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3	Differential and Driveline
5	Brakes
5a	Brakes
7	Cooling System
8A	Battery
8B	Starting Systems
8C	Charging System
8D	Ignition System
8E	Instrument Panel and Systems
8Ea	Instrument Panel and Systems
8F	Audio Systems
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8K	Wiper and Washer Systems
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INTRODUCTION

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DESCRIPTION AND OPERATION

VEHICLE SAFETY CERTIFICATION LABEL

DESCRIPTION

A vehicle safety certification label is attached to the left side of B-pillar or on the rearward facing of the front door (Fig. 1). This label indicates date of manufacture (month and year), Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR) front, Gross Axle Weight Rating (GAWR) rear and the Vehicle Identification Number (VIN). The Month, Day and Hour of manufacture is also included.

All communications or inquiries regarding the vehicle should include the Month-Day-Hour and Vehicle Identification Number.

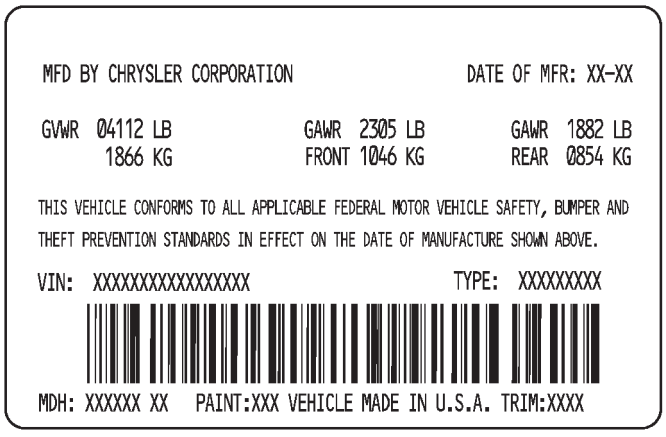


Fig. 1 Vehicle Safety Certification Label

VEHICLE IDENTIFICATION NUMBER

DESCRIPTION

The Vehicle Identification Number (VIN) is located on the upper left corner of the upper plenum, near the left windshield pillar (Fig. 2). The VIN consists of 17 characters in a combination of letters and numbers that provide specific information about the vehicle. Refer to VIN Code Breakdown table for decoding information.

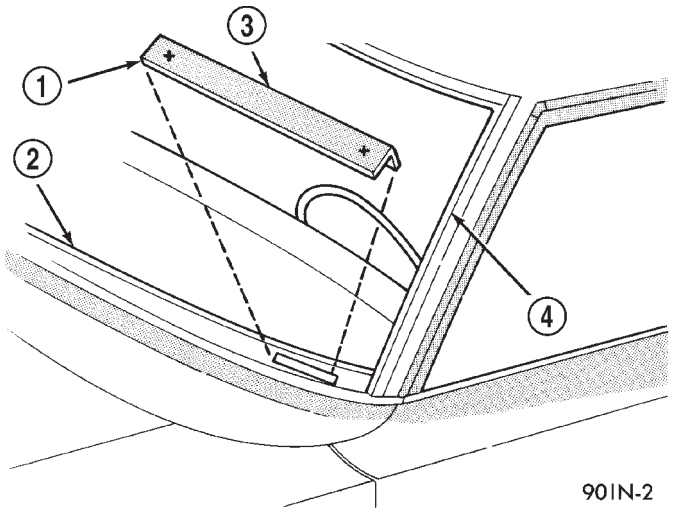


Fig. 2 Vehicle Identification Number (VIN Plate)

1 – V. I. N. PLATE
2 – DASH PANEL
3 – 17 DIGITS
4 – WINDSHIELD OPENING

DESCRIPTION AND OPERATION (Continued)

VIN CODE BREAKDOWN

POSITION	INTERPRETATION	CODE = DESCRIPTION
1	Country of Origin	2 = Built in Canada by Chrysler Canada Ltd.
2	Make	B = Dodge C = Chrysler
3	Vehicle Type	3 = Passenger Car
4	Passenger Safety	H = Restraint System - Active Driver and Passenger Air Bags
5	Car Line	C = Chrysler, LHS D = Chrysler, Concorde E = Chrysler, 300M F = Chrysler Intrepid R/T (Canada) H = Chrysler, Intrepid (Canada & Mexico) D = Dodge, Intrepid (U. S. A.) F = Dodge, Intrepid R/T (U. S. A. & Mexico
6	Series	3 = Medium 4 = High Line 5 = Premium 6 = Sport X = Special
7	Body Style	6 = 4 Door Sedan
8	Engine	G = 3.5L V6 Cyl 24 Valve Gasoline SOHC J = 3.2L V6 Cyl 24 Valve Gasoline SOHC R = 2.7L V6 Cyl 24 Valve Gasoline DOHC U = 2.7L V6 Cyl 24 Valve Gasoline DOHC V = 2.7L V6 Cyl 24 Valve Gasoline DOHC
9	Check Digit	0 through 9 or X
10	Model Year	Y = 2000
11	Assembly Plant	H = Bramelea Assembly
12 through 17	Sequence Number	Six digit number assigned by assembly plant

VIN CHECK DIGIT

DESCRIPTION

To protect the consumer from theft and possible fraud the manufacturer is required to include a Check Digit at the ninth position of the Vehicle Identification Number. The check digit is used by the manufacturer and government agencies to verify the authenticity of the vehicle and official documentation. The formula to use the check digit is not released to the general public.

BODY CODE PLATE

LOCATION AND DECODING

DESCRIPTION

The Body Code Plate (Fig. 3) is located in the engine compartment on the battery tray front side (Fig. 4). There are seven lines of information on the body code plate. Lines 4, 5, 6, and 7 are not used to define service information. Information reads from left to right, starting with line 3 in the center of the plate to line 1 at the bottom of the plate.

DESCRIPTION AND OPERATION (Continued)

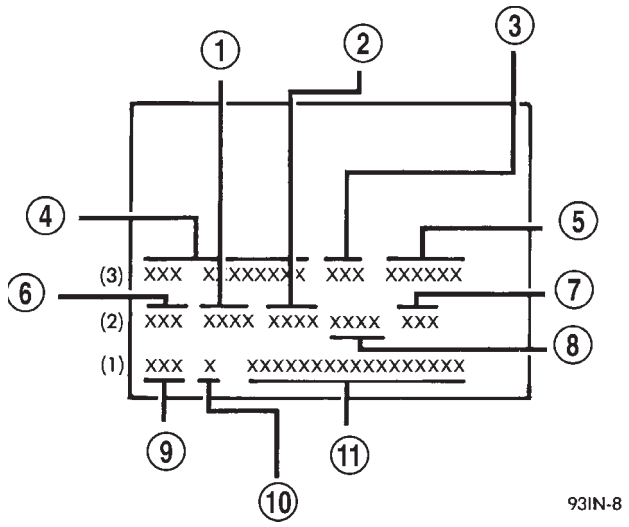


Fig. 3 Body Code Plate

1 – PRIMARY PAINT
2 – SECONDARY PAINT
3 – VINYL ROOF
4 – VEHICLE ORDER NUMBER
5 – CAR LINE SHELL
6 – PAINT PROCEDURE
7 – ENGINE
8 – TRIM
9 – TRANSMISSION
10 – MARKET
11 – VIN

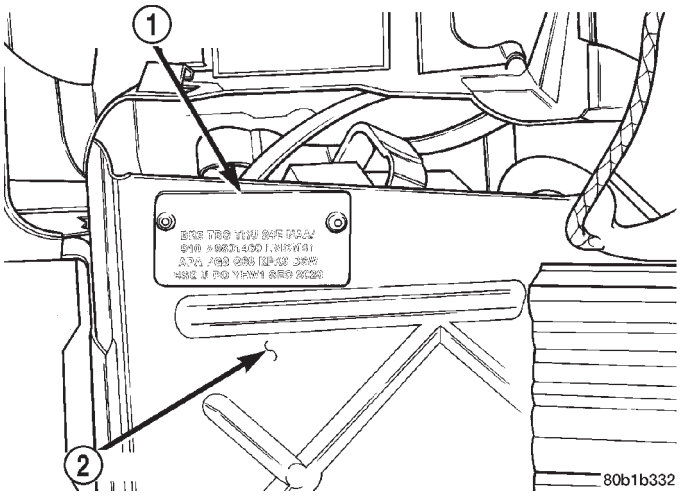


Fig. 4 Body Code Plate Location

1 – BODY COPY PLATE
2 – BATTERY TRAY

BODY CODE PLATE LINE 3

DIGITS 1, 2, AND 3
Paint procedure

DIGIT 4
Open Space

DIGITS 5 THROUGH 7
Primary paint
See Group 23, Body for color codes.

DIGIT 8 AND 9
Open Space

DIGITS 10 THROUGH 12
Secondary Paint

DIGIT 13 AND 14
Open Space

DIGITS 15 THROUGH 18
Interior Trim Code

DIGIT 19
Open Space

DIGITS 20, 21, AND 22
Engine Code
- EER = 2.7 L, Six Cylinder, 24 Valve, DOHC, Gasoline, Aluminum Block
- EGW = 3.2 L, Six Cylinder, 24 Valve, SOHC, Gasoline, Aluminum Block
- EGG = 3.5 L, Six Cylinder, 24 Valve, SOHC, Gasoline, Aluminum Block
- EES = 2.7 L, Six Cylinder, 24 Valve, DOHC, Gasoline, Aluminum Block
- ECG = 3.5 L, Six Cylinder, 24 Valve, SOHC, Gasoline, Aluminum Block

DIGIT 23
Open Space

BODY CODE PLATE – LINE 2

DIGITS 1 THROUGH 12
Vehicle Order Number

DIGITS 13, THROUGH 15
Vinyl Roof Code

DIGITS 16 AND 17
Open space

DIGITS 18 AND 19
Vehicle Shell Line
- LH

DIGITS 20
Carline
- C = Chrysler
- D = Dodge

DESCRIPTION AND OPERATION (Continued)

- Y = Chrysler

DIGIT 21

Price Class
- E = Economy
- H = High Line
- L = Low Line
- M = Mid Line
- P = Premium
- S = Special/Sport
- X = Performance Image

DIGITS 22 AND 23

Body Type
- 41 = Four Door Sedan

BODY CODE PLATE LINE 1

DIGITS 1, 2, AND 3

Transaxle Codes
- DGX = 42LE four speed Electronic Automatic Transaxle

DIGIT 4

Open Space

DIGIT 5

Market Code
- C = Canada
- B = International
- M = Mexico
- U = United States

DIGIT 6

Open Space

DIGITS 7 THROUGH 23

Vehicle Identification Number
- Refer to Vehicle Identification Number (VIN) paragraph for proper breakdown of VIN code.

IF TWO BODY CODE PLATES ARE REQUIRED

The last code shown on either plate will be followed by END. When two plates are required, the last code space on the first plate will indicate (CTD)

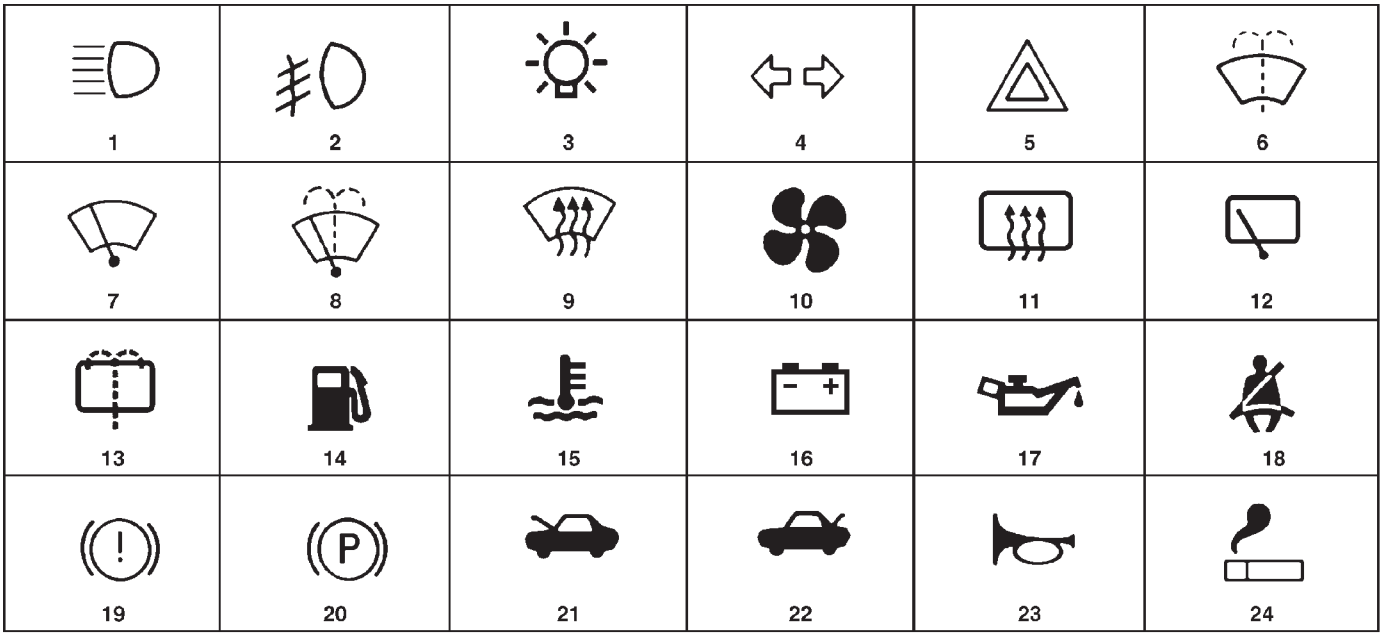
When a second plate is required, the first four spaces of each line will not be used due to overlap of the plates.

INTERNATIONAL SYMBOLS

DESCRIPTION

The graphic symbols illustrated in the following International Control and Display Symbols Chart are used to identify various instrument controls. The symbols correspond to the controls and displays that are located on the instrument panel.

DESCRIPTION AND OPERATION (Continued)



80be4788

1	High Beam	13	Rear Window Washer
2	Fog Lamps	14	Fuel
3	Headlamp, Parking Lamps, Panel Lamps	15	Engine Coolant Temperature
4	Turn Warning	16	Battery Charging Condition
5	Hazard Warning	17	Engine Oil
6	Windshield Washer	18	Seat Belt
7	Windshield Wiper	19	Brake Failure
8	Windshield Wiper and Washer	20	Parking Brake
9	Windscreen Demisting and Defrosting	21	Front Hood
10	Ventilating Fan	22	Rear hood (Decklid)
11	Rear Window Defogger	23	Horn
12	Rear Window Wiper	24	Lighter

FASTENER IDENTIFICATION

DESCRIPTION

GRADE/CLASS IDENTIFICATION

The SAE bolt strength grades range from grade 2 to grade 8. The higher the grade number, the greater the bolt strength. Identification is determined by the line marks on the top of each bolt head. The actual bolt strength grade corresponds to the number of line marks plus 2. The most commonly used metric bolt strength classes are 9.8 and 10.9. The metric strength class identification number is imprinted on the head of the bolt. The higher the class number, the greater the bolt strength. Some metric nuts are imprinted with a single-digit strength class on the nut face. Refer to the Fastener Identification and Fastener Strength Charts.

FASTENER USAGE

DESCRIPTION

WARNING: USE OF AN INCORRECT FASTENER MAY RESULT IN COMPONENT DAMAGE OR PERSONAL INJURY.

Figure art, specifications and tightening torque references in this manual are identified in metric and SAE format.

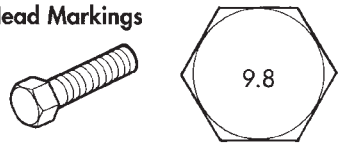
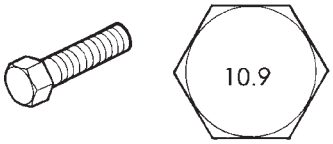
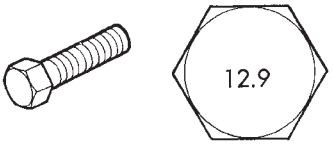
During any maintenance or repair procedures, it is important to salvage all fasteners (nuts, bolts, etc.) for reassembly. If the fastener is not salvageable, a fastener of equivalent specification must be use.

DESCRIPTION AND OPERATION (Continued)

FASTENER IDENTIFICATION

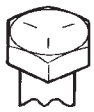
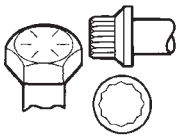
Bolt Markings and Torque - Metric

Commercial Steel Class

	9.8	10.9	12.9
Bolt Head Markings			

Body Size	Torque				Torque				Torque			
Diam.	Cast Iron		Aluminum		Cast Iron		Aluminum		Cast Iron		Aluminum	
mm	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
6	9	5	7	4	14	9	11	7	14	9	11	7
7	14	9	11	7	18	14	14	11	23	18	18	14
8	25	18	18	14	32	23	25	18	36	27	28	21
10	40	30	30	25	60	45	45	35	70	50	55	40
12	70	55	55	40	105	75	80	60	125	95	100	75
14	115	85	90	65	160	120	125	95	195	145	150	110
16	180	130	140	100	240	175	190	135	290	210	220	165
18	230	170	180	135	320	240	250	185	400	290	310	230

Bolt Markings and Torque Values - U.S. Customary

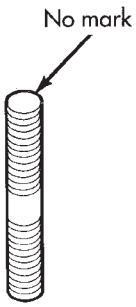
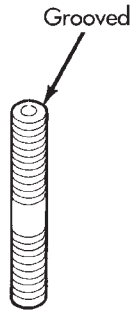
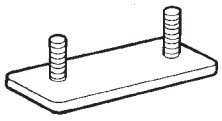
SAE Grade Number	5	8
Bolt Head Markings These are all SAE Grade 5 (3) line	 	

Body Size	Bolt Torque - Grade 5 Bolt				Bolt Torque - Grade 8 Bolt			
	Cast Iron		Aluminum		Cast Iron		Aluminum	
	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
1/4 - 20	9	7	8	6	15	11	12	9
- 28	12	9	9	7	18	13	14	10
5/16 - 18	20	15	16	12	30	22	24	18
- 24	23	17	19	14	33	24	25	19
3/8 - 16	40	30	25	20	55	40	40	30
- 24	40	30	35	25	60	45	45	35
7/16 - 14	60	45	45	35	90	65	65	50
- 20	65	50	55	40	95	70	75	55
1/2 - 13	95	70	75	55	130	95	100	75
- 20	100	75	80	60	150	110	120	90
9/16 - 12	135	100	110	80	190	140	150	110
- 18	150	110	115	85	210	155	170	125
5/8 - 11	180	135	150	110	255	190	205	150
- 18	210	155	160	120	290	215	230	170
3/4 - 10	325	240	255	190	460	340	365	270
- 16	365	270	285	210	515	380	410	300
7/8 - 9	490	360	380	280	745	550	600	440
- 14	530	390	420	310	825	610	660	490
1 - 8	720	530	570	420	1100	820	890	660
- 14	800	590	650	480	1200	890	960	710

DESCRIPTION AND OPERATION (Continued)

FASTENER STRENGTH

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4 — 4T; 5 — 5T; 6 — 6T; 7 — 7T; 8 — 8T; 9 — 9T; 10 — 10T; 11 — 11T		Stud bolt	 No mark	4T
	 No mark	4T			
Hexagon flange bolt w/washer hexagon bolt	 No mark	4T		 Grooved	6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/washer hexagon bolt	 Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 Three protruding lines	7T			
Hexagon head bolt	 Four protruding lines	8T			

DESCRIPTION AND OPERATION (Continued)

THREADED HOLE REPAIR

DESCRIPTION

Most stripped threaded holes can be repaired using a Helicoil ®. Follow the manufacture recommendation for application and repair procedures.

METRIC SYSTEM

DESCRIPTION

The metric system is based on quantities of one, ten, one hundred, one thousand and one million.

The following chart will assist in converting metric units to equivalent English and SAE units, or vise versa.

CONVERSION FORMULAS AND EQUIVALENT VALUES

MULTIPLY	BY	TO GET	MULTIPLY	BY	TO GET
in-lbs	x 0.11298	= Newton Meters (N·m)	N·m	x 8.851	= in-lbs
ft-lbs	x 1.3558	= Newton Meters (N·m)	N·m	x 0.7376	= ft-lbs
Inches Hg (60° F)	x 3.377	= Kilopascals (kPa)	kPa	x 0.2961	= Inches Hg
psi	x 6.895	= Kilopascals (kPa)	kPa	x 0.145	= psi
Inches	x 25.4	= Millimeters (mm)	mm	x 0.03937	= Inches
Feet	x 0.3048	= Meters (M)	M	x 3.281	= Feet
Yards	x 0.9144	= Meters	M	x 1.0936	= Yards
mph	x 1.6093	= Kilometers/Hr. (Km/h)	Km/h	x 0.6214	= mph
Feet/Sec	x 0.3048	= Meters/Sec (M/S)	M/S	x 3.281	= Feet/Sec
mph	x 0.4470	= Meters/Sec (M/S)	M/S	x 2.237	= mph
Kilometers/ Hr. (Km/h)	x 0.27778	= Meters/Sec (M/S)	M/S	x 3.600	Kilometers/Hr. (Km/h)

COMMON METRIC EQUIVALENTS

1 inch = 25 Millimeters	1 Cubic Inch = 16 Cubic Centimeters
1 Foot = 0.3 Meter	1 Cubic Foot = 0.03 Cubic Meter
1 Yard = 0.9 Meter	1 Cubic Yard = 0.8 Cubic Meter
1 Mile = 1.6 Kilometers	

Refer to the Metric Conversion Chart to convert torque values listed in metric Newton- meters (N·m). Also, use the chart to convert between millimeters (mm) and inches (in.)

TORQUE REFERENCES

DESCRIPTION

Individual Torque Charts appear at the end of many Groups. Refer to the Standard Torque Specifications Chart for torque references not listed in the individual torque charts.

DESCRIPTION AND OPERATION (Continued)

METRIC CONVERSION CHART

in-lbs to N•m

in- lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m
2	.2260	42	4.7453	82	9.2646	122	13.7839	162	18.3032
4	.4519	44	4.9713	84	9.4906	124	14.0099	164	18.5292
6	.6779	46	5.1972	86	9.7165	126	14.2359	166	18.7552
8	.9039	48	5.4232	88	9.9425	128	14.4618	168	18.9811
10	1.1298	50	5.6492	90	10.1685	130	14.6878	170	19.2071
12	1.3558	52	5.8751	92	10.3944	132	14.9138	172	19.4331
14	1.5818	54	6.1011	94	10.6204	134	15.1397	174	19.6590
16	1.8077	56	6.3270	96	10.8464	136	15.3657	176	19.8850
18	2.0337	58	6.5530	98	11.0723	138	15.5917	178	20.1110
20	2.2597	60	6.7790	100	11.2983	140	15.8176	180	20.3369
22	2.4856	62	7.0049	102	11.5243	142	16.0436	182	20.5629
24	2.7116	64	7.2309	104	11.7502	144	16.2696	184	20.7889
26	2.9376	66	7.4569	106	11.9762	146	16.4955	186	21.0148
28	3.1635	68	7.6828	108	12.2022	148	16.7215	188	21.2408
30	3.3895	70	7.9088	110	12.4281	150	16.9475	190	21.4668
32	3.6155	72	8.1348	112	12.6541	152	17.1734	192	21.6927
34	3.8414	74	8.3607	114	12.8801	154	17.3994	194	21.9187
36	4.0674	76	8.5867	116	13.1060	156	17.6253	196	22.1447
38	4.2934	78	8.8127	118	13.3320	158	17.8513	198	22.3706
40	4.5193	80	9.0386	120	13.5580	160	18.0773	200	22.5966

N•m to in-lbs

N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb	N•m	in-lb
.2	1.7702	4.2	37.1747	8.2	72.5792	12.2	107.9837	16.2	143.3882
.4	3.5404	4.4	38.9449	8.4	74.3494	12.4	109.7539	16.4	145.1584
.6	5.3107	4.6	40.7152	8.6	76.1197	12.6	111.5242	16.6	146.9287
.8	7.0809	4.8	42.4854	8.8	77.8899	12.8	113.2944	16.8	148.6989
1	8.8511	5	44.2556	9	79.6601	13	115.0646	17	150.4691
1.2	10.6213	5.2	46.0258	9.2	81.4303	13.2	116.8348	17.2	152.2393
1.4	12.3916	5.4	47.7961	9.4	83.2006	13.4	118.6051	17.4	154.0096
1.6	14.1618	5.6	49.5663	9.6	84.9708	13.6	120.3753	17.6	155.7798
1.8	15.9320	5.8	51.3365	9.8	86.7410	13.8	122.1455	17.8	157.5500
2	17.7022	6	53.1067	10	88.5112	14	123.9157	18	159.3202
2.2	19.4725	6.2	54.8770	10.2	90.2815	14.2	125.6860	18.5	163.7458
2.4	21.2427	6.4	56.6472	10.4	92.0517	14.4	127.4562	19	168.1714
2.6	23.0129	6.6	58.4174	10.6	93.8219	14.6	129.2264	19.5	172.5970
2.8	24.7831	6.8	60.1876	10.8	95.5921	14.8	130.9966	20	177.0225
3	26.5534	7	61.9579	11	97.3624	15	132.7669	20.5	181.4480
3.2	28.3236	7.2	63.7281	11.2	99.1326	15.2	134.5371	21	185.8736
3.4	30.0938	7.4	65.4983	11.4	100.9028	15.4	136.3073	22	194.7247
3.6	31.8640	7.6	67.2685	11.6	102.6730	15.6	138.0775	23	203.5759
3.8	33.6342	7.8	69.0388	11.8	104.4433	15.8	139.8478	24	212.4270
4	35.4045	8	70.8090	12	106.2135	16	141.6180	25	221.2781

ft-lbs to N•m

ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m
1	1.3558	21	28.4722	41	55.5885	61	82.7049	81	109.8212
2	2.7116	22	29.8280	42	56.9444	62	84.0607	82	111.1770
3	4.0675	23	31.1838	43	58.3002	63	85.4165	83	112.5328
4	5.4233	24	32.5396	44	59.6560	64	86.7723	84	113.8888
5	6.7791	25	33.8954	45	61.0118	65	88.1281	85	115.2446
6	8.1349	26	35.2513	46	62.3676	66	89.4840	86	116.6004
7	9.4907	27	36.6071	47	63.7234	67	90.8398	87	117.9562
8	10.8465	28	37.9629	48	65.0793	68	92.1956	88	119.3120
9	12.2024	29	39.3187	49	66.4351	69	93.5514	89	120.6678
10	13.5582	30	40.6745	50	67.7909	70	94.9073	90	122.0236
11	14.9140	31	42.0304	51	69.1467	71	96.2631	91	123.3794
12	16.2698	32	43.3862	52	70.5025	72	97.6189	92	124.7352
13	17.6256	33	44.7420	53	71.8583	73	98.9747	93	126.0910
14	18.9815	34	46.0978	54	73.2142	74	100.3316	94	127.4468
15	20.3373	35	47.4536	55	74.5700	75	101.6862	95	128.8026
16	21.6931	36	48.8094	56	75.9258	76	103.0422	96	130.1586
17	23.0489	37	50.1653	57	77.2816	77	104.3980	97	131.5144
18	24.4047	38	51.5211	58	78.6374	78	105.7538	98	132.8702
19	25.7605	39	52.8769	59	79.9933	79	107.1196	99	134.2260
20	27.1164	40	54.2327	60	81.3491	80	108.4654	100	135.5820

N•m to ft-lbs

N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
1	.7376	21	15.9888	41	30.2400	61	44.9913	81	59.7425
2	1.4751	22	16.2264	42	30.9776	62	45.7289	82	60.4801
3	2.2127	23	16.9639	43	31.7152	63	46.4664	83	61.2177
4	2.9502	24	17.7015	44	32.4527	64	47.2040	84	61.9552
5	3.6878	25	18.4391	45	33.1903	65	47.9415	85	62.6928
6	4.4254	26	19.1766	46	33.9279	66	48.6791	86	63.4303
7	5.1629	27	19.9142	47	34.6654	67	49.4167	87	64.1679
8	5.9005	28	20.6517	48	35.4030	68	50.1542	88	64.9545
9	6.6381	29	21.3893	49	36.1405	69	50.8918	89	65.6430
10	7.3756	30	22.1269	50	36.8781	70	51.6293	90	66.3806
11	8.1132	31	22.8644	51	37.6157	71	52.3669	91	67.1181
12	8.8507	32	23.6020	52	38.3532	72	53.1045	92	67.8557
13	9.5883	33	24.3395	53	39.0908	73	53.8420	93	68.5933
14	10.3259	34	25.0771	54	39.8284	74	54.5720	94	69.3308
15	11.0634	35	25.8147	55	40.5659	75	55.3172	95	70.0684
16	11.8010	36	26.5522	56	41.3035	76	56.0547	96	70.8060
17	12.5386	37	27.2898	57	42.0410	77	56.7923	97	71.5435
18	13.2761	38	28.0274	58	42.7786	78	57.5298	98	72.2811
19	14.0137	39	28.7649	59	43.5162	79	58.2674	99	73.0187
20	14.7512	40	29.5025	60	44.2537	80	59.0050	100	73.7562

in. to mm

in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
.01	.254	.21	5.334	.41	10.414	.61	15.494	.81	20.574
.02	.508	.22	5.588	.42	10.668	.62	15.748	.82	20.828
.03	.762	.23	5.842	.43	10.922	.63	16.002	.83	21.082
.04	1.016	.24	6.096	.44	11.176	.64	16.256	.84	21.336
.05	1.270	.25	6.350	.45	11.430	.65	16.510	.85	21.590
.06	1.524	.26	6.604	.46	11.684	.66	16.764	.86	21.844
.07	1.778	.27	6.858	.47	11.938	.67	17.018	.87	22.098
.08	2.032	.28	7.112	.48	12.192	.68	17.272	.88	22.352
.09	2.286	.29	7.366	.49	12.446	.69	17.526	.89	22.606
.10	2.540	.30	7.620	.50	12.700	.70	17.780	.90	22.860
.11	2.794	.31	7.874	.51	12.954	.71	18.034	.91	23.114
.12	3.048	.32	8.128	.52	13.208	.72	18.288	.92	23.368
.13	3.302	.33	8.382	.53	13.462	.73	18.542	.93	23.622
.14	3.556	.34	8.636	.54	13.716	.74	18.796	.94	23.876
.15	3.810	.35	8.890	.55	13.970	.75	19.050	.95	24.130
.16	4.064	.36	9.144	.56	14.224	.76	19.304	.96	24.384
.17	3.318	.37	9.398	.57	14.478	.77	19.558	.97	24.638
.18	4.572	.38	9.652	.58	14.732	.78	19.812	.98	24.892
.19	4.826	.39	9.906	.59	14.986	.79	20.066	.99	25.146
.20	5.080	.40	10.160	.60	15.240	.80	20.320	1.00	25.400

mm to in.

mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
.01	.00039	.21	.00827	.41	.01614	.61	.02402	.81	.03189
.02	.00079	.22	.00866	.42	.01654	.62	.02441	.82	.03228
.03	.00118	.23	.00906	.43	.01693	.63	.02480	.83	.03268
.04	.00157	.24	.00945	.44	.01732	.64	.02520	.84	.03307
.05	.00197	.25	.00984	.45	.01772	.65	.02559	.85	.03346
.06	.00236	.26	.01024	.46	.01811	.66	.02598	.86	.03386
.07	.00276	.27	.01063	.47	.01850	.67	.02638	.87	.03425
.08	.00315	.28	.01102	.48	.01890	.68	.02677	.88	.03465
.09	.00354	.29	.01142	.49	.01929	.69	.02717	.89	.03504
.10	.00394	.30	.01181	.50	.01969	.70	.02756	.90	.03543
.11	.00433	.31	.01220	.51	.02008	.71	.02795	.91	.03583
.12	.00472	.32	.01260	.52	.02047	.72	.02835	.92	.03622
.13	.00512	.33	.01299	.53	.02087	.73	.02874	.93	.03661
.14	.00551	.34	.01339	.54	.02126	.74	.02913	.94	.03701
.15	.00591	.35	.01378	.55	.02165	.75	.02953	.95	.03740
.16	.00630	.36	.01417	.56	.02205	.76	.02992	.96	.03780
.17	.00669	.37	.01457	.57	.02244	.77	.03032	.97	.03819
.18	.00709	.38	.01496	.58	.02283	.78	.03071	.98	.03858
.19	.00748	.39	.01535	.59	.02323	.79	.03110	.99	.03898
.20	.00787	.40	.01575	.60	.02362	.80	.03150	1.00	.03937

DESCRIPTION AND OPERATION (Continued)

TORQUE SPECIFICATIONS

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N•m	kgf-cm	ft-lbf	N•m	kgf-cm	ft-lbf
4T	6	1	5	55	48 in.-lbf	6	60	52 in.-lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	—	—	—
5T	6	1	6.5	65	56 in.-lbf	7.5	75	65 in.-lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	—	—	—
6T	6	1	8	80	69 in.-lbf	9	90	78 in.-lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	—	—	—
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	—	—	—
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

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VIN CHECK DIGIT 2
BODY CODE PLATE 2
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DESCRIPTION AND OPERATION

E-MARK LABEL

DESCRIPTION

An E-mark Label (Fig. 1) is located on the rear shut face of the driver's door. The label contains the following information:

- Date of Manufacture
- Month-Day-Hour (MDH)
- Vehicle Identification Number (VIN)
- Country Codes
- Regulation Number
- Regulation Amendment Number
- Approval Number

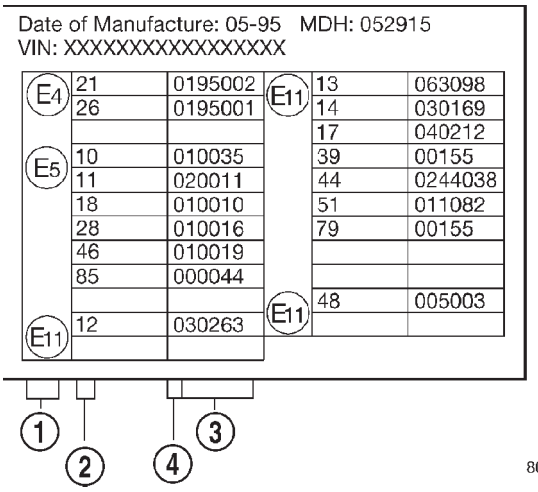


Fig. 1 E-Mark Label

1 – Country Code
2 – Regulation Number
3 – Approval Number
4 – Amendment Number

VEHICLE IDENTIFICATION NUMBER

DESCRIPTION

The Vehicle Identification Number (VIN) is located on the upper left corner of the instrument panel, near the left windshield pillar (Fig. 2). The VIN consists of 17 characters in a combination of letters and numbers that provide specific information about the vehicle. Refer to VIN Code Breakdown table for decoding information.

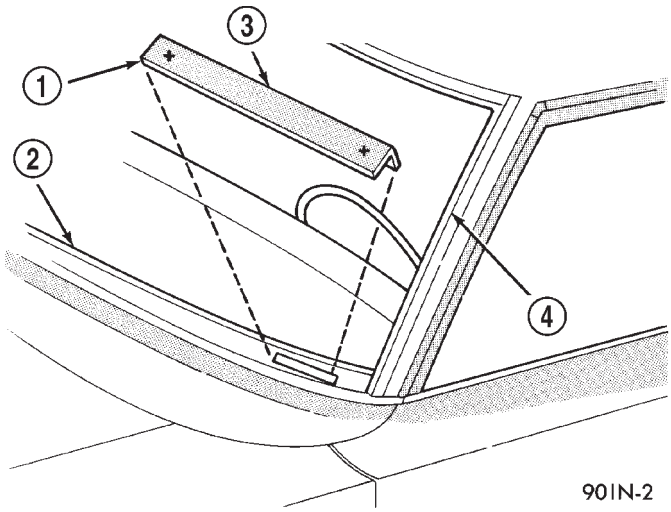


Fig. 2 Vehicle Identification Number (VIN Plate)

1 – V. I. N. PLATE
2 – DASH PANEL
3 – 17 DIGITS
4 – WINDSHIELD OPENING

DESCRIPTION AND OPERATION (Continued)

VIN DECODING INFORMATION

POSITION	INTERPRETATION	CODE = DESCRIPTION
1	Country of Origin	2 = Built in Canada by Chrysler Canada Ltd.
2	Make	C = Chrysler
3	Vehicle Type	3 = Passenger Car
4	Passenger Safety	H = Restraint System - Active Driver and Passenger Air Bags
5	Car Line	C = LHS D = Concorde E = 300M
6	Series	4 = High Line 5 = Premium 6 = Sport
7	Body Style	6 = 4 Door Sedan
8	Engine	G = 3.5L 6 Cyl 24 Valve Gasoline SOHC High Output U = 2.7L V-6 DOHC 24V Gasoline
9	Check Digit	See explanation in this section.
10	Model Year	Y = 2000
11	Assembly Plant	H = Bramelea Assembly
12 through 17	Sequence Number	6 digit number assigned by assembly plant.

VIN CHECK DIGIT

DESCRIPTION

To protect the consumer from theft and possible fraud the manufacturer is required to include a Check Digit at the ninth position of the Vehicle Identification Number. The check digit is used by the manufacturer and government agencies to verify the authenticity of the vehicle and official documentation. The formula to use the check digit is not released to the general public.

BODY CODE PLATE

DESCRIPTION

The Body Code Plate (Fig. 3) is located in the engine compartment on the battery tray front side (Fig. 4). There are seven lines of information on the body code plate. Lines 4, 5, 6, and 7 are not used to define service information. Information reads from left to right, starting with line 3 in the center of the plate to line 1 at the bottom of the plate.

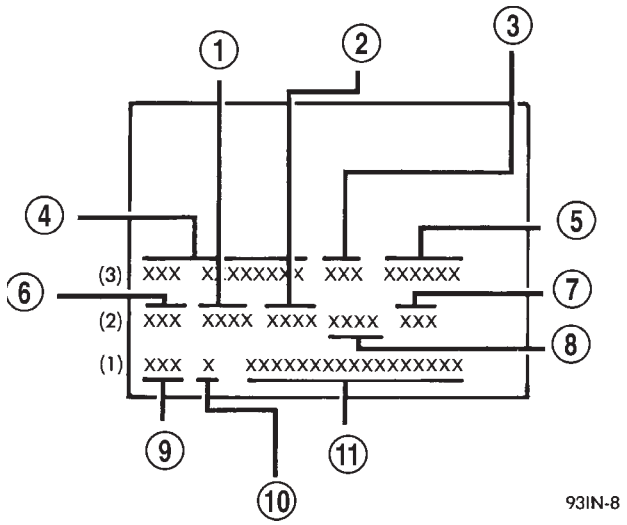


Fig. 3 Body Code Plate

1 – PRIMARY PAINT
2 – SECONDARY PAINT
3 – VINYL ROOF
4 – VEHICLE ORDER NUMBER
5 – CAR LINE SHELL
6 – PAINT PROCEDURE
7 – ENGINE
8 – TRIM
9 – TRANSMISSION
10 – MARKET
11 – VIN

DESCRIPTION AND OPERATION (Continued)

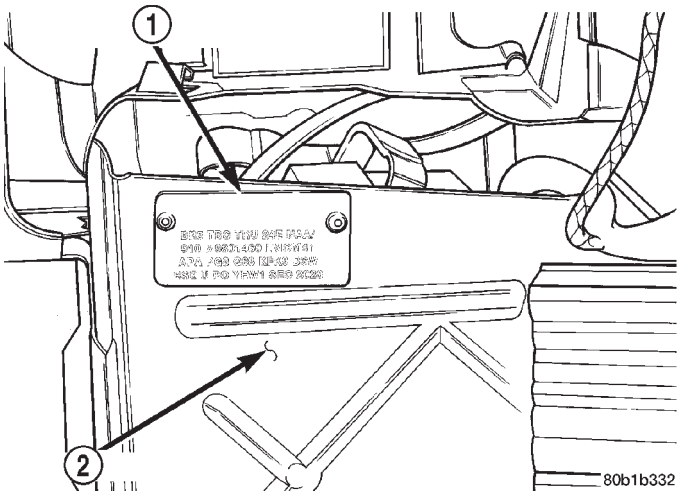


Fig. 4 Body Code Plate Location

1 – BODY COPY PLATE
2 – BATTERY TRAY

BODY CODE PLATE – LINE 3

DIGITS 1 THROUGH 12
Vehicle Order Number

DIGITS 13, THROUGH 15
Vinyl Roof Code

DIGITS 16 AND 17
Open space

DIGITS 18 AND 19
Vehicle Shell Line
- LH

DIGITS 20
Carline
- C = Chrysler
- Y = Chrysler

DIGIT 21
Price Class
- E = Economy
- H = High Line
- L = Low Line
- M = Mid Line
- P = Premium
- S = Special/Sport
- X = Performance Image

DIGITS 22 AND 23
Body Type
- 41 = Four Door Sedan

BODY CODE PLATE LINE 2

DIGITS 1, 2, AND 3
Paint procedure

DIGIT 4
Open Space

DIGITS 5 THROUGH 7
Primary paint
See Group 23, Body for color codes.

DIGITS 8 and 9
Open Space

DIGITS 10 THROUGH 12
Secondary Paint

DIGITS 13 and 14
Open Space

DIGITS 15 THROUGH 18
Interior Trim Code

DIGIT 19
Open Space

DIGITS 20, 21, AND 22
Engine Code
- EER = 2.7 L, Six Cylinder, 24 Valve, DOHC, Gasoline, Aluminum Block
- EGG = 3.5 L, Six Cylinder, 24 Valve, SOHC, Gasoline, Aluminum Block

DIGIT 23
Open Space

BODY CODE PLATE LINE 1

DIGITS 1, 2, AND 3
Transaxle Codes
- DGX = 42LE four speed Electronic Automatic Transaxle

DIGIT 4
Open Space

DIGIT 5
Market Code
- B = International

DIGIT 6
Open Space

DIGITS 7 THROUGH 23
Vehicle Identification Number

DESCRIPTION AND OPERATION (Continued)

- Refer to Vehicle Identification Number (VIN) paragraph for proper breakdown of VIN code.

IF TWO BODY CODE PLATES ARE REQUIRED

The last code shown on either plate will be followed by END. When two plates are required, the last code space on the first plate will indicate (CTD)

When a second plate is required, the first four spaces of each line will not be used due to overlap of the plates.

MANUFACTURER PLATE

The Manufacturer Plate is located in the engine compartment on the radiator closure panel crossmember adjacent to the Body Code Plate. The plate contains five lines of information:

1. Vehicle Identification Number (VIN)
2. Gross Vehicle Mass (GVM)
3. Gross Train Mass (GTM)
4. Gross Front Axle Rating (GFAR)
5. Gross Rear Axle Rating (GRAR)

LUBRICATION AND MAINTENANCE

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LUBRICANTS

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SERVICE PROCEDURES

PARTS AND LUBRICANT RECOMMENDATIONS

When service is required, DaimlerChrysler Motor Corporation recommends that only Mopar® brand parts, lubricants and chemicals be used. Mopar provides the best engineered products for servicing DaimlerChrysler Corporation vehicles.

ENGINE COOLANT

The green and the orange engine coolant MUST NOT BE MIXED. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CLASSIFICATION OF LUBRICANTS

Only lubricants bearing designations defined by the following organization should be used to service a DaimlerChrysler Corporation vehicle.

- Society of Automotive Engineers (SAE)
- American Petroleum Institute (API) (Fig. 1)
- National Lubricating Grease Institute (NLGI) (Fig. 2)

SAE VISCOSITY RATING

An SAE viscosity grade is used to specify the viscosity of engine oil. Engine oils also have multiple viscosities. These are specified with a dual SAE viscosity grade which indicates the cold-to-hot temperature viscosity range.

- SAE 30 = single grade engine oil.
- SAE 10W-30 = multiple grade engine oil.

DaimlerChrysler Corporation only recommends multiple grade engine oils.

API QUALITY CLASSIFICATION

This symbol (Fig. 1) on the front of an oil container means that the oil has been certified by the American Petroleum Institute (API) to meet all the lubrication requirements specified by DaimlerChrysler Corporation.

Refer to Group 9, Engine for gasoline engine oil specification.



9400-9

Fig. 1 API Symbol

GEAR LUBRICANTS

SAE ratings also apply to multiple grade gear lubricants. In addition, API classification defines the

SERVICE PROCEDURES (Continued)

lubricants usage. Such as API GL-5 and SAE 80W-90.

LUBRICANTS AND GREASES

Lubricating grease is rated for quality and usage by the NLGI. All approved products have the NLGI symbol (Fig. 2) on the label. At the bottom NLGI symbol is the usage and quality identification letters. Wheel bearing lubricant is identified by the letter "G". Chassis lubricant is identified by the latter "L". The letter following the usage letter indicates the quality of the lubricant. The following symbols indicate the highest quality.

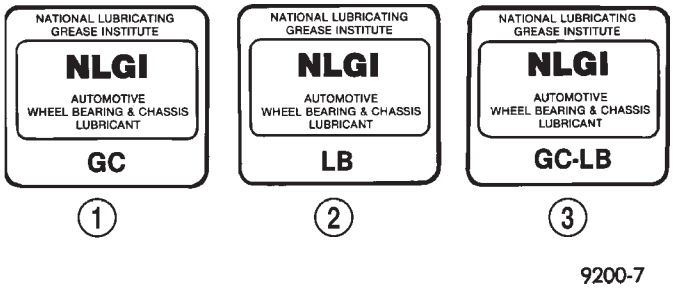


Fig. 2 NLGI Symbol

1 – WHEEL BEARINGS
2 – CHASSIS LUBRICATION
3 – CHASSIS AND WHEEL BEARINGS

INTERNATIONAL SYMBOLS

DaimlerChrysler Corporation uses international symbols to identify engine compartment lubricant and fluid check and fill locations (Fig. 3).

FLUID CHECK/FILL POINTS AND LUBRICATION LOCATIONS

The fluid check/fill points and lubrication locations are located in each applicable Sections.

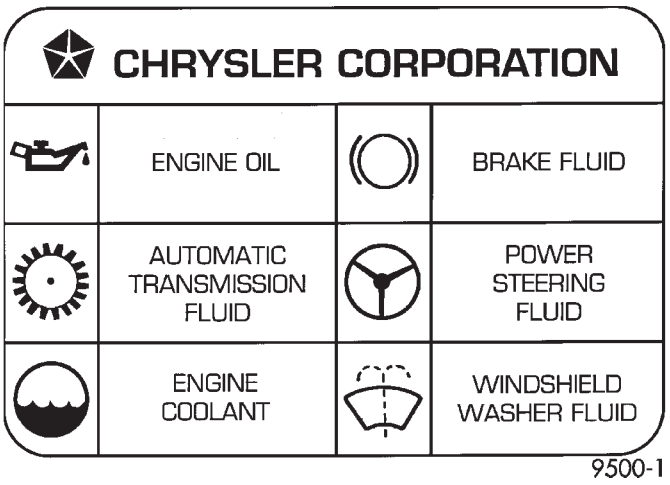


Fig. 3 International Symbols

LUBRICATION POINT LOCATIONS

Lubrication point locations are located in each applicable Sections.

SPECIFICATIONS

FLUID CAPACITIES

Fuel Tank	68 L (18 gal.)
Engine Oil – 2.7 L Engine with Oil Filter	4.7 L (5.0 qts.)
Engine Oil – 3.2 L Engine with Oil Filter	4.7 L (5.0 qts.)
Engine Oil – 3.5 L Engine with Oil Filter	4.7 L (5.0 qts.)
Cooling System – 2.7 L Engine	8.9 L (9.4 qts.)
Cooling System – 3.2 L Engine	8.9 L (9.4 qts.)
Cooling System – 3.5 L Engine	8.9 L (9.4 qts.)
Automatic Transaxle – Estimated Service Fill	4.3 L (4.5 qts.)
Automatic Transaxle – Overhaul Fill Capacity with Torque Converter Empty	9.4 L (9.9 qts.)
Differential	0.95 L (1 qt.)

MAINTENANCE SCHEDULES

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DESCRIPTION AND OPERATION

MAINTENANCE SCHEDULES

DESCRIPTION

There are two maintenance schedules that show proper service for your vehicle.

Schedule **"A"**. It lists all the scheduled maintenance to be performed under "normal" operating conditions.

Schedule **"B"** It is a schedule for vehicles that are operated under the conditions listed below.

SPECIFICATIONS

UNSCHEDULE INSPECTION

At Each Stop For Fuel

- Check engine oil level and add as required.
- Check windshield washer solvent and add as required.

Once A Month

- Check tire pressure and look for unusual wear or damage.
- Check fluid levels of coolant reservoir, brake master cylinder, power steering and transmission. Add fluid as required.
- Check all lights and all other electrical items for correct operation.

At Each Oil Change

- Inspect the exhaust system.
- Inspect brake hoses.
- Inspect the CV joints and front suspension component boots and seals.
- Rotate the tires at each oil change interval shown on Schedule "A" (7,500 miles - 12 000 km) or every other interval on Schedule "B" (6,000 miles - 10 000 km).
- Check the engine coolant level, hoses, and clamps.

If mileage is less than 7,500 miles (12 000 km) yearly, replace the engine oil filter at each oil change.

EMISSION CONTROL SYSTEM MAINTENANCE

The scheduled emission maintenance listed in **bold type** on the Maintenance Schedules, must be done at the mileage specified to assure the continued proper functioning of the emission control system. These, and all other maintenance services included in this manual, should be done to provide the best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions such as dusty areas and very short trip driving.

FLUID FILL POINTS AND LUBRICATION LOCATIONS

The fluid fill/check locations and lubrication locations are located in each applicable group.

SCHEDULE – A

7,500 miles (12 000 km) or at 6 months

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

15,000 miles (24 000 km) or at 12 months

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Adjust the drive belt tension.

22,500 Miles (36 000 km) or at 18 months

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

SPECIFICATIONS (Continued)

• Inspect the front and rear brake linings and rotors.

30,000 Miles (48 000 km) or at 24 months

• Change the engine oil.
• Replace the engine oil filter.
• Replace the **engine air cleaner element (filter).**
• Adjust the drive belt tension.

37,500 Miles (60 000 km) or at 30 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

45,000 Miles (72 000 km) or at 36 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.
• Adjust the drive belt tension.

52,500 Miles (84 000 km) or at 42 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note # 1 at the end of this chart.

60,000 Miles (96 000 km) or at 48 months

• Change the engine oil.
• Replace the engine oil filter.
• Check and replace, if necessary, the **PCV valve.** See note #1 at the end of this chart.
• Inspect and replace, if necessary the drive belts.
• Replace the **engine air cleaner element (filter).**

67,500 Miles (108 000 km) or at 54 months

• Change engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.

75,000 Miles (120 000 km) or at 60 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Adjust the drive belt tension.
• Flush and replace the engine coolant at 60 months.

82,500 Miles (132 000 km) or at 66 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

90,000 Miles (144 000 km) or at 72 months

• Change the engine oil.
• Replace the engine oil filter.
• Replace the **engine air cleaner element (filter).**
• Check and replace, if necessary, the **PCV valve.** See notes # 1 and # 2 at the end of this chart.
• Inspect the front and rear brake linings and rotors.
• Adjust the drive belt tension.

97,500 Miles (156 000 km) or at 78 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

100,000 Miles (160 000 km) regardless of time interval

• Replace the **spark plugs.**
• Replace the **ignition cables.**
• Replace the **engine timing belt** (Federal Emissions equipped vehicles only)
• Flush and replace the engine coolant if not done at 60 months.
• Change the automatic transaxle fluid and filter.

105,000 Miles (168 000 km) or at 84 months

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Replace the **engine timing belt** (California Emissions equipped vehicles only)

NOTE # 1 This maintenance is recommended by DaimlerChrysler Corporation to the owner but is not required to maintain the warranty on the PCV valve.

NOTE # 2 This maintenance is not required if the component was previously replaced.

SPECIFICATIONS (Continued)

Note # 1 This maintenance is recommended by DaimlerChrysler Corporation to the owner but is not required to maintain the emissions warranty.

Note # 2 This maintenance is not required if the component was previously replaced.

SCHEDULE – B

Follow this schedule if the vehicle is usually operates under one or more of the following conditions.

- Day and night temperatures are below freezing
- Frequent stop and go driving
- Frequent long periods of engine idling
- Frequent driving in dusty conditions
- Frequent short trips of less than 5 miles
- Frequent operation at sustained high speeds during hot weather, above 90°F (32°C)
- Frequent trailer towing
- Taxi, police or delivery service

NOTE: Operating vehicle under the following conditions will require the transmission service indicated with an * in schedule "B".

- More than 50% of vehicle operation is in stop and go traffic where the vehicle is driven **regularly** for more than 45 minutes of continuous operation, such as in heavy city traffic or construction zone traffic.
- Police, taxi, limousine, commercial type operation, or trailer towing where the vehicle is driven **regularly** for more than 45 minutes of continuous operation.

At Each Stop For Fuel

- Check engine oil level and add as required.
- Check windshield washer solvent and add as required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Check fluid levels of coolant reservoir, brake master cylinder, power steering and transmission. Add fluid as required.
- Check all lights and all other electrical items for correct operation.

At Each Oil Change

- Inspect exhaust system.
- Inspect brake hoses.
- Inspect the CV joints and front suspension components.
- Rotate the tires every other oil change.
- Check the coolant level, hoses and clamps.
- If mileage is less than 7,500 miles (12 000 km) yearly, replace the engine oil filter at each oil change.

3,000 Miles (5 000 km)

- Change the engine oil
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

6,000 Miles (10 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

9,000 Miles (14 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the front and rear brake linings and rotors.
- Inspect the **Engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

12,000 Miles (19 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **Engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

15,000 Miles (24 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Adjust the drive belt tension.
- Change the differential fluid.
- Replace the **engine air cleaner element (filter).** See note #1 at the end of this chart.

18,000 Miles (29 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Inspect the front and rear brake linings and rotors.

21,000 Miles (34 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

24,000 Miles (38 000 km)

- Change the engine oil.
- Replace the engine oil filter.

SPECIFICATIONS (Continued)

• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

27,000 Miles (43 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.

30,000 Miles (48 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Check and replace, if necessary, the **PCV valve.** See note #1.
• Adjust the drive belt tension.
• Replace the **engine air cleaner element (filter).**
• Replace the power steering fluid.
• Change the differential fluid.

33,000 Miles (53 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

36,000 Miles (58 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.

39,000 Miles (62 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

42,000 Miles (67 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

45,000 Miles (72 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Replace the **engine air cleaner element (filter).** See note #1 at the end of this chart.
• Adjust the drive belt tension.
• Change the differential fluid.
• Inspect the front and rear brake linings and rotors.

48,000 Miles (77 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Change the automatic transaxle fluid and filter.*

51,000 Miles (82 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

54,000 Miles (86 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.

57,000 Miles (91 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

60,000 Miles (96 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Replace the **engine air cleaner element (filter).**
• Check and replace, if necessary, the **PCV valve.** See notes # 1 and # 2 at the end of this chart.
• Inspect and replace, if necessary the drive belts.
• Replace the power steering fluid.
• Change the differential fluid.

63,000 Miles (101 000 km)

• Change the engine oil.
• Replace the engine oil filter.
• Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
• Inspect the front and rear brake linings and rotors.

SPECIFICATIONS (Continued)

66,000 Miles (106 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

69,000 Miles (110 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

72,000 Miles (115 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Inspect the front and rear brake linings and rotors.

75,000 Miles (120 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Replace the **engine air cleaner element (filter).** See note #1 at the end of this chart.
- Adjust the drive belt tension.
- Change the differential fluid.

78,000 Miles (125 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

81,000 Miles (130 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Inspect the front and rear brake linings and rotors.

84,000 Miles (134 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

87,000 Miles (139 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

90,000 Miles (144 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Replace the **engine air cleaner element (filter).**
- Adjust the drive belt tension.
- Check and replace, if necessary, the **PCV valve.** See notes # 1 and # 2 at the end of this chart.
- Replace the power steering fluid.
- Change the differential fluid.
- Inspect the front and rear brake linings and rotors.

93,000 Miles (149 000 km)

- Change engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

96,000 Miles (154 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Change the automatic transaxle fluid and filter.*

99,000 Miles (158 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.
- Inspect the front and rear brake linings and rotors.

100,000 Miles (161 000 km)

- Flush and replace the engine coolant.
- Replace the **engine timing belt.**
- Replace the **spark plugs**
- Replace the **ignition Cables** (on Federal Emissions equipped vehicles only)

102,000 Miles (164 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Inspect the **engine air cleaner element (filter)** and replace if required. See note #1 at the end of this chart.

SPECIFICATIONS (Continued)

105,000 Miles (168 000 km)

- Change the engine oil.
- Replace the engine oil filter.
- Replace the **engine air cleaner element (filter).**
- Replace the **ignition Cables** (on California Emissions equipped vehicles only)
- Change the differential fluid.
- Inspect the front and rear brake linings and rotors.

Note # 1 This maintenance is recommended by DaimlerChrysler Corporation to the owner but is not required to maintain the emissions warranty.

Note # 2 This maintenance is not required if the component was previously replaced.

NOTE: Operating vehicle under the following conditions will require the transmission service indicated with an * in schedule "B".

- More than 50% of vehicle operation is in stop and go traffic where the vehicle is driven **regularly** for more than 45 minutes of continuous operation, such as in heavy city traffic or construction zone traffic.
- Police, taxi, limousine, commercial type operation, or trailer towing where the vehicle is driven **regularly** for more than 45 minutes of continuous operation.

JUMP STARTING, TOWING, AND HOISTING

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SERVICE PROCEDURES

JUMP STARTING PROCEDURE

WARNING: REVIEW ALL SAFETY PRECAUTIONS AND WARNINGS IN GROUP 8A, BATTERY.

DO NOT JUMP START A FROZEN BATTERY, PERSONAL INJURY CAN RESULT.

DO NOT JUMP START WHEN MAINTENANCE FREE BATTERY INDICATOR DOT IS YELLOW OR BRIGHT COLOR.

A BATTERY GENERATES HYDROGEN GAS WHICH IS FLAMMABLE AND EXPLOSIVE. KEEP OPEN FLAME OR SPARKS AWAY FROM THE BATTERY.

DO NOT ALLOW JUMPER CABLE CLAMPS TO TOUCH EACH OTHER WHEN CONNECTED TO A BOOSTER SOURCE.,

DO NOT ALLOW BATTERY VOLTAGE TO EXCEED 16 VOLTS.

TAKE CARE TO AVOID THE RADIATOR COOLING FAN WHENEVER THE HOOD IS RAISED. THE FAN CAN START AT ANYTIME THE IGNITION SWITCH IS ON. YOU CAN BE HURT BY THE FAN.

BATTERY FLUID IS A CORROSIVE ACID SOLUTION: DO NOT ALLOW BATTERY FLUID TO CONTACT EYES, SKIN, OR CLOTHING. IF ACID SPLASHES IN EYES OR ON SKIN, FLUSH THE CONTAMINATED AREA IMMEDIATELY WITH LARGE QUANTITIES OF WATER.

CAUTION: Do not attempt to push or tow the vehicle to start it. The vehicle cannot be started this way. Pushing with another vehicle may damage the transaxle or the rear of the vehicle.

If the vehicle has a discharged battery, booster cables may be used to obtain a start from another vehicle. This type of start can be dangerous if done improperly, so follow the procedure carefully.

NOTE: The battery is stored in a compartment in front of the tire in the right front fender and is accessible through the engine compartment.

TO JUMP START A DISABLED VEHICLE:

If the indicator is dark or shows a green dot, proceed as follows:

(1) Wear eye protection and remove metallic jewelry worn on hands or wrists to avoid injury by accidental arcing of battery current.

(2) When using another vehicle as a booster source, park the booster vehicle within cable reach without allow vehicles to touch.

(3) Turn off all accessories, set the parking brake, place the automatic transmission in PARK, and turn the ignition OFF in both vehicles.

(4) Connect one end of the positive jumper cable to the positive jump start attachment of the booster battery. Connect the other end of the cable to the positive jump start attachment of the discharged battery (Fig. 1).

(5) Connect one end of the negative jumper cable to the negative jump start attachment of the booster battery. Connect the other end of the cable to the negative jump start attachment of the discharged battery (Fig. 2). Ensure that the jump cable clamps have good connections.

(6) Start the engine in the vehicle which has the booster battery, let the engine idle a few minutes, then start the engine in the vehicle with the discharged battery.

CAUTION: Do not crank starter motor on disabled vehicle for more than 15 seconds, starter will overheat and could fail.

(7) When removing the jumper cables:

- Disconnect jumper cable negative clamp from the disabled vehicle.
- Disconnect the jumper cable negative clamp from the booster battery start attachment.
- Disconnect jumper cable positive clamp from disable battery start attachment.
- Disconnect jumper cable positive clamp from booster battery start attachment.

SERVICE PROCEDURES (Continued)

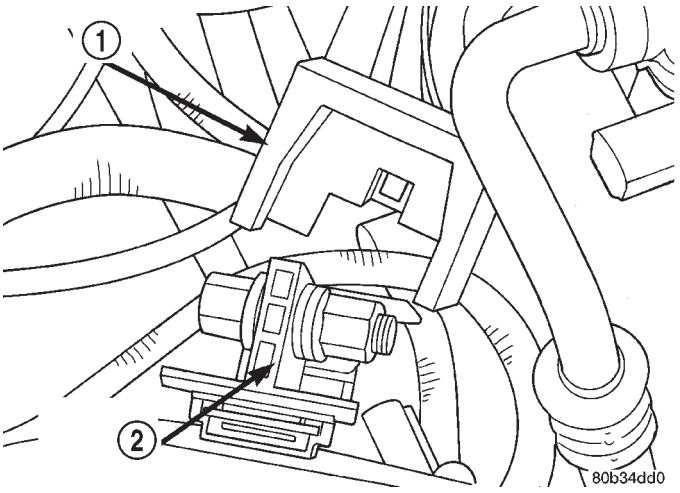


Fig. 1 Positive Jumper Start Attachment

1 – ATTACHMENT CAP
2 – JUMPER START ATTACHMENT

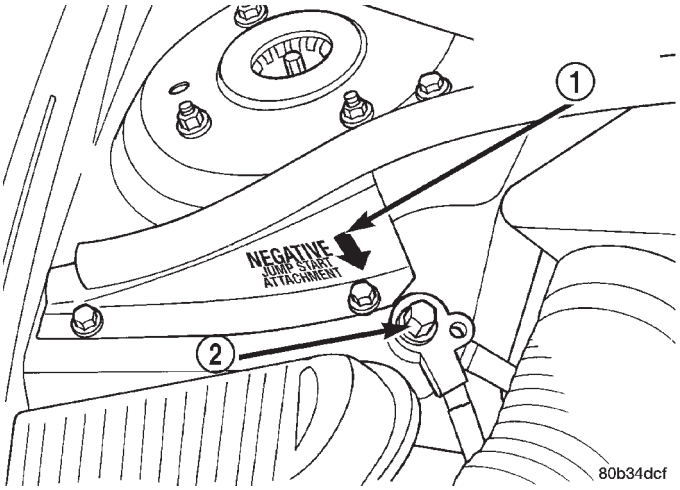


Fig. 2 Negative Jumper Start Attachment

1 – NEGATIVE JUMP START ATTACHMENT
2 – ATTACHMENT

TOWING RECOMMENDATIONS

WARNING:

- **Do NOT tow vehicle with front wheels on the ground. The transaxle can be damaged.**
- **Secure loose and protruding parts from a disabled vehicle.**
- **Always use a safety chain system that is independent of the lifting and towing equipment.**
- **Do not allow any of the towing equipment to contact the fuel tank of the vehicle being towed.**
- **Do not go under the vehicle while it is lifted by the towing equipment.**
- **Do not allow passengers to ride in a vehicle being towed.**
- **Always observe all state and local laws pertaining to warning signals, night illumination, speed, etc.**
- **Do not attempt a towing operation that could jeopardize the operator, bystanders or other motorists.**
- **Do not exceed a towing speed of 48 km/h (30 mph).**
- **Avoid towing distances of more than 24 km (15 miles), whenever possible.**
- **Never attach tow chains or a tow sling to the bumper, steering linkage, or constant velocity joints.**

RECOMMENDED TOWING EQUIPMENT

To avoid damage to bumper fascia and air dams use of a wheel lift or flat bed towing device (Fig. 3) is recommended. When using a wheel lift towing device, be sure the rear end of disabled vehicle has at least 100 mm (4 inches) ground clearance. If minimum ground clearance cannot be reached, use a towing dolly. If a flat bed device is used, the approach angle should not exceed :

- 13 degrees for Intrepid
- 12 degrees for Concorde, and 300M
- Additional ramping may be required.

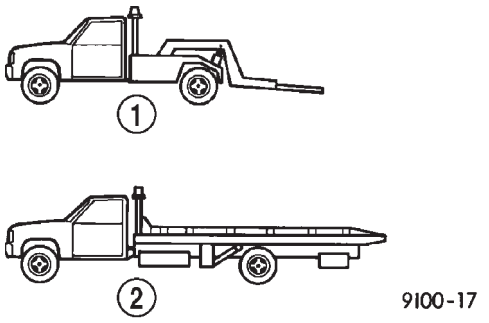


Fig. 3 Recommended Towing Devices

1 – WHEEL LIFT
2 – FLAT BED

GROUND CLEARANCE

CAUTION: If vehicle is towed with wheels removed, install lug nuts to retain brake drums or rotors.

A towed vehicle should be raised until lifted wheels are a minimum 100 mm (4 in) from the ground. Be sure there is adequate ground clearance at the opposite end of the vehicle, especially when towing over rough terrain or steep rises in the road. If necessary, remove the wheels from the lifted end of the vehicle and lower the vehicle closer to the ground, to increase the ground clearance at the opposite end of

SERVICE PROCEDURES (Continued)

the vehicle. Install lug nuts on wheel attaching studs to retain braking discs.

TIE DOWN LOCATIONS FOR FLAT BED TOWING

There are two reinforced elongated holes on each side of the vehicle designed to serve as hold down locations. These locations can safely hold the vehicle to the towing device using T or R hooks.

- Bottom of the forward torque box between the front frame rail and the rocker panel.
- Bottom of the rearward torque box forward of the rear wheel.

FRONT TOWING PROCEDURES

CAUTION: Do Not tow vehicle from the front with sling type towing device. Damage to bumper fascia will result.

Always tow vehicle with front wheels off the ground as shown (Fig. 4).

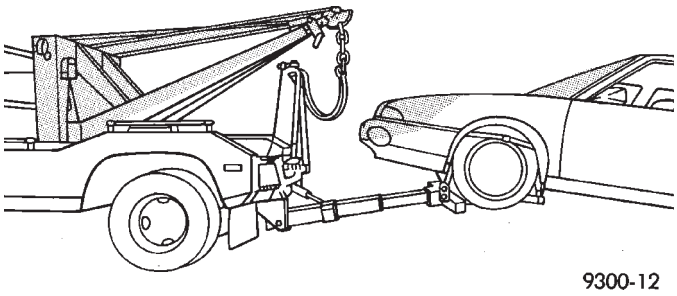


Fig. 4 Towing

Use a flat bed towing device when wheel lift towing device is not available.

REAR TOWING PROCEDURES

CAUTION: Do not tow vehicle with the rear end lifted.

If damage to the vehicle prevents front towing, use a flat bed towing device.

CAUTION: Do not push the vehicle with another vehicle as damage to the bumper fascia and transaxle can result.

HOISTING RECOMMENDATIONS

Refer to Owner's Manual provided with vehicle for proper emergency jacking procedures.

WARNING: THE HOISTING AND JACK LIFTING POINTS PROVIDED ARE FOR A COMPLETE VEHICLE. WHEN THE ENGINE OR REAR SUSPENSION IS REMOVED FROM A VEHICLE, THE CENTER OF GRAVITY IS ALTERED MAKING SOME HOISTING CONDITIONS UNSTABLE. PROPERLY SUPPORT OR SECURE VEHICLE TO HOISTING DEVICE WHEN THESE CONDITIONS EXIST.

CAUTION: Do not position hoisting device on suspension components, damage to vehicle can result.

For proper hoisting and jacking points, refer to (Fig. 5).

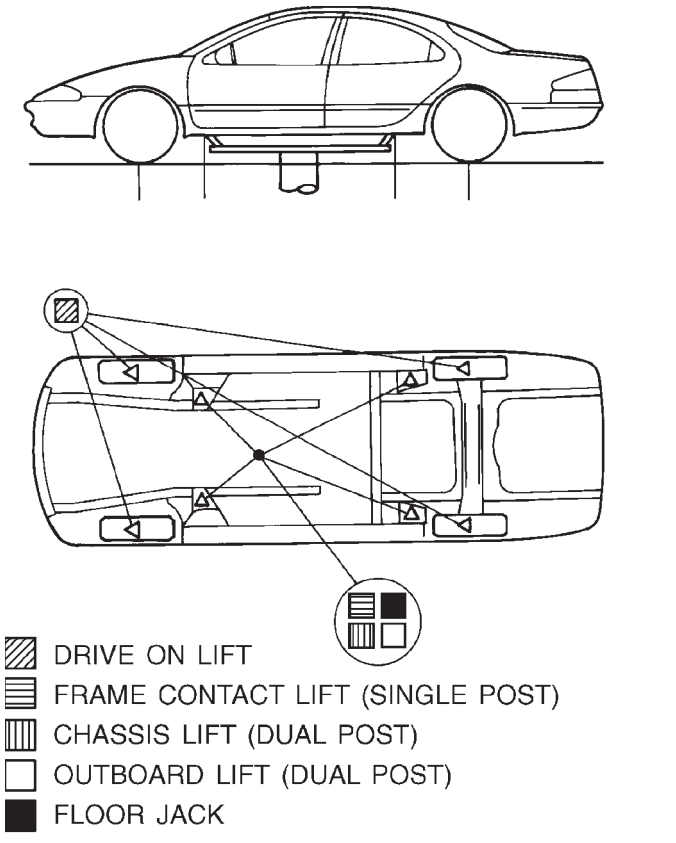


Fig. 5 Hoisting and Jacking Points

SUSPENSION

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WHEEL ALIGNMENT

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DESCRIPTION AND OPERATION

WHEEL ALIGNMENT

DESCRIPTION

Vehicle wheel alignment is the proper adjustment of all interrelated front and rear suspension angles. These angles are what affects the handling and steering of the vehicle when it is in motion.

The method of checking a vehicle's front and rear wheel alignment will vary depending on the type and manufacturer of the equipment being used. Instructions furnished by the manufacturer of the equipment being used should always be followed to ensure accuracy of the alignment, except when alignment specifications recommended by DaimlerChrysler differ.

Typical wheel alignment angles and measurements are camber, caster, toe, and thrust angle.

- Camber is the number of degrees the top of the tire and wheel assembly is tilted either inward or outward (Fig. 1). Camber is a tire wearing angle. Excessive negative camber will cause tread wear at the inside of the tire, while excessive positive camber will cause outside tire wear.
- Cross Camber is the difference between left and right camber. To achieve the cross camber reading, subtract the right side camber reading from the left. For example, if the left camber is +0.3° and the right camber is 0.0°, the cross camber would be +0.3°.

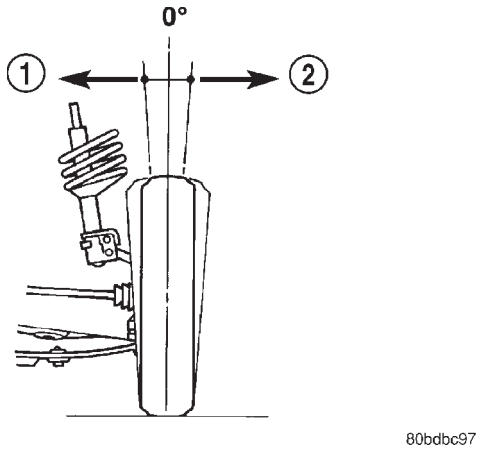


Fig. 1 Camber

1 – NEGATIVE
2 – POSITIVE

- Caster is the number of degrees of forward or rearward tilt of the steering knuckle (Fig. 2). Forward tilt provides a negative caster angle, while rearward tilt provides a positive caster angle. Although caster does not affect tire wear, a caster imbalance (side-to-side) on the vehicle may cause the vehicle to lead to the side with the least positive caster. Caster is not adjustable on this vehicle.
- Cross Caster is the difference between left and right caster.

DESCRIPTION AND OPERATION (Continued)

• Toe is measured in degrees or inches and is the difference in width between the centered leading and trailing edges of the tires on the same axle (Fig. 3). Toe-in means that the front width is more narrow than the rear. Toe-out means that the front width is wider than the rear.

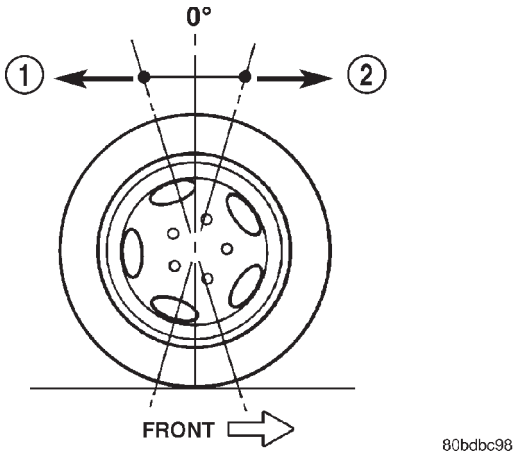


Fig. 2 Caster

1 – POSITIVE
2 – NEGATIVE

• Thrust Angle is defined as the average of the toe settings on each rear wheel. If this measurement is out of specification, readjust the rear wheel toe so that each wheel has 1/2 of the total toe measurement. When readjusting, do not exceed the total toe specification.

Wheel alignment on this vehicle is to be checked and all alignment adjustments are to be made with the vehicle standing at its curb height specification. Curb height is the riding height of the vehicle measured from a certain point on the vehicle to the ground while the vehicle is setting on a flat, level surface.

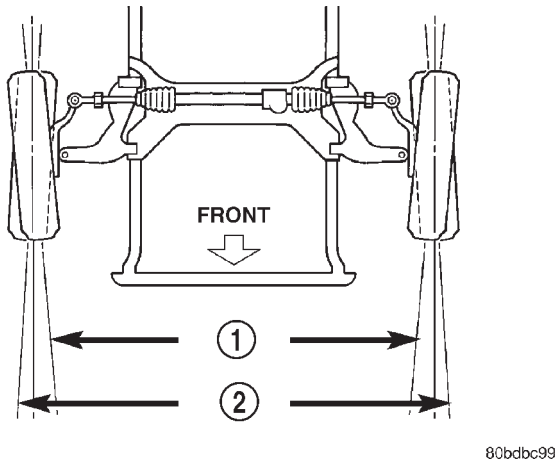


Fig. 3 Toe

1 – TOE-IN
2 – TOE-OUT

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
Front End Whine On Turns	1. Defective wheel bearing	1. Replace wheel bearing
	2. Incorrect wheel alignment	2. Check and reset wheel alignment
	3. Worn tires	3. Replace tires
Front End Growl Or Grinding On Turns	1. Defective wheel bearing	1. Replace wheel bearing
	2. Engine mount grounding	2. Check for motor mount hitting frame rail and reposition engine as required
	3. Worn or broken C/V joint	3. Replace C/V joint
	4. Loose wheel lug nuts	4. Verify wheel lug nut torque
	5. Incorrect wheel alignment	5. Check and reset wheel alignment
	6. Worn tires	6. Replace tires
	7. Front strut pin in upper strut mount	7. Replace the front strut upper mount and bearing
Front End Clunk Or Snap On Turns	1. Loose lug nuts	1. Verify wheel lug nut torque

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	2. Worn or broken C/V joint	2. Replace C/V joint
	3. Worn or loose tie rod	3. Tighten or replace tie rod end
	4. Worn or loose ball joint	4. Tighten or replace ball joint
	5. Worn/loose control arm bushing	5. Replace control arm bushing
	6. Loose stabilizer bar.	6. Tighten stabilizer bar to specified torque
	7. Loose strut mount to body attachment	7. Tighten strut attachment to specified torque
	8. Loose crossmember bolts	8. Tighten crossmember bolts to specified torque
Front End Whine With Vehicle Going Straight At A Constant Speed	1. Defective wheel bearing	1. Replace wheel bearing
	2. Incorrect wheel alignment	2. Check and reset wheel alignment
	3. Worn tires	3. Replace tires
	4. Worn or defective transaxle gears or bearings	4. Replace transaxle gears or bearings
Front End Growl Or Grinding With Vehicle Going Straight At A Constant Speed	1. Engine mount grounding	1. Reposition engine as required
	2. Worn or broken C/V joint	2. Replace C/V joint
Front End Whine When Accelerating Or Decelerating	1. Worn or defective transaxle gears or bearings	1. Replace transaxle gears or bearings
Front End Clunk When Accelerating Or Decelerating	1. Worn or broken engine mount	1. Replace engine mount
	2. Worn or defective transaxle gears or bearings	2. Replace transaxle gears or bearings
	3. Loose lug nuts	3. Verify wheel lug nut torque
	4. Worn or broken C/V joint	4. Replace C/V joint
	5. Worn or loose ball joint	5. Tighten or replace ball joint
	6. Worn or loose control arm bushing	6. Replace control arm bushing
	7. Loose crossmember bolts	7. Tighten crossmember bolts to specified torque
	8. Worn tie rod end	8. Replace tie rod end
Road Wander	1. Incorrect tire pressure	1. Inflate tires to recommended pressure
	2. Incorrect front or rear wheel toe	2. Check and reset wheel toe
	3. Worn wheel bearings	3. Replace wheel bearing
	4. Worn control arm bushings	4. Replace control arm bushing
	5. Excessive friction in steering gear	5. Replace steering gear
	6. Excessive friction in steering shaft coupling	6. Replace steering coupler

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	7. Excessive friction in strut upper bearing	7. Replace strut bearing
Lateral Pull	1. Unequal tire pressure	1. Inflate all tires to recommended pressure
	2. Radial tire lead	2. Perform lead correction procedure
	3. Incorrect front wheel camber	3. Check and reset front wheel camber
	4. Power steering gear imbalance	4. Replace power steering gear
	5. Wheel braking	5. Correct braking condition causing lateral pull
Excessive Steering Free Play	1. Worn or loose tie rod ends	1. Replace or tighten tie rod ends
	2. Loose steering gear mounting bolts	2. Tighten steering gear bolts to specified torque
	3. Worn steering gear	3. Replace Steering Gear
	4. Loose or worn steering shaft coupler	4. Replace steering shaft coupler
Excessive Steering Effort	1. Low tire pressure	1. Inflate all tires to recommended pressure
	2. Low power steering fluid level	2. Fill power steering fluid reservoir to correct level
	3. Loose power steering pump drive belt	3. Correctly adjust power steering pump drive belt
	4. Lack of lubricant in ball joints	4. Lubricate or replace ball joints
	5. Steering gear malfunction	5. Replace steering gear
	6. Lack of lubricant in steering coupler	6. Replace steering coupler

VEHICLE LEAD DIAGNOSIS AND CORRECTION

Use the following chart to diagnose a vehicle that has a complaint of a drift or lead condition. The use of the chart will help to determine if the lead condition is the result of a bad tire or is caused by the front wheel alignment.

SERVICE PROCEDURES

PRE-WHEEL ALIGNMENT INSPECTION

Before any attempt is made to change or correct the wheel alignment factors. The following part inspection and the necessary corrections should be made to those parts which influence the steering of the vehicle.

(1) Check and inflate all tires to recommended pressure. All tires should be the same size and in good condition and have approximately the same wear. Note the type of tread wear which will aid in diagnosing, see Wheels and Tires, Group 22.

(2) Check front wheel and tire assembly for radial runout.

(3) Inspect lower ball joints and all steering linkage for looseness.

(4) Check for broken or sagged front and rear springs.

(5) Check vehicle ride height to verify it is within specifications.

(6) Alignment **MUST** only be checked after the vehicle has the following areas inspected and or adjusted. Recommended tire pressures, full tank of fuel, no passenger or luggage compartment load and is on a level floor or a properly calibrated alignment rack.

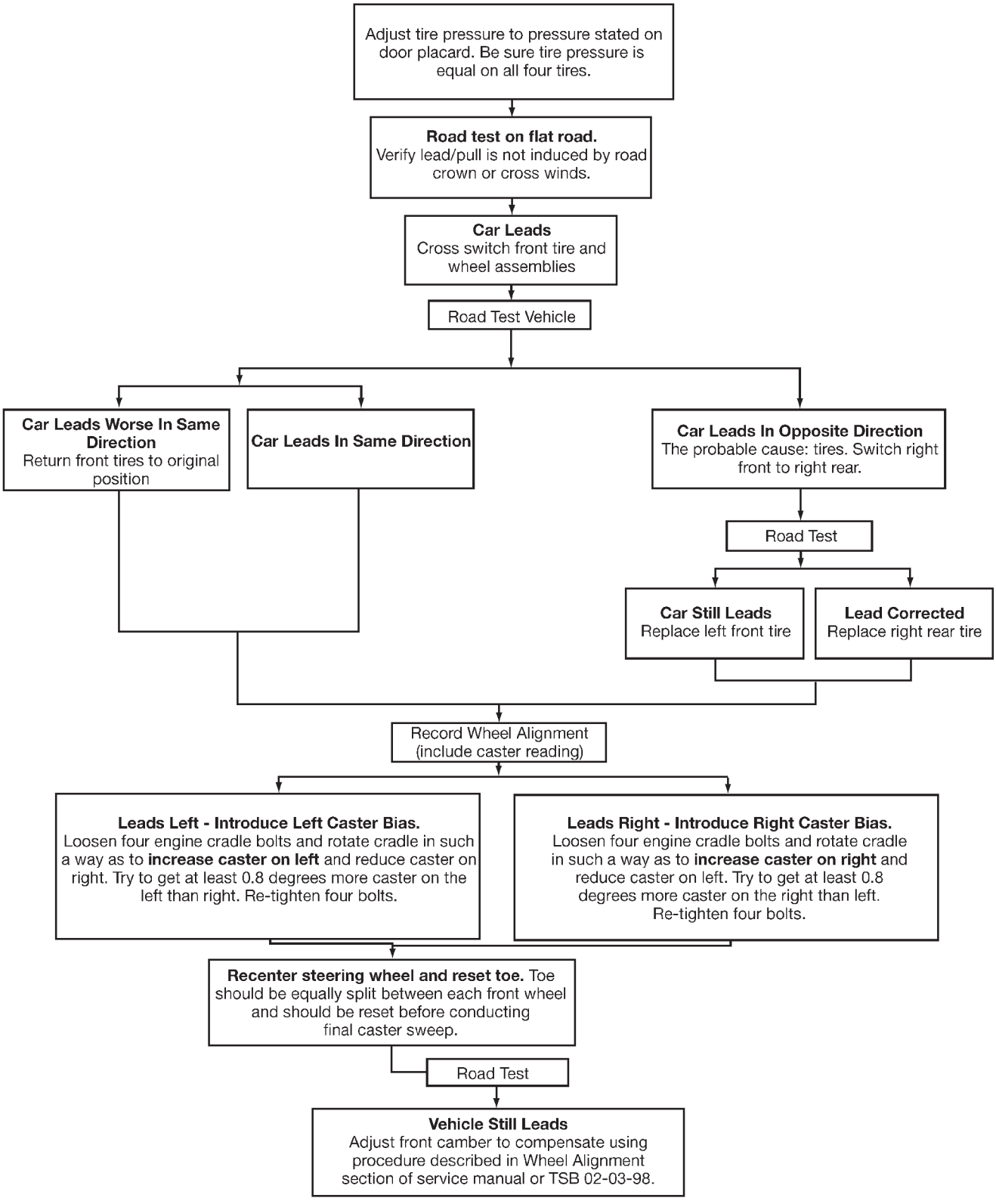
CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. Vehicle height is checked with the

SERVICE PROCEDURES (Continued)

VEHICLE LEAD DIAGNOSIS AND CORRECTION PROCEDURE



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SERVICE PROCEDURES (Continued)

fuel tank full of fuel, and no passenger or luggage compartment load.

Vehicle height is not adjustable. If measurement is not within specifications, inspect vehicle for bent or weak suspension components. Compare parts tag on suspect coil spring(s) to parts book and vehicle sales code, checking for a match. Once removed from vehicle, compare coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

(1) Measure from the inboard edge of the wheel opening fender lip directly above the wheel center (spindle), to the floor or alignment rack surface.

(2) When measuring, maximum left-to-right differential is not to exceed 20 mm (0.79 in.).

(3) Compare measurements to specifications listed in the following chart.

CURB HEIGHT SPECIFICATIONS

VEHICLE	FRONT	REAR
CONCORDE/LHS/300M	739 mm ± 20 mm 29.09 in. ± 0.79 in.	754 mm ± 20 mm 29.68 in. ± 0.79 in.
INTREPID	729 mm ± 20 mm 28.70 in. ± 0.79 in.	735 mm ± 20 mm 28.93 in. ± 0.79 in.

WHEEL ALIGNMENT

(1) Position the vehicle on an alignment rack.

(2) Perform a pre-wheel alignment inspection.

(3) Install all required alignment equipment on the vehicle, per the alignment equipment manufacturer's instructions.

NOTE: Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced. Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.

(4) Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe-in. See Alignment Specifications in this group of the service manual for the required specifications.

(5) If the rear alignment is out of specification, adjust it first, before proceeding to the front. Rear camber and caster are not adjustable. If rear camber is out of specification, check for damaged or bent rear suspension components.

REAR WHEEL TOE ADJUSTMENT

(1) Loosen lateral link, adjustment link jam nuts (Fig. 4). Rotate adjustment links as required to set rear wheel Toe to specifications. **Do not exceed the maximum length dimensions of the lateral links shown in (Fig. 5). Both dimensions must be checked to ensure they do not exceed maximums allowed.**

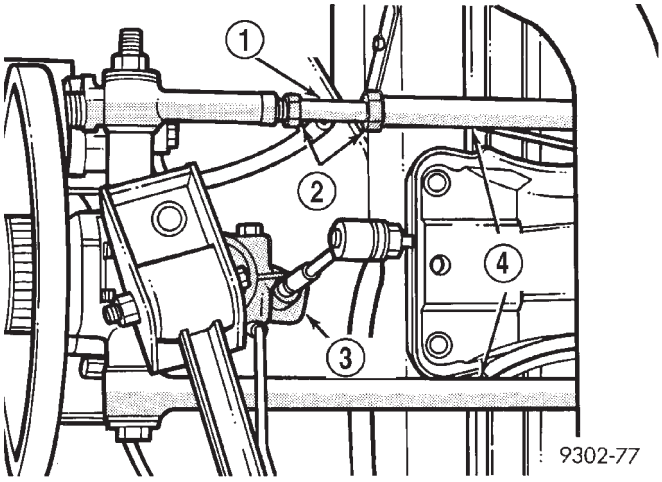


Fig. 4 Rear Wheel Toe Adjustment

1 – ADJUSTMENT LINK
2 – JAM NUTS
3 – SPINDLE
4 – LATERAL LINKS

CAUTION: When setting rear toe-in on vehicle, the maximum lengths of the adjustable lateral link at the locations shown in (Fig. 5) must not be exceeded. If these maximum lengths are exceeded, inadequate retention of adjustment link to the inner and outer link may result. Ensure that the adjustment sleeve jam nuts are torqued to the required specifications when the Toe setting procedure is completed.

(2) Tighten lateral link, adjustment link lock-nuts to 88 N·m (65 ft. lbs.) torque.

SERVICE PROCEDURES (Continued)

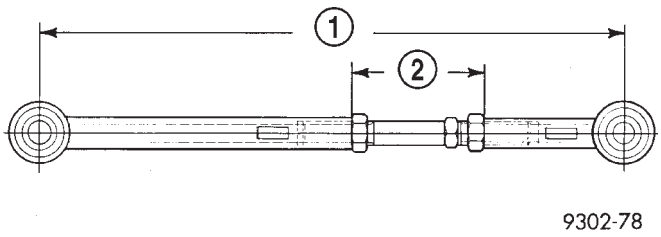


Fig. 5 Lateral Link Maximum Length Dimensions

1 – 380mm (MAX)
2 – 90mm (MAX)

(3) Proceed to set the front wheel alignment. If front camber and caster readings are within required specifications, proceed to Front Wheel Toe Adjustment. If not, refer to the following procedure to correct camber.

CAMBER AND CASTER

Front wheel Camber and Caster settings on this vehicle are determined at the time the vehicle is designed. This is done by determining the precise mounting location of the vehicle's suspension components throughout the design and assembly processes of the vehicle. This is called a Net-Build vehicle and results in no normal requirement for adjustment of the Camber and Caster after a vehicle is built, or when servicing the suspension components. Thus, Camber and Caster are not normally considered an adjustable specification when performing an alignment on this vehicle. Though Camber and Caster are not adjustable, they should be checked during the alignment procedure to ensure they meet the manufacturers specifications.

If camber and caster do not meet required specifications, the vehicles suspension components should be inspected for any signs of damage or bending. **This inspection must be done before performing the camber setting procedure.**

If a vehicle has a drift or lead condition, and it is determined that the drift or lead is not caused by road conditions, the front camber can be adjusted using the following camber adjustment procedure.

CAUTION: Do not attempt to adjust the vehicles Caster or Camber by heating, bending or by performing any other modification to the vehicle's front suspension components.

FRONT CAMBER ADJUSTMENT PROCEDURE

There are camber adjustment bolts and nuts available to allow front suspension camber adjustment in the event the vehicle pulls even though the camber is within specifications. This procedure involves replacing the original strut clevis to knuckle attachment bolts with special undersized bolts.

(1) Raise the front of vehicle by the frame until the tires are not supporting the weight of the vehicle.

(2) Remove the tire and wheel assembly from the location on the vehicle requiring camber adjustment.

CAUTION: When removing the strut to knuckle bolts from the strut clevis bracket, do not allow knuckle to pull away, putting a strain on the brake flex hose.

CAUTION: The bolts attaching the strut to the steering knuckle are serrated in the area where they go through the steering knuckle and strut. When removing, do not turn the bolts in the steering knuckle. If bolts are turned in the steering knuckle, damage to the steering knuckle will result.

(3) Remove the nuts from the bolts attaching the strut to the knuckle (Fig. 6). Tap the bolts out of the knuckle.

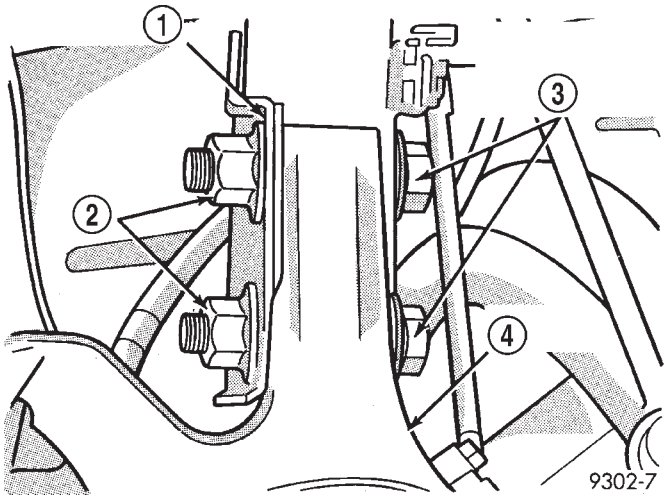


Fig. 6 Strut To Steering Knuckle Attaching Bolts

1 – STRUT ASSEMBLY
2 – NUTS
3 – STRUT ASSEMBLY TO STEERING KNUCKLE ATTACHING BOLTS
4 – STEERING KNUCKLE

(4) Loosely install the camber adjustment bolts and nuts attaching the strut to the steering knuckle. The bolts should be installed so the nuts are towards the front of the vehicle.

(5) Install the tire and wheel assembly.

SERVICE PROCEDURES (Continued)

(6) If necessary, repeat steps 2 through 5 to the other side of the vehicle.

(7) Lower the vehicle.

(8) Jounce the front and rear of vehicle.

(9) Adjust the front camber to the preferred setting by pushing in or pulling outward on the top of the wheel and tire as required. When camber is correct, tighten the upper and lower strut to knuckle camber adjustment bolts to a torque of 170 N·m (125 ft. lbs.).

(10) Proceed to Front Wheel Toe Adjustment in this section and adjust front wheel toe as necessary.

FRONT WHEEL TOE ADJUSTMENT

(1) Center steering wheel and hold it in place using a steering wheel clamp.

(2) Loosen the tie rod adjustment pinch bolt. Rotate the adjustment sleeve to align toe to specifications (Fig. 7).

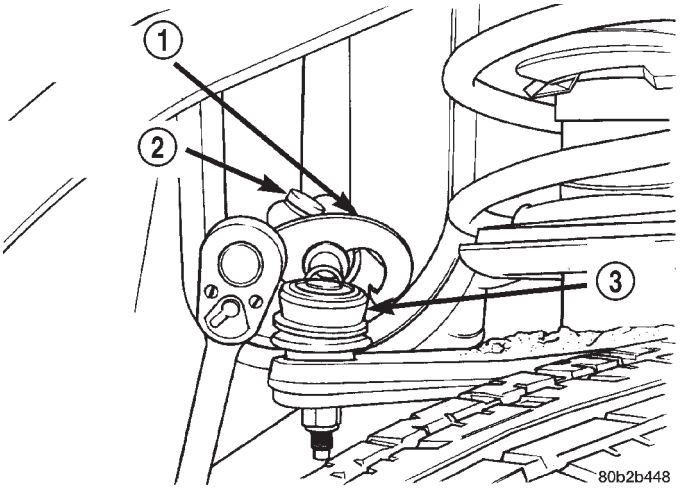


Fig. 7 Front Wheel Toe Adjustment Location

1 – ADJUSTMENT TOOL
2 – ADJUSTMENT PINCH BOLT
3 – TIE ROD END

CAUTION: When setting toe on vehicle, the maximum dimension of exposed threads allowed on inner and outer tie rod cannot exceed the distance shown (Fig. 8). If the maximum distance is exceeded, inadequate retention of either inner or outer tie rod may result. Ensure that adjustment pinch bolt is torqued to required specification when Toe setting procedure is completed.

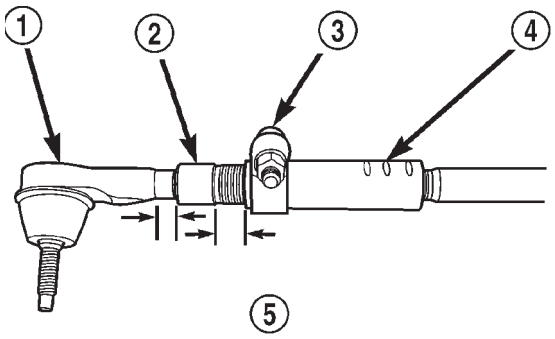


Fig. 8 Tie Rod Thread Engagement Requirements

1 – OUTER TIE ROD
2 – ADJUSTER
3 – PINCH BOLT
4 – INNER TIE ROD
5 – ALLOWABLE THREADS EXPOSED ON OUTER TIE ROD AND ADJUSTER IS A MAXIMUM OF 20 MILLIMETERS. REFER TO AREA INDICATED ABOVE ON THE OUTER TIE ROD AND ADJUSTER.

CAUTION: When torquing adjustment pinch bolt, the following procedure must be followed to ensure adequate retention of the adjustment sleeve. Not following this procedure, could result in the Toe Setting Adjustment changing and/or loosening of the inner or outer tie rod ends.

NOTE: Use an appropriate tool on neck area of outer tie rod to maintain the correct perpendicular orientation of the tie rod end stud within the tie rod end.

(3) After completion of toe adjustment procedure, tighten tie rod pinch bolt (Fig. 8) to a torque of 38 N·m (28 ft. lbs.).

(6) Road test the vehicle after the initial wheel alignment has been performed. If vehicle still drifts or leads, repeat the front wheel alignment procedure and adjust the camber to bias the cross camber setting opposite of the direction in which the vehicle has the tendency to lead. For example, if the vehicle leads left, compensate by setting left front camber to 0.0° and right front camber up to +0.6°, allowing both sides to remain within camber specifications. The cross camber is still at 0.6° which is within the allowed alignment specification.

SPECIFICATIONS

WHEEL ALIGNMENT SPECIFICATIONS

NOTE: All specifications are given in degrees.

NOTE: All wheel alignments are to be set with the vehicle at curb height. Refer to CURB HEIGHT MEASUREMENT in SERVICE PROCEDURES.

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	0.00°	-0.60° to +0.60°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	0.70°
CASTER	+3.00°	+2.00° to +4.00°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	1.00°
TOTAL TOE*	0.00°	−0.20° to +0.20°
REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	−0.20°	−0.70° to +0.30°
TOTAL TOE*	+0.10°	−0.20° to +0.40°
THRUST ANGLE	0.00°	-0.15° to +0.15°

NOTE:

*TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE must be equally split between each front wheel to ensure the steering wheel is centered after setting toe. Positive (+) is Toe-in, Negative (−) is Toe-out.

FRONT SUSPENSION

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DESCRIPTION AND OPERATION

FRONT SUSPENSION SYSTEM

DESCRIPTION

This vehicle uses a MacPherson strut type front suspension design (Fig. 1).

The front suspension includes the following components:

- Strut assembly
- Steering knuckle
- Hub and bearing
- Lower control arm and ball joint
- Tension strut
- Stabilizer bar

OPERATION

The front suspension allows each front wheel on a vehicle to adapt to different road surfaces and conditions without affecting the control of the vehicle. Each side of the front suspension is allowed to move independently from the other. Both sides of the front suspension are allowed to pivot so the vehicle can be steered in the direction preferred. Steering of the vehicle is provided by a rack and pinion steering gear that is connected to a fixed steering arm on each front strut.

STRUT ASSEMBLY (FRONT)

DESCRIPTION

The front strut and suspension of the vehicle is supported by coil springs positioned around the struts (Fig. 1). The springs are contained between an upper seat, located just below the upper strut mount and a lower spring seat on the strut housing. A steering arm is permanently attached to each strut making it side specific.

The top of each strut assembly is bolted to the upper fender reinforcement (strut tower) through a rubber isolated mount.

The bottom of the strut assembly attaches to the top of the steering knuckle with two serrated through-bolts and prevailing torque nuts.

Coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service.

The components of the strut assembly listed below are serviceable if found to be defective (Fig. 2):

- Strut shaft retainer nut
- Upper mount
- Seat and bearing
- Dust shield
- Jounce bumper
- Jounce bumper cup
- Coil spring

DESCRIPTION AND OPERATION (Continued)

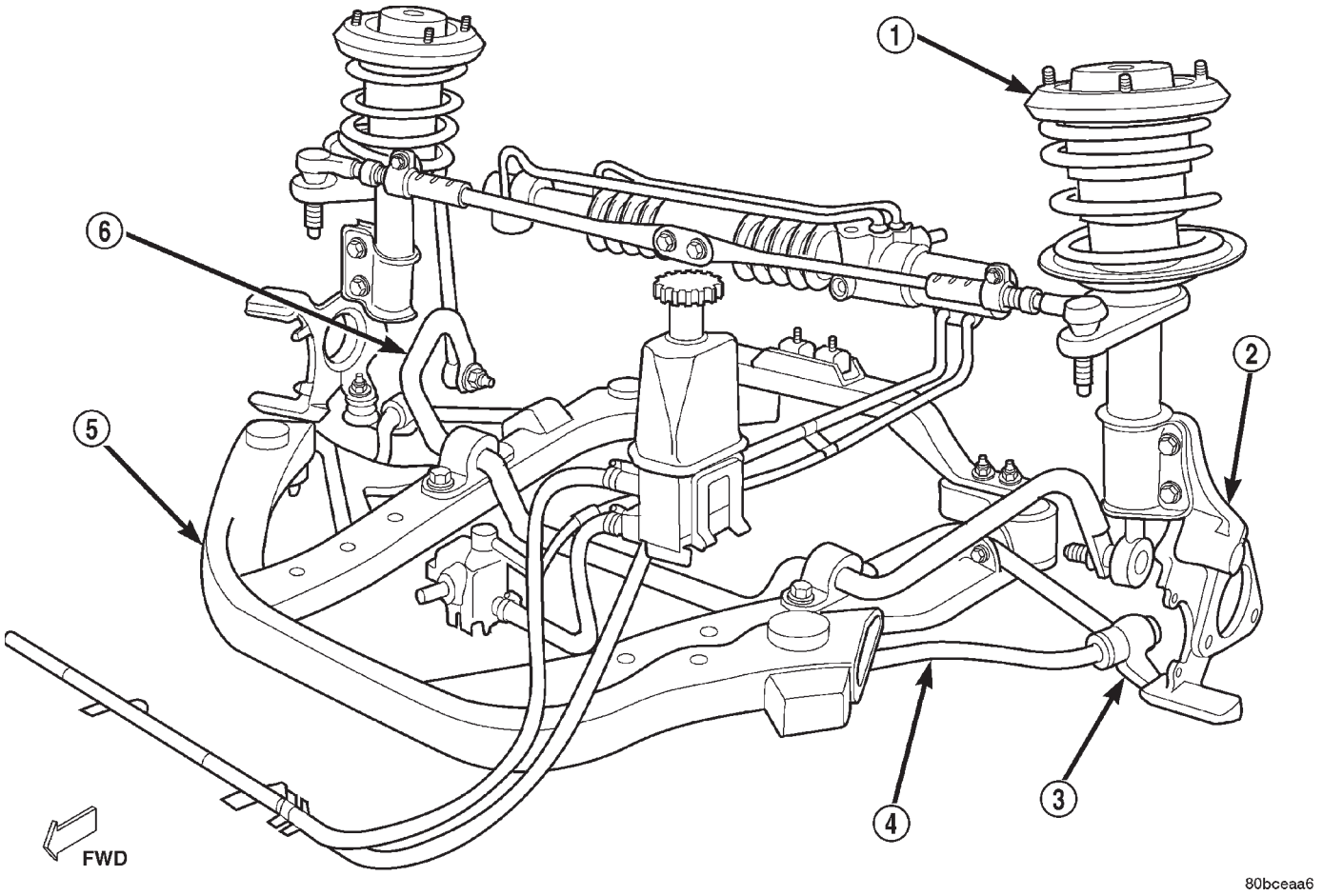


Fig. 1 Front Suspension

1 – STRUT ASSEMBLY
2 – STEERING KNUCKLE
3 – LOWER CONTROL ARM
4 – TENSION STRUT
5 – ENGINE CRADLE CROSSMEMBER
6 – STABILIZER BAR

- Upper spring isolator
- Lower spring isolator
- Strut

OPERATION

The strut assembly cushions the ride of the vehicle, controlling vibration, jounce and rebound of the suspension.

The coil spring controls ride quality and maintains proper ride height.

The spring isolators isolate the coil spring at the top and bottom from coming into metal-to-metal contact with the upper mounting seat and the strut.

The jounce bumper limits suspension travel and metal-to-metal contact under full jounce condition.

The strut dampens jounce and rebound motions of the coil spring and suspension.

STEERING KNUCKLE

DESCRIPTION

The steering knuckle is a single casting with legs machined for attachment to the front strut assembly and lower control arm ball joint (Fig. 1). The steering knuckle also has machined abutments on the casting to support and align the front brake caliper. The knuckle also holds the hub and bearing, and supports the driveshaft. The hub and bearing is positioned through the center of the knuckle. The driveshaft outer constant velocity (C/V) stub shaft is splined to the center of the hub.

OPERATION

The steering knuckle provides for steering control of the vehicle, supports the brake caliper and absorbs the loads exerted during vehicle braking. It also supports the front (driving) hub and bearing and driveshaft stub axle assembly.

DESCRIPTION AND OPERATION (Continued)

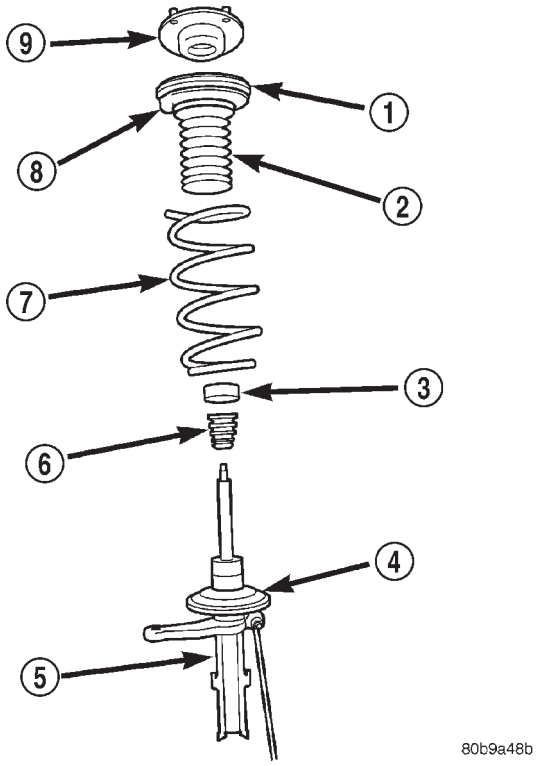


Fig. 2 Strut Assembly Components

1 – SEAT AND BEARING
2 – DUST SHIELD
3 – CUP
4 – LOWER SPRING ISOLATOR
5 – STRUT
6 – JOUNCE BUMPER
7 – COIL SPRING
8 – UPPER SPRING ISOLATOR
9 – UPPER MOUNT

The steering knuckle pivots with the strut assembly on the lower control arm ball joint, allowing the vehicle to be steered.

HUB AND BEARING (FRONT)

DESCRIPTION

The front wheel bearing and front wheel hub of this vehicle are a hub and bearing unit type assembly. This unit combines the front wheel mounting hub (flange) and the front wheel bearing into a sealed one piece unit. The hub and bearing is mounted to the center of the steering knuckle and is retained by three mounting bolts accessible from the rear of the steering knuckle. The hub flange has five wheel mounting studs.

The wheel mounting studs used to mount the tire and wheel to the vehicle are the only replaceable components of the hub and bearing assembly. Otherwise, the hub and bearing is serviced only as a complete assembly.

OPERATION

The hub and bearing has internal bearings that allow the hub to rotate with the driveshaft and tire and wheel. The five wheel mounting studs mount the tire and wheel, and brake rotor to the vehicle.

LOWER CONTROL ARM

DESCRIPTION

The lower control arm is a steel forging with 2 rubber bushings and a ball joint (Fig. 1). The bushing isolating the lower control arm from the front cradle/crossmember is a metal encased pivot bushing. The bushing isolating the lower control arm from the tension strut is a solid rubber bushing. The lower control arm is bolted to the cradle/crossmember using a bolt through the center of the pivot bushing. The tension strut is fastened through the center of the tension strut bushing and lower control arm. The lower control arm ball joint connects to the steering knuckle.

OPERATION

The lower control arm supports the lower end of the steering knuckle and allows for the up and down movement of the suspension during the jounce and rebound travel.

BALL JOINT

DESCRIPTION

The ball joint is an integral part of the control arm and has a non-tapered stud with a notch for clamp (pinch) bolt installation. The stud is clamped and locked into the steering knuckle leg using a clamp (pinch) bolt.

The ball joint used in the lower control arm of this vehicle is a sealed-for-life ball joint and requires no maintenance lubrication. The ball joint cannot be serviced separately from the lower control arm. If the ball joint is determined to be defective it will require replacement of the complete lower control arm. Refer to DIAGNOSIS AND TESTING in this section for proper testing of the ball joint.

NOTE: The ball joint does not require any type of additional lubrication for the life of the vehicle. No attempt should be made to ever add any lubrication to the lower ball joint.

OPERATION

The ball joint is a pivotal joint on the lower control arm that allows the knuckle to move up and down, and turn with ease.

DESCRIPTION AND OPERATION (Continued)

TENSION STRUT

DESCRIPTION

This vehicle uses a steel tension strut on each side of the vehicle's front suspension, between the lower control arm and front suspension cradle/crossmember (Fig. 1). The strut has rubber isolator bushings, retainer washers and nuts at each end where it mounts.

OPERATION

The tension strut controls longitudinal (fore-and-aft) movement of each front wheel and the front suspension. Controlling the longitudinal movement helps reduce harshness when the wheel hits sudden irregularities in the road surface.

The tension strut's rubber isolator bushings isolate suspension noise from the body of the vehicle.

STABILIZER BAR (FRONT)

DESCRIPTION

The stabilizer bar interconnects both front struts of the vehicle and is attached to the front cradle/crossmember (Fig. 1).

Attachment of the stabilizer bar to the front cradle/crossmember is through 2 rubber-isolator cushion bushings and retainers. A double ball jointed stabilizer bar link is used to attach each end of the stabilizer bar to the front strut assemblies. All parts of the stabilizer bar are replaceable as individual components.

The stabilizer bar to front cradle cushion bushings are slit for easy removal and installation. The slit must be positioned toward the front of the vehicle when the stabilizer bar is installed.

OPERATION

Jounce and rebound movements affecting one wheel are partially transmitted to the opposite wheel of the vehicle through the stabilizer bar. This helps to minimize the body roll of the vehicle during suspension movement.

DIAGNOSIS AND TESTING

STRUT ASSEMBLY (FRONT)

(1) Inspect for damaged or broken coil springs.

(2) Inspect for torn or damaged strut assembly dust boots.

(3) Lift dust boot and inspect strut assembly for evidence of fluid running from the upper end of fluid reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit). A slight amount of seepage between the strut rod and strut shaft seal is not unusual and does not affect performance of the strut assembly. Also inspect jounce bumpers for signs of damage or deterioration.

(4) Inspect the upper strut mount assembly. Make sure the correct mount is on the correct side of the vehicle. Looking down at the top of the upper mount, 2 tabs can be seen, (Fig. 3) and (Fig. 4), down inside the mount center well. The positioning of these tabs is critical to vehicle ride and sound. **DO NOT install a right mount on the left front strut or a left mount on a right front strut.**

(4) If the strut is off the vehicle, a rectangular hole can be seen on the edge of the mount mounting surface (Fig. 3) and (Fig. 4). This is always in the 10 o'clock position when observing rubber tab positioning, whether a left or right mount is being observed.

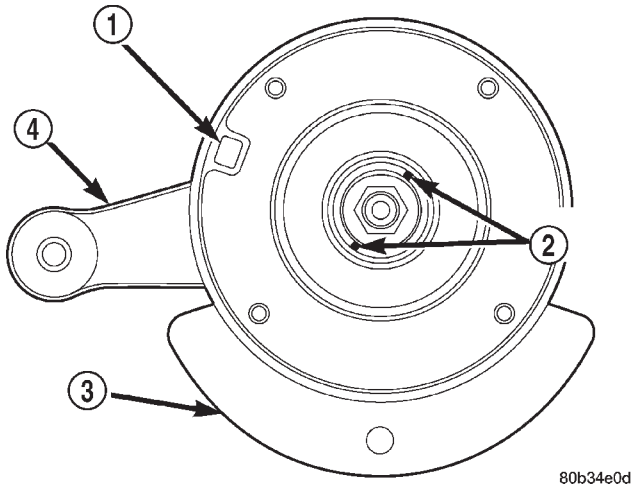


Fig. 3 Left Front Strut Upper Mount

1 – NOTCH
2 – RUBBER TABS
3 – OUTBOARD STRUT COIL SPRING SEAT
4 – STEERING ARM

Coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. Be sure that the springs meet the correct load rating for the vehicle and its specific options.

STEERING KNUCKLE

The front suspension knuckle (Fig. 5) is not a serviceable component. Do not attempt to straighten or repair the front suspension knuckle in any way.

Service repair or replacement of the front (drive) hub and bearing, (Fig. 5) can be done with the front suspension knuckle remaining on the vehicle.

HUB AND BEARING (FRONT)

The front hub bearing is designed for the life of the vehicle and requires no type of periodic maintenance.

DIAGNOSIS AND TESTING (Continued)

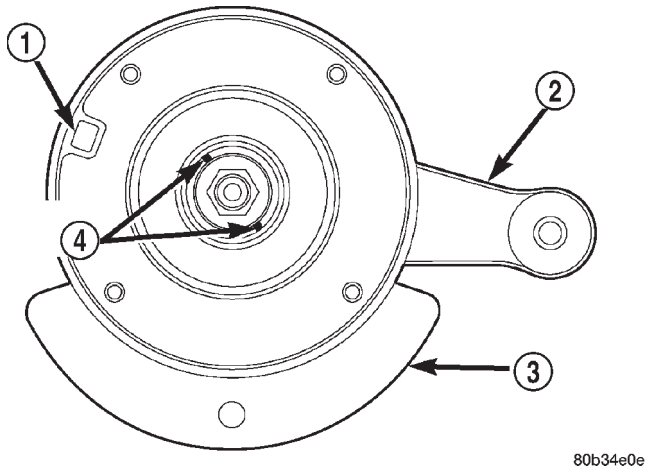


Fig. 4 Right Front Strut Upper Mount

1 – NOTCH
2 – STEERING ARM
3 – OUTBOARD STRUT COIL SPRING SEAT
4 – RUBBER TABS

The following procedure may be used for diagnosing the condition of the front hub bearing.

With the wheel, disc brake caliper, and brake rotor removed, rotate the wheel hub. Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the hub bearing exhibits any of these conditions during diagnosis, the hub and bearing will require replacement. The bearing is not serviceable.

Damaged bearing seals and the resulting excessive grease loss may also require bearing replacement. Moderate grease weapage from the hub bearing is considered normal and should not require replacement of the hub and bearing.

To check for excessive hub runout, refer to BRAKE ROTOR in the DIAGNOSIS AND TESTING section of service manual group BRAKES for the procedure.

LOWER CONTROL ARM

The lower control arm if damaged, is serviced only as a complete component. **Do not attempt to repair or straighten a broken or bent lower control arm.** Inspect the lower control arm for signs of damage from contact with the ground or road debris. If the lower control arm shows any sign of damage, inspect the lower control arm to see if it is bent.

The only serviceable components of the lower control arm are, the pivot bushing, and the tension strut bushing. The service procedure to replace these components is detailed in the specific component Service Procedures Sections in this group of the service manual.

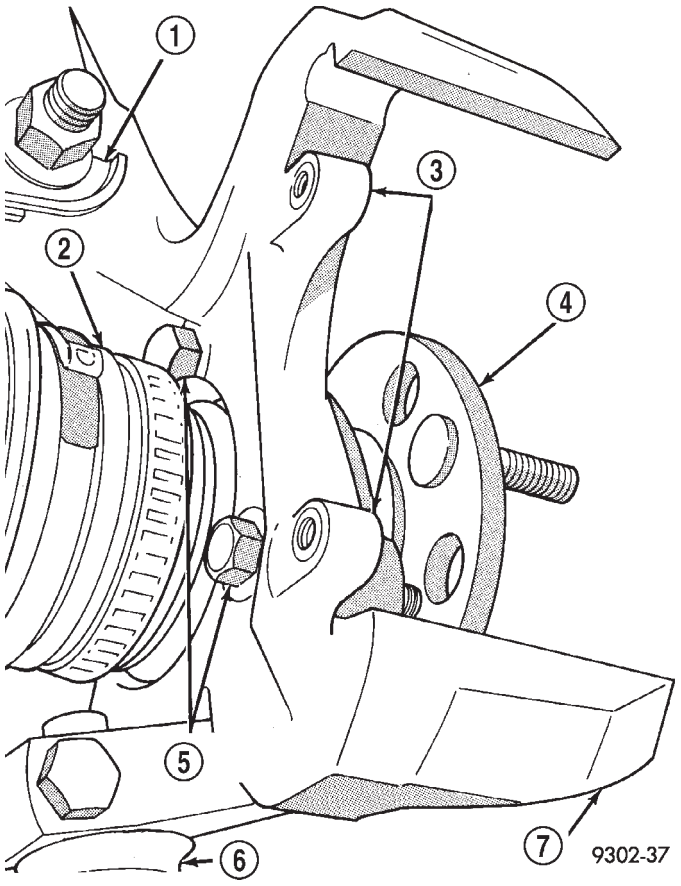


Fig. 5 Steering Knuckle

1 – STRUT ASSEMBLY
2 – STUB AXLE
3 – BRAKE CALIPER MOUNTING BOSSES
4 – HUB/BEARING ASSEMBLY
5 – HUB/BEARING ATTACHING BOLTS
6 – LOWER CONTROL ARM
7 – FRONT KNUCKLE ASSEMBLY

BALL JOINT

Raise front of vehicle using jack stands or a frame contact type hoist, until front suspension is in full rebound and tires are not in contact with the ground. Grasp tire at top and bottom, and apply an in and out on the wheel and tire. While applying force to the tire, look for any movement between the lower ball joint and lower control arm. If any movement is evident the lower ball joint is worn and the lower control arm requires replacement.

STABILIZER BAR (FRONT)

Inspect for broken or distorted retainers and bushings. If bushing replacement is required, bushing can be removed by opening slit in bushing and removing bushing from around stabilizer bar. The stabilizer bar to cradle assembly bushings, should be positioned on stabilizer bar, so slit in bushing is positioned

DIAGNOSIS AND TESTING (Continued)

toward the front of the vehicle when the stabilizer bar is installed (Fig. 6).

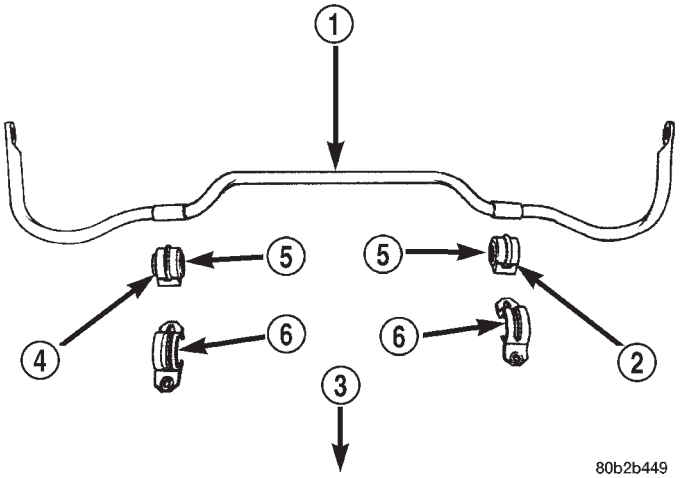


Fig. 6 Stabilizer Bar And Isolator Bushings

1 – STABILIZER BAR
2 – SLIT
3 – FRONT OF CAR
4 – SLIT
5 – ISOLATOR BUSHINGS
6 – RETAINERS

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: DO NOT REMOVE THE STRUT ASSEMBLY'S SHAFT NUT AT ANY TIME UNLESS THE COIL SPRING HAS BEEN PROPERLY COMPRESSED FOLLOWING THE PROCEDURE LISTED IN DISASSEMBLY AND ASSEMBLY IN THIS SECTION.

CAUTION: Only frame contact hoisting equipment can be used on this vehicle. All vehicles have a fully independent rear suspension. The vehicles cannot be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used, damage to rear suspension components will occur.

CAUTION: At no time when servicing a vehicle, can a sheet metal screw, bolt or other metal fastener be installed in the shock tower to take the place of an original plastic clip. Also, NO holes can be drilled into the front shock tower in the area shown (Fig. 7), for the installation of any metal fasteners into the shock tower. Because of the minimum clearance in this area, installation of metal fasteners could damage the coil spring coating and lead to a corrosion failure of the spring.

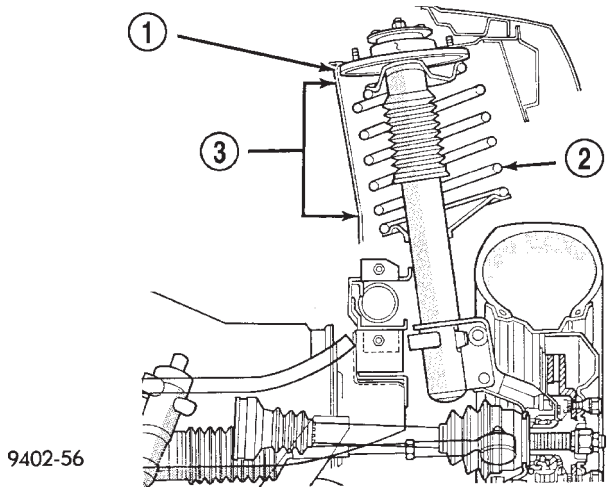


Fig. 7 Strut Tower To Coil Spring Minimum Clearance Area (Typical)

1 – SHOCK TOWER
2 – COIL SPRING
3 – NO SHEET METAL SCREWS, BOLTS, OR ANY OTHER METAL FASTENERS ARE TO BE INSTALLED INTO SHOCK TOWER IN THIS AREA. ALSO, NO HOLES ARE TO BE DRILLED INTO SHOCK TOWER IN THIS SAME AREA.

STRUT ASSEMBLY (FRONT)

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(2) Remove front tire and wheel assembly from the vehicle.

(3) Remove the stabilizer bar attaching link nut at the strut assembly. Remove the attaching link from the strut assembly (Fig. 8).

REMOVAL AND INSTALLATION (Continued)

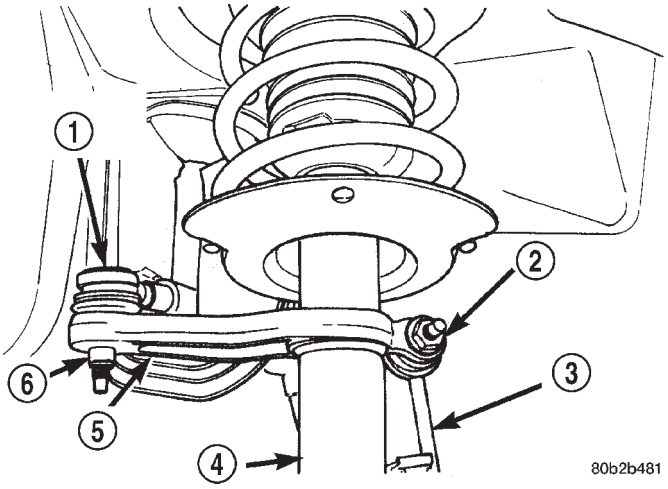


Fig. 8 Stabilizer Bar Link At Strut

1 – OUTER TIE ROD
2 – NUT
3 – STABILIZER BAR ATTACHING LINK
4 – STRUT ASSEMBLY
5 – STEERING ARM
6 – NUT

(4) Loosen, but do not remove, the outer tie rod end to strut arm attaching nut (Fig. 9). Release outer tie rod end from steering arm using Puller, Special Tool C-3894A (Fig. 9), then remove nut and tie rod from the steering arm.

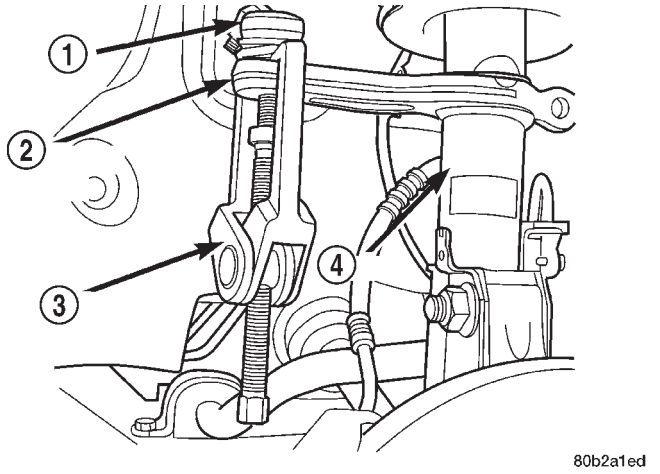


Fig. 9 Removing Outer Tie Rod From Steering Arm

1 – TIE ROD END
2 – STEERING ARM
3 – SPECIAL TOOL C-3894A
4 – STRUT

(5) If vehicle is equipped with antilock brakes, remove the speed sensor cable routing bracket from the strut assembly (Fig. 10).

(6) Remove the 2 guide pin bolts mounting the caliper assembly to the steering knuckle (Fig. 11).

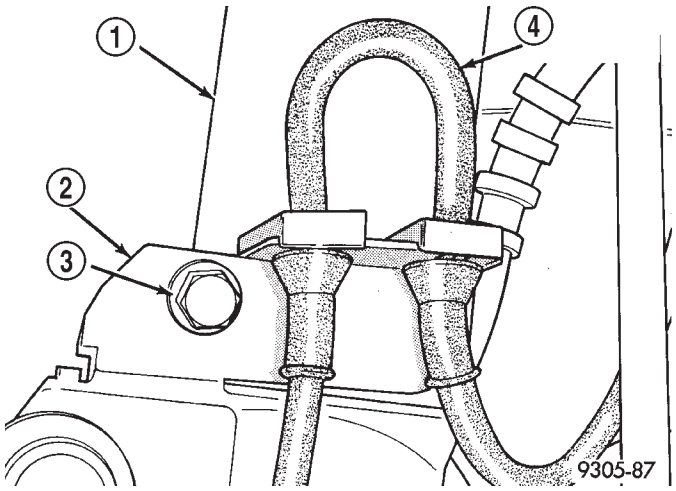


Fig. 10 Speed Sensor Cable Routing Bracket

1 – STRUT ASSEMBLY
2 – ROUTING BRACKET
3 – SCREW
4 – SPEED SENSOR CABLE

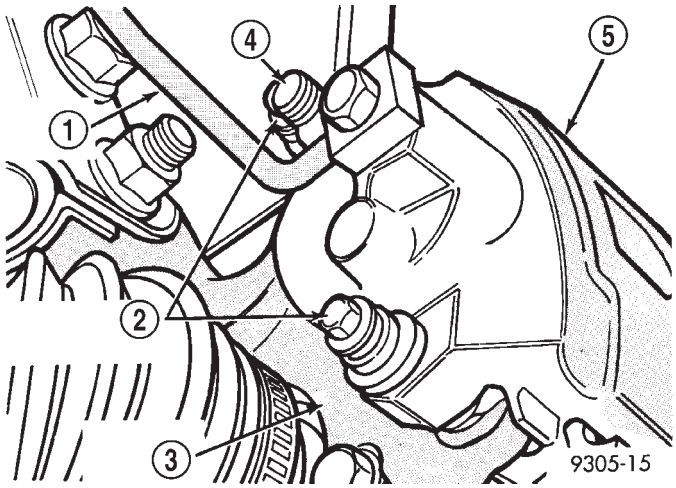


Fig. 11 Caliper Guide Pin Bolts

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

(7) Remove brake caliper assembly from steering knuckle and braking disc. Refer to the Brake Section in this service manual for the required caliper removal procedure. Support caliper assembly by hanging it from frame of vehicle with wire or some other method, (Fig. 12) do not let caliper assembly hang by brake hose. Remove front braking disc from hub.

REMOVAL AND INSTALLATION (Continued)

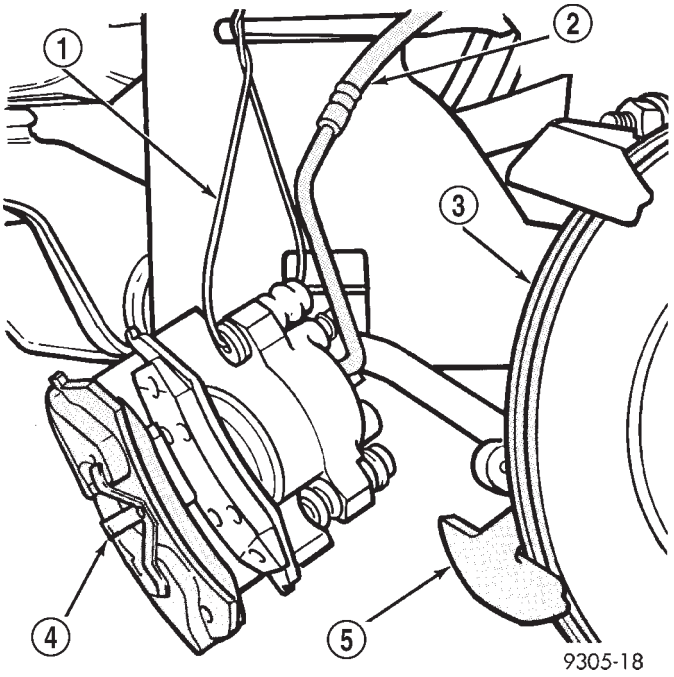


Fig. 12 Removal And Storage Of Front Caliper

1 – WIRE HANGER
2 – FLEXIBLE BRAKE HOSE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – STEERING KNUCKLE

CAUTION: The strut assembly to steering knuckle bolts are serrated were they go through strut assembly and steering knuckle. When removing bolts, turn nuts off bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

(8) Remove the 2 strut assembly to steering knuckle attaching bolts (Fig. 13).

(9) Remove the 4 strut assembly upper mount to strut tower mounting nut and washer assemblies (Fig. 14).

(10) Remove the strut assembly from the vehicle for inspection and disassembly. Refer to DISASSEMBLY AND ASSEMBLY for the required procedure.

INSTALLATION

(1) Install front strut assembly into shock tower. Install the 4 strut assembly upper mount to shock tower attaching nuts (Fig. 14). Tighten the 4 strut mount to strut tower attaching nuts to a torque of 37 N·m (28 ft. lbs.) torque.

(2) Position steering knuckle into strut assembly.

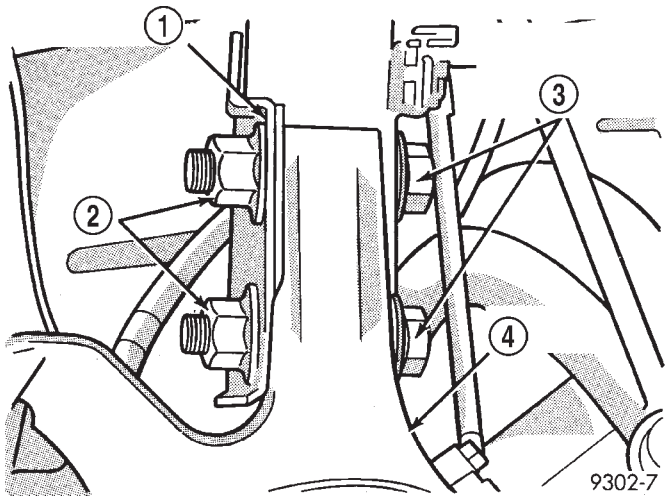


Fig. 13 Strut Assembly To Steering Knuckle Attaching Bolts

1 – STRUT ASSEMBLY
2 – NUTS
3 – STRUT ASSEMBLY TO STEERING KNUCKLE ATTACHING BOLTS
4 – STEERING KNUCKLE

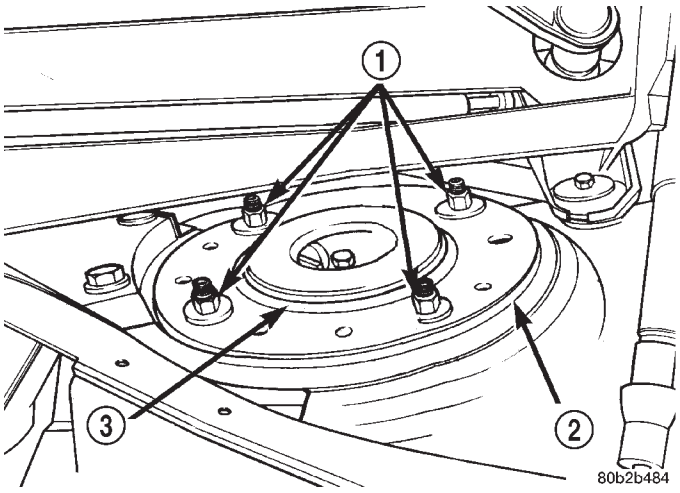


Fig. 14 Strut Assembly Mounting

1 – STRUT ASSEMBLY MOUNTING NUTS
2 – SHOCK TOWER
3 – STRUT MOUNT

CAUTION: The strut assembly to steering knuckle bolts are serrated were they go through strut assembly and steering knuckle. When installing bolts, turn nuts onto bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

REMOVAL AND INSTALLATION (Continued)

(3) Install the strut assembly to steering knuckle attaching bolts (Fig. 13). Install nuts on attaching bolts. Tighten the strut assembly clevis to steering knuckle attaching bolt nuts to a torque of 203 N·m (150 ft. lbs.).

(4) Install braking disc back on front hub and bearing assembly. Install front brake caliper assembly on steering knuckle. Install the 2 caliper assembly to steering knuckle attaching bolts (Fig. 11). Tighten the caliper assembly guide pin bolts to a torque of 19 N·m (192 in. lbs.).

(5) If the vehicle is equipped with antilock brakes. Install the front speed sensor cable routing bracket onto the front strut assembly (Fig. 10).

(6) Install outer tie rod on strut assembly. Install tie rod attaching nut. Tighten the tie rod attaching nut to a torque of 37 N·m (27 ft. lbs.).

(7) Install stabilizer bar link on strut (Fig. 8). Tighten the stabilizer link attaching nut to a torque of 95 N·m (70 ft. lbs.).

(8) Install the wheel and tire assembly.

(9) Tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(10) Lower vehicle.

STEERING KNUCKLE

REMOVE

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the front wheel and tire assembly from the vehicle.

(3) Remove the front caliper assembly from the front steering knuckle assembly (Fig. 15). Refer to Front Disc Brake Service in the Brake Section of this service manual for caliper removal procedure.

(4) Remove front rotor from hub (Fig. 16).

(5) Remove screw attaching wheel speed sensor head to steering knuckle. **Speed sensor head should be removed from steering knuckle, to avoid damage to speed sensor by outer C/V joint when hub and bearing is removed.**

(6) Carefully, remove sensor head from steering knuckle. If the sensor has seized, due to corrosion, **DO NOT USE PLIERS ON SENSOR HEAD.** Use a hammer and punch (Fig. 17) to tap edge of sensor ear, rocking sensor side to side until free.

(7) Remove the hub and bearing to stub axle retaining nut (Fig. 18).

(8) Remove the 3 steering knuckle to hub and bearing assembly attaching bolts (Fig. 19).

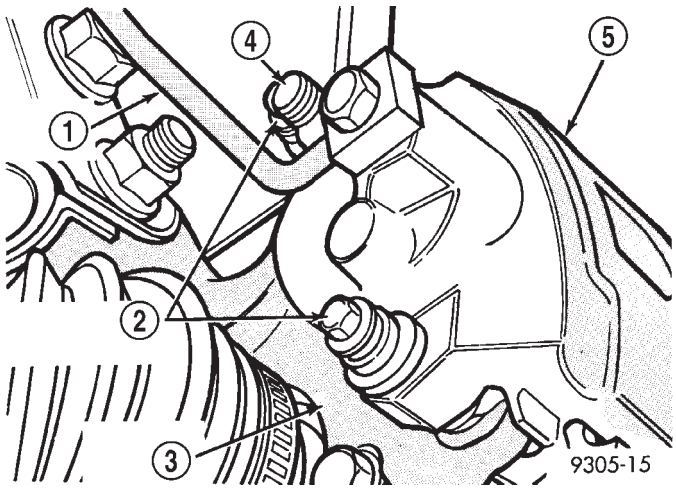


Fig. 15 Disc Brake Caliper Mounting

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

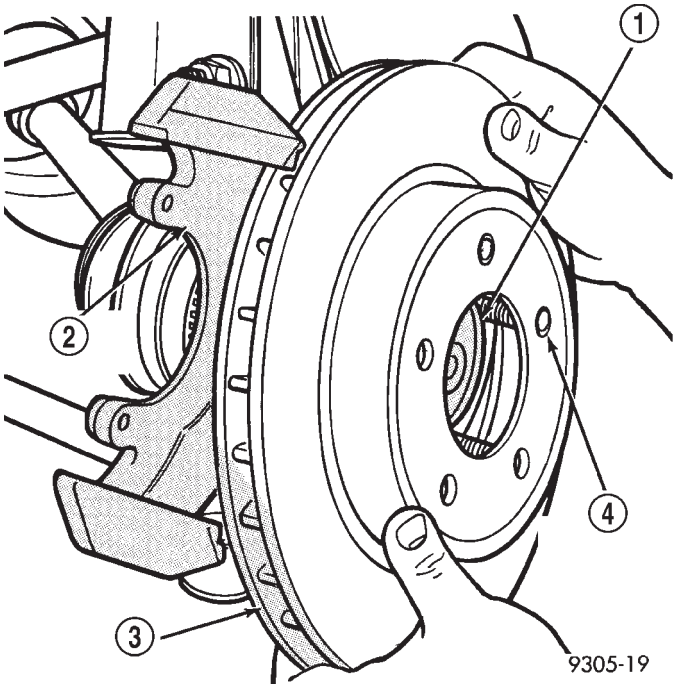


Fig. 16 Brake Rotor

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

REMOVAL AND INSTALLATION (Continued)

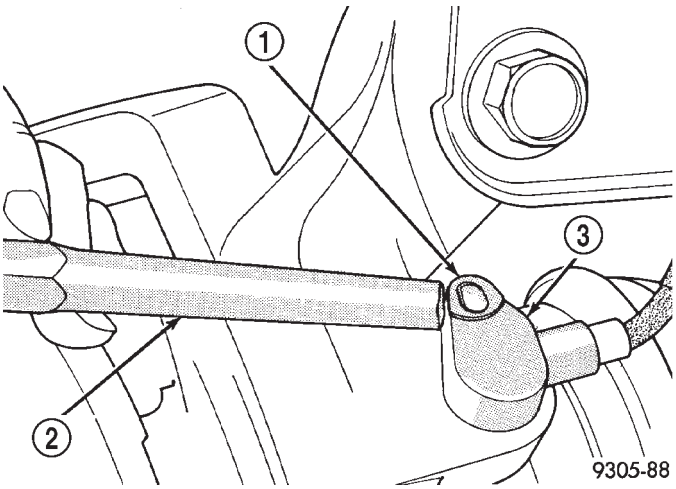


Fig. 17 Speed Sensor Head Removal

1 – SENSOR EAR
2 – PUNCH
3 – SPEED SENSOR HEAD

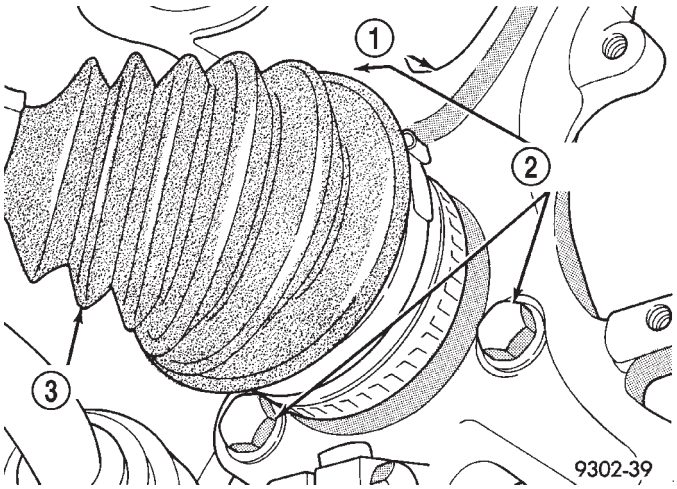


Fig. 19 Hub And Bearing Retaining Bolts

1 – STEERING KNUCKLE
2 – HUB/BEARING ATTACHING BOLTS
3 – HALF SHAFT

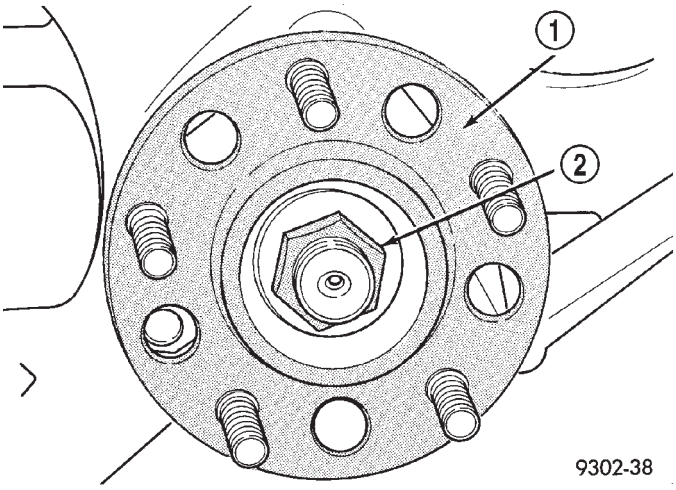


Fig. 18 Hub And Bearing Retaining Nut

1 – HUB/BEARING ASSEMBLY
2 – NUT

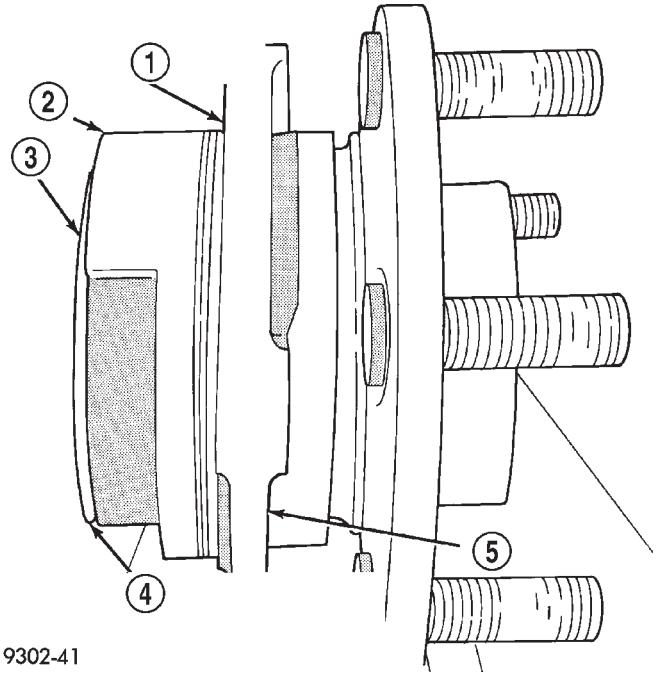


Fig. 20 Hub And Bearing Assembly Seal

1 – SEAL CAN MUST REMAIN TIGHT AGAINST HUB AND BEARING ASSEMBLY HERE
2 – SEAL
3 – FLINGER
4 – DO NOT ALLOW FLINGER TO BE BENT OR DAMAGED DURING REMOVAL OF HUB/BEARING OR C/V JOINT
5 – HUB/BEARING ASSEMBLY

CAUTION: If metal seal (Fig. 20) on hub and bearing assembly is seized to steering knuckle and becomes dislodged on hub and bearing assembly during bearing removal the hub and bearing assembly MUST not be reused and MUST be replaced with a new hub and bearing assembly. Also if flinger disc (Fig. 20) becomes damaged (bent or dented) during removal, hub and bearing assembly must be replaced with a new hub and bearing assembly.

(9) Remove hub and bearing assembly from steering knuckle. It is removed by sliding it straight out of steering knuckle and off end of stub axle (Fig. 21). If hub and bearing assembly will not slide out of knuckle, insert a pry bar between hub and bearing assembly and steering knuckle (Fig. 22) and gently pry hub and bearing from knuckle. If stub shaft is frozen to hub and bearing assembly tap end of stub shaft with soft face hammer to free it from hub and bearing spline.

REMOVAL AND INSTALLATION (Continued)

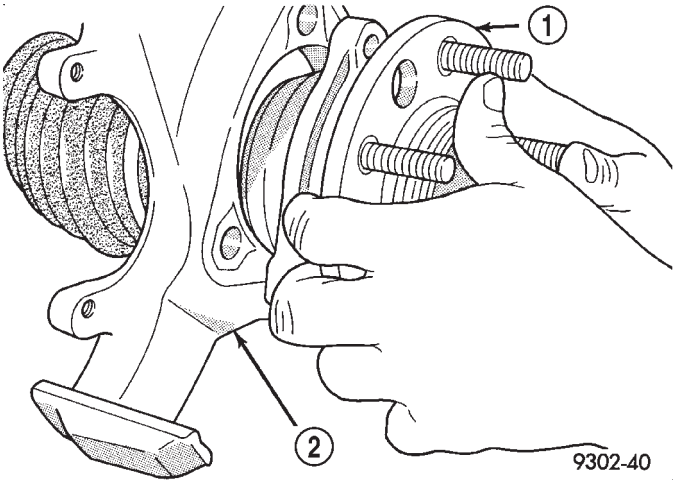


Fig. 21 Hub And Bearing Assembly Removal And Installation

1 – HUB/BEARING ASSEMBLY
2 – STEERING KNUCKLE

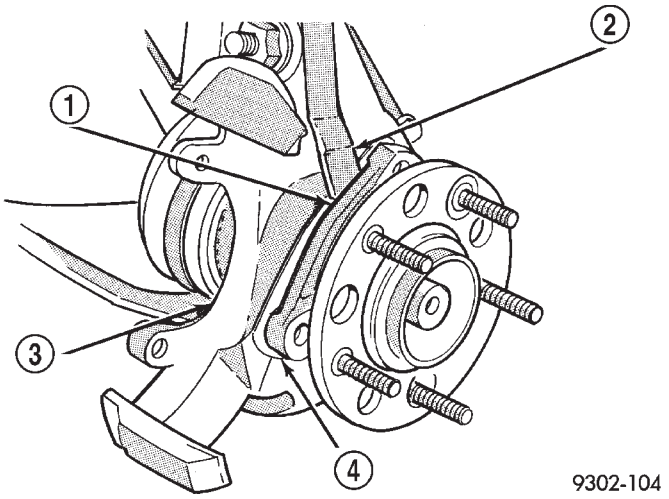


Fig. 22 Prying Hub And Bearing Assembly From Steering Knuckle

1 – INSERT PRY BAR HERE
2 – PRY BAR
3 – KNUCKLE
4 – HUB/BEARING ASSEMBLY

(10) Remove the ball joint stud to steering knuckle attaching nut and bolt (Fig. 23).

CAUTION: When lower control arm is separated from steering knuckle, do not let ball joint seal hit up against steering knuckle. If ball joint seal hits steering knuckle, seal damage may occur. If ball joint seal becomes torn, replace seal before assembling lower control arm to knuckle.

(11) Carefully insert a pry bar between lower control arm and steering knuckle (Fig. 24). Push down on pry bar to separate ball joint stud from steering knuckle (Fig. 24).

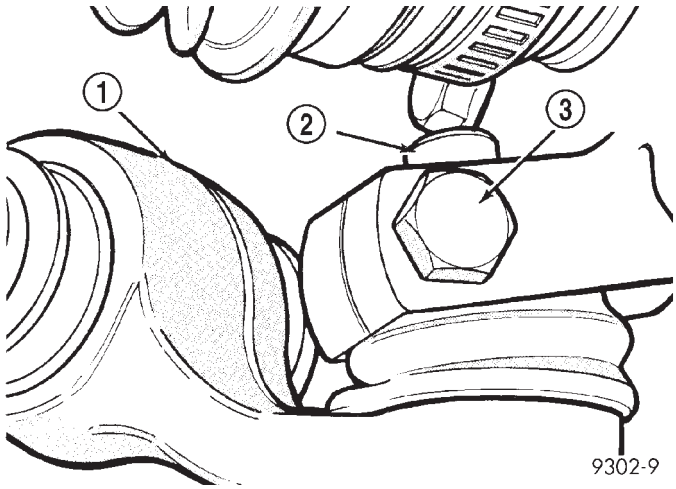


Fig. 23 Control Arm To Steering Knuckle Attachment

1 – LOWER CONTROL ARM
2 – BALL JOINT STUD
3 – CLAMP NUT AND BOLT

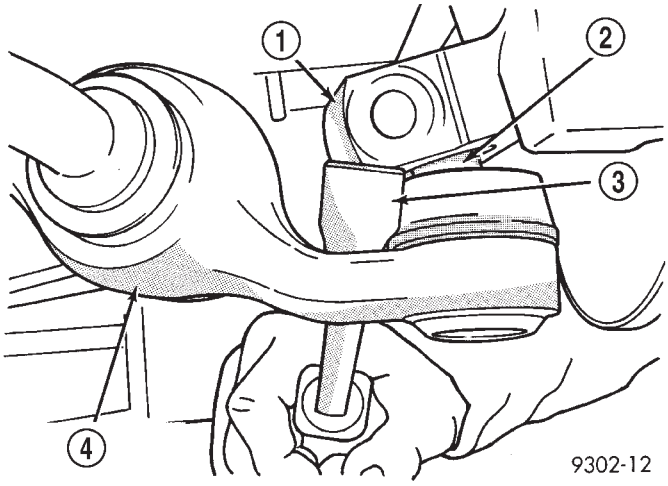


Fig. 24 Separating Ball Joint From Steering Knuckle

1 – STEERING KNUCKLE
2 – BALL JOINT STUD
3 – PRY BAR
4 – LOWER CONTROL ARM

CAUTION: The strut assembly to steering knuckle bolts are serrated where they go through strut assembly and steering knuckle. When removing bolts, turn nuts off bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

(12) Remove the strut assembly to steering knuckle attaching bolts (Fig. 25).

(13) Remove the steering knuckle from the vehicle.

REMOVAL AND INSTALLATION (Continued)

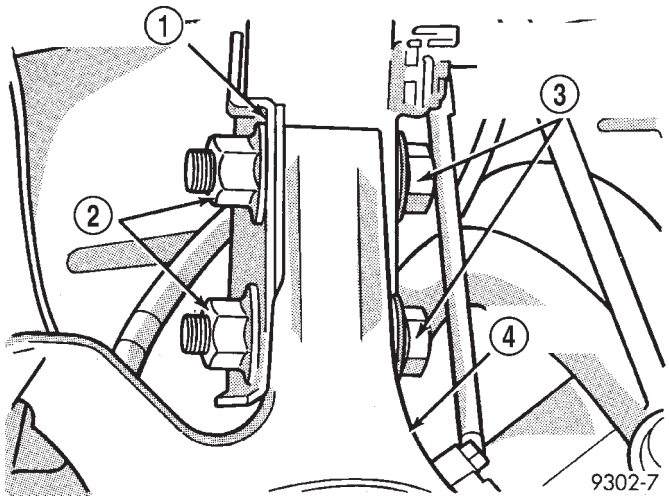


Fig. 25 Strut To Steering Knuckle Attaching Bolts

1 – STRUT ASSEMBLY
2 – NUTS
3 – STRUT ASSEMBLY TO STEERING KNUCKLE ATTACHING BOLTS
4 – STEERING KNUCKLE

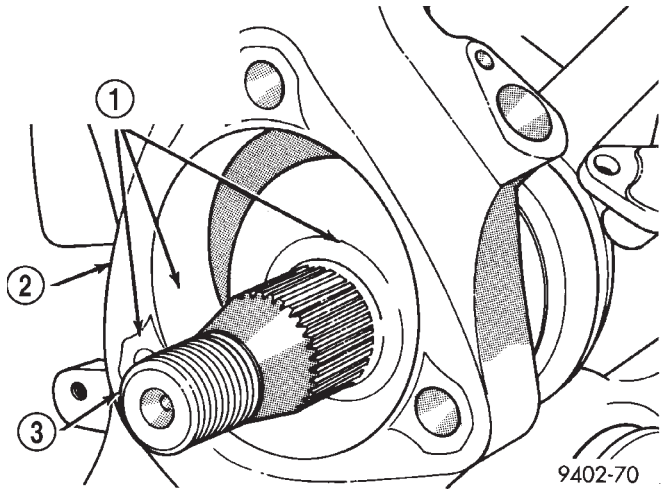


Fig. 26 Hub And Bearing Assembly Mounting Surfaces

1 – BE SURE THESE SURFACES ARE CLEAN AND FREE OF KNICKS BEFORE INSTALLING BEARINGS
2 – STEERING KNUCKLE
3 – STUB AXLE

INSTALL

(1) Install steering knuckle on ball joint stud. Install steering knuckle to lower ball joint attaching bolt and nut into steering knuckle (Fig. 23). Tighten the attaching bolt to a torque of 55 N·m (40 ft. lbs.).

(2) Position steering knuckle into strut assembly.

CAUTION: The strut assembly to steering knuckle bolts are serrated were they go through strut assembly and steering knuckle. When installing bolts, turn nuts onto bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

(3) Install the strut assembly to steering knuckle attaching bolts (Fig. 25). Install nuts on attaching bolts (Fig. 25). Tighten the strut clevis to steering knuckle attaching bolt nuts to a torque of 203 N·m (150 ft. lbs.).

CAUTION: Hub and bearing assembly mounting surfaces on steering knuckle and halfshaft (Fig. 26) must be smooth and completely free of foreign material or nicks.

CAUTION: When installing hub and bearing assembly into steering knuckle, be careful not to damage the flinger disc (Fig. 20) on hub and bearing assembly. If flinger disc becomes damaged, hub and bearing assembly MUST not be used and MUST be replaced with a new hub and bearing assembly.

(4) Install hub and bearing assembly onto stub shaft and into steering knuckle until squarely seated on face of steering knuckle.

(5) Install the 3 steering knuckle to hub and bearing assembly attaching bolts (Fig. 19). Equally tighten all 3 mounting bolts until hub and bearing assembly is squarely seated against front of steering knuckle. Then tighten all 3 hub and bearing assembly mounting bolts to a torque of 110 N·m (80 ft. lbs.)

CAUTION: The hub and bearing assembly to stub shaft retaining nut (Fig. 18) is a prevailing torque nut and can not be reused. A NEW retaining nut MUST be used when assembled.

(6) Install a **NEW** hub and bearing assembly to stub shaft retaining nut (Fig. 18). **Tighten, but do not torque the hub nut at this time.**

(7) Coat speed sensor head with High Temperature Multipurpose E. P. Grease before installing into the steering knuckle. Install speed sensor head into steering knuckle. Install screw and tighten to a torque of 7 N·m (60 in. lbs.)

(8) Install the braking disk back on the hub and bearing assembly (Fig. 16).

(9) Install front brake caliper on steering knuckle. Refer to Front Disc Brake Service in the Brake Section of this service manual for caliper installation procedure. Install the caliper to steering knuckle attaching bolts (Fig. 15) and tighten them to a torque of 19 N·m (168 in. lbs.).

(10) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specifica-

REMOVAL AND INSTALLATION (Continued)

tion. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(11) Lower vehicle to the ground.

CAUTION: When torquing hub and bearing assembly to stub shaft retaining nut, do not exceed the maximum torque of 163 N·m ± 14 N·m (120 ft. lbs. ± 10 ft. lbs.). If the maximum torque is exceeded this may result in a failure of the drive shaft.

(12) Apply the brakes to keep the vehicle from moving, then tighten the **NEW** stub axle retaining nut to a torque of 163 N·m ± 14 N·m (120 ft. lbs. ± 10 ft. lbs.) (Fig. 27).

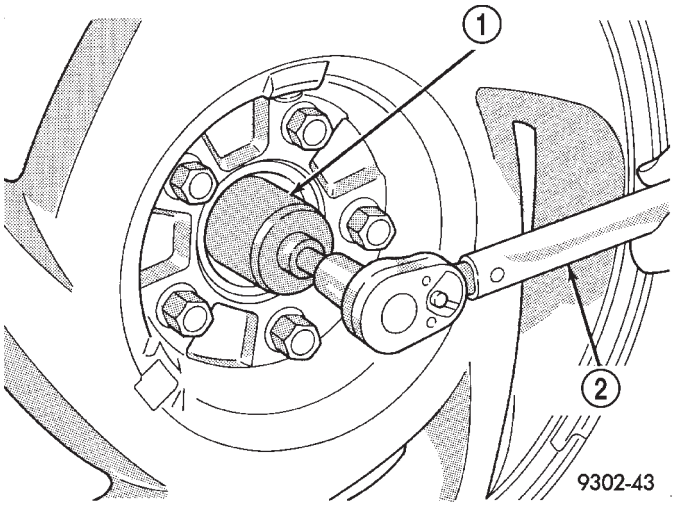


Fig. 27 Torquing Hub And Bearing Retaining Nut

1 – HUB/BEARING
2 – TORQUE WRENCH

HUB AND BEARING (FRONT)

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the front wheel and tire assembly from the vehicle.

(3) Remove the 2 guide pin bolts mounting the caliper assembly to the steering knuckle (Fig. 28). Remove the caliper from the front steering knuckle. Refer to Disc Brake Caliper in the Removal And Installation Section in the Brake Group of this service manual for the caliper removal procedure.

(4) Remove rotor from hub by pulling it straight off wheel mounting studs (Fig. 29).

(5) Remove the hub and bearing retaining nut (Fig. 30).

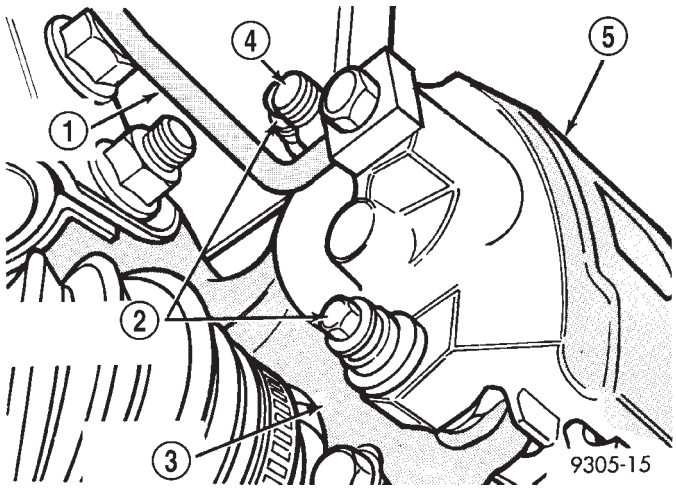


Fig. 28 Disc Brake Caliper Mounting

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

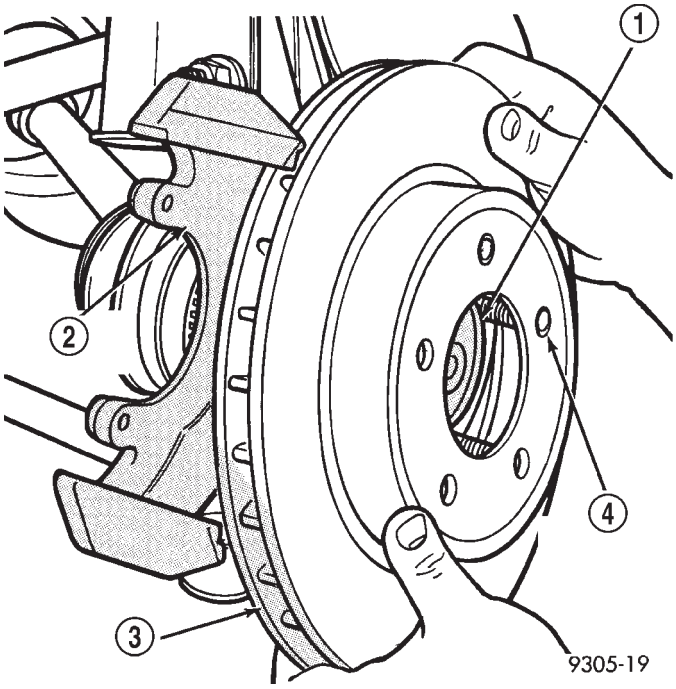


Fig. 29 Removing Rotor

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

(6) Remove the 3 hub and bearing assembly to steering knuckle attaching bolts (Fig. 31).

REMOVAL AND INSTALLATION (Continued)

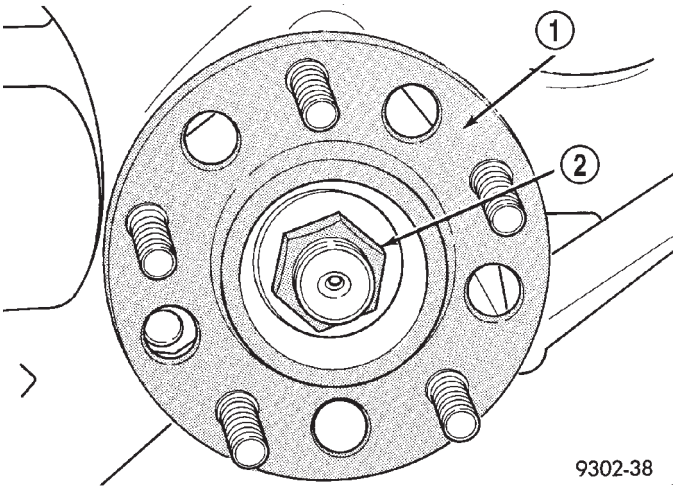


Fig. 30 Hub And Bearing Retaining Nut

1 – HUB/BEARING ASSEMBLY
2 – NUT

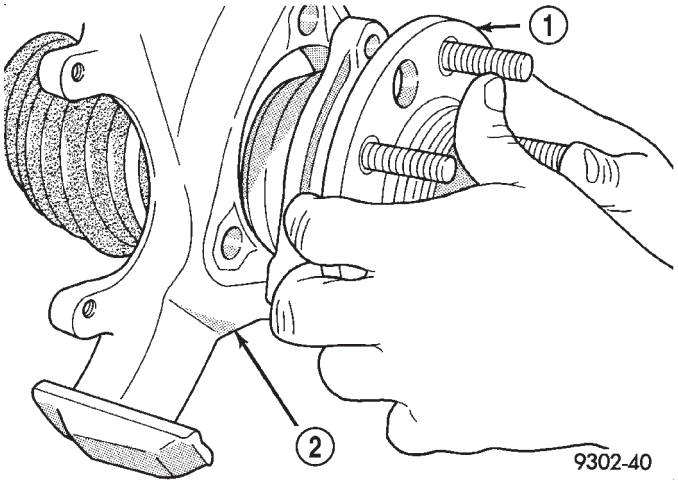


Fig. 32 Hub And Bearing Removal And Installation

1 – HUB/BEARING ASSEMBLY
2 – STEERING KNUCKLE

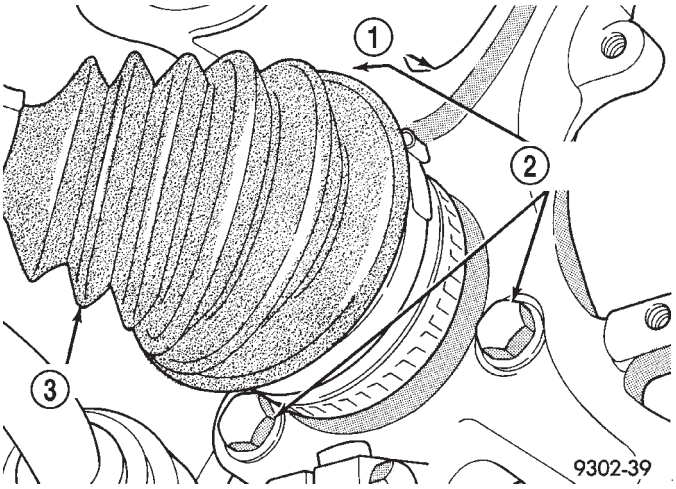


Fig. 31 Hub And Bearing Assembly Retaining Bolts

1 – STEERING KNUCKLE
2 – HUB/BEARING ATTACHING BOLTS
3 – HALF SHAFT

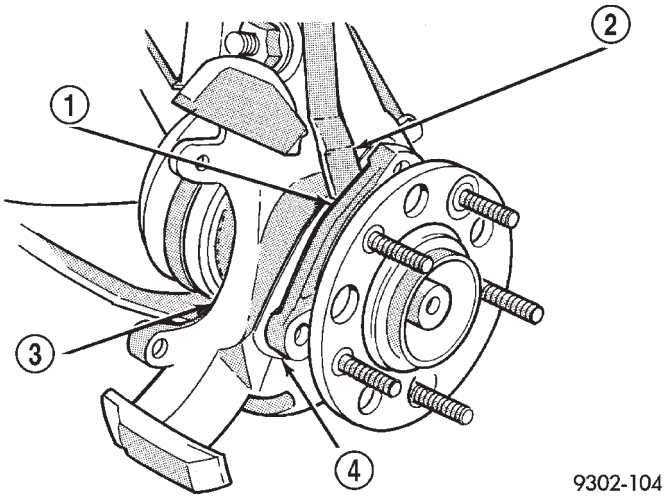


Fig. 33 Prying Hub And Bearing Assembly From Steering Knuckle

1 – INSERT PRY BAR HERE
2 – PRY BAR
3 – KNUCKLE
4 – HUB/BEARING ASSEMBLY

CAUTION: When removing hub and bearing assembly from steering knuckle, be careful not to damage the flinger disc (Fig. 34) on hub and bearing assembly. If flinger disc becomes damaged, hub and bearing assembly MUST not be used and MUST be replaced with a new hub and bearing assembly.

(7) Remove hub and bearing assembly from steering knuckle, by sliding it straight out of steering knuckle and off end of stub axle (Fig. 32). If hub and bearing assembly will not slide out of knuckle. Insert a pry bar between hub and bearing assembly and steering knuckle (Fig. 33) and gently pry hub and bearing from knuckle. If stub shaft is frozen to hub and bearing assembly tap end of stub shaft with soft face hammer to free it from hub and bearing spline.

CAUTION: If metal seal (Fig. 34) on hub and bearing assembly is seized to steering knuckle and becomes dislodged on hub and bearing assembly during bearing removal. The hub and bearing assembly MUST not be reused and MUST be replaced with a new hub and bearing assembly.

INSTALLATION

CAUTION: Hub and bearing assembly mounting surfaces on steering knuckle and driveshaft (Fig. 35) must be smooth and completely free of foreign material or nicks.

REMOVAL AND INSTALLATION (Continued)

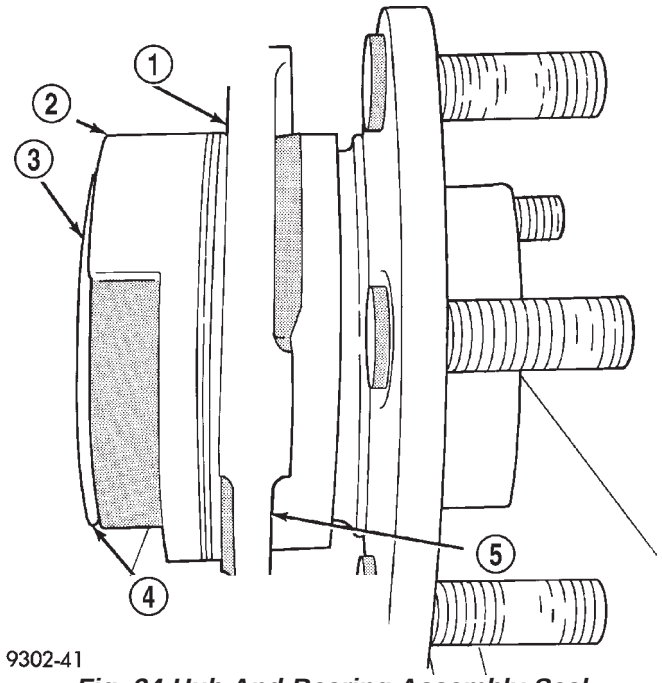


Fig. 34 Hub And Bearing Assembly Seal

1 – SEAL CAN MUST REMAIN TIGHT AGAINST HUB AND BEARING ASSEMBLY HERE
2 – SEAL
3 – FLINGER
4 – DO NOT ALLOW FLINGER TO BE BENT OR DAMAGED DURING REMOVAL OF HUB/BEARING OR C/V JOINT
5 – HUB/BEARING ASSEMBLY

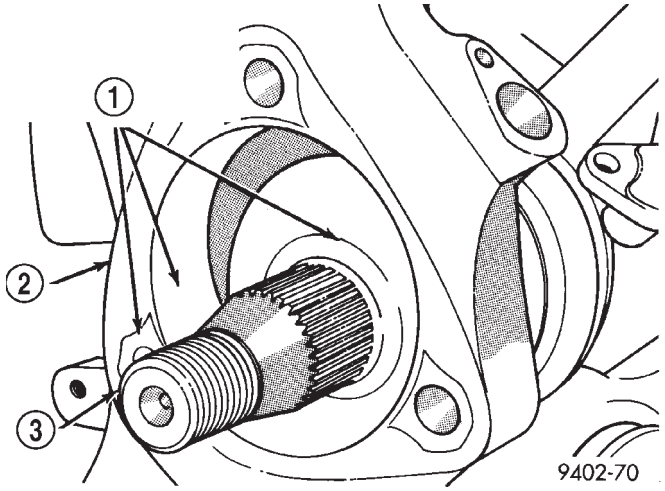


Fig. 35 Hub And Bearing Mounting Surfaces

1 – BE SURE THESE SURFACES ARE CLEAN AND FREE OF KNICKS BEFORE INSTALLING BEARINGS
2 – STEERING KNUCKLE
3 – STUB AXLE

CAUTION: When installing hub and bearing assembly into steering knuckle, be careful not to damage the flinger disc (Fig. 34) on hub and bearing assembly. If flinger disc becomes damaged, hub and bearing assembly MUST not be used and MUST be replaced with a new hub and bearing assembly.

(1) Install hub and bearing assembly onto stub shaft and into steering knuckle until squarely seated on face of steering knuckle

(2) Install the 3 hub and bearing assembly to steering knuckle attaching bolts (Fig. 31). Equally tighten all 3 mounting bolts until hub and bearing assembly is squarely seated against front of steering knuckle. Then tighten the 3 hub and bearing assembly mounting bolts to a torque of 110 N·m (80 ft. lbs.)

CAUTION: The hub and bearing assembly to stub shaft retaining nut (Fig. 30) is a prevailing torque nut and can not be re-used. A NEW retaining nut MUST be used when assembled.

(3) Install a **NEW** hub and bearing assembly to stub shaft retaining nut (Fig. 30). **Tighten, but do not torque the hub nut at this time.**

(4) Install the rotor on the hub and bearing assembly (Fig. 29).

(5) Install front brake caliper back over braking disc and align with caliper mounting holes on steering knuckle. Refer to Disc Brake Caliper in the Removal And Installation Section in the Brake Group of this service manual for the caliper installation procedure. Install the caliper to steering knuckle guide pin bolts (Fig. 28) and tighten to a torque of 19 N·m (168 in. lbs.).

(6) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(7) Lower the vehicle to the ground.

CAUTION: When torquing hub and bearing assembly to stub shaft retaining nut, do not exceed the maximum torque of 163 N·m ± 14 N·m (120 ft. lbs. ± 10 ft. lbs.). If the maximum torque is exceeded this may result in a failure of the drive shaft.

(8) With vehicle brakes applied to keep vehicle from moving, tighten the **NEW** stub shaft to hub and bearing assembly retaining nut to 163 N·m ± 14 N·m (120 ft. lbs. ± 10 ft. lbs.) (Fig. 36).

(9) Check the Toe setting on the vehicle and reset if not with-in specifications.

LOWER CONTROL ARM

NOTE: This procedure involves removal and installation of both the lower control arm and tension strut from the vehicle.

REMOVAL AND INSTALLATION (Continued)

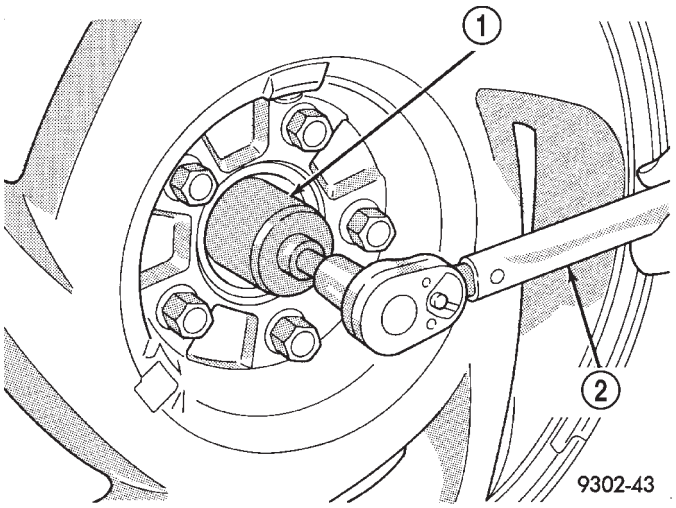


Fig. 36 Torquing Hub And Bearing Retaining Nut

1 – HUB/BEARING
2 – TORQUE WRENCH

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the wheel and tire assembly from the vehicle.

(3) Remove the ball joint stud to steering knuckle attaching nut and bolt (Fig. 37).

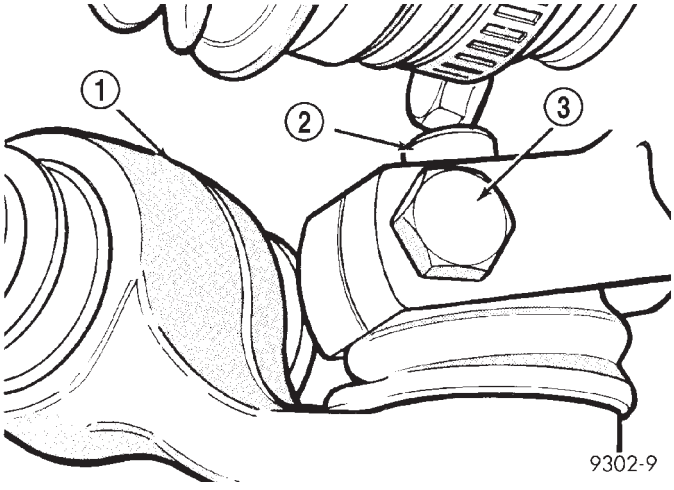


Fig. 37 Control Arm To Steering Knuckle Attachment

1 – LOWER CONTROL ARM
2 – BALL JOINT STUD
3 – CLAMP NUT AND BOLT

CAUTION: Pulling steering knuckle out from vehicle after releasing from ball joint can separate inner C/V joint. See Driveshafts.

CAUTION: When lower control arm is separated from steering knuckle, do not let ball joint seal hit up against steering knuckle. If ball joint seal hits steering knuckle, seal damage may occur. If ball joint seal becomes torn, replace seal before assembling lower control arm to knuckle.

(4) Carefully insert a pry bar between lower control arm and steering knuckle (Fig. 38). Push down on pry bar to separate ball joint stud from steering knuckle (Fig. 38).

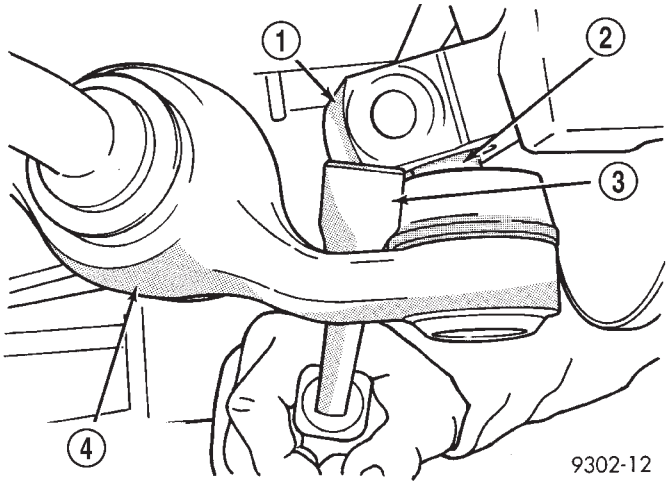


Fig. 38 Separating Ball Joint From Steering Knuckle

1 – STEERING KNUCKLE
2 – BALL JOINT STUD
3 – PRY BAR
4 – LOWER CONTROL ARM

(5) Remove tension strut to cradle attaching nut and washer from end of tension strut (Fig. 39). When removing tension strut nut, keep strut from turning by holding tension strut at flat using open end wrench (Fig. 39). **Discard tension strut to cradle retaining nut. A NEW tension strut to cradle nut must be used when installing tension strut.**

(6) Loosen and remove lower control arm pivot bushing to cradle assembly pivot bolt (Fig. 40).

(7) Separate lower control arm and tension strut from the cradle as an assembly. Lower control arm is removed from cradle, by first removing pivot bushing from cradle and then sliding tension strut out of isolator bushing (Fig. 41). Refer to TENSION STRUT in the DISASSEMBLY AND ASSEMBLY section in this group for the required procedure.

(8) Inspect lower control arm and tension strut (Fig. 42) for distortion. Check all bushings for signs of sever deterioration. Replace any bushings that show signs of sever deterioration.

REMOVAL AND INSTALLATION (Continued)

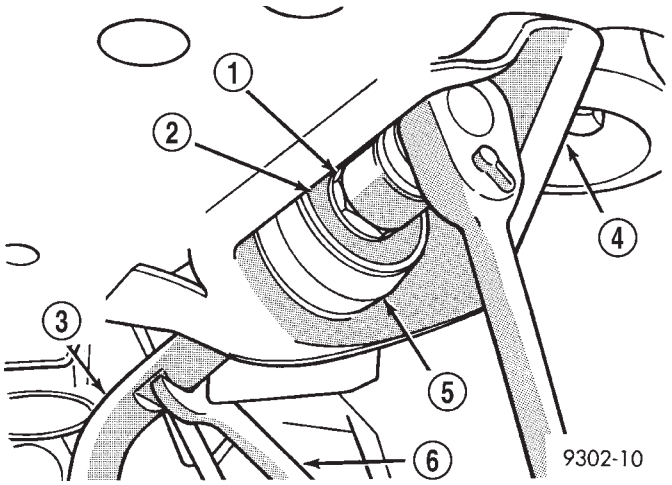


Fig. 39 Tension Strut To Cradle Mounting

1 – NUT
2 – WASHER
3 – TENSION STRUT
4 – CRADLE ASSEMBLY
5 – ISOLATOR BUSHING
6 – FLAT

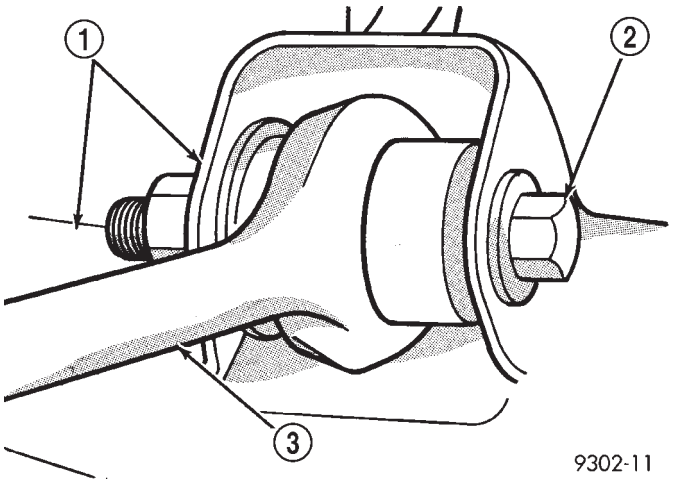


Fig. 40 Lower Control Arm Pivot Bolt

1 – CRADLE ASSEMBLY
2 – PIVOT BOLT
3 – LOWER CONTROL ARM

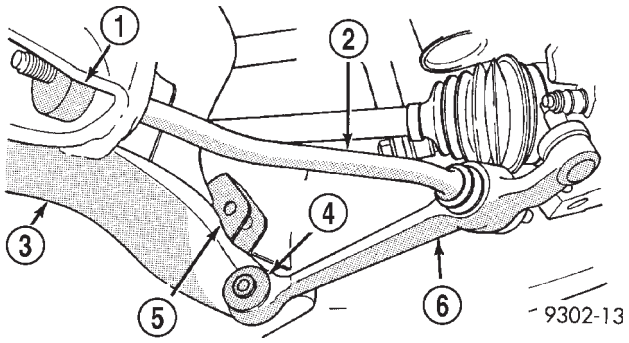


Fig. 41 Lower Control Arm Remove/Install

1 – ISOLATOR BUSHING
2 – TENSION STRUT
3 – CRADLE
4 – PIVOT BUSHING
5 – LOWER CONTROL ARM BRACKET
6 – LOWER CONTROL ARM

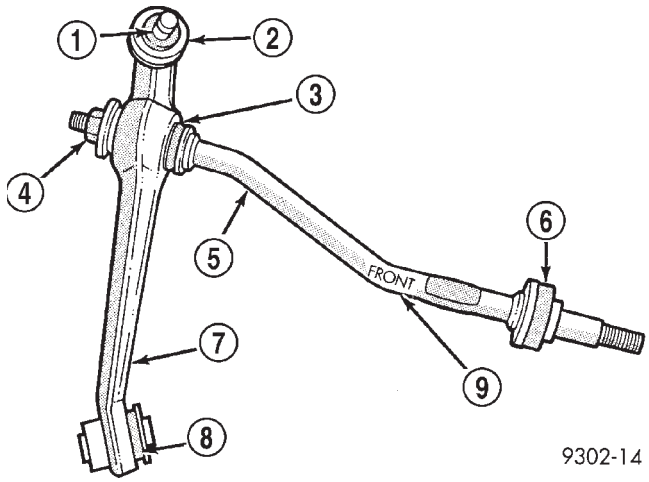


Fig. 42 Lower Control Arm And Tension Strut

1 – BALL JOINT STUD
2 – BALL JOINT SEAL
3 – LOWER CONTROL ARM TENSION STRUT BUSHING
4 – NUT
5 – TENSION STRUT
6 – TENSION STRUT TO CRADLE ISOLATOR BUSHING
7 – LOWER CONTROL ARM
8 – LOWER CONTROL ARM PIVOT BUSHING
9 – WORD “FRONT” STAMPED IN CONTROL ARM HERE

INSTALLATION

(1) Install the lower control arm and tension strut on the cradle using the following sequence. Install tension strut and isolator bushing into cradle first, then install lower control arm pivot bushing into bracket on cradle (Fig. 41).

(2) Install the lower control arm to cradle bracket attaching pivot bolt and nut (Fig. 40). **Do not tighten the lower control arm to cradle bracket attaching bolt at this time.**

(3) Install washer on end of tension strut (Fig. 39). Install a **NEW** tension strut to cradle bracket nut, on tension strut (Fig. 39). Tighten the tension strut to cradle bracket retaining nut to a torque of 130 N·m (95 ft. lbs.). When torquing tension strut nut, keep tension strut from turning by holding tension strut at flat using an open end wrench (Fig. 39).

CAUTION: Pulling steering knuckle out from vehicle after releasing from ball joint can separate inner C/V joint. See Driveshafts.

REMOVAL AND INSTALLATION (Continued)

CAUTION: When ball joint stud is installed into steering knuckle, do not let ball joint seal hit up against steering knuckle. If ball joint seal hits steering knuckle, seal damage may occur. If ball joint seal becomes torn, replace seal before assembling lower control arm to knuckle.

(4) Install lower ball joint stud into steering knuckle. Install steering knuckle to lower ball joint stud, clamp bolt and nut into steering knuckle (Fig. 37). Tighten the clamping bolt to a torque of 55 N·m (40 ft. lbs.).

(5) Install the wheel and tire assembly.

(6) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(7) Lower vehicle so the suspension is supporting vehicles weight (control arm at design height). Tighten the lower control arm pivot bushing to cradle bracket attaching bolt (Fig. 40) to a torque of 142 N·m (105 ft. lbs.).

STABILIZER BAR (FRONT)

REMOVAL

(1) Remove the 4 strut assembly upper mount to strut tower mounting nut and washer assemblies securing the right front strut in place (Fig. 43).

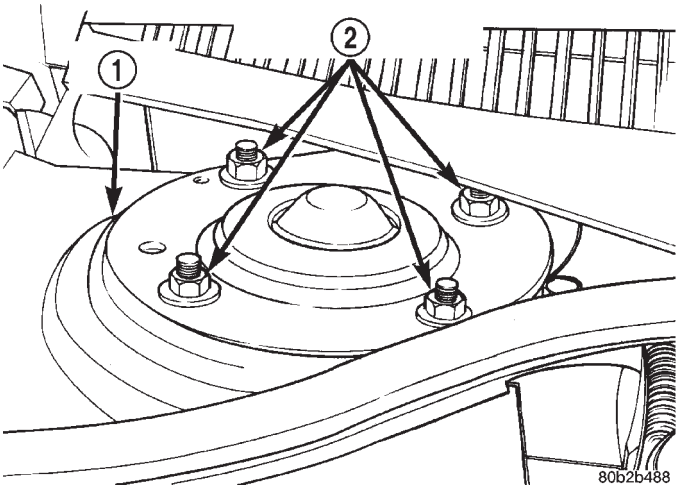


Fig. 43 Strut Assembly Upper Mounting

1 – SHOCK TOWER
2 – STRUT ASSEMBLY MOUNTING NUTS

(2) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(3) Remove right front wheel and tire assembly from the vehicle.

(4) Remove the right stabilizer bar attaching link nut at the strut assembly. Remove the attaching link from the strut assembly (Fig. 44).

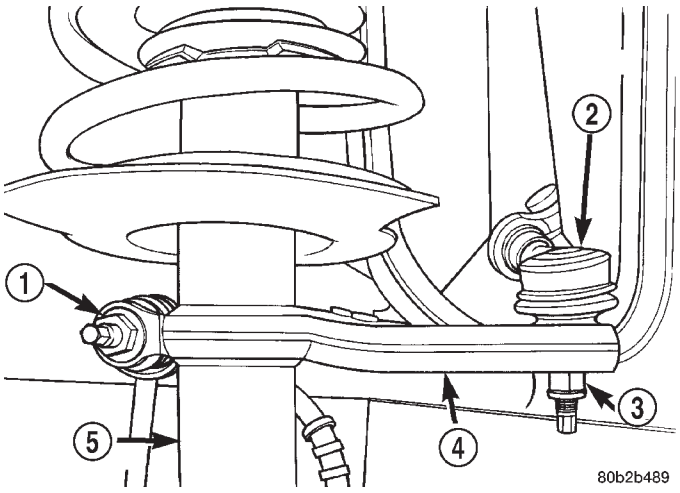


Fig. 44 Stabilizer Bar Link At Strut

1 – NUT
2 – OUTER TIE ROD
3 – NUT
4 – STEERING ARM
5 – STRUT ASSEMBLY

(5) Remove the left stablizer bar attaching link nut at the stabilizer bar (Fig. 45). Remove the attaching link from the stabilizer bar.

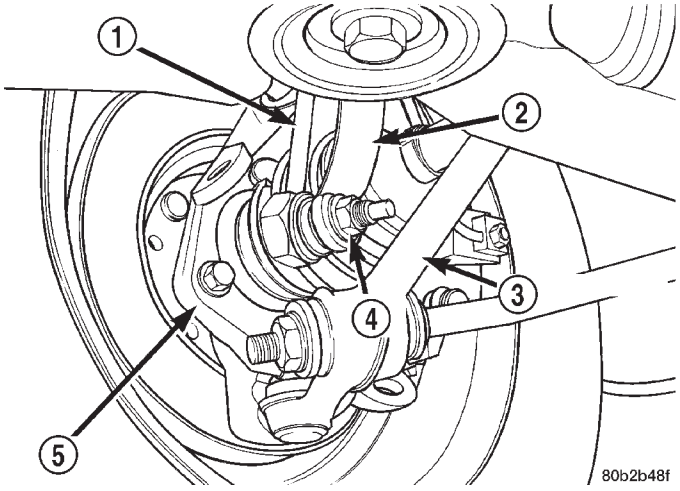


Fig. 45 Stabilizer Bar At Left Attaching Link

1 – ATTACHING LINK
2 – STABILIZER BAR
3 – LOWER ARM
4 – NUT
5 – KNUCKLE

(6) Loosen, but do not remove, the right outer tie rod end to strut arm attaching nut. Release right outer tie rod end from right strut steering arm using

REMOVAL AND INSTALLATION (Continued)

Puller, Special Tool C-3894A (Fig. 46), then remove nut and tie rod from the steering arm.

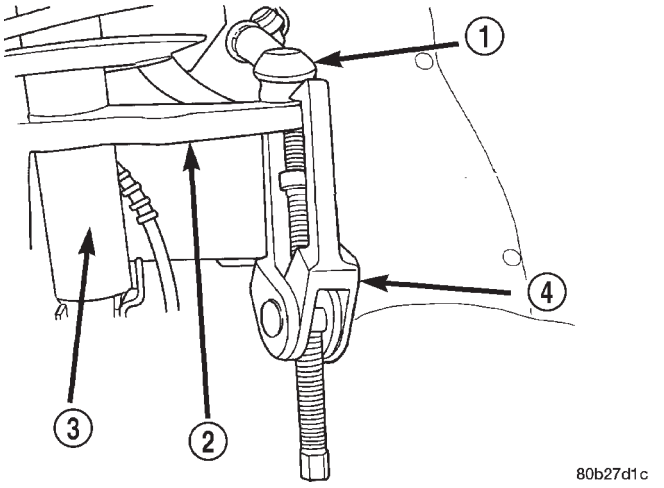


Fig. 46 Removing Outer Tie Rod From Steering Arm

1 – TIE ROD END
2 – STEERING ARM
3 – STRUT
4 – C-3894A

(7) If vehicle is equipped with antilock brakes, remove the speed sensor cable routing bracket from the strut assembly (Fig. 47).

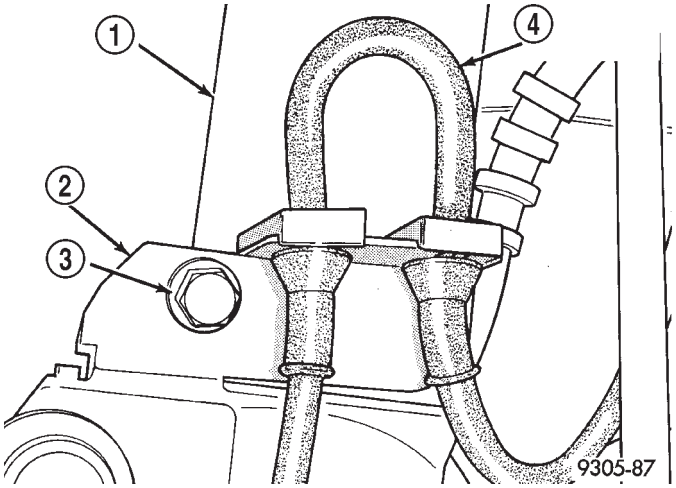


Fig. 47 Speed Sensor Cable Routing Bracket

1 – STRUT ASSEMBLY
2 – ROUTING BRACKET
3 – SCREW
4 – SPEED SENSOR CABLE

CAUTION: The strut assembly to steering knuckle bolts are serrated were they go through strut assembly and steering knuckle. When removing bolts, turn nuts off bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

(8) Remove the 2 strut assembly to steering knuckle attaching bolts (Fig. 48).

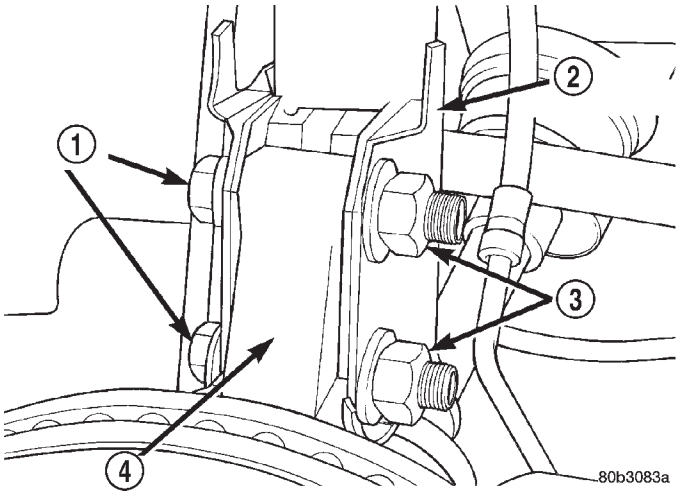


Fig. 48 Strut Assembly To Steering Knuckle Attaching Bolts

1 – BOLTS
2 – STRUT ASSEMBLY
3 – NUTS
4 – KNUCKLE

(9) Remove right front strut assembly from vehicle.

(10) Remove the nine bolts securing the structural collar to the engine oil pan and transaxle (Fig. 49).

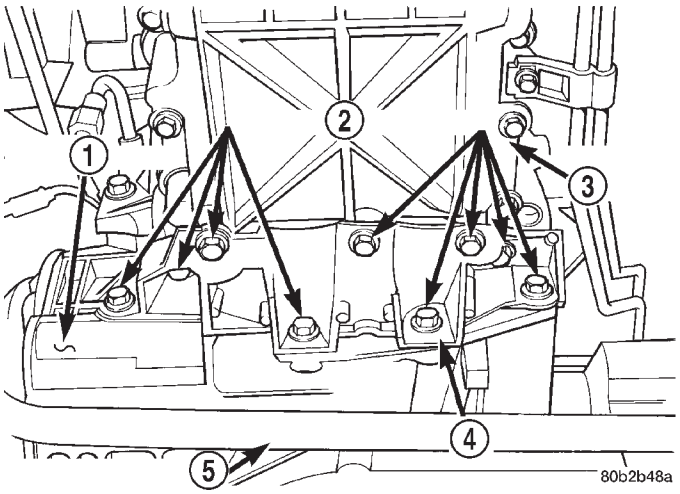


Fig. 49 Structural Collar

1 – TRANSAXLE
2 – MOUNTING BOLTS
3 – ENGINE OIL PAN
4 – STRUCTURAL COLLAR
5 – STABILIZER BAR

(11) Remove the 4 nuts attaching the engine motor mounts to the cradle assembly (Fig. 50).

REMOVAL AND INSTALLATION (Continued)

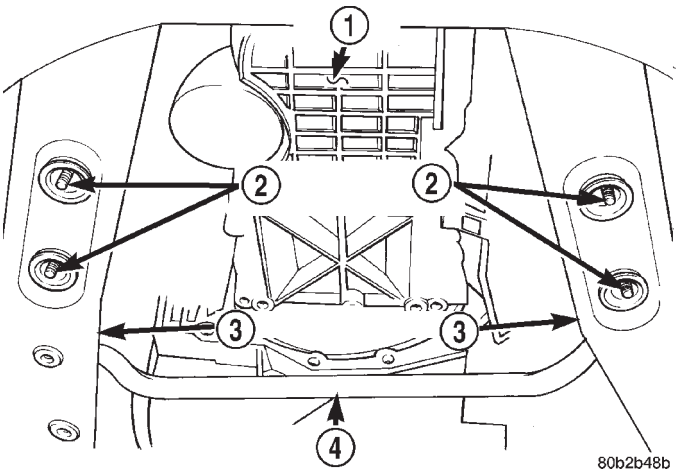


Fig. 50 Motor Mount To Cradle Assembly Attachment

1 – ENGINE OIL PAN
2 – MOTOR MOUNT ATTACHING NUTS
3 – CRADLE ASSEMBLY
4 – STABILIZER BAR

(12) Remove the bolts attaching each of the 2 stabilizer bushing retainers to the cradle assembly (Fig. 51).

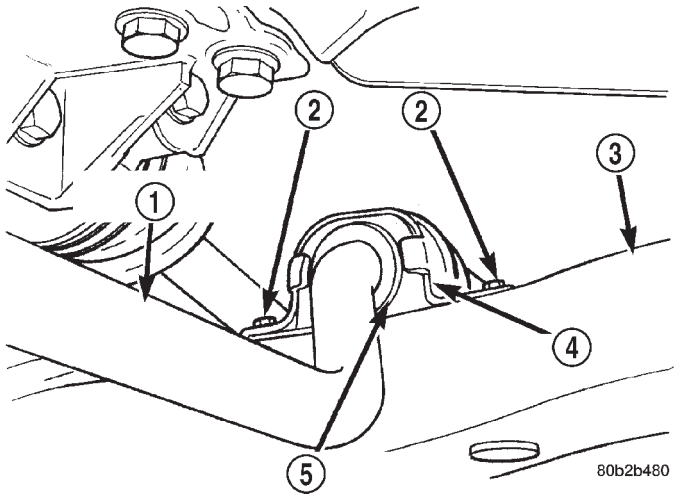


Fig. 51 Stabilizer Bar Isolator Bushing Attachment To Cradle

1 – STABILIZER BAR
2 – ATTACHING BOLTS
3 – CRADLE
4 – BUSHING RETAINER
5 – ISOLATOR BUSHING

(13) Remove both stabilizer bar isolator bushing retainers and bushings from stabilizer bar (Fig. 51).

(14) Position a transmission jack under the body of the engine oil pan (Fig. 52). Use a wood block as a buffer between the jack and the engine oil pan in order to avoid damage to the pan (Fig. 52). Carefully raise the jack until the motor mounts clear the cradle assembly. It may be necessary to raise the jack further.

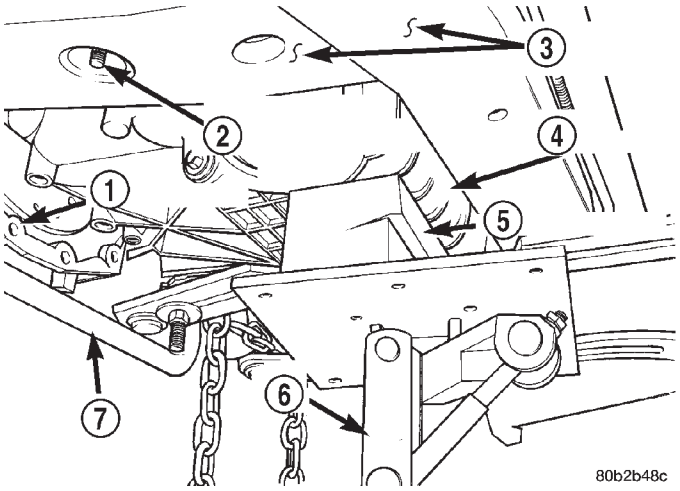


Fig. 52 Jack Positioning Below Engine Oil Pan

1 – TRANSAXLE
2 – RIGHT FRONT MOTOR MOUNT STUD
3 – CRADLE ASSEMBLY
4 – ENGINE OIL PAN
5 – WOOD BLOCK
6 – JACK
7 – STABILIZER BAR

(15) Remove the stabilizer bar out the right side by rotating it, taking advantage of the removed structural collar area between the engine and transaxle assembly. Remove the stabilizer bar out the right wheel opening by routing it in front of the right halfshaft then behind the right knuckle (Fig. 53).

CAUTION: Be careful not to pull knuckle outward, thus stretching halfshaft and possibly separating inner C/V joint. See Driveshafts. Keep knuckle in upright position.

INSTALLATION

(1) Install stabilizer bar by reversing the manner in which it was removed (Fig. 53). Rotate the bar the opposite direction used when removed and move it into mounting position.

CAUTION: Be careful not to pull knuckle outward, thus stretching halfshaft and possibly separating inner C/V joint. See Driveshafts. Keep knuckle in upright position.

(2) Lower the jack supporting the engine, guiding the motor mount studs into place in the cradle assembly (Fig. 52).

REMOVAL AND INSTALLATION (Continued)

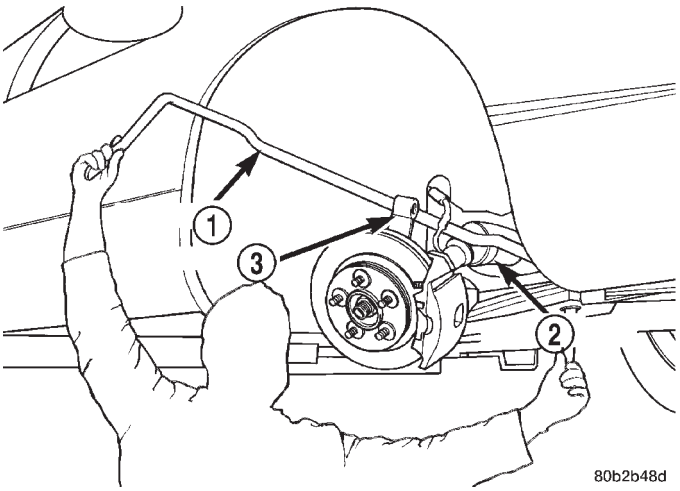


Fig. 53 Stabilizer Bar Removal and Installation

1 – STABILIZER BAR
2 – HALFSHAFT
3 – KNUCKLE

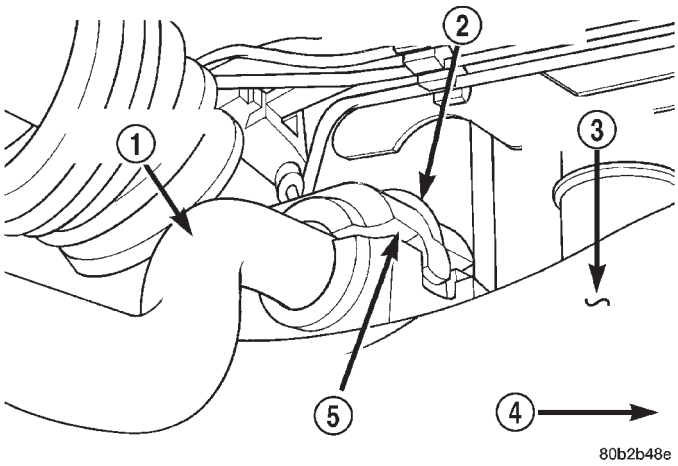


Fig. 54 Stabilizer Bar Isolator Bushing

1 – STABILIZER BAR
2 – STABILIZER BAR ISOLATOR BUSHING
3 – CRADLE ASSEMBLY
4 – FRONT OF CAR
5 – SLIT

(3) Install the 4 engine motor mount to cradle assembly attaching nuts (Fig. 50). Tighten the 4 nuts to a torque of 61 N·m (45 ft. lbs).

(4) Install the structural collar to the engine oil pan and the transaxle. The structural collar should be installed using the following sequence:

- Position collar onto engine oil pan and transaxle (Fig. 49).
- Install the 2 center collar bolts to oil pan bolts. Tighten bolts initially to 3 N·m (30 in. lbs).
- Install collar to transmission bolts and tighten to 61 N·m (45 ft. lbs).
- Install the remaining collar to engine oil pan bolts. starting with the center bolts and working outwards, tighten collar to oil pan bolts to 61 N·m (45 ft. lbs).

(5) Install stabilizer bar isolator bushings onto stabilizer bar with slits facing forward and flat side facing downward. **The stabilizer bar to cradle assembly bushings must be positioned on the stabilizer bar so the slit in the bushing is positioned toward front of vehicle** (Fig. 54).

(6) Install the isolator bushing retainers onto the stabilizer bar isolator bushings (Fig. 51).

CAUTION: When stabilizer bar is installed, position stabilizer bar so lower part of stabilizer bar is centered in the middle of the cradle assembly. Failure to do this may cause stabilizer bar to come in contact with other suspension components.

(7) Align the stabilizer bar bushing retainers with the mounting holes in the cradle assembly. Install and tighten the 4 stabilizer bar bushing retainer to cradle assembly attaching bolts to 61 N·m (45 ft. lbs.). (Fig. 51).

(8) Install left side stabilizer bar attaching link to left end of stabilizer bar (Fig. 45). Install attaching nut and tighten to 95 N·m (70 ft. lbs.).

(9) Install right front strut assembly into shock tower. Install the 4 strut assembly upper mount to shock tower attaching nuts (Fig. 43). Tighten the 4 strut mount to strut tower attaching nuts to a torque of 45 N·m (33 ft. lbs.) torque.

(10) Position steering knuckle into strut assembly.

CAUTION: The strut assembly to steering knuckle bolts are serrated were they go through strut assembly and steering knuckle. When installing bolts, turn nuts onto bolts DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned damage to steering knuckle will result.

(11) Install the strut assembly to steering knuckle attaching bolts (Fig. 48). Install nuts on attaching bolts. Tighten the strut assembly to steering knuckle attaching bolt nuts to a torque of 203 N·m (150 ft. lbs.).

(12) If the vehicle is equipped with antilock brakes. Install the front speed sensor cable routing bracket onto the front strut assembly (Fig. 47).

(13) Install outer tie rod on strut assembly. Install tie rod attaching nut (Fig. 44). Tighten the tie rod attaching nut to a torque of 37 N·m (27 ft. lbs.).

(14) Install stabilizer bar link on strut (Fig. 44). Tighten the stabilizer link attaching nut to a torque of 95 N·m (70 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(15) Install the right front wheel and tire assembly.

(16) Tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(17) Lower vehicle to the ground.

STABILIZER BAR ISOLATOR BUSHINGS (FRONT)

If only the stabilizer bar isolator bushings require service, they can be removed from the stabilizer bar without requiring the stabilizer bar to be removed from the vehicle.

REMOVAL

(1) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(2) Remove the 2 bolts attaching each of the 2 stabilizer bushing retainers and bushings to the cradle assembly (Fig. 55).

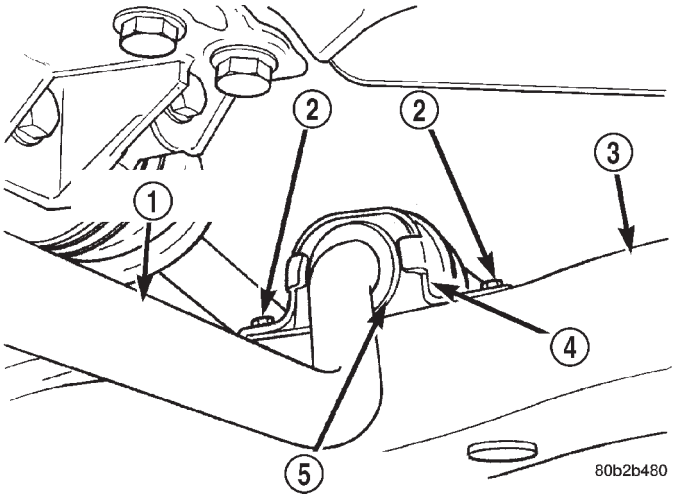


Fig. 55 Stabilizer Bar Isolator Bushing Attachment To Cradle

1 – STABILIZER BAR
2 – ATTACHING BOLTS
3 – CRADLE
4 – BUSHING RETAINER
5 – ISOLATOR BUSHING

(3) Remove the stabilizer bar isolator bushing retainers from the isolator bushings.

(4) Inspect for broken or distorted retainers and bushings. If bushing replacement is required, the bushing can be removed by opening the slit in the bushing and removing the bushing from around stabilizer bar. **The stabilizer bar to cradle assembly bushings must be positioned on the stabilizer bar so the slit in the bushing is positioned toward front of vehicle** (Fig. 56).

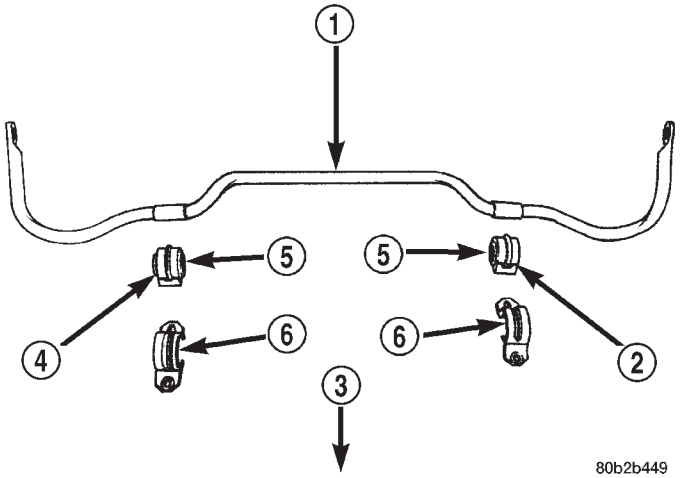


Fig. 56 Isolator Bushing Install Position

1 – STABILIZER BAR
2 – SLIT
3 – FRONT OF CAR
4 – SLIT
5 – ISOLATOR BUSHINGS
6 – RETAINERS

INSTALLATION

(1) Install bushings onto stabilizer bar with slits facing forward and flat side facing downward. **The stabilizer bar to cradle assembly bushings must be positioned on the stabilizer bar so the slit in the bushing is positioned toward front of vehicle** (Fig. 57).

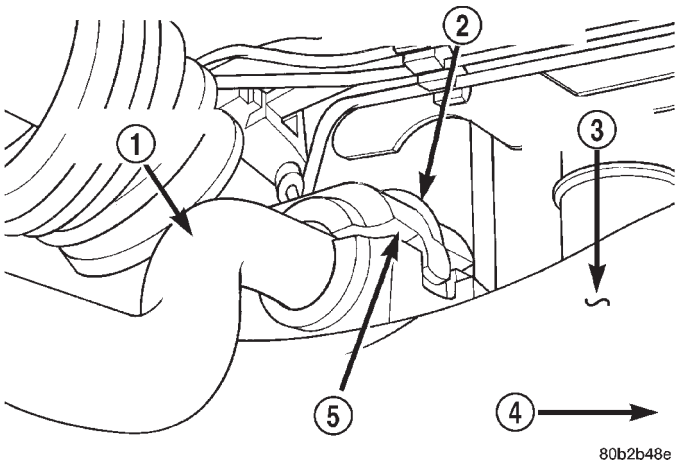


Fig. 57 Stabilizer Bar Isolator Bushing

1 – STABILIZER BAR
2 – STABILIZER BAR ISOLATOR BUSHING
3 – CRADLE ASSEMBLY
4 – FRONT OF CAR
5 – SLIT

REMOVAL AND INSTALLATION (Continued)

(2) Install the isolator bushing retainers back onto the stabilizer bar isolator bushings.

CAUTION: When stabilizer bar is installed. Position stabilizer bar, so lower part of stabilizer bar is centered in the middle of the cradle assembly. Failure to do this may cause stabilizer bar to come in contact with other suspension components.

(3) Align the stabilizer bar bushing retainers with the mounting holes in the cradle assembly (Fig. 55).

(4) Install and torque the 4 stabilizer bar bushing retainer to cradle assembly attaching bolts (2 each retainer) to 61 N·m (45 ft. lbs.).

(5) Lower vehicle to the ground.

WHEEL MOUNTING STUDS (FRONT)

CAUTION: If a wheel attaching stud needs to be replaced in the hub and bearing assembly, DO NOT be hammer them out of the hub flange. If a stud is removed by hammering it out of the bearing flange, damage to the hub and bearing assembly will occur leading to premature bearing failure.

NOTE: The hub and bearing assembly does not require removal from the steering knuckle to replace wheel attaching studs in the hub and bearing assembly.

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the 2 guide pin bolts mounting the caliper assembly to the steering knuckle (Fig. 58). Remove the caliper from the front steering knuckle. Refer to Disc Brake Caliper in the Removal And Installation Section in the Brake Group of this service manual for the caliper removal procedure.

(3) Remove rotor from hub by pulling it straight off wheel mounting studs (Fig. 59).

(4) Install a lug nut on the wheel stud to be removed from the hub and bearing assembly (Fig. 60) so the threads on stud are even with end of lug nut. Install Remover, Special Tool C-4150 on hub and bearing assembly flange and wheel stud (Fig. 60).

(5) Tighten down on special tool, to push wheel stud out of the hub and bearing assembly. When shoulder of wheel stud is past flange remove special tool from hub and bearing assembly. Remove lug nut from stud and remove wheel stud from flange.

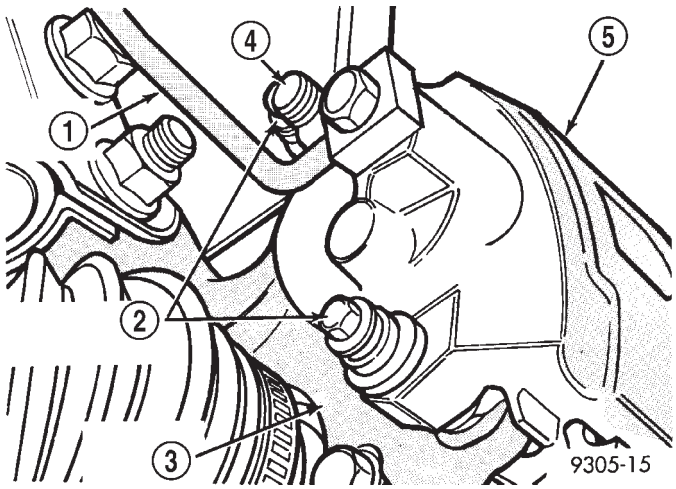


Fig. 58 Caliper Mounting

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

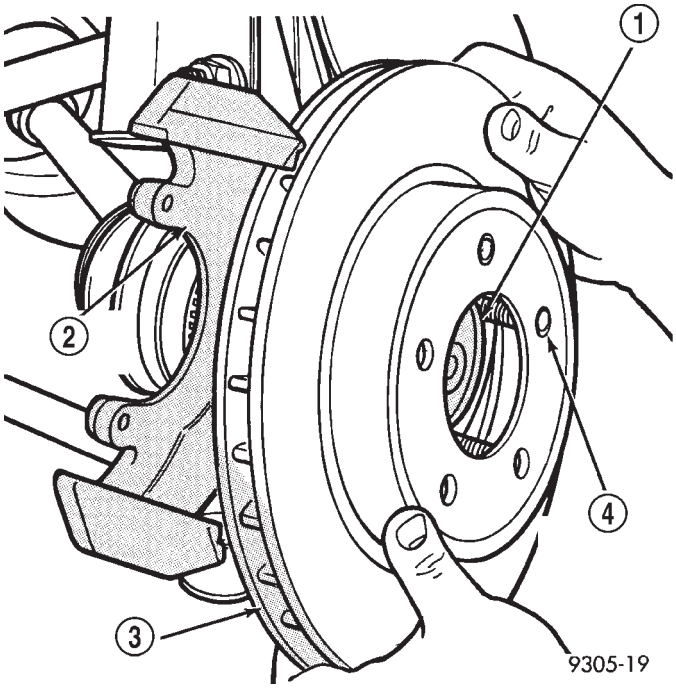


Fig. 59 Removing Rotor

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

INSTALLATION

(1) Install wheel stud into of hub and bearing assembly. Install washers on wheel stud, then install a wheel lug nut on stud with flat side of lug nut against washers (Fig. 61).

REMOVAL AND INSTALLATION (Continued)

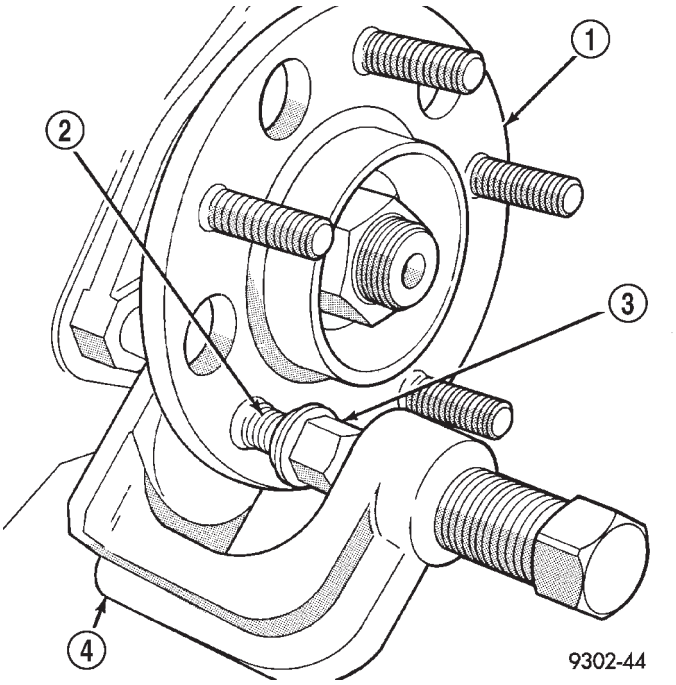


Fig. 60 Removing Wheel Stud From Hub And Bearing

1 – HUB/BEARING ASSEMBLY
2 – WHEEL STUD
3 – LUG NUT
4 – SPECIAL TOOL C-4150

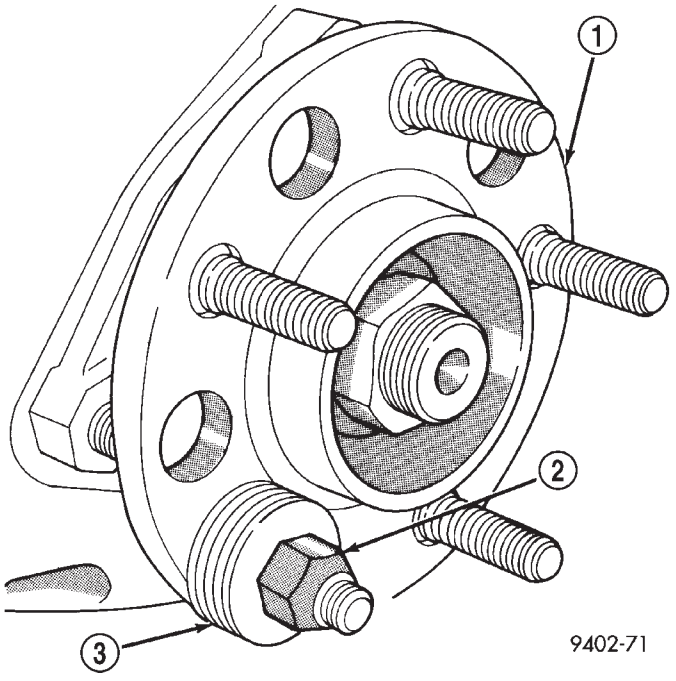


Fig. 61 Installing Wheel Stud Into Hub And Bearing

1 – HUB/BEARING ASSEMBLY
2 – WHEEL LUG NUT
3 – WASHERS

(2) Tighten the wheel lug nut, pulling the wheel stud into the flange of the hub and bearing assembly. When the head of the stud is fully seated against the bearing flange, remove lug nut and washers from wheel stud.

(3) Install the rotor on the hub and bearing assembly (Fig. 59).

(4) Install front brake caliper back over braking disc and align with caliper mounting holes on steering knuckle. Refer to Disc Brake Caliper in the Removal And Installation Section in the Brake Group of this service manual for the caliper installation procedure. Install the caliper to steering knuckle guide pin bolts (Fig. 58) and tighten to a torque of 19 N·m (168 in. lbs.).

(5) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(6) Lower the vehicle to the ground.

DISASSEMBLY AND ASSEMBLY

STRUT ASSEMBLY (FRONT)

The Strut assembly must be removed from the vehicle for it to be disassembled and assembled. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

For the disassembly and assembly of the strut assembly, use strut spring compressor, Pentastar Service Equipment (PSE) tool W-7200, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

DISASSEMBLY

(1) If both struts are being serviced at the same time, mark the coil spring and strut assembly according to which side of the vehicle the strut was removed from, and which strut the coil spring was removed from.

(2) Position the strut assembly in the strut coil spring compressor following the manufacturers instructions (Fig. 62). The strut clevis bracket should be positioned outward. It will be necessary to turn the strut assembly so the steering arm will clear the compressor arm. Position the upper and lower hooks on the coil spring, then place a clamp on the lower end of the coil spring, so the strut is held in place once the strut shaft nut is removed (Fig. 62).

DISASSEMBLY AND ASSEMBLY (Continued)

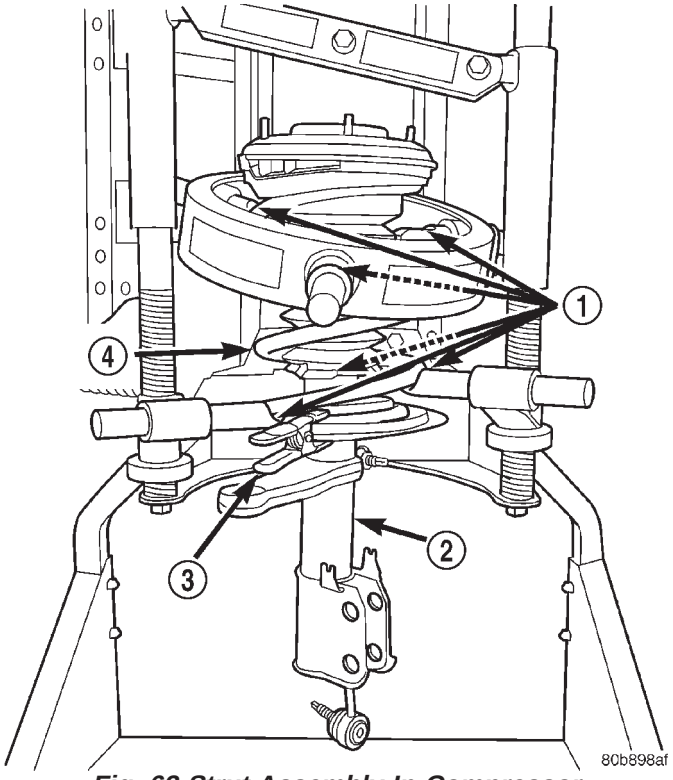


Fig. 62 Strut Assembly In Compressor

1 – HOOKS
2 – STRUT ASSEMBLY
3 – CLAMP
4 – COIL SPRING

WARNING: DO NOT REMOVE THE STRUT SHAFT NUT BEFORE THE COIL SPRING IS COMPRESSED. THE COIL SPRING IS HELD UNDER PRESSURE AND MUST BE COMPRESSED, REMOVING SPRING TENSION FROM THE UPPER MOUNT AND PIVOT BEARING, BEFORE THE SHAFT NUT IS REMOVED.

(3) Compress the coil spring until all coil spring tension is removed from the upper mount.

(4) Install Strut Nut Socket, Special Tool 6864, on the strut shaft retaining nut (Fig. 63). Next, install a socket on the hex on the end of the strut shaft. While holding the strut shaft from turning, remove the nut from the strut shaft.

(5) Remove the upper mount from the strut shaft.

(6) Remove the clamp from the bottom of the coil spring and remove the strut out through the bottom of the coil spring.

NOTE: If the seat and bearing, upper spring isolator, dust boot, or coil spring need to be serviced, proceed with the next step, otherwise, proceed with step 9.

NOTE: Before removal of the seat and bearing from the spring, note the flat on the inboard side of the seat and bearing outer perimeter. This must align with the inboard side of the strut (or rear of the clevis bracket) on reassembly. Also note the coil spring ending at the stop built into the seat and upper isolator.

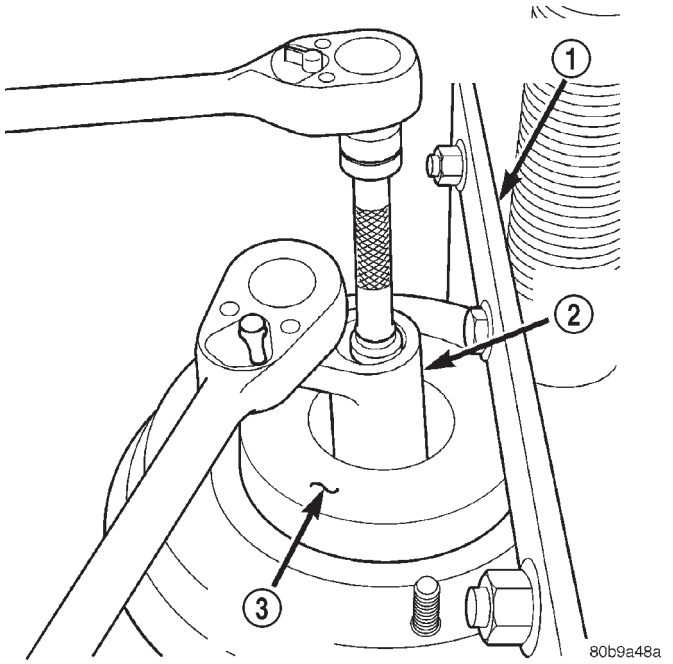


Fig. 63 Shaft Nut Removal/Installation

1 – SPRING COMPRESSOR
2 – SPECIAL TOOL 6864
3 – UPPER MOUNT

(7) Remove the seat and bearing, upper spring isolator and dust shield as an assembly from the top of the coil spring by pulling them straight up. They can be separated once removed from the vehicle. The jounce bumper cup may also come off when the assembly is removed. Check inside the dust shield.

NOTE: Before releasing the tension on the coil spring, note the position of the coil end on the upper end of the coil spring. When reistalled, it must be positioned in the same spot for proper alignment of the seat and bearing, and the strut.

(8) Release the tension from the coil spring by backing off the compressor drive fully. Push back the compressor hooks and remove the coil spring.

(9) Remove the jounce bumper cup and jounce bumper from the strut shaft by pulling each straight up and off the strut shaft (Fig. 64). If the jounce bumper cup is not present, check inside the dust shield. It may have stayed inside the dust shield.

(10) Remove the lower spring isolator from the lower spring seat on the strut (Fig. 65).

(11) Inspect the strut assembly components for the following and replace as necessary:

DISASSEMBLY AND ASSEMBLY (Continued)

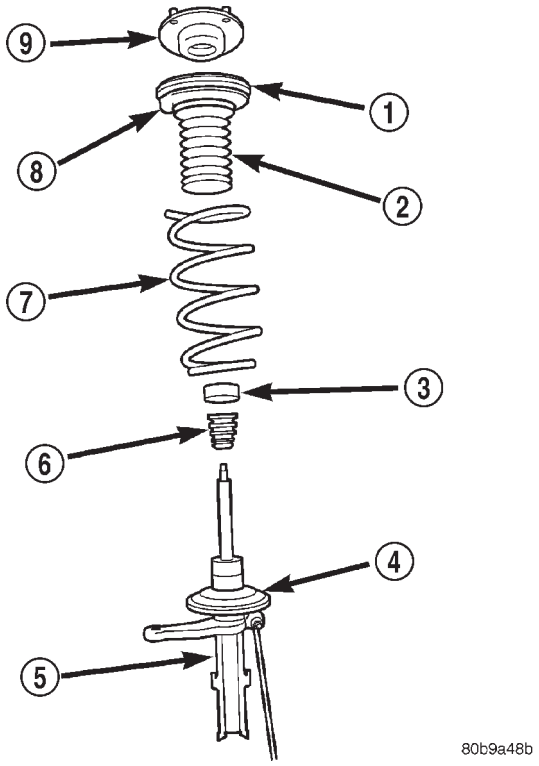


Fig. 64 Strut Assembly Components

1 – SEAT AND BEARING
2 – DUST SHIELD
3 – CUP
4 – LOWER SPRING ISOLATOR
5 – STRUT
6 – JOUNCE BUMPER
7 – COIL SPRING
8 – UPPER SPRING ISOLATOR
9 – UPPER MOUNT

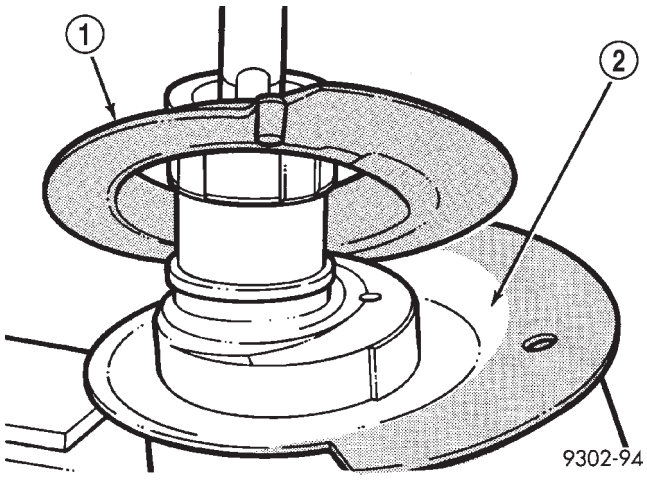


Fig. 65 Lower Spring Isolator

1 – LOWER SPRING ISOLATOR
2 – LOWER SPRING SEAT

- Inspect the strut for any condition of shaft binding over the full stroke of the shaft.
- Inspect the jounce bumper for cracks and signs of deterioration.
- Check the upper mount for cracks and distortion and its retaining studs for any sign of damage.
- Check the upper seat and bearing for cracks and distortion.
- Check for binding of the seat and bearing pivot bearing.
- Inspect the dust shield for rips and deterioration.
- Inspect the upper and lower spring isolators for material deterioration.
- Inspect the coil spring for any sign of damage to the coating.

ASSEMBLY

NOTE: If the coil spring has been removed from the spring compressor, proceed with the next step, otherwise, proceed with step 5.

(1) Place the coil spring in the compressor following the manufacturers instructions (Fig. 62). Before compressing the spring, rotate the spring to the position noted in the note between steps 7 and 8.

(2) If disassembled, reinstall the upper spring isolator and dust shield on seat and bearing. Match the step in the isolator with the step in the seat and bearing.

(3) Install the seat and bearing (with dust shield attached) on top of the coil spring. Position the step built into the seat and upper spring isolator against the coil end of the coil spring.

(4) Install the lower spring isolator on the lower spring seat of the strut (Fig. 65). The tabs on the isolator will align it on the strut spring seat. They straddle the expanded area of the lower spring seat on the strut.

(5) Install the jounce bumper on the strut shaft. The jounce bumper is to be installed with the smaller end pointing downward toward the lower seat (Fig. 64).

(6) Install the jounce bumper cup (Fig. 64) on the strut shaft. The cupped side goes on first.

(7) Install the strut through the bottom of the coil spring until the lower spring seat contacts the lower end of the coil spring. The inboard side of the strut (or rear of the clevis bracket) should align with the flat on the inboard side of the seat and bearing outer perimeter. Install the clamp on the lower end of the coil spring and strut, so the strut is held in place (Fig. 62).

DISASSEMBLY AND ASSEMBLY (Continued)

CAUTION: Before installing the upper mount, make sure the correct upper mount is being installed on the strut. DO NOT install a right mount on a left front strut or a left mount on a right front strut. Incorrect mount installation may cause poor vehicle ride and steering feel, and excessive front end noise. A lead or drift condition may also be the result. Left and right mounts look similar, but are different from one another. Looking down at the top of the upper mount, 2 tabs can be seen, (Fig. 66) and (Fig. 67), down inside the mount center well. A rectangular hole can be seen on the edge of the mount mounting surface (Fig. 66) and (Fig. 67). This is always in the 10 o'clock position when observing rubber tab positioning, whether a left or right mount is being observed. Once this hole is located in the 10 o'clock position, the tabs should be in the positions as shown (Fig. 66) and (Fig. 67). The right upper mount should also have a white dot painted on its mounting face.

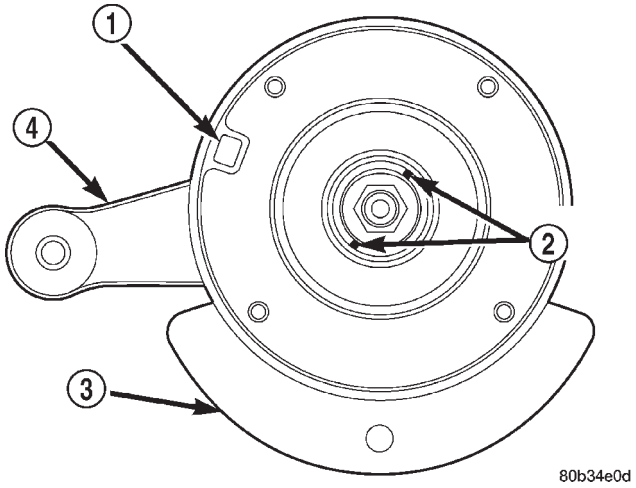


Fig. 66 Left Front Strut Upper Mount

1 – NOTCH
2 – RUBBER TABS
3 – OUTBOARD STRUT COIL SPRING SEAT
4 – STEERING ARM

(8) Install the strut upper mount over the strut shaft and onto the top of the seat and bearing. Loosely install the retaining nut on the strut shaft.

(9) Install Strut Nut Socket (on the end of a torque wrench), Special Tool 6864, on the strut shaft retaining nut (Fig. 63). Next, install a socket on the hex on the end of the strut shaft. While holding the strut shaft from turning, tighten the strut shaft retaining nut to a torque of 94 N·m (70 ft. lbs.).

(10) Slowly release the tension from the coil spring by backing off the compressor drive fully. As the tension is relieved, make sure the upper mount and seat and bearing align properly. Verify the upper mount does not bind.

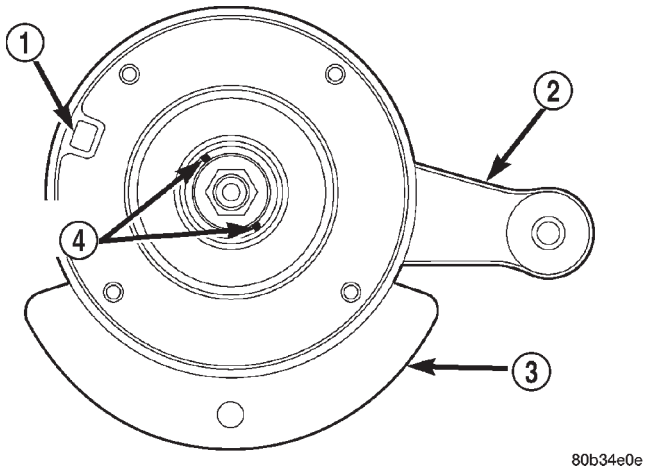


Fig. 67 Right Front Strut Upper Mount

1 – NOTCH
2 – STEERING ARM
3 – OUTBOARD STRUT COIL SPRING SEAT
4 – RUBBER TABS

(11) Remove the clamp from the lower end of the coil spring and strut. Push back the spring compressor upper and lower hooks, then remove the strut assembly from the spring compressor.

(12) Install the strut assembly on the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

LOWER CONTROL ARM PIVOT BUSHING

To replacement the lower control arm pivot bushing, the control arm and tension strut assembly must be removed from the vehicle. The removal and replacement of the lower control arm pivot bushing must be performed using an arbor press.

DISASSEMBLY

(1) Raise vehicle using a frame contact type hoist or supported as required using jackstands. See Hoisting in the Lubrication and Maintenance group of this service manual for the required hoisting procedure to be used for this vehicle.

(2) Remove lower control arm and tension strut as an assembly from the vehicle. See Lower Control Arm Removal in this section of the service manual for the required removal procedure.

(3) Separate the tension strut from the lower control arm assembly.

(4) Position lower control arm in arbor press with large end of pivot bushing inside Receiver, Special Tool MB-990799, and special tool supporting lower control arm (Fig. 68). Position Remover, Special Tool, 6644-2 on top of pivot bushing (Fig. 68). Using the arbor press, press the lower control arm pivot bushing out of lower control arm.

DISASSEMBLY AND ASSEMBLY (Continued)

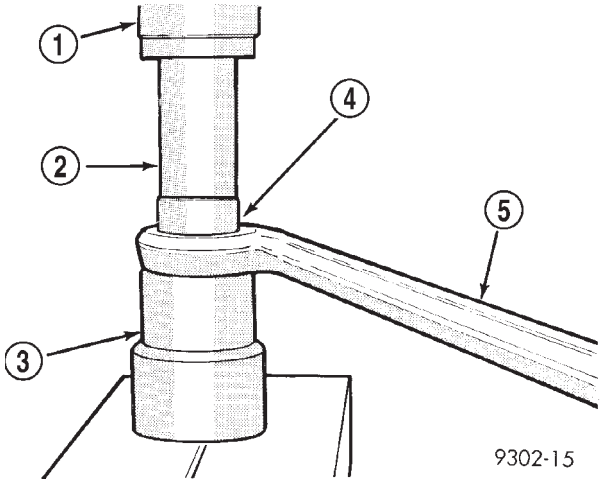


Fig. 68 Lower Control Arm Pivot Bushing Removal

1 – ARBOR PRESS RAM
2 – SPECIAL TOOL 6644-2
3 – SPECIAL TOOL MB990799
4 – PIVOT BUSHING
5 – LOWER CONTROL ARM

(5) Remove the pressed out lower control arm pivot bushing from the Receiver, Special Tool MB-990799 and discard.

ASSEMBLY

(1) Turn the lower control arm over in the arbor press. Position the lower control arm so it is supported by Receiver, Special Tool, MB-990799 as shown in (Fig. 69).

(2) Position new pivot bushing in lower control arm so it is square with the bushing hole. Position Installer, Special Tool 6644-1 on top of pivot bushing, with pivot bushing setting in recessed area of Installer (Fig. 69). Press the pivot bushing into the lower control arm.

(3) Press lower control arm pivot bushing into lower control arm until Installer, Special Tool 6644-1 squarely bottoms against surface of lower control arm (Fig. 70). When Installer, Special Tool 6644-1 squarely bottoms on control arm, bushing is installed to the correct position in control arm.

(4) Install tension strut into the tension strut bushing in lower control arm. Position tension strut in lower control as shown in, (Fig. 71) with word FRONT stamped in tension strut positioned away from control arm. With an open end wrench on flat of tension strut to stop tension strut from turning. Tighten the **NEW** tension strut to lower control retaining nut to a torque of 130 N·m (95 ft. lbs.)

(5) Install lower control arm and tension strut as an assembly back on the vehicle. See Lower Control Arm Installation in this section of the service manual for the required installation procedure.

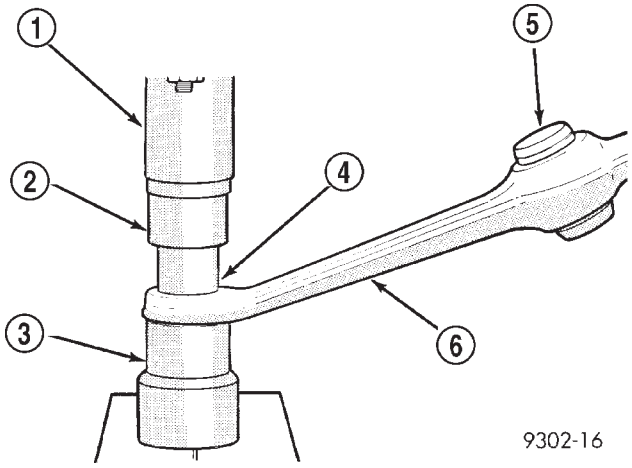


Fig. 69 Installing Lower Control Arm Pivot Bushing

1 – ARBOR PRESS RAM
2 – SPECIAL TOOL 6644-1
3 – SPECIAL TOOL MB990799
4 – PIVOT BUSHING
5 – TENSION STRUT BUSHING
6 – LOWER CONTROL ARM

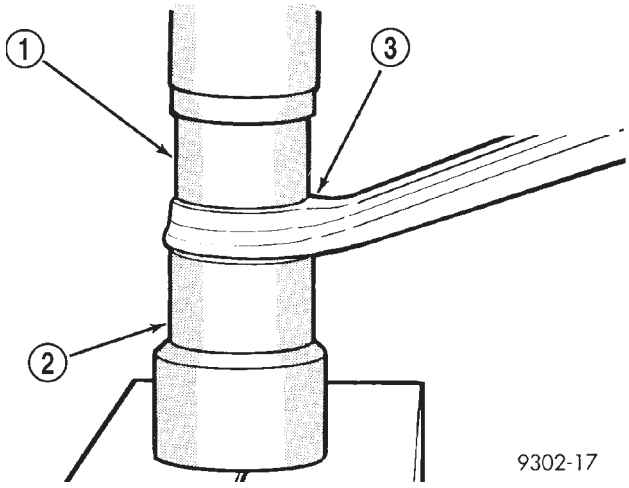


Fig. 70 Pivot Bushing Installed In Lower Control Arm

1 – SPECIAL TOOL 6644-1
2 – SPECIAL TOOL MB990799
3 – PRESS PIVOT BUSHING INTO LOWER CONTROL ARM UNTIL INSTALLER TOUCHES THIS SURFACE OF CONTROL ARM

LOWER CONTROL ARM TENSION STRUT BUSHING

To replace the lower control arm tension strut bushing, the control arm and tension strut assembly must be removed from the vehicle. The removal and replacement of the lower control arm tension strut bushing must be performed using an arbor press.

DISASSEMBLY AND ASSEMBLY (Continued)

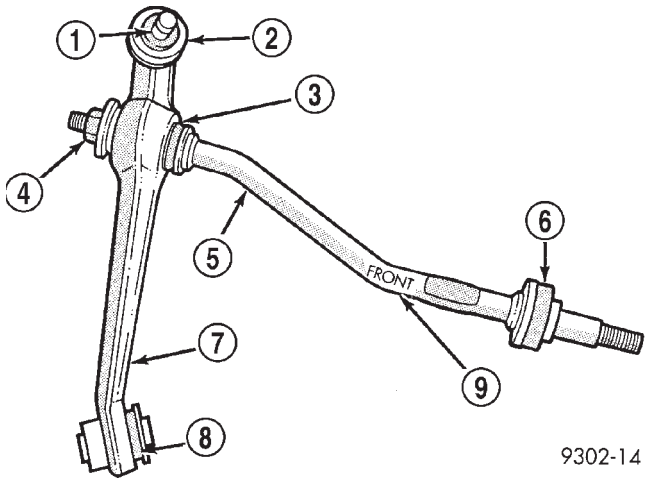


Fig. 71 Tension Strut Installed In Lower Control Arm

1 – BALL JOINT STUD
2 – BALL JOINT SEAL
3 – LOWER CONTROL ARM TENSION STRUT BUSHING
4 – NUT
5 – TENSION STRUT
6 – TENSION STRUT TO CRADLE ISOLATOR BUSHING
7 – LOWER CONTROL ARM
8 – LOWER CONTROL ARM PIVOT BUSHING
9 – WORD "FRONT" STAMPED IN CONTROL ARM HERE

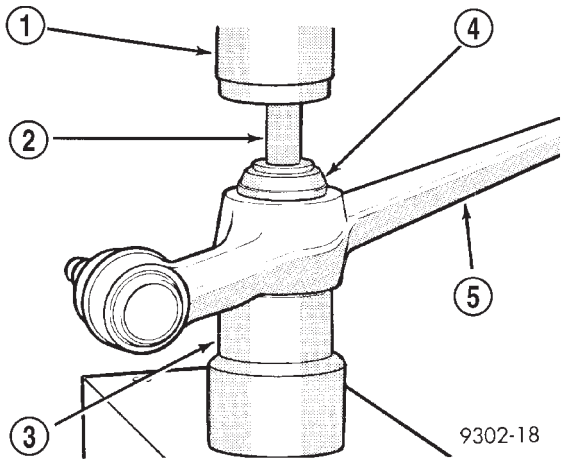


Fig. 72 Removing Lower Control Arm Tension Strut Bushing

1 – ARBOR PRESS RAM
2 – SPECIAL TOOL 6644-4
3 – SPECIAL TOOL MB990799
4 – TENSION STRUT BUSHING
5 – LOWER CONTROL ARM

DISASSEMBLY

(1) Raise the vehicle using a frame contact type hoist or supported as required using jackstands. See Hoisting in the Lubrication and Maintenance group of this service manual for the required hoisting or jacking procedure to be used for this vehicle.

(2) Remove tire and wheel from vehicle.

(3) Remove lower control arm and tension strut as an assembly from the vehicle. See Lower Control Arm Removal in this section of the service manual for the required removal procedure.

(4) Separate the tension strut from the lower control arm assembly.

(5) Position lower control arm in arbor press with tension strut bushing inside Receiver, Special Tool MB-990799 and special tool supporting lower control arm (Fig. 72). Position Remover, Special Tool, 6644-4 on top of tension strut bushing (Fig. 72). Press Remover, Special Tool, 6644-4 down through the tension strut bushing until the arbor press can push it no farther. As Remover, Special Tool, 6644-4 is pressed down through tension strut bushing it will cut the bushing into two pieces.

(6) Remove lower control arm assembly from arbor press. Remove pieces of tension strut and Remover, Special Tool 6644-4, from lower control arm.

ASSEMBLY

(1) Thoroughly lubricate the replacement tension strut bushing, lower control arm and Installer, Special Tool 6644-3 using Mopar® Rubber Bushing Installation Lube, or an equivalent.

(2) By hand, install tension strut bushing into large end of Installer, Special Tool 6644-3. Press bushing into installer as far as it will go by hand.

(3) Position lower control arm in arbor press, so tension strut hole in lower control arm is centered on Receiver, Special Tool MB-990799 (Fig. 73). Position Installer, Special Tool 6644-3 with previously installed bushing, inside of tension strut bushing hole in lower control arm (Fig. 73). Position Installer, Special Tool 6644-2 on top of tension strut bushing (Fig. 73). Using the arbor press, press the tension strut bushing into the lower control arm. As the bushing is being pressed into the control arm a pop will be heard. When the pop is heard Installer, Special Tool 6644-3 will slightly move up off the control arm. At this time remove the control arm assembly from the arbor press and pull Special Tool 6644-3 off the tension strut bushing in the control arm. Tension strut bushing is now installed.

(4) Install tension strut into the tension strut bushing in lower control arm. Position tension strut in lower control as shown in, (Fig. 74) with word FRONT stamped in tension strut positioned away from control arm. With an open end wrench on flat of tension strut to stop tension strut from turning. Tighten the **NEW** tension strut to lower control retaining nut to a torque of 130 N·m (95 ft. lbs.)

(5) Install lower control arm and tension strut as an assembly back on the vehicle. See Lower Control Arm Installation in this section of the service manual for the required installation procedure.

DISASSEMBLY AND ASSEMBLY (Continued)

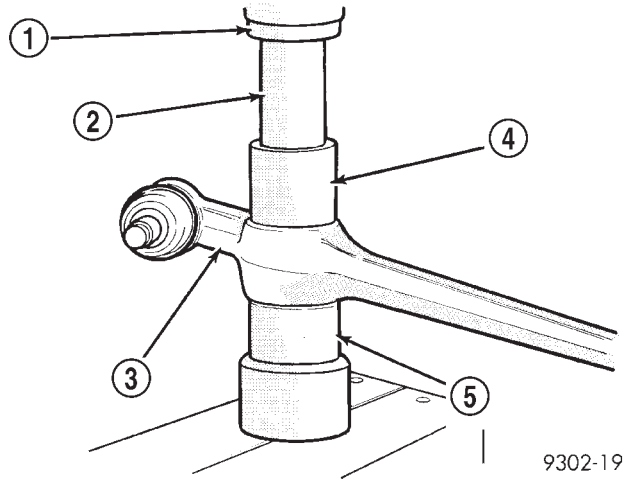


Fig. 73 Installing Tension Strut Bushing Into Lower Control Arm

1 – ARBOR PRESS
2 – SPECIAL TOOL 6644-2
3 – LOWER CONTROL ARM
4 – SPECIAL TOOL 6644-3
5 – SPECIAL TOOL MB990799

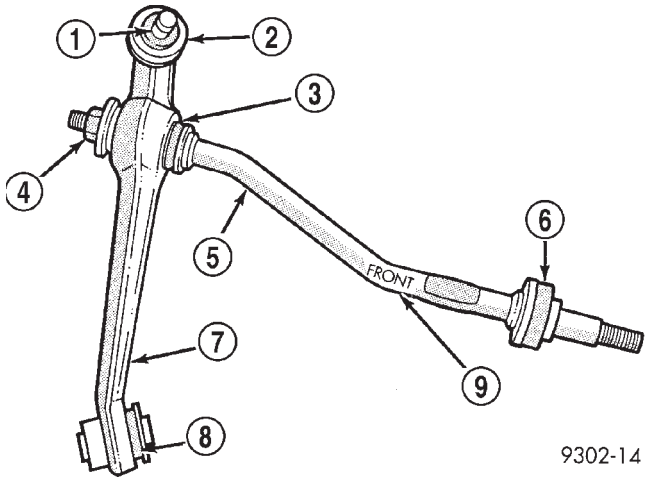


Fig. 74 Tension Strut Installed In Lower Control Arm

1 – BALL JOINT STUD
2 – BALL JOINT SEAL
3 – LOWER CONTROL ARM TENSION STRUT BUSHING
4 – NUT
5 – TENSION STRUT
6 – TENSION STRUT TO CRADLE ISOLATOR BUSHING
7 – LOWER CONTROL ARM
8 – LOWER CONTROL ARM PIVOT BUSHING
9 – WORD “FRONT” STAMPED IN CONTROL ARM HERE

TENSION STRUT

To replace the tension strut, the tension strut and lower control arm first MUST be removed as an assembly from the vehicle.

DISASSEMBLY

(1) Raise vehicle using a frame contact type hoist or supported as required using jack stands. See Hoisting in the Lubrication and Maintenance group of this service manual for the required hoisting or jacking procedure to be used for this vehicle.

(2) Remove the wheel and tire from the car.

(3) Remove lower control arm and tension strut as an assembly from the vehicle. See Lower Control Arm Removal in this section of the service manual for the required removal procedure.

(4) Separate the tension strut from the lower control arm assembly.

(5) Inspect tension strut bushing in lower control arm for excessive wear or deterioration. If tension strut bushing is found to be defective replace lower control tension strut bushing at this time. Refer to Lower Control Arm Bushing Service in this section of the service for tension strut removal and installation procedure.

ASSEMBLY

(1) Position tension strut in lower control as shown in (Fig. 75), with word FRONT stamped in tension strut positioned away from control arm (Fig. 75). With an open end wrench on flat of tension strut to keep tension strut from turning. Tighten **NEW** tension strut to lower control retaining nut to a torque of 130 N·m (95 ft. lbs.).

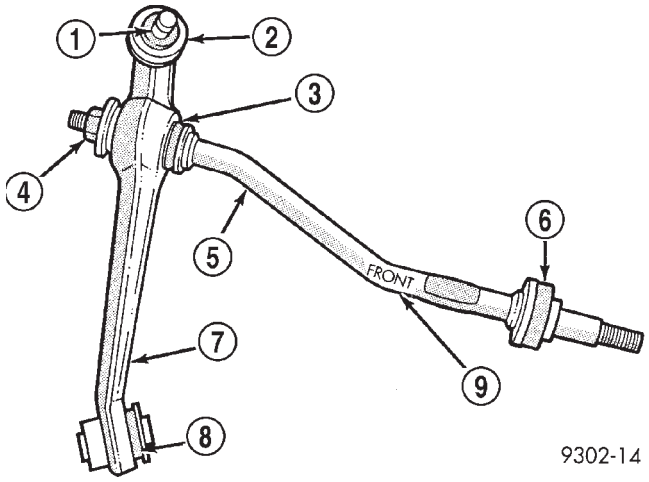


Fig. 75 Tension Strut Installed In Lower Control Arm.

1 – BALL JOINT STUD
2 – BALL JOINT SEAL
3 – LOWER CONTROL ARM TENSION STRUT BUSHING
4 – NUT
5 – TENSION STRUT
6 – TENSION STRUT TO CRADLE ISOLATOR BUSHING
7 – LOWER CONTROL ARM
8 – LOWER CONTROL ARM PIVOT BUSHING
9 – WORD “FRONT” STAMPED IN CONTROL ARM HERE

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Install lower control arm and tension strut as an assembly back on the vehicle. See Lower Control Arm Installation in this section of the service manual for the required installation procedure.

(3) Install washer on end of tension strut (Fig. 76). Install a **NEW** tension strut to cradle bracket nut, on tension strut (Fig. 76). Tighten the tension strut to cradle bracket retaining nut to a torque of 130 N·m (95 ft. lbs.). When torquing tension strut nut, keep tension strut from turning by holding tension strut at flat using a large open end wrench (Fig. 76).

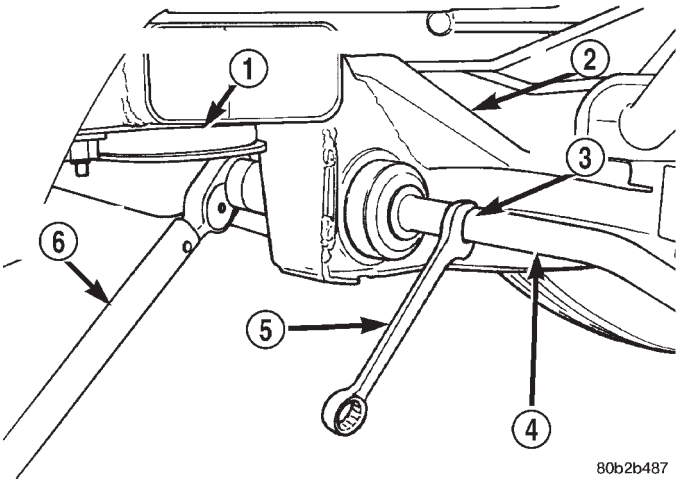


Fig. 76 Tension Strut To Cradle Mounting

1 – CRADLE ISOLATOR BUSHING
2 – CRADLE
3 – FLAT
4 – TENSION STRUT
5 – OPEN END WRENCH
6 – TORQUE WRENCH

(4) Install the wheel and tire assembly.

(5) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(6) Lower the vehicle to the ground so the suspension is supporting the vehicles full weight (control arm at design height). Tighten the lower control arm pivot bushing to cradle bracket attaching bolt (Fig. 77) to a torque of 142 N·m (105 ft. lbs.).

TENSION STRUT CRADLE BUSHING

To remove tension strut to cradle bushings from vehicle for replacement, the tension strut and lower control arm first MUST be removed as an assembly from the vehicle.

REMOVAL

(1) Remove lower control arm and tension strut as an assembly from the vehicle. See Lower Control Arm in the Removal and Installation section of this service manual for the required removal procedure.

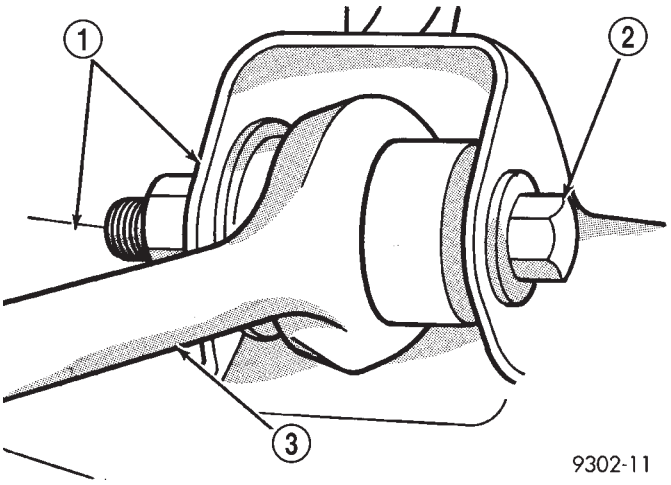


Fig. 77 Lower Control Arm Pivot Bolt

1 – CRADLE ASSEMBLY
2 – PIVOT BOLT
3 – LOWER CONTROL ARM

(2) Remove the tension strut to cradle isolator bushing from the tension strut. Install replacement isolator bushing on tension strut until it is seated against retaining washer (Fig. 78).

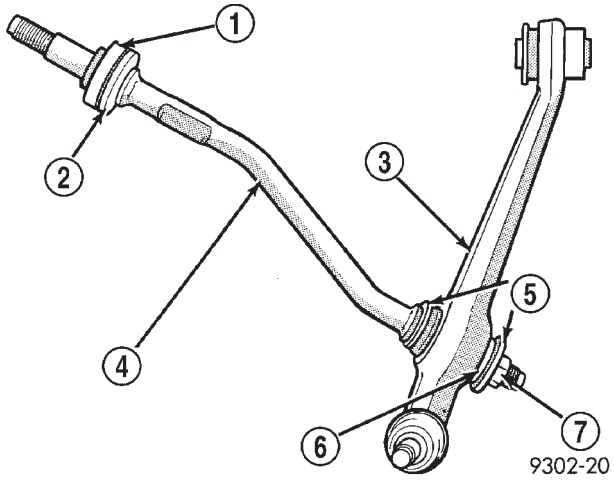


Fig. 78 Tension Strut Bushing Installation On Tension Strut

1 – TENSION STRUT TO CRADLE BUSHING
2 – RETAINING WASHER
3 – LOWER CONTROL ARM
4 – TENSION STRUT
5 – RETAINING WASHERS
6 – TENSION STRUT TO LOWER CONTROL ARM BUSHING
7 – NUT

(3) Remove the tension strut to cradle isolator bushing from the cradle assembly. Install replacement tension strut to cradle isolator bushing into

DISASSEMBLY AND ASSEMBLY (Continued)

cradle, until squarely seated against cradle assembly (Fig. 79).

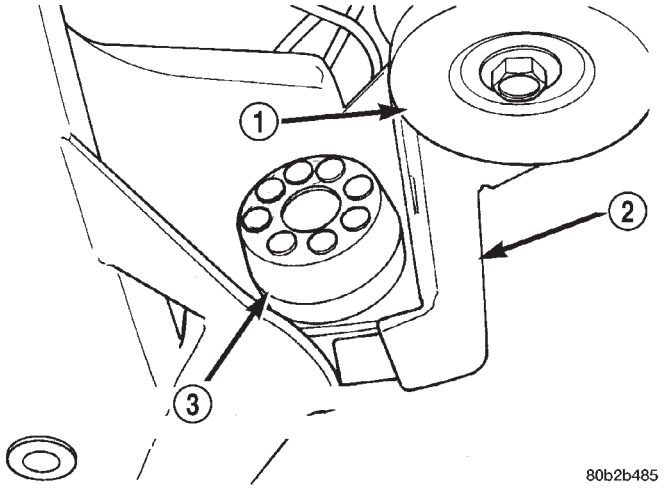


Fig. 79 Tension Strut Bushing Installed In Cradle

1 – CRADLE ISOLATOR BUSHING
2 – CRADLE
3 – TENSION STRUT TO CRADLE ISOLATOR BUSHING

INSTALLATION

(1) Install lower control arm and tension strut as an assembly back on the vehicle. See Lower Control Arm in the Removal and Installation section of this service manual for the required installation procedure.

(2) Install washer on end of tension strut (Fig. 80). Install a **NEW** tension strut to cradle bracket nut, on tension strut (Fig. 80)..

(3) Tighten the tension strut to cradle bracket retaining nut to a torque of 130 N·m (95 ft. lbs.). When torquing tension strut nut, keep tension strut from turning by holding tension strut at flat using an open end wrench (Fig. 81)

(4) Install the wheel and tire assembly.

(5) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(6) Lower the vehicle to the ground so the suspension is supporting the full weight of the vehicle (control arm at design height). Tighten the lower control arm pivot bushing attaching bolt (Fig. 82) to a torque of 142 N·m (105 ft. lbs.).

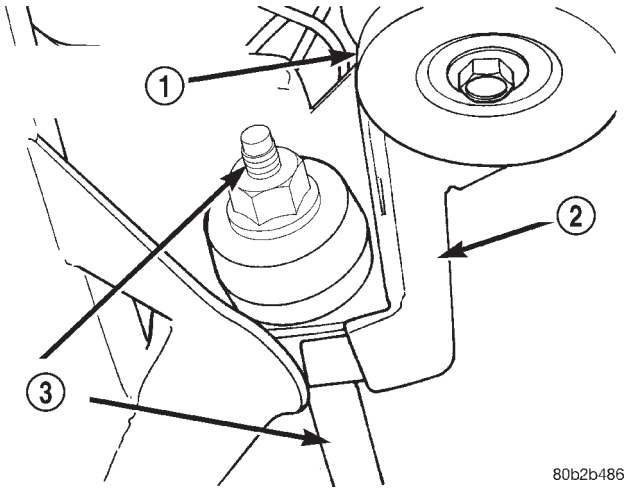


Fig. 80 Tension Strut To Cradle Mounting

1 – CRADLE ISOLATOR BUSHING
2 – CRADLE
3 – TENSION STRUT

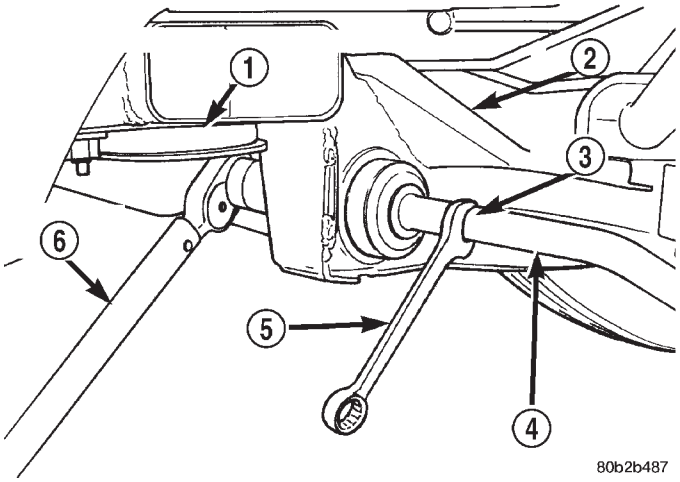


Fig. 81 Proper Nut Torquing Procedure

1 – CRADLE ISOLATOR BUSHING
2 – CRADLE
3 – FLAT
4 – TENSION STRUT
5 – OPEN END WRENCH
6 – TORQUE WRENCH

DISASSEMBLY AND ASSEMBLY (Continued)

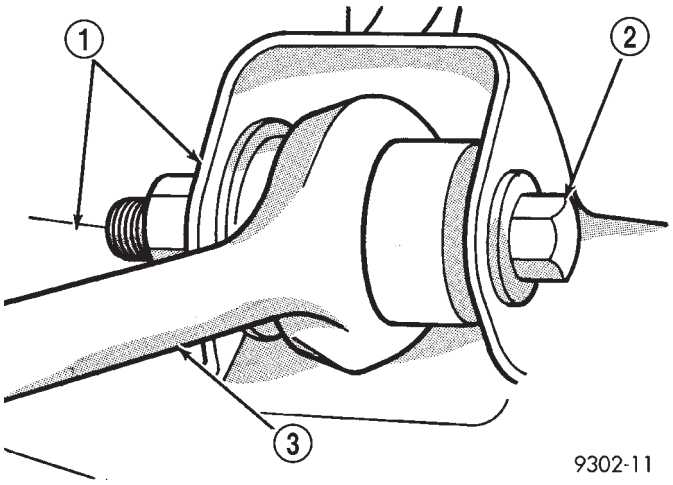


Fig. 82 Lower Control Arm Pivot Bushing Bolt

1 – CRADLE ASSEMBLY
2 – PIVOT BOLT
3 – LOWER CONTROL ARM

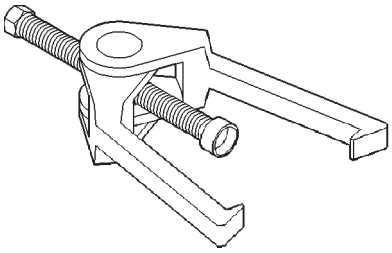
SPECIFICATIONS

FRONT SUSPENSION FASTENER TORQUES

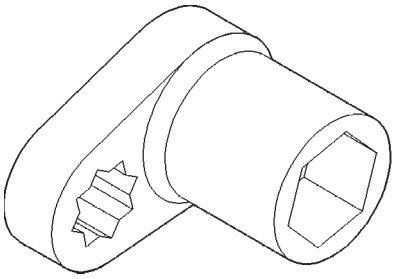
DESCRIPTION	TORQUE
STRUT ASSEMBLY:	
Steering Knuckle Nuts	203 N·m (150 ft. lbs.)
Strut Shaft Nut	95 N·m (70 ft. lbs.)
Stabilizer Bar Attaching Link Upper Nut	95 N·m (70 ft. lbs.)
Tower Nuts	37 N·m (28 ft. lbs.)
STEERING KNUCKLE:	
Ball Joint Stud Pinch Bolt Nut	55 N·m (40 ft. lbs.)
Disc Brake Caliper Bolts	22 N·m (16 ft. lbs.)
Tie Rod Steering Arm Nut	37 N·m (27 ft. lbs.)
Tie Rod Adjuster Pinch Bolt	38 N·m (28 ft. lbs.)
HUB AND BEARING:	
Steering Knuckle Bolts	110 N·m (80 ft. lbs.)
Front Stub Axle Nut	183 N·m (135 ft. lbs.)
Wheel Mounting Nuts	109-150 N·m (80-110 ft. lbs.)
FRONT SUSPENSION CRADLE:	
Body Attaching Bolts	163 N·m (120 ft. lbs.)
Lower Control Arm Pivot Bolt	142 N·m (105 ft. lbs.)
Tension Strut Mounting Nut	130 N·m (95 ft. lbs.)
STABILIZER BAR:	
Bushing Retainer Bolts	61 N·m (45 ft. lbs.)
Attaching Link Lower Nut	88 N·m (65 ft. lbs.)

SPECIAL TOOLS

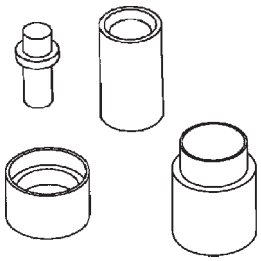
FRONT SUSPENSION



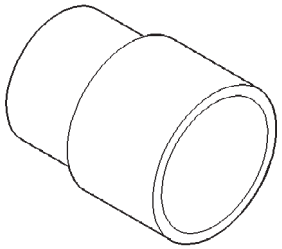
Puller C-3894A



Socket/Holder Front Strut Nut 6864

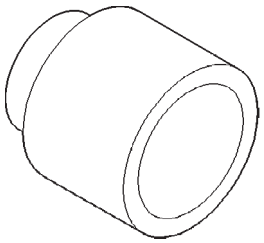


Remover/Installer Lower Control Arm Bushings 6644

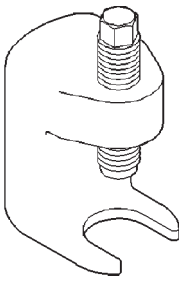


Remover Ball Joint MB-990799

SPECIAL TOOLS (Continued)



Installer, Ball Joint MB-990800



Remover C-4150A

REAR SUSPENSION

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DESCRIPTION AND OPERATION

REAR SUSPENSION SYSTEM

DESCRIPTION

The rear suspension used on this vehicle is a fully independent rear suspension (Fig. 1).

Each side of the rear suspension consists of these major components:

- Strut assembly
- Spindle
- Hub and bearing
- Two lateral links
- Trailing arm
- Stabilizer bar

OPERATION

The rear suspension allows each rear wheel on the vehicle to adapt to different road surfaces and conditions without affecting the control of the vehicle. Each side of the suspension is allowed to move independently from the other.

STRUT ASSEMBLY (REAR)

DESCRIPTION

The rear strut assemblies support the weight of the vehicle using coil springs positioned around the struts (Fig. 1). The coil springs are contained between the upper mount of the strut assembly and a lower spring seat on the body of the strut assembly.

The top of each strut assembly is bolted to the top of the inner fender through the rubber isolated upper mount.

The bottom of the strut assembly attaches to the spindle. Strut attachment to the spindle is accomplished using a split collar on the rear spindle. The collar uses a pinch bolt to retain the spindle to the strut.

The rear coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. Coil springs come in a various rates; be sure the correct spring is in use.

The components of the strut assembly listed below are serviceable if found to be defective (Fig. 2).

- Strut shaft retainer nut
- Upper mount
- Dust shield
- Jounce bumper
- Coil spring
- Upper spring isolator
- Lower spring isolator
- Strut

OPERATION

The rear strut assemblies support the weight of the vehicle. They cushion the ride of the vehicle, controlling vibration, jounce and rebound of the suspension.

DESCRIPTION AND OPERATION (Continued)

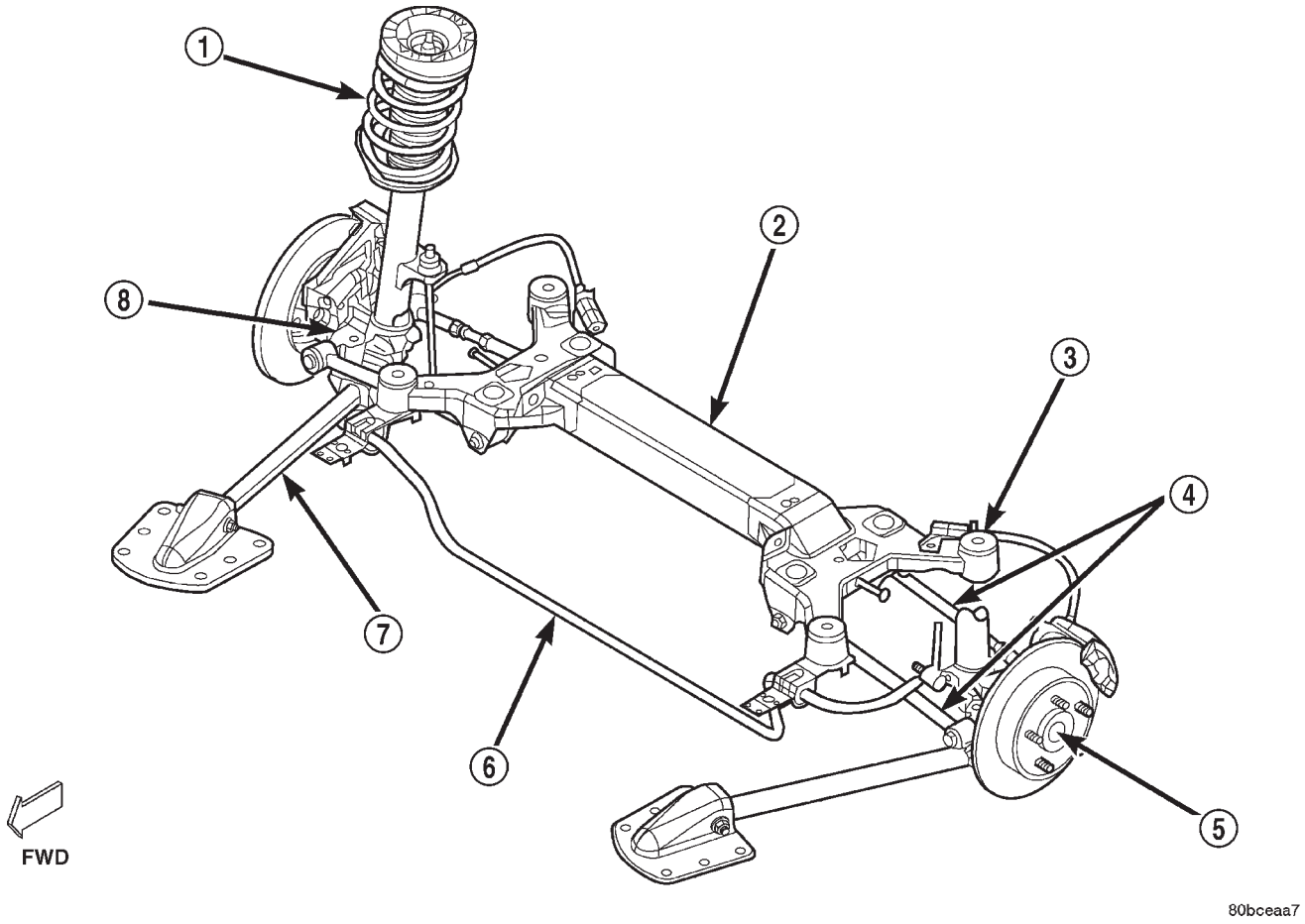


Fig. 1 Rear Suspension

1 – STRUT ASSEMBLY
2 – REAR SUSPENSION CROSSMEMBER
3 – REAR SUSPENSION CROSSMEMBER BUSHING
4 – LATERAL LINKS
5 – HUB AND BEARING
6 – STABILIZER BAR
7 – TRAILING ARM
8 – SPINDLE

The coil spring controls ride quality and maintains ride height.

The jounce bumper limits suspension travel and metal-to-metal contact under full jounce.

The strut dampens jounce and rebound motions of the coil spring and suspension.

SPINDLE

DESCRIPTION

A forged rear spindle is mounted to each side of the rear suspension (Fig. 1). The top attaches to the rear strut assembly. Two lateral links leading from the rear suspension crossmember are mounted to the forward and rearward ends of the spindle centerline. A trailing arm leading from the frame rail connects to the bottom of the spindle.

OPERATION

The spindle moves up and down with the tire and wheel under jounce and rebound conditions. The lateral links control lateral movement of the spindle while the trailing arm controls fore-and-aft movement.

The spindle acts as a mount for the rear hub and bearing, tire and wheel, and rear brakes.

HUB AND BEARING (REAR)

DESCRIPTION

The rear wheel bearing and rear wheel hub of this vehicle are a one piece sealed unit or hub and bearing unit type assembly. The hub and bearing is mounted to the center of the spindle using a retaining nut (Fig. 1). It has five wheel mounting studs on the hub flange.

DESCRIPTION AND OPERATION (Continued)

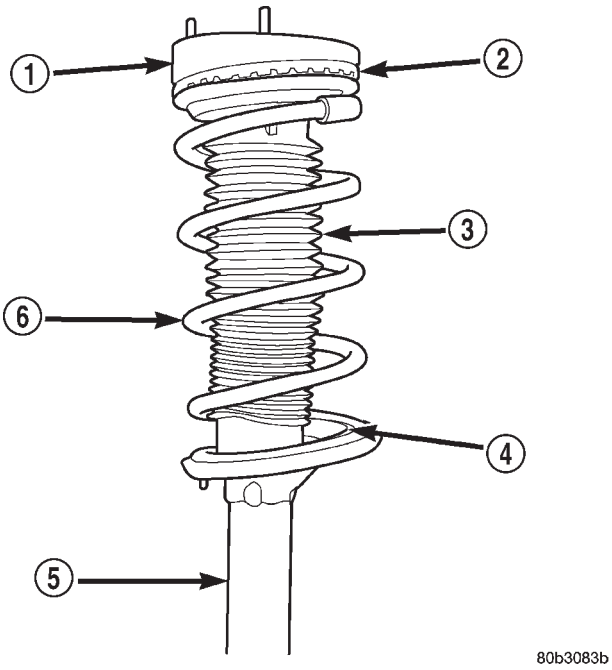


Fig. 2 Strut Assembly

1 – UPPER STRUT MOUNT
2 – UPPER SPRING ISOLATOR
3 – DUST BOOT
4 – LOWER SPRING ISOLATOR
5 – STRUT ASSEMBLY
6 – COIL SPRING

The wheel mounting studs used to mount the tire and wheel to the vehicle are the only replaceable components of the hub and bearing assembly. Otherwise, the hub and bearing is serviced only as a complete assembly.

CAUTION: If a vehicle is equipped with antilock brakes, the tone wheel for the rear wheel speed sensor is pressed onto the hub and bearing.

OPERATION

The hub and bearing has internal bearings that allow the hub to rotate with the tire and wheel. The five wheel mounting studs mount the tire and wheel, and disc brake rotor to the vehicle.

LATERAL LINKS

DESCRIPTION

There are two tubular lateral links on each side of the rear suspension (Fig. 1). The lateral links have rubber isolator bushings at each end. They are attached to the rear suspension crossmember, and the spindle using a bolt and nut assembly at each end. The rear lateral link incorporates a threaded wheel alignment toe adjustment sleeve.

OPERATION

The lateral movement of the rear spindle is controlled by the lateral links connecting the front and rear centerline of the spindle to the rear suspension crossmember. The threaded adjustment sleeve of the rear link allows for setting rear wheel alignment toe adjustment.

TRAILING ARM

DESCRIPTION

There is one trailing arm on each side of the vehicle (Fig. 1). It spans from the spindle forward to the frame rail and rear torque box. The trailing arm attaches to the rear spindle through a bracket which is bolted to the bottom of the spindle. The trailing arm attaches to the body using a bracket attached to the frame rail and rear torque box. The trailing arm has rubber isolator bushings at each end to isolate suspension noise from the body of the vehicle.

OPERATION

The purpose of the trailing arm is to control the fore-and-aft movement of the spindle.

STABILIZER BAR (REAR)

DESCRIPTION

The stabilizer bar interconnects both rear strut assemblies and is attached to the rear frame rails of the vehicle (Fig. 1).

Attachment of the stabilizer bar to the rear frame rails of the vehicle is through 2 rubber-isolator bushings and bushing retainers. Stabilizer bar to strut assembly attachment is done utilizing a rubber-isolated stabilizer bar attaching link. All parts of the stabilizer bar are replaceable as individual components.

The stabilizer bar to frame rail bushings are slit for easy removal and installation. The slit must be positioned toward the front of the vehicle when the stabilizer bar is installed.

OPERATION

Jounce and rebound movements affecting one wheel are partially transmitted to the opposite wheel of the vehicle through the stabilizer bar. This helps to minimize the body roll of the vehicle during suspension movement.

DIAGNOSIS AND TESTING

STRUT ASSEMBLY (REAR)

(1) Inspect for damaged or broken coil springs (Fig. 3).

DIAGNOSIS AND TESTING (Continued)

(2) Inspect for torn or damaged strut assembly dust boots (Fig. 3).

(3) Inspect for damaged upper and lower spring isolators (Fig. 3).

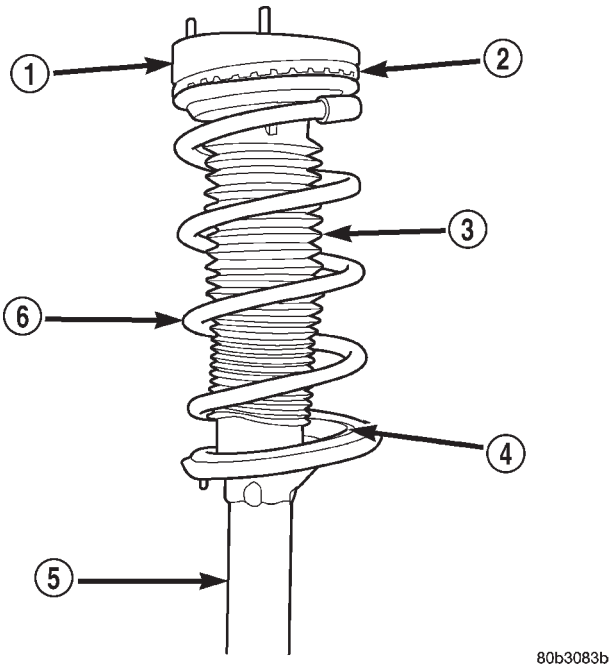


Fig. 3 Strut Assembly Inspection

1 – UPPER STRUT MOUNT
2 – UPPER SPRING ISOLATOR
3 – DUST BOOT
4 – LOWER SPRING ISOLATOR
5 – STRUT ASSEMBLY
6 – COIL SPRING

(4) Lift dust boot and inspect strut assembly for evidence of fluid running from the upper end of fluid reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit). A slight amount of seepage between the strut rod and strut shaft seal is not unusual and does not affect performance of the strut assembly. Also inspect jounce bumpers inside dust boot for signs of damage or deterioration.

(5) Verify correct struts and coil springs are installed on vehicle.

Coil springs are rated separately for each side of vehicle depending on optional equipment and type of service.

NOTE: If the coils springs require replacement, be sure that the springs being replaced, are replaced with springs meeting the correct load and spring rate for the vehicle.

Replacement of the coil spring requires removal and disassembly of the strut assembly. Refer to Strut Assembly in the Removal and Installation section in this group of the service manual for the required removal and replacement procedure. Then, refer to Strut Assembly in the Disassembly and Assembly section in this group of the service manual for the required procedure to disassemble and assemble the shock absorber.

SPINDLE

The rear suspension spindle is not a repairable component of the rear suspension, If it is determined that the spindle is broken or bent when servicing the vehicle, no attempt is to be made to repair or to straighten the spindle. **THE SPINDLE MUST BE REPLACED IF FOUND TO BE DAMAGED IN ANY WAY.**

HUB AND BEARING (REAR)

The rear hub and bearing assembly is designed for the life of the vehicle and should require no maintenance. The following procedure may be used for evaluation of bearing condition.

With wheel and brake drum removed, rotate flanged outer ring of hub. Excessive roughness, lateral play or resistance to rotation may indicate dirt intrusion or bearing failure. If the rear wheel bearings exhibit these conditions during inspection, the hub and bearing assembly should be replaced.

Damaged bearing seals and resulting excessive grease loss may also require bearing replacement. Moderate grease loss from bearing is considered normal and should not require replacement of the hub and bearing assembly.

LATERAL LINKS

Inspect the lateral link isolator bushings and sleeves for signs of damage or deterioration. If the lateral link isolator bushings or sleeves are damaged or are deteriorated, replacement of the lateral link assembly will be required. The isolator bushings are not serviceable as a separate component of the lateral link assembly.

Inspect the lateral links for signs of contact with the ground or road debris which has bent or caused other damage to the lateral link assembly. If the lateral link is bent or damaged, the lateral link will require replacement. **Do not attempt to repair or straighten a lateral link.**

TRAILING ARM

Inspect the trailing arm and trailing arm bushings for signs of deterioration and or damage. If the trailing arm bushings are deteriorated or the trailing arm is damaged in any way, replacement of the trailing arm will be required.

Inspect the trailing arm for signs of contact with the ground or road debris which has bent or caused

DIAGNOSIS AND TESTING (Continued)

other damage to the trailing arm. If the trailing arm is bent or damaged the trailing arm will require replacement. **Do not attempt to repair or straighten a trailing arm.**

STABILIZER BAR (REAR)

Inspect the stabilizer bar for damage or bending. Inspect for broken or distorted stabilizer bar bushings, bushing retainers, and worn or damaged stabilizer bar to strut attaching links. Verify all fastener bolts are properly tightened.

STABILIZER BAR ATTACHING LINKS

Inspect the bushings and sleeves on the stabilizer bar attaching links for damage or deterioration. Inspect the lower ball stud for excessive looseness and damage. Inspect the stabilizer bar attaching link to ensure it is not bent or broken. If any of these conditions are present when inspecting the attaching links, replacement of the attaching link is required.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: DO NOT REMOVE THE STRUT ASSEMBLY'S SHAFT NUT AT ANY TIME UNLESS THE COIL SPRING HAS BEEN PROPERLY COMPRESSED FOLLOWING THE PROCEDURE LISTED IN DISASSEMBLY AND ASSEMBLY IN THIS SECTION.

CAUTION: Only frame contact or wheel lift hoisting equipment can be used on vehicles having a fully independent rear suspension. Vehicles with independent rear suspension can not be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used damage to rear suspension components will occur.

NOTE: If a rear suspension component becomes bent, damaged or fails, no attempt should be made to straighten or repair it. Always replace with a new component.

STRUT ASSEMBLY (REAR)

REMOVAL

NOTE: When removing rear strut assembly from vehicle, access for the 3 rear strut assembly to strut tower attaching nuts is through the passenger compartment of the vehicle.

(1) Remove the rear seat cushion from the interior of the car. Refer to Seats in the Body section of this manual for the required procedure to be used for this vehicle.

(2) Remove the rear seat back assembly. Refer to Seats in the Body section of this manual for the required procedure to be used for this vehicle.

(3) Remove both upper quarter trim panels from the rear of the vehicle interior. Refer to Body Components in the Body section of this manual for the required procedure to be used for this vehicle.

(4) Remove both lower quarter trim panels from the rear of the vehicle interior. Refer to Body Components in the Body section of this manual for the required procedure to be used for this vehicle.

(5) Remove the rear parcel shelf trim panel from the vehicle interior. Refer to Body Components in the Body section of this manual for the required procedure to be used for this vehicle.

Remove the 4 screws securing the rear speaker and mounting plate in place for the side of the vehicle requiring repair. **The speaker should be removed from the vehicle with the mounting plate attached** Unplug the wiring from the speaker, then remove the speaker and mounting plate from the vehicle.

(6) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(7) Remove the rear wheel and tire assembly from the vehicle.

(8) Remove the rear caliper assembly from the adapter. Refer to Rear Disc Brakes in Group 5 Brakes of this Service manual for required caliper removal procedure. After removing the caliper assembly, store the caliper by hanging it from the underside of the vehicle (Fig. 4). Do not let the rear caliper assembly hang from flexible brake hose.

(9) If loose on wheel mounting studs, remove rear braking disc from hub.

(10) If the vehicle is equipped with antilock brakes, remove the wheel speed sensor from the disc brake caliper adapter by removing the bolt, then the sensor (Fig. 5).

(11) Remove the lateral links from the spindle (Fig. 6). This requires the removal of one long bolt attaching both links to the spindle (Fig. 6).

(12) Install a thin wrench on the hex of the stabilizer bar attaching link stud to keep the stud from turning in the link. Next, remove the nut from the stabilizer bar attaching link stud at the stabilizer bar (Fig. 7). Remove the link from the stabilizer bar.

(13) Loosen and fully remove, the rear spindle to strut assembly pinch bolt (Fig. 8).

REMOVAL AND INSTALLATION (Continued)

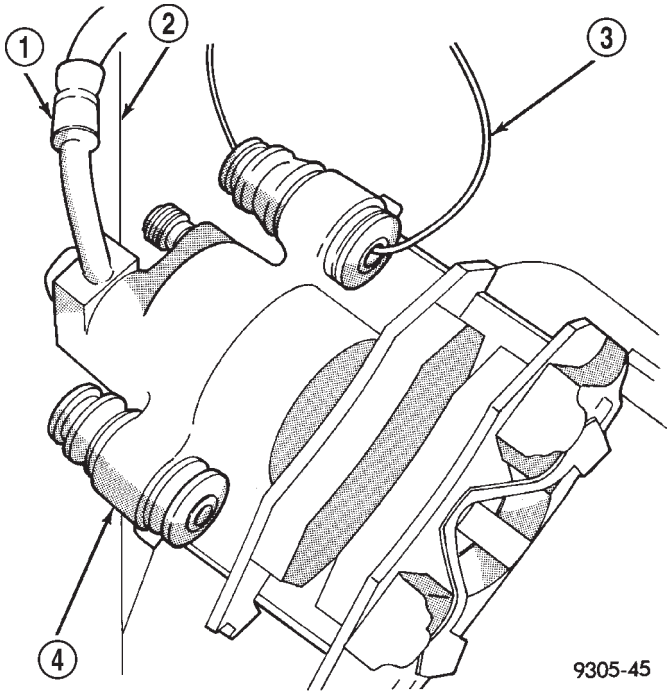


Fig. 4 Storing Rear Caliper Assembly

1 – FLEX HOSE
2 – STRUT
3 – WIRE HANGER
4 – CALIPER ASSEMBLY

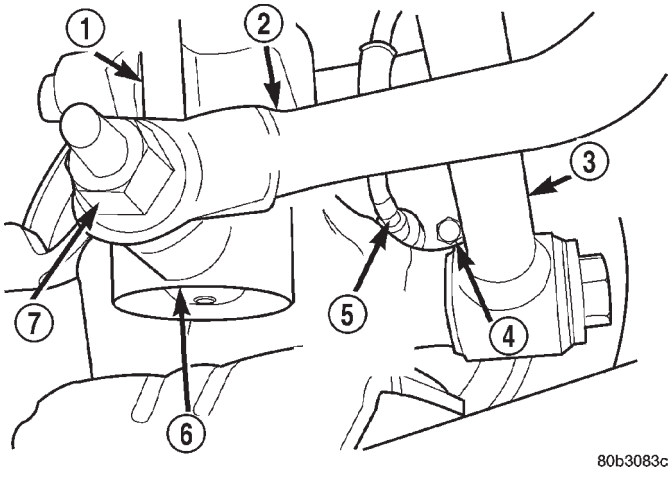


Fig. 5 Wheel Speed Sensor At Adapter

1 – STABILIZER BAR LINK
2 – STABILIZER BAR
3 – LATERAL LINK
4 – BOLT
5 – WHEEL SPEED SENSOR
6 – STRUT ASSEMBLY
7 – NUT

CAUTION: When inserting center punch into rear spindle, use care so point of center punch does not puncture strut assembly.

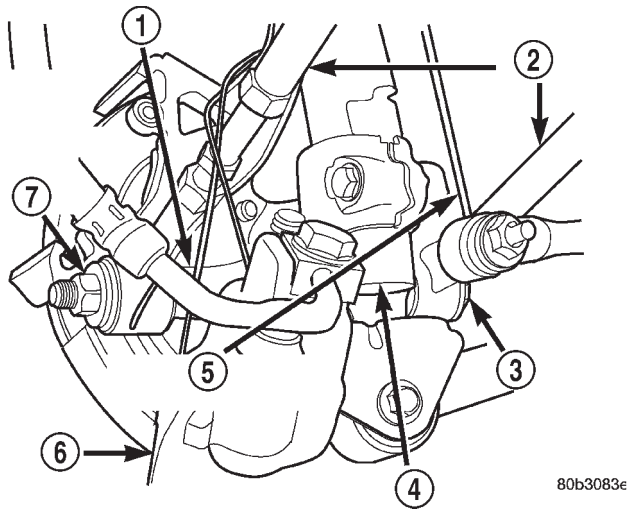


Fig. 6 Lateral Links To Spindle Attachment

1 – SPINDLE
2 – LATERAL LINKS
3 – LATERAL LINK ATTACHING BOLT HEAD
4 – STRUT ASSEMBLY
5 – STABILIZER BAR ATTACHING LINK
6 – BRAKE CALIPER
7 – LATERAL LINK ATTACHING BOLT NUT

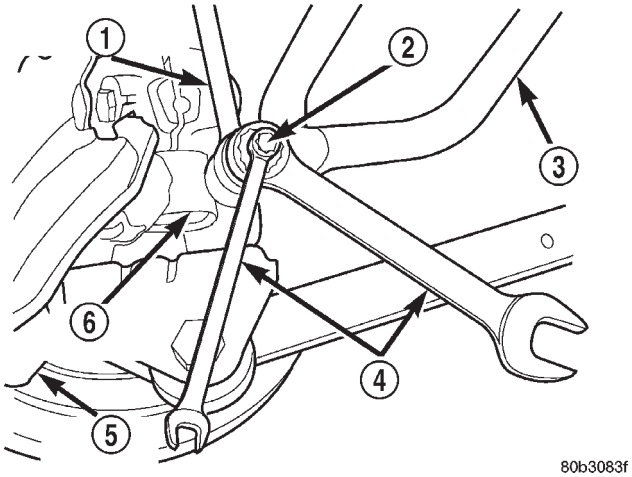


Fig. 7 Link Attachment To Stabilizer Bar

1 – STABILIZER BAR ATTACHING LINK
2 – LINK STUD
3 – STABILIZER BAR
4 – WRENCHES
5 – BRAKE CALIPER
6 – STRUT ASSEMBLY

(14) Insert a center punch into the hole on the spindle (Fig. 9). Center punch must be tapped into spindle until jammed into hole. This will spread spindle casting allowing it to be removed from strut assembly.

REMOVAL AND INSTALLATION (Continued)

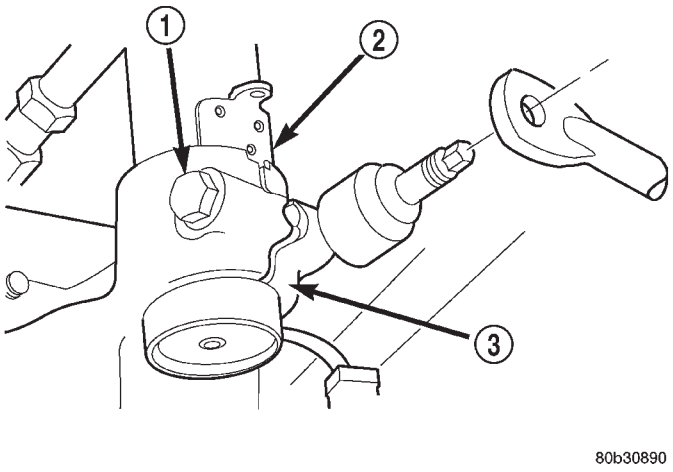


Fig. 8 Spindle To Strut Assembly Pinch Bolt

1 – PINCH BOLT
2 – STRUT ASSEMBLY
3 – REAR SPINDLE

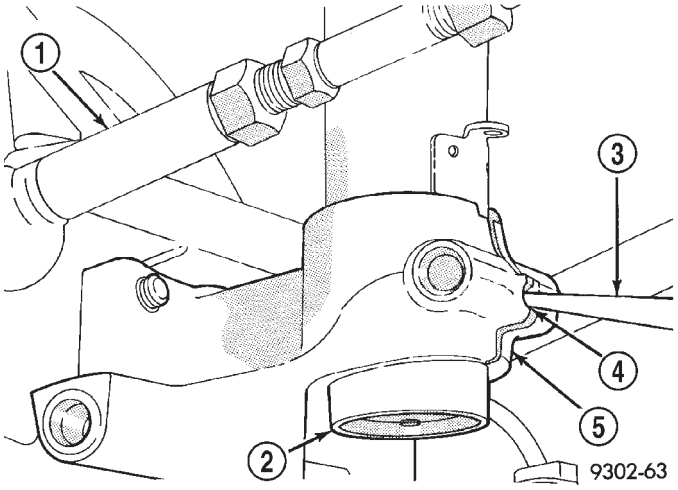


Fig. 9 Center Punch Installed In Spindle

1 – LATERAL LINK
2 – STRUT ASSEMBLY
3 – CENTER PUNCH
4 – HOLE
5 – SPINDLE

(15) Using a hammer and a brass drift punch, tap on top surface of spindle driving it down and off the end of the strut assembly (Fig. 10).

(16) Let the rear spindle and assembled components hang from the trailing arm while the strut assembly is out of the vehicle.

(17) Lower vehicle enough to access rear passenger compartment.

NOTE: When removing rear strut assembly from vehicle, access for the 3 rear strut assembly to strut tower attaching nuts is through the passenger compartment of the vehicle.

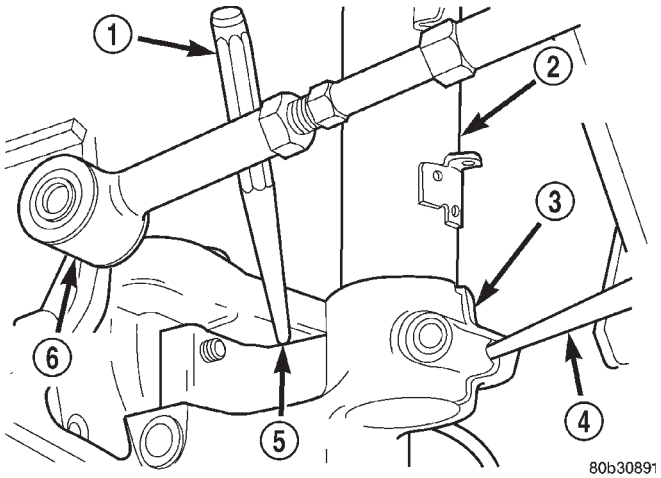


Fig. 10 Removing Spindle From Strut Assembly

1 – BRASS DRIFT PUNCH
2 – STRUT ASSEMBLY
3 – SPINDLE
4 – CENTER PUNCH
5 – HIT SPINDLE HERE
6 – LATERAL LINK

(18) Remove the 3 strut assembly to rear strut tower attaching nuts (Fig. 11), then remove strut assembly from vehicle.

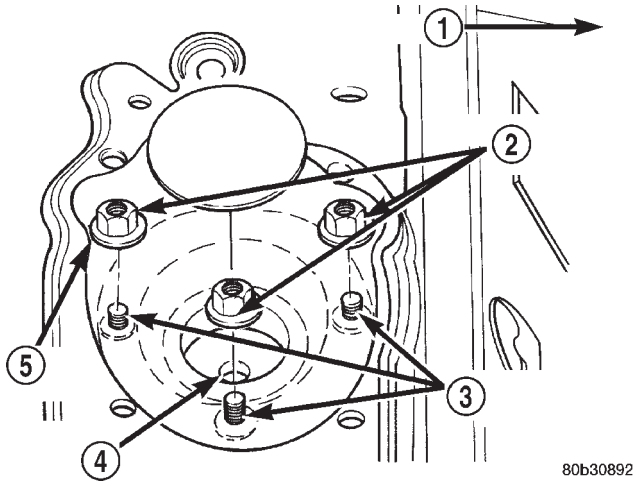


Fig. 11 Strut Assembly Attaching Nuts

1 – FRONT OF CAR
2 – ATTACHING NUTS
3 – MOUNTING STUDS
4 – STRUT ASSEMBLY
5 – SPEAKER OPENING

(19) Remove the nut, washers, and rubber isolators securing the stabilizer bar attaching link to the strut.

(20) For disassembly and assembly of the strut assembly, refer to DISASSEMBLY AND ASSEMBLY in this section of this service manual group.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Install the nut, washers, and rubber isolators securing the stabilizer bar attaching link to the strut.

(2) Position the strut assembly back in the vehicle with the 3 studs on the strut mount through the holes in the strut tower. Install the 3 strut mount to body attaching nuts onto mounting studs (Fig. 11). Tighten the 3 strut mount attaching nuts to a torque of 25 N·m (19 ft. lbs.).

(3) Raise vehicle back up to working height for reconnecting lower strut.

(4) Install spindle onto bottom of the strut assembly. Push or tap spindle assembly onto lower end of strut, until notch in spindle is tightly seated against locating tab on strut assembly (Fig. 12). Then remove center punch from hole in spindle. Install spindle to strut assembly pinch bolt into spindle (Fig. 12). Tighten spindle to strut assembly pinch bolt to 53 N·m (40 ft. lbs.).

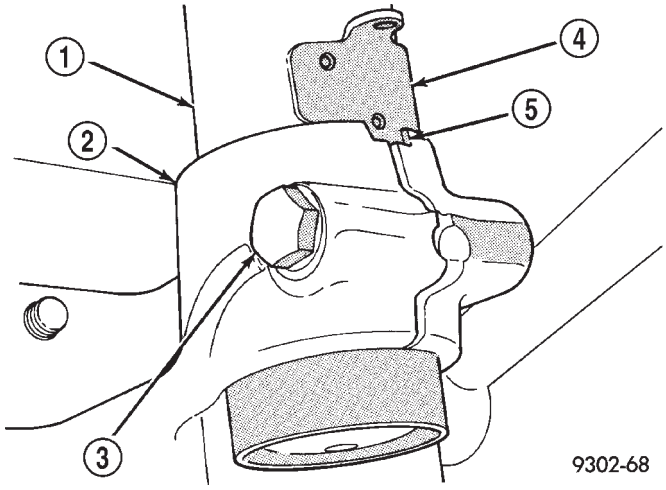


Fig. 12 Spindle Attachment To Strut

1 – STRUT ASSEMBLY
2 – SPINDLE
3 – PINCH BOLT
4 – LOCATING TAB
5 – NOTCH

(5) Install the lateral links on the spindle (Fig. 6). Install, but DO NOT fully tighten lateral links to spindle attaching bolt at this time.

CAUTION: Tightening lateral link attaching bolt to spindle at this time will contort the bushing at curb height and lead to bushing failure. This bolt is to be tightened only when the vehicle is at curb riding height.

(6) Install stabilizer bar attaching link onto stabilizer bar (Fig. 7). Install stabilizer link to stabilizer bar attaching nut (Fig. 7). Tighten the stabilizer link to stabilizer bar attaching nut to a torque of 95 N·m (70 ft. lbs.) using a crow foot wrench and torque wrench in place of the wrench on the attaching nut. **Be sure to use a wrench to hold the link stud in place while tightening attaching nut.**

(7) Install rear wheel speed sensor into brake caliper adapter. Install head attaching bolt (Fig. 5) and tighten to 7 N·m (60 in. lbs.).

(8) Install rear braking disc on hub. Carefully install rear brake caliper over braking disc and install on adapter. Tighten rear caliper assembly to adapter mounting bolts to 22 N·m (192 in. lbs.).

(9) Install wheel and tire assembly on vehicle. Then torque all wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat tightening sequence to full specified torque of 129 N·m (95 ft. lbs.).

(10) Lower vehicle to the ground.

(11) With the weight of the vehicle on the tires, tighten lateral link to spindle attaching bolt to 135 N·m (100 ft. lbs.).

(12) Reconnect the radio speaker wiring to the rear speaker. Install rear radio speaker and mounting bracket using 4 screws.

(13) Install both lower quarter and upper quarter trim panels Refer to Body Components in the Body section of this manual for the required procedure to be used for this vehicle.

(14) Install the rear seat back, and seat cushion. Refer to Seats in the Body section of this manual for the required procedure to be used for this vehicle.

(15) Check and reset rear wheel TOE to specifications if required.

SPINDLE

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) Remove the rear caliper assembly from the adapter. Refer to Rear Disc Brakes in Group 5 Brakes of this Service manual for required caliper removal procedure. After removing caliper assembly store caliper by hanging it from frame of vehicle (Fig. 13). Do not let weight of rear caliper assembly hang from flexible brake hose. If vehicle is equipped with rear drum brakes, remove the brake flex hose bracket from the support plate and wheel cylinder.

(4) Remove rear braking disc from hub.

(5) Remove rear hub and bearing assembly cotter pin and nut retainer (Fig. 14). Remove the hub and bearing retaining nut and washer from the spindle

REMOVAL AND INSTALLATION (Continued)

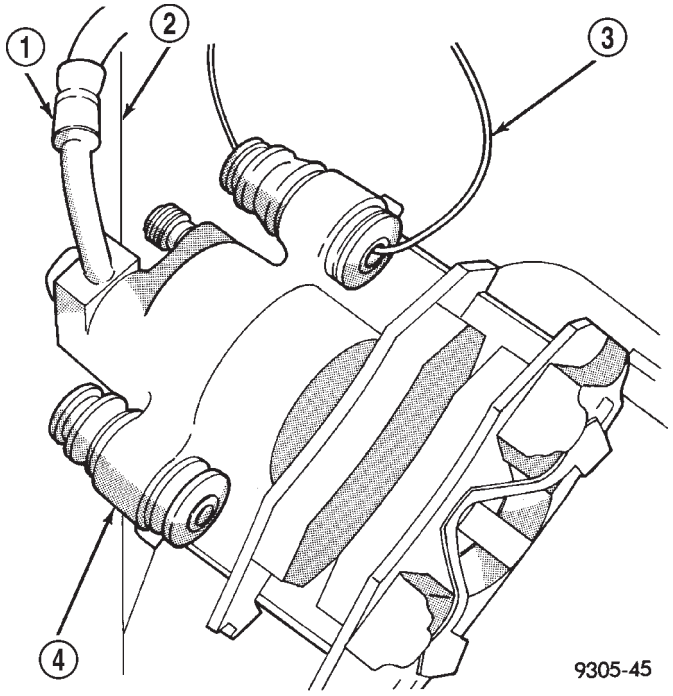


Fig. 13 Storing Caliper

1 – FLEX HOSE
2 – STRUT
3 – WIRE HANGER
4 – CALIPER ASSEMBLY

(Fig. 14). Then remove hub and bearing assembly from spindle.

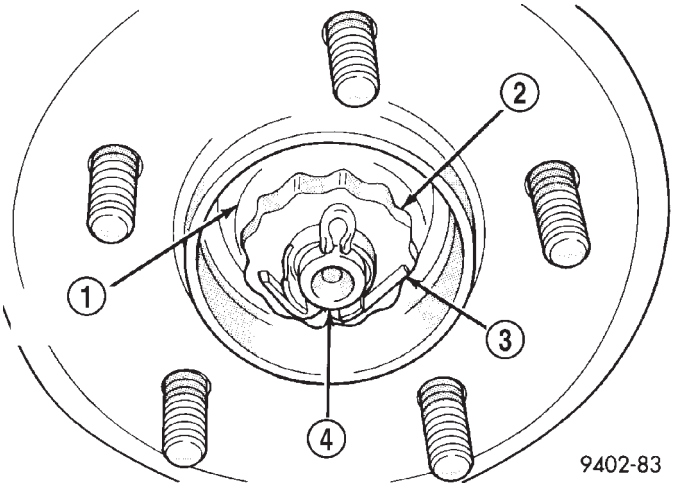


Fig. 14 Hub And Bearing Retaining Nut and Washer

1 – HUB RETAINING NUT
2 – NUT RETAINER
3 – COTTER PIN
4 – SPINDLE

(6) If vehicle is equipped with antilock brakes, remove the speed sensor head from the rear disc brake adapter (Fig. 15).

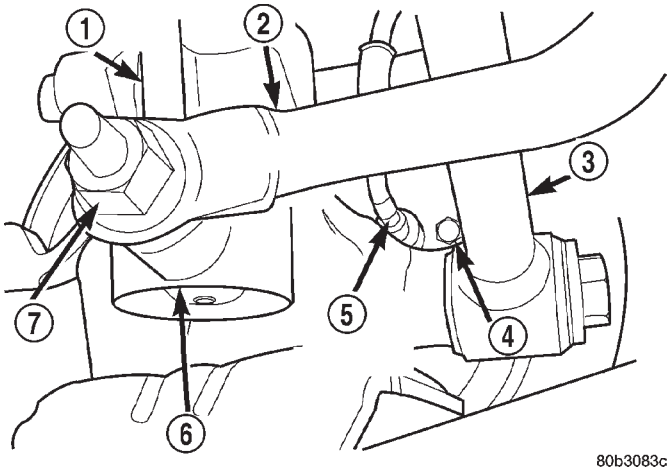


Fig. 15 Speed Sensor Head

1 – STABILIZER BAR LINK
2 – STABILIZER BAR
3 – LATERAL LINK
4 – BOLT
5 – WHEEL SPEED SENSOR
6 – STRUT ASSEMBLY
7 – NUT

(7) Remove the 4 bolts attaching the disc brake adapter to the rear spindle (Fig. 16). Then remove the adapter, disc shield, park brake shoes and park brake cable as an assembly from the spindle.

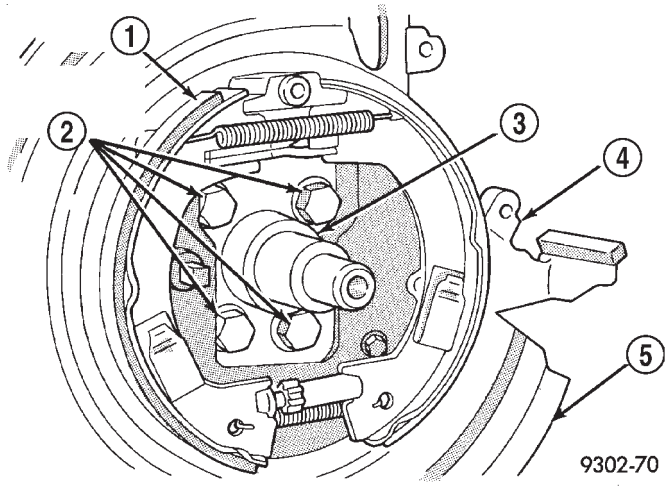


Fig. 16 Disc Brake Adapter Mounting

1 – PARK BRAKE SHOES
2 – ADAPTER MOUNTING BOLTS
3 – SPINDLE
4 – ADAPTER
5 – DISC SHIELD

(8) Remove the bolt attaching the trailing arm to the bracket on the bottom of the spindle (Fig. 17).

(9) Remove the bolt (Fig. 18) attaching the lateral links to the spindle.

REMOVAL AND INSTALLATION (Continued)

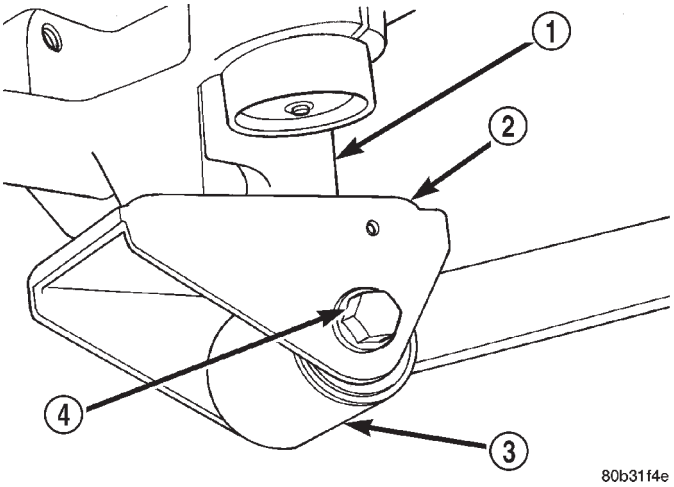


Fig. 17 Trailing Arm To Bracket Bolt

1 – SPINDLE
2 – TRAILING ARM BRACKET
3 – TRAILING ARM
4 – BOLT

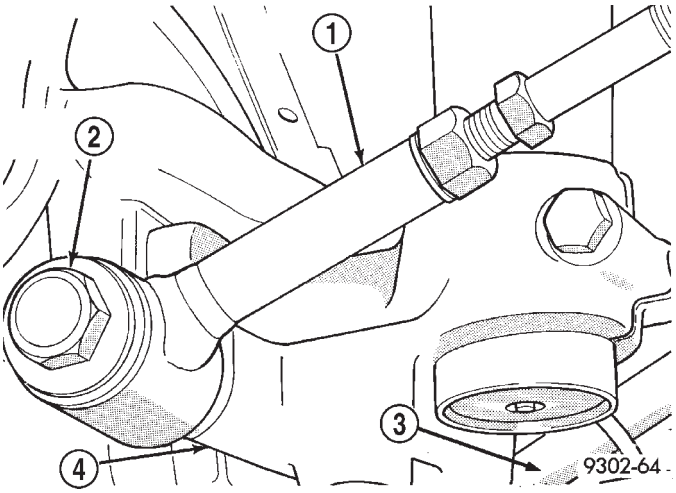


Fig. 18 Lateral Links To Spindle Attaching Bolt

1 – REAR LATERAL LINK
2 – LATERAL LINKS ATTACHING BOLT
3 – FRONT LATERAL LINK
4 – SPINDLE

(10) Remove the pinch bolt from the spindle (Fig. 19).

CAUTION: When inserting center punch into rear spindle, use care so point of center punch does not puncture strut assembly.

(11) Insert a center punch into the hole on the spindle (Fig. 20). Center punch must be tapped into the hole in the spindle until jammed into place. This will spread the spindle casting allowing it to be removed from strut assembly.

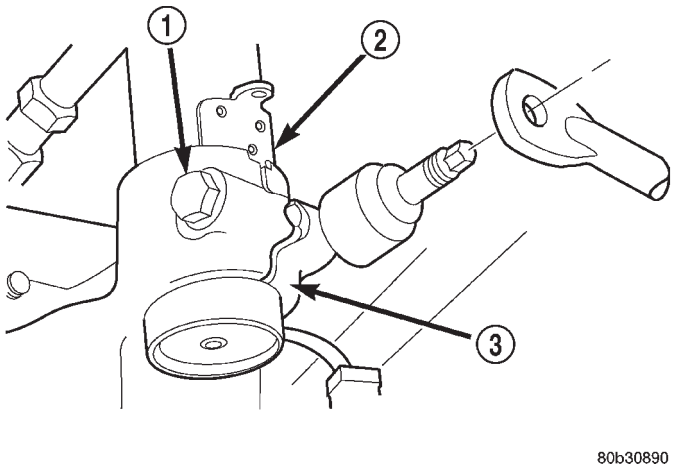


Fig. 19 Spindle Pinch Bolt

1 – PINCH BOLT
2 – STRUT ASSEMBLY
3 – REAR SPINDLE

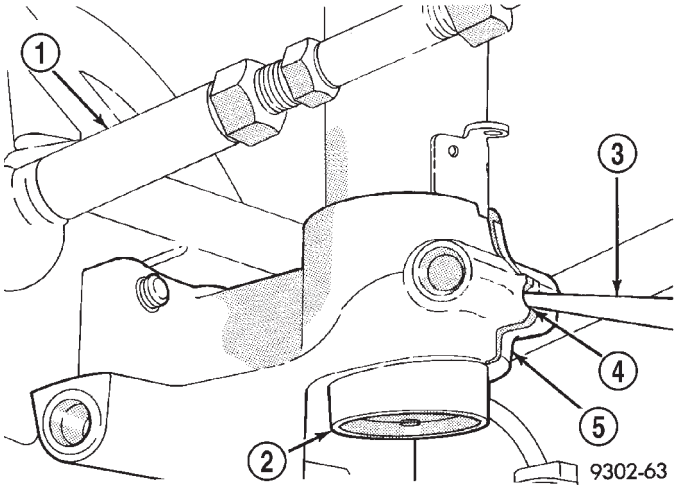


Fig. 20 Center Punch Inserted In Spindle

1 – LATERAL LINK
2 – STRUT ASSEMBLY
3 – CENTER PUNCH
4 – HOLE
5 – SPINDLE

(12) Using a hammer and a brass drift punch, tap on top surface of spindle, (Fig. 21) driving it off the end of the strut assembly.

INSTALLATION

(1) Install the spindle on the strut assembly. Push and or tap spindle assembly onto strut, until notch in spindle is tightly seated against locating tap on strut assembly (Fig. 19). Then remove center punch from hole in spindle. Install the pinch bolt in the spindle (Fig. 19). Tighten the pinch bolt to a torque of 53 N·m (40 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

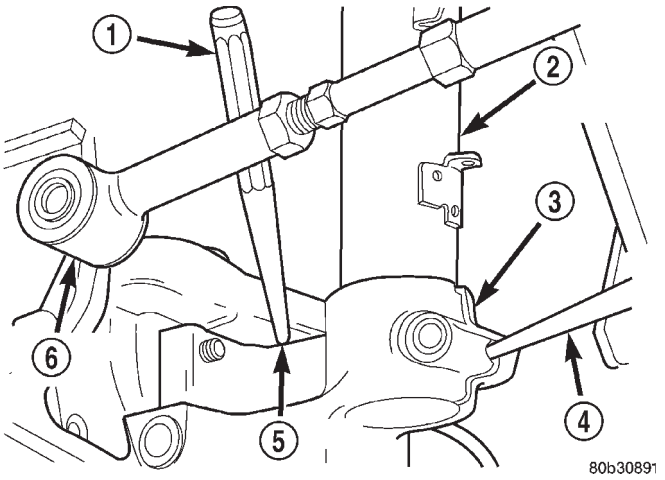


Fig. 21 Removing Spindle From Strut

1 – BRASS DRIFT PUNCH
2 – STRUT ASSEMBLY
3 – SPINDLE
4 – CENTER PUNCH
5 – HIT SPINDLE HERE
6 – LATERAL LINK

(2) Install the lateral links on the spindle (Fig. 18). Install, but do not fully tighten attaching bolt at this time.

(3) Install bolt attaching trailing arm to trailing arm bracket on bottom of spindle (Fig. 17). Do not fully tighten attaching bolt at this time.

(4) Install the disc brake adapter back on the spindle. Install the 4 bolts attaching the disc brake adapter to the rear spindle (Fig. 16). Tighten the disc brake adapter mounting bolts to a torque of 115 N·m (85 ft. lbs.).

(5) If vehicle is equipped with antilock brakes, install the speed sensor head into the rear disc brake adapter (Fig. 15). Tighten the speed sensor head attaching bolt to a torque of 7 N·m (60 in. lbs.).

(6) Install the rear hub and bearing assembly on the rear spindle. Install hub and bearing assembly retaining washer and nut on spindle (Fig. 14). Tighten the hub and bearing retaining nut to a torque of 168 N·m (124 ft. lbs.).

(7) Install the rear brake disc on the hub.

(8) Carefully place rear brake caliper over rotor and install on adapter. Tighten the caliper assembly to adapter mounting bolts to a torque of 22 N·m (192 in. lbs.). Refer to Rear Disc Brakes in Group 5 Brakes in this service manual for required caliper installation procedure.

(9) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(10) Lower vehicle to the ground.

(11) Tighten the lateral links to spindle attaching bolt to a torque of 135 N·m (100 ft. lbs.).

(12) Tighten the trailing arm to spindle bracket attaching bolt to a torque of 100 N·m (75 ft. lbs.).

(13) Check and reset rear wheel TOE to specifications if required.

HUB AND BEARING (REAR)

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) Remove the rear caliper assembly from the adapter. Refer to Rear Disc Brakes in Group 5 Brakes of this Service manual for required caliper removal procedure. After removing caliper assembly store caliper by hanging it from frame of vehicle (Fig. 22). Do not let weight of rear caliper assembly hang from flexible brake hose.

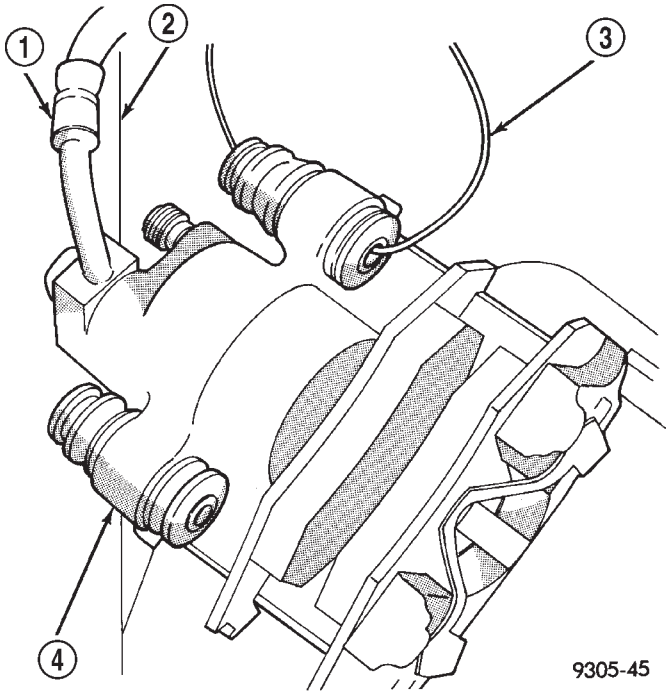


Fig. 22 Storing Caliper

1 – FLEX HOSE
2 – STRUT
3 – WIRE HANGER
4 – CALIPER ASSEMBLY

(4) Remove rear braking disc from hub.

(5) Remove rear hub and bearing assembly cotter pin and nut retainer (Fig. 23). Remove the hub and

REMOVAL AND INSTALLATION (Continued)

bearing retaining nut and washer from the spindle (Fig. 23). Then remove hub and bearing assembly from spindle.

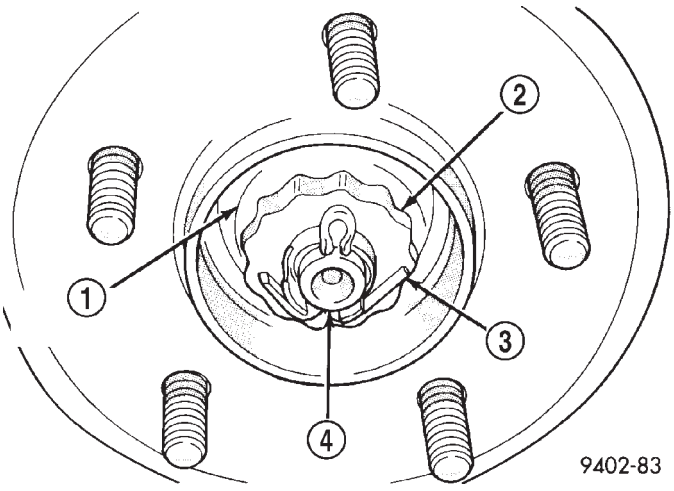


Fig. 23 Hub And Bearing Retaining Nut and Washer

1 – HUB RETAINING NUT
2 – NUT RETAINER
3 – COTTER PIN
4 – SPINDLE

INSTALLATION

(1) Install the rear hub and bearing assembly on the rear spindle. Install hub and bearing assembly retaining washer and nut on spindle (Fig. 23). Tighten the hub and bearing retaining nut to a torque of 168 N·m (124 ft. lbs.). Install the nut retainer and cotter pin. (Fig. 23)

(2) Install the rear brake disc on the hub.

(3) Carefully place rear brake caliper over rotor and install on adapter. Tighten the caliper assembly to adapter mounting bolts to a torque of 22 N·m (192 in. lbs.). Refer to Rear Disc Brakes in Group 5 Brakes in this service manual for required caliper installation procedure.

(4) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(5) Lower vehicle to the ground.

LATERAL LINKS

The lateral links are only serviced as complete assemblies. The isolator bushings used in the lateral links are not serviced as separate components. The left forward lateral link requires a more involved removal and installation procedure in order to remove the attaching bolt at the crossmember. See procedures below for the proper lateral link service procedure.

LEFT FORWARD LATERAL LINK

REMOVE

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove left rear wheel and tire assembly from the vehicle.

(3) Remove the nut and bolt attaching the left lateral links to the spindle (Fig. 24).

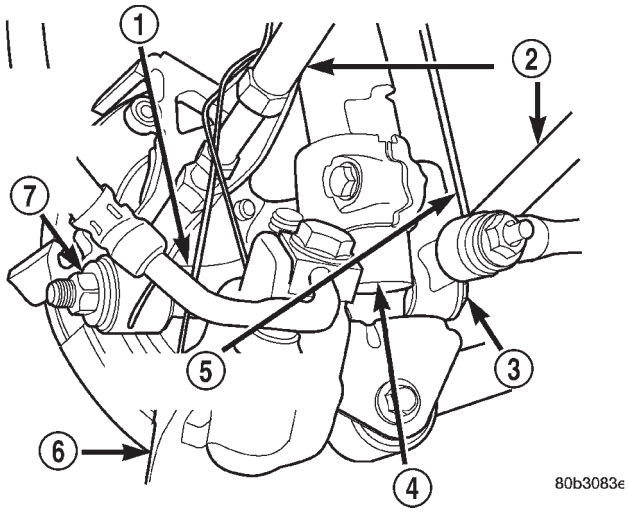


Fig. 24 Lateral Link Attachment To Spindle

1 – SPINDLE
2 – LATERAL LINKS
3 – LATERAL LINK ATTACHING BOLT HEAD
4 – STRUT ASSEMBLY
5 – STABILIZER BAR ATTACHING LINK
6 – BRAKE CALIPER
7 – LATERAL LINK ATTACHING BOLT NUT

(4) Remove the nut attaching the left forward lateral link to the rear suspension crossmember. **The bolt for the left front lateral link may not be removed at this time. Remove the nut only. Once the crossmember is lowered, the bolt can be easily removed.** Notice the forward link attaching bolt faces rearward.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 25) to prevent damage to the fuel tank and or fuel tubes. Also, the left rear lateral arm attaching bolt to the crossmember is to be installed pointing forward to prevent possible damage to the fuel filler tube.

(5) Remove the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer.

REMOVAL AND INSTALLATION (Continued)

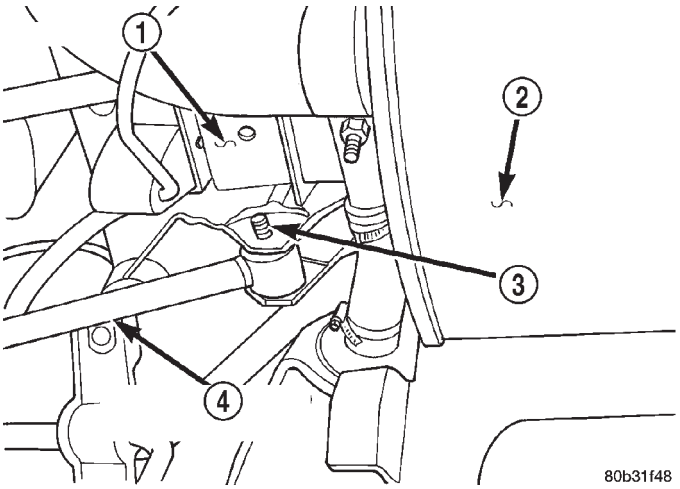


Fig. 25 Lateral Link Attachment To Crossmember

1 – CROSSMEMBER
2 – EXHAUST MUFFLER
3 – ATTACHING BOLT
4 – LEFT FORWARD LATERAL LINK

(6) Remove the 4 bolts attaching both stabilizer bar isolator bushing retainers to the frame rails (the 2 rearward attaching bolts also attach the front corners of the rear suspension crossmember in place). Allow the stabilizer bar to hang down out of the way.

(7) Remove the screw securing the fuel filler neck to the left frame rail.

(8) Position a transmission jack under the fuel tank.

(9) Remove the attaching bolts securing both fuel tank mounting straps. First, remove the right, then the left attaching bolt. Allow the straps to hang down.

(10) Lower the transmission jack and fuel tank just enough to allow for removal of the lateral link attaching bolt at the crossmember.

(11) Remove the left forward lateral link from the crossmember.

INSTALL

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 25) to prevent damage to the fuel tank and or fuel tubes. Also, the left rear lateral arm attaching bolt to the crossmember is to be installed pointing forward to prevent possible damage to the fuel filler tube.

(1) Attach the left forward lateral link to crossmember. Install mounting bolt through the front of the crossmember mount towards the rear. Install the lateral link attaching nut, but DO NOT fully tighten at this time.

CAUTION: Tightening the lateral link attaching bolt at this point will cause the bushing to contort when the vehicle is at curb riding height, thus contributing to premature failure of the lateral link bushings.

(2) Raise the fuel tank up into mounting position.

(3) Reattach the fuel tank straps, securing the fuel tank in place.

(4) Remove transmission jack supporting the fuel tank.

(5) Reinstall the fuel filler neck attaching screw and secure the fuel filler neck to the left frame rail.

(6) Install the 4 bolts attaching both stabilizer bar isolator bushing retainers to the frame rails (the 2 rearward attaching bolts attach the front corners of the rear suspension crossmember in place). Tighten the forward stabilizer bar isolator bushing retainer attaching bolts to 40 N·m (30 ft. lbs.). Tighten the 2 rearward stabilizer bar isolator bushing retainer attaching bolts (which also serve as the front crossmember attaching bolts) to 100 N·m (75 ft. lbs.).

(7) Install the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer.

(8) Install the lateral links on the spindle. Install, but DO NOT fully tighten the attaching bolt and nut at this time (Fig. 24).

CAUTION: Tightening the lateral link attaching bolt at this point will cause the bushing to contort when the vehicle is at curb riding height, thus contributing to premature failure of the lateral link bushings.

(9) Install rear wheel and tire assembly on vehicle.

(10) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(11) Lower vehicle to the ground.

(12) Tighten lateral arm to crossmmember attaching bolt 95 N·m (70 ft. lbs.).

(13) Tighten lateral arm to spindle attaching bolt 135 N·m (100 ft. lbs.).

(14) Check and reset rear wheel TOE to specifications if required.

LEFT REAR AND BOTH RIGHT LATERAL LINKS

REMOVE

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove rear wheel and tire assembly from the vehicle.

(3) Remove the nut and bolt attaching the left lateral links to the spindle (Fig. 26).

(4) Remove the nut and bolt attaching the lateral link to the rear suspension crossmember. Note the

REMOVAL AND INSTALLATION (Continued)

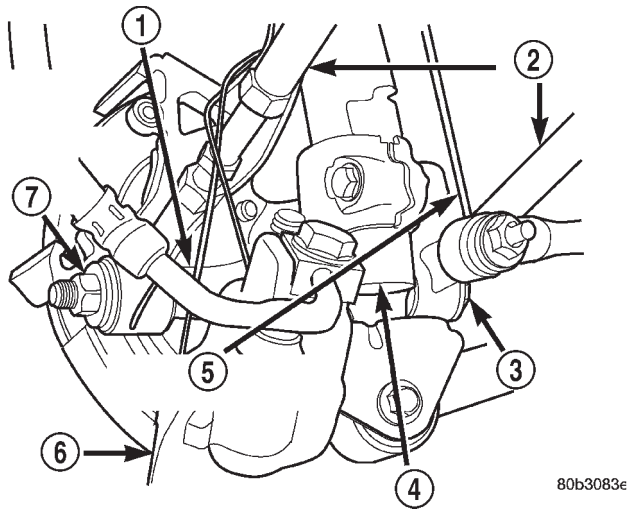


Fig. 26 Lateral Link Attachment To Spindle

1 – SPINDLE
2 – LATERAL LINKS
3 – LATERAL LINK ATTACHING BOLT HEAD
4 – STRUT ASSEMBLY
5 – STABILIZER BAR ATTACHING LINK
6 – BRAKE CALIPER
7 – LATERAL LINK ATTACHING BOLT NUT

direction in which the lateral arm attaching bolt is installed.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 27) to prevent damage to the fuel tank and or fuel tubes. Also, the left rear lateral arm attaching bolt to the crossmember is to be installed pointing forward to prevent possible damage to the fuel filler tube.

(5) Remove the lateral link from the crossmember.

INSTALL

(1) Attach the lateral link to crossmember. Rear lateral link attachment bolts should be installed from the rear and point forward. Forward lateral link attachment bolts should be installed from the front and point rearward.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 27) to prevent damage to the fuel tank and or fuel tubes. Also, the left rear lateral arm attaching bolt to the crossmember is to be installed pointing forward to prevent possible damage to the fuel filler tube.

(2) Install the attaching nut, but DO NOT tighten at this time.

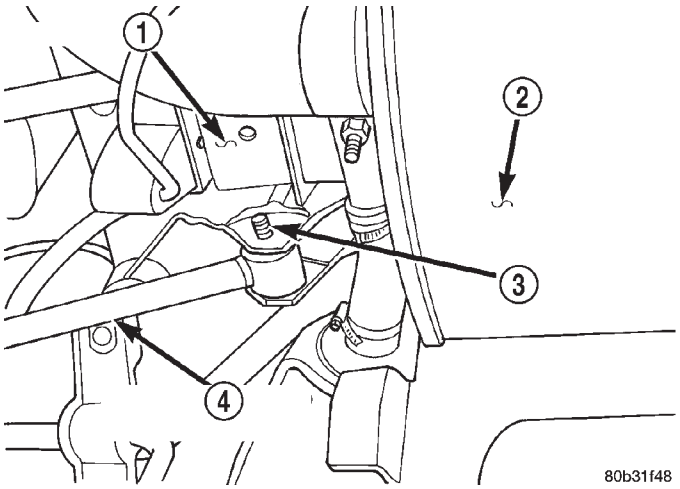


Fig. 27 Lateral Link Attachment To Crossmember

1 – CROSSMEMBER
2 – EXHAUST MUFFLER
3 – ATTACHING BOLT
4 – LEFT FORWARD LATERAL LINK

CAUTION: Tightening the lateral link attaching bolt at this point will cause the bushing to contort when the vehicle is at curb riding height, thus contributing to premature failure of the lateral link bushings.

(3) Install the lateral links on the spindle. Install, but DO NOT fully tighten the attaching bolt and nut at this time (Fig. 26).

(4) Install rear wheel and tire assembly on vehicle.

(5) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(6) Lower vehicle to the ground.

(7) Tighten lateral arm to crossmember attaching bolt and nut to 95 N·m (70 ft. lbs.).

(8) Tighten lateral arm to spindle attaching bolt and nut to 135 N·m (100 ft. lbs.).

(9) Check and reset rear wheel TOE to specifications if required.

TRAILING ARM

REMOVE

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the rear wheel and tire assembly from the vehicle.

(3) Remove the bolt attaching the trailing arm to the bracket on the bottom of the spindle (Fig. 28).

REMOVAL AND INSTALLATION (Continued)

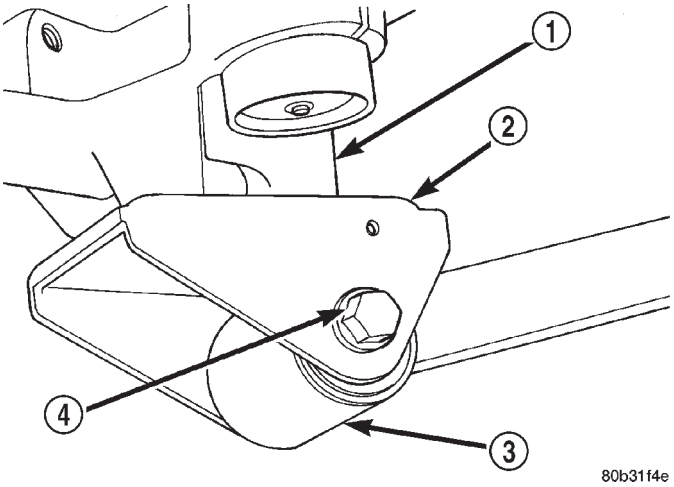


Fig. 28 Trailing Arm To Bracket Bolt

1 – SPINDLE
2 – TRAILING ARM BRACKET
3 – TRAILING ARM
4 – BOLT

(4) Remove the 4 bolts attaching the arm forward mounting bracket to the frame rail and rear torque box (Fig. 29).

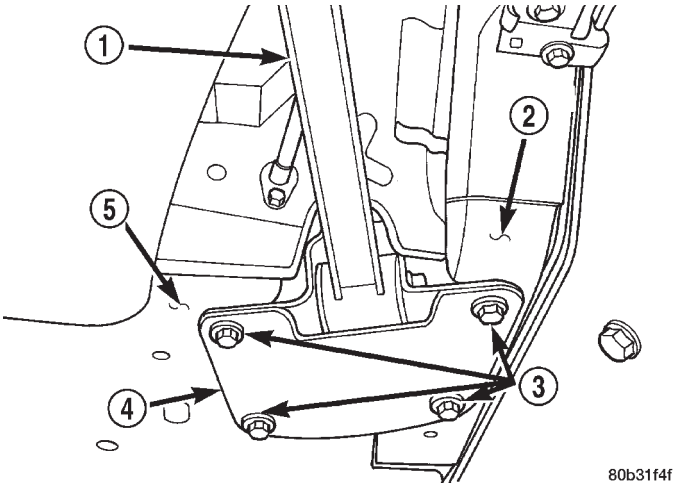


Fig. 29 Mounting Bracket Attachment

1 – TRAILING ARM
2 – FRAME RAIL
3 – ATTACHING BOLTS
4 – MOUNTING BRACKET
5 – TORQUE BOX

(5) Remove the trailing arm and forward mounting bracket from vehicle.

(6) Remove the bolt attaching the trailing arm to the mounting bracket.

INSTALL

CAUTION: When the trailing arm is installed to its mounting bracket, it is important to set an offset angle of 5 degrees before tightening the attaching bolt. Otherwise, the bushing will be contorted when the vehicle is at normal riding height. This angle cannot be set once the trailing arm and bracket are installed on the vehicle.

(1) Install the trailing arm to the mounting bracket so the length-wise opening in the arm points downward. Align the plane of the arm at a 5 degree angle to the mounting bracket, mounting surface (to the vehicle) (Fig. 30). This can be accomplished by using a simple magnetic base protractor (Fig. 30). Verify the mounting bracket is level, then rotate the trailing arm until 5 degrees is measured (Fig. 30). **This angle is important to set, so the bushing is not contorted when the vehicle is at normal riding height.**. Tighten the attaching bolt and nut to a torque of 100 N·m (75 ft. lbs.). **This bolt cannot be tightened once mounted on the vehicle.**

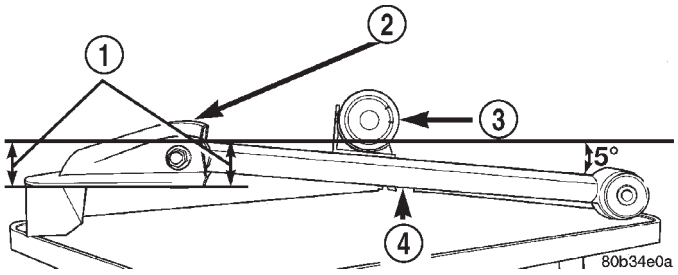


Fig. 30 Trailing Arm Mounting Angle

1 – EQUAL DISTANCES
2 – MOUNTING BRACKET
3 – PROTRACTOR
4 – TRAILING ARM

(2) Position the trailing arm and forward mounting bracket into the vehicle. Attach to frame rail and torque box with the 4 attaching bolts (Fig. 29). Tighten the attaching bolts to 60 N·m (45 ft. lbs.).

(3) Install bolt attaching trailing arm to trailing arm bracket on bottom of spindle (Fig. 28). Do not fully tighten attaching bolt at this time.

(4) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(5) Lower vehicle to the ground.

(6) Tighten the trailing arm to spindle bracket attaching bolt to a torque of 100 N·m (75 ft. lbs.).

(7) Check and reset rear wheel TOE to specifications if required.

REMOVAL AND INSTALLATION (Continued)

STABILIZER BAR (REAR)

REMOVAL

(1) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(2) Install a thin wrench on the hex of the attaching link stud to keep the stud from turning in the link. Next, remove the nut from the stabilizer bar to strut assembly attaching link stud at the stabilizer bar (Fig. 31). Remove the link from the stabilizer bar. Repeat this procedure on the other side of the vehicle for the other attaching link.

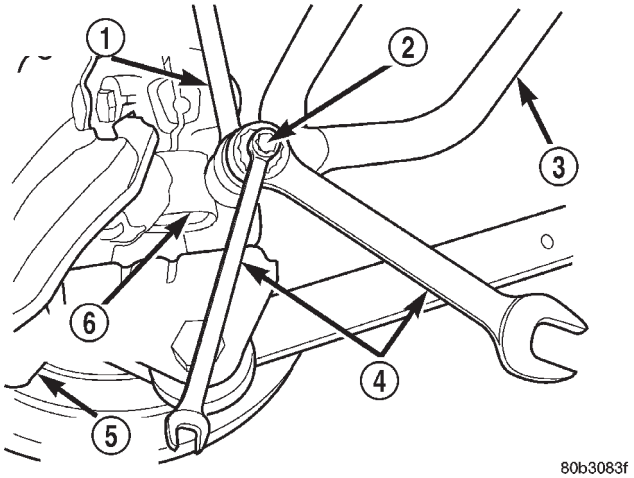


Fig. 31 Link Attachment To Stabilizer Bar

1 – STABILIZER BAR ATTACHING LINK
2 – LINK STUD
3 – STABILIZER BAR
4 – WRENCHES
5 – BRAKE CALIPER
6 – STRUT ASSEMBLY

(3) Remove the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer (Fig. 32).

(4) Remove the 2 bolts attaching each of the 2 stabilizer bar isolator bushing retainers to the frame rails (Fig. 32) (the 2 rearward attaching bolts also attach the front corners of the rear suspension crossmember in place). Remove the stabilizer bar from the vehicle.

(5) Mount the stabilizer bar in a soft jawed vise with one of the two bushings mount just above the vise jaws.

(6) Carefully pry back the retainer tabs on the wider end of the upper bushing retainer away from the lower half.

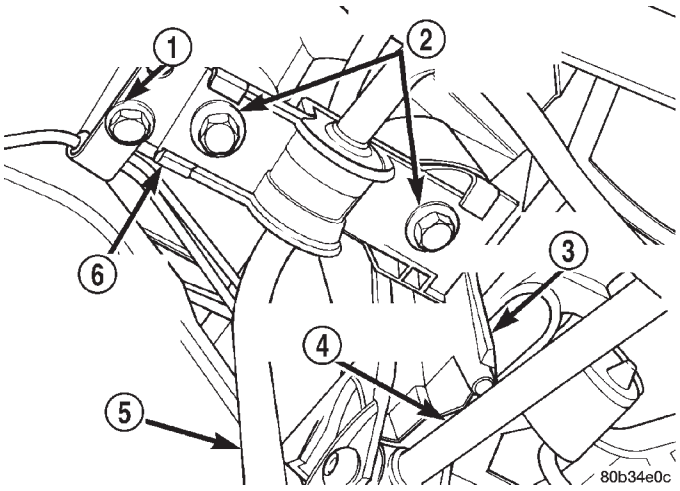


Fig. 32 Bushing Retainer Attachment

1 – BRAKE TUBE ROUTING BRACKET SCREW
2 – BUSHING RETAINER ATTACHING BOLTS
3 – REAR CROSSMEMBER
4 – LEFT FORWARD LATERAL LINK
5 – STABILIZER BAR
6 – BUSHING RETAINER ASSEMBLY

(7) Using a hammer and a brass drift punch, tap the upper half of the bushing retainer assembly forward, off of the lower half and bushing (Fig. 33).

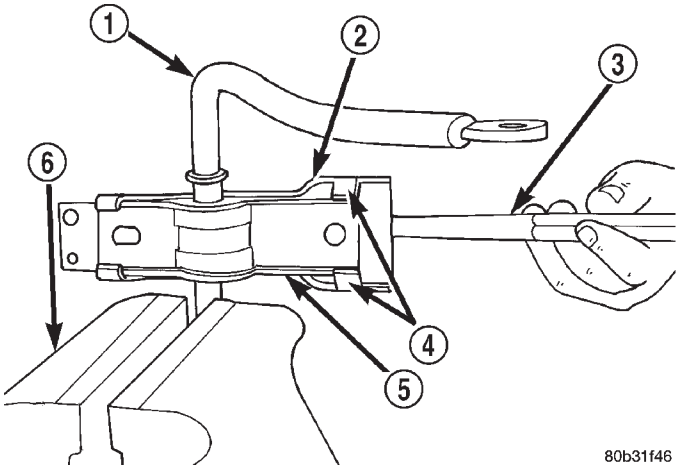


Fig. 33 Bushing Retainer Removal

1 – STABILIZER BAR
2 – UPPER RETAINER HALF
3 – BRASS DRIFT PUNCH
4 – RELEASED RETAINER TABS
5 – LOWER RETAINER HALF
6 – SOFT JAWED VISE

(8) Remove the lower half of the bushing retainer from the bushing.

(9) Remove the bushing from the stabilizer bar. **Make note that the slit in the bushing points toward the front of the vehicle.**

REMOVAL AND INSTALLATION (Continued)

(10) Remove the stabilizer bar from the vise, and repeat the preceding 5 steps to remove the second bushing from the other side of the stabilizer bar.

INSPECTION

Inspect the bushings and retainers for cracks and or distortion. If any signs appear, these pieces should be replaced.

INSTALLATION

(1) Install the bushings onto the stabilizer bar. **Make sure that the slit in the bushing points toward the front of the vehicle.**

(2) Mount the stabilizer bar in the soft jawed vise with the bushing just above the top of the vise jaws.

(3) Install the lower half of the retainer onto the bushing with the elongated mounting hole towards the front of the vehicle.

(4) Install the upper half of the retainer onto the lower half. This is done by tapping the upper half, starting with the large end, onto the lower half with a hammer and brass drift punch (Fig. 34). Tap the upper retainer half on until the mounting holes line up with the ones in the lower half.

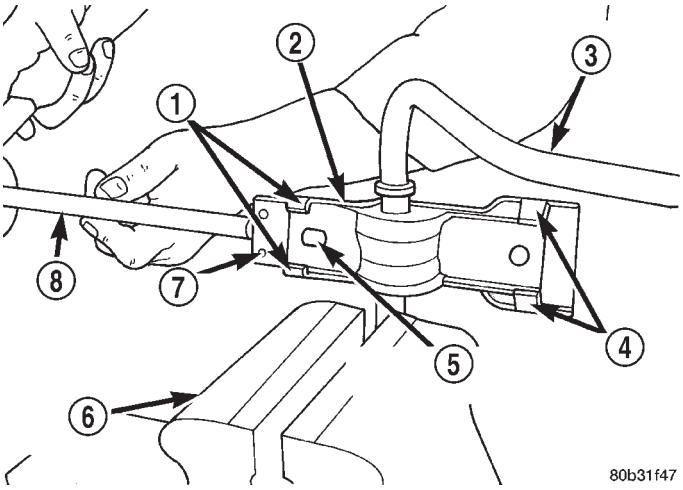


Fig. 34 Bushing Retainer Installation

1 – RETAINER TABS
2 – LOWER RETAINER HALF
3 – STABILIZER BAR
4 – RETAINER TABS
5 – ELONGATED MOUNTING HOLE
6 – SOFT JAWED VISE
7 – UPPER RETAINER HALF
8 – BRASS DRIFT PUNCH

(5) Using a pair of pliers, bend the retainer tabs on the upper retainer half around the lower retainer half, securing the two halves together.

(6) Remove the stabilizer bar from the vise, and repeat the preceding 5 steps to install the second bushing and retainer on the other side of the stabilizer bar.

(7) Position the rear stabilizer bar in position between the frame rails. Install the 4 bolts attaching both stabilizer bar isolator bushing retainers to the frame rails (Fig. 32) (the 2 rearward attaching bolts attach the front corners of the rear suspension crossmember in place). Tighten the forward stabilizer bar isolator bushing retainer attaching bolts to 40 N·m (30 ft. lbs.). Tighten the 2 rearward stabilizer bar isolator bushing retainer attaching bolts (which also serve as the forward rear crossmember attaching bolts) to 100 N·m (75 ft. lbs.).

(8) Install the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer (Fig. 32).

(9) Install both stabilizer bar attaching links onto stabilizer bar (Fig. 31). Install both stabilizer link to stabilizer bar attaching nuts (Fig. 31). Tighten the stabilizer link to stabilizer bar attaching nuts to a torque of 95 N·m (70 ft. lbs.) using a crow foot wrench and torque wrench in place of the wrench on the attaching nut. **Be sure to use a wrench to hold the link stud in place while tightening each attaching nut.**

(10) Lower vehicle to the ground.

WHEEL MOUNTING STUDS (REAR)

CAUTION: If a wheel attaching stud needs to be replaced in the hub and bearing assembly, DO NOT hammer studs out of the hub flange. If a stud is removed by hammering it out of the bearing flange, damage to the hub and bearing assembly will occur leading to premature bearing failure.

CAUTION: The following procedure must be used when replacing rear wheel attaching studs.

NOTE: Rear hub and bearing assembly removal is required, first, before attaching studs can be replaced.

REMOVAL

(1) Position the hub and bearing assembly under a hydraulic press ram, supported by a 21 mm. deep well impact socket under the stud to be replaced (Fig. 35).

Take care to keep hub and bearing assembly from falling during stud removal. This could damage the assembly.

(2) Press the stud out of the hub flange, and into the socket well.

REMOVAL AND INSTALLATION (Continued)

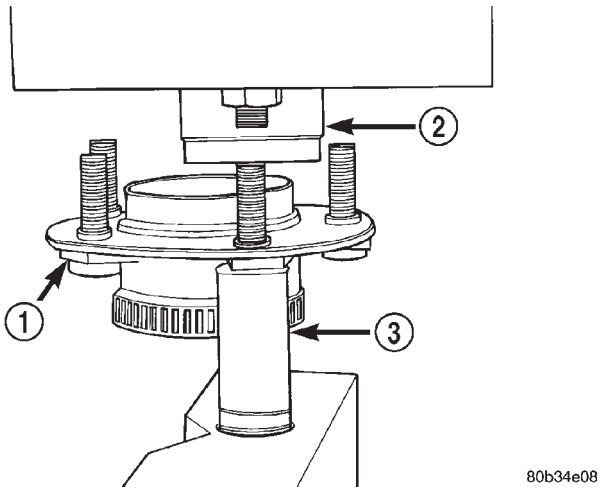


Fig. 35 Wheel Stud Removal

1 – HUB AND BEARING ASSEMBLY
2 – PRESS RAM
3 – 21mm IMPACT SOCKET

(3) Remove the hub and bearing assembly from the press.

(4) Remove the stud from the socket.

INSTALLATION

(1) Install wheel stud into stud hole in hub and bearing assembly.

(2) Position the hub and bearing assembly face down with stud pointing down into the well of the 21 mm. socket. The hydraulic press ram must line up with the stud (Fig. 36).

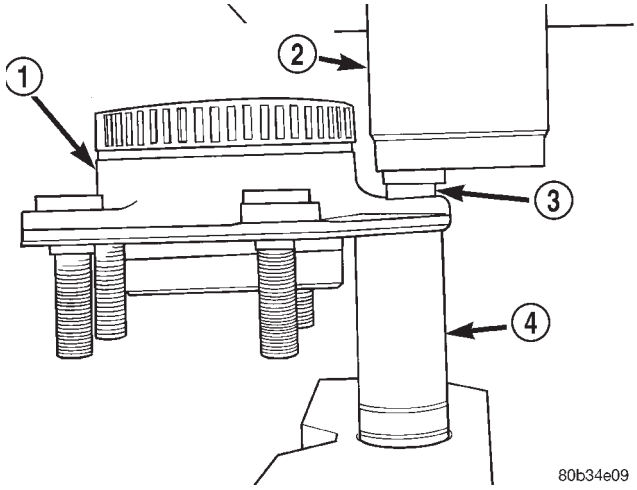


Fig. 36 Wheel Stud Installation

1 – HUB AND BEARING ASSEMBLY
2 – PRESS RAM
3 – WHEEL STUD
4 – 21mm IMPACT SOCKET

(3) Press the stud into the hub flange until it bottoms.

(4) Remove the hub and bearing assembly from the press.

DISASSEMBLY AND ASSEMBLY

STRUT ASSEMBLY (REAR)

The Strut assembly must be removed from the vehicle for it to be disassembled and assembled. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

For the disassembly and assembly of the strut assembly, use strut spring compressor, Pentastar Service Equipment (PSE) tool W-7200, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

The rear strut is available with 3 calibrations; be sure strut is replaced with an assembly of the same calibration.

DISASSEMBLY

(1) If both struts are being serviced at the same time, mark the coil spring and strut assembly according to which side of the vehicle the strut was removed from, and which strut the coil spring was removed from.

WARNING: Do not install the spring compressor hooks on the coil spring in an area of the spring covered by a sleeve. If the sleeve moves when compressing the spring, the spring could come move resulting in personal injury.

CAUTION: When installing the spring compressor's hooks on the coil spring, do not position the hooks of the spring compressor on the sleeve of the coil spring. Positioning the spring compressor on the sleeve could cause the sleeve to dislodge from the coil spring when it is compressed. This would result in the required replacement of the coil spring.

(2) Position the strut assembly in the strut coil spring compressor following the manufacturers instructions. Position the strut assembly so the outboard side of the strut is outward away from the compressor. Grasp the upper and lower coils of the spring with the upper and lower hooks of the compressor. Place a clamp on the lower end of the coil spring, so the strut is held in place once the strut shaft nut is removed. Compress the coil spring until all load is removed from the upper strut mount.

(3) Install Strut Shaft Socket, Special Tool 6864, on the strut shaft nut. Use a deep well socket inserted into the opening of tool 6864 to keep strut shaft from turning. With the spring compressed, remove the nut from the strut shaft.

DISASSEMBLY AND ASSEMBLY (Continued)

(4) Remove the strut upper mount assembly, upper spring isolator, dust shield, and jounce bumper. The jounce bumper should come off with the dust shield. The dust shield and upper spring isolator can be removed from the upper mount if necessary.

(5) Remove the clamp and remove the strut out from the bottom of the coil spring.

(6) Remove the lower spring isolator from the strut coil spring seat.

(7) Inspect the strut assembly components for the following and replace as necessary:

- Inspect the strut for any condition of shaft binding over the full stroke of the shaft.
- Inspect the strut shaft for loss of charge.
- Inspect the jounce bumper for cracks and signs of deterioration.
- Check the upper mount for cracks and distortion and its retaining studs for any sign of damage.
- Inspect the dust shield for rips and deterioration.
- Inspect the upper and lower spring isolators for material deterioration.
- Inspect the coil spring for any sign of damage to the coating.

NOTE: Before releasing the tension on the coil spring, note the position of the coil end on the upper end of the coil spring. When reinstalled, position it in the same spot for ease of alignment of the upper mount, coil spring and the strut.

(8) If the coil spring needs to be removed from the compressor, release the tension from the coil spring by backing off the compressor drive fully. Push back the compressor hooks and remove the coil spring.

ASSEMBLY

NOTE: Make sure all components are free of dirt and debris before assembly, especially around the mounting surfaces.

NOTE: If the coil spring has been removed from the spring compressor, proceed with the next step, otherwise, proceed with step 2.

WARNING: Do not install the spring compressor hooks on the coil spring in an area of the spring covered by a sleeve. If the sleeve moves when compressing the spring, the spring could come move resulting in personal injury.

CAUTION: When installing the spring compressor's hooks on the coil spring, do not position the hooks of the spring compressor on the sleeve of the coil spring. Positioning the spring compressor on the sleeve could cause the sleeve to dislodge from the coil spring when it is compressed. This would result in the required replacement of the coil spring.

(1) Place the coil spring in the compressor following the manufacturer's instructions. The coil spring must be installed so the sleeve on the spring is towards the upper end of assembly. Before compressing the spring, rotate the spring to the position noted in disassembly for ease of strut assembly components.

(2) Install the lower spring isolator on strut matching the step in the isolator to the step in the strut lower spring seat.

(3) Install the strut through the bottom of the coil spring until the lower spring seat contacts the lower end of the coil spring. Align the lower coil spring end with the step in the strut lower spring seat. Install the clamp on the lower end of the coil spring and strut, so the strut is held in place.

(4) Install the jounce bumper into the dust shield from the bottom (Fig. 37). The jounce bumper should snap into position at the top end of the dust shield.

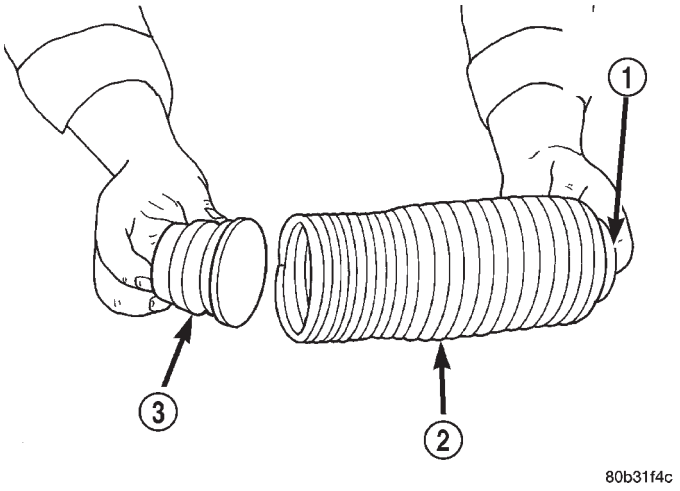


Fig. 37 Jounce Bumper Installed Into Dust Shield

1 – TOP OF DUST SHIELD
2 – DUST SHIELD
3 – JOUNCE BUMPER

(5) Install the dust shield and jounce bumper into position in bottom of upper strut mount. Dust shield should snap into position. Once correctly installed, the dust boot should be able to be rotated within the mount without coming loose.

(6) Install the upper strut mount, dust shield and jounce bumper onto the strut shaft. Position the mount so its center rear mounting stud is aligned with the stabilizer bar attaching link bracket that is on the inboard side of the strut.

(7) Install the upper strut mount to strut shaft nut on the strut shaft. Install Strut Shaft Socket, Special

DISASSEMBLY AND ASSEMBLY (Continued)

Tool 6864, on strut shaft nut. Use a deep well socket inserted into the opening of tool 6864 to keep strut shaft from turning. Tighten the strut shaft nut to a torque of 75 N·m (55 ft. lbs.).

(8) Slowly release the tension from the coil spring by backing off the compressor drive fully. As the tension is relieved, make sure the upper mount, spring, and strut align properly.

(9) Remove the clamp from the lower end of the coil spring and strut. Push back the spring compressor upper and lower hooks, then remove the strut assembly from the spring compressor.

(10) Install the strut assembly back into the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

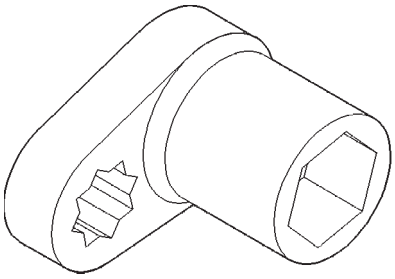
SPECIFICATIONS

REAR SUSPENSION FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
STRUT ASSEMBLY:	
Body Mounting Nuts	25 N·m (19 ft. lbs.)
Spindle Pinch Bolt	53 N·m (40 ft. lbs.)
Strut Shaft Nut	75 N·m (55 ft. lbs.)
Stabilizer Bar Link Upper Attaching Nut	23 N·m (17 ft. lbs.)
SPINDLE:	
Brake Support Plate Mounting Bolts	109 N·m (80 ft. lbs.)
Brake Hose Bracket Bolt	23 N·m (17 ft. lbs.)
Caliper Adapter Spindle Bolts	115 N·m (85 ft. lbs.)
Disc Brake Caliper Bolts	22 N·m (16 ft. lbs.)
HUB AND BEARING:	
Spindle Retaining Nut	168 N·m (124 ft. lbs.)
Wheel Mounting Nuts	109-150 N·m (80-110 ft. lbs.)
LATERAL LINKS:	
Jam Nuts	88 N·m (65 ft. lbs.)
Spindle Nut	135 N·m (100 ft. lbs.)
Suspension Crossmember Nuts	95 N·m (70 ft. lbs.)
TRAILING ARM:	
Attaching Nuts	100 N·m (75 ft. lbs.)
Bracket To Body Bolts	60 N·m (45 ft. lbs.)
Bracket To Spindle Bolts	110 N·m (80 ft. lbs.)
REAR SUSPENSION CROSSMEMBER:	
Body Attaching Bolts	100 N·m (75 ft. lbs.)
STABILIZER BAR:	
Bushing Retainer Bolts	40 N·m (30 ft. lbs.)
Strut Attaching Link Lower Nut	95 N·m (70 ft. lbs.)

SPECIAL TOOLS

REAR SUSPENSION



Socket Strut Shaft Nut 6864

DIFFERENTIAL AND DRIVELINE

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DESCRIPTION AND OPERATION

DRIVESHAFT ASSEMBLIES

DESCRIPTION

The front driveshaft assemblies are flexible assemblies consisting of an inner and outer flexible joint connected by an solid shaft (Fig. 1) (Fig. 2). Transaxle packaging and location requires the use of unequal length driveshafts, with the left shaft being longer than the right.

The inner joints are of a tripod design (Fig. 2), and allow for axial and angular movement to accommodate for shifting of powertrain and suspension components. The inner joints incorporate a female spline which install over the transaxle stub shafts.

The outer joints are of a constant velocity design (Fig. 2), and only offer angular flexibility. The outer joints incorporate a male spline, which connect to the wheel hub/bearing. The outer joint is fastened to the hub to ensure that there is no axial movement (end-play).

Both inner and outer joints utilize flexible “boots” (Fig. 1) (Fig. 2) which maintain grease within the joints, protect the joints from the environment/elements, and facilitate the axial and angular movement of the joints. The inner tripod joint boots are constructed of silicone rubber. The outer C/V boots are made of Hytrel plastic.

NOTE: When driveshaft boots are replaced be sure boots of the correct material are used.

DESCRIPTION AND OPERATION (Continued)

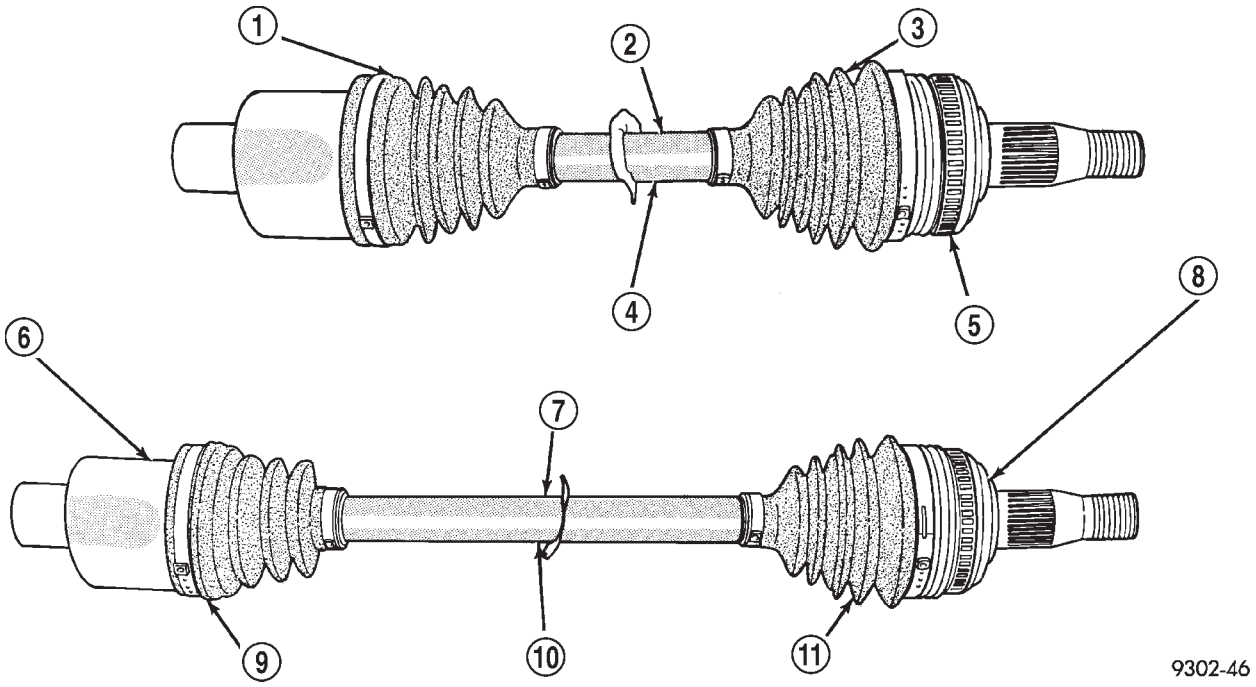


Fig. 1 Front Driveshaft Assemblies

1 – INNER BOOT
2 – INTERCONNECTING SHAFT
3 – OUTER BOOT
4 – RIGHT DRIVE SHAFT
5 – TONE WHEEL (WHEN EQUIPPED WITH ABS)
6 – INNER TRIPOD JOINT
7 – INTERCONNECTING SHAFT
8 – OUTER C/V JOINT
9 – INNER BOOT
10 – LEFT DRIVE SHAFT
11 – OUTER BOOT

DESCRIPTION AND OPERATION (Continued)

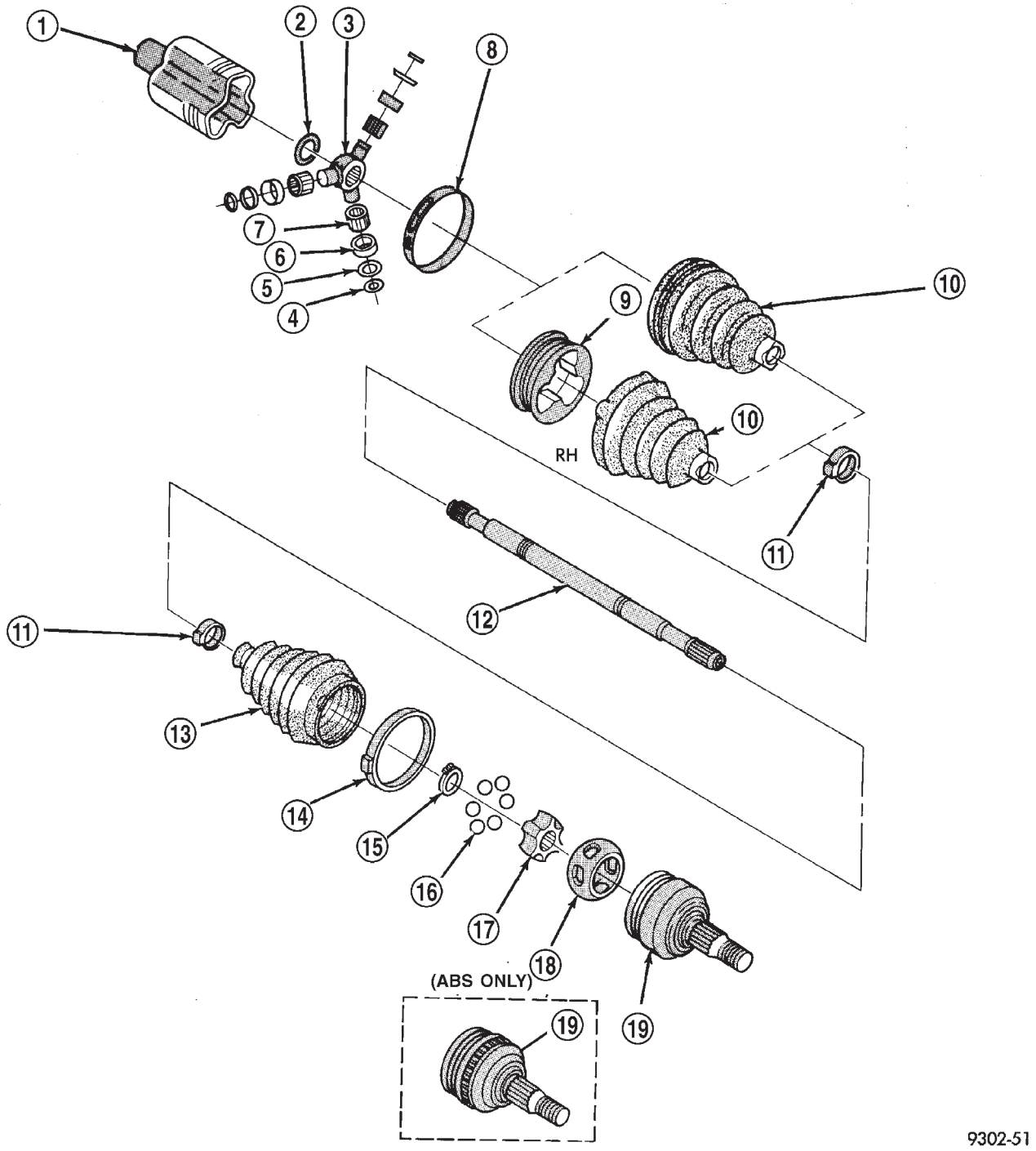


Fig. 2 Driveshaft Component Identification

1 – HOUSING ASM, RETAINER &
2 – RING, SPACER
3 – SPIDER, TRIPOTD JOINT
4 – RING, RETAINING
5 – RETAINER, BALL & ROLLER
6 – BALL, TRIPOD JOINT
7 – ROLLER, NEEDLE
8 – CLAMP, SEAL RETAINING
9 – BUSHING, TRILOBAL TRIPOD
10 – SEAL, DRIVE AXLE INBOARD
11 – CLAMP, SEAL RETAINING
12 – SHAFT, AXLE (RH SHOWN, LH SIMILAR)
13 – SEAL, DRIVE AXLE OUTBOARD
14 – CLAMP, SEAL RETAINING
15 – RING, RACE RETAINING
16 – BALL, CHROME ALLOY
17 – RACE, C/V JOINT INNER
18 – CAGE, C/V JOINT
19 – RACE, C/V JOINT OUTER

DESCRIPTION AND OPERATION (Continued)

OPERATION

Driveshaft assemblies are designed to transmit power from the transaxle to the front wheels, while allowing for powertrain and suspension flex.

DIAGNOSIS AND TESTING

DRIVESHAFT DIAGNOSIS

VEHICLE INSPECTION

(1) Check for grease in the vicinity of the inboard tripod joint and outboard C/V joint; this is a sign of inner or outer joint seal boot or seal boot clamp damage.

(2) A light film of grease may appear on the inner tripod joint seal boot; this is considered normal and should not require replacement of the seal boot. All inner tripod joint seal boots are made of silicone rubber; which will allow the weeping (sweating) of the joint lubricant to pass through it while in operation.

NOISE AND/OR VIBRATION IN TURNS

A clicking noise and/or a vibration in turns could be caused by one of the following conditions:

(1) Damaged outer C/V or inner tripod joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.

(2) Noise may also be caused by another component of the vehicle coming in contact with the driveshafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

(1) A torn seal boot on the inner or outer joint of the driveshaft assembly.

(2) A loose or missing clamp on the inner or outer joint of the driveshaft assembly.

(3) A damaged or worn driveshaft C/V joint.

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

(1) A worn or damaged driveshaft inner tripod joint.

(2) A sticking tripod joint spider assembly (inner tripod joint only).

(3) Improper wheel alignment. See Wheel Alignment in this group for alignment checking and setting procedures and specifications.

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

(1) Foreign material (mud, etc.) packed on the backside of the wheel(s).

(2) Out of balance front tires or wheels. See Group 22, Wheels And Tires for the required balancing procedure.

(3) Improper tire and/or wheel runout. See Group 22, Wheels And Tires for the required runout checking procedure.

REMOVAL AND INSTALLATION

FRONT DRIVESHAFTS

NOTE: The only service which is to be performed on the driveshaft assemblies is the replacement of the driveshaft seal boots or replacement of the entire assembly.

If any failure of internal driveshaft components is diagnosed during a vehicle road test or disassembly of the driveshaft, the driveshaft assembly will need to be replaced.

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. Refer to Hoisting, in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(2) Remove the front wheel and tire assembly from the vehicle.

(3) Remove the front caliper assembly from the front steering knuckle assembly (Fig. 3). Refer to Front Disc Brake Service in the Brake Section of this service manual for caliper removal procedure.

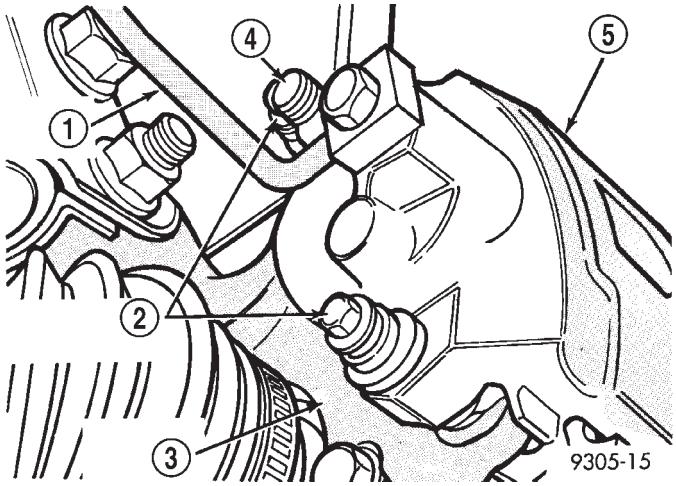


Fig. 3 Disc Brake Caliper Mounting

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

(4) Remove front braking disk (rotor) from hub, by pulling it straight off wheel mounting studs (Fig. 4).

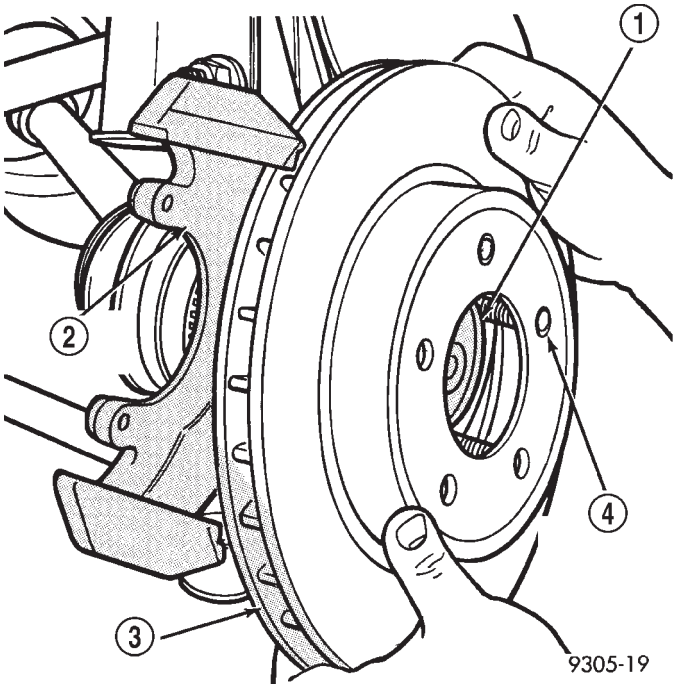


Fig. 4 Removing Braking Disc

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

(5) Remove the speed sensor cable routing bracket from the strut assembly (Fig. 5).

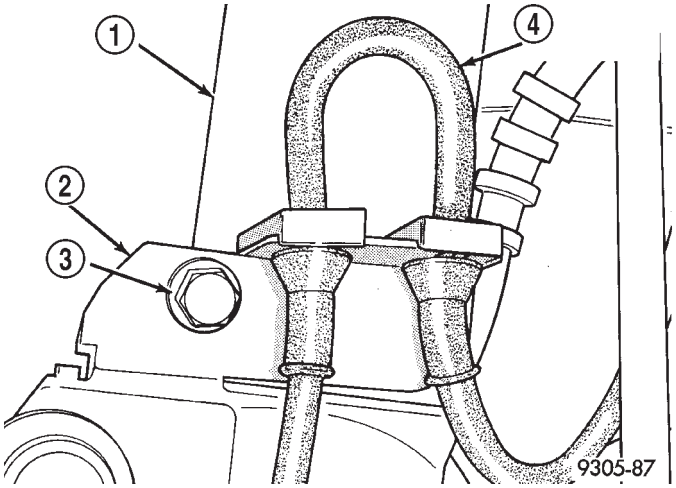


Fig. 5 Speed Sensor Cable Routing Bracket

1 – STRUT ASSEMBLY
2 – ROUTING BRACKET
3 – SCREW
4 – SPEED SENSOR CABLE

(6) Remove the hub and bearing to stub axle retaining nut (Fig. 6).

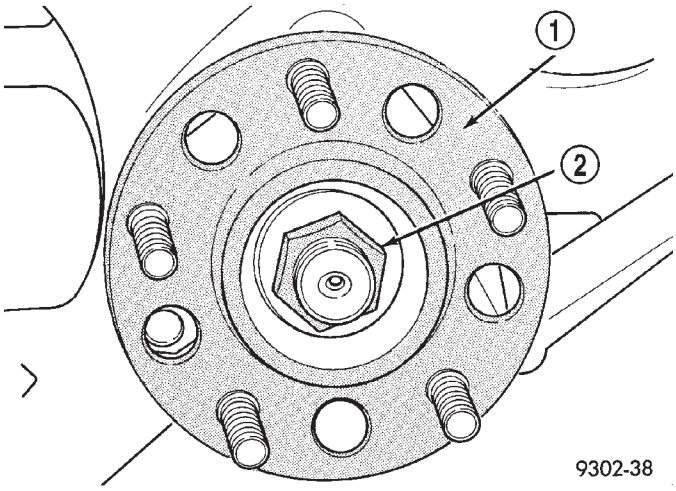


Fig. 6 Hub And Bearing To Stub Axle Retaining Nut

1 – HUB/BEARING ASSEMBLY
2 – NUT

(7) Install Puller, Special Tool 6790 on hub and bearing assembly (Fig. 7), using wheel lug nuts to secure it in place.

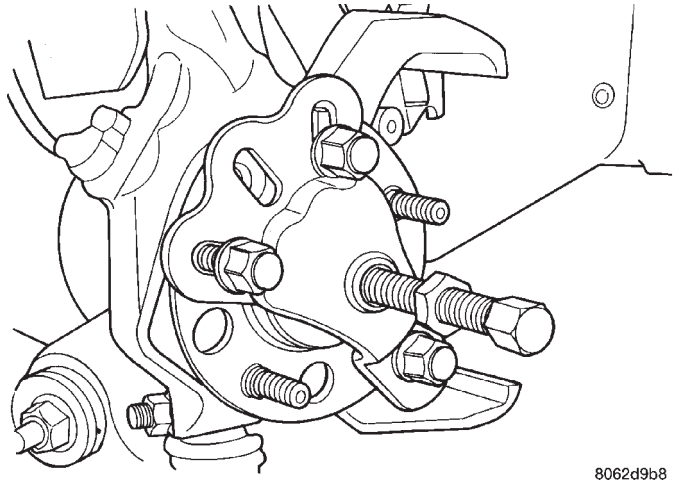


Fig. 7 Puller Installed On Hub/Bearing Assembly

REMOVAL AND INSTALLATION (Continued)

(8) Install a wheel lug nut on wheel stud to protect the threads on the stud. Install a flat blade pry tool to keep hub from turning. Using Puller, force the outer stub axle from the hub and bearing asssembly (Fig. 8).

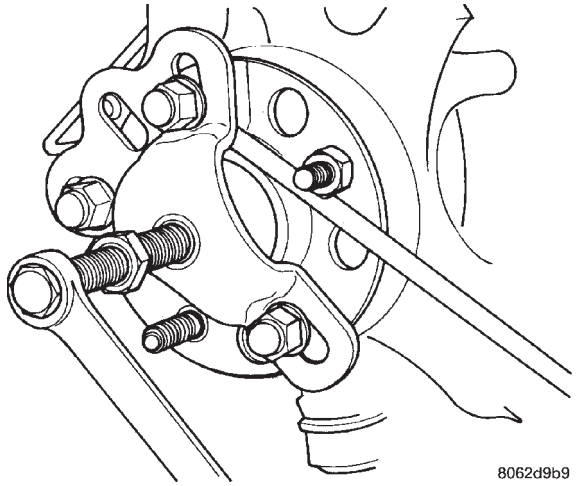


Fig. 8 Removing Stub Axle From Hub/Bearing

(9) Dislodge inner tripod joint from stub shaft retaining snap ring on transaxle assembly (Fig. 9). Inner tripod joint is dislodged from stub shaft retaining snap ring, by inserting a pry bar between transaxle case and inner tripod joint and prying on tripod joint. **Only disengage the inner tripod joint from the retaining snap ring. Do not attempt to remove the inner tripod joint from the transmission stub shaft at this time.**

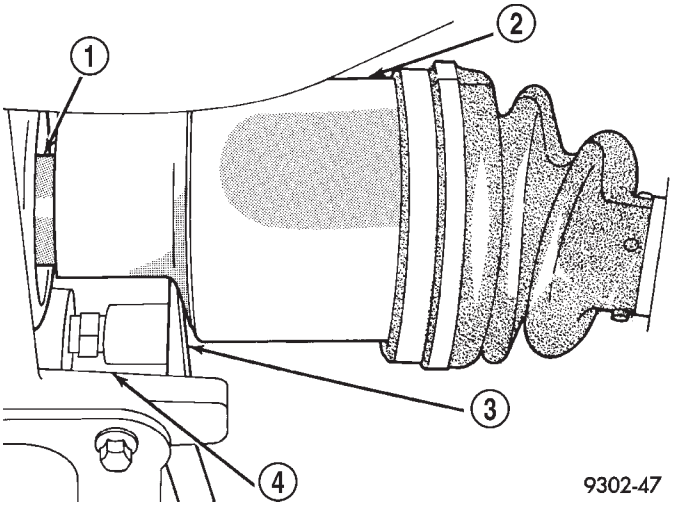


Fig. 9 Inner Tripod Joint Removal From Stub Shaft

1 – TRANSMISSION STUB SHAFT
2 – INNER TRIPOD JOINT
3 – PRY BAR
4 – TRANSAXLE

CAUTION: The strut assembly to steering knuckle bolts are serrated where they go through strut assembly and steering knuckle. When removing bolts, turn nuts off bolts. DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned, damage to steering knuckle will result.

(10) Remove the strut assembly to steering knuckle attaching bolts (Fig. 10).

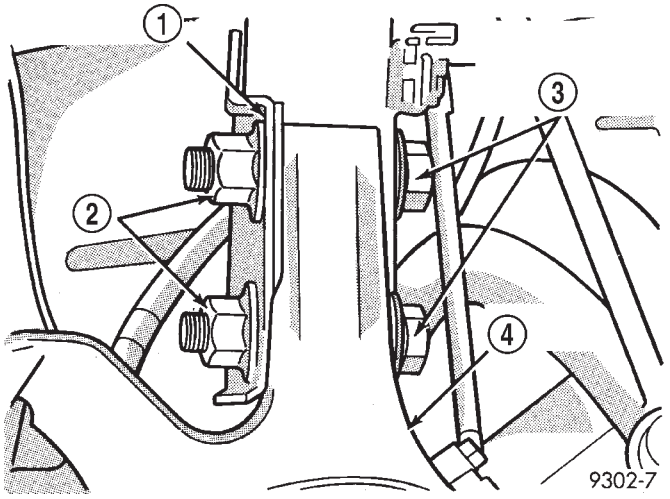


Fig. 10 Strut Assembly To Steering Knuckle Attaching Bolts

1 – STRUT ASSEMBLY
2 – NUTS
3 – STRUT ASSEMBLY TO STEERING KNUCKLE ATTACHING BOLTS
4 – STEERING KNUCKLE

(11) Remove the top of the steering knuckle from the strut assembly.

CAUTION: When removing outer C/V joint from hub and bearing assembly, do not allow the flinger disk (Fig. 11) on hub and bearing assembly to become damaged. Damage to the flinger disk will cause dirt and water intrusion into bearing. Premature bearing failure will result.

(12) Hold outer C/V joint assembly with one hand. Grasp steering knuckle with other and rotate it out and to the rear of the vehicle, until outer C/V joint clears hub and bearing assembly (Fig. 11).

(13) Remove driveshaft inner tripod joint from transaxle stub shaft. **When removing driveshaft, do not pull on interconnecting shaft to remove inner tripod joint from stub shaft. Removal in this manner will separate the spider assembly from the tripod joint housing. Grasp inner tripod joint (Fig. 12) and interconnecting shaft and pull on both pieces at the same time.**

REMOVAL AND INSTALLATION (Continued)

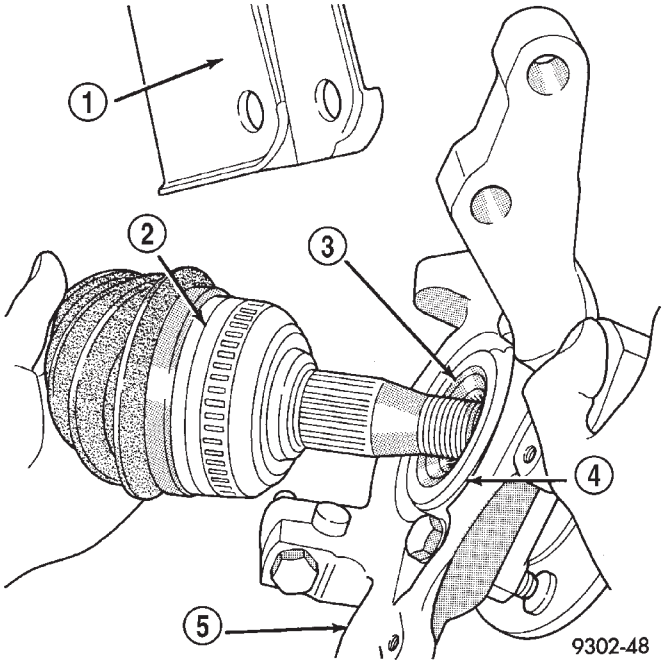


Fig. 11 Outer C/V Joint Removal From Hub and Bearing

1 – STRUT ASSEMBLY
2 – OUTER C/V JOINT
3 – HUB/BEARING ASSEMBLY
4 – FLINGER DISK
5 – STEERING KNUCKLE

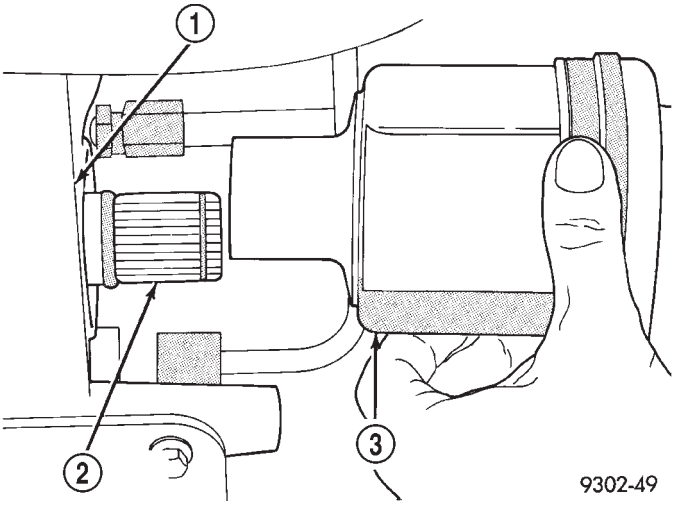


Fig. 12 Inner Tripod Joint Removal From Stub Shaft

1 – TRANSAXLE
2 – TRANSMISSION STUB SHAFT
3 – INNER TRIPOD JOINT

INSTALLATION

CAUTION: The inboard tripod joint retaining circlip and O-ring seal (Fig. 13) on the transaxle stub shaft are not re-usable. Whenever the inboard tripod joint is removed from the stub shaft, the retaining circlip and O-ring seal MUST BE REPLACED. The retaining circlip and O-ring seal is included in all service kits requiring removal of the inboard tripod joint from the stub shaft.

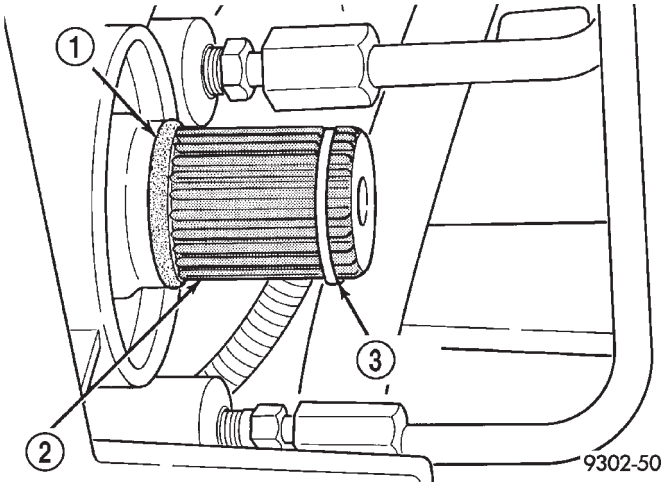


Fig. 13 Tripod Joint Retaining Circlip And O-Ring Seal

1 – O-RING SEAL
2 – STUB SHAFT
3 – RETAINING CIR CLIP

(1) Replace O-ring seal and tripod joint retaining circlip (Fig. 13) on the transaxle stub shaft.

(2) Evenly apply a bead of grease, such as Mopar Multi-Purpose Lubricant or an equivalent, around spline of inner tripod joint (Fig. 14) where the O-ring seats against tripod joint. This will spread grease onto stub shaft during tripod joint installation preventing corrosion and help to seal the O-ring.

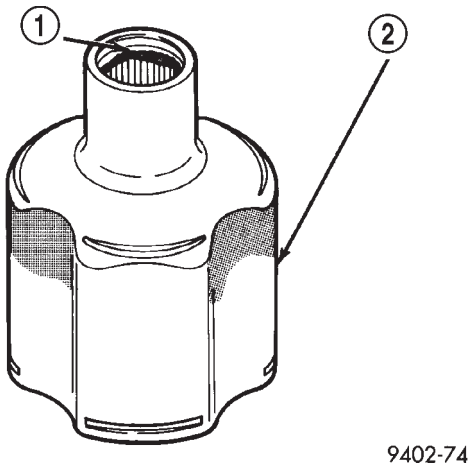


Fig. 14 Grease Applied To Inner Tripod Joint Housing Spline

1 – APPLY 1 MILLILITER BEAD OF GREASE HERE
2 – INNER TRIPOD JOINT HOUSING

REMOVAL AND INSTALLATION (Continued)

(3) Install driveshaft through hole in splash shield. Grasp inner tripod joint in one hand and interconnecting shaft in the other. Align inner tripod joint spline with stub shaft spline on transaxle (Fig. 15). Use a rocking motion with the inner tripod joint, to get it past the circlip on the transaxle stub shaft.

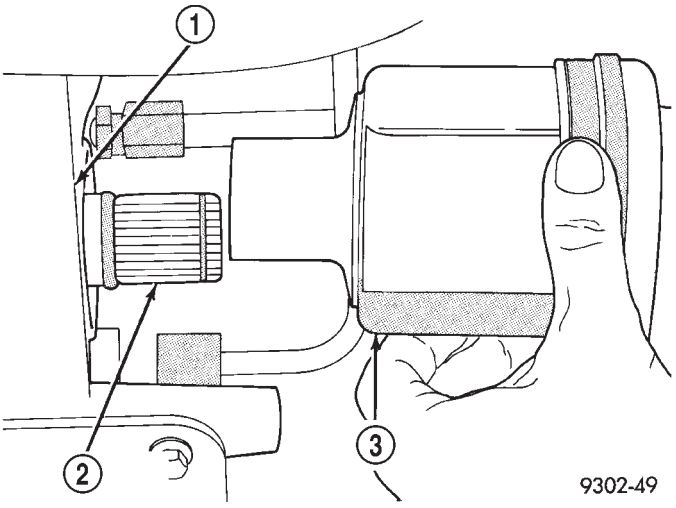


Fig. 15 Inner Tripod Joint Installation On Stub Shaft

1 – TRANSAXLE
2 – TRANSMISSION STUB SHAFT
3 – INNER TRIPOD JOINT

(4) Continue pushing tripod joint onto transaxle stub shaft until it stops moving. The O-ring seal on the stub should not be visible when inner tripod joint is fully installed on stub shaft. **To check that inner tripod joint retaining circlip is locked into tripod joint, grasp inner tripod joint and pull on it by hand. If circlip is locked into tripod joint, tripod joint will not move on stub shaft.**

CAUTION: When installing outer C/V joint into the hub and bearing assembly, do not allow the flinger disk on hub and bearing assembly to become damaged. Damage to the flinger disk can cause dirt and water intrusion into bearing and premature bearing failure.

(5) Hold outer C/V joint assembly with one hand. Grasp steering knuckle with other hand and rotate it out and to the rear of the vehicle. Install outer C/V joint into the hub and bearing assembly (Fig. 16).

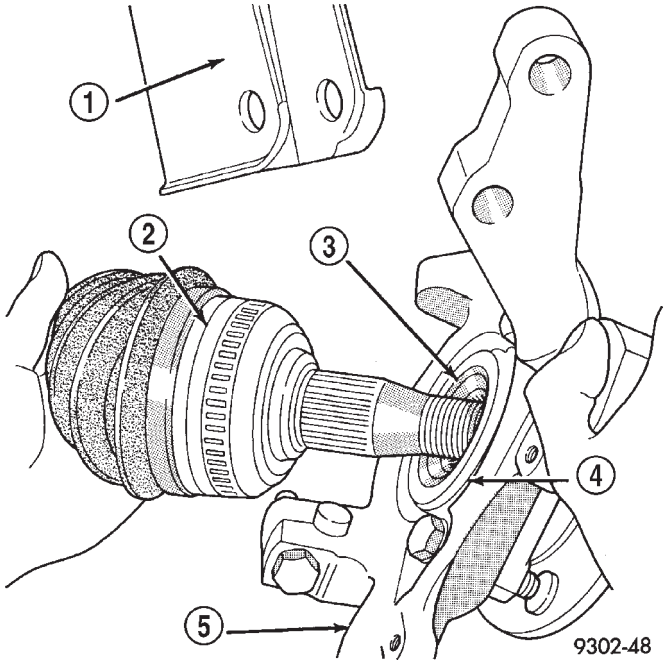


Fig. 16 Outer C/V Joint Installation Into Hub and Bearing

1 – STRUT ASSEMBLY
2 – OUTER C/V JOINT
3 – HUB/BEARING ASSEMBLY
4 – FLINGER DISK
5 – STEERING KNUCKLE

(6) Install the top of the steering knuckle into the strut assembly. Align the steering knuckle to strut assembly mounting holes.

CAUTION: The strut assembly to steering knuckle bolts are serrated where they go through strut assembly and steering knuckle. When installing bolts, turn nuts onto bolts. DO NOT TURN BOLTS IN STEERING KNUCKLE. If bolts are turned, damage to steering knuckle will result.

REMOVAL AND INSTALLATION (Continued)

(7) Install the strut assembly to steering knuckle attaching bolts. Install nuts on attaching bolts (Fig. 17). Tighten the strut assembly to steering knuckle bolt nuts to 169 N·m (125 ft. lbs.). **TURN NUTS ON BOLTS. DO NOT TURN BOLTS.**

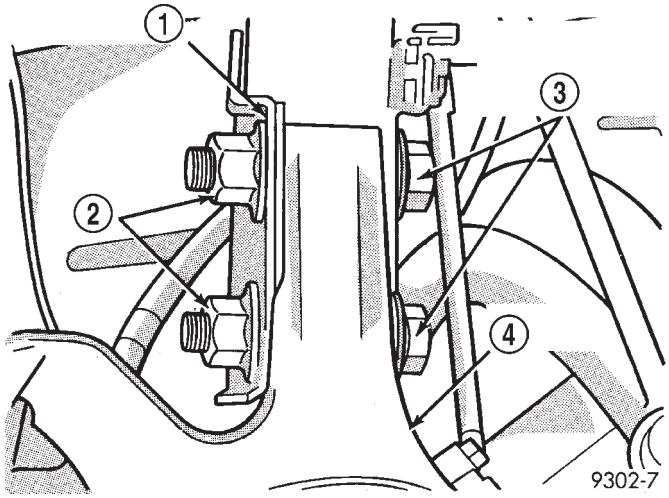


Fig. 17 Strut Assembly to Steering Knuckle Attaching Bolts

1 – STRUT ASSEMBLY
2 – NUTS
3 – STRUT ASSEMBLY TO STEERING KNUCKLE ATTACHING BOLTS
4 – STEERING KNUCKLE

CAUTION: The hub and bearing assembly to stub shaft retaining nut is a prevailing torque nut and can not be re-used. A NEW retaining nut MUST be used when assembled.

(8) Install a **NEW** retaining nut (Fig. 18). **Tighten, but do not torque the hub nut at this time.**

(9) Install speed sensor cable routing bracket on front strut assembly. Install and securely tighten routing bracket screw.

(10) Install the braking disk on the hub and bearing assembly (Fig. 19).

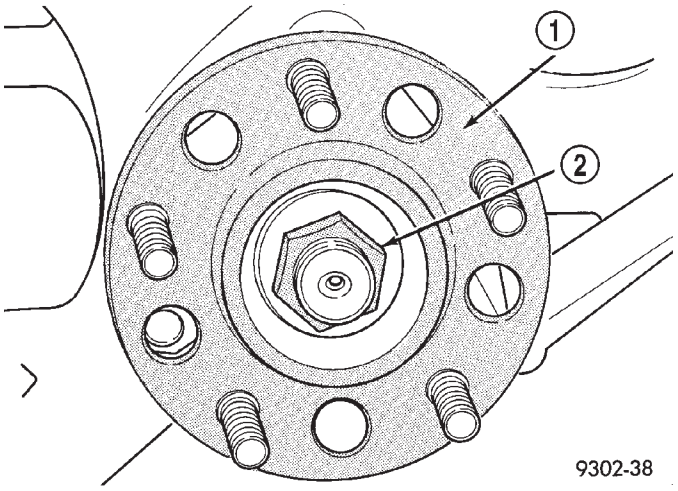


Fig. 18 Hub And Bearing To Stub Axle Retaining Nut

1 – HUB/BEARING ASSEMBLY
2 – NUT

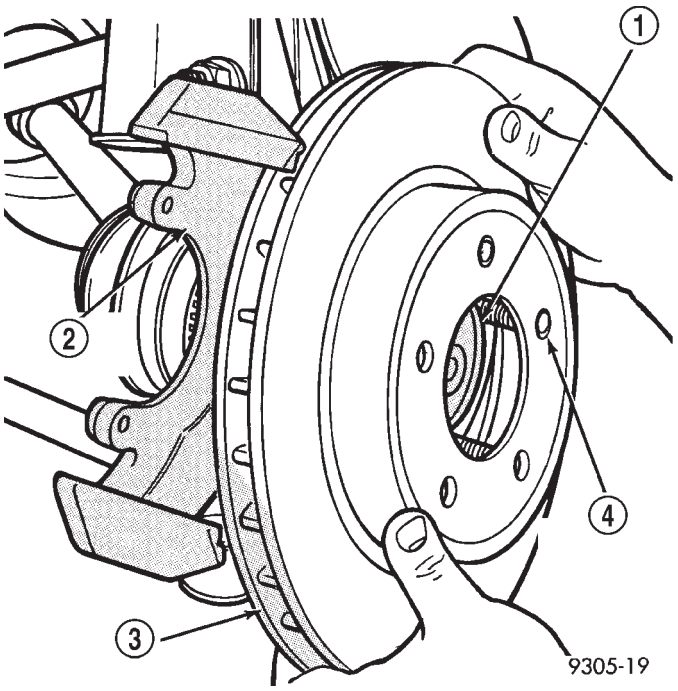


Fig. 19 Installing Braking Disc

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

REMOVAL AND INSTALLATION (Continued)

(11) Install front brake caliper over braking disc and align with caliper mounting holes on steering knuckle (Fig. 20). Refer to Front Disc Brake Service in the Brake Section of this service manual for caliper installation procedure. Install the caliper to steering knuckle bolts. Tighten bolts to 19 N·m (168 in. lbs.).

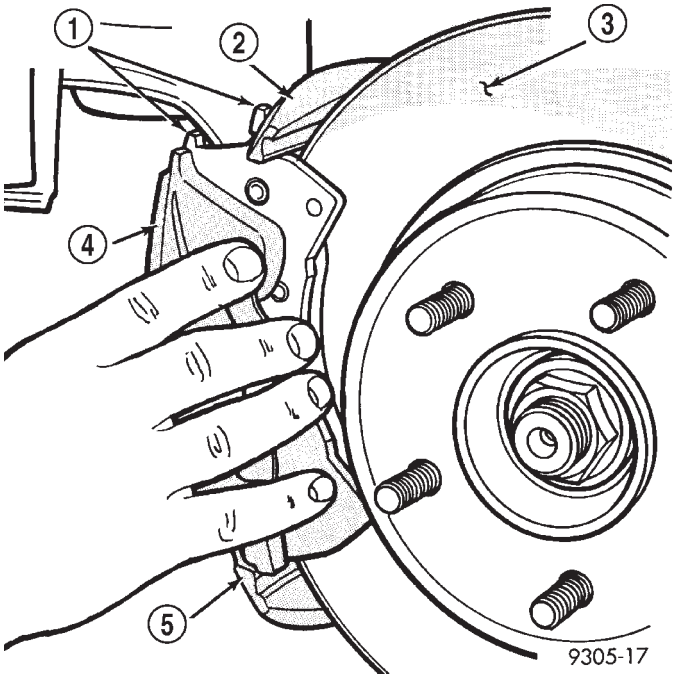


Fig. 20 Disc Brake Caliper Mounting

1 – BRAKE SHOES
2 – STEERING KNUCKLE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – MACHINED ABUTMENT

(12) Install wheel and tire assembly on vehicle. Tighten the wheel mounting stud nuts in proper sequence (Fig. 21), until all nuts are tightened to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(13) Lower vehicle to the ground.

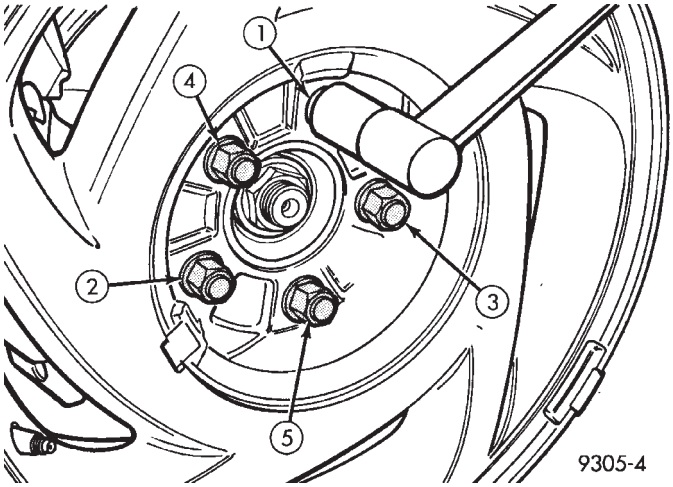


Fig. 21 Tightening Wheel Nuts

CAUTION: When tightening hub and bearing assembly to stub shaft retaining nut, do not exceed the maximum torque of 150 N·m (105 ft. lbs.). If the maximum torque is exceeded this may result in a failure of the driveshaft.

(14) Apply the vehicle's brakes to keep vehicle from moving. Tighten the **NEW** stub shaft to hub and bearing assembly retaining nut to 150 N·m (105 ft. lbs.) (Fig. 22).

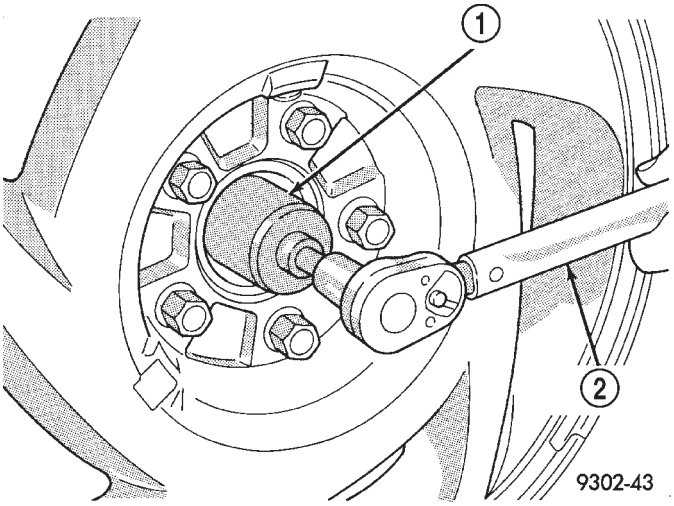


Fig. 22 Tighten Hub And Bearing Retaining Nut

1 – HUB/BEARING
2 – TORQUE WRENCH

DISASSEMBLY AND ASSEMBLY

INNER TRIPOD JOINT SEALING BOOT

CAUTION: Boot sealing is vital to retain special lubricants and to prevent foreign contaminants from entering the C/V joint. Mishandling, such as allowing the assemblies to dangle unsupported, pulling or pushing the ends can cut boots or damage C/V joints. The LH platform driveshafts use no retention system to retain the spider assembly in the tripod housing. During removal and installation procedures always support both ends of the driveshaft to prevent damage or disengaging tripod joint. Therefore, do not pull on the interconnecting shaft when attempting to remove drive shafts from vehicle.

REMOVAL

To remove sealing boots from driveshafts for replacement, the driveshaft assemblies must be removed from the vehicle. See Driveshaft Removal and Installation in this Group for the required driveshaft removal and replacement procedure.

(1) Remove the driveshaft requiring boot replacement from the vehicle.

(2) Remove large boot clamp which retains inner tripod joint sealing boot to tripod joint housing (Fig. 23) and discard. Remove small clamp which retains inner tripod joint sealing boot to interconnecting shaft and discard. Remove the sealing boot from the tripod housing and slide it down the interconnecting shaft.

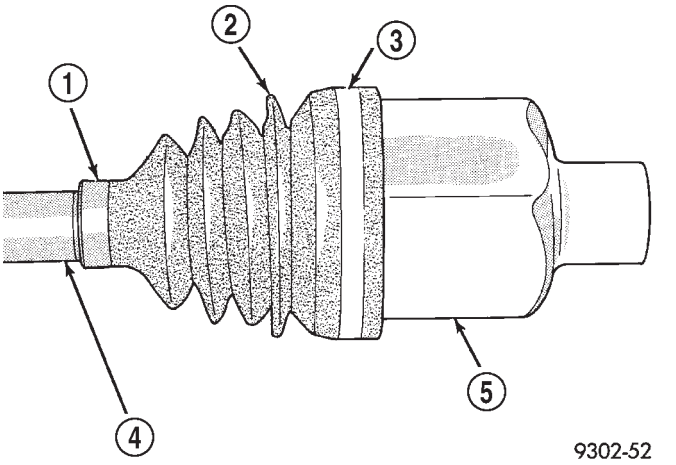


Fig. 23 Inner Tripod Joint Sealing Boot Clamps

1 – SMALL CLAMP
2 – SEALING BOOT
3 – LARGE CLAMP
4 – INTERCONNECTING SHAFT
5 – INNER TRIPOD JOINT

CAUTION: When removing the spider joint from the tripod joint housing. Hold the rollers in place on the spider trunions to prevent the rollers and needle bearings from falling away.

(3) Slide the interconnecting shaft and spider assembly out of the tripod joint housing (Fig. 24).

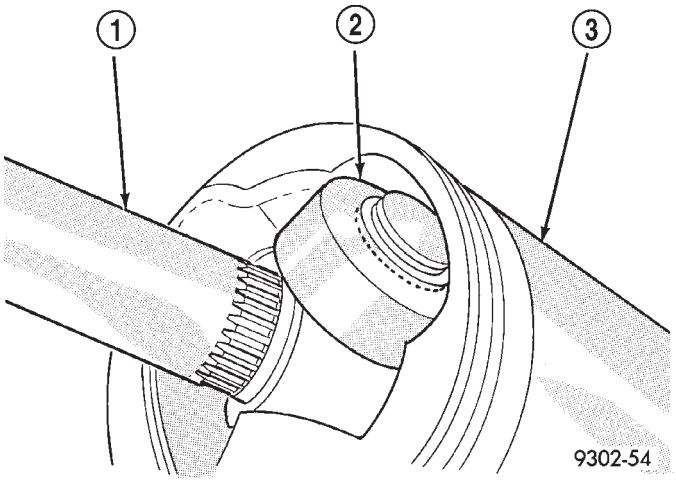


Fig. 24 Spider Assembly Joint Removal From Housing

1 – INTERCONNECTING SHAFT
2 – SPIDER ASSEMBLY
3 – TRIPOD JOINT HOUSING

(4) Remove snap ring which retains spider assembly to interconnecting shaft (Fig. 25). Then remove the spider assembly from interconnecting shaft. If spider assembly will not come off interconnecting shaft by hand, it can be removed by tapping the end of the spider body with a brass drift. **Do not hit the outer tripod bearings in an attempt to remove spider assembly from interconnecting shaft.**

(5) Slide failed sealing boot off the interconnecting shaft.

(6) Thoroughly clean and inspect spider assembly, tripod joint housing and interconnecting shaft for any signs of excessive wear. **If any parts show signs of excessive wear, the driveshaft assembly will require replacement. Component parts of the assemblies are not serviceable.**

INSTALLATION

NOTE: The inner tripod joint sealing boots are made of silicone rubber which is soft and pliable. The replacement sealing boot MUST BE the same type of material as the sealing boot which was removed.

DISASSEMBLY AND ASSEMBLY (Continued)

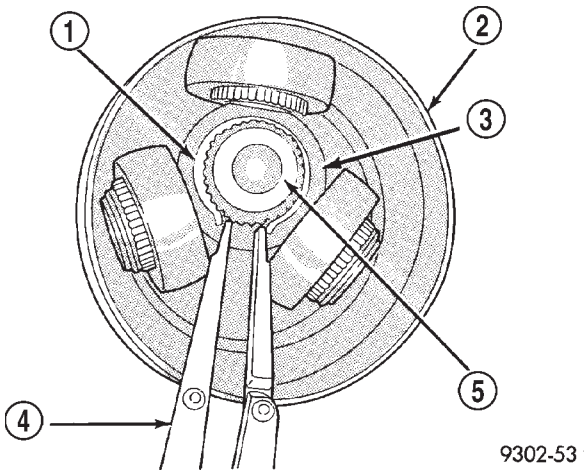


Fig. 25 Spider Assembly Retaining Snap Ring Removal

1 – SNAP RING
2 – SEALING BOOT
3 – SPIDER ASSEMBLY
4 – SNAP RING PLIERS
5 – INTERCONNECTING SHAFT

(1) Slide inner tripod joint seal boot retaining clamp, onto interconnecting shaft. Then slide replacement inner tripod joint sealing boot onto the interconnecting shaft. **Inner tripod joint seal boot MUST be positioned on interconnecting shaft, so only the thinnest (sight) groove on interconnecting shaft is visible (Fig. 26).**

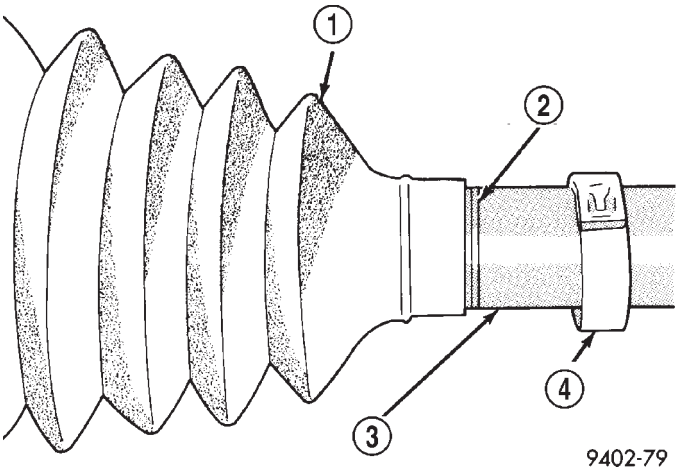


Fig. 26 Seal Boot Correctly Positioned On Interconnecting Shaft

1 – SEALING BOOT
2 – INTERCONNECTING SHAFT THINNEST GROOVE
3 – INTERCONNECTING SHAFT
4 – BOOT CLAMP

(2) Install the spider assembly onto the interconnecting shaft. Spider assembly must be installed on interconnecting shaft far enough to fully install the retaining snap ring. If spider assembly will not fully install on interconnecting shaft by hand, it can be installed by tapping the spider body with a brass drift. **Do not hit the outer tripod bearings in an attempt to install spider assembly on interconnecting shaft.**

(3) Install the spider assembly to interconnecting shaft retaining snap ring into groove on end of interconnecting shaft (Fig. 27). Verify the snap ring is fully seated into groove on interconnecting shaft.

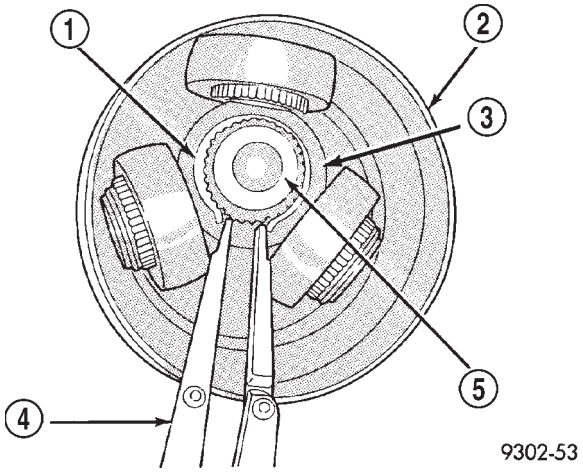


Fig. 27 Spider Assembly Retaining Snap Ring Installation

1 – SNAP RING
2 – SEALING BOOT
3 – SPIDER ASSEMBLY
4 – SNAP RING PLIERS
5 – INTERCONNECTING SHAFT

(4) Distribute 1/2 the amount of grease provided in the seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into tripod housing. Put the remaining amount into the sealing boot.

(5) Slide the spider assembly and the interconnecting shaft into the tripod joint housing (Fig. 28).

(6) Install inner tripod joint seal boot to interconnecting shaft clamp evenly on sealing boot.

(7) Clamp sealing boot onto interconnecting shaft using Crimper, Special Tool C-4975 and the following procedure. Place crimping tool C-4975 over bridge of clamp (Fig. 29). Tighten nut on crimping tool C-4975 until jaws on tool are closed completely together, face to face (Fig. 30).

CAUTION: Seal must not be dimpled, stretched or out of shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

DISASSEMBLY AND ASSEMBLY (Continued)

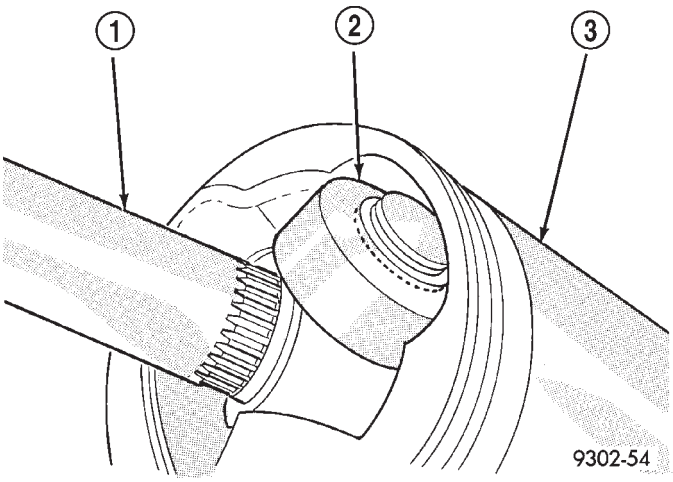


Fig. 28 Spider Assembly Installed In Housing

1 – INTERCONNECTING SHAFT
2 – SPIDER ASSEMBLY
3 – TRIPOD JOINT HOUSING

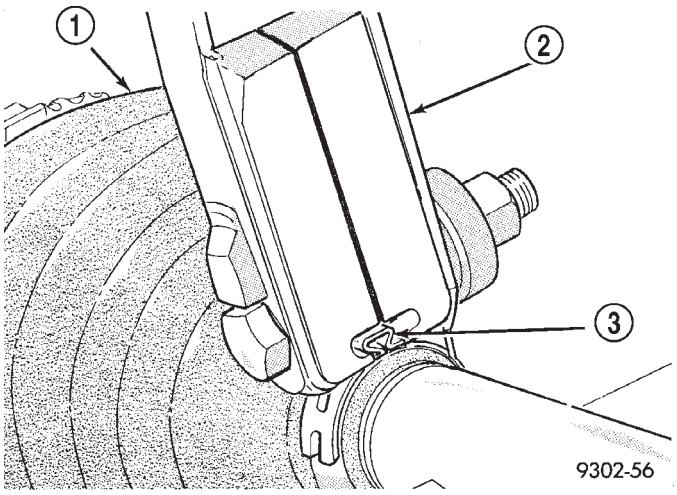


Fig. 30 Sealing Boot Retaining Clamp Installed

1 – SEALING BOOT
2 – SPECIAL TOOL C-4975
3 – CLAMP BRIDGE

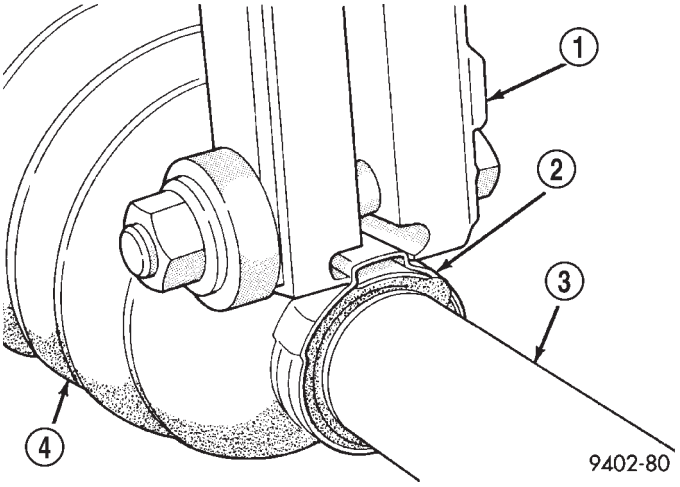


Fig. 29 Crimping Tool Installed On Sealing Boot Clamp

1 – SPECIAL TOOL C-4975
2 – SEALING BOOT CLAMP
3 – INTERCONNECTING SHAFT
4 – SEALING BOOT

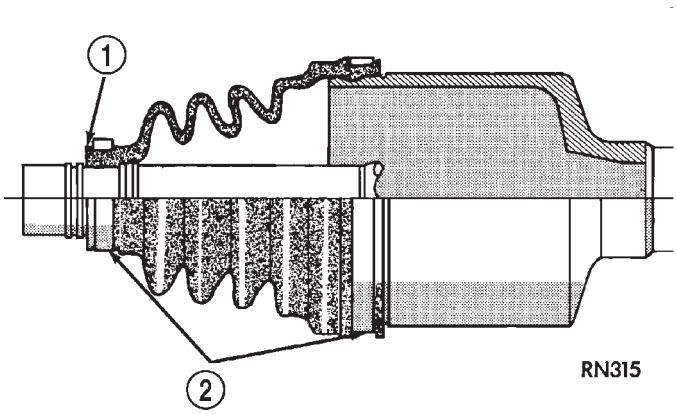


Fig. 31 Boot and Clamp Positioning

1 – POSITION ON FLAT BETWEEN LOCATING SHOULDERS
2 – CLAMPS

(8) Position the sealing boot into the tripod housing retaining groove (Fig. 31). Install seal boot retaining clamp evenly on sealing boot.

(9) Clamp sealing boot onto tripod housing using Crimper, Special Tool C-4975 and the following procedure. Place crimping tool C-4975 over bridge of clamp. Tighten nut on crimping tool C-4975 until jaws on tool are closed completely together, face to face.

(10) Install the driveshaft back into the vehicle. See “Driveshaft Removal and Installation” in this section of the service manual for the required driveshaft installation procedure.

DISASSEMBLY AND ASSEMBLY (Continued)

OUTER C/V JOINT SEALING BOOT

CAUTION: Boot sealing is vital to retain special lubricants and to prevent foreign contaminants from entering the C/V joint. Mishandling, such as allowing the assemblies to dangle unsupported, pulling or pushing the ends can cut boots or damage C/V joints. The LH platform driveshafts use no retention system to retain the spider assembly in the tripod housing. During removal and installation procedures always support both ends of the driveshaft to prevent damage or disengaging tripod joint. Therefore, do not pull on the interconnecting shaft when attempting to remove drive shafts from vehicle.

REMOVAL

To remove sealing boots from driveshafts for replacement, the driveshaft assemblies must be removed from the vehicle. See Driveshaft Removal and Installation in this Group for the required driveshaft removal and replacement procedure.

(1) Remove the driveshaft requiring boot replacement from the vehicle.

(2) Remove large boot clamp, retaining C/V joint sealing boot, to C/V joint housing (Fig. 32) and discard. Remove small clamp which retains outer C/V joint sealing boot to interconnecting shaft and discard. Remove sealing boot from outer C/V joint housing and slide it down interconnecting shaft.

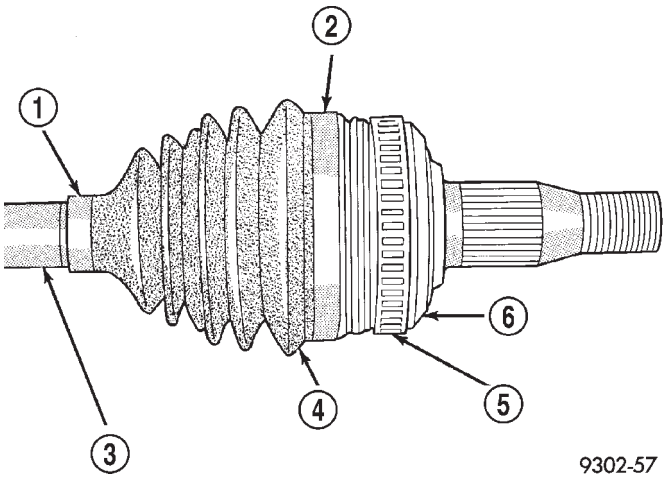


Fig. 32 Outer C/V Joint Seal Boot Clamps

1 – SMALL CLAMP
2 – LARGE CLAMP
3 – INTERCONNECTING SHAFT
4 – SEALING BOOT
5 – TONE WHEEL (ABS ONLY)
6 – OUTER C/V JOINT HOUSING

(3) Wipe away grease to expose outer C/V joint to interconnecting shaft retaining ring. Spread ears apart on C/V joint assembly to interconnecting shaft retaining snap ring (Fig. 33). Slide outer C/V joint assembly off end of interconnecting shaft.

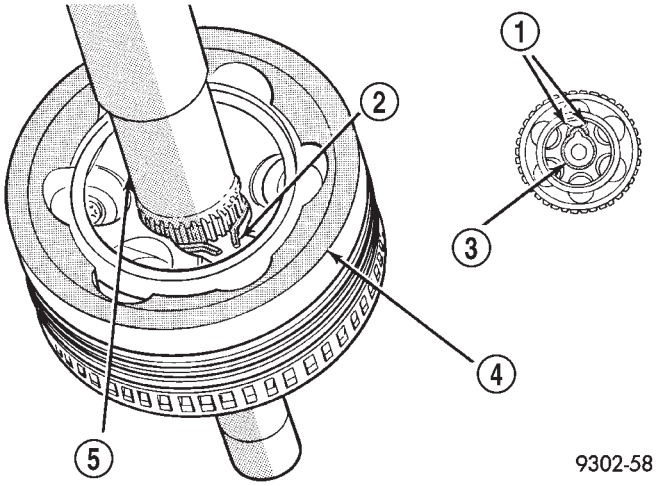


Fig. 33 Outer C/V Joint Removal From Interconnecting Shaft

1 – SPREAD RETAINING RING EARS AND PULL JOINT OFF SHAFT
2 – RETAINING SNAP RING
3 – RETAINING RING
4 – OUTER C/V JOINT ASSEMBLY
5 – INTERCONNECTING SHAFT

(4) Slide failed sealing boot off interconnecting shaft.

(5) Thoroughly clean and inspect outer C/V joint assembly and interconnecting joint for any signs of excessive wear. **If any parts show signs of excessive wear, the driveshaft assembly will require replacement. Component parts of the driveshaft assemblies are not serviceable.**

INSTALLATION

(1) Slide a new seal boot to interconnecting shaft retaining clamp, onto the interconnecting shaft. Then slide the replacement outer C/V joint assembly sealing boot onto the interconnecting shaft.

(2) Install outer C/V joint assembly onto interconnecting shaft. Joint is installed on interconnecting shaft, by pushing interconnecting shaft into outer C/V joint, until retaining snap ring is seated in groove on interconnecting shaft (Fig. 34). Verify the snap ring is fully seated into groove on interconnecting shaft.

(3) Distribute 1/2 the amount of grease provided in seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into outer C/V joint assembly housing. Put the remaining amount into the sealing boot.

DISASSEMBLY AND ASSEMBLY (Continued)

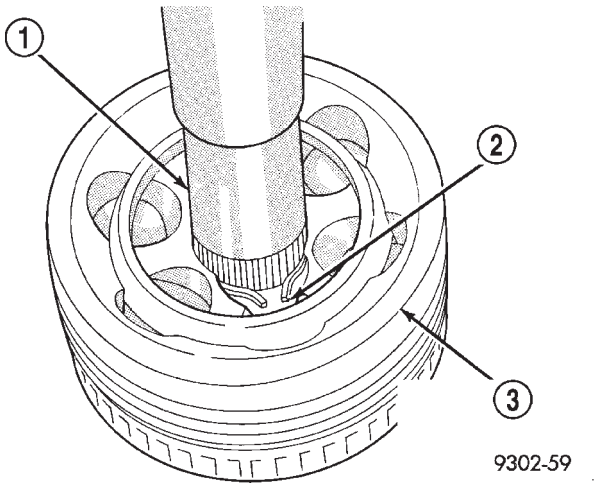


Fig. 34 Outer C/V Joint Installed On Interconnecting Shaft

1 – INTERCONNECTING SHAFT
2 – RETAINING SNAP RING
3 – OUTER C/V JOINT ASSEMBLY

(4) Install outer C/V joint seal boot retaining clamp, onto interconnecting shaft. Install replacement outer C/V joint sealing boot onto interconnecting shaft. **Outer C/V joint seal boot MUST be positioned on interconnecting shaft, so only the thinnest (sight) groove on interconnecting shaft is visible (Fig. 35).**

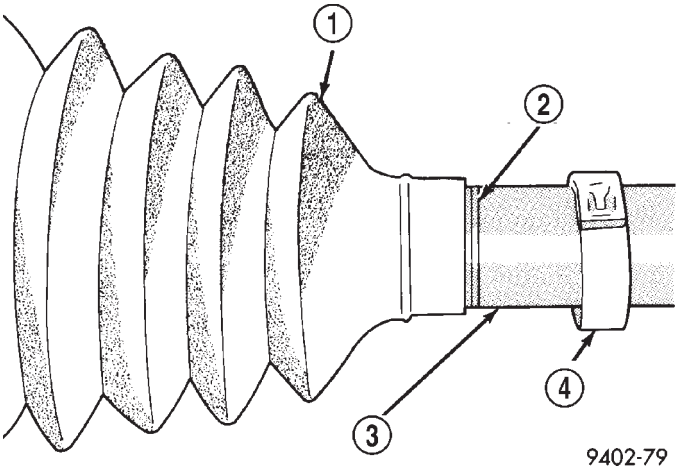


Fig. 35 Seal Boot Correctly Positioned On Interconnecting Shaft

1 – SEALING BOOT
2 – INTERCONNECTING SHAFT THINNEST GROOVE
3 – INTERCONNECTING SHAFT
4 – BOOT CLAMP

(5) Clamp sealing boot on interconnecting shaft using Crimper, Special Tool C-4975 and the following procedure. Place crimping tool C-4975 over bridge of clamp (Fig. 36). Tighten nut on crimping tool C-4975 until jaws on tool are closed completely together, face to face (Fig. 37).

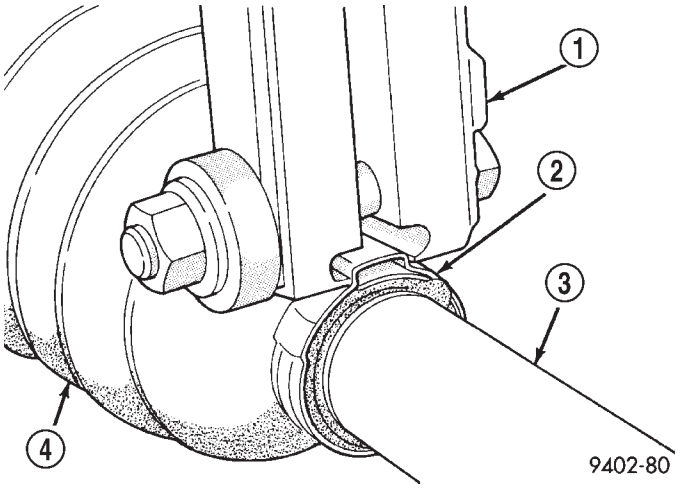


Fig. 36 Crimping Tool Installed On Sealing Boot Clamp

1 – SPECIAL TOOL C-4975
2 – SEALING BOOT CLAMP
3 – INTERCONNECTING SHAFT
4 – SEALING BOOT

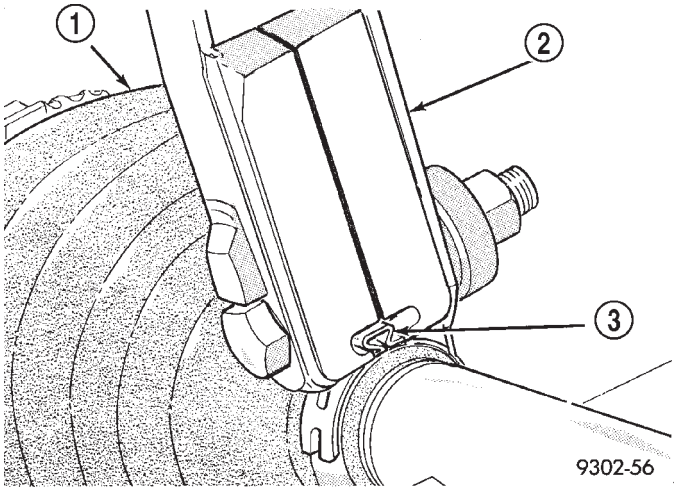


Fig. 37 Sealing Boot Retaining Clamp Installed

1 – SEALING BOOT
2 – SPECIAL TOOL C-4975
3 – CLAMP BRIDGE

CAUTION: Seal must not be dimpled, stretched or out of shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

(6) Position outer C/V joint seal boot, into boot retaining groove on outer C/V joint housing. Install seal boot to outer C/V joint retaining clamp evenly on sealing boot.

DISASSEMBLY AND ASSEMBLY (Continued)

(7) Clamp sealing boot onto outer C/V joint housing using Crimper, Special Tool C-4975 and the following procedure. Place crimping tool C- 4975 over bridge of clamp (Fig. 38). Tighten nut on crimping tool C-4975 until jaws on tool are closed completely together, face to face (Fig. 39).

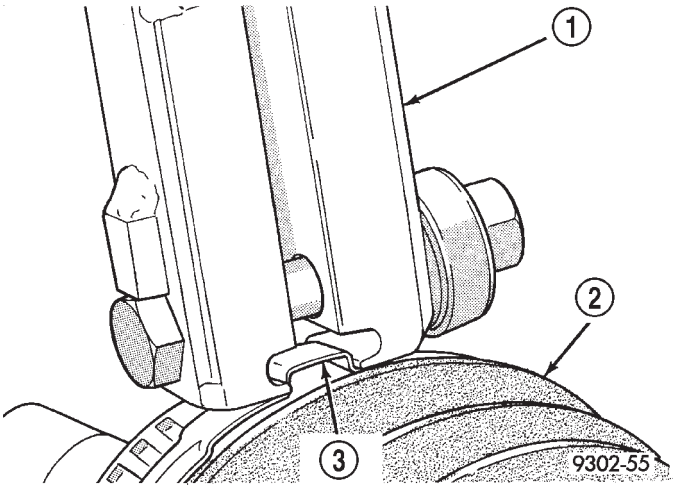


Fig. 38 Crimping Tool Installed On Sealing Boot Clamp

1 – SPECIAL TOOL C-4975
2 – SEALING BOOT
3 – CLAMP BRIDGE

(8) Install the driveshaft requiring boot replacement back on the vehicle. See “Driveshaft Removal and Installation” in this section of the service manual for the required driveshaft installation procedure.

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Caliper To Knuckle Bolts	19 N·m (168 in. lbs.)
Driveshaft Nut	150 N·m (105 ft. lbs.)
Front Wheel Lug Nuts	135 N·m (100 ft. lbs.)
Knuckle To Strut Bolt Nuts	169 N·m (125 ft. lbs.)
Tie Rod End To Knuckle	61 N·m (45 ft. lbs.)

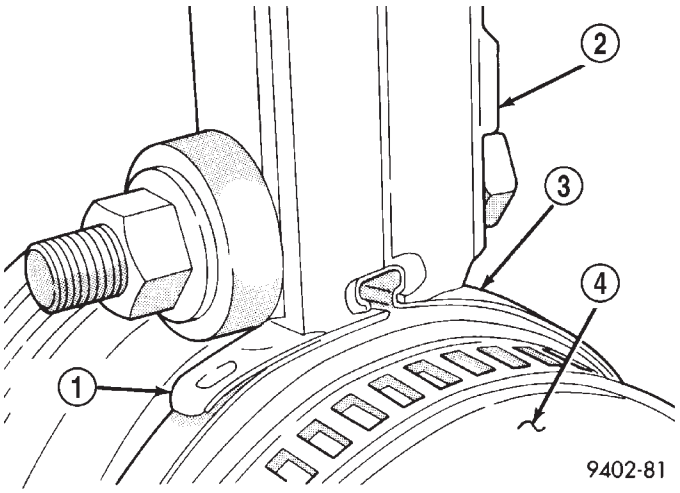
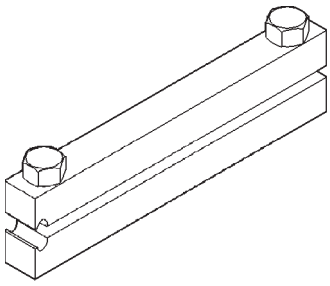


Fig. 39 Sealing Boot Retaining Clamp Installed

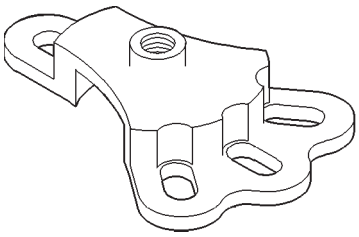
1 – BOOT CLAMP
2 – SPECIAL TOOL C-4975
3 – SEALING BOOT
4 – OUTER C/V JOINT

SPECIAL TOOLS

DRIVESHAFT



Boot Clamp Installer C-4975A



Puller 6790

BRAKES

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ANTILOCK BRAKE SYSTEM 55

BASE BRAKE SYSTEM

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DESCRIPTION AND OPERATION

BASE BRAKE SYSTEM

DESCRIPTION

The base brake system consists of the following components:

- brake pedal
- master cylinder
- power brake booster
- brake tubes and hoses
- proportioning valves (2)
- disc brakes (front and rear)
- brake lamp switch
- brake fluid level switch
- parking brakes

All brakes are power assist type through the use of a vacuum operated power brake booster.

The hydraulic brake system is diagonally split on both the non-antilock and antilock braking systems. This means the left front and right rear brakes are on one hydraulic circuit from the master cylinder and the right front and left rear are on the other.

Front disc brakes control the braking of the front wheels; rear braking is controlled by rear disc brakes.

Vehicles equipped with the optional antilock brake system (ABS) (with and without traction control) use a system designated Mark 20i. This system shares most base brake hardware used on vehicles without ABS. All components differing from the base brake hardware are described in detail in the ANTILOCK BRAKE SYSTEM section in this group of the service manual.

The parking brake on this vehicle is pedal-operated.

For more information on the description of any individual base brake component, refer to that component elsewhere in this section.

OPERATION

When a vehicle needs to be stopped, the driver applies the brake pedal. The brake pedal pushes the input rod of the power brake booster into the booster. The booster uses vacuum to ease pedal effort as force is transferred through the booster to the master cylinder. The booster's output rod pushes in the master cylinder's primary and secondary pistons applying hydraulic pressure through the chassis brake tubes, junction block, and proportioning valves to the brakes at each tire and wheel assembly.

The pedal-operated parking brake operates in the following manner. When applied, the parking brake lever pulls on cables that actuate parking brake shoes at each rear wheel.

For more information on the operation of any individual base brake component, refer to that component elsewhere in this section.

BRAKE PEDAL

DESCRIPTION

A suspended type brake pedal is used on this vehicle (Fig. 1). The pedal pivots on a shaft mounted in the pedal support bracket under the instrument panel. The pedal also connects to the power brake booster input rod. The pedal ratio is 3.18:1.

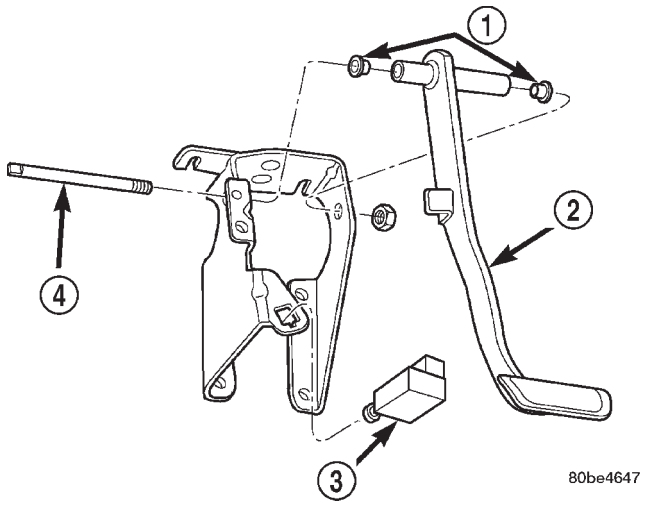


Fig. 1 Brake Pedal

1 – BUSHINGS
2 – BRAKE PEDAL
3 – BRAKE LAMP SWITCH
4 – PIVOT SHAFT

OPERATION

When the brake pedal is depressed, it pushes in on the power brake booster input rod applying the brakes. At the same time, it allows the brake lamp switch's plunger to extend, thus applying the brake lamps.

MASTER CYLINDER

DESCRIPTION

One style master cylinder is used for all applications. A Bosch center-valve master cylinder is used (Fig. 2). It has the brake fluid reservoir mounted on top and the brake fluid level switch is mounted in the side of that reservoir.

OPERATION

When the brake pedal is pressed, the master cylinder primary and secondary pistons apply brake pressure through the chassis brake tubes and proportioning valves to each brake assembly. The

DESCRIPTION AND OPERATION (Continued)

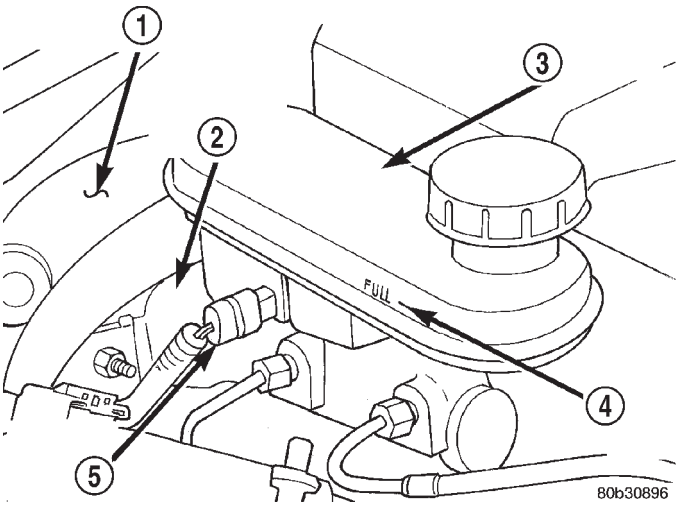


Fig. 2 Master Cylinder

1 – BOOSTER
2 – MASTER CYLINDER
3 – MASTER CYLINDER FLUID RESERVOIR
4 – FLUID LEVEL FULL MARK
5 – FLUID LEVEL SENSOR

brake fluid reservoir supplies the brake hydraulic system with the necessary fluid to operate properly.

The primary and secondary outlet tubes of the master cylinder are connected to a junction block on non-ABS equipped vehicles. The tube from the master cylinder primary outlet port connects to the inboard port of the junction block, and the tube from the secondary outlet port connects to the outboard port of the junction block. The inboard port of the junction block supplies the right front and left rear brakes. The outboard port of the junction block supplies the left front and right rear brakes.

On vehicles equipped with Antilock Brakes (with or without Traction Control), the master cylinder primary outlet port outlet tube connects to the inboard port of the ICU, and the secondary outlet port outlet tube connects to the outboard port of the ICU.

The master cylinder reservoir cap diaphragm is slit to allow atmospheric pressure to equalize on both sides of the diaphragm.

POWER BRAKE BOOSTER

DESCRIPTION

The power brake booster assembly mounts on the engine side of the dash panel. It is externally connected to the brake pedal by an input push rod extending out the rear of the booster (Fig. 3). The master cylinder is bolted to the front of the power brake booster assembly.

A vacuum check valve is mounted on the power brake booster body. A vacuum line connects the booster (check valve) to the intake manifold. Depending on the engine combination, different vacuum hose routings are required.

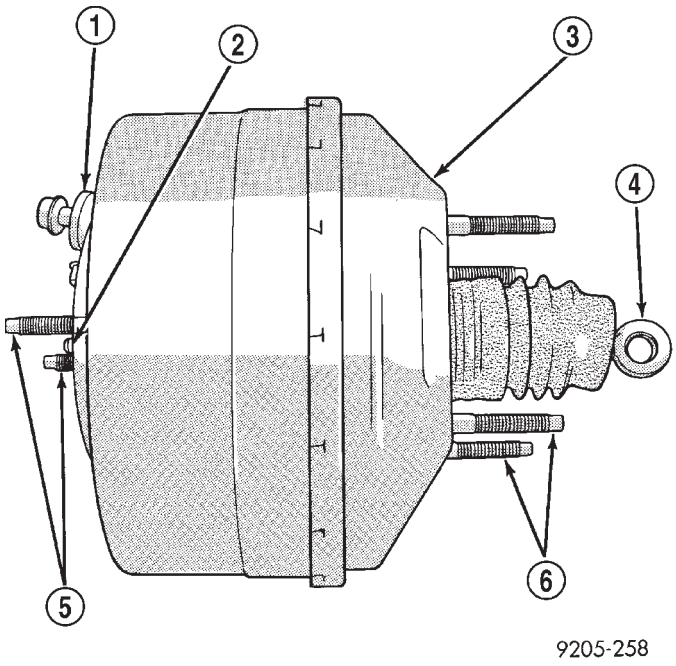


Fig. 3 Power Brake Booster

1 – VACUUM CHECK VALVE
2 – OUTPUT ROD
3 – POWER BRAKE BOOSTER ASSEMBLY
4 – INPUT ROD
5 – MASTER CYLINDER MOUNTING STUDS (2)
6 – POWER BOOSTER ASSEMBLY TO DASH PANEL MOUNTING STUDS (4)

The power brake booster can be identified by the tag attached to the body of the booster assembly (Fig. 4). This tag contains the following information:

- the production part number
- the date it was built
- who manufactured it

NOTE: The power brake booster assembly is not a repairable part and must be replaced as a complete unit if it is found to be faulty in any way. The power booster vacuum check valve is not repairable but can be replaced as an assembly.

OPERATION

The purpose of the power brake booster is to reduce the amount of force required by the driver (foot-pedal pressure) to obtain the required hydraulic pressure in the brake system to stop the vehicle. This vehicle utilizes a Bosch power brake booster to accomplish this task in all brake applications.

The power brake booster is vacuum operated. The vacuum is supplied from the intake manifold on the engine through the vacuum hose and power brake booster check valve (Fig. 3).

DESCRIPTION AND OPERATION (Continued)

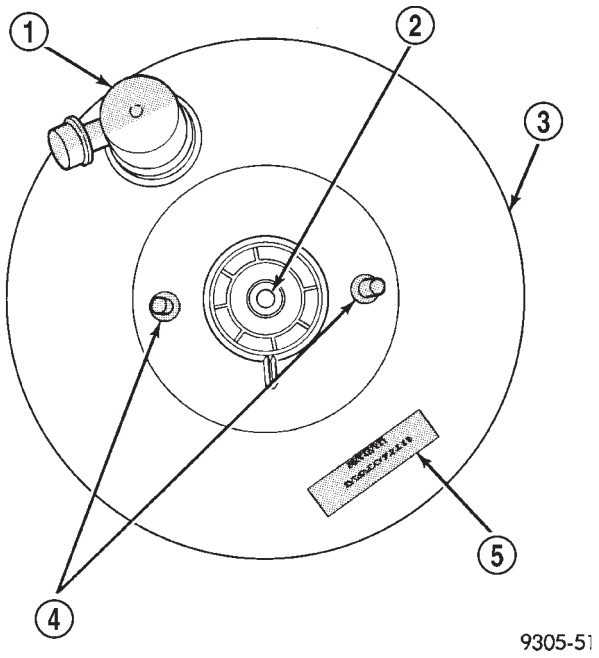


Fig. 4 Power Brake Booster Identification

1 – VACUUM CHECK VALVE
2 – MASTER CYLINDER PUSH ROD
3 – POWER BRAKE BOOSTER ASSEMBLY
4 – MASTER CYLINDER MOUNTING STUDS
5 – PART IDENTIFICATION TAG

As the brake pedal is pressed, the power brake booster's input rod moves forward. This opens and closes valves in the power brake booster, creating a vacuum on one side of a diaphragm and allowing atmospheric pressure to enter on the other. This difference in pressure forces the output rod of the power booster out against the primary piston of the master cylinder. As the pistons in the master cylinder move forward this creates the hydraulic pressure in the brake system.

BRAKE TUBES AND HOSES

DESCRIPTION

The chassis brake tubes are steel with a corrosion resistant coating applied to the external surfaces. The flex hoses are made of reinforced rubber.

All available brake systems on this vehicle use the same type of brake line fittings and tubing flares. The brake line fittings used are double-wall ISO style tubing flares and fittings at all tubing joint locations. Only the outlets of the proportioning valves and the rear flex hoses threading into them have non-ISO style flares. They are double-inverted style flares. Refer to (Fig. 5) for specific joint locations and tube fitting size.

OPERATION

The purpose of the chassis brake tubes and flex hoses is to transfer the pressurized brake fluid developed by the master cylinder to the wheel brakes of the vehicle. The flex hoses are made of rubber to allow for the movement of the vehicle's steering and suspension.

JUNCTION BLOCK

DESCRIPTION

A junction block is used on vehicles that are not equipped with antilock brakes (ABS). The junction block is located in front of the driver's side front tire behind the front fascia. The junction block mounts in the same location as the ABS integrated control unit (ICU) does on vehicles with ABS.

It has six threaded ports to which the brake tubes connect. Two are for the brake tubes coming from the master cylinder. The remaining four are for the brake tubes going to each brake assembly.

OPERATION

The junction block distributes the brake fluid coming from the master cylinder primary and secondary ports to the four brake tubes leading to the brakes. Since the junction block mounts in the same location as the ABS integrated control unit (ICU), it allows for the common use of brake tubes on the vehicle whether it is equipped with or without ABS.

PROPORTIONING VALVE

DESCRIPTION

Two in-line proportioning valves are used on both the Antilock Brake System and all Non-Antilock Brake applications (Fig. 6). One valve is used for each rear brake hydraulic circuit.

The in-line proportioning valves are located in the rear of the vehicle, at each rear brake flex hose. The proportioning valves are not serviceable, but are a replaceable component.

OPERATION

Proportioning valves balance front to rear braking by controlling (at a given ratio) brake hydraulic pressure to the rear brakes above a preset level (split point). On light pedal applications equal brake pressure is transmitted to both the front and rear brakes. On heavier pedal applications, through the use of proportioning valves, the pressure transmitted to the rear will be lower than the front brakes. This prevents premature rear wheel skid.

DESCRIPTION AND OPERATION (Continued)

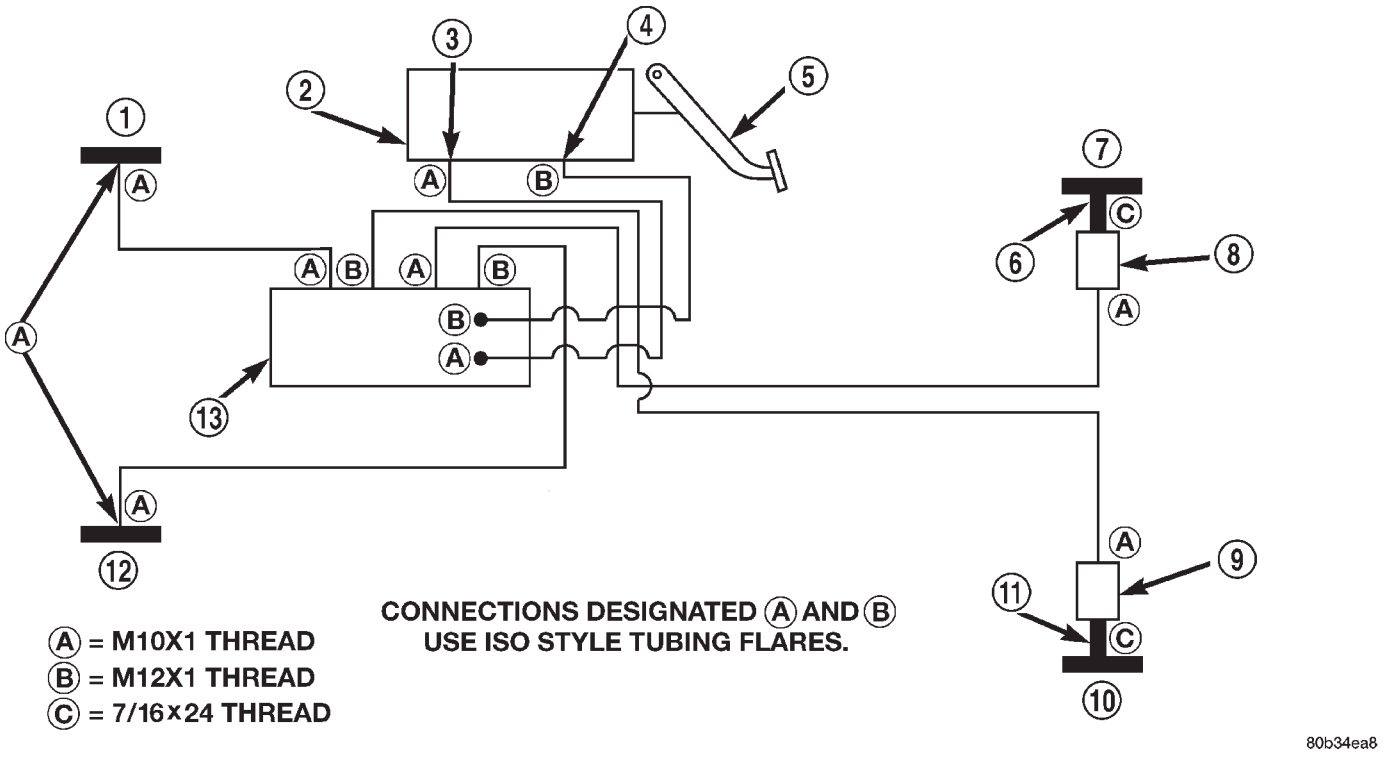


Fig. 5 Brake Tube Nut Thread Sizes And Tube Routing

1 – HOSE END RT. FRONT
2 – MASTER CYLINDER
3 – SECONDARY PORT
4 – PRIMARY PORT
5 – BRAKE PEDAL
6 – HOSE
7 – HOSE END RT. REAR
8 – PROPORTIONING VALVE
9 – PROPORTIONING VALVE
10 – HOSE END LT. REAR
11 – HOSE
12 – HOSE END LT. FRONT
13 – HYDRAULIC CONTROL UNIT/JUNCTION BLOCK

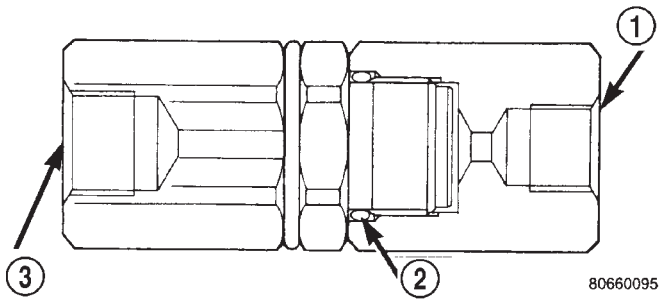


Fig. 6 Proportioning Valve

1 – FROM MASTER CYLINDER
2 – O. RING SEAL
3 – TO REAR BRAKES

If hydraulic pressure is lost in one half of the diagonally split brake hydraulic system, the operation of the proportioning valve in the remaining half is not effected.

DISC BRAKES (FRONT)

DESCRIPTION

The front disc brake assembly used on this vehicle consists of the following components:

- Disc brake caliper
- Brake Shoes (and linings)
- Brake shoe retractor clips (except on vehicles with BR5 Performance Brake Package)
- Brake Rotor

The floating double pin single piston calipers (Fig. 7) (Fig. 8) used on this vehicle are mounted directly to the steering knuckles and use no adapter. The caliper is mounted to the steering knuckle using bushings, sleeves and 2 thru-bolts which thread directly into the steering knuckle (Fig. 9).

The caliper is a one piece casting with the inboard side containing a single piston cylinder bore. The front disc brake caliper phenolic piston is 60 mm (2.36 inch) in diameter.

DESCRIPTION AND OPERATION (Continued)

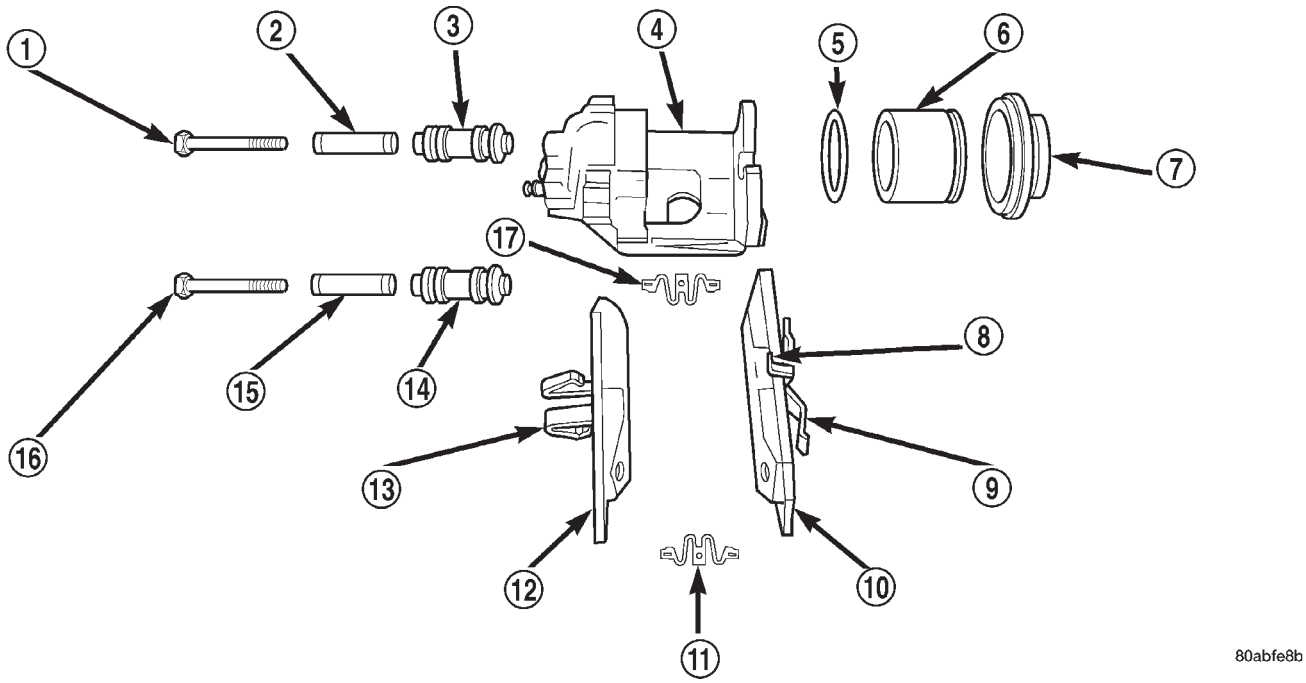


Fig. 7 Front Disc Brake Caliper Assembly

1 – CALIPER GUIDE PIN BOLT
2 – SLEEVE
3 – BUSHING
4 – CALIPER
5 – PISTON SEAL
6 – PISTON
7 – DUST SEAL
8 – WEAR INDICATOR
9 – ANTI-RATTLE CLIP
10 – BRAKE SHOE
11 – RETRACTOR CLIP
12 – BRAKE SHOE
13 – ANTI-RATTLE CLIP
14 – BUSHING
15 – SLEEVE
16 – CALIPER GUIDE PIN BOLT
17 – RETRACTOR CLIP

There are two brake shoes mounted to the brake caliper (Fig. 7). One brake shoe is mounted on each side of a brake rotor. The brake shoe lining material used has been specifically formulated to meet the braking requirements of the vehicle. An audible wear indicator is mounted on the outboard pad of the front disc brake assemblies.

Retractor clips are mounted above and below the brake pads (when mounted) (Fig. 7), except on models equipped with the performance disc brake package (BR5) (Fig. 8). The performance disc brake package (BR5) does not use retractor clips.

The brake rotor is mounted on the hub and bearing. The rotor is made of iron and is vented to help cool it during brake applications.

OPERATION

Two machined abutments on the steering knuckle (Fig. 9) position and align the caliper fore and aft. The guide pin bolts, sleeves, and bushings control the side-to-side movement of the caliper.

The disc brake calipers have shoe retractor clips attached to the inner and outer brake shoe and lining assemblies to help pull the front disc brake shoes away from the rotor when the brakes are released (Fig. 7). Vehicles equipped with the performance disc brake package (BR5) do not have retractor clips (Fig. 8).

Although there are different disc brake systems available, they operate and are serviced in the same manner.

A square cut rubber piston seal is located in a machined groove in the cylinder bore. This provides a hydraulic seal between the piston and the cylinder wall (Fig. 10). The piston seal is designed to pull the piston back into the bore of the caliper when the brake pedal is released. This, along with the brake shoe retractor clips, maintains the proper brake shoe to rotor clearance.

A molded rubber dust boot is installed in a groove in the cylinder bore and the piston, keeping contamination from the cylinder wall and the piston (Fig. 10).

DESCRIPTION AND OPERATION (Continued)

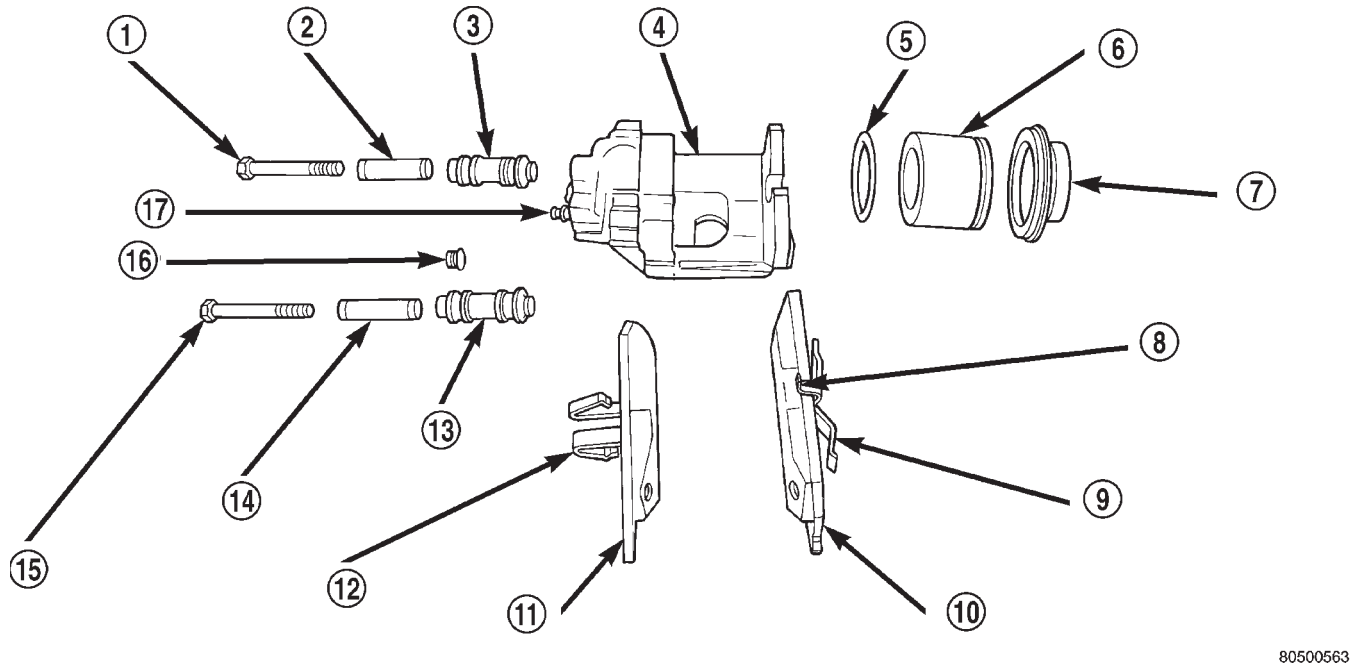


Fig. 8 Performance Front Disc Brake Caliper Assembly (BR5)

1 – CALIPER GUIDE PIN BOLT
2 – SLEEVE
3 – BUSHING
4 – CALIPER
5 – PISTON SEAL
6 – PISTON
7 – DUST SEAL
8 – WEAR INDICATOR
9 – ANTI-RATTLE CLIP
10 – BRAKE SHOE
11 – BRAKE SHOE
12 – ANTI-RATTLE CLIP
13 – BUSHING
14 – SLEEVE
15 – CALIPER GUIDE PIN BOLT
16 – CAP
17 – BLEEDER SCREW

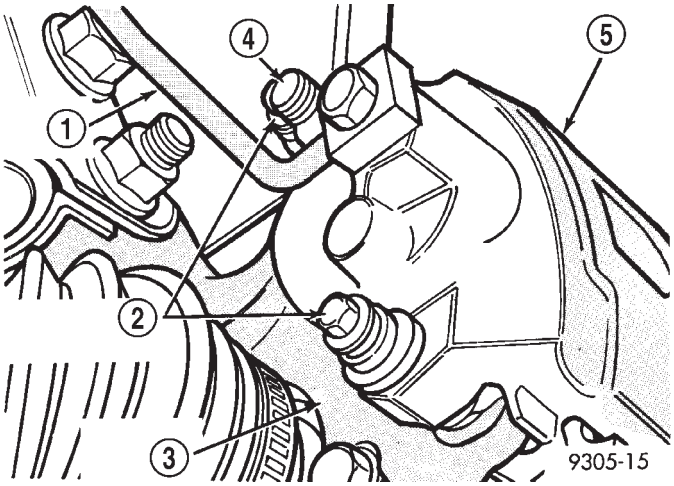


Fig. 9 Disc Brake Caliper Mounting

1 – BRAKE LINE
2 – CALIPER GUIDE PIN BOLTS
3 – STEERING KNUCKLE
4 – BLEEDER SCREW
5 – CALIPER ASSEMBLY

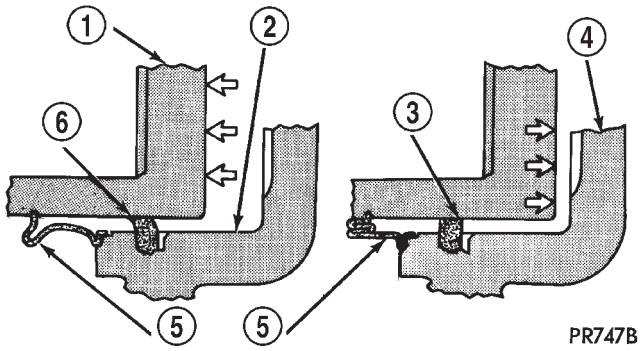


Fig. 10 Piston Seal Function for Automatic Adjustment Of Front Brakes

1 – PISTON
2 – CYLINDER BORE
3 – PISTON SEAL BRAKE PRESSURE OFF
4 – CALIPER HOUSING
5 – DUST BOOT
6 – PISTON SEAL BRAKE PRESSURE ON

DESCRIPTION AND OPERATION (Continued)

The brake shoe lining material rides against the brake rotors braking surface. When the brakes are applied, the shoes apply pressure against the rotor, thus slowing the vehicle.

As brake shoe linings wear, master cylinder reservoir brake fluid level will go down. If brake fluid has been added to the reservoir, overflow may occur if the piston is pushed back into the recessed position.

An audible wear indicator (Fig. 7) is mounted on the outboard pad of the front disc brake assemblies. Upon contact with the brake rotor, this indicator emits a sound, signaling that brake shoes may need inspection or replacement.

DISC BRAKES (REAR)

DESCRIPTION

The rear disc brakes are similar to front disc brakes, however, there are several distinctive features that require different service procedures. This single piston, floating caliper rear disc brake assembly includes:

- disc brake caliper
- brake shoes (and linings)
- brake rotor
- disc brake caliper adapter

This vehicle is equipped with a caliper assembly that has a 36 mm (1.42 in.) piston and uses a 14 inch solid non-vented rotor.

The caliper assembly on all applications float on rubber bushings using internal metal sleeves which are attached to the adapter using threaded guide pin bolts.

The adapter and disc shield are mounted to the rear suspension knuckles of vehicle. The adapter is used to mount the brake shoes and actuating cables for the parking brake system. The adapter also mounts the rear caliper assembly to the vehicle. The adapter has two machined abutments which are used to position and align the caliper and brake shoes for movement inboard and outboard (Fig. 11).

The parking brake system on all vehicles equipped with rear disc brakes uses the rear disc brake rotor as a drum for its brakes.

OPERATION

Rear disc brakes operate similarly to front disc brakes. Refer to front disc brakes for additional information.

When the parking brake is applied, the parking brake shoes expand out against a braking surface (hat section) on the inside area of the rear disc brake rotor.

PARKING BRAKE

DESCRIPTION

The parking brake mechanism on vehicles equipped with rear disc brakes consists of a small duo-servo brake which is mounted to the disc brake caliper adapter. The hat (center) section (Fig. 12) of the rear rotor serves as the braking surface (drum) for the parking brakes.

The parking brake shoes are mechanically operated by an internal lever connected to a flexible steel cable. The wheel brake (rear) cables are joined at an equalizer which is attached to the intermediate cable. The intermediate cable is attached to the front cable leading to the foot lever.

OPERATION

When the parking brake (foot) lever is pressed, the cables are pulled, thus actuating the parking brake shoes. The shoes expand outward against the drum section of the rear disc brake rotor.

BRAKE LAMP SWITCH

DESCRIPTION

The brake lamp switch is located under the instrument panel at the brake pedal arm (Fig. 13). It controls operation of the vehicle's brake lamps. Also, if the vehicle is equipped with speed control, the brake lamp switch will deactivate speed control when the brake pedal is depressed.

OPERATION

When the brake pedal is pressed, the plunger on the outside of the switch extends outward. This action closes the electrical contacts within the switch, completing the circuit to the brake lamps at the rear of the vehicle, thus illuminating the brake lamps and the center-high-mounted stop lamp (CHMSL).

BRAKE FLUID LEVEL SWITCH

DESCRIPTION

The brake fluid level switch used on this vehicle's master cylinder is internal to the master cylinder fluid reservoir (Fig. 14). The vehicle wiring harness has a connector which plugs directly into the brake fluid reservoir.

The brake fluid level switch in the brake fluid reservoir is not a repairable item. If the switch is found to be defective the entire brake fluid reservoir must be replaced.

DESCRIPTION AND OPERATION (Continued)

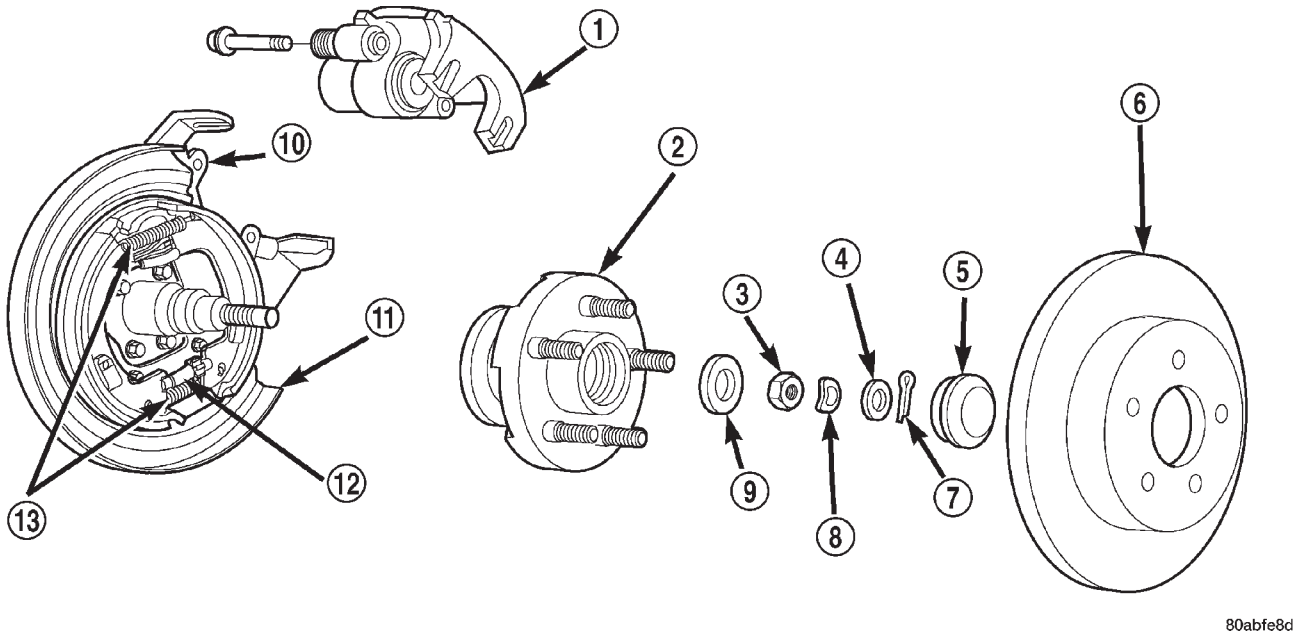


Fig. 11 Rear Disc Brake Assembly

1 – CALIPER ASSEMBLY
2 – HUB/BEARING ASSEMBLY
3 – NUT
4 – NUT LOCK
5 – DUST CAP
6 – DISC
7 – COTTER PIN
8 – ANTI-RATTLE WASHER
9 – WASHER
10 – ADAPTER
11 – DISC SHIELD
12 – ADJUSTER
13 – RETURN SPRINGS

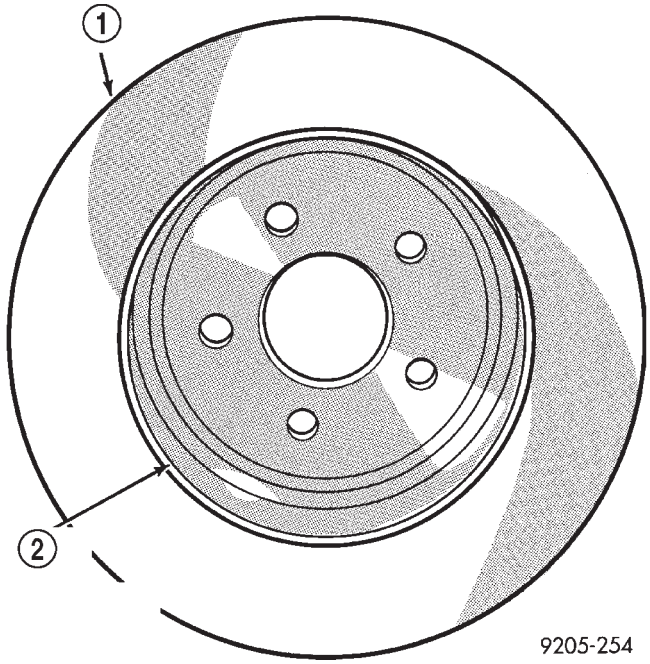


Fig. 12 Drum In Hat Braking Disc

1 – REAR BRAKING DISK ROTOR
2 – HAT SECTION OF REAR BRAKING DISC (PARKING BRAKE BRAKING SURFACE)

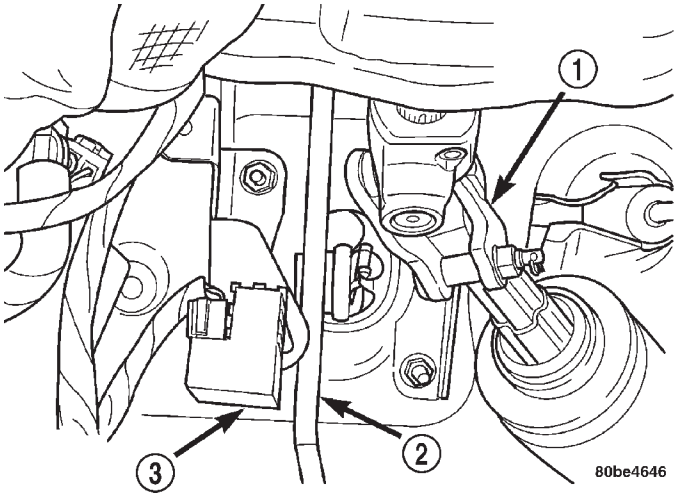


Fig. 13 Brake Lamp Switch

1 – STEERING COLUMN COUPLER
2 – BRAKE PEDAL
3 – SWITCH

OPERATION

The purpose of the brake fluid level switch is to provide the driver with early warning that brake fluid in the master cylinder is below a normal level.

DESCRIPTION AND OPERATION (Continued)

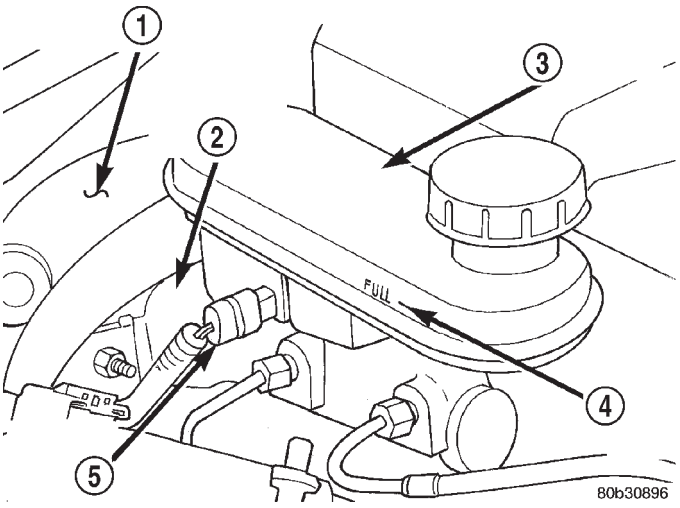


Fig. 14 Brake fluid Level Switch (Sensor)

1 – BOOSTER
2 – MASTER CYLINDER
3 – MASTER CYLINDER FLUID RESERVOIR
4 – FLUID LEVEL FULL MARK
5 – FLUID LEVEL SENSOR

As the fluid drops below the designed level, the switch closes completing the Red BRAKE Warning Lamp circuit. This will illuminate the red BRAKE warning lamp located in the instrument cluster. At this time, the master cylinder fluid reservoir should be checked and filled to the full mark with DOT 3 brake fluid. **If the brake fluid level has dropped in the brake fluid reservoir, the entire brake hydraulic system should be checked for evidence of a leak.**

RED BRAKE WARNING LAMP

DESCRIPTION

The red BRAKE warning lamp is located in the instrument cluster and is used to indicate a low brake fluid condition or that the parking brake is applied. In addition, the brake warning lamp is turned on as a bulb check by the ignition switch when the ignition switch is placed in the crank position.

OPERATION

The red BRAKE warning lamp is supplied 12-volt ignition feed anytime the ignition switch is on. The lamp is then illuminated by completing the ground circuit either through the parking brake warning switch mounted on the parking brake lever, the brake fluid level switch mounting in the master cylinder reservoir, or the ignition switch when in the crank position. The red BRAKE lamp can also be illuminated by the instrument cluster in the case when the ABS CAB detects a fault in the ABS system and cannot illuminate the amber ABS warning lamp.

DIAGNOSIS AND TESTING

BASE BRAKE SYSTEM DIAGNOSIS CHARTS

NOTE: There are three diagnosis charts following that cover the RED BRAKE WARNING LAMP, BRAKE NOISE and OTHER BRAKE CONDITIONS.

RED BRAKE WARNING LAMP

CONDITION	POSSIBLE CAUSES	CORRECTION
RED BRAKE WARNING LAMP ON	1. Parking brake lever not fully released.	1. Release parking brake lever.
	2. Parking brake warning lamp switch on parking brake lever.	2. Inspect and replace switch as necessary.
	3. Brake fluid level low in reservoir.	3. Fill reservoir. Check entire system for leaks. Repair or replace as required.
	4. Brake fluid level switch.	4. Disconnect switch wiring connector. If lamp goes out, replace switch.
	5. Mechanical instrument cluster (MIC) problem.	5. Refer to Chassis Diagnostic Procedures manual.

BRAKE NOISE

CONDITION	POSSIBLE CAUSES	CORRECTION
DISC BRAKE CHIRP	1. Excessive brake rotor runout.	1. Follow brake rotor diagnosis and testing. Correct as necessary.
	2. Lack of lubricant on brake caliper slides.	2. Lubricate brake caliper slides.
DISC BRAKE RATTLE OR CLUNK	1. Broken or missing anti-rattle spring clips on shoes.	1. Replace brake shoes.
	2. Caliper guide pins loose.	2. Tighten guide pins.
DISC BRAKE SQUEAK AT LOW SPEED (WHILE APPLYING LIGHT BRAKE PEDAL EFFORT)	1. Brake shoe linings.	1. Replace brake shoes.
SCRAPING (METAL-TO-METAL).	1. Foreign object interference with brakes.	1. Inspect brakes and remove foreign object.
	2. Brake shoes worn out.	2. Replace brake shoes. Inspect rotors. Reface or replace as necessary.

DIAGNOSIS AND TESTING (Continued)

OTHER BRAKE CONDITIONS

CONDITION	POSSIBLE CAUSES	CORRECTION
BRAKES CHATTER	1. Disc brake rotor has excessive thickness variation.	1. Isolate condition as rear or front. Reface or replace brake rotors as necessary.
BRAKES DRAG (FRONT OR ALL)	1. Contaminated brake fluid. 2. Binding caliper pins or bushings. 3. Binding master cylinder. 4. Binding brake pedal.	1. Check for swollen seals. Replace all system components containing rubber. 2. Replace pins and bushings 3. Replace master cylinder. 4. Replace brake pedal.
BRAKES DRAG (REAR ONLY)	1. Parking brake cables binding or froze up. 2. Parking brake cable return spring not returning shoes. 3. Obstruction inside the center console preventing full return of the parking brake cables.	1. Check cable routing. Replace cables as necessary. 2. Replace cables as necessary. 3. Remove console and remove obstruction.
BRAKES GRAB	1. Contaminated brake shoe linings. 2. Improper power brake booster assist.	1. Inspect and clean, or replace shoes. Repair source of contamination. 2. Refer to Power Brake Booster in the diagnosis and testing section.
EXCESSIVE PEDAL EFFORT	1. Obstruction of brake pedal. 2. Low power brake booster assist. 3. Glazed brake linings. 4. Brake shoe lining transfer to brake rotor.	1. Inspect, remove or move obstruction. 2. Refer to power brake booster in the diagnosis and testing section. 3. Reface or replace brake rotors as necessary. Replace brake shoes. 4. Reface or replace brake rotors as necessary. Replace brake shoes.
EXCESSIVE PEDAL TRAVEL (VEHICLE STOPS OK)	1. Air in brake lines.	1. Bleed brakes.
EXCESSIVE PEDAL TRAVEL (PEDAL GOES TO FLOOR - CAN'T SKID WHEELS)	1. Power brake booster runout (vacuum assist).	1. Check booster vacuum hose and engine tune for adequate vacuum supply. Refer to power brake booster in the diagnosis and testing section.
EXCESSIVE PEDAL TRAVEL (ONE FRONT WHEEL LOCKS UP DURING HARD BRAKING)	1. One of the two hydraulic circuits to the front brakes is malfunctioning.	1. Inspect system for leaks. Check master cylinder for internal malfunction.
PEDAL PULSATES/ SURGES DURING BRAKING	1. Disc brake rotor has excessive thickness variation.	1. Isolate condition as rear or front. Reface or replace brake rotors as necessary.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
PEDAL IS SPONGY	1. Air in brake lines. 2. Power brake booster runout (vacuum assist).	1. Bleed brakes. 2. Check booster vacuum hose and engine tune for adequate vacuum supply. Refer to power brake booster in the diagnosis and testing section.
PREMATURE REAR WHEEL LOCKUP	1. Contaminated brake shoe linings. 2. Inoperative proportioning valve. 3. Improper power brake booster assist.	1. Inspect and clean, or replace shoes. Repair source of contamination. 2. Test proportioning valves folowing procedure listed in diagnosis and testing section. Replace valves as necessary. 3. Refer to power brake booster in the diagnosis and testing section.
STOP LAMPS STAY ON	1. Brake lamp switch out of adjustment. 2. Brake pedal binding. 3. Obstruction in pedal linkage. 4. Power Brake Booster not allowing pedal to return completely.	1. Adjust brake lamp switch. 2. Inspect and replace as necessary. 3. Remove obstruction. 4. Replace power brake booster.
VEHICLE PULLS TO RIGHT OR LEFT ON BRAKING	1. Frozen brake caliper piston. 2. Contaminated brake shoe lining. 3. Pinched brake lines. 4. Leaking piston seal. 5. Suspension problem.	1. Replace frozen piston or caliper. Bleed brakes. 2. Inspect and clean, or replace shoes. Repair source of contamination. 3. Replace pinched line. 4. Replace piston seal or brake caliper. 5. Refer to the Suspension group.
PARKING BRAKE - EXCESSIVE LEVER TRAVEL	1. Rear parking brake shoes out of adjustment.	1. Adjust rear parking brake shoes.

POWER BRAKE BOOSTER

BASIC TEST

(1) With engine off, depress and release the brake pedal several times to purge all vacuum from the power brake booster.

(2) Depress and hold the pedal with light effort (15 to 25 lbs. pressure), then start the engine.

The pedal should fall slightly, then hold. Less effort should be needed to apply the pedal at this time. If the pedal fell as indicated, perform the VACUUM LEAK TEST listed after the BASIC TEST. If the pedal did not fall, continue on with this BASIC TEST.

(3) Disconnect the vacuum hose on the side of the vacuum check valve that leads to the speed control, then connect a vacuum gauge to the open vacuum port on the valve.

(4) Start the engine.

(5) When the engine is at warm operating temperature, allow it to idle and check the vacuum at the gauge.

If the vacuum supply is 12 inches Hg (40.5 kPa) or more, the power brake booster is defective and must be replaced. If the vacuum supply is below 12 inches, continue on with this BASIC TEST.

(6) Shut off the engine.

(7) Connect the vacuum gauge to the vacuum reference port on the engine intake manifold.

(8) Start the engine and observe the vacuum gauge.

If the vacuum is still low, check the engine tune and repair as necessary. If the vacuum is above 12

DIAGNOSIS AND TESTING (Continued)

inches, the hose or check to the booster has a restriction or leak.

Once an adequate vacuum supply is obtained, repeat the BASIC TEST.

VACUUM LEAK TEST

(1) Disconnect the vacuum hose on the side of the power brake booster vacuum check valve that leads to the speed control, then connect a vacuum gauge to the open vacuum port on the valve.

(2) Remove the remaining hose on the vacuum check valve that is not the vacuum supply hose coming from the intake manifold. Cap off the open port on the check valve.

(3) Start the engine.

(4) Allow the engine to warm up to normal operating temperature and engine idle.

(5) Using vacuum line pliers, close off the vacuum supply hose near the booster and observe the vacuum gauge.

If the vacuum drop exceeds 1.0 inch Hg (3.3 kPa) in one minute, repeat the above steps to confirm the reading. The vacuum loss should be less than 1.0 inch Hg in one minute time span. If the loss is more than 1.0 inch Hg, replace the power brake booster. If it is not, continue on with this test.

(6) Remove the pliers from the hose temporarily.

(7) Apply light effort (approximately 15 lbs. of force) to the brake pedal and hold the pedal steady. Do not move the pedal once the pressure is applied or the test results may vary.

(8) Have an assistant reattach the pliers to the vacuum supply hose.

(9) Allow 5 seconds for stabilization, then observe the vacuum gauge.

If the vacuum drop exceeds 3.0 inches Hg (10 kPa) in 15 seconds, repeat the above steps to confirm the reading. The vacuum loss should be less than 3.0 inches Hg in 15 seconds time span. If the loss is more than 3.0 inches Hg, replace the power brake booster. If it is not, the booster is not defective.

PROPORTIONING VALVE

PROPORTIONING VALVE TEST (WITH AND WITHOUT ANTILOCK BRAKES)

CAUTION: Not all components use the same type tubing flare. The tube leading into the proportioning valve has an ISO flare, while the flex hose coming out of the proportioning valve has a standard double-inverted flare. Use the correct adapters when installing gauges to test proportioning valves.

Both vehicles, with Antilock Brakes, and without Antilock Brakes, have two proportioning valves. One valve is connected to each rear flex hose. One proportioning valve controls the right rear brake, and the other proportioning valve controls the left rear brake.

On vehicles without ABS, if premature wheel skid occurs on a hard brake application, it could be an indication that a malfunction has occurred with one of the two rear brake proportioning valves. Test the valve that controls the side of the vehicle on which the skid occurs.

On vehicles with ABS, if premature rear wheel ABS cycling occurs on a hard brake application, it could be an indication that a malfunction has occurred with one of the two proportioning valves. Since ABS cycles both rear brakes together, both valves must be tested to isolate the suspect proportioning valve.

(1) Raise the vehicle on jack stands or centered on a hoist. See hoisting in the Lubrication and Maintenance section of this manual.

(2) Clean any debris away from the suspect proportioning valve, connections, and area.

(3) Remove the chassis brake tube (Fig. 15) from the suspect proportioning valve.

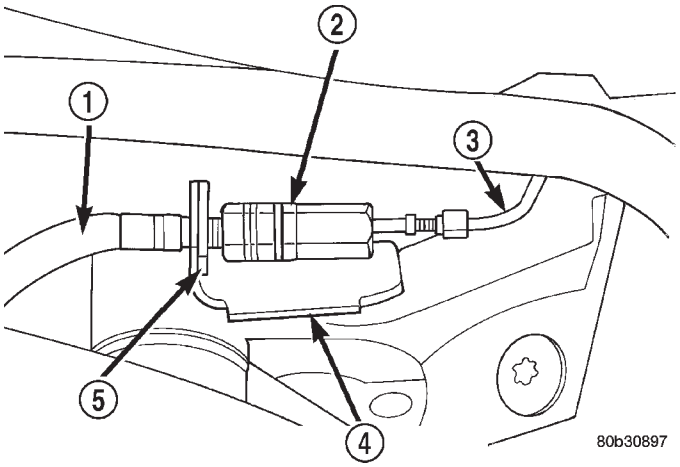


Fig. 15 Proportioning Valve

1 – FLEX HOSE
2 – PROPORTIONING VALVE
3 – BRAKE TUBE
4 – BRACKET
5 – RETAINER CLIP

(4) Remove the proportioning valve from the rear flex hose which is held stationary by a bracket mounted on the back side of the crossmember.

(5) Remove the retainer clip securing the rear flex hose from its bracket (Fig. 15). **This should be done to allow the proportioning valve pressure test fittings to be installed without bending the chassis brake tube.**

DIAGNOSIS AND TESTING (Continued)

CAUTION: Be sure the pressure test fittings being installed into the proportioning valve, have the correct thread sizes for installation into the proportioning valve and installation of the chassis brake tubes.

(6) Correctly install Pressure Test Fittings, Special Tool 6892–2 into the inlet port, and Special Tool 8187–2 into the outlet port, of the proportioning valve (Fig. 16).

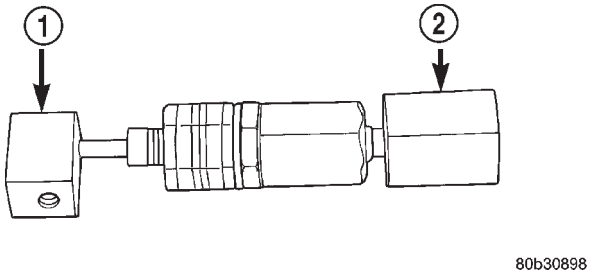


Fig. 16 Proportioning Valve With Fittings

1 – SPECIAL TOOL 8187–2
2 – SPECIAL TOOL 6892–2

(7) Install the proportioning valve and the Pressure Test Fittings, Special Tool 6892–2 and 8187–2, as an assembly back into the chassis brake tube. Connect Special Tool 6892–2 to the chassis brake tube, and Special Tool 8187–2 to the brake flex hose.

(8) Install a Pressure Gauge, Special Tool C-4007-A into each pressure test fitting (Fig. 17). Bleed any air out of the system. This includes bleeding the air from the hose between the pressure test fitting and pressure gauge, which is done at the pressure gauge.

(9) With the aid of a helper, apply pressure to the brake pedal until reading on proportioning valve inlet gauge, is at the pressure shown on the following chart. Then check the pressure reading on the proportioning valve outlet gauge. If proportioning valve outlet pressure does not agree with value shown on the following chart, when inlet pressure shown on chart is obtained, replace the proportioning valve. If proportioning valve is within pressure specifications do not replace proportioning valve.

(10) Remove the pressure gauges from the pressure test fittings.

(11) Remove the proportioning valve and the Pressure Test Fittings, Special Tool 6892–2, and 8187–2 from the chassis brake tube and rear flex hose. Remove the pressure test fittings from the proportioning valve (Fig. 16).

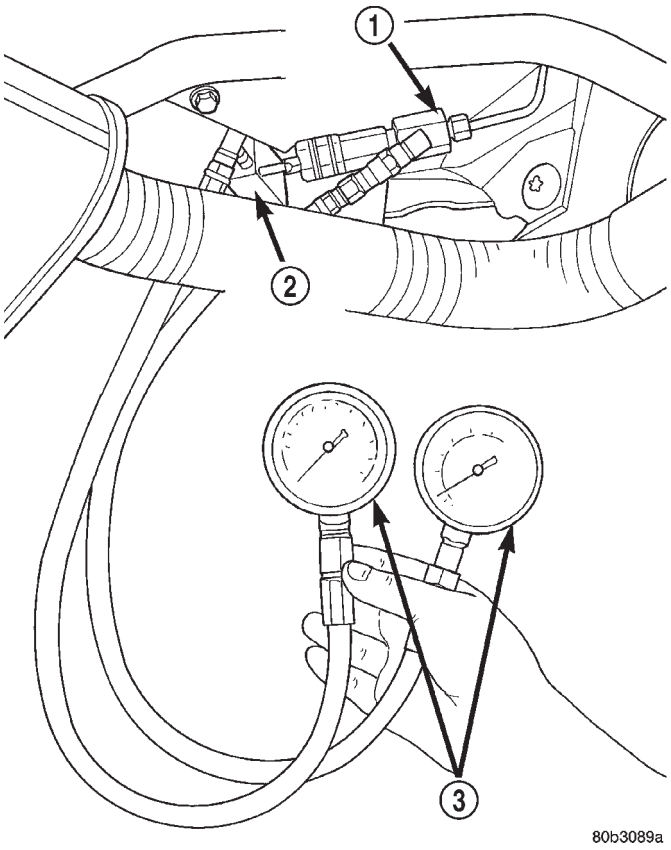


Fig. 17 Pressure Gauges Installed

1 – SPECIAL TOOL 6892–2
2 – SPECIAL TOOL 8187–2
3 – SPECIAL TOOL C-4007–A

(12) Install the rear brake flex hose to its mounting bracket using a new retainer clip.

(13) Install the proportioning valve to the rear brake flex hose. Tighten to a torque of 17 N·m (145 in. lbs.).

(14) Install the chassis brake tube to the proportioning valve (Fig. 15). Tighten the tube nut to a torque of 17 N·m (145 in. lbs.).

(15) Bleed the affected brake line. See Bleeding Brake System in the Service Adjustments section of the manual for proper bleeding procedure.

(16) On vehicles with Antilock Brakes, repeat the above steps for the other proportioning valve.

(17) If no problem is found with the proportioning valves, check the rear wheel brake shoe linings for contamination or for replacement brake shoes not meeting OEM brake lining material specifications. These conditions can also be a possible cause for a premature rear wheel skid.

DIAGNOSIS AND TESTING (Continued)

PROPORTIONING VALVE APPLICATIONS AND PRESSURE SPECIFICATIONS

Sales Code	Brake System Type	Split Point	Slope	Identification	Inlet Pressure	Outlet Pressure
All	All Disc/Disc	350 psi	0.34	Bar Code Label	1000 psi	525-625 psi

BRAKE ROTOR

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

Excessive runout or wobble in a rotor can increase pedal travel due to piston knock-back. This increases guide pin sleeve wear due to the tendency of the caliper to follow the rotor wobble.

When diagnosing a brake noise or pulsation, the machined disc braking surface should be checked and inspected.

BRAKING SURFACE INSPECTION

Light braking surface scoring and wear is acceptable. If heavy scoring or warping is evident, the rotor must be refaced or replaced. Refer to SERVICE PROCEDURES in this section of this group for information on brake rotor machining.

Excessive wear and scoring of the rotor can cause improper lining contact on the rotor's braking surface. If the ridges on the rotor are not removed before new brake shoes are installed, improper wear of the shoes will result.

If a vehicle has not been driven for a period of time, the rotor's braking surface will rust in the areas not covered by the brake shoes at that time. Once the vehicle is driven, noise and chatter from the disc brakes can result when the brakes are applied.

Some discoloration or wear of the rotor surface is normal and does not require resurfacing when linings are replaced. If cracks or burned spots are evident, the rotor must be replaced.

ROTOR MINIMUM THICKNESS

Measure rotor thickness at the center of the brake shoe contact surface. Replace the rotor if it is worn below minimum thickness or if machining the rotor will cause its thickness to fall below specifications.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

Minimum thickness specifications are cast on the rotor's unmachined surface (Fig. 18). Limits can also be found in the table at the end of this brake rotor information.

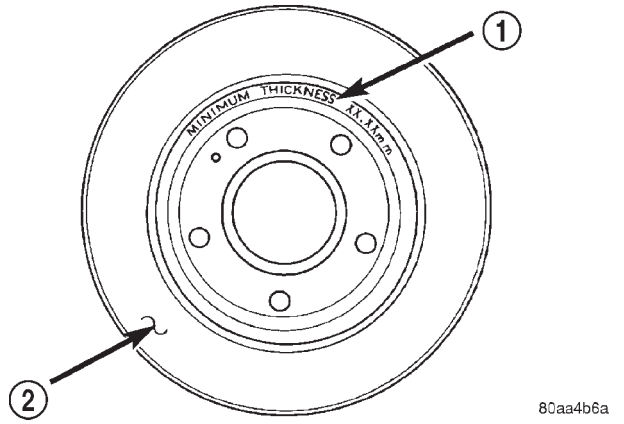


Fig. 18 Minimum Brake Rotor Thickness Markings (Typical)

1 – ROTOR MINIMUM THICKNESS MARKING
2 – ROTOR

ROTOR THICKNESS VARIATION

Thickness variation in a rotor's braking surface can result in pedal pulsation, chatter and surge. This can also be caused by excessive runout in the rotor or the hub.

Rotor thickness variation measurements should be made in conjunction with measuring runout. Measure thickness of the brake rotor at 12 equal points around the rotor braking surface with a micrometer at a radius approximately 25 mm (1 inch) from edge of rotor (Fig. 19). If thickness measurements vary by more than 0.013 mm (0.0005 inch), the rotor should refaced or replaced. Refer to SERVICE PROCEDURES in this section of this group for information on brake rotor machining.

ROTOR RUNOUT

On-vehicle rotor runout is the combination of the individual runout of the hub face and the runout of the rotor. (The hub and rotor runouts are separable). To measure rotor runout on the vehicle, first remove the tire and wheel assembly. Reinstall the wheel mounting nuts on the studs, tightening the rotor to the hub. Mount the Dial Indicator, Special Tool C-3339, with Mounting Adaptor, Special Tool SP-1910 on steering arm. The dial indicator plunger should contact braking surface of rotor approximately 25 mm (one inch) from outer edge of rotor (Fig. 20).

DIAGNOSIS AND TESTING (Continued)

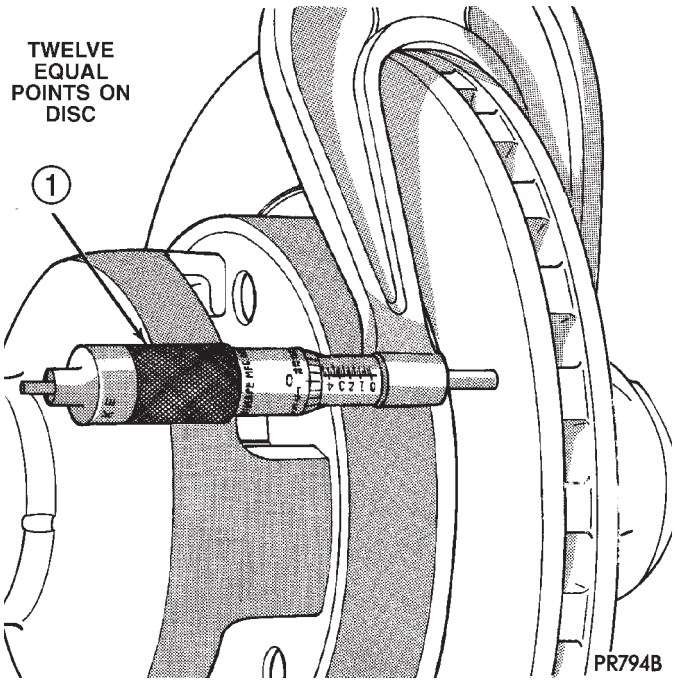


Fig. 19 Checking Rotor For Thickness

1 – CALIPER

Check lateral runout on both sides of the rotor, marking the low and high spots on both. Runout limits can be found in the table at the end of this brake rotor information.

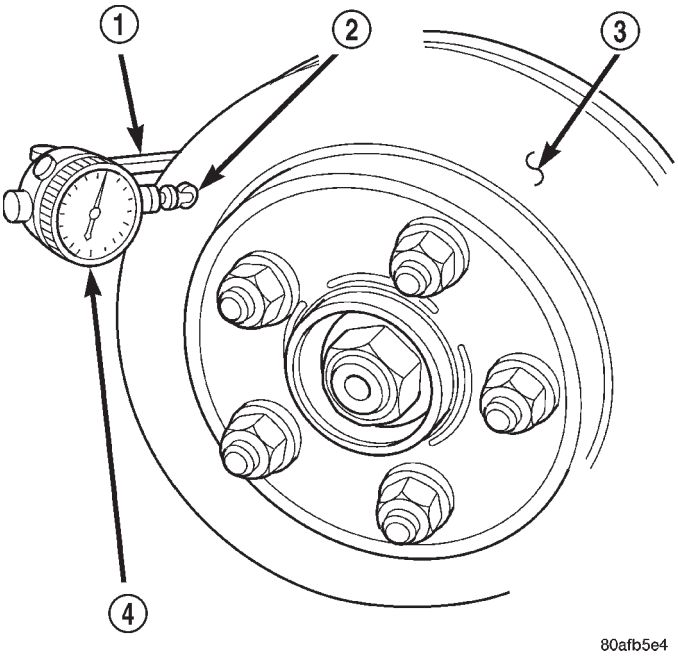


Fig. 20 Checking Rotor Runout

1 – SPECIAL TOOL SP-1910
2 – 25mm FROM EDGE
3 – DISC SURFACE
4 – SPECIAL TOOL C-3339

If runout is in excess of the specification, check the lateral runout of the hub face. Before removing the rotor from the hub, place a chalk mark across both the rotor and the one wheel stud closest to where the high runout measurement was taken. This way, the original mounting spot of the rotor on the hub is indexed (Fig. 21).

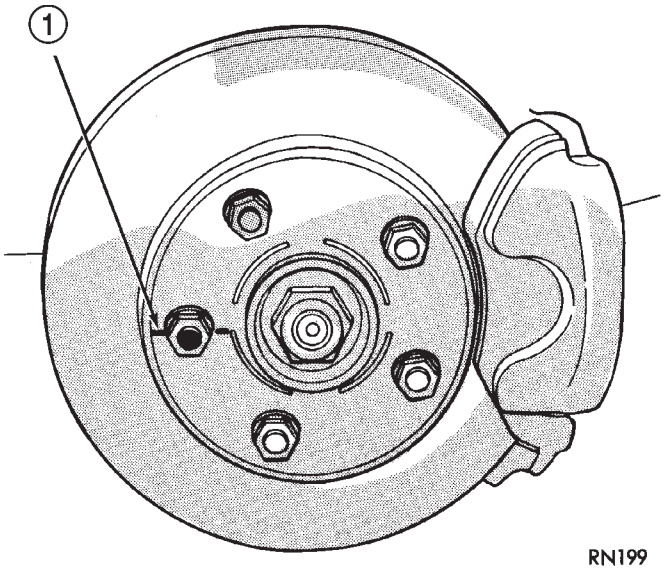


Fig. 21 Marking Rotor and Wheel Stud

1 – CHALK MARK

Remove the rotor from the hub.

NOTE: Clean the hub face surface before checking runout. This provides a clean surface to get an accurate indicator reading.

Mount Dial Indicator, Special Tool C-3339, and Mounting Adaptor, Special Tool SP-1910, to the steering knuckle. Position the indicator stem so it contacts the hub face near the outer diameter. Care must be taken to position stem outside of the stud circle, but inside of the chamfer on the hub rim (Fig. 22).

Hub runout should not exceed 0.03 mm (0.0012 inch). If runout exceeds this specification, the hub must be replaced. Refer to the SUSPENSION group in this service manual for the hub and bearing removal and installation procedure.

If the hub runout does not exceed this specification, install the rotor back on the hub, aligning the chalk marks on the rotor with a wheel mounting stud, two studs apart from the original stud (Fig. 23). Tighten nuts in the proper sequence and torque to specifications.

Recheck brake rotor runout to see if the runout is now within specifications.

DIAGNOSIS AND TESTING (Continued)

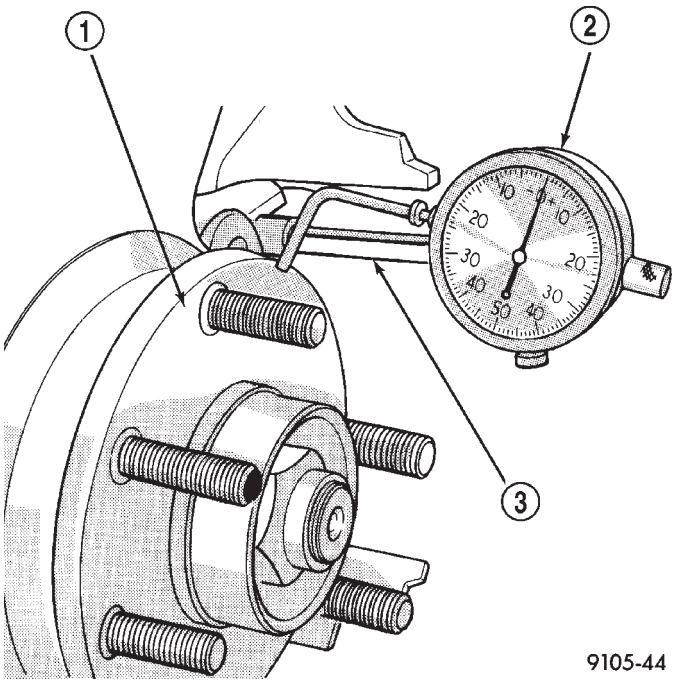


Fig. 22 Checking Hub Runout

1 – HUB SURFACE
2 – SPECIAL TOOL C-3339
3 – SPECIAL TOOL SP-1910

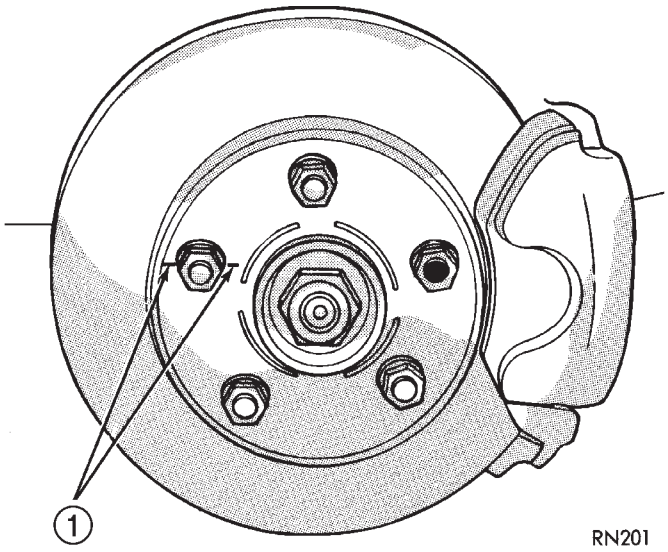


Fig. 23 Index Rotor And Wheel Stud

1 – CHALK MARK

If runout is not within specifications, reface or replace the brake rotor. Refer to SERVICE PROCEDURES in this section of this group for information on brake rotor machining.

BRAKE ROTOR LIMITS

Braking Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Run Out*	Rotor Micro Finish
Front Rotor	25.87–26.13 mm 1.019 -1.029 in.	24.4 mm 0.960 in.	0.013 mm 0.0005 in.	0.08 mm 0.003 in.	15-80 RMS
Rear Rotor	11.63–12.13 mm 0.458 -0.478 in.	10.4 mm 0.409 in.	0.013 mm 0.0005 in.	0.08 mm 0.003 in.	15-80 RMS
* TIR Total Indicator Reading (Measured On Vehicle)					

BRAKE FLUID CONTAMINATION

Indications of fluid contamination are swollen or deteriorated rubber parts.

Swollen rubber parts indicate the presence of petroleum in the brake fluid.

To test for contamination, put a small amount of drained brake fluid in clear glass jar. If fluid separates into layers, there is mineral oil or other fluid contamination of the brake fluid.

If brake fluid is contaminated, drain and thoroughly flush system. Replace master cylinder, proportioning valve, caliper seals, wheel cylinder seals, Antilock Brakes hydraulic unit and all hydraulic fluid hoses.

BRAKE LAMP SWITCH

NOTE: Before proceeding with this diagnostic test, verify the adjustment of the brake lamp switch to rule out misadjustment. Refer to ADJUSTMENTS in this service manual group.

If the electrical circuit has been tested and the brake lamp switch is suspected of being faulty, it can be tested using the following method.

(1) Remove the switch from the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the proper procedure.

(2) With the switch in the released position (plunger extended), use an ohmmeter to test each of the

DIAGNOSIS AND TESTING (Continued)

three internal switches as shown (Fig. 24). You should achieve the results as listed in the figure.

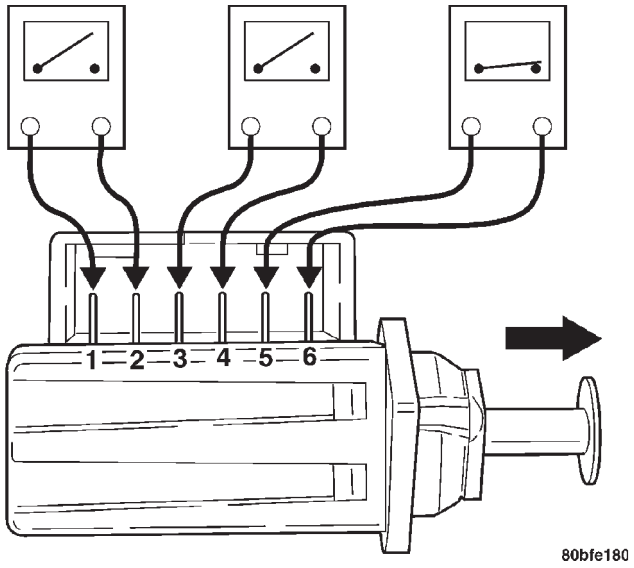


Fig. 24 Switch Test - Released Position

(3) Gently push the plunger on the brake lamp switch in until it stops.

(4) With the switch in the depressed position (plunger pushed in), use an ohmmeter to test each of the three internal switches as shown (Fig. 25). You should achieve the results as listed in the figure.

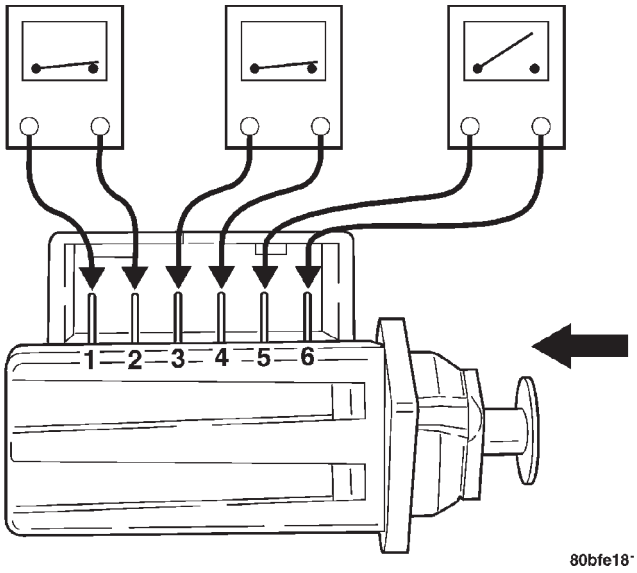


Fig. 25 Switch Test - Depressed Position

If you do not achieve the results as listed in both figures, the switch is faulty and must be replaced.

(5) Install the switch in the vehicle. Refer to REMOVAL AND INSTALLATION in this section for the proper procedure.

SERVICE PROCEDURES

BRAKE FLUID LEVEL CHECK

Check master cylinder reservoir brake fluid level a minimum of twice a year.

The master cylinder brake fluid reservoir used on this vehicle includes a brake fluid level sensor. The brake fluid level sensor location is in the body of the brake fluid reservoir (Fig. 26). In the event of low brake fluid level in the brake fluid reservoir, the RED brake warning light in the instrument panel will turn on.

Master cylinder fluid reservoirs on both standard and antilock brake systems, are marked with a FULL fill line indicating the fluid reservoirs proper fluid level (Fig. 26).

NOTE: When filling brake fluid reservoir, use only Mopar® brake fluid or an equivalent stored in a tightly sealed container. Brake fluid must conform to DOT 3, specifications. Do not use brake fluid with a lower boiling point then DOT 3, as brake failure could result during prolonged hard braking. Do not use petroleum-based fluid because seal damage in the brake system will result.

If necessary, add brake fluid to reservoir, bringing brake fluid level to the FULL fill line shown on fluid reservoir (Fig. 26).

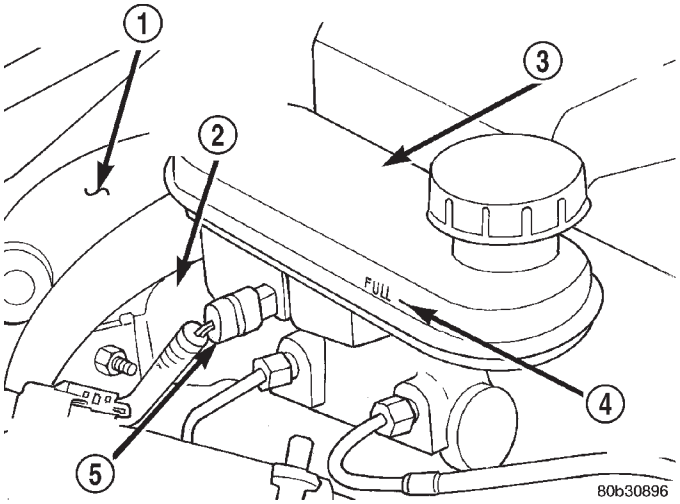


Fig. 26 Master Cylinder Fluid Level

1 – BOOSTER
2 – MASTER CYLINDER
3 – MASTER CYLINDER FLUID RESERVOIR
4 – FLUID LEVEL FULL MARK
5 – FLUID LEVEL SENSOR

SERVICE PROCEDURES (Continued)

BASE BRAKE BLEEDING

NOTE: To bleed this vehicles antilock brakes hydraulic system, see the antilock brake system service procedures in this group of the service manual. It describes in detail the required procedure which needs to be followed when bleeding the antilock brake system.

CAUTION: Before removing the master cylinder cover, wipe it clean to prevent dirt and other foreign matter from dropping into the master cylinder.

PRESSURE BLEEDING

CAUTION: Use bleeder tank Special Tool C-3496-B or equivalent, with Adapter, Special Tool 8224 (Fig. 27), to pressurize the brake hydraulic system for bleeding.

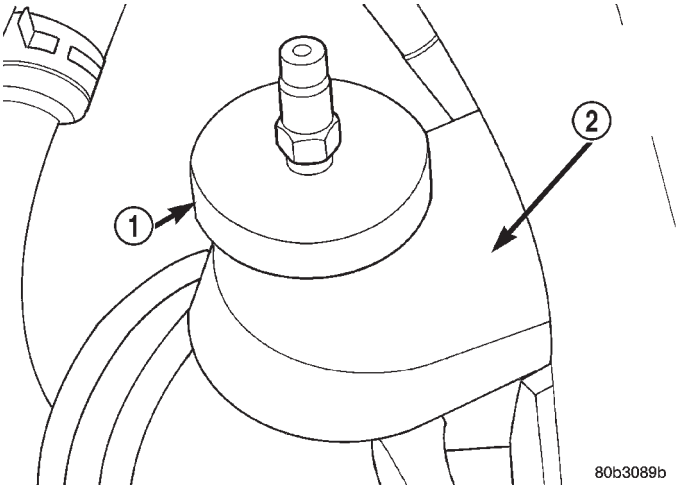


Fig. 27 Pressure Bleeding Adapter Mounted On Fluid Reservoir

1 – SPECIAL TOOL 8224
2 – MASTER CYLINDER FLUID RESERVOIR

Follow pressure bleeder manufacturer's instructions, for use of pressure bleeding equipment.

When bleeding the brake system. Some air may be trapped in the brake lines or valves far upstream. As much as ten feet from the bleeder screw (Fig. 28). Therefore, it is essential to have a fast flow of a large volume of brake fluid when bleeding the brakes. This will ensure all the air is bled from the brakes hydraulic system.

(1) Remove rubber dust caps from all 4 bleeder screws.

(2) Attach a clear hose to the bleeder screw at one wheel and feed the hose into a clear jar containing fresh brake fluid (Fig. 29).

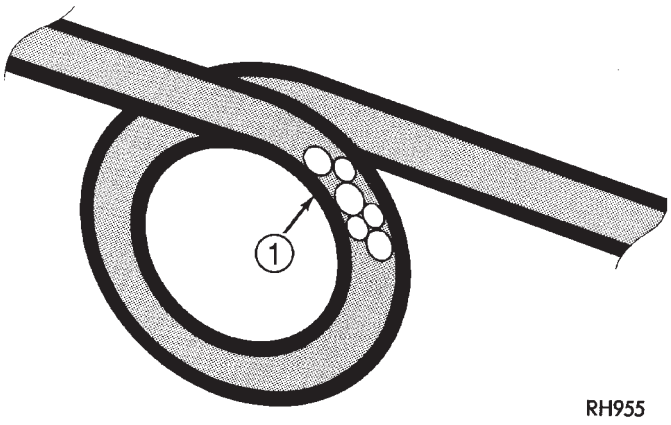


Fig. 28 Trapped Air in Brake Line

1 – TRAPPED AIR

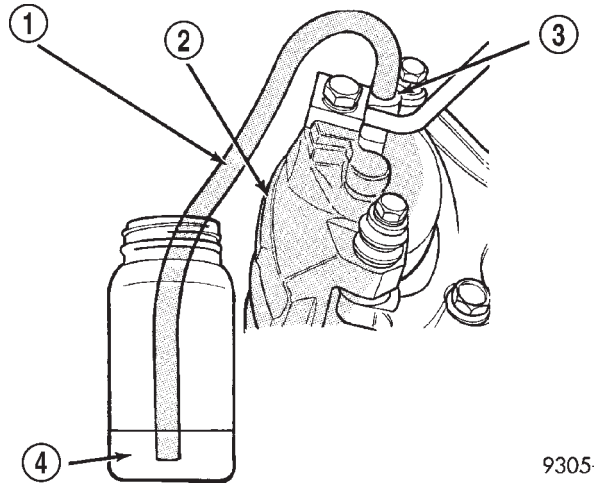


Fig. 29 Proper Method for Purging Air From Brake System

1 – CLEAR HOSE
2 – BRAKE CALIPER
3 – BLEEDER SCREW
4 – CLEAN BRAKE FLUID

CAUTION: Just cracking the bleeder screw often restricts fluid flow, and a slow weak fluid discharge will NOT get all the air out.

(3) Open bleeder screw (Fig. 29) on caliper assembly or wheel cylinder, at least **one full turn** or more to obtain an adequate flow of brake fluid.

(4) After 4 to 8 ounces of brake fluid has been bled through an individual wheel's brake hydraulic system. And an air-free flow (no bubbles) is maintained in the clear plastic hose and jar, this will indicate a good bleed of this individual hydraulic circuit.

(5) Repeat the procedure at all the other remaining bleeder screws. Then check the pedal for travel. If pedal travel is excessive or has not been improved. Enough fluid has not passed through the system to

SERVICE PROCEDURES (Continued)

expel all the trapped air. Be sure to monitor the fluid level in the pressure bleeder. It must stay at the proper level so air will not be allowed to reenter the brake system through the master cylinder.

(6) Replace all 4 bleeder screw rubber dust caps.

BLEEDING WITHOUT A PRESSURE BLEEDER

If a pressure bleeder is not available. A good brake fluid flow can be obtained by manual bleeding of the brake hydraulic system, following these steps.

(1) Remove rubber duct caps from all 4 bleeder screws.

(2) Attach a clear hose to the bleeder screw at one wheel and feed the hose into a clear jar containing fresh brake fluid (Fig. 29).

(3) Pump the brake pedal three or four times and hold it down before the bleeder screw is opened.

(4) Then, while the pedal is being held down, open the bleeder screw at least 1 full turn. When the bleeder screw opens the brake pedal will drop all the way to the floor.

(5) Release the brake pedal only **after** the bleeder screw is closed.

(6) Repeat steps 1 through 5, four or five times at each bleeder screw. This should pass a sufficient amount of fluid to expel all the trapped air from the brakes hydraulic system. Be sure to monitor brake fluid level in master cylinder fluid reservoir, to ensure it stays at a proper level. This will ensure air does not reenter brake hydraulic system through master cylinder.

(7) Only after a short stroke and solid brake pedal feel is obtained, test drive vehicle to ensure brakes are operating correctly.

(8) Replace all 4 bleeder screw dust caps.

MASTER CYLINDER BLEEDING

CAUTION: When clamping the master cylinder in a vise for bleeding, carefully tighten the vise just enough to hold the master cylinder from moving. Excessive pressure can damage the master cylinder.

(1) Clamp the master cylinder in a vise (Fig. 30).

NOTE: The master cylinder on this vehicle uses ISO style flares and metric threads on the master cylinder outlet ports. Special Tool Packages 8129 and 8305 have ISO style flares and metric threads on their bleeding tubes.

(2) Position the appropriate bleeding tools from packages, Special Tool 8129 and 8305, on the master cylinder. Place open ends in the fluid reservoir. Then, attach the bleeding tube fittings to the master cylinder outlet ports. (Fig. 30)

NOTE: Make sure the open ends of the bleeding tubes are below the surface of the brake fluid when the reservoir is filled to the proper level.

(3) Fill reservoir with brake fluid conforming to DOT 3 specifications such as Mopar or Equivalent.

(4) Using a wooden dowel per (Fig. 30). Depress master cylinder pistons slowly, and then allow pistons to return to released position. Repeat several times until all air bubbles are expelled.

(5) Remove bleeding tubes from cylinder, plug outlets and install filler cap.

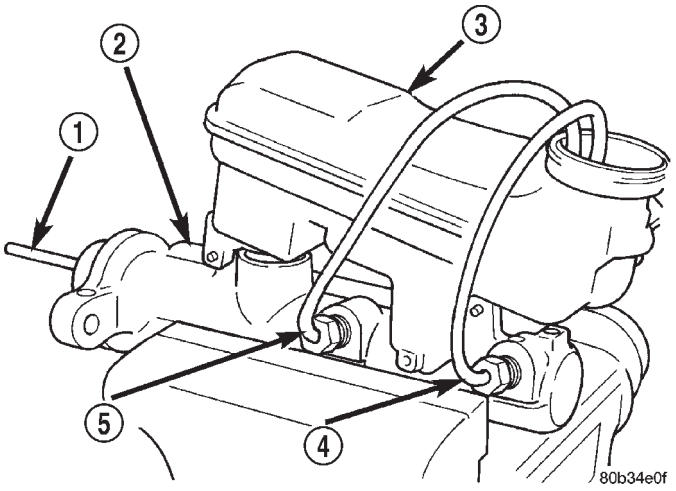


Fig. 30 Bleeding Master Cylinder

1 – WOODEN DOWEL
2 – MASTER CYLINDER
3 – FLUID RESERVOIR
4 – SPECIAL TOOL 8129
5 – SPECIAL TOOL 8305

(6) Remove master cylinder from vise and install on power brake vacuum booster.

NOTE: It is not necessary to bleed the entire hydraulic system after replacing the master cylinder, providing that the master cylinder has been bled and filled upon installation.

BRAKE TUBE REPAIR

All available brake systems on this vehicle use **ISO STYLE TUBING FLARES** (Fig. 31) at all chassis brake tube to component locations, **Only the connection between the rear proportioning valve and flex hose uses a double inverted flare.**

Only double wall 4.75mm (3/16 in.) steel tubing should be used for replacement of the chassis brake tubes. **The chassis brake tubes used on this vehicle are coated with a zinc alloy and aluminum rich coating referred to as Prokote 2000. If a chassis brake tube requires replacement, only**

SERVICE PROCEDURES (Continued)

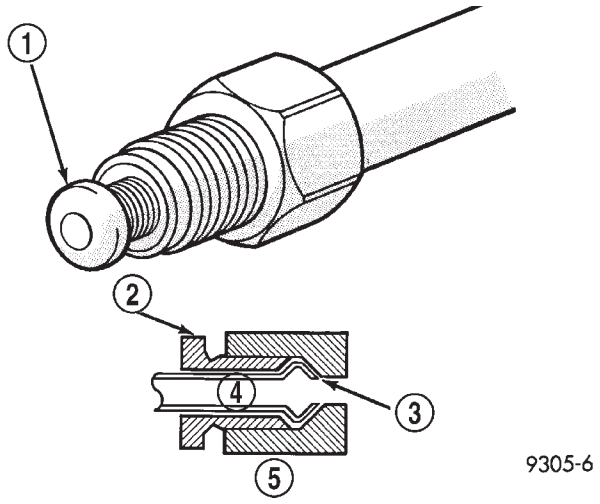


Fig. 31 I. S. O. Style Tubing Flare And Fitting Connection

1 – ISO STYLE TUBING FLARE
2 – ISO FLARE TUBE NUT
3 – SEAT
4 – TUBE
5 – ISO-FLARE (METRIC)

brake tubing with the same coating should be used as a service replacement. Care should be taken when replacing brake tubing, to be sure the proper bending and flaring tools and procedures are used, to avoid kinking. Do not route the tubes against sharp edges, moving components or into hot areas. All tubes should be properly attached with recommended retaining clips and fasteners.

Care must be taken when servicing components to avoid damage to the flexible stainless steel hoses between the master cylinder and junction block or antilock hydraulic control unit.

ISO STYLE TUBE FLARING PROCEDURE

CAUTION: ALWAYS USE THE PROPER TYPE OF ISO FLARING TOOL AND REQUIRED PROCEDURE, WHEN TUBE FLARING IS REQUIRED WHEN SERVICING THE VEHICLES HYDRAULIC BRAKE SYSTEM. THIS IS REQUIRED TO ENSURE THE INTEGRITY OF THE VEHICLE'S HYDRAULIC BRAKING SYSTEM.

Using Tubing Cutter, Special Tool C-3478-A or equivalent, cut off damaged seat on tubing (Fig. 32). Ream out any burrs or rough edges showing on inside of tubing. This will make the ends of tubing square (Fig. 33) and ensure better seating of flared end tubing. **Be sure to put the tube nut on tubing before the tubing is flared.**

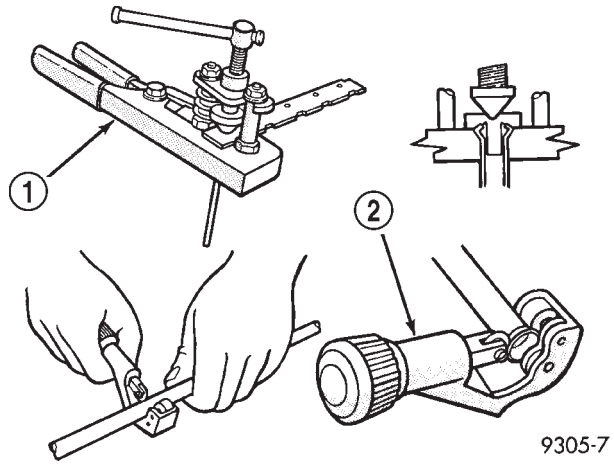


Fig. 32 Cutting and Flaring of Brake Line Tubing

1 – SPECIAL TOOL TFM428
2 – SPECIAL TOOL C3478A

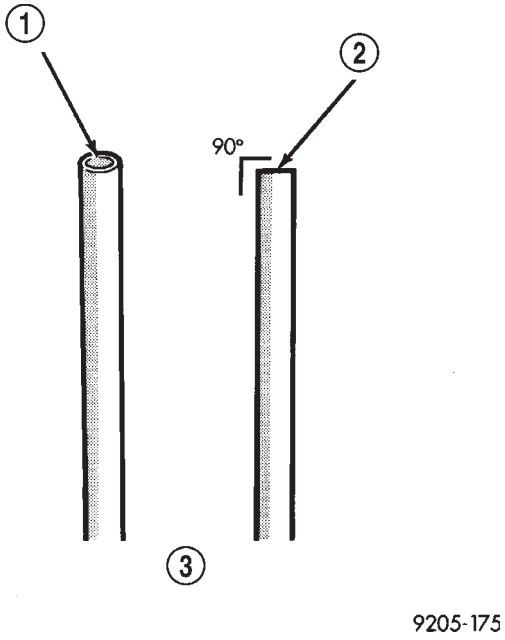


Fig. 33 Tube End Properly Prepared For Flaring

1 – BE SURE ALL BURRS ARE REMOVED FROM INSIDE OF TUBING
2 – BE SURE END OF TUBING IS SQUARE BEFORE FLARING TUBE
3 – HYDRAULIC BRAKE LINE TUBING

CAUTION: All ISO style tubing flares are of metric dimensions. When performing any service procedures on a vehicle using ISO style tubing flares, metric size tubing of 4.75 mm MUST be used with metric ISO tube flaring equipment.

To create a (metric) ISO style tubing flare, use Snap-On Flaring Tool TFM-428, (Fig. 32) or the equivalent. See (Fig. 34) and proceed with the steps

SERVICE PROCEDURES (Continued)

listed below. **Be sure to place the tubing nut on tube before proceeding to flare the tubing.**

(1) Carefully prepare the end of the tubing to be flared. Be sure the end of the tubing is square and all burrs on the inside of the tubing are removed (Fig. 33). **This preparation is essential to obtain the correct form of a (metric) ISO tubing flare.**

(2) Open the jaws of the Flaring Tool. Align the jaws of the flaring tool around the tubing. Close the jaws of the Flaring Tool around the tubing, but do not lock the tubing in place.

(3) Position tubing in jaws of the Flaring Tool so that it is flush with top surface of flaring tool bar assembly (Fig. 34).

(4) Install the correct size adaptor for the brake tubing being flared, on the feed screw of the yoke assembly. Center the yoke and adapter over the end of the tubing. Apply lubricant to the adapter area that contacts the brake tubing. Make sure the adapter pilot is fully inserted in the end of the brake tubing. Tighten screw on yoke assembly until the adaptor has seated squarely on the surface of the bar assembly (Fig. 34). This process will properly create a metric ISO tubing flare.

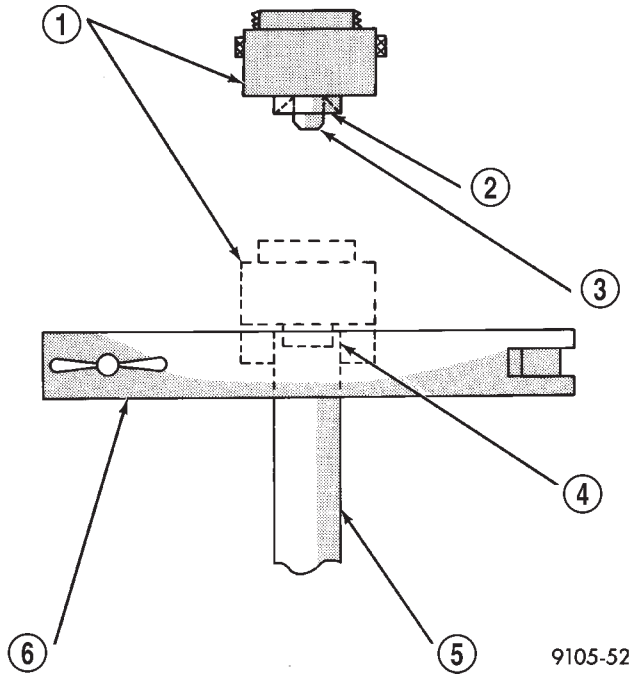


Fig. 34 ISO Tubing Flare Tool

1 – ADAPTER
2 – LUBRICATE HERE
3 – PILOT
4 – FLUSH WITH BAR
5 – TUBING
6 – BAR ASSEMBLY

BRAKE ROTOR MACHINING

BRAKE ROTOR MACHINING

NOTE: Refacing of the rotor is not required each time the brake pads are replaced.

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

If the rotor surface is deeply scored or warped, or there is a complaint of brake roughness or brake pedal pulsation, the rotor should be refaced using a hub-mounted on-car brake lathe (Fig. 35), or replaced.

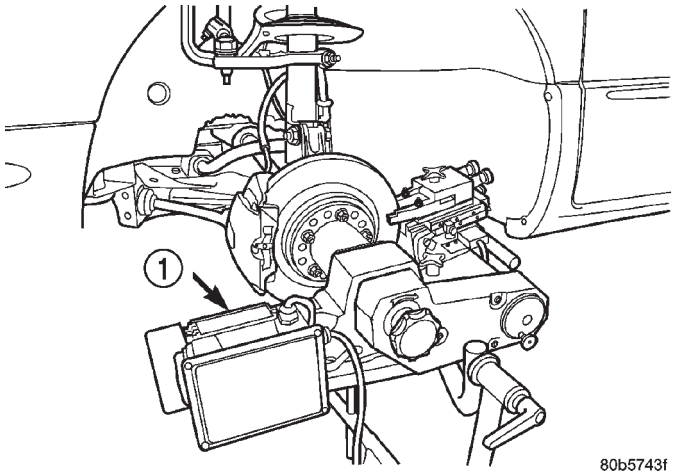


Fig. 35 Refacing Brake Rotor

1 – ON-CAR BRAKE LATHE

The use of a hub-mounted on-car brake lathe is highly recommended to eliminate the possibility of excessive runout. It trues the brake rotor to the vehicle's hub and bearing.

NOTE: All rotors have markings for minimum allowable thickness cast on an un-machined surface of the rotor (Fig. 36) or (Fig. 37).

Minimum allowable thickness is the minimum thickness which the brake rotor machined surface may be cut to.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

Before installation, verify the brake rotor face and the hub adapters are free of any chips, rust, or contamination.

SERVICE PROCEDURES (Continued)

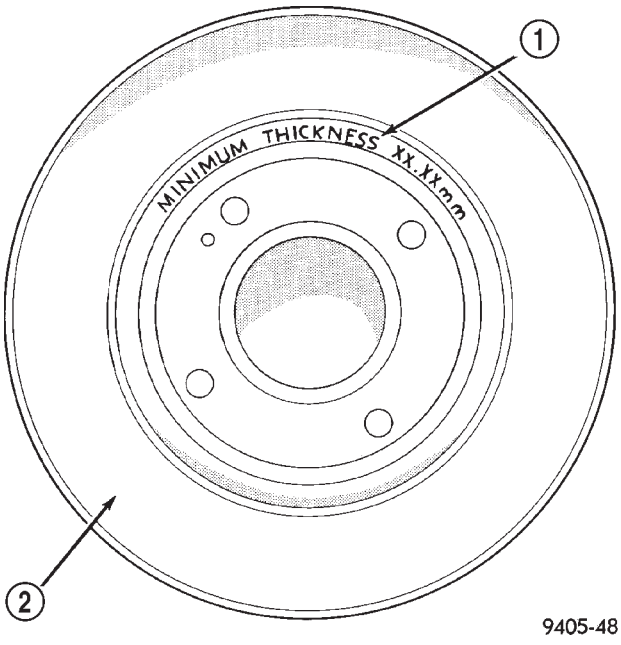


Fig. 36 Front Rotor Thickness Markings

1 – BRAKING DISC MINIMUM THICKNESS MARKING
2 – BRAKING DISC

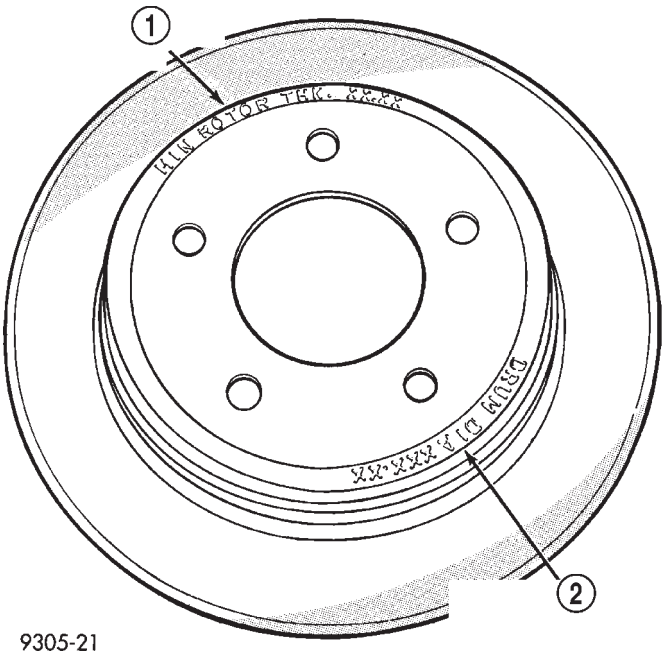


Fig. 37 Rear Rotor Thickness Markings

1 – BRAKING DISC MINIMUM THICKNESS MARKING
2 – PARK BRAKE DRUM MAXIMUM DIAMETER MARKING

When mounting and using the brake lathe, strict attention to the brake lathe manufacturer's operating instructions is required.

Machine both sides of the brake rotor at the same time. Cutting both sides at the same time minimizes the possibility of a tapered or uneven cut.

SPECIFICATIONS AND LIMITS

When refacing a rotor, the required 0.08 mm (0.003 inch) TIR (Total Indicator Reading) and 0.013 mm (0.0005 inch) thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning equipment is required.

BRAKE ROTOR REFINISHING LIMITS

Braking Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Run Out*	Rotor Micro Finish
Front Rotor	25.87–26.13 mm 1.019 -1.029 in.	24.4 mm .960 in.	.013 mm .0005 in.	.08 mm .003 in.	15-80 RMS
Rear Rotor	11.63–12.13 mm .458 -.478 in.	10.4 mm .409 in.	.013 mm .0005 in.	.08 mm .003 in.	15-80 RMS
* TIR Total Indicator Reading (Measured On Vehicle)					

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: ALTHOUGH FACTORY INSTALLED BRAKE SHOE LININGS ARE MADE FROM ASBESTOS-FREE MATERIALS, SOME AFTERMARKET BRAKE SHOE LININGS MAY CONTAIN ASBESTOS. THIS SHOULD BE TAKEN INTO ACCOUNT WHEN SERVICING A VEHICLE'S BRAKE SYSTEM. IT IS POSSIBLE THAT AFTERMARKET BRAKE SHOES MAY HAVE BEEN INSTALLED ON THE VEHICLE. ALWAYS WEAR A RESPIRATOR WHEN CLEANING BRAKE COMPONENTS; ASBESTOS CAN CAUSE SERIOUS BODILY HARM SUCH AS ASBESTOSIS AND CANCER. NEVER CLEAN BRAKE COMPONENTS BY USING COMPRESSED AIR; USE ONLY A VACUUM CLEANER SPECIFICALLY DESIGNED FOR THE REMOVAL OF BRAKE DUST. IF A VACUUM CLEANER IS NOT AVAILABLE, CLEAN BRAKE PARTS USING ONLY WATER-DAMPENED SHOP TOWELS. DO NOT CREATE BRAKE LINING DUST BY SANDING THE BRAKE LININGS WHEN SERVICING A VEHICLE. DISPOSE OF ALL DUST AND DIRT SUSPECTED OF CONTAINING ASBESTOS FIBERS. USE ONLY SEALED AIRTIGHT BAGS OR CONTAINERS. FOLLOW ALL RECOMMENDED SAFETY PRACTICES PRESCRIBED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND THE ENVIRONMENTAL PROTECTION AGENCY (EPA), FOR HANDLING AND DISPOSING OF PRODUCTS CONTAINING ASBESTOS.

CAUTION: Use only Mopar® brake fluid or an equivalent from a tightly sealed container. Brake fluid must conform to DOT 3 specifications. Do not use petroleum-based fluid because seal damage in the brake system will result.

CAUTION: Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surfaces, wash it off immediately with water.

CAUTION: During service procedures, grease or any other foreign material must be kept off the caliper assembly, surfaces of the brake rotor and external surfaces of the hub. Avoid deformation, scratching or nicking of the brake rotor and brake shoe linings.

CAUTION: When handling the brake rotor and caliper, be careful to avoid damaging the rotor and caliper, and scratching or nicking the brake shoe lining.

BRAKE PEDAL

REMOVAL

(1) Disconnect and isolate the remote ground battery cable from the ground stud on the right strut tower.

(2) Remove the brake lamp switch from its bracket (Fig. 38). The brake lamp switch is removed by depressing and holding the brake pedal while rotating brake lamp switch in a counterclockwise direction approximately 30 degrees. Pull the switch rearward and remove it from its mounting bracket.

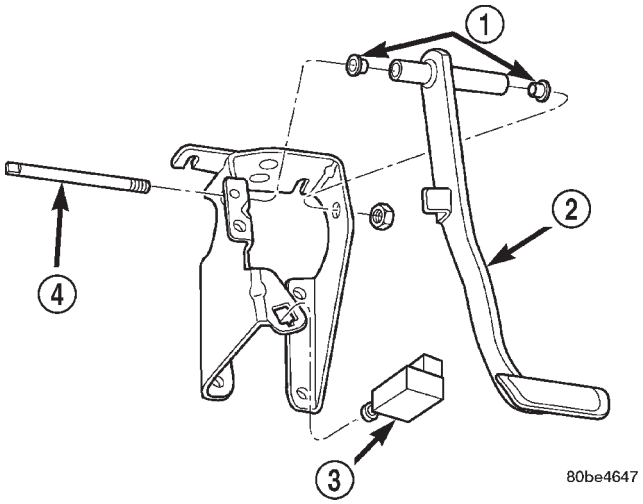


Fig. 38 Brake Pedal Mounting

1 – BUSHINGS
2 – BRAKE PEDAL
3 – BRAKE LAMP SWITCH
4 – PIVOT SHAFT

(3) Remove the retaining clip from the brake pedal pin securing the power brake booster to the pedal using following procedure (Fig. 39). Position a small screwdriver between the center tang on the retaining clip and the brake pedal pin. Rotate blade of screwdriver enough so center tang on retaining clip can pass over end of brake pedal pin, then pull retaining clip off brake pedal pin.

(4) Remove the booster input rod from the brake pedal pin.

(5) Remove the nut from the brake pedal pivot shaft (Fig. 38). The pivot shaft has a flat on it to hold while the nut is removed.

(6) Remove the brake pedal pivot shaft from the brake pedal and pedal mounting bracket.

(7) Remove the brake pedal with bushings from mounting bracket (Fig. 38).

NOTE: The bushings can be easily removed from the pedal by pulling them straight out each side.

REMOVAL AND INSTALLATION (Continued)

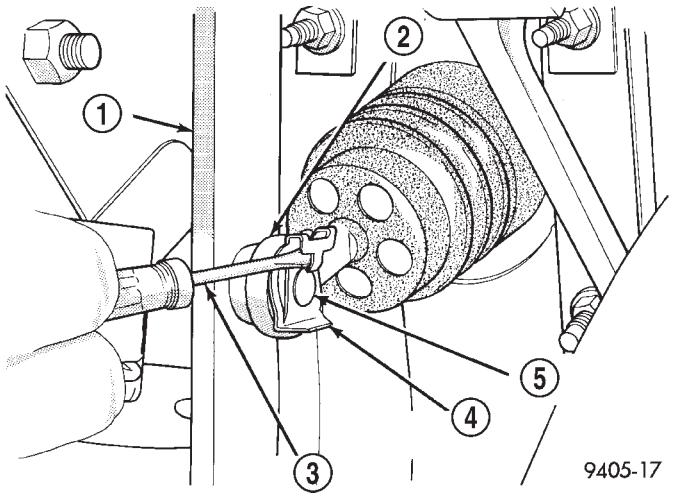


Fig. 39 Brake Pedal Retaining Clip

1 – BRAKE PEDAL
2 – INPUT ROD
3 – SCREWDRIVER
4 – RETAINING CLIP
5 – BRAKE PEDAL PIN

INSTALLATION

(1) Make sure the pedal has a properly installed bushing on each side of the pedal (Fig. 38).

(2) Lubricate the brake pedal pivot shaft and brake pedal bushings using Mopar Lubriplate or an equivalent.

(3) Install the brake pedal in the pedal bracket (Fig. 38). Align the hole in brake pedal with the pivot shaft holes in the pedal bracket.

(4) Install the brake pedal shaft (Fig. 38).

(5) Install the nut on the end of the brake pedal pivot shaft. Tighten the nut to a torque of 34 N·m (25 ft. lbs.).

(6) Install the power brake booster input rod on the brake pedal pin.

CAUTION: When installing the retaining clip on the brake pedal pin, a NEW retaining clip must be used to ensure the retention of the power brake booster input rod.

(7) Install a **new** retaining clip (Fig. 39) on the brake pedal pin.

(8) Using Mopar Lubriplate or an equivalent, lightly lubricate the surface of the brake pedal striker where the plunger of the brake lamp switch contacts it.

NOTE: Prior to installing the brake lamp switch into its bracket, the plunger must be moved to its fully extended position using the procedure in Step 9.

(9) Hold brake lamp switch firmly in one hand. Using other hand, pull outward on the plunger of the brake lamp switch until it has ratcheted out to its fully extended position.

(10) Install the brake lamp switch in the brake pedal bracket (Fig. 38). Install it using the following procedure. Depress the brake pedal as far down as possible. Then while holding brake pedal down, align the index key on switch with notch in square hole of mounting bracket. When the switch is fully installed into the bracket, rotate the switch in a clockwise direction approximately 30 degrees until it locks into place.

CAUTION: Do not use excessive force when pulling back on brake pedal to adjust the brake lamp switch. If to much force is used, damage to the brake lamp switch or striker can result.

(11) Gently release/pull back the brake pedal until it stops moving. This will cause the switch plunger to ratchet back to its correctly adjusted position.

(12) Connect the remote ground cable to the ground stud on the right front strut tower.

(13) Check the operation of the brake lamps.

MASTER CYLINDER

REMOVE

(1) Disconnect brake fluid level sensor wire connector on the side of the master cylinder reservoir.

(2) Disconnect primary and secondary brake tubes from master cylinder housing. Install plugs at brake tube outlets.

(3) Remove the 2 nuts (Fig. 40) attaching the master cylinder to the vacuum booster.

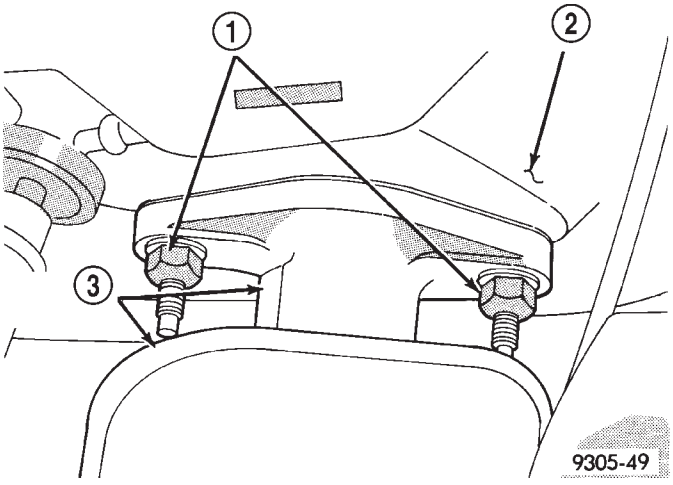


Fig. 40 Master Cylinder Mounting

1 – MASTER CYLINDER MOUNTING NUTS
2 – POWER BRAKE BOOSTER
3 – MASTER CYLINDER

(4) Slide master cylinder straight out from the vacuum booster.

REMOVAL AND INSTALLATION (Continued)

INSTALL

CAUTION: If the master cylinder is being replaced or or has been repaired, the master cylinder must be bled before installation. See Master Cylinder Bleeding in Service Procedures within this group of this service manual.

(1) Install master cylinder on studs of vacuum booster, aligning the vacuum booster push rod with master cylinder piston.

(2) Install the master cylinder mounting nuts (Fig. 40). Tighten the nuts to a torque of 28 N·m (250 in. lbs.).

(3) Connect brake tubes to master cylinder primary and secondary ports. Tighten fittings to 17 N·m (145 in. lbs.) torque.

(4) Reconnect brake fluid level sensor.

POWER BRAKE BOOSTER

REMOVAL

(1) Remove the battery ground cable from the ground stud on the right strut tower. Then, correctly isolate the ground cable by installing the cable isolator on the ground stud (Fig. 41).

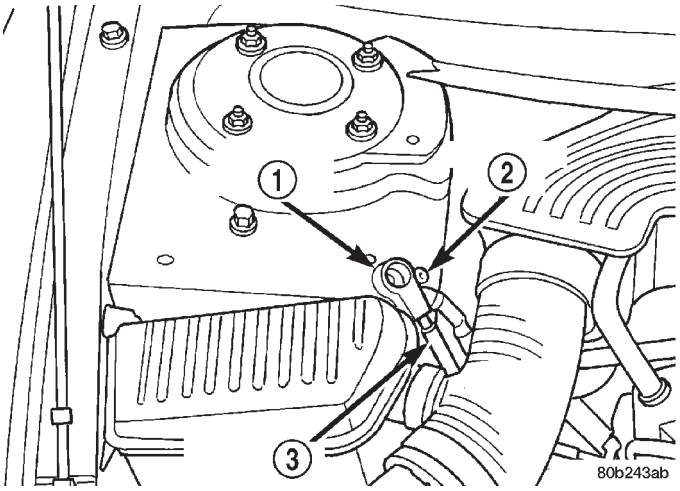


Fig. 41 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(2) Remove caps from both wiper arms at the attachment to the pivots to expose the wiper arm attaching nut. Remove the nut (Fig. 42) attaching each wiper arm to its pivot.

(3) Remove the wiper arms from the pivots. Wiper arms are removed from the pivots by rocking them back and force on the pivots until they can be pulled off the pivots.

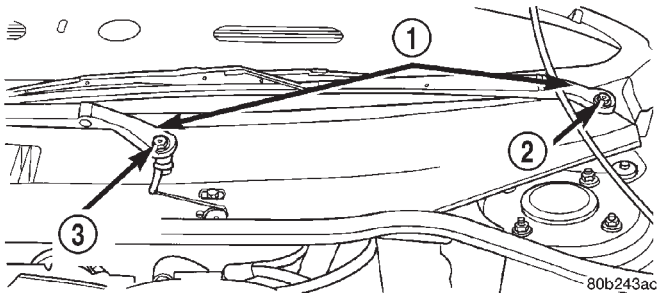


Fig. 42 Wiper Arm Attachment To Pivot

1 – WIPER ARMS
2 – ATTACHING NUT
3 – ATTACHING NUT

(4) Remove the wiper module cover and cowl cover (Fig. 43) from the vehicle.

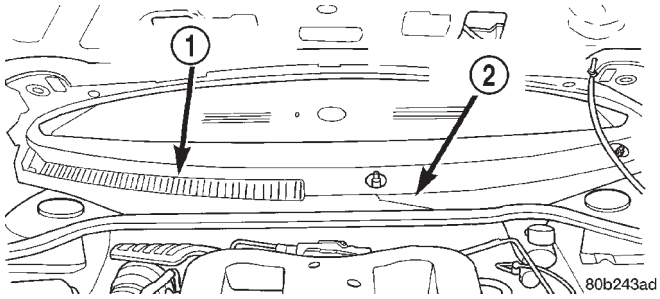


Fig. 43 Wiper Module And Cowl Cover

1 – COWL COVER
2 – WIPER MODULE COVER

(5) Remove the 8 bolts, attaching the reinforcement (Fig. 44) to the strut towers and the 1 bolt (Fig. 44) attaching the wiper module to the reinforcement. Remove the reinforcement from the vehicle.

(6) Disconnect the wire connector from the brake fluid level sensor on the right side of the master cylinder reservoir.

(7) Remove the 2 nuts (Fig. 45) attaching the master cylinder to the vacuum booster.

(8) Carefully slide master cylinder off vacuum booster with brake lines attached, and position it backwards, on top of left engine cylinder head cover (Fig. 46).

(9) Disconnect vacuum hose from power brake booster check valve. **DO NOT REMOVE CHECK VALVE FROM POWER BRAKE BOOSTER.**

(10) From under instrument panel, position a small screwdriver between the center tang on the power brake booster input rod to brake pedal pin retaining clip.

(11) Rotate screwdriver enough to allow retainer clip center tang to pass over end of brake pedal pin and pull retainer clip off pin. **Discard retainer clip**

REMOVAL AND INSTALLATION (Continued)

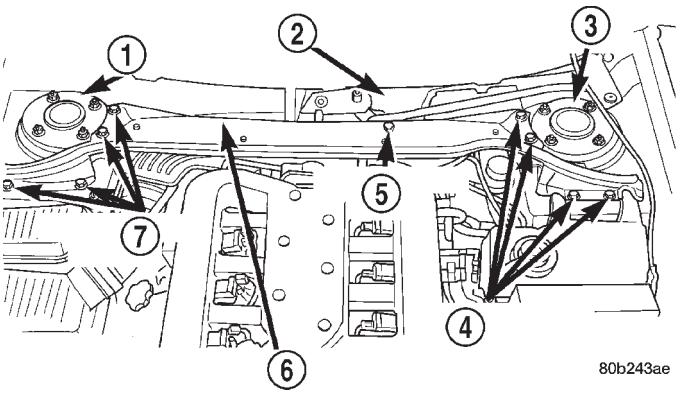


Fig. 44 Reinforcement Attachment To Vehicle

1 – RIGHT STRUT TOWER
2 – WIPER MODULE
3 – LEFT STRUT TOWER
4 – ATTACHING BOLTS
5 – ATTACHING BOLT
6 – REINFORCEMENT
7 – ATTACHING BOLTS

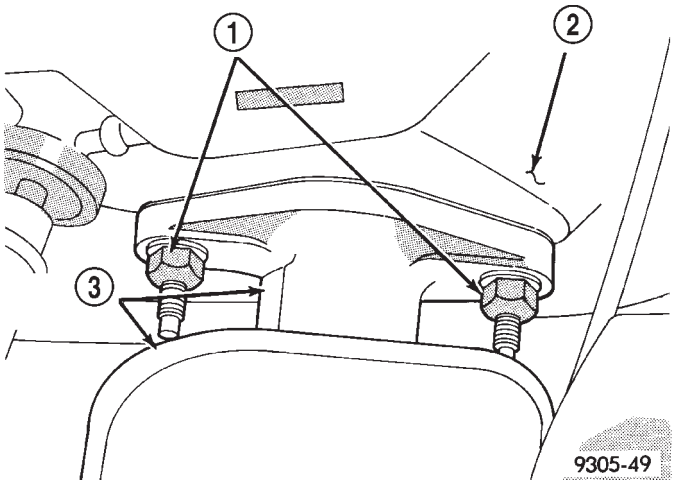


Fig. 45 Master Cylinder Mounting

1 – MASTER CYLINDER MOUNTING NUTS
2 – POWER BRAKE BOOSTER
3 – MASTER CYLINDER

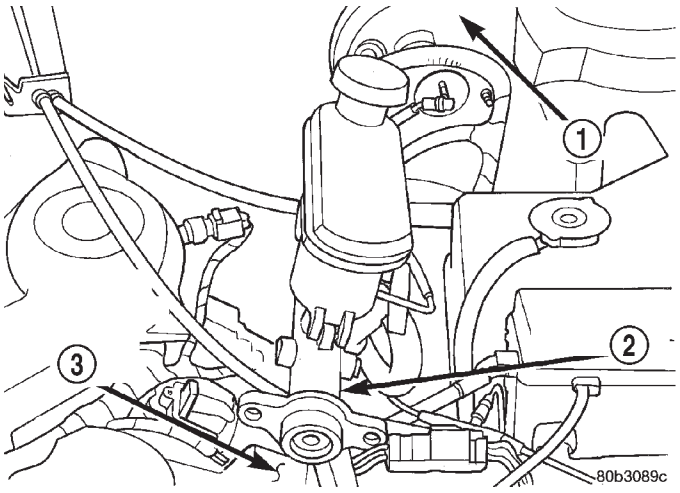


Fig. 46 Master Cylinder Positioning

1 – BOOSTER
2 – MASTER CYLINDER
3 – ENGINE CYLINDER HEAD COVER

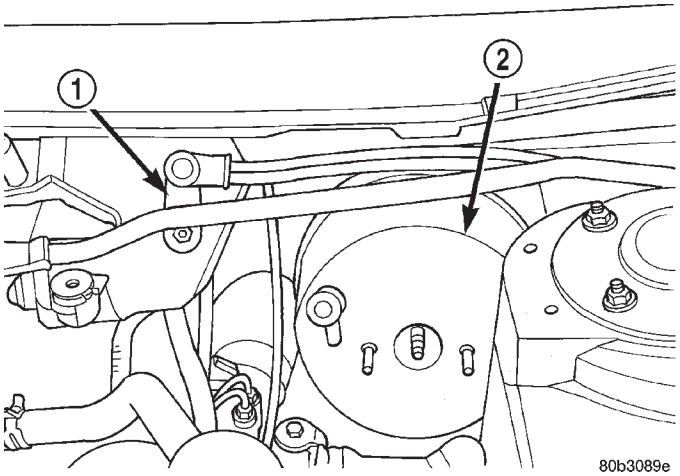


Fig. 47 Wiper Crank Lever Positioning

1 – WIPER MOTOR CRANK LEVER
2 – BRAKE BOOSTER

it is not to be reused, replace only with a new retainer clip.

(12) Remove the four nuts that attach the vacuum booster to the vehicle dash panel. Nuts are accessible from under the dash panel in the area of the steering column and pedal bracket.

(13) Rotate the windshield wiper motor crank lever until the crank lever points in the 12 o'clock position (Fig. 47).

(14) Slide the vacuum booster out of the dash panel, and remove from vehicle.

CAUTION: Do not attempt to disassemble the vacuum booster. It is serviced ONLY as a complete assembly.

INSTALLATION

(1) Position vacuum booster on dash panel.

(2) Install and tighten the 4 power brake booster to dash panel mounting nuts to 29 N·m (250 in. lbs.) torque.

(3) Using lubriplate, or equivalent, coat the bearing surface of brake pedal pin.

(4) Connect vacuum booster input rod to brake pedal pin and install a NEW retainer clip. **Use only a new retainer clip DO NOT USE the old clip.**

NOTE: Before installing master cylinder, reposition under hood wiring harness above master cylinder mounting studs (Fig. 46), in front of booster.

REMOVAL AND INSTALLATION (Continued)

(5) Carefully position master cylinder on vacuum booster. Position wire harness routing bracket onto right master cylinder mounting stud.

(6) Install and tighten the 2 master cylinder to vacuum booster mounting nuts (Fig. 45) to 29 N·m (250 in. lbs.) torque.

(7) Reconnect brake fluid level sensor connector.

(8) Connect all vacuum hoses onto the vacuum booster check valve.

(9) Check stop light switch operation.

(10) Install the wiper module reinforcement (Fig. 44) on the vehicle. Install the 8 bolts, attaching the reinforcement (Fig. 44) to the strut towers. Install the bolt (Fig. 44) attaching the wiper module to the reinforcement.

(11) Install the covers (Fig. 43) over the wiper module and the cowl. Install and securely tighten the attaching screws.

(12) Reconnect the battery ground cable to the ground stud on the shock tower.

(13) Turn windshield wipers on, then off, in order to park wipers in the proper position before installing wiper arms.

(14) Install the wiper arms (Fig. 42) on the pivots. Install and securely tighten the wiper arm to pivot attaching nuts. Install the caps on the wiper arms covering the pivot nuts.

(15) Verify proper operation of the brake booster and brake system.

BRAKE TUBES AND HOSES

Always use factory recommended brake hose to ensure quality, correct length and superior fatigue life. Care should be taken to make sure that the tube and hose mating surfaces are clean and free from nicks and burrs. **Front and rear right and left side hoses, are not interchangeable.**

Connections should be correct and properly made. Use new copper seal washers on all connections using Banjo Bolts and tighten all fittings to their specified torques.

The flexible front hydraulic brake hose should always be installed on the vehicle by first attaching the Banjo connector to the caliper assembly. Then attach the remaining hose end bracket to the vehicle frame to minimize hose twisting. Then hand start the steel brake tube fitting into the hose end fitting. Tighten all attachment screws and tube fittings to specified torque. The frame bracket is keyed so that it will only fit one way.

Vehicles equipped with rear disc brakes have brake flex hoses attached to the brake caliper on each side of vehicle. The brake flex hose should be first attached to the Banjo bolt at the caliper, then secured to the flex hose/bracket at the rear suspension crossmember. Next, attach the rear proportioning valve to the flex hose. last, fasten the steel brake tubing to the rear proportioning valve. Tighten all attachment screws and brake line tube fittings to their specified torque (See Specifications Section) at the end of this group for the required fitting torques.

JUNCTION BLOCK

REMOVAL

(1) Disconnect and isolate the negative battery connection at the right front strut tower.

(2) Using a brake pedal holding tool such as shown (Fig. 48), depress brake pedal past its first 1 inch of travel and secure in this position. This will isolate the master cylinder reservoir from the brake hydraulic system, not allowing the brake fluid to drain out of the reservoir.

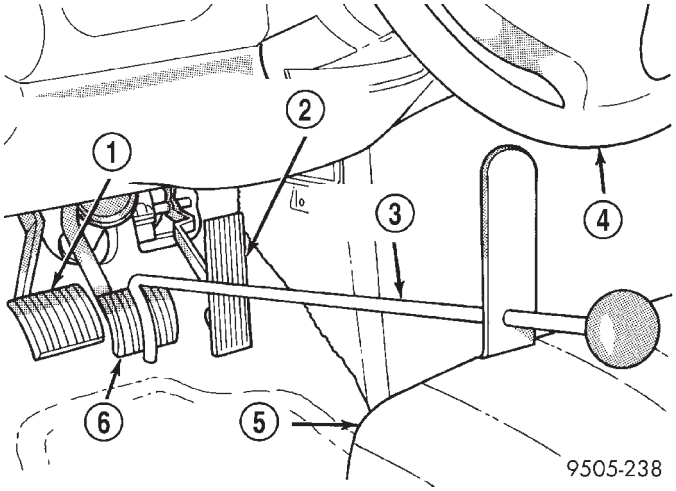


Fig. 48 Brake Pedal Holding Tool Installed

1 – CLUTCH PEDAL (IF EQUIPPED WITH MANUAL TRANSAXLE)
2 – THROTTLE PEDAL
3 – BRAKE PEDAL HOLDING TOOL
4 – STEERING WHEEL
5 – DRIVER'S SEAT
6 – BRAKE PEDAL

(3) Raise the vehicle on jack stands or centered on a hoist. See hoisting in the Lubrication and Maintenance section of this manual.

(4) Remove fasteners holding the forward half of the left inner fender shield in place. Move the forward half of the inner fender shield back out of the way.

(5) Clean any debris away from the fittings on top of the junction block.

(6) Remove the 4 chassis brake tubes mounted across the front top of the junction block.

(7) Remove the 2 remaining brake tubes, from the primary and secondary master cylinder ports, from the top of the junction block.

REMOVAL AND INSTALLATION (Continued)

(8) Remove the 3 bolts attaching the junction block to the mounting bracket.

(9) Remove the junction block from the vehicle.

INSTALLATION

(1) Install the junction block to the mounting bracket using the 3 attaching bolts. Tighten bolts to 26 N·m (230 in. lbs.).

(2) Install the 2 brake tubes, from the primary and secondary master cylinder ports, to the top rear corners of the junction block. Tighten the tube fittings to 17 N·m (145 in. lbs.).

(3) Install the 4 chassis brake tubes to the junction block. Tighten the tube fittings to 17 N·m (145 in. lbs.).

(4) Reinstall the inner fender shield.

(5) Lower the vehicle to the ground.

(6) Remove the brake pedal holding tool.

(7) Bleed the Brake system. See Bleeding Brake System in the Service Adjustments section of the manual for proper bleeding procedure.

PROPORTIONING VALVE

REMOVE

(1) Raise the vehicle on jack stands or centered on a hoist. See hoisting in the Lubrication and Maintenance section of this manual.

(2) Clean any debris away from the proportioning valve, connections, and area.

(3) Remove the chassis brake tube (Fig. 49) from the proportioning valve.

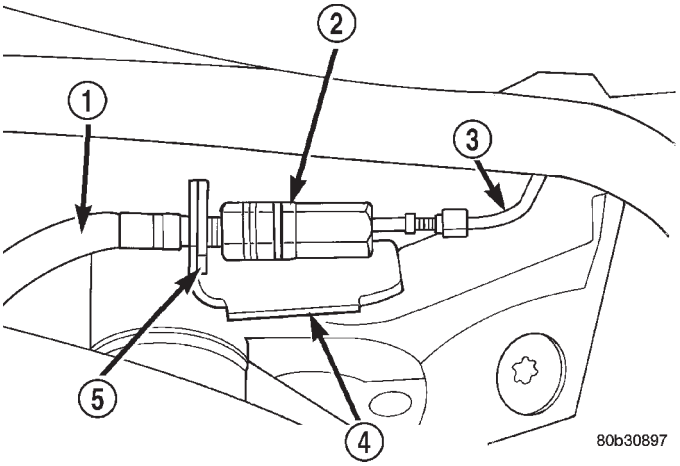


Fig. 49 Proportioning Valve

1 – FLEX HOSE
2 – PROPORTIONING VALVE
3 – BRAKE TUBE
4 – BRACKET
5 – RETAINER CLIP

(4) Remove the proportioning valve from the rear flex hose which is held stationary by a bracket mounted on the back side of the crossmember.

INSTALL

(1) Install the proportioning valve to the rear brake flex hose. Tighten to a torque of 17 N·m (145 in. lbs.).

(2) Install the chassis brake tube to the proportioning valve (Fig. 49). Tighten the tube nut to a torque of 17 N·m (145 in. lbs.).

(3) Bleed the affected brake line. See Bleeding Brake System in the Service Adjustments section of the manual for proper bleeding procedure.

(4) Lower the vehicle to the ground.

DISC BRAKE CALIPER (FRONT)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Raise vehicle on jackstands or centered on a hoist. See Hoisting in the Lubrication and Maintenance section of this manual.

(2) Remove front wheel and tire assemblies from vehicle.

(3) Remove the 2 caliper assembly to steering knuckle guide pin bolts (Fig. 50).

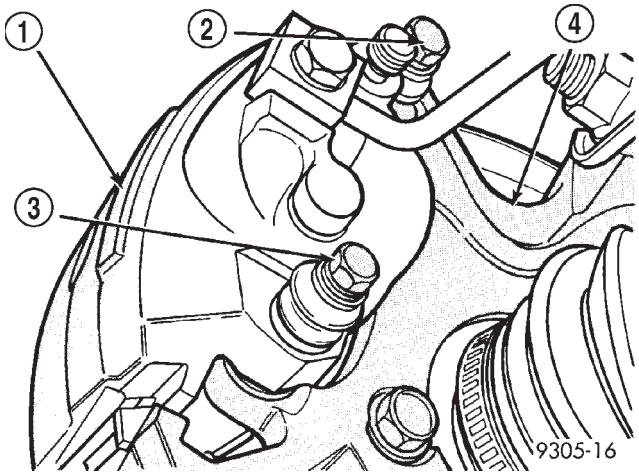


Fig. 50 Removing Caliper Assembly Guide Pin Bolts

1 – CALIPER ASSEMBLY
2 – GUIDE PIN BOLT
3 – GUIDE PIN BOLT
4 – STEERING KNUCKLE

(4) Remove caliper assembly from steering knuckle. Proceed by first rotating top of caliper away from steering knuckle and then lifting caliper off bottom machined abutment on steering knuckle (Fig. 51).

REMOVAL AND INSTALLATION (Continued)

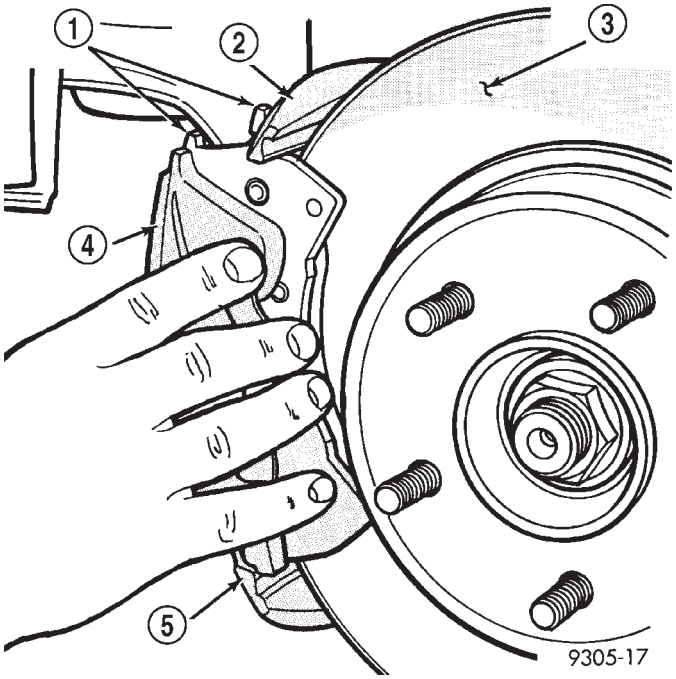


Fig. 51 Removing Caliper Assembly

1 – BRAKE SHOES
2 – STEERING KNUCKLE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – MACHINED ABUTMENT

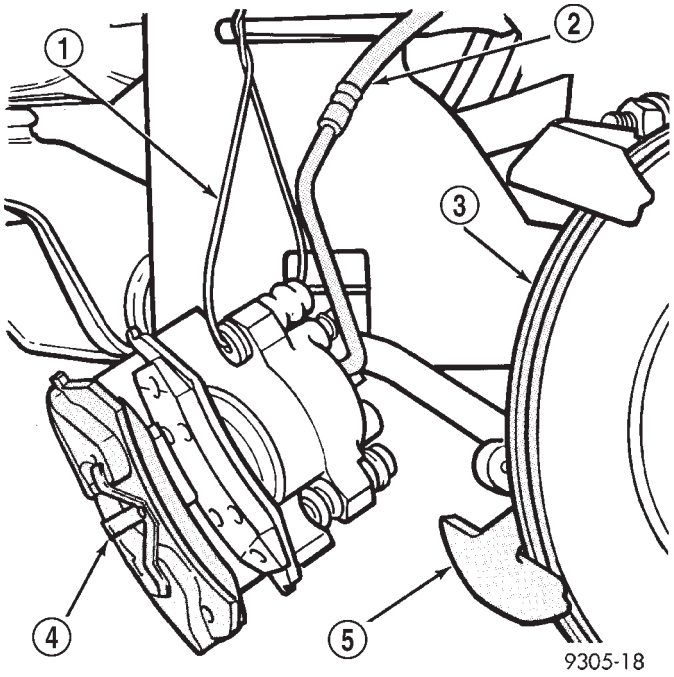


Fig. 52 Storing Caliper

1 – WIRE HANGER
2 – FLEXIBLE BRAKE HOSE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – STEERING KNUCKLE

(5) If the caliper is to be completely removed from the vehicle, remove the banjo bolt connecting the brake flex hose to the caliper. There will be 2 washers (one on each side of the flex hose fitting) that will come off at the same time.

(6) If the caliper is not being completely removed from the vehicle, support the caliper firmly to prevent weight of caliper from damaging the flexible brake hose (Fig. 52).

(7) If required, remove rotor from hub by pulling it straight off wheel mounting studs (Fig. 53).

INSTALLATION

CAUTION: Use care when installing the caliper assembly on the steering knuckle, so seals on caliper guide pin bushings do not get damaged by the steering knuckle bosses.

(1) Completely retract the caliper piston back into the piston bore of the caliper, if new brake shoes have been installed.

(2) If removed, install rotor on hub (Fig. 53).

NOTE: Make sure shoe retractor clips are in position between the shoe backing plates on each end of shoes before caliper installation.

(3) Carefully position caliper and brake shoe assemblies over rotor using the reversed required removal procedure (Fig. 51).

(4) Install the banjo bolt connecting the flex hose to the caliper. One washer should be installed on each side of the flex hose fitting before installing the banjo bolt. Tighten banjo bolt to a torque of 48 N·m (35 ft. lbs.).

CAUTION: When being installed, extreme caution should be taken not to crossthread the caliper guide pin bolts.

(5) Install the caliper guide pin bolts. Tighten guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(6) Install the wheel and tire assembly.

(7) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(8) Remove jackstands or lower hoist. **Before moving vehicle, pump the brake pedal several times to insure the vehicle has a firm brake pedal to adequately stop vehicle.**.

WARNING: Before moving vehicle after performing any service to the vehicle brake system, be sure to obtain a firm brake pedal.

REMOVAL AND INSTALLATION (Continued)

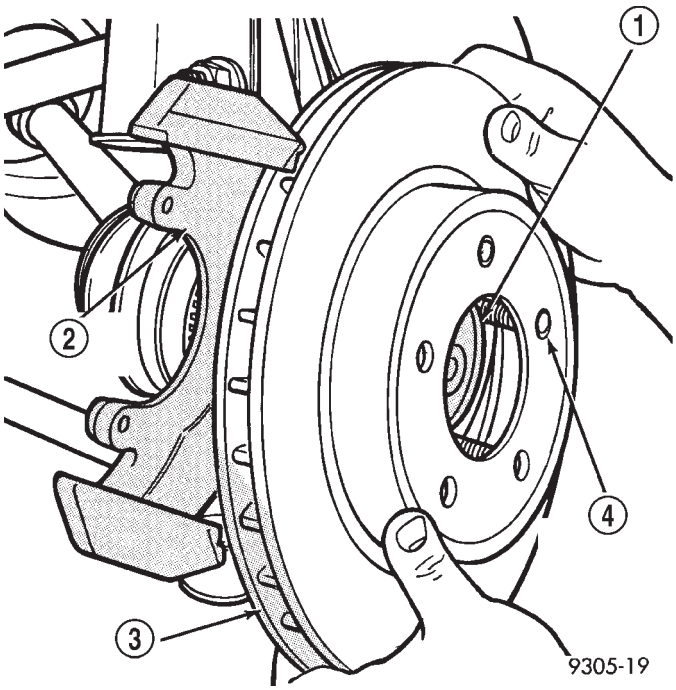


Fig. 53 Removing Or Installing Braking Disc

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

(9) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

DISC BRAKE SHOES (FRONT)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove caliper as described in Front Disc Brake Caliper Removal and Installation, found elsewhere in this section of this service manual.

(2) Remove the shoe retractor clips from between the shoes.

(3) Remove outboard brake shoe, by prying the shoe retaining clip over raised area on caliper. Then slide the brake shoe off the caliper (Fig. 54).

(4) Pull inboard brake shoe away from piston, until retaining clip is free from cavity in piston (Fig. 55).

CALIPER INSPECTION

Check for piston seal leaks (brake fluid in and around boot area and inboard lining) and for any ruptures of the piston dust boot. If boot is damaged, or fluid leak is visible, disassemble caliper assembly and install a new seal and boot, (and piston if scored). Refer to procedures titled Disc Brake Caliper Disassembly.

Check the caliper dust boot and caliper pin bushings to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Cleaning And Inspection Of Brake Caliper.

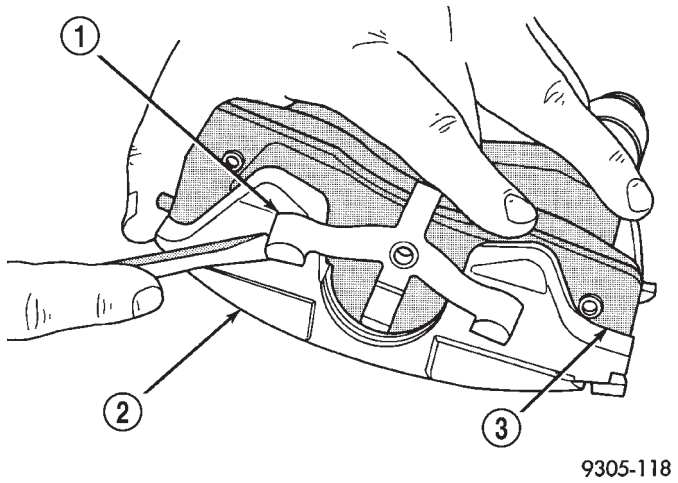


Fig. 54 Removing Outboard Brake Shoe

1 – RETAINING CLIP
2 – CALIPER ASSEMBLY
3 – BRAKE SHOE

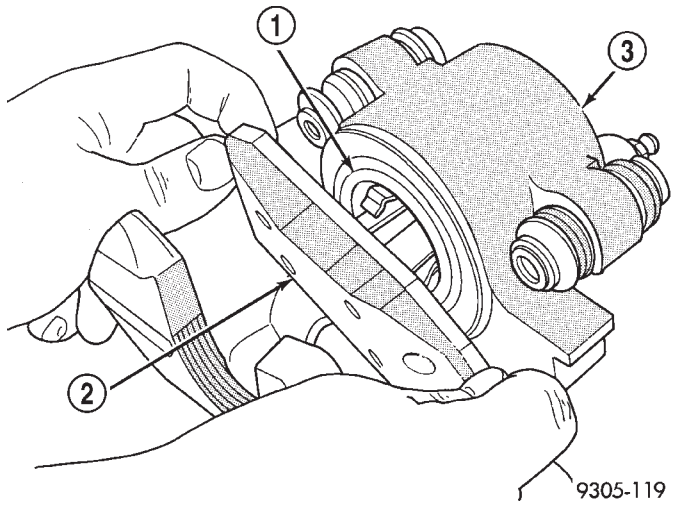


Fig. 55 Inboard Brake Shoe

1 – PISTON
2 – BRAKE SHOE
3 – CALIPER ASSEMBLY

INSTALLATION

NOTE: Step 1 below is only required when installing a caliper after new brake shoes have been installed.

REMOVAL AND INSTALLATION (Continued)

(1) Completely retract caliper piston back into piston bore of caliper assembly.

(2) Lubricate both steering knuckle abutments with a liberal amount of Mopar® Brake Grease for Caliper Slides Lubricant, or equivalent.

(3) Remove the protective paper from the noise suppression gasket on both the inner and outer brake shoe assemblies (if equipped).

NOTE: The inboard and outboard brake shoes are not common, refer to (Fig. 56) for inboard and outboard brake shoe assembly identification.

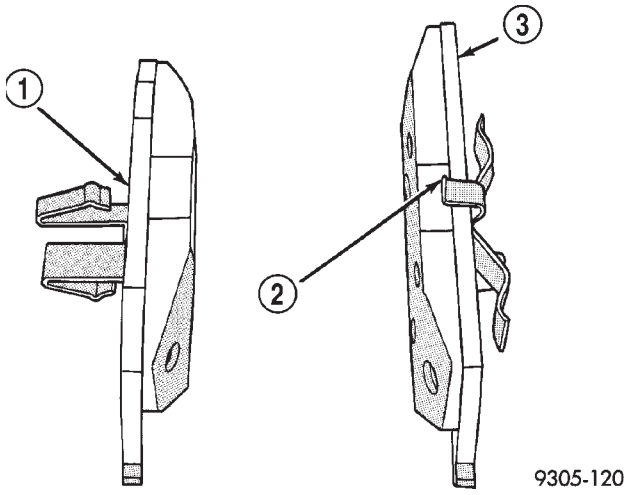


Fig. 56 Front Brake Shoe Assembly Identification

1 – INBOARD BRAKE SHOE
2 – WEAR INDICATOR
3 – OUTBOARD BRAKE SHOE

NOTE: When installing inboard brake shoe into caliper piston, be sure brake shoe is positioned squarely against the face of the caliper piston.

(4) Install the new inboard brake shoe assembly into the caliper piston by firmly pressing it into bore of caliper piston with thumbs (Fig. 55).

(5) Slide the new outboard brake shoe assembly onto the caliper assembly (Fig. 57).

NOTE: All vehicles, except those equipped with the performance brake package (BR5), are equipped with shoe retractor clips (Fig. 58). Make sure to reinstall these where applicable.

(6) On all vehicles, except those equipped with the performance brake package (BR5), install shoe retractor clips between outboard and inboard shoes, at both ends of shoe backing plates (Fig. 58).

(7) Reinstall caliper as described in Front Disc Brake Caliper Removal and Installation, found elsewhere in this section of this service manual.

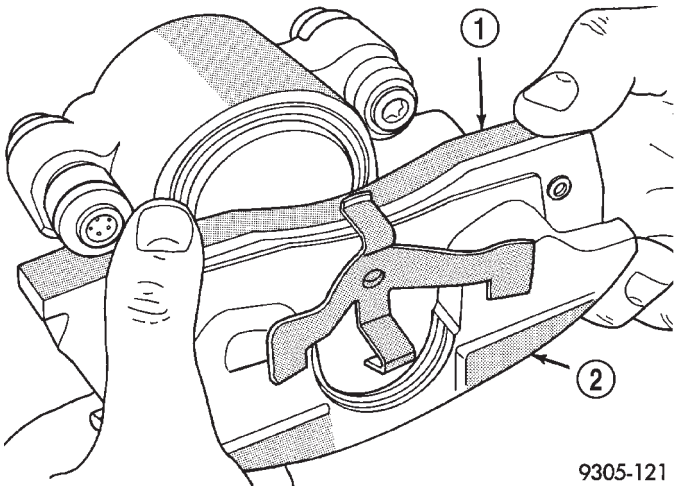


Fig. 57 Installing Outboard Brake Shoe Assembly

1 – BRAKE SHOE ASSEMBLY
2 – BRAKE CALIPER

CAUTION: Before vehicle is moved after performing a service procedure on the vehicle brake system, pump the brake pedal several times to insure the vehicle has a firm brake pedal that is to adequate to stop the vehicle.

(8) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

DISC BRAKE CALIPER (REAR)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Raise vehicle on jackstands or centered on a hoist. See Hoisting in the Lubrication and Maintenance section of this manual.

(2) Remove rear wheel and tire assemblies from vehicle.

(3) Remove the 2 caliper assembly to adapter guide pin bolts (Fig. 59).

(4) Remove caliper from adapter using following procedure. First rotate top of caliper away from adapter. Then lift the caliper off the bottom abutment on the adapter (Fig. 60).

(5) Support caliper assembly firmly from rear strut to prevent weight of caliper from damaging the flexible brake hose (Fig. 61).

(6) Remove the rear rotor from hub by pulling it straight off the wheel mounting studs (Fig. 62).

REMOVAL AND INSTALLATION (Continued)

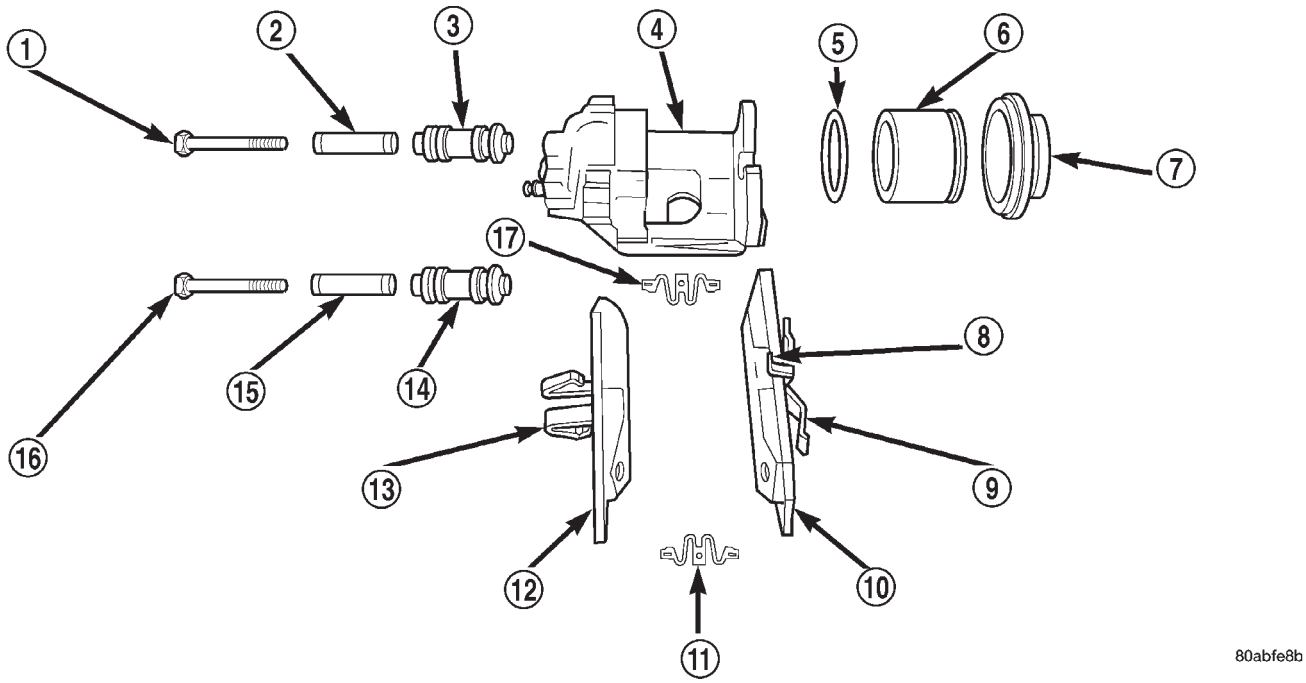


Fig. 58 Front Disc Brake Caliper With Retractor Clips

1 – CALIPER GUIDE PIN BOLT
2 – SLEEVE
3 – BUSHING
4 – CALIPER
5 – PISTON SEAL
6 – PISTON
7 – DUST SEAL
8 – WEAR INDICATOR
9 – ANTI-RATTLE CLIP
10 – BRAKE SHOE
11 – RETRACTOR CLIP
12 – BRAKE SHOE
13 – ANTI-RATTLE CLIP
14 – BUSHING
15 – SLEEVE
16 – CALIPER GUIDE PIN BOLT
17 – RETRACTOR CLIP

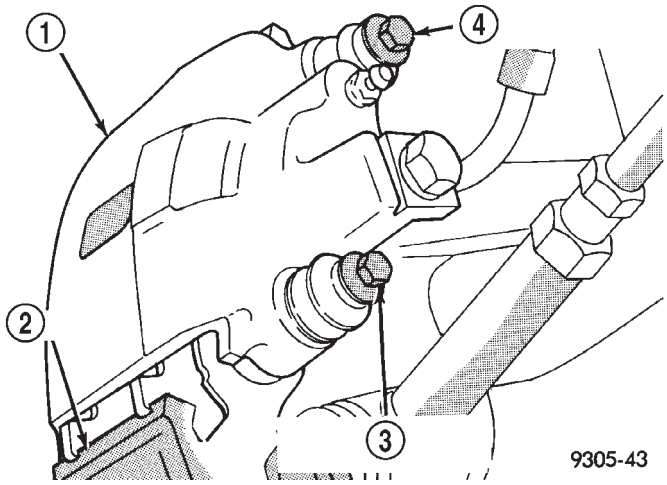


Fig. 59 Removing Caliper Guide Pin Bolts

1 – CALIPER ASSEMBLY
2 – ADAPTER
3 – CALIPER ASSEMBLY ATTACHING BOLT
4 – CALIPER ASSEMBLY ATTACHING BOLT

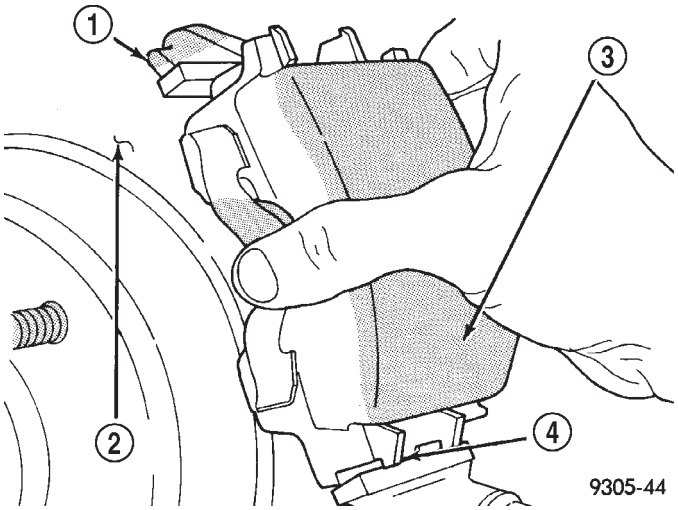


Fig. 60 Removing / Installing Caliper Assembly

1 – ADAPTER
2 – BRAKING DISC
3 – CALIPER ASSEMBLY
4 – ADAPTER ABUTMENT

REMOVAL AND INSTALLATION (Continued)

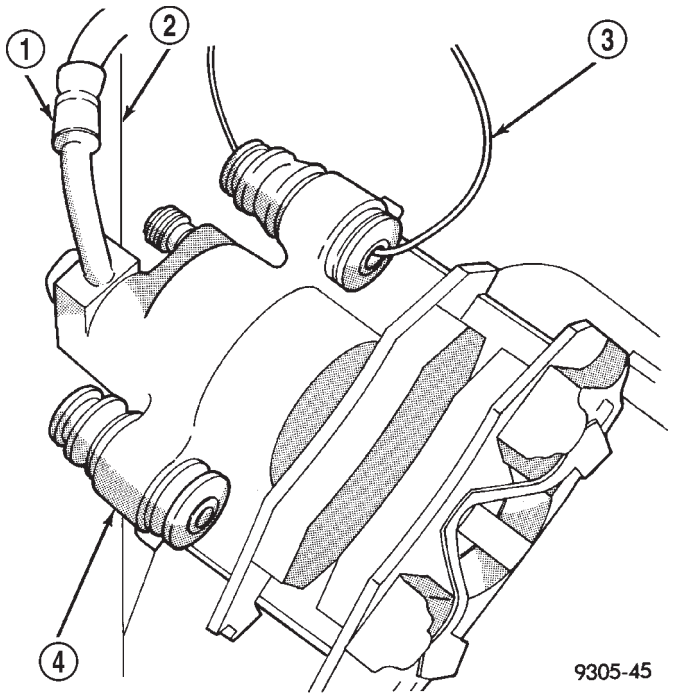


Fig. 61 Storing Caliper

1 – FLEX HOSE
2 – STRUT
3 – WIRE HANGER
4 – CALIPER ASSEMBLY

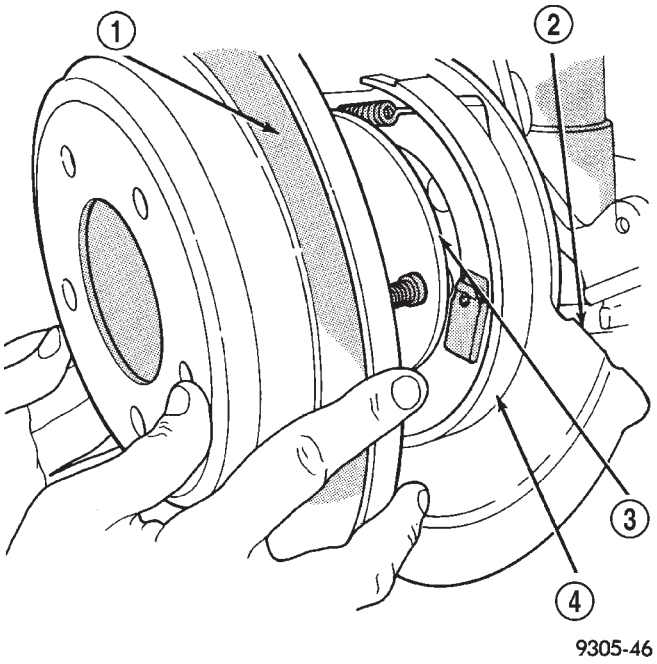


Fig. 62 Removing / Installing Rear Rotor

1 – BRAKING DISC
2 – DISC SHIELD
3 – HUB
4 – DRUM-IN-HAT PARKING BRAKE

INSTALLATION

NOTE: Step 1 below is only required when installing the disc brake caliper after new brake shoes have been installed.

(1) Completely retract caliper piston back into piston bore of caliper assembly.
(2) Lubricate both adapter abutments with a liberal amount of Mopar® Multipurpose Lubricant, or equivalent.
(3) Install the rear rotor on the hub, making sure it is squarely seated on the face of the hub (Fig. 62).

CAUTION: Use care when installing the caliper assembly onto the adapter, so the caliper guide pin bushings do not get damaged by the mounting bosses.

(4) Carefully lower caliper and brake shoes over rotor and onto the adapter using the reverse procedure for removal (Fig. 60).

CAUTION: When installing guide pin bolts extreme caution should be taken not to crossthread the caliper guide pin bolts.

(5) Install the caliper guide pin bolts. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).
(6) Install the wheel and tire assembly.
(7) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).
(8) Remove jackstands or lower hoist.

CAUTION: Before moving vehicle, pump the brake pedal several times to insure the vehicle has a firm brake pedal to adequately stop vehicle.

(9) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

DISC BRAKE SHOES (REAR)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Raise vehicle on jackstands or centered on a hoist. See Hoisting in the Lubrication and Maintenance section of this manual.
(2) Remove rear wheel and tire assemblies from vehicle.

REMOVAL AND INSTALLATION (Continued)

(3) Remove the 2 caliper assembly to adapter guide pin bolts (Fig. 63).

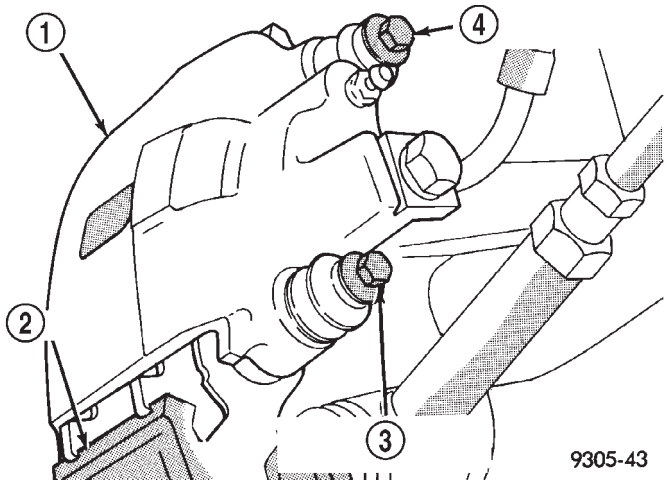


Fig. 63 Caliper Guide Pin Bolts

1 – CALIPER ASSEMBLY
2 – ADAPTER
3 – CALIPER ASSEMBLY ATTACHING BOLT
4 – CALIPER ASSEMBLY ATTACHING BOLT

(4) Remove caliper from adapter using the following procedure. First rotate top of caliper away from adapter. Then lift caliper assembly off bottom abutment of adapter to remove it from the vehicle (Fig. 64).

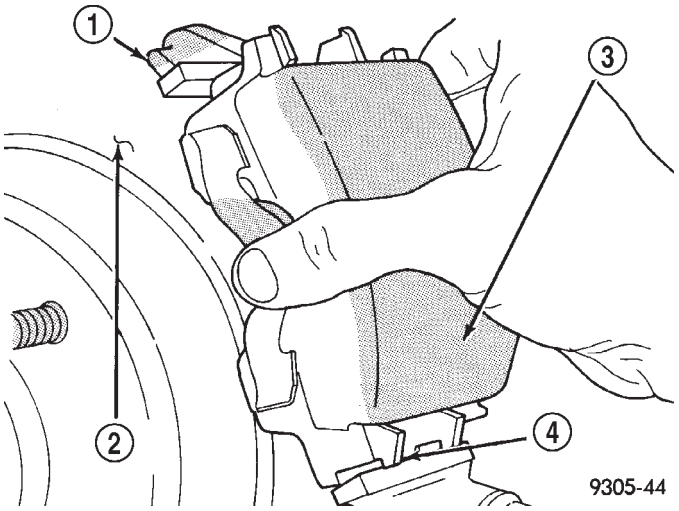


Fig. 64 Removing / Installing Caliper

1 – ADAPTER
2 – BRAKING DISC
3 – CALIPER ASSEMBLY
4 – ADAPTER ABUTMENT

(5) Support caliper assembly firmly from rear strut to prevent weight of caliper from damaging the flexible brake hose (Fig. 65).

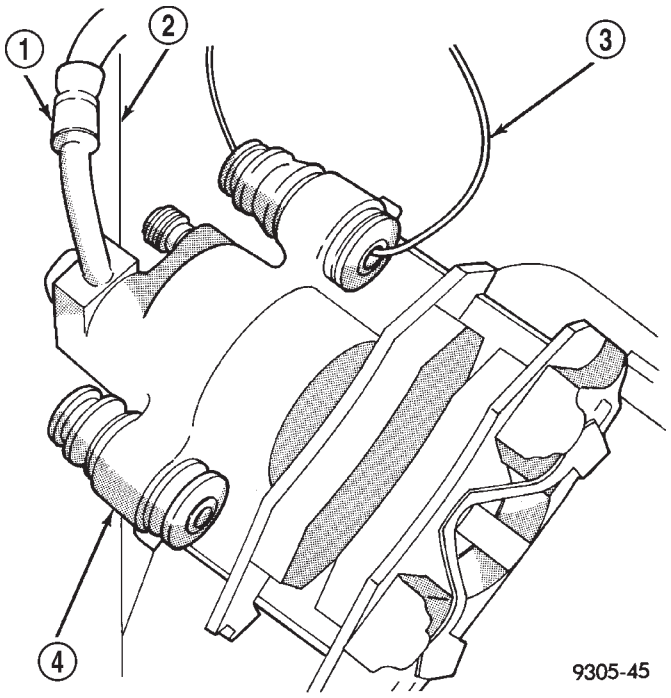


Fig. 65 Storing Caliper

1 – FLEX HOSE
2 – STRUT
3 – WIRE HANGER
4 – CALIPER ASSEMBLY

(6) Remove the rear rotor from the hub by pulling it straight off the wheel mounting studs (Fig. 66).

(7) Remove outboard brake shoe, by prying brake shoe retaining clip over raised area on caliper and sliding the shoe off the caliper (Fig. 67).

(8) Pull inboard brake shoe away from piston, until the retaining clip is free from the cavity in the piston (Fig. 68).

CALIPER INSPECTION

Check for piston seal leaks (brake fluid in and around boot area and inboard lining) and for any ruptures of the piston dust boot. If boot is damaged, or fluid leak is visible, disassemble caliper assembly and install a new seal and boot, (and piston if scored). Refer to procedures titled Disc Brake Caliper Disassembly.

Check the caliper dust boot and caliper pin bushings to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Cleaning And Inspection Of Brake Caliper.

INSTALLATION

NOTE: Step 1 below is only required when installing a caliper after new brake shoes have been installed.

REMOVAL AND INSTALLATION (Continued)

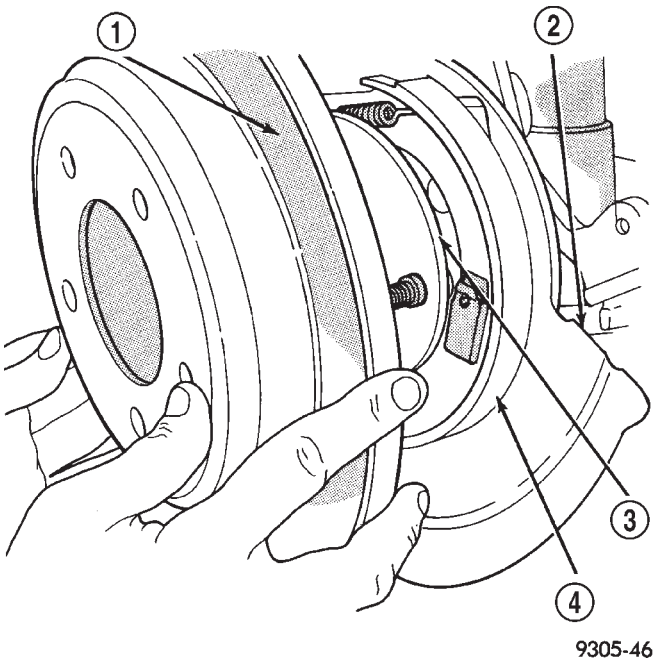


Fig. 66 Removing / Installing Rear Rotor

1 – BRAKING DISC
2 – DISC SHIELD
3 – HUB
4 – DRUM-IN-HAT PARKING BRAKE

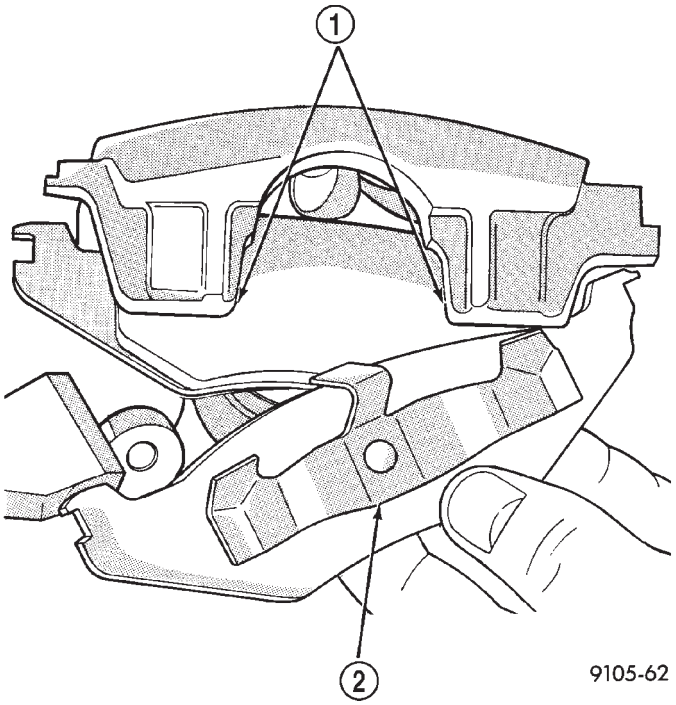


Fig. 67 Removing / Installing Outboard Brake Shoe

1 – CALIPER FINGERS
2 – RETAINING CLIP

(1) Completely retract caliper piston back into piston bore of caliper assembly.

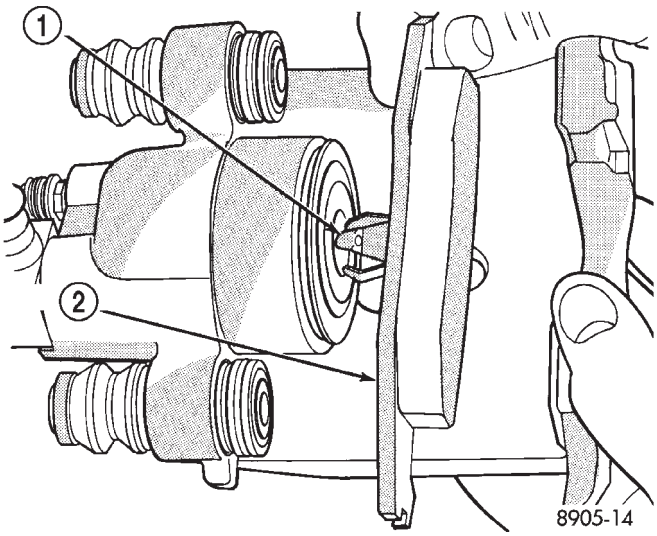


Fig. 68 Removing / Installing Inboard Brake Shoe

1 – RETAINING CLIP
2 – INBOARD SHOE

(2) Lubricate both adapter abutments with a liberal amount of Mopar® Multipurpose Lubricant, or equivalent.

(3) Install the rear rotor on the hub, making sure it is squarely seated on the face of the hub (Fig. 66).

(4) Remove the protective paper from the noise suppression gasket on both the inner and outer brake shoe assemblies (if equipped).

(5) Install the new inboard brake shoe assembly into the caliper piston by firmly pressing into piston bore with thumbs. Be sure inboard brake shoe assembly is positioned squarely against the face of the caliper piston (Fig. 68).

(6) Slide the new outboard brake shoe assembly onto the caliper assembly (Fig. 67).

CAUTION: Use care when installing the caliper assembly onto the adapter, so the caliper guide pin bushings do not get damaged by the mounting bosses.

(7) Carefully lower caliper and brake shoes over rotor and onto adapter, reversing the removal procedure (Fig. 64).

CAUTION: When installing the caliper guide pin bolts extreme caution should be taken not to cross thread the guide pin bolts.

(8) Install the caliper guide pin bolts. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(9) Install the wheel and tire assembly.

(10) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half

REMOVAL AND INSTALLATION (Continued)

specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(11) Remove jackstands or lower hoist.

CAUTION: Before moving vehicle, pump the brake pedal several times to insure the vehicle has a firm brake pedal to adequately stop the vehicle.

(12) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

PARKING BRAKE LEVER (PEDAL) AND FRONT CABLE ASSEMBLY

REMOVAL

NOTE: The parking brake lever assembly on this vehicle is serviced with the front cable installed on it. They should be removed, replaced, and installed as an assembly.

(1) Remove remote ground cable from ground stud on shock tower. Then correctly isolate ground cable from vehicle by installing isolator on stud (Fig. 69).

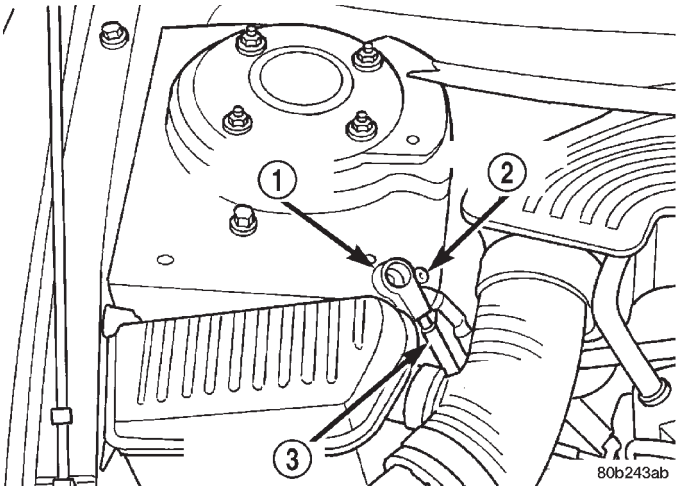


Fig. 69 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(2) Raise the vehicle using a frame contact type hoist or correctly supported on jackstands. See Hoisting in the Lubrication and Maintenance group of this service manual for the required lifting procedure for this vehicle.

(3) Loosen the park brake tensioner adjuster nut, in front of the rear crossmember, until tension is removed from cables.

(4) Disconnect the cable connector between the front and intermediate cable.

(5) Lower the vehicle to the ground.

(6) Remove the driver's door opening sill cover.

(7) Remove the driver's side kick panel.

(8) Remove the fuse panel cover from the left end of the instrument panel (Fig. 70).

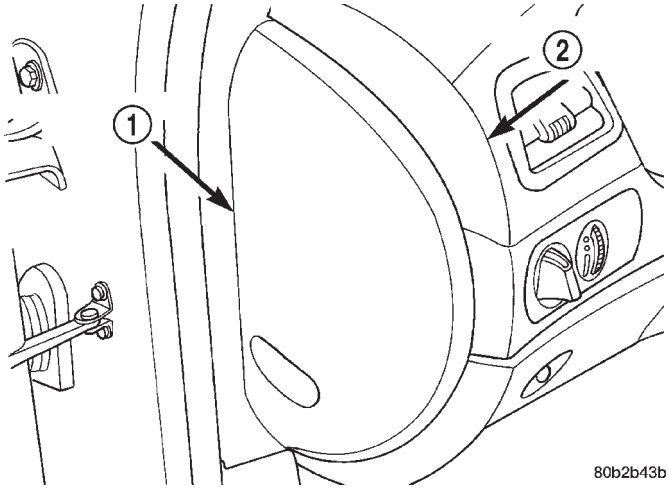


Fig. 70 Fuse Panel Cover

1 – FUSE PANEL COVER
2 – INSTRUMENT PANEL

(9) Remove the 2 screws behind the fuse panel cover, (Fig. 71) attaching the lower instrument panel cover to the instrument panel mounting bracket.

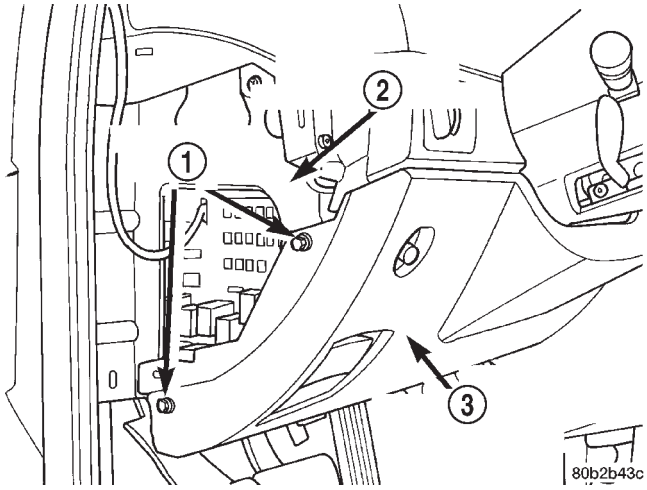


Fig. 71 Lower Instrument Panel Cover Mounting Screws

1 – MOUNTING SCREWS
2 – INSTRUMENT PANEL BRACKET
3 – LOWER INSTRUMENT PANEL COVER

(10) Remove the lower instrument panel cover from the instrument panel. It is attached by retaining clips along the top and right edge.

REMOVAL AND INSTALLATION (Continued)

(11) Remove the wiring harness connector from the trunk release switch in the lower instrument panel cover (Fig. 72).

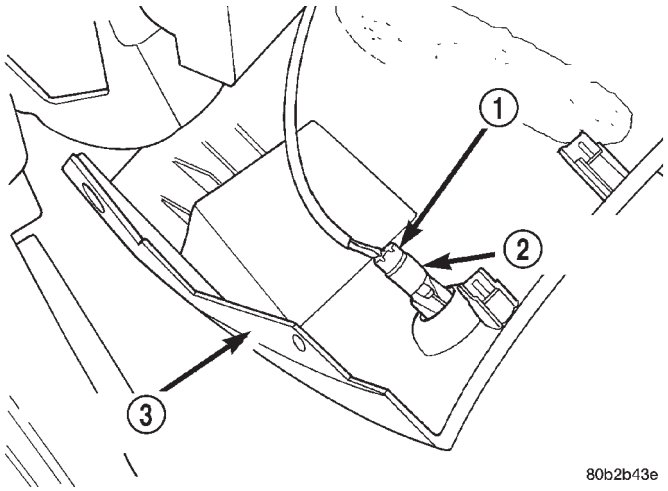


Fig. 72 Trunk Release Wiring

1 – WIRING HARNESS CONNECTOR
2 – TRUNK RELEASE SWITCH
3 – LOWER INSTRUMENT PANEL COVER

(12) Remove the park brake release cable, from the park brake release handle in the lower instrument panel cover (Fig. 73).

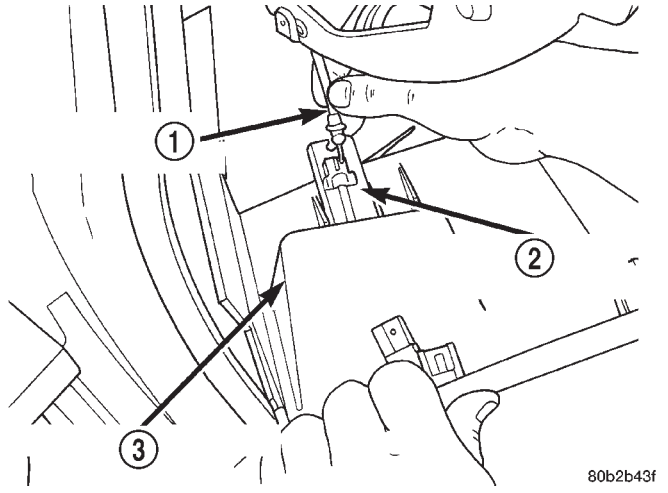


Fig. 73 Park Brake Release Cable

1 – PARK BRAKE RELEASE CABLE
2 – PARK BRAKE RELEASE HANDLE
3 – LOWER INSTRUMENT PANEL COVER

(13) Remove the 4 bolts mounting the reinforcement (Fig. 74) to the instrument panel. Remove the reinforcement from the instrument panel. Remove the diagnostic connector from the reinforcement.

(14) Remove the lower A/C duct below the steering column. It is secured with 1 screw.

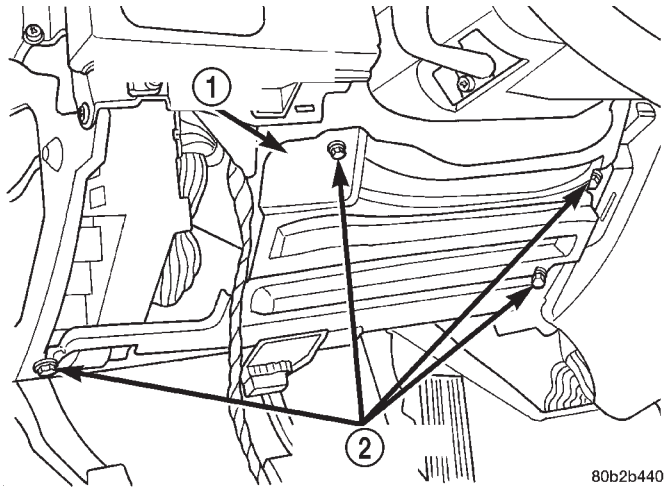


Fig. 74 Reinforcement Panel

1 – REINFORCEMENT PANEL
2 – MOUNTING BOLTS

(15) Remove the 2 lower mounting screws securing fuse junction block bracket to instrument panel end housing (Fig. 75).

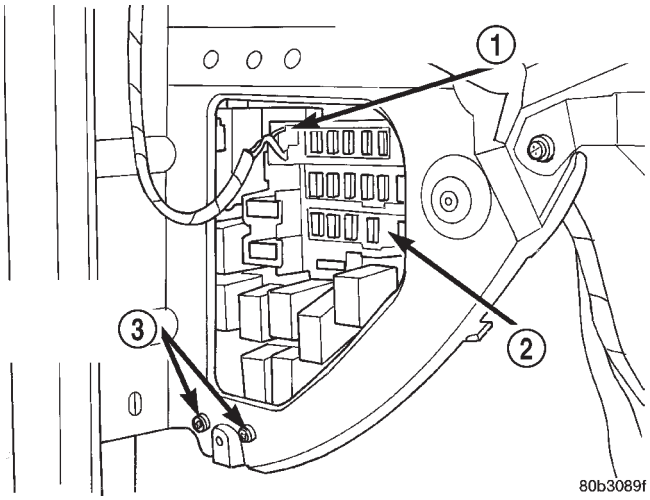


Fig. 75 Fuse Junction Block

1 – DOME LAMP WIRING HARNESS CONNECTOR
2 – FUSE JUNCTION BLOCK
3 – LOWER MOUNTING SCREWS

(16) Remove the 2 screws securing fuse junction block upper edge to the instrument panel bracket. These screws are installed from above the right side of the fuse junction block and mount to the left.

(17) Remove the dome lamp wiring harness connector from the fuse junction block (Fig. 75).

(18) Move fuse junction block as far down and to the right as possible without causing damage to the harness or fuse junction block.

(19) Remove left rear door opening sill cover.

REMOVAL AND INSTALLATION (Continued)

(20) Remove front seat belt anchor bolt at base of left B-pillar.

(21) Pull back floor carpeting on left side of passenger compartment to reveal front park brake cable.

(22) Remove the 2 screws securing the front park brake cable retainer bracket to the rear floor pan (Fig. 76).

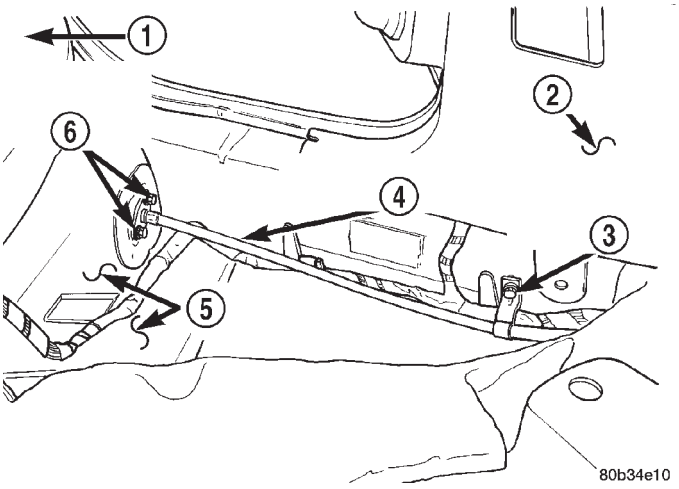


Fig. 76 Front Park Brake Cable At Rear Floor Pan

1 – REAR SEAT CUSHION
2 – B-PILLAR
3 – ROUTING BRACKET SCREW
4 – FRONT PARK BRAKE CABLE
5 – FLOOR PAN
6 – RETAINER BRACKET SCREWS

(23) Remove 2 routing bracket screws securing front park brake cable to left side of the passenger compartment floor. One is at the base of the B-pillar by the seat belt anchor bolt (Fig. 76), and the other is below the park brake lever assembly on the floor pan (Fig. 77).

(24) Remove the rear bolt, and loosen the 2 front nuts on studs, securing the park brake lever assembly in place.

(25) Lower the park brake lever assembly enough to gain access to the warning lamp ground wire connector. Remove the brake warning light ground wire from the switch on the park brake lever assembly.

(26) Continue to move park brake lever, with front park brake cable attached, downward, and remove both from vehicle together.

INSTALLATION

(1) Install the park brake lever, with front cable, assembly back in vehicle by first running the front cable, starting from front to the rear, along the left side of passenger compartment. Guide it into the hole at the rear of the floor pan.

(2) Guiding the lever assembly up past the fuse junction block, position the park brake release cable into place. Also, reinstall the brake warning lamp wire, through access hole in lever assembly, onto switch.

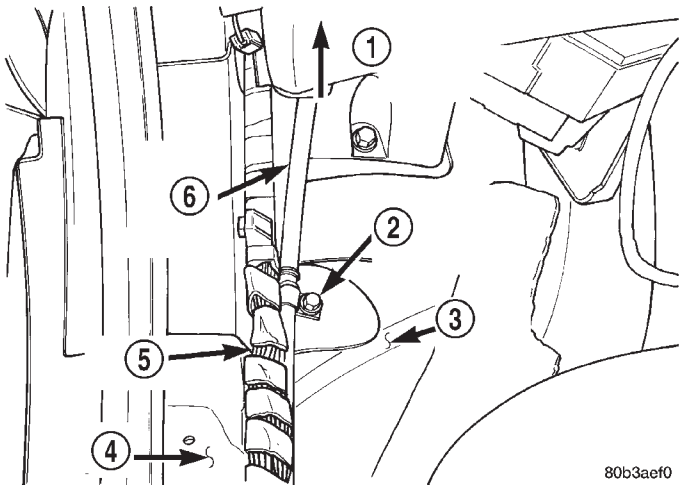


Fig. 77 Front Park Brake Cable Attachment At Front Floor Pan

1 – TO PARK BRAKE LEVER
2 – ROUTING BRACKET SCREW
3 – FLOOR PLAN
4 – DOOR SILL
5 – WIRE HARNESS
6 – FRONT PARK BRAKE CABLE

(3) Position the lever assembly in its mounting place. Install the rear mounting bolt and tighten it to a torque of 27 N·m (19 ft. lbs.). Tighten the 2 mounting nuts to a torque of 27 N·m (19 ft. lbs.).

(4) Ensure that the park brake cable is properly routed and install the two routing bracket screws.

(5) Install the 2 screws securing the front park brake cable retainer bracket to the rear floor pan.

(6) Reposition the carpeting in place.

(7) Reinstall the front seat belt anchor bolt at the base of the B-pillar.

(8) Reinstall the rear door opening sill cover.

(9) Reposition the fuse junction block in place, and install the two lower, then, the two upper mounting screws.

(10) Reinstall the lower A/C duct in place.

(11) Install the diagnostic connector to the instrument panel steel reinforcement. Reinstall the steel reinforcement to the instrument panel.

(12) Connect the park brake release cable to the release handle.

(13) Reconnect the trunk release harness connector to the release switch.

(14) Reinstall the lower instrument panel cover below the steering column. Reinstall the 2 screws securing the lower instrument panel cover behind the fuse panel cover.

REMOVAL AND INSTALLATION (Continued)

(15) Reinstall the fuse panel cover on left side of instrument panel.
(16) Reinstall driver's side kick panel
(17) Reinstall driver's door opening sill cover
(18) Raise the vehicle up.
(19) Reconnect the cable connector between the front and intermediate cables.
(20) Adjust parking brake. See Adjustments in this group of the service manual for the proper parking brake adjustment procedure.
(21) Lower the vehicle.

PARKING BRAKE CABLE (INTERMEDIATE)

REMOVAL

(1) Raise the vehicle using a frame contact type hoist or correctly supported on jackstands. See Hoisting in the Lubrication and Maintenance group of this service manual for the required lifting procedure for this vehicle.
(2) Loosen the park brake cable tensioner adjuster nut until tension is removed from cables.
(3) Disconnect the cable connector between the front and intermediate cable.
(4) Remove the bolt attaching the intermediate cable retainer to the body torque box (Fig. 78).

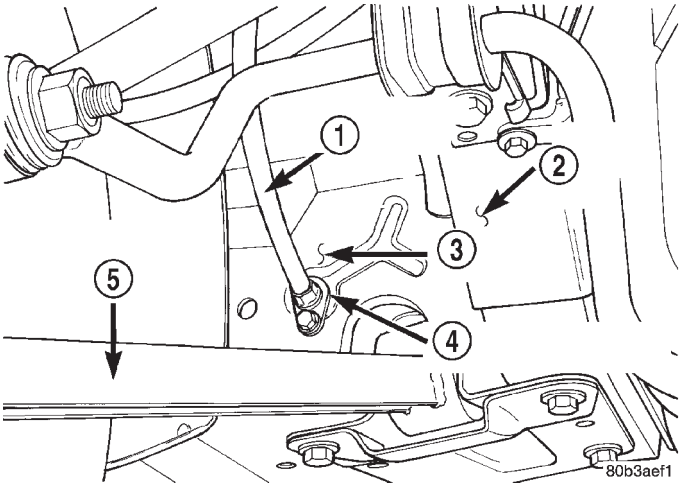


Fig. 78 Cable At Torque Box

1 – INTERMEDIATE PARK BRAKE CABLE
2 – LEFT FRAME RAIL
3 – TORQUE BOX
4 – CABLE RETAINER
5 – LEFT REAR TRAILING ARM

(5) Remove the intermediate cable from the body torque box (Fig. 78).
(6) Remove the connector from the intermediate cable at the right rear park brake cable.
(7) Remove the intermediate cable from the tensioner bracket using the box end of a 1/2 inch wrench.
(8) Release the latch on the routing clip for the intermediate cable, mounted above the left rear cable retainer clip, on rear suspension crossmember.
(9) Remove the intermediate park brake cable.

INSTALLATION

(1) Install the intermediate park brake cable.

NOTE: When guiding the cable towards the front of the rear crossmember from the left side, make sure the cable is routed between the rear suspension crossmember and the frame rail crossing below the rear park brake cable. It should also be routed below the brake tubes at this point.

(2) Install the intermediate cable to the tensioner bracket by snapping it into place.
(3) Reinstall retainer clip on top of left side of crossmember, around intermediate cable and into place.
(4) Connect the intermediate cable to the right rear cable connector.
(5) Install the intermediate cable through the hole in the body torque box (Fig. 78). Install the bolt attaching the intermediate cable retainer to the body torque box.
(6) Connect the intermediate cable to the front cable connector.
(7) Adjust parking brake. See Adjustments in this group of the service manual for the proper parking brake adjustment procedure.
(8) Lower the vehicle.

PARKING BRAKE CABLE (REAR)

This procedure can be used to remove and install either rear park brake cable.

REMOVAL

Raise vehicle using a frame contact type hoist or correctly jack and support the vehicle using jack stands. See Hoisting in the Lubrication And Maintenance Group of this service manual for the required lifting procedures to be used for this vehicle.
(1) Loose the park brake cable tensioner nut until tension is removed from cables.
(2) **Left rear cable only -** Remove the rear cable from the connector at the park brake cable tensioner.
(3) **Right rear cable only -** Remove the rear cable from the connector at the intermediate cable.
(4) Remove the retainer clip securing the preferred rear park brake cable to the crossmember (Fig. 79).
(5) Lower the vehicle enough to have rear brakes at good working height.
(6) Remove the rear wheel and tire assembly from the side of the vehicle requiring service to the park brake cable.

REMOVAL AND INSTALLATION (Continued)

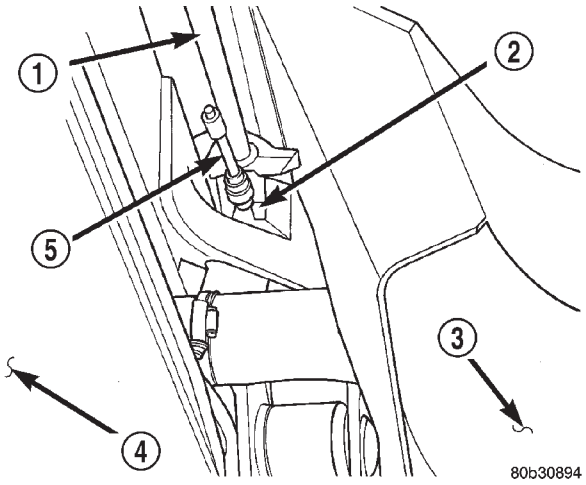


Fig. 79 Left Rear Parking Brake Retainer Clip

1 – INTERMEDIATE PARKING BRAKE CABLE
2 – CLIP
3 – FUEL TANK
4 – MUFFLER
5 – REAR PARKING BRAKE CABLE

(7) Remove the rear disc brake caliper from the adapter and rotor (See Disc Brake Caliper Removal in Removal and Installation section of this group)

(8) Remove the rear brake rotor from the rear hub/bearing assembly.

(9) Remove the park brake shoes from the disc brake adapter (See Rear Disc Brake Shoes in the Removal and Installation section of this group).

(10) Remove the park brake actuator lever from the rear park brake cable.

(11) Using a screwdriver, carefully compress the retainer tabs securing the rear park brake cable to the disc brake adapter.

(12) Remove the rear park brake cable from the disc brake adapter and vehicle.

INSTALLATION

(1) Install the rear parking brake cable by routing the leading end above the intermediate cable, then, between the frame, crossmember, and stabilizer bar.

(2) Install the other end of the cable into the disc brake adapter, allowing the retainer tabs to lock into place in the adapter.

(3) Install the park brake actuator lever onto the end of the rear park brake cable behind the spring.

(4) Reinstall the park brake shoes.

(5) Reinstall the rear disc brake rotor on the hub/bearing.

(6) Reinstall the brake caliper on the rotor and adapter.

(7) Install the caliper guide pin bolts and tighten to 41 N·m (30 ft. lbs.).

(8) Reinstall the tire and wheel assembly.

(9) Raise the vehicle back up.

(10) Install the rear park brake cable into the rear suspension crossmember mounting hole.

(11) Install a new retainer clip, on the end of the cable housing, to secure it in place.

(12) **Left rear cable only -** Connect the left rear park brake cable to the connector on the park brake cable tensioner.

(13) **Right rear cable only -** Connect the right rear park brake cable to the connector on the intermediate park brake cable.

(14) When repairs are complete, adjust parking brake shoes before adjusting parking brake tensioner. See Parking Brake Cable Tensioner Adjustment in the Adjustment section of this group in this service manual for complete parking brake adjustment procedure.

PARKING BRAKE TENSIONER

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

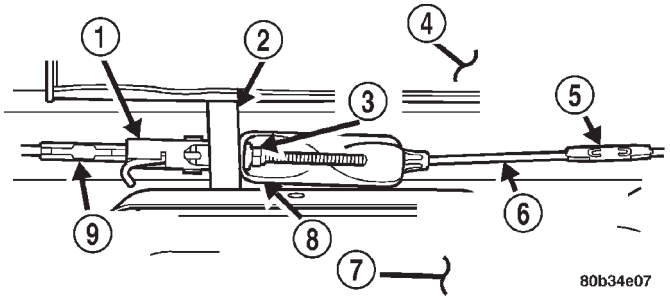


Fig. 80 Tensioner

1 – TENSIONER
2 – ISOLATOR
3 – ADJUSTER NUT
4 – MUFFLER
5 – RIGHT REAR CABLE CONNECTOR
6 – INTERMEDIATE PARK BRAKE CABLE
7 – FUEL TANK
8 – BRACKET
9 – LEFT REAR CABLE CONNECTOR

(2) Remove the park brake tensioner adjuster nut (Fig. 80), releasing the tensioner from the equalizer bracket to the intermediate cable.

(3) Disconnect the connector and remove the park brake tensioner from the left rear parking brake cable (Fig. 80).

(4) Remove the park brake tensioner with its isolator from the vehicle.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Mark tensioner rod 6.35 mm (1/4 in.) from edge of tensioner bracket (Fig. 81).

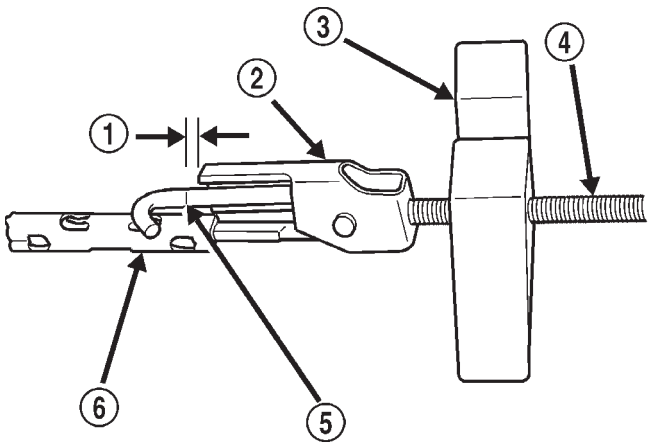


Fig. 81 Adjustment Mark On Cable Tensioner Rod

1 – MEASURE
2 – TENSIONER
3 – TENSIONER ISOLATOR
4 – THREADED ROD
5 – PLACE MARK HERE
6 – BRAKE CABLE CONNECTOR

(2) Install the park brake tensioner, with its isolator, in the vehicle, with the threaded adjustment stud pointed towards the right side of the vehicle (Fig. 80).

(3) Connect the left rear park brake cable to the cable connector on the tensioner (Fig. 80).

(4) Attach the threaded end of the tensioner to the equalizer bracket (Fig. 80), and install a new adjuster nut. Do not tighten at this time.

(5) Verify the rear park brake shoes are properly adjusted.

(6) Lower vehicle enough for access to park brake foot pedal. Fully apply park brakes.

NOTE: Leave park brakes applied until adjustment is complete.

(7) Raise vehicle again.

(8) Tighten adjusting nut at equalizer (Fig. 80) until mark on tensioner rod (Fig. 81) moves into alignment with edge of tensioner bracket.

CAUTION: Do not loosen, or tighten the tensioner adjusting nut for any reason after completing adjustment.

(9) Lower vehicle until rear wheels are 15-20 cm (6-8 in.) off shop floor.

(10) Release park brake foot pedal and verify that rear wheels rotate freely without drag. Verify pedal returns to the fully released position.

(11) Lower vehicle to the ground.

PARKING BRAKE SHOES (WITH REAR DISC BRAKES)

REMOVAL

(1) Remove rear disc brake caliper assembly from adapter and rotor (See Disc Brake Caliper Removal).

(2) Remove rear rotor from rear hub.

(3) Remove dust cap from rear hub.

(4) Remove the cotter pin, nut retainer, wave washer and rear hub/bearing assembly retaining nut and washer from the rear spindle.

(5) Remove rear hub and bearing assembly from rear spindle.

(6) Remove rear brake shoe assembly hold down clip.

(7) Turn brake shoe adjuster wheel until adjuster is at shortest length.

(8) Remove adjuster assembly from the parking brake shoe assemblies.

(9) Remove lower shoe to shoe spring.

(10) Pull rear brake shoe assembly away from anchor. Then remove rear brake shoe and upper spring.

(11) Remove front brake shoe hold-down clip. Then remove front brake shoe assembly.

INSTALLATION

(1) Install front brake shoe and hold down clip.

(2) Install rear brake shoe and the upper brake shoe to shoe return spring.

(3) Pull rear brake shoe over anchor block until properly located on adapter.

(4) Install the lower shoe to shoe return spring.

(5) Install brake shoe adjuster assembly with star wheel rearward.

(6) Install rear brake shoe hold down clip.

(7) Adjust brake shoes to a diameter to 171 mm (6.75 inch).

(8) Install rear hub and bearing assembly on spindle.

(9) Install hub and bearing assembly washer and retaining nut. Torque the hub and bearing assembly retaining nut to 168 N·m (124 ft. lbs.).

(10) Install the wave washer, retaining nut and cotter pin.

(11) Install hub and bearing assembly dust cap.

(12) Install rear rotor.

(13) Install rear disc brake caliper on the adapter (See Brake Shoe Removal).

(14) Install wheel and tire assemblies.

(15) Tighten wheel stud nuts to 129 N·m (95 ft.lbs.).

REMOVAL AND INSTALLATION (Continued)

BRAKE LAMP SWITCH

REMOVAL

(1) Depress and hold the brake pedal.
(2) Remove the brake switch from it's bracket (Fig. 82). To do so, rotate the brake lamp switch in a counterclockwise direction approximately 30 degrees from its proper mounting position. Pull the switch rearward and remove it from it's mounting bracket.

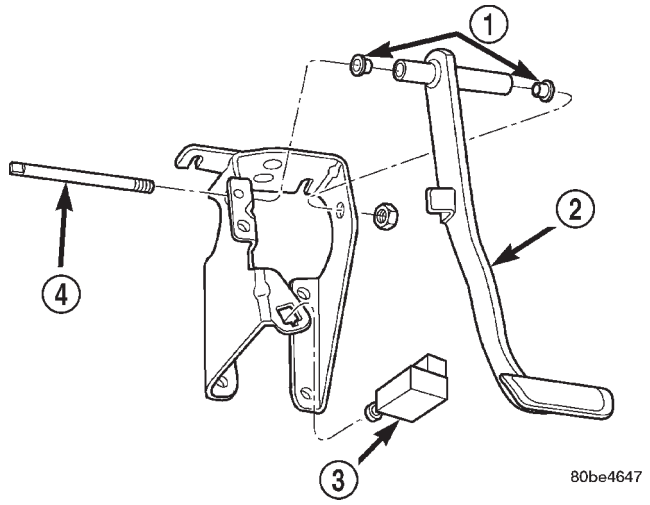


Fig. 82 Brake Lamp Switch Location

1 – BUSHINGS
2 – BRAKE PEDAL
3 – BRAKE LAMP SWITCH
4 – PIVOT SHAFT

(3) Disconnect the wiring harness connector from switch.

INSTALLATION

NOTE: Prior to installing the brake lamp switch into it's bracket, the plunger must be moved to its fully extended position using the procedure in Step 1.

(1) Hold the brake lamp switch firmly in one hand. Using your other hand, pull outward on the plunger of the switch until it has ratcheted out to its fully extended position.
(2) Connect the wiring harness connector to the brake lamp switch.
(3) Mount the brake lamp switch into the bracket as follows: Depress the brake pedal as far down as possible. Install the switch in it's bracket by aligning the index key on switch with the notch in the square mounting hole of the mounting bracket (Fig. 82). Once the switch is fully seated, rotate the switch clockwise approximately 30° to lock the switch into the bracket.

CAUTION: Do not use excessive force when pulling back on the brake pedal to adjust the brake lamp switch. If to much force is used, damage to the brake lamp switch or striker can result.

(4) Gently pull back on brake pedal until the pedal stops moving. This will cause the switch plunger to ratchet backward to the correct position.
(5) Check for proper operation of the brake lamps and speed control.

DISASSEMBLY AND ASSEMBLY

MASTER CYLINDER BRAKE FLUID RESERVOIR

DISASSEMBLE

(1) Using an appropriate cleaner such as Mopar, Brake Parts Cleaner, clean the master cylinder housing and brake fluid reservoir.
(2) Remove the brake fluid reservoir caps. Using a syringe or equivalent empty brake fluid from reservoir.
(3) Remove the master cylinder from the vacuum booster.
(4) Clamp the master cylinder in vise.
(5) Remove the 2 fluid reservoir to master cylinder retaining pins (Fig. 83).

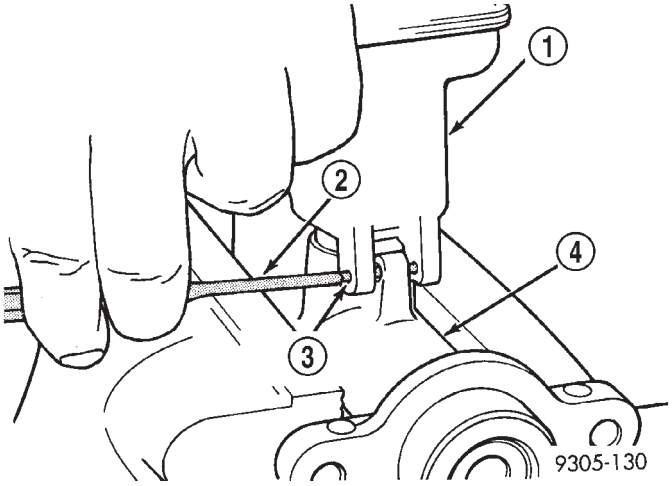


Fig. 83 Reservoir Retaining Pins

1 – BRAKE FLUID RESERVOIR
2 – DRIFT
3 – RETAINING PIN
4 – MASTER CYLINDER

NOTE: Do not pry off fluid reservoir using a tool, damage to reservoir may result.

(6) Remove reservoir from master cylinder (Fig. 84) by pulling upward on the reservoir while rock it from side to side.

DISASSEMBLY AND ASSEMBLY (Continued)

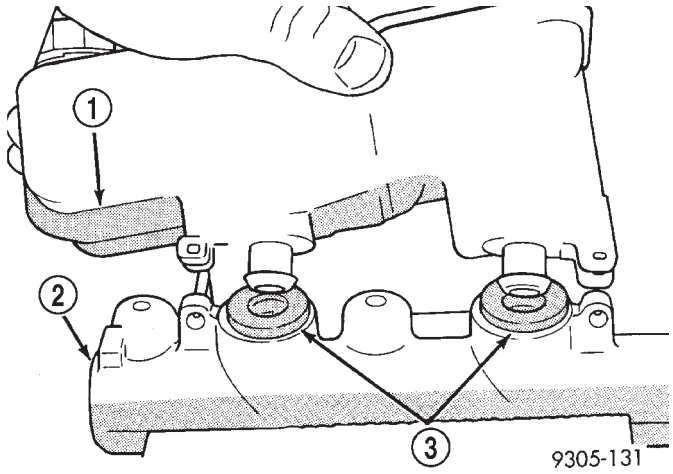


Fig. 84 Removing Reservoir

1 – FLUID RESERVOIR
2 – MASTER CYLINDER
3 – SEALING GROMMETS

(7) Remove the master cylinder housing-to-reservoir grommets (Fig. 85).

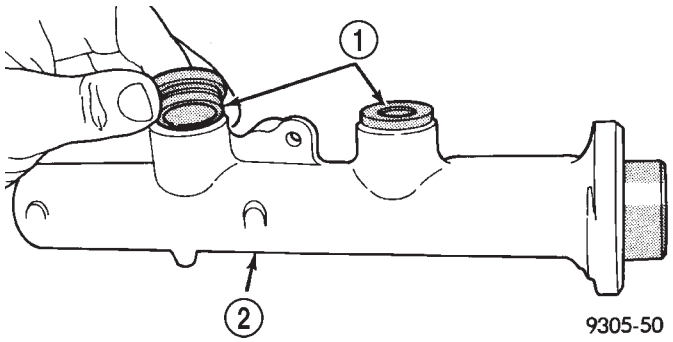


Fig. 85 Reservoir Sealing Grommets

1 – RESERVOIR SEALING GROMMETS
2 – MASTER CYLINDER

ASSEMBLE

(1) Install new housing-to-reservoir grommets in master cylinder housing (Fig. 85).

(2) Lubricate brake fluid reservoir mounting area with clean brake fluid. Place reservoir in position over grommets. Seat reservoir into sealing grommets using a rocking motion while pushing down on reservoir.

(3) Make sure bottom of reservoir touches the top of both sealing grommets.

(4) Install the 2 fluid reservoir to master cylinder retaining pins (Fig. 83).

DISC BRAKE CALIPER (FRONT AND REAR)

CLEANING AND INSPECTION

Check for brake fluid leaks in and around dust boot area and inboard brake pad, and for any ruptures, brittleness or damage to the piston dust boot. If the dust boot is damaged, or a fluid leak is visible, disassemble caliper assembly and install a new piston seal and dust boot, and piston if scored. Refer to Caliper Disassembly And Re-Assembly Procedures in Disc Brake Caliper Service in this section of the service manual.

Check the guide pin dust boots to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Guide Pin Bushing Service in Disc Brake Caliper Service in this section of the service manual.

CALIPER GUIDE PIN BUSHING SERVICE

The double pin caliper uses a sealed for life bushing and sleeve assembly. If required this assembly can be serviced using the following procedure.

REMOVING CALIPER GUIDE PIN BUSHINGS

(1) Remove caliper from brake rotor (See Brake Shoe Removal). Hang caliper assembly on a wire hook away from the brake rotor.

(2) Push out and then pull the steel sleeve from the inside of the bushing using your fingers as shown in (Fig. 86).

(3) Using your fingers, collapse one side of the bushing. Then pull on the opposite side to remove the bushing from the brake caliper housing (Fig. 87).

INSTALLING CALIPER GUIDE PIN BUSHINGS

(1) Fold the bushing in half lengthwise at the solid middle section of the bushing (Fig. 88).

(2) Insert the folded bushing into the caliper housing (Fig. 89). **Do not use a sharp object to perform this step due to possible damage to the bushing.**

(3) Unfold the bushing using your fingers or a wooden dowel until the bushing is fully seated into the caliper housing. Flanges should be seated evenly on both sides of the bushing hole (Fig. 90).

(4) Lubricate the inside surfaces of the bushing using Mopar, Silicone Dielectric Compound or an equivalent.

(5) Install guide pin sleeve into one end of bushing until seal area of bushing is past seal groove in sleeve (Fig. 91).

DISASSEMBLY AND ASSEMBLY (Continued)

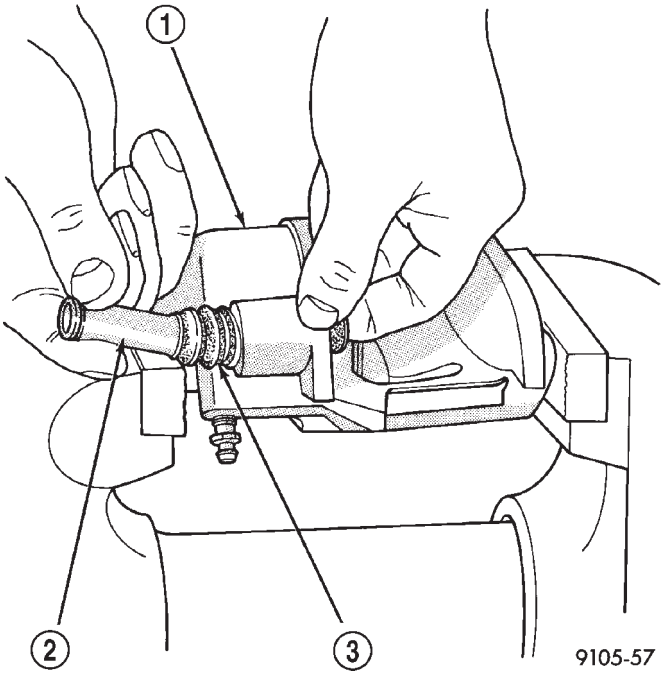


Fig. 86 Removing Inner Sleeve From Bushing

1 – CALIPER
2 – SLEEVE
3 – BUSHING

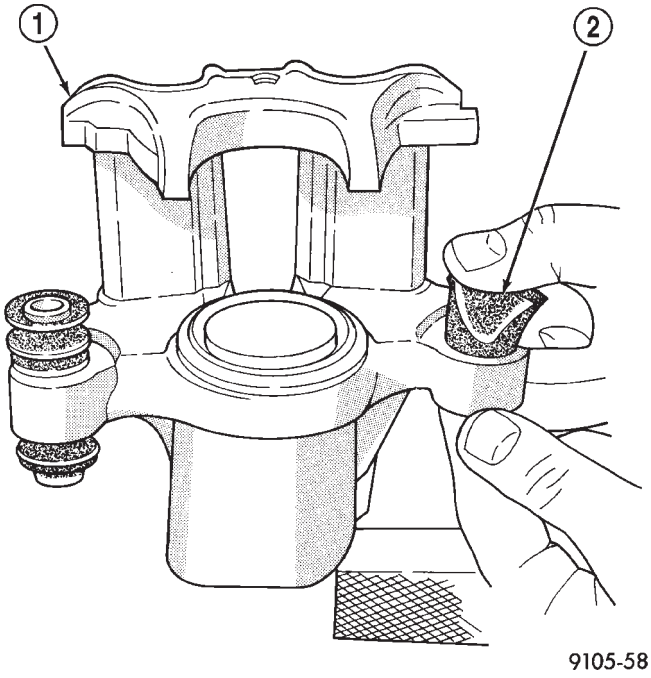


Fig. 87 Removing Bushing From Caliper

1 – CALIPER
2 – BUSHING

(6) Holding convoluted boot end of bushing with one hand, push steel sleeve bushing through boot

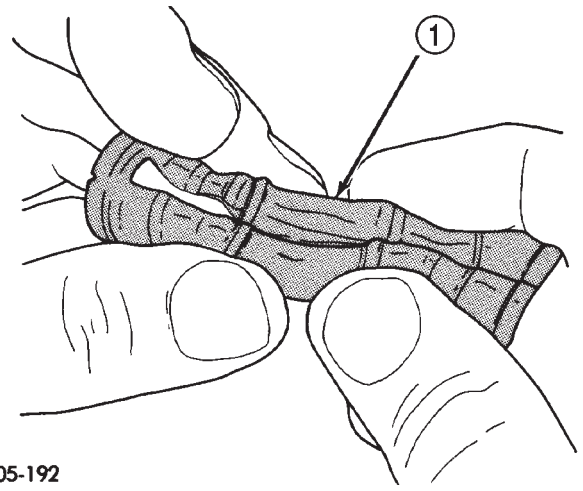


Fig. 88 Folded Caliper Guide Pin Bushing

1 – CALIPER GUIDE PIN BUSHING

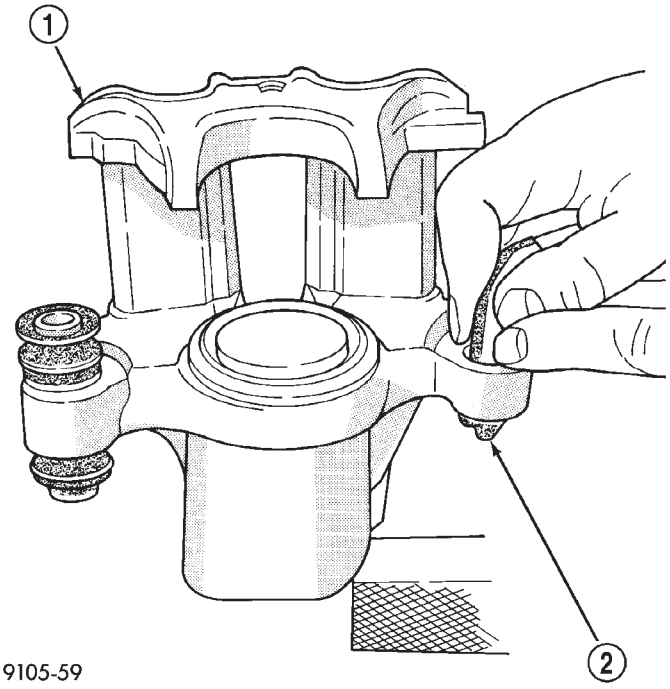


Fig. 89 Installing Caliper Guide Pin Bushing

1 – CALIPER
2 – BUSHING

until one end of bushing is fully seated into seal groove on one end of sleeve (Fig. 91).

(7) Holding sleeve in place, work other end of bushing over end of sleeve and into the seal grove on sleeve (Fig. 92). Be sure other end of bushing did not come out of seal grove in sleeve.

(8) When the sleeve is seated properly into the bushing, the sealed for life sleeve/bushing can be held between your fingers and easily slid back and

DISASSEMBLY AND ASSEMBLY (Continued)

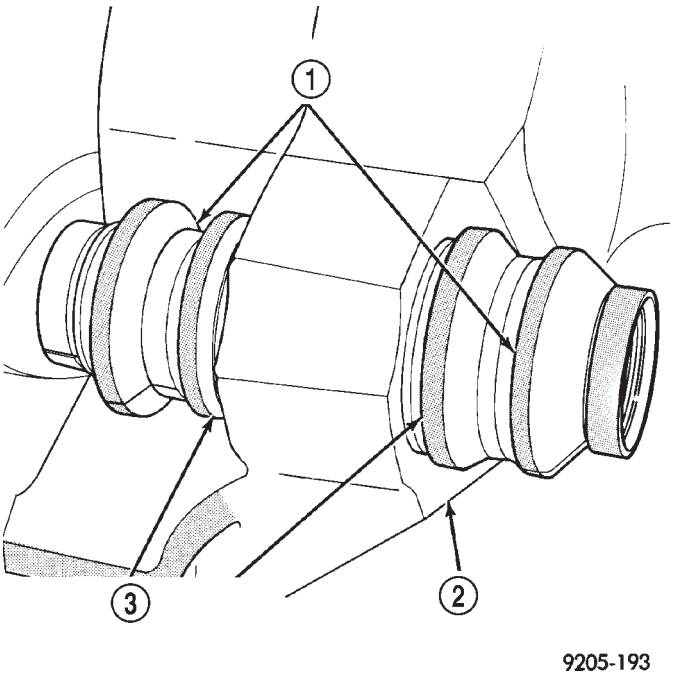


Fig. 90 Bushing Correctly Installed In Caliper

1 – BUSHING
2 – CALIPER
3 – BE SURE BOTH BUSHING FLANGES ARE FULLY SEATED AROUND CALIPER BUSHING BORES.

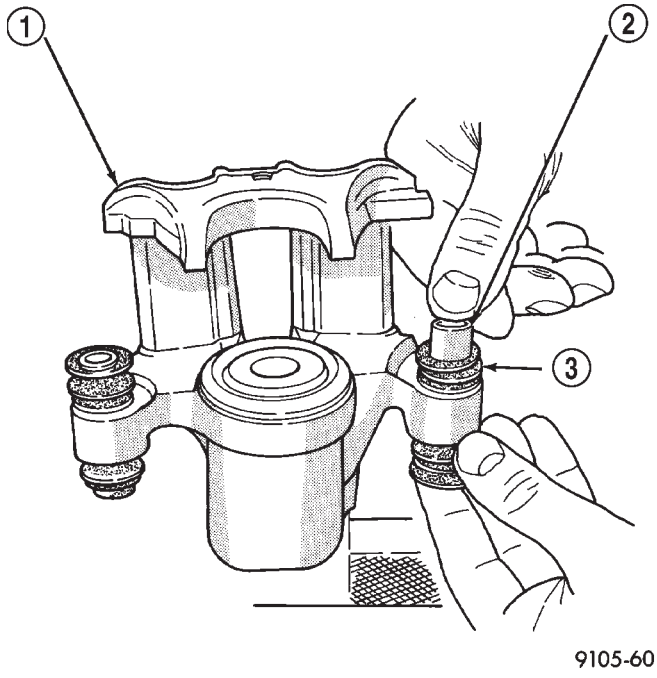


Fig. 91 Installing Sleeve In Bushing

1 – CALIPER
2 – SLEEVE
3 – BUSHING

forth without the bushing unseating from the sleeve groove.

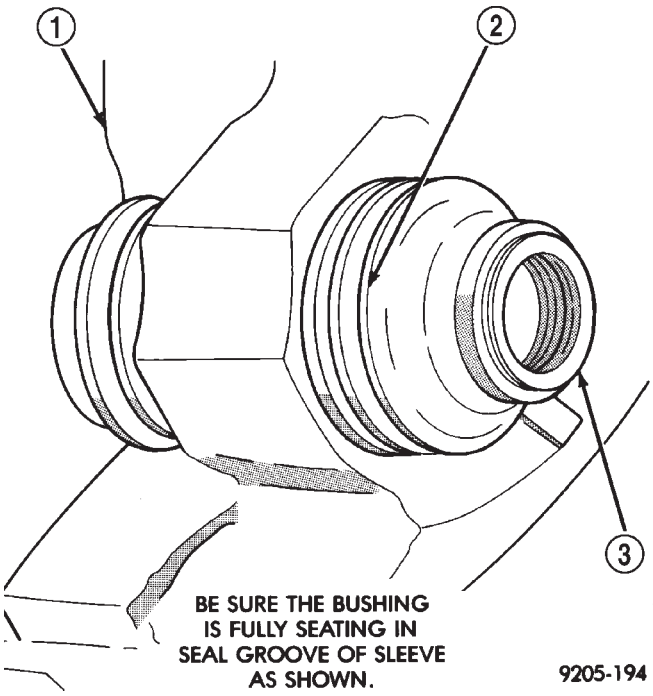


Fig. 92 Correctly Installed Caliper Sleeve And Bushing

1 – CALIPER
2 – BUSHING
3 – SLEEVE

CALIPER DISASSEMBLY

WARNING: UNDER NO CONDITION SHOULD AIR PRESSURE EVER BE USED TO REMOVE A PISTON FROM A CALIPER BORE. PERSONAL INJURY COULD RESULT FROM SUCH A PRACTICE.

(1) Remove caliper from brake rotor (See Brake Shoe Removal). Hang assembly on a wire hook away from rotor, so hydraulic fluid cannot get on rotor. Place a small piece of wood between the piston and caliper fingers.

(2) **Carefully** depress brake pedal to hydraulically push piston out of bore. Then apply and hold down the brake pedal to any position beyond the first inch of pedal travel. This will prevent loss of brake fluid from the master cylinder.

(3) If both front caliper pistons are to be removed, disconnect brake tube at flexible brake hose at frame rail. Plug brake tube and remove piston from opposite caliper using the same process as above for the first piston removal.

(4) Disconnect the brake fluid flex hose from the caliper assembly.

CAUTION: Do not use excessive force when clamping caliper in vise. Excessive vise pressure will cause bore distortion and binding of piston.

DISASSEMBLY AND ASSEMBLY (Continued)

(5) To disassemble caliper, mount in a vise equipped with protective jaws.

(6) Remove guide pin sleeves and guide pin bushings. See Removing Guide Pin Bushings in the caliper disassembly section of this manual.

(7) Remove the piston dust boot from the caliper and discard (Fig. 93).

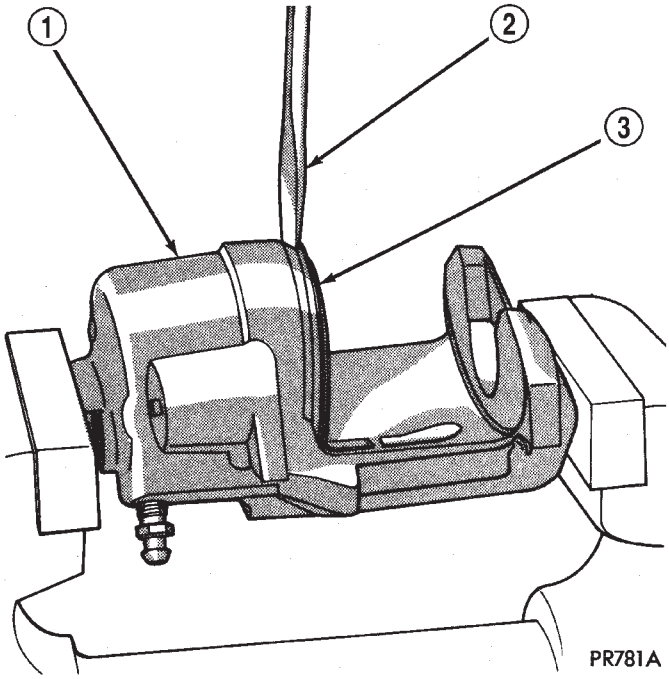


Fig. 93 Removing Caliper/Piston Dust Boot

1 – CALIPER
2 – SCREW DRIVER
3 – BOOT

(8) Using a soft tool, such as a plastic trim stick, work piston seal out of its groove in caliper piston bore (Fig. 94). Discard old seal. **Do not use a screw driver or other metal tool for this operation, because of the possibility of scratching piston bore or burring edges of seal groove.**

(9) Clean all parts using alcohol or a suitable solvent and wipe dry **using only a lint free cloth.** No lint residue can remain in caliper bore. Clean out all drilled passages and bores. **Whenever a caliper has been disassembled, a new boot and seal must be installed at assembly.**

(10) Inspect the piston bore for scoring or pitting. Bores that show light scratches or corrosion can usually be cleared of the light scratches or corrosion using crocus cloth. Bores that have deep scratches or scoring should be honed. Use Caliper Hone, Special Tool C-4095, or equivalent providing the diameter of the bore is not increased more than 0.0254 mm (0.001 inch) (Fig. 95).

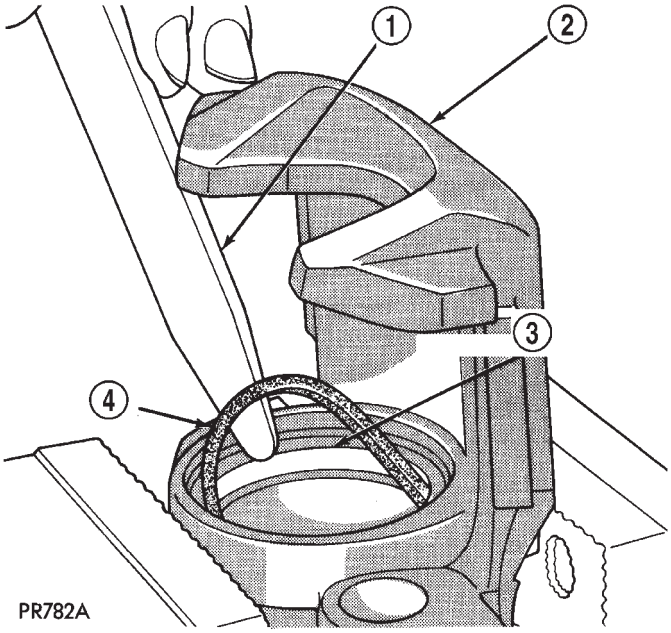


Fig. 94 Removing Piston Seal From Caliper

1 – PLASTIC TRIM STICK
2 – CALIPER
3 – PISTON SEAL GROOVE
4 – PISTON SEAL

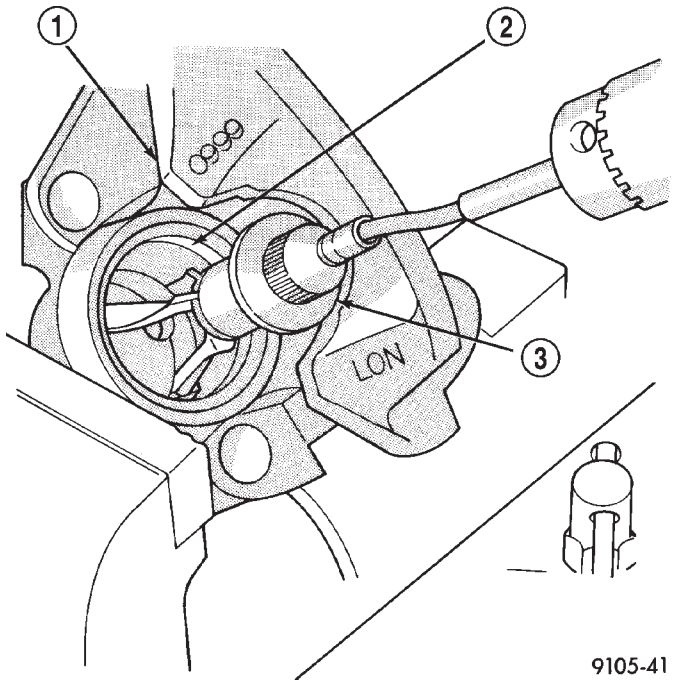


Fig. 95 Honing Brake Caliper Piston Bore

1 – CALIPER
2 – CALIPER BORE
3 – SPECIAL TOOL C-4095

DISASSEMBLY AND ASSEMBLY (Continued)

(11) If the bore does not clean up within this specification, a new caliper housing should be installed. Install a new piston if the old one is pitted or scored.

NOTE: When using Caliper Honing Tool, Special Tool C-4095, coat the stones and bore with brake fluid. After honing the bore, carefully clean the seal and boot grooves with a stiff non-metallic rotary brush.

NOTE: Use extreme care in cleaning the caliper after honing. Remove all dirt and grit by flushing the caliper with brake fluid; wipe dry with a clean, lint free cloth and then clean a second time.

CAUTION: When inspecting caliper piston, do not use anything but solvents to clean piston surface. If surface of piston cannot be cleaned using only solvents, piston must be replaced.

(12) Inspect caliper piston for pitting, scratches, or any physical damage. Replace piston if there is evidence of scratches, pitting or physical damage.

CALIPER ASSEMBLY

CAUTION: Excessive vise pressure will cause bore distortion and binding of piston.

(1) Clamp caliper in a vise (with protective caps installed on jaws of vise).

(2) Dip new piston seal in clean brake fluid and install in the groove of the caliper bore. Seal should be positioned at one area in groove and gently worked around the groove (Fig. 96), using only your fingers until properly seated. **NEVER USE AN OLD PISTON SEAL.** Be sure that fingers are clean and seal is not twisted or rolled (Fig. 96).

(3) Coat new piston boot with clean brake fluid leaving a generous amount inside boot.

(4) Position dust boot over piston after coating with brake fluid.

CAUTION: Force must be applied to the piston uniformly to avoid cocking and binding of the piston in the bore of the caliper.

(5) Install piston into caliper bore pushing it past the piston seal until it bottoms in the caliper bore (Fig. 97).

(6) Position dust boot into the counterbore of the caliper assembly piston bore.

(7) Using a hammer and Installer Piston Caliper Boot, Special Tool C-4689 and Handle, Special Tool C-4171, drive boot into counterbore of the caliper (Fig. 98).

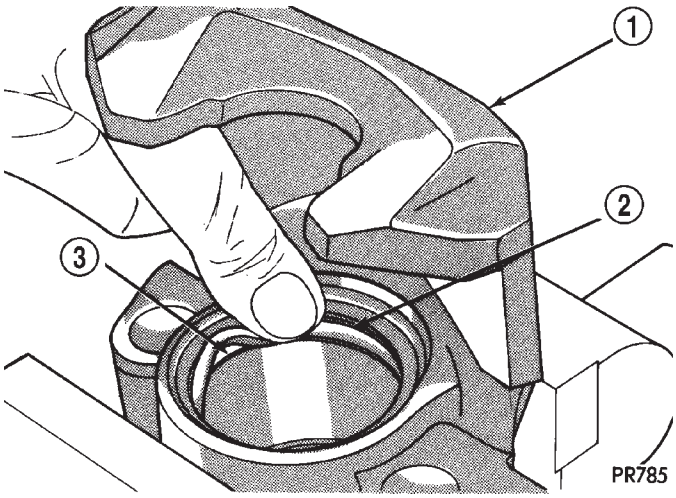


Fig. 96 Installing New Piston Seal In Caliper

1 – CALIPER
2 – PISTON SEAL
3 – SEAL GROOVE

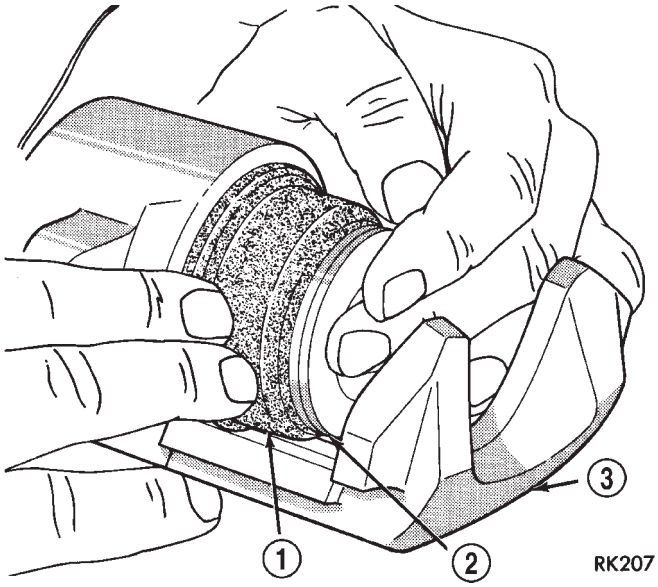


Fig. 97 Installing Piston Into Caliper Bore

1 – BOOT
2 – PISTON
3 – CALIPER

(8) Install guide pin sleeves and bushings. See Install Guide Pin Bushings section in the caliper disassembly section of this manual.

(9) Install brake pads. See Installing Brake Pads in the Brake Pad Service Procedures section of this manual.

(10) Before installing caliper assembly on vehicle, inspect brake rotor. If any conditions as described in Checking Brake Rotor for Runout and Thickness are present the rotor, must be replaced or refaced. If the

DISASSEMBLY AND ASSEMBLY (Continued)

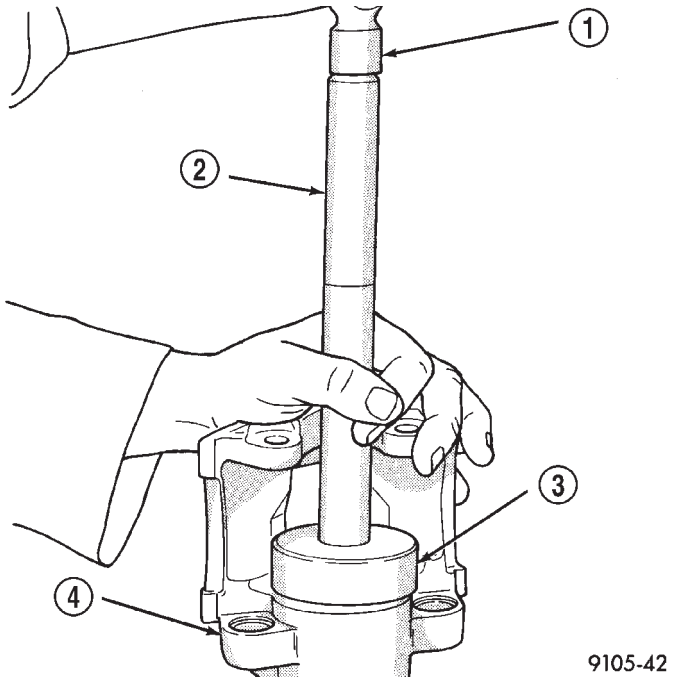


Fig. 98 Installing Dust Boot In Caliper Counterbore

1 – HAMMER
2 – SPECIAL TOOL C-4171
3 – SPECIAL TOOL C-4689
4 – CALIPER

rotor does not require any servicing, install caliper assembly.

(11) Install brake hose onto caliper using banjo bolt. Torque the brake hose to caliper assembly banjo bolt to 33 N·m (24 ft. lbs.). **New seal washers MUST always be used when installing brake hose to caliper.**

(12) Bleed the brake system (see Bleeding Brake System).

CLEANING AND INSPECTION

BRAKE TUBES AND HOSES

Flexible rubber hose is used at both front and rear brakes. Inspection of brake hoses should be performed whenever the brake system is serviced and every 7,500 miles or 12 months, whichever comes first (every engine oil change). Inspect hydraulic brake hoses for severe surface cracking, scuffing, worn spots or physical damage. If the fabric casing of the rubber hose becomes exposed due to cracks or abrasions in the rubber hose cover, the hose should be replaced immediately. Eventual deterioration of the hose can take place with possible burst failure. Faulty installation can cause twisting, resulting in wheel, tire, or chassis interference.

The steel brake tubing should be inspected periodically for evidence of corrosion, physical damage or contact with moving or hot components of the vehicle.

DISC BRAKES (FRONT)

BRAKE SHOE (PAD) LINING WEAR

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the wheel and tire assemblies, and the calipers.

Remove the front disc brake shoes. Refer to Front Disc Brake Shoe Removal in the Removal And Installation section in this group of the service manual for the required procedure.

The combined brake shoe and lining material thickness should be measured at the thinnest part of the assembly.

When a set of brake shoes are worn to a total thickness of approximately 6.5 mm (1/4 inch), they should be replaced.

Replace **both** brake shoe assemblies (inboard and outboard). It is necessary that **both** front wheel sets be replaced whenever brake shoe assemblies on either side are replaced.

If the brake shoe assemblies do not require replacement, reinstall, the assemblies making sure each brake shoe is returned to the original position. Refer to Front Disc Brake Shoe Installation in the Removal And Installation section in this group of the service manual for the required procedure.

CALIPER INSPECTION

Check for brake fluid leaks in and around boot area and inboard lining, and for any ruptures, brittleness or damage to the piston dust boot. If the boot is damaged, or a fluid leak is visible, disassemble caliper assembly and install a new seal and boot, and piston if scored. Refer to Front Disc Brake Caliper in the Disassembly And Assembly Section in this group of the service manual.

Check the guide pin dust boots to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Front Disc Brake Caliper in the Disassembly And Assembly Section in this group of the service manual.

DISC BRAKES (REAR)

BRAKE SHOE (PAD) LINING WEAR

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear,

CLEANING AND INSPECTION (Continued)

remove the wheel and tire assemblies, and the calipers.

Remove the rear disc brake shoes. Refer to Disc Brake Shoes in the Removal And Installation section in this group of the service manual for the required procedure.

The combined brake shoe and lining material thickness should be measured at the thinnest part of the assembly.

When a set of brake shoes are worn to a total thickness of approximately 7.0 mm (9/32 inch) they should be replaced.

Replace **both** brake shoe assemblies (inboard and outboard). It is necessary that **both** rear wheel sets be replaced whenever brake shoe assemblies on either side are replaced.

If the brake shoe assemblies do not require replacement, reinstall, the assemblies making sure each brake shoe is returned to the original position. Refer to Rear Disc Brake Shoe Installation in the Removal And Installation section in this group of the service manual for the required procedure.

CALIPER INSPECTION

Check for brake fluid leaks in and around boot area and inboard lining, and for any ruptures, brittleness or damage to the piston dust boot. If the boot is damaged, or a fluid leak is visible, disassemble caliper assembly and install a new seal and boot, and piston if scored. Refer to Rear Disc Brake Caliper in the Disassembly And Assembly Section in this group of the service manual.

Check the guide pin dust boots to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Rear Disc Brake Caliper in the Disassembly And Assembly Section in this group of the service manual.

ADJUSTMENTS

PARKING BRAKE

NOTE: Tensioner adjustment is only necessary when the tensioner, or a cable has been replaced or disconnected for service. When adjustment is necessary, perform adjustment only as described in the following procedure. This is necessary to avoid faulty park brake operation.

(1) Raise vehicle.

(2) Fully back off cable tensioner adjusting nut at equalizer to create slack in cables.

(3) Remove rear wheel/tire assemblies. Remove brake calipers and rotors.

(4) Verify park brakes are in good condition and operating properly.

(5) Verify park brake cables operate freely and are not binding, or seized.

(6) Check park brake shoe adjustment.

(7) Reinstall rotors and make sure rotors turn freely.

(8) Reinstall brake calipers. Tighten guide pin bolts to 41 n·m (30 ft.lbs.).

(9) Reinstall wheel/tire assemblies after brake shoe adjustment is complete.

(10) Lower vehicle enough for access to park brake foot pedal. Fully apply park brakes.

NOTE: Leave park brakes applied until adjustment is complete.

(11) Raise vehicle again.

(12) Mark tensioner rod 6.35 mm (1/4 in.) from edge of tensioner bracket (Fig. 99).

(13) Tighten adjusting nut at equalizer until mark on tensioner rod moves into alignment with tensioner bracket.

CAUTION: Do not loosen, or tighten the tensioner adjusting nut for any reason after completing adjustment.

(14) Lower vehicle until rear wheels are 15-20 cm (6-8 in.) off shop floor.

(15) Release park brake foot pedal and verify that rear wheels rotate freely without drag. Verify pedal returns to fully released position.

(16) Lower the vehicle.

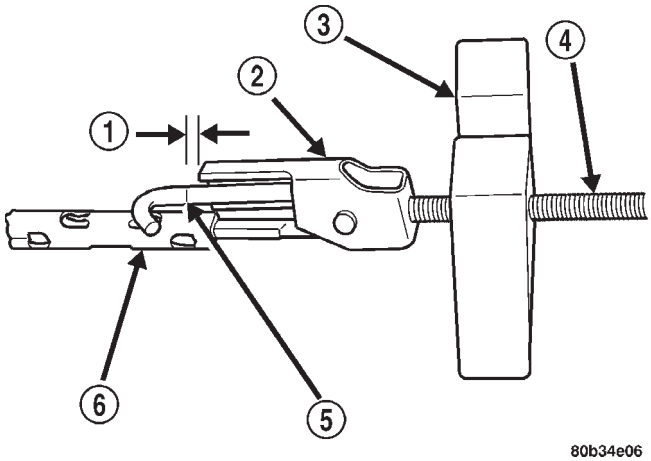


Fig. 99 Adjustment Mark On Cable Tensioner Rod

1 – MEASURE
2 – TENSIONER
3 – TENSIONER ISOLATOR
4 – THREADED ROD
5 – PLACE MARK HERE
6 – BRAKE CABLE CONNECTOR

ADJUSTMENTS (Continued)

BRAKE LAMP SWITCH

(1) Depress and hold the brake pedal.

(2) Remove the brake switch from it's bracket (Fig. 100). To do so, rotate the brake lamp switch in a counterclockwise direction approximately 30 degrees from its proper mounting position. Pull the switch rearward and remove it from it's mounting bracket.

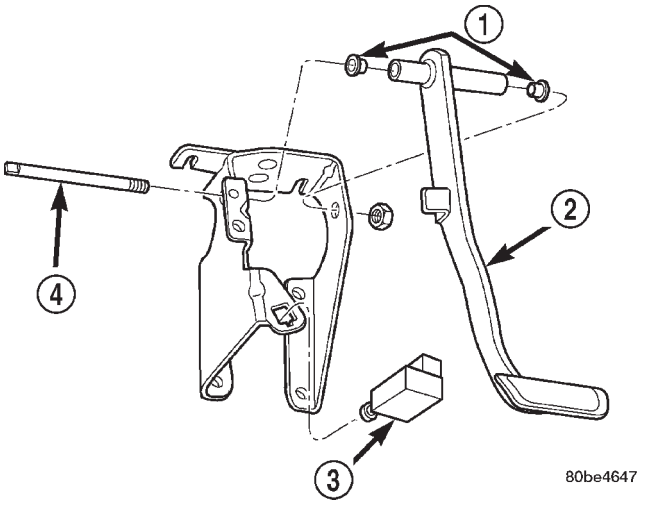


Fig. 100 Brake Lamp Switch Location

1 – BUSHINGS
2 – BRAKE PEDAL
3 – BRAKE LAMP SWITCH
4 – PIVOT SHAFT

(3) Hold the brake lamp switch firmly in one hand. Using your other hand, pull outward on the plunger of the switch until it has ratcheted out to its fully extended position.

(4) Mount the brake lamp switch into the bracket as follows: Depress the brake pedal as far down as possible. Install the switch in it's bracket by aligning the index key on switch with the notch in the square mounting hole of the mounting bracket (Fig. 100). Once the switch is fully seated, rotate the switch clockwise approximately 30° to lock the switch into the bracket.

CAUTION: Do not use excessive force when pulling back on the brake pedal to adjust the brake lamp switch. If to much force is used, damage to the brake lamp switch or striker can result.

(5) Gently pull back on brake pedal until the pedal stops moving. This will cause the switch plunger to ratchet backward to the correct position.

(6) Check for proper operation of the brake lamps and speed control.

SPECIFICATIONS

BRAKE FLUID

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar brake fluid or an equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from an container which has been left open. An open container will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

BRAKE ACTUATION SYSTEM

ACTUATION:
Vacuum Operated Power Brakes . . . . . Standard
Hydraulic System . . . . . Dual-Diagonally Split
MASTER CYLINDER ASSEMBLY:
Type . . . . . Dual Tandem
Body Material . . . . . Anodized Aluminum
Reservoir Material . . . . . Glass Reinforced Nylon
MASTER CYLINDER BORE / STROKE AND SPLIT:
All . . . . . 23.8 mm x 39.4 mm (.937 in. x 1.55 in.)
Displacement Split . . . . . 50 / 50
MASTER CYLINDER FLUID OUTLET PORTS:
Outlet Fitting Type . . . . . ISO Flare
Primary Tube Nut Thread M–12
Secondary Tube Nut Thread M–10
ABS INTEGRATED CONTROL UNIT (ICU):
Hydraulic Tube Fitting Type . . . . . ISO Flare
BOOSTER:
Make/Type . . . . . Bosch, Vacuum Assist With And With Out ABS
Mounting Studs . . . . . M8 x 1.25
Type . . . . . 205 mm With And With Out ABS
Boost At 20 inches Of Manifold Vacuum . 4690 All
IN-LINE PROPORTIONING VALVE:
Material . . . . . Aluminum
Function . . . . . Hydraulic Pressure Proportioning
BRAKE PEDAL
Pedal Ratio 3.18:1

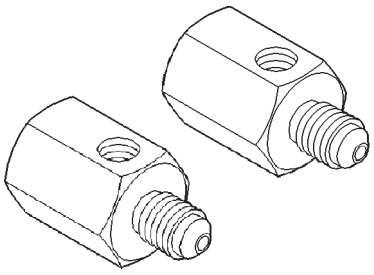
SPECIFICATIONS (Continued)

BRAKE FASTENER TORQUE SPECIFICATIONS

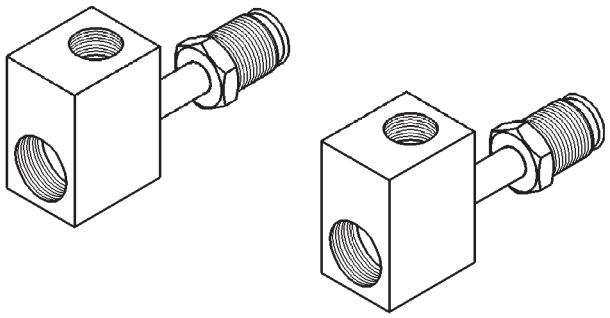
DESCRIPTION	TORQUE
BRAKE TUBES:	
Tube Nuts	17 N·m (145 in. lbs.)
BRAKE HOSE:	
Caliper Banjo Bolt	48 N·m (35 ft. lbs.)
Intermediate Bracket	12 N·m (105 in. lbs.)
MASTER CYLINDER:	
Mounting Nuts	28 N·m (250 in. lbs.)
BRAKE BOOSTER:	
Dash Panel Mounting Nuts	28 N·m (250 in. lbs.)
JUNCTION BLOCK (NON-ABS BRAKES)	
Support Bracket Bolts	26 N·m (230 in. lbs.)
DISC BRAKE CALIPER:	
Guide Pin Bolts	22 N·m (192 in. lbs.)
Bleeder Screw	15 N·m (125 in. lbs.)
ABS INTEGRATED CONTROL UNIT (ICU):	
Mounting Bracket Bolts	11 N·m (97 in. lbs.)
Mounting Bracket To Frame Bolts	26 N·m (230 in. lbs.)
CAB To HCU Screws	2 N·m (17 in. lbs.)
PARKING BRAKE:	
Lever Assembly Mounting Bolts	28 N·m (250 in. lbs.)
REAR HUB AND BEARING:	
Spindle Retaining Nut	168 N·m (124 ft. lbs.)
WHEEL:	
Mounting Nut	110–135 N·m (85–115 ft. lbs.)

SPECIAL TOOLS

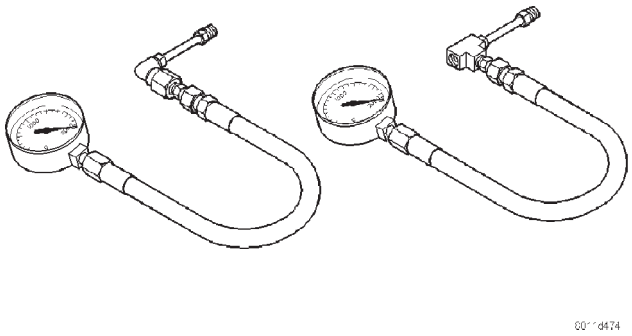
BASE BRAKE SYSTEM



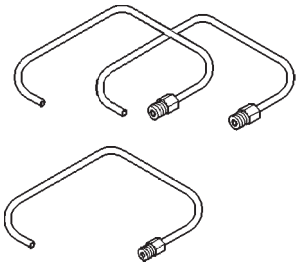
Adapters, Brake Pressure Test 6892



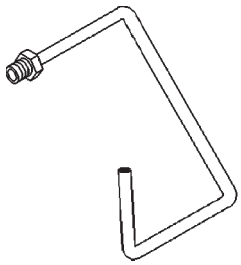
Adapters, Brake Pressure Test 8187



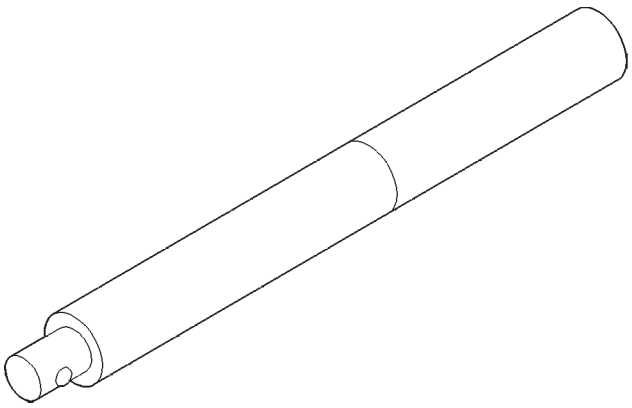
Gauge Set C-4007-A



Master Cylinder Bleed Tube 8129

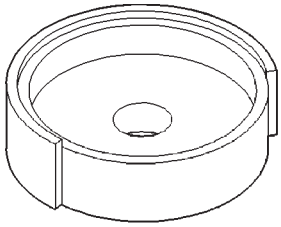


Master Cylinder Bleed Tube 8305

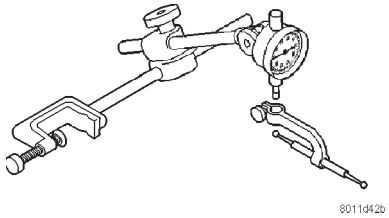


Handle, Universal C-4171

SPECIAL TOOLS (Continued)



Installer, Dust Boot C-4689



Dial Indicator C-3339

ANTILOCK BRAKE SYSTEM

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DESCRIPTION AND OPERATION

ANTILOCK BRAKE SYSTEM

DESCRIPTION

This section covers the physical and operational descriptions and the on-car service procedures for the Mark 20i Antilock Brake System and the Mark 20i Antilock Brake System with traction control.

The purpose of the antilock brake system (ABS) is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

OPERATION

There are a few performance characteristics of the Mark 20i Antilock Brake System that may at first seem abnormal, but in fact are normal. These characteristics are described below.

NORMAL BRAKING

Under normal braking conditions, the ABS functions the same as a standard base brake system with a diagonally split master cylinder and conventional vacuum assist.

ABS BRAKING

ABS operation is available at all vehicle speeds above 3–5 mph. If a wheel locking tendency is detected during a brake application, the brake system enters the ABS mode. During ABS braking, hydraulic pressure in the four wheel circuits is modulated to prevent any wheel from locking. Each wheel circuit is designed with a set of electric solenoids to allow modulation and each wheel receives its own separate electrical signal. Wheel lockup may be perceived at the very end of an ABS stop and is considered normal.

During an ABS stop, the brakes hydraulic system is still diagonally split. However, the brake system pressure is further split into four control channels. During antilock operation of the vehicle's brake system, the front wheels are controlled independently and are on two separate control channels, and the rear wheels of the vehicle are controlled together.

The system can build and release pressure at each wheel, depending on signals generated by the wheel speed sensors (WSS) at each wheel and received at the controller antilock brake (CAB).

NOISE AND BRAKE PEDAL FEEL

During ABS braking, some brake pedal movement may be felt. In addition, ABS braking will create ticking, popping, or groaning noises heard by the driver. This is normal and is due to pressurized fluid being transferred between the master cylinder and the brakes. If ABS operation occurs during hard braking, some pulsation may be felt in the vehicle

DESCRIPTION AND OPERATION (Continued)

body due to fore and aft movement of the suspension as brake pressures are modulated.

At the end of an ABS stop, ABS is turned off when the vehicle is slowed to a speed of 3–4 mph. There may be a slight brake pedal drop anytime that the ABS is deactivated, such as at the end of the stop when the vehicle speed is less than 3 mph or during an ABS stop where ABS is no longer required. These conditions exist when a vehicle is being stopped on a road surface with patches of ice, loose gravel, or sand on it. Also, stopping a vehicle on a bumpy road surface activates ABS because of the wheel hop caused by the bumps.

TIRE NOISE AND MARKS

Although the ABS system prevents complete wheel lockup, some wheel slip is desired in order to achieve optimum braking performance. Wheel slip is defined as follows: 0 percent slip means the wheel is rolling freely and 100 percent slip means the wheel is fully locked. During brake pressure modulation, wheel slip is allowed to reach up to 25–30 percent. This means that the wheel rolling velocity is 25–30 percent less than that of a free rolling wheel at a given vehicle speed. This slip may result in some tire chirping, depending on the road surface. This sound should not be interpreted as total wheel lockup.

Complete wheel lockup normally leaves black tire marks on dry pavement. The ABS will not leave dark black tire marks since the wheel never reaches a fully locked condition. However, tire marks may be noticeable as light patched marks.

START-UP CYCLE

When the ignition is turned on, a popping sound and a slight brake pedal movement may be noticed. The ABS warning lamp will also be on for up to 5 seconds after the ignition is turned on. When the vehicle is first driven off, a humming may be heard or felt by the driver at approximately 25–40 kph (15–25 mph). All of these conditions are a normal function of ABS as the system is performing a diagnosis check.

PREMATURE ABS CYCLING

Symptoms of premature ABS cycling include: clicking sounds from the solenoid valves; pump/motor running; and pulsations in the brake pedal. Premature ABS cycling can occur at any braking rate of the vehicle and on any type of road surface. Neither the red BRAKE warning lamp, nor the amber ABS warning lamp, illuminate and no fault codes are stored in the CAB.

Premature ABS cycling is a condition that needs to be correctly assessed when diagnosing problems with the antilock brake system. It may be necessary to use a DRB scan tool to detect and verify premature ABS cycling.

Check the following common causes when diagnosing premature ABS cycling: damaged tone wheels; incorrect tone wheels; damaged steering knuckle wheel speed sensor mounting bosses; loose wheel speed sensor mounting bolts; excessive tone wheel runout; or an excessively large tone wheel-to-wheel speed sensor air gap. Give special attention to these components when diagnosing a vehicle exhibiting premature ABS cycling.

After diagnosing the defective component, repair or replace it as required. When the component repair or replacement is completed, test drive the vehicle to verify that premature ABS cycling has been corrected.

ANTILOCK BRAKE SYSTEM COMPONENTS

The following is a detailed description of the antilock brake system components. For information on servicing base brake system components used in conjunction with these components, see the BASE BRAKE SYSTEM found at the beginning of this service manual group.

INTEGRATED CONTROL UNIT (ICU)

DESCRIPTION

The hydraulic control unit (HCU) and the controller antilock brake (CAB) used with this antilock brake system are combined (integrated) into one unit, which is called the integrated control unit (ICU) (Fig. 1). The ICU is located in front of the driver's side front tire (Fig. 2), behind the inner fender splash shield.

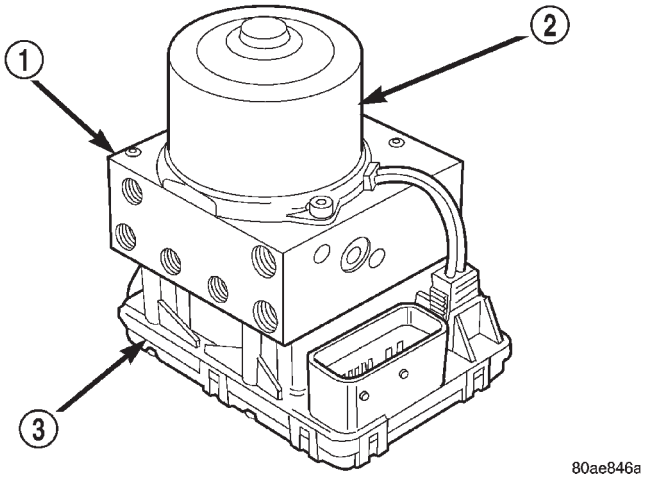


Fig. 1 Integrated Control Unit

1 – HCU
2 – PUMP/MOTOR
3 – CAB

DESCRIPTION AND OPERATION (Continued)

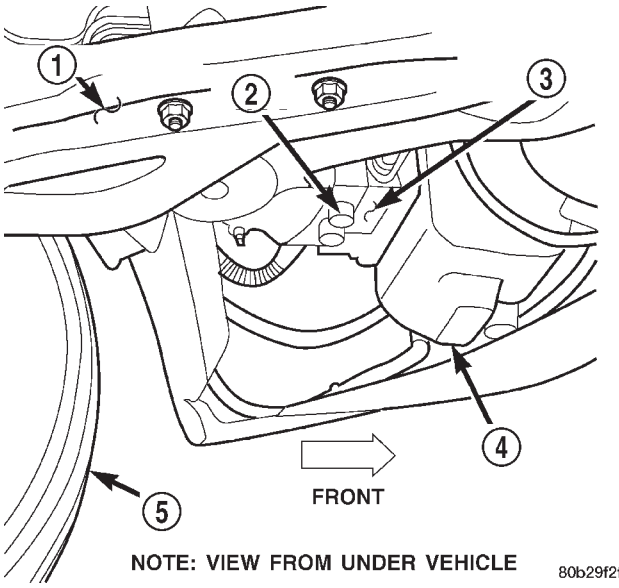


Fig. 2 Integrated Control Unit (HCU And CAB) Location

1 – ENGINE CRADLE
2 – HCU
3 – CONTROLLER ANTILOCK BRAKE (CAB)
4 – BOTTOM OF WINDSHIELD WASHER RESERVOIR
5 – LEFT FRONT TIRE

Two different ICU's (HCU and CAB) are used on this vehicle depending on whether or not the vehicle is equipped with traction control. The HCU on a vehicle equipped with traction control has a valve block that is approximately one inch longer than a HCU on a vehicle that is equipped with ABS only.

The ABS-only ICU consists of the following components: the CAB, eight (build/decay) solenoid valves (four inlet valves and four outlet valves), valve block, fluid accumulators, a pump, and an electric motor.

The ABS-with traction control ICU consists of the following components: the CAB, eight (build/decay) solenoid valves (four inlet valves and four outlet valves), two traction control (ASR) valves, two hydraulic shuttle valves, valve block, fluid accumulators, a pump, and an electric motor.

The replaceable components of the ICU are the HCU and the CAB. No attempt should be made to service any individual components of the HCU or CAB.

OPERATION

For information of the ICU, refer to these individual components of the ICU:

- CONTROLLER ANTILOCK BRAKE (CAB)
- HYDRAULIC CONTROL UNIT (HCU)

For information on the ICU's hydraulic circuits, refer to HYDRAULIC CIRCUITS AND VALVE OPERATION which can be found elsewhere in this section.

CONTROLLER ANTILOCK BRAKE (CAB)

DESCRIPTION

The controller antilock brake (CAB) is a microprocessor-based device which monitors the ABS system during normal braking and controls it when the vehicle is in an ABS stop. The CAB is mounted to the bottom of the HCU (Fig. 1). The CAB uses a 25-way electrical connector on the vehicle wiring harness. The power source for the CAB is through the ignition switch in the RUN or ON position. The CAB is on the PCI bus.

OPERATION

The primary functions of the CAB are to:

- Monitor the antilock brake system for proper operation.
- Detect wheel locking or wheel slipping tendencies by monitoring the speed of all four wheels of the vehicle.
- Control fluid modulation to the wheel brakes while the system is in an ABS mode.
- Store diagnostic information.
- Provide communication to the DRB scan tool while in diagnostic mode.
- Illuminate the amber ABS warning lamp.
- (with traction control only) Illuminate the TRAC ON lamp in the message center on the instrument panel when a traction control event occurs.
- (with traction control only) Illuminate the TRAC OFF lamp when the amber ABS warning lamp illuminates.

The CAB constantly monitors the antilock brake system for proper operation. If the CAB detects a fault, it will turn on the amber ABS warning lamp and disable the antilock braking system. The normal base braking system will remain operational.

NOTE: If the vehicle is equipped with traction control, the TRAC OFF lamp will illuminate anytime the amber ABS warning lamp illuminates.

The CAB continuously monitors the speed of each wheel through the signals generated by the wheel speed sensors to determine if any wheel is beginning to lock. When a wheel locking tendency is detected, the CAB commands the CAB command coils to actuate. The coils then open and close the valves in the HCU that modulate brake fluid pressure in some or all of the hydraulic circuits. The CAB continues to control pressure in individual hydraulic circuits until a locking tendency is no longer present.

The CAB contains a self-diagnostic program that monitors the antilock brake system for system faults. When a fault is detected, the amber ABS warning lamp is turned on and the fault diagnostic trouble code (DTC) is then stored in a diagnostic program

DESCRIPTION AND OPERATION (Continued)

memory. These DTC's will remain in the CAB memory even after the ignition has been turned off. The DTC's can be read and cleared from the CAB memory by a technician using the DRB scan tool. If not cleared with a DRB scan tool, the fault occurrence and DTC will be automatically cleared from the CAB memory after the identical fault has not been seen during the next 3,500 miles.

CONTROLLER ANTILOCK BRAKE INPUTS

- wheel speed sensors (four)
- brake lamp switch
- ignition switch
- system and pump voltage
- ground
- traction control switch (if equipped)
- diagnostic communication (PCI)

CONTROLLER ANTILOCK BRAKE OUTPUTS

- amber ABS warning lamp actuation (via BUS)
- instrument cluster (MIC) communication (PCI)
- traction control lamps (if equipped)
- diagnostic communication (PCI, via BUS)

HYDRAULIC CONTROL UNIT (HCU)

DESCRIPTION

The hydraulic control unit (HCU) is mounted to the CAB as part of the ICU (Fig. 3). The ICU is located in front of the driver's side front tire, behind the inner fender splash shield. The HCU controls the flow of brake fluid to the brakes using a series of valves and accumulators. A pump/motor is mounted on the HCU to supply build pressure to the brakes during an ABS stop.

The HCU on a vehicle equipped with traction control has a valve block that is approximately one inch longer than a HCU on a vehicle that is equipped with ABS only in order to incorporate the additional valves.

For more information, see INTEGRATED CONTROL UNIT in this section.

OPERATION

The operation of the HCU's hydraulic circuits can be found in HYDRAULIC CIRCUITS AND VALVE OPERATION which can be found elsewhere in this section.

The following topics explain how the different components within the HCU operate.

VALVES AND SOLENOIDS

The valve block contains four inlet valves and four outlet valves. The inlet valves are spring-loaded in the open position and the outlet valves are spring-loaded in the closed position during normal braking.

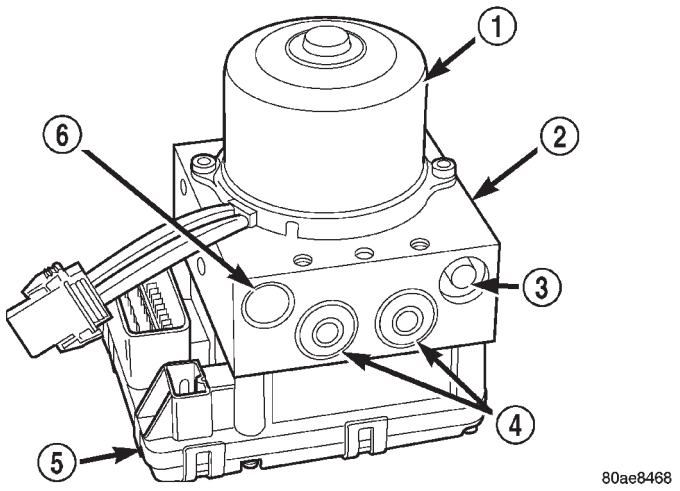


Fig. 3 Integrated Control Unit (ICU)

1 – PUMP MOTOR
2 – HYDRAULIC CONTROL UNIT (HCU)
3 – NOISE DAMPENING CHAMBER
4 – LOW PRESSURE FLUID ACCUMULATORS
5 – CAB
6 – LIP SEAL SAVER

The fluid is allowed to flow from the master cylinder to the wheel brakes.

During an ABS stop, these valves cycle to maintain the proper slip ratio for each wheel. The inlet valve closes preventing further pressure increase and the outlet valve opens to provide a path from the wheel brake to the HCU accumulators and pump/motor. This releases (decays) pressure from the wheel brake, thus releasing the wheel from excessive slippage. Once the wheel is no longer slipping, the outlet valve is closed and the inlet valve is opened to reapply (build) pressure.

For information on the valves used with the traction control system, refer to TRACTION CONTROL SYSTEM in this section.

BRAKE FLUID ACCUMULATORS

There are two fluid accumulators in the HCU–one for the primary hydraulic circuit and one for the secondary hydraulic circuit (Fig. 3). Each hydraulic circuit uses a 5 cc accumulator.

The fluid accumulators temporarily store brake fluid that is removed from the wheel brakes during an ABS cycle. This stored fluid is used by the pump/motor to provide build pressure for the brake hydraulic system. When the antilock stop is complete, the accumulators are drained by the pump/motor.

PUMP/MOTOR

There are two pump assemblies in the HCU–one for the primary hydraulic circuit and one for the secondary hydraulic circuit. Both pumps are driven by a

DESCRIPTION AND OPERATION (Continued)

common electric motor (Fig. 3). This DC-type motor is integral to the HCU and is controlled by the CAB.

The pump/motor provides the extra amount of brake fluid needed during antilock braking. Brake fluid is released to the accumulators when the outlet valve is opened during an antilock stop. The pump mechanism consists of two opposing pistons operated by an eccentric camshaft. In operation, one piston draws fluid from the accumulators, and the opposing piston pumps fluid to the master cylinder circuits. When the antilock stop is complete, the pump/motor drains the accumulators.

The CAB may turn on the pump/motor when an antilock stop is detected. The pump/motor continues to run during the antilock stop and is turned off after the stop is complete. Under some conditions, the pump/motor runs to drain the accumulators during the next drive-off.

The pump/motor is not a serviceable item; if it requires replacement, the HCU must be replaced.

ABS FUSES

DESCRIPTION

The ABS fuses and the ABS pump/motor fuse are located in the power distribution center (PDC). Refer to the label on the inside of the PDC cover for the location of these fuses. The PDC is located on the driver's side of the engine compartment in front of the strut tower.

ABS RELAYS (SOLID STATE)

DESCRIPTION

Two internal relays are used to control the antilock brake system. The two relays are the pump/motor relay and the system relay. The pump/motor relay and the system relay are located in the CAB. If either the pump/motor relay or the system relay is diagnosed as not functioning properly, the CAB must be replaced. Refer to INTEGRATED CONTROL UNIT in the DISASSEMBLY AND ASSEMBLY section in this section of this service manual group for the procedure to remove the CAB from the HCU.

AMBER ABS WARNING LAMP

DESCRIPTION

The amber ABS warning lamp is located on the left side of the instrument panel in the instrument cluster. The purpose of the warning lamp is discussed in detail below.

OPERATION

When the ignition key is turned to the ON position, the amber ABS warning lamp is lit until the CAB completes it's self-tests and turns off the lamp (approximately 4 seconds). The amber ABS warning lamp will illuminate when the CAB detects a condition that results in the shutdown of ABS function or when the instrument cluster does not receive messages from the CAB. The CAB sends a message across the PCI BUS circuit that informs the instrument cluster to turn on the amber ABS warning lamp.

NOTE: If the vehicle is equipped with traction control, the TRAC OFF lamp will illuminate anytime the amber ABS warning lamp illuminates.

Under most conditions, when the amber ABS warning lamp is on, only the ABS function of the brake system is affected; the base brake system and the ability to stop the vehicle are not affected.

WHEEL SPEED SENSOR (WSS) AND TONE WHEEL

DESCRIPTION

One wheel speed sensor (WSS) and one tone wheel are located at each front and rear wheel. Each front wheel speed sensor is attached to a boss in the steering knuckle (Fig. 4). The front tone wheel is part of the outboard constant velocity joint. The rear wheel speed sensor on rear disc brake applications is mounted to the rear disc brake adapter (Fig. 5). The rear tone wheel is an integral part of the rear wheel hub and bearing.

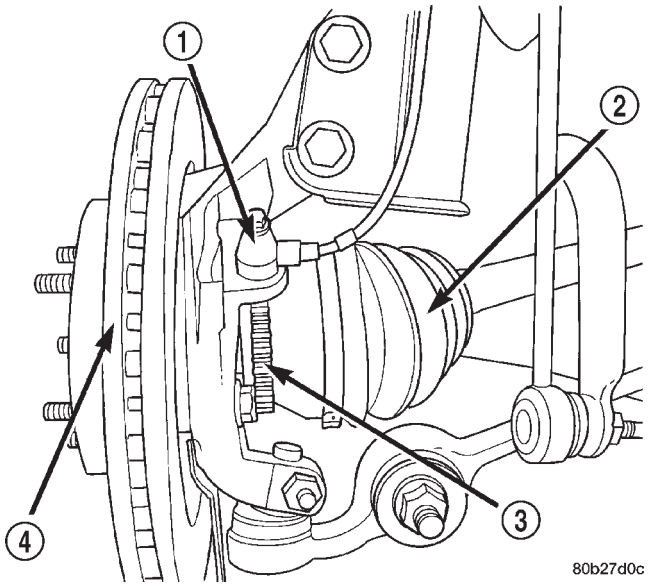


Fig. 4 Front Wheel Speed Sensor

1 – WHEEL SPEED SENSOR
2 – CV BOOT
3 – TONE WHEEL
4 – ROTOR

DESCRIPTION AND OPERATION (Continued)

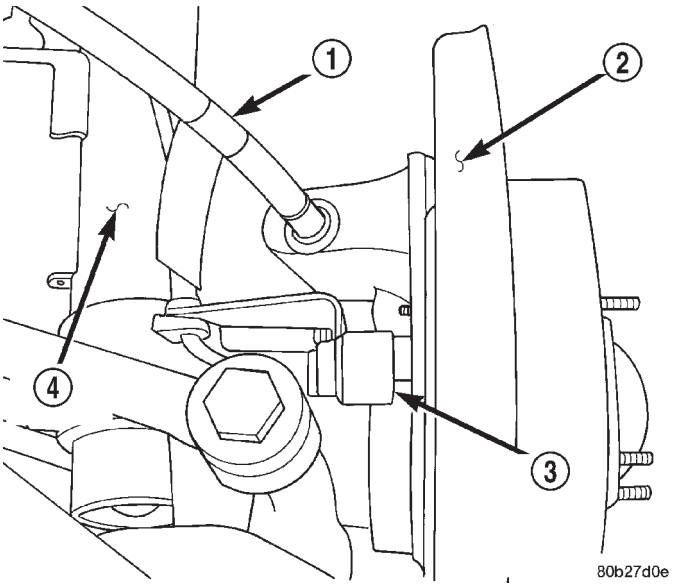


Fig. 5 Rear Wheel Speed Sensor

1 – PARKING BRAKE CABLE
2 – BACKING PLATE
3 – REAR WHEEL SPEED SENSOR
4 – REAR STRUT

OPERATION

The wheel speed sensor sends a small AC signal to the CAB. This signal is generated by magnetic induction created when a toothed sensor ring (tone wheel) passes the stationary magnetic wheel speed sensor. The CAB converts the AC signal into a digital signal. If a wheel locking tendency is detected by the CAB, it will then modulate hydraulic pressure via the HCU to prevent the wheel(s) from locking.

Correct ABS operation is dependent on accurate wheel speed signals. The vehicle's tires and wheels all must be the same size and type to generate accurate signals. Variations in tire and wheel size can produce inaccurate wheel speed signals.

Improper speed sensor-to-tone wheel clearance can cause erratic speed sensor signals. The speed sensor air gap is not adjustable, but should be checked when applicable. Wheel speed sensor-to-tone wheel clearance specifications can be found in the SPECIFICATIONS section in this section of this service manual group.

TRACTION CONTROL SYSTEM

DESCRIPTION

Traction control reduces wheel slip and maintains traction at the driving wheels at speeds below 56 kph (35 mph) when road surfaces are wet or snow covered. The traction control system reduces wheel slip by braking the wheel that is losing traction.

OPERATION

The traction control system monitors wheel speed. During acceleration, if the CAB detects front (drive) wheel slip and the brakes are not applied, the system enters traction control mode. Traction control operation proceeds in the following order:

(1) Close the normally open isolator valves.

(2) Start the pump/motor and supply volume and pressure to the front (drive) hydraulic circuit. (The pump/motor runs continuously during traction control operation.)

(3) Open and close the build and decay valves to maintain minimum wheel slip and maximum traction.

The cycling of the build and decay valves during traction control is similar to that during antilock braking, except the valves work to control wheel spin by applying the brakes, whereas the ABS function is to control wheel skid by releasing the brakes.

HYDRAULIC SHUTTLE VALVES

Two hydraulic shuttle valves allow pressure and volume to return to the master cylinder reservoir when not consumed by the build and decay valves. These valves are necessary because the pump/motor supplies more volume than the system requires.

If the brakes are applied at anytime during a traction control cycle, the brake lamp switch triggers the CAB to switch off traction control.

TRACTION CONTROL FUNCTION LAMPS

The traction control function lamp illuminates during a traction control cycle, displaying TRAC ON.

The traction control system is enabled at each ignition cycle. It may be turned off by depressing the traction control switch button. The traction control function lamp (TRAC OFF) illuminates immediately upon depressing the button.

If the CAB calculates that the brake temperatures are high, the traction control system becomes inoperative until a time-out period has elapsed. During this "thermo-protection mode," the traction control function lamp illuminates TRAC OFF; note that no trouble code is registered.

In the event that a system fault occurs thus illuminating the amber ABS warning lamp, the TRAC OFF lamp will also illuminate.

HYDRAULIC CIRCUITS AND VALVE OPERATION

The hydraulic fluid control valves control the flow of pressurized brake fluid to the wheel brakes during the different modes of ABS braking. The following paragraphs explain how this works. For purposes of explanation only, it is assumed that only the right front wheel is experiencing antilock braking; the fol-

DESCRIPTION AND OPERATION (Continued)

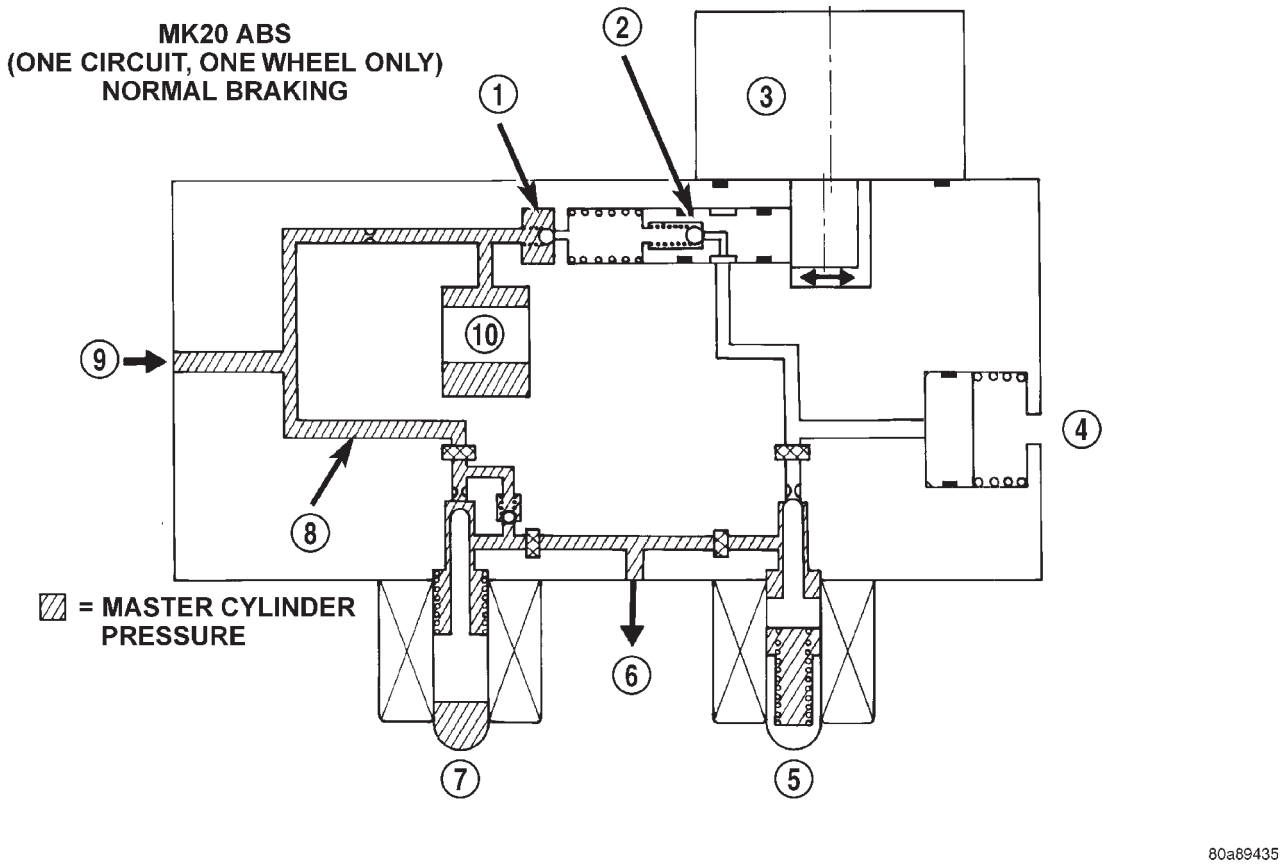


Fig. 6 Normal Braking Hydraulic Circuit

1 – OUTLET VALVE
2 – PUMP PISTON
3 – PUMP MOTOR (OFF)
4 – LOW PRESSURE ACCUMULATOR
5 – NORMALLY CLOSED VALVE (OFF)
6 – TO RIGHT FRONT WHEEL
7 – NORMALLY OPEN VALVE (OFF)
8 – MASTER CYLINDER PRESSURE
9 – FROM MASTER CYLINDER
10 – NOISE DAMPER CHAMBER

lowing diagrams show only the right front wheel in an antilock braking operation.

NORMAL BRAKING HYDRAULIC CIRCUIT AND SOLENOID VALVE FUNCTION

The hydraulic diagram (Fig. 6) shows the vehicle in the normal braking mode of the base brake hydraulic system. The diagram shows no wheel spin or slip occurring relative to the speed of the vehicle. The driver is applying the brake pedal which builds pressure in the brake hydraulic system to engage the brakes and stop the vehicle.

ABS HYDRAULIC CIRCUIT AND SOLENOID VALVE FUNCTION (ABS WITHOUT TRACTION CONTROL)

The hydraulic diagram (Fig. 7) shows the vehicle in the ABS braking mode. The diagram shows one wheel is slipping because the driver is attempting to stop the vehicle at a faster rate than is allowed by the surface on which the tires are riding.

- The normally open and normally closed valves modulate (build/decay) the brake hydraulic pressure as required.
- The pump/motor is switched on so that the brake fluid from the low pressure accumulators is returned to the master cylinder circuits.
- The brake fluid is routed to either the master cylinder or the wheel brake depending on the position of the normally open valve.

NORMAL BRAKING HYDRAULIC CIRCUIT, SOLENOID VALVE, AND SHUTTLE VALVE FUNCTION (ABS WITH TRACTION CONTROL)

The hydraulic diagram (Fig. 8) shows a vehicle with traction control in the normal braking mode. The diagram shows no wheel spin or slip occurring relative to the speed of the vehicle. The driver is applying the brake pedal which builds pressure in the brake hydraulic system to engage the brakes and stop the vehicle. The hydraulic shuttle valve closes

DESCRIPTION AND OPERATION (Continued)

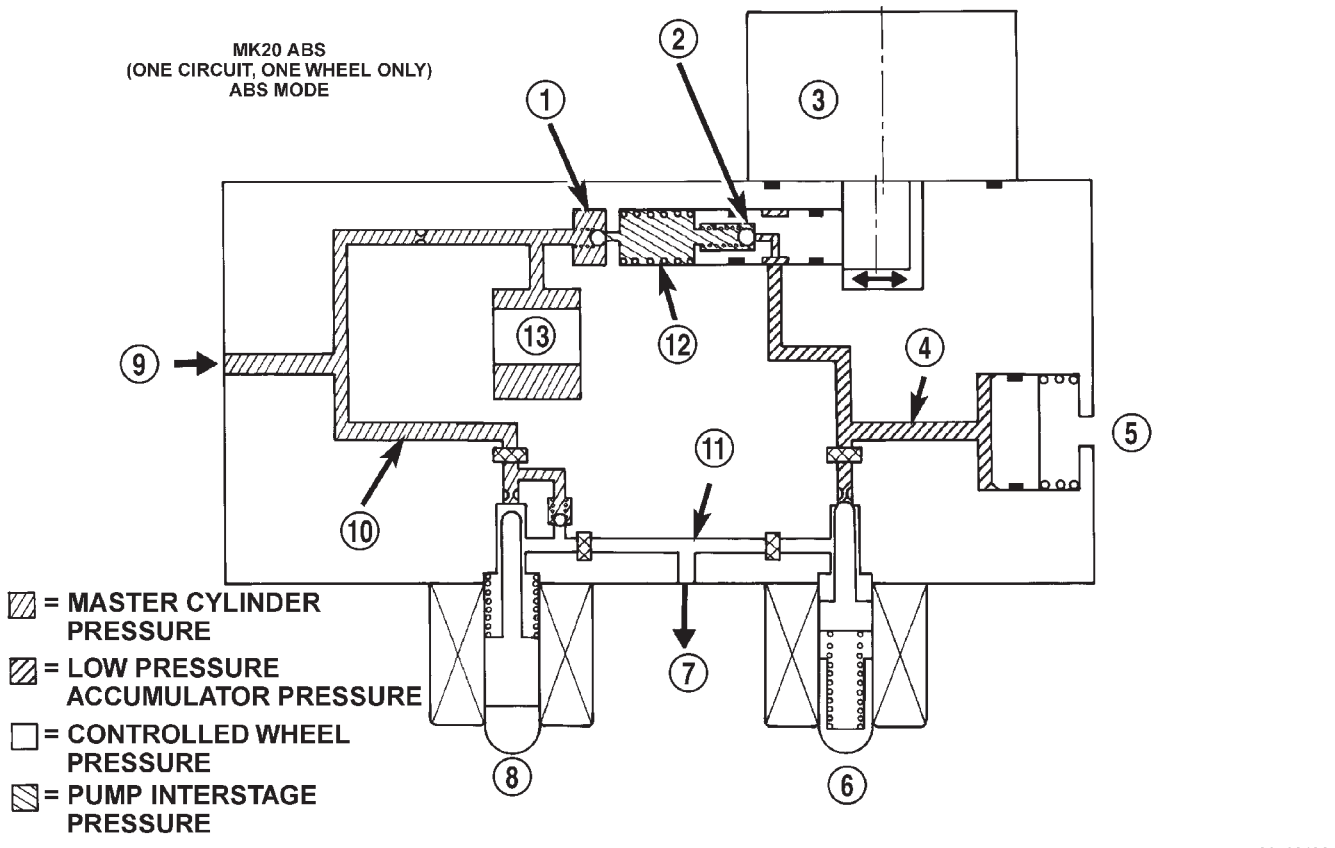


Fig. 7 ABS Without Traction Control - ABS Mode Hydraulic Circuit

1 – OUTLET VALVE
2 – PUMP PISTON
3 – PUMP MOTOR (ON)
4 – LOW PRESSURE ACCUMULATOR PRESSURE
5 – LOW PRESSURE ACCUMULATOR
6 – NORMALLY CLOSED VALVE (MODULATING)
7 – TO RIGHT FRONT WHEEL
8 – NORMALLY OPEN VALVE (MODULATING)
9 – FROM MASTER CYLINDER
10 – MASTER CYLINDER PRESSURE
11 – CONTROLLED WHEEL PRESSURE
12 – PUMP INTERSTAGE PRESSURE
13 – NOISE DAMPER CHAMBER

with every brake pedal application so pressure is not created at the inlet to the pump/motor.

ABS BRAKING HYDRAULIC CIRCUIT, SOLENOID VALVE, AND SHUTTLE VALVE FUNCTION (ABS WITH TRACTION CONTROL)

The hydraulic diagram (Fig. 9) shows the vehicle in the ABS braking mode. The diagram shows one wheel is slipping because the driver is attempting to stop the vehicle at a faster rate than is allowed by the surface on which the tires are riding.

- The hydraulic shuttle valve closes upon brake application so that the pump/motor cannot siphon brake fluid from the master cylinder.
- The normally open and normally closed valves modulate (build/decay) the brake hydraulic pressure as required.
- The pump/motor is switched on so that the brake fluid from the low pressure accumulators is returned to the master cylinder circuits.
- The brake fluid is routed to either the master cylinder or the wheel brake depending on the position of the normally open valve.

ABS TRACTION CONTROL HYDRAULIC CIRCUIT, SOLENOID VALVE, AND SHUTTLE VALVE FUNCTION (ABS WITH TRACTION CONTROL)

The hydraulic diagram (Fig. 10) shows the vehicle in the traction control (TC) mode. The diagram shows a drive wheel is spinning and brake pressure is required to reduce its speed.

- The normally open TC (ASR) valve is energized to isolate the brake fluid being pumped from the master cylinder and to isolate the driven wheel.

DESCRIPTION AND OPERATION (Continued)

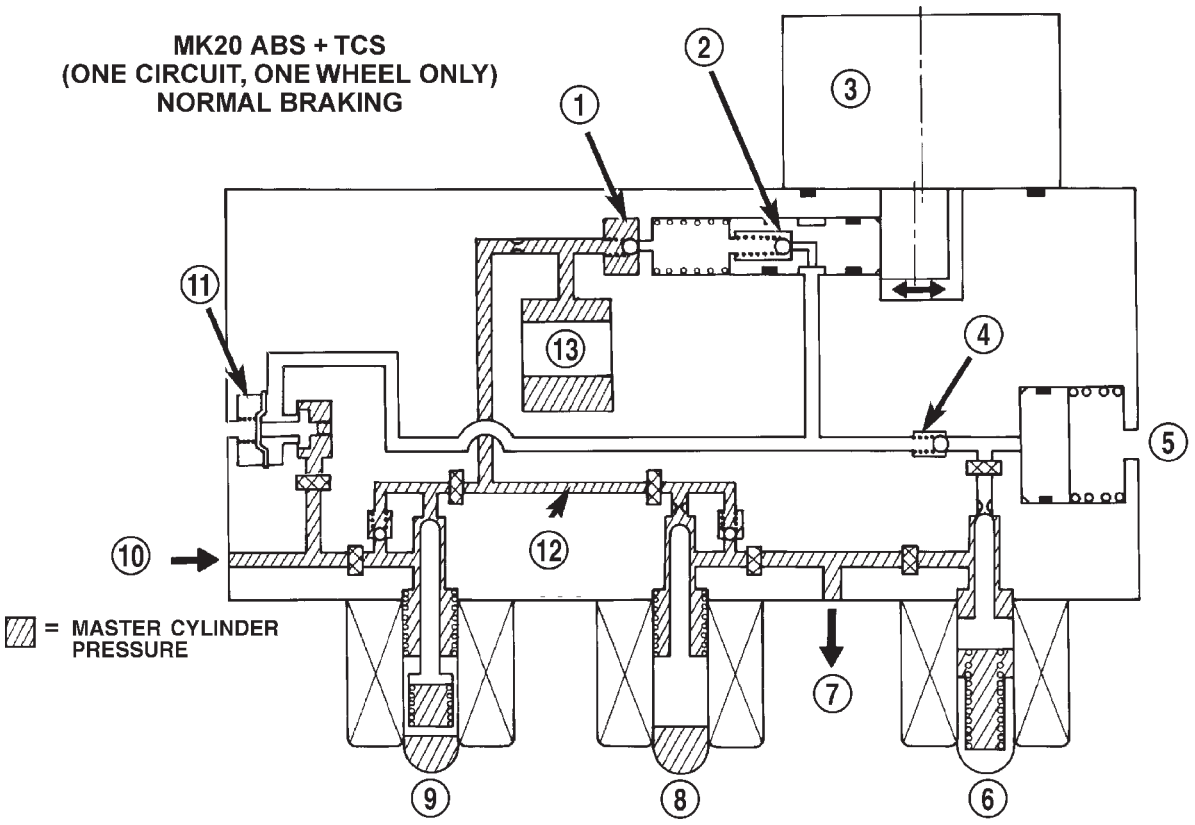


Fig. 8 ABS With Traction Control - Normal Braking Hydraulic Circuit

1 – OUTLET VALVE
2 – PUMP PISTON
3 – PUMP MOTOR (OFF)
4 – SUCTION VALVE
5 – LOW PRESSURE ACCUMULATOR
6 – NORMALLY CLOSED VALVE (OFF)
7 – TO RIGHT FRONT WHEEL
8 – NORMALLY OPEN VALVE (OFF)
9 – NORMALLY OPEN ASR VALVE (OFF)
10 – FROM MASTER CYLINDER
11 – HYDRAULIC SHUTTLE VALVE
12 – MASTER CYLINDER PRESSURE
13 – NOISE DAMPER CHAMBER

- The normally open TC (ASR) valve bypasses the pump output back to the master cylinder at a fixed pressure setting.
- The normally open and normally closed valves modulate (build/decay) the brake pressure as required to the spinning wheel.

DIAGNOSIS AND TESTING

SERVICE WARNINGS AND CAUTIONS

The ABS uses an electronic control module, the CAB. This module is designed to withstand normal current draws associated with vehicle operation. Care must be taken to avoid overloading the CAB circuits.

CAUTION: In testing for open or short circuits, do not ground or apply voltage to any of the circuits unless instructed to do so for a diagnostic procedure.

CAUTION: These circuits should only be tested using a high impedance multi-meter or the DRB scan tool as described in this section. Power should never be removed or applied to any control module with the ignition in the ON position. Before removing or connecting battery cables, fuses, or connectors, always turn the ignition to the OFF position.

CAUTION: Use only factory wiring harnesses. Do not cut or splice wiring to the brake circuits. The addition of after-market electrical equipment (car phone, radar detector, citizen band radio, trailer lighting, trailer brakes, etc.) on a vehicle equipped with antilock brakes may affect the function of the antilock brake system.

DIAGNOSIS AND TESTING (Continued)

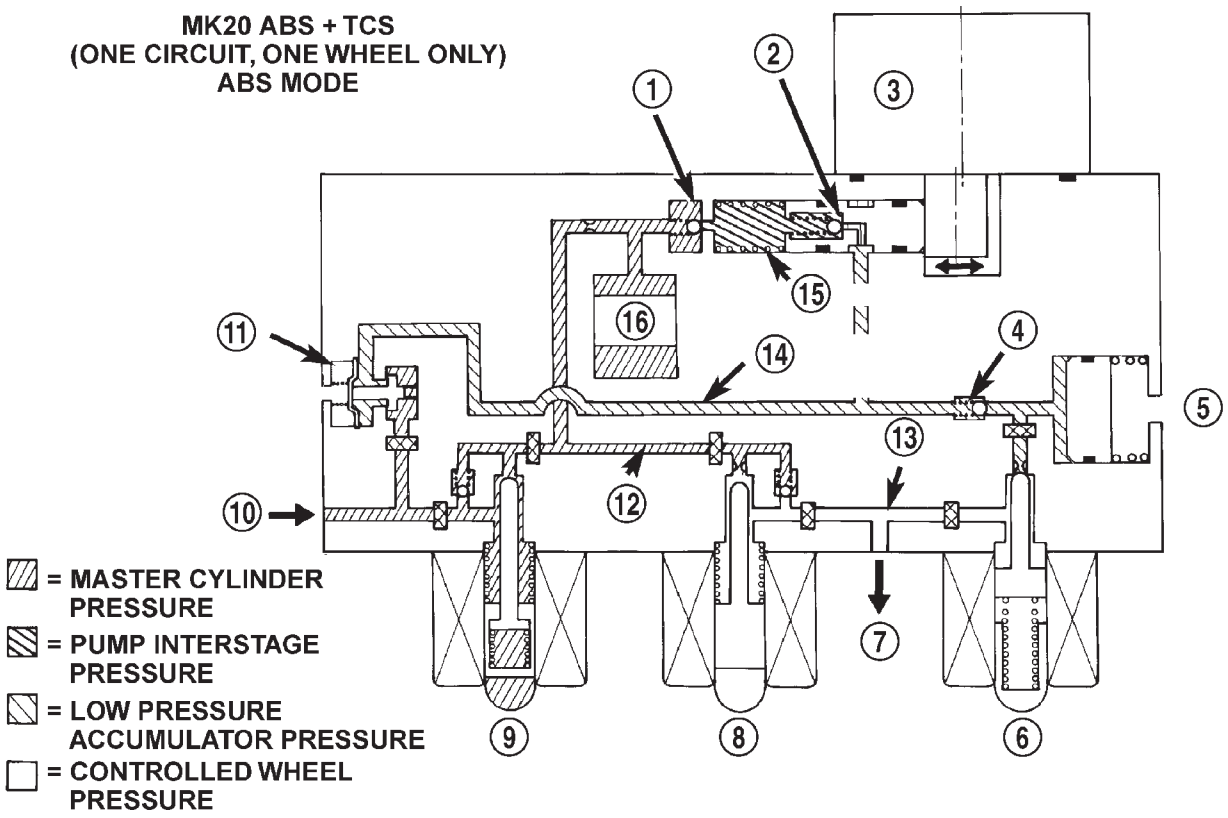


Fig. 9 ABS With Traction Control - ABS Mode Hydraulic Circuit

1 – OUTLET VALVE
2 – PUMP PISTON
3 – PUMP MOTOR (ON)
4 – SUCTION VALVE
5 – LOW PRESSURE ACCUMULATOR
6 – NORMALLY CLOSED VALVE (MODULATING)
7 – TO RIGHT FRONT WHEEL
8 – NORMALLY OPEN VALVE (MODULATING)
9 – NORMALLY OPEN ASR VALVE (OFF)
10 – FROM MASTER CYLINDER
11 – HYDRAULIC SHUTTLE VALVE
12 – MASTER CYLINDER PRESSURE
13 – CONTROLLED WHEEL PRESSURE
14 – LOW PRESSURE ACCUMULATOR PRESSURE
15 – PUMP INTERSTAGE PRESSURE
16 – NOISE DAMPER CHAMBER

ABS GENERAL DIAGNOSTICS INFORMATION

This section contains information necessary to diagnose the antilock brake system. Specifically, this section should be used to help diagnose conditions which result in any of the following:

(1) amber ABS warning lamp turned on.
(2) brakes lock-up on hard application.

Diagnosis of base brake conditions that are obviously mechanical in nature should be directed to BASE BRAKE SYSTEM at the beginning of this group.

Many ABS conditions judged to be a problem by the driver may be normal operating conditions. See ABS OPERATION in the DESCRIPTION AND OPERATION section of this group to become familiarized with the normal characteristics of this antilock brake system.

ABS WIRING DIAGRAM INFORMATION

During the diagnosis and testing of the antilock brake system it may become necessary to reference the wiring diagrams covering the antilock brake system and its components. For wiring diagrams refer to GROUP 8W of this service manual. It will provide you with the wiring diagrams and the circuit description and operation information covering the antilock brake system.

ABS VEHICLE TEST DRIVE

Most ABS complaints will require a test drive to properly duplicate and diagnose the condition.

WARNING: CONDITIONS THAT RESULT IN TURNING ON THE RED BRAKE WARNING LAMP MAY INDICATE REDUCED BRAKING ABILITY.

DIAGNOSIS AND TESTING (Continued)

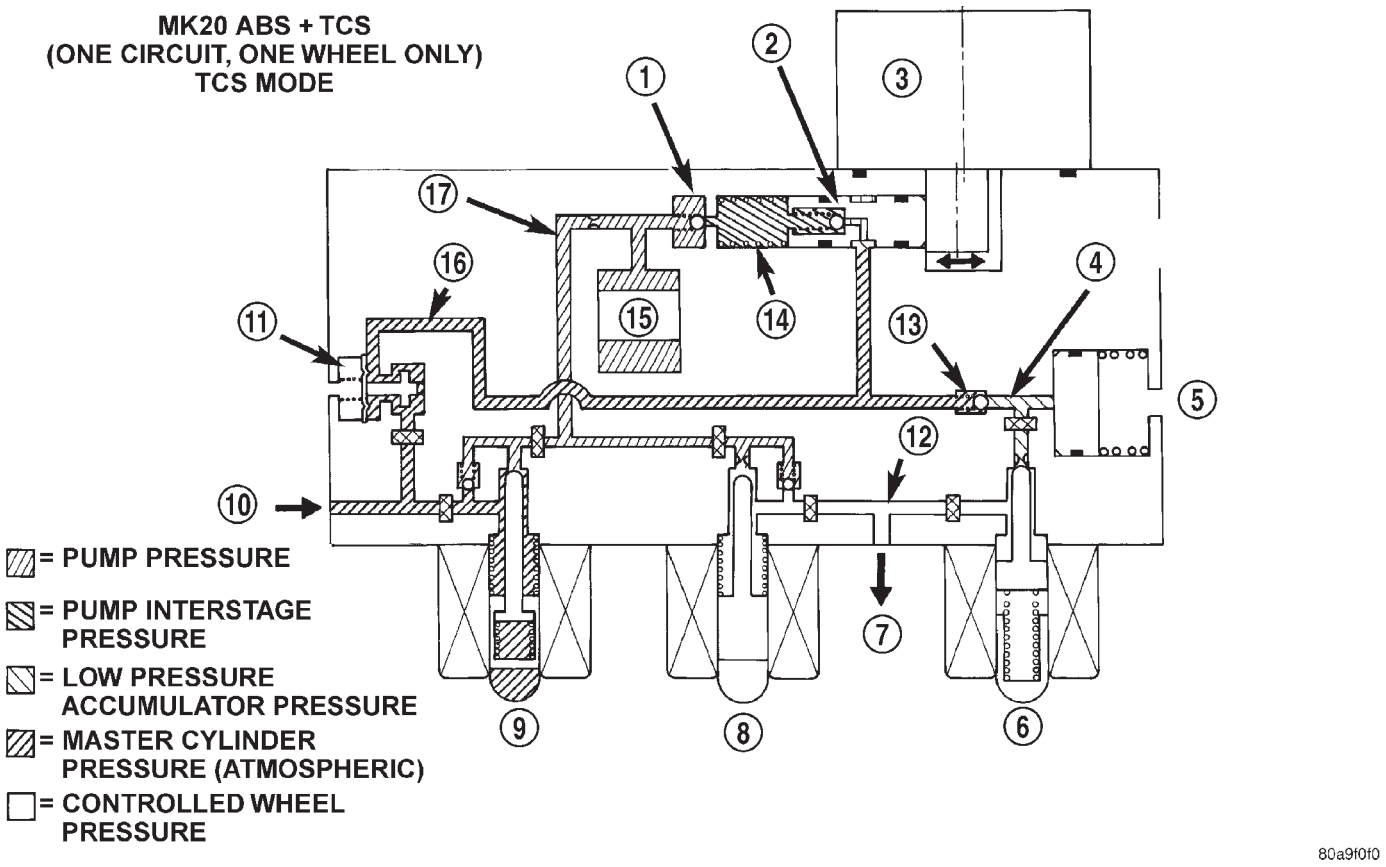


Fig. 10 Traction Control Hydraulic Circuit

1 – OUTLET VALVE
2 – PUMP PISTON
3 – PUMP MOTOR (ON)
4 – LOW PRESSURE ACCUMULATOR PRESSURE
5 – LOW PRESSURE ACCUMULATOR
6 – NORMALLY CLOSED VALVE (MODULATING)
7 – TO RIGHT FRONT WHEEL (SPINNING)
8 – NORMALLY OPEN VALVE (MODULATING)
9 – NORMALLY OPEN ASR VALVE ON (REGULATING)
10 – FROM MASTER CYLINDER
11 – HYDRAULIC SHUTTLE VALVE
12 – CONTROLLED WHEEL PRESSURE
13 – SUCTION VALVE
14 – PUMP INTERSTAGE PRESSURE
15 – NOISE DAMPER CHAMBER
16 – MASTER CYLINDER PRESSURE
17 – PUMP PRESSURE

Before test driving a brake complaint vehicle, note whether the red BRAKE warning lamp, amber ABS warning lamp, or both are turned on. If it is the red BRAKE warning lamp, there is a brake hydraulic problem that must be corrected before driving the vehicle. Refer to the BASE BRAKE SYSTEM for diagnosis of the red BRAKE warning lamp. If the red brake warning lamp is illuminated, there is also a possibility that there is an ABS problem and the amber ABS warning lamp is not able to illuminate, so the MIC turns on the red Brake warning lamp by default.

If the amber ABS warning lamp is on, test drive the vehicle as described below. While the amber ABS warning lamp is on, the ABS is not functional. The ability to stop the car using the base brake system should not be affected.

If a functional problem of the ABS is determined while test driving the vehicle, refer to the Chassis Diagnostic Procedures manual.

(1) Turn the key to the OFF position and then back to the ON position. Note whether the amber ABS warning lamp continues to stay on. If it does, refer to the diagnostic manual.

(2) If the amber ABS warning lamp goes out, shift into gear and drive the car to a speed of 25 kph (15 mph) to complete the ABS start-up and drive-off cycles (see ABS ELECTRONIC DIAGNOSIS). If at this time the amber ABS warning lamp comes on, refer to the diagnostic manual.

(3) If the amber ABS warning lamp remains out, drive the vehicle a short distance. Accelerate the vehicle to a speed of at least 64 kph (40 mph). Bring the vehicle to a complete stop, braking hard enough

to cause the ABS to cycle. Again accelerate the vehicle past 40 kph (25 mph). Refer to the diagnostic manual for further testing of the antilock brake system.

ABS ELECTRONIC DIAGNOSIS

The following information is presented to give the technician a general background on the diagnostic capabilities of the ABS system. Complete electronic diagnosis of the ABS system used on this vehicle is covered in the ITT Teves Mark 20 Antilock Brake System diagnostics manual.

Electronic diagnosis of the ABS used on this vehicle is performed using the DRB scan tool. The vehicle's scan tool diagnostic connector is located under the instrument panel, near the steering column (Fig. 11).

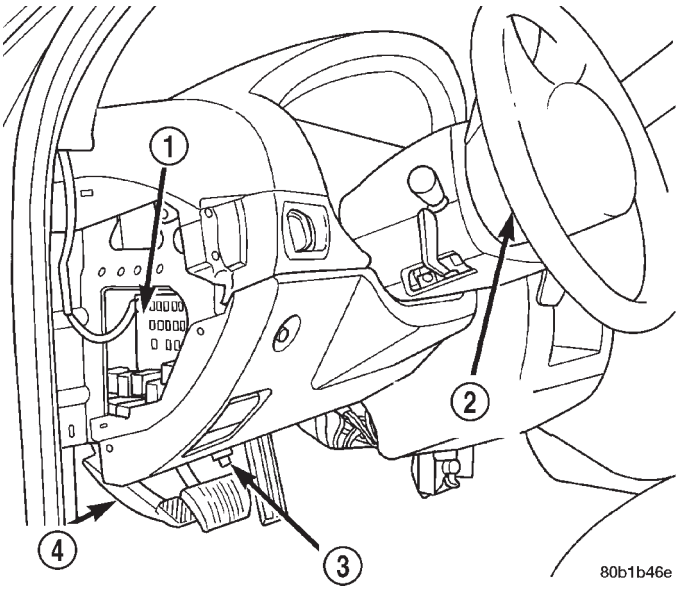


Fig. 11 ABS System Diagnostic Connector Location

1 – JUNCTION BLOCK
2 – STEERING WHEEL
3 – DATA LINK CONNECTOR
4 – PARKING BRAKE

ABS SELF-DIAGNOSIS

The ABS system is equipped with a self-diagnosis capability, which may be used to assist in the isolation of ABS faults. The features are described below.

START-UP CYCLE

The self-diagnosis ABS start-up cycle begins when the ignition switch is turned to the ON position. Electrical checks are completed on ABS components, including the CAB, solenoid continuity, and the relay system operation. During this check the amber ABS warning lamp is turned on for approximately 5 seconds and the brake pedal may emit a popping sound, moving slightly when the solenoid valves are checked.

DRIVE-OFF CYCLE

The first time the vehicle is set in motion after an ignition off/on cycle, the drive-off cycle occurs. This cycle is performed when the vehicle reaches a speed of approximately 25 kph (15 mph.).

- The pump/motor is briefly activated to verify function. When the pump/motor is briefly activated, a whirling or buzzing sound may be heard by the driver. This sound is normal, indicating the pump/motor is running.
- The wheel speed sensor output correct operating range is verified.

ONGOING TESTS

While the system is operating, these tests are performed on a continuous basis:

- solenoid continuity
- wheel speed sensor continuity
- wheel speed sensor output
- system voltage
- CAB self-diagnosis
- PCI communication circuit - sending/receiving messages

DIAGNOSTIC TROUBLE CODES (DTC's)

Diagnostic trouble codes (DTC's) are kept in the controller's memory until either erased by the technician using the DRB, or erased automatically after 3500 miles. DTC's are retained by the controller even if the ignition is turned off or the battery is disconnected. More than one DTC can be stored at a time. When accessed, the number of occurrences and the DTC that is stored are displayed. Most functions of the CAB and the ABS system can be accessed by the technician for testing and diagnostic purposes using the DRB.

LATCHING VERSUS NON-LATCHING DIAGNOSTIC TROUBLE CODES

Some DTC's detected by the CAB are "latching" codes. The DTC is latched and ABS braking is disabled until the ignition switch is reset. Thus, ABS braking is non-operational even if the original DTC has disappeared. Other DTC's are non-latching. Any warning lamps that are turned on are only turned on as long as the DTC condition exists; as soon as the condition goes away, the amber ABS warning lamp is turned off, although, in most cases, a DTC is set.

INTERMITTENT DIAGNOSTIC TROUBLE CODES

As with virtually any electronic system, intermittent electrical problems in the ABS system may be difficult to accurately diagnose. Most intermittent electrical problems are caused by faulty electrical connections or wiring. A visual inspection should be done before trying to diagnose or service the antilock brake system; this will eliminate unnecessary diag-

DIAGNOSIS AND TESTING (Continued)

nosis and testing time. Perform a visual inspection for loose, disconnected, damaged, or misrouted wires or connectors; include the following components and areas of the vehicle in the inspection.

(1) Inspect fuses in the power distribution center (PDC) and the wiring junction block. Verify that all fuses are fully inserted into the PDC and wiring junction block. A label on the underside of the PDC cover identifies the locations of the ABS fuses.

(2) Inspect the 25-way electrical connector at the CAB for damaged, spread, or backed-out wiring terminals. Verify that the 25-way connector is fully inserted in the socket of the CAB. Be sure that wires are not stretched tight or pulled out of the connector.

(3) Verify that all the wheel speed sensor connections are secure.

(4) Look for poor mating of connector halves or terminals not fully seated in the connector body.

(5) Check for improperly formed or damaged terminals. All connector terminals in a suspect circuit should be carefully reformed to increase contact tension.

(6) Look for poor terminal-to-wire connections. This requires removing the terminal from the connector body to inspect it.

(7) Verify pin presence in the connector assembly

(8) Check for proper ground connections. Check all ground connections for signs of corrosion, loose fasteners, or other potential defects. Refer to the wiring diagrams for ground locations.

(9) Look for problems with the main power sources of the vehicle. Inspect the battery, generator, ignition circuits and other related relays and fuses.

If a visual check does not find the cause of the problem, operate the car in an attempt to duplicate the condition and record any trouble codes.

Most failures of the ABS disable the ABS function for the entire ignition cycle even if the fault clears before key-off. There are some failure conditions, however, that allow ABS operation to resume during the ignition cycle in which the trouble occurred even if the trouble conditions are no longer present.

The following trouble conditions may result in intermittent illumination of the amber ABS warning lamp.

- Low system voltage. If Low System Voltage is detected by the CAB, the CAB will turn on the amber ABS warning lamp until normal system voltage is achieved. Once normal voltage is seen at the CAB, normal operation resumes.

Additional possible causes that may result in the illumination of the amber ABS warning lamp are as follows:

- High system voltage. If high system voltage is detected by the CAB, the CAB will turn on the amber ABS warning lamp. If the ignition key is cycled and normal voltage is again detected by the CAB, normal ABS operation resumes and the lamp remains off.
- Any condition that interrupts electrical current to the CAB may cause the amber ABS warning lamp to turn on intermittently.
- If PCI communication between the mechanical instrument cluster (MIC) and the CAB is interrupted, the MIC can turn on the amber ABS warning lamp.

TONE WHEEL

Tone wheels can cause erratic wheel speed sensor signals. Inspect tone wheels for the following possible causes.

- missing, chipped, or broken teeth
- contact with the wheel speed sensor
- wheel speed sensor to tone wheel alignment
- wheel speed sensor to tone wheel clearance
- excessive tone wheel runout
- tone wheel loose on its mounting surface

If a front tone wheel is found to need replacement, the drive shaft must be replaced. No attempt should be made to replace just the tone wheel. Refer to the DIFFERENTIAL AND DRIVELINE group in this service manual for removal and installation.

If a rear tone wheel is found to need replacement, the rear hub and bearing must be replaced. No attempt should be made to replace just the tone wheel. Refer to the SUSPENSION group in this service manual for removal and installation.

If wheel speed sensor to tone wheel contact is evident, determine the cause and correct it before replacing the wheel speed sensor or tone wheel.

Check the gap between the speed sensor head and the tone wheel to ensure it is within specifications. Refer to SPECIFICATIONS in this section of the service manual for the minimum and maximum wheel speed sensor to tone wheel clearance.

Excessive wheel speed sensor runout can cause erratic wheel speed sensor signals. Refer to SPECIFICATIONS in this section of the service manual for the maximum allowed tone wheel runout. If tone wheel runout is excessive, determine if it is caused by a defect in the driveshaft assembly or hub and bearing. Replace as necessary.

Tone wheels are pressed onto their mounting surfaces and should not rotate independently from the mounting surface. Replacement of the front driveshaft or rear hub and bearing is necessary.

BRAKE FLUID CONTAMINATION

Indications of fluid contamination are swollen or deteriorated rubber parts.

Swollen rubber parts indicate the presence of petroleum in the brake fluid.

DIAGNOSIS AND TESTING (Continued)

To test for contamination, put a small amount of drained brake fluid in clear glass jar. If fluid separates into layers, there is mineral oil or other fluid contamination of the brake fluid.

If brake fluid is contaminated, drain and thoroughly flush system. Replace master cylinder, proportioning valve, caliper seals, wheel cylinder seals, Antilock Brakes hydraulic unit and all hydraulic fluid hoses.

SERVICE PROCEDURES

BRAKE FLUID LEVEL CHECKING

CAUTION: Use only Mopar brake fluid or an equivalent from a tightly sealed container. Brake fluid must conform to DOT 3 specifications. Do not use petroleum-based fluid because seal damage in the brake system will result.

Refer to SERVICE PROCEDURES in the BASE BRAKE SYSTEM section in this group for the proper procedure to check and adjust the brake fluid level in the master cylinder fluid reservoir.

ANTILOCK BRAKE SYSTEM BLEEDING

The base brake's hydraulic system must be bled anytime air enters the hydraulic system. The ABS though, particularly the ICU (HCU), should only be bled when the HCU is replaced or removed from the vehicle. The ABS must always be bled anytime it is suspected that the HCU has ingested air. Under most circumstances that require the bleeding of the brakes hydraulic system, only the base brake hydraulic system needs to be bled.

It is important to note that excessive air in the brake system will cause a soft or spongy feeling brake pedal.

During the brake bleeding procedure, be sure the brake fluid level remains close to the FULL level in the master cylinder fluid reservoir. Check the fluid level periodically during the bleeding procedure and add DOT 3 brake fluid as required.

The ABS must be bled as two independent braking systems. The non-ABS portion of the brake system with ABS is to be bled the same as any non-ABS system.

The ABS portion of the brake system must be bled separately. Use the following procedure to properly bleed the brake hydraulic system including the ABS.

BLEEDING

When bleeding the ABS system, the following bleeding sequence must be followed to insure complete and adequate bleeding.

(1) Make sure all hydraulic fluid lines are installed and properly torqued.

(2) Connect the DRB scan tool to the diagnostics connector. The diagnostic connector is located under the lower steering column cover to the left of the steering column.

(3) Using the DRB, check to make sure the CAB does not have any fault codes stored. If it does, clear them using the DRB.

WARNING: WHEN BLEEDING THE BRAKE SYSTEM WEAR SAFETY GLASSES. A CLEAR BLEED TUBE MUST BE ATTACHED TO THE BLEEDER SCREWS AND SUBMERGED IN A CLEAR CONTAINER FILLED PART WAY WITH CLEAN BRAKE FLUID. DIRECT THE FLOW OF BRAKE FLUID AWAY FROM YOURSELF AND THE PAINTED SURFACES OF THE VEHICLE. BRAKE FLUID AT HIGH PRESSURE MAY COME OUT OF THE BLEEDER SCREWS WHEN OPENED.

(4) Bleed the base brake system using the standard pressure or manual bleeding procedure as outlined in SERVICE PROCEDURES in the BASE BRAKE SYSTEM section at the beginning of this group.

(5) Using the DRB, select ANTILOCK BRAKES, followed by MISCELLANEOUS, then BLEED BRAKES. Follow the instructions displayed. When the scan tool displays TEST COMPLETED, disconnect the scan tool and proceed.

(6) Bleed the base brake system a second time. Check brake fluid level in the reservoir periodically to prevent emptying, causing air to enter the hydraulic system.

(7) Fill the master cylinder reservoir to the full level.

(8) Test drive the vehicle to be sure the brakes are operating correctly and that the brake pedal does not feel spongy.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

Review this entire section prior to performing any mechanical work on a vehicle equipped with ABS. This section contains information on precautions pertaining to potential component damage, vehicle damage and personal injury which could result when servicing an ABS equipped vehicle.

REMOVAL AND INSTALLATION (Continued)

CAUTION: Only the recommended jacking or hoisting positions for this vehicle are to be used whenever it is necessary to lift a vehicle. Failure to raise a vehicle from the recommended locations could result in lifting a vehicle by the hydraulic control unit mounting bracket. Lifting a vehicle by the hydraulic control unit mounting bracket will result in damage to the mounting bracket and the hydraulic control unit.

CAUTION: An attempt to remove or disconnect certain system components may result in improper system operation. Only those components with approved removal and installation procedures in this manual should be serviced.

CAUTION: Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surfaces, wash off with water immediately.

CAUTION: When performing any service procedure on a vehicle equipped with ABS do not apply a 12-volt power source to the ground circuit of the pump motor in the HCU. Doing this will damage the pump motor and will require replacement of the entire HCU.

CAUTION: If welding work is to be performed on the vehicle, using an electric arc welder, the CAB connector should be disconnected during the welding operation.

CAUTION: The CAB 25-way connector should never be connected or disconnected with the ignition switch in the ON position.

Many components of the ABS System are not serviceable and must be replaced as an assembly. Do not disassemble any component which is not designed to be serviced.

INTEGRATED CONTROL UNIT

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove the remote ground cable from the ground stud on the right strut tower.

(2) Correctly isolate remote ground cable when servicing vehicle by installing the ground cable insulator on the strut tower ground stud as shown in (Fig. 12) and installing the nut on the stud. **This will prevent accidental grounding of the remote ground cable.**

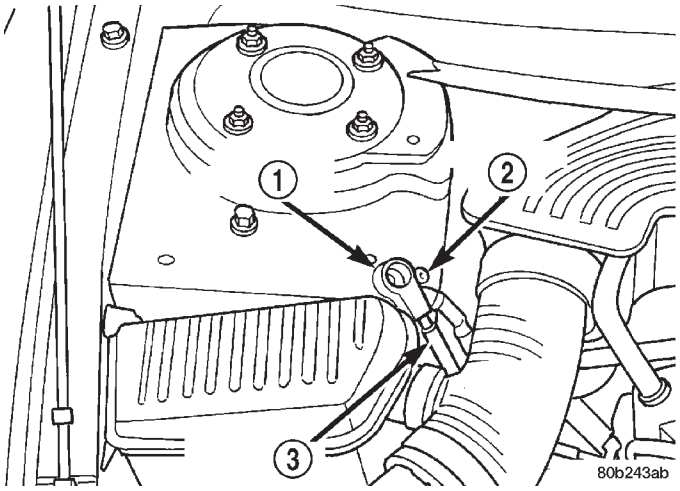


Fig. 12 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(3) Using a brake pedal positioning tool such as shown in (Fig. 13) depress brake pedal past its first 1 inch of travel and hold in this position. This will isolate the master cylinder reservoir from the brake hydraulic system, not allowing the brake fluid to drain out of the reservoir.

(4) Remove the bolt and 2 nuts securing the speed control servo to vehicle. Disconnect the wire harness connector from speed control servo. Leaving the cable attached to the speed control servo, move it aside, out of the way.

(5) Remove the screw attaching the washer bottle filler neck to the vehicle. Move neck to the side without loosening the filler tube (Fig. 14).

(6) Remove the nut and bolt holding the transmission controller and bracket to vehicle (Fig. 14). Lift transmission controller up and move away from mounting position.

(7) Using Mopar, Brake Parts Cleaner or an equivalent, thoroughly clean all surfaces of the HCU. Also, thoroughly clean all brake tube to HCU connections.

(8) Remove the primary and secondary brake tubes coming from the master cylinder, at the HCU, using a crow foot wrench (Fig. 15).

(9) Remove the chassis brake tubes at the HCU (Fig. 15), using a crow foot wrench.

REMOVAL AND INSTALLATION (Continued)

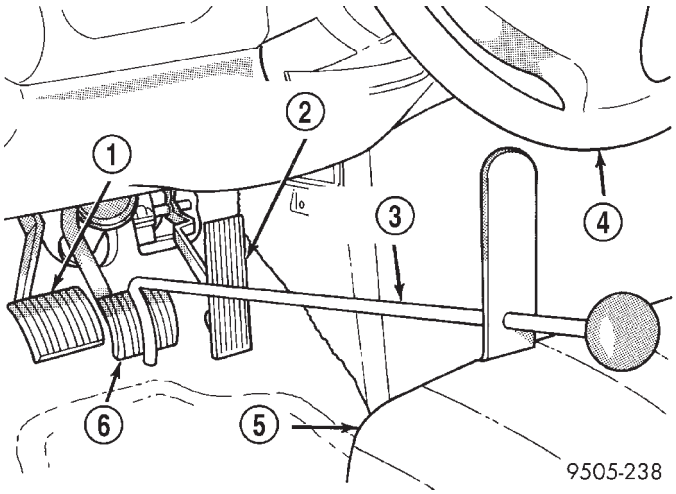


Fig. 13 Brake Pedal Holding Tool Installed

1 – CLUTCH PEDAL (IF EQUIPPED WITH MANUAL TRANSAXLE)
2 – THROTTLE PEDAL
3 – BRAKE PEDAL HOLDING TOOL
4 – STEERING WHEEL
5 – DRIVER'S SEAT
6 – BRAKE PEDAL

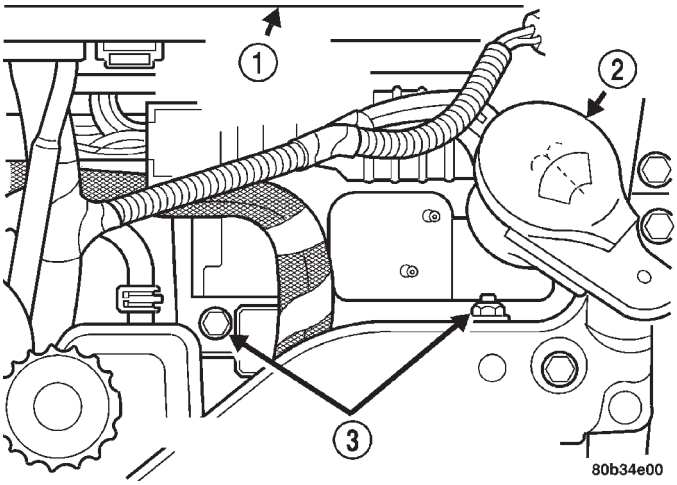


Fig. 14 Transmission Controller Mounting

1 – POWER DISTRIBUTION CENTER
2 – WASHER BOTTLE NECK
3 – TRANSMISSION CONTROLLER MOUNTING BOLT AND NUT

CAUTION: Do not apply a 12-volt power source to any terminals of the 25-way HCU connector when disconnected from the CAB.

(10) Disconnect the 25-way wiring harness connector from the CAB using the following procedure. Grasp the lock on the 25-way connector (Fig. 16), and pull it up from the connector as far as possible. This will unlock and raise the 25-way connector out of the socket on the CAB.

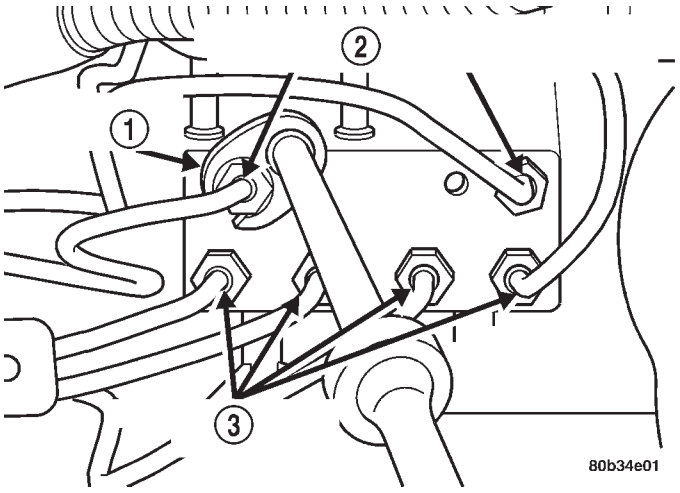


Fig. 15 Brake Tube Fittings

1 – CROW FOOT WRENCH
2 – PRIMARY AND SECONDARY BRAKE TUBES FROM MASTER CYLINDER
3 – CHASSIS BRAKE TUBES

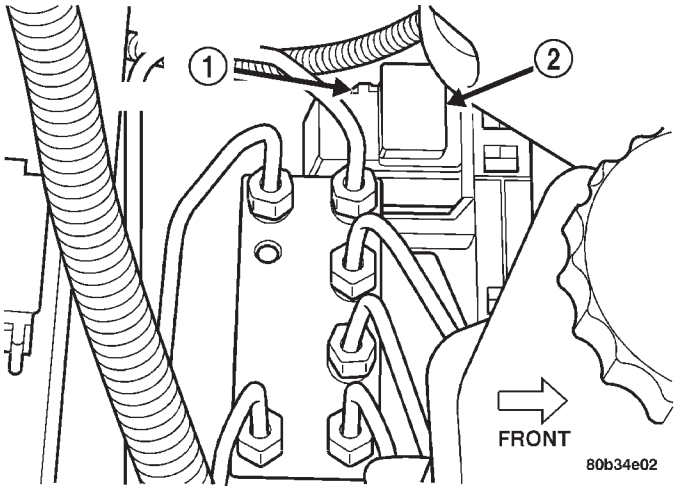


Fig. 16 25-Way CAB Connector Lock

1 – 25–WAY CAB CONNECTOR
2 – CONNECTOR LOCK

(11) Raise vehicle on jackstands or centered on a hoist. See Hoisting in the Lubrication and Maintenance section of this manual.

(12) Remove the left front tire and wheel assembly.

(13) Remove fasteners securing the inner fender splash shield in place. Move the splash shield out of the way.

(14) Remove the 3 bolts attaching the ICU to the mounting bracket.

(15) Remove the ICU from its mounting bracket. Then, remove the ICU from the vehicle by pulling it out around the left side of the mounting bracket, then through the wheel well.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Install the ICU back in the vehicle and attach it to its mounting bracket. Tighten the 3 ICU mounting bolts to 11 N·m (97 in. lbs.).
(2) Reinstall the inner fender splash shield.
(3) reinstall the tire and wheel assembly.
(4) Lower the vehicle.

CAUTION: Before installing the 25-way connector in the CAB be sure that the seal is properly installed in the connector.

(5) Install the 25-way connector into the socket on the CAB. The connector is installed using the following procedure. Position the 25-way connector in the socket on the CAB and carefully push it onto CAB as far as it will go. When connector is fully seated into the CAB socket push in the connector lock (Fig. 16) as far as it will go. This will pull the 25-way connector into the socket on the CAB and lock it in the installed position.
(6) Install the 4 chassis brake tubes on the HCU (Fig. 15). Tighten the chassis brake tubes to 17 N·m (145 in. lbs.).
(7) Install the primary and secondary brake lines from the master cylinder on the HCU (Fig. 15). Tighten the primary and secondary brake tubes to 17 N·m (145 in. lbs.).
(8) Reinstall the transmission controller (Fig. 14).
(9) Reattach the washer bottle filler neck to the radiator support.
(10) Reinstall the speed control servo to its mounting studs and radiator support.
(11) Remove brake pedal positioning tool.
(12) Install the remote ground cable onto the ground stud located on left shock tower. Install the remote ground cable attaching nut and tighten to a torque of 28 N·m (250 in. lbs.).

NOTE: The ICU may need to be initialized, using the DRB scan tool, after installation.

(13) Bleed the base brakes and the ABS brakes hydraulic system. Refer to the Bleeding ABS System in this section of the manual for the proper bleeding procedure.
(14) Road test vehicle to ensure proper operation of the base and ABS systems.

WHEEL SPEED SENSOR (FRONT)

REMOVAL

(1) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.
(2) Remove the tire and wheel assembly from the vehicle.
(3) Remove bolt securing the speed sensor cable routing bracket (Fig. 17) to the strut assembly.

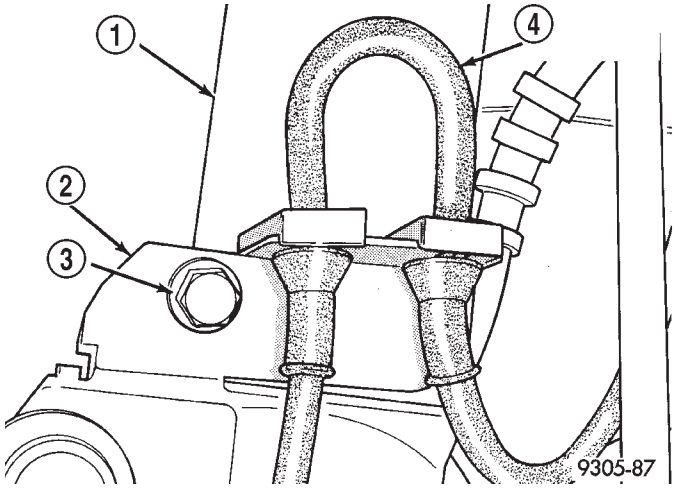


Fig. 17 Speed Sensor Cable Routing Bracket
1 – STRUT ASSEMBLY
2 – ROUTING BRACKET
3 – SCREW
4 – SPEED SENSOR CABLE

(4) Remove retainer, holding the speed sensor sealing grommet, from the inner fender. pull the grommet out, then unplug the speed sensor cable from the vehicle wiring harness
(5) Remove bolt attaching speed sensor to steering knuckle. Carefully remove speed sensor head from steering knuckle. If sensor is seized in place by corrosion, tap the edge of the sensor ear with a hammer and brass punch (Fig. 18), working it side to side.

CAUTION: If speed sensor head locating pin has seized to the steering knuckle, do not attempt to remove speed sensor head by grasping with pliers and turning. This will damage the speed sensor head. Use only the following procedure.

INSTALLATION

CAUTION: Proper installation of wheel speed sensor cables is critical to continued system operation. Be sure that cables are installed in retainers. Failure to install cables in retainers as shown in this section may result in contact with moving parts and/or over extension of cables, resulting in an open circuit.

(1) Connect the wheel speed sensor cable connector to the vehicle wiring harness.
(2) Install the speed sensor cable assembly grommet into the front inner fender. Install speed sensor

REMOVAL AND INSTALLATION (Continued)

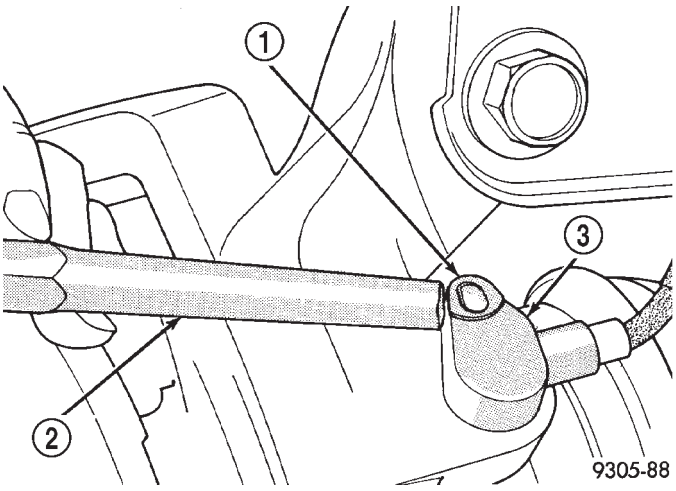


Fig. 18 Speed Sensor Head Attachment To Steering Knuckle

1 – SENSOR EAR
2 – PUNCH
3 – SPEED SENSOR HEAD

cable grommet and retainer bracket on the inner fender of the vehicle and install and securely tighten attaching bolt.

CAUTION: When installing the wheel speed sensor cable routing bracket on the strut, the speed sensor cable must be looped upward as shown (Fig. 17). If speed sensor cable is not routed in this direction it may rub, damaging the speed sensor cable.

(3) Install the speed sensor cable routing bracket on the steering knuckle. Install and tighten routing bracket mounting bolt to a torque of 12 N·m (105 in. lbs.)

(4) Apply a small amount of High Temperature Multipurpose grease to the sensor head before installation. Install speed sensor head on steering knuckle. Install the speed sensor head attaching screw and tighten to a torque of 7 N·m (60 in. lbs.).

(5) Install the wheel and tire assembly on vehicle.

(6) Lower the vehicle to the ground.

(7) Road test vehicle to ensure proper operation of the base and ABS systems.

WHEEL SPEED SENSOR (REAR)

REMOVAL

NOTE: When removing rear wheel speed sensor from vehicle, access to the wire harness connector is through the passenger compartment of the vehicle.

(1) Remove the rear seat cushion, and the rear seat back, from the interior of the car. Refer to Seats in the Body section of this manual for the required procedure to be used for this vehicle.

(2) Disconnect the wheel speed sensor cable from the wire harness.

(3) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(4) Remove the rear wheel and tire assembly from the vehicle.

(5) Remove the grommet from the floor pan, along with the end of the cable that fastens to the wire harness.

(6) Remove the sensor cable from the routing bracket attached to the strut tower flange.

(7) Remove the wheel speed sensor head and routing bracket from the disc brake caliper adapter by removing the bolt, then the sensor (Fig. 19).

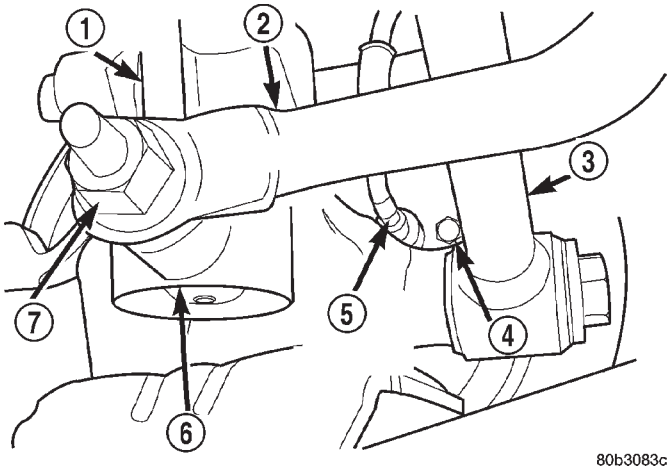


Fig. 19 Wheel Speed Sensor At Adapter

1 – STABILIZER BAR LINK
2 – STABILIZER BAR
3 – LATERAL LINK
4 – BOLT
5 – WHEEL SPEED SENSOR
6 – STRUT ASSEMBLY
7 – NUT

INSTALLATION

(1) Install rear wheel speed sensor and routing bracket into brake caliper adapter. Install head attaching bolt (Fig. 19) and tighten to 7 N·m (60 in. lbs.).

(2) Install the sensor cable to the routing bracket attached to the strut tower flange.

(3) Guide the cable through the hole in the floor pan and install the grommet.

REMOVAL AND INSTALLATION (Continued)

(4) Install wheel and tire assembly on vehicle. Then torque all wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat tightening sequence to full specified torque of 129 N·m (95 ft. lbs.).
(5) Lower vehicle to the ground.
(6) Connect the sensor cable to the wiring harness.
(7) Reinstall the rear seat back and seat cushion.
(8) Road test vehicle to ensure proper operation of the base and ABS systems.

DISASSEMBLY AND ASSEMBLY

INTEGRATED CONTROL UNIT

REMOVAL

NOTE: To replace the hydraulic control unit (HCU) or the controller antilock brake (CAB) on this vehicle, the entire integrated control unit (ICU) needs to be removed from the vehicle. The CAB can then be separated from the HCU. Do not attempt to replace the CAB with the ICU mounted in the vehicle.

(1) Remove the ICU from the vehicle. Refer INTEGRATED CONTROL UNIT in the REMOVAL AND INSTALLATION section in this section of the service manual.
(2) Disconnect the pump/motor wiring harness (Fig. 20) from the CAB.

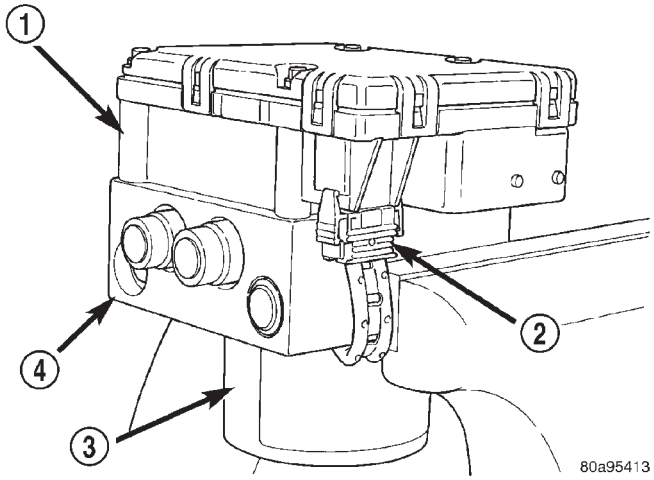


Fig. 20 Pump/Motor To CAB Wiring Harness

1 – CAB
2 – PUMP MOTOR WIRING HARNESS
3 – PUMP MOTOR
4 – HCU VALVE BLOCK

(3) Remove the 4 bolts (Fig. 21) attaching the CAB to the HCU.
(4) Remove the CAB from the HCU (Fig. 22).

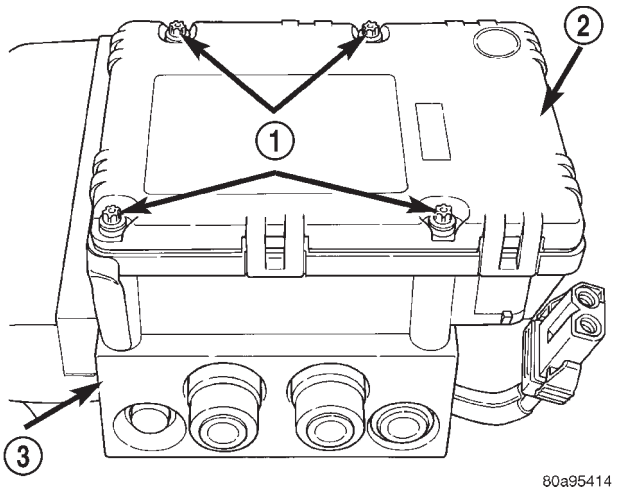


Fig. 21 CAB Attaching Bolts

1 – MOUNTING BOLTS
2 – CAB
3 – HCU VALVE BLOCK

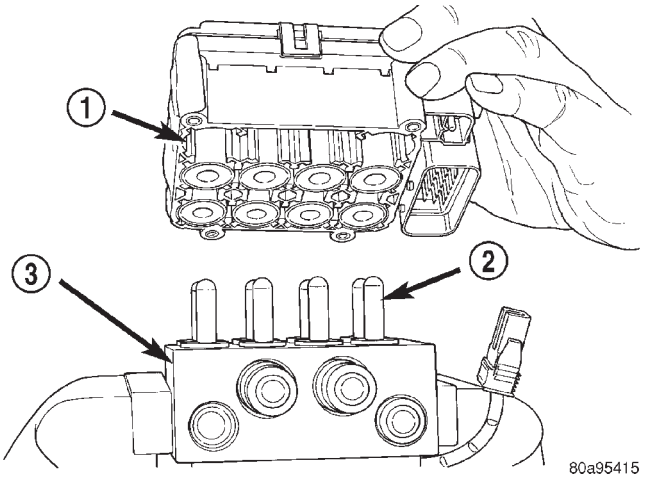


Fig. 22 Remove/Install CAB

1 – CAB
2 – HCU VALVES
3 – HCU VALVE BLOCK

INSTALLATION

(1) Install the CAB (Fig. 22) on the HCU.
(2) Install the 4 bolts mounting the CAB (Fig. 21) to the HCU. Tighten the CAB mounting bolts to a torque of 2 N·m (17 in. lbs.).
(3) Plug the pump/motor wiring harness into the CAB (Fig. 20).
(4) Install the ICU in the vehicle.
(5) Bleed the base and ABS hydraulic systems. Refer to ANTILOCK BRAKE SYSTEM BLEEDING in this section of this service manual group.
(6) Road test the vehicle to ensure proper operation of the base brakes and ABS.

SPECIFICATIONS

TONE WHEEL RUNOUT

FRONT TONE WHEEL:
Maximum Runout . . . . . 0.15 mm (0.006 in.)
REAR TONE WHEEL:
Maximum Runout . . . . . 0.15 mm (0.006 in.)

WHEEL SPEED SENSOR-TO-TONE WHEEL CLEARANCE

FRONT WHEEL:
Minimum Clearance . . . . . 0.42 mm (0.017 in.)
Maximum Clearance . . . . . 1.71 mm (0.067 in.)
REAR WHEEL:
Minimum Clearance . . . . . 0.38 mm (0.015 in.)
Maximum Clearance . . . . . 1.31 mm (0.052 in.)

WHEEL SPEED SENSOR RESISTANCE

FRONT AND REAR:
Allowable Resistance . . . . . 900 - 1300 ohms

BRAKE FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
BRAKE TUBES:	
Tube Nuts	17 N·m (145 in. lbs.)
ABS INTEGRATED CONTROL UNIT (ICU):	
Mounting Bracket Bolts	11 N·m (97 in. lbs.)
CAB To HCU Screws	2 N·m (17 in. lbs.)

BRAKES

BASE BRAKE SYSTEM

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DESCRIPTION AND OPERATION

BASE BRAKE SYSTEM

DESCRIPTION

The service procedures in this group are published for the overseas market. Most base brake system service procedures are the same for all LH vehicles however, if differences are present they will be called out in this group of the service manual. Refer to Group 5, Brakes for additional information not covered in this manual.

DIAGNOSIS AND TESTING

PROPORTIONING VALVE

PROPORTIONING VALVE TEST (WITH AND WITHOUT ANTILOCK BRAKES)

CAUTION: Not all components use the same type tubing flare. The tube leading into the proportioning valve has an ISO flare, while the flex hose coming out of the proportioning valve has a standard double-inverted flare. Use the correct adapters when installing gauges to test proportioning valves.

Both vehicles, with Antilock Brakes, and without Antilock Brakes, have two proportioning valves. One valve is connected to each rear flex hose. One proportioning valve controls the right rear brake, and the other proportioning valve controls the left rear brake.

On vehicles without ABS, if premature wheel skid occurs on a hard brake application, it could be an indication that a malfunction has occurred with one of the two rear brake proportioning valves. Test the valve that controls the side of the vehicle on which the skid occurs.

On vehicles with ABS, if premature rear wheel ABS cycling occurs on a hard brake application, it could be an indication that a malfunction has occurred with one of the two proportioning valves. Since ABS cycles both rear brakes together, both valves must be tested to isolate the suspect proportioning valve.

(1) Raise the vehicle on jack stands or centered on a hoist. See hoisting in the Lubrication and Maintenance section of this manual.

(2) Clean any debris away from the suspect proportioning valve, connections, and area.

(3) Remove the chassis brake tube (Fig. 1) from the suspect proportioning valve.

(4) Remove the proportioning valve from the rear flex hose which is held stationary by a bracket mounted on the back side of the crossmember.

DIAGNOSIS AND TESTING (Continued)

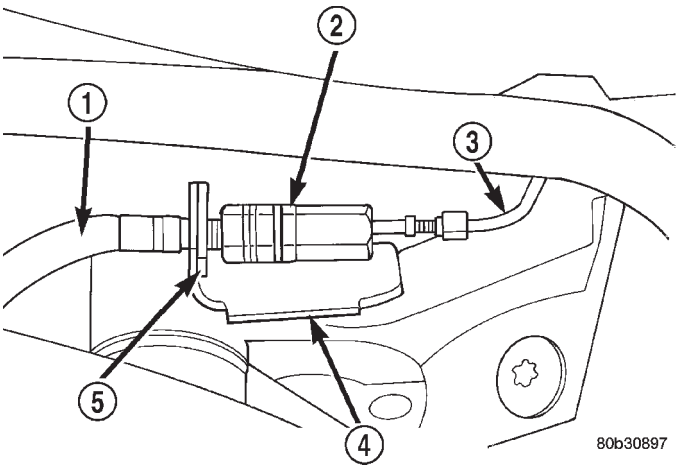


Fig. 1 Proportioning Valve

1 – FLEX HOSE
2 – PROPORTIONING VALVE
3 – BRAKE TUBE
4 – BRACKET
5 – RETAINER CLIP

(5) Remove the retainer clip securing the rear flex hose from its bracket (Fig. 1). **This should be done to allow the proportioning valve pressure test fittings to be installed without bending the chassis brake tube.**

CAUTION: Be sure the pressure test fittings being installed into the proportioning valve, have the correct thread sizes for installation into the proportioning valve and installation of the chassis brake tubes.

(6) Correctly install Pressure Test Fittings, Special Tool 6892–2 into the inlet port, and Special Tool 8187–2 into the outlet port, of the proportioning valve (Fig. 2).

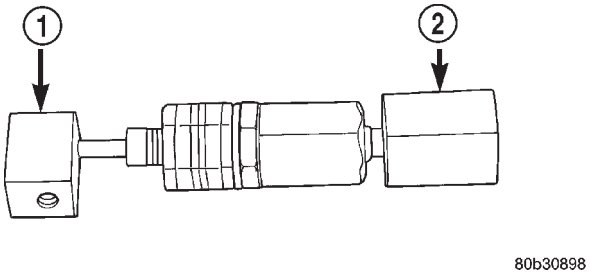


Fig. 2 Proportioning Valve With Fittings

1 – SPECIAL TOOL 8187–2
2 – SPECIAL TOOL 6892–2

(7) Install the proportioning valve and the Pressure Test Fittings, Special Tool 6892–2 and 8187–2, as an assembly back into the chassis brake tube. Connect Special Tool 6892–2 to the chassis brake tube, and Special Tool 8187–2 to the brake flex hose.

(8) Install a Pressure Gauge, Special Tool C-4007-A into each pressure test fitting (Fig. 3). Bleed any air out of the system. This includes bleeding the air from the hose between the pressure test fitting and pressure gauge, which is done at the pressure gauge.

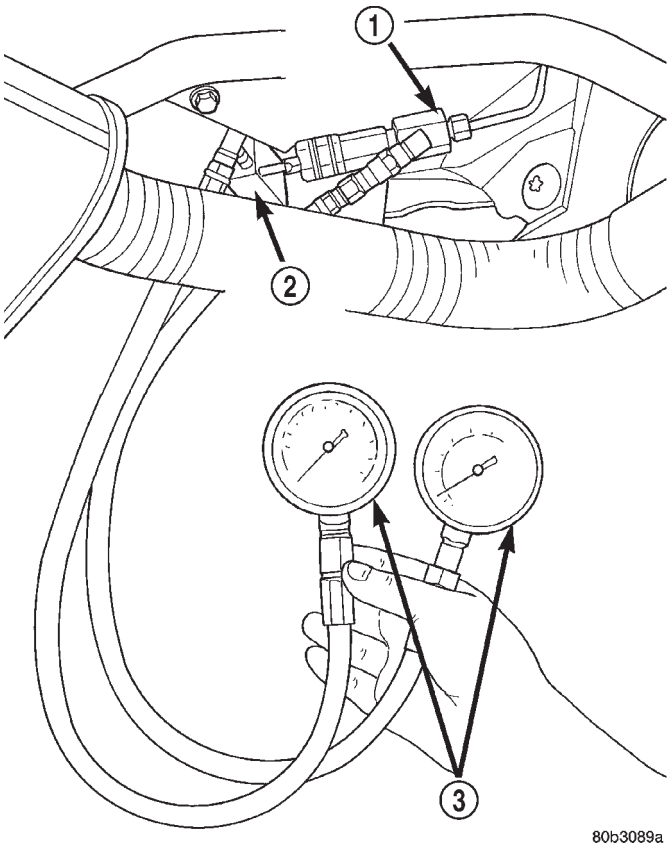


Fig. 3 Pressure Gauges Installed

1 – SPECIAL TOOL 6892–2
2 – SPECIAL TOOL 8187–2
3 – SPECIAL TOOL C-4007–A

(9) With the aid of a helper, apply pressure to the brake pedal until reading on proportioning valve inlet gauge, is at the pressure shown on the following chart. Then check the pressure reading on the proportioning valve outlet gauge. If proportioning valve outlet pressure does not agree with value shown on the following chart, when inlet pressure shown on chart is obtained, replace the proportioning valve. If proportioning valve is within pressure specifications do not replace proportioning valve.

(10) Remove the pressure gauges from the pressure test fittings.

(11) Remove the proportioning valve and the Pressure Test Fittings, Special Tool 6892–2, and 8187–2 from the chassis brake tube and rear flex hose. Remove the pressure test fittings from the proportioning valve (Fig. 2).

(12) Install the rear brake flex hose to its mounting bracket using a new retainer clip.

DIAGNOSIS AND TESTING (Continued)

(13) Install the proportioning valve to the rear brake flex hose. Tighten to a torque of 17 N·m (145 in. lbs.).

(14) Install the chassis brake tube to the proportioning valve (Fig. 1). Tighten the tube nut to a torque of 17 N·m (145 in. lbs.).

(15) Bleed the affected brake line. See Bleeding Brake System in the Service Adjustments section of the manual for proper bleeding procedure.

(16) On vehicles with Antilock Brakes, repeat the above steps for the other proportioning valve.

(17) If no problem is found with the proportioning valves, check the rear wheel brake shoe linings for contamination or for replacement brake shoes not meeting OEM brake lining material specifications. These conditions can also be a possible cause for a premature rear wheel skid.

PROPORTIONING VALVE APPLICATIONS AND PRESSURE SPECIFICATIONS

Sales Code	Brake System Type	Split Point	Slope	Identification	Inlet Pressure	Outlet Pressure
BR5	16” Disc/Disc W/ABS And Traction Control	500 psi	0.43	Bar Code Label	1000 psi	650-750 psi

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: ALTHOUGH FACTORY INSTALLED BRAKE SHOE LININGS ARE MADE FROM ASBESTOS-FREE MATERIALS, SOME AFTERMARKET BRAKE SHOE LININGS MAY CONTAIN ASBESTOS. THIS SHOULD BE TAKEN INTO ACCOUNT WHEN SERVICING A VEHICLE'S BRAKE SYSTEM. IT IS POSSIBLE THAT AFTERMARKET BRAKE SHOES MAY HAVE BEEN INSTALLED ON THE VEHICLE. ALWAYS WEAR A RESPIRATOR WHEN CLEANING BRAKE COMPONENTS; ASBESTOS CAN CAUSE SERIOUS BODILY HARM SUCH AS ASBESTOSIS AND CANCER. NEVER CLEAN BRAKE COMPONENTS BY USING COMPRESSED AIR; USE ONLY A VACUUM CLEANER SPECIFICALLY DESIGNED FOR THE REMOVAL OF BRAKE DUST. IF A VACUUM CLEANER IS NOT AVAILABLE, CLEAN BRAKE PARTS USING ONLY WATER-DAMPENED SHOP TOWELS. DO NOT CREATE BRAKE LINING DUST BY SANDING THE BRAKE LININGS WHEN SERVICING A VEHICLE. DISPOSE OF ALL DUST AND DIRT SUSPECTED OF CONTAINING ASBESTOS FIBERS. USE ONLY SEALED AIRTIGHT BAGS OR CONTAINERS. FOLLOW ALL RECOMMENDED SAFETY PRACTICES PRESCRIBED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND THE ENVIRONMENTAL PROTECTION AGENCY (EPA), FOR HANDLING AND DISPOSING OF PRODUCTS CONTAINING ASBESTOS.

CAUTION: Use only Mopar® brake fluid or an equivalent from a tightly sealed container. Brake fluid must conform to DOT 3 specifications. Do not use petroleum-based fluid because seal damage in the brake system will result.

CAUTION: Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surfaces, wash it off immediately with water.

CAUTION: During service procedures, grease or any other foreign material must be kept off the caliper assembly, surfaces of the brake rotor and external surfaces of the hub. Avoid deformation, scratching or nicking of the brake rotor and brake shoe linings.

CAUTION: When handling the brake rotor and caliper, be careful to avoid damaging the rotor and caliper, and scratching or nicking the brake shoe lining.

DISC BRAKE CALIPER (FRONT)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Raise vehicle on jackstands or centered on a hoist. See Hoisting in the Lubrication and Maintenance section of this manual.

(2) Remove front wheel and tire assemblies from vehicle.

(3) Remove the 2 caliper assembly to steering knuckle guide pin bolts (Fig. 4).

REMOVAL AND INSTALLATION (Continued)

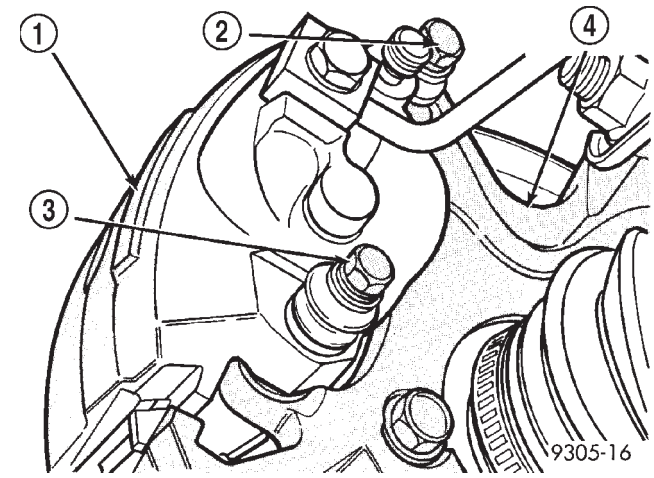


Fig. 4 Removing Caliper Assembly Guide Pin Bolts

1 – CALIPER ASSEMBLY
2 – GUIDE PIN BOLT
3 – GUIDE PIN BOLT
4 – STEERING KNUCKLE

(4) Remove caliper assembly from steering knuckle. Proceed by first rotating top of caliper away from steering knuckle and then lifting caliper off bottom machined abutment on steering knuckle (Fig. 5).

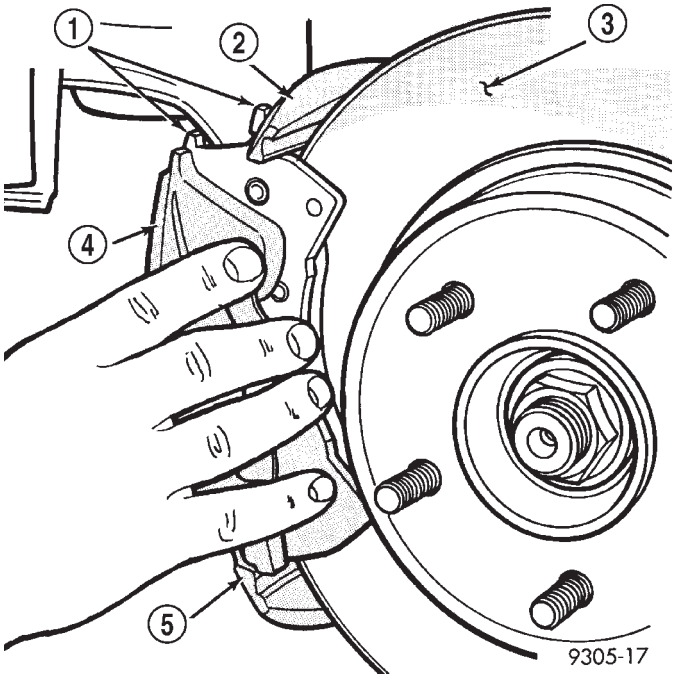


Fig. 5 Removing Caliper Assembly

1 – BRAKE SHOES
2 – STEERING KNUCKLE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – MACHINED ABUTMENT

(5) If the caliper is to be completely removed from the vehicle, remove the banjo bolt connecting the brake flex hose to the caliper. There will be 2 washers (one on each side of the flex hose fitting) that will come off at the same time.

(6) If the caliper is not being completely removed from the vehicle, support the caliper firmly to prevent weight of caliper from damaging the flexible brake hose (Fig. 6).

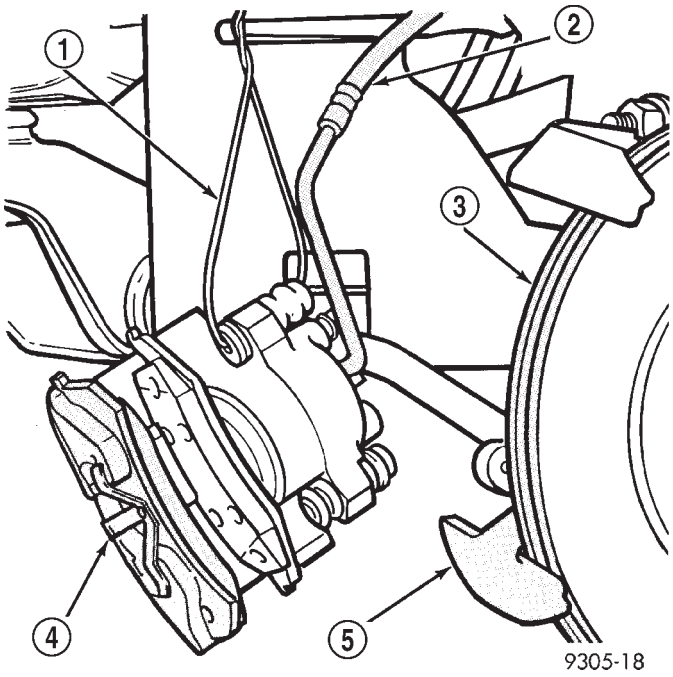


Fig. 6 Storing Caliper

1 – WIRE HANGER
2 – FLEXIBLE BRAKE HOSE
3 – BRAKING DISC
4 – CALIPER ASSEMBLY
5 – STEERING KNUCKLE

(7) If required, remove rotor from hub by pulling it straight off wheel mounting studs (Fig. 7).

INSTALLATION

CAUTION: Use care when installing the caliper assembly on the steering knuckle, so seals on caliper guide pin bushings do not get damaged by the steering knuckle bosses.

(1) Completely retract the caliper piston back into the piston bore of the caliper, if new brake shoes have been installed.

(2) If removed, install rotor on hub (Fig. 7).

(3) Carefully position caliper and brake shoe assemblies over rotor using the reversed required removal procedure (Fig. 5).

(4) Install the banjo bolt connecting the flex hose to the caliper. One washer should be installed on each side of the flex hose fitting before installing the

REMOVAL AND INSTALLATION (Continued)

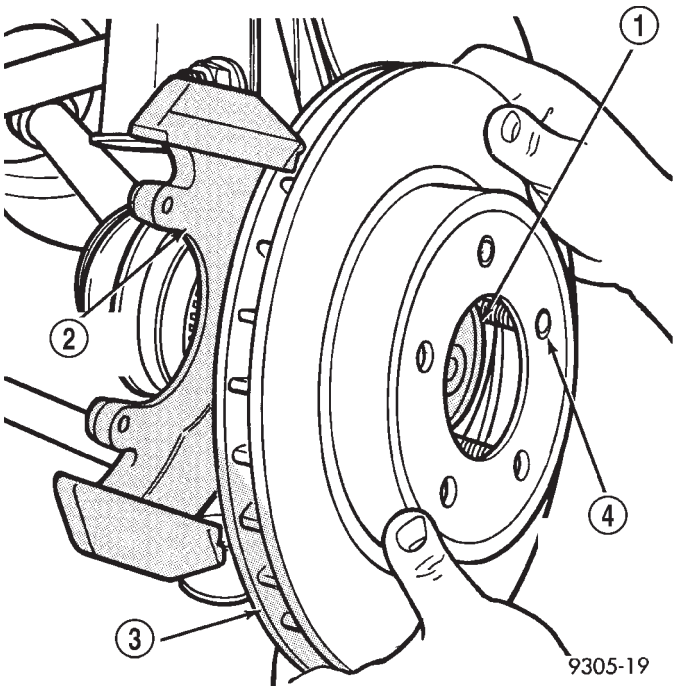


Fig. 7 Removing Or Installing Braking Disc

1 – HUB
2 – STEERING KNUCKLE
3 – BRAKING DISC (ROTOR)
4 – WHEEL MOUNTING STUD

banjo bolt. Tighten banjo bolt to a torque of 48 N·m (35 ft. lbs.).

CAUTION: When being installed, extreme caution should be taken not to crossthread the caliper guide pin bolts.

(5) Install the caliper guide pin bolts. Tighten guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(6) Install the wheel and tire assembly.

(7) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(8) Remove jackstands or lower hoist. **Before moving vehicle, pump the brake pedal several times to insure the vehicle has a firm brake pedal to adequately stop vehicle.**.

WARNING: Before moving vehicle after performing any service to the vehicle brake system, be sure to obtain a firm brake pedal.

(9) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

DISC BRAKE SHOES (FRONT)

NOTE: Before proceeding with this procedure, review SERVICE WARNINGS AND CAUTIONS at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove caliper as described in Front Disc Brake Caliper Removal and Installation, found elsewhere in this section of this service manual.

(2) Remove outboard brake shoe, by prying the shoe retaining clip over raised area on caliper. Then slide the brake shoe off the caliper (Fig. 8).

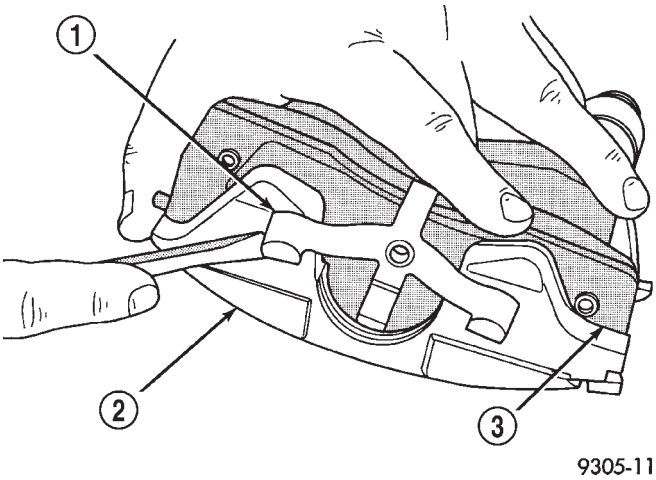


Fig. 8 Removing Outboard Brake Shoe

1 – RETAINING CLIP
2 – CALIPER ASSEMBLY
3 – BRAKE SHOE

(3) Pull inboard brake shoe away from piston, until retaining clip is free from cavity in piston (Fig. 9).

CALIPER INSPECTION

Check for piston seal leaks (brake fluid in and around boot area and inboard lining) and for any ruptures of the piston dust boot. If boot is damaged, or fluid leak is visible, disassemble caliper assembly and install a new seal and boot, (and piston if scored). Refer to procedures titled Disc Brake Caliper Disassembly.

Check the caliper dust boot and caliper pin bushings to determine if they are in good condition. Replace if they are damaged, dry, or found to be brittle. Refer to Cleaning And Inspection Of Brake Caliper.

REMOVAL AND INSTALLATION (Continued)

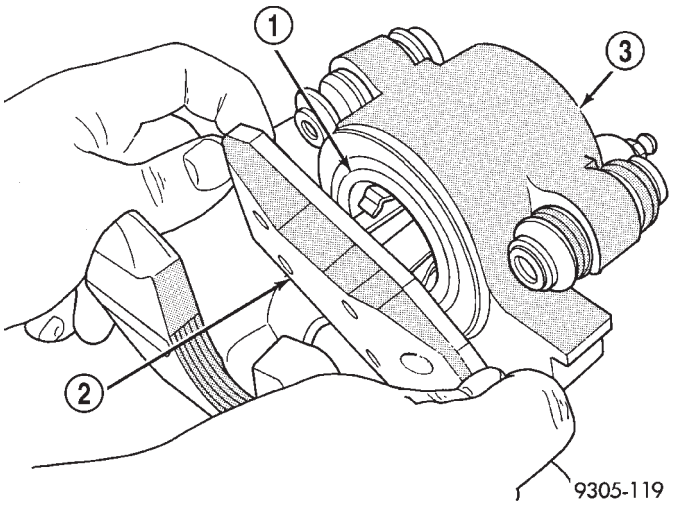


Fig. 9 Inboard Brake Shoe

1 – PISTON
2 – BRAKE SHOE
3 – CALIPER ASSEMBLY

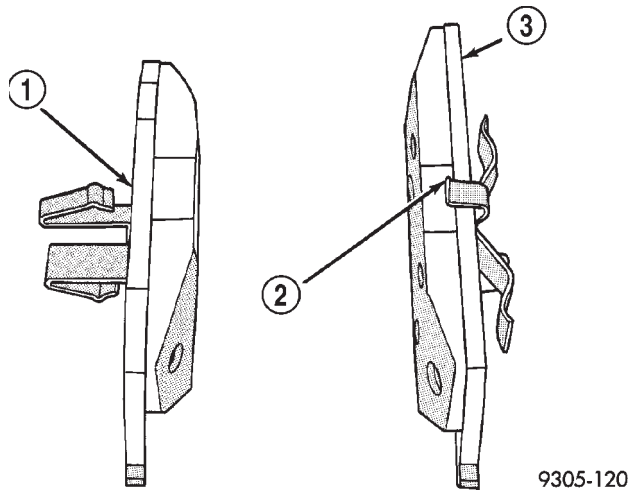


Fig. 10 Front Brake Shoe Assembly Identification

1 – INBOARD BRAKE SHOE
2 – WEAR INDICATOR
3 – OUTBOARD BRAKE SHOE

INSTALLATION

NOTE: Step 1 below is only required when installing a caliper after new brake shoes have been installed.

(1) Completely retract caliper piston back into piston bore of caliper assembly.
(2) Lubricate both steering knuckle abutments with a liberal amount of Mopar® Brake Grease for Caliper Slides Lubricant, or equivalent.
(3) Remove the protective paper from the noise suppression gasket on both the inner and outer brake shoe assemblies (if equipped).

NOTE: The inboard and outboard brake shoes are not common, refer to (Fig. 10) for inboard and outboard brake shoe assembly identification.

NOTE: When installing inboard brake shoe into caliper piston, be sure brake shoe is positioned squarely against the face of the caliper piston.

(4) Install the new inboard brake shoe assembly into the caliper piston by firmly pressing it into bore of caliper piston with thumbs (Fig. 9).
(5) Slide the new outboard brake shoe assembly onto the caliper assembly (Fig. 11).
(6) Reinstall caliper as described in Front Disc Brake Caliper Removal and Installation, found elsewhere in this section of this service manual.

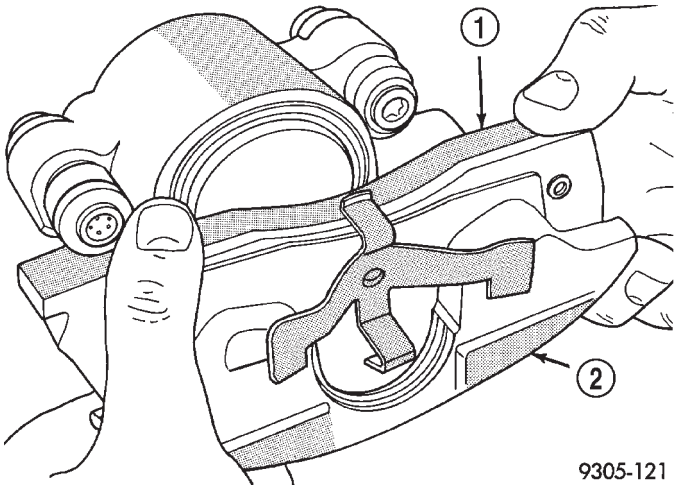


Fig. 11 Installing Outboard Brake Shoe Assembly

1 – BRAKE SHOE ASSEMBLY
2 – BRAKE CALIPER

CAUTION: Before vehicle is moved after performing a service procedure on the vehicle brake system, pump the brake pedal several times to insure the vehicle has a firm brake pedal that is to adequate to stop the vehicle.

(7) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

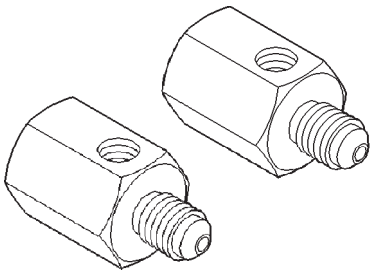
SPECIFICATIONS

BRAKE FASTENER TORQUE SPECIFICATIONS

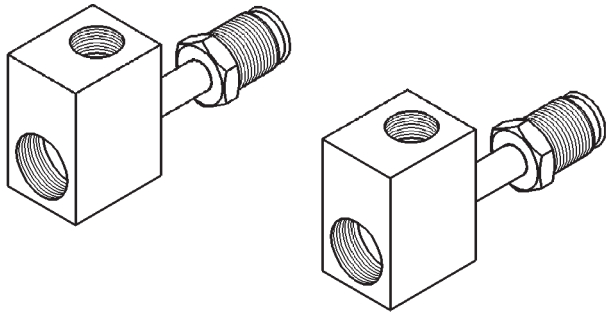
DESCRIPTION	TORQUE
BRAKE TUBES:	
Tube Nuts	17 N·m (145 in. lbs.)
BRAKE HOSE:	
Caliper Banjo Bolt	48 N·m (35 ft. lbs.)
Intermediate Bracket	12 N·m (105 in. lbs.)
MASTER CYLINDER:	
Mounting Nuts	28 N·m (250 in. lbs.)
BRAKE BOOSTER:	
Dash Panel Mounting Nuts	28 N·m (250 in. lbs.)
JUNCTION BLOCK (NON-ABS BRAKES)	
Support Bracket Bolts	26 N·m (230 in. lbs.)
DISC BRAKE CALIPER:	
Guide Pin Bolts	22 N·m (192 in. lbs.)
Bleeder Screw	15 N·m (125 in. lbs.)
ABS INTEGRATED CONTROL UNIT (ICU):	
Mounting Bracket Bolts	11 N·m (97 in. lbs.)
Mounting Bracket To Frame Bolts	26 N·m (230 in. lbs.)
CAB To HCU Screws	2 N·m (17 in. lbs.)
PARKING BRAKE:	
Lever Assembly Mounting Bolts	28 N·m (250 in. lbs.)
REAR HUB AND BEARING:	
Spindle Retaining Nut	168 N·m (124 ft. lbs.)
WHEEL:	
Mounting Nut	110–135 N·m (85–115 ft. lbs.)

SPECIAL TOOLS

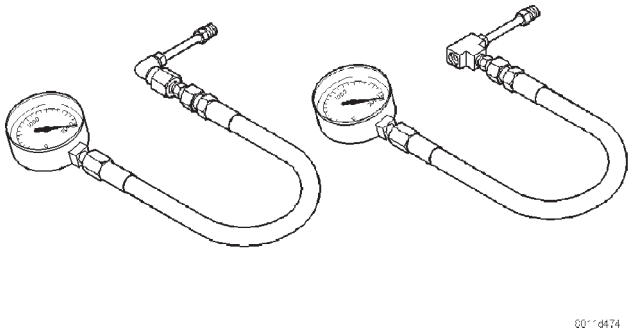
BASE BRAKE SYSTEM



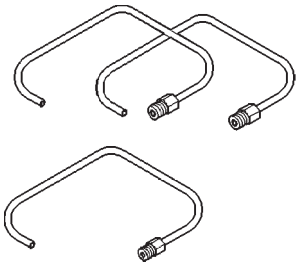
Adapters, Brake Pressure Test 6892



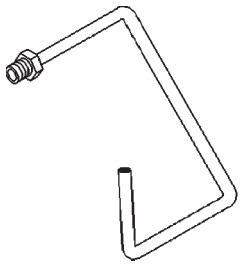
Adapters, Brake Pressure Test 8187



Gauge Set C-4007-A

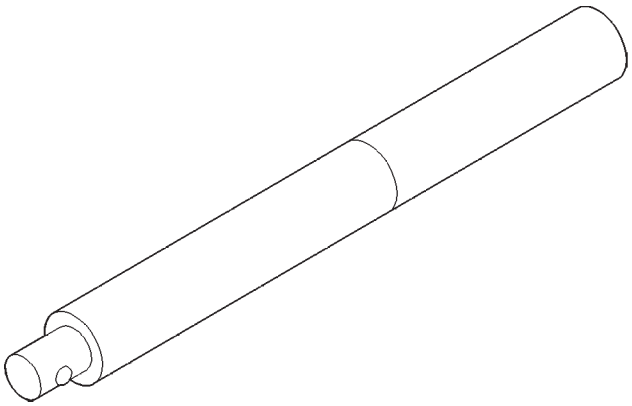


Master Cylinder Bleed Tube 8129

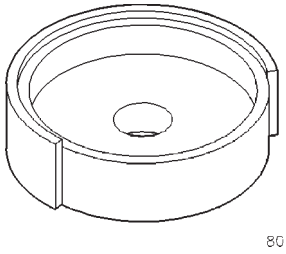


Master Cylinder Bleed Tube 8305

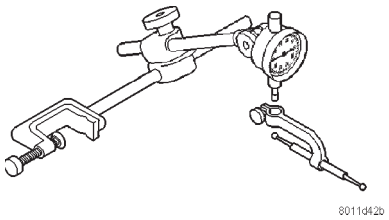
SPECIAL TOOLS (Continued)



Handle, Universal C-4171



Installer, Dust Boot C-4689



Dial Indicator C-3339

COOLING SYSTEM

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DESCRIPTION AND OPERATION

COOLING SYSTEM

DESCRIPTION

The cooling system consists of an engine cooling module, pressure cap, coolant bottle, thermostat (inlet), coolant, plumbing, and a water pump to circulate the coolant (Fig. 1). The engine cooling module consist of a radiator, electric fan motors, shroud, internal transmission oil cooler, internal engine oil cooler (if equipped), air conditioning condenser, and a auxiliary transmission oil cooler (if equipped).

OPERATION

- When Engine is cold: Thermostat is closed, cooling system has no flow through the radiator. The coolant flows through the engine heater core, coolant bottle and an internal engine by-pass.
- When Engine is warm: Thermostat is open, coolant flows through the radiator, heater core, coolant bottle and by-pass.

The cooling systems primary purpose is to maintain engine temperature in a range that will provide satisfactory engine performance and emission levels under all expected driving conditions. It also provides hot coolant for heater, and cooling for automatic transmission fluid. It does this by transferring heat from engine metal to coolant, moving this heated coolant to the radiator, and then transferring this heat to the ambient air.

The coolant flow circuit is shown in (Fig. 1).

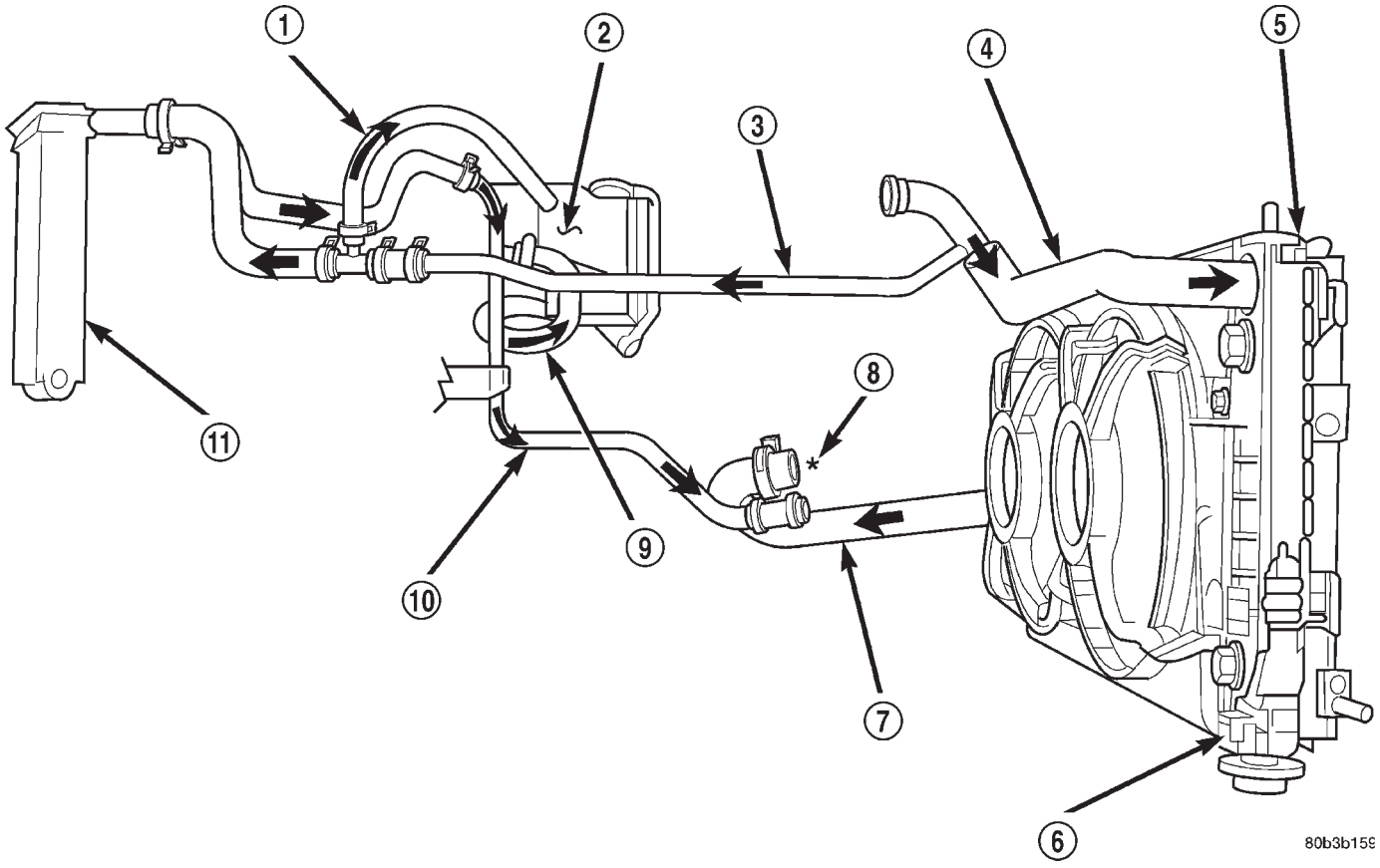


Fig. 1 Cooling System Flow

1 – BOTTLE SUPPLY HOSE
2 – PRESSURE BOTTLE
3 – HEATER SUPPLY TUBE
4 – RADIATOR UPPER INLET HOSE
5 – RADIATOR
6 – DRAIN COCK
7 – RADIATOR LOWER OUTLET HOSE
8 – THERMOSTAT LOCATION
9 – BOTTLE RETURN
10 – HEATER RETURN TUBE
11 – HEATER CORE

DESCRIPTION AND OPERATION (Continued)

COOLANT

DESCRIPTION

CAUTION: Use of Propylene Glycol based coolants is not recommended, as they provide less freeze protection and less corrosion protection.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (orange in color), or the equivalent ethylene glycol base coolant with corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% Ethylene Glycol and 50% distilled water to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution. Mixing of coolants other than specified (non-HOAT), will reduce the 5 year/100,000 mile corrosion protection.

OPERATION

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then carry this heat to the radiator where the tube/fin radiator can give it up to the air.

WARNING: ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASE COOLANT PROPERLY, CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE, PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED, PERSONAL INJURY CAN RESULT.

COOLANT PERFORMANCE

Performance is measurable. For heat transfer, pure water absorbs 1 btu for each degree of temperature rise for each pound of water. This formula is altered when necessary additives to control boiling, freezing, and corrosion are added as follows:

- Pure Water (1 btu) boils at 100°C (212°F) and freezes at 0°C (32°F).
- 100 Percent ethylene glycol (.7 btu) can cause an engine to run hot, cause detonation, and will freeze at -22°C (-8°F).
- 50/50 Ethylene Glycol and Distilled Water (.82 btu) is the recommended combination that provides a freeze point of -37°C (-35°F). The radiator, water pump, engine water jacket, radiator pressure cap, thermostat, temperature gauge, coolant sensor and heater are all designed for 50/50 ethylene glycol.

Where required, a 56 percent glycol and 44 percent water mixture will provide a freeze point of -46°C (-50°F).

NOTE: Richer mixtures cannot be measured with field equipment and can lead to problems associated with 100 percent glycol. If there is doubt that the coolant mixture is too rich for field equipment to measure, put a sample in a clean container. Add exactly the same amount of water and retest. If the coolant in the vehicle is 100% antifreeze, the diluted sample will read 50%. If the coolant in the vehicle was 70% antifreeze and 30% water, the diluted sample will read as 35%, etc.

SELECTION AND ADDITIVES

The use of aluminum cylinder blocks, cylinder heads, intake manifolds, and water pumps require special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (orange in color), or the equivalent is recommended. This coolant provides optimum engine cooling and protection against corrosion when mixed to a freeze point of -37°C (-35°F) to -59°C (-50°F). If it looses color or becomes contaminated; drain, flush, and replace with fresh properly mixed solution.

CAUTION: Do not use well water, or suspect water supply in cooling system. A 50/50 ethylene glycol and distilled water mix is recommended.

ENGINE THERMOSTAT

DESCRIPTION

The thermostat on the 2.7L and 3.2/3.5L engines are located on the lower left side of engine, near the front (Fig. 2) and (Fig. 3). The thermostat on both engines are on the inlet side of the water pump. The thermostats have an air bleed located in the thermostat flange. The air bleed allows internal trapped air during cooling system filling to be released.

DESCRIPTION AND OPERATION (Continued)

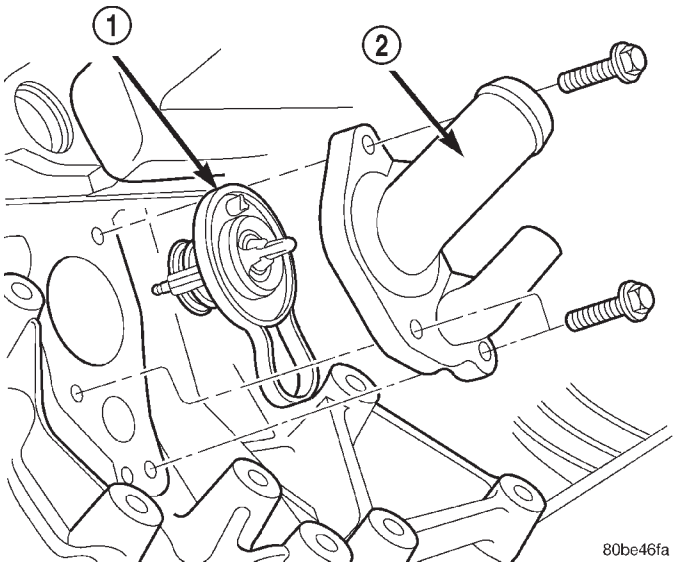


Fig. 2 Thermostat and Housing—2.7L Engine

1 – THERMOSTAT AND GASKET
2 – THERMOSTAT HOUSING/COOLANT INLET

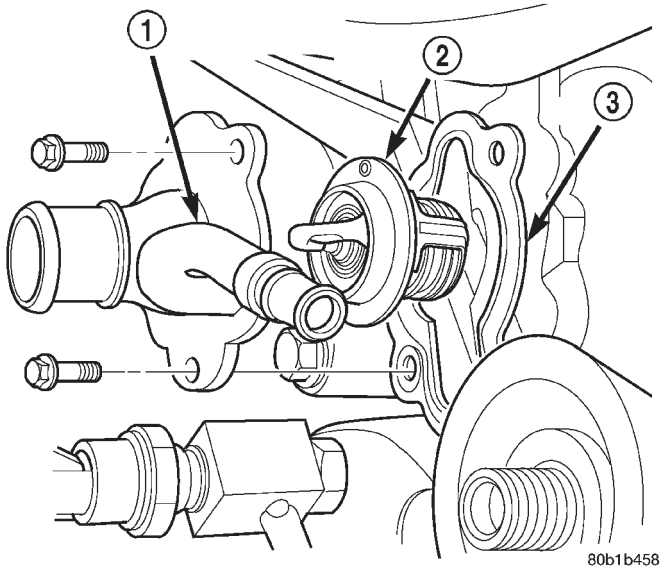


Fig. 3 Thermostat and Housing—3.2/3.5L Engines

1 – THERMOSTAT HOUSING/COOLANT INLET
2 – THERMOSTAT
3 – GASKET

OPERATION

The engine cooling thermostat is a wax pellet driven, reverse poppet type. The thermostat is located in the inlet side of the engine to provide fast warm up and to optimize a consistent temperature in the engine. The thermostat is designed to prevent leakage through it and to guarantee a minimum engine operating temperature of 82°C (180°F). They also automatically reach wide open at a temperature of approximately 95°C (203°F) so they do not restrict flow to the radiator as temperature of the coolant rises in hot weather to around 104°C (220°F). Above 102°C (215°F) the coolant temperature is controlled by the radiator, fan, and ambient temperature, not the thermostat.

WATER PUMP

DESCRIPTION

The 2.7L pump has a die cast aluminum housing and a plastic swept vane impeller. It bolts directly to the cylinder block, behind the timing chain cover (Fig. 4). The water pump is driven by the back side of the engine primary timing chain.

The 3.2/3.5L water pump has a die cast aluminum housing and a plastic swept vane impeller. The housing bolts directly to the right rear timing belt cover, using a O-ring gasket for pump to cover sealing (Fig. 5). The pump is driven by the engine timing belt.

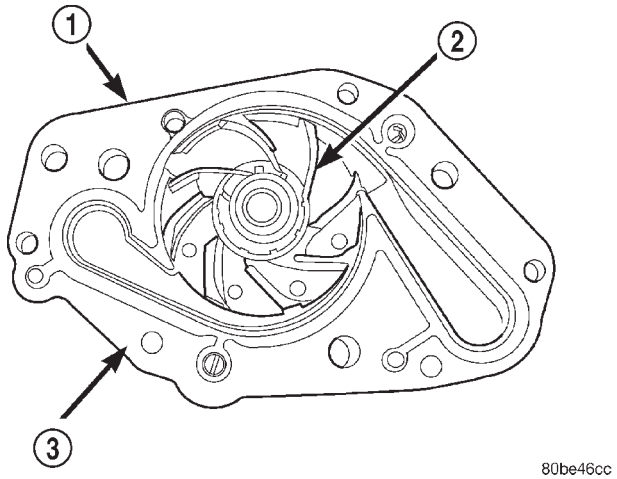


Fig. 4 Water Pump—2.7L Engine

1 – WATER PUMP BODY
2 – IMPELLER
3 – GASKET

OPERATION

The water pump is the heart of the cooling system, pumping the coolant through the engine block, cylinder head, heater core, and radiator.

RADIATOR

DESCRIPTION

The radiators are cross-flow types (horizontal tubes) with design features that provide greater strength as well as sufficient heat transfer capabilities to keep the engine satisfactorily cooled. The radiator cooling tubes are made of aluminum and the side tanks are plastic (Fig. 6). The radiator is positioned in the front part of the engine compartment to

DESCRIPTION AND OPERATION (Continued)

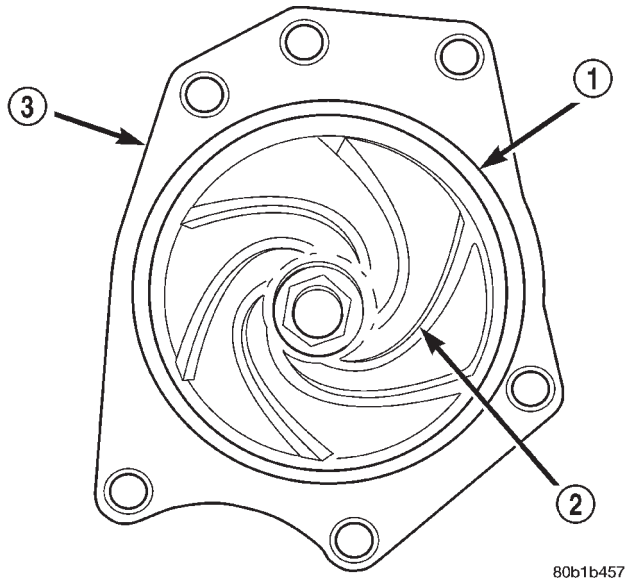


Fig. 5 Water Pump—3.2/3.5L Engine

1 – O-RING
2 – IMPELLER
3 – WATER PUMP BODY

allow air flow across the cooling fins while vehicle is in motion.

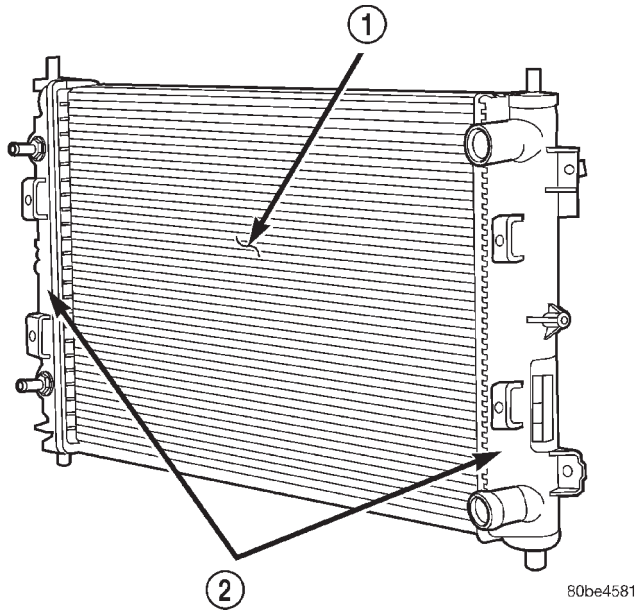


Fig. 6 Radiator—Typical

1 – COOLING TUBES
2 – TANKS

OPERATION

The radiator functions as a heat exchanger, using air flow across the exterior of the radiator tubes. This heat is then transferred from the coolant and into the passing air.

COOLING SYSTEM FAN

DESCRIPTION

The cooling system fan module includes two electric motors, a motor support, and a one piece shroud. The module is fastened to the radiator by screws with square nuts and retaining clips (Fig. 7).

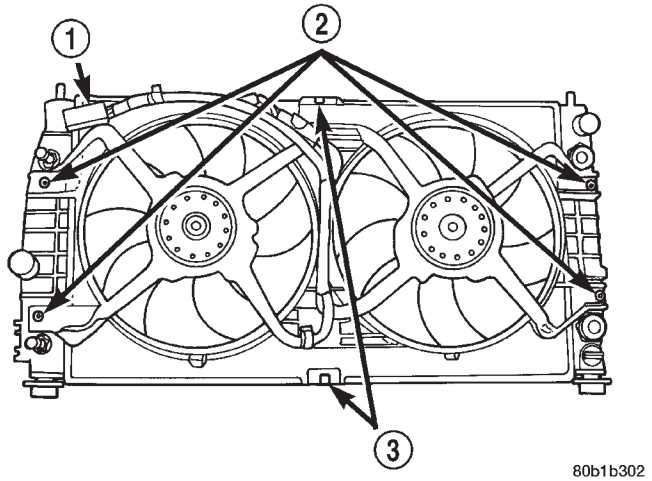


Fig. 7 Fan Module

1 – ELECTRICAL CONNECTOR
2 – FASTENERS
3 – CLIPS

OPERATION

The cooling system fans will operate at two speeds and are simultaneously activated. The dual fan system improves engine cooling and air conditioning performance in hot weather and severe driving conditions, while reducing fan noise and power consumption.

The cooling fans will operate based on inputs to the Powertrain Control Module (PCM). When fan operation is determined necessary, the PCM provides a ground to the fan relay control circuit.

The inputs provided to the PCM that influence fan operation are:

- Coolant Temperature Sensor
- Intake Air Temperature Sensor
- Output Speed Sensor
- Transmission Oil Temperature Sensor
- A/C Pressure Transducer

HOSE CLAMPS

DESCRIPTION

The cooling system utilizes both worm drive and spring type hose clamps. If a spring type clamp replacement is necessary, replace with the original Mopar® equipment spring type clamp. To identify size of spring hose clamps, the size in millimeters

DESCRIPTION AND OPERATION (Continued)

has been stamped on each clamp (Fig. 8). Refer to Hose Clamp Usage Chart for proper size and location of hose clamps.

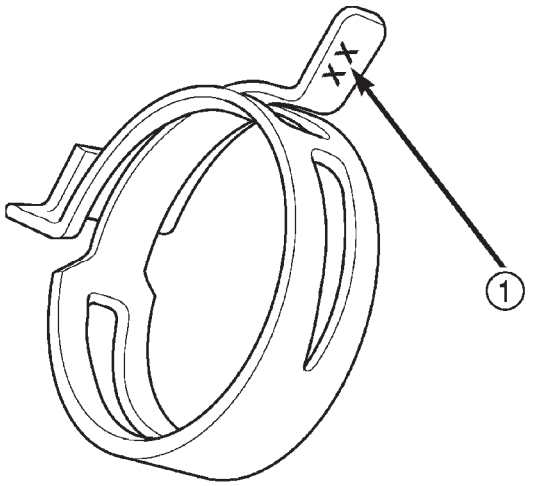


Fig. 8 Spring Clamp Size Location

1 – SPRING CLAMP SIZE LOCATION

HOSE CLAMP USAGE CHART

SPRING CLAMP LOCATION		2.7L	3.2/3.5L
Upper Radiator Hose	@ engine	40 mm	47 mm
	@ radiator	42 mm	42 mm
Lower Radiator Hose	@ engine	40 mm	40 mm
	@ radiator	42 mm	42 mm
Heater Hoses	3/4″	27 mm	27 mm
	3/8″	17 mm	17 mm

OPERATION

The worm type hose clamp uses a specified torque value to maintain proper tension on a hose connection.

The spring type hose clamp applies constant tension on a hose connection. To remove a spring type hose clamp, use Special Tool 6094 or equivalent, constant tension clamp pliers (Fig. 9) to compress the hose clamp.

COOLANT BOTTLE

DESCRIPTION

The coolant bottle consists of a pressure chamber and a overflow chamber (Fig. 10) that is mounted in the engine compartment (Fig. 11). The overflow hose connects the pressure chamber to the overflow chamber.

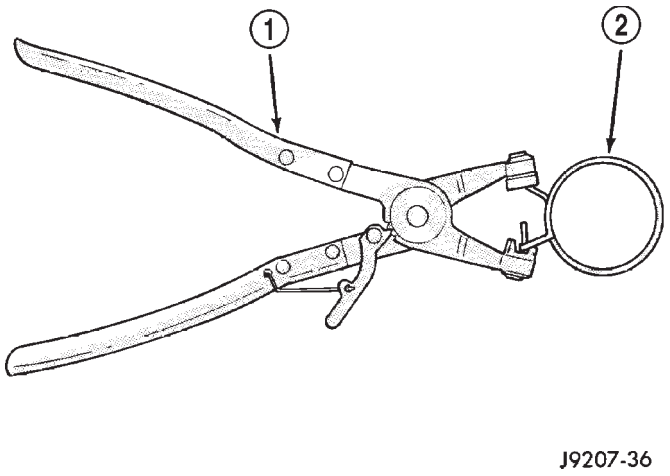


Fig. 9 Hose Clamp Tool

1 – HOSE CLAMP TOOL 6094
2 – HOSE CLAMP

NOTE: Coolant will normally be in the pressure chamber side of the coolant bottle. The overflow chamber should normally be empty

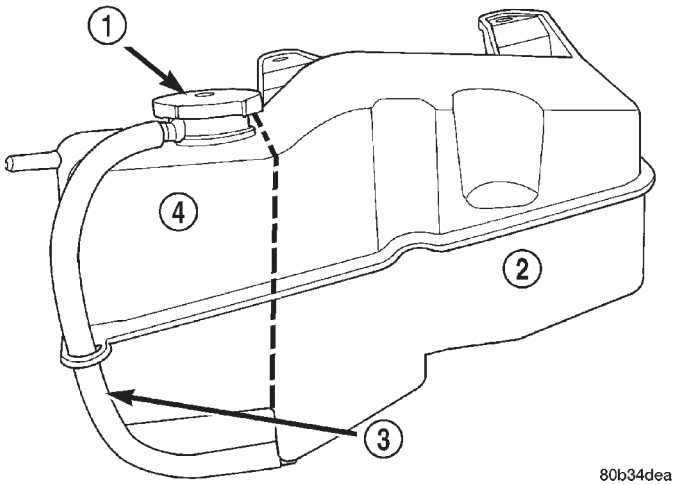


Fig. 10 Coolant Pressure/Recovery Bottle

1 – PRESSURE CAP
2 – OVERFLOW CHAMBER
3 – OVERFLOW HOSE
4 – PRESSURE CHAMBER

OPERATION

The pressure chamber keeps the coolant free of trapped air, provides a volume for expansion and contraction, and provides a convenient and safe method for checking and adjusting coolant level at atmospheric pressure. It also provides some reserve coolant to cover minor leaks, evaporation or boiling losses. The overflow chamber allows coolant recovery in case of an overheat.

DESCRIPTION AND OPERATION (Continued)

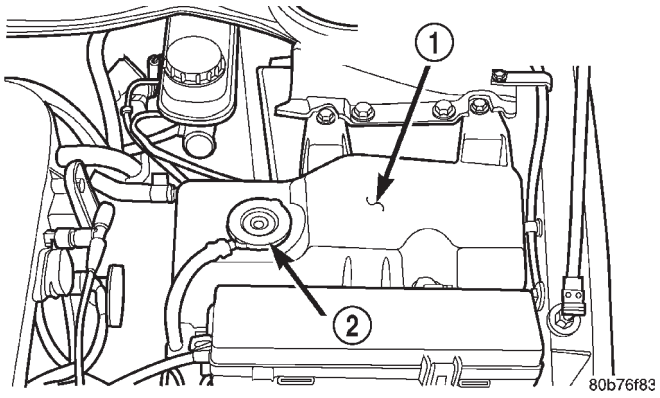


Fig. 11 Coolant Pressure/Recovery Bottle Location

1 – COOLANT RECOVERY PRESSURE BOTTLE
2 – PRESSURE CAP

COOLANT PRESSURE BOTTLE CAP

DESCRIPTION

The cooling system cap is located on the coolant pressure bottle. The cap construction includes; stainless steel swivel top, rubber seals and retainer, main spring, and a spring loaded valve (Fig. 12).

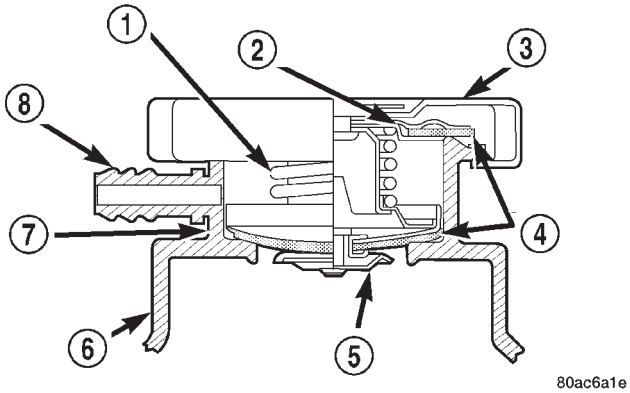


Fig. 12 Pressure Cap and Bottle

1 – MAIN SPRING
2 – GASKET RETAINER
3 – STAINLESS STEEL SWIVEL TOP
4 – RUBBER SEALS
5 – SPRING LOADED VALVE
6 – COOLANT PRESSURE BOTTLE
7 – FILLER NECK
8 – OVERFLOW NIPPLE

OPERATION

The pressure cap allows the cooling system to operate at higher than atmospheric pressure which raises the coolant boiling point, thus allowing increased radiator cooling capacity. The pressure cap releases pressure at some point within a range of 110 kPa ± 14 kPa (16 psi ± 2 psi) (Fig. 12).

A spring-loaded vent valve in the center of the cap allows the system to pressurize and depressurize without creating a vacuum. If the valve is stuck open, coolant will escape to the overflow hose. There is also a gasket in the cap to seal to the top of the filler neck.

CAUTION: Use only the pressure cap specified for this vehicle. Use of other pressure caps can lead to coolant loss and overheating.

ENGINE BLOCK HEATER

DESCRIPTION

The engine block heater is mounted in the cylinder block, near the right rear corner. The block heater is a dry cylinder type design and is powered by 110 volt A. C. **The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.**

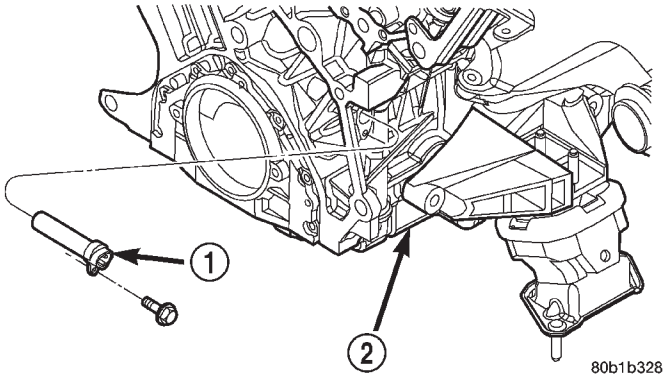


Fig. 13 Engine Block Heater

1 – BLOCK HEATER
2 – ENGINE — RIGHT SIDE

OPERATION

When power is applied (110 volt A. C.) to the block heater, the heating element transfers heat through the aluminum engine block and into the coolant without directly penetrating the cooling system.

ACCESSORY DRIVE BELTS

DESCRIPTION

The accessory drive system on 2.7L and 3.2/3.5L engines utilizes two different belts. A conventional V-belt drives the air conditioning compressor on 3.2/3.5L engines; Poly-V belt on the 2.7L engine. The generator and power steering pump on all engines are driven by a Poly-V belt.

DESCRIPTION AND OPERATION (Continued)

OPERATION

The accessory drive belts provide the link between the engine crankshaft and the engine driven accessories.

AUTOMATIC TRANSMISSION OIL COOLER

DESCRIPTION

The transmission oil cooler circuit consists of a series connected internal cooler mounted inside the left radiator tank and an auxiliary external oil cooler mounted to the front of the air conditioning condenser (Fig. 14).

OPERATION

Steel tubes and rubber lines supply the oil from the transmission to the internal oil cooler and return the oil to the transmission from the auxiliary external oil cooler.

ENGINE OIL COOLER—2.7L

DESCRIPTION

The 2.7L engine (Sales Code EES only) uses an engine oil cooler that is mounted inside the right radiator tank (Fig. 15). Oil lines connect the cooler to the engine.

OPERATION

Engine oil travels from the engine through the supply line and into the cooler. The supply line is connected to a control valve that allows engine oil flow when pressure is above 138–207 kPa (20–30 psi) and an internal orifice limits oil flow to a maximum of 11.3 LPM (3 GPM). The engine oil exits the cooler through the oil return line and is returned to the engine oil pan (Fig. 16).

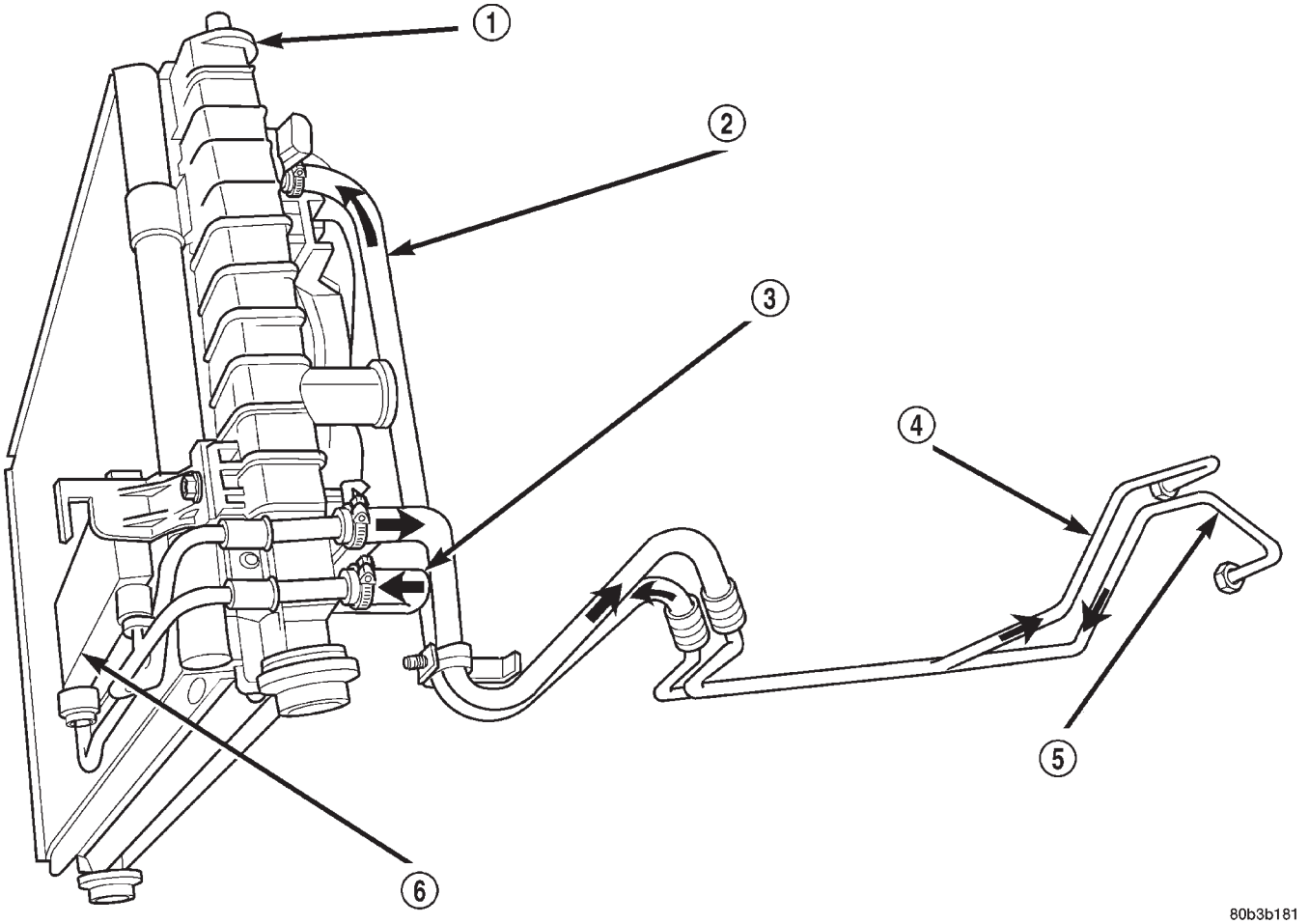


Fig. 14 Transmission Oil Cooler

1 – RADIATOR
2 – TRANSMISSION OIL COOLER SUPPLY LINE TO IN-TANK COOLER
3 – FROM IN-TANK COOLER TO AUXILIARY OIL COOLER
4 – TRANSMISSION OIL RETURN LINE
5 – FROM TORQUE CONVERTER TO IN-TANK OIL COOLER
6 – AUXILIARY TRANSMISSION OIL COOLER

DESCRIPTION AND OPERATION (Continued)

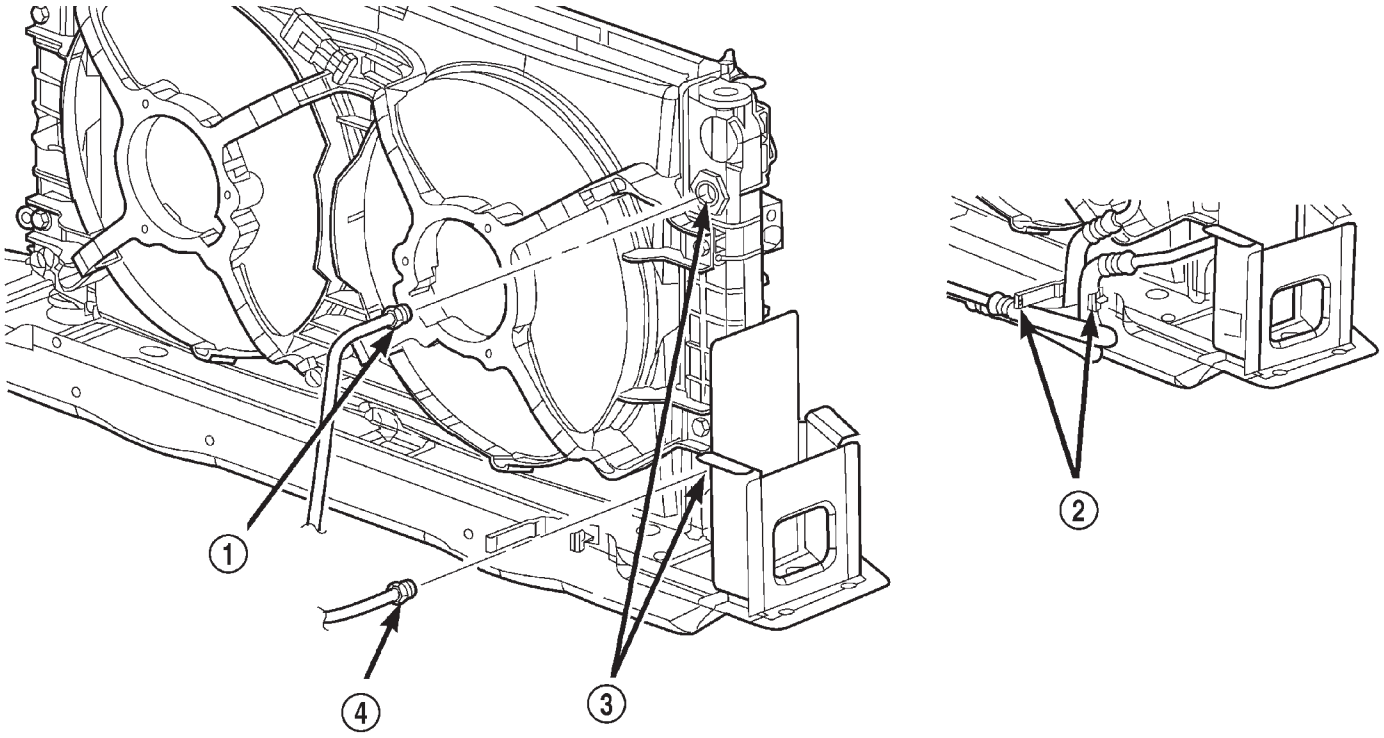


Fig. 15 Engine Oil Cooler—2.7L Engine (EES only)

1 – ENGINE OIL COOLER SUPPLY LINE
2 – RETAINER
3 – ENGINE OIL COOLER FITTINGS
4 – ENGINE OIL COOLER RETURN LINE

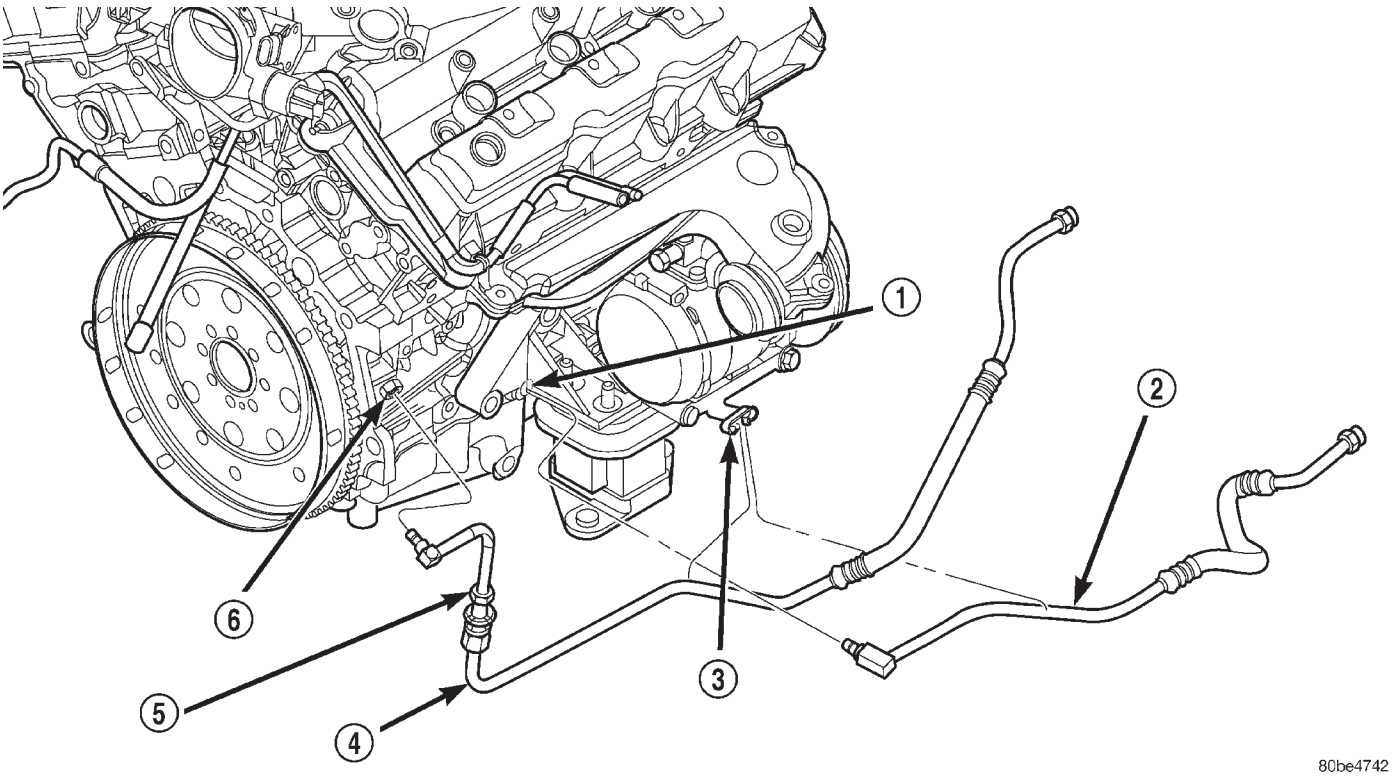


Fig. 16 Engine Oil Cooler Lines—2.7L Engine (EES only)

1 – RETURN LINE FITTING
2 – OIL COOLER RETURN LINE
3 – SUPPORT BRACKET
4 – OIL COOLER SUPPLY LINE
5 – PRESSURE CONTROL VALVE
6 – SUPPLY LINE FITTING

DESCRIPTION AND OPERATION (Continued)

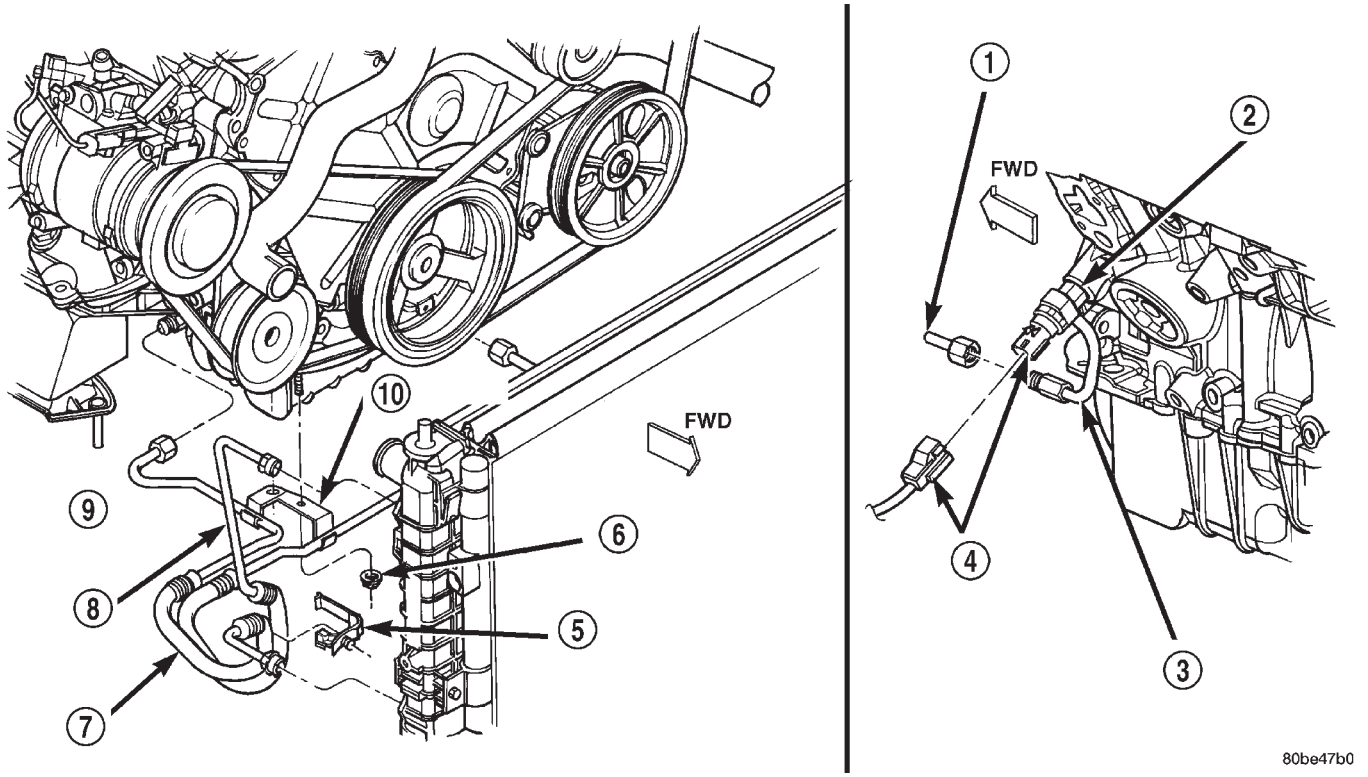


Fig. 17 Engine Oil Cooler—3.2/3.5L

1 – SUPPLY LINE TO OIL COOLER
2 – FITTING
3 – OIL COOLER PRESSURE CONTROL VALVE
4 – OIL PRESSURE SWITCH AND CONNECTOR
5 – RETAINER
6 – NUT
7 – RETURN LINE
8 – SUPPLY LINE
9 – ENGINE OIL COOLER:
10 – ISOLATOR

ENGINE OIL COOLER—3.2/3.5L7

DESCRIPTION

The 3.2/3.5L engine uses an engine oil cooler that is mounted inside the right radiator tank. An oil cooler pressure control valve is used to control flow to the cooler (Fig. 17).

OPERATION

Engine oil travels from the control valve through the supply line and into the cooler. The control valve allows engine oil flow when pressure is above 138–207 kPa (20–30 psi) and an internal orifice limits its oil flow to a maximum of 11.3 LPM (3 GPM). The engine oil exits the cooler through the oil return line and is returned to the engine oil pan (Fig. 17).

DIAGNOSIS AND TESTING

COOLING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC).	1. During cold weather operation with the heater blower in the high position, the gauge reading may drop slightly. Fluctuation is also influenced by loads, outside temperature, and cycling of the air conditioning system.	1. A normal condition. No correction is necessary.
	2. Temperature gauge or engine sending unit sensor defective or shorted. Also, corroded or loose wiring in this circuit.	2. Check operation of gauge and repair if necessary. Refer to INSTRUMENT PANEL AND SYSTEMS.
	3. Gauge reading rise when vehicle is brought to a stop after heavy use (engine still running).	3. A normal condition. No correction is necessary. Gauge reading should return to normal range after vehicle is driven.
	4. Gauge reading high after restarting a warmed-up (hot) engine.	4. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation.
	5. Coolant level low (air will build up in the cooling system causing the thermostat to open late).	5. Check and correct coolant leaks. Refer to Testing Cooling System for Leaks in this section.
	6. Cylinder head gasket leaking allowing exhaust gas to enter cooling system causing thermostat to open late.	6. (a) Check for cylinder head gasket leaks with a commercially available block leak tester. Repair as necessary. (b) Check for coolant in engine oil. Inspect for white steam emitting from exhaust system. Repair as necessary.
	7. Water pump impeller loose on shaft.	7. Check water pump and replace as necessary. Refer to Water Pump Removal in this section.
	8. Air leak on the suction side of water pump allows air to build up in cooling system causing thermostat to open late.	8. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN COOLANT RESERVE/ OVERFLOW TANK.	1. Pressure relief valve in radiator cap is defective, or was not properly seated.	1. Check condition of radiator cap and cap seal. Refer to Pressure Cap in this group. Replace cap as necessary.
	2. Incorrect cap was installed.	2. Replace cap as necessary.
	3. Incorrect coolant mixture.	3. Make sure a 50% by volume mixture of coolant is used.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. System overfilled.	4. Ensure cold coolant level is between MIN and MAX marks on coolant bottle.
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE IS READING HIGH OR HOT.	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. Refer to Testing Cooling System for Leaks in this section.
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM) GAUGE MAY NOT BE READING HIGH.	1. Engine overheating. 2. Freeze point of coolant not correct. Mixture too concentrated or too diluted. 3. Wrong cooling system pressure cap.	1. Check reason for overheating and repair as necessary. 2. Check freeze point of the coolant. Refer to Coolant, General Information in this section for test procedure. Adjust the ethylene glycol to water ration as required. 3. Install correct pressure cap.
HOSE(S) COLLAPSE AS ENGINE COOLS DOWN.	1. Vacuum created in cooling system on engine cool-down is not being relieved through coolant bottle system.	1. (a) Pressure cap relief valve stuck. Refer to Pressure cap in this section. Replace as necessary. (b) Hose between the pressure and overflow tank is plugged. Clean vent and repair as necessary. (c) Vent at coolant reserve/overflow tank is plugged. Clean vent and repair as necessary. (d) Reserve/overflow tank is internally blocked. Clean and repair as necessary
ELECTRIC RADIATOR FAN RUNS ALL THE TIME.	1. Fan relay, Powertrain Control Module (PCM) or engine coolant temperature sensor possibly defective. 2. Check for low coolant level. 3. A/C pressure transducer defective.	1. Refer to appropriate Powertrain Diagnostic Manual for operation of the DRB scan tool. Repair as necessary. 2. Repair as necessary. 3. Refer to appropriate Powertrain Diagnostic Manual for operation of the DRB scan tool. Repair as necessary
NOISY COOLING FAN.	1. Fan blade loose. 2. Fan blade striking a surrounding object. 3. Air obstructions at radiator or A/C condenser. 4. Electric fan motor defective.	1. Replace fan module assembly. Refer to procedure in this section. 2. Locate point of fan blade contact and repair/replace as necessary. 3. Remove obstructions and/or clean debris. 4. Replace fan motor/assembly. Refer to procedure in this section.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
INADEQUATE AIR CONDITIONER PERFORMANCE (COOLING SYSTEM SUSPECTED).	1. Radiator and/or A/C condenser is restricted, obstructed or dirty (insects, leaves, etc.).	1. Remove restriction and/or clean as necessary.
	2. Electrical radiator fan not operating when A/C is operated.	2. Refer to appropriate Powertrain Diagnostic Procedures manual for test procedure. repair as necessary.
	3. Engine is overheating (heat may be transferred from radiator to A/C condenser. High underhood temperatures due to engine overheating may also transfer heat to A/C components.	3. Correct overheating condition. Refer to procedures in this section.
	4. all models are equipped with air seals at the radiator and/or A/C condenser. If these seals are missing or damaged, not enough air flow will be pulled through the radiator and A/C condenser.	4. Check for missing or damaged air seals and repair as necessary.
INADEQUATE HEATER PERFORMANCE.	1. Has a diagnostic trouble code (DTC) been set?	1. Refer to the appropriate Diagnostic manual. Repair as necessary.
	2. Coolant level low?	2. Refer to Cooling System Testing in this section. Repair as necessary.
	3. Air Trapped in heater core.	3. Improper coolant fill procedure. Refer to Cooling System Filling in this section.
	4. Obstructions in heater hose fitting at engine or at heater core.	4. Remove heater hoses at both ends and check for obstructions. Repair as necessary.
	5. Heater hose kinked?	5. Locate kinked area and repair as necessary.
	6. Thermostat possibly stuck open.	6. Refer to Diagnosis and Testing, Engine Thermostat in this section.
	7. Water pump is not pumping coolant to heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch. If only one of the hoses is hot, the water pump may not be operating correctly.	7. Refer to Water Pump procedures in this section.
HEAT ODOR	1. Various heat shields are used at certain driveline components. One or more of these shields may be missing.	1. Locate missing shields and replace or repair as necessary.
	2. Is temperature gauge reading above the normal range?	2. Refer to Temperature Gauge Reads High in these Diagnosis Charts.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Is cooling fan operating correctly?	3. Refer to Cooling System Fan in the section for diagnosis. Repair as necessary.
	4. Has undercoating been applied to any unnecessary component?	4. Clean undercoating as necessary.
	5. Engine may be running rich, causing the catalytic converter to overheat	5. Refer to appropriate Powertrain Diagnostic Procedures manual for operation of the DRB scan tool. Repair as necessary.
POOR DRIVEABILITY (THERMOSTAT POSSIBLY STUCK OPEN). GAUGE MAY BE READING LOW.	1. For proper driveability, clean vehicle emissions and prevention of buildup of engine oil sludge, the thermostat must be operating properly. Has a diagnostic trouble code been set?	1. Refer to appropriate Powertrain Diagnostic Procedures manual for operation of the DRB scan tool. Replace thermostat if necessary.
STEAM IS COMING FROM FRONT OF VEHICLE NEAR GRILL AREA WHEN WEATHER IS WET, ENGINE WARMED UP AND RUNNING WITH VEHICLE STATIONARY, OR JUST SHUT OFF. TEMPERATURE GAUGE IS NORMAL.	1. During wet weather, moisture (snow, ice, rain, or condensation) on the radiator will evaporate when the thermostat opens. The thermostat opening allows heated coolant into the radiator. When the moisture contacts the hot radiator, steam may be emitted. this usually occurs in cold weather with no fan or air flow to blow it away.	1. Occasional steam emitting from this area is normal. No repair is necessary.
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. Check the freeze point of the coolant. Refer to Coolant in this section for test procedure. Adjust the ethylene glycol-to-water ratio as necessary and service according to maintenance schedule. Refer to LUBRICATION AND MAINTENANCE.
COOLANT LEVEL CHANGES IN COOLANT BOTTLE. TEMPERATURE GAUGE IS IN NORMAL RANGE.	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. The coolant level will also drop as the system removes air from a recent filling.	1. A normal condition. No repair is necessary.

ENGINE THERMOSTAT

The thermostat is operated by a wax filled container (pellet) which is sealed so that when heated to a predetermined temperature, the wax expands enough to overcome the closing spring and water pump pressure, which forces the valve to open. Coolant leakage into the pellet will cause a thermostat to fail open. Do not attempt to free up a thermostat with a screwdriver.

The open too soon type failure mode is included in the on-board diagnosis. The check engine light will not be lit by an open too soon condition. If it has failed open, a DTC diagnostic trouble code will be set. Do not change a thermostat for lack of heat by gauge or heater performance, unless a code is present, see diagnosis for other probable causes. Failing shut is the normal long term mode of failure, and normally, only on high mileage vehicles. The temperature gauge will indicate this, Refer to diagnosis in this section.

DIAGNOSIS AND TESTING (Continued)

WATER PUMP DIAGNOSIS

A quick test to tell whether or not the pump is working is to see if the heater warms properly. A defective pump will not be able to circulate heated coolant through the long heater hoses. For additional diagnosis, refer to Cooling System Diagnosis in this section. For water pump inspection, refer to Cleaning and Inspection, Water Pump for procedures in this section. **The water pump on all models can be replaced without discharging the air conditioning system.**

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain on water pump body—3.2/3.5L, or at weep passage below the thermostat housing—2.7L). Do not replace the water pump if this condition exists. Replace the water pump only if a heavy deposit or a steady flow of engine coolant is evident on water pump body (3.2/3.5L), or from the weep passage (2.7L). This condition indicates a shaft seal failure. Be sure to perform a thorough analysis before replacing the water pump.

RADIATOR FAN CONTROL

Cooling fan control can be accomplished five ways. A pressure transducer on the air conditioning compressor discharge line sends a signal to the Powertrain Control Module (PCM) which will activate both fans if necessary. In addition to this control, the fans are turned on based on coolant temperature sensor, intake air temperature sensor, output speed sensor, and transmission oil temperature sensor output to the PCM. The PCM switches the fans on through the fan relays. Refer to Wiring Diagrams Manual for circuit and diagnostics.

The PCM provides fan control for the following conditions:

- Regardless of coolant temperature the fan will not run during cranking until the engine starts.
- Fans will run in accordance with the specifications listed in the following operation charts.

RADIATOR FAN OPERATION—2.7L ENGINE

ENGINE COOLANT TEMPERATURE							INTAKE (CHARGE) TEMPERATURE	
	A/C Off		A/C On		Engine @ Idle<2 Km/h (1 MPH) Vehicle Speed			
Fan Speed	Low	High	Low	High	Low	High	Low	High
Fan On:	106°C (223°F)	110°C (230°F)	105°C (221°F)	110°C (230°F)	99°C (210°F) - After 2nd Fan Cycle	110°C (230°F)	63°C (145°F) if coolant<93°C (199°F) 60°C (140°F) if coolant >99°C (210°F)	67°C (153°F)
Fan Off:	102°C (216°F)	107°C (225°F)	102°C (216°F)	106°C (223°F)	Fan on time = 4 minutes*	105°C (221°F)	Fan on time = 8 minutes*	Fan on time = 4 minutes*
*Minimum fan on time = 90 seconds								

	A/C PRESSURE		TRANSMISSION OIL TEMPERATURE	
Fan Speed	Low	High	Low	High
Fan On:	1,448 Kpa (210 psi)	1,717 Kpa (249 psi)	109°C (228°F)	111°C (232°F)
Fan Off:	1,207 Kpa (175 psi)	1,503 Kpa (218 psi)	104°C (220°F)	109°C (228°F)

DIAGNOSIS AND TESTING (Continued)

RADIATOR FAN OPERATION—3.2/3.5L ENGINES

ENGINE COOLANT TEMPERATURE					INTAKE (CHARGE) AIR TEMPERATURE	
	A/C Off/On		Engine @ Idle <2 Km/h (1 MPH) Vehicle Speed			
Fan Speed	Low	High	Low	High	Low	High
Fan On:	102°C (216°F)	110°C (230°F)	99°C (210°F) - After 2nd Fan Cycle	110°C (230°F)	63°C (145°F) if coolant<93°C (199°F) 60°C (140°F) if coolant>99°C (210°F)	67°C (153°F)
Fan Off:	99°C (210°F)	105°C (221°F)	Fan on time = 4 minutes*	105°C (221°F)	Fan on time = 8 minutes*	Fan on time = 4 minutes*
*Minimum fan on time = 90 seconds						

	A/C PRESSURE		TRANSMISSION OIL TEMPERATURE	
Fan Speed	Low	High	Low	High
Fan On:	1,448 Kpa (210 psi)	1,717 Kpa (249 psi)	102°C (216°F)	109°C (228°F)
Fan Off:	1,207 Kpa (175 psi)	1,510 Kpa (219 psi)	98°C (208°F)	107°C (224°F)

RADIATOR COOLANT FLOW

To determine whether coolant is flowing through the cooling system, use the following procedure:

- If engine is cold, idle engine until normal operating temperature is reached. If the upper radiator hose is hot, coolant is circulating.

WARNING: DO NOT REMOVE COOLANT PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

ELECTRIC FAN MOTOR

Refer to Power Train Diagnostic Manual for procedure.

COOLANT CONCENTRATION TESTING

Coolant concentration should be checked when any additional coolant was added to system or after a coolant drain, flush and refill. The coolant mixture offers optimum engine cooling and protection against corrosion when mixed to a freeze point of -37°C (-34°F) to -59°C (-50°F). The use of a hydrometer or a refractometer can be used to test coolant concentration.

A hydrometer will test the amount of glycol in a mixture by measuring the specific gravity of the mixture. The higher the concentration of ethylene glycol, the larger the number of balls that will float, and higher the freeze protection (up to a maximum of 70% by volume glycol).

A refractometer will test the amount of glycol in a coolant mixture by measuring the amount a beam of light bends as it passes through the fluid.

Some coolant manufactures use other types of glycols into their coolant formulations. Propylene glycol is the most common new coolant. However, propylene glycol based coolants do not provide the same freezing protection and corrosion protection and is only recommended for limited usage. Refer to appropriate Technical Service Bulletin(s) regarding use of propylene glycol based coolants.

CAUTION: Do not mix types of coolant—corrosion protection will be severely reduced.

Because ethylene glycol and propylene glycol do not have the same specific gravities, the use of a hydrometer will be inaccurate. Therefore, Special Tool 8286 refractometer, is recommended when testing either ethylene or propylene glycol coolants.

DIAGNOSIS AND TESTING (Continued)

TESTING SYSTEM FOR LEAKS

With engine not running, wipe the coolant bottle neck sealing seat clean.

Attach a radiator pressure tester to the coolant bottle, as shown in (Fig. 18) and apply 104 kPa (15 psi) pressure. If the pressure drops more than 2 psi in 2 minutes inspect all points for external leaks.

All hoses, radiator and heater, should be moved while at 15 psi since some leaks occur while driving due to engine rock, etc. If the cooling system will not pressurize easily and there is no coolant leaks, the cooling system is only partially filled. Refer to filling procedure in this section.

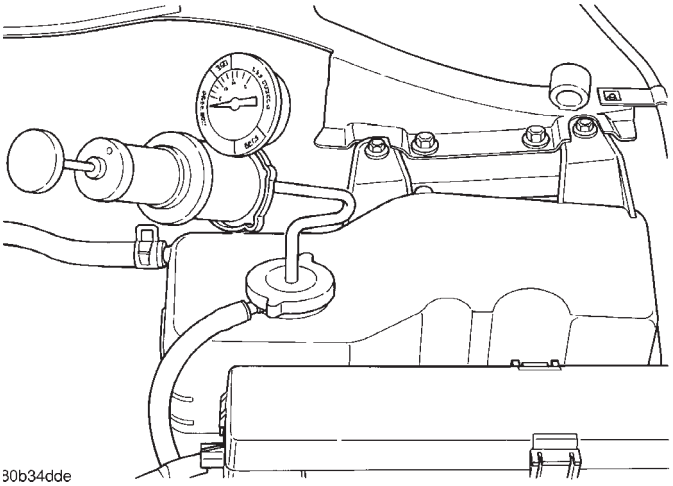


Fig. 18 Pressure Testing Cooling System

If there are no external leaks after the gauge dial shows a drop in pressure, detach the tester. Start engine and run the engine to normal operating temperature in order to open the thermostat and allow the coolant to expand. Reattach the tester. If the needle on the dial fluctuates it indicates a combustion leak, usually a head gasket leak.

WARNING: WITH TOOL IN PLACE PRESSURE BUILDS UP FAST. ANY EXCESSIVE AMOUNT OF PRESSURE BUILT UP BY CONTINUOUS ENGINE OPERATION MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

If the needle on the dial does not fluctuate, race the engine a few times. If an abnormal amount of coolant or steam is emitted from the tail pipe, it may indicate a faulty head gasket, cracked engine block or cylinder head.

There may be internal leaks which can be determined by removing the oil dipstick. If water globules appear intermixed with the oil it will indicate a internal leak in the engine. If there is an internal leak, the engine must be disassembled for repair.

LOW COOLANT LEVEL

Low coolant level in a cross flow radiator will equalize in both tanks with engine off. With engine at running and at operating temperature, the high pressure inlet tank runs full and the low pressure outlet tank drops. If this level drops below the top of the transmission oil cooler, air will be drawn into the water pump:

- Transmission oil will become hotter.
- High reading shown on the temperature gauge.
- Air in the coolant will also cause loss of flow through the heater core.
- Water pump seal may run dry, increasing the risk of premature seal failure.
- Exhaust gas leaks into the coolant can also cause the same problems.

DEAERATION

As air is removed from the cooling system, it gathers in the coolant bottle. This pressure is released into the atmosphere through the pressure valve located in the pressure cap when pressure reaches 96 - 124 kPa (14 - 18 psi). This air is replaced with coolant from the coolant bottle.

NOTE: Deaeration does not occur at engine idle—higher engine speeds are required. Normal driving will deaerate cooling system.

DIAGNOSIS AND TESTING (Continued)

ACCESSORY DRIVE BELT DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
INSUFFICIENT ACCESSORY OUTPUT DUE TO BELT SLIPPAGE	1. Belt too loose.	1. Adjust belt tension.
	2. Belt excessively glazed or worn.	2. Replace and tighten as specified.
BELT SQUEAL WHEN ACCELERATING ENGINE	1. Belts too loose.	1. Adjust belt tension.
	2. Belts glazed.	2. Replace belts.
BELT CHIRP AT IDLE	1. Belts too loose.	1. Adjust belt tension.
	2. Foreign material imbedded in belt.	2. Replace belt.
	3. Non-uniform belt.	3. Replace belt.
	4. Misaligned pulley(s).	4. Align accessories.
	5. Non-uniform groove or eccentric pulley.	5. Replace pulley(s).
BELT ROLLED OVER IN GROOVE OR BELT JUMPS OFF	1. Broken cord in belt.	1. Replace belt.
	2. Belt too loose, or too tight.	2. Adjust belt tension.
	3. Misaligned pulleys.	3. Align accessories.
	4. Non-uniform grooves or eccentric pulley.	4. Replace pulley(s).

ENGINE BLOCK HEATER

If unit does not operate, trouble can be in either the power cord or the heater element. Test power cord for continuity with a 110-volt voltmeter or 110-volt test light; test heater element continuity with an ohmmeter or 12-volt test light.

The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.

SERVICE PROCEDURES

COOLANT SERVICE

Refer to LUBRICATION AND MAINTENANCE for engine coolant recommended service schedule.

COOLANT LEVEL CHECK

Do not remove coolant bottle pressure cap for routine coolant level inspections.

The coolant bottle provides a quick visual method for determining the coolant level without removing the pressure cap. With the engine cold, the level of the coolant in the coolant bottle (Fig. 19) should be between the MIN and MAX lines on the bottle.

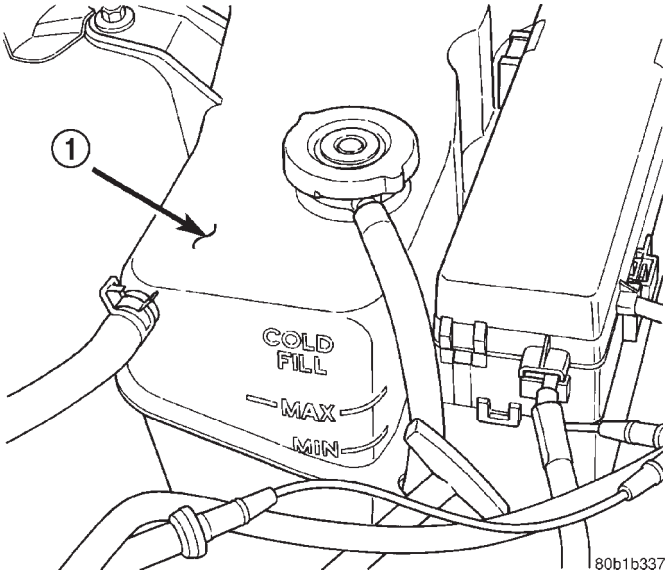


Fig. 19 Coolant Bottle Cold Fill Level

1 – COOLANT PRESSURE BOTTLE

COOLANT—ADDING ADDITIONAL

When additional coolant is needed, it should be added to the coolant pressure bottle. Use only 50/50 mix of Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (orange in color), or the equivalent and distilled water. This coolant must not be mixed with

SERVICE PROCEDURES (Continued)

other (green in color) coolants. If this occurs, a reduction in the extended service interval will result. Refer to LUBRICATION AND MAINTENANCE for service schedules.

WARNING: DO NOT OPEN COOLING SYSTEM WHEN HOT AND UNDER PRESSURE BECAUSE PERSONAL INJURY AND SERIOUS BURNS FROM COOLANT CAN OCCUR. ALLOW ENGINE TO COOL BEFORE SERVICING COOLING SYSTEM.

(1) Try squeezing the upper radiator hose to determine if the system is still pressurized.

(2) Place a shop towel over the pressure cap and turn to the first stop. Wait to see if any pressure is released. When no pressure is released, press down on the cap and turn to the second stop. Remove cap (Fig. 20).

NOTE: If the coolant pressure is bottle completely empty, refer to Filling Cooling System in this section.

(3) If there is some coolant in coolant pressure bottle, slowly fill coolant pressure bottle.

CAUTION: Do not use well water, or suspect water supply in cooling system. A 50/50 ethylene glycol and distilled water mix is recommended.

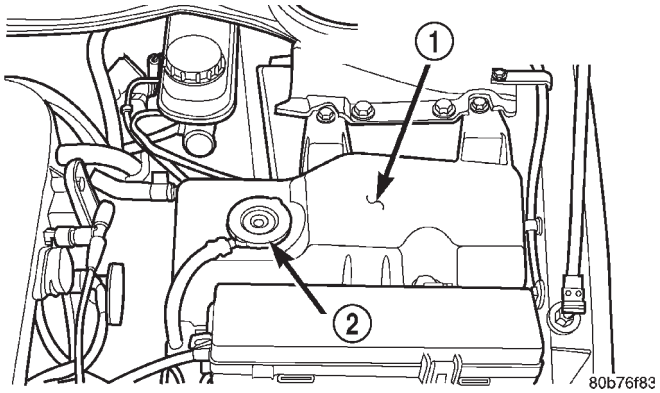


Fig. 20 Coolant Recovery Pressure Bottle and Cap Location

1 – COOLANT RECOVERY PRESSURE BOTTLE
2 – PRESSURE CAP

COOLING SYSTEM—DRAINING

When servicing the cooling system, it is essential that coolant does not drip onto the drive belts and/or pulleys. Shield the belts with shop towels before working on the cooling system. If coolant contacts the belts or pulleys, flush both with clean water.

WARNING: DO NOT REMOVE HOSE CLAMPS OR HOSES, CYLINDER BLOCK DRAIN PLUGS, COOLANT BOTTLE CAP, OR OPEN THE RADIATOR DRAINCOCK, WHEN THE SYSTEM IS HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM THE COOLANT CAN OCCUR.

(1) Open radiator drain located at the lower right side of radiator (Fig. 21). Drain takes place through the cooling module's lower right side insulator. **Do Not Use pliers to open draincock.**

(2) Remove coolant pressure bottle cap and open the thermostat bleed valve.

(3) Remove the cylinder block drain plug(s) located below each exhaust manifold.

Most service drains are about 80 percent of capacity listed in Cooling System Capacity Chart because not all coolant is drained from system.

CAUTION: The cooling system normally operates at 97-124 kPa (14-18 psi) pressure. Exceeding this pressure may damage the radiator or hoses.

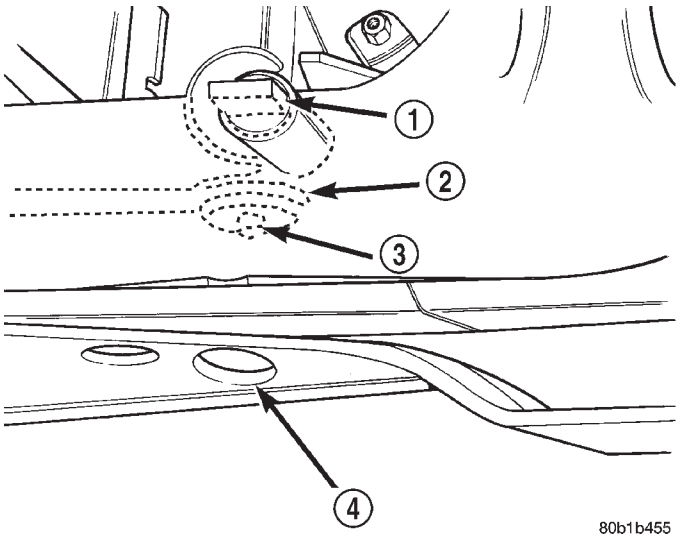


Fig. 21 Radiator Draincock Location

1 – DRAIN COCK
2 – INSULATOR
3 – DRAIN
4 – DRAIN HOLE

COOLING SYSTEM—FILLING

WARNING: MAKE SURE ENGINE COOLING SYSTEM IS COOL BEFORE REMOVING PRESSURE CAP OR ANY HOSE. SEVERE PERSONAL INJURY MAY RESULT FROM ESCAPING HOT COOLANT. THE COOLING SYSTEM IS PRESSURIZED WHEN HOT.

CAUTION: Do not use well water, or suspect water supply in cooling system. A 50/50 mix of ethylene glycol and distilled water mix is recommended.

SERVICE PROCEDURES (Continued)

(1) Close radiator drain. Hand tighten only.

WARNING: WHEN INSTALLING DRAIN HOSE TO AIR BLEED VALVE ON THERMOSTAT HOUSING, ROUTE HOSE AWAY FROM ACCESSORY DRIVE BELT, ACCESSORY DRIVE PULLEYS, AND ELECTRIC COOLING FAN MOTORS.

(2) Attach one end of a 6.35 mm (0.250 in.) ID clear hose that is approximately 1200 mm (48 in.) long, to the bleed valve in the outlet housing (Fig. 22). Route the hose away from the accessory drive belt, drive pulleys and electric cooling fan. Place the other end of hose into a clean container. The hose will prevent coolant from contacting the accessory drive belt when bleeding the system during the refilling operation.

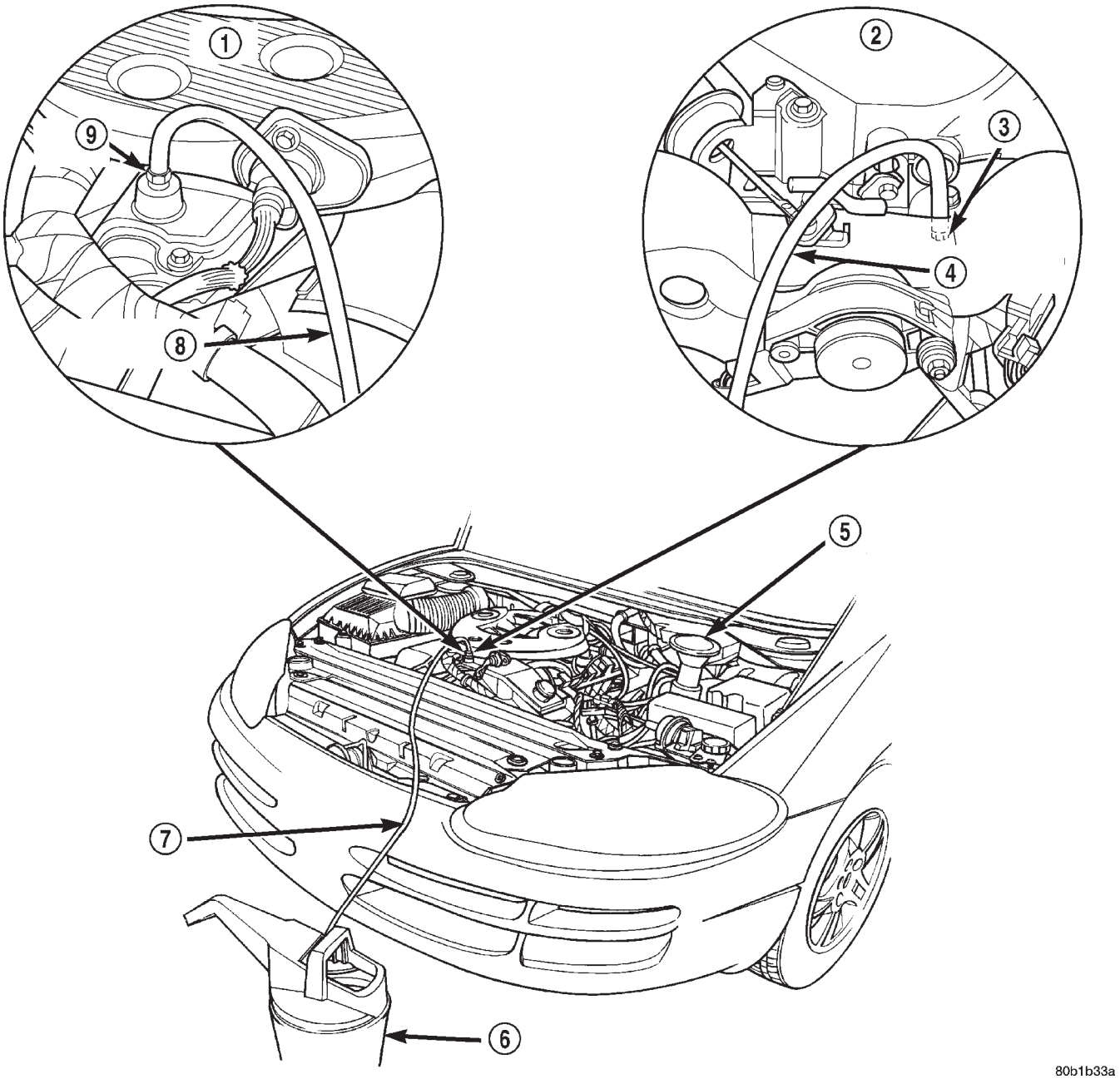


Fig. 22 Cooling System Bleeding

1 – 2.7L
2 – 3.2/3.5L
3 – BLEED VALVE
4 – TO COOLANT CONTAINER
5 – SPECIAL TOOL 8195
6 – COOLANT CONTAINER
7 – HOSE
8 – TO COOLANT CONTAINER
9 – BLEED VALVE

SERVICE PROCEDURES (Continued)

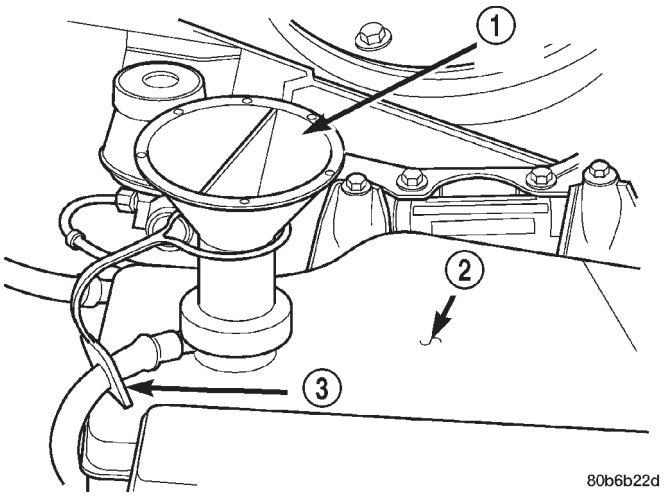


Fig. 23 Special Tool 8195

1 – SPECIAL TOOL 8195
2 – PRESSURE BOTTLE
3 – PINCH OVERFLOW HOSE

(3) Open the cooling system bleed valve:

- 2.7L: Located on the water outlet connector at the front of engine (Fig. 22).
- 3.2/3.5L: Located on the lower intake manifold, left of center and below the upper intake plenum (Fig. 22).

(4) Attach Special Tool 8195, Filling Aid Funnel to pressure bottle filler neck (Fig. 23).

(5) Use the supplied clip to pinch overflow hose that connects between the two chambers of the coolant bottle (Fig. 23).

NOTE: Use only Mopar® Antifreeze/Coolant, 5 Year/ 100,000 Mile Formula or the equivalent. This coolant contains corrosion inhibitors (called OAT, for Organic Additive Technology) that permit extended drain intervals. Refer to Coolant Performance in this section for appropriate coolant mixture to use.

CAUTION: Do not mix coolants. If coolant other than Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula or equivalent is added, the mixed coolant will have a reduced service schedule. Refer to Group 0, Lubrication and Maintenance for scheduled maintenance.

(6) Pour a 50/50 mix of Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula or equivalent and distilled water into the larger section of Filling Aid Funnel (the smaller section of Funnel is to allow air to escape). For system capacity, refer to Cooling System Capacity Chart.

(7) Slowly fill the cooling system until a steady stream of coolant flows from the hose attached to the bleed valve (Fig. 22).

(8) Close the bleed valve and continue filling system to the top of the Filling Funnel.

(9) Remove clip from overflow hose (Fig. 23).

(10) Allow the coolant in Filling Funnel to drain into overflow chamber of the pressure bottle.

(11) Remove Special Tool 8195, Filling Aid Funnel. Install cap on coolant pressure bottle.

(12) Remove hose from bleed valve.

(13) Start engine and run until it reaches operating temperature.

NOTE: The engine cooling system will push any remaining air into the coolant bottle within about an hour of normal driving. As a result, a drop in coolant level in the pressure bottle may occur.

If the engine cooling system overheats and pushes coolant into the overflow side of the coolant bottle, this coolant will be sucked back into the cooling system ONLY IF THE PRESSURE CAP IS LEFT ON THE BOTTLE. Removing the pressure cap breaks the vacuum path between the two bottle sections and the coolant will not return to cooling system.

(14) Shut off engine allow it to cool down. This permits coolant to be drawn into the pressure chamber.

(15) With engine COLD, observe coolant level in pressure chamber. Coolant level should be within MIN and MAX marks. Adjust coolant level as necessary.

NOTE: The coolant bottle has two chambers. Coolant will normally only be in the inboard (smaller) of the two. The outboard chamber is only to recover coolant in the event of an overheat or after a recent service fill. The outboard chamber should normally be empty. If there is coolant in the overflow side of the coolant bottle (after several warm/cold cycles of the engine) and coolant level is within MIN and MAX marks, disconnect the end of the overflow hose at the fill neck and lower it into a clean container. Allow coolant to drain into the container until emptied. Reconnect overflow hose to fill neck.

REMOVAL AND INSTALLATION

WATER PUMP—2.7L

REMOVAL

The water pump on all models can be replaced without discharging the air conditioning system.

REMOVAL AND INSTALLATION (Continued)

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain at weep passage). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident on side of the cylinder block from the weep hole passage (shaft seal failure). Be sure to perform a thorough analysis before replacing water pump.

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND PRESSURIZED. SERIOUS BURNS FROM COOLANT CAN RESULT.

(1) Drain cooling system. Refer to Cooling System Draining in this section.
(2) Remove upper radiator crossmember. Refer to BODY for procedure.
(3) Remove fan module.
(4) Remove accessory and air conditioning drive belts.

NOTE: The water pump is driven by the primary timing chain.

(5) Remove crankshaft damper, timing chain cover, primary timing chain, and all chain guides. Refer to ENGINE for procedures.
(6) Remove bolts attaching water pump to block (Fig. 24).
(7) Remove water pump and gasket.

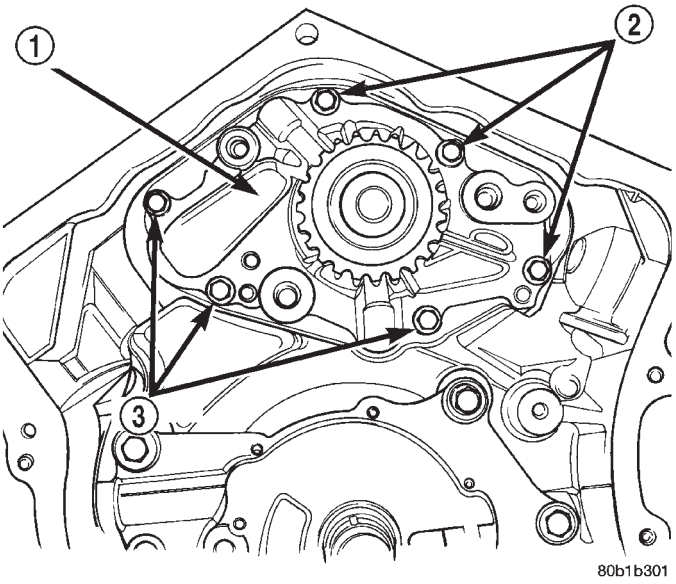


Fig. 24 Water Pump—2.7L Engine

1 – WATER PUMP
2 – BOLTS
3 – BOLTS

INSTALLATION

(1) Clean all sealing surfaces.
(2) Install water pump and gasket. Tighten mounting bolts to 12 N·m (105 in. lbs.).
(3) Install timing chain guides, timing chain, timing chain cover, and crankshaft damper. Refer to ENGINE for procedures
(4) Install accessory drive belts. Refer to procedure in this section.
(5) Install fan module and upper radiator crossmember.
(6) Fill cooling system. Refer to Cooling System Refilling in this section.

WATER PUMP—3.2/3.5L

REMOVAL

The water pump on all models can be replaced without discharging the air conditioning system.

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain on water pump body). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident on water pump body from the weep hole (shaft seal failure). Be sure to perform a thorough analysis before replacing water pump.

(1) Drain cooling system. Refer to Cooling System Draining in this section.
(2) Remove accessory drive belts. Refer to procedure in this section.
(3) The water pump is driven by the timing belt. Refer to Timing Belt Removal in ENGINE for component removal to provide access to water pump.
(4) Remove water pump mounting bolts (Fig. 25). Note position of longer bolt for proper re-installation.
(5) Remove water pump body from engine (Fig. 25).

INSTALLATION

(1) Clean all O-ring surfaces on pump and cover.
(2) Apply Mopar® Dielectric Grease or equivalent to the O-ring to facilitate assembly. Install new O-ring on water pump (Fig. 26).
(3) Position water pump to engine.
(4) Install mounting bolts and tighten to 12 N·m (105 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

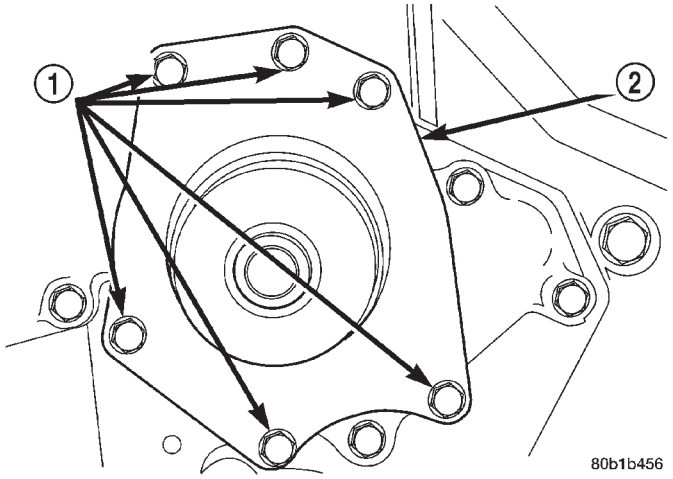


Fig. 25 Water Pump—3.2/3.5L Engine

1 – SCREWS 12 N·m (105 in. lbs.)
2 – WATER PUMP BODY

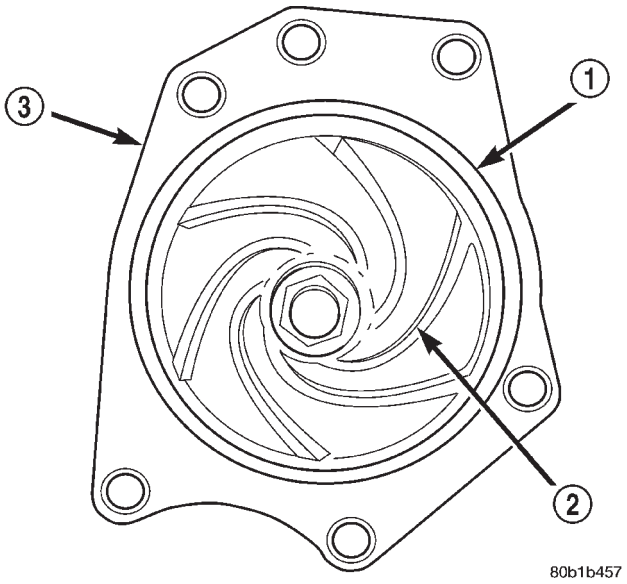


Fig. 26 Water Pump Body—3.2/3.5L Engine

1 – O-RING
2 – IMPELLER
3 – WATER PUMP BODY

(5) Install timing belt. Refer to ENGINE for procedure.

(6) Install accessory drive belts. Refer to procedure in this section.

(7) Fill cooling system. Refer to Cooling System Refilling.

WATER OUTLET CONNECTOR—2.7L

REMOVAL

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(1) Drain cooling system. Refer to procedure in this section.

(2) Remove upper intake manifold. Refer to ENGINE for procedure.

(3) Remove screws attaching heater tube to outlet connector.

(4) Disengage tube from outlet connector—only enough for connector removal.

(5) Remove bolts attaching water outlet connector (Fig. 27).

(6) Remove outlet connector.

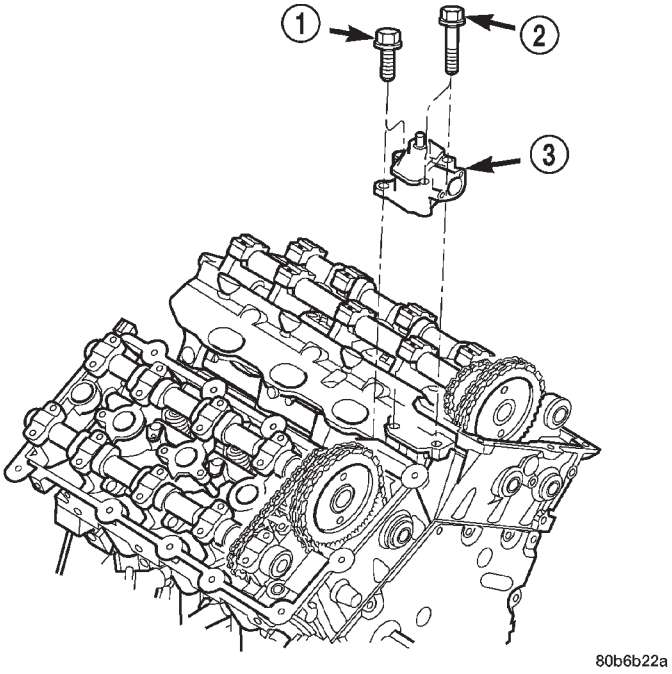


Fig. 27 Water Outlet Connector—Removal and Installation

1 – BOLT (2)
2 – BOLT (2)
3 – WATER OUTLET CONNECTOR

INSTALLATION

(1) Clean sealing surfaces. Inspect gaskets for tears and cuts. Replace as necessary.

(2) Install outlet connector and tighten bolts to 12 N·m (105 in. lbs.) (Fig. 27).

(3) Inspect and replace heater supply tube O-ring as necessary.

REMOVAL AND INSTALLATION (Continued)

(4) Lubricate O-ring and insert heater tube assembly into outlet connector. Tighten screws to 3 N·m (30 in. lbs.).

(5) Install upper intake manifold. Refer to ENGINE for procedure.

(6) Fill cooling system. Refer to Cooling System Filling in this section.

HEATER SUPPLY TUBE—2.7L

REMOVAL

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(1) Drain cooling system. Refer to procedure in this section.

(2) Remove upper radiator crossmember. Refer to BODY for procedure.

(3) Remove upper radiator hose at tube.

(4) Remove heater hose from heater tube at rear of engine.

(5) Disconnect heater tube from retaining clip at rear of engine.

(6) Disconnect electrical connector from coolant temperature sensor.

(7) Remove screws attaching heater tube to outlet connector (Fig. 28).

(8) Disengage heater tube from outlet connector (Fig. 28). To remove heater tube, move forward until the tube clears cylinder heads.

INSTALLATION

(1) Inspect heater tube O-ring. Replace as necessary.

(2) Lubricate O-ring and install heater tube by inserting tube in-between cylinder heads. Insert tube into water outlet housing (Fig. 28).

(3) Attach heater tube to the retaining clip at rear of engine.

(4) Install attaching screws and tighten to 3 N·m (30 in. lbs.).

(5) Install upper radiator hose and heater hose to heater tube.

(6) Connect electrical connector to coolant temperature sensor.

(7) Install upper radiator crossmember. Refer to BODY for procedure.

(8) Fill cooling system. Refer to Cooling System Filling in this section.

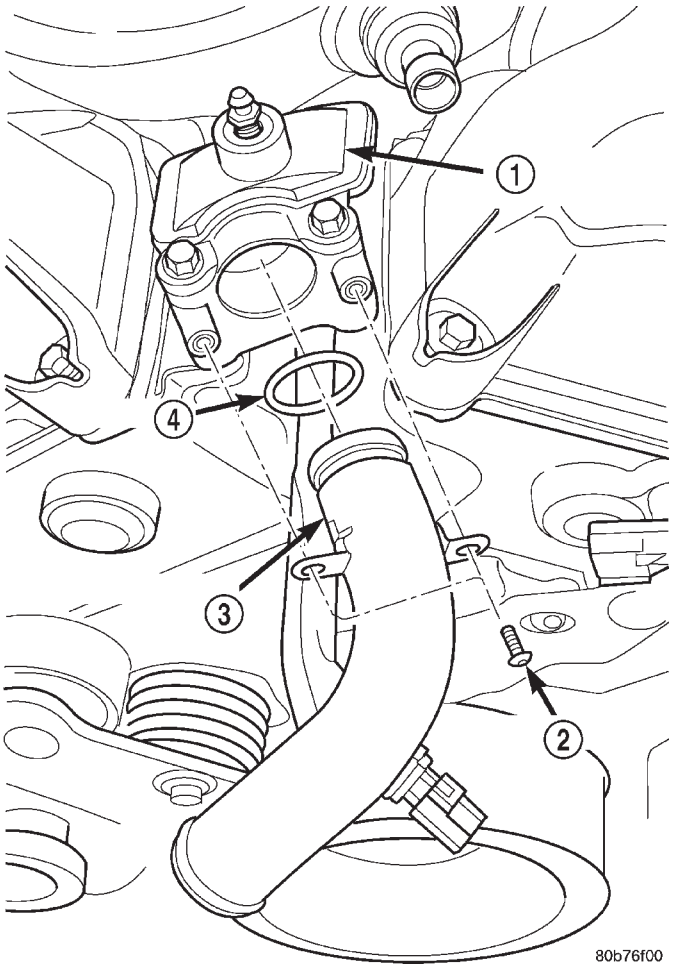


Fig. 28 Heater Supply Tube—Removal and Installation

1 – OUTLET CONNECTOR
2 – SCREW (2)
3 – HEATER TUBE
4 – O-RING

HEATER SUPPLY TUBE—3.2/3.5L

REMOVAL

WARNING: DO NOT REMOVE PRESSURE CAP WITH SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(1) Drain cooling system. Refer to procedure in this section.

(2) Remove upper and lower intake manifold. Refer to ENGINE for procedures.

(3) With lower intake manifold turned upside down on bench, remove the tube retaining bolt.

(4) Remove tube from manifold and discard O-ring.

REMOVAL AND INSTALLATION (Continued)

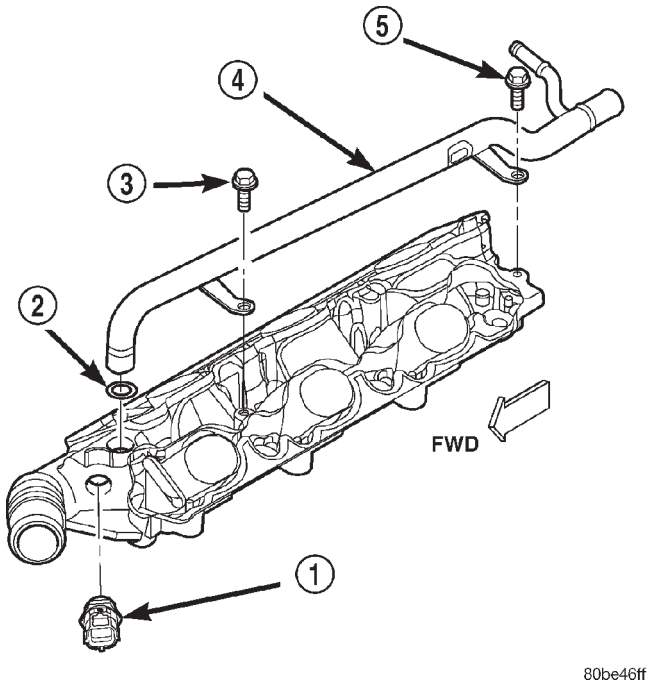


Fig. 29 Heater Supply Tube—3.2/3.5L

1 – COOLANT TEMPERATURE SENSOR
2 – O-RING
3 – BOLT
4 – HEATER SUPPLY TUBE
5 – BOLT

INSTALLATION

(1) Clean heater tube sealing surfaces.
(2) Install new O-ring on heater tube.
(3) Install heater tube on manifold
(4) Install retaining bolts and tighten to 12 N·m (105 in. lbs.).
(5) Install lower and upper intake manifolds. Refer to ENGINE for procedures.
(6) Refill cooling system. Refer to procedure in this section.

THERMOSTAT—2.7L

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(2) Drain cooling system.
(3) Remove accessory drive belt for removal of the generator.
(4) Raise vehicle on hoist.
(5) Remove generator attaching bolts. Set generator aside for ease of access to thermostat.
(6) Remove lower radiator and heater hoses from thermostat housing.
(7) Remove thermostat housing bolts (Fig. 30).
(8) Remove thermostat and housing.

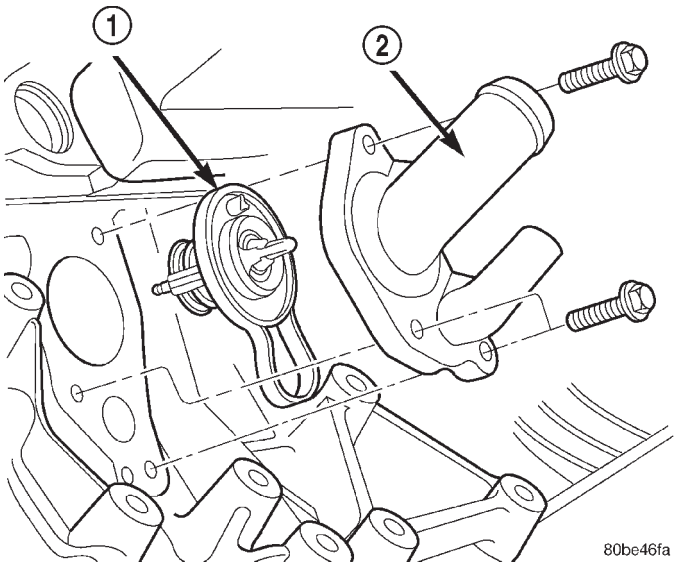


Fig. 30 Thermostat and Housing—2.7L Engine

1 – THERMOSTAT AND GASKET
2 – THERMOSTAT HOUSING/COOLANT INLET

INSTALLATION

(1) Clean gasket sealing surfaces.

NOTE: Install thermostat with the bleed valve located at the 12 o'clock position.

(2) Install thermostat and gasket into the thermostat housing.
(3) Install thermostat and housing to cylinder block. Tighten attaching bolts to 12 N·m (105 in. lbs.) (Fig. 30).
(4) Connect heater and lower radiator hoses. Install hose clamps.
(5) Install generator and attaching bolts.
(6) Lower vehicle.
(7) Install accessory drive belt. Refer to procedure outlined in this section.
(8) Refill cooling system. Refer to Cooling System Refilling.
(9) Connect negative cable to remote jumper terminal.

REMOVAL AND INSTALLATION (Continued)

THERMOSTAT—3.2/3.5L

REMOVAL

WARNING: DO NOT REMOVE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(1) Disconnect negative cable from remote jumper terminal.
(2) Drain cooling system.
(3) Raise vehicle on hoist.
(4) Disconnect electrical connectors from engine oil and power steering pressure switches.
(5) Disconnect radiator and heater hoses from thermostat housing.
(6) Remove thermostat housing bolts (Fig. 31).
(7) Remove housing, thermostat, and gasket.

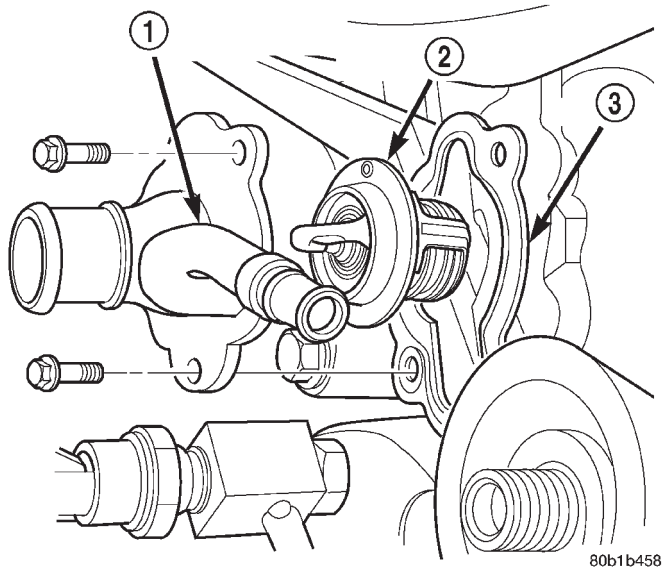


Fig. 31 Thermostat and Housing—3.2/3.5L Engine
1 – THERMOSTAT HOUSING/COOLANT INLET
2 – THERMOSTAT
3 – GASKET

INSTALLATION

(1) Clean gasket sealing surfaces.
(2) Install thermostat and gasket into thermostat housing. For ease of installation, install bolts in housing for thermostat and gasket retention.
(3) Install thermostat and housing to cylinder block. Tighten bolts to 12 N·m (105 in. lbs.).
(4) Connect heater and radiator hoses. Install hose clamps.
(5) Connect electrical connectors to engine oil and power steering pressure switches.
(6) Lower vehicle and connect negative cable to remote jumper terminal.
(7) Refill cooling system. Refer to Cooling System Refilling in this section.

RADIATOR

REMOVAL

NOTE: It is not necessary to discharge air conditioning system when removing the radiator.

(1) Disconnect negative cable from remote jumper terminal.

WARNING: DO NOT REMOVE THE CYLINDER BLOCK PLUG OR THE RADIATOR DRAINCOCK WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

(2) Drain cooling system. Refer to Cooling System Draining in this section.
(3) Remove upper radiator crossmember.
(4) Remove hose clamps and hoses from radiator.
(5) Disconnect transmission hoses from cooler and plug off (Fig. 32).
(6) Disconnect engine oil cooler lines (if equipped) (Fig. 32).
(7) Disconnect the fan electrical connector (Fig. 33).
(8) Remove fan module (Fig. 33).

CAUTION: Avoid bending the condenser inlet tube. Care should be taken not to damage radiator or condenser cooling fins or water tubes during removal.

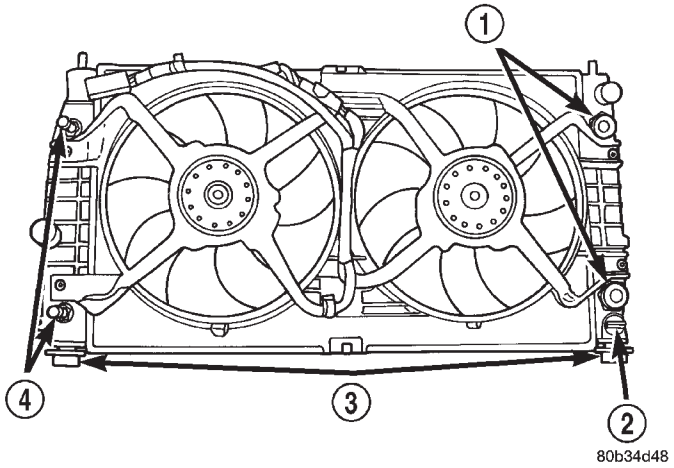


Fig. 32 Radiator—Removal and Installation
1 – ENGINE OIL COOLER FITTINGS (IF EQUIPPED)
2 – DRAINCOCK
3 – LOWER MOUNTING ISOLATORS
4 – TRANSMISSION COOLER LINE NIPPLES

REMOVAL AND INSTALLATION (Continued)

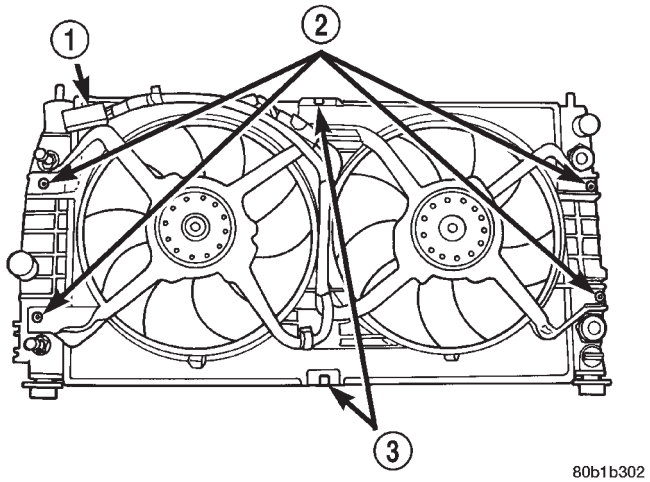


Fig. 33 Fan Module—Removal and Installation

1 – ELECTRICAL CONNECTOR
2 – FASTENERS
3 – CLIPS

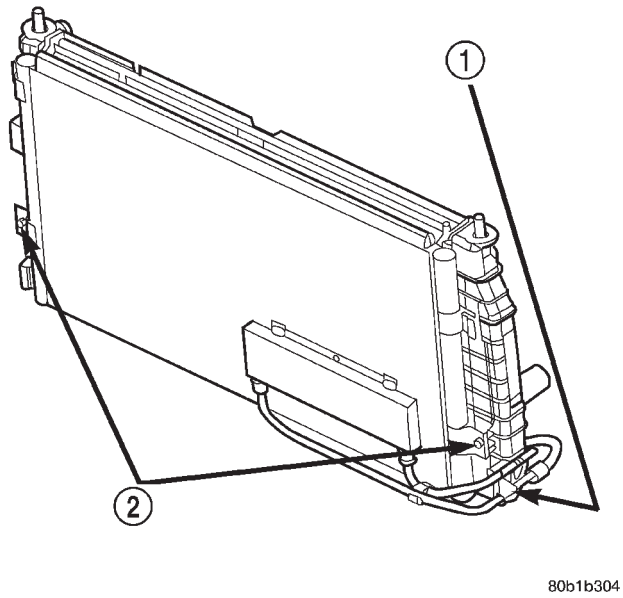


Fig. 34 A/C Condenser To Radiator—Removal and Installation

1 – TRANSMISSION OIL COOLER LINE MOUNTING BRACKET
2 – A/C CONDENSER TO RADIATOR MOUNTING SCREWS

(9) Remove the air conditioning condenser attaching screws located at the front of the radiator (Fig. 34).

(10) Remove fastener attaching transmission cooler line bracket to left side of radiator (Fig. 34).

(11) Lift condenser upward, only enough to clear upper mounting clips; allow condenser to rest on lower radiator crossmember. It is not necessary to discharge the air conditioning system.

(12) Radiator can now be lifted free from engine compartment. **Care should be taken not to damage radiator cooling fins or water tubes during removal.**

INSTALLATION

(1) Slide radiator down into position; seat the radiator assembly lower rubber isolators in the mounting holes provided in lower radiator support (Fig. 32).

(2) Attach air conditioning condenser to mounting clips on radiator. Install mounting screws and tighten to 5 N·m (45 in. lbs.) (Fig. 34).

(3) Connect lower radiator hose and clamp.

(4) Install transmission cooler line bracket and attaching fastener. Connect automatic transmission hoses; torque hose clamps to 2 N·m (18 in. lbs.).

(5) Install fan module.

(6) Connect fan motor electrical connector.

(7) Connect engine oil cooler lines (if equipped). Torque lines to 18 N·m (160 in. lbs.).

(8) Install upper radiator hose. Align hose so it does not interfere with the accessory drive belt or engine. Position hose clamp so it will not interfere with the hood liner.

(9) Install upper radiator support crossmember.

(10) Connect negative cable to remote jumper terminal.

(11) Fill cooling system with coolant. Refer to Cooling System Filling in this section.

(12) Operate engine until it reaches normal operating temperature. Check cooling system and automatic transmission for correct fluid levels.

RADIATOR DRAINCOCK

REMOVAL

WARNING: DO NOT REMOVE THE CYLINDER BLOCK PLUG OR THE RADIATOR DRAINCOCK WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

CAUTION: Use of pliers on draincock is not recommended. Damage may occur to part. Draincock should not be removed unless leakage is observed.

(1) Turn the draincock stem counterclockwise to unscrew the stem. When the stem is unscrewed to the end of its threads, turn back 1/8 turn and pull the stem (Fig. 35) from the radiator tank.

INSTALLATION

(1) Push the draincock assembly body into the tank opening until it snaps into place.

(2) Tighten the draincock stem by turning clockwise until it stops.

REMOVAL AND INSTALLATION (Continued)

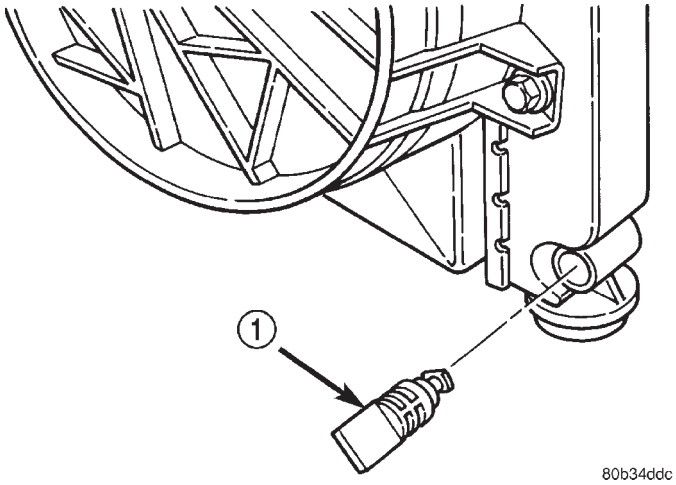


Fig. 35 Draincock

1 – DRAIN COCK BODY

COOLING FAN MODULE

REMOVAL

(1) Remove upper radiator crossmember. Refer to BODY for procedure.

(2) Disconnect fan electrical connector.

(3) Remove fan module attaching fasteners and clips (Fig. 36).

(4) Remove fan module by lifting upward to clear radiator.

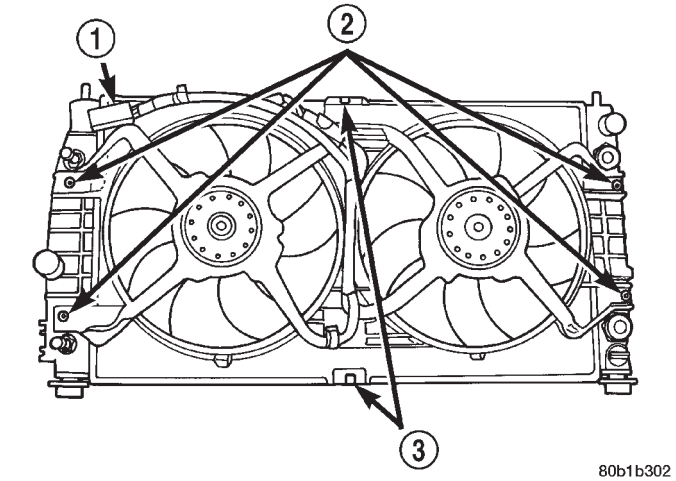


Fig. 36 Fan Module

1 – ELECTRICAL CONNECTOR
2 – FASTENERS
3 – CLIPS

INSTALLATION

(1) Install fan module.

(2) Install mounting clips and fasteners.

(3) Connect fan module electrical connector.

(4) Install upper radiator crossmember. Refer to BODY for procedure.

TRANSMISSION OIL COOLER—EXTERNAL

REMOVAL

(1) Remove A/C condenser. Refer to HEATING AND AIR CONDITIONING for procedure.

(2) Cut off attaching clips and remove transmission oil cooler.

INSTALLATION

(1) Attach cooler using new retainer straps.

(2) Install A/C condenser. Refer to HEATING AND AIR CONDITIONING for procedure.

(3) Connect cooler hoses to cooler lines and tighten hose clamps to 2 N·m (18 in. lbs.).

(4) Start engine and check transmission oil level. Adjust level as necessary.

TRANSMISSION OIL COOLER LINES

REMOVAL

(1) Loosen hose clamps at radiator connections and remove cooler hoses (Fig. 37).

(2) Remove lines from transmission.

(3) Remove lines from supports.

INSTALLATION

(1) Position cooler lines and connect to transmission. Torque flare nuts at transmission to 30 N·m (260 in. lbs.).

(2) Connect cooler lines to supports.

(3) Connect cooler hoses to radiator (Fig. 37). Tighten hose clamps to 2 N·m (18 in. lbs.).

(4) Start engine and check transmission fluid level. Adjust as necessary.

REMOVAL AND INSTALLATION (Continued)

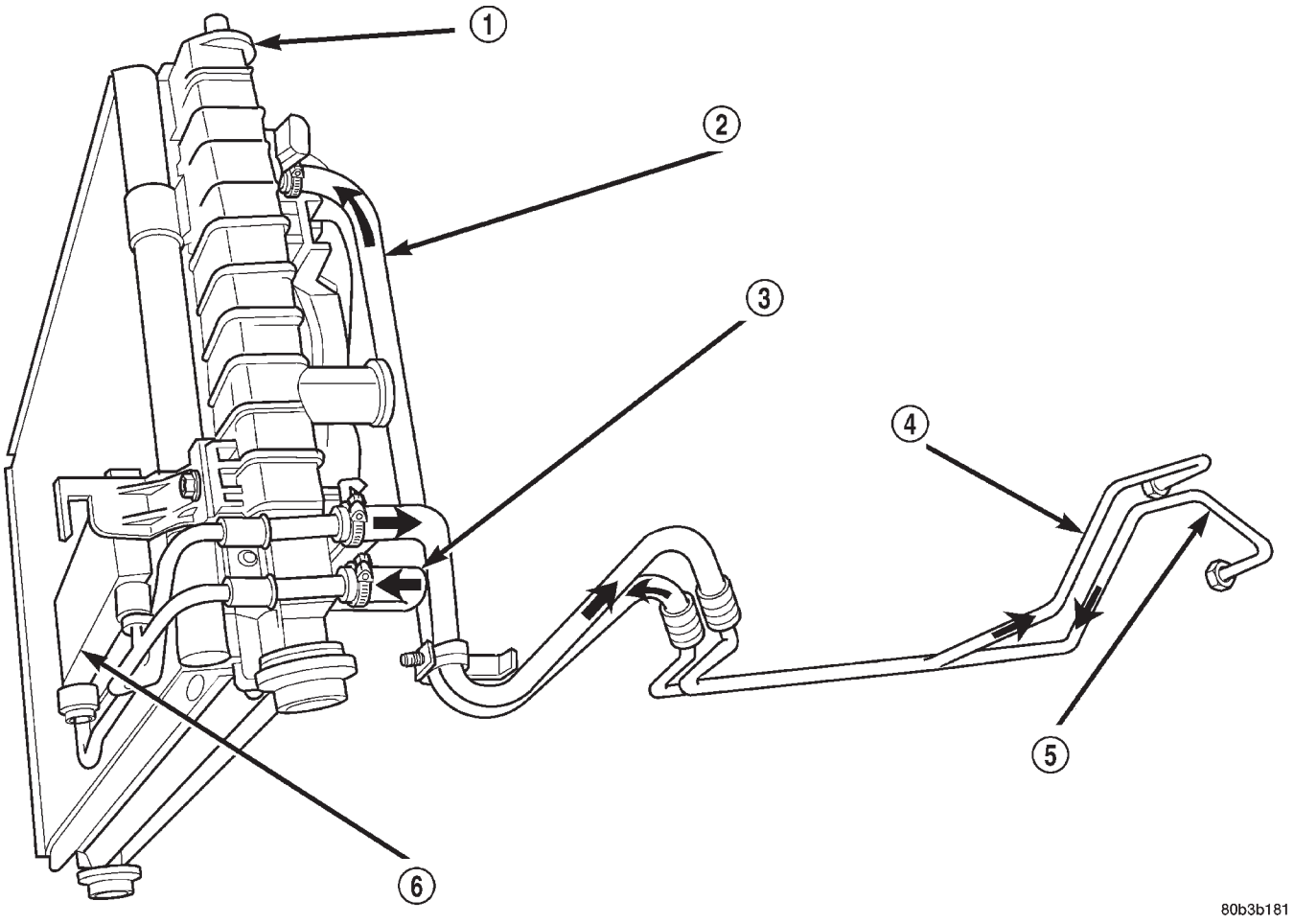


Fig. 37 Transmission Oil Cooler Lines

1 – RADIATOR
2 – TRANSMISSION OIL COOLER SUPPLY LINE TO IN-TANK COOLER
3 – FROM IN-TANK COOLER TO AUXILIARY OIL COOLER
4 – TRANSMISSION OIL RETURN LINE
5 – FROM TORQUE CONVERTER TO IN-TANK OIL COOLER
6 – AUXILIARY TRANSMISSION OIL COOLER

ENGINE OIL COOLER—2.7L ENGINE

REMOVAL

ENGINE OIL COOLER

(1) The engine oil cooler is serviced with the radiator. Refer to Radiator—Removal and Installation procedure in this section.

COOLER LINES

(1) Disconnect cooler lines at radiator (Fig. 38).

NOTE: The quick connect feature of the cooler lines are a one time assembly only design. To remove cooler lines, unscrew the fittings from block and oil pan.

(2) Disconnect lines at the engine block and oil pan by unscrewing the fittings.

(3) Disconnect lines from support bracket and retainer (Fig. 38) and (Fig. 39).

(4) Remove lines (Fig. 39).

PRESSURE CONTROL VALVE

(1) Disconnect supply line to control valve.

(2) Remove control valve by unscrewing fitting from engine block (Fig. 39).

INSTALLATION

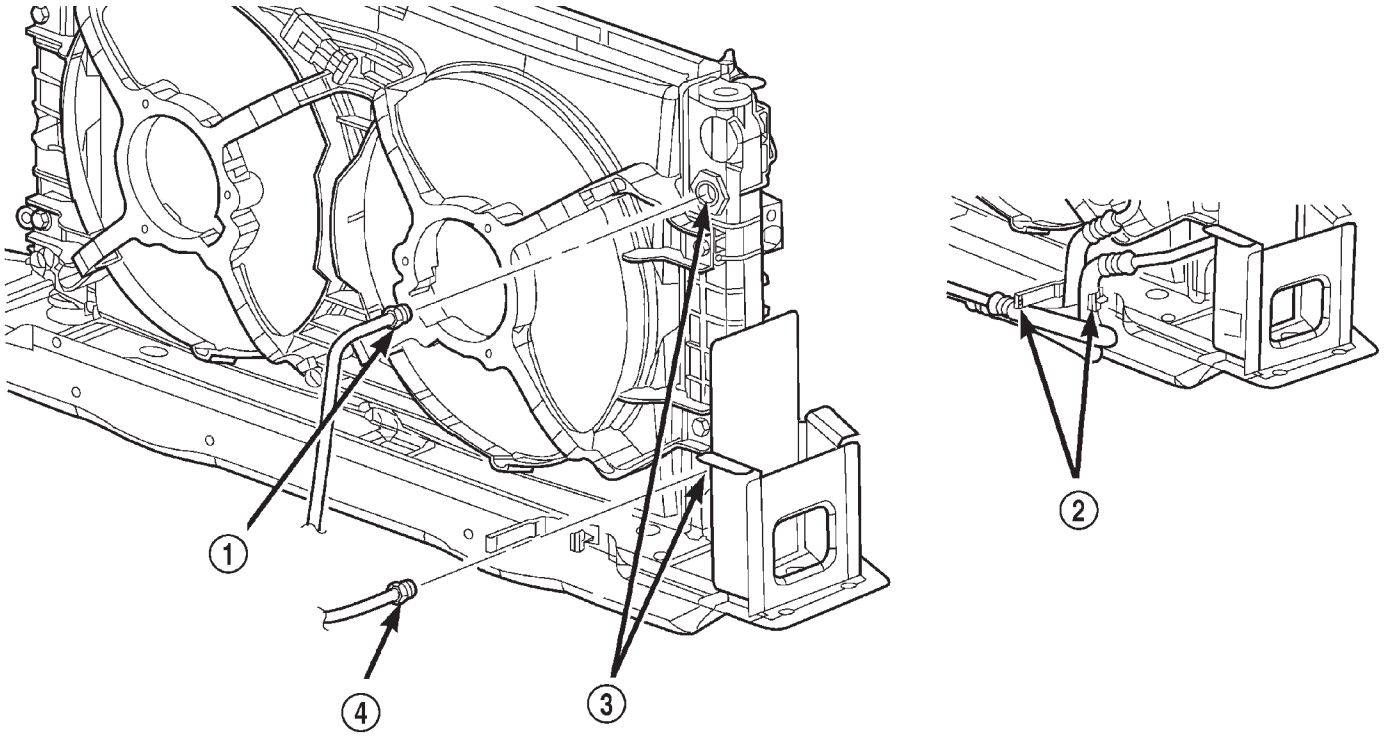
ENGINE OIL COOLER

(1) Install radiator assembly. Tighten lines to radiator fittings to 18 N·m (160 in. lbs.).

COOLER LINES

(1) Connect cooler lines to radiator fittings and retainer clip (Fig. 38). Tighten lines to radiator fittings to 18 N·m (160 in. lbs.).

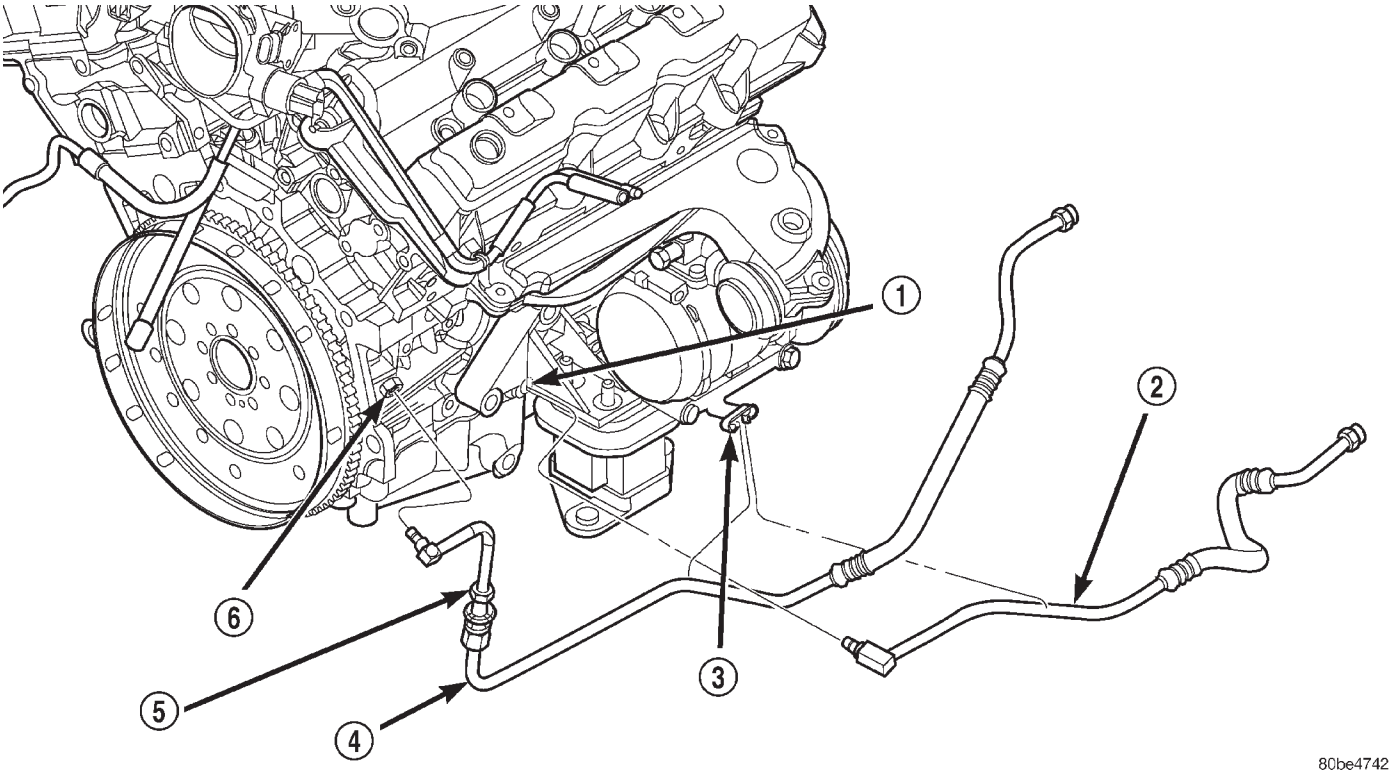
REMOVAL AND INSTALLATION (Continued)



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Fig. 38 Engine Oil Cooler—2.7L (EES only)

1 – ENGINE OIL COOLER SUPPLY LINE
2 – RETAINER
3 – ENGINE OIL COOLER FITTINGS
4 – ENGINE OIL COOLER RETURN LINE



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Fig. 39 Engine Oil Cooler Line Installation—2.7L (EES only)

1 – RETURN LINE FITTING
2 – OIL COOLER RETURN LINE
3 – SUPPORT BRACKET
4 – OIL COOLER SUPPLY LINE
5 – PRESSURE CONTROL VALVE
6 – SUPPLY LINE FITTING

REMOVAL AND INSTALLATION (Continued)

(2) Installation of NEW cooler lines:

(a) Install new line fittings to engine block and oil pan (Fig. 39). Tighten fittings to 30 N·m (260 in. lbs.).

(b) Position lines to fittings. Push line into fitting until it locks in place. Ensure proper connection is made by pulling in-and-out on line.

(c) Connect lines to support bracket (Fig. 39).

(3) Installation of the original cooler lines:

(a) Position cooler lines to engine block and oil pan (Fig. 39). Tighten fittings to 30 N·m (260 in. lbs.).

(b) Connect lines to support bracket (Fig. 39).

PRESSURE CONTROL VALVE

(1) Install supply line fitting into engine block (Fig. 39). Tighten fitting to 30 N·m (260 in. lbs.).

(2) Position control valve into fitting. Push valve into fitting until it locks in place. Ensure proper connection is made by pulling in-and-out on valve.

(3) Connect supply line to control valve. Tighten connection fitting to 30 N·m (260 in. lbs.).

ENGINE OIL COOLER—3.2/3.5L ENGINE

REMOVAL

ENGINE OIL COOLER

(1) The engine oil cooler is serviced with the radiator. Refer to Radiator—Removal and Installation procedure in this section.

COOLER LINES

(1) Disconnect cooler lines at radiator (Fig. 40).

(2) Disconnect lines at the pressure control valve and oil pan fitting.

(3) Disconnect lines for support retainer and isolator.

(4) Remove lines.

PRESSURE CONTROL VALVE

(1) Disconnect oil pressure switch connector (Fig. 40).

(2) Disconnect cooler supply line for valve.

(3) Remove valve from engine block by unscrewing fitting.

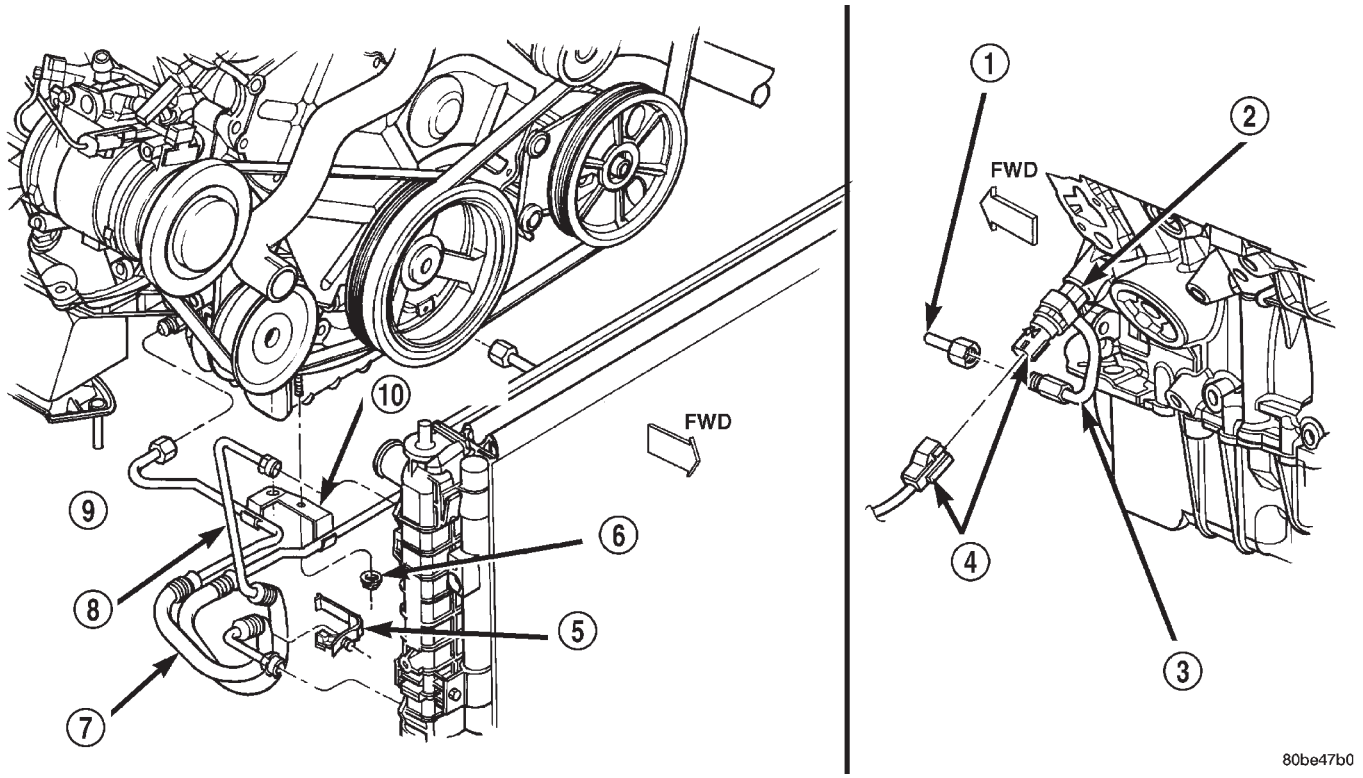


Fig. 40 Engine Oil Cooler and Hoses—3.2/3.5L

1 – SUPPLY LINE TO OIL COOLER
2 – FITTING
3 – OIL COOLER PRESSURE CONTROL VALVE
4 – OIL PRESSURE SWITCH AND CONNECTOR
5 – RETAINER
6 – NUT
7 – RETURN LINE
8 – SUPPLY LINE
9 – ENGINE OIL COOLER:
10 – ISOLATOR

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

ENGINE OIL COOLER

(1) Install radiator assembly. Tighten lines to radiator fittings to 18 N·m (160 in. lbs.) (Fig. 40).

COOLER LINES

(1) Position cooler lines and connect lines to radiator fittings. Tighten lines to radiator fittings to 18 N·m (160 in. lbs.) (Fig. 40).

(2) Connect lines to pressure control valve and oil pan fitting. Tighten lines to 30 N·m (260 in. lbs.) (Fig. 40).

(3) Connect lines to support retainer and isolator.

PRESSURE CONTROL VALVE

(1) For installation of a NEW control valve:

(a) Install fitting into block. Tighten fitting to 30 N·m (260 in. lbs.).

(b) Position control valve to fitting. Push line into fitting until it locks in place. Ensure proper connection is made by pulling in-and-out on valve.

(2) For installation of original control valve:

(a) Install pressure control valve to engine block. Tighten fitting to 30 N·m (260 in. lbs.) (Fig. 40).

(3) Connect oil cooler supply line. Tighten to 30 N·m (260 in. lbs.).

(4) Connect oil pressure switch connector.

ENGINE BLOCK HEATER

REMOVAL

(1) Raise vehicle on hoist.

(2) Detach power cord plug from heater (Fig. 41).

(3) Remove block heater attaching screw located below heater terminals.

(4) Remove block heater from cylinder block.

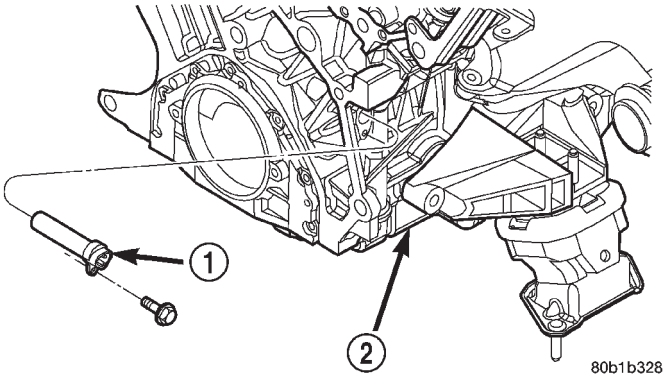


Fig. 41 Engine Block Heater

1 – BLOCK HEATER
2 – ENGINE — RIGHT SIDE

INSTALLATION

(1) Thoroughly clean cylinder block heater cavity.

(2) Insert heater assembly into block such that mounting hole is located below heater terminals.

(3) Install mounting screw and tighten to 12 N·m (105 in. lb.).

(4) Attach power cord to heater.

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

(5) Lower vehicle.

ACCESSORY DRIVE BELTS—2.7L

AIR CONDITIONING BELT

NOTE: The A/C drive belt self tensioner is NOT a dynamic tensioner. After tensioner adjustment bracket bolts are tightened, the torsion spring is no longer responsible for tensioning the A/C belt. The torsion spring is only used for initial belt tensioning only.

REMOVAL

(1) Remove generator/power steering belt. Refer to procedure in this section.

(2) Loosen **BUT DO NOT REMOVE** tensioner locking bolt and pivot bolt (Fig. 42).

(3) Insert 1/2” drive breaker bar into square opening on belt tensioner. Rotate tensioner counterclockwise until belt can be removed from pulleys (Fig. 42).

(4) Slowly rotate tensioner clockwise to relieve spring load.

INSTALLATION—NEW BELT

WARNING: DO NOT REMOVE A/C BELT TENSIONER LOCKING BOLT WITHOUT FIRST HOLDING THE TENSIONER WITH A 1/2” DRIVE BREAKER BAR, AS PERSONAL INJURY COULD RESULT.

NOTE: Verify that torsion spring position is in the new belt position before installing a NEW belt (Fig. 43). If torsion spring is not in the new belt position, follow steps 1 – 7 to change the tensioner spring from the USED belt position to the NEW belt position.

(1) Insert a 1/2” drive breaker bar into the square opening on the tensioner. Hold counterclockwise pressure on tensioner while removing the locking bolt (Fig. 42).

REMOVAL AND INSTALLATION (Continued)

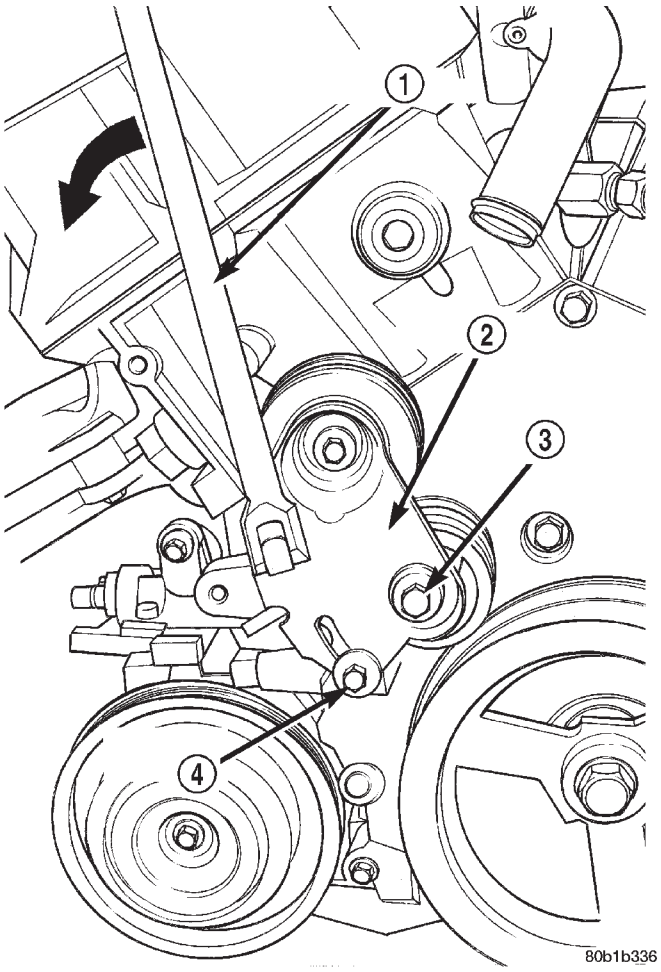


Fig. 42 Air Conditioning Drive Belt—Removal and Installation

1 – 1/2" DRIVE BREAKER BAR
2 – TENSIONER
3 – PIVOT BOLT
4 – LOCKING BOLT

(2) Carefully release spring load of the torsion spring on the tensioner.

(3) Remove pivot bolt, tensioner, and spring from front timing cover.

(4) Insert spring arm into the NEW belt position on the tensioner (Fig. 43).

(5) Install torsion spring, tensioner, and pivot bolt.

(6) Install pivot bolt. Tighten only finger tight, at this time.

(7) Using a 1/2" drive breaker bar, apply counterclockwise pressure until locking bolt can be installed.

(8) Rotate tensioner counterclockwise until the NEW belt can be installed on pulleys. See (Fig. 44) for belt routing.

(9) Release tensioner and remove breaker bar. Belt is automatically adjusted with the tensioner's torsion spring.

(10) Tighten tensioner locking bolt and pivot bolt to 28 N·m (250 in. lbs.) (Fig. 42).

(11) Install generator/power steering belt.

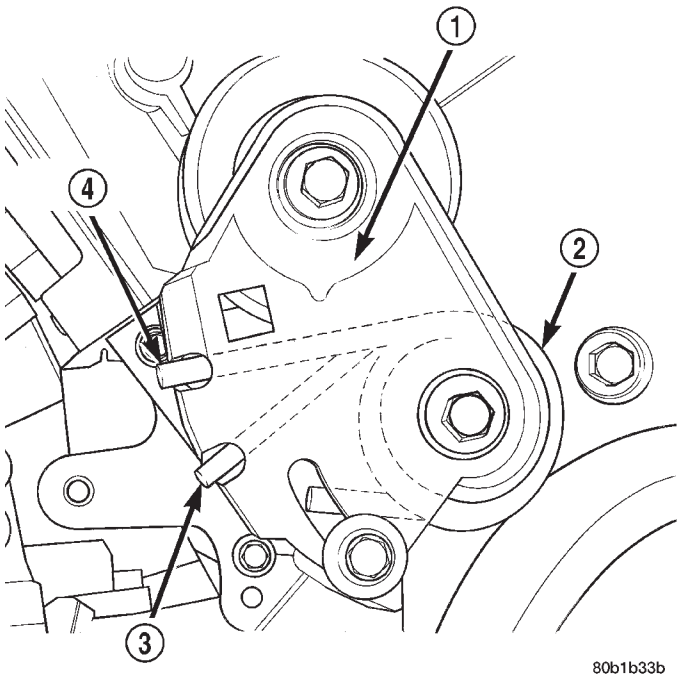


Fig. 43 Air Conditioning Belt Tensioner Spring Position

1 – TENSIONER
2 – TORSION SPRING
3 – NEW BELT POSITION
4 – USED BELT POSITION

INSTALLATION—USED BELT

NOTE: A "used belt" is considered having more than 500 miles of service use.

NOTE: Perform steps 1 – 7 to change the tensioner spring from the NEW belt position, to the USED belt position.

(1) Insert a 1/2" drive breaker bar into the square opening on tensioner. Hold counterclockwise pressure on tensioner, while removing tensioner locking bolt (Fig. 42).

(2) Carefully release the tension of spring on tensioner.

(3) Remove pivot bolt, tensioner, and spring from front cover.

(4) Insert spring into the USED belt position on tensioner bracket (Fig. 43).

(5) Install spring, tensioner bracket, and pivot bolt.

(6) Install pivot bolt. Tighten only finger tight, at this time.

REMOVAL AND INSTALLATION (Continued)

(7) Using a 1/2" drive breaker bar, apply counterclockwise pressure until locking bolt can be installed.

(8) Install the USED belt by rotating tensioner counterclockwise until belt can be installed on pulleys. See (Fig. 44) for belt routing.

(9) Release tensioner and remove breaker bar. Belt is automatically adjusted with the tensioner's torsion spring.

(10) Tighten tensioner locking bolt and pivot bolt to 28 N·m (250 in. lbs.) (Fig. 42).

(11) Install generator/power steering belt.

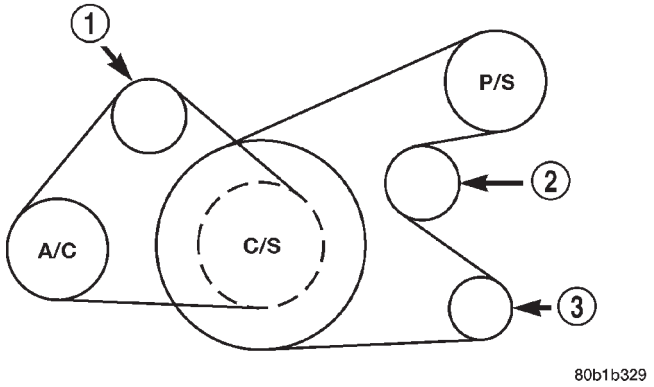


Fig. 44 Belt Routing—2.7L Engine

1 – IDLER
2 – IDLER
3 – GEN.

GENERATOR/POWER STEERING BELT

REMOVAL

(1) Loosen tensioner pulley locking nut (Fig. 45).

(2) Loosen belt adjusting bolt (Fig. 45).

(3) Remove generator/power steering belt.

INSTALLATION

(1) Install generator/power steering belt on pulleys.

(2) Tighten belt adjusting bolt to proper belt tension.

(3) Tighten tensioner locking nut.

NOTE: See Belt Tension Chart for specifications.

ACCESSORY DRIVE BELTS—3.2/3.5L

AIR CONDITIONING BELT

REMOVAL

(1) Remove generator/power steering drive belt to gain access to the air conditioning drive belt. Refer to procedure in this section.

(2) To remove air conditioning drive belt, first loosen the tensioner pulley lock nut, then loosen the adjusting screw to the tensioner pulley assembly until the belt can be removed (Fig. 46).

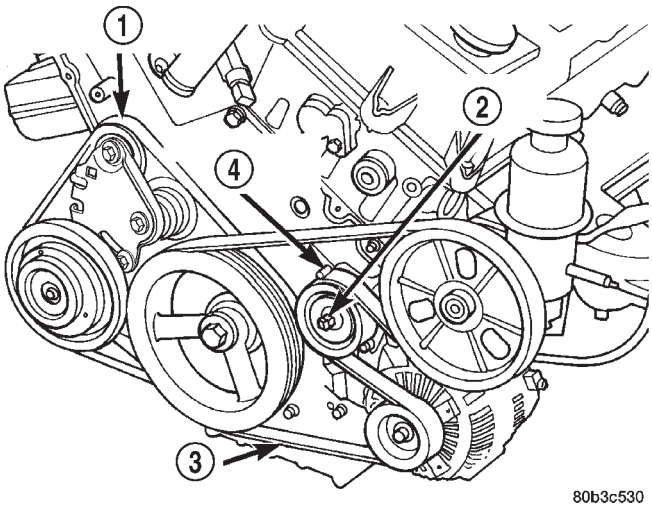


Fig. 45 Accessory Drive Belts

1 – A/C DRIVE BELT
2 – LOCKING NUT
3 – GENERATOR/POWER STEERING DRIVE BELT
4 – ADJUSTING BOLT

BELT TENSION CHART—2.7L

POLY-V BELT	GAUGE
Generator/Power Steering Belt	New Belt: 836 ±44 N (190 ±10 lbs.)
	Used Belt: 534 N (120 lbs.)

INSTALLATION

(1) Install air conditioning belt over drive pulleys. Tighten the tensioner adjusting bolt until the belt is at specified tension using a Belt Tension Gauge. Refer to Belt Tension Chart. Tighten tensioner pulley locking nut to 54 N·m (40 ft. lbs.).

(2) Install generator/power steering drive belt and adjust to specified tension.

Air Conditioning Belt Tension Adjustment

Loosen the tensioner pulley locking nut and adjust belt tension by tightening adjusting bolt. Use Belt Tension Gauge and refer to Belt Tension Chart for specifications. Torque pulley nut to 54 N·m (40 ft. lbs.) after adjustment.

GENERATOR/POWER STEERING BELT

The Poly-V generator/power steering belt has an adjustable tensioner pulley located on the front timing belt cover.

REMOVAL AND INSTALLATION (Continued)

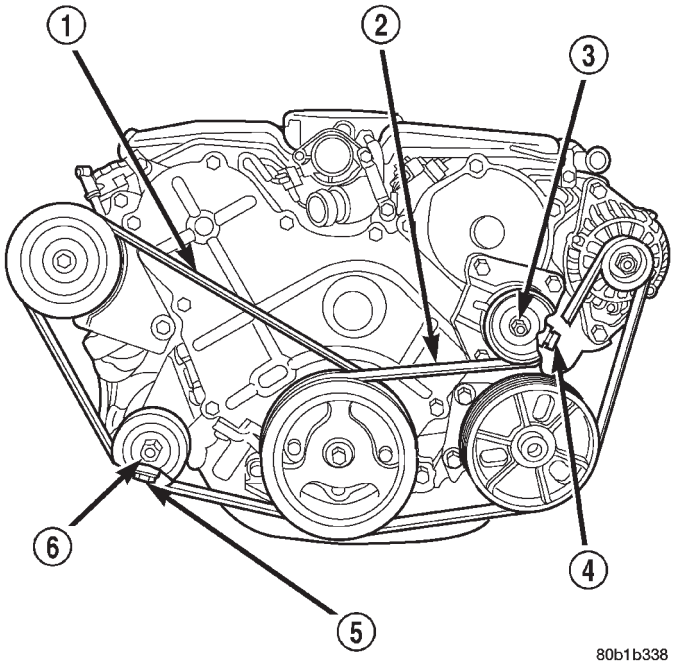


Fig. 46 Accessory Drive Belts

1 – V-BELT
2 – POLY-V BELT
3 – LOCKING NUT
4 – ADJUSTING BOLT
5 – ADJUSTING BOLT
6 – LOCKING NUT

REMOVAL

(1) Loosen tensioner pulley locking nut.
(2) Raise vehicle on hoist.
(3) Remove the two (2) push clips attaching lower air shield to engine cradle. Remove air shield.
(4) Loosen tensioner adjusting bolt until the belt can be removed.

INSTALLATION

(1) Install generator/power steering belt.

NOTE: Use Special Tool 7198, Belt Tension Gauge to obtain proper tension on accessory drive belt. Refer to Belt Tension Chart.

(2) Tighten adjusting bolt until the specified tension is obtained.
(3) Install lower air shield and attaching push clips.
(4) Lower vehicle.
(5) Tighten tensioner pulley locking nut.

Generator/Power Steering Belt Tension Adjustment

Loosen the tensioner pulley locking nut and adjust belt tension by tightening adjusting bolt. Use Belt Tension Gauge and refer to Belt Tension Chart for specifications. Torque pulley nut to 54 N·m (40 ft. lbs.) after adjustment.

BELT TENSION CHART—3.2/3.5L

POLY-V BELT	GAUGE
Generator/Power Steering Belt	New Belt: 836 ±44 N (190 ±10 lbs.)
	Used Belt: 534 N (120 lbs.)
V-BELT	GAUGE
Air Conditioning Belt	New Belt: 667 ±44 N (150 ±10 lbs.)
	Used Belt: 534 N (120 lbs.)

CLEANING AND INSPECTION

WATER PUMP

CLEANING

Clean all gasket mating surfaces as necessary.

INSPECTION

Inspect and replace the water pump if it has any of the following defects:
(1) Damage or cracks on the pump body.
(2) Coolant leaks; if the seal is leaking, this will be evident by traces of thick deposits of dried glycol running down the pump body (3.2/3.5L), pump weep passage (2.7L) (Fig. 47), and components below. A thin black stain below pump weep hole/passage is considered normal operation.
(3) Impeller rubs inside of cylinder block (2.7L) or timing belt cover (3.2/3.5L) engines.
(4) Excessively loose or rough turning bearing.

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain on water pump body). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident on water pump body (3.2/3.5L) or from the weep passage (2.7L) (Fig. 47). This indicates a shaft seal failure and pump must be replaced. Be sure to perform a thorough analysis before replacing water pump.

ACCESSORY DRIVE BELTS

CLEANING

Clean all foreign debris from belt pulley grooves. The belt pulleys must be free of oil, grease, and coolants before installing the drive belt.

CLEANING AND INSPECTION (Continued)

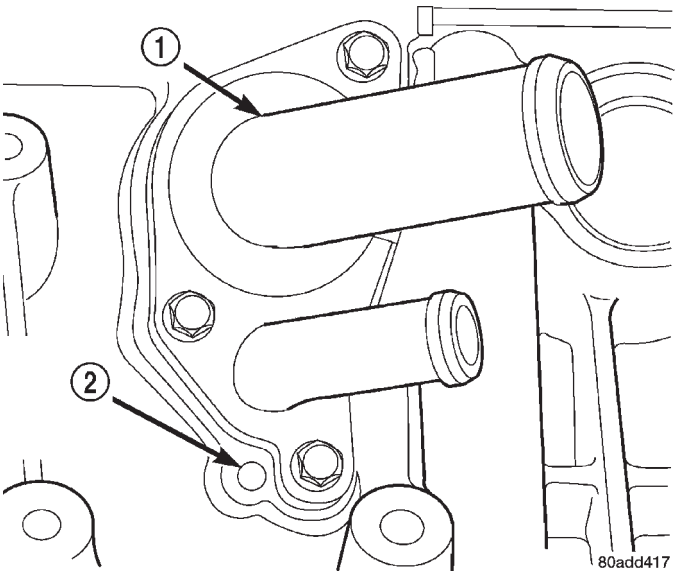


Fig. 47 Water Pump Weep Passage—2.7L Engine

1 – THERMOSTAT HOUSING/COOLANT INLET
2 – WATER PUMP WEEP PASSAGE

INSPECTION

Satisfactory performance of the belt driven accessories depends on belt condition and proper belt tension.

Inspect and replace accessory drive belt under any or all of the following conditions:

(1) Excessive wear.
(2) Frayed cords.
(3) Severe glazing.

V-Ribbed belt systems with back drive pulley may develop minor cracks across the ribbed side (due to reverse bending). These minor cracks are considered normal and acceptable. Parallel cracks are not (Fig. 48).

COOLANT BOTTLE PRESSURE CAP

INSPECTION

The pressure cap upper gasket (seal) pressure relief can be checked by removing cap. Attach the Radiator Pressure Tool to the cap and pump air into the cap. Pressure cap upper gasket should relieve at 124 kPa (18 psi) and hold pressure at 110 kPa (16 psi) minimum.

Remove the pressure tester hold the cap in hand, **right side up** (Fig. 49). The vent valve at the bottom of the cap should not open. If the rubber gasket has swollen and prevents the valve from closing, replace the cap.

Hold the cleaned cap in hand **upside down.** If any light can be seen between vent valve and rubber gasket, replace cap.

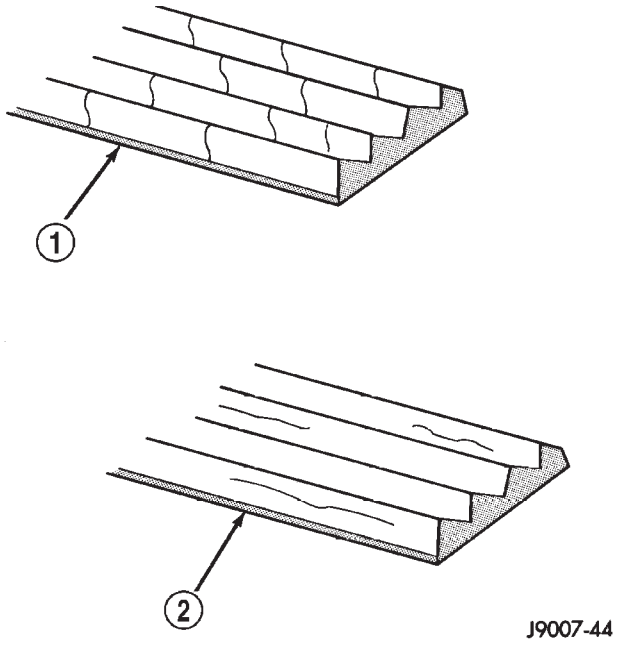


Fig. 48 Drive Belt Inspection

1 – NORMAL CRACKS BELT OK
2 – NOT NORMAL CRACKS REPLACE BELT

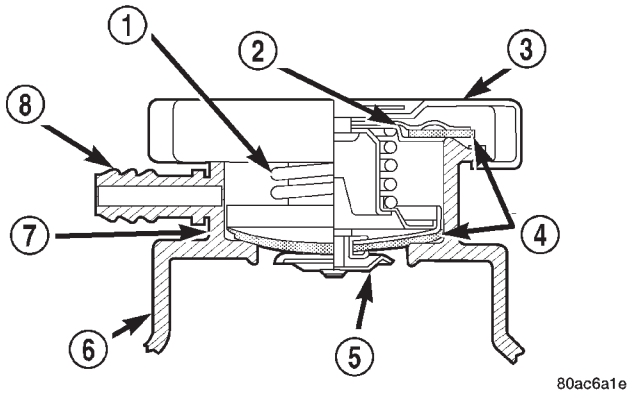


Fig. 49 Pressure Cap

1 – MAIN SPRING
2 – GASKET RETAINER
3 – STAINLESS STEEL SWIVEL TOP
4 – RUBBER SEALS
5 – SPRING LOADED VALVE
6 – COOLANT PRESSURE BOTTLE
7 – FILLER NECK
8 – OVERFLOW NIPPLE

WARNING: THE WARNING WORDS DO NOT OPEN HOT ON THE COOLANT BOTTLE PRESSURE CAP IS A SAFETY PRECAUTION. WHEN HOT, PRESSURE BUILDS UP IN COOLING SYSTEM. TO PREVENT SCALDING OR INJURY, THE COOLANT BOTTLE PRESSURE CAP SHOULD NOT BE REMOVED WHILE THE SYSTEM IS HOT AND/OR UNDER PRESSURE.

CLEANING AND INSPECTION (Continued)

There is no need to remove the pressure cap at any time **except** for the following purposes:

- Checking and adjust antifreeze freeze point.
- Refilling system with new coolant.
- Conducting service procedures.
- Checking for vacuum leaks.

WARNING: IF VEHICLE HAS BEEN RUN RECENTLY, WAIT 15 MINUTES BEFORE REMOVING CAP. THEN PLACE A SHOP TOWEL OVER THE CAP AND WITHOUT PUSHING DOWN ROTATE IT COUNTERCLOCKWISE TO THE FIRST STOP. ALLOW FLUIDS TO ESCAPE THROUGH THE OVERFLOW TUBE AND WHEN THE SYSTEM STOPS PUSHING OUT COOLANT AND STEAM AND PRESSURE DROPS, REMOVE THE CAP COMPLETELY. SQUEEZING THE RADIATOR INLET HOSE WITH A SHOP TOWEL (TO CHECK PRESSURE) BEFORE AND AFTER TURNING TO THE FIRST STOP IS RECOMMENDED.

RADIATOR

CLEANING

Clean radiator fins are necessary for good heat transfer. The radiator and air conditioning fins should be cleaned when an accumulation of debris has occurred. With the engine cold, apply cold water and compressed air to the back (engine side) of the radiator to flush the radiator and/or A/C condenser of debris.

INSPECTION

Inspect the radiator side tanks for cracks, broken or missing fittings also inspect the joint where the tanks seam up to the radiator core for signs of leakage and/or deteriorating seals.

Inspect radiator core for corroded, bent or missing cooling fins. Inspect the core for bent or damaged cooling tubes.

COOLING SYSTEM CLEANING/FLUSHING

CLEANING

CAUTION: Internal radiator pressure must not exceed 138 kPa (20 psi) as damage to radiator may result.

Reverse flushing of cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

(1) Drain cooling system. Remove thermostat housing and thermostat. Install thermostat housing.

(2) Connect a suitable cooling system flusher and follow instructions supplied with flusher.

INSPECTION

After performing a flush procedure, inspect all hoses, clamps and connections for deterioration and leaks. Inspect radiator and heater core for leaks.

TRANSMISSION OIL COOLER

CLEANING

Check the external cooler for debris on the cooling fin surfaces. Clean as necessary. For internal cleaning/flushing procedures, refer to TRANSAXLE.

INSPECTION

Inspect all cooler lines and clamps. Replace as necessary.

ADJUSTMENTS

BELT TENSION

Use belt tension gauge, Special Tool 7198 for conventional V-belts and Poly-V belts.

Adjust the belt tension for **NEW** or **USED** belt tension applications. Refer to Belt Tension Chart.

BELT TENSION CHART—2.7/3.2/3.5L ENGINES

POLY-V BELT	GAUGE
Generator/Power Steering Belt (all engines)	New Belt: 836 ±44 N (190 ±10 lbs.)
	Used Belt: 534 N (120 lbs.)
V-BELT	GAUGE
Air Conditioning Belt (3.2/3.5L only)	New Belt: 667 ±44 N (150 ±10 lbs.)
	Used Belt: 534 N (120 lbs.)

SPECIFICATIONS

COOLING SYSTEM CAPACITY

ENGINE	CAPACITY	
2.7/3.2/3.5L	8.9 LITERS	9.4 QTS.
CAPACITY: Includes heater and coolant pressure bottle.		
Most service refills are about 80 percent of capacity listed. This is because not all coolant is drained from the cooling system.		

TORQUE

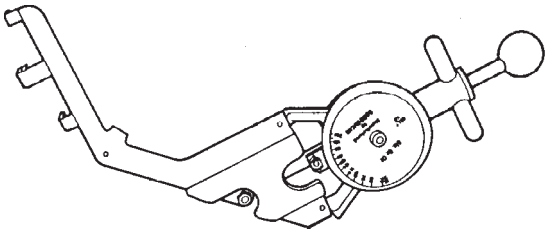
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
A/C Condenser to Radiator	5	—	45
A/C Belt Tensioner & Pulley (2.7L)—Bolts	28	—	250
A/C Belt Tensioner Pulley (3.2/3.5L)—Nut	54	40	—
Cooling System Bleed Screw			
—(2.7L)	12	—	110
—(3.2/3.5L)	8	—	70
Condenser Inlet Tube Bracket—Screw	5	—	45
Engine Oil Cooler			
—Supply Lines to Engine	30	—	260
—Supply Lines to Radiator	18	—	160
Fan Module to Radiator—Screws	5	—	45
Fan Blade to Motor—Nut	5	—	45
Fan Motor to Shroud—Screws	3	—	25
Generator/Power Steering Belt Tensioner Pulley—Nut	54	40	—
Thermostat Housing	12	—	105
Transmission Oil Cooler			
—Hose Clamps	2	—	18
—Flare Nuts at Transmission	30	—	260
Water Pump Mounting—Bolts	12	—	105
Water Outlet Connector—Bolts	12	—	105

SPECIAL TOOLS

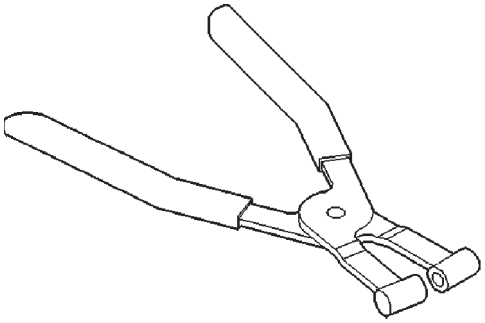
COOLING



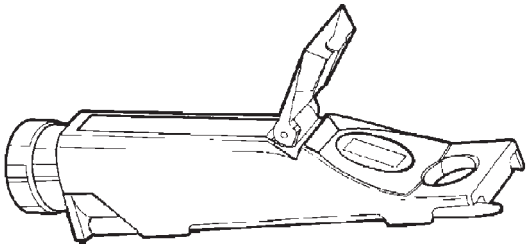
Filling Aid Funnel 8195



Belt Tension Gauge 7198



Hose Clamp Pliers 6094



Coolant Refractometer 8286

BATTERY

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DESCRIPTION AND OPERATION

BATTERY

DESCRIPTION

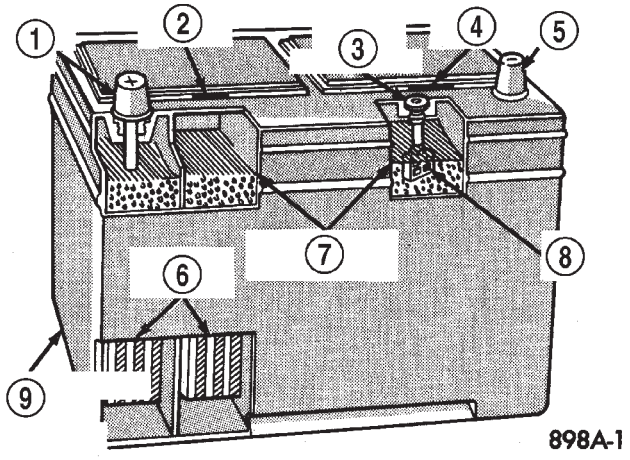


Fig. 1 Maintenance Free Battery

1 – POSITIVE POST
2 – VENT
3 – TEST INDICATOR
4 – VENT
5 – NEGATIVE POST
6 – PLATE GROUPS
7 – ELECTROLYTE LEVEL
8 – GREEN BALL
9 – MAINTENANCE FREE BATTERY

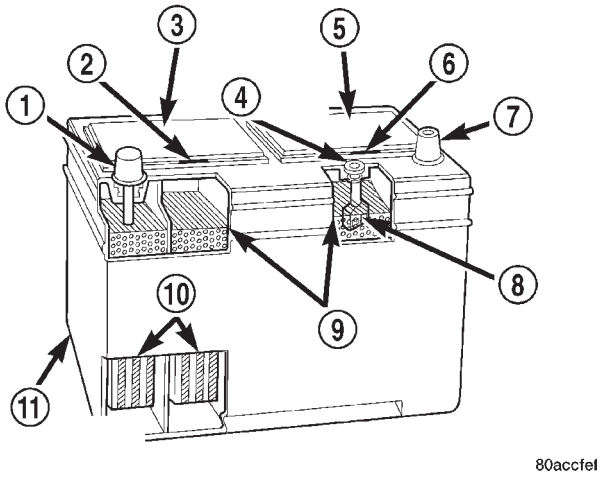


Fig. 2 Low Maintenance Battery

1 – POSITIVE POST
2 – VENT
3 – CELL CAP
4 – TEST INDICATOR
5 – CELL CAP
6 – VENT
7 – NEGATIVE POST
8 – GREEN BALL
9 – ELECTROLYTE LEVEL
10 – PLATE GROUPS
11 – LOW-MAINTENANCE BATTERY

From the factory, most vehicles are equipped with a maintenance-free battery, and others with a low-maintenance battery. A Hydrometer test may be

DESCRIPTION AND OPERATION (Continued)

required for low-maintenance batteries that is not required on maintenance-free (sealed) batteries.

NOTE: Vehicles using a Maintenance-Free battery, should be replaced with a Maintenance-Free battery.

Maintenance-free batteries have non-removable battery vent caps (Fig. 1). Water cannot be added to this battery. Under normal service the composition of this battery reduces gassing and water loss at normal charge rates. If the battery electrolyte level becomes low, this battery must be replaced.

Low-maintenance batteries have removable battery cell caps (Fig. 2). Water can be added to this battery. Under normal service the composition of this battery reduces gassing and water loss at normal charge rates.

The battery is a device used to store electrical energy potential in a chemical form. When an electrical load is applied to the battery terminals, an electrochemical reaction occurs within the battery. This reaction causes the battery to discharge electrical current.

The battery is made up of six individual cells that are connected in series. Each cell contains positive charged plate groups made of lead oxide, and negatively charged plate groups made of sponge lead. The dissimilar metal plates are submerged in a sulfuric acid and water solution called an electrolyte.

OPERATION

The battery has three major electrical system functions: First, it provides an energy source for cranking the engine; second, it acts as an electrical system voltage stabilizer; third, it delivers electrical current to operate various electrical systems in the vehicle, for a limited time, when the electrical load exceeds the generator output or during engine off conditions.

As the battery discharges, a gradual chemical change takes place within each cell. The sulfuric acid in the electrolyte combines with the plate material causing both plates to slowly change to lead sulfate. At the same time, oxygen from the positive plate material combines with hydrogen from the sulfuric acid, causing the electrolyte to become mainly water.

The chemical changes within the battery are caused by the movement of excess or free electrons between the positive and negative plate groups. This movement of electrons produces a flow of electrical current through the load device attached to the battery terminals. As the plate materials become more similar chemically, and the electrolyte becomes less acid, the voltage potential of each cell is reduced. However, by charging the battery with a voltage higher than that of the battery, the battery discharging process is reversed.

Charging the battery gradually changes the sulfated lead plates back into sponge lead and lead oxide, and the water back into sulfuric acid. This action restores the difference in the electron charges deposited on the plates, and the voltage potential of the battery cells.

For a battery to remain useful, it must be able to produce high-amperage current over an extend period. A battery must also be able to accept a charge so that its voltage potential may be restored.

In addition to producing and storing electrical energy, the battery serves as a capacitor, or voltage stabilizer, for a vehicle's electrical system. It absorbs most abnormal or transient voltages caused by the switching of any of the vehicle's electrical components.

The battery is vented to release excess hydrogen gas that is created when the battery is being charged or discharged. However, even with these vents, the hydrogen gas can collect in or around the battery. hydrogen gas is exposed to flame or sparks, it might ignite.

If the electrolyte level is low, the battery may arc internally and explode. If the battery is equipped with removable cell caps, add distilled water whenever the electrolyte level is below the top of the plates. If the battery cell caps cannot be removed, the battery must be replaced if the electrolyte level becomes low.

BATTERY CHARGER CAPACITY

DESCRIPTION

A charger which can supply only five amperes will require a much longer period of charging than a charger that can supply 20 amperes or more.

OPERATION

Refer to the individual battery charger instructions for charging information.

BATTERY IGNITION OFF DRAW (IOD)

DESCRIPTION

The IOD fuse (M1) is located in the Junction Block. Refer to the raised fuse or the cover of the Junction Block for proper fuse location.

OPERATION

A completely normal vehicle will have a small amount of current drain on the battery with the key out of the ignition. It can range from 5 to 25 milliamperes after all the modules time out. If a vehicle will not be operated for approximately a 20 days, the IOD fuse should be pulled to eliminate the vehicle electrical drain on the battery during storage.

DESCRIPTION AND OPERATION (Continued)

BATTERY STATE OF CHARGE

DESCRIPTION

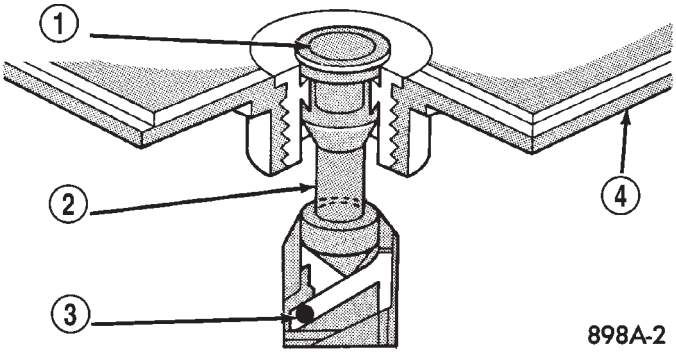


Fig. 3 Battery Test Indicator

1 – SIGHT GLASS
2 – PLASTIC TUBE
3 – GREEN BALL
4 – BATTERY TOP

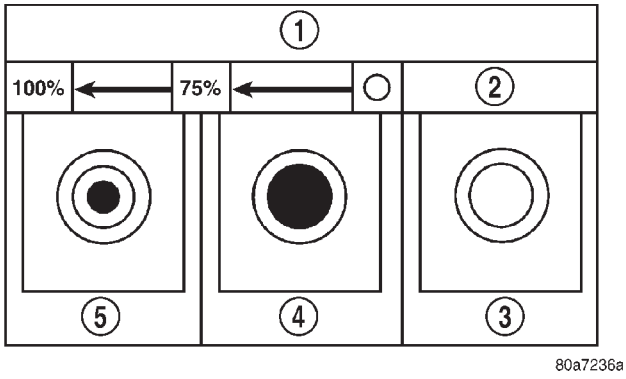


Fig. 4 Reading Test Indicator

1 – TEST INDICATOR/STATE OF CHARGE
2 – REPLACE BATTERY
3 – CLEAR
4 – BLACK
5 – GREEN

A completely discharged battery requires more charging time than a partially charged battery. Electrolyte is nearly pure water in a completely discharged battery.

OPERATION

At first, the charging current amperage will be low. As water is converted back to sulfuric acid inside the battery, the current amp rate will rise. Also, the specific gravity of the electrolyte will rise, bringing the green ball (Fig. 4) into view at approximately 75 percent state-of-charge.

BATTERY TEMPERATURE

DESCRIPTION

A longer time will be needed to charge a battery at -18°C (0°F) than at 27°C (80°F).

OPERATION

When a fast charger is connected to a cold battery, current accepted by battery will be very low at first. In time, the battery will accept a higher rate as battery temperature warms.

CHARGING TIME REQUIRED

DESCRIPTION

BATTERY CHARGING TIMETABLE

CHARGING AMPERAGE	5 AMPERES	10 AMPERES	20 AMPERES
OPEN CIRCUIT VOLTAGE	HOURS CHARGING AT 21° C (70° F)		
12.25 TO 12.49	6 HOURS	3 HOURS	1.5 HOURS
12.00 TO 12.24	10 HOURS	5 HOURS	2.5 HOURS
10.00 TO 11.99	14 HOURS	7 HOURS	3.5 HOURS
*BELOW 10.00	18 HOURS	9 HOURS	4.5 HOURS
*REFER TO CHARGING A COMPLETELY DISCHARGED BATTERY			

The time required to charge a battery will vary depending upon the following factors.

- Size of battery
- Battery temperature
- Battery charger capacity
- Battery state of charge

WARNING: NEVER EXCEED 20 AMPS WHEN CHARGING A COLD -1°C (30°F) BATTERY. THE BATTERY MAY ARC INTERNALLY AND EXPLODE. PERSONAL INJURY AND/OR VEHICLE DAMAGE MAY RESULT.

OPERATION

After proper charging time required is determined, refer to the individual battery charger instructions for proper charging procedures.

DESCRIPTION AND OPERATION (Continued)

SIZE OF BATTERY

DESCRIPTION

A completely discharged large heavy-duty battery may require more recharging time than a completely discharged small capacity battery.

OPERATION

Refer to Battery Charging Timetable.

DIAGNOSIS AND TESTING

BATTERY BUILT-IN TEST INDICATOR

TEST INDICATOR

The Test Indicator (Fig. 5) and (Fig. 4) measures the specific gravity of the electrolyte. Specific Gravity (SG) of the electrolyte will show state-of-charge (voltage). The test indicator WILL NOT show cranking capacity of the battery. Refer to Battery Load Test for more information. Look into the sight glass (Fig. 4) and note the color of the indicator. Refer to the following description of colors:

NOTE: GREEN = 75 to 100% state-of-charge

The battery is adequately charged for further testing and may be returned to use. If the vehicle will not crank for a maximum 15 seconds, refer to BATTERY LOAD TEST in this Group for more information.

NOTE: BLACK OR DARK = 0 to 75% state-of-charge

The battery is INADEQUATELY charged and must be charged until green dot is visible, (12.4 volts or greater) before the battery is tested or returned to use. Refer to Causes of Battery Discharging in this Group for more information.

NOTE: CLEAR COLOR = Replace Battery

WARNING: DO NOT CHARGE, ASSIST BOOST, LOAD TEST, OR ADD WATER TO THE BATTERY WHEN CLEAR COLOR DOT IS VISIBLE. PERSONAL INJURY MAY OCCUR.

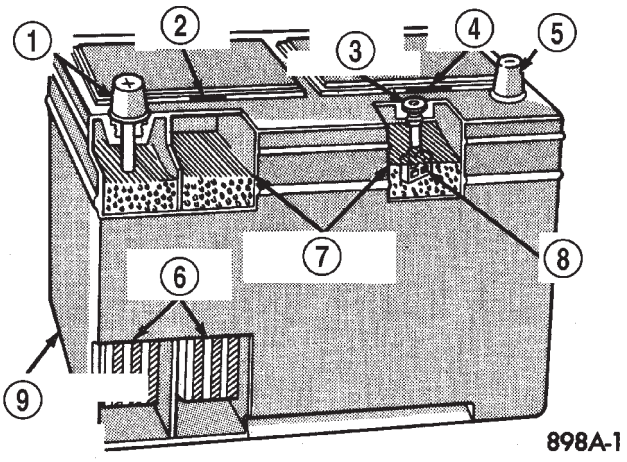


Fig. 5 Battery Construction and Test Indicator

1 – POSITIVE POST
2 – VENT
3 – TEST INDICATOR
4 – VENT
5 – NEGATIVE POST
6 – PLATE GROUPS
7 – ELECTROLYTE LEVEL
8 – GREEN BALL
9 – MAINTENANCE FREE BATTERY

A clear color dot shows electrolyte level in battery is below the test indicator (Fig. 4). Water cannot be added to a maintenance free battery. The battery must be replaced. A low electrolyte level may be caused by an over charging condition. Refer to Group 8C, Generator for proper test procedures on Vehicle.

BATTERY TEST

To test battery, refer to the Battery Diagnosis and Testing table and to the proper procedures.

BATTERY DIAGNOSIS AND TESTING

STEPS	POSSIBLE CAUSE	CORRECTION
VISUAL INSPECTION CHECK FOR POSSIBLE DAMAGE TO BATTERY AND CLEAN BATTERY.	(1) LOOSE BATTERY POST, CRACKED BATTERY COVER OR CASE, LEAKS OR ANY OTHER PHYSICAL (2) BATTERY OK.	(1) REPLACE BATTERY (2) CHECK STATE OF CHARGE. REFER TO TEST INDICATOR.

DIAGNOSIS AND TESTING (Continued)

STEPS	POSSIBLE CAUSE	CORRECTION
TEST INDICATOR CHECK CHARGE EYE COLOR	(1) GREEN (2) BLACK (3) CLEAR	(1) BATTERY IS CHARGED. PERFORM BATTERY 0PEN CIRCUIT VOLTAGE TEST (2) PERFORM BATTERY CHARGING PROCEDURE. (3) REPLACE BATTERY.
BATTERY OPEN CIRCUIT VOLTAGE TEST	(1) BATTERY IS ABOVE 12.40 VOLTS (2) BATTERY IS BELOW 12.40 VOLTS.	(1) PERFORM THE BATTERY LOAD TEST. (2) PERFORM BATTERY CHARGING PROCEDURE.
BATTERY CHARGING	(1) BATTERY ACCEPTED CHARGE. (2) BATTERY WILL NOT ACCEPT CHARGE	(1) ENSURE THAT THE INDICATOR EYE IS GREEN AND PERFORM BATTERY 0PEN CIRCUIT VOLTAGE TEST (2) PERFORM CHARGING A COMPLETELY DISCHARGED BATTERY.
BATTERY LOAD TEST	(1) ACCEPTABLE MINIMUM VOLTAGE. (2) UNACCEPTABLE MINIMUM VOLTAGE	(1) BATTERY IS OK TO PUT IN USE, PERFORM BATTERY IGNITION OFF DRAW TEST. (2) REPLACE BATTERY AND PERFORM BATTERY IGNITION OFF DRAW TEST.
CHARGING A COMPLETELY DISCHARGED BATTERY	(1) BATTERY ACCEPTED CHARGE. (2) BATTERY WILL NOT ACCEPT CHARGE.	(1) ENSURE THAT THE INDICATOR EYE IS GREEN AND PERFORM BATTERY 0PEN CIRCUIT VOLTAGE TEST. (2) REPLACE BATTERY.
IGNITION OFF DRAW TEST	(1) IOD IS 5-35 MILLIAMPERES. (2) IOD EXCEEDS 35 MILLIAMPERES.	(1) VEHICLE IS NORMAL. (2) ELIMINATE EXCESS IOD DRAW.

ABNORMAL BATTERY DISCHARGING

- Corroded battery posts, cables or terminals.
- Loose or worn generator drive belt.
- Electrical loads that exceed the output of the charging system due to equipment or accessories installed after delivery.
- Slow driving speeds in heavy traffic conditions or prolonged idling with high-amperage electrical systems in use.
- Defective electrical circuit or component causing excess Ignition Off Draw (IOD). Refer to Battery Ignition Off Draw (IOD).
- Defective charging system.
- Defective battery.

BATTERY IGNITION OFF DRAW (IOD)

High current draw on the battery with the ignition OFF will discharge a battery. After a dead battery is serviced the vehicle Ignition Off Draw (IOD) should be checked. Determine if a high current draw condition exists first check the vehicle with a milliampere meter.

(1) Verify that all electrical accessories are OFF.

- Remove key from ignition switch
- Turn off all lights
- Trunk lid and glove box door is closed
- Sun visor vanity lights are OFF
- All doors are closed
- Allow the Illuminated Entry System to time out in approximately 30 seconds, if equipped.
- During Transmission Control Module (TCM) power down there will be 500 milliamperes present for 20 minutes. Afterwards less than 1.0 milliampere.

(2) Disconnect battery negative cable.

CAUTION: Always disconnect the milliampere meter before opening a door.

DIAGNOSIS AND TESTING (Continued)

(3) Using an multi-meter, that has least a milliampere range of 200 mA. Set meter to the highest mA range. Install meter between the battery negative cable and battery negative post. After all modules time-out the total vehicle IOD should be less than 35 milliamperes. If ignition off draw is more than 35 milliamperes go to Step 4.

(4) Each time the milliampere meter is disconnected and connected, all electronic timer functions will be activated for approximately one minute. The Body Control Module (BCM) ignition off draw can reach 90 milliamperes.

(5) Remove the PDC fuses:

- Interior lamps
- Brake lamp
- IOD

(6) If there is any reading, with fuses removed there is a short circuit in the wiring. Refer to Group 8W, wiring diagrams. Repair as necessary. If reading is less than 35 mA go to Step 8.

(7) Install all fuses. After installing fuse, the current can reach 90 mA. After time-out the reading should not exceed 35 mA. If OK go to Step 9. If not, disconnect:

- Radio
- Body control module
- Remote keyless entry module

(8) Disconnect one component at time, to see if any component is at fault. If the high reading is not eliminated there is a short circuit in the wiring. Refer to Group 8W, for wiring diagrams and circuit information.

(9) Remove interior and brake lamp fuses. Install the fuses. The milliampere reading should be 2-4 mA. If reading is higher than 4 mA:

(a) Disconnect PCM.

(b) If reading is OK, replace PCM.

(c) If reading does not change, disconnect the TCM.

(d) If reading is OK, replace TCM.

(e) If reading stays, there is a short circuit to one of the modules. Refer to Group 8W, Wiring Diagrams.

BATTERY LOAD TEST

A fully charged battery must have cranking capacity, to provide the starter motor and ignition system enough power to start the engine over a broad range of ambient temperatures. A battery load test will verify the actual cranking capability of the battery.

WARNING: IF BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR EXCESSIVELY LOW ELECTROLYTE LEVEL, DO NOT TEST. ACID BURNS OR AN EXPLOSIVE CONDITION MAY RESULT.

(1) Remove battery from vehicle. The battery top, cables and posts should be clean. If green dot is not visible in indicator, charge the battery. Refer to Battery Charging Procedures.

(2) Connect a Volt/Ammeter/Load tester to the battery posts (Fig. 6). Rotate the load control knob of the Carbon pile rheostat to apply a 300 amp load. Apply this load for 15 seconds to remove the surface charge from the battery, and return the control knob to off (Fig. 7).

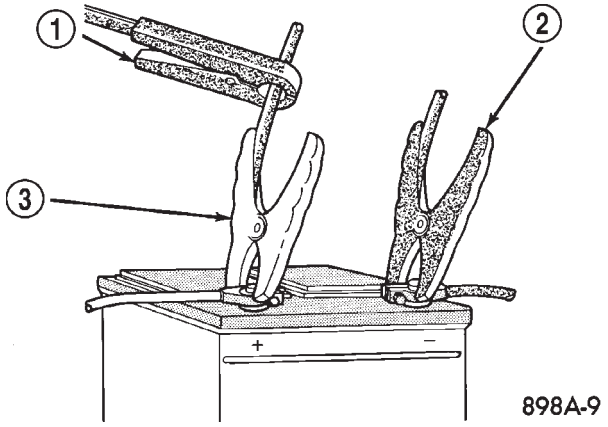


Fig. 6 Volt-Ammeter Load Tester Connections

1 – INDUCTION AMPMETER CLAMP
2 – NEGATIVE CLAMP
3 – POSITIVE CLAMP

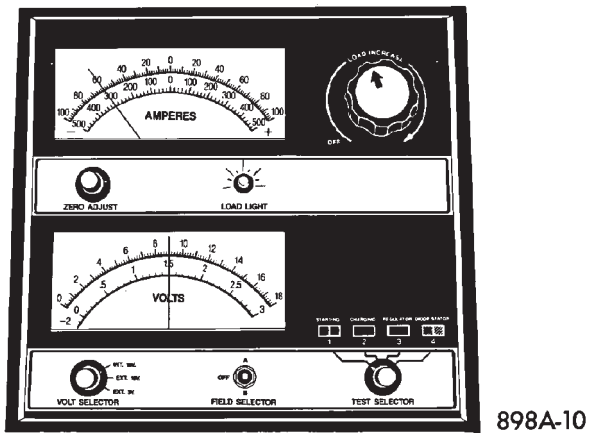


Fig. 7 Remove Surface Charge From Battery

(3) Allow the battery to stabilize for 2 minutes, and then verify open circuit voltage.

(4) Rotate the load control knob on the tester to maintain 50% of the battery cold crank rating for 15 seconds (Fig. 8). Record the loaded voltage reading and return the load control to off. Refer to the Battery Specifications at the rear of this Group.

(5) Voltage drop will vary according to battery temperature at the time of the load test. Battery temperature can be estimated by the temperature of exposure over the preceding several hours. If the bat-

DIAGNOSIS AND TESTING (Continued)

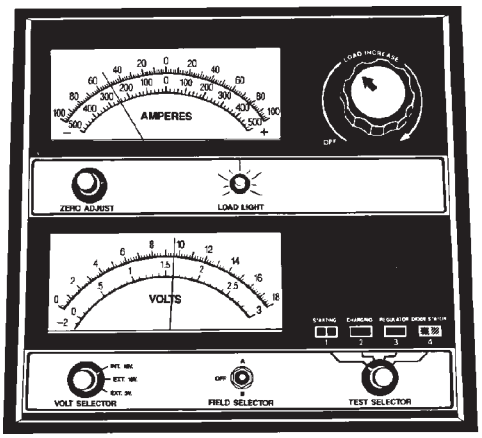


Fig. 8 Load 50% Cold Crank Rating

tery has been charged or boosted a few minutes prior to the test, the battery would be slightly warmer. Refer to Load Test Temperature Chart for proper loaded voltage reading.

LOAD TEST TEMPERATURE

MINIMUM VOLTAGE	TEMPERATURE	
	CELSIUS	FAHRENHEIT
9.6 VOLTS	21° AND ABOVE	70° AND ABOVE
9.5 VOLTS	16°	60°
9.4 VOLTS	10°	50°
9.3 VOLTS	4°	40°
9.1 VOLTS	-1°	30°
8.9 VOLTS	-7°	20°
8.7 VOLTS	-12°	10°
8.5 VOLTS	-18°	0°

(6) If battery passes load test, it is in good condition and further tests are not necessary. If it fails load test, it should be replaced.

BATTERY OPEN CIRCUIT VOLTAGE TEST

An open circuit voltage no load test shows the state of charge of a battery and whether it is ready for a load test at 50 percent of the battery's cold crank rating. Refer to Battery Load Test. If a battery has open circuit voltage reading of 12.4 volts or greater, and will not pass the load test, replace the battery because it is defective. To test open circuit voltage, perform the following operation.

(1) Remove both battery cables, negative cable first. Battery top, cables and posts should be clean. If green dot is not visible in indicator, charge the battery. Refer to Battery Charging Procedures.

(2) Connect a Volt/Ammeter/Load tester to the battery posts (Fig. 6). Rotate the load control knob of the Carbon pile rheostat to apply a 300 amp load. Apply this load for 15 seconds to remove the surface charge from the battery, and return the control knob to off (Fig. 7).

(3) Allow the battery to stabilize for 2 minutes, and then verify the open circuit voltage (Fig. 9).

(4) This voltage reading will approximate the state of charge of the battery. It will not reveal battery cranking capacity. Refer to Battery Open Circuit Voltage table.

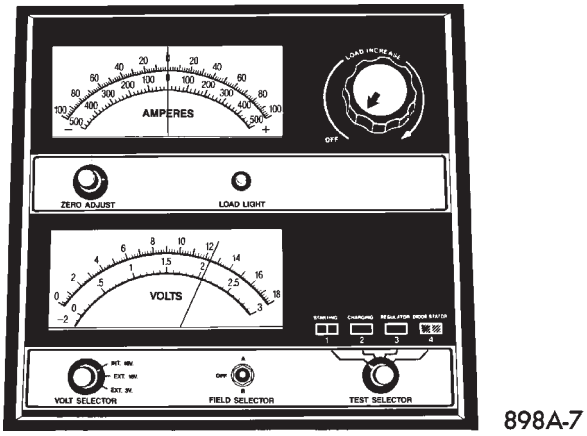


Fig. 9 Testing Open Circuit Voltage

BATTERY OPEN CIRCUIT VOLTAGE

OPEN CIRCUIT VOLTS	CHARGE PERCENTAGE
11.7 VOLTS OR LESS	0%
12.0 VOLTS	25%
12.2 VOLTS	50%
12.4 VOLTS	75%
12.6 VOLTS OR MORE	100%

SERVICE PROCEDURES

BATTERY CHARGING

WARNING: DO NOT CHARGE A BATTERY THAT HAS EXCESSIVELY LOW ELECTROLYTE LEVEL. BATTERY MAY SPARK INTERNALLY AND EXPLODE. EXPLOSIVE GASES FORM OVER THE BATTERY. DO NOT SMOKE, USE FLAME, OR CREATE SPARKS NEAR BATTERY. DO NOT ASSIST BOOST OR CHARGE A FROZEN BATTERY. BATTERY CASING MAY FRACTURE. BATTERY ACID IS POISON, AND MAY CAUSE SEVERE BURNS. BATTERIES CONTAIN SULFURIC ACID. AVOID CONTACT WITH SKIN, EYES, OR CLOTHING. IN THE EVENT OF CONTACT, FLUSH WITH WATER AND CALL PHYSICIAN IMMEDIATELY. KEEP OUT OF REACH OF CHILDREN.

SERVICE PROCEDURES (Continued)

CAUTION: Disconnect the NEGATIVE battery cable remote terminal first before charging battery to avoid damage to electrical systems. Do not exceed 16.0 volts while charging battery. Refer to the instructions supplied with charging equipment

NOTE: The battery cannot be refilled with water, it must be replaced.

A battery is considered fully charged when it will meet all the following requirements.

- It has an open circuit voltage charge of at least 12.4 volts. Refer to Batter Open Circuit Voltage table.
- It passes the 15 second load test, refer to the Load Test Temperature chart.
- The built in test indicator dot is GREEN (Fig. 4).

Battery electrolyte will bubble inside of battery case while being charged properly. If the electrolyte boils violently, or is discharged from the vent holes while charging, immediately reduce charging rate or turn off charger. Evaluate battery condition. Battery damage may occur if charging is excessive.

Some battery chargers are equipped with polarity sensing devices to protect the charger or battery from being damaged if improperly connected. If the battery state of charge is too low for the polarity sensor to detect, the sensor must be bypassed for charger to operate. Refer to operating instructions provided with battery charger being used.

CAUTION: Charge battery until test indicator appears green. Do not overcharge.

It may be necessary to jiggle the battery or vehicle to bring the green dot in the test indicator into view.

After the battery has been charged to 12.4 volts or greater, perform a load test to determine cranking capacity. Refer to Battery Load Test in this Group. If the battery passes the load test, return the battery to use. If battery will not endure a load test, it must be replaced. Properly clean and inspect battery hold downs, tray, terminals, cables, posts, and top before completing service.

CHARGING COMPLETELY DISCHARGED BATTERY

The following procedure should be used to recharge a completely discharged battery. Unless procedure is properly followed, a good battery may be needlessly replaced Battery Charging Rate tablet.

BATTERY CHARGING RATE

VOLTAGE	HOURS
16.0 VOLTS OR MORE	UP TO 4 HOURS
14.0 TO 15.9 VOLTS	UP TO 8 HOURS
13.9 VOLTS OR LESS	UP TO 16 HOURS

(1) Measure the voltage at battery posts with a voltmeter accurate to 1/10 volt (Fig. 10). If below 10 volts, charge current will be low, and it could take some time before it accepts a current in excess of a few milliamperes. Such low current may not be detectable on amp meters built into many chargers.

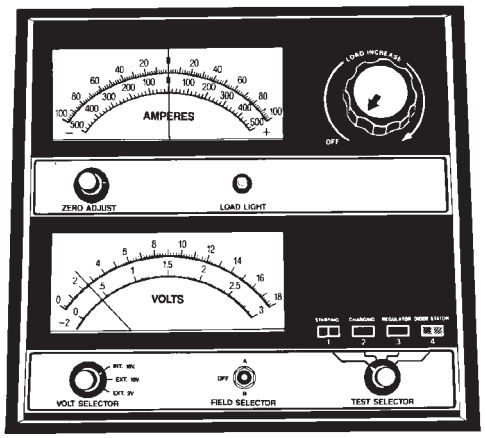


Fig. 10 Voltmeter Accurate to 1/10 Volt (Connected)

(2) Connect charger leads. Some chargers feature polarity protection circuitry that prevents operation unless charger is connected to battery posts correctly. A completely discharged battery may not have enough voltage to activate this circuitry. This may happen even though the leads are connected properly.

(3) Battery chargers vary in the amount of voltage and current they provide. For the time required for the battery to accept measurable charger current at various voltages, refer to Charging Rate Chart. If charge current is still not measurable after charging times, the battery should be replaced. If charge current is measurable during charging time, the battery may be good, and charging should be completed in the normal manner.

VISUAL INSPECTION

CAUTION: Do not allow baking soda solution to enter vent holes, as damage to battery can result.

(1) Clean top of battery with a solution of warm water and baking soda.

(2) Apply soda solution with a bristle brush and allow to soak until acid deposits loosen (Fig. 11).

SERVICE PROCEDURES (Continued)

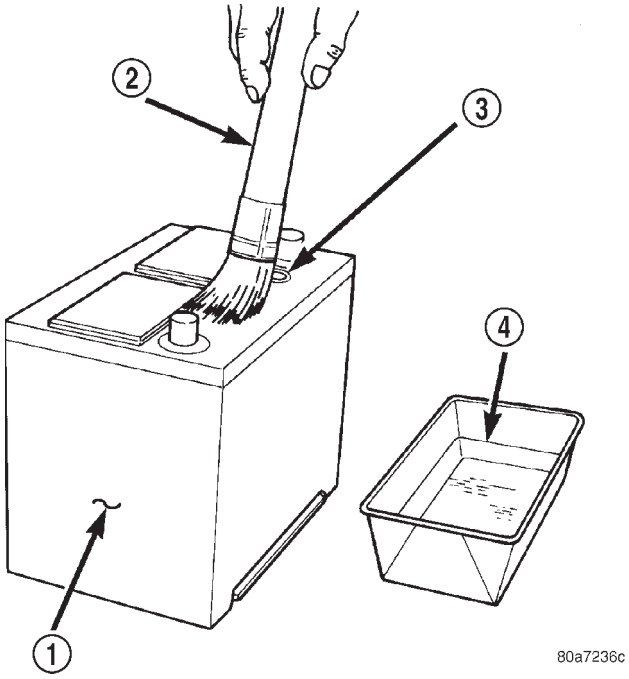


Fig. 11 Cleaning Battery

1 – BATTERY
2 – CLEANING BRUSH
3 – TEST INDICATOR
4 – WARM WATER AND BAKING SODA SOLUTION

(3) Rinse soda solution from battery with clear water and blot battery dry with paper toweling. Dispose of toweling in a safe manner. Refer to the WARNINGS on top of battery.

(4) Inspect battery case and cover for cracks, leakage or damaged hold down ledge. If battery is damaged replace it.

(5) Inspect battery tray for damage caused by acid from battery. If acid is present, clean area with baking soda solution.

(6) Clean battery posts with a battery post cleaning tool (Fig. 12).

(7) Clean battery cable clamps with a battery terminal cleaning tool (Fig. 13). Replace cables that are frayed or have broken clamps.

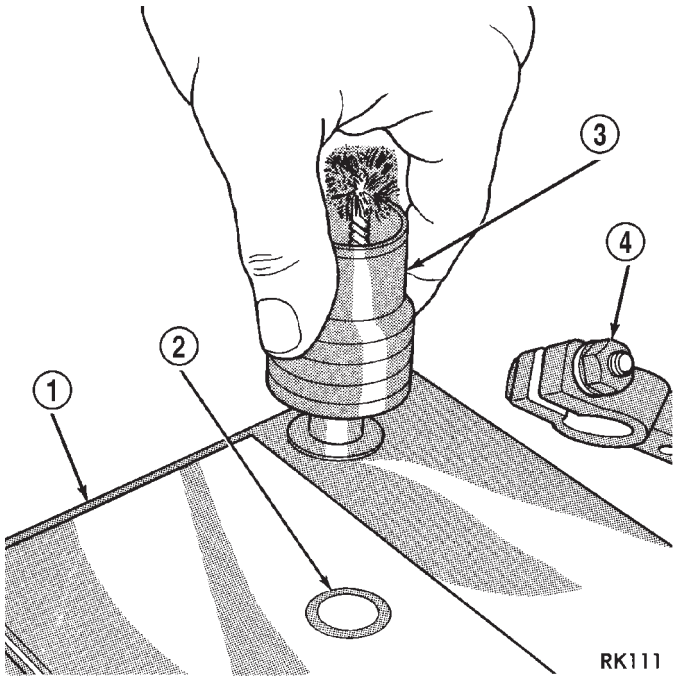


Fig. 12 Cleaning Battery Post

1 – BATTERY
2 – TEST INDICATOR
3 – BATTERY POST CLEANER
4 – BATTERY CABLE

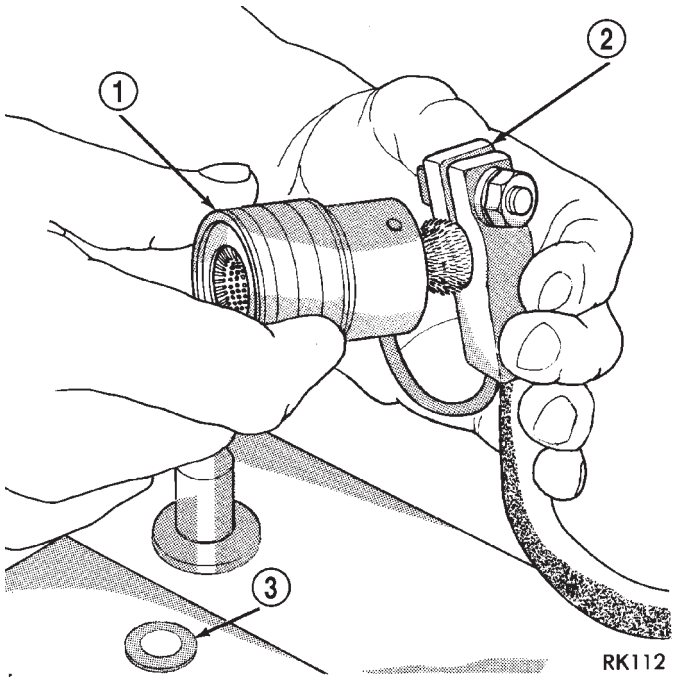


Fig. 13 Cleaning Battery Cable Terminal

1 – BATTERY CABLE CLEANING TOOL MX75
2 – BATTERY CABLE
3 – TEST INDICATOR

REMOVAL AND INSTALLATION

SAFETY PRECAUTIONS AND WARNINGS

WARNING: WEAR SAFETY GLASSES.

DO NOT ALLOW JUMPER CABLE CLAMPS TO TOUCH EACH OTHER WHEN CONNECTED TO A BOOSTER SOURCE.

DO NOT USE OPEN FLAME NEAR BATTERY.

REMOVE METALLIC JEWELRY WORN ON HANDS OR WRISTS TO AVOID INJURY BY ACCIDENTAL ARCING OF BATTERY CURRENT.

WHEN USING A HIGH OUTPUT BOOSTING DEVICE, DO NOT ALLOW THE DISABLED VEHICLE'S BATTERY TO EXCEED 16 VOLTS. PERSONAL INJURY OR DAMAGE TO ELECTRICAL SYSTEM CAN RESULT.

TO PROTECT THE HANDS FROM BATTERY ACID, A SUITABLE PAIR OF HEAVY DUTY RUBBER GLOVES, NOT THE HOUSEHOLD TYPE, SHOULD BE WORN WHEN REMOVING OR SERVICING A BATTERY. SAFETY GLASSES ALSO SHOULD BE WORN.

BATTERY

WARNING: TO PROTECT THE HANDS FROM BATTERY ACID, A SUITABLE PAIR OF HEAVY DUTY RUBBER GLOVES, NOT THE HOUSEHOLD TYPE, SHOULD BE WORN WHEN REMOVING OR SERVICING A BATTERY. SAFETY GLASSES ALSO SHOULD BE WORN.

REMOVAL

(1) Turn the steering wheel all the way to the right.

(2) Verify that the ignition switch and all accessories are OFF.

(3) Disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 14).

(4) Remove air cleaner housing. Refer to Group 14, Fuel for service procedures.

(5) Remove battery splash shield. Refer to Group 23, Body for service procedures.

(6) Remove two short bolts to battery hold down.

(7) Slide battery rearward to disconnect the negative and positive battery terminals from battery.

(8) Slide battery toward rear of vehicle and lift out of the engine compartment.

(9) Remove battery from vehicle.

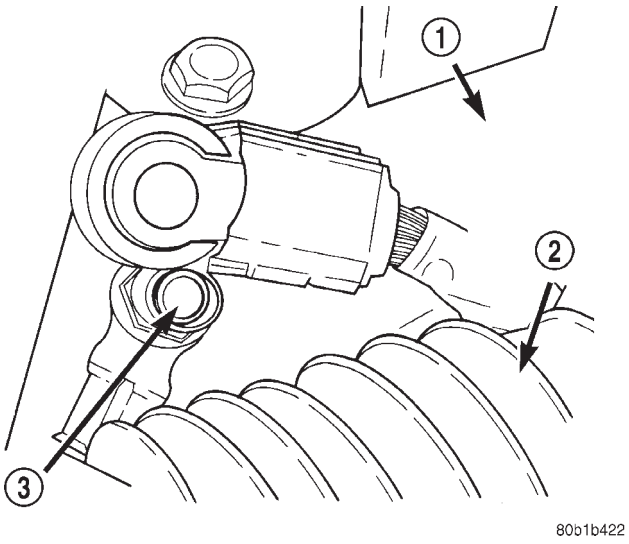


Fig. 14 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

INSTALLATION

For installation, reverse the above procedures. Inspect and clean battery and attaching components before installation.

WARNING: DO NOT OVER TIGHTEN BATTERY CABLE CLAMPS, DAMAGE TO CLAMPS CAN RESULT.

(1) Tighten clamp nuts to 8.5 N·m (75 in. lbs.) torque.

SPECIFICATIONS

BATTERY

BATTERY SPECIFICATIONS

LOAD TEST (AMPS)	COLD CRANKING RATING @ -18°C (0°F)	RESERVE CAPACITY
300 AMP	600 AMP	120 MINUTES
250 AMP	500 AMP	110 MINUTES

CRANKING RATING

The current battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 volts or greater at specified temperature.

SPECIFICATIONS (Continued)

RESERVE CAPACITY RATING

The length of time a battery can deliver 25 amps and maintain a minimum terminal voltage of 10.5 volts at 27°C (80°F).

TORQUE

DESCRIPTION	TORQUE
Battery Hold Down Clamp Bolt	14 N·m (125 in. lbs.)

STARTING SYSTEMS

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DESCRIPTION AND OPERATION

STARTING SYSTEM

DESCRIPTION

The starting system has (Fig. 1):

- Ignition switch
- Starter relay
- Transmission Range Sensor or Park/Neutral Switch
- Wiring harness
- Battery
- Starter motor with an integral solenoid
- Powertrain Control Module (PCM)

OPERATION

These components form two separate circuits. A high amperage circuit that feeds the starter motor up to 300+ amps, and a control circuit that operates on less than 20 amps.

The PCM controls a double start over-ride safety that does not allow the starter to be engaged if the engine is already running.

STARTER RELAY

DESCRIPTION

The Starter Relay is a micro relay located in the Power Distribution Center (PDC), positioned in the left front corner of the engine compartment.

OPERATION

As battery power is applied to the relay from the ignition switch, battery power is applied to the starter motor through the relay to the starter solenoid.

STARTER SOLENOID

DESCRIPTION

The Starter Solenoid is mounted directly to the Starter Motor, mounted on the left side of the engine.

OPERATION

The Starter Solenoid is a switching device used to activate the high amperage starter motor circuit from a low amperage control circuit.

MELCO STARTER (2.7L ENGINE)

DESCRIPTION

The Melco is a permanent magnet starter motor.

OPERATION

A planetary gear train transmits power between starter motor and pinion shaft. The fields have permanent magnets.

NIPPONDENSO STARTER (3.2 - 3.5L ENGINE)

DESCRIPTION

The Nippondenso is a reduction gear-field coil starter motor.

OPERATION

Power is applied to the coil windings which causes the pinion to rotate the ring gear mounted on the drive plate.

DESCRIPTION AND OPERATION (Continued)

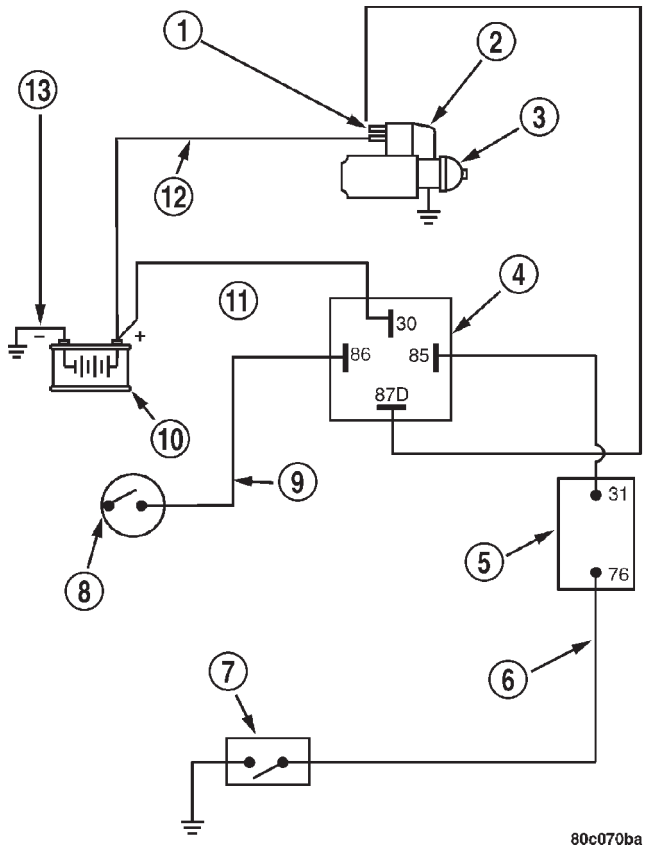


Fig. 1 Starting System Schematic

1 – SOLENOID TERMINAL
2 – STARTER SOLENOID
3 – STARTER MOTOR
4 – STARTER RELAY CONNECTOR
5 – PCM
6 – GROUND CIRCUIT
7 – TRANSMISSION RANGE SENSOR/PARK/NEUTRAL SENSE
8 – IGNITION SWITCH
9 – IGNITION FEED
10 – BATTERY
11 – BATTERY RELAY FEED
12 – POSITIVE CABLE
13 – NEGATIVE CABLE

SUPPLY CIRCUIT AND CONTROL CIRCUIT

DESCRIPTION

The starter system consists of two separate circuits (Fig. 1).

OPERATION

- A high amperage supply to feed the starter motor.
- A low amperage circuit to control the starter solenoid.

DIAGNOSIS AND TESTING

CONTROL CIRCUIT TEST

The starter control circuit has:

- Starter motor with integral solenoid
- Starter relay
- Transmission range sensor, or Park/Neutral Position switch with automatic transmissions
- Ignition switch
- Battery
- All related wiring and connections
- Powertrain Control Module (PCM)

CAUTION: Before performing any starter tests, the ignition and fuel systems must be disabled.

- To disable ignition and fuel systems, disconnect the Automatic Shutdown Relay (ASD). The ASD relay is located in the Power Distribution Center (PDC). Refer to the PDC cover for the proper relay location.

STARTER SOLENOID

WARNING: CHECK TO ENSURE THAT THE TRANSMISSION IS IN THE PARK POSITION WITH THE PARKING BRAKE APPLIED.

(1) Verify battery condition. Battery must be in good condition with a full charge before performing any starter tests. Refer to Battery Tests.

(2) Perform Starter Solenoid test BEFORE performing the starter relay test.

(3) Raise the vehicle.

(4) Perform a visual inspection of the starter/starter solenoid for corrosion, loose connections or faulty wiring.

(5) Lower the vehicle.

(6) Locate and remove the starter relay from the Power Distribution Center (PDC). Refer to the PDC label for relay identification and location.

(7) Connect a remote starter switch or a jumper wire between the remote battery positive post and terminal 87 of the starter relay connector.

(a) If engine cranks, starter/starter solenoid is good. Go to the Starter Relay Test.

(b) If engine does not crank or solenoid chatters, check wiring and connectors from starter relay to starter solenoid for loose or corroded connections. Particularly at starter terminals.

(c) Repeat test. If engine still fails to crank properly, trouble is within starter or starter mounted solenoid, and replace starter.

DIAGNOSIS AND TESTING (Continued)

STARTER RELAY

WARNING: CHECK TO ENSURE THAT THE TRANSMISSION IS IN THE PARK/NEUTRAL POSITION WITH THE PARKING BRAKE APPLIED.

RELAY TEST

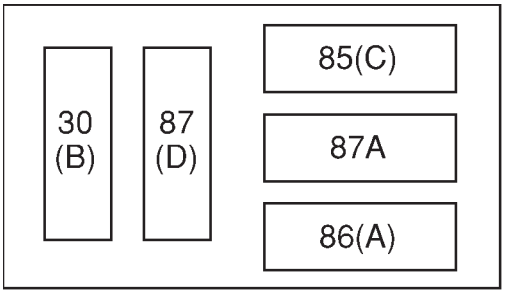
The starter relay is located in the Power Distribution Center (PDC) in the engine compartment. Refer to the PDC label for relay identification and location.

Remove the starter relay from the PDC as described in this group to perform the following tests:

(1) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 2. If not OK, replace the faulty relay.

(2) Resistance between terminals 85 and 86 (electromagnet) should be 75 ±5 ohms. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Connect a battery B+ lead to terminals 86 and a ground lead to terminal 85 to energize the relay. The relay should click. Also test for continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, refer to Relay Circuit Test procedure. If not OK, replace the faulty relay.



Starter Relay Pinout

CAV	COLOR	FUNCTION
30 (B)	RD	B (+)
85 (C)	TN	P/N POSITION SW. SENSE (AUTO)
86 (A)	YL	IGNITION SWITCH OUTPUT
87 (D)	LG	STARTER RELAY OUTPUT

RELAY CIRCUIT TEST

(1) The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to Step 2. If not OK, repair the open circuit to the PDC fuse as required.

(2) The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to Step 3.

(3) The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the starter solenoid field coils. There should be continuity between the cavity for relay terminal 87 and the starter solenoid terminal at all times. If OK, go to Step 4. If not OK, repair the open circuit to the starter solenoid as required.

(4) The coil battery terminal (86) is connected to the electromagnet in the relay. It is energized when the ignition switch is held in the Start position. Check for battery voltage at the cavity for relay terminal 86 with the ignition switch in the Start position, and no voltage when the ignition switch is released to the On position. If OK, go to Step 5. If not OK, check for an open or short circuit to the ignition switch and repair, if required. If the circuit to the ignition switch is OK, see the Ignition Switch Test procedure in this group.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. It is grounded through the transmission range sensor only when the gearshift selector lever is in the Park or Neutral positions. Check for continuity to ground at the cavity for relay terminal 85. If not OK with an automatic transmission, check for an open or short circuit to the transmission range sensor and repair.

SAFETY SWITCHES

For diagnostics of the Transmission Range Sensor, refer to Group 21, Transaxle.

IGNITION SWITCH

After testing starter solenoid and relay, test ignition switch and wiring. Refer to Group 8D, Ignition Systems or Group 8W, Wiring Diagrams. Check all wiring for opens or shorts, and all connectors for being loose or corroded.

BATTERY

For battery diagnosis and testing, refer to Group 8A, Battery for procedures.

ALL RELATED WIRING AND CONNECTORS

Refer to Group 8W, Wiring Diagrams.

FEED CIRCUIT RESISTANCE TEST

Before proceeding with this operation, review Diagnostic Preparation and Starter Feed Circuit Tests. The following operation will require a voltmeter, accurate to 1/10 of a volt.

CAUTION: Ignition and Fuel systems must be disabled to prevent engine start while performing the following tests.

DIAGNOSIS AND TESTING (Continued)

(1) To disable the Ignition and Fuel systems, disconnect the Automatic Shutdown Relay (ASD). The ASD relay is located in the Power Distribution Center (PDC). Refer to the PDC cover for proper relay location.

(2) Remove the air cleaner assembly for access to battery terminals. Refer to Group 14, Fuel for service procedures.

(3) With all wiring harnesses and components properly connected, perform the following:

(a) Connect the negative lead of the voltmeter to the battery negative post, and positive lead to the battery negative cable clamp. Rotate and hold the ignition switch in the START position. Observe the voltmeter. If voltage is detected, correct poor contact between cable clamp and post.

(b) Connect positive lead of the voltmeter to the battery positive post, and negative lead to the battery positive cable clamp. Rotate and hold the ignition switch key in the START position. Observe the voltmeter. If voltage is detected, correct poor contact between the cable clamp and post.

(c) Connect negative lead of voltmeter to battery negative terminal, and positive lead to engine block near the battery cable attaching point. Rotate and hold the ignition switch in the START position. If voltage reads above 0.2 volt, correct poor contact at ground cable attaching point. If voltage reading is still above 0.2 volt after correcting poor contacts, replace ground cable.

(4) Connect positive voltmeter lead to the starter motor housing and the negative lead to the battery negative terminal. Hold the ignition switch key in the START position. If voltage reads above 0.2 volt, correct poor starter to engine ground.

(a) Connect the positive voltmeter lead to the battery positive terminal, and negative lead to battery cable terminal on starter solenoid. Rotate and hold the ignition switch in the START position. If voltage reads above 0.2 volt, correct poor contact at battery cable to solenoid connection. If reading is still above 0.2 volt after correcting poor contacts, replace battery positive cable.

(b) If resistance tests do not detect feed circuit failures, replace the starter motor.

FEED CIRCUIT TEST

NOTE: The following results are based upon the vehicle being at room temperature.

The following procedure will require a suitable volt-ampere tester (Fig. 2).

CAUTION: Before performing any starter tests, the ignition and fuel systems must be disabled.

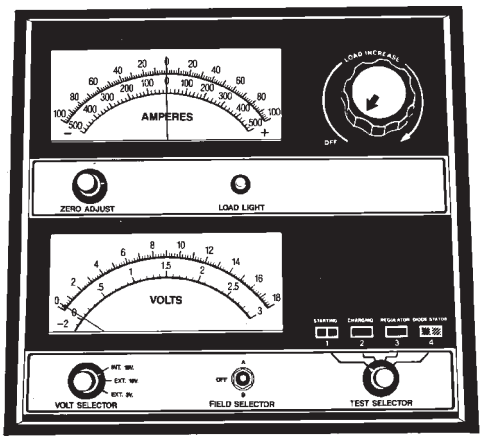


Fig. 2 Volt Ampere Tester

(1) Connect a volt-ampere tester to the battery terminals. Refer to the operating instructions provided with the tester being used.

(2) To disable the ignition and fuel systems, disconnect the Automatic Shutdown Relay (ASD). The ASD relay is located in the Power Distribution Center (PDC). Refer to the PDC cover for proper relay location.

(3) Verify that all lights and accessories are OFF, and the transmission shift selector is in the PARK and SET parking brake.

CAUTION: Do not overheat the starter motor or draw the battery voltage below 9.6 volts during cranking operations.

(4) Rotate and hold the ignition switch in the START position. Observe the volt-ampere tester (Fig. 2).

- If voltage reads above 9.6 volts, and amperage draw reads above 280 amps, check for engine seizing or faulty starter.
- If voltage reads 12.4 volts or greater and amperage reads 0 to 10 amps, check for corroded cables and/or bad connections.
- Voltage below 9.6 volts and amperage draw above 300 amps, the problem is the starter. Replace the starter refer to starter removal.

(5) After the starting system problems have been corrected, verify the battery state-of-charge and charge battery if necessary. Disconnect all testing equipment and connect ASD relay. Start the vehicle several times to assure the problem has been corrected.

STARTING SYSTEM TEST

For circuit descriptions and diagrams, refer to Group 8W, Wiring Diagrams.

DIAGNOSIS AND TESTING (Continued)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

INSPECTION

Before removing any unit from the starting system for repair or diagnosis, perform the following inspections:

- **Battery** - Visually inspect the battery for indications of physical damage and loose or corroded cable connections. Determine the state-of-charge and cranking capacity of the battery. Charge or replace the battery, if required. Refer to Group 8A, Battery for more information.
- **Ignition Switch** - Visually inspect the ignition switch for indications of physical damage and loose or corroded wire harness connections.
- **Transmission Range Sensor** - Visually inspect the transmission range sensor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Relay** - Visually inspect the starter relay for indications of physical damage and loose or corroded wire harness connections.
- **Starter** - Visually inspect the starter for indications of physical damage and loose or corroded wire harness connections.
- **Starter Solenoid** - Visually inspect the starter solenoid for indications of physical damage and loose or corroded wire harness connections.
- **Wiring** - Visually inspect the wire harness for damage. Repair or replace any faulty wiring, as required. Check for loose or corroded wire harness connections at main engine ground and remote jump post.
- **Power Distribution Center (PDC)** - Visually inspect the B+ connections at the PDC for physical damage and loose or corroded harness connections.

STARTING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
STARTER FAILS TO ENGAGE.	1. BATTERY DISCHARGED OR FAULTY. 2. STARTING CIRCUIT WIRING FAULTY. 3. STARTER RELAY FAULTY. 4. IGNITION SWITCH FAULTY. 5. PARK/NEUTRAL POSITION SWITCH (AUTO TRANS) FAULTY OR MIS-ADJUSTED. 6. CLUTCH PEDAL POSITION SWITCH (MAN TRANS) FAULTY. 7. STARTER SOLENOID FAULTY. 8. STARTER ASSEMBLY FAULTY.	1. REFER TO GROUP 8A, BATTERY. CHARGE OR REPLACE BATTERY, IF REQUIRED. 2. REFER TO FEED CIRCUIT RESISTANCE TEST AND FEED CIRCUIT TEST IN THIS SECTION. 3. REFER TO RELAY TEST, IN THIS SECTION. REPLACE RELAY, IF NECESSARY. 4. REFER TO IGNITION SWITCH TEST, IN GROUP 8D IGNITION SYSTEM OR GROUP 8W, WIRING DIAGRAMS. REPLACE SWITCH, IF NECESSARY. 5. REFER PARK/NEUTRAL POSITION SWITCH TEST, IN GROUP 21, TRANSAXLE. REPLACE SWITCH, IF NECESSARY. 6. REFER TO CLUTCH PEDAL POSITION SWITCH TEST, IN GROUP 6, CLUTCH. REPLACE SWITCH, IF NECESSARY. 7. REFER TO SOLENOID TEST, IN THIS SECTION. REPLACE STARTER ASSEMBLY, IF NECESSARY. 8. IF ALL OTHER STARTING SYSTEM COMPONENTS AND CIRCUITS CHECK OK, REPLACE STARTER ASSEMBLY.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
STARTER ENGAGES, FAILS TO TURN ENGINE.	1. BATTERY DISCHARGED OR FAULTY. 2. STARTING CIRCUIT WIRING FAULTY. 3. STARTER ASSEMBLY FAULTY. 4. ENGINE SEIZED. 5. LOOSE CONNECTION AT BATTERY, PDC, STARTER, OR ENGINE GROUND.	1. REFER TO GROUP 8A, BATTERY. CHARGE OR REPLACE BATTERY AS NECESSARY. 2. REFER TO THE FEED CIRCUIT RESISTANCE TEST AND THE FEED CIRCUIT TEST IN THIS SECTION. REPAIR AS NECESSARY. 3. IF ALL OTHER STARTING SYSTEM COMPONENTS AND CIRCUITS CHECK OK, REPLACE STARTER ASSEMBLY. 4. REFER TO GROUP 9 ENGINE, FOR DIAGNOSTIC AND SERVICE PROCEDURES. 5. INSPECT FOR LOOSE CONNECTIONS.
STARTER ENGAGES, SPINS OUT BEFORE ENGINE STARTS.	1. BROKEN TEETH ON STARTER RING GEAR. 2. STARTER ASSEMBLY FAULTY.	1. REMOVE STARTER. INSPECT RING GEAR AND REPLACE IF NECESSARY. 2. IF ALL OTHER STARTING SYSTEM COMPONENTS AND CIRCUITS CHECK OK, REPLACE STARTER ASSEMBLY.
STARTER DOES NOT DISENGAGE.	1. STARTER IMPROPERLY INSTALLED. 2. STARTER RELAY FAULTY. 3. IGNITION SWITCH FAULTY. 4. STARTER ASSEMBLY FAULTY. 5. FAULTY TEETH ON RING GEAR.	1. INSTALL STARTER. TIGHTEN STARTER MOUNTING HARDWARE TO CORRECT TORQUE SPECIFICATIONS. 2. REFER TO RELAY TEST, IN THIS SECTION. REPLACE RELAY, IF NECESSARY. 3. REFER TO IGNITION SWITCH TEST, IN GROUP 8D, IGNITION SYSTEM. REPLACE SWITCH, IF NECESSARY. 4. IF ALL OTHER STARTING SYSTEM COMPONENTS AND CIRCUITS CHECK OK, REPLACE STARTER ASSEMBLY. 5. ROTATE FLYWHEEL 360°, AND INSPECT TEETH.

REMOVAL AND INSTALLATION

SAFETY SWITCHES

For Removal and Installation of the Transmission Range Sensor, refer to Group 21, Transaxle.

STARTER

REMOVAL

(1) Disconnect and isolate the battery negative remote cable from remote ground post (Fig. 3).

(2) Raise vehicle.

(3) Remove three bolts attaching starter to engine (Fig. 4).

(4) Remove battery positive feed wire from starter.

(5) Remove starter solenoid assembly from transmission housing. Position the starter to gain access to the Connector Positive Assurance (CPA) wiring connector.

(6) Position jack stand beneath engine and slightly lift to relieve pressure from left engine mount.

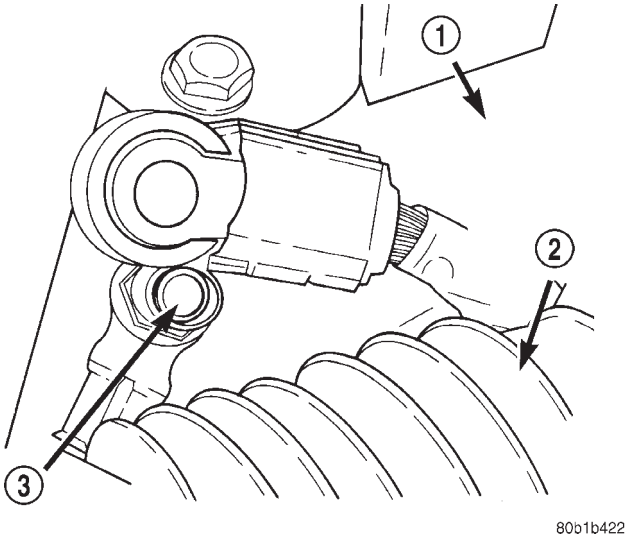


Fig. 3 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

REMOVAL AND INSTALLATION (Continued)

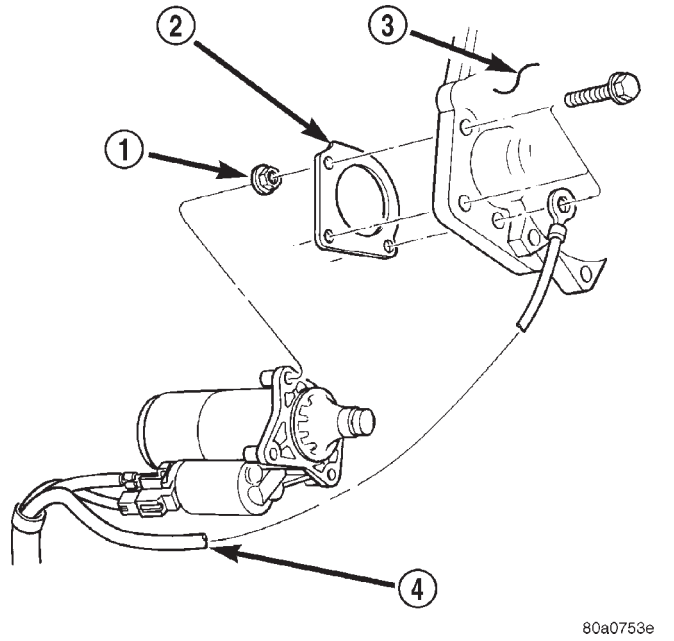


Fig. 4 Starter – 3.2 / 3.5L Engine

1 – STARTER SHIELD RETENTION SLEEVE
2 – COVER
3 – TRANSAXLE HOUSING (3)
4 – GROUND CABLE

(7) Remove three left engine mount mounting bolts from engine block.

(8) Jack engine up slightly to give more room to maneuver starter assembly.

(9) Slide rear of starter motor out between catalyst and engine mount.

(10) Disconnect posi-lock starter solenoid connector.

(11) Remove the starter from vehicle.

INSTALLATION

For installation, reverse the above procedures. Clean corrosion/dirt from the cable and wire terminals before installing wiring to the solenoid.

Reconnect posi-lock connector right after starter is placed into position.

STARTER RELAY

The relay is located in the Power Distribution Center (PDC). Refer to the PDC cover for relay location.

SPECIFICATIONS

STARTER

MANUFACTURER	NIPPONDENSO	MELCO
ENGINE APPLICATION	3.2L / 3.5L	2.7L
POWER RATING	1.4 KW	1.4 KW
VOLTAGE	12 VOLTS	12 VOLTS
BRUSHES	4	4
DRIVE	OFFSET GEAR REDUCED	PLANETARY GEAR TRAIN
CRANKING AMPERAGE* DRAW TEST	150 - 280 AMP*	150 - 280 AMP*

NOTE: Engine should be up to operating temperature. Extremely heavy oil or tight engine will increase starter amperage draw.

TORQUE

DESCRIPTION	TORQUE
Starter Mounting Bolts	54 N·m (40 ft. lbs.)
Starter Solenoid Battery Nut . .	10 N·m (90 in. lbs.)

CHARGING SYSTEM

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DESCRIPTION AND OPERATION

CHARGING SYSTEM OPERATION

DESCRIPTION

The charging system consists of:

- Generator
- Electronic Voltage Regulator (EVR) circuitry within the Powertrain Control Module (PCM)
- Ignition switch (refer to the Ignition System section for information)
- Battery (refer to the Battery section for information)
- Battery temperature sensor
- Voltmeter (refer to the Instrument Panel and Gauges section for information)
- Wiring harness and connections (refer to the Wiring section for information)

OPERATION

The charging system is turned on and off with the ignition switch. The system is on when the engine is running and the ASD relay is energized. When the ASD relay is on, voltage is supplied to the ASD relay sense circuit at the PCM. This voltage is connected through the PCM and supplied to one of the generator field terminals (Gen. Source +) at the back of the generator.

The amount of DC current produced by the generator is controlled by the EVR (field control) circuitry contained within the PCM. This circuitry is connected in series with the second rotor field terminal and ground.

A battery temperature sensor is used to sense battery temperature. This temperature data, along with data from monitored line voltage, is used by the PCM to vary the battery charging rate. This is done by cycling the ground path to control the strength of the rotor magnetic field. The PCM then compensates and regulates generator current output accordingly.

All vehicles are equipped with On-Board Diagnostics (OBD). All OBD-sensed systems, including EVR (field control) circuitry, are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects. Refer to On-Board Diagnostics in the Emission Control System section for more DTC information.

The Check Gauges Lamp (if equipped) monitors: **charging system voltage,** engine coolant temperature and engine oil pressure. If an extreme condition is indicated, the lamp will be illuminated. This is done as reminder to check the three gauges. The signal to activate the lamp is sent via the PCI bus circuits. The lamp is located on the instrument panel. Refer to the Instrument Panel and Gauges section for additional information.

GENERATOR

DESCRIPTION

The generator is belt-driven by the engine. It is serviced only as a complete assembly. If the generator fails for any reason, the entire assembly must be replaced. The generator produces DC voltage.

OPERATION

As the energized rotor begins to rotate within the generator, the spinning magnetic field induces a current into the windings of the stator coil. Once the generator begins producing sufficient current, it also provides the current needed to energize the rotor.

The Y type stator winding connections deliver the induced AC current to 3 positive and 3 negative diodes for rectification. From the diodes, rectified DC current is delivered to the vehicles electrical system through the generator, battery, and ground terminals.

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DESCRIPTION AND OPERATION (Continued)

Noise emitting from the generator may be caused by:

- Worn, loose or defective bearings
- Loose or defective drive pulley
- Incorrect, worn, damaged or misadjusted drive belt
- Loose mounting bolts
- Misaligned drive pulley
- Defective stator or diode
- Damaged internal fins

BATTERY TEMPERATURE SENSOR—PCM INPUT

DESCRIPTION

The PCM incorporates a Battery Temperature Sensor (BTS) on its circuit board.

OPERATION

The PCM uses the temperature of the battery area to control the charge rate. The signal is used to regulate the system voltage. The system voltage is higher at cold temperatures and is gradually reduced as temperature around the battery increases.

The function of the BTS is to enable control of the generator output based upon ambient temperature. As temperature increases, the charging rate should decrease. As temperature decreases, the charging rate should increase. The sensor functions similar to the ECT sensor with one major difference, the ambient sensor does not have a dual temperature range program. The PCM maintains the maximum output of the generator by monitoring battery voltage and controlling battery voltage to a range of 13.5-14.7 volts.

REMOVAL AND INSTALLATION

GENERATOR—2.7L

REMOVAL

(1) Disconnect negative battery cable.
(2) Raise and support vehicle.
(3) Remove lower plastic splash shield.
(4) Remove transmission cooler and reposition cooler out of the way.
(5) Remove lower radiator crossmember support and position a jackstand under radiator for support.
(6) Loosen adjusting T-bolt, but do not remove.
(7) Loosen pivot bolt, but do not remove.
(8) Remove the generator drive belt. Refer to the Cooling System section.
(9) Disconnect the generator field circuit plug.
(10) Remove the B+ terminal nut and wire.
(11) Remove pivot bolt, being careful not to lose spacer.
(12) Remove generator.

INSTALLATION

(1) Install generator.
(2) Install pivot bolt, leave loose.
(3) Connect the generator field circuit plug.
(4) Install the B+ terminal nut and wire.
(5) Install the generator drive belt. Refer to the Cooling System section.
(6) Adjusting T-bolt and tighten belt.
(7) Remove jackstand from under radiator and install lower radiator crossmember support.
(8) Reposition transmission cooler and tighten fasteners.
(9) Install lower plastic splash shield.
(10) Lower vehicle.
(11) Connect negative battery cable.

Tighten all fasteners to the proper torque. Refer to the Torque Specifications chart in this section.

GENERATOR—3.2/3.5L

REMOVAL

(1) Disconnect negative battery cable.
(2) Remove the upper radiator support and relocate.
(3) Loosen lower mounting bolt do not remove.
(4) Loosen pivot bolt, but do not remove.
(5) Loosen belt adjustment bolt.
(6) Remove the generator drive belt. Refer to the Cooling System section.
(7) Remove bracket.
(8) Remove lower mounting bolt.
(9) Remove pivot bolt.
(10) Remove generator.
(11) Disconnect the generator field circuit plug.
(12) Remove the B+ terminal nut and wire.

INSTALLATION

(1) Connect the B+ wire and tighten nut.
(2) Connect the generator field circuit connector.
(3) Install generator.
(4) Install the pivot bolt.
(5) Install the lower mounting bolt.
(6) Install bracket and tighten bolts.
(7) Install generator drive belt. Refer to the Cooling System section.
(8) Tighten the pivot bolt.
(9) Tighten the lower mounting bolt.
(10) Install the upper radiator support and tighten the bolts.
(11) Connect the negative battery cable.

Tighten all fasteners to the proper torque. Refer to the Torque Specifications chart in this section.

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
Battery Terminal Nut	10 N·m (90 in. lbs.)
Battery Hold Down Clamp Bolt	14 N·m (125 in. lbs.)
Generator B+ Terminal	9 N·m (75 in. lbs.)
Generator Mounting Bolt 8 mm	41 N·m (30 ft. lbs.)
Generator Mounting Bolt 10 mm	54 N·m (40 ft. lbs.)
Generator Pivot Bolt 10 mm	54 N·m (40 ft. lbs.)

GENERATOR

Type	Engine	Minimun Test Amperage
Denso	2.7 L	105 Amp
Melco	3.2/3.5 L	110 Amp
Test Specification: 1. Engine RPM : 2500 RPM ±20 RPM 2. Voltage Output : 14.0 V ± 0.5 V 3. Field Current : 5 amps ± 0.1 amps		

Part number is located on the side of the generator.

IGNITION SYSTEM

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DESCRIPTION AND OPERATION

IGNITION SYSTEM

DESCRIPTION

NOTE: All engines use a fixed ignition timing system. Basic ignition timing is not adjustable. All spark advance is determined by the Powertrain Control Module (PCM).

The distributorless ignition system used on these engines is referred to as the Direct Ignition System (DIS). The system's three main components are the coils, crankshaft position sensor, and camshaft position sensor. The coil on plug ignition system utilizes an ignition coil for every cylinder, it is mounted directly over the each spark plug.

OPERATION

The crankshaft position sensor and camshaft position sensor are hall effect devices. The camshaft position sensor and crankshaft position sensor generate pulses that are inputs to the PCM. The PCM determines crankshaft position from these sensors. The PCM calculates injector sequence and ignition timing from crankshaft position. For a description of both sensors, refer to Camshaft Position Sensor and Crankshaft Position Sensor in this section.

SPARK PLUGS-PLATINUM

DESCRIPTION

The 2.7, 3.2, and 3.5L engines use platinum resistor spark plugs. They have resistance values of 6,000 to 20,000 ohms when checked with at least a 1000 volt tester. For spark plug identification and specifications, Refer to the Specifications section.

Do not use an ohm meter to check the resistance of the spark plugs. This will give an inaccurate reading.

The spark plugs are double platinum and have a recommended service life of 100,000 miles for normal driving conditions per schedule A in this manual. The spark plugs have a recommended service life of 75,000 miles for severe driving conditions.

A thin platinum pad is welded to both or center electrode end(s) as show in (Fig. 1). Extreme care must be used to prevent spark plug cross threading, mis-gaping and ceramic insulator damage during plug removal and installation.

CAUTION: Cleaning of the platinum plug may damage the platinum tip.

COIL ON PLUG

DESCRIPTION

The engines are equipped with a coil on plug ignition system. Each cylinder has a dedicated coil that sits atop each plug. No secondary wires are required and connection from the coil to plug is made with a boot that is attached to the coil. The combination of

DESCRIPTION AND OPERATION (Continued)

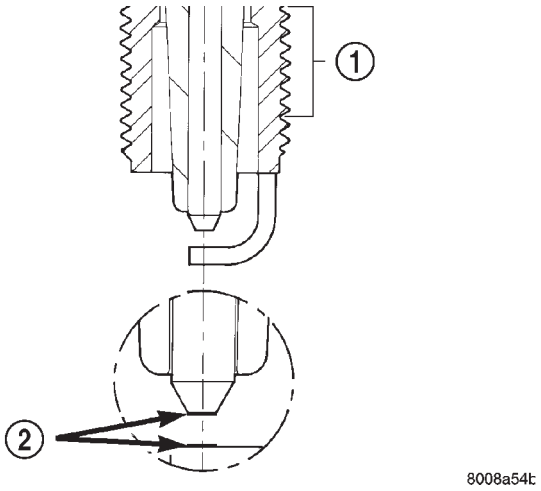


Fig. 1 Platinum Pads

1 – APPLY ANTI-SEIZE COMPOUND HERE ONLY
2 – PLATINUM SPARK SURFACE

the coil, boot, and fasteners is known as the ignition coil assembly. The Powertrain Control Module (PCM) determines which coil to charge and fire at the correct time.

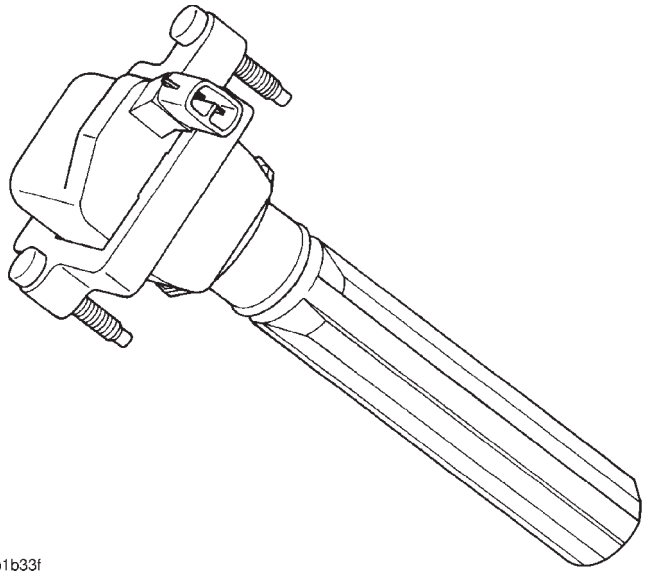


Fig. 2 2.7L Coil

OPERATION

The Auto Shutdown (ASD) relay provides battery voltage to the ignition coil. The PCM provides a ground contact (circuit) for energizing the coil. When the PCM breaks the contact, the energy in the coil primary transfers to the secondary causing the spark. The PCM will de-energize the ASD relay if it does not receive the crankshaft position sensor and camshaft position sensor inputs. For limp home capability, the engine can run on crankshaft sensor input only. Refer to Auto Shutdown (ASD) Relay—PCM Output, in this section for relay operation.

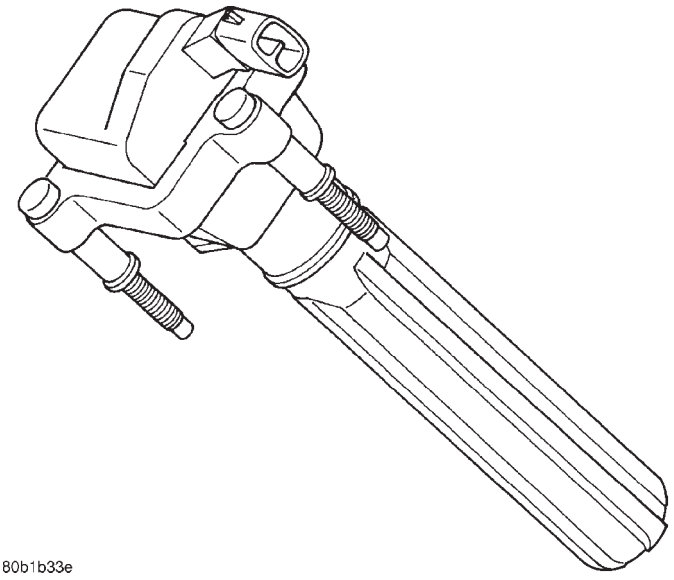


Fig. 3 3.2/3.5L Coil

The coil's low primary resistance (0.4 - 0.6 ohm) allows the PCM to fully charge the coil for each firing. There is a coil capacitor added to each bank of cylinders for radio noise suppression.

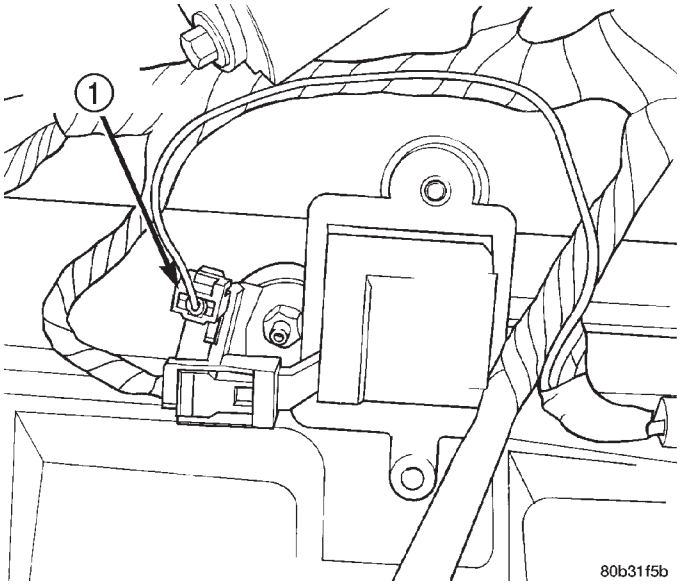


Fig. 4 Coil Capacitor

1 – IGNITION COIL CAPACITOR

CRANKSHAFT POSITION SENSOR

DESCRIPTION

The crankshaft sensor is located on the passengers side of the transmission housing, above the differential housing (Fig. 6). The bottom of the sensor is positioned next to the drive plate.

DESCRIPTION AND OPERATION (Continued)

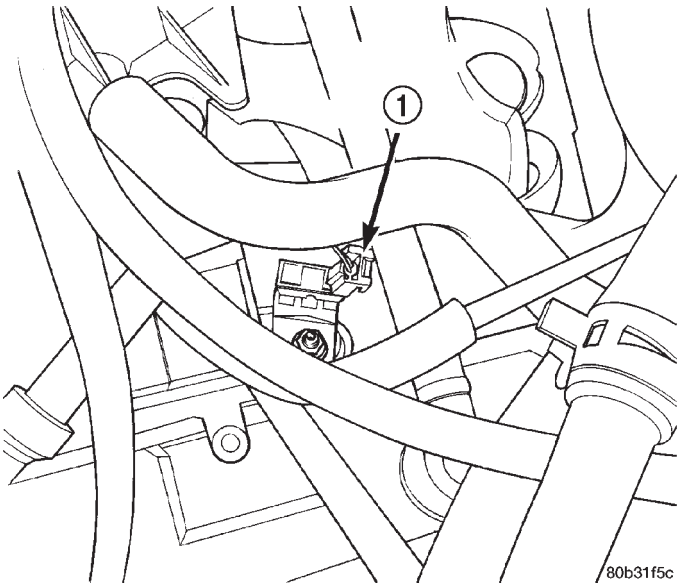


Fig. 5 Coil Capacitor

1 – IGNITION COIL CAPACITOR

The sensor is a hall effect device combined with an internal magnet. It is also sensitive to steel within a certain distance from it.

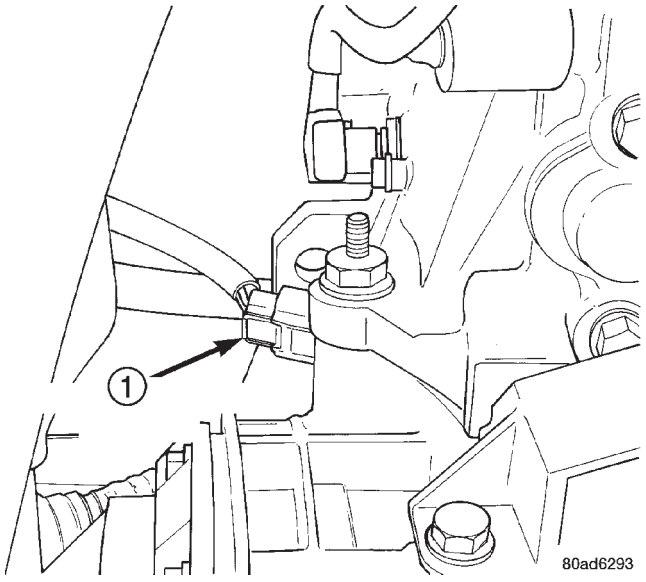


Fig. 6 Crankshaft Position Sensor Location

1 – CRANKSHAFT POSITION SENSOR

OPERATION

Engine speed and crankshaft position are provided through the crankshaft position sensor. The sensor generates pulses that are the input sent to the powertrain control module (PCM). The PCM interprets the sensor input to determine the crankshaft position. The PCM then uses this position, along with other inputs, to determine injector sequence and ignition timing.

The crankshaft position sensor detects slots cut into the transmission driveplate extension. There are 3 sets of slots. Two sets contain 4 slots and one set contains 5 slots, for a total of 13 slots (Fig. 7). Basic timing is set by the position of the last slot in each group. Once the Powertrain Control Module (PCM) senses the last slot, it determines which piston will be next at TDC from the camshaft position sensor input. It may take the PCM one engine revolution to determine crankshaft position.

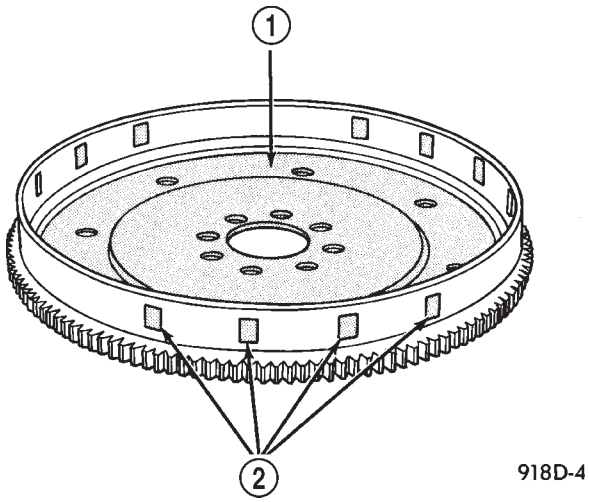


Fig. 7 Timing Slots

1 – TORQUE CONVERTER DRIVE PLATE
2 – SLOTS

The PCM uses crankshaft position reference to determine injector sequence and ignition timing. Once the PCM determines crankshaft position, it begins energizing the injectors and coils in sequence.

The PCM uses the Crankshaft Position sensor to calculate the following:

- Engine rpm
- TDC number 1 and 4
- Ignition coil synchronization
- Injector synchronization
- Camshaft-to-crankshaft misalignment (Timing belt skipped 1 tooth or more diagnostic trouble code)

CAMSHAFT POSITION SENSOR

DESCRIPTION

The camshaft position sensor is mounted in the front of the timing case cover (Fig. 8) or (Fig. 9). It is a hall effect device.

DESCRIPTION AND OPERATION (Continued)

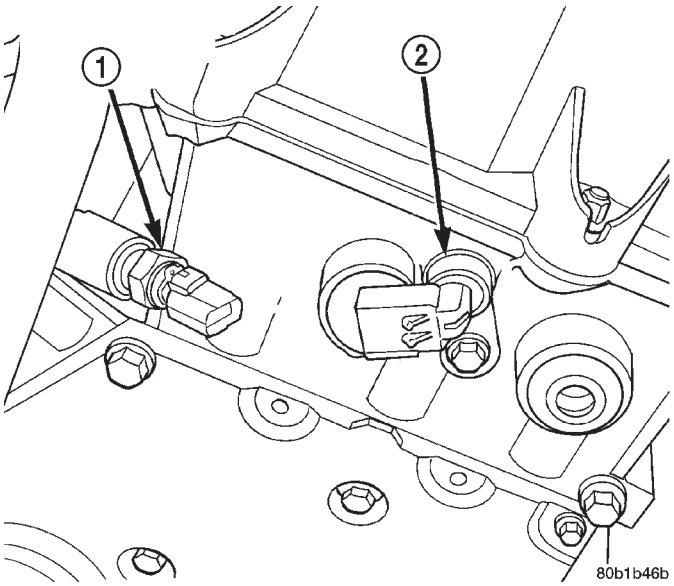


Fig. 8 Camshaft Position Sensor Location—2.7L Engine

1 – ENGINE COOLANT TEMPERATURE SENSOR
2 – CAM SENSOR

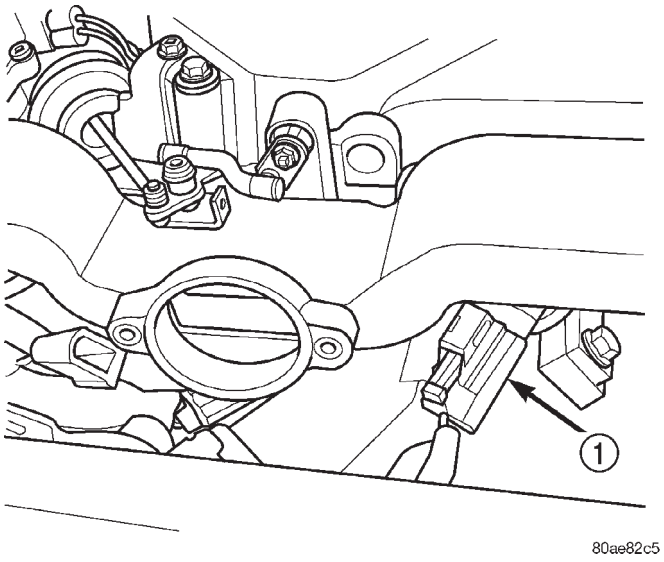


Fig. 9 Camshaft Position Sensor Location—3.2/3.5L Engine

1 – CAMSHAFT SENSOR

OPERATION

The CMP sensor contains a hall effect device called a sync signal generator to generate a fuel sync signal. The camshaft position sensor helps provide cylinder identification to the Powertrain Control Module (PCM) (Fig. 10) or (Fig. 11). The sensor generates pulses as groups of notches on the camshaft sprocket pass underneath it. The PCM keeps track of crankshaft rotation and identifies each cylinder by the pulses generated by the notches on the camshaft sprocket. Crankshaft pulses follow each group of camshaft pulses.

When metal aligns with the sensor, voltage goes low (less than 0.3 volts). When a notch aligns with the sensor, voltage spikes high (5.0 volts). As a group of notches pass under the sensor, the voltage switches from low (metal) to high (notch) then back to low. The number of notches determine the amount of pulses. If available, an oscilloscope can display the square wave patterns of each timing event.

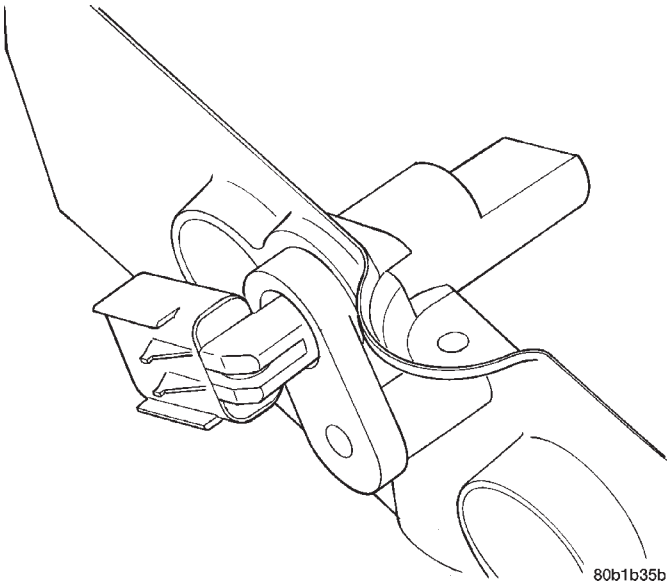


Fig. 10 Camshaft Position Sensor—2.7L Engine

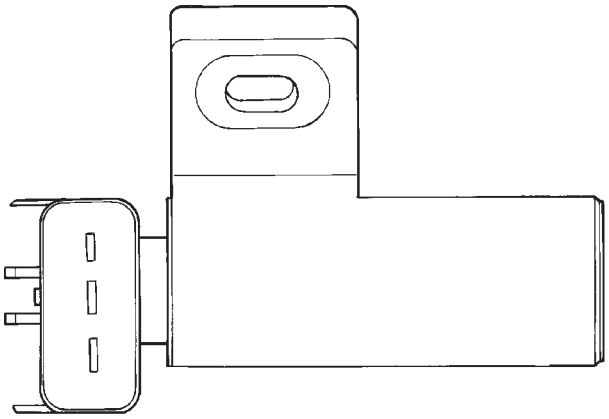


Fig. 11 Camshaft Position Sensor—3.2/3.5L Engine

DESCRIPTION AND OPERATION (Continued)

KNOCK SENSOR

DESCRIPTION

The knock sensor threads into the cylinder block. The knock sensor is designed to detect engine vibration that is caused by detonation.

OPERATION

When the knock sensor detects a knock in one of the cylinders, it sends an input signal to the PCM. In response, the PCM retards ignition timing for all cylinders by a scheduled amount.

Knock sensors contain a piezoelectric material which constantly vibrates and sends an input voltage (signal) to the PCM while the engine operates. As the intensity of the crystal's vibration increases, the knock sensor output voltage also increases.

The voltage signal produced by the knock sensor increases with the amplitude of vibration. The PCM receives as an input the knock sensor voltage signal. If the signal rises above a predetermined level, the PCM will store that value in memory and retard ignition timing to reduce engine knock. If the knock sensor voltage exceeds a preset value, the PCM retards ignition timing for all cylinders. It is not a selective cylinder retard.

The PCM ignores knock sensor input during engine idle conditions. Once the engine speed exceeds a specified value, knock retard is allowed.

Knock retard uses its own short term and long term memory program.

Long term memory stores previous detonation information in its battery-backed RAM. The maximum authority that long term memory has over timing retard can be calibrated.

Short term memory is allowed to retard timing up to a preset amount under all operating conditions (as long as rpm is above the minimum rpm) except WOT. The PCM, using short term memory, can respond quickly to retard timing when engine knock is detected. Short term memory is lost any time the ignition key is turned off.

NOTE: Over or under tightening affects knock sensor performance, possibly causing improper spark control.

LOCK KEY CYLINDER

DESCRIPTION

The lock cylinder is inserted in the end of the housing opposite the ignition switch.

OPERATION

The ignition key rotates the cylinder to 5 different detents (Fig. 12) :

- Accessory
- Off (lock)
- Unlock
- On/Run
- Start

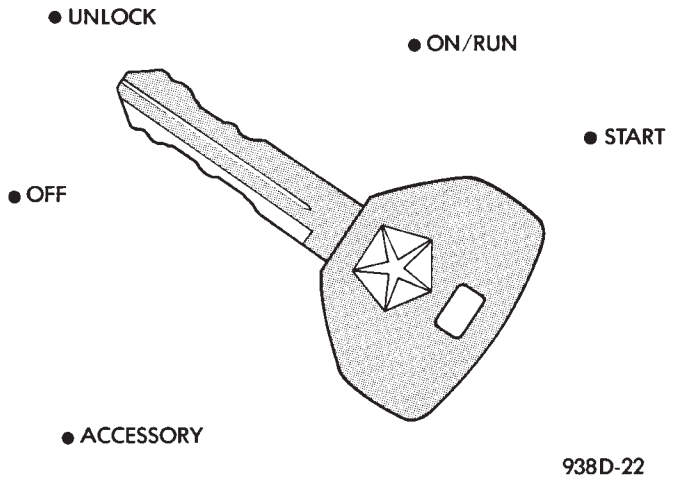


Fig. 12 Ignition Lock Cylinder Detents

IGNITION INTERLOCK

OPERATION

All vehicles equipped with automatic transaxles have an interlock system. The system prevents shifting the vehicle out of Park unless the ignition lock cylinder is in the Unlock, Run or Start position. In addition, the operator cannot rotate the key to the lock position unless the shifter is in the park position. On vehicles equipped with floor shift refer to the - Transaxle for Automatic Transmission Shifter/ Ignition Interlock.

REMOVAL AND INSTALLATION

SPARK PLUG

Always remove the ignition coil assembly by grasping at the spark plug boot, turning the assembly 1/2 turn and pulling straight back in a steady motion.

REMOVAL

(1) Prior to removing the spark plug, spray compressed air around the coil area and spark plug.

(2) Remove electrical connector from ignition coil.

On 3.2/3.5L engines, it is necessary to loosen the screws by alternating back and forth. Do not lose the spacers under the coil when loosening the screws.

(3) Remove 2 fasteners from ignition coil.

(4) Remove ignition coil assembly.

REMOVAL AND INSTALLATION (Continued)

(5) Remove the spark plug using a quality socket with a rubber or foam insert.

(6) Inspect the spark plug condition.

INSTALLATION

(1) To avoid cross threading, start the spark plug into the cylinder head by hand.

(2) 3.2/3.5L engines tighten spark plugs to 28 N·m (20 ft. lbs.) torque, 2.7L engine tighten spark plugs to 17.6 N·m (13 ft. lbs.).

(3) Install ignition coil assembly onto spark plug.

(4) Install coil screws and tighten: 2.7L engine to 6.2 N·m (55 in. lbs.), 3.2/3.5L engines to 6.7 N·m (60 in. lbs.).

(5) Connect the electrical connector.

IGNITION COIL

REMOVAL

(1) Prior to removing the ignition coils, spray compressed air around the coil area and spark plug.

(2) Remove electrical connector from ignition coil.

On 3.2/3.5L engines, it is necessary to loosen the screws by alternating back and forth. Do not lose the spacers under the coil when loosening the screws.

(3) Remove 2 fasteners from ignition coil assembly.

(4) Remove ignition coil assembly.

INSTALLATION

(1) Install ignition coil assembly for spark plug.

(2) Install coil screws and tighten: 2.7L engine to 6.2 N·m (55 in. lbs.), 3.2/3.5L engines to 6.7 N·m (60 in. lbs.).

(3) Connect the electrical connector.

AUTOMATIC SHUTDOWN RELAY

The relay is located in the Power Distribution Center (PDC) (Fig. 13). For the location of the relay within the PDC, refer to the PDC cover for location. Check electrical terminals for corrosion and repair as necessary.

CAMSHAFT POSITION SENSOR—2.7L

The camshaft position sensor is mounted in the front of the timing case cover (Fig. 14).

REMOVAL

(1) Disconnect electrical connector from sensor.

(2) Remove camshaft position sensor screw.

(3) Without pulling on the connector, pull the sensor out of the chain case cover.

INSTALLATION

(1) Install sensor in the chain case cover and push sensor in until contact is made with the timing chain cover. While holding the sensor in this position, install and tighten the retaining bolt to 12 N·m (105 in. lbs.) torque.

(2) Attach electrical connector to sensor.

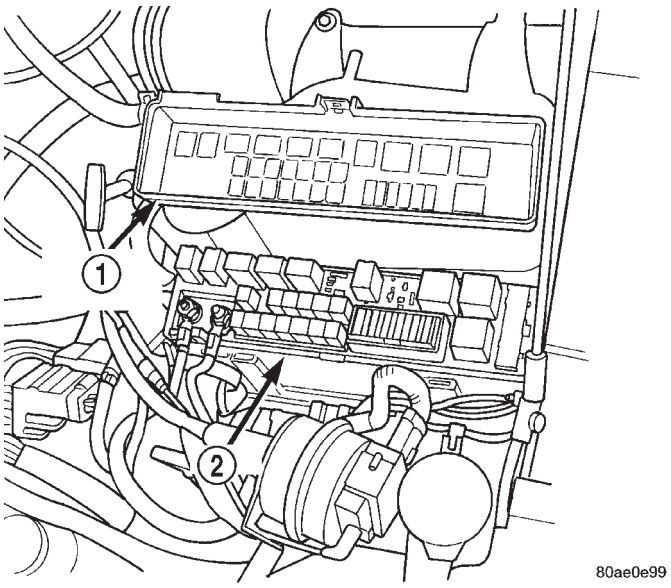


Fig. 13 Power Distribution Center (PDC)

1 – PDC COVER
2 – PDC

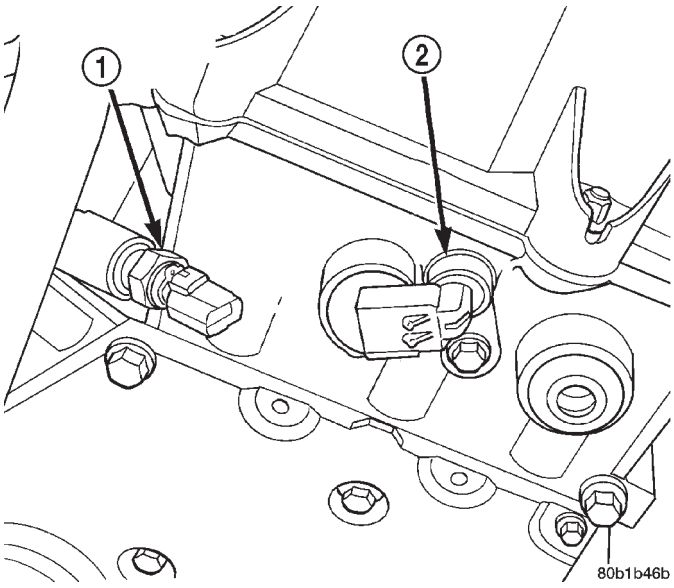


Fig. 14 Camshaft Position Sensor Location

1 – ENGINE COOLANT TEMPERATURE SENSOR
2 – CAM SENSOR

CAMSHAFT POSITION SENSOR—3.2/3.5L

The camshaft position sensor is installed in the timing belt housing cover above the left camshaft sprocket (Fig. 15).

REMOVAL AND INSTALLATION (Continued)

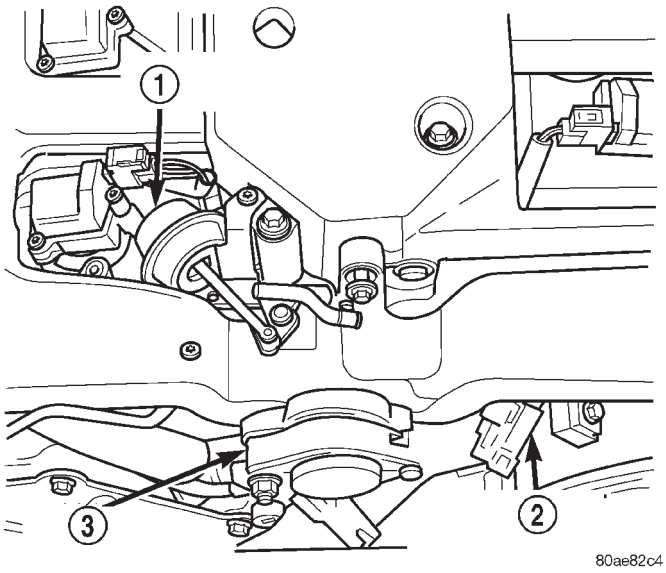


Fig. 15 Camshaft Position Sensor

1 – SHORT RUNNER VALVE
2 – CAMSHAFT POSITION SENSOR
3 – MANIFOLD TUNING VALVE

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove the upper intake plenum, refer to the Intake System section.
(3) Disconnect electrical connector from sensor.
(4) Remove camshaft position sensor screw.
(5) Pull sensor up out of the timing belt housing cover.

INSTALLATION

If the removed sensor is reinstalled, completely remove the old spacer from the sensor face. Attach a NEW SPACER to the face of the sensor before installation. If installing a new sensor, confirm that the paper spacer is attached to the face (Fig. 16).

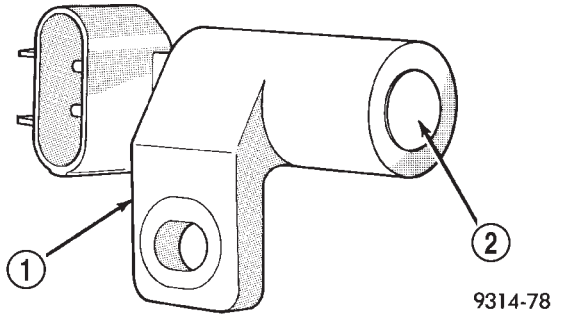


Fig. 16 Paper Spacer—3.2/3.5L Engine

1 – CAMSHAFT POSITION SENSOR
2 – PAPER SPACER

(1) Install sensor in the timing belt housing and push sensor down until contact is made with the camshaft sprocket. While holding the sensor in this position, install and tighten the retaining bolt to 12 N·m (105 in. lbs.) torque.
(2) Attach electrical connector to sensor.
(3) Install the upper intake plenum, refer to the Intake System section.
(4) Connect the negative battery cable.

CRANKSHAFT POSITION SENSOR

The crankshaft sensor is located on the passengers side of the transmission housing, above the differential housing (Fig. 17). The bottom of the sensor sits above the drive plate.

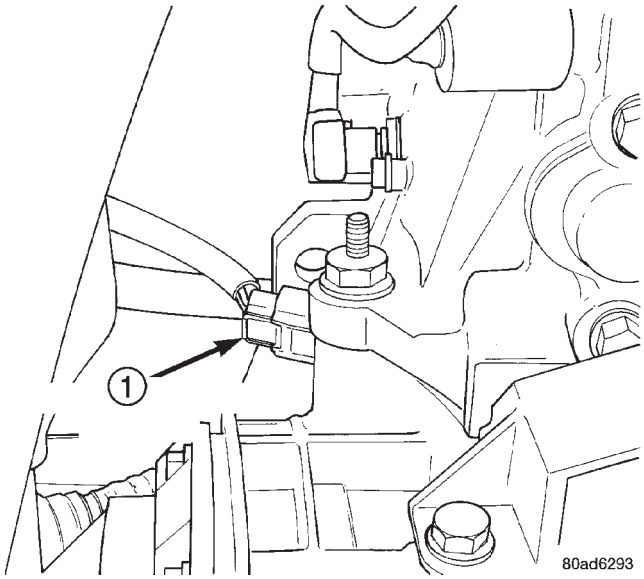


Fig. 17 Crankshaft Position Sensor

1 – CRANKSHAFT POSITION SENSOR

REMOVAL

(1) Disconnect electrical connector from crankshaft position sensor.
(2) Remove sensor mounting screw. Remove sensor.

INSTALLATION

(1) Install sensor and push sensor down until contact is made with the transmission case. While holding the sensor in this position, install and tighten the retaining bolt to 12 N·m (105 in. lbs.) torque.
(2) Connect electrical connector to crankshaft position sensor.

KNOCK SENSOR

The engine uses one knock sensor(s). The sensor is bolted into the cylinder block, directly below the intake manifold.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove intake manifold plenum and intake manifold. Refer to the Engine section.

(2) For the 2.7 L engine remove the right cylinder head. Refer to the Engine section.

(3) Disconnect electrical connector from knock sensor(s) (Fig. 18) or (Fig. 19).

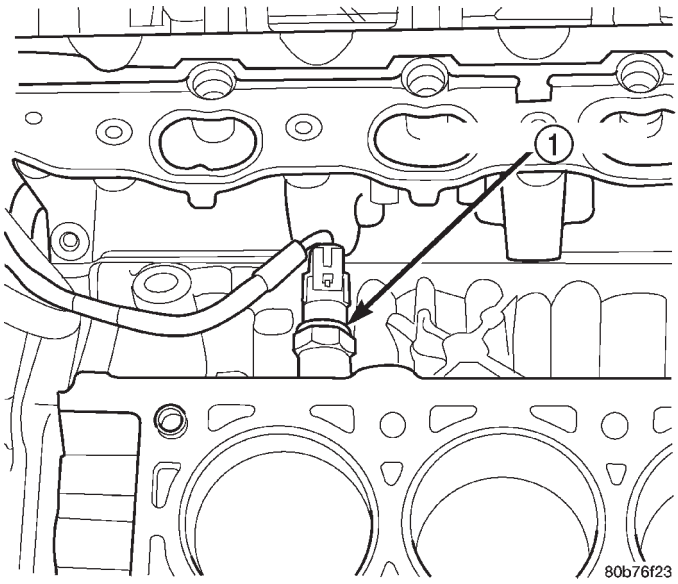


Fig. 18 Knock Sensor 2.7 L

1 – KNOCK SENSOR

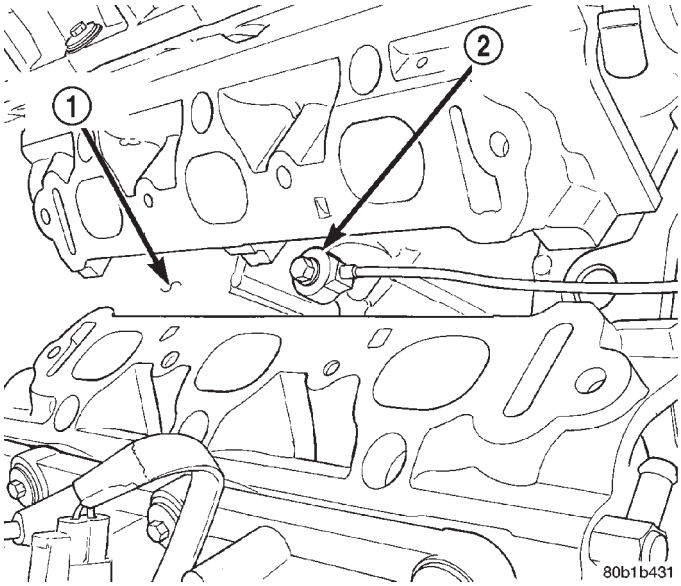


Fig. 19 Knock Sensor 3.2/3.5 L

1 – CYLINDER BLOCK
2 – KNOCK SENSOR

(4) Use a crows foot socket to remove the knock sensor bolt.

INSTALLATION

(1) Install knock sensor. Tighten bolt to 10 N·m (7 ft. lbs.) torque. **Over or under tightening affects knock sensor performance, possibly causing improper spark control.**

(2) Attach electrical connector to knock sensor.

(3) Install the cylinder head. Refer to the Engine section.

(4) Install intake manifold plenum and intake manifold. Refer to the Engine section.

COIL CAPACITOR

REMOVAL

(1) Remove the negative battery cable.

(2) Disconnect the electrical connector (Fig. 21) or (Fig. 20).

(3) Remove nut and capacitor.

INSTALLATION

(1) Install capacitor and tighten nut.

(2) Attach electrical connector to capacitor.

(3) Install the negative battery cable.

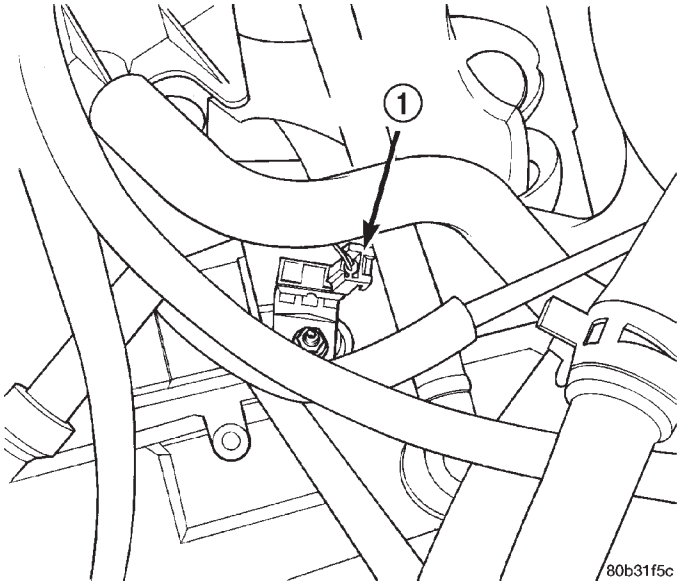


Fig. 20 Ignition Coil Capacitor

1 – IGNITION COIL CAPACITOR

IGNITION SWITCH

The ignition switch attaches to the lock cylinder housing on the end opposite the lock cylinder (Fig. 22). For ignition switch terminal and circuit identification, refer to the Wiring Diagrams section.

REMOVAL

(1) Disconnect negative cable from battery.

(2) Remove tilt lever attaching screw. Remove lever.

REMOVAL AND INSTALLATION (Continued)

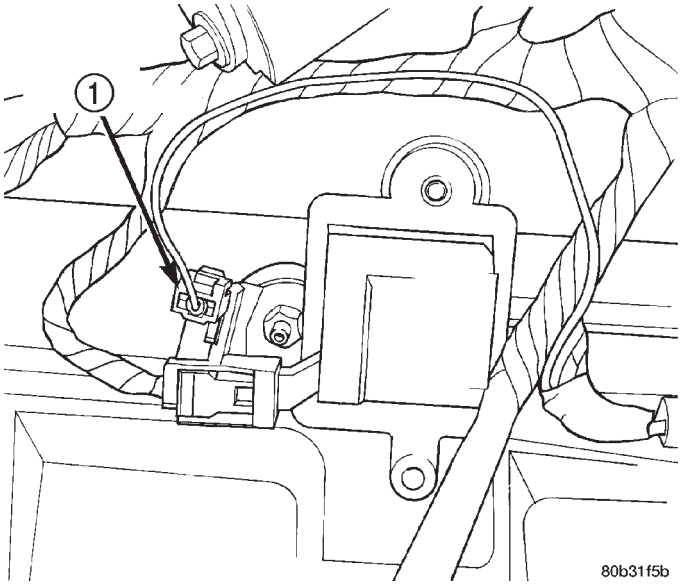


Fig. 21 Ignition Coil Capacitor

1 – IGNITION COIL CAPACITOR

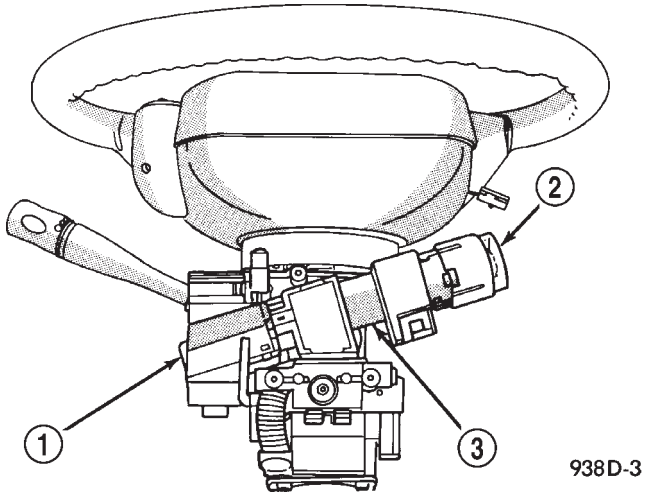


Fig. 22 Ignition Switch

1 – IGNITION SWITCH
2 – LOCK CYLINDER AND HALO LIGHT
3 – LOCK CYLINDER HOUSING

(3) Remove upper and lower cover from steering column.

(4) Remove Sentry Key Immobilizer Module (SKIM) if equipped. Refer to the Power Door Locks section for removal.

(5) Remove multi-function switch.

(6) Disconnect electrical connector from ignition switch (Fig. 23).

(7) Remove Ignition switch mounting screws. Remove switch.

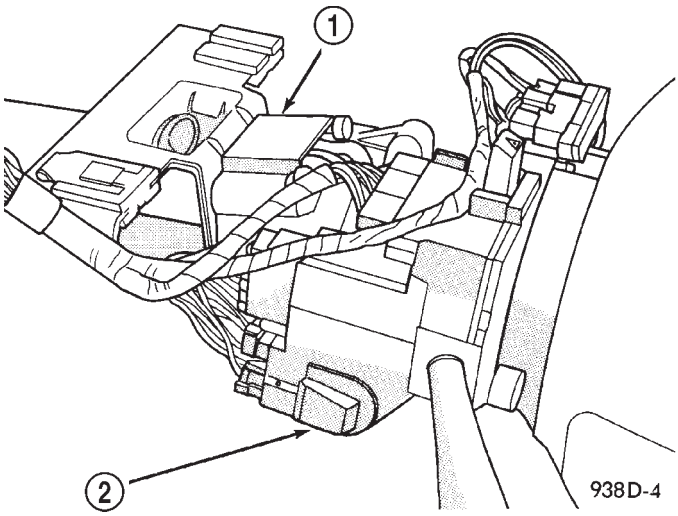


Fig. 23 Ignition Switch Removal/Installation

1 – STEERING COLUMN
2 – IGNITION SWITCH

INSTALLATION

(1) A tab on the ignition switch indexes to a notch in the lock cylinder housing (Fig. 24). Also, a slot in the end of the ignition switch fits over the shaft in the end of the lock cylinder housing. Use the ignition key to rotate the lock cylinder to align the ignition switch with lock cylinder housing.

(2) Install and tighten ignition switch mounting screws.

(3) Attach electrical connector to ignition switch.

(4) Install multi-function switch.

(5) Install SKIM if equipped, refer to the Power Door Locks section for installation.

(6) Install upper and lower cover on steering column.

(7) Install tilt lever.

(8) Connect negative cable to battery.

LOCK KEY CYLINDER

The lock cylinder is inserted in the end of the housing opposite the ignition switch. The ignition key rotates the cylinder to 5 different detentes (Fig. 25) :

- Accessory
- Off (lock)
- Unlock
- On/Run
- Start

When replacing the lock cylinder, if the vehicle has a column shifter, install a new interlock cassette. If the vehicle has a floor shift, adjust the interlock cable at the floor shifter when the lock cylinder is replaced. Refer to Floor Shift Interlock Adjustment in the Transmission section.

REMOVAL AND INSTALLATION (Continued)

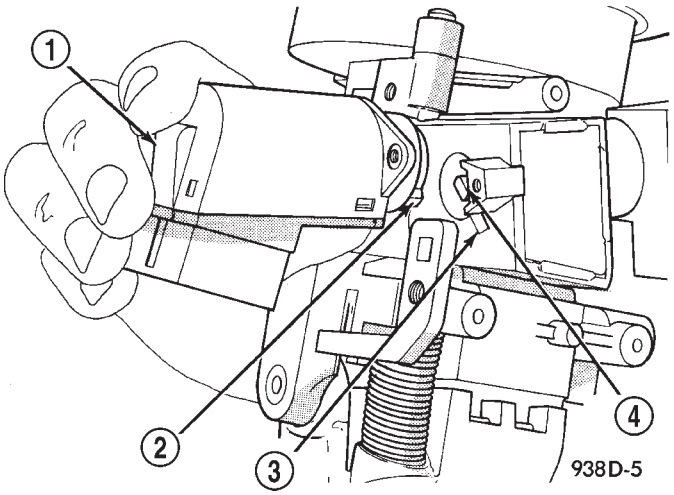


Fig. 24 Ignition Switch Alignment

1 – IGNITION SWITCH
2 – TAB
3 – NOTCH
4 – SHAFT

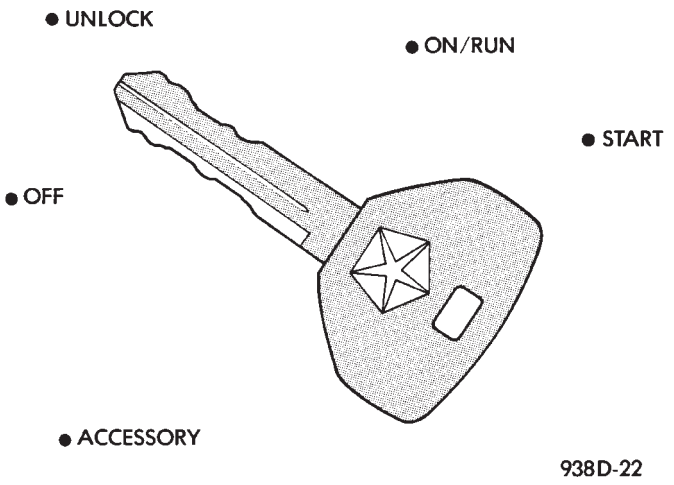


Fig. 25 Ignition Lock Cylinder Detentes

REMOVAL

(1) Disconnect negative cable from battery.

(2) Remove the tilt lever attaching screw. Remove lever.

(3) Remove the upper and lower covers from the steering column.

(4) Turn the ignition key to the run position. When ignition switch is in the run position, the lock cylinder retaining tab will depress.

(5) Depress tab and slide lock cylinder out of housing (Fig. 26).

INSTALLATION

(1) Install key in lock cylinder. Turn key to run position (retaining tab on lock cylinder can be depressed).

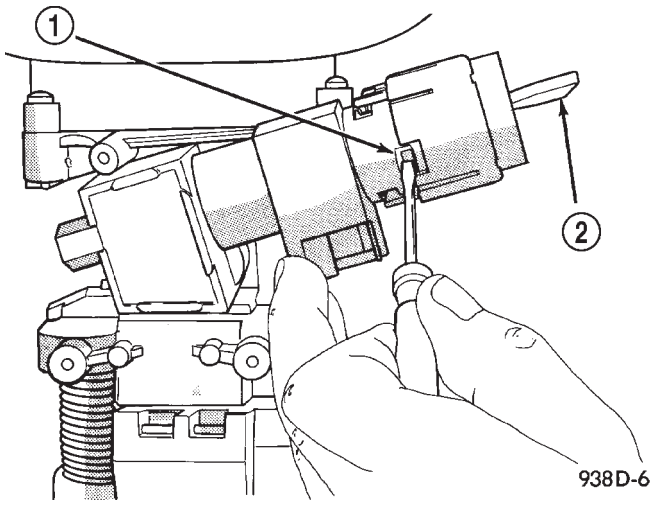


Fig. 26 Lock Cylinder Removal

1 – TAB
2 – KEY IN RUN POSITION

(2) The shaft at the end of the lock cylinder aligns with the socket in the end of the housing. To align the socket with the lock cylinder, ensure the socket is in the Run position (Fig. 27).

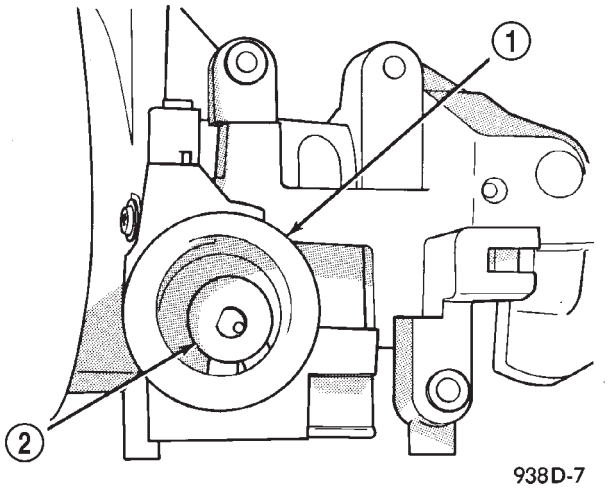


Fig. 27 Socket in Lock Cylinder Housing

1 – LOCK CYLINDER HOUSING
2 – SOCKET IN RUN POSITION

(3) Align the lock cylinder with the grooves in the housing. Slide the lock cylinder into the housing until the tab sticks through the opening in the housing (Fig. 28).

(4) Turn key to Off position. Remove key.

(5) If the vehicle has column shift and a new lock cylinder was used, install and adjust a new interlock cassette. Refer to Ignition Interlock in this section. If the vehicle has a floor shift, adjust the interlock cable when the lock cylinder is replaced. Refer to the

REMOVAL AND INSTALLATION (Continued)

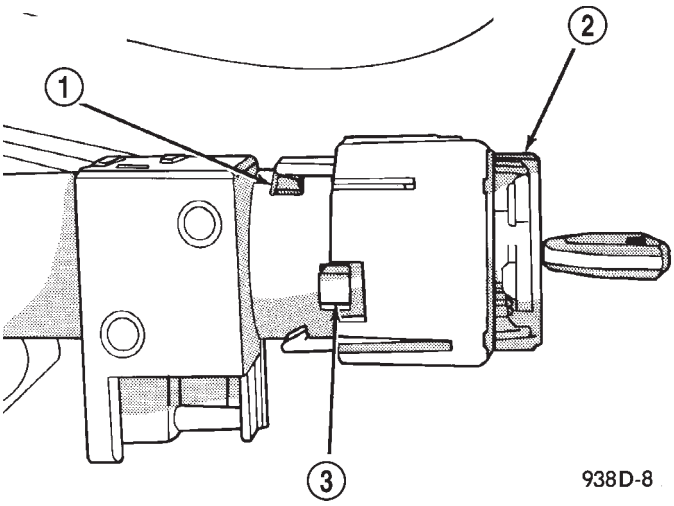


Fig. 28 Lock Cylinder Installation

1 – LOCK CYLINDER HOUSING
2 – LOCK CYLINDER
3 – TAB

Floor Shift Interlock Adjustment procedure in the Transmission section..

(6) Install upper and lower cover on steering column.

(7) Install tilt lever.
(8) Connect negative cable to battery.

SPECIFICATIONS

TORQUE

Description	Torque
2.7L Camshaft Position Sensor Screw	12 N·m (105 in. lbs.)
3.2/3.5L Camshaft Position Sensor Screw	12 N·m (105 in. lbs.)
Engine Coolant Sensor	28 N·m (20 ft. lbs.)
2.7L Crankshaft Position Sensor Screw	12 N·m (105 in. lbs.)
3.2/3.5L Crankshaft Position Sensor Screw	12 N·m (105 in. lbs.)
2.7L Ignition Coil	6.2 N·m (55 in. lbs.)
3.2/3.5L Ignition Coil	6.7 N·m (60 in. lbs.)
Knock Sensor	10 N·m (7 ft. lbs.)
2.7L Map Sensor	2 N·m (20 in. lbs.)
3.2/3.5L Map Sensor	2 N·m (20 in. lbs.)
2.7L Spark Plugs	17.6 N·m (13 ft. lbs.)
3.2/3.5L Spark Plugs	28 N·m (20 ft. lbs.)

SPARK PLUGS

Engine	Spark Plug	Gap	Thread Size
2.7L	RE10PMC5	0,048 TO 0,058 in.	14mm (1 in.) reach
3.2L	RC12PEC5	0.048 TO 0.053 in.	14 mm (3/4 in.) reach
3.5L	RC12PEC5	0.048 TO 0.053 in.	14 mm (3/4 in.) reach

INSTRUMENT PANEL SYSTEMS

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DESCRIPTION AND OPERATION

CIGAR LIGHTER/POWER OUTLET

DESCRIPTION

The power feed to the Cigar Lighter/Power Outlet can be HOT (12v - B+) with the ignition ON, or HOT (12v - B+) with the ignition OFF.

OPERATION

To change the operating mode of the Cigar Lighter/Power Outlet, refer to the SERVICE PROCEDURES, Cigar Lighter/Power Outlet in this section.

CLOCK

DESCRIPTION

The clock is of analog type, mounted in the instrument panel center air distribution bezel.

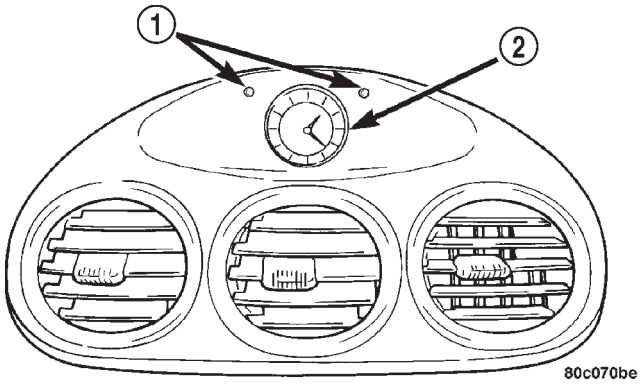


Fig. 1 Analog Clock

1 – SET BUTTONS
2 – ANALOG CLOCK

OPERATION

Refer to the Owner's Manual for setting instructions.

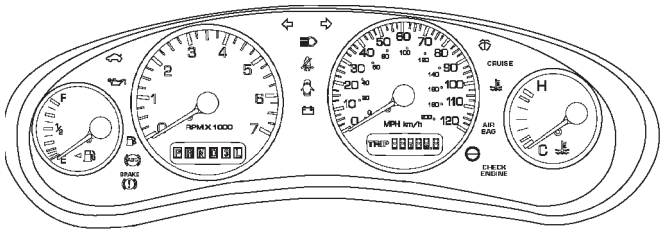
DESCRIPTION AND OPERATION (Continued)

ELECTRO–MECHANICAL INSTRUMENT CLUSTER

DESCRIPTION

The mechanical instrument cluster is an electro-mechanical module which receives most of its information via the Programmable Communication Interface (PCI) bus.

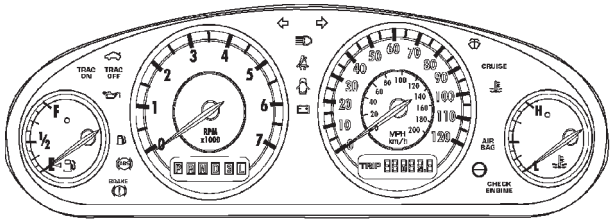
There are three types of clusters.



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Fig. 2 Cluster – Intrepid/Concorde

The Instrument Cluster for the Intrepid and Concorde are almost identical. The gauge and warning lamp location and functionality are identical. The difference being, the Intrepid has white gauges with black numbers with black gauge rings, and the Concorde has black gauges with white numbers and chrome rings around the gauges.



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Fig. 3 Cluster – LHS / 300M

- Speedometer
- Tachometer
- Odometer/trip odometer
- Fuel gauge
- Temperature gauge
- Electronic transmission range

The warning and information indicators include the following:

- Check Engine
- Airbag
- Charging system
- Low oil pressure
- High temperature
- Low fuel
- Seat belt
- Cruise
- Brake/park brake
- High beam
- Turn signals
- Door Ajar
- Decklid Ajar
- ABS (optional)
- Traction Control Active (optional)
- Traction Control Off (optional)
- Low Washer Fluid

OPERATION

The gauges are the magnetic air-core type. When the ignition switch is OFF, the gauge pointers should rest at or below the low graduation.

DIAGNOSIS AND TESTING

CLUSTER DIAGNOSTIC PROCEDURE

As a quick diagnosis, the cluster will perform a functional check of the odometer display, transmission range display and warning indicators after the ignition is switched to RUN/START. If the cluster is not receiving any PCI bus messages, the cluster will appear non-functional and “no bus” will appear in the odometer display.

A self-test of the cluster can also be initiated by pressing and holding the odometer reset button and switching the ignition from lock to unlock. The cluster will then step through several displays for functional verification.

If the cluster is not functioning properly, refer to the proper Body Diagnostic Procedures Manual.

If the cluster is not receiving PCI bus messages, refer to the pre-diagnostic test described in Body Diagnostic Procedures Manual.

In order to diagnose the instrument cluster functions, a DRB lll® scan tool and the proper Body Diagnostic Procedures Manual are required.

If the diagnostic procedure determines that a replacement of an instrument cluster component is required, refer to Cluster and Bezel Removal and Installation in this section.

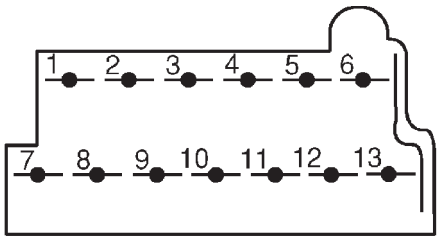
HEADLAMP SWITCH

Using an ohmmeter, test for resistance values between the terminals of the switch as shown in the Headlamp Switch Resistance table and (Fig. 4).

DIAGNOSIS AND TESTING (Continued)

HEADLAMP SWITCH RESISTANCE

POSITION	TERMINALS	RESISTANCE VALUES
OFF	6 & 12	3600 Ω - 5400 Ω
PARK LAMP ON	6 & 12	44.65 Ω - 49.35 Ω
PARK LAMP W/FRONT FOG	6 & 12	64.6 Ω - 71.4 Ω
HEADLAMP ON	6 & 12	209.2 Ω - 231 Ω
HEADLAMP W/FRONT FOG	6 & 12	446.5 Ω - 493.5 Ω
AUTO	6 & 12	370.5 Ω - 409.5 Ω
AUTO WFRONT FOG	6 & 12	1251 Ω - 1529 Ω
RHEOSTAT (THUMBWHEEL) DIM POSITION	6 & 3	180 Ω - 1870 Ω (POT)
RHEOSTAT (THUMBWHEEL) BRIGHT POSITION (FUNERAL MODE)	6 & 3	2280 Ω - 2520 Ω
DOME LAMP	6 & 3	3230 Ω - 3570 Ω



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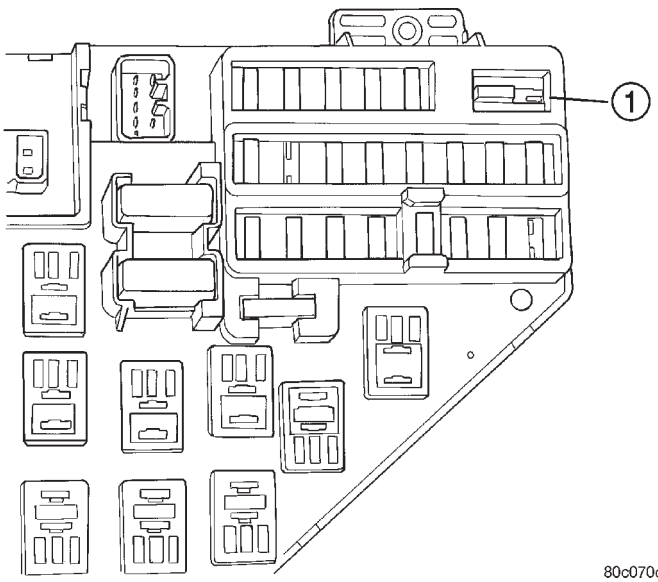
Fig. 4 Headlamp Switch Connector

SERVICE PROCEDURES

CIGAR LIGHTER/POWER OUTLET CUSTOMER PREFERENCE

This vehicle was delivered with the Cigar Lighter/ Power Outlet activated only when the ignition is ON. To convert the lighter/outlet to operate with the ignition OFF, perform the following:

- Remove the left instrument panel end cap from the left end of the instrument panel.
- Remove fuse #6 in the upper right of the junction block (Fig. 5) from its "IGN" position.



80c070c2

Fig. 5 Cigar Lighter/Power Outlet Customer Preference Fuse Location

1 – FUSE #6

- Move the fuse slightly right and insert it in the fuse #6 "BAT" location in the junction block.
- Reinstall the left instrument panel end cap.

CAUTION:

- **Many accessories that can be plugged in draw power from the vehicle's battery, even when not in use (i.e. cellular phones, etc.). Eventually, if plugged in long enough, the vehicle's battery will discharge sufficiently to degrade battery life and/or prevent engine starting.**
- **Accessories that draw higher power (i.e. coolers, vacuum cleaners, lights, etc.), will degrade the battery even more quickly. Only use these intermittently and with greater caution.**
- **After the use of high power draw accessories, or long periods of the vehicle not being started (with accessories still plugged in), the vehicle must be driven a sufficient length of time to allow the generator to recharge the vehicle's battery.**

REMOVAL AND INSTALLATION

ATC IN-CAR TEMPERATURE SENSOR

The In-car Temperature Sensor is part of the ATC Control Head and not a separate service part. If defective, the complete ATC head must be replaced.

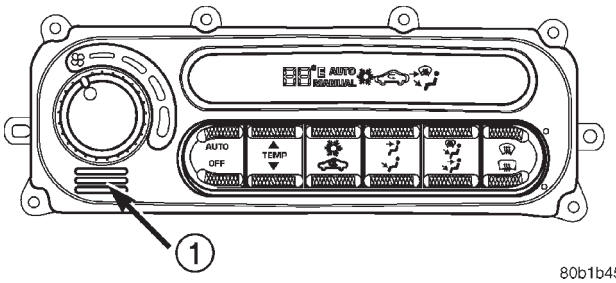


Fig. 6 ATC In-Car Temperature Sensor

1 – ATC IN-CAR TEMPERATURE SENSOR

ATC SUN SENSOR

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove the instrument upper/top cover. Refer to Instrument Panel Upper/Top Cover Removal and Installation in this section, (Fig. 8), (Fig. 9) and (Fig. 10).

(3) Remove the two sun sensor mounting screws.

(4) Disconnect the wire connector and remove the sensor (Fig. 7).

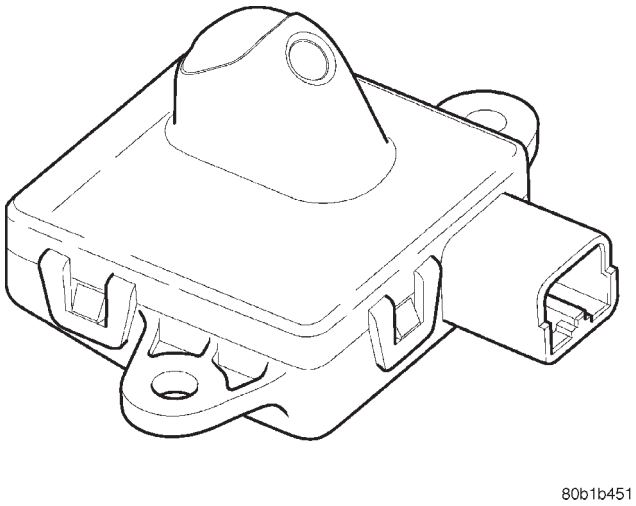


Fig. 7 ATC Sun Sensor

INSTALLATION

For installation, reverse the above procedures

REMOVAL AND INSTALLATION (Continued)

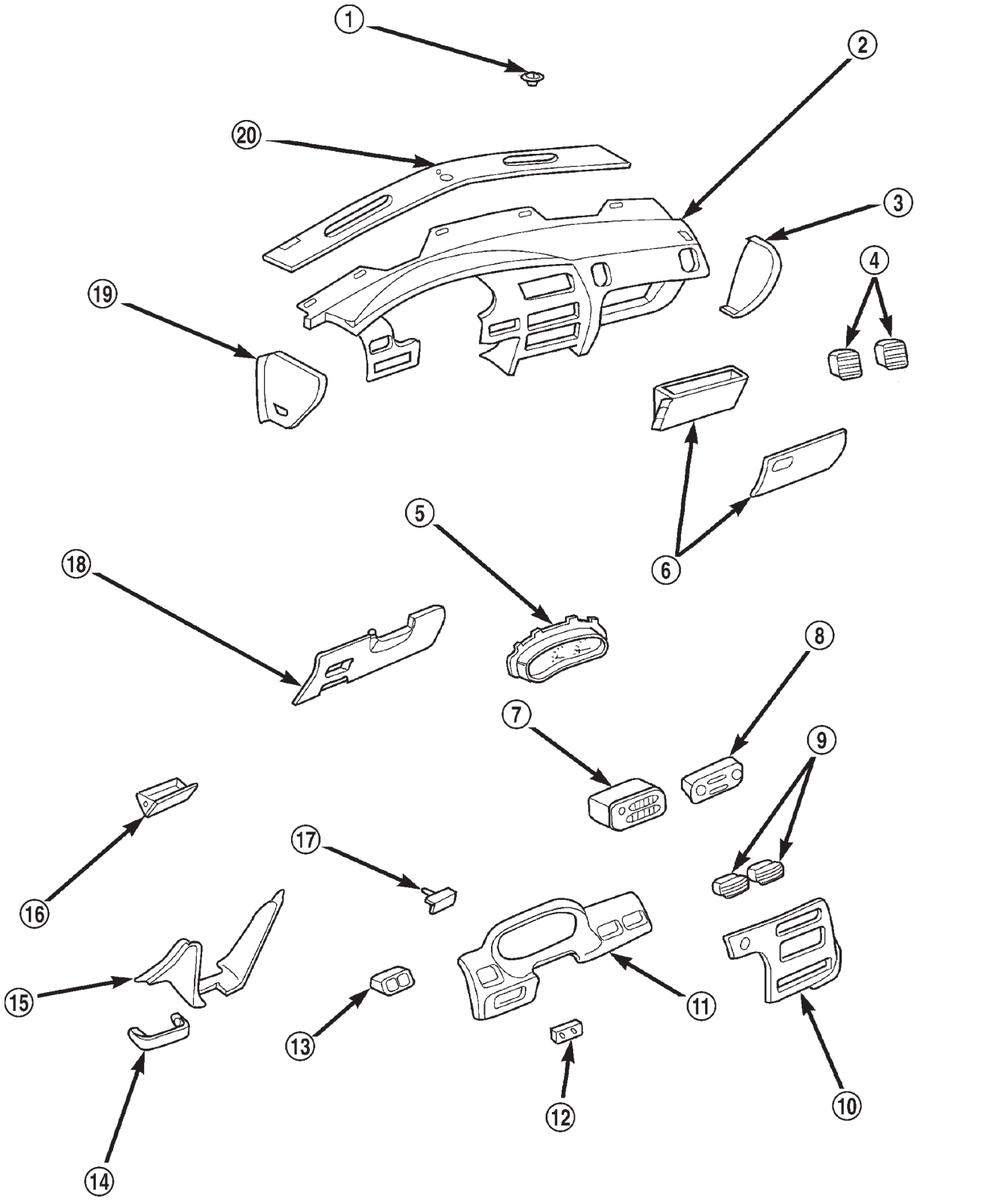


Fig. 8 Instrument Panel Components – Intrepid

REMOVAL AND INSTALLATION (Continued)

1 – SPEAKER, INSTRUMENT PANEL CENTER
2 – INSTRUMENT PANEL ASSEMBLY
3 – BEZEL, INSTRUMENT PANEL END CAP
4 – LOUVER, AIR OUTLET
5 – HOUSING INSTRUMENT CLUSTER
6 – GLOVE BOX ASSEMBLY
7 – RADIO
8 – CONTROL ASSEMBLY, INSTRUMENT PANEL
9 – LOUVER, AIR OUTLET
10 – BEZEL, INSTRUMENT PANEL TRIM-CENTER
11 – BEZEL INSTRUMENT CLUSTER
12 – SWITCH HEADLAMP
13 – LOUVER, AIR OUTLET
14 – COVER, INSTRUMENT PANEL CENTER SUPPORT/BIN (6 PASS. ONLY)
15 – 6 PASS. ONLY
16 – ASH RECEIVER
17 – LEVER, PARKING BRAKE
18 – COVER, LOWER INSTRUMENT PANEL
19 – BEZEL, INSTRUMENT PANEL END CAP
20 – COVER, UPPER INSTRUMENT PANEL

REMOVAL AND INSTALLATION (Continued)

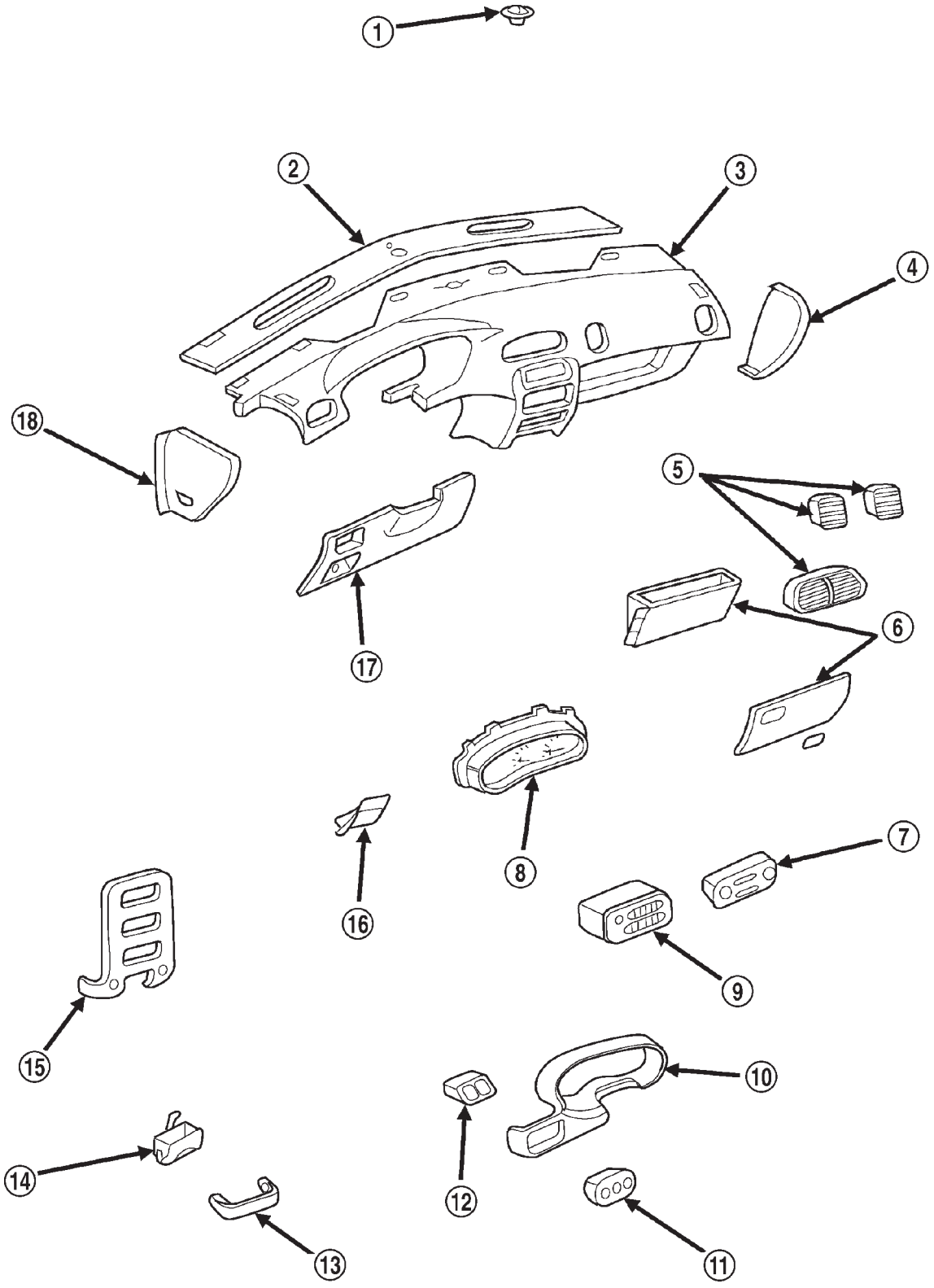


Fig. 9 Instrument Panel Components – Concorde

REMOVAL AND INSTALLATION (Continued)

1 – SPEAKER, INSTRUMENT PANEL CENTER
2 – COVER, UPPER INSTRUMENT PANEL
3 – INSTRUMENT PANEL ASSEMBLY
4 – BEZEL, INSTRUMENT PANEL END CAP
5 – LOUVER, AIR OUTLET
6 – GLOVE BOX ASSEMBLY
7 – CONTROL ASSEMBLY, INSTRUMENT PANEL
8 – HOUSING, INSTRUMENT CLUSTER
9 – RADIO
10 – BEZEL, INSTRUMENT CLUSTER
11 – SWITCH, HEADLAMP
12 – LOUVER, AIR OUTLET
13 – COVER, INSTRUMENT PANEL CENTER SUPPORT/BIN (6 PASS. ONLY)
14 – ASH RECEIVER
15 – BEZEL, INSTRUMENT PANEL TRIM-CENTER
16 – LEVER, PARKING BRAKE
17 – COVER, LOWER INSTRUMENT PANEL
18 – BEZEL, INSTRUMENT PANEL END CAP

REMOVAL AND INSTALLATION (Continued)

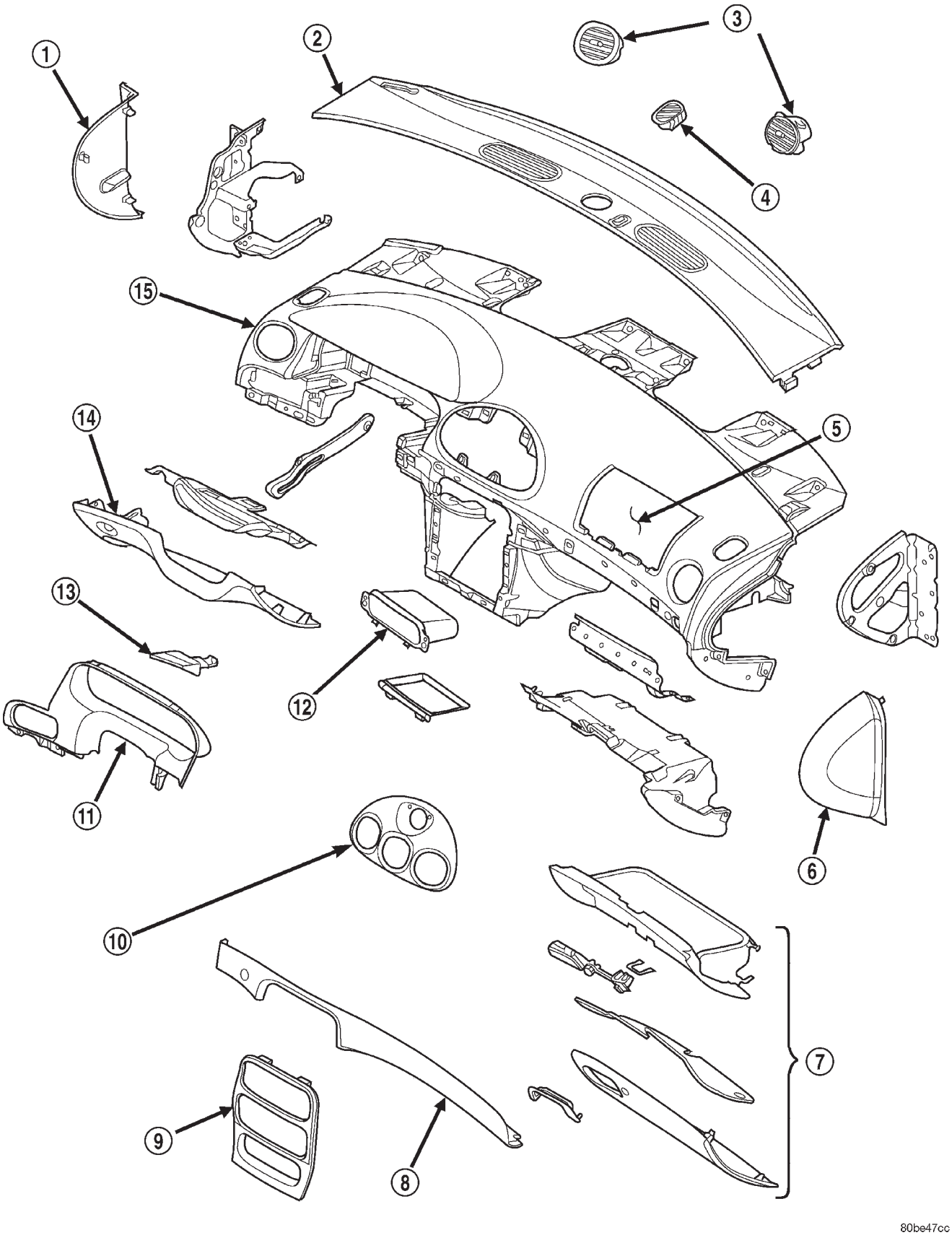


Fig. 10 Instrument Panel Components – LHS/300M

REMOVAL AND INSTALLATION (Continued)

1 – BEZEL, INSTRUMENT PANEL END CAP
2 – COVER, UPPER INSTRUMENT PANEL
3 – LOUVER, AIR OUTLET
4 – LOUVER/DEMISTER SIDE WINDOW
5 – MODULE, PASSENGER SIDE AIRBAG
6 – BEZEL, INSTRUMENT PANEL END CAP
7 – GLOVE BOX ASSEMBLY, INSTRUMENT PANEL
8 – BEZEL, INSTRUMENT PANEL UPPER RIGHT TRIM
9 – BEZEL, INSTRUMENT PANEL TRIM-CENTER
10 – BEZEL, INSTRUMENT PANEL AIR DISTRIBUTION OUTLET
11 – BEZEL, INSTRUMENT CLUSTER
12 – STORAGE COMPARTMENT CUBBY BOX
13 – LEVER, PARKING BRAKE
14 – COVER, LOWER INSTRUMENT PANEL-LEFT SIDE
15 – INSTRUMENT PANEL ASSEMBLY

BODY CONTROL MODULE (BCM)

REMOVAL

(1) With the Junction Block/BCM removed from the vehicle, refer to Group 8O, Power Distribution Systems for Removal and Installation.

(2) Remove the four BCM attaching screws from the Junction Block.

(3) Disconnect BCM from the Junction Block.

NOTE: The Remote Keyless Entry (RKE) module is attached to the BCM with three screws. This must be transferred (if equipped) to the new BCM.

NOTE: If the BCM is replaced, the Vehicle Theft / Security System (VTSS (if equipped) must be enabled in the new BCM via the DRB III® in order to start the vehicle.

INSTALLATION

For installation, reverse the above procedures.

Ensure that the wire terminals and connectors are in good condition and connectors are properly installed when reinstalling Junction Block / BCM.

BRAKE LAMP/SPEED CONTROL CUTOUT SWITCH

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove the left under instrument panel silencer/duct.

(3) Twist and pull the switch assembly rearward from the brake bracket. After switch is free disconnect the wire connector and remove switch.

INSTALLATION

For installation, reverse the above procedures.

CIGAR LIGHTER/POWER OUTLET ASSEMBLY

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Look inside and note position of the retaining bosses (Fig. 11).

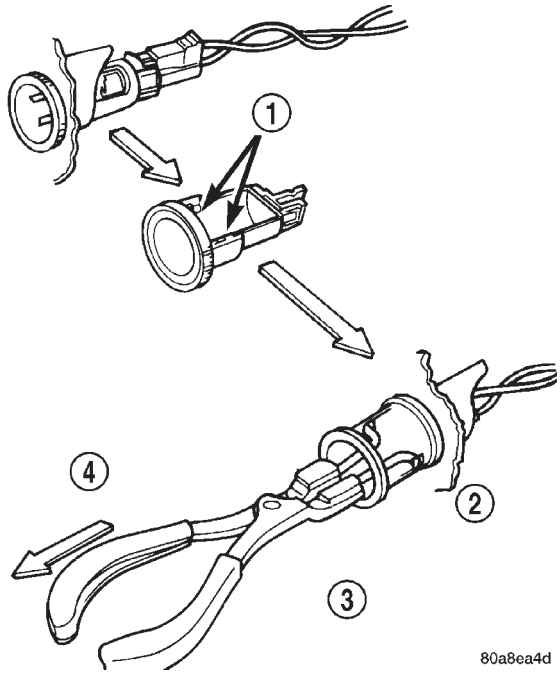


Fig. 11 Cigar Lighter / Power Outlet Base Removal

1 – RETAINING BOSSES-ENGAGE PLIERS HERE
2 – PARTIALLY REMOVED
3 – EXTERNAL SNAP-RING PLIERS
4 – PULL BASE OUT-THROUGH MOUNTING RING

(3) Using external snap ring pliers with 90 degree tips. Insert pliers with tips against bosses and squeeze forcing bosses out of base.

(4) Pull out the base through mounting ring by gently rocking pliers. A tool can be made to do the same. Refer to (Fig. 12).

(5) Disconnect the base wires.

(6) Set base aside and remove base mount ring.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position mount ring to the instrument panel and feed the wires through ring. Index the cap and the mount ring with the index tab at 9 o'clock to the key in the instrument panel. Install the ring.

(2) Connect wires to base. Orient base alignment rib at 11 o'clock to mate the groove in mount ring at the same location

(3) Push base into the bezel till it locks.

(4) Install cigar lighter cap and check operation of element.

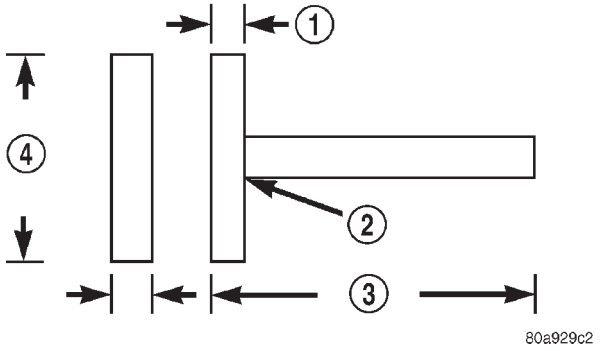


Fig. 12 Tool For Cigar Lighter / Power Outlet Removal

1 – 2.5MM (3/32 INS.)
2 – WELD
3 – 100MM (4 INS.)
4 – 22.25 TO 22.45MM (7/8 TO 57/64 INS.)

CLOCK

REMOVAL

(1) Open hood.

(2) Disconnect and isolate the negative battery remote cable.

(3) Using a trim stick (special tool #C-4755), gently pry out instrument panel air distribution outlet bezel that retains the analog clock.

(4) Disconnect the one wire connector to the clock.

(5) Remove bezel from vehicle.

(6) On the bench, remove two retaining screws to analog clock and remove from bezel (Fig. 13).

INSTALLATION

For installation, reverse the above procedures.

CLUSTER AND BEZEL

REMOVAL

To service any instrument cluster component, the instrument cluster must be removed from the instrument panel. Use the following procedure:

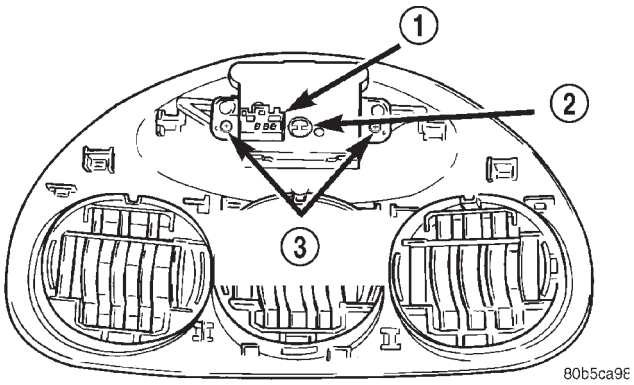


Fig. 13 Analog Clock Removal

1 – WIRE HARNESS CONNECTOR
2 – CLOCK LAMP
3 – RETAINING SCREWS

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove the instrument panel left end cap.

(3) Remove steering column shroud cover.

(4) Tilt the steering column down into the lowest position.

(5) Remove one screw (LHS / 300M) to cluster bezel

(6) Remove the items to expose bezel mounting screws. Items vary depending on model.

(7) Remove two screws over upper cluster bezel in instrument panel brow area and all remaining attaching screws (four on Intrepid, LHS, and 300M, and five on Concorde).

(8) Using a trim stick (special tool #C-4755), gently pry out on the instrument panel cluster bezel, disconnect headlamp switch connector, and remove.

(9) Remove the instrument cluster screws.

NOTE: Tilt steering wheel down to gain access for instrument cluster removal.

(10) Remove the instrument cluster from panel. The instrument panel wiring harness connectors are self-aligning, mounted directly to the rear panel. A force of approximately 9 kilograms (30 lbs.) will be required to disengage the cluster from the connectors and upper clips. In the lower corners of the cluster housing, tabs have been provided so that a "hook" type device can be used to aid in removal.

INSTALLATION

For installation, reverse the above procedures.

CLUSTER LAMPS

To service instrument cluster lamps, the cluster must be removed from the instrument panel. Refer to

REMOVAL AND INSTALLATION (Continued)

Cluster and Bezel Removal and Installation in this section.

Refer to (Fig. 14), (Fig. 15), and (Fig. 16) for cluster lamp locations.

The lamps that are replaceable are called out on the back cover of the instrument cluster. All other indicators are Light Emitting Diodes (LED's), and are serviced with the cluster assembly. If a LED is non-functional, the entire instrument cluster must be replaced. Refer to the INDICATORS – BULBS table for applications.

INDICATORS – BULBS

INDICATOR	COLOR	BULB # / LED
BATTERY	RED	LED
BRAKE	RED	LED
AIRBAG	RED	LED
LOW OIL	RED	LED
SEATBELT	RED	LED
TEMPERATURE	RED	LED
DOOR AJAR	RED	LED
DECKLID AJAR	RED	LED
HIGH BEAM	BLUE	74
TURN SIGNALS	GREEN	194
CRUISE	GREEN	74
TRAC ON	GREEN	74
TRAC OFF	AMBER	LED
CHECK ENGINE	AMBER	LED
ABS	AMBER	LED
LOW FUEL	AMBER	LED
LOW WASHER FLUID	AMBER	LED
ILLUMINATION	BLUEGREEN	194

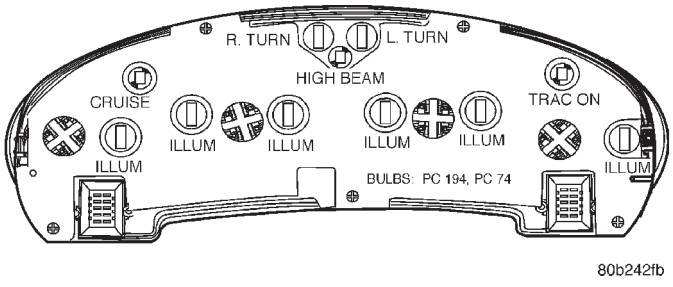


Fig. 14 Cluster lamps – Intrepid

CLUSTER MASK/LENS

The instrument cluster must be removed for mask/lens service. Refer to Instrument Cluster and Bezel Removal and Installation in this section.

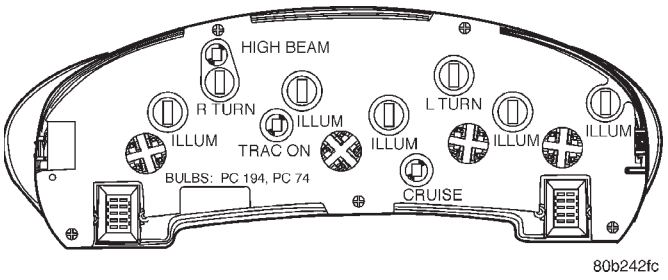


Fig. 15 Cluster lamps – Concorde

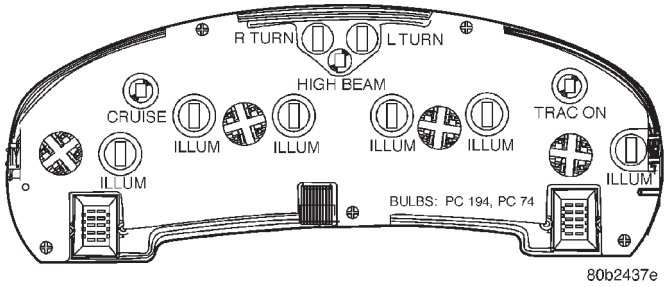


Fig. 16 Cluster Lamps – LHS / 300M

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove instrument cluster from vehicle. Refer to procedures in this section.

(3) Remove two screws to mask/lens (Fig. 17).

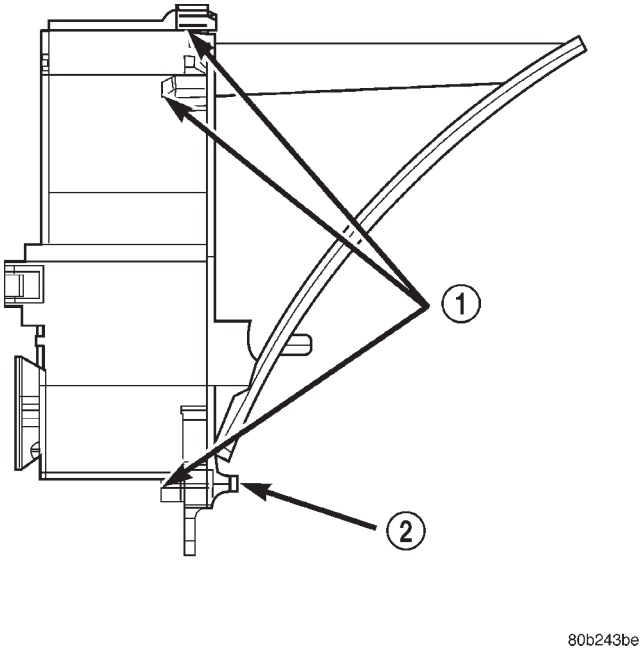


Fig. 17 Instrument Cluster Mask/Lens Retaining Screws

1 – MASK/LENS RETAINING TABS
2 – RETAINING SCREWS

REMOVAL AND INSTALLATION (Continued)

(4) Unsnap seven retaining tabs holding mask/lens to cluster housing (Fig. 18).

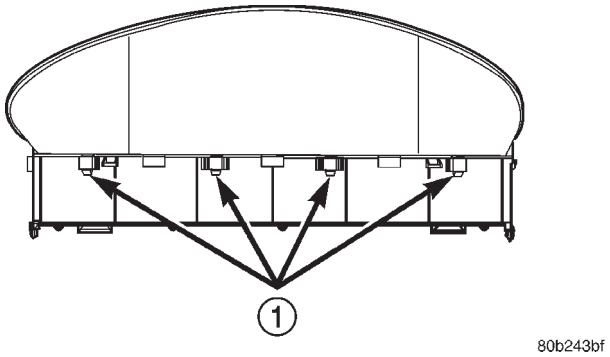


Fig. 18 Instrument Cluster Mask/Lens Retaining Tabs – Top

1 – MASK/LENS RETAINING TABS

(5) Separate mask/lens from instrument cluster and remove.

INSTALLATION

For installation, reverse the above procedures.

COMBINATION FLASHER

The combination flasher is located on the left side of the instrument panel, underneath, between the junction block and the brake pedal.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

NOTE: It may be necessary to remove the left side lower instrument panel cover to gain access to Combination Flasher.

(2) Slide the Combination Flasher rearward to remove from the electrical bracket.

INSTALLATION

For installation, reverse the above procedures.

CUBBY BIN/STORAGE COMPARTMENT

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove ash receiver (if applicable).

(3) Using a trim stick (special tool #C-4755), gently pry out on center trim bezel. Disconnect wiring connectors to HVAC controls, cigar lighter/auxiliary power outlet and traction control switch.

(4) Remove instrument panel center trim bezel.

(5) Remove two retaining screws to cubby bin and remove.

INSTALLATION

For installation, reverse the above procedures

DECKLID RELEASE SWITCH

REMOVE

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove left instrument panel endcap. Refer to Removal and Installation procedures in this section.

(3) Remove left lower instrument panel cover. Refer to Instrument Panel and Pad Assembly Removal and Installation procedures in this section.

(4) Pinch four tabs around side of decklid release switch on the rear side of the left lower instrument panel cover, and push switch through opening.

INSTALLATION

For installation, reverse the above procedures.

GLOVE BOX DOOR/HANDLE

REMOVAL

(1) Remove the four screws at bottom of glove box door.

(2) Open the glove box door and slide sidewalls inboard to remove the door/box assembly from instrument panel.

(3) Place the glove box on a cloth to protect the door surface.

(4) Remove the nine screws from backside of the door.

(5) Separate the inner and outer door.

(6) Remove one screw to the handle and latch.

(7) Remove handle and latch from outer door.

NOTE: If the glove box door is going to be left off for an extended period of time, the Ignition Off Draw (IOD) fuse should be pulled to maintain battery condition.

INSTALLATION

For installation, reverse the above procedures.

GLOVE BOX LAMP/SWITCH ASSEMBLY

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

REMOVAL AND INSTALLATION (Continued)

(2) Open the glove box door, and pull out the glove box lamp/switch assembly from upper right hand corner of opening (Fig. 19).

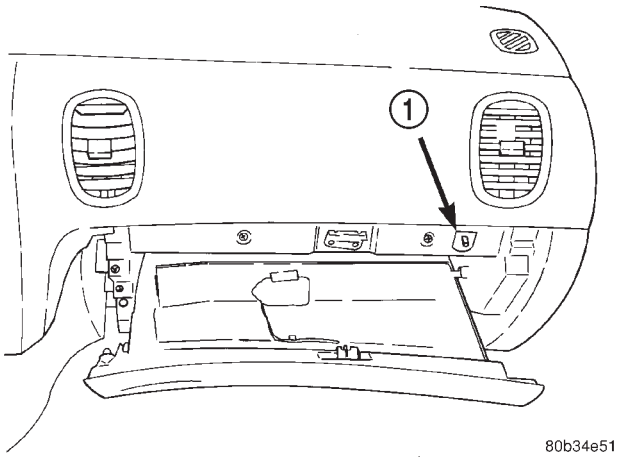


Fig. 19 Glove Box Lamp/Switch

1 – GLOVE BOX LAMP

(3) Replace the lamp if necessary.

(4) To replace the lamp/switch assembly, disconnect the wire connector.

(5) Remove the lamp/switch assembly.

INSTALLATION

For installation, reverse the above procedures.

HEADLAMP SWITCH

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove the left end cover, left instrument panel trim cover, and the cluster bezel. Refer to the various Removal and Installation procedures in this section.

(3) Remove the three screws retaining headlamp switch to cluster bezel.

(4) Remove headlamp switch from bezel.

INSTALLATION

For installation, reverse the above procedures. Twist out lamp sockets are serviceable at this time. Ensure that the switch is seated against the pad.

HEATER - A/C CONTROLS

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove the ash receiver assembly, if necessary.

(3) Remove the instrument panel center trim bezel and remove the two electrical connectors from the back of the control head and traction control switch (if equipped) (Fig. 20) and (Fig. 21).

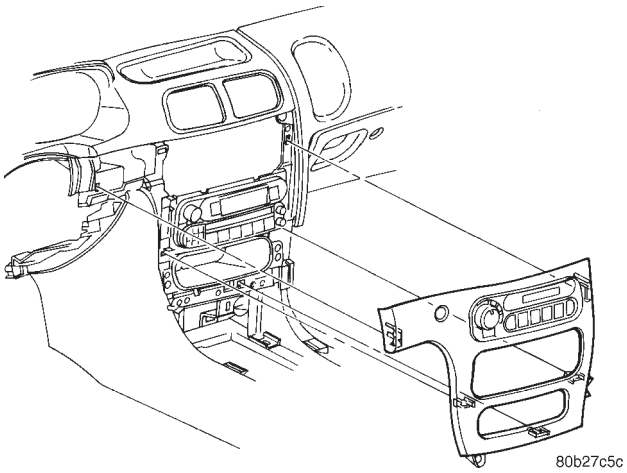


Fig. 20 Instrument Panel Center Trim Panel Removal

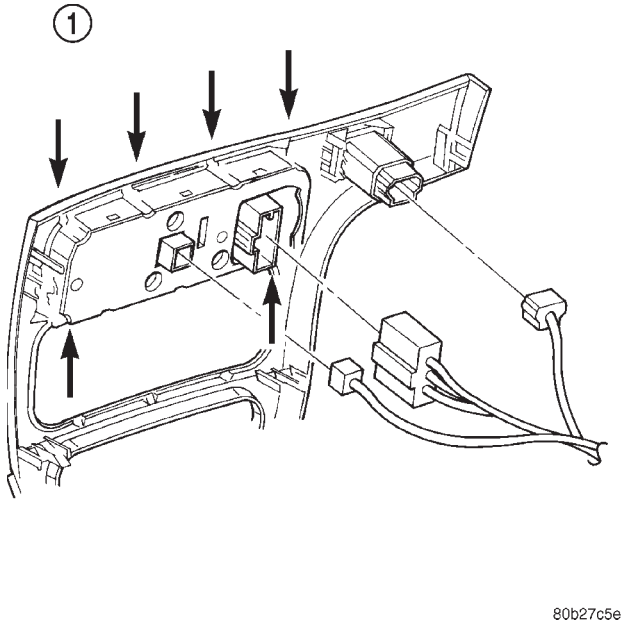


Fig. 21 Heater - A/C Control Head Removal

1 – RETAINING SCREWS

(4) From the back of the center trim bezel, remove the six retaining screws from the heater - a/c control head and remove from the bezel.

INSTALLATION

For installation, reverse the above procedures.

IN-DASH CD CHANGER

Refer to Group 8E-Instrument Panel Systems, In-Dash CD Changer Removal and Installation.

REMOVAL AND INSTALLATION (Continued)

INSTRUMENT PANEL AND PAD ASSEMBLY

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY AIRBAG SYSTEM COMPONENT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY. ALLOW SYSTEM CAPACITOR TO DISCHARGE FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG COMPONENTS.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

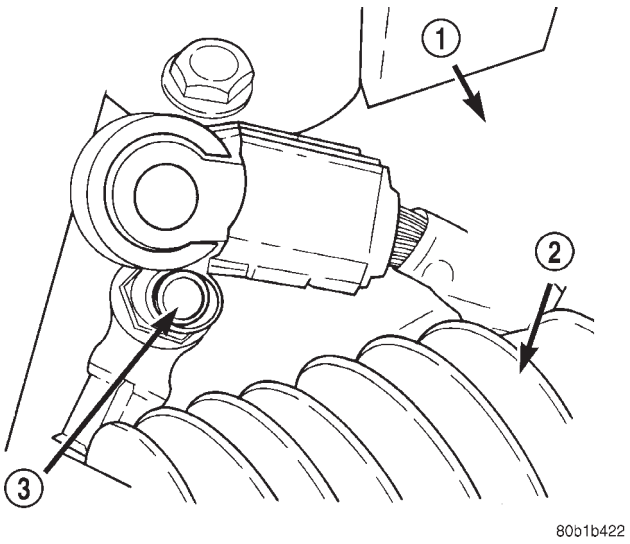


Fig. 22 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Remove one allen screw to shifter knob.

(3) Remove left and right instrument panel end covers.

NOTE: On LHS/300M vehicles, the center bezel must be removed prior to the shifter bezel.

(4) Using a trim stick (special tool #C-4755), gently pry up on shifter bezel, disconnect two wire connectors, one illumination bulb socket and remove.

(5) Remove two screws from lower instrument panel cover (outside end) and disconnect decklid release switch wiring connector. Pull rearward on lower instrument panel cover releasing clips. Remove cable to brake release handle. Pull rearward and remove cover from vehicle.

(6) On six passenger vehicles, remove the lower floor bin and proceed with Step 12.

(7) On five passenger vehicles, use trim stick to gently remove center bezel. Disconnect wire harnesses connected to hvac control and traction control switch.

(8) Remove bezel from vehicle.

(9) Remove two screws to left console side cover, pull outboard and remove from vehicle.

(10) Lower glove box door. Remove two screws to right console side cover, pull outboard and remove from vehicle

(11) Remove two front bracket screws and two screws inside console bin to remove console.

(12) Remove two nuts attaching center lower instrument panel.

(13) Remove four bolts to steel reinforcement from bottom of lower instrument panel cover and disconnect 16-way Diagnostic Link Connector (DLC) from steel reinforcement.

(14) Remove one screw to left floor duct/silencer pad and remove from vehicle.

(15) Remove steering column from vehicle.

(a) Remove column shrouds.

(b) Disconnect shift interlock cable at ignition switch.

(c) Disconnect column wiring.

(d) Disconnect under column duct section and remove from vehicle.

(e) Disconnect and remove left panel A/C outlet duct.

(f) Remove four column mounting bolts at brake pedal support bracket.

(g) Lower steering column to floor.

(16) Disconnect two harness connectors to the hvac housing, the Airbag Control Module (ACM) and two ground eyelets left of the floor tunnel near the bulkhead.

(17) Using a trim stick, gently pry out on the left and right A-pillar trim moldings, and slide rearward to remove.

(18) Using a trim stick, gently pry up on the instrument panel top cover and remove toward the rear of vehicle.

(19) Remove one screw retaining each left and right scuff plate. Using a trim stick, gently pry out on left and right scuff plates and remove from vehicle.

(20) Remove three screws to right side cowl panel and remove from vehicle.

(21) Remove three screws to left side cowl panel and remove from vehicle.

(22) Remove right side under dash silencer/pad.

(23) Disconnect the two right side harness connectors to radio antenna and amplifier DIN cable.

REMOVAL AND INSTALLATION (Continued)

(24) Disconnect the left side harness connectors to junction block and Body Control Module (BCM).

(25) Remove eight remaining instrument panel retaining screws to body.

(26) Pull rearward on instrument panel.

(27) Make sure that all harnesses are free and clear from snagging.

(28) With the help of an assistant, remove instrument panel from vehicle and place on bench.

(29) If replacing instrument panel and pad assembly, transfer all parts to new assembly.

INSTALLATION

For installation, reverse the above procedures.

INSTRUMENT PANEL END COVERS - LEFT AND RIGHT

REMOVAL

(1) Open the left door and pull on the access handle to disengage the end cover clips. Fuse diagram is located inside the left end cover. Fuse Access is under the left end cover.

(2) Open the right door and remove the right end cover by inserting a trim stick (special tool #C-4755), between cap and instrument panel to disengage clips.

INSTALLATION

For installation, reverse the above procedures. Remove the weather-strip locally from door opening flange before installing end cover.

INSTRUMENT PANEL FLOOR BIN

REMOVAL

(1) Remove one screw and one push pin to the lower instrument panel.

(2) Pull rearward and remove the floor bin.

INSTALLATION

For installation, reverse the above procedures.

INSTRUMENT PANEL CENTER TRIM BEZEL

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove ash receiver (if applicable).

(3) Using a trim stick (special tool #C-4755), gently pry out on center trim bezel. Disconnect wiring connectors to HVAC controls, cigar lighter/auxiliary power outlet and traction control switch.

(4) Remove instrument panel center trim bezel.

NOTE: The traction control switch, HVAC control head and cigar lighter/auxiliary power outlet must be transferred to new bezel if being replaced.

INSTALLATION

For installation, reverse the above procedures

INSTRUMENT PANEL SILENCER / DUCT

REMOVAL

(1) Remove the retaining screw to the instrument panel.

(2) Maneuver part and bracket off of the center floor distribution duct.

(3) Remove the silencer / duct.

INSTALLATION

For installation, reverse the above procedures.

INSTRUMENT PANEL UPPER/TOP COVER

REMOVAL

(1) Using a trim stick (special tool #C-4755), pry out the left and right a-pillar moldings, slide rearward and remove.

(2) Using a trim stick, pry out the left and right a-pillar moldings, slip each end of the top cover disengaging clips.

(3) Lift rear edge of the upper/top cover using a trim stick along the rear edge of the upper/top cover.

(4) Slide upper/top cover rearward to disengaging the eight clips.

(5) Remove the upper/top cover from vehicle.

INSTALLATION

For installation, reverse the above procedures.

ODOMETER

The instrument cluster must be removed for Odometer service. Refer to Instrument Cluster Removal and Installation procedures.

On Intrepid, Concorde, LHS, and 300M models, the odometer and PRNDL are one assembly retained by three screws.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove instrument cluster from vehicle. Refer to Instrument Cluster Removal and Installation in this section.

(3) Remove five cluster back cover retaining screws and remove the cover.

(4) Unplug connectors from printed circuit board.

REMOVAL AND INSTALLATION (Continued)

(5) Remove cluster mask/lens from instrument cluster. Refer to Mask/Lens Removal and Installation in this section.

(6) Remove two screws to Vacuum Fluorescent (VF) display Odometer and remove from cluster.

INSTALLATION

For installation, reverse the above procedures.

RADIO

Refer to Group 8F, Audio System for the proper radio removal and installation procedures.

REMOTE KEYLESS ENTRY (RKE) MODULE

Refer to Group 8P, Power Door Locks for Remote Keyless Entry Module Removal and Installation procedures.

TRACTION CONTROL SWITCH

The traction control switch in located in the upper right trim bezel on the instrument panel. The upper right trim bezel must be removed to service the switch. Refer to Upper Right Trim Bezel Removal and Installation in this section.

REMOVAL

(1) With the bezel removed, press the tabs in at both sides of the switch and remove the switch from the bezel.

INSTALLATION

For installation, reverse the above procedures. Check the switch for proper operation.

TRIP RESET KNOB

The instrument cluster must be removed for Trip Reset Knob service. Refer to Instrument Cluster and Bezel Removal and Installation in this section.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Remove instrument cluster from vehicle. Refer to procedures in this section.

(3) Remove five cluster back cover retaining screws and remove the cover.

(4) Remove nine screws to Printed Circuit Board and remove.

(5) Gently pull Trip Reset Knob from the instrument cluster housing and remove.

INSTALLATION

For installation, reverse the above procedures.

UPPER RIGHT TRIM BEZEL (LHS / 300M)

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 22).

(2) Using a trim stick (special tool #C-4755), gently pry out on center instrument panel bezel.

(3) Open glove box and remove four screws along bottom edge of trim bezel.

(4) Remove one screw in center bezel area.

(5) Loosen the lower right edge of steering column cover, then loosen upper right corner of steering column cover.

(6) Using a trim stick, gently pry bezel away from the instrument panel and disconnect the traction control switch connector.

(7) Remove upper right trim bezel from vehicle.

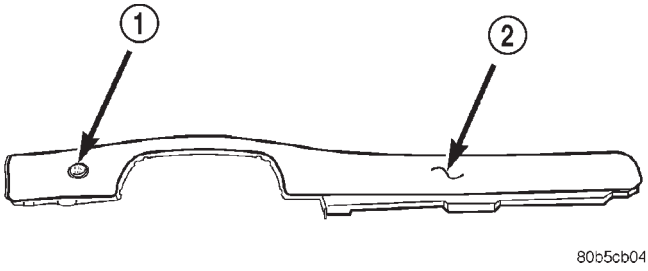


Fig. 23 Upper Right Trim Bezel

1 – TRACTION CONTROL SWITCH
2 – UPPER RIGHT TRIM BEZEL

INSTALLATION

(1) For installation, reverse the above procedures.

INSTRUMENT PANEL AND SYSTEMS

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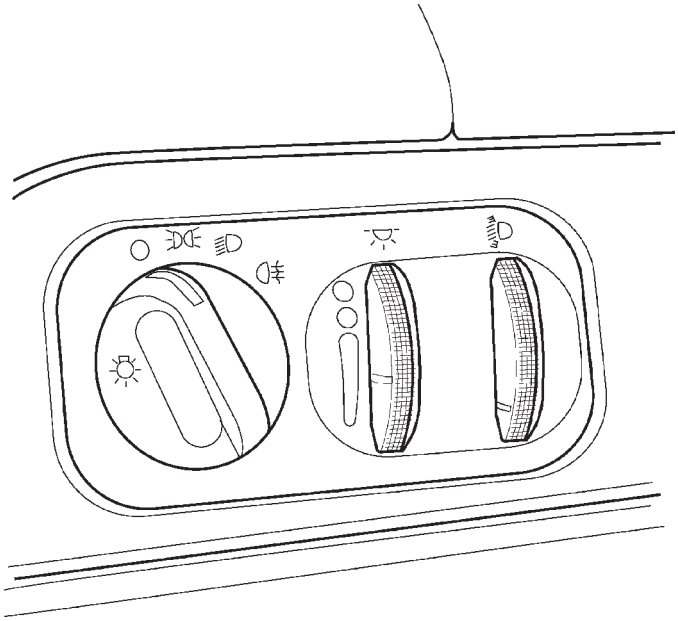
DESCRIPTION AND OPERATION

HEADLAMP LEVELING SYSTEM

Some vehicles are equipped with a remote headlamp leveling system. This system allows the driver to adjust the vertical headlamp aim from the interior of the vehicle to compensate for passenger or cargo load. A headlamp leveling switch is located on the instrument panel and controls the headlamp leveling motor found on the back of the headlamp module. Refer to Group 8W, Wiring Diagrams for a detailed schematic.

HEADLAMP LEVELING SWITCH

DESCRIPTION



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Fig. 1 Headlamp Leveling Switch

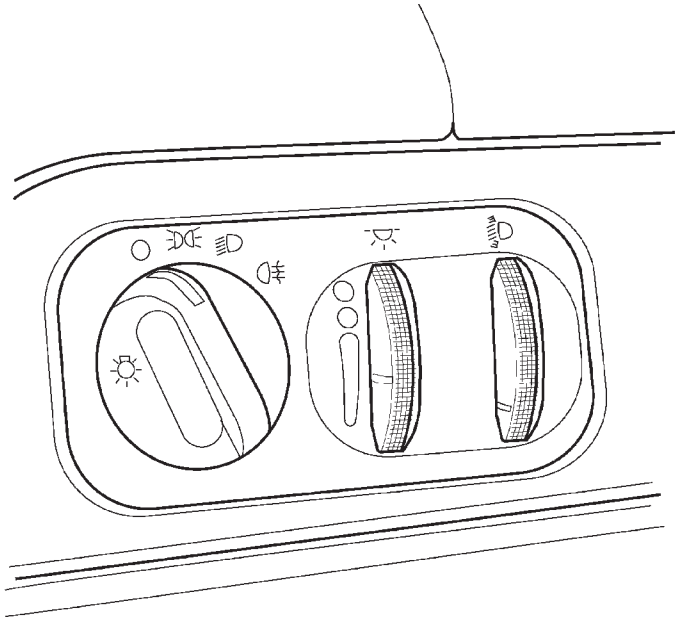
The headlamp leveling switch controls the headlamp leveling motor. This switch is located on the instrument panel, integral with the headlamp switch. If this switch fails the entire headlamp switch must be replaced.

OPERATION

The headlamp leveling switch allows remote adjustment of the vertical aim of the headlamps. By rotating this switch upward the headlamp beam concentration will rise, by rotating downward the beam concentration will decline.

REAR FOG LAMP SWITCH

DESCRIPTION



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Fig. 2 LH Headlamp Switch

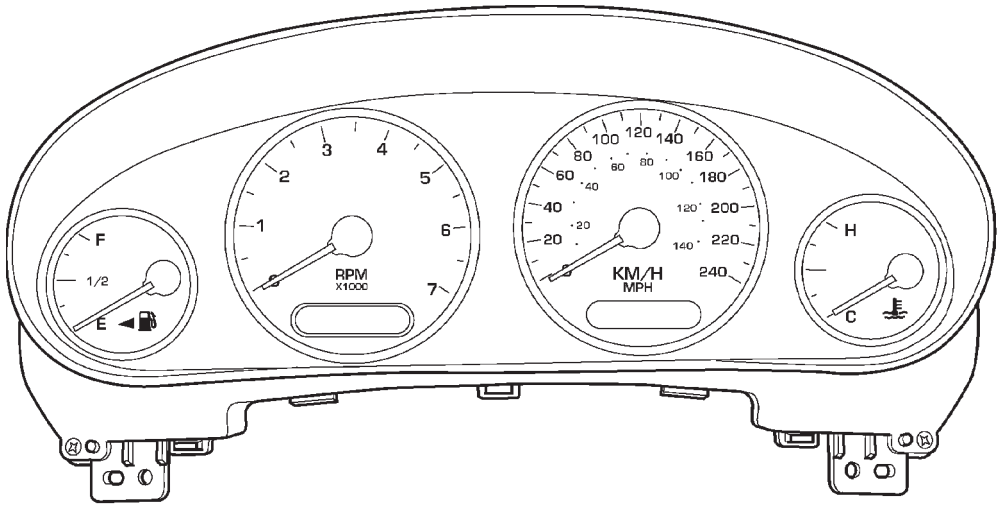
The rear fog lamp switch controls the rear fog lamps of the vehicle. This switch is integrated in the headlamp switch. If this switch fails the entire headlamp switch must be replaced.

OPERATION

When the headlamp switch is rotated to the full right position the rear fog lamps will illuminate from the rear of the vehicle.

DESCRIPTION AND OPERATION (Continued)

INSTRUMENT CLUSTER



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Fig. 3 Electro - Mechanical Instrument Cluster

The instrument cluster used on LH vehicles is an electro - mechanical module which receives most of its information via the Programable Communication Interface (PCI) bus. The instrument cluster shown above (Fig. 3) operates in the same fashion as other LH instrument clusters, just uses kilometers instead of miles per hour graduations for vehicle speed. For any service information refer to Group 8E, Instrument Panel Systems.

REMOVAL AND INSTALLATION

HEADLAMP LEVELING SWITCH

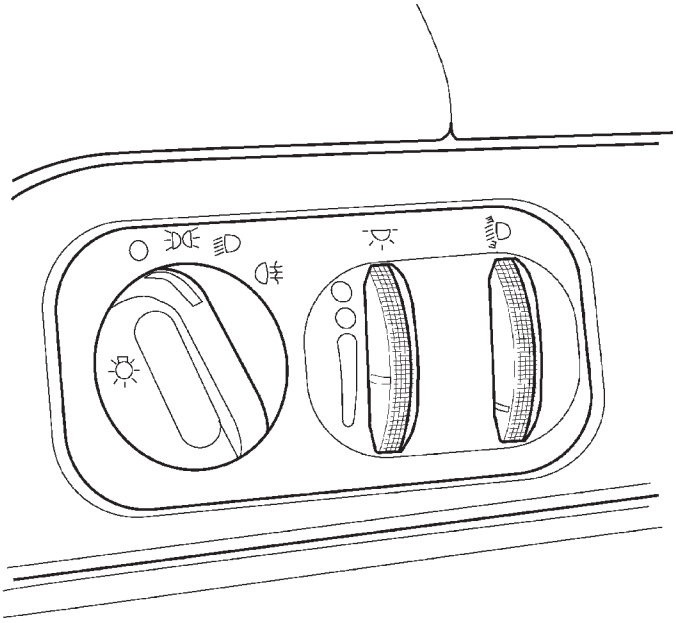
The headlamp leveling switch is integrated into the headlamp switch on LH vehicles. If the headlamp leveling switch fails the entire headlamp switch must be replaced.

REMOVAL

(1) Open the hood and disconnect the remote negative battery cable.

(2) Remove the left instrument panel end cover. Grasp the molded handle and pull outward to release the three retaining clips.

(3) Remove the lower left instrument panel cover. Remove the two cover retaining screws located on far left side of I. P. Pull cover straight away from I. P. to release retaining clips. Disconnect trunk release switch and parking brake handle and remove lower left instrument panel cover from the vehicle.



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Fig. 4 Headlamp (Leveling) Switch

(4) Remove center instrument panel trim bezel by gently prying out with trim stick (special tool # C-4755). Disconnect HVAC control head and remove trim bezel.

(5) Remove upper screws from cluster bezel, located just above gauges.

REMOVAL AND INSTALLATION (Continued)

(6) Open the glove box door and remove the four screws retaining the instrument panel upper right trim bezel.
(7) Remove the screw located directly above the HVAC control head opening retaining the instrument panel upper right trim bezel. Remove the instrument panel upper right trim bezel.
(8) Remove lower screws from the left and right sides of the cluster bezel.
(9) Pull the instrument cluster bezel away from I. P. and disconnect the headlamp (leveling) switch. Remove the bezel and switch from the vehicle.
(10) Remove the screws retaining the switch to the cluster bezel and remove switch.

INSTALLATION

(1) Install the screws retaining the switch to the cluster bezel.
(2) Connect the headlamp (leveling) switch. Position the bezel and switch on the I. P.
(3) Install the lower screws on the left and right sides of the cluster bezel.
(4) Install the screw located directly above the HVAC control head opening retaining the instrument panel upper right trim bezel.
(5) Install the four screws retaining the instrument panel upper right trim bezel and close the glove box door.
(6) Install the upper screws in cluster bezel, located just above gauges.
(7) Connect HVAC control head and install the center trim bezel.
(8) Connect trunk release switch and parking brake handle and install lower left instrument panel cover on the I. P.
(9) Install the left instrument panel end cover.
(10) Connect the remote negative battery cable.
(11) Verify switch operation.

REAR FOG LAMP SWITCH

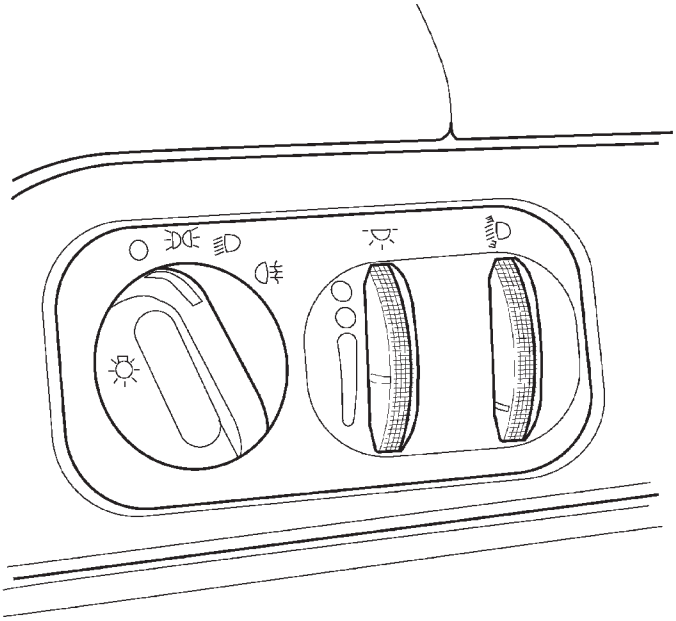


Fig. 5 Rear Fog Lamp (Headlamp) Switch

The rear fog lamp switch is integrated into the headlamp switch on LH vehicles. For a removal and installation procedure of the rear fog lamp switch refer to the Headlamp (Leveling) Switch removal and installation procedure in this group.

2000 LHS, 300M, CONCORDE AND INTREPID

AUDIO SYSTEMS

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DESCRIPTION AND OPERATION

AUDIO SYSTEMS

DESCRIPTION

There are four different system combinations available on the LH models. They are a Base, Midline, Infinity l, and Infinity ll system.

BASE SYSTEM

The Base System includes:

- AM-FM stereo radio with cassette player.
- Two 6.5 inch round, full-range speakers in the front doors.
- Two 6 x 9-inch, full-range speakers mounted in the rear shelf panel.

MIDLINE SYSTEM

The Midline System includes:

- AM-FM radio with cassette player.
- AM-FM stereo radio with CD/cassette.
- A compact 120 watt power amplifier with four output channels.
- Two 2.5 inch, round single-cone speakers in the lower front corners of the front door windows.
- Two 6.5 inch, round single-cone speakers in the front doors.
- Two 6 x 9-inch, coaxial speakers mounted in the rear shelf panel.

INFINITY I SYSTEM

The Infinity l System includes:

- AM-FM stereo radio with cassette player and 4 disc in-dash CD changer.
- AM-FM stereo radio with CD and cassette player.
- A 240 watt Infinity power amplifier with six output channels
- One 2.5 inch, round single-cone, spatial imaging speaker in the center of the instrument panel.
- Two 2.5 inch, coaxial speakers in the lower corners of the front door windows.
- Two 6.5 inch, round single-cone speakers in the front doors.
- Two 6 x 9-inch, single-cone speakers mounted in the rear shelf panel.

INFINITY II SYSTEM

The Infinity ll System includes:

- AM-FM stereo radio with cassette player and 4 disc in-dash CD changer.
- A 360 watt power amplifier with nine output channels, one for each speaker location.
- One 2.5 inch, round single-cone, spatial imaging speaker in the center of the instrument panel.
- Two 2.5 inch, coaxial speakers in the lower corners of the front door windows.
- Two 6.5 inch, round single-cone speakers in the front doors.
- Two 6 x 9-inch, single-cone speakers mounted in the rear shelf panel.
- Two 2.5 inch, round speakers mounted in the rear doors.

DESCRIPTION AND OPERATION (Continued)

OPERATION

For operation of the factory installed standard and optional radios with cassette or compact disc player, refer to the Sound Systems Operating Instructions in the Owners Manual supplied with the vehicle.

The vehicles are shipped with fuse 13 removed from the junction block. The fuse replaces the ignition-off draw (IOD) connector. Fuse 13 is a ten amp fuse. When removed, it prevents the battery from discharging during storage. For specific wiring and location, refer to Group 8W, Wiring Diagrams.

4 DISC IN-DASH CD CHANGER

DESCRIPTION

The 4 Disc In-Dash CD Changer (if equipped) is located in the existing cubby bin. It is a cartridgeless changer controlled by the radio and allows the occupants to load up to four discs at one time.

OPERATION

Due to its compact design, the CD changer can only carry out one operation at a time. For example, you can not load a new disc while playing another at the same time. Each operation happens sequentially.

The radio unit provides control over all features of the CD changer with the exception of the CD load and eject functions, which are controlled by buttons located on the front of the CD changer. All features you would expect, such as Disc Up/Down, Track Up/Down, Random and Scan are controlled by the radio, which also displays all relevant CD changer information on the radio display.

The CD changer contains a Load/Eject button and an indicator light for each of the four disc positions. The individual light indicates whether a CD is currently loaded in that particular chamber of the CD changer. Pressing the individual Load/Eject button for a particular chamber will eject a disc currently present in that chamber. If the chamber is currently empty, actuating the Load/Eject button will position that chamber to receive and load a new disc in that chamber.

INTERFERENCE ELIMINATION

DESCRIPTION

Some components used on the vehicles are equipped with a capacitor to suppress radio frequency interference/static.

Ground straps are mounted from the engine to each shock tower. The ground straps should be securely tightened to assure good metal to metal contact.

OPERATION

Capacitors are mounted in various locations internal to the generator, instrument cluster and windshield wiper motor.

Ground straps conduct very small high frequency electrical signals to ground and require clean large surface area contact. The radio grounds to the floor pan through a ground strap which bolts to the back of the radio from the instrument panel wire harness.

REAR WINDOW ANTENNA

DESCRIPTION

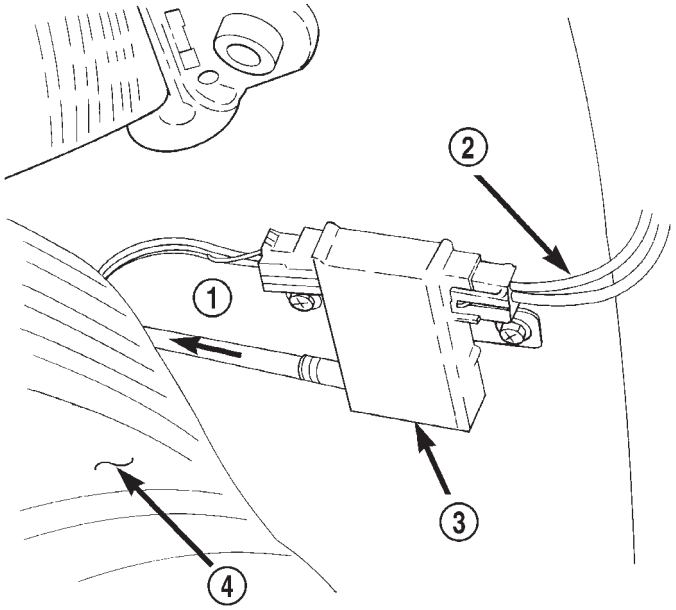


Fig. 1 Rear Defogger/Antenna Module

1 – TO RADIO
2 – TO BACKLITE
3 – REAR DEFOGGER/ANTENNA MODULE
4 – REAR SEAT

The integrated rear window antenna incorporates the rear window defogger and a electronic module to receive radio signals. The module is located in the right C-pillar behind the trim panel.

OPERATION

The AM and FM signals are received via isolated unheated lines along the top of the rear window.

NOTE: If aftermarket window shading is added, it cannot be of the metallic type. Metallic type window shading can cause poor radio reception.

NOTE: If an accessory cellular phone glass mount antenna is installed, it should only be installed so as to avoid contact with any of the rear glass grid lines.

DESCRIPTION AND OPERATION (Continued)

REMOTE AMPLIFIER

DESCRIPTION

MIDLINE AND INFINITY I SYSTEM

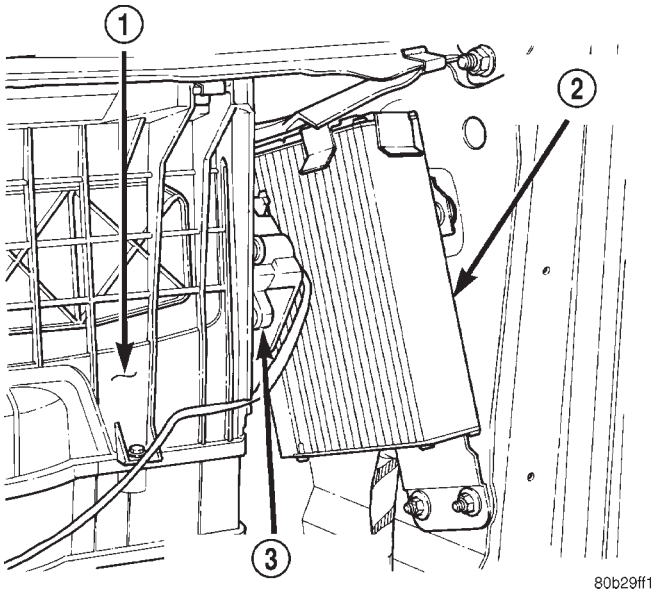


Fig. 2 Midline/InfinitylRemote Amplifier Location

1 – HVAC UNIT
2 – REMOTE AMPLIFIER
3 – RECIRCULATION AIR MOTOR

The amplifier is located in the right front cowl panel.

INFINITY II SYSTEM

The amplifier is located beneath the trunk liner covering the right quarter inner panel.

OPERATION

For specific operation of each individual system, refer to the vehicles owners manual, Audio System Operation Manual.

When the radio system is ON, and all or some speakers are not operating or have a noise distortion refer to the diagnostic tests. Refer to Group 8W, Wiring Diagrams for Pin numbers and location.

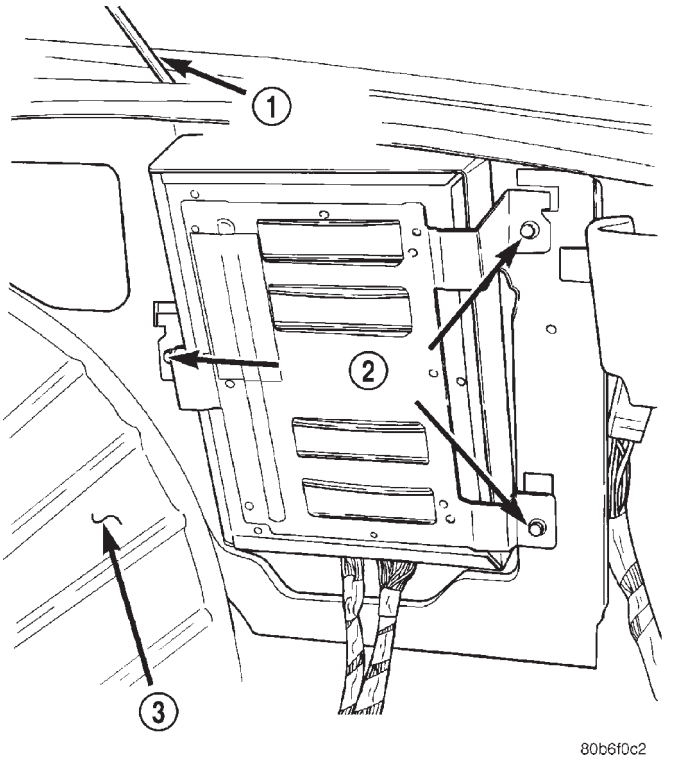


Fig. 3 Infinity II Remote Amplifier Location

1 – RIGHT DECKLID SUPPORT
2 – RETAINING SCREWS
3 – RIGHT INNER FENDER WELL

DIAGNOSIS AND TESTING

AUDIO DIAGNOSTIC TEST PROCEDURES

CAUTION: The CD player will only operate between approximate temperatures of -23°C and +65°C (-10°F and +145°F).

Whenever a radio malfunction occurs;

(1) First check FUSES in the Junction Block:
- (a) Radio power
- (b) Ignition feed
- (c) Power Amplifier
- (d) Illumination
- (e) Memory feed

NOTE: The vehicles are shipped with the INTERIOR LAMP fuse disconnected.

(2) Verify, the radio wire harness is properly connected before starting normal diagnosis and repair procedures. Refer to Audio Diagnostic Tables and/or Group 8W, Wiring Diagrams.

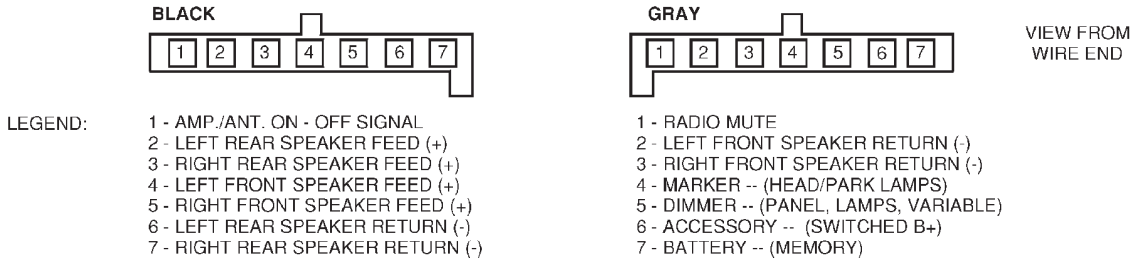
NOTE: If aftermarket accessories:
- **Radar detector**
- **Cellular Telephone**
- **Other electrical devices**

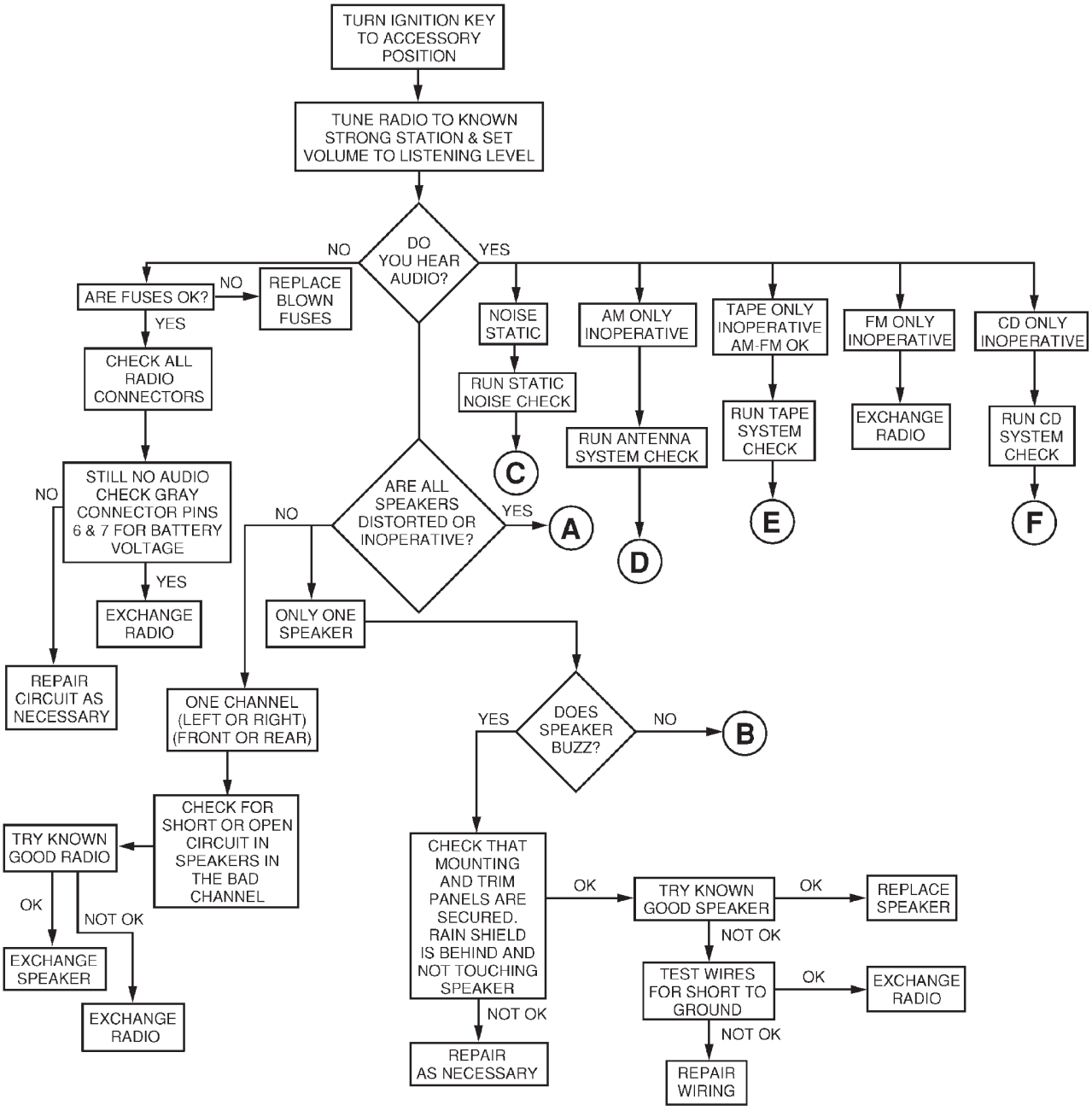
are present, ensure that the devices or the installation of these devices have not negatively effected the vehicle's operation.

DIAGNOSIS AND TESTING (Continued)

BASE 4 SPEAKER SYSTEM

RADIO CONNECTORS

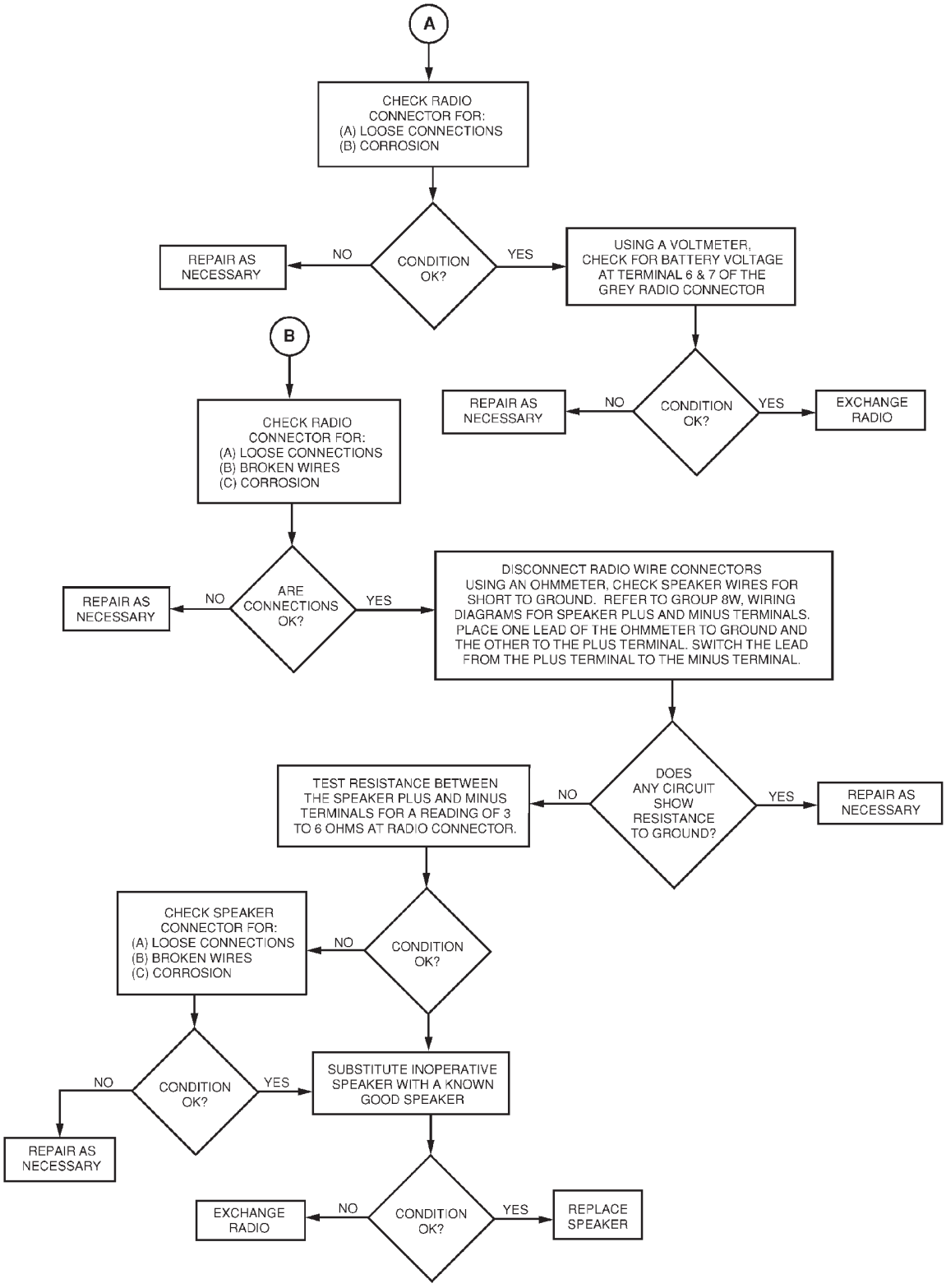




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DIAGNOSIS AND TESTING (Continued)

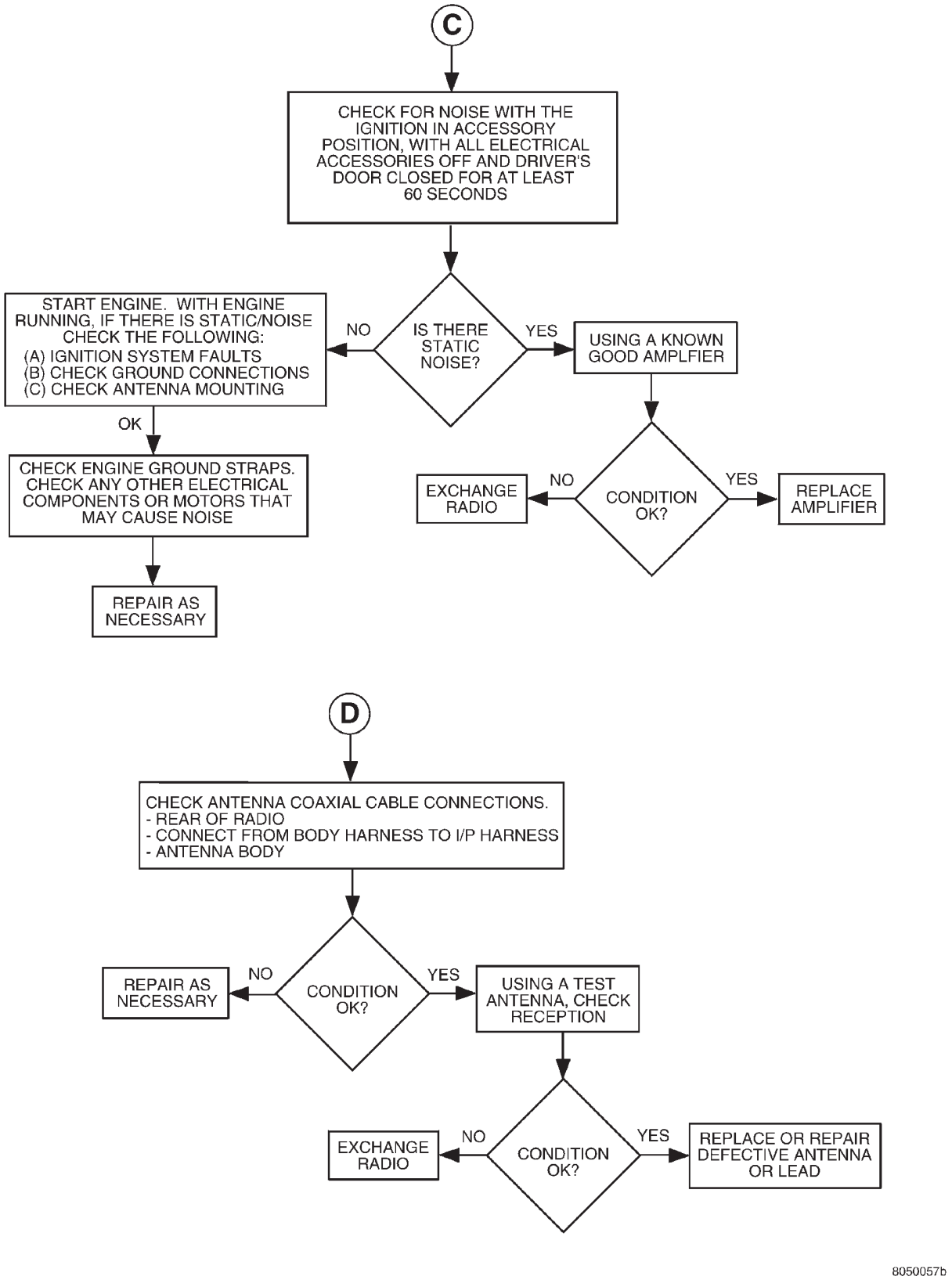
BASE 4 SPEAKER SYSTEM CONTINUED



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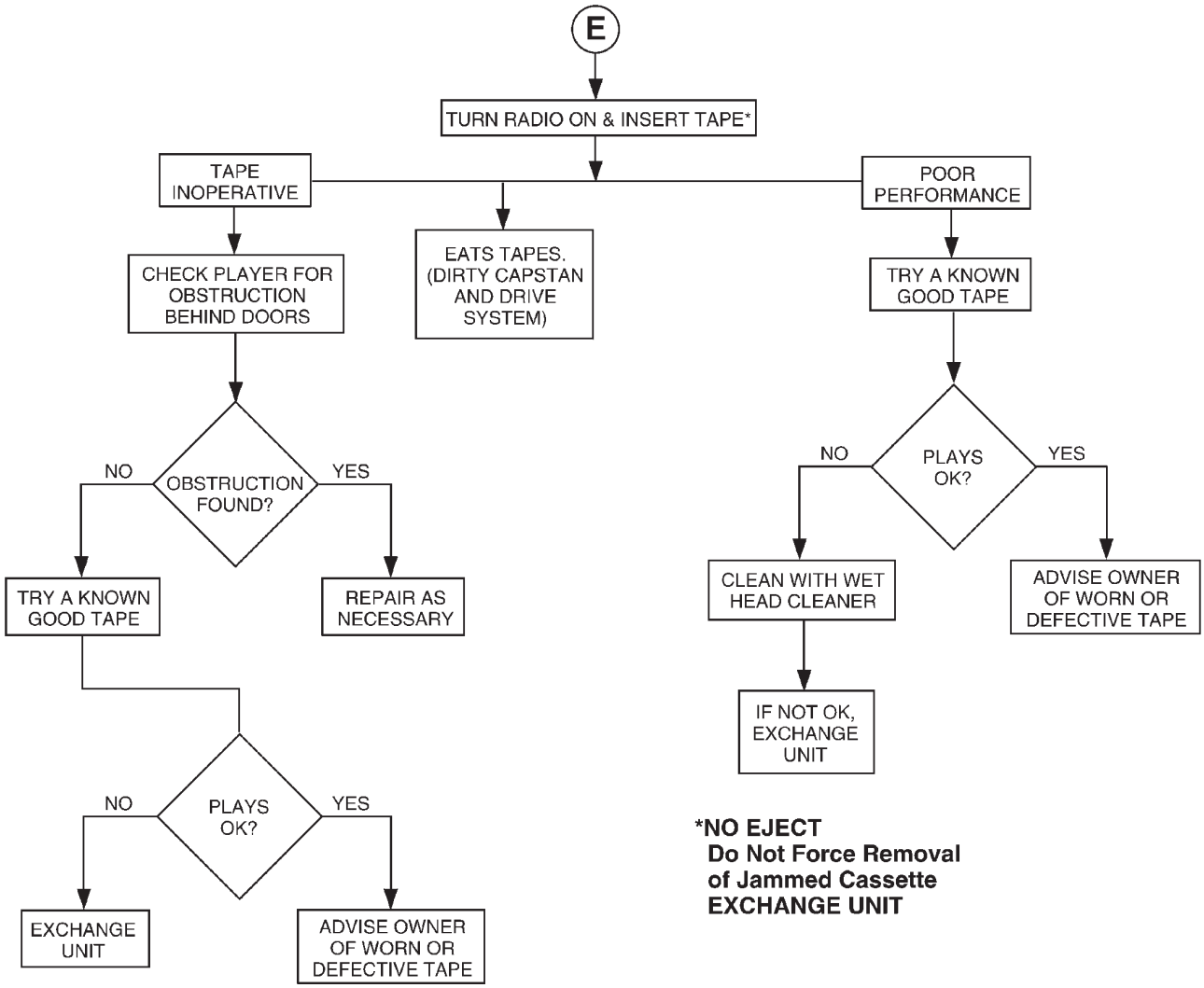
DIAGNOSIS AND TESTING (Continued)

BASE 4 SPEAKER SYSTEM CONTINUED



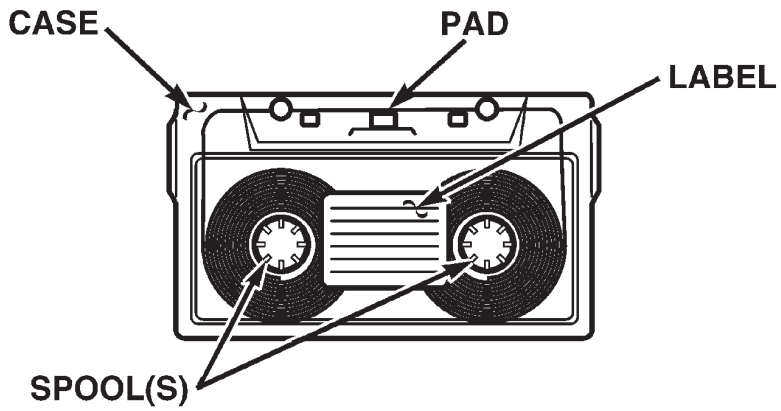
DIAGNOSIS AND TESTING (Continued)

BASE 4 SPEAKER SYSTEM CONTINUED



CHECK TAPES FOR:

- **CRACKED OR WARPED CASE**
- **LOOSE LABEL ON CASE**
- **TAPE PAD MISSING**
- **TAPE SPOOL(S) JAMMING**

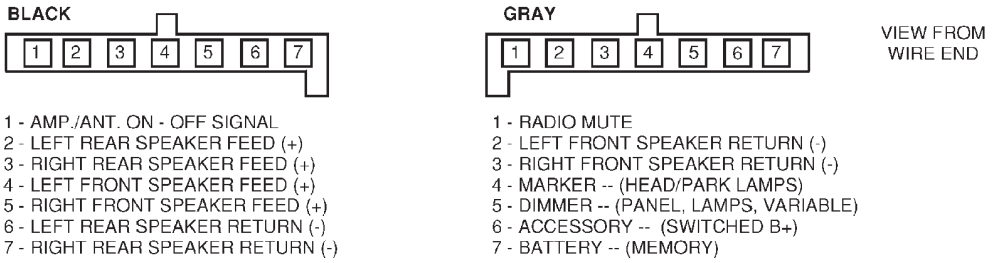


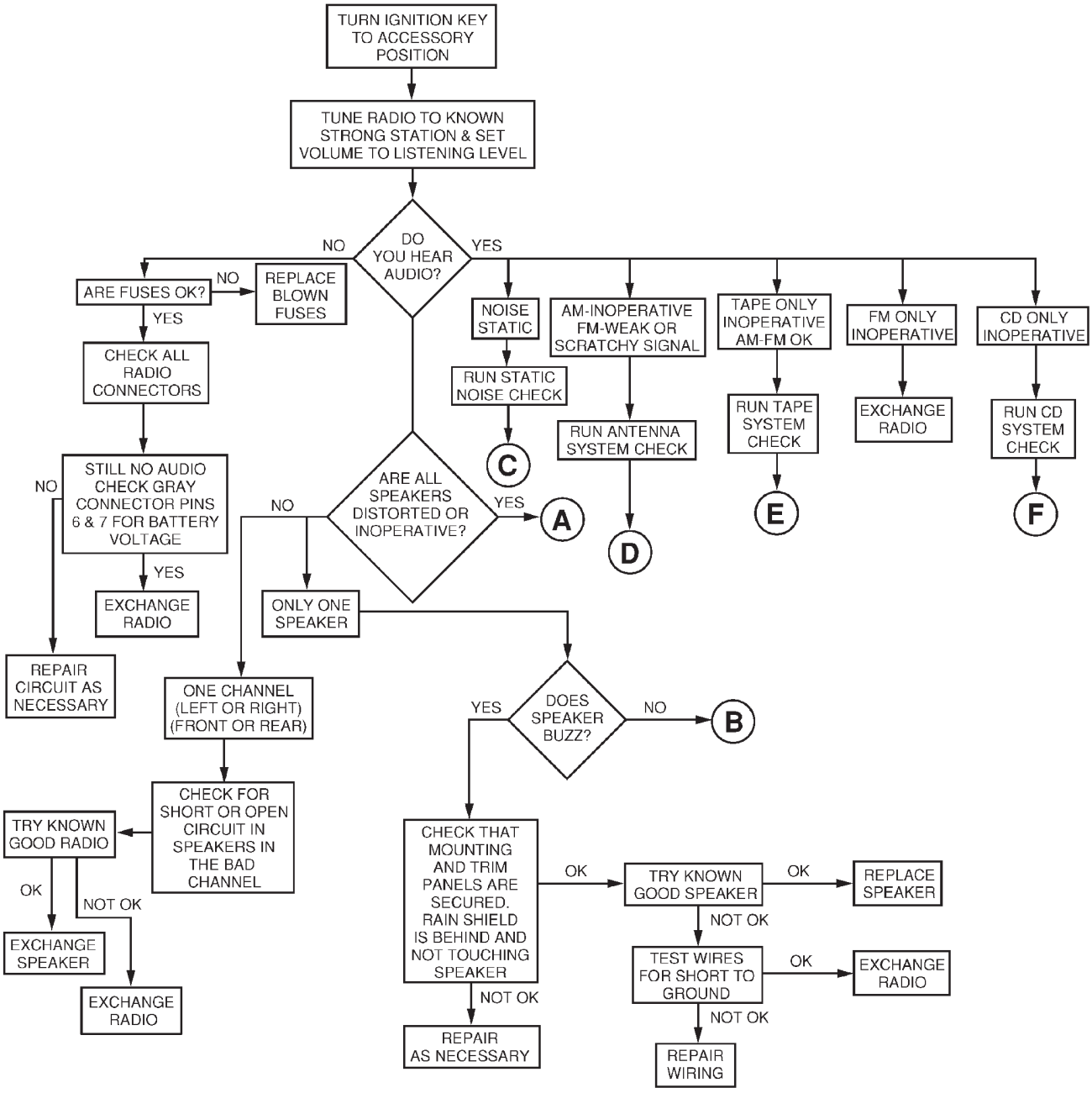
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DIAGNOSIS AND TESTING (Continued)

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RADIO CONNECTORS

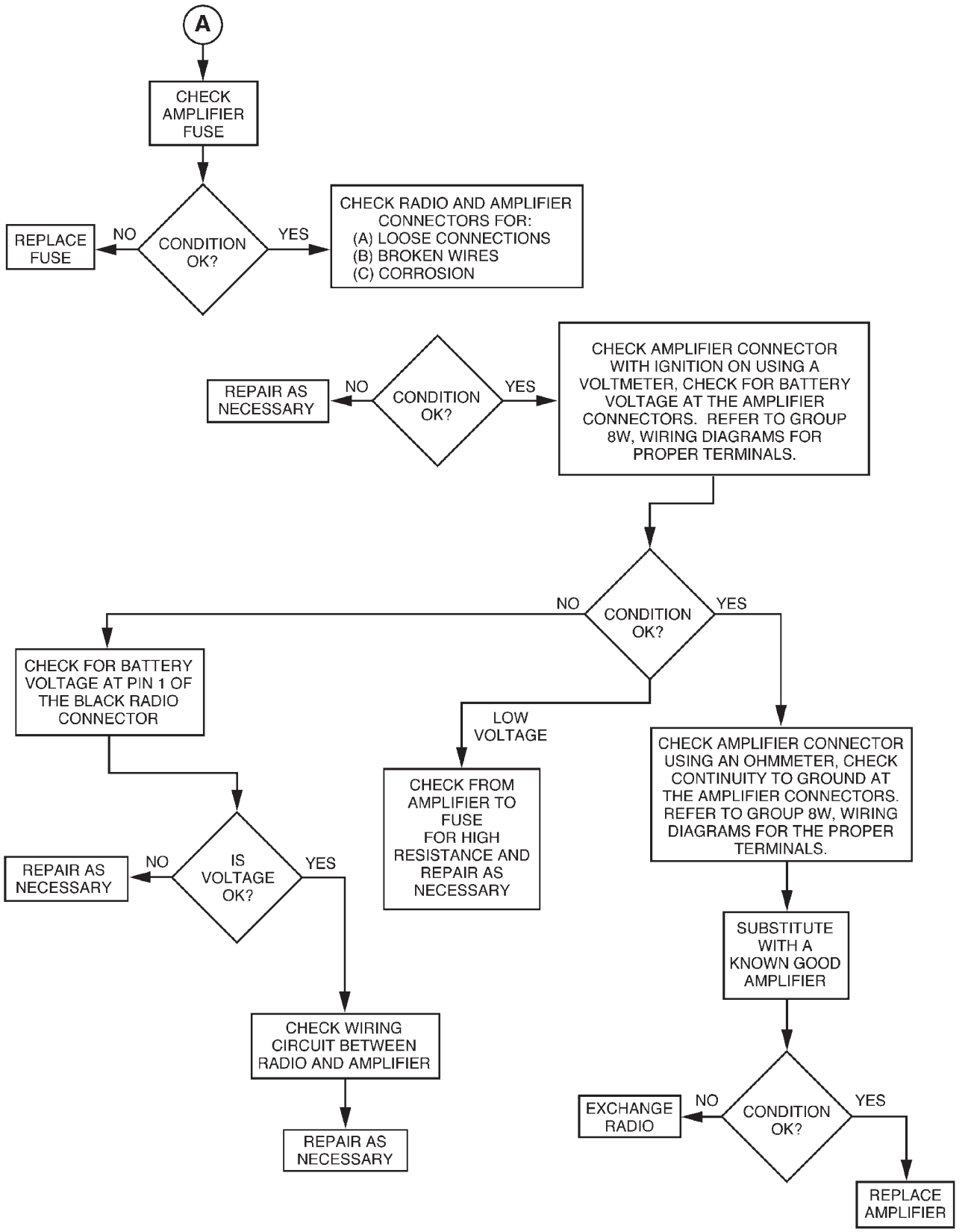




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DIAGNOSIS AND TESTING (Continued)

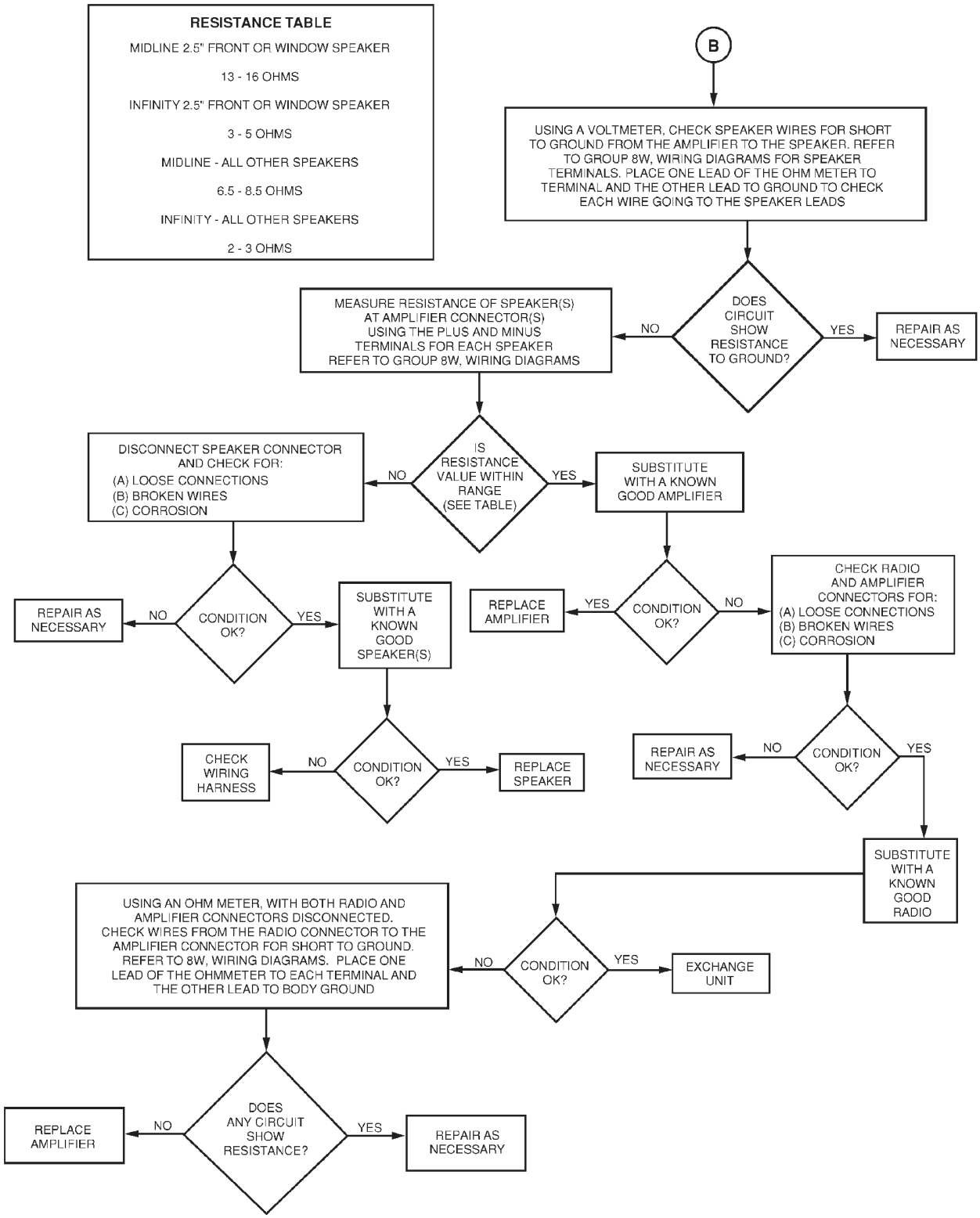
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DIAGNOSIS AND TESTING (Continued)

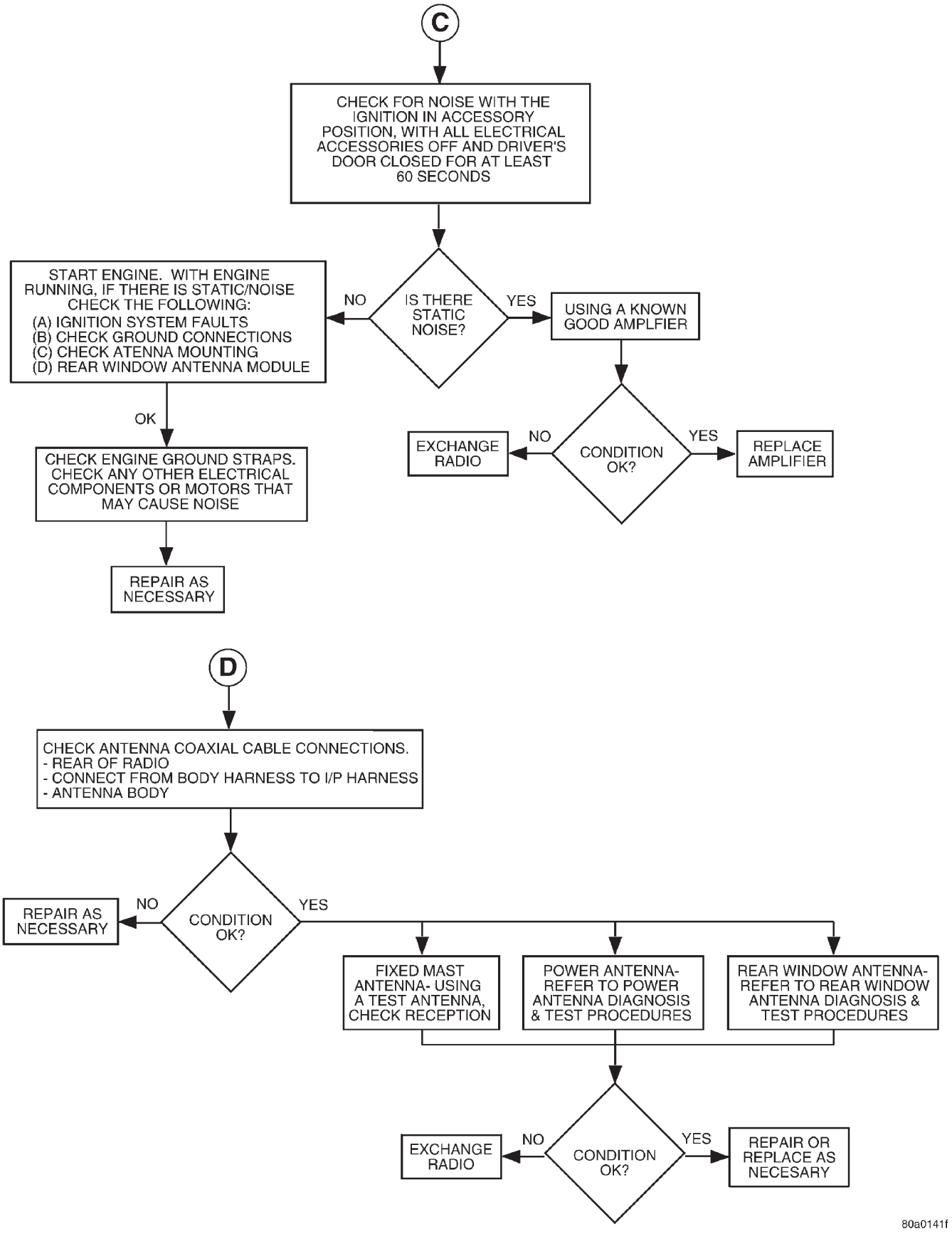
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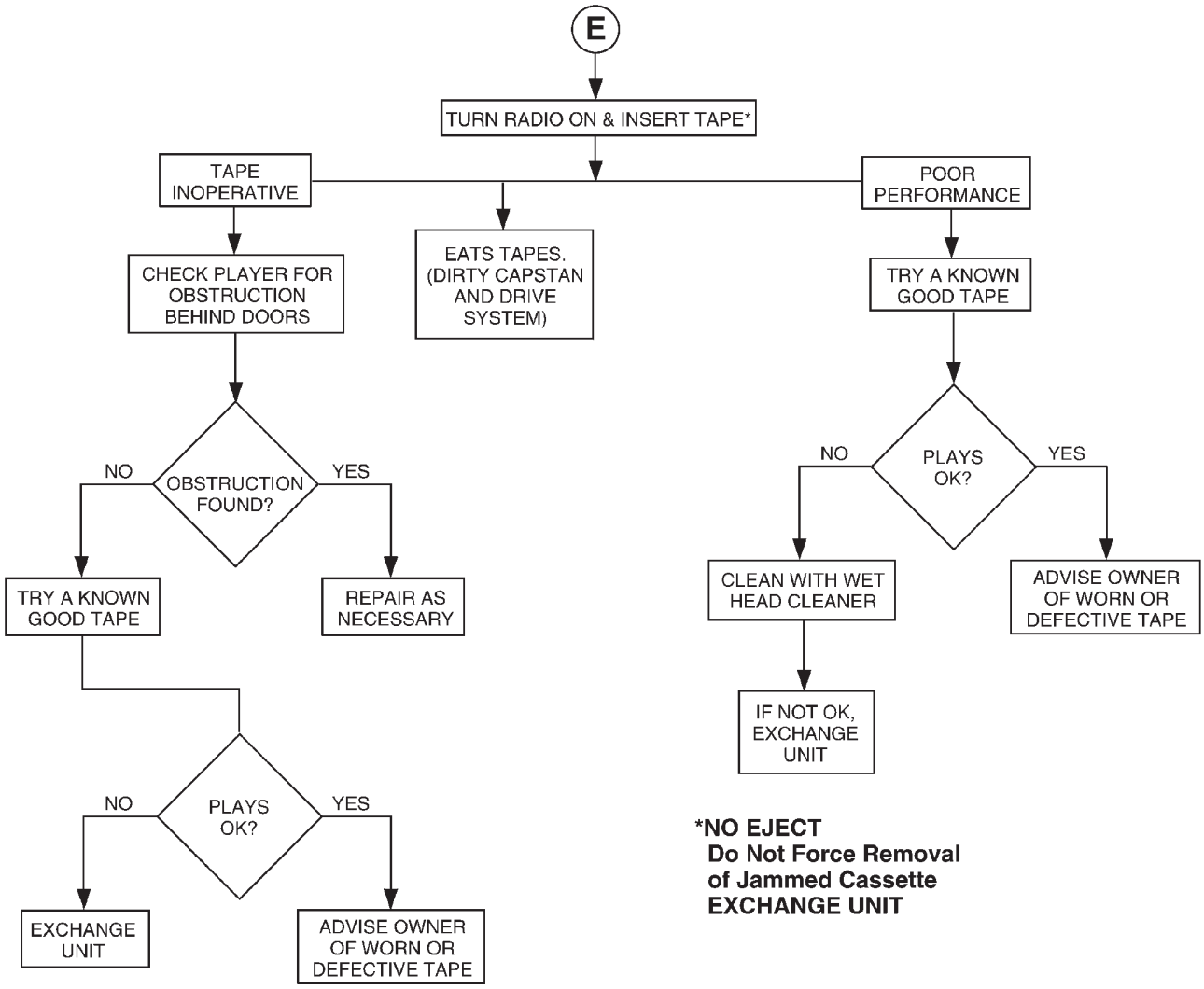
DIAGNOSIS AND TESTING (Continued)

AMPLIFIED CONTINUED



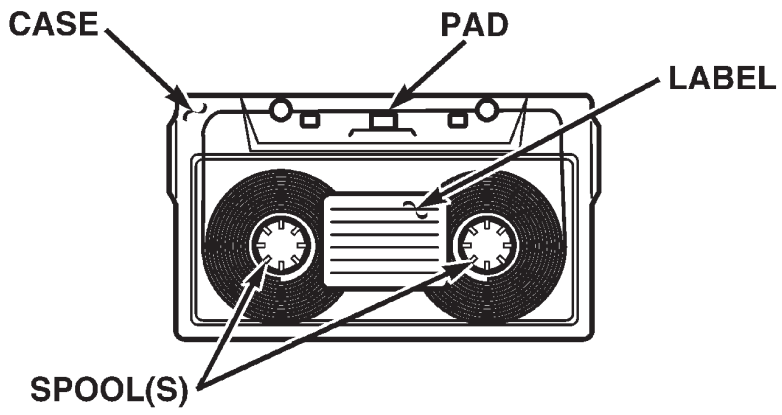
DIAGNOSIS AND TESTING (Continued)

AMPLIFIED CONTINUED



CHECK TAPES FOR:

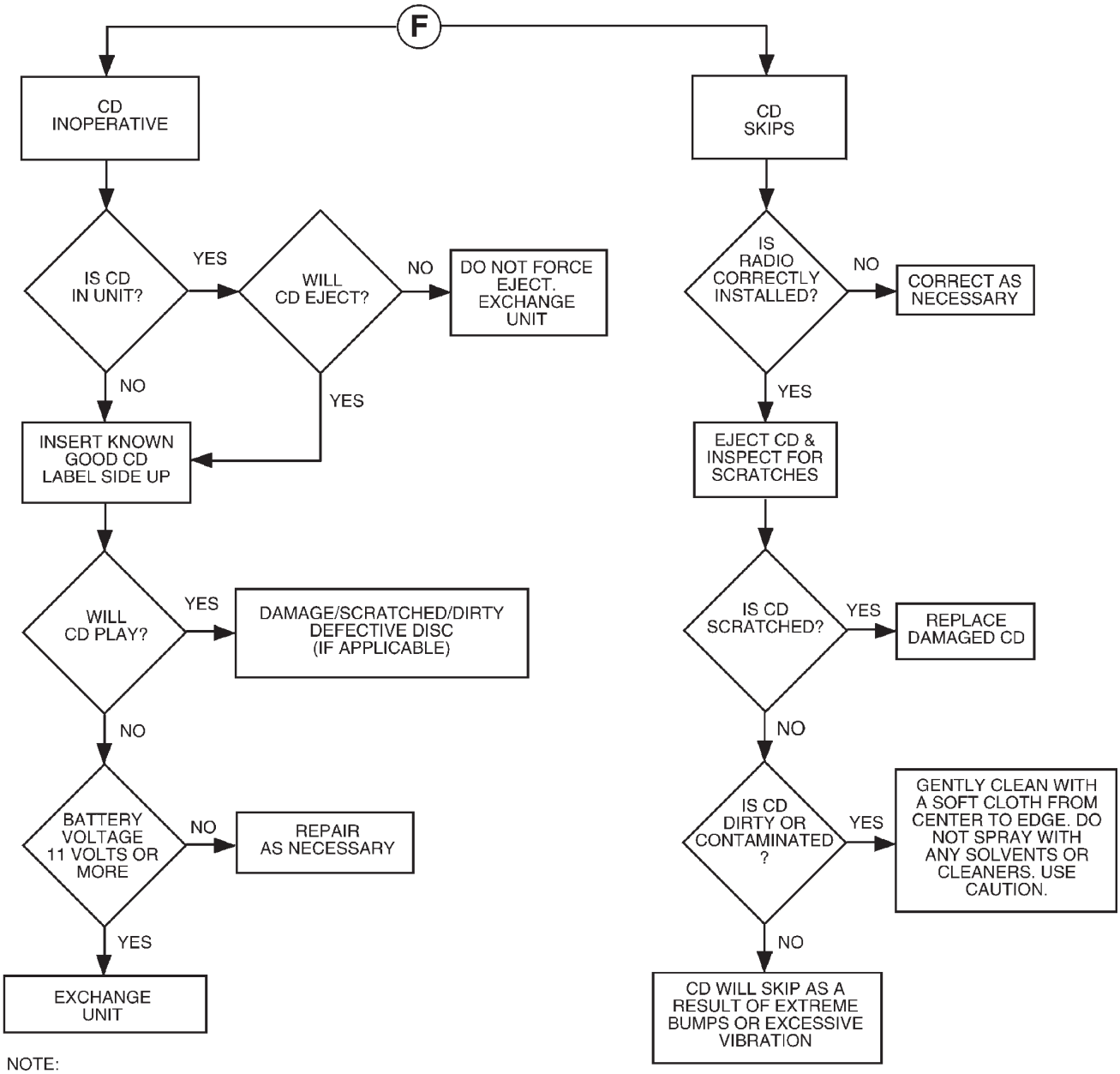
- **CRACKED OR WARPED CASE**
- **LOOSE LABEL ON CASE**
- **TAPE PAD MISSING**
- **TAPE SPOOL(S) JAMMING**



8050057d

DIAGNOSIS AND TESTING (Continued)

AMPLIFIED CONTINUED



NOTE:
THE CD PLAYER WILL ONLY OPERATE BETWEEN APPROXIMATE TEMPERATURES OF -23°C AND +65°C (-10°F AND +145°F)

80500581

DIAGNOSIS AND TESTING (Continued)

With the use of the DRB III® scan tool, you may read the CD changer fault codes. Refer to the CD Changer Fault Codes table.

CD CHANGER FAULT CODES

FAULT	DESCRIPTION
CD CHANGER MECHANICAL FAILURE	MAGAZINE LOAD/EJECT FAILURE, ELEVATOR UP/DOWN FAILURE, OPTICAL PICK-UP FAILURE, SERVO POWER FAILURE.
CD CHANGER TEMPERATURE HIGH	OPTICAL HEAD OR LASER OVER TEMPERATURE (149° F).
CD CHANGER PLAY FAILURE	SCRATCHED DISC, FOCUS ERROR, DISC REVERSED.
IMPROPER DISC	WRONG OR UNKNOWN DISC FORMAT.

For simple diagnosis of the 4 Disc In-Dash CD Changer, refer to the CD Changer Diagnosis table. For any further diagnosis, refer to the proper Body Diagnostic Procedures Manual.

The following tests are to be performed after the Radio Fuse has been checked and found to be OK.

CD CHANGER DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
1. CD DOESN'T PLAY 2. CD DOESN'T CHANGE DISCS 3. CD DOESN'T LOAD/EJECT 4. CD STOPS PLAYING 5. CD WON'T PLAY AT ALL	1. CD CHANGER MECHANICAL FAILURE (MECHANISM) 2. INSTRUMENT PANEL TEMPERATURE NOT WITHIN CD CHANGER OPERATING RANGE (-22° F TO 149° F) 3. SCRATCHED DISC 4. FOCUS ERROR (LASER) DUE TO FOGGING/MOISTURE 5. DISC INVERTED 6. WRONG OR UNKNOWN CD FORMAT (CD-R, CD-ROM, CD-RW, OR DVD). 7. LOW QUALITY CDR.	1. REPLACE CD CHANGER 2. RETRY CD OPERATION WITHIN PROPER TEMPERATURE SETTING. 3. RETRY WITH A KNOWN OPERATIONAL CD. 4. RETRY CD OPERATION WITHIN PROPER TEMPERATURE SETTING. 5. RETRY WITH A KNOWN OPERATIONAL CD. 6. RETRY WITH A KNOWN OPERATIONAL CD. 7. RETRY WITH A KNOWN OPERATIONAL CD. IF STILL INOPERABLE AFTER TESTING, REPLACE THE CD CHANGER.
1. NO SOUND WHEN CD IS PLAYING	1. INCORRECT CD FORMAT, COMPUTER INFORMATION ON MUSIC FORMAT DISC.	1. USING THE SEEK BUTTON, SEEK UP ONE OR TWO SONGS AND SEE IF THE MUSIC BEGINS TO PLAY. 2. RETRY WITH A KNOWN OPERATIONAL CD. IF STILL INOPERABLE AFTER TESTING, REPLACE THE CD CHANGER.

DIAGNOSIS AND TESTING (Continued)

DIAGNOSTIC CONDITIONS

NOISE DISTORTION IN ALL SPEAKERS

Does the distortion occur through all operations:

- AM and FM stations
- Cassette tape
- Compact disc

If not, check for radio interference, damaged tape or disc that may be causing the distortion. Refer to Sound Systems Operating Instructions in the Owners Manual for cleaning procedures of the cassette tape player.

- Check battery voltage, for 11 Volts or more
- Check amplifier connectors, and wires for proper connection
- If OK, check radio, refer to Radio Diagnosis
- If OK, replace amplifier

ELECTRICAL NOISE DISTORTION ONE SPEAKER

- Remove output signal connector from amplifier and check for short to ground on the speaker with the distortion. Refer to Group 8W, Wiring Diagrams for the appropriate pin numbers.
- If shorted to ground, disconnect speaker connector and recheck from the amplifier for short to ground.
- If still shorted to ground, repair wires. Not shorted to ground, replace speaker.
- Not shorted to ground, check speaker resistance at amplifier connector for 2 - 16 ohms.
- If resistance is OK, refer to Radio Diagnosis. If radio checks OK, replace amplifier.
- If resistance is less than two ohms, replace speaker. If resistance is OK, repair wires

MECHANICAL NOISE DISTORTION

- Check trim for loose parts, and speaker attachments for buzzes
- Remove speaker that is still connected and listen for distortion. If distortion remains, replace speaker.

ONE SPEAKER NON-OPERATIVE

- Remove output signal connector from amplifier and check for 2 - 16 ohms resistance to the non-operative speaker. Refer to Group 8W, Wiring Diagrams for the appropriate pin numbers.
- If resistance is less than two ohms, test speaker for resistance.
- If OK, repair wire. If not OK, replace speaker.

ALL SPEAKERS NON-OPERATIVE

- Check radio for being ON, are the display lights on
- Radio not ON, refer to Radio Diagnosis
- Check fuses, amplifier connectors and wires for proper connection
- Check for good ground
- Check amplifier, for battery voltage and ON/OFF voltage

(1) Battery voltage OK and NO voltage at the ON/OFF terminal, check for short or open in the ON/OFF circuit.

(2) ON/OFF voltage OK, and NO battery voltage, check for short or open in battery circuit.

(3) Prior to replacing amplifier check fuse to the cigar lighter and horn. If not OK, replace fuse. If fuse blows again disconnect amplifier B+ wire connector. Refer to Group 8W, Wiring Diagrams for the proper connector.

(4) If fuse still blows the problem is not the amplifier. If fuse does not blow replace the amplifier.

(5) If shorted or open circuit repair as necessary.

SPEAKER RESISTANCE

SPEAKER	RESISTANCE VALUE
MIDLINE 2.5” FRONT OR WINDOW SPEAKER	13 - 16 OHMS
INFINITY 2.5” FRONT OR WINDOW SPEAKER	3 - 5 OHMS
MIDLINE - ALL OTHER SPEAKERS	6.5 - 8.5OHMS
INFINITY - ALL OTHER SPEAKERS	2 - 3 OHMS

REAR WINDOW ANTENNA

NOTE: Due to a capacitor integral with the coaxial cable, the coax cable can not be tested. The continuity test between the center pin of the coax to the antenna does not apply. An ohm meter check to the center pin of the coaxial cable will falsely indicate an open circuit. The coaxial shield to ground test can be performed. Verify coaxial cable performance by using a known good cable.

Before performing any antenna service procedures, verify that Rear Window Defogger is operating properly (Fig. 4) and (Fig. 5). If no, repair as necessary.

DIAGNOSIS AND TESTING (Continued)

Refer to Group 8N, Electrically Heated Systems. Any repairs to either the AM or FM grid should be preformed as in Group 8N, Electrically Heated Systems, Grid Line and Terminal Repair.

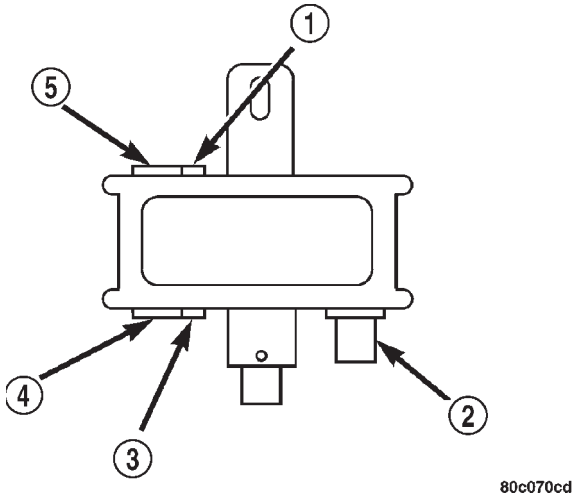


Fig. 4 Rear Window Antenna Module

1 – TO FM/DEFOGGER GRID LINES
2 – RADIO COAX CONNECTOR
3 – 12 VOLT FEED TO REAR WINDOW DEFOGGER
4 – 12 VOLT FEED TO MODULE
5 – TO AM GRID LINES

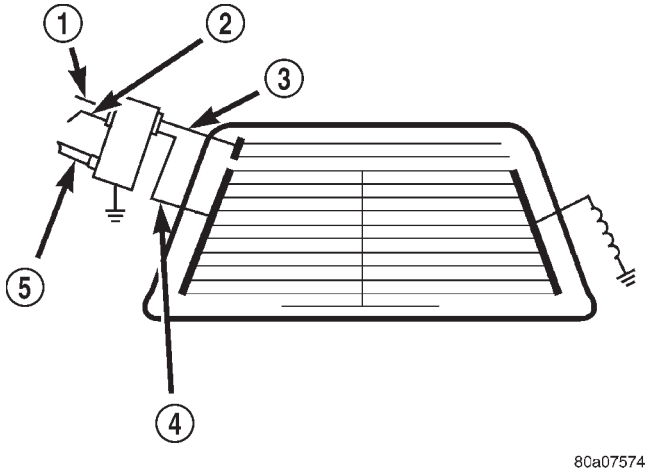


Fig. 5 Rear Window Grid Lines and Module

1 – B+ FOR AMPLIFIER
2 – B+ FOR REAR WINDOW DEFOGGER
3 – AM
4 – FM & REAR WINDOW DEFOGGER
5 – RADIO COAX

(1) Check that the rear window adhesive does not come in contact with any portion of the grid lines or bus bars. There should be a minimum of 2 mm gap between adhesive and the grid lines or bus bars. If not OK, repair as necessary. If OK, go to Step 2.

(2) Check for proper radio coaxial cable connections at the radio and rear window antenna module. If not OK, repair as necessary. If OK, go to Step 3.

(3) Loss of reception on only one band (AM or FM) may indicate a continuity problem on the rear window grids. Test the grid lines with an ohmmeter. If not OK, repair grid lines as necessary. If OK, go to Step 5.

(4) Reception degradation when the rear window defogger is actuated may indicate discontinuity in the heated grid lines.

(5) Turn the radio and rear window defogger ON position. Using a voltmeter, test for battery voltage at the X60 and C15 circuit terminals of the rear window antenna module wire harness connector (Fig. 4). If not OK, check fuses, if fuses are OK, repair wire harness as necessary. Refer to Group 8W, Wiring Diagrams for circuit information.

(6) Ensure that the rear window defogger ground wire with integral coil in the C-pillar has a good ground.

(6) If not OK, repair as necessary. If OK, go to Step 7.

CAUTION: Rear Window Defogger must be in the OFF position

(7) Quick check of the module:

- Place the ignition switch in the ACC position with the radio in the ON position on a appropriate station (AM/FM).
- Tune to a AM station
- Using a grounded jumper wire, momentarily short the AM lead to the grid lines (Fig. 5).
- There should be an audible CRACKLE through the speakers indicating circuit continuity.
- Tune to a FM station
- Using a grounded jumper wire, momentarily short the FM lead to the grid lines (Fig. 5).
- There should be an audible CRACKLE through the speakers indicating circuit continuity.

If not OK, go to Step 8. If OK, go to Step 9.

(8) Using a ohmmeter, check continuity between the module wire connector and:

- AM grid lines
- FM/rear window antenna grid lines

If not OK, repair necessary. Refer to Group 8N, Electrically Heated Systems and Group 8W, Wiring Diagrams. If OK, go to Step 9.

(9) If neither AM or FM can be received, use a known good radio and verify. If not OK, use a known good antenna module and verify. If OK, either exchange radio or replace antenna module.

REMOVAL AND INSTALLATION

FRONT DOOR SPEAKERS

CAUTION: Do not operate the radio with speaker leads detached. Damage to the output devices may result.

REMOVAL - 6.5 INCH LOWER DOOR MOUNTED SPEAKERS

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

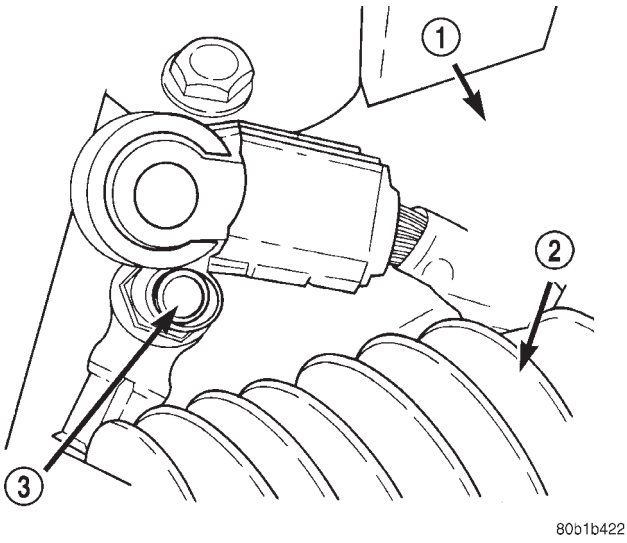


Fig. 6 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Open drivers door.
(3) Using a trim stick (special tool #C-4755), carefully pry speaker grille away from door trim panel (Fig. 7).
(4) Remove three speaker retaining screws.
(5) Pull speaker away from door and disconnect wiring.

INSTALLATION

For installation, reverse the above procedures.

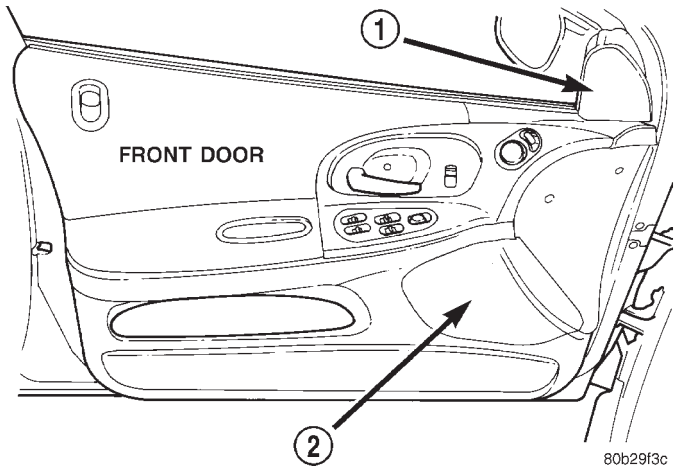


Fig. 7 Front Door Speakers

1 – INFINITY SPEAKERS
2 – DOOR SPEAKER

REMOVAL - 2.5 INCH LOWER FRONT WINDOW CORNER SPEAKERS (INFINITY and MIDLINE)

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Open drivers door.
(3) Remove two speaker enclosure attachment screws holding the enclosure ring and grill to the door (Fig. 7).
(4) Remove two speaker retaining screws.
(5) Pull speaker away from door and disconnect wiring.

INSTALLATION

For installation, reverse the above procedures.

FIXED MAST ANTENNA (INTREPID ONLY)

REMOVE

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Inside trunk, pull passenger side trunk liner aside.
(3) Unplug antenna lead from base of antenna mast.
(4) Remove antenna mast by unscrewing mast from antenna body.
(5) Remove screw from mounting bracket.
(6) Pull antenna body down through the rubber grommet.

INSTALLATION

For installation, reverse the above procedures.

REMOVAL AND INSTALLATION (Continued)

4 DISC IN-DASH CD CHANGER

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.
(2) Remove ash receiver (if applicable).
(3) Using a trim stick (special tool #C-4755), gently pry out on center trim bezel. Disconnect wiring connectors to HVAC controls, cigar lighter/auxiliary power outlet and traction control switch.
(4) Remove instrument panel center trim bezel.
(5) Remove two retaining screws to in-dash CD changer.
(6) Pull CD changer out of instrument panel, disconnect wiring and remove from vehicle.

INSTALLATION

For installation, reverse the above procedures

INSTRUMENT PANEL SPEAKER (INFINITY)

CAUTION: Do not operate the radio with speaker leads detached. Damage to the output devices may result.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Remove instrument panel top cover: Refer to Group 8E, Instrument Panel Systems for Removal and Installation procedures.
(3) Remove two retaining screws to center speaker and disconnect wiring connector.
(4) Remove speaker from vehicle.

INSTALLATION

For installation, reverse the above procedures.

RADIO/TAPE/CD PLAYER

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Remove instrument panel center trim bezel. Refer to Group 8E, Instrument Panel and Systems for Removal and Installation procedures.
(3) Remove four radio mounting screws.
(4) Pull radio from panel and disconnect wiring, ground strap, wires and antenna lead from radio.
(5) Remove radio from vehicle.

INSTALLATION

For installation, reverse the above procedures.

REAR DOOR SPEAKERS (INFINITY II)

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Open rear door.
(3) Using a trim stick (special tool #C-4755), carefully pry speaker grille away from door trim panel.
(4) Remove two speaker retaining screws.
(5) Pull speaker away from door and disconnect wiring.

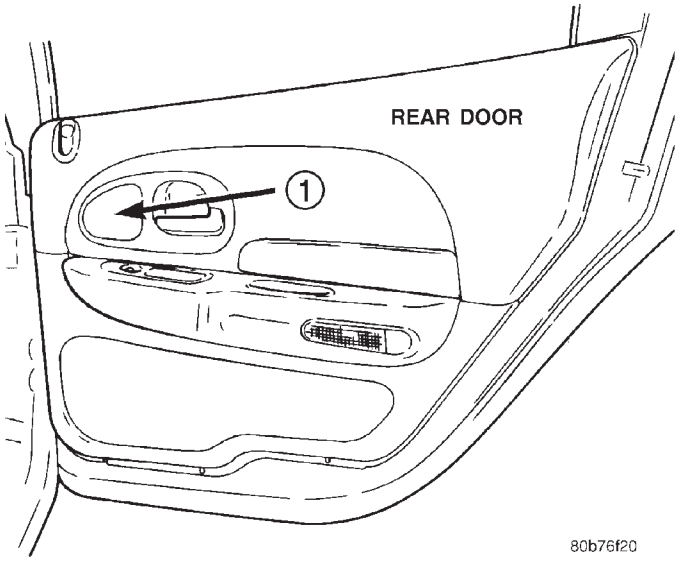


Fig. 8 Rear Door Speaker

1 – DOOR SPEAKER

INSTALLATION

For installation, reverse the above procedures.

REAR SHELF SPEAKER

CAUTION: Do not operate the radio with speaker leads detached. Damage to the output devices may result.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).
(2) Remove rear shelf panel, refer to Group 23, Body for Removal and Installation procedures.
(3) Remove four retaining screws.
(4) Remove speaker and disconnect wire connector.
The wire connectors can be accessed through the trunk.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

For installation, reverse the above procedures. Be sure that the wire connectors are facing forward in vehicle.

REAR WINDOW ANTENNA (CONCORDE, LHS, and 300M)

To replace the rear window antenna the rear window has to be replaced. Refer to Group 23, Body for proper procedures.

REAR WINDOW ANTENNA MODULE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

(2) Remove right upper quarter trim panel. Refer to Group 23, Body for Removal and Installation procedures.

(3) Remove the attaching screw from module.

(4) Disconnect wire connectors and radio antenna coaxial cable (Fig. 4).

(5) Remove module from vehicle.

INSTALLATION

For installation, reverse the above procedures.

REMOTE AMPLIFIER

REMOVAL - MIDLINE AND INFINITY I SYSTEM

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

(2) Remove right under panel silencer/duct. Refer to Group 8E, Instrument Panel and Systems for Removal and Installation procedures.

(3) Remove two retaining nuts to remote amplifier.

(4) Pull amplifier inboard and then pull downward to remove from upper retaining clips (Fig. 2).

(5) Disconnect two wiring connectors.

(6) Remove remote amplifier from vehicle.

INSTALLATION

For installation, reverse the above procedures.

REMOVAL - INFINITY II SYSTEM

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

(2) Inside trunk, pull the trunk liner aside (right quarter panel passenger side) (Fig. 3).

(3) Remove three retaining screws.

(4) Disconnect two wire connectors.

(5) Remove remote amplifier from vehicle.

INSTALLATION

For installation, reverse the above procedures.

HORN SYSTEMS

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DESCRIPTION AND OPERATION

HORN SYSTEM

WARNING: ON VEHICLES EQUIPPED WITH AIR-BAG, SEE GROUP 8M, RESTRAINT SYSTEMS FOR STEERING WHEEL OR COLUMN REMOVAL PROCEDURES.

DESCRIPTION

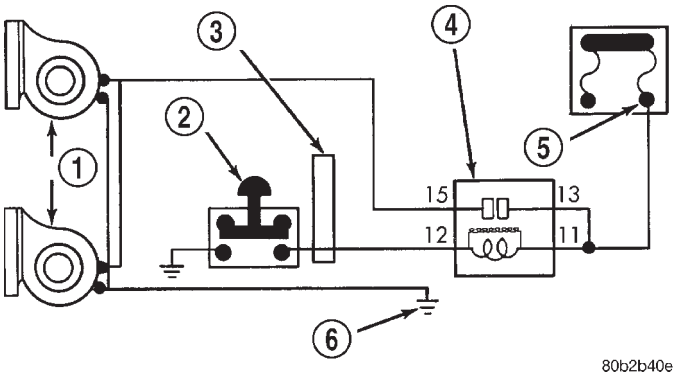


Fig. 1 Horn System Schematic

1 – HORNS
2 – HORN SWITCH
3 – CLOCKSPRING
4 – HORN RELAY
5 – 20 AMP FUSE #8
6 – RIGHT SHOCK TOWER GROUND

The horn circuit consists of a horn switch, horn relay, and horns.

OPERATION

The horn circuit feed is from the fuse to the horn relay in the Junction Block. When the horn switch is depressed, it completes the ground circuit. Then the horn relay coil closes a set of contacts which allows current to flow to the horns. Refer to Horn System Schematic.

DIAGNOSIS AND TESTING

HORN

(1) Disconnect wire connector at each horn.
(2) Using a voltmeter, connect one lead to body ground and the other lead to the horn relay ouput pin of the horn connector (Fig. 2).

HORN CONNECTOR PIN CALL-OUT

PIN #	CIRCUIT NAME
1	GROUND
2	HORN RELAY OUTPUT

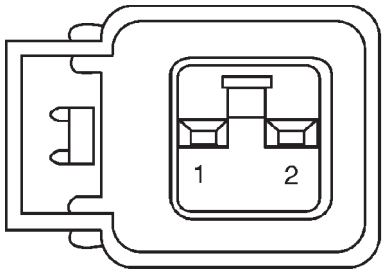


Fig. 2 Horn Connector Pin Call-Out

The right horn is grounded on the front outboard side of the right frame rail. The left horn is grounded on the left front fender apron.
(3) When the horn switch is depressed, battery voltage should be present. Repeat for the other horn.
(4) If no voltage, repair as necessary. If battery voltage is present, go to next step.
(5) Using an ohmmeter, test the negative terminal of the connector for continuity to ground. Repeat for the other horn.

DIAGNOSIS AND TESTING (Continued)

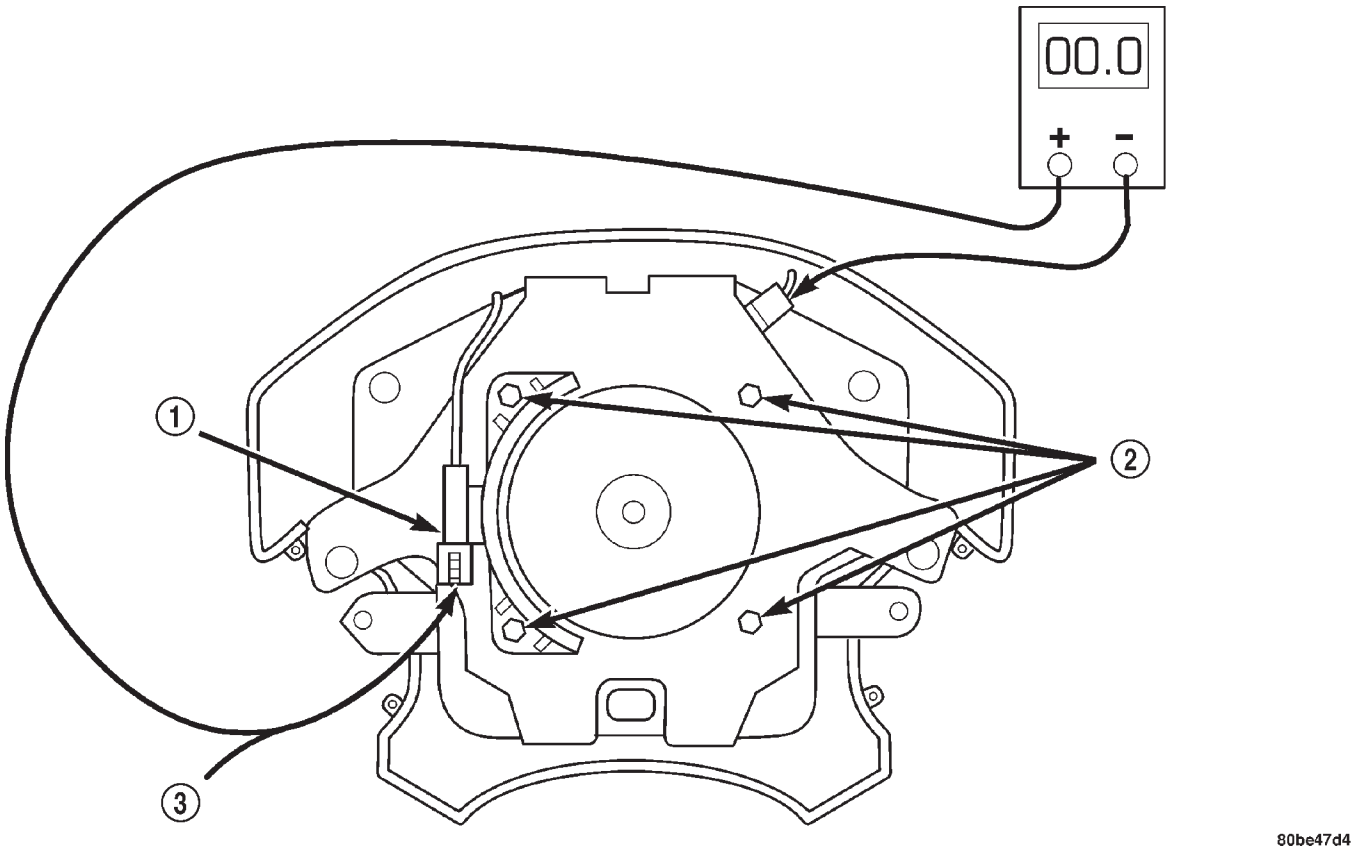


Fig. 3 Horn Switch Test Locations

1 – HORN SWITCH CONNECTOR
2 – DO NOT REMOVE NUTS
3 – INSIDE CONNECTOR

(6) If no ground, repair as necessary.
(7) If wires test OK and horn(s) does not sound, replace horn(s).

HORN SWITCH

(1) Using ohmmeter, connect one lead to ground wire and the other lead to the positive wire (Fig. 3).
(2) Depress horn switch, should have continuity repeat for other switch. If no continuity replace switches.

HORN RELAY

(1) Remove horn relay.
(2) Using ohmmeter, test for continuity between ground and terminal 12 of junction block.
(a) When the horn switch is not depressed, no continuity.
(b) Continuity to ground when horn switch is depressed.
(c) If continuity is not correct repair horn switch or wiring as necessary. Refer to Group 8W, Wiring diagrams.
(3) Using voltmeter, test voltage at:
(a) Terminal 11 and 13 test for battery voltage from fuse F30.
(b) If voltage is incorrect repair as necessary. Refer to Group 8W, Wiring Diagrams.
(4) Insert a jumper wire between terminals 13 and 15 of the junction block.
(a) If horns sound replace relay.
(b) If the horns do not sound, install horn relay and refer to Horn Diagnosis and Testing.

SYSTEM TEST

CAUTION: Continuous sounding of horns will cause horn to fail.

Check fuse 18 in the Junction Block and fuse L in the Power Distribution Center. Refer to Horn System Test table.

DIAGNOSIS AND TESTING (Continued)

HORN SYSTEM TEST

CONDITION	POSSIBLE CAUSE	CORRECTION
HORN SOUNDS CONTINUOUSLY. NOTE: IMMEDIATELY UNPLUG HORN AND RELAY IN THE JUNCTION BLOCK	1. FAULTY HORN RELAY. 2. HORN CONTROL CIRCUIT TO RELAY SHORTED TO GROUND. 3. HORN RELAY CONTROL CIRCUIT X3 SHORTING TO GROUND INSIDE STEERING WHEEL. 4. PINCHED HORN SWITCH WIRE UNDER DRIVER AIRBAG MODULE. 5. DEFECTIVE HORN SWITCH	1. REFER TO HORN RELAY TEST. 2. CHECK HORN RELAY TERMINAL 7 IN JUNCTION BLOCK FOR CONTINUITY TO GROUND INDICATES: A. WIRING HARNESS SHORTED TO GROUND. B. FIND THE SHORT AND REPAIR AS NECESSARY. 3. REMOVE DRIVER AIRBAG MODULE AND CHECK FOR RUBBING, SHORTED OR LOOSE WIRE CONNECTOR AND REPAIR AS NECESSARY. 4. REPLACE DRIVER AIRBAG MODULE. 5. REPLACE DRIVER AIRBAG MODULE.
HORN SOUND INTERMITTENTLY AS THE STEERING WHEEL IS TURNED.	1. HORN RELAY CONTROL CIRCUIT 3 IS SHORTED TO GROUND INSIDE STEERING WHEEL. 2. PINCHED HORN SWITCH WIRE UNDER DRIVER AIRBAG MODULE 3. DEFECTIVE HORN SWITCH	1. REMOVE DRIVER AIRBAG MODULE AND CHECK FOR RUBBING OR LOOSE WIRE/CONNECTOR, REPAIR AS NECESSARY. 2. REPLACE DRIVER AIRBAG MODULE. 3. REPLACE DRIVER AIRBAG MODULE.
HORN DOES NOT SOUND	1. CHECK FUSE 18 IN THE JUNCTION BLOCK. 2. NO VOLTAGE AT HORN RELAY TERMINALS 1 & 2 AND FUSE IS OK. 3. OPEN CIRCUIT FROM TERMINAL 7 OF THE RELAY TO HORN SWITCH X3 CIRCUIT. 4. DEFECTIVE OR DAMAGED HORN. 5. DEFECTIVE HORN SWITCH	1. REPLACE FUSE IF BLOWN AS REPAIR AS NECESSARY. 2. NO VOLTAGE, REPLACE JUNCTION BLOCK OR REPAIR AS NECESSARY. 3. REPAIR CIRCUIT AS NECESSARY. 4. VOLTAGE AT HORN WHEN HORN SWITCH IS PRESSED, REPLACE HORN. 5. REPLACE DRIVER AIRBAG MODULE.
FUSE BLOWS WHEN HORN IS BLOWN	1. SHORT CIRCUIT IN HORN OR HORN WIRING	1. REMOVE HORN RELAY, CHECK FOR SHORTED HORN OR HORN WIRING. DISCONNECT HORN WIRE HARNESS TO ISOLATE SHORT AND REPAIR AS NECESSARY.
FUSE BLOWS WITHOUT BLOWING HORN NOTE: FOR WIRING REPAIRS REFER TO GROUP 8W, WIRE DIAGRAMS.	1. SHORT CIRCUIT	1. REMOVE RELAY, INSTALL NEW FUSE, IF FUSE DOES NOT BLOW REPLACE HORN RELAY. IF FUSE BLOWS WITH RELAY REMOVED, CHECK FOR SHORT TO GROUND WITH OHMMETER BETWEEN TERMINALS 1 & 2 AND THE FUSE TERMINAL. REPAIR AS NECESSARY.

REMOVAL AND INSTALLATION

HORN

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

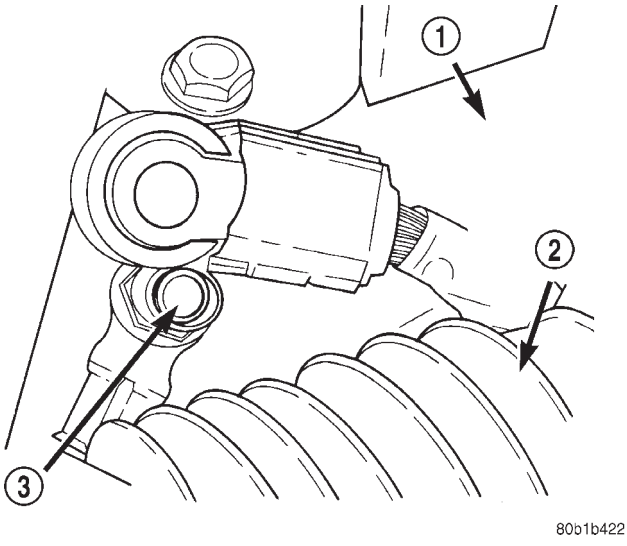


Fig. 4 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Disconnect wire connector.

(3) Remove the horn bracket mounting bolt and remove horn.

NOTE: Do not disconnect horn from horn bracket.

INSTALLATION

For installation, reverse the above procedures.

HORN SWITCH

WARNING: BEFORE BEGINNING ANY AIRBAG SYSTEM REMOVAL OR INSTALLATION PROCEDURES, REMOVE AND ISOLATE THE BATTERY NEGATIVE CABLE FROM THE VEHICLE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

The Horn Switch is an intregal part of the Driver Airbag Module and if defective, the Driver Airbag Module must replaced.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Remove the two speed control switch screws from the steering wheel back cover.

(3) Remove the two speed control switches and disconnect the wires.

(4) Remove the two bolts retaining the Driver Airbag Module.

(5) Lift the module and disconnect the airbag horn wire connectors.

(6) Remove the Driver Airbag Module from the vehicle.

INSTALLATION

For installation, reverse the above procedures. Assure that the switch is locked into position. Use caution not to pinch wires.

HORN RELAY

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Open the driver's door and remove the left instrument panel end cover.

(3) Remove the horn relay (Fig. 5).

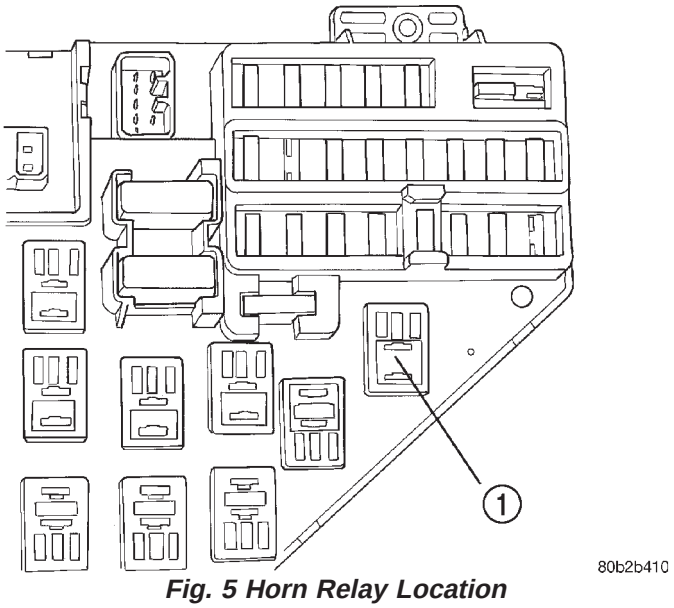


Fig. 5 Horn Relay Location

1 – HORN RELAY

INSTALLATION

For installation, reverse the above procedures.

VEHICLE SPEED CONTROL SYSTEM

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DESCRIPTION AND OPERATION

SPEED CONTROL SYSTEM

DESCRIPTION

The speed control system is electronically controlled and vacuum operated. The electronic control is integrated into the powertrain control module, located on the driver's side under the speed control servo. The controls are located on the steering wheel. The ON, OFF, and SET buttons are located on the left side of the airbag module. The RESUME, ACCEL, CANCEL and COAST buttons are located on the right side of the airbag module (Fig. 1).

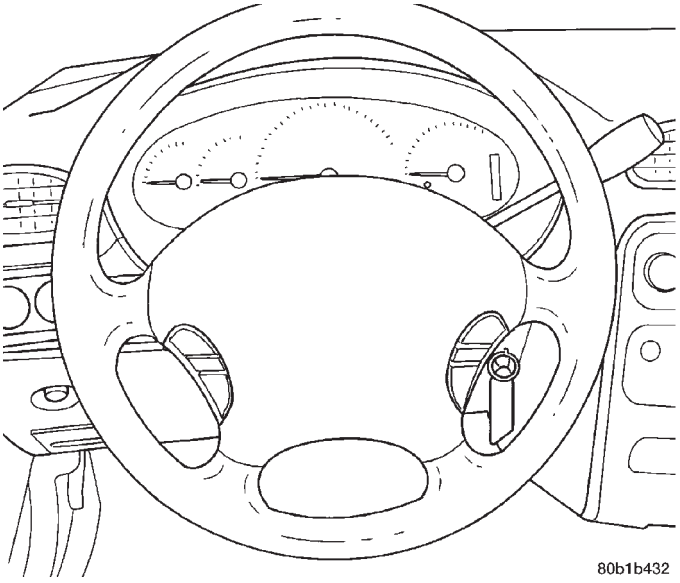


Fig. 1 Speed Control Switches

The system is designed to operate at speeds above 30 mph (48 km/h).

WARNING: THE USE OF SPEED CONTROL IS NOT RECOMMENDED WHEN DRIVING CONDITIONS DO NOT PERMIT MAINTAINING A CONSTANT SPEED, SUCH AS IN HEAVY TRAFFIC OR ON ROADS THAT ARE WINDING, ICY, SNOW COVERED, OR SLIPPERY.

OPERATION

When speed control is activated by depressing the ON switch, the PCM allows a set speed to be stored in RAM for speed control. To store a set speed, depress the SET switch while the vehicle is moving at a speed between 30 and 85 mph. In order for the speed control to engage, the brakes cannot be applied, nor can the gear selector be indicating the transmission is in Park or Neutral.

The speed control can be disengaged manually by:

- Stepping on the brake pedal
- Depressing the OFF switch
- Depressing the CANCEL switch.
- Depressing the clutch pedal

NOTE: Turning the system off by depressing the OFF switch or turning off the ignition switch will erase the set speed stored in the PCM.

For added safety, the speed control system is programmed to disengage for any of the following conditions:

- An indication of Park or Neutral
- A rapid increase rpm (indicates that the clutch has been disengaged)

DESCRIPTION AND OPERATION (Continued)

- Excessive engine rpm (indicates that the transmission may be in a low gear)
- The speed signal increases at a rate of 10 mph per second (indicates that the co-efficient of friction between the road surface and tires is extremely low)
- The speed signal decreases at a rate of 10 mph per second (indicates that the vehicle may have decelerated at an extremely high rate)

Once the speed control has been disengaged, depressing the RESUME switch when speed is greater than 25 mph allows the vehicle to resume control to the target speed that was stored in the PCM.

While the speed control is engaged, the driver can increase the vehicle speed by depressing the ACCEL switch. The new target speed is stored in the PCM when the ACCEL switch is released. The PCM also has a "tap-up" feature in which target speed increases by 2 mph for each momentary switch activation of the ACCEL switch. The PCM also provides a means to decelerate to a new lower target speed without disengaging speed control. Depress and hold the COAST switch until the desired speed is reached, then release the switch.

SPEED CONTROL SERVO-PCM OUTPUT

DESCRIPTION

The servo unit consists of a solenoid valve body, and a vacuum chamber. The solenoid valve body contains three solenoids:

- Vacuum
- Vent
- Dump

The vacuum chamber contains a diaphragm with a cable attached to control the throttle linkage.

OPERATION

The PCM controls the solenoid valve body. The solenoid valve body controls the application and release of vacuum to the diaphragm of the vacuum servo. The servo unit cannot be repaired and is serviced only as a complete assembly.

Power is supplied to the servo by the PCM through the brake switch. The PCM controls the ground path for the vacuum and vent solenoids.

The dump solenoid is energized anytime it receives power. If power to the dump solenoid is interrupted, the solenoid dumps vacuum in the servo. This provides a safety backup to the vent and vacuum solenoids.

The vacuum and vent solenoids must be grounded at the PCM to operate. When the PCM grounds the vacuum servo solenoid, the solenoid allows vacuum to enter the servo and pull open the throttle plate using the cable. When the PCM breaks the ground, the solenoid closes and no more vacuum is allowed to enter the servo. The PCM also operates the vent solenoid via ground. The vent solenoid opens and closes a passage to bleed or hold vacuum in the servo as required.

The PCM duty cycles the vacuum and vent solenoids to maintain the set speed, or to accelerate and decelerate the vehicle. To increase throttle opening, the PCM grounds the vacuum and vent solenoids. To decrease throttle opening, the PCM removes the grounds from the vacuum and vent solenoids.

SPEED CONTROL SWITCHES

DESCRIPTION

There are two separate switch pods that operate the speed control system and are located on the steering wheel..

OPERATION

The speed control system has five separate resistive switches that provide a single multiplexed (MUX) voltage inputs to the PCM. The switch names are: ON, OFF, SET, COAST, RESUME, ACCEL, TAP-UP, COAST, and CANCEL. Based on conditions when the buttons are pushed (and released), the five voltages ranges provided to the PCM result in the following functions: ON, OFF, SET, COAST, RESUME, ACCEL, TAP-UP, COAST, and CANCEL. Refer to the Speed Control Section for more information

Also the PCM receives an input from the brake switch to sense whether the brake pedal has been depressed. When the PCM receives the brake depressed input, it turns off power to the speed control servo and disengages speed control.

The individual switches cannot be repaired. If one switch fails, the entire switch module must be replaced.

INTERACTIVE SPEED CONTROL

DESCRIPTION

Interactive means that communication between the PCM and the TCM is taking place. Interactive speed control avoids unnecessary shifting for smoother, quieter operation and when downshifts are required, makes the shifts smoother.

CLIMBING A GRADE

DESCRIPTION

When climbing a grade the interactive speed control tries to maintain the set speed by increasing the throttle opening, while inability/delaying downshifts.

DESCRIPTION AND OPERATION (Continued)

OPERATION

If opening the throttle alone cannot maintain the set speed and the vehicle speed drops more than three mph below the set speed, the transmission will downshift to third gear. If the vehicle continues to lose speed, by more than 6 mph, the transmission will downshift again maintain the set speed. After the vehicle encounters a less-steep grade, or has crested the grade (reduced the load on the powertrain) and can maintain the set speed at a reduced throttle position, the transmission will upshift, as appropriate, until the set speed can be maintained in Overdrive.

DOWNSHIFT DELAY

DESCRIPTION

Downshift delay features have been added to reduce the number and frequency of downshifts when operating in hilly or mountainous country.

OPERATION

While operating, interactive speed control delays or avoids downshifts by allowing up to nearly wide open throttle without the TCM scheduling a downshift. If the interactive speed control is not engaged or the throttle is manually overridden by the driver while interactive speed control is engaged, the downshift delay feature is not activated.

Torque converter lock and unlock shifts are not affected by the downshift delay feature and will occur at the same throttle angle at a given speed regardless of whether interactive speed control operates or not.

GRADE HUNTING

DESCRIPTION

All vehicles equipped with a four speed automatic transmission have a grade hunting feature for the 2nd to 3rd gear upshift and the 3rd to Overdrive upshift.

OPERATION

The TCM identifies the powertrain loading conditions and selects the proper gear to maintain the current vehicle speed. Under moderate loading conditions the transaxle will stay in 3rd gear until the top of the grade is reached or the powertrain loading is reduced.

If powertrain loading is severe, the transaxle may shift into 2nd gear and remain there until powertrain loading is reduced, then a 2nd to 3rd gear upshift will be scheduled. Grade hunting features always operate regardless of whether or not the interactive speed control is engaged. **If the interactive speed control is not engaged and powertrain loading is not reduced, the driver may have to completely lift off of the throttle before an upshift will occur**. If the driver does lift off the throttle to induce an upshift under these conditions, vehicle speed will reduce and the Overdrive to 3rd and 3rd to 2nd gear downshifts will reoccur when the throttle is reapplied. If grade hunting is repeatedly induced by the driver, transaxle damage may result.

AUTOMATIC SPEED CONTROL OVERSPEED REDUCTION

DESCRIPTION

Transmission control software includes an automatic speed control overspeed reduction feature. This maintains vehicle speed at the selected set point when descending a grade.

OPERATION

The Transmission Control Module (TCM) first senses that the speed control is set. If the set speed is exceeded by more than 4 mph (6.5 km/hr) and the throttle is closed, the TCM causes the transaxle to downshift to THIRD gear. After downshifting, the automatic speed control resumes normal operation. To ensure that an upshift is appropriate after the set speed is reached, the TCM waits until the speed control system opens the throttle at least 6 degrees before upshifting to OVERDRIVE again.

If the driver applies the brakes, canceling automatic speed control operation with the transaxle still in THIRD gear, the TCM maintains this gear until the driver opens the throttle at least 6 degrees to avoid an inappropriate upshift. The upshift is also delayed for 2.5 seconds after reaching the 6 degrees throttle opening in anticipation that the driver might open the throttle enough to require THIRD gear. This will avoid unnecessary and disturbing transmission cycling. If the automatic speed control RESUME feature is used after braking, the upshift is delayed until the set speed is achieved to reduce cycling and provide better response.

BRAKE LAMP SWITCH

DESCRIPTION

The switch is mounted on the brake pedal mounting bracket under the instrument panel.

OPERATION

Vehicles equipped with the speed control option use a dual function brake lamp switch. The PCM monitors the state of the dual function brake lamp switch. Refer to the Brake section for more information on

DESCRIPTION AND OPERATION (Continued)

brake lamp switch service and adjustment procedures.

The brake switch is equipped with three sets of contacts, one normally open and the other two normally closed (brakes disengaged). The PCM sends a 12 volt signal to one of the normally closed contacts in the brake switch, which is returned to the PCM as a brake switch state signal. With the contacts closed, the 12 volt signal is pulled to ground causing the signal to go low. The low voltage signal, monitored by the PCM, indicates that the brakes are not applied. When the brakes are applied, the contacts open, causing the PCM's output brake signal to go high, disengaging the speed control, cutting off PCM power to the speed control solenoids.

The second set of normally closed contacts supplies 12 volts from the PCM any time speed control is turned on. Through the brake switch, current is routed to the speed control servo solenoids. The speed control solenoids (vacuum, vent and dump) are provided this current any time the speed control is ON and the brakes are disengaged.

When the driver applies the brakes, the contacts open and current is interrupted to the solenoids. The normally open contacts are fed battery voltage. When the brakes are applied, battery voltage is supplied to the brake lamps.

SERVO CABLE

DESCRIPTION

The speed control servo cable is connected between the speed control vacuum servo diaphragm and the throttle body control linkage.

OPERATION

This cable causes the throttle control linkage to open or close the throttle valve in response to movement of the vacuum servo diaphragm.

POWERTRAIN CONTROL MODULE

DESCRIPTION

The PCM is located in the engine compartment.

OPERATION

The speed control electronic control circuitry is integrated into the Powertrain Control Module (PCM). The PCM speed control functions are monitored by the On-Board Diagnostics (OBD). All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. The PCM cannot be repaired and must be replaced if faulty.

USE THE DRB SCAN TOOL TO REPROGRAM THE NEW PCM WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

VACUUM RESERVOIR

DESCRIPTION

The vacuum reservoir is located in the engine compartment. It is made of plastic.

OPERATION

The reservoir stores engine vacuum in the reservoir. When engine vacuum drops, as in climbing a grade while driving, the reservoir supplies the vacuum needed to maintain proper speed control operation. The vacuum reservoir cannot be repaired and must be replaced if faulty.

VEHICLE SPEED AND DISTANCE

DESCRIPTION

The PCM receives a signal from the TCM and the transaxle output speed sensor over the bus communication line.

OPERATION

The 4 speed automatic Transmission Control Module (TCM) supplies the speed input to the PCM. The PCM determines acceleration rates. The speed control software in the PCM uses vehicle speed and acceleration to control to the set speed.

Vehicles with a 3 speed automatic or manual transmission have a Vehicle Speed Sensor (VSS) mounted to an adapter near the transmission output shaft. The sensor is driven through the adapter by a speedometer pinion gear. The VSS pulse signal is monitored by the PCM to determine vehicle speed and to maintain speed control set speed. Refer to the appropriate Powertrain Diagnostic Procedures manual for diagnosis and testing of this component.

ROAD TEST

OPERATION

Perform a vehicle road test to verify reports of speed control system malfunction. The road test should include attention to the speedometer. Speedometer operation should be smooth and without flutter at all speeds.

Flutter in the speedometer indicates a problem which might cause surging in the speed control system. The cause of any speedometer problems should

DESCRIPTION AND OPERATION (Continued)

be corrected before proceeding. Refer to the Instrument Panel and Gauges for speedometer diagnosis.

If a road test verifies a surge following a set and the speedometer operates properly see “Overshoot/ Undershoot on speed control set”.

If a road test verifies an inoperative system, and the speedometer operates properly, check for:

- A Diagnostic Trouble Code (DTC). If a DTC exists, conduct tests per the Powertrain Diagnostic Procedures service manual.
- A misadjusted brake (stop) lamp switch. This could also cause an intermittent problem.
- Loose or corroded electrical connections at the servo. Corrosion should be removed from electrical terminals and a light coating of Mopar Multipurpose Grease, or equivalent, applied.
- Leaking vacuum reservoir.
- Loose or leaking vacuum hoses or connections.
- Defective one-way vacuum check valve.
- Secure attachment at both ends of the speed control servo cable.
- Smooth operation of throttle linkage and throttle body air valve.
- Conduct electrical test at PCM.
- Failed speed control servo. Do the servo vacuum test.

CAUTION: When test probing for voltage or continuity at electrical connectors, care must be taken not to damage connector, terminals or seals. If these components are damaged, intermittent or complete system failure may occur.

CHECKING FOR DIAGNOSTIC CODES

OPERATION

When trying to verify a speed control system electronic malfunction: Connect a DRB scan tool if available to the data link connector. The connector is located at left side of the steering column, and at lower edge of the panel.

A speed control malfunction may occur without a diagnostic code being indicated.

For further information and usage of the DRB scan tool and a more complete list of Diagnostic Trouble Code and No Trouble Codes, refer to the Powertrain Diagnostic Manual.

REMOVAL AND INSTALLATION

SERVO

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove three bolts from servo bracket.
(3) Disconnect electrical connectors and vacuum hose.
(4) Remove two nuts attaching speed control cable and mounting bracket to servo.
(5) Remove servo mounting bracket.
(6) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.

INSTALLATION

(1) With throttle in full open position align hole in speed control cable sleeve with hole in servo pin and install retaining clip.
(2) Connect vacuum hose to servo.
(3) Connect electrical connector.
(4) Insert servo studs through holes in speed control cable and mounting bracket.
(5) Install nuts, tighten to 6.7 N·m (60 in. lbs.).
(6) Install servo and bracket and tighten bolt and nuts.
(7) Connect negative battery cable.

SPEED CONTROL SWITCH

REMOVAL

The speed control switch is mounted in the steering wheel and wired through the clock spring device under the airbag module.

WARNING: IF REMOVAL OF AIRBAG MODULE IS NECESSARY, REFER TO the RESTRAINT SYSTEMS section for more information.

(1) Remove the negative battery cable.
(2) Turn off ignition.
(3) Remove two screws from side of the switch.
(4) Rock switch away from airbag and steering wheel.
(5) Disconnect two-way electrical connector.
(6) Repeat for the other switch.

INSTALLATION

(1) Connect two-way electrical connector.
(2) Install switch.
(3) Install two screws into the side of the switch.
(4) Repeat for the other switch.
(5) Install the negative battery cable.

SPEED CONTROL SERVO CABLE—2.7L

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove speed control cable from throttle cam by sliding clasp out hole used for throttle cable.
(3) Compress the retaining tabs on the cable and slide cable out of bracket.
(4) Remove 2 nuts and 1 bolt from servo bracket.

REMOVAL AND INSTALLATION (Continued)

(5) Disconnect electrical connectors and vacuum hose.
(6) Remove two nuts attaching speed control cable and mounting bracket to servo.
(7) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.
(8) Remove servo mounting bracket.

INSTALLATION

(1) Slide cable into throttle cable bracket and engage retaining tabs.
(2) Rotate the throttle cam forward to the wide open position and install speed control cable clasp (Fig. 2).
(3) Rotate the throttle cam forward to the wide open position and install throttle cable clasp.
(4) Install retaining clip to cable at servo.
(5) Insert servo studs through holes in the mounting bracket and speed control cable.
(6) Install nuts, tighten to 6.7 N·m (60 in. lbs.).
(7) Connect vacuum hose to servo.
(8) Connect electrical connector.
(9) Install servo and bracket and tighten nuts and bolt.
(10) Connect negative battery cable.

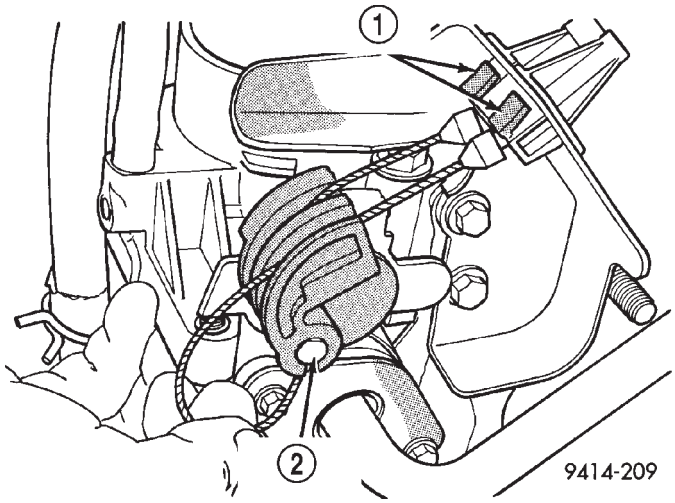


Fig. 2 Disconnecting Throttle Cable—Typical

1 – TABS
2 – CABLE CLASP

SPEED CONTROL SERVO CABLE—3.2/3.5L

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove throttle cable bracket from intake manifold.
(3) Remove speed control cable from throttle cam by sliding clasp out hole used for throttle cable.
(4) Remove the throttle cable (with retaining tab) and then slide cable speed control cable out from bracket.
(5) Remove one bolt and two nuts from servo bracket.
(6) Disconnect electrical connectors and vacuum hose.
(7) Remove two nuts attaching mounting bracket and speed control cable to servo.
(8) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.
(9) Remove servo mounting bracket.

INSTALLATION

(1) Slide speed control cable into bracket and with locator positioned into notch in bracket, then slide throttle cable into bracket and engage retaining tab.
(2) Rotate the throttle cam forward to the wide open position and install speed control cable clasp (Fig. 2).
(3) Rotate the throttle cam forward to the wide open position and install throttle cable clasp.
(4) Install throttle cable bracket and tighten bolts.
(5) Route cable through bracket and install retaining clip to cable at servo.
(6) Insert servo studs through holes in mounting bracket and speed control cable.
(7) Install nuts, tighten to 6.7 N·m (60 in. lbs.).
(8) Connect vacuum hose to servo.
(9) Connect electrical connector.
(10) Install servo and bracket and tighten bolts.
(11) Connect negative battery cable.

VACUUM RESERVOIR

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove the Powertrain Control Module (PCM) refer to the Fuel Injection System section.
(3) Remove and reposition coolant reservoir.
(4) Remove PDC and bracket.
(5) Remove vacuum reservoir.
(6) Disconnect vacuum hose

INSTALLATION

(1) Connect vacuum hose.
(2) Install vacuum reservoir and tighten fasteners.
(3) Install PDC and bracket and tighten fasteners.
(4) Install coolant reservoir.
(5) Install PCM refer to the Fuel Injection System section.
(6) Connect the negative battery cable.

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
Vacuum Resevoir Screws	12 N·m (8.8 ft. lbs.)
Servo Mounting Bracket Nuts	14 N·m (10.3 ft. lbs.)
Servo Mounting Bracket Bolts	14 N·m (10.3 ft.. lbs.)
Servo Mounting Nuts	6.7 N·m (60 in. lbs.)

TURN SIGNAL AND HAZARD WARNING SYSTEMS

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COMBINATION FLASHER 5
MULTI-FUNCTION SWITCH 5

DESCRIPTION AND OPERATION

COMBINATION FLASHER

DESCRIPTION

The Combination Flasher, also refered to as the combo-flasher, is mounted to the in-line bracket which is located to the right of the Junction Block. The flasher can be removed by pulling in a rearward direction. The left under panel silencer duct must be removed to access the flasher. The combo-flasher is black in color for ease of identification.

OPERATION

The Turn Signal and Hazard Warning Flasher is combined into one unit called a Combination Flasher (Combo-Flasher). The combo-flasher controls the flashing of the hazard warning system and the turn signal system. An inoperative bulb or incomplete turn signal circuit will result in an increase in flasher speed.

HAZARD WARNING SYSTEM

DESCRIPTION

The hazard warning system is actuated by a push button located on the top of the steering column between the steering wheel and the instrument panel. The hazard switch is identified with a double triangle on top of the button.

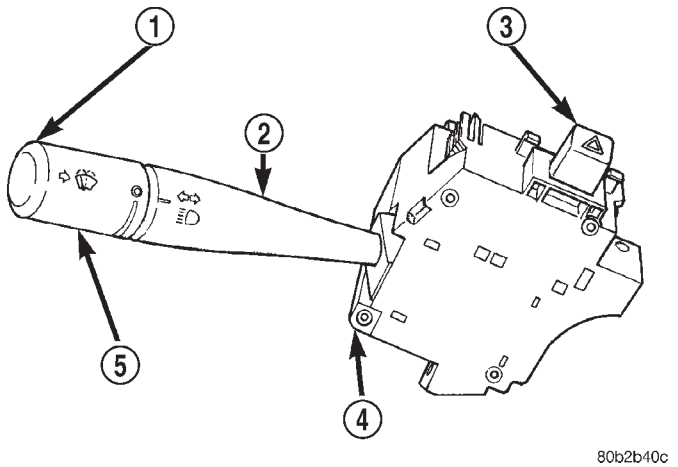


Fig. 1 Hazard Warning Switch Location

1 – WINDSHIELD WASHER BUTTON
2 – CONTROL STALK (BEAM SELECT)
3 – HAZARD WARNING BUTTON
4 – MULTI-FUNCTION SWITCH
5 – WINDSHIELD WIPER CONTROL

OPERATION

Push and release the button to turn the hazard function ON or OFF. The button will move out from the steering column in the ON position and will remain in toward the column in the OFF position.

DESCRIPTION AND OPERATION (Continued)

MULTI-FUNCTION SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAG, SEE GROUP 8M, RESTRAINT SYSTEMS FOR AIRBAG REMOVAL PROCEDURES.

DESCRIPTION

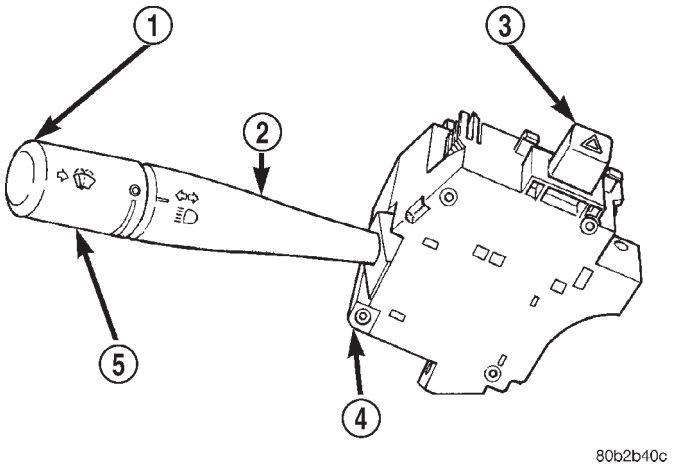


Fig. 2 Multi-Function Switch

1 – WINDSHIELD WASHER BUTTON
2 – CONTROL STALK (BEAM SELECT)
3 – HAZARD WARNING BUTTON
4 – MULTI-FUNCTION SWITCH
5 – WINDSHIELD WIPER CONTROL

The turn signals are part of the multi-function switch which contains:

- Electrical circuitry for turn signals
- Hazard warning switch
- Headlamp beam select switch
- Headlamp optical horn
- Windshield wiper switch
- Pulse wipe and windshield washer switching

The integrated switch assembly is mounted to the left hand side of the steering column.

OPERATION

When the driver wishes to signal his intentions to change direction of travel, he moves the lever upward to cause the right signals to flash and downward to cause the left signals to flash. After completion of a turn the system is deactivated automatically. As the steering wheel returns to the straight ahead position, a canceling cam molded to the clockspring mechanism comes in contact with the cancel actuator on the turn signal multi-function switch assembly. The cam lobe, pushing on the cancel actuator, returns the switch to the off position.

If only momentary signaling such as indication of a lane change is desired, the switch is actuated to a left or right intermediate detent position. In this position the signal lamps flash as described above, but the switch returns to the OFF position as soon as the lever is released.

When the system is activated, one of two indicator lamps mounted in the instrument cluster flashes in unison with the turn signal lamps, indicating to the driver that the system is operating.

DIAGNOSIS AND TESTING

MULTI-FUNCTION SWITCH TESTS

The multi-function switch contains electrical circuitry for turn signal, hazard warning, headlamp beam select, headlamp optical horn, windshield wiper, pulse wipe, and windshield washer switching. Refer to Group 8K, Windshield Wiper and Washer Systems for Wiper and Washer functions. This integrated switch assembly is mounted to the left hand side of the steering column. Should any function of the switch fail, the entire switch assembly must be replaced. Refer to Combination Flasher Diagnosis table.

To test the switch, the switch must first be removed. Refer to Multi-function Switch Removal and Installation procedures within this section. Using an ohmmeter, test for continuity (no resistance) between the terminals of the switch as shown in the Turn Signal and Hazard Switch Continuity and Beam Select Switch Continuity tables.

DIAGNOSIS AND TESTING (Continued)

COMBINATION FLASHER DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
SYSTEM DOES NOT FLASH ON ONE SIDE, INDICATOR LAMP FLASHES AT DOUBLE NORMAL RATE	1. FAULTY EXTERNAL LAMP. 2. POOR GROUND AT LAMP. 3. OPEN CIRCUIT IN WIRING TO EXTERNAL LAMP.	1. REPLACE LAMP. 2. CHECK AND/OR REPLACE WIRING. 3. REPLACE WIRING HARNESS. CHECK CONNECTIONS.
INDICATOR LAMP FLASHES AT DOUBLE NORMAL RATE. EXTERNAL LAMP-DIM AND FLASHES RAPIDLY OR NO FLASH	1. LOOSE OR CORRODED EXTERNAL LAMP CONNECTION. 2. POOR GROUND CIRCUIT AT EXTERNAL LAMP.	1. REPLACE SOCKET/HARNESS. 2. REPLACE WIRING HARNESS. CHECK CONNECTORS.
HAZARD WARNING MALFUNCTION/SYSTEM DOES NOT FLASH	1. FAULTY FUSE. 2. FAULTY FLASHER UNIT. 3. OPEN CIRCUIT IN FEED WIRE TO SWITCH. 4. FAULTY CONTACT IN SWITCH. 5. OPEN OR GROUNDED CIRCUIT IN WIRING TO EXTERNAL LAMPS.	1. REPLACE FUSE. 2. REPLACE FLASHER UNIT. 3. REPLACE WIRING HARNESS. CHECK CONNECTORS. 4. REPLACE MULTI-FUNCTION SWITCH. 5. REPLACE WIRING HARNESS.
INDICATOR LAMP FLASHES AT DOUBLE NORMAL RATE. EXTERNAL LAMP DOES NOT LIGHT	1. OPEN CIRCUIT IN WIRE TO EXTERNAL LAMP. 2. BURNED OUT LAMP.	1. REPLACE WIRING HARNESS. 2. REPLACE LAMP.
SYSTEM DOES NOT FLASH ON EITHER SIDE	1. FAULTY FUSE. 2. FAULTY FLASHER UNIT. 3. LOOSE BULKHEAD CONNECTOR. 4. LOOSE OR FAULTY REAR WIRING HARNESS OR TERMINALS. 5. OPEN CIRCUIT TO FLASHER UNIT. 6. OPEN CIRCUIT IN FEED WIRE TO TURN SIGNAL SWITCH. 7. FAULTY SWITCH CONNECTION IN SWITCH. 8. OPEN OR GROUNDED CIRCUIT IN WIRING TO EXTERNAL LAMPS. 9. BURNED OUT LAMPS.	1. REPLACE FUSE. 2. REPLACE FLASHER UNIT. 3. TIGHTEN CONNECTOR. 4. REPLACE WIRING HARNESS. 5. CHECK CONNECTORS, REPLACE WIRING HARNESS. 6. CHECK CONNECTORS, REPLACE WIRING HARNESS. 7. REPLACE SWITCH. 8. REPLACE WIRING HARNESS. 9. REPLACE LAMPS.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SYSTEM DOES NOT CANCEL AFTER COMPLETION OF TURN	1. BROKEN CANCELLING FINGER ON SWITCH. 2. BROKEN OR MISSING CANCELLING CAM ON CLOCKSPRING. 3. STICKING CANCELLING FINGER ON MULTI-FUNCTION SWITCH.	1. REPLACE MULTI-FUNCTION SWITCH. 2. REPLACE CLOCKSPRING. 3. REPLACE MULTI-FUNCTION SWITCH.
EXTERNAL LAMPS OPERATE PROPERLY, NO INDICATOR LAMP OPERATION	1. FAULTY INDICATOR LAMP IN INSTRUMENT CLUSTER.	1. REPLACE LAMP.

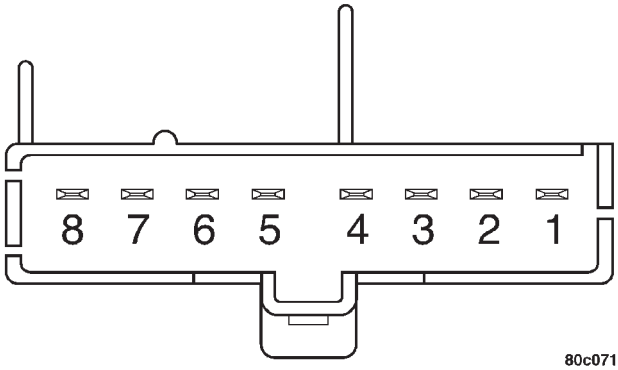


Fig. 3 Turn Signal and Hazard Switch Connector Pin Call-Out

TURN SIGNAL AND HAZARD SWITCH CONTINUITY

SWITCH POSITION		CONTINUITY BETWEEN
TURN SIGNAL	HAZARD WARNING	
LEFT	OFF	7 AND 6
RIGHT	OFF	7 AND 8
NEUTRAL	ON	7 AND 8 7 AND 6 4 AND 5

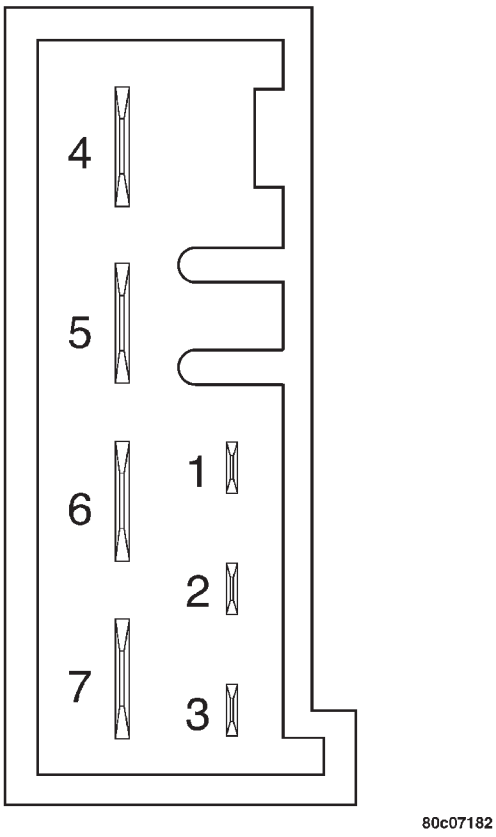


Fig. 4 Beam Select Switch Connector Pin Call-Out

BEAM SELECT SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
HIGH BEAM	7 AND 4
OPTICAL HORN	7 AND 5

REMOVAL AND INSTALLATION

COMBINATION FLASHER

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 5).

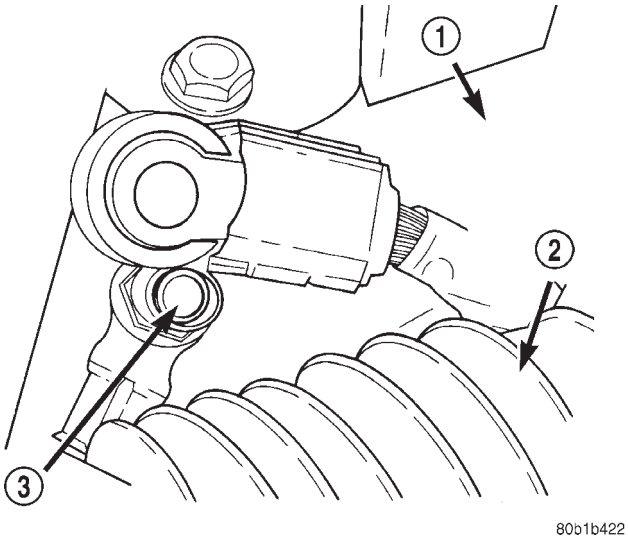


Fig. 5 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Remove the left under panel silencer duct.

(3) The flasher can be removed by pulling in a rearward direction.

INSTALLATION

For installation, reverse the above procedures.

MULTI-FUNCTION SWITCH

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove tilt lever.

(3) Remove both upper and lower steering column shrouds.

(4) Remove multi-function switch mounting screws and connectors (Fig. 6).

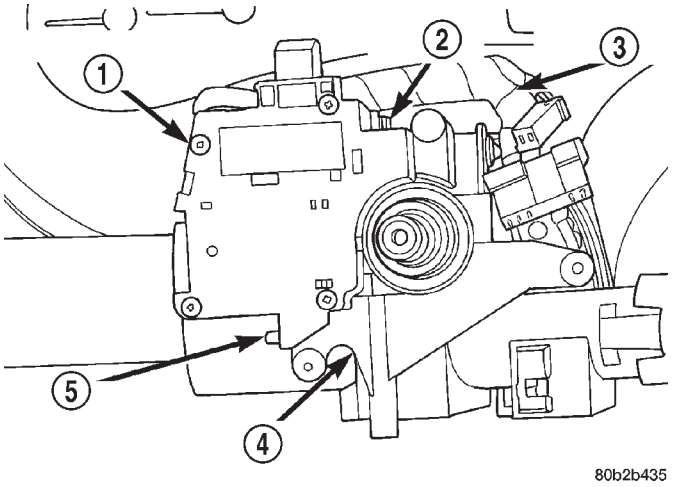


Fig. 6 Multi-Function Switch

1 – MULTIFUNCTION SWITCH
2 – MOUNTING SCREW
3 – WIRING HARNESS
4 – STEERING COLUMN
5 – MOUNTING SCREW

INSTALLATION

For installation, reverse the above procedures.

(1) Tighten multi-function switch retaining screws to 17 in. lbs. (2 N·m) torque.

WIPER AND WASHER SYSTEMS

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DESCRIPTION AND OPERATION

WINDSHIELD WIPER SYSTEM

WARNING: VEHICLES ARE EQUIPPED WITH AN AIRBAG, REFER TO GROUP 8M, RESTRAINT SYSTEMS FOR STEERING WHEEL OR COLUMN SERVICE PROCEDURES.

DESCRIPTION

The windshield wiper system is controlled by a switch located on the multi-functin switch stalk. The multi-function switch is located on the steering column behind the steering wheel.

OPERATION

The windshield wipers will operate when the ignition switch is in the ACCESSORY or IGNITION ON position. The windshield wipers will return to the parked position when the ignition switch is turned to the OFF position. Fuses, located in the Junction Block and Power Distribution Center protects the circuitry of the wiper system and the vehicle.

The wiper motor has permanent magnet fields. The speeds are determined by current flow to the appropriate set of brushes.

The intermittent wiper system, in addition to low and high speed, has a delay mode. The delay mode has a range of 1/2 to 18 seconds. The wiper delay times will double to a range of 1 to 36 seconds when the vehicle speed is less than 10 mph. The delay is controlled by a variable resistor in the wiper switch and the Body Control Module (BCM). The BCM controls the timing for the wiper ON/OFF, as well as the wiper HI/LO relay.

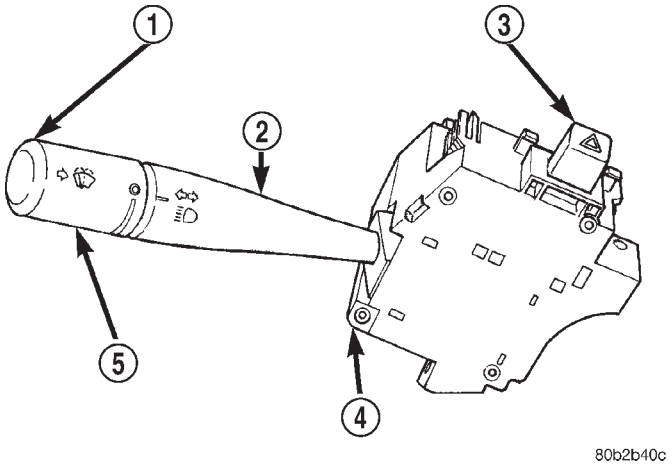


Fig. 1 Windshield Wiper Switch

1 – WINDSHIELD WASHER BUTTON
2 – CONTROL STALK (BEAM SELECT)
3 – HAZARD WARNING BUTTON
4 – MULTI-FUNCTION SWITCH
5 – WINDSHIELD WIPER CONTROL

DESCRIPTION AND OPERATION (Continued)

The wiper system completes the wipe cycle when the switch is turned OFF. The blades park in the lowest portion of the wipe pattern.

When using the DRB lll® scan tool, refer to the proper Body Diagnostic Procedures Manual for Diagnosis and Testing.

WINDSHIELD WASHER SYSTEM

DESCRIPTION

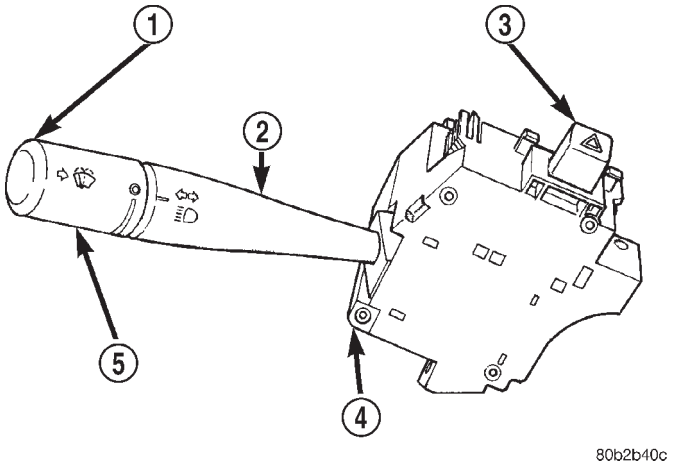


Fig. 2 Windshield Washer Switch

1 – WINDSHIELD WASHER BUTTON
2 – CONTROL STALK (BEAM SELECT)
3 – HAZARD WARNING BUTTON
4 – MULTI-FUNCTION SWITCH
5 – WINDSHIELD WIPER CONTROL

All models are equipped with electric operated windshield washer pumps. The electric pump assembly is mounted with a grommet directly to the reservoir.

The windshield washer system is controlled by a switch located on the multi-functin switch stalk. The multi-function switch is located on the steering column behind the steering wheel.

OPERATION

The wash function can be accessed in the OFF position of the wiper control switch. Wash switch must be pressed for at least 0.5 second to get the wipe after wash. Holding the wash button depressed when the switch is in the OFF position will operate the wipers and washer motor pump continuously until the washer button is released. Releasing the button will stop the washer pump but the wipers will complete the current wipe cycle, followed by an average of two more wipe cycles (±1) before the wipers park and the module turns off. If the wash switch is pressed momentarily with the wipers in the OFF or INTERMITTENT position, a pulse wipe cycle consisting of two wipes will occur.

Fluid is gravity fed from the reservoir to the motor. The fluid is forced by the pump through rubber hoses to the hood mounted nozzles which direct the fluid streams to the windshield. The one way flow check valves are located in each hood nozzle. The purpose of the check valves is to improve fluid flow response time and to prevent excessive washer fluid staining the surface of the hood. The hood mounted nozzles distribute washer fluid on the surface of the windshield. The nozzles are adjustable, refer to the Washer Nozzle Adjusting Procedures. The pump and reservoir are serviced as separate assemblies.

WIPER BLADES

DESCRIPTION

The wiper blades are a rubber element with a steel vertebrae that are mounted on the end of the windshield wiper arm and sweep across the front windshield to clear it of water, snow, and debris.

OPERATION

When the wiper blade rubber element is exposed to the weather for a long period of time, it tends to lose wiping ability. Periodic cleaning of the wiper blade element is suggested to remove the accumulation of salt and road film. The wiper blades, arms, and windshield should be cleaned with a sponge or cloth and a mild detergent or non-abrasive cleaner. If the blades continue to streak or smear, they should be replaced. The driver blade element is 600 mm in length and the passenger blade element is 550 mm in length.

DIAGNOSIS AND TESTING

INTERMITTENT WIPER FUNCTION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, SEE GROUP 8M, RESTRAINT SYSTEMS FOR STEERING WHEEL OR COLUMN REMOVAL PROCEDURES.

The intermittent wiper function is controlled by the Body Control Module (BCM), located in the left side of the instrument panel, attached to the Junction Block (Fig. 3). If the Body Control Module is determined to be the problem, refer to Group 8E, Instrument Panels and Systems, for replacement procedures.

MULTI-FUNCTION/WIPER SWITCH

To test the multi-function/wiper switch, first disconnect the switch wires from the body wiring in the steering column (Fig. 4). Using an ohmmeter, test for continuity between the terminals of the switch, as

DIAGNOSIS AND TESTING (Continued)

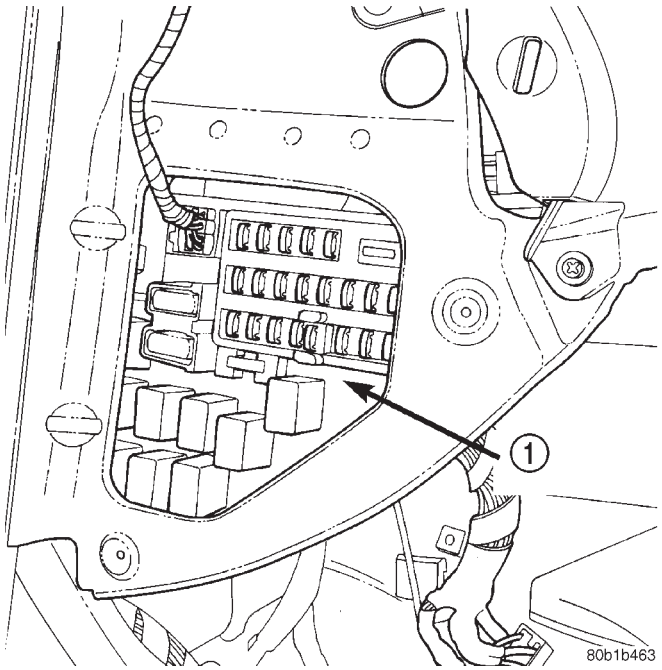


Fig. 3 Body Control Module Location

1 – JUNCTION BLOCK/BCM

indicated in the following continuity table. The identity of each terminal is shown in (Fig. 5).

For test purposes, the first position is the OFF position, the next six positions are for the DELAY wipe. LOW is the next detent position and HIGH is the full counterclockwise detent position.

In any wiper switch position, if the control stalk end cap is depressed, the washer circuit will be completed.

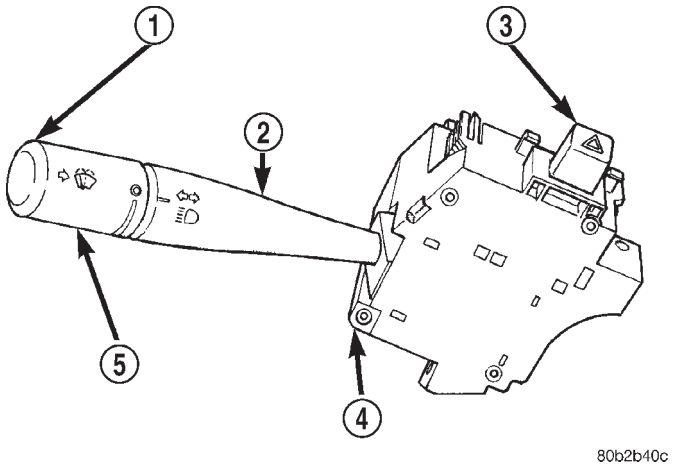


Fig. 4 Multi-Function/Wiper Switch

1 – WINDSHIELD WASHER BUTTON
2 – CONTROL STALK (BEAM SELECT)
3 – HAZARD WARNING BUTTON
4 – MULTI-FUNCTION SWITCH
5 – WINDSHIELD WIPER CONTROL

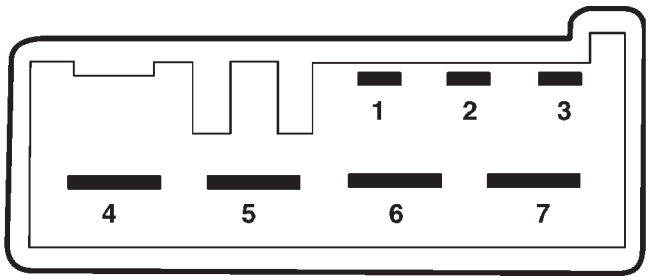


Fig. 5 Multi-Function/Wiper Switch Pin Call-Out

WINDSHIELD WIPER/WASHER SWITCH RESISTANCE TEST

SWITCH POSITION		TERMINALS	RESISTANCE VALUE
OFF		PINS 1 T0 3	OPEN > 300 K OHMS
DELAY LEVEL	1	PINS 1 TO 3	9.72 K OHMS
	2	PINS 1 TO 3	8.22 K OHMS
	3	PINS 1 TO 3	6.61 K OHMS
	4	PINS 1 TO 3	5.12K OHMS
	5	PINS 1 TO 3	3.67K OHMS
	6	PINS 1 TO 3	2.22K OHMS
LOW		PINS 1 TO 3	1.02 K OHMS
HIGH		PINS 1 TO 3	0.51K OHMS
WASH		PINS 1 TO 2	0 OHMS

WINDSHIELD WASHERS

Whenever a windshield washer malfunction occurs, first verify that the windshield washer wire harness is properly connected to all connectors before starting normal diagnosis and repair procedures. Refer to Windshield Washer Test table.

DIAGNOSIS AND TESTING (Continued)

WINDSHIELD WASHER TEST

CONDITION	POSSIBLE CAUSE	CORRECTION
WASHER POWER FEED FUSE OPEN	1. JUNCTION BLOCK FUSE #5 BLOWN.	CHECK FUSE #5. REPLACE IF NOT OK.
BLOWN FUSE WHEN WASHER SWITCH IS DEPRESSED	1. SHORT IN WIPER / WASHER SWITCH. 2. SHORT IN MOTOR POWER CIRCUIT. 3. SHORT IN WASHER MOTOR.	1. DEFECTIVE WASHER SWITCH. REFER TO WIPE / WASHER SWITCH DIAGNOSTIC PROCEDURES. 2. SHORT OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 3. CONNECT AN OHMMETER ACROSS WASHER MOTOR TERMINALS #1 AND #2 AND CHECK FOR A SHORT CIRCUIT. IF NOT OK, REPLACE WASHER MOTOR.
WASHER SYSTEM WILL NOT FLOW WASHER FLUID	1. NO WASHER FLUID IN RESERVOIR. 2. JUNCTION BLOCK FUSE #5 BLOWN. 3. WASHER HOSE NOT FLOWING FLUID. 4. MOTOR CONNECTOR LOOSE. 5. MOTOR CONNECTOR TERMINALS BENT. 6. OPEN POWER CIRCUIT TO SWITCH. 7. OPEN OR DEFECTIVE WIPER / WASHER SWITCH. 8. OPEN POWER CIRCUIT TO MOTOR. 9. OPEN OR DEFECTIVE MOTOR GROUND CIRCUIT. 10. OPEN CIRCUIT IN MOTOR. 11. SEIZED MOTOR BEARINGS.	1. FILL RESERVOIR. 2. SHORT CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WIPER SWITCH TERMINAL #1. SHORT IN WIPER SWITCH. IF NOT OK, REPAIR CIRCUIT OR REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 3. ASSURE WASHER HOSE IS NOT PINCHED, LOOSE, BROKEN, OR DISCONNECTED. IF NOT OK, PROPERLY ROUTE OR REPAIR WASHER HOSE. 4. PROPERLY SEAT CONNECTOR TO MOTOR. 5. REPAIR TERMINALS AND PROPERLY SEAT CONNECTOR TO MOTOR. 6. OPEN OR DEFECTIVE CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WASHER SWITCH CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 7. CONNECT AN OHMMETER ACROSS WIPER / WASHER SWITCH TERMINAL #1 AND #2 AND DEPRESS WASHER BUTTON AND CHECK FOR CONTINUITY. IF NOT OK, REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 8. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 9. OPEN OR DEFECTIVE CIRCUIT BETWEEN WASHER MOTOR CONNECTOR GROUND TERMINAL #2 AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2. 10. CHECK FOR AN OPEN CIRCUIT ON MOTOR BETWEEN POWER TERMINAL #1 AND GROUND TERMINAL #2. IF NOT OK, REPLACE WASHER MOTOR. 11. APPLY DIRECT BATTERY VOLTAGE TO MOTOR TERMINALS. IF MOTOR DOES NOT RUN, REPLACE MOTOR.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
HOOD NOZZLE WILL NOT FLOW	1. FROZEN NOZZLE. 2. NOZZLE HOSE NOT FLOWING. 3. NOZZLE OR NOZZLE HOSE PLUGGED BY CONTAMINATION. 4. DEFECTIVE NOZZLE CHECK VALVE.	DEICE NOZZLE BY ALLOWING TIME FOR UNDERHOOD ENGINE HEAT TO THAW NOZZLE. IF NOT OK, MOVE VEHICLE INTO HEATED AREA. ASSURE WASHER FLUID IS PROPERLY BLENDED FOR AMBIENT OUTSIDE TEMPERATURES. 2. ASSURE NOZZLE HOSE IS NOT PINCHED, LOOSE, BROKEN, OR DISCONNECTED. IF NOT OK, PROPERLY ROUTE OR REPAIR NOZZLE HOSE. 3. CLEAN NOZZLE OR NOZZLE HOSE OF CONTAMINATION. DETERMINE SOURCE OF CONTAMINATION. INSPECT RESERVOIR FOR EXCESSIVE CONTAMINATION. CLEAN SYSTEM AS REQUIRED. 4. REPLACE HOOD NOZZLE.
WASHER FLUID OUTPUT IS LOW	1. PARTIALLY PINCHED HOSE. 2. REVERSE POLARITY TO PUMP.	1. ASSURE WASHER HOSE IS NOT PARTIALLY PINCHED. IF NOT OK, PROPERLY ROUTE HOSE. 2. CHECK FOR CROSSED CIRCUIT TO PUMP. IF NOT OK, REPAIR CIRCUIT.
HOOD NOZZLE STREAM OVERSHOOTS WINDSHIELD	1. NOZZLE NOT SEATED IN HOOD. 2. NOZZLE JET(S) OUT OF ADJUSTMENT.	1. ASSURE NOZZLE IS SNAPPED IN PLACE. 2. ADJUST NOZZLE JETS USING A SAFETY PIN.
WIPER WILL NOT CYCLE WHEN WASHER SWITCH IS DEPRESSED	1. OPEN OR DEFECTIVE WASHER SYSTEM CONTROL CIRCUIT. 2. DEFECTIVE BODY CONTROL MODULE (BCM).	1. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND BCM #C2 BLACK CONNECTOR TERMINAL #7. IF NOT OK REPAIR CIRCUIT. 2. REFER TO BCM DIAGNOSTIC PROCEDURES.
WASHER OPERATES INTERMITTENTLY	1. INTERMITTENT OPEN OR DEFECTIVE WASHER MOTOR POWER CIRCUIT. 2. INTERMITTENT OPEN TO MOTOR GROUND. 3. INTERMITTENT OPEN IN WASHER SWITCH. 4. DEFECTIVE WASHER MOTOR.	1. INTERMITTENT OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 2. INTERMITTENT OPEN BETWEEN MOTOR CONNECTOR TERMINAL #2 AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2. 3. REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 4. REPLACE WASHER MOTOR.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
WASHER FLUID LEVEL INDICATOR INOPERATIVE	1. LOOSE FLUID LEVEL SENSOR CONNECTOR. 2. OPEN POWER CIRCUIT TO SWITCH. 3. OPEN GROUND CIRCUIT. 4. DEFECTIVE INSTRUMENT CLUSTER 5. FLUID LEVEL SENSOR SWITCH OPEN OR DEFECTIVE.	1. PROPERLY SEAT CONNECTOR TO SWITCH. 2. OPEN OR DEFECTIVE CIRCUIT BETWEEN INSTRUMENT CLUSTER CONNECTOR TERMINAL #B4 AND LOW FLUID LEVEL SENSOR CONNECTOR TERMINAL. IF NOT OK, REPAIR CIRCUIT. 3. OPEN OR DEFECTIVE CIRCUIT BETWEEN FLUID LEVEL SENSOR CONNECTOR AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2. 4. REFER TO INSTRUMENT CLUSTER DIAGNOSTIC PROCEDURES. 5. CONNECT AND OHMMETER TO SWITCH TERMINALS TO CHECK FOR COMPLETE CIRCUIT. CYCLE SWITCH FLOAT BACK AND FORTH BY FILLING AND DEPLETING RESERVOIR OF WASHER FLUID TO CHECK FOR PROPER SWITCH FUNCTION. IF NOT OK, REPLACE SWITCH.
LEAKING WASHER FLUID	1. FILLER TUBE LEAKING. 2. FILLER TUBE OUT OR DAMAGED. 3. PUMP OR SENSOR GROMMET DEFECTIVE. 4. LEAKING OR DEFECTIVE RESERVOIR BODY.	1. ASSURE FILLER TUBE IS NOT LOOSE OR DISCONNECTED. IF NOT OK, PROPERLY SEAT FILLER TUBE. 2. REPLACE FILLER TUBE. 3. REPLACE PUMP OR SENSOR GROMMET. 4. REPLACE RESERVOIR BODY.

WINDSHIELD WIPER SYSTEM CONDITIONS

The following is a list of general wiper motor system problems and tests that are to be performed to locate the faulty part, and the corrective action to be taken. When installing harness connector to motor connector on vehicle, assure motor terminals are not bent causing an open circuit to motor.

MOTOR WILL NOT RUN IN ANY SWITCH POSITION

(1) Check fuse 5, in the Junction Block and fuse M in the Power Distribution Center and. Refer to Group 8W, Wiring Diagrams for pin call outs.

(a) If fuse(s) are good, go to Step 2.

(b) If fuse(s) are defective replace, and check motor operation in all switch positions.

(c) If motor is still inoperative and the fuse does not blow, go to Step 2.

(d) If replacement fuse blows, go to Step 11.

(2) Disconnect motor wire harness connector.

(3) Check the wiper motor low speed. Using two jumper wires, connect one jumper wire between the battery positive jump start terminal and Pin 2 on the wiper motor connector. Connect the other jumper wire to ground and Pin 5 on the wiper motor connector. Check the wiper motor high speed, connect the positive jumper wire to Pin 1 on the wiper motor connector. Connect the negative jumper wire to Pin 5 on the wiper motor connector.

(a) If motor runs, go to Step 4.

(b) If motor does not run, high or low speed replace the wiper motor.

(4) Using an ohmmeter, check for good ground at Pin 5 of the wiper motor wire harness connector. If not OK, repair the ground circuit as necessary. If OK, go to Step 5.

(5) Place the wiper switch in the ON position. Using a voltmeter, check for battery voltage at terminal D and A of the intermittent wiper relay in the Power Distribution Center. If no voltage check fuse M. If OK, go to Step 6. If not OK, repair as necessary.

(6) Using an ohmmeter, check from terminal D of the HI-LO wiper relay to Pin 1 of the motor wire connector for continuity. Check from terminal E of the HI-LO wiper relay to Pin 2 of the motor wire connector for continuity. If OK, go to Step 7. If not repair as necessary.

(7) Using an ohmmeter, check for continuity between the HI-LO wiper relay and the intermittent wiper relay. Check from terminal B of the HI- LO wiper relay to terminal B of the intermittent wiper

DIAGNOSIS AND TESTING (Continued)

relay. If OK, check for faulty relays and go to Step 8. If not repair as necessary.

(8) Disconnect the C3 bone 12-way connector from the BCM.

(9) Using an ohmmeter, check for continuity from terminal 4 of the BCM C3 24-way, black connector to the terminal C of the intermittent wiper relay. If OK, go to Step 10. If not repair as necessary.

(10) Using a voltmeter, connect positive lead to terminal 8 of the BCM C2 black 24-way connector and negative lead to ground. Turn ignition switch to the ON position. Slowly move the wiper switch from OFF position through each position to HIGH.

(a) If voltage increases from zero to approximately 10 volts in the HIGH position, replace BCM. If no voltage, go to Step b.

(b) Using an ohmmeter, check for continuity from terminal 3 of wiper switch connector to terminal 8 of the BCM C2 black 24-way connector. If no continuity, repair circuit. If OK, go to Step c.

(c) Using a voltmeter, connect positive lead to terminal 1 of the wiper switch connector. If ignition voltage is present, replace the wiper switch. If no voltage, check continuity from fuse 5 to terminal 1 of the wiper switch connector. Repair circuit as necessary.

(11) Disconnect motor connector and replace fuse 5 from the Junction Block.

(a) If fuse does not blow, go to Step 2.

(b) If fuse blows, wiper control circuit is at fault, repair as necessary, refer to Group 8W, Wiring Diagrams.

MOTOR RUNS SLOWLY AT ALL SPEEDS

(1) Disconnect the wire harness from the wiper motor. Remove wiper arms and blades. Disconnect motor drive link from motor. Connect an ammeter between battery negative jump start terminal and Pin 5 on the wiper motor connector. Connect battery positive wire to Pin 2 on the wiper motor connector. When replacing motor crank nut tighten to 15-20 N·m (130-177 in. lbs.) torque.

(a) If average ammeter reading is more than 10 amps with a hot motor and dry windshield, replace motor.

(b) If motor runs and average ammeter reading is less than 10 amps, go to Step 2.

(2) Check to see if wiper linkage or pivots are binding or caught.

MOTOR WILL RUN AT HIGH SPEED, BUT NOT MOVE AT LOW SPEED. MOTOR WILL RUN AT LOW SPEED, BUT WILL NOT MOVE AT HIGH SPEED

(1) Disconnect motor connector.

(2) If motor will not run on low speed, connect a jumper wire between battery positive jump start terminal and Pin 2 on the wiper motor connector. Connect a second jumper wire between ground and Pin 5 on the wiper motor wire harness connector.

(a) If motor runs, go to Step 3.

(b) If motor does not run, replace the motor.

(3) If motor will not run on high speed, connect a jumper wire between battery positive terminal and Pin 1. Connect a second jumper wire between ground and Pin 5 of the motor connector.

(a) If motor runs, go to Step 4.

(b) If motor does not run, replace the motor.

(4) If wipers will not run at low speed, using an ohmmeter, check for open circuit. Check between terminal E of the HI-LO wiper relay to Pin 2 of the wiper motor wire harness connector for continuity. If OK, go to Step 5. If not repair circuit as necessary.

(5) If wiper will not run at the high speed, using an ohmmeter, check for an open circuit. Check between terminal D of the HI-LO wiper relay and Pin 2 of the wiper motor wire harness connector for continuity. If OK, go to Step 6. If not repair circuit as necessary.

(6) Check for faulty HI-LO wiper relay.

WIPERS RUN AT HIGH SPEED WITH SWITCH IN LOW SPEED POSITION. WIPERS OPERATE IN INTERMITTENT MODE, BUT EACH WIPE IS AT HIGH SPEED.

(1) Disconnect motor connector.

(2) Using two jumper wires, connect one between the battery positive jump start terminal and Pin 2 on the wiper motor connector. Connect the second lead between ground and Pin 5 on the wiper motor connector. If motor runs at low speed, go to Step 3. If motor runs at high speed, replace the motor.

(3) Check for faulty HI-LO wiper relay. Check for crossed wires in harness from HI-LO relay to motor.

(4) Disconnect C3 bone 12-way connector from the BCM and remove the HI/LO wiper relay.

(5) Using an ohmmeter, check terminal 12 of the C3 bone 12-way connector for short to ground.

(6) If continuity to ground is present, repair as necessary. If no continuity to ground, replace the BCM.

WIPERS RUN AT LOW SPEED WITH SWITCH IN HIGH SPEED POSITION

(1) Check for faulty HI-LO wiper relay.

(2) Using an ohmmeter, check for open circuit between terminal C of the HI-LO wiper relay and terminal 12 of the BCM 33 bone 12-way connector. If OK, go to Step 3. If not OK, repair as necessary.

(3) Check wiper switch.

(4) Check for binding linkage

DIAGNOSIS AND TESTING (Continued)

(5) Refer to MOTOR RUNS SLOWLY AT ALL SPEEDS.

MOTOR WILL KEEP RUNNING WITH SWITCH IN OFF POSITION.

(1) Check wiper motor wiring harness for shorts between the low speed motor feed terminal 2 or high speed motor feed terminal 1 and battery or ignition.

(2) Check for faulty wiper ON/OFF or HI/LO relay.

(3) Check circuit from ON/OFF relay terminal C to HI/LO relay terminal B for short to battery or ignition.

(4) Disconnect the C3 bone 12-way connector from the BCM. Check circuit from terminal 4 of C3 bone 12-way connector to terminal C of the ON/OFF wiper relay for short to ground.

(5) Check circuit from terminal 3 of C2 bone 24–way connector to Pin 4 of the wiper motor harness connector for an open. If open circuit, repair as necessary.

(6) Using a voltmeter, connect positive lead to terminal 8 of the C2 black 24-way connector. Connect negative lead to ground. If voltmeter reads greater than 0 volts, check wiper switch and wiring.

(7) Using a voltmeter, connect positive lead to terminal 8 of the C3 black 12-way connector.

(a) If voltmeter reads 10 to 15 volts, check the circuit for short to battery or ignition.

(b) If the voltmeter reads 0 volts, replace the BCM.

WIPER WILL RUN CONTINUOUSLY WITH SWITCH IN THE INTERMITTENT POSITION. WHEN COLUMN SWITCH IS TURNED OFF, WIPERS STOP WHEREVER THEY ARE, WITHOUT RETURNING TO PARK POSITION.

(1) Using an ohmmeter, check for ground at Pin 4 on the wiper motor connector. If grounded, replace motor.

(2) Using an ohmmeter, with the wiper motor in the PARK position, check for continuity between Pin 5 and Pin 4 on the wiper motor connector. If continuous continuity, go to Step 3. If not OK, replace motor.

(3) Disconnect the wiper motor wire harness connector and the BCM C3 bone 12–way connector. Check for continuity between Pin 1 of the wiper motor wire harness connector and terminal 3 of the BCM C3 bone 12-way connector. If no continuity, repair as necessary. If continuity is OK, test the wiper motor.

WIPERS DO NOT RUN WHEN WASHER MOTOR IS ENGAGED

(1) Disconnect the C2 black 24-way connector from the BCM.

(2) Using a voltmeter, connect positive lead to terminal 7 of the C2 black 24-way connector and the negative lead to ground.

(3) Engage the washer switch so that the washer motor runs continuously.

(a) If the voltage is zero, check the wiring between the washer switch terminal 2 and the BCM and repair as necessary.

(b) If the battery voltage is shown, replace the BCM.

WIPER MOTOR SYSTEM

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, SEE GROUP 8M, RESTRAINT SYSTEMS FOR STEERING WHEEL OR COLUMN REMOVAL PROCEDURES.

Whenever a wiper motor malfunction occurs, disconnect motor wire harness and clean the terminals. Ensure the wire harness is properly connected before starting diagnosis and repair procedures. Refer to Wiper Motor Test table.

DIAGNOSIS AND TESTING (Continued)

WIPER MOTOR TEST

CONDITION	POSSIBLE CAUSE	CORRECTION
WIPER OPERATES IN LOW SPEED OR INTERMITTENT ONLY	1. HI / LO RELAY DEFECTIVE. 2. OPEN OR DEFECTIVE CONTROL CIRCUIT IN BCM. 3. DEFECTIVE WIPER SWITCH. 4. OPEN HIGH SPEED CIRCUIT. 5. DEFECTIVE MOTOR.	1. CHECK HI / LO RELAY WITH KNOWN GOOD RELAY. IF NOT OK, REPLACE HI / LO RELAY. 2. OPEN OR DEFECTIVE CIRCUIT BETWEEN HI / LO RELAY CAVITY “C″ AND BCM CONNECTOR TERMINAL #12C. DEFECTIVE BCM. IF NOT OK, REPAIR CIRCUIT OR REFER TO BCM DIAGNOSTIC PROCEDURES. 3. REFER TO WIPER SWITCH DIAGNOSTIC PROCEDURES. 4. OPEN OR DEFECTIVE CIRCUIT BETWEEN HI / LO RELAY CAVITY “D″ AND WIPER MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 5. APPLY BATTERY JUMPER OVER TO WIPER TERMINAL #1 AND GROUND TERMINAL #5. IF NOT OK, REPLACE MOTOR.
WIPER OPERATES IN INTERMITTENT MODE ONLY	1. DEFECTIVE WIPER SWITCH.	1. REFER TO WIPER SWITCH DIAGNOSTIC PROCEDURES.
WIPER OPERATES IN HIGH SPEED ONLY	1. DEFECTIVE HI / LO RELAY. 2. DEFECTIVE CONTROL CIRCUIT TO BCM. 3. DEFECTIVE BCM. 4. OPEN LOW SPEED CIRCUIT. 5. DEFECTIVE MOTOR.	1. CHECK WIPER HI / LO RELAY WITH KNOWN GOOD RELAY. REPLACE IF NOT OK. 2. CONTINUOUS SHORT BETWEEN HI / LO RELAY CAVITY “C” AND BCM CONNECTOR TERMINAL #12C. IF NOT OK, REPAIR CIRCUIT. 3. REFER TO BCM DIAGNOSTIC PROCEDURES. 4. OPEN OR DEFECTIVE CIRCUIT BETWEEN HI / LO RELAY CAVITY “E″ AND WIPER MOTOR CONNECTOR TERMINAL #2. IF NOT OK, REPAIR CIRCUIT. 5. APPLY BATTERY JUMPER POWER TO WIPER TERMINAL #2 AND GROUND TERMINAL #5. IF NOT OK, REPLACE MOTOR.
WIPER OPERATION SWITCHES BETWEEN LOW AND HIGH SPEED OPERATION	1. DEFECTIVE CONTROL CIRCUIT TO BCM. 2. DEFECTIVE BCM.	1. INTERMITTENT SHORT BETWEEN HI / LO RELAY CAVITY “C” AND BCM CONNECTOR TERMINAL #12C, IF NOT OK, REPAIR CIRCUIT. 2. REFER TO BCM DIAGNOSTIC PROCEDURES.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
WIPER WILL NOT PARK	1. OPEN WIPER MOTOR PARK CIRCUIT. 2. DEFECTIVE BCM. 3. DEFECTIVE WIPER MOTOR.	1. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER MOTOR CONNECTOR TERMINAL #4 AND BCM TERMINAL #3C. IF NOT OK, REPAIR CIRCUIT. 2. REFER TO BCM DIAGNOSTIC PROCEDURES. 3. APPLY BATTERY JUMPER POWER TO WIPER TERMINAL #2 (LOW SPEED) AND GROUND TERMINAL #5 (COMMON GROUND). POSITION AN OHMMETER ACROSS MOTOR PARK TERMINAL #4 AND COMMON GROUND. THE OHMMETER MUST INDICATE ONE SHORT, ONCE EVERY MOTOR REVOLUTION. OR WITH MOTOR IN “PARK” POSITION, CHECK FOR CONTINUITY BETWEEN MOTOR TERMINAL #4 AND 5. IF NOT OK, REPLACE MOTOR.
WIPER WILL NOT RUM TO PARK AFTER IGNITION OFF	1. DEFECTIVE BCM.	1. REFER TO BCM DIAGNOSTIC PROCEDURES.
WIPER RUNS THRU PARK POSITION ON WINDSHIELD	1. DEFECTIVE ON / OFF RELAY. 2. OPEN ON / OFF RELAY GROUND CIRCUIT.	1. CHECK WIPER ON / OFF RELAY WITH KNOWN GOOD RELAY. IF NOT OK, REPLACE RELAY. 2. OPEN OR DEFECTIVE CIRCUIT BETWEEN ON / OFF RELAY CAVITY “E″ AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2.
WIPER RUNS CONTINUOUSLY OR INTERMITTENTLY IN LOW SPEED WITH IGNITION OR ACCESSORY ON AND WIPER SWITCH OFF	1. DEFECTIVE ON / OFF RELAY. 2. DEFECTIVE CONTROL CIRCUIT TO BCM. 3. DEFECTIVE BCM.	1. CHECK WIPER ON / OFF RELAY WITH KNOWN GOOD RELAY. IF NOT OK, REPLACE RELAY. 2. INTERMITTENT OR CONTINUOUS SHORT BETWEEN ON / OFF RELAY CAVITY ″C” AND BCM CONNECTOR TERMINAL #4C. IF NOT OK, REPAIR CIRCUIT. 3. REFER TO BCM DIAGNOSTIC PROCEDURES.
WIPER MOTOR POWER FEED FUSE OPEN	1. POWER DISTRIBUTION CENTER (PDC) FUSE “M” DEFECTIVE.	1. CHECK FUSE “M”. IF NOT OK, REPLACE FUSE.
WIPER SWITCH POWER FEED FUSE OPEN	1. JUNCTION BLOCK FUSE #5 DEFECTIVE.	1. CHECK FUSE #5. IF NOT OK, REPLACE FUSE.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
WIPER SYSTEM WILL NOT RUN	1. PDC FUSE “M” BLOWN. 2. JUNCTION BLOCK FUSE #5 BLOWN. 3. ON / OFF RELAY DEFECTIVE. 4. MOTOR CONNECTOR DEFECTIVE (LOOSE, BENT OR CORRODED). 5. OPEN POWER CIRCUIT TO MOTOR. 6. BCM CONNECTORS “B” AND “C” (LOOSE, BENT OR CORRODED). 7. OPEN OR DEFECTIVE CONTROL CIRCUIT TO BCM. 8. OPEN OR DEFECTIVE MOTOR GROUND CIRCUIT. 9. OPEN CIRCUIT IN MOTOR. 10. STRIPPED GEARS IN MOTOR. 11. SEIZED MOTOR BEARINGS.	1. SHORT CIRCUIT BETWEEN PDC FUSE “M” AND ON / OFF RELAY CAVITY ″A” OR “D” OR HI / LO RELAY CAVITY “A”. SHORT CIRCUIT IN ON / OFF RELAY OR HI / LO RELAY. SHORT CIRCUIT BETWEEN ON / OFF RELAY CAVITY “B” AND HI / LO RELAY CAVITY “B”. IF NOT OK, REPLACE ON / OFF RELAY OR REPAIR CIRCUIT(S). 2. SHORT CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WIPER SWITCH TERMINAL #1. SHORT IN WIPER SWITCH. IF NOT OK, REPAIR CIRCUIT OR REFER TO WIPER SWITCH DIAGNOSTIC PROCEDURES. 3. CHECK WITH A KNOWN GOOD RELAY. IF NOT OK, REPLACE RELAY. 4. CHECK MOTOR CONNECTOR FOR BENT, LOOSE, OR CORRODED CONNECTOR. 5. OPEN OR DEFECTIVE CIRCUIT BETWEEN PDC FUSE “M” AND ON / OFF RELAY CAVITY “A” OR “D”. OPEN OR DEFECTIVE CIRCUIT BETWEEN ON / OFF RELAY CAVITY “B” AND HI / LO RELAY CAVITY “B”. IF NOT OK, REPLACE ON / OFF RELAY OR REPAIR CIRCUIT(S). 6. CHECK BCM CONNECTORS “B” AND “C” FOR BENT, LOOSE, OR CORRODED CONNECTORS. 7. OPEN OR DEFECTIVE CIRCUIT BETWEEN ON / OFF RELAY CAVITY “C″ AND BCM CONNECTOR TERMINAL #4C. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER SWITCH TERMINAL #5 AND BCM CONNECTOR TERMINAL #5B. DEFECTIVE BCM. IF NOT OK, REPAIR CIRCUIT(S) OR REFER TO BCM DIAGNOSTIC PROCEDURES. 8. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER MOTOR CONNECTOR GROUND TERMINAL #5 AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2. 9. CHECK FOR OPEN CIRCUIT IN MOTOR BETWEEN LO SPEED TERMINAL #2 AND GROUND TERMINAL #5 OR BETWEEN HI SPEED TERMINAL #1 AND GROUND TERMINAL #5. IF NOT OK, REPLACE WIPER MOTOR. 10. APPLY BATTERY VOLTAGE TO MOTOR HI SPEED OR LO SPEED CIRCUIT. IF MOTOR RUNS AND OUTPUT CRANK RUNS INTERMITTENTLY OR DOES NOT RUN, REPLACE MOTOR. 11. APPLY BATTERY VOLTAGE TO MOTOR HI SPEED OR LO SPEED CIRCUIT. IF MOTOR DOES NOT RUN, REPLACE MOTOR.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
WIPER SYSTEM MAKES REVERSAL NOISE	1. LOOSE ARM TO BLADE CONNECTION. 2. LOOSE MASTER LINK. 3. LOOSE SLAVE LINK. 4. LOOSE LINKAGE PIVOT(S). 5. LOOSE MOTOR CRANK. 6. EXCESSIVE MOTOR GEARBOX “BACKLASH” OR LOOSE ARMATURE.	1. INSPECT CONNECTION FOR DAMAGE, BENDING, EXCESSIVE WARE. REPLACE ARM OR BLADE IF NOT OK. 2. REPLACE MASTER LINK IF NOT OK. 3. REPLACE SLAVE LINK IF NOT OK. 4. REPLACE LINKAGE FRAME IF NOT OK. 5. TIGHTEN CRANK NUT TO SPECIFICATION. 6. REPLACE WIPER MOTOR.
WIPER ARM(S) CHATTER ON WINDSHIELD	1. PERMANENT HI OR LO TEMPERATURE SET OF BLADE ELEMENT EDGE. 2. BENT OR DAMAGED BLADE STRUCTURE. 3. BENT OR DAMAGED ARM.	1. INSPECT RUBBER ELEMENT FOR PERMANENT SET. IF NOT OK, REPLACE RUBBER ELEMENT. 2. INSPECT BLADE. IF NOT OK, REPLACE BLADE. 3. INSPECT ARM. IF NOT OK, REPLACE ARM.
DRIVER AND / OR PASSENGER ARM WILL NOT CYCLE (OPERATE)	1. LOOSE ARM TO PIVOT SHAFT. 2. STRIPPED ARM TO PIVOT SHAFT.	1. CHECK ARM TO PIVOT SHAFT CONNECTION FOR LOOSENESS. TORQUE NUT TO SPECIFICATION. 2. CHECK ARM TO PIVOT SHAFT FOR STRIPPING. TORQUE NUT TO SPECIFICATION. IF NOT OK, REPLACE ARM.
DRIVER AND / OR PASSENGER ARM OR BLADE HITS COWL SCREEN OR WINDSHIELD MOLDINGS	1. ARM(S) OUT OF POSITION.	1. REMOVE ARM OFF PIVOT SHAFT, CYCLE MODULE TO PARK. REPOSITION ARM / BLADE TO LOCATION MARKS ON WINDSHIELD. SECURE ARM TO PIVOT SHAFT AND TORQUE TO SPECIFICATION.
WIPER BLADE(S) STREAK	1. CONTAMINATION ON BLADE ELEMENT OR WINDSHIELD. 2. BLADE ELEMENT DAMAGED.	1. CLEAN BLADE ELEMENT EDGE WITH MILD SOAP OR ALCOHOL AND WATER. CLEAN WINDSHIELD WITH MILD SOAP OR NON-ABRASIVE CLEANSER AND WATER. CHECK FOR PROPER WIPE QUALITY. IF NOT OK, REPLACE BLADE ELEMENT. 2. REPLACE BLADE ELEMENT.
POOR COLD TEMPERATURE WIPE QUALITY	1. NO WASHER FLUID FOR WASH / WIPE CYCLE. 2. POOR WINDSHIELD DEFROST PERFORMANCE. 3. PERMANENT HI OR LO TEMPERATURE SET OF BLADE ELEMENT EDGE. 4. LOW ARM FORCE	1. ADD WASHER FLUID TO RESERVOIR. 2. CHECK WINDSHIELD DEFROSTER FOR PROPER FUNCTION AND PERFORMANCE. 3. INSPECT RUBBER ELEMENT FOR PERMANENT SET. IF NOT OK, REPLACE RUBBER ELEMENT. 4. CHECK FOR PROPER ARM FORCE. IF NOT OK, REPLACE ARM.

REMOVAL AND INSTALLATION

MULTI-FUNCTION SWITCH

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

(2) Remove tilt lever.

(3) Remove both upper and lower steering column shrouds.

(4) Remove multi-function switch mounting screws and connectors (Fig. 7).

INSTALLATION

For installation, reverse the above procedures.

REMOVAL AND INSTALLATION (Continued)

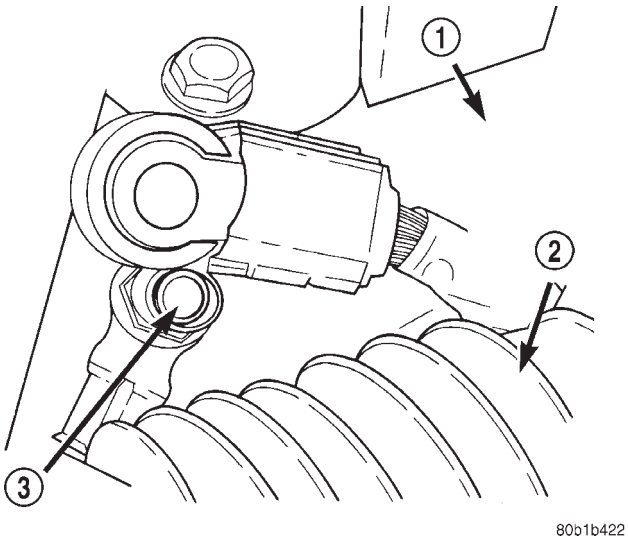


Fig. 6 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

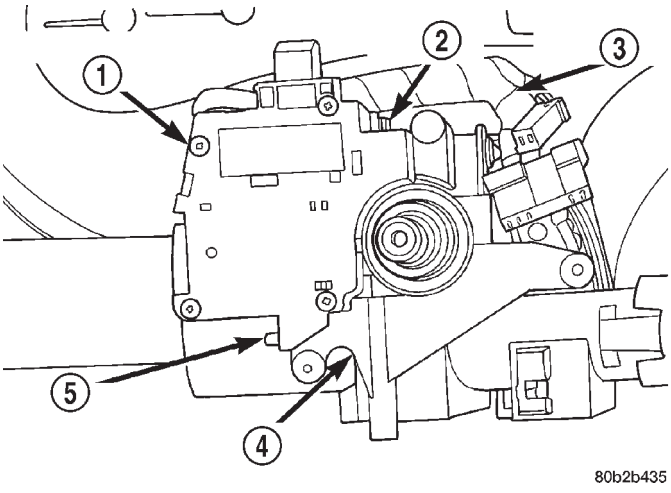


Fig. 7 Multi-Function Switch

1 – MULTIFUNCTION SWITCH
2 – MOUNTING SCREW
3 – WIRING HARNESS
4 – STEERING COLUMN
5 – MOUNTING SCREW

(1) Tighten multi-function switch retaining screws to 17 in. lbs. (2 N·m) torque.

WASHER FLUID LEVEL SENSOR

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 6).

(2) Hoist vehicle.

(3) Remove front fascia as necessary (left side only and use a 2x4 to prop left edge of fascia away from body). Refer to Group 23, Body for Removal and Installation procedures.

(4) Disconnect the wire connector from the reservoir fluid level sensor.

(5) Gently pry sensor away from reservoir and out of grommet. Care must be taken not to puncture reservoir (Fig. 10).

(6) Remover rubber grommet from reservoir and throw away.

INSTALLATION

For installation, reverse the above procedures.

NOTE: Use a new mounting grommet when installing a new sensor assembly.

Assure “flat” of sensor is aligned under the “ridge” of reservoir and that sensor connector is facing down in the fully seated position.

WASHER FLUID LEVEL SENSOR (INTREPID)

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove the Washer Reservoir. Refer to Washer Reservoir Removal and Installation in this section

(3) Gently pry sensor away from reservoir and out of grommet. Care must be taken not to puncture reservoir (Fig. 10).

(4) Remover rubber grommet from reservoir and throw away.

INSTALLATION

For installation, reverse the above procedures.

NOTE: Use a new mounting grommet when installing a new sensor assembly.

Assure “flat” of sensor is aligned under the “ridge” of reservoir and that sensor connector is facing down in the fully seated position.

WASHER HOSE

REMOVAL

(1) Remove left headlamp module. Refer to Group 8L, Lamps for Removal and Installation procedures.

(2) Remove underhood silencer pad clips only along left rear of hood.

(3) Carefully pull silencer pad away from hood.

(4) Disconnect “Y” connector from hood.

(5) Disconnect right and left hood nozzle hoses at “Y” connector.

REMOVAL AND INSTALLATION (Continued)

(6) Disconnect hose clips from hood, tower to tower beam, and fender beam.

(7) Disconnect washer hose from top of reservoir and from washer pump discharge port.

(8) Carefully pull washer hose up through engine compartment.

INSTALLATION

For installation, reverse the above procedures. Be sure to test and check system for leaks and pinched or kinked hoses.

WINDSHIELD WASHER NOZZLES

REMOVAL

(1) Using a plastic body filler spreader or equivalent (credit card), gently place it underneath the front of the washer nozzle. Be careful not to damage the hood seal underneath the nozzle.

(2) Rock the nozzle back and forth slightly to release it from the hood panel.

(3) Pull the nozzle out of the hood panel far enough to disconnect the hose.

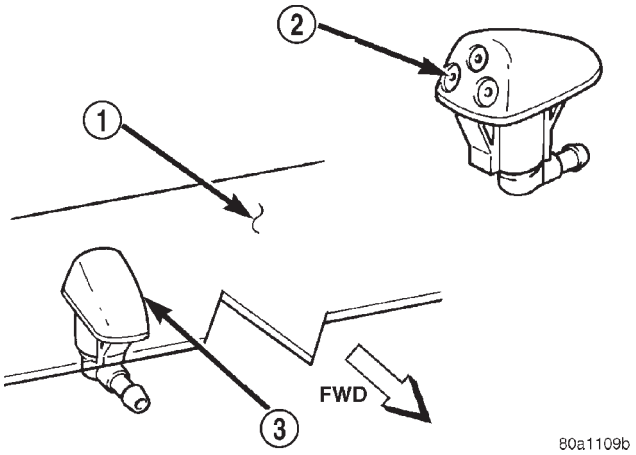


Fig. 8 Windshield Washer Nozzle

1 – HOOD
2 – ADJUST WITH A SAFETY PIN
3 – NOZZLE

INSTALLATION

(1) For installation, reverse the above procedures.

(2) After connecting hose, check for proper system function and to assure leak free connections by actuating the washer system switch from inside of vehicle.

WASHER RESERVOIR

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Hoist vehicle.

(3) Remove front fascia as necessary (left side only and use a 2x4 to prop left edge of fascia away from body). Refer to Group 23, Body for Removal and Installation procedures.

(4) Disconnect the wire connectors from the reservoir pump and float sensor.

(5) Disconnect the washer hose and block the liquid outlet to prevent the liquid from running out of the reservoir.

(6) Reach up behind the washer reservoir and pull the filler tube off the rear of the reservoir.

(7) Remove four mounting bolts to washer reservoir (Fig. 9).

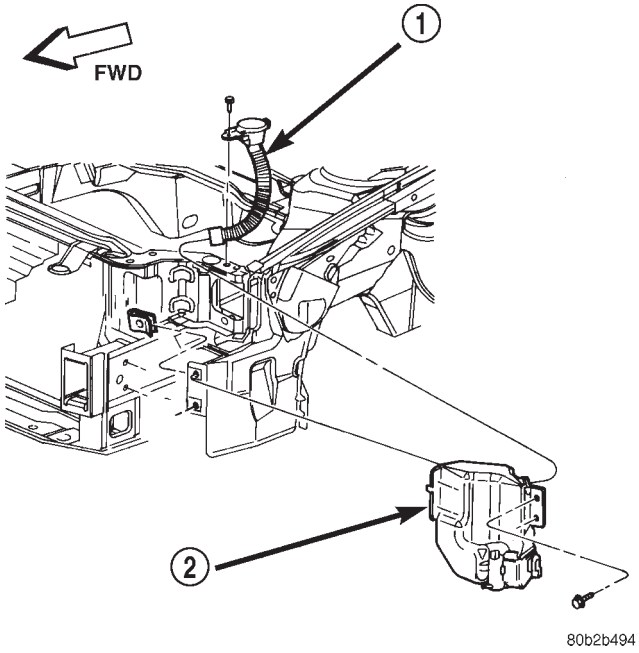


Fig. 9 Washer Reservoir Removal

1 – WASHER RESERVOIR FILLER TUBE
2 – WASHER RESERVOIR

(8) Remove washer reservoir from vehicle.

(9) Transfer fluid level sensor, pump, and washer fluid to new reservoir (Fig. 10).

INSTALLATION

(1) Connect washer hose, filler tube, and wire connectors to reservoir.

(2) Install reservoir retaining bolts. Torque bolts to 80 to 124 in. lbs. (9 to 14 N·m).

(3) Reconnect the negative battery cable remote terminal.

WASHER RESERVOIR (INTREPID)

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

REMOVAL AND INSTALLATION (Continued)

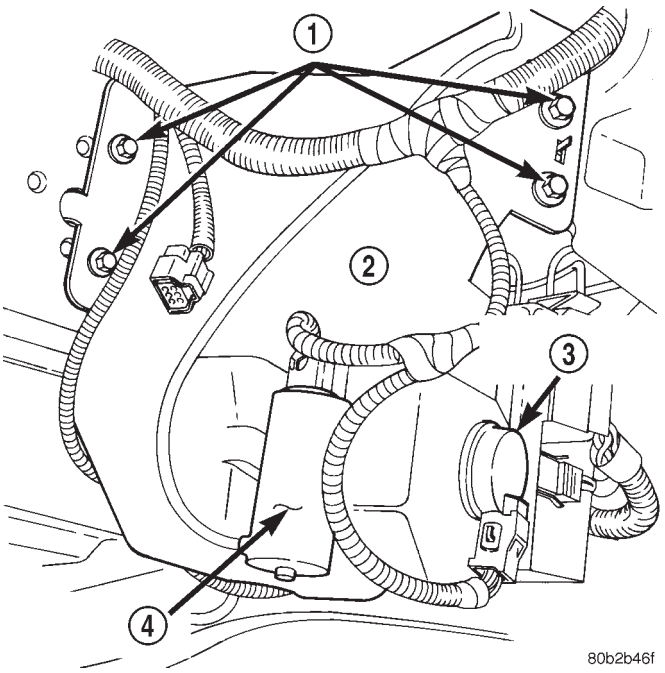


Fig. 10 Washer Reservoir

1 – RETAINING BOLTS
2 – WASHER RESERVOIR
3 – FLUID LEVEL SENSOR
4 – WASHER FLUID PUMP

(2) Remove the left headlamp assembly and set aside. Refer to Group 8L-Lamps, Headlamp Housing (Intrepid) Removal and Installation.

(3) Remove the four retaining bolts to the washer reservoir (Fig. 9).

(4) Disconnect the pump and sensor wire connectors.

(5) Disconnect the washer hose.

(6) Disconnect the washer filler hose.

(7) Pivot the inboard side of the reservoir forward and lift out of vehicle.

(8) If replacing the reservoir, you must transfer the pump and sensor to the new reservoir (Fig. 10).

NOTE: When transferring pump and sensor, make sure to use a new grommet for proper sealing and to avoid leaks.

INSTALLATION

(1) Connect washer hose, filler tube, and wire connectors to reservoir.

(2) Install reservoir retaining bolts. Torque bolts to 80 to 124 in. lbs. (9 to 14 N·m).

(3) Reconnect the negative battery cable remote terminal.

WASHER RESERVOIR FILLER TUBE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Hoist vehicle.

(3) Remove front fascia as necessary (left side only and use a 2x4 to prop left edge of fascia away from body). Refer to Group 23, Body for Removal and Installation procedures.

(4) Reach up behind the washer reservoir and pull the filler tube off the rear of the reservoir.

(5) Remove one screw attaching washer reservoir filler tube to upper radiator support (Fig. 11).

(6) Pull filler tube and hose up through left fender and remove.

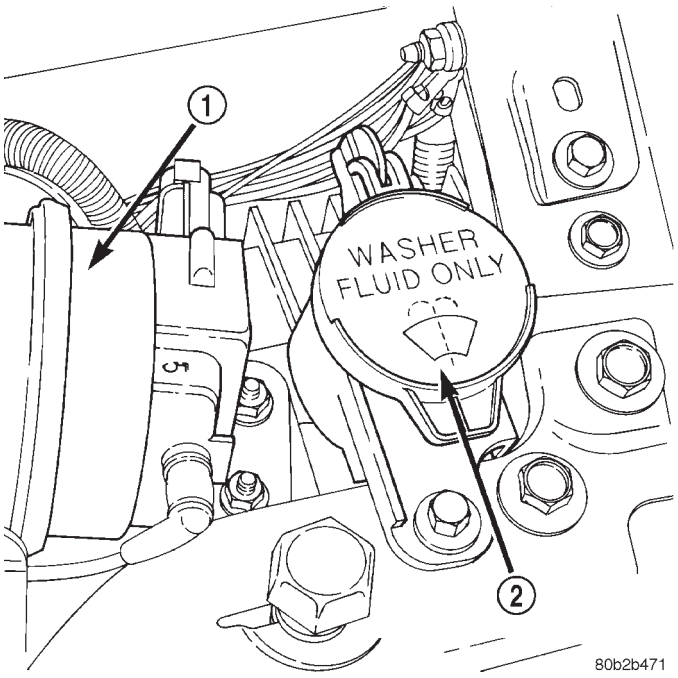


Fig. 11 Washer Reservoir Filler Tube

1 – SPEED CONTROL SERVO
2 – WASHER RESERVOIR FILLER TUBE

INSTALLATION

For installation, reverse the above procedures.

NOTE: Replace/refill washer fluid after filler tube replacement.

WASHER RESERVOIR PUMP

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Hoist vehicle.

REMOVAL AND INSTALLATION (Continued)

(3) Remove front fascia as necessary (left side only and use a 2x4 to prop left edge of fascia away from body). Refer to Group 23, Body for Removal and Installation procedures.

(4) Disconnect the wire connectors from the reservoir pump.

(5) Gently pry pump away from reservoir and out of grommet. Care must be taken not to puncture reservoir (Fig. 10).

(6) Remover rubber grommet from reservoir and throw away.

INSTALLATION

For installation, reverse the above procedures. Use new rubber grommet with new pump. Assure pump is fully seated into reservoir.

NOTE: Replace/refill washer fluid after reservoir pump replacement.

WIPER ARM AND BLADE

REMOVAL

(1) Cycle the wiper arm/blades into PARK position and turn ignition OFF.

(2) Using a trim stick (special tool #C-4755), gently pry up on the wiper arm retaining nut cap and remove.

(3) Remove the retaining nut from the wiper arm pivot.

(4) Lift wiper arm to raise blade off glass and remove the arm from the pivot using a rocking motion and remove from vehicle.

INSTALLATION

For installation, reverse the above procedures.

Refer to Wiper Arm Adjustment in this section for adjustment procedures.

WIPER BLADE

REMOVAL

(1) Lift wiper arm to raise blade off glass.

(2) Remove blade assembly from arm by pushing release tab under arm tip and slide blade away from arm tip (Fig. 12) and (Fig. 13). The vertebra is curved on the right blade only. Install with the curve matching the shape of the windshield.

(3) Gently place wiper arm tip on glass surface.

INSTALLATION

For installation reverse the above procedures.

NOTE: The vertebra is curved on right side only. Install with curve matching shape of windshield.

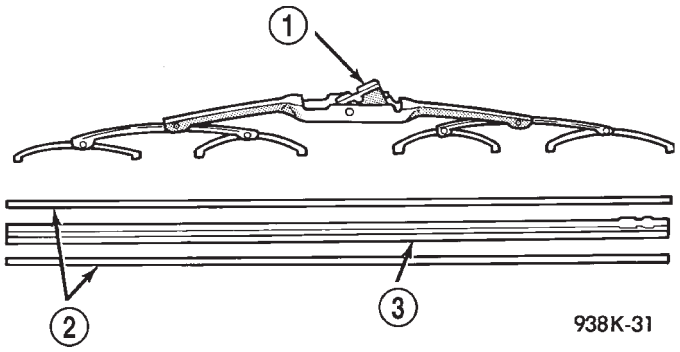


Fig. 12 Wiper Blade and Element

1 – ARM RELEASE TAB
2 – VERTABRA
3 – RUBBER ELEMENT

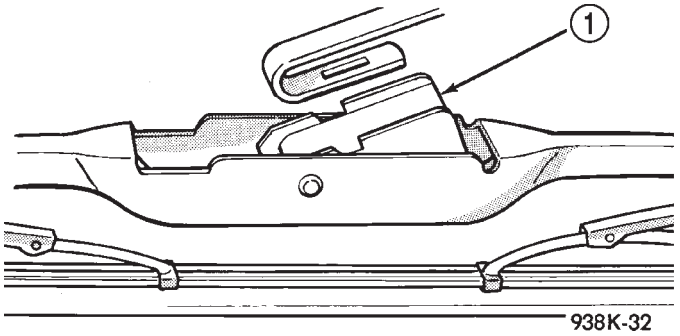


Fig. 13 Remove Blade from Arm

1 – RELEASE TAB

WIPER BLADE ELEMENT

REMOVAL

(1) Remove wiping element from blade assembly by grasping and pulling stopper of blade element out of end claw together with vertebra (metal rails).

(2) Remove wiping element and vertebra by sliding them out of claws.

(3) Remove vertebra from wiping element.

INSTALLATION

For installation reverse the above procedures.

(2) Install right blade element vertebra to match the shape of the windshield. Install vertebra with curve down.

(3) Install left blade element vertebra flat.

(4) Check that blade element and vertebra are through all the claws and the final claw is locked in the stopper. Assure element locked end is closest to wiper system pivot.

REMOVAL AND INSTALLATION (Continued)

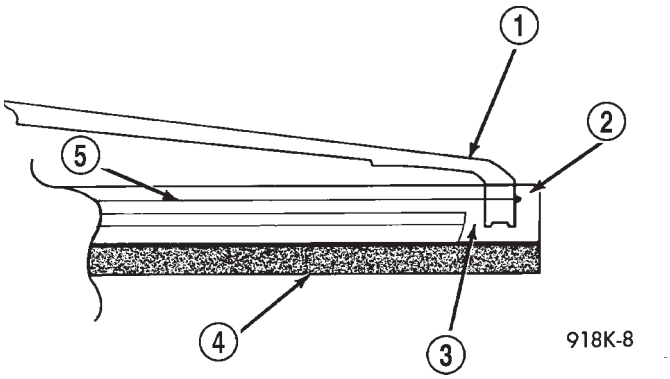


Fig. 14 Wiper Blade and Element

1 – CLAW
2 – TO GRASP AND PULL
3 – CHANNEL
4 – RUBBER ELEMENT
5 – VERTABRA

WIPER FRAME ASSEMBLY

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove driver and passenger side wiper arms. Refer to Wiper Arm Removal and Installation procedures in this section.

(3) Remove nine screws to cowl screen panel. Refer to Group 23, Body for Removal and Installation procedures.

(4) Remove wiper module mounting bolt located on top of the tower to tower beam.

(5) Remove eight bolts to Tower to Tower (crosscar) support (Fig. 15). Refer to Group 23, Body for Removal and Installation procedures.

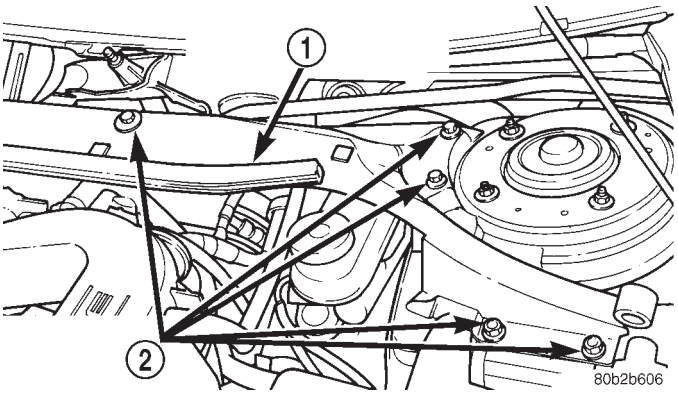


Fig. 15 Tower to Tower Support Removal

1 – TOWER TO TOWER SUPPORT
2 – RETAINING BOLTS

(6) Remove three retaining bolts to windshield wiper module (Fig. 16).

(7) Lift wiper module away from vehicle body.

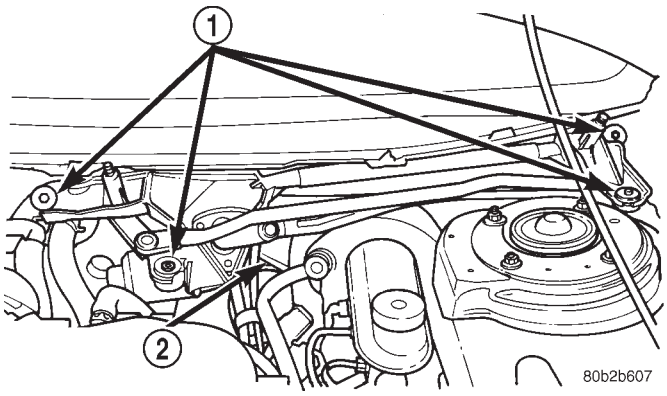


Fig. 16 Wiper Module Retaining Bolts

1 – RETAINING BOLTS
2 – WIPER MOTOR CONNECTOR

(8) Disconnect one wire connector.

(9) Remove windshield wiper module from vehicle.

TRANSFER PARTS

(1) Transfer wiper module grommets to new module assembly (Fig. 17).

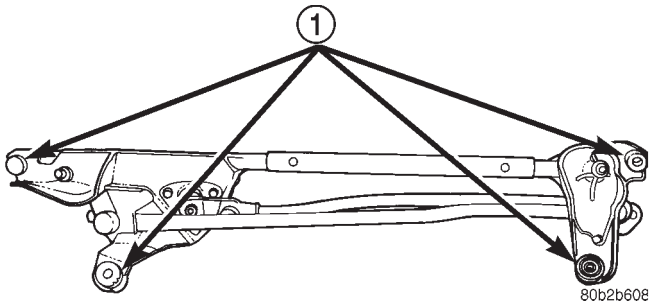


Fig. 17 Wiper Frame Grommets

1 – GROMMETS

(2) Remove one nut to crank arm and remove from motor (Fig. 19).

(3) Remove three retaining bolts from wiper motor (Fig. 19).

(4) Remove wiper motor from wiper module assembly. Install onto new wiper module assembly. Refer to Wiper Motor Removal and Installation procedures in this section.

INSTALLATION

For installation, reverse the above procedures.

(1) Start rear outboard screw first, rear inboard screw second, and forward outboard screw last.

(2) Start all module mounting screws and bolt by hand before torquing to specifications.

(3) Assur wiper module pivots are in “PARK” position cycling the switch “ON” and “OFF” with engine off prior to installing arms and blades.

REMOVAL AND INSTALLATION (Continued)

CAUTION: KEEP HANDS CLEAR OF CYCLING WIPER MODULE LINKAGE.

WIPER LINK ARMS

There a two servicable link assemblies in the wiper module. The Master Link connects the motor output crank to the drivers side pivot. The Slave link connects the driver side pivot to the passenger side pivot. To service these links, remove the wiper module from the vehicle.

The wiper module mounting grommets can be serviced anytime the module is removed from the vehicle. Replace module mounting grommets if they are broken, cracked, deteriorated, or defective.

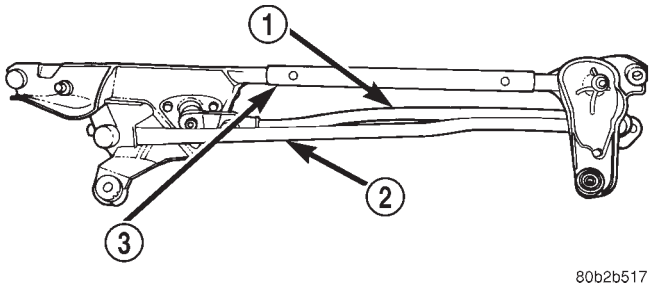


Fig. 18 Wiper Link Arms

1 – MASTER LINK ARM
2 – SLAVE LINK ARM
3 – WINDSHIELD WIPER FRAME ASSEMBLY

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove wiper module from vehicle. Refer to Wiper Module Removal and Installation in this section.

(3) Disconnect wiper module slave link from pivot levers by carefully using a ball and socket wedge. Do not damage ball and socket or seal when using wedge.

(4) Disconnect wiper module master link from pivot lever and motor crank by carefully using a ball and socket wedge. Do not damage ball and socket or seal when using wedge.

(5) Remove module linkage mounting grommets.

NOTE: Grommet eyelet may need to be removed from rubber isolator on rear inboard and forward outboard mounting grommets only during disassembly.

(6) Remove “U” nut from body (if necessary).

INSTALLATION

For installation, reverse the above procedures.

NOTE: When assembling master link or slave link to module frame, use channel locks wrapped in cloth to prevent damage to ball and socket joint. Apply light pressure to assemble socket to ball.

WIPER MOTOR

The Wiper Module Assembly must be removed to service the wiper motor.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove wiper module assembly. Refer to Wiper Module Assembly Removal and Installation in this section.

(3) Disconnect wiper module master link from motor crank by carefully using a ball and socket wedge. Do not damage ball and socket or seal when using wedge.

(4) Remove three retaining bolts from wiper motor (Fig. 19).

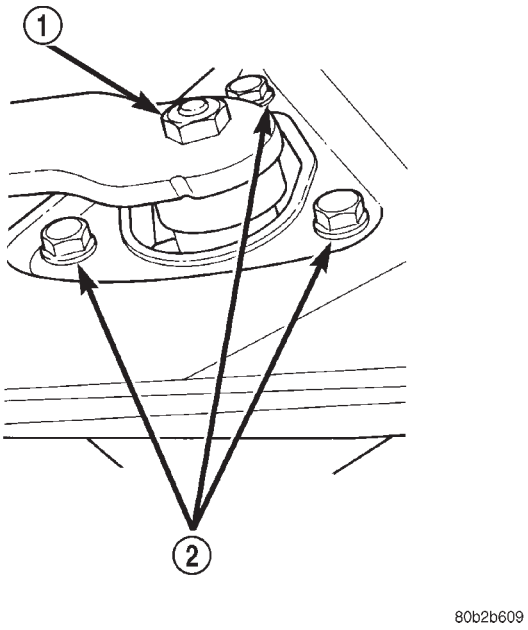


Fig. 19 Wiper Motor Retaining Bolts

1 – CRANK ARM NUT
2 – WIPER MOTOR RETAINING BOLTS

(5) Remove wiper motor from wiper module assembly.

INSTALLATION

For installation, reverse the above procedures.

CLEANING AND INSPECTION

WIPER BLADES

Wiper blades exposed to the weather for a long period of time tend to lose their wiping effectiveness. Periodic cleaning of the wiper blade is recommended to remove the accumulation of salt and road grime. The wiper blades, arms and windshield should be cleaned with a sponge or cloth and a mild detergent or nonabrasive cleaner. If the wiper blades continue to streak or smear, they should be replaced. The wiper blade should run smoothly across the windshield in both directions. The wiper blade should slightly roll over center when the blade reverses direction. A wiper blade element that has lost flexibility will not roll over properly. Or a wiper arm that has lost spring tension will cause the blade to skip or chatter across the windshield. If the wiper blades are new and the wiper arm spring tension is OK and a chattering sound is emitted from the wiper(s), the wiper blade is not rolling over center. If this condition exists, refer to the Wiper Arm Adjustment procedure in this section.

ADJUSTMENTS

WASHER NOZZLE

Right and left nozzles have three adjustable spray juts each.

CAUTION: DURING ADJUSTMENT, BE CAREFUL NOT TO DAMAGE INSIDE OPENING OF JET.

ASSURE PROPER VENTILATION OF ENGINE EXHAUST.

(1) Using a safety pin, adjust each nozzle jet as required to windshield washer spray pattern.

(2) Each adjustment of the jet should be checked by actuating the washer system switch from inside of vehicle.

(3) After adjustment, a final check of the spray pattern should be done by actuating the washer system switch from inside the vehicle with engine idling.

This model is equipped with two hood mounted washer nozzles. Each nozzle emits three streams into the wiper sweep pattern. If nozzle performance is unsatisfactory they can be adjusted. To adjust it is recommended to use a safety pin. Insert a safety pin into the nozzle ball and adjust the spray pattern on the windshield as shown in (Fig. 20). The right and left nozzles are identical.

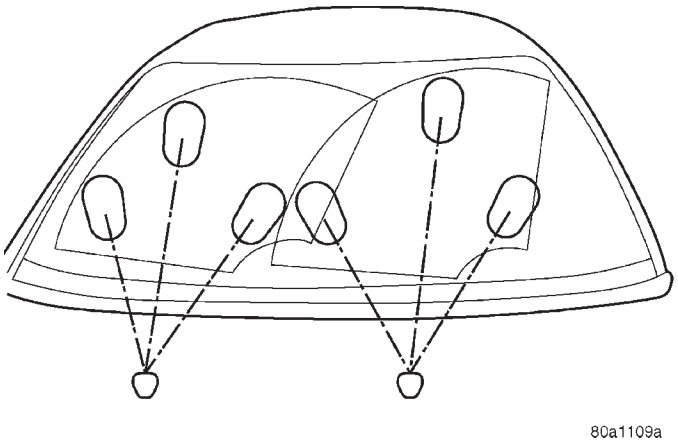


Fig. 20 Windshield Washer Spray Pattern

WIPER ARM ADJUSTMENT

The wiper system does not have an indexing feature designed into the arm and blade assembly. The arms and blades are positioned to “tic” marks on the windshield and secured. This design allows for a tighter fit between wiper arm and pivot shaft.

(1) Cycle the wiper motor into the PARK position.

CAUTION: AFTER CYCLING, TURN WIPER SWITCH AND IGNITION SWITCH TO OFF.

(2) Check drivers side blade tip position is on or between two “tic” marks on the windshield. Check that passenger side blade edge is on or near one “tic” mark on windshield.

(3) If requirements are not met, check for and repair as necessary:

- bent arm or blades
- loose or worn wiper module links
- loose wiper module
- defective module mounting grommets
- defective wiper parking system
- etc

(4) Position arm and blade to “tic” marks on windshield as described above and secure the wiper arm retaining nuts.

(5) Operate system and verify proper operation. If problem still exists, refer to Wiper System Test in this section.

WIPER AND WASHER SYSTEMS
HEADLAMP WASHERS

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GENERAL INFORMATION

INTRODUCTION

Headlamp washers are available as a factory-installed option on this model. The headlamp washers on this vehicle work in conjunction with the windshield washers. The headlamp washers are enabled with the headlamps “ON” and the windshield washers activated. With the windshield washers activated the headlamp washers will spray for a preset amount of time controlled by a relay.

The headlamp washer system utilizes a separate high pressure pump that is attached to the windshield washer reservoir. The headlamp washer pump feeds four nozzles that are mounted behind the front fascia of the vehicle. The nozzle bodies have a telescopic action that will extend the nozzles in front of the headlamp assembly. During the telescopic action, doors in the fascia will open to allow the nozzles to advance into the proper spray position. These nozzles spray the headlamps when the system is activated.

DIAGNOSIS AND TESTING

WINDSHIELD/HEADLAMP WASHERS

Whenever a windshield washer malfunction occurs, first verify that the windshield washer wire harness is properly connected to all connectors before starting normal diagnosis and repair procedures. Refer to Windshield Washer Test table.

DIAGNOSIS AND TESTING (Continued)

WINDSHIELD/HEADLAMP WASHER TEST

CONDITION	POSSIBLE CAUSE	CORRECTION
WASHER POWER FEED FUSE OPEN	1. JUNCTION BLOCK FUSE #5 BLOWN.	CHECK FUSE #5. REPLACE IF NOT OK.
BLOWN FUSE WHEN WASHER SWITCH IS DEPRESSED	1. SHORT IN WIPER / WASHER SWITCH. 2. SHORT IN MOTOR POWER CIRCUIT. 3. SHORT IN WASHER MOTOR.	1. DEFECTIVE WASHER SWITCH. REFER TO WIPE / WASHER SWITCH DIAGNOSTIC PROCEDURES. 2. SHORT OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 3. REPLACE WASHER MOTOR.
WASHER SYSTEM WILL NOT FLOW WASHER FLUID	1. JUNCTION BLOCK FUSE #5 BLOWN. 2. MOTOR CONNECTOR LOOSE. 3. MOTOR CONNECTOR TERMINALS BENT. 4. OPEN POWER CIRCUIT TO SWITCH. 5. OPEN OR DEFECTIVE WIPER / WASHER SWITCH. 6. OPEN POWER CIRCUIT TO MOTOR. 7. OPEN OR DEFECTIVE MOTOR GROUND CIRCUIT. 8. OPEN CIRCUIT IN MOTOR. 9. SEIZED MOTOR BEARINGS. 9. PINCHED WASHER HOSE.	1. SHORT CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WIPER SWITCH TERMINAL #1. SHORT IN WIPER SWITCH. IF NOT OK, REPAIR CIRCUIT OR REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 2. PROPERLY SEAT CONNECTOR TO MOTOR. 3. REPAIR TERMINALS AND PROPERLY SEAT CONNECTOR TO MOTOR. 4. OPEN OR DEFECTIVE CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WASHER SWITCH CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 5. REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 6. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 7. OPEN OR DEFECTIVE CIRCUIT BETWEEN WASHER MOTOR CONNECTOR GROUND TERMINAL #2 AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR #2. 8. CHECK FOR AN OPEN CIRCUIT ON MOTOR BETWEEN POWER TERMINAL #1 AND GROUND TERMINAL #2. IF NOT OK, REPLACE WASHER MOTOR. 9. APPLY DIRECT BATTERY VOLTAGE TO MOTOR TERMINALS. IF MOTOR DOES NOT RUN, REPLACE MOTOR. 10. ASSURE WASHER HOSE IS NOT PINCHED. IF NOT 0. K.,PROPERLY ROUTE WASHER HOSE.
HOOD NOZZLE WILL NOT FLOW	1. PINCHED NOZZLE HOSE. 2. PLUGGED NOZZLE OR NOZZLE HOSE BY CONTAMONATION. 3. DEFECTIVE NOZZLE CHECK VALVE.	1. ASSURE NOZZLE HOSE IS NOT PINCHED, LOOSE, BROKEN, OR DISCONNECTED. IF NOT OK, PROPERLY ROUTE OR REPAIR NOZZLE HOSE. 2. CLEAN NOZZLE OR NOZZLE HOSE OF CONTAMINATION. DETERMINE SOURCE OF CONTAMINATION. INSPECT RESERVOIR FOR EXCESSIVE CONTAMINATION. CLEAN SYSTEM AS REQUIRED. 3. REPLACE HOOD NOZZLE.
HOOD NOZZLE STREAM OVERSHOOTS WINDSHIELD.	1. NOZZLE NOT SEATED IN HOOD. 2. NOZZLE JET(S) OUT OF ADJUSTMENT.	1. ASSURE NOZZLE IS SNAPPED IN PLACE. ADJUST JETS USING A SAFETY PIN.
WIPER WILL NOT CYCLE WHEN WASHER SWITCH IS DEPRESSED	1. OPEN OR DEFECTIVE WASHER SYSTEM CONTROL CIRCUIT. 2. DEFECTIVE BODY CONTROL MODULE (BCM).	1. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND BCM #C2 BLACK CONNECTOR TERMINAL #7. IF NOT OK REPAIR CIRCUIT. 2. REFER TO BCM DIAGNOSTIC PROCEDURES.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
WASHER FLUID LEVEL INDICATOR INOPERATIVE	1. LOOSE FLUID LEVEL SENSOR CONNECTOR. 2. FLUID LEVEL SENSOR SWITCH OPEN OR DEFECTIVE.	1. PROPERLY SEAT CONNECTOR TO SWITCH. 2. ASSURE SENSOR FLOAT SWITCH IS CLOSED (DOWN POSITION). APPLY OHMMETER TO SWITCH TO CHECK FOR COMPLETE CIRCUIT. IF NOT O. K., REPLACE SWITCH.
HEADLAMP WASHER SYSTEM WILL NOT FLOW WASHER FLUID	1. NO WASHER FLUID IN RESERVOIR. 2. JUNCTION BLOCK FUSE #5 BLOWN. 3. HEADLAMP WASHER HOSE NOT FLOWING FLUID. 4. MOTOR CONNECTOR LOOSE. 5. MOTOR CONNECTOR TERMINALS BENT. 6. OPEN POWER CIRCUIT TO SWITCH. 7. OPEN OR DEFECTIVE WIPER / WASHER SWITCH. 8. OPEN POWER CIRCUIT TO MOTOR. 9. OPEN OR DEFECTIVE MOTOR GROUND CIRCUIT. 10. OPEN CIRCUIT IN HEADLAMP WASHER MOTOR. 11. SEIZED MOTOR BEARINGS. 12. DEFECTIVE HEADLAMP WASHER RELAY.	1. FILL RESERVOIR. 2. SHORT CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WIPER SWITCH TERMINAL #1. SHORT IN WIPER SWITCH. IF NOT OK, REPAIR CIRCUIT OR REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 3. ASSURE WASHER HOSE IS NOT PINCHED, LOOSE, BROKEN, OR DISCONNECTED. IF NOT OK, PROPERLY ROUTE OR REPAIR WASHER HOSE. 4. PROPERLY SEAT CONNECTOR TO MOTOR. 5. REPAIR TERMINALS AND PROPERLY SEAT CONNECTOR TO MOTOR. 6. OPEN OR DEFECTIVE CIRCUIT BETWEEN JUNCTION BLOCK FUSE #5 AND WASHER SWITCH CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 7. CONNECT AN OHMMETER ACROSS WIPER / WASHER SWITCH TERMINAL #1 AND #2 AND DEPRESS WASHER BUTTON AND CHECK FOR CONTINUITY. IF NOT OK, REFER TO WIPER / WASHER SWITCH DIAGNOSTIC PROCEDURES. 8. OPEN OR DEFECTIVE CIRCUIT BETWEEN WIPER / WASHER SWITCH CONNECTOR TERMINAL #2 AND MOTOR CONNECTOR TERMINAL #1. IF NOT OK, REPAIR CIRCUIT. 9. OPEN OR DEFECTIVE CIRCUIT BETWEEN WASHER MOTOR CONNECTOR GROUND TERMINAL #2 AND LEFT HEADLAMP GROUND #5 OR ENGINE GROUND #1 OR 2. 10. CHECK FOR AN OPEN CIRCUIT ON MOTOR BETWEEN POWER TERMINAL #1 AND GROUND TERMINAL #2. IF NOT OK, REPLACE WASHER MOTOR. 11. APPLY DIRECT BATTERY VOLTAGE TO MOTOR TERMINALS. IF MOTOR DOES NOT RUN, REPLACE MOTOR. REPLACE THE HEADLAMP WASHER RELAY.
ONE HEADLAMP WASHER NOZZLE WILL NOT FLOW WASHER FLUID	1. HEADLAMP WASHER HOSE NOT FLOWING FLUID. 2. PLUGGED HEADLAMP WASHER NOZZLE.	1. REPAIR OR REPLACE THE HEADLAMP WASHER HOSE. 2. REPLACE HEADLAMP WASHER NOZZLE.

SERVICE PROCEDURES

HEADLAMP WASHER SYSTEM PRIMING PROCEDURE

The headlamp washer system may loose it's prime when the system is serviced. The following procedure must be used to prime the headlamp washer system. A DRB III must be used for this priming procedure.

CAUTION: Do not allow washer fluid to spray on hot engine with the hood up.

CAUTION: Do not stand near the headlamp washer nozzles when actuating the headlamp washer system. The washer fluid comes out of the nozzles at high pressure.

(1) Connect a DRB III.
(2) Go to the "BODY" menu.
(3) Go to the "ACTUATER" menu.
(4) Actuate the "HEADLAMP WASHER" actuator until the headlamp washer system is properly primed.

CAUTION: Do not actuate the headlamp washers longer that 4 seconds at a time. Allow pump to cool prior to next attempt. Damage to the headlamp washer pump may occur.

REMOVAL AND INSTALLATION

WINDSHIELD/HEADLAMP WASHER RESERVOIR

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.
(2) Hoist vehicle.
(3) Drain washer fluid into a clean container.
(4) Partially remove the front fascia to gain access to the windshield/headlamp washer reservoir. Refer to Group 23, Body for Removal and Installation procedures.
(5) Disconnect the wire connectors from the windshield washer pump, headlamp washer pump, and the washer fluid level sensor.
(6) Disconnect the windshield washer pump and the headlamp washer pump hoses.
(7) Reach up behind the washer reservoir and pull the filler tube off the rear of the reservoir.
(8) Remove the four mounting bolts to washer reservoir (Fig. 1).

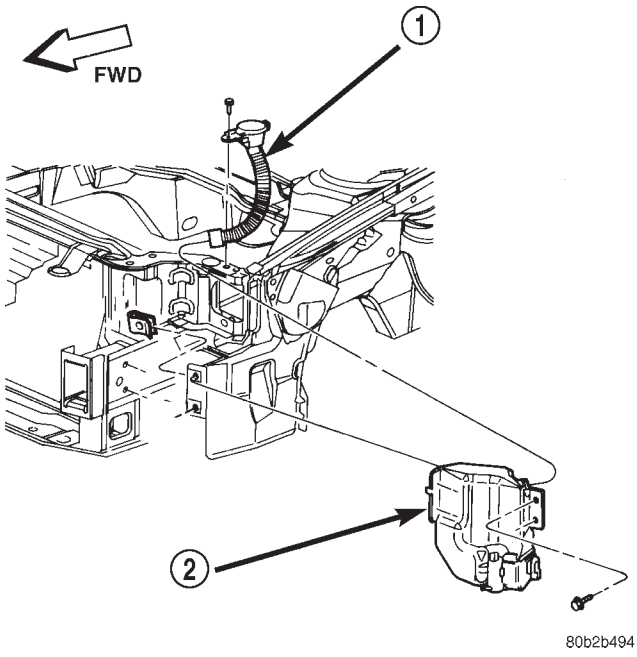


Fig. 1 Windshield/Headlamp Washer Reservoir Removal

1 – WASHER RESERVOIR FILLER TUBE
2 – WASHER RESERVOIR

(9) Remove the washer reservoir from vehicle.
(10) Transfer the washer fluid level sensor, headlamp washer pump, and the windshield washer pump to the new reservoir (Fig. 2).

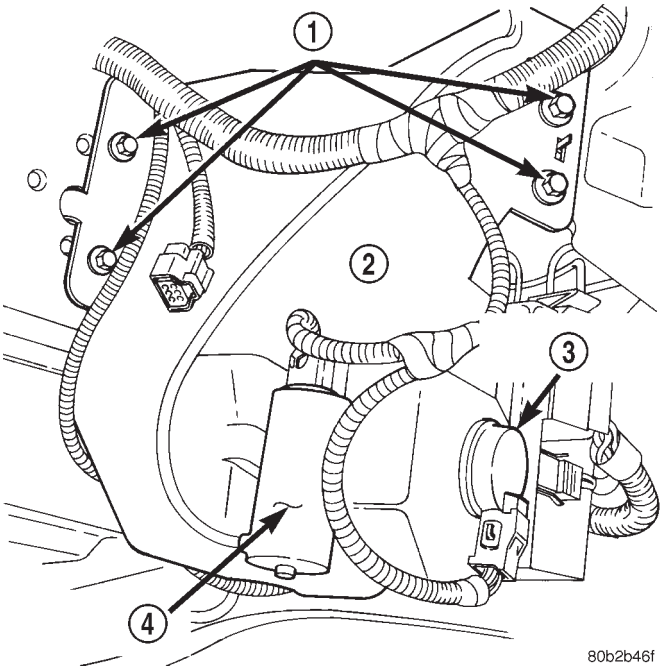


Fig. 2 Windshield/Headlamp Washer Reservoir

1 – RETAINING BOLTS
2 – WASHER RESERVOIR
3 – FLUID LEVEL SENSOR
4 – WASHER FLUID PUMP

INSTALLATION

(1) Connect the windshield washer pump hose, headlamp washer pump hose, filler tube, and the wire connectors to reservoir.
(2) Install the reservoir retaining bolts. Torque bolts to 5 to 7 N·m.
(3) Reinstall the front fascia as necessary. Refer to Group 23, Body for Removal and Installation procedures.
(4) Reconnect the negative battery cable remote terminal.
(5) Lower vehicle from hoist.
(6) Refill the windshield/headlamp washer reservoir.
(7) Reconnect the negative battery cable at the remote battery post.
(8) Prime the headlamp washer system. Refer to the Headlamp Washer Priming Procedure in this section.

WINDSHIELD/HEADLAMP WASHER RESERVOIR FILLER TUBE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.
(2) Hoist vehicle.
(3) Drain washer fluid into a clean container.

REMOVAL AND INSTALLATION (Continued)

(4) Partially remove the front fascia to gain access to the windshield/headlamp washer reservoir. Refer to Group 23, Body for Removal and Installation procedures.

(5) Reach up behind the washer reservoir and pull the filler tube off the rear of the reservoir.

(6) Remove the windshield/headlamp washer reservoir filler tube mounting screw (Fig. 3).

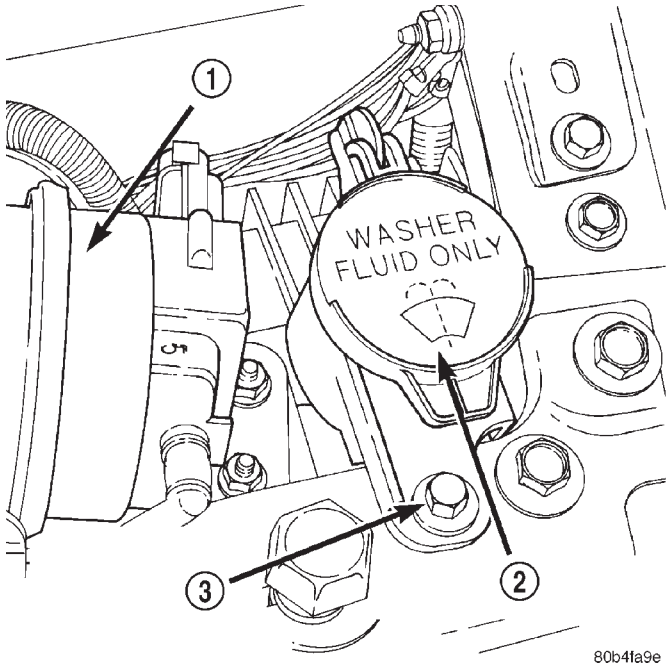


Fig. 3 Washer Reservoir Filler Tube Mounting Bolt

1 – SPEED CONTROL SERVO
2 – WASHER RESERVOIR FILLER TUBE
3 – WASHER RESERVOIR FILLER TUBE MOUNTING SCREW

(7) Reach up behind the windshield/headlamp washer reservoir and pull the filler tube off of the reservoir.

(8) Pull filler tube and hose up through left fender and remove (Fig. 4).

INSTALLATION

(1) Reconnect the windshield/headlamp washer reservoir filler tube to the reservoir.

(2) Install the windshield/headlamp washer reservoir filler tube mounting screw.

(3) Reinstall the front fascia as necessary. Refer to Group 23, Body for Removal and Installation Procedures.

(4) Lower vehicle from hoist.

(5) Refill the washer fluid.

(6) Reconnect the negative battery cable at the remote battery post.

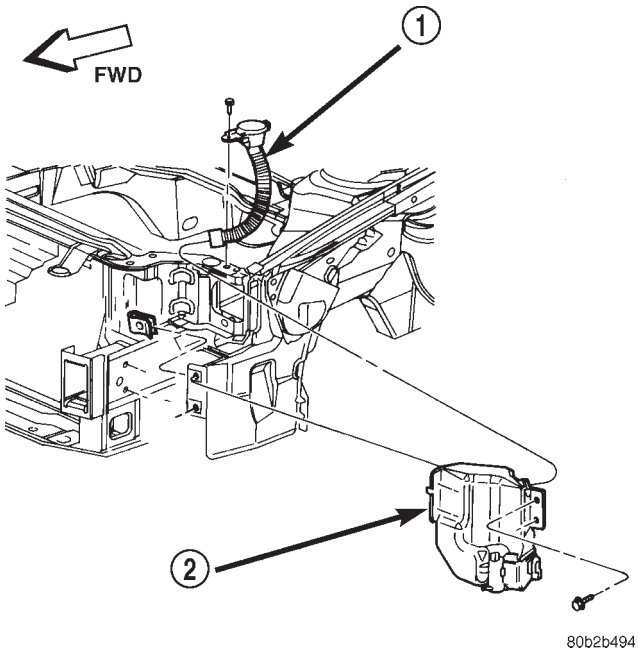


Fig. 4 Washer Reservoir Filler Tube Removal

1 – WASHER RESERVOIR FILLER TUBE
2 – WASHER RESERVOIR

HEADLAMP WASHER HOSES

Removal

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Hoist vehicle.

(3) Remove the front fascia. Refer to Group 23, Body for Removal and Installation procedures.

(4) Disconnect the headlamp washer hoses at the quick disconnect connectors (Fig. 5) (Fig. 6).

(5) Remove the headlamp washer hoses from the radiator closure panel.

Installation

(1) Install the headlamp washer hoses to the radiator closure panel.

(2) Connect the headlamp washer hoses quick disconnect connectors (Fig. 5) (Fig. 6).

(3) Reinstall the front fascia. Refer to Group 23, Body for Removal and Installation procedures.

(4) Lower vehicle from hoist.

(5) Refill the washer fluid.

(6) Reconnect the negative battery cable remote terminal.

REMOVAL AND INSTALLATION (Continued)

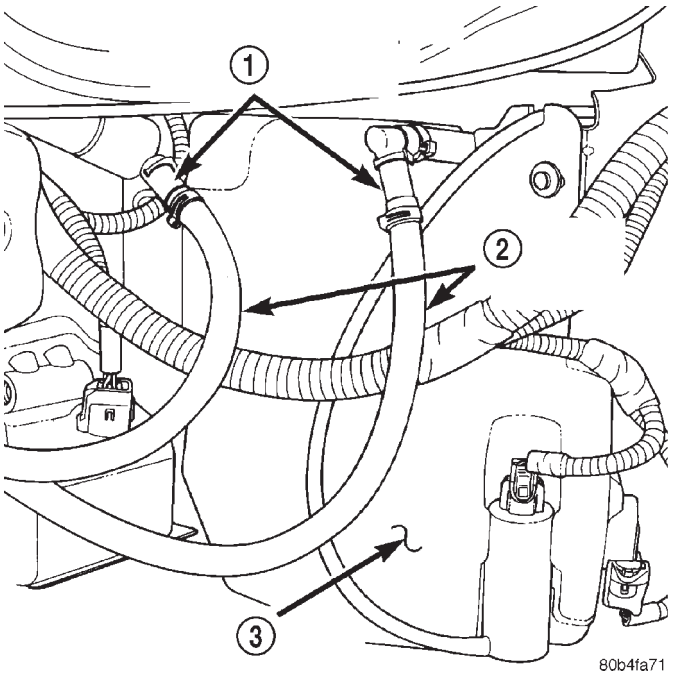


Fig. 5 Left Side Headlamp Washer Hoses

1 – HEADLAMP WASHER HOSES QUICK DISCONNECT CONNECTORS
2 – HEADLAMP WASHER HOSES
3 – WINDSHIELD/HEADLAMP WASHER RESERVOIR

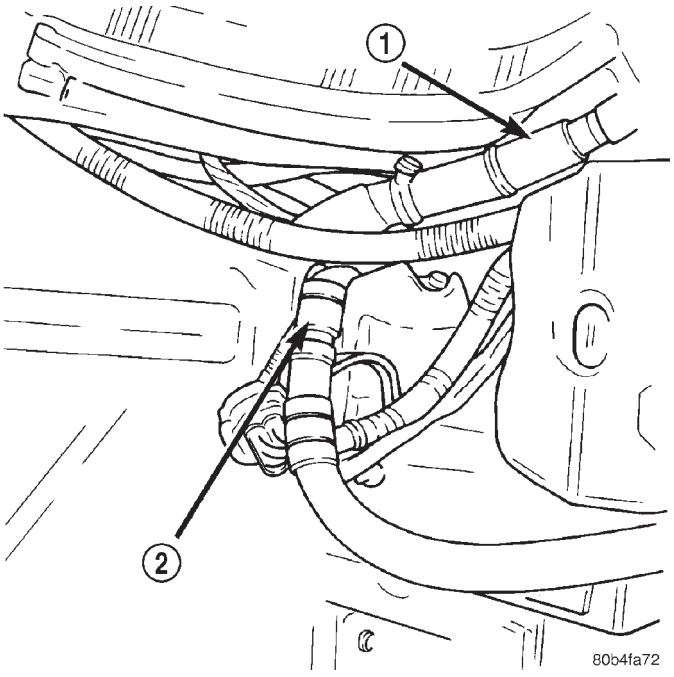


Fig. 6 Right Side Headlamp Washer Hoses

1 – HEADLAMP WASHER NOZZLE
2 – HEADLAMP WASHER HOSES QUICK DISCONNECT CONNECTOR

HEADLAMP WASHER NOZZLE

Removal

(1) Hoist vehicle.
(2) Partially remove the front fascia to gain access to the headlamp assembly. Refer to Group 13, Body for Removal and Installation procedures.
(3) Remove the headlamp assembly. Refer to Group 8L, Lamps for Removal and Installation Procedures.
(4) Remove the headlamp washer nozzle retaining screws and remove the nozzle from the headlamp assembly.

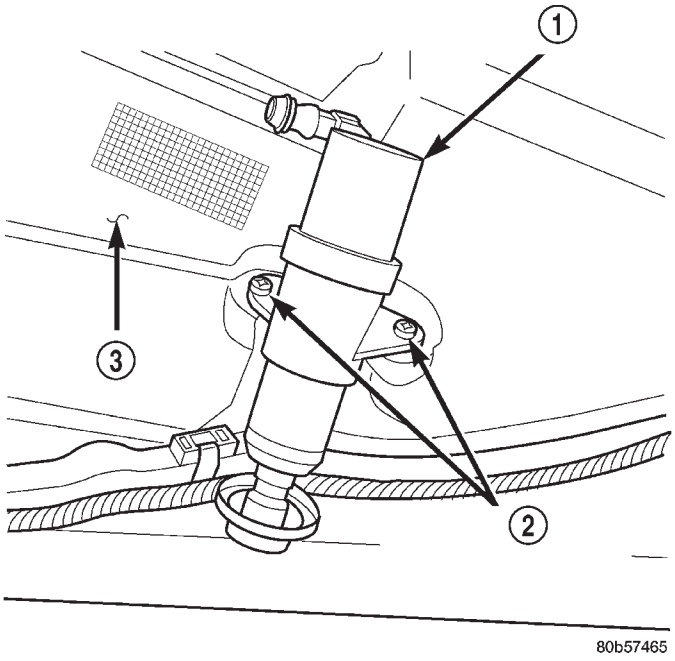


Fig. 7 Headlamp Washer Nozzle

1 – HEADLAMP WASHER NOZZLE
2 – HEADLAMP WASHER NOZZLE RETAINING SCREWS
3 – HEADLAMP ASSEMBLY

Installation

(1) Place the headlamp washer nozzle in position on the headlamp assembly.
(2) Install the headlamp washer nozzle retaining screws. Torque to 0.7 to 1.3 N·m.
(3) Reinstall the headlamp assembly. Refer to Group 8L, Lamps for Removal and Installation Procedures.
(4) Reinstall the front fascia as necessary. Refer to Group 13, Body for Removal and Installation Procedures.
(5) Lower vehicle from hoist.
(6) Refill the washer fluid.
(7) Prime the headlamp washer system. Refer to the Headlamp Priming Procedure in this section.

REMOVAL AND INSTALLATION (Continued)

HEADLAMP WASHER PUMP

Removal

(1) Open hood and disconnect the negative battery cable remote terminal from the battery post.
(2) Hoist vehicle.
(3) Drain washer fluid into a clean container.
(4) Partially remove the front fascia to gain access to the windshield/headlamp washer pump. Refer to Group 23, Body for Removal and Installation procedures.
(5) Remove the four windshield/headlamp washer reservoir mounting bolts.
(6) Pull the reservoir away from body to gain access to the headlamp washer pump.
(7) Disconnect the headlamp washer pump electrical connector and the headlamp washer pump hose.
(8) Pull the headlamp washer pump from the reservoir.

Installation

(1) Install the headlamp washer motor in the windshield/headlamp washer pump.
(2) Connect the headlamp washer pump hose and electrical connector.
(3) Install the reservoir retaining bolts. Torque bolts to 5 to 7 N·m.
(4) Reinstall the front fascia as necessary. Refer to Group 23, Body for Removal and Installation procedures.
(5) Lower vehicle from hoist.
(6) Refill the windshield/headlamp washer reservoir.
(7) Reconnect the negative battery cable remote terminal.
(8) Prime the headlamp washer system. Refer to the Headlamp Washer Priming Procedure in this section.

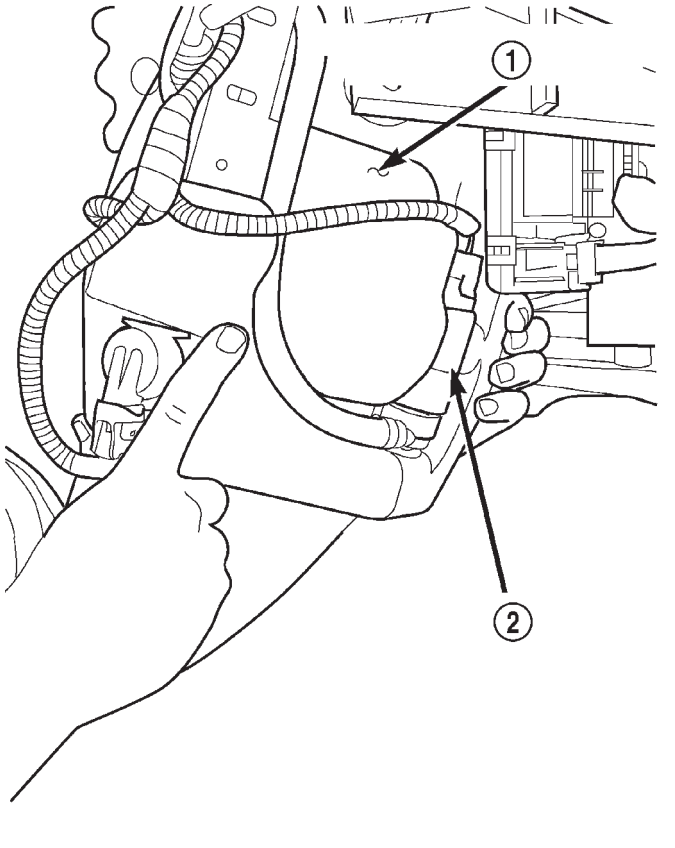


Fig. 8 Headlamp Washer Pump
1 – WINDSHIELD/HEADLAMP WASHER RESERVOIR
2 – HEADLAMP WASHER PUMP

2000 LHS, 300M, CONCORDE AND INTREPID

LAMPS

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LAMP DIAGNOSIS

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DESCRIPTION AND OPERATION

LAMP SYSTEMS

DESCRIPTION

LH vehicles use lighting on the interior and exterior of the vehicle for illuminating and indicating purposes. Lighting circuits are protected by fuses or circuit breakers. Lighting circuits require an overload protected power source, on/off device, lamps and body ground to operate properly. Plastic lamp sockets require a wire in the harness to supply body ground to the lamp socket. Lamp sockets that are exposed to moisture should be coated with Mopar® Multi purpose Grease or equivalent to avoid corrosion. If a socket has become corroded, clean socket and bulb base with abrasive fiber sanding pad or metallic bristle brush. Replace sockets and bulbs that are deformed from corrosion that could prevent a continuous body ground.

Wire connectors can make intermittent contact or become corroded. Before coupling wire connectors, inspect the terminals inside the connector. Male terminals should not be bent or disengaged from the insulator. Female terminals should not be sprung open or disengaged from the insulator. Bent and sprung terminals can be repaired using needle nose pliers and pick tool. Corroded terminals appear chalky or green. Corroded terminals should be replaced to avoid recurrence of the problem symptoms. Wire connector terminals should be coated with Mopar® Multi purpose Grease or equivalent to avoid corrosion.

Begin electrical system failure diagnosis by testing related fuses and circuit breakers in the fuse block and engine compartment. Verify that bulbs are in good condition and test continuity of the circuit ground. Refer to Group 8W, Wiring Diagrams, for component location and circuit information.

AUTOMATIC HEADLAMP SYSTEM

DESCRIPTION

The Automatic Headlamp system turns the instrumentation and exterior illumination lamps ON when the ambient light levels are low and OFF when light levels are high.

OPERATION

Automatic headlamps are controlled by the Body Control Module (BCM). With the headlamp switch in the AUTO position, the BCM will control the headlamp, parking, side marker, tail and instrumentation

DESCRIPTION AND OPERATION (Continued)

lamps based on ambient light levels. Ambient light levels are monitored by the BCM using the automatic temperature control system Sun load Sensor, located on the top of the instrument panel cover. Ambient light readings are averaged to limit cycling the lamps ON and OFF when passing through areas with varying light levels. The automatic headlamps will only function when the engine is running. When the headlamp switch is in the AUTO position (Automatic mode), the Headlamp Time Delay system will function when the ignition is switched OFF.

COURTESY LAMPS

DESCRIPTION

The Body Control Module (BCM) illuminates the courtesy lamps whenever a door is opened. When the last door is closed, the BCM "fades-to-OFF" the courtesy lamps in five seconds. If a door is left ajar, the courtesy lamps remain on for a maximum of one hour when ignition switch is OFF. After one hour, the BCM "fades-to-OFF" the courtesy lamps.

DAYTIME RUNNING LAMPS – CANADA ONLY

DESCRIPTION

The daytime running lamps are controlled by the Daytime Running Lamp Module (DRL Module). The DRL module is attach to the Junction Block. The Junction Block is located on the left side of the instrument panel. The DRL allows the high beam headlamps to illuminate at reduced power when the ignition switch is in the run position with the high and low beam headlamp switches in the OFF position. The Park Brake must be released and the Brake Fluid Level switch must be in the open position to allow the headlamps to operate in DRL mode. The daytime running lamps will go out when the headlamp switch is turned ON. The passing light feature will flash bright high beams while the daytime running lamps are activated.

HEADLAMPS ON WITH WINDSHIELD WIPERS

DESCRIPTION

For vehicles equipped with the Automatic Headlamp System, the instrumentation and exterior illumination lamps will be turned ON when the headlamp switch is in the AUTO position and the windshield wipers have been in the intermittent, low or high mode of operation for more than ten seconds. When the windshield wipers are turned OFF the Body Control Module will determine if the instrumentation and exterior illumination lamps should remain ON base upon the current ambient light level.

HEADLAMP SYSTEM

DESCRIPTION

The headlamp system is controlled completely by the Body Control Module (BCM). The BCM controls the Park lamps, Headlamps, and Front Fog Lamps using relays located in the Junction Block. Three wires are connected between the headlamp switch and the BCM. The first wire contains information regarding the position of the headlamp switch (Off, Automatic Headlamps, Automatic Headlamp switch fog, Park with Fog, Head, or Head with Fog Lamps). The second wire contains information regarding the position of the dimmer switch (Dome Lamp, Daytime Brightness, or Dimming Level). The third wire is a dedicated signal return (ground) wire.

OPERATION

The headlamp system will default to headlamps ON position when ignition switch is ON when an open or short circuit failure occurs on the headlamp switch input. The system will return to normal operation when the open or short is repaired. A fault will be reported by the BCM when a failure occurs on the dimmer or headlamp switch input.

The dimmer system will default to Daytime Brightness when an open or a short occurs on the dimmer switch input.

The BCM will turn OFF the exterior lamps if they are left ON with the ignition switch OFF for more than ten minutes. This feature prevents the vehicle battery from being discharged when the vehicle lights have been left ON.

HEADLAMP TIME DELAY SYSTEM

DESCRIPTION

The Headlamp Time Delay system is controlled by the Body Control Module (BCM) through the headlamp relay.

OPERATION

The headlamp time delay system is activated by turning the headlamps ON (high or low beam) while the engine is running, turning the ignition switch OFF, and then turning the headlamp switch OFF within 45 seconds. The system will not activate if more than 45 seconds elapse between ignition switch OFF and headlamp switch OFF. The BCM will allow the headlamps to remain ON for 90 seconds before they automatically turn off. Refer to the Owner's Manual for more information.

DESCRIPTION AND OPERATION (Continued)

ILLUMINATED ENTRY

DESCRIPTION

The Illuminated Entry System is available on vehicles equipped with the Remote Keyless Entry system. The Illuminated Entry System turns ON the courtesy lamps when the remote keyless entry system is activated.

OPERATION

The Remote Keyless Entry Module and the Body Control Module (BCM) are used to control the system. Courtesy lamps will turn on for 30 seconds (± 1 second) and "fade-to-OFF" over a five second period.

The Illuminated Entry System also turns ON the courtesy lamps when a door is opened. The courtesy lamps will remain ON while the door is open, then "fade-to-OFF" 30 seconds (± 1 second) after the last door is closed.

The courtesy lamps will "fade-to-OFF" immediately when the ignition is switched to ON.

The Illuminated Entry System cannot be activated during the 30 second (± 1 second) period after the ignition switch is turned OFF except by using the RKE transmitter. If a door is opened and closed during this 30 second period, the system will function as previously described.

The courtesy lamps will fade to OFF immediately, if the Remote Keyless Entry lock function is actuated with all doors closed.

FLOOR CONSOLE TRANSMISSION RANGE INDICATOR LAMP

DESCRIPTION

The floor console mounted Transmission Range Indicator Lamp display utilizes electroluminescent technology as the light source. The only diagnostics that should be performed is to check for the presence of 12 volts on the mating wire harness connector. The electroluminescent lamp requires a 120 volt AC signal that is provided by a power converter included in the assembly. Because of a potential shock hazard, diagnostics testing of the electroluminescent lamp and power converter should be avoided. The module is not serviceable. Refer to Body, Floor Console Shift Bezel Removal and Installation.

SAFETY PRECAUTIONS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result. Do not use bulbs with higher candle power than indicated in the Bulb Application table at the end of this group. Damage to lamp can result. Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

DIAGNOSIS AND TESTING

HEADLAMP AND FOG LAMP DIAGNOSIS

When a vehicle experiences problems with the headlamp system, verify the condition of:

- Battery connections
- Charging system
- Headlamp bulbs
- Head lamp relay
- High beam dimmer switch
- Headlamp switch
- Body Control Module
- Wire connectors

Refer to Group 8W, Wiring Diagrams, for component locations and circuit information.

ELECTRONIC DAYTIME RUNNING LIGHT

LH vehicles built for use in Canada are equipped with a Daytime Running Lamp (DRL) system. The DRL system operates the headlamp high beams at reduced power with the headlamp high beam and low beam switch OFF and the ignition switch in the run position. In addition, the park brake must be disengaged and the brake fluid level switch must be open for the headlamps to operate in the DRL mode. The DRL system is controlled by the Daytime Running Lamp Module attached to the Junction Block on the left side of the instrument panel. The DRL module overrides the headlamp switch when the headlamps are turned OFF. The headlamps operate normally when the headlamps are turned ON.

DAYTIME RUNNING LAMP MODULE

The Daytime Lamp Module is controlled by inputs received from the Parking Brake, Brake Fluid Level Switch, High Beam Headlamp Relay and Low Beam Headlamp relay. Refer to Group 8W, Wiring Diagrams, for location and circuit information.

DIAGNOSIS AND TESTING (Continued)

HEADLAMP SWITCH

The headlamp switch is located on the upper left side of the instrument panel. Refer to Group 8E, Instrument Panel and Systems, for proper service procedures.

HIGH-BEAM HEADLAMP SWITCH

The high beam headlamp switch is part of the multi-function switch located on the steering column. Refer to Group 8J, Turn Signals and Warning Flashers, for proper service procedures.

HEADLAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn generator drive belt.	2. Adjust or replace generator drive belt.
	3. Charging system output too low.	3. Test and repair charging system, refer to Group 8A, Battery
	4. Battery has insufficient charge.	4. Test battery state-of-charge, refer to Group 8A, Battery.
	5. Battery is sulfated or shorted.	5. Load test battery, refer to Group 8A, Battery.
	6. Poor lighting circuit Z1 ground.	6. Test for voltage drop across Z1 ground locations, refer to Group 8W, Wiring Diagrams.
	7. Both headlamp bulbs defective.	7. Replace both headlamp bulbs.
HEADLAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system, refer to Group 8A, Battery.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices, refer to Group 8W, Wiring Diagrams.
HEADLAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system, refer to Group 8A, Battery.
	2. Poor lighting circuit Z1 ground.	2. Test for voltage drop across Z1 ground locations, refer to Group 8W, Wiring Diagrams.
	3. High resistance in headlamp circuit.	3. Test amperage draw of headlamp circuit.
	4. Both headlamp bulbs defective.	4. Replace both headlamp bulbs.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations, refer to Group 8W, Wiring Diagrams.
	2. High resistance in headlamp circuit.	2. Test amperage draw of headlamp circuit.
	3. Faulty headlamps switch circuit breaker.	3. Replace headlamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices, refer to Group 8W, Wiring Diagrams.
	5. Loose relay	5. Inspect and reset headlamp and parking lamp relays.
	6. Faulty Body Control Module	6. Replace Body Control Module
HEADLAMPS DO NOT ILLUMINATE	1. No voltage to headlamps.	1. Repair open headlamp circuit, refer to Group 8W, Wiring Diagrams.
	2. No Z1-ground at headlamps.	2. Repair circuit ground, refer to Group 8W, Wiring Diagrams.
	3. Faulty headlamp switch.	3. Replace headlamp switch.
	4. Faulty dimmer switch.	4. Replace headlamp switch.
	5. Broken connection between BCM and headlamp/parking lamp relay.	5. Check Junction Block. continuity. Service as necessary.
	6. Faulty parking lamp/headlamp relay.	6. Replace relay.
	7. Faulty Body Control Module	7. Replace Body Control Module
HEADLAMPS ILLUMINATE CONTINUOUSLY WITH IGNITION ON	1. Check headlamp switch circuit G52 for continuity. If no continuity.	1. Repair circuit.
	2. Check headlamp switch return circuit L80 for continuity. If no continuity. (BCM will automatically do this if no continuity is detected.)	2. Repair circuit.
	3. Check circuit L43 left side and L44 right side for a short to battery between the headlamp switch and the headlamp relay.	3. Repair circuit.
	4. Stuck relay.	4. Replace relay.
	5. Faulty Body Control Module	5. Replace Body Control Module
INSTRUMENT PANEL LAMPS DO NOT DIM OR ILLUMINATE	1. No voltage to dimmer switch.	1. Check fuse. If good repair open headlamp circuit, refer to Group 8W, Wiring Diagrams.
	2. No Z1-ground at headlamps.	2. Repair circuit ground, refer to Group 8W, Wiring Diagrams.
	3. Faulty dimmer switch.	3. Replace dimmer switch.

DIAGNOSIS AND TESTING (Continued)

FOG LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF.	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn generator drive belt.	2. Adjust or replace generator drive belt.
	3. Charging system output too low.	3. Test and repair charging system, refer to Group 8A, Battery.
	4. Battery has insufficient charge.	4. Test battery state-of-charge, refer to Group 8A, Battery.
	5. Battery is sulfated or shorted.	5. Load test battery, refer to Group 8A, Battery.
	6. Poor lighting circuit Z1 ground.	6. Test for voltage drop across Z1 ground locations, refer to Group 8W, Wiring Diagrams.
	7. Both fog lamps are defective.	7. Replace both fog lamp bulbs.
FOG LAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system, refer to Group 8A, Battery.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices, refer to Group 8W, Wiring Diagrams.
FOG LAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system, refer to Group 8A, Battery.
	2. Poor lighting circuit Z1 ground.	2. Test for voltage drop across Z1 ground locations, refer to Group 8W, Wiring Diagrams.
	3. High resistance in fog lamp circuit.	3. Test amperage draw of fog lamp circuit.
	4. Both fog lamp bulbs defective.	4. Replace both fog lamp bulbs.
FOG LAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations, refer to Group 8W, Wiring Diagrams.
	2. High resistance in fog lamp circuit.	2. Test amperage draw of fog lamp circuit.
	3. Faulty fog lamp switch.	3. Replace headlamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices, refer to Group 8W, Wiring Diagrams.
	5. Bad connection between headlamp switch and BCM	5. Test and diagnose circuit between headlamp switch and BCM.
	6. Loose relay.	6. Inspect and reset fog lamp relay.
	7. Faulty Body Control Module.	7. Replace Body Control Module.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS DO NOT ILLUMINATE	1. Blown fuse for fog lamps.	1. Replace fuse, refer to Group 8W, Wiring Diagrams.
	2. No Z1-ground at fog lamps.	2. Repair circuit ground, refer to Group 8W, Wiring Diagrams.
	3. Faulty fog lamp switch.	3. Replace headlamp switch.
	4. Broken connector terminal or wire splice in fog lamp circuit.	4. Repair connector terminal or wire splice.
	5. Broken connection between BCM and fog lamp relay.	5. Test relay connectors in the Junction Block and the circuit to BCM. Repair as necessary.
	6. Faulty fog lamp relay.	6. Replace relay.
	7. Faulty Body Control Module.	7. Replace Body Control Module.

HEADLAMP ALIGNMENT

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ADJUSTMENTS

HEADLAMP ALIGNMENT PREPARATION

LH vehicle headlamps are equipped with a bubble level to aid up/down headlamp alignment. The bubble level is used to assist headlamp alignment when compensating for vehicle ride height changes due to heavy luggage compartment loads or vehicle ride height changes. The vehicle should always be on a level surface when headlamp alignments are checked or changed. Headlamp alignment should always be first attempted by using the bubble level.

The bubble levels cannot be calibrated. The bubble level adjustments are set by the manufacturer. Horizontal alignment does not ordinarily have to be changed except in the case of body damage or tampering.

(1) Verify headlamp dimmer switch and high beam indicator operation.

(2) Inspect and correct damaged or defective components that could interfere with proper headlamp alignment.

(3) Verify proper tire inflation.

(4) Clean headlamp lenses.

(5) Verify that luggage area is not heavily loaded.

(6) Fuel tank should be FULL. Add 2.94 kg (6.5 lbs.) of weight over the fuel tank for each estimated gallon of missing fuel.

HEADLAMP AND FOG LAMP ADJUSTMENT USING ALIGNMENT SCREEN

NOTE: LH vehicle headlamps should be aligned using the low beams. The high beams should be used to verify low beam settings.

ALIGNMENT SCREEN PREPARATION

(1) Position vehicle on a level surface perpendicular to a flat wall 7.62 meters (25 ft.) away from front of headlamp lens.

(2) If necessary, tape a line on the floor 7.62 meters (25 ft.) away from and parallel to the wall.

(3) From the floor up 1.27 meters (5 ft.), tape a line on the wall at the center line of the vehicle. Sight along the center line of the vehicle (from rear of vehicle forward) to verify accuracy of the line placement.

(4) Rock vehicle side-to-side three times to allow suspension to stabilize.

(5) Jounce front suspension three times by pushing downward on front bumper and releasing.

(6) Measure the distance from the center of the headlamp bulbs to the floor, or refer to Headlamp Alignment Measurement Chart. Transfer measurement to the alignment screen (with tape). Use this line for up/down adjustment reference. Individual vehicles may vary.

(7) Measure distance from the center line of the vehicle to the center of the headlamp bulbs, or refer to Headlamp Alignment Measurement Chart. Transfer measurements to screen (with tape) to each side of vehicle center line. Use these lines for left/right adjustment reference (Fig. 1).

NOTE: There are reference marks on the lens to assist in locating the lamp centers.

HEADLAMP ALIGNMENT MEASUREMENT CHART

Module	Low Beam Center Line to Ground		Distance Between Lamp Centers (Low Beam)	
Concorde	25.0 in.	635.4 mm	54.2 in.	1376 mm
Intrepid	25.7 in.	652.4 mm	52.4 in.	1330 mm
LHS	25.0 in.	635.4 mm	49.3 in.	1254.5 mm
300M	24.8 in.	629.3	52.7 in.	1338.5 mm

ADJUSTMENTS (Continued)

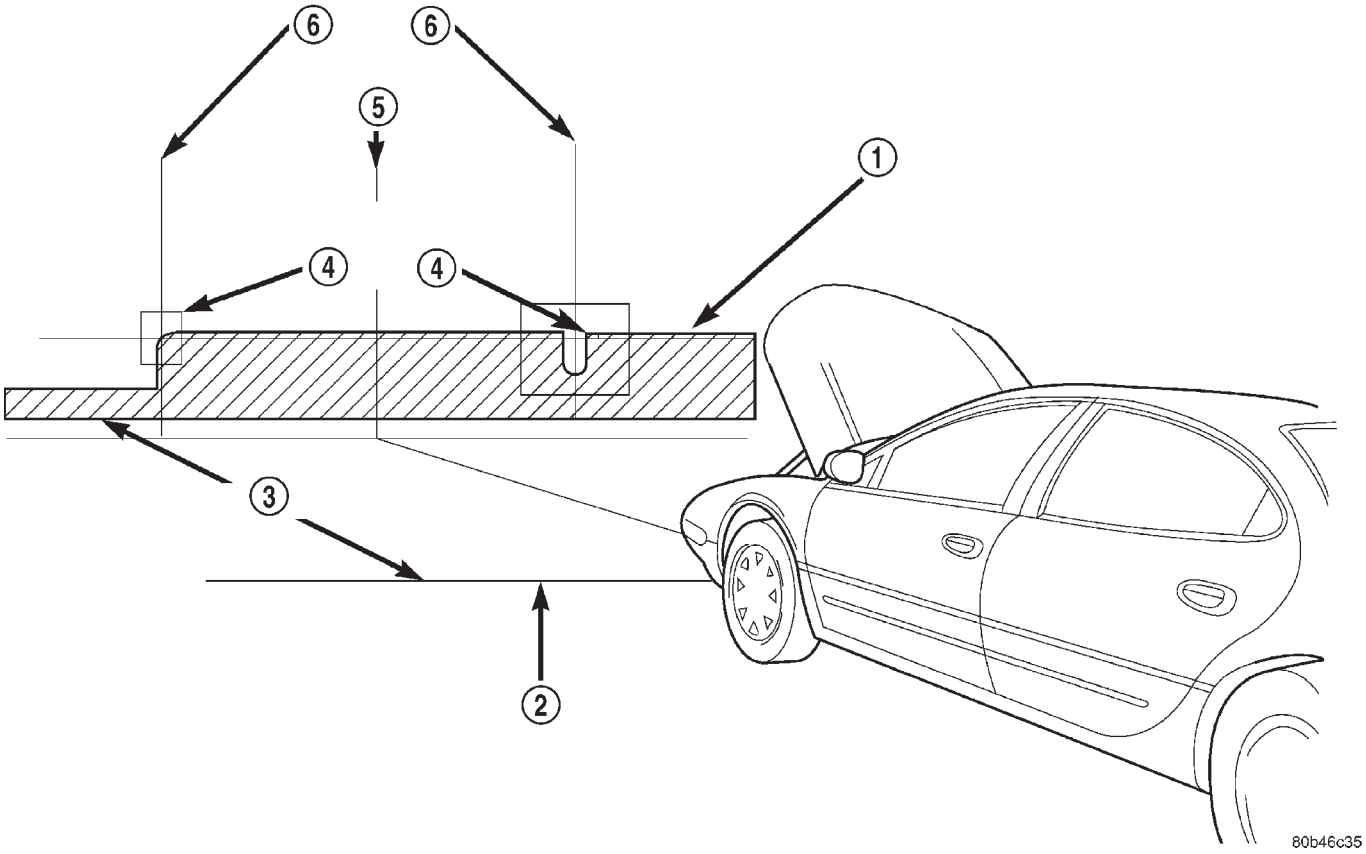


Fig. 1 Headlamp Alignment Screen

1 – LOW BEAM CENTER LINE TO GROUND
2 – FRONT OF HEADLAMP
3 – 7.26 METERS (25ft.)
4 – PREFERRED CUT OFF LOCATION ± 2 INS.
5 – CENTER OF VEHICLE
6 – CENTER OF HEADLAMP

HEADLAMP ADJUSTMENT

(Fig. 1). The low beam hot spot cut off should be within 2 inches above/below the horizontal center line, and to the right of the vertical center line. This puts the low beam hot spot in the lower right quadrant of the aiming screen. Occasional stray filament images should be disregarded while verifying aim. Verify the vertical adjustment by checking the high beams to ensure they are centered within ± 2 inches relative to the horizontal center line. The low beams should be shielded when checking high beams. Do NOT cover the headlamp(s) for extended periods, as the heat may damage them. To adjust headlamp alignment, rotate the alignment screws, (Fig. 2) and (Fig. 3) to achieve the specified pattern.

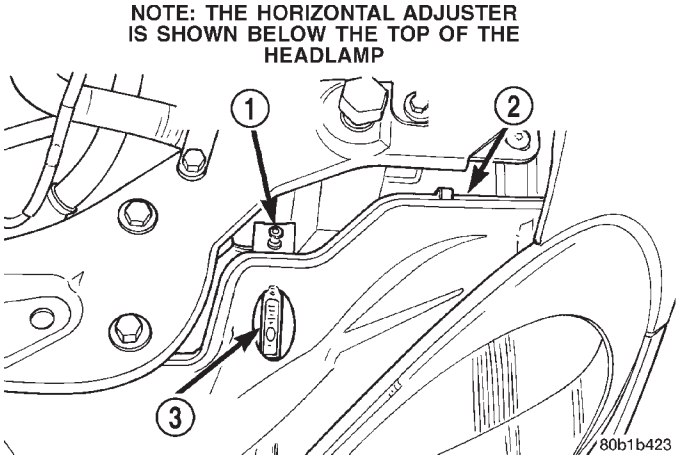


Fig. 2 Headlamp Alignment Screws – Concorde/ LHS/300M

1 – VERTICAL ADJUSTER
2 – HORIZONTAL ADJUSTER
3 – BUBBLE LEVEL

ADJUSTMENTS (Continued)

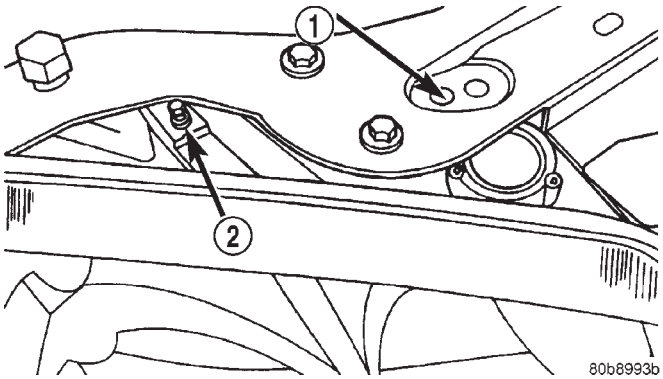


Fig. 3 Headlamp Alignment Screws – Intrepid

1 – HORIZONTAL ADJUSTER
2 – VERTICAL ADJUSTER

FOG LAMP ALIGNMENT

Prepare an alignment screen. Refer to Alignment Screen Preparation paragraph in this section. A properly aligned fog lamp will project a pattern on the alignment screen 100 mm (4 in.) below the fog lamp center line and straight ahead. To adjust fog lamp alignment, rotate the alignment screw (Fig. 5), (Fig. 6) or (Fig. 7)

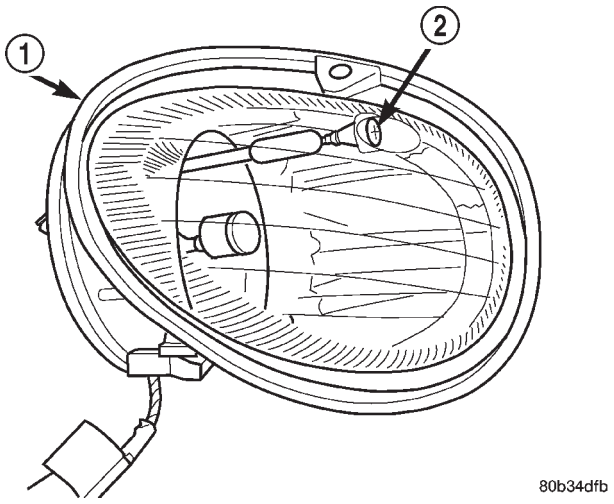


Fig. 5 Fog lamp Adjuster Screw – Intrepid

1 – FOG LAMP
2 – UP/DOWN ADJUSTER SCREW

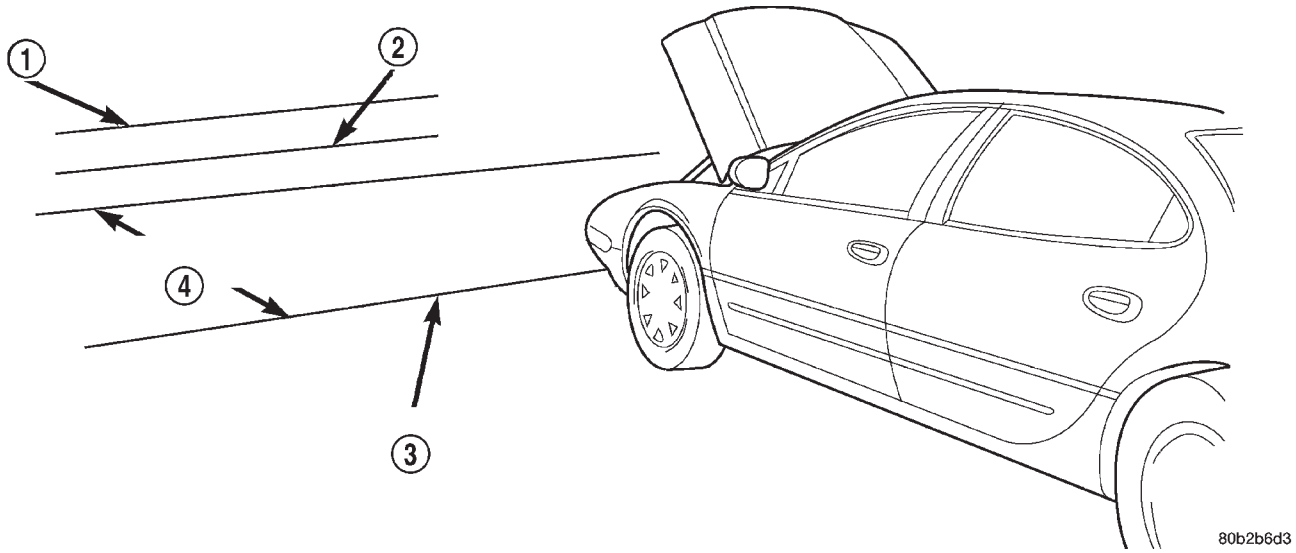


Fig. 4 Fog Lamp Alignment Screen

1 – HORIZONTAL CENTER LINE OF FOG LAMPS
2 – TOP OF FOG LAMP BEAM PATTERN CUT OFF ± 4 INS. FROM HORIZONTAL CENTER LINE
3 – FRONT OF FOG LAMP
4 – 7.62 METERS (25 FT.)

ADJUSTMENTS (Continued)

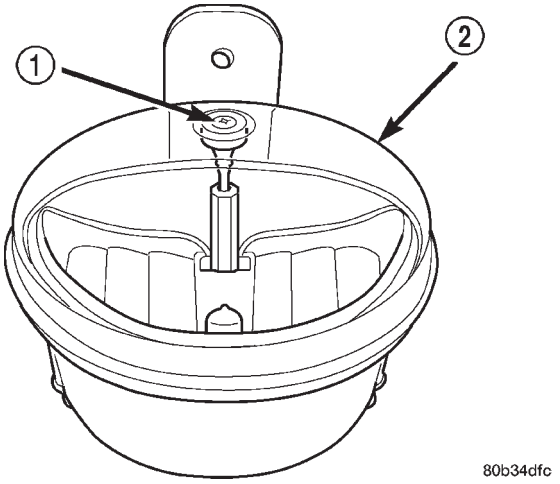


Fig. 6 Fog lamp Adjuster Screw – LHS

1 – UP/DOWN ADJUSTER SCREW
2 – FOG LAMP

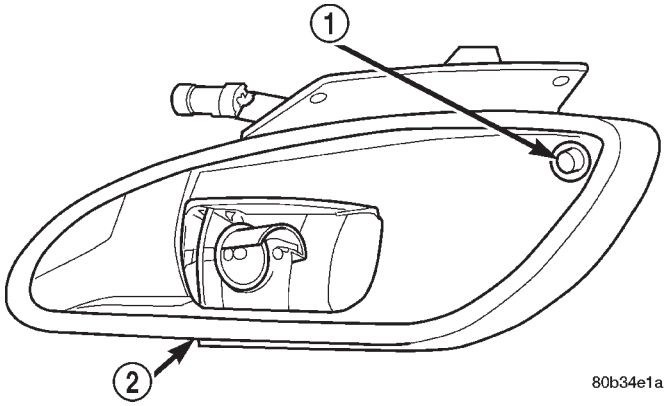


Fig. 7 Fog lamp Adjuster Screw – 300M

1 – UP/DOWN ADJUSTER SCREW
2 – FOG LAMP

LAMP BULB SERVICE

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REMOVAL AND INSTALLATION

HEADLAMP BULB(S) – CONCORDE/LHS/300M

Headlamp lens fogging is a normal condition and does not require service unless excessive or continual. Moisture will vent from tubes or vents located on the back of the lamp.

REMOVAL

(1) Remove headlamp housing. Refer to Headlamp Housing - Concorde/LHS/300M for proper procedures.
(2) Rotate retaining ring (High beam or Low beam) and pull lamp socket from headlamp housing (Fig. 1).
(3) Remove bulb from lamp wiring connector.

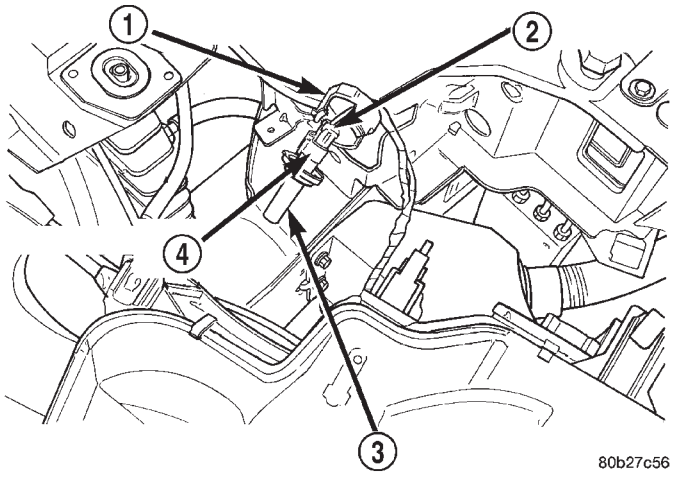


Fig. 1 Headlamp Bulb Removal

1 – RETAINING RING
2 – WIRE CONNECTOR
3 – BULB
4 – LAMP SOCKET

INSTALLATION

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

(1) Push bulb into lamp wiring connector.
(2) Place lamp socket into headlamp housing and rotate retaining ring to the lock position.
(3) Install headlamp housing.

HEADLAMP BULBS – INTREPID

Headlamp lens fogging is a normal condition and does not require service unless excessive or continual. Moisture will vent from tubes or vents located on the back of the lamp.

REMOVAL

(1) Release hood latch and open hood.
(2) Remove jackscrews attaching headlamp housing to crossmember and remove the lamp housing to access the lamp(s).
(3) Disconnect wire connector from back of lamp socket (Fig. 2).
(4) Rotate bulb (High beam or Low beam) and pull from headlamp housing.

INSTALLATION

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

(1) Place into headlamp housing and rotate to the lock position.
(2) Connect wire connector to bulb.
(3) Place lamp housing in position on vehicle.

REMOVAL AND INSTALLATION (Continued)

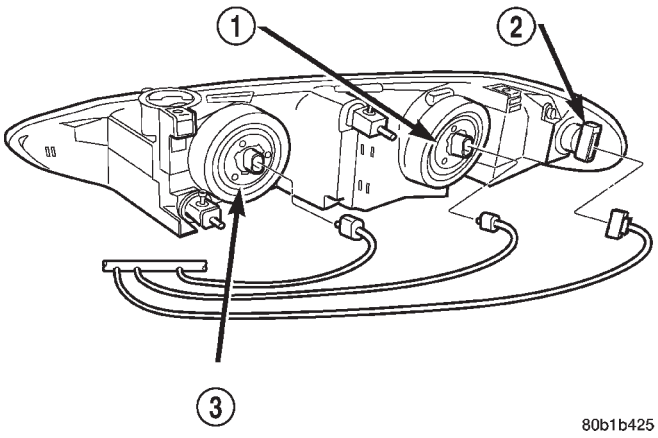


Fig. 2 Headlamp Bulb – Intrepid

1 – LOW BEAM
2 – PARKING AND TURN SIGNAL
3 – HIGH BEAM

(4) Verify headlamp operation.
(5) Install jackscrews to attach headlamp housing to crossmember.
(6) Verify headlamp operation and alignment.

FOG LAMP BULB – INTREPID/300M

REMOVAL

(1) Remove fog lamp housing screw in front fascia and pull lamp housing from the fascia.
(2) Remove rear cover from fog lamp housing.
(3) Disengage wire clip holding bulb in fog lamp.
(4) Hinge wire clip out of bulb removal path.
(5) Pull bulb from lamp housing (Fig. 3) or (Fig. 4).
(6) Disengage wire connector from body wire harness.

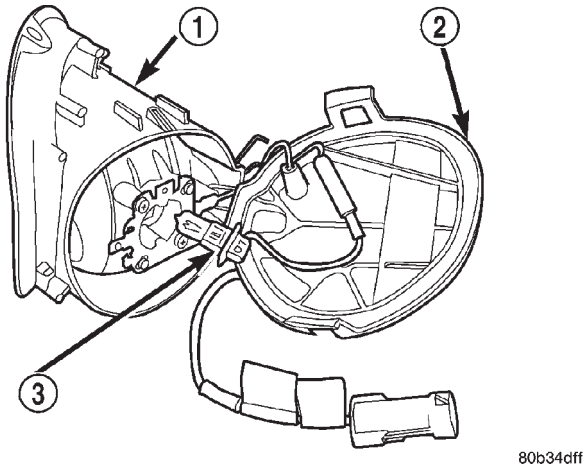


Fig. 3 Fog Lamp Bulb – Intrepid

1 – FOG LAMP
2 – REAR COVER
3 – FOG LAMP BULB

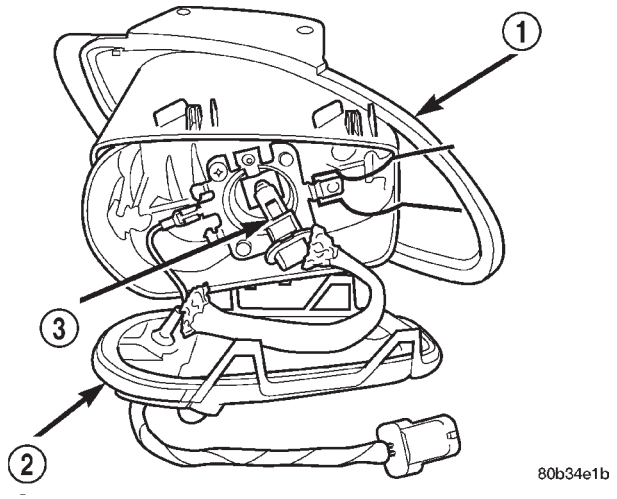


Fig. 4 Fog Lamp Bulb – 300M

1 – FOG LAMP
2 – REAR COVER
3 – FOG LAMP BULB

INSTALLATION

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

(1) Connect wire connector to body wire harness.
(2) Cover exposed terminal with teflon coated sleeve.
(3) Insert bulb into lamp housing.
(4) Hinge wire clip over bulb base.
(5) Engage wire clip to hold bulb in fog lamp.
(6) Install rear cover to fog lamp housing.
(7) Verify fog lamp operation and alignment.
(8) Install fog lamp housing screw to the front fascia.

FOG LAMP BULB – LHS

REMOVAL

(1) Remove fog lamp housing screw in front fascia and pull lamp housing from the front fascia.
(2) Disconnect wire connector from fog lamp socket (Fig. 5).
(3) Rotate socket and pull bulb/socket from lamp housing.

INSTALLATION

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

(1) Install socket into fog lamp housing and rotate to the lock position.

REMOVAL AND INSTALLATION (Continued)

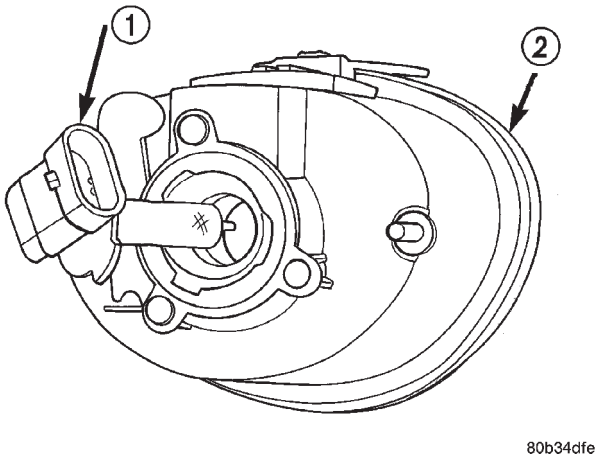


Fig. 5 Fog Lamp Bulb – LHS

1 – FOG LAMP BULB/SOCKET
2 – FOG LAMP

(2) Connect wire connector to the socket.
(3) Verify fog lamp operation and alignment.
(4) Install fog lamp housing into fascia.
(5) Install fog lamp screw to the front fascia

FRONT PARKING AND TURN SIGNAL LAMP BULB - LHS

REMOVAL

(1) Remove headlamp housing from vehicle.
(2) Disconnect wire connector from back of lamp socket(s).
(3) Rotate socket and pull lamp socket from headlamp housing.
(4) Remove bulb from lamp socket.

INSTALLATION

(1) Push bulb into lamp socket.
(2) Place lamp socket into headlamp housing and rotate to the lock position.
(3) Connect wire connector to lamp socket(s).
(4) Verify headlamp operation.
(5) Install headlamp housing.
(6) Verify headlamp operation and alignment.

FRONT PARKING, SIDE MARKER, AND TURN SIGNAL LAMP BULB – CONCORDE

REMOVAL

(1) Reach under the fascia and remove the socket from the lamp housing (Fig. 6).
(2) Rotate and pull socket from lamp housing.
(3) Pull bulb from socket.

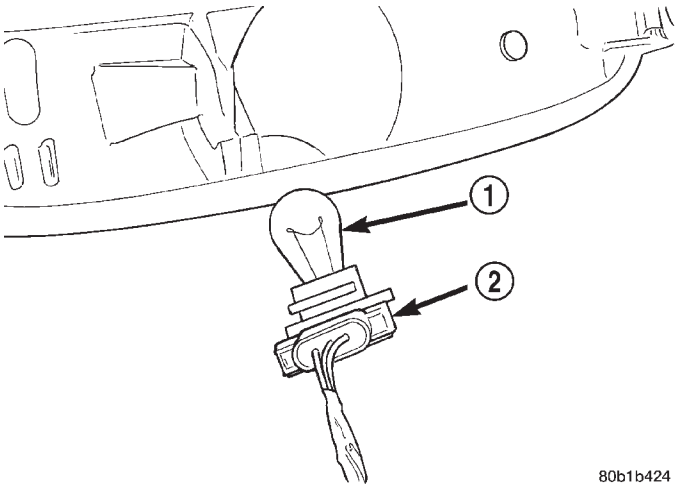


Fig. 6 Parking, Side Marker, and Turn Signal Lamp Bulb – Concorde

1 – BULB
2 – SOCKET

INSTALLATION

(1) Push bulb into socket.
(2) Install socket into lamp housing.
(3) Verify park and turn signal lamp operation.

FRONT PARKING, SIDE MARKER, AND TURN SIGNAL LAMP BULB – INTREPID

REMOVAL

(1) Release hood latch and open hood.
(2) Remove jackscrews attaching headlamp to crossmember.
(3) Remove lamp housing to access the lamp socket.
(4) Remove lamp socket from lamp housing (Fig. 7).
(5) Pull bulb from socket.

INSTALLATION

(1) Push bulb into socket.
(2) Install lamp socket in lamp housing.
(3) Verify lamp operation.
(4) Place headlamp in position on vehicle.
(5) Install jackscrews to attach headlamp housing to crossmember.

REMOVAL AND INSTALLATION (Continued)

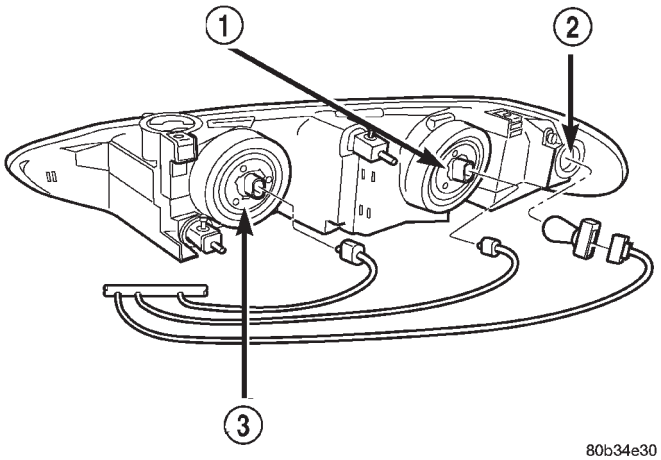


Fig. 7 Parking, Side Marker, and Turn Signal Bulb - Intrepid

1 – LOW BEAM
2 – PARKING AND TURN SIGNAL
3 – HIGH BEAM

FRONT SIDE MARKER LAMP BULB – LHS

REMOVAL

(1) Reach under the fascia and remove the socket from the side marker lamp housing (Fig. 8).
(2) Pull bulb from socket.

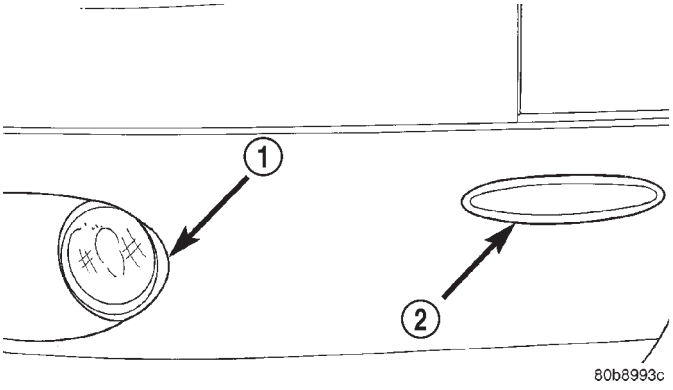


Fig. 8 Front Side Marker Lamp Bulb – LHS

1 – FOG LAMP
2 – SIDE MARKER

INSTALLATION

(1) Push bulb into socket.
(2) Install socket into front side marker lamp housing.
(3) Verify park and front side marker lamp operation.

CHMSL BULB(S) – CONCORDE/LHS

REMOVAL

(1) Release decklid latch and open decklid.
(2) From under rear shelf panel, disconnect the lamp socket from the CHMSL housing (Fig. 9).
(3) Remove bulb from the socket.

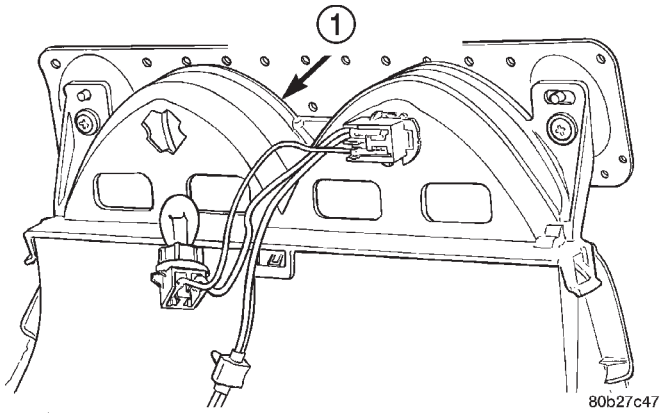


Fig. 9 CHMSL – Rear Shelf

1 – CHMSL HOUSING

INSTALLATION

(1) Install the bulb into the socket.
(2) Install socket into CHMSL housing.
(3) Verify CHMSL operation.

CHMSL AND APPLIQUE LAMP BULB(S) – INTREPID

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove decklid cover.
(3) Disconnect lamp socket from housing (Fig. 10).
(4) Remove bulb from socket.

INSTALLATION

(1) Install bulb into socket.
(2) Install socket into housing.
(3) Verify CHMSL operation.
(4) Install decklid cover.

REMOVAL AND INSTALLATION (Continued)

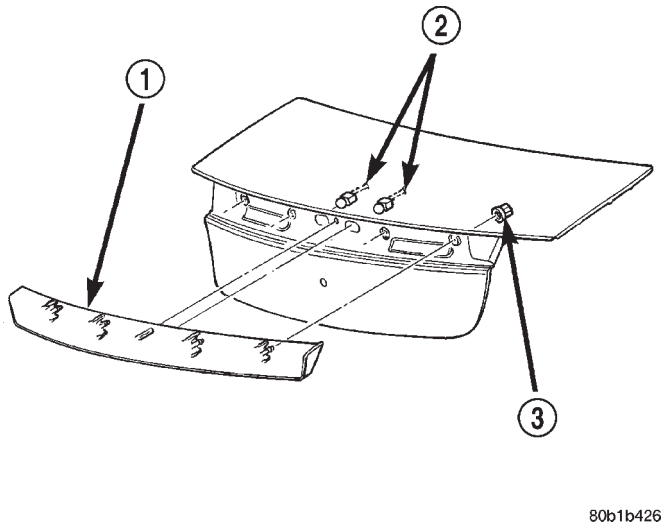


Fig. 10 CHMSL – Intrepid

1 – TRUNK LID APPLIQUE AND CHMSL
2 – BODY WIRING AND LAMPS
3 – PLASTIC HEX NUT

CHMSL LAMP BULB – 300M

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove decklid cover.
(3) Disconnect lamp socket(s) from housing (Fig. 11).
(4) Remove bulb(s) from socket(s).

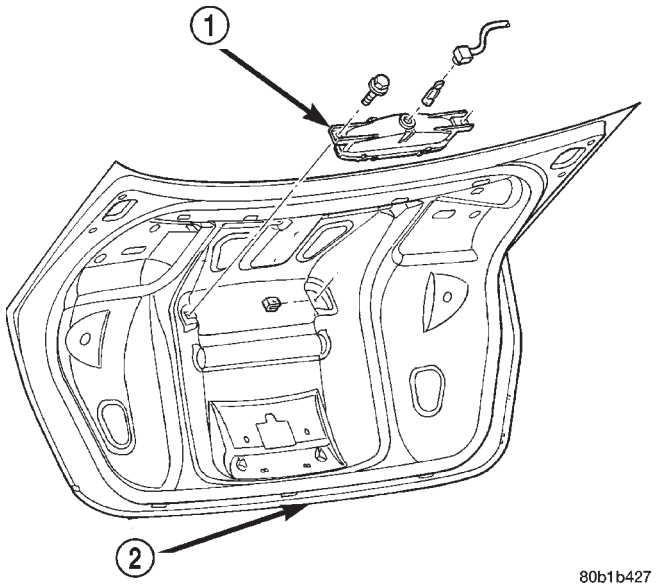


Fig. 11 CHMSL – 300M

1 – CHMSL LAMP
2 – TRUNK LID LOWER EDGE

INSTALLATION

(1) Install bulb(s) in socket(s).
(2) Install socket(s) into housing.
(3) Verify CHMSL operation.
(4) Install decklid cover.

TRUNK LAMP BULB

REMOVAL

(1) Remove lens from lamp from the rear shelf (Fig. 12).
(2) Pull bulb from socket.

INSTALLATION

(1) Insert bulb into socket.
(2) Install lamp lens.

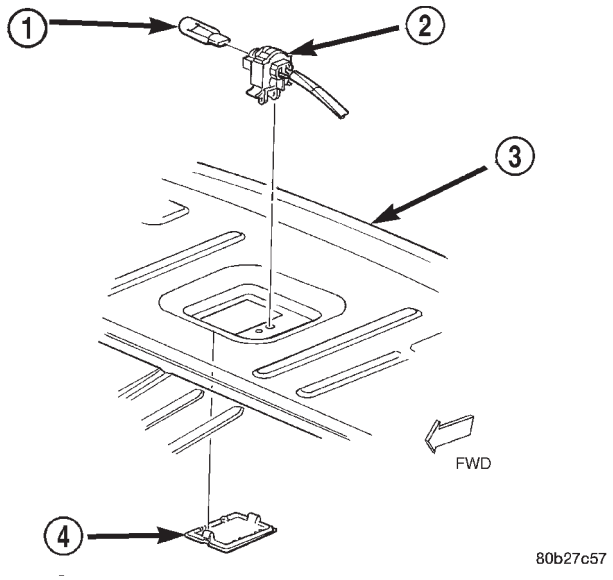


Fig. 12 Trunk Lamp Bulb

1 – BULB
2 – TRUNK LAMP SOCKET
3 – REAR SHELF
4 – LENS

TAIL, STOP, BACK UP, AND TURN SIGNAL LAMP BULB

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove trunk lining from rear closure panel as necessary to gain access to tail lamp fasteners.
(3) Remove nuts attaching tail lamp to rear closure panel.
(4) Remove tail lamp from rear closure panel.
(5) Remove socket(s) from tail lamp (Fig. 13), (Fig. 14), and (Fig. 15).
(6) Pull bulb from socket.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Push bulb into socket.
(2) Install socket(s) in tail lamp.
(3) Place tail lamp in position on rear closure panel.
(4) Install nuts attaching tail lamp to rear closure panel.
(5) Install trunk lining.
(6) Verify lamp operation.

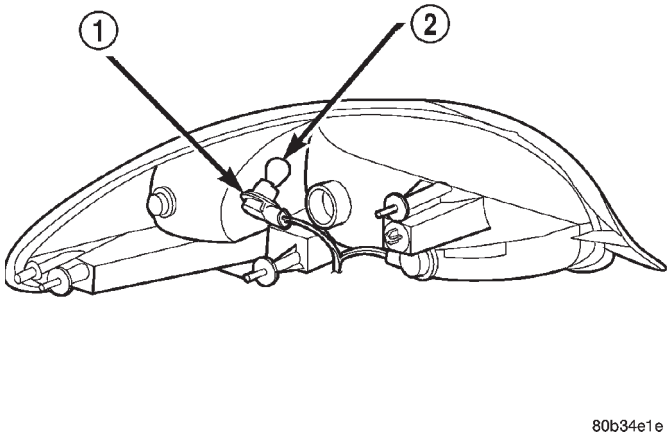


Fig. 13 Tail, Stop, Back up, and Turn Signal Lamp Bulb – Concorde/LHS

1 – SOCKET
2 – BULB

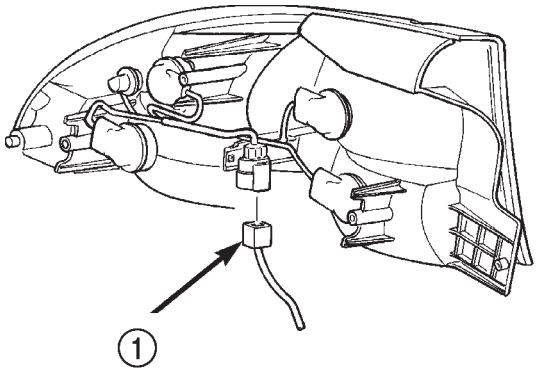


Fig. 14 Tail, Stop, Back up, and Turn Signal Lamp Bulb – Intrepid

1 – BODY WIRE HARNESS CONNECTOR

LICENSE PLATE LAMP BULB – REAR BUMPER FASCIA

REMOVAL

(1) Remove screws attaching license plate lamp to rear bumper fascia.
(2) Remove license plate lamp from rear bumper fascia.
(3) Remove socket from lamp (Fig. 16).

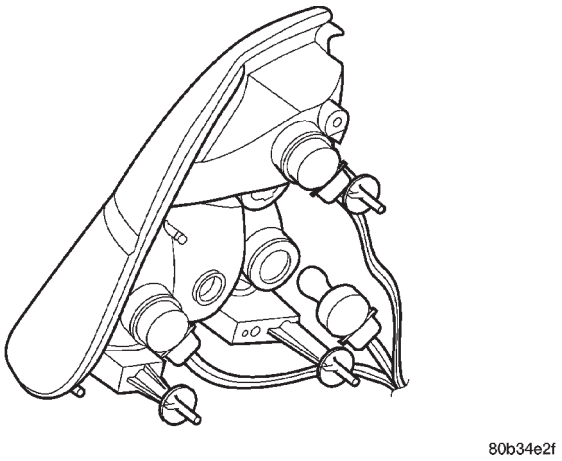


Fig. 15 Tail, Stop, Back up, and Turn Signal Lamp Bulb – 300M

(4) Pull bulb from socket.

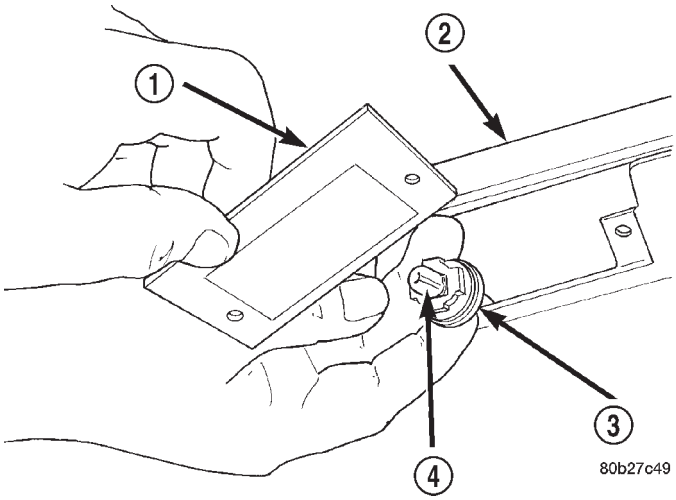


Fig. 16 License Plate Lamp Bulb

1 – LICENSE PLATE LAMP
2 – TRUNK LID
3 – SOCKET
4 – BULB

INSTALLATION

(1) Push bulb into socket.
(2) Install socket into lamp.
(3) Place license plate lamp in position on rear bumper fascia.
(4) Install screws to attach license plate lamp to rear bumper fascia.

LAMP SERVICE

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DIAGNOSIS AND TESTING

DAYTIME RUNNING LAMP

The Daytime Running Light Module (DRL Module) is controlled by inputs received from the ignition switch and High or Low Beam Headlamp relays, Park Brake switch, and the Brake Fluid Level switch. Refer to Group 8W, Wiring Diagrams, for component location and circuit information.

ILLUMINATED ENTRY

When testing the system, all doors must be closed to prevent courtesy lamps from lighting. Verify that remote keyless entry system is operating properly before testing illuminated entry circuits. The body controller uses input from the remote keyless entry system to switch ON the courtesy lamps.

Refer to Group 8W, Wiring Diagrams, for component location and circuit information. Refer to Body Systems Diagnostic Procedures Manual for complete diagnostic information.

ALL OTHER LIGHTING SYSTEMS

Refer to Group 8W, Wiring Diagrams, for component locations and circuit information. For additional diagnostic information, refer to the appropriate Body Diagnostic Procedures manual.

REMOVAL AND INSTALLATION

HEADLAMP HOUSING – CONCORDE/LHS/300M

Headlamp lens fogging is a normal condition and does not require service unless excessive or continual. Moisture will vent from tubes or vents located on the back of the lamp.

REMOVAL

(1) Release hood latch and open hood.

(2) Remove large rubber grommet (70 mm x 168 mm) from splash shield to gain access to fascia fasteners (Fig. 1).

(3) Remove fasteners attaching fascia to the front fender and splash shield, using access hole in splash shield (Fig. 2).

(4) Remove the push pins attaching the fascia to the upper radiator closure panel (Fig. 3).

(5) Remove jackscrews attaching headlamp housing to crossmember and remove the lamp housing to access the lamp(s) (Fig. 4).

(6) Roll fascia forward to clear way for headlamp housing removal (Fig. 5).

(7) Disconnect wire connector from back of lamp socket(s) and/or bulbs.

(8) Remove headlamp housing (Fig. 6).

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

(1) Place headlamp housing into position.
(2) Connect wire connector to lamp socket(s) and/or bulbs.
(3) Verify headlamp and signal lamp operation.
(4) Install jackscrews to attach headlamp housing to crossmember.
(5) Align fascia to bumper reinforcement and install the top center push pins, to upper radiator closure panel.
(6) Align the two fascia studs to the fender vertical attachments, at the same time align the fascia groove on the horizontal flange with the fender drive pin. Push fascia rearward to engage the fasteners.
(7) Install nut on fascia stud through the splash shield access hole.
(8) Verify headlamp operation and alignment.

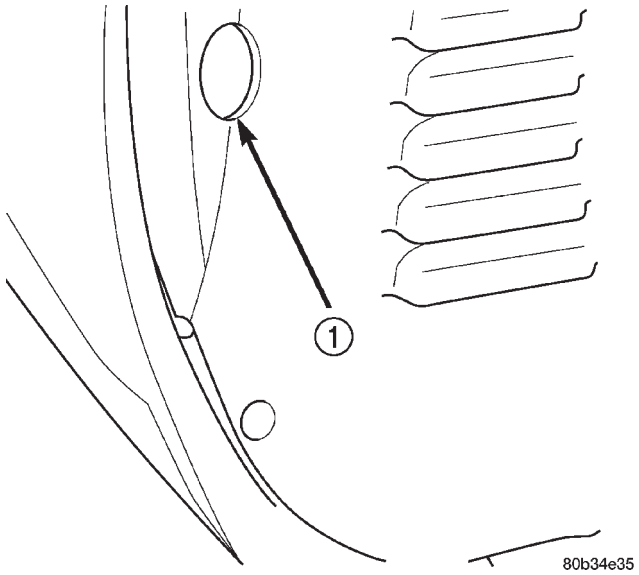


Fig. 1 Access Rubber Grommet

1 – ACCESS RUBBER GROMMET

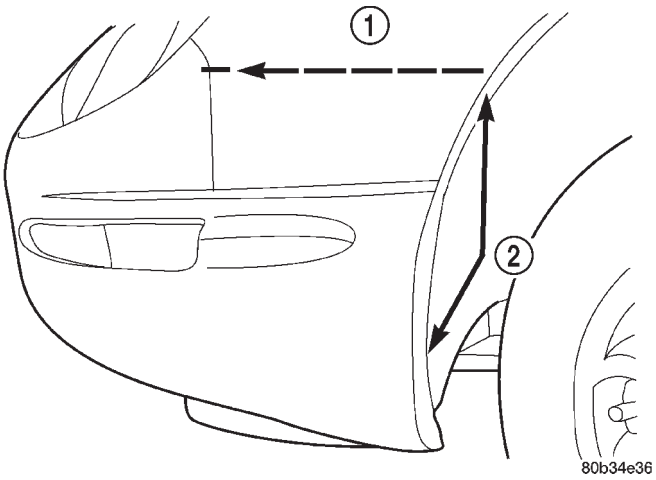


Fig. 2 Fastener Locations

1 – THROUGH ACCESS REMOVE FASTENER
2 – FASTENERS

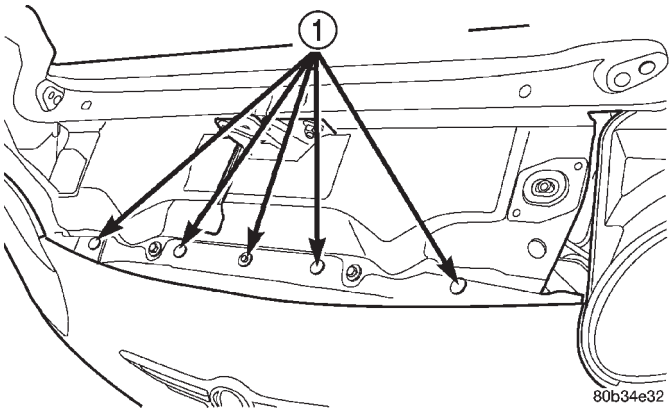


Fig. 3 Remove Push In Fasteners

1 – PUSH IN FASTENERS

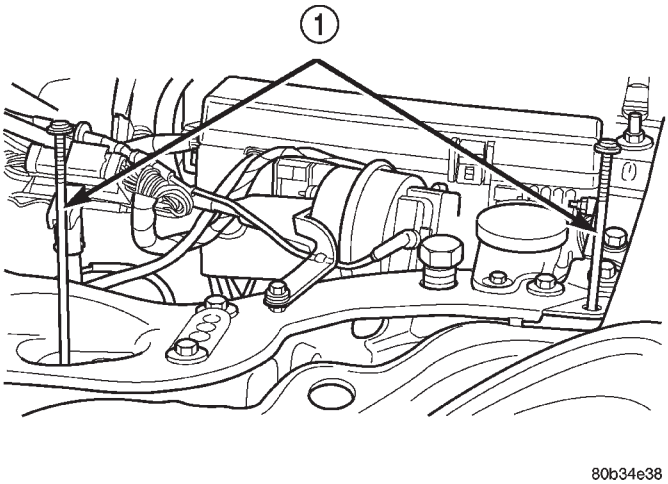


Fig. 4 Headlamp Jackscrews

1 – HEADLAMP JACKSCREWS

REMOVAL AND INSTALLATION (Continued)

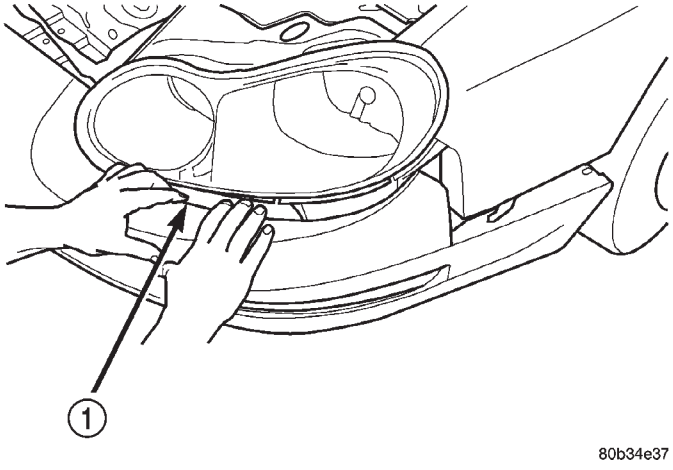


Fig. 5 Roll Fascia Forward

1 – ROLL FORWARD

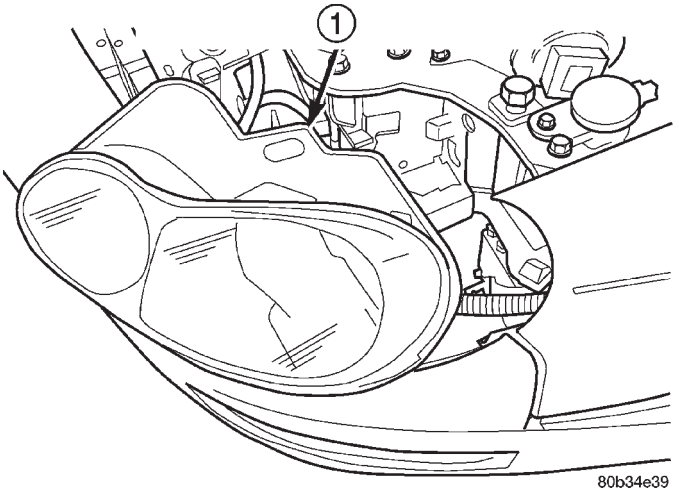


Fig. 6 Remove Headlamp Housing

1 – REMOVE HEADLAMP HOUSING

HEADLAMP HOUSING – INTREPID

Headlamp lens fogging is a normal condition and does not require service unless excessive or continual. Moisture will vent from tubes or vents located on the back of the lamp.

REMOVAL

(1) Release hood latch and open hood.

(2) Remove jackscrews attaching headlamp to body (Fig. 7).

(3) Remove headlamp from body.

(4) Disconnect wire connector from headlamp and parking, side marker, and turn signal lamps.

(5) Remove headlamp housing from vehicle.

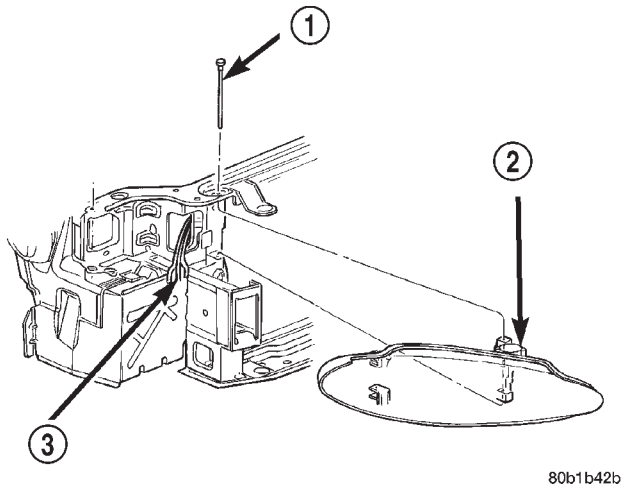


Fig. 7 Headlamp Housing – Intrepid

1 – JACKSCREW
2 – HEADLAMP HOUSING
3 – BODY WIRE CONNECTOR

INSTALLATION

(1) Place headlamp housing in position on vehicle.

(2) Connect wire connectors to headlamp, parking, side marker, and turn signal lamps.

(3) Place headlamp in position on body.

(4) Install screws to attach headlamp to body.

(5) Verify headlamp operation and alignment.

FOG LAMP HOUSING

REMOVAL

(1) Remove screw(s) attaching fog lamp to fascia (Fig. 8), (Fig. 9), and (Fig. 10).

(2) Pull fog lamp forward from opening in front bumper fascia.

(3) Disconnect fog lamp wire connector from front lighting wire harness.

(4) Remove fog lamp from vehicle.

INSTALLATION

(1) Place fog lamp in position on vehicle.

(2) Connect fog lamp wire connector to front lighting wire harness.

(3) Insert fog lamp rearward into opening in front bumper fascia.

(4) Install screw(s) attaching fog lamp to fascia.

(5) Verify fog lamp operation and alignment. Refer to Fog Lamp Alignment procedures in this group.

REMOVAL AND INSTALLATION (Continued)

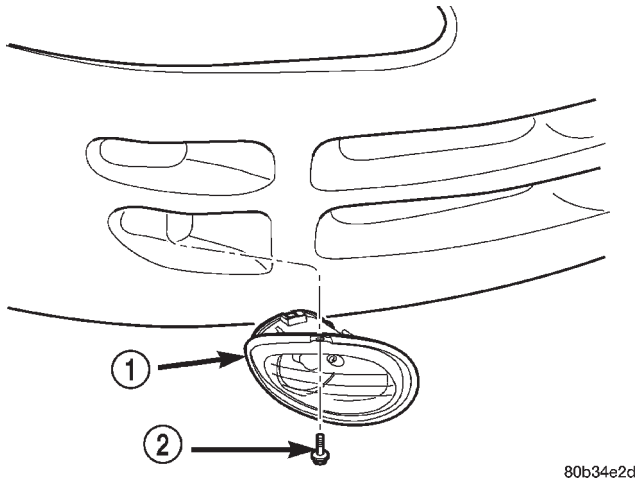


Fig. 8 Fog Lamp – Intrepid

1 – FOG LAMP
2 – SCREW

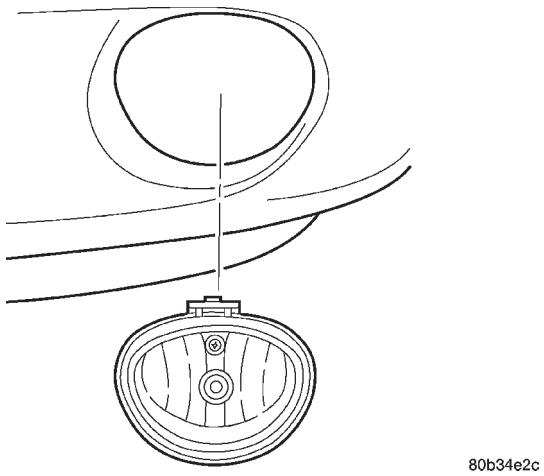


Fig. 9 Fog Lamp – LHS

FRONT PARKING, AND TURN SIGNAL LAMP HOUSING – LHS

The front parking, and turn signal lamp housing is part of the headlamp housing. For removal procedure refer to Headlamp Housing Removal and Installation procedures.

FRONT PARKING, SIDE MARKER, AND TURN SIGNAL LAMP HOUSING – INTREPID

The front parking, side marker, and turn signal lamp housing is part of the headlamp housing. For removal procedure refer to Headlamp Housing Removal and Installation procedures.

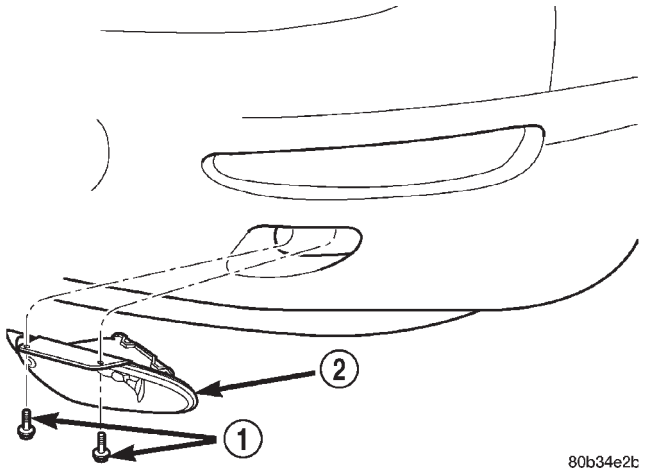


Fig. 10 Fog Lamp – 300M

1 – SCREWS
2 – FOG LAMP

FRONT SIDE MARKER HOUSING – LHS

REMOVAL

(1) Loosen fascia as necessary to access lamp.
(2) Remove bulb socket from lamp.
(3) Disconnect fasteners attaching side marker lamp to fascia (Fig. 11).
(4) Remove attaching fasteners.
(5) Remove lamp housing from vehicle.

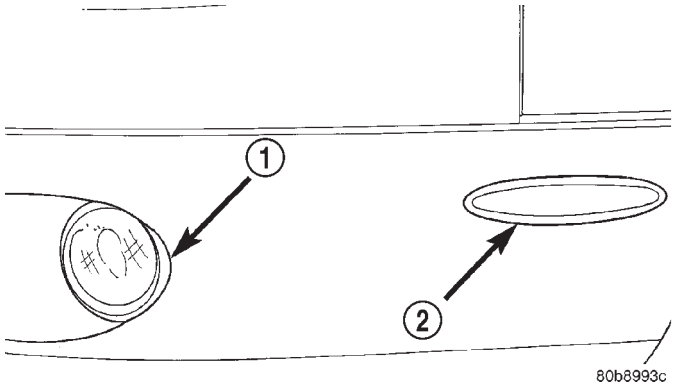


Fig. 11 Front Side Marker Lamp Housing

1 – FOG LAMP
2 – SIDE MARKER

INSTALLATION

(1) Place lamp in position on fascia.
(2) Install lamp fasteners.
(3) Install bulb socket in lamp.
(4) Connect wire harness connector.
(5) Verify lamp operation.
(6) Attach fascia to vehicle.

REMOVAL AND INSTALLATION (Continued)

FRONT PARKING, SIDE MARKER, AND TURN SIGNAL LAMP HOUSING – CONCORDE/300M

REMOVAL

(1) Remove headlamp housing to access lamp housing.
(2) Rotate and pull socket from lamp housing.
(3) Disconnect fastener attaching lamp housing to fascia (Fig. 12).
(4) Remove lamp housing from vehicle.

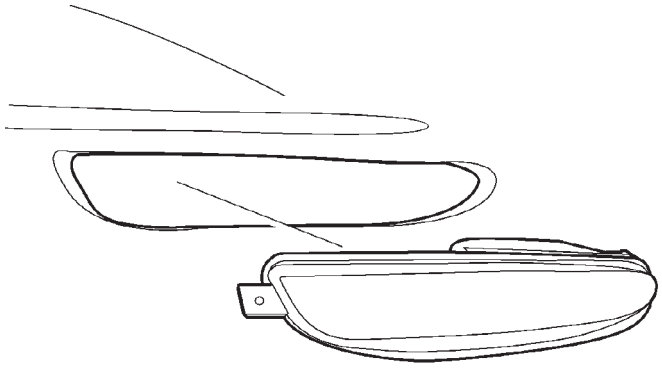


Fig. 12 Front Parking, Side Marker, and Turn Signal Lamp Housing

INSTALLATION

(1) Place lamp housing in position on fascia.
(2) Install lamp fastener.
(3) Install bulb socket in lamp.
(4) Verify lamp operation.
(5) Install headlamp housing.

CHMSL HOUSING – CONCORDE/LHS

REMOVAL

(1) Release decklid latch and open decklid.
(2) From under rear shelf panel, disconnect CHMSL wire connector from body harness.
(3) Remove rear shelf upper panel.
(4) Remove fasteners attaching the CHMSL to rear shelf upper panel (Fig. 13).
(5) Remove CHMSL from rear shelf upper panel.

INSTALLATION

(1) Place CHMSL in position on rear shelf upper panel.
(2) Install fasteners to attach CHMSL to rear shelf upper panel.
(3) Install rear shelf upper panel.
(4) Connect CHMSL wire connector to body harness.
(5) Verify CHMSL operation.

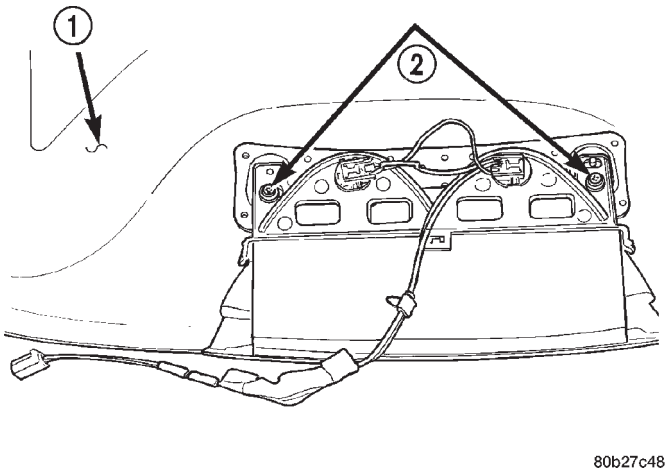


Fig. 13 CHMSL – Rear Shelf

1 – REAR SHELF TRIM PANEL
2 – ATTACHING SCREWS

CHMSL AND APPLIQUE HOUSING – INTREPID

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove decklid cover.
(3) Disconnect CHMSL wire connector from body harness (Fig. 14).
(4) Remove fasteners attaching CHMSL and applique to the decklid.
(5) Remove CHMSL from decklid.

INSTALLATION

(1) Place CHMSL in position on decklid.
(2) Install fasteners attaching CHMSL and applique to decklid.
(3) Connect CHMSL wire connector to body harness.
(4) Verify CHMSL operation.
(5) Install decklid cover.

CHMSL HOUSING – 300M

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove decklid cover.
(3) Disconnect CHMSL wire connector from body harness (Fig. 15).
(4) Remove fasteners attaching CHMSL to the decklid.
(5) Remove CHMSL from decklid.

INSTALLATION

(1) Place CHMSL in position on decklid.
(2) Install fasteners attaching CHMSL to decklid.
(3) Connect CHMSL wire connector to body harness.

REMOVAL AND INSTALLATION (Continued)

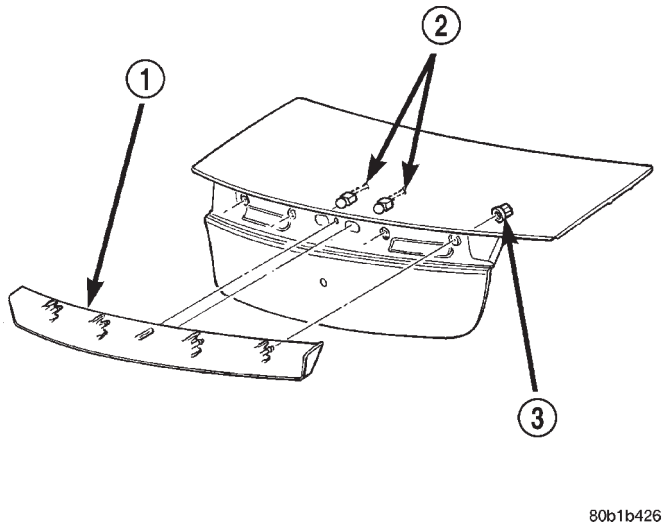


Fig. 14 CHMSL Housing – Intrepid

1 – TRUNK LID APPLIQUE AND CHMSL
2 – BODY WIRING AND LAMPS
3 – PLASTIC HEX NUT

(4) Verify CHMSL operation.
(5) Install decklid cover.

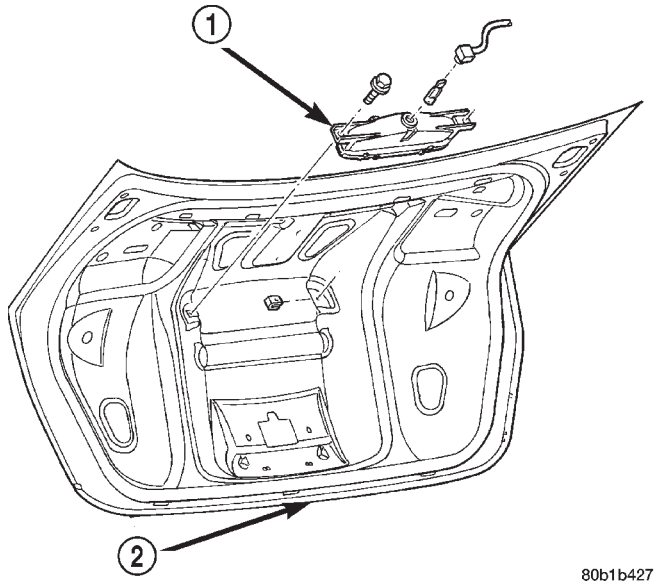


Fig. 15 CHMSL – Decklid

1 – CHMSL LAMP
2 – TRUNK LID LOWER EDGE

TAIL, STOP, BACK UP, AND TURN SIGNAL LAMP

REMOVAL

(1) Release decklid latch and open decklid.
(2) Remove fasteners attaching trunk lining to lower rear trunk panel.
(3) Move the trunk lining to access the tail lamp fasteners.
(4) Remove nuts attaching tail lamp to lower trunk and quarter panel (Fig. 16), and (Fig. 17).
(5) Remove tail lamp from vehicle.
(6) Disconnect tail lamp wire connector from body wire harness.

INSTALLATION

(1) Connect tail lamp wire connector to body wire harness.
(2) Place tail lamp in position on vehicle.
(3) Install nuts to attach tail lamp to lower trunk and quarter panel.
(4) Place trunk lining in position on lower trunk panel.
(5) Install fasteners to attach trunk lining to lower rear trunk panel.
(6) Verify lamp operation.

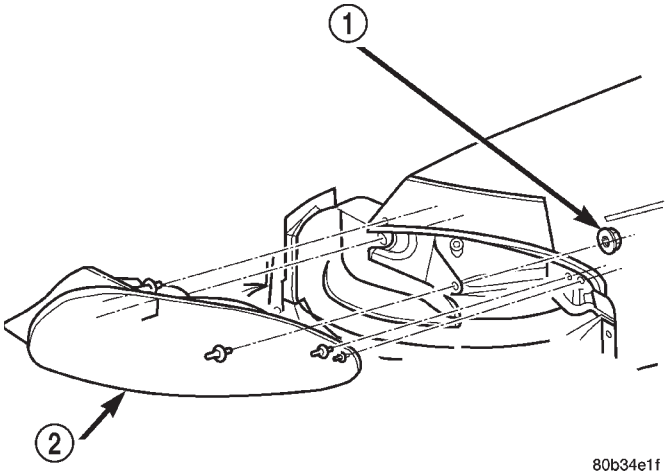


Fig. 16 Tail, Stop, Back up, and Turn Signal – Concorde/LHS

1 – PLASTIC HEX NUT (4)
2 – TAIL LAMP

REMOVAL AND INSTALLATION (Continued)

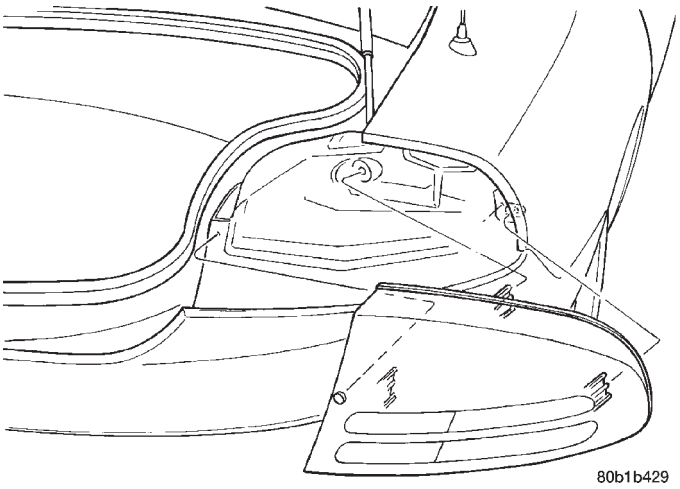


Fig. 17 Tail, Stop, Back up, and Turn Signal – Intrepid

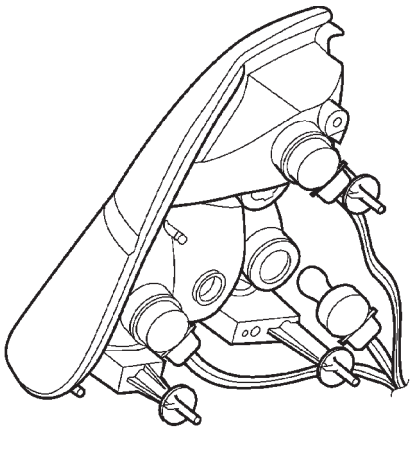


Fig. 18 Tail, Stop, Back up, and Turn Signal – 300M

LICENSE PLATE LAMP – REAR BUMPER FASCIA

REMOVAL

(1) Remove screws holding license plate lamp to fascia (Fig. 19).

(2) Remove license plate lamp from vehicle.

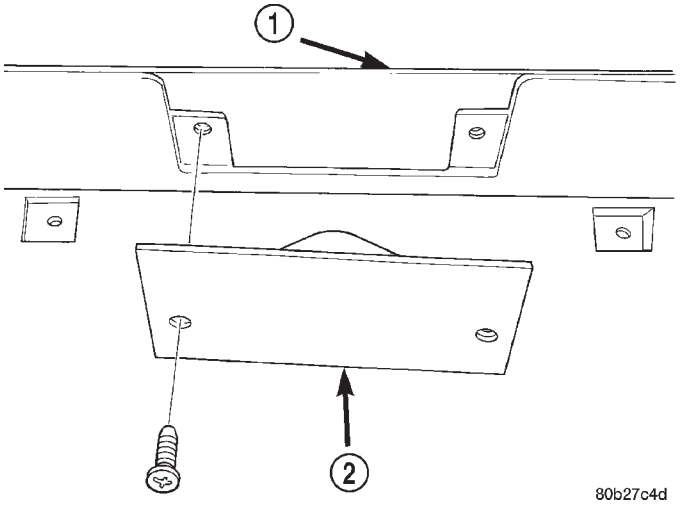


Fig. 19 License Plate Lamp

1 – APPLIQUE OR FASCIA
2 – LICENSE PLATE LAMP

INSTALLATION

(1) Place license plate lamp in position on vehicle.

(2) Install screws to attach license plate lamp to fascia.

BULB APPLICATION

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SPECIFICATIONS

DIMMER CONTROLLED INTERIOR LAMPS

Service procedures for most of the lamps in the instrument panel, Instrument cluster and switches are located in Group 8E, Instrument Panel and Gauges. Some components have lamps that can only be serviced by a Authorized Service Center (ASC) after the component is removed from the vehicle. Contact local dealer for location of nearest ASC.

LAMP LOCATION	BULB NUMBER
A/C Heater Control	330
Ash Receiver	161
Headlamp Switch	4798351
Instrument Cluster	PC194
Radio	ASC
Analog Clock	A9625

EXTERIOR LAMP BULBS

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result.

CAUTION: Do not touch halogen bulbs with fingers or other oily surfaces. Bulb life will be reduced.

EXTERIOR LAMP BULB CHART

LAMP NAME		BULB NUMBER
Back up	Concorde/LHS	921
Back up	Intrepid/300M	3157K
Center High Mounted Stop - Two Bulbs	Concorde/LHS	921
Center High Mounted Stop - Two Bulbs	Intrepid	912
Center High Mounted Stop - One Bulb	300M	921
Front Parking/Turn Signal	LHS	3157 K
Front Parking/Turn Signal/Side Marker	Concorde/300M	3157 KNA
Front Parking/Turn Signal/Side Marker	Intrepid	3157 KNA
Front Side Marker	LHS	168
Fog lamps	Intrepid	H-3 (35 watt)
	300M	H-3 (55 watt)
	LHS	9040 (40 Watt)

SPECIFICATIONS (Continued)

LAMP NAME		BULB NUMBER
Headlamps	Concorde/Intrepid/300M	High beam
		9005 XS
		Low beam
		9006 XSLL
	LHS	High beam
		9005 XSLL
		Low beam
		9006
License Plate	ALL	168
Side Marker (front)	LHS	168
Tail	300M	168
Tail Side Marker	Intrepid	168
Tail/Brake/Turn Signal	ALL	3157K

INDICATOR LAMPS

Service procedures for most of the lamps in the instrument panel, instrument cluster and switches are located in Group 8E, Instrument Panel and Systems.

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result.

CAUTION: Do not touch halogen bulbs with fingers or other oily surfaces. Bulb life will be reduced.

INDICATOR	BULB NUMBER
Air Bag	LED
Anti-Lock Brake	LED
Brake Warning	LED
Charging System	LED
Check Engine	LED
Cruise	74
Door Open	LED
Engine Oil Pressure	LED
Engine Temperature	LED
High Beam	74
Low Fuel	LED
Low Washer Fluid	LED
Seat Belt	LED
Decklid Open	LED
Turn Signal	PC194
Trac ON	74
Trac OFF	LED

NON DIMMER CONTROLLED INTERIOR LAMPS

Service procedures for most of the lamps in the following list can be found in Group 23, Body. Some components have lamps that can only be serviced by a Authorized Service Center (ASC) after the component is removed from the vehicle. Contact local dealer for location of nearest ASC.

LAMP LOCATION	BULB NUMBER
Ash Receiver	161
Door Courtesy	212-2
Glove Compartment	194
Overhead Console	192
Overhead Information Center	4437661
Reading Lamp – Front or Rear	192
Trunk	906
Visor Vanity	6501966

LAMPS

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LAMP SYSTEMS

DESCRIPTION AND OPERATION

HEADLAMP LEVELING SYSTEM

This vehicle is equipped with a remote headlamp leveling system. This system allows the driver to adjust the vertical headlamp aim from the interior of the vehicle to compensate for passenger or cargo load. A headlamp leveling switch is located on the instrument panel and controls the headlamp leveling motors found on the backs of the headlamp modules.

DIAGNOSIS AND TESTING

SAFETY PRECAUTIONS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not touch the glass of halogen bulbs with fingers or other possibly oily surface, reduced bulb life will result.

Do not use bulbs with higher candle power than indicated in the Bulb Application table at the end of this group. Damage to lamp and/or Daytime Running Lamp Module can result.

Do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owners Manual.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges are not holding the component in place.

DIAGNOSTIC PROCEDURES

When a vehicle experiences problems with the headlamp system, verify the condition of the battery connections, charging system, headlamp bulbs, wire connectors, relay, high beam dimmer switch and headlamp switch. Refer to Group 8W, Wiring Diagrams, for component locations and circuit information.

DIAGNOSIS AND TESTING (Continued)

HEADLAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn alternator drive belt.	2. Adjust or replace alternator drive belt.
	3. Charging system output too low.	3. Test and repair charging system. Refer to Group 8A.
	4. Battery has insufficient charge.	4. Test battery state-of -charge. Refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery. Refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
HEADLAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system. Refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices. Refer to Group 8W.
HEADLAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system. Refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	3. High resistance in headlamp circuit.	3. Test amperage draw of headlamp circuit.
HEADLAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations, refer to Group 8W.
	2. High resistance in headlamp circuit.	2. Test amperage draw of headlamp circuit.
	3. Loose or corroded terminals or splices in circuit.	3. Inspect and repair all connectors and splices. Refer to Group 8W.
HEADLAMPS DO NOT ILLUMINATE	1. No voltage to headlamps.	1. Repair open headlamp circuit. Refer to Group 8W.
	2. No Z1-ground at headlamps.	2. Repair circuit ground. Refer to Group 8W.
	3. Faulty headlamp switch.	3. Replace headlamp switch.
	4. Faulty headlamp dimmer (multi-function) switch.	4. Replace multi-function switch.
	5. Broken connector terminal or wire splice in headlamp circuit.	5. Repair connector terminal or wire splice.
	6. Defective or burned out bulb.	6. Replace bulb.
	7. Body controller malfunction.	7. Refer to appropriate body controller diagnostics.

DIAGNOSIS AND TESTING (Continued)

FOG LAMP DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
FOG LAMPS ARE DIM WITH ENGINE IDLING OR IGNITION TURNED OFF.	1. Loose or corroded battery cables.	1. Clean and secure battery cable clamps and posts.
	2. Loose or worn alternator drive belt.	2. Adjust or replace alternator drive belt.
	3. Charging system output too low.	3. Test and repair charging system. Refer to Group 8A,
	4. Battery has insufficient charge.	4. Test battery state-of -charge. Refer to Group 8A.
	5. Battery is sulfated or shorted.	5. Load test battery. Refer to Group 8A.
	6. Poor lighting circuit Z1-ground.	6. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
FOG LAMP BULBS BURN OUT FREQUENTLY	1. Charging system output too high.	1. Test and repair charging system. Refer to Group 8A.
	2. Loose or corroded terminals or splices in circuit.	2. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS ARE DIM WITH ENGINE RUNNING ABOVE IDLE	1. Charging system output too low.	1. Test and repair charging system. Refer to Group 8A.
	2. Poor lighting circuit Z1-ground.	2. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	3. High resistance in fog lamp circuit.	3. Test amperage draw of fog lamp circuit.
FOG LAMPS FLASH RANDOMLY	1. Poor lighting circuit Z1-ground.	1. Test for voltage drop across Z1-ground locations. Refer to Group 8W.
	2. High resistance in fog lamp circuit.	2. Test amperage draw of fog lamp circuit.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Loose or corroded terminals or splices in circuit.	4. Inspect and repair all connectors and splices. Refer to Group 8W.
FOG LAMPS DO NOT ILLUMINATE	1. Blown fuse for fog lamp.	1. Replace fuse. Refer to Group 8W.
	2. No Z1-ground at fog lamps.	2. Repair circuit ground. Refer to Group 8W.
	3. Faulty fog lamp switch.	3. Replace fog lamp switch.
	4. Broken connector terminal or wire splice in fog lamp circuit.	4. Repair connector terminal or wire splice.
	5. Defective or burned out bulb.	5. Replace bulb.

DIAGNOSIS AND TESTING (Continued)

HEADLAMP LEVELING MOTOR DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE MOTOR DOES NOT OPERATE	1. Poor connection at motor.	1. Secure connector on motor.
	2. No voltage at motor.	2. Repair circuit. Refer to Group 8W, Wiring.
	3. Defective motor.	3. Replace motor.
BOTH MOTORS DO NOT OPERATE	1. No voltage at headlamp leveling switch.	1. Repair circuit or replace fuse. Refer to Group 8W, Wiring.
	2. No voltage at both motors.	2. Repair circuit or replace fuse. Refer to Group 8W, Wiring.
	3. Poor connection at motors.	3. Secure connectors on motors.
	4. Both motors defective.	4. Replace motors.

HEADLAMP ALIGNMENT

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SERVICE PROCEDURES

HEADLAMP ALIGNMENT PREPARATION

(1) Verify headlamp dimmer switch and high beam indicator operation.

(2) Inspect and correct damaged or defective components that could interfere with proper headlamp alignment.

(3) Verify that the headlamp leveling switch is in the “0” position.

(4) Verify proper tire inflation.

(5) Clean the headlamp lenses.

(6) Verify that the luggage area is not heavily loaded.

(7) Fuel tank should be FULL. Add 2.94 kg (6.5 lbs.) of weight over the fuel tank for each estimated gallon of missing fuel.

ADJUSTMENTS

HEADLAMP AND FOG LAMP ADJUSTMENT USING ALIGNMENT SCREEN

NOTE: 300M vehicle headlamps should be aligned using the low beams. The high beams should be used to verify low beam settings.

ALIGNMENT SCREEN PREPARATION

(1) Position vehicle on a level surface perpendicular to a flat wall 7.62 meters (25 ft.) away from front of headlamp lens.

(2) If necessary, tape a line on the floor 7.62 meters (25 ft.) away from and parallel to the wall.

(3) From the floor up 1.27 meters (5 ft.), tape a line on the wall at the center line of the vehicle. Sight along the center line of the vehicle (from rear of vehicle forward) to verify accuracy of the line placement.

ADJUSTMENTS (Continued)

(4) Rock vehicle side-to-side three times to allow suspension to stabilize.

(5) Jounce front suspension three times by pushing downward on front bumper and releasing.

(6) Measure the distance from the center of the headlamp bulbs to the floor (623 mm or 24.5 in. by design). Transfer measurement to the alignment screen (with tape). Use this line for up/down adjustment reference.

(7) Measure distance from the center line of the vehicle to the center of the low beam headlamp bulbs (670 mm or 26.4 in. by design). Transfer measurements to screen (with tape) to each side of vehicle center line. Use these lines for left/right adjustment reference.

NOTE: There are reference marks on the lens to assist in locating the lamp centers.

HEADLAMP ADJUSTMENT

NOTE: HEADLAMPS MUST BE ALIGNED WITH THE HEADLAMP LEVELING MOTOR IN THE "0" POSITION.

(Fig. 1). The low beams should be aimed such that the cut-off is 1% below the horizontal centerline established in step 6 of the alignment screen preparation. For a 7.25m (25ft.) aiming distance, this is 75mm (3in.). For a standard 10m European aiming screen, this 100mm (4in.). The vertical aim can be adjusted by turning the adjusting screw on the top of the leveling motor.

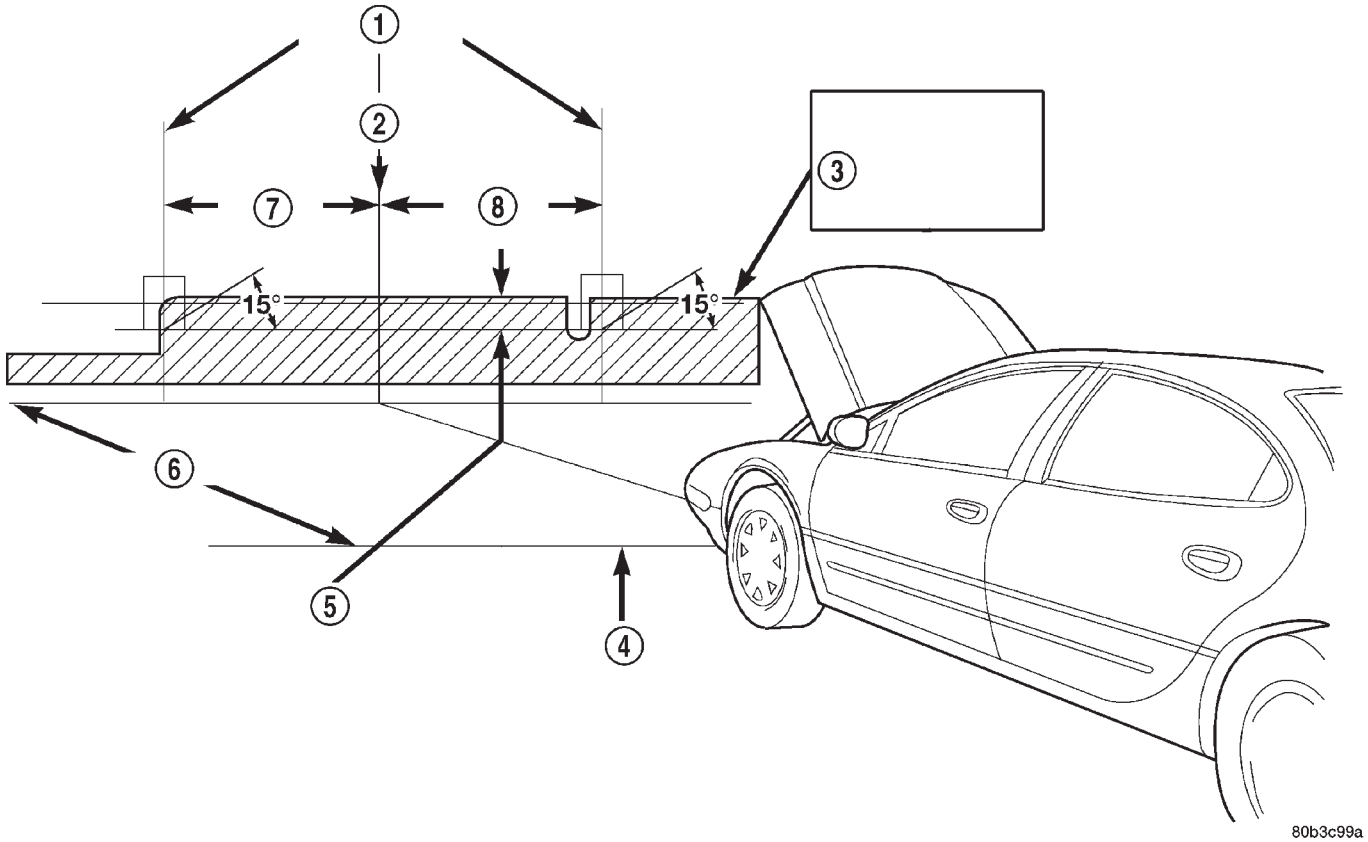


Fig. 1 Headlamp Alignment Screen

1 – CENTER OF HEADLAMP
2 – CENTER OF VEHICLE
3 – HEADLAMP HORIZONTAL DESIGN HEIGHT 623 mm
4 – FRONT OF HEADLAMPS
5 – 75 mm AT 7.25 m. 100 mm AT 10 m.
6 – 7.25 METERS (25 ft.)
7 – 670 mm
8 – 670 mm

ADJUSTMENTS (Continued)

The horizontal aim should be set so that the notch between the horizontal component of the cut-off and the 15° portion is approximately at the headlamp centerline as shown in the illustration. This is not normally required, but the horizontal adjusters can be accessed in the outboard area between the lamp and the crossmember.

FOG LAMP ALIGNMENT

Prepare an alignment screen. Refer to Alignment Screen Preparation paragraph in this section. A properly aligned fog lamp will project a pattern on the alignment screen 100 mm (4 in.) below the fog lamp center line and straight ahead. To adjust fog lamp alignment, rotate the vertical alignment screen (Fig. 3).

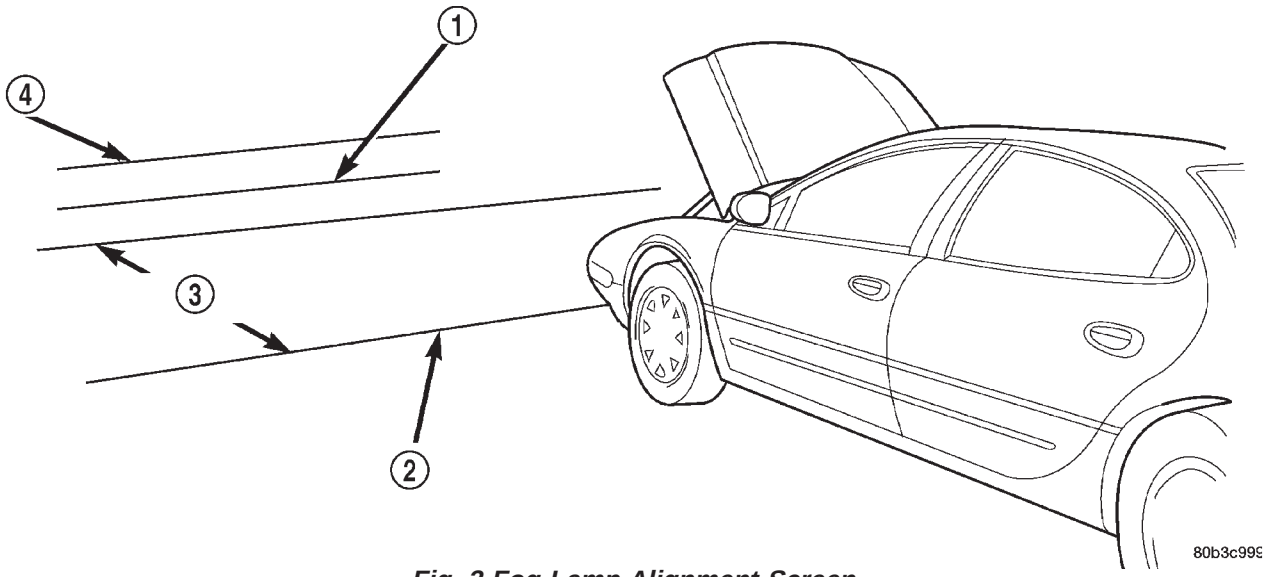


Fig. 2 Fog Lamp Alignment Screen

1 – TOP OF FOG LAMP HIGH INTENSITY ZONE ±4 INS. FROM HORIZONTAL CENTER LINE
2 – FRONT OF FOG LAMP
3 – 7.62 METERS (25 FT.)
4 – HORIZONTAL CENTER LINE OF FOG LAMPS

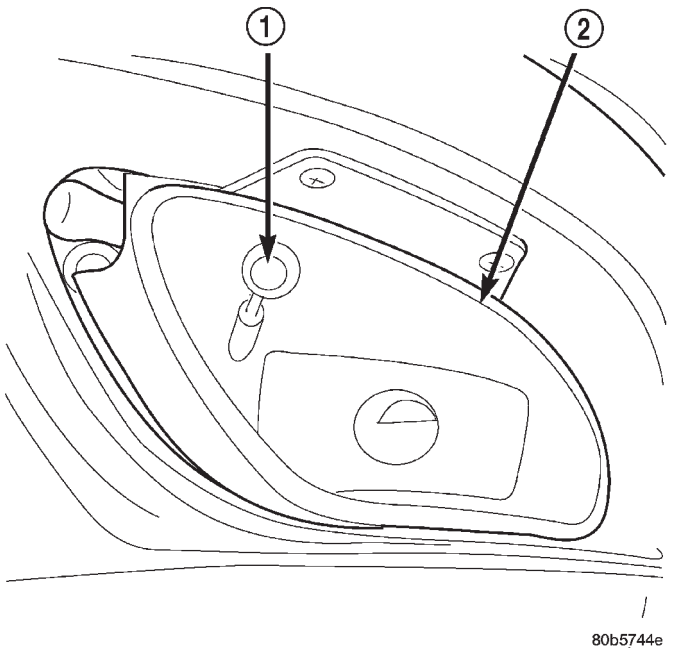


Fig. 3 Fog lamp Adjuster Screw

1 – FOG LAMP ADJUSTER SCREW
2 – FRONT FOG LAMP

LAMP BULB SERVICE

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REMOVAL AND INSTALLATION

HEADLAMP BULB

REMOVAL

(1) Remove the headlamp sight shield. Remove the pushpins and remove sight shield.

(2) Partially remove the front fascia to gain access to the headlamp assembly. Refer to Group 13, Frame and Bumpers for Removal and Installation procedures.

(3) Remove the jackscrews attaching the headlamp assembly to the body (Fig. 1).

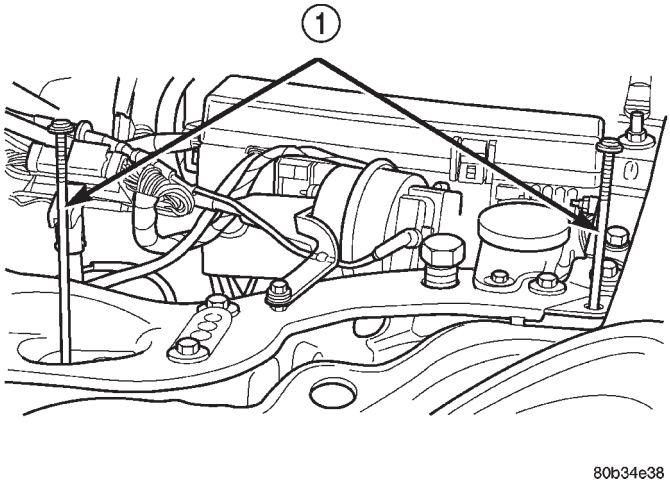


Fig. 1 Headlamp Jackscrews
1 – HEADLAMP JACKSCREWS

NOTE: Use care not to damage headlamp lens or vehicle paint during this procedure.

(4) Pull the headlamp assembly out far enough to gain access to the bulbs (Fig. 2).

(5) Twist and remove the headlamp bulb from the headlamp assembly (Fig. 3).

(6) Remove the electrical connector from the bulb.

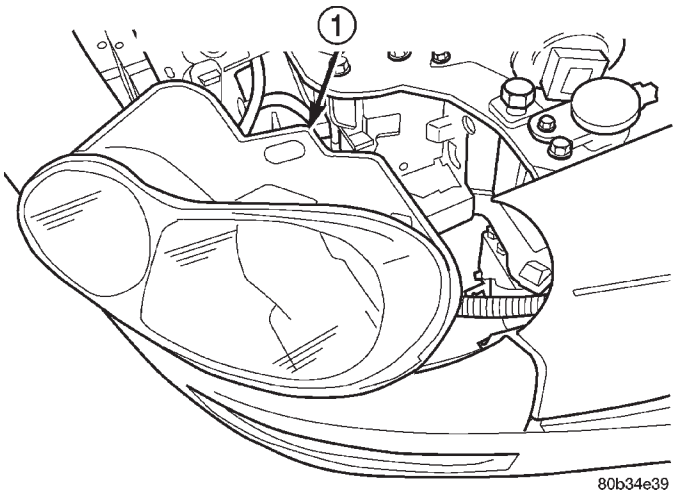


Fig. 2 Headlamp Assembly Removal
1 – REMOVE HEADLAMP HOUSING

INSTALLATION

CAUTION: Do not touch the bulb glass with fingers or other oily surfaces. Reduced bulb life will result.

(1) Twist the new bulb into the headlamp assembly.

(2) Reconnect the headlamp assembly electrical connectors and slide the headlamp assembly back into the body.

(3) Install the headlamp jackscrews (Fig. 1).

(4) Reinstall the front fascia. Refer to Group 13, Frame and Bumpers for Removal and Installation procedures.

(5) Position and install the headlamp sight shield.

FRONT PARKING, SIDE MARKER, AND TURN SIGNAL LAMP BULB

Removal

(1) Remove the front fog lamp assembly. Refer to the Front Fog Lamp Assembly Removal and Installation procedures.

REMOVAL AND INSTALLATION (Continued)

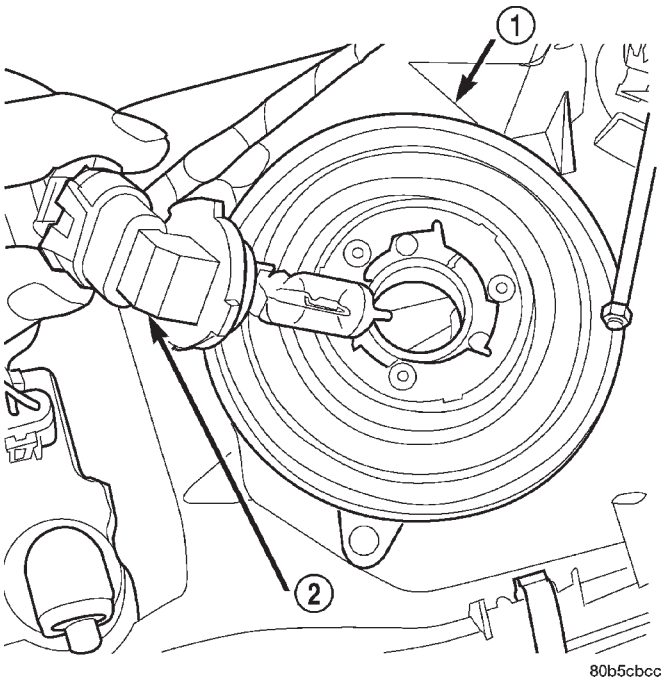


Fig. 3 Headlamp Bulb

1 – HEADLAMP ASSEMBLY
2 – HEADLAMP BULB

(2) Reach up through the front fascia and rotate the bulb socket.

(3) Pull the bulb socket from the lamp housing (Fig. 4).

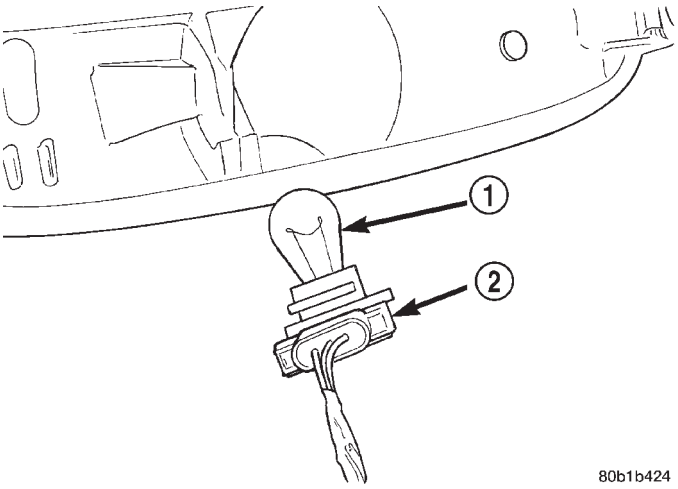


Fig. 4 Front Parking, Side Marker, and Turn Signal Lamp Bulb

1 – BULB
2 – SOCKET

(4) Pull the bulb from the socket.

Installation

(1) Push the bulb into the socket.
(2) Install the socket into the lamp housing.
(3) Install the fog lamp assembly.

CITY LAMP BULB

REMOVAL

(1) Remove the headlamp assembly. Refer to the Headlamp Assembly removal and Installation procedure in this group.

(2) Twist and remove the city lamp socket from the headlamp assembly (Fig. 5).

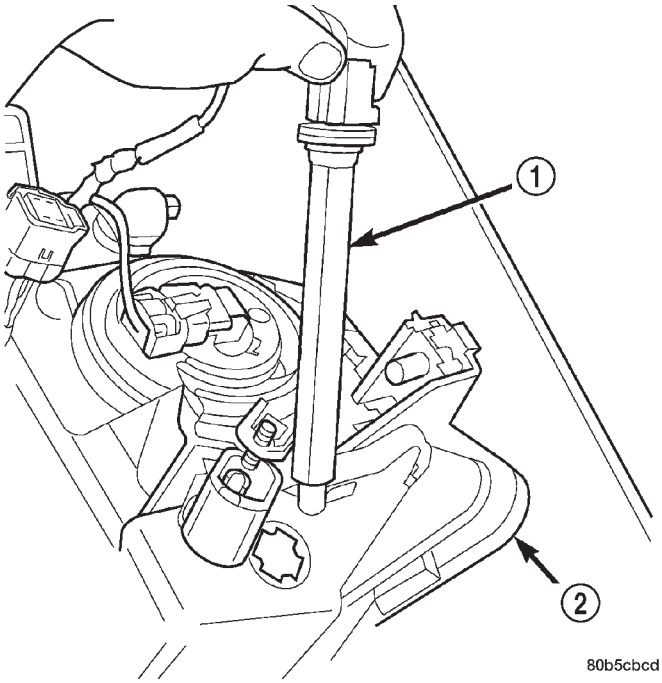


Fig. 5 City Lamp Housing

1 – CITY LAMP SOCKET HOUSING
2 – HEADLAMP ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

(3) Pull the city lamp bulb straight from its socket (Fig. 6).

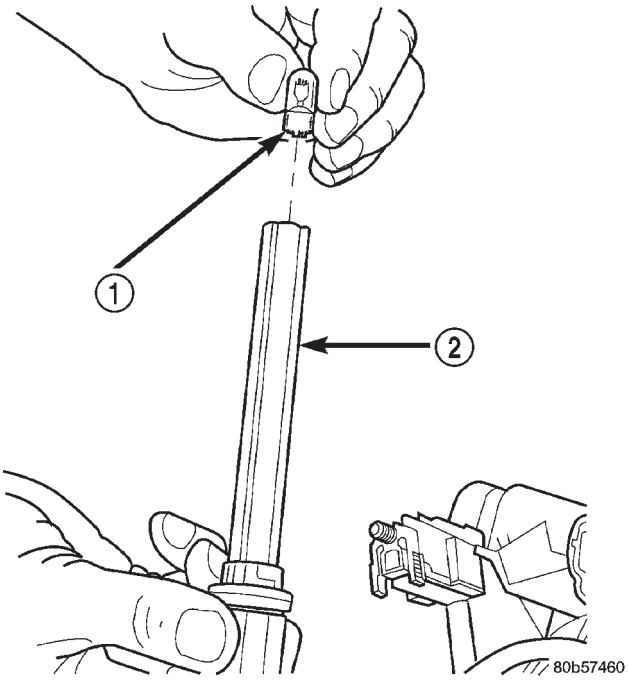


Fig. 6 City Lamp Bulb

1 – CITY LAMP BULB
2 – CITY LAMP HOUSING

INSTALLATION

(1) Push the city lamp bulb into the lamp socket.
(2) Verify lamp operation.
(3) Install the city lamp socket into the headlamp assembly.
(4) Install the headlamp assembly.

FRONT FOG LAMP BULB

Removal

(1) Remove the front fog lamp attaching screws (Fig. 7).
(2) Pull the fog lamp assembly from the bumper fascia and disconnect the electrical connector (Fig. 8).
(3) Remove the fog lamp assembly rear cover from the fog lamp assembly (Fig. 9).
(4) Disengage the fog lamp bulb retaining wire and remove the bulb from the fog lamp assembly (Fig. 10).

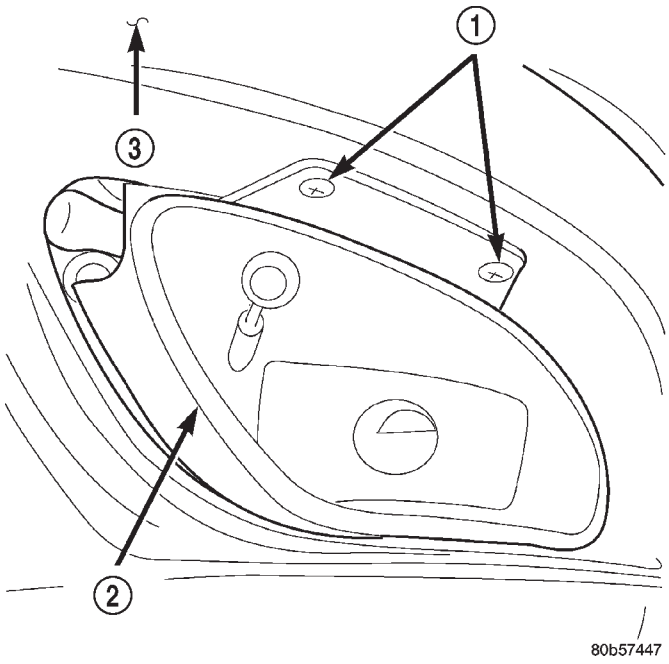


Fig. 7 Front Fog Lamp

1 – FRONT FOG LAMP ATTACHING SCREWS
2 – FRONT FOG LAMP ASSEMBLY
3 – FRONT BUMPER FASCIA

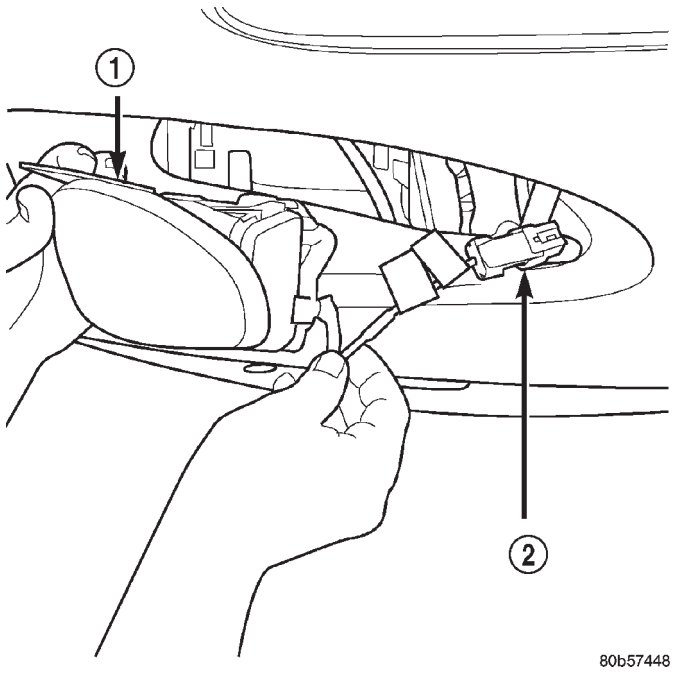


Fig. 8 Front Fog Lamp Electrical Connector

1 – FRONT FOG LAMP ASSEMBLY
2 – ELECTRICAL CONNECTOR

REMOVAL AND INSTALLATION (Continued)

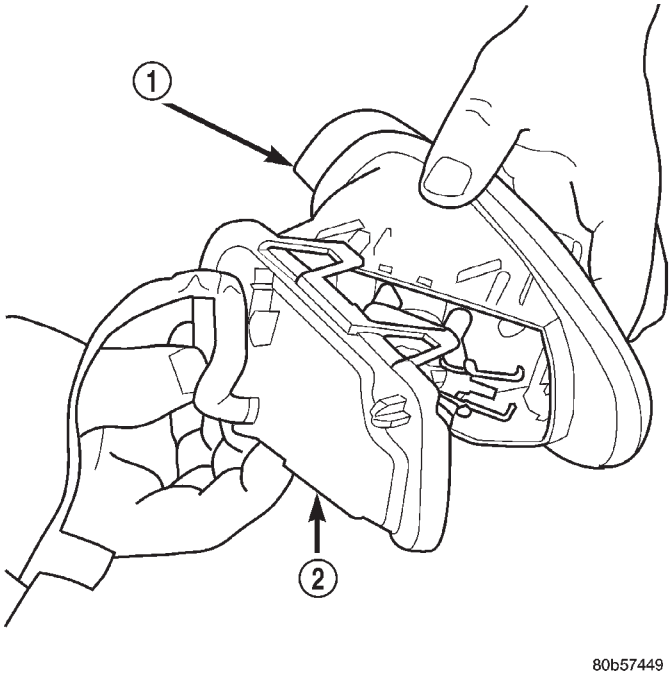


Fig. 9 Front Fog Lamp Assembly Rear Cover

1 – FRONT FOG LAMP ASSEMBLY
2 – FRONT FOG LAMP ASSEMBLY REAR COVER

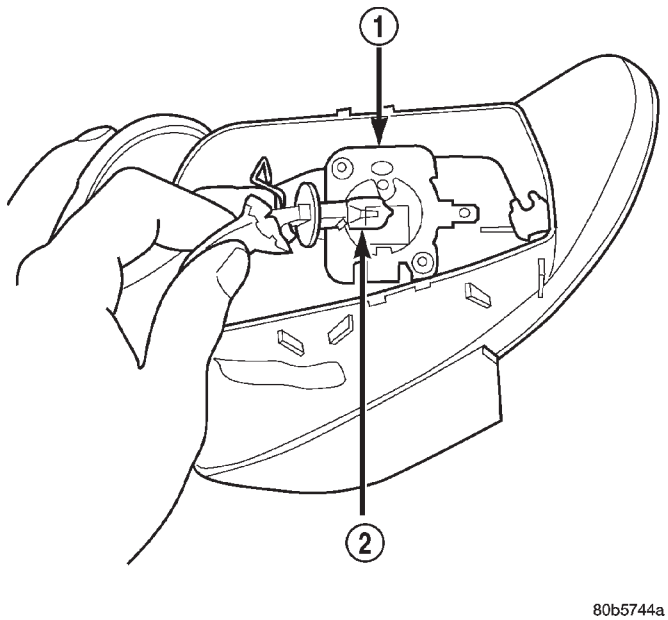


Fig. 10 Front Fog Lamp Bulb

1 – FRONT FOG LAMP ASSEMBLY
2 – FRONT FOG LAMP BULB

Installation

(1) Install bulb into the fog lamp assembly and reattach the retaining wire.
(2) Cover exposed terminals with protective sleeve.
(3) Install the rear cover on the fog lamp assembly.
(4) Connect the electrical connector and place the fog lamp assembly into the front bumper fascia.
(5) Install the fog lamp assembly attaching screws.

SIDE REPEATER LAMP BULB

Removal

(1) Insert a small flat screwdriver between the lamp and the body panel. Disengage the lamp retaining tabs (Fig. 11) (Fig. 12).

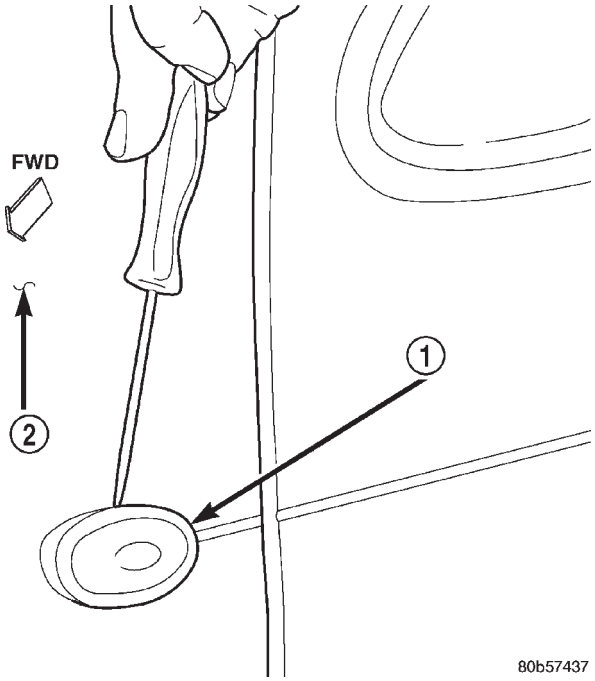


Fig. 11 Side Repeater Lamp

1 – SIDE REPEATER LAMP
2 – FENDER

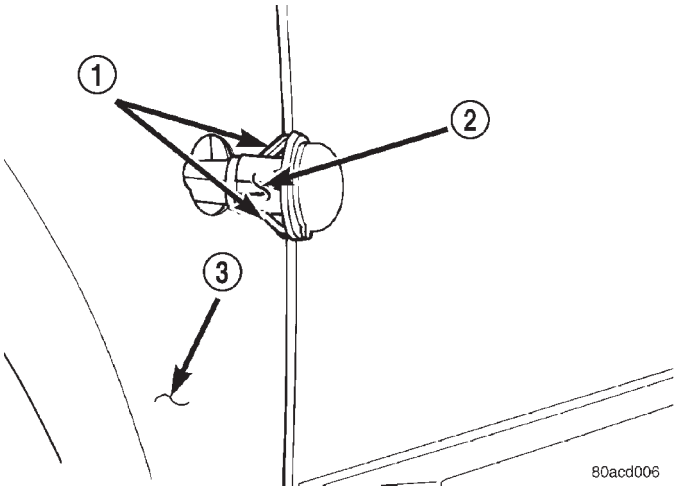


Fig. 12 Side Repeater Lamp Retaining Tabs

1 – RETAINING TABS
2 – REPEATER LAMP
3 – FENDER

REMOVAL AND INSTALLATION (Continued)

(2) Pull lamp from fender.
(3) Twist the bulb socket 1/4 turn and separate the bulb socket from the lamp (Fig. 13).

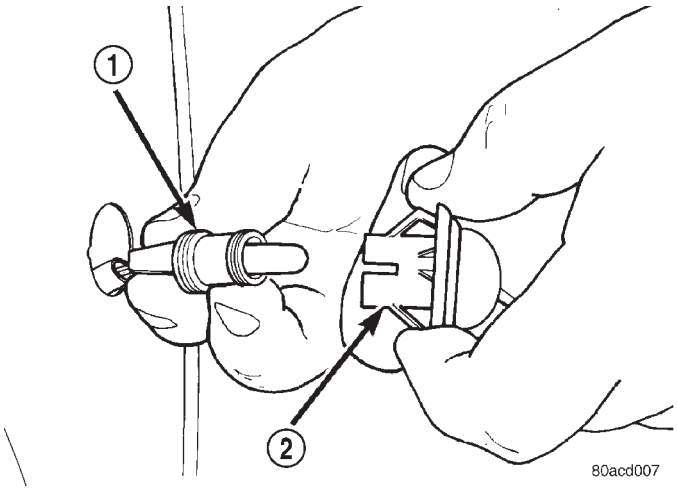


Fig. 13 Side Repeater Lamp Socket
1 – BULB SOCKET
2 – REPEATER LAMP

(4) Pull the bulb from the socket.

Installation

(1) Insert the bulb into the socket.
(2) Position the socket in the lamp and twist the socket 1/4 turn.
(3) Position the lamp into the body opening and push into place.

TAIL, STOP, BACKUP, FOG LAMP AND TURN SIGNAL BULBS

Removal

(1) Release the deck lid latch and open the deck lid.
(2) Remove the tail lamp assembly attaching nuts (Fig. 14).
(3) Remove the tail lamp assembly from the vehicle (Fig. 15).
(4) Disconnect the tail lamp assembly electrical connector.
(5) Twist and remove the bulb socket from the tail lamp assembly (Fig. 16) (Fig. 17).
(6) Pull the bulb from the socket.

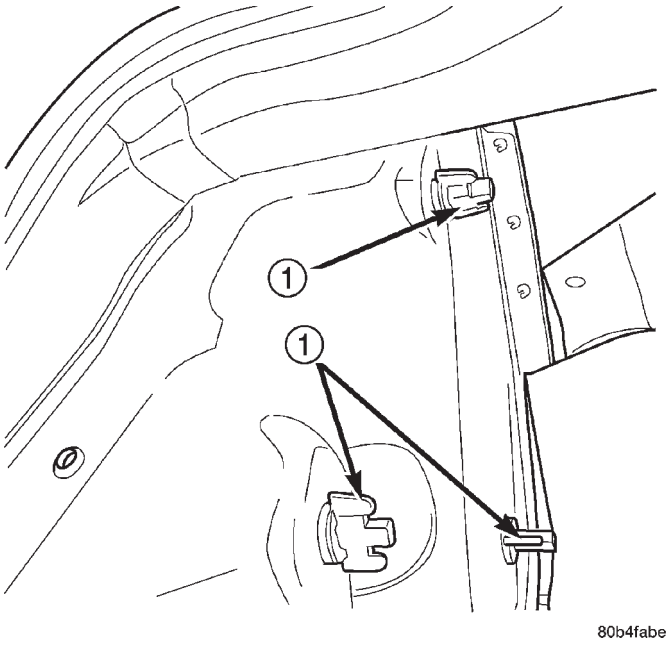


Fig. 14 Tail Lamp Assembly Fasteners
1 – TAIL LAMP ASSEMBLY FASTENERS

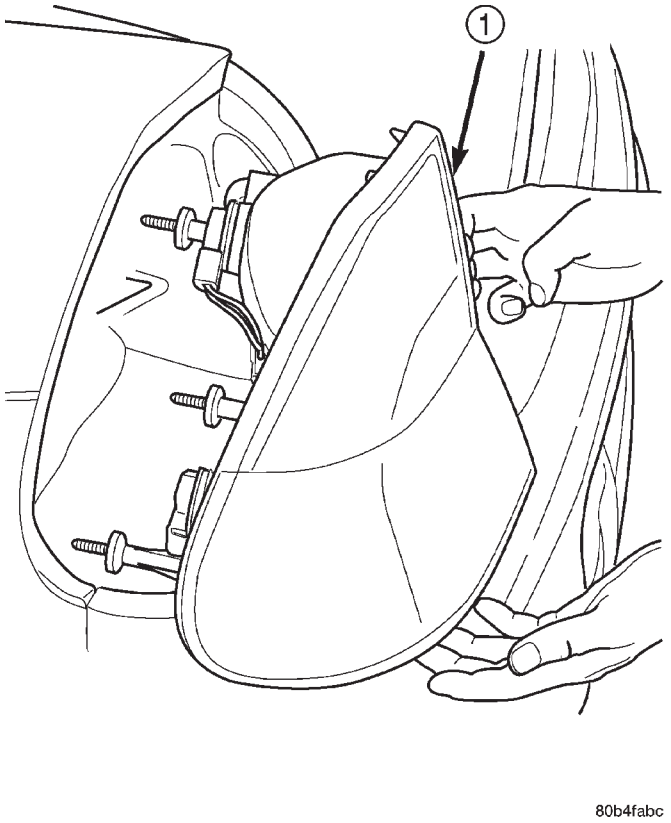


Fig. 15 Tail Lamp Assembly
1 – REAR TAIL LAMP ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

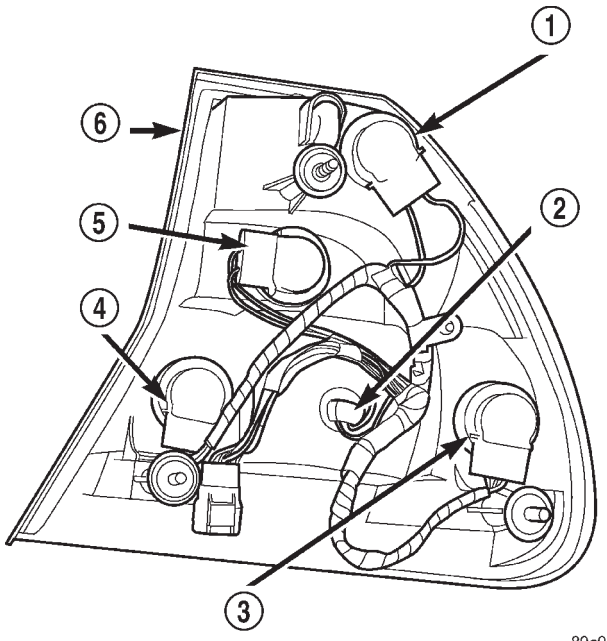


Fig. 16 Tail Lamp Bulbs

1 – REAR TURN SIGNAL LAMP
2 – REAR TAIL LAMP
3 – REAR TAIL/STOP LAMP
4 – REAR TAIL/FOG LAMP
5 – BACK UP LAMP
6 – TAIL LAMP ASSEMBLY

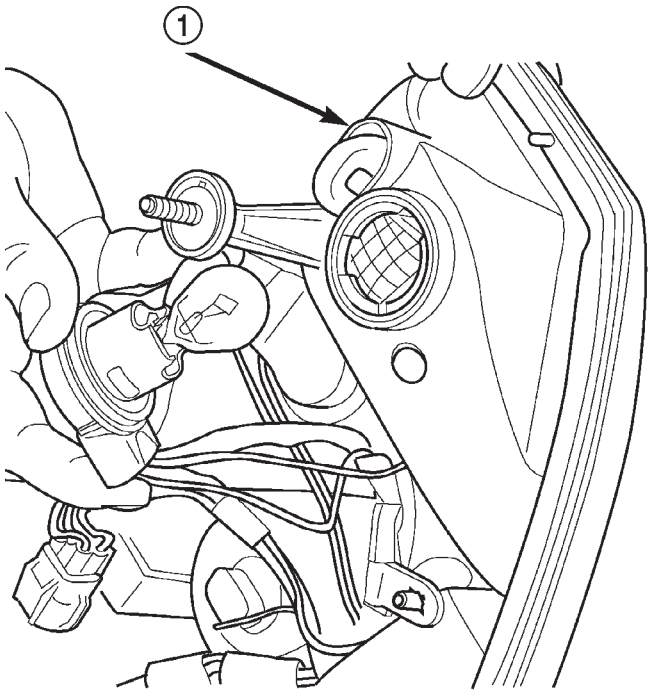


Fig. 17 Tail Lamp Bulb Socket

1 – TAIL LAMP ASSEMBLY

Installation

(1) Push the bulb into the socket.
(2) Install the socket into the tail lamp assembly.
(3) Connect the tail lamp assembly electrical connector.
(4) Install the tail lamp assembly into the vehicle.
(5) Install the tail lamp assembly attaching nuts.

REAR LICENSE PLATE LAMP BULB

Removal

(1) Remove the screws attaching the rear license plate lamp to the rear bumper fascia.
(2) Remove the license plate lamp from the rear bumper fascia (Fig. 10).

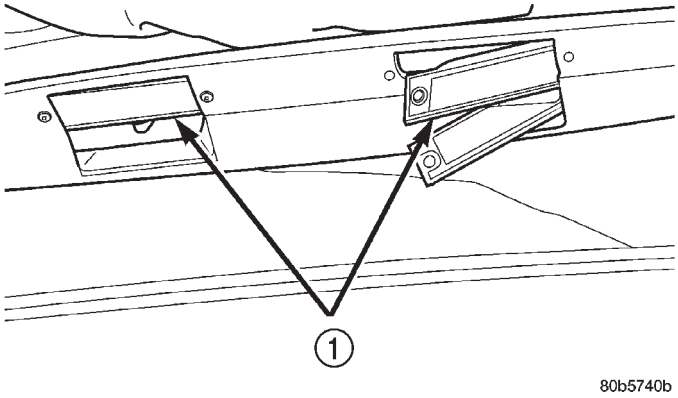


Fig. 18 Rear License Plate Lamp

1 – REAR LICENSE PLATE LAMPS

(3) Twist and remove the socket from the lamp (Fig. 11).

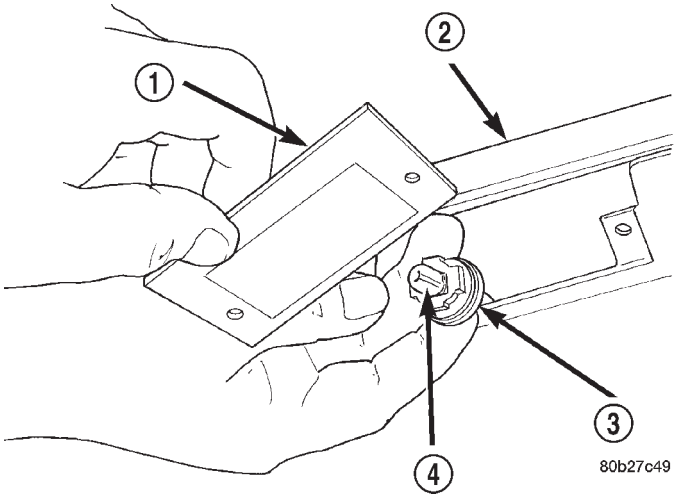


Fig. 19 Rear License Plate Lamp Socket

1 – LICENSE PLATE LAMP
2 – TRUNK LID
3 – SOCKET
4 – BULB

REMOVAL AND INSTALLATION (Continued)

(4) Pull the bulb from the socket.

Installation

(1) Push the bulb into the socket.
(2) Install the socket into the lamp.
(3) Place the license plate lamp in position in the rear bumper fascia.
(4) Install the screws attaching the rear license plate lamp to the rear bumper fascia.

CHMSL LAMP BULB

Removal

(1) Release the deck lid latch and open deck lid.
(2) Remove the trunk lid cover.
(3) Grasp the chmsl lamp socket and rotate counterclockwise. Separate the bulb lamp socket from the lamp assembly (Fig. 20).
(4) Remove the bulb from the socket.

Installation

(1) Install the bulb into the socket.
(2) Install the socket into the lamp assembly.
(3) Install the deck lid cover.

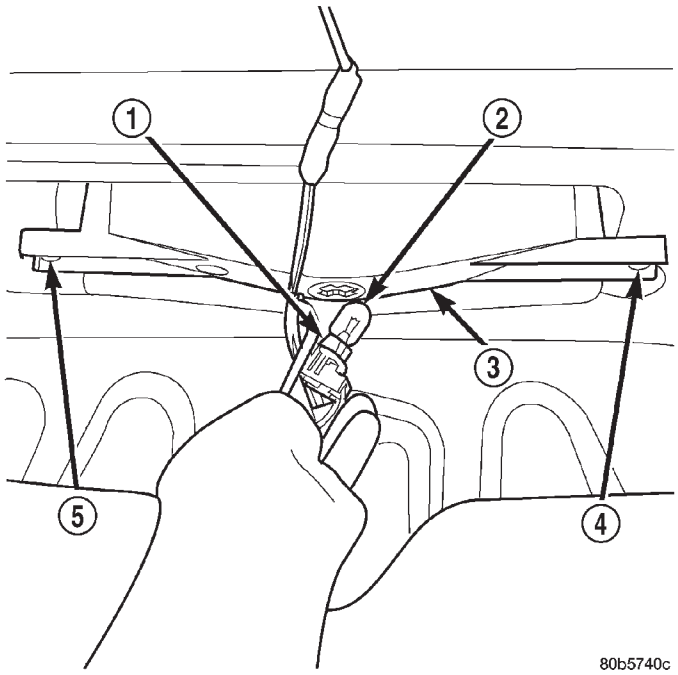


Fig. 20 CHMSL

1 – CHMSL BULB SOCKET
2 – CHMSL BULB
3 – CHMSL
4 – CHMSL FASTENER
5 – CHMSL FASTENER

LAMP SERVICE

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REMOVAL AND INSTALLATION

HEADLAMP SWITCH

Service procedures for the headlamp switch can be found in Group 8E, Instrument Panel and Gauges. More information can be found in Group 8W, Wiring Diagrams.

HEADLAMP DIMMER SWITCH

The headlamp dimmer switch is incorporated into the multi-function (turn signal) switch. Proper procedures can be found in Group 8J, Turn Signal and Flashers. More information can be found in Group 8W, Wiring Diagrams.

HEADLAMP ASSEMBLY

REMOVAL

(1) Remove the headlamp sight shield. Remove pushpins and remove sight shield.
(2) Partially remove the front fascia to gain access to the headlamp assembly. Refer to Group 13, Frame and Bumpers for Removal and Installation procedures.
(3) Remove the jackscrews attaching the headlamp assembly to the body (Fig. 1).
(4) Pull the headlamp assembly out and disconnect the electrical connectors (Fig. 2).

INSTALLATION

CAUTION: Do not touch the bulb glass with fingers or other oily surfaces. Reduced bulb life will result.

(1) Reconnect the headlamp assembly electrical connectors and slide the headlamp assembly back into the body.
(2) Install the headlamp jackscrews (Fig. 1).
(3) Reinstall the front fascia. Refer to Group 13, Frame and Bumpers for Removal and Installation procedures.

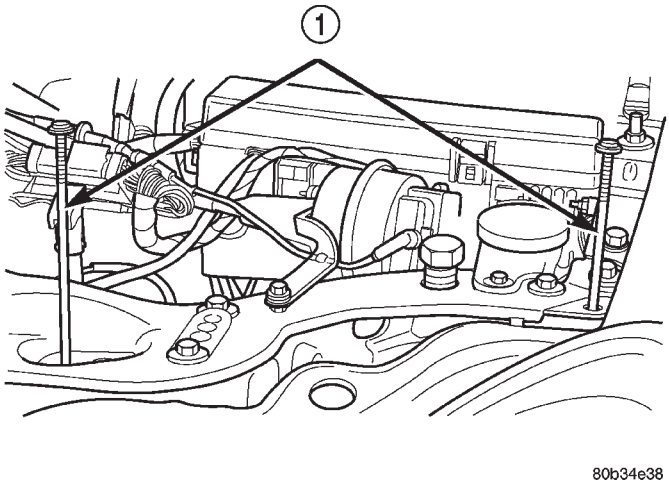


Fig. 1 Headlamp Jackscrews
1 – HEADLAMP JACKSCREWS

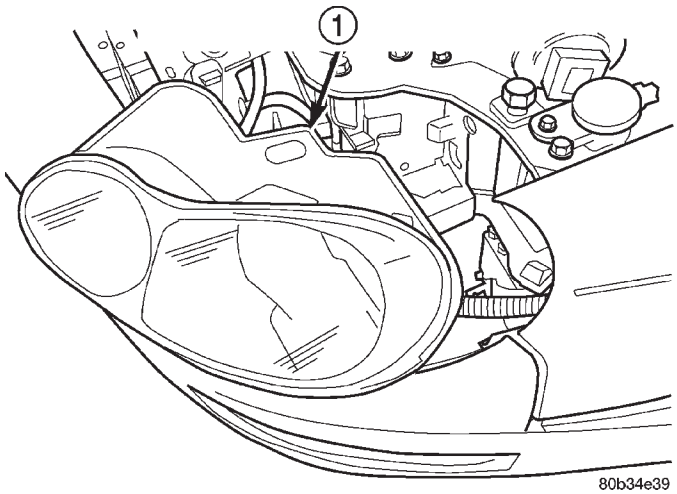


Fig. 2 Headlamp Assembly Removal
1 – REMOVE HEADLAMP HOUSING

(4) Install the headlamp sight shield.

REMOVAL AND INSTALLATION (Continued)

HEADLAMP LEVELING MOTOR

REMOVAL

(1) Remove the headlamp assembly from the vehicle. Refer to the procedure in this group.
(2) Disconnect the headlamp leveling motor wire connector.
(3) Place the headlamp assembly on a protective surface to prevent damage the lens.
(4) Grasp the leveling motor and rotate approximately 45 degrees to unlatch it from the lamp housing.
(5) Using an appropriate prying tool, place the edge of tool between leveling motor gasket and headlamp assembly. Pry the leveling motor up and out.

CAUTION: BE CERTAIN NOT TO DAMAGE THE LAMP HOUSING SEALING SURFACE.

INSTALLATION

(1) Be certain replacement motor matches the configuration of the motor removed.
(2) Line up lugs on new motor with the corresponding openings on the headlamp housing making sure the ball stud on the motor lines up with ball stud receptacle on the lamp assembly. The receptacle can be moved by grasping the rubber boot area of the outboard lamp and moving by hand. Rotate the motor back into position to secure in place.
(3) Push down on outboard lamp until leveling motor ball stud snaps into place. Ensure that the ball stud is fully seated.
(4) Connect the headlamp leveling motor wire connector.
(5) Install the headlamp assembly on the vehicle. Refer to the procedure in this group.
(6) Verify headlamp leveling motor operation.
(7) Align the headlamps. Refer to the procedure in this group.

NOTE: Headlamps must be aligned with the headlamp leveling switch in the "0" position

FRONT FOG LAMP

Removal

(1) Remove the front fog lamp attaching screws (Fig. 3).
(2) Pull the fog lamp assembly from the bumper fascia and disconnect the electrical connector (Fig. 4).

Installation

(1) Connect the electrical connector and place the fog lamp assembly into the front bumper fascia.
(2) Install the fog lamp assembly attaching screws.

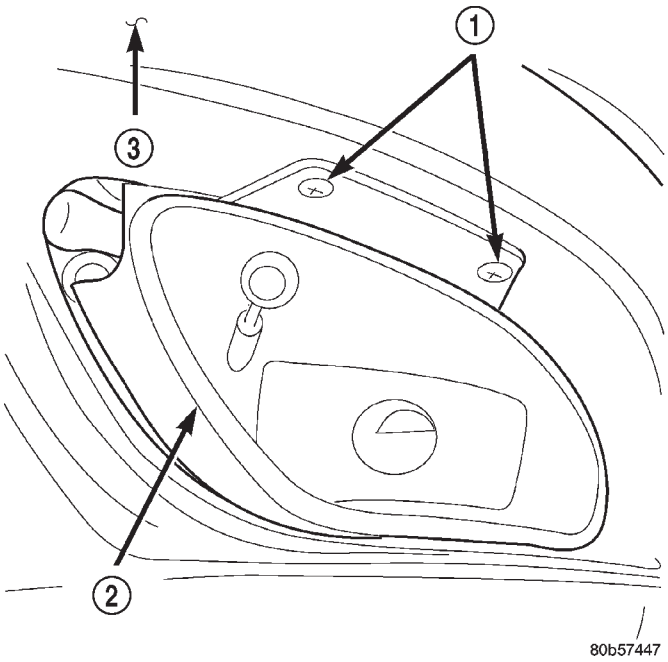


Fig. 3 Front Fog Lamp

1 – FRONT FOG LAMP ATTACHING SCREWS
2 – FRONT FOG LAMP ASSEMBLY
3 – FRONT BUMPER FASCIA

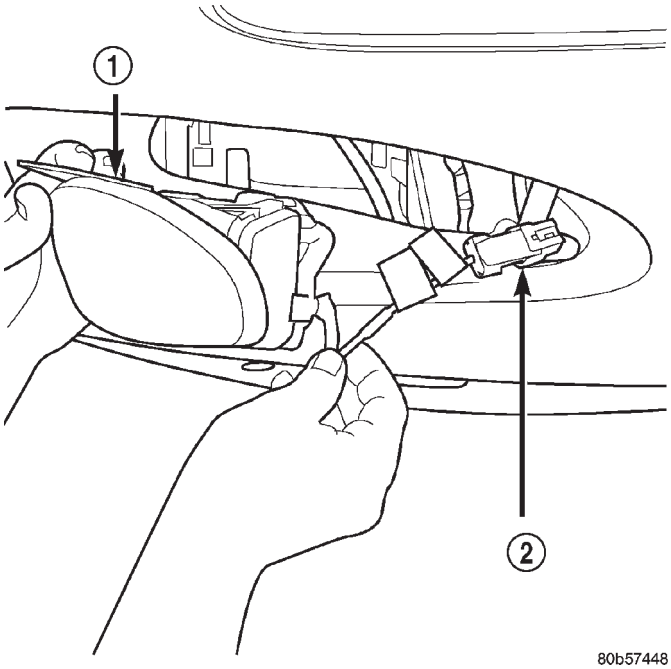


Fig. 4 Front Fog Lamp Electrical Connector

1 – FRONT FOG LAMP ASSEMBLY
2 – ELECTRICAL CONNECTOR

REMOVAL AND INSTALLATION (Continued)

SIDE REPEATER LAMP

Removal

(1) Insert a small flat screwdriver between the lamp and the body panel. Disengage the lamp retaining tabs (Fig. 6) (Fig. 5).

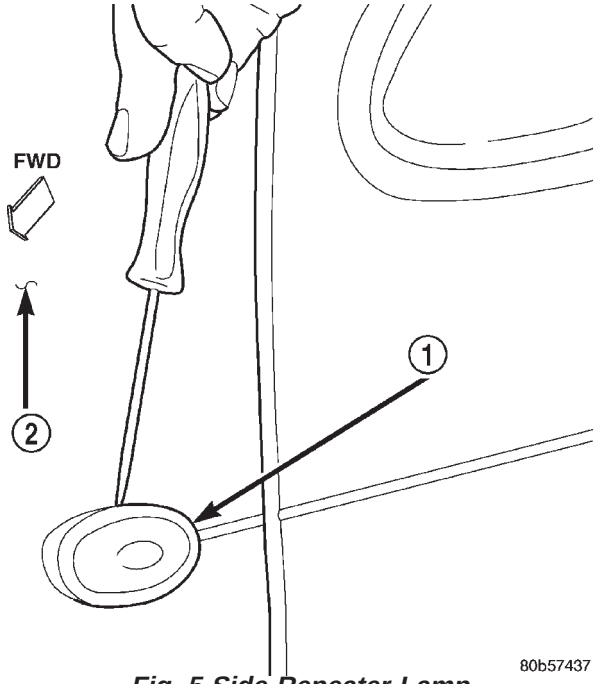


Fig. 5 Side Repeater Lamp

1 – SIDE REPEATER LAMP
2 – FENDER

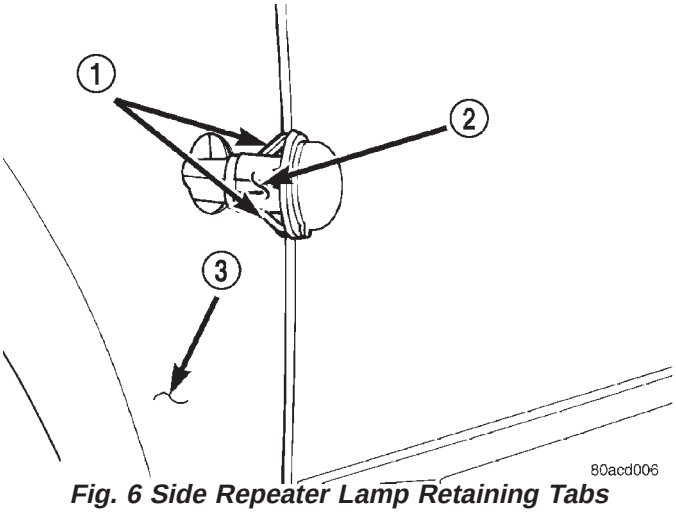


Fig. 6 Side Repeater Lamp Retaining Tabs

1 – RETAINING TABS
2 – REPEATER LAMP
3 – FENDER

(2) Pull lamp from fender.

(3) Twist bulb socket 1/4 turn and separate the bulb socket from the lamp (Fig. 7).

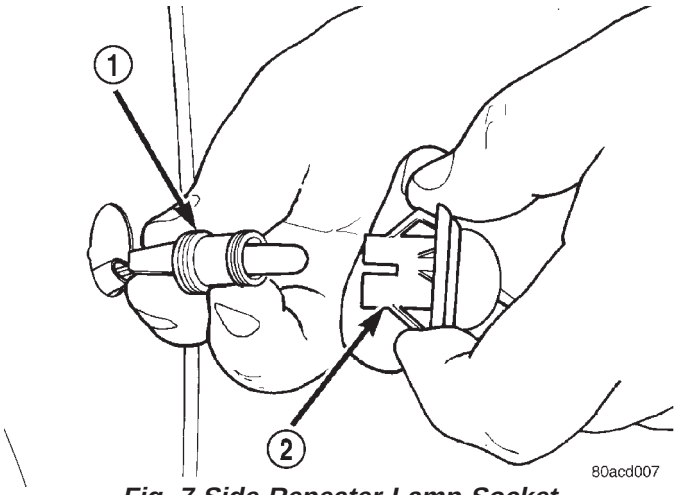


Fig. 7 Side Repeater Lamp Socket

1 – BULB SOCKET
2 – REPEATER LAMP

Installation

(1) Position the socket in the lamp and twist the socket 1/4 turn.

(2) Position the lamp into the body opening and push into place.

TAIL LAMP ASSEMBLY

Removal

(1) Release the deck lid latch and open the deck lid.

(2) Remove the tail lamp assembly attaching nuts (Fig. 8).

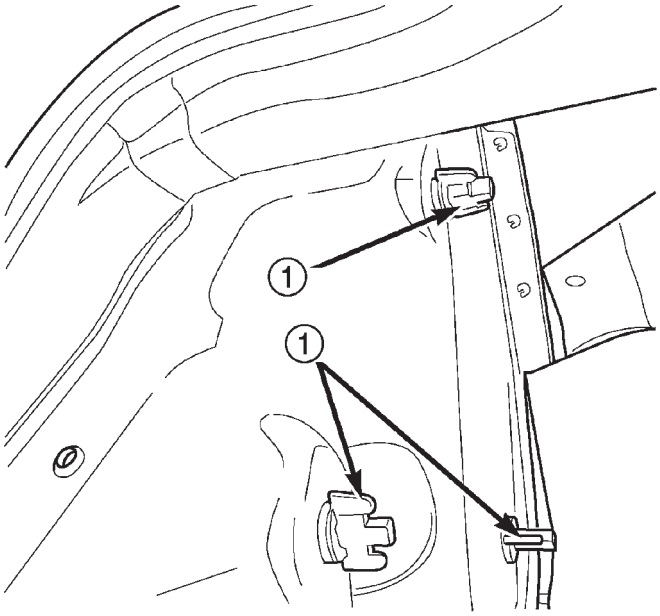


Fig. 8 Tail Lamp Assembly Fasteners

1 – TAIL LAMP ASSEMBLY FASTENERS

REMOVAL AND INSTALLATION (Continued)

(3) Remove the tail lamp assembly from the vehicle (Fig. 9).

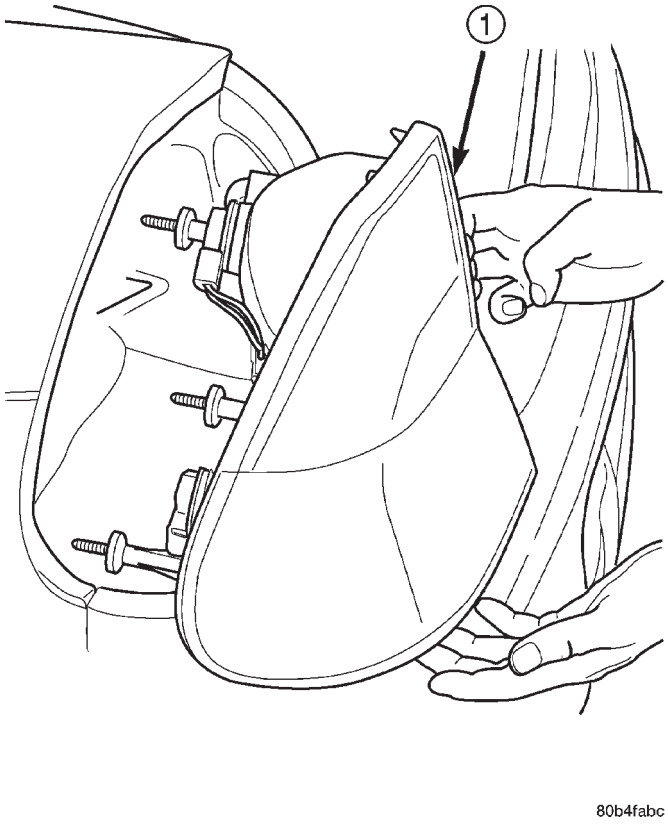


Fig. 9 Tail Lamp Assembly

1 – REAR TAIL LAMP ASSEMBLY

(4) Disconnect the tail lamp assembly electrical connector.

Installation

(1) Connect the tail lamp assembly electrical connector.
(2) Install the tail lamp assembly into the vehicle.
(3) Install the tail lamp assembly attaching nuts.

REAR LICENSE PLATE LAMP

Removal

(1) Remove the screws attaching the rear license plate lamp to the rear bumper fascia.
(2) Remove the license plate lamp from the rear bumper fascia (Fig. 10).

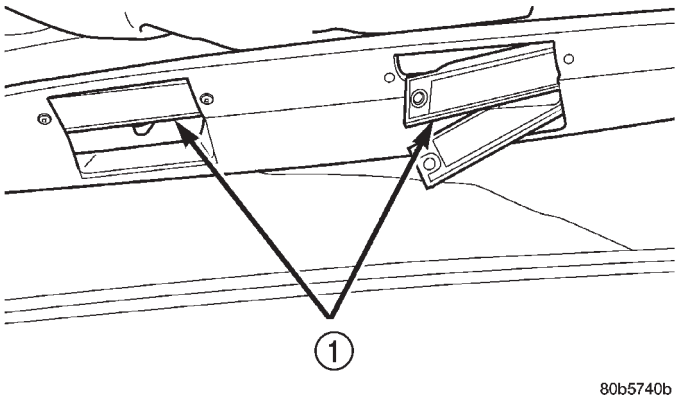


Fig. 10 Rear License Plate Lamp

1 – REAR LICENSE PLATE LAMPS

(3) Twist and remove the socket from the lamp (Fig. 11).

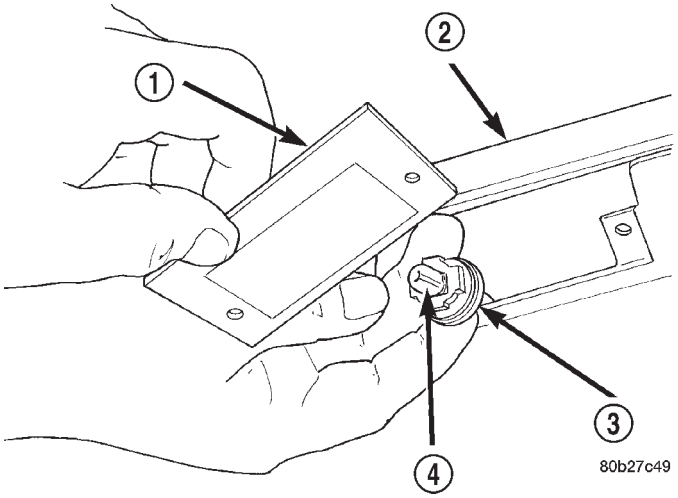


Fig. 11 Rear License Plate Lamp Socket

1 – LICENSE PLATE LAMP
2 – TRUNK LID
3 – SOCKET
4 – BULB

Installation

(1) Install the socket into the lamp.
(2) Place the license plate lamp in position in the rear bumper fascia.
(3) Install the screws attaching the rear license plate lamp to the rear bumper fascia.

REMOVAL AND INSTALLATION (Continued)

CHMSL LAMP

Removal

(1) Release the deck lid latch and open deck lid.
(2) Remove the deck lid cover.
(3) Grasp the chmsl lamp socket and rotate counterclockwise. Separate the bulb lamp socket from the lamp assembly (Fig. 12).
(4) Remove the chmsl lamp assembly fasteners (Fig. 12).
(5) Remove the chmsl lamp assembly from the deck lid.

Installation

(1) Install the chmsl lamp assembly into the deck lid.
(2) Install the chmsl lamp assembly fasteners.
(3) Install the socket into the lamp assembly.
(4) Install the deck lid cover.

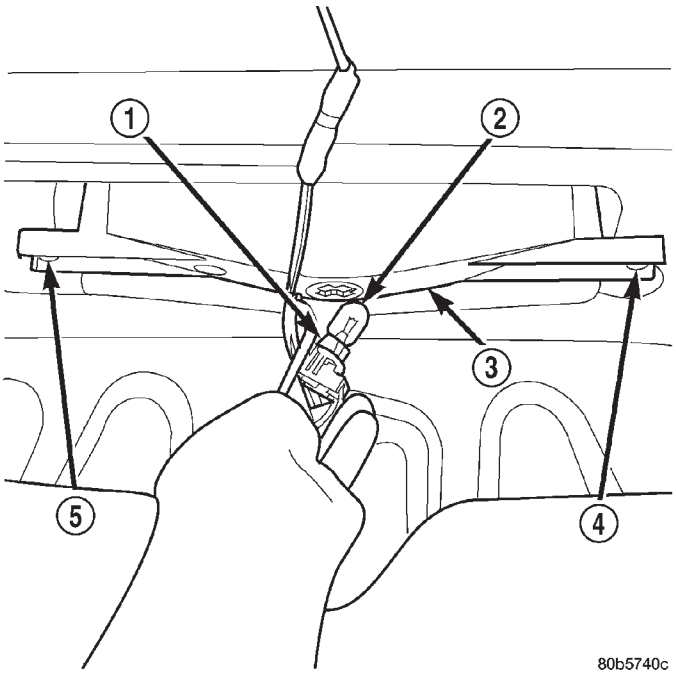


Fig. 12 CHMSL Lamp Assembly

1 – CHMSL BULB SOCKET
2 – CHMSL BULB
3 – CHMSL
4 – CHMSL FASTENER
5 – CHMSL FASTENER

BULB APPLICATION

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CLEANING AND INSPECTION

HEADLAMP CLEANING

This vehicle is equipped with plastic headlights that are lighter and less susceptible to stone breakage than glass headlights.

This plastic is not as scratch resistant as glass and therefore a different lens cleaning procedures must be followed.

To minimize the possibility of scratching the lenses and reducing light output, avoid wiping with a dry cloth. To remove road dirt, wash with a mild soap solution followed by rinsing with water.

Do not use abrasive cleaning components, solvents, steel wool or other aggressive material to clean the lenses.

SPECIFICATIONS

EXTERIOR LAMP BULBS

LAMP	BULB
Back-up	P27/7W
CHMSL	W16W
Front Fog Lamp	H3 55W
Headlamp(Low Beam)	9006 (HB4)
Headlamp(High Beam)	9005 (HB3)
License Plate	W5W
Front Turn Signal	P27/7W
Citylight	W5W
Side Repeater	T4W
Tail, Stop/Fog	P27/7W
Rear Turn Signal	P27/7W
Rear Tail Lamp	W5W

INTERIOR LAMP BULBS

LAMP	BULB
A/C Heater Control	330
Airbag	LED
Analog Clock	A9625
Anti-Lock Brake	LED
Ash Receiver	161
Brake Warning	LED
Charging System	LED
Check Engine	LED
Cruise	74
Door Courtesy	212-2
Door Open	LED
Engine Oil Pressure	LED
Engine Temperature	LED
Glove Compartment	194
Headlamp Switch	4798351
High Beam	74
Instrument Cluster	PC194
Low Fuel	LED
Low Washer Fluid	LED
Overhead Console	192
Overhead Information Center	4437661
Radio	ASC
Reading Lamp—Front or Rear	192
Seat Belt	LED
Trunk Open	LED
Turn Signal	PC194
Trac ON	74
Trac OFF	LED
Trunk	906
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PASSIVE RESTRAINT SYSTEMS

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DESCRIPTION AND OPERATION

OCCUPANT RESTRAINT CONTROLLER (ORC)

DESCRIPTION

The Occupant Restraint Controller (ORC) contains the accelerometer and energy reserve capacitor. The ORC is mounted on the tunnel floor pan, forward of the center console.

OPERATION

The accelerometer is located inside the ORC. The accelerometer provides confirmation of a crash, discriminating severity. The ORC monitors the system to determine the system readiness. The ORC may store sufficient energy to deploy the airbags for only two minutes after the battery is disconnected. The ORC contains on-board diagnostics, and will illuminate the AIRBAG warning lamp on the cluster when a fault occurs. The warning equipment is tested for a few seconds every time the vehicle is started.

CLOCKSPRING

DESCRIPTION

The clockspring is mounted to the steering column behind the steering wheel. The clockspring is used to maintain a continuous electrical circuit between the wiring harness and the:

- Driver's airbag module
- Speed control switches
- Horn switch

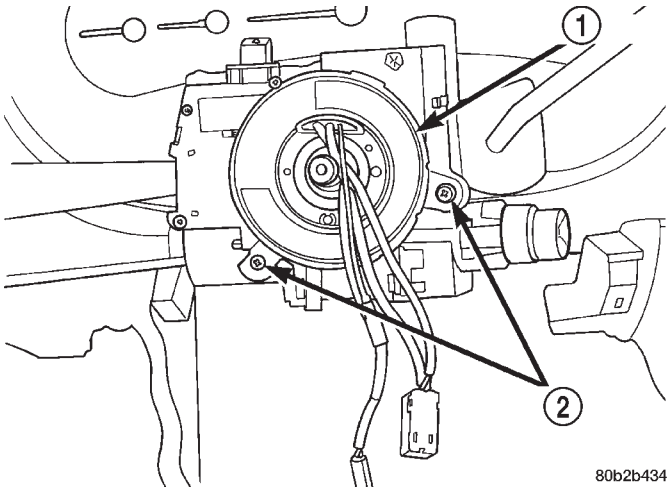


Fig. 1 Clockspring Location

1 – CLOCKSPRING
2 – MOUNTING SCREWS

OPERATION

The clockspring consists of a flat, ribbon like, electrically conductive tape which winds and unwinds with the steering wheel rotation.

DRIVER AIRBAG MODULE

WARNING: NEVER DISASSEMBLE THE DRIVER/ PASSENGER AIRBAG MODULES, THERE ARE NO SERVICEABLE PARTS WITHIN THE MODULES.

DESCRIPTION AND OPERATION (Continued)

DESCRIPTION

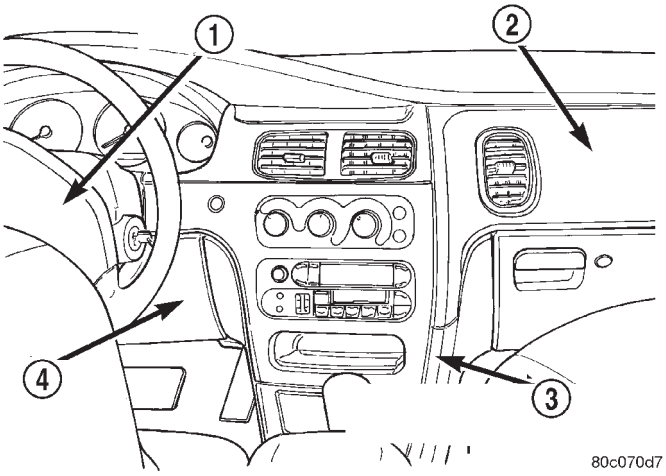


Fig. 2 Driver Airbag Location

1 – DRIVER AIRBAG MODULE
2 – PASSENGER AIRBAG MODULE
3 – OCCUPANT RESTRAINT CONTROLLER (ORC)
4 – KNEE BLOCKER

OPERATION

The driver side inflator assembly is mounted from the back of the module housing. When supplied with the proper electrical signal the inflator assembly will produce a gas and discharge it directly into the cushion. A protective cover is fitted to the front of the Driver Airbag Module and forms a decorative cover in the center of the steering wheel. This cover incorporates the integral horn switch. The driver airbag module is mounted directly to the steering wheel.

IMPACT SENSOR

DESCRIPTION

The Airbag System is a supplemental safety device designed to help protect the driver and passenger from serious injury, caused by a frontal impact of the vehicle.

The Occupant Restraint Controller's (ORC) internal impact sensor provides verification of the direction and severity of an impact. The sensor is mounted within the ORC.

OPERATION

The Occupant Restraint Controller (ORC) uses data collected from it's internal accelerometers to discriminate the direction and severity of an impact. The ORC will activate power stages internal to the module in order to deploy the driver and passenger side airbags once a predetermined threshold has been exceeded. The ORC is calibrated for a particular vehicle family and uses an advanced software algorithm to discriminate the severity and direction of any vehicle event.

PASSENGER AIRBAG MODULE

WARNING: NEVER DISASSEMBLE THE DRIVER/ PASSENGER AIRBAG MODULES, THERE ARE NO SERVICEABLE PARTS WITHIN THE MODULES.

DESCRIPTION

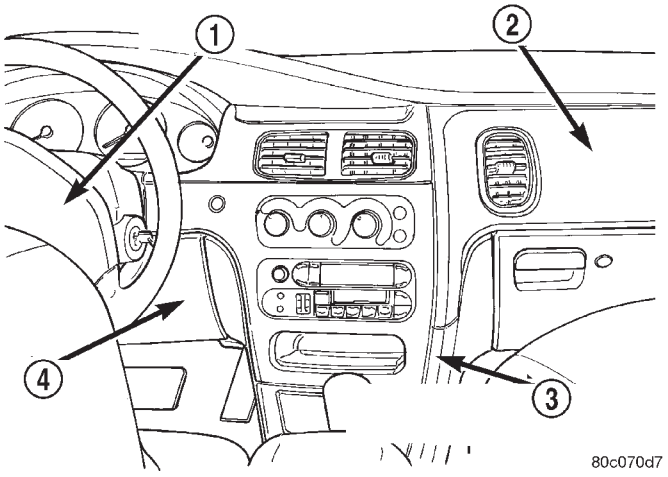


Fig. 3 Passenger Airbag Location

1 – DRIVER AIRBAG MODULE
2 – PASSENGER AIRBAG MODULE
3 – OCCUPANT RESTRAINT CONTROLLER (ORC)
4 – KNEE BLOCKER

The Passenger Airbag Module is located beneath the instrument panel and pad assembly. The module is mounted to a bracket (welded to the floor pan) with three screws.

OPERATION

The passenger inflator assembly is within the module housing. When supplied with the proper electrical signal the inflator will produce a gas and discharge it directly into the cushion. Upon deployment, the instrument panel upper cover will tear open and allow the passenger airbag to fully inflate.

DIAGNOSIS AND TESTING

AIRBAG SYSTEM TEST

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Connect the DRB lll® scan tool to the Data Link connector, located on the left side of the steering

DIAGNOSIS AND TESTING (Continued)

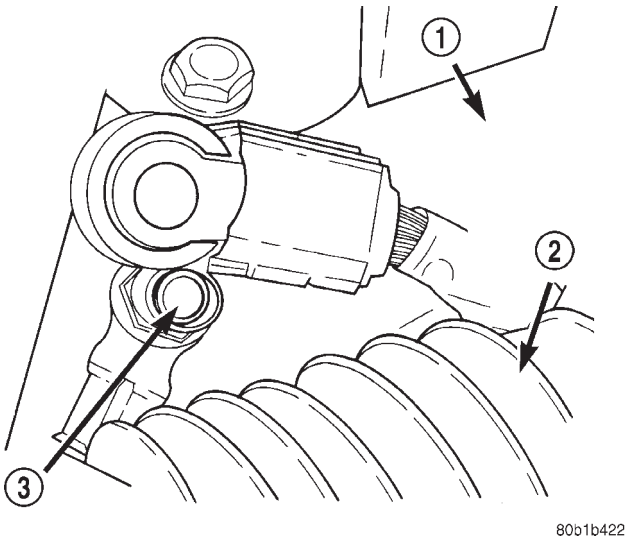


Fig. 4 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

column and at the lower edge of the instrument panel.

(3) Turn the ignition key to ON position. Exit vehicle with scan tool. Use the latest version of the proper cartridge.

(4) After checking that no one is inside the vehicle, connect the battery negative remote terminal.

(5) Using the DRB lll® scan tool, read and record active diagnostic code data.

(6) Read and record any stored diagnostic codes.

(7) Refer to the Passive Restraint Diagnostic Procedures Manual if any diagnostic codes are found in Step 5 or Step 6.

(8) Erase stored diagnostic codes if there are no active diagnostic codes. If problems remain, diagnostic codes will not erase. Refer to the Passive Restraint Diagnostic Test Manual to diagnose the problem. **If airbag warning lamp either fails to light, or goes on and stays on, there is a system malfunction. Refer to the proper Body Diagnostic Procedures Manual to diagnose the problem.**

SERVICE PROCEDURES

CLEANUP PROCEDURE

Roll or fold the passenger airbag towards the instrument panel surface and tuck into instrument panel into module area. Then tape the ripped instrument panel pad over the deployed airbag.

Use a vacuum cleaner to remove any residual powder from the vehicle interior. Work from the outside in to avoid kneeling or sitting in a contaminated area. Vacuum the heater and A/C outlets as well (Fig. 5). If the heater or air conditioner was in RECIRC mode at time of airbag deployment, operate blower motor on low speed and vacuum powder residue expelled from the heater and A/C outlets. Multiple vacuum cleaning may be necessary to decontaminate the interior of the vehicle.

Place the deployed driver and passenger airbag modules along with the instrument panel and center duct in your automotive scrap.

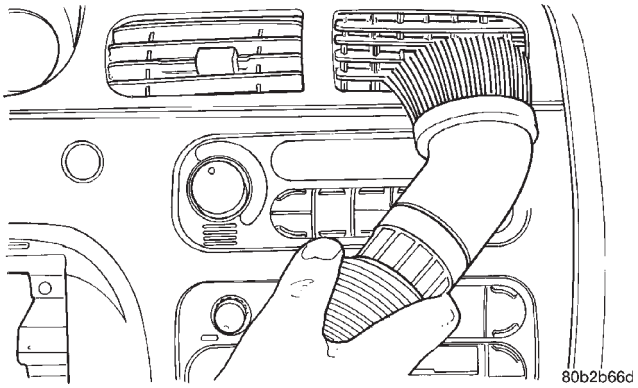


Fig. 5 Vacuum Heater and A/C Outlets

SERVICE OF DEPLOYED AIRBAG MODULE

DRIVER AIRBAG

After a Driver Airbag Module has been deployed due to a collision, the following must be replaced:

- Driver Airbag Module
- Clockspring Assembly
- Steering Wheel
- Complete Steering Column Assembly with shrouds and Lower Steering Column Coupler

The component above must be replaced because they cannot be reused. Other driver airbag system components are replaced if damaged.

PASSENGER AIRBAG

After a Passenger Airbag Module has been deployed due to a collision. the following must be replaced:

- Passenger Airbag Module
- Instrument Panel and Pad Assembly

The components above must be replaced because of visible or non visible structural damage.

Any other components should be replaced if damaged.

HANDLING AIRBAG MODULE

DEPLOYED MODULE

The vehicle interior may contain a very small amount of potassium hydroxide powder, a by-product of airbag deployment. Sodium hydroxide powder can irritate the skin, eyes, nose and throat. Wear safety glasses, rubber gloves, and long sleeved clothing

SERVICE PROCEDURES (Continued)

when cleaning any of the powder residue from the vehicle.

If you find that the cleanup is irritating your skin, run cool water over the affected area. Also, if you experience nasal or throat irritation, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.

UNDEPLOYED

The airbag modules must be stored in its original special container until used for service. At no time should a source of electricity be permitted near the inflator on the back of an airbag module. When carrying or handling an undeployed airbag module, the trim side of the airbag should be pointing away from the body to minimize possibility of injury if accidental deployment occurs. Do not place undeployed airbag face down on a solid surface, the airbag will propel into the air if accidental deployment occurs.

MAINTENANCE INSPECTION

Check the airbag warning lamp for proper operation as follows:

(1) Turn the ignition switch to the ON position. The airbag warning lamp should illuminate. If it does not, test the system using a DRB lll® scan tool and the proper Body Diagnostic Procedures Manual. Repair as required.

(2) The airbag warning lamp lights, but fails to go out after ten seconds. Test the system using a DRB lll® scan tool and the proper Body Diagnostic Procedures Manual. Repair as required.

REMOVAL AND INSTALLATION

WARNINGS AND PRECAUTIONS

WARNING: THIS SYSTEM IS A SENSITIVE, COMPLEX ELECTRONIC UNIT. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE REMOTE CABLE BEFORE BEGINNING AIRBAG SYSTEM COMPONENT REMOVAL OR INSTALLATION PROCEDURES. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

ALLOW SYSTEM CAPACITOR TO DISCHARGE FOR TWO MINUTES BEFORE REMOVING AIRBAG COMPONENTS.

DO NOT PLACE AN INTACT UNDEPLOYED AIRBAG FACE DOWN ON A SOLID SURFACE, THE AIRBAG WILL PROPEL INTO THE AIR IF ACCIDENTALLY DEPLOYED AND COULD RESULT IN PERSONAL INJURY. WHEN CARRYING OR HANDLING AN UNDEPLOYED AIRBAG MODULE, THE TRIM SIDE OF THE AIRBAG SHOULD BE POINTING AWAY FROM THE BODY TO MINIMIZE POSSIBILITY OF INJURY IF ACCIDENTAL DEPLOYMENT OCCURS.

REPLACE AIRBAG SYSTEM COMPONENTS WITH MOPAR® REPLACEMENT PARTS. SUBSTITUTE PARTS MAY APPEAR INTERCHANGEABLE, BUT INTERNAL DIFFERENCES MAY RESULT IN INFERIOR OCCUPANT PROTECTION.

WEAR SAFETY GLASSES, RUBBER GLOVES, AND LONG SLEEVED CLOTHING WHEN CLEANING POWDER RESIDUE FROM VEHICLE AFTER AIRBAG DEPLOYMENT. SODIUM HYDROXIDE POWDER RESIDUE EMITTED FROM A DEPLOYED AIRBAG CAN CAUSE SKIN IRRITATION. FLUSH AFFECTED AREA WITH COOL WATER IF IRRITATION IS EXPERIENCED. IF NASAL OR THROAT IRRITATION IS EXPERIENCED, EXIT THE VEHICLE FOR FRESH AIR UNTIL THE IRRITATION CEASES. IF IRRITATION CONTINUES, SEE A PHYSICIAN.

DO NOT USE A REPLACEMENT AIRBAG THAT IS NOT IN THE ORIGINAL PACKAGING, IMPROPER DEPLOYMENT AND PERSONAL INJURY CAN RESULT.

THE FACTORY INSTALLED FASTENERS, SCREWS AND BOLTS USED TO FASTEN AIRBAG COMPONENTS HAVE A SPECIAL COATING AND ARE SPECIFICALLY DESIGNED FOR THE AIRBAG SYSTEM. DO NOT USE SUBSTITUTE FASTENERS, USE ONLY ORIGINAL EQUIPMENT FASTENERS LISTED IN THE PARTS CATALOG WHEN FASTENER REPLACEMENT IS REQUIRED.

NOTE: Airbags should be stored in a cool dry location away from excessive heat and static electrical activity with the fabric airbag facing UP, or a premature deployment can result.

If the Driver/Passenger Airbag Module is defective and not deployed, refer to Chrysler Corporation current return list for proper handling procedures.

CLOCKSPRING

REMOVAL

(1) Place the front road wheels in the straight ahead position then:

- Rotate the steering wheel half turn (180 degrees) to the right (clockwise)
- Lock column with ignition lock cylinder.

(2) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(3) Wait two minutes for the reserve capacitor to discharge before removing non deployed module.

REMOVAL AND INSTALLATION (Continued)

(4) Remove speed control switch mounting screws, from the back of the steering wheel, and disconnect the wire connectors.

(5) Remove the Driver Airbag Module attaching bolts.

(6) Lift module and disconnect the airbag and horn wire connectors.

(7) Remove the steering wheel. Refer to Steering Wheel Removal and Installation in this section.

(8) Remove the tilt wheel release lever.

(9) Remove upper and lower steering column shrouds to gain access to clockspring wiring.

(10) Disconnect the 2-way and 4-way connectors between the clockspring and the instrument panel wiring harness at the base of the clockspring.

(11) Remove two mounting screws and pull clockspring assembly from steering shaft. The clockspring cannot be repaired, and must be replaced if faulty.

INSTALLATION

(1) Confirm that:

- The steering wheel position is a half turn (180 degrees) to the right (clockwise)
- The column is locked with the ignition cylinder lock.
- Locate the clockspring on the steering shaft and push down on the rotor until the clockspring is fully seated on the steering column.
- Fasten clockspring to steering column using the two mounting screws and torque screws to 24 in. lbs. (2.7 N•m).

(2) Connect the clockspring to the instrument panel harness, ensure wiring is properly routed. Then check that the connectors, locking tabs are properly engaged.

(3) Install steering column shrouds. Be sure all wires are inside of shrouds.

(4) Install the tilt wheel release lever, if equipped.

(5) Pull all wires through the large opening of the hub area on the steering wheel. Install steering wheel ensuring the flats on hub align with the clockspring. Tighten steering wheel nut to 61 N·n (45 ft. lbs.) torque. Ensure leads do not get pinched under the steering wheel.

(6) Unlock the steering column with the ignition lock cylinder. Return the steering wheel to the upright position (180 ° counterclockwise).

(7) Route speed control wires under and behind the airbag module mounting tabs.

(8) Connect the horn lead wire and the airbag lead wire to the airbag module.

(9) Install the airbag module and torque bolts to 7-9 N·m (65-85 in. lbs.) torque.

(10) Connect the speed control wires to the switches and install switches. Torque screws to 1.5 N·m (13 in. lbs.) torque.

(11) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

DRIVER AIRBAG MODULE

REMOVAL

When removing a deployed module, rubber gloves, eye protection and long sleeved shirt should be worn, as there may be deposits on the surface which could irritate the skin and eyes. **When removing a Driver Airbag Module for any reason the following procedures must be followed.**

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove speed control switch screws from steering wheel back cover, remove switches and disconnect the wires.

(3) Remove two bolts retaining Driver Airbag Module.

(4) Lift module and disconnect airbag and horn wire connectors.

(5) Remove Driver Airbag Module from vehicle.

WARNING: When replacing a deployed Driver Airbag Module, the clockspring must also be replaced. Refer to Clockspring Removal and Installation in this section for proper procedure.

INSTALLATION

(1) Connect clockspring, horn and airbag wiring connectors to the module. Make airbag connection by pressing straight in on the connector. The connector should be fully seated to assure positive connection. Insert Connector Position Assurance (CPA) tab. Check that the wires are not pinched during installation.

(2) Install the airbag screws and tighten to 7 to 9 N·m (65 to 85 in. lbs.) torque.

(3) Connect the wire connectors to the speed control switches and install switches. Tighten speed control screws to 1.5 N·m (13 in. lbs).

(4) Do not connect battery negative cable remote terminal. Refer to Diagnosis and Testing for Airbag System Test procedures.

REMOVAL AND INSTALLATION (Continued)

OCCUPANT RESTRAINT CONTROLLER (ORC)

WARNING: THE OCCUPANT RESTRAINT CONTROLLER (ORC) CONTAINS AN ACCELEROMETER WHICH ENABLES THE SYSTEM TO DEPLOY THE AIRBAGS. TO AVOID ACCIDENTAL DEPLOYMENT, NEVER CONNECT ORC ELECTRICALLY TO THE SYSTEM WHILE VEHICLE BATTERY IS CONNECTED. BEFORE BEGINNING ANY AIRBAG SYSTEM REMOVAL OR INSTALLATION PROCEDURES, DISCONNECT AND ISOLATE THE BATTERY NEGATIVE REMOTE (GROUND) CABLE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT, AND POSSIBLE PERSONAL INJURY.

FIVE PASSENGER VEHICLE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

NOTE: If working on a Concorde, the Instrument Panel must be removed. Refer to Group 8E, Instrument Panel Systems for Removal and Installation. Then go to Step 10.

(2) Remove one screw to shift knob.
(3) Remove two screws to shifter bezel.
(4) Disconnect power outlet connector and remove bezel from vehicle.
(5) Remove left instrument panel endcap covering the junction block.
(6) Remove two screws to steering column cover then pull toward rear of vehicle to disengage clips.
(7) Open glove box door. Continue to pull down on the door until the glove box drops and you see the screws in the upper and lower left corner or the glove box bin.
(8) Pull the right console side panel off.
(9) Remove two screws to left console side panel and pull off.
(10) With the ORC now exposed, slide the red Connector Position Assurance (CPA) tab out. Press down on the locking latch and disconnect the ORC 23-way connector.
(11) Remove the two side module mounting screws on the drivers side.
(12) Loosen the top screw on the drivers side.
(13) Lift up the module and slide out the ORC.

NOTE: If the module cannot be lifted out, the passenger side screw needs some additional loosening.

(14) Remove the ORC from vehicle.

INSTALLATION

WARNING: THE ORC IS A SAFETY MODULE AND FAILURE TO INSTALL AND SECURE IT PROPERLY, COULD CAUSE THE MODULE TO POSSIBLY MALFUNCTION.

(1) Position the ORC (arrow pointing forward in vehicle) on the ORC mounting bracket. The mounting bosses on the module will correctly position the ORC on the bracket. Attach the ORC to the bracket with the three screws supplied and torque to 88 to 124 in.lbs. (10 to 14 N·m).

CAUTION: USE SUPPLIED SCREWS ONLY.

(2) Reverse the above procedures for continued installation.

CAUTION: Do not connect negative battery cable remote terminal. Refer to Airbag System Check in this section for proper procedure.

SIX PASSENGER VEHICLE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).
(2) Open glove box door and release side tabs and swing down.

NOTE: If working on a Concorde, the Instrument Panel must be removed. Refer to Group 8E, Instrument Panel Systems for Removal and Installation. Then go to Step 10.

(3) Remove the left endcap at the junction block.
(4) Remove two screws to steering column cover then pull toward rear of vehicle to disengage clips.
(5) Open glove box door. Continue to pull down on the door until the glove box drops and you see the screws in the upper and lower left corner or the glove box bin.
(6) Remove the instrument panel center bezel. The temperature control module, power outlet and traction control switch will pop out with the center bezel.
(7) Disconnect the connectors at center bezel.
(8) Remove four screws to Chin bezel. Two on the right side and two on the left side of vehicle.
(9) Remove one screw and one push fastener retaining floor bin.
(10) With the ORC now exposed, slide the red Connector Position Assurance (CPA) tab out. Press down

REMOVAL AND INSTALLATION (Continued)

on the locking latch and disconnect the ORC 23-way connector.

(11) Remove the two side module mounting screws on the drivers side.

(12) Loosen the top screw on the drivers side.

(13) Lift up the module and slide out the ORC.

NOTE: If the module cannot be lifted out, the passenger side screw needs some additional loosening.

(14) Remove the ORC from vehicle.

INSTALLATION

WARNING: THE ORC IS A SAFETY MODULE AND FAILURE TO INSTALL AND SECURE IT PROPERLY, COULD CAUSE THE MODULE TO POSSIBLY MALFUNCTION.

(1) Position the ORC (arrow pointing forward in vehicle) on the ORC mounting bracket. The mounting bosses on the module will correctly position the ORC on the bracket. Attach the ORC to the bracket with the three screws supplied and torque to 88 to 124 in.lbs. (10 to 14 N·m).

CAUTION: USE SUPPLIED SCREWS ONLY.

(2) Reverse the above procedures for continued installation.

CAUTION: Do not connect negative battery cable remote terminal. Refer to Airbag System Check in this section for proper procedure.

PASSENGER AIRBAG MODULE

NON DEPLOYED MODULE

When removing a module for any reason other than DEPLOYMENT.

The instrument panel must be **PARTIALLY** removed for Passenger Airbag Module service. Refer to Group 8E, Instrument Panel and Systems for graphics of complete I/P.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove the four screws that attach the glove box door to the instrument panel and remove the glove box door.

(3) Remove right instrument panel endcap.

(4) If equipped with center console:

- Remove the gearshift handle set screw and then remove the gear shift handle.
- Remove the console shifter bezel.
- Remove the right console side trim panel.

(5) Accessing through the glove box door, remove five screws to the glove box close-out assembly (20 in. lbs. torque) (Fig. 6).

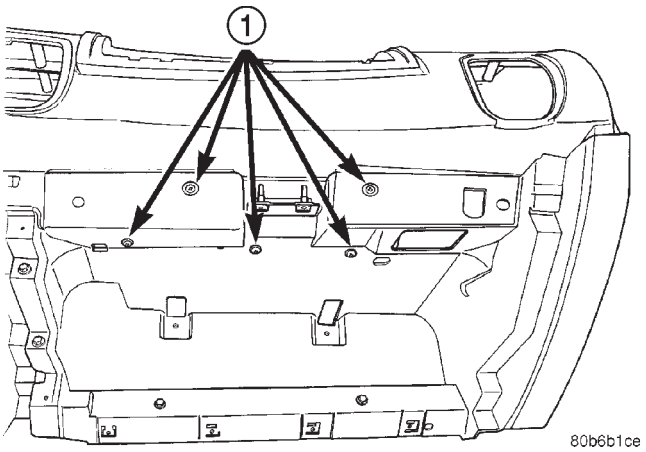


Fig. 6 Glove Box Close - Out to Reinforcement

1 – RETAINING SCREWS

(6) Remove the left and right A-pillar trim moldings.

(7) Remove the left instrument panel endcap.

(8) Remove the left lower instrument panel trim cover. Disconnect the hood release cable and decklid release electrical connector. Remove and set panel aside.

(9) Remove the left knee blocker.

(10) Remove the instrument panel center bezel. Disconnect the heater - a/c control unit and traction control switch (if equipped), electrical connectors.

(11) If equipped with console, remove the left instrument panel side cover.

(12) If not equipped with center console, remove the center lower instrument panel floor bin.

(13) Remove the two center instrument panel lower attaching nuts.

(14) Remove the left (driver's) side air distribution ducts.

(15) Disconnect the brake switch electrical connector.

(16) Remove the bulkhead connector mounting screw.

NOTE: It is not necessary to disconnect the bulkhead connector.

(17) Disconnect the Occupant Restraint Controller (ORC) electrical connector.

(18) Disconnect the two center instrument panel ground eyelets on the left side of the floor tunnel.

(19) Remove the four steering column nuts and lower the steering column to the floor.

REMOVAL AND INSTALLATION (Continued)

(20) Remove the three lower left instrument panel mounting bolts.

(21) Remove the three upper left instrument panel mounting bolts.

(22) Disconnect the instrument panel to body harness electrical connector.

(23) Disconnect the radio antenna connector.

(24) Remove the three lower right instrument panel mounting bolts.

(25) Remove the three upper right instrument panel mounting bolts.

(26) Pull the right side of the instrument panel back and set on right (passenger side) seat to access the passenger airbag module.

NOTE: The instrument panel does not have to be removed any more than this for passenger airbag service.

(27) Remove four screws to the right demister duct (20 in. lbs. torque).

(28) Remove two screws to the right distribution duct assembly (20 in. lbs. torque).

(29) Disconnect the yellow wire harness connector from the airbag module assembly and the three christmas tree fasteners.

(30) Remove the right and left pencil strut to Passenger Airbag screws (45 in. lbs. torque) (Fig. 7).

(31) Disconnect the instrument panel wiring harness from the airbag reinforcement bracket.

(32) Remove four 10 mm hex head screws to the deployment door reinforcement - two screws per side (75 in. lbs. torque.) (Fig. 7)

(33) Remove five screws from the passenger airbag module assembly to retainer (20 in. lbs. torque) (Fig. 7).

(34) Remove the airbag module assembly from the instrument panel retainer.

(35) Remove four screws to the reinforcement brace on the old airbag module (20 in. lbs. torque) (Fig. 8).

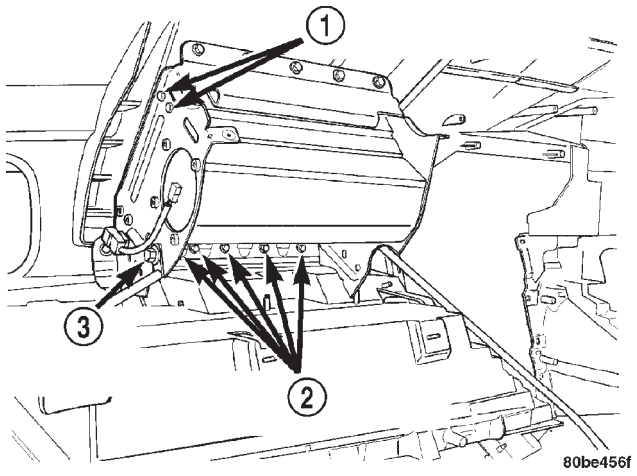


Fig. 7 Instrument Panel and Pad Assembly

1 – STEP #32
2 SCREWS PER SIDE
2 – STEP #33
5 SCREWS
3 – STEP #30
1 SCREW PER SIDE

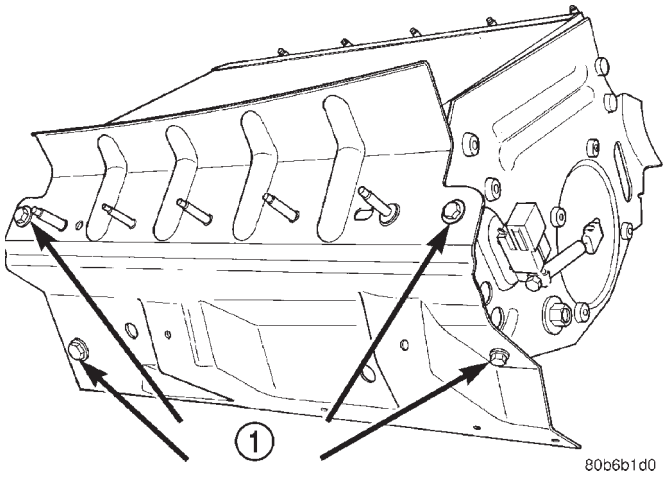


Fig. 8 Reinforcement to Passenger Airbag

1 – RETAINING SCREWS

INSTALLATION

(1) Install the reinforcement bracket on to the new airbag module. Tighten to 20 in.lbs. (2.3 N•m).

For installation, reverse the above procedures. Refer to Diagnosis and Testing for Airbag System Test procedures.

DEPLOYED MODULE

The instrument panel must be removed for DEPLOYED Passenger Airbag Module service.

REMOVAL

When removing a deployed module: rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the surface which could irritate the skin and eyes.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Roll or fold the passenger airbag towards the instrument panel surface and tuck into instrument panel into module area. Then tape the ripped instrument panel pad over the deployed airbag.

(3) Remove instrument panel and pad assembly. Refer to Group 8E Instrument Panel and Systems, for Removal and Installation.

(4) Remove Passenger Airbag Module. Refer to Passenger Airbag Removal and Installation in this section for a Non-Deployed Module.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Transfer all instrument panel components which are not damaged to NEW instrument panel and pad assembly. Tighten screws to 2 N·m (20 in. lbs.) torque.

(2) For Installation of Passenger Airbag Module, reverse procedures outlined in the Non Deployed Module removal procedure.

(3) For installation of the instrument panel, reverse the procedures outlined in Group 8E Instrument Panel and Systems.

(4) Do not connect battery negative cable remote terminal. Refer to Diagnosis and Testing for Airbag System Test procedures.

STEERING WHEEL

REMOVAL

(1) Place the front road wheels in the straight ahead position then:

- Rotate the steering wheel half turn (180 degrees) to the right (clockwise)
- Lock column with the ignition cylinder lock

(2) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(3) Wait two minutes for the reserve capacitor to discharge before removing non deployed module.

(4) Remove speed control switches and connectors.

(5) Remove the airbag module attaching bolts on the front of the steering wheel.

(6) Lift module and disconnect the airbag and horn wire connectors.

(7) Remove steering wheel retaining nut.

(8) Remove steering wheel with steering wheel puller Tool C-3428B. While removing steering wheel take care to feed the wires gently through the opening in the steering wheel armature.

INSTALLATION

(1) Confirm that:

- The steering wheel position is a half turn (180 degrees) to the right (clockwise)
- The column is locked with the ignition cylinder lock.
- Check that the turn signal stalk is in the neutral position

(2) Pull all wires through the larger opening of the hub area on the wheel. Install steering wheel ensuring the flats on hub align with the clockspring. Ensure leads do not get pinched under the steering wheel.

(3) Install retaining nut, and torque it to 61 N·m (45 ft.lbs.).

(4) Route speed control wires through the slots in the steering wheel back cover.

(5) Connect the horn lead wire and the airbag lead wire to the airbag module.

(6) Install the airbag module and torque bolts to 7 to 9 N·m (65 to 85 in.lbs.).

(7) Connect the speed control wires to the switches and install switches. Torque screws to 1.4 to 2.0 N·m (12 to 18 in.lbs.).

(8) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

ADJUSTMENTS

CLOCKSPRING CENTERING PROCEDURE

If the rotating tape within the clockspring is not positioned properly with the steering wheel and the front wheels, the clockspring may fail during use. The following procedure MUST BE USED to center the clockspring if:

- The clockspring is not known to be properly positioned
- The front wheels were moved with the steering wheel off
- The steering wheel was moved from the half turn (180 degrees) to the right (clockwise) position.

(1) Remove steering wheel. Refer to Steering Wheel Removal and Installation procedures in this section.

(2) After removal, depress the plastic locking pin to disengage locking mechanism.

(3) Keeping locking mechanism disengaged, rotate the clockspring rotor until a yellow dot appears in centering window and black arrow lines up with drive pin.

(4) Reinstall steering wheel upside down with wheels turned 180° clockwise.

(5) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

PASSIVE RESTRAINT SYSTEMS

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DESCRIPTION AND OPERATION

SIDE IMPACT AIRBAG RESTRAINT SYSTEM

DESCRIPTION

Vehicles equipped with the side impact airbag restraint system utilize two airbags mounted to each front seat back frame (Fig. 1). This system designed to protect occupants in the event of a side impact collision.

OPERATION

The side impact airbag control module (SIACM) controls the seat back mounted airbags. If the SIACM determines the impact is severe enough, the appropriate airbag/s will inflate, tearing open the front seat back trim cover/s protecting the passenger/s. Once a seat back mounted airbag has been deployed, all damaged parts must be replaced.

DESCRIPTION AND OPERATION (Continued)

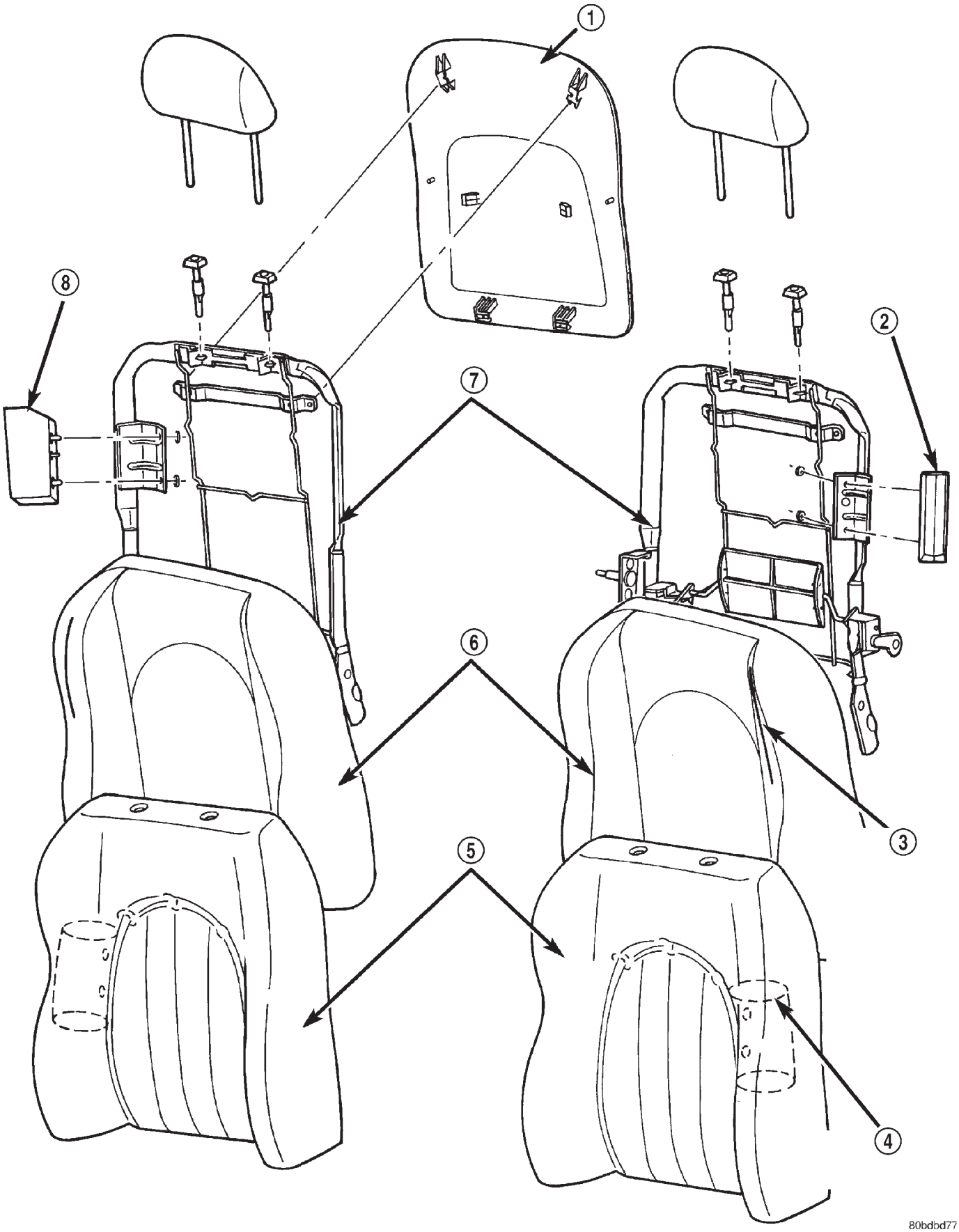


Fig. 1 LH FRONT SEAT BACKS EQUIPPED WITH AIRBAGS

DESCRIPTION AND OPERATION (Continued)

1 – FRONT SEAT BACK PANEL
2 – LEFT SEAT AIRBAG MODULE
3 – HOLE PROVIDED IN SEAT BACK FOAM FOR SEAT AIRBAG MODULE
4 – SIDE AIRBAG MODULE NYLON SLEEVE
5 – SEAT BACK TRIM COVERS
6 – SEAT BACK CUSHIONS
7 – SEAT BACK FRAMES
8 – RIGHT SEAT AIRBAG MODULE

OCCUPANT RESTRAINT CONTROLLER (ORC)

DESCRIPTION

The Occupant Restraint Controller contains the accelerometer and energy reserve capacitor. The ORC is mounted on the tunnel floor pan, forward of the center console.

OPERATION

The accelerometer is located inside the ORC. The accelerometer provides confirmation of a crash, discriminating severity. The ORC monitors the system to determine the system readiness. The ORC may store sufficient energy to deploy the airbags for only two minutes after the battery is disconnected. The ORC contains on-board diagnostics, and will illuminate the AIRBAG warning lamp on the cluster when a fault occurs. The warning equipment is tested for a few seconds every time the vehicle is started.

SIDE IMPACT AIRBAG CONTROL MODULE

DESCRIPTION

Vehicles equipped with side impact airbags use two side impact airbag control modules. One is located on each vehicle body B-pillar (Fig. 2).

OPERATION

Each side impact airbag control module serves as the impact sensor for its seat mounted airbag. The right side SIACM controls the right seat airbag (Fig. 3). The left side SIACM controls the left seat airbag (Fig. 3). Each SIACM contains two accelerometers, both accelerometers must agree in order to deploy the side airbag. In the event of a side impact the appropriate SIACM will send a electronic signal to its airbag, deploying the airbag. The SIACM communicates with the occupant restraint controller via J1950 bus circuit.

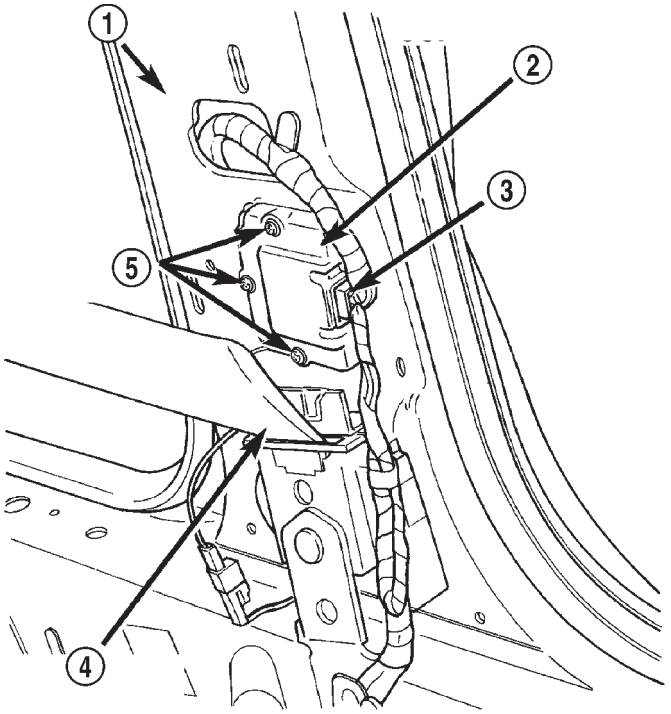


Fig. 2 SIACM Position & Orientation

1 – VEHICLE BODY B-PILLAR
2 – SIDE IMPACT AIRBAG CONTROL MODULE (S. I. A. C. M.)
3 – S. I. A. C. M. ELECTRICAL CONNECTOR
4 – SEAT BELT RETRACTOR ASSEMBLY
5 – S. I. A. C. M. RETAINING SCREWS

DESCRIPTION AND OPERATION (Continued)

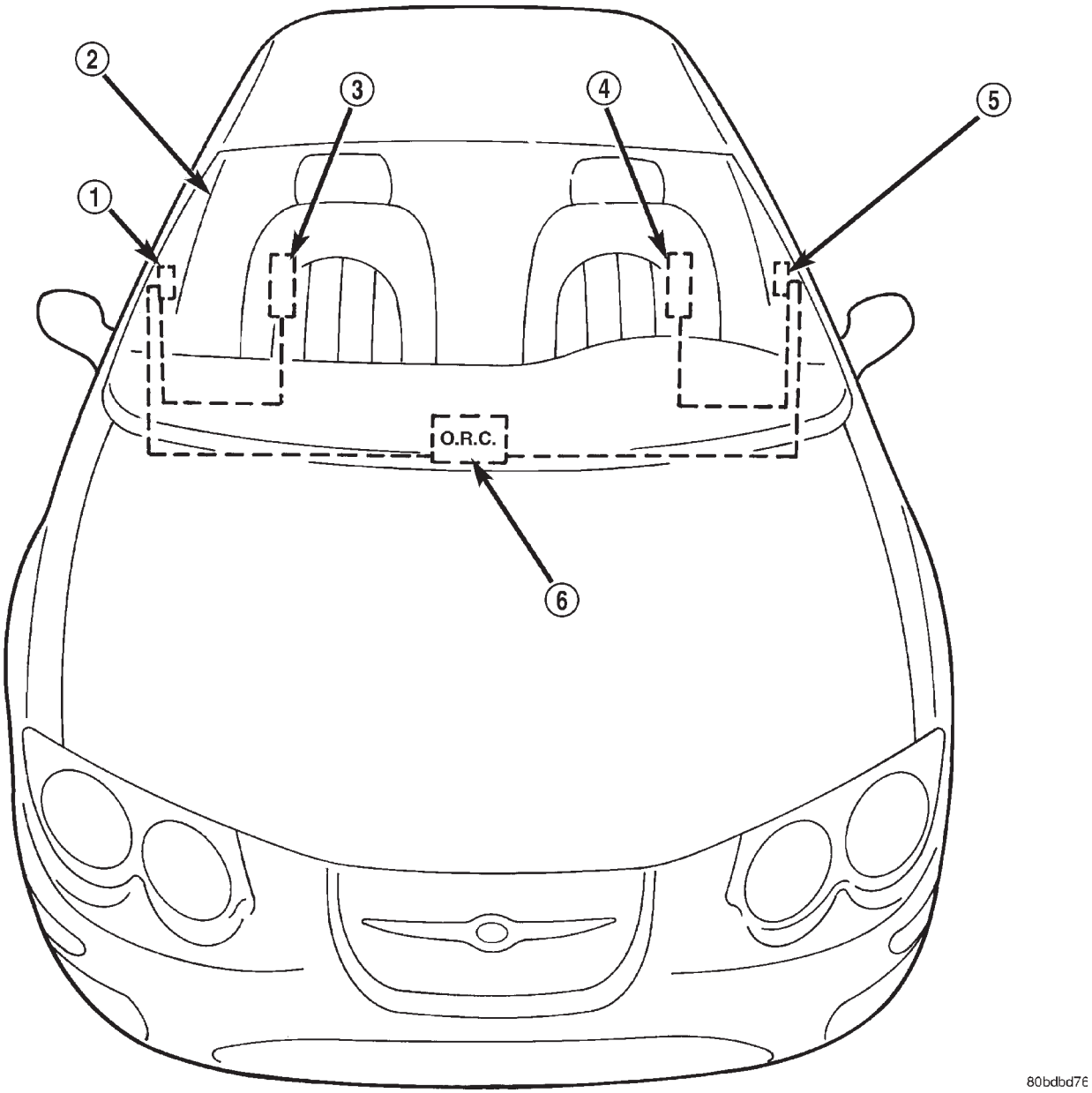


Fig. 3 Side Impact Airbag Restraint System

1 – RIGHT SIDE IMPACT AIRBAG CONTROL MODULE (SIACM)
2 – VEHICLE BODY B-PILLAR
3 – RIGHT SEAT AIRBAG MODULE
4 – LEFT SEAT AIRBAG MODULE
5 – LEFT SIDE IMPACT AIRBAG CONTROL MODULE (SIACM)
6 – OCCUPANT RESTRAINT CONTROLLER

DESCRIPTION AND OPERATION (Continued)

SEAT AIRBAG MODULES

DESCRIPTION

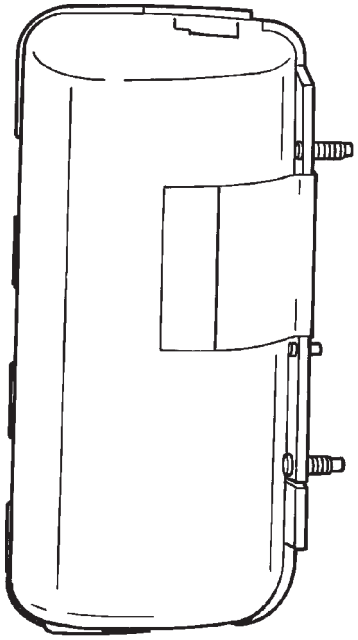


Fig. 4 Airbag Module

The seat/side airbags are located in the front seat backs (Fig. 5). One in each front seat. The seat airbag inflator assembly is within the module housing (Fig. 4). Each module is mounted to the seat back frame (Fig. 5).

OPERATION

Only the side impact airbag control module can deploy the seat/side airbags. When supplied with the proper electrical signal the seat airbag's inflator will produce a gas and discharge the bag directly between the occupant and the side of the vehicle. Protecting the occupant. Upon deployment, the seat back trim cover will tear open and allow the side airbag to fully inflate.

DESCRIPTION AND OPERATION (Continued)

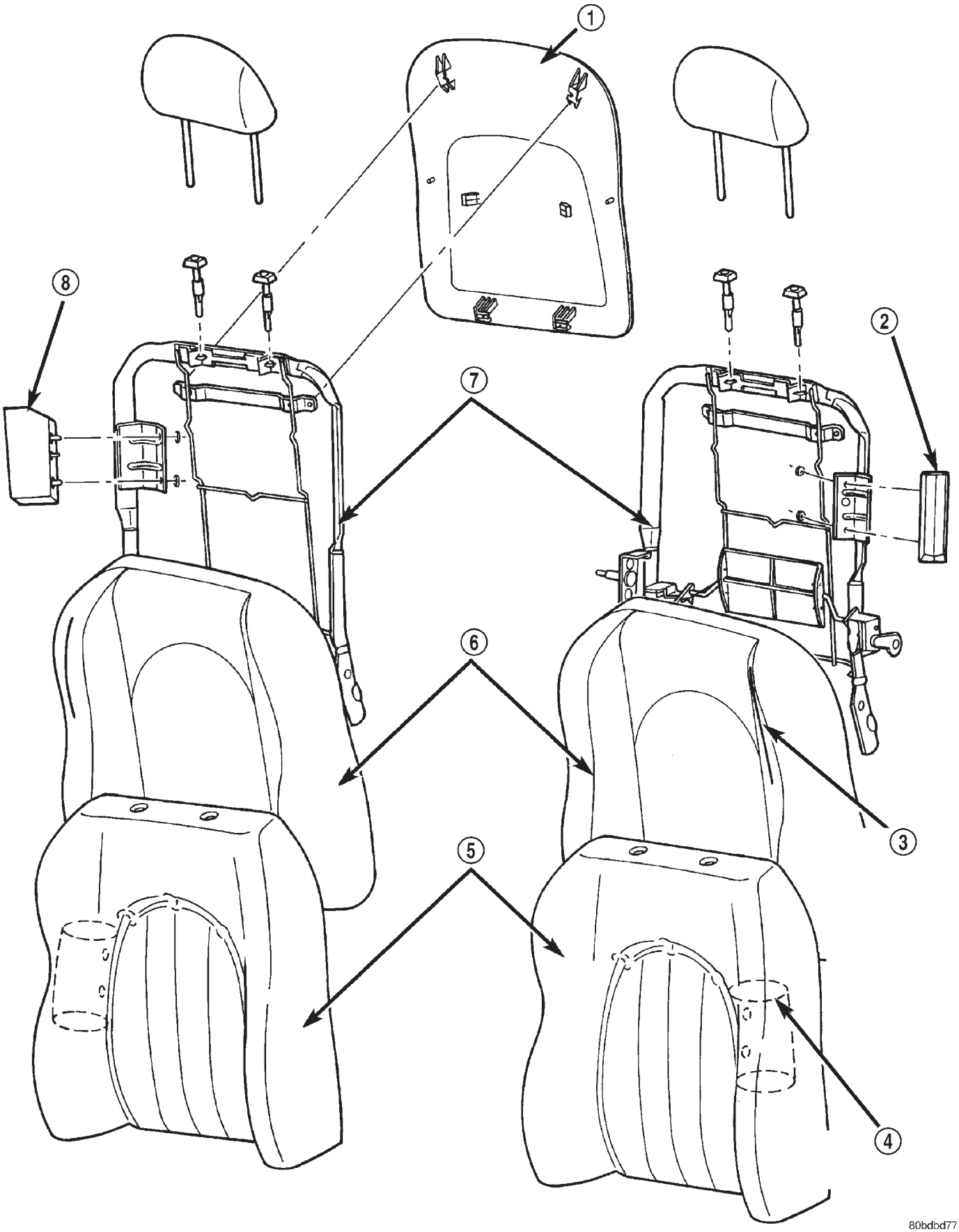


Fig. 5 LH AIRBAG FRONT SEAT BACKS

DESCRIPTION AND OPERATION (Continued)

1 – FRONT SEAT BACK PANEL
2 – LEFT SEAT AIRBAG MODULE
3 – HOLE PROVIDED IN SEAT BACK FOAM FOR SEAT AIRBAG MODULE
4 – SIDE AIRBAG MODULE NYLON SLEEVE
5 – SEAT BACK TRIM COVERS
6 – SEAT BACK CUSHIONS
7 – SEAT BACK FRAMES
8 – RIGHT SEAT AIRBAG MODULE

SEAT AIRBAG WIRE HARNESS

DESCRIPTION

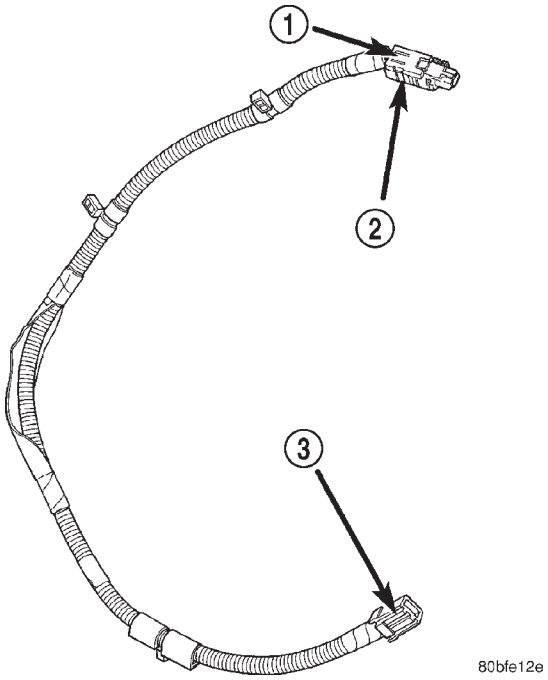


Fig. 6 Front Seat Airbag Wire Harness

1 – YELLOW CONNECTOR LOCK
2 – TO AIRBAG MODULE
3 – TO SEAT HARNESS

The seat airbag wire harness is used to make electrical connection between the seat back mounted airbag and the seat wire harness. Refer to Group 8W, Wiring Diagrams for more information.

CLOCKSPRING

DESCRIPTION

The clockspring is mounted to the steering column behind the steering wheel. The clockspring is used to maintain a continuous electrical circuit between the wiring harness and the:

- Driver's airbag module
- Speed control switches
- Horn switch

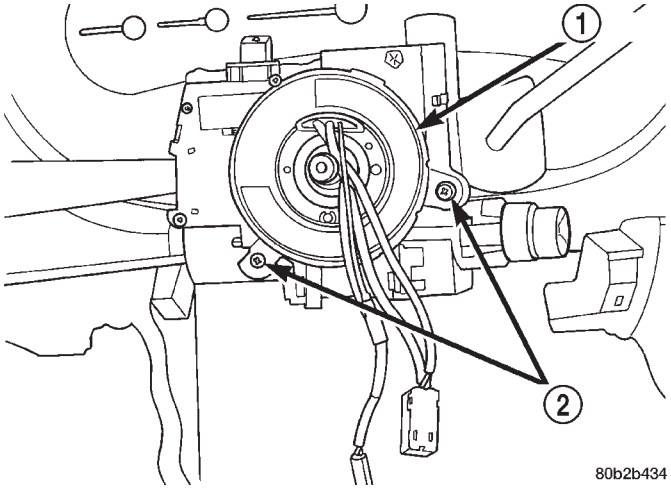


Fig. 7 Clockspring Location

1 – CLOCKSPRING
2 – MOUNTING SCREWS

OPERATION

The clockspring consists of a flat, ribbon like, electrically conductive tape which winds and unwinds with the steering wheel rotation.

DRIVER AIRBAG MODULE

WARNING: NEVER DISASSEMBLE THE DRIVER/ PASSENGER AIRBAG MODULES, THERE ARE NO SERVICEABLE PARTS WITHIN THE MODULES.

DESCRIPTION

OPERATION

The driver side inflator assembly is mounted from the back of the module housing. When supplied with the proper electrical signal the inflator assembly will produce a gas and discharge it directly into the cushion. A protective cover is fitted to the front of the Driver Airbag Module and forms a decorative cover in the center of the steering wheel. This cover incorporates the integral horn switch. The driver airbag module is mounted directly to the steering wheel.

DESCRIPTION AND OPERATION (Continued)

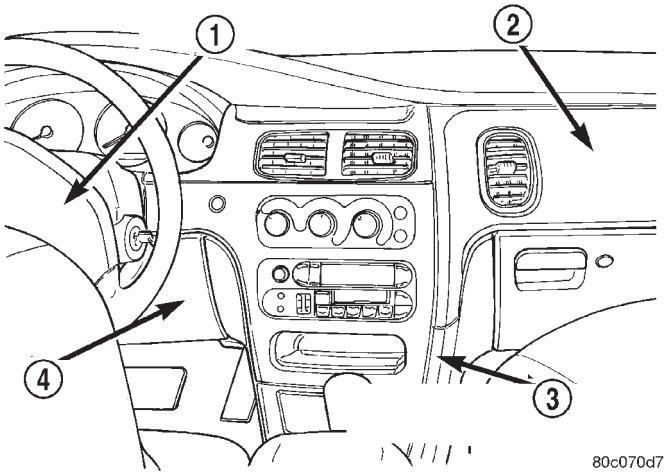


Fig. 8 Driver Airbag Location

1 – DRIVER AIRBAG MODULE
2 – PASSENGER AIRBAG MODULE
3 – OCCUPANT RESTRAINT CONTROLLER (ORC)
4 – KNEE BLOCKER

FRONT IMPACT SENSOR

DESCRIPTION

The Airbag System is a supplemental safety device designed to help protect the driver and passenger from serious injury, caused by a frontal impact of the vehicle.

The Occupant Restraint Controller's (ORC) internal impact sensor provides verification of the direction and severity of an impact. The sensor is mounted within the ORC.

OPERATION

The Occupant Restraint Controller (ORC) uses data collected from it's internal accelerometers to discriminate the direction and severity of an impact. The ORC will activate power stages internal to the module in order to deploy the driver and passenger side airbags once a predetermined threshold has been exceeded. The ORC is calibrated for a particular vehicle family and uses an advanced software algorithm to discriminate the severity and direction of any vehicle event.

PASSENGER AIRBAG MODULE

WARNING: NEVER DISASSEMBLE THE DRIVER/ PASSENGER AIRBAG MODULES, THERE ARE NO SERVICEABLE PARTS WITHIN THE MODULES.

DESCRIPTION

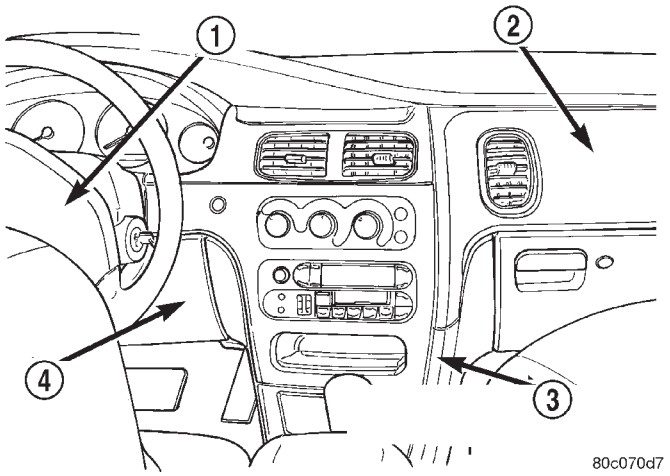


Fig. 9 Passenger Airbag Location

1 – DRIVER AIRBAG MODULE
2 – PASSENGER AIRBAG MODULE
3 – OCCUPANT RESTRAINT CONTROLLER (ORC)
4 – KNEE BLOCKER

The Passenger Airbag Module is located beneath the instrument panel and pad assembly. The module is mounted to a bracket (welded to the floor pan) with three screws.

OPERATION

The passenger inflator assembly is within the module housing. When supplied with the proper electrical signal the inflator will produce a gas and discharge it directly into the cushion. Upon deployment, the instrument panel upper cover will tear open and allow the passenger airbag to fully inflate.

DIAGNOSIS AND TESTING

AIRBAG SYSTEM TEST

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 10).

(2) Connect the DRB lll® scan tool to the Data Link connector, located on the left side of the steering column and at the lower edge of the instrument panel.

(3) Turn the ignition key to ON position. Exit vehicle with scan tool. Use the latest version of the proper cartridge.

(4) After checking that no one is inside the vehicle, connect the battery negative remote terminal.

DIAGNOSIS AND TESTING (Continued)

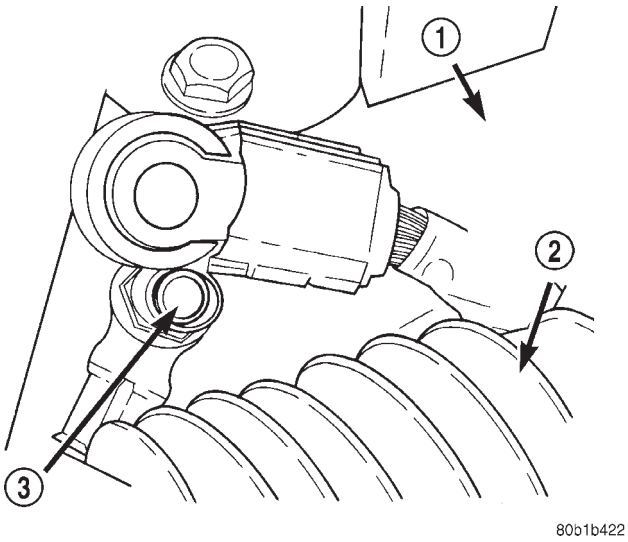


Fig. 10 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(5) Using the DRB lll® scan tool, read and record active diagnostic code data.

(6) Read and record any stored diagnostic codes.

(7) Refer to the Passive Restraint Diagnostic Procedures Manual if any diagnostic codes are found in Step 5 or Step 6.

(8) Erase stored diagnostic codes if there are no active diagnostic codes. If problems remain, diagnostic codes will not erase. Refer to the Passive Restraint Diagnostic Test Manual to diagnose the problem. **If airbag warning lamp either fails to light, or goes on and stays on, there is a system malfunction. Refer to the proper Body Diagnostic Procedures Manual to diagnose the problem.**

SERVICE PROCEDURES

FRONT IMPACT SENSOR

DESCRIPTION

The Airbag System is a supplemental safety device designed to help protect the driver and passenger from serious injury, caused by a frontal impact of the vehicle.

The Occupant Restraint Controller's (ORC) internal impact sensor provides verification of the direction and severity of an impact. The sensor is mounted within the ORC.

OPERATION

The Occupant Restraint Controller (ORC) uses data collected from it's internal accelerometers to discriminate the direction and severity of an impact. The ORC will activate power stages internal to the module in order to deploy the driver and passenger side airbags once a predetermined threshold has been exceeded. The ORC is calibrated for a particular vehicle family and uses an advanced software algorithm to discriminate the severity and direction of any vehicle event.

HANDLING AIRBAG MODULE

DEPLOYED MODULE

The vehicle interior may contain a very small amount of sodium hydroxide powder, a by-product of airbag deployment. Sodium hydroxide powder can irritate the skin, eyes, nose and throat. Wear safety glasses, rubber gloves, and long sleeved clothing when cleaning any of the powder residue from the vehicle.

If you find that the cleanup is irritating your skin, run cool water over the affected area. Also, if you experience nasal or throat irritation, exit the vehicle for fresh air until the irritation ceases. If irritation continues, see a physician.

UNDEPLOYED

The airbag modules must be stored in its original special container until used for service. At no time should a source of electricity be permitted near the inflator on the back of an airbag module. When carrying or handling an undeployed airbag module, the trim side of the airbag should be pointing away from the body to minimize possibility of injury if accidental deployment occurs. Do not place undeployed airbag face down on a solid surface, the airbag will propel into the air if accidental deployment occurs.

MAINTENANCE INSPECTION

Check the airbag warning lamp for proper operation as follows:

(1) Turn the ignition switch to the ON position. The airbag warning lamp should illuminate. If it does not, test the system using a DRB lll® scan tool and the proper Body Diagnostic Procedures Manual. Repair as required.

(2) The airbag warning lamp lights, but fails to go out after ten seconds. Test the system using a DRB lll® scan tool and the proper Body Diagnostic Procedures Manual. Repair as required.

REMOVAL AND INSTALLATION

WARNINGS AND PRECAUTIONS

WARNING: THIS SYSTEM IS A SENSITIVE, COMPLEX ELECTRONIC UNIT. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE REMOTE CABLE BEFORE BEGINNING AIRBAG SYSTEM COMPONENT REMOVAL OR INSTALLATION PROCEDURES. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

ALLOW SYSTEM CAPACITOR TO DISCHARGE FOR TWO MINUTES BEFORE REMOVING AIRBAG COMPONENTS.

DO NOT PLACE AN INTACT UNDEPLOYED AIRBAG FACE DOWN ON A SOLID SURFACE, THE AIRBAG WILL PROPEL INTO THE AIR IF ACCIDENTALLY DEPLOYED AND COULD RESULT IN PERSONAL INJURY. WHEN CARRYING OR HANDLING AN UNDEPLOYED AIRBAG MODULE, THE TRIM SIDE OF THE AIRBAG SHOULD BE POINTING AWAY FROM THE BODY TO MINIMIZE POSSIBILITY OF INJURY IF ACCIDENTAL DEPLOYMENT OCCURS.

REPLACE AIRBAG SYSTEM COMPONENTS WITH MOPAR® REPLACEMENT PARTS. SUBSTITUTE PARTS MAY APPEAR INTERCHANGEABLE, BUT INTERNAL DIFFERENCES MAY RESULT IN INFERIOR OCCUPANT PROTECTION.

WEAR SAFETY GLASSES, RUBBER GLOVES, AND LONG SLEEVED CLOTHING WHEN CLEANING POWDER RESIDUE FROM VEHICLE AFTER AIRBAG DEPLOYMENT. SODIUM HYDROXIDE POWDER RESIDUE EMITTED FROM A DEPLOYED AIRBAG CAN CAUSE SKIN IRRITATION. FLUSH AFFECTED AREA WITH COOL WATER IF IRRITATION IS EXPERIENCED. IF NASAL OR THROAT IRRITATION IS EXPERIENCED, EXIT THE VEHICLE FOR FRESH AIR UNTIL THE IRRITATION CEASES. IF IRRITATION CONTINUES, SEE A PHYSICIAN.

DO NOT USE A REPLACEMENT AIRBAG THAT IS NOT IN THE ORIGINAL PACKAGING, IMPROPER DEPLOYMENT AND PERSONAL INJURY CAN RESULT.

THE FACTORY INSTALLED FASTENERS, SCREWS AND BOLTS USED TO FASTEN AIRBAG COMPONENTS HAVE A SPECIAL COATING AND ARE SPECIFICALLY DESIGNED FOR THE AIRBAG SYSTEM. DO NOT USE SUBSTITUTE FASTENERS, USE ONLY ORIGINAL EQUIPMENT FASTENERS LISTED IN THE PARTS CATALOG WHEN FASTENER REPLACEMENT IS REQUIRED.

NOTE: Airbags should be stored in a cool dry location away from excessive heat and static electrical activity with the fabric airbag facing UP, or a premature deployment can result.

If the Driver/Passenger Airbag Module is defective and not deployed, refer to Chrysler Corporation current return list for proper handling procedures.

OCCUPANT RESTRAINT CONTROLLER (ORC)

WARNING: THE ORC CONTAINS AN ACCELEROMETER WHICH ENABLES THE SYSTEM TO DEPLOY THE FRONT AIRBAGS. TO AVOID ACCIDENTAL DEPLOYMENT, NEVER CONNECT ORC ELECTRICALLY TO THE SYSTEM WHILE VEHICLE BATTERY IS CONNECTED. BEFORE BEGINNING ANY AIRBAG SYSTEM REMOVAL OR INSTALLATION PROCEDURES, DISCONNECT AND ISOLATE THE BATTERY NEGATIVE REMOTE (GROUND) CABLE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT, AND POSSIBLE PERSONAL INJURY.

FIVE PASSENGER VEHICLE

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.
(2) Remove one screw to shift knob.
(3) Remove two screws to shifter bezel.
(4) Disconnect power outlet connector and remove bezel from vehicle.
(5) Remove left instrument panel endcap covering junction block.
(6) Remove two screws to steering column cover then pull toward rear of vehicle to disengage clips.
(7) Open glove box door. Continue to pull down on the door until the glove box drops and you see the screws in the upper and lower left corner or the glove box bin.
(8) Pull the right console side panel off.
(9) Remove two screws to left console side panel and pull off.
(10) With the Occupant Restraint Controller (ORC) now exposed, slide the red Connector Position Assurance (CPA) tab out. Press down on the locking latch and disconnect the ORC 23-way connector.
(11) Remove the two side module mounting screws on the drivers side.
(12) Loosen the top screw on the drivers side.
(13) Lift up the module and slide out the ORC.

NOTE: If the module cannot be lifted out, the passenger side screw needs some additional loosening.

(14) Remove the ORC from vehicle.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

WARNING: THE ORC IS A SAFETY MODULE AND FAILURE TO INSTALL AND SECURE IT PROPERLY, COULD CAUSE THE MODULE TO POSSIBLY MALFUNCTION.

(1) Position the ORC (arrow pointing forward in vehicle) on the ORC mounting bracket. The mounting bosses on the module will correctly position the ORC on the bracket. Attach the ORC to the bracket with the three screws supplied and torque to 88 to 124 in.lbs. (10 to 14 N•m).

CAUTION: USE SUPPLIED SCREWS ONLY.

(2) Reverse the above procedures for continued installation.

CAUTION: Do not connect negative battery cable remote terminal. Refer to Airbag System Check in this section for proper procedure.

CLOCKSPRING

REMOVAL

(1) Place the front road wheels in the straight ahead position then:

- Rotate the steering wheel half turn (180 degrees) to the right (clockwise)
- Lock column with ignition lock cylinder.

(2) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 10).

(3) Wait two minutes for the reserve capacitor to discharge before removing non deployed module.

(4) Remove speed control switch mounting screws, from the back of the steering wheel, and disconnect the wire connectors.

(5) Remove the Driver Airbag Module attaching bolts.

(6) Lift module and disconnect the airbag and horn wire connectors.

(7) Remove the steering wheel. Refer to Steering Wheel Removal and Installation in this section.

(8) Remove the tilt wheel release lever.

(9) Remove upper and lower steering column shrouds to gain access to clockspring wiring.

(10) Disconnect the 2-way and 4-way connectors between the clockspring and the instrument panel wiring harness at the base of the clockspring.

(11) Remove two mounting screws and pull clockspring assembly from steering shaft. The clockspring cannot be repaired, and must be replaced if faulty.

INSTALLATION

(1) Confirm that:

- The steering wheel position is a half turn (180 degrees) to the right (clockwise)
- The column is locked with the ignition cylinder lock.
- Locate the clockspring on the steering shaft and push down on the rotor until the clockspring is fully seated on the steering column.
- Fasten clockspring to steering column using the two mounting screws and torque screws to 24 in. lbs. (2.7 N•m).

(2) Connect the clockspring to the instrument panel harness, ensure wiring is properly routed. Then check that the connectors, locking tabs are properly engaged.

(3) Install steering column shrouds. Be sure all wires are inside of shrouds.

(4) Install the tilt wheel release lever, if equipped.

(5) Pull all wires through the large opening of the hub area on the steering wheel. Install steering wheel ensuring the flats on hub align with the clockspring. Tighten steering wheel nut to 61 N·n (45 ft. lbs.) torque. Ensure leads do not get pinched under the steering wheel.

(6) Unlock the steering column with the ignition lock cylinder. Return the steering wheel to the upright position (180 ° counterclockwise).

(7) Route speed control wires under and behind the airbag module mounting tabs.

(8) Connect the horn lead wire and the airbag lead wire to the airbag module.

(9) Install the airbag module and torque bolts to 7-9 N·m (65-85 in. lbs.) torque.

(10) Connect the speed control wires to the switches and install switches. Torque screws to 1.5 N·m (13 in. lbs.) torque.

(11) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

DRIVER AIRBAG MODULE

REMOVAL

When removing a deployed module, rubber gloves, eye protection and long sleeved shirt should be worn, as there may be deposits on the surface which could irritate the skin and eyes. **When removing a Driver Airbag Module for any reason the following procedures must be followed.**

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Remove speed control switch screws from steering wheel back cover, remove switches and disconnect the wires.

REMOVAL AND INSTALLATION (Continued)

(3) Remove two bolts retaining Driver Airbag Module.
(4) Lift module and disconnect airbag and horn wire connectors.
(5) Remove Driver Airbag Module from vehicle.

WARNING: When replacing a deployed Driver Airbag Module, the clockspring must also be replaced. Refer to Clockspring Removal and Installation in this section for proper procedure.

INSTALLATION

(1) Connect clockspring, horn and airbag wiring connectors to the module. Make airbag connection by pressing straight in on the connector. The connector should be fully seated to assure positive connection. Insert Connector Position Assurance (CPA) tab. Check that the wires are not pinched during installation.
(2) Install the airbag screws and tighten to 7 to 9 N·m (65 to 85 in. lbs.) torque.
(3) Connect the wire connectors to the speed control switches and install switches. Tighten speed control screws to 1.5 N·m (13 in. lbs).
(4) Do not connect battery negative cable remote terminal. Refer to Diagnosis and Testing for Airbag System Test procedures.

PASSENGER AIRBAG MODULE

NON DEPLOYED MODULE

When removing a module for any reason other than DEPLOYMENT.
The instrument panel must be **PARTIALLY** removed for Passenger Airbag Module service. Refer to Group 8E, Instrument Panel and Systems for graphics of complete I/P.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.
(2) Remove the four screws that attach the glove box door to the instrument panel and remove the glove box door.
(3) Remove right instrument panel endcap.
(4) If equipped with center console:
- Remove the gearshift handle set screw and then remove the gear shift handle.
- Remove the console shifter bezel.
- Remove the right console side trim panel.

(5) Accessing through the glove box door, remove five screws to the glove box close-out assembly (20 in. lbs. torque) (Fig. 11).
(6) Remove the left and right A-pillar trim moldings.
(7) Remove the left instrument panel endcap.

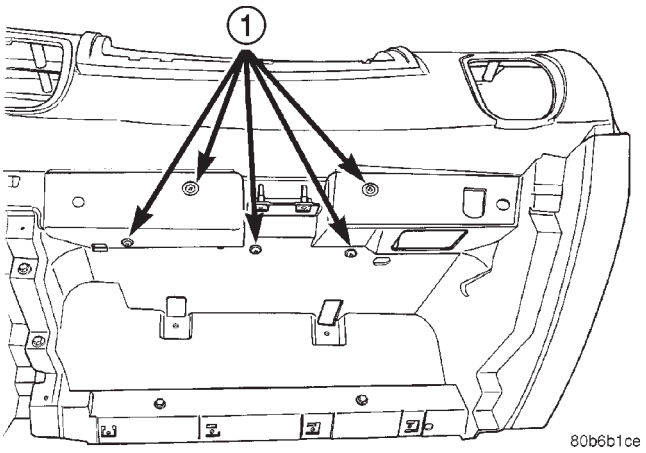


Fig. 11 Glove Box Close - Out to Reinforcement
1 – RETAINING SCREWS

(8) Remove the left lower instrument panel trim cover. Disconnect the hood release cable and decklid release electrical connector. Remove and set panel aside.
(9) Remove the left knee blocker.
(10) Remove the instrument panel center bezel. Disconnect the heater - a/c control unit and traction control switch (if equipped), electrical connectors.
(11) If equipped with console, remove the left instrument panel side cover.
(12) If not equipped with center console, remove the center lower instrument panel floor bin.
(13) Remove the two center instrument panel lower attaching nuts.
(14) Remove the left (driver's) side air distribution ducts.
(15) Disconnect the brake switch electrical connector.
(16) Remove the bulkhead connector mounting screw.

NOTE: It is not necessary to disconnect the bulkhead connector.

(17) Disconnect the Occupant Restraint Controller (ORC) electrical connector.
(18) Disconnect the two center instrument panel ground eyelets on the left side of the floor tunnel.
(19) Remove the four steering column nuts and lower the steering column to the floor.
(20) Remove the three lower left instrument panel mounting bolts.
(21) Remove the three upper left instrument panel mounting bolts.
(22) Disconnect the instrument panel to body harness electrical connector.
(23) Disconnect the radio antenna connector.
(24) Remove the three lower right instrument panel mounting bolts.

REMOVAL AND INSTALLATION (Continued)

(25) Remove the three upper right instrument panel mounting bolts.

(26) Pull the right side of the instrument panel back and set on right (passenger side) seat to access the passenger airbag module.

NOTE: The instrument panel does not have to be removed any more than this for passenger airbag service.

(27) Remove four screws to the right demister duct (20 in. lbs. torque).

(28) Remove two screws to the right distribution duct assembly (20 in. lbs. torque).

(29) Disconnect the yellow wire harness connector from the airbag module assembly and the three christmas tree fasteners.

(30) Remove the right and left pencil strut to Passenger Airbag screws (45 in. lbs. torque) (Fig. 12).

(31) Disconnect the instrument panel wiring harness from the airbag reinforcement bracket.

(32) Remove four 10 mm hex head screws to the deployment door reinforcement - two screws per side (75 in. lbs. torque.) (Fig. 12)

(33) Remove five screws from the passenger airbag module assembly to retainer (20 in. lbs. torque) (Fig. 12).

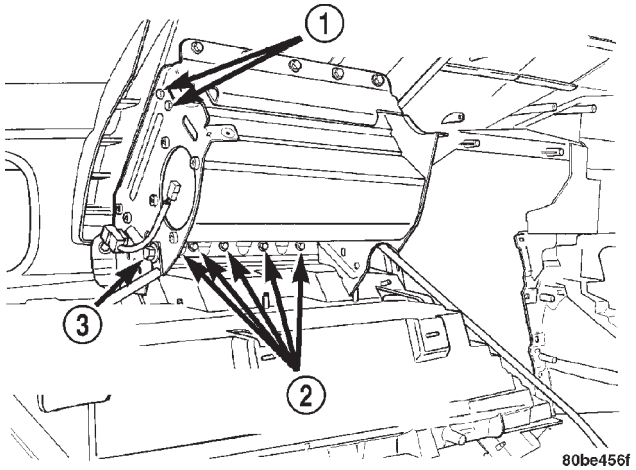


Fig. 12 Instrument Panel and Pad Assembly

1 – STEP #32 2 SCREWS PER SIDE
2 – STEP #33 5 SCREWS
3 – STEP #30 1 SCREW PER SIDE

(34) Remove the airbag module assembly from the instrument panel retainer.

(35) Remove four screws to the reinforcement brace on the old airbag module (20 in. lbs. torque) (Fig. 13).

INSTALLATION

(1) Install the reinforcement bracket on to the new airbag module. Tighten to 20 in.lbs. (2.3 N•m).

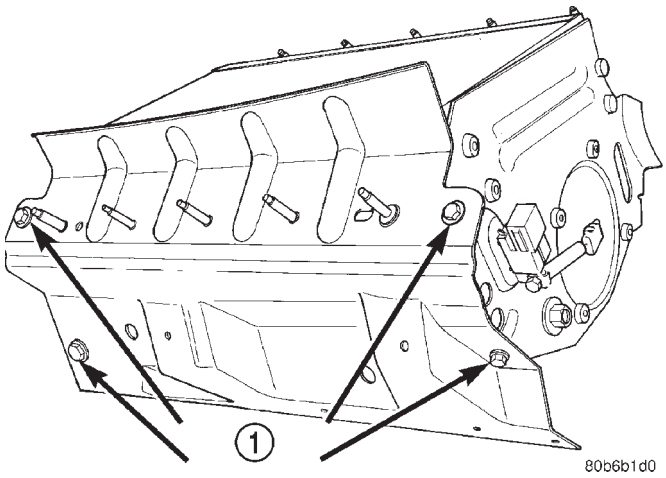


Fig. 13 Reinforcement to Passenger Airbag

1 – RETAINING SCREWS

For installation, reverse the above procedures. Refer to Diagnosis and Testing for Airbag System Test procedures.

DEPLOYED MODULE

The instrument panel must be removed for DEPLOYED Passenger Airbag Module service.

REMOVAL

When removing a deployed module: rubber gloves, eye protection, and a long-sleeved shirt should be worn. There may be deposits on the surface which could irritate the skin and eyes.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post.

(2) Roll or fold the passenger airbag towards the instrument panel surface and tuck into instrument panel into module area. Then tape the ripped instrument panel pad over the deployed airbag.

(3) Remove instrument panel and pad assembly. Refer to Group 8E Instrument Panel and Systems, for Removal and Installation.

(4) Remove Passenger Airbag Module. Refer to Passenger Airbag Removal and Installation in this section for a Non-Deployed Module.

INSTALLATION

(1) Transfer all instrument panel components which are not damaged to NEW instrument panel and pad assembly. Tighten screws to 2 N·m (20 in. lbs.) torque.

(2) For Installation of Passenger Airbag Module, reverse procedures outlined in the Non Deployed Module removal procedure.

(3) For installation of the instrument panel, reverse the procedures outlined in Group 8E Instrument Panel and Systems.

REMOVAL AND INSTALLATION (Continued)

(4) Do not connect battery negative cable remote terminal. Refer to Diagnosis and Testing for Airbag System Test procedures.

LEFT SEAT AIRBAG MODULE

CAUTION: DO NOT REPLACE A DEPLOYED AIRBAG. IF SEAT AIRBAG HAS BEEN DEPLOYED ALL DAMAGED PARTS MUST BE REPLACED.

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

REMOVAL - NONDEPLOYED

(1) Position the left front seat in the full forward position.
(2) Disconnect and isolate the negative battery cable.
(3) Remove plastic back panel from the seat back (Fig. 14). Refer to Group 23, Body for a detailed procedure.
(4) Disengage seat back trim cover J-strap from the upper, lower and airbag side of seat back.
(5) Disconnect the side airbag module electrical connector (Fig. 15). Slide yellow locking tab down to unlock. Then with two fingers, push two side retaining tabs in and pull connector straight from module.
(6) Remove the side airbag module retaining nuts (Fig. 16).
(7) Grasp the upper airbag side of the seat back trim cover and pull trim cover and cushion over top of seat back frame (Fig. 16). This will allow room to remove side airbag module without damaging trim cover or cushion.
(8) Working between seat back trim cover/cushion and frame carefully unhook airbag module studs from nylon sleeve and slide module out of sleeve. Be careful not to tear nylon sleeve as this will affect function of airbag system.

CAUTION: BE CERTAIN NOT TO TEAR AIRBAG MODULE NYLON SLEEVE DURING THE REMOVAL PROCEDURE. IF THIS OCCURS OF SEAT BACK TRIM COVER MUST BE REPLACED.

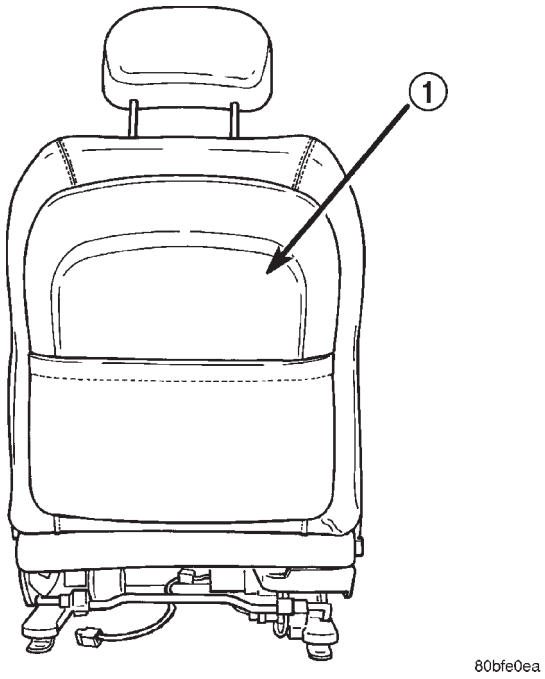


Fig. 14 Front Seat Back Panel
1 – FRONT SEAT BACK PANEL

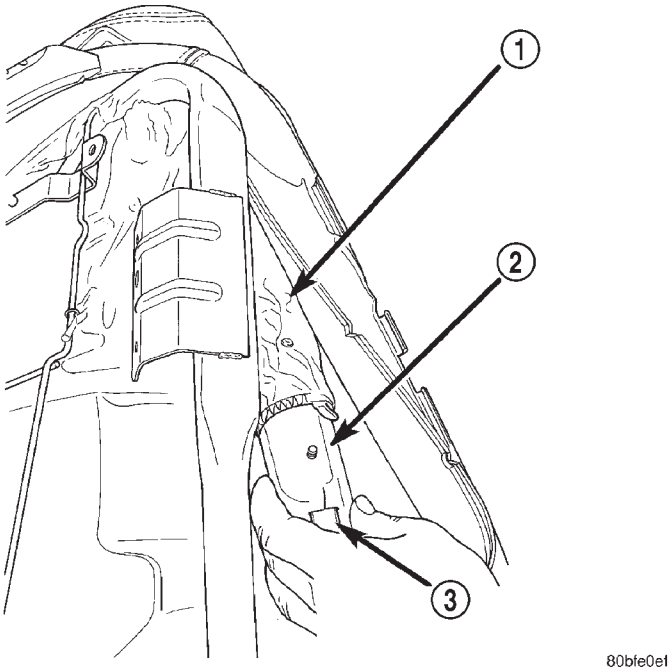


Fig. 15 Seat Airbag Electrical Connector
1 – AIRBAG MODULE NYLON SLEEVE
2 – AIRBAG MODULE
3 – AIRBAG MODULE ELECTRICAL CONNECTOR

REMOVAL AND INSTALLATION (Continued)

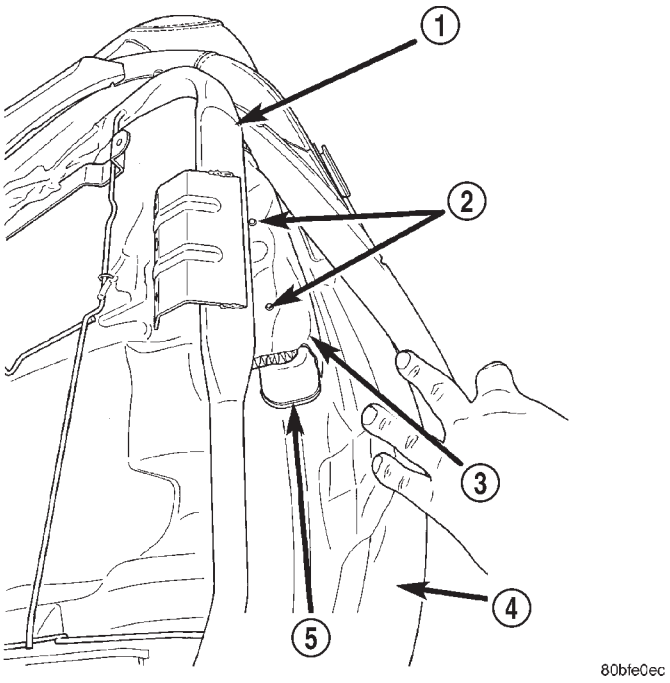


Fig. 16 Seat Airbag Position & Orientation

1 – SEAT BACK FRAME
2 – AIRBAG MOUNTING STUDS
3 – AIRBAG NYLON SLEEVE
4 – SEAT BACK TRIM COVER/CUSHION
5 – SEAT AIRBAG MODULE

INSTALLATION - NONDEPLOYED

CAUTION: DO NOT REPLACE A DEPLOYED AIRBAG. IF SEAT AIRBAG HAS BEEN DEPLOYED ALL DAMAGED PARTS MUST BE REPLACED.

NOTE: AIRBAG CONNECTOR MUST FACE DOWN (TOWARD SEAT CUSHION) AFTER INSTALLATION.

(1) Carefully slide the seat airbag module in nylon sleeve until mounting studs line up with holes provided in nylon sleeve. Be careful not to tear nylon sleeve as this will affect function of airbag system.

CAUTION: AIRBAG MUST BE INSIDE NYLON SLEEVE BEFORE INSTALLING RETAINING NUTS. FAILURE TO DO SO WILL ADVERSELY AFFECT THE FUNCTION OF THE AIRBAG SYSTEM.

(2) Pull airbag module and nylon sleeve assembly up to line up mounting studs and mistake proofing pin with holes provided in seat back frame mounting bracket (Fig. 17). Install airbag module retaining nuts. Torque to 10.7 N·m (94.7 in. lbs.).

(3) Position the upper seat back trim cover and cushion over seat back frame.

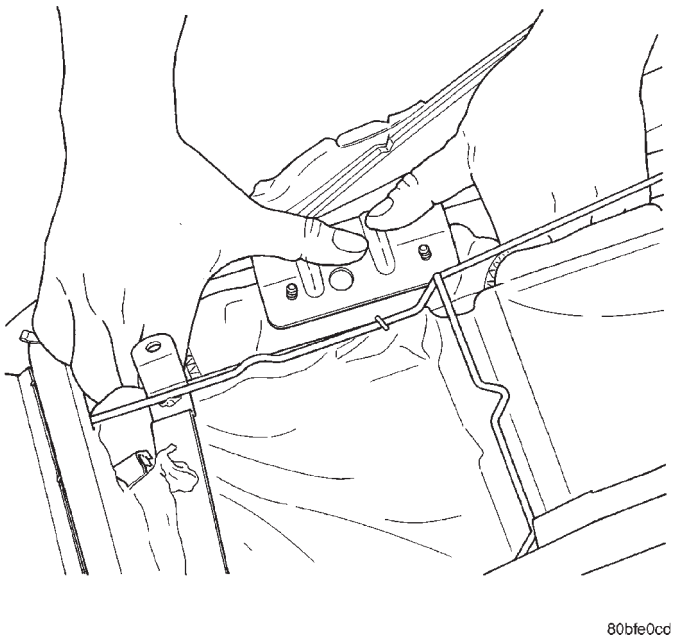


Fig. 17 Installing Seat Airbag

(4) Connect the side airbag module electrical connector. After initial connector is installed be certain the yellow locking tab is in the upper “locked” position. Check to be certain connector cannot be removed once yellow locking tab is positioned.

(5) Position seat back trim cover and install seat back trim cover J-straps on the upper, lower and airbag side of seat back frame.

CAUTION: ALWAYS INSTALL NEW PUSHPINS, WHEN INSTALLING SEAT BACK PLASTIC BACK PANEL.

(6) Install the plastic back panel on the seat back. Install new pushpins in the upper mounting location of the back cover. Refer to Group 23, Body for a detailed procedure.

CAUTION: BE CERTAIN PLASTIC BACK PANEL IS SECURELY INSTALLED ON THE SEAT BACK. FAILURE TO DO SO WILL ADVERSELY AFFECT THE AIRBAG SYSTEM.

(7) Connect the negative battery cable.

(8) Using the DRB III Scan Tool erase any stored DTC’s and perform Airbag System Diagnostics.

RIGHT SEAT AIRBAG MODULE

CAUTION: DO NOT REPLACE A DEPLOYED SEAT AIRBAG. IF SEAT AIRBAG HAS BEEN DEPLOYED ALL DAMAGED PARTS MUST BE REPLACED.

REMOVAL AND INSTALLATION (Continued)

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

REMOVAL - NONDEPLOYED

(1) Position the right front seat in its full forward position.

(2) Disconnect and isolate the negative battery cable.

(3) Remove plastic back panel from seat back (Fig. 18). Refer to Group 23, Body for a detailed procedure.

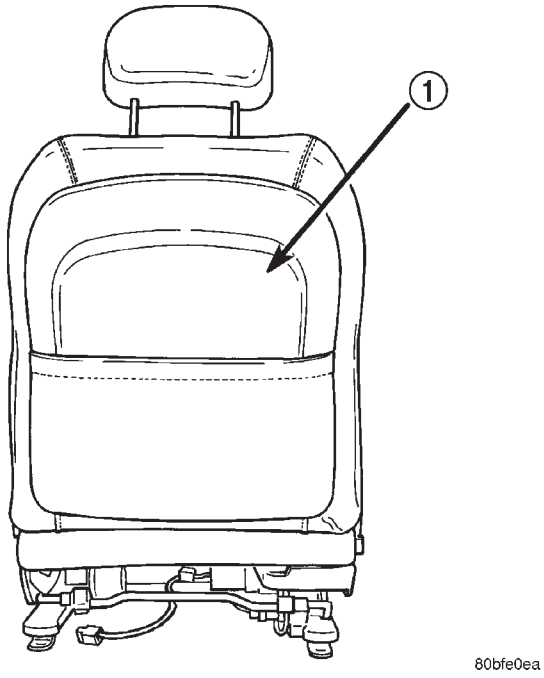


Fig. 18 Front Seat Back Panel

1 – FRONT SEAT BACK PANEL

(4) Disengage seat back trim cover J-strap from the upper, lower and airbag side of seat back.

(5) Disconnect the side airbag module electrical connector (Fig. 19). Slide yellow locking tab down to unlock. Then with two fingers, push two side retaining tabs in and pull connector straight from module.

(6) Remove the side airbag module retaining nuts (Fig. 20).

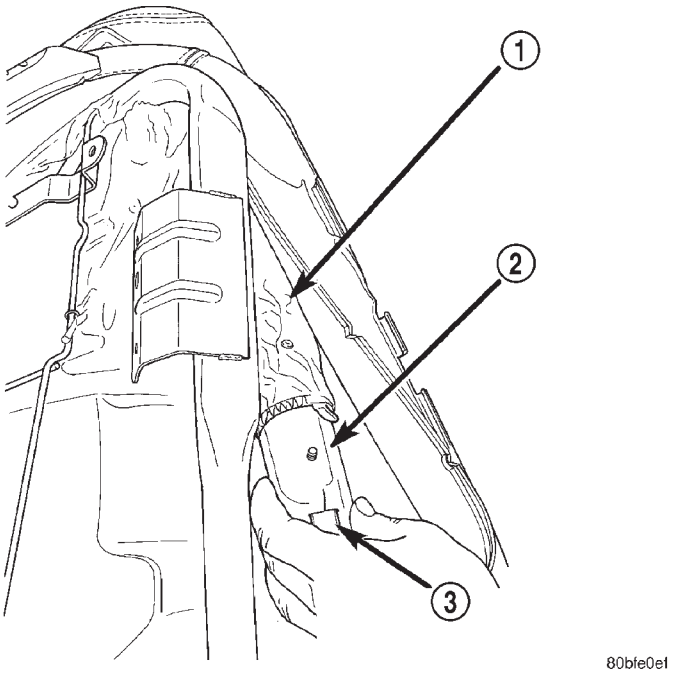


Fig. 19 Seat Airbag Electrical Connector

1 – AIRBAG MODULE NYLON SLEEVE
2 – AIRBAG MODULE
3 – AIRBAG MODULE ELECTRICAL CONNECTOR

(7) Grasp the upper airbag side of the trim cover and pull trim cover and cushion over top of seat back frame (Fig. 20). This will allow room to remove side airbag module without damaging trim cover or cushion.

(8) Working between seat back trim cover/cushion and frame unhook airbag module studs from nylon sleeve and slide module out of sleeve. Be careful not to tear nylon sleeve as this will affect function of airbag system.

CAUTION: BE CERTAIN NOT TO TEAR AIRBAG NYLON SLEEVE DURING THE REMOVAL PROCEDURE. IF THIS OCCURS THE SEAT BACK TRIM COVER MUST BE REPLACED.

INSTALLATION - NONDEPLOYED

CAUTION: DO NOT REPLACE A DEPLOYED AIRBAG. IF SEAT AIRBAG HAS BEEN DEPLOYED ALL DAMAGED PARTS MUST BE REPLACED.

NOTE: AIRBAG CONNECTOR MUST FACE DOWN (TOWARD SEAT CUSHION) AFTER INSTALLATION.

(1) Carefully slide the seat airbag module in nylon sleeve until mounting studs line up with holes provided in nylon sleeve. Be careful not to tear nylon sleeve as this will affect function of airbag system.

REMOVAL AND INSTALLATION (Continued)

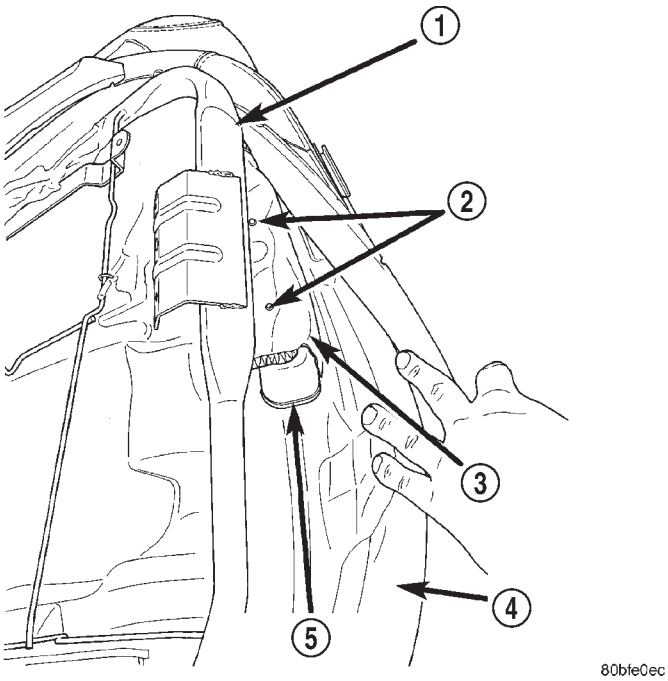


Fig. 20 Seat Airbag Module Position & Orientation

1 – SEAT BACK FRAME
2 – AIRBAG MOUNTING STUDS
3 – AIRBAG NYLON SLEEVE
4 – SEAT BACK TRIM COVER/CUSHION
5 – SEAT AIRBAG MODULE

CAUTION: AIRBAG MUST BE INSIDE NYLON SLEEVE BEFORE INSTALLING RETAINING NUTS. FAILURE TO DO SO WILL ADVERSELY AFFECT THE FUNCTION OF THE AIRBAG SYSTEM.

(2) Pull airbag module and nylon sleeve assembly up to line up mounting studs and mistake proofing pin with holes provided in seat back frame mounting bracket (Fig. 21). Install airbag module retaining nuts. Torque to 10.7 N·m (94.7 in. lbs.).

(3) Position the upper seat back trim cover and cushion over seat back frame.

(4) Connect the side airbag module electrical connector. After initial connector is installed be certain the yellow locking tab is in the upper “locked” position. Check to be certain connector cannot be removed once yellow locking tab is positioned.

(5) Position seat back trim cover and Install seat back trim cover J-straps on the upper, lower and airbag side of seat back frame.

CAUTION: ALWAYS INSTALL NEW PUSHPINS, WHEN INSTALLING SEAT BACK PLASTIC BACK PANEL.

(6) Install the plastic back panel on the seat back. Install new pushpins in the upper mounting location

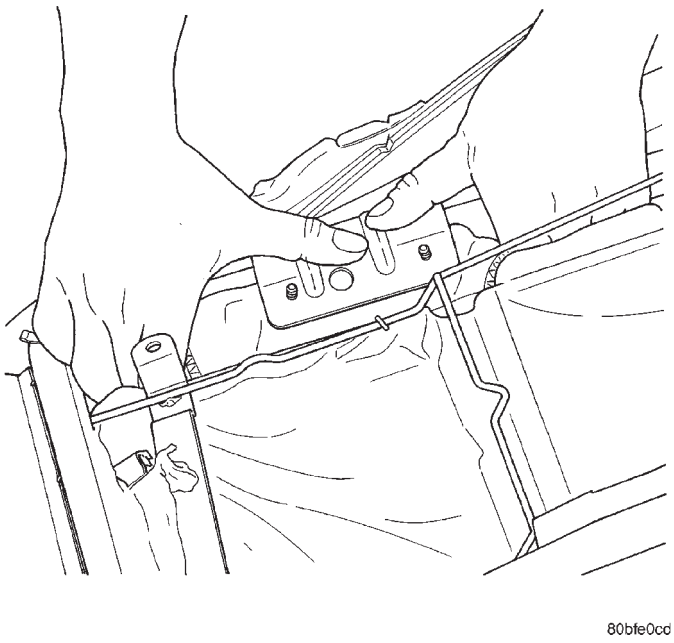


Fig. 21 Installing Seat Airbag

of the back cover. Refer to Group 23, Body for a detailed procedure.

CAUTION: BE CERTAIN PLASTIC BACK PANEL IS SECURELY INSTALLED ON THE SEAT BACK. FAILURE TO DO SO WILL ADVERSELY AFFECT THE AIRBAG SYSTEM.

(7) Connect the negative battery cable.

(8) Using the DRB III Scan Tool erase any stored DTC's and perform Airbag System Diagnostics.

LEFT SEAT AIRBAG WIRE HARNESS

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the left front seat from the vehicle and place on a bench. Refer to Group 23, Body for the procedure.

REMOVAL AND INSTALLATION (Continued)

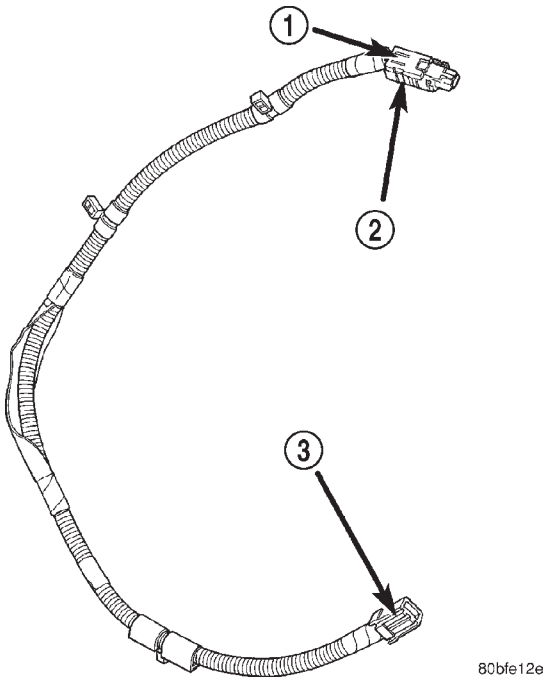


Fig. 22 Airbag Seat Wire Harness

1 – YELLOW CONNECTOR LOCK
2 – TO AIRBAG MODULE
3 – TO SEAT HARNESS

(3) Remove plastic back panel from the seat back. Refer to Group 23, Body for the procedure.

(4) Disengage seat back trim cover J-strap from the upper, lower and airbag side of seat back.

(5) Disconnect the side airbag module electrical connector. Slide yellow locking tab down to unlock. Then with two fingers, push two side retaining tabs in and pull connector straight from module.

(6) Remove the front seat cushion side shield. Refer to Group 23, Body for the procedure.

(7) Disengage pushpin and remove the wire harness (Fig. 23) from the seat assembly.

INSTALLATION

(1) Install airbag wire harness in seat. Be certain wire harness routing is correct. Harness should follow leading edge of seat back frame down into lower seat cushion. Once inserted in lower cushion harness is positioned between the cushion pan and seat track and held in place with pushpin.

(2) Connect the side airbag module electrical connector. After initial connector is installed be certain the yellow locking tab is in the upper “locked” position. Check to be certain connector cannot be removed once yellow locking tab is positioned.

(3) Install seat back trim cover J-straps on the upper, lower and airbag side of seat back frame.

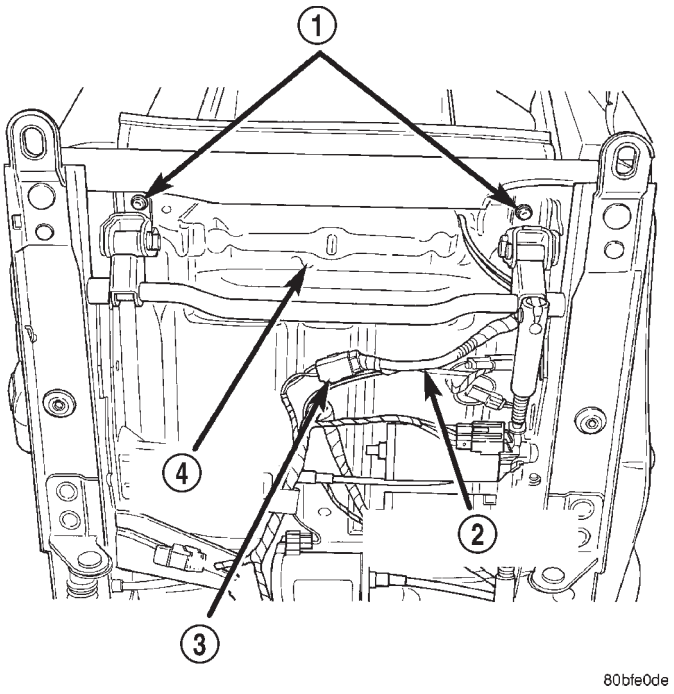


Fig. 23 Wire Harness Position & Orientation – Passenger Seat Shown Here Driver Seat (Mirror Image)

1 – SEAT TRACK RETAINING BOLTS
2 – SEAT AIRBAG WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS CONNECTOR
4 – CUSHION PAN

CAUTION: ALWAYS INSTALL NEW PUSHPINS, WHEN INSTALLING SEAT BACK PLASTIC BACK COVER.

(4) Install the plastic back panel on the seat back. Install new pushpins in the upper mounting location of the back cover. Refer to Group 23, Body for the procedure.

(5) Install the front seat cushion side shield. Refer to Group 23, Body for the procedure.

CAUTION: BE CERTAIN PLASTIC BACK COVER IS SECURELY INSTALLED ON THE SEAT BACK. FAILURE TO DO SO WILL ADVERSELY AFFECT THE AIRBAG SYSTEM.

(6) Install the left front seat in the vehicle. Refer to Group 23, Body for the procedure.

(7) Connect the negative battery cable.

(8) Using the DRB III Scan Tool erase any stored DTC’s and perform Airbag System Diagnostics.

REMOVAL AND INSTALLATION (Continued)

RIGHT SEAT AIRBAG WIRE HARNESS

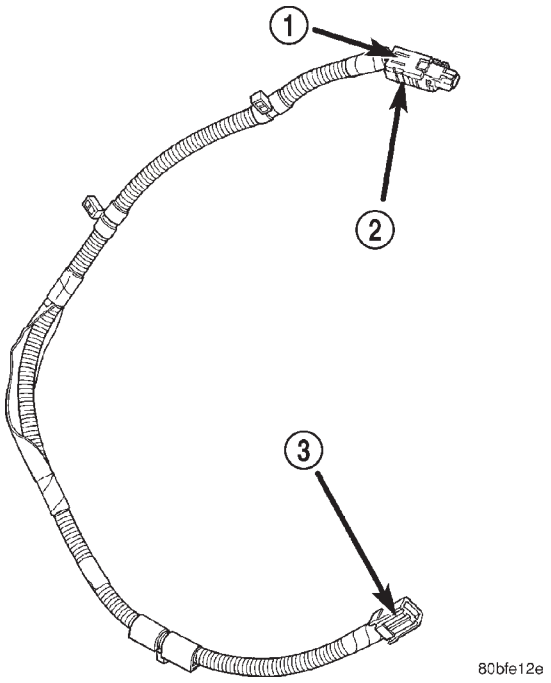


Fig. 24 Airbag Seat Wire Harness

1 – YELLOW CONNECTOR LOCK
2 – TO AIRBAG MODULE
3 – TO SEAT HARNESS

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the right front seat from the vehicle and place on a bench. Refer to Group 23, Body for the procedure.

(3) Remove the plastic back panel from the seat back. Refer to Group 23, Body for a detailed procedure.

(4) Disengage seat back trim cover J-strap from the upper, lower and airbag side of seat back.

(5) Disconnect the side airbag module electrical connector. Slide yellow locking tab down to unlock. Then with two fingers, push two side retaining tabs in and pull connector straight from module.

(6) Remove the front seat cushion side shield. Refer to Group 23, Body for the procedure.

(7) Disengage pushpin and remove the wire harness (Fig. 25) from the seat assembly.

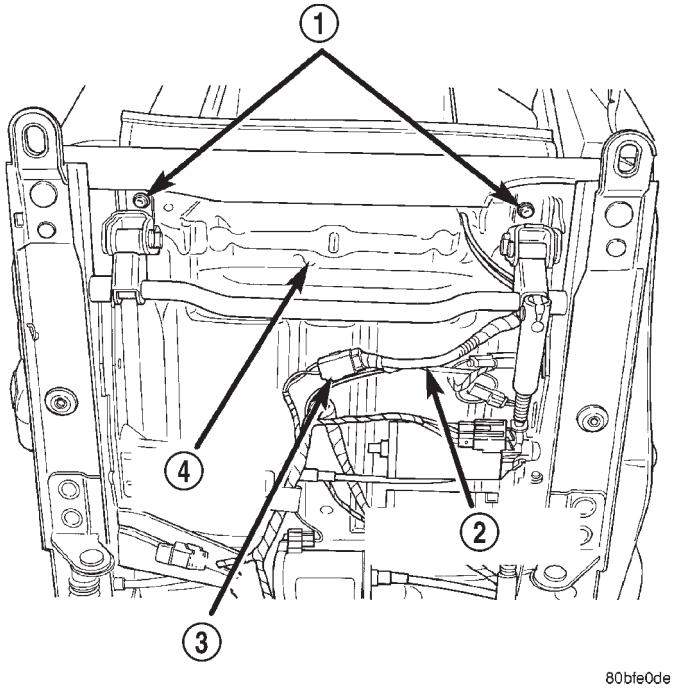


Fig. 25 Wire Harness Position & Orientation – Passenger Seat

1 – SEAT TRACK RETAINING BOLTS
2 – SEAT AIRBAG WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS CONNECTOR
4 – CUSHION PAN

INSTALLATION

(1) Install airbag wire harness in seat. Be certain wire harness routing is correct. Harness should follow leading edge of seat back frame down into lower seat cushion. Once inserted in lower cushion, harness is positioned between the cushion pan and seat track and held in place with pushpin (Fig. 25).

(2) Connect the side airbag module electrical connector. After initial connector is installed be certain the yellow locking tab is in the upper “locked” position. Check to be certain connector cannot be removed once yellow locking tab is positioned.

(3) Install seat back trim cover J-straps on the upper, lower and airbag side of seat back frame.

CAUTION: ALWAYS INSTALL NEW PUSHPINS, WHEN INSTALLING SEAT BACK PLASTIC BACK PANEL.

(4) Install the plastic back panel on the seat back. Install new pushpins in the upper mounting location of the back cover. Refer to Group 23, Body for the procedure.

REMOVAL AND INSTALLATION (Continued)

(5) Install the front seat cushion side shield. Refer to Group 23, Body for the procedure.

CAUTION: BE CERTAIN PLASTIC BACK COVER IS SECURELY INSTALLED ON THE SEAT BACK. FAILURE TO DO SO WILL ADVERSELY AFFECT THE AIRBAG SYSTEM.

(6) Install the right front seat in the vehicle. Refer to Group 23, Body for the procedure.
(7) Connect the negative battery cable.
(8) Using the DRB III Scan Tool erase any stored DTC's and perform Airbag System Diagnostics.

STEERING WHEEL

REMOVAL

(1) Place the front road wheels in the straight ahead position then:
- Rotate the steering wheel half turn (180 degrees) to the right (clockwise)
- Lock column with the ignition cylinder lock

(2) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 10).
(3) Wait two minutes for the reserve capacitor to discharge before removing non deployed module.
(4) Remove speed control switches and connectors.
(5) Remove the airbag module attaching bolts on the front of the steering wheel.
(6) Lift module and disconnect the airbag and horn wire connectors.
(7) Remove steering wheel retaining nut.
(8) Remove steering wheel with steering wheel puller Tool C-3428B. While removing steering wheel take care to feed the wires gently through the opening in the steering wheel armature.

INSTALLATION

(1) Confirm that:
- The steering wheel position is a half turn (180 degrees) to the right (clockwise)
- The column is locked with the ignition cylinder lock.
- Check that the turn signal stalk is in the neutral position

(2) Pull all wires through the larger opening of the hub area on the wheel. Install steering wheel ensuring the flats on hub align with the clockspring. Ensure leads do not get pinched under the steering wheel.
(3) Install retaining nut, and torque it to 61 N·m (45 ft.lbs.).
(4) Route speed control wires through the slots in the steering wheel back cover.
(5) Connect the horn lead wire and the airbag lead wire to the airbag module.
(6) Install the airbag module and torque bolts to 7 to 9 N·m (65 to 85 in.lbs.).
(7) Connect the speed control wires to the switches and install switches. Torque screws to 1.4 to 2.0 N·m (12 to 18 in.lbs.).
(8) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

ADJUSTMENTS

CLOCKSPRING CENTERING PROCEDURE

If the rotating tape within the clockspring is not positioned properly with the steering wheel and the front wheels, the clockspring may fail during use. The following procedure MUST BE USED to center the clockspring if:
- The clockspring is not known to be properly positioned
- The front wheels were moved with the steering wheel off
- The steering wheel was moved from the half turn (180 degrees) to the right (clockwise) position.

(1) Remove steering wheel. Refer to Steering Wheel Removal and Installation procedures in this section.
(2) After removal, depress the plastic locking pin to disengage locking mechanism.
(3) Keeping locking mechanism disengaged, rotate the clockspring rotor until a yellow dot appears in centering window and black arrow lines up with drive pin.
(4) Reinstall steering wheel upside down with wheels turned 180° clockwise.
(5) Do not connect the battery negative cable remote terminal. Refer to Airbag System Check for proper procedure.

SPECIFICATIONS

TORQUE SPECIFICATIONS

AIRBAG RELATED COMPONENTS

DESCRIPTION	TORQUE
Front seat track to floor pan bolts	61 N·m (45 ft. lbs.)
Front seat inboard pivot bolt	40 N·m (30 ft. lbs.)
Front seat recliner to seat cushion frame	12 N·m (9 ft. lbs.)
Front seat track to cushion frame bolt	28 N·m (21 ft. lbs.)
Front seat back	40 N·m (30 ft. lbs.)
Front seat back to seat cushion	30 N·m (22 ft. lbs.)

SPECIFICATIONS (Continued)

DESCRIPTION	TORQUE
Front seat back recliner to seat back	12 N·m (9 ft. lbs.)
Front seat rear outboard seat track to floor pan bolts	28 N·m (20 ft. lbs.)
Front seat airbag module to seat back frame	10.7 N·m (94.7 in. lbs.)
Side impact airbag control module to B-pillar	7 N·m (62 in. lbs.)
Occupant restraint controller to bracket	7 N·m (62 in. lbs.)
Clockspring to steering column	2.7 N·m (24 in. lbs.)
Steering wheel retaining nut	61 N·m (45 ft. lbs.)
Front driver side airbag module	7 N·m (62 in. lbs.)
Front passenger side airbag module	7 N·m (62 in. lbs.)

2000 LHS, 300M, CONCORDE AND INTREPID

ELECTRICALLY HEATED SYSTEMS

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REAR WINDOW DEFOGGER

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DESCRIPTION AND OPERATION

REAR WINDOW DEFOGGER SYSTEM

DESCRIPTION

The Rear Window Defogger electrical system involves the operation of the Heater-A/C or ATC Control Head, the Body Control Module (BCM), and the rear Window Defogger Relay and wiring. The system consists of a rear glass with two vertical bus bars and a series of electrically connected grid lines fired on the inside surface. The Body Control Module (BCM) operates a relay located in the trunk area on all models..

Vehicles with Rear Window Antenna refer to Group 8F, Audio Systems.

Vehicles equipped with an electrically heated rear window defogger also have a 90 amp generator.

OPERATION

The passenger can push the Rear Widow Defogger button on the Heater-A/C or ATC Control to defog the rear glass. The system will only operate when the ignition switch is in the run position. Once the Rear Widow Defogger button is pushed. the button indicator will light and the system will operate for a period of time and then automatically turn off. Refer to the owner's manual for operation of the A/C-Heater or ATC control.

When the rear window defogger relay is ON, current is directed to the rear defogger grid lines. The heated grid lines heat the rear glass to clear the surface of fog or frost.

Circuit protection is provided by a fusible link, located in the charging circuit, for the heated grid circuit and by a fuse for the relay control circuit.

The A/C-Heater or the ATC control sends a signal to the BCM, which indicates to the BCM that the operator wants the rear window grid to heat. Refer to the A/C-Heater or ATC Control section of the service manual for details on how these modules interact. An output wire from the BCM connects to the coil of the rear window defogger relay. The other side of the coil is connected to a fuse. The BCM turns on the relay by connecting the output line of the BCM to vehicle ground. The relay contacts will then close supplying vehicle power to the rear window defogger grid.

CAUTION: Grid lines can be damaged or scraped off with sharp instruments, care should be taken in cleaning glass or removing foreign materials, decals or stickers. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

DESCRIPTION AND OPERATION (Continued)

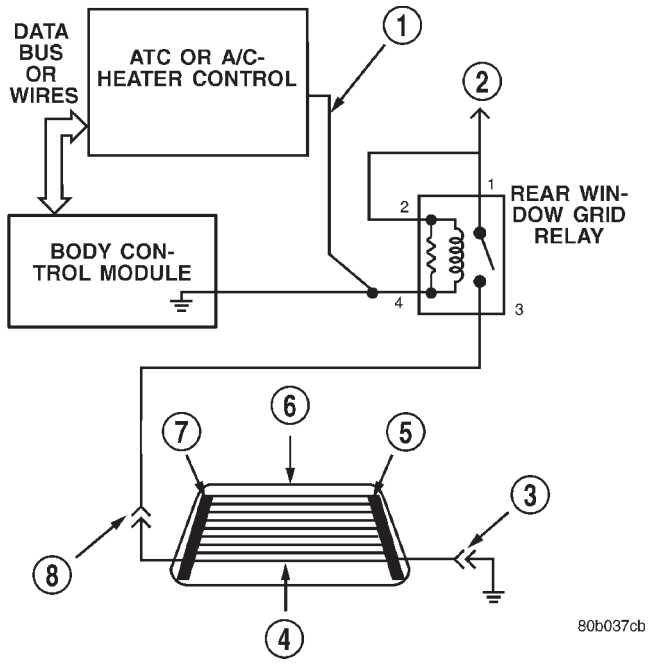


Fig. 1 Rear Window Defogger System Schematic

1 – BCM AND BUTTON LED RELAY CONTROL LINE (A/C-MANUAL CONTROL ONLY)
2 – VEHICLE VOLTAGE SUPPLY
3 – GROUND CONNECTOR
4 – REAR WINDOW GRID LINE STRUCTURE
5 – POINT B
6 – MIDPOINT C (TYPICAL)
7 – POINT A
8 – POWER CONNECTOR

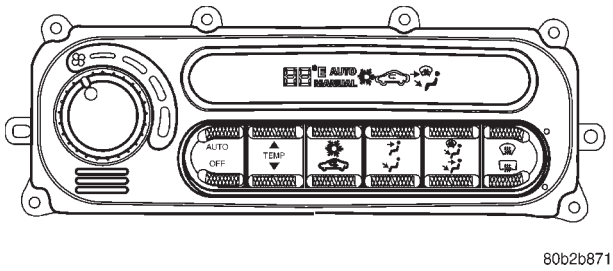


Fig. 2 ATC Control Head

DIAGNOSIS AND TESTING

SERVICE PROCEDURES

Electrically Heated Rear Window Defogger operation can be easily checked in three steps:

(1) Use ATC, Manual Heater-A/C self diagnostics, or the DRB III® scan tool to check fault codes and control button operation. Note, this does not check the EBL system. There are no fault codes that can check for the EBL grid, relay, or wiring. Refer to steps 2 and 3 for system test.

(2) Perform system test with voltmeter.

(3) Check voltages at rear grid relay and refer to Rear Widow Defogger Relay Test table.

A/C-HEATER AND ATC CONTROL HEAD

Refer to Group 24, Heating and Air Conditioning for instructions on how to use the DRB III® scan tool or the control head self-diagnostics to test the control head. The problem is not with the control head if no trouble codes are found. The next step should be to check the rest of the system after the A/C-Heater or ATC control head is checked.

SYSTEM TEST

(1) Start engine. With the engine running, push the Rear Window Defogger button on the ATC or Manual A/C Heater Control Head. The button LED indicator should light. If the EBL indicator does not light on the **MANUAL-A/C HEATER CONTROL,** then there may be a wiring problem. This may also indicate that the BCM will not complete the circuit to ground that is required to energize the EBL relay coil (non-ATC vehicles only). Refer to EBL Relay Test. On ATC vehicles, the LED indicator may light when the BCM failed to complete the circuit to ground required to energize the EBL relay coil.

(2) Using a DC voltmeter with a 0-15 volt range, connect the negative lead to a known good vehicle electrical ground.

(3) Touch the positive bus bar and check voltage. The voltage should be above 11 volts. Push the Rear Window Defogger button to turn off the indicator. The measured voltage should be 0 volts. If these voltages are correct then the problem is with the Rear Window Grid or Grid ground electrical connection. Go to the Grid Lines test to check the Grid and ground connection.. If there is no voltage to the rear window defogger grid when the system is ON, then go to the Fuse and Electrical Short Test.

GRID TEST

The horizontal grid line and vertical bus bar line is printed and fired on the inside surface of the rear window glass. These comprise and electrical circuit. The electrically conductive lines are composed of a silver ceramic material which when fired on glass becomes bonded to the glass and is highly resistant to abrasion. It is possible, however, that a break may occur in and individual grid line resulting in no current flow through the line. To detect breaks in grid lines, the following procedure is required:

(1) Stop the engine. Connect the negative lead of a 0-25 volt range voltmeter to a known good vehicle electrical ground.

(2) Start the engine and push the rear window defogger button to turn on the system.

(3) Touch the ground side (point B) of the Rear Window Defogger Grid. The voltage measured should be below 1 volt. If the voltage is greater than 1 volt then check the voltage on each grid line at the Mid-

DIAGNOSIS AND TESTING (Continued)

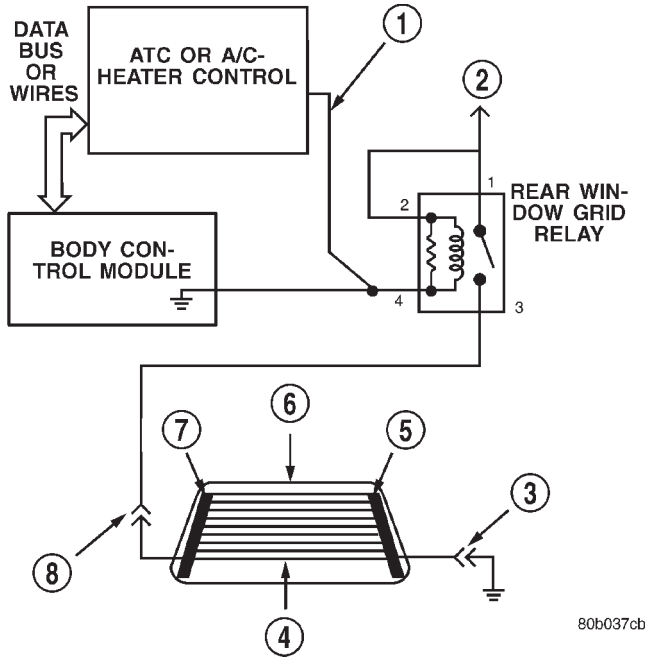


Fig. 3 System Electrical Circuit

1 – BCM AND BUTTON LED RELAY CONTROL LINE (A/C-MANUAL CONTROL ONLY)
2 – VEHICLE VOLTAGE SUPPLY
3 – GROUND CONNECTOR
4 – REAR WINDOW GRID LINE STRUCTURE
5 – POINT B
6 – MIDPOINT C (TYPICAL)
7 – POINT A
8 – POWER CONNECTOR

Point with the positive lead. If the voltage is not approximately 6 volts or half the voltage measured on the positive rear window grid bus bar, then the grid line is bad. The break in the grid can be found by moving the probe along the line until the voltage changes. The area where the voltage changes is where the open circuit is.

FUSE AND ELECTRICAL SHORT TEST

(1) Stop engine.

(2) Check the fuse supplying power to the rear glass grid relay. If the fuse is good, then go to the Rear Window Defogger Relay test. If the fuse is open, then go to Step 3.

(3) Locate the ground lug that connects the negative lead of the rear window grid to ground. Remove the screw holding the ground lug and isolate it from any vehicle ground.

(4) Connect one lead of an ohmmeter to the negative ground lug of the rear window grid (with the lug still not connected to a vehicle ground), and check the resistance to a known good vehicle ground. If the ohmmeter indicates less than 10 ohms, then the rear window defogger grid is shorting to the vehicle ground and must be replaced. If the ohmmeter indicates more than 100 ohms of resistance, then go to Step 6.

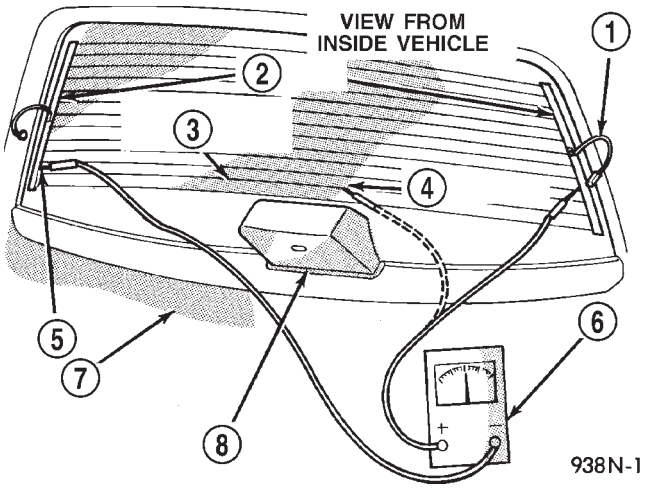


Fig. 4 Grid Line Test

1 – VOLTAGE FEED A
2 – BUS BARS
3 – REAR WINDOW DEFOGGER
4 – MIDPOINT C
5 – GROUND B
6 – VOLTMETER
7 – REAR SHELF
8 – CHMSL TRIM COVER

(5) Disconnect the rear window defogger grid voltage feed wire from the vehicle harness. If the ohmmeter still indicates less than 10 ohms, then the rear window defogger grid is shorting to the vehicle ground and must be replaced. If the ohmmeter indicates more than 100 ohms of resistance, then go to Step 6.

(6) There is a problem with the circuits that connect to the rear window defogger relay. Refer to Group 8W, Wiring Diagrams for circuit descriptions. Check wiring with an ohmmeter to verify proper wiring connections to the rear window defogger relay. If no problems are found, then replace the fuse and try running the system.

REAR WINDOW DEFOGGER RELAY

(1) Stop engine. Connect the negative lead of a 0-15 volt range voltmeter to a known good vehicle electrical ground.

(2) Reconnect rear window grid connections disconnected during the Fuse and Electrical Short Test. Start engine and with the system OFF, check the voltages present at the rear window defogger relay and rear window defogger grid. Refer to the Rear Window Defogger Relay Test table for diagnosis

DIAGNOSIS AND TESTING (Continued)

REAR WINDOW DEFOGGER RELAY TEST

POTENTIAL PROBLEM	SYSTEM ON OR OFF WITH ENGINE RUNNING	VOLTAGE AT REAR WINDOW DEFOGGER RELAY POINT TO GOOD VEHICLE GROUND				VOLTAGE AT REAR WINDOW DEFOGGER GRID TO GOOD VEHICLE GROUND	
		1	2	3	4	A	B
NO PROBLEM. VOLTAGES AS EXPECTED WITH THE SYSTEM OFF.	OFF	MORE THAN 11	MORE THAN 11	0	MORE THAN 11	0	0
NO PROBLEM. VOLTAGES AS EXPECTED WITH THE SYSTEM ON.	ON	MORE THAN 11	MORE THAN 11	MORE THAN 11	LESS THAN 1.0	MORE THAN 11	LESS THAN 1.0
RELAY CONTACTS NOT CLOSING. REPLACE RELAY.	ON	MORE THAN 11	MORE THAN 11	0	LESS THAN 1.0	0	0
WIRING OPEN BETWEEN BODY CONTROL MODULE AND REAR WINDOW DEFOGGER RELAY, OR, DEFECTIVE BODY CONTROL MODULE.	ON	MORE THAN 11	MORE THAN 11	0	MORE THAN 11	0	0
POOR CONNECTION BETWEEN PIN 3 OF RELAY AND POSITIVE CONNECTION ON REAR WINDOW DEFOGGER GRID CIRCUIT.	ON	MORE THAN 11	MORE THAN 11	MORE THAN 11	LESS THAN 1.0	0	0
POOR CONNECTION TO GROUND ON NEGATIVE SIDE OF REAR WINDOW DEFOGGER GRID.	ON	MORE THAN 11	MORE THAN 11	MORE THAN 11	LESS THAN 1.0	MORE THAN 11	MORE THAN 11
POOR WIRING CONNECTION BETWEEN PINS 1 TO 2 OF THE REAR WINDOW DEFOGGER RELAY.	ON	MORE THAN 11	0	0	0	0	0
OPEN FUSE OR OPEN WIRING CONNECTION TO PIN 1 OF REAR WINDOW DEFOGGER RELAY.	ON	0	0	0	0	0	0
RELAY CONTACTS SHORTED. REPLACE RELAY. REAR WINDOW DEFOGGER WILL NOT TURN OFF.	OFF	MORE THAN 11	MORE THAN 11	MORE THAN 11	MORE THAN 11	MORE THAN 11	0

SERVICE PROCEDURES

REPAIR GRID LINES, TERMINALS AND PIGTAILS

The repair of the grid lines or the terminal is possible using the Mopar® Repair Package or equivalent.

(1) Mask repair area so conductive epoxy can be extended onto the line or the bus bar (Fig. 5).

(2) Follow instructions in repair kit for preparing damaged area.

(3) Remove package separator clamp and mix plastic conductive epoxy thoroughly. Fold in half and cut center corner to dispense epoxy.

(4) For grid line, mark off area to be repaired with masking tape or a template (Fig. 5).

(5) Apply conductive epoxy through slit in masking tape. Overlap both ends of the break by 19 mm (3/4 inch).

(6) For a terminal or pigtail replacement, mask adjacent areas so epoxy can be extended onto line as well as bus bar. Apply a thin layer of epoxy to area where terminal was fastened and to adjacent line.

SERVICE PROCEDURES (Continued)

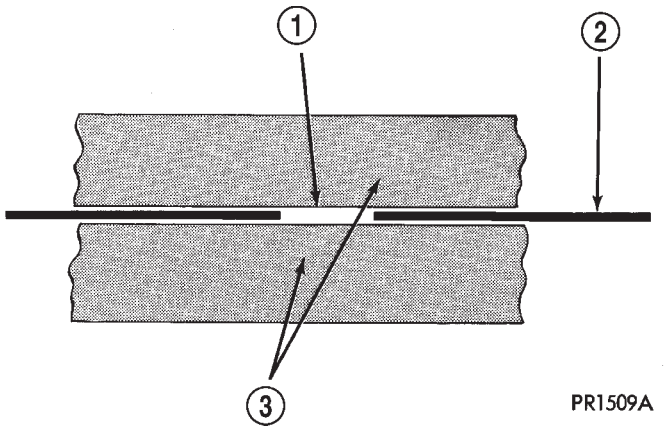


Fig. 5 Grid Line Repair

1 – BREAK
2 – GRID LINE
3 – MASKING TAPE

(7) Apply a thin layer of conductive epoxy on terminal and place terminal on desired location. To prevent terminal from moving while the epoxy is curing, it must be wedged or clamped.

(8) Carefully remove masking tape from grid line.

CAUTION: Do not allow the glass surface to exceed 204°C (400°F), glass may fracture.

(9) Allow epoxy to cure 24 hours at room temperature or use heat gun with a 260°-371°C (500°-700°F) range for 15 minutes. Hold gun approximately 254 mm (10 inches) from repaired area.

(10) After conductive epoxy is properly cured remove wedge from terminal and check out operation of rear window defogger. Do not attach connectors until curing is complete.

WARNING: REPAIR KIT MAY CAUSE SKIN OR EYE IRRITATION. CONTAINS EPOXY RESIN AND AMINE TYPE HARDENER, HARMFUL IF SWALLOWED. AVOID CONTACT WITH SKIN AND EYES. FOR SKIN, WASH AFFECTED AREAS WITH SOAP AND WATER. DO NOT TAKE INTERNALLY. IF TAKEN INTERNALLY, INDUCE VOMITING; CALL A PHYSICIAN IMMEDIATELY. IF IN CONTACT WITH EYES, FLUSH WITH PLENTY OF WATER. USE WITH ADEQUATE VENTILATION. DO NOT USE NEAR FIRE OR FLAME. CONTENTS CONTAIN 3 PERCENT FLAMMABLE SOLVENTS.

KEEP OUT OF REACH OF CHILDREN.

REMOVAL AND INSTALLATION

HEATER-A/C ATC CONTROL

Refer to Group 8E, Instrument Panel and Systems for proper Removal and Installation procedures.

REAR WINDOW DEFOGGER RELAY

REMOVAL

(1) Disconnect battery negative remote cable from remote ground post (Fig. 6).

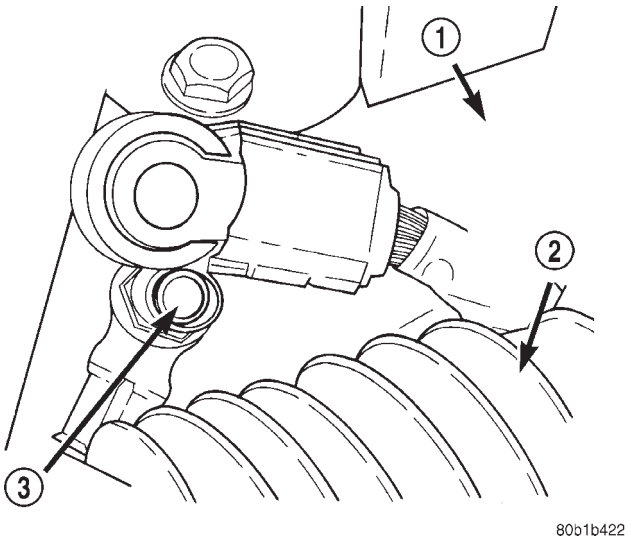


Fig. 6 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Open trunk. Reach behind trunk carpet and pull out on relay.

(3) Remove relay from vehicle.

INSTALLATION

For installation, reverse the above procedures.

HEATED SEATS

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DESCRIPTION AND OPERATION

HEATED SEAT SYSTEM

DESCRIPTION

Heated seats only available with leather and memory. The seat heaters are controlled by the Memory Heated Seat and Mirror Module (MHSMM). The heaters will only operate when the ignition switch is in the ON position, and the surface temperature at the from seat heating element sensors is below the designed temperature set points of the system.

OPERATION

The heater switch is a three position (HI, LO, and neutral position OFF) momentary rocker switch. Green LED's illuminate the switch for night visibility. Amber LED's are located in the switch adjacent to the HI and LO graphics, which indicate the selected operating mode of the seat heater, The LO heat position set point is about 98° F and the HI set point is about 107° F.

The heaters are solid high side driven, and are controlled by an NTC circuit. When either HI or LO is activated, the temperature in the seat rises the Negative Temperature Coefficient (NTC) resistance decreases, and the voltage reading detected by the MHSMM increases. The seat heater output is deactivated once the voltage reading reaches its upper threshold for either of the settings, HI or LO.

As the temperature decreases the voltage reading decreases until the lower threshold is reached for either setting, HI or LO. At this point the seat heat output is activated once again. This cycle repeats itself as long as the seat heat request remains on. The thresholds for high and low settings are pre-programmed into the MHSMM.

The system will automatically turn off when the ignition is turned to the OFF position. For complete circuit descriptions and diagrams, refer to Group 8W, Wiring Diagrams.

HEATED SEAT SWITCH

DESCRIPTION

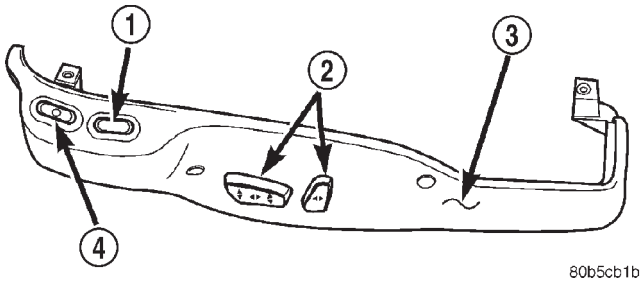


Fig. 1 Memory and Heated Seat Switch Location

1 – HEATED SEAT SWITCH
2 – POWER SEAT SWITCH
3 – SEAT CUSHION SIDE SHIELD
4 – MEMORY SELECTOR SWITCH

The heated seat switch is located in the outboard cushion side shield of the driver and passenger seats.

OPERATION

The switch is a three position (HI, LO, and OFF) momentary rocker switch. Green LED's illuminate the switch for night visibility. Amber LED's are located in the switch adjacent to the HI and LO graphics, which indicate whether low or high has been selected. The heated seat switches and their LED's are not repairable. If either the switch or LED is faulty, the switch will have to be replaced.

DESCRIPTION AND OPERATION (Continued)

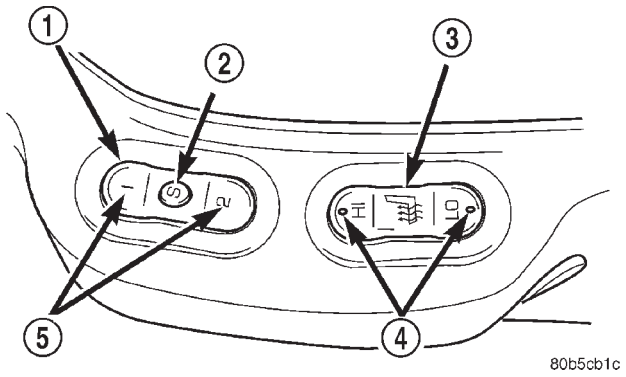


Fig. 2 Memory and Heated Seat Switches

1 – MEMORY SELECTOR SWITCH
2 – DRIVER POSITION SET
3 – HEATED SEAT SWITCH
4 – LED'S
5 – DRIVER POSITION

MEMORY HEATED SEAT/MIRROR MODULE (MHSMM)

DESCRIPTION

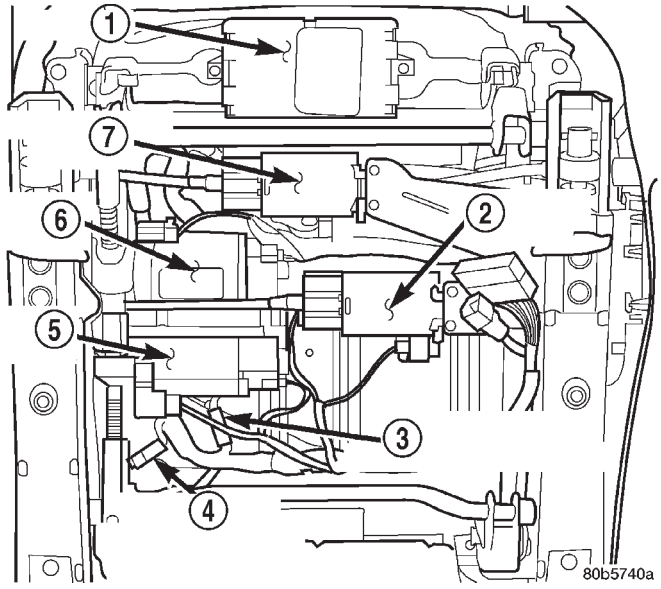


Fig. 3 Memory Heated Seat/Mirror Module (MHSMM) Location

1 – MHSMM
2 – RECLINER MOTOR
3 – SEAT HEATER 4–WAY CONNECTOR
4 – SEAT BACK HEATER 2–WAY CONNECTOR
5 – REAR RISER
6 – FRONT RISER
7 – HORIZONTAL MOTOR

The Memory Heated Seat and Mirror Module controls the seat heaters, and is mounted unto the bottom of the driver seat

OPERATION

The module controls the seat heaters and is connected to the seat harness by four connectors. There is only one module per memory and heated system. The module cannot be repaired, and if faulty or damaged will have to be replaced.

HEATED SEAT ELEMENT AND SENSOR

DESCRIPTION

Two heated seat elements are used in both of the front seats, one for the seat cushion and the other for the seat back. The two elements for each seat are connected in series to the Memory Heated Seat/Mirror Module (MHSMM).

The temperature sensor is a Negative Temperature Coefficient (NTC) thermistor. One temperature sensor is used for each set, and it is integrated into the seat cushion heating element

OPERATION

The heating elements are sewn into the seat cushion cover and seat back cover assemblies, which are serviced individually. The heating elements and temperature sensor cannot be repaired, and if faulty or damaged, the affected seat cover must be replaced. Refer to Group 23 Body, for the Seat Cushion Cover and Seat Back Cover Removal and Installation.

DIAGNOSIS AND TESTING

HEATED SEAT SYSTEM

For circuit descriptions and diagrams, refer to Group 8W, Wiring Diagrams.

Before testing the individual components in the heated seat system, cheek the following:

- If the heated seat switch LED doesn't light up with the ignition in the ON position, and the switch in the LO or HI position, check the battery voltage, If the battery is below 10 volts, recharge the battery. If the problem persists, then check the fuse in the junction block. If the fuse is OK, test the heated seat switch as described in this group. If not OK, repair the shorted circuit or component failure and replace the faulty fuse.
- If the heated seat LED's light up, but the heating elements don't heat, check the circuit breaker in the junction block. If the circuit is OK, test the heated set elements as described in this group, otherwise replace the faulty circuit breaker.
- Using a DRB III® scan tool, check DTC's and refer to the proper Body Diagnostic Procedures Manual.

DIAGNOSIS AND TESTING (Continued)

HEATED SEAT SWITCH

For circuit description and diagrams, refer to Group 8W Wiring Diagrams.

Inspect the Heated Seat Switches for apparent damage or sticking/binding and replace as required. Refer to Heated Seat Switch Removal and Installation.

Inspect the continuity between pin 4 and pin 6 of the switch. Measure the resistance between the two pins. Refer to (Fig. 4) and the Heated Seat Switch Pin Call-Out table. If the readings don't correspond to those in the Heated Seat Switch Continuity table, replace the heated seat switch.

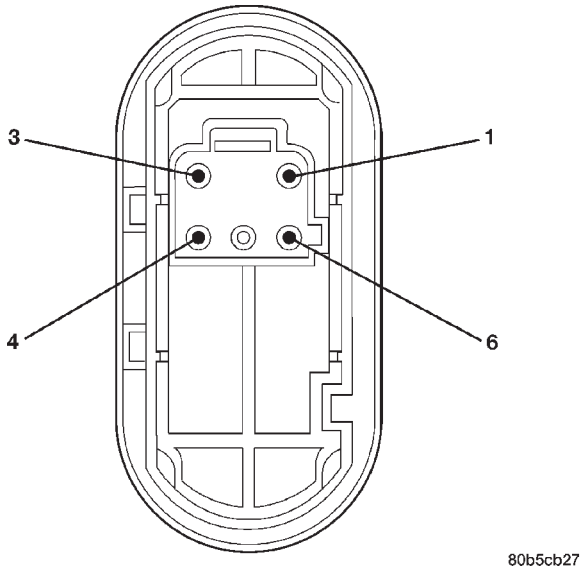


Fig. 4 Heated Seat Switch (Rear View)

HEATED SEAT SWITCH PIN CALL-OUT

PIN	FUNCTION
1	LO LED
2	OPEN
3	GROUND
4	IGNITION FEED
5	HI LED
6	REQUEST LINE

HEATED SEAT SWITCH CONTINUITY

CONTINUITY BETWEEN	SWITCH POSITION	READING
PIN 4 AND 6	OFF	2200 OHMS
PIN 4 AND 6	LO	415 OHMS
PIN 4 AND 6	HI	33 OHMS

MEMORY HEATED SEAT / MIRROR MODULE (MHSMM)

Before testing the Memory Heated Seat / Mirror Module (MHSMM), test the heated seat switches, the heated seat elements, and the heated seat sensors. If there are no problems, proceed as follows:

- Replace the current MHSMM with a known good module, and test the operation of the heated seats. If OK, discard the faulty MHSMM. If the problem persists, proceed.
- Test each of the circuits from the heated seat switch, elements, and sensors to the MHSMM. Repair any shorts or open circuits as required.

HEATED SEAT ELEMENT

The wire harness connectors for the seat cushion and seat back heating elements are located under the seat, near the rear edge of the seat cushion frame.

SEAT CUSHION

(1) Unplug the 4–way heated seat cushion wire harness connector.

(2) Check the continuity between the two heated seat driver circuit cavities of the seat cushion cover half of the heated seat cushion wire harness connector. If there is continuity, go to Step 3, otherwise replace the faulty seat cushion cover.

(3) Check the continuity between one of the heated seat driver circuit cavities of the seat cushion cover half of the heated seat cushion wire harness connector and the seat cushion frame. If there isn't any continuity, go to the Seat Back test, otherwise replace the faulty seat cushion cover.

SEAT BACK

(1) Unplug the 2–way heated seat back wire harness connector.

(2) Check the continuity between the heated seat driver circuit cavity and the ground cavity of the seat back cover half of the heated seat cushion wire harness connector. If there is continuity go to Step 3, otherwise replace the faulty seat cushion cover.

(3) Check the continuity between the heated seat driver circuit cavity of the seat back cover half of the heated seat cushion wire harness connector and the seat back frame. If there isn't any continuity, test the heated seat sensor as described in this section, otherwise replace the faulty seat cushion cover.

HEATED SEAT SENSOR

The wire harness connector for the seat cushion heating element and sensor are located under the seat, near the rear edge of the seat cushion frame. For circuit descriptions and diagrams, refer to Group 8W, Wiring Diagrams.

DIAGNOSIS AND TESTING (Continued)

(1) Unplug the 4–way heated seat cushion wire harness connector.

(2) Using an ohmmeter, measure the resistance between the heated seat switch output circuit cavity and the ground circuit cavity of the seat cushion cover half of the heated seat cushion wire harness connector. The sensor resistance should be between 2 Kohms and 200 Kohms. If OK, test the MHSMM as described in this section, otherwise replace the faulty seat cushion cover.

REMOVAL AND INSTALLATION

HEATED SEAT SWITCH

REMOVAL

(1) Disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 5).

(2) Unscrew the side shield on the seat, either driver or passenger side (Fig. 6).

(3) From the bottom, disengage the switch and gently rock through the opening.

INSTALLATION

For installation, reverse the above procedures.

MEMORY HEATED SEAT / MIRROR MODULE (MHSMM)

Refer to Group 8R Power Seats, for Removal and Installation procedures.

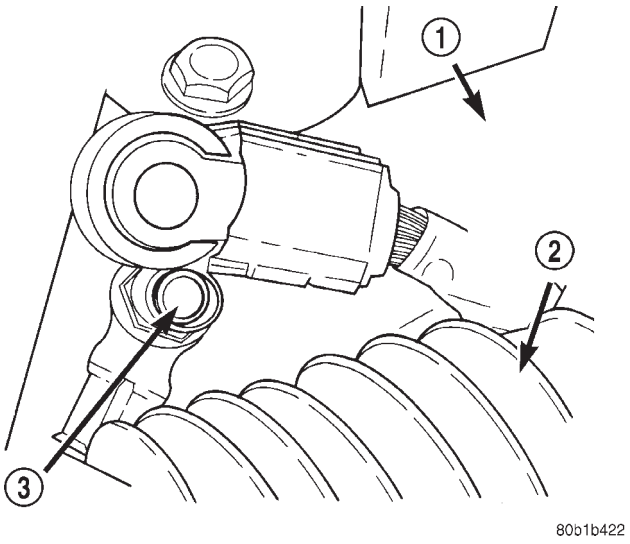


Fig. 5 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

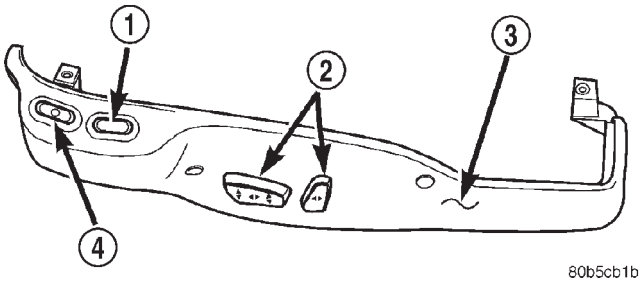


Fig. 6 Heated Seat Switch / Seat Cushion Side Shield Removal

1 – HEATED SEAT SWITCH
2 – POWER SEAT SWITCH
3 – SEAT CUSHION SIDE SHIELD
4 – MEMORY SELECTOR SWITCH

POWER DISTRIBUTION SYSTEMS

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DESCRIPTION AND OPERATION

POWER DISTRIBUTION SYSTEM

DESCRIPTION

This group covers the various standard and optional power distribution components used on this model. Refer to the Component Index of Group 8W - Wiring Diagrams for complete circuit diagrams of the various power distribution components.

OPERATION

The power distribution system for this vehicle is designed to provide safe, reliable, centralized and convenient to access distribution of the electrical current required to operate all of the many standard and optional factory-installed electrical and electronic powertrain, chassis, safety, comfort and convenience systems. At the same time, these systems were designed to provide centralized locations for conducting diagnosis of faulty circuits, and for sourcing the additional current requirements of many aftermarket vehicle accessory and convenience items.

These power distribution systems also incorporate various types of circuit control and protection features, including:

- Fuses
- Fuse cartridges
- Fusible links
- Automatic resetting circuit breakers
- Relays
- Flashers
- Timers
- Circuit splice blocks.

The power distribution system for this vehicle consists of the following components:

- Power Distribution Center (PDC)
- Junction Block (JB)
- Accessory power outlet.

Following are general descriptions of the major components in the power distribution system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of all of the power distribution system components.

POWER DISTRIBUTION CENTER (PDC)

DESCRIPTION

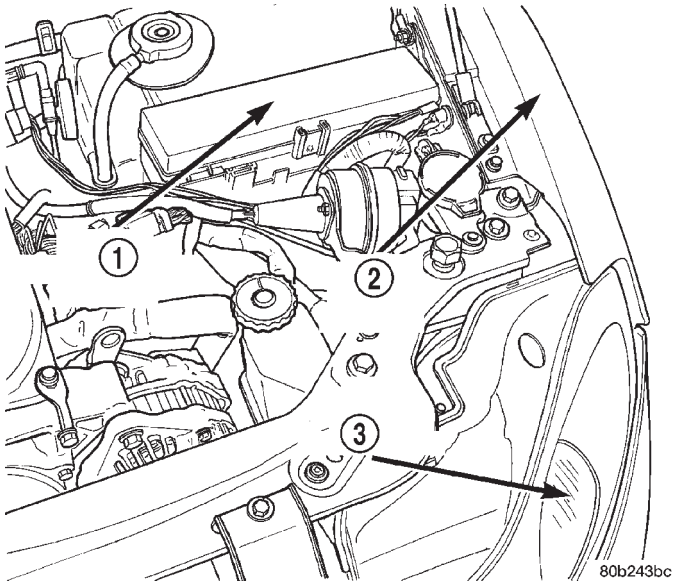


Fig. 1 Power Distribution Center Location

1 – POWER DISTRIBUTION CENTER
2 – LEFT FRONT FENDER
3 – LEFT FRONT HEADLAMP

All of the electrical current distributed throughout this vehicle is directed through the standard equipment Power Distribution Center (PDC). The molded plastic PDC housing is located in the left front corner of the engine compartment, just in front of the coolant reservoir bottle. The PDC housing has a molded plastic cover. The PDC cover is easily removed for service access and has a convenient fuse and relay layout label affixed to the inside surface of the cover to ensure proper component identification. The PDC housing is secured in the engine compartment by one screw to the rear of the PDC and two clips on the

DESCRIPTION AND OPERATION (Continued)

front side. A small molded plastic protective cover on the front right side of the engine compartment is unsnapped to access the battery/generator cable input connection studs.

OPERATION

All of the PDC outputs are through the integral engine compartment wire harness, which exits from the front of the PDC housing.

All of the current from the battery/generator cable connection enters the PDC through a 140 ampere fusible link that is secured with screws just inside the left end of the PDC housing. The PDC houses up to fourteen maxi-fuse cartridges, which replace all in-line fusible links. The PDC also houses up to six blade-type fuses, up to four full International Standards Organization (ISO) relays, and up to seven ISO micro-relays. Internal connection of all the PDC circuits is accomplished by an intricate network of hard wiring and bus bars. Refer to **Power Distribution** in the Component Index of Group 8W - Wiring Diagrams for complete circuit diagrams.

The fusible link, fuse cartridges, fuses and relays are available for service replacement. The PDC unit cannot be repaired and is only serviced as a unit with the engine compartment wire harness. If the PDC is faulty or damaged, the engine compartment wire harness assembly must be replaced.

JUNCTION BLOCK (JB)

DESCRIPTION

An electrical Junction Block (JB) is located in the left endcap of the instrument panel. The JB combines the functions previously provided by a separate fuse-block module and relay center. It also serves to simplify and centralize numerous electrical components, as well as to distribute electrical current to many of the accessory systems in the vehicle. It eliminates the need for numerous splice connections and serves in place of a bulkhead connector between many of the engine compartment, instrument panel, and body wire harnesses.

The JB is positioned on a mounting bracket up and under the left instrument panel. It is secured by four screws. The JB is concealed behind the left instrument panel endcap. The left instrument panel endcap is a snap-fit fuse access cover that conceals the JB fuses. A fuse puller and spare fuse holders are located on the back of the endcap, as well as the fuse layout to ensure proper fuse identification. The left instrument panel endcap must be removed to access components other than the fuses in the JB.

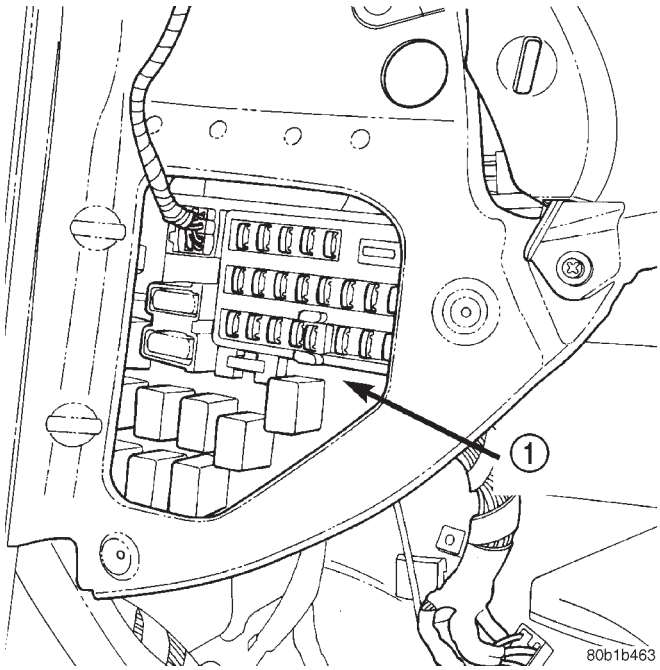


Fig. 2 Junction Block Location

1 – JUNCTION BLOCK/BCM

OPERATION

All of the current entering and leaving the JB does so through wire harnesses, which are connected to the JB through integral connector receptacles molded into the JB housing. The JB houses blade-type fuses, blade-type automatic resetting circuit breakers, full International Standards Organization (ISO) relays, and ISO micro-relays. Internal connection of all the JB circuits is accomplished by an intricate network of hard wiring and bus bars. Refer to **Junction Block** in the Component Index of Group 8W - Wiring Diagrams for complete circuit diagrams.

The fuses, circuit breakers, relays, and are available for service replacement. The JB unit cannot be repaired and is only serviced as an assembly. If any internal circuit or the JB housing is faulty or damaged, the entire Junction Block assembly must be replaced.

REMOVAL AND INSTALLATION

JUNCTION BLOCK (JB)

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

The Junction Block and Body Control Module (BCM) are attached to each other. After removal, they can be separated. The Junction Block/BCM assemblies are located on the driver's side of the vehicle.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 3).

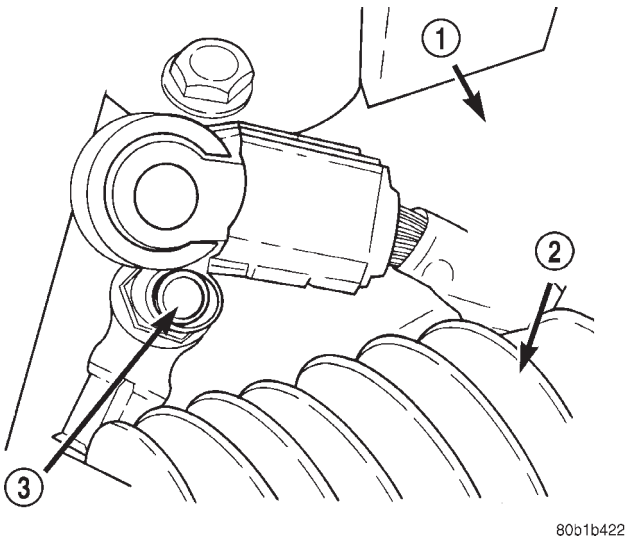


Fig. 3 Negative Battery Remote Cable

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Open the front driver's door and remove left end cap.

(3) Remove two screws from lower instrument panel cover (outside end). Pull rearward on lower instrument panel cover releasing clips. Disconnect decklid release switch wiring, cable to hood release, and remove cover from vehicle.

(4) Remove left knee blocker.

(5) Remove under column ducts.

(6) Remove Junction Block/BCM four mounting screws.

(7) Remove wire harness connectors from Junction Block/BCM.

(8) Remove Junction Block/BCM.

(9) Disconnect BCM wire connectors and RKE antenna connector.

(10) Remove Junction Block/BCM from vehicle.

INSTALLATION

For installation, reverse the above procedures. Ensure that the wire terminals and connectors are in good condition and connectors are properly installed.

POWER DISTRIBUTION CENTER

The Power Distribution Center (PDC) is serviced as a unit with the engine compartment wire harness. If any internal circuit of the PDC or the PDC housing is faulty or damaged, the entire PDC and engine compartment wire harness unit must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative remote cable.

(2) Disconnect each of the engine compartment wire harness connectors. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the locations of the affected connectors.

(3) Remove the fasteners that secure each of the engine compartment wire harness ground eyelets to the vehicle body and chassis components. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the ground eyelet locations.

(4) Disengage each of the retainers that secure the engine compartment wire harness to the vehicle body and chassis components. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the retainer locations.

(5) Remove one PDC mounting screw and disengage the PDC housing by pushing the locking tabs in on the PDC base. The mounting bracket blades are retained by a snap fit in the PDC mounting slots.

(6) Remove the PDC and the engine compartment wire harness from the engine compartment as a unit.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

NOTE: If the power distribution center (PDC) is being replaced with a new unit, be certain to transfer each of the fuses, fuse cartridges, fusible links and relays from the old power distribution center to the proper cavities of the new power distribution center. Refer to Power Distribution in Group 8W - Wiring Diagrams for the proper power distribution center cavity assignments.

(1) Position the PDC over the mounting bracket in the engine compartment.

(2) Align the PDC mounting slots with the blades on the PDC mounting bracket.

(3) Push down firmly and evenly on the PDC housing until it snaps into place on the PDC mounting bracket.

(4) Route the engine compartment wire harness from the PDC through the engine compartment, engaging each of the harness retainers to the mounting provisions in the vehicle body and chassis components. Make sure to make clip attachment into the rail located behind the PDC. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the harness routing and retainer locations.

(5) Install and tighten the fasteners that secure each of the engine compartment wire harness ground eyelets to the vehicle body and chassis components. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the ground eyelet locations. See the table below for the proper fastener tightness values.

(6) Reconnect each of the engine compartment wire harness connectors. Refer to **8W-90 - Connector Locations** in Group 8W - Wiring Diagrams for more information on the locations of the affected connectors.

(7) Torque nut retaining positive battery cable at PDC to 96 - 141 N·m (85 - 130 in. lbs.).

(8) Reconnect the battery negative remote cable.

POWER LOCK SYSTEMS

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POWER DOOR LOCKS

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DESCRIPTION AND OPERATION

POWER DOOR LOCK SYSTEM

DESCRIPTION

All doors can be locked or unlocked electrically by operating the switch on either front door panels. When the door lock switch is activated the Body Control Module (BCM) actuates the door lock relay.

All doors can be locked or unlocked mechanically and independently with their respective locking knobs.

The right and left front door can be locked or unlocked mechanically from the outside with the key or all locks can be remotely locked or unlocked with the Remote Keyless Entry (RKE) transmitter. All doors can be locked/unlocked from the front doors via the Central Locking System. The front doors can also be unlocked by actuation of the inside remote door handle.

The deck lid can be unlatched by either depressing the push switch from inside the car, manually by key from outside or by depressing the remote keyless entry deck lid release button two times. This feature is customer programmable. The customer has a choice of one or two button presses for deck lid opening. The vehicle is shipped in the button pressed twice mode.

OPERATION

The Body Control Module (BCM) actuates the power door lock relays when a door lock switch is activated. If the door lock switch is pressed for longer than eight consecutive seconds, the BCM will de-energize the door lock relay.

The system includes an Automatic Door Locking feature. **The vehicle is shipped with the system enabled.** When the system is disabled the door locks will work by use of the door lock switches and the Remote Keyless Entry System only. When the Automatic Door Lock System is enabled the BCM will automatically lock all the doors when all of the conditions below are met:

- All doors are closed
- The vehicle speed exceeds 15 ± 1 mph
- The throttle position sensor tip-in is greater than 10 ± 2 degrees

The DRBIII® scan tool is used to enable/disable the automatic door lock system. Refer to the proper Body Diagnostic Procedures Manual. They are also customer programmable. Refer to Owners Manual for customer programming procedures.

DESCRIPTION AND OPERATION (Continued)

The BCM will automatically re-lock all doors if the above conditions are met and if any of the doors become ajar and then closes again.

The power lock motors are also equipped with a thermal protection system which prevents the motors from burning out. The motors may chatter if they are continuously activated.

CENTRAL LOCKING SYSTEM

DESCRIPTION

The Central Locking System is part of the Vehicle Theft Security System (VTSS).

OPERATION

Using the key, turn the driver's or passenger door cylinder lock to the lock position, all doors will lock. This feature operates differently on each door. Turn key in the driver's door to the unlock position once will unlock driver's door only. Turning the key a second time to the unlock position within five seconds of the first time will unlock all doors. Turn key once in the passenger's door to the unlock position will unlock all doors.

The lock/unlock operation will arm/disarm the VTSS and will also activate/cancel the illuminated entry feature.

CHILD PROTECTION LOCK

DESCRIPTION

The child protection locks are on the rear doors only.

OPERATION

The lock when engaged, will disable the inside door handle from opening the door. The lock is part of the latch/lock assembly. The lock is engaged by moving a lever that is located on the rearward inside edge of the door.

DOOR LOCK INHIBIT

DESCRIPTION

The Door Lock Inhibit prevents the vehicle from being locked with the key in the ignition.

OPERATION

With the key in the ignition switch and the driver's door open, the Body Control Module (BCM) will ignore the command to lock the power door locks.

Once the key is removed, or the driver's door is closed, the BCM will allow the power door locks to lock.

REMOTE KEYLESS ENTRY (RKE) SYSTEM

DESCRIPTION

The Remote keyless Entry (RKE) system allows locking and unlocking of vehicle door(s) and deck lid by remote control using a hand held radio frequency (RF) transmitter.

OPERATION

The ignition switch must be OFF before the trunk lid can be unlatched with the transmitter.

The receiver may be programmed with up to four transmitters (vehicles are shipped with two). Each transmitter has its own code and the code has been stored in memory when it is programmed into the receiver. If the transmitter is replaced or other transmitters are added, each transmitter must be reprogrammed.

DIAGNOSIS AND TESTING

AUTOMATIC DOOR LOCK SYSTEM

For complete testing of the automatic door lock systems, refer to the proper Body Diagnostic Procedures Manual.

DECK LID RELEASE

For vehicles equipped with electric trunk lid release.

(1) Confirm motor lead wire is connected and 10 volts or more are available at solenoid.

(2) Provide proper ground through latch mounting screws.

(3) Remove latch and examine plunger. Plunger should spring back when pressed.

(4) Insure that solenoid plunger travel is adequate approximately 16 mm (5/8 inch).

DOOR LOCK MOTOR

Make certain battery is in normal condition before circuits are tested.

To determine which motor is faulty, check each individual door for electrical lock and unlock or disconnect the motor connectors one at a time, while operating the door lock switch. In the event that none of the motors work, the problem maybe caused by a shorted motor, a bad switch or a bad relay. Disconnecting a defective motor will allow the others to work.

To test an individual door lock motor, disconnect the electrical connector from the motor. To lock the door, connect a 12 volt power source to the positive pin of the lock motor and a ground wire to the other pin (Fig. 1). To unlock the door reverse the wire connections at the motor pin terminals. If these results are NOT obtained, replace the motor.

DIAGNOSIS AND TESTING (Continued)

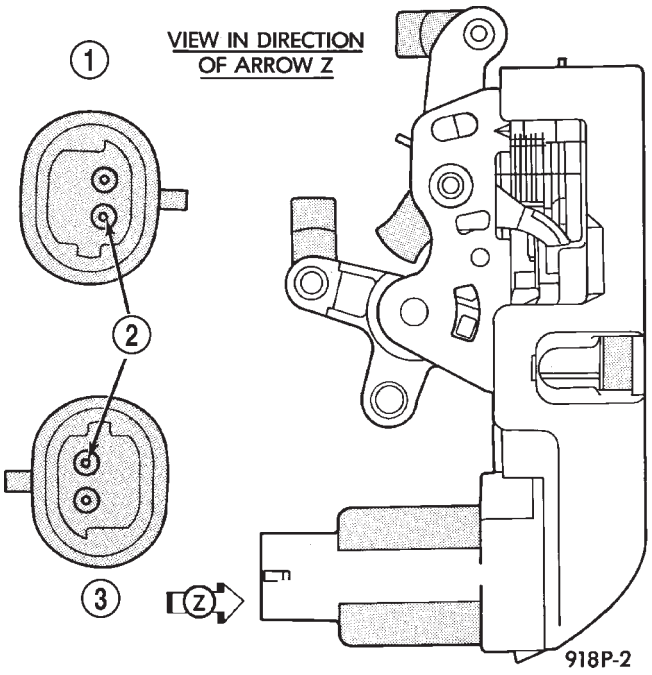


Fig. 1 Door Lock Motor/Latch

1 – RH
2 – + TO LOCK
3 – LH

DOOR LOCK SWITCH

Remove the switch from its mounting location. Using an ohmmeter, refer to Door Lock Switch Continuity Test table to determine if continuity is correct in the LOCK and UNLOCK switch positions. If these results are not obtained, replace the switch.

DOOR LOCK SWITCH CONTINUITY TEST

SWITCH POSITION	CONTINUITY BETWEEN	RESISTANCE VALUE
LOCK	1 AND 4	2700 Ω ± 10%
UNLOCK	1 AND 4	620 Ω ± 10%

DOOR LOCK SYSTEM

For complete testing of the automatic door lock systems, refer to the proper Body Diagnostic Procedures Manual.

VOLTAGE

The following wiring test sequence determines whether or not voltage is continuous through the body harness to switch.

(1) Remove left side switch from door trim panel.

(2) Carefully separate multiple terminal block on wiring harness from switch body.

(3) Connect one lead of test light to a ground terminal:

- Touch other test light lead to battery feed B+ terminal.
- If test light comes on, the wiring circuit between the battery and switch is functional.
- If test light does not come on, check fuse 13 in the Junction Block for a blown fuse. Refer to Group 8W, Wiring Diagrams for circuit information.

REMOVAL AND INSTALLATION

DECK LID RELEASE MOTOR

REMOVAL

(1) Disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Raise deck lid to the full up position.

(3) Remove latch cover attaching screws then remove cover.

(4) Remove two mounting motor screws and remote key cable retainers then remove motor.

INSTALLATION

For installation, reverse the above procedures.

DOOR LOCK MOTOR/LATCH

Refer to Group 23–Body, Front or Rear Door Latch Removal and Installation.

ADJUSTMENTS

DECK LID

Adjust deck lid latch and striker so that the deck lid latches with a moderate slam. With ignition switch in On or Accessory position, push deck lid unlock switch. Should latch fail to lock or unlock replace latch assembly.

REMOTE KEYLESS ENTRY

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DESCRIPTION AND OPERATION

REMOTE KEYLESS ENTRY (RKE) SYSTEM

DESCRIPTION

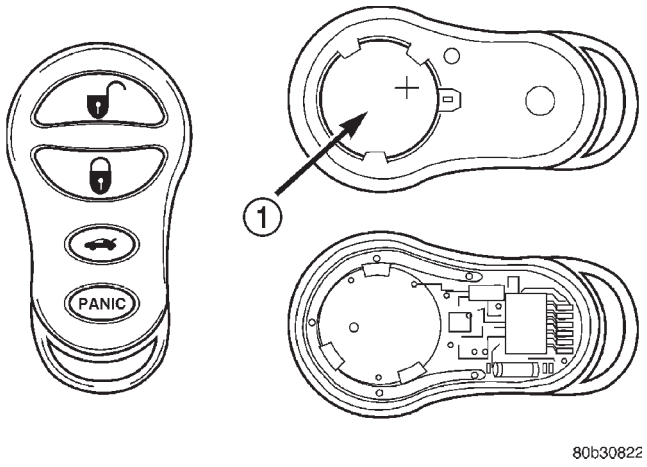


Fig. 1 Remote Keyless Entry Transmitter
1 – BATTERIES

The system allows locking and unlocking of vehicle door(s), deck lid release, and panic by remote control using a hand held radio frequency transmitter. The vehicle must be in PARK before the trunk lid can be unlatched with the transmitter.

The receiver may receive signals from up to four transmitters. Each transmitter has its own code, and the code is programmed and stored into receiver memory. If a transmitter is replaced or additional transmitters are added, the codes for all units have to be reprogrammed into the receiver memory. If a receiver module is replaced, the transmitter codes must be stored in the new receiver memory.

OPERATION

The transmitter has four buttons for operation. They are LOCK, UNLOCK, DECK LID RELEASE, and PANIC.

- The UNLOCK button will unlock the driver's door and enable illuminated entry. Pushing and releasing the button once will unlock the driver's door. Pushing and releasing the button two times, within a five second interval, will unlock all doors.
- Upon pressing the LOCK button, the horn will sound a short CHIRP (if enabled) and flash the park lamps to notify that the all door lock signal was received and set. Illuminated entry is cancelled and the interior lamps are faded to off.
- Pushing and releasing the DECK LID RELEASE button (one or two times depending on customer preference) within a two second interval, will slightly ajar the deck lid.
- Pushing and holding the PANIC button will cause the panic alarm to sound for three minutes, until the panic button is pressed and held a second time, or the vehicle reaches a speed of 15 mph.

The receiver is capable of retaining a Vehicle Access Code (VAC) even when power is removed.

Each Remote Keyless Entry (RKE) module must have at least one and no more than four transmitters.

HORN CHIRP TOGGLE

DESCRIPTION

Once the transmitters have been programmed, the horn chirp can be enabled/disabled by sending the horn chirp toggle operation code to the Body Control Module (BCM).

DESCRIPTION AND OPERATION (Continued)

OPERATION

This can be done using a DRB scan tool or by the customer. The horn chirp will enter the opposite state of its current programmed state by receiving this operation code. The BCM is responsible for keeping track of the horn chirp status.

DIAGNOSIS AND TESTING

REMOTE KEYLESS ENTRY (RKE) SYSTEM

When trouble shooting problems with the Remote Keyless Entry System, always verify that the power door lock/unlock switches are functional. If the doors do not lock/unlock with the power switches, the following modules should be analyzed:

- Lock/Unlock Switches
- Body Control Module
- Lock and unlock relays
- Door lock/unlock motors

If the following modules do not work:

- Remote keyless entry system
- Radio/clock
- Body Control Module
- Door lock switches

A blown fuse is the probable cause. The remote keyless entry fuse 13 is located in the Junction Block. To check for a blown fuse, pull the fuse out slightly, but maintain contact between the fuse terminals and the terminals in Junction Block. Using the voltmeter probe, check both terminals for 12 volts. If only one terminal measures battery voltage, the fuse is defective and must be replaced. If neither terminal measures battery voltage, check for an open or shorted circuit to the Junction Block, repair as needed. If battery voltage is still not available, check the high current fuse G in the Power Distribution Center, located in the engine compartment.

To diagnose the Remote Keyless Entry (RKE) System, use a DRBIII® scan tool and refer to Power Door Lock System in the proper Body Diagnostic Procedures Manual.

REMOTE KEYLESS ENTRY DIAGNOSIS

To diagnose the Remote Keyless Entry (RKE) System, use a DRB scan tool and refer to the proper Body Diagnostic Procedures Manual.

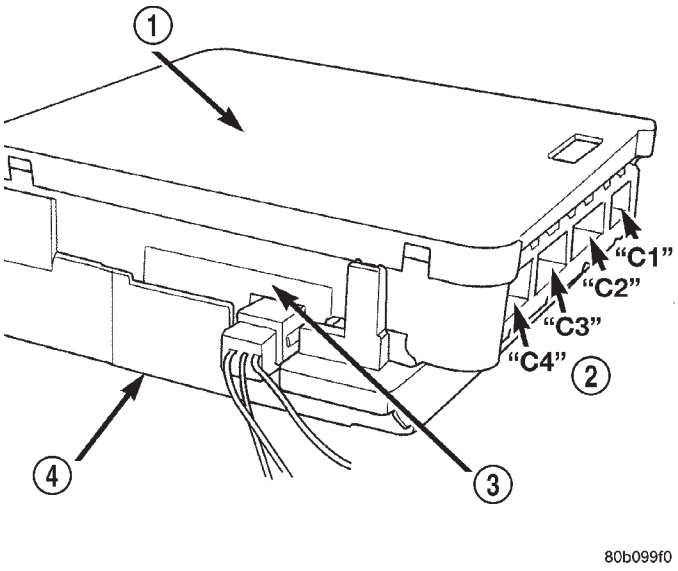


Fig. 2 Remote Keyless Entry Module Location

1 – BODY CONTROL MODULE
2 – CONNECTORS
3 – REMOTE KEYLESS ENTRY MODULE
4 – JUNCTION BLOCK

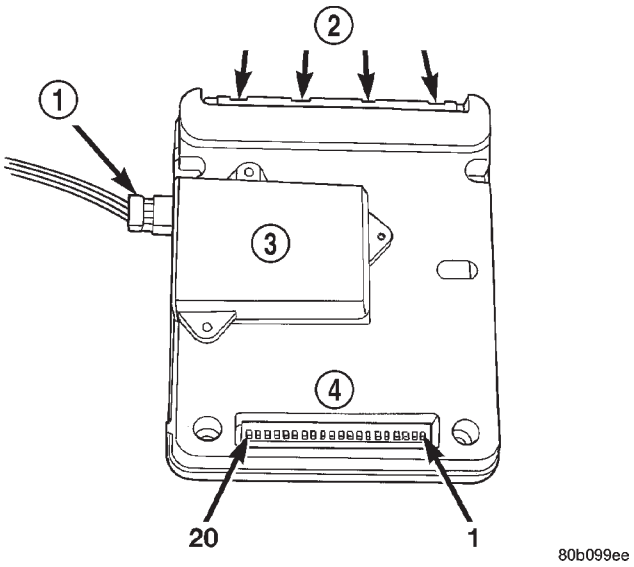


Fig. 3 Remote Keyless Entry Module/BCM

1 – RKE ANTENNA CONNECTOR
2 – CONNECTORS
3 – RKE MODULE
4 – 20–WAY INTERNAL

SERVICE PROCEDURES

DECK LID RELEASE TOGGLE

Deck lid release toggle is programmed to "one press" or "two presses" by continually pressing the unlock button for a minimum of 4 seconds to a maximum of 10 seconds. Within the 4-10 second range, the deck lid release button is depressed. Both buttons are then released.

HORN CHIRP TOGGLE

Once the transmitters have been programmed, the horn chirp can be enabled/disabled by sending the horn chirp toggle operation code to the Body Control

SERVICE PROCEDURES (Continued)

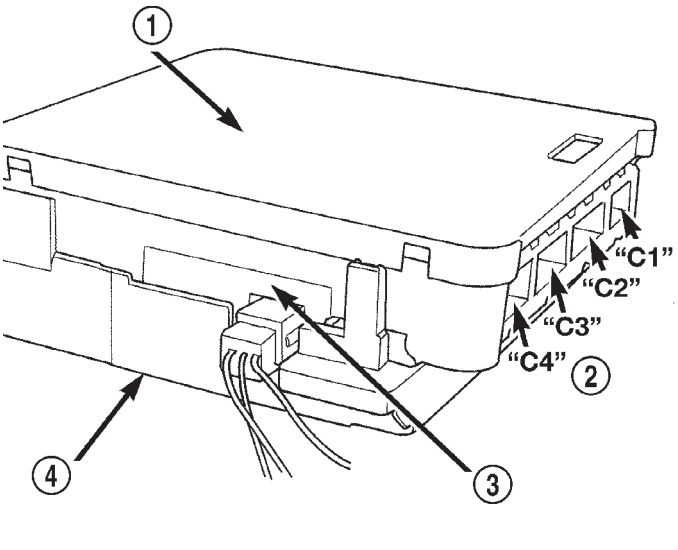


Fig. 4 Remote Keyless Entry Module Location

1 – BODY CONTROL MODULE
2 – CONNECTORS
3 – REMOTE KEYLESS ENTRY MODULE
4 – JUNCTION BLOCK

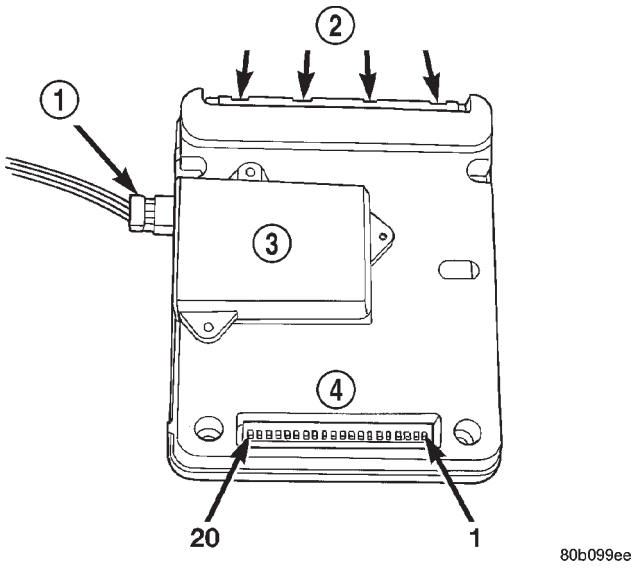


Fig. 5 Remote Keyless Entry Module/BCM

1 – RKE ANTENNA CONNECTOR
2 – CONNECTORS
3 – RKE MODULE
4 – 20–WAY INTERNAL

Module (BCM). This can be done using a DRB III® scan tool or by the customer. The horn chirp will enter the opposite state of its current programmed state by receiving this operation code. The BCM is responsible for keeping track of the horn chirp status.

REMOVAL AND INSTALLATION

REMOTE KEYLESS ENTRY MODULE

The Remote Keyless Entry (RKE) Module is located between the junction block and body control module (Fig. 4). Refer to Group 8E, Instrument Panel and Systems for Junction Block/BCM Removal and Installation procedures.

REMOVAL

(1) With the junction block/BCM removed, separate the two. Refer to Group 8E, Instrument Panel and Systems for BCM Removal and Installation procedures.

(2) Remove the three retaining screws to RKE Module and separate from BCM.

INSTALLATION

For installation, reverse the above procedures.

NOTE: The RKE transmitters must be reprogrammed to the new RKE module.

ADJUSTMENTS

PROGRAMMING REMOTE KEYLESS ENTRY TRANSMITTER(S)

The Remote Keyless Entry (RKE) Transmitter(s) can be programmed with the use of the DRB III® scan tool, or by the customer.

PROGRAMMING TRANSMITTER WITH THE DRB III® SCAN TOOL

For procedures on programming the transmitter(s) with the DRB III® scan tool, refer to the proper Body Diagnostic Procedures Manual.

PROGRAMMING BY CUSTOMER

For a customer to be able to program RKE transmitters themselves, at least one RKE transmitter must be programmed already. This procedure is to add additional transmitters. If all transmitters are lost, the DRB III® scan tool must be used to program the new transmitter(s).

Transmitter programming by the customer is done by continually pressing the unlock button, on a programmed fob, for a minimum of 4 seconds to a maximum of 10 seconds with the ignition switch ON. Within the 4-10 second range, the panic button is depressed. Both buttons are then released.

The BCM will chime. Them press any button on each fob to be programmed. The BCM will chime as each fob is learned. To exit program mode, turn off

ADJUSTMENTS (Continued)

ignition or wait 32 seconds. The BCM will chime again.

SPECIFICATIONS

TRANSMITTER BATTERY

The transmitter has two 3 volt batteries, which can be removed and replaced without special tools. Insert a dime in the side slot of the transmitter and twist. the halves should separate and the batteries are stacked on top of eachother. The batteries are available at local retail stores. Recommended batteries are Panasonic CR 2016 or equivalent. Battery life is about two years (Fig. 1).

TRANSMITTER RANGE

Operation range is within 12 meters (40 ft.) of the module/receiver.

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DESCRIPTION AND OPERATION

VEHICLE THEFT/SECURITY SYSTEM (VTSS)

DESCRIPTION

The Vehicle Theft Security System (VTSS) is designed to protect against whole vehicle theft. The system monitors vehicle doors, deck lid key cylinder, and ignition action for unauthorized operation. The alarm activates:

- Sounding of the horn
- Flashing of the park and tail lamps
- Flashing of the headlamps
- An engine kill feature (without SKIS)

OPERATION

Upon failure of proper VTSS/SKIM communication to the PCM, the PCM will shut off fuel after two seconds of run time. The engine will not re-crank on the key cycle that the failure occurred, a full key down sequence must be performed for the engine to crank again. After six consecutive fuel shut-offs, the engine will no longer crank on subsequent key cycles. The failure must be corrected and a valid communication process between the BCM (VTSS), or SKIM, and the PCM must occur for the engine to crank and start again.

The electronics for the VTSS are part of the Body Control Module (BCM). The system is armed when the vehicle is locked using the:

- Power door lock switches
- Remote Keyless Entry transmitter.

For vehicles equipped with SKIS, the doors do not have to be locked to enable the fuel shut off feature.

After the vehicle is locked and the last door is closed, the set LED indicator in the top cover will flash quickly for 16 seconds, indicating that arming is in progress. If no monitored systems are activated during this period, the system will arm. After 16 seconds the indicator LED will continue to flash at a slower rate.

This indicates that the system is armed. If the deck lid key cylinder switch is not sensed by the system, the indicator LED will remain lit during the arming process, although the system will still arm. If the indicator LED does not illuminate at all upon door closing it indicates that the system is not arming.

Passive disarming occurs upon normal vehicle entry by unlocking either door with the ignition key/remote transmitter. This disarming will also halt the alarm once it has been activated.

A tamper alert exists to notify the driver that the VTSS had been activated. This alert consists of 3 horn pulses when the vehicle is disarmed.

The VTSS will not arm by pushing down the door lock mechanism. This will manually override the system.

SENTRY KEY IMMOBILIZER SYSTEM (SKIS)

DESCRIPTION

The Sentry Key Immobilizer System (SKIS) is designed to provide passive protection against unauthorized vehicle use by preventing the engine from operating. The components of this system are the Sentry Key Immobilizer Module (SKIM), Body Control Module (BCM), Sentry Key transponder, VTSS

DESCRIPTION AND OPERATION (Continued)

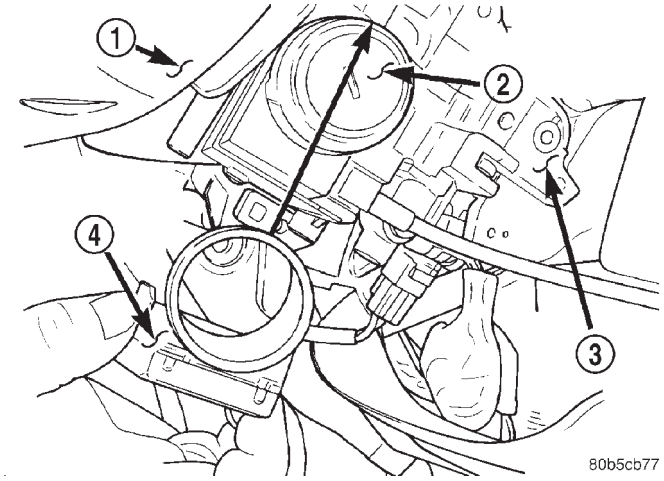


Fig. 1 Sentry Key Immobilizer Module Location

1 – STEERING WHEEL
2 – IGNITION KEY CYLINDER
3 – STEERING COLUMN
4 – SENTRY KEY IMMOBILIZER MODULE

indicator LED, and the Powertrain Control Module (PCM).

The SKIM is installed on the steering column near the ignition lock cylinder. The transponder is located under the molded rubber cap on the head of the ignition key. The VTSS indicator LED is located in the instrument panel top cover.

OPERATION

The SKIS includes two valid Sentry Key transponders from the factory. These two Sentry Keys can be used to program additional non-coded blank Sentry Keys. These blank keys can be cut to match a valid ignition key, but the engine will not start unless the key transponder is also programmed to the vehicle. The SKIS will recognize no more than eight valid Sentry Key transponders at any one time.

The SKIS performs a self-test each time the ignition switch is turned to the ON position, and will store Diagnostic Trouble Codes (DTC's) if a system malfunction is detected. The SKIS can be diagnosed, and any stored DTC can be retrieved using a DRB III® scan tool as described in the proper Body Diagnostic Procedures Manual.

SENTRY KEY IMMOBILIZER MODULE (SKIM)

DESCRIPTION

The Sentry Key Immobilizer Module (SKIM) contains a Radio Frequency (RF) transceiver and a central processing unit, which includes the Sentry Key Immobilizer System (SKIS) program logic. The SKIS programming enables the SKIM to program and retain in memory the codes of at least two, but no more than eight electronically coded Sentry Key transponders. The SKIS programming also enables the SKIM to communicate over the Programmable Communication Interface (PCI) bus network with the Powertrain Control Module (PCM), and/or the DRB III® scan tool.

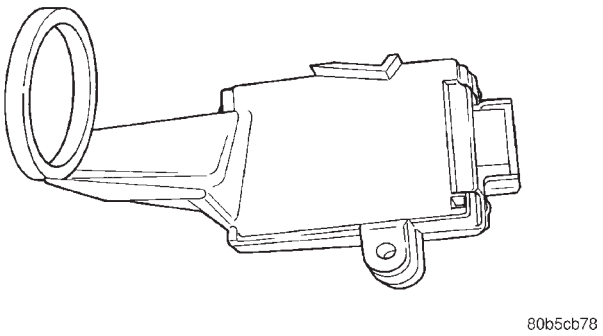


Fig. 2 Sentry Key Immobilizer Module

OPERATION

The SKIM transmits and receives RF signals through a tuned antenna enclosed within a molded plastic ring formation that is integral to the SKIM housing. When the SKIM is properly installed on the steering column, the antenna ring is oriented around the circumference of the ignition lock cylinder housing (Fig. 1). This antenna ring must be located within eight millimeters (0.31 inches) of the Sentry Key in order to ensure proper RF communication between the SKIM and the Sentry Key transponder.

For added system security, each SKIM is programmed with a unique "Secret Key" code and a security code. The SKIM keeps the "Secret Key" code in memory and sends the code over the PCI bus to the PCM, which also keeps this code in its memory. The SKIM also sends the "Secret Key" code to each of the programmed Sentry Key transponders. The security code is used by the assembly plant to access the SKIS for initialization, or by the dealer technician to access the system for service. The SKIM also stores in its memory the Vehicle Identification Number (VIN), which it learns through a PCI bus message from the PCM during initialization.

The SKIM and the PCM both use software that includes a rolling code algorithm strategy, which helps to reduce the possibility of unauthorized SKIS disarming. The rolling code algorithm ensures security by preventing an override of the SKIS through the unauthorized substitution of the SKIM or the PCM. However, the use of this strategy also means that replacement of either the SKIM or the PCM units will require a system initialization procedure to restore system operation.

DESCRIPTION AND OPERATION (Continued)

When the ignition switch is turned to the ON or START positions, the SKIM transmits an RF signal to excite the Sentry Key transponder. The SKIM then listens for a return RF signal from the transponder of the Sentry Key that is inserted in the ignition lock cylinder. If the SKIM receives an RF signal with valid "Secret Key" and transponder identification codes, the SKIM sends a "valid key" message to the PCM over the PCI bus. If the SKIM receives an invalid RF signal or no response, it sends "invalid key" messages to the PCM. The PCM will enable or disable engine operation based upon the status of the SKIM messages.

The SKIM also sends messages to the BCM which controls the VTSS indicator LED. The SKIM sends messages to the BCM to turn the LED on for about three seconds when the ignition switch is turned to the ON position as a bulb test. After completion of the bulb test, the SKIM sends bus messages to keep the LED off for a duration of about one second. Then the SKIM sends messages to turn the LED on or off based upon the results of the SKIS self-tests. If the VTSS indicator LED comes on and stays on after the bulb test, it indicates that the SKIM has detected a system malfunction and/or that the SKIS has become inoperative.

If the SKIM detects an invalid key when the ignition switch is turned to the ON position, it sends messages to flash the VTSS indicator LED. The SKIM can also send messages to flash the LED and to generate a single audible chime tone. These functions serve as an indication to the customer that the SKIS has been placed in its "Customer Learn" programming mode. See Sentry Key Immobilizer System Transponder Programming in this section for more information on the "Customer Learn" programming mode.

For diagnosis or initialization of the SKIM and the PCM, a DRB III® scan tool and the proper Body Diagnostic Procedures Manual are required. The SKIM cannot be repaired and, if faulty or damaged, the unit must be replaced.

SENTRY KEY IMMOBILIZER SYSTEM INDICATOR LAMP

DESCRIPTION

The Sentry Key Immobilizer System (SKIS) uses the Vehicle Theft Security System (VTSS) indicator LED to give an indication when the SKIS is faulty or when the vehicle has been immobilized due to the use of an invalid ignition key. The LED is controlled by the BCM based upon messages received from the Sentry Key Immobilizer Module (SKIM). The VTSS/SKIS indicator LED is hard wired directly to the BCM.

OPERATION

The SKIM sends messages to the BCM to turn the LED on for about three seconds when the ignition switch is turned to the ON position as a bulb test. After completion of the bulb test, the SKIM sends bus messages to the BCM to keep the LED off for a duration of about one second. Then the SKIM sends messages to the BCM to turn the LED on or off based upon the results of the SKIS self-tests. If the VTSS indicator LED comes on and stays on after the bulb test, it indicates that the SKIM has detected a system malfunction and/or that the SKIS has become inoperative. If the SKIM detects an invalid key when the ignition switch is turned to the ON position, it sends messages to the BCM to flash the VTSS indicator LED.

The SKIM can also send messages to the BCM to flash the LED and to generate a single audible chime tone. These functions serve as an indication to the customer that the SKIS has been placed in its "Customer Learn" programming mode. See Sentry Key Immobilizer System Transponder Programming in this section for more information on the "Customer Learn" programming mode.

The VTSS indicator LED is housed in the Automatic Temperature Control (ATC) Sun Sensor located in the instrument panel top cover. Refer to Group 8E - Instrument Panel and Systems for service of ATC Sun Sensor. If the VTSS indicator LED comes on and stays on after the bulb test function, diagnosis of the SKIS should be performed with a DRB III® scan tool and the proper Body Diagnostic Procedures Manual.

SENTRY KEY IMMOBILIZER TRANSPONDER

DESCRIPTION

The Sentry Key Immobilizer System (SKIS) uses a transponder that is integral to each of two ignition key that are supplied with the vehicle when it is shipped from the factory. The transponder chip is insulated within a nylon mount inserted in the head of the key, and invisible beneath a molded rubber cap.

OPERATION

Each Sentry Key transponder has a unique transponder identification code programmed into it by the manufacturer. The Sentry Key Immobilizer Module (SKIM) has a unique "Secret Key" code programmed into it by the manufacturer. When a Sentry Key transponder is programmed into the memory of the SKIM, the SKIM learns the transponder identification code from the transponder, and the transponder learns the "Secret Key" code from the SKIM. Each of these codes is stored within the transponder and in the nonvolatile memory of the SKIM. Therefore,

DESCRIPTION AND OPERATION (Continued)

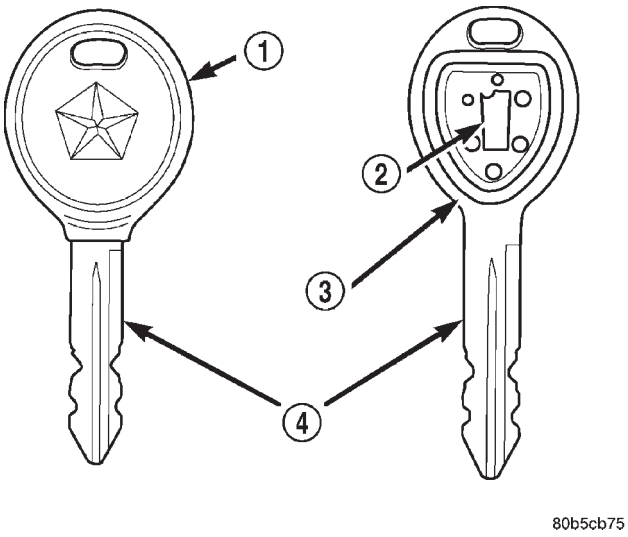


Fig. 3 Sentry Key Immobilizer Transponder

1 – MOLDED CAP
2 – TRANSPONDER
3 – MOLDED CAP REMOVED
4 – SENTRY KEY

blank keys for the SKIS must be programmed by and into the SKIM, in addition to being cut to match the mechanical coding of the ignition lock cylinder. See Sentry Key Immobilizer System Transponder Programming in this section for more information.

The Sentry Key transponder is within the range of the SKIM transceiver antenna ring when it is inserted in the ignition lock cylinder. When the ignition switch is turned to the START or ON positions, the SKIM transceiver issues a Radio Frequency (RF) signal that excites the transponder chip. The transponder chip responds by issuing an RF signal containing its transponder identification code and the "Secret Key" code. The SKIM transceiver compares the transponder codes with the codes stored in its memory to determine whether a valid key is in the ignition lock cylinder.

The Sentry Key transponder cannot be repaired and, if faulty or damaged, it must be replaced.

TRIGGERING THE VTSS

DESCRIPTION

Any of the following actions will trigger the system:

(1) Opening any door.
(2) Removing the deck lid lock cylinder.
(3) Turning the ignition to the ON position.

OPERATION

Using the power door switch or the keyless transmitter will arm the system.

CAUTION: The VTSS indicator LED will trigger and engine will continue to run if the vehicle is equipped with SKIS and the proper key is used to start the vehicle. This condition will occur if the VTSS has been triggered.

NOTE: The ignition switch can be turned to the accessory position without triggering alarm system.

DIAGNOSIS AND TESTING

SENTRY KEY IMMOBILIZER SYSTEM (SKIS)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

NOTE: The following tests may not prove conclusive in the diagnosis of this system. The most reliable, efficient, and accurate means to diagnose the Sentry Key Immobilizer System involves the use of a DRB III® scan tool. Refer to the proper Body Diagnostic Procedures Manual.

The Sentry Key Immobilizer System (SKIS) and the Programmable Communication Interface (PCI) bus network should be diagnosed using a DRB III® scan tool. The DRB III® will allow confirmation that the PCI bus is functional, that the Sentry Key Immobilizer Module (SKIM) is placing the proper messages on the PCI bus, and that the Powertrain Control Module (PCM) is receiving the PCI bus messages. Refer to the proper Body Diagnostic Procedures Manual, and Group 8W, Wiring Diagrams for complete circuit descriptions and diagrams.

(1) Check the fuses in the junction block. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Disconnect and isolate the battery negative remote cable from the remote terminal. Unplug the wire harness connector at the SKIM. Check for continuity between the ground circuit cavity of the SKIM wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit to ground as required.

(3) Connect the battery negative remote cable. Check for battery voltage at the fused B(+) circuit cavity of the SKIM wire harness connector. If OK, go

DIAGNOSIS AND TESTING (Continued)

to Step 4. If not OK, repair the open circuit to the fuse in the junction block as required.

(4) Turn the ignition switch to the ON position. Check for battery voltage at the fused ignition switch output (run/start) circuit cavity of the SKIM wire harness connector. If OK, use a DRB III® scan tool and the proper Body Diagnostic Procedures Manual to complete the diagnosis of the SKIS. If not OK, repair the open circuit to the fuse in the junction block as required.

VEHICLE THEFT SECURITY SYSTEM SELF-TESTS

A diagnostics test mode is available in the system to verify operation of all monitored switches or circuits. To enter diagnostics, use the DRB III® and the proper Body Diagnostic Procedures Manual.

When the diagnostics test mode is activated, the horn will pulse twice to indicate that the trunk key cylinder is in its proper position. Placing the key in the ignition will allow the warning lamp, headlamps and park/tail lamps to be checked for proper flashing operation. Remove the ignition key from the ignition switch in order to check for door lock cylinder switch operation. At the completion of each of the following operations, a horn pulse will occur to indicate proper operation. Each action must be separated by a minimum of one second or horn pulse will not occur.

- Open then close each door one at a time.
- Rotate the key in each of the door lock cylinder to the unlock position.
- Cycle the ignition switch key to the ON position as the last step. A single horn pulse will indicate proper operation of the ignition switch. This will also take the system out of the stand alone diagnostic mode.

The self diagnostic mode may also be exited by using the scan tool.

When the RKE lock button is pressed, the BCM will also pulse the horn. This is part of the RKE normal operation.

SERVICE PROCEDURES

SENTRY KEY IMMOBILIZER TRANSPONDER PROGRAMMING

Two programmed Sentry Key transponders are included with the Sentry Key Immobilizer System (SKIS) when it is shipped from the factory. The Sentry Key Immobilizer Module (SKIM) can be programmed to recognize up to six additional transponders, for a total of eight Sentry Keys. The following “Customer Learn” programming procedure for the programming of additional transponders requires access to at least two of the valid Sentry Keys. If two valid Sentry Keys are not available, Sentry Key programming will require the use of a DRB III® scan tool and the proper Body Diagnostic Procedures Manual.

CUSTOMER LEARN

(1) Obtain the additional Sentry Key transponder blank(s) that are to be programmed for the vehicle. Cut the additional Sentry Key transponder blanks to match the ignition lock cylinder mechanical key codes.

(2) Insert one of the two valid Sentry Key transponders into the ignition switch and turn the ignition switch to the ON position.

(3) After the ignition switch has been in the ON position for about three seconds, but no more than fifteen seconds, cycle the ignition switch back to the OFF position. Replace the first valid Sentry Key in the ignition lock cylinder with the second valid Sentry Key and turn the ignition switch back to the ON position. Both operations must be performed within 15 seconds.

(4) About ten seconds after the completion of Step 3, the VTSS indicator LED will start to flash and a single audible chime tone will sound to indicate that the system has entered the “Customer Learn” programming mode.

(5) Within about fifty seconds of entering the “Customer Learn” programming mode, turn the ignition switch to the OFF position, replace the valid Sentry Key with a blank Sentry Key transponder, and turn the ignition switch back to the ON position.

(6) About ten seconds after the completion of Step 5, a single audible chime tone will sound and the VTSS indicator LED will stop flashing and stay on solid for about three seconds to indicate that the blank Sentry Key transponder has been successfully programmed. The SKIS will immediately return to normal system operation following exit from the “Customer Learn” programming mode.

(7) Go back to Step 2 and repeat this process for each additional Sentry Key transponder blank to be programmed.

If any of the above steps is not completed in the proper sequence, or within the allotted time, the SKIS will automatically exit the “Customer Learn” programming mode. The SKIS will also automatically exit the “Customer Learn” programming mode if it sees a non-blank Sentry Key transponder when it should see a blank, if it has already programmed eight valid Sentry Keys, or if the ignition switch is turned to the OFF position for more than about fifty seconds.

REMOVAL AND INSTALLATION

BODY CONTROL MODULE

For service of the Body Control Module (BCM), refer to Group 8E, Instrument Panel and Systems for Removal and Installation.

NOTE: If the BCM is replaced, the VTSS must be enabled in the new BCM via the DRB III®, in order to start the vehicle.

DECK LID SECURITY SWITCH

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Refer to Group 23 Body, for Deck Lid Latch Removal and Installation.

(3) Disconnect connector and remove deck lid lock cylinder from bracket (Fig. 4), (Fig. 5), and (Fig. 6).

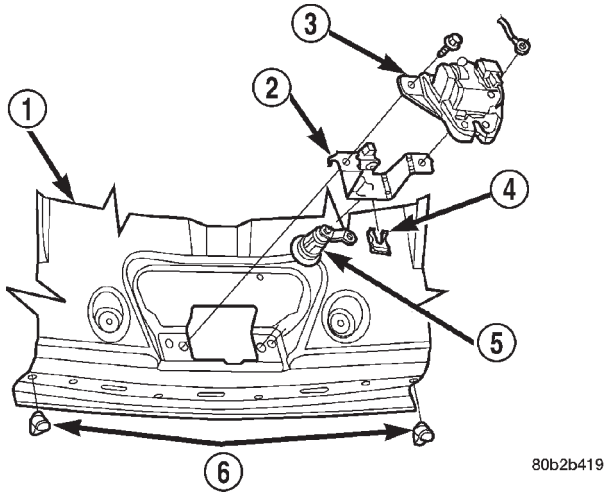


Fig. 4 Deck Lid Latch - Concorde / LHS

1 – TRUNK LID
2 – TRUNK LID CYLINDER BRACKET
3 – TRUNK LID LATCH
4 – LOCK SET
5 – TRUCK LID LOCK CYLINDER
6 – TRUNK LID OVER SLAM BUMPERS

INSTALLATION

For installation, reverse the above procedures.

LOCK CYLINDER SWITCH

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post.

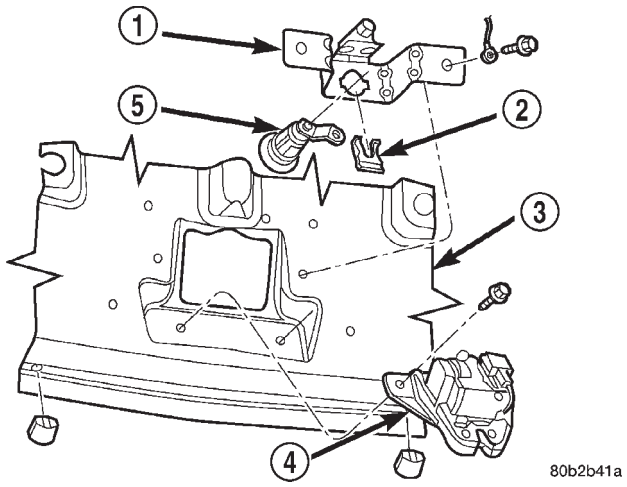


Fig. 5 Deck Lid Latch - Intrepid

1 – LOCK CYLINDER BRACKET
2 – LOCK SET
3 – TRUNK LID
4 – TRUNK LID LATCH
5 – TRUNK LOCK CYLINDER

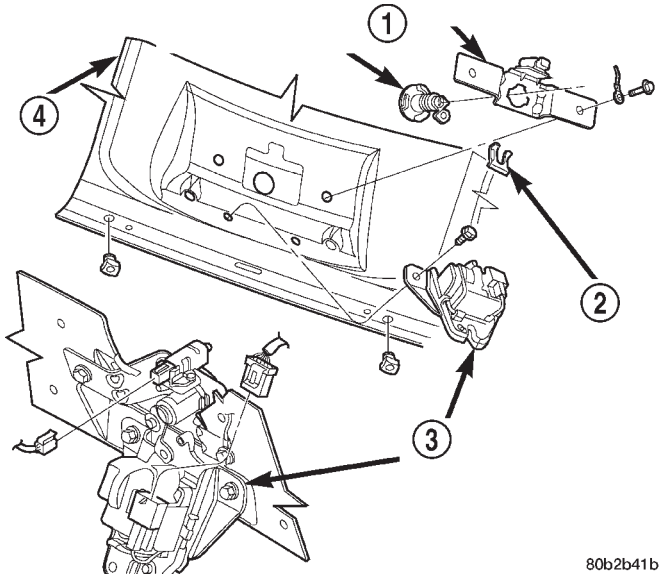


Fig. 6 Deck Lid Latch - 300M

1 – LOCK CYLINDER BRACKET AND LOCK CYLINDER
2 – LOCK SET
3 – TRUNK LID LATCH
4 – TRUNK LID

(2) Refer to Group 23 Body, for door trim and water shield Removal and Installation.

(3) Disconnect wiring clip and pigtail wire connector (Fig. 7).

(4) Remove the Door Key Cylinder Switch from door lock cylinder.

REMOVAL AND INSTALLATION (Continued)

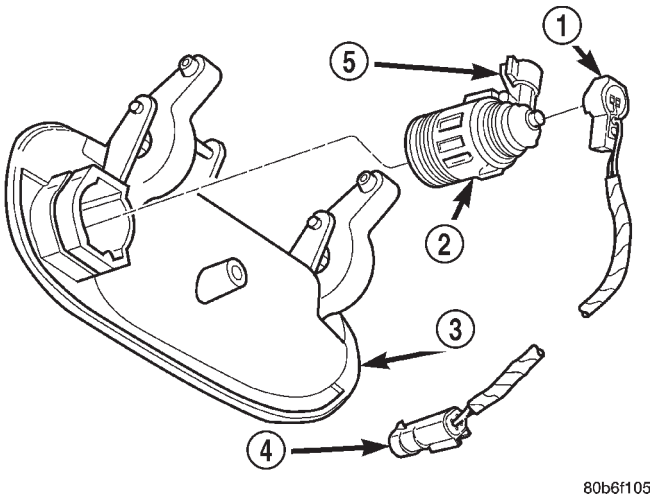


Fig. 7 Door Key Cylinder Switch

1 – DOOR KEY CYLINDER SWITCH
2 – LOCK CYLINDER
3 – DOOR HANDLE
4 – PIGTAIL CONNECTOR
5 – CLIP

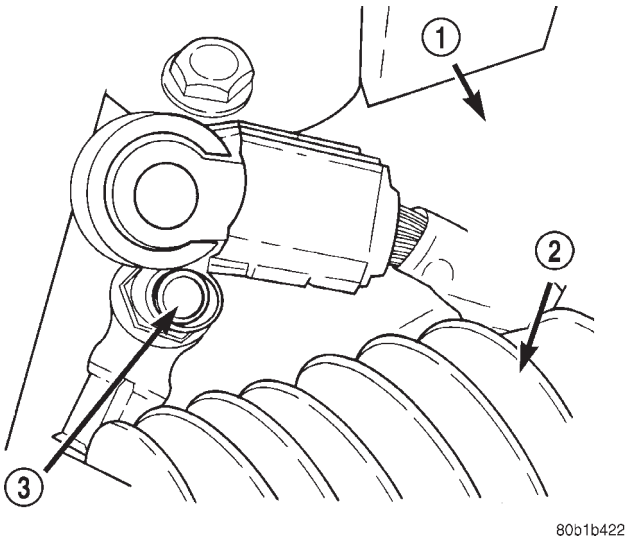


Fig. 8 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

INSTALLATION

For installation, reverse the above procedures.

SENTRY KEY IMMOBILIZER MODULE (SKIM)

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 8).

(2) Remove knee bolster. Refer to Group 8E, Instrument Panel Systems for Removal and Installation.

(3) Remove the steering column upper and lower shrouds. Refer to Group 19, Steering for Removal and Installation.

(4) Disengage the steering column wire harness from the Sentry Key Immobilizer Module (SKIM).

(5) Remove the one screw securing the SKIM to the bottom of the steering column.

(6) Slide the SKIM away from the steering column to clear the SKIM antenna ring from around the ignition switch lock cylinder housing (Fig. 1).

(7) Remove the SKIM from the vehicle.

INSTALLATION

(1) For installation, reverse the above procedures.

(2) If the SKIM is replaced with a new unit, a DRB III® scan tool and the proper Body Diagnostic Procedures Manual MUST be used to initialize the new SKIM and to program at least two Sentry Key transponders.

POWER SEAT SYSTEMS

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POWER SEATS

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DESCRIPTION AND OPERATION

POWER SEAT SYSTEM

DESCRIPTION

Power seats can be adjusted in 8 different directions:

- Up or down
- Forward or back
- Tilt forward or rearward
- Recliner up or down

OPERATION

Two single armature permanent magnet reversible motors are coupled through cables to worm gear box assemblies. They are located in the seat tracks and upper supports. The two single gear motor assemblies attach to the seat tracks provide the various seat movements.

The electrical circuit is protected by a 20 amp circuit breaker located on the Junction Block and a 40 amp fuse in the Power Distribution Center.

POSITION SENSING POWER SEAT POTENTIOMETERS

DESCRIPTION

A potentiometer is mounted to each seat motor to provide a sense voltage to the MHSMM that will indicate where the actual seat position is.

OPERATION

This sense voltage is derived from a 5-volt source provided by the module to the potentiometer. The MHSMM reads this sense voltage and stores it if required.

POWER SEAT SWITCH

DESCRIPTION

The seat switch assembly is mounted outboard in the seat cushion side cover.

OPERATION

Activating any seat switch will move the seat in the corresponding direction. The MHSMM will drive a maximum of two motors at a time in a given direction. If conflicting directions are requested, the priorities for responses are as follows:

DESCRIPTION AND OPERATION (Continued)

- Seat Track Rearward
- Seat Front Down
- Seat Rear Down
- Seat Recliner Rearward
- Seat Track Forward
- Seat Front Up
- Seat Rear Up
- Seat Recliner Forward

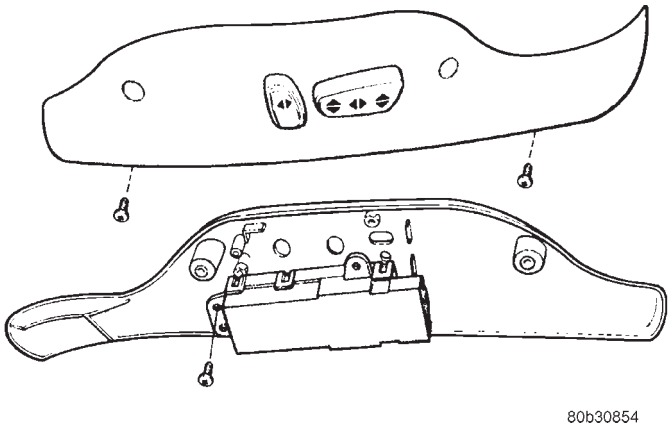


Fig. 1 Power Seat Switch

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURE

Before any testing is attempted the battery should be carefully charged and all connections and terminals cleaned and tightened to insure proper continuity and grounds.

With dome lamp on, apply switch in direction of failure. If dome lamp dims the seat motor is trying to work indicating mechanical jamming. If dome lamp does not dim, then proceed with the following electrical tests.

CIRCUIT BREAKER

Find correct circuit breaker on fuse block. Pull out slightly but be sure that circuit breaker terminals still contact terminals in fuse block. Connect ground wire of voltmeter to a good ground. With probe of voltmeter positive wire, check both terminals of circuit breaker for battery voltage. If only one terminal checks at battery voltage, circuit breaker is defective and must be replaced. If neither terminal shows battery voltage, check for open or shorted circuit to circuit breaker.

POWER SEAT SWITCH DIAGNOSTIC TEST

The Power Seat Switch Diagnostic Test can be used to test whether the switch activations are being recognized by the MHSMM.

ACTIVATION

The Power Seat Switch Diagnostic Test can only be activated by sending the proper PCI bus command via the DRB lll scan tool to enter diagnostic test number 2.

Upon activation of the test the operator has ten seconds to activate all switches, manual seat switches - all 8 directions, 3 memory switches, and both driver and passenger heat HI and LO requests, but not including the mirrors.

At the conclusion on the ten-second period, the MHSMM can be requested to provide both Pass/Fail test information. A Pass condition occurs only if all the switches are activated. If any of the switches are not activated, Fail will be registered.

Should a Fail condition occur, the individual switch information could be accessed using the proper commands on the DRB lll scan tool.

MOTOR TESTS

(1) Remove power seat switch from seat. Refer to Seat Switch Removal and Installation in this group.

(2) Disconnect wire harness connector.

(3) Check Pin 1 for battery voltage and Pin 5 for ground.

(4) To test the seat motors and verify proper seat responses, refer to (Fig. 2) and the Seat Motor Test table. Using two jumper wires, connect one to a battery supply and the second to a ground. Connect the other ends to the seat wire harness connector as described in the Seat Motor Test table.

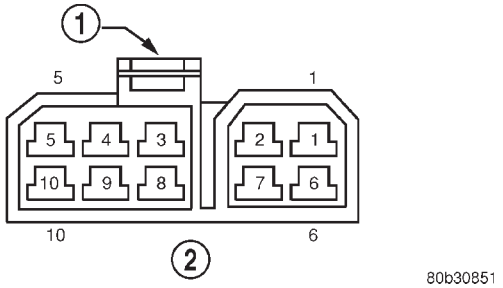


Fig. 2 Power Seat Wire Harness Pin Call-Out

1 – BLUE
2 – VIEWED FROM TERMINAL END

DIAGNOSIS AND TESTING (Continued)

SEAT MOTOR TEST

SEAT CONNECTOR			
CONNECT JUMPER		SEAT ACTION	
B (+)	B (-)	DRIVER SIDE	PASSENGER SIDE
PIN 9	PIN 6	FRONT RISER UP	FRONT RISER DOWN
PIN 6	PIN 9	FRONT RISER DOWN	FRONT RISER UP
PIN 10	PIN 3	FORWARD	FORWARD
PIN 3	PIN 10	REARWARD	REARWARD
PIN 8	PIN 7	REAR RISER UP	REAR RISER DOWN
PIN 7	PIN 8	REAR RISER DOWN	REAR RISER UP
PIN 4	PIN 2	RECLINER UP	RECLINER UP
PIN 2	PIN 4	RECLINER DOWN	RECLINER DOWN

SWITCH TEST

(1) Remove switch, refer to Switch Removal and Installation in this section.

(2) Using an ohmmeter, perform the Seat Switch Continuity Test table and (Fig. 3). If there is no continuity at any of the switch positions, replace switch.

VOLTAGE

The following test will determine whether or not voltage is continuous through the body harness to the switch.

(1) Remove power seat switch from mounting position and disconnect switch from wiring harness.

(2) Using a voltmeter, connect the ground lead to Pin 5 of the switch harness connector. Connect the positive lead to Pin 1. If battery voltage the ground and B+ circuit is OK. If no voltage check circuit breaker and repair as necessary.

SEAT SWITCH CONTINUITY TEST

SWITCH POSITION	CONTINUITY BETWEEN PINS	
	DRIVER	PASSENGER
OFF	PIN 5 TO 4 PIN 5 TO 3 PIN 5 TO 2 PIN 5 TO 10 PIN 5 TO 9 PIN 5 TO 8 PIN 5 TO 7 PIN 5 TO 6	PIN 5 TO 4 PIN 5 TO 3 PIN 5 TO 2 PIN 5 TO 10 PIN 5 TO 9 PIN 5 TO 8 PIN 5 TO 7 PIN 5 TO 6
FRONT RISER UP	PIN 5 TO 6 PIN 1 TO 9	PIN 5 TO 9 PIN 1 TO 6
FRONT RISER DOWN	PIN 5 TO 9 PIN 1 TO 6	PIN 5 TO 6 PIN 1 TO 9
CENTER SWITCH FORWARD	PIN 5 TO 3 PIN 1 TO 10	PIN 5 TO 3 PIN 1 TO 10
CENTER SWITCH REARWARD	PIN 5 TO 10 PIN 3 TO 1	PIN 5 TO 10 PIN 3 TO 1
REAR RISER UP	PIN 5 TO 7 PIN 1 TO 8	PIN 5 TO 8 PIN 1 TO 7
REAR RISER DOWN	PIN 5 TO 8 PIN 1 TO 7	PIN 5 TO 7 PIN 1 TO 8
RECLINER UP	PIN 5 TO 2 PIN 4 TO 1	PIN 5 TO 2 PIN 4 TO 1
RECLINER DOWN	PIN 5 TO 4 PIN 2 TO 1	PIN 5 TO 4 PIN 2 TO 1

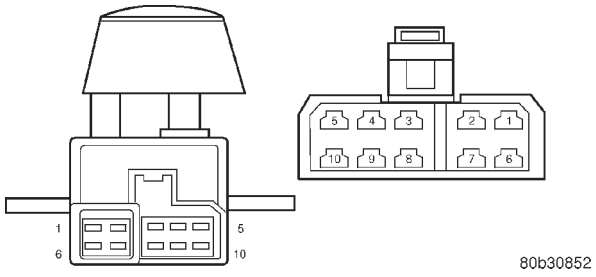


Fig. 3 Seat Switch Pin Call-Out

REMOVAL AND INSTALLATION

SEAT ASSEMBLY

Refer to Group 23–Body, Front Seat Removal and Installation.

SEAT ADJUSTER

REMOVAL

(1) Seat removed from vehicle. Using a clean area to place seat.

(2) Remove two seat back mounting screws and also remove two seat back recliner screws (Fig. 4).

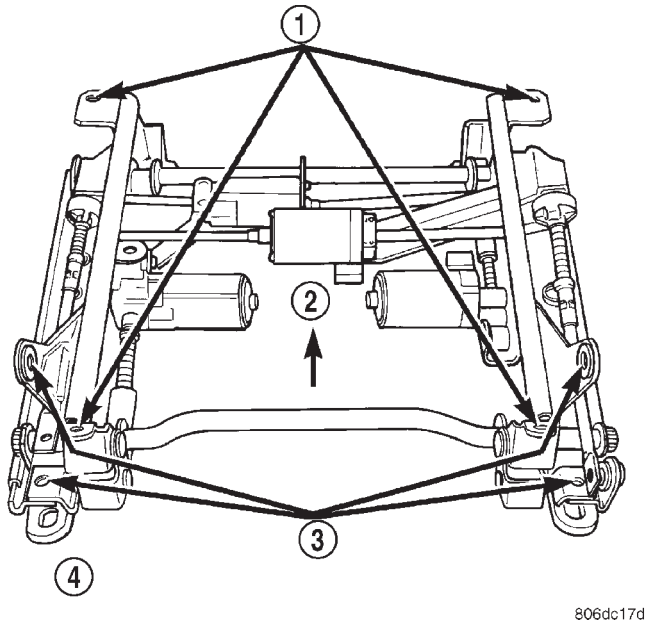


Fig. 4 Seat Adjuster Removal

1 – TRACK TO SEAT CUSHION SCREWS
2 – FRONT
3 – SEAT BACK RECLINER SCREWS
4 – VIEWED FROM TOP OF TRACK

(3) Remove four seat adjuster mounting screws from cushion pan.

(4) Remove adjuster from seat.

INSTALLATION

For installation, reverse the above procedure.

SEAT SWITCH

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 5).

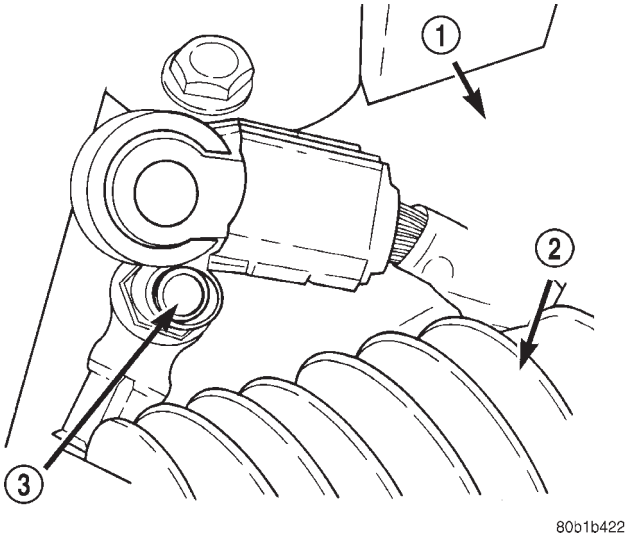


Fig. 5 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Remove cushion side shield (Fig. 6).

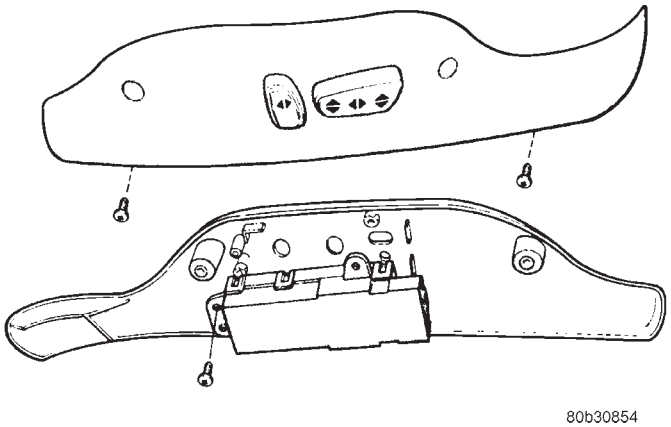


Fig. 6 Cushion Side Shield

(3) Disconnect wiring from switch.
(4) Remove knobs from the switch.
(5) Remove four switch attaching screws.
(6) Remove switch from cushion side shield

INSTALLATION

For installation, reverse the above procedure.

MEMORY SEATS

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MEMORY SELECTOR SWITCH 7

DESCRIPTION AND OPERATION

MEMORY SEAT SYSTEM

DESCRIPTION

The Memory Heated Seat and Mirror Module (MHSMM) is located underneath the front of the driver seat. It is mounted unto the bottom of the seat by two screws. The connections to the system are through a seat wiring harness that interfaces with all of the components within the seat structure.

OPERATION

The MHSMM system allows the driver to adjust the seat, both driver and passenger side mirrors, and the radio stations to his/her preference and store them in memory. There are two memory locations available for two driver positions to be stored. The module will also allow either of the two positions to be recalled upon request.

The MHSMM reads all seat switch inputs and operates the seat motors according to which switch is being actuated. The MHSMM monitors position sensing potentiometers (mounted on the motors) for seat track positioning.

The MHSMM uses solid state drivers (electronic switches) to control motor activation for both driver and passenger side mirrors. Each mirror has vertical and horizontal motors, that contain potentiometers used to located the actual mirror position for recall purposes. Normal electrical operation of the mirrors is accomplished by actuating the power mirror switch and doesn't require the use of the module.

The MHSMM monitors the memory switches and has the capability to store desired positions in memory in response to a valid input sequence. Refer to Memory Selector Switches (1, 2, and S) and Remote Keyless Entry (RKE). The memory heated seat and mirror module will activate the seat and mirror motors in response to a recall request from an individual memory switch. The positioning of the motors is determined by the potentiometer values stored in memory.

The module operates the seat motors through relays: four dedicated to track horizontal forward/rearward, front vertical up/down, rear vertical up/down, and recliner forward/rearward. A fifth relay controls the direction of operation of these motors.

GLIDE FEATURE

DESCRIPTION

The MHSMM shall incorporate a seat glide feature. When exiting the vehicle and the ignition switch is removed, the glide feature will then activate.

OPERATION

This feature will allow easier entry and exit to the vehicle by moving the seat rearward a short distance when the operator leaves the vehicle and returning the seat to its original position when the vehicle operator returns and turns the ignition ON or extends their seat belt.

MEMORY SELECTOR SWITCH

DESCRIPTION

The memory selector switches are mounted on the cushion cover side shield of the driver eat within easy reach of the driver. They provide a means to set and recall either of the two positions of seat and recliner, and the side view mirror as chosen by the driver.

OPERATION

The proper procedure of setting and recalling a memory position using the memory switches is as follows:

(1) Adjust the seat, recliner and side view mirrors to the desired position.

DESCRIPTION AND OPERATION (Continued)

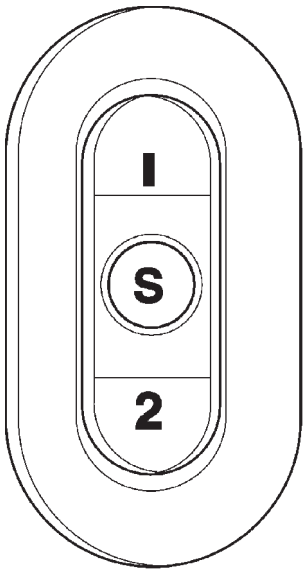


Fig. 1 Memory Selector Switch

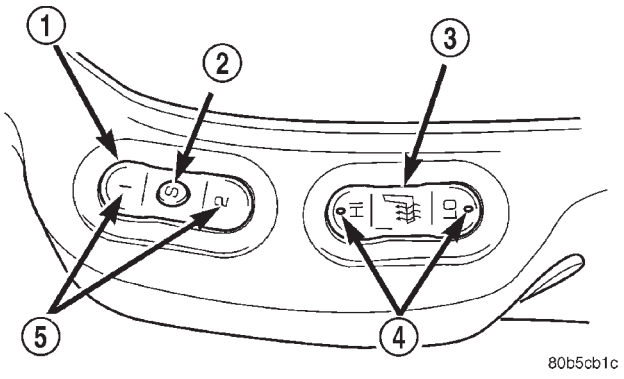


Fig. 2 Memory Selector Switch Location

1 – MEMORY SELECTOR SWITCH
2 – DRIVER POSITION SET
3 – HEATED SEAT SWITCH
4 – LED'S
5 – DRIVER POSITION

(2) Press momentarily and release memory switch S.

(3) Press momentarily and release memory switch 1 or 2.

(4) To program the second driver's position, repeat the above procedure using the remaining memory switch.

(5) To recall either of the programmed positions momentarily press and release either memory selector switch 1 or 2.

DIAGNOSIS AND TESTING

GLIDE FEATURE

If seat isn't sliding forward properly:

(1) First use the DRB scan tool to check whether glide feature is enabled or not. Enable glide feature if disabled, and go to Step 2.

(2) Turn the ignition ON and then back OFF. Remove the key. If seat glides rearward, reinsert key and turn to ON position. If seat doesn't glide forward, go to Step 3, otherwise the problem has been fixed. If Learn Guard Bands test has been run and problem persists, then replace MHSMM.

(3) Now run Learn Guard Bands Diagnostic test as shown in this section, and go through Step 2 again.

SERVICE PROCEDURES

REMOTE KEYLESS ENTRY (RKE)

The MHSMM interfaces with the RKE vial the Programmable Communication Interface (PCI) bus. The proper procedure of setting and recalling a memory position using the RKE is as follows:

(1) Press memory switch 1 and release to recall memory position 1.

(2) Adjust the seat, recliner and side view mirrors to the desired position.

(3) Press momentarily and release memory switch S.

(4) Press momentarily and release memory switch 1 or 2.

(5) Press and release the UNLOCK button on one of the RKE transmitters. Do NOT press any switch for 10 seconds.

(6) Set radio station presets.

To program the second driver's position, repeat the above procedure using memory switch 2. The second RKE transmitter can be programmed in the fashion.

To recall either of the programmed positions momentarily press and release either memory selector switch 1 or 2. If using RKE, just press and release the UNLOCK button on the proper transmitter for either position 1 or 2.

A recall is possible any time the vehicle transmission is in PARK. This condition is monitored by the Body Control Module (BCM).

NOTE: The module will abort a recall if the transmission is moved out of park or if any seat movement is activated whether manually or by memory recall.

REMOVAL AND INSTALLATION

MEMORY HEATED SEAT/MIRROR MODULE (MHSMM)

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Remove two module attaching screws (Fig. 3).

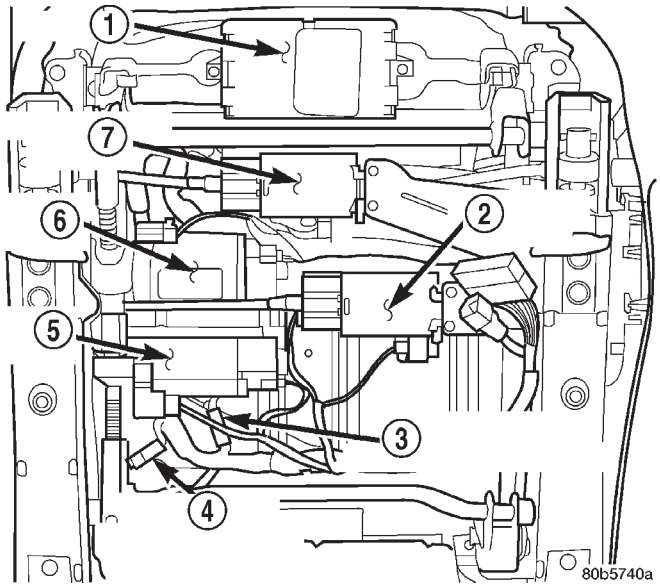


Fig. 3 Memory Heated Seat/Mirror Module Location

1 – MHSMM
2 – RECLINER MOTOR
3 – SEAT HEATER 4–WAY CONNECTOR
4 – SEAT BACK HEATER 2–WAY CONNECTOR
5 – REAR RISER
6 – FRONT RISER
7 – HORIZONTAL MOTOR

(3) Disconnect four module connectors.

(4) Remove module from vehicle.

INSTALLATION

For installation, reverse the above procedures.

MEMORY SELECTOR SWITCH

REMOVAL

(1) Disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Unscrew the side shield on the seat, either driver or passenger side (Fig. 4).

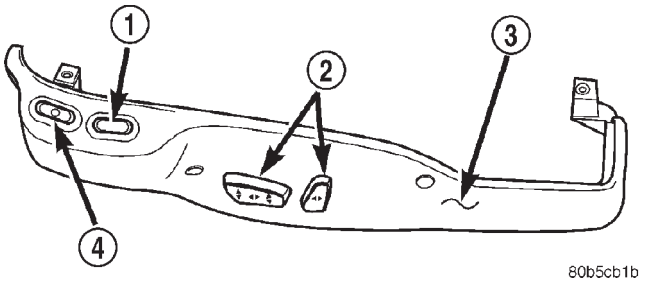


Fig. 4 Seat Cushion Side Shield

1 – HEATED SEAT SWITCH
2 – POWER SEAT SWITCH
3 – SEAT CUSHION SIDE SHIELD
4 – MEMORY SELECTOR SWITCH

(3) From the bottom, disengage the switch and gently rock through the opening.

INSTALLATION

For installation, reverse the above procedures.

POWER SEAT SYSTEMS

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DESCRIPTION AND OPERATION

SIDE IMPACT AIRBAG RESTRAINT SYSTEM

DESCRIPTION

Vehicles equipped with the side impact airbag restraint system utilize two airbags mounted to each front seat back frame (Fig. 1). This system designed to protect occupants in the event of a side impact collision.

OPERATION

The side impact airbag control module (SIACM) controls the seat back mounted airbags. If the SIACM determines the impact is severe enough, the appropriate airbag/s will inflate, tearing open the front seat back trim cover/s protecting the passenger/s. Once a seat back mounted airbag has been deployed, all damaged parts must be replaced.

DESCRIPTION AND OPERATION (Continued)

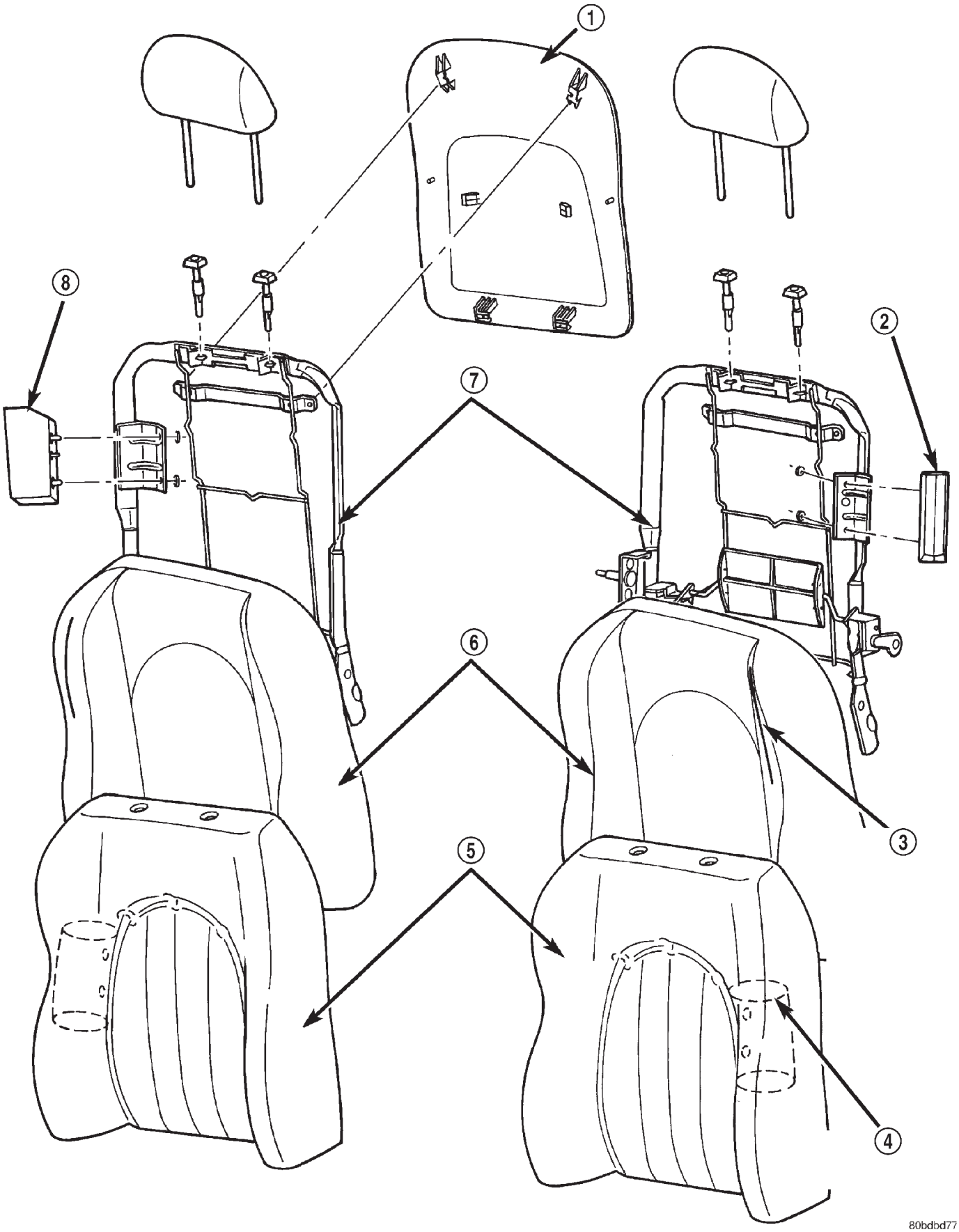


Fig. 1 LH FRONT SEAT BACKS EQUIPPED WITH AIRBAGS

DESCRIPTION AND OPERATION (Continued)

1 – FRONT SEAT BACK PANEL
2 – LEFT SEAT AIRBAG MODULE
3 – HOLE PROVIDED IN SEAT BACK FOAM FOR SEAT AIRBAG MODULE
4 – SIDE AIRBAG MODULE NYLON SLEEVE
5 – SEAT BACK TRIM COVERS
6 – SEAT BACK CUSHIONS
7 – SEAT BACK FRAMES
8 – RIGHT SEAT AIRBAG MODULE

POWER SEAT SYSTEM

DESCRIPTION

Power seats can be adjusted in 8 different directions:

- Up or down
- Forward or back
- Tilt forward or rearward
- Recliner up or down

OPERATION

Two single armature permanent magnet reversible motors are coupled through cables to worm gear box assemblies. They are located in the seat tracks and upper supports. The two single gear motor assemblies attach to the seat tracks provide the various seat movements.

The electrical circuit is protected by a 20 amp circuit breaker located on the Junction Block and a 40 amp fuse in the Power Distribution Center.

POSITION SENSING POWER SEAT POTENTIOMETERS

DESCRIPTION

A potentiometer is mounted to each seat motor to provide a sense voltage to the MHSMM that will indicate where the actual seat position is.

OPERATION

This sense voltage is derived from a 5-volt source provided by the module to the potentiometer. The MHSMM reads this sense voltage and stores it if required.

POWER SEAT SWITCH

DESCRIPTION

The seat switch assembly is mounted outboard in the seat cushion side cover.

OPERATION

Activating any seat switch will move the seat in the corresponding direction. The MHSMM will drive a maximum of two motors at a time in a given direction. If conflicting directions are requested, the priorities for responses are as follows:

- Seat Track Rearward
- Seat Front Down

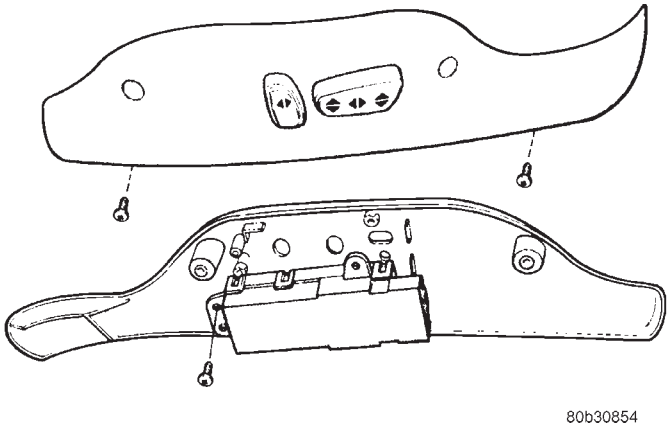


Fig. 2 Power Seat Switch

- Seat Rear Down
- Seat Recliner Rearward
- Seat Track Forward
- Seat Front Up
- Seat Rear Up
- Seat Recliner Forward

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURE

Before any testing is attempted the battery should be carefully charged and all connections and terminals cleaned and tightened to insure proper continuity and grounds.

With dome lamp on, apply switch in direction of failure. If dome lamp dims the seat motor is trying to work indicating mechanical jamming. If dome lamp does not dim, then proceed with the following electrical tests.

CIRCUIT BREAKER

Find correct circuit breaker on fuse block. Pull out slightly but be sure that circuit breaker terminals still contact terminals in fuse block. Connect ground wire of voltmeter to a good ground. With probe of voltmeter positive wire, check both terminals of circuit breaker for battery voltage. If only one terminal checks at battery voltage, circuit breaker is defective and must be replaced. If neither terminal shows battery voltage, check for open or shorted circuit to circuit breaker.

DIAGNOSIS AND TESTING (Continued)

POWER SEAT SWITCH DIAGNOSTIC TEST

The Power Seat Switch Diagnostic Test can be used to test whether the switch activations are being recognized by the MHSMM.

ACTIVATION

The Power Seat Switch Diagnostic Test can only be activated by sending the proper PCI bus command via the DRB lll scan tool to enter diagnostic test number 2.

Upon activation of the test the operator has ten seconds to activate all switches, manual seat switches - all 8 directions, 3 memory switches, and both driver and passenger heat HI and LO requests, but not including the mirrors.

At the conclusion on the ten-second period, the MHSMM can be requested to provide both Pass/Fail test information. A Pass condition occurs only if all the switches are activated. If any of the switches are not activated, Fail will be registered.

Should a Fail condition occur, the individual switch information could be accessed using the proper commands on the DRB lll scan tool.

MOTOR TESTS

(1) Remove power seat switch from seat. Refer to Seat Switch Removal and Installation in this group.

(2) Disconnect wire harness connector.

(3) Check Pin 1 for battery voltage and Pin 5 for ground.

(4) To test the seat motors and verify proper seat responses, refer to (Fig. 3) and the Seat Motor Test table. Using two jumper wires, connect one to a battery supply and the second to a ground. Connect the other ends to the seat wire harness connector as described in the Seat Motor Test table.

SWITCH TEST

(1) Remove switch, refer to Switch Removal and Installation in this section.

(2) Using an ohmmeter, perform the Seat Switch Continuity Test table and (Fig. 4). If there is no continuity at any of the switch positions, replace switch.

VOLTAGE

The following test will determine whether or not voltage is continuous through the body harness to the seat switch.

NOTE: POWER IS SUPPLIED TO THE SEAT THROUGH THE FOUR PIN AIRBAG WIRE CONNECTOR. LOCATED DIRECTLY UNDER THE SEAT (Fig. 5).

SEAT MOTOR TEST

SEAT CONNECTOR			
CONNECT JUMPER		SEAT ACTION	
B (+)	B (-)	DRIVER SIDE	PASSENGER SIDE
PIN 9	PIN 6	FRONT RISER UP	FRONT RISER DOWN
PIN 6	PIN 9	FRONT RISER DOWN	FRONT RISER UP
PIN 10	PIN 3	FORWARD	FORWARD
PIN 3	PIN 10	REARWARD	REARWARD
PIN 8	PIN 7	REAR RISER UP	REAR RISER DOWN
PIN 7	PIN 8	REAR RISER DOWN	REAR RISER UP
PIN 4	PIN 2	RECLINER UP	RECLINER UP
PIN 2	PIN 4	RECLINER DOWN	RECLINER DOWN

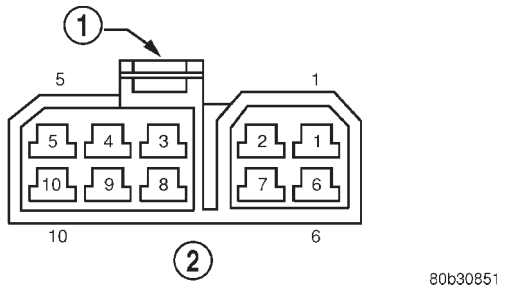


Fig. 3 Power Seat Wire Harness Pin Call-Out

1 – BLUE
2 – VIEWED FROM TERMINAL END

WARNING: NEVER TEST SEAT CIRCUITS BY PROBING AIRBAG WIRE HARNESS CONNECTOR PINS (Fig. 5). THE AIRBAG WIRE CONNECTOR CAN BE IDENTIFIED BY ITS YELLOW COLOR (Fig. 5). CAREFULLY FOLLOW THE TEST PROCEDURES CALLED OUT IN THIS GROUP OF THE SERVICE MANUAL TO DIAGNOSE POWER SEATS EQUIPPED WITH AIRBAGS. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT, RESULTING IN SERIOUS PERSONAL INJURY.

(1) Remove the front seat cushion side shield from the seat to be tested. Refer to Group 23, Body for the procedure.

DIAGNOSIS AND TESTING (Continued)

SEAT SWITCH CONTINUITY TEST

SWITCH POSITION	CONTINUITY BETWEEN PINS	
	DRIVER	PASSENGER
OFF	PIN 5 TO 4 PIN 5 TO 3 PIN 5 TO 2 PIN 5 TO 10 PIN 5 TO 9 PIN 5 TO 8 PIN 5 TO 7 PIN 5 TO 6	PIN 5 TO 4 PIN 5 TO 3 PIN 5 TO 2 PIN 5 TO 10 PIN 5 TO 9 PIN 5 TO 8 PIN 5 TO 7 PIN 5 TO 6
FRONT RISER UP	PIN 5 TO 6 PIN 1 TO 9	PIN 5 TO 9 PIN 1 TO 6
FRONT RISER DOWN	PIN 5 TO 9 PIN 1 TO 6	PIN 5 TO 6 PIN 1 TO 9
CENTER SWITCH FORWARD	PIN 5 TO 3 PIN 1 TO 10	PIN 5 TO 3 PIN 1 TO 10
CENTER SWITCH REARWARD	PIN 5 TO 10 PIN 3 TO 1	PIN 5 TO 10 PIN 3 TO 1
REAR RISER UP	PIN 5 TO 7 PIN 1 TO 8	PIN 5 TO 8 PIN 1 TO 7
REAR RISER DOWN	PIN 5 TO 8 PIN 1 TO 7	PIN 5 TO 7 PIN 1 TO 8
RECLINER UP	PIN 5 TO 2 PIN 4 TO 1	PIN 5 TO 2 PIN 4 TO 1
RECLINER DOWN	PIN 5 TO 4 PIN 2 TO 1	PIN 5 TO 4 PIN 2 TO 1

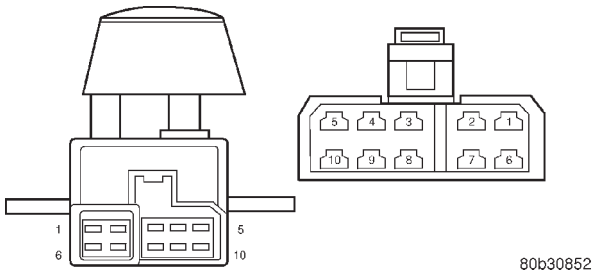


Fig. 4 Seat Switch Pin Call-Out

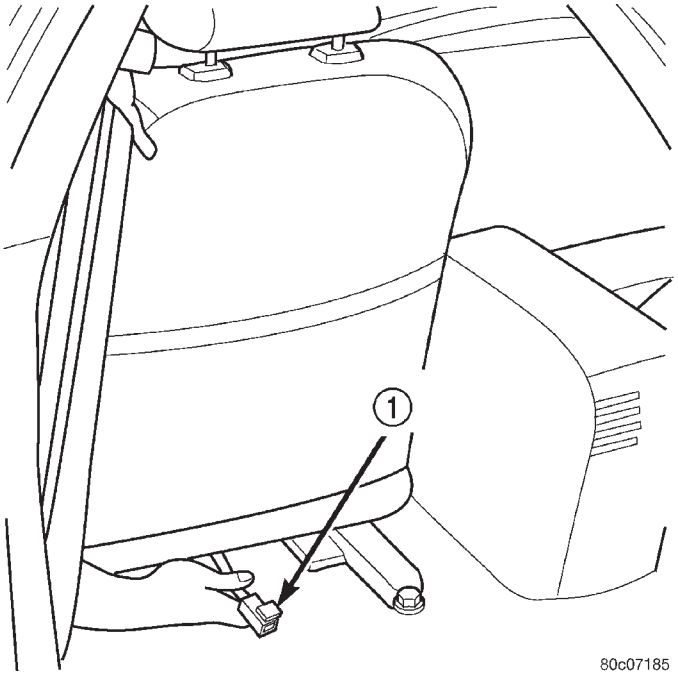


Fig. 5 Seat / Side Airbag Connector Location

1 – WARNING— AIRBAG CONNECTOR DO NOT PROBE

(2) Using a voltmeter, connect the ground lead to Pin 5 and positive lead to Pin 1 of the seat switch connector. If battery voltage is present circuit is OK. If no voltage is present check circuit breaker and repair as necessary.

WARNING: NEVER TEST SEAT CIRCUITS BY PROBING AIRBAG WIRE HARNESS CONNECTOR PINS (Fig. 5). THE AIRBAG WIRE CONNECTORS CAN BE IDENTIFIED BY THERE YELLOW COLOR. CAREFULLY FOLLOW THE TEST PROCEDURES CALLED OUT IN THIS GROUP OF THE SERVICE MANUAL TO DIAGNOSE POWER SEATS EQUIPPED WITH AIRBAGS. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT, RESULTING IN SERIOUS PERSONAL INJURY.

REMOVAL AND INSTALLATION

SEAT ASSEMBLY

Refer to Group 23–Body, Front Seat Removal and Installation.

SEAT ADJUSTER

REMOVAL

(1) Seat removed from vehicle. Using a clean area to place seat.

(2) Remove two seat back mounting screws and also remove two seat back recliner screws (Fig. 6).

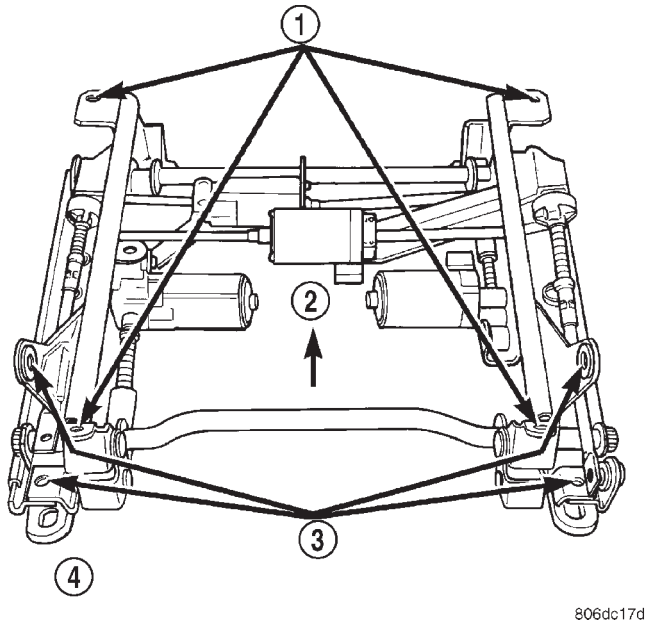


Fig. 6 Seat Adjuster Removal

1 – TRACK TO SEAT CUSHION SCREWS
2 – FRONT
3 – SEAT BACK RECLINER SCREWS
4 – VIEWED FROM TOP OF TRACK

(3) Remove four seat adjuster mounting screws from cushion pan.

(4) Remove adjuster from seat.

INSTALLATION

For installation, reverse the above procedure.

SEAT SWITCH

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 7).

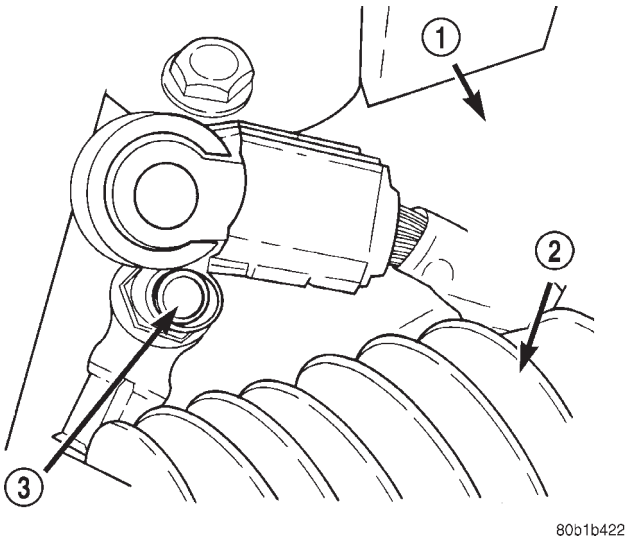


Fig. 7 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Remove the seat cushion side shield. Refer to Group 23, Body for the procedure.

(3) Disconnect wiring from switch.

(4) Remove knobs from the switch by gently prying straight off..

(5) Remove the switch attaching screws.

(6) Remove switch from cushion side shield

INSTALLATION

For installation, reverse the above procedure.

MEMORY SEATS

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DESCRIPTION AND OPERATION

MEMORY SEAT SYSTEM

DESCRIPTION

The Memory Heated Seat and Mirror Module (MHSMM) is located underneath the front of the driver seat. It is mounted unto the bottom of the seat by two screws. The connections to the system are through a seat wiring harness that interfaces with all of the components within the seat structure.

OPERATION

The MHSMM system allows the driver to adjust the seat, both driver and passenger side mirrors, and the radio stations to his/her preference and store them in memory. There are two memory locations available for two driver positions to be stored. The module will also allow either of the two positions to be recalled upon request.

The MHSMM reads all seat switch inputs and operates the seat motors according to which switch is being actuated. The MHSMM monitors position sensing potentiometers (mounted on the motors) for seat track positioning.

The MHSMM uses solid state drivers (electronic switches) to control motor activation for both driver and passenger side mirrors. Each mirror has vertical and horizontal motors, that contain potentiometers used to located the actual mirror position for recall purposes. Normal electrical operation of the mirrors is accomplished by actuating the power mirror switch and doesn't require the use of the module.

The MHSMM monitors the memory switches and has the capability to store desired positions in memory in response to a valid input sequence. Refer to Memory Selector Switches (1, 2, and S) and Remote Keyless Entry (RKE). The memory heated seat and mirror module will activate the seat and mirror motors in response to a recall request from an individual memory switch. The positioning of the motors is determined by the potentiometer values stored in memory.

The module operates the seat motors through relays: four dedicated to track horizontal forward/rearward, front vertical up/down, rear vertical up/down, and recliner forward/rearward. A fifth relay controls the direction of operation of these motors.

GLIDE FEATURE

DESCRIPTION

The MHSMM shall incorporate a seat glide feature. When exiting the vehicle and the ignition switch is removed, the glide feature will then activate.

OPERATION

This feature will allow easier entry and exit to the vehicle by moving the seat rearward a short distance when the operator leaves the vehicle and returning the seat to its original position when the vehicle operator returns and turns the ignition ON or extends their seat belt.

DESCRIPTION AND OPERATION (Continued)

MEMORY SELECTOR SWITCH

DESCRIPTION

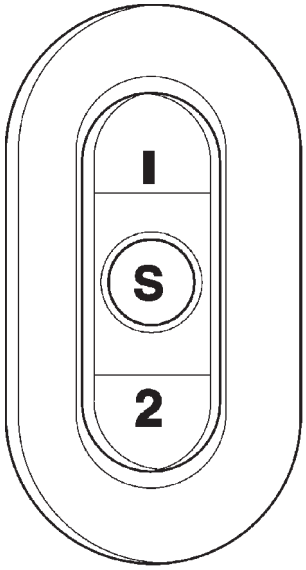


Fig. 1 Memory Selector Switch

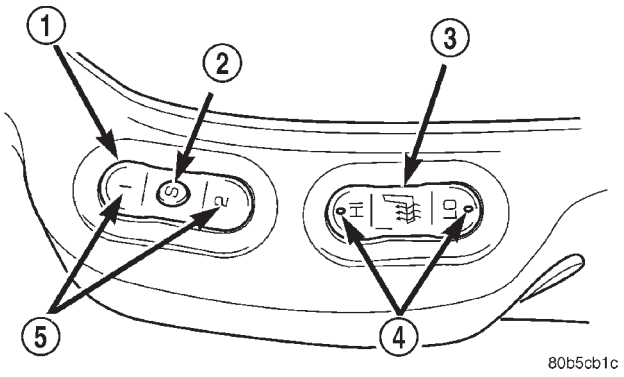


Fig. 2 Memory Selector Switch Location

1 – MEMORY SELECTOR SWITCH
2 – DRIVER POSITION SET
3 – HEATED SEAT SWITCH
4 – LED'S
5 – DRIVER POSITION

The memory selector switches are mounted on the cushion cover side shield of the driver eat within easy reach of the driver. They provide a means to set and recall either of the two positions of seat and recliner, and the side view mirror as chosen by the driver.

OPERATION

The proper procedure of setting and recalling a memory position using the memory switches is as follows:

(1) Adjust the seat, recliner and side view mirrors to the desired position.

(2) Press momentarily and release memory switch S.

(3) Press momentarily and release memory switch 1 or 2.

(4) To program the second driver's position, repeat the above procedure using the remaining memory switch.

(5) To recall either of the programmed positions momentarily press and release either memory selector switch 1 or 2.

DIAGNOSIS AND TESTING

GLIDE FEATURE

If seat isn't sliding forward properly:

(1) First use the DRB scan tool to check whether glide feature is enabled or not. Enable glide feature if disabled, and go to Step 2.

(2) Turn the ignition ON and then back OFF. Remove the key. If seat glides rearward, reinsert key and turn to ON position. If seat doesn't glide forward, go to Step 3, otherwise the problem has been fixed. If Learn Guard Bands test has been run and problem persists, then replace MHSMM.

(3) Now run Learn Guard Bands Diagnostic test as shown in this section, and go through Step 2 again.

SERVICE PROCEDURES

REMOTE KEYLESS ENTRY (RKE)

The MHSMM interfaces with the RKE vial the Programmable Communication Interface (PCI) bus. The proper procedure of setting and recalling a memory position using the RKE is as follows:

(1) Press memory switch 1 and release to recall memory position 1.

(2) Adjust the seat, recliner and side view mirrors to the desired position.

(3) Press momentarily and release memory switch S.

(4) Press momentarily and release memory switch 1 or 2.

SERVICE PROCEDURES (Continued)

(5) Press and release the UNLOCK button on one of the RKE transmitters. Do NOT press any switch for 10 seconds.

(6) Set radio station presets.

To program the second driver's position, repeat the above procedure using memory switch 2. The second RKE transmitter can be programmed in the fashion.

To recall either of the programmed positions momentarily press and release either memory selector switch 1 or 2. If using RKE, just press and release the UNLOCK button on the proper transmitter for either position 1 or 2.

A recall is possible any time the vehicle transmission is in PARK. This condition is monitored by the Body Control Module (BCM).

NOTE: The module will abort a recall if the transmission is moved out of park or if any seat movement is activated whether manually or by memory recall.

REMOVAL AND INSTALLATION

MEMORY HEATED SEAT/MIRROR MODULE (MHSMM)

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Remove two module attaching screws (Fig. 3).

(3) Disconnect four module connectors.

(4) Remove module from vehicle.

INSTALLATION

For installation, reverse the above procedures.

MEMORY SELECTOR SWITCH

REMOVAL

(1) Disconnect and isolate the negative battery cable remote terminal from the remote battery post.

(2) Unscrew the side shield on the seat, either driver or passenger side (Fig. 4).

(3) From the bottom, disengage the switch and gently rock through the opening.

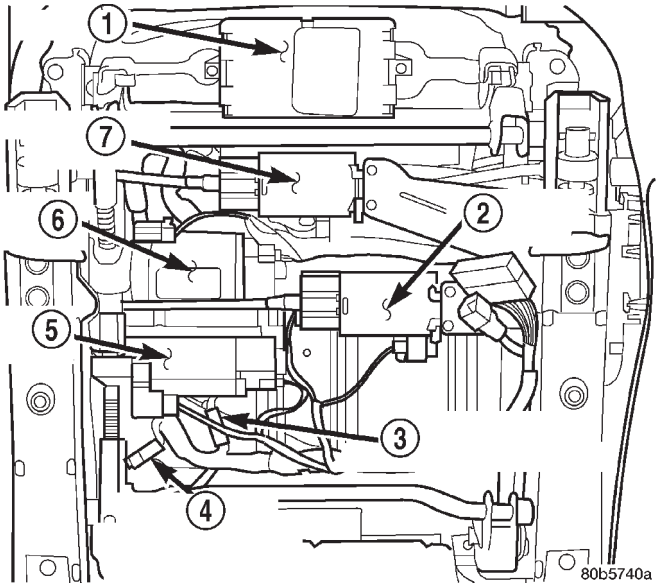


Fig. 3 Memory Heated Seat/Mirror Module Location

1 – MHSMM
2 – RECLINER MOTOR
3 – SEAT HEATER 4–WAY CONNECTOR
4 – SEAT BACK HEATER 2–WAY CONNECTOR
5 – REAR RISER
6 – FRONT RISER
7 – HORIZONTAL MOTOR

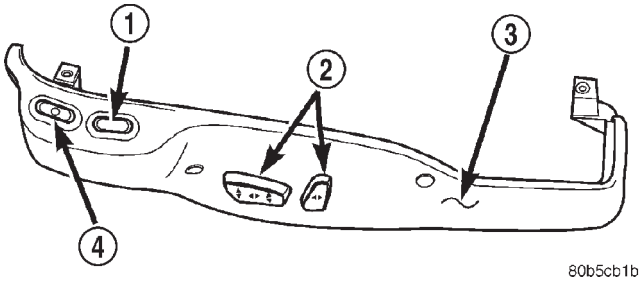


Fig. 4 Seat Cushion Side Shield

1 – HEATED SEAT SWITCH
2 – POWER SEAT SWITCH
3 – SEAT CUSHION SIDE SHIELD
4 – MEMORY SELECTOR SWITCH

INSTALLATION

For installation, reverse the above procedures.

2000 LHS, 300M, CONCORDE AND INTREPID

POWER WINDOW SYSTEMS

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DESCRIPTION AND OPERATION

POWER WINDOW SYSTEMS

DESCRIPTION

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on the trim panel of each respective door. A master switch on the driver side front door trim panel allows the driver to raise or lower each of the passenger door windows, and to lock out the individual switches on the passenger doors from operation. The power window system receives battery feed through a circuit breaker in the junction block, only when the ignition switch is in the On position.

The power window system includes the power window switches on each door trim panel, the circuit breaker in the junction block, and the power window motors inside each door. For service of mechanical components, such as the regulator, lift plate, window tracks, or glass refer to Group 23 - Body.

OPERATION

Front and rear door window lift motors are of the permanent magnet type. A battery positive and negative connection to either of the two motor terminals will cause the motor to rotate in one direction. Reversing current through these same two connections will cause the motor to rotate in the opposite direction.

Each individual motor is grounded through the master switch.

DIAGNOSIS AND TESTING

VOLTAGE

The following circuit test sequence determines whether or not voltage is continuous through the body harness to switch.

(1) Remove the driver door trim panel. Refer to Group 23, Body for proper procedures.

(2) Carefully separate wiring harness connector from switch body. Refer to Group 8W, Wiring Diagrams.

(3) Using a voltmeter, connect the ground lead to the Pin 10 of the wiring harness connector.

(4) Using the positive lead, check Pin 1 of the harness connector for battery voltage. If OK, go to Window Switch Test below. If not OK, check 20 amp circuit breaker in the Junction Block, if the circuit breaker is OK, repair wire as necessary. For wiring, specific connector type and location, refer to Group 8W, Wiring Diagrams.

WINDOW MOTOR

(1) Remove door trim panel, refer to Group 23, Body for Removal and Installation procedures.

(2) Connect positive (+) lead from a test battery to either of the two motor terminals.

(3) Connect negative (-) lead from test battery to remaining motor terminal.

(4) The motor should now rotate in one direction to either move window up or down.

(a) If window happens to already be in full UP position and motor is connected so as to move it in UP direction no movement will be observed.

(b) Likewise, motor connected to move window in DOWN direction no movement will be observed if window is already in full DOWN position.

(c) Reverse battery leads in Step 1 and Step 2 and window should now move. If window does not move, remove motor. See below for motor removal from vehicle.

(5) If window moved completely up or down, the test leads should be reversed one more time to complete a full window travel inspection.

(6) If window does not move, check to make sure that it is free.

(7) It is necessary that the window be free to slide up and down in the glass channels. If the window is not free to move up and down, the window lift motor will not be able to move the glass.

DIAGNOSIS AND TESTING (Continued)

(8) To determine if the glass is free is to disconnect the regulator from the glass lift plate. Remove the two attaching screws, and slide the window up and down by hand.

WINDOW SWITCH

For switch testing, remove the switch from its mounting, refer to Switch Removal. Using an ohmmeter, refer to Window Switch Continuity Charts to determine if continuity is correct (Fig. 1) and (Fig. 2). If the results are not obtained, replace the switch.

The master window switch has an Auto-Down feature. Actuation of the master switch to the second down detent position will move the drivers side window completely down. The electronic switch will automatically disconnect the motor approximately 1 second after the window bottoms out. Failure of the electronic switch to detect stall current, will cause the switch to disconnect after approximately 15 seconds of operation. The auto down function can be canceled by any movement of the switch.

REMOVAL AND INSTALLATION

WINDOW MOTOR

WARNING: DO NOT HAVE ANY HANDS OR FINGERS IN SECTOR GEAR AREA WHERE THEY CAN BE PINCHED BY SMALL MOVEMENTS OF REGULATOR LINKAGE.

REMOVAL

(1) Move the window to the full-up position, if possible.

(2) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(3) Remove door trim panel and window regulator, refer to Group 23, Body for Removal and Installation procedures.

WARNING: FAILURE TO CLAMP THE SECTOR GEAR TO THE MOUNTING PLATE WHEN REMOVING THE MOTOR CAN RESULT IN INJURY.

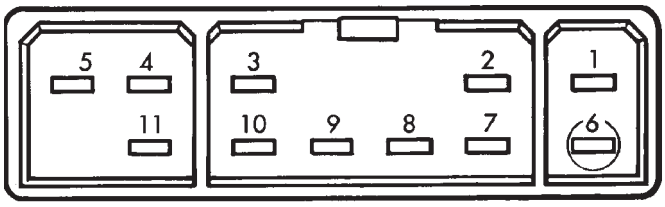
(4) Disconnect wiring connector from motor.

(5) Secure the sector gear and mounting plate with a C clamp or similar clamping tool. This will prevent a sudden and forceful movement of the regulator when the motor is removed.

(6) Remove three mounting screws that hold motor gearbox to regulator (Fig. 3).

(7) Remove motor from regulator.

SWITCH POSITION		CONTINUITY BETWEEN TERMINALS
	OFF	PIN 8 to 10
		PIN 8 to 11
		PIN 8 to 7
		PIN 8 to 6
		PIN 8 to 3
		PIN 8 to 4
		PIN 8 to 9
		PIN 8 to 2
UP	DRIVER'S	PIN 8 to 10
		PIN 5 to 11
UP	RIGHT FRONT	PIN 8 to 7
		PIN 5 to 6
UP	LEFT REAR	PIN 8 to 3
		PIN 5 to 4
UP	RIGHT REAR	PIN 8 to 9
		PIN 5 to 2
DOWN	DRIVER'S	PIN 8 to 11
		PIN 5 to 10
DOWN	RIGHT FRONT	PIN 8 to 6
		PIN 5 to 7
DOWN	LEFT REAR	PIN 8 to 4
		PIN 5 to 3
DOWN	RIGHT REAR	PIN 8 to 2
		PIN 5 to 9
WINDOW LOCK		PIN 5 to 1



938S-2

Fig. 1 Master Window Switch

INSTALLATION

(1) Install new motor on regulator by positioning motor gearbox so that it engages regulator sector teeth.

(2) A slight rotational or rocking movement may be necessary to bring three motor gearbox screw holes into proper position.

REMOVAL AND INSTALLATION (Continued)

SWITCH POSITION	CONTINUITY BETWEEN TERMINALS
OFF′	PIN 2 to 5
	PIN 6 to 3
UP	PIN 6 to 3
	PIN 4 to 5
DOWN	PIN 2 to 5
	PIN 4 to 3

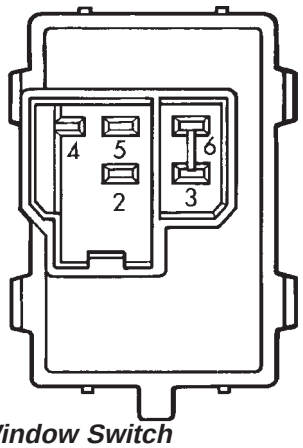


Fig. 2 Passenger Window Switch

9485-5

(3) Install three gearbox screws and one tie down bracket screw, if applicable. Tighten to 5.6 to 8 N·m (50 to 70 in. lbs.) torque.

(4) Install regulator, using the switch, test operation of motor.

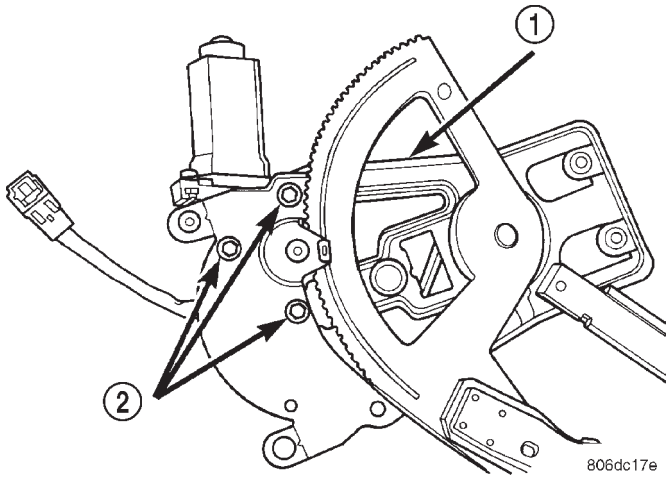


Fig. 3 Motor Removal

1 – CLAMP REGULATOR TO SECTOR GEAR
2 – MOTOR MOUNTING SCREWS

WINDOW SWITCHES

MASTER SWITCH

REMOVAL

INTREPID AND CONCORDE

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Remove driver's door trim panel. Refer to Group 23-Body, Front Door Trim Removal and Installation.

(3) Remove three mounting screws.

(4) Remove switch and disconnect wire connector.

LHS and 300M

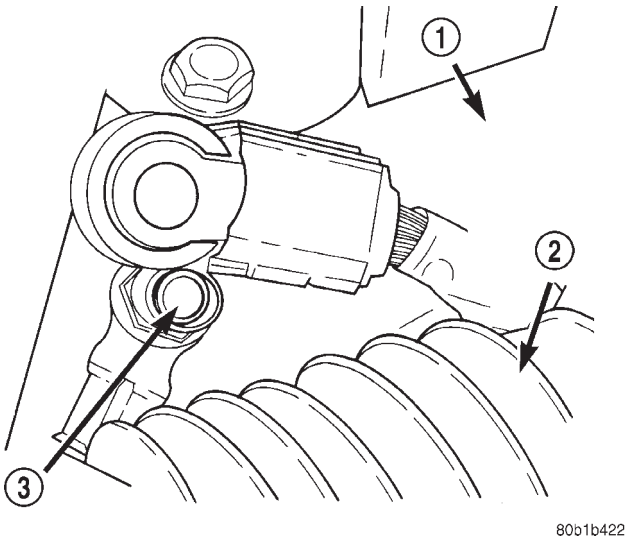


Fig. 4 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(5) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(6) Using a trim stick (special tool #C-4755) or equivalent, gently pry up on switch trim bezel and lift up and out of trim panel.

(7) Disconnect wire connector from rear of switch and remove switch from vehicle.

INSTALLATION

For installation, reverse the above procedures.

PASSENGER SWITCH

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Remove passenger door trim panel. Refer to Group 23-Body, Front Door Trim Removal and Installation.

(3) Disconnect switch wire connector.

(4) Remove switch from bezel and vehicle.

INSTALLATION

For installation, reverse the above procedures.

REAR DOOR SWITCHES

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 4).

(2) Open rear door.

REMOVAL AND INSTALLATION (Continued)

(3) Using a trim stick (special tool #C-4755), gently pry up on rear edge of switch pushing forward as you pry up on switch bezel.

(4) Pull switch up and out of rear door trim panel.

(5) Using a trim stick, gently pry out on retaining tabs on side of switch connector and pull connector from switch.

(6) Remove switch from vehicle.

INSTALLATION

For installation, reverse the above procedures.

POWER MIRROR SYSTEMS

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MIRROR SWITCH 3

DESCRIPTION AND OPERATION

INTRODUCTION

DESCRIPTION

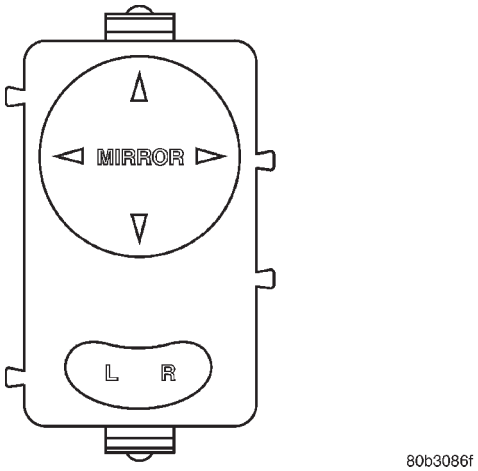


Fig. 1 Power Mirror Switch

Power mirrors are controlled by a single switch assembly located on the driver's door trim panel. The switch has a rocker button marked L (left) and R (right) for mirror selection and a single platform button for mirror UP, DOWN, RIGHT and LEFT movement.

The motors which operate the mirrors are part of the mirror assembly and cannot be replaced separately.

OPERATION

The vehicle is equipped with an Ignition-Off Draw Fuse which is used when it is originally shipped from the factory. This fuse is located in the Junction Block and helps to prevent battery discharge during storage when disconnected.

This fuse is included in the power mirror circuity and should be checked if the mirrors are inoperative.

HEATED MIRROR

DESCRIPTION

Heated mirrors are available with Memory Mirrors and Rear Window Defogger only.

OPERATION

The heated mirror is controlled by the rear window defogger switch. Only time that the heated mirror is on is when the rear window defogger is on. The mirror should become warm to the touch.

POWER SIDE VIEW MIRROR POSITION SENSING

DESCRIPTION

The mirror switch on the door trim panel operates both the outside rear view mirrors. On vehicles equipped with Memory/Heated Seats, the Memory Heated Seat Mirror Module (MHSMM) activates the mirror motors in recall mode.

OPERATION

Position sensing potentiometers built into each mirror's vertical and horizontal motor assembly. These potentiometers provide a sense voltage to the MHSMM that indicates where the actual location of each mirror is. If a memory position is set, the values of the potentiometers at that location are stored in memory.

DIAGNOSIS AND TESTING

AUTOMATIC DAY/NIGHT INSIDE MIRROR

Operational test:

- Turn ignition switch to the ON position with the vehicle in park.
- Place mirror switch in the high position.
- Cover the forward facing sensor with dark cloth to keep out any ambient light.
- Shine a light into the rear facing sensor, watch to see if the mirror darkens.

With the mirror darkened, place the vehicle in reverse, the mirror should return to its normal condition.

If the above conditions are met the mirror is operating properly. If not OK, test voltage.

Test three way connector harness.

(1) Pin 1 Ignition Switch in run position, should have battery voltage.

(2) Pin 2 Should have continuity to Ground.

(3) Pin 3 Senses when the transmission is in reverse. There should be battery voltage present when transmission is in the reverse position.

(4) If test is OK replace Mirror.

(5) If not refer, to Group 8W, Wiring Diagrams manual to test the circuits.

HEATED MIRROR

(1) Check fuse 1 in the Junction Block and repair as necessary.

(2) Using a ohmmeter, check Pin 1 of the mirror motor harness connector for continuity to ground. If OK, go to Step 3. If not OK, repair as necessary. Refer to Group 8W, Wiring Diagrams for proper Pin location.

(3) Activate the rear window defogger switch, use a voltmeter and check Pin 3 for battery voltage.

(a) If OK, go to Step 4. If not OK, Step b

(b) Check rear window defogger switch, refer to Group 8N, Electrically Heated Systems. If OK, go to Step c. If not OK, repair as necessary.

(c) If no voltage repair wire as necessary. Refer to Group 8W, Wiring Diagrams.

(4) Remove mirror glass and check wires. If wires are OK, replace mirror glass. If not OK, repair as necessary or replace mirror.

MIRROR MOTOR

(1) Using a trim stick, remove power mirror switch from mounting position.

(2) Disconnect wire harness connector.

(3) Using two jumper wires, one connected to a 12 volt source, and the other connected to a good body ground. Jumpers are applied to the mating switch connector on the wire harness. Refer to the Mirror Test table and (Fig. 2) for appropriate mirror response.

(4) If test results are not obtained as shown in the (Fig. 2), check for open or shorted circuit, or replace mirror assembly as necessary.

MIRROR TEST

MIRROR SWITCH CONNECTOR			
B (+)	B (-)	MIRROR REACTION	
		LEFT	RIGHT
PIN 12	PIN 6		UP
PIN 13	PIN 1	UP	
PIN 6	PIN 12		DOWN
PIN 1	PIN 13	DOWN	
PIN 6	PIN 7		RIGHT
PIN 1	PIN 8	RIGHT	
PIN 7	PIN 6		LEFT
PIN 8	PIN 1	LEFT	
DOOR CONNECTOR			
PIN 6	PIN 2	UP	
PIN 2	PIN 6	DOWN	
PIN 2	PIN 5	RIGHT	
PIN 5	PIN 2	LEFT	
PIN 1	PIN 3	HEATER	

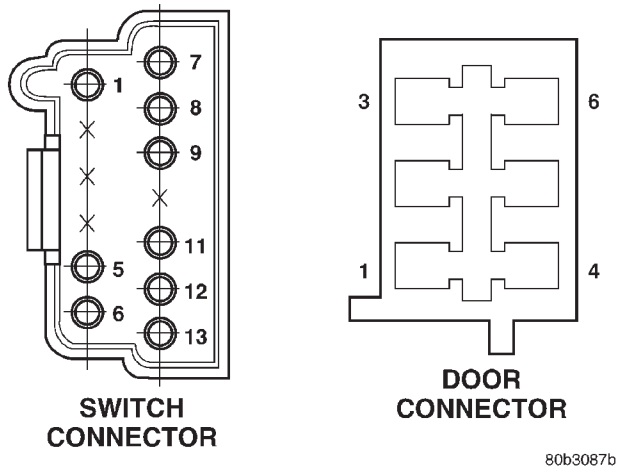


Fig. 2 Connector Pin Call-Out

MIRROR SWITCH

(1) Remove trim panel. Refer to Group 23, Body for Removal and Installation procedures.

(2) Disconnect wire harness connector from back of power mirror switch.

(3) Disengage lock tabs at both ends of switch and remove power mirror switch from door trim panel.

DIAGNOSIS AND TESTING (Continued)

(4) Using an ohmmeter, test for continuity between the terminals of the switch (Fig. 3) as shown in the Mirror Switch Test table.

(5) If test results are not obtained as shown in the Mirror Switch Test table, replace the switch.

MIRROR SWITCH TEST

SWITCH POSITION MOVE BUTTON	CONTINUITY BETWEEN TERMINALS
MIRROR IN “L” POSITION	
UP	PIN 11 TO 12 PIN 12 TO 13 PIN 9 TO 1
RIGHT	PIN 11 TO 1 PIN 9 TO 7 PIN 9 TO 8
DOWN	PIN 11 TO 1 PIN 9 TO 12 PIN 9 TO 13
LEFT	PIN 11 TO 7 PIN 11 TO 8 PIN 9 TO 1
MIRROR IN “R” POSITION	
UP	PIN 11 TO 12 PIN 11 TO 13 PIN 9 TO 2
RIGHT	PIN 11 TO 6 PIN 9 TO 7 PIN 9 TO 8
DOWN	PIN 11 TO 6 PIN 9 TO 12 PIN 9 TO 13
LEFT	PIN 11 TO 7 PIN 11 TO 8 PIN 9 TO 6

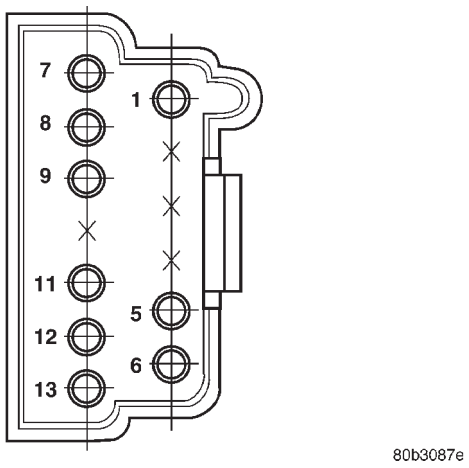


Fig. 3 Mirror Switch Connector Pin Call-Out

REMOVAL AND INSTALLATION

MIRROR SWITCH

REMOVAL

(1) Remove the door trim panel. Refer to Group 23, Body for Removal and Installation procedures.

(2) Disconnect wire connector from back of power mirror switch.

(3) Disengage lock tabs at both ends of switch and remove switch from door trim panel.

INSTALLATION

For installation, reverse the above procedures.

MIRROR SWITCH

REMOVAL

(1) Using a trim stick, remove power mirror switch from mounting position.

(2) Disconnect wire connector.

(3) Remove switch.

INSTALLATION

For installation, reverse the above procedures.

CHIME/BUZZER WARNING SYSTEMS

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DESCRIPTION AND OPERATION

CHIME/BUZZER WARNING SYSTEM

WARNING: ON VEHICLES EQUIPPED WITH AN AIR-BAG, REFER TO GROUP 8M, PASSIVE RESTRAINT SYSTEMS FOR STEERING WHEEL REMOVAL AND INSTALLATION.

DESCRIPTION

The Chime/Buzzer Warning System includes the following:

- **Exterior Lamps Left On chime.** An audible chime indicates the exterior lamps were left on.
- **Fasten Seat Belts chime.** A warning lamp on the instrument panel, and an audible chime are used as the fasten seat belt warning/reminder.
- **Key left in ignition chime.** An audible chime that indicates the ignition key was left in the ignition.

OPERATION

When using the DRB lll® scan tool, refer to the proper Body Diagnostic Procedures Manual. Refer to Group 8W, Wiring Diagrams for circuit information.

DESCRIPTION AND OPERATION (Continued)

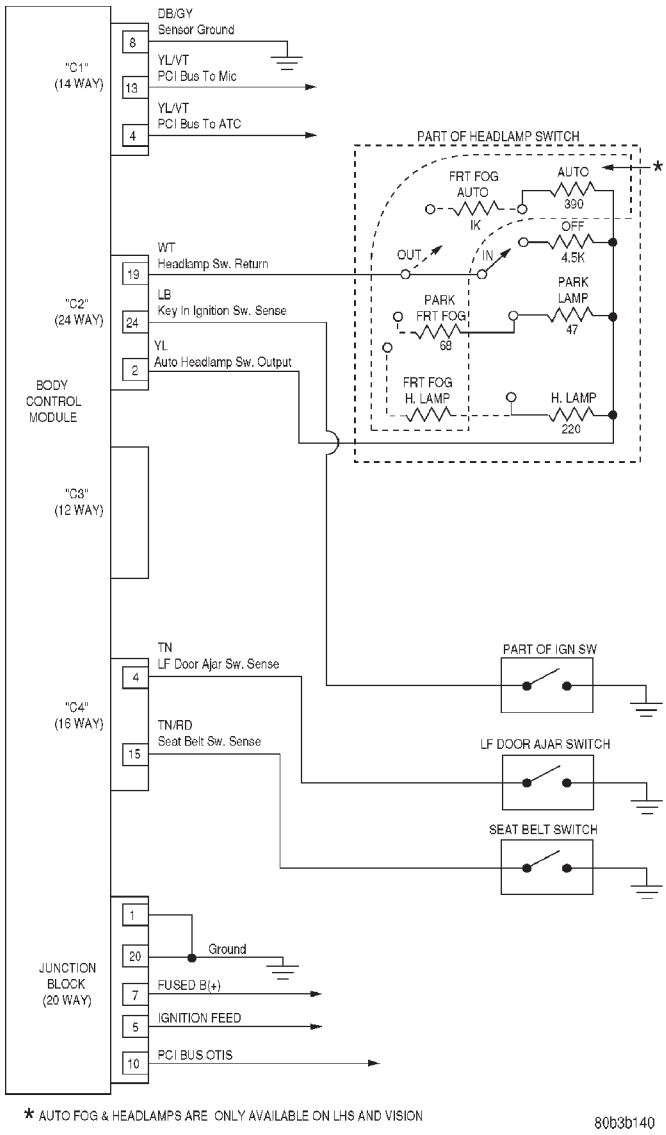


Fig. 1 Chime/Buzzer Warning System Schematic

DIAGNOSIS AND TESTING

CHIME CONDITIONS

No tone when ignition switch is turned on and drivers seat belt is unbuckled and fully retracted.

(1) Check driver's seat belt retractor switch for a ground when belt is unbuckled.

(2) Use a DRB lll® scan tool to perform PCI bus diagnostics on the Body Control Module (BCM) for battery, ignition and seat belt switch input.

(3) Use a DRB lll® scan tool to perform actuator diagnostics on BCM chime.

(4) Check for battery feed at terminal J1-7 and ignition feed at terminal J1-5 of the BCM connector.

(5) Check for tone in any other function.

No fasten seat belt lamp when ignition switch is turned on.

(1) Use DRB lll® scan tool to perform PCI bus diagnostics on BCM for battery and ignition switch input

(2) Check for burned out bulb.

(3) Using the DRB lll® scan tool, do the actuator test on cluster. Refer to proper Body Diagnostic Procedures Manual.

(4) Check for battery feed at terminal J1-7 of the BCM connector.

(5) Check for ignition feed at terminal J1-5 of the BCM connector.

DIAGNOSIS AND TESTING (Continued)

Fasten seat belt lamp or tone continue for more than 10 seconds after seat belts are fastened and ignition ON.

(1) Use DRB lll® scan tool to perform PCI bus diagnostics on BCM for battery and ignition switch input.

(2) Inspect the BCM connectors and wires for proper connection.

No tone when headlamps are on, ignition switch is OFF and driver's door is open.

(1) Using a DRB lll® scan tool, check drivers door ajar switch for good ground when driver's door is open.

(2) Use DRB lll® scan tool to perform PCI bus diagnostics on BCM for battery, ignition switch input, headlamp switch and driver's door input and Chime Output Test.

(3) Inspect BCM connectors and wires for proper connection.

(4) Check for battery feed at terminal J1-7 of BCM connector.

(5) Check headlamp switch.

No tone when key is left in ignition. Ignition switch is in the OFF position and driver's door is open.

(1) Using a DRB lll® scan tool, check drivers door ajar switch for good ground when driver's door is open.

(2) Use DRB lll® scan tool to perform PCI bus diagnostics on BCM for battery, ignition switch input, key-in-switch and driver's door input and Chime Output Test.

(3) Inspect BCM connectors and wires for proper connection.

(4) Check for battery feed at terminal J1-7 of BCM connector.

(5) Check key-in switch.

Chimes continue when headlamps are turned off and/or key is removed from ignition.

(1) Use DRB lll® scan tool to perform PCI bus diagnostics on BCM for headlamp or key-in-ignition inputs.

(2) Check wiring for a grounded condition between key-in switch and BCM.

(3) Inspect the BCM connectors and wires for proper connection.

EXTERIOR LAMPS LEFT ON

To test the headlamps left on function, remove the ignition key, turn exterior lamps on with driver's door open. Chime should sound until headlamps are turned off or drivers door is closed.

FASTEN SEAT BELTS

To test the fasten seat belt function, start with the ignition switch in the OFF position. Turn the ignition switch to the ON position with the driver's seat belt unbuckled. The seat belt warning lamp should light for 4 to 8 seconds and the tone should sound 4 to 8 seconds.

KEY LEFT IN IGNITION

To test the key left in ignition function, the ignition switch must be in the OFF position with key in the ignition switch. The driver's door must be open. The chime should sound until key is removed from ignition switch or drivers door is closed.

REMOVAL AND INSTALLATION

BODY CONTROL MODULE REMOVAL

Refer to Group 8E, Instrument Panel and Systems for Removal and Installation procedures.

HEADLAMP SWITCH

Refer to Group 8E Instrument Panel and Systems, for Headlamp Switch Removal and Installation.

SEAT BELT BUCKLE

Refer to Group 23, Body for Seat Belt Buckle Removal and Installation procedures.

KEY-IN SWITCH

The Key-in switch is built into the ignition switch assembly. Should the Key-in switch require service, the ignition switch assembly must be replaced. Refer to Group 8D, Ignition System for service procedures.

OVERHEAD CONSOLE SYSTEMS

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DESCRIPTION AND OPERATION

OVERHEAD CONSOLE

DESCRIPTION

There are two types of overhead consoles and two available Overhead Travel Information System (OTIS) electronic packages.

(1) Mini Console (Fig. 1) has:

- Overhead Travel Information System (OTIS) withoutuniversal Transmitter (OTIS only)
- Two map/courtesy lamps

(2) Mini Console (Fig. 2) has:

- Overhead Travel Information System (OTIS) with Universal Transmitter
- Two map/courtesy lamps
- Universal Transmitter

(3) Base unit (Fig. 3) has two map/courtesy lamps.

OPERATION

Refer to the vehicle Owner's Manual for specific operation of each overhead console and its systems.

MAP READING LAMPS

DESCRIPTION

The lamps serve as map reading lamps and also courtesy lamps whenever:

- A door is opened.
- The illuminated entry system is activated.
- The headlamp dimmer switch is rotated up to the courtesy lamp detent.

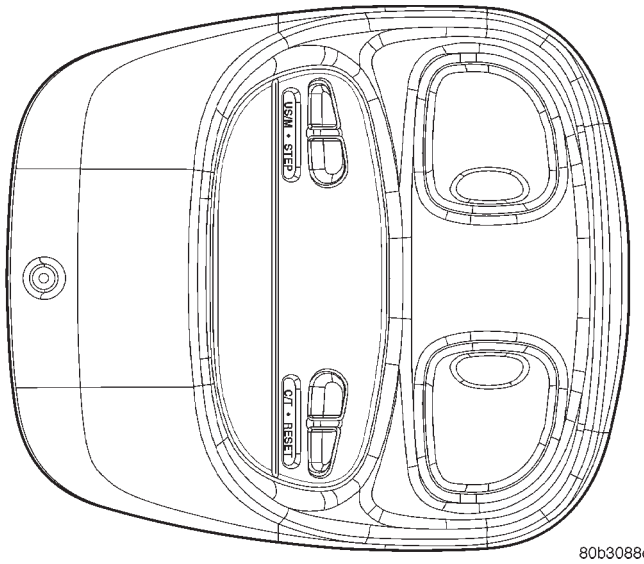


Fig. 1 Mini Console Without Universal Transmitter

OPERATION

The map lamps are actuated by pressing on the lens to turn ON the lamp and a second time turn OFF the lamp.

OVERHEAD TRAVEL INFORMATION SYSTEM (OTIS)

DESCRIPTION

Overhead Travel Information System (OTIS) is a module with six informational displays which can be

DESCRIPTION AND OPERATION (Continued)

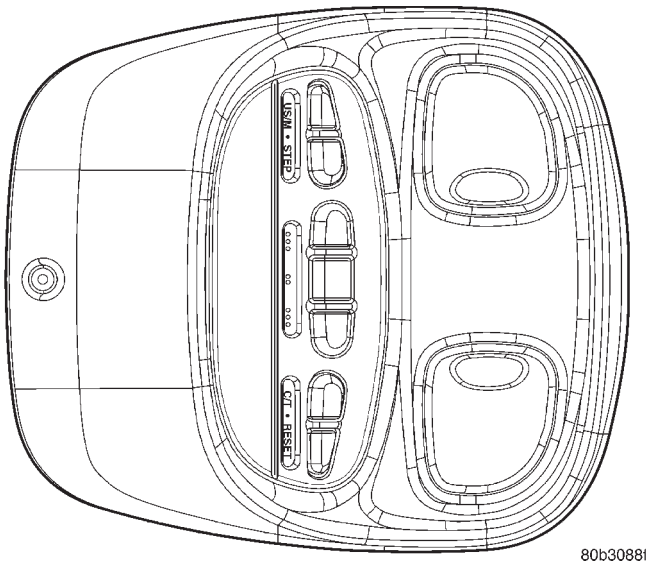


Fig. 2 Mini Console With Universal Transmitter

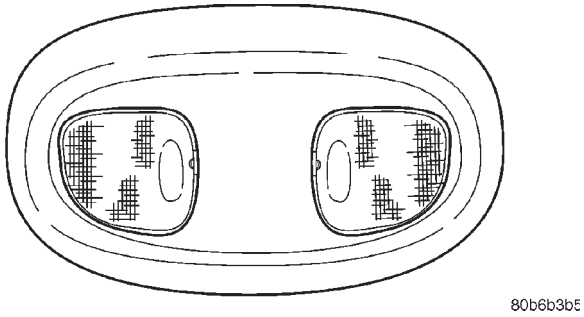


Fig. 3 Base Console

displayed using the four outer buttons. When the vehicle is first turned ON:

- OTIS blanks the display for a half second
- Illuminates all segments of the vacuum fluorescent display (VFD) at full brightness for one and a half seconds
- Displays whatever was being viewed when the ignition was last turned OFF

OTIS may also be integrated with the Universal Transmitter. If so, your OTIS module will have three buttons centered together between the outer four buttons. Below the three buttons are corresponding dots to indicate which button you are using.

THERE ARE 6 DISPLAYS:

- Compass/Temperature
- Average fuel economy
- Distance to empty
- Instantaneous fuel economy
- Trip odometer
- Elapsed time

OPERATION

THERE ARE 4 BUTTONS FOR OTIS OPERATIONS

The buttons operate when the ignition is in the ON position. The VFD will display the last display before ignition was turned OFF. The four outer buttons operate:

- STEP
- C/T - Compass/Temperature
- US/M - English/Metric
- RESET

1. STEP BUTTON

Pressing the STEP button selects one of the following 5 displays:

- Average fuel economy
- Distance to empty
- Instantaneous fuel economy
- Trip odometer
- Elapsed time

2. C/T (COMPASS/TEMPERATURE) BUTTON

Pressing the C/T button selects the Compass/Temperature display.

3. US/M (ENGLISH/METRIC MEASUREMENT) BUTTON

Pressing the US/M button switches the display units between English and Metric readings.

4. RESET BUTTON

Pressing the RESET button resets the function on the display, provided that function can be reset. The functions which can be reset are Average fuel economy, Trip odometer and Elapsed time.

The RESET button is also used to set the variance and/or calibrate the compass. Refer to the Variance Procedure and Calibration Procedure in this section.

THERE ARE THREE BUTTONS FOR UNIVERSAL TRANSMITTER OPERATIONS

Each button controls an independent channel for transmitter operations. A house shaped icon will be illuminated along with the corresponding number of dots located at the bottom of the icon.

The Universal Transmitter will operate most:

- Garage door opener (rolling code and non-rolling code)
- Gate openers
- Home/Office lighting and/or security system(s)

The transmitter is powered by the M1 circuit.

DIAGNOSIS AND TESTING

DISPLAY DIAGNOSTICS (OTIS)

TEMPERATURE

OTIS receives Programmable Communications Interface bus (PCI bus) messages from the Body Control Module (BCM) for all displayed information

DIAGNOSIS AND TESTING (Continued)

except the compass display. If a dash (-) is displayed, OTIS is not receiving a PCI bus message from the BCM. To check out the PCI bus line and the BCM use the DRB lll® scan tool and proper Body Diagnostic Procedure Manual.

If OTIS displays SC instead of a temperature reading, the PCI bus message is more than 83° C (181° F). Check for a short circuit between the temperature sensor and the BCM.

If OTIS displays OC instead of a temperature, the PCI bus message is less than -55° C (-67° F). Check for an open circuit between the temperature sensor and the BCM.

AVERAGE FUEL ECONOMY

OTIS receives average fuel economy information from the BCM over the PCI bus line. If OTIS displays -.- instead of an average fuel economy value, it is not receiving a PCI bus message for the average fuel economy from the BCM. To check out the PCI bus line and the BCM use the DRB lll® scan tool.

DISTANCE TO EMPTY

OTIS receives distance to empty information from the BCM over the PCI bus line. If OTIS displays a dash (-) instead of a distance to empty value, it is not receiving a PCI bus message for the distance to empty from the BCM. To check out the PCI bus line and the BCM use the DRB lll® scan tool.

INSTANTANEOUS FUEL ECONOMY

OTIS receives instantaneous fuel economy information from the BCM over the PCI bus line. If OTIS displays a dash (-) instead of an instantaneous fuel economy value, it is not receiving a PCI bus message for the instantaneous fuel economy from the BCM. To check out the PCI bus line and the BCM use the DRB lll® scan tool.

TRIP ODOMETER

OTIS receives trip odometer information from the BCM over the PCI bus line. If OTIS displays dashes -.- instead of the trip odometer value, it is not receiving a PCI bus message for the trip odometer from the BCM. To check out the PCI bus line and the BCM, use the DRB lll® scan tool.

ELAPSED TIME

OTIS receives a PCI bus message containing elapsed time information. If OTIS displays dashes -:-- instead of the elapsed time, it is not receiving a PCI bus message for the elapsed time from the BCM. To check out the PCI bus line and the BCM, use the DRB lll® scan tool.

COMPASS DISPLAY

To display the vehicle direction, the OTIS processes information from a sensor internal to the module. The OTIS is self- calibrating and requires only variance adjustments dependent upon location. The OTIS displays the label CAL whenever the compass is in the fast calibration mode.

If all three of the following conditions listed below occur, the vehicle must be demagnetized.

- Compass portion of the display is blank
- Temperature portion of the display is OK
- The label CAL is illuminated

If demagnetizing the vehicle is needed, refer to the demagnetizing procedure in this section. After demagnetizing, to calibrate the compass refer to Calibration Procedure and to set the variance refer to Variance Procedure, both within this section. If the compass portion of the display is still blank, replace the OTIS.

SELF-DIAGNOSTIC TEST

(1) With the ignition switch in the OFF position simultaneously press the RESET and STEP buttons and hold.

(2) Turn ignition switch ON, then release RESET and STEP buttons.

(3) OTIS lights all segments on the VFD for 2-4 seconds. Check for segments that are not illuminated.

(4) If OTIS displays PASS, the module is OK.

(5) If OTIS displays FAIL, replace the module.

(6) If OTIS displays bUS, check for an open or a short in the PCI bus communication wire.

(7) Press the RESET or the STEP button to exit self-test.

UNIVERSAL TRANSMITTER

(1) Check the battery voltage to the universal transmitter by pressing transmitter button and seeing if the house shaped icon and corresponding number of dots light up. If OK, go to.

(2) Check M1 fuse. If fuse is OK, go to Step 3. If not OK, replace fuse.

(3) Check the OTIS w/universal transmitter connector M1 battery circuit for voltage (9-16 volts). If voltage is OK, proceed to Step 4. If no voltage, repair wire as necessary.

(4) Test the Z2 circuit for ground at the OTIS, (with universal transmitter), connector. If ground is OK, replace OTIS with universal transmitter module. If no ground, repair as necessary.

(5) Check the instructions in the Owner's Manual and retrain the module. If the module cannot be trained, replace the OTIS w/universal transmitter.

SERVICE PROCEDURES

COMPASS CALIBRATION

Do not attempt to calibrate the compass near large metal objects such as other vehicles, large buildings or bridges. Remove all magnetic devices from roof panel. This compass is equipped with an auto-calibration feature which eliminates the need to manually set compass calibration. For a short time when the vehicle is new, the compass may appear erratic and the CAL symbol will be lit. After completing 3 complete 360 degree turns at 5 mph, in an area free of metal objects and on level ground, the CAL symbol will turn off and the compass will perform normally.

If at any time the compass should become inaccurate it can be put in auto-calibration mode by using the following procedure.

(1) Turn key to the ON position.

(2) Press C/T button to select the Compass/Temperature display.

(3) Press and hold RESET button for 5 seconds. The VAR symbol will light. While continuing to hold the RESET button for about 10 seconds, the CAL symbol will light.

(4) Drive the vehicle through 3 complete 360 degree turns, in an area free of metal objects and in no less than 48 seconds, the compass will be calibrated.

(5) The OTIS will extinguish the CAL label.

(6) Reset compass variance. The calibration procedure automatically sets the variance to 8. If you are in an area with a variance number other than 8 you must reset the variance.

DEMAGNETIZING PROCEDURE

Do not attach magnetic devices such as magnetic CB antennas to the vehicle roof. They can cause the compass to give false readings.

Every vehicle has its own magnetic field. This magnetic field is created by the various processes a steel roof goes through when the vehicle is built. A magnetic field can also be created if the roof is subjected to a magnet, example magnetic CB antenna, magnetic tipped screwdriver, etc. If the roof becomes magnetized use a demagnetizing Tool 6029 to demagnetize the roof.

In this demagnetizing procedure you will use the demagnetizing tool to demagnetize the roof. It is important that you follow the instructions below exactly.

(1) Be sure the ignition switch is in the OFF position before you begin the demagnetizing procedure.

(2) Place an 8 1/2 in. X 11 in. piece of paper lengthwise on the roof of vehicle directly above compass. The purpose of the paper is to protect the roof panel from scratches and define the area to be demagnetized.

(3) Plug in the demagnetizing tool, keeping it at least two feet away from the OTIS.

(4) Slowly approach the center of the roof panel at the windshield with the demagnetizing tool plugged in.

- Contact the roof panel with the tip of the tool.
- Use slow sweeping motions of 1/2 inch between sweeps.
- Move the tool about four inches either side of the centerline, and at least 11 inches back from the windshield.

(5) With the demagnetizing tool still energized, slowly back away from the roof panel until the tip is at least two feet from the roof before unplugging the tool.

(6) Recalibrate compass and set variance.

TRAINING THE UNIVERSAL TRANSMITTER

To train the universal transmitter, refer to procedures outlined in the Owner's Manual or proper Body Diagnostic Procedures Manual.

UNIVERSAL TRANSMITTER CHANNEL STATUS

The Universal Transmitter feature has three independent RF channels. The DRB lll® scan tool can be used to check each channel. For the necessary message set to check the universal transmitter, use the DRB lll® scan tool and proper Body Diagnostic Procedures Manual.

VARIANCE SETTING PROCEDURE

Variance is the difference between magnetic North and geographic North. In some areas the difference between magnetic and geographic north is great enough to cause the compass to give false readings. If this occurs, the variance must be set (Fig. 4).

To set the variance:

- Turn ignition key ON
- Press the C/T button to select the Compass/Temperature display
- Press and hold RESET button; the VAR symbol should come on in about 5 seconds.
- The OTIS will display the variance zone and the word VAR.
- Press STEP button to select the desired zone.
- Press RESET button to set the new variance zone and resume normal operation.

SERVICE PROCEDURES (Continued)

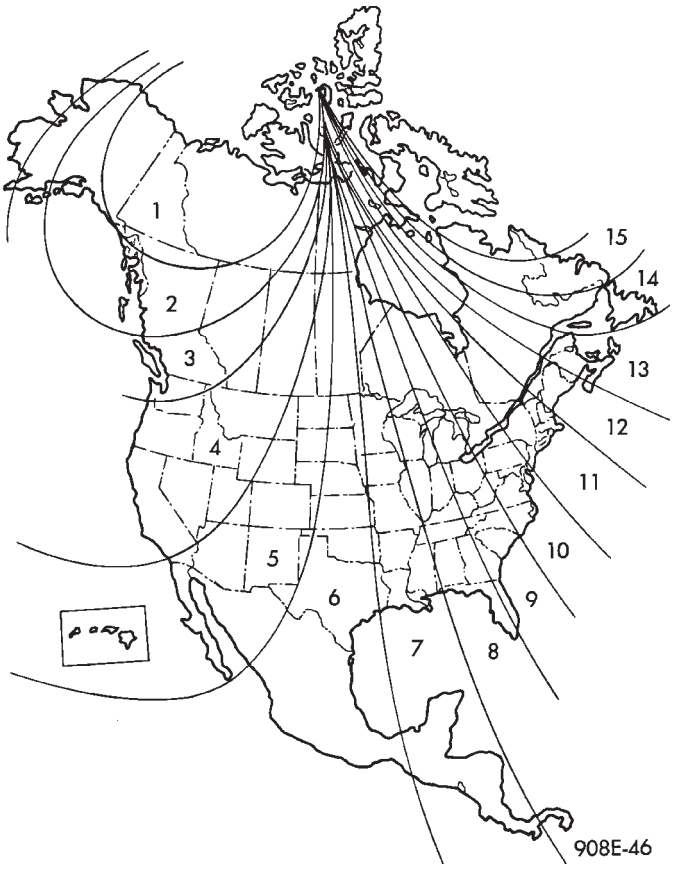


Fig. 4 Variance Zone Map

REMOVAL AND INSTALLATION

AMBIENT TEMPERATURE SENSOR

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 5).

(2) Raise and support vehicle on safety stands.

(3) From behind front bumper fascia, remove screw attaching sensor to radiator closure panel (Fig. 6).

INSTALLATION

For installation, reverse the above procedures.

BASE UNIT

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 5).

(2) Grasp the both outer sides and pull downward to disconnect the retaining clips.

(3) Disconnect wire connector and lower the unit.

(4) Remove console from vehicle.

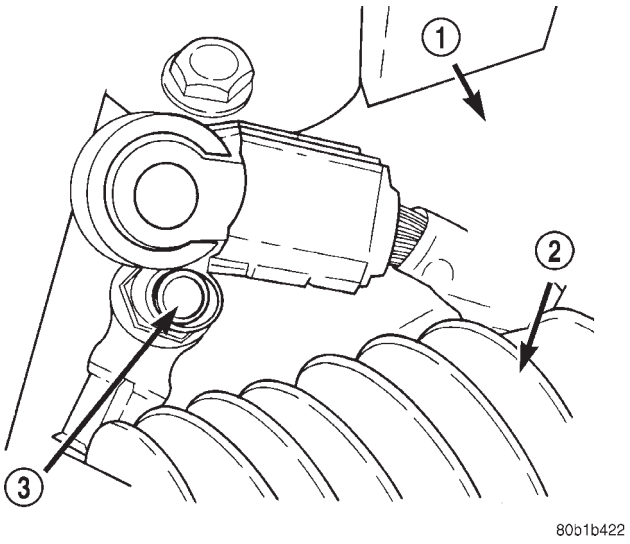


Fig. 5 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

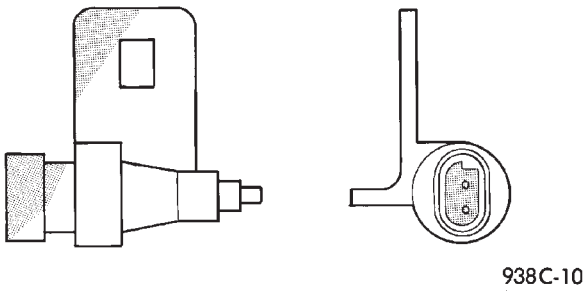


Fig. 6 Ambient Temperature Sensor

INSTALLATION

For installation, reverse the above procedures.

MAP LAMP

REMOVAL

(1) Open hood, disconnect and isolate the negative battery cable remote terminal from the remote battery post (Fig. 5).

(2) Remove overhead console, refer to Console Removal and Installation procedures in this section.

(3) Remove lamp socket from mounting.

(4) Remove lamp(s). Replace as necessary.

INSTALLATION

For installation, reverse the above procedures.

MINI CONSOLE

REMOVAL

(1) Remove screw from windshield side of console.

REMOVAL AND INSTALLATION (Continued)

(2) Grasp the front of console and pull downward to disconnect the retaining clips.

(3) Disconnect wire connectors and lower the console.

INSTALLATION

For installation, reverse the above procedures.

OVERHEAD TRAVEL INFORMATION SYSTEM (OTIS) MODULE

REMOVAL

(1) Remove overhead console, refer to Console Removal and Installation in this section.

(2) Remove mounting screws and release the map lamp wire connector from the OTIS (Fig. 7).

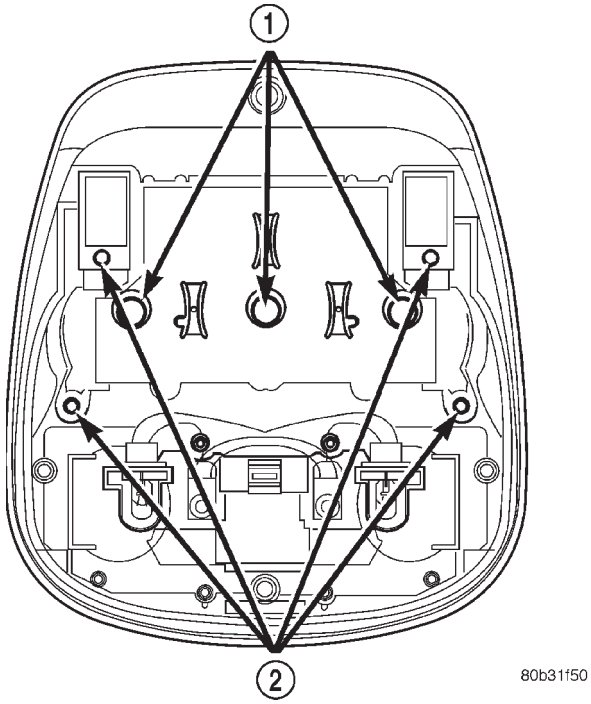


Fig. 7 OTIS Removal

1 – LAMPS
2 – MOUNTING SCREWS

(3) Remove the OTIS from overhead console.

INSTALLATION

For installation, reverse the above procedures. Align the OTIS guides on the housing with the grooves of the console. Make sure the LOOP of wire that was clipped into the OTIS module housing is properly clipped into the new module before the console is placed back into the headliner.

OVERHEAD TRAVEL INFORMATION SYSTEM (OTIS) LAMP

REMOVAL

(1) Remove overhead console, refer to Console Removal and Installatioin procedures in this section.

(2) Using a flat blade screwdriver twist out socket/lamp.

(3) Replace lamp(s) as necessary.

INSTALLATION

For installation, reverse the above procedures.

OVERHEAD CONSOLE BASE PLATE

REMOVAL

(1) Remove overhead console. Refer to Overhead Console Removal and Installation procedures in this section.

(2) Remove head liner. Refer to Group 23, Body for Removal and Installation procedures.

(3) Using an trim stick, remove console base by disengaging the body clips (Fig. 8).

(4) Remove base from vehicle.

INSTALLATION

For installation, reverse the above procedures.

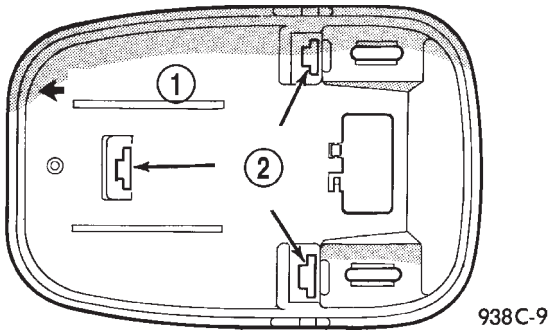


Fig. 8 Mini Console Base Removal

1 – FRONT
2 – BODY CLIP LOCATIONS

WIRING DIAGRAMS

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AUDIO SYSTEMS	8W-47-1	POWER MIRRORS	8W-62-1
BODY CONTROL MODULE	8W-45-1	POWER SEATS	8W-63-1
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COMPONENT INDEX	8W-02-1	POWER WINDOWS	8W-60-1
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8W-01 GENERAL INFORMATION

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DESCRIPTION AND OPERATION

INTRODUCTION

Chrysler wiring diagrams are designed to provide information regarding the vehicles wiring content. In order to effectively use Chrysler wiring diagrams to diagnose and repair a Chrysler vehicle, it is important to understand all of their features and characteristics.

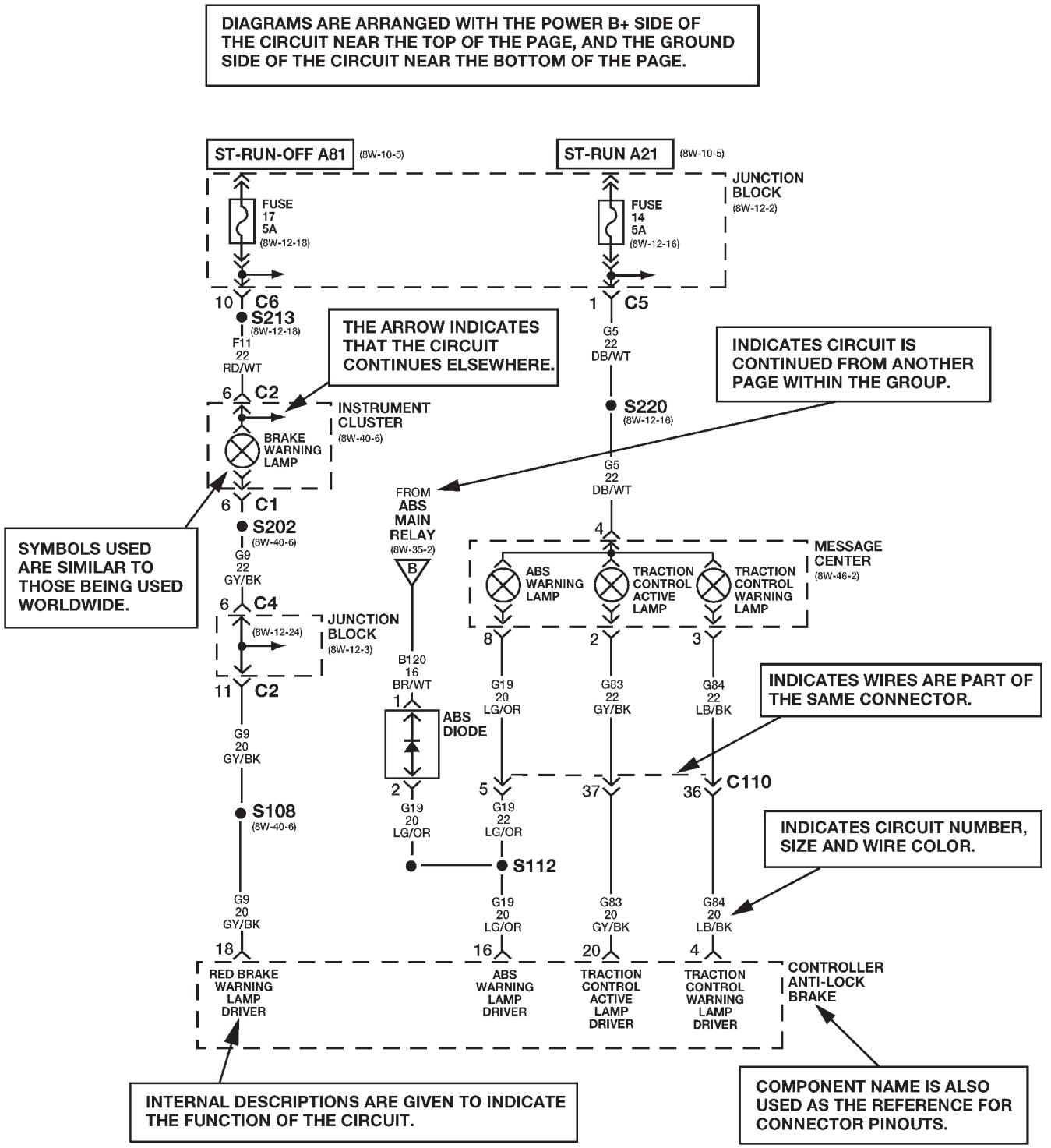
Diagrams are arranged such that the power (B+) side of the circuit is placed near the top of the page, and the ground (B-) side of the circuit is placed near the bottom of the page.

All switches, components, and modules are shown in the at rest position with the doors closed and the key removed from the ignition.

Components are shown two ways. A solid line around a component indicates that the component is complete. A dashed line around a component indicates that the component being shown is not complete. Incomplete components have a reference number to indicate the page where the component is shown complete.

It is important to realize that no attempt is made on the diagrams to represent components and wiring as they appear on the vehicle. For example, a short piece of wire is treated the same as a long one. In addition, switches and other components are shown as simply as possible, with regard to function only.

DESCRIPTION AND OPERATION (Continued)

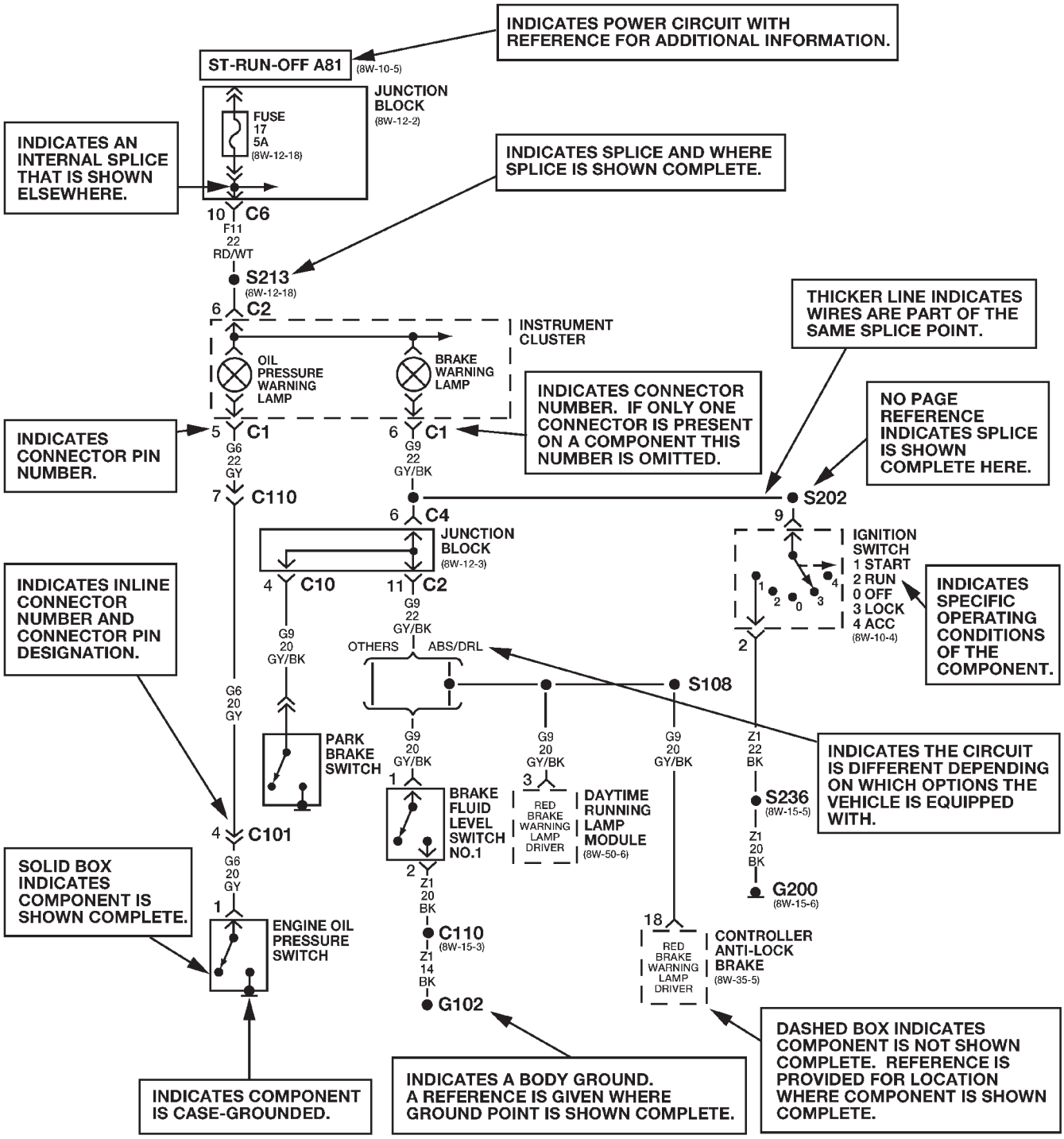


The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

80c06d01

Wiring Diagram Example No.1

DESCRIPTION AND OPERATION (Continued)



The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

80c06d02

Wiring Diagram Example No.2

DESCRIPTION AND OPERATION (Continued)

CIRCUIT INFORMATION

Each wire shown in the diagrams contains a code which identifies the main circuit, part of the main circuit, gage of wire, and color (Fig. 1).

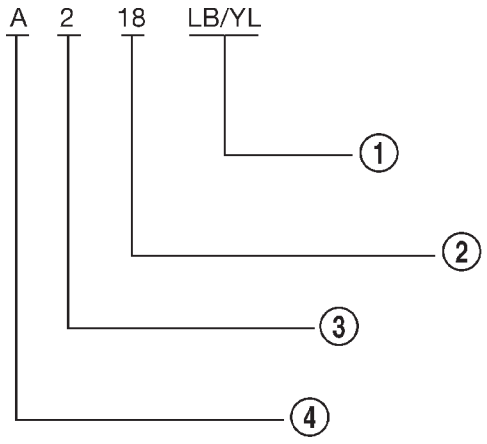


Fig. 1 Wire Code Identification

1 – COLOR OF WIRE (LIGHT BLUE WITH YELLOW TRACER)
2 – GAUGE OF WIRE (18 GAUGE)
3 – PART OF MAIN CIRCUIT (VARIES DEPENDING ON EQUIPMENT)
4 – MAIN CIRCUIT IDENTIFICATION

WIRE COLOR CODE CHART

COLOR CODE	COLOR	STANDARD TRACER COLOR
BL	BLUE	WT
BK	BLACK	WT
BR	BROWN	WT
DB	DARK BLUE	WT
DG	DARK GREEN	WT
GY	GRAY	BK
LB	LIGHT BLUE	BK
LG	LIGHT GREEN	BK
OR	ORANGE	BK
PK	PINK	BK or WT
RD	RED	WT
TN	TAN	WT
VT	VIOLET	WT
WT	WHITE	BK
YL	YELLOW	BK
*	WITH TRACER	

CIRCUIT FUNCTIONS

All circuits in the diagrams use an alpha/numeric code to identify the wire and its function. To identify which circuit code applies to a system, refer to the Circuit Identification Code Chart. This chart shows the main circuits only and does not show the secondary codes that may apply to some models.

CIRCUIT IDENTIFICATION CODE CHART

CIRCUIT	FUNCTION
A	BATTERY FEED
B	BRAKE CONTROLS
C	CLIMATE CONTROLS
D	DIAGNOSTIC CIRCUITS
E	DIMMING ILLUMINATION CIRCUITS
F	FUSED CIRCUITS
G	MONITORING CIRCUITS (GAUGES)
H	OPEN
I	NOT USED
J	OPEN
K	POWERTRAIN CONTROL MODULE
L	EXTERIOR LIGHTING
M	INTERIOR LIGHTING
N	NOT USED
O	NOT USED
P	POWER OPTION (BATTERY FEED)
Q	POWER OPTIONS (IGNITION FEED)
R	PASSIVE RESTRAINT
S	SUSPENSION/STEERING
T	TRANSMISSION/TRANSAXLE/ TRANSFER CASE
U	OPEN
V	SPEED CONTROL, WIPER/WASHER
W	OPEN
X	AUDIO SYSTEMS
Y	OPEN
Z	GROUNDS

DESCRIPTION AND OPERATION (Continued)

SECTION IDENTIFICATION

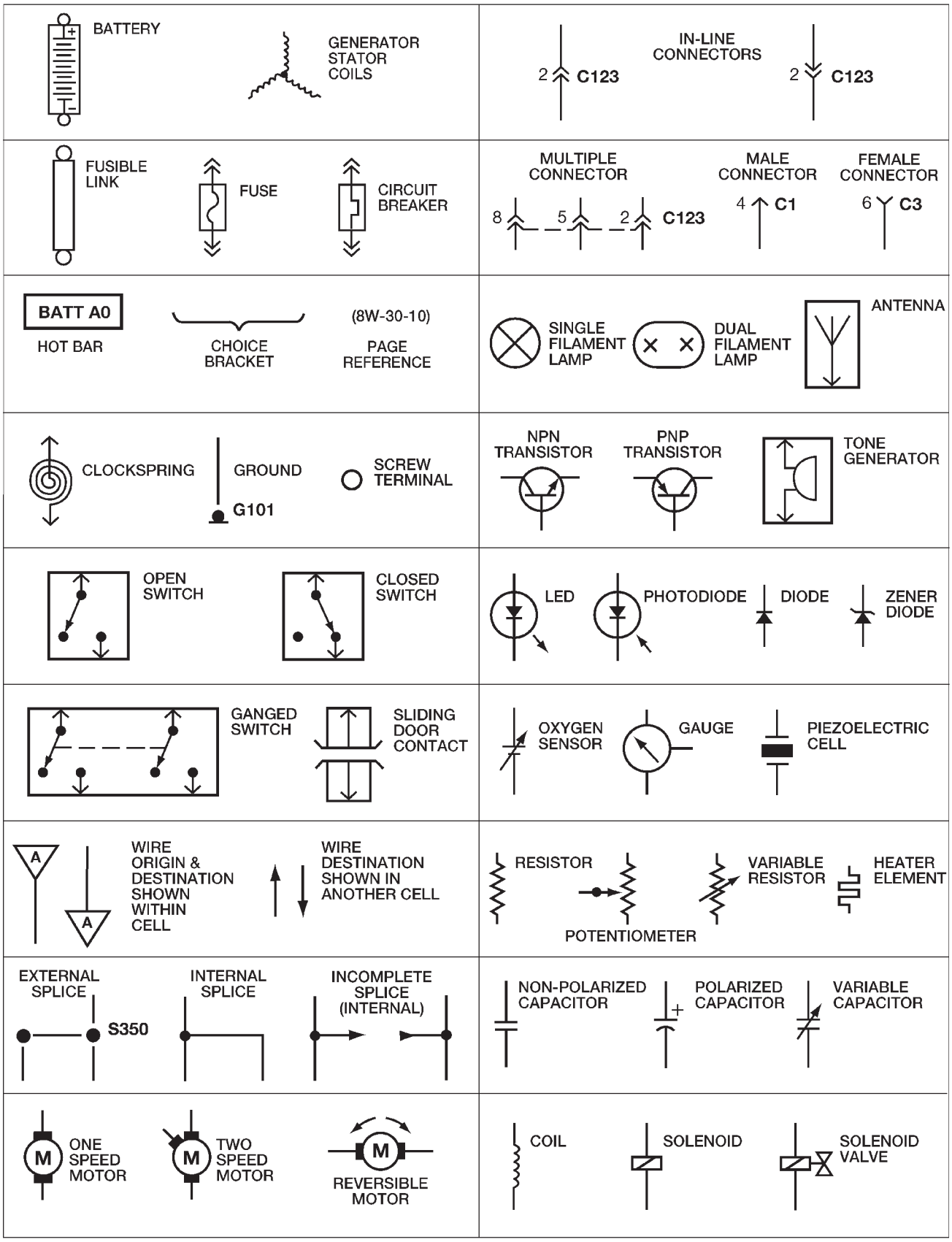
The wiring diagrams are grouped into individual sections. If a component is most likely found in a particular group, it will be shown complete (all wires, connectors, and pins) within that group. For example, the Auto Shutdown Relay is most likely to be found in Group 30, so it is shown there complete. It can, however, be shown partially in another group if it contains some associated wiring.

SYMBOLS

International symbols are used throughout the wiring diagrams. These symbols are consistent with those being used around the world

GROUP	TOPIC
8W-01 thru 8W-09	General Information and Diagram Overview
8W-10 thru 8W-19	Main Sources of Power and Vehicle Grounding
8W-20 thru 8W-29	Starting and Charging
8W-30 thru 8W-39	Powertrain/Drivetrain Systems
8W-40 thru 8W-49	Body Electrical items and A/C
8W-50 thru 8W-59	Exterior Lighting, Wipers, and Trailer Tow
8W-60 thru 8W-69	Power Accessories
8W-70	Splice Information
8W-80	Connector Pin Outs
8W-90	Connector Locations (including grounds)
8W-95	Splice Locations

DESCRIPTION AND OPERATION (Continued)



80ae8370

Wiring Diagram Symbols

DESCRIPTION AND OPERATION (Continued)

TERMINOLOGY

This a list of terms with there definitions used in the wiring diagrams.

Built-Up-Export . . . . . Vehicles Built For Sale In Markets Other Than North America
Except-Built-Up-Export . Vehicles Built For Sale In North America
LHD . . . . . Left Hand Drive Vehicles
RHD . . . . . Right Hand Drive Vehicles
EATX . . . Electronic Automatic Transmission-Front Wheel Drive
ATX . . Automatic Transmission-Front Wheel Drive
MTX . . . . Manual Transmission-Front Wheel Drive
A/T . . . . Automatic Transmission-Rear Wheel Drive
M/T . . . . . Manual Transmission-Rear Wheel Drive
SOHC . . . . . Single Over Head Cam Engine
DOHC . . . . . Dual Over Head Cam Engine

CONNECTOR INFORMATION

CAUTION: Not all connectors are serviced. Some connectors are serviced only with a harness. A typical example might be the Supplemental Restraint System connectors. Always check parts availability before attempting a repair.

IDENTIFICATION

In-line connectors are identified by a number, as follows:

- In-line connectors located on the **engine compartment harness** are **C100** series numbers.
- Connectors located on the **instrument panel harness** are **C200** series numbers.
- Connectors located on the **body harness** are **C300** series numbers.
- **Jumper harness connectors** are **C400** series numbers.
- **Grounds and ground connectors** are identified with a **"G"** and follow the same series numbering as the in-line connector.

Component connectors are identified by the component name instead of a number. Multiple connectors on a component use a C1, C2, etc. identifier.

LOCATIONS

Section 8W-90 contains connector/ground location illustrations. The illustrations contain the connector name (or number)/ground number and component identification. Connector/ground location charts in Section 8W-90 reference the illustration number for components and connectors.

Section 8W-80 shows each connector and the circuits involved with that connector. The connectors are identified using the name/number on the Diagram pages.

SPLICE LOCATIONS

Splice Location charts in Section 8W-70 show the entire splice, and provide references to other sections the splice serves.

Section 8W-95 contains illustrations that show the general location of the splices in each harness. The illustrations show the splice by number, and provide a written location.

NOTES, CAUTIONS, and WARNINGS

Throughout this group additional important information is presented in three ways; Notes, Cautions, and Warnings.

NOTES are used to help describe how switches or components operate to complete a particular circuit. They are also used to indicate different conditions that may appear on the vehicle. For example, an up-to and after condition.

CAUTIONS are used to indicate information that could prevent making an error that may damage the vehicle.

WARNINGS provide information to prevent personal injury and vehicle damage. Below is a list of general warnings that should be followed any time a vehicle is being serviced.

WARNING: ALWAYS WEAR SAFETY GLASSES FOR EYE PROTECTION.

WARNING: USE SAFETY STANDS ANYTIME A PROCEDURE REQUIRES BEING UNDER A VEHICLE.

WARNING: BE SURE THAT THE IGNITION SWITCH ALWAYS IS IN THE OFF POSITION, UNLESS THE PROCEDURE REQUIRES IT TO BE ON.

WARNING: SET THE PARKING BRAKE WHEN WORKING ON ANY VEHICLE. AN AUTOMATIC TRANSMISSION SHOULD BE IN PARK. A MANUAL TRANSMISSION SHOULD BE IN NEUTRAL.

WARNING: OPERATE THE ENGINE ONLY IN A WELL-VENTILATED AREA.

WARNING: KEEP AWAY FROM MOVING PARTS WHEN THE ENGINE IS RUNNING, ESPECIALLY THE FAN AND BELTS.

DESCRIPTION AND OPERATION (Continued)

WARNING: TO PREVENT SERIOUS BURNS, AVOID CONTACT WITH HOT PARTS SUCH AS THE RADIATOR, EXHAUST MANIFOLD(S), TAIL PIPE, CATALYTIC CONVERTER, AND MUFFLER.

WARNING: DO NOT ALLOW FLAME OR SPARKS NEAR THE BATTERY. GASES ARE ALWAYS PRESENT IN AND AROUND THE BATTERY.

WARNING: ALWAYS REMOVE RINGS, WATCHES, LOOSE HANGING JEWELRY, AND LOOSE CLOTHING.

TAKE OUTS

The abbreviation T/O is used in the component location section to indicate a point in which the wiring harness branches out to a component.

ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES

All ESD sensitive components are solid state and a symbol (Fig. 2) is used to indicate this. When handling any component with this symbol comply with the following procedures to reduce the possibility of electrostatic charge build up on the body and inadvertent discharge into the component. If it is not known whether the part is ESD sensitive, assume that it is.

(1) Always touch a known good ground before handling the part. This should be repeated while handling the part and more frequently after sliding across a seat, sitting down from a standing position, or walking a distance.

(2) Avoid touching electrical terminals of the part, unless instructed to do so by a written procedure.

(3) When using a voltmeter, be sure to connect the ground lead first.

(4) Do not remove the part from its protective packing until it is time to install the part.

(5) Before removing the part from its package, ground the package to a known good ground on the vehicle.



948W-193

Fig. 2 Electrostatic Discharge Symbol

DIAGNOSIS AND TESTING

TROUBLESHOOTING TOOLS

When diagnosing a problem in an electrical circuit there are several common tools necessary. These tools are listed and explained below.

- Jumper Wire - This is a test wire used to connect two points of a circuit. It can be used to bypass an open in a circuit.

WARNING: NEVER USE A JUMPER WIRE ACROSS A LOAD, SUCH AS A MOTOR, CONNECTED BETWEEN A BATTERY FEED AND GROUND.

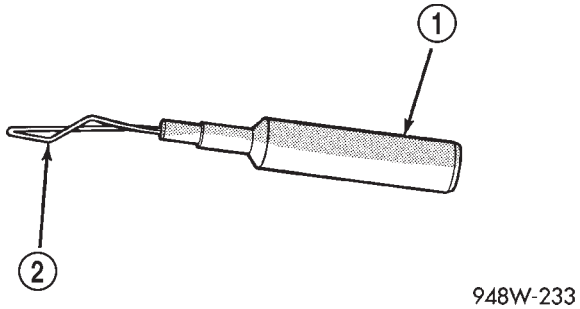
- Voltmeter - Used to check for voltage on a circuit. Always connect the black lead to a known good ground and the red lead to the positive side of the circuit.

CAUTION: Most of the electrical components used in today's vehicle are solid state. When checking voltages in these circuits use a meter with a 10-megohm or greater impedance rating.

- Ohmmeter - Used to check the resistance between two points of a circuit. Low or no resistance in a circuit means good continuity.

CAUTION: - Most of the electrical components used in today's vehicle are Solid State. When checking resistance in these circuits use a meter with a 10-megohm or greater impedance rating. In addition, make sure the power is disconnected from the circuit. Circuits that are powered up by the vehicle electrical system can cause damage to the equipment and provide false readings.

- Probing Tools - These tools are used for probing terminals in connectors (Fig. 3). Select the proper size tool from Special Tool Package 6807, and insert it into the terminal being tested. Use the other end of the tool to insert the meter probe.



948W-233

Fig. 3 Probing Tool

1 – SPECIAL TOOL 6801
2 – PROBING END

DIAGNOSIS AND TESTING (Continued)

INTERMITTENT AND POOR CONNECTIONS

Most intermittent electrical problems are caused by faulty electrical connections or wiring. It is also possible for a sticking component or relay to cause a problem. Before condemning a component or wiring assembly check the following items.

- Connectors are fully seated
- Spread terminals, or terminal push out
- Terminals in the wiring assembly are fully seated into the connector/component and locked in position
- Dirt or corrosion on the terminals. Any amount of corrosion or dirt could cause an intermittent problem
- Damaged connector/component casing exposing the item to dirt and moisture
- Wire insulation that has rubbed through causing a short to ground
- Some or all of the wiring strands broken inside of the insulation covering.
- Wiring broken inside of the insulation

TROUBLESHOOTING TESTS

Before beginning any tests on a vehicles electrical system use the Wiring Diagrams and study the circuit. Also refer to the Troubleshooting Wiring Problems in this section.

TESTING FOR VOLTAGE POTENTIAL

(1) Connect the ground lead of a voltmeter to a known good ground (Fig. 4).

(2) Connect the other lead of the voltmeter to the selected test point. The vehicle ignition may need to be turned ON to check voltage. Refer to the appropriate test procedure.

TESTING FOR CONTINUITY

(1) Remove the fuse for the circuit being checked or, disconnect the battery.

(2) Connect one lead of the ohmmeter to one side of the circuit being tested (Fig. 5).

(3) Connect the other lead to the other end of the circuit being tested. Low or no resistance means good continuity.

TESTING FOR A SHORT TO GROUND

(1) Remove the fuse and disconnect all items involved with the fuse.

(2) Connect a test light or a voltmeter across the terminals of the fuse.

(3) Starting at the fuse block, wiggle the wiring harness about six to eight inches apart and watch the voltmeter/test lamp.

(4) If the voltmeter registers voltage or the test lamp glows, there is a short to ground in that general area of the wiring harness.

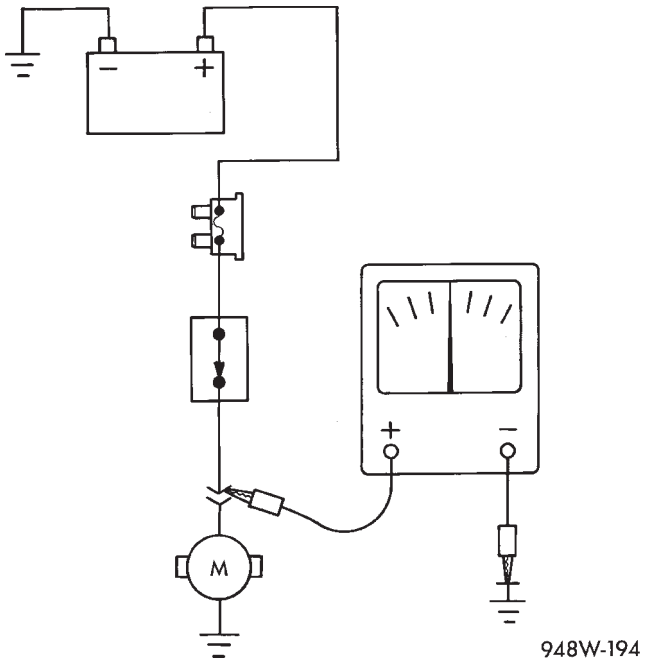


Fig. 4 Testing for Voltage Potential

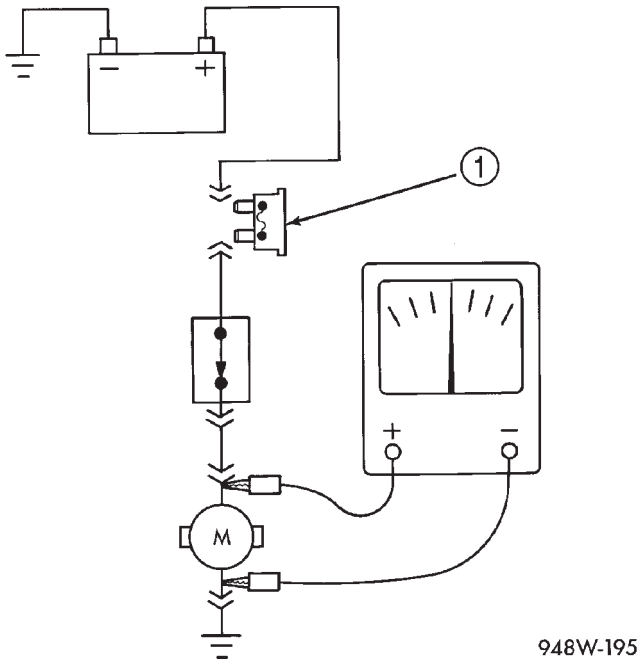


Fig. 5 Testing for Continuity

1 – FUSE REMOVED FROM CIRCUIT

TESTING FOR A SHORT TO GROUND ON FUSES POWERING SEVERAL LOADS

(1) Refer to the wiring diagrams and disconnect or isolate all items on the suspected fused circuits.

(2) Replace the blown fuse.

(3) Supply power to the fuse by turning ON the ignition switch or re-connecting the battery.

DIAGNOSIS AND TESTING (Continued)

(4) Start connecting the items in the fuse circuit one at a time. When the fuse blows the circuit with the short to ground has been isolated.

TESTING FOR A VOLTAGE DROP

(1) Connect the positive lead of the voltmeter to the side of the circuit closest to the battery (Fig. 6).

(2) Connect the other lead of the voltmeter to the other side of the switch or component.

(3) Operate the item.

(4) The voltmeter will show the difference in voltage between the two points.

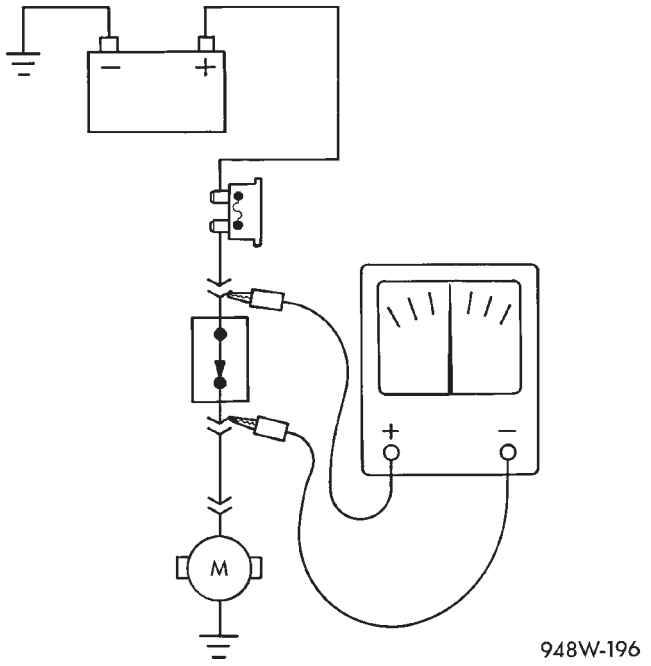


Fig. 6 Testing for Voltage Drop

TROUBLESHOOTING WIRING PROBLEMS

When troubleshooting wiring problems there are six steps which can aid in the procedure. The steps are listed and explained below. Always check for non-factory items added to the vehicle before doing any diagnosis. If the vehicle is equipped with these items, disconnect them to verify these add-on items are not the cause of the problem.

(1) Verify the problem.

(2) Verify any related symptoms. Do this by performing operational checks on components that are in the same circuit. Refer to the wiring diagrams.

(3) Analyze the symptoms. Use the wiring diagrams to determine what the circuit is doing, where the problem most likely is occurring and where the diagnosis will continue.

(4) Isolate the problem area.

(5) Repair the problem.

(6) Verify proper operation. For this step check for proper operation of all items on the repaired circuit. Refer to the wiring diagrams.

SERVICE PROCEDURES

WIRING REPAIR

When replacing or repairing a wire, it is important that the correct gage be used as shown in the wiring diagrams. The wires must also be held securely in place to prevent damage to the insulation.

(1) Disconnect battery negative cable

(2) Remove 1 inch of insulation from each end of the wire.

(3) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(4) Spread the strands of the wire apart on each part of the exposed wire (example 1). (Fig. 7)

(5) Push the two ends of wire together until the strands of wire are close to the insulation (example 2) (Fig. 7)

(6) Twist the wires together (example 3) (Fig. 7)

(7) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(8) Center the heat shrink tubing over the joint, and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(9) Secure the wire to the existing ones to prevent chafing or damage to the insulation

(10) Connect battery and test all affected systems.

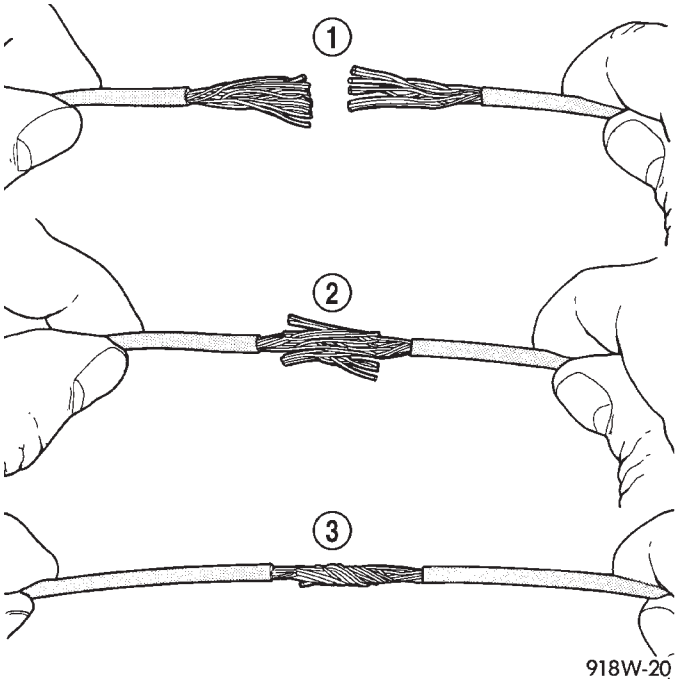


Fig. 7 Wire Repair

1 – EXAMPLE 1
2 – EXAMPLE 2
3 – EXAMPLE 3

SERVICE PROCEDURES (Continued)

TERMINAL/CONNECTOR REPAIR-MOLEX CONNECTORS

(1) Disconnect battery.
(2) Disconnect the connector from its mating half/component.
(3) Insert the terminal releasing special tool 6742 into the terminal end of the connector (Fig. 8).

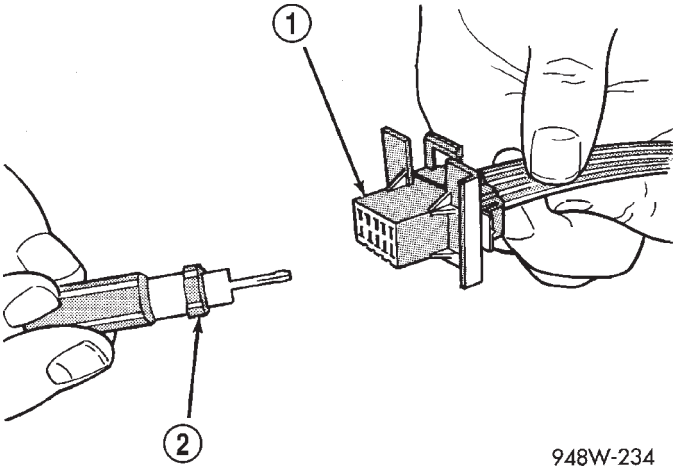


Fig. 8 Molex Connector Repair

1 – CONNECTOR
2 – SPECIAL TOOL 6742

(4) Using special tool 6742 release the locking fingers on the terminal (Fig. 9).
(5) Pull on the wire to remove it from the connector.
(6) Repair or replace the connector or terminal, as necessary.

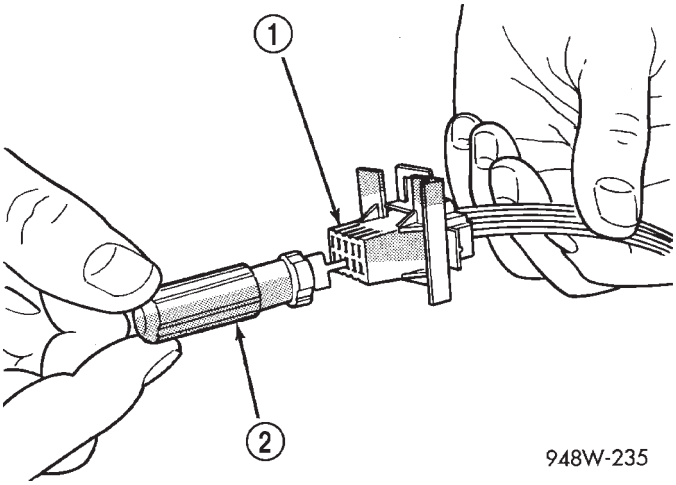


Fig. 9 Using Special Tool 6742

1 – CONNECTOR
2 – SPECIAL TOOL 6742

CONNECTOR REPLACEMENT

(1) Disconnect battery.
(2) Disconnect the connector that is to be repaired from its mating half/component
(3) Remove the connector locking wedge, if required (Fig. 10)

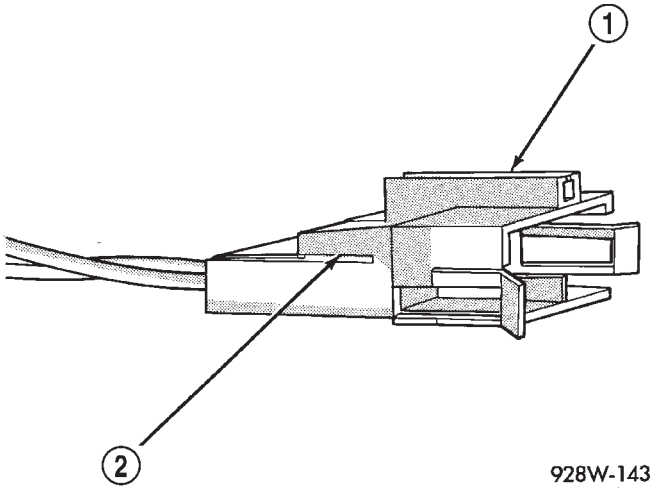


Fig. 10 Connector Locking Wedge

1 – CONNECTOR
2 – CONNECTOR LOCKING WEDGE TAB

(4) Position the connector locking finger away from the terminal using the proper pick from special tool kit 6680. Pull on the wire to remove the terminal from the connector (Fig. 11) (Fig. 12).
(5) Reset the terminal locking tang, if it has one.
(6) Insert the removed wire in the same cavity on the repair connector.
(7) Repeat steps four through six for each wire in the connector, being sure that all wires are inserted into the proper cavities. For additional connector pinout identification, refer to the wiring diagrams.
(8) Insert the connector locking wedge into the repaired connector, if required.
(9) Connect connector to its mating half/component.
(10) Connect battery and test all affected systems.

CONNECTOR AND TERMINAL REPLACEMENT

(1) Disconnect battery.
(2) Disconnect the connector (that is to be repaired) from its mating half/component.
(3) Cut off the existing wire connector directly behind the insulator. Remove six inches of tape from the harness.
(4) Stagger cut all wires on the harness side at 1/2 inch intervals (Fig. 13).
(5) Remove 1 inch of insulation from each wire on the harness side.

SERVICE PROCEDURES (Continued)

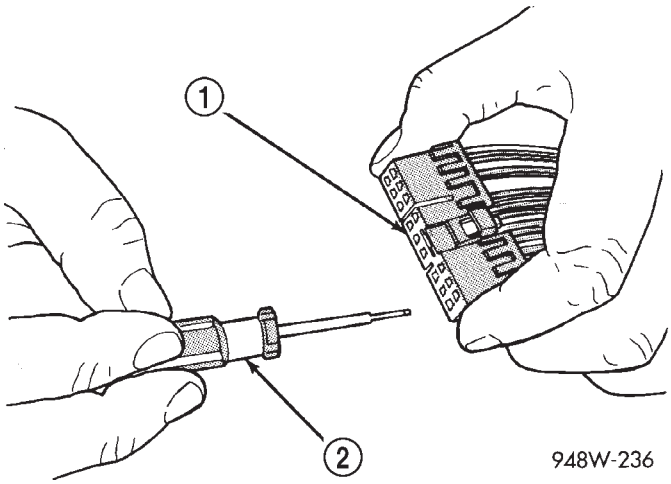


Fig. 11 Terminal Removal

1 – CONNECTOR
2 – FROM SPECIAL TOOL KIT 6680

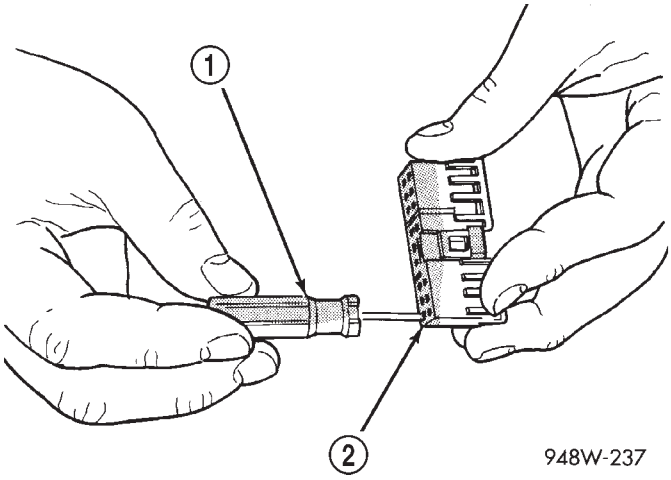


Fig. 12 Terminal Removal Using Special Tool

1 – FROM SPECIAL TOOL KIT 6680
2 – CONNECTOR

(6) Stagger cut the matching wires on the repair connector assembly in the opposite order as was done on the harness side of the repair. Allow extra length for soldered connections. Check that the overall length is the same as the original (Fig. 13).

(7) Remove 1 inch of insulation from each wire.

(8) Place a piece of heat shrink tubing over one side of the wire. Be sure the tubing will be long enough to cover and seal the entire repair area.

(9) Spread the strands of the wire apart on each part of the exposed wires.

(10) Push the two ends of wire together until the strands of wire are close to the insulation.

(11) Twist the wires together.

(12) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

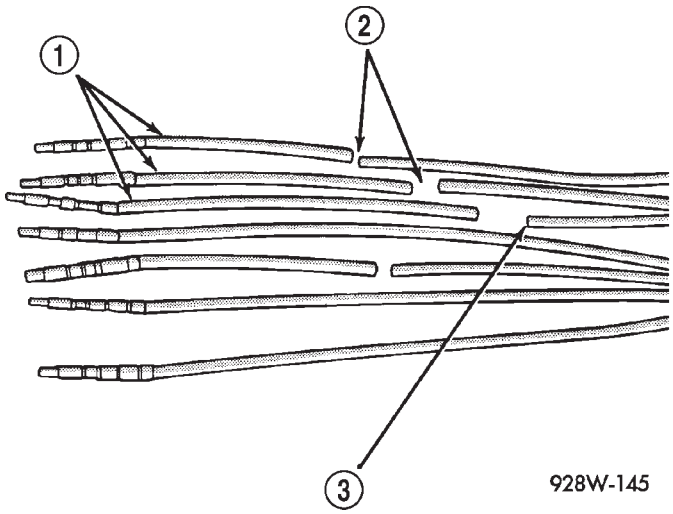


Fig. 13 Stagger Cutting Wires

1 – REPAIR SIDE WIRES
2 – STAGER CUTS
3 – HARNESS WIRES

(13) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing

(14) Repeat steps 8 through 13 for each wire.

(15) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.

(16) Re-connect the repaired connector.

(17) Connect the battery, and test all affected systems.

TERMINAL/CONNECTOR REPAIR- AUGAT CONNECTORS

(1) Disconnect battery.

(2) Disconnect the connector from its mating half/component.

(3) Push down on the yellow connector locking tab to release the terminals (Fig. 14).

(4) Using special tool 6932, push the terminal to remove it from the connector (Fig. 15).

(5) Repair or replace the connector or terminal as necessary.

(6) When re-assembling the connector, the locking wedge must be placed in the locked position to prevent terminal push out.

TERMINAL REPLACEMENT

(1) Disconnect battery.

(2) Disconnect the connector being repaired from its mating half. Remove connector locking wedge, if required (Fig. 16).

(3) Remove connector locking wedge, if required (Fig. 16).

SERVICE PROCEDURES (Continued)

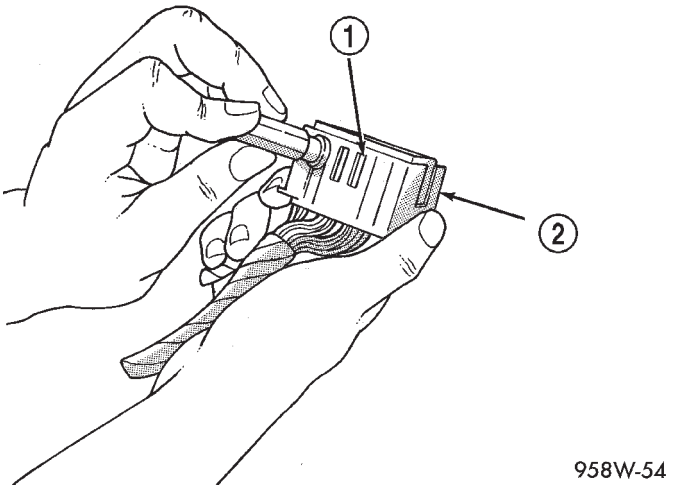


Fig. 14 Augat Connector Repair

1 – LOCKING TAB
2 – CONNECTOR

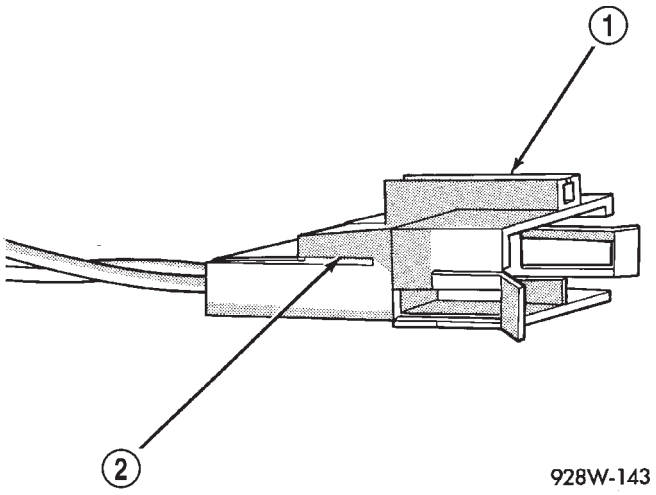


Fig. 16 Connector Locking Wedge Tab (Typical)

1 – CONNECTOR
2 – CONNECTOR LOCKING WEDGE TAB

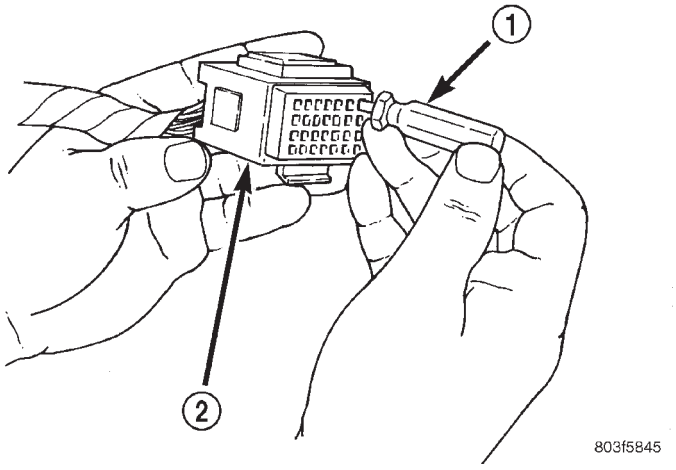


Fig. 15 Using Special Tool 6932

1 – SPECIAL TOOL 6932
2 – CONNECTOR

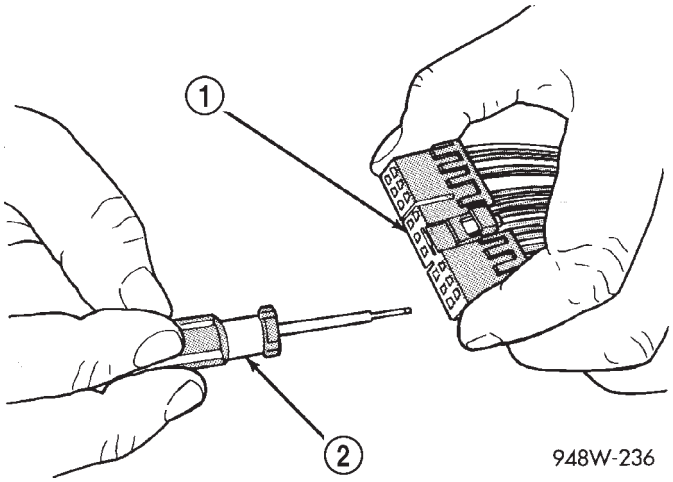


Fig. 17 Terminal Removal

1 – CONNECTOR
2 – FROM SPECIAL TOOL KIT 6680

(4) Position the connector locking finger away from the terminal using the proper pick from special tool kit 6680. Pull on the wire to remove the terminal from the connector (Fig. 17) (Fig. 18).

(5) Cut the wire 6 inches from the back of the connector.

(6) Remove 1 inch of insulation from the wire on the harness side.

(7) Select a wire from the terminal repair assembly that best matches the color wire being repaired.

(8) Cut the repair wire to the proper length and remove 1 inch of insulation.

(9) Place a piece of heat shrink tubing over one side of the wire. Make sure the tubing will be long enough to cover and seal the entire repair area.

(10) Spread the strands of the wire apart on each part of the exposed wires.

(11) Push the two ends of wire together until the strands of wire are close to the insulation.

(12) Twist the wires together.

(13) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(14) Center the heat shrink tubing over the joint and heat using a heat gun. Heat the joint until the tubing is tightly sealed and sealant comes out of both ends of the tubing.

(15) Insert the repaired wire into the connector.

(16) Install the connector locking wedge, if required, and reconnect the connector to its mating half/component.

SERVICE PROCEDURES (Continued)

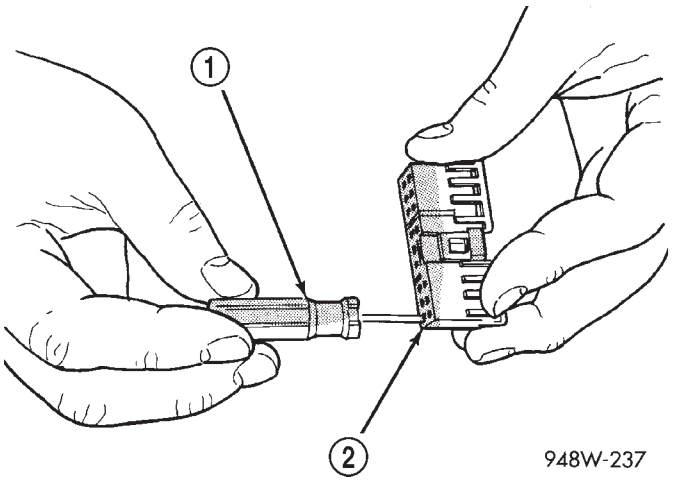


Fig. 18 Terminal Removal Using Special Tool

1 – FROM SPECIAL TOOL KIT 6680
2 – CONNECTOR

(17) Re-tape the wire harness starting 1-1/2 inches behind the connector and 2 inches past the repair.

(18) Connect battery, and test all affected systems.

DIODE REPLACEMENT

(1) Disconnect the battery.

(2) Locate the diode in the harness, and remove the protective covering.

(3) Remove the diode from the harness, pay attention to the current flow direction (Fig. 19).

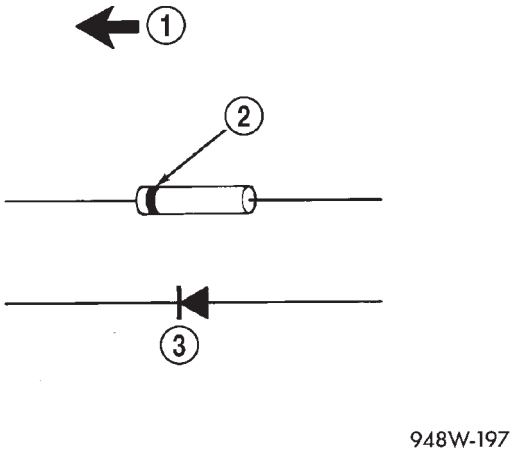


Fig. 19 Diode Identification

1 – CURRENT FLOW
2 – BAND AROUND DIODE INDICATES CURRENT FLOW
3 – DIODE AS SHOWN IN THE DIAGRAMS

(4) Remove the insulation from the wires in the harness. Only remove enough insulation to solder in the new diode.

(5) Install the new diode in the harness, making sure current flow is correct. If necessary refer to the appropriate wiring diagram for current flow.

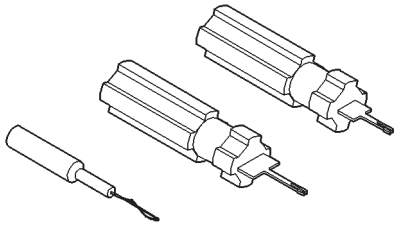
(6) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(7) Tape the diode to the harness using electrical tape making, sure the diode is completely sealed from the elements.

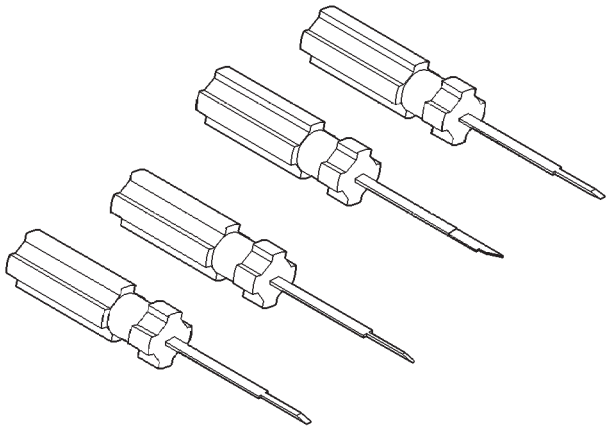
(8) Re-connect the battery, and test affected systems.

SPECIAL TOOLS

WIRING/TERMINAL

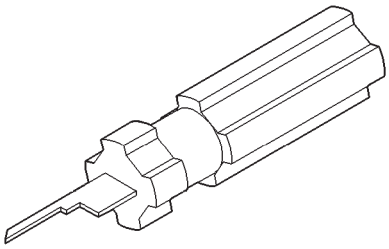


Probing Tool Package 6807

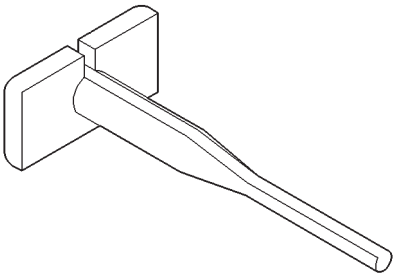


Terminal Pick 6680

SPECIAL TOOLS (Continued)



Terminal Removing Tool 6932



Terminal Removing Tool 6934

8W-02 COMPONENT INDEX

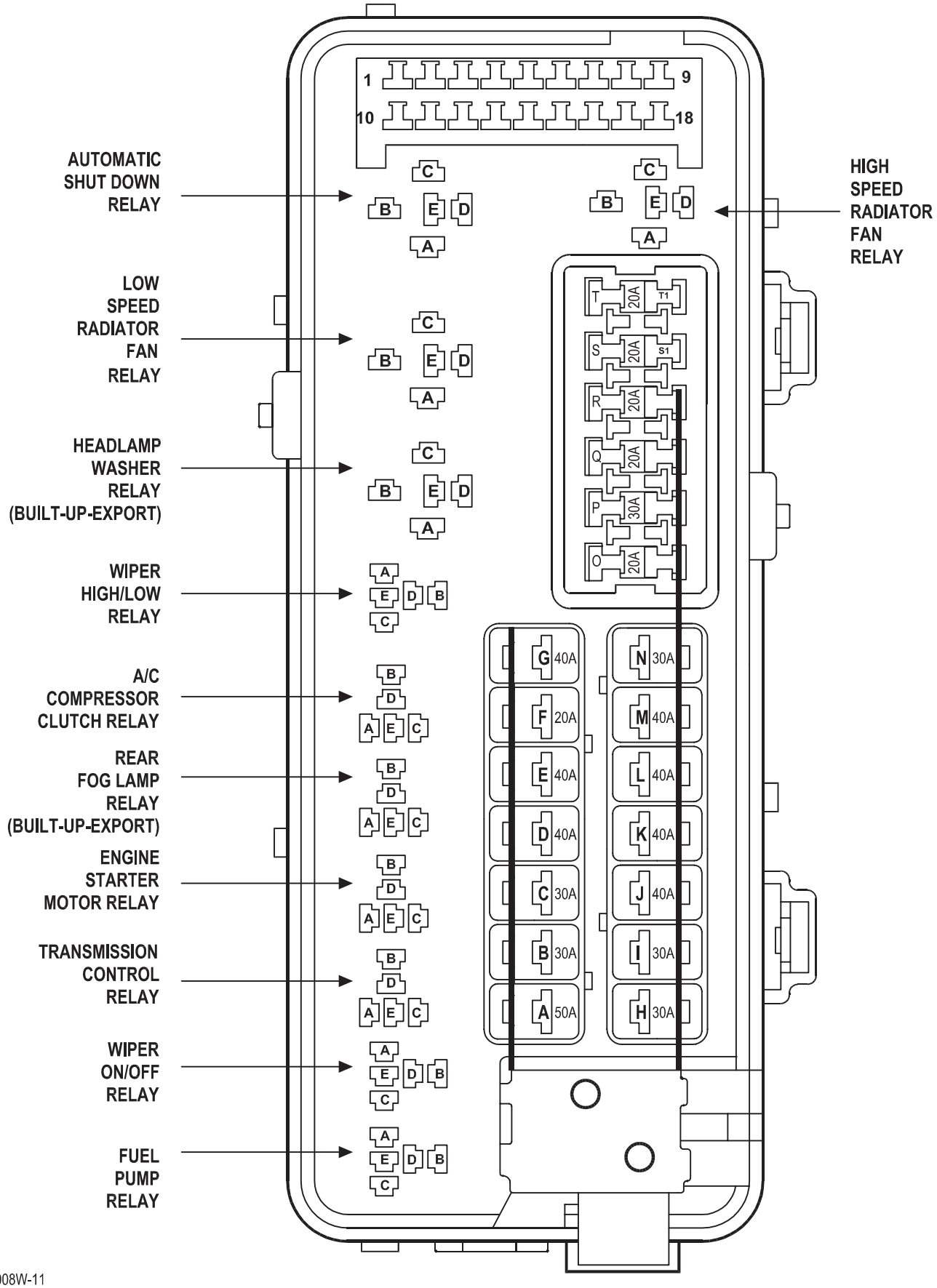
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POWER DISTRIBUTION CENTER



FUSES

FUSE	AMPS	FUSED CIRCUIT	FUNCTION
A	50A	A4 10BK/PK	FUSED B(+)
B	30A	A17 14RD/BR	FUSED B(+)
C	30A	A3 14RD/TN	FUSED B(+)
D	40A	A34 12LB/RD	FUSED B(+)
E	40A	A16 12GY	FUSED B(+)
F	20A	A37 16WT/DB	FUSED B(+)
G	40A	A1 12RD	FUSED B(+)
H •	30A	A20 12RD/DB	FUSED B(+)
I	30A	A7 14RD/BK	FUSED B(+)
J	40A	A2 12PK/BK	FUSED B(+)
K •	40A	A10 12RD/DG	FUSED B(+)
L	40A	A13 12PK/WT	FUSED B(+)
M	40A	A5 12 RD/OR	FUSED B(+)
N	30A	A14 14RD/WT	FUSED B(+)
O	20A	A15 18PK	FUSED B(+)
P ••	30A	A53 14RD/YL	FUSED B(+)
Q	20A	A30 18RD/LB	FUSED B(+)
R ••	20A	A35 18DB	FUSED B(+)
S	20A	F42 16DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT
T	20A	F142 16OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT

• ABS
•• BUILT-UP-EXPORT

A/C COMPRESSOR CLUTCH RELAY

CAVITY	CIRCUIT	FUNCTION
A	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B	A17 14RD/BR	FUSED B(+)
C	C28 20DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
D	C2 14DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
E	-	-

AUTOMATIC SHUT DOWN RELAY

CAVITY	CIRCUIT	FUNCTION
A	A14 14RD/WT	FUSED B(+)
B	A14 14RD/WT	FUSED B(+)
C	K51 20DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
D	A142 14DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
E	-	-

ENGINE STARTER MOTOR RELAY

CAVITY	CIRCUIT	FUNCTION
A	A41 14YL	FUSED IGNITION SWITCH OUTPUT (START)
B	A1 12RD	FUSED B(+)
C	K90 20TN	STARTER RELAY CONTROL
D	T40 12BR	STARTER RELAY OUTPUT
E	-	-

FUEL PUMP RELAY

CAVITY	CIRCUIT	FUNCTION
A	F12 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B	A1 12RD	FUSED B(+)
C	K31 20BR	FUEL PUMP RELAY CONTROL
D	A141 12DG/WT	FUEL PUMP RELAY OUTPUT
E	-	-

HEADLAMP WASHER RELAY (BUILT-UP-EXPORT)

CAVITY	CIRCUIT	FUNCTION
A	V58 14BR/YL	HEADLAMP WASHER RELAY CONTROL
B	A53 14RD/YL	FUSED B(+)
C	A53 14RD/YL	FUSED B(+)
D	V53 14RD/OR	WASHER RELAY OUTPUT
E	-	-

HIGH SPEED RADIATOR FAN RELAY

CAVITY	CIRCUIT	FUNCTION
A	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B	A17 14RD/BR	FUSED B(+)
C	C27 20DB/LG	HIGH SPEED RADIATOR FAN RELAY CONTROL
D	C25 14YL	HIGH SPEED RADIATOR RELAY OUTPUT
E	-	-

LOW SPEED RADIATOR FAN RELAY

CAVITY	CIRCUIT	FUNCTION
A	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
B	A16 12GY	FUSED B(+)
C	C24 20DB/PK	LOW SPEED RADIATOR FAN RELAY CONTROL
D	C23 12DG	LOW SPEED RADIATOR FAN RELAY OUTPUT
E	-	-

REAR FOG LAMP RELAY (BUILT-UP-EXPORT)

CAVITY	CIRCUIT	FUNCTION
A	A35 18DB	FUSED B(+)
B	A35 18DB	FUSED B(+)
C	L96 18LG/RD	REAR FOG LAMP SWITCH GROUND
D	L95 18DG/YL	FOG LAMP RELAY OUTPUT
E	-	-

TRANSMISSION CONTROL RELAY

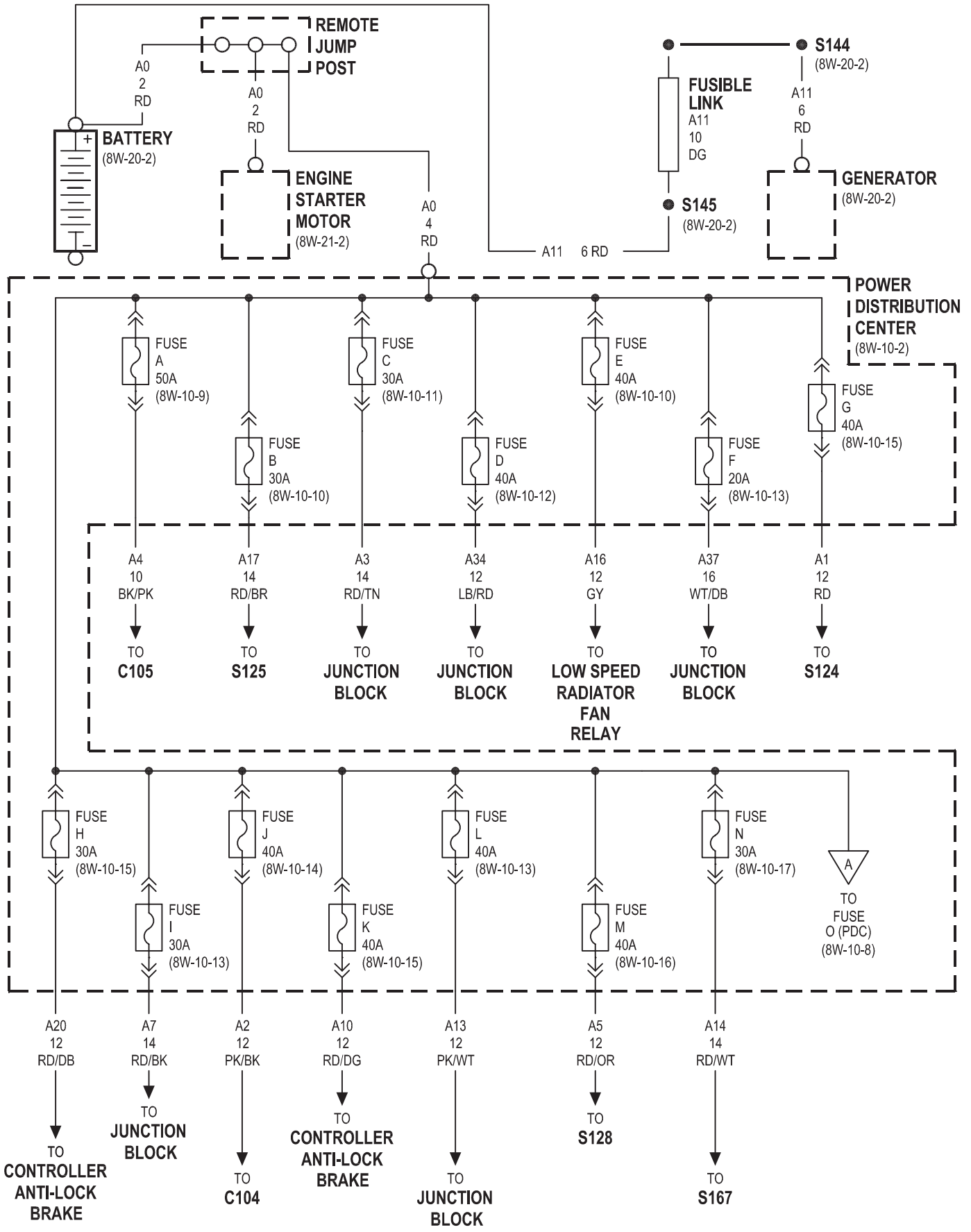
CAVITY	CIRCUIT	FUNCTION
A	T15 20LG	TRANSMISSION CONTROL RELAY
B	A30 18RD/LB	FUSED B(+)
C	Z1 20BK	GROUND
D	T16 16RD	TRANSMISSION CONTROL RELAY OUTPUT
E	-	-

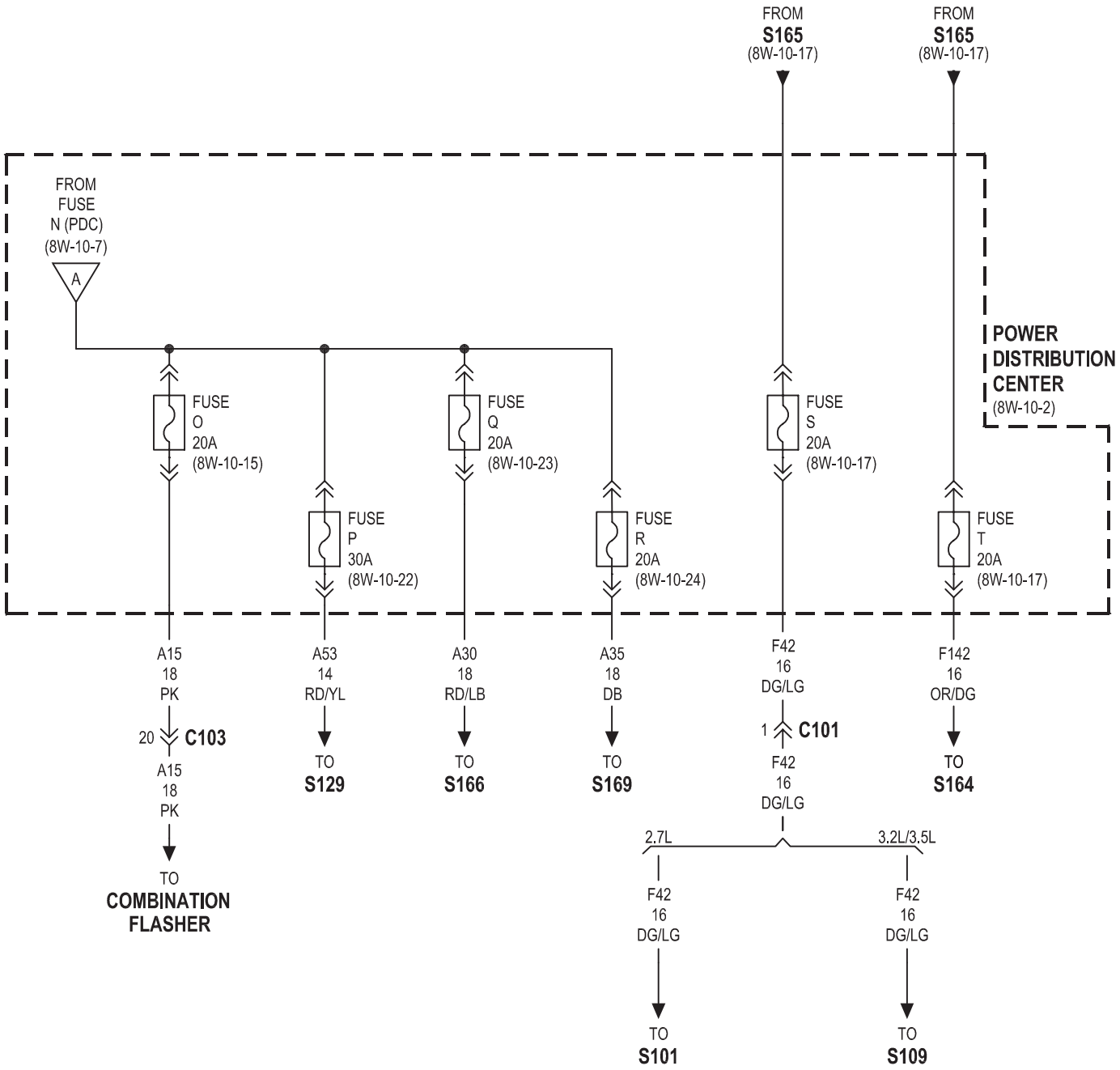
WIPER HIGH/LOW RELAY

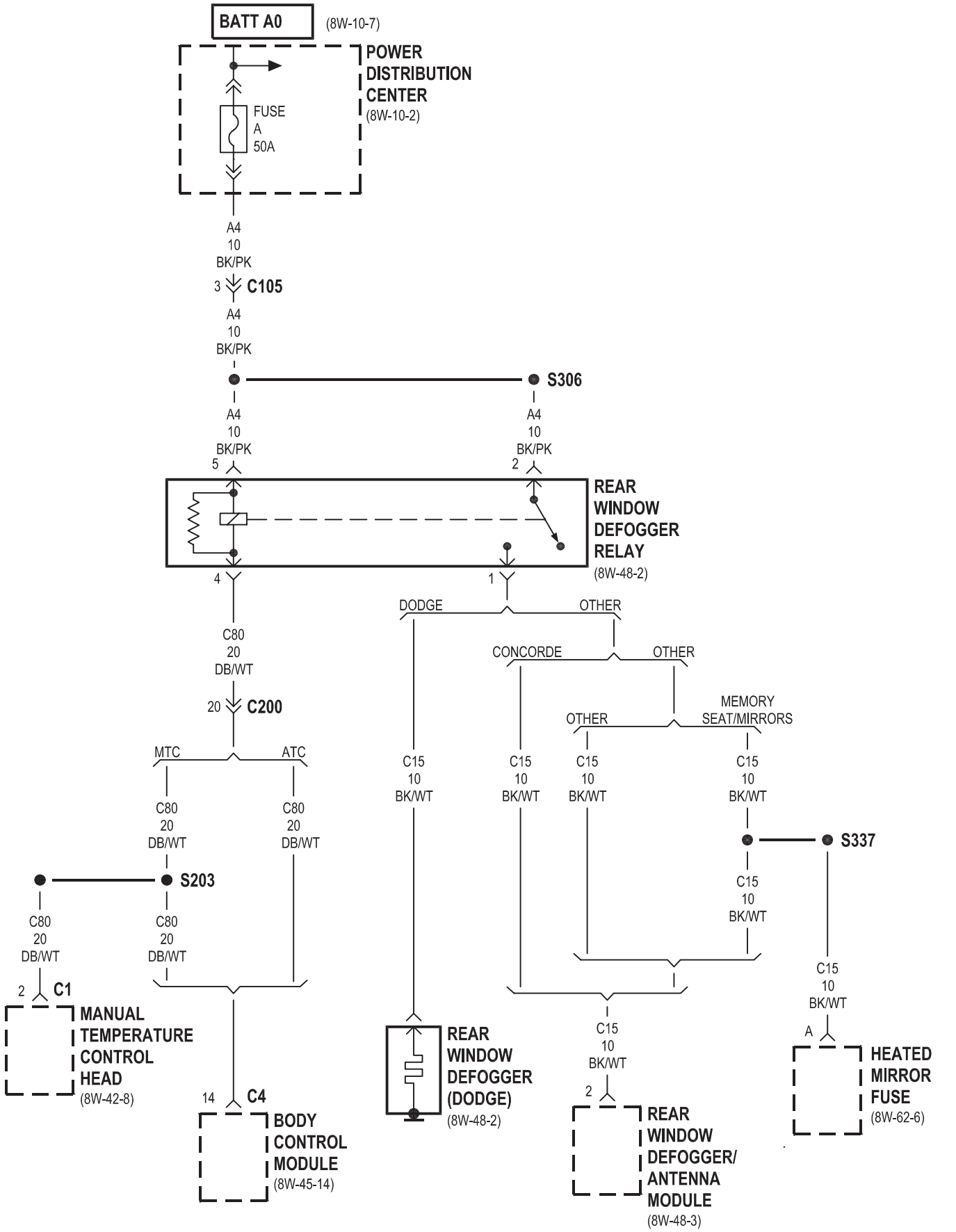
CAVITY	CIRCUIT	FUNCTION
A	A5 14RD/OR	FUSED B(+)
B	V5 12DG	WIPER RELAY COMMON
C	V16 20VT	WIPER HIGH/LOW RELAY CONTROL
D	V4 14RD/YL	WIPER HIGH/LOW RELAY HIGH SPEED OUTPUT
E	V3 14BR/WT	WIPER HIGH/LOW RELAY LOW SPEED OUTPUT

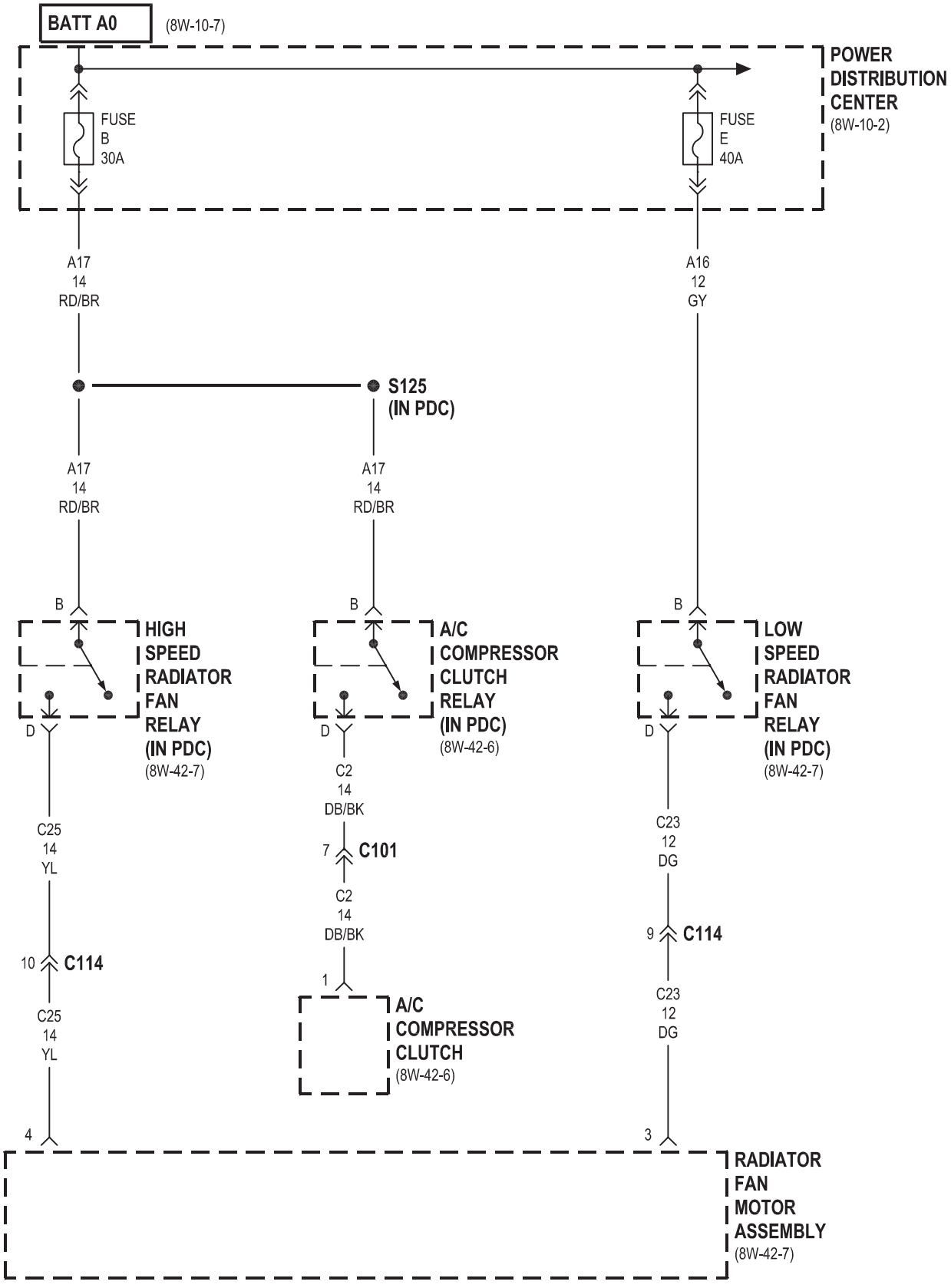
WIPER ON/OFF RELAY

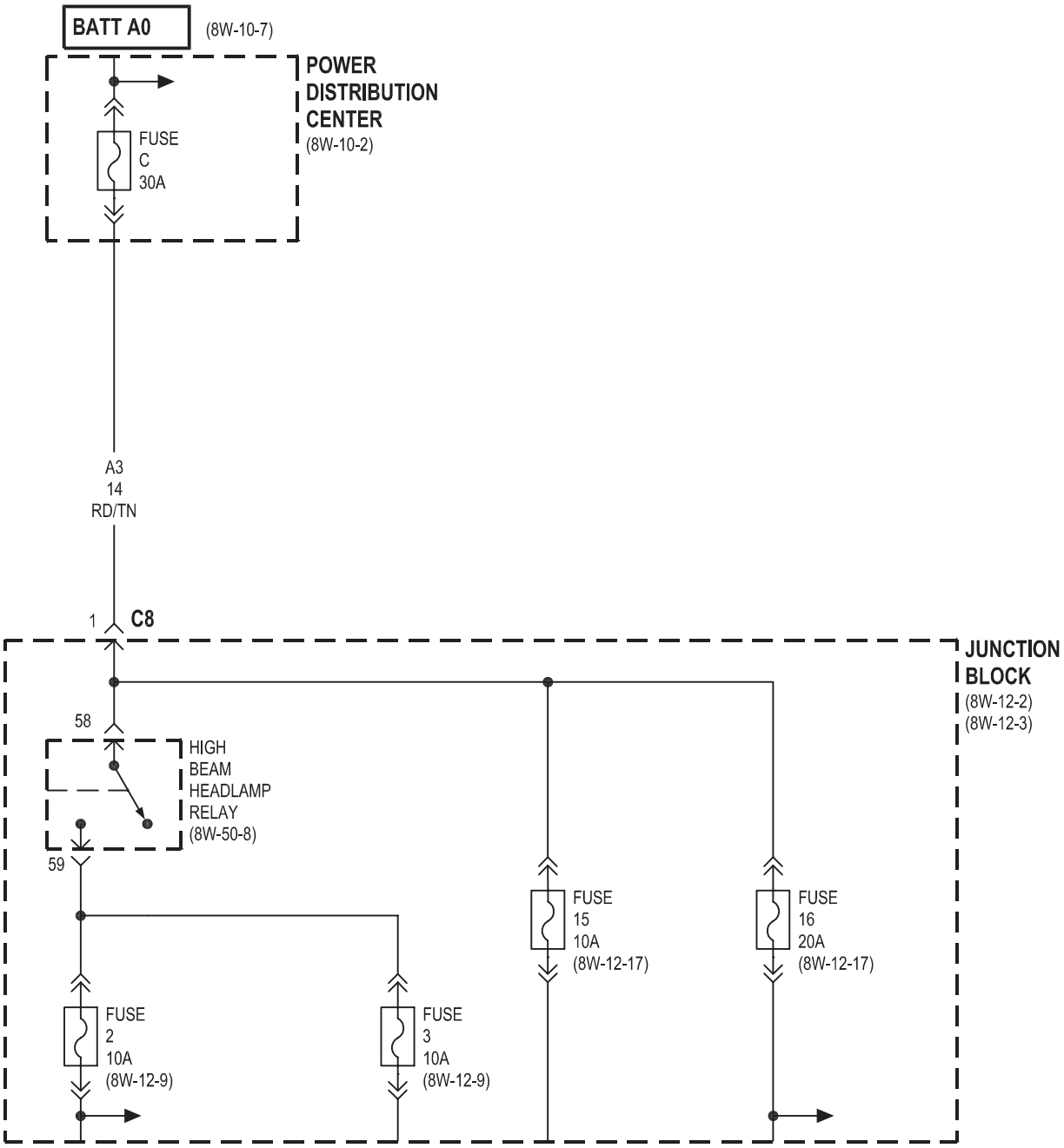
CAVITY	CIRCUIT	FUNCTION
A	A5 14RD/OR	FUSED B(+)
B	V5 12DG	WIPER RELAY COMMON
C	V14 20RD/VT	WIPER ON/OFF RELAY CONTROL
D	A5 12RD/OR	FUSED B(+)
E	Z1 14BK	GROUND

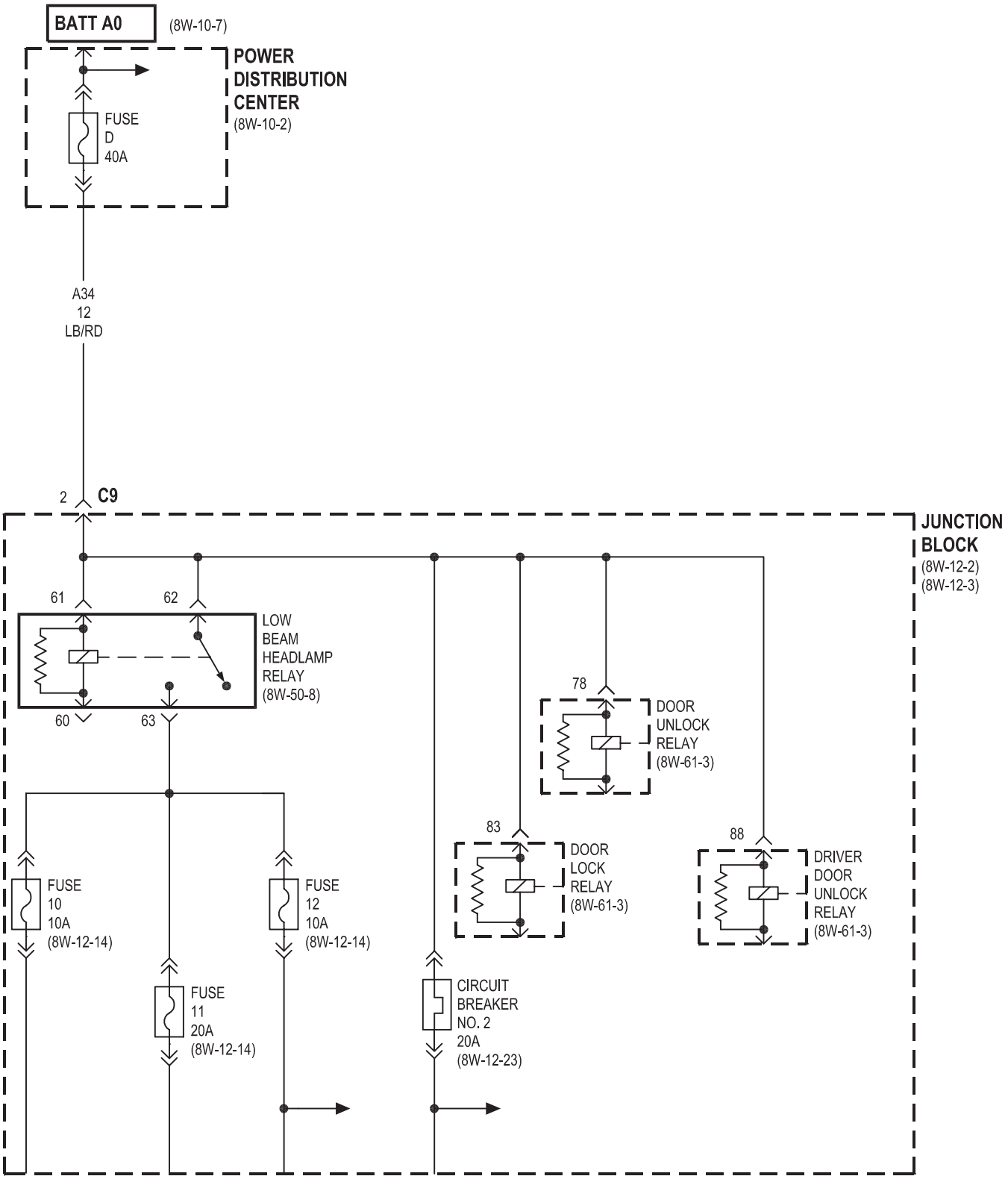

REMOTE JUMP POST
A0 2 RD
A0 2 RD
BATTERY
(8W-20-2)
ENGINE STARTER MOTOR
(8W-21-2)
A0 4 RD
A11 6 RD
FUSIBLE LINK
A11 10 DG
S144
(8W-20-2)
A11 6 RD
S145
(8W-20-2)
GENERATOR
(8W-20-2)
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(8W-10-2)
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FUSE C 30A (8W-10-11)
FUSE D 40A (8W-10-12)
FUSE E 40A (8W-10-10)
FUSE F 20A (8W-10-13)
FUSE G 40A (8W-10-15)
A4 10 BK/PK
TO C105
A17 14 RD/BR
TO S125
A3 14 RD/TN
TO JUNCTION BLOCK
A34 12 LB/RD
TO JUNCTION BLOCK
A16 12 GY
TO LOW SPEED RADIATOR FAN RELAY
A37 16 WT/DB
TO JUNCTION BLOCK
A1 12 RD
TO S124
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FUSE I 30A (8W-10-13)
FUSE J 40A (8W-10-14)
FUSE K 40A (8W-10-15)
FUSE L 40A (8W-10-13)
FUSE M 40A (8W-10-16)
FUSE N 30A (8W-10-17)
A
TO FUSE O (PDC) (8W-10-8)
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TO CONTROLLER ANTI-LOCK BRAKE
A7 14 RD/BK
TO JUNCTION BLOCK
A2 12 PK/BK
TO C104
A10 12 RD/DG
TO CONTROLLER ANTI-LOCK BRAKE
A13 12 PK/WT
TO JUNCTION BLOCK
A5 12 RD/OR
TO S128
A14 14 RD/WT
TO S167

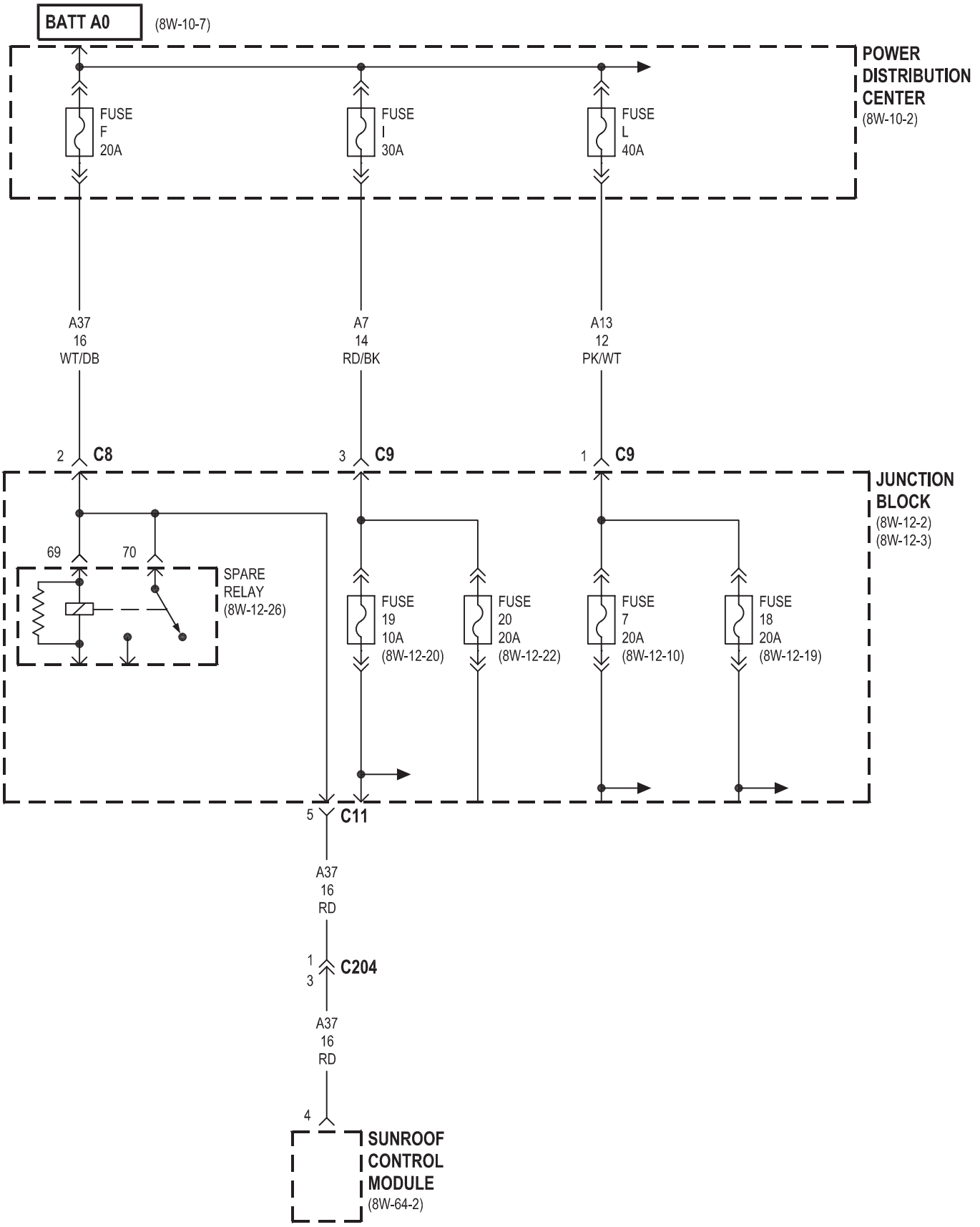

FROM
S165
(8W-10-17)
FROM
S165
(8W-10-17)
FROM
FUSE
N (PDC)
(8W-10-7)
A
POWER
DISTRIBUTION
CENTER
(8W-10-2)
FUSE
O
20A
(8W-10-15)
FUSE
P
30A
(8W-10-22)
FUSE
Q
20A
(8W-10-23)
FUSE
R
20A
(8W-10-24)
FUSE
S
20A
(8W-10-17)
FUSE
T
20A
(8W-10-17)
A15
18
PK
20 C103
A15
18
PK
TO
COMBINATION
FLASHER
A53
14
RD/YL
TO
S129
A30
18
RD/LB
TO
S166
A35
18
DB
TO
S169
F42
16
DG/LG
1 C101
F42
16
DG/LG
2.7L
3.2L/3.5L
F42
16
DG/LG
TO
S101
F42
16
DG/LG
TO
S109
F142
16
OR/DG
TO
S164

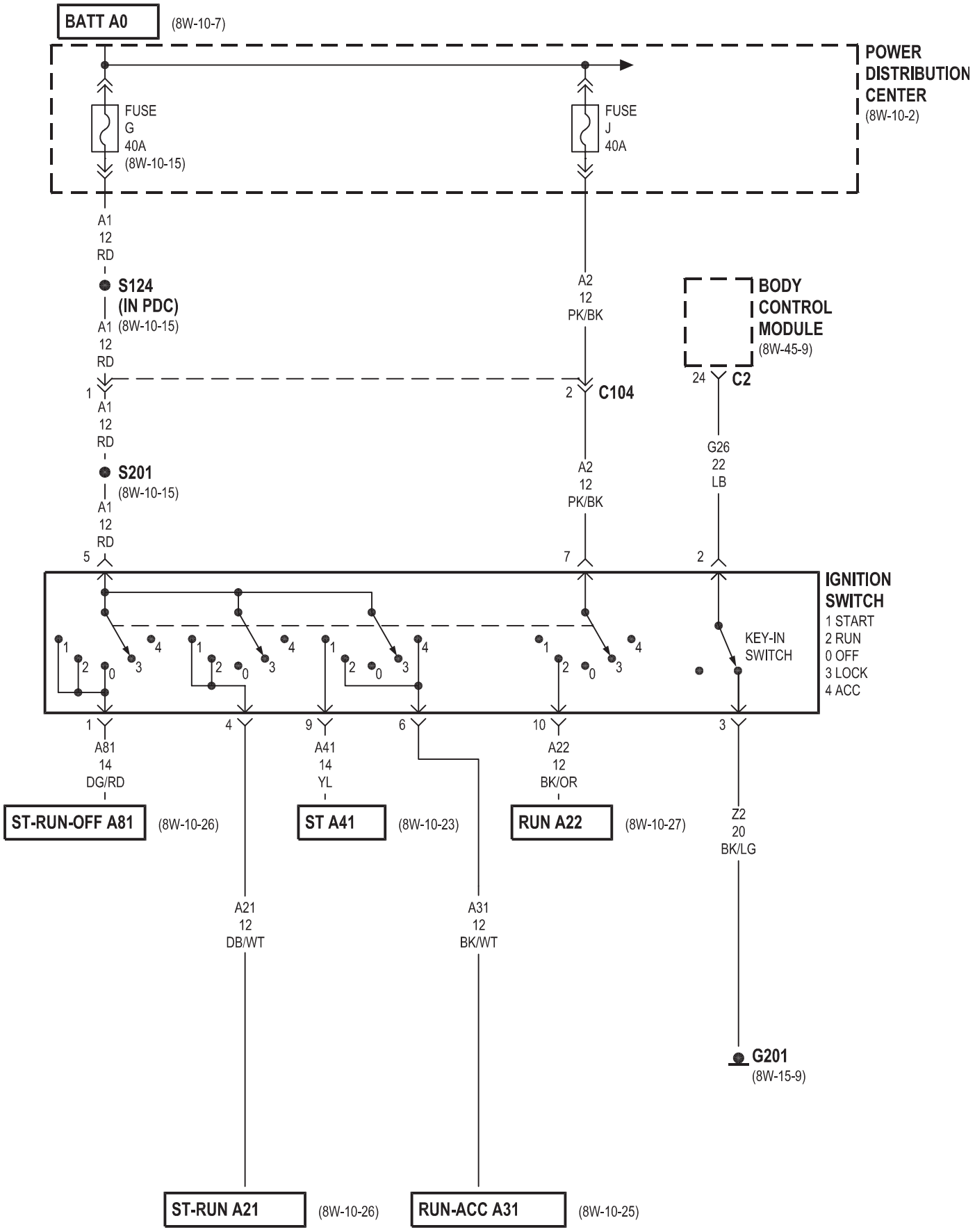

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE A 50A
A4 10 BK/PK
3 C105
A4 10 BK/PK
S306
A4 10 BK/PK
5
A4 10 BK/PK
2
REAR WINDOW DEFOGGER RELAY
(8W-48-2)
4
1
C80 20 DB/WT
20 C200
DODGE
OTHER
CONCORDE
OTHER
OTHER
MEMORY SEAT/MIRRORS
MTC
ATC
C15 10 BK/WT
C15 10 BK/WT
C15 10 BK/WT
C15 10 BK/WT
C80 20 DB/WT
C80 20 DB/WT
S203
S337
C80 20 DB/WT
C80 20 DB/WT
C15 10 BK/WT
2 C1
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-8)
14 C4
BODY CONTROL MODULE
(8W-45-14)
REAR WINDOW DEFOGGER (DODGE)
(8W-48-2)
C15 10 BK/WT
2
REAR WINDOW DEFOGGER/ ANTENNA MODULE
(8W-48-3)
C15 10 BK/WT
A
HEATED MIRROR FUSE
(8W-62-6)

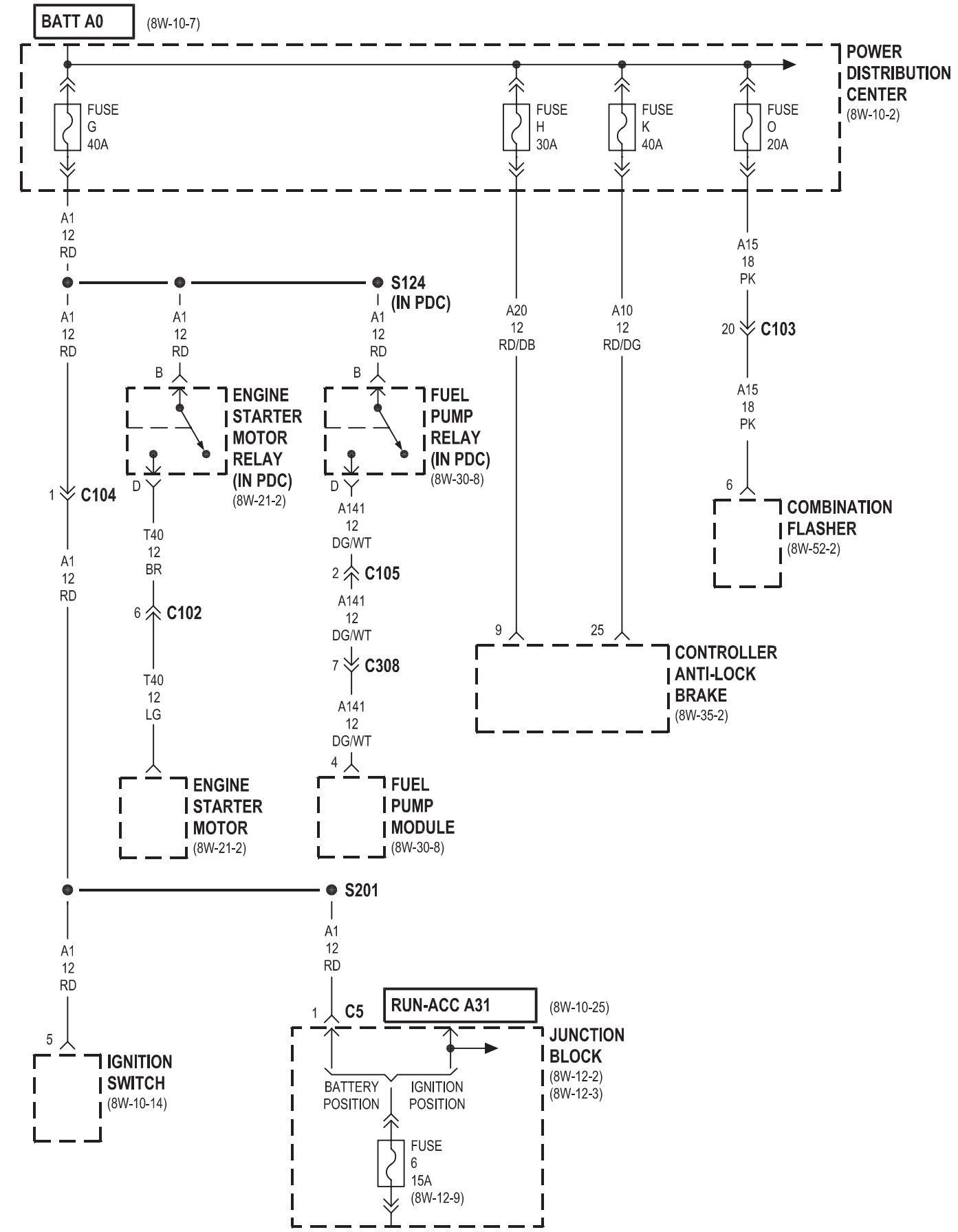

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE B 30A
FUSE E 40A
A17 14 RD/BR
A16 12 GY
S125 (IN PDC)
A17 14 RD/BR
A17 14 RD/BR
B
D
HIGH SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8W-42-6)
LOW SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
C25 14 YL
10 C114
C25 14 YL
4
C2 14 DB/BK
7 C101
C2 14 DB/BK
1
A/C COMPRESSOR CLUTCH
(8W-42-6)
C23 12 DG
9 C114
C23 12 DG
3
RADIATOR FAN MOTOR ASSEMBLY
(8W-42-7)

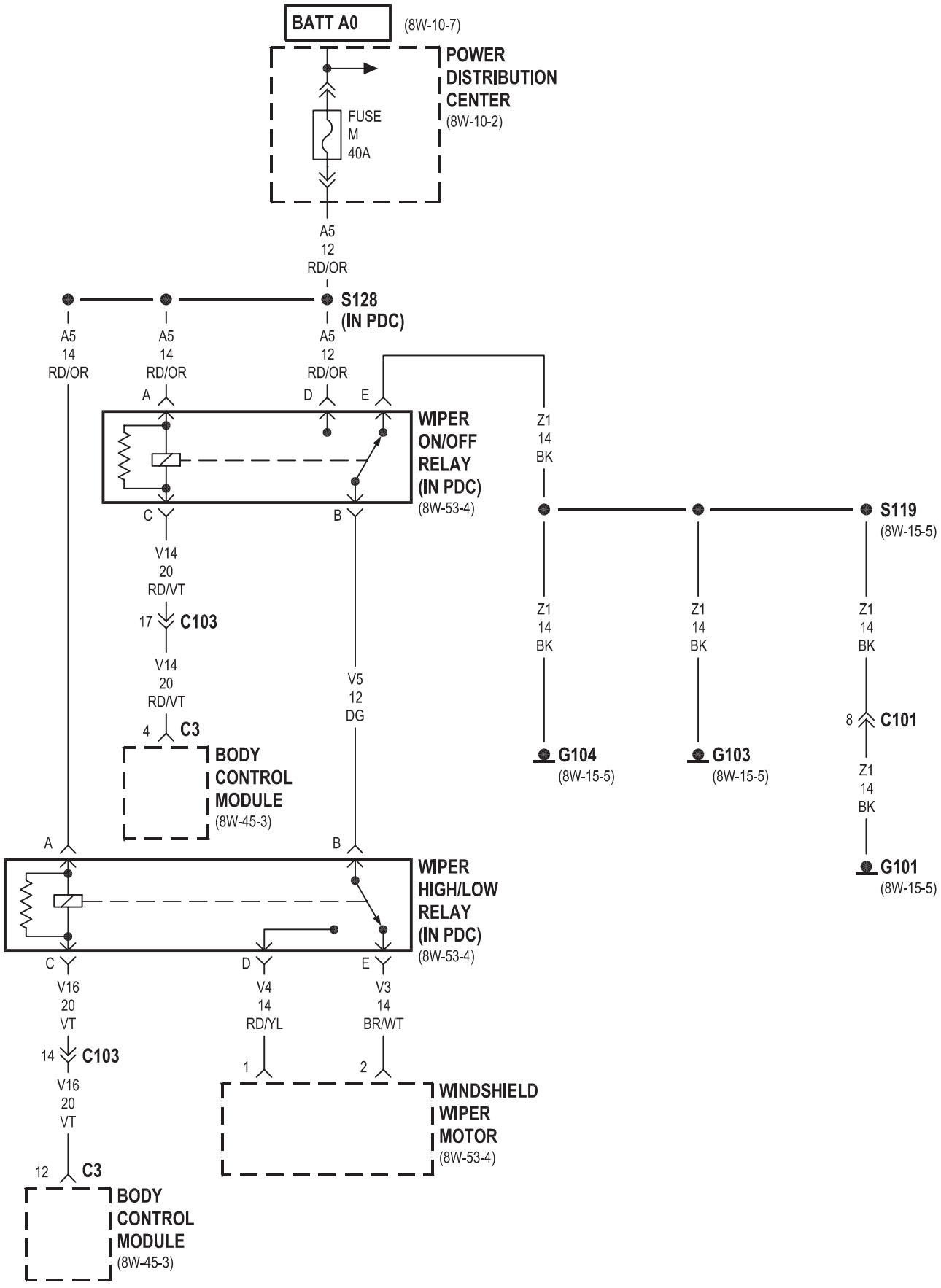

BATT A0
(8W-10-7)
POWER
DISTRIBUTION
CENTER
(8W-10-2)
FUSE
C
30A
A3
14
RD/TN
1
C8
JUNCTION
BLOCK
(8W-12-2)
(8W-12-3)
58
HIGH
BEAM
HEADLAMP
RELAY
(8W-50-8)
59
FUSE
2
10A
(8W-12-9)
FUSE
3
10A
(8W-12-9)
FUSE
15
10A
(8W-12-17)
FUSE
16
20A
(8W-12-17)

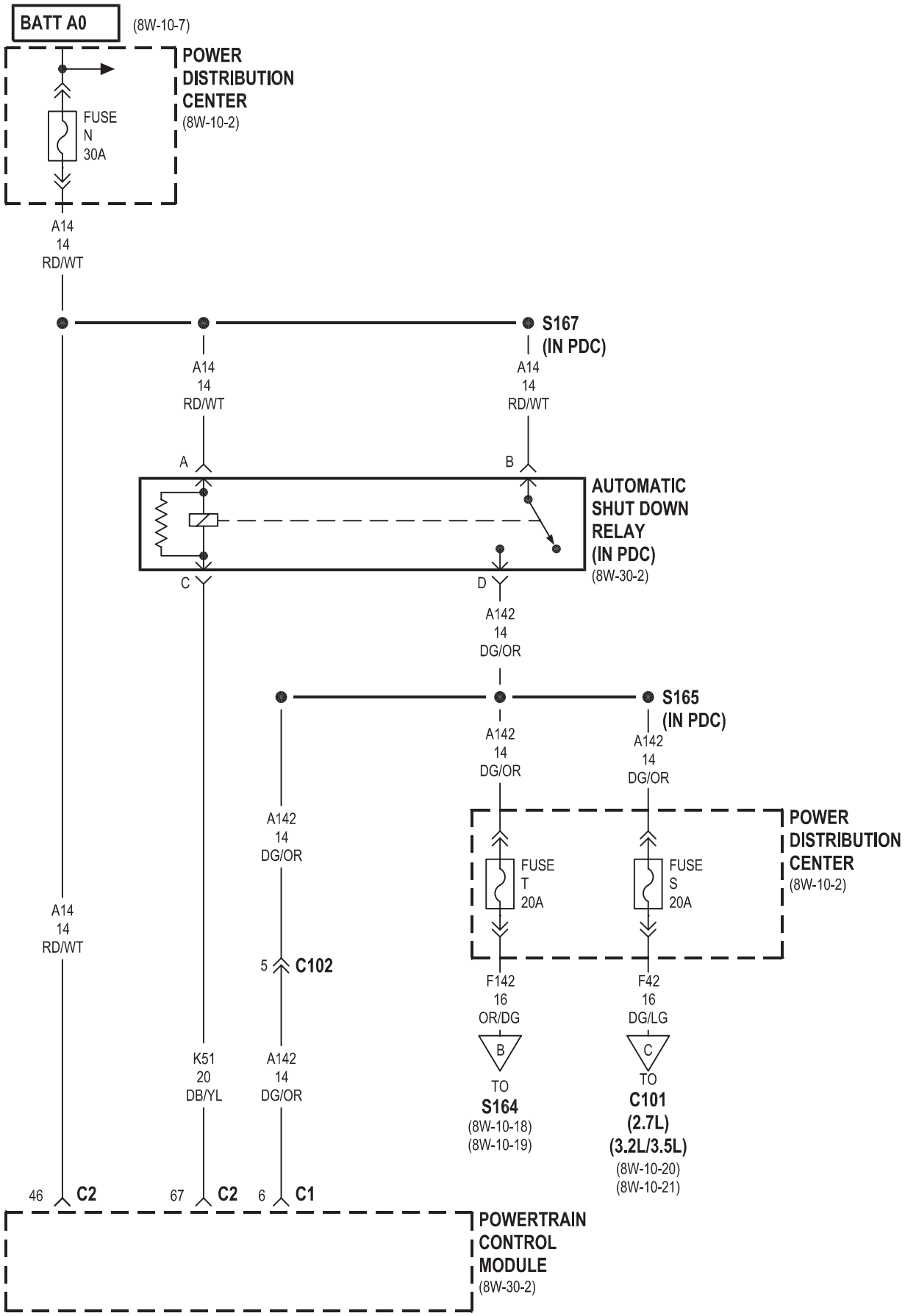

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE D 40A
A34 12 LB/RD
2
C9
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
61
62
LOW BEAM HEADLAMP RELAY
(8W-50-8)
60
63
78
DOOR UNLOCK RELAY
(8W-61-3)
83
DOOR LOCK RELAY
(8W-61-3)
88
DRIVER DOOR UNLOCK RELAY
(8W-61-3)
FUSE 10 10A
(8W-12-14)
FUSE 12 10A
(8W-12-14)
FUSE 11 20A
(8W-12-14)
CIRCUIT BREAKER NO. 2 20A
(8W-12-23)

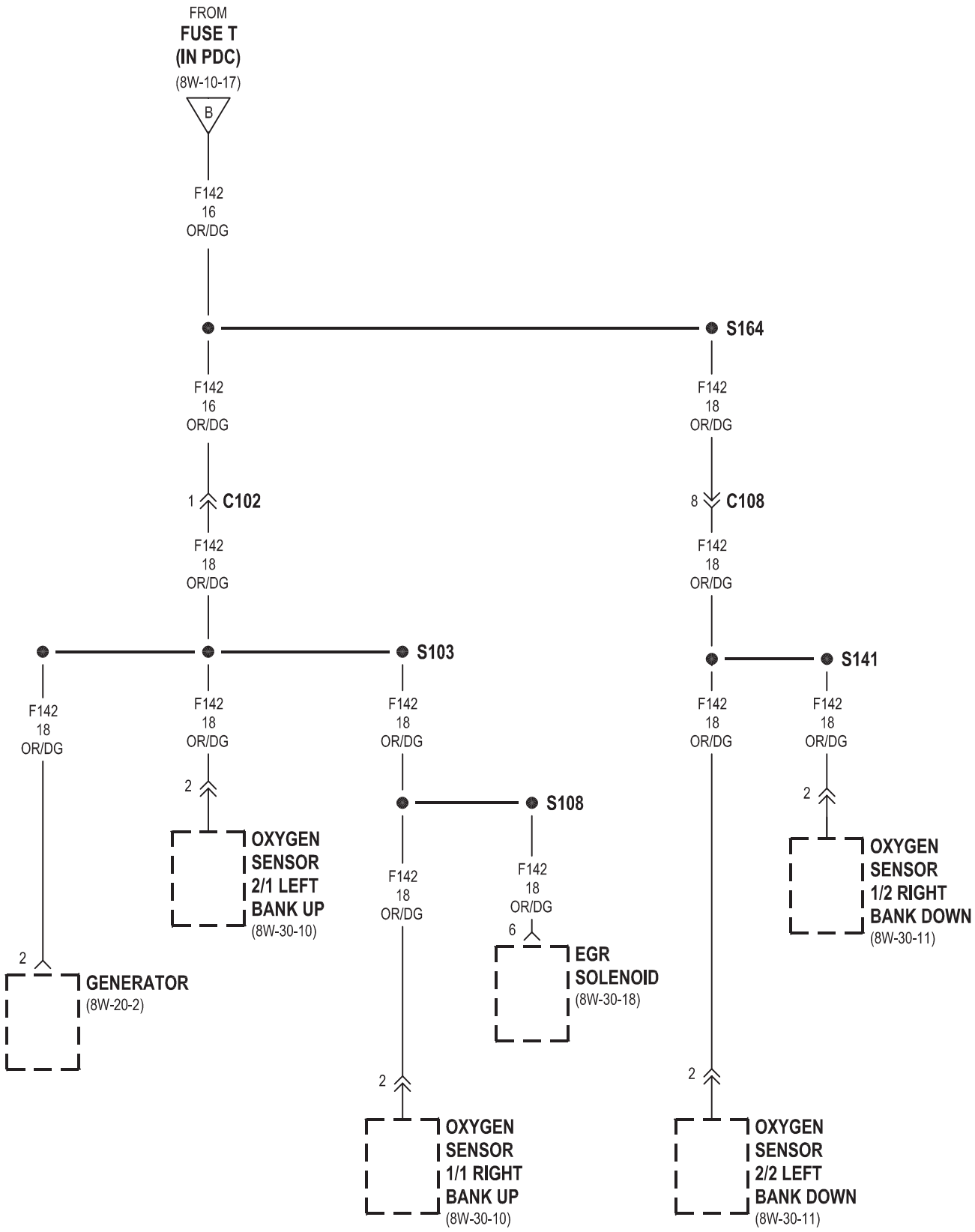

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE F 20A
FUSE I 30A
FUSE L 40A
A37 16 WT/DB
A7 14 RD/BK
A13 12 PK/WT
2 C8
3 C9
1 C9
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
69
70
SPARE RELAY
(8W-12-26)
FUSE 19 10A
(8W-12-20)
FUSE 20 20A
(8W-12-22)
FUSE 7 20A
(8W-12-10)
FUSE 18 20A
(8W-12-19)
5 C11
A37 16 RD
1
3
C204
A37 16 RD
4
SUNROOF CONTROL MODULE
(8W-64-2)

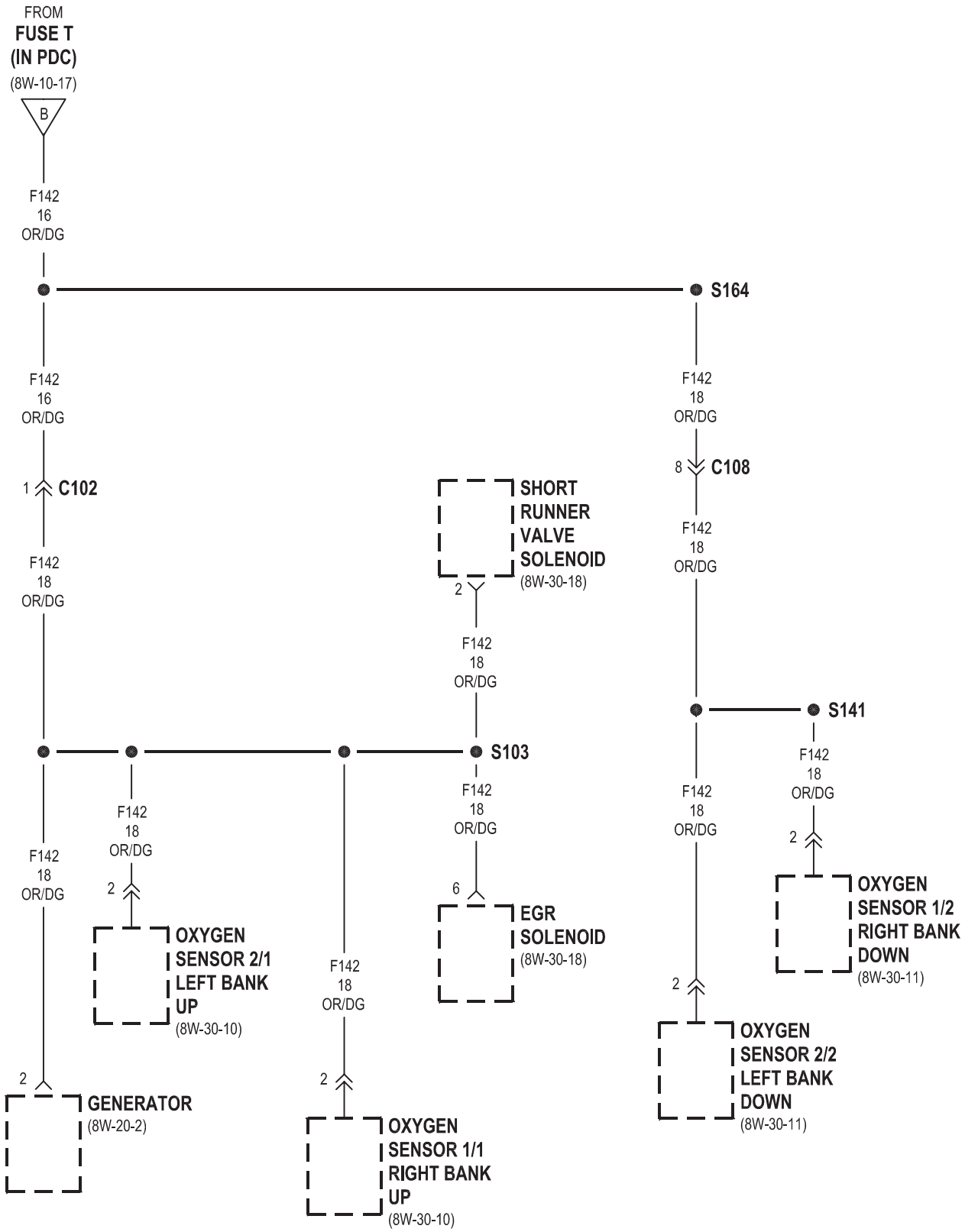

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE G 40A
(8W-10-15)
FUSE J 40A
A1 12 RD
S124 (IN PDC)
(8W-10-15)
A2 12 PK/BK
BODY CONTROL MODULE
(8W-45-9)
C104
C2
G26 22 LB
S201
(8W-10-15)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
KEY-IN SWITCH
A81 14 DG/RD
A41 14 YL
A22 12 BK/OR
Z2 20 BK/LG
ST-RUN-OFF A81
(8W-10-26)
ST A41
(8W-10-23)
RUN A22
(8W-10-27)
A21 12 DB/WT
A31 12 BK/WT
G201
(8W-15-9)
ST-RUN A21
(8W-10-26)
RUN-ACC A31
(8W-10-25)

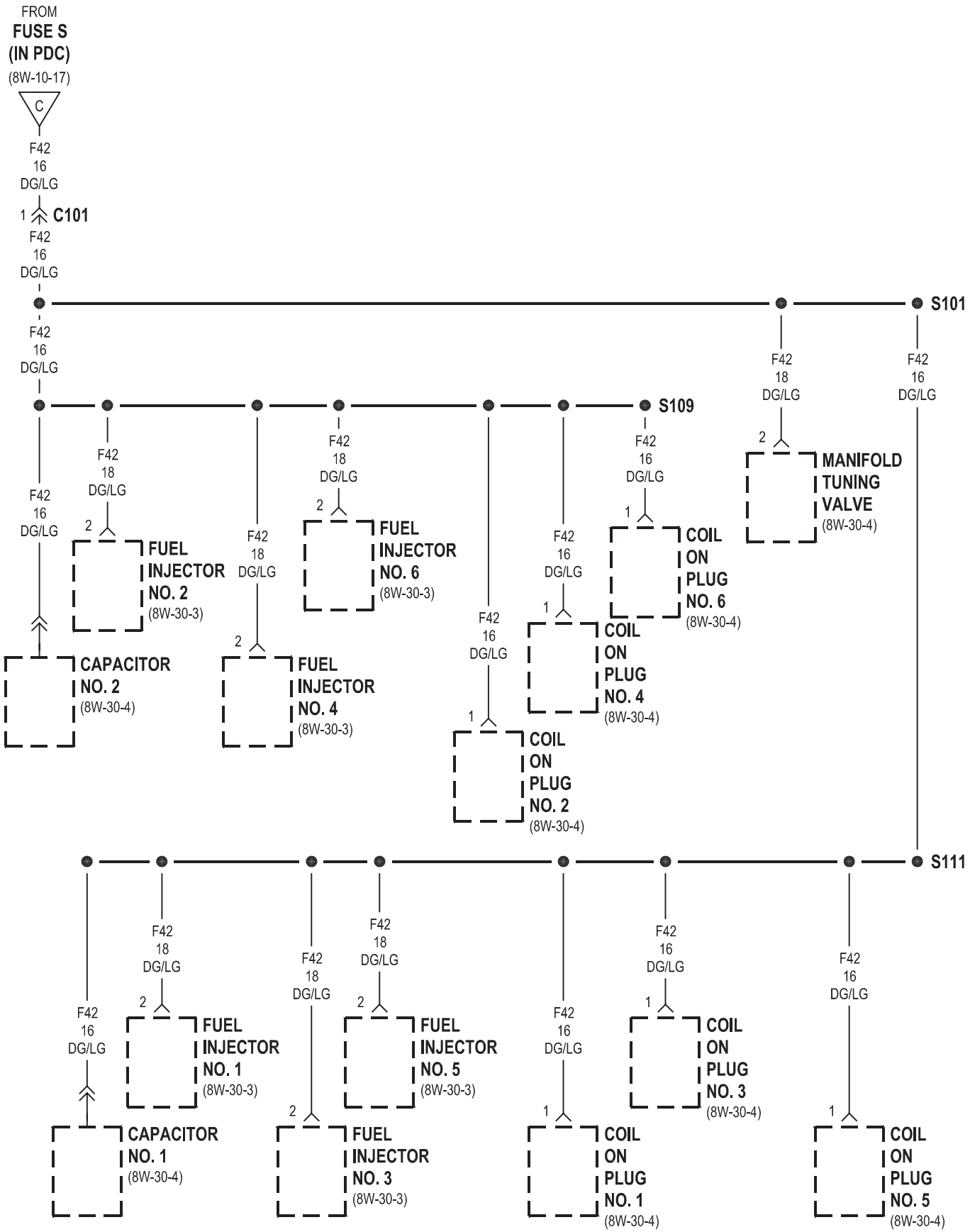

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE G 40A
FUSE H 30A
FUSE K 40A
FUSE O 20A
A1 12 RD
A20 12 RD/DB
A10 12 RD/DG
A15 18 PK
S124 (IN PDC)
20 C103
ENGINE STARTER MOTOR RELAY (IN PDC)
(8W-21-2)
FUEL PUMP RELAY (IN PDC)
(8W-30-8)
1 C104
T40 12 BR
6 C102
A141 12 DG/WT
2 C105
7 C308
4
COMBINATION FLASHER
(8W-52-2)
9
25
CONTROLLER ANTI-LOCK BRAKE
(8W-35-2)
ENGINE STARTER MOTOR
(8W-21-2)
FUEL PUMP MODULE
(8W-30-8)
S201
5
IGNITION SWITCH
(8W-10-14)
1 C5
RUN-ACC A31
(8W-10-25)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
BATTERY POSITION
IGNITION POSITION
FUSE 6 15A
(8W-12-9)

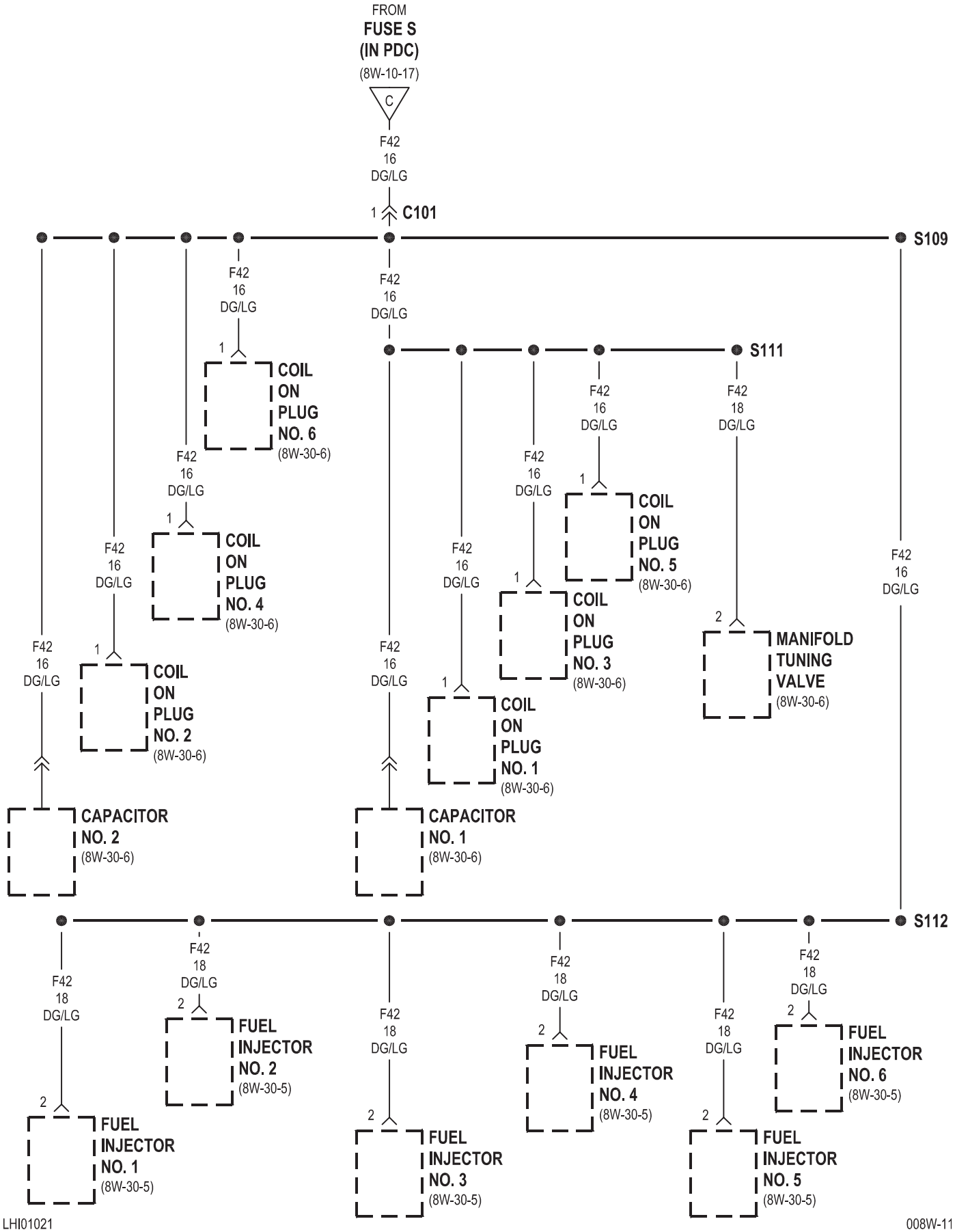

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE M 40A
A5 12 RD/OR
S128 (IN PDC)
A5 14 RD/OR
A5 14 RD/OR
A5 12 RD/OR
A
D
E
WIPER ON/OFF RELAY (IN PDC)
(8W-53-4)
C
B
V14 20 RD/VT
17 C103
V14 20 RD/VT
4 C3
BODY CONTROL MODULE
(8W-45-3)
V5 12 DG
Z1 14 BK
S119
(8W-15-5)
G104
(8W-15-5)
G103
(8W-15-5)
8 C101
G101
(8W-15-5)
A
B
WIPER HIGH/LOW RELAY (IN PDC)
(8W-53-4)
C
D
E
V16 20 VT
14 C103
V16 20 VT
12 C3
BODY CONTROL MODULE
(8W-45-3)
V4 14 RD/YL
V3 14 BR/WT
1
2
WINDSHIELD WIPER MOTOR
(8W-53-4)


BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE N 30A
A14 14 RD/WT
S167 (IN PDC)
A14 14 RD/WT
A14 14 RD/WT
A
B
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
C
D
A142 14 DG/OR
S165 (IN PDC)
A142 14 DG/OR
A142 14 DG/OR
A142 14 DG/OR
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE T 20A
FUSE S 20A
A14 14 RD/WT
5 C102
F142 16 OR/DG
F42 16 DG/LG
B
C
TO S164
(8W-10-18)
(8W-10-19)
TO C101 (2.7L) (3.2L/3.5L)
(8W-10-20)
(8W-10-21)
K51 20 DB/YL
A142 14 DG/OR
46 C2
67 C2
6 C1
POWERTRAIN CONTROL MODULE
(8W-30-2)

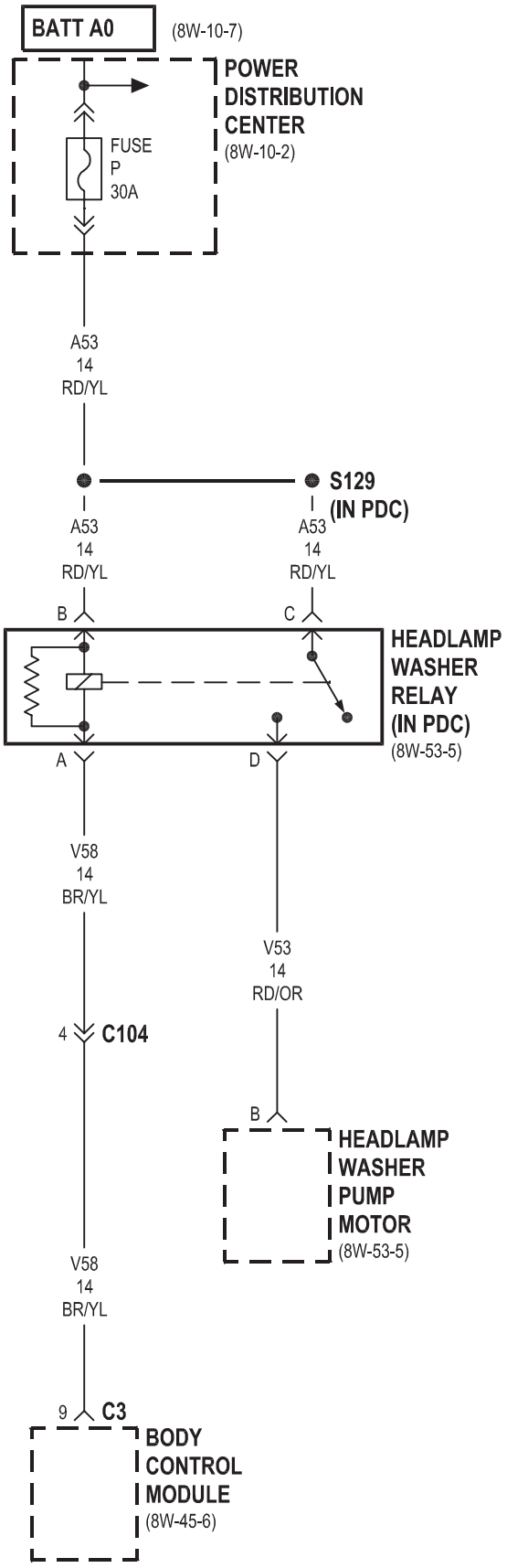

FROM
FUSE T
(IN PDC)
(8W-10-17)
B
F142
16
OR/DG
S164
F142
16
OR/DG
F142
18
OR/DG
1
C102
8
C108
F142
18
OR/DG
F142
18
OR/DG
S103
S141
F142
18
OR/DG
F142
18
OR/DG
F142
18
OR/DG
F142
18
OR/DG
2
2
S108
OXYGEN
SENSOR
2/1 LEFT
BANK UP
(8W-30-10)
F142
18
OR/DG
F142
18
OR/DG
6
2
OXYGEN
SENSOR
1/2 RIGHT
BANK DOWN
(8W-30-11)
2
GENERATOR
(8W-20-2)
EGR
SOLENOID
(8W-30-18)
2
2
OXYGEN
SENSOR
1/1 RIGHT
BANK UP
(8W-30-10)
OXYGEN
SENSOR
2/2 LEFT
BANK DOWN
(8W-30-11)


FROM
FUSE T
(IN PDC)
(8W-10-17)
B
F142
16
OR/DG
S164
F142
16
OR/DG
1 C102
F142
18
OR/DG
F142
18
OR/DG
8 C108
F142
18
OR/DG
SHORT
RUNNER
VALVE
SOLENOID
(8W-30-18)
2
F142
18
OR/DG
S141
S103
F142
18
OR/DG
F142
18
OR/DG
F142
18
OR/DG
2
OXYGEN
SENSOR 1/2
RIGHT BANK
DOWN
(8W-30-11)
F142
18
OR/DG
2
OXYGEN
SENSOR 2/1
LEFT BANK
UP
(8W-30-10)
6
EGR
SOLENOID
(8W-30-18)
2
OXYGEN
SENSOR 2/2
LEFT BANK
DOWN
(8W-30-11)
2
GENERATOR
(8W-20-2)
F142
18
OR/DG
2
OXYGEN
SENSOR 1/1
RIGHT BANK
UP
(8W-30-10)

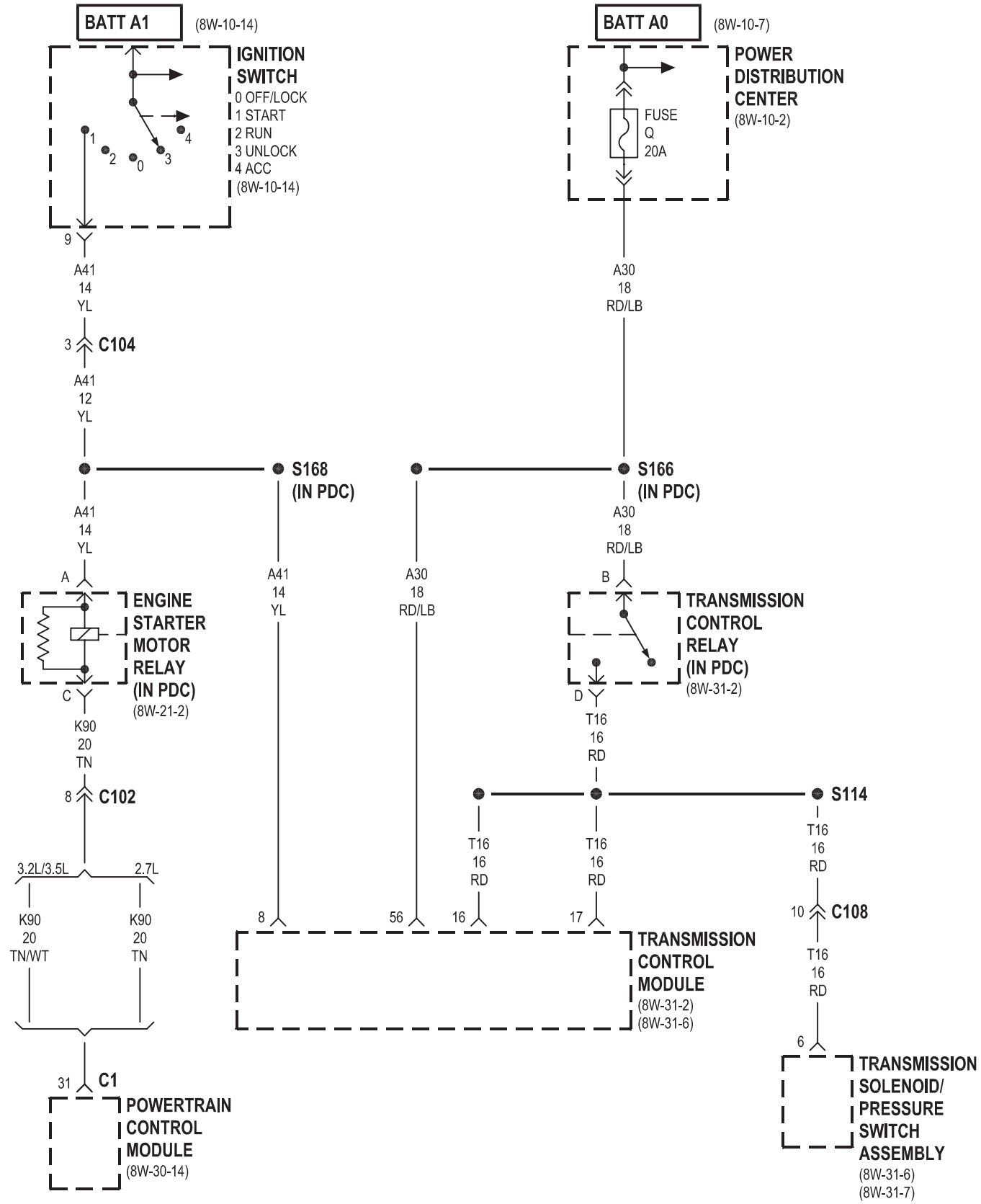

FROM
FUSE S
(IN PDC)
(8W-10-17)
C
F42
16
DG/LG
1
C101
F42
16
DG/LG
S101
S109
S111
F42
18
DG/LG
2
FUEL
INJECTOR
NO. 2
(8W-30-3)
CAPACITOR
NO. 2
(8W-30-4)
FUEL
INJECTOR
NO. 4
(8W-30-3)
FUEL
INJECTOR
NO. 6
(8W-30-3)
COIL
ON
PLUG
NO. 2
(8W-30-4)
COIL
ON
PLUG
NO. 4
(8W-30-4)
COIL
ON
PLUG
NO. 6
(8W-30-4)
MANIFOLD
TUNING
VALVE
(8W-30-4)
FUEL
INJECTOR
NO. 1
(8W-30-3)
CAPACITOR
NO. 1
(8W-30-4)
FUEL
INJECTOR
NO. 3
(8W-30-3)
FUEL
INJECTOR
NO. 5
(8W-30-3)
COIL
ON
PLUG
NO. 1
(8W-30-4)
COIL
ON
PLUG
NO. 3
(8W-30-4)
COIL
ON
PLUG
NO. 5
(8W-30-4)


FROM
FUSE S
(IN PDC)
(8W-10-17)
C
F42
16
DG/LG
1
C101
S109
S111
S112
F42
16
DG/LG
F42
18
DG/LG
COIL
ON
PLUG
NO. 6
(8W-30-6)
COIL
ON
PLUG
NO. 4
(8W-30-6)
COIL
ON
PLUG
NO. 2
(8W-30-6)
COIL
ON
PLUG
NO. 1
(8W-30-6)
COIL
ON
PLUG
NO. 5
(8W-30-6)
COIL
ON
PLUG
NO. 3
(8W-30-6)
MANIFOLD
TUNING
VALVE
(8W-30-6)
CAPACITOR
NO. 2
(8W-30-6)
CAPACITOR
NO. 1
(8W-30-6)
FUEL
INJECTOR
NO. 1
(8W-30-5)
FUEL
INJECTOR
NO. 2
(8W-30-5)
FUEL
INJECTOR
NO. 3
(8W-30-5)
FUEL
INJECTOR
NO. 4
(8W-30-5)
FUEL
INJECTOR
NO. 5
(8W-30-5)
FUEL
INJECTOR
NO. 6
(8W-30-5)

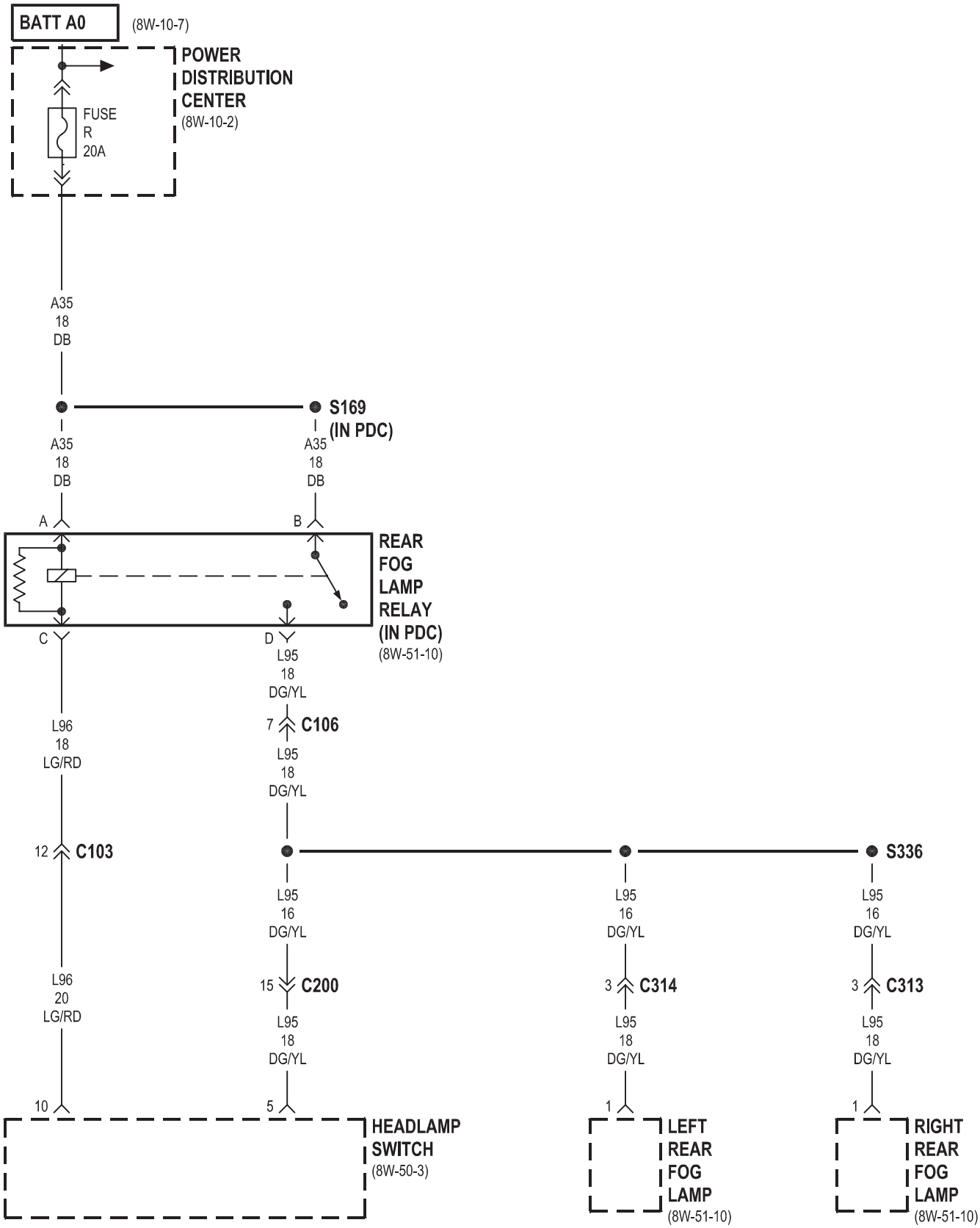
BUILT-UP-EXPORT

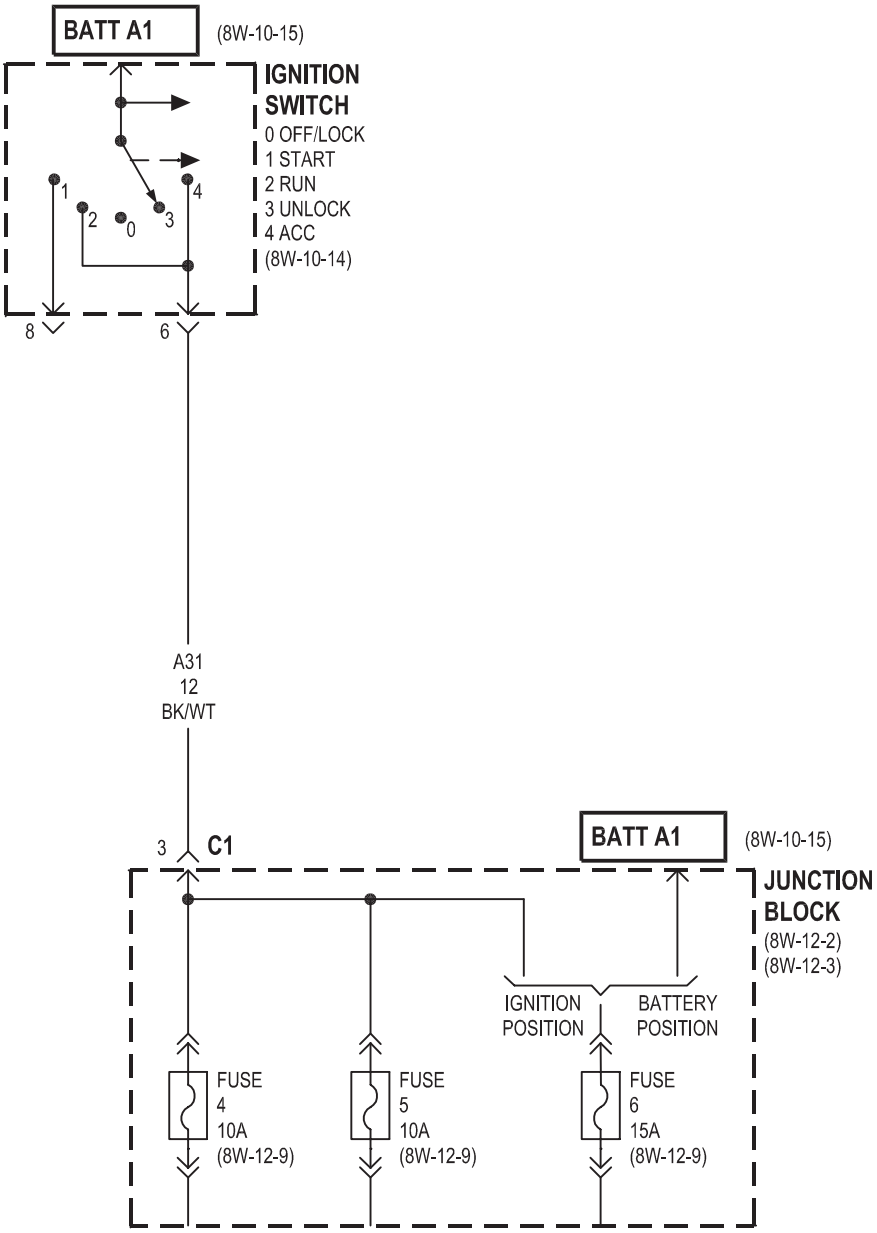


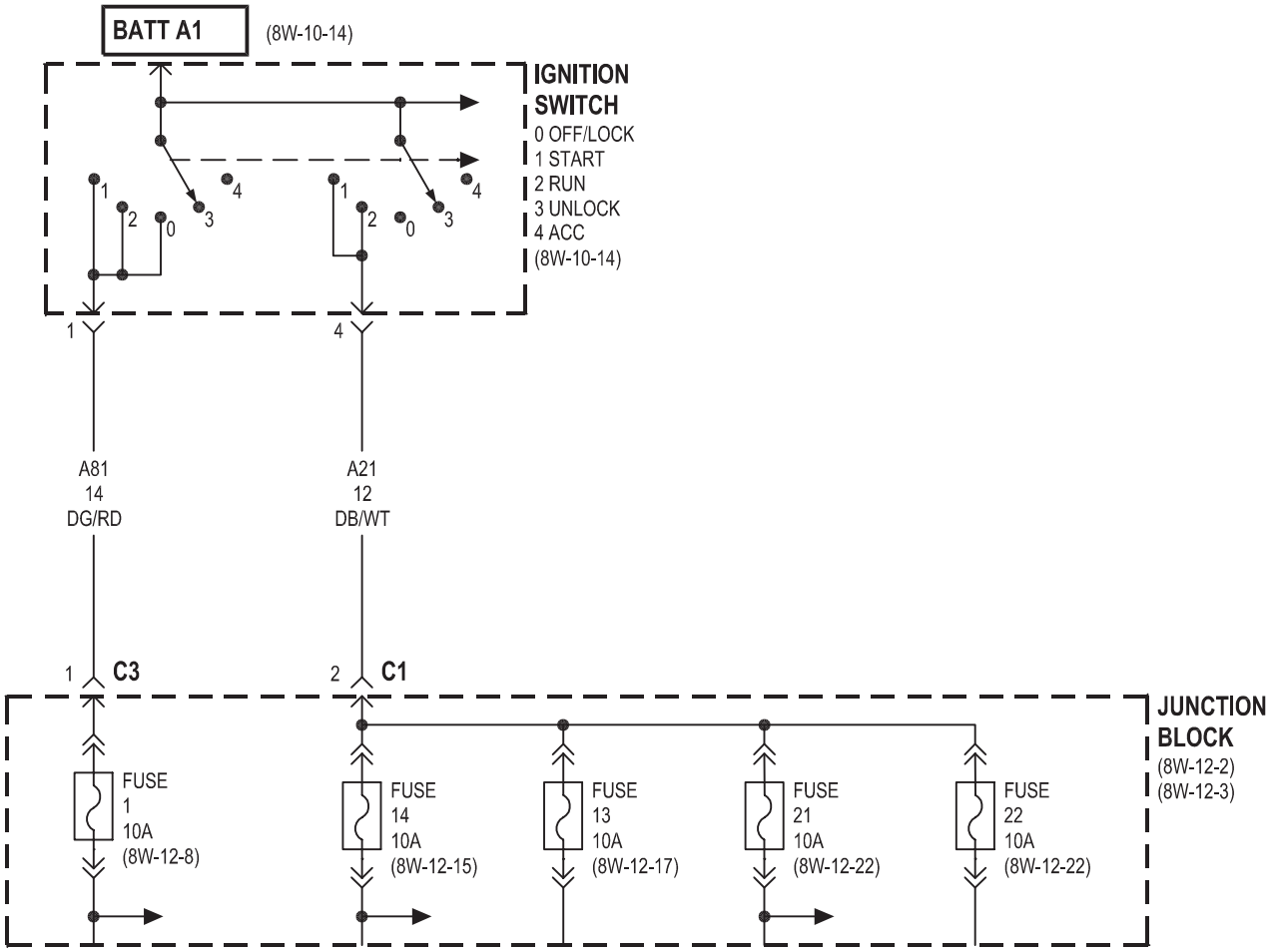
BUILT-UP-EXPORT

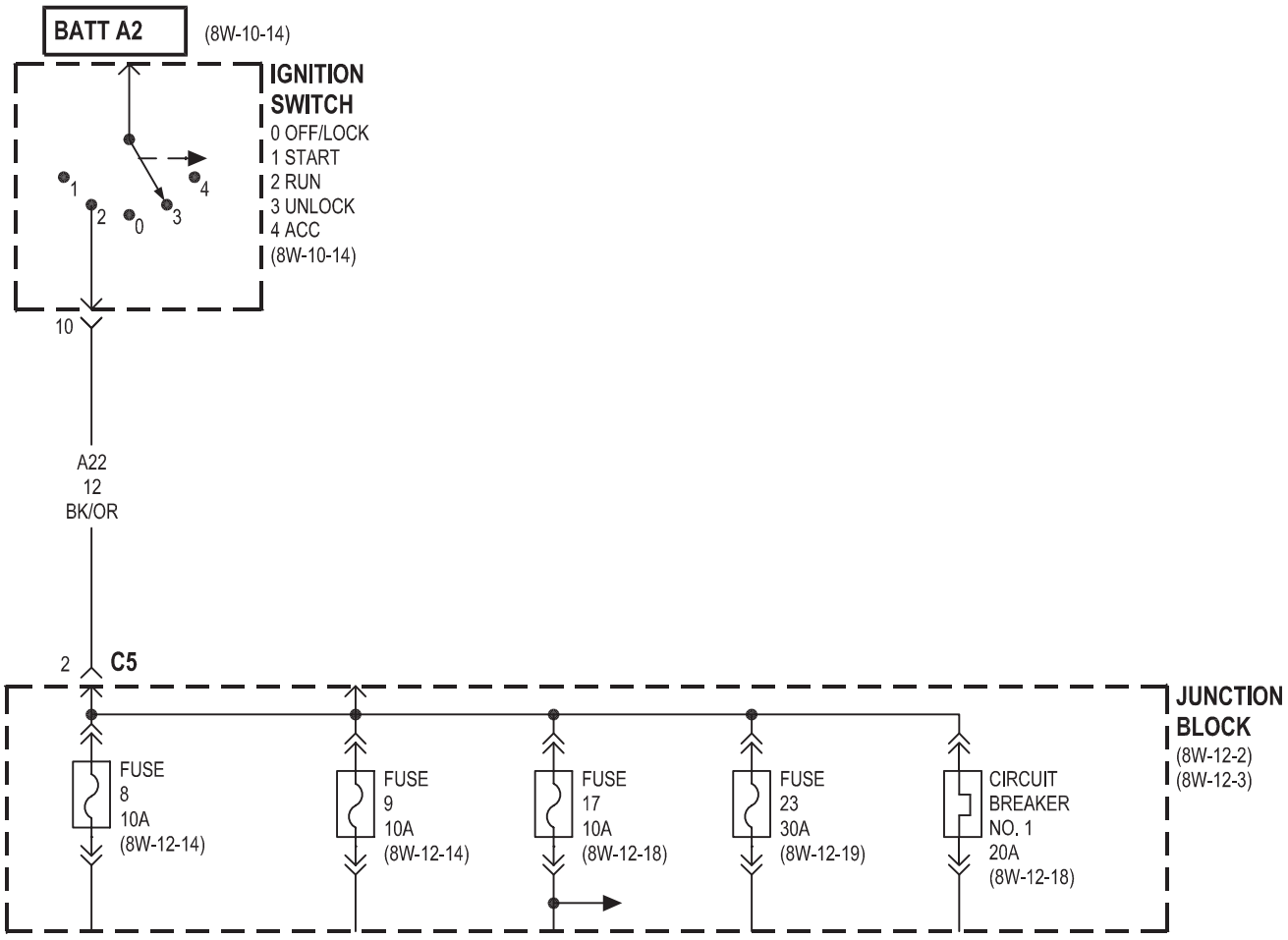


BUILT-UP-EXPORT



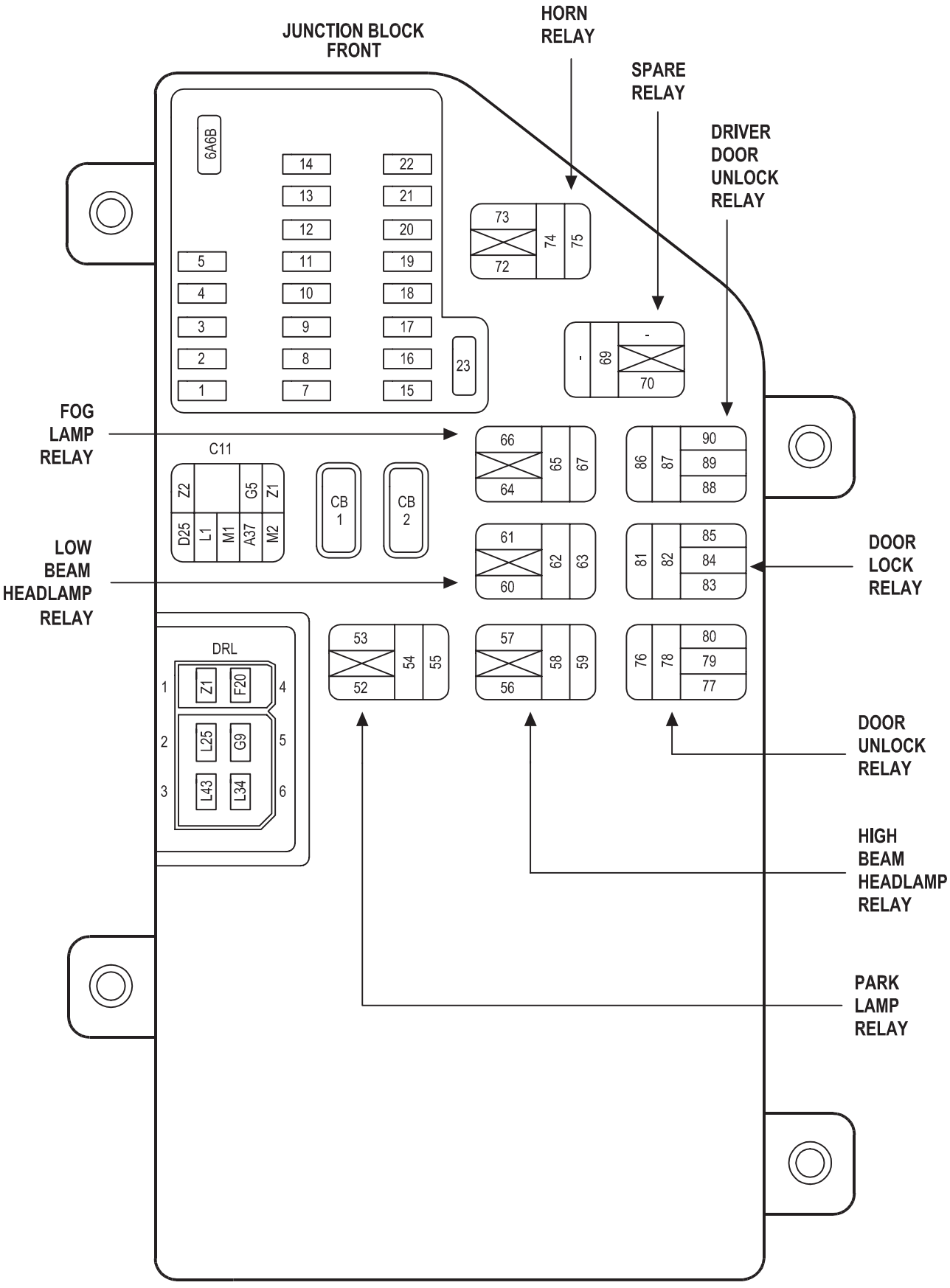

BATT A1
(8W-10-15)
IGNITION SWITCH
0 OFF/LOCK
1 START
2 RUN
3 UNLOCK
4 ACC
(8W-10-14)
1
2
0
3
4
8
6
A31
12
BK/WT
3
C1
BATT A1
(8W-10-15)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
IGNITION POSITION
BATTERY POSITION
FUSE 4 10A (8W-12-9)
FUSE 5 10A (8W-12-9)
FUSE 6 15A (8W-12-9)

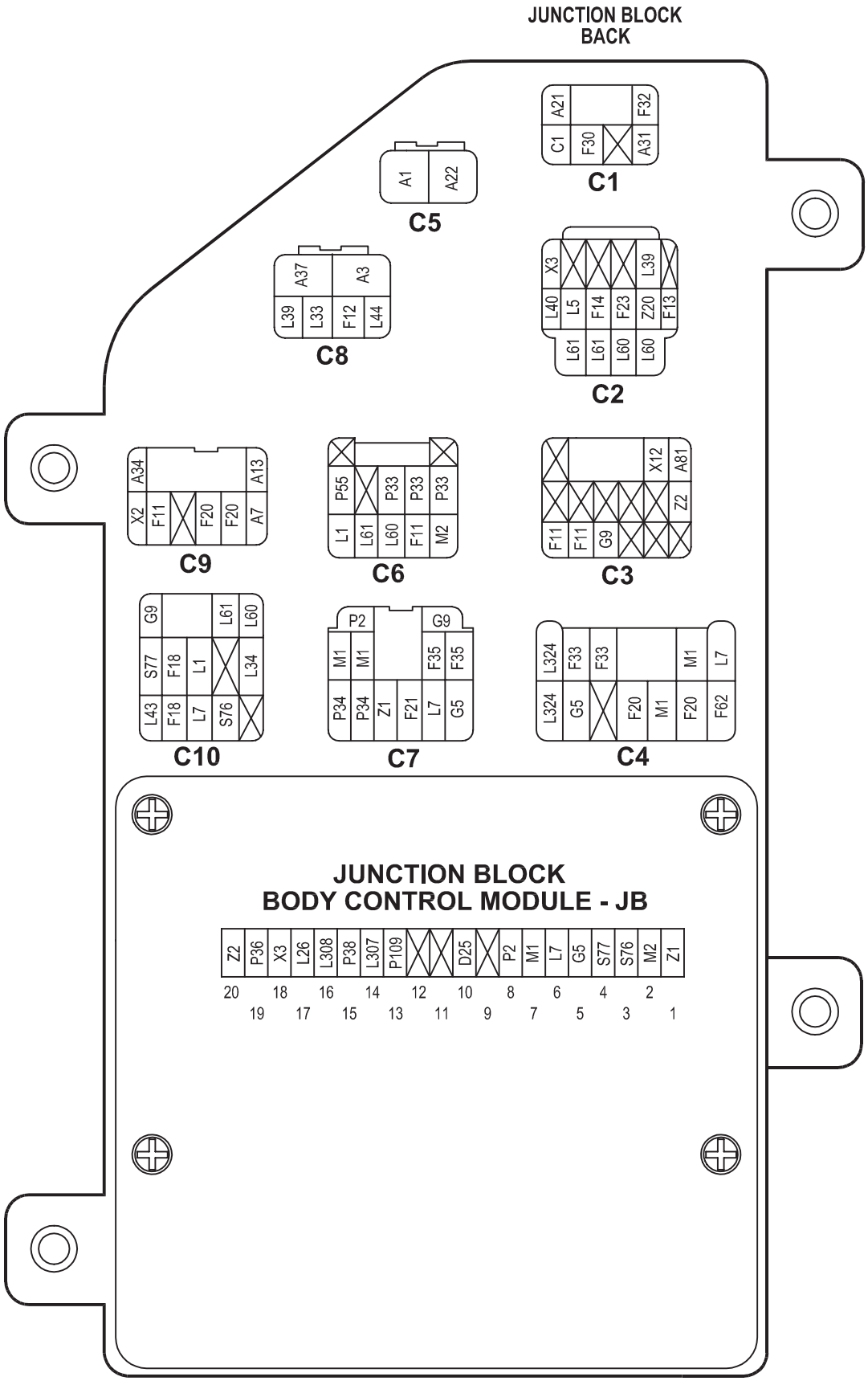

BATT A1
(8W-10-14)
IGNITION SWITCH
0 OFF/LOCK
1 START
2 RUN
3 UNLOCK
4 ACC
(8W-10-14)
1
4
A81
14
DG/RD
A21
12
DB/WT
1 C3
2 C1
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A (8W-12-8)
FUSE 14 10A (8W-12-15)
FUSE 13 10A (8W-12-17)
FUSE 21 10A (8W-12-22)
FUSE 22 10A (8W-12-22)


BATT A2
(8W-10-14)
IGNITION SWITCH
0 OFF/LOCK
1 START
2 RUN
3 UNLOCK
4 ACC
(8W-10-14)
1
2
0
3
4
10
A22
12
BK/OR
2
C5
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 8 10A (8W-12-14)
FUSE 9 10A (8W-12-14)
FUSE 17 10A (8W-12-18)
FUSE 23 30A (8W-12-19)
CIRCUIT BREAKER NO. 1 20A (8W-12-18)

8W-12 JUNCTION BLOCK

Component	Page
A/C Compressor Clutch Relay	8W-12-22
Automatic Day/Night Mirror	8W-12-15, 28, 29
Automatic Temperature Control Head	8W-12-18
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Blower Motor Power Module	8W-12-19
Blower Motor Resistor Block	8W-12-19
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Brake Lamp Switch	8W-12-22
Brake Pressure Switch	8W-12-27
Cigar Lighter	8W-12-9
Circuit Breaker No. 1 8W-Cb	8W-12-18
Circuit Breaker No. 2 (JB)	8W-12-23, 24
Clockspring No. 1	8W-12-19
Combination Flasher	8W-12-14
Controller Anti-Lock Brake	8W-12-18
Data Link Connector	8W-12-8
Daytime Running Lamp Module	8W-12-9, 14, 17, 18, 25, 27
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Door Lock Relay	8W-12-23, 24
Door Unlock Relay	8W-12-23, 24
Driver Door Courtesy Lamp	8W-12-20, 29
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Driver Door Lock Motor/Ajar Switch	8W-12-24
Driver Door Unlock Relay	8W-12-23, 24
Driver Heated Seat Switch	8W-12-16
Driver Power Door Lock Switch	8W-12-16, 20
Driver Power Seat Switch	8W-12-23
Driver Power Window Switch	8W-12-18
Fog Lamp Relay	8W-12-17
Fuel Pump Relay	8W-12-17
Fuse 1 (JB)	8W-12-8
Fuse 2 (JB)	8W-12-9
Fuse 3 (JB)	8W-12-9
Fuse 4 (JB)	8W-12-9
Fuse 5 (JB)	8W-12-9
Fuse 6 (JB)	8W-12-9
Fuse 7 (JB)	8W-12-11, 12
Fuse 8 (JB)	8W-12-14
Fuse 9 (JB)	8W-12-14
Fuse 10 (JB)	8W-12-14
Fuse 11 (JB)	8W-12-14
Fuse 12 (JB)	8W-12-14
Fuse 13 (JB)	8W-12-17
Fuse 14 (JB)	8W-12-15
Fuse 15 (JB)	8W-12-17
Fuse 16 (JB)	8W-12-17
Fuse 17 (JB)	8W-12-18
Fuse 18 (JB)	8W-12-19
Fuse 19 (JB)	8W-12-20
Fuse 20 (JB)	8W-12-22
Fuse 21 (JB)	8W-12-22
Fuse 22 (JB)	8W-12-22
Fuse 23 (JB)	8W-12-19
G200	8W-12-26
G201	8W-12-29
G300	8W-12-24, 25
Glove Box Lamp	8W-12-20
Headlamp Dimmer Switch	8W-12-10, 11, 14, 25
Headlamp Switch	8W-12-11, 17
High Beam Headlamp Relay	8W-12-9, 25
High Speed Radiator Fan Relay	8W-12-22
Horn Relay	8W-12-19
Ignition Switch	8W-12-8
Instrument Cluster	8W-12-8, 10, 11, 15, 25, 27, 30, 31
Junction Block	8W-12-2, 3, 8, 9, 10, 11, 14, 15, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31
Leak Detection Pump	8W-12-22
Left Back-Up Lamp	8W-12-28
Left Fog Lamp	8W-12-17
Left Front Park/Turn Signal Lamp	8W-12-10, 31
Left Front Side Marker Lamp	8W-12-10, 31
Left Headlamp Leveling Motor	8W-12-11
Left High Beam Headlamp	8W-12-9
Left Horn	8W-12-19
Left License Lamp	8W-12-12
Left Low Beam Headlamp	8W-12-14
Left Position Lamp	8W-12-11
Left Rear Door Courtesy Lamp	8W-12-20
Left Rear Door Lock Motor/Ajar Switch	8W-12-24
Left Rear Side Marker Lamp	8W-12-12
Left Rear Turn Signal Lamp	8W-12-31
Left Side Impact Airbag Control Module	8W-12-22
Left Side Repeater	8W-12-31
Left Tail Lamp	8W-12-12
Left Tail/Stop Lamp	8W-12-12
Left Tail/Stop Lamp No. 1	8W-12-12
Left Tail/Stop Lamp No. 2	8W-12-12
Left Tail/Turn Signal Lamp	8W-12-12, 31
License Lamp	8W-12-12
Low Beam Headlamp Relay	8W-12-14
Low Speed Radiator Fan Relay	8W-12-22
Manual Temperature Control Head	8W-12-18
Memory Heated Seat/Mirror Module	8W-12-23
Occupant Restraint Controller	8W-12-14, 22
Overhead Map/Courtesy Lamp	8W-12-25
Overhead Travel Information System	8W-12-15, 26, 29
Park Brake Switch	8W-12-27
Park Lamp Relay	8W-12-10, 11
Passenger Door Courtesy Lamp	8W-12-21, 29
Passenger Door Cylinder Lock Switch	8W-12-21
Passenger Door Lock Motor/Ajar Switch	8W-12-24
Passenger Heated Seat Switch	8W-12-16
Passenger Power Door Lock Switch	8W-12-16, 21
Passenger Power Seat Switch	8W-12-23
Power Amplifier	8W-12-19
Power Mirror Switch	8W-12-16, 20
Powertrain Control Module	8W-12-17
Radio	8W-12-9
Right Back-Up Lamp	8W-12-28
Right Fog Lamp	8W-12-17
Right Front Park/Turn Signal Lamp	8W-12-10, 30
Right Front Side Marker Lamp	8W-12-10, 30
Right Headlamp Leveling Motor	8W-12-11
Right High Beam Headlamp	8W-12-9
Right Horn	8W-12-19
Right License Lamp	8W-12-12
Right Low Beam Headlamp	8W-12-14
Right Position Lamp	8W-12-11
Right Rear Door Courtesy Lamp	8W-12-20, 29
Right Rear Door Lock Motor/Ajar Switch	8W-12-24
Right Rear Side Marker Lamp	8W-12-13
Right Rear Turn Signal Lamp	8W-12-30
Right Side Impact Airbag Control Module	8W-12-22
Right Side Repeater	8W-12-30
Right Tail Lamp	8W-12-13
Right Tail/Stop Lamp	8W-12-13
Right Tail/Stop Lamp No. 1	8W-12-13
Right Tail/Stop Lamp No. 2	8W-12-13
Right Tail/Turn Signal Lamp	8W-12-13, 30
Sentry Key Immobilizer Module	8W-12-15
Shift Interlock Solenoid	8W-12-15
Spare Relay	8W-12-26
Speed Proportional Steering Solenoid	8W-12-23
Sunroof Control Module	8W-12-15, 26
Transmission Control Module	8W-12-8
Transmission Range Sensor	8W-12-18, 28
Trunk Lamp	8W-12-20
Turn Signal/Hazard Switch	8W-12-30, 31
Wiper Switch	8W-12-9


JUNCTION BLOCK FRONT
HORN RELAY
SPARE RELAY
DRIVER DOOR UNLOCK RELAY
6A6B
14
13
12
11
10
9
8
7
22
21
20
19
18
17
16
15
5
4
3
2
1
23
73
74
75
72
-
69
-
70
FOG LAMP RELAY
C11
Z2
G5
Z1
D25
L1
M1
A37
M2
CB 1
CB 2
66
65
67
64
86
87
90
89
88
LOW BEAM HEADLAMP RELAY
61
62
63
60
81
82
85
84
83
DOOR LOCK RELAY
DRL
1
Z1
F20
4
2
L25
G9
5
3
L43
L34
6
53
54
55
52
57
58
59
56
76
78
80
79
77
DOOR UNLOCK RELAY
HIGH BEAM HEADLAMP RELAY
PARK LAMP RELAY


JUNCTION BLOCK
BACK
C1
A21 F32
C1 F30 A31
C5
A1 A22
C8
A37 A3
L39 L33 F12 L44
C2
X3 L39
L40 L5 F14 F23 Z20 F13
L61 L61 L60 L60
C9
A34 A13
X2 F11 F20 F20 A7
C6
P55 P33 P33 P33
L1 L61 L60 F11 M2
C3
X12 A81
Z2
F11 F11 G9
C10
G9 L61 L60
S77 F18 L1 L34
L43 F18 L7 S76
C7
P2 G9
M1 M1 F35 F35
P34 P34 Z1 F21 L7 G5
C4
L324 F33 F33 M1 L7
L324 G5 F20 M1 F20 F62
JUNCTION BLOCK
BODY CONTROL MODULE - JB
Z2 P36 X3 L26 L308 P38 L307 P109 D25 P2 M1 L7 G5 S77 S76 M2 Z1
20 18 16 14 12 10 8 6 4 2
19 17 15 13 11 9 7 5 3 1

FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FUNCTIONS
1	10A	INTERNAL	IGNITION SWITCH OUTPUT (ST-RUN-OFF)
2	10A	INTERNAL	INTERNAL
3	10A	L33 20RD	FUSED B(+)
4	10A	X12 20RD	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
5	10A	F13 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
6 •	15A	F30 18RD	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
6 ••	15A	F30 18RD	FUSED B(+)
7	20A	INTERNAL	INTERNAL
8	10A	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
9	10A	L5 22BK/YL	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
10	10A	L44 20VT/RD	FUSED RIGHT LOW BEAM OUTPUT
11	20A	L40 20BR/WT	FUSED LOW BEAM RELAY OUTPUT
12	10A	INTERNAL	INTERNAL
13	10A	F12 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
14	10A	INTERNAL	INTERNAL
15	10A	INTERNAL	INTERNAL
16	20A	INTERNAL	INTERNAL
17	10A	INTERNAL	INTERNAL
18	20A	INTERNAL	INTERNAL
19	10A	INTERNAL	INTERNAL
20	20A	F32 16PK/DB	FUSED B(+)
21	10A	INTERNAL	INTERNAL
22	10A	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
23	30A	C1 12DG	FUSED IGNITION SWITCH OUTPUT (RUN)

CIRCUIT BREAKERS

CB NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	20A	F21 14TN	INTERNAL
2	20A	INTERNAL	INTERNAL

• IGNITION POSITION
•• BATTERY POSITION

DAYTIME RUNNING LAMP MODULE

CAVITY	CIRCUIT	FUNCTION
1	Z1 14BK	GROUND
2	INTERNAL	FUSED B(+)
3	INTERNAL	LOW BEAM RELAY OUTPUT
4	INTERNAL	FUSED IGNITION SWITCH OUTPUT (RUN)
5	G9 20GY/BK	PARK BRAKE SENSE
6	INTERNAL	FUSED HIGH BEAM RELAY OUTPUT

DOOR LOCK RELAY

CAVITY	CIRCUIT	FUNCTION
81	INTERNAL	LOCK RELAY OUTPUT
82	INTERNAL	FUSED B(+)
83	INTERNAL	FUSED B(+)
84	INTERNAL	GROUND
85	INTERNAL	DOOR LOCK RELAY CONTROL

DOOR UNLOCK RELAY

CAVITY	CIRCUIT	FUNCTION
76	INTERNAL	UNLOCK RELAY OUTPUT
77	INTERNAL	FUSED B(+)
78	INTERNAL	FUSED B(+)
79	INTERNAL	GROUND
80	INTERNAL	DOOR UNLOCK RELAY CONTROL

DRIVER DOOR UNLOCK RELAY

CAVITY	CIRCUIT	FUNCTION
86	P55 16DB	DRIVER DOOR UNLOCK RELAY OUTPUT
87	INTERNAL	FUSED B(+)
88	INTERNAL	FUSED B(+)
89	INTERNAL	GROUND
90	INTERNAL	DRIVER DOOR UNLOCK RELAY CONTROL

FOG LAMP RELAY

CAVITY	CIRCUIT	FUNCTION
64	INTERNAL	FOG LAMP RELAY CONTROL
65	INTERNAL	FUSED B(+)
66	INTERNAL	FUSED B(+)
67	INTERNAL	FOG LAMP RELAY OUTPUT
-	-	-

HIGH BEAM HEADLAMP RELAY

CAVITY	CIRCUIT	FUNCTION
56	INTERNAL	GROUND
57	INTERNAL	HIGH BEAM RELAY CONTROL
58	INTERNAL	FUSED B (+)
59	INTERNAL	HIGH BEAM HEADLAMP RELAY OUTPUT
-	-	-

HORN RELAY

CAVITY	CIRCUIT	FUNCTION
72	INTERNAL	HORN RELAY CONTROL
73	INTERNAL	FUSED B(+)
74	INTERNAL	FUSED B(+)
75	X2 18DG/RD	HORN RELAY OUTPUT
-	-	-

LOW BEAM HEADLAMP RELAY

CAVITY	CIRCUIT	FUNCTION
60	INTERNAL	LOW BEAM HEADLAMP RELAY CONTROL
61	INTERNAL	FUSED B(+)
62	INTERNAL	FUSED B(+)
63	INTERNAL	LOW BEAM HEADLAMP RELAY OUTPUT
-	-	-

PARK LAMP RELAY

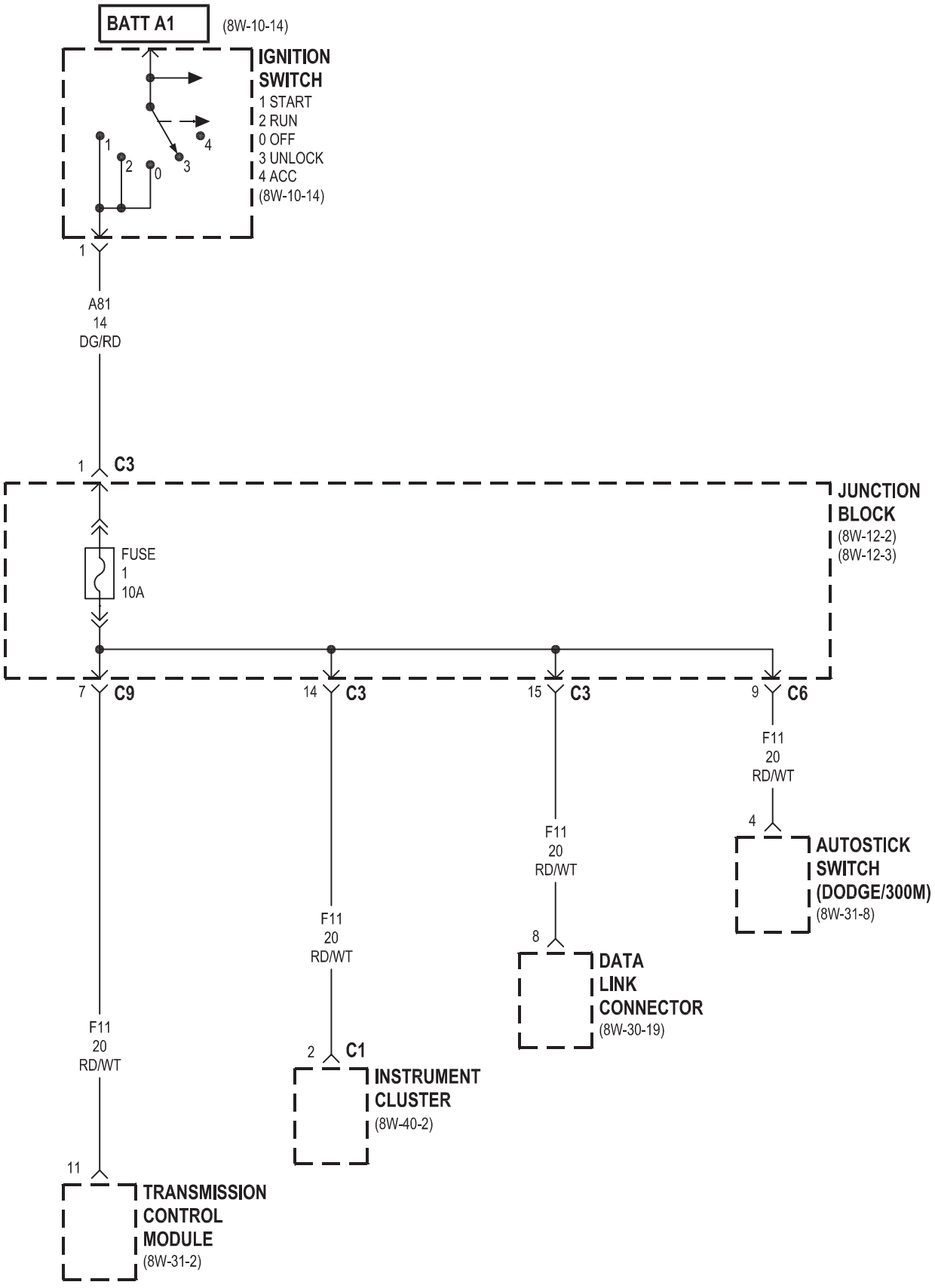
CAVITY	CIRCUIT	FUNCTION
52	INTERNAL	PARK LAMP RELAY CONTROL
53	INTERNAL	FUSED B(+)
54	INTERNAL	FUSED B(+)
55	INTERNAL	PARK LAMP RELAY OUTPUT
-	-	-

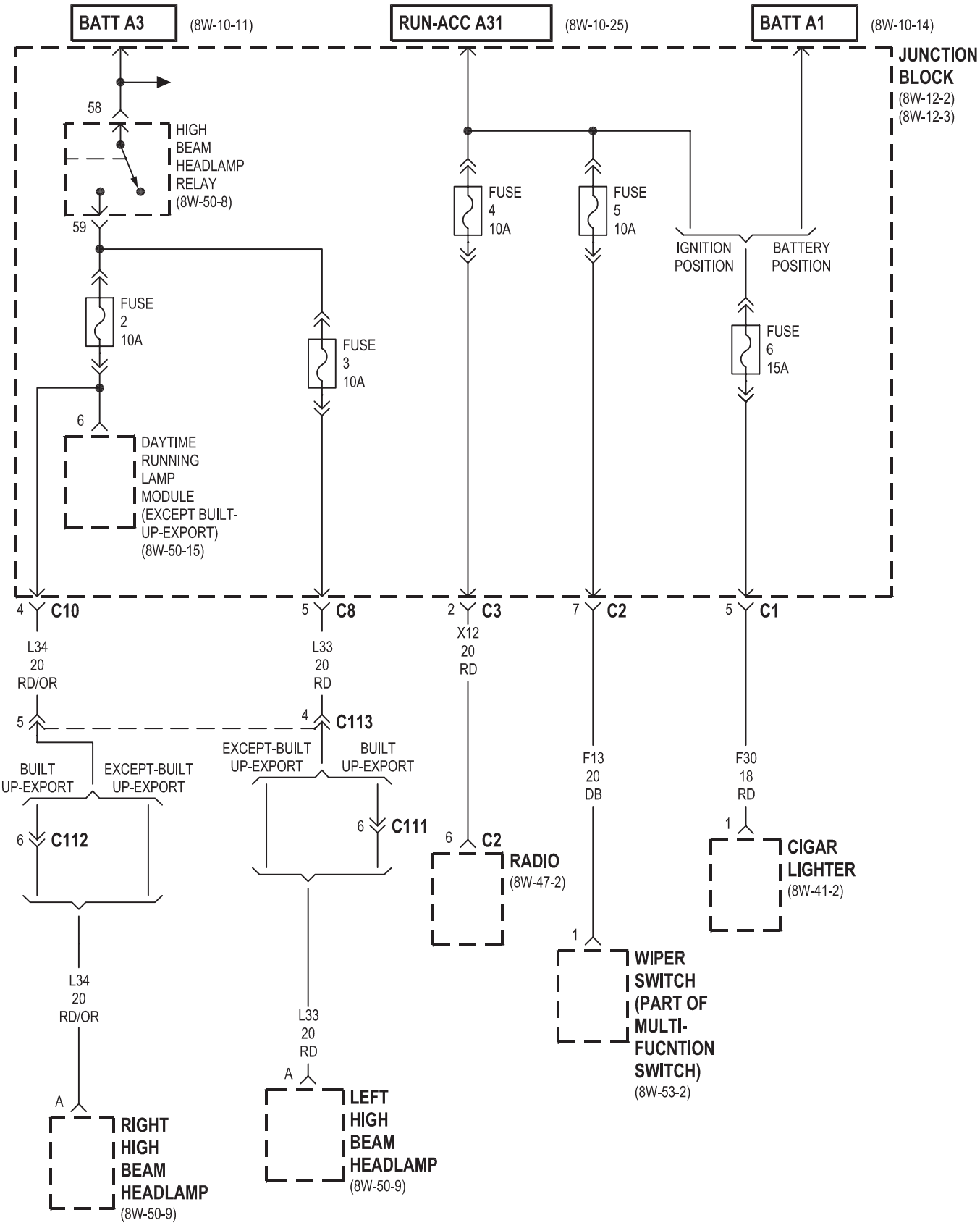
SPARE RELAY

CAVITY	CIRCUIT	FUNCTION
68	-	-
69	A37 16WT/DB	FUSED B(+)
70	A37 16WT/DB	FUSED B(+)
71	-	-
-	-	-

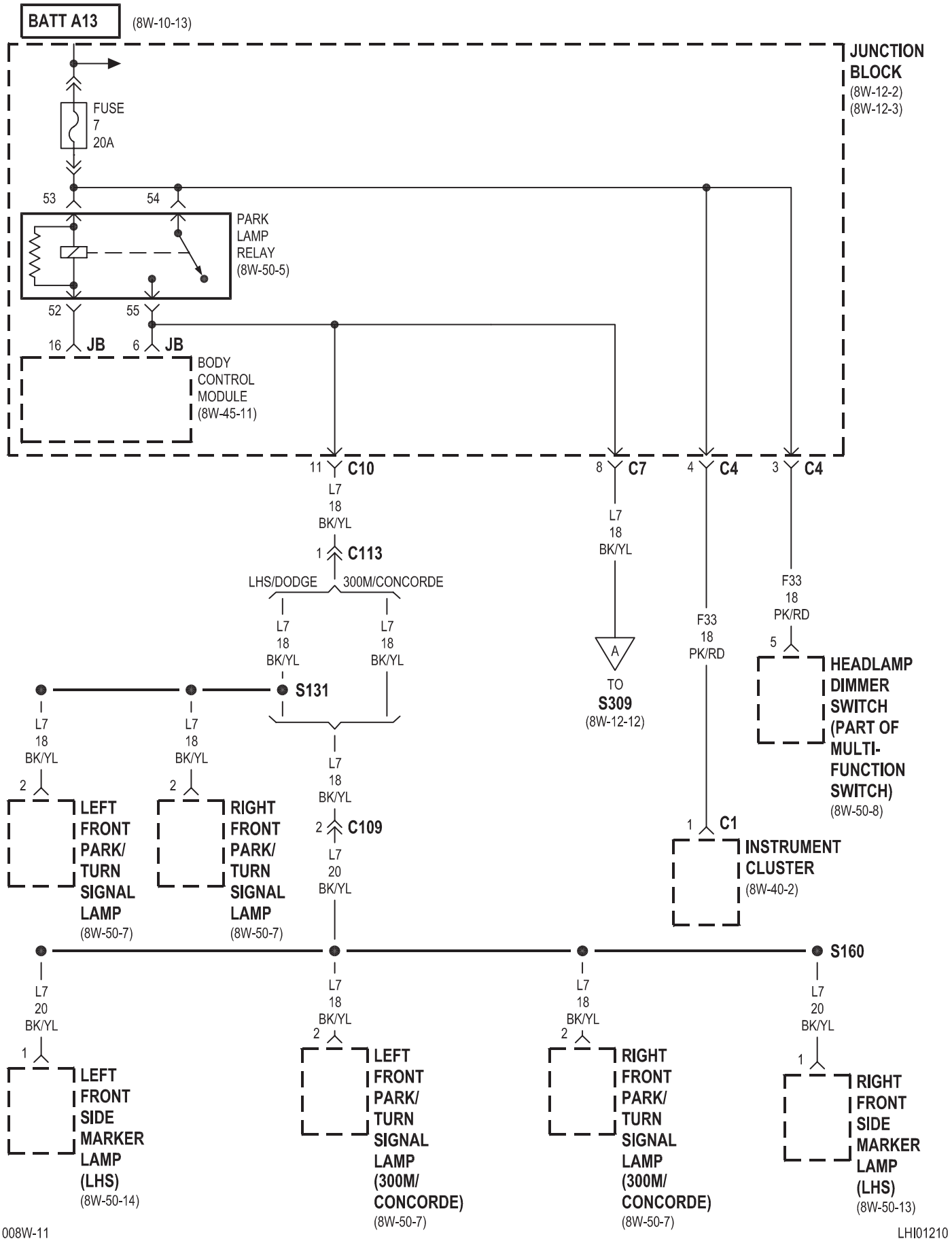
JUNCTION BLOCK
BODY CONTROL MODULE - JB

CAVITY	CIRCUIT	FUNCTION
1	Z1	GROUND
2	M2	COURTESY LAMP DRIVER
3	S76	SPEED PROPORTIONAL STEERING SOLENOID (-)
4	S77	SPEED PROPORTIONAL STEERING SOLENOID (+)
5	G5	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
6	L7	PARK LAMP RELAY OUTPUT
7	M1	FUSED B(+)
8	P2	DECKLID RELEASE CONTROL
9	-	-
10	D25	PCI BUS (OTIS)
11	-	-
12	-	-
13	P109	DRIVER DOOR UNLOCK RELAY CONTROL
14	L307	LOW BEAM RELAY CONRTOL
15	P38	DOOR LOCK RELAY CONTROL
16	L308	PARK LAMP RELAY CONTROL
17	L26	FOG LAMP RELAY CONTROL
18	X3	HORN RELAY CONTROL
19	P36	DOOR UNLOCK RELAY CONTROL
20	Z2	GROUND

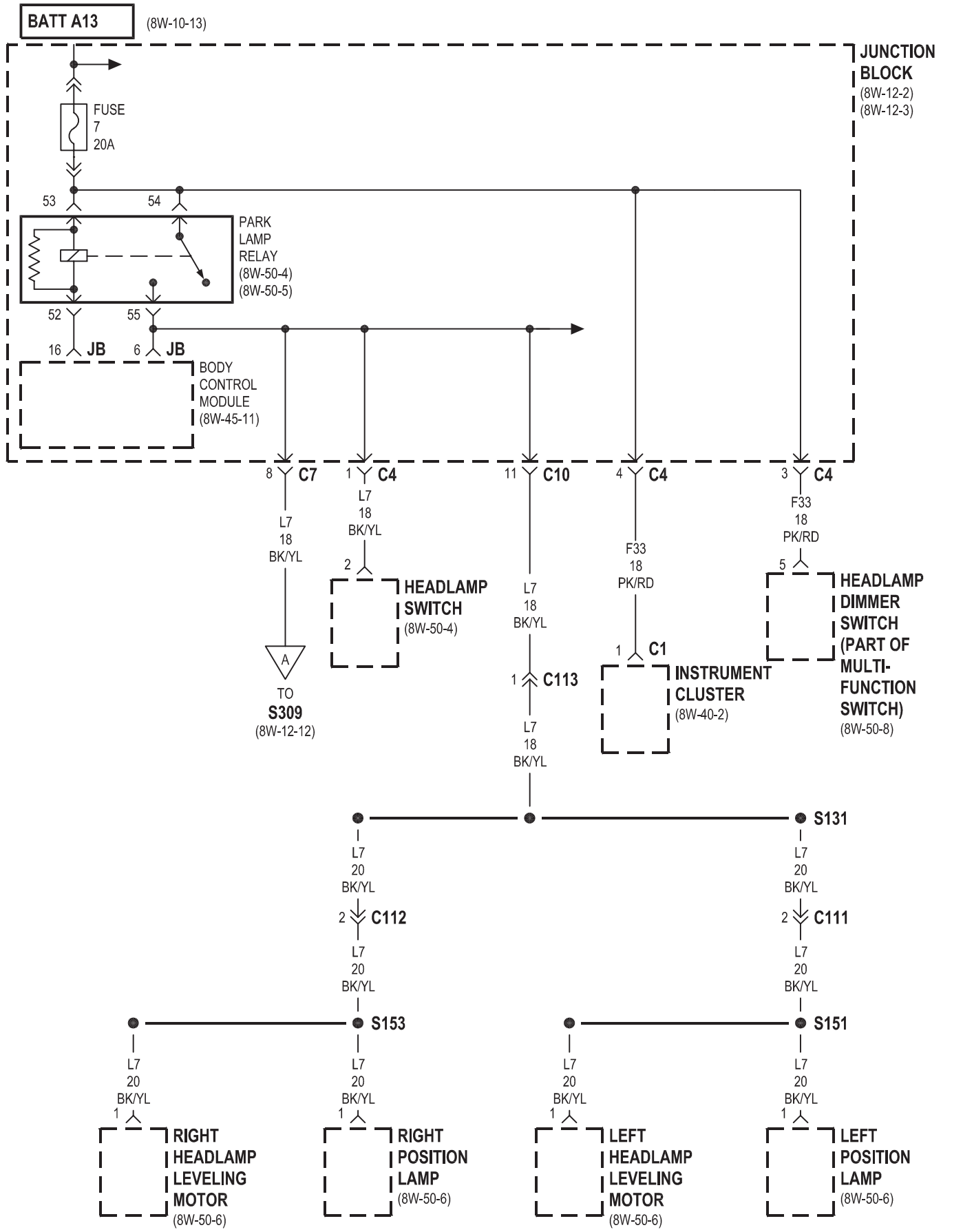

BATT A1
(8W-10-14)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 UNLOCK
4 ACC
(8W-10-14)
1
2
0
3
4
1
A81
14
DG/RD
1 C3
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
1
10A
7 C9
14 C3
15 C3
9 C6
F11
20
RD/WT
4
AUTOSTICK SWITCH (DODGE/300M)
(8W-31-8)
F11
20
RD/WT
8
DATA LINK CONNECTOR
(8W-30-19)
F11
20
RD/WT
2 C1
INSTRUMENT CLUSTER
(8W-40-2)
F11
20
RD/WT
11
TRANSMISSION CONTROL MODULE
(8W-31-2)

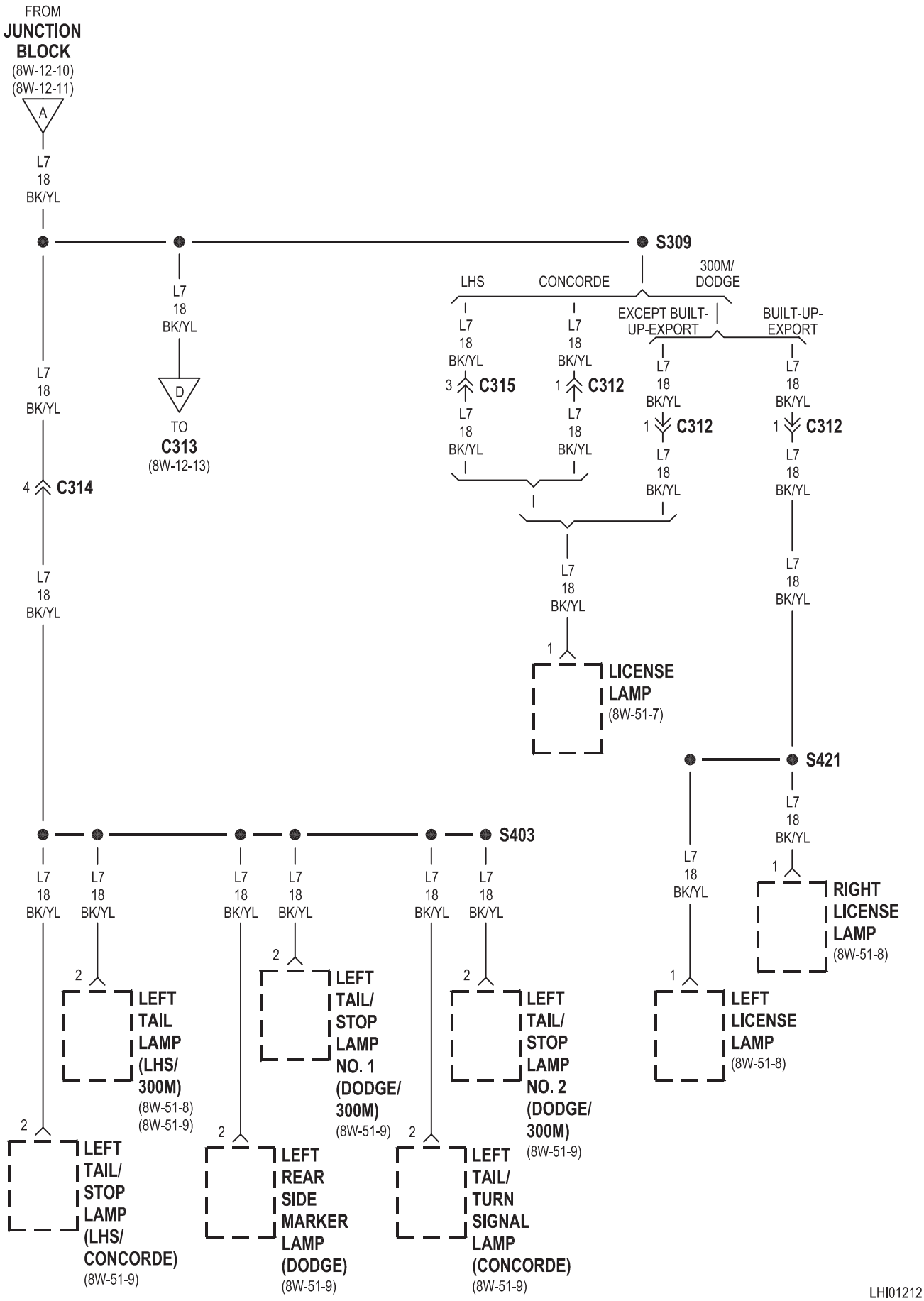

BATT A3
(8W-10-11)
RUN-ACC A31
(8W-10-25)
BATT A1
(8W-10-14)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
58
HIGH BEAM HEADLAMP RELAY
(8W-50-8)
59
FUSE 2 10A
FUSE 3 10A
FUSE 4 10A
FUSE 5 10A
IGNITION POSITION
BATTERY POSITION
FUSE 6 15A
6
DAYTIME RUNNING LAMP MODULE
(EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
4 C10
5 C8
2 C3
7 C2
5 C1
L34 20 RD/OR
L33 20 RD
X12 20 RD
F13 20 DB
F30 18 RD
5
4 C113
BUILT UP-EXPORT
EXCEPT-BUILT UP-EXPORT
EXCEPT-BUILT UP-EXPORT
BUILT UP-EXPORT
6 C112
6 C111
6 C2
RADIO
(8W-47-2)
1
CIGAR LIGHTER
(8W-41-2)
1
WIPER SWITCH (PART OF MULTI-FUCNTION SWITCH)
(8W-53-2)
L34 20 RD/OR
L33 20 RD
A
RIGHT HIGH BEAM HEADLAMP
(8W-50-9)
A
LEFT HIGH BEAM HEADLAMP
(8W-50-9)

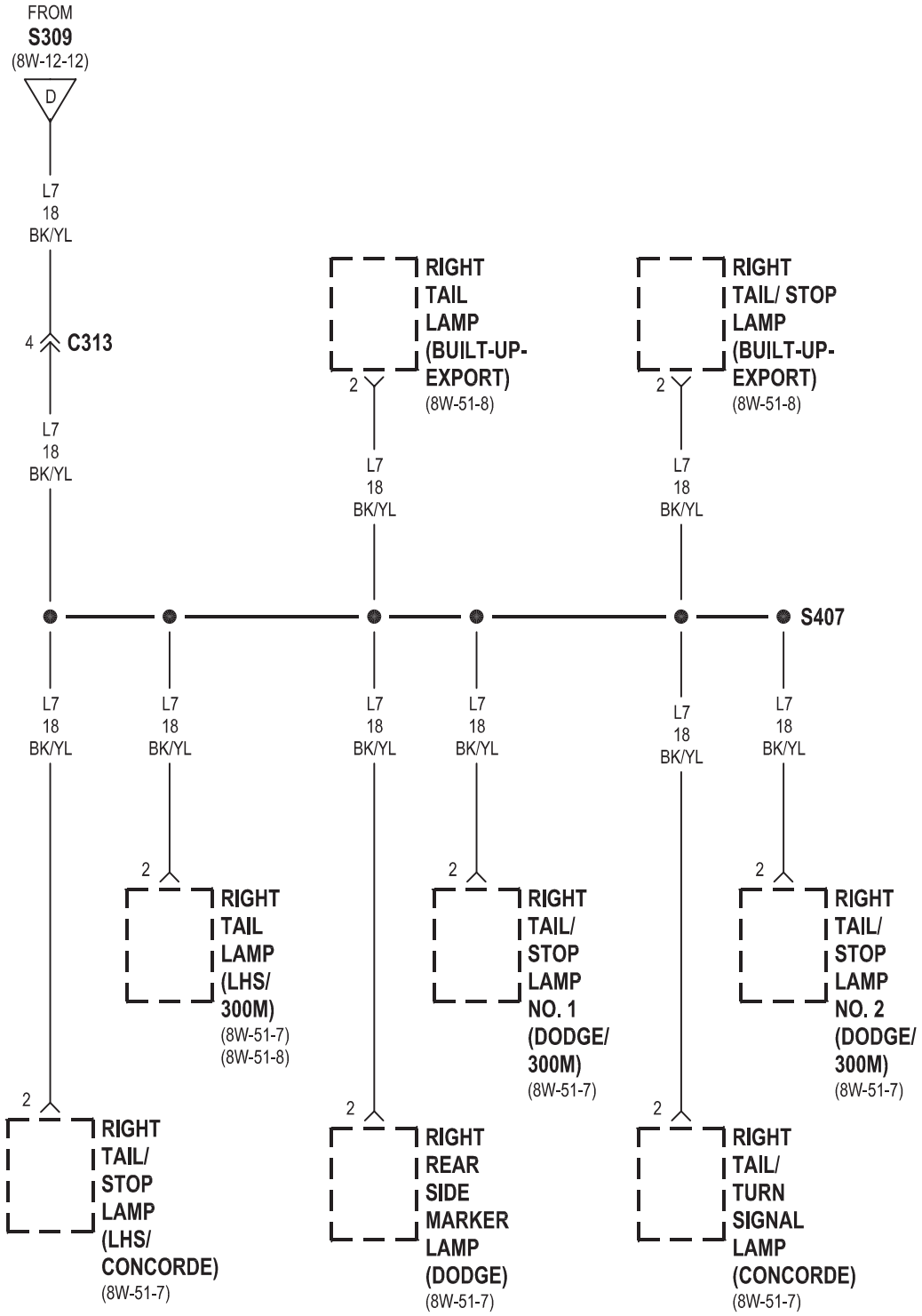
EXCEPT BUILT-UP-EXPORT

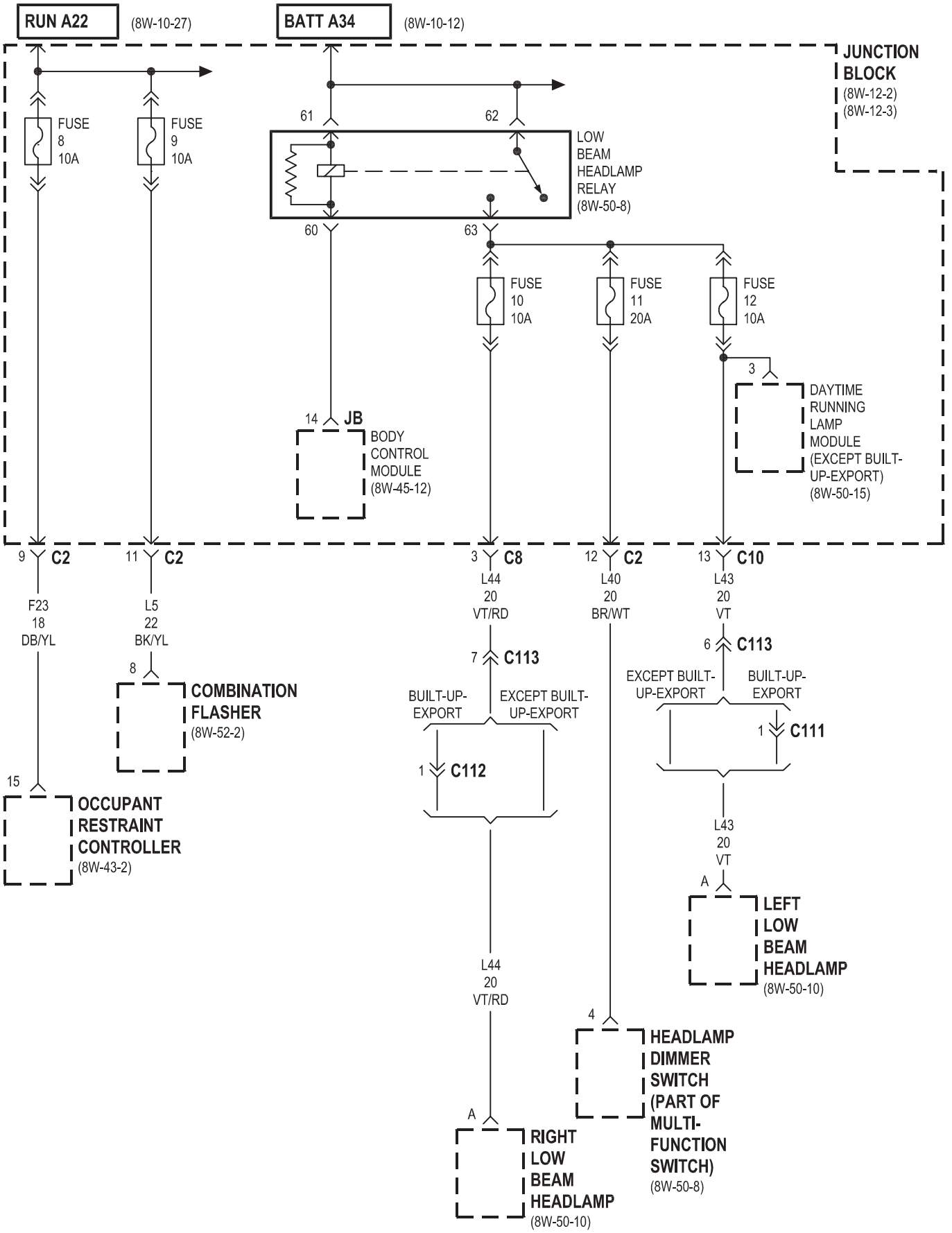


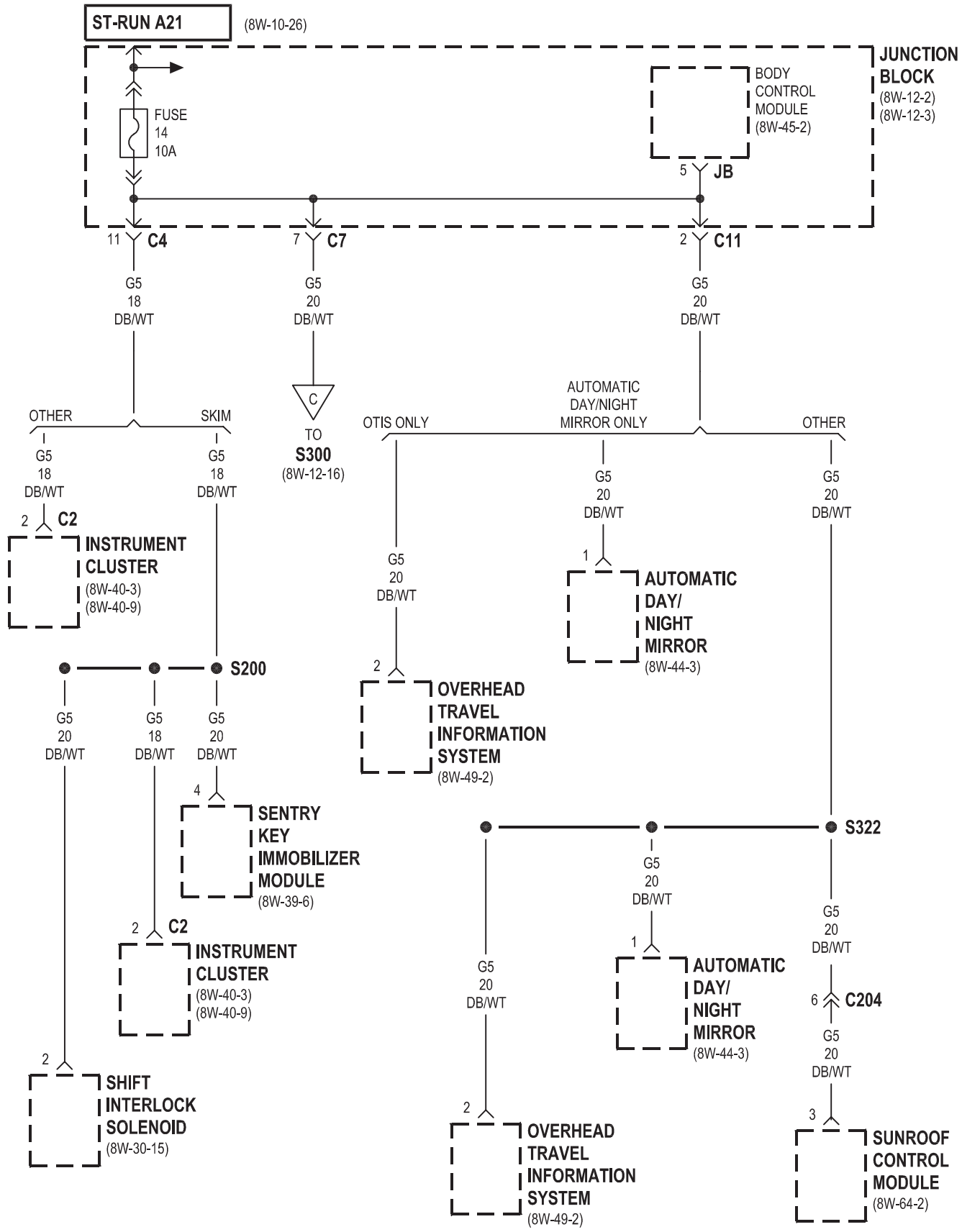
BUILT-UP-EXPORT

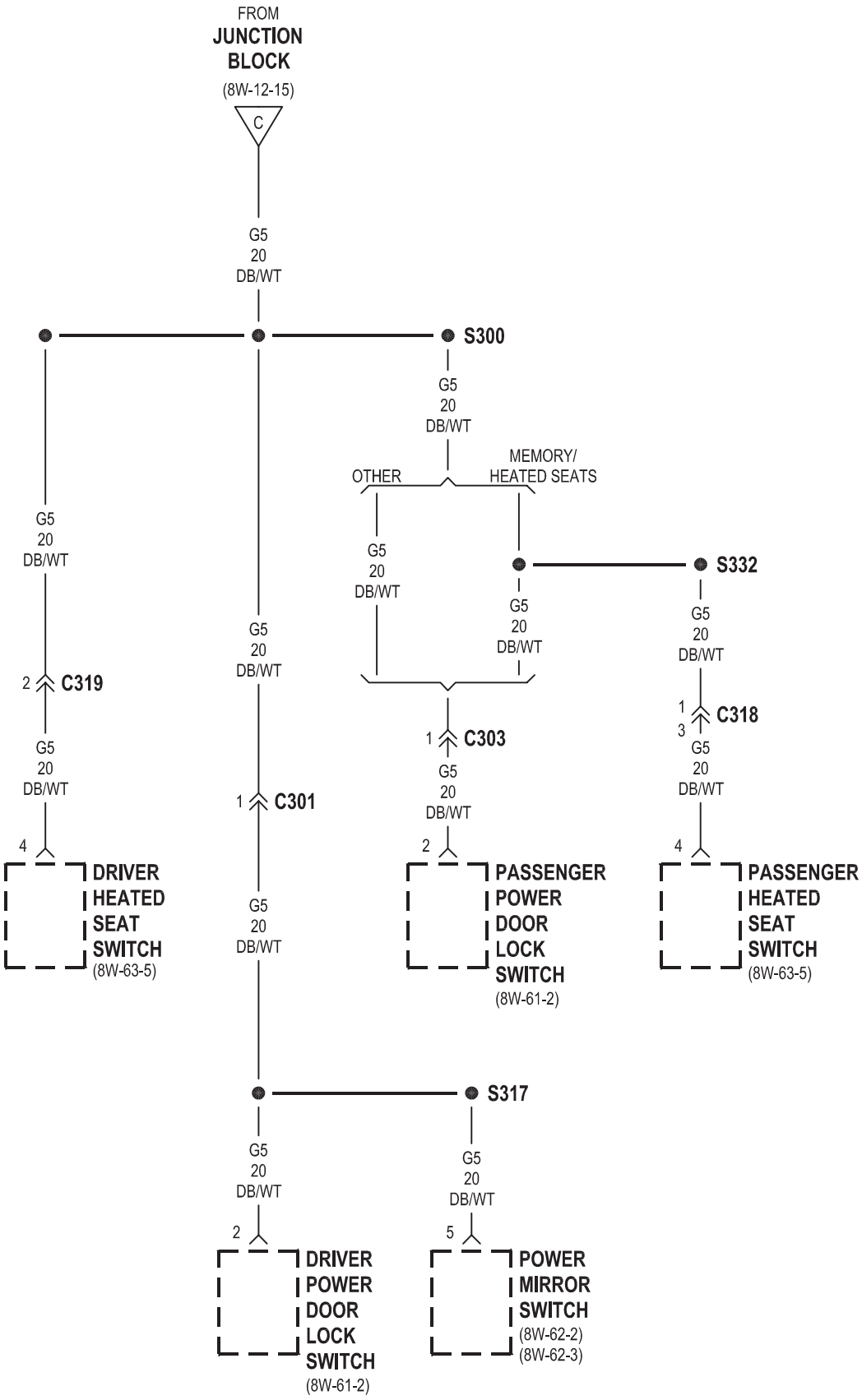


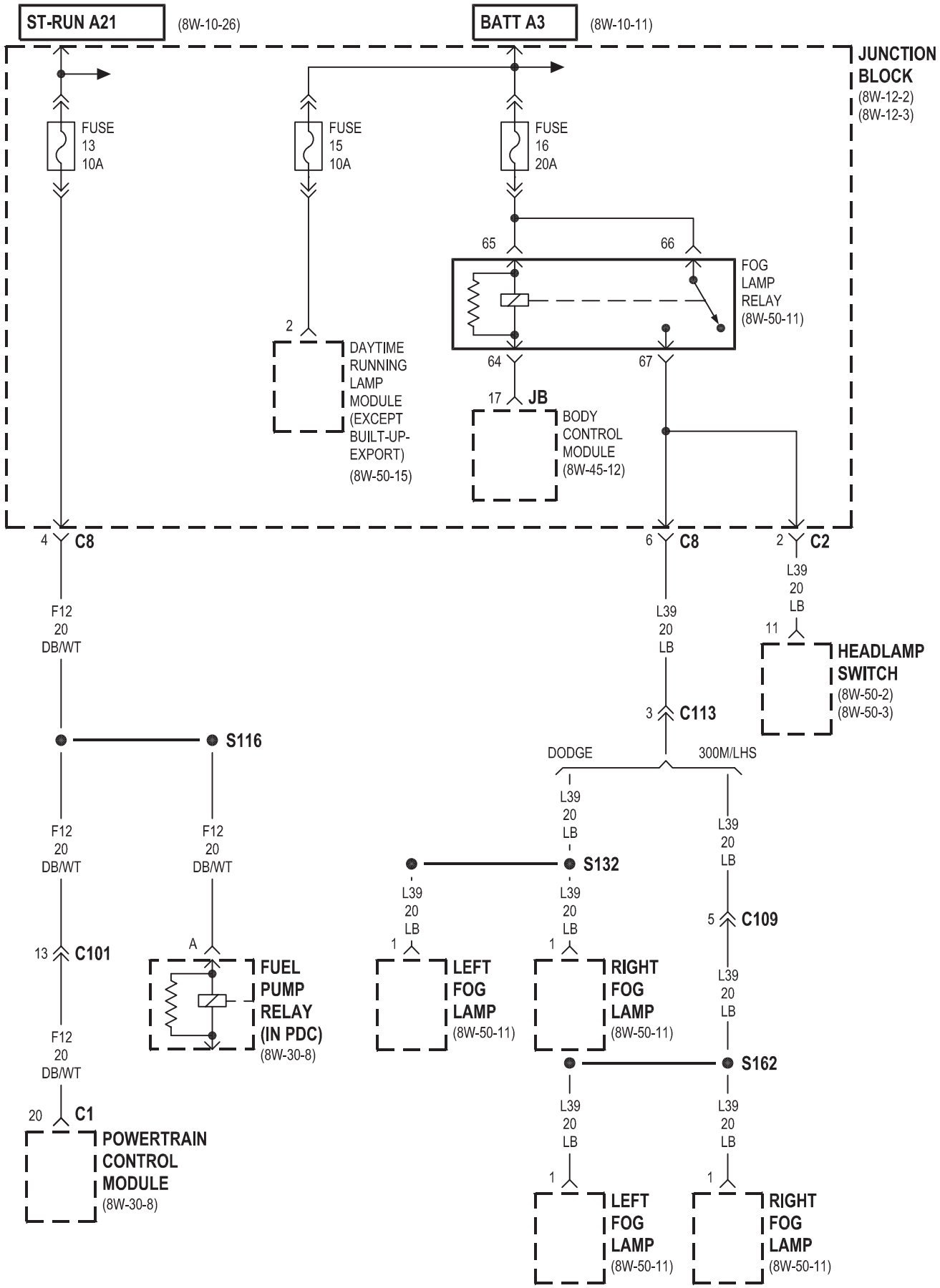

FROM
JUNCTION BLOCK
(8W-12-10)
(8W-12-11)
A
L7
18
BK/YL
S309
L7
18
BK/YL
D
TO
C313
(8W-12-13)
LHS
CONCORDE
300M/
DODGE
EXCEPT BUILT-
UP-EXPORT
BUILT-UP-
EXPORT
3 C315
1 C312
1 C312
1 C312
4 C314
1
LICENSE
LAMP
(8W-51-7)
S421
S403
1
RIGHT
LICENSE
LAMP
(8W-51-8)
1
LEFT
LICENSE
LAMP
(8W-51-8)
2
LEFT
TAIL
LAMP
(LHS/
300M)
(8W-51-8)
(8W-51-9)
2
LEFT
TAIL/
STOP
LAMP
NO. 1
(DODGE/
300M)
(8W-51-9)
2
LEFT
TAIL/
STOP
LAMP
NO. 2
(DODGE/
300M)
(8W-51-9)
2
LEFT
TAIL/
STOP
LAMP
(LHS/
CONCORDE)
(8W-51-9)
2
LEFT
REAR
SIDE
MARKER
LAMP
(DODGE)
(8W-51-9)
2
LEFT
TAIL/
TURN
SIGNAL
LAMP
(CONCORDE)
(8W-51-9)

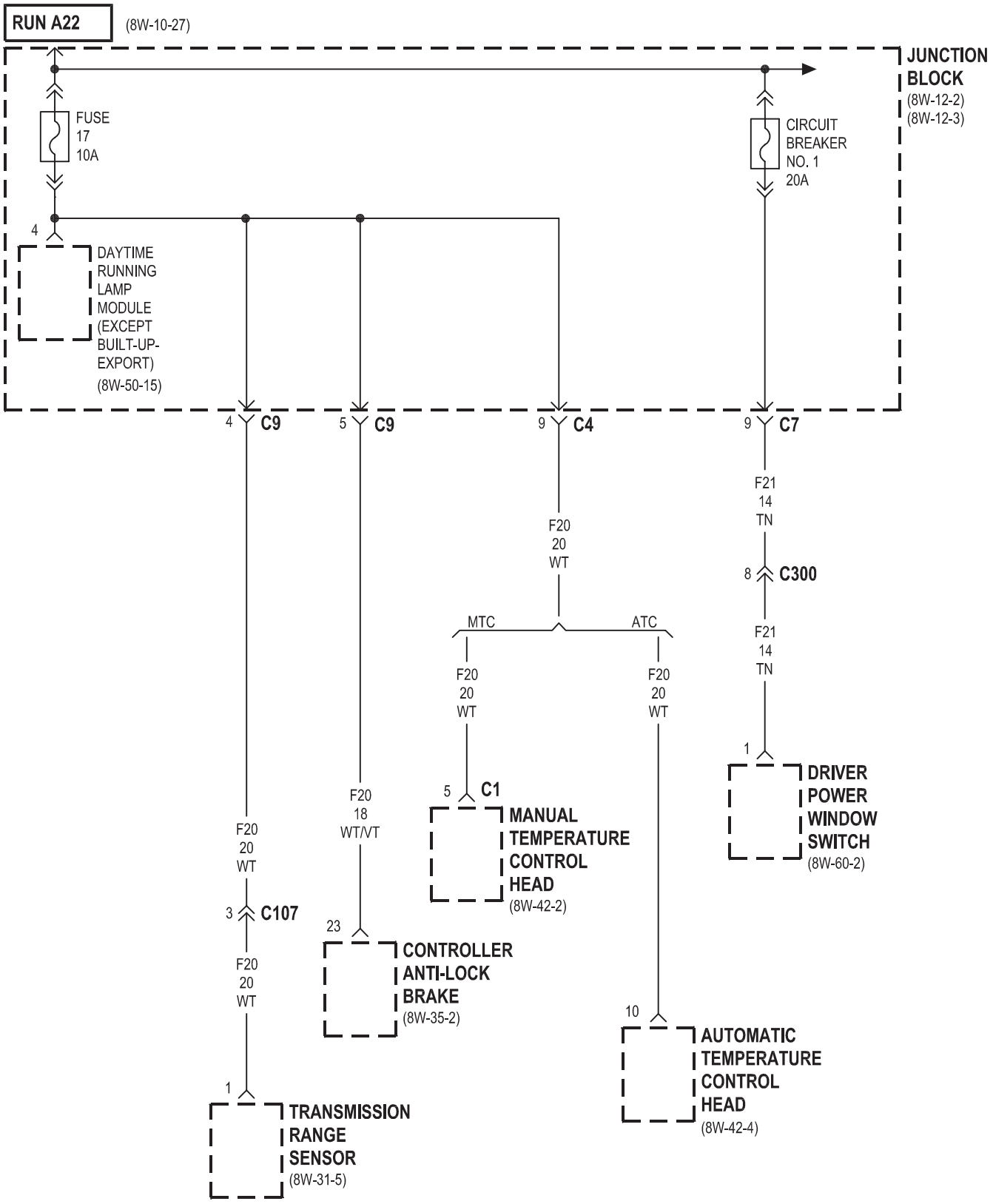

FROM
S309
(8W-12-12)
D
L7
18
BK/YL
4
C313
L7
18
BK/YL
2
RIGHT
TAIL
LAMP
(BUILT-UP-
EXPORT)
(8W-51-8)
L7
18
BK/YL
2
RIGHT
TAIL/ STOP
LAMP
(BUILT-UP-
EXPORT)
(8W-51-8)
L7
18
BK/YL
S407
L7
18
BK/YL
2
RIGHT
TAIL/
STOP
LAMP
(LHS/
CONCORDE)
(8W-51-7)
L7
18
BK/YL
2
RIGHT
TAIL
LAMP
(LHS/
300M)
(8W-51-7)
(8W-51-8)
L7
18
BK/YL
2
RIGHT
REAR
SIDE
MARKER
LAMP
(DODGE)
(8W-51-7)
L7
18
BK/YL
2
RIGHT
TAIL/
STOP
LAMP
NO. 1
(DODGE/
300M)
(8W-51-7)
L7
18
BK/YL
2
RIGHT
TAIL/
TURN
SIGNAL
LAMP
(CONCORDE)
(8W-51-7)
L7
18
BK/YL
2
RIGHT
TAIL/
STOP
LAMP
NO. 2
(DODGE/
300M)
(8W-51-7)

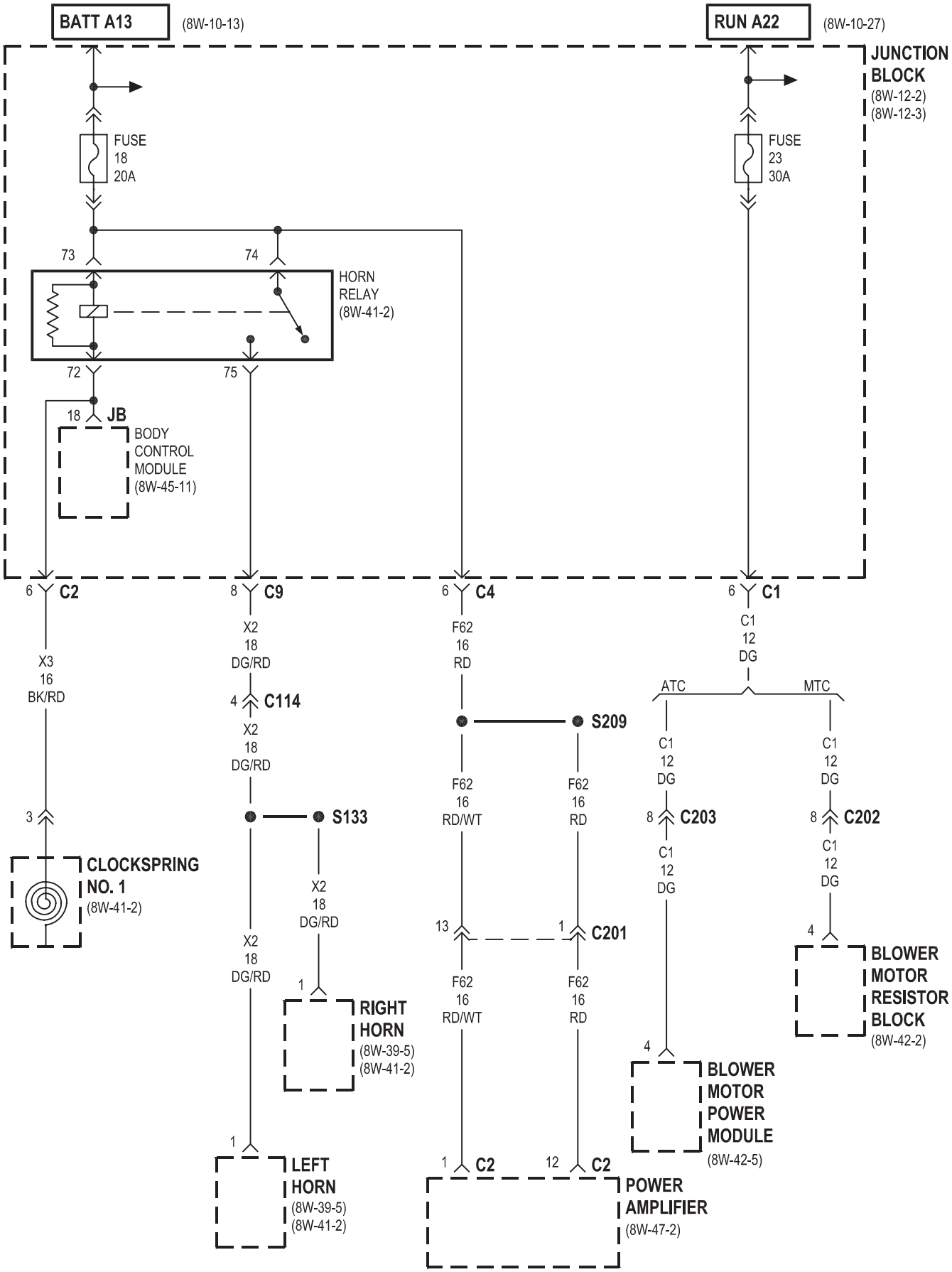

RUN A22
(8W-10-27)
BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 8 10A
FUSE 9 10A
61
62
LOW BEAM HEADLAMP RELAY
(8W-50-8)
60
63
FUSE 10 10A
FUSE 11 20A
FUSE 12 10A
3
DAYTIME RUNNING LAMP MODULE
(EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
14 JB
BODY CONTROL MODULE
(8W-45-12)
9 C2
11 C2
3 C8
12 C2
13 C10
F23
18
DB/YL
L5
22
BK/YL
L44
20
VT/RD
L40
20
BR/WT
L43
20
VT
8
COMBINATION FLASHER
(8W-52-2)
7 C113
6 C113
BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
1 C112
1 C111
15
OCCUPANT RESTRAINT CONTROLLER
(8W-43-2)
L43
20
VT
A
LEFT LOW BEAM HEADLAMP
(8W-50-10)
L44
20
VT/RD
4
HEADLAMP DIMMER SWITCH (PART OF MULTI-FUNCTION SWITCH)
(8W-50-8)
A
RIGHT LOW BEAM HEADLAMP
(8W-50-10)

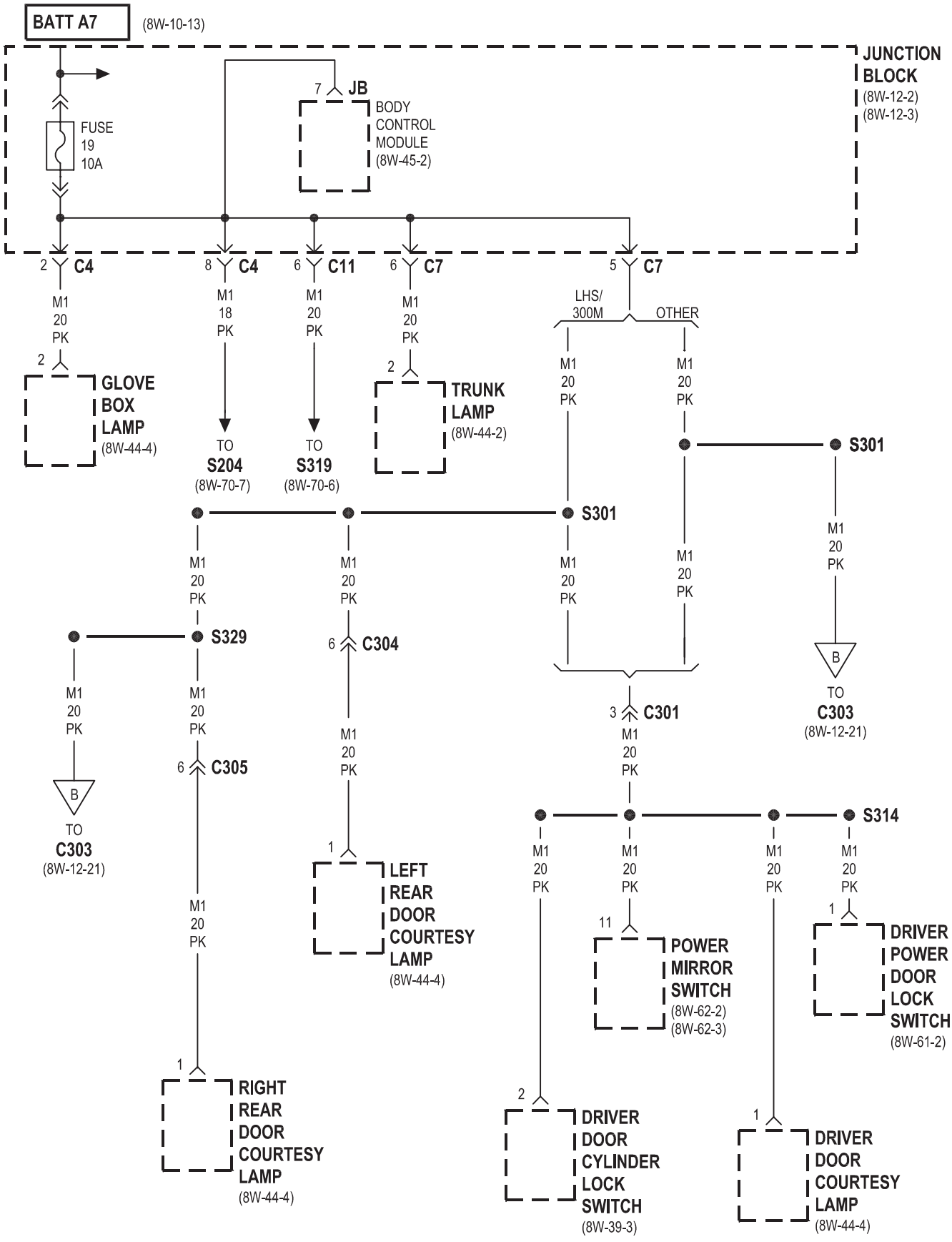

ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
14
10A
BODY CONTROL MODULE
(8W-45-2)
5 JB
11 C4
7 C7
2 C11
G5
18
DB/WT
G5
20
DB/WT
G5
20
DB/WT
C
TO
S300
(8W-12-16)
OTHER
SKIM
OTIS ONLY
AUTOMATIC DAY/NIGHT MIRROR ONLY
OTHER
G5
18
DB/WT
G5
18
DB/WT
G5
20
DB/WT
G5
20
DB/WT
G5
20
DB/WT
2 C2
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
1
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
2
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)
S200
G5
20
DB/WT
G5
18
DB/WT
G5
20
DB/WT
4
SENTRY KEY IMMOBILIZER MODULE
(8W-39-6)
2 C2
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
2
SHIFT INTERLOCK SOLENOID
(8W-30-15)
S322
G5
20
DB/WT
G5
20
DB/WT
G5
20
DB/WT
1
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
6 C204
G5
20
DB/WT
2
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)
3
SUNROOF CONTROL MODULE
(8W-64-2)

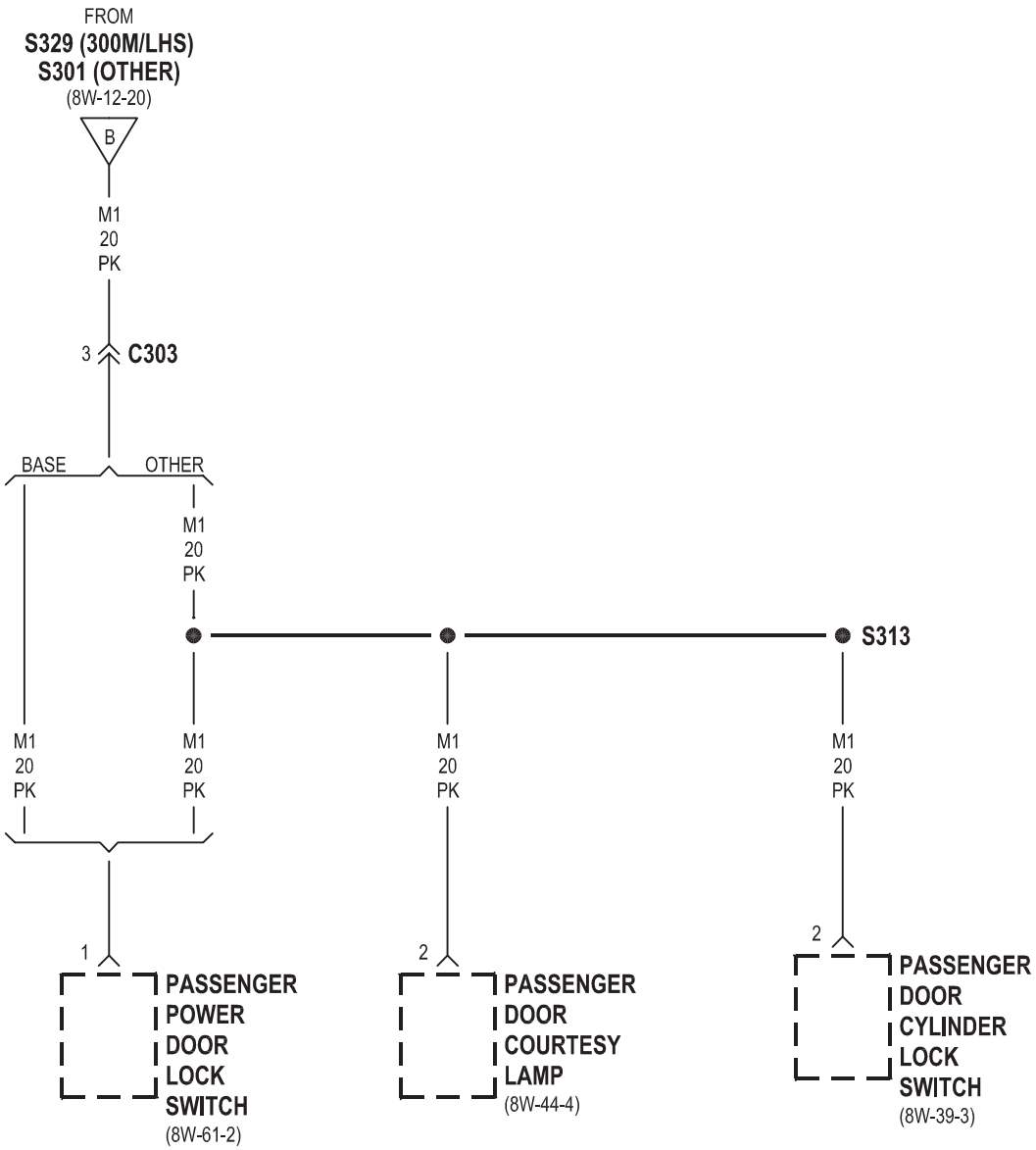

FROM
JUNCTION
BLOCK
(8W-12-15)
C
G5
20
DB/WT
S300
G5
20
DB/WT
MEMORY/
HEATED SEATS
OTHER
G5
20
DB/WT
S332
G5
20
DB/WT
G5
20
DB/WT
G5
20
DB/WT
2
C319
G5
20
DB/WT
1
C303
G5
20
DB/WT
1
3
C318
G5
20
DB/WT
1
C301
G5
20
DB/WT
4
DRIVER
HEATED
SEAT
SWITCH
(8W-63-5)
2
PASSENGER
POWER
DOOR
LOCK
SWITCH
(8W-61-2)
4
PASSENGER
HEATED
SEAT
SWITCH
(8W-63-5)
S317
G5
20
DB/WT
G5
20
DB/WT
2
DRIVER
POWER
DOOR
LOCK
SWITCH
(8W-61-2)
5
POWER
MIRROR
SWITCH
(8W-62-2)
(8W-62-3)

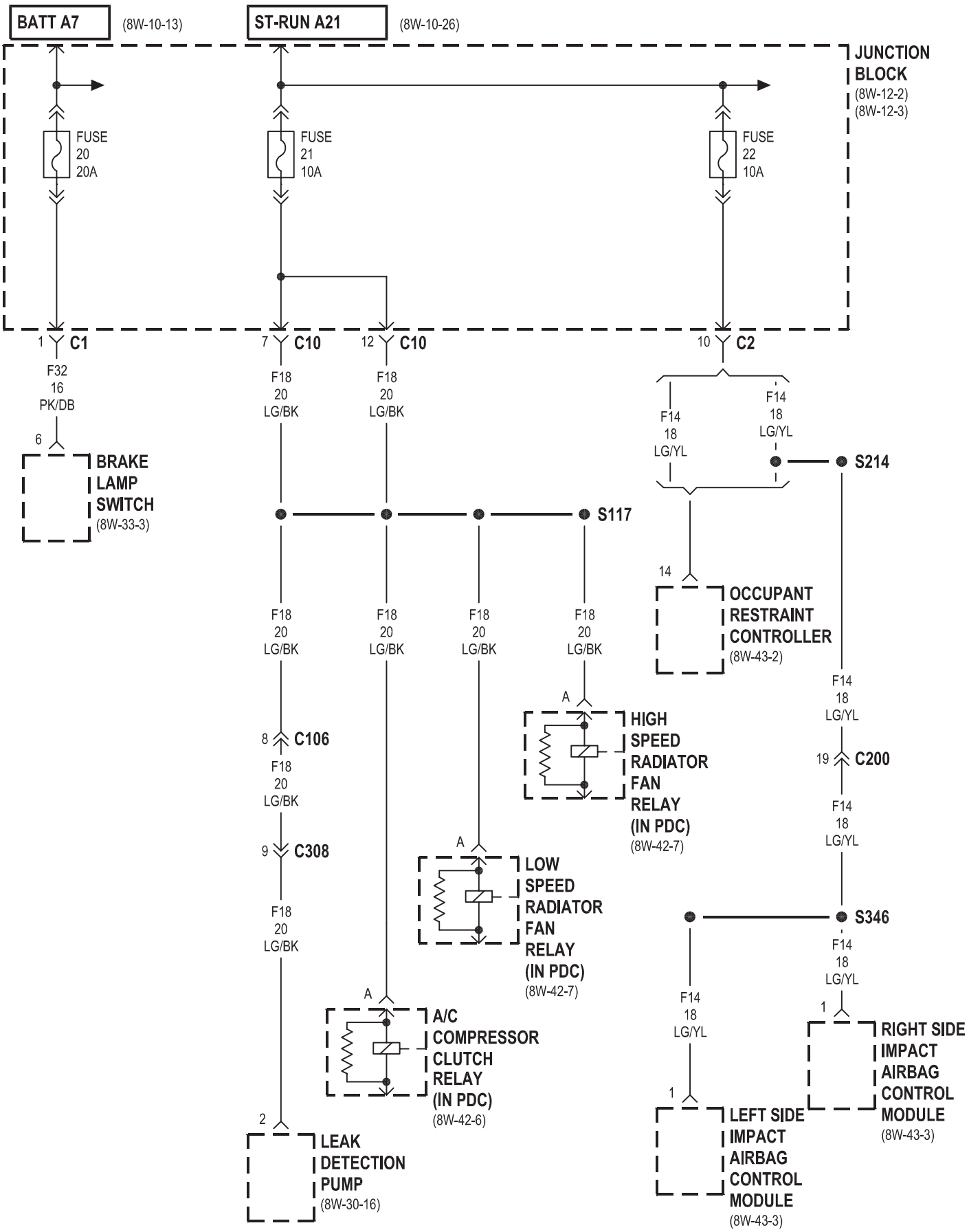

ST-RUN A21
(8W-10-26)
BATT A3
(8W-10-11)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 13 10A
FUSE 15 10A
FUSE 16 20A
65
66
FOG LAMP RELAY
(8W-50-11)
2
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
64
67
17 JB
BODY CONTROL MODULE
(8W-45-12)
4 C8
6 C8
2 C2
F12 20 DB/WT
L39 20 LB
11
HEADLAMP SWITCH
(8W-50-2)
(8W-50-3)
3 C113
S116
DODGE
300M/LHS
S132
13 C101
A
FUEL PUMP RELAY (IN PDC)
(8W-30-8)
1
LEFT FOG LAMP
(8W-50-11)
RIGHT FOG LAMP
(8W-50-11)
5 C109
S162
20 C1
POWERTRAIN CONTROL MODULE
(8W-30-8)

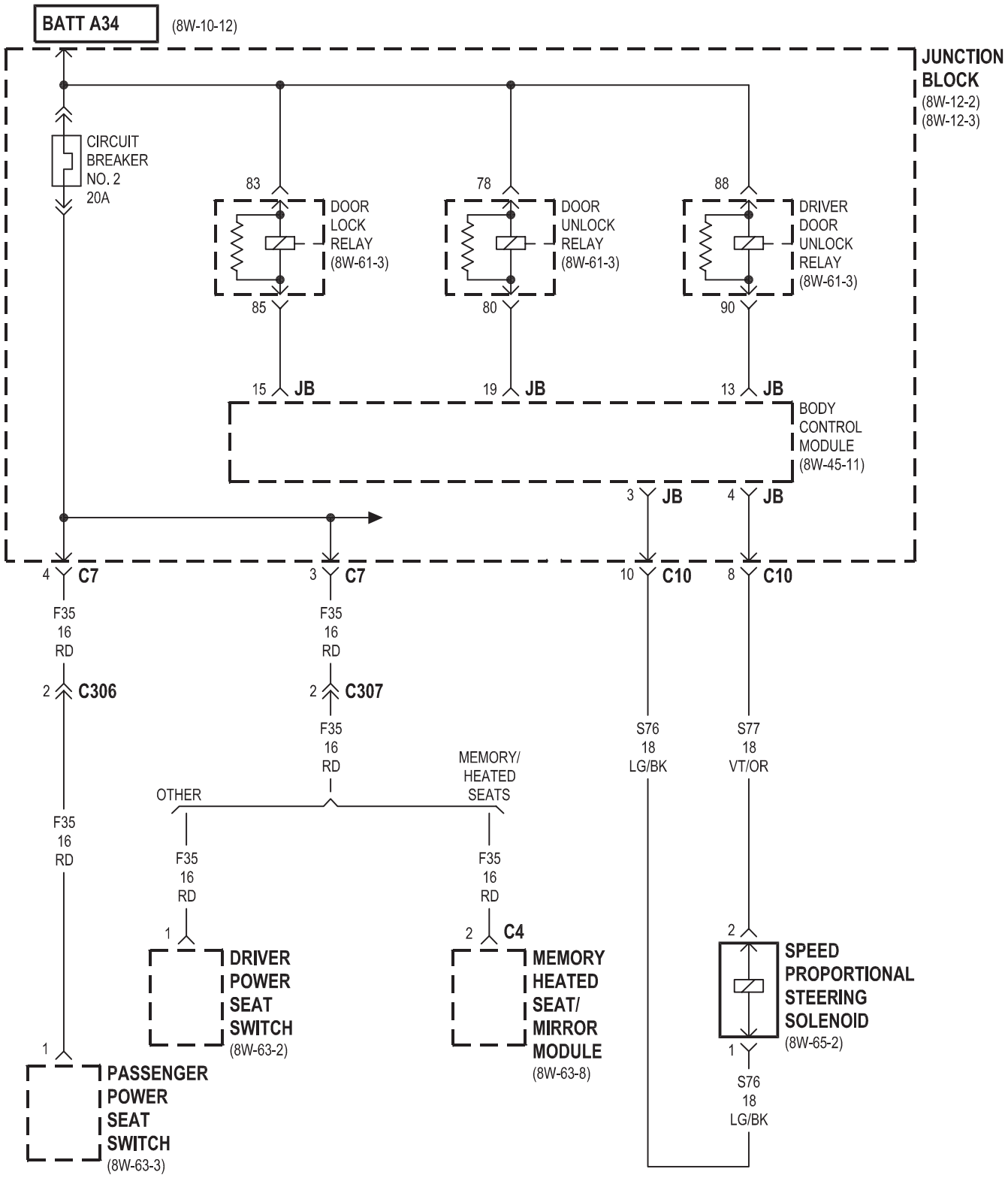

RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
17
10A
CIRCUIT BREAKER
NO. 1
20A
4
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
4 C9
5 C9
9 C4
9 C7
F21
14
TN
F20
20
WT
8 C300
MTC
ATC
F21
14
TN
F20
20
WT
F20
20
WT
1
DRIVER POWER WINDOW SWITCH
(8W-60-2)
5 C1
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-2)
F20
18
WT/VT
F20
20
WT
3 C107
23
CONTROLLER ANTI-LOCK BRAKE
(8W-35-2)
F20
20
WT
10
AUTOMATIC TEMPERATURE CONTROL HEAD
(8W-42-4)
1
TRANSMISSION RANGE SENSOR
(8W-31-5)

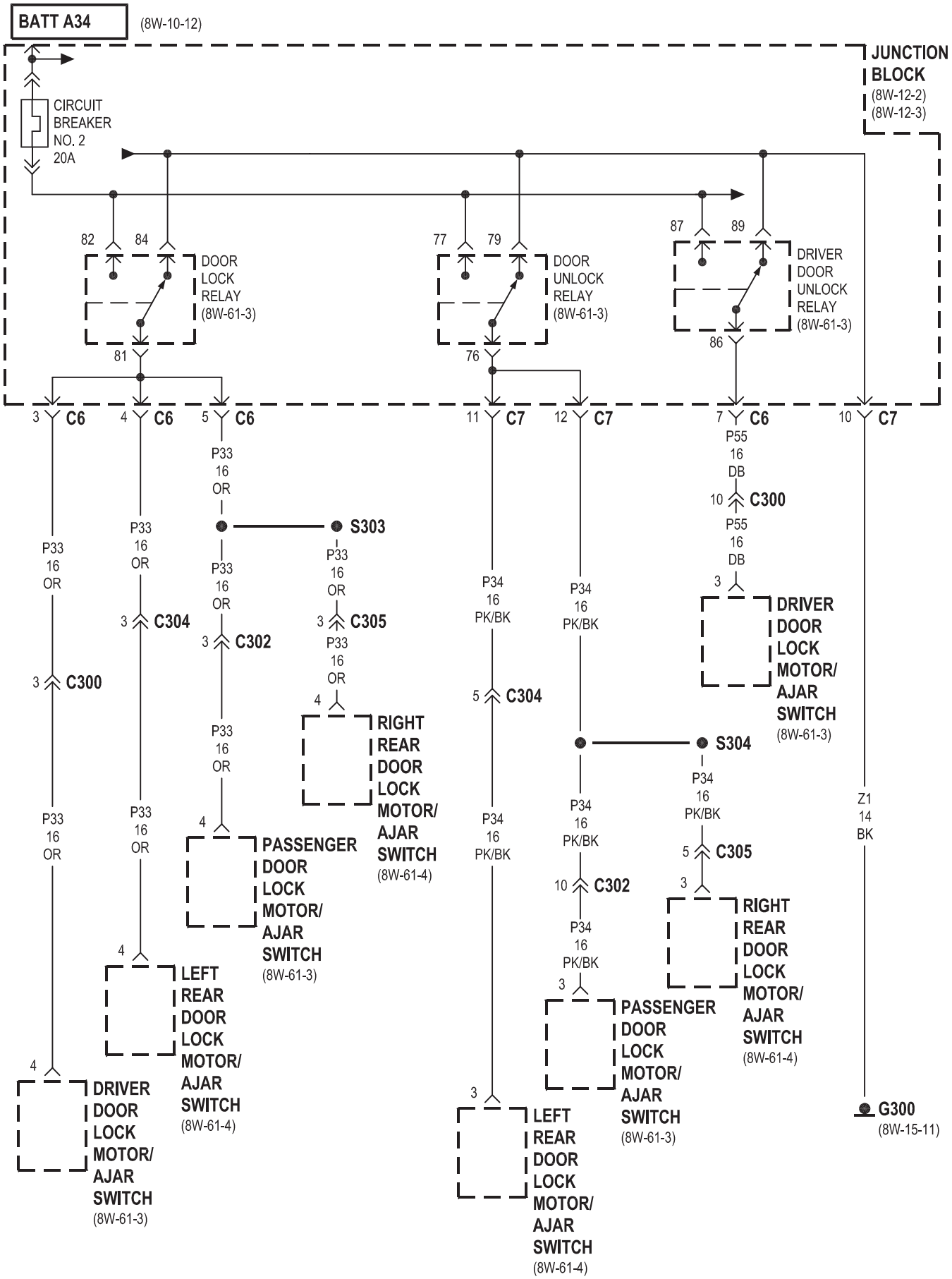

BATT A13
(8W-10-13)
RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 18 20A
FUSE 23 30A
73
74
HORN RELAY
(8W-41-2)
72
75
18 JB
BODY CONTROL MODULE
(8W-45-11)
6 C2
8 C9
6 C4
6 C1
X3 16 BK/RD
X2 18 DG/RD
4 C114
F62 16 RD
C1 12 DG
ATC
MTC
S209
S133
F62 16 RD/WT
C1 12 DG
8 C203
8 C202
3
CLOCKSPRING NO. 1
(8W-41-2)
13
1 C201
4
BLOWER MOTOR RESISTOR BLOCK
(8W-42-2)
1
RIGHT HORN
(8W-39-5)
(8W-41-2)
4
BLOWER MOTOR POWER MODULE
(8W-42-5)
1
LEFT HORN
(8W-39-5)
(8W-41-2)
1 C2
12 C2
POWER AMPLIFIER
(8W-47-2)

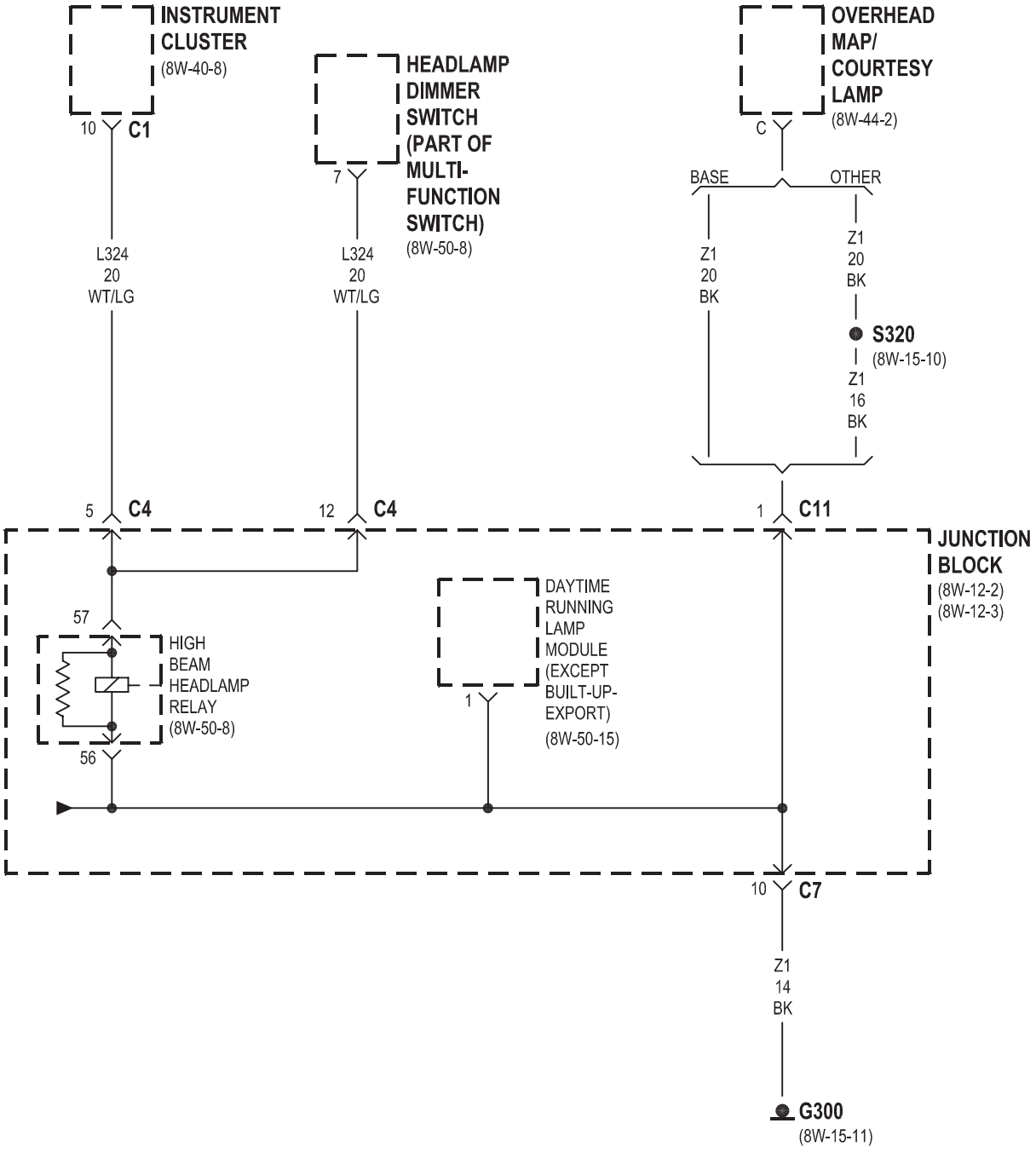

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
7 JB
BODY CONTROL MODULE
(8W-45-2)
2 C4
8 C4
6 C11
6 C7
5 C7
M1 20 PK
M1 18 PK
LHS/ 300M
OTHER
2
GLOVE BOX LAMP
(8W-44-4)
TO S204
(8W-70-7)
TO S319
(8W-70-6)
2
TRUNK LAMP
(8W-44-2)
S301
S329
6 C304
6 C305
3 C301
B
TO C303
(8W-12-21)
1
LEFT REAR DOOR COURTESY LAMP
(8W-44-4)
1
RIGHT REAR DOOR COURTESY LAMP
(8W-44-4)
S314
11
POWER MIRROR SWITCH
(8W-62-2)
(8W-62-3)
1
DRIVER POWER DOOR LOCK SWITCH
(8W-61-2)
2
DRIVER DOOR CYLINDER LOCK SWITCH
(8W-39-3)
1
DRIVER DOOR COURTESY LAMP
(8W-44-4)

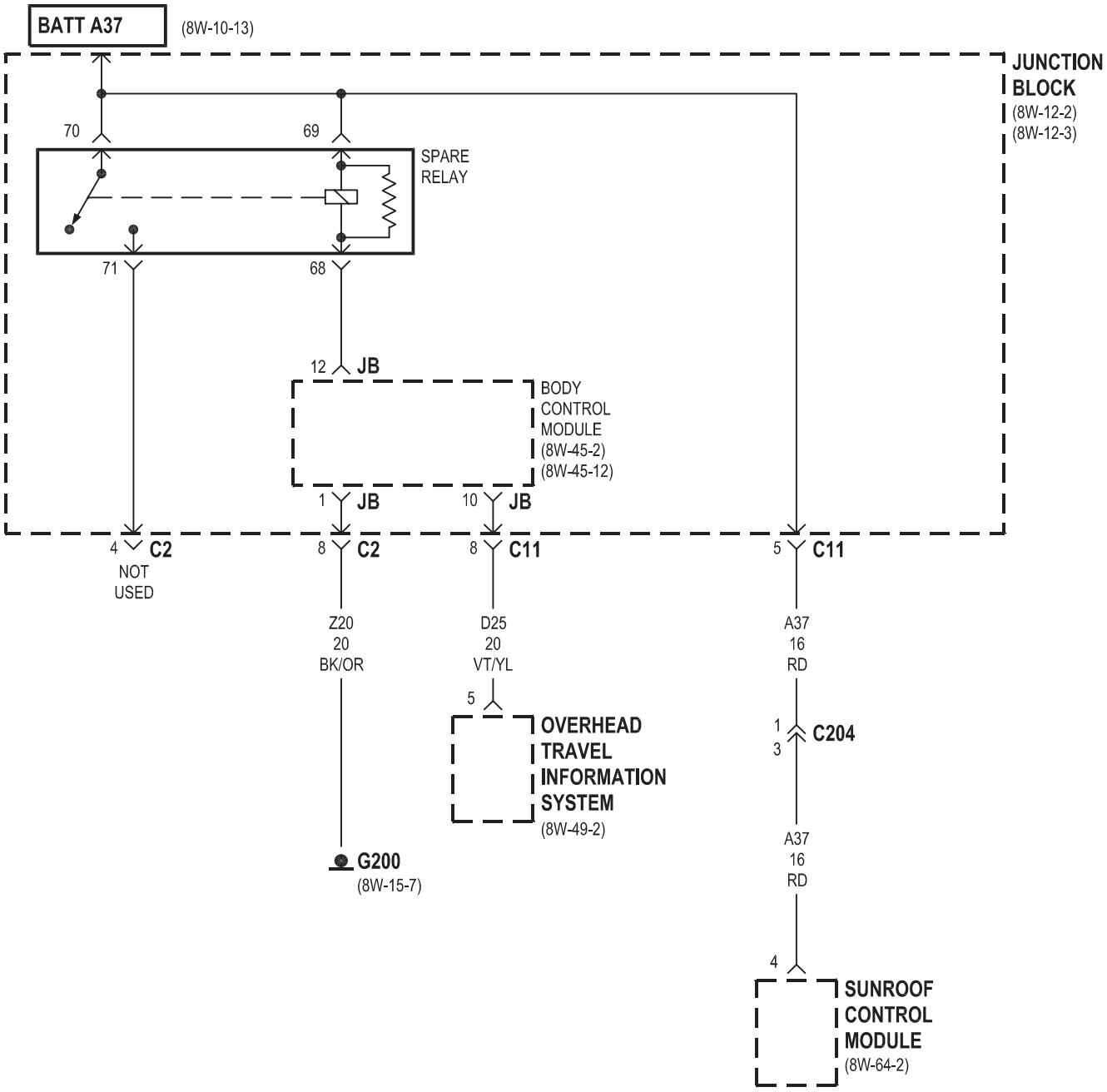

FROM
S329 (300M/LHS)
S301 (OTHER)
(8W-12-20)
B
M1
20
PK
3
C303
BASE
OTHER
M1
20
PK
S313
M1
20
PK
M1
20
PK
M1
20
PK
M1
20
PK
1
PASSENGER
POWER
DOOR
LOCK
SWITCH
(8W-61-2)
2
PASSENGER
DOOR
COURTESY
LAMP
(8W-44-4)
2
PASSENGER
DOOR
CYLINDER
LOCK
SWITCH
(8W-39-3)

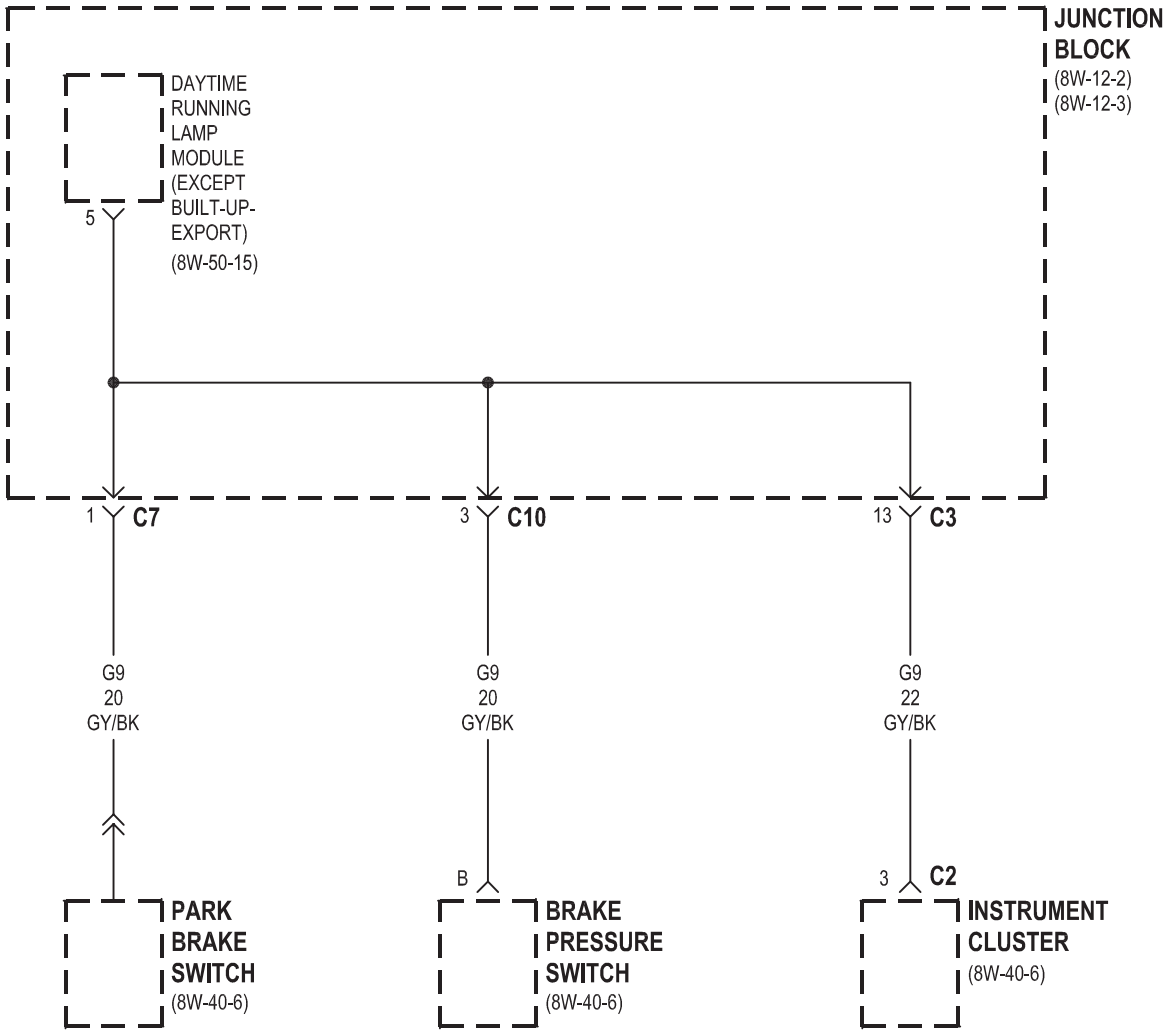

BATT A7
(8W-10-13)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 20 20A
FUSE 21 10A
FUSE 22 10A
1 C1
F32 16 PK/DB
6
BRAKE LAMP SWITCH
(8W-33-3)
7 C10
12 C10
F18 20 LG/BK
10 C2
F14 18 LG/YL
S214
S117
14
OCCUPANT RESTRAINT CONTROLLER
(8W-43-2)
A
HIGH SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
8 C106
9 C308
LOW SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
19 C200
S346
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8W-42-6)
2
LEAK DETECTION PUMP
(8W-30-16)
RIGHT SIDE IMPACT AIRBAG CONTROL MODULE
(8W-43-3)
LEFT SIDE IMPACT AIRBAG CONTROL MODULE
(8W-43-3)

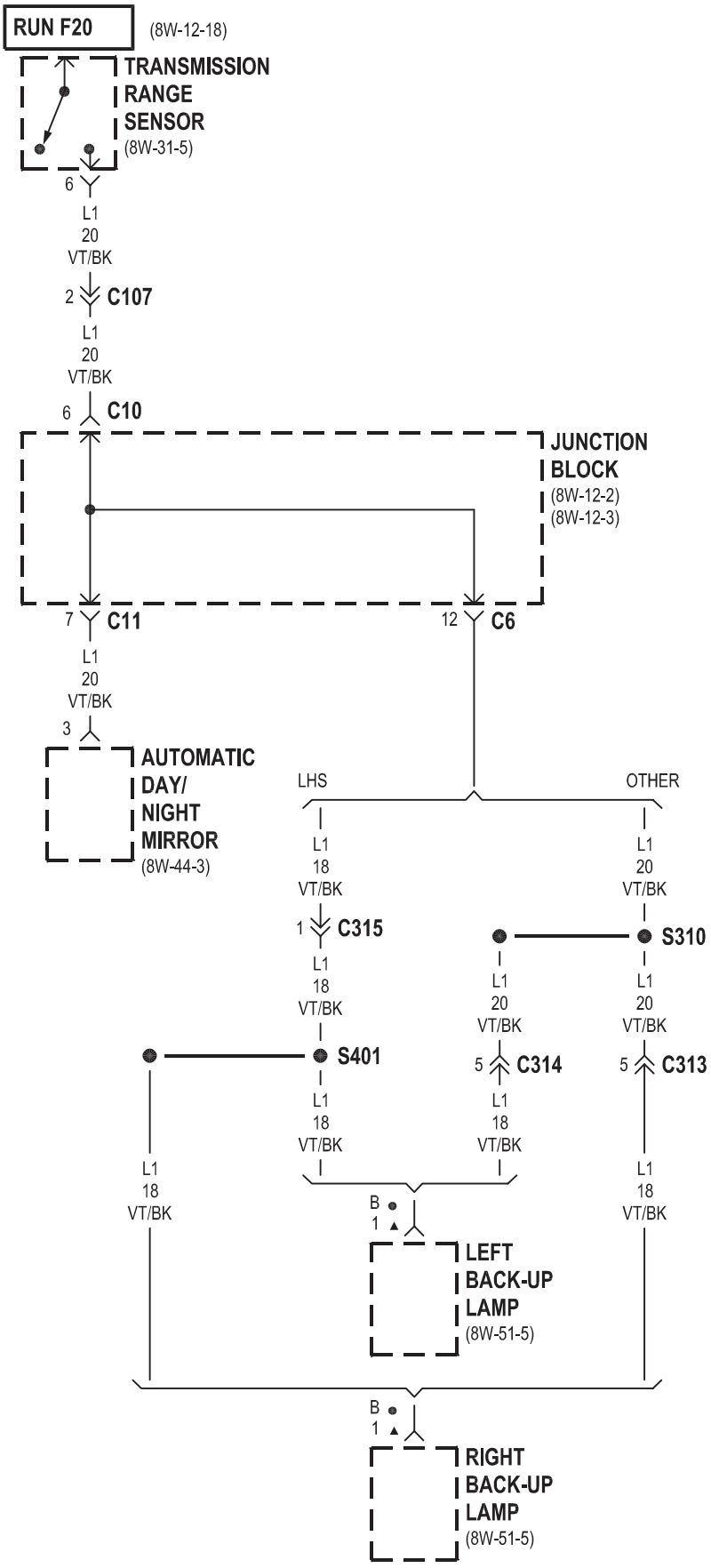

BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
83
DOOR LOCK RELAY
(8W-61-3)
78
DOOR UNLOCK RELAY
(8W-61-3)
88
DRIVER DOOR UNLOCK RELAY
(8W-61-3)
85
80
90
15 JB
19 JB
13 JB
BODY CONTROL MODULE
(8W-45-11)
3 JB
4 JB
4 C7
3 C7
10 C10
8 C10
F35 16 RD
2 C306
2 C307
S76 18 LG/BK
S77 18 VT/OR
OTHER
MEMORY/ HEATED SEATS
1
DRIVER POWER SEAT SWITCH
(8W-63-2)
2 C4
MEMORY HEATED SEAT/ MIRROR MODULE
(8W-63-8)
2
SPEED PROPORTIONAL STEERING SOLENOID
(8W-65-2)
1
PASSENGER POWER SEAT SWITCH
(8W-63-3)

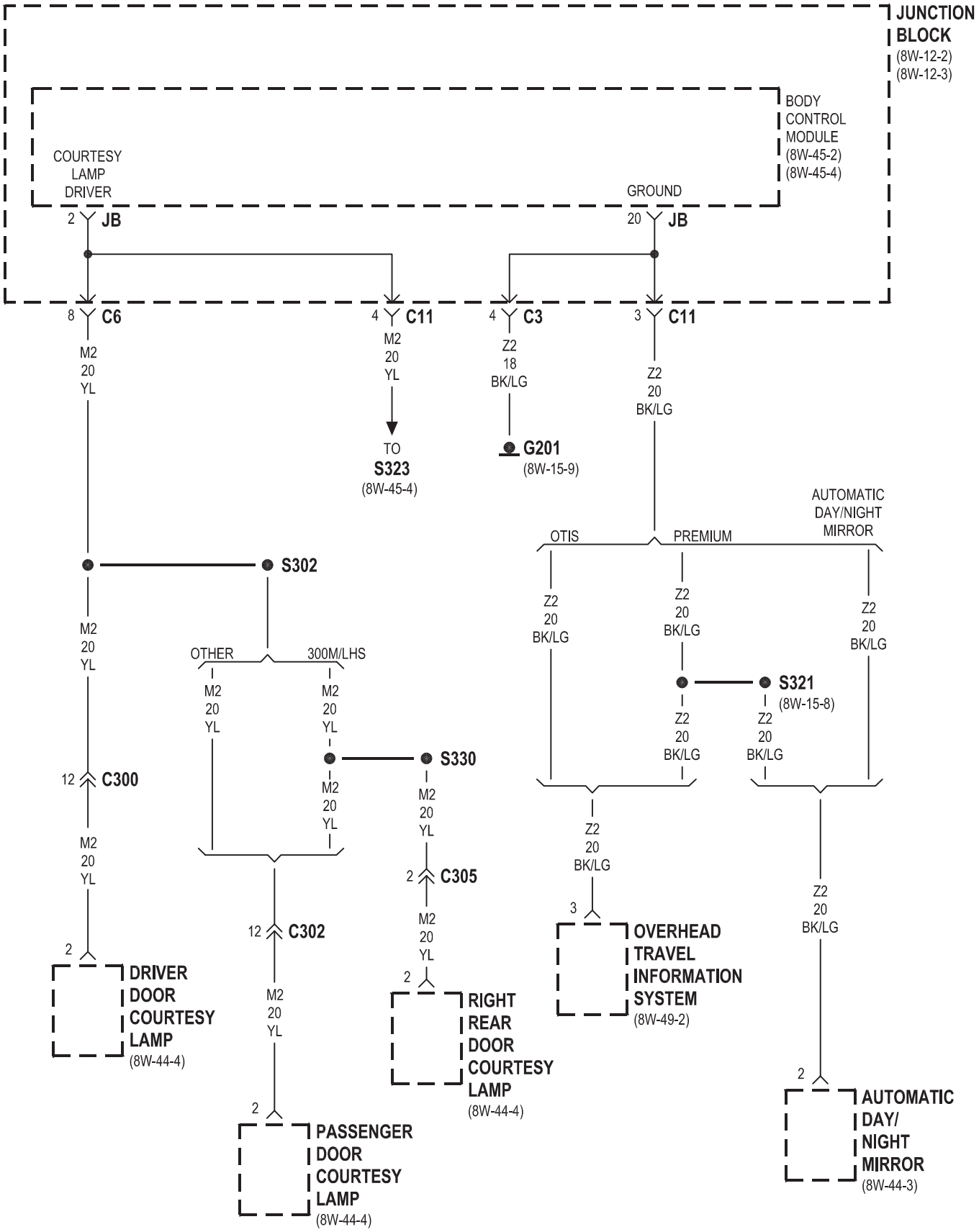

BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
82
84
DOOR LOCK RELAY
(8W-61-3)
81
77
79
DOOR UNLOCK RELAY
(8W-61-3)
76
87
89
DRIVER DOOR UNLOCK RELAY
(8W-61-3)
86
3 C6
4 C6
5 C6
11 C7
12 C7
7 C6
10 C7
P33 16 OR
P34 16 PK/BK
P55 16 DB
10 C300
3 C300
3 C304
3 C302
3 C305
5 C304
10 C302
5 C305
S303
S304
RIGHT REAR DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-3)
LEFT REAR DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-3)
Z1 14 BK
G300
(8W-15-11)

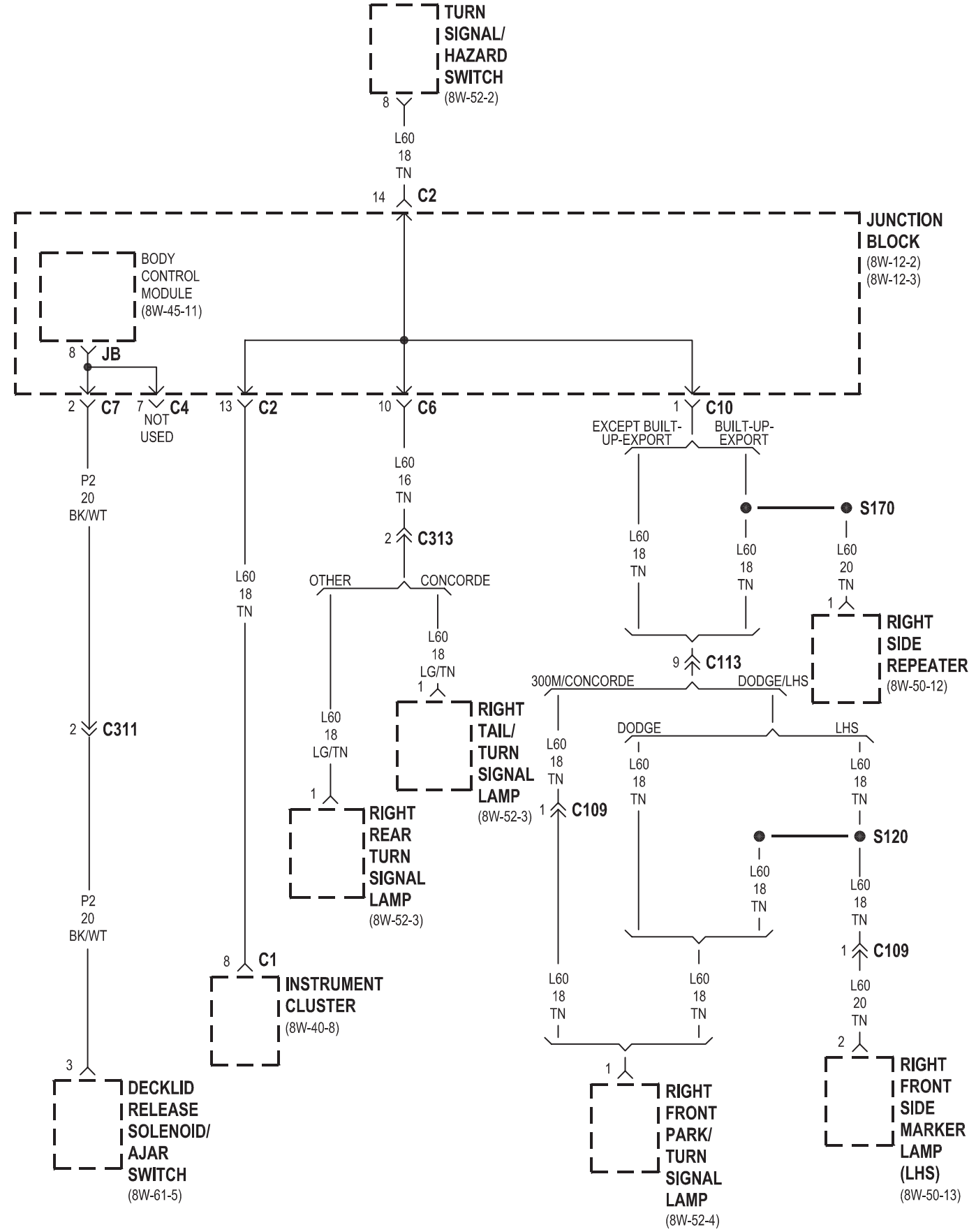

INSTRUMENT CLUSTER
(8W-40-8)
10
C1
L324
20
WT/LG
HEADLAMP DIMMER SWITCH (PART OF MULTI-FUNCTION SWITCH)
(8W-50-8)
7
L324
20
WT/LG
OVERHEAD MAP/ COURTESY LAMP
(8W-44-2)
C
BASE
OTHER
Z1
20
BK
Z1
20
BK
S320
(8W-15-10)
Z1
16
BK
5
C4
12
C4
1
C11
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
57
HIGH BEAM HEADLAMP RELAY
(8W-50-8)
56
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
1
10
C7
Z1
14
BK
G300
(8W-15-11)

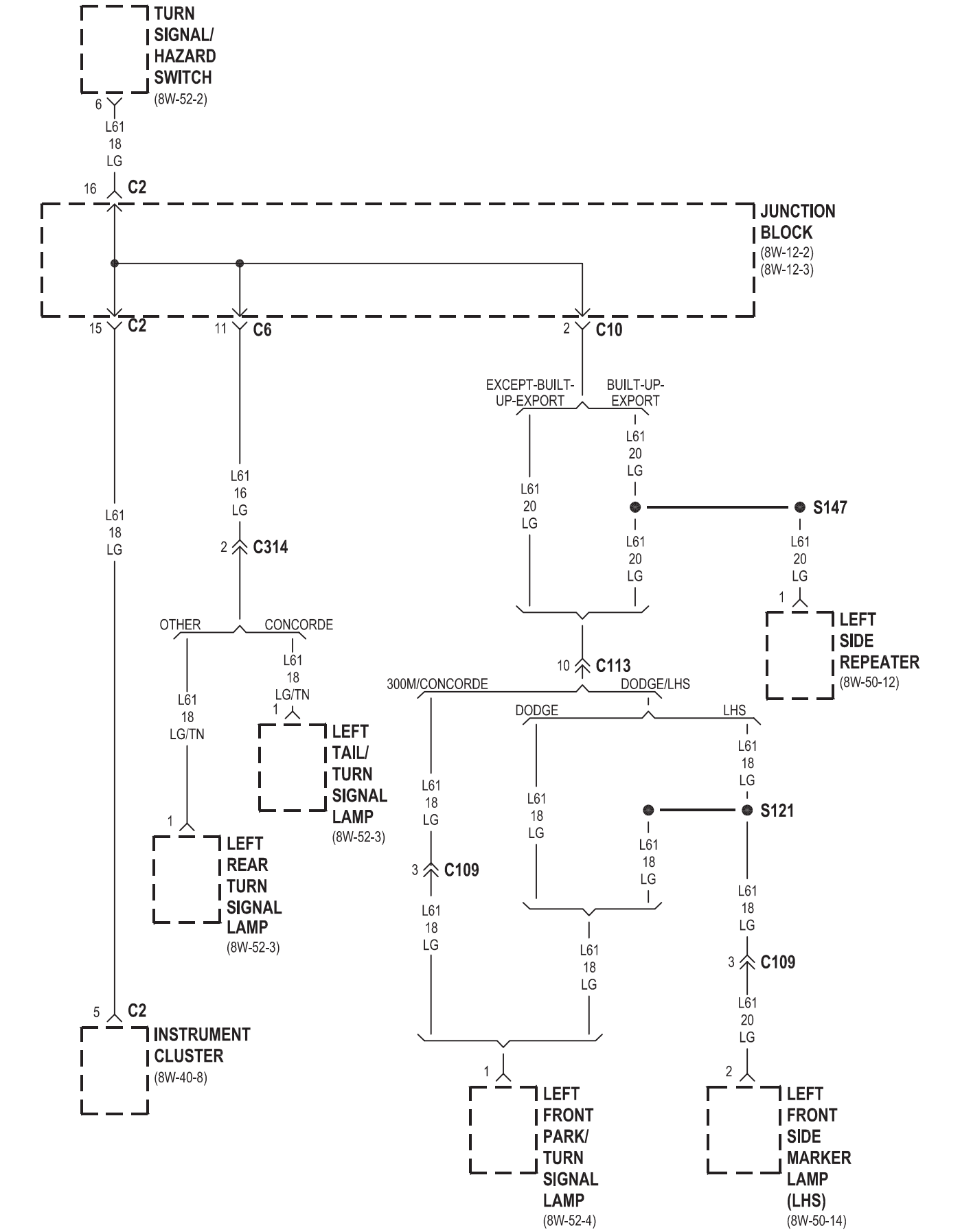

BATT A37
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
70
69
SPARE RELAY
71
68
12 JB
BODY CONTROL MODULE
(8W-45-2)
(8W-45-12)
1 JB
10 JB
4 C2
NOT USED
8 C2
8 C11
5 C11
Z20
20
BK/OR
D25
20
VT/YL
A37
16
RD
5
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)
1
3
C204
G200
(8W-15-7)
A37
16
RD
4
SUNROOF CONTROL MODULE
(8W-64-2)


JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT)
(8W-50-15)
5
1 C7
3 C10
13 C3
G9
20
GY/BK
G9
20
GY/BK
G9
22
GY/BK
B
3 C2
PARK BRAKE SWITCH
(8W-40-6)
BRAKE PRESSURE SWITCH
(8W-40-6)
INSTRUMENT CLUSTER
(8W-40-6)


RUN F20
(8W-12-18)
TRANSMISSION RANGE SENSOR
(8W-31-5)
6
L1 20 VT/BK
2 C107
L1 20 VT/BK
6 C10
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
7 C11
12 C6
L1 20 VT/BK
3
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
LHS
OTHER
L1 18 VT/BK
1 C315
L1 18 VT/BK
S401
L1 18 VT/BK
L1 20 VT/BK
S310
L1 20 VT/BK
5 C314
L1 18 VT/BK
L1 20 VT/BK
5 C313
L1 18 VT/BK
L1 18 VT/BK
B
1
LEFT BACK-UP LAMP
(8W-51-5)
B
1
RIGHT BACK-UP LAMP
(8W-51-5)
● CONCORDE
▲ LHS/300M/DODGE

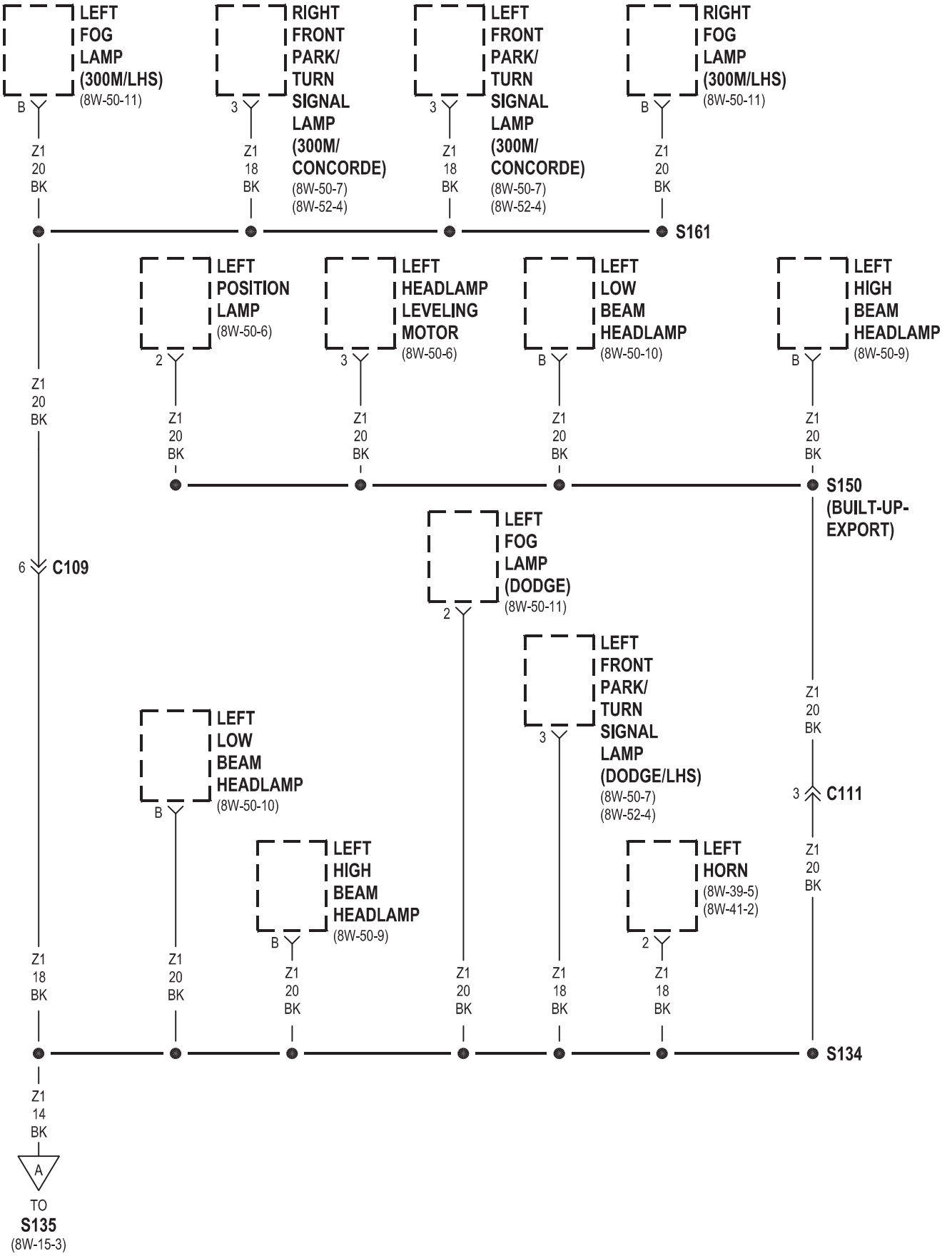

JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
BODY CONTROL MODULE
(8W-45-2)
(8W-45-4)
COURTESY LAMP DRIVER
GROUND
2 JB
20 JB
8 C6
4 C11
4 C3
3 C11
M2 20 YL
TO S323
(8W-45-4)
Z2 18 BK/LG
G201
(8W-15-9)
Z2 20 BK/LG
AUTOMATIC DAY/NIGHT MIRROR
OTIS
PREMIUM
S302
OTHER
300M/LHS
S330
S321
(8W-15-8)
12 C300
12 C302
2 C305
3
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)
2
DRIVER DOOR COURTESY LAMP
(8W-44-4)
RIGHT REAR DOOR COURTESY LAMP
(8W-44-4)
PASSENGER DOOR COURTESY LAMP
(8W-44-4)
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)

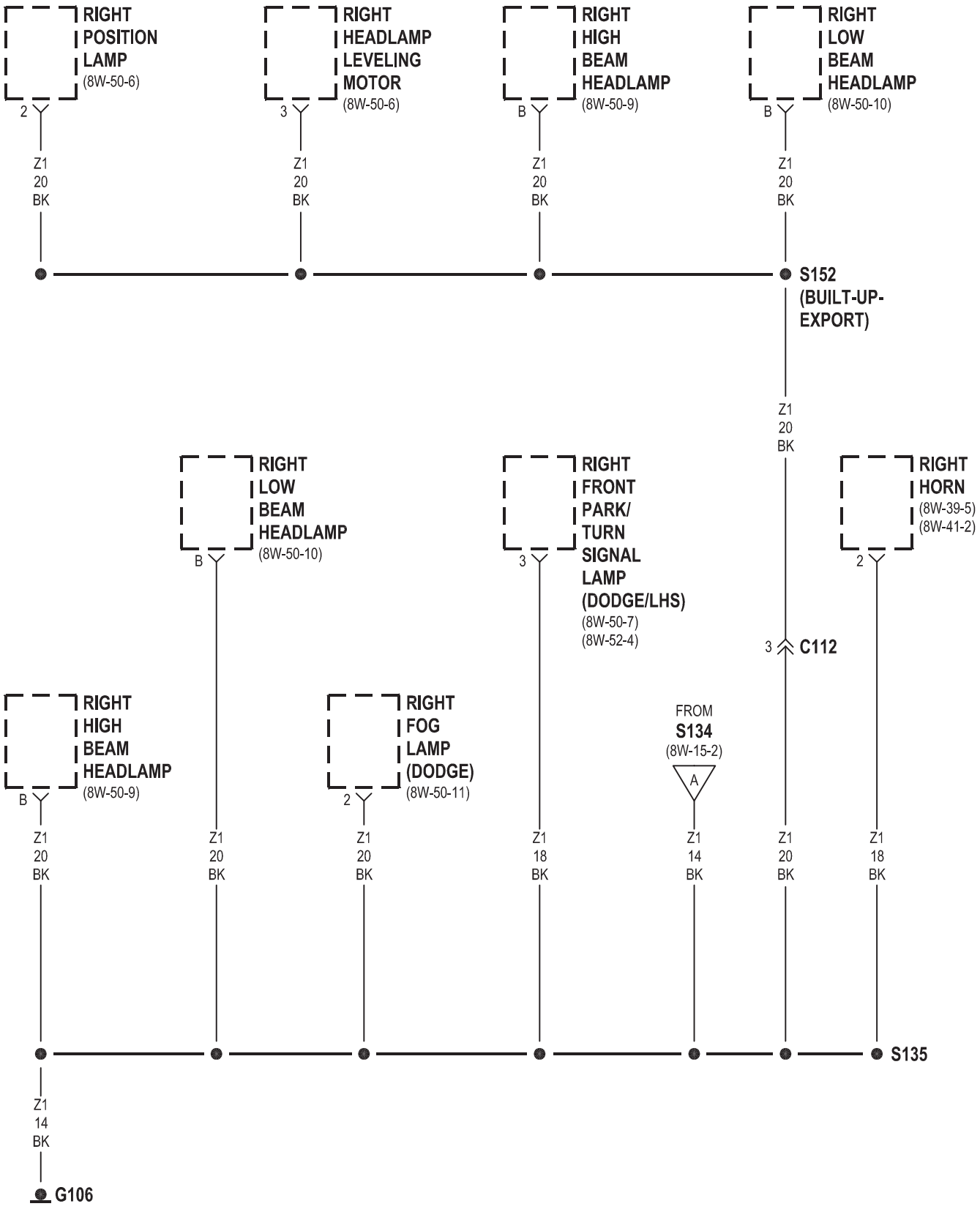

TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
8
L60 18 TN
14 C2
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
BODY CONTROL MODULE
(8W-45-11)
8 JB
2 C7
7 C4
NOT USED
13 C2
10 C6
1 C10
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
P2 20 BK/WT
L60 16 TN
2 C313
S170
L60 18 TN
L60 20 TN
OTHER
CONCORDE
L60 18 TN
1
RIGHT SIDE REPEATER
(8W-50-12)
9 C113
300M/CONCORDE
DODGE/LHS
L60 18 LG/TN
1
RIGHT TAIL/ TURN SIGNAL LAMP
(8W-52-3)
DODGE
LHS
2 C311
L60 18 LG/TN
1
RIGHT REAR TURN SIGNAL LAMP
(8W-52-3)
L60 18 TN
1 C109
S120
P2 20 BK/WT
8 C1
INSTRUMENT CLUSTER
(8W-40-8)
1 C109
L60 20 TN
2
RIGHT FRONT SIDE MARKER LAMP (LHS)
(8W-50-13)
3
DECKLID RELEASE SOLENOID/ AJAR SWITCH
(8W-61-5)
1
RIGHT FRONT PARK/ TURN SIGNAL LAMP
(8W-52-4)

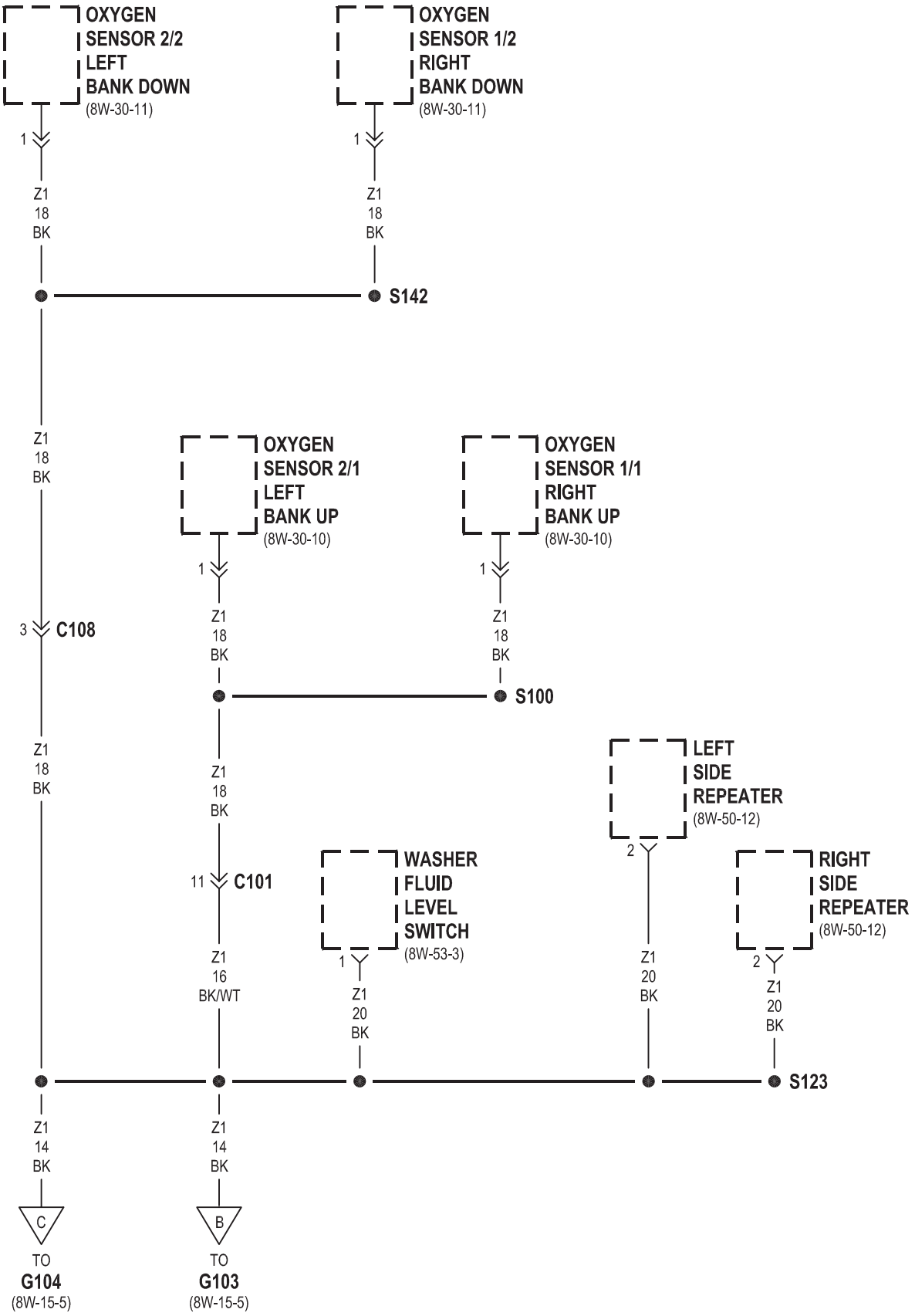

TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
6
L61 18 LG
16 C2
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
15 C2
11 C6
2 C10
EXCEPT-BUILT-UP-EXPORT
BUILT-UP-EXPORT
L61 20 LG
S147
L61 16 LG
2 C314
OTHER
CONCORDE
L61 18 LG/TN
1
LEFT TAIL/ TURN SIGNAL LAMP
(8W-52-3)
L61 18 LG/TN
1
LEFT REAR TURN SIGNAL LAMP
(8W-52-3)
10 C113
300M/CONCORDE
DODGE/LHS
DODGE
LHS
L61 18 LG
S121
3 C109
1
LEFT SIDE REPEATER
(8W-50-12)
5 C2
INSTRUMENT CLUSTER
(8W-40-8)
1
LEFT FRONT PARK/ TURN SIGNAL LAMP
(8W-52-4)
2
LEFT FRONT SIDE MARKER LAMP (LHS)
(8W-50-14)

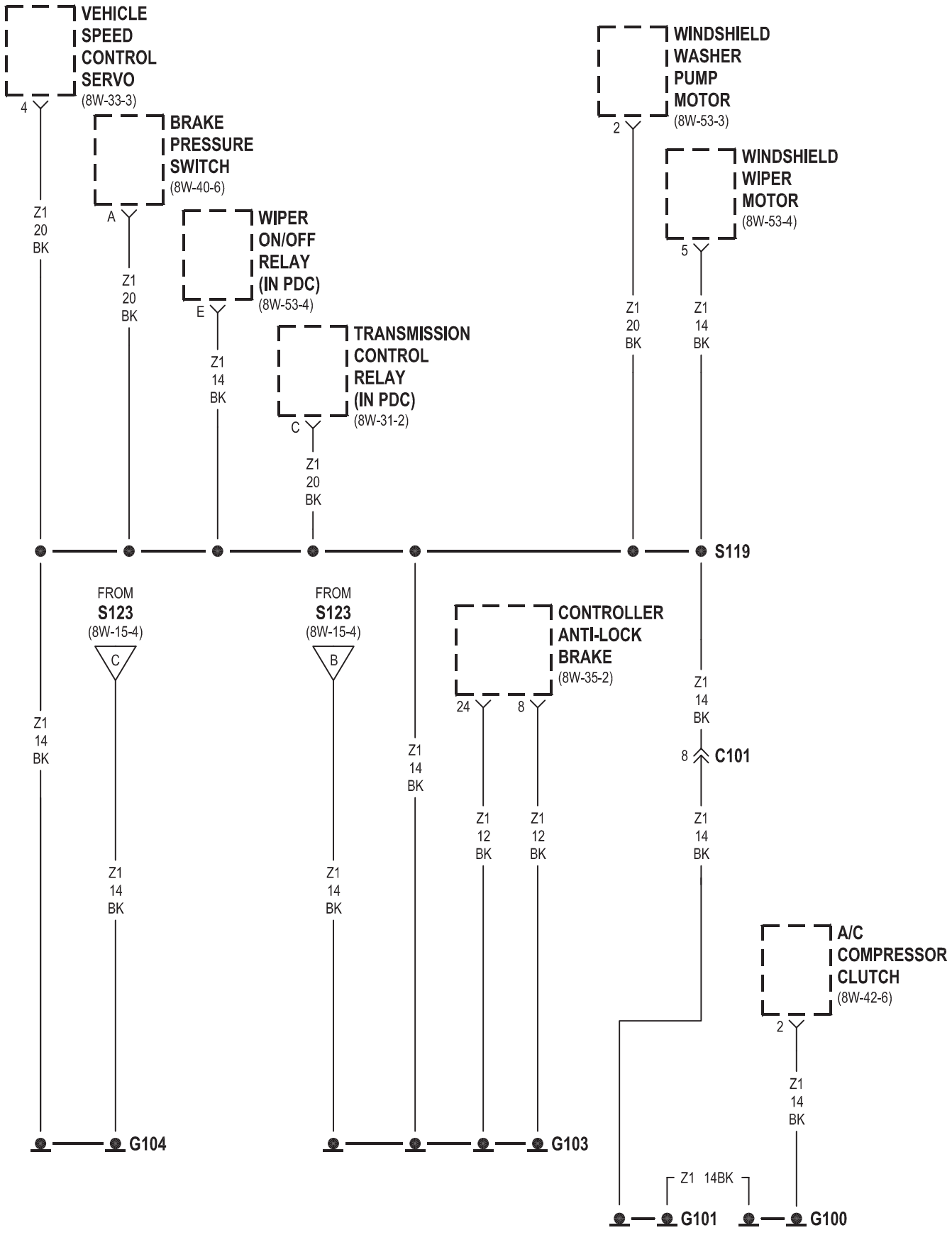
8W-15 GROUND DISTRIBUTION

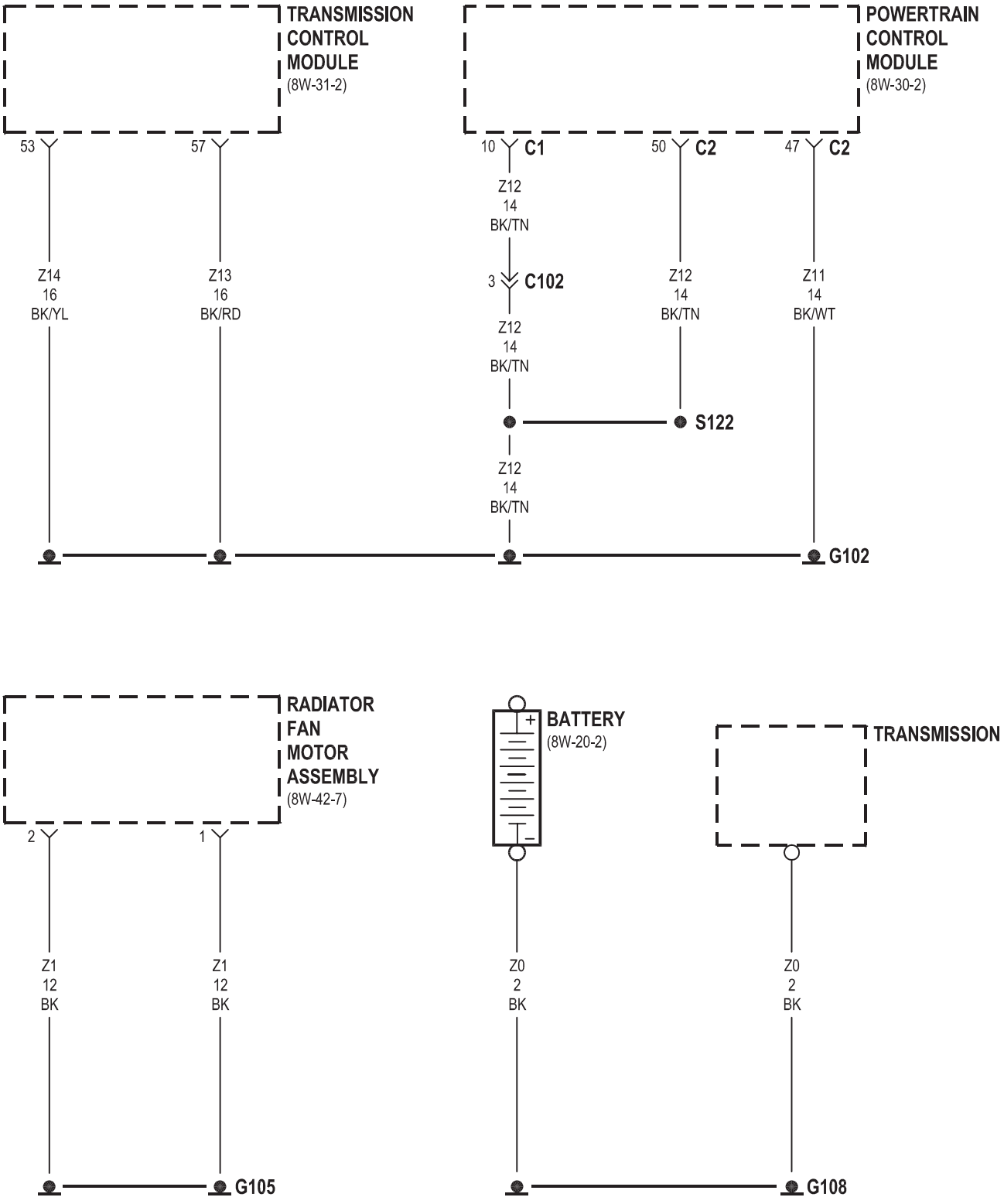
Component	Page
A/C Compressor Clutch	8W-15-5
Analog Clock	8W-15-9
Ash Receiver Lamp	8W-15-7
Automatic Day/Night Mirror	8W-15-8
Automatic Temperature Control Head	8W-15-7, 9
Autostick Switch	8W-15-11
Battery	8W-15-6
Blower Motor Power Module	8W-15-7
Body Control Module	8W-15-7, 8
Brake Lamp Switch	8W-15-9
Brake Pressure Switch	8W-15-5
Center High Mounted Stop Lamp	8W-15-14
Center High Mounted Stop Lamp No. 1	8W-15-14, 17
Center High Mounted Stop Lamp No. 2	8W-15-14, 17
Cigar Lighter	8W-15-7
Combination Flasher	8W-15-7
Controller Anti-Lock Brake	8W-15-5
Data Link Connector	8W-15-7, 9
Daytime Running Lamp Module	8W-15-10
Decklid Release Solenoid/Ajar Switch	8W-15-14
Door Lock Relay	8W-15-10
Door Unlock Relay	8W-15-10
Driver Door Lock Motor/Ajar Switch	8W-15-11
Driver Door Unlock Relay	8W-15-10
Driver Heated Seat Back	8W-15-8
Driver Heated Seat Switch	8W-15-8
Driver Power Door Lock Switch	8W-15-11
Driver Power Mirror	8W-15-11
Driver Power Seat Switch	8W-15-8, 11
Driver Power Window Switch	8W-15-11
Fuel Pump Module	8W-15-17
G100	8W-15-5
G101	8W-15-5
G102	8W-15-6
G103	8W-15-5
G104	8W-15-5
G105	8W-15-6
G106	8W-15-3
G108	8W-15-6
G200	8W-15-7
G201	8W-15-9
G300	8W-15-11, 13, 15, 16
G301	8W-15-17
G303	8W-15-17
G400	8W-15-14
Glove Box Lamp	8W-15-7
Headlamp Switch	8W-15-7
High Beam Headlamp Relay	8W-15-10
Ignition Switch	8W-15-9
Instrument Cluster	8W-15-7, 9
Junction Block	8W-15-7, 8, 10
Left Back-Up Lamp	8W-15-15, 16
Left Fog Lamp	8W-15-2
Left Front Park/Turn Signal Lamp	8W-15-2
Left Headlamp Leveling Motor	8W-15-2
Left High Beam Headlamp	8W-15-2
Left Horn	8W-15-2
Left License Lamp	8W-15-16
Left Low Beam Headlamp	8W-15-2
Left Position Lamp	8W-15-2
Left Rear Door Lock Motor/Ajar Switch	8W-15-11
Left Rear Fog Lamp	8W-15-16
Left Rear Reading Lamp Switch	8W-15-10
Left Rear Side Marker Lamp	8W-15-15
Left Rear Turn Signal Lamp	8W-15-15, 16
Left Side Impact Airbag Control Module	8W-15-9
Left Side Repeater	8W-15-4
Left Tail Lamp	8W-15-15, 16
Left Tail/Stop Lamp	8W-15-15, 16
Left Tail/Stop Lamp No. 1	8W-15-15
Left Tail/Stop Lamp No. 2	8W-15-15
Left Tail/Turn Signal Lamp	8W-15-15
Left Visor/Vanity Lamp	8W-15-10
License Lamp	8W-15-15
Manual Temperature Control Head	8W-15-7
Memory Heated Seat/Mirror Module	8W-15-8
Memory Set Switch	8W-15-8
Occupant Restraint Controller	8W-15-9
Overhead Map/Courtesy Lamp	8W-15-10
Overhead Travel Information System	8W-15-8
Oxygen Sensor 1/1 Right Bank Up	8W-15-4
Oxygen Sensor 1/2 Right Bank Down	8W-15-4
Oxygen Sensor 2/1 Left Bank Up	8W-15-4
Oxygen Sensor 2/2 Left Bank Down	8W-15-4
Passenger Door Lock Motor/Ajar Switch	8W-15-17
Passenger Heated Seat Back	8W-15-11
Passenger Heated Seat Switch	8W-15-11
Passenger Power Door Lock Switch	8W-15-17
Passenger Power Mirror	8W-15-17
Passenger Power Seat Switch	8W-15-11
Power Amplifier	8W-15-17
Power Mirror Switch	8W-15-11
Powertrain Control Module	8W-15-6
PRNDL Illumination	8W-15-7
Radiator Fan Motor Assembly	8W-15-6
Radio	8W-15-9
Right Back-Up Lamp	8W-15-12, 13
Right Fog Lamp	8W-15-2, 3
Right Front Park/Turn Signal Lamp	8W-15-2, 3
Right Headlamp Leveling Motor	8W-15-3
Right High Beam Headlamp	8W-15-3
Right Horn	8W-15-3
Right Low Beam Headlamp	8W-15-3
Right Position Lamp	8W-15-3
Right Rear Door Lock Motor/Ajar Switch	8W-15-17
Right Rear Fog Lamp	8W-15-13
Right Rear Reading Lamp Switch	8W-15-10
Right Rear Side Marker Lamp	8W-15-12
Right Rear Turn Signal Lamp	8W-15-12, 13
Right Side Impact Airbag Control Module	8W-15-9
Right Side Repeater	8W-15-4
Right Tail Lamp	8W-15-12, 13
Right Tail/Stop Lamp	8W-15-12, 13
Right Tail/Stop Lamp No. 1	8W-15-12
Right Tail/Stop Lamp No. 2	8W-15-12
Right Tail/Turn Signal Lamp	8W-15-12
Right Visor/Vanity Lamp	8W-15-10
Seat Belt Switch	8W-15-9
Sentry Key Immobilizer Module	8W-15-9
Sunroof Control Module	8W-15-10
Sunroof Limit Switch	8W-15-10
Sunroof Switch	8W-15-10
Traction Control Switch	8W-15-9
Transmission Control Module	8W-15-6
Transmission Control Relay	8W-15-5
Trunk Knock Out Switch	8W-15-14
Turn Signal/Hazard Switch	8W-15-7
Vehicle Speed Control Servo	8W-15-5
Washer Fluid Level Switch	8W-15-4
Windshield Washer Pump Motor	8W-15-5
Windshield Wiper Motor	8W-15-5
Wiper On/Off Relay	8W-15-5

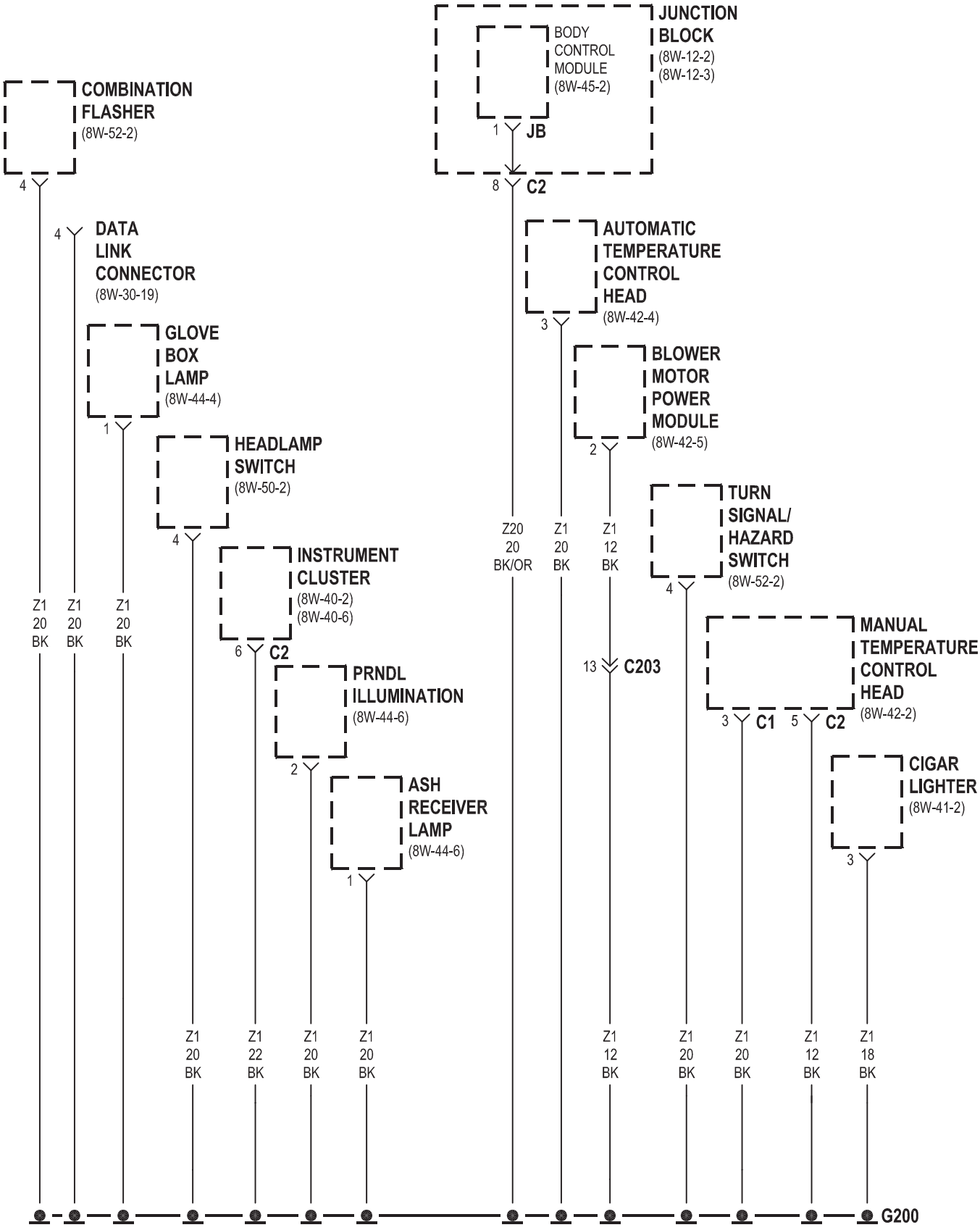

LEFT FOG LAMP (300M/LHS) (8W-50-11)
RIGHT FRONT PARK/ TURN SIGNAL LAMP (300M/ CONCORDE) (8W-50-7) (8W-52-4)
LEFT FRONT PARK/ TURN SIGNAL LAMP (300M/ CONCORDE) (8W-50-7) (8W-52-4)
RIGHT FOG LAMP (300M/LHS) (8W-50-11)
S161
LEFT POSITION LAMP (8W-50-6)
LEFT HEADLAMP LEVELING MOTOR (8W-50-6)
LEFT LOW BEAM HEADLAMP (8W-50-10)
LEFT HIGH BEAM HEADLAMP (8W-50-9)
S150 (BUILT-UP-EXPORT)
C109
LEFT FOG LAMP (DODGE) (8W-50-11)
LEFT FRONT PARK/ TURN SIGNAL LAMP (DODGE/LHS) (8W-50-7) (8W-52-4)
C111
LEFT LOW BEAM HEADLAMP (8W-50-10)
LEFT HIGH BEAM HEADLAMP (8W-50-9)
LEFT HORN (8W-39-5) (8W-41-2)
S134
TO S135 (8W-15-3)

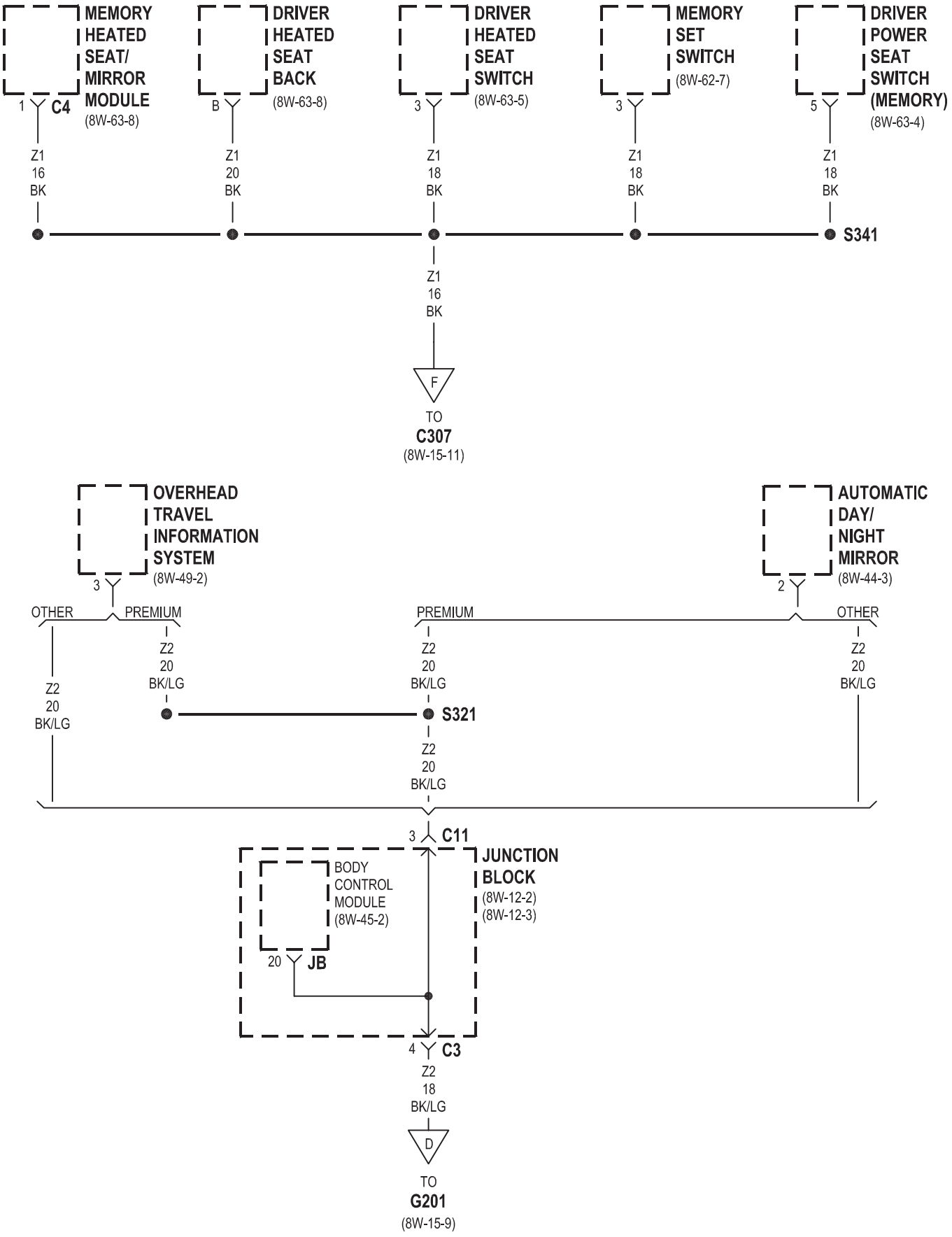

RIGHT POSITION LAMP (8W-50-6)
2
Z1 20 BK
RIGHT HEADLAMP LEVELING MOTOR (8W-50-6)
3
Z1 20 BK
RIGHT HIGH BEAM HEADLAMP (8W-50-9)
B
Z1 20 BK
RIGHT LOW BEAM HEADLAMP (8W-50-10)
B
Z1 20 BK
S152 (BUILT-UP-EXPORT)
Z1 20 BK
3 C112
RIGHT LOW BEAM HEADLAMP (8W-50-10)
B
Z1 20 BK
RIGHT FRONT PARK/ TURN SIGNAL LAMP (DODGE/LHS) (8W-50-7) (8W-52-4)
3
Z1 18 BK
RIGHT HORN (8W-39-5) (8W-41-2)
2
Z1 18 BK
RIGHT HIGH BEAM HEADLAMP (8W-50-9)
B
Z1 20 BK
RIGHT FOG LAMP (DODGE) (8W-50-11)
2
Z1 20 BK
FROM S134 (8W-15-2)
A
Z1 14 BK
Z1 20 BK
S135
Z1 14 BK
G106

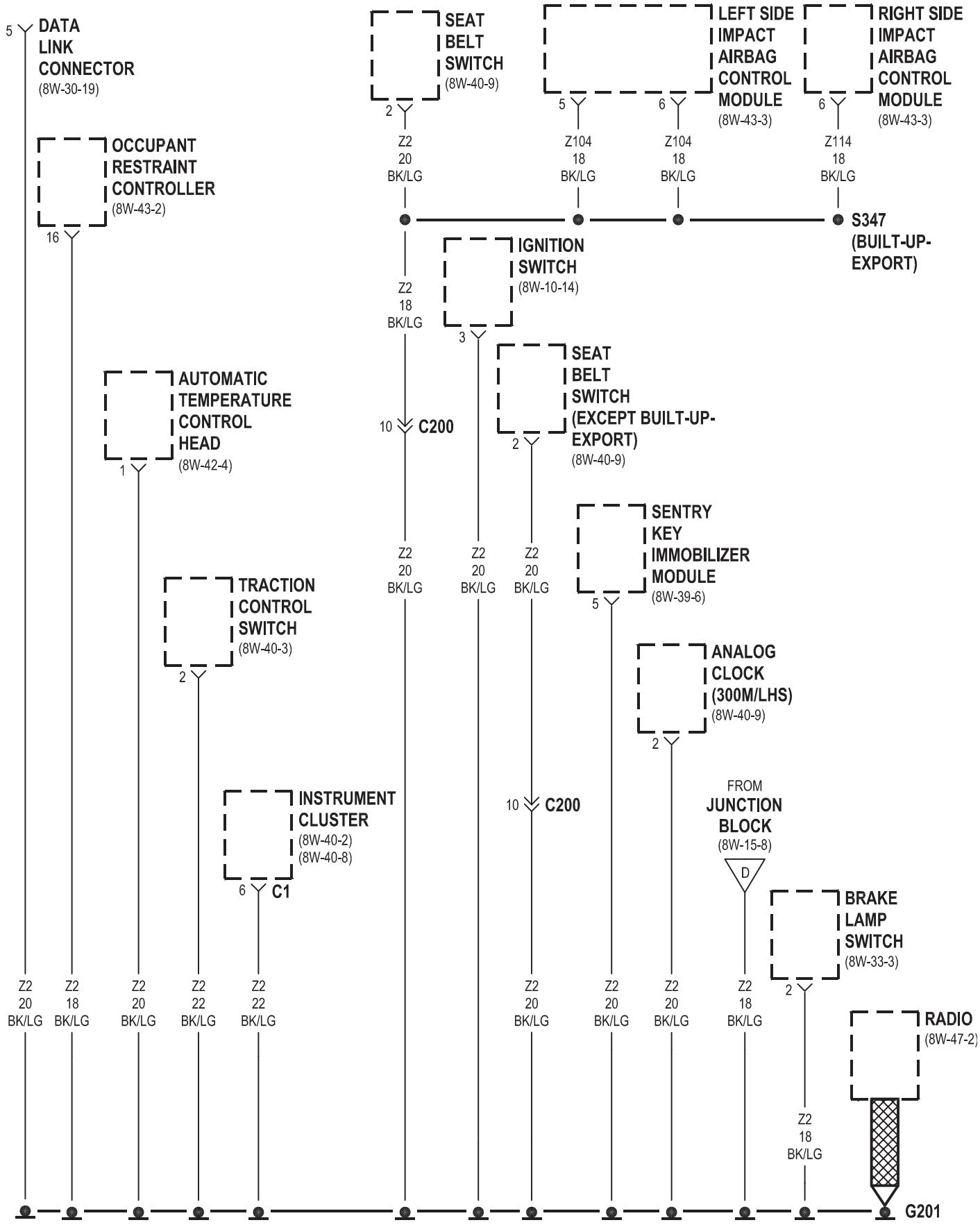

OXYGEN SENSOR 2/2 LEFT BANK DOWN
(8W-30-11)
OXYGEN SENSOR 1/2 RIGHT BANK DOWN
(8W-30-11)
1
Z1
18
BK
S142
OXYGEN SENSOR 2/1 LEFT BANK UP
(8W-30-10)
OXYGEN SENSOR 1/1 RIGHT BANK UP
(8W-30-10)
3 C108
S100
11 C101
LEFT SIDE REPEATER
(8W-50-12)
WASHER FLUID LEVEL SWITCH
(8W-53-3)
RIGHT SIDE REPEATER
(8W-50-12)
2
Z1
16
BK/WT
Z1
20
BK
S123
Z1
14
BK
C
TO
G104
(8W-15-5)
B
TO
G103
(8W-15-5)

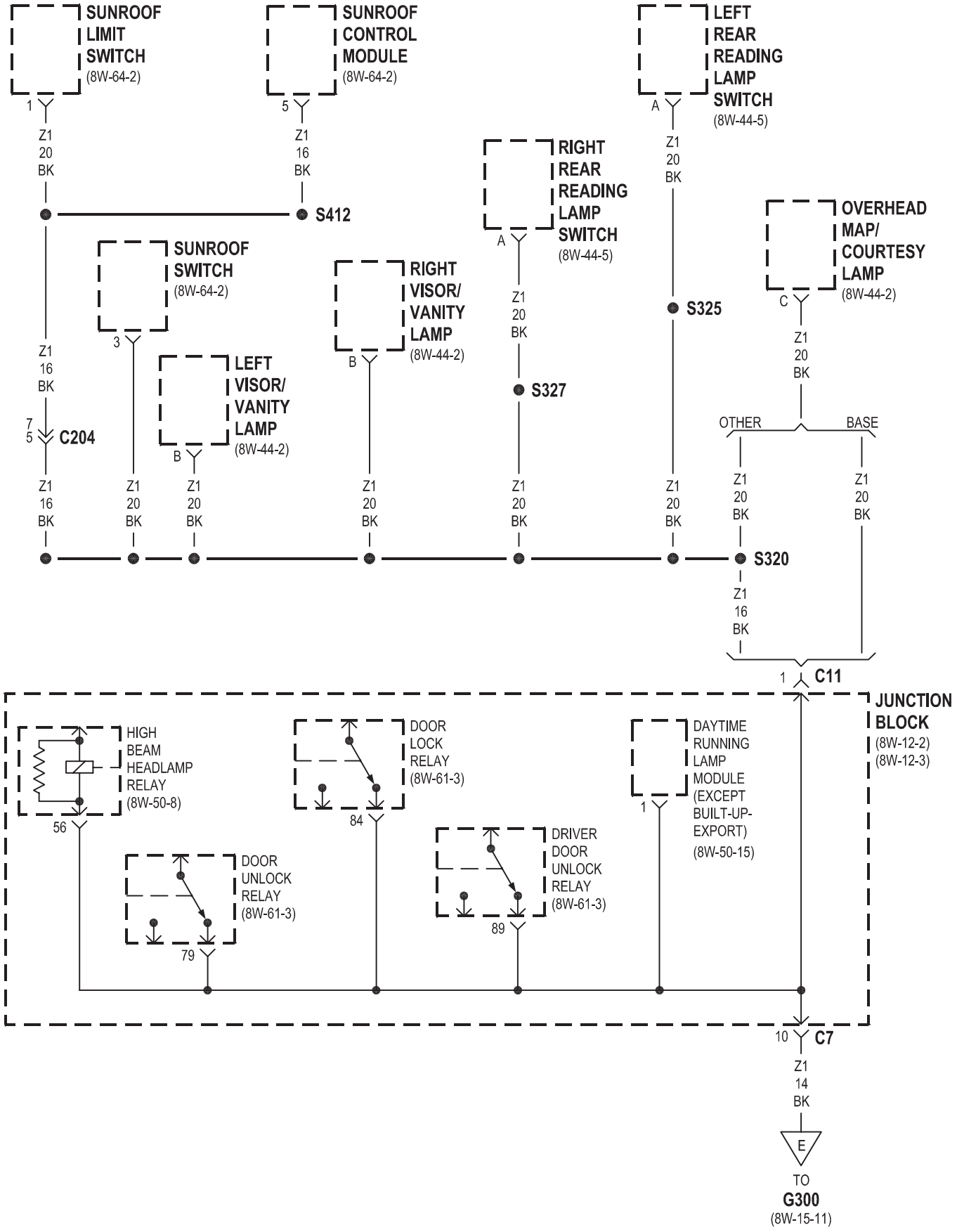

VEHICLE SPEED CONTROL SERVO (8W-33-3)
4
BRAKE PRESSURE SWITCH (8W-40-6)
A
WIPER ON/OFF RELAY (IN PDC) (8W-53-4)
E
TRANSMISSION CONTROL RELAY (IN PDC) (8W-31-2)
C
WINDSHIELD WASHER PUMP MOTOR (8W-53-3)
2
WINDSHIELD WIPER MOTOR (8W-53-4)
5
Z1 20 BK
Z1 14 BK
S119
FROM S123 (8W-15-4)
C
B
CONTROLLER ANTI-LOCK BRAKE (8W-35-2)
24
8
Z1 12 BK
C101
A/C COMPRESSOR CLUTCH (8W-42-6)
2
Z1 14BK
G104
G103
G101
G100

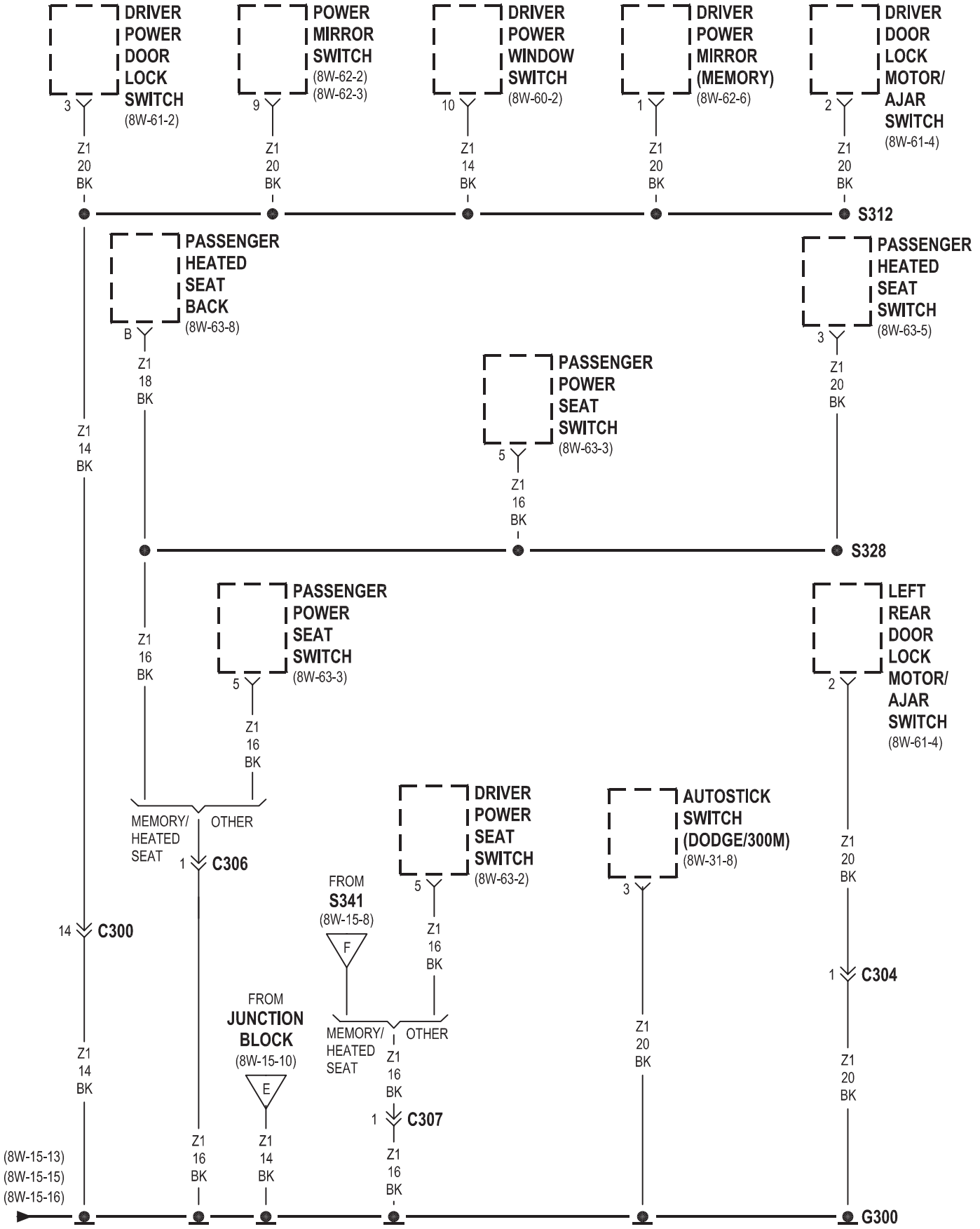

TRANSMISSION CONTROL MODULE
(8W-31-2)
53
57
Z14
16
BK/YL
Z13
16
BK/RD
POWERTRAIN CONTROL MODULE
(8W-30-2)
10 C1
50 C2
47 C2
Z12
14
BK/TN
3 C102
Z12
14
BK/TN
Z12
14
BK/TN
S122
Z12
14
BK/TN
Z11
14
BK/WT
G102
RADIATOR FAN MOTOR ASSEMBLY
(8W-42-7)
2
1
Z1
12
BK
Z1
12
BK
G105
BATTERY
(8W-20-2)
Z0
2
BK
TRANSMISSION
Z0
2
BK
G108

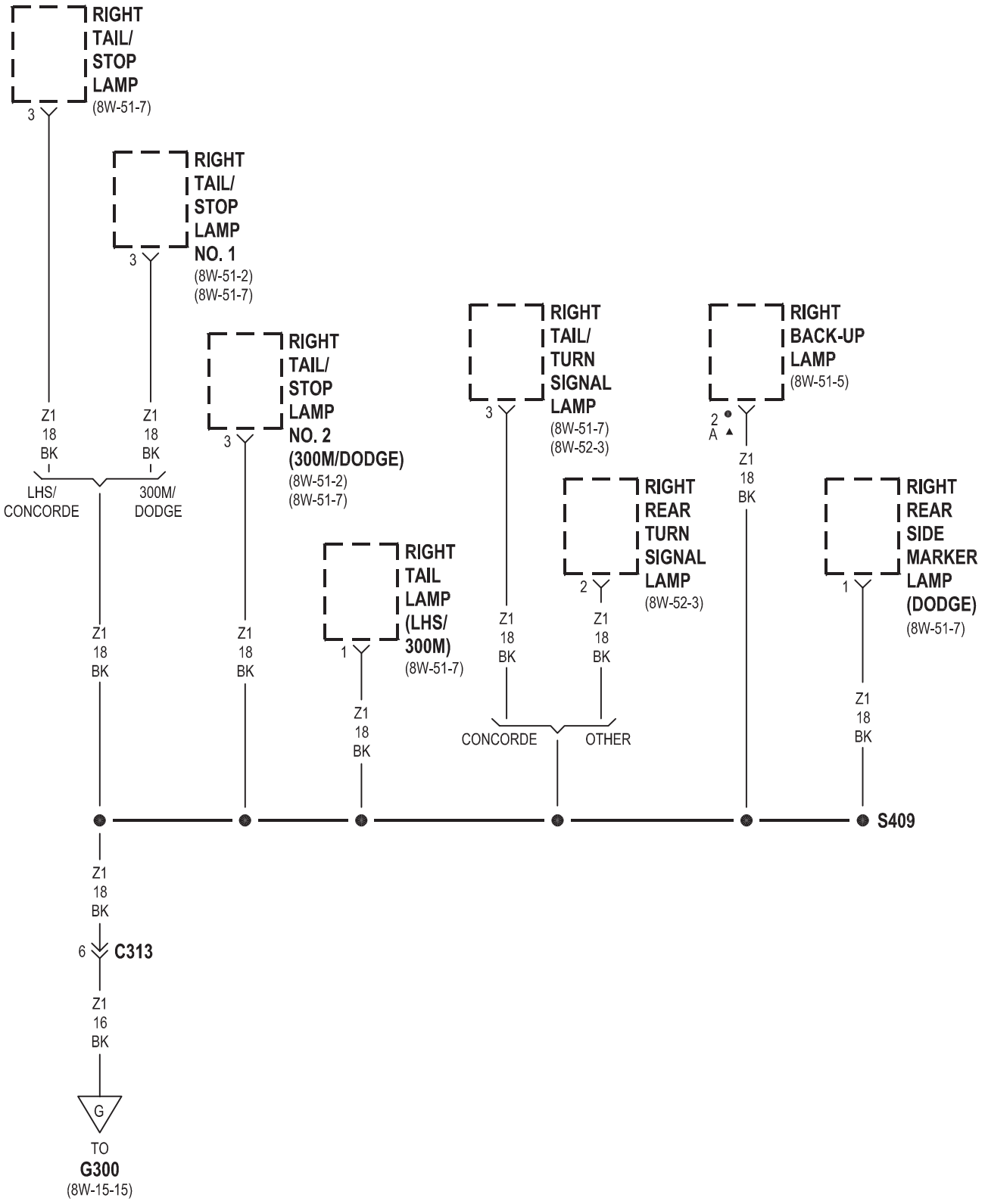

JUNCTION BLOCK (8W-12-2) (8W-12-3)
BODY CONTROL MODULE (8W-45-2)
1 JB
8 C2
COMBINATION FLASHER (8W-52-2)
4
4 DATA LINK CONNECTOR (8W-30-19)
GLOVE BOX LAMP (8W-44-4)
1
HEADLAMP SWITCH (8W-50-2)
4
INSTRUMENT CLUSTER (8W-40-2) (8W-40-6)
6 C2
PRNDL ILLUMINATION (8W-44-6)
2
ASH RECEIVER LAMP (8W-44-6)
1
AUTOMATIC TEMPERATURE CONTROL HEAD (8W-42-4)
3
BLOWER MOTOR POWER MODULE (8W-42-5)
2
TURN SIGNAL/ HAZARD SWITCH (8W-52-2)
4
MANUAL TEMPERATURE CONTROL HEAD (8W-42-2)
3 C1 5 C2
CIGAR LIGHTER (8W-41-2)
3
13 C203
Z1 20 BK
Z1 20 BK
Z1 20 BK
Z1 20 BK
Z1 22 BK
Z1 20 BK
Z1 20 BK
Z20 20 BK/OR
Z1 20 BK
Z1 12 BK
Z1 12 BK
Z1 20 BK
Z1 20 BK
Z1 12 BK
Z1 18 BK
G200

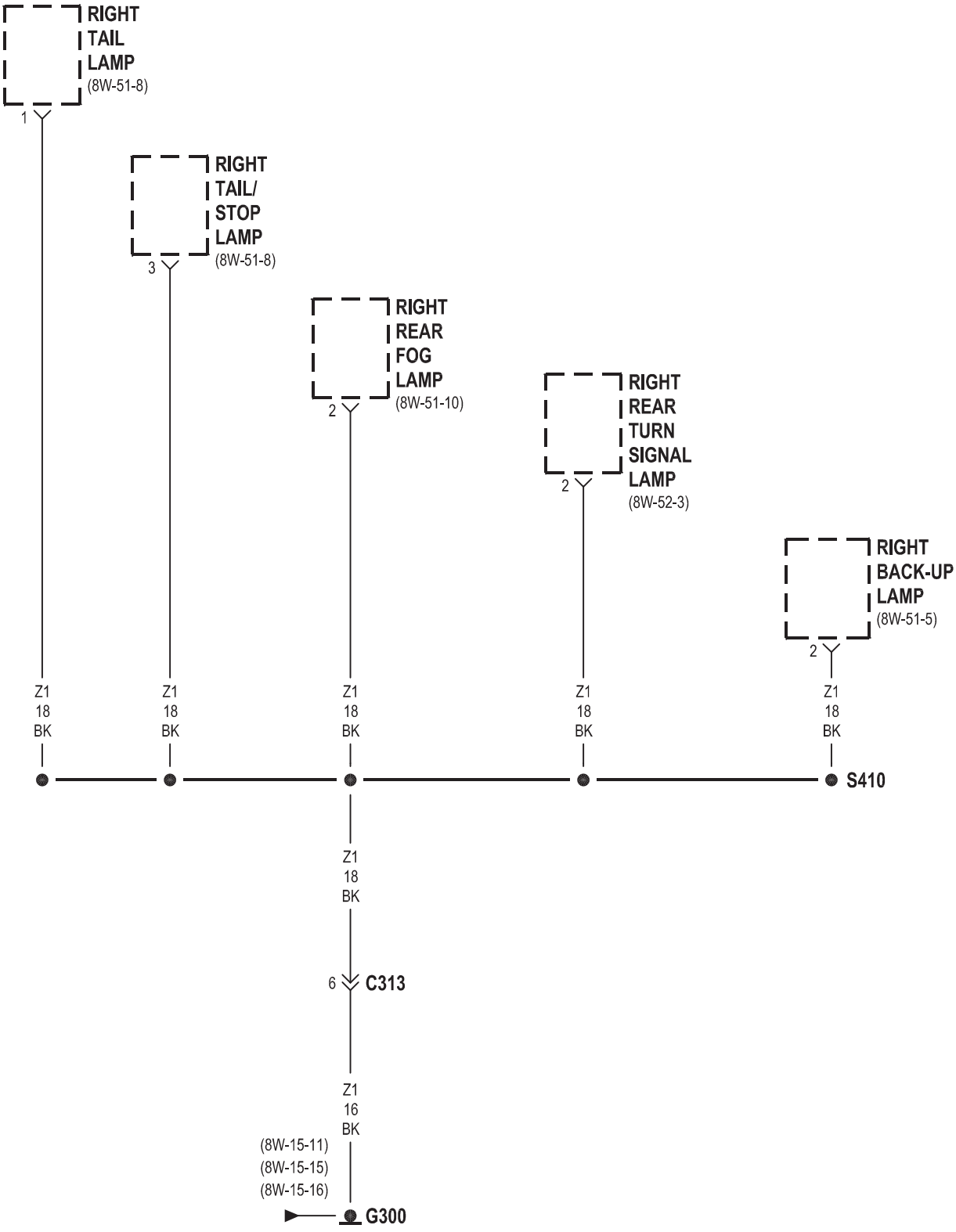

MEMORY HEATED SEAT/ MIRROR MODULE (8W-63-8)
1 C4
DRIVER HEATED SEAT BACK (8W-63-8)
B
DRIVER HEATED SEAT SWITCH (8W-63-5)
3
MEMORY SET SWITCH (8W-62-7)
3
DRIVER POWER SEAT SWITCH (MEMORY) (8W-63-4)
5
Z1 16 BK
Z1 20 BK
Z1 18 BK
Z1 18 BK
Z1 18 BK
S341
Z1 16 BK
F
TO C307 (8W-15-11)
OVERHEAD TRAVEL INFORMATION SYSTEM (8W-49-2)
3
AUTOMATIC DAY/ NIGHT MIRROR (8W-44-3)
2
OTHER
PREMIUM
PREMIUM
OTHER
Z2 20 BK/LG
Z2 20 BK/LG
Z2 20 BK/LG
Z2 20 BK/LG
S321
Z2 20 BK/LG
3 C11
JUNCTION BLOCK (8W-12-2) (8W-12-3)
BODY CONTROL MODULE (8W-45-2)
20 JB
4 C3
Z2 18 BK/LG
D
TO G201 (8W-15-9)

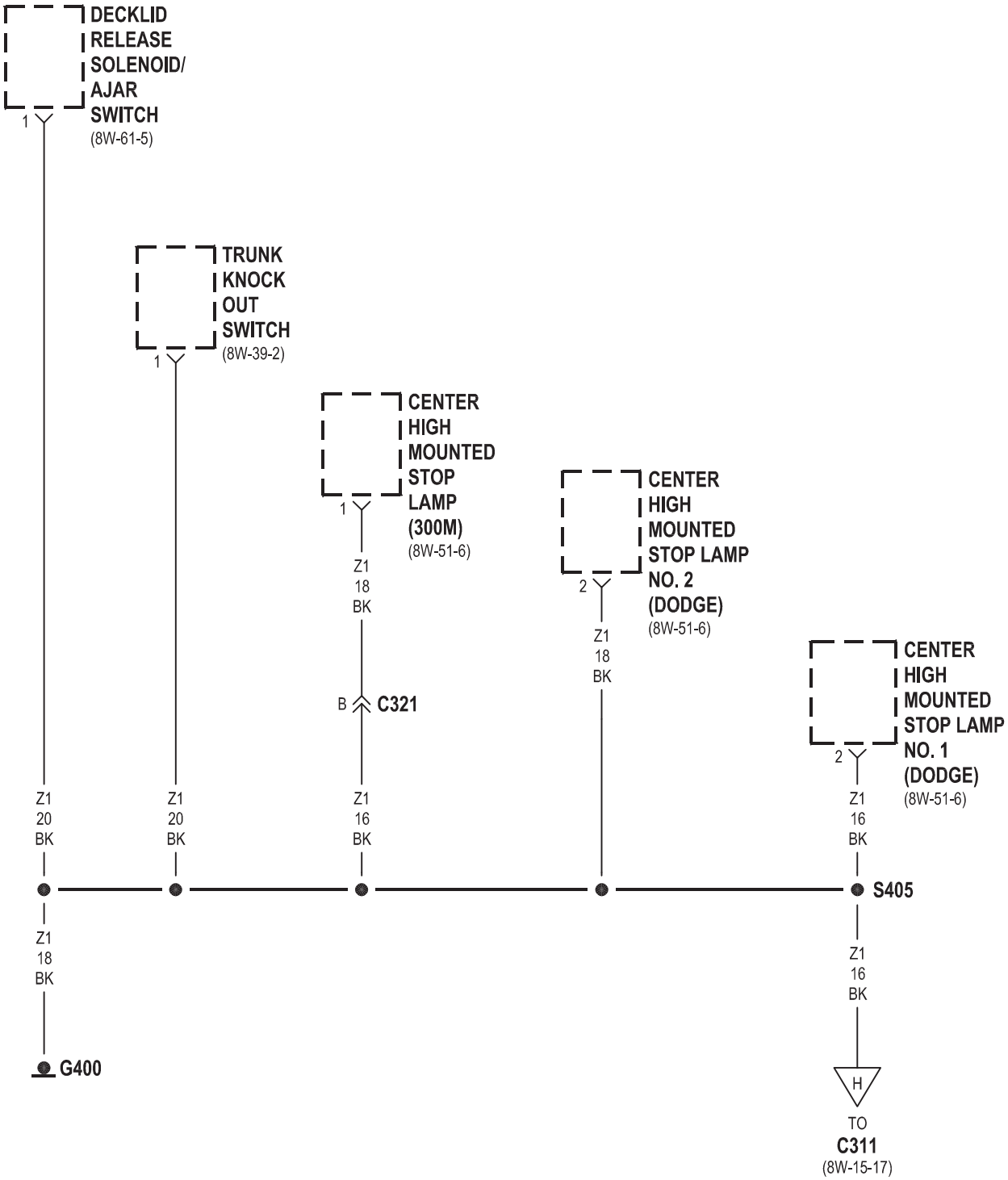

5 DATA LINK CONNECTOR (8W-30-19)
OCCUPANT RESTRAINT CONTROLLER (8W-43-2)
16
AUTOMATIC TEMPERATURE CONTROL HEAD (8W-42-4)
1
TRACTION CONTROL SWITCH (8W-40-3)
2
INSTRUMENT CLUSTER (8W-40-2) (8W-40-8)
6 C1
SEAT BELT SWITCH (8W-40-9)
2
Z2 20 BK/LG
LEFT SIDE IMPACT AIRBAG CONTROL MODULE (8W-43-3)
5
6
Z104 18 BK/LG
Z104 18 BK/LG
RIGHT SIDE IMPACT AIRBAG CONTROL MODULE (8W-43-3)
6
Z114 18 BK/LG
S347 (BUILT-UP-EXPORT)
IGNITION SWITCH (8W-10-14)
3
Z2 18 BK/LG
10 C200
SEAT BELT SWITCH (EXCEPT BUILT-UP-EXPORT) (8W-40-9)
2
SENTRY KEY IMMOBILIZER MODULE (8W-39-6)
5
ANALOG CLOCK (300M/LHS) (8W-40-9)
2
10 C200
FROM JUNCTION BLOCK (8W-15-8)
D
BRAKE LAMP SWITCH (8W-33-3)
2
RADIO (8W-47-2)
Z2 18 BK/LG
G201
Z2 20 BK/LG
Z2 18 BK/LG
Z2 20 BK/LG
Z2 22 BK/LG
Z2 22 BK/LG
Z2 20 BK/LG
Z2 20 BK/LG
Z2 20 BK/LG
Z2 20 BK/LG
Z2 18 BK/LG


SUNROOF LIMIT SWITCH (8W-64-2)
1
Z1 20 BK
SUNROOF CONTROL MODULE (8W-64-2)
5
Z1 16 BK
S412
LEFT REAR READING LAMP SWITCH (8W-44-5)
A
Z1 20 BK
S325
RIGHT REAR READING LAMP SWITCH (8W-44-5)
A
Z1 20 BK
S327
OVERHEAD MAP/ COURTESY LAMP (8W-44-2)
C
Z1 20 BK
OTHER
BASE
Z1 20 BK
Z1 20 BK
SUNROOF SWITCH (8W-64-2)
3
Z1 20 BK
RIGHT VISOR/ VANITY LAMP (8W-44-2)
B
Z1 20 BK
LEFT VISOR/ VANITY LAMP (8W-44-2)
B
Z1 20 BK
Z1 16 BK
7
5
C204
Z1 16 BK
S320
Z1 16 BK
1
C11
JUNCTION BLOCK (8W-12-2) (8W-12-3)
HIGH BEAM HEADLAMP RELAY (8W-50-8)
56
DOOR LOCK RELAY (8W-61-3)
84
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT) (8W-50-15)
1
DOOR UNLOCK RELAY (8W-61-3)
79
DRIVER DOOR UNLOCK RELAY (8W-61-3)
89
10
C7
Z1 14 BK
E
TO
G300
(8W-15-11)

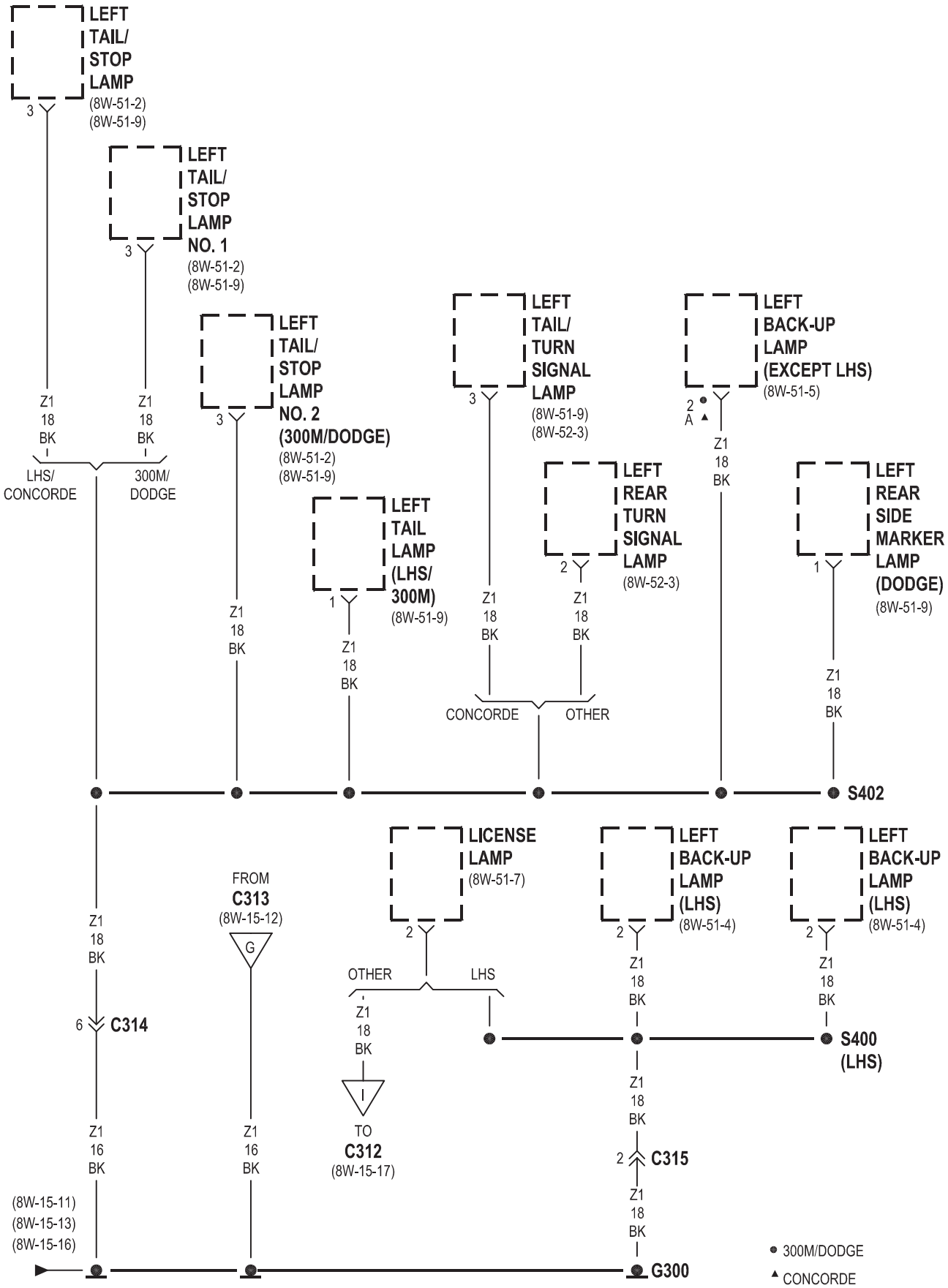

DRIVER POWER DOOR LOCK SWITCH (8W-61-2)
POWER MIRROR SWITCH (8W-62-2) (8W-62-3)
DRIVER POWER WINDOW SWITCH (8W-60-2)
DRIVER POWER MIRROR (MEMORY) (8W-62-6)
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
S312
PASSENGER HEATED SEAT BACK (8W-63-8)
PASSENGER HEATED SEAT SWITCH (8W-63-5)
PASSENGER POWER SEAT SWITCH (8W-63-3)
S328
PASSENGER POWER SEAT SWITCH (8W-63-3)
LEFT REAR DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
MEMORY/ HEATED SEAT
OTHER
C306
DRIVER POWER SEAT SWITCH (8W-63-2)
AUTOSTICK SWITCH (DODGE/300M) (8W-31-8)
FROM S341 (8W-15-8)
C300
C304
FROM JUNCTION BLOCK (8W-15-10)
C307
(8W-15-13)
(8W-15-15)
(8W-15-16)
G300

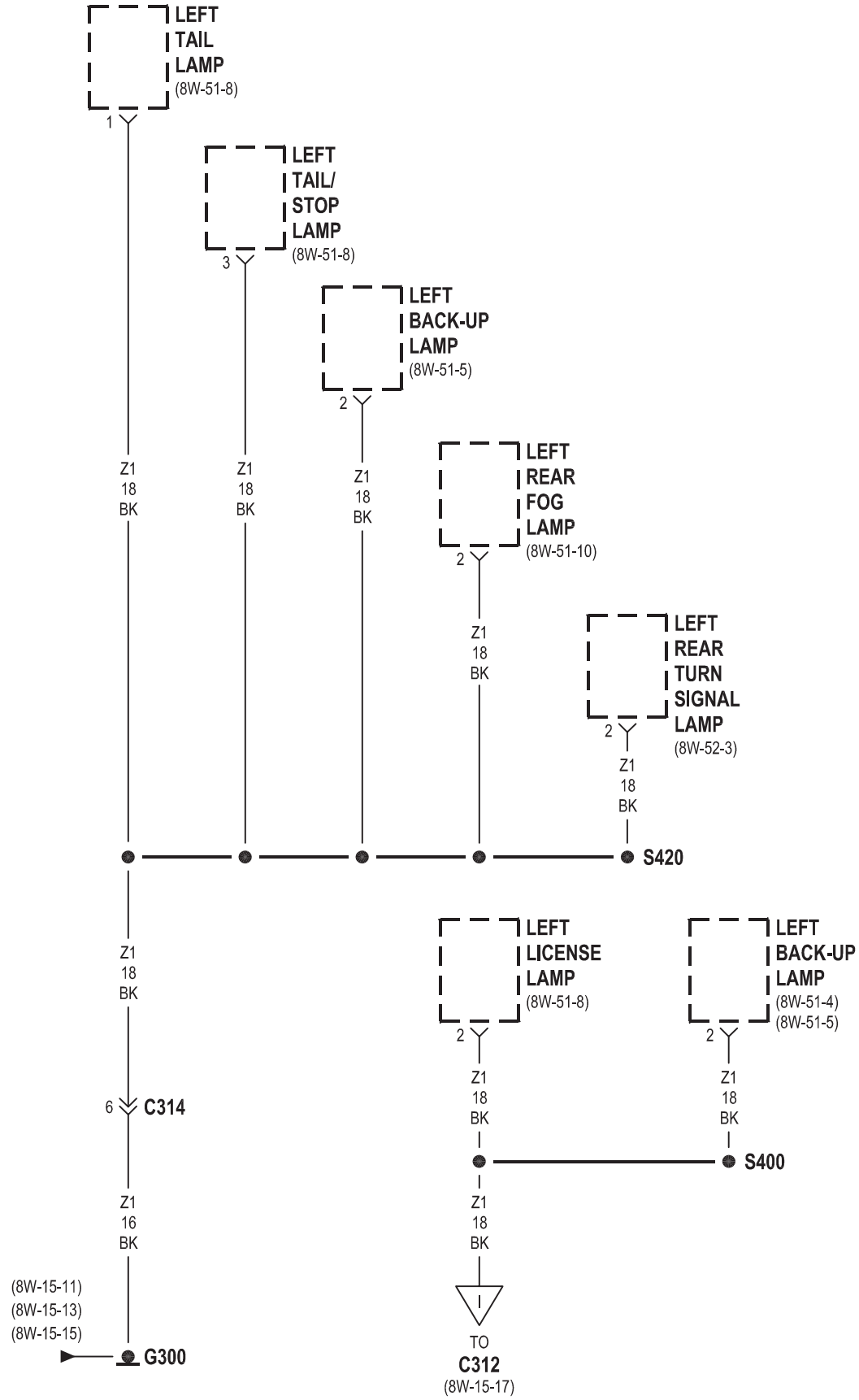

RIGHT TAIL/ STOP LAMP (8W-51-7)
3
RIGHT TAIL/ STOP LAMP NO. 1 (8W-51-2) (8W-51-7)
3
RIGHT TAIL/ STOP LAMP NO. 2 (300M/DODGE) (8W-51-2) (8W-51-7)
3
RIGHT TAIL/ TURN SIGNAL LAMP (8W-51-7) (8W-52-3)
3
RIGHT BACK-UP LAMP (8W-51-5)
2 ● ▲ A
RIGHT REAR TURN SIGNAL LAMP (8W-52-3)
2
RIGHT REAR SIDE MARKER LAMP (DODGE) (8W-51-7)
1
RIGHT TAIL LAMP (LHS/ 300M) (8W-51-7)
1
Z1 18 BK
LHS/ CONCORDE
300M/ DODGE
CONCORDE
OTHER
S409
Z1 18 BK
6 C313
Z1 16 BK
G
TO G300 (8W-15-15)
● 300M/DODGE
▲ CONCORDE

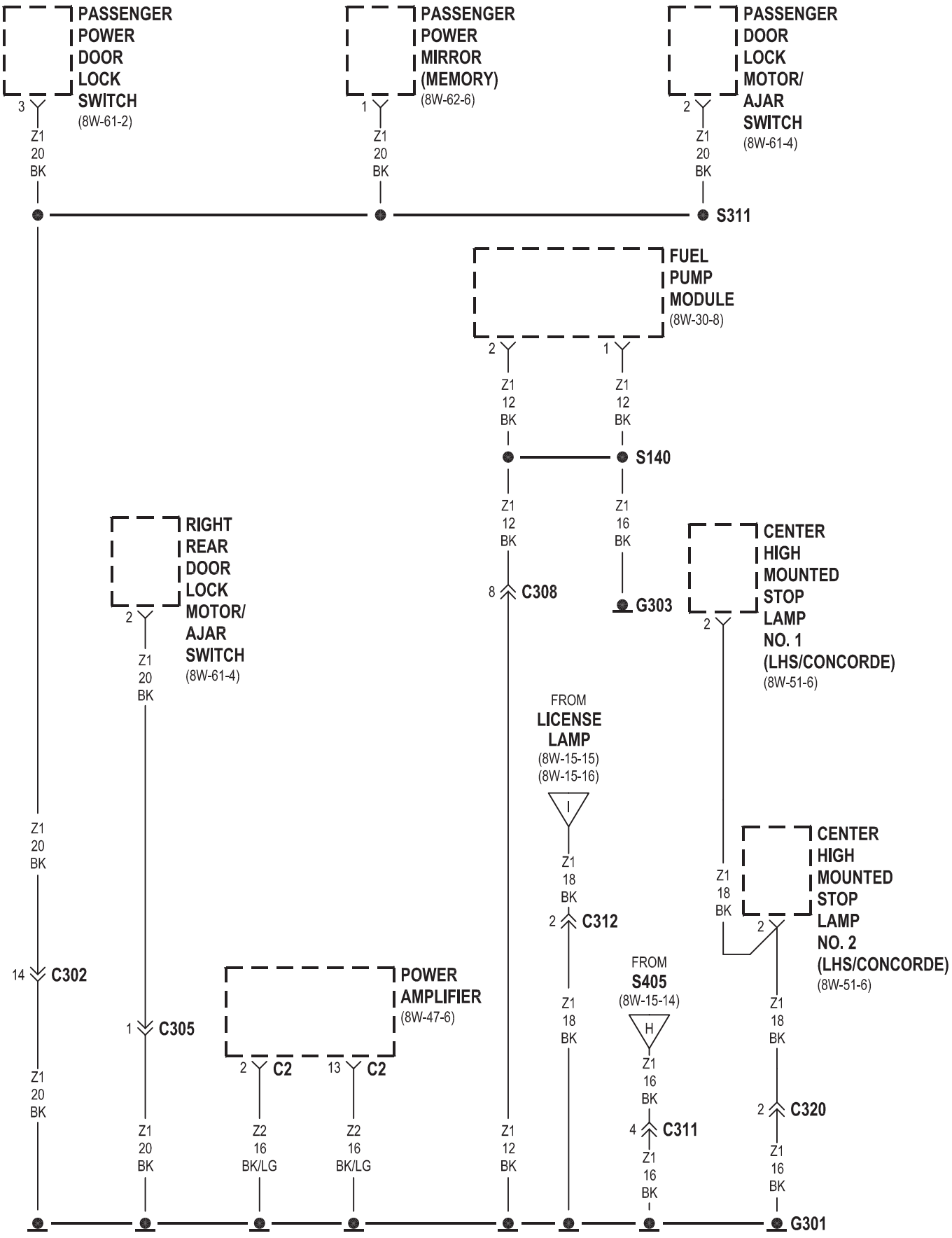

RIGHT TAIL LAMP
(8W-51-8)
1
RIGHT TAIL/ STOP LAMP
(8W-51-8)
3
RIGHT REAR FOG LAMP
(8W-51-10)
2
RIGHT REAR TURN SIGNAL LAMP
(8W-52-3)
2
RIGHT BACK-UP LAMP
(8W-51-5)
2
Z1
18
BK
S410
6
C313
Z1
16
BK
(8W-15-11)
(8W-15-15)
(8W-15-16)
G300


DECKLID RELEASE SOLENOID/ AJAR SWITCH
(8W-61-5)
1
TRUNK KNOCK OUT SWITCH
(8W-39-2)
1
CENTER HIGH MOUNTED STOP LAMP (300M)
(8W-51-6)
1
Z1 18 BK
B C321
CENTER HIGH MOUNTED STOP LAMP NO. 2 (DODGE)
(8W-51-6)
2
Z1 18 BK
CENTER HIGH MOUNTED STOP LAMP NO. 1 (DODGE)
(8W-51-6)
2
Z1 16 BK
Z1 20 BK
Z1 20 BK
Z1 16 BK
S405
Z1 18 BK
G400
Z1 16 BK
H
TO C311
(8W-15-17)

EXCEPT BUILT-UP-EXPORT

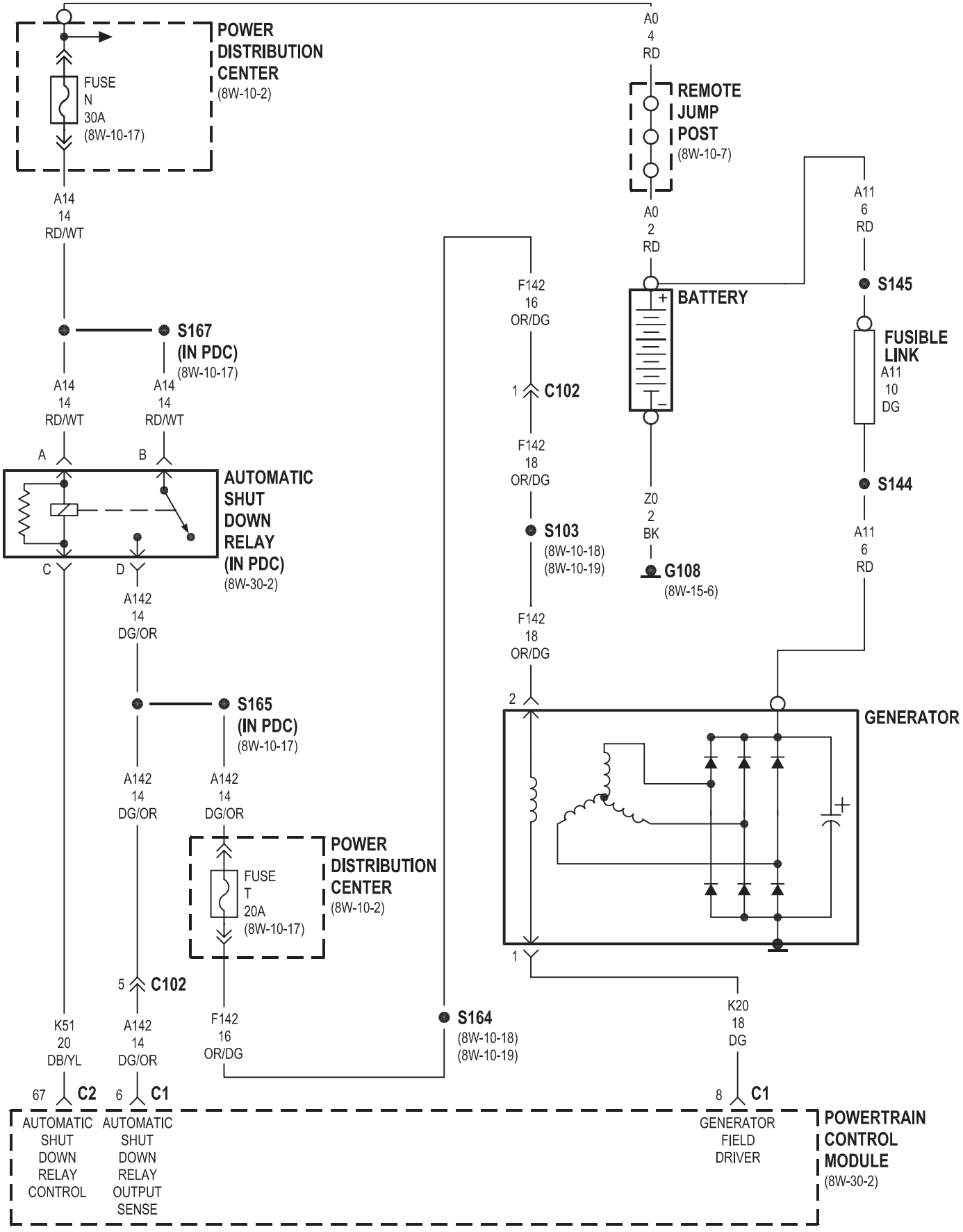



LEFT TAIL LAMP
(8W-51-8)
1
LEFT TAIL/ STOP LAMP
(8W-51-8)
3
LEFT BACK-UP LAMP
(8W-51-5)
2
LEFT REAR FOG LAMP
(8W-51-10)
2
LEFT REAR TURN SIGNAL LAMP
(8W-52-3)
2
Z1
18
BK
S420
LEFT LICENSE LAMP
(8W-51-8)
2
LEFT BACK-UP LAMP
(8W-51-4)
(8W-51-5)
2
S400
6
C314
Z1
16
BK
(8W-15-11)
(8W-15-13)
(8W-15-15)
G300
TO
C312
(8W-15-17)


PASSENGER POWER DOOR LOCK SWITCH
(8W-61-2)
PASSENGER POWER MIRROR (MEMORY)
(8W-62-6)
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
3
1
2
Z1 20 BK
S311
FUEL PUMP MODULE
(8W-30-8)
2
1
Z1 12 BK
S140
Z1 16 BK
G303
8
C308
RIGHT REAR DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
CENTER HIGH MOUNTED STOP LAMP NO. 1 (LHS/CONCORDE)
(8W-51-6)
FROM LICENSE LAMP
(8W-15-15)
(8W-15-16)
I
Z1 18 BK
2
C312
CENTER HIGH MOUNTED STOP LAMP NO. 2 (LHS/CONCORDE)
(8W-51-6)
Z1 20 BK
14
C302
1
C305
POWER AMPLIFIER
(8W-47-6)
2
C2
13
C2
Z2 16 BK/LG
FROM S405
(8W-15-14)
H
Z1 16 BK
4
C311
2
C320
G301

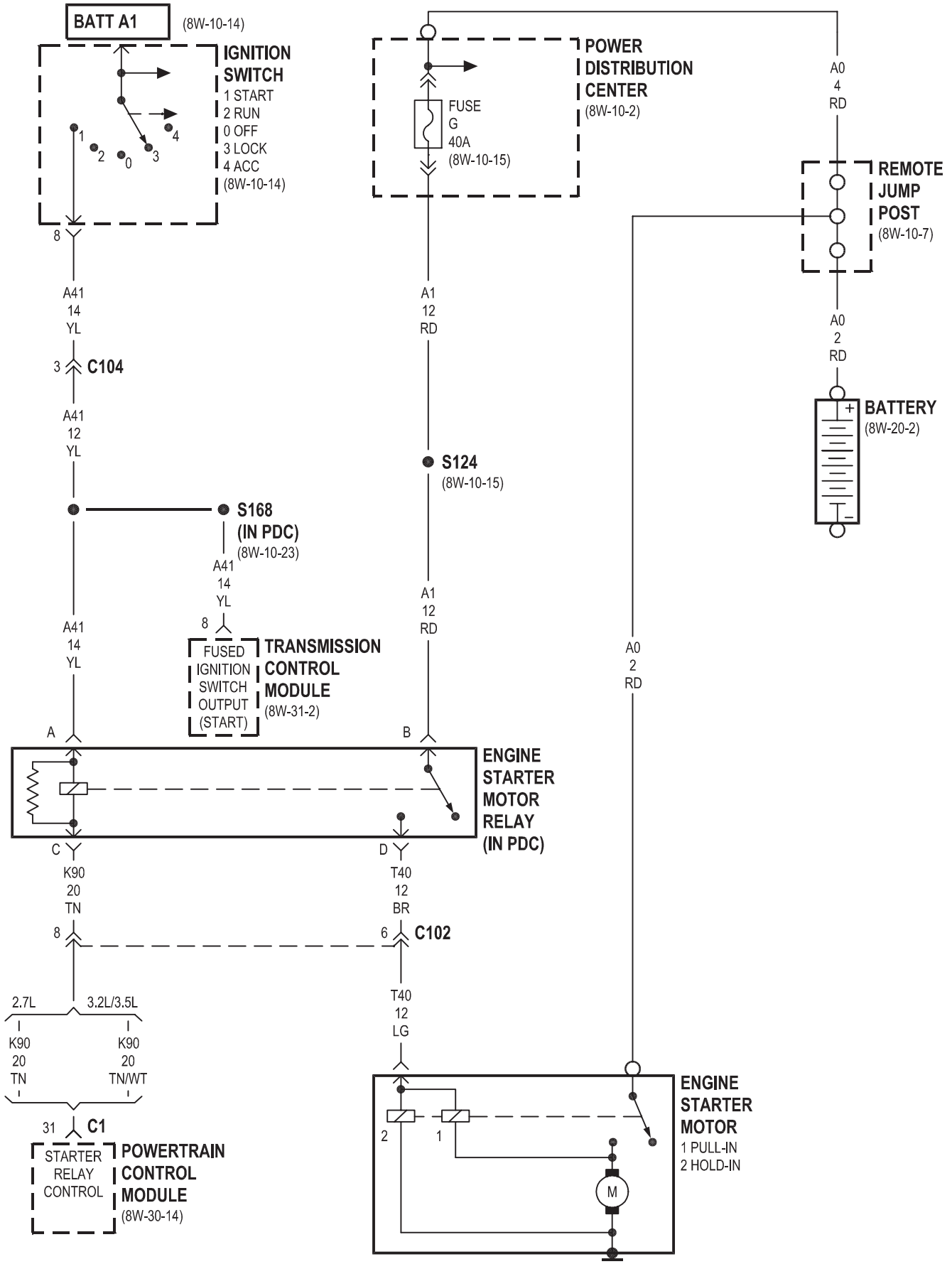
8W-20 CHARGING SYSTEM

Component	Page	Component	Page
Automatic Shut Down Relay	8W-20-2	G108	8W-20-2
Battery	8W-20-2	Generator	8W-20-2
Fuse N (PDC)	8W-20-2	Power Distribution Center	8W-20-2
Fuse T (PDC)	8W-20-2	Powertrain Control Module	8W-20-2
Fusible Link	8W-20-2	Remote Jump Post	8W-20-2


POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE N 30A
(8W-10-17)
A14 14 RD/WT
S167 (IN PDC)
(8W-10-17)
A14 14 RD/WT
A14 14 RD/WT
A
B
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
C
D
A142 14 DG/OR
S165 (IN PDC)
(8W-10-17)
A142 14 DG/OR
A142 14 DG/OR
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE T 20A
(8W-10-17)
5 C102
K51 20 DB/YL
A142 14 DG/OR
F142 16 OR/DG
67 C2
6 C1
AUTOMATIC SHUT DOWN RELAY CONTROL
AUTOMATIC SHUT DOWN RELAY OUTPUT SENSE
S164
(8W-10-18)
(8W-10-19)
F142 16 OR/DG
1 C102
F142 18 OR/DG
S103
(8W-10-18)
(8W-10-19)
F142 18 OR/DG
2
1
K20 18 DG
8 C1
GENERATOR FIELD DRIVER
POWERTRAIN CONTROL MODULE
(8W-30-2)
A0 4 RD
REMOTE JUMP POST
(8W-10-7)
A0 2 RD
BATTERY
Z0 2 BK
G108
(8W-15-6)
A11 6 RD
S145
FUSIBLE LINK A11 10 DG
S144
A11 6 RD
GENERATOR

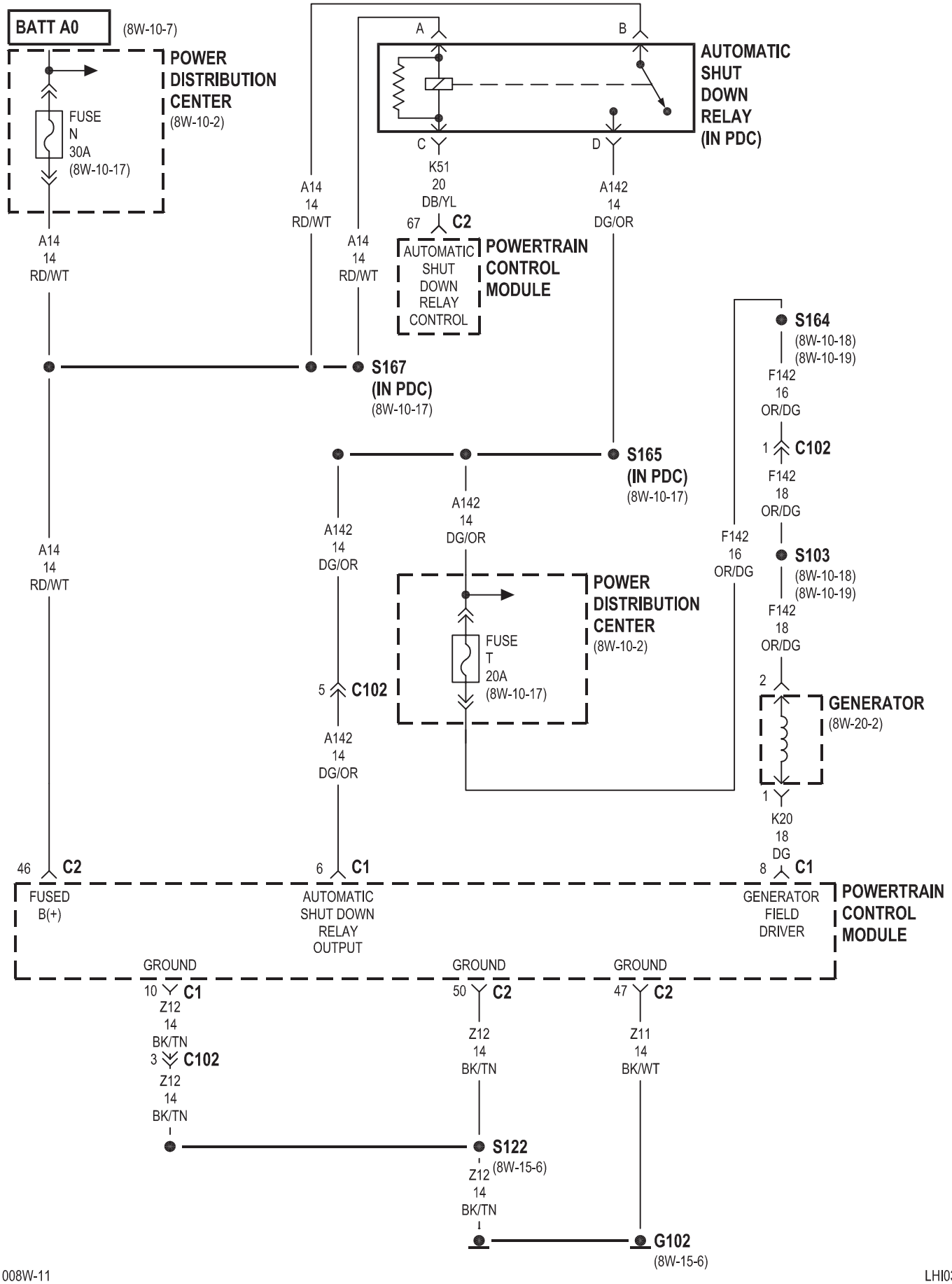
8W-21 STARTING SYSTEM

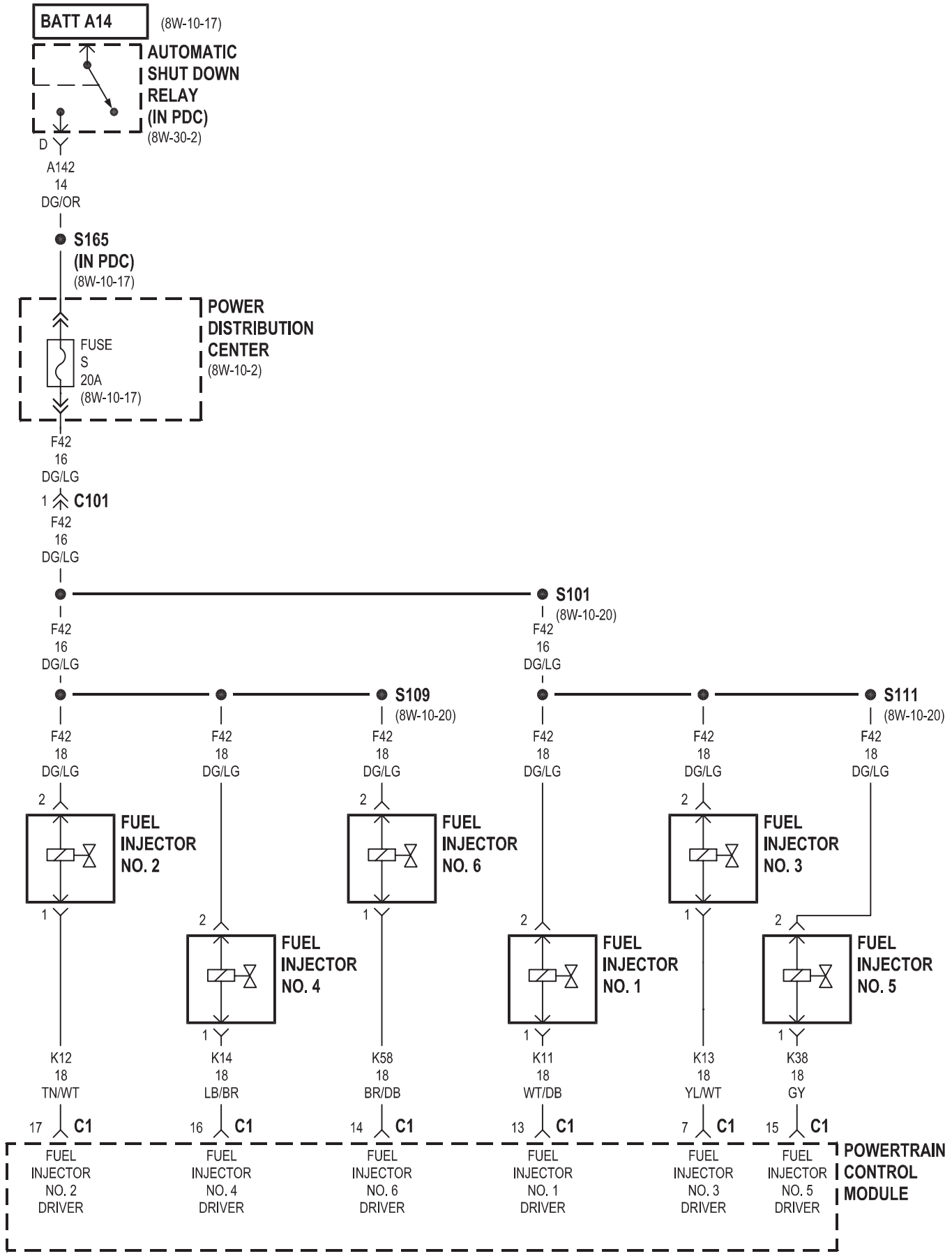
Component	Page	Component	Page
Battery	8W-21-2	Power Distribution Center	8W-21-2
Engine Starter Motor	8W-21-2	Powertrain Control Module	8W-21-2
Engine Starter Motor Relay	8W-21-2	Remote Jump Post	8W-21-2
Fuse G (PDC)	8W-21-2	Transmission Control Module	8W-21-2
Ignition Switch	8W-21-2		

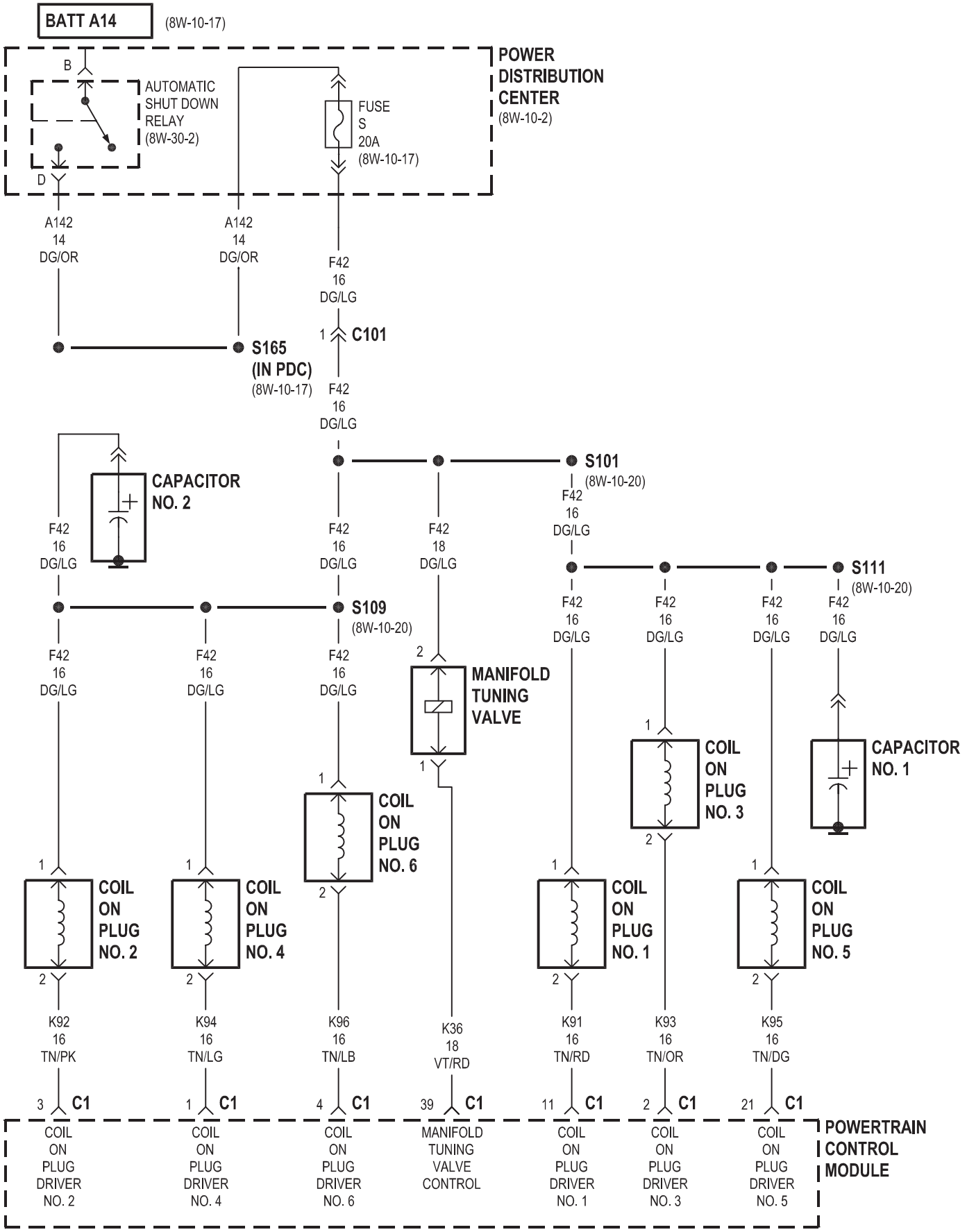

BATT A1
(8W-10-14)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-14)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
G
40A
(8W-10-15)
A0
4
RD
REMOTE JUMP POST
(8W-10-7)
A0
2
RD
BATTERY
(8W-20-2)
A41
14
YL
C104
A41
12
YL
A1
12
RD
S124
(8W-10-15)
S168
(IN PDC)
(8W-10-23)
A41
14
YL
FUSED IGNITION SWITCH OUTPUT (START)
TRANSMISSION CONTROL MODULE
(8W-31-2)
A41
14
YL
A1
12
RD
A0
2
RD
ENGINE STARTER MOTOR RELAY
(IN PDC)
K90
20
TN
T40
12
BR
C102
2.7L
3.2L/3.5L
K90
20
TN
K90
20
TN/WT
T40
12
LG
C1
STARTER RELAY CONTROL
POWERTRAIN CONTROL MODULE
(8W-30-14)
ENGINE STARTER MOTOR
1 PULL-IN
2 HOLD-IN
M

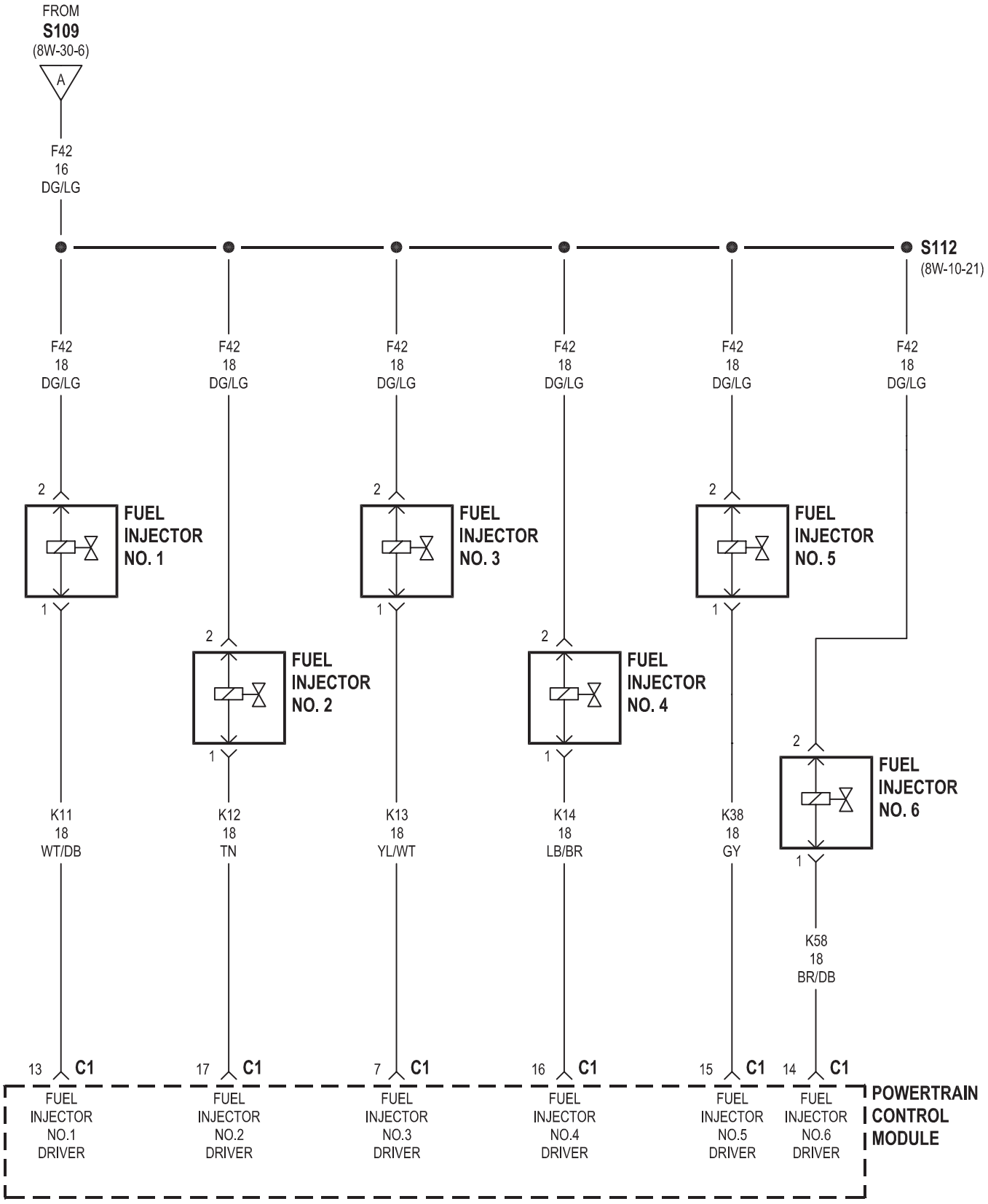
8W-30 FUEL/IGNITION SYSTEM

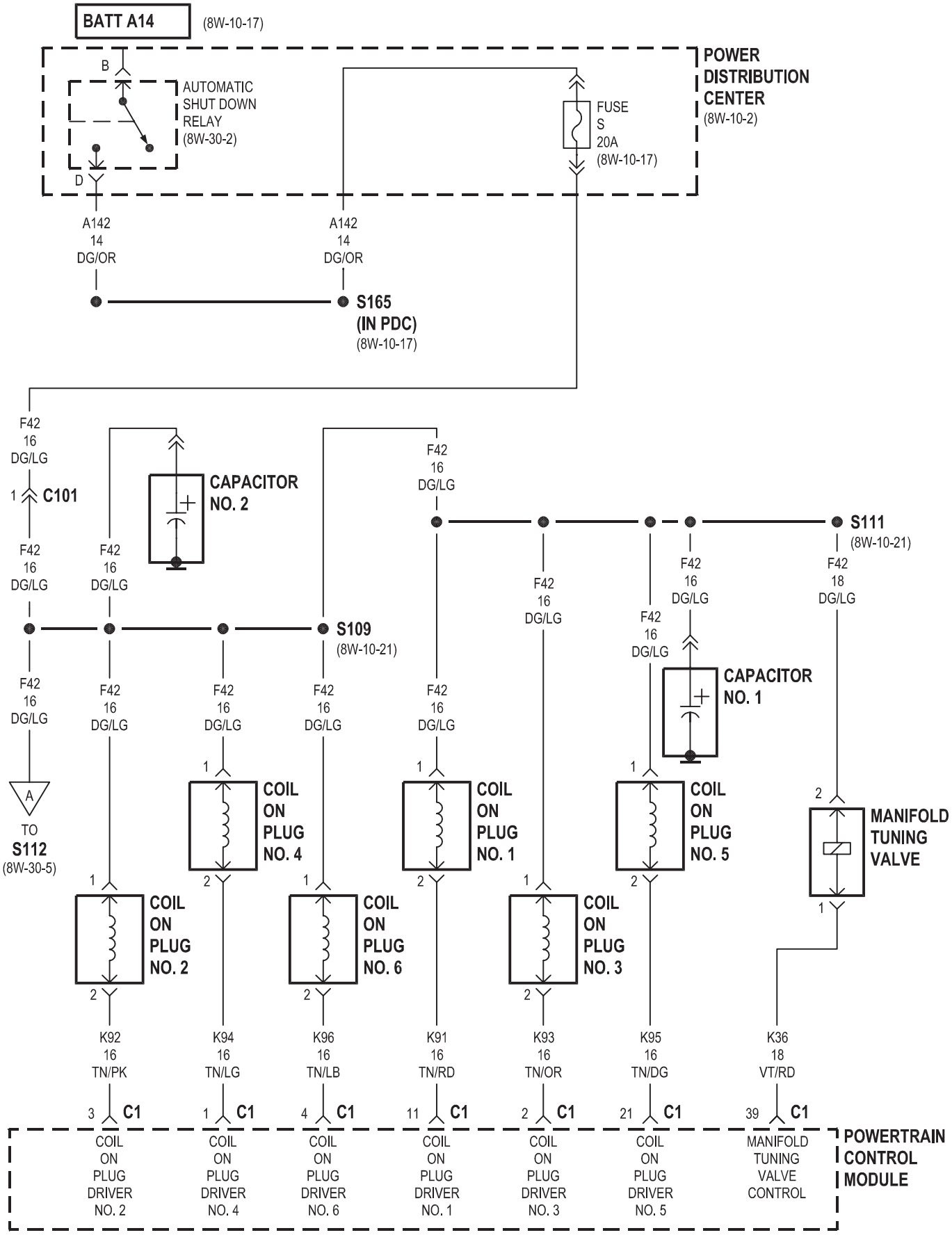
Component	Page
A/C Compressor Clutch Relay	8W-30-16
A/C Pressure Transducer	8W-30-12, 13
Automatic Shut Down Relay	8W-30-2, 3, 4, 6, 10, 11
Body Control Module	8W-30-8, 19
Brake Lamp Switch	8W-30-14, 15
Camshaft Position Sensor	8W-30-7, 12, 20
Capacitor No. 1	8W-30-4, 6
Capacitor No. 2	8W-30-4, 6
Clockspring No. 1	8W-30-9, 14
Coil On Plug No. 1	8W-30-4, 6
Coil On Plug No. 2	8W-30-4, 6
Coil On Plug No. 3	8W-30-4, 6
Coil On Plug No. 4	8W-30-4, 6
Coil On Plug No. 5	8W-30-4, 6
Coil On Plug No. 6	8W-30-4, 6
Crankshaft Position Sensor	8W-30-7, 20
Data Link Connector	8W-30-19
EGR Solenoid	8W-30-18
Engine Coolant Temperature Sensor	8W-30-9
Engine Starter Motor Relay	8W-30-14
Evap/Purge Solenoid	8W-30-12, 20
Fuel Injector No. 1	8W-30-3, 5
Fuel Injector No. 2	8W-30-3, 5
Fuel Injector No. 3	8W-30-3, 5
Fuel Injector No. 4	8W-30-3, 5
Fuel Injector No. 5	8W-30-3, 5
Fuel Injector No. 6	8W-30-3, 5
Fuel Pump Module	8W-30-8
Fuel Pump Relay	8W-30-8
Fuse 1 (JB)	8W-30-19
Fuse 13 (JB)	8W-30-8
Fuse 14 (JB)	8W-30-15
Fuse 19 (JB)	8W-30-19
Fuse 21 (JB)	8W-30-16
Fuse G (PDC)	8W-30-8
Fuse N (PDC)	8W-30-2
Fuse S (PDC)	8W-30-3, 4, 6
Fuse T (PDC)	8W-30-2, 10, 11, 18
G102	8W-30-2
G103	8W-30-10, 11
G104	8W-30-10, 11
G200	8W-30-19
G201	8W-30-19
G301	8W-30-8
G303	8W-30-8
Generator	8W-30-2
High Speed Radiator Fan Relay	8W-30-16
Idle Air Control Motor	8W-30-17
Instrument Cluster	8W-30-15
Intake Air Temperature Sensor	8W-30-12
Intake Air Temperature/Manifold Absolute Pressure Sensor	8W-30-13
Junction Block	8W-30-8, 15, 16, 19
Knock Sensor	8W-30-7, 9, 12
Leak Detection Pump	8W-30-16
Low Speed Radiator Fan Relay	8W-30-16
Manifold Absolute Pressure Sensor	8W-30-12
Manifold Tuning Valve	8W-30-6
Oxygen Sensor 1/1 Right Bank Up	8W-30-10
Oxygen Sensor 1/2 Right Bank Down	8W-30-11
Oxygen Sensor 2/1 Left Bank Up	8W-30-10
Oxygen Sensor 2/2 Left Bank Down	8W-30-11
Power Distribution Center	8W-30-2, 3, 4, 6, 8, 10, 11, 14, 18
Power Steering Pressure Switch	8W-30-9
Powertrain Control Module	8W-30-2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
Shift Interlock Solenoid	8W-30-15
Short Runner Valve Solenoid	8W-30-18
Throttle Position Sensor	8W-30-9
Transmission Control Module	8W-30-14, 19
Transmission Range Sensor	8W-30-14
Vehicle Speed Control Servo	8W-30-14
Vehicle Speed Control/Horn Switch	8W-30-14

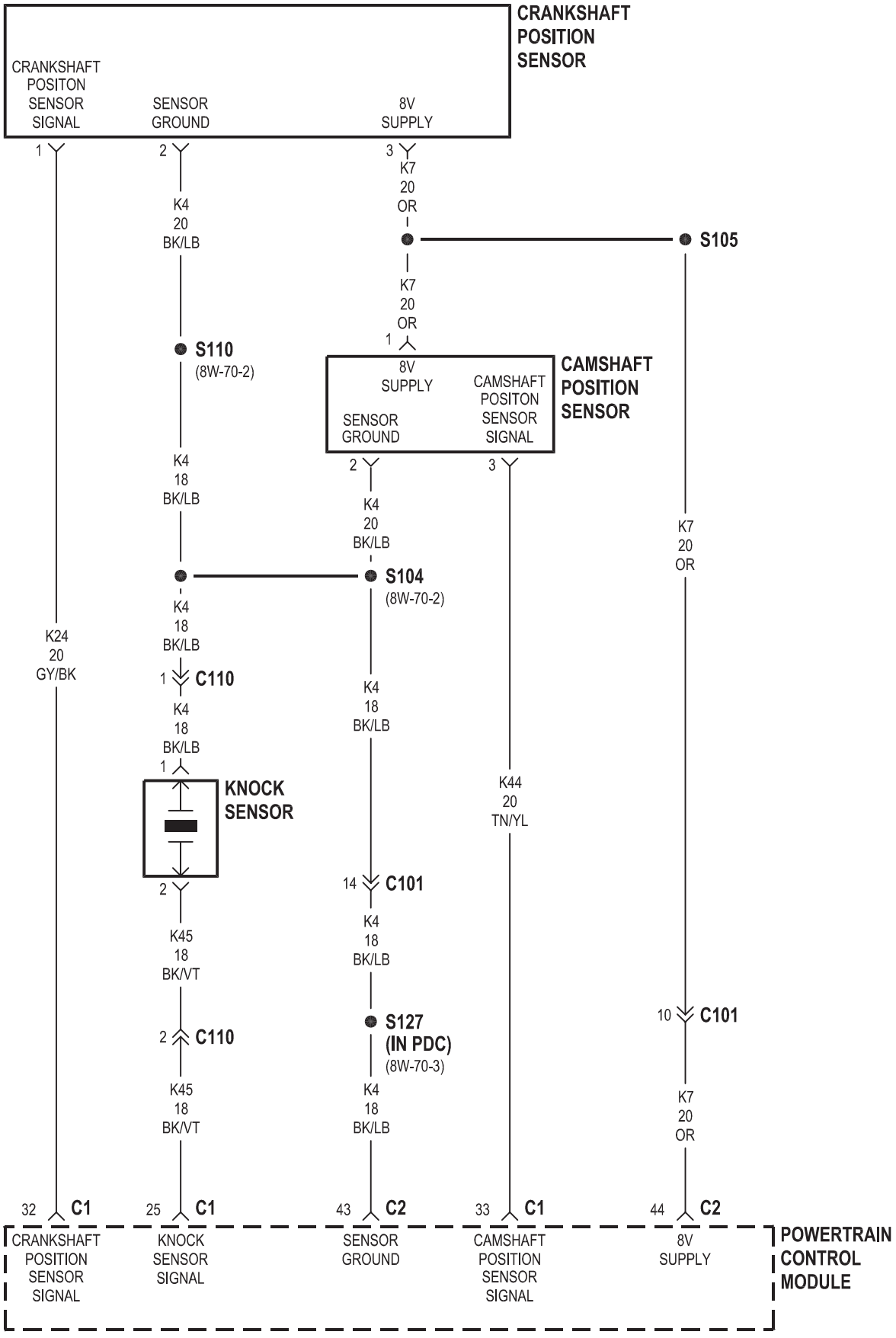

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE N 30A
(8W-10-17)
A14 14 RD/WT
A14 14 RD/WT
A14 14 RD/WT
A
B
C
D
AUTOMATIC SHUT DOWN RELAY (IN PDC)
K51 20 DB/YL
67 C2
A142 14 DG/OR
AUTOMATIC SHUT DOWN RELAY CONTROL
POWERTRAIN CONTROL MODULE
S167 (IN PDC)
(8W-10-17)
S165 (IN PDC)
(8W-10-17)
S164
(8W-10-18)
(8W-10-19)
F142 16 OR/DG
1 C102
F142 18 OR/DG
S103
(8W-10-18)
(8W-10-19)
F142 18 OR/DG
2
GENERATOR
(8W-20-2)
1
K20 18 DG
A142 14 DG/OR
A142 14 DG/OR
A142 14 DG/OR
F142 16 OR/DG
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE T 20A
(8W-10-17)
5 C102
46 C2
FUSED B(+)
6 C1
AUTOMATIC SHUT DOWN RELAY OUTPUT
8 C1
GENERATOR FIELD DRIVER
POWERTRAIN CONTROL MODULE
GROUND
GROUND
GROUND
10 C1
Z12 14 BK/TN
3 C102
Z12 14 BK/TN
50 C2
Z12 14 BK/TN
47 C2
Z11 14 BK/WT
S122
(8W-15-6)
Z12 14 BK/TN
G102
(8W-15-6)

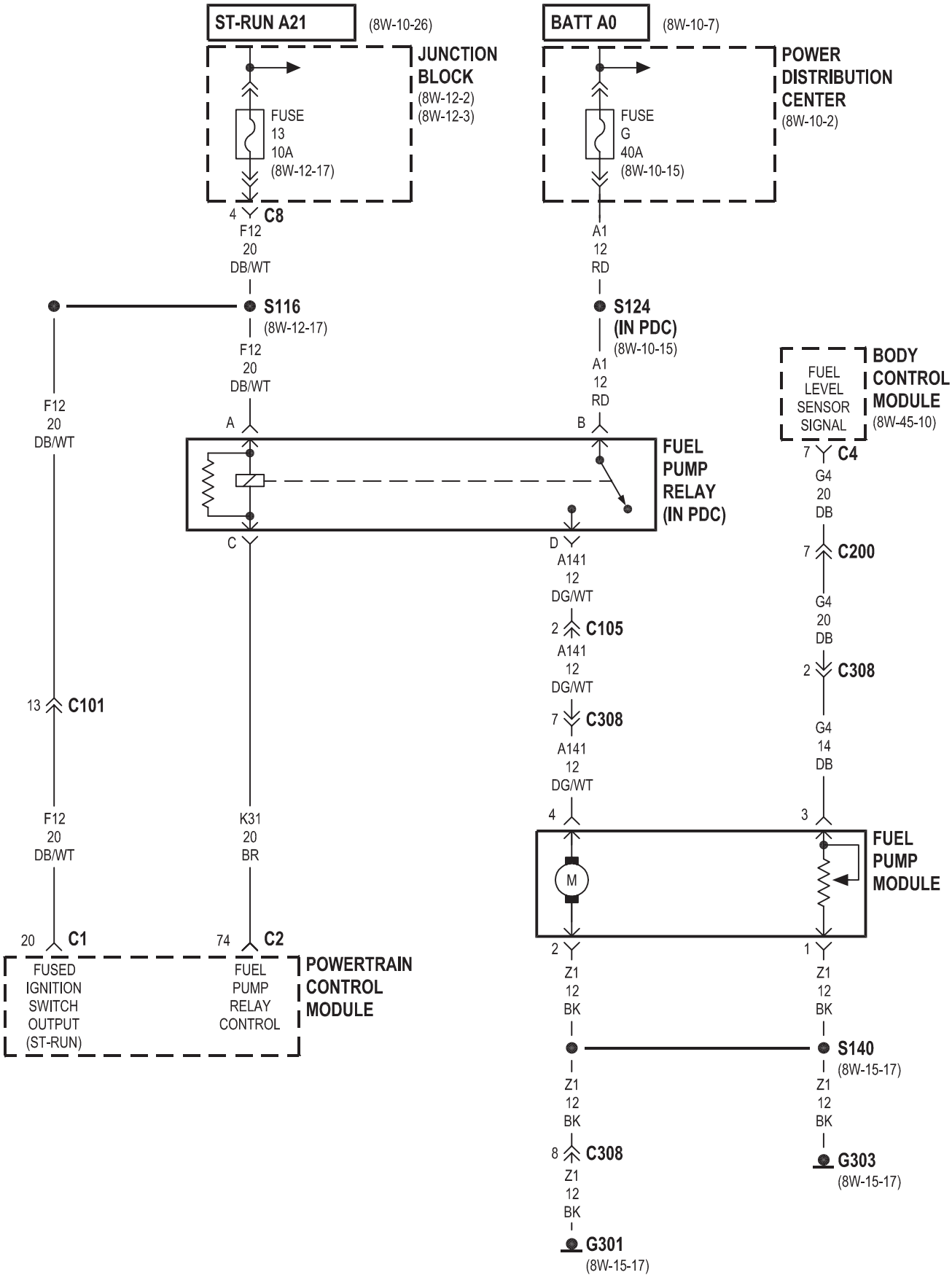

BATT A14
(8W-10-17)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
D
A142
14
DG/OR
S165
(IN PDC)
(8W-10-17)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
S
20A
(8W-10-17)
F42
16
DG/LG
1
C101
S101
(8W-10-20)
S109
(8W-10-20)
S111
(8W-10-20)
F42
18
DG/LG
2
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 4
FUEL INJECTOR NO. 6
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 5
K12
18
TN/WT
K14
18
LB/BR
K58
18
BR/DB
K11
18
WT/DB
K13
18
YL/WT
K38
18
GY
17
16
14
13
7
15
C1
FUEL INJECTOR NO. 2 DRIVER
FUEL INJECTOR NO. 4 DRIVER
FUEL INJECTOR NO. 6 DRIVER
FUEL INJECTOR NO. 1 DRIVER
FUEL INJECTOR NO. 3 DRIVER
FUEL INJECTOR NO. 5 DRIVER
POWERTRAIN CONTROL MODULE

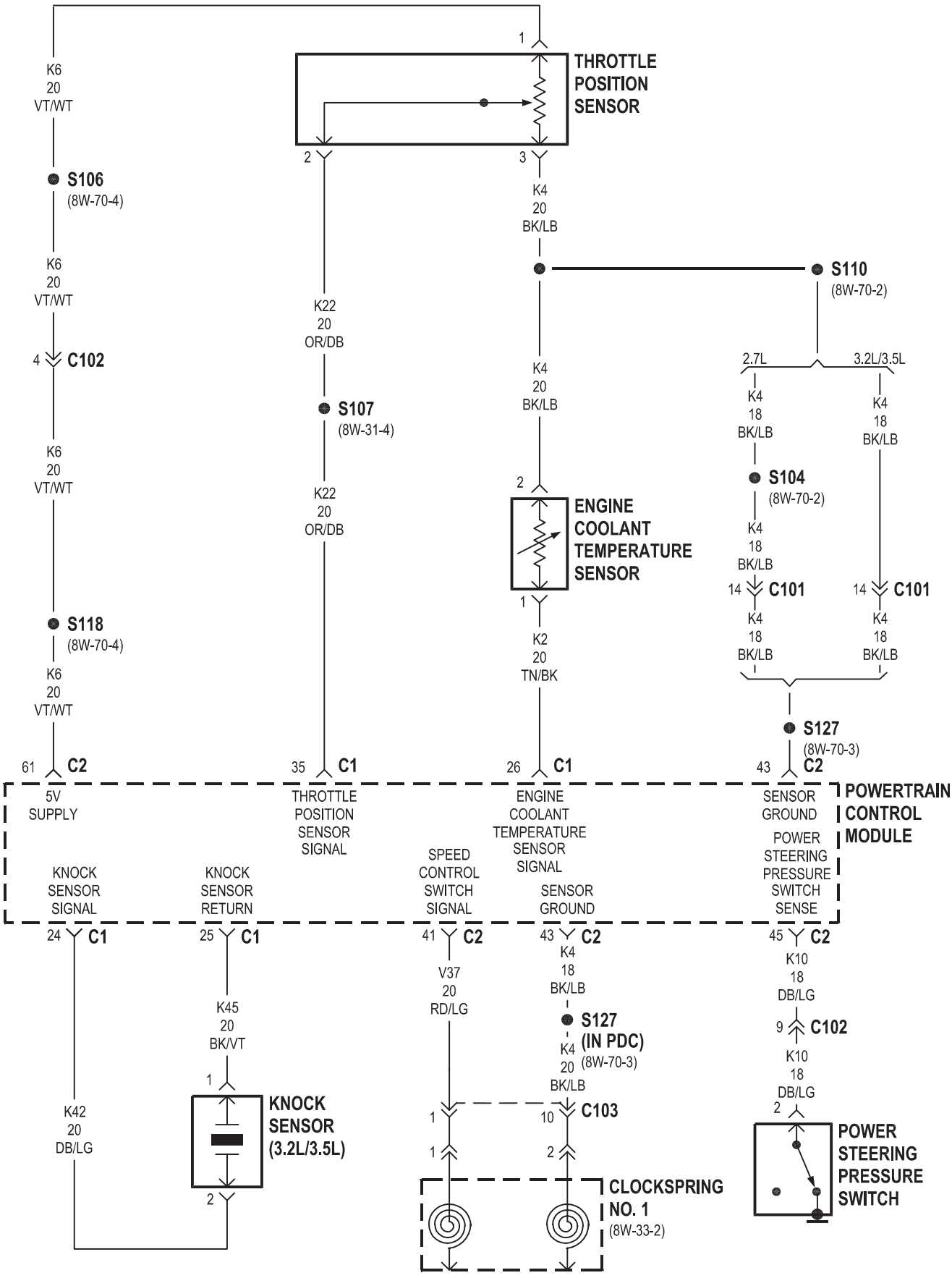

BATT A14
(8W-10-17)
B
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
D
FUSE S 20A
(8W-10-17)
POWER DISTRIBUTION CENTER
(8W-10-2)
A142 14 DG/OR
A142 14 DG/OR
F42 16 DG/LG
1 C101
S165 (IN PDC)
(8W-10-17)
F42 16 DG/LG
S101
(8W-10-20)
CAPACITOR NO. 2
F42 16 DG/LG
F42 16 DG/LG
F42 18 DG/LG
F42 16 DG/LG
S111
(8W-10-20)
S109
(8W-10-20)
F42 16 DG/LG
F42 16 DG/LG
F42 16 DG/LG
F42 16 DG/LG
F42 16 DG/LG
F42 16 DG/LG
MANIFOLD TUNING VALVE
COIL ON PLUG NO. 3
CAPACITOR NO. 1
COIL ON PLUG NO. 6
COIL ON PLUG NO. 2
COIL ON PLUG NO. 4
COIL ON PLUG NO. 1
COIL ON PLUG NO. 5
K92 16 TN/PK
K94 16 TN/LG
K96 16 TN/LB
K36 18 VT/RD
K91 16 TN/RD
K93 16 TN/OR
K95 16 TN/DG
3 C1
1 C1
4 C1
39 C1
11 C1
2 C1
21 C1
COIL ON PLUG DRIVER NO. 2
COIL ON PLUG DRIVER NO. 4
COIL ON PLUG DRIVER NO. 6
MANIFOLD TUNING VALVE CONTROL
COIL ON PLUG DRIVER NO. 1
COIL ON PLUG DRIVER NO. 3
COIL ON PLUG DRIVER NO. 5
POWERTRAIN CONTROL MODULE

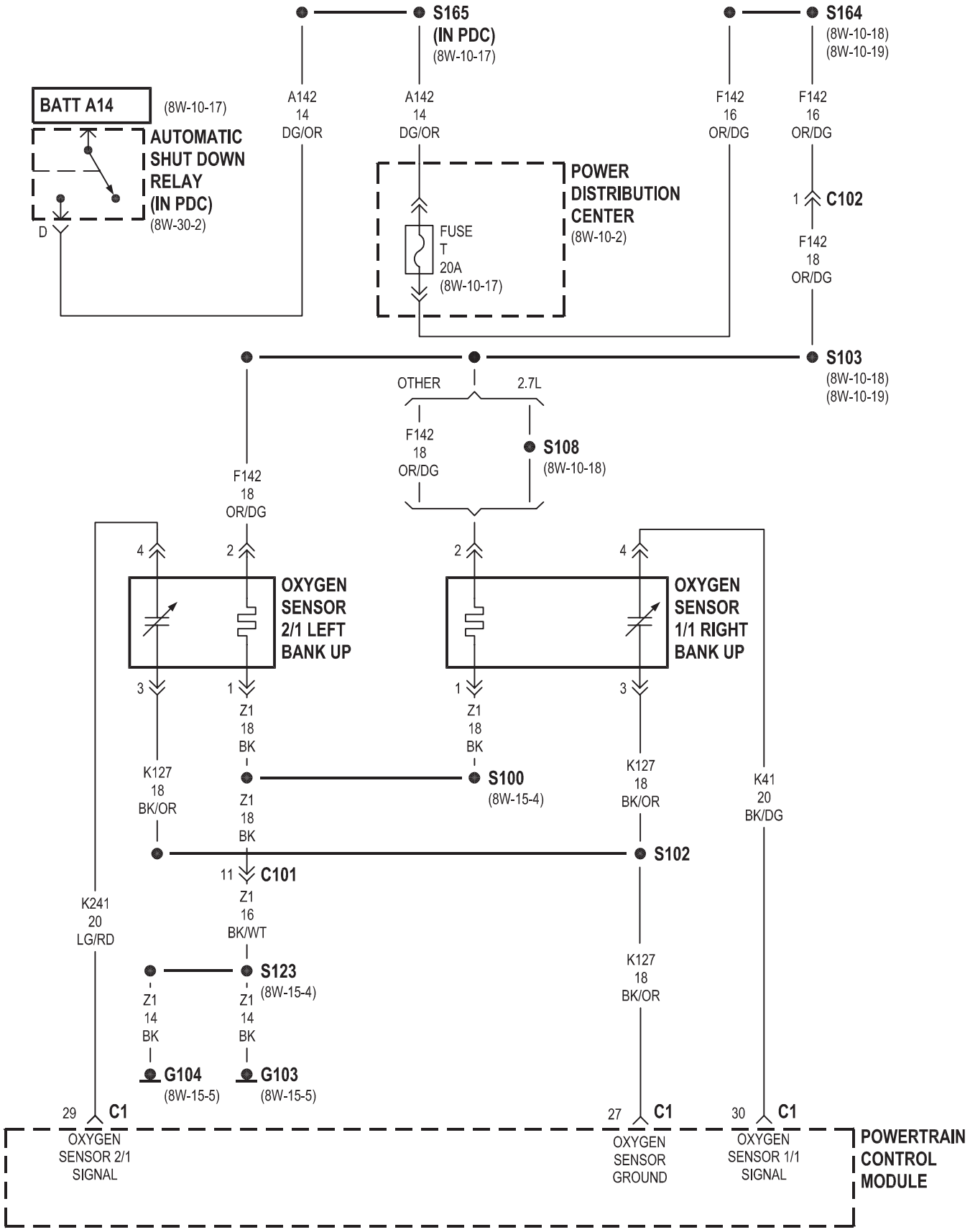

FROM
S109
(8W-30-6)
A
F42
16
DG/LG
S112
(8W-10-21)
F42
18
DG/LG
FUEL
INJECTOR
NO. 1
FUEL
INJECTOR
NO. 2
FUEL
INJECTOR
NO. 3
FUEL
INJECTOR
NO. 4
FUEL
INJECTOR
NO. 5
FUEL
INJECTOR
NO. 6
K11
18
WT/DB
K12
18
TN
K13
18
YL/WT
K14
18
LB/BR
K38
18
GY
K58
18
BR/DB
13 C1
17 C1
7 C1
16 C1
15 C1
14 C1
FUEL
INJECTOR
NO.1
DRIVER
FUEL
INJECTOR
NO.2
DRIVER
FUEL
INJECTOR
NO.3
DRIVER
FUEL
INJECTOR
NO.4
DRIVER
FUEL
INJECTOR
NO.5
DRIVER
FUEL
INJECTOR
NO.6
DRIVER
POWERTRAIN
CONTROL
MODULE

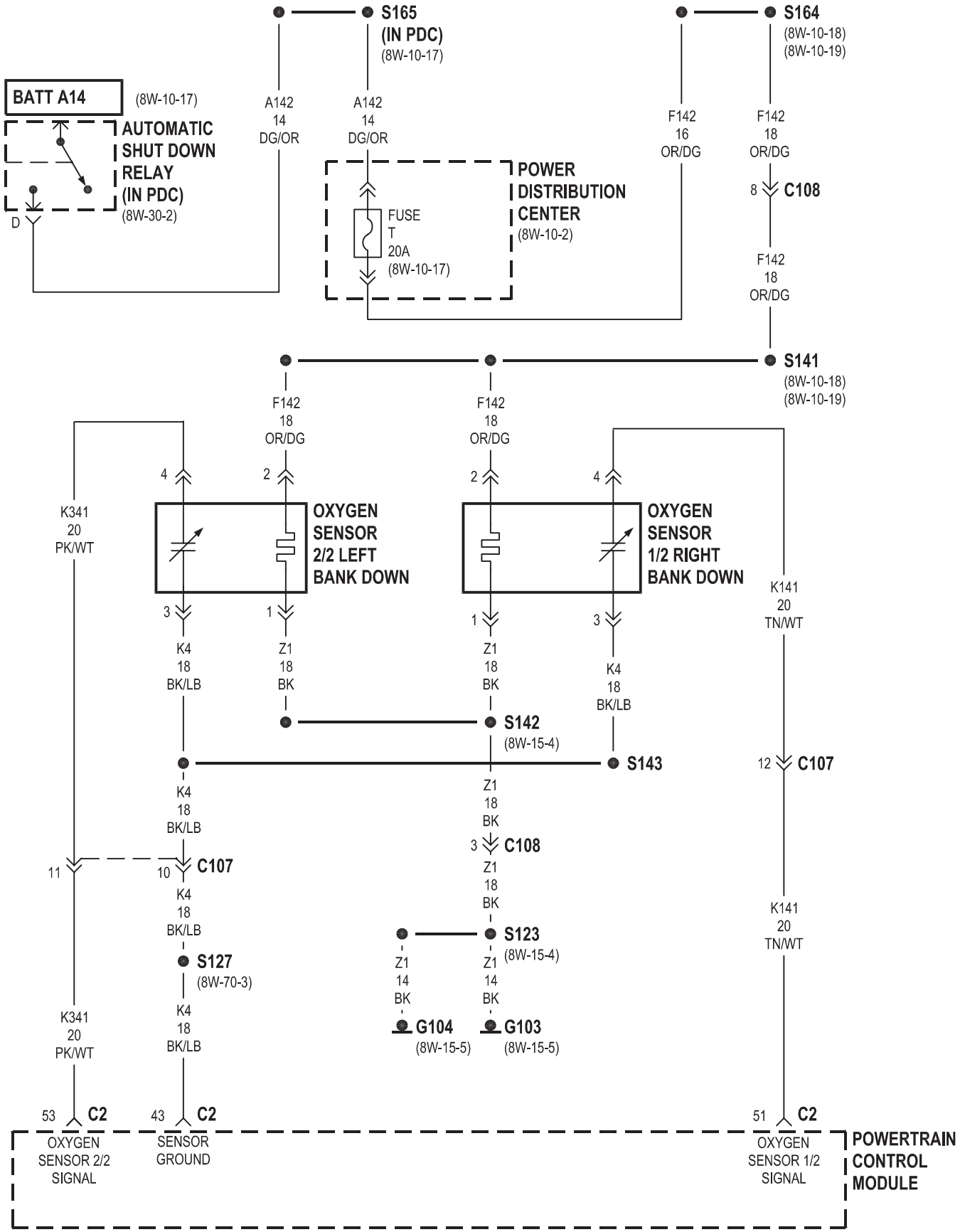

BATT A14
(8W-10-17)
B
AUTOMATIC SHUT DOWN RELAY
(8W-30-2)
D
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE S 20A
(8W-10-17)
A142 14 DG/OR
A142 14 DG/OR
S165 (IN PDC)
(8W-10-17)
F42 16 DG/LG
C101
CAPACITOR NO. 2
S109
(8W-10-21)
S111
(8W-10-21)
F42 18 DG/LG
CAPACITOR NO. 1
A
TO S112
(8W-30-5)
COIL ON PLUG NO. 4
COIL ON PLUG NO. 1
COIL ON PLUG NO. 5
MANIFOLD TUNING VALVE
COIL ON PLUG NO. 2
COIL ON PLUG NO. 6
COIL ON PLUG NO. 3
K92 16 TN/PK
K94 16 TN/LG
K96 16 TN/LB
K91 16 TN/RD
K93 16 TN/OR
K95 16 TN/DG
K36 18 VT/RD
3 C1
1 C1
4 C1
11 C1
2 C1
21 C1
39 C1
COIL ON PLUG DRIVER NO. 2
COIL ON PLUG DRIVER NO. 4
COIL ON PLUG DRIVER NO. 6
COIL ON PLUG DRIVER NO. 1
COIL ON PLUG DRIVER NO. 3
COIL ON PLUG DRIVER NO. 5
MANIFOLD TUNING VALVE CONTROL
POWERTRAIN CONTROL MODULE

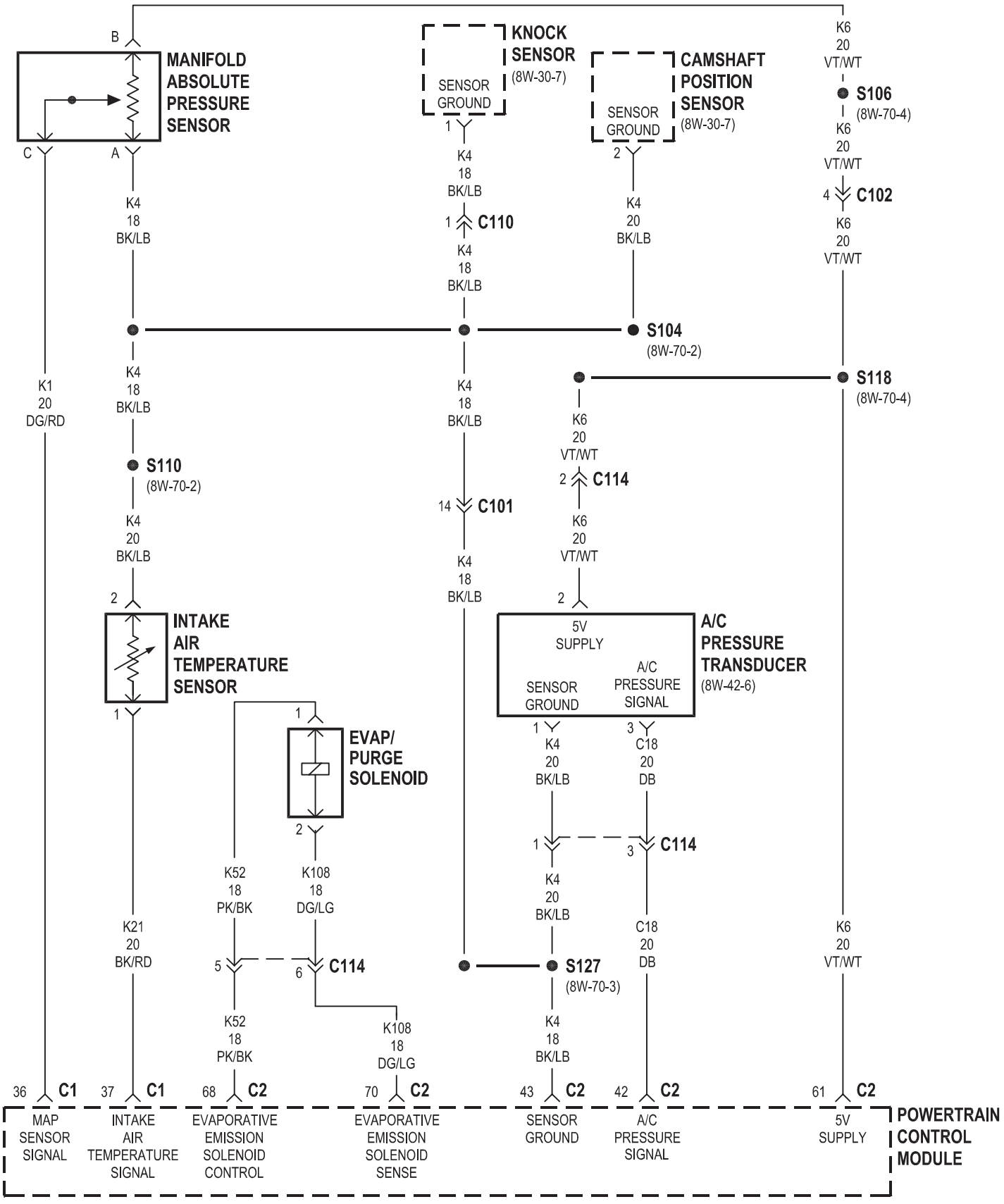

CRANKSHAFT POSITION SENSOR
CRANKSHAFT POSITON SENSOR SIGNAL
SENSOR GROUND
8V SUPPLY
1
2
3
K4 20 BK/LB
K7 20 OR
S105
S110 (8W-70-2)
CAMSHAFT POSITION SENSOR
8V SUPPLY
SENSOR GROUND
CAMSHAFT POSITON SENSOR SIGNAL
K4 18 BK/LB
S104 (8W-70-2)
K24 20 GY/BK
C110
KNOCK SENSOR
K45 18 BK/VT
K44 20 TN/YL
C101
S127 (IN PDC) (8W-70-3)
32 C1
25 C1
43 C2
33 C1
44 C2
10 C101
POWERTRAIN CONTROL MODULE
CRANKSHAFT POSITION SENSOR SIGNAL
KNOCK SENSOR SIGNAL
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
8V SUPPLY

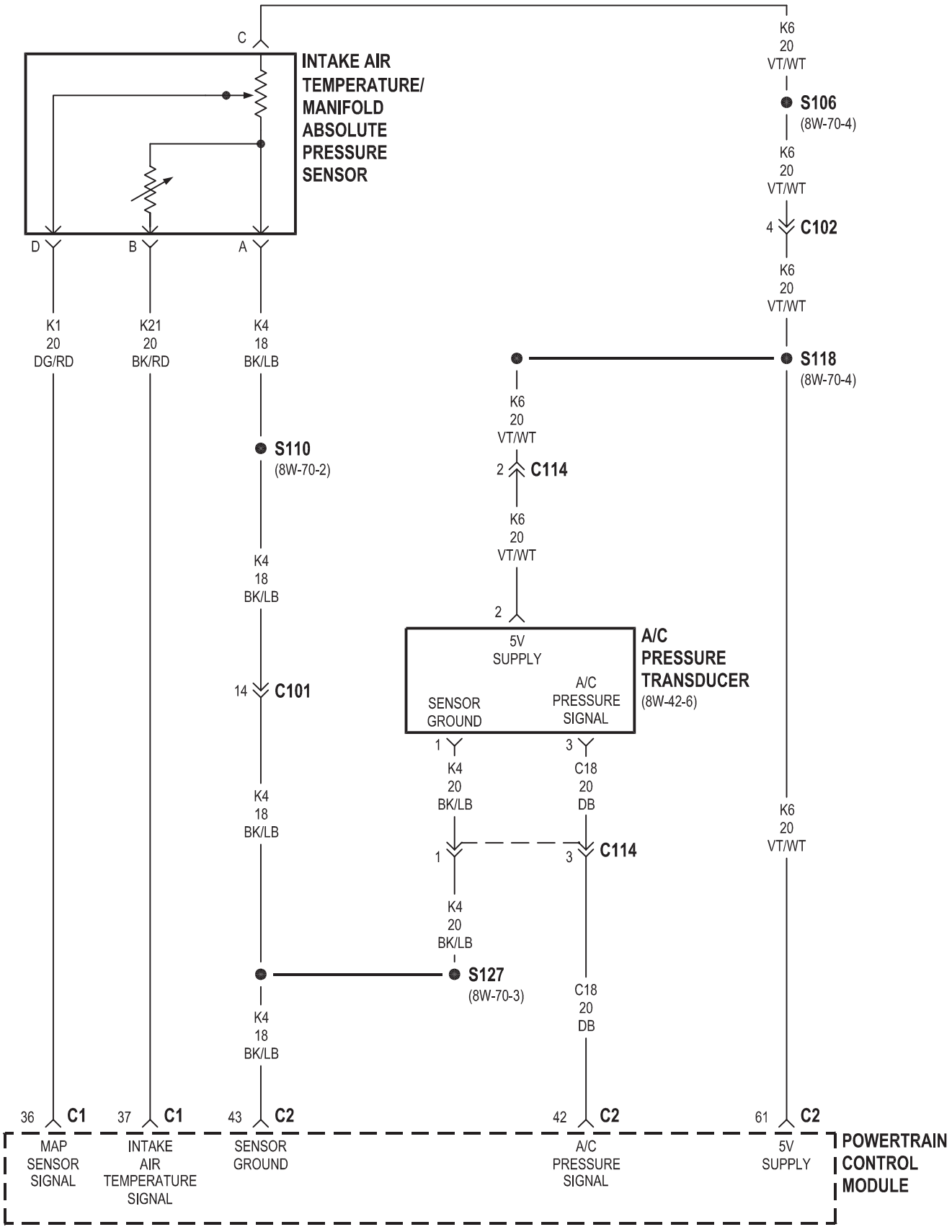

ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 13 10A
(8W-12-17)
BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE G 40A
(8W-10-15)
4 C8
F12 20 DB/WT
A1 12 RD
S116
(8W-12-17)
S124 (IN PDC)
(8W-10-15)
F12 20 DB/WT
A1 12 RD
A
B
FUEL PUMP RELAY (IN PDC)
C
D
FUEL LEVEL SENSOR SIGNAL
BODY CONTROL MODULE
(8W-45-10)
7 C4
G4 20 DB
7 C200
G4 20 DB
2 C308
G4 14 DB
3
13 C101
F12 20 DB/WT
K31 20 BR
A141 12 DG/WT
2 C105
A141 12 DG/WT
7 C308
A141 12 DG/WT
4
M
FUEL PUMP MODULE
20 C1
74 C2
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUEL PUMP RELAY CONTROL
POWERTRAIN CONTROL MODULE
2
1
Z1 12 BK
S140
(8W-15-17)
Z1 12 BK
8 C308
Z1 12 BK
G303
(8W-15-17)
G301
(8W-15-17)

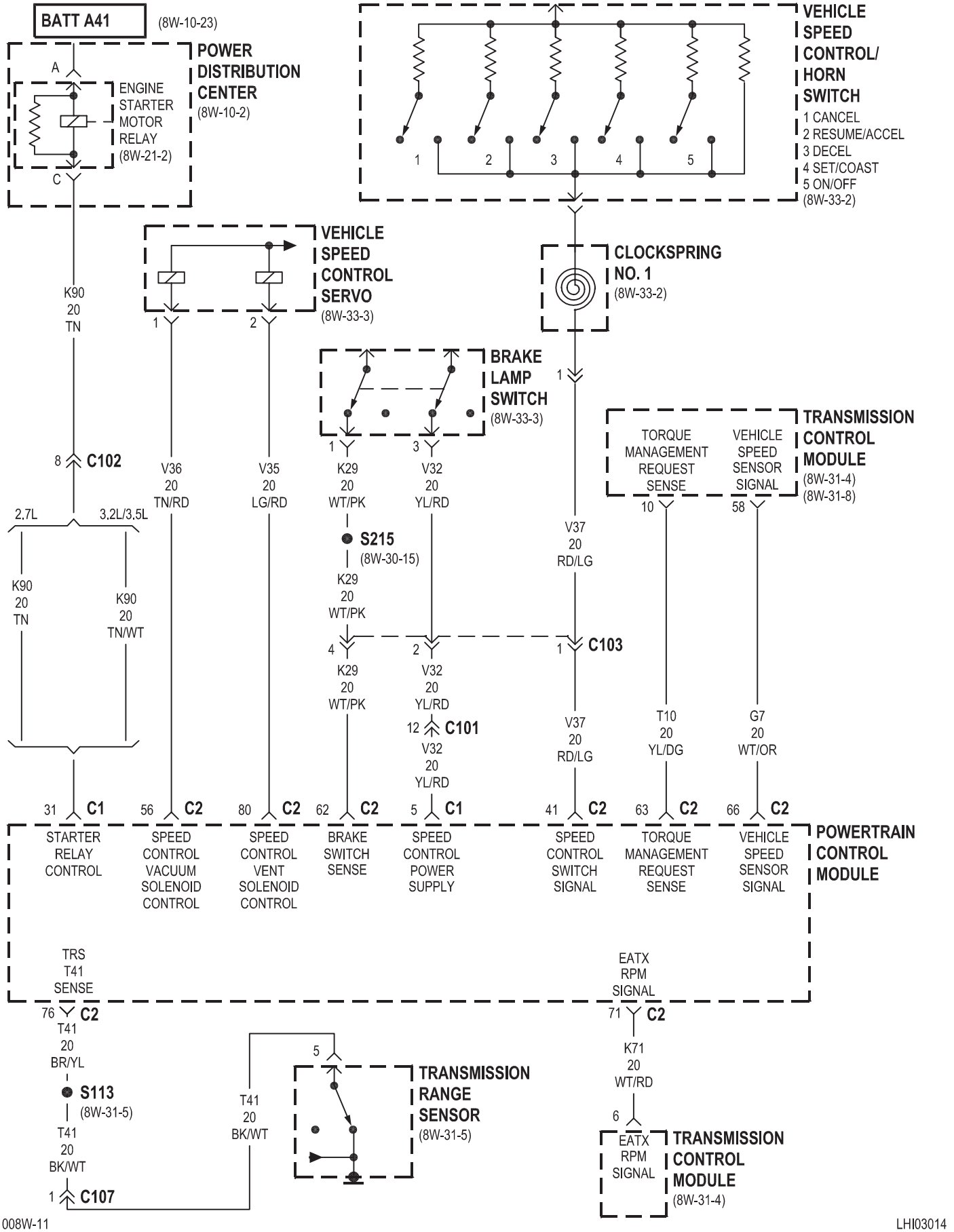

K6
20
VT/WT
S106
(8W-70-4)
K6
20
VT/WT
4
C102
K6
20
VT/WT
S118
(8W-70-4)
K6
20
VT/WT
61
C2
5V
SUPPLY
1
THROTTLE
POSITION
SENSOR
2
3
K22
20
OR/DB
S107
(8W-31-4)
K22
20
OR/DB
35
C1
THROTTLE
POSITION
SENSOR
SIGNAL
K4
20
BK/LB
S110
(8W-70-2)
K4
20
BK/LB
2
ENGINE
COOLANT
TEMPERATURE
SENSOR
1
K2
20
TN/BK
26
C1
ENGINE
COOLANT
TEMPERATURE
SENSOR
SIGNAL
2.7L
3.2L/3.5L
K4
18
BK/LB
K4
18
BK/LB
S104
(8W-70-2)
K4
18
BK/LB
14
C101
K4
18
BK/LB
14
C101
K4
18
BK/LB
K4
18
BK/LB
S127
(8W-70-3)
43
C2
SENSOR
GROUND
POWERTRAIN
CONTROL
MODULE
KNOCK
SENSOR
SIGNAL
24
C1
K42
20
DB/LG
KNOCK
SENSOR
RETURN
25
C1
K45
20
BK/VT
1
KNOCK
SENSOR
(3.2L/3.5L)
2
SPEED
CONTROL
SWITCH
SIGNAL
41
C2
V37
20
RD/LG
1
1
SENSOR
GROUND
43
C2
K4
18
BK/LB
S127
(IN PDC)
(8W-70-3)
K4
20
BK/LB
10
C103
2
CLOCKSPRING
NO. 1
(8W-33-2)
POWER
STEERING
PRESSURE
SWITCH
SENSE
45
C2
K10
18
DB/LG
9
C102
K10
18
DB/LG
2
POWER
STEERING
PRESSURE
SWITCH

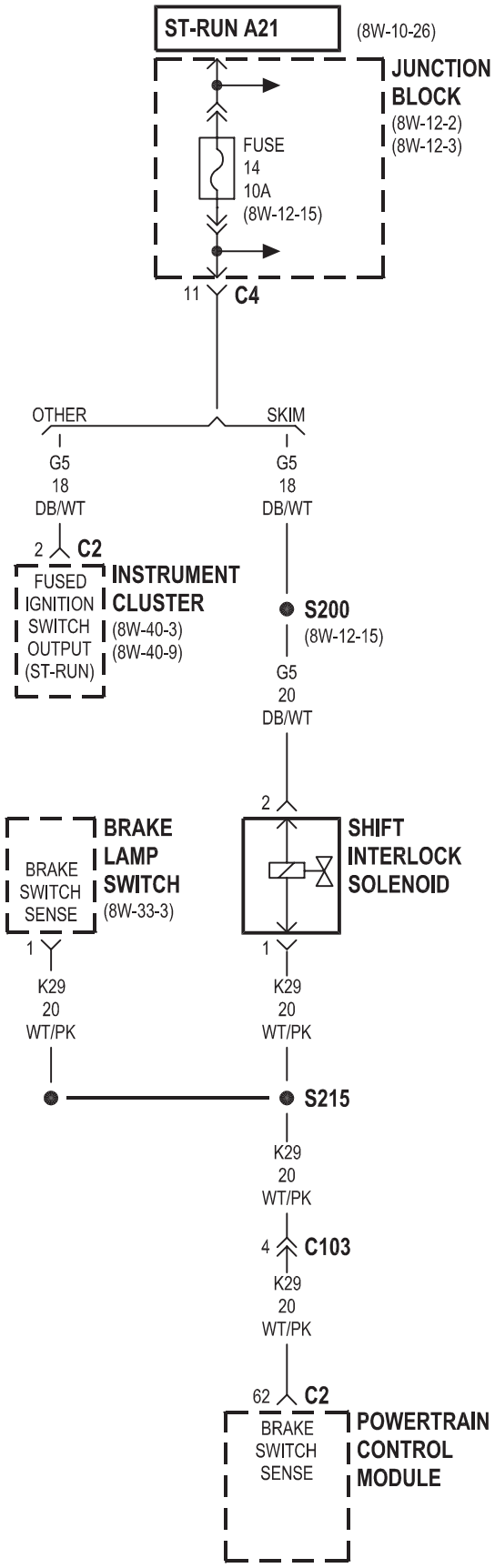

S165
(IN PDC)
(8W-10-17)
S164
(8W-10-18)
(8W-10-19)
BATT A14
(8W-10-17)
AUTOMATIC SHUT DOWN RELAY (IN PDC)
(8W-30-2)
D
A142
14
DG/OR
A142
14
DG/OR
F142
16
OR/DG
F142
16
OR/DG
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
T
20A
(8W-10-17)
1
C102
F142
18
OR/DG
S103
(8W-10-18)
(8W-10-19)
OTHER
2.7L
F142
18
OR/DG
S108
(8W-10-18)
F142
18
OR/DG
4
2
2
4
OXYGEN SENSOR 2/1 LEFT BANK UP
OXYGEN SENSOR 1/1 RIGHT BANK UP
3
1
1
3
Z1
18
BK
Z1
18
BK
K127
18
BK/OR
S100
(8W-15-4)
K127
18
BK/OR
K41
20
BK/DG
Z1
18
BK
S102
11
C101
Z1
16
BK/WT
K241
20
LG/RD
S123
(8W-15-4)
K127
18
BK/OR
Z1
14
BK
Z1
14
BK
G104
(8W-15-5)
G103
(8W-15-5)
29
C1
27
C1
30
C1
OXYGEN SENSOR 2/1 SIGNAL
OXYGEN SENSOR GROUND
OXYGEN SENSOR 1/1 SIGNAL
POWERTRAIN CONTROL MODULE

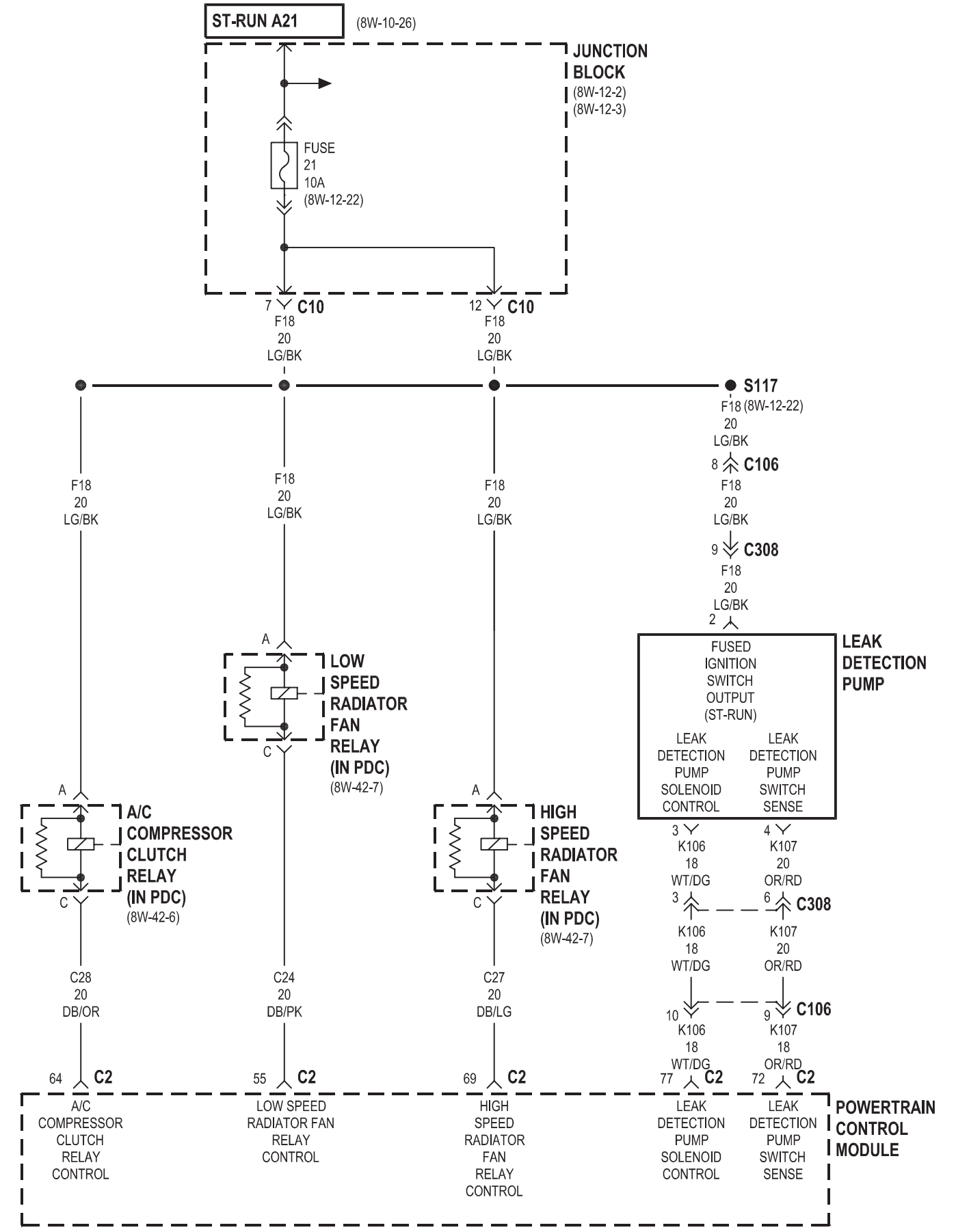

S165
(IN PDC)
(8W-10-17)
S164
(8W-10-18)
(8W-10-19)
BATT A14
(8W-10-17)
AUTOMATIC
SHUT DOWN
RELAY
(IN PDC)
(8W-30-2)
D
A142
14
DG/OR
A142
14
DG/OR
F142
16
OR/DG
F142
18
OR/DG
8
C108
FUSE
T
20A
(8W-10-17)
POWER
DISTRIBUTION
CENTER
(8W-10-2)
F142
18
OR/DG
S141
(8W-10-18)
(8W-10-19)
F142
18
OR/DG
F142
18
OR/DG
4
2
2
4
K341
20
PK/WT
OXYGEN
SENSOR
2/2 LEFT
BANK DOWN
OXYGEN
SENSOR
1/2 RIGHT
BANK DOWN
K141
20
TN/WT
3
1
1
3
K4
18
BK/LB
Z1
18
BK
Z1
18
BK
K4
18
BK/LB
S142
(8W-15-4)
S143
12
C107
K4
18
BK/LB
Z1
18
BK
3
C108
11
10
C107
K4
18
BK/LB
Z1
18
BK
S123
(8W-15-4)
K141
20
TN/WT
S127
(8W-70-3)
Z1
14
BK
Z1
14
BK
K341
20
PK/WT
K4
18
BK/LB
G104
(8W-15-5)
G103
(8W-15-5)
53
C2
43
C2
51
C2
OXYGEN
SENSOR 2/2
SIGNAL
SENSOR
GROUND
OXYGEN
SENSOR 1/2
SIGNAL
POWERTRAIN
CONTROL
MODULE

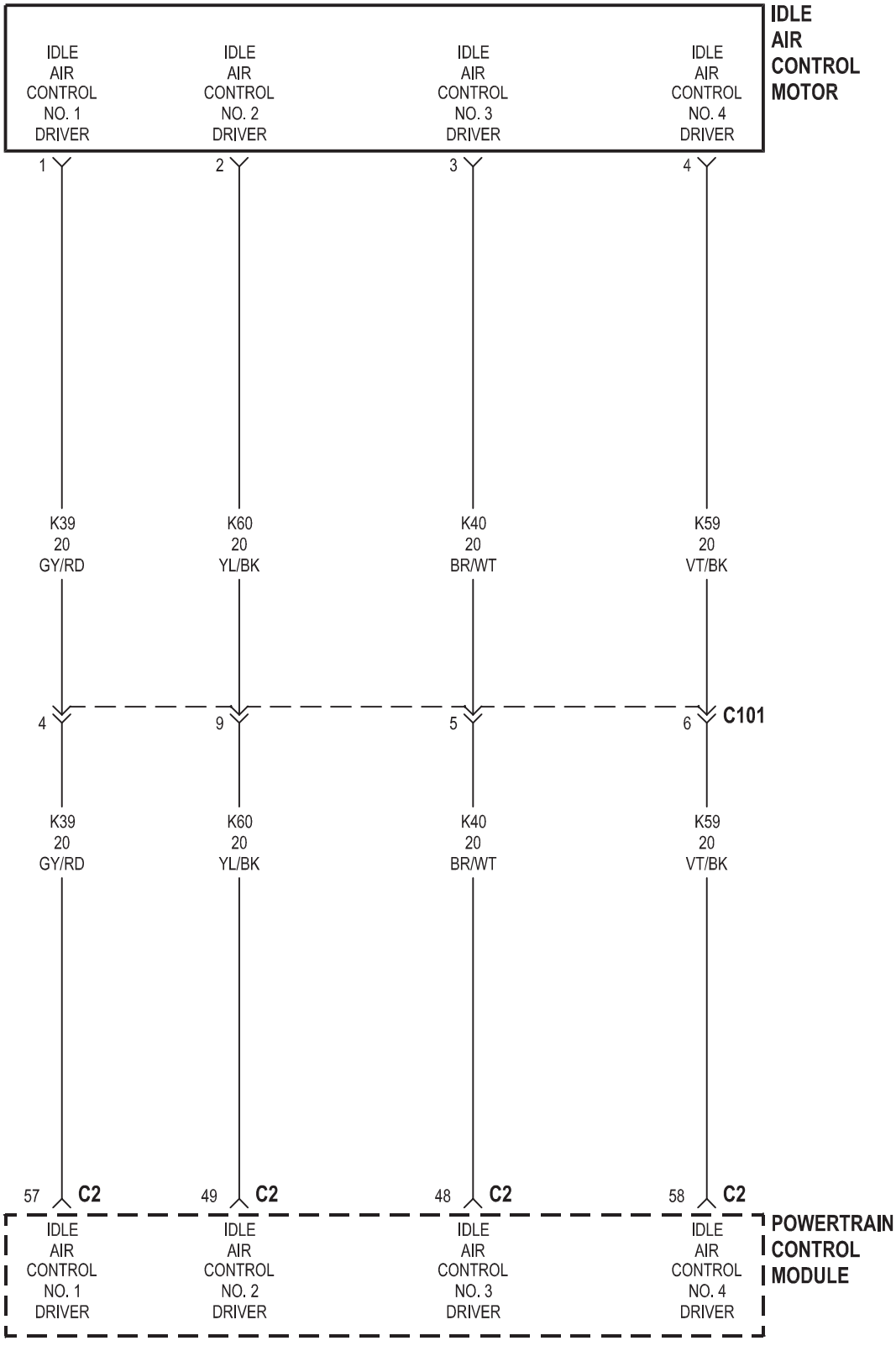

MANIFOLD ABSOLUTE PRESSURE SENSOR
KNOCK SENSOR (8W-30-7)
SENSOR GROUND
CAMSHAFT POSITION SENSOR (8W-30-7)
SENSOR GROUND
S106 (8W-70-4)
C102
C110
S104 (8W-70-2)
S118 (8W-70-4)
S110 (8W-70-2)
C101
C114
INTAKE AIR TEMPERATURE SENSOR
EVAP/ PURGE SOLENOID
A/C PRESSURE TRANSDUCER (8W-42-6)
5V SUPPLY
SENSOR GROUND
A/C PRESSURE SIGNAL
C114
S127 (8W-70-3)
K1 20 DG/RD
K4 18 BK/LB
K4 20 BK/LB
K6 20 VT/WT
K21 20 BK/RD
K52 18 PK/BK
K108 18 DG/LG
C18 20 DB
36 C1
37 C1
68 C2
70 C2
43 C2
42 C2
61 C2
MAP SENSOR SIGNAL
INTAKE AIR TEMPERATURE SIGNAL
EVAPORATIVE EMISSION SOLENOID CONTROL
EVAPORATIVE EMISSION SOLENOID SENSE
SENSOR GROUND
A/C PRESSURE SIGNAL
5V SUPPLY
POWERTRAIN CONTROL MODULE

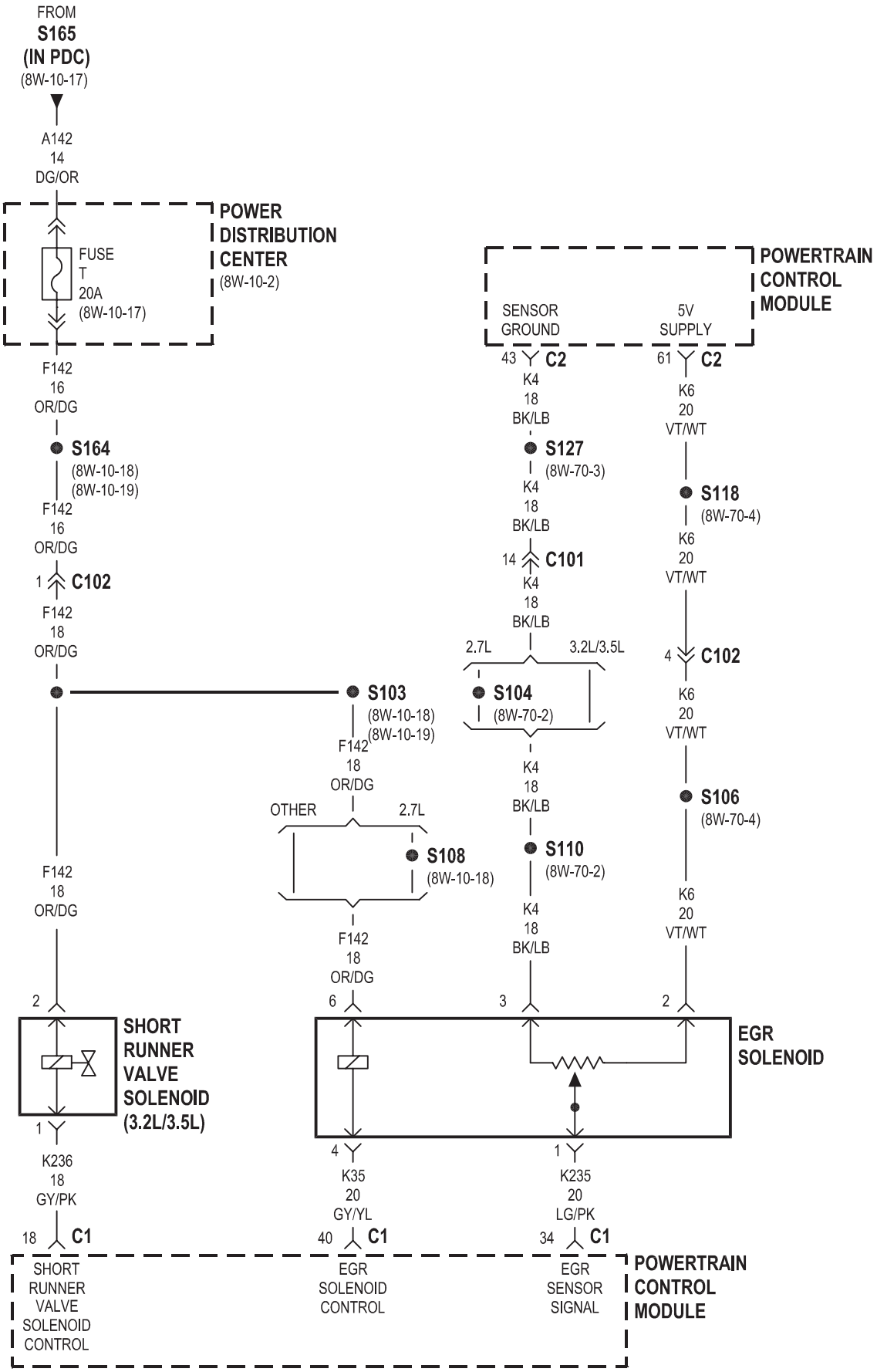

C
INTAKE AIR TEMPERATURE/ MANIFOLD ABSOLUTE PRESSURE SENSOR
D
B
A
K1 20 DG/RD
K21 20 BK/RD
K4 18 BK/LB
S110 (8W-70-2)
K4 18 BK/LB
14 C101
K4 18 BK/LB
K4 18 BK/LB
S127 (8W-70-3)
K4 18 BK/LB
K6 20 VT/WT
S106 (8W-70-4)
K6 20 VT/WT
4 C102
K6 20 VT/WT
S118 (8W-70-4)
K6 20 VT/WT
2 C114
K6 20 VT/WT
2
5V SUPPLY
SENSOR GROUND
A/C PRESSURE SIGNAL
A/C PRESSURE TRANSDUCER (8W-42-6)
1
3
K4 20 BK/LB
C18 20 DB
1
3
C114
K4 20 BK/LB
C18 20 DB
K6 20 VT/WT
36 C1
37 C1
43 C2
42 C2
61 C2
MAP SENSOR SIGNAL
INTAKE AIR TEMPERATURE SIGNAL
SENSOR GROUND
A/C PRESSURE SIGNAL
5V SUPPLY
POWERTRAIN CONTROL MODULE

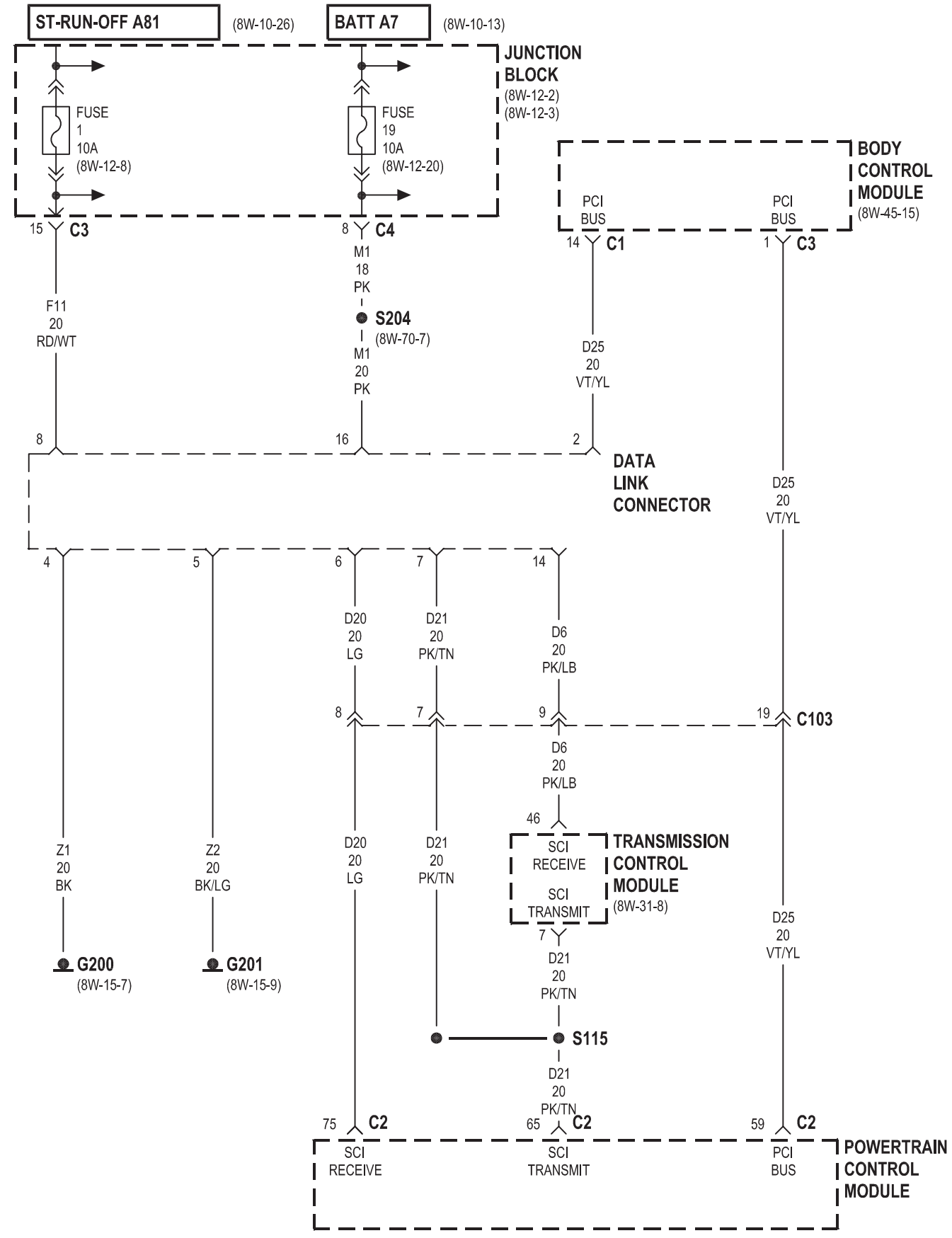

BATT A41
(8W-10-23)
POWER DISTRIBUTION CENTER
(8W-10-2)
A
C
ENGINE STARTER MOTOR RELAY
(8W-21-2)
VEHICLE SPEED CONTROL/ HORN SWITCH
1 CANCEL
2 RESUME/ACCEL
3 DECEL
4 SET/COAST
5 ON/OFF
(8W-33-2)
1 2 3 4 5
VEHICLE SPEED CONTROL SERVO
(8W-33-3)
CLOCKSPRING NO. 1
(8W-33-2)
BRAKE LAMP SWITCH
(8W-33-3)
TRANSMISSION CONTROL MODULE
(8W-31-4)
(8W-31-8)
TORQUE MANAGEMENT REQUEST SENSE
VEHICLE SPEED SENSOR SIGNAL
K90 20 TN
8 C102
2.7L
3.2L/3.5L
K90 20 TN
K90 20 TN/WT
V36 20 TN/RD
V35 20 LG/RD
K29 20 WT/PK
V32 20 YL/RD
S215
(8W-30-15)
K29 20 WT/PK
4 K29 20 WT/PK
2 V32 20 YL/RD
12 C101
V32 20 YL/RD
V37 20 RD/LG
1 C103
V37 20 RD/LG
T10 20 YL/DG
G7 20 WT/OR
10
58
31 C1
56 C2
80 C2
62 C2
5 C1
41 C2
63 C2
66 C2
STARTER RELAY CONTROL
SPEED CONTROL VACUUM SOLENOID CONTROL
SPEED CONTROL VENT SOLENOID CONTROL
BRAKE SWITCH SENSE
SPEED CONTROL POWER SUPPLY
SPEED CONTROL SWITCH SIGNAL
TORQUE MANAGEMENT REQUEST SENSE
VEHICLE SPEED SENSOR SIGNAL
POWERTRAIN CONTROL MODULE
TRS T41 SENSE
76 C2
T41 20 BR/YL
S113
(8W-31-5)
T41 20 BK/WT
1 C107
T41 20 BK/WT
5
TRANSMISSION RANGE SENSOR
(8W-31-5)
EATX RPM SIGNAL
71 C2
K71 20 WT/RD
6
EATX RPM SIGNAL
TRANSMISSION CONTROL MODULE
(8W-31-4)

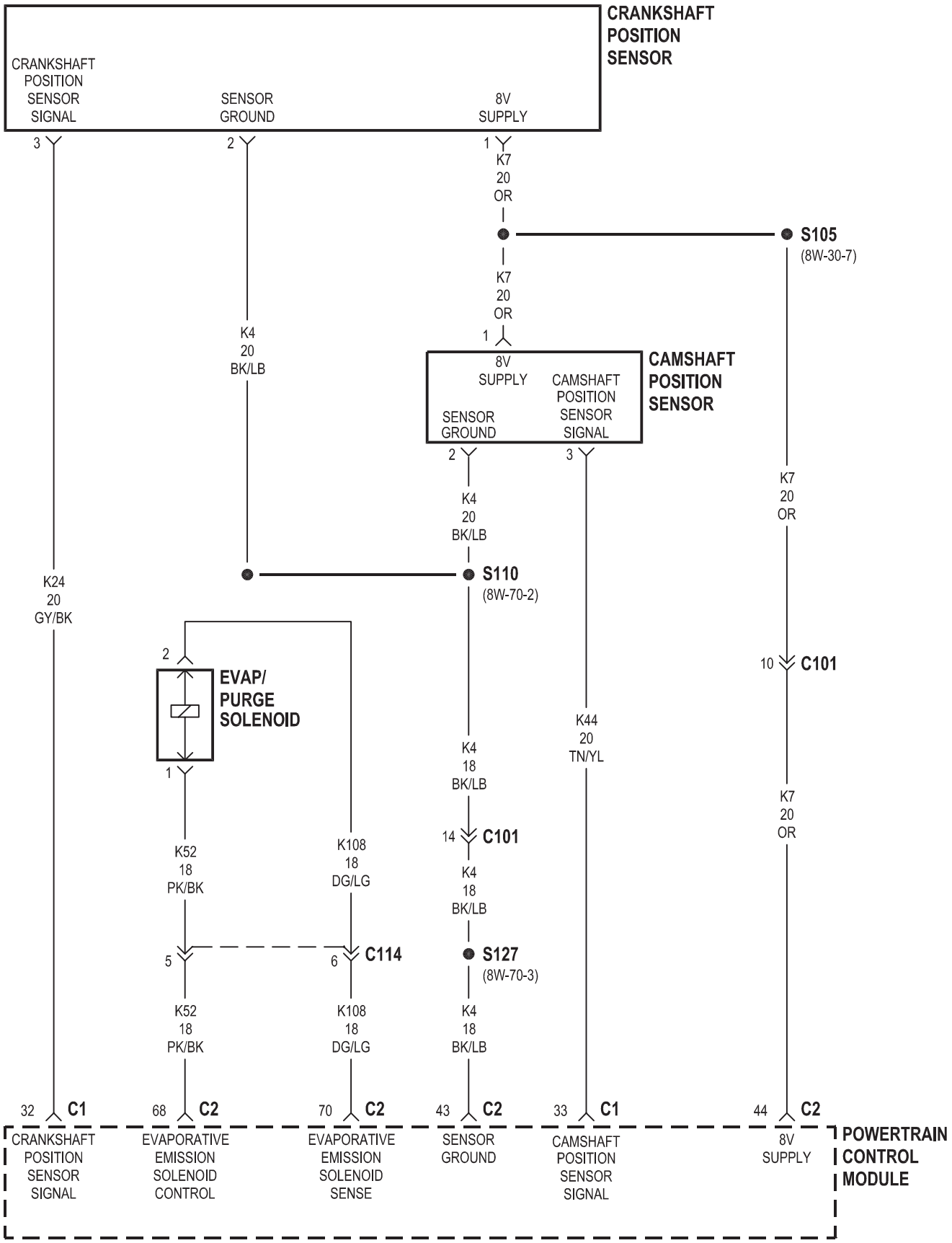

ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
14
10A
(8W-12-15)
11
C4
OTHER
SKIM
G5
18
DB/WT
G5
18
DB/WT
2
C2
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
S200
(8W-12-15)
G5
20
DB/WT
2
BRAKE SWITCH SENSE
BRAKE LAMP SWITCH
(8W-33-3)
SHIFT INTERLOCK SOLENOID
1
1
K29
20
WT/PK
K29
20
WT/PK
S215
K29
20
WT/PK
4
C103
K29
20
WT/PK
62
C2
BRAKE SWITCH SENSE
POWERTRAIN CONTROL MODULE


ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
21
10A
(8W-12-22)
7 C10
F18
20
LG/BK
12 C10
F18
20
LG/BK
S117
F18 (8W-12-22)
20
LG/BK
8 C106
F18
20
LG/BK
9 C308
F18
20
LG/BK
2
F18
20
LG/BK
F18
20
LG/BK
F18
20
LG/BK
A
LOW SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
C
A
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
(8W-42-6)
C
A
HIGH SPEED RADIATOR FAN RELAY (IN PDC)
(8W-42-7)
C
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
LEAK DETECTION PUMP
3 K106 18 WT/DG
4 K107 20 OR/RD
3 K106 18 WT/DG
6 C308
K107 20 OR/RD
10 K106 18 WT/DG
9 C106
K107 18 OR/RD
C28 20 DB/OR
C24 20 DB/PK
C27 20 DB/LG
64 C2
55 C2
69 C2
77 C2
72 C2
A/C COMPRESSOR CLUTCH RELAY CONTROL
LOW SPEED RADIATOR FAN RELAY CONTROL
HIGH SPEED RADIATOR FAN RELAY CONTROL
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
POWERTRAIN CONTROL MODULE


IDLE AIR CONTROL MOTOR
IDLE AIR CONTROL NO. 1 DRIVER
IDLE AIR CONTROL NO. 2 DRIVER
IDLE AIR CONTROL NO. 3 DRIVER
IDLE AIR CONTROL NO. 4 DRIVER
1
2
3
4
K39 20 GY/RD
K60 20 YL/BK
K40 20 BR/WT
K59 20 VT/BK
4
9
5
6
C101
K39 20 GY/RD
K60 20 YL/BK
K40 20 BR/WT
K59 20 VT/BK
57 C2
49 C2
48 C2
58 C2
IDLE AIR CONTROL NO. 1 DRIVER
IDLE AIR CONTROL NO. 2 DRIVER
IDLE AIR CONTROL NO. 3 DRIVER
IDLE AIR CONTROL NO. 4 DRIVER
POWERTRAIN CONTROL MODULE

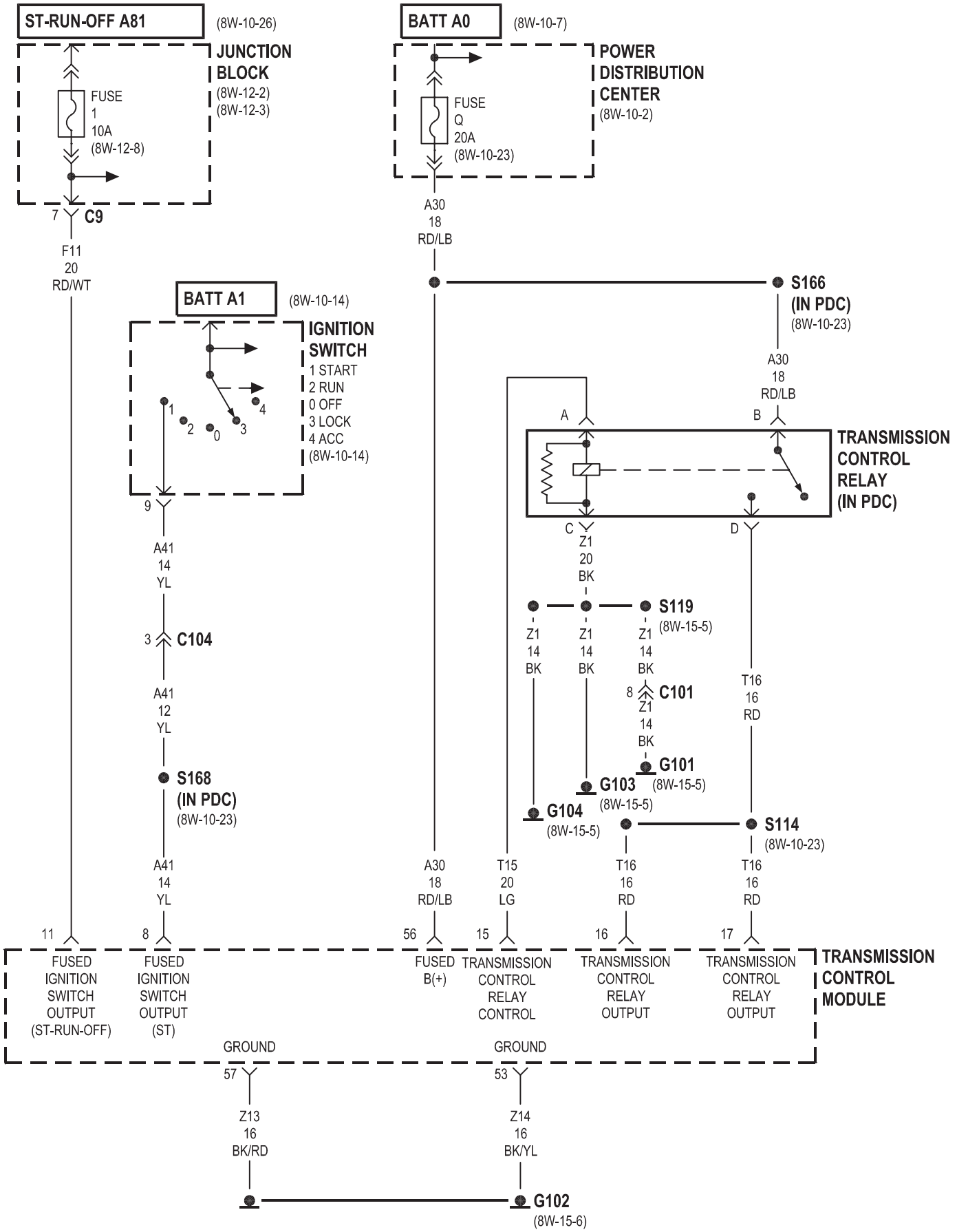

FROM
S165
(IN PDC)
(8W-10-17)
A142
14
DG/OR
POWER
DISTRIBUTION
CENTER
(8W-10-2)
FUSE
T
20A
(8W-10-17)
F142
16
OR/DG
S164
(8W-10-18)
(8W-10-19)
F142
16
OR/DG
1 C102
F142
18
OR/DG
S103
(8W-10-18)
(8W-10-19)
F142
18
OR/DG
OTHER
2.7L
S108
(8W-10-18)
F142
18
OR/DG
2
SHORT
RUNNER
VALVE
SOLENOID
(3.2L/3.5L)
1
K236
18
GY/PK
18 C1
SHORT
RUNNER
VALVE
SOLENOID
CONTROL
POWERTRAIN
CONTROL
MODULE
SENSOR
GROUND
5V
SUPPLY
43 C2
61 C2
K4
18
BK/LB
S127
(8W-70-3)
K4
18
BK/LB
14 C101
K4
18
BK/LB
2.7L
3.2L/3.5L
S104
(8W-70-2)
K4
18
BK/LB
S110
(8W-70-2)
K4
18
BK/LB
6
4
K35
20
GY/YL
40 C1
EGR
SOLENOID
CONTROL
3
1
K235
20
LG/PK
34 C1
EGR
SENSOR
SIGNAL
K6
20
VT/WT
S118
(8W-70-4)
K6
20
VT/WT
4 C102
K6
20
VT/WT
S106
(8W-70-4)
K6
20
VT/WT
2
EGR
SOLENOID

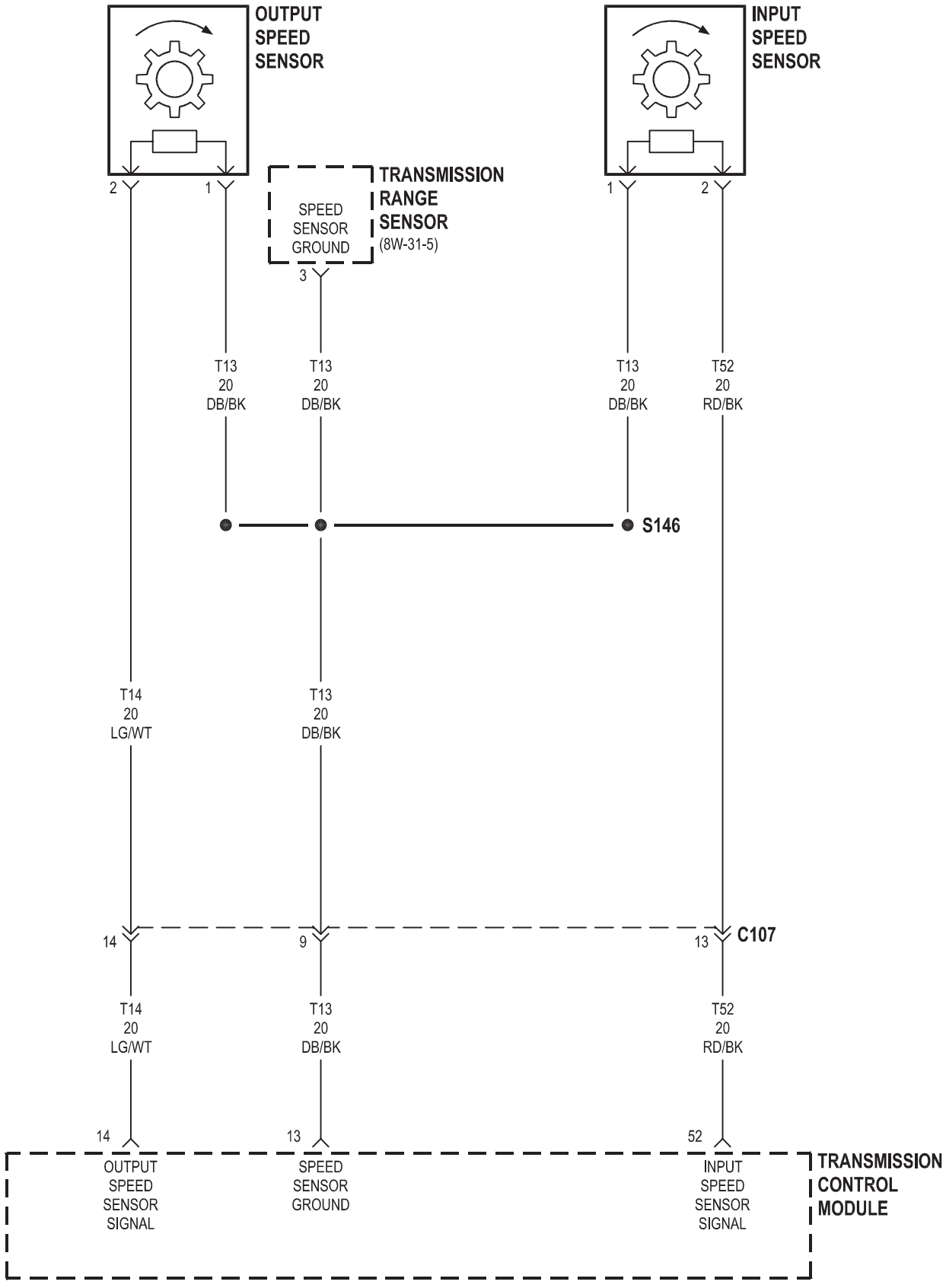

ST-RUN-OFF A81
(8W-10-26)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A
(8W-12-8)
FUSE 19 10A
(8W-12-20)
BODY CONTROL MODULE
(8W-45-15)
PCI BUS
PCI BUS
15 C3
8 C4
14 C1
1 C3
F11 20 RD/WT
M1 18 PK
S204
(8W-70-7)
M1 20 PK
D25 20 VT/YL
8
16
2
DATA LINK CONNECTOR
D25 20 VT/YL
4
5
6
7
14
D20 20 LG
D21 20 PK/TN
D6 20 PK/LB
8
7
9
19 C103
D6 20 PK/LB
46
SCI RECEIVE
SCI TRANSMIT
TRANSMISSION CONTROL MODULE
(8W-31-8)
Z1 20 BK
Z2 20 BK/LG
D20 20 LG
D21 20 PK/TN
D25 20 VT/YL
7
D21 20 PK/TN
G200
(8W-15-7)
G201
(8W-15-9)
S115
D21 20 PK/TN
75 C2
65 C2
59 C2
SCI RECEIVE
SCI TRANSMIT
PCI BUS
POWERTRAIN CONTROL MODULE

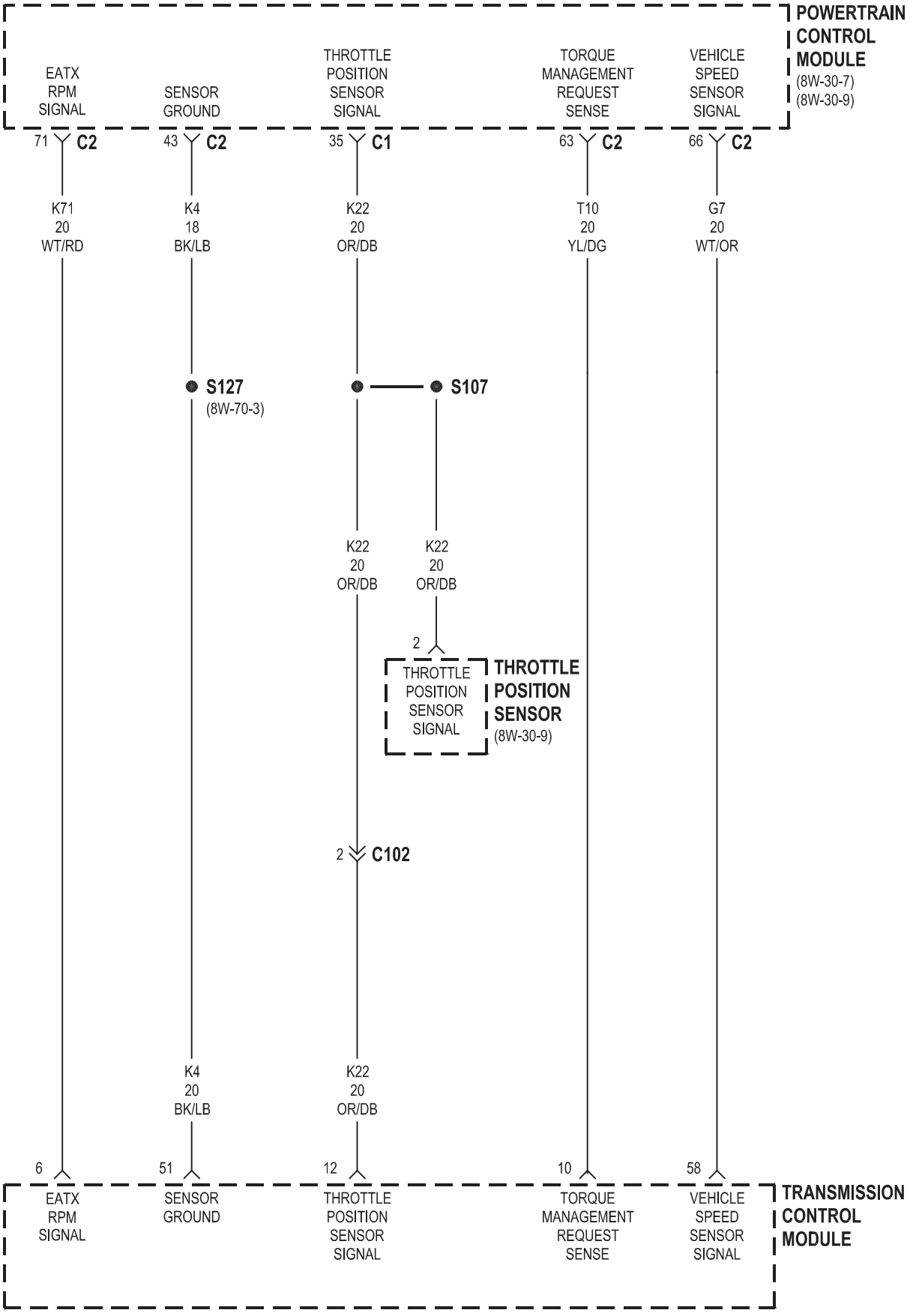

CRANKSHAFT POSITION SENSOR
CRANKSHAFT POSITION SENSOR SIGNAL
SENSOR GROUND
8V SUPPLY
3
2
1
K7 20 OR
S105
(8W-30-7)
K4 20 BK/LB
CAMSHAFT POSITION SENSOR
8V SUPPLY
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
S110
(8W-70-2)
K24 20 GY/BK
EVAP/ PURGE SOLENOID
K52 18 PK/BK
K108 18 DG/LG
K4 18 BK/LB
K44 20 TN/YL
C101
C114
S127
(8W-70-3)
32 C1
68 C2
70 C2
43 C2
33 C1
44 C2
CRANKSHAFT POSITION SENSOR SIGNAL
EVAPORATIVE EMISSION SOLENOID CONTROL
EVAPORATIVE EMISSION SOLENOID SENSE
SENSOR GROUND
CAMSHAFT POSITION SENSOR SIGNAL
8V SUPPLY
POWERTRAIN CONTROL MODULE

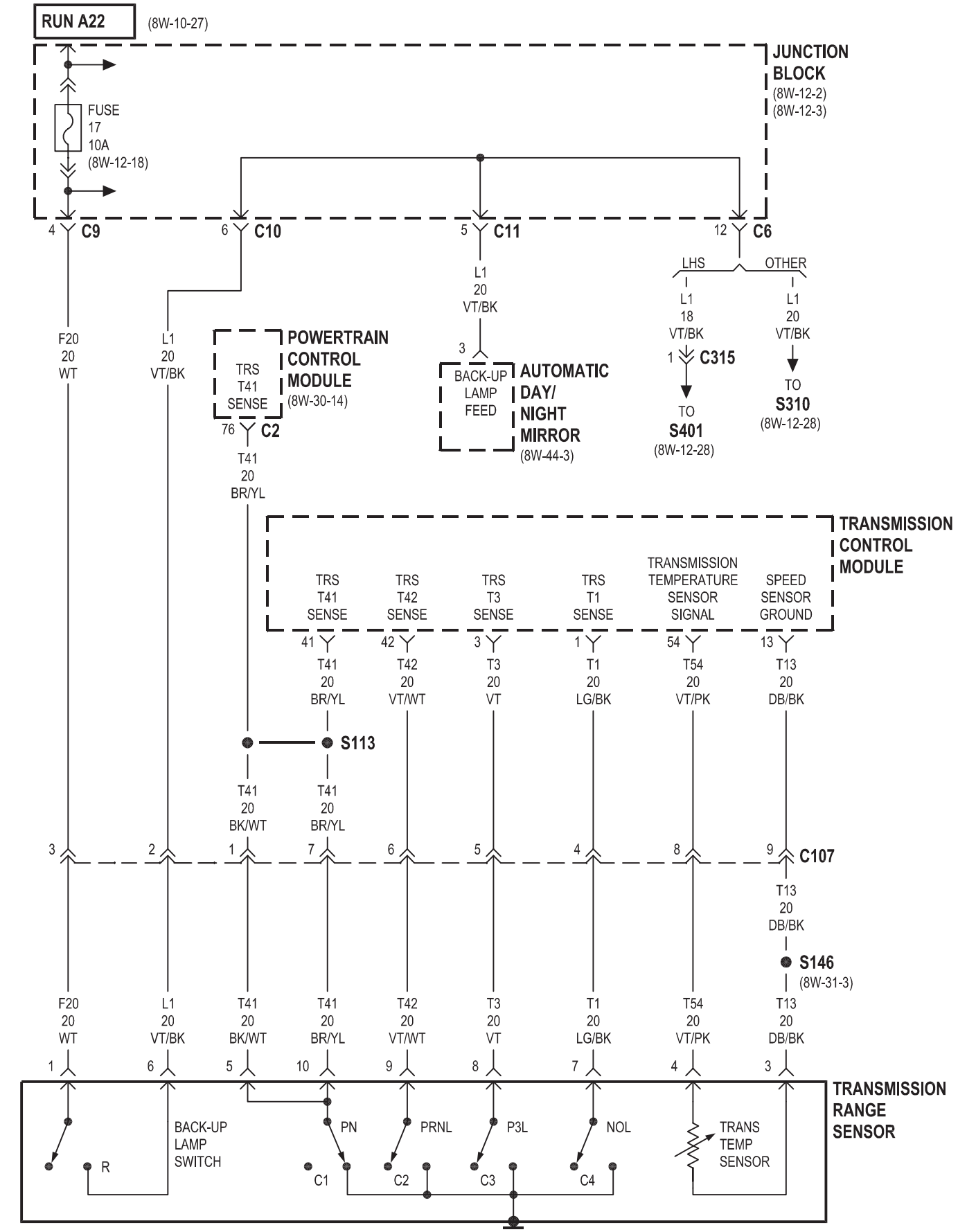
8W-31 TRANSMISSION CONTROL SYSTEM

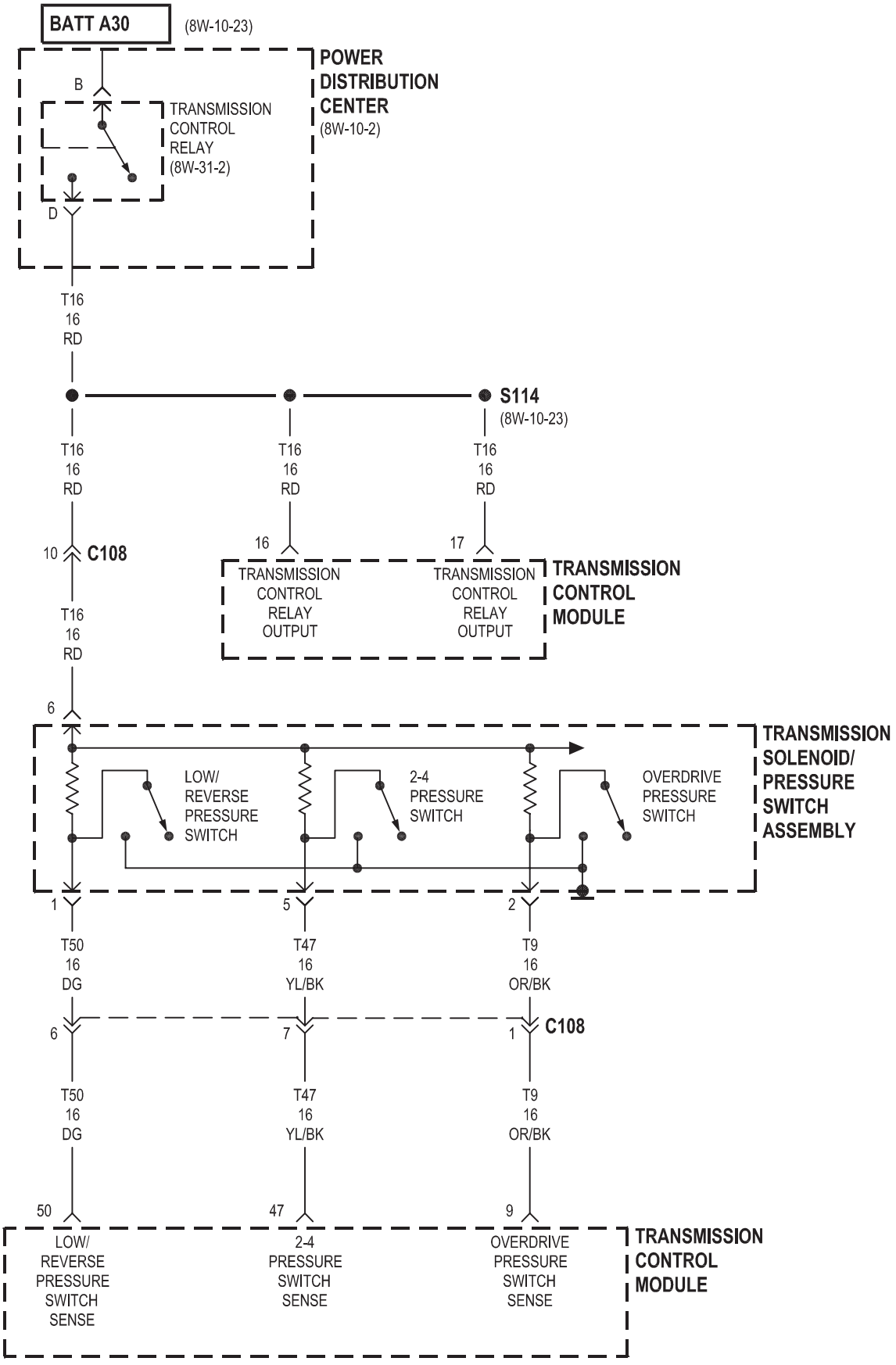
Component	Page
Automatic Day/Night Mirror	8W-31-5
Autostick Switch	8W-31-8
Body Control Module	8W-31-8
Data Link Connector	8W-31-8
Fuse 1 (JB)	8W-31-2, 8
Fuse 17 (JB)	8W-31-5
Fuse Q (PDC)	8W-31-2
G101	8W-31-2
G102	8W-31-2
G103	8W-31-2
G104	8W-31-2
G300	8W-31-8
Ignition Switch	8W-31-2
Input Speed Sensor	8W-31-3
Junction Block	8W-31-2, 5, 8
Low/Reverse Solenoid	8W-31-7
Output Speed Sensor	8W-31-3
Overdrive Solenoid	8W-31-7
Power Distribution Center	8W-31-2, 6, 7
Powertrain Control Module	8W-31-4, 5, 8
Throttle Position Sensor	8W-31-4
Transmission Control Module	8W-31-2, 3, 4, 5, 6, 7, 8
Transmission Control Relay	8W-31-2, 6, 7
Transmission Range Sensor	8W-31-3, 5
Transmission Solenoid/Pressure Switch Assembly	8W-31-6, 7
Underdrive Solenoid	8W-31-7

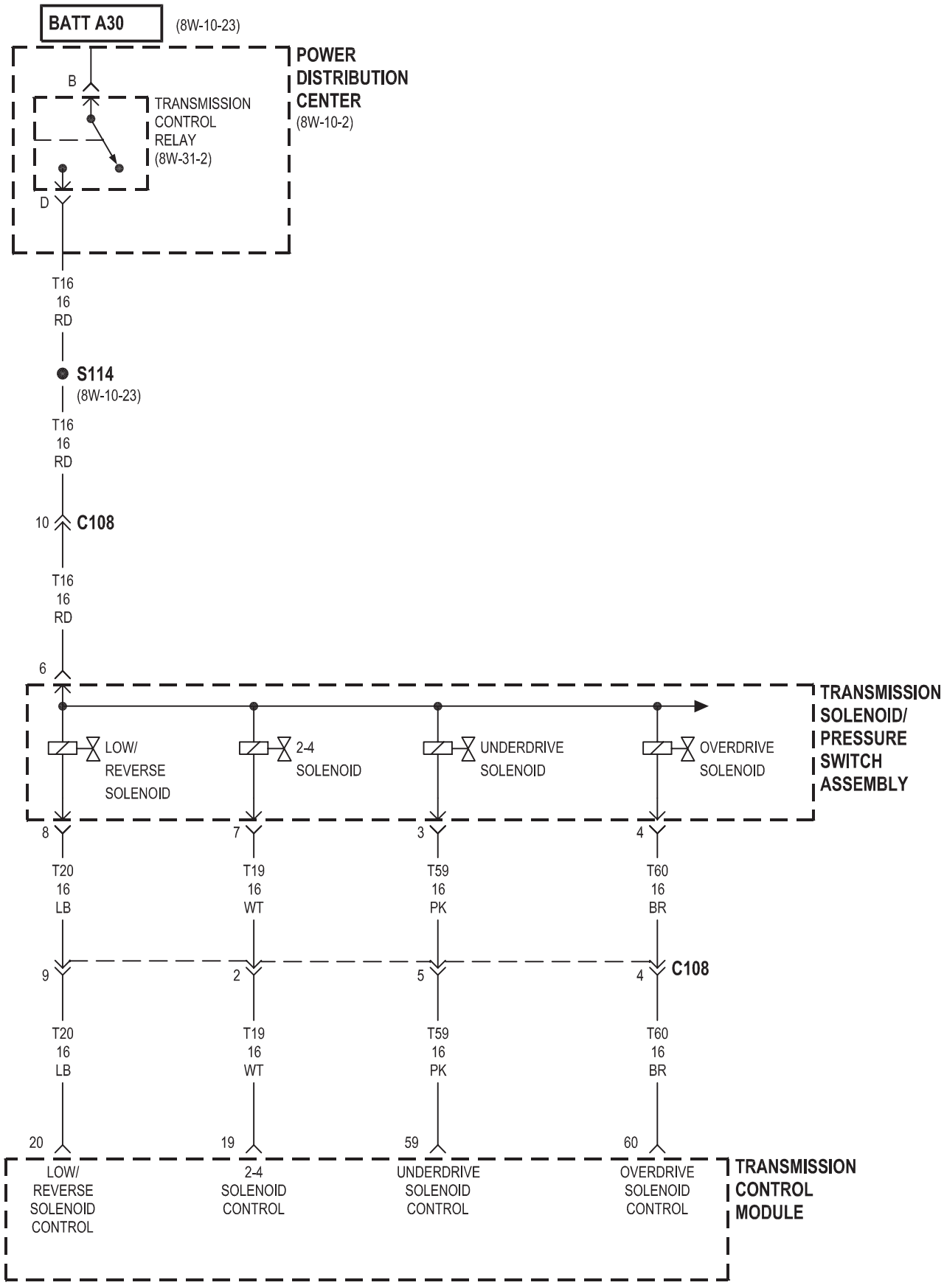

ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A (8W-12-8)
7 C9
F11 20 RD/WT
BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE Q 20A (8W-10-23)
A30 18 RD/LB
S166 (IN PDC)
(8W-10-23)
A30 18 RD/LB
BATT A1
(8W-10-14)
IGNITION SWITCH
1 START
2 RUN
0 OFF
3 LOCK
4 ACC
(8W-10-14)
TRANSMISSION CONTROL RELAY (IN PDC)
A
B
C
D
Z1 20 BK
S119
(8W-15-5)
Z1 14 BK
C101
T16 16 RD
G101
(8W-15-5)
G103
(8W-15-5)
G104
(8W-15-5)
S114
(8W-10-23)
A41 14 YL
C104
A41 12 YL
S168 (IN PDC)
(8W-10-23)
A41 14 YL
A30 18 RD/LB
T15 20 LG
T16 16 RD
T16 16 RD
11
8
56
15
16
17
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
FUSED IGNITION SWITCH OUTPUT (ST)
FUSED B(+)
TRANSMISSION CONTROL RELAY CONTROL
TRANSMISSION CONTROL RELAY OUTPUT
TRANSMISSION CONTROL RELAY OUTPUT
TRANSMISSION CONTROL MODULE
GROUND
GROUND
57
53
Z13 16 BK/RD
Z14 16 BK/YL
G102
(8W-15-6)

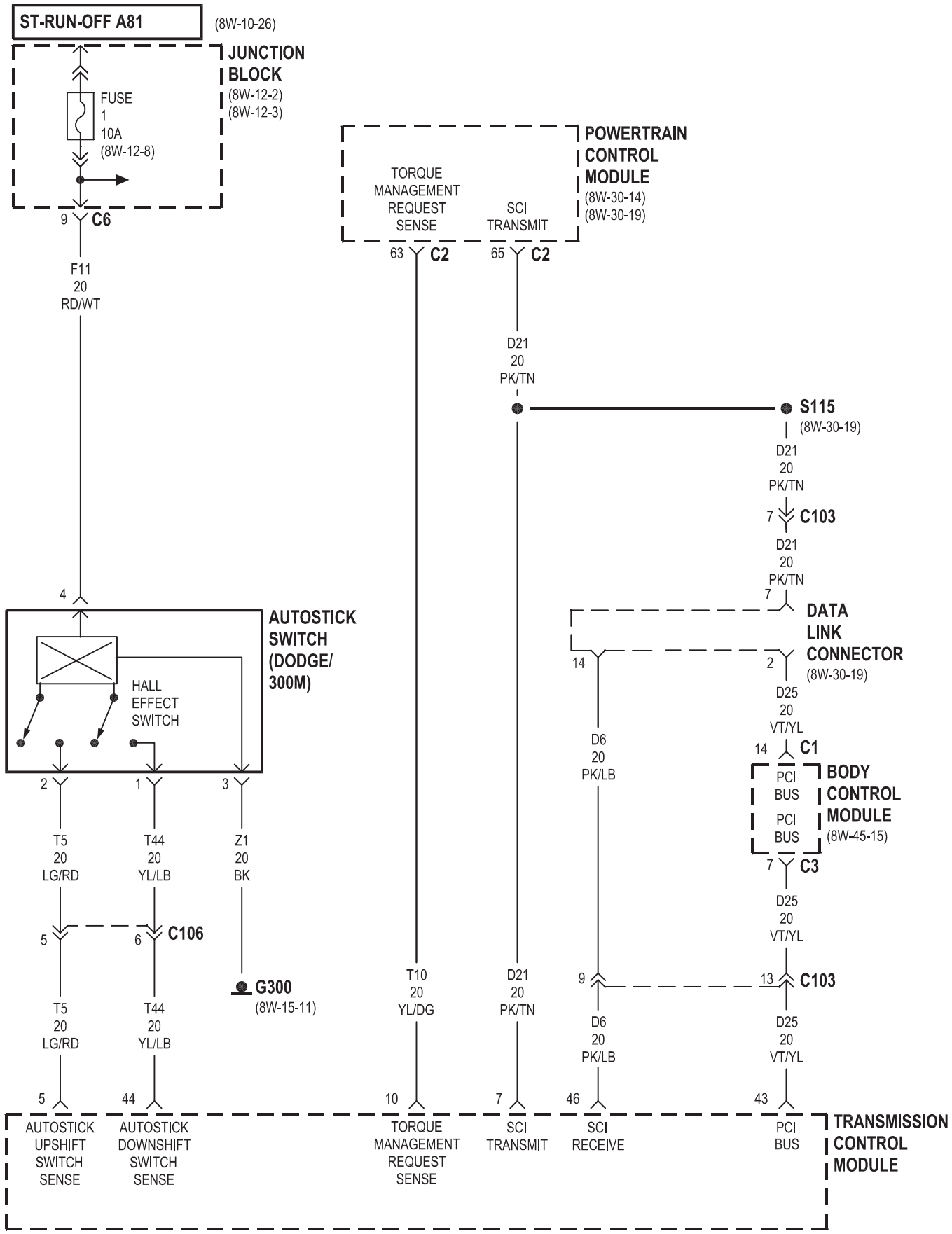

OUTPUT SPEED SENSOR
INPUT SPEED SENSOR
TRANSMISSION RANGE SENSOR
(8W-31-5)
SPEED SENSOR GROUND
2
1
3
1
2
T13 20 DB/BK
T13 20 DB/BK
T13 20 DB/BK
T52 20 RD/BK
S146
T14 20 LG/WT
T13 20 DB/BK
14
9
13
C107
T14 20 LG/WT
T13 20 DB/BK
T52 20 RD/BK
14
13
52
OUTPUT SPEED SENSOR SIGNAL
SPEED SENSOR GROUND
INPUT SPEED SENSOR SIGNAL
TRANSMISSION CONTROL MODULE


POWERTRAIN CONTROL MODULE
(8W-30-7)
(8W-30-9)
EATX RPM SIGNAL
SENSOR GROUND
THROTTLE POSITION SENSOR SIGNAL
TORQUE MANAGEMENT REQUEST SENSE
VEHICLE SPEED SENSOR SIGNAL
71 C2
43 C2
35 C1
63 C2
66 C2
K71 20 WT/RD
K4 18 BK/LB
K22 20 OR/DB
T10 20 YL/DG
G7 20 WT/OR
S127
(8W-70-3)
S107
K22 20 OR/DB
K22 20 OR/DB
2
THROTTLE POSITION SENSOR SIGNAL
THROTTLE POSITION SENSOR
(8W-30-9)
2 C102
K4 20 BK/LB
K22 20 OR/DB
6
51
12
10
58
EATX RPM SIGNAL
SENSOR GROUND
THROTTLE POSITION SENSOR SIGNAL
TORQUE MANAGEMENT REQUEST SENSE
VEHICLE SPEED SENSOR SIGNAL
TRANSMISSION CONTROL MODULE


RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 17 10A
(8W-12-18)
4 C9
6 C10
5 C11
12 C6
LHS
OTHER
L1 20 VT/BK
L1 18 VT/BK
1 C315
TO S401
(8W-12-28)
L1 20 VT/BK
TO S310
(8W-12-28)
F20 20 WT
L1 20 VT/BK
TRS T41 SENSE
76 C2
POWERTRAIN CONTROL MODULE
(8W-30-14)
3
BACK-UP LAMP FEED
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
T41 20 BR/YL
TRANSMISSION CONTROL MODULE
TRS T41 SENSE
TRS T42 SENSE
TRS T3 SENSE
TRS T1 SENSE
TRANSMISSION TEMPERATURE SENSOR SIGNAL
SPEED SENSOR GROUND
41
42
3
1
54
13
T41 20 BR/YL
T42 20 VT/WT
T3 20 VT
T1 20 LG/BK
T54 20 VT/PK
T13 20 DB/BK
S113
T41 20 BK/WT
T41 20 BR/YL
3
2
1
7
6
5
4
8
9 C107
T13 20 DB/BK
S146
(8W-31-3)
F20 20 WT
L1 20 VT/BK
T41 20 BK/WT
T41 20 BR/YL
T42 20 VT/WT
T3 20 VT
T1 20 LG/BK
T54 20 VT/PK
T13 20 DB/BK
1
6
5
10
9
8
7
4
3
TRANSMISSION RANGE SENSOR
BACK-UP LAMP SWITCH
R
PN
PRNL
P3L
NOL
TRANS TEMP SENSOR
C1
C2
C3
C4

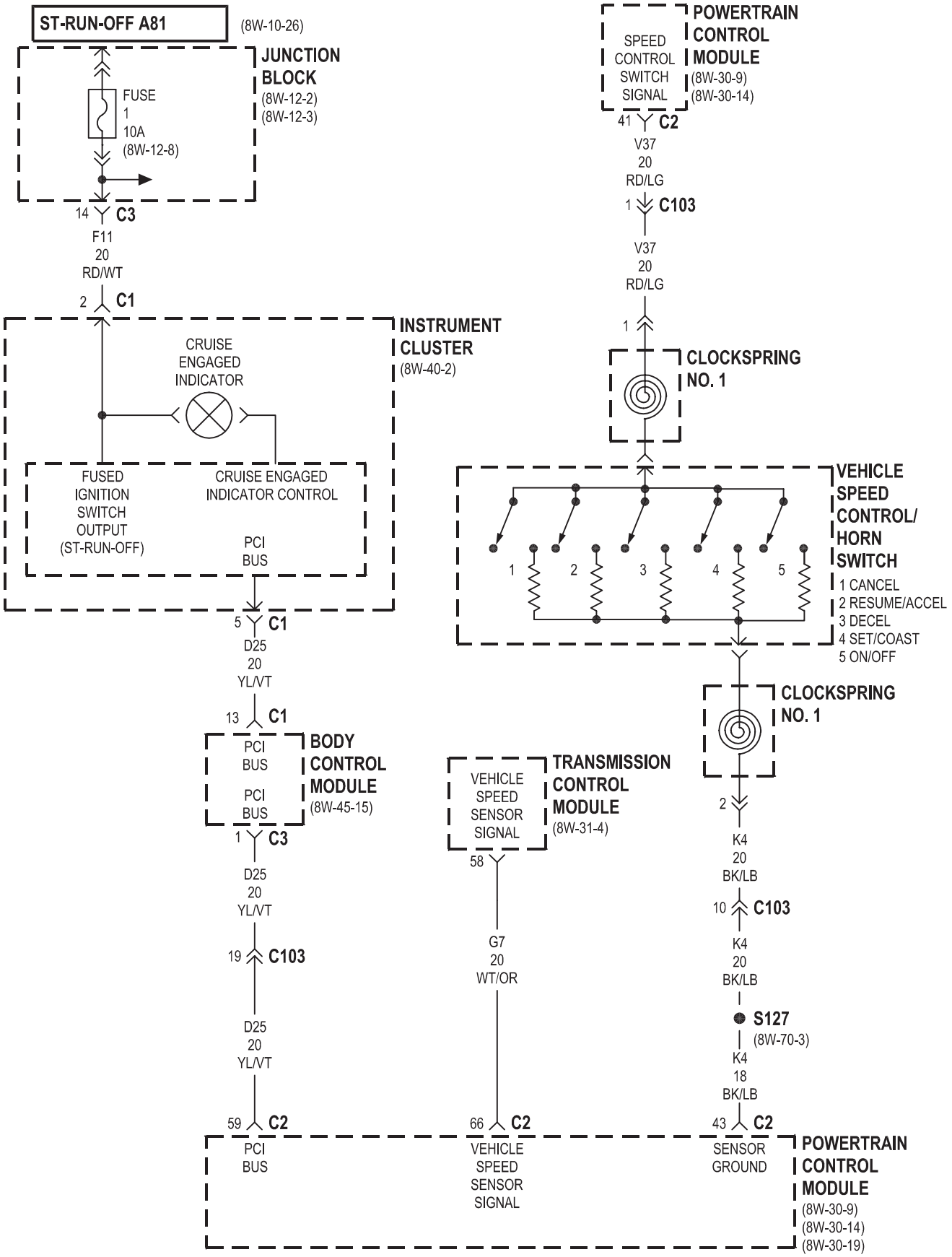

BATT A30
(8W-10-23)
POWER DISTRIBUTION CENTER
(8W-10-2)
B
TRANSMISSION CONTROL RELAY
(8W-31-2)
D
T16
16
RD
S114
(8W-10-23)
10
C108
16
17
TRANSMISSION CONTROL RELAY OUTPUT
TRANSMISSION CONTROL RELAY OUTPUT
TRANSMISSION CONTROL MODULE
6
LOW/ REVERSE PRESSURE SWITCH
2-4 PRESSURE SWITCH
OVERDRIVE PRESSURE SWITCH
TRANSMISSION SOLENOID/ PRESSURE SWITCH ASSEMBLY
1
5
2
T50
16
DG
T47
16
YL/BK
T9
16
OR/BK
C108
7
50
47
9
LOW/ REVERSE PRESSURE SWITCH SENSE
2-4 PRESSURE SWITCH SENSE
OVERDRIVE PRESSURE SWITCH SENSE
TRANSMISSION CONTROL MODULE

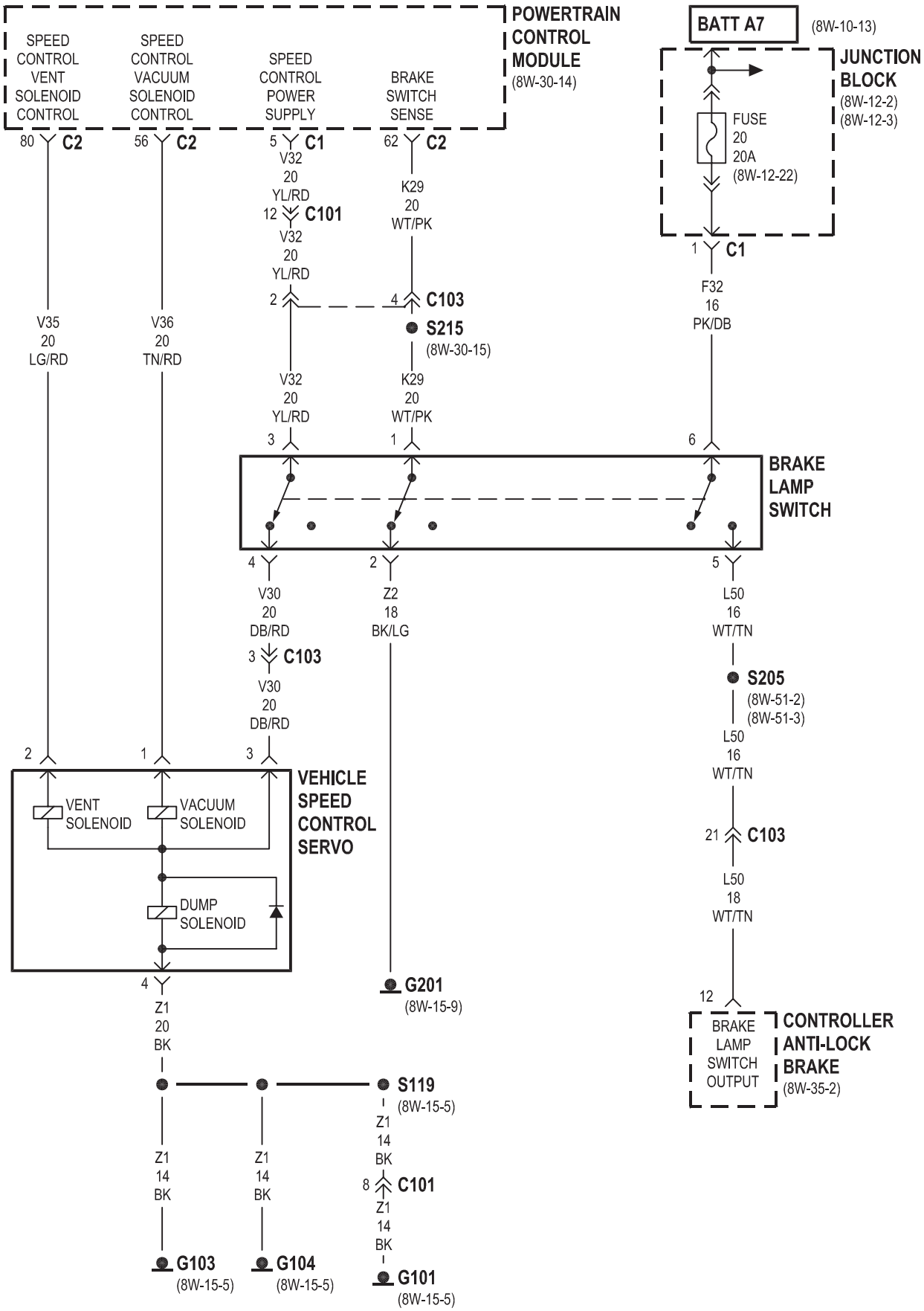

BATT A30
(8W-10-23)
POWER DISTRIBUTION CENTER
(8W-10-2)
B
TRANSMISSION CONTROL RELAY
(8W-31-2)
D
T16
16
RD
S114
(8W-10-23)
T16
16
RD
10
C108
T16
16
RD
6
TRANSMISSION SOLENOID/ PRESSURE SWITCH ASSEMBLY
LOW/ REVERSE SOLENOID
2-4 SOLENOID
UNDERDRIVE SOLENOID
OVERDRIVE SOLENOID
8
7
3
4
T20
16
LB
T19
16
WT
T59
16
PK
T60
16
BR
9
2
5
4
C108
T20
16
LB
T19
16
WT
T59
16
PK
T60
16
BR
20
19
59
60
LOW/ REVERSE SOLENOID CONTROL
2-4 SOLENOID CONTROL
UNDERDRIVE SOLENOID CONTROL
OVERDRIVE SOLENOID CONTROL
TRANSMISSION CONTROL MODULE


ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A
(8W-12-8)
9 C6
F11 20 RD/WT
4
AUTOSTICK SWITCH (DODGE/ 300M)
HALL EFFECT SWITCH
2
1
3
T5 20 LG/RD
T44 20 YL/LB
Z1 20 BK
5
6
C106
T5 20 LG/RD
T44 20 YL/LB
G300
(8W-15-11)
POWERTRAIN CONTROL MODULE
(8W-30-14)
(8W-30-19)
TORQUE MANAGEMENT REQUEST SENSE
SCI TRANSMIT
63 C2
65 C2
T10 20 YL/DG
D21 20 PK/TN
D21 20 PK/TN
S115
(8W-30-19)
D21 20 PK/TN
7 C103
D21 20 PK/TN
7
DATA LINK CONNECTOR
(8W-30-19)
14
2
D25 20 VT/YL
14 C1
D6 20 PK/LB
BODY CONTROL MODULE
(8W-45-15)
PCI BUS
PCI BUS
7 C3
D25 20 VT/YL
9
13 C103
D6 20 PK/LB
D25 20 VT/YL
5
44
10
7
46
43
AUTOSTICK UPSHIFT SWITCH SENSE
AUTOSTICK DOWNSHIFT SWITCH SENSE
TORQUE MANAGEMENT REQUEST SENSE
SCI TRANSMIT
SCI RECEIVE
PCI BUS
TRANSMISSION CONTROL MODULE

8W-33 VEHICLE SPEED CONTROL

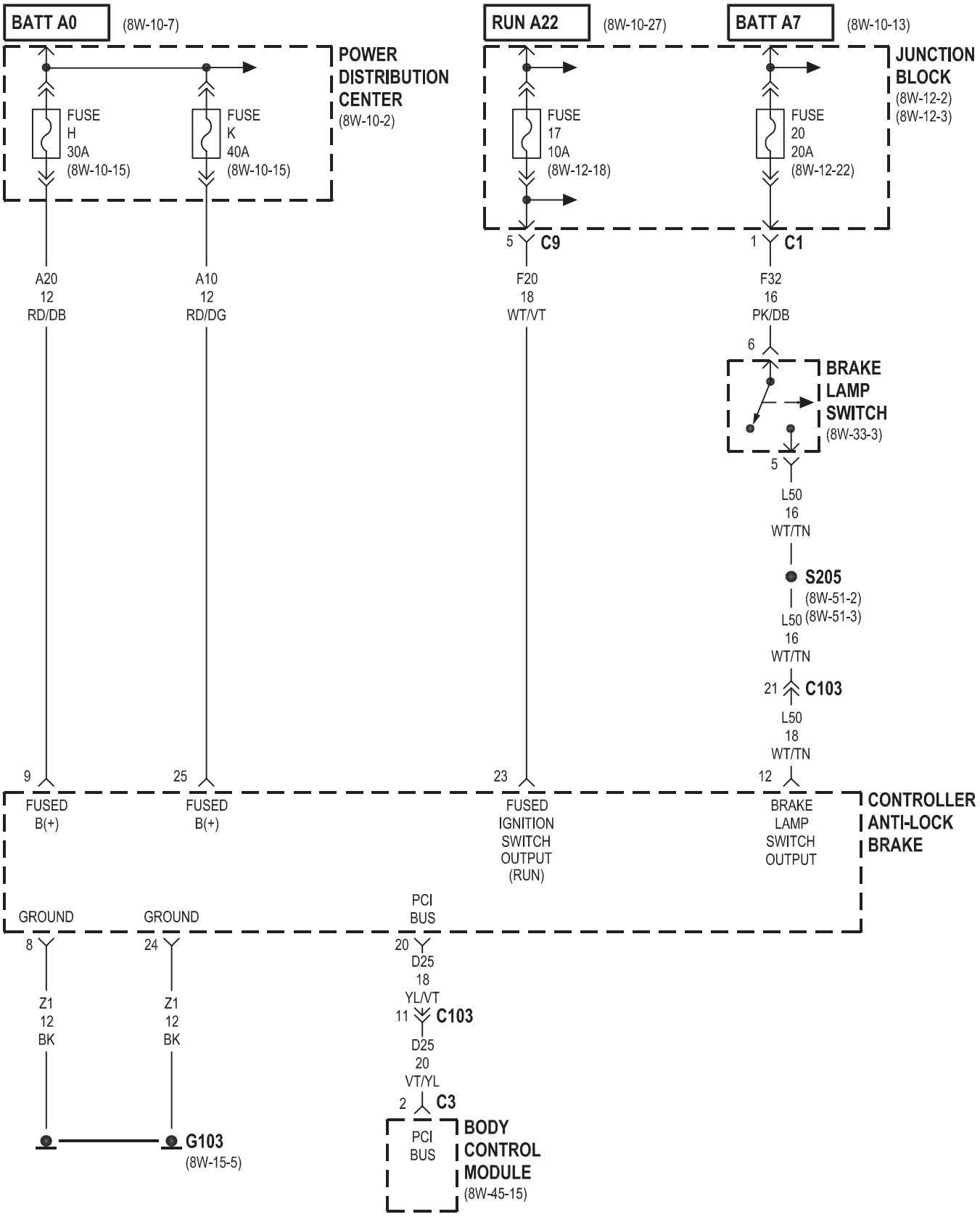
Component	Page
Body Control Module	8W-33-2
Brake Lamp Switch	8W-33-3
Clockspring No. 1	8W-33-2
Controller Anti-Lock Brake	8W-33-3
Cruise Engaged Indicator	8W-33-2
Fuse 1 (JB)	8W-33-2
Fuse 20 (JB)	8W-33-3
G101	8W-33-3
G103	8W-33-3
G104	8W-33-3
G201	8W-33-3
Instrument Cluster	8W-33-2
Junction Block	8W-33-2, 3
Powertrain Control Module	8W-33-2, 3
Transmission Control Module	8W-33-2
Vehicle Speed Control Servo	8W-33-3
Vehicle Speed Control/Horn Switch	8W-33-2

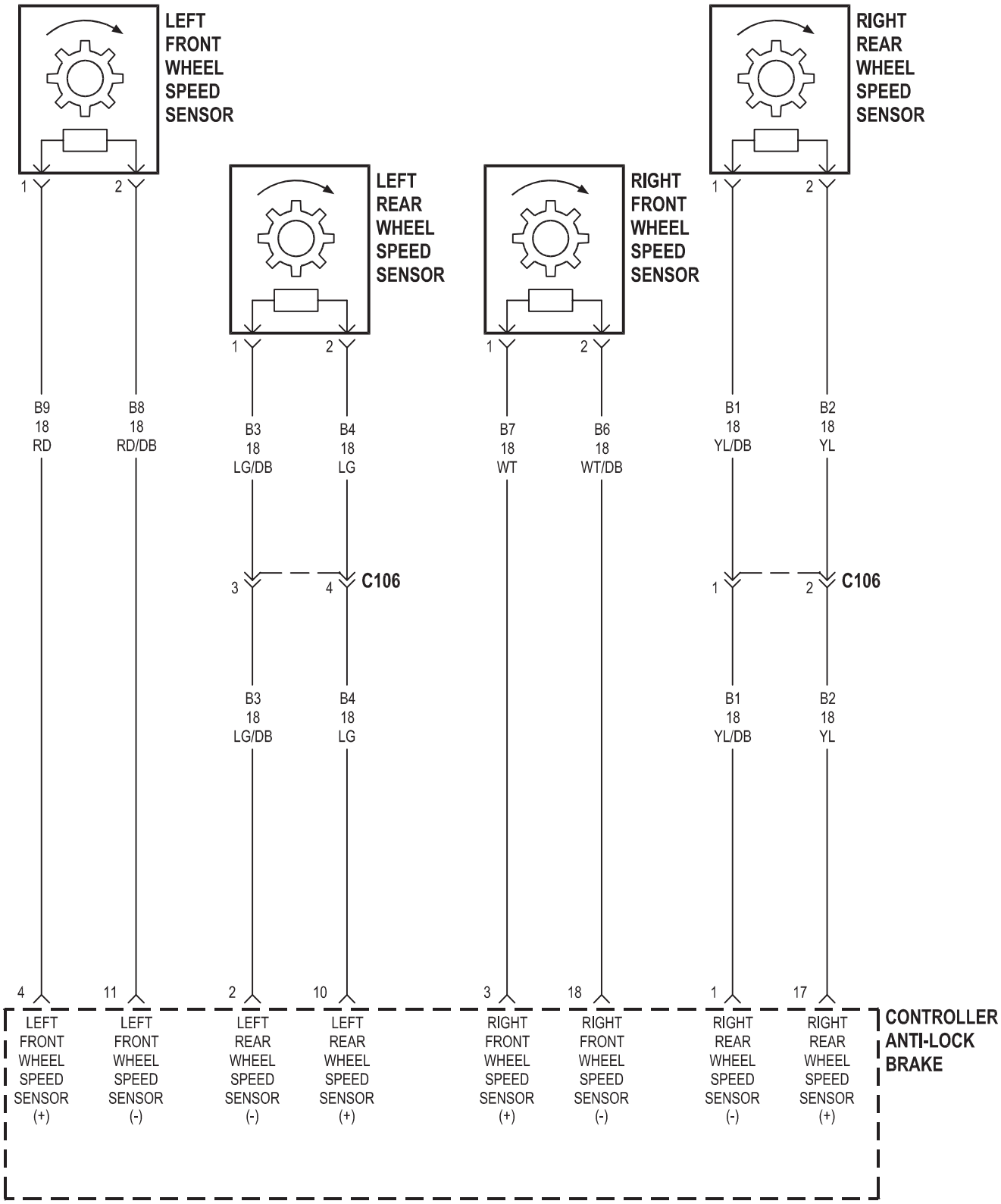

ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A
(8W-12-8)
14 C3
F11 20 RD/WT
2 C1
INSTRUMENT CLUSTER
(8W-40-2)
CRUISE ENGAGED INDICATOR
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
CRUISE ENGAGED INDICATOR CONTROL
PCI BUS
5 C1
D25 20 YL/VT
13 C1
PCI BUS
PCI BUS
BODY CONTROL MODULE
(8W-45-15)
1 C3
D25 20 YL/VT
19 C103
D25 20 YL/VT
59 C2
PCI BUS
SPEED CONTROL SWITCH SIGNAL
POWERTRAIN CONTROL MODULE
(8W-30-9)
(8W-30-14)
41 C2
V37 20 RD/LG
1 C103
V37 20 RD/LG
1
CLOCKSPRING NO. 1
VEHICLE SPEED CONTROL/ HORN SWITCH
1 CANCEL
2 RESUME/ACCEL
3 DECEL
4 SET/COAST
5 ON/OFF
1 2 3 4 5
CLOCKSPRING NO. 1
2
K4 20 BK/LB
10 C103
K4 20 BK/LB
S127
(8W-70-3)
K4 18 BK/LB
43 C2
SENSOR GROUND
VEHICLE SPEED SENSOR SIGNAL
TRANSMISSION CONTROL MODULE
(8W-31-4)
58
G7 20 WT/OR
66 C2
VEHICLE SPEED SENSOR SIGNAL
POWERTRAIN CONTROL MODULE
(8W-30-9)
(8W-30-14)
(8W-30-19)


POWERTRAIN CONTROL MODULE
(8W-30-14)
SPEED CONTROL VENT SOLENOID CONTROL
SPEED CONTROL VACUUM SOLENOID CONTROL
SPEED CONTROL POWER SUPPLY
BRAKE SWITCH SENSE
80 C2
56 C2
5 C1
62 C2
V32 20 YL/RD
12 C101
V32 20 YL/RD
2
4 C103
S215
(8W-30-15)
K29 20 WT/PK
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 20 20A
(8W-12-22)
1 C1
F32 16 PK/DB
V35 20 LG/RD
V36 20 TN/RD
V32 20 YL/RD
K29 20 WT/PK
3
1
6
BRAKE LAMP SWITCH
4
2
5
V30 20 DB/RD
Z2 18 BK/LG
L50 16 WT/TN
3 C103
V30 20 DB/RD
S205
(8W-51-2)
(8W-51-3)
L50 16 WT/TN
2
1
3
VEHICLE SPEED CONTROL SERVO
VENT SOLENOID
VACUUM SOLENOID
DUMP SOLENOID
21 C103
L50 18 WT/TN
4
G201
(8W-15-9)
12
BRAKE LAMP SWITCH OUTPUT
CONTROLLER ANTI-LOCK BRAKE
(8W-35-2)
Z1 20 BK
S119
(8W-15-5)
Z1 14 BK
Z1 14 BK
8 C101
Z1 14 BK
G103
(8W-15-5)
G104
(8W-15-5)
G101
(8W-15-5)

8W-35 ANTI-LOCK BRAKES

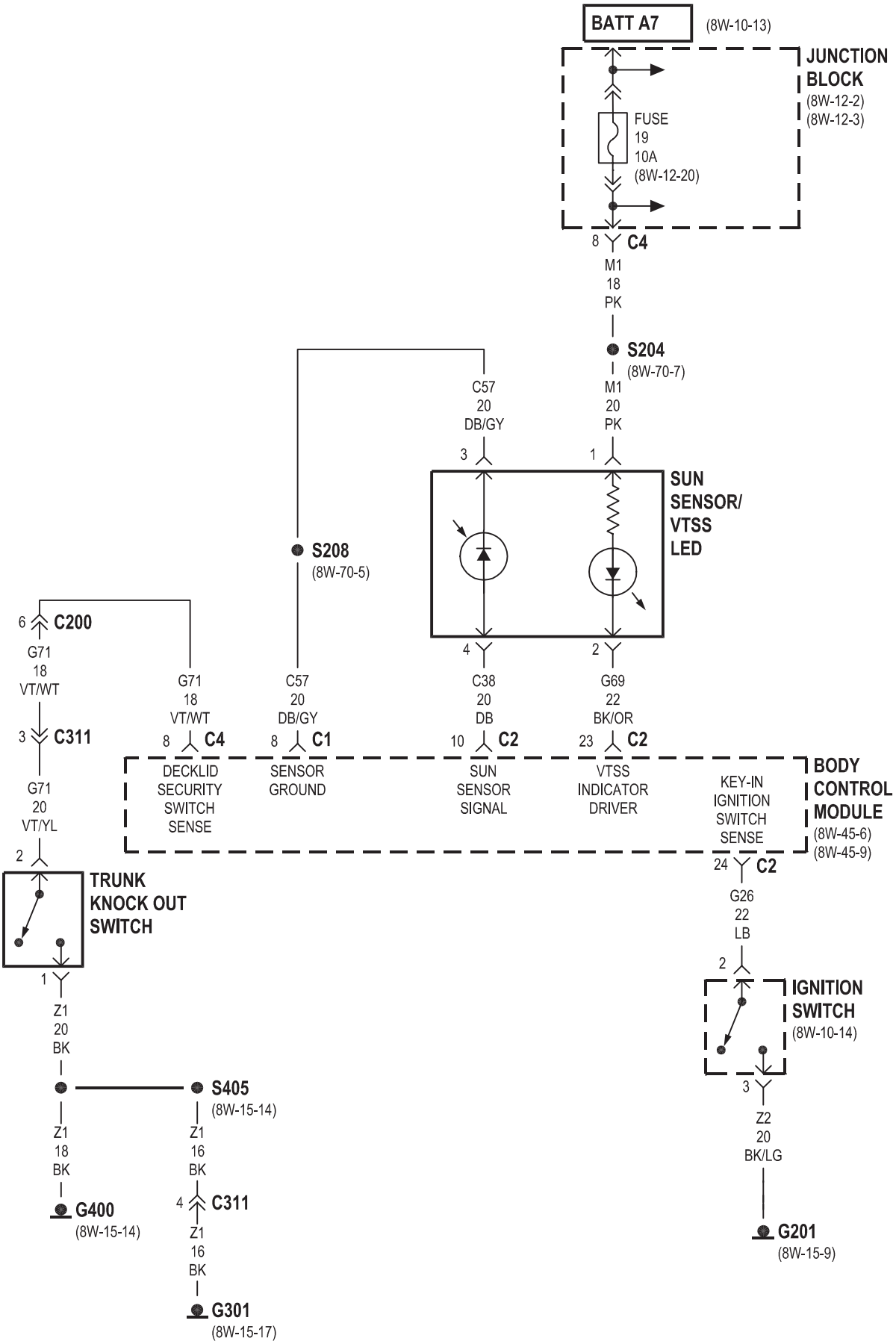
Component	Page
Body Control Module	8W-35-2
Brake Lamp Switch	8W-35-2
Controller Anti-Lock Brake	8W-35-2, 3
Fuse 17 (JB)	8W-35-2
Fuse 20 (JB)	8W-35-2
Fuse H (PDC)	8W-35-2
Fuse K (PDC)	8W-35-2
G103	8W-35-2
Junction Block	8W-35-2
Left Front Wheel Speed Sensor	8W-35-3
Left Rear Wheel Speed Sensor	8W-35-3
Power Distribution Center	8W-35-2
Right Front Wheel Speed Sensor	8W-35-3
Right Rear Wheel Speed Sensor	8W-35-3

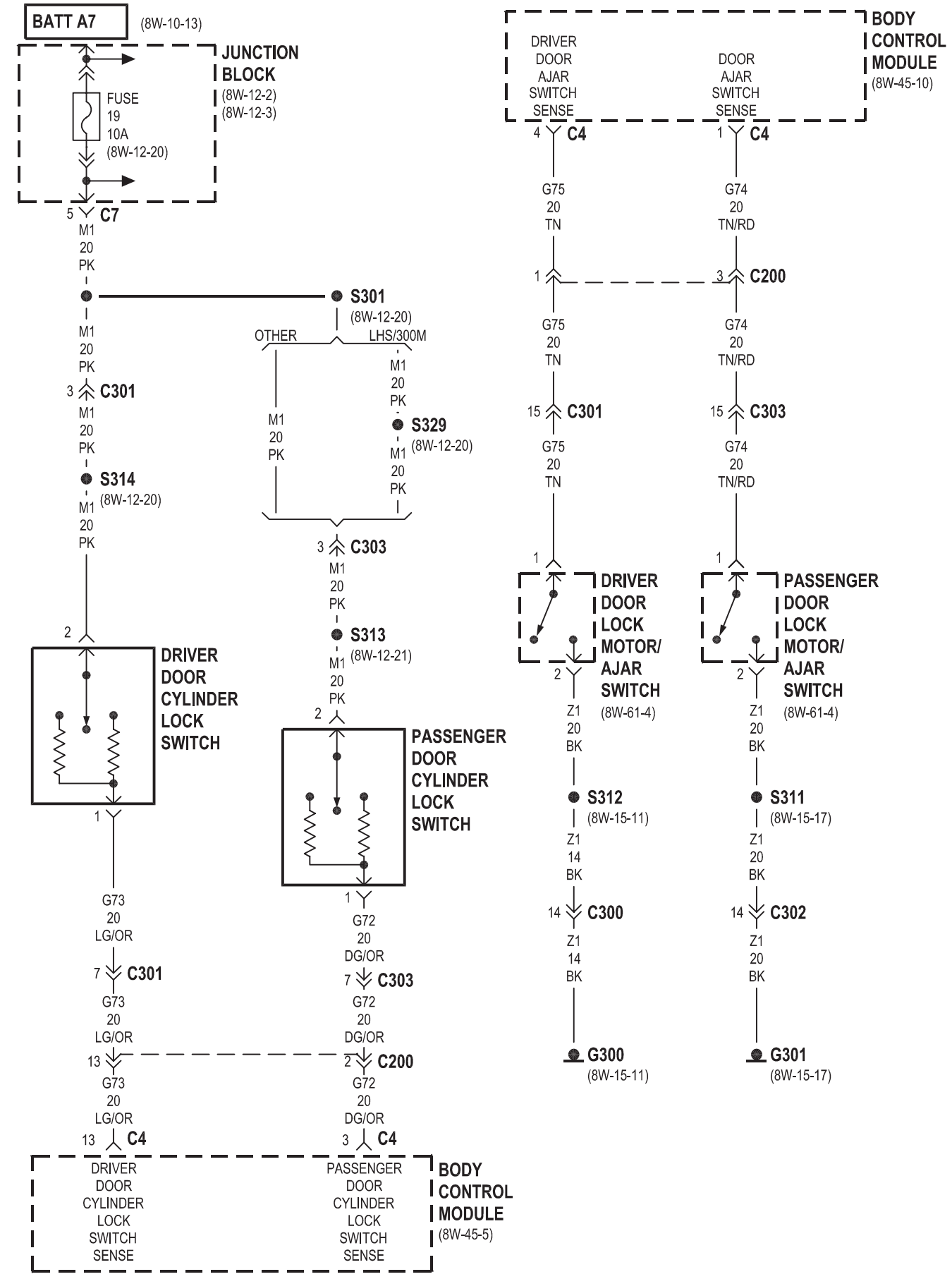

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE H 30A (8W-10-15)
FUSE K 40A (8W-10-15)
RUN A22
(8W-10-27)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 17 10A (8W-12-18)
FUSE 20 20A (8W-12-22)
5 C9
1 C1
A20 12 RD/DB
A10 12 RD/DG
F20 18 WT/VT
F32 16 PK/DB
6
BRAKE LAMP SWITCH
(8W-33-3)
5
L50 16 WT/TN
S205
(8W-51-2)
(8W-51-3)
L50 16 WT/TN
21 C103
L50 18 WT/TN
9
25
23
12
FUSED B(+)
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN)
BRAKE LAMP SWITCH OUTPUT
CONTROLLER ANTI-LOCK BRAKE
GROUND
GROUND
PCI BUS
8
24
20
Z1 12 BK
Z1 12 BK
D25 18 YL/VT
11 C103
D25 20 VT/YL
2 C3
G103
(8W-15-5)
PCI BUS
BODY CONTROL MODULE
(8W-45-15)

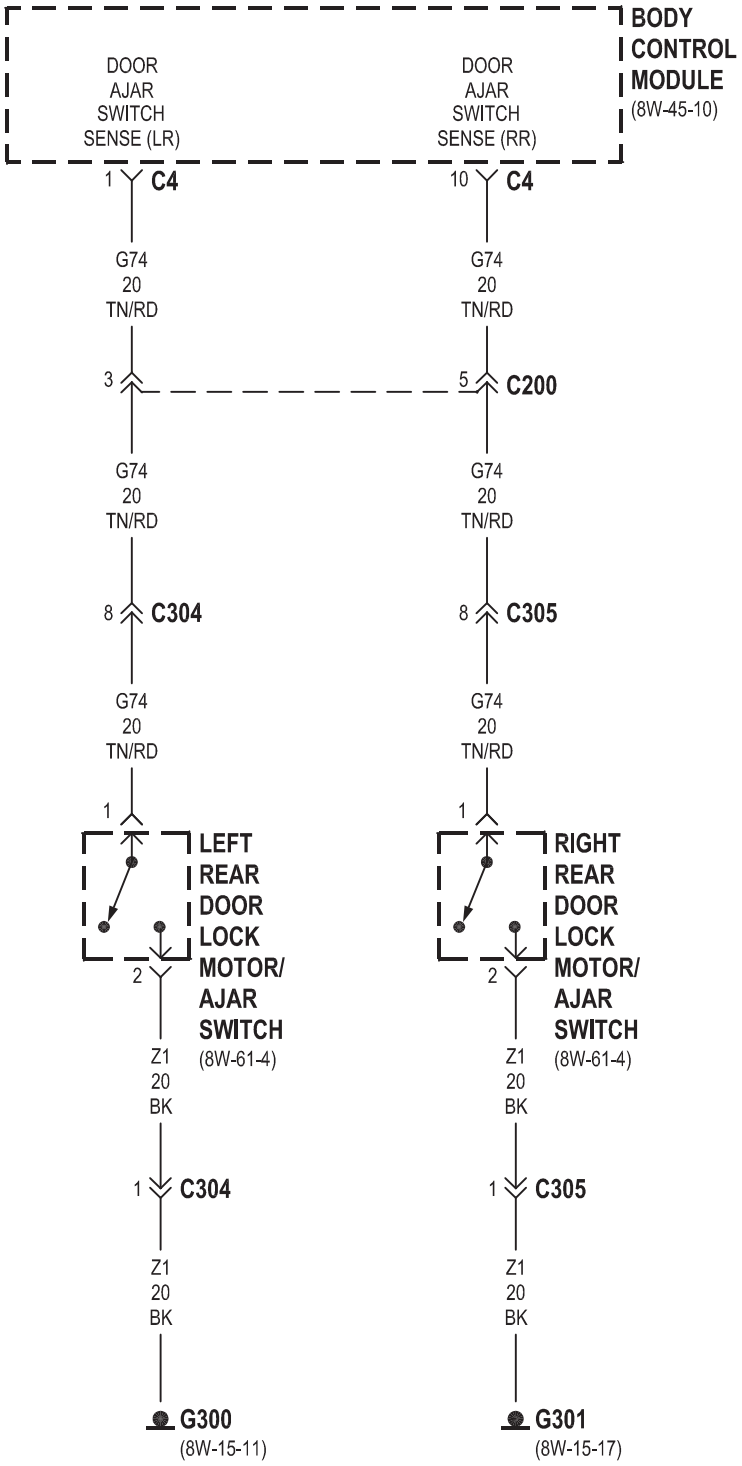

LEFT FRONT WHEEL SPEED SENSOR
LEFT REAR WHEEL SPEED SENSOR
RIGHT FRONT WHEEL SPEED SENSOR
RIGHT REAR WHEEL SPEED SENSOR
1
2
B9 18 RD
B8 18 RD/DB
B3 18 LG/DB
B4 18 LG
B7 18 WT
B6 18 WT/DB
B1 18 YL/DB
B2 18 YL
3
4
C106
4
11
2
10
3
18
1
17
LEFT FRONT WHEEL SPEED SENSOR (+)
LEFT FRONT WHEEL SPEED SENSOR (-)
LEFT REAR WHEEL SPEED SENSOR (-)
LEFT REAR WHEEL SPEED SENSOR (+)
RIGHT FRONT WHEEL SPEED SENSOR (+)
RIGHT FRONT WHEEL SPEED SENSOR (-)
RIGHT REAR WHEEL SPEED SENSOR (-)
RIGHT REAR WHEEL SPEED SENSOR (+)
CONTROLLER ANTI-LOCK BRAKE

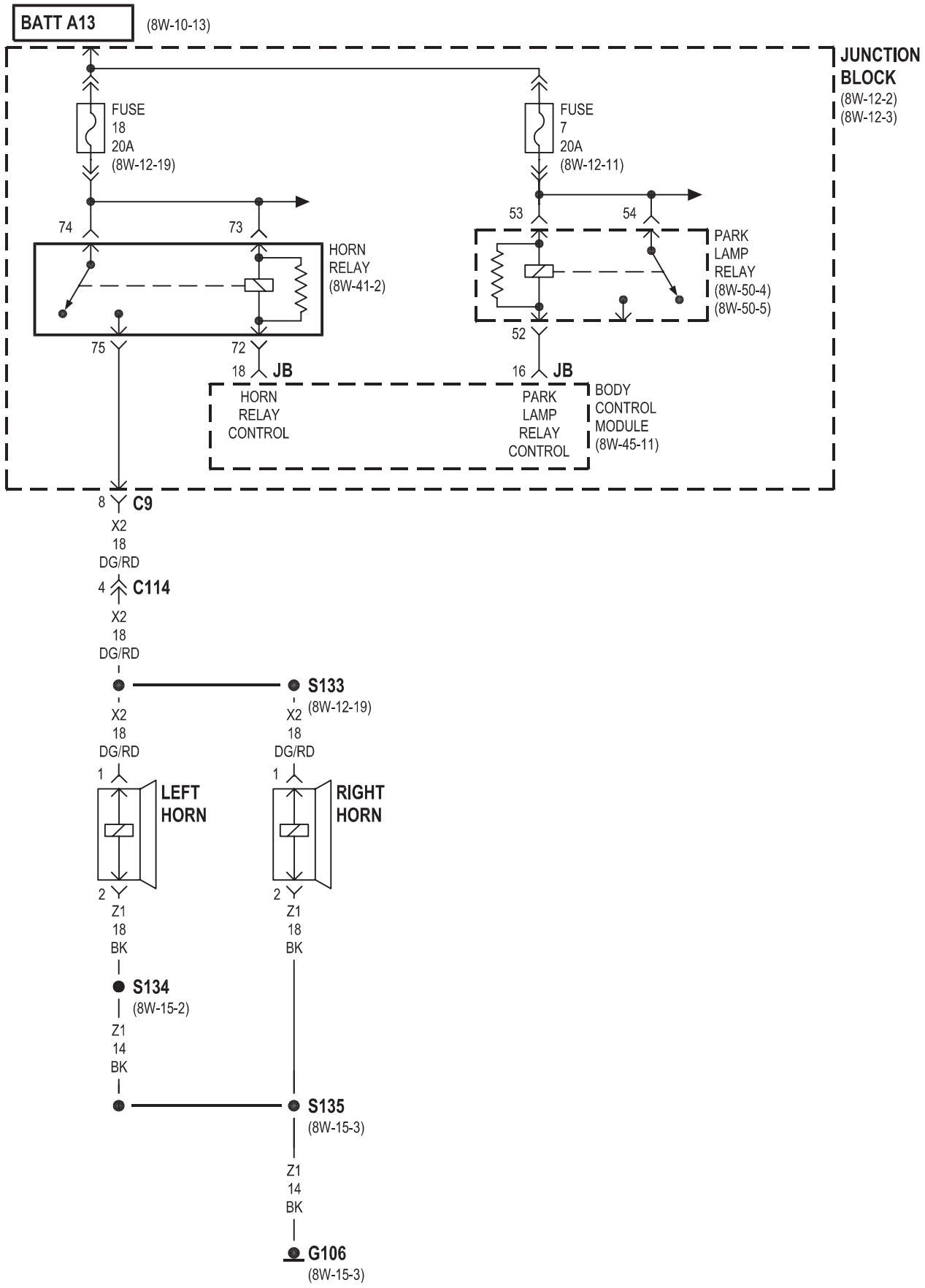
8W-39 VEHICLE THEFT SECURITY SYSTEM

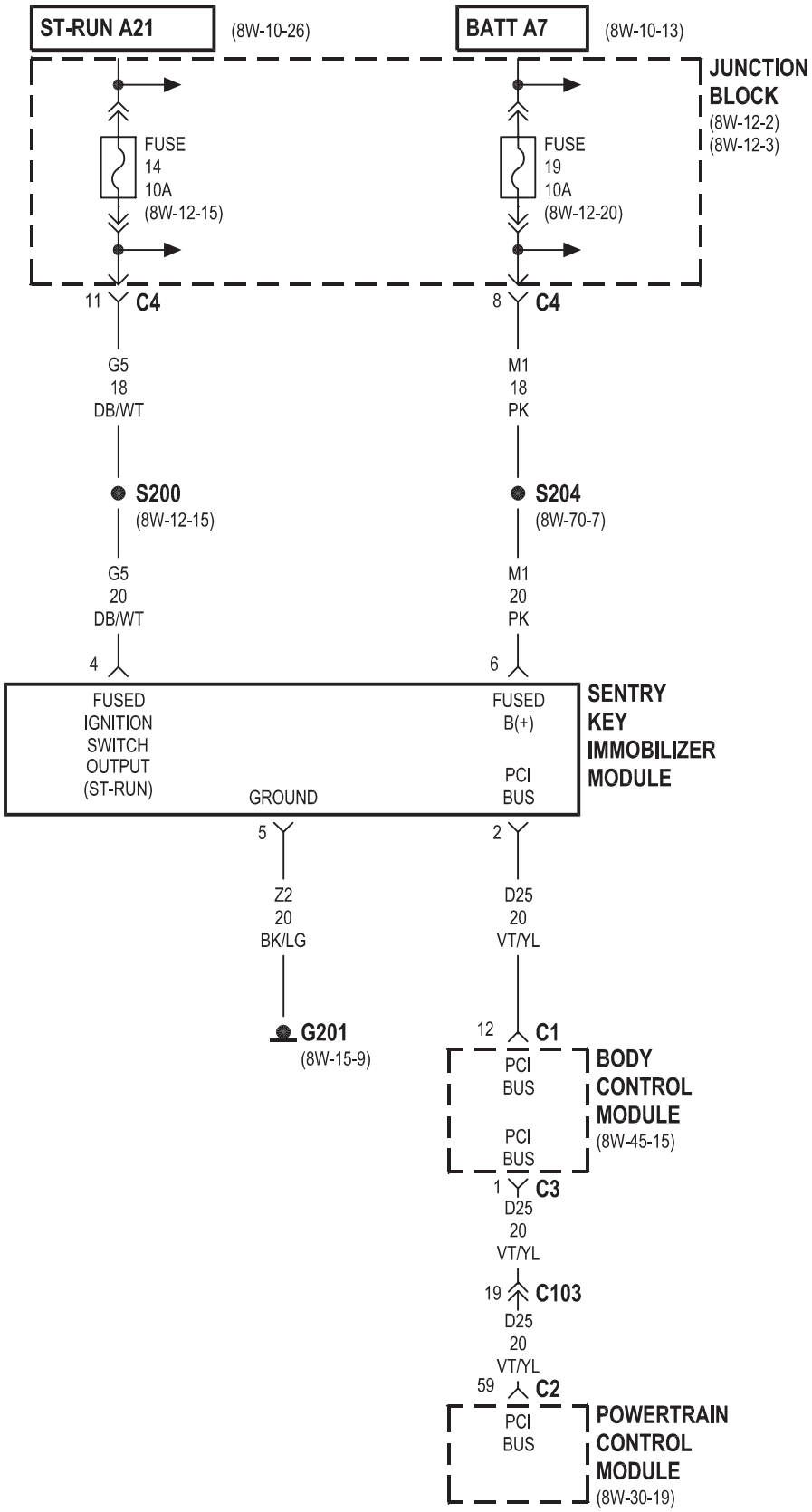
Component	Page
Body Control Module	8W-39-2, 3, 4, 5, 6
Driver Door Cylinder Lock Switch	8W-39-3
Driver Door Lock Motor/Ajar Switch	8W-39-3
Fuse 14 (JB)	8W-39-6
Fuse 18 (JB)	8W-39-5
Fuse 19 (JB)	8W-39-2, 3, 6
Fuse 7 (JB)	8W-39-5
G106	8W-39-5
G201	8W-39-2, 6
G300	8W-39-3, 4
G301	8W-39-2, 3, 4
G400	8W-39-2
Horn Relay	8W-39-5
Ignition Switch	8W-39-2
Junction Block	8W-39-2, 3, 5, 6
Left Horn	8W-39-5
Left Rear Door Lock Motor/Ajar Switch	8W-39-4
Park Lamp Relay	8W-39-5
Passenger Door Cylinder Lock Switch	8W-39-3
Passenger Door Lock Motor/Ajar Switch	8W-39-3
Powertrain Control Module	8W-39-6
Right Horn	8W-39-5
Right Rear Door Lock Motor/Ajar Switch	8W-39-4
Sentry Key Immobilizer Module	8W-39-6
Sun Sensor/VTSS Led	8W-39-2
Trunk Knock Out Switch	8W-39-2


BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
8 C4
M1 18 PK
S204
(8W-70-7)
C57 20 DB/GY
M1 20 PK
3
1
SUN SENSOR/ VTSS LED
S208
(8W-70-5)
6 C200
G71 18 VT/WT
3 C311
G71 20 VT/YL
2
4
2
G71 18 VT/WT
8 C4
C57 20 DB/GY
8 C1
C38 20 DB
10 C2
G69 22 BK/OR
23 C2
DECKLID SECURITY SWITCH SENSE
SENSOR GROUND
SUN SENSOR SIGNAL
VTSS INDICATOR DRIVER
KEY-IN IGNITION SWITCH SENSE
BODY CONTROL MODULE
(8W-45-6)
(8W-45-9)
24 C2
G26 22 LB
2
TRUNK KNOCK OUT SWITCH
1
Z1 20 BK
S405
(8W-15-14)
Z1 18 BK
G400
(8W-15-14)
Z1 16 BK
4 C311
Z1 16 BK
G301
(8W-15-17)
IGNITION SWITCH
(8W-10-14)
3
Z2 20 BK/LG
G201
(8W-15-9)


BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
5 C7
M1 20 PK
S301
(8W-12-20)
OTHER
LHS/300M
3 C301
S314
(8W-12-20)
S329
(8W-12-20)
3 C303
S313
(8W-12-21)
2
DRIVER DOOR CYLINDER LOCK SWITCH
PASSENGER DOOR CYLINDER LOCK SWITCH
1
G73 20 LG/OR
7 C301
13 C200
13 C4
G72 20 DG/OR
7 C303
2 C200
3 C4
DRIVER DOOR CYLINDER LOCK SWITCH SENSE
PASSENGER DOOR CYLINDER LOCK SWITCH SENSE
BODY CONTROL MODULE
(8W-45-5)
DRIVER DOOR AJAR SWITCH SENSE
DOOR AJAR SWITCH SENSE
BODY CONTROL MODULE
(8W-45-10)
4 C4
1 C4
G75 20 TN
G74 20 TN/RD
1 3 C200
15 C301
15 C303
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
Z1 20 BK
S312
(8W-15-11)
S311
(8W-15-17)
Z1 14 BK
14 C300
14 C302
G300
(8W-15-11)
G301
(8W-15-17)

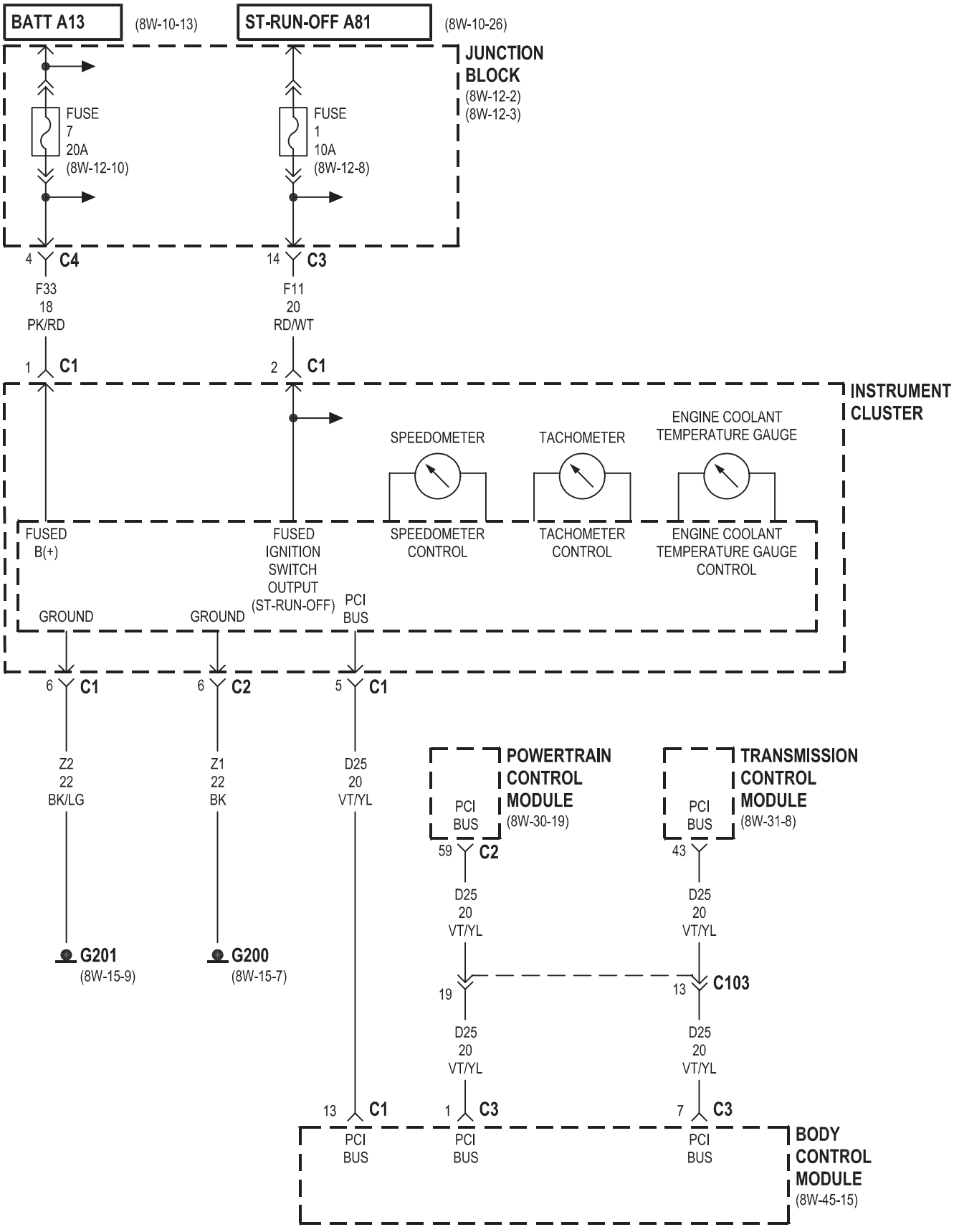

BODY CONTROL MODULE
(8W-45-10)
DOOR AJAR SWITCH SENSE (LR)
DOOR AJAR SWITCH SENSE (RR)
1 C4
10 C4
G74 20 TN/RD
3
5 C200
8 C304
8 C305
1
LEFT REAR DOOR LOCK MOTOR/ AJAR SWITCH
(8W-61-4)
RIGHT REAR DOOR LOCK MOTOR/ AJAR SWITCH
2
Z1 20 BK
G300
(8W-15-11)
G301
(8W-15-17)

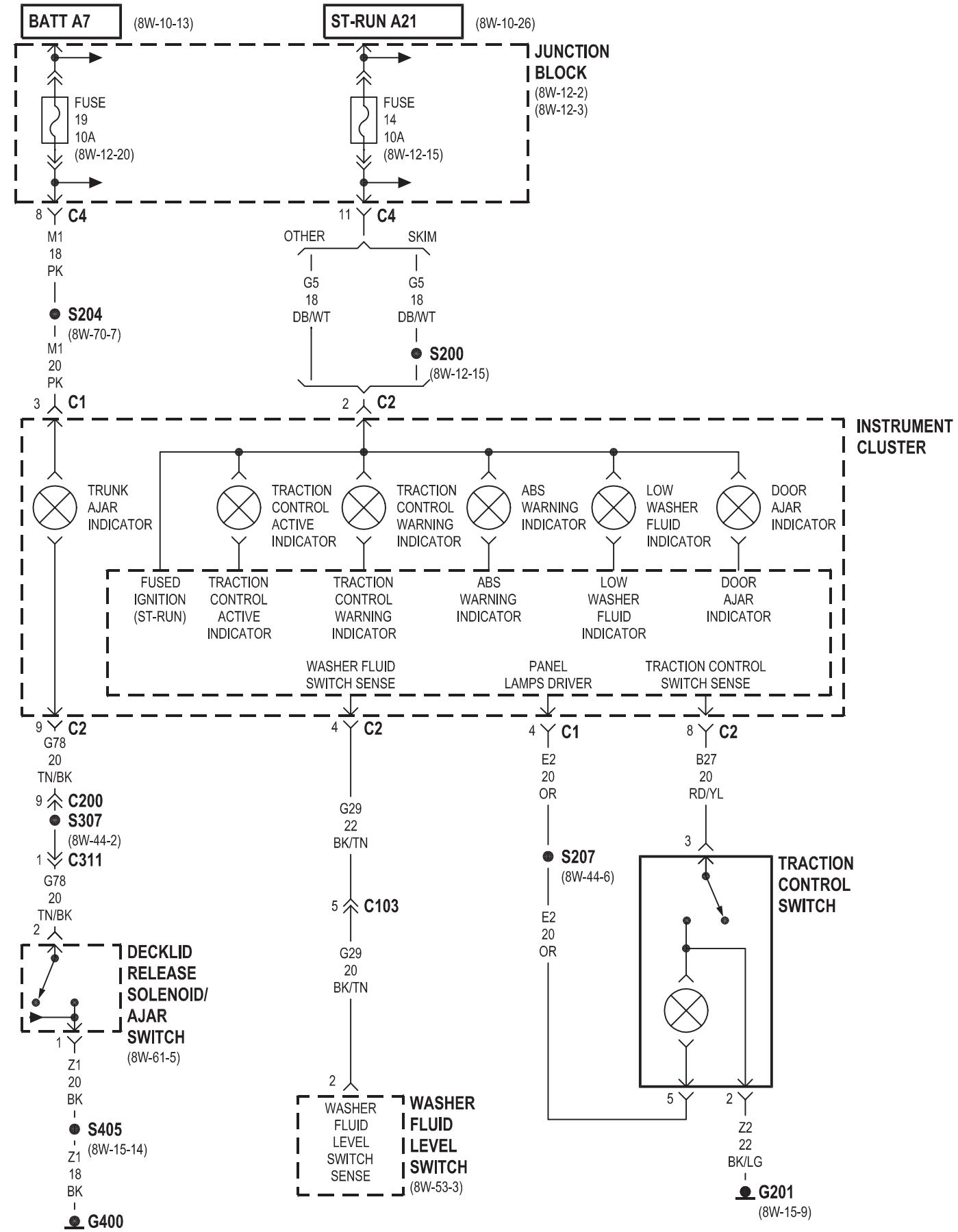

BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 18 20A (8W-12-19)
FUSE 7 20A (8W-12-11)
74
73
53
54
HORN RELAY (8W-41-2)
PARK LAMP RELAY (8W-50-4) (8W-50-5)
75
72
52
18 JB
16 JB
HORN RELAY CONTROL
PARK LAMP RELAY CONTROL
BODY CONTROL MODULE (8W-45-11)
8 C9
X2 18 DG/RD
4 C114
X2 18 DG/RD
S133
(8W-12-19)
X2 18 DG/RD
X2 18 DG/RD
1
1
LEFT HORN
RIGHT HORN
2
2
Z1 18 BK
Z1 18 BK
S134
(8W-15-2)
Z1 14 BK
S135
(8W-15-3)
Z1 14 BK
G106
(8W-15-3)


ST-RUN A21
(8W-10-26)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 14 10A (8W-12-15)
FUSE 19 10A (8W-12-20)
11 C4
8 C4
G5 18 DB/WT
M1 18 PK
S200
(8W-12-15)
S204
(8W-70-7)
G5 20 DB/WT
M1 20 PK
4
6
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED B(+)
PCI BUS
SENTRY KEY IMMOBILIZER MODULE
GROUND
5
2
Z2 20 BK/LG
D25 20 VT/YL
G201
(8W-15-9)
12 C1
PCI BUS
PCI BUS
BODY CONTROL MODULE
(8W-45-15)
1 C3
D25 20 VT/YL
19 C103
D25 20 VT/YL
59 C2
PCI BUS
POWERTRAIN CONTROL MODULE
(8W-30-19)

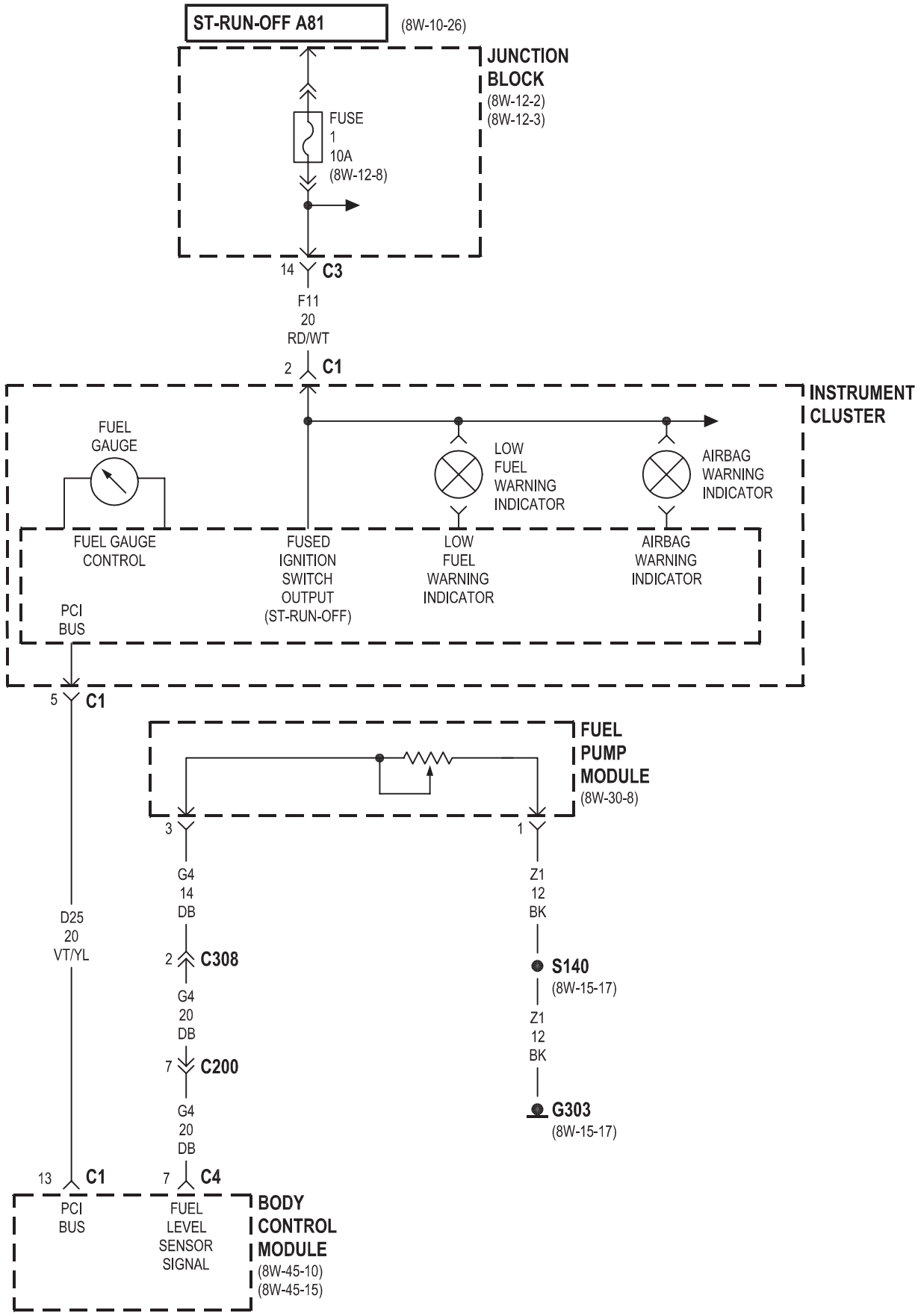
8W-40 INSTRUMENT CLUSTER

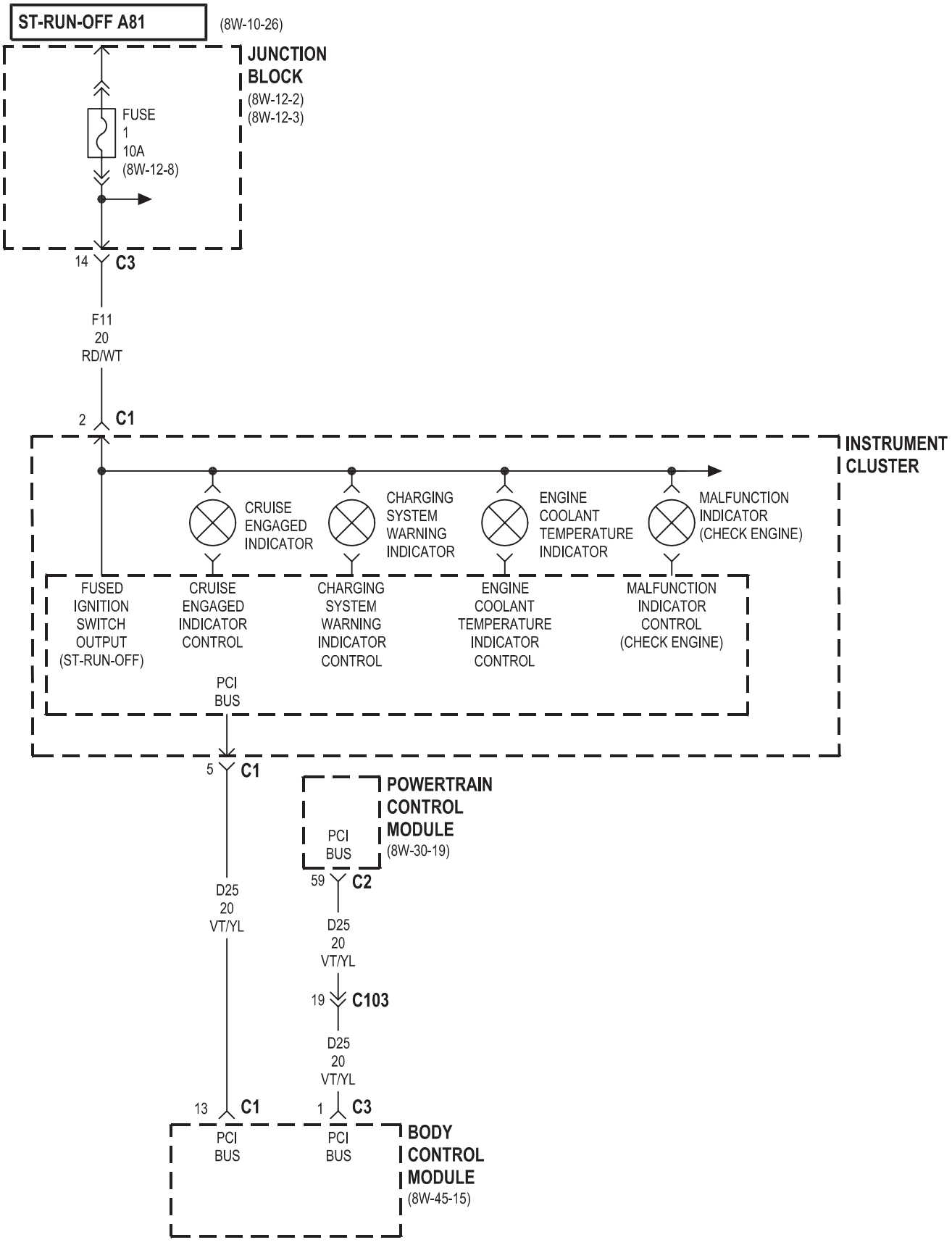
Component	Page
ABS Warning Indicator	8W-40-3
Analog Clock	8W-40-9
Body Control Module	8W-40-2, 4, 5, 7, 9
Brake Pressure Switch	8W-40-6
Daytime Running Lamp Module	8W-40-6
Decklid Release Solenoid/Ajar Switch	8W-40-3
Door Ajar Indicator	8W-40-3
Engine Oil Pressure Switch	8W-40-6
Fuel Pump Module	8W-40-4
Fuse 1 (JB)	8W-40-2, 4, 5, 6, 7, 9
Fuse 14 (JB)	8W-40-3, 9
Fuse 19 (JB)	8W-40-3, 9
Fuse 7 (JB)	8W-40-2
G101	8W-40-6
G103	8W-40-6
G104	8W-40-6
G200	8W-40-2, 6
G201	8W-40-2, 3, 8, 9
G303	8W-40-4
G400	8W-40-3
Headlamp Dimmer Switch	8W-40-8
High Beam Headlamp Relay	8W-40-8
Instrument Cluster	8W-40-2, 3, 4, 5, 6, 7, 8, 9
Junction Block	8W-40-2, 3, 4, 5, 6, 7, 8, 9
Low Washer Fluid Indicator	8W-40-3
Park Brake Switch	8W-40-6
Powertrain Control Module	8W-40-2, 5, 7
Seat Belt Switch	8W-40-9
Traction Control Active Indicator	8W-40-3
Traction Control Switch	8W-40-3
Traction Control Warning Indicator	8W-40-3
Transmission Control Module	8W-40-2, 7
Trunk Ajar Indicator	8W-40-3
Turn Signal/Hazard Switch	8W-40-8
Washer Fluid Level Switch	8W-40-3

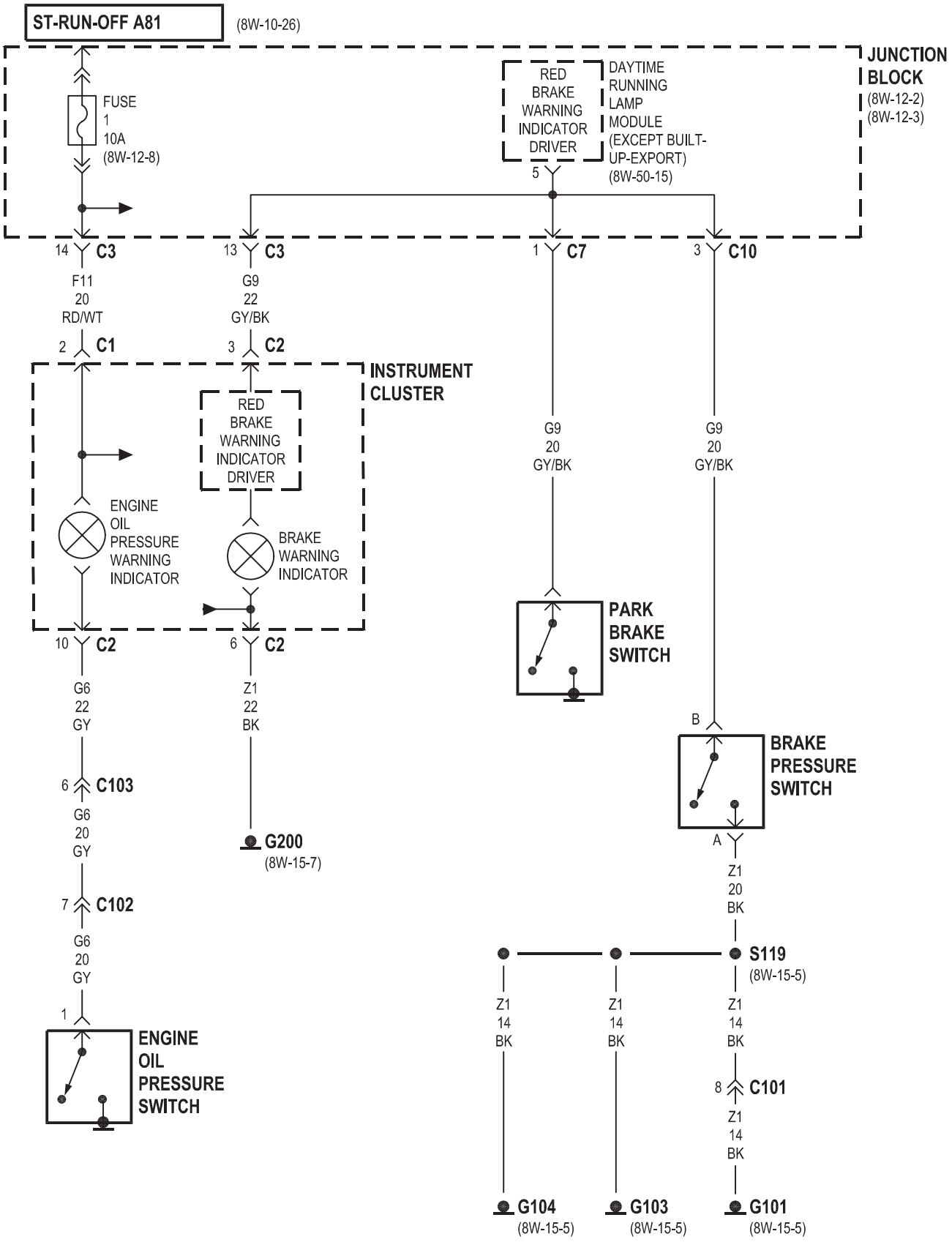

BATT A13
(8W-10-13)
ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 7 20A (8W-12-10)
FUSE 1 10A (8W-12-8)
4 C4
14 C3
F33 18 PK/RD
F11 20 RD/WT
1 C1
2 C1
INSTRUMENT CLUSTER
SPEEDOMETER
TACHOMETER
ENGINE COOLANT TEMPERATURE GAUGE
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
SPEEDOMETER CONTROL
TACHOMETER CONTROL
ENGINE COOLANT TEMPERATURE GAUGE CONTROL
GROUND
GROUND
PCI BUS
6 C1
6 C2
5 C1
Z2 22 BK/LG
Z1 22 BK
D25 20 VT/YL
G201
(8W-15-9)
G200
(8W-15-7)
POWERTRAIN CONTROL MODULE
(8W-30-19)
TRANSMISSION CONTROL MODULE
(8W-31-8)
PCI BUS
59 C2
43
D25 20 VT/YL
19
13 C103
13 C1
1 C3
7 C3
BODY CONTROL MODULE
(8W-45-15)

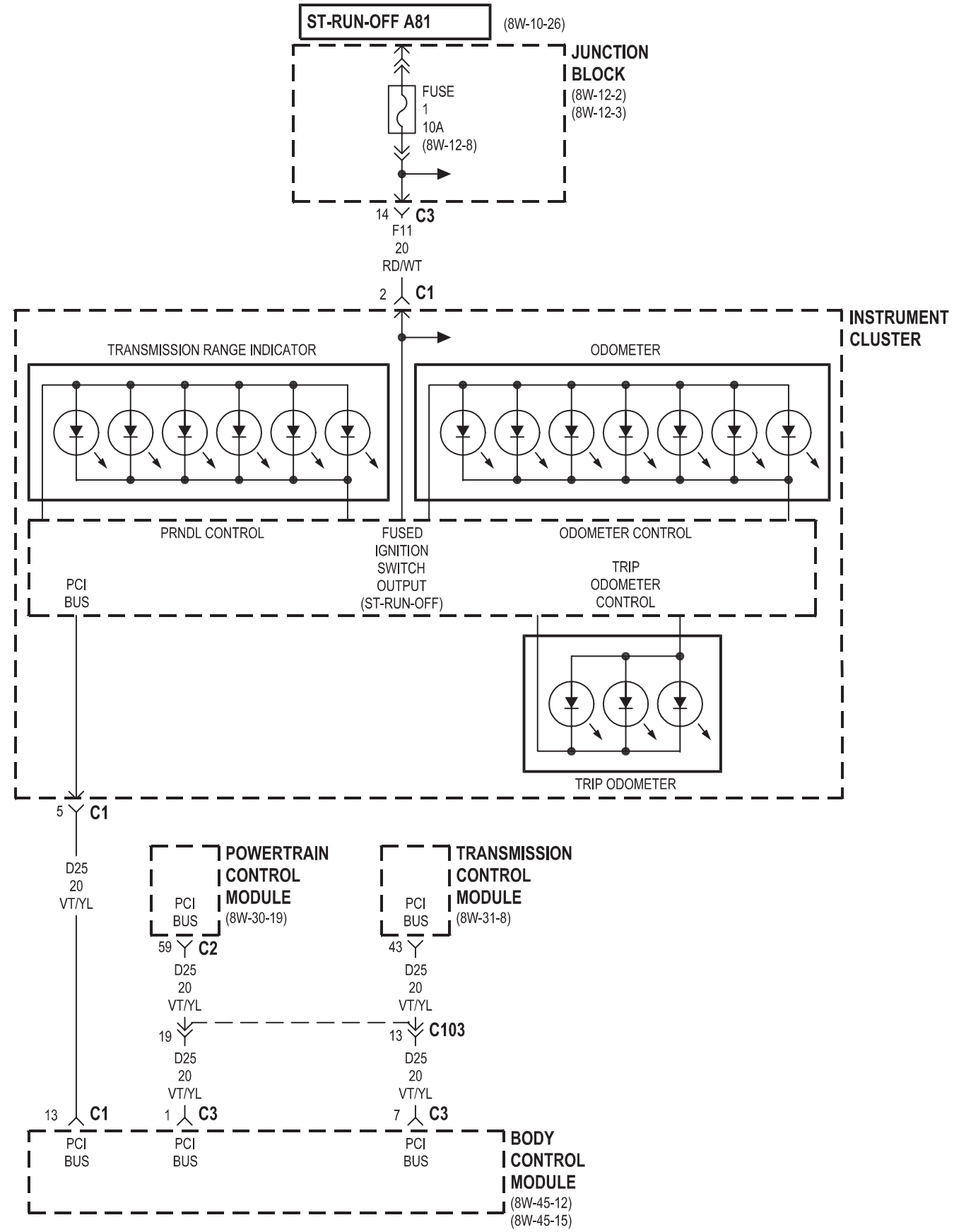

BATT A7
(8W-10-13)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A (8W-12-20)
FUSE 14 10A (8W-12-15)
8 C4
M1 18 PK
S204
(8W-70-7)
M1 20 PK
3 C1
11 C4
OTHER
SKIM
G5 18 DB/WT
G5 18 DB/WT
S200
(8W-12-15)
2 C2
INSTRUMENT CLUSTER
TRUNK AJAR INDICATOR
TRACTION CONTROL ACTIVE INDICATOR
TRACTION CONTROL WARNING INDICATOR
ABS WARNING INDICATOR
LOW WASHER FLUID INDICATOR
DOOR AJAR INDICATOR
FUSED IGNITION (ST-RUN)
TRACTION CONTROL ACTIVE INDICATOR
TRACTION CONTROL WARNING INDICATOR
ABS WARNING INDICATOR
LOW WASHER FLUID INDICATOR
DOOR AJAR INDICATOR
WASHER FLUID SWITCH SENSE
PANEL LAMPS DRIVER
TRACTION CONTROL SWITCH SENSE
9 C2
G78 20 TN/BK
9 C200
S307
(8W-44-2)
1 C311
G78 20 TN/BK
2
DECKLID RELEASE SOLENOID/ AJAR SWITCH
(8W-61-5)
1
Z1 20 BK
S405
(8W-15-14)
Z1 18 BK
G400
(8W-15-14)
4 C2
G29 22 BK/TN
5 C103
G29 20 BK/TN
2
WASHER FLUID LEVEL SWITCH SENSE
WASHER FLUID LEVEL SWITCH
(8W-53-3)
4 C1
E2 20 OR
S207
(8W-44-6)
E2 20 OR
8 C2
B27 20 RD/YL
3
TRACTION CONTROL SWITCH
5
2
Z2 22 BK/LG
G201
(8W-15-9)

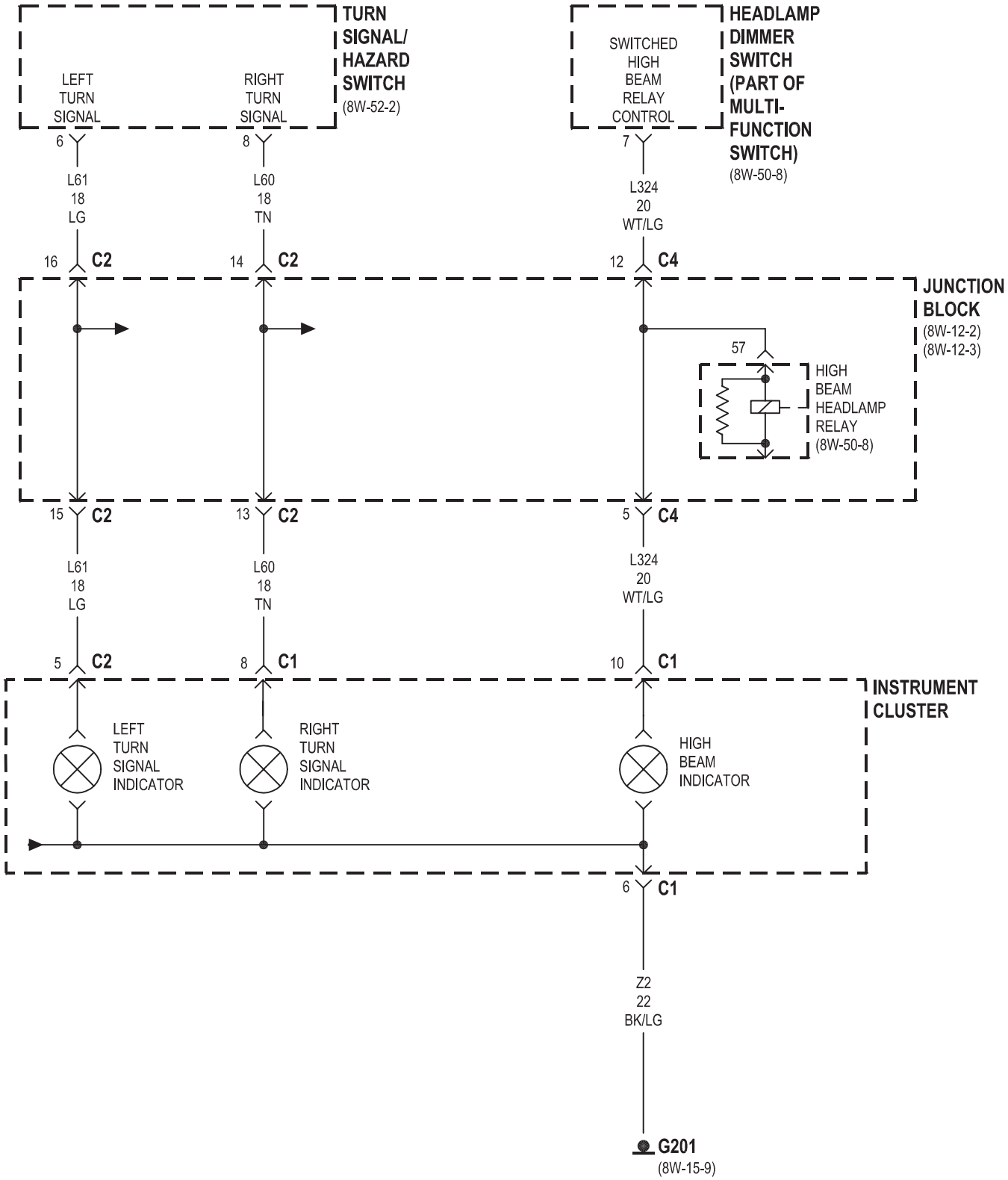
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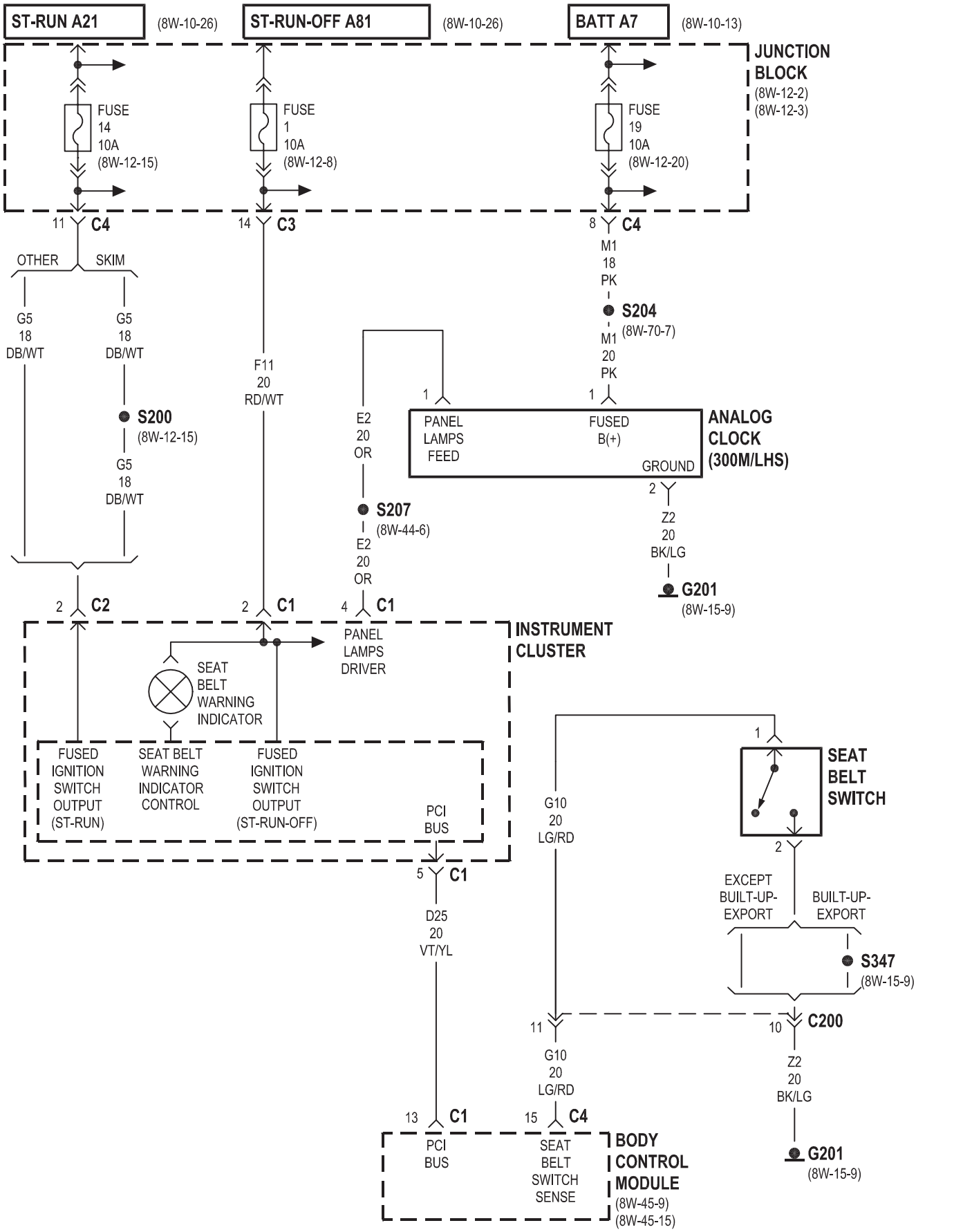

ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
1
10A
(8W-12-8)
14 C3
F11
20
RD/WT
2 C1
INSTRUMENT CLUSTER
FUEL GAUGE
LOW FUEL WARNING INDICATOR
AIRBAG WARNING INDICATOR
FUEL GAUGE CONTROL
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
LOW FUEL WARNING INDICATOR
AIRBAG WARNING INDICATOR
PCI BUS
5 C1
FUEL PUMP MODULE
(8W-30-8)
3
1
G4
14
DB
2 C308
G4
20
DB
7 C200
G4
20
DB
7 C4
Z1
12
BK
S140
(8W-15-17)
Z1
12
BK
G303
(8W-15-17)
D25
20
VT/YL
13 C1
PCI BUS
FUEL LEVEL SENSOR SIGNAL
BODY CONTROL MODULE
(8W-45-10)
(8W-45-15)


ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
1
10A
(8W-12-8)
14
C3
F11
20
RD/WT
2
C1
INSTRUMENT CLUSTER
CRUISE ENGAGED INDICATOR
CHARGING SYSTEM WARNING INDICATOR
ENGINE COOLANT TEMPERATURE INDICATOR
MALFUNCTION INDICATOR (CHECK ENGINE)
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
CRUISE ENGAGED INDICATOR CONTROL
CHARGING SYSTEM WARNING INDICATOR CONTROL
ENGINE COOLANT TEMPERATURE INDICATOR CONTROL
MALFUNCTION INDICATOR CONTROL (CHECK ENGINE)
PCI BUS
5
C1
POWERTRAIN CONTROL MODULE
(8W-30-19)
PCI BUS
59
C2
D25
20
VT/YL
19
C103
D25
20
VT/YL
D25
20
VT/YL
13
C1
1
C3
PCI BUS
PCI BUS
BODY CONTROL MODULE
(8W-45-15)


ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 1 10A (8W-12-8)
RED BRAKE WARNING INDICATOR DRIVER
DAYTIME RUNNING LAMP MODULE (EXCEPT BUILT-UP-EXPORT) (8W-50-15)
5
14 C3
13 C3
1 C7
3 C10
F11 20 RD/WT
G9 22 GY/BK
2 C1
3 C2
INSTRUMENT CLUSTER
RED BRAKE WARNING INDICATOR DRIVER
ENGINE OIL PRESSURE WARNING INDICATOR
BRAKE WARNING INDICATOR
G9 20 GY/BK
G9 20 GY/BK
PARK BRAKE SWITCH
10 C2
6 C2
G6 22 GY
Z1 22 BK
B
BRAKE PRESSURE SWITCH
6 C103
G6 20 GY
G200
(8W-15-7)
A
Z1 20 BK
7 C102
G6 20 GY
S119
(8W-15-5)
Z1 14 BK
Z1 14 BK
Z1 14 BK
1
8 C101
Z1 14 BK
ENGINE OIL PRESSURE SWITCH
G104
(8W-15-5)
G103
(8W-15-5)
G101
(8W-15-5)

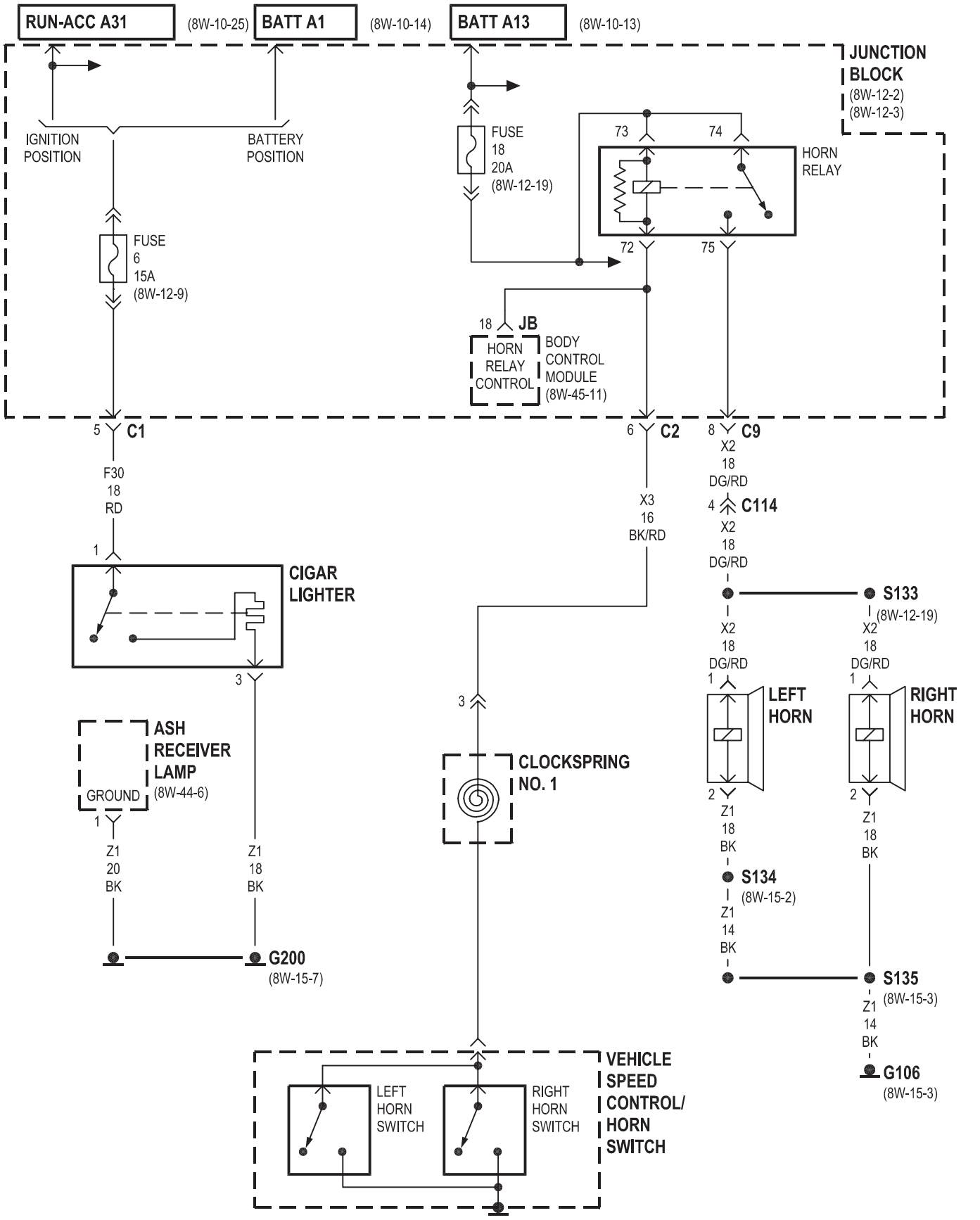

ST-RUN-OFF A81
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
1
10A
(8W-12-8)
14 C3
F11
20
RD/WT
2 C1
INSTRUMENT CLUSTER
TRANSMISSION RANGE INDICATOR
ODOMETER
PRNDL CONTROL
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
ODOMETER CONTROL
PCI BUS
TRIP ODOMETER CONTROL
TRIP ODOMETER
5 C1
D25
20
VT/YL
POWERTRAIN CONTROL MODULE
(8W-30-19)
PCI BUS
59 C2
D25
20
VT/YL
19
D25
20
VT/YL
1 C3
PCI BUS
TRANSMISSION CONTROL MODULE
(8W-31-8)
PCI BUS
43
D25
20
VT/YL
13 C103
D25
20
VT/YL
7 C3
PCI BUS
13 C1
PCI BUS
BODY CONTROL MODULE
(8W-45-12)
(8W-45-15)


TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
LEFT TURN SIGNAL
RIGHT TURN SIGNAL
HEADLAMP DIMMER SWITCH (PART OF MULTI-FUNCTION SWITCH)
(8W-50-8)
SWITCHED HIGH BEAM RELAY CONTROL
6
8
7
L61 18 LG
L60 18 TN
L324 20 WT/LG
16 C2
14 C2
12 C4
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
57
HIGH BEAM HEADLAMP RELAY
(8W-50-8)
15 C2
13 C2
5 C4
L61 18 LG
L60 18 TN
L324 20 WT/LG
5 C2
8 C1
10 C1
INSTRUMENT CLUSTER
LEFT TURN SIGNAL INDICATOR
RIGHT TURN SIGNAL INDICATOR
HIGH BEAM INDICATOR
6 C1
Z2 22 BK/LG
G201
(8W-15-9)


ST-RUN A21
(8W-10-26)
ST-RUN-OFF A81
(8W-10-26)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 14 10A (8W-12-15)
FUSE 1 10A (8W-12-8)
FUSE 19 10A (8W-12-20)
11 C4
14 C3
8 C4
OTHER
SKIM
G5 18 DB/WT
G5 18 DB/WT
S200
(8W-12-15)
G5 18 DB/WT
F11 20 RD/WT
M1 18 PK
S204
(8W-70-7)
M1 20 PK
E2 20 OR
S207
(8W-44-6)
E2 20 OR
1
PANEL LAMPS FEED
FUSED B(+)
GROUND
ANALOG CLOCK (300M/LHS)
2
Z2 20 BK/LG
G201
(8W-15-9)
2 C2
2 C1
4 C1
INSTRUMENT CLUSTER
PANEL LAMPS DRIVER
SEAT BELT WARNING INDICATOR
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
SEAT BELT WARNING INDICATOR CONTROL
FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
PCI BUS
5 C1
D25 20 VT/YL
13 C1
PCI BUS
G10 20 LG/RD
11
G10 20 LG/RD
15 C4
SEAT BELT SWITCH SENSE
BODY CONTROL MODULE
(8W-45-9)
(8W-45-15)
1
SEAT BELT SWITCH
2
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S347
(8W-15-9)
10 C200
Z2 20 BK/LG
G201
(8W-15-9)

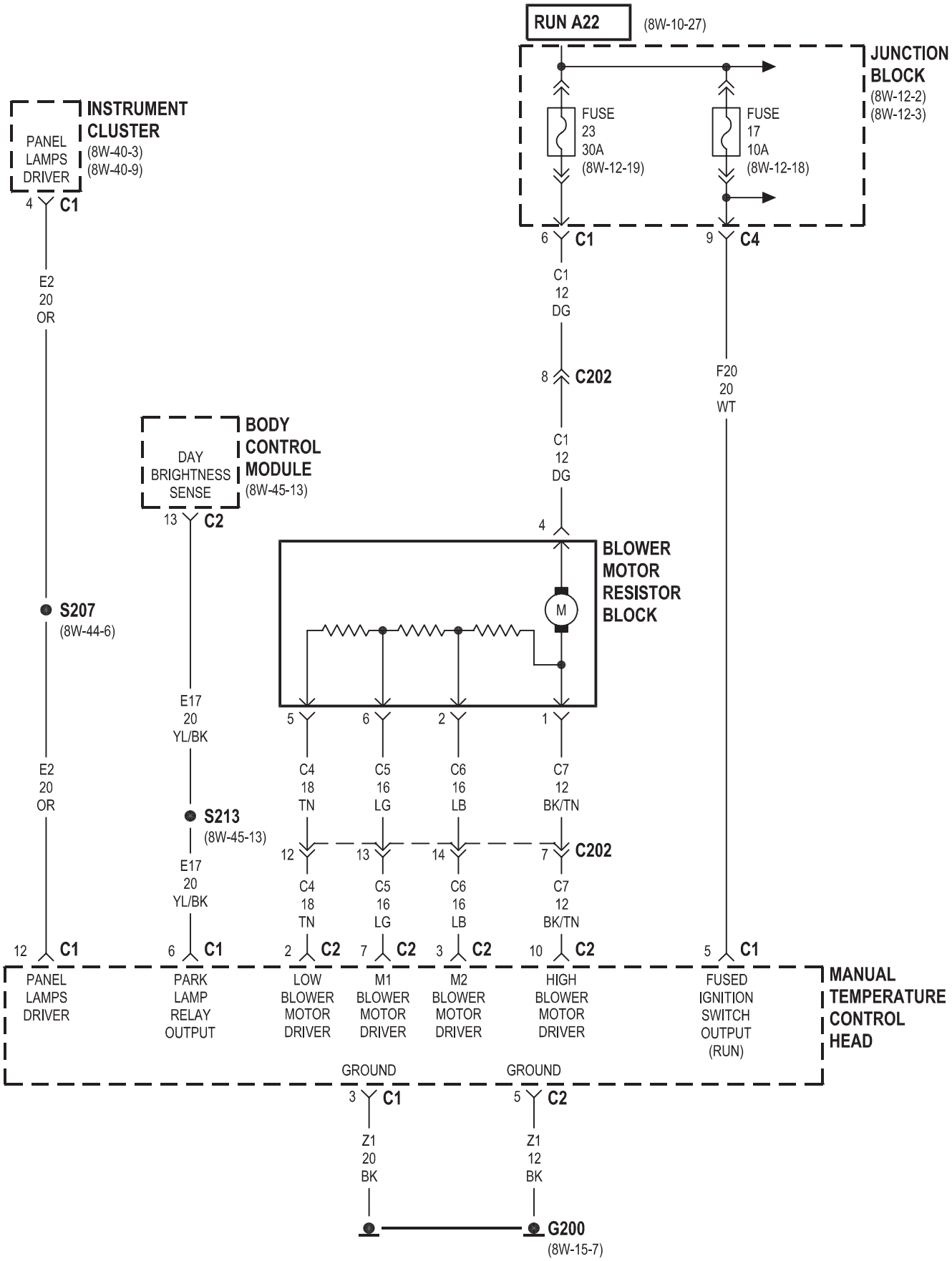
8W-41 HORN/CIGAR LIGHTER

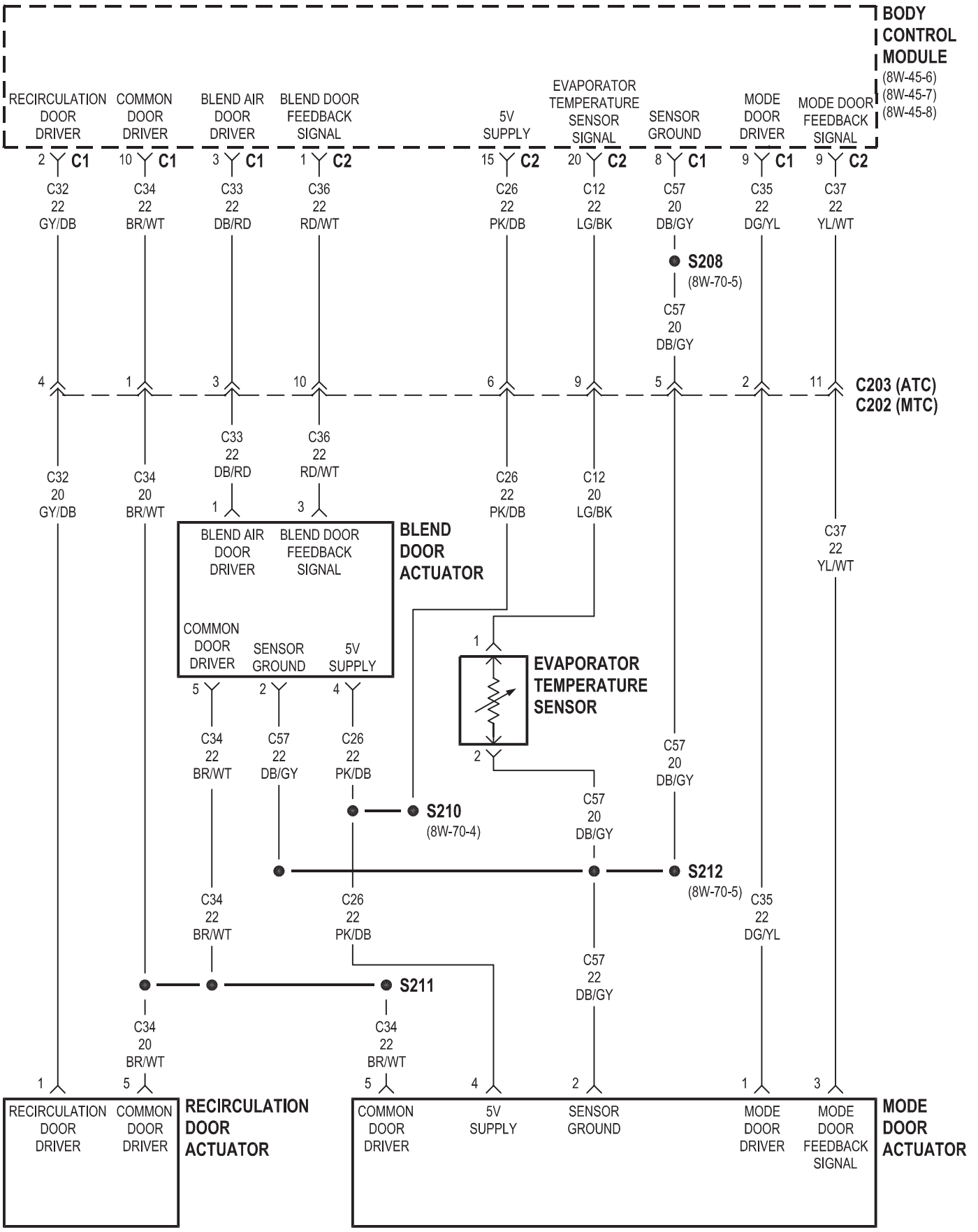
Component	Page
Ash Receiver Lamp	8W-41-2
Body Control Module	8W-41-2
Cigar Lighter	8W-41-2
Clockspring No. 1	8W-41-2
Fuse 6 (JB)	8W-41-2
Fuse 18 (JB)	8W-41-2
G106	8W-41-2
G200	8W-41-2
Horn Relay	8W-41-2
Junction Block	8W-41-2
Left Horn	8W-41-2
Left Horn Switch	8W-41-2
Right Horn	8W-41-2
Right Horn Switch	8W-41-2
Vehicle Speed Control/Horn Switch	8W-41-2

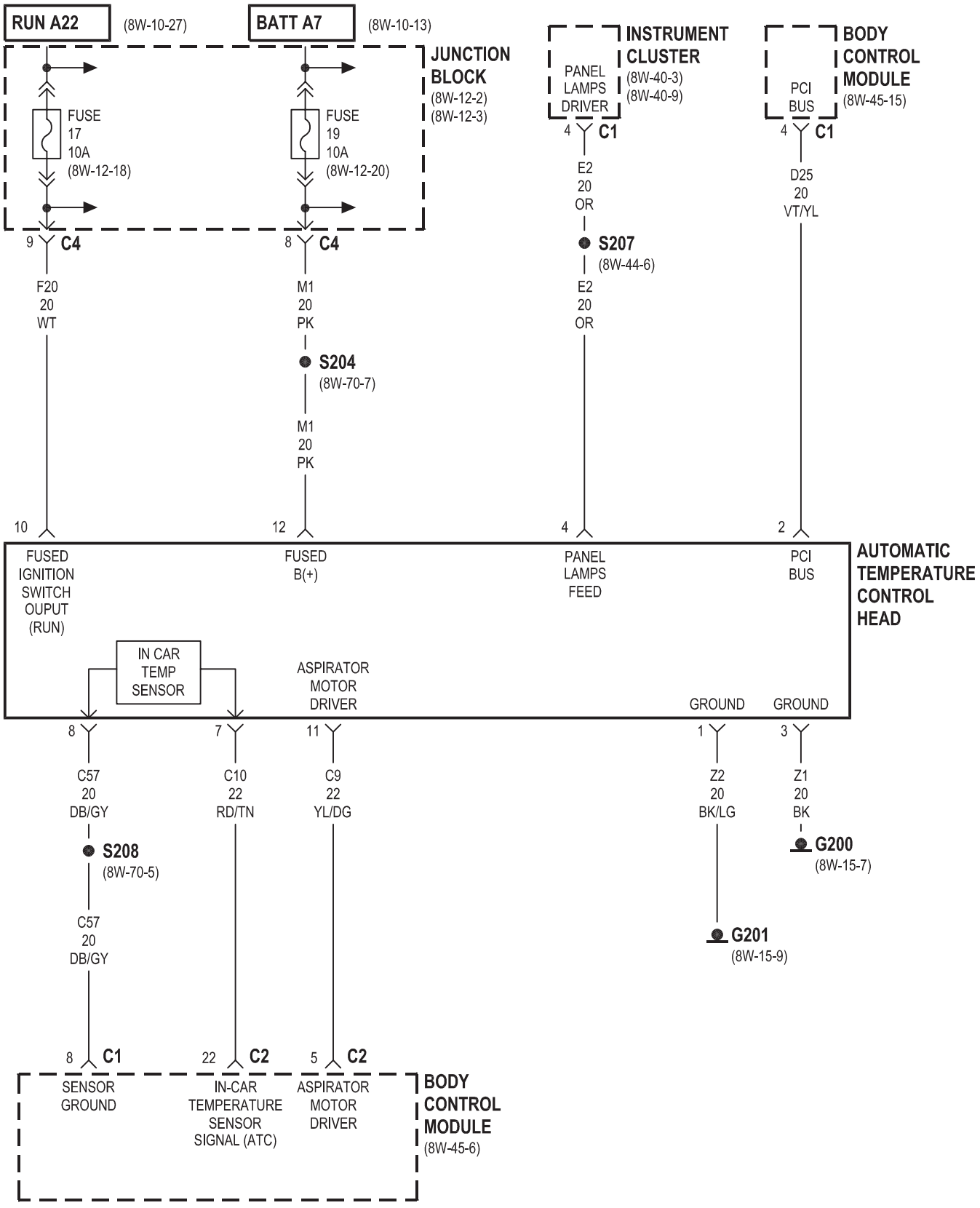

RUN-ACC A31
(8W-10-25)
BATT A1
(8W-10-14)
BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
IGNITION POSITION
BATTERY POSITION
FUSE 6 15A (8W-12-9)
FUSE 18 20A (8W-12-19)
73
74
HORN RELAY
72
75
18 JB
HORN RELAY CONTROL
BODY CONTROL MODULE (8W-45-11)
5 C1
6 C2
8 C9
F30 18 RD
X3 16 BK/RD
X2 18 DG/RD
4 C114
1
CIGAR LIGHTER
3
S133
(8W-12-19)
ASH RECEIVER LAMP
GROUND
(8W-44-6)
CLOCKSPRING NO. 1
LEFT HORN
RIGHT HORN
2
Z1 18 BK
S134
(8W-15-2)
Z1 20 BK
Z1 18 BK
G200
(8W-15-7)
Z1 14 BK
S135
(8W-15-3)
G106
(8W-15-3)
LEFT HORN SWITCH
RIGHT HORN SWITCH
VEHICLE SPEED CONTROL/ HORN SWITCH

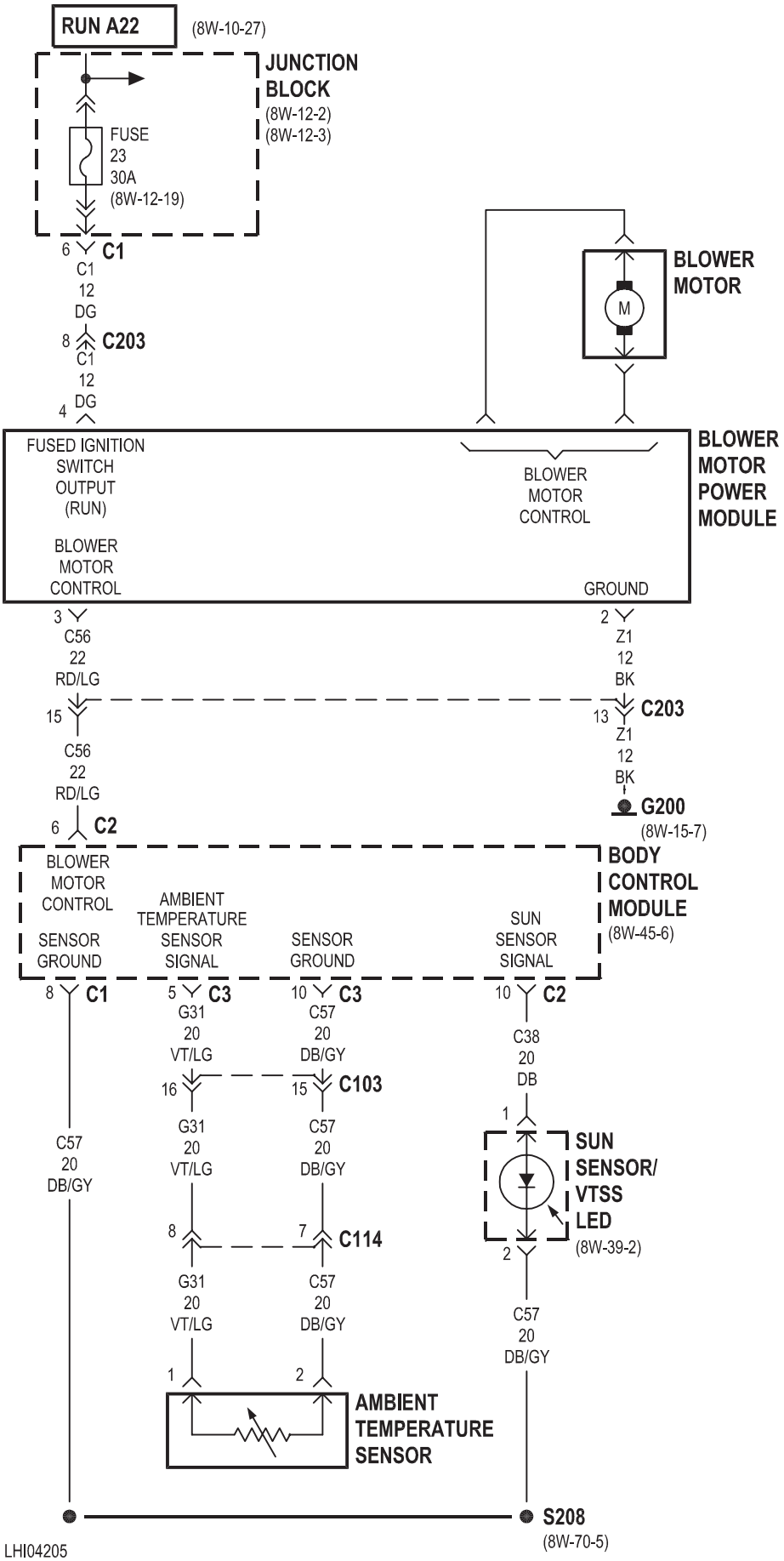
8W-42 AIR CONDITIONING-HEATER

Component	Page
A/C Compressor Clutch	8W-42-6
A/C Compressor Clutch Relay	8W-42-6
A/C Pressure Transducer	8W-42-6
Ambient Temperature Sensor	8W-42-5
Automatic Temperature Control Head	8W-42-4
Blend Door Actuator	8W-42-3
Blower Motor	8W-42-5
Blower Motor Power Module	8W-42-5
Blower Motor Resistor Block	8W-42-2
Body Control Module	8W-42-2, 3, 4, 5, 8
Evaporator Temperature Sensor	8W-42-3
Fuse 17 (JB)	8W-42-2, 4
Fuse 19 (JB)	8W-42-4
Fuse 21 (JB)	8W-42-6, 7
Fuse 23 (JB)	8W-42-2, 5
Fuse B (PDC)	8W-42-6, 7
Fuse E (PDC)	8W-42-7
G100	8W-42-6
G105	8W-42-7
G200	8W-42-2, 4, 5
G201	8W-42-4
High Speed Radiator Fan Relay	8W-42-7
Instrument Cluster	8W-42-2, 4
Junction Block	8W-42-2, 4, 5, 6, 7
Low Speed Radiator Fan Relay	8W-42-7
Manual Temperature Control Head	8W-42-2, 8
Mode Door Actuator	8W-42-3
Power Distribution Center	8W-42-6, 7
Powertrain Control Module	8W-42-6, 7
Radiator Fan Motor Assembly	8W-42-7
Recirculation Door Actuator	8W-42-3
Sun Sensor/VTSS LED	8W-42-5

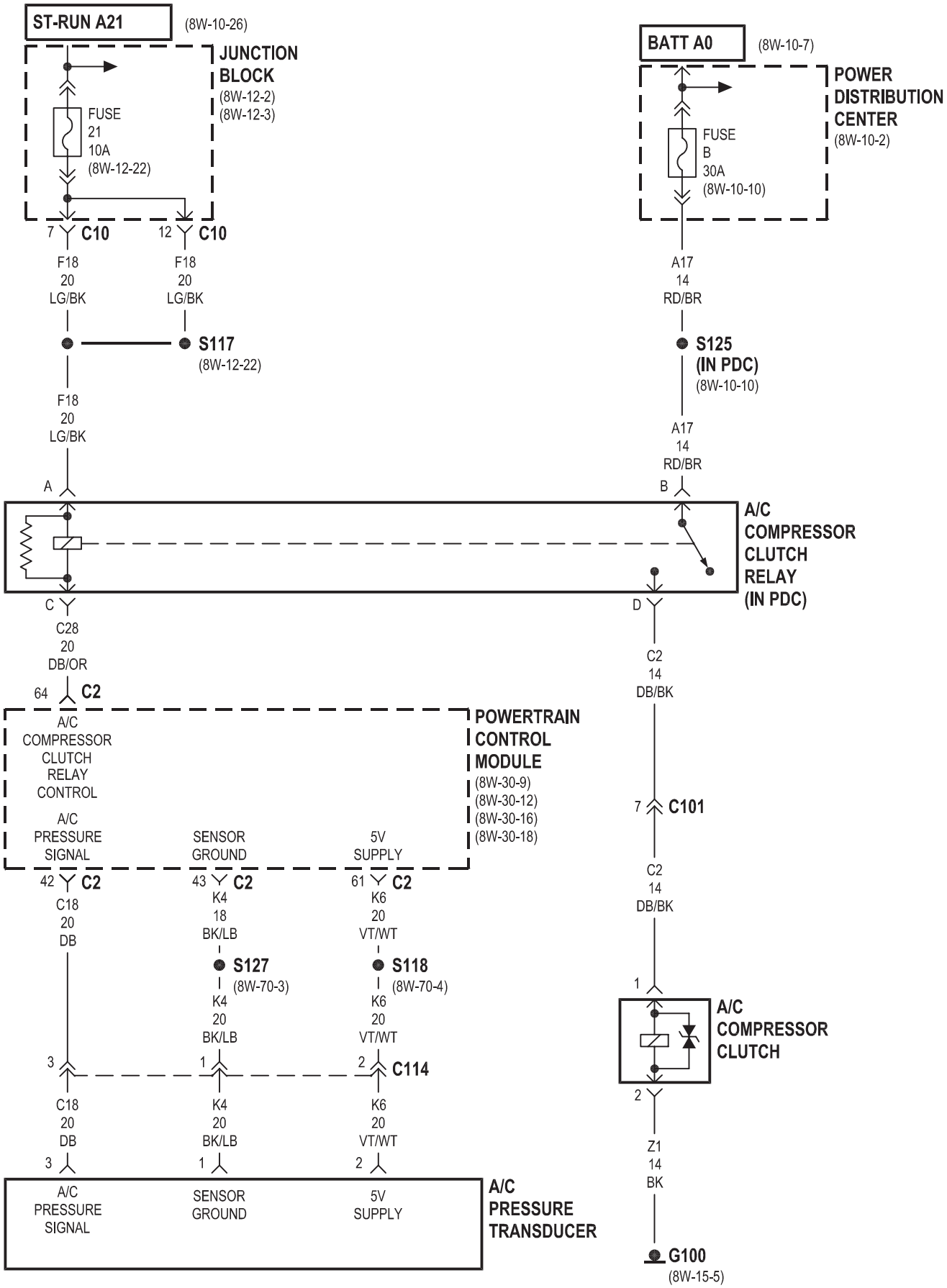

RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 23 30A
(8W-12-19)
FUSE 17 10A
(8W-12-18)
6 C1
9 C4
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
PANEL LAMPS DRIVER
4 C1
E2 20 OR
C1 12 DG
8 C202
F20 20 WT
BODY CONTROL MODULE
(8W-45-13)
DAY BRIGHTNESS SENSE
13 C2
4
BLOWER MOTOR RESISTOR BLOCK
M
S207
(8W-44-6)
E17 20 YL/BK
S213
(8W-45-13)
5 6 2 1
C4 18 TN
C5 16 LG
C6 16 LB
C7 12 BK/TN
12 13 14 7 C202
12 C1
6 C1
2 C2
7 C2
3 C2
10 C2
5 C1
PANEL LAMPS DRIVER
PARK LAMP RELAY OUTPUT
LOW BLOWER MOTOR DRIVER
M1 BLOWER MOTOR DRIVER
M2 BLOWER MOTOR DRIVER
HIGH BLOWER MOTOR DRIVER
FUSED IGNITION SWITCH OUTPUT (RUN)
MANUAL TEMPERATURE CONTROL HEAD
GROUND
3 C1
5 C2
Z1 20 BK
Z1 12 BK
G200
(8W-15-7)

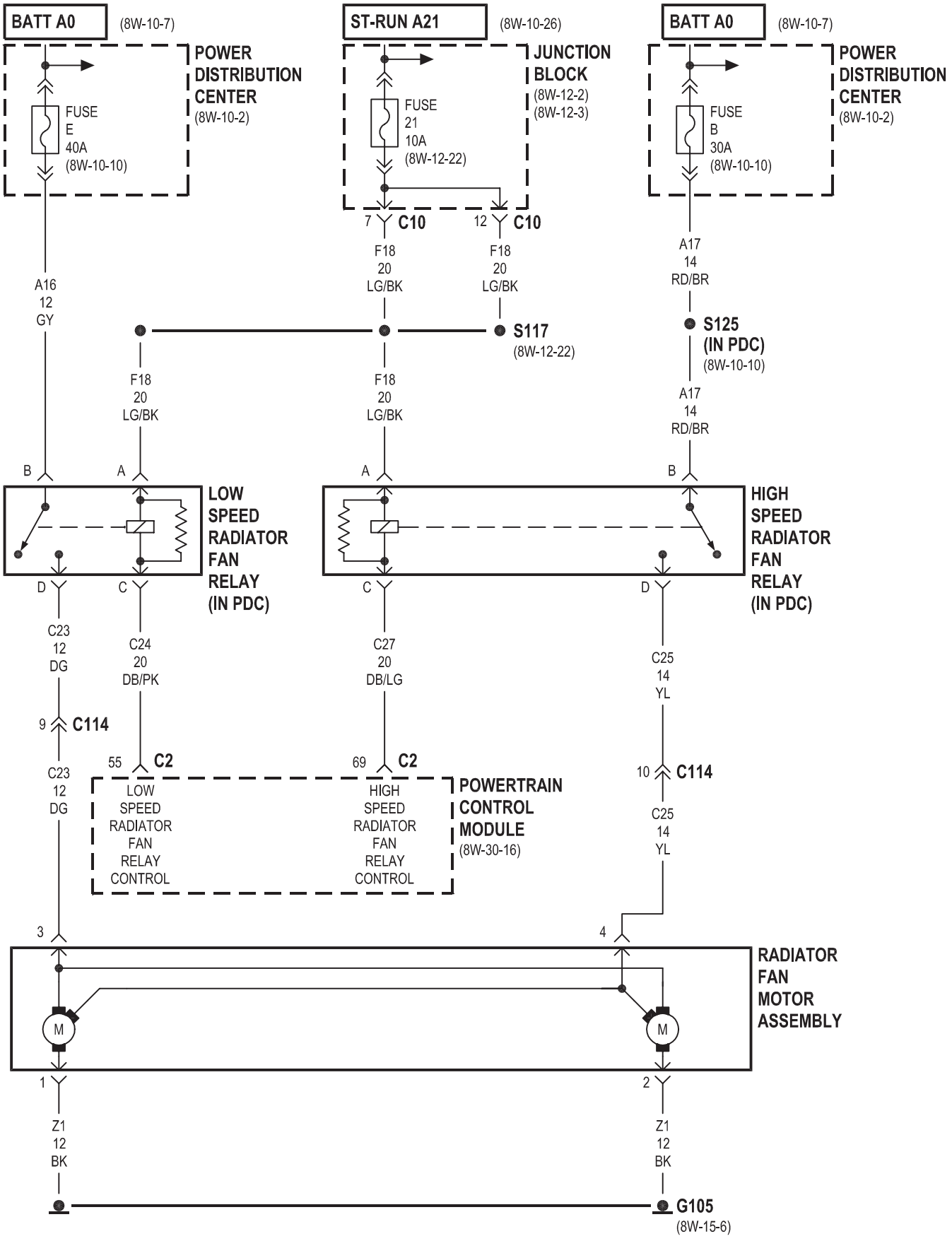

BODY CONTROL MODULE
(8W-45-6)
(8W-45-7)
(8W-45-8)
RECIRCULATION DOOR DRIVER
COMMON DOOR DRIVER
BLEND AIR DOOR DRIVER
BLEND DOOR FEEDBACK SIGNAL
5V SUPPLY
EVAPORATOR TEMPERATURE SENSOR SIGNAL
SENSOR GROUND
MODE DOOR DRIVER
MODE DOOR FEEDBACK SIGNAL
2 C1
10 C1
3 C1
1 C2
15 C2
20 C2
8 C1
9 C1
9 C2
C32 22 GY/DB
C34 22 BR/WT
C33 22 DB/RD
C36 22 RD/WT
C26 22 PK/DB
C12 22 LG/BK
C57 20 DB/GY
C35 22 DG/YL
C37 22 YL/WT
S208
(8W-70-5)
C57 20 DB/GY
4
1
3
10
6
9
5
2
11
C203 (ATC)
C202 (MTC)
C32 20 GY/DB
C34 20 BR/WT
C33 22 DB/RD
C36 22 RD/WT
C26 22 PK/DB
C12 20 LG/BK
C37 22 YL/WT
1
3
BLEND AIR DOOR DRIVER
BLEND DOOR FEEDBACK SIGNAL
BLEND DOOR ACTUATOR
COMMON DOOR DRIVER
SENSOR GROUND
5V SUPPLY
5
2
4
1
EVAPORATOR TEMPERATURE SENSOR
2
C34 22 BR/WT
C57 22 DB/GY
C26 22 PK/DB
C57 20 DB/GY
S210
(8W-70-4)
C57 20 DB/GY
S212
(8W-70-5)
C34 22 BR/WT
C26 22 PK/DB
C35 22 DG/YL
C57 22 DB/GY
S211
C34 20 BR/WT
C34 22 BR/WT
1
5
5
4
2
1
3
RECIRCULATION DOOR DRIVER
COMMON DOOR DRIVER
RECIRCULATION DOOR ACTUATOR
COMMON DOOR DRIVER
5V SUPPLY
SENSOR GROUND
MODE DOOR DRIVER
MODE DOOR FEEDBACK SIGNAL
MODE DOOR ACTUATOR

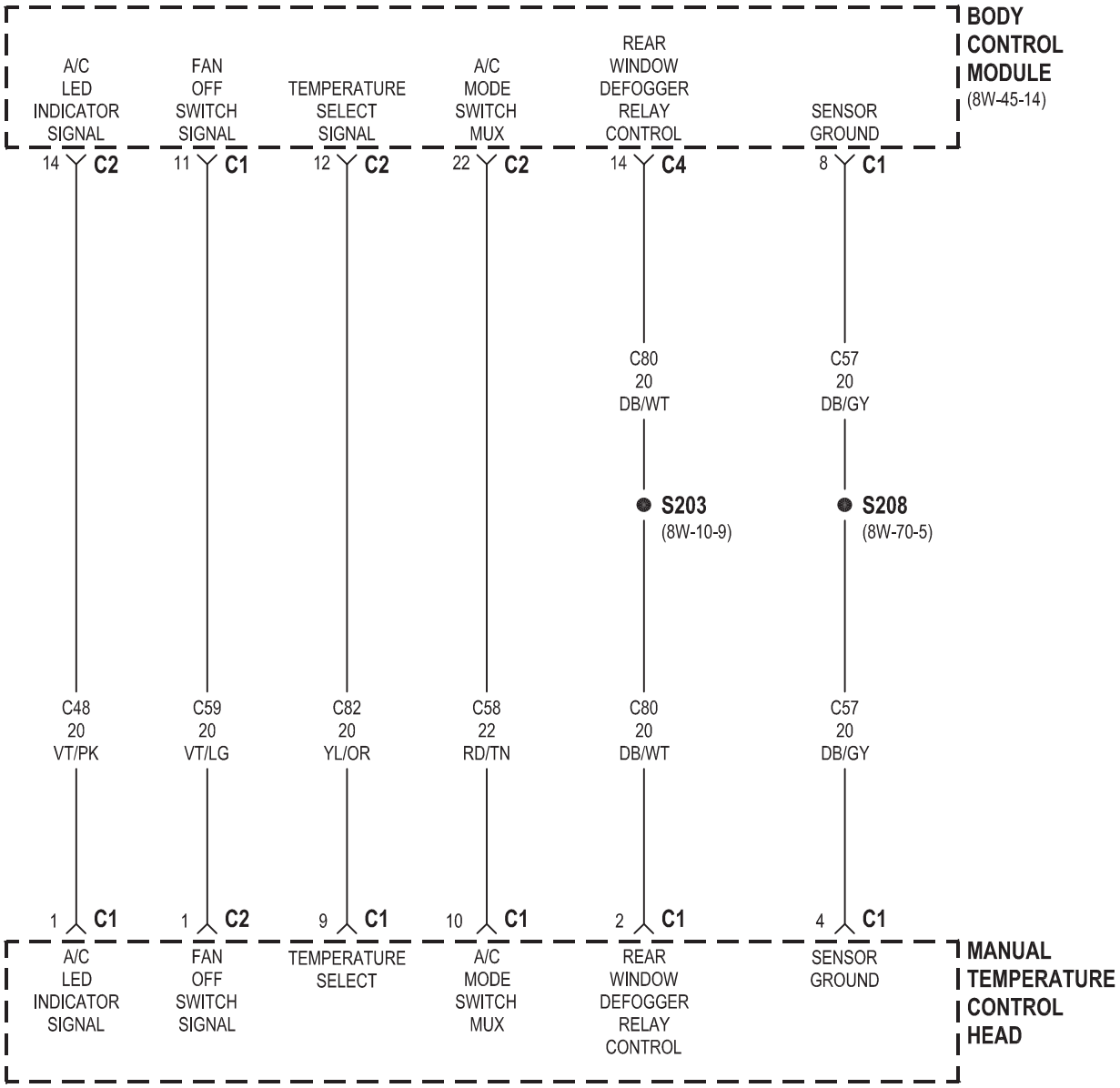

RUN A22
(8W-10-27)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 17 10A (8W-12-18)
FUSE 19 10A (8W-12-20)
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
PANEL LAMPS DRIVER
BODY CONTROL MODULE
(8W-45-15)
PCI BUS
9 C4
8 C4
4 C1
4 C1
F20 20 WT
M1 20 PK
S204
(8W-70-7)
M1 20 PK
E2 20 OR
S207
(8W-44-6)
E2 20 OR
D25 20 VT/YL
10
12
4
2
FUSED IGNITION SWITCH OUPUT (RUN)
FUSED B(+)
PANEL LAMPS FEED
PCI BUS
AUTOMATIC TEMPERATURE CONTROL HEAD
IN CAR TEMP SENSOR
ASPIRATOR MOTOR DRIVER
GROUND
GROUND
8
7
11
1
3
C57 20 DB/GY
C10 22 RD/TN
C9 22 YL/DG
Z2 20 BK/LG
Z1 20 BK
S208
(8W-70-5)
G200
(8W-15-7)
C57 20 DB/GY
G201
(8W-15-9)
8 C1
22 C2
5 C2
SENSOR GROUND
IN-CAR TEMPERATURE SENSOR SIGNAL (ATC)
ASPIRATOR MOTOR DRIVER
BODY CONTROL MODULE
(8W-45-6)


RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
23
30A
(8W-12-19)
6 C1
C1
12
DG
8 C203
C1
12
DG
4
BLOWER MOTOR
M
FUSED IGNITION SWITCH OUTPUT (RUN)
BLOWER MOTOR CONTROL
BLOWER MOTOR CONTROL
BLOWER MOTOR POWER MODULE
BLOWER MOTOR CONTROL
GROUND
3 C56 22 RD/LG
2 Z1 12 BK
15 C56 22 RD/LG
13 C203 Z1 12 BK
G200
(8W-15-7)
6 C2
BODY CONTROL MODULE
(8W-45-6)
BLOWER MOTOR CONTROL SENSOR GROUND
AMBIENT TEMPERATURE SENSOR SIGNAL
SENSOR GROUND
SUN SENSOR SIGNAL
8 C1
5 C3
10 C3
10 C2
G31 20 VT/LG
C57 20 DB/GY
C38 20 DB
16 15 C103
C57 20 DB/GY
G31 20 VT/LG
1
SUN SENSOR/ VTSS LED
(8W-39-2)
8 7 C114
2
G31 20 VT/LG
C57 20 DB/GY
C57 20 DB/GY
1 2
AMBIENT TEMPERATURE SENSOR
S208
(8W-70-5)

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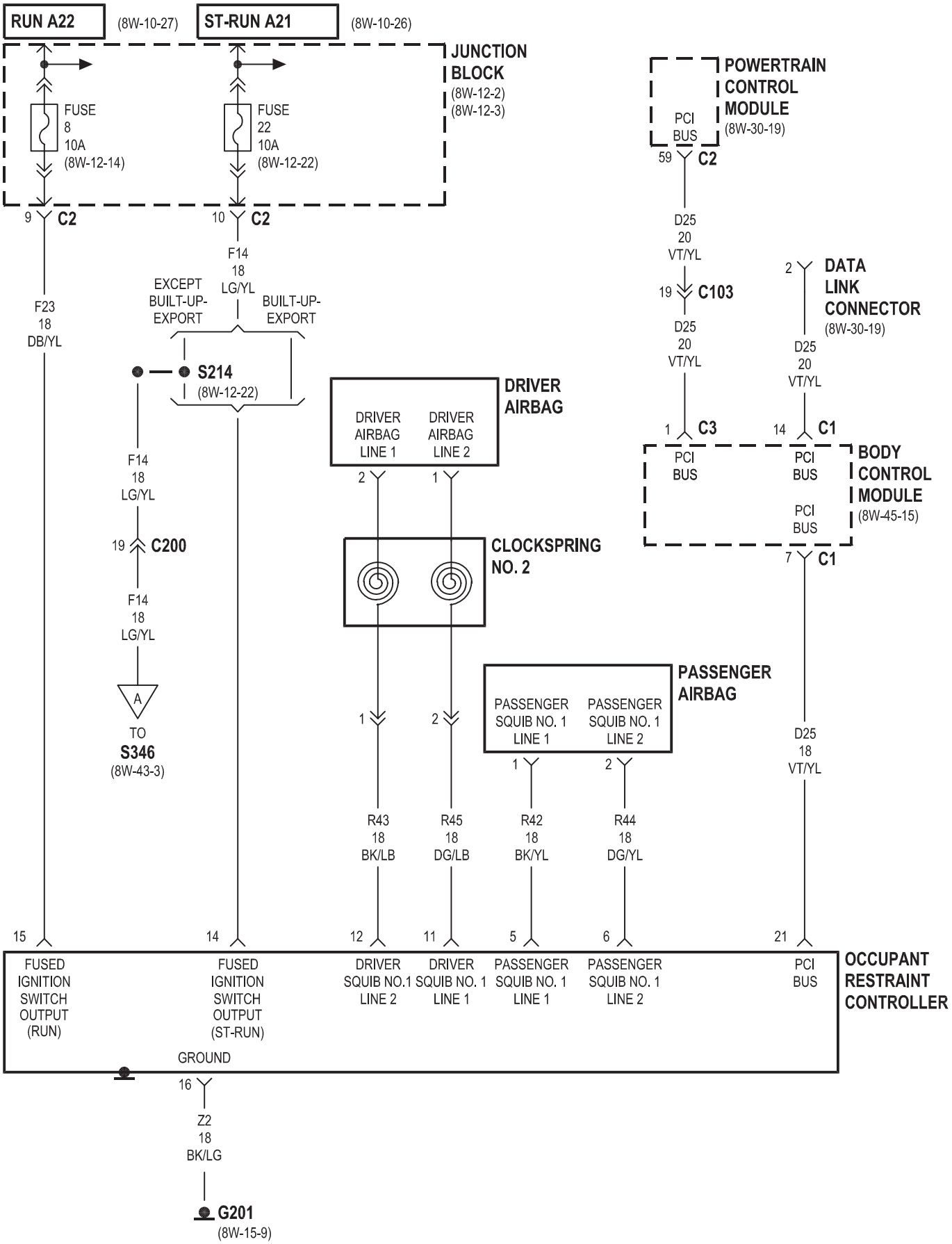

ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 21 10A
(8W-12-22)
7 C10
12 C10
F18 20 LG/BK
F18 20 LG/BK
S117
(8W-12-22)
F18 20 LG/BK
A
BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE B 30A
(8W-10-10)
A17 14 RD/BR
S125 (IN PDC)
(8W-10-10)
A17 14 RD/BR
B
A/C COMPRESSOR CLUTCH RELAY (IN PDC)
C
C28 20 DB/OR
64 C2
D
C2 14 DB/BK
POWERTRAIN CONTROL MODULE
(8W-30-9)
(8W-30-12)
(8W-30-16)
(8W-30-18)
A/C COMPRESSOR CLUTCH RELAY CONTROL
A/C PRESSURE SIGNAL
SENSOR GROUND
5V SUPPLY
42 C2
43 C2
61 C2
C18 20 DB
K4 18 BK/LB
K6 20 VT/WT
S127
(8W-70-3)
S118
(8W-70-4)
K4 20 BK/LB
K6 20 VT/WT
3
1
2 C114
C18 20 DB
K4 20 BK/LB
K6 20 VT/WT
3
1
2
A/C PRESSURE SIGNAL
SENSOR GROUND
5V SUPPLY
A/C PRESSURE TRANSDUCER
7 C101
C2 14 DB/BK
1
A/C COMPRESSOR CLUTCH
2
Z1 14 BK
G100
(8W-15-5)


BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE E 40A (8W-10-10)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 21 10A (8W-12-22)
BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE B 30A (8W-10-10)
7 C10
12 C10
A16 12 GY
F18 20 LG/BK
F18 20 LG/BK
A17 14 RD/BR
S117
(8W-12-22)
S125
(IN PDC)
(8W-10-10)
F18 20 LG/BK
F18 20 LG/BK
A17 14 RD/BR
B
A
A
B
LOW SPEED RADIATOR FAN RELAY (IN PDC)
HIGH SPEED RADIATOR FAN RELAY (IN PDC)
D
C
C
D
C23 12 DG
C24 20 DB/PK
C27 20 DB/LG
C25 14 YL
9 C114
55 C2
69 C2
10 C114
C23 12 DG
LOW SPEED RADIATOR FAN RELAY CONTROL
HIGH SPEED RADIATOR FAN RELAY CONTROL
POWERTRAIN CONTROL MODULE
(8W-30-16)
C25 14 YL
3
4
RADIATOR FAN MOTOR ASSEMBLY
M
M
1
2
Z1 12 BK
Z1 12 BK
G105
(8W-15-6)

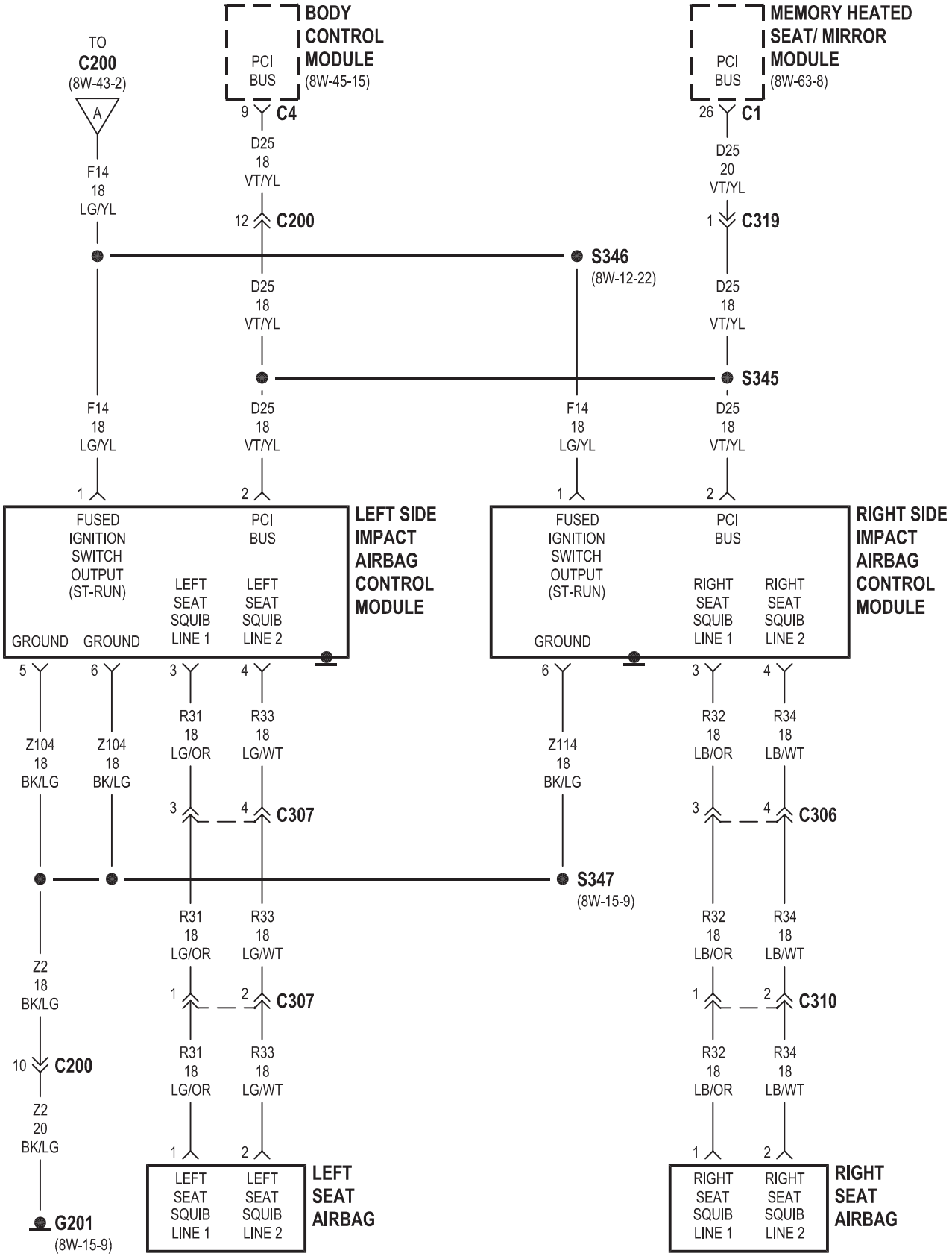

BODY CONTROL MODULE
(8W-45-14)
A/C LED INDICATOR SIGNAL
FAN OFF SWITCH SIGNAL
TEMPERATURE SELECT SIGNAL
A/C MODE SWITCH MUX
REAR WINDOW DEFOGGER RELAY CONTROL
SENSOR GROUND
14 C2
11 C1
12 C2
22 C2
14 C4
8 C1
C80 20 DB/WT
C57 20 DB/GY
S203
(8W-10-9)
S208
(8W-70-5)
C48 20 VT/PK
C59 20 VT/LG
C82 20 YL/OR
C58 22 RD/TN
C80 20 DB/WT
C57 20 DB/GY
1 C1
1 C2
9 C1
10 C1
2 C1
4 C1
A/C LED INDICATOR SIGNAL
FAN OFF SWITCH SIGNAL
TEMPERATURE SELECT
A/C MODE SWITCH MUX
REAR WINDOW DEFOGGER RELAY CONTROL
SENSOR GROUND
MANUAL TEMPERATURE CONTROL HEAD

8W-43 OCCUPANT RESTRAINT SYSTEM

Component	Page
Body Control Module	8W-43-2, 3
Clockspring No. 2	8W-43-2
Data Link Connector	8W-43-2
Driver Airbag	8W-43-2
Fuse 8 (JB)	8W-43-2
Fuse 22 (JB)	8W-43-2
G201	8W-43-2, 3
Junction Block	8W-43-2
Left Seat Airbag	8W-43-3
Left Side Impact Airbag Control Module	8W-43-3
Memory Heated Seat/Mirror Module	8W-43-3
Occupant Restraint Controller	8W-43-2
Passenger Airbag	8W-43-2
Powertrain Control Module	8W-43-2
Right Seat Airbag	8W-43-3
Right Side Impact Airbag Control Module	8W-43-3

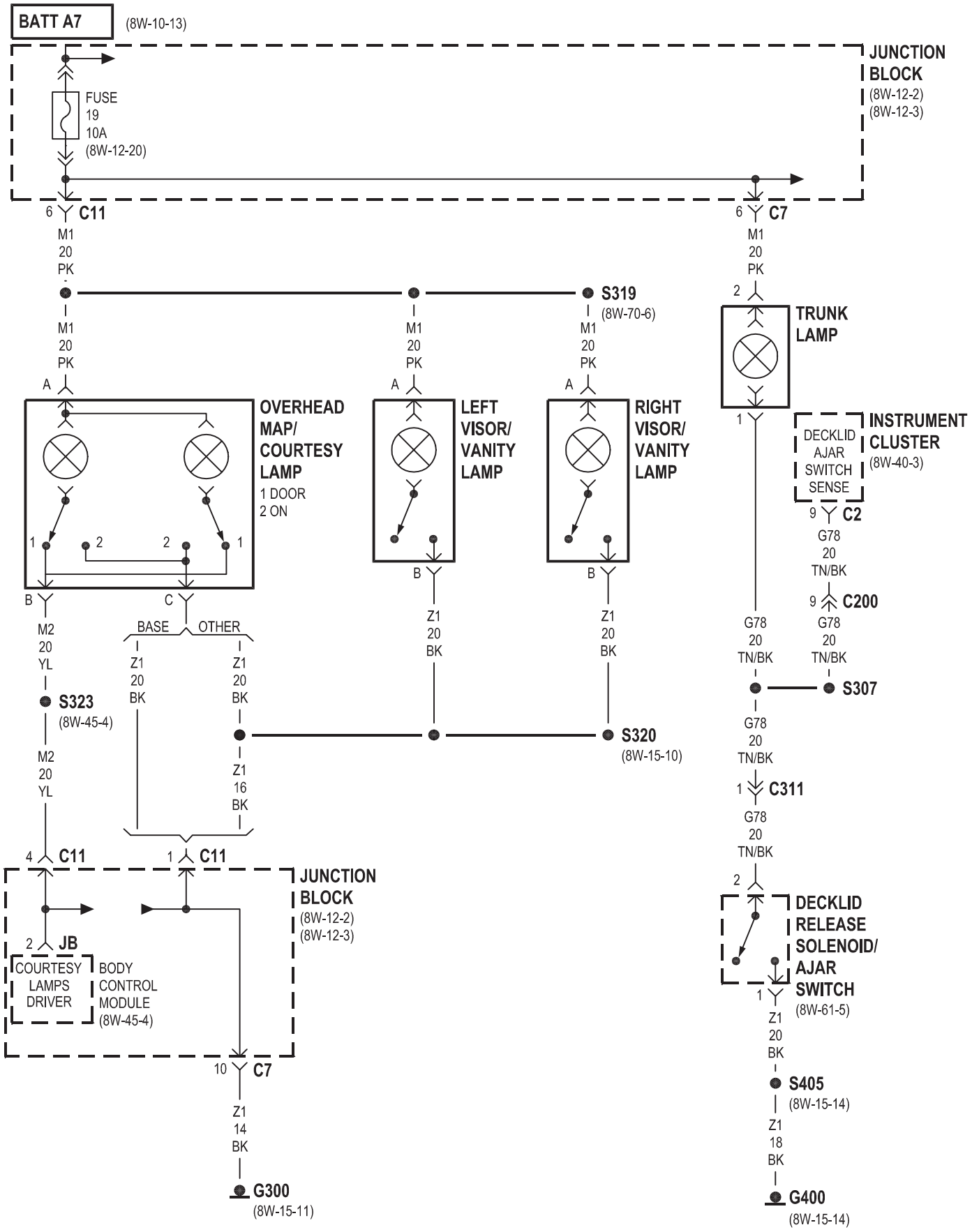

RUN A22
(8W-10-27)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 8 10A (8W-12-14)
FUSE 22 10A (8W-12-22)
9 C2
10 C2
F23 18 DB/YL
F14 18 LG/YL
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S214
(8W-12-22)
F14 18 LG/YL
19 C200
F14 18 LG/YL
A
TO S346
(8W-43-3)
POWERTRAIN CONTROL MODULE
(8W-30-19)
PCI BUS
59 C2
D25 20 VT/YL
19 C103
D25 20 VT/YL
1 C3
PCI BUS
2 DATA LINK CONNECTOR
(8W-30-19)
D25 20 VT/YL
14 C1
PCI BUS
BODY CONTROL MODULE
(8W-45-15)
PCI BUS
7 C1
DRIVER AIRBAG
DRIVER AIRBAG LINE 1
DRIVER AIRBAG LINE 2
2
1
CLOCKSPRING NO. 2
1
2
PASSENGER AIRBAG
PASSENGER SQUIB NO. 1 LINE 1
PASSENGER SQUIB NO. 1 LINE 2
1
2
R43 18 BK/LB
R45 18 DG/LB
R42 18 BK/YL
R44 18 DG/YL
D25 18 VT/YL
15
14
12
11
5
6
21
FUSED IGNITION SWITCH OUTPUT (RUN)
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
DRIVER SQUIB NO.1 LINE 2
DRIVER SQUIB NO. 1 LINE 1
PASSENGER SQUIB NO. 1 LINE 1
PASSENGER SQUIB NO. 1 LINE 2
PCI BUS
OCCUPANT RESTRAINT CONTROLLER
GROUND
16
Z2 18 BK/LG
G201
(8W-15-9)

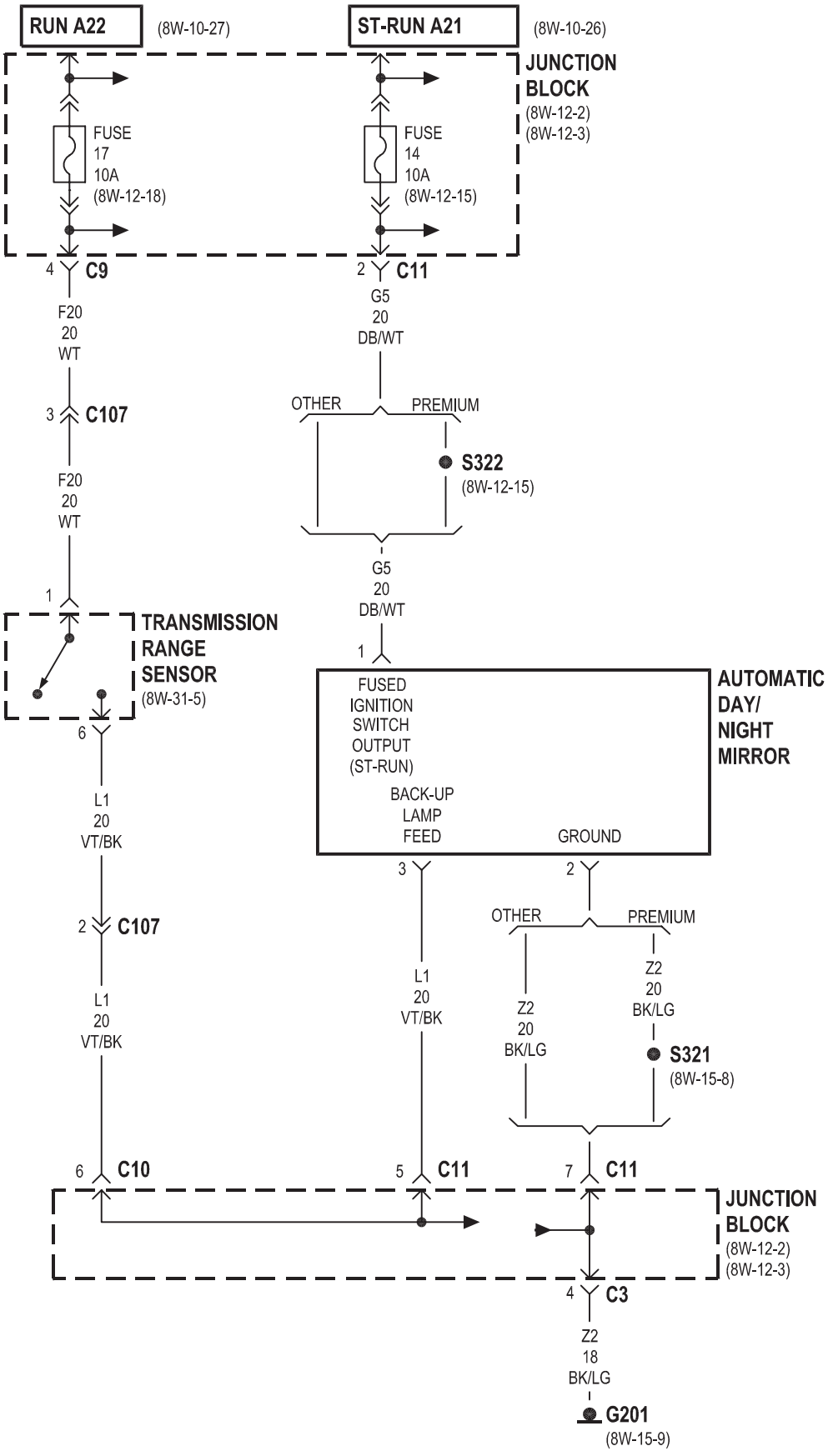
BUILT-UP-EXPORT

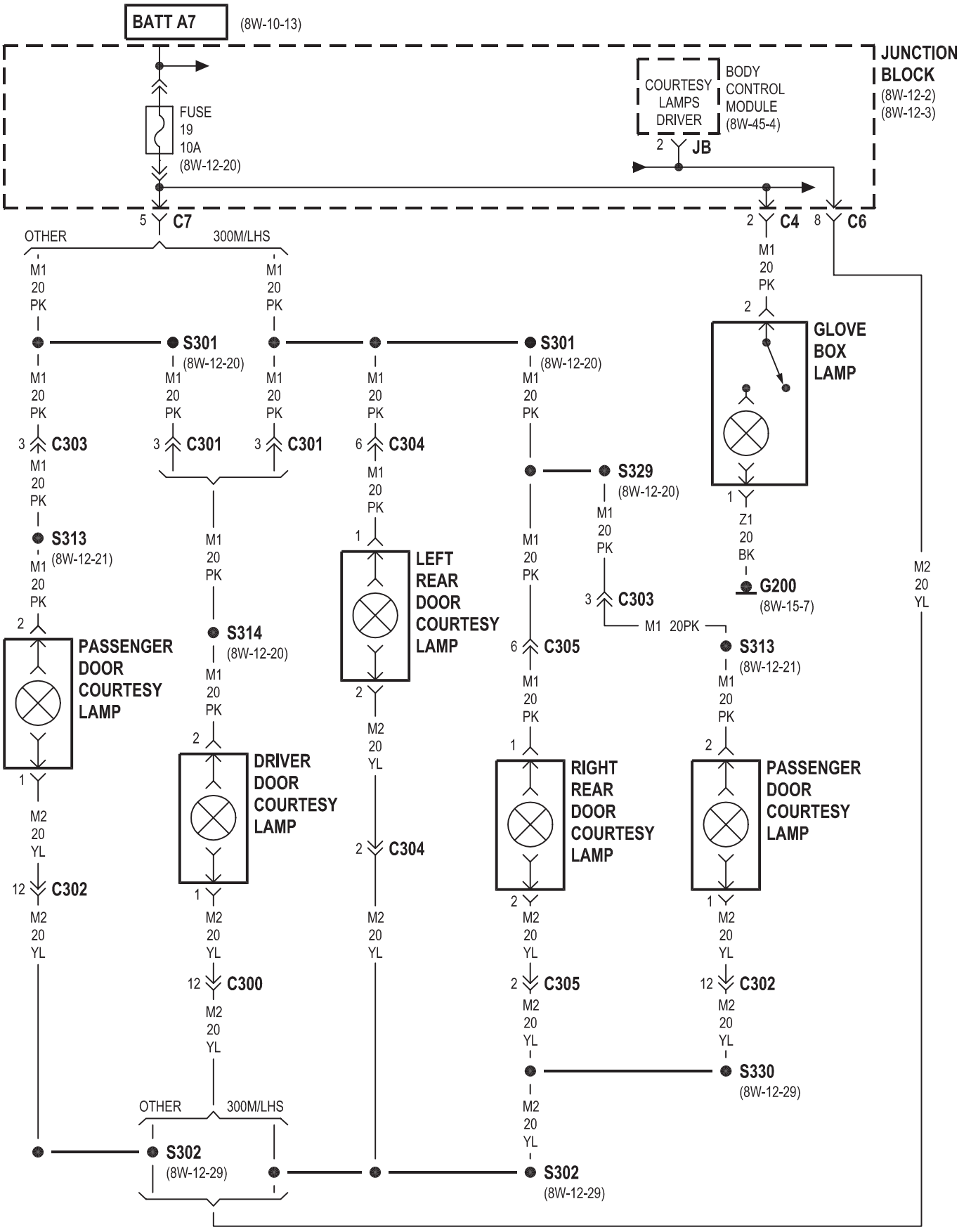


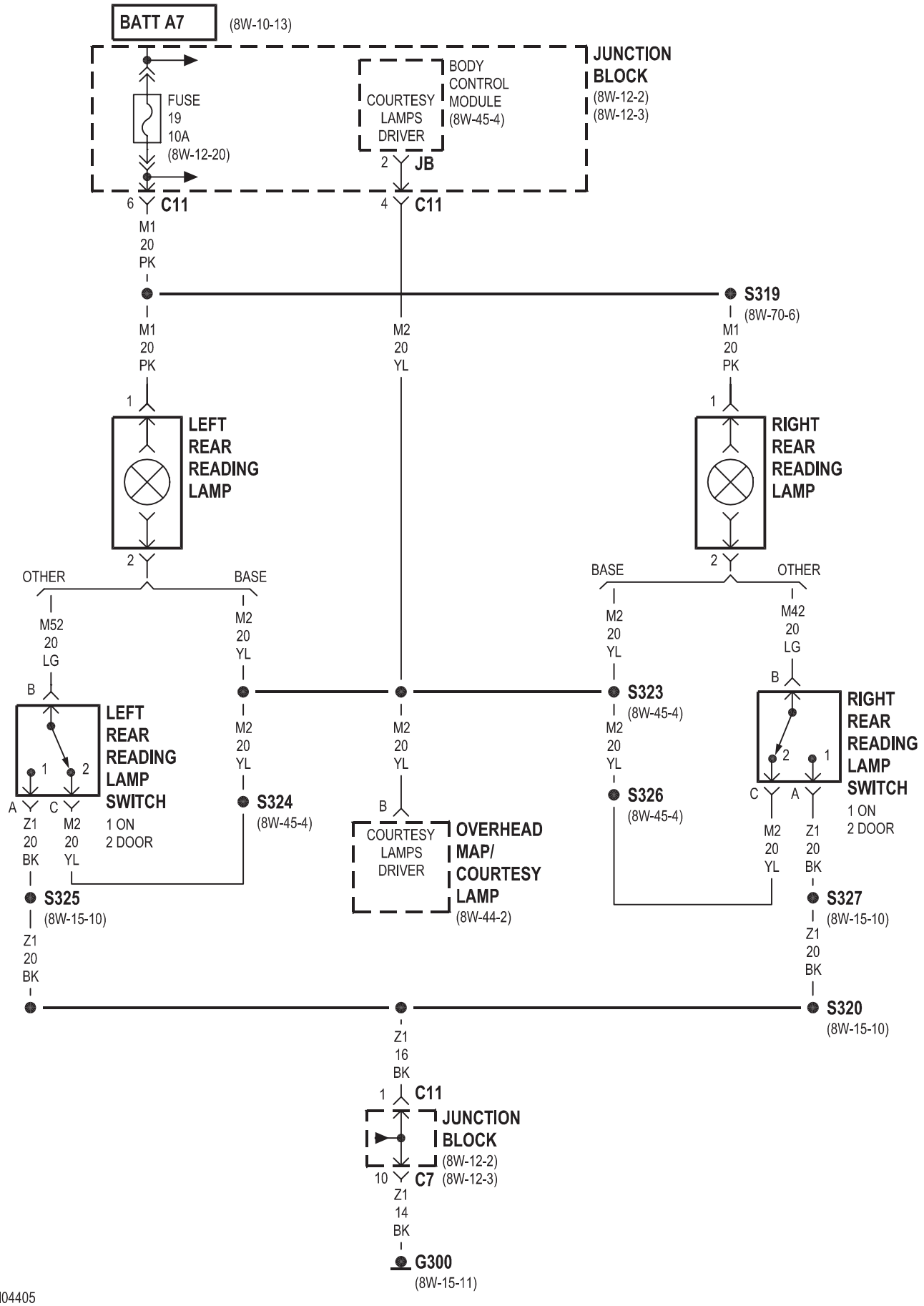
8W-44 INTERIOR LIGHTING

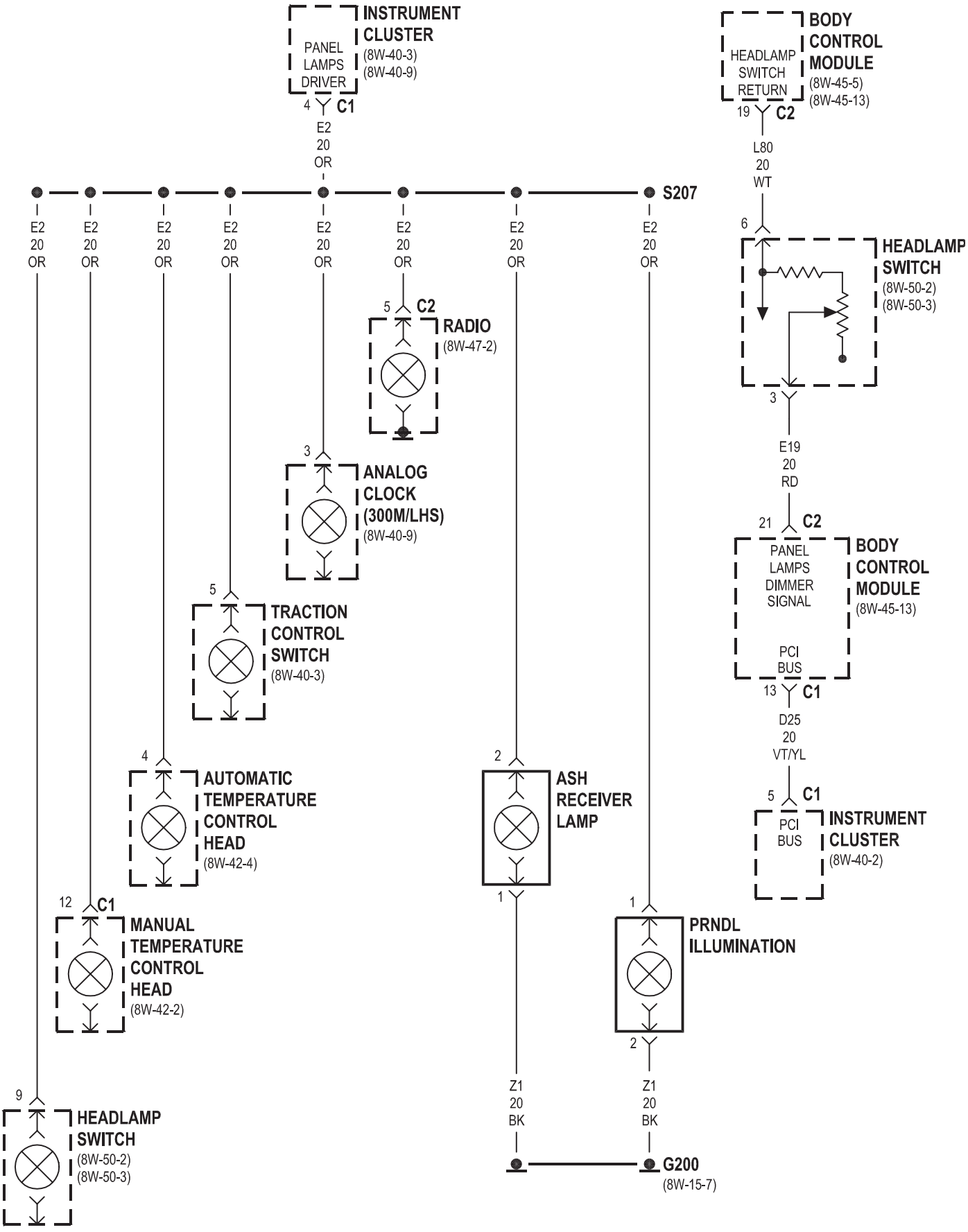
Component	Page
Analog Clock	8W-44-6
Ash Receiver Lamp	8W-44-6
Automatic Day/Night Mirror	8W-44-3
Automatic Temperature Control Head	8W-44-6
Body Control Module	8W-44-2, 4, 5, 6
Decklid Release Solenoid/Ajar Switch	8W-44-2
Driver Door Courtesy Lamp	8W-44-4
Fuse 14 (JB)	8W-44-3
Fuse 17 (JB)	8W-44-3
Fuse 19 (JB)	8W-44-2, 4, 5
G200	8W-44-4, 6
G201	8W-44-3
G300	8W-44-2, 5
G400	8W-44-2
Glove Box Lamp	8W-44-4
Headlamp Switch	8W-44-6
Instrument Cluster	8W-44-2, 6
Junction Block	8W-44-2, 3, 4, 5
Left Rear Door Courtesy Lamp	8W-44-4
Left Rear Reading Lamp	8W-44-5
Left Rear Reading Lamp Switch	8W-44-5
Left Visor/Vanity Lamp	8W-44-2
Manual Temperature Control Head	8W-44-6
Overhead Map/Courtesy Lamp	8W-44-2, 5
Passenger Door Courtesy Lamp	8W-44-4
PRNDL Illumination	8W-44-6
Radio	8W-44-6
Right Rear Door Courtesy Lamp	8W-44-4
Right Rear Reading Lamp	8W-44-5
Right Rear Reading Lamp Switch	8W-44-5
Right Visor/Vanity Lamp	8W-44-2
Traction Control Switch	8W-44-6
Transmission Range Sensor	8W-44-3
Trunk Lamp	8W-44-2


BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
19
10A
(8W-12-20)
6 C11
6 C7
M1
20
PK
S319
(8W-70-6)
TRUNK LAMP
OVERHEAD MAP/ COURTESY LAMP
1 DOOR
2 ON
LEFT VISOR/ VANITY LAMP
RIGHT VISOR/ VANITY LAMP
INSTRUMENT CLUSTER
(8W-40-3)
DECKLID AJAR SWITCH SENSE
9 C2
G78
20
TN/BK
9 C200
M2
20
YL
BASE
OTHER
Z1
20
BK
S323
(8W-45-4)
S320
(8W-15-10)
S307
Z1
16
BK
4 C11
1 C11
1 C311
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
2 JB
COURTESY LAMPS DRIVER
BODY CONTROL MODULE
(8W-45-4)
DECKLID RELEASE SOLENOID/ AJAR SWITCH
(8W-61-5)
10 C7
Z1
14
BK
18
G300
(8W-15-11)
S405
(8W-15-14)
G400
(8W-15-14)


RUN A22
(8W-10-27)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 17 10A
(8W-12-18)
FUSE 14 10A
(8W-12-15)
4 C9
2 C11
F20 20 WT
G5 20 DB/WT
3 C107
OTHER
PREMIUM
S322
(8W-12-15)
F20 20 WT
G5 20 DB/WT
1
TRANSMISSION RANGE SENSOR
(8W-31-5)
1
AUTOMATIC DAY/ NIGHT MIRROR
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
BACK-UP LAMP FEED
GROUND
6
L1 20 VT/BK
3
2
OTHER
PREMIUM
2 C107
L1 20 VT/BK
L1 20 VT/BK
Z2 20 BK/LG
Z2 20 BK/LG
S321
(8W-15-8)
6 C10
5 C11
7 C11
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
4 C3
Z2 18 BK/LG
G201
(8W-15-9)

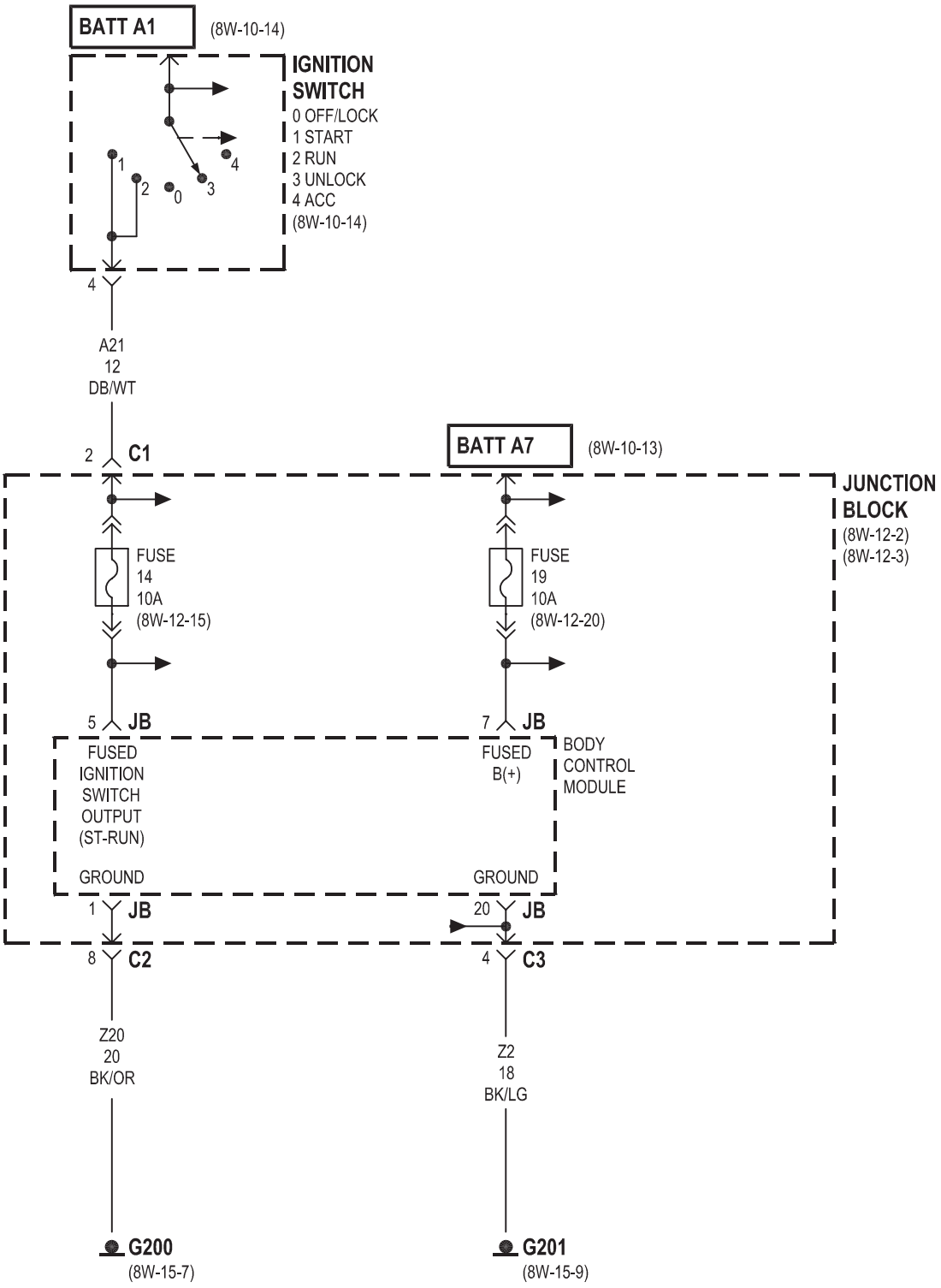

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
COURTESY LAMPS DRIVER
BODY CONTROL MODULE
(8W-45-4)
JB
C7
C4
C6
OTHER
300M/LHS
S301
(8W-12-20)
S329
(8W-12-20)
S313
(8W-12-21)
S314
(8W-12-20)
S302
(8W-12-29)
S330
(8W-12-29)
C303
C301
C304
C305
C302
C300
GLOVE BOX LAMP
G200
(8W-15-7)
PASSENGER DOOR COURTESY LAMP
DRIVER DOOR COURTESY LAMP
LEFT REAR DOOR COURTESY LAMP
RIGHT REAR DOOR COURTESY LAMP
PASSENGER DOOR COURTESY LAMP
M1 20 PK
M2 20 YL
Z1 20 BK
M1 20PK

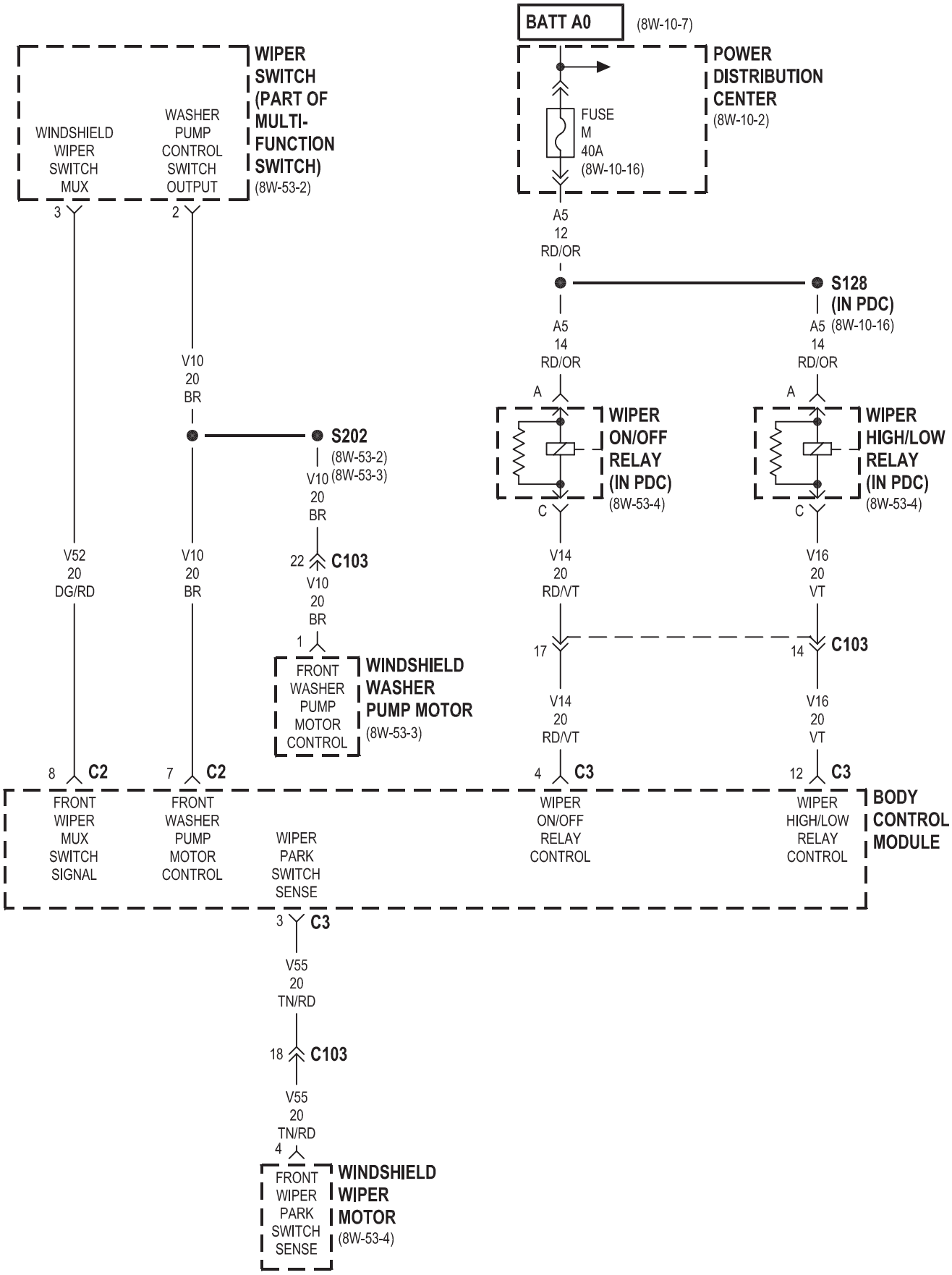

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
BODY CONTROL MODULE
(8W-45-4)
COURTESY LAMPS DRIVER
JB
6 C11
4 C11
M1 20 PK
M2 20 YL
S319
(8W-70-6)
LEFT REAR READING LAMP
RIGHT REAR READING LAMP
OTHER
BASE
M52 20 LG
M42 20 LG
LEFT REAR READING LAMP SWITCH
1 ON 2 DOOR
RIGHT REAR READING LAMP SWITCH
1 ON 2 DOOR
S323
(8W-45-4)
S324
(8W-45-4)
S325
(8W-15-10)
S326
(8W-45-4)
S327
(8W-15-10)
S320
(8W-15-10)
OVERHEAD MAP/ COURTESY LAMP
(8W-44-2)
Z1 20 BK
Z1 16 BK
Z1 14 BK
C7
(8W-12-3)
G300
(8W-15-11)

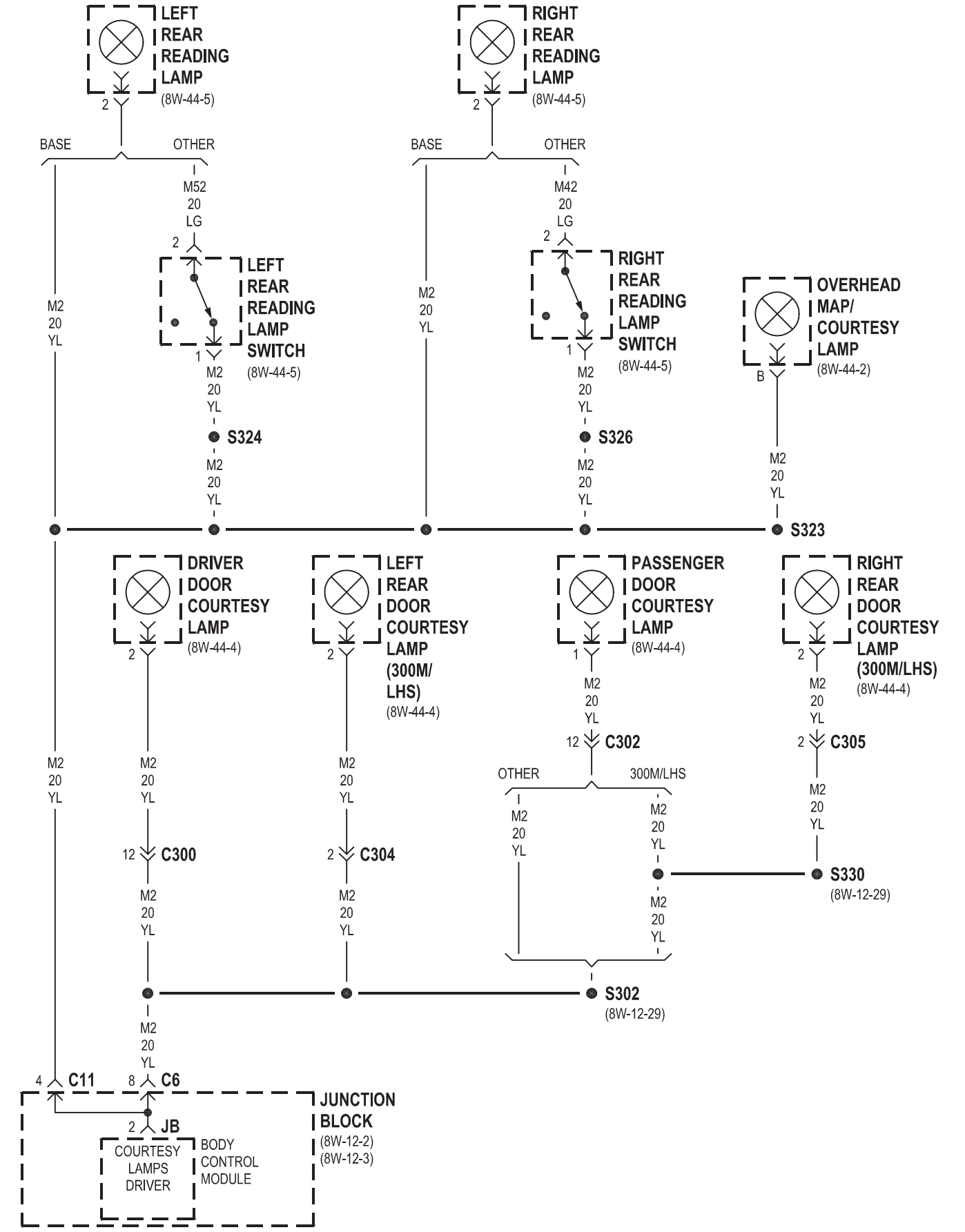

INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
PANEL LAMPS DRIVER
4
C1
E2
20
OR
BODY CONTROL MODULE
(8W-45-5)
(8W-45-13)
HEADLAMP SWITCH RETURN
19
C2
L80
20
WT
S207
E2 20 OR
6
HEADLAMP SWITCH
(8W-50-2)
(8W-50-3)
3
E19
20
RD
21
C2
PANEL LAMPS DIMMER SIGNAL
BODY CONTROL MODULE
(8W-45-13)
PCI BUS
13
C1
D25
20
VT/YL
5
C1
PCI BUS
INSTRUMENT CLUSTER
(8W-40-2)
5
C2
RADIO
(8W-47-2)
3
ANALOG CLOCK (300M/LHS)
(8W-40-9)
5
TRACTION CONTROL SWITCH
(8W-40-3)
4
AUTOMATIC TEMPERATURE CONTROL HEAD
(8W-42-4)
12
C1
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-2)
9
HEADLAMP SWITCH
(8W-50-2)
(8W-50-3)
2
ASH RECEIVER LAMP
1
Z1
20
BK
1
PRNDL ILLUMINATION
2
Z1
20
BK
G200
(8W-15-7)

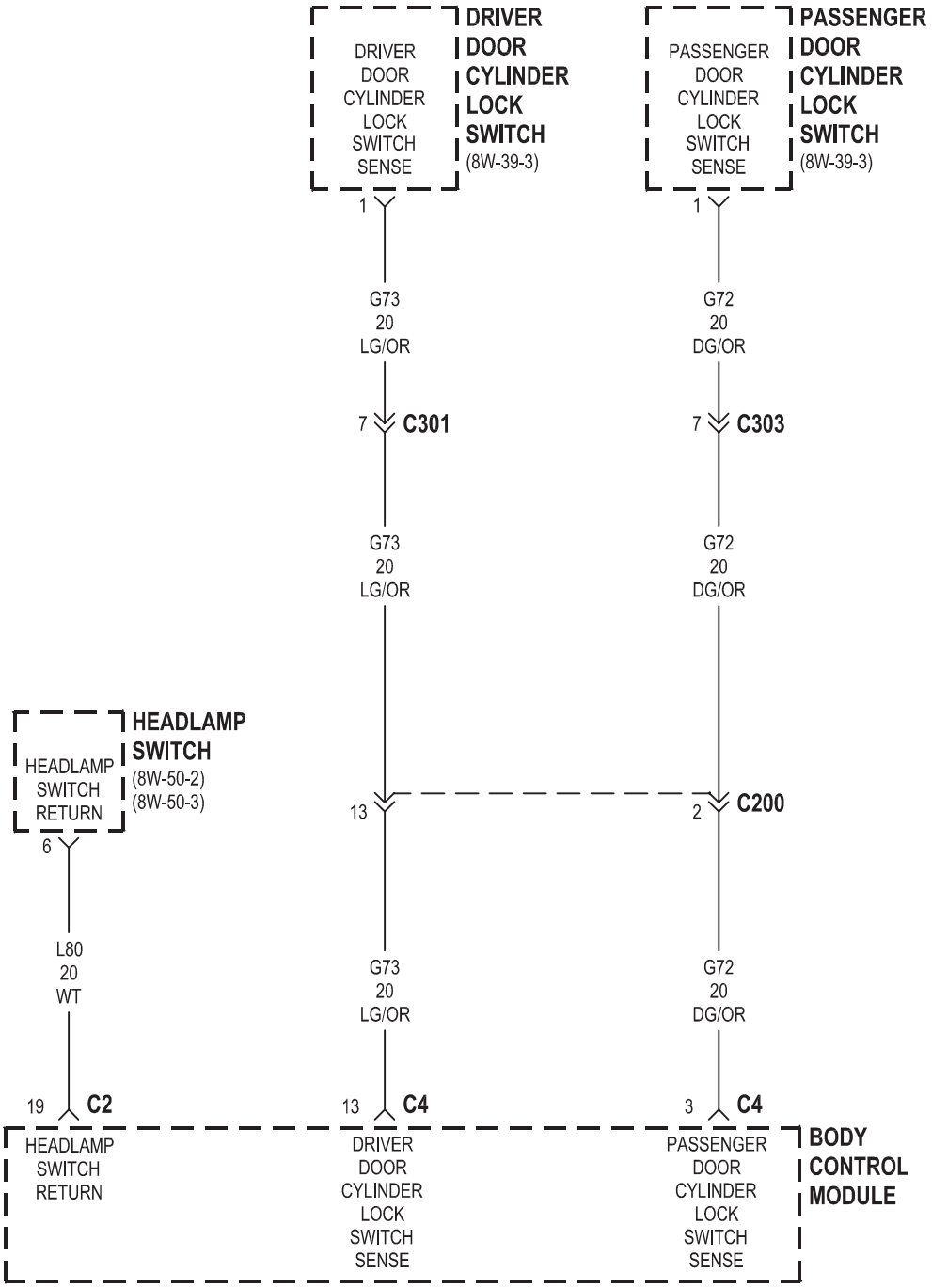
8W-45 BODY CONTROL MODULE

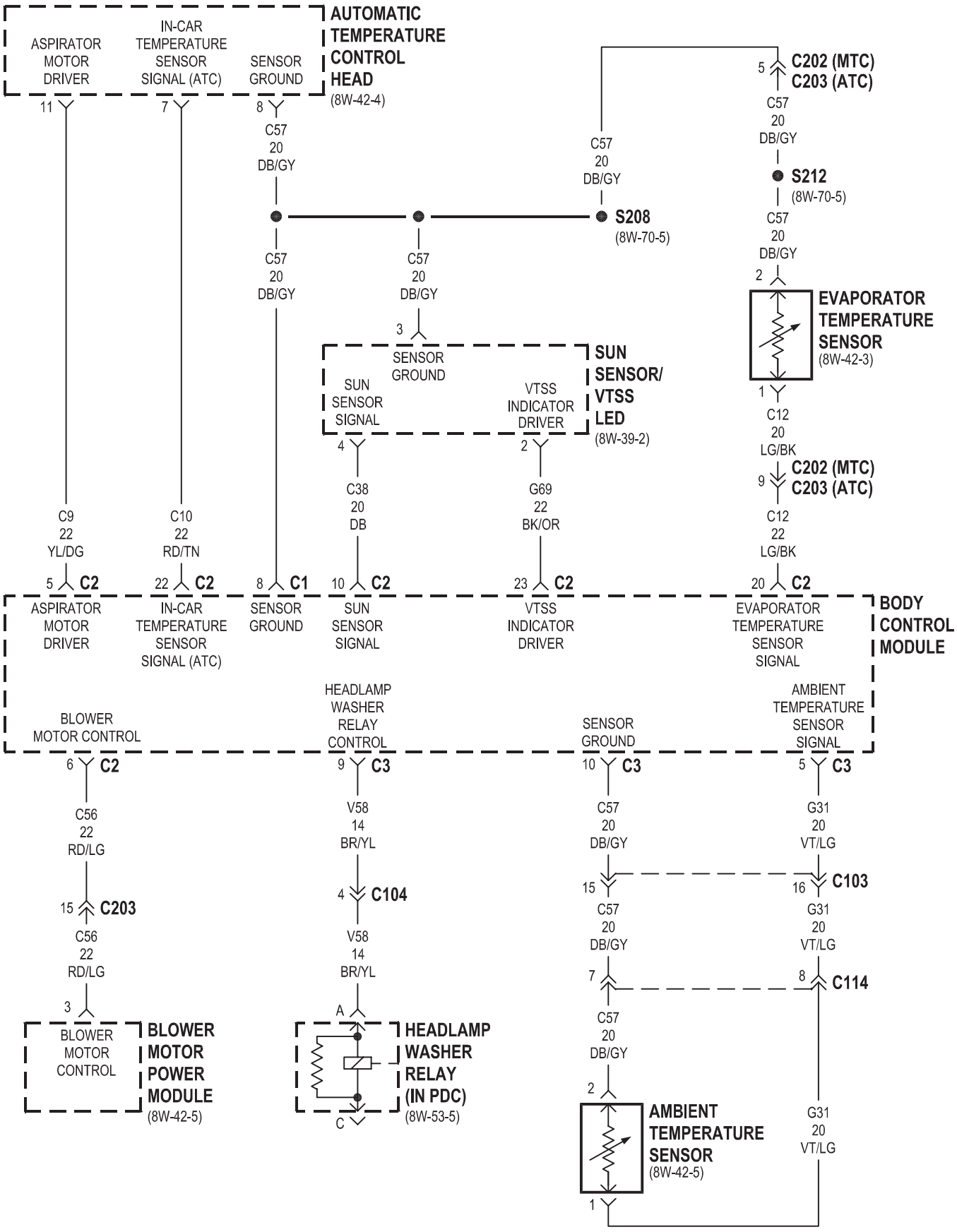
Component	Page
Ambient Temperature Sensor	8W-45-6
Automatic Temperature Control Head	8W-45-6, 15
Blend Door Actuator	8W-45-8
Blower Motor Power Module	8W-45-6
Body Control Module	8W-45-2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
Clockspring No. 1	8W-45-11
Controller Anti-Lock Brake	8W-45-15
Data Link Connector	8W-45-15
Decklid Release Solenoid/Ajar Switch	8W-45-11
Decklid Release Switch	8W-45-13
Door Lock Relay	8W-45-11
Door Unlock Relay	8W-45-11
Driver Door Courtesy Lamp	8W-45-4
Driver Door Cylinder Lock Switch	8W-45-5
Driver Door Lock Motor/Ajar Switch	8W-45-10
Driver Door Unlock Relay	8W-45-11
Driver Power Door Lock Switch	8W-45-9
Evaporator Temperature Sensor	8W-45-6
Fog Lamp Relay	8W-45-12
Fuel Pump Module	8W-45-10
Fuse 14 (JB)	8W-45-2
Fuse 16 (JB)	8W-45-12
Fuse 18 (JB)	8W-45-11
Fuse 19 (JB)	8W-45-2, 13
Fuse 7 (JB)	8W-45-11
Fuse M (PDC)	8W-45-3
G200	8W-45-2
G201	8W-45-2
G400	8W-45-11
Headlamp Switch	8W-45-5, 9, 13
Headlamp Washer Relay	8W-45-6
Horn Relay	8W-45-11
Ignition Switch	8W-45-2, 9
Instrument Cluster	8W-45-15
Junction Block	8W-45-2, 4, 11, 12, 13
Left Rear Door Courtesy Lamp	8W-45-4
Left Rear Door Lock Motor/Ajar Switch	8W-45-10
Left Rear Reading Lamp	8W-45-4
Left Rear Reading Lamp Switch	8W-45-4
Left Side Impact Airbag Control Module	8W-45-15
Low Beam Headlamp Relay	8W-45-12
Manual Temperature Control Head	8W-45-13, 14
Memory Heated Seat/Mirror Module	8W-45-15
Mode Door Actuator	8W-45-7
Occupant Restraint Controller	8W-45-15
Overhead Map/Courtesy Lamp	8W-45-4
Overhead Travel Information System	8W-45-12
Park Lamp Relay	8W-45-11
Passenger Door Courtesy Lamp	8W-45-4
Passenger Door Cylinder Lock Switch	8W-45-5
Passenger Door Lock Motor/Ajar Switch	8W-45-10
Passenger Power Door Lock Switch	8W-45-9
Power Distribution Center	8W-45-3
Powertrain Control Module	8W-45-15
Radio	8W-45-13, 15
Rear Window Defogger Relay	8W-45-14
Recirculation Door Actuator	8W-45-8
Remote Keyless Entry Module	8W-45-10
Right Rear Door Courtesy Lamp	8W-45-4
Right Rear Door Lock Motor/Ajar Switch	8W-45-10
Right Rear Reading Lamp	8W-45-4
Right Rear Reading Lamp Switch	8W-45-4
Right Side Impact Airbag Control Module	8W-45-15
Seat Belt Switch	8W-45-9
Sentry Key Immobilizer Module	8W-45-15
Spare Relay	8W-45-12
Speed Proportional Steering Solenoid	8W-45-12
Sun Sensor/VTSS LED	8W-45-6
Transmission Control Module	8W-45-15
Trunk Knock Out Switch	8W-45-9
Vehicle Speed Control/Horn Switch	8W-45-11
Windshield Washer Pump Motor	8W-45-3
Windshield Wiper Motor	8W-45-3
Wiper High/Low Relay	8W-45-3
Wiper On/Off Relay	8W-45-3
Wiper Switch	8W-45-3

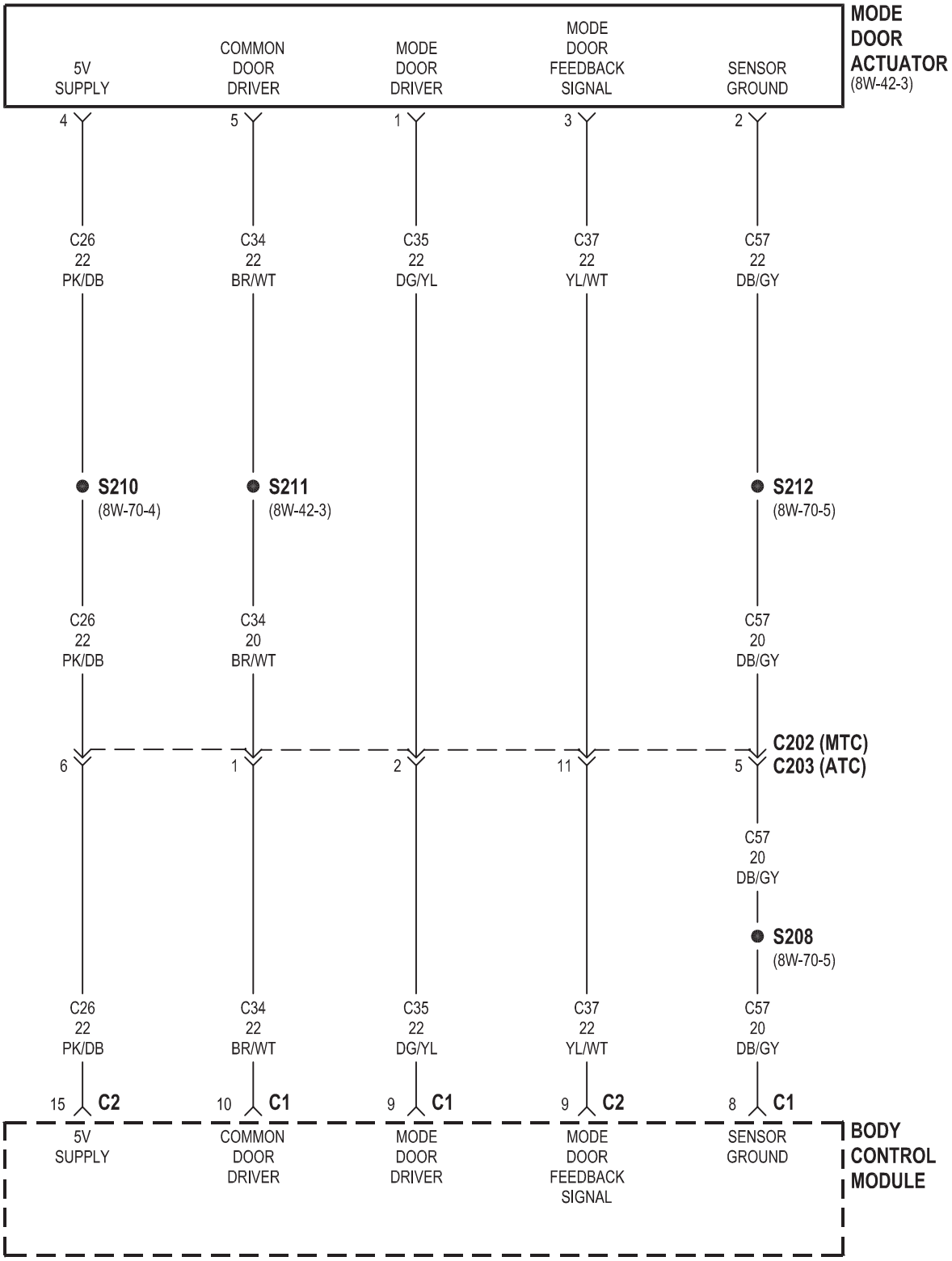

BATT A1
(8W-10-14)
IGNITION SWITCH
0 OFF/LOCK
1 START
2 RUN
3 UNLOCK
4 ACC
(8W-10-14)
1
2
0
3
4
4
A21
12
DB/WT
2
C1
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
14
10A
(8W-12-15)
FUSE
19
10A
(8W-12-20)
5
JB
7
JB
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED B(+)
BODY CONTROL MODULE
GROUND
GROUND
1
JB
20
JB
8
C2
4
C3
Z20
20
BK/OR
Z2
18
BK/LG
G200
(8W-15-7)
G201
(8W-15-9)

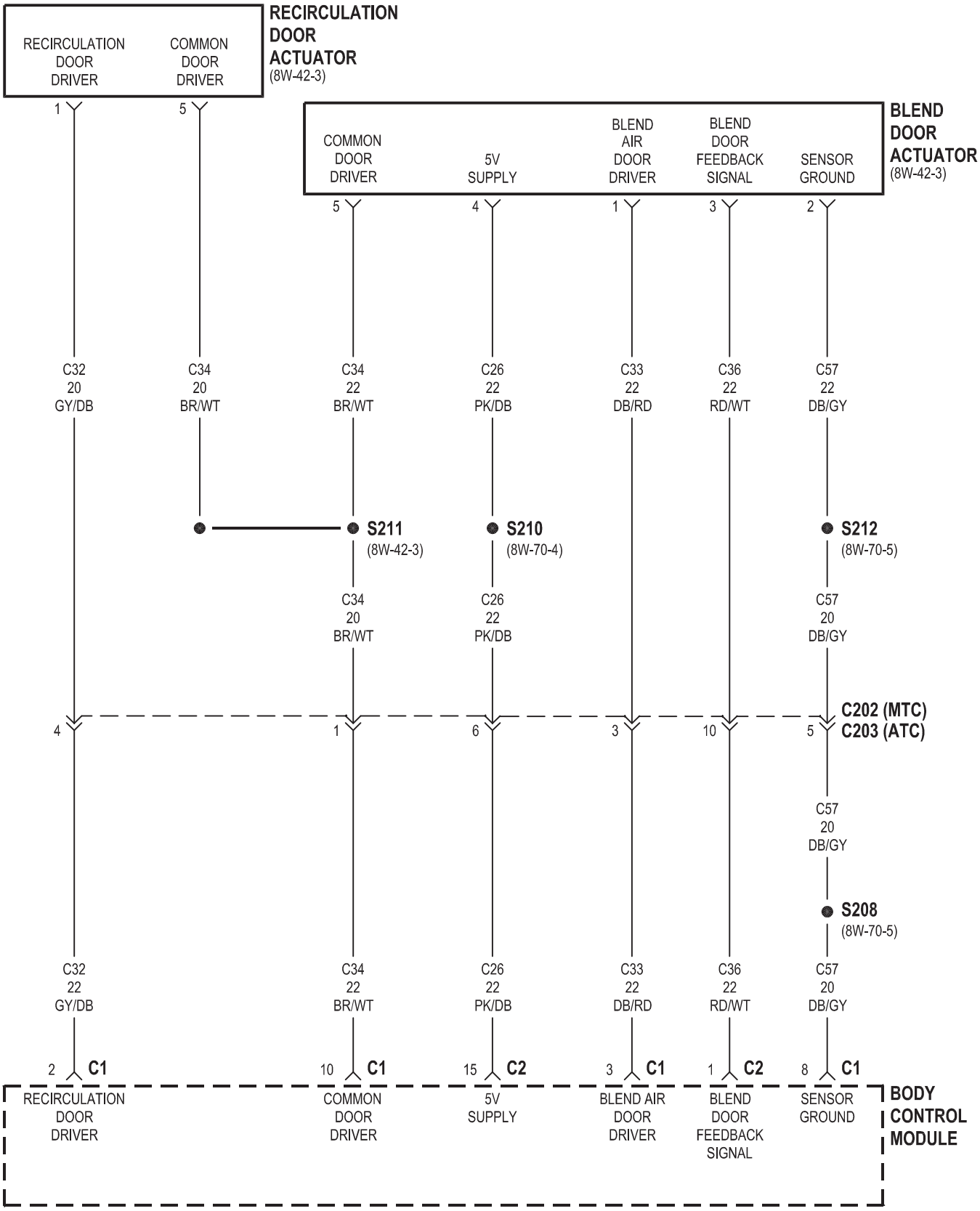

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE M 40A
(8W-10-16)
WIPER SWITCH (PART OF MULTI-FUNCTION SWITCH)
(8W-53-2)
WINDSHIELD WIPER SWITCH MUX
WASHER PUMP CONTROL SWITCH OUTPUT
3
2
A5 12 RD/OR
S128 (IN PDC)
(8W-10-16)
A5 14 RD/OR
A5 14 RD/OR
A
A
WIPER ON/OFF RELAY (IN PDC)
(8W-53-4)
WIPER HIGH/LOW RELAY (IN PDC)
(8W-53-4)
C
C
V10 20 BR
S202
(8W-53-2)
(8W-53-3)
V10 20 BR
V52 20 DG/RD
V10 20 BR
22
C103
V10 20 BR
1
V14 20 RD/VT
V16 20 VT
17
14
C103
FRONT WASHER PUMP MOTOR CONTROL
WINDSHIELD WASHER PUMP MOTOR
(8W-53-3)
V14 20 RD/VT
V16 20 VT
8
C2
7
C2
4
C3
12
C3
FRONT WIPER MUX SWITCH SIGNAL
FRONT WASHER PUMP MOTOR CONTROL
WIPER PARK SWITCH SENSE
WIPER ON/OFF RELAY CONTROL
WIPER HIGH/LOW RELAY CONTROL
BODY CONTROL MODULE
3
C3
V55 20 TN/RD
18
C103
V55 20 TN/RD
4
FRONT WIPER PARK SWITCH SENSE
WINDSHIELD WIPER MOTOR
(8W-53-4)

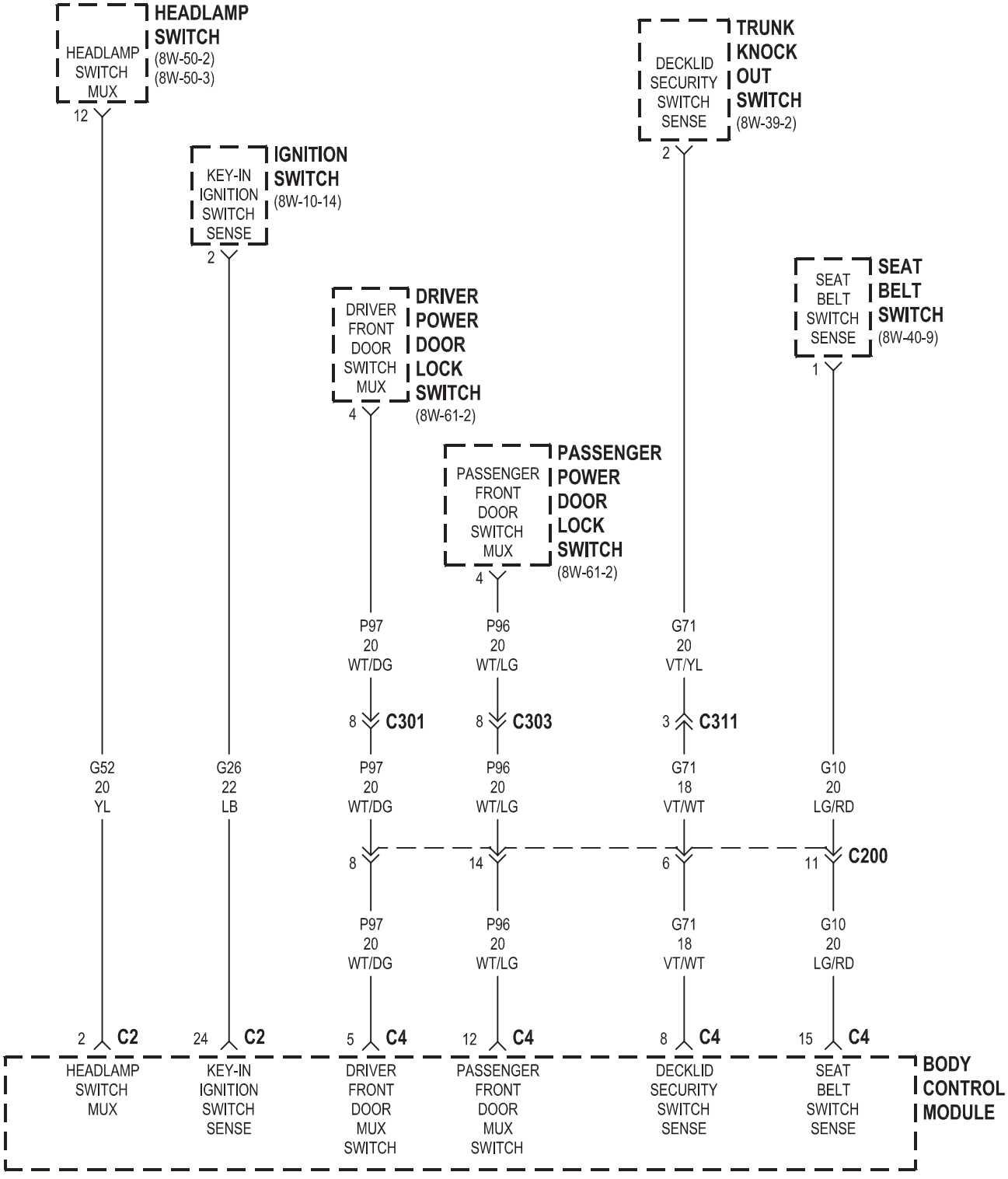

LEFT REAR READING LAMP
(8W-44-5)
2
BASE
OTHER
M52
20
LG
2
LEFT REAR READING LAMP SWITCH
(8W-44-5)
1
M2
20
YL
S324
RIGHT REAR READING LAMP
(8W-44-5)
M42
20
LG
RIGHT REAR READING LAMP SWITCH
(8W-44-5)
S326
OVERHEAD MAP/ COURTESY LAMP
(8W-44-2)
B
S323
DRIVER DOOR COURTESY LAMP
(8W-44-4)
LEFT REAR DOOR COURTESY LAMP (300M/ LHS)
(8W-44-4)
PASSENGER DOOR COURTESY LAMP
(8W-44-4)
RIGHT REAR DOOR COURTESY LAMP (300M/LHS)
(8W-44-4)
C300
12
C304
C302
OTHER
300M/LHS
C305
S330
(8W-12-29)
S302
(8W-12-29)
C11
4
C6
8
JB
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
COURTESY LAMPS DRIVER
BODY CONTROL MODULE

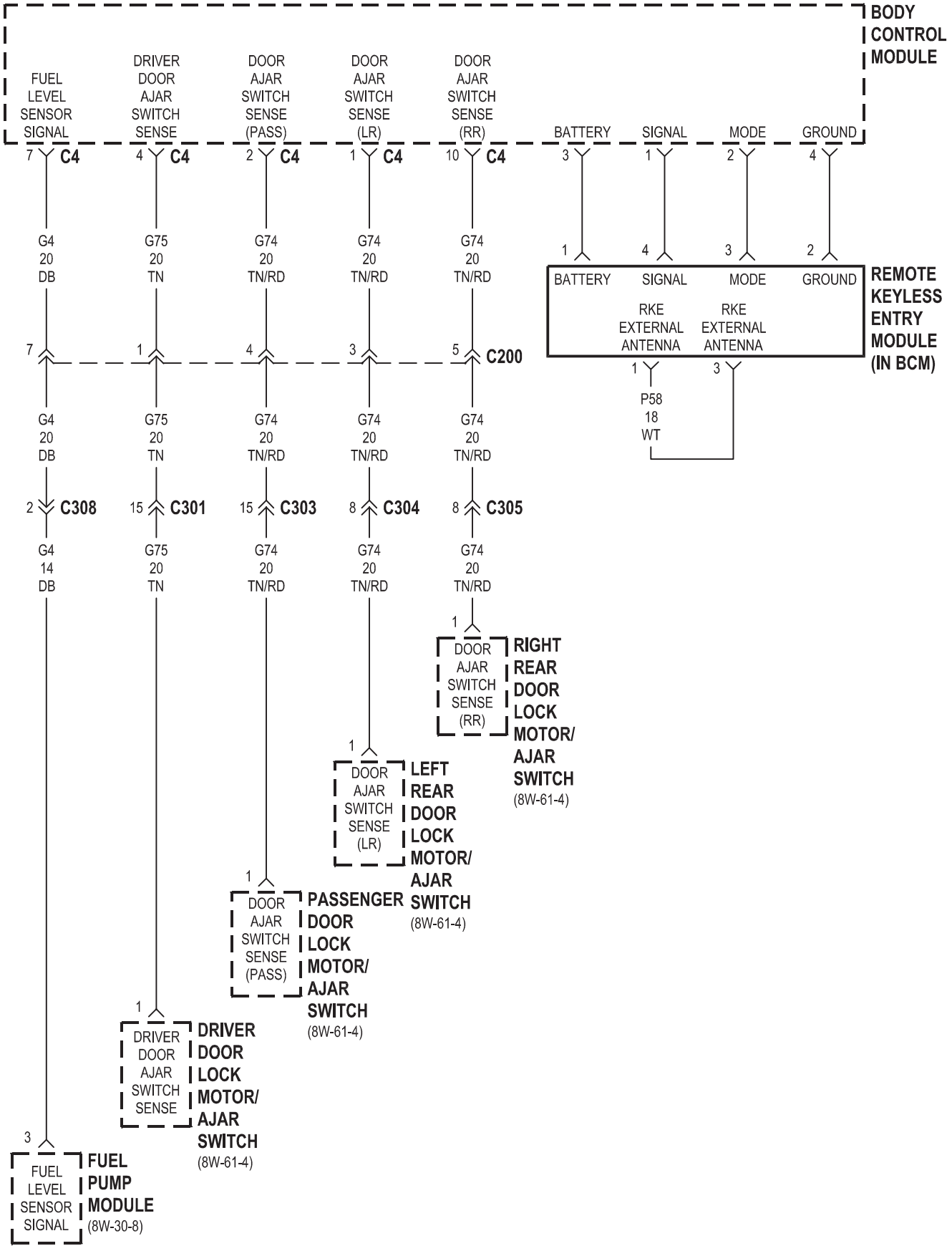

DRIVER DOOR CYLINDER LOCK SWITCH SENSE
DRIVER DOOR CYLINDER LOCK SWITCH
(8W-39-3)
PASSENGER DOOR CYLINDER LOCK SWITCH SENSE
PASSENGER DOOR CYLINDER LOCK SWITCH
(8W-39-3)
1
G73
20
LG/OR
7 C301
G72
20
DG/OR
7 C303
HEADLAMP SWITCH RETURN
HEADLAMP SWITCH
(8W-50-2)
(8W-50-3)
13
2 C200
6
L80
20
WT
19 C2
13 C4
3 C4
HEADLAMP SWITCH RETURN
DRIVER DOOR CYLINDER LOCK SWITCH SENSE
PASSENGER DOOR CYLINDER LOCK SWITCH SENSE
BODY CONTROL MODULE

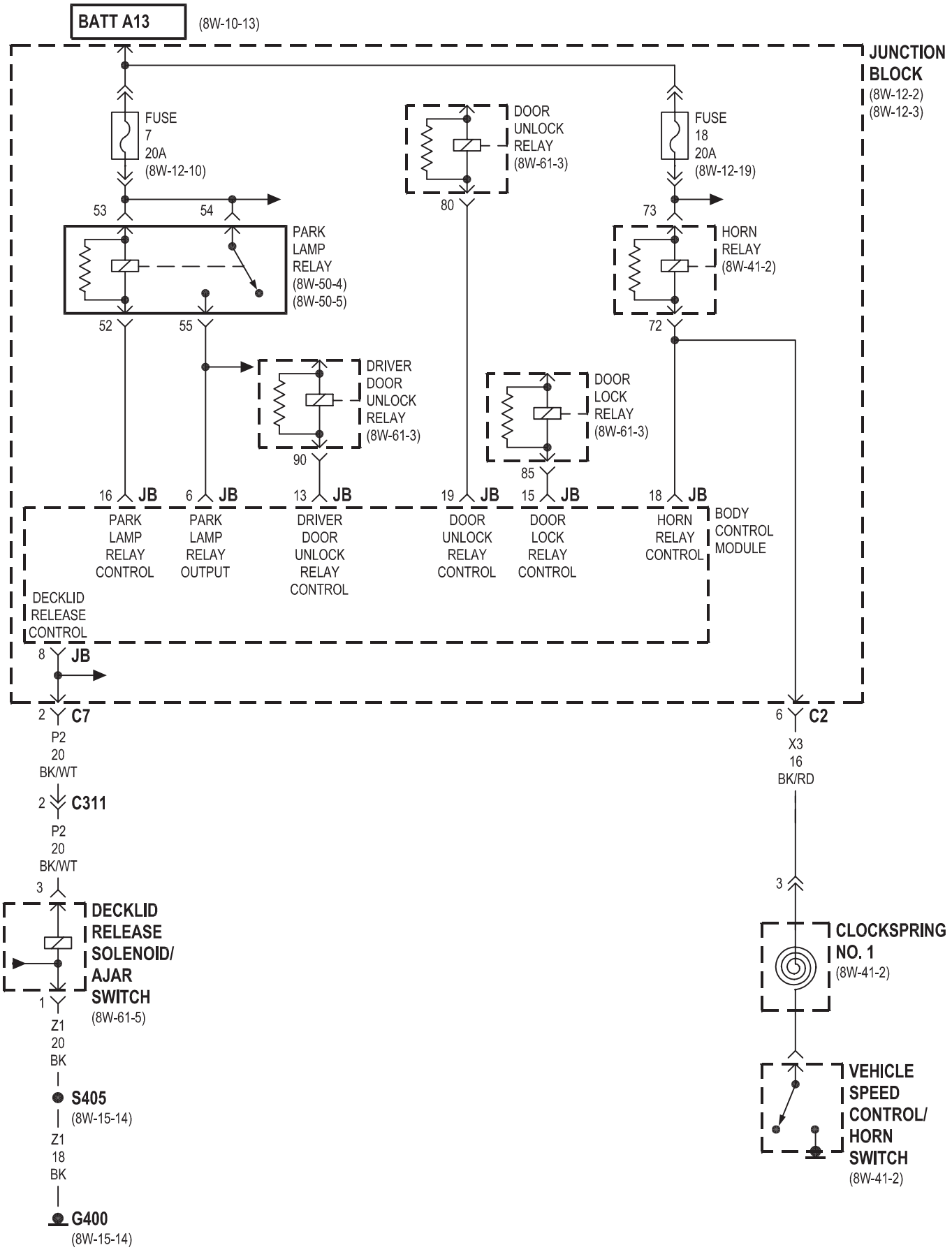

AUTOMATIC TEMPERATURE CONTROL HEAD
(8W-42-4)
ASPIRATOR MOTOR DRIVER
IN-CAR TEMPERATURE SENSOR SIGNAL (ATC)
SENSOR GROUND
11
7
8
C57 20 DB/GY
S208
(8W-70-5)
5
C202 (MTC)
C203 (ATC)
S212
(8W-70-5)
2
EVAPORATOR TEMPERATURE SENSOR
(8W-42-3)
1
C12 20 LG/BK
9
C12 22 LG/BK
3
SENSOR GROUND
SUN SENSOR SIGNAL
VTSS INDICATOR DRIVER
SUN SENSOR/ VTSS LED
(8W-39-2)
4
2
C38 20 DB
G69 22 BK/OR
C9 22 YL/DG
C10 22 RD/TN
5
22
8
10
23
20
C2
C1
BODY CONTROL MODULE
ASPIRATOR MOTOR DRIVER
IN-CAR TEMPERATURE SENSOR SIGNAL (ATC)
SENSOR GROUND
SUN SENSOR SIGNAL
VTSS INDICATOR DRIVER
EVAPORATOR TEMPERATURE SENSOR SIGNAL
BLOWER MOTOR CONTROL
HEADLAMP WASHER RELAY CONTROL
SENSOR GROUND
AMBIENT TEMPERATURE SENSOR SIGNAL
6
9
10
5
C3
C56 22 RD/LG
C203
V58 14 BR/YL
C104
C57 20 DB/GY
G31 20 VT/LG
C103
C114
15
16
7
8
3
A
C
BLOWER MOTOR CONTROL
BLOWER MOTOR POWER MODULE
(8W-42-5)
HEADLAMP WASHER RELAY (IN PDC)
(8W-53-5)
AMBIENT TEMPERATURE SENSOR
(8W-42-5)
1

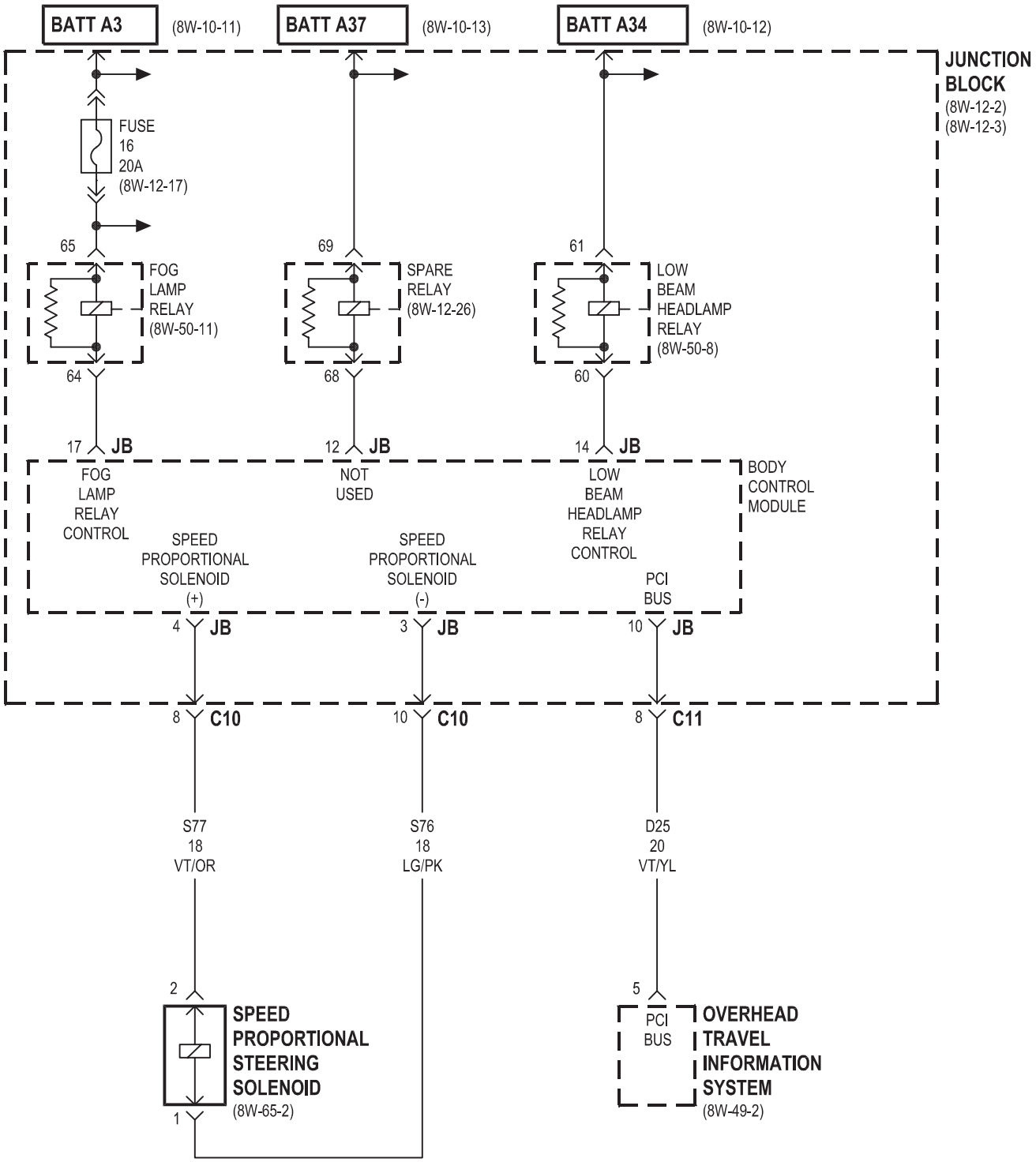

MODE DOOR ACTUATOR
(8W-42-3)
5V SUPPLY
COMMON DOOR DRIVER
MODE DOOR DRIVER
MODE DOOR FEEDBACK SIGNAL
SENSOR GROUND
4
5
1
3
2
C26 22 PK/DB
C34 22 BR/WT
C35 22 DG/YL
C37 22 YL/WT
C57 22 DB/GY
S210
(8W-70-4)
S211
(8W-42-3)
S212
(8W-70-5)
C26 22 PK/DB
C34 20 BR/WT
C57 20 DB/GY
6
1
2
11
5
C202 (MTC)
C203 (ATC)
C57 20 DB/GY
S208
(8W-70-5)
C26 22 PK/DB
C34 22 BR/WT
C35 22 DG/YL
C37 22 YL/WT
C57 20 DB/GY
15 C2
10 C1
9 C1
9 C2
8 C1
5V SUPPLY
COMMON DOOR DRIVER
MODE DOOR DRIVER
MODE DOOR FEEDBACK SIGNAL
SENSOR GROUND
BODY CONTROL MODULE

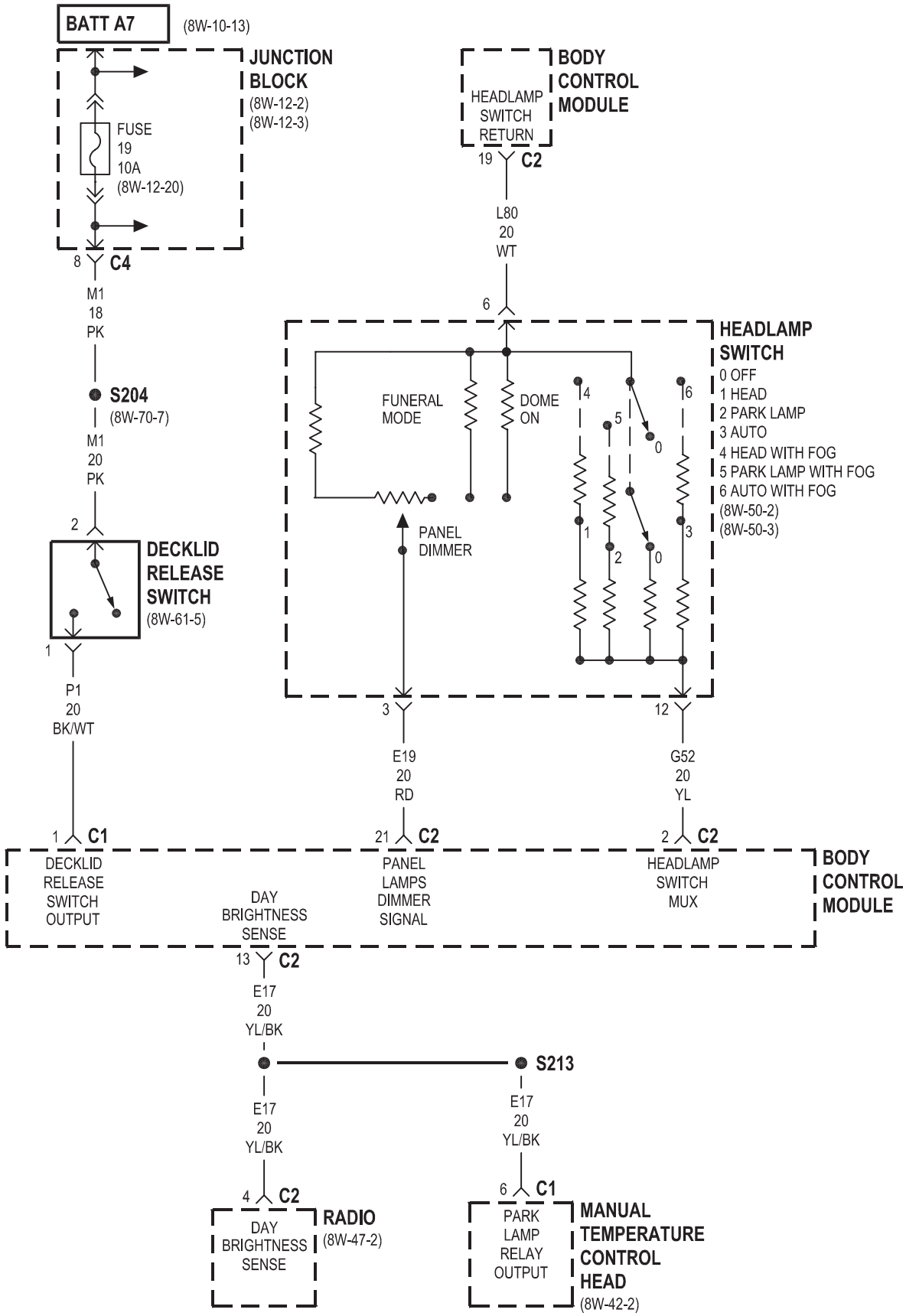

RECIRCULATION DOOR ACTUATOR
(8W-42-3)
RECIRCULATION DOOR DRIVER
COMMON DOOR DRIVER
1
5
BLEND DOOR ACTUATOR
(8W-42-3)
COMMON DOOR DRIVER
5V SUPPLY
BLEND AIR DOOR DRIVER
BLEND DOOR FEEDBACK SIGNAL
SENSOR GROUND
5
4
1
3
2
C32 20 GY/DB
C34 20 BR/WT
C34 22 BR/WT
C26 22 PK/DB
C33 22 DB/RD
C36 22 RD/WT
C57 22 DB/GY
S211
(8W-42-3)
S210
(8W-70-4)
S212
(8W-70-5)
C34 20 BR/WT
C26 22 PK/DB
C57 20 DB/GY
C202 (MTC)
C203 (ATC)
4
1
6
3
10
5
C57 20 DB/GY
S208
(8W-70-5)
C32 22 GY/DB
C34 22 BR/WT
C26 22 PK/DB
C33 22 DB/RD
C36 22 RD/WT
C57 20 DB/GY
2 C1
10 C1
15 C2
3 C1
1 C2
8 C1
RECIRCULATION DOOR DRIVER
COMMON DOOR DRIVER
5V SUPPLY
BLEND AIR DOOR DRIVER
BLEND DOOR FEEDBACK SIGNAL
SENSOR GROUND
BODY CONTROL MODULE

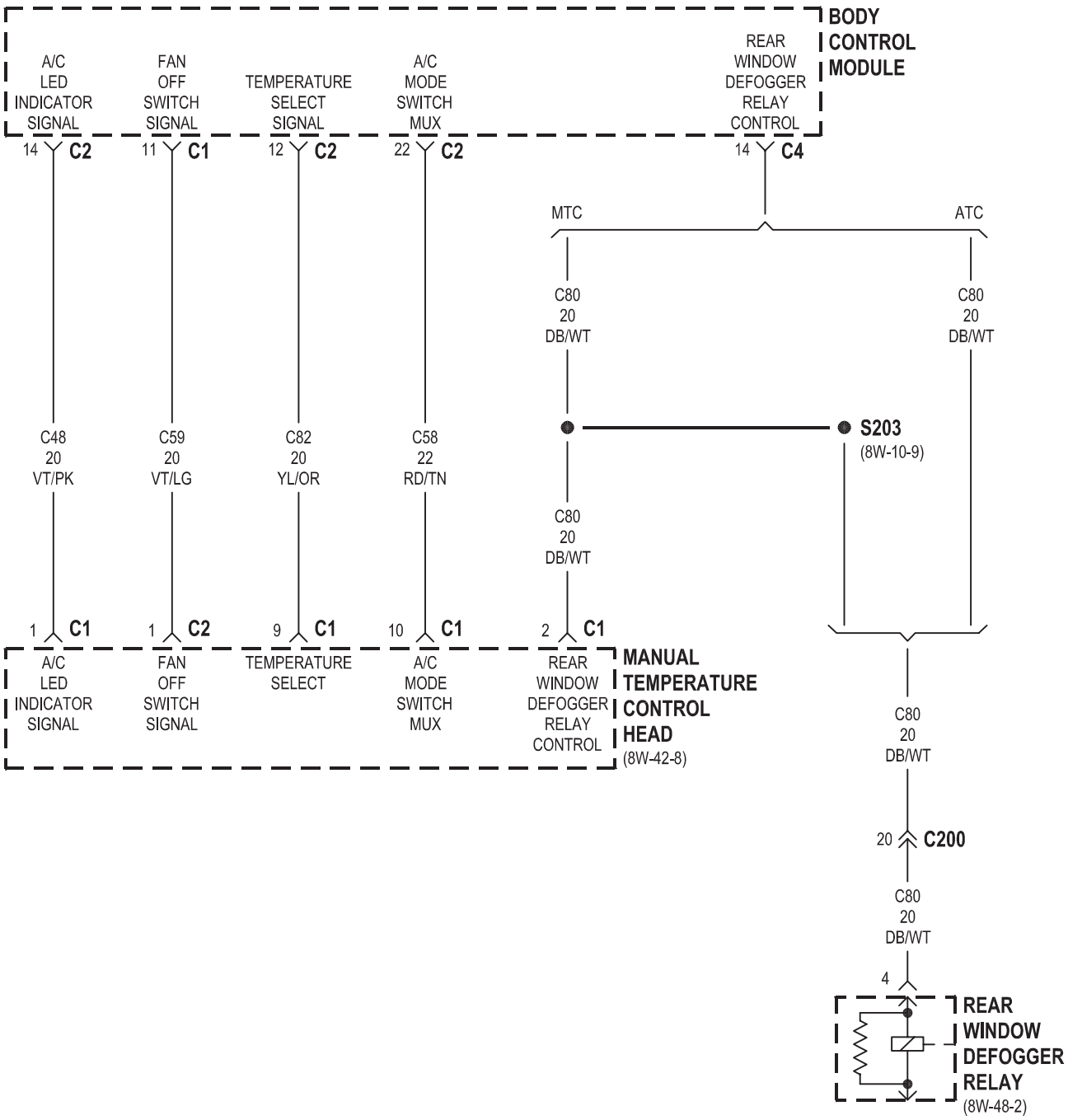

HEADLAMP SWITCH
(8W-50-2)
(8W-50-3)
HEADLAMP SWITCH MUX
12
IGNITION SWITCH
(8W-10-14)
KEY-IN IGNITION SWITCH SENSE
2
TRUNK KNOCK OUT SWITCH
(8W-39-2)
DECKLID SECURITY SWITCH SENSE
2
SEAT BELT SWITCH
(8W-40-9)
SEAT BELT SWITCH SENSE
1
DRIVER POWER DOOR LOCK SWITCH
(8W-61-2)
DRIVER FRONT DOOR SWITCH MUX
4
PASSENGER POWER DOOR LOCK SWITCH
(8W-61-2)
PASSENGER FRONT DOOR SWITCH MUX
4
P97 20 WT/DG
P96 20 WT/LG
G71 20 VT/YL
8 C301
8 C303
3 C311
G52 20 YL
G26 22 LB
P97 20 WT/DG
P96 20 WT/LG
G71 18 VT/WT
G10 20 LG/RD
8
14
6
11 C200
P97 20 WT/DG
P96 20 WT/LG
G71 18 VT/WT
G10 20 LG/RD
2 C2
24 C2
5 C4
12 C4
8 C4
15 C4
HEADLAMP SWITCH MUX
KEY-IN IGNITION SWITCH SENSE
DRIVER FRONT DOOR MUX SWITCH
PASSENGER FRONT DOOR MUX SWITCH
DECKLID SECURITY SWITCH SENSE
SEAT BELT SWITCH SENSE
BODY CONTROL MODULE

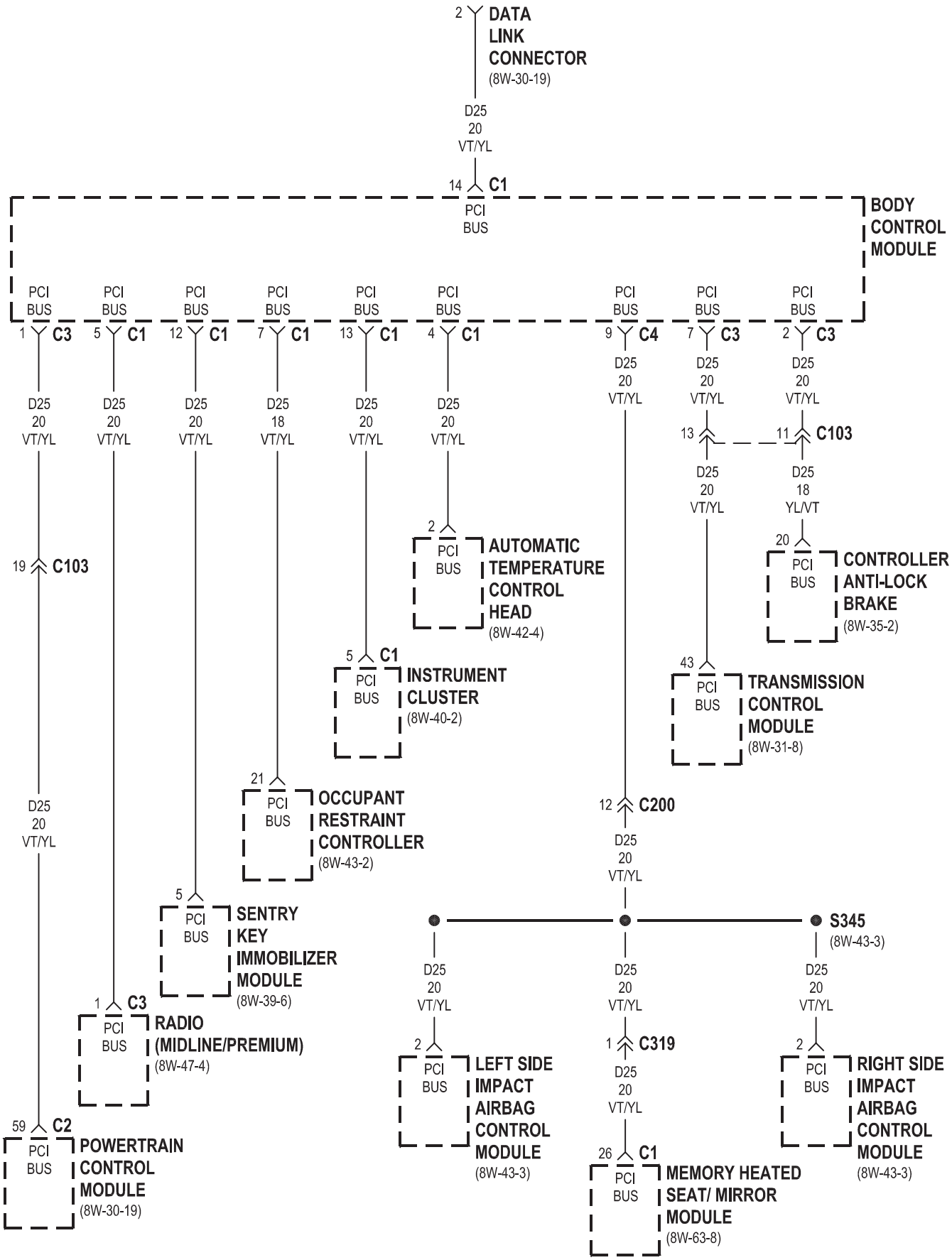

BODY CONTROL MODULE
FUEL LEVEL SENSOR SIGNAL
DRIVER DOOR AJAR SWITCH SENSE
DOOR AJAR SWITCH SENSE (PASS)
DOOR AJAR SWITCH SENSE (LR)
DOOR AJAR SWITCH SENSE (RR)
BATTERY
SIGNAL
MODE
GROUND
7 C4
4 C4
2 C4
1 C4
10 C4
3
1
2
4
G4 20 DB
G75 20 TN
G74 20 TN/RD
1
4
3
2
BATTERY
SIGNAL
MODE
GROUND
REMOTE KEYLESS ENTRY MODULE (IN BCM)
RKE EXTERNAL ANTENNA
RKE EXTERNAL ANTENNA
7
1
4
3
5 C200
1
3
P58 18 WT
2 C308
15 C301
15 C303
8 C304
8 C305
G4 14 DB
1
DOOR AJAR SWITCH SENSE (RR)
RIGHT REAR DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
1
DOOR AJAR SWITCH SENSE (LR)
LEFT REAR DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
1
DOOR AJAR SWITCH SENSE (PASS)
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
1
DRIVER DOOR AJAR SWITCH SENSE
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH (8W-61-4)
3
FUEL LEVEL SENSOR SIGNAL
FUEL PUMP MODULE (8W-30-8)


BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 7 20A
(8W-12-10)
FUSE 18 20A
(8W-12-19)
DOOR UNLOCK RELAY
(8W-61-3)
PARK LAMP RELAY
(8W-50-4)
(8W-50-5)
HORN RELAY
(8W-41-2)
DRIVER DOOR UNLOCK RELAY
(8W-61-3)
DOOR LOCK RELAY
(8W-61-3)
53
54
80
73
52
55
72
90
85
16 JB
6 JB
13 JB
19 JB
15 JB
18 JB
PARK LAMP RELAY CONTROL
PARK LAMP RELAY OUTPUT
DRIVER DOOR UNLOCK RELAY CONTROL
DOOR UNLOCK RELAY CONTROL
DOOR LOCK RELAY CONTROL
HORN RELAY CONTROL
BODY CONTROL MODULE
DECKLID RELEASE CONTROL
8 JB
2 C7
P2
20
BK/WT
2 C311
P2
20
BK/WT
3
DECKLID RELEASE SOLENOID/ AJAR SWITCH
(8W-61-5)
1
Z1
20
BK
S405
(8W-15-14)
Z1
18
BK
G400
(8W-15-14)
6 C2
X3
16
BK/RD
3
CLOCKSPRING NO. 1
(8W-41-2)
VEHICLE SPEED CONTROL/ HORN SWITCH
(8W-41-2)


BATT A3
(8W-10-11)
BATT A37
(8W-10-13)
BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 16 20A
(8W-12-17)
65
69
61
FOG LAMP RELAY
(8W-50-11)
SPARE RELAY
(8W-12-26)
LOW BEAM HEADLAMP RELAY
(8W-50-8)
64
68
60
17 JB
12 JB
14 JB
FOG LAMP RELAY CONTROL
NOT USED
LOW BEAM HEADLAMP RELAY CONTROL
BODY CONTROL MODULE
SPEED PROPORTIONAL SOLENOID (+)
SPEED PROPORTIONAL SOLENOID (-)
PCI BUS
4 JB
3 JB
10 JB
8 C10
10 C10
8 C11
S77
18
VT/OR
S76
18
LG/PK
D25
20
VT/YL
2
5
SPEED PROPORTIONAL STEERING SOLENOID
(8W-65-2)
1
PCI BUS
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)

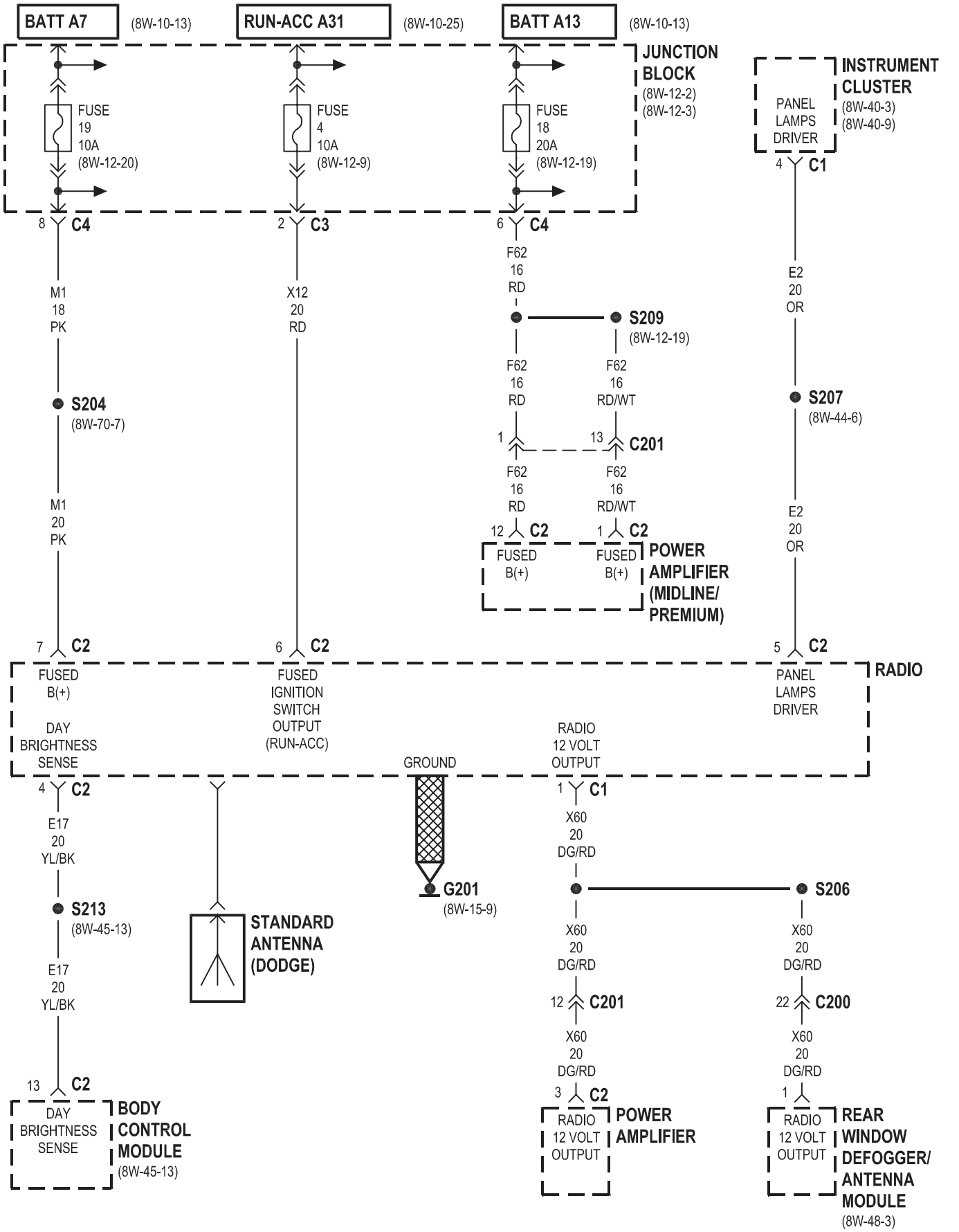

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
19
10A
(8W-12-20)
8
C4
M1
18
PK
S204
(8W-70-7)
M1
20
PK
2
DECKLID RELEASE SWITCH
(8W-61-5)
1
P1
20
BK/WT
1
C1
DECKLID RELEASE SWITCH OUTPUT
BODY CONTROL MODULE
HEADLAMP SWITCH RETURN
19
C2
L80
20
WT
6
HEADLAMP SWITCH
0 OFF
1 HEAD
2 PARK LAMP
3 AUTO
4 HEAD WITH FOG
5 PARK LAMP WITH FOG
6 AUTO WITH FOG
(8W-50-2)
(8W-50-3)
FUNERAL MODE
DOME ON
PANEL DIMMER
3
E19
20
RD
21
C2
PANEL LAMPS DIMMER SIGNAL
12
G52
20
YL
2
C2
HEADLAMP SWITCH MUX
DAY BRIGHTNESS SENSE
13
C2
E17
20
YL/BK
S213
E17
20
YL/BK
4
C2
DAY BRIGHTNESS SENSE
RADIO
(8W-47-2)
E17
20
YL/BK
6
C1
PARK LAMP RELAY OUTPUT
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-2)

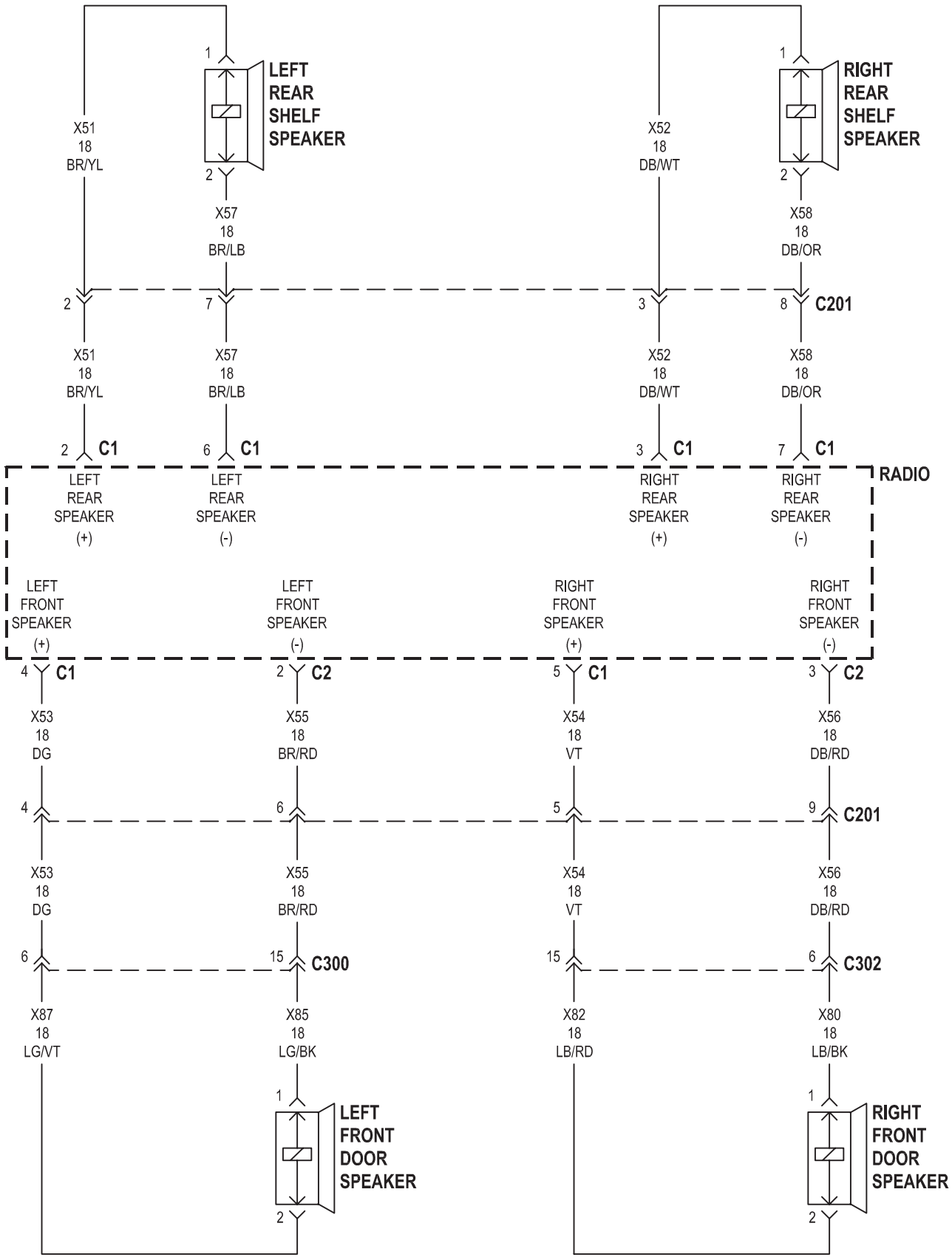

BODY CONTROL MODULE
A/C LED INDICATOR SIGNAL
FAN OFF SWITCH SIGNAL
TEMPERATURE SELECT SIGNAL
A/C MODE SWITCH MUX
REAR WINDOW DEFOGGER RELAY CONTROL
14 C2
11 C1
12 C2
22 C2
14 C4
MTC
ATC
C80 20 DB/WT
C80 20 DB/WT
C48 20 VT/PK
C59 20 VT/LG
C82 20 YL/OR
C58 22 RD/TN
S203
(8W-10-9)
C80 20 DB/WT
1 C1
1 C2
9 C1
10 C1
2 C1
A/C LED INDICATOR SIGNAL
FAN OFF SWITCH SIGNAL
TEMPERATURE SELECT
A/C MODE SWITCH MUX
REAR WINDOW DEFOGGER RELAY CONTROL
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-8)
C80 20 DB/WT
20 C200
C80 20 DB/WT
4
REAR WINDOW DEFOGGER RELAY
(8W-48-2)


2 DATA LINK CONNECTOR (8W-30-19)
D25 20 VT/YL
14 C1 PCI BUS
BODY CONTROL MODULE
PCI BUS
1 C3
5 C1
12 C1
7 C1
13 C1
4 C1
9 C4
7 C3
2 C3
D25 20 VT/YL
D25 18 VT/YL
19 C103
13 C103
11 C103
D25 18 YL/VT
2 PCI BUS AUTOMATIC TEMPERATURE CONTROL HEAD (8W-42-4)
20 PCI BUS CONTROLLER ANTI-LOCK BRAKE (8W-35-2)
5 C1 PCI BUS INSTRUMENT CLUSTER (8W-40-2)
43 PCI BUS TRANSMISSION CONTROL MODULE (8W-31-8)
21 PCI BUS OCCUPANT RESTRAINT CONTROLLER (8W-43-2)
12 C200
5 PCI BUS SENTRY KEY IMMOBILIZER MODULE (8W-39-6)
S345 (8W-43-3)
1 C3 PCI BUS RADIO (MIDLINE/PREMIUM) (8W-47-4)
2 PCI BUS LEFT SIDE IMPACT AIRBAG CONTROL MODULE (8W-43-3)
1 C319
2 PCI BUS RIGHT SIDE IMPACT AIRBAG CONTROL MODULE (8W-43-3)
59 C2 PCI BUS POWERTRAIN CONTROL MODULE (8W-30-19)
26 C1 PCI BUS MEMORY HEATED SEAT/ MIRROR MODULE (8W-63-8)

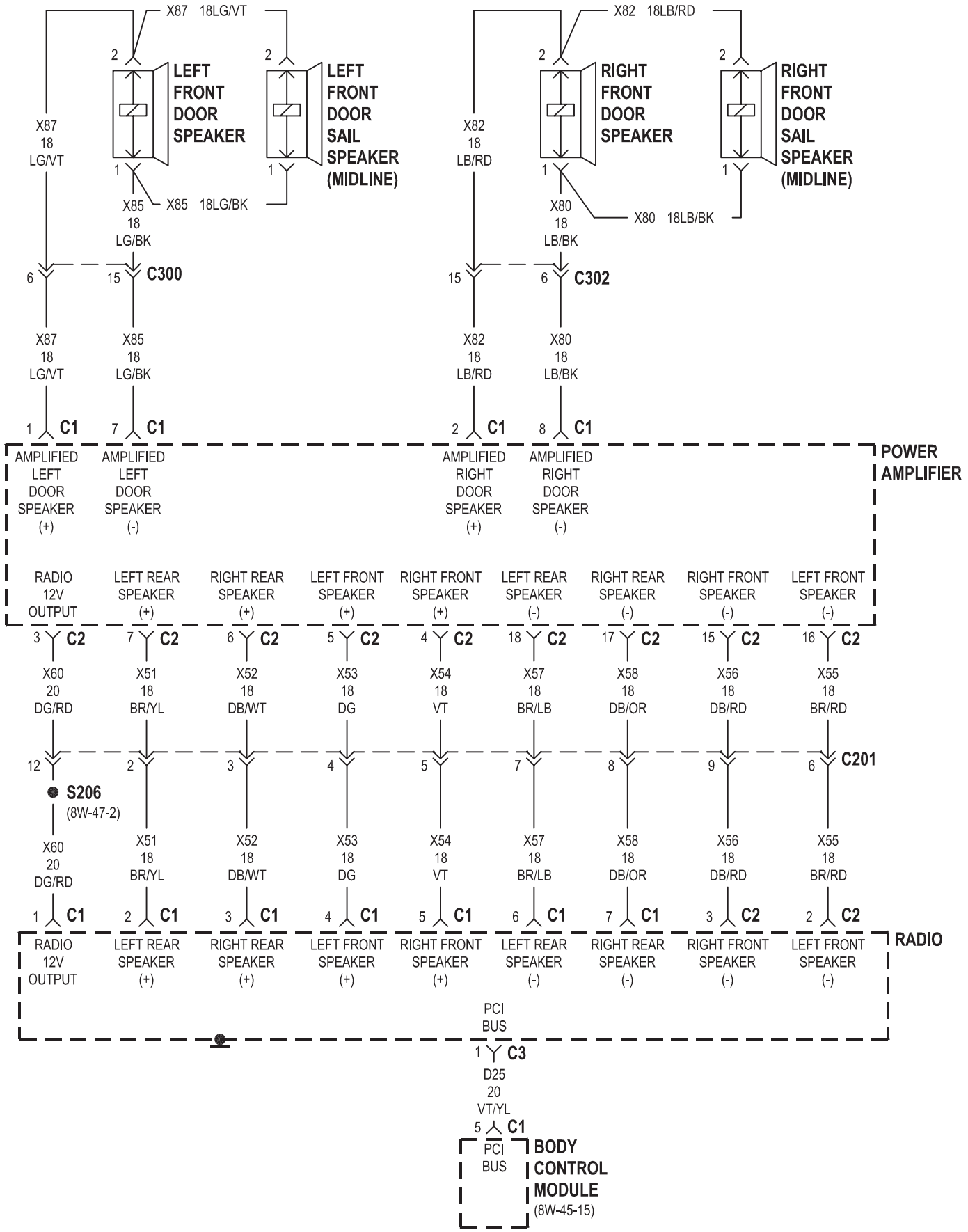
8W-47 AUDIO SYSTEMS

Component	Page
Body Control Module	8W-47-2, 4
Center Instrument Panel Speaker	8W-47-5
Fuse 4 (JB)	8W-47-2
Fuse 18 (JB)	8W-47-2
Fuse 19 (JB)	8W-47-2
G201	8W-47-2
G301	8W-47-5, 6
Instrument Cluster	8W-47-2
Junction Block	8W-47-2
Left Front Door Sail Speaker	8W-47-4, 5
Left Front Door Speaker	8W-47-3, 4
Left Rear Door Speaker	8W-47-7
Left Rear Shelf Speaker	8W-47-3, 5
Power Amplifier	8W-47-2, 4, 5, 6, 7
Radio	8W-47-2, 3, 4, 6
Rear Window Defogger Antenna	8W-47-6
Rear Window Defogger Relay	8W-47-6
Rear Window Defogger/Antenna Module	8W-47-2, 6
Right Front Door Sail Speaker	8W-47-4, 5
Right Front Door Speaker	8W-47-3, 4
Right Rear Door Speaker	8W-47-7
Right Rear Shelf Speaker	8W-47-3, 5
Standard Antenna	8W-47-2

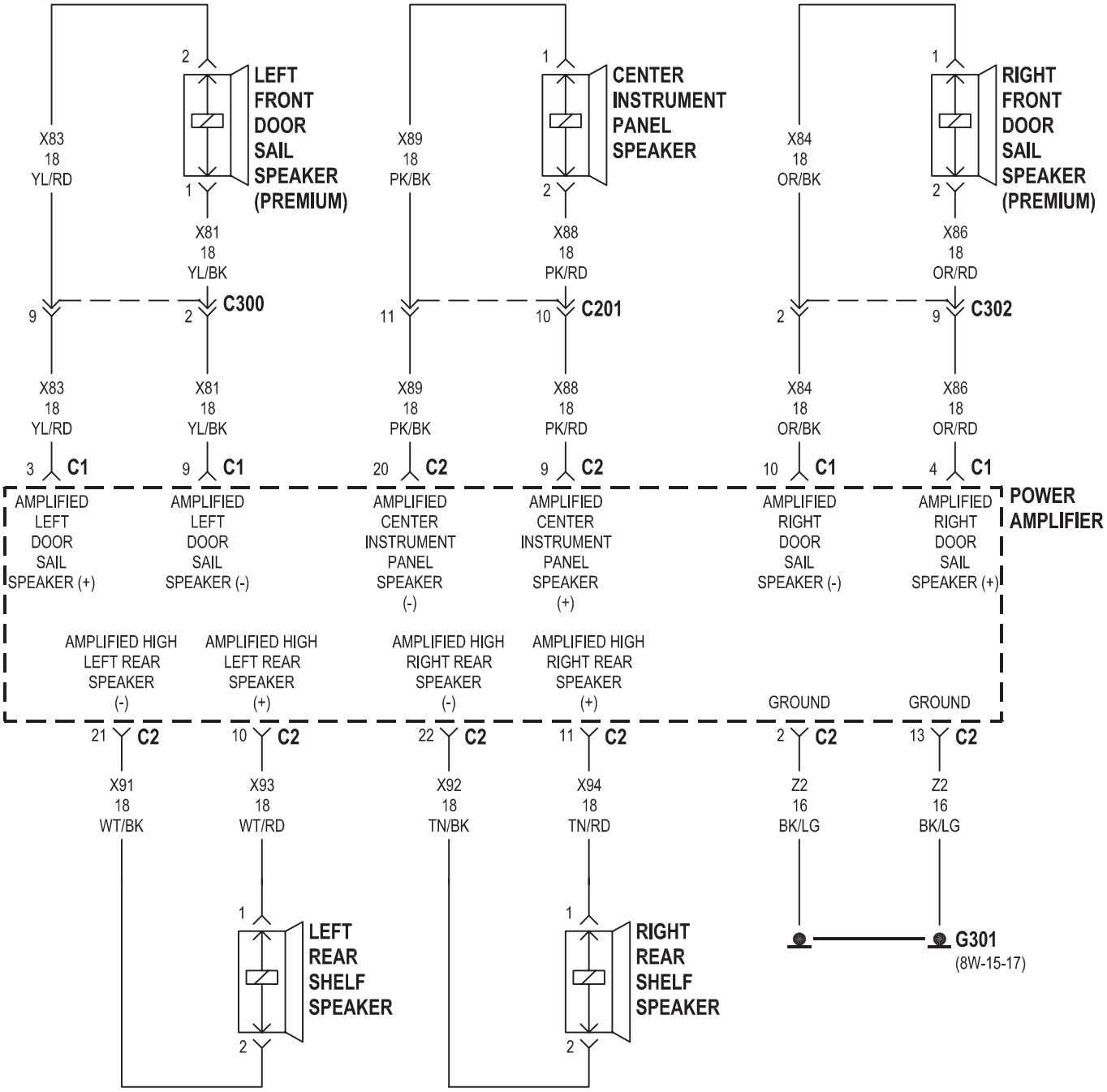

BATT A7
(8W-10-13)
RUN-ACC A31
(8W-10-25)
BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A (8W-12-20)
FUSE 4 10A (8W-12-9)
FUSE 18 20A (8W-12-19)
INSTRUMENT CLUSTER
(8W-40-3)
(8W-40-9)
PANEL LAMPS DRIVER
4 C1
8 C4
2 C3
6 C4
M1 18 PK
X12 20 RD
F62 16 RD
S209
(8W-12-19)
F62 16 RD
F62 16 RD/WT
E2 20 OR
S207
(8W-44-6)
S204
(8W-70-7)
1
13 C201
F62 16 RD
F62 16 RD/WT
M1 20 PK
12 C2
1 C2
FUSED B(+)
FUSED B(+)
POWER AMPLIFIER (MIDLINE/ PREMIUM)
E2 20 OR
7 C2
6 C2
5 C2
RADIO
FUSED B(+)
FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
PANEL LAMPS DRIVER
DAY BRIGHTNESS SENSE
GROUND
RADIO 12 VOLT OUTPUT
4 C2
1 C1
E17 20 YL/BK
X60 20 DG/RD
S213
(8W-45-13)
G201
(8W-15-9)
S206
STANDARD ANTENNA (DODGE)
E17 20 YL/BK
X60 20 DG/RD
X60 20 DG/RD
12 C201
22 C200
X60 20 DG/RD
X60 20 DG/RD
13 C2
3 C2
1
DAY BRIGHTNESS SENSE
BODY CONTROL MODULE
(8W-45-13)
RADIO 12 VOLT OUTPUT
POWER AMPLIFIER
RADIO 12 VOLT OUTPUT
REAR WINDOW DEFOGGER/ ANTENNA MODULE
(8W-48-3)

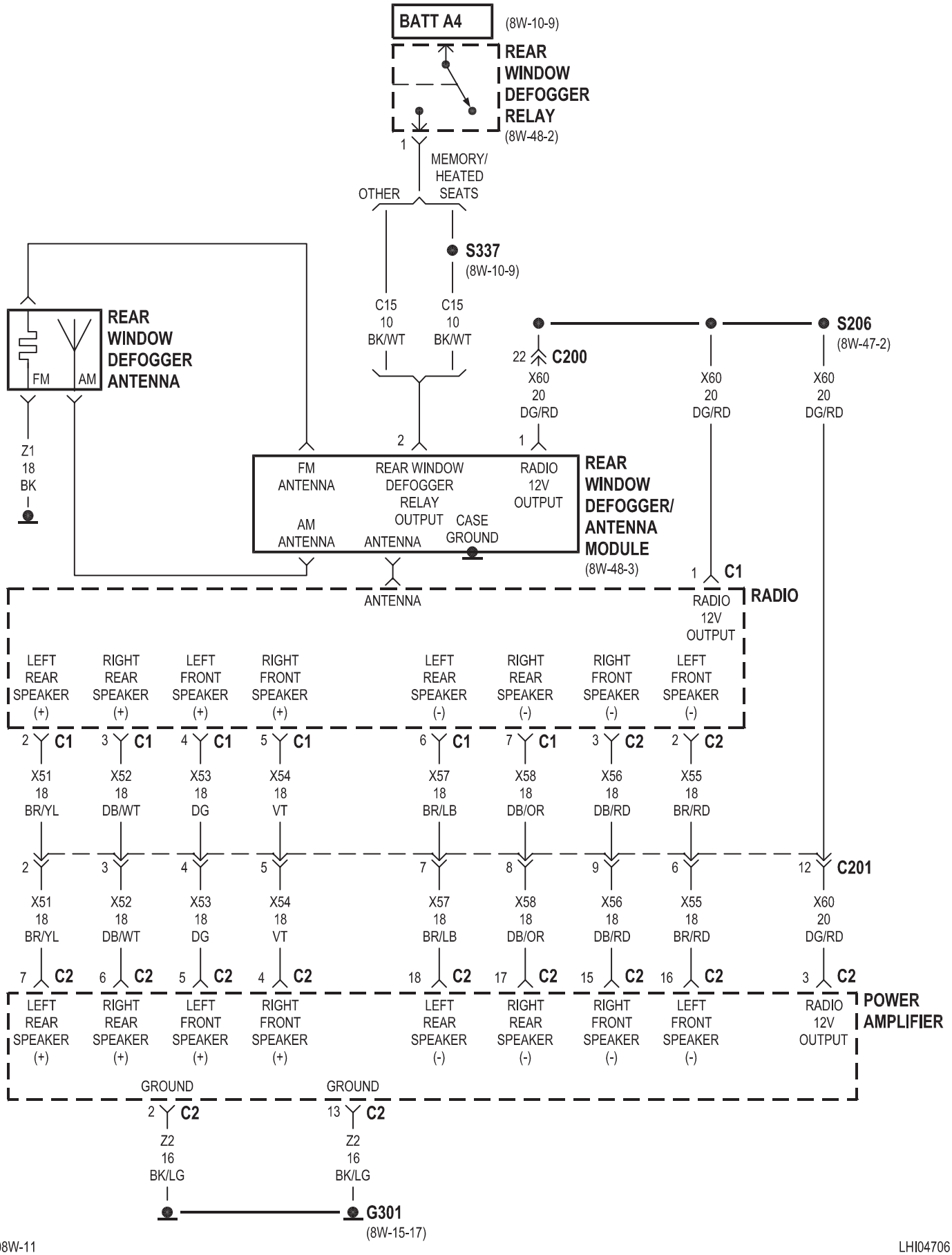

LEFT REAR SHELF SPEAKER
RIGHT REAR SHELF SPEAKER
X51 18 BR/YL
X57 18 BR/LB
X52 18 DB/WT
X58 18 DB/OR
C201
C1
C2
RADIO
LEFT REAR SPEAKER (+)
LEFT REAR SPEAKER (-)
RIGHT REAR SPEAKER (+)
RIGHT REAR SPEAKER (-)
LEFT FRONT SPEAKER (+)
LEFT FRONT SPEAKER (-)
RIGHT FRONT SPEAKER (+)
RIGHT FRONT SPEAKER (-)
X53 18 DG
X55 18 BR/RD
X54 18 VT
X56 18 DB/RD
C300
C302
X87 18 LG/VT
X85 18 LG/BK
X82 18 LB/RD
X80 18 LB/BK
LEFT FRONT DOOR SPEAKER
RIGHT FRONT DOOR SPEAKER

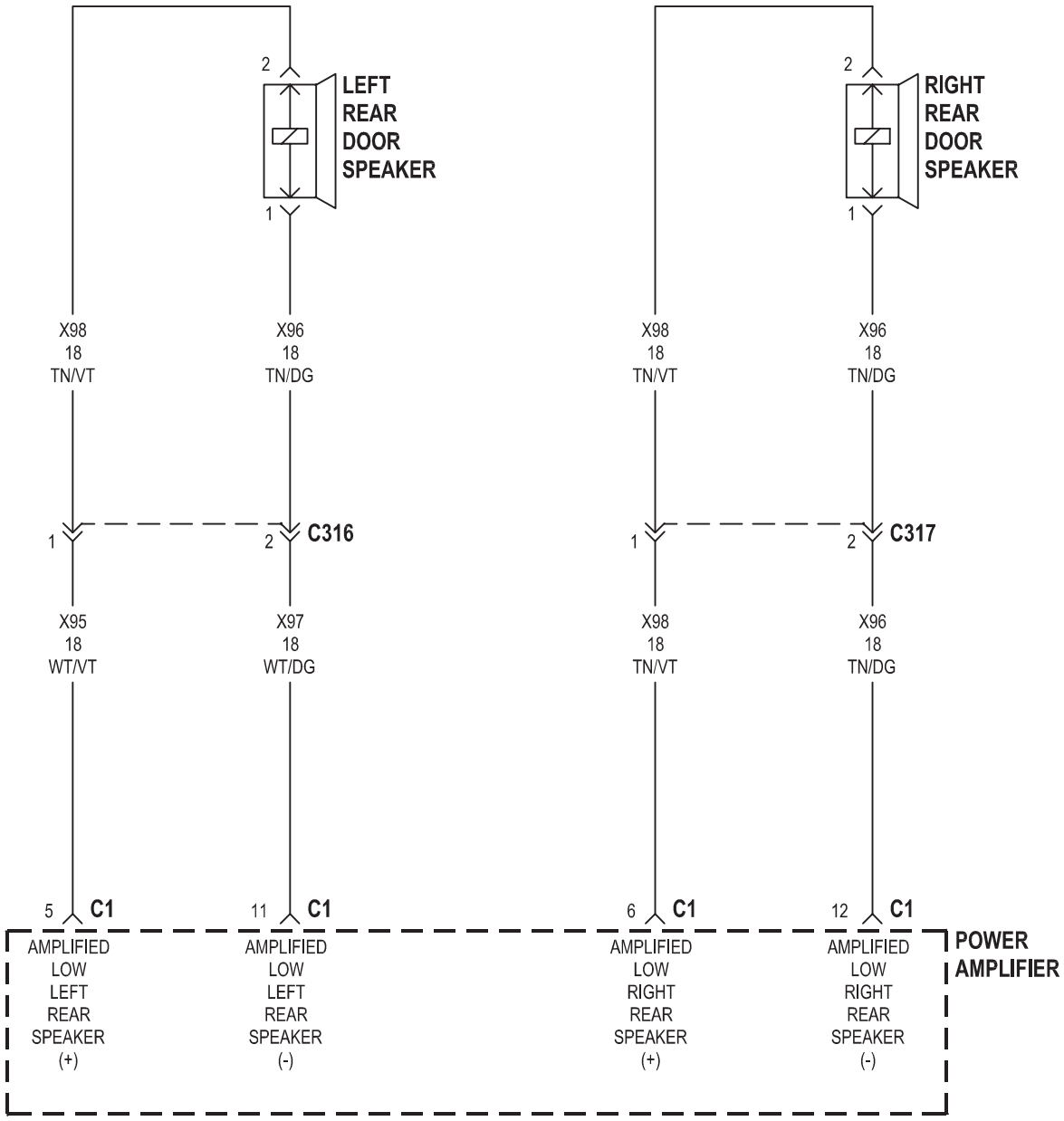
MID-LINE AND PREMIUM I/II



MID-LINE AND PREMIUM I/II

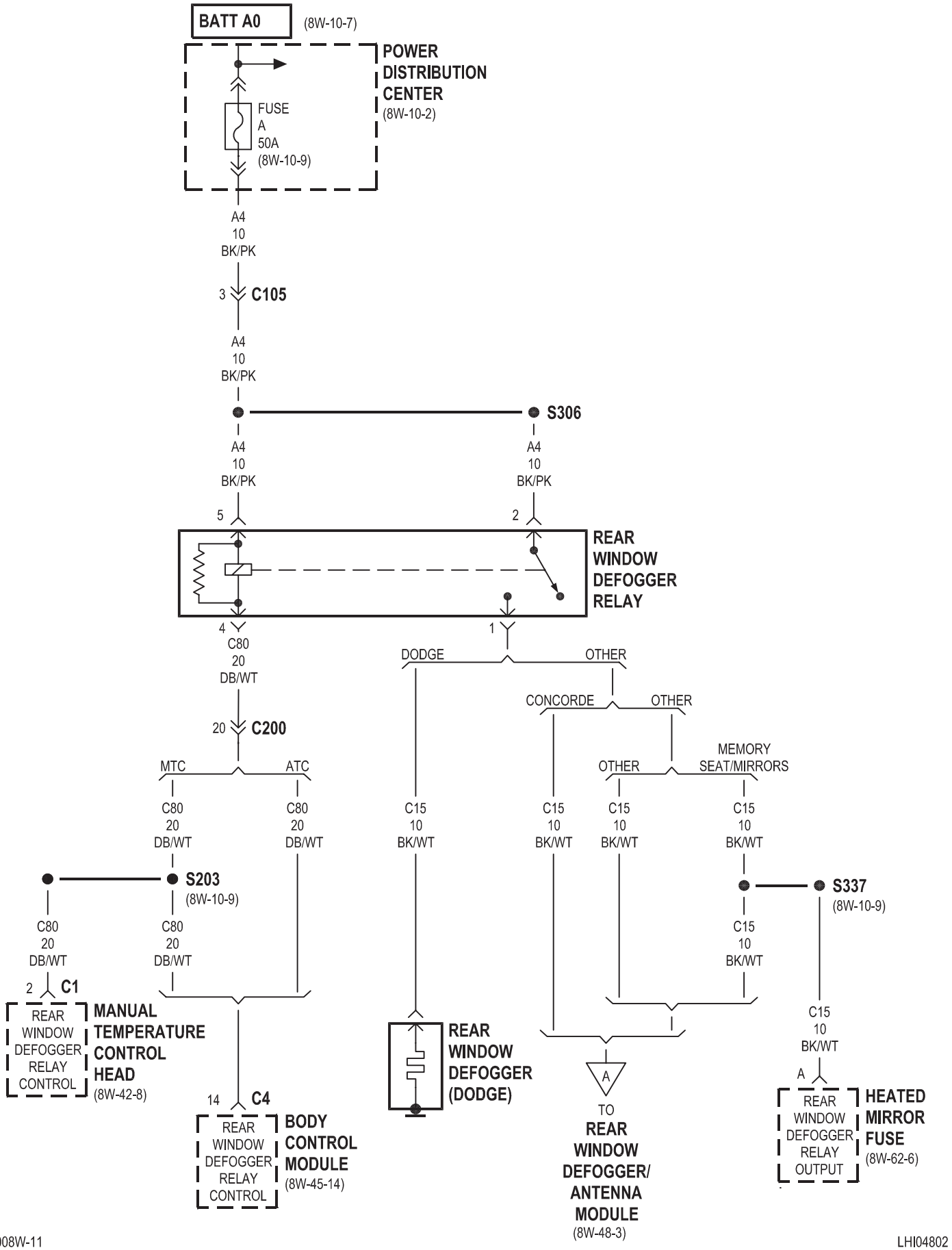


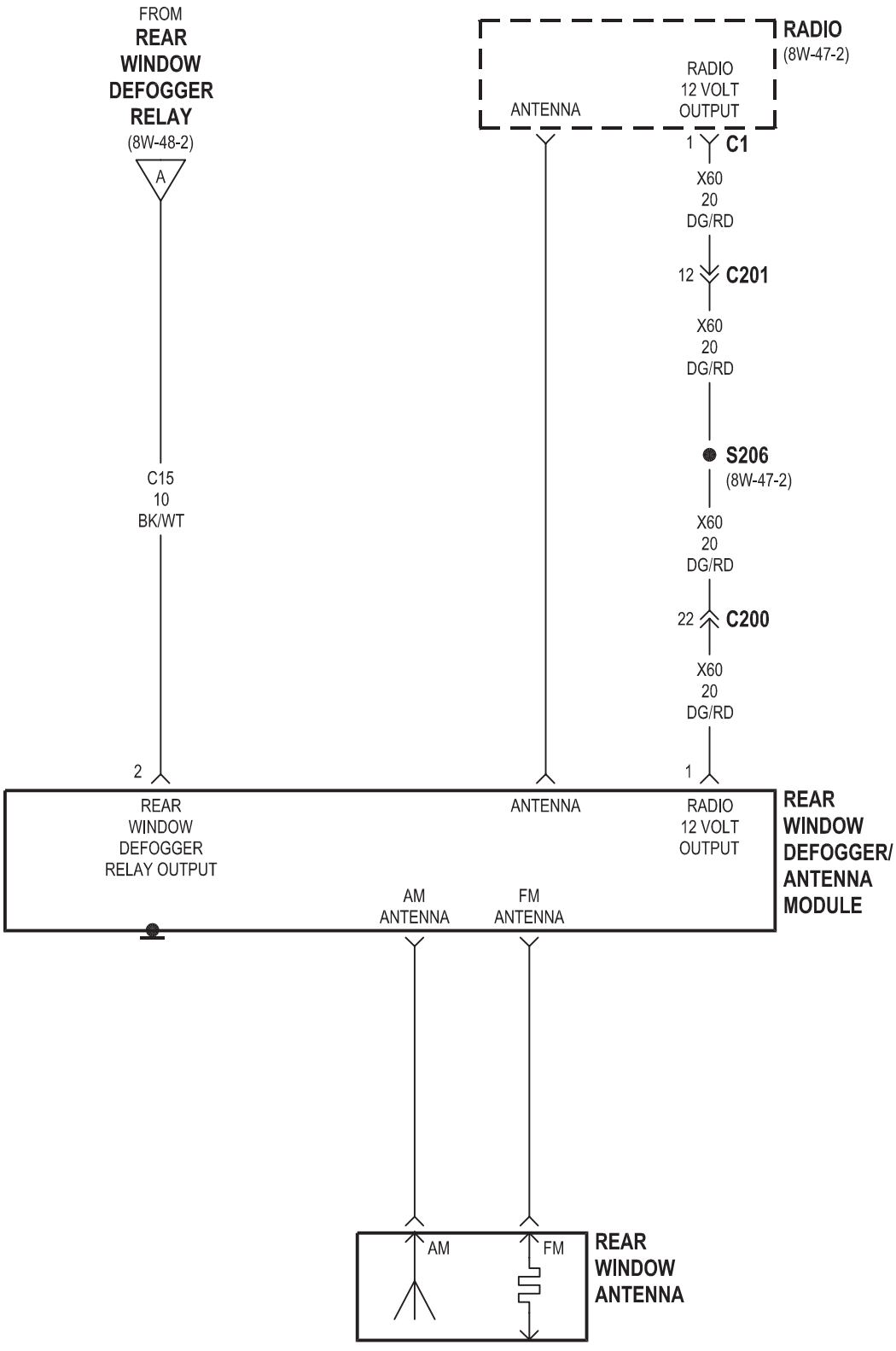

BATT A4
(8W-10-9)
REAR WINDOW DEFOGGER RELAY
(8W-48-2)
1
MEMORY/ HEATED SEATS
OTHER
S337
(8W-10-9)
C15 10 BK/WT
C15 10 BK/WT
REAR WINDOW DEFOGGER ANTENNA
FM
AM
Z1 18 BK
22 C200
X60 20 DG/RD
S206
(8W-47-2)
X60 20 DG/RD
X60 20 DG/RD
2
1
FM ANTENNA
AM ANTENNA
REAR WINDOW DEFOGGER RELAY OUTPUT
ANTENNA
CASE GROUND
RADIO 12V OUTPUT
REAR WINDOW DEFOGGER/ ANTENNA MODULE
(8W-48-3)
ANTENNA
1 C1
RADIO
RADIO 12V OUTPUT
LEFT REAR SPEAKER (+)
RIGHT REAR SPEAKER (+)
LEFT FRONT SPEAKER (+)
RIGHT FRONT SPEAKER (+)
LEFT REAR SPEAKER (-)
RIGHT REAR SPEAKER (-)
RIGHT FRONT SPEAKER (-)
LEFT FRONT SPEAKER (-)
2 C1
3 C1
4 C1
5 C1
6 C1
7 C1
3 C2
2 C2
X51 18 BR/YL
X52 18 DB/WT
X53 18 DG
X54 18 VT
X57 18 BR/LB
X58 18 DB/OR
X56 18 DB/RD
X55 18 BR/RD
2
3
4
5
7
8
9
6
12 C201
X51 18 BR/YL
X52 18 DB/WT
X53 18 DG
X54 18 VT
X57 18 BR/LB
X58 18 DB/OR
X56 18 DB/RD
X55 18 BR/RD
X60 20 DG/RD
7 C2
6 C2
5 C2
4 C2
18 C2
17 C2
15 C2
16 C2
3 C2
LEFT REAR SPEAKER (+)
RIGHT REAR SPEAKER (+)
LEFT FRONT SPEAKER (+)
RIGHT FRONT SPEAKER (+)
LEFT REAR SPEAKER (-)
RIGHT REAR SPEAKER (-)
RIGHT FRONT SPEAKER (-)
LEFT FRONT SPEAKER (-)
RADIO 12V OUTPUT
POWER AMPLIFIER
GROUND
GROUND
2 C2
13 C2
Z2 16 BK/LG
Z2 16 BK/LG
G301
(8W-15-17)


2
LEFT
REAR
DOOR
SPEAKER
1
X98
18
TN/VT
X96
18
TN/DG
1
C316
2
X95
18
WT/VT
X97
18
WT/DG
5
C1
11
C1
AMPLIFIED
LOW
LEFT
REAR
SPEAKER
(+)
AMPLIFIED
LOW
LEFT
REAR
SPEAKER
(-)
2
RIGHT
REAR
DOOR
SPEAKER
1
X98
18
TN/VT
X96
18
TN/DG
1
C317
2
X98
18
TN/VT
X96
18
TN/DG
6
C1
12
C1
AMPLIFIED
LOW
RIGHT
REAR
SPEAKER
(+)
AMPLIFIED
LOW
RIGHT
REAR
SPEAKER
(-)
POWER
AMPLIFIER

8W-48 REAR WINDOW DEFOGGER

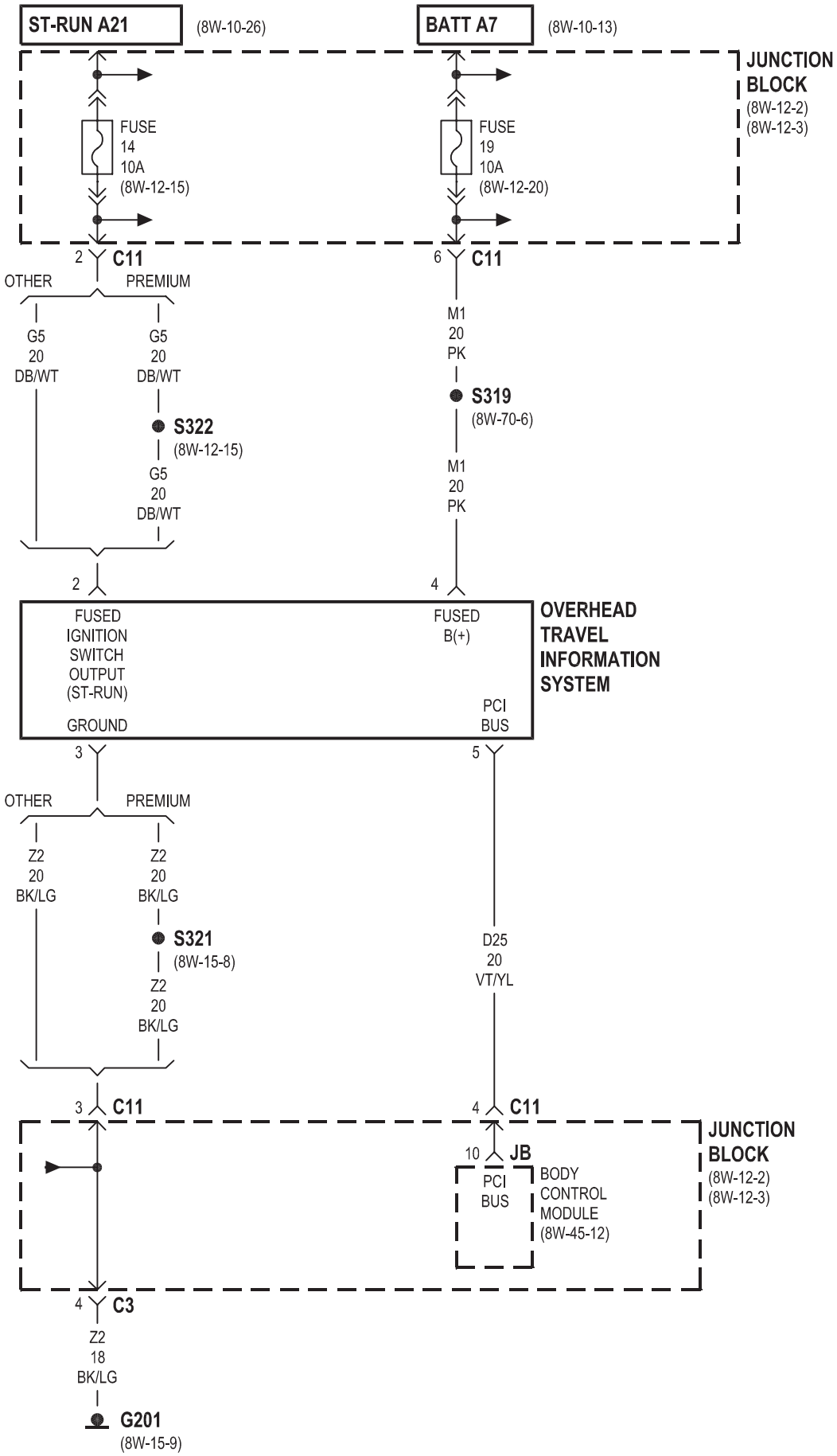
Component	Page	Component	Page
Body Control Module	8W-48-2	Radio	8W-48-3
Fuse A (PDC)	8W-48-2	Rear Window Antenna	8W-48-3
Heated Mirror Fuse	8W-48-2	Rear Window Defogger	8W-48-2
Manual Temperature Control Head	8W-48-2	Rear Window Defogger Relay	8W-48-2
Power Distribution Center	8W-48-2	Rear Window Defogger/Antenna Module	8W-48-3


BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
A
50A
(8W-10-9)
A4
10
BK/PK
3
C105
S306
5
2
REAR WINDOW DEFOGGER RELAY
4
C80
20
DB/WT
1
DODGE
OTHER
CONCORDE
OTHER
20
C200
MTC
ATC
OTHER
MEMORY SEAT/MIRRORS
C15
10
BK/WT
S203
(8W-10-9)
S337
(8W-10-9)
2
C1
REAR WINDOW DEFOGGER RELAY CONTROL
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-8)
14
C4
REAR WINDOW DEFOGGER RELAY CONTROL
BODY CONTROL MODULE
(8W-45-14)
REAR WINDOW DEFOGGER (DODGE)
A
TO REAR WINDOW DEFOGGER/ ANTENNA MODULE
(8W-48-3)
REAR WINDOW DEFOGGER RELAY OUTPUT
HEATED MIRROR FUSE
(8W-62-6)


FROM
REAR
WINDOW
DEFOGGER
RELAY
(8W-48-2)
A
C15
10
BK/WT
2
REAR
WINDOW
DEFOGGER
RELAY OUTPUT
RADIO
(8W-47-2)
ANTENNA
RADIO
12 VOLT
OUTPUT
1
C1
X60
20
DG/RD
12
C201
X60
20
DG/RD
S206
(8W-47-2)
X60
20
DG/RD
22
C200
X60
20
DG/RD
1
ANTENNA
RADIO
12 VOLT
OUTPUT
REAR
WINDOW
DEFOGGER/
ANTENNA
MODULE
AM
ANTENNA
FM
ANTENNA
AM
FM
REAR
WINDOW
ANTENNA

8W-49 OVERHEAD CONSOLE

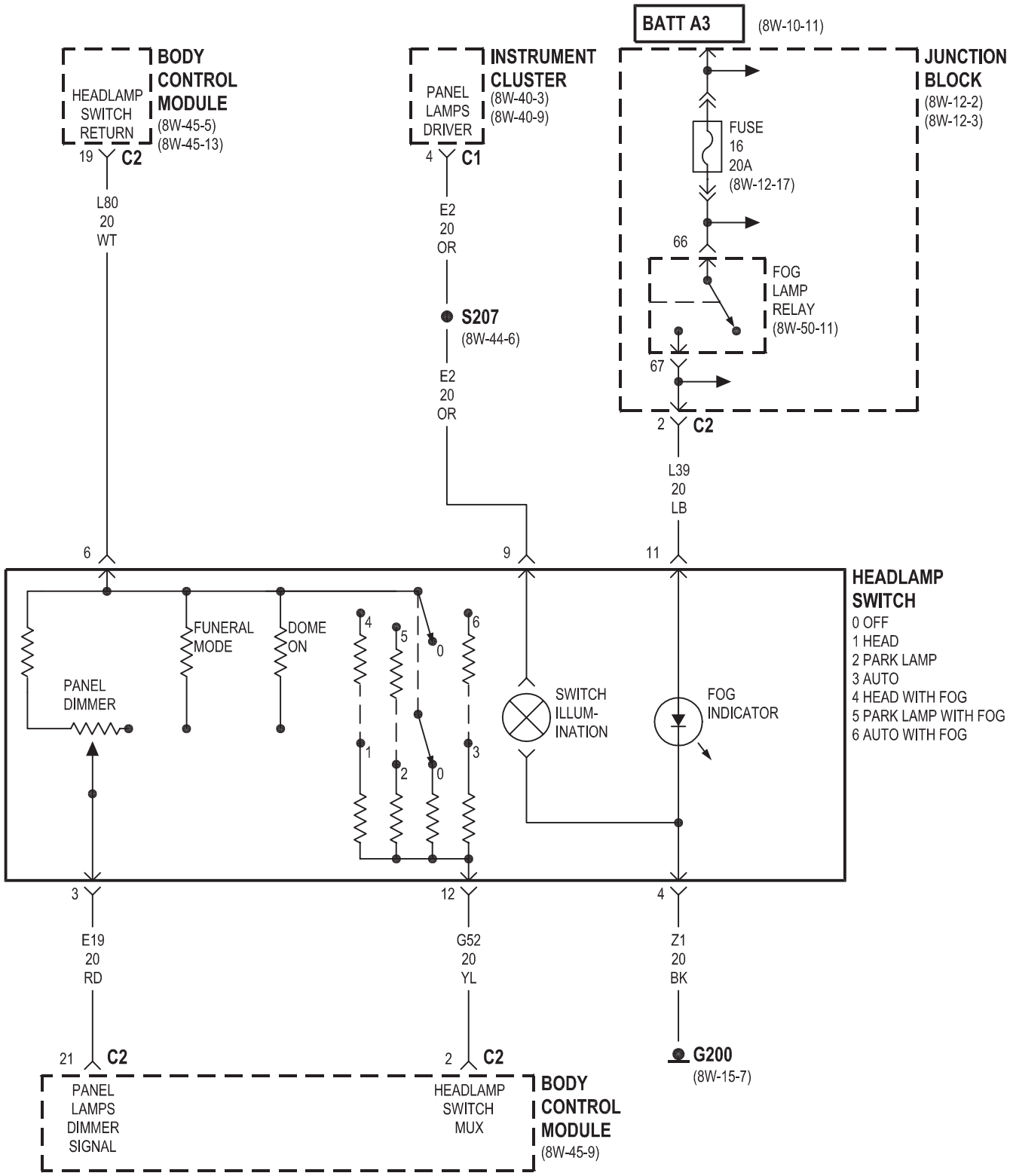
Component	Page	Component	Page
Body Control Module	8W-49-2	G201	8W-49-2
Fuse 14 (JB)	8W-49-2	Junction Block	8W-49-2
Fuse 19 (JB)	8W-49-2	Overhead Travel Information System	8W-49-2


ST-RUN A21
(8W-10-26)
BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 14 10A (8W-12-15)
FUSE 19 10A (8W-12-20)
2 C11
6 C11
OTHER
PREMIUM
G5 20 DB/WT
G5 20 DB/WT
S322
(8W-12-15)
G5 20 DB/WT
M1 20 PK
S319
(8W-70-6)
M1 20 PK
2
4
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED B(+)
GROUND
PCI BUS
OVERHEAD TRAVEL INFORMATION SYSTEM
3
5
OTHER
PREMIUM
Z2 20 BK/LG
Z2 20 BK/LG
S321
(8W-15-8)
Z2 20 BK/LG
D25 20 VT/YL
3 C11
4 C11
10 JB
PCI BUS
BODY CONTROL MODULE
(8W-45-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
4 C3
Z2 18 BK/LG
G201
(8W-15-9)

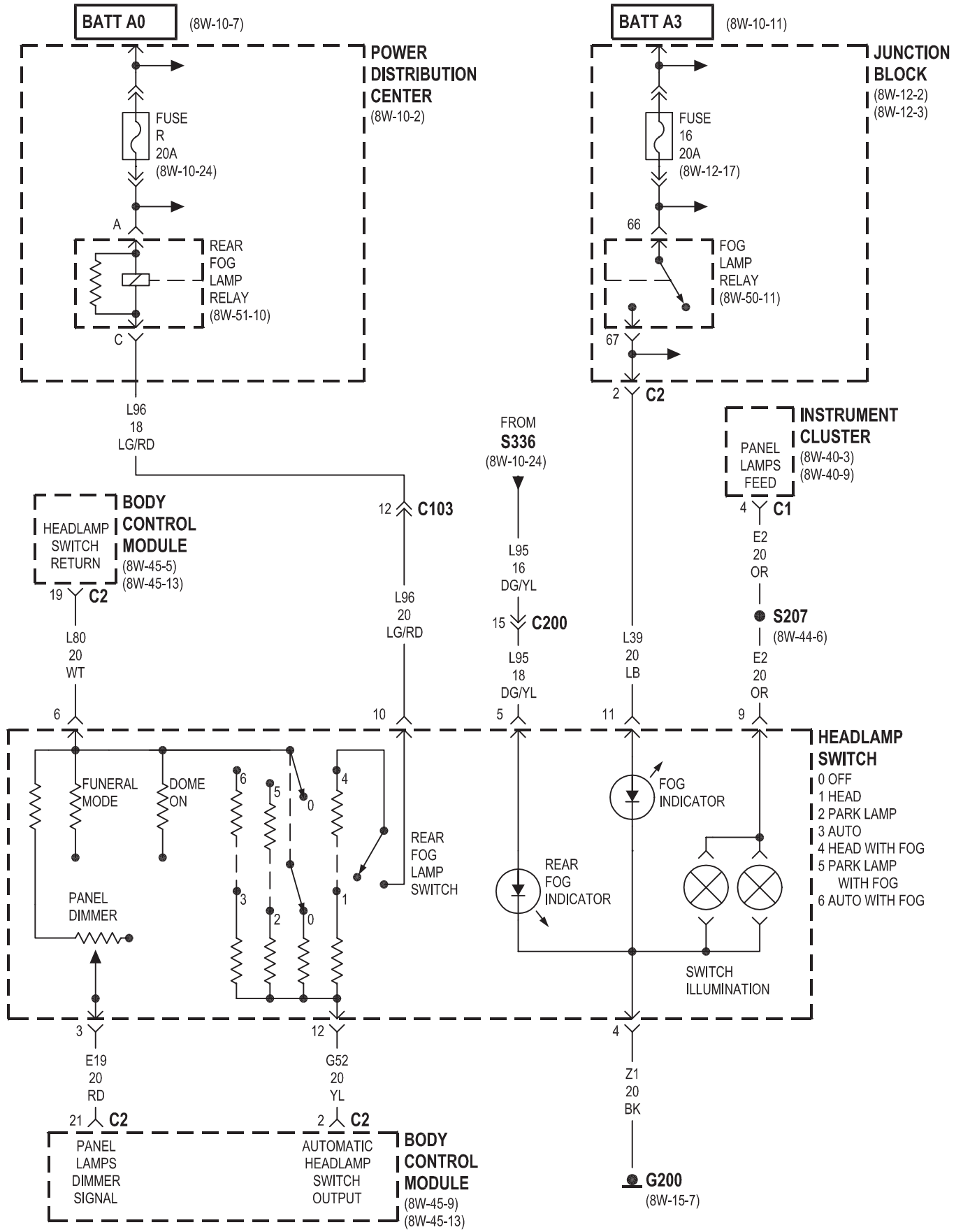
8W-50 FRONT LIGHTING

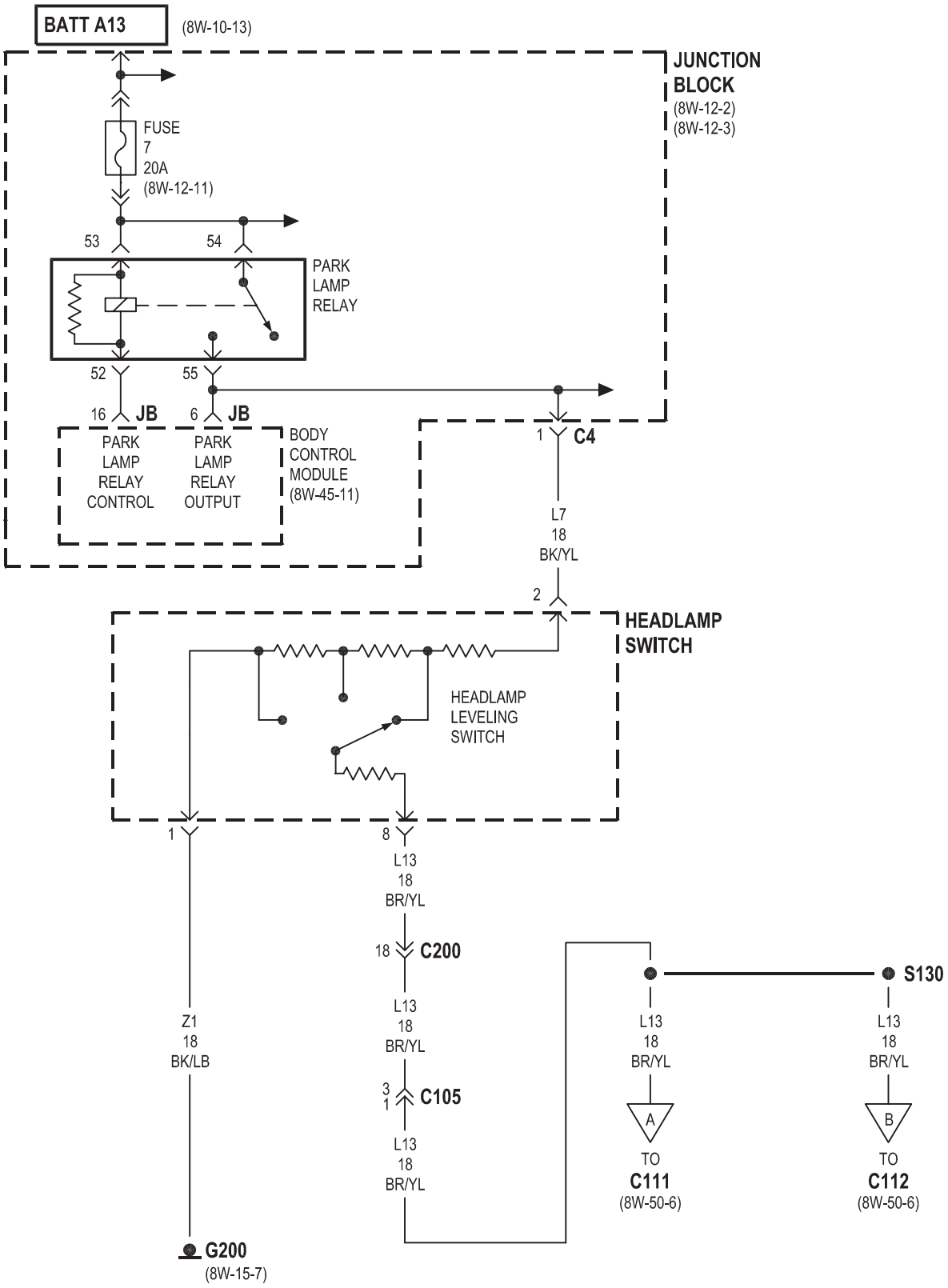
Component	Page
Body Control Module	8W-50-2, 3, 4, 5, 8, 11
Daytime Running Lamp Module	8W-50-15
Fog Lamp Relay	8W-50-2, 3, 11
Fuse 2 (JB)	8W-50-8, 15
Fuse 3 (JB)	8W-50-8
Fuse 7 (JB)	8W-50-4, 5, 8, 13, 14
Fuse 10 (JB)	8W-50-8
Fuse 11 (JB)	8W-50-8
Fuse 12 (JB)	8W-50-8, 15
Fuse 15 (JB)	8W-50-15
Fuse 16 (JB)	8W-50-2, 3, 11
Fuse 17 (JB)	8W-50-15
Fuse R (PDC)	8W-50-3
G103	8W-50-12
G106	8W-50-6, 7, 9, 10, 11, 12, 13, 14
G200	8W-50-2, 3, 4
G300	8W-50-8, 15
Headlamp Dimmer Switch	8W-50-8
Headlamp Switch	8W-50-2, 3, 4
High Beam Headlamp Relay	8W-50-8, 15
Instrument Cluster	8W-50-2, 3
Junction Block	8W-50-2, 3, 4, 5, 8, 11, 12, 13, 14, 15
Left Fog Lamp	8W-50-11
Left Front Park/Turn Signal Lamp	8W-50-7, 12, 14
Left Front Side Marker Lamp	8W-50-7, 14
Left Headlamp Leveling Motor	8W-50-6
Left High Beam Headlamp	8W-50-9
Left Low Beam Headlamp	8W-50-10
Left Position Lamp	8W-50-6
Left Side Repeater	8W-50-12
Low Beam Headlamp Relay	8W-50-8, 15
Park Brake Switch	8W-50-15
Park Lamp Relay	8W-50-4, 5, 13, 14
Power Distribution Center	8W-50-3
Rear Fog Lamp Relay	8W-50-3
Right Fog Lamp	8W-50-11
Right Front Park/Turn Signal Lamp	8W-50-7, 12, 13
Right Front Side Marker Lamp	8W-50-7, 13
Right Headlamp Leveling Motor	8W-50-6
Right High Beam Headlamp	8W-50-9
Right Low Beam Headlamp	8W-50-10
Right Position Lamp	8W-50-6
Right Side Repeater	8W-50-12
Turn Signal/Hazard Switch	8W-50-12, 13, 14

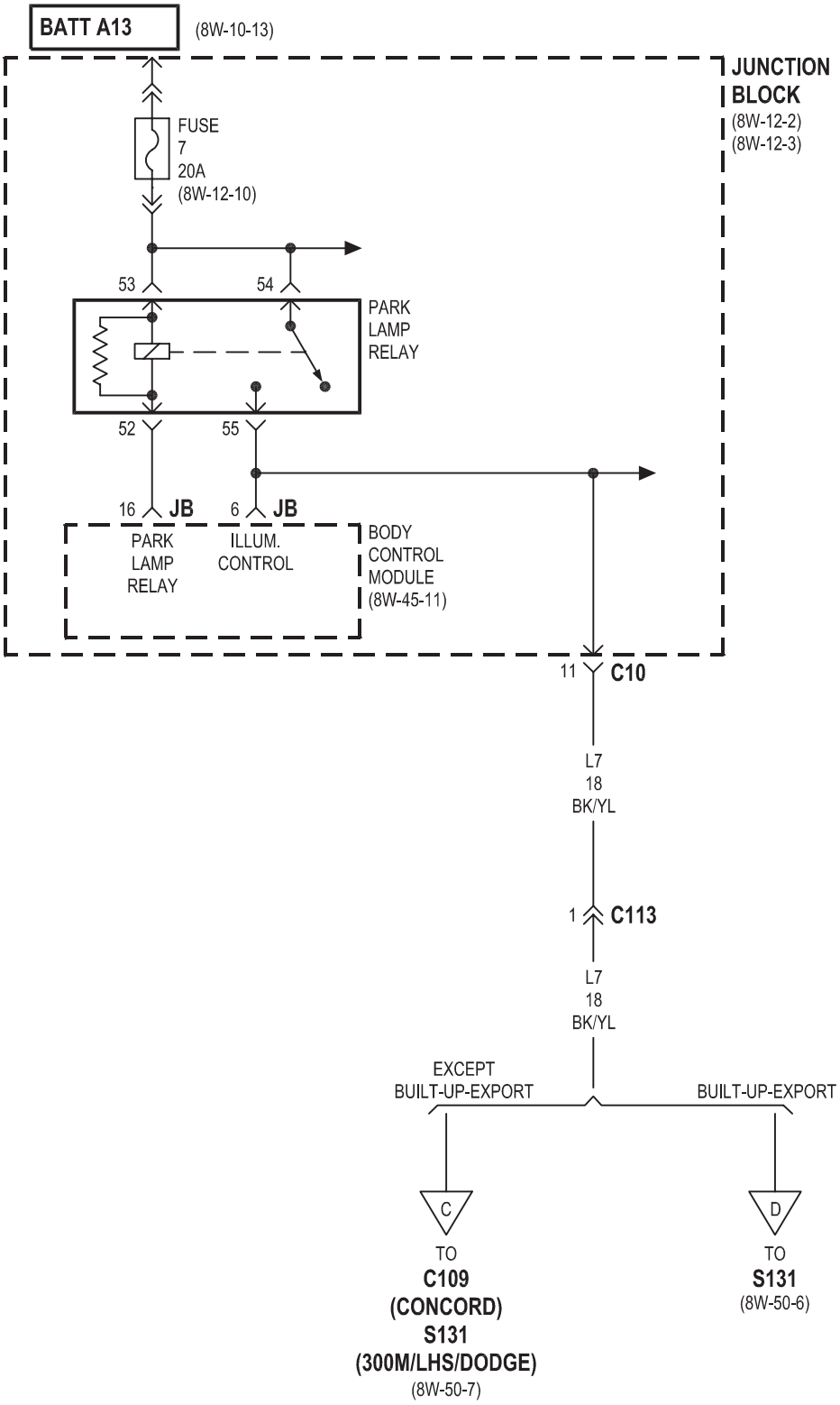
EXCEPT BUILT-UP-EXPORT

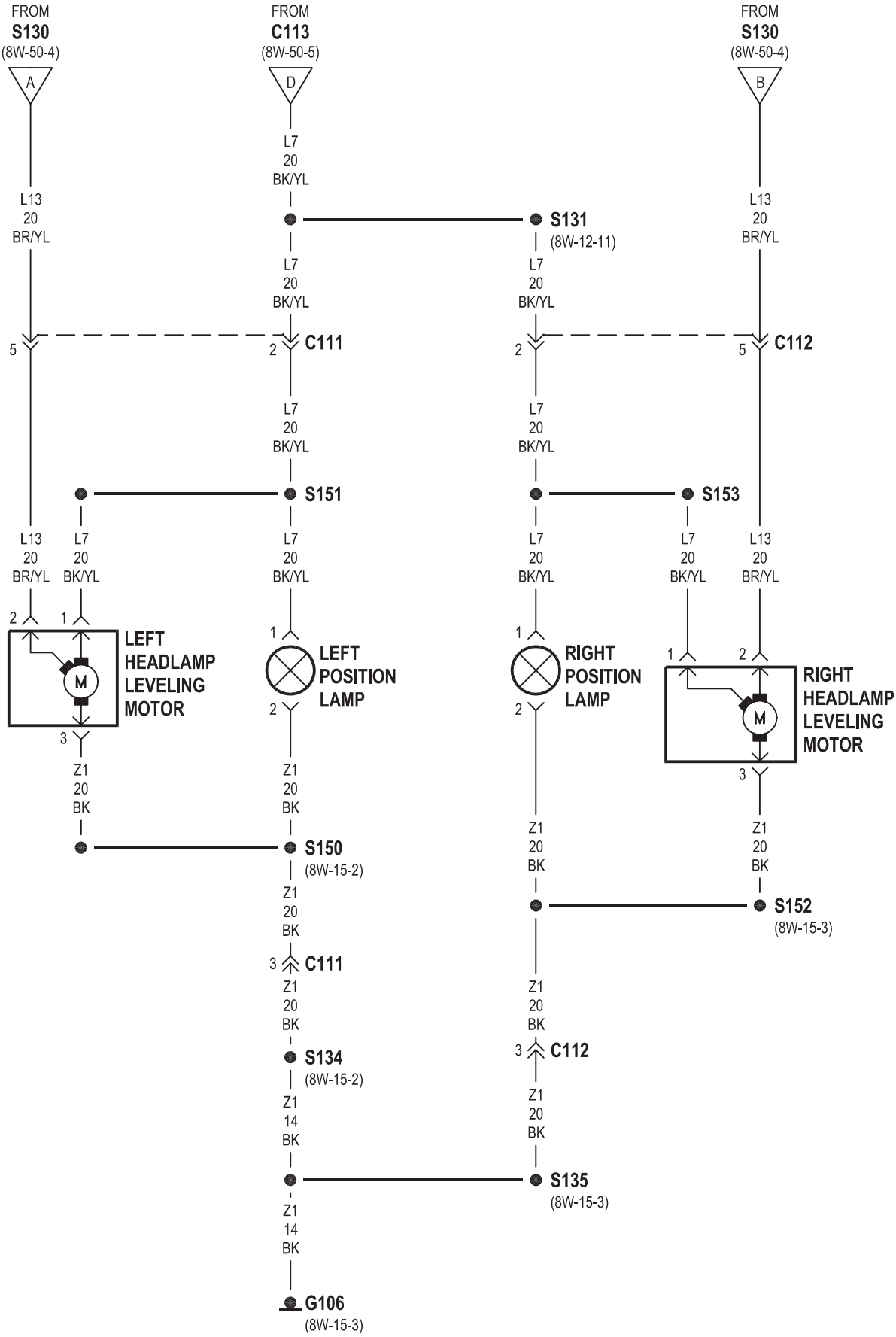


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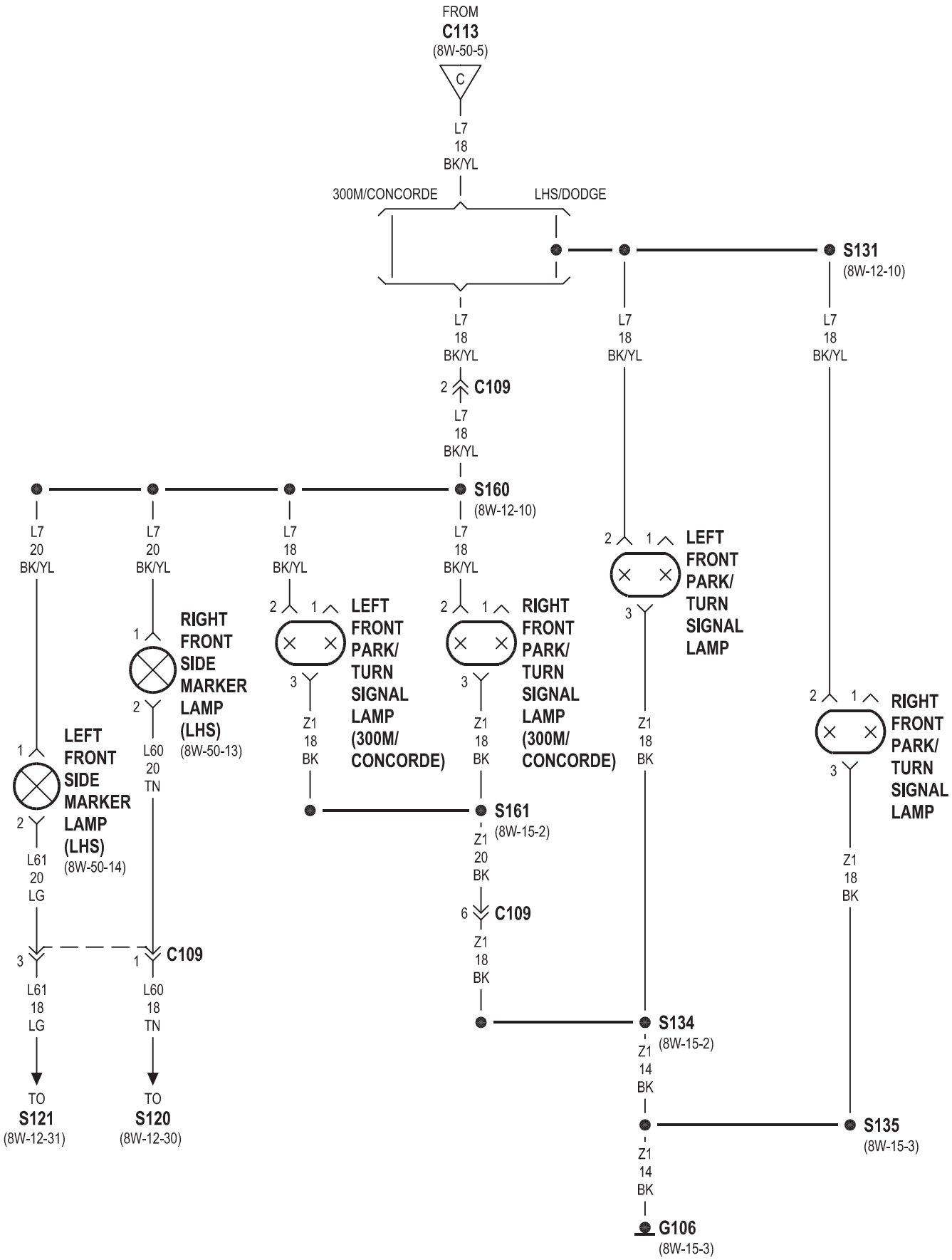


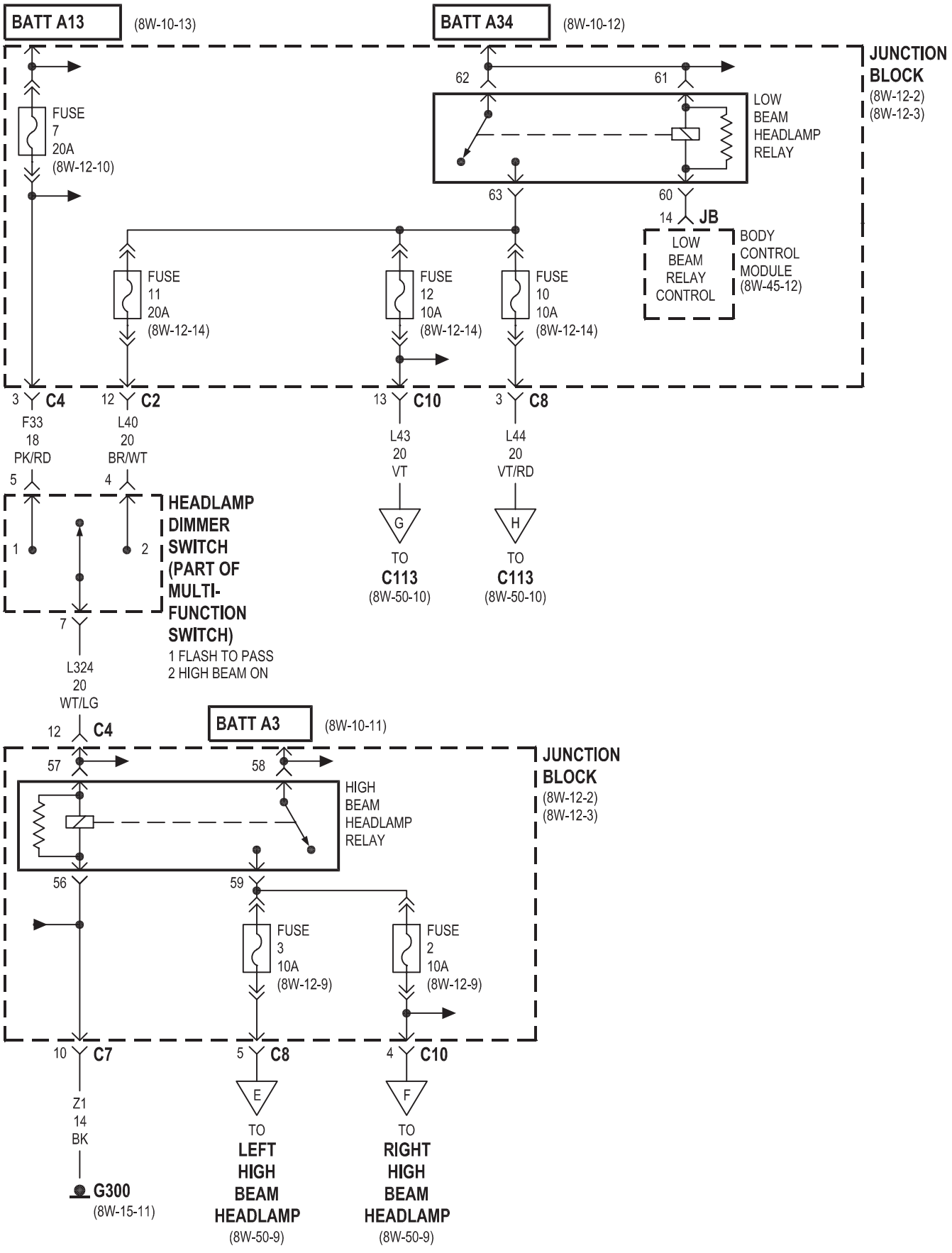

BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 7 20A
(8W-12-11)
53
54
PARK LAMP RELAY
52
55
16 JB
6 JB
PARK LAMP RELAY CONTROL
PARK LAMP RELAY OUTPUT
BODY CONTROL MODULE
(8W-45-11)
1 C4
L7 18 BK/YL
2
HEADLAMP SWITCH
HEADLAMP LEVELING SWITCH
1
8
L13 18 BR/YL
18 C200
L13 18 BR/YL
3 1 C105
L13 18 BR/YL
Z1 18 BK/LB
G200
(8W-15-7)
S130
L13 18 BR/YL
A
TO C111
(8W-50-6)
L13 18 BR/YL
B
TO C112
(8W-50-6)

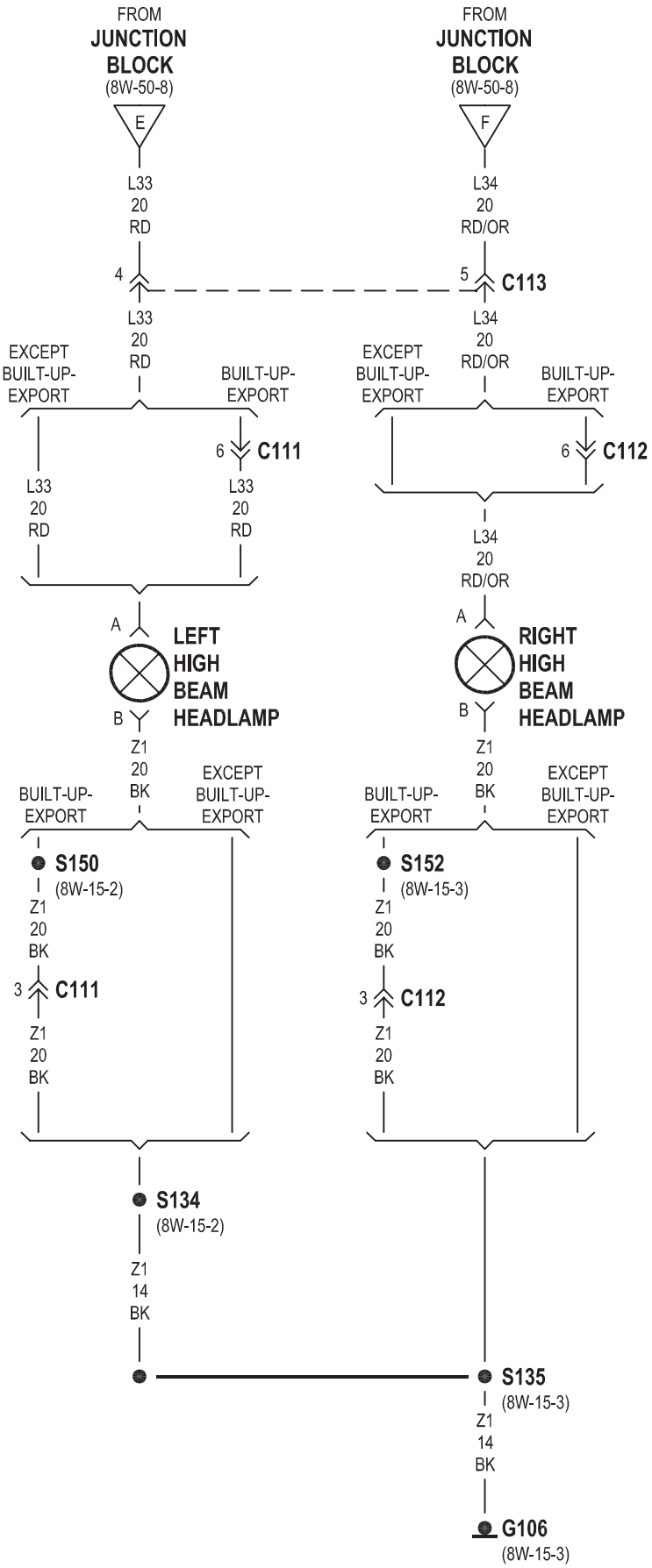

BATT A13
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
7
20A
(8W-12-10)
53
54
PARK LAMP RELAY
52
55
16 JB
6 JB
PARK LAMP RELAY
ILLUM. CONTROL
BODY CONTROL MODULE
(8W-45-11)
11 C10
L7
18
BK/YL
1 C113
L7
18
BK/YL
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
C
D
TO
C109
(CONCORD)
S131
(300M/LHS/DODGE)
(8W-50-7)
TO
S131
(8W-50-6)

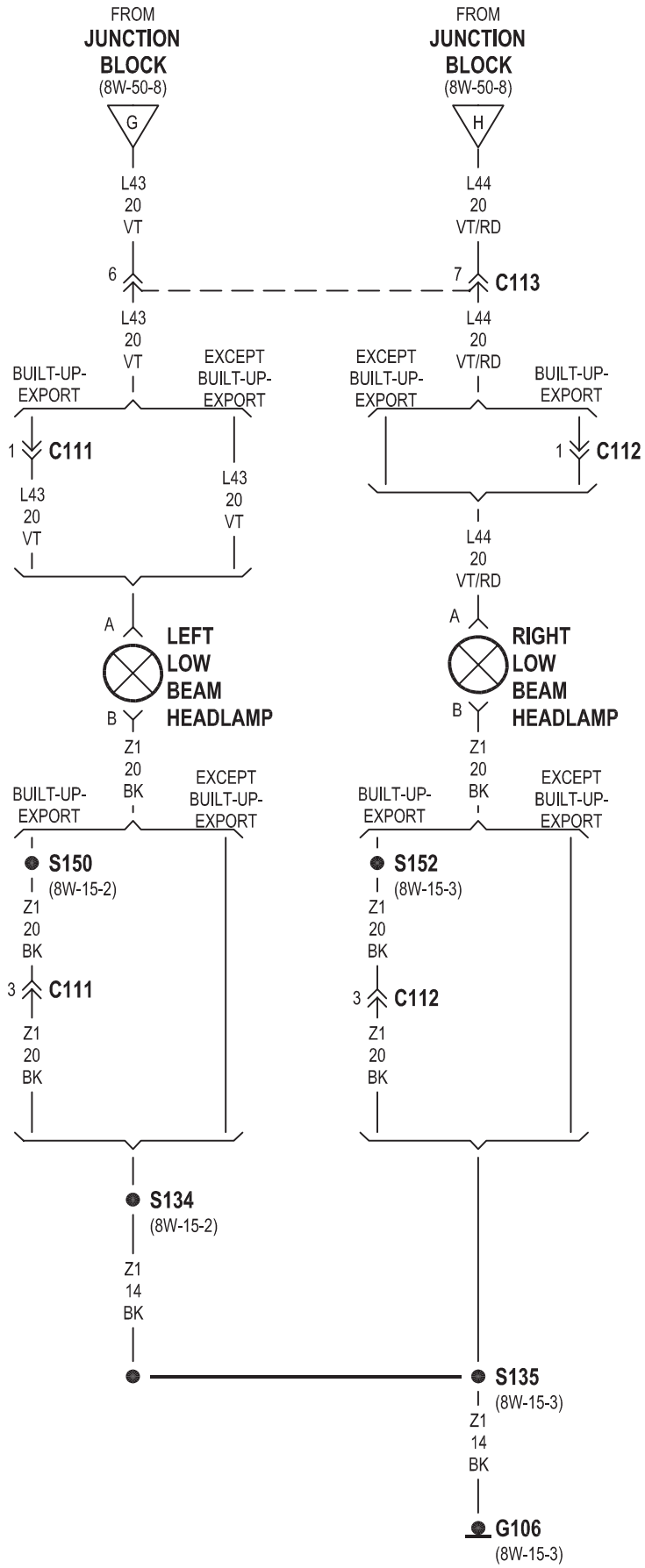

FROM
S130
(8W-50-4)
A
FROM
C113
(8W-50-5)
D
FROM
S130
(8W-50-4)
B
L7
20
BK/YL
L13
20
BR/YL
S131
(8W-12-11)
5
C111
2
2
C112
5
S151
S153
L13
20
BR/YL
L7
20
BK/YL
2
1
LEFT
HEADLAMP
LEVELING
MOTOR
M
3
1
LEFT
POSITION
LAMP
2
1
RIGHT
POSITION
LAMP
2
1
2
RIGHT
HEADLAMP
LEVELING
MOTOR
M
3
Z1
20
BK
S150
(8W-15-2)
3
C111
Z1
14
BK
S134
(8W-15-2)
S135
(8W-15-3)
3
C112
S152
(8W-15-3)
G106
(8W-15-3)

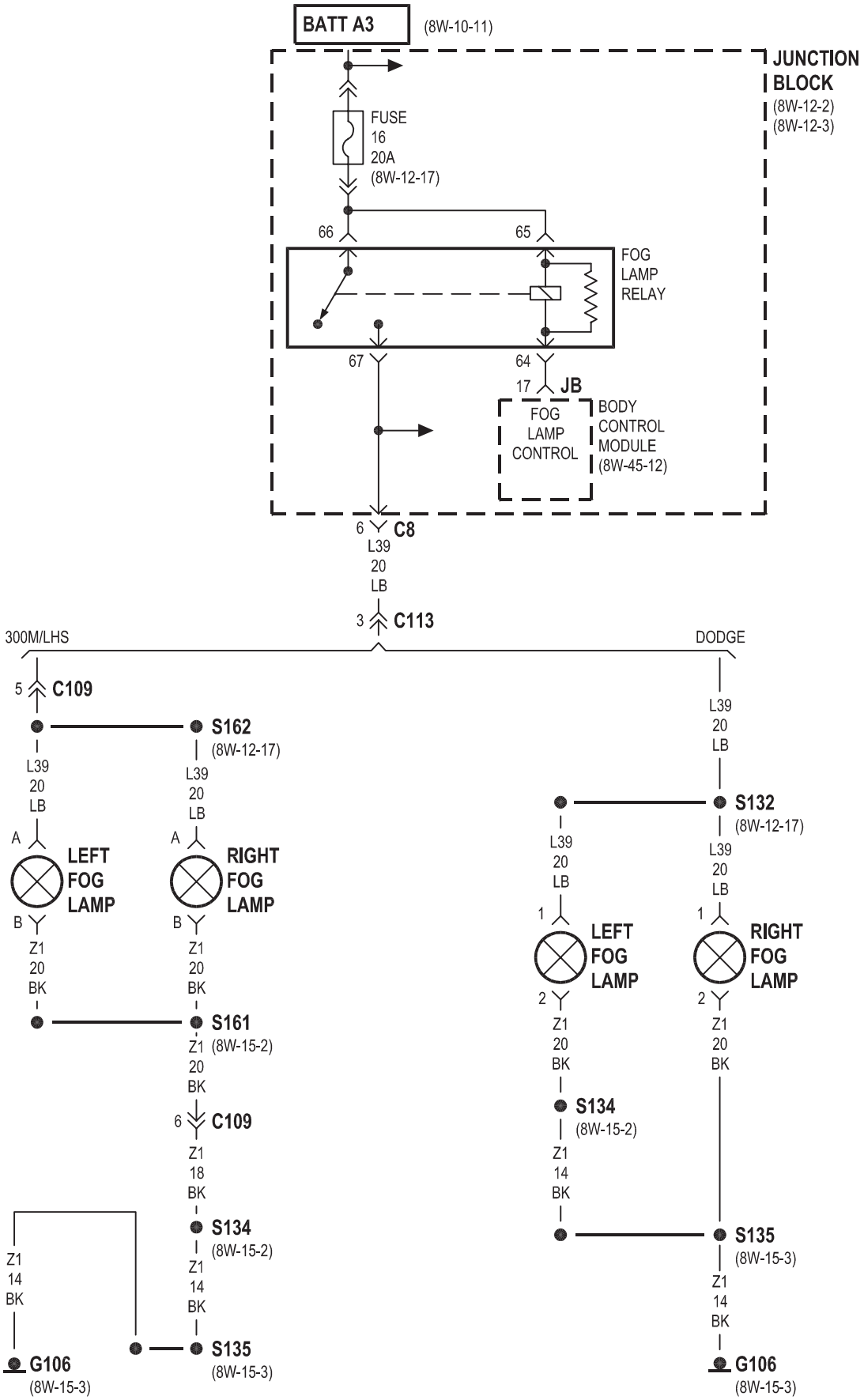
EXCEPT BUILT-UP-EXPORT



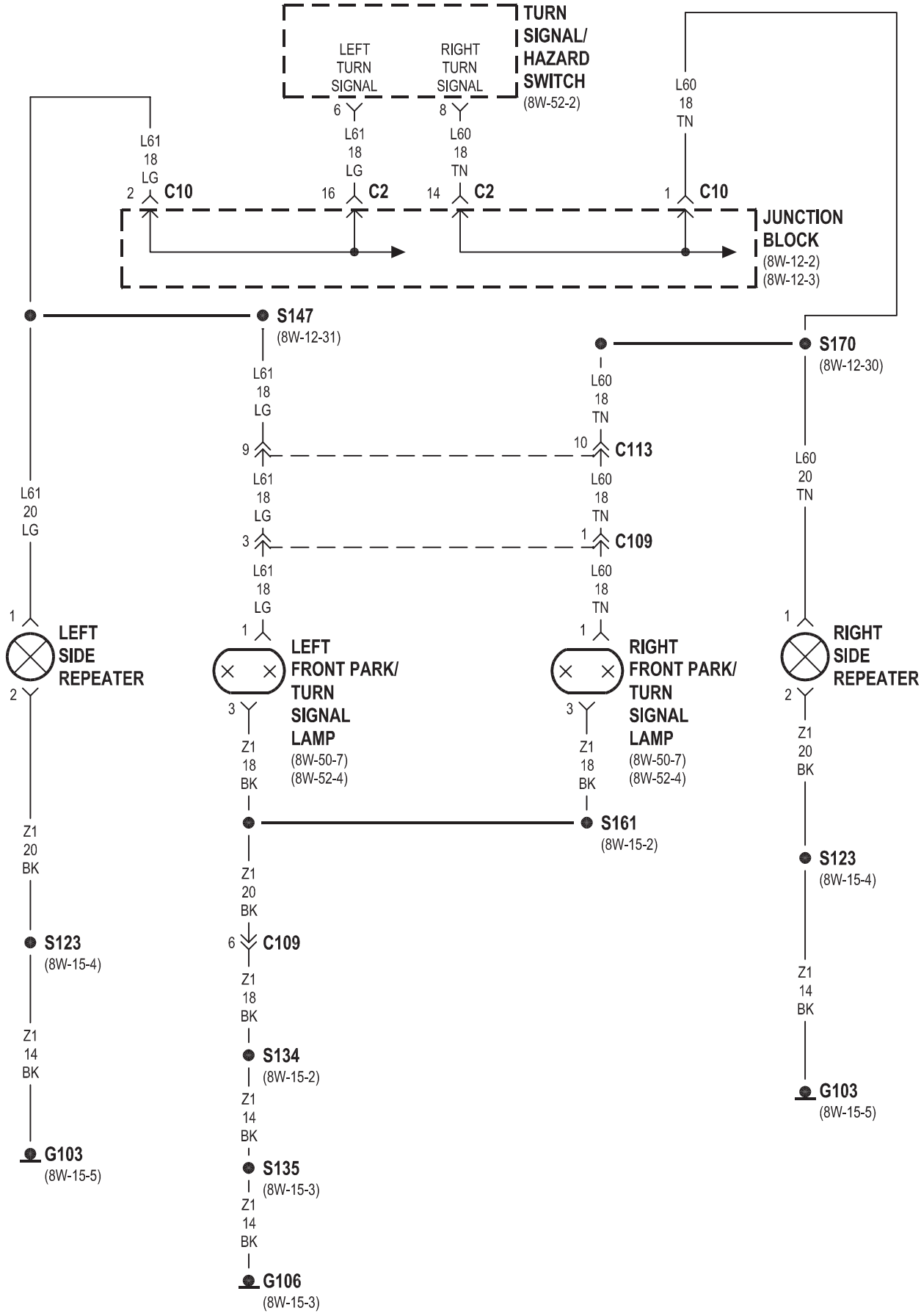

BATT A13
(8W-10-13)
BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 7 20A (8W-12-10)
62
61
LOW BEAM HEADLAMP RELAY
63
60
14 JB
LOW BEAM RELAY CONTROL
BODY CONTROL MODULE (8W-45-12)
FUSE 11 20A (8W-12-14)
FUSE 12 10A (8W-12-14)
FUSE 10 10A (8W-12-14)
3 C4
F33 18 PK/RD
12 C2
L40 20 BR/WT
13 C10
L43 20 VT
3 C8
L44 20 VT/RD
5
4
HEADLAMP DIMMER SWITCH (PART OF MULTI-FUNCTION SWITCH)
1 FLASH TO PASS
2 HIGH BEAM ON
1
2
7
L324 20 WT/LG
G
H
TO C113 (8W-50-10)
TO C113 (8W-50-10)
12 C4
BATT A3
(8W-10-11)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
57
58
HIGH BEAM HEADLAMP RELAY
56
59
FUSE 3 10A (8W-12-9)
FUSE 2 10A (8W-12-9)
10 C7
5 C8
4 C10
Z1 14 BK
E
F
G300
(8W-15-11)
TO LEFT HIGH BEAM HEADLAMP (8W-50-9)
TO RIGHT HIGH BEAM HEADLAMP (8W-50-9)


FROM
JUNCTION
BLOCK
(8W-50-8)
E
L33
20
RD
4
L33
20
RD
FROM
JUNCTION
BLOCK
(8W-50-8)
F
L34
20
RD/OR
5
C113
L34
20
RD/OR
EXCEPT
BUILT-UP-
EXPORT
BUILT-UP-
EXPORT
6
C111
L33
20
RD
L33
20
RD
EXCEPT
BUILT-UP-
EXPORT
BUILT-UP-
EXPORT
6
C112
L34
20
RD/OR
A
LEFT
HIGH
BEAM
HEADLAMP
B
A
RIGHT
HIGH
BEAM
HEADLAMP
B
Z1
20
BK
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
Z1
20
BK
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
S150
(8W-15-2)
Z1
20
BK
3
C111
Z1
20
BK
S152
(8W-15-3)
Z1
20
BK
3
C112
Z1
20
BK
S134
(8W-15-2)
Z1
14
BK
S135
(8W-15-3)
Z1
14
BK
G106
(8W-15-3)

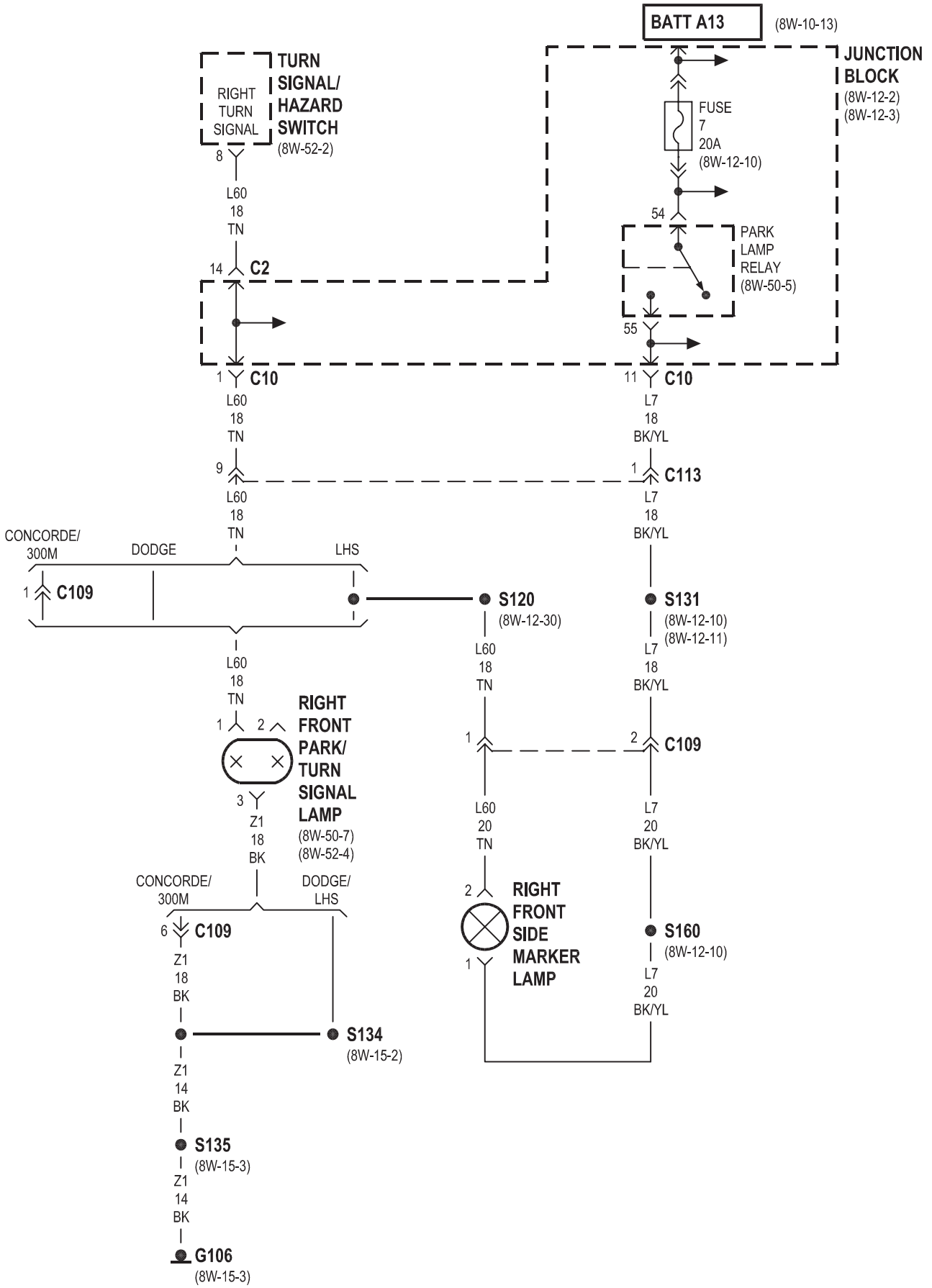

FROM
JUNCTION
BLOCK
(8W-50-8)
G
L43
20
VT
FROM
JUNCTION
BLOCK
(8W-50-8)
H
L44
20
VT/RD
6
7
C113
L43
20
VT
L44
20
VT/RD
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
BUILT-UP-
EXPORT
1
C111
1
C112
L43
20
VT
L43
20
VT
L44
20
VT/RD
A
LEFT
LOW
BEAM
HEADLAMP
A
RIGHT
LOW
BEAM
HEADLAMP
B
B
Z1
20
BK
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
BUILT-UP-
EXPORT
EXCEPT
BUILT-UP-
EXPORT
S150
(8W-15-2)
S152
(8W-15-3)
Z1
20
BK
3
C111
3
C112
Z1
20
BK
S134
(8W-15-2)
Z1
14
BK
S135
(8W-15-3)
Z1
14
BK
G106
(8W-15-3)


BATT A3
(8W-10-11)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
16
20A
(8W-12-17)
66
65
FOG LAMP RELAY
67
64
17
JB
FOG LAMP CONTROL
BODY CONTROL MODULE
(8W-45-12)
6
C8
L39
20
LB
3
C113
300M/LHS
DODGE
5
C109
S162
(8W-12-17)
L39
20
LB
A
LEFT FOG LAMP
B
Z1
20
BK
S161
(8W-15-2)
6
C109
Z1
18
BK
S134
(8W-15-2)
Z1
14
BK
G106
(8W-15-3)
S135
(8W-15-3)
S132
(8W-12-17)
1
2
S134
(8W-15-2)
S135
(8W-15-3)
G106
(8W-15-3)

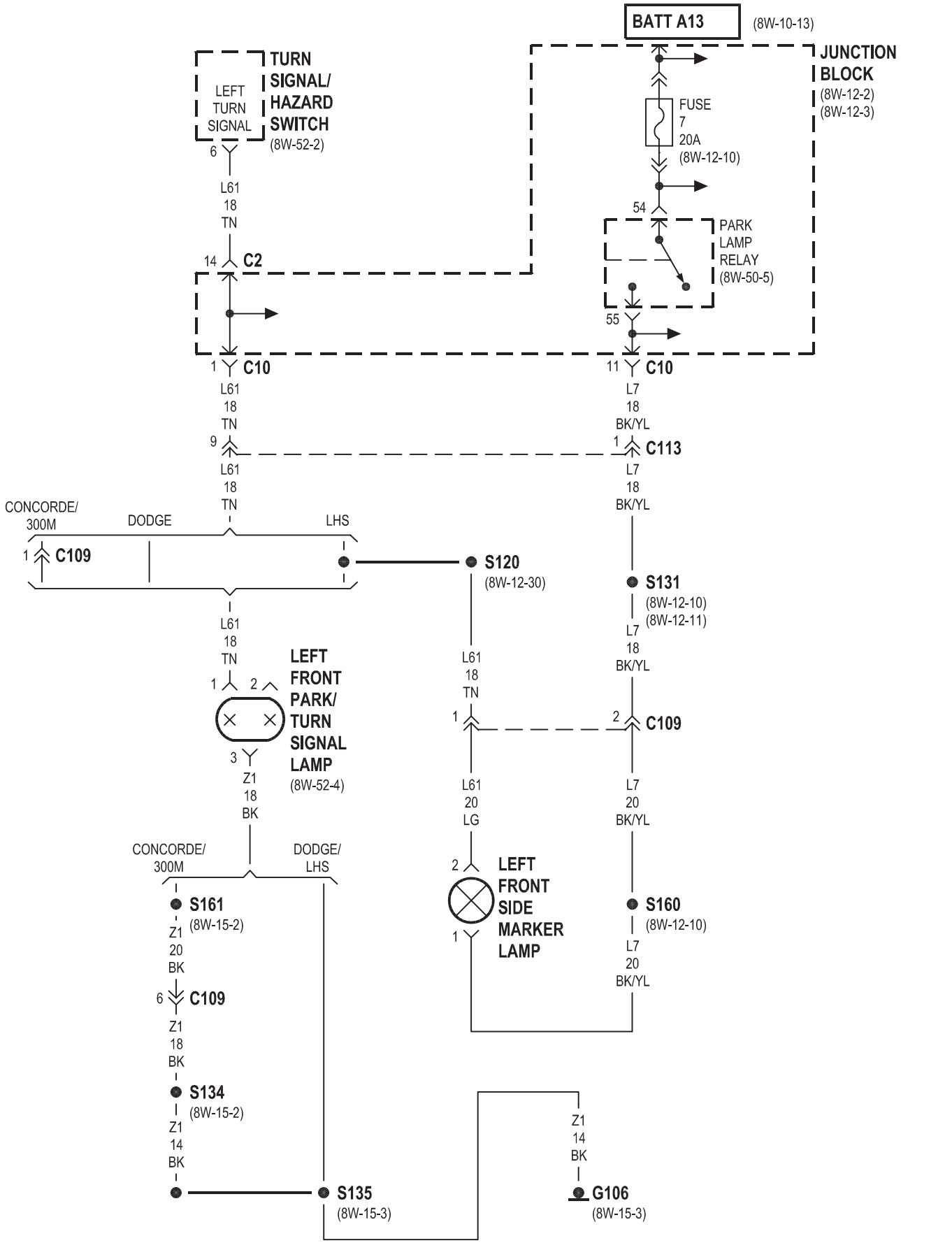
BUILT-UP-EXPORT



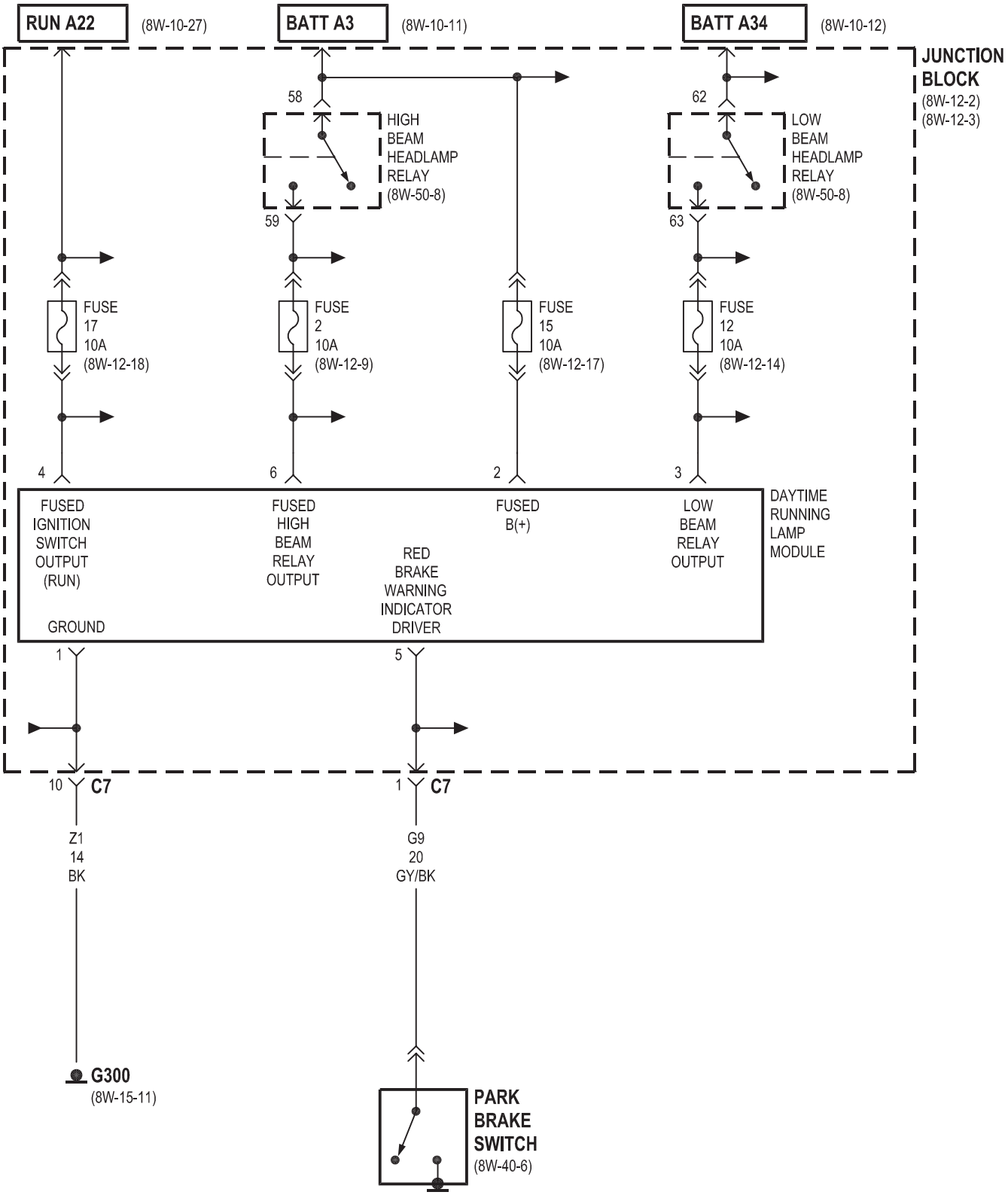
EXCEPT BUILT-UP-EXPORT



EXCEPT BUILT-UP-EXPORT



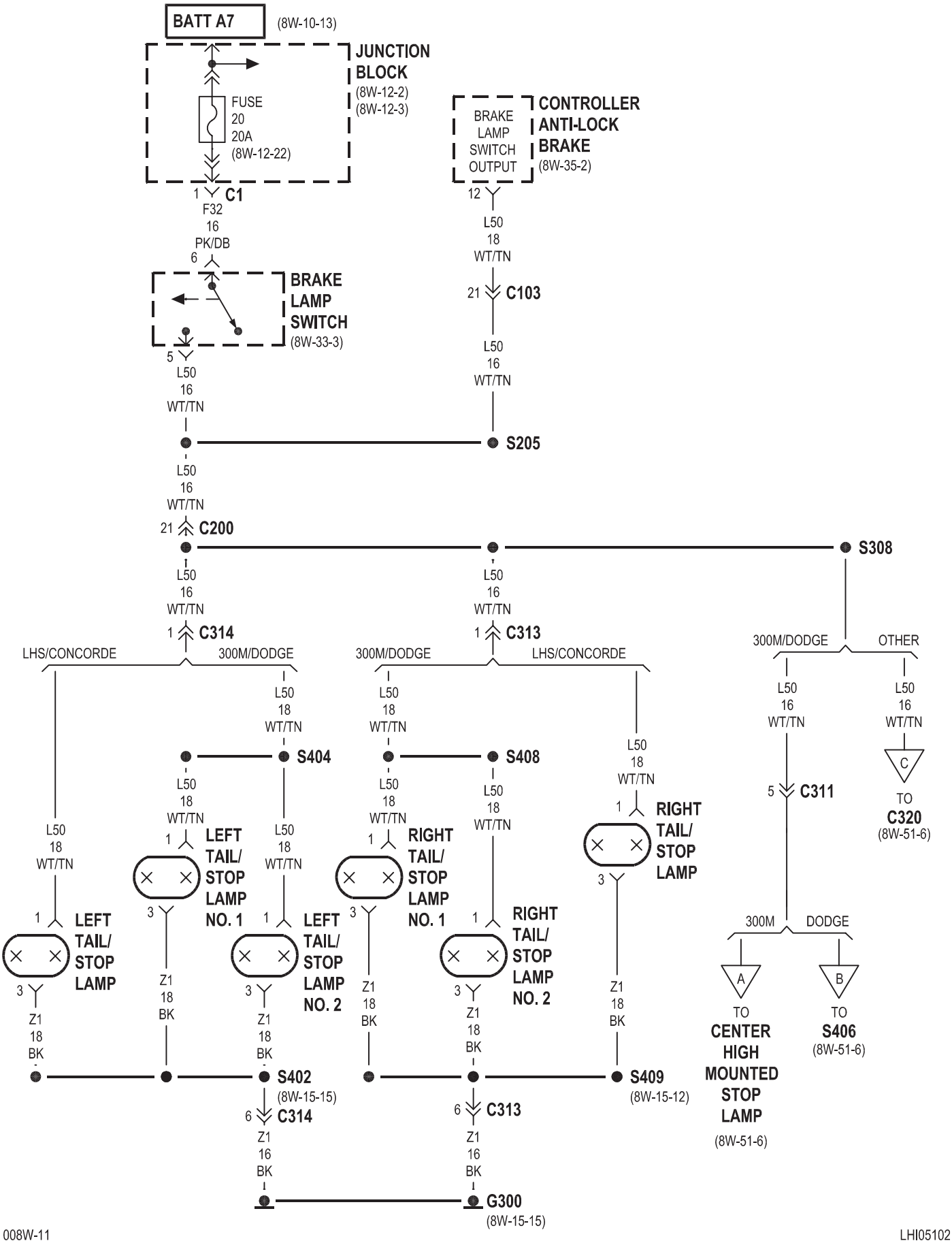
DRL


RUN A22
(8W-10-27)
BATT A3
(8W-10-11)
BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
58
HIGH BEAM HEADLAMP RELAY
(8W-50-8)
59
62
LOW BEAM HEADLAMP RELAY
(8W-50-8)
63
FUSE 17 10A
(8W-12-18)
FUSE 2 10A
(8W-12-9)
FUSE 15 10A
(8W-12-17)
FUSE 12 10A
(8W-12-14)
4
6
2
3
FUSED IGNITION SWITCH OUTPUT (RUN)
FUSED HIGH BEAM RELAY OUTPUT
FUSED B(+)
LOW BEAM RELAY OUTPUT
DAYTIME RUNNING LAMP MODULE
RED BRAKE WARNING INDICATOR DRIVER
GROUND
1
5
10
C7
1
C7
Z1
14
BK
G9
20
GY/BK
G300
(8W-15-11)
PARK BRAKE SWITCH
(8W-40-6)

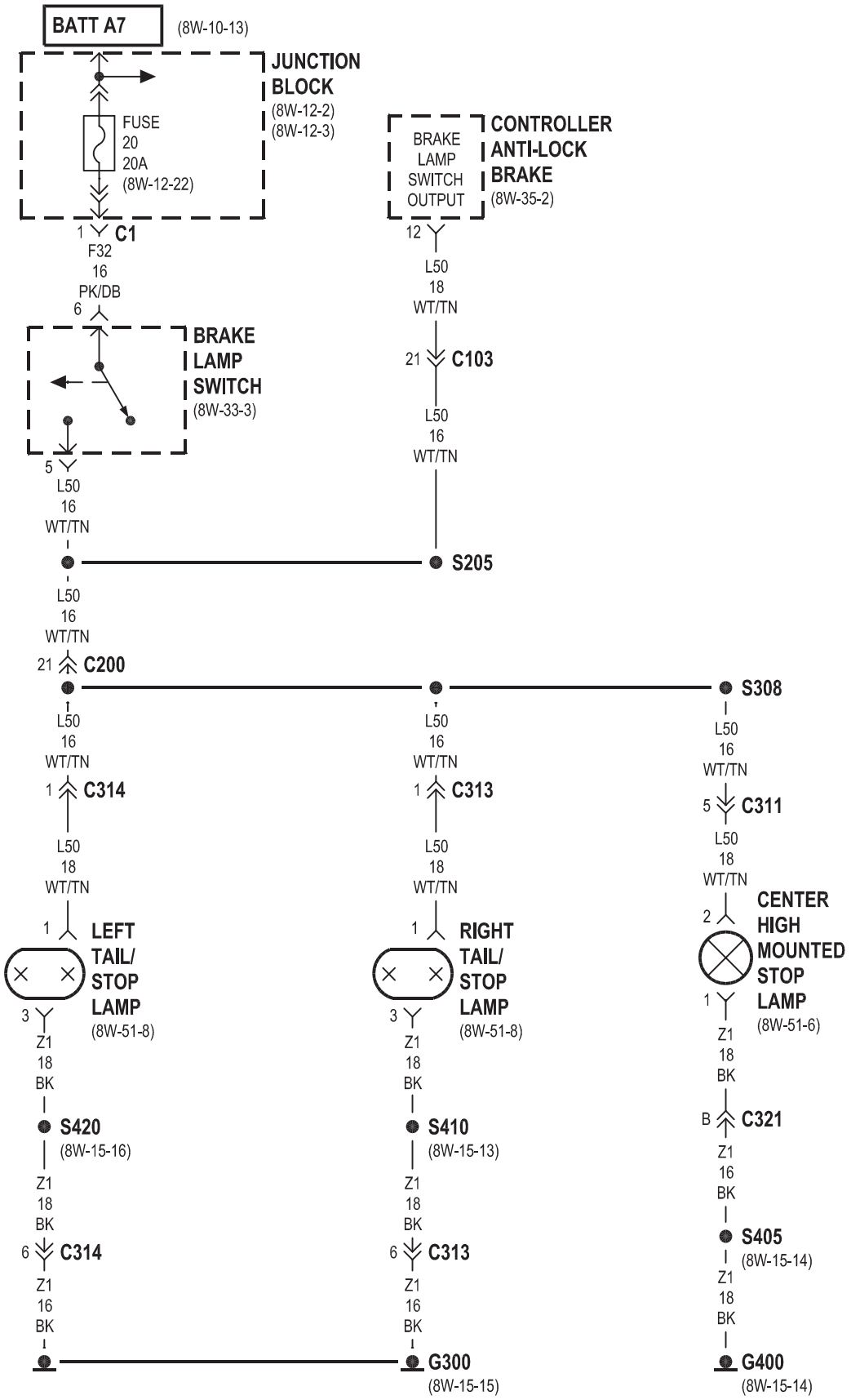
8W-51 REAR LIGHTING

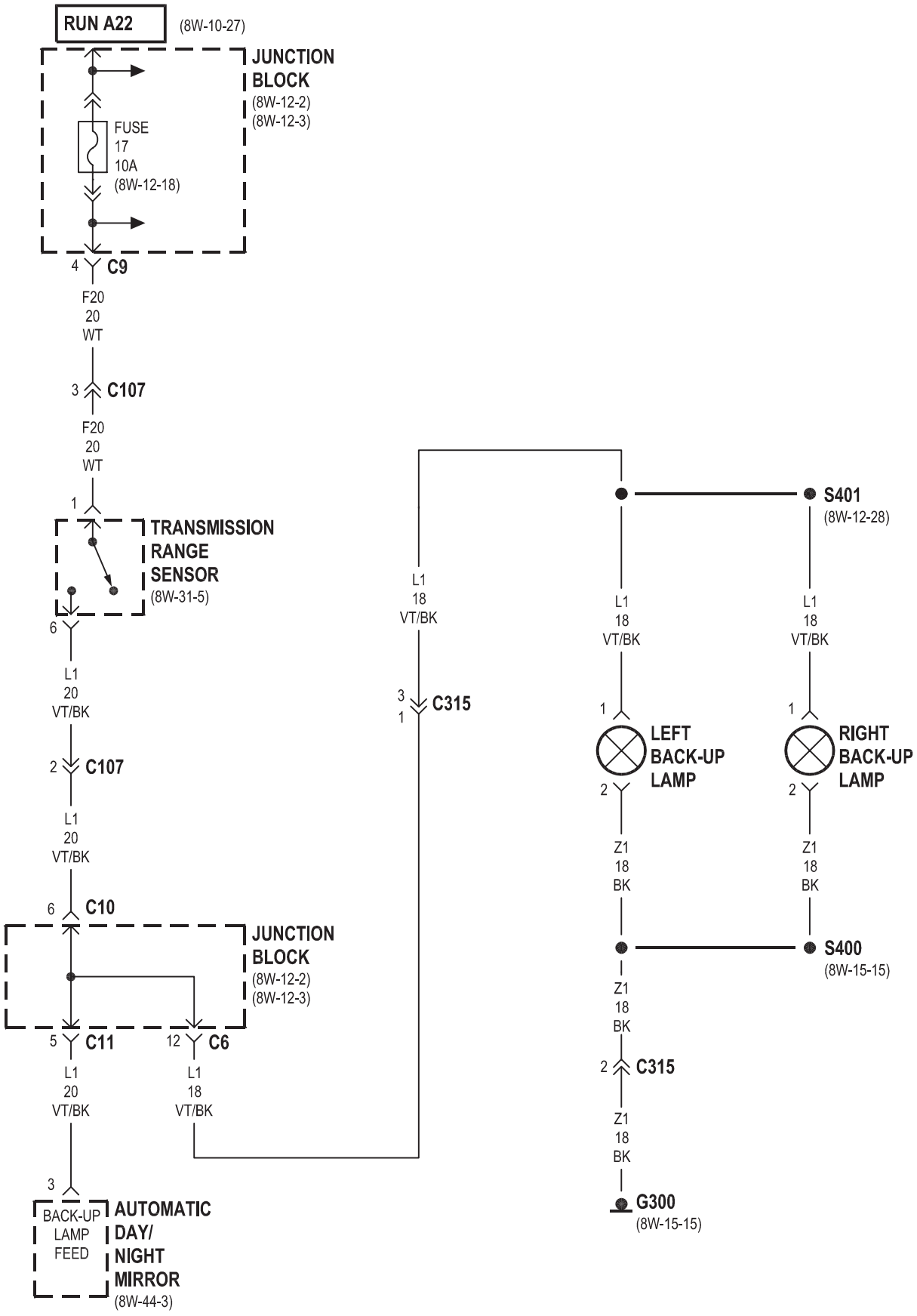
Component	Page
Automatic Day/Night Mirror	8W-51-4, 5
Brake Lamp Switch	8W-51-2, 3
Center High Mounted Stop Lamp	8W-51-3, 6
Center High Mounted Stop Lamp No. 1	8W-51-6
Center High Mounted Stop Lamp No. 2	8W-51-6
Controller Anti-Lock Brake	8W-51-2, 3
Fuse 17 (JB)	8W-51-4, 5, 7, 9
Fuse 20 (JB)	8W-51-2, 3
Fuse R (PDC)	8W-51-10
G200	8W-51-10
G300	8W-51-2, 3, 4, 5, 7, 8, 9, 10
G301	8W-51-6, 7, 8
G400	8W-51-3, 6
Headlamp Switch	8W-51-10
Junction Block	8W-51-2, 3, 4, 5, 7, 8, 9
Left Back-Up Lamp	8W-51-4, 5
Left License Lamp	8W-51-8
Left Rear Fog Lamp	8W-51-10
Left Rear Side Marker Lamp	8W-51-9
Left Tail Lamp	8W-51-8, 9
Left Tail/Stop Lamp	8W-51-2, 3, 8, 9
Left Tail/Stop Lamp No. 1	8W-51-2, 9
Left Tail/Stop Lamp No. 2	8W-51-2, 9
Left Tail/Turn Signal Lamp	8W-51-9
License Lamp	8W-51-7
Park Lamp Relay	8W-51-7, 8, 9
Power Distribution Center	8W-51-10
Rear Fog Lamp Relay	8W-51-10
Right Back-Up Lamp	8W-51-4, 5
Right License Lamp	8W-51-8
Right Rear Fog Lamp	8W-51-10
Right Rear Side Marker Lamp	8W-51-7
Right Tail Lamp	8W-51-7, 8
Right Tail/Stop Lamp	8W-51-2, 3, 7, 8
Right Tail/Stop Lamp No. 1	8W-51-2, 7
Right Tail/Stop Lamp No. 2	8W-51-2, 7
Right Tail/Turn Signal Lamp	8W-51-7
Transmission Range Sensor	8W-51-4, 5

EXCEPT BUILT-UP-EXPORT

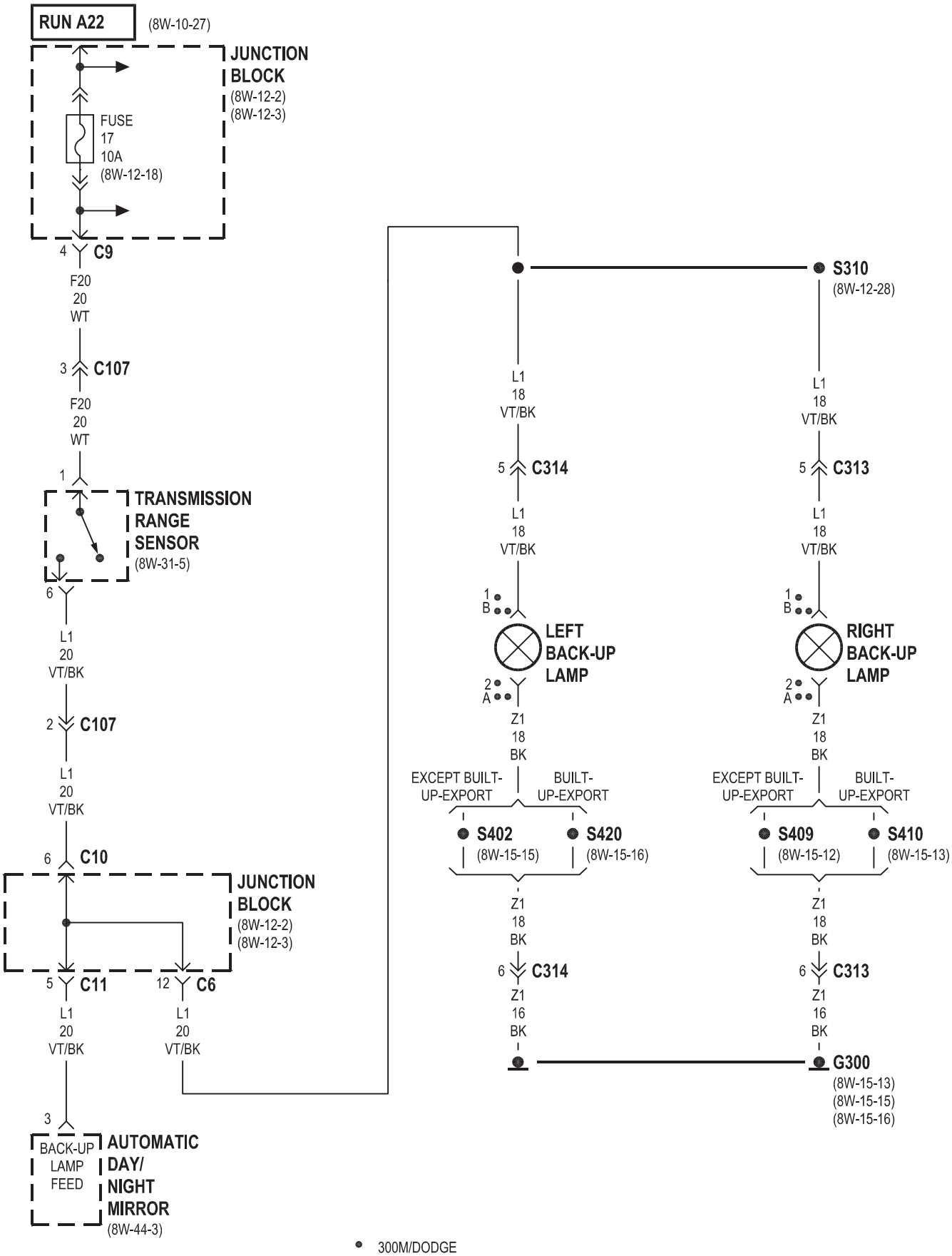


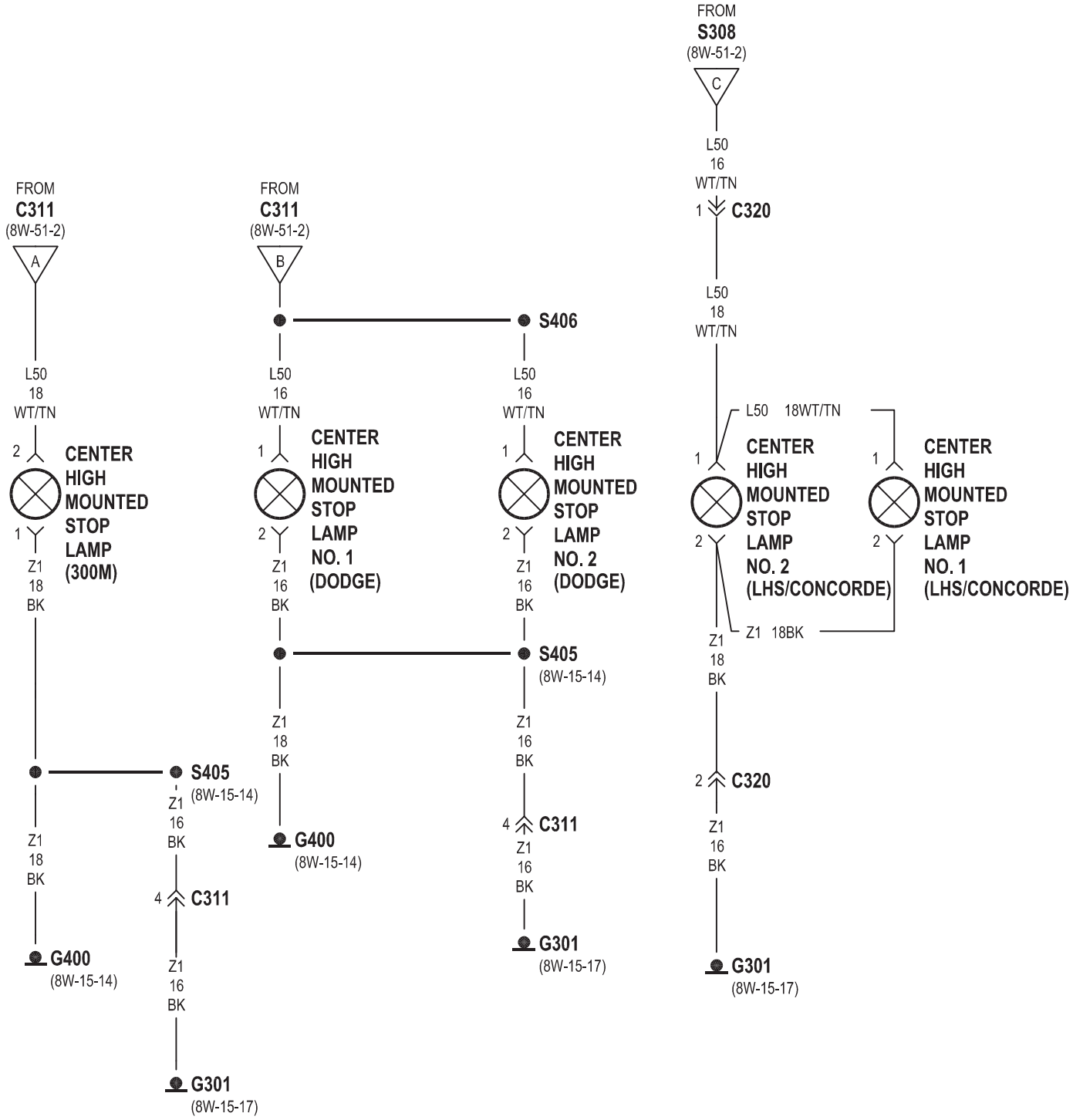
BUILT-UP-EXPORT



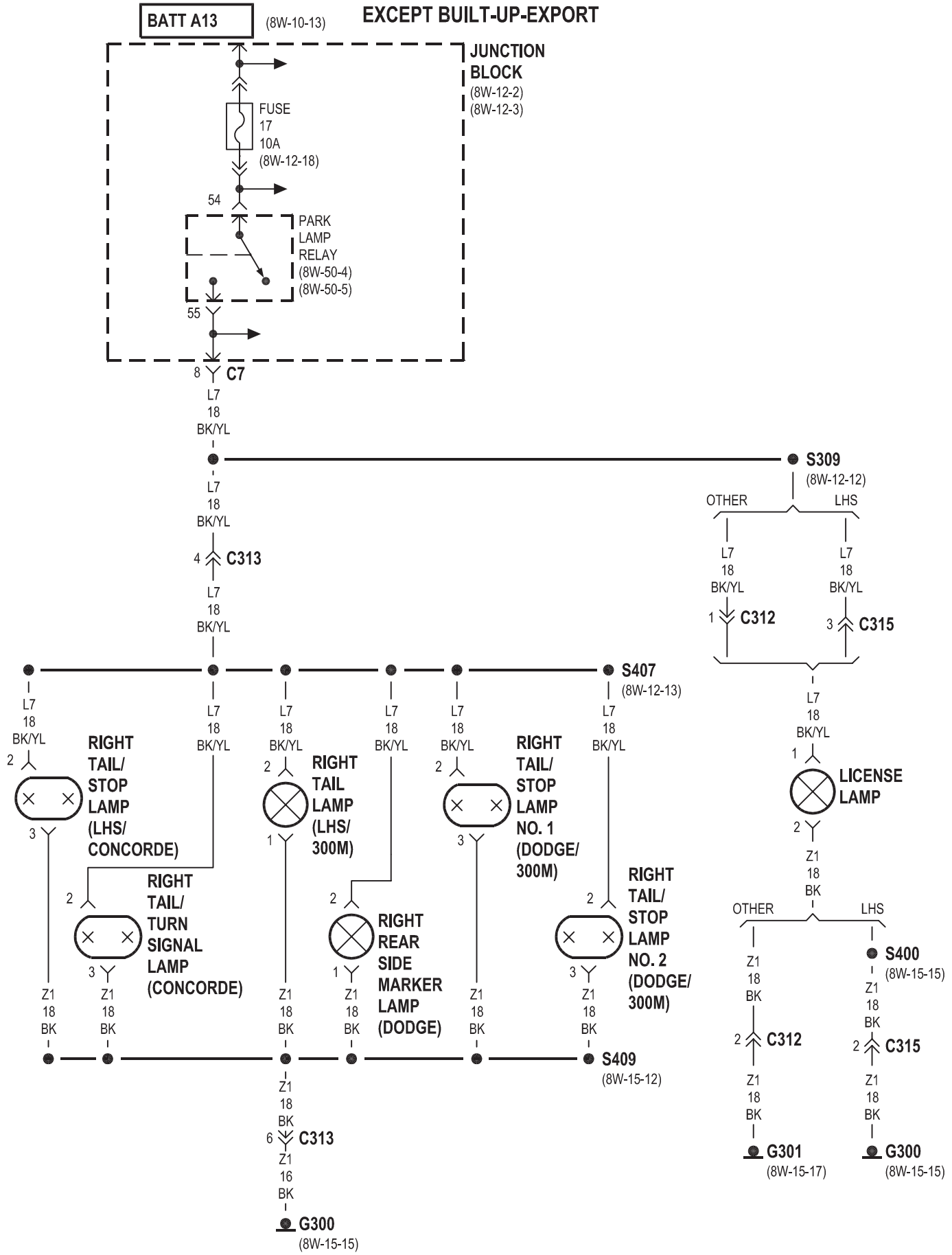

RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
17
10A
(8W-12-18)
4
C9
F20
20
WT
3
C107
F20
20
WT
1
TRANSMISSION RANGE SENSOR
(8W-31-5)
6
L1
20
VT/BK
2
C107
L1
20
VT/BK
6
C10
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
5
C11
12
C6
L1
20
VT/BK
L1
18
VT/BK
3
BACK-UP LAMP FEED
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
L1
18
VT/BK
3
C315
1
S401
(8W-12-28)
L1
18
VT/BK
L1
18
VT/BK
1
LEFT BACK-UP LAMP
2
1
RIGHT BACK-UP LAMP
2
Z1
18
BK
Z1
18
BK
S400
(8W-15-15)
Z1
18
BK
2
C315
Z1
18
BK
G300
(8W-15-15)

EXCEPT LHS

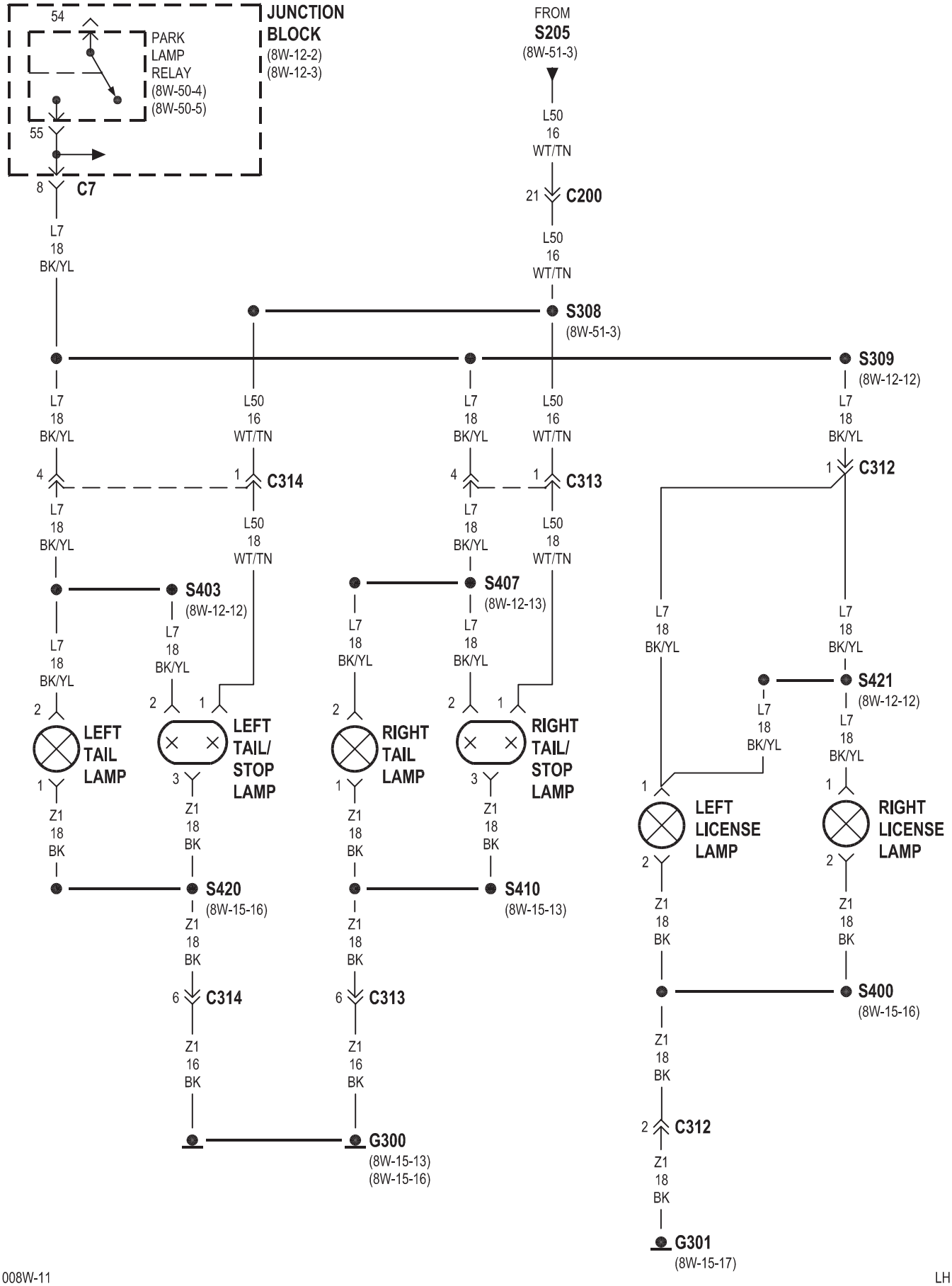

RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 17 10A
(8W-12-18)
4 C9
F20 20 WT
3 C107
F20 20 WT
1
TRANSMISSION RANGE SENSOR
(8W-31-5)
6
L1 20 VT/BK
2 C107
L1 20 VT/BK
6 C10
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
5 C11
12 C6
L1 20 VT/BK
L1 20 VT/BK
3
BACK-UP LAMP FEED
AUTOMATIC DAY/ NIGHT MIRROR
(8W-44-3)
S310
(8W-12-28)
L1 18 VT/BK
5 C314
L1 18 VT/BK
1 B
LEFT BACK-UP LAMP
2 A
Z1 18 BK
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S402
(8W-15-15)
S420
(8W-15-16)
Z1 18 BK
6 C314
Z1 16 BK
L1 18 VT/BK
5 C313
L1 18 VT/BK
1 B
RIGHT BACK-UP LAMP
2 A
Z1 18 BK
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
S409
(8W-15-12)
S410
(8W-15-13)
Z1 18 BK
6 C313
Z1 16 BK
G300
(8W-15-13)
(8W-15-15)
(8W-15-16)
300M/DODGE
CONCORDE


FROM
C311
(8W-51-2)
A
L50
18
WT/TN
2
CENTER
HIGH
MOUNTED
STOP
LAMP
(300M)
1
Z1
18
BK
S405
(8W-15-14)
Z1
16
BK
4
C311
Z1
16
BK
G301
(8W-15-17)
Z1
18
BK
G400
(8W-15-14)
FROM
C311
(8W-51-2)
B
S406
L50
16
WT/TN
1
CENTER
HIGH
MOUNTED
STOP
LAMP
NO. 1
(DODGE)
2
Z1
16
BK
S405
(8W-15-14)
Z1
18
BK
G400
(8W-15-14)
L50
16
WT/TN
1
CENTER
HIGH
MOUNTED
STOP
LAMP
NO. 2
(DODGE)
2
Z1
16
BK
4
C311
Z1
16
BK
G301
(8W-15-17)
FROM
S308
(8W-51-2)
C
L50
16
WT/TN
1
C320
L50
18
WT/TN
L50 18WT/TN
1
CENTER
HIGH
MOUNTED
STOP
LAMP
NO. 2
(LHS/CONCORDE)
2
Z1 18BK
1
CENTER
HIGH
MOUNTED
STOP
LAMP
NO. 1
(LHS/CONCORDE)
2
Z1
18
BK
2
C320
Z1
16
BK
G301
(8W-15-17)

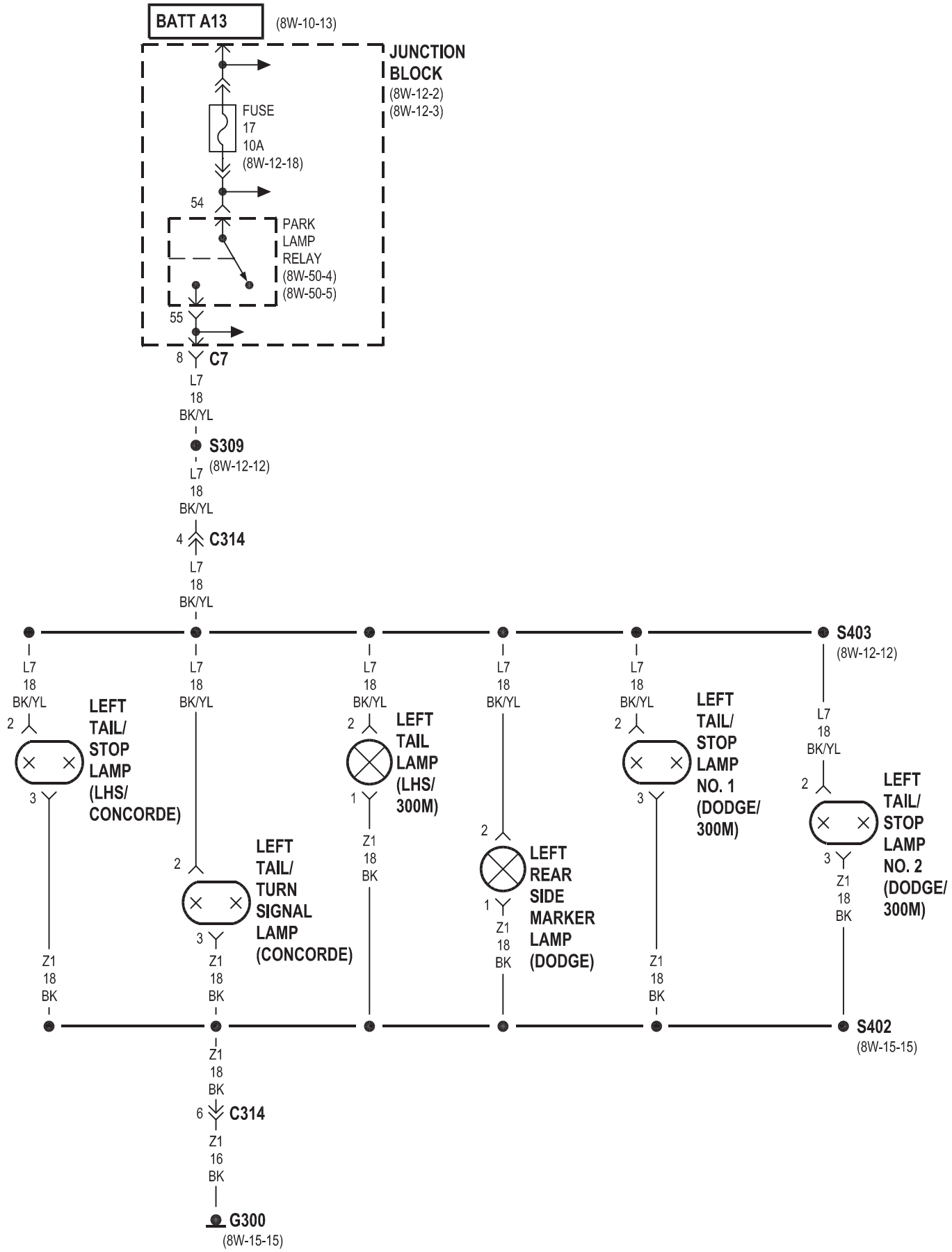
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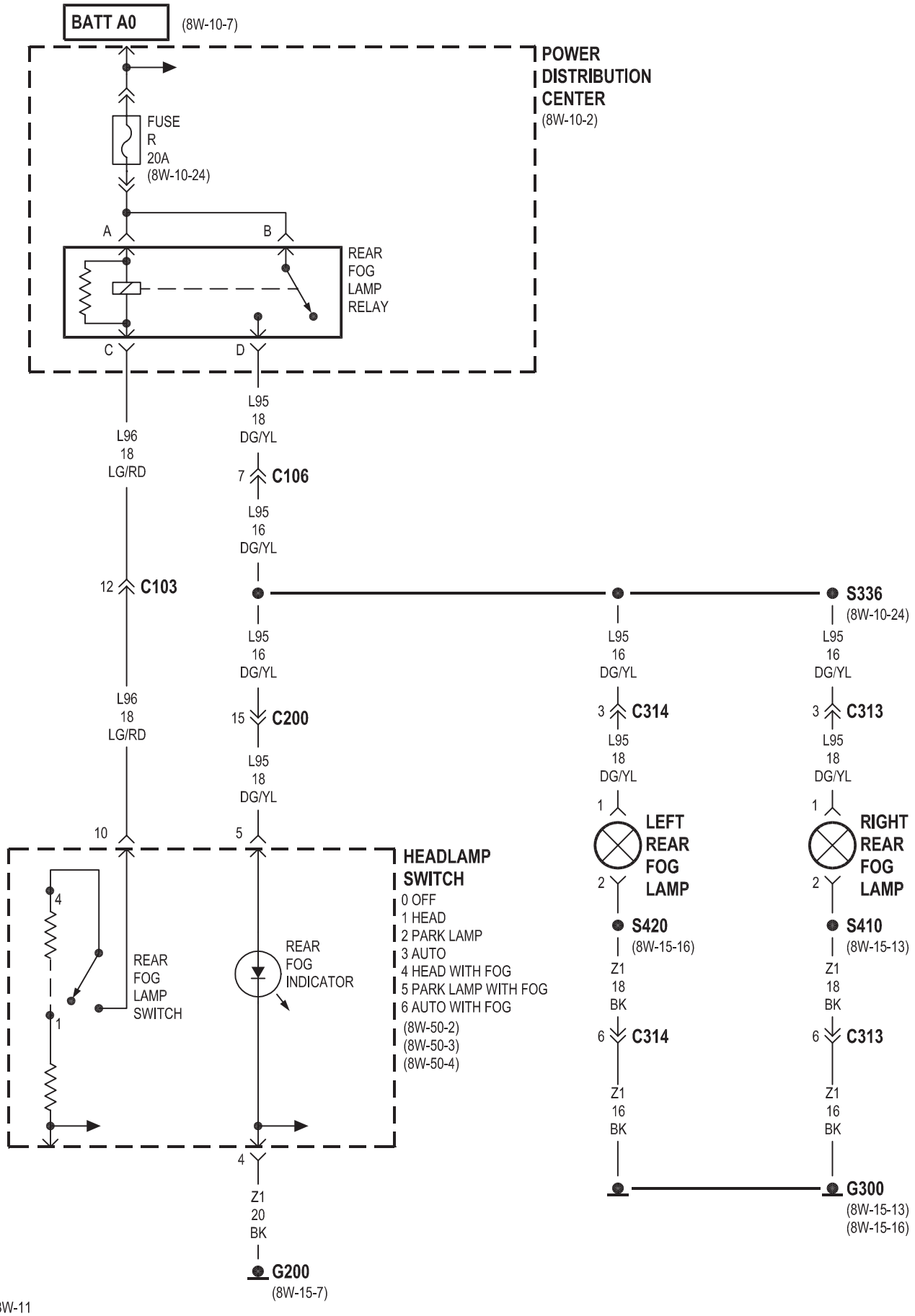


BUILT-UP-EXPORT



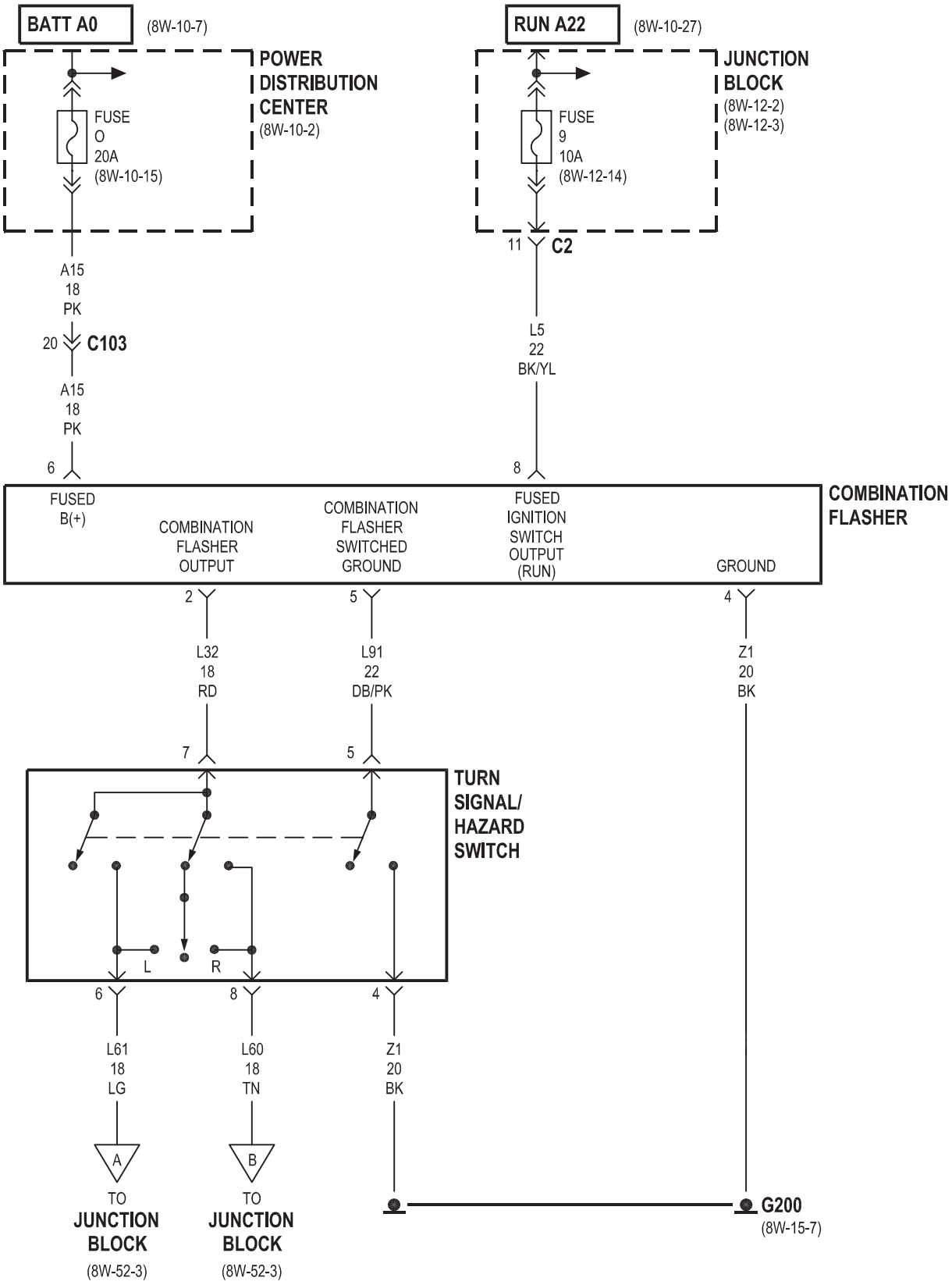
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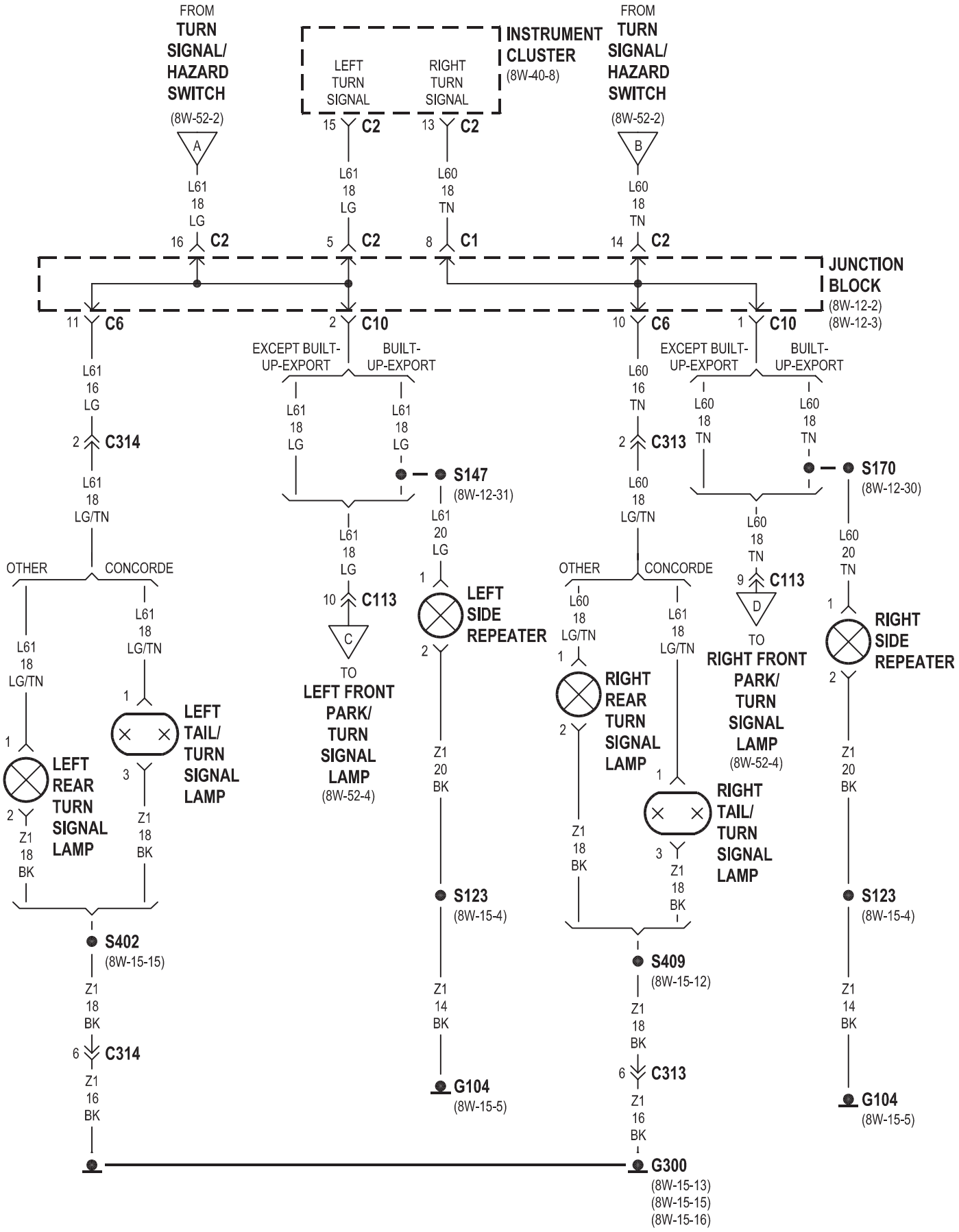


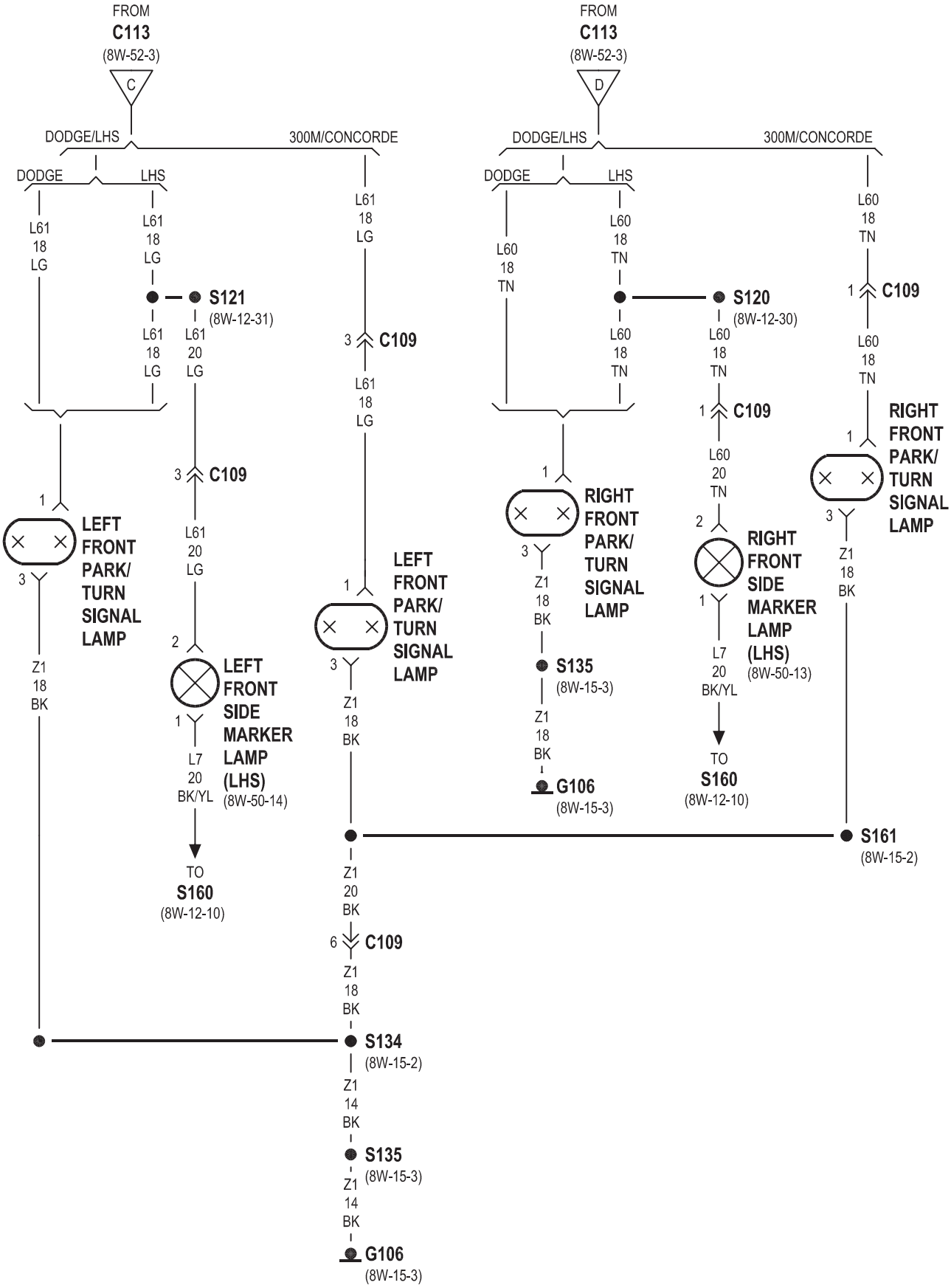

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
R
20A
(8W-10-24)
A
B
REAR FOG LAMP RELAY
C
D
L96
18
LG/RD
L95
18
DG/YL
7
C106
L95
16
DG/YL
12
C103
L96
18
LG/RD
L95
16
DG/YL
15
C200
L95
18
DG/YL
10
5
HEADLAMP SWITCH
0 OFF
1 HEAD
2 PARK LAMP
3 AUTO
4 HEAD WITH FOG
5 PARK LAMP WITH FOG
6 AUTO WITH FOG
(8W-50-2)
(8W-50-3)
(8W-50-4)
4
REAR FOG LAMP SWITCH
1
REAR FOG INDICATOR
4
Z1
20
BK
G200
(8W-15-7)
L95
16
DG/YL
3
C314
L95
18
DG/YL
1
LEFT REAR FOG LAMP
2
S420
(8W-15-16)
Z1
18
BK
6
C314
Z1
16
BK
S336
(8W-10-24)
L95
16
DG/YL
3
C313
L95
18
DG/YL
1
RIGHT REAR FOG LAMP
2
S410
(8W-15-13)
Z1
18
BK
6
C313
Z1
16
BK
G300
(8W-15-13)
(8W-15-16)

8W-52 TURN SIGNALS

Component	Page
Combination Flasher	8W-52-2
Fuse 9 (JB)	8W-52-2
Fuse O (PDC)	8W-52-2
G104	8W-52-3
G106	8W-52-4
G200	8W-52-2
G300	8W-52-3
Instrument Cluster	8W-52-3
Junction Block	8W-52-2, 3
Left Front Park/Turn Signal Lamp	8W-52-4
Left Front Side Marker Lamp	8W-52-4
Left Rear Turn Signal Lamp	8W-52-3
Left Side Repeater	8W-52-3
Left Tail/Turn Signal Lamp	8W-52-3
Power Distribution Center	8W-52-2
Right Front Park/Turn Signal Lamp	8W-52-4
Right Front Side Marker Lamp	8W-52-4
Right Rear Turn Signal Lamp	8W-52-3
Right Side Repeater	8W-52-3
Right Tail/Turn Signal Lamp	8W-52-3
Turn Signal/Hazard Switch	8W-52-2

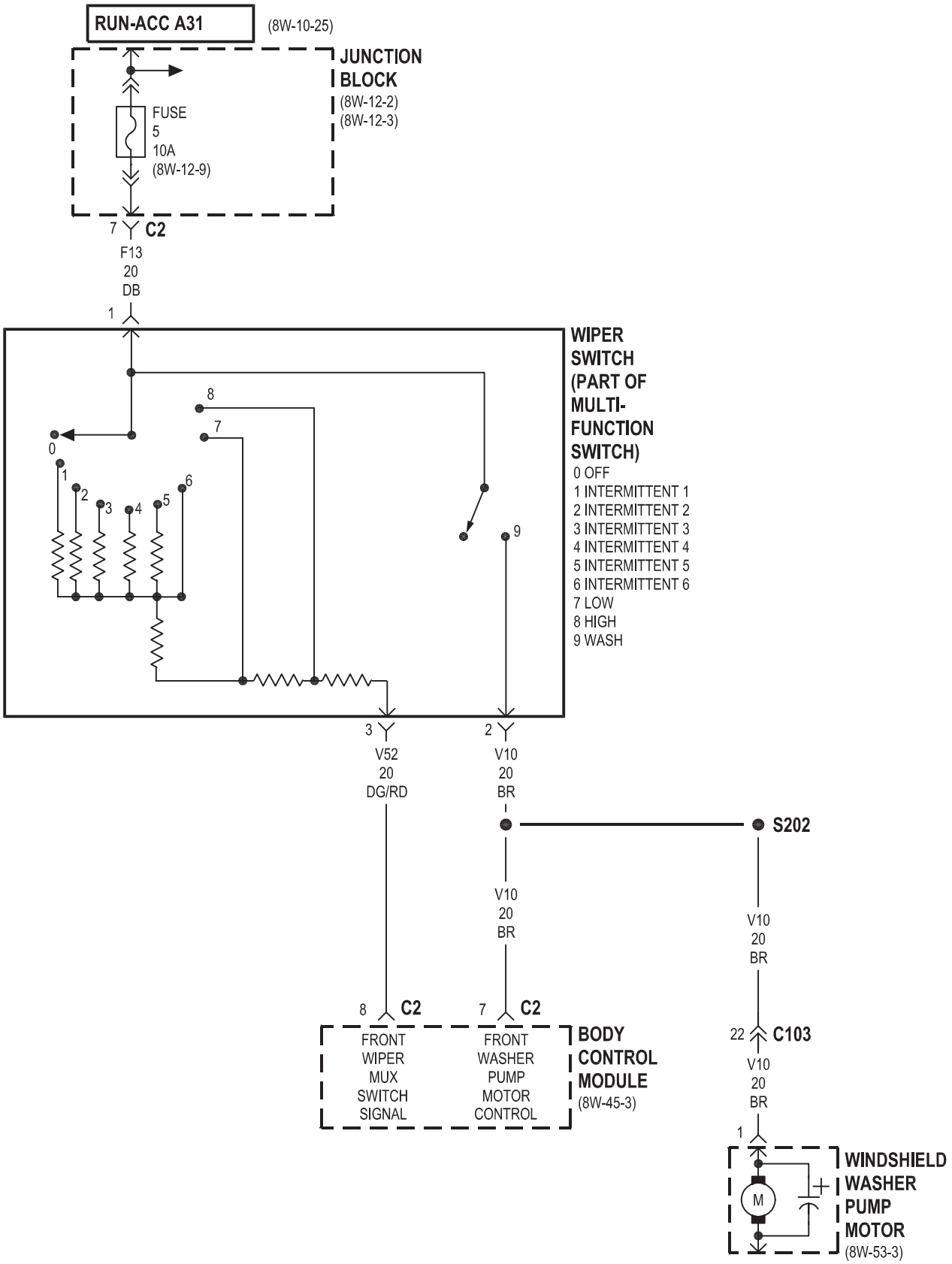

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE O 20A
(8W-10-15)
A15 18 PK
20
C103
A15 18 PK
6
RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 9 10A
(8W-12-14)
11
C2
L5 22 BK/YL
8
COMBINATION FLASHER
FUSED B(+)
COMBINATION FLASHER OUTPUT
COMBINATION FLASHER SWITCHED GROUND
FUSED IGNITION SWITCH OUTPUT (RUN)
GROUND
2
5
4
L32 18 RD
L91 22 DB/PK
Z1 20 BK
7
5
TURN SIGNAL/ HAZARD SWITCH
L
R
6
8
4
L61 18 LG
L60 18 TN
Z1 20 BK
A
B
TO JUNCTION BLOCK
(8W-52-3)
TO JUNCTION BLOCK
(8W-52-3)
G200
(8W-15-7)

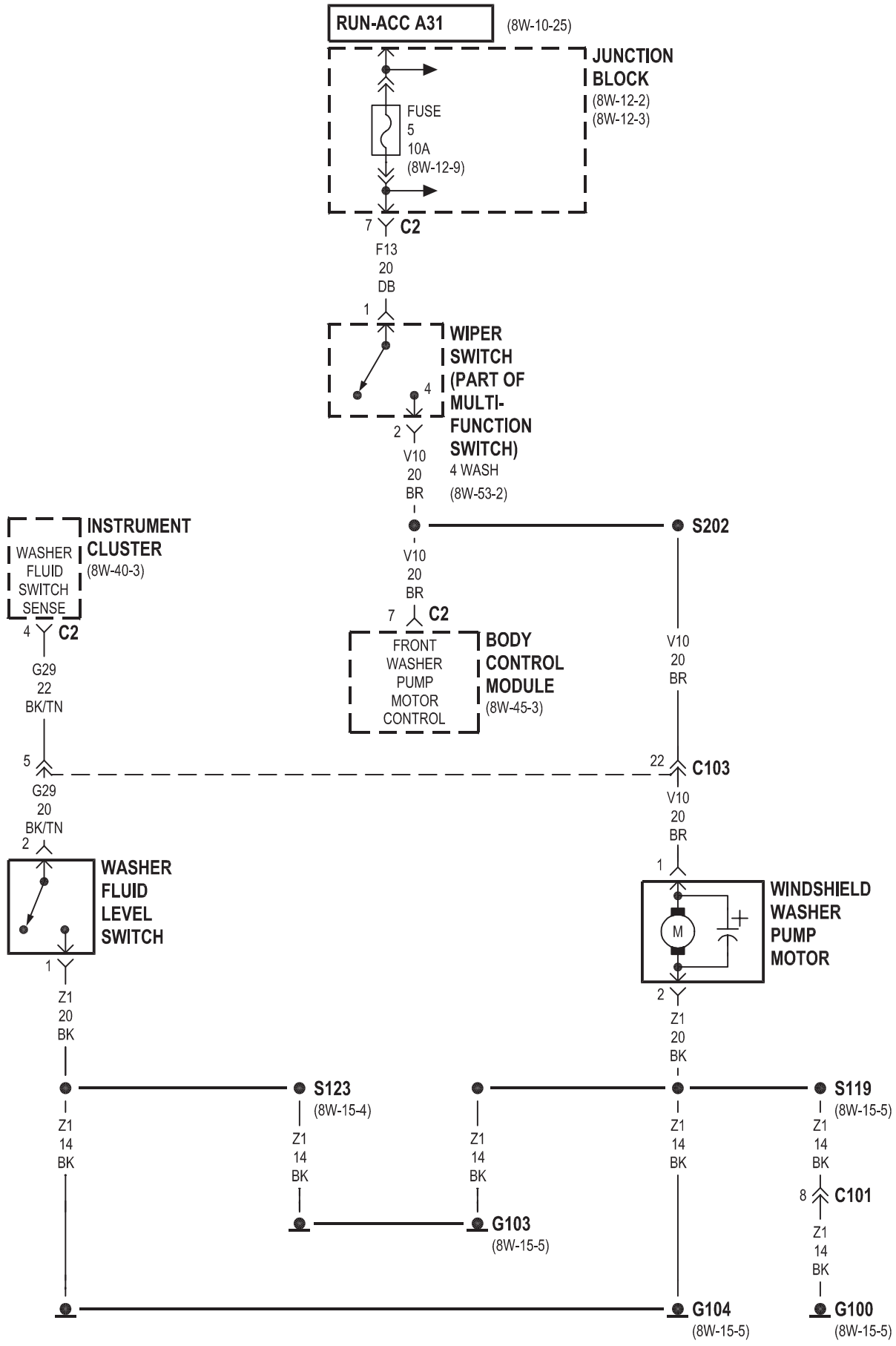

FROM TURN SIGNAL/ HAZARD SWITCH (8W-52-2)
A
L61 18 LG
16 C2
INSTRUMENT CLUSTER (8W-40-8)
LEFT TURN SIGNAL
RIGHT TURN SIGNAL
15 C2
13 C2
L61 18 LG
L60 18 TN
5 C2
8 C1
FROM TURN SIGNAL/ HAZARD SWITCH (8W-52-2)
B
L60 18 TN
14 C2
JUNCTION BLOCK (8W-12-2) (8W-12-3)
11 C6
2 C10
10 C6
1 C10
L61 16 LG
2 C314
L61 18 LG/TN
OTHER
CONCORDE
L61 18 LG/TN
1
LEFT REAR TURN SIGNAL LAMP
2
Z1 18 BK
L61 18 LG/TN
1
LEFT TAIL/ TURN SIGNAL LAMP
3
Z1 18 BK
S402 (8W-15-15)
Z1 18 BK
6 C314
Z1 16 BK
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
L61 18 LG
L61 18 LG
S147 (8W-12-31)
L61 18 LG
10 C113
C
TO LEFT FRONT PARK/ TURN SIGNAL LAMP (8W-52-4)
L61 20 LG
1
LEFT SIDE REPEATER
2
Z1 20 BK
S123 (8W-15-4)
Z1 14 BK
G104 (8W-15-5)
L60 16 TN
2 C313
L60 18 LG/TN
OTHER
CONCORDE
L60 18 LG/TN
1
RIGHT REAR TURN SIGNAL LAMP
2
Z1 18 BK
L61 18 LG/TN
1
RIGHT TAIL/ TURN SIGNAL LAMP
3
Z1 18 BK
S409 (8W-15-12)
Z1 18 BK
6 C313
Z1 16 BK
G300 (8W-15-13) (8W-15-15) (8W-15-16)
EXCEPT BUILT-UP-EXPORT
BUILT-UP-EXPORT
L60 18 TN
L60 18 TN
S170 (8W-12-30)
L60 18 TN
9 C113
D
TO RIGHT FRONT PARK/ TURN SIGNAL LAMP (8W-52-4)
L60 20 TN
1
RIGHT SIDE REPEATER
2
Z1 20 BK
S123 (8W-15-4)
Z1 14 BK
G104 (8W-15-5)


FROM
C113
(8W-52-3)
C
DODGE/LHS
300M/CONCORDE
DODGE
LHS
L61
18
LG
L61
20
LG
S121
(8W-12-31)
3
C109
1
LEFT
FRONT
PARK/
TURN
SIGNAL
LAMP
Z1
18
BK
2
LEFT
FRONT
SIDE
MARKER
LAMP
(LHS)
(8W-50-14)
L7
20
BK/YL
TO
S160
(8W-12-10)
Z1
20
BK
6
C109
Z1
14
BK
S134
(8W-15-2)
S135
(8W-15-3)
G106
(8W-15-3)
FROM
C113
(8W-52-3)
D
DODGE/LHS
300M/CONCORDE
DODGE
LHS
L60
18
TN
L60
20
TN
S120
(8W-12-30)
RIGHT
FRONT
PARK/
TURN
SIGNAL
LAMP
RIGHT
FRONT
SIDE
MARKER
LAMP
(LHS)
(8W-50-13)
TO
S160
(8W-12-10)
S161
(8W-15-2)

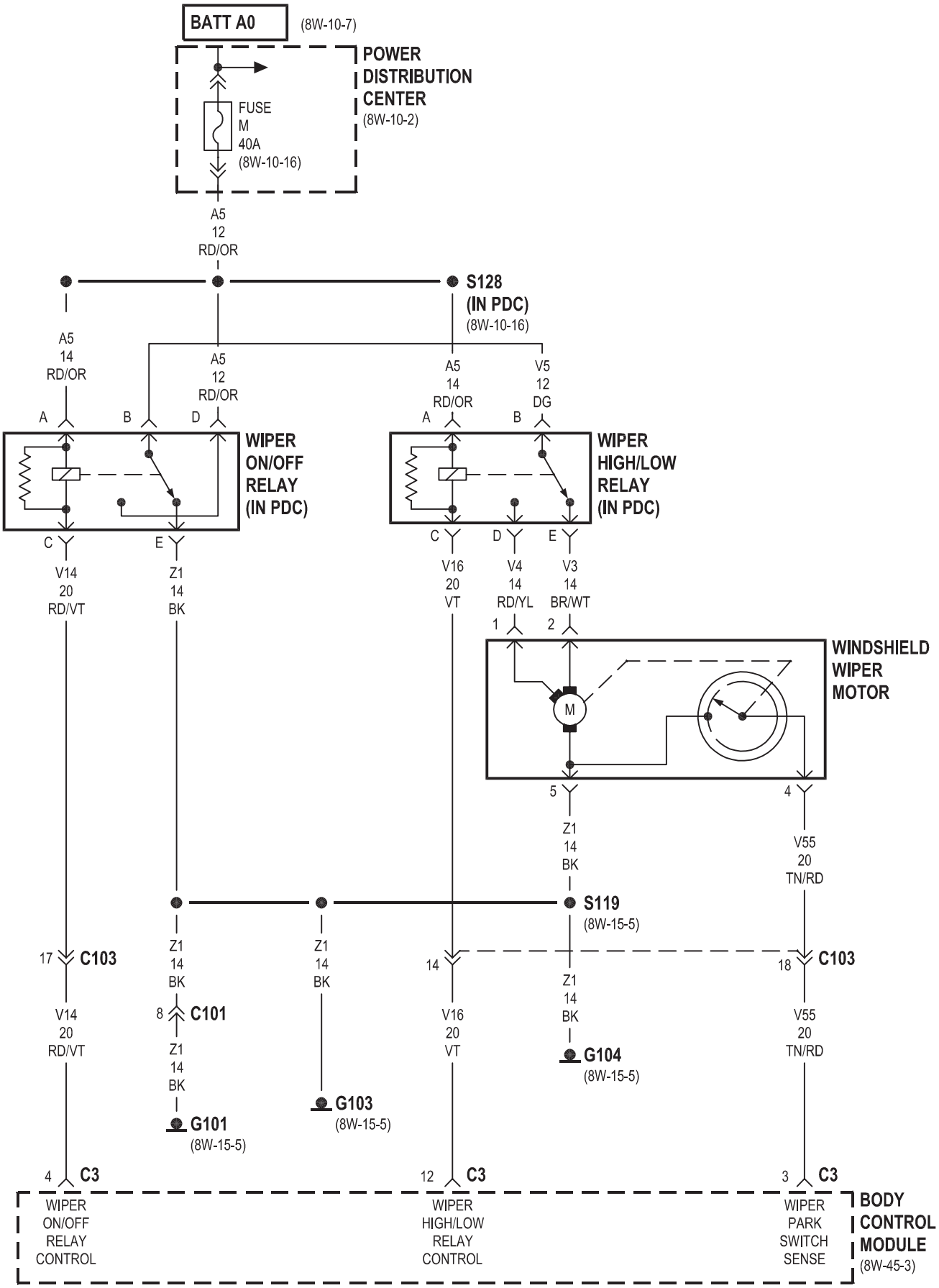
8W-53 WIPERS

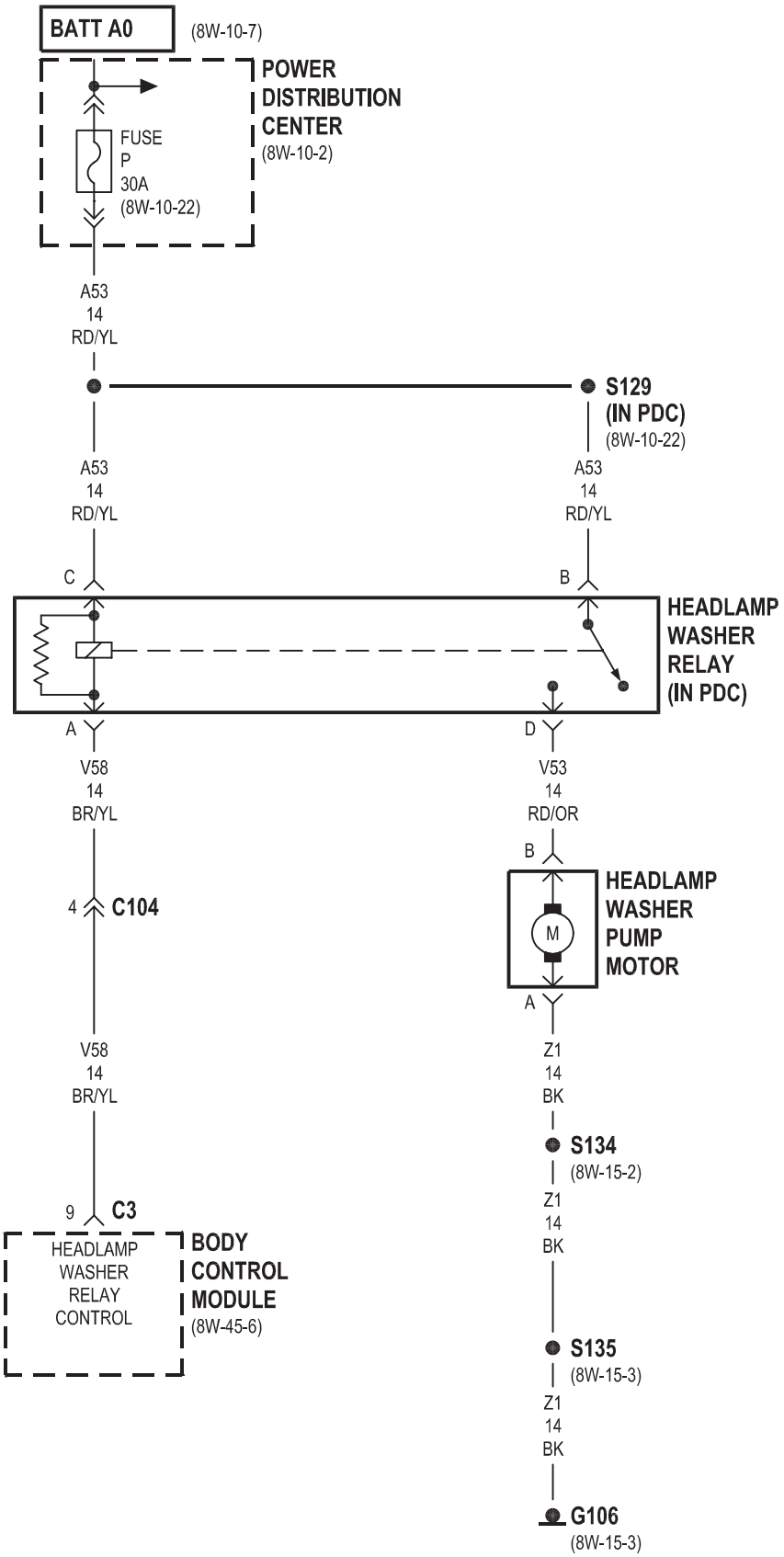
Component	Page
Body Control Module	8W-53-2, 3, 4, 5
Fuse 5 (JB)	8W-53-2, 3
Fuse M (PDC)	8W-53-4
Fuse P (PDC)	8W-53-5
G100	8W-53-3
G101	8W-53-4
G103	8W-53-3, 4
G104	8W-53-3, 4
G106	8W-53-5
Headlamp Washer Pump Motor	8W-53-5
Headlamp Washer Relay	8W-53-5
Instrument Cluster	8W-53-3
Junction Block	8W-53-2, 3
Power Distribution Center	8W-53-4, 5
Washer Fluid Level Switch	8W-53-3
Windshield Washer Pump Motor	8W-53-2, 3
Windshield Wiper Motor	8W-53-4
Wiper High/Low Relay	8W-53-4
Wiper On/Off Relay	8W-53-4
Wiper Switch	8W-53-2, 3


RUN-ACC A31
(8W-10-25)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
5
10A
(8W-12-9)
7 C2
F13
20
DB
1
WIPER SWITCH (PART OF MULTI-FUNCTION SWITCH)
0 OFF
1 INTERMITTENT 1
2 INTERMITTENT 2
3 INTERMITTENT 3
4 INTERMITTENT 4
5 INTERMITTENT 5
6 INTERMITTENT 6
7 LOW
8 HIGH
9 WASH
3
V52
20
DG/RD
2
V10
20
BR
S202
V10
20
BR
V10
20
BR
8 C2
7 C2
FRONT WIPER MUX SWITCH SIGNAL
FRONT WASHER PUMP MOTOR CONTROL
BODY CONTROL MODULE
(8W-45-3)
22 C103
V10
20
BR
1
M
WINDSHIELD WASHER PUMP MOTOR
(8W-53-3)


RUN-ACC A31
(8W-10-25)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
5
10A
(8W-12-9)
7 C2
F13
20
DB
1
WIPER SWITCH (PART OF MULTI-FUNCTION SWITCH)
4
2
V10
20
BR
4 WASH
(8W-53-2)
INSTRUMENT CLUSTER
(8W-40-3)
WASHER FLUID SWITCH SENSE
4 C2
G29
22
BK/TN
V10
20
BR
7 C2
FRONT WASHER PUMP MOTOR CONTROL
BODY CONTROL MODULE
(8W-45-3)
S202
V10
20
BR
5
G29
20
BK/TN
22 C103
V10
20
BR
2
WASHER FLUID LEVEL SWITCH
1
Z1
20
BK
1
M
WINDSHIELD WASHER PUMP MOTOR
2
Z1
20
BK
S123
(8W-15-4)
S119
(8W-15-5)
Z1
14
BK
Z1
14
BK
Z1
14
BK
Z1
14
BK
8 C101
Z1
14
BK
G103
(8W-15-5)
G104
(8W-15-5)
G100
(8W-15-5)

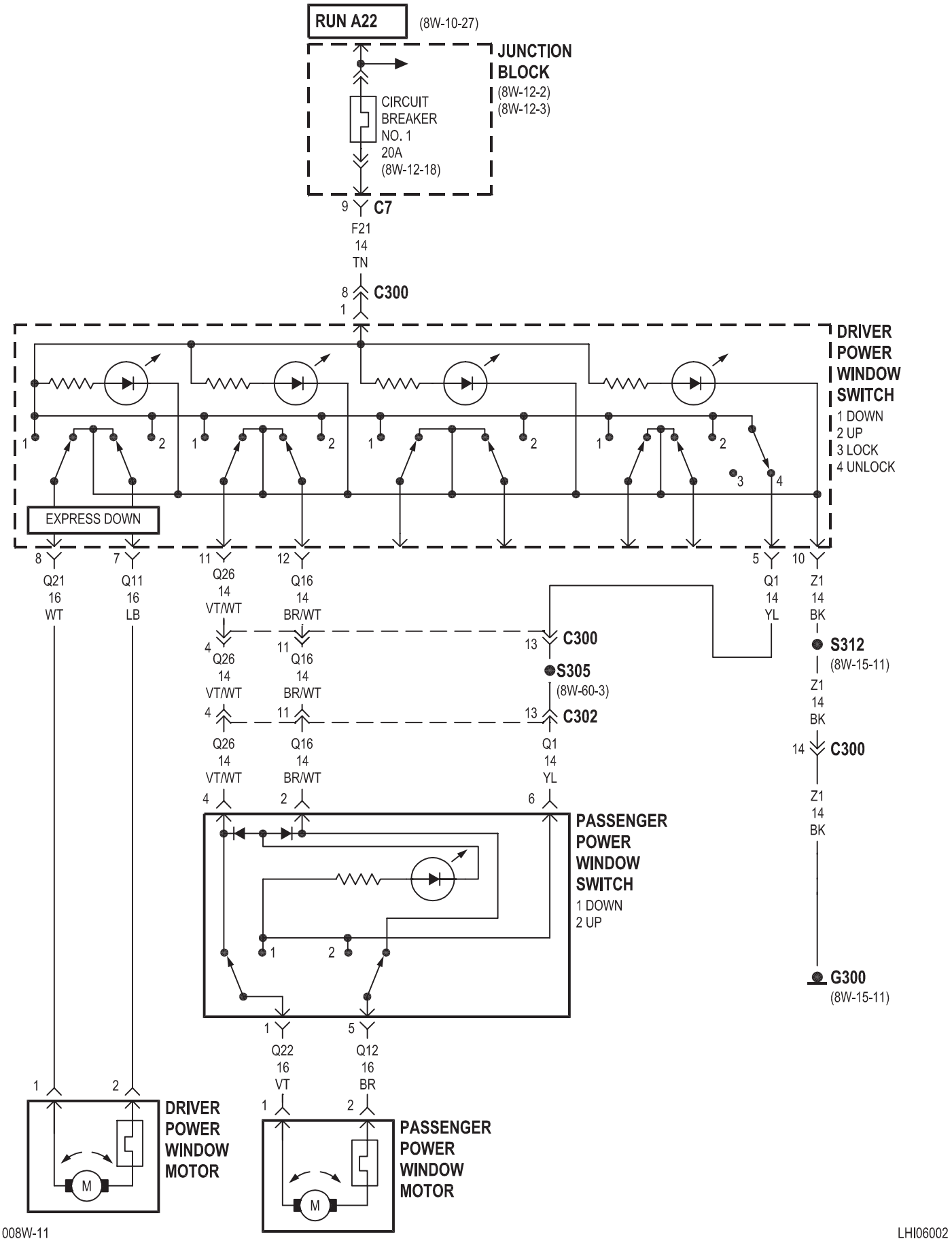
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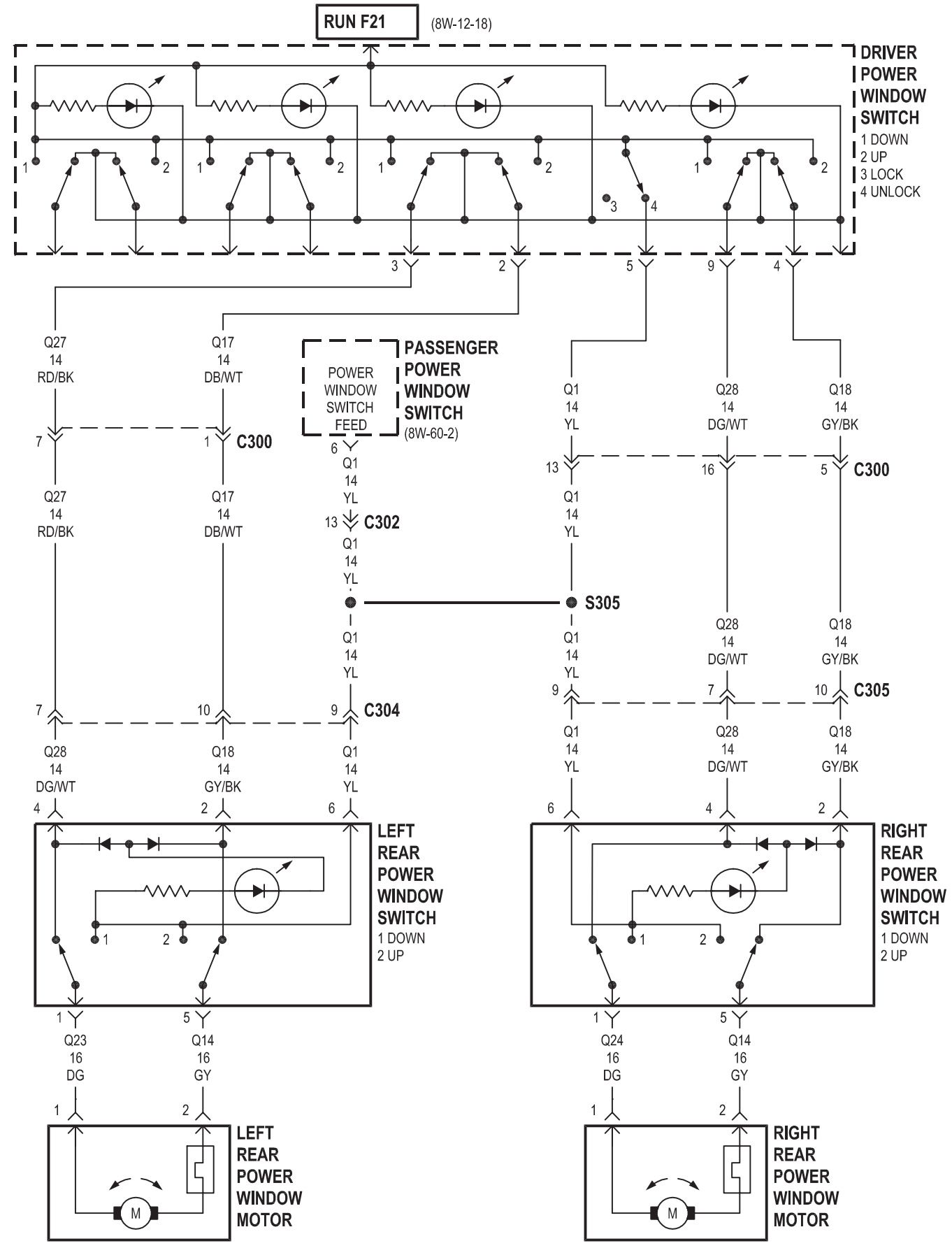

BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE M 40A
(8W-10-16)
A5 12 RD/OR
S128 (IN PDC)
(8W-10-16)
A5 14 RD/OR
A5 12 RD/OR
A5 14 RD/OR
V5 12 DG
WIPER ON/OFF RELAY (IN PDC)
WIPER HIGH/LOW RELAY (IN PDC)
V14 20 RD/VT
Z1 14 BK
V16 20 VT
V4 14 RD/YL
V3 14 BR/WT
WINDSHIELD WIPER MOTOR
Z1 14 BK
V55 20 TN/RD
S119
(8W-15-5)
C103
C101
G101
(8W-15-5)
G103
(8W-15-5)
G104
(8W-15-5)
C3
WIPER ON/OFF RELAY CONTROL
WIPER HIGH/LOW RELAY CONTROL
WIPER PARK SWITCH SENSE
BODY CONTROL MODULE
(8W-45-3)


BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE
P
30A
(8W-10-22)
A53
14
RD/YL
S129
(IN PDC)
(8W-10-22)
A53
14
RD/YL
A53
14
RD/YL
C
B
HEADLAMP WASHER RELAY (IN PDC)
A
D
V58
14
BR/YL
V53
14
RD/OR
B
4
C104
HEADLAMP WASHER PUMP MOTOR
M
A
V58
14
BR/YL
Z1
14
BK
S134
(8W-15-2)
9
C3
Z1
14
BK
HEADLAMP WASHER RELAY CONTROL
BODY CONTROL MODULE
(8W-45-6)
S135
(8W-15-3)
Z1
14
BK
G106
(8W-15-3)

8W-60 POWER WINDOWS

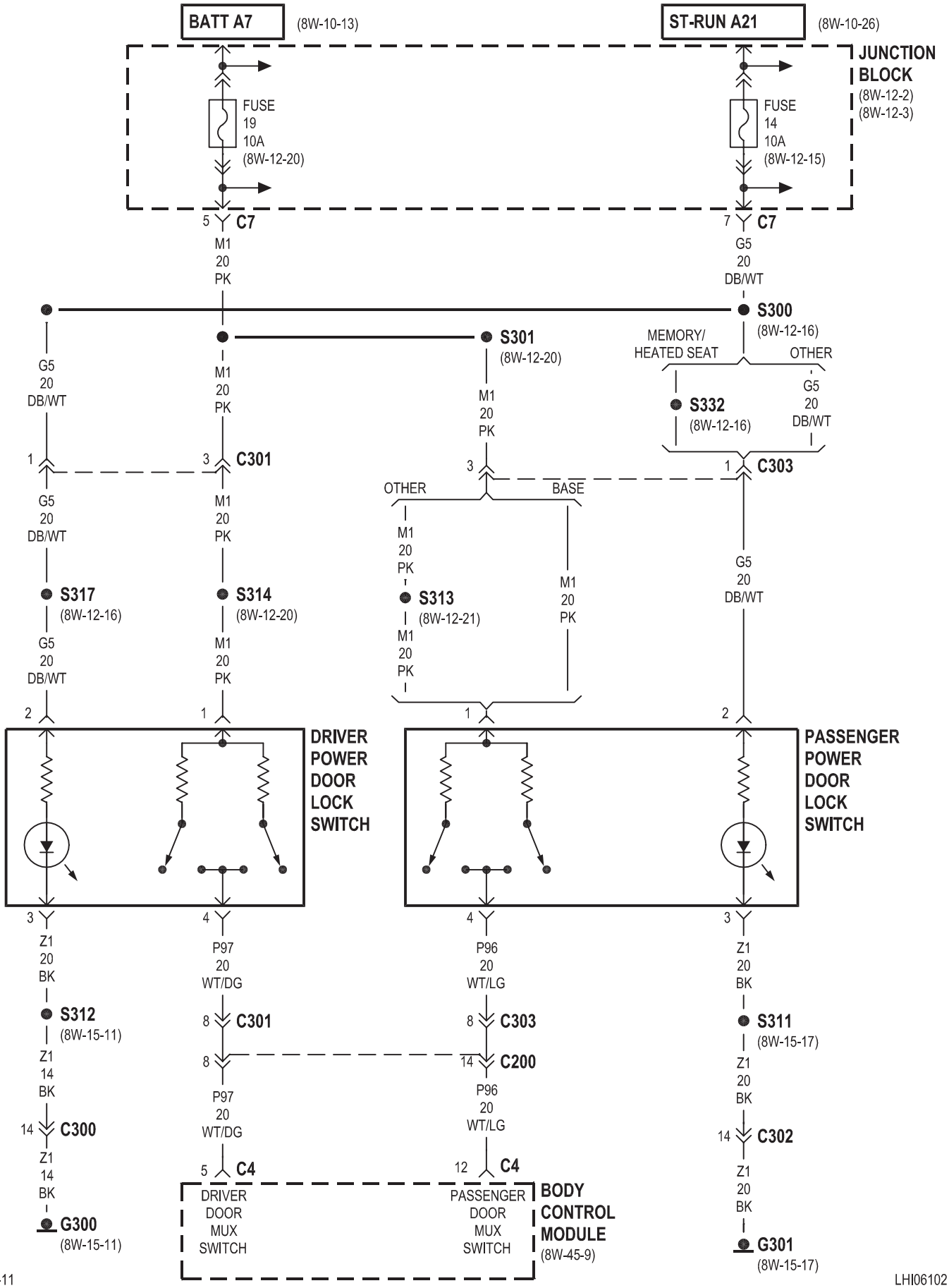
Component	Page
Circuit Breaker No. 1 8W-Cb	8W-60-2
Driver Power Window Motor	8W-60-2
Driver Power Window Switch	8W-60-2, 3
G300	8W-60-2
Junction Block	8W-60-2
Left Rear Power Window Motor	8W-60-3
Left Rear Power Window Switch	8W-60-3
Passenger Power Window Motor	8W-60-2
Passenger Power Window Switch	8W-60-2, 3
Right Rear Power Window Motor	8W-60-3
Right Rear Power Window Switch	8W-60-3

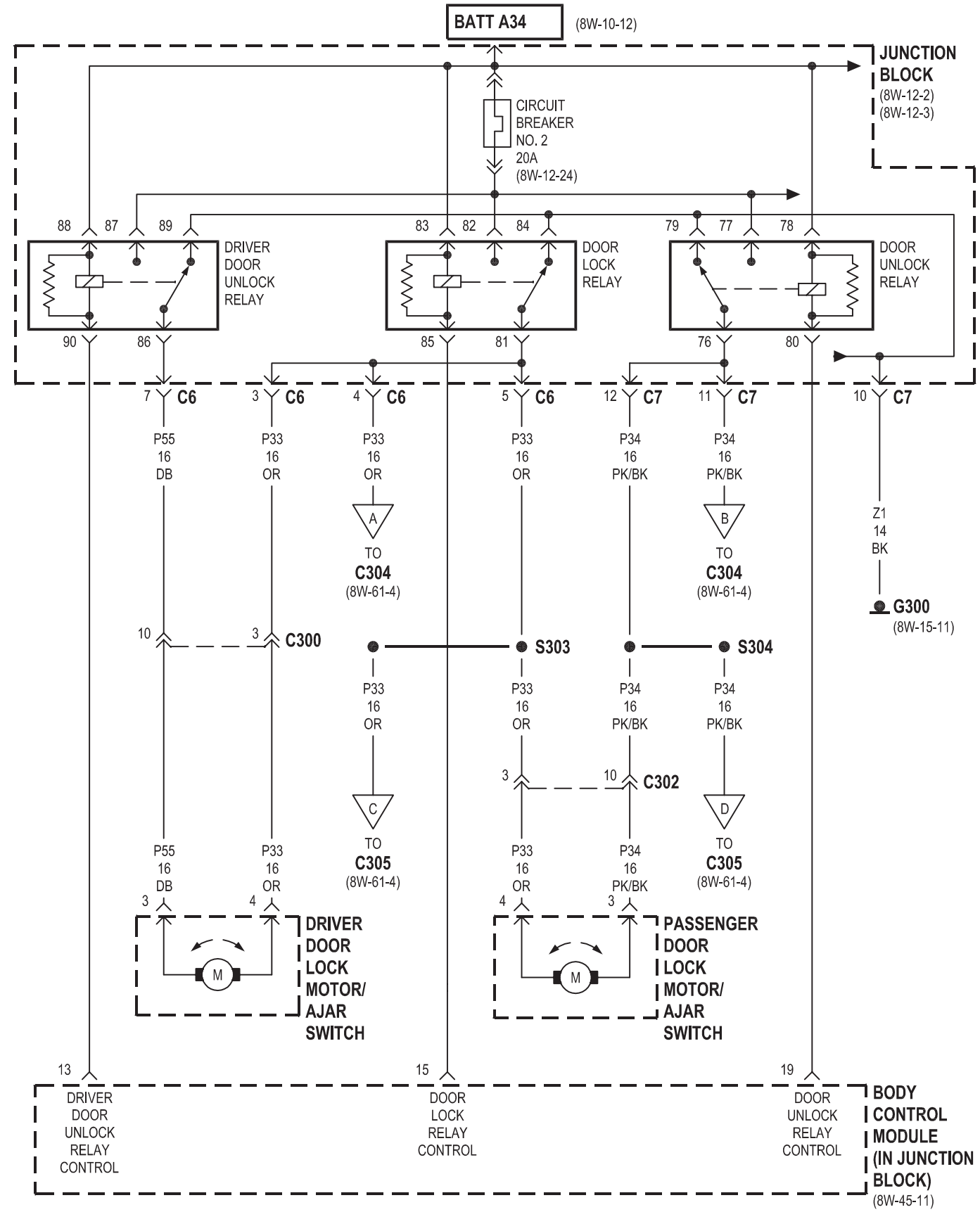

RUN A22
(8W-10-27)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 1 20A
(8W-12-18)
9 C7
F21 14 TN
8 C300
1
DRIVER POWER WINDOW SWITCH
1 DOWN
2 UP
3 LOCK
4 UNLOCK
EXPRESS DOWN
8 Q21 16 WT
7 Q11 16 LB
11 Q26 14 VT/WT
12 Q16 14 BR/WT
5 Q1 14 YL
10 Z1 14 BK
4 Q26 14 VT/WT
11 Q16 14 BR/WT
13 C300
S305
(8W-60-3)
13 C302
Q26 14 VT/WT
Q16 14 BR/WT
Q1 14 YL
4
2
6
S312
(8W-15-11)
Z1 14 BK
14 C300
Z1 14 BK
G300
(8W-15-11)
PASSENGER POWER WINDOW SWITCH
1 DOWN
2 UP
1 Q22 16 VT
5 Q12 16 BR
1 2
DRIVER POWER WINDOW MOTOR
M
1 2
PASSENGER POWER WINDOW MOTOR
M

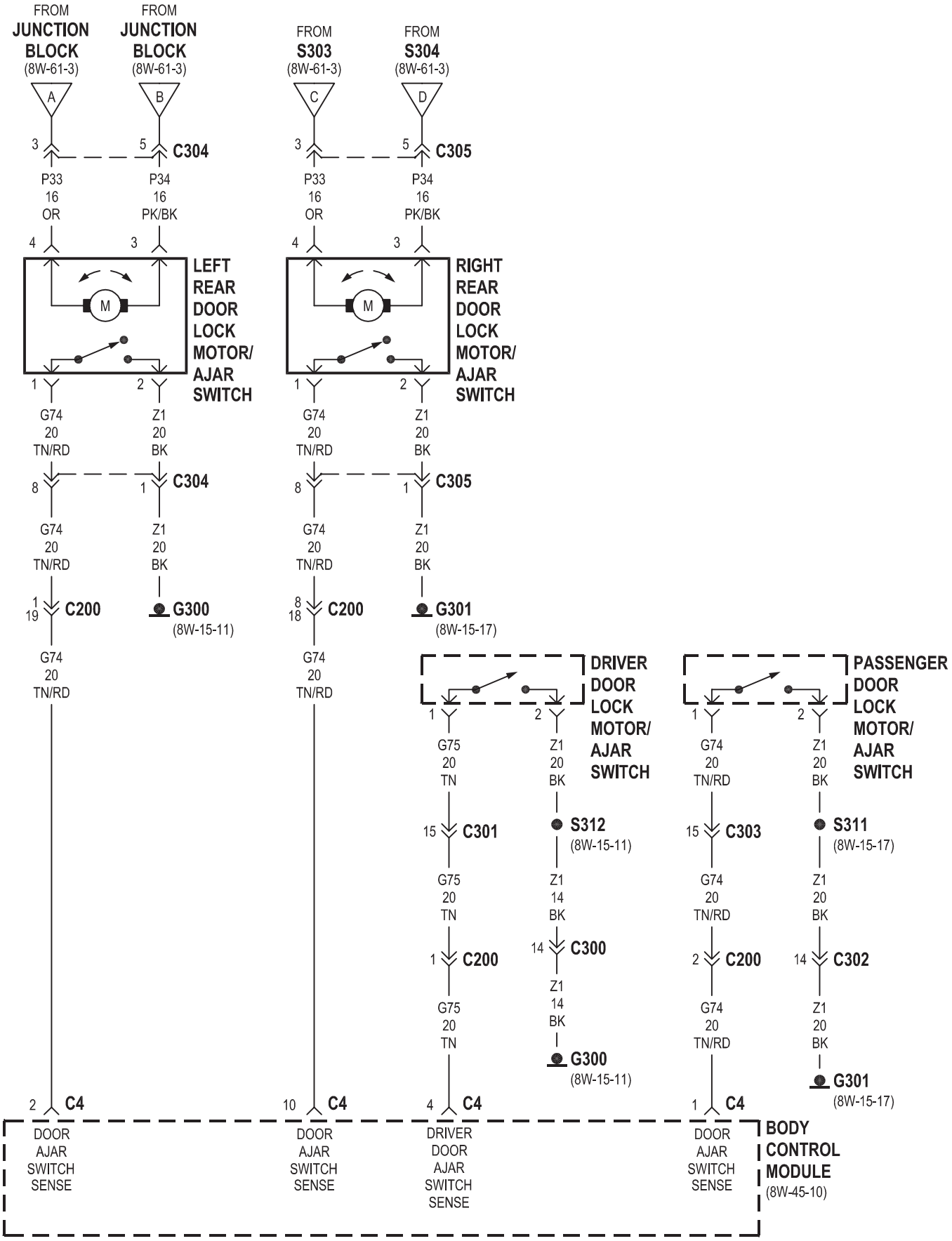

RUN F21
(8W-12-18)
DRIVER POWER WINDOW SWITCH
1 DOWN
2 UP
3 LOCK
4 UNLOCK
Q27 14 RD/BK
Q17 14 DB/WT
POWER WINDOW SWITCH FEED
PASSENGER POWER WINDOW SWITCH
(8W-60-2)
Q1 14 YL
Q28 14 DG/WT
Q18 14 GY/BK
C300
C302
C304
C305
S305
LEFT REAR POWER WINDOW SWITCH
1 DOWN
2 UP
RIGHT REAR POWER WINDOW SWITCH
1 DOWN
2 UP
Q23 16 DG
Q14 16 GY
Q24 16 DG
LEFT REAR POWER WINDOW MOTOR
RIGHT REAR POWER WINDOW MOTOR
M

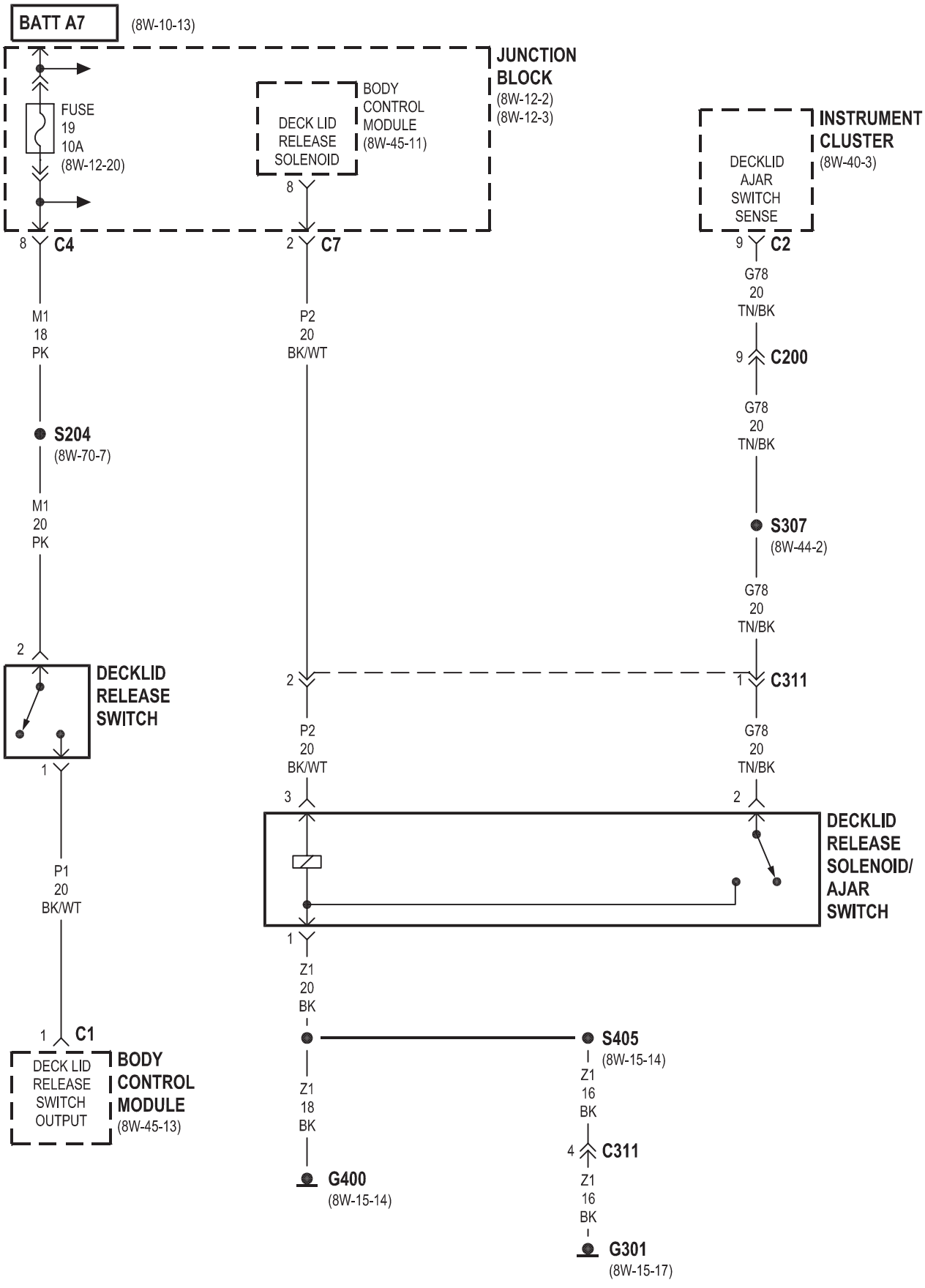
8W-61 POWER DOOR LOCKS

Component	Page
Body Control Module	8W-61-2, 3, 4, 5
Circuit Breaker No. 2 (JB)	8W-61-3
Decklid Release Solenoid/Ajar Switch	8W-61-5
Decklid Release Switch	8W-61-5
Door Lock Relay	8W-61-3
Door Unlock Relay	8W-61-3
Driver Door Lock Motor/Ajar Switch	8W-61-3, 4
Driver Door Unlock Relay	8W-61-3
Driver Power Door Lock Switch	8W-61-2
Fuse 14 (JB)	8W-61-2
Fuse 19 (JB)	8W-61-2, 5
G300	8W-61-2, 3, 4
G301	8W-61-2, 4, 5
G400	8W-61-5
Instrument Cluster	8W-61-5
Junction Block	8W-61-2, 3, 5
Left Rear Door Lock Motor/Ajar Switch	8W-61-4
Passenger Door Lock Motor/Ajar Switch	8W-61-3, 4
Passenger Power Door Lock Switch	8W-61-2
Right Rear Door Lock Motor/Ajar Switch	8W-61-4


BATT A7
(8W-10-13)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A (8W-12-20)
FUSE 14 10A (8W-12-15)
5 C7
M1 20 PK
7 C7
G5 20 DB/WT
S300
(8W-12-16)
S301
(8W-12-20)
MEMORY/ HEATED SEAT
OTHER
S332
(8W-12-16)
G5 20 DB/WT
M1 20 PK
1 C301
3 C301
3 C303
1 C303
OTHER
BASE
S317
(8W-12-16)
S314
(8W-12-20)
S313
(8W-12-21)
2
1
1
2
DRIVER POWER DOOR LOCK SWITCH
PASSENGER POWER DOOR LOCK SWITCH
3 Z1 20 BK
4 P97 20 WT/DG
4 P96 20 WT/LG
3 Z1 20 BK
S312
(8W-15-11)
8 C301
8 C303
S311
(8W-15-17)
8
14 C200
Z1 14 BK
14 C300
P97 20 WT/DG
P96 20 WT/LG
Z1 20 BK
14 C302
5 C4
12 C4
DRIVER DOOR MUX SWITCH
PASSENGER DOOR MUX SWITCH
BODY CONTROL MODULE
(8W-45-9)
G300
(8W-15-11)
G301
(8W-15-17)

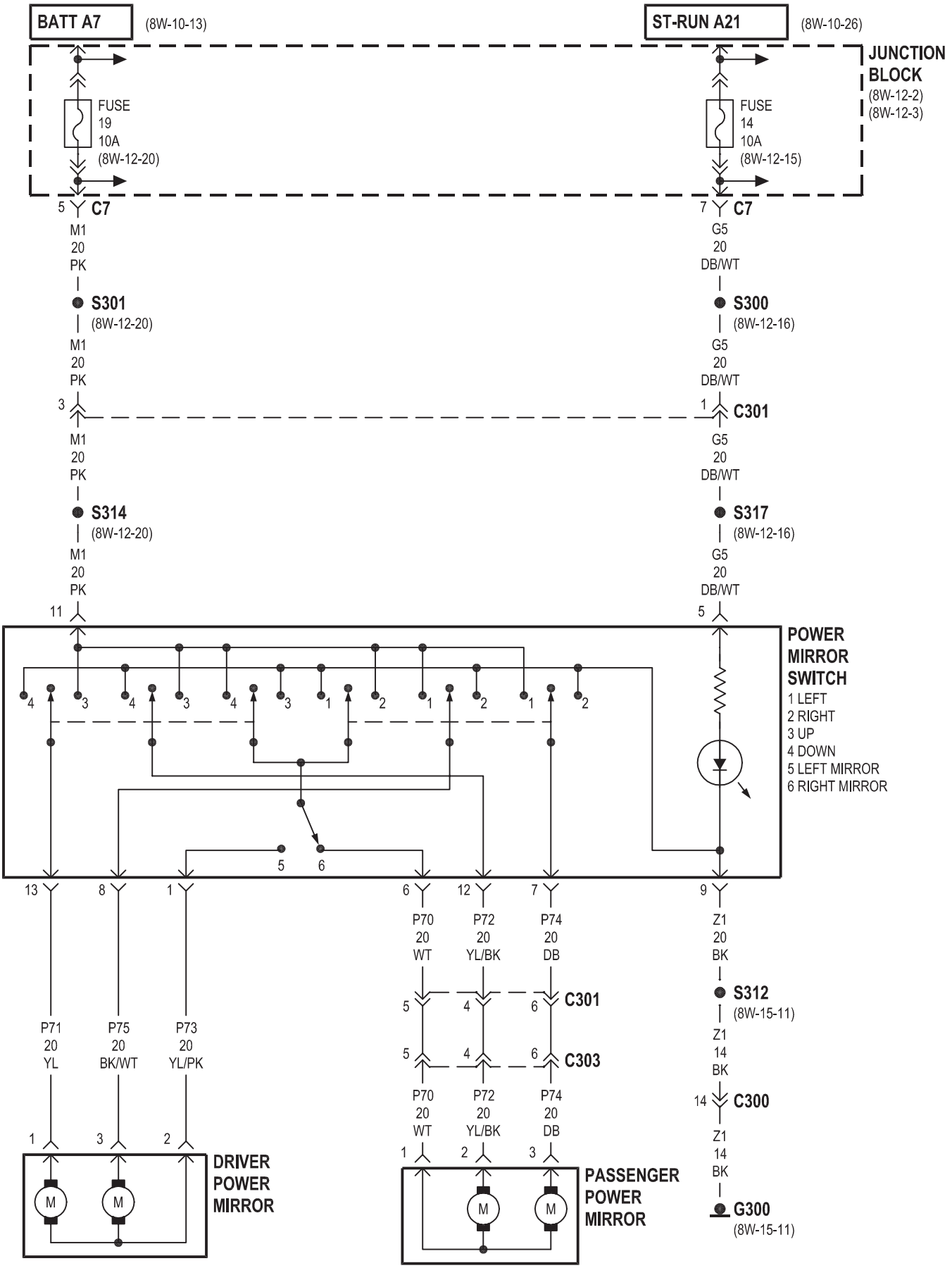

BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
(8W-12-24)
88 87 89
DRIVER DOOR UNLOCK RELAY
90 86
83 82 84
DOOR LOCK RELAY
85 81
79 77 78
DOOR UNLOCK RELAY
76 80
7 C6
3 C6
4 C6
5 C6
12 C7
11 C7
10 C7
P55 16 DB
P33 16 OR
P33 16 OR
P33 16 OR
P34 16 PK/BK
P34 16 PK/BK
A
TO C304
(8W-61-4)
B
TO C304
(8W-61-4)
Z1 14 BK
G300
(8W-15-11)
10 3 C300
S303
S304
P33 16 OR
P33 16 OR
P34 16 PK/BK
P34 16 PK/BK
3 10 C302
C
TO C305
(8W-61-4)
D
TO C305
(8W-61-4)
P55 16 DB
P33 16 OR
P33 16 OR
P34 16 PK/BK
3 4
4 3
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH
M
13
15
19
DRIVER DOOR UNLOCK RELAY CONTROL
DOOR LOCK RELAY CONTROL
DOOR UNLOCK RELAY CONTROL
BODY CONTROL MODULE (IN JUNCTION BLOCK)
(8W-45-11)


FROM JUNCTION BLOCK (8W-61-3)
A
B
C
D
FROM S303 (8W-61-3)
FROM S304 (8W-61-3)
C304
C305
P33 16 OR
P34 16 PK/BK
LEFT REAR DOOR LOCK MOTOR/ AJAR SWITCH
RIGHT REAR DOOR LOCK MOTOR/ AJAR SWITCH
M
G74 20 TN/RD
Z1 20 BK
C200
G300 (8W-15-11)
G301 (8W-15-17)
DRIVER DOOR LOCK MOTOR/ AJAR SWITCH
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH
G75 20 TN
C301
S312 (8W-15-11)
Z1 14 BK
C300
C303
S311 (8W-15-17)
C302
C4
DOOR AJAR SWITCH SENSE
DRIVER DOOR AJAR SWITCH SENSE
BODY CONTROL MODULE (8W-45-10)

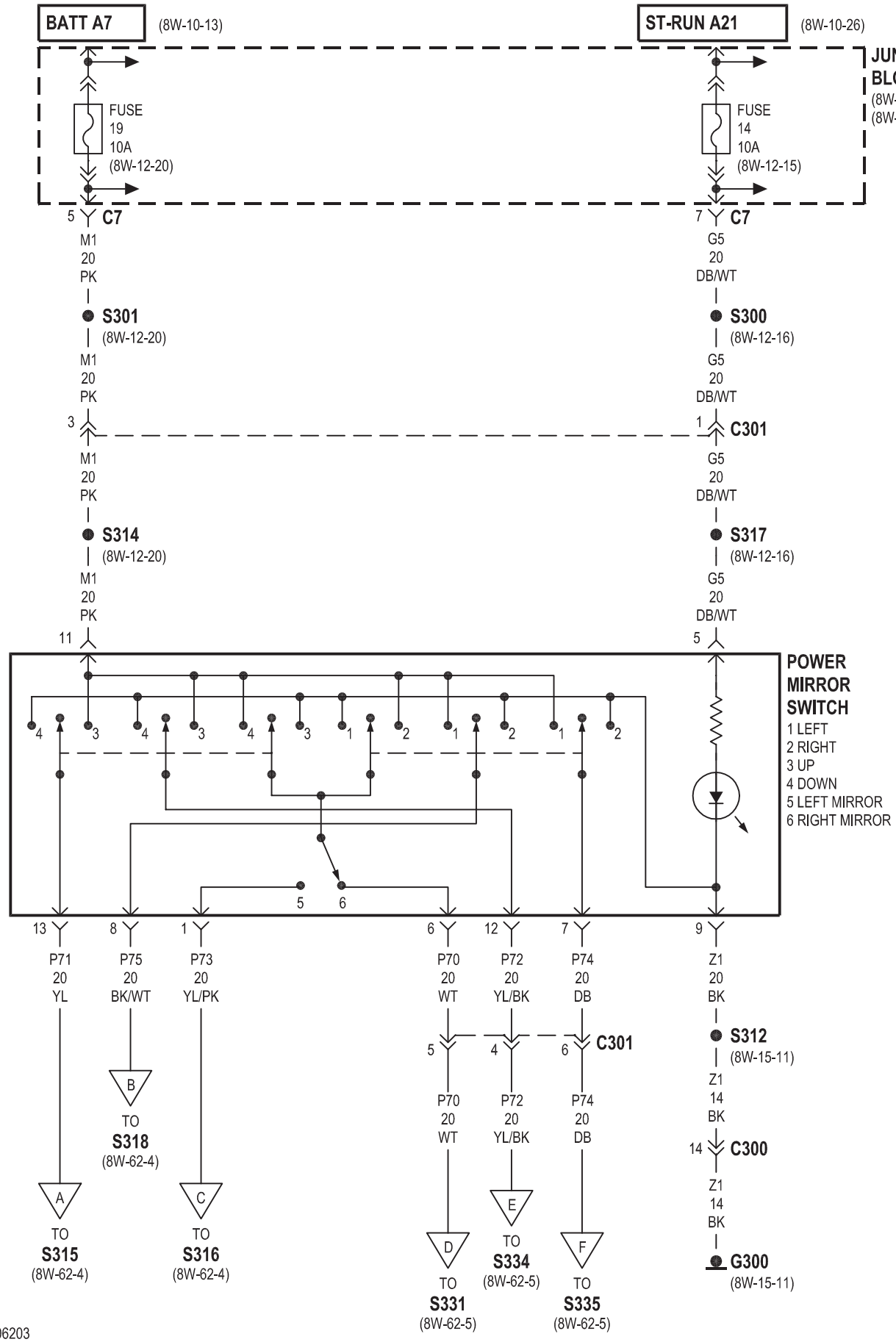

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE
19
10A
(8W-12-20)
DECK LID RELEASE SOLENOID
BODY CONTROL MODULE
(8W-45-11)
INSTRUMENT CLUSTER
(8W-40-3)
DECKLID AJAR SWITCH SENSE
8 C4
2 C7
9 C2
M1
18
PK
P2
20
BK/WT
G78
20
TN/BK
9 C200
S204
(8W-70-7)
M1
20
PK
S307
(8W-44-2)
2
DECKLID RELEASE SWITCH
1
2
1 C311
P1
20
BK/WT
P2
20
BK/WT
G78
20
TN/BK
3
2
DECKLID RELEASE SOLENOID/ AJAR SWITCH
1
Z1
20
BK
1 C1
DECK LID RELEASE SWITCH OUTPUT
BODY CONTROL MODULE
(8W-45-13)
S405
(8W-15-14)
Z1
16
BK
4 C311
Z1
18
BK
G400
(8W-15-14)
Z1
16
BK
G301
(8W-15-17)

8W-62 POWER MIRRORS

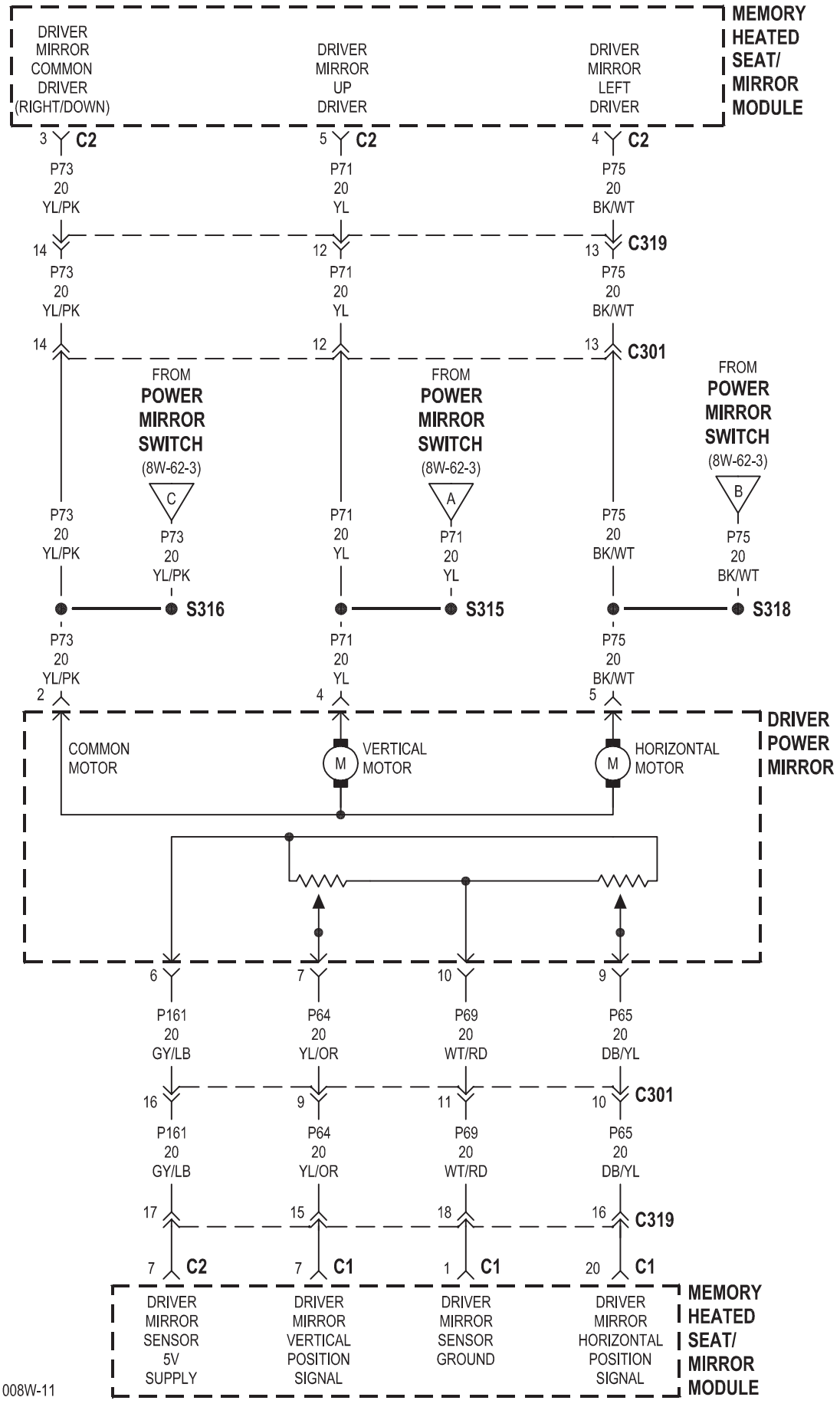
Component	Page
Driver Power Mirror	8W-62-2, 4, 6
Fuse 14 (JB)	8W-62-2, 3
Fuse 19 (JB)	8W-62-2, 3
G300	8W-62-2, 3, 6, 7
G301	8W-62-6
Heated Mirror Fuse	8W-62-6
Junction Block	8W-62-2, 3
Memory Heated Seat/Mirror Module	8W-62-4, 5, 7
Memory Set Switch	8W-62-7
Passenger Power Mirror	8W-62-2, 5, 6
Power Mirror Switch	8W-62-2, 3
Rear Window Defogger Relay	8W-62-6


BATT A7
(8W-10-13)
ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A (8W-12-20)
FUSE 14 10A (8W-12-15)
5 C7
M1 20 PK
7 C7
G5 20 DB/WT
S301
(8W-12-20)
S300
(8W-12-16)
3
1 C301
S314
(8W-12-20)
S317
(8W-12-16)
11
5
POWER MIRROR SWITCH
1 LEFT
2 RIGHT
3 UP
4 DOWN
5 LEFT MIRROR
6 RIGHT MIRROR
13
8
1
6
12
7
9
P70 20 WT
P72 20 YL/BK
P74 20 DB
Z1 20 BK
S312
(8W-15-11)
C301
C303
Z1 14 BK
14 C300
G300
(8W-15-11)
P71 20 YL
P75 20 BK/WT
P73 20 YL/PK
DRIVER POWER MIRROR
PASSENGER POWER MIRROR
M

MEMORY/HEATED

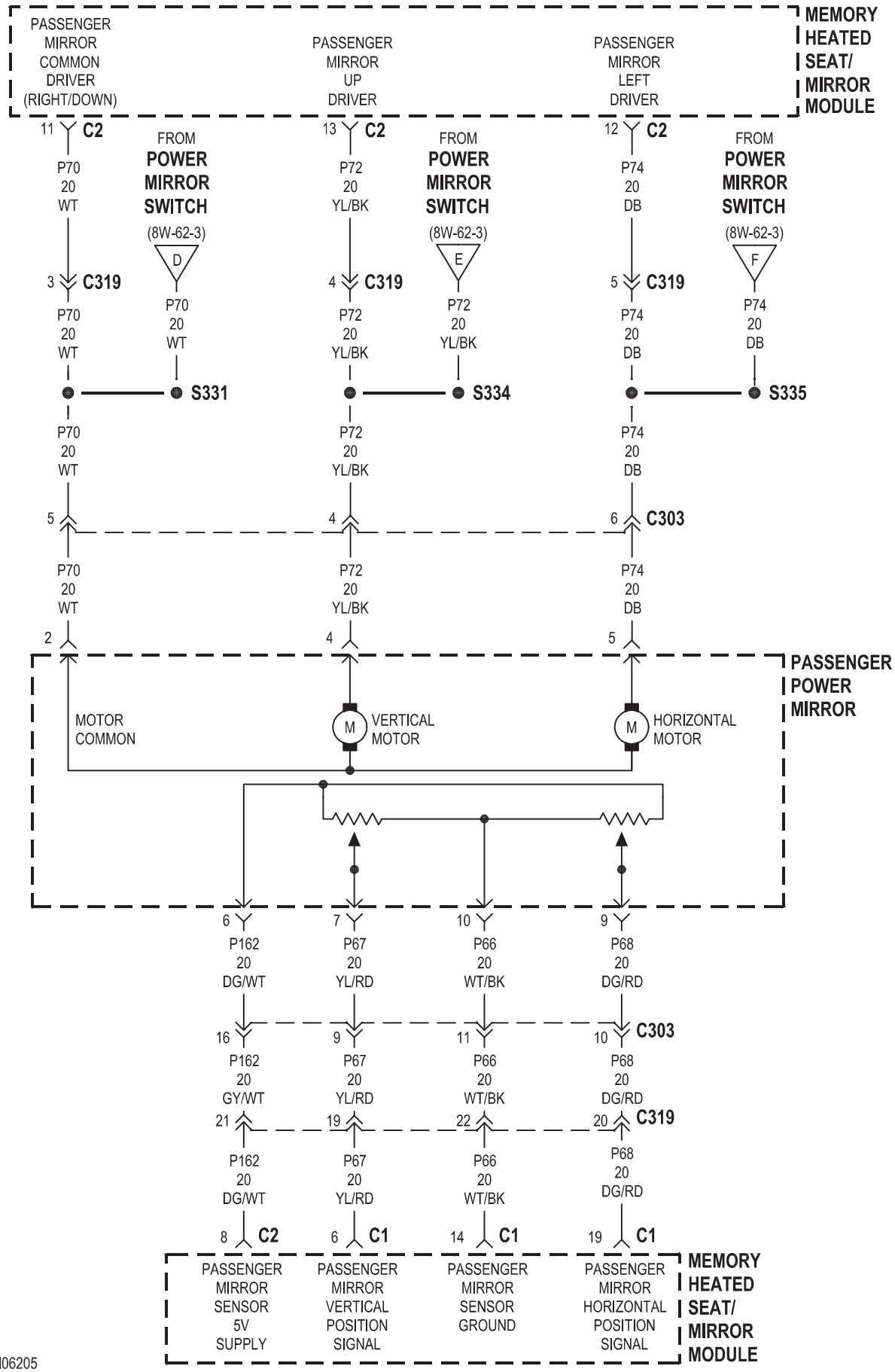


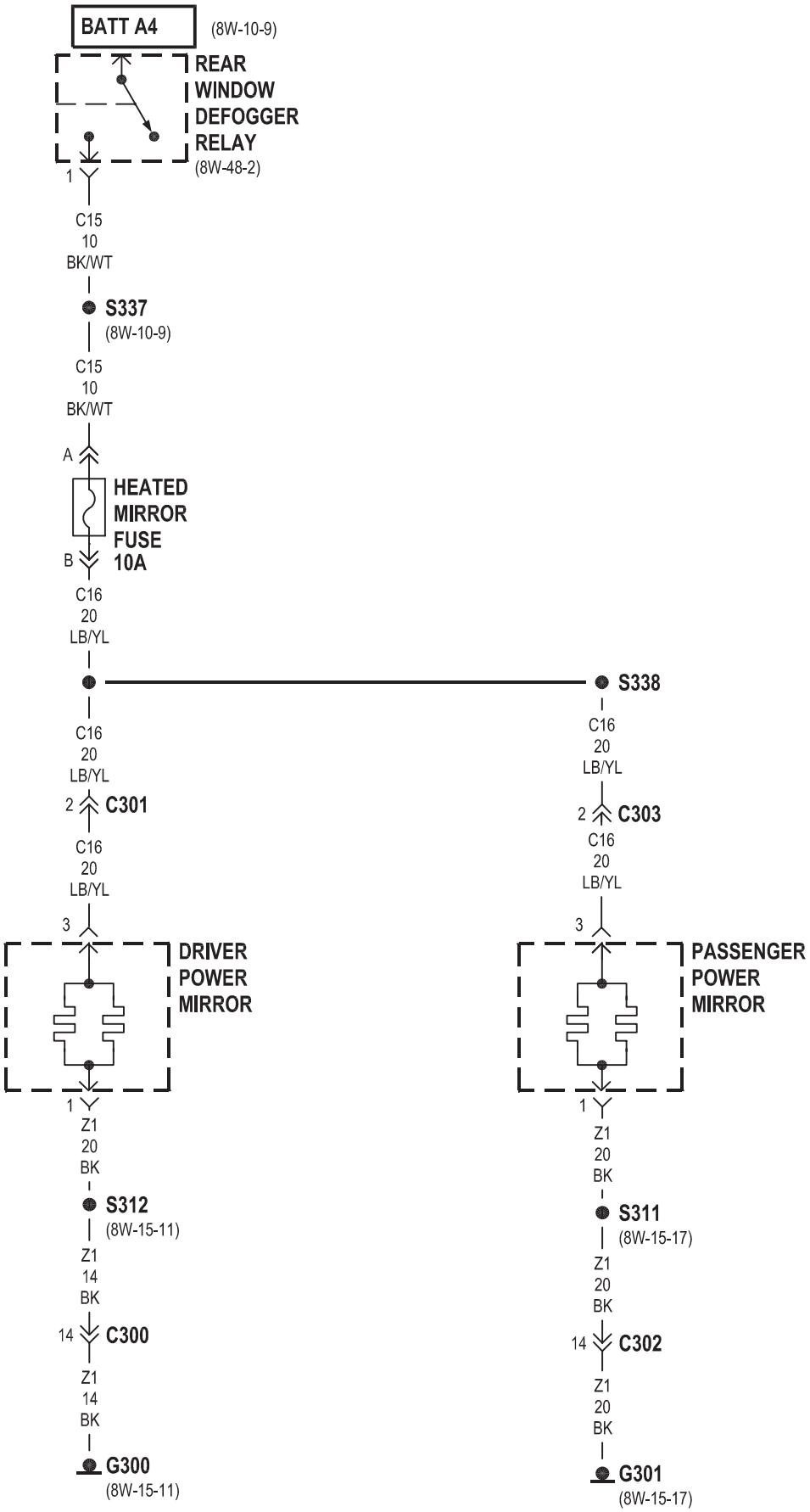
MEMORY/HEATED

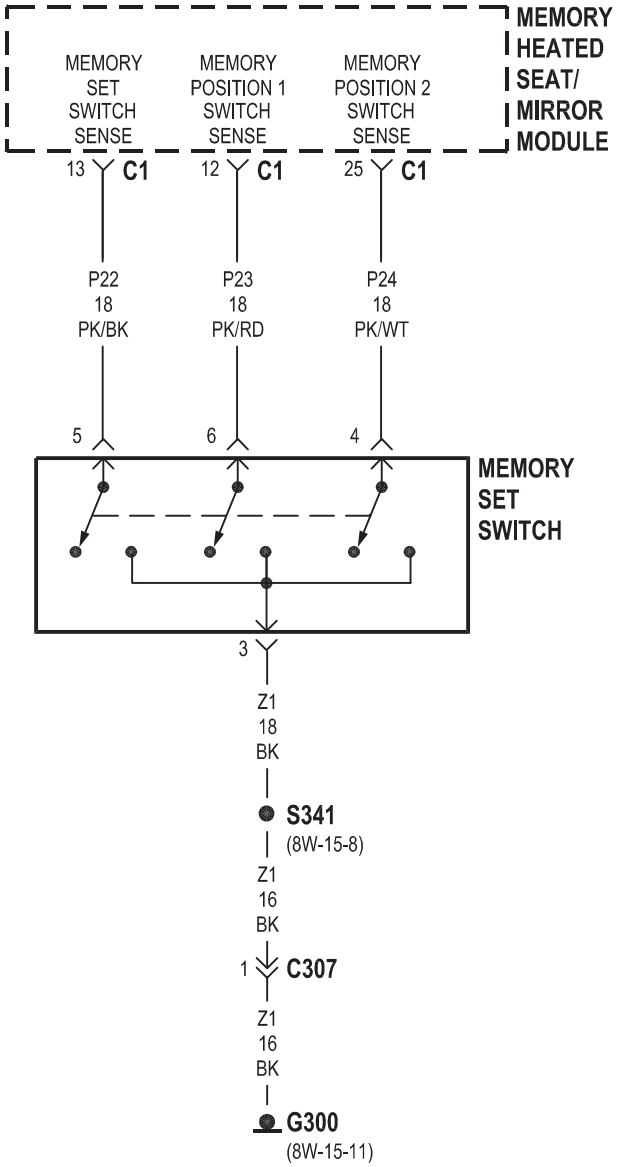


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MEMORY/HEATED

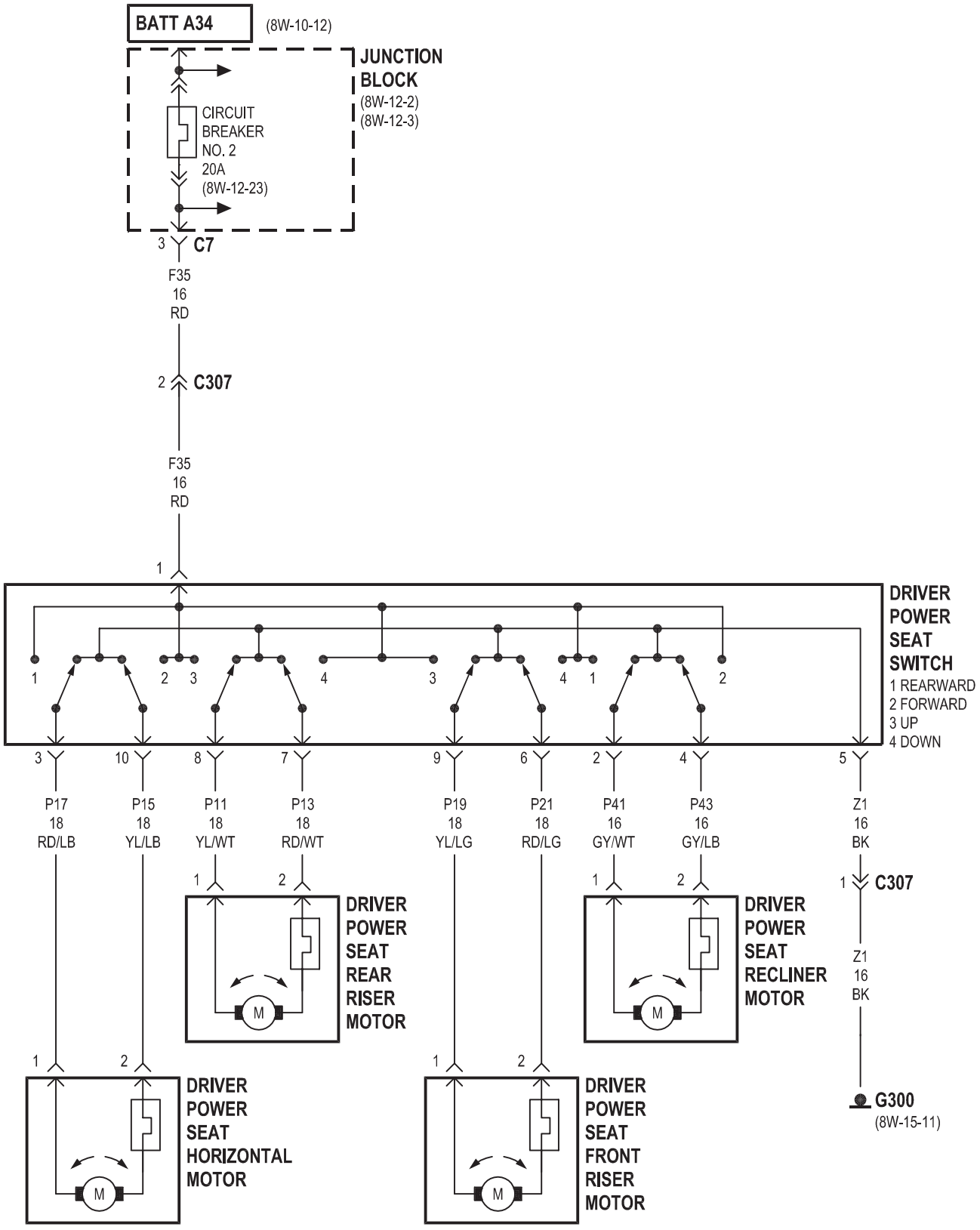


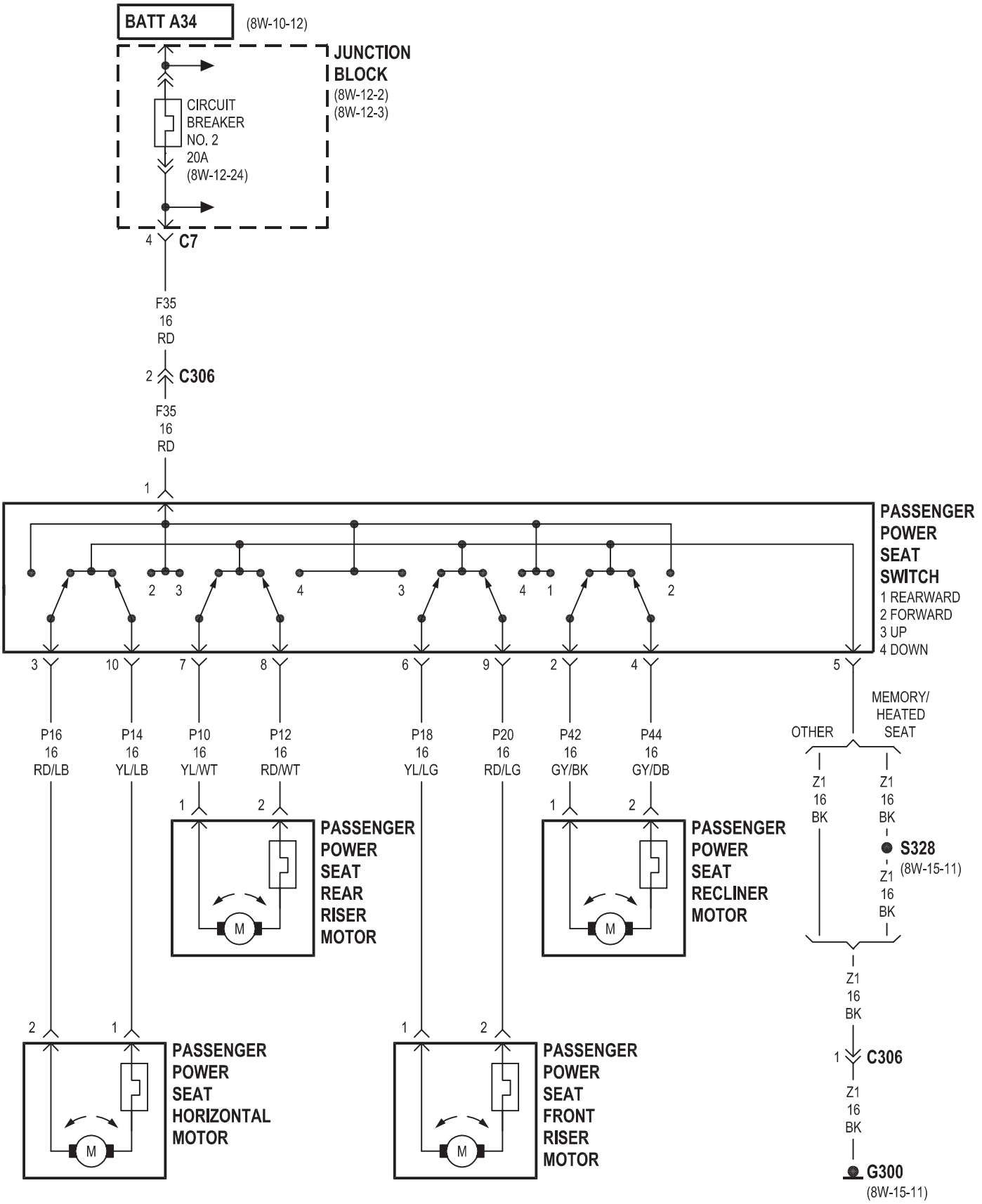

BATT A4
(8W-10-9)
REAR WINDOW DEFOGGER RELAY
(8W-48-2)
1
C15
10
BK/WT
S337
(8W-10-9)
C15
10
BK/WT
A
HEATED MIRROR FUSE 10A
B
C16
20
LB/YL
S338
C16
20
LB/YL
2
C301
C16
20
LB/YL
3
DRIVER POWER MIRROR
1
Z1
20
BK
S312
(8W-15-11)
Z1
14
BK
14
C300
Z1
14
BK
G300
(8W-15-11)
C16
20
LB/YL
2
C303
C16
20
LB/YL
3
PASSENGER POWER MIRROR
1
Z1
20
BK
S311
(8W-15-17)
Z1
20
BK
14
C302
Z1
20
BK
G301
(8W-15-17)

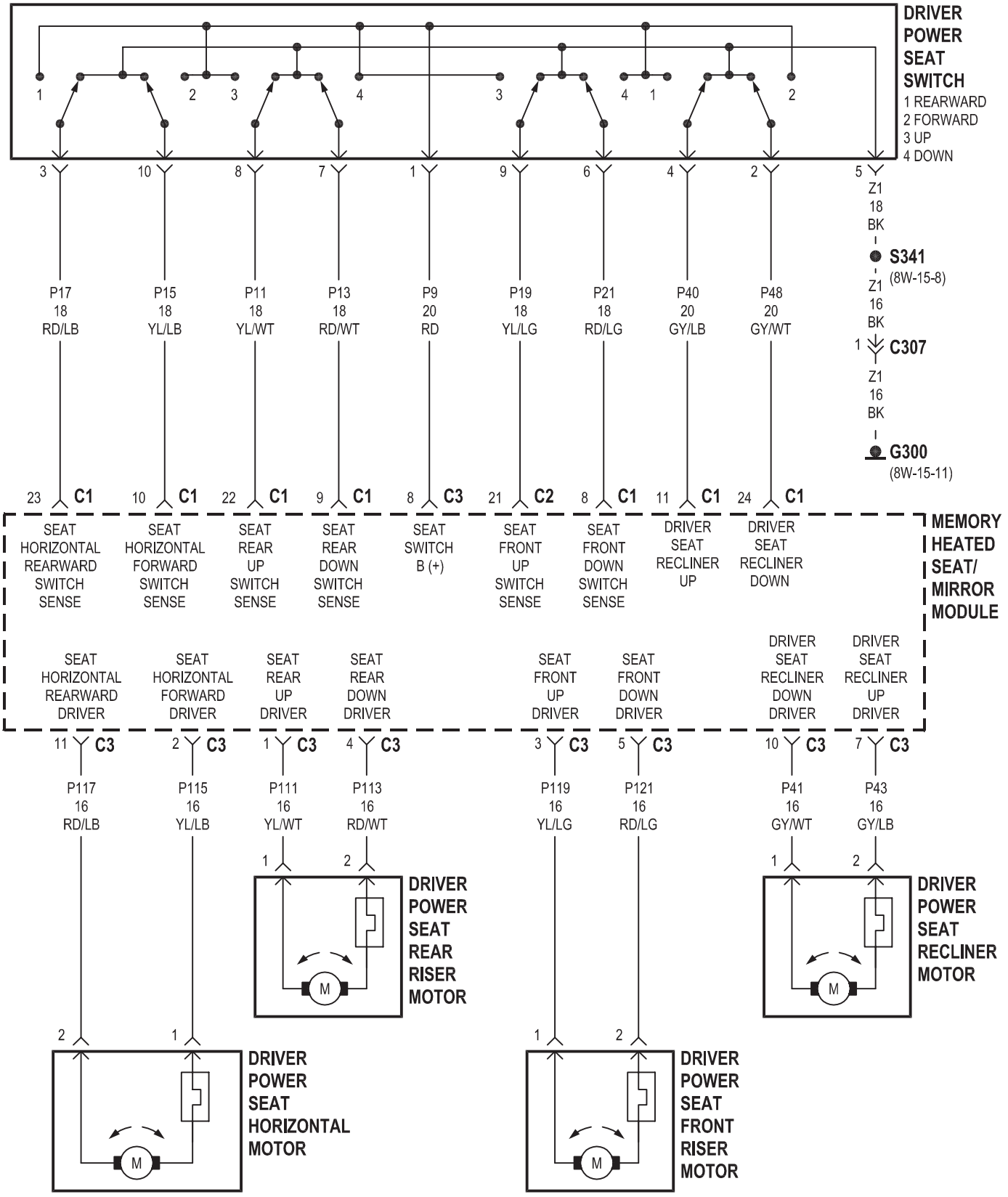

MEMORY HEATED SEAT/ MIRROR MODULE
MEMORY SET SWITCH SENSE
MEMORY POSITION 1 SWITCH SENSE
MEMORY POSITION 2 SWITCH SENSE
13 C1
12 C1
25 C1
P22 18 PK/BK
P23 18 PK/RD
P24 18 PK/WT
5
6
4
MEMORY SET SWITCH
3
Z1 18 BK
S341
(8W-15-8)
Z1 16 BK
1 C307
Z1 16 BK
G300
(8W-15-11)

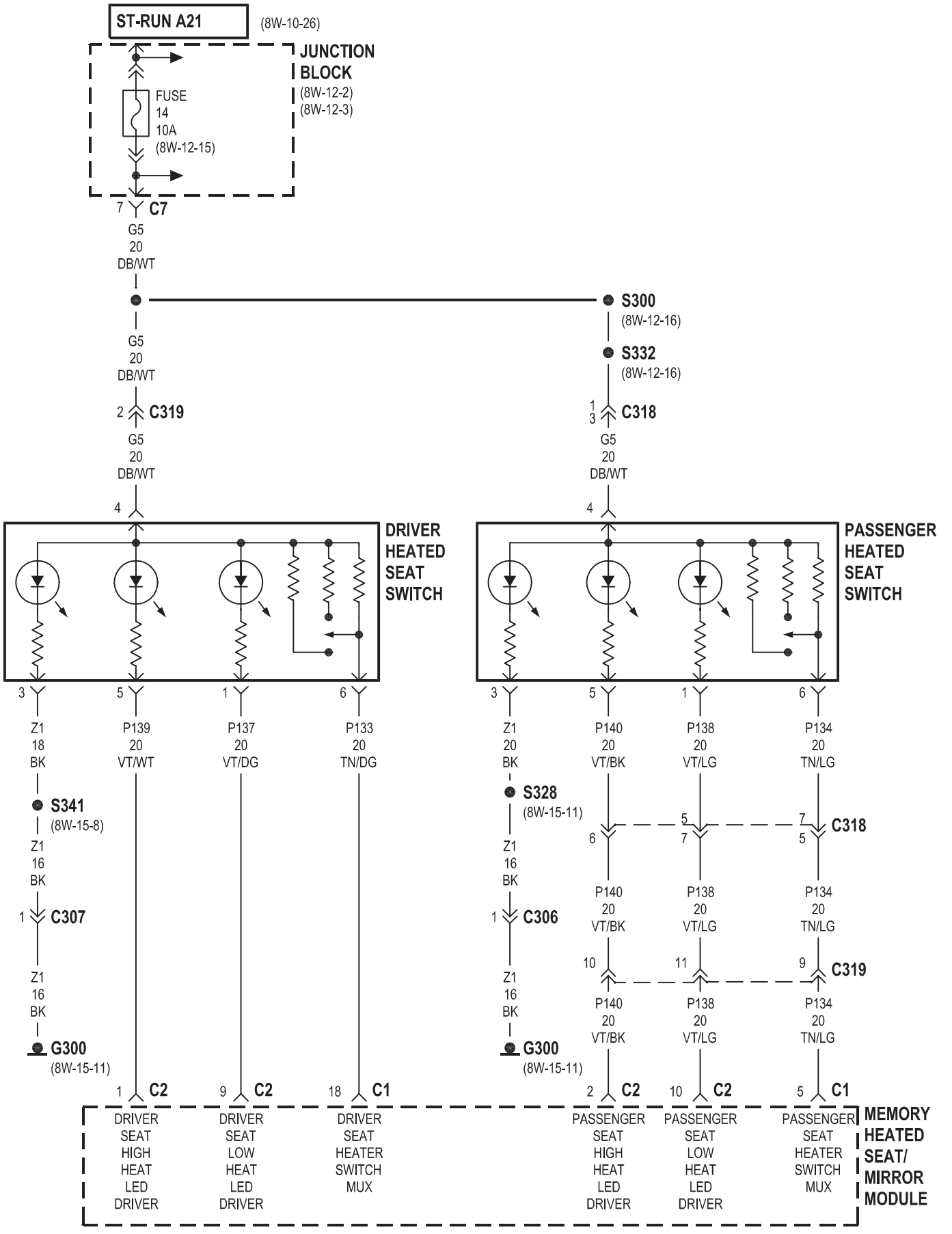
8W-63 POWER SEATS

Component	Page
Body Control Module	8W-63-8
Circuit Breaker No. 2 (JB)	8W-63-2, 3, 8
Driver Heated Seat Back	8W-63-8
Driver Heated Seat Cushion	8W-63-8
Driver Heated Seat Switch	8W-63-5
Driver Power Seat Front Riser Motor	8W-63-2, 4
Driver Power Seat Front Riser Motor Sensor	8W-63-6, 7
Driver Power Seat Horizontal Motor	8W-63-2, 4
Driver Power Seat Horizontal Motor Sensor	8W-63-6, 7
Driver Power Seat Rear Riser Motor	8W-63-2, 4
Driver Power Seat Rear Riser Motor Sensor	8W-63-6, 7
Driver Power Seat Recliner Motor	8W-63-2, 4
Driver Power Seat Recliner Motor Sensor	8W-63-6, 7
Driver Power Seat Switch	8W-63-2, 4
Fuse 14 (JB)	8W-63-5
G300	8W-63-2, 3, 4, 5, 8
Junction Block	8W-63-2, 3, 5, 8
Memory Heated Seat/Mirror Module	8W-63-4, 5, 6, 7, 8
Passenger Heated Seat Back	8W-63-8
Passenger Heated Seat Cushion	8W-63-8
Passenger Heated Seat Switch	8W-63-5
Passenger Power Seat Front Riser Motor	8W-63-3
Passenger Power Seat Horizontal Motor	8W-63-3
Passenger Power Seat Rear Riser Motor	8W-63-3
Passenger Power Seat Recliner Motor	8W-63-3
Passenger Power Seat Switch	8W-63-3

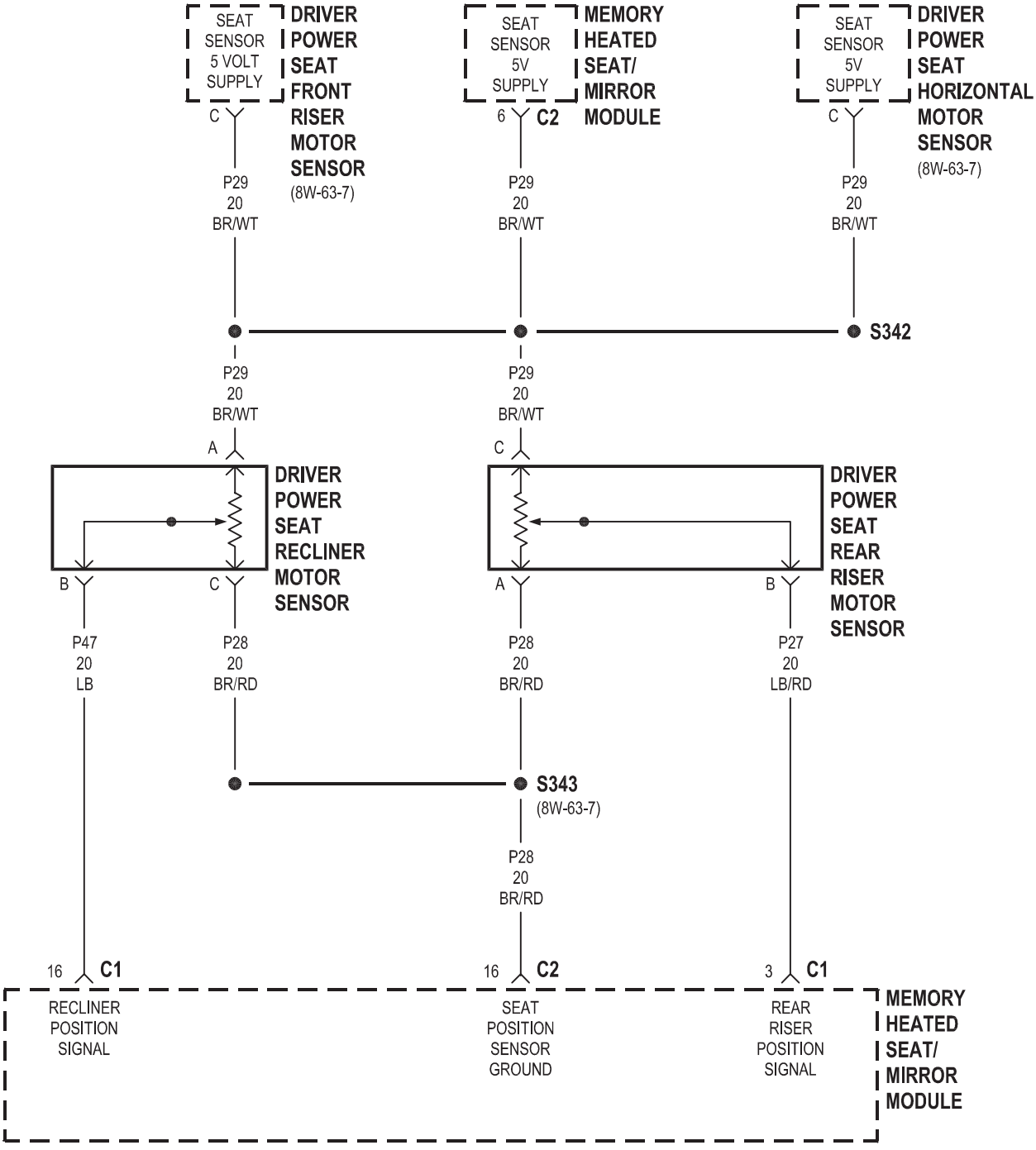

BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
(8W-12-23)
3 C7
F35 16 RD
2 C307
F35 16 RD
1
DRIVER POWER SEAT SWITCH
1 REARWARD
2 FORWARD
3 UP
4 DOWN
3 10 8 7 9 6 2 4 5
P17 18 RD/LB
P15 18 YL/LB
P11 18 YL/WT
P13 18 RD/WT
P19 18 YL/LG
P21 18 RD/LG
P41 16 GY/WT
P43 16 GY/LB
Z1 16 BK
DRIVER POWER SEAT REAR RISER MOTOR
DRIVER POWER SEAT RECLINER MOTOR
DRIVER POWER SEAT HORIZONTAL MOTOR
DRIVER POWER SEAT FRONT RISER MOTOR
M
1 C307
Z1 16 BK
G300
(8W-15-11)

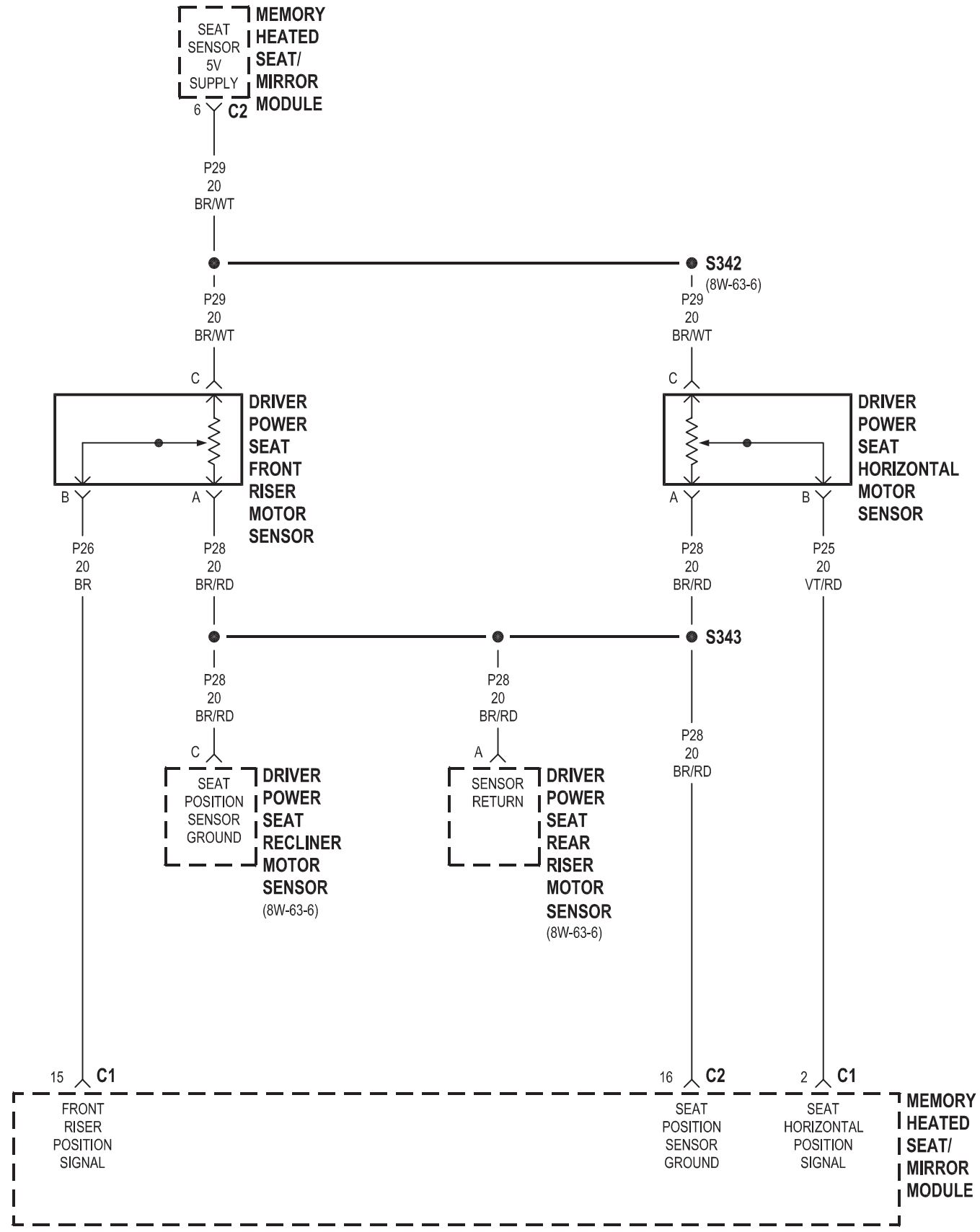

BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
(8W-12-24)
4 C7
F35 16 RD
2 C306
F35 16 RD
1
PASSENGER POWER SEAT SWITCH
1 REARWARD
2 FORWARD
3 UP
4 DOWN
3 10 7 8 6 9 2 4 5
P16 16 RD/LB
P14 16 YL/LB
P10 16 YL/WT
P12 16 RD/WT
P18 16 YL/LG
P20 16 RD/LG
P42 16 GY/BK
P44 16 GY/DB
PASSENGER POWER SEAT REAR RISER MOTOR
PASSENGER POWER SEAT RECLINER MOTOR
PASSENGER POWER SEAT HORIZONTAL MOTOR
PASSENGER POWER SEAT FRONT RISER MOTOR
M
MEMORY/ HEATED SEAT
OTHER
Z1 16 BK
S328
(8W-15-11)
Z1 16 BK
C306
G300
(8W-15-11)

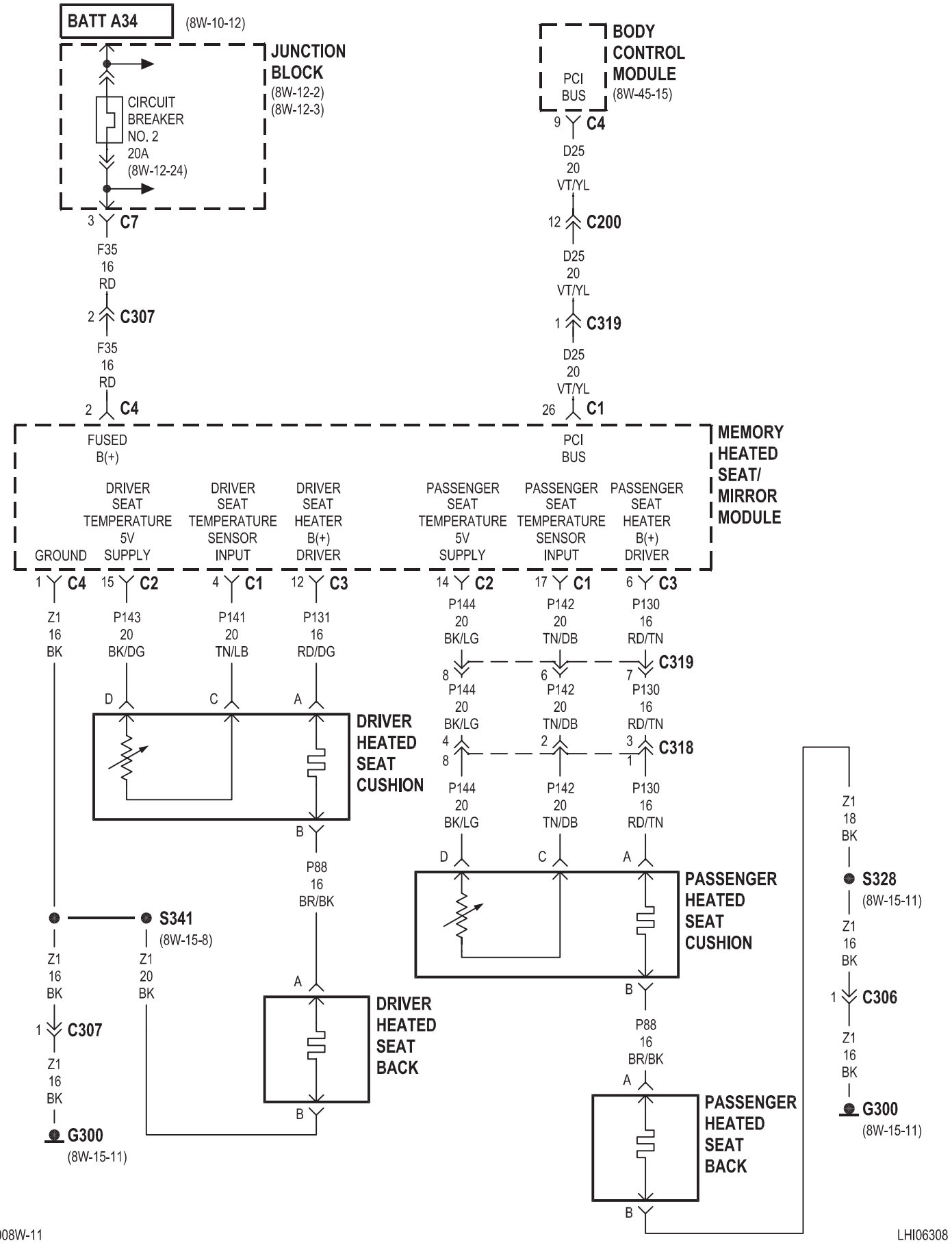

DRIVER POWER SEAT SWITCH
1 REARWARD
2 FORWARD
3 UP
4 DOWN
P17 18 RD/LB
P15 18 YL/LB
P11 18 YL/WT
P13 18 RD/WT
P9 20 RD
P19 18 YL/LG
P21 18 RD/LG
P40 20 GY/LB
P48 20 GY/WT
Z1 18 BK
S341 (8W-15-8)
Z1 16 BK
C307
Z1 16 BK
G300 (8W-15-11)
SEAT HORIZONTAL REARWARD SWITCH SENSE
SEAT HORIZONTAL FORWARD SWITCH SENSE
SEAT REAR UP SWITCH SENSE
SEAT REAR DOWN SWITCH SENSE
SEAT SWITCH B (+)
SEAT FRONT UP SWITCH SENSE
SEAT FRONT DOWN SWITCH SENSE
DRIVER SEAT RECLINER UP
DRIVER SEAT RECLINER DOWN
MEMORY HEATED SEAT/ MIRROR MODULE
SEAT HORIZONTAL REARWARD DRIVER
SEAT HORIZONTAL FORWARD DRIVER
SEAT REAR UP DRIVER
SEAT REAR DOWN DRIVER
SEAT FRONT UP DRIVER
SEAT FRONT DOWN DRIVER
DRIVER SEAT RECLINER DOWN DRIVER
DRIVER SEAT RECLINER UP DRIVER
P117 16 RD/LB
P115 16 YL/LB
P111 16 YL/WT
P113 16 RD/WT
P119 16 YL/LG
P121 16 RD/LG
P41 16 GY/WT
P43 16 GY/LB
DRIVER POWER SEAT REAR RISER MOTOR
DRIVER POWER SEAT RECLINER MOTOR
DRIVER POWER SEAT HORIZONTAL MOTOR
DRIVER POWER SEAT FRONT RISER MOTOR


ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 14 10A
(8W-12-15)
7 C7
G5 20 DB/WT
S300
(8W-12-16)
S332
(8W-12-16)
2 C319
1 3 C318
DRIVER HEATED SEAT SWITCH
PASSENGER HEATED SEAT SWITCH
Z1 18 BK
P139 20 VT/WT
P137 20 VT/DG
P133 20 TN/DG
Z1 20 BK
P140 20 VT/BK
P138 20 VT/LG
P134 20 TN/LG
S341
(8W-15-8)
S328
(8W-15-11)
Z1 16 BK
C307
C306
C318
C319
G300
(8W-15-11)
DRIVER SEAT HIGH HEAT LED DRIVER
DRIVER SEAT LOW HEAT LED DRIVER
DRIVER SEAT HEATER SWITCH MUX
PASSENGER SEAT HIGH HEAT LED DRIVER
PASSENGER SEAT LOW HEAT LED DRIVER
PASSENGER SEAT HEATER SWITCH MUX
MEMORY HEATED SEAT/ MIRROR MODULE

LHI06305

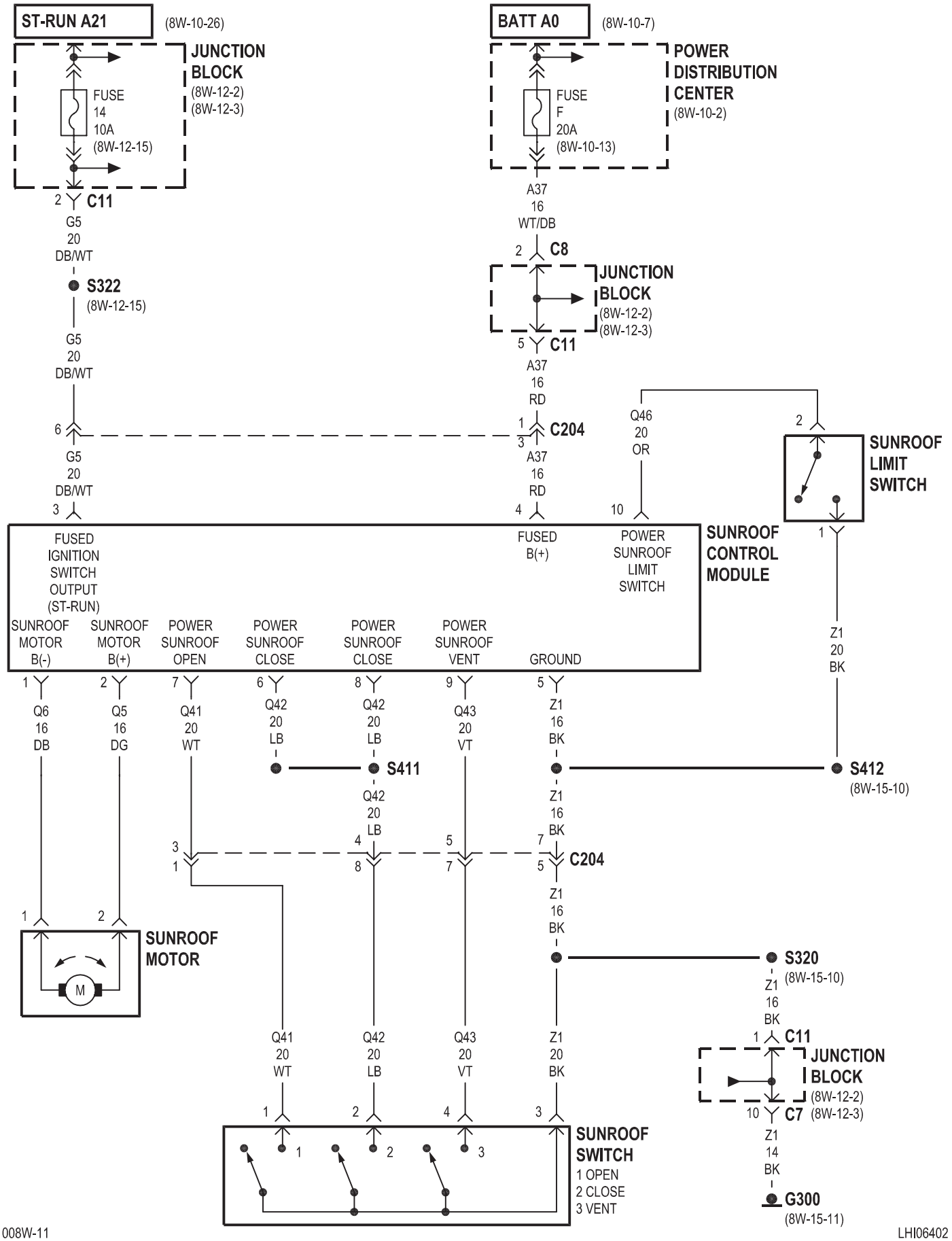

SEAT SENSOR 5 VOLT SUPPLY
C
P29 20 BR/WT
DRIVER POWER SEAT FRONT RISER MOTOR SENSOR
(8W-63-7)
SEAT SENSOR 5V SUPPLY
6
C2
P29 20 BR/WT
MEMORY HEATED SEAT/ MIRROR MODULE
SEAT SENSOR 5V SUPPLY
C
P29 20 BR/WT
DRIVER POWER SEAT HORIZONTAL MOTOR SENSOR
(8W-63-7)
S342
P29 20 BR/WT
A
P29 20 BR/WT
C
DRIVER POWER SEAT RECLINER MOTOR SENSOR
B
C
P47 20 LB
P28 20 BR/RD
DRIVER POWER SEAT REAR RISER MOTOR SENSOR
A
B
P28 20 BR/RD
P27 20 LB/RD
S343
(8W-63-7)
P28 20 BR/RD
16
C1
RECLINER POSITION SIGNAL
16
C2
SEAT POSITION SENSOR GROUND
3
C1
REAR RISER POSITION SIGNAL
MEMORY HEATED SEAT/ MIRROR MODULE


SEAT SENSOR 5V SUPPLY
6
C2
MEMORY HEATED SEAT/ MIRROR MODULE
P29 20 BR/WT
S342
(8W-63-6)
P29 20 BR/WT
P29 20 BR/WT
C
C
DRIVER POWER SEAT FRONT RISER MOTOR SENSOR
DRIVER POWER SEAT HORIZONTAL MOTOR SENSOR
B
A
A
B
P26 20 BR
P28 20 BR/RD
P28 20 BR/RD
P25 20 VT/RD
S343
P28 20 BR/RD
P28 20 BR/RD
P28 20 BR/RD
C
A
SEAT POSITION SENSOR GROUND
DRIVER POWER SEAT RECLINER MOTOR SENSOR
(8W-63-6)
SENSOR RETURN
DRIVER POWER SEAT REAR RISER MOTOR SENSOR
(8W-63-6)
15
C1
16
C2
2
C1
FRONT RISER POSITION SIGNAL
SEAT POSITION SENSOR GROUND
SEAT HORIZONTAL POSITION SIGNAL
MEMORY HEATED SEAT/ MIRROR MODULE


BATT A34
(8W-10-12)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
CIRCUIT BREAKER NO. 2 20A
(8W-12-24)
3 C7
F35 16 RD
2 C307
F35 16 RD
2 C4
FUSED B(+)
BODY CONTROL MODULE
(8W-45-15)
PCI BUS
9 C4
D25 20 VT/YL
12 C200
D25 20 VT/YL
1 C319
D25 20 VT/YL
26 C1
PCI BUS
MEMORY HEATED SEAT/ MIRROR MODULE
GROUND
DRIVER SEAT TEMPERATURE 5V SUPPLY
DRIVER SEAT TEMPERATURE SENSOR INPUT
DRIVER SEAT HEATER B(+) DRIVER
PASSENGER SEAT TEMPERATURE 5V SUPPLY
PASSENGER SEAT TEMPERATURE SENSOR INPUT
PASSENGER SEAT HEATER B(+) DRIVER
1 C4
15 C2
4 C1
12 C3
14 C2
17 C1
6 C3
Z1 16 BK
P143 20 BK/DG
P141 20 TN/LB
P131 16 RD/DG
P144 20 BK/LG
P142 20 TN/DB
P130 16 RD/TN
8 C319
6
7
P144 20 BK/LG
P142 20 TN/DB
P130 16 RD/TN
4 C318
8
2
3
1
P144 20 BK/LG
P142 20 TN/DB
P130 16 RD/TN
D
C
A
DRIVER HEATED SEAT CUSHION
B
P88 16 BR/BK
PASSENGER HEATED SEAT CUSHION
B
P88 16 BR/BK
A
PASSENGER HEATED SEAT BACK
B
S341
(8W-15-8)
Z1 16 BK
Z1 20 BK
1 C307
Z1 16 BK
G300
(8W-15-11)
A
DRIVER HEATED SEAT BACK
B
Z1 18 BK
S328
(8W-15-11)
Z1 16 BK
1 C306
Z1 16 BK
G300
(8W-15-11)

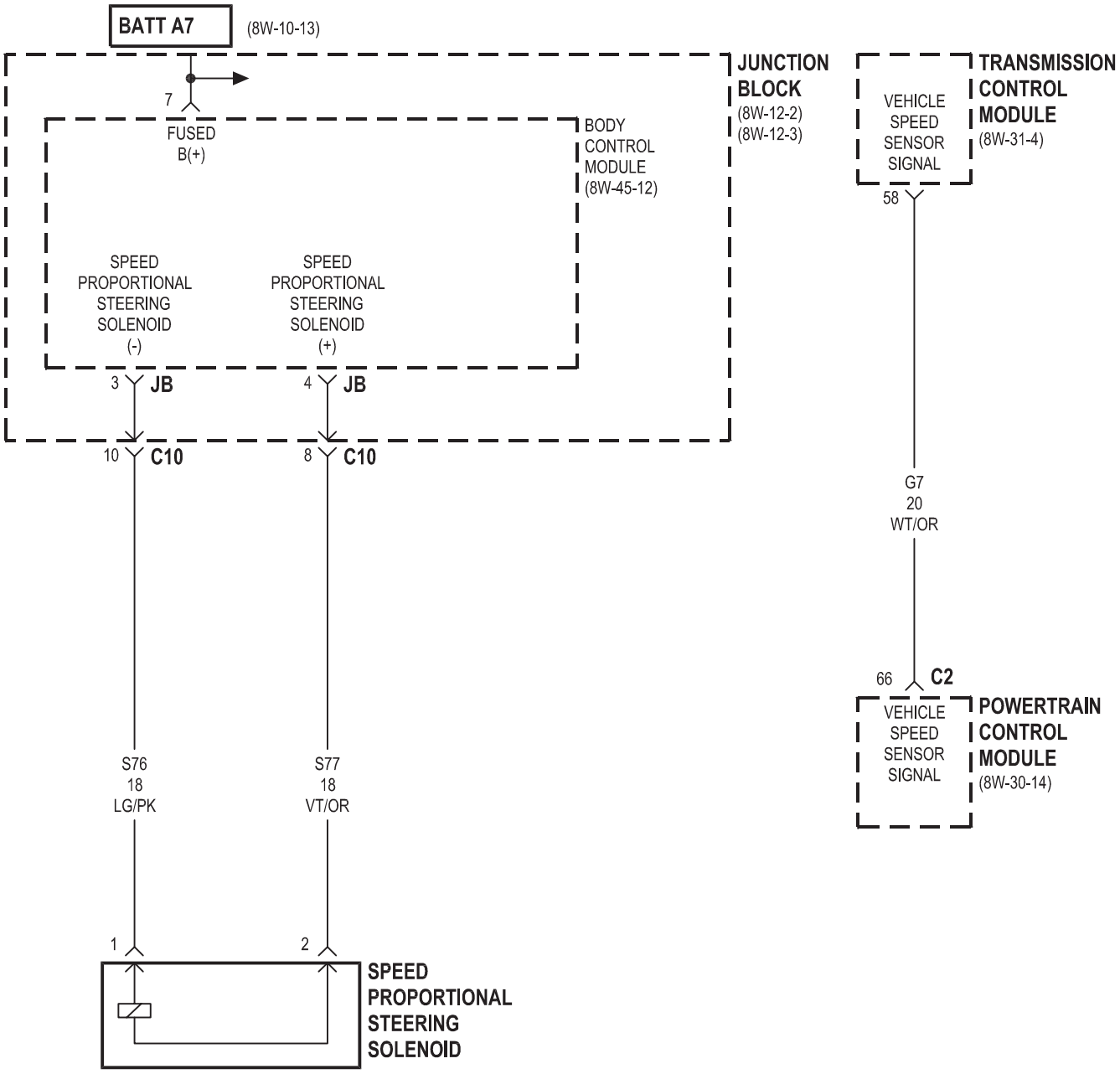
8W-64 POWER SUNROOF

Component	Page
Fuse 14 (JB)	8W-64-2
Fuse F (PDC)	8W-64-2
G300	8W-64-2
Junction Block	8W-64-2
Power Distribution Center	8W-64-2
Sunroof Control Module	8W-64-2
Sunroof Limit Switch	8W-64-2
Sunroof Motor	8W-64-2
Sunroof Switch	8W-64-2


ST-RUN A21
(8W-10-26)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 14 10A (8W-12-15)
2 C11
G5 20 DB/WT
S322
(8W-12-15)
G5 20 DB/WT
6
G5 20 DB/WT
3
BATT A0
(8W-10-7)
POWER DISTRIBUTION CENTER
(8W-10-2)
FUSE F 20A (8W-10-13)
A37 16 WT/DB
2 C8
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
5 C11
A37 16 RD
1 C204
3
A37 16 RD
4
Q46 20 OR
10
2
SUNROOF LIMIT SWITCH
1
Z1 20 BK
SUNROOF CONTROL MODULE
FUSED IGNITION SWITCH OUTPUT (ST-RUN)
FUSED B(+)
POWER SUNROOF LIMIT SWITCH
SUNROOF MOTOR B(-)
SUNROOF MOTOR B(+)
POWER SUNROOF OPEN
POWER SUNROOF CLOSE
POWER SUNROOF CLOSE
POWER SUNROOF VENT
GROUND
1 Q6 16 DB
2 Q5 16 DG
7 Q41 20 WT
6 Q42 20 LB
8 Q42 20 LB
9 Q43 20 VT
5 Z1 16 BK
S411
S412
(8W-15-10)
Q42 20 LB
4
Z1 16 BK
7
3
1
8
5
7
5 C204
Z1 16 BK
S320
(8W-15-10)
Z1 16 BK
1 C11
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
10 C7
Z1 14 BK
G300
(8W-15-11)
1 2 SUNROOF MOTOR
M
Q41 20 WT
Q42 20 LB
Q43 20 VT
Z1 20 BK
1 2 4 3
1 2 3
SUNROOF SWITCH
1 OPEN
2 CLOSE
3 VENT

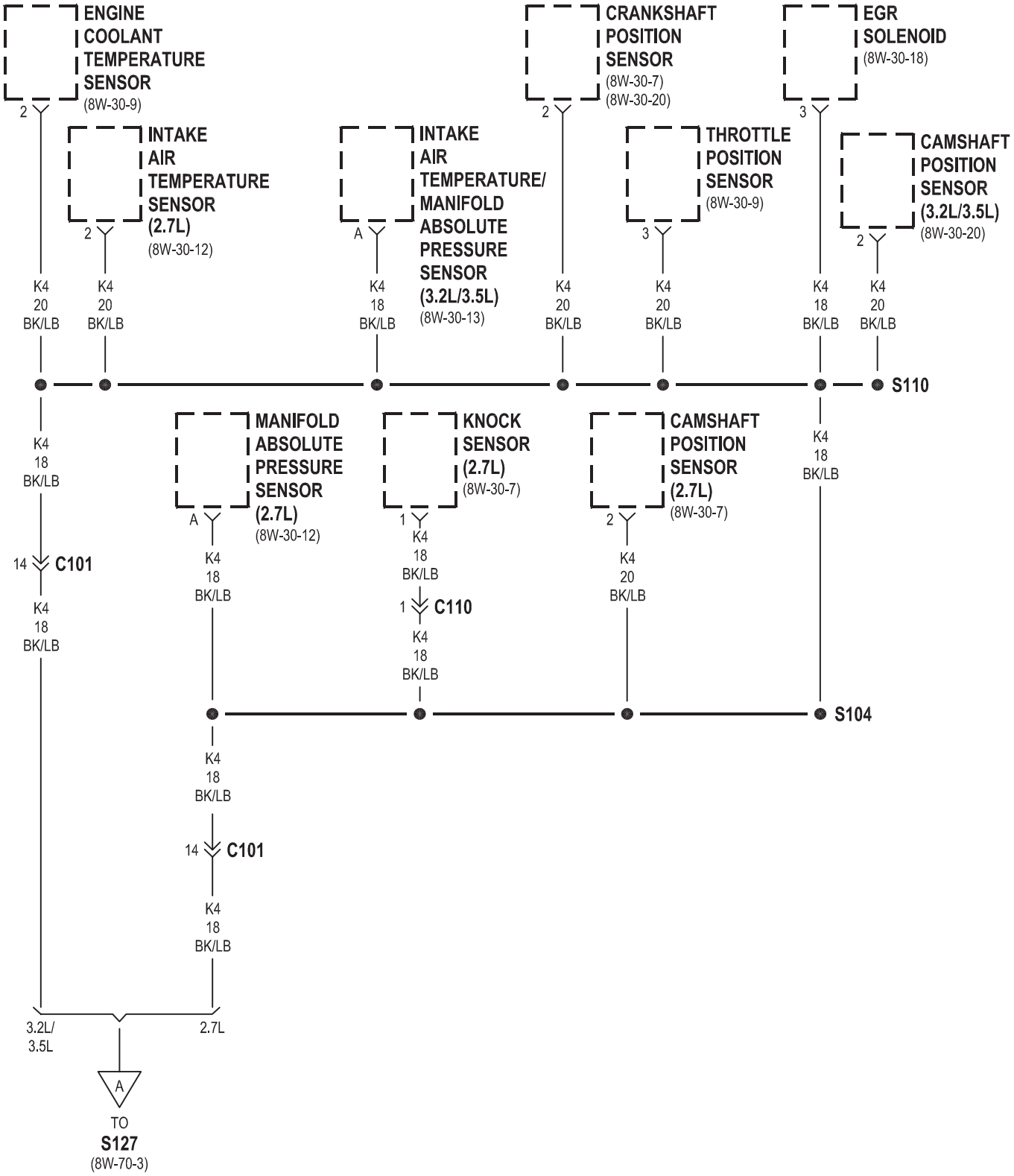
8W-65 SPEED PROPORTIONAL STEERING

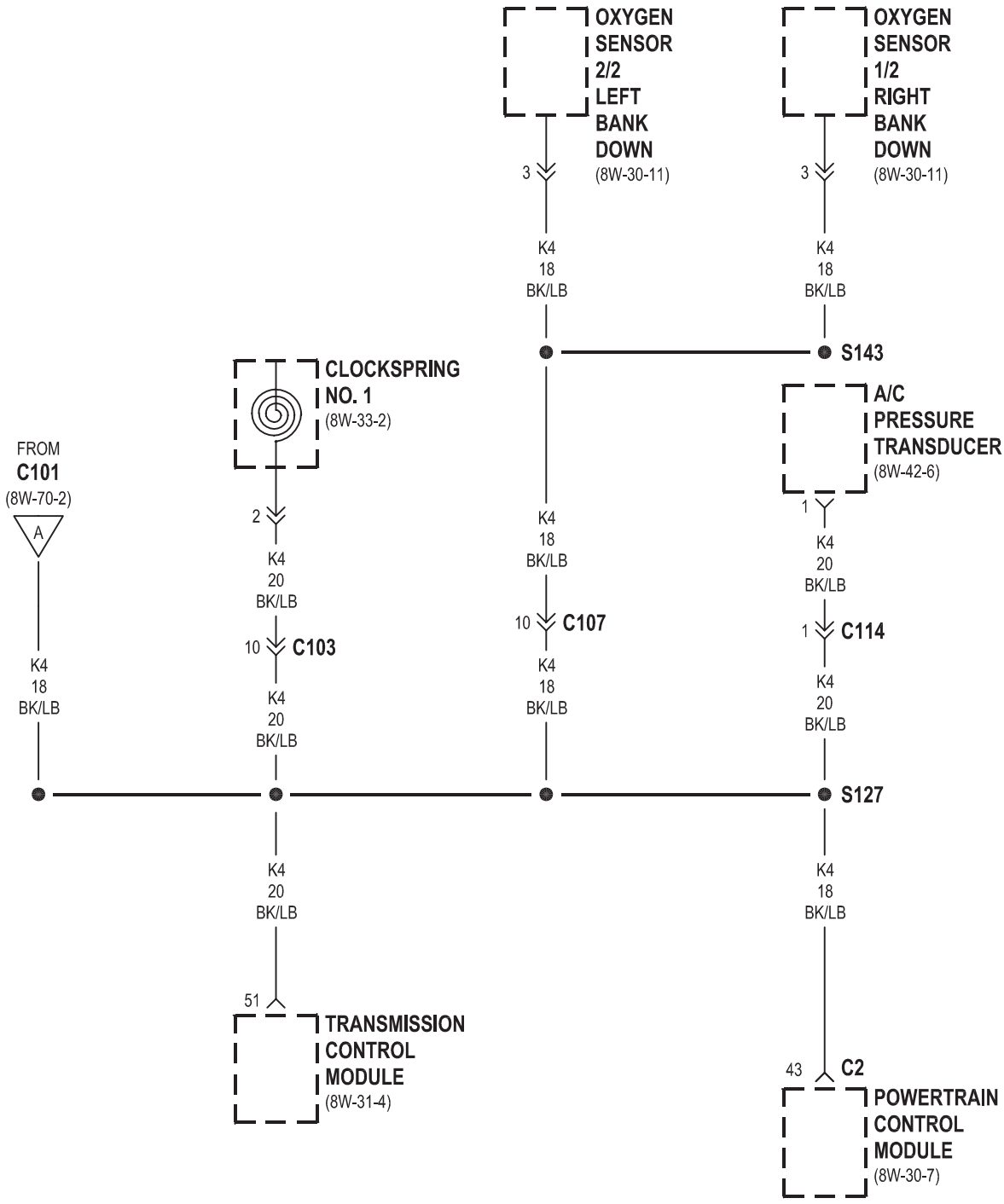
Component	Page	Component	Page
Body Control Module	8W-65-2	Speed Proportional Steering Solenoid	8W-65-2
Junction Block	8W-65-2	Transmission Control Module	8W-65-2
Powertrain Control Module	8W-65-2		

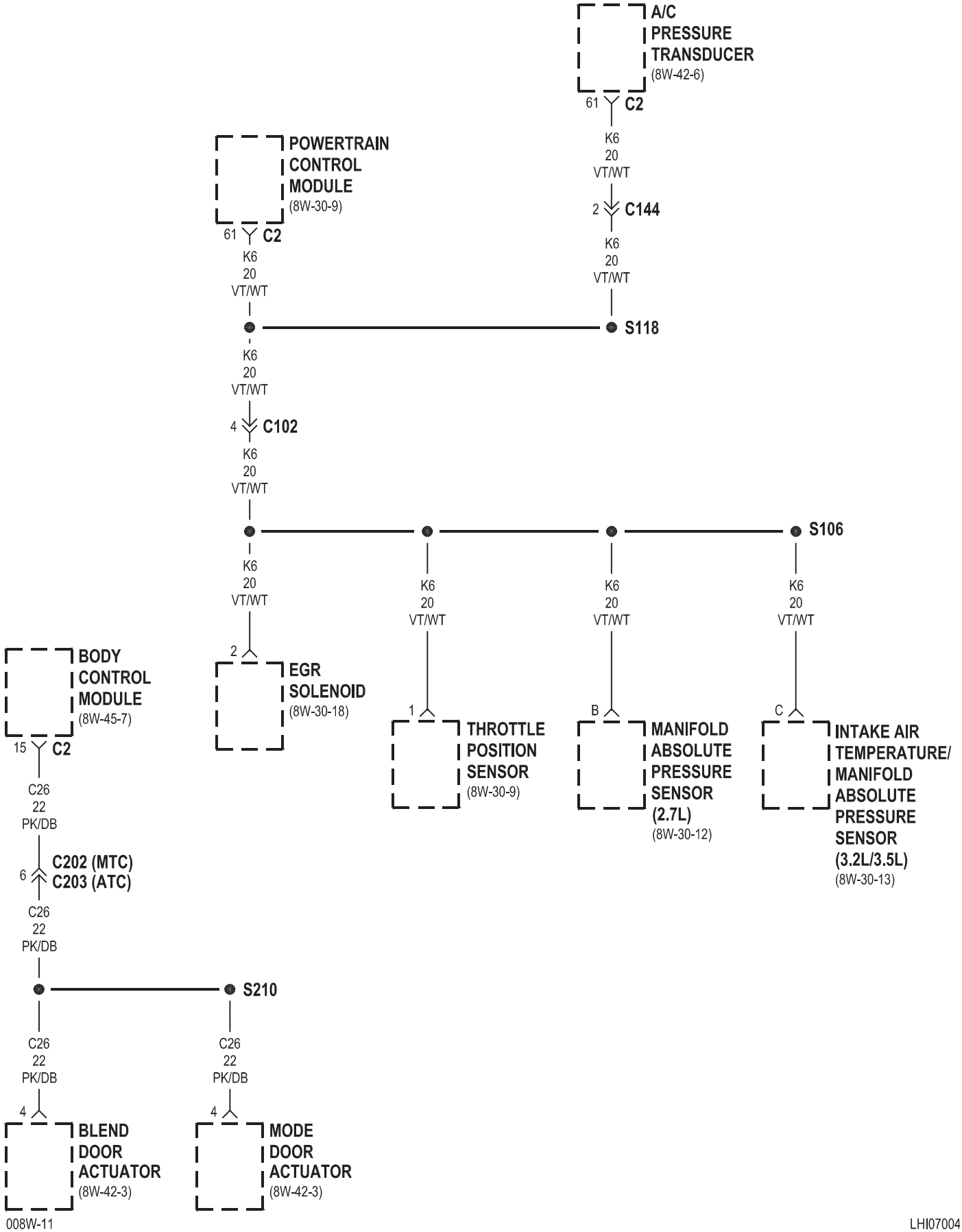

BATT A7
(8W-10-13)
7
FUSED
B(+)
JUNCTION
BLOCK
(8W-12-2)
(8W-12-3)
BODY
CONTROL
MODULE
(8W-45-12)
SPEED
PROPORTIONAL
STEERING
SOLENOID
(-)
SPEED
PROPORTIONAL
STEERING
SOLENOID
(+)
3 JB
4 JB
10 C10
8 C10
S76
18
LG/PK
S77
18
VT/OR
1
2
SPEED
PROPORTIONAL
STEERING
SOLENOID
VEHICLE
SPEED
SENSOR
SIGNAL
TRANSMISSION
CONTROL
MODULE
(8W-31-4)
58
G7
20
WT/OR
66 C2
VEHICLE
SPEED
SENSOR
SIGNAL
POWERTRAIN
CONTROL
MODULE
(8W-30-14)

8W-70 SPLICE INFORMATION

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S101	8W-10-20
S102	8W-30-10
S103	8W-10-18, 19
S104	8W-70-2
S105	8W-30-7
S106	8W-70-4
S107	8W-31-4
S108	8W-10-18
S109	8W-10-20, 21
S110	8W-70-2
S111	8W-10-20, 21
S112	8W-10-21
S113	8W-31-5
S114	8W-10-23
S115	8W-30-19
S116	8W-12-17
S117	8W-12-22
S118	8W-70-4
S119	8W-15-5
S120	8W-12-30
S121	8W-12-31
S122	8W-15-6
S123	8W-15-4
S124	8W-10-15
S125	8W-10-10
S127	8W-70-3
S128	8W-10-16
S129	8W-10-22
S130	8W-50-4
S131	8W-12-10, 11
S132	8W-12-17
S133	8W-12-19
S134	8W-15-2
S135	8W-15-3
S140	8W-15-17
S141	8W-10-18, 19
S142	8W-15-4
S143	8W-70-3
S144	8W-20-2
S145	8W-20-2
S146	8W-31-3
S147	8W-12-31
S150	8W-15-2
S151	8W-12-11
S152	8W-15-3
S153	8W-12-11
S160	8W-12-10
S161	8W-15-2
S162	8W-12-17
S164	8W-10-18, 19
S165	8W-10-17
S166	8W-10-23
S167	8W-10-17
S168	8W-10-23
S169	8W-10-24
S170	8W-12-30
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S201	8W-10-15
S202	8W-53-2, 3
S203	8W-10-9
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S206	8W-47-2
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S209	8W-12-19
S210	8W-70-4
S211	8W-42-3
S212	8W-70-5
S213	8W-45-13
S214	8W-12-22
S215	8W-30-15
S300	8W-12-16
S301	8W-12-20
S302	8W-12-29
S303	8W-12-24
S304	8W-12-24
S305	8W-60-3
S306	8W-10-9
S307	8W-44-2
S308	8W-51-2, 3
S309	8W-12-12
S310	8W-12-28
S311	8W-15-17
S312	8W-15-11
S313	8W-12-21
S314	8W-12-20
S315	8W-62-4
S316	8W-62-4
S317	8W-12-16
S318	8W-62-4
S319	8W-70-6
S320	8W-15-10
S321	8W-15-8
S322	8W-12-15
S323	8W-45-4
S324	8W-45-4
S325	8W-15-10
S326	8W-45-4
S327	8W-15-10
S328	8W-15-11
S329	8W-12-20
S330	8W-12-29
S331	8W-62-5
S332	8W-12-16
S334	8W-62-5
S335	8W-62-5
S336	8W-10-24
S337	8W-10-9
S338	8W-62-6
S341	8W-15-8
S342	8W-63-6
S343	8W-63-7
S345	8W-43-3
S346	8W-12-22
S347	8W-15-9
S400	8W-15-15, 16
S401	8W-12-28
S402	8W-15-15
S403	8W-12-12
S404	8W-51-2
S405	8W-15-14
S406	8W-51-6
S407	8W-12-13
S408	8W-51-2
S409	8W-15-12
S410	8W-15-13
S411	8W-64-2
S412	8W-15-10
S420	8W-15-16
S421	8W-12-12

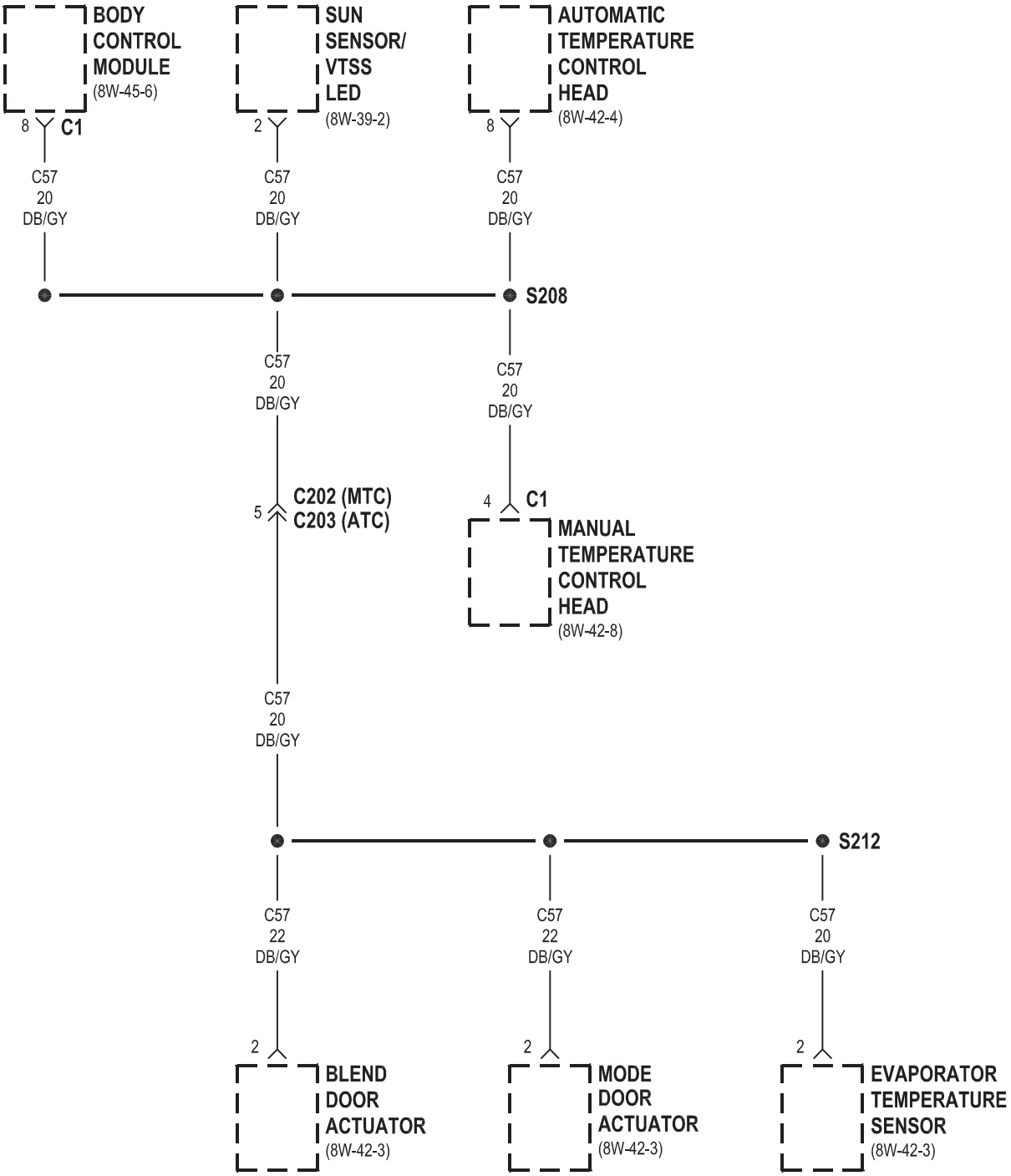

ENGINE COOLANT TEMPERATURE SENSOR (8W-30-9)
2
INTAKE AIR TEMPERATURE SENSOR (2.7L) (8W-30-12)
2
INTAKE AIR TEMPERATURE/ MANIFOLD ABSOLUTE PRESSURE SENSOR (3.2L/3.5L) (8W-30-13)
A
CRANKSHAFT POSITION SENSOR (8W-30-7) (8W-30-20)
2
THROTTLE POSITION SENSOR (8W-30-9)
3
EGR SOLENOID (8W-30-18)
3
CAMSHAFT POSITION SENSOR (3.2L/3.5L) (8W-30-20)
2
K4 20 BK/LB
K4 20 BK/LB
K4 18 BK/LB
K4 20 BK/LB
K4 20 BK/LB
K4 18 BK/LB
K4 20 BK/LB
S110
K4 18 BK/LB
14 C101
K4 18 BK/LB
MANIFOLD ABSOLUTE PRESSURE SENSOR (2.7L) (8W-30-12)
A
KNOCK SENSOR (2.7L) (8W-30-7)
1
CAMSHAFT POSITION SENSOR (2.7L) (8W-30-7)
2
K4 18 BK/LB
1 C110
K4 18 BK/LB
K4 18 BK/LB
K4 20 BK/LB
K4 18 BK/LB
S104
K4 18 BK/LB
14 C101
K4 18 BK/LB
3.2L/ 3.5L
2.7L
A
TO S127 (8W-70-3)

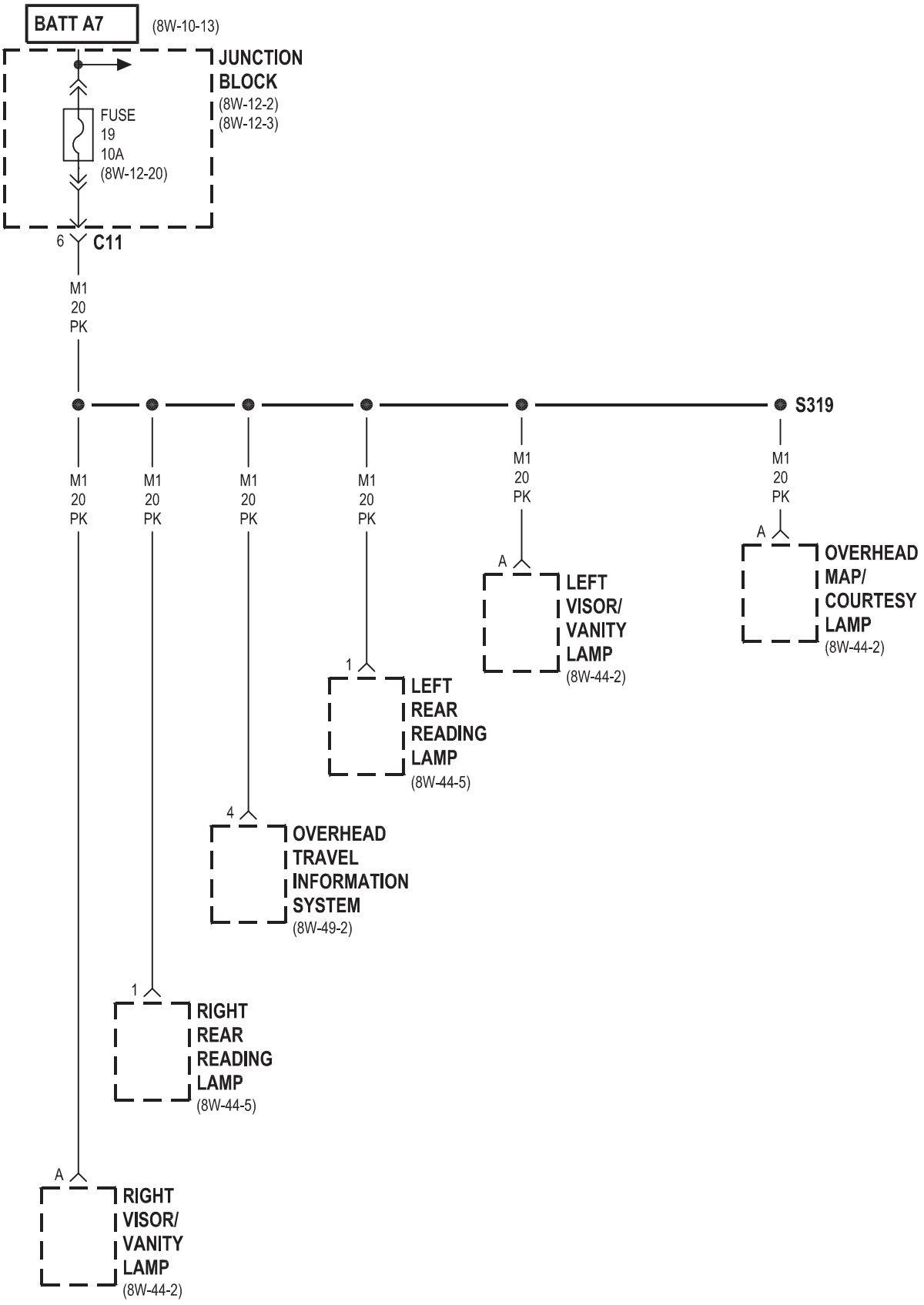

OXYGEN SENSOR 2/2 LEFT BANK DOWN
(8W-30-11)
OXYGEN SENSOR 1/2 RIGHT BANK DOWN
(8W-30-11)
3
3
K4 18 BK/LB
K4 18 BK/LB
S143
CLOCKSPRING NO. 1
(8W-33-2)
A/C PRESSURE TRANSDUCER
(8W-42-6)
FROM C101
(8W-70-2)
A
2
1
K4 20 BK/LB
K4 18 BK/LB
K4 18 BK/LB
10 C107
1 C114
K4 20 BK/LB
10 C103
K4 18 BK/LB
K4 20 BK/LB
K4 20 BK/LB
S127
K4 18 BK/LB
51
43 C2
TRANSMISSION CONTROL MODULE
(8W-31-4)
POWERTRAIN CONTROL MODULE
(8W-30-7)

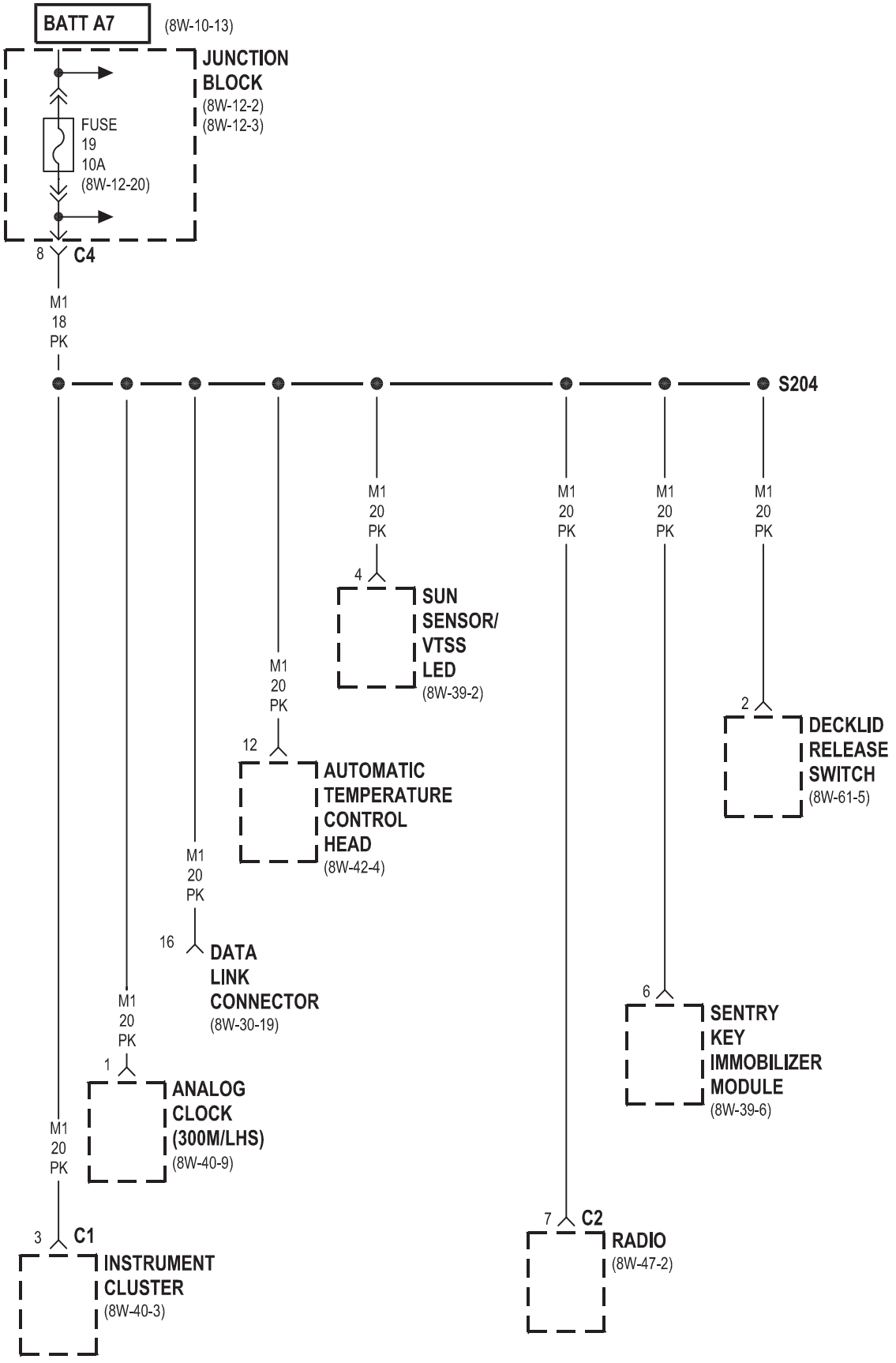


008W-11

LHI07004


BODY CONTROL MODULE
(8W-45-6)
8
C1
C57
20
DB/GY
SUN SENSOR/ VTSS LED
(8W-39-2)
2
C57
20
DB/GY
AUTOMATIC TEMPERATURE CONTROL HEAD
(8W-42-4)
8
C57
20
DB/GY
S208
C57
20
DB/GY
5
C202 (MTC)
C203 (ATC)
C57
20
DB/GY
4
C1
MANUAL TEMPERATURE CONTROL HEAD
(8W-42-8)
C57
20
DB/GY
S212
C57
22
DB/GY
2
BLEND DOOR ACTUATOR
(8W-42-3)
C57
22
DB/GY
2
MODE DOOR ACTUATOR
(8W-42-3)
C57
20
DB/GY
2
EVAPORATOR TEMPERATURE SENSOR
(8W-42-3)


BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
6
C11
M1 20 PK
S319
M1 20 PK
A
LEFT VISOR/ VANITY LAMP
(8W-44-2)
M1 20 PK
A
OVERHEAD MAP/ COURTESY LAMP
(8W-44-2)
M1 20 PK
1
LEFT REAR READING LAMP
(8W-44-5)
M1 20 PK
4
OVERHEAD TRAVEL INFORMATION SYSTEM
(8W-49-2)
M1 20 PK
1
RIGHT REAR READING LAMP
(8W-44-5)
M1 20 PK
A
RIGHT VISOR/ VANITY LAMP
(8W-44-2)

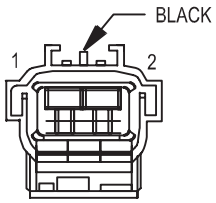

BATT A7
(8W-10-13)
JUNCTION BLOCK
(8W-12-2)
(8W-12-3)
FUSE 19 10A
(8W-12-20)
8 C4
M1 18 PK
S204
M1 20 PK
4
SUN SENSOR/ VTSS LED
(8W-39-2)
12
AUTOMATIC TEMPERATURE CONTROL HEAD
(8W-42-4)
2
DECKLID RELEASE SWITCH
(8W-61-5)
16
DATA LINK CONNECTOR
(8W-30-19)
1
ANALOG CLOCK (300M/LHS)
(8W-40-9)
6
SENTRY KEY IMMOBILIZER MODULE
(8W-39-6)
3 C1
INSTRUMENT CLUSTER
(8W-40-3)
7 C2
RADIO
(8W-47-2)

8W-80 CONNECTOR PIN-OUTS

Component	Page
A/C Compressor Clutch	8W-80-4
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Blower Motor Power Module	8W-80-6
Blower Motor Resistor Block	8W-80-7
Body Control Module	8W-80-7, 8
Brake Lamp Switch	8W-80-8
Brake Pressure Switch	8W-80-8
C101	8W-80-9
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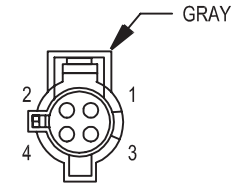
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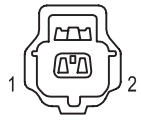
A/C COMPRESSOR CLUTCH

CAV	CIRCUIT	FUNCTION
1	C2 14DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
2	Z1 14BK	GROUND



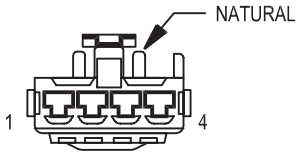
A/C PRESSURE TRANSDUCER

CAV	CIRCUIT	FUNCTION
1	K4 20BK/LB	SENSOR GROUND
2	K6 20VT/WT	5V SUPPLY
3	C18 20DB	A/C PRESSURE SIGNAL
4	-	-



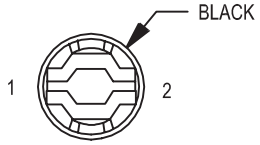
AMBIENT TEMPERATURE SENSOR

CAV	CIRCUIT	FUNCTION
1	G31 20VT/LG	AMBIENT TEMPERATURE SENSOR SIGNAL
2	C57 20DB/GY	SENSOR GROUND



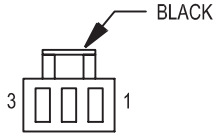
ANALOG CLOCK (300M/LHS)

CAV	CIRCUIT	FUNCTION
1	M1 20PK	FUSED B (+)
2	Z2 20BK/LG	GROUND
3	E2 20OR	PANEL LAMPS FEED
4	-	-



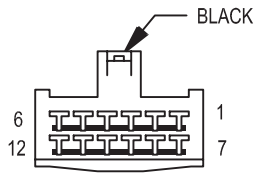
ASH RECEIVER LAMP

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	E2 20OR	PANEL LAMPS FEED



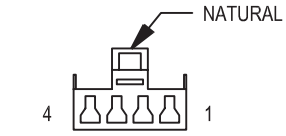
AUTOMATIC DAY/NIGHT MIRROR

CAV	CIRCUIT	FUNCTION
1	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
2	Z2 20BK/LG	GROUND
3	L1 20VT/BK	BACK-UP LAMP FEED



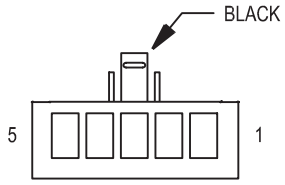
AUTOMATIC TEMPERATURE CONTROL HEAD

CAV	CIRCUIT	FUNCTION
1	Z2 20BK/LG	GROUND
2	D25 20VT/YL	PCI BUS
3	Z1 20BK	GROUND
4	E2 20OR	PANEL LAMPS FEED
5	-	-
6	-	-
7	C10 22RD/TN	IN-CAR TEMPERATURE SENSOR SIGNAL (ATC)
8	C57 20DB/GY	SENSOR GROUND
9	-	-
10	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
11	C9 22YL/DG	ASPIRATOR MOTOR DRIVER
12	M1 20PK	FUSED B(+)



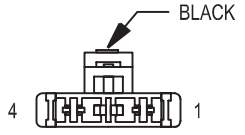
AUTOSTICK SWITCH (DODGE/300M)

CAV	CIRCUIT	FUNCTION
1	T44 20YL/LB	AUTOSTICK DOWNSHIFT SWITCH SENSE
2	T5 20LG/RD	AUTOSTICK UPSHIFT SWITCH SENSE
3	Z1 20BK	GROUND
4	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)



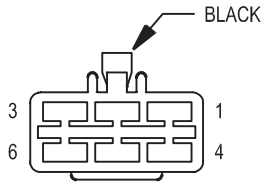
BLEND DOOR ACTUATOR

CAV	CIRCUIT	FUNCTION
1	C33 22DB/RD	BLEND AIR DOOR DRIVER
2	C57 22DB/GY	SENSOR GROUND
3	C36 22RD/WT	BLEND DOOR FEEDBACK SIGNAL
4	C26 22PK/DB	5V SUPPLY
5	C34 22BR/WT	COMMON DOOR DRIVER



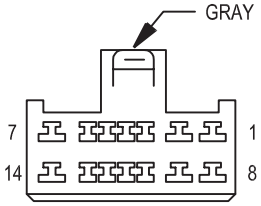
BLOWER MOTOR POWER MODULE

CAV	CIRCUIT	FUNCTION
1	-	-
2	Z1 12BK	GROUND
3	C56 22RD/LG	BLOWER MOTOR CONTROL
4	C1 12DG	FUSED IGNITION SWITCH OUTPUT (RUN)



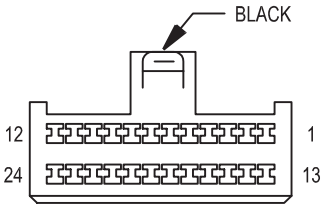
BLOWER MOTOR RESISTOR BLOCK

CAV	CIRCUIT	FUNCTION
1	C7 12BK/TN	HIGH BLOWER MOTOR DRIVER
2	C6 16LB	M2 BLOWER MOTOR DRIVER
3	-	-
4	C1 12DG	FUSED IGNITION SWITCH OUTPUT (RUN)
5	C4 18TN	LOW BLOWER MOTOR DRIVER
6	C5 16LG	M1 BLOWER MOTOR DRIVER



BODY CONTROL MODULE - C1

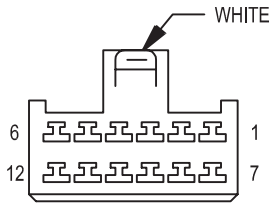
CAV	CIRCUIT	FUNCTION
1	P1 20BK/WT	DECKLID RELASE SWITCH OUTPUT
2	C32 22GY/DB	RECIRCULATION DOOR DRIVER
3	C33 22DB/RD	BLEND AIR DOOR DRIVER
4	D25 20VT/YL	PCI BUS (ATC)
5	D25 20VT/YL	PCI BUS (RADIO)
6	-	-
7	D25 18VT/YL	PCI BUS (ORC)
8	C57 20DB/GY	SENSOR GROUND
9	C35 22DG/YL	MODE DOOR DRIVER
10	C34 22BR/WT	COMMON DOOR DRIVER
11	C59 20VT/LG	FAN OFF SWITCH SIGNAL
12	D25 20VT/YL	PCI BUS (SKIM)
13	D25 20VT/YL	PCI BUS (MIC)
14	D25 20VT/YL	PCI BUS (DLC)



BODY CONTROL MODULE - C2

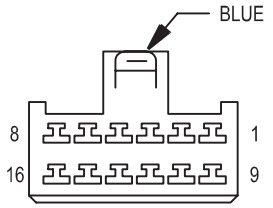
CAV	CIRCUIT	FUNCTION
1	C36 22RD/WT	BLEND DOOR FEEDBACK SIGNAL
2	G52 20YL	HEADLAMP SWITCH MUX
3	-	-
4	-	-
5	C9 22YL/DG	ASPIRATOR MOTOR DRIVER
6	C56 22RD/LG	BLOWER MOTOR CONTROL
7	V10 20BR	FRONT WASHER PUMP MOTOR CONTROL
8	V52 20DG/RD	FRONT WIPER MUX SWITCH SIGNAL
9	C37 22YL/WT	MODE DOOR FEEDBACK SIGNAL
10	C38 20DB	SUN SENSOR SIGNAL
11	-	-
12	C82 20YL/OR	TEMPERATURE SELECT SIGNAL
13	E17 20YL/BK ●●	DAY BRIGHTNESS SENSE
14	C48 20VT/PK	A/C LED INDICATOR SIGNAL
15	C26 22PK/DB	5V SUPPLY
16	-	-
17	-	-
18	-	-
19	L80 20WT	HEADLAMP SWITCH RETURN
20	C12 22LG/BK	EVAPORATOR TEMPERATURE SENSOR SIGNAL
21	E19 20RD	PANEL LAMPS DIMMER SIGNAL
22	C10 22RD/TN ●	IN-CAR TEMPERATURE SENSOR SIGNAL (ATC)
22	C58 22RD/TN ●●	A/C MODE SWITCH MUX
23	G69 22BK/OR	VTSS INDICATOR DRIVER
24	G26 22LB	KEY-IN IGNITION SWITCH SENSE

● ATC
●● MTC



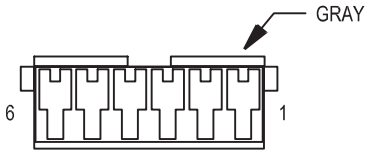
BODY CONTROL MODULE - C3

CAV	CIRCUIT	FUNCTION
1	D25 20VT/YL	PCI BUS (PCM)
2	D25 20VT/YL	PCI BUS (CAB)
3	V55 20TN/RD	WIPER PARK SWITCH SENSE
4	V14 20RD/VT	WIPER ON/OFF RELAY CONTROL
5	G31 20VT/LG	AMBIENT TEMPERATURE SENSOR SIGNAL
6	-	-
7	D25 20VT/YL	PCI BUS (TCM)
8	-	-
9	-	-
10	C57 20DB/GY	SENSOR GROUND
11	-	-
12	V16 20VT	WIPER HIGH/LOW RELAY CONTROL



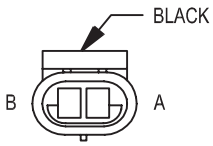
BODY CONTROL MODULE - C4

CAV	CIRCUIT	FUNCTION
1	G74 20TN/RD	DOOR AJAR SWITCH SENSE (LR)
2	G74 20TN/RD	DOOR AJAR SWITCH SENSE (PASS)
3	G72 20DG/OR	PASSENGER DOOR CYLINDER LOCK SWITCH SENSE
4	G75 20TN	DRIVER DOOR AJAR SWITCH SENSE
5	P97 20WT/DG	DRIVER DOOR MUX SWITCH
6	-	-
7	G4 20DB	FUEL LEVEL SENSOR SIGNAL
8	G71 18VT/WT	DECKLID SECURITY SWITCH SENSE
9	D25 20VT/YL	PCI BUS (MHS/MM)
10	G74 20TN/RD	DOOR AJAR SWITCH SENSE (RR)
11	-	-
12	P96 20WT/LG	PASSENGER DOOR MUX SWITCH
13	G73 20LG/OR	DRIVER DOOR CYLINDER LOCK SWITCH SENSE
14	C80 20DB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
15	G10 20LG/RD	SEAT BELT SWITCH SENSE
16	-	-



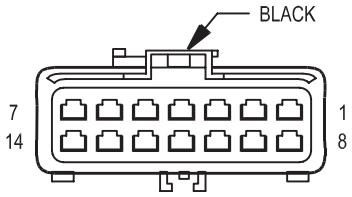
BRAKE LAMP SWITCH

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE SWITCH SENSE
2	Z2 18BK/LG	GROUND
3	V32 20YL/RD	SPEED CONTROL POWER SUPPLY
4	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
5	L50 16WT/TN	BRAKE LAMP SWITCH OUTPUT
6	F32 16PK/DB	FUSED B(+)



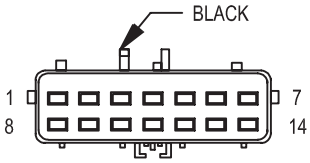
BRAKE PRESSURE SWITCH

CAV	CIRCUIT	FUNCTION
A	Z1 20BK	GROUND
B	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER



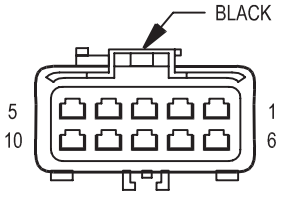
C101

CAV	CIRCUIT
1	F42 16DG/LG
2	-
3	-
4	K39 20GY/RD
5	K40 20BR/WT
6	K59 20VT/BK
7	C2 14DB/BK
8	Z1 14BK
9	K60 20YL/BK
10	K7 20OR
11	Z1 16BK/WT
12	V32 20YL/RD
13	F12 20DB/WT
14	K4 18BK/LB



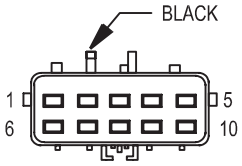
C101

CAV	CIRCUIT
1	F42 16DG/LG
2	-
3	-
4	K39 20GY/RD
5	K40 20BR/WT
6	K59 20VT/BK
7	C2 14DB/BK
8	Z1 14BK
9	K60 20YL/BK
10	K7 20OR
11	Z1 18BK
12	V32 20YL/RD
13	F12 20DB/WT
14	K4 18BK/LB



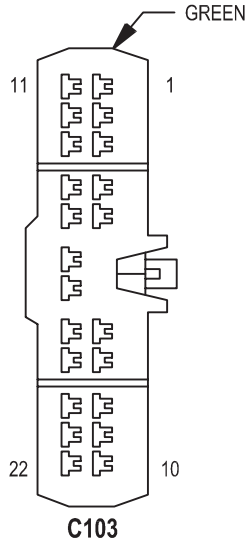
C102

CAV	CIRCUIT
1	F142 16OR/DG
2	K22 20OR/DB
3	Z12 14BK/TN
4	K6 20VT/WT
5	A142 14DG/OR
6	T40 12BR
7	G6 20GY
8	K90 20TN
9	K10 18DB/LG
10	-



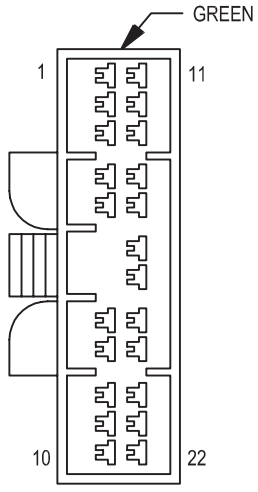
C102

CAV	CIRCUIT
1	F142 18OR/DG
2	K22 20OR/DB
3	Z12 14BK/TN
4	K6 20VT/WT
5	A142 14DG/OR
6	T40 12LG
7	G6 20GY
8	K90 20TN ●
	K90 20TN/WT ●●
9	-
10	-



C103

CAV	CIRCUIT
1	V37 20RD/LG
2	V32 20YL/RD
3	V30 20DB/RD
4	K29 20WT/PK
5	G29 22BK/TN
6	G6 22GY
7	D21 20PK/TN
8	D20 20LG
9	D6 20PK/LB
10	K4 20BK/LB
11	D25 20VT/YL
12	L96 18LG/RD
13	D25 20VT/YL
14	V16 20VT
15	C57 20DB/GY
16	G31 20VT/LG
17	V14 20RD/VT
18	V55 20TN/RD
19	D25 20VT/YL
20	A15 18PK
21	L50 16WT/TN
22	V10 20BR

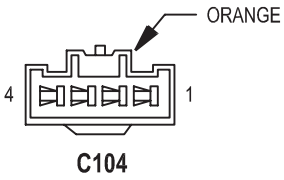


C103

CAV	CIRCUIT
1	V37 20RD/LG
2	V32 20YL/RD
3	V30 20DB/RD
4	K29 20WT/PK
5	G29 20BK/TN
6	G6 20GY
7	D21 20PK/TN
8	D20 20LG
9	D6 20PK/LB
10	K4 20BK/LB
11	D25 18YL/VT
12	L96 18LG/RD ▲
13	D25 20VT/YL
14	V16 20VT
15	C57 20DB/GY
16	G31 20VT/LG
17	V14 20RD/VT
18	V55 20TN/RD
19	D25 20VT/YL
20	A15 18PK
21	L50 18WT/TN
22	V10 20BR

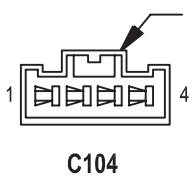
● 2.7L ▲ BUILT-UP-EXPORT

●● 3.2L/3.5L



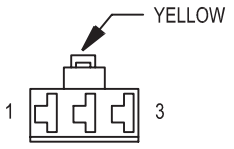
C104

CAV	CIRCUIT
1	A1 12RD
2	A2 12PK/BK
3	A41 14YL
4	V58 14BR/YL



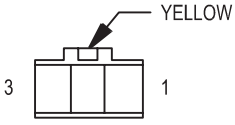
C104

CAV	CIRCUIT
1	A1 12RD
2	A2 12PK/BK
3	A41 12YL
4	V58 14BR/YL ●



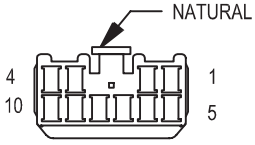
C105

CAV	CIRCUIT
1	L13 18BR/YL
2	A141 12DG/WT
3	A4 10BK/PK



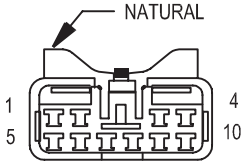
C105

CAV	CIRCUIT
1	L13 18BR/YL
2	A141 12DG/WT
3	A4 10BK/PK



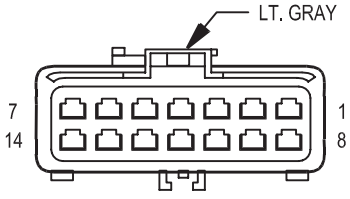
C106

CAV	CIRCUIT
1	B1 18YL/DB
2	B2 18YL
3	B3 18LG/DB
4	B4 18LG
5	T5 20LG/RD
6	T44 20YL/LB
7	L95 16DG/YL ●
8	F18 20LG/BK
9	K107 18OR/RD
10	K106 18WT/DG



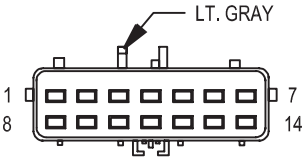
C106

CAV	CIRCUIT
1	B1 18YL/DB
2	B2 18YL
3	B3 18LG/DB
4	B4 18LG
5	T5 20LG/RD
6	T44 20YL/LB
7	L95 16DG/YL
8	F18 20LG/BK
9	K107 20OR/RD
10	K106 18WT/DG



C107

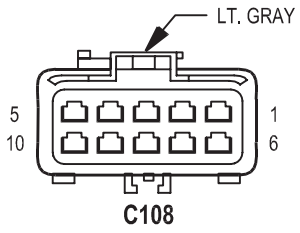
CAV	CIRCUIT
1	T41 20BK/WT
2	L1 20VT/BK
3	F20 20WT
4	T1 20LG/BK
5	T3 20VT
6	T42 20VT/WT
7	T41 20BR/YL
8	T54 20VT/PK
9	T13 20DB/BK
10	K4 18BK/LB
11	K341 20PK/WT
12	K141 20TN/WT
13	T52 20RD/BK
14	T14 20LG/WT



C107

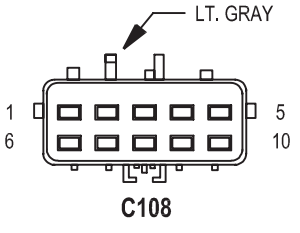
CAV	CIRCUIT
1	T41 20BK/WT
2	L1 20VT/BK
3	F20 20WT
4	T1 20LG/BK
5	T3 20VT
6	T42 20VT/WT
7	T41 20BR/YL
8	T54 20VT/PK
9	T13 20DB/BK
10	K4 18BK/LB
11	K341 20PK/WT
12	K141 20TN/WT
13	T52 20RD/BK
14	T14 20LG/WT

● BUILT-UP-EXPORT



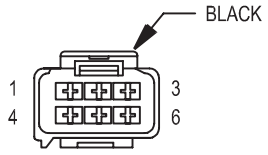
C108

CAV	CIRCUIT
1	T9 16OR/BK
2	T19 16WT
3	Z1 18BK
4	T60 16BR
5	T59 16PK
6	T50 16DG
7	T47 16YL/BK
8	F142 18OR/DG
9	T20 16LB
10	T16 16RD



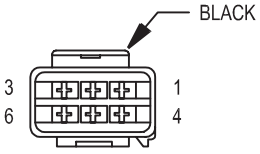
C108

CAV	CIRCUIT
1	T9 16OR/BK
2	T19 16WT
3	Z1 18BK
4	T60 16BR
5	T59 16PK
6	T50 16DG
7	T47 16YL/BK
8	F142 18OR/DG
9	T20 16LB
10	T16 16RD



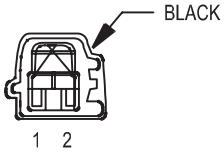
C109

CAV	CIRCUIT
1	L60 18TN
2	L7 18BK/YL ▲
3	L61 18LG
4	-
5	L39 20LB
6	Z1 18BK



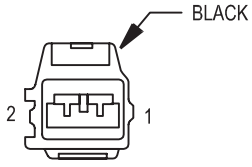
C109

CAV	CIRCUIT
1	L60 20TN ●
1	L60 18TN ●●
2	L7 20BK/YL
3	L61 20LG ●
3	L61 18LG ●●
4	-
5	L39 20LB
6	Z1 20BK



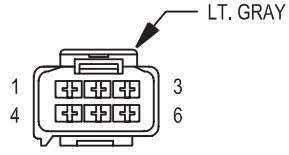
C110

CAV	CIRCUIT
1	K4 18BK/LB
2	K45 18BK/VT



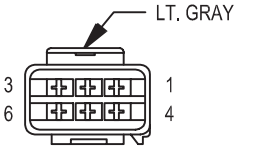
C110

CAV	CIRCUIT
1	K4 18BK/LB
2	K45 18BK/VT



C111

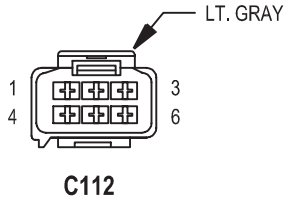
CAV	CIRCUIT
1	L43 20VT
2	L7 20BK/YL
3	Z1 20BK
4	-
5	L13 20BR/YL
6	L33 20RD



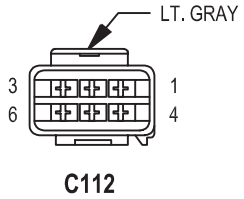
C111

CAV	CIRCUIT
1	L43 20VT
2	L7 20BK/YL
3	Z1 20BK
4	-
5	L13 20BR/YL
6	L33 20RD

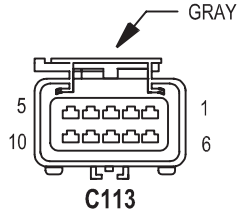
● LHS
●● 300M/CONCORDE
▲ EXCEPT 300M



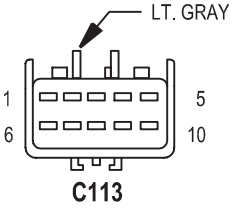
CAV	CIRCUIT
1	L44 20VT/RD
2	L7 20BK/YL
3	Z1 20BK
4	-
5	L13 20BR/YL
6	L34 20RD/OR



CAV	CIRCUIT
1	L44 20VT/RD
2	L7 20BK/YL
3	Z1 20BK
4	-
5	L13 20BR/YL
6	L34 20RD/OR

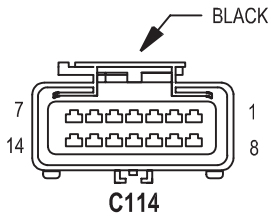


CAV	CIRCUIT
1	L7 18BK/YL
2	L13 18BR/YL
3	L39 20LB
4	L33 20RD
5	L34 20RD/OR
6	L43 20VT
7	L44 20VT/RD
8	V53 14RD/OR
9	L60 18TN
10	L61 18LG



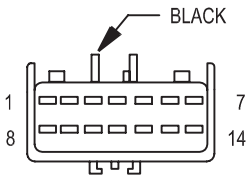
CAV	CIRCUIT
1	L7 18BK/YL ●
1	L7 18BK/YL ●
1	L7 18BK/YL ●●
2	L13 18BR/YL
3	L39 20LB ●
3	L39 20LB ●
3	L39 20LB ●●
4	L33 20RD
5	L34 20RD/OR
6	L43 20VT
7	L44 20VT/RD
8	V53 14RD/OR
9	L60 18TN ▲▲
9	L60 18TN ▲▲
9	L60 18TN ▲
10	L61 18LG ▲▲
10	L61 18LG ▲▲
10	L61 18LG ▲

● DODGE
●● EXCEPT DODGE
▲ LHS
▲▲ EXCEPT LHS



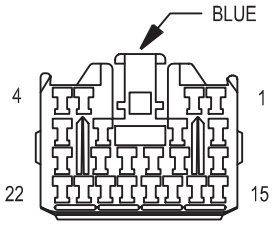
C114

CAV	CIRCUIT
1	K4 20BK/LB
2	K6 20VT/WT
3	C18 20DB
4	X2 18DG/RD
5	K52 18PK/BK
6	K108 18DG/LG
7	C57 20DB/GY
8	G31 20VT/LG
9	C23 12DG
10	C25 14YL
11	-
12	-
13	-
14	-



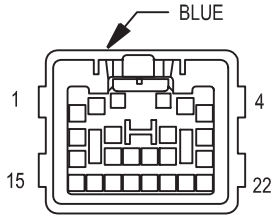
C114

CAV	CIRCUIT
1	K4 20BK/LB
2	K6 20VT/WT
3	C18 20DB
4	X2 18DG/RD
5	K52 18PK/BK
6	K108 18DG/LG
7	C57 20DB/GY
8	G31 20VT/LG
9	C23 12DG
10	C25 14YL
11	-
12	-
13	-
14	-



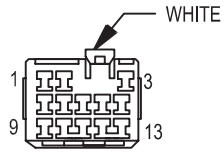
C200

CAV	CIRCUIT
1	G75 20TN
2	G72 20DG/OR
3	G74 20TN/RD
4	G74 20TN/RD
5	G74 20TN/RD
6	G71 18VT/WT
7	G4 20DB
8	P97 20WT/DG
9	G78 20TN/BK
10	Z2 18BK/LG
11	G10 20LG/RD
12	D25 20VT/YL
13	G73 20LG/OR
14	P96 20WT/LG
15	L95 18DG/YL
16	-
17	-
18	L13 18BR/YL
19	F14 18LG/YL
20	C80 20DB/WT
21	L50 16WT/TN
22	X60 20DG/RD



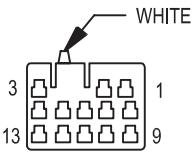
C200

CAV	CIRCUIT
1	G75 20TN
2	G72 20DG/OR
3	G74 20TN/RD
4	G74 20TN/RD
5	G74 20TN/RD
6	G71 18VT/WT
7	G4 20DB
8	P97 20WT/DG
9	G78 20TN/BK
10	Z2 18BK/LG ●
10	Z2 20BK/LG ●●
11	G10 20LG/RD
12	D25 18VT/YL ●
12	D25 20VT/YL ●●
13	G73 20LG/OR
14	P96 20WT/LG
15	L95 16DG/YL
16	-
17	-
18	L13 18BR/YL
19	F14 18LG/YL
20	C80 20DB/WT
21	L50 16WT/TN
22	X60 20DG/RD



C201

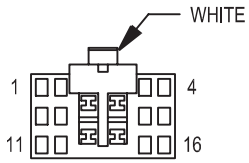
CAV	CIRCUIT
1	F62 16RD
2	X51 18BR/YL
3	X52 18DB/WT
4	X53 18DG
5	X54 18VT
6	X55 18BR/RD
7	X57 18BR/LB
8	X58 18DB/OR
9	X56 18DB/RD
10	X88 18PK/RD
11	X89 18PK/BK
12	X60 20DG/RD
13	F62 16RD/WT



C201

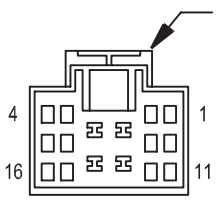
CAV	CIRCUIT
1	F62 16RD
2	X51 18BR/YL
3	X52 18DB/WT
4	X53 18DG
5	X54 18VT
6	X55 18BR/RD
7	X57 18BR/LB
8	X58 18DB/OR
9	X56 18DB/RD
10	X88 18PK/RD
11	X89 18PK/BK
12	X60 20DG/RD
13	F62 16RD/WT

● 300M/BUILT-UP-EXPORT
●● EXCEPT 300M/BUILT-UP-EXPORT



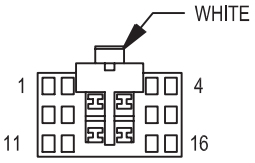
C202
(MTC)

CAV	CIRCUIT
1	C34 22BR/WT
2	C35 22DG/YL
3	C33 22DB/RD
4	C32 22GY/DB
5	C57 20DB/GY
6	C26 22PK/DB
7	C7 12BK/TN
8	C1 12DG
9	C12 22LG/BK
10	C36 22RD/WT
11	C37 22YL/WT
12	C4 18TN
13	C5 16LG
14	C6 16LB
15	-
16	-



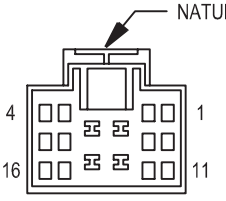
C202
(MTC)

CAV	CIRCUIT
1	C34 20BR/WT
2	C35 22DG/YL
3	C33 22DB/RD
4	C32 20GY/DB
5	C57 20DB/GY
6	C26 22PK/DB
7	C7 12BK/TN
8	C1 12DG
9	C12 20LG/BK
10	C36 22RD/WT
11	C37 22YL/WT
12	C4 18TN
13	C5 16LG
14	C6 16LB
15	-
16	-



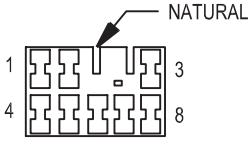
C203
(ATC)

CAV	CIRCUIT
1	C34 22BR/WT
2	C35 22DG/YL
3	C33 22DB/RD
4	C32 22GY/DB
5	C57 20DB/GY
6	C26 22PK/DB
7	-
8	C1 12DG
9	C12 22LG/BK
10	C36 22RD/WT
11	C37 22YL/WT
12	-
13	Z1 12BK
14	-
15	C56 22RD/LG
16	-



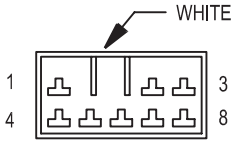
C203
(ATC)

CAV	CIRCUIT
1	C34 20BR/WT
2	C35 22DG/YL
3	C33 22DB/RD
4	C32 20GY/DB
5	C57 20DB/GY
6	C26 22PK/DB
7	-
8	C1 12DG
9	C12 20LG/BK
10	C36 22RD/WT
11	C37 22YL/WT
12	-
13	Z1 12BK
14	-
15	C56 22RD/LG
16	-



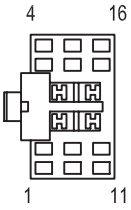
C204

CAV	CIRCUIT
1	Q41 20WT
2	-
3	A37 16RD
4	-
5	Z1 16BK
6	G5 20DB/WT
7	Q43 20VT
8	Q42 20LB



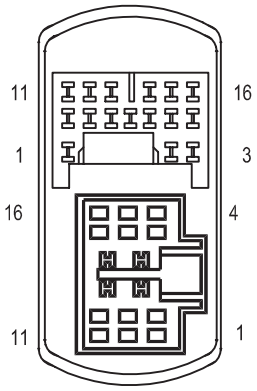
C204

CAV	CIRCUIT
1	A37 16RD
2	-
3	Q41 20WT
4	Q42 20LB
5	Q43 20VT
6	G5 20DB/WT
7	Z1 16BK
8	-



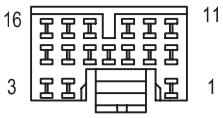
C300

CAV	CIRCUIT
1	Q17 14DB/WT
2	X81 18YL/BK ▲
3	P33 16OR
4	Q26 14VT/WT
5	Q18 14GY/BK
6	X87 18LG/VT ▲
	X53 18DG ▲▲
7	Q27 14RD/BK
8	F21 14TN
9	X83 18YL/RD ▲
10	P55 16DB
11	Q16 14BR/WT
12	M2 20YL
13	Q1 14YL
14	Z1 14BK
15	X85 18LG/BK ▲
	X55 18BR/RD ▲▲
16	Q28 14DG/WT



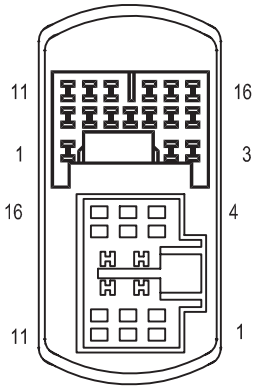
C300

CAV	CIRCUIT
1	Q17 14DB/WT
2	X81 18YL/BK ▲
3	P33 16OR
4	Q26 14VT/WT
5	Q18 14GY/BK
6	X87 18LG/VT
7	Q27 14RD/BK
8	F21 14TN
9	X83 18YL/RD ▲
10	P55 16DB
11	Q16 14BR/WT
12	M2 20YL
13	Q1 14YL
14	Z1 14BK
15	X85 18LG/BK
16	Q28 14DG/WT



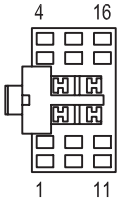
C301

CAV	CIRCUIT
1	G5 20DB/WT
2	C16 20LB/YL
3	M1 20PK
4	P72 20YL/BK
	P72 20YL/BK
5	P70 20WT
	P70 20WT
6	P74 20DB
	P74 20DB
7	G73 20LG/OR
8	P97 20WT/DG
9	P64 20YL/OR
10	P65 20DB/YL
11	P69 20WT/RD
12	P71 20YL ●
13	P75 20BK/WT ●
14	P73 20YL/PK ●
15	G75 20TN
16	P161 20GY/LB



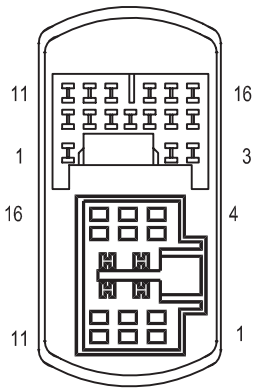
C301

CAV	CIRCUIT
1	G5 20DB/WT
2	C16 20LB/YL
3	M1 20PK
4	P72 20YL/BK
5	P70 20WT
6	P74 20DB
7	G73 20LG/OR
8	P97 20WT/DG
9	P64 20YL/OR
10	P65 20DB/YL
11	P69 20WT/RD
12	P71 20YL ●
13	P75 20BK/WT ●
14	P73 20YL/PK ●
15	G75 20TN
16	P161 20GY/LB



C302

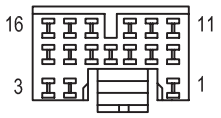
CAV	CIRCUIT
1	-
2	X84 18OR/BK ▲
3	P33 16OR
4	Q26 14VT/WT
5	-
6	X80 18LB/BK ▲
6	X56 18DB/RD
7	-
8	-
9	X86 18OR/RD ▲
10	P34 16PK/BK ▲▲
11	Q16 14BR/WT
12	M2 20YL
13	Q1 14YL
14	Z1 20BK
15	X82 18LB/RD ▲
15	X54 18VT ▲▲
16	-



C302

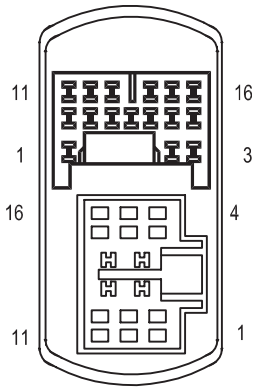
▲ MIDLINE AND PREMIUM AUDIO
▲▲ BASE
● EXCEPT MEMORY

CAV	CIRCUIT
1	-
2	X84 18OR/BK ▲
3	P33 16OR
4	Q26 14VT/WT
5	-
6	X80 18LB/BK
7	-
8	-
9	X86 18OR/RD ▲
10	P34 16PK/BK
11	Q16 14BR/WT
12	M2 20YL
13	Q1 14YL
14	Z1 20BK
15	X82 18LB/RD
16	-



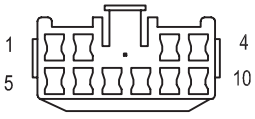
C303

CAV	CIRCUIT
1	G5 20DB/WT
2	C16 20LB/YL
3	M1 20PK
4	P72 20YL/BK
	P72 20YL/BK ■
5	P70 20WT
	P70 20WT ■
6	P74 20DB
7	G72 20DG/OR
8	P96 20WT/LG
9	P67 20YL/RD ●
10	P68 20DG/RD ●
11	P66 20WT/BK ●
12	-
13	-
14	-
15	G74 20TN/RD
16	P162 20GY/WT ●



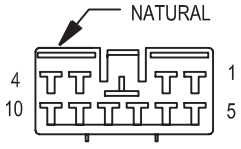
C303

CAV	CIRCUIT
1	G5 20DB/WT
2	C16 20LB/YL
3	M1 20PK
4	P72 20YL/BK
5	P70 20WT
6	P74 20DB
7	G72 20DG/OR
8	P96 20WT/LG
9	P67 20YL/RD ●
10	P68 20DG/RD ●
11	P66 20WT/BK ●
12	-
13	-
14	-
15	G74 20TN/RD
16	P162 20GY/WT ●



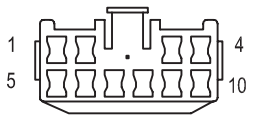
C304

CAV	CIRCUIT
1	Z1 20BK
2	M2 20YL
3	P33 16OR
4	-
5	P34 16PK/BK
6	M1 20PK
7	Q27 14RD/BK
8	G74 20TN/RD
9	Q1 14YL
10	Q17 14DB/WT



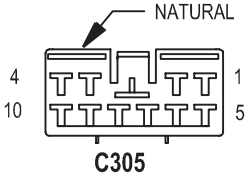
C304

CAV	CIRCUIT
1	Z1 20BK
2	M2 20YL ●
3	P33 16OR
4	-
5	P34 16PK/BK
6	M1 20PK ●
7	Q28 14DG/WT
8	G74 20TN/RD
9	Q1 14YL
10	Q18 14GY/BK



C305

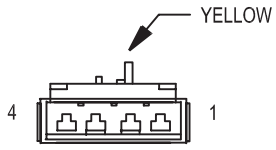
CAV	CIRCUIT
1	Z1 20BK
2	M2 20YL
3	P33 16OR
4	-
5	P34 16PK/BK
6	M1 20PK
7	Q28 14DG/WT
8	G74 20TN/RD
9	Q1 14YL
10	Q18 14GY/BK



C305

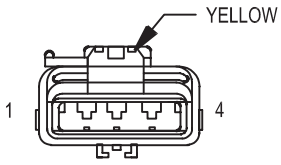
CAV	CIRCUIT
1	Z1 20BK
2	M2 20YL ●
3	P33 16OR
4	-
5	P34 16PK/BK
6	M1 20PK ●
7	Q28 14DG/WT
8	G74 20TN/RD
9	Q1 14YL
10	Q18 14GY/BK

■ MEMORY
● 300M/LHS



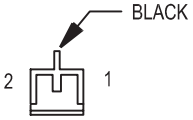
C306
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK
2	F35 16RD
3	R32 18LB/OR ■
4	R34 18LB/WT ■



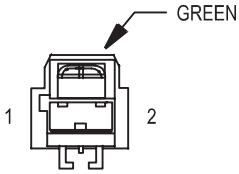
C306
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK ▲
1	Z1 20BK
2	F35 16RD
3	R32 18LB/OR ■ ●
3	R32 18LB/OR ■ ●●
4	R34 18LB/WT ■ ●
4	R34 18LB/WT ■ ●●



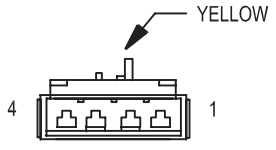
C306
(EXCEPT
BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK
2	F35 16RD



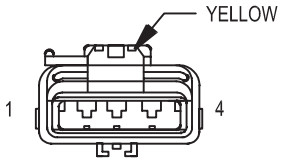
C306
(EXCEPT
BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK ▲
1	Z1 20BK
2	F35 16RD



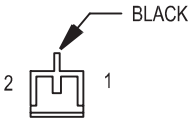
C307
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK
2	F35 16RD
3	R32 18LB/OR ■
4	R34 18LB/WT ■



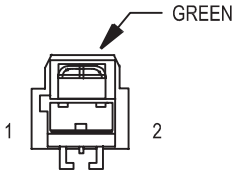
C307
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK ▲
1	Z1 20BK
2	F35 16RD
3	R32 18LB/OR ■ ●
3	R32 18LB/OR ■ ●●
4	R34 18LB/WT ■ ●
4	R34 18LB/WT ■ ●●



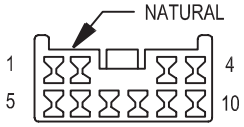
C307
(EXCEPT
BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK
2	F35 16RD



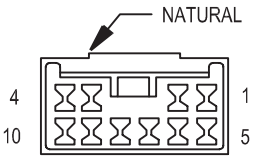
C307
(EXCEPT
BUILT-UP-EXPORT)

CAV	CIRCUIT
1	Z1 16BK ▲
1	Z1 20BK
2	F35 16RD



C308

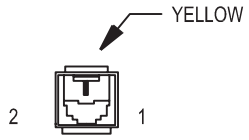
CAV	CIRCUIT
1	-
2	G4 14DB
3	K106 18WT/DG
4	-
5	-
6	K107 20OR/RD
7	A141 12DG/WT
8	Z1 12BK
9	F18 20LG/BK
10	-



C308

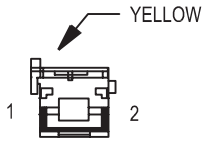
CAV	CIRCUIT
1	-
2	G4 20DB
3	K106 18WT/DG
4	-
5	-
6	K107 20OR/RD
7	A141 12DG/WT
8	Z1 12BK
9	F18 20LG/BK
10	-

● DRIVERS SEAT
●● PASSENGER SEAT
▲ HEATED SEATS
■ BUILT-UP-EXPORT



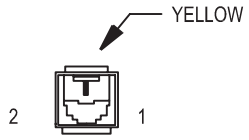
C309
(300M)
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	P31 18 LG/OR
2	P33 18LG/WT



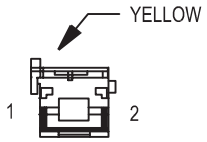
C309
(300M)
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	R31 18LG/OR ▲
1	R32 18LB/OR ▲▲
2	R33 18LG/WT ▲
2	R34 18LB/WT ▲▲



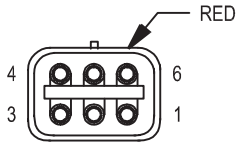
C310
(300M)
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	P32 18 LB/OR
2	P34 18LB/WT



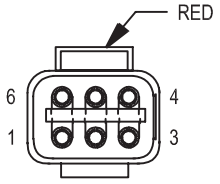
C310
(300M)
(BUILT-UP-EXPORT)

CAV	CIRCUIT
1	R32 18LB/OR
2	R34 18LB/WT



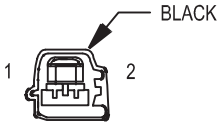
C311

CAV	CIRCUIT
1	G78 20TN/BK
2	P2 20BK/WT
3	G71 20VT/YL
4	Z1 16BK
5	L50 18WT/TN ● ●
5	L50 16WT/TN ●
6	-



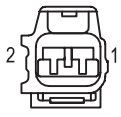
C311

CAV	CIRCUIT
1	G78 20TN/BK
2	P2 20BK/WT
3	G71 18VT/WT
4	Z1 16BK
5	L50 16WT/TN
6	-



C312

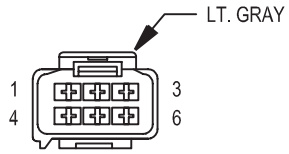
CAV	CIRCUIT
1	L7 18BK/YL
2	Z1 18BK



C312

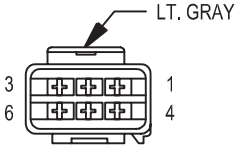
CAV	CIRCUIT
1	L7 18BK/YL
2	Z1 18BK

● DODGE ▲ MANUAL POWER SEAT
●● 300M ▲▲ MEMORY POWER SEAT



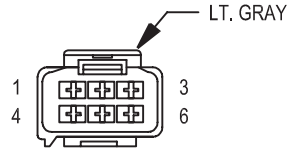
C313

CAV	CIRCUIT
1	L50 16WT/TN
2	L60 16TN
3	L95 16DG/YL ●●
4	L7 18BK/YL
5	L1 20VT/BK
6	Z1 16BK



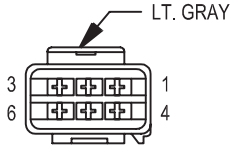
C313

CAV	CIRCUIT
1	L50 18WT/TN
2	L60 18LG/TN ▲
2	L61 18LG/TN ▲▲
3	L95 18DG/YL ●●
4	L7 18BK/YL
5	L1 18VT/BK ■
6	Z1 18BK



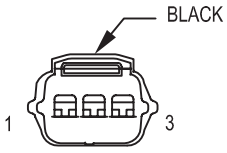
C314

CAV	CIRCUIT
1	L50 16WT/TN
2	L61 16LG
3	L95 16DG/YL ●●
4	L7 18BK/YL
5	L1 20VT/BK
6	Z1 16BK



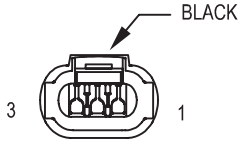
C314

CAV	CIRCUIT
1	L50 18WT/TN
2	L60 18LG/TN ▲
2	L61 18LG/TN ▲▲
3	L95 18DG/YL ●●
4	L7 18BK/YL
5	L1 18VT/BK ■
6	Z1 18BK



C315
(LHS)

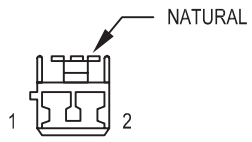
CAV	CIRCUIT
1	L1 18VT/BK
2	Z1 18BK
3	L7 18BK/YL



C315
(LHS)

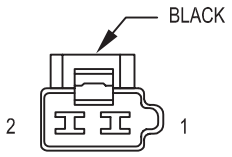
CAV	CIRCUIT
1	L1 18VT/BK
2	Z1 18BK
3	L7 18BK/YL

■ EXCEPT LHS
● DODGE ▲ 300M/BUILT-UP-EXPORT
●● 300M ▲▲ EXCEPT 300M/BUILT-UP-EXPORT



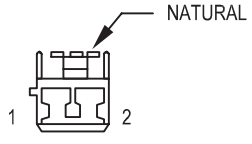
C316

CAV	CIRCUIT	
1	X95 18WT/VT	•
2	X97 18WT/DG	•



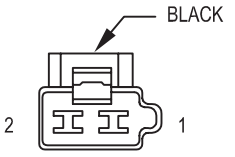
C316

CAV	CIRCUIT	
1	X98 18TN/VT	•
2	X96 18TN/DG	•



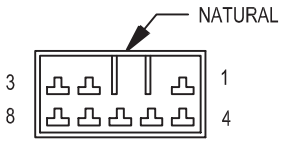
C317

CAV	CIRCUIT	
1	X98 18TN/VT	•
2	X96 18TN/DG	•



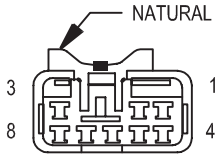
C317

CAV	CIRCUIT	
1	X98 18TN/VT	•
2	X96 18TN/DG	•



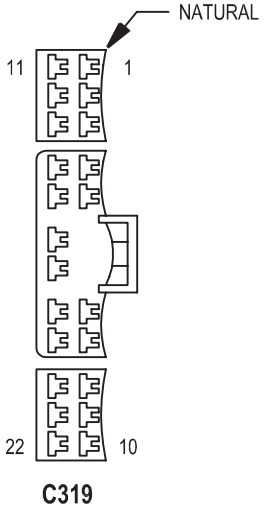
C318

CAV	CIRCUIT
1	G5 20DB/WT
2	P142 20TN/DB
3	P130 16RD/TN
4	P144 20BK/LG
5	P134 20TN/LG
6	P140 20VT/BK
7	P138 20VT/LG
8	-



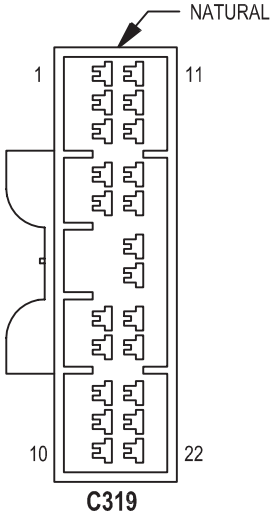
C318

CAV	CIRCUIT
1	P130 16RD/TN
2	P142 20TN/DB
3	G5 20DB/WT
4	-
5	P138 20VT/LG
6	P140 20VT/BK
7	P134 20TN/LG
8	P144 20BK/LG



C319

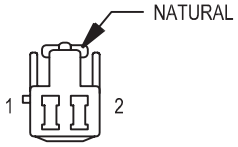
CAV	CIRCUIT
1	D25 20VT/YL
2	G5 20DB/WT
3	P70 20WT
4	P72 20YL/BK
5	P74 20DB
6	P142 20TN/DB
7	P130 16RD/TN
8	P144 20BK/LG
9	P134 20TN/LG
10	P140 20VT/BK
11	P138 20VT/LG
12	P71 20YL
13	P75 20BK/WT
14	P73 20YL/PK
15	P64 20YL/OR
16	P65 20DB/YL
17	P161 20GY/LB
18	P69 20WT/RD
19	P67 20YL/RD
20	P68 20DG/RD
21	P162 20GY/WT
22	P66 20WT/BK



C319

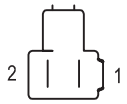
CAV	CIRCUIT
1	D25 20VT/YL
2	G5 20DB/WT
3	P70 20WT
4	P72 20YL/BK
5	P74 20DB
6	P142 20TN/DB
7	P130 16RD/TN
8	P144 20BK/LG
9	P134 20TN/LG
10	P140 20VT/BK
11	P138 20VT/LG
12	P71 20YL
13	P75 20BK/WT
14	P73 20YL/PK
15	P64 20YL/OR
16	P65 20DB/YL
17	P161 20GY/LB
18	P69 20WT/RD
19	P67 20YL/RD
20	P68 20DG/RD
21	P162 20GY/WT
22	P66 20WT/BK

• PREMIUM II AUDIO



C320
(LHS/CONCORDE)

CAV	CIRCUIT
1	L50 18WT/TN
2	Z1 18BK



C320
(LHS/CONCORDE)

CAV	CIRCUIT
1	L50 16WT/TN
2	Z1 16BK



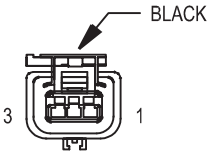
C321
(300M)

CAV	CIRCUIT
A	L50 18WT/TN
B	Z1 18BK



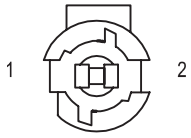
C321
(300M)

CAV	CIRCUIT
A	L50 16BK/TN
B	Z1 18BK



CAMSHAFT
POSITION
SENSOR

CAV	CIRCUIT	FUNCTION
1	K7 20OR	8V SUPPLY
2	K4 20BK/LB	SENSOR GROUND
3	K44 20TN/YL	CAMSHAFT POSITION SENSOR SIGNAL



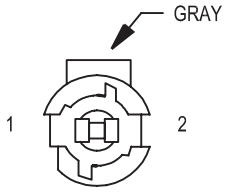
CENTER HIGH
MOUNTED STOP
LAMP
(300M)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L50 18BK/TN	BRAKE LAMP SWITCH OUTPUT



CENTER HIGH MOUNTED STOP LAMP NO.1 (DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 16WT/TN	BRAKE LAMP SWITCH OUTPUT
2	Z1 16BK	GROUND



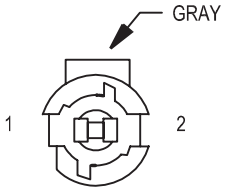
CENTER HIGH MOUNTED STOP LAMP NO.1 (LHS/CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	Z1 18BK	GROUND



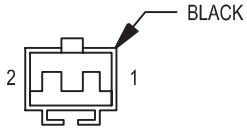
CENTER HIGH MOUNTED STOP LAMP NO.2 (DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 16WT/TN	BRAKE LAMP SWITCH OUTPUT
2	Z1 16BK	GROUND



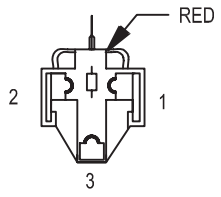
CENTER HIGH MOUNTED STOP LAMP NO.2 (LHS/CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	Z1 18BK	GROUND
	Z1 18BK	GROUND



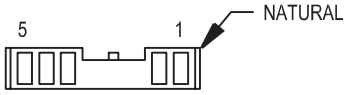
CENTER INSTRUMENT PANEL SPEAKER

CAV	CIRCUIT	FUNCTION
1	X89 18PK/BK	AMPLIFIED CENTER INSTRUMENT PANEL SPEAKER (-)
2	X88 18PK/RD	AMPLIFIED CENTER INSTRUMENT PANEL SPEAKER (+)



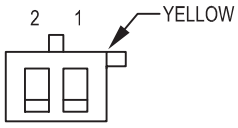
CIGAR LIGHTER

CAV	CIRCUIT	FUNCTION
1	F30 18RD ●	FUSED B(+)
1	F30 18RD ●●	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
2	-	
3	Z1 18BK	GROUND



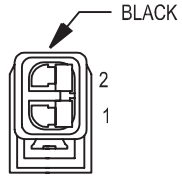
CLOCKSPRING NO. 1

CAV	CIRCUIT	FUNCTION
1	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL
2	K4 20BK/LB	SENSOR GROUND
3	X3 16BK/RD	HORN RELAY CONTROL
4	-	-
5	-	-



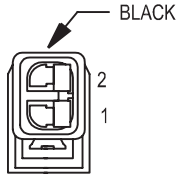
CLOCKSPRING NO. 2

CAV	CIRCUIT	FUNCTION
1	R43 18BK/LB	DRIVER SQUIB NO. 1 LINE 2
2	R45 18DG/LB	DRIVER SQUIB NO. 1 LINE 1



COIL ON PLUG NO. 1

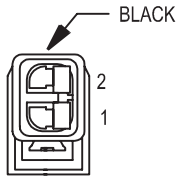
CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K91 16TN/RD	COIL ON PLUG DRIVER NO. 1



COIL ON PLUG NO. 2

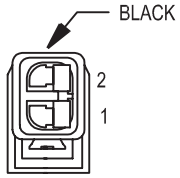
CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K92 16TN/PK	COIL ON PLUG DRIVER NO. 2

● BATTERY POSITION
●● IGNITION POSITION



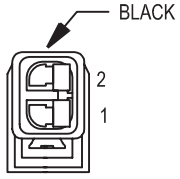
COIL ON PLUG NO. 3

CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K93 16TN/OR	COIL ON PLUG DRIVER NO. 3



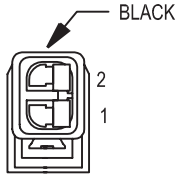
COIL ON PLUG NO. 4

CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K94 16TN/LG	COIL ON PLUG DRIVER NO. 4



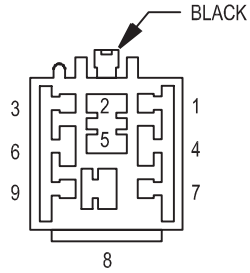
COIL ON PLUG NO. 5

CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K95 16TN/DG	COIL ON PLUG DRIVER NO. 5



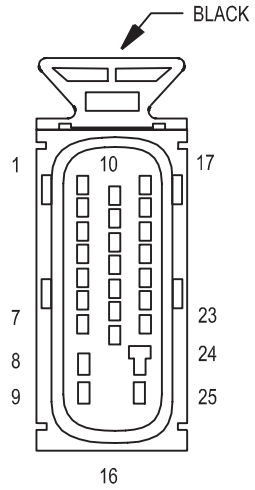
COIL ON PLUG NO. 6

CAV	CIRCUIT	FUNCTION
1	F42 16DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
2	K96 16TN/LB	COIL ON PLUG DRIVER NO. 6



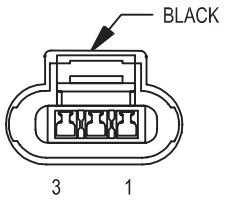
COMBINATION FLASHER

CAV	CIRCUIT	FUNCTION
1	-	-
2	L32 18RD	COMBINATION FLASHER OUTPUT
3	-	-
4	Z1 20BK	GROUND
5	L91 22DB/PK	COMBINATION FLASHER SWITCHED GROUND
6	A15 18PK	FUSED B(+)
7	-	-
8	L5 22BK/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
9	-	-



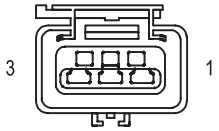
CONTROLLER ANTILOCK BRAKE

CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
3	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)
4	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)
5	-	-
6	-	-
7	-	-
8	Z1 12BK	GROUND
9	A20 12RD/DB	FUSED B(+)
10	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)
11	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
12	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
13	-	-
14	-	-
15	-	-
16	-	-
17	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)
18	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
19	-	-
20	D25 18YL/VT	PCI BUS
21	-	-
22	-	-
23	F20 18WT/VT	FUSED IGNITION SWITCH OUTPUT (RUN)
24	Z1 12BK	GROUND
25	A10 12RD/DG	FUSED B(+)

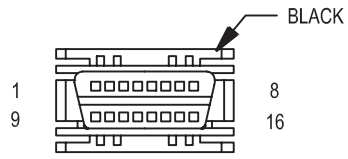


CRANKSHAFT POSITION SENSOR (2.7L)

CAV	CIRCUIT		FUNCTION
1	K24 20GY/BK	◇	CRANKSHAFT POSITION SENSOR SIGNAL
1	K7 20OR	◇◇	8V SUPPLY
2	K4 20BK/LB		SENSOR GROUND
3	K7 20OR	◇	8V SUPPLY
3	K24 20GY/BK	◇◇	CRANKSHAFT POSITION SENSOR SIGNAL



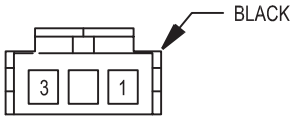
CRANKSHAFT POSITION SENSOR (3.2L/3.5L)



DATA LINK CONNECTOR

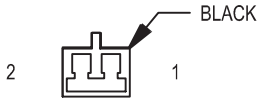
CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20VT/YL	PCI BUS
3	-	-
4	Z1 20BK	GROUND
5	Z2 20BK/LG	GROUND
6	D20 20LG	SCI RECEIVE (PCM)
7	D21 20PK/TN	SCI TRANSMIT
8	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	D6 20PK/LB	SCI RECEIVE (TCM)
15	-	-
16	M1 20PK	FUSED B(+)

◇ 2.7L
◇◇ 3.2L/3.5L



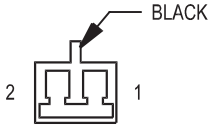
DECKLID RELEASE SOLENOID/ AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	G78 20TN/BK	DECKLID AJAR SWITCH SENSE
3	P2 20BK/WT	DECKLID RELEASE CONTROL



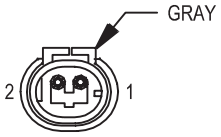
DECKLID RELEASE SWITCH

CAV	CIRCUIT	FUNCTION
1	P1 20BK/WT	DECKLID RELEASE SWITCH OUTPUT
2	M1 20PK	FUSED B(+)



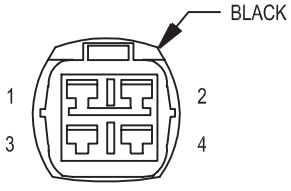
DRIVER DOOR COURTESY LAMP

CAV	CIRCUIT	FUNCTION
1	M2 20YL	COURTESY LAMPS DRIVER
2	M1 20PK	FUSED B(+)



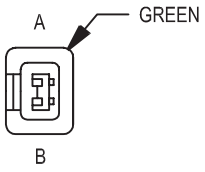
DRIVER DOOR CYLINDER LOCK SWITCH

CAV	CIRCUIT	FUNCTION
1	G73 20LG/OR	DRIVER DOOR CYLINDER LOCK SWITCH SENSE
2	M1 20PK	FUSED B(+)



DRIVER DOOR LOCK MOTOR/ AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	G75 20TN	DRIVER DOOR AJAR SWITCH SENSE
2	Z1 20BK	GROUND
3	P55 16DB	DRIVER DOOR UNLOCK RELAY OUTPUT
4	P33 16OR	DOOR LOCK RELAY OUTPUT



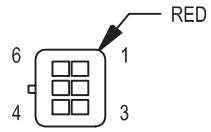
DRIVER HEATED SEAT BACK

CAV	CIRCUIT		FUNCTION
A	P88 16BR/BK		HEATED SEAT DRIVER
B	Z1 18BK	••	GROUND
B	Z1 20BK	•	GROUND



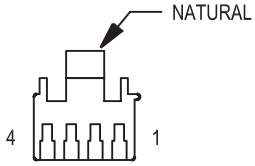
DRIVER HEATED SEAT CUSHION

CAV	CIRCUIT	FUNCTION
A	P131 16RD/DG	DRIVER SEAT HEATER B(+) DRIVER
B	P88 16BR/BK	HEATED SEAT DRIVER
C	P141 20TN/LB	DRIVER SEAT TEMPERATURE SENSOR INPUT
D	P143 20BK/DG	DRIVER SEAT TEMPERATURE 5V SUPPLY



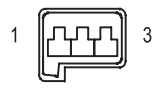
DRIVER HEATED SEAT SWITCH

CAV	CIRCUIT		FUNCTION
1	P137 20VT/DG		DRIVER SEAT LOW HEAT LED DRIVER
2	-		-
3	Z1 20BK	••	GROUND
3	Z1 18BK	•	GROUND
4	G5 20DB/WT		FUSED IGNITION SWITCH OUTPUT (ST-RUN)
5	P139 20VT/WT		DRIVER SEAT HIGH HEAT LED DRIVER
6	P133 20TN/DG		DRIVER SEAT HEATER SWITCH MUX



DRIVER POWER DOOR LOCK SWITCH

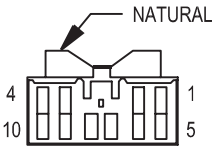
CAV	CIRCUIT	FUNCTION
1	M1 20PK	FUSED B(+)
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	Z1 20BK	GROUND
4	P97 20WT/DG	DRIVER FRONT DOOR SWITCH MUX



DRIVER POWER MIRROR (EXCEPT MEMORY)

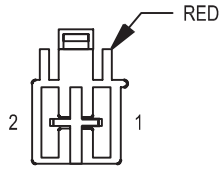
CAV	CIRCUIT	FUNCTION
1	P71 20YL	DRIVER MIRROR UP DRIVER
2	P73 20YL/PK	DRIVER MIRROR COMMON DRIVER
3	P75 20BK/WT	DRIVER MIRROR LEFT DRIVER

• MEMORY SEATS
•• EXCEPT MEMORY SEATS



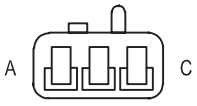
DRIVER POWER MIRROR (MEMORY)

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	P73 20YL/PK ▲	DRIVER MIRROR COMMON DRIVER (RIGHT/DOWN)
3	C16 20LB/YL	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
4	P71 20YL ▲	DRIVER MIRROR UP DRIVER
5	P75 20BK/WT ▲	DRIVER MIRROR LEFT DRIVER
6	P161 20GY/LB	DRIVER MIRROR SENSOR 5V SUPPLY
7	P64 20YL/OR	DRIVER MIRROR VERTICAL POSITION SIGNAL
8	-	-
9	P65 20DB/YL	DRIVER MIRROR HORIZONTAL POSITION SIGNAL
10	P69 20WT/RD	DRIVER MIRROR SENSOR GROUND



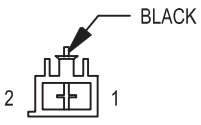
DRIVER POWER SEAT FRONT RISER MOTOR

CAV	CIRCUIT	FUNCTION
1	P19 18YL/LG ●●	DRIVER SEAT FRONT UP
1	P119 16YL/LG ●	SEAT FRONT UP DRIVER
2	P21 18RD/LG ●●	DRIVER SEAT FRONT DOWN
2	P121 16RD/LG ●	SEAT FRONT DOWN DRIVER



DRIVER POWER SEAT FRONT RISER MOTOR SENSOR (MEMORY)

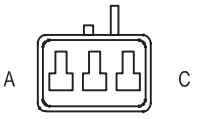
CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSOR GROUND
B	P26 20BR	FRONT RISER POSITION SENSOR SIGNAL
C	P29 20 BR/WT	SEAT SENSOR 5V SUPPLY



DRIVER POWER SEAT HORIZONTAL MOTOR

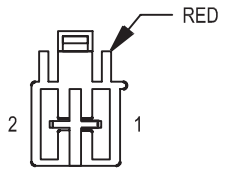
CAV	CIRCUIT	FUNCTION
1	P15 18YL/LB ●●	DRIVER SEAT HORIZONTAL REARWARD DRIVER
	P115 16YL/DB ●	DRIVER SEAT HORIZONTAL FORWARD DRIVER
2	P17 18RD/LB ●●	DRIVER SEAT HORIZONTAL FORWARD DRIVER
	P117 16RD/LB ●	DRIVER SEAT HORIZONTAL REARWARD DRIVER

● MEMORY SEATS
●● EXCEPT MEMORY SEATS
▲ 300M/LHS



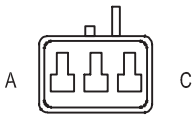
DRIVER POWER SEAT HORIZONTAL MOTOR SENSOR (MEMORY)

CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSOR GROUND
B	P25 20VT/RD	SEAT HORIZONTAL POSITION SIGNAL
C	P29 20BR/WT	SEAT SENSOR 5V SUPPLY



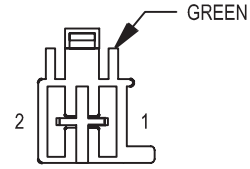
DRIVER POWER SEAT REAR RISER MOTOR

CAV	CIRCUIT		FUNCTION
1	P11 18YL/WT	••	SEAT REAR UP SWITCH SENSE
1	P111 16YL/WT	•	SEAT REAR UP DRIVER
2	P13 18RD/WT	••	SEAT REAR DOWN SWITCH SENSE
2	P113 16RD/WT	•	SEAT REAR DOWN DRIVER



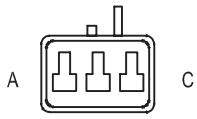
DRIVER POWER SEAT REAR RISER MOTOR SENSOR (MEMORY)

CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSOR GROUND
B	P27 20LB/RD	REAR RISER POSITION SIGNAL
C	P29 20BR/WT	SEAT SENSOR 5V SUPPLY



DRIVER POWER SEAT RECLINER MOTOR

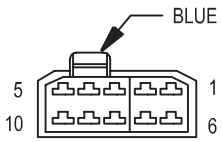
CAV	CIRCUIT	FUNCTION
1	P41 16GY/WT	DRIVER SEAT RECLINER DOWN DRIVER
2	P43 16GY/LB	DRIVER SEAT RECLINER UP DRIVER



DRIVER POWER SEAT RECLINER MOTOR SENSOR (MEMORY)

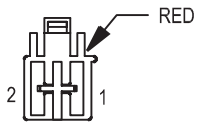
CAV	CIRCUIT	FUNCTION
A	P29 20BR/WT	SEAT SENSOR 5V SUPPLY
B	P47 20LB	RECLINER POSITION SIGNAL
C	P28 20BR/RD	SEAT POSITION SENSOR GROUND

• MEMORY SEATS
•• EXCEPT MEMORY SEATS



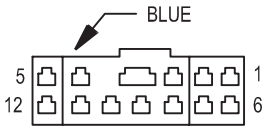
DRIVER POWER SEAT SWITCH

CAV	CIRCUIT		FUNCTION
1	F35 16RD	●●	FUSED B(+)
1	P9 20RD	●	SEAT SWITCH B(+)
2	P41 16GY/WT	●●	DRIVER SEAT RECLINER SWITCH UP
2	P48 20GY/WT	●	DRIVER SEAT RECLINER DOWN
3	P17 18RD/LB	●●	DRIVER SEAT HORIZONTAL REARWARD
3	P17 18RD/LB	●	SEAT HORIZONTAL REARWARD SWITCH SENSE
4	P43 16GY/LB	●●	DRIVER SEAT RECLINER SWITCH DOWN
4	P40 20GY/LB	●	DRIVER SEAT RECLINER UP
5	Z1 16BK	●●	GROUND
5	Z1 18BK	●	GROUND
6	P21 18RD/LG	●●	DRIVER SEAT FRONT DOWN
6	P21 18RD/LG	●	SEAT FRONT DOWN SWITCH SENSE
7	P13 18RD/WT	●●	DRIVER SEAT REAR DOWN
7	P13 18RD/WT	●	SEAT REAR DOWN SWITCH SENSE
8	P11 18YL/WT	●●	DRIVER SEAT REAR UP
8	P11 18YL/WT	●	SEAT REAR UP SWITCH SENSE
9	P19 18YL/LG	●●	DRIVER SEAT FRONT UP
9	P19 18YL/LG	●	SEAT FRONT UP SWITCH SENSE
10	P15 18YL/LB	●●	DRIVER SEAT HORIZONTAL FORWARD
10	P15 18YL/LB	●	SEAT HORIZONTAL FORWARD SWITCH SENSE



DRIVER POWER WINDOW MOTOR

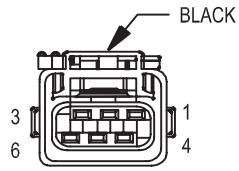
CAV	CIRCUIT	FUNCTION
1	Q21 16WT	DRIVER WINDOW DRIVER (DOWN)
2	Q11 16LB	DRIVER WINDOW DRIVER (UP)



DRIVER POWER WINDOW SWITCH

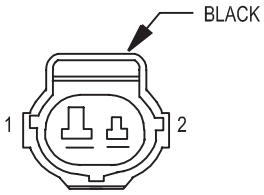
CAV	CIRCUIT	FUNCTION
1	F21 14TN	FUSED IGNITION SWITCH OUTPUT (RUN)
2	Q17 14DB/WT	LEFT REAR WINDOW DRIVER (UP)
3	Q27 14RD/BK	LEFT REAR WINDOW DRIVER (DOWN)
4	Q18 14GY/BK	RIGHT REAR WINDOW DRIVER (UP)
5	Q1 14YL	POWER WINDOW SWITCH FEED
6	-	-
7	Q11 16LB	DRIVER WINDOW DRIVER (UP)
8	Q21 16WT	DRIVER WINDOW DRIVER (DOWN)
9	Q28 14DG/WT	RIGHT REAR WINDOW DRIVER (DOWN)
10	Z1 14BK	GROUND
11	Q26 14VT/WT	MASTER WINDOW SWITCH PASSENGER (DOWN)
12	Q16 14BR/WT	MASTER WINDOW SWITCH PASSENGER (UP)

● MEMORY SEATS
●● WITHOUT MEMORY SEATS



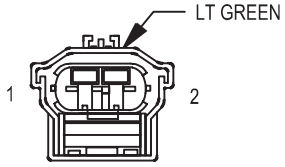
EGR SOLENOID

CAV	CIRCUIT	FUNCTION
1	K235 20LG/PK	EGR SENSOR SIGNAL
2	K6 20VT/WT	5V SUPPLY
3	K4 18BK/LB	SENSOR GROUND
4	K35 20GY/YL	EGR SOLENOID CONTROL
5	-	-
6	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



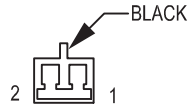
ENGINE COOLANT TEMPERATURE SENSOR

CAV	CIRCUIT	FUNCTION
1	K2 20TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
2	K4 20BK/LB	SENSOR GROUND



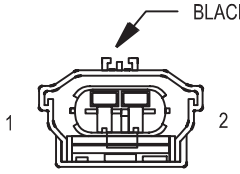
ENGINE OIL PRESSURE SWITCH

CAV	CIRCUIT	FUNCTION
1	G6 20GY	OIL PRESSURE SWITCH SENSE
2	-	-



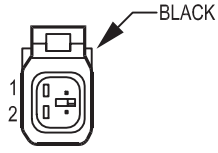
EVAPORATOR TEMPERATURE SENSOR

CAV	CIRCUIT	FUNCTION
1	C12 20LG/BK	EVAPORATOR TEMPERATURE SENSOR SIGNAL
2	C57 20DB/GY	SENSOR GROUND



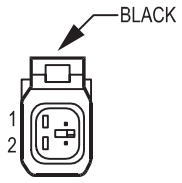
EVAP/PURGE SOLENOID

CAV	CIRCUIT	FUNCTION
1	K52 18PK/BK	EVAPORATIVE EMISSION SOLENOID CONTROL
2	K108 18DG/LG	EVAPORATIVE SOLENOID SENSE



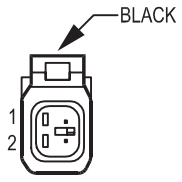
FUEL INJECTOR NO. 1

CAV	CIRCUIT	FUNCTION
1	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



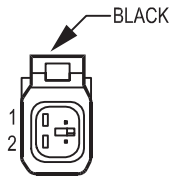
FUEL INJECTOR NO. 2

CAV	CIRCUIT	FUNCTION
1	K12 18TN/WT	FUEL INJECTOR NO. 2 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



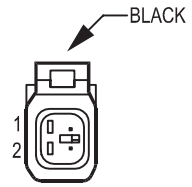
FUEL INJECTOR NO. 3

CAV	CIRCUIT	FUNCTION
1	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



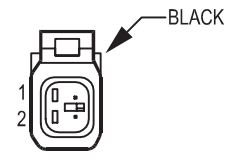
FUEL INJECTOR NO. 4

CAV	CIRCUIT	FUNCTION
1	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



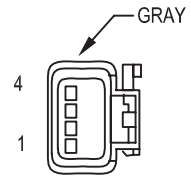
FUEL INJECTOR NO. 5

CAV	CIRCUIT	FUNCTION
1	K38 18GY	FUEL INJECTOR NO. 5 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



FUEL INJECTOR NO. 6

CAV	CIRCUIT	FUNCTION
1	K58 18BR/DB	FUEL INJECTOR NO. 6 DRIVER
2	F42 18DG/LG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



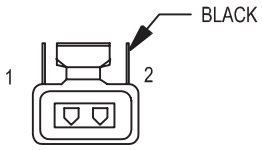
FUEL PUMP MODULE

CAV	CIRCUIT	FUNCTION
1	Z1 12BK	GROUND
2	Z1 12BK	GROUND
3	G4 14DB	FUEL LEVEL SENSOR SIGNAL
4	A141 12DG/WT	FUEL PUMP RELAY OUTPUT



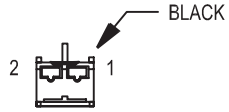
GENERATOR (2.7L)

CAV	CIRCUIT	FUNCTION
1	K20 18DG	GENERATOR FIELD DRIVER
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



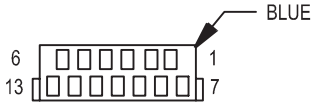
GENERATOR (3.2L/3.5L)

CAV	CIRCUIT	FUNCTION
1	K20 18DG	GENERATOR FIELD DRIVER
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



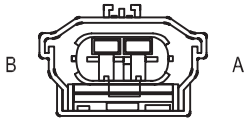
GLOVE BOX LAMP

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	M1 20PK	FUSED B(+)



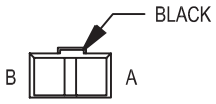
HEADLAMP SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 18BK/LB	GROUND
2	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
3	E19 20RD	PANEL LAMPS DIMMER SIGNAL
4	Z1 20BK	GROUND
5	L95 18DG/YL	REAR FOG LAMP RELAY OUTPUT
6	L80 20WT	HEADLAMP SWITCH RETURN
7	-	-
8	L13 18BR/YL	HEADLAMP ADJUST SIGNAL
9	E2 20OR	PANEL LAMPS DRIVER
10	L96 18LG/RD	REAR FOG LAMP SWITCH GROUND
11	L39 20LB	FOG LAMP RELAY OUTPUT
12	G52 20YL	HEADLAMP SWITCH MUX
13	-	-



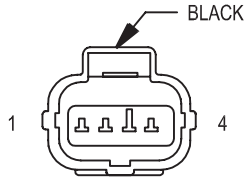
HEADLAMP WASHER PUMP MOTOR (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
A	Z1 14BK	GROUND
B	V53 14RD/OR	HEADLAMP WASHER RELAY OUTPUT



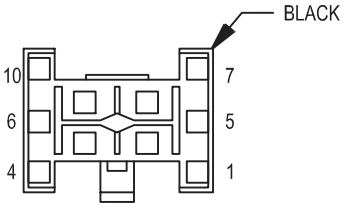
HEATED MIRROR FUSE

CAV	CIRCUIT	FUNCTION
A	C16 20LB/YL	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
B	C15 10BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT



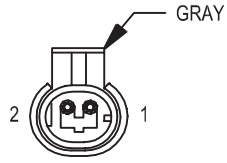
IDLE AIR CONTROL MOTOR

CAV	CIRCUIT	FUNCTION
1	K39 20GY/RD	IDLE AIR CONTROL NO. 1 DRIVER
2	K60 20YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
3	K40 20BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
4	K59 20VT/BK	IDLE AIR CONTROL NO. 4 DRIVER



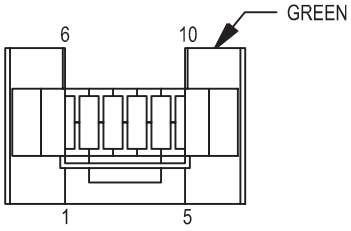
IGNITION SWITCH

CAV	CIRCUIT	FUNCTION
1	A81 14DG/RD	IGNITION SWITCH OUTPUT (ST-RUN-OFF)
2	G26 22LB	KEY-IN IGNITION SWITCH SENSE
3	Z2 20BK/LG	GROUND
4	A21 12DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
5	A1 12RD	FUSED B(+)
6	A31 12BK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
7	A2 12PK/BK	FUSED B(+)
8	-	-
9	A41 14YL	FUSED IGNITION SWITCH OUTPUT (START)
10	A22 12BK/OR	FUSED IGNITION SWITCH OUTPUT (RUN)



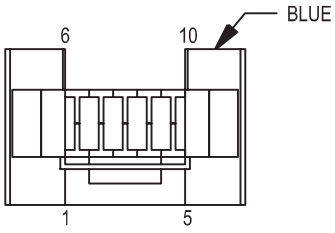
INPUT SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	T13 20DB/BK	SPEED SENSOR GROUND
2	T52 20RD/BK	INPUT SPEED SENSOR SIGNAL



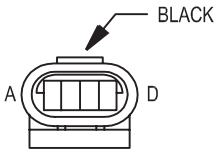
INSTRUMENT CLUSTER - C1

CAV	CIRCUIT	FUNCTION
1	F33 18PK/RD	FUSED B(+)
2	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
3	M1 20PK	FUSED B(+)
4	E2 20OR	PANEL LAMPS DRIVER
5	D25 20VT/YL	PCI BUS
6	Z2 22BK/LG	GROUND
7	-	-
8	L60 18TN	RIGHT TURN SIGNAL
9	-	-
10	L324 20WT/LG	HIGH BEAM RELAY CONTROL



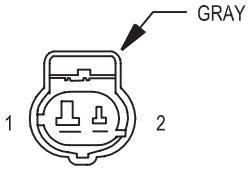
INSTRUMENT CLUSTER - C2

CAV	CIRCUIT	FUNCTION
1	-	-
2	G5 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	G9 22GY/BK	RED BRAKE WARNING INDICATOR DRIVER
4	G29 22BK/TN	WASHER FLUID SWITCH SENSE
5	L61 18LG	LEFT TURN SIGNAL
6	Z1 22BK	GROUND
7	-	-
8	B27 20RD/YL	TRACTION CONTROL SWITCH SENSE
9	G78 20TN/BK	DECKLID AJAR SWITCH SENSE
10	G6 22GY	ENGINE OIL PRESSURE SWITCH SENSE



INTAKE AIR TEMPERATURE/ MANIFOLD ABSOLUTE PRESSURE SENSOR (3.2L/3.5L)

CAV	CIRCUIT	FUNCTION
A	K4 18BK/LB	SENSOR GROUND
B	K21 20BK/RD	INTAKE AIR TEMPERATURE SIGNAL
C	K6 20VT/WT	5V SUPPLY
D	K1 20DG/RD	MAP SENSOR SIGNAL



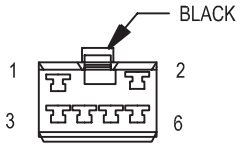
INTAKE AIR TEMPERATURE SENSOR (2.7L)

CAV	CIRCUIT	FUNCTION
1	K21 20BK/RD	INTAKE AIR TEMPERATURE SIGNAL
2	K4 20BK/LB	SENSOR GROUND



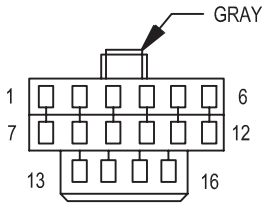
JUNCTION BLOCK BODY CONTROL MODULE - JB

CAV	CIRCUIT	FUNCTION
1	Z1	GROUND
2	M2	COURTESY LAMP DRIVER
3	S76	SPEED PROPORTIONAL STEERING SOLENOID (-)
4	S77	SPEED PROPORTIONAL STEERING SOLENOID (+)
5	G5	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
6	L7	PARK LAMP RELAY OUTPUT
7	M1	FUSED B(+)
8	P2	DECKLID RELEASE CONTROL
9	-	
10	D25	PCI BUS (OTIS)
11	-	
12	-	
13	P109	DRIVER DOOR UNLOCK RELAY CONTROL
14	L307	LOW BEAM RELAY CONTROL
15	P38	DOOR LOCK RELAY CONTROL
16	L308	PARK LAMP RELAY CONTROL
17	L26	FOG LAMP RELAY CONTROL
18	X3	HORN RELAY CONTROL
19	P36	DOOR UNLOCK RELAY CONTROL
20	Z2	GROUND



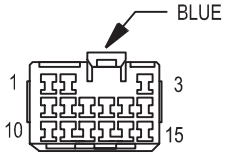
JUNCTION BLOCK - C1

CAV	CIRCUIT	FUNCTION
1	F32 16PK/DB	FUSED B(+)
2	A21 12DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	A31 12BK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
4	-	-
5	F30 18RD	FUSED B(+)
6	C1 12DG	BLOWER MOTOR FEED



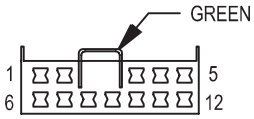
JUNCTION BLOCK - C2

CAV	CIRCUIT	FUNCTION
1	-	-
2	L39 20LB	FOG LAMP RELAY OUTPUT
3	-	-
4	-	-
5	-	-
6	X3 16BK/RD	HORN RELAY CONTROL
7	F13 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
8	Z20 20BK/OR	GROUND
9	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
10	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
11	L5 22BK/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
12	L40 20BR/WT	FUSED FOG LAMP FEED
13	L60 18TN	RIGHT TURN SIGNAL
14	L60 18TN	RIGHT TURN SIGNAL
15	L61 18LG	LEFT TURN SIGNAL
16	L61 18LG	LEFT TURN SIGNAL



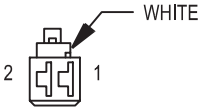
JUNCTION BLOCK - C3

CAV	CIRCUIT	FUNCTION
1	A81 14DG/RD	IGNITION SWITCH OUTPUT (ST-RUN-OFF)
2	X12 20RD	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
3	-	-
4	Z2 18BK/LG	GROUND
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	G9 22GY/BK	RED BRAKE WARNING INDICATOR DRIVER
14	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
15	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)



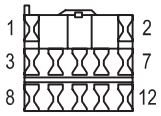
JUNCTION BLOCK - C4

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	HEADLAMP SWITCH OUTPUT
2	M1 20PK	FUSED B(+)
3	F33 18PK/RD	FUSED B(+)
4	F33 18PK/RD	FUSED B(+)
5	L324 20WT/LG	SWITCHED HIGH BEAM RELAY CONTROL
6	F62 16RD	FUSED B(+)
7	-	-
8	M1 18PK	FUSED B(+)
9	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
10	-	-
11	G5 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
12	L324 20WT/LG	SWITCHED HIGH BEAM RELAY CONTROL



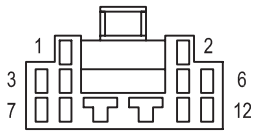
JUNCTION BLOCK - C5

CAV	CIRCUIT	FUNCTION
1	A1 12RD	FUSED B(+)
2	A22 12BK/OR	IGNITION SWITCH OUTPUT (RUN)



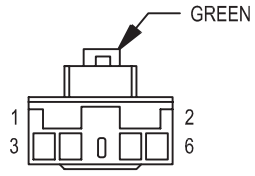
JUNCTION BLOCK - C6

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	P33 16OR	DOOR LOCK RELAY DRIVER
4	P33 16OR	DOOR LOCK RELAY DRIVER
5	P33 16OR	DOOR LOCK RELAY DRIVER
6	-	-
7	P55 16DB	DRIVER DOOR UNLOCK RELAY OUTPUT
8	M2 20YL	COURTESY LAMPS DRIVER
9	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
10	L60 16TN	RIGHT TURN SIGNAL
11	L61 16LG	LEFT TURN SIGNAL
12	L1 20VT/BK ●	BACK-UP LAMP FEED
12	L1 18VT/BK ●●	BACK-UP LAMP FEED



JUNCTION BLOCK - C7

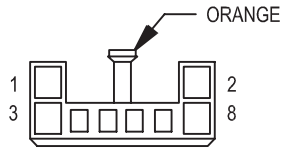
CAV	CIRCUIT	FUNCTION
1	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER
2	P2 20BK/WT	DECKLID RELEASE CONTROL
3	F35 16RD	FUSED B(+)
4	F35 16RD	FUSED B(+)
5	M1 20PK	FUSED B(+)
6	M1 20PK	FUSED B(+)
7	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
8	L7 18BK/YL	PARK LAMP RELAY OUTPUT
9	F21 14TN	FUSED IGNITION SWITCH OUTPUT (RUN)
10	Z1 14BK	GROUND
11	P34 16PK/BK	UNLOCK RELAY OUTPUT
12	P34 16PK/BK	UNLOCK RELAY OUTPUT



JUNCTION BLOCK - C8

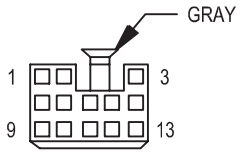
CAV	CIRCUIT	FUNCTION
1	A3 14RD/TN	FUSED B(+)
2	A37 16WT/DB	FUSED B(+)
3	L44 20VT/RD	FUSED RIGHT LOW BEAM OUTPUT
4	F12 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
5	L33 20RD	FUSED B(+)
6	L39 20LB	FOG LAMP RELAY OUTPUT

● EXCEPT LHS
●● LHS



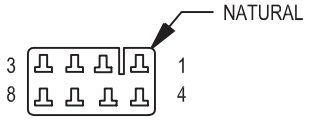
JUNCTION BLOCK - C9

CAV	CIRCUIT	FUNCTION
1	A13 12PK/WT	FUSED B(+)
2	A34 12LB/RD	FUSED B(+)
3	A7 14RD/BK	FUSED B(+)
4	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
5	F20 18WT/VT	FUSED IGNITION SWITCH OUTPUT (RUN)
6	-	-
7	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
8	X2 18DG/RD	HORN RELAY OUTPUT



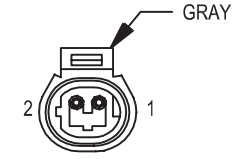
JUNCTION BLOCK - C10

CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	L61 18LG	LEFT TURN SIGNAL
3	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER
4	L34 20RD/OR	FUSED RIGHT HIGH BEAM OUTPUT
5	-	-
6	L1 20VT/BK	BACK-UP LAMP FEED
7	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
8	S77 18VT/OR ▲	SPEED PROPORTIONAL STEERING SOLENOID (+)
9	-	-
10	S76 18LG/PK ▲	SPEED PROPORTIONAL STEERING SOLENOID (-)
11	L7 18BK/YL	PARK LAMP RELAY OUTPUT
12	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
13	L43 20VT	FUSED LEFT LOW BEAM OUTPUT



JUNCTION BLOCK - C11

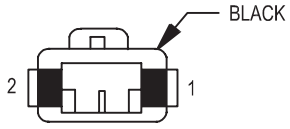
CAV	CIRCUIT	FUNCTION
1	Z1 20BK ●	GROUND
1	Z1 16BK ●●	GROUND
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	Z2 20BK/LG	GROUND
4	M2 20YL	COURTESY LAMPS DRIVER
5	A37 16RD ●●	FUSED B(+)
6	M1 20PK	FUSED B(+)
7	L1 20VT/BK	BACK UP LAMP FEED
8	D25 20VT/YL	PCI BUS



KNOCK SENSOR (2.7L)

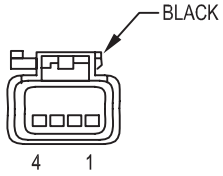
CAV	CIRCUIT	FUNCTION
1	K4 18BK/LB	SENSOR GROUND
2	K45 18BK/VT	KNOCK SENSOR SIGNAL

● BASE ▲ EXCEPT BUILT-UP-EXPORT
●● PREMIUM



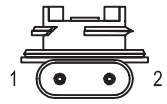
KNOCK SENSOR (3.2L/3.5L)

CAV	CIRCUIT	FUNCTION
1	K45 20BK/VT	KNOCK SENSOR RETURN
2	K42 20DB/LG	KNOCK SENSOR SIGNAL



LEAK DETECTION PUMP

CAV	CIRCUIT	FUNCTION
1	-	-
2	F18 20LG/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	K106 18WT/DG	LEAK DETECTION PUMP SOLENOID CONTROL
4	K107 20OR/RD	LEAK DETECTION PUMP SWITCH SENSE



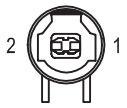
LEFT BACK-UP LAMP (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L1 18VT/BK	BACK-UP LAMP FEED
2	Z1 18BK	GROUND



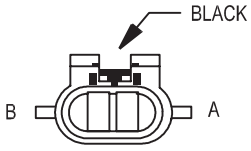
LEFT BACK-UP LAMP (CONCORDE)

CAV	CIRCUIT	FUNCTION
A	Z1 18BK	GROUND
B	L1 18VT/BK	BACK-UP LAMP FEED



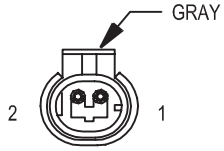
LEFT BACK-UP LAMP (LHS)

CAV	CIRCUIT	FUNCTION
1	L1 18VT/BK	BACK-UP LAMP FEED
2	Z1 18BK	GROUND



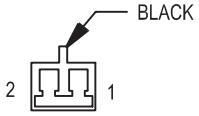
LEFT FOG LAMP (300M/LHS)

CAV	CIRCUIT	FUNCTION
A	L39 20LB	FOG LAMP RELAY OUTPUT
B	Z1 20BK	GROUND



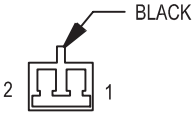
LEFT FOG LAMP (DODGE)

CAV	CIRCUIT	FUNCTION
1	L39 20LB	FOG LAMP RELAY OUTPUT
2	Z1 20BK	GROUND



LEFT FRONT DOOR SAIL SPEAKER

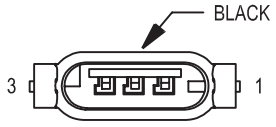
CAV	CIRCUIT		FUNCTION
1	X85 18LG/BK	●●	AMPLIFIED LEFT DOOR SPEAKER (-)
1	X81 18YL/BK	●	AMPLIFIED LEFT DOOR SAIL SPEAKER (-)
2	X87 18LG/VT	●●	AMPLIFIED LEFT DOOR SPEAKER (+)
2	X83 18YL/RD	●	AMPLIFIED LEFT DOOR SAIL SPEAKER (+)



LEFT FRONT DOOR SPEAKER

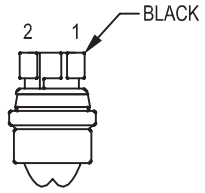
CAV	CIRCUIT	FUNCTION
1	X85 18LG/BK	AMPLIFIED LEFT DOOR SPEAKER (-)
	X85 18LG/BK	AMPLIFIED LEFT DOOR SPEAKER (-)
2	X87 18LG/VT	AMPLIFIED LEFT DOOR SPEAKER (+)
	X87 18LG/VT	AMPLIFIED LEFT DOOR SPEAKER (+)

● PREMIUM AUDIO I/II
●● MIDLINE AUDIO



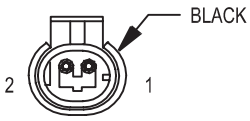
LEFT FRONT PARK/TURN SIGNAL LAMP

CAV	CIRCUIT	FUNCTION
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



LEFT FRONT SIDE MARKER LAMP (LHS)

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	L61 20LG	LEFT TURN SIGNAL



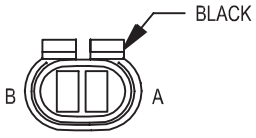
LEFT FRONT WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)
2	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)



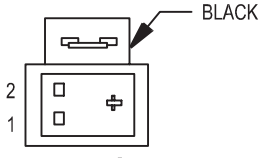
LEFT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	L13 20BK/YL	HEADLAMP ADJUST SIGNAL
3	Z1 20BK	GROUND



LEFT HIGH BEAM HEADLAMP

CAV	CIRCUIT	FUNCTION
A	L33 20RD	FUSED LEFT HIGH BEAM OUTPUT
B	Z1 20BK	GROUND



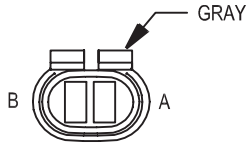
LEFT HORN

CAV	CIRCUIT	FUNCTION
1	X2 18DG/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND



LEFT LICENSE LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	PARK LAMP RELAY OUTPUT
	L7 18BK/YL	PARK LAMP RELAY OUTPUT
2	Z1 18BK	GROUND



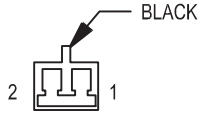
LEFT LOW BEAM HEADLAMP

CAV	CIRCUIT	FUNCTION
A	L43 20VT	FUSED LEFT LOW BEAM OUTPUT
B	Z1 20BK	GROUND



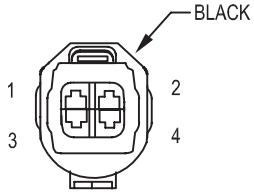
LEFT POSITION LAMP

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	Z1 20BK	GROUND



LEFT REAR DOOR COURTESY LAMP

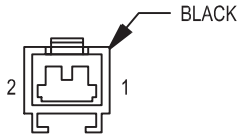
CAV	CIRCUIT		FUNCTION
1	M1 20PK		FUSED B(+)
2	M2 20YL	•	COURTESY LAMPS DRIVER
2	M52 20LG	••	COURTESY LAMPS DRIVER



LEFT REAR DOOR LOCK MOTOR/AJAR SWITCH

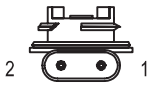
CAV	CIRCUIT	FUNCTION
1	G74 20TN/RD	DOOR AJAR SWITCH SENSE
2	Z1 20BK	GROUND
3	P34 16PK/BK	UNLOCK REPLAY OUTPUT
4	P33 16OR	LOCK RELAY RELAY OUTPUT

• BASE
•• EXCEPT BASE



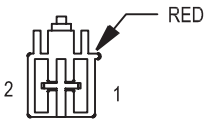
LEFT REAR DOOR SPEAKER

CAV	CIRCUIT	FUNCTION
1	X96 18TN/DG	AMPLIFIED LOW LEFT REAR SPEAKER (-)
2	X98 18TN/VT	AMPLIFIED LOW LEFT REAR SPEAKER (+)



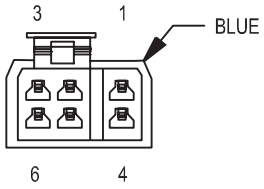
LEFT REAR FOG LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L95 18DG/YL	REAR FOG LAMP RELAY OUTPUT
2	Z1 18BK	GROUND



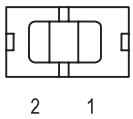
LEFT REAR POWER WINDOW MOTOR

CAV	CIRCUIT	FUNCTION
1	Q24 16DG	LEFT REAR POWER WINDOW DRIVER DOWN
2	Q14 16GY	POWER WINDOW LEFT REAR B(+) UP



LEFT REAR POWER WINDOW SWITCH

CAV	CIRCUIT	FUNCTION
1	Q24 16DG	LEFT REAR POWER WINDOW DRIVER DOWN
2	Q18 14GY/BK	LEFT REAR WINDOW DRIVER (UP)
3	-	-
4	Q28 14DG/WT	LEFT REAR WINDOW DRIVER (DOWN)
5	Q14 16GY	POWER WINDOW LEFT REAR B(+) UP
6	Q1 14YL	POWER WINDOW SWITCH FEED

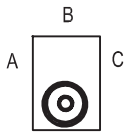


LEFT REAR READING LAMP

CAV	CIRCUIT	FUNCTION
1	M1 20PK	FUSED B(+)
2	M52 20LG ●●	LEFT REAR READING LAMP SWITCH CONTROL
	M2 20YL ●	COURTESY LAMPS DRIVER

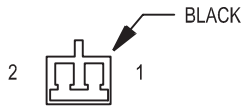
●● PREMIUM

● BASE



LEFT REAR READING LAMP SWITCH

CAV	CIRCUIT	FUNCTION
A	Z1 20BK	GROUND
B	M52 20LG	LEFT REAR READING LAMP SWITCH CONTROL
C	M2 20YL	COURTESY LAMPS DRIVER



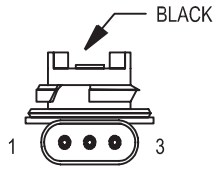
LEFT REAR SHELF SPEAKER

CAV	CIRCUIT		FUNCTION
1	X51 18BR/YL	●●	LEFT REAR SPEAKER (+)
1	X93 18WT/RD	●	AMPLIFIED HIGH LEFT REAR SPEAKER (+)
2	X57 18BR/LB	●●	LEFT REAR SPEAKER (-)
2	X91 18WT/BK	●	AMPLIFIED HIGH LEFT REAR SPEAKER (-)



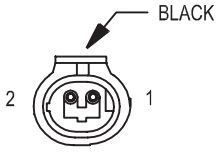
LEFT REAR SIDE MARKER LAMP (DODGE)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L7 18BK	PARK LAMP RELAY OUTPUT



LEFT REAR TURN SIGNAL LAMP (EXCEPT CONCORDE)

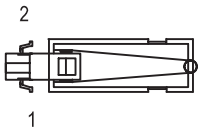
CAV	CIRCUIT		FUNCTION
1	L60 18LG/TN	▲	LEFT TURN SIGNAL
1	L61 18LG/TN	▲▲	LEFT TURN SIGNAL
2	Z1 18BK		GROUND



LEFT REAR WHEEL SPEED SENSOR

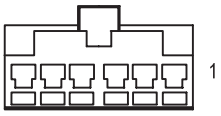
CAV	CIRCUIT	FUNCTION
1	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
2	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)

● MIDLINE AND PREMIUM AUDIO
●● BASE AUDIO
▲ BUILT-UP-EXPORT
▲▲ EXCEPT-BUILT-UP-EXPORT



LEFT SEAT AIRBAG (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	R31 18LG/OR	LEFT SEAT SQUIB LINE 1
2	R33 18LG/WT	LEFT SEAT SQUIB LINE 2



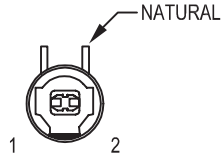
LEFT SIDE IMPACT AIRBAG CONTROL MODULE (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
2	D25 18VT/YL	PCI BUS
3	R31 18 LG/OR	LEFT SEAT SQUIB LINE 1
4	R33 18 LG/WT	LEFT SEAT SQUIB LINE 2
5	Z104 18BK/LG	GROUND
6	Z104 18BK/LG	GROUND



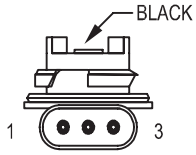
LEFT SIDE REPEATER (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L61 20LG	LEFT TURN SIGNAL
2	Z1 20BK	GROUND



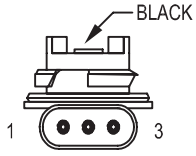
LEFT TAIL LAMP (LHS/300M)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT



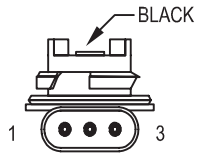
LEFT TAIL/ STOP LAMP (LHS/CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



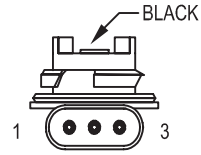
LEFT TAIL/STOP LAMP NO. 1 (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



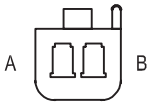
LEFT TAIL/STOP LAMP NO. 2 (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



LEFT TAIL/TURN SIGNAL LAMP (CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L61 18LG/TN	LEFT TURN SIGNAL
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



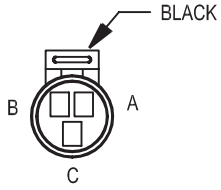
LEFT VISOR/VANITY LAMP

CAV	CIRCUIT	FUNCTION
A	M1 20PK	FUSED B(+)
B	Z1 20BK	GROUND



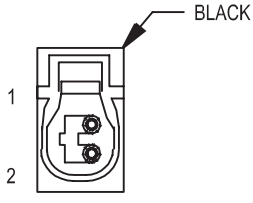
LICENSE LAMP (EXCEPT BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	PARK LAMP RELAY OUTPUT
2	Z1 18BK	GROUND



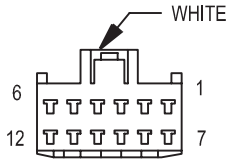
MANIFOLD ABSOLUTE PRESSURE SENSOR (2.7L)

CAV	CIRCUIT	FUNCTION
A	K4 18BK/LB	SENSOR GROUND
B	K6 20VT/WT	5V SUPPLY
C	K1 20DG/RD	MAP SENSOR SIGNAL



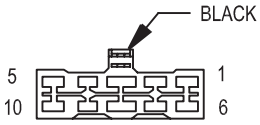
MANIFOLD TUNING VALVE

CAV	CIRCUIT	FUNCTION
1	K36 18VT/RD	MANIFOLD TUNING VALVE CONTROL
2	F42 18DG/LG	AUTOMATIC SHUT DOWN RELAY OUTPUT



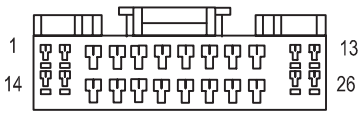
MANUAL TEMPERATURE CONTROL HEAD - C1

CAV	CIRCUIT	FUNCTION
1	C48 20VT/PK	A/C LED INDICATOR SIGNAL
2	C80 20DB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
3	Z1 20BK	GROUND
4	C57 20DB/GY	SENSOR GROUND
5	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
6	E17 20YL/BK	DAY BRIGHTNESS SENSE
7	-	-
8	-	-
9	C82 20YL/OR	TEMPERATURE SELECT
10	C58 22RD/TN	A/C MODE SWITCH MUX
11	-	-
12	E2 20OR	PANEL LAMPS DRIVER



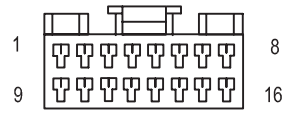
MANUAL TEMPERATURE CONTROL HEAD - C2

CAV	CIRCUIT	FUNCTION
1	C59 20VT/LG	FAN OFF SWITCH SIGNAL
2	C4 18TN	LOW BLOWER MOTOR DRIVER
3	C6 16LB	M2 BLOWER MOTOR DRIVER
4	-	-
5	Z1 12BK	GROUND
6	-	-
7	C5 16LG	M1 BLOWER MOTOR DRIVER
8	-	-
9	-	-
10	C7 12BK/TN	HIGH BLOWER MOTOR DRIVER



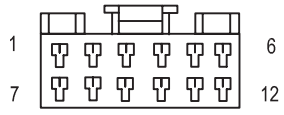
MEMORY HEATED SEAT/MIRROR MODULE - C1

CAV	CIRCUIT	FUNCTION
1	P69 20WT/RD	DRIVER MIRROR SENSOR GROUND
2	P25 20VT/RD	SEAT HORIZONTAL POSITION SIGNAL
3	P27 20LB/RD	REAR RISER POSITION SIGNAL
4	P141 20TN/LB	DRIVER SEAT TEMPERATURE SENSOR INPUT
5	P134 20TN/LG	PASSENGER SEAT HEATER MUX SWITCH
6	P67 20YL/RD	PASSENGER MIRROR VERTICAL POSITION SIGNAL
7	P64 20YL/OR	DRIVER MIRROR VERTICAL POSTION SIGNAL
8	P21 18RD/LG	SEAT FRONT DOWN SWITCH SENSE
9	P13 18RD/WT	SEAT REAR DOWN SWITCH SENSE
10	P15 18YL/LB	SEAT HORIZONTAL FORWARD SWITCH SENSE
11	P40 20GY/LB	DRIVER SEAT RECLINER UP
12	P23 18PK/RD	MEMORY POSITION 1 SWITCH SENSE
13	P22 18PK/BK	MEMORY SET SWITCH SENSE
14	P66 20WT/BK	PASSENGER MIRROR SENSOR GROUND
15	P26 20BR	FRONT RISER POSITION SIGNAL
16	P47 20LB	RECLINER POSITION SIGNAL
17	P142 20TN/DB	PASSENGER SEAT TEMPERATURE SENSOR INPUT
18	P133 20TN/DG	DRIVER SEAT HEATER MUX SWITCH
19	P68 20DG/RD	PASSENGER MIRROR HORIZONTAL POSITION SIGNAL
20	P65 20DB/YL	DRIVER MIRROR HORIZONTAL POSITION SIGNAL
21	P19 18YL/LG	SEAT FRONT UP SWITCH SENSE
22	P11 18YL/WT	SEAT REAR UP SWITCH SENSE
23	P17 18RD/LB	SEAT HORIZONTAL REARWARD SWITCH SENSE
24	P48 20GY/WT	DRIVER SEAT RECLINER DOWN
25	P24 18PK/WT	MEMORY POSITION 2 SWITCH SENSE
26	D25 20VT/YL	PCI BUS



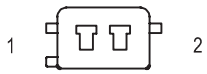
MEMORY HEATED SEAT/MIRROR MODULE - C2

CAV	CIRCUIT	FUNCTION
1	P139 20VT/WT	DRIVER SEAT HIGH HEAT LED DRIVER
2	P140 20VT/BK	PASSENGER SEAT HIGH HEAT LED DRIVER
3	P73 20YL/PK	DRIVER MIRROR COMMON DRIVER (RIGHT/DOWN)
4	P75 20BK/WT	DRIVER MIRROR LEFT DRIVER
5	P71 20YL	DRIVER MIRROR UP DRIVER
6	P29 20BR/WT	SEAT SENSOR 5V SUPPLY
7	P161 20GY/LB	DRIVER MIRROR SENSOR 5V SUPPLY
8	P162 20GY/WT	PASSENGER MIRROR SENSOR 5V SUPPLY
9	P137 20VT/DG	DRIVER SEAT LOW HEAT LED DRIVER
10	P138 20VT/LG	PASSENGER SEAT LOW HEAT LED DRIVER
11	P70 20WT	PASSENGER MIRROR COMMON DRIVER (RIGHT/DOWN)
12	P74 20DB	PASSENGER MIRROR LEFT DRIVER
13	P72 20YL/BK	PASSENGER MIRROR UP DRIVER
14	P144 20BK/LG	PASSENGER SEAT TEMPERATURE 5V SUPPLY
15	P143 20BK/DG	DRIVER SEAT TEMPERATURE 5V SUPPLY
16	P28 20BR/RD	SEAT POSITION SENSOR GROUND



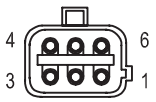
MEMORY HEATED SEAT/MIRROR MODULE - C3

CAV	CIRCUIT	FUNCTION
1	P111 16YL/WT	SEAT REAR UP DRIVER
2	P115 16YL/DB	SEAT HORIZONTAL FORWARD DRIVER
3	P119 16YL/LG	SEAT FRONT UP DRIVER
4	P113 16RD/WT	SEAT REAR DOWN DRIVER
5	P121 16RD/LG	SEAT FRONT DOWN DRIVER
6	P130 16RD/TN	PASSENGER SEAT HEATER B(+) DRIVER
7	P43 16GY/LB	DRIVER SEAT RECLINER UP DRIVER
8	P9 20RD	SEAT SWITCH B(+)
9	-	-
10	P41 16GY/WT	DRIVER SEAT RECLINER DOWN DRIVER
11	P117 16RD/LB	SEAT HORIZONTAL REARWARD DRIVER
12	P131 16RD/DG	DRIVER SEAT HEATER B(+) DRIVER



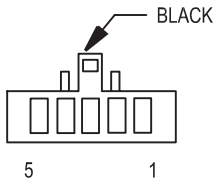
MEMORY HEATED SEAT/MIRROR MODULE - C4

CAV	CIRCUIT	FUNCTION
1	Z1 16BK	GROUND
2	F35 16RD	FUSED B(+)



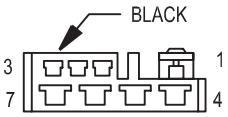
MEMORY SET SWITCH

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	Z1 18BK	GROUND
4	P24 18PK/WT	MEMORY POSITION 2 SWITCH SENSE
5	P22 18PK/BK	MEMORY SET SWITCH SENSE
6	P23 18PK/RD	MEMORY POSITION 1 SWITCH SENSE



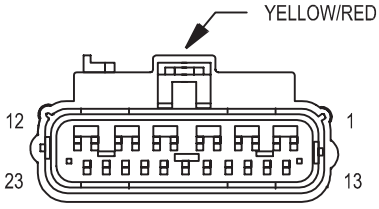
MODE DOOR ACTUATOR

CAV	CIRCUIT	FUNCTION
1	C35 22DG/YL	MODE DOOR DRIVER
2	C57 22DB/GY	SENSOR GROUND
3	C37 22YL/WT	MODE DOOR FEEDBACK SIGNAL
4	C26 22PK/DB	5V SUPPLY
5	C34 22BR/WT	COMMON DOOR DRIVER



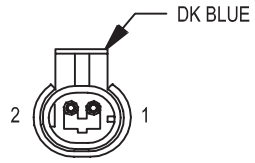
MULTI-FUNCTION SWITCH

CAV	CIRCUIT	FUNCTION
1	F13 20DB	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
2	V10 20BR	FRONT WASHER PUMP MOTOR CONTROL
3	V52 20DG/RD	FRONT WIPER MUX SWITCH SIGNAL
4	L40 20BR/WT	FUSED LOW BEAM RELAY OUTPUT
5	F33 18PK/RD	FUSED B(+)
6	-	-
7	L324 20WT/LG	SWITCHED HIGH BEAM RELAY CONTROL



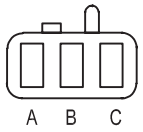
OCCUPANT RESTRAINT CONTROLLER

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	-	-
4	-	-
5	R42 18BK/YL	PASSENGER SQUIB NO. 1 LINE 1
6	R44 18DG/YL	PASSENGER SQUIB NO. 1 LINE 2
7	-	-
8	-	-
9	-	-
10	-	-
11	R45 18DG/LB	DRIVER SQUIB NO. 1 LINE 1
12	R43 18BK/LB	DRIVER SQUIB NO. 1 LINE 2
13	-	-
14	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
15	F23 18DB/YL	FUSED IGNITION SWITCH OUTPUT (RUN)
16	Z2 18BK/LG	GROUND
17	-	-
18	-	-
19	-	-
20	-	-
21	D25 18VT/YL	PCI BUS
22	-	-
23	-	-



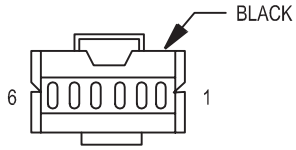
OUTPUT SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	T13 20DB/BK	SPEED SENSOR GROUND
2	T14 20LG/WT	OUTPUT SPEED SENSOR SIGNAL



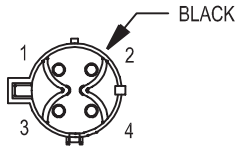
OVERHEAD MAP/COURTESY LAMP

CAV	CIRCUIT	FUNCTION
A	M1 20PK	FUSED B(+)
B	M2 20YL	COURTESY LAMPS DRIVER
C	Z1 20BK	GROUND



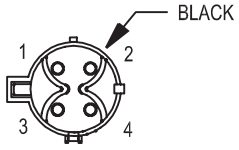
OVERHEAD TRAVEL INFORMATION SYSTEM

CAV	CIRCUIT	FUNCTION
1	-	-
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	Z2 20BK/LG	GROUND
4	M1 20PK	FUSED B(+)
5	D25 20VT/YL	PCI BUS
6	-	-



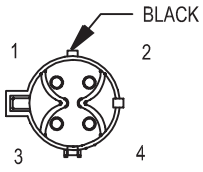
OXYGEN SENSOR 1/1 RIGHT BANK UP

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K127 18BK/OR	OXYGEN SENSOR GROUND
4	K41 20BK/DG	OXYGEN SENSOR 1/1 SIGNAL



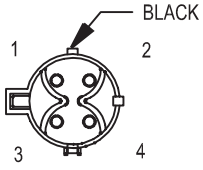
OXYGEN SENSOR 1/2 RIGHT BANK DOWN

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K4 18BK/LB	SENSOR GROUND
4	K141 20TN/WT	OXYGEN SENSOR 1/2 SIGNAL



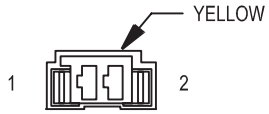
OXYGEN SENSOR 2/1 LEFT BANK UP

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT
3	K127 18BK/OR	OXYGEN SENSOR GROUND
4	K241 20LG/RD	OXYGEN SENSOR 2/1 SIGNAL



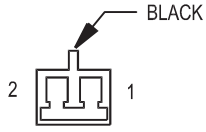
OXYGEN SENSOR 2/2 LEFT BANK DOWN

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	F142 18OR/DG	FUSED AUTOMATIC SHUTDOWN RELAY OUTPUT
3	K4 18BK/LB	SENSOR GROUND
4	K341 20PK/WT	OXYGEN SENSOR 2/2 SIGNAL



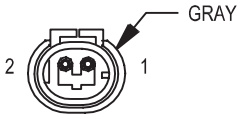
PASSENGER AIRBAG

CAV	CIRCUIT	FUNCTION
1	R42 18BK/YL	PASSENGER SQUIB NO. 1 LINE 1
2	R44 18DG/YL	PASSENGER SQUIB NO. 1 LINE 2



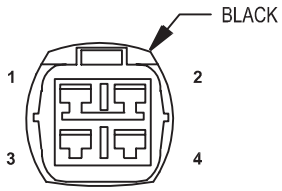
PASSENGER DOOR COURTESY LAMP

CAV	CIRCUIT	FUNCTION
1	M2 20YL	COURTESY LAMPS DRIVER
2	M1 20PK	FUSED B(+)



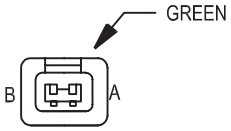
PASSENGER DOOR CYLINDER LOCK SWITCH

CAV	CIRCUIT	FUNCTION
1	G72 20DG/OR	PASSENGER DOOR CYLINDER LOCK SWITCH SENSE
2	M1 20PK	FUSED B(+)



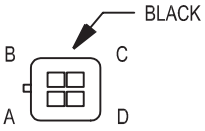
PASSENGER DOOR LOCK MOTOR/ AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	G74 20TN/RD	DOOR AJAR SWITCH SENSE
2	Z1 20BK	GROUND
3	P34 16PK/BK	UNLOCK RELAY OUTPUT
4	P33 16OR	LOCK RELAY OUTPUT



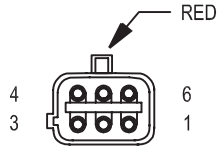
PASSENGER HEATED SEAT BACK

CAV	CIRCUIT	FUNCTION
A	P88 16BR/BK	HEATED SEAT DRIVER
B	Z1 18BK	GROUND



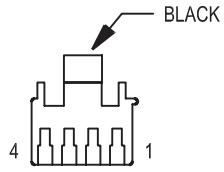
PASSENGER HEATED SEAT CUSHION

CAV	CIRCUIT	FUNCTION
A	P130 16RD/TN	PASSENGER SEAT HEATER B(+) DRIVER
B	P88 16 BR/BK	HEATED SEAT DRIVER
C	P142 20TN/DB	PASSENGER SEAT TEMPERATURE SENSOR INPUT
D	P144 20 BK/LG	PASSENGER SEAT TEMPERATURE 5V SUPPLY



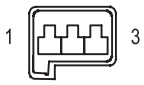
PASSENGER HEATED SEAT SWITCH

CAV	CIRCUIT	FUNCTION
1	P138 20VT/LG	PASSENGER SEAT LOW HEAT LED DRIVER
2	-	-
3	Z1 20BK	GROUND
4	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
5	P140 20 VT/BK	PASSENGER SEAT HIGH HEAT LED DRIVER
6	P134 20TN/LG	PASSENGER SEAT HEATER MUX SWITCH



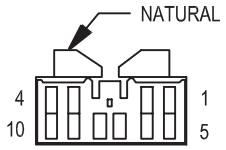
PASSENGER POWER DOOR LOCK SWITCH

CAV	CIRCUIT	FUNCTION
1	M1 20PK	FUSED B(+)
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	Z1 20BK	GROUND
4	P96 20WT/LG	PASSENGER FRONT DOOR MUX SWITCH



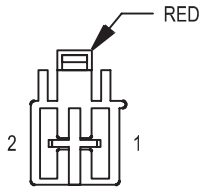
PASSENGER POWER MIRROR (EXCEPT MEMORY)

CAV	CIRCUIT	FUNCTION
1	P70 20WT	PASSENGER MIRROR RIGHT/DOWN
2	P72 20YL/BK	PASSENGER MIRROR UP
3	P74 20DB	PASSENGER MIRROR LEFT



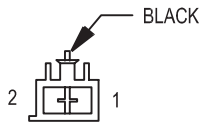
PASSENGER POWER MIRROR (MEMORY)

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	P70 20WT	PASSENGER MIRROR COMMON DRIVER (RIGHT/DOWN)
3	C16 20LB/YL	FUSED REAR WINDOW DEFOGGER RELAY OUTPUT
4	P72 20YL/BK	PASSENGER MIRROR UP DRIVER
5	P74 20DB	PASSENGER MIRROR LEFT DRIVER
6	P162 20GY/WT	PASSENGER MIRROR SENSOR 5V SUPPLY
7	P67 20YL/RD	PASSENGER MIRROR VERTICAL POSITION SIGNAL
8	-	-
9	P68 20DG/RD	PASSENGER MIRROR HORIZONTAL POSITION SIGNAL
10	P66 20WT/BK	PASSENGER MIRROR SENSOR GROUND



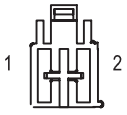
PASSENGER POWER SEAT FRONT RISER MOTOR

CAV	CIRCUIT	FUNCTION
1	P18 16YL/LG	PASSENGER SEAT FRONT UP DRIVER
2	P20 16 RD/LG	PASSENGER SEAT FRONT DOWN DRIVER



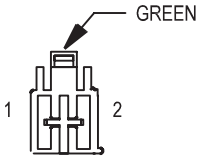
PASSENGER POWER SEAT HORIZONTAL MOTOR

CAV	CIRCUIT	FUNCTION
1	P14 16YL/LB	PASSENGER SEAT HORIZONTAL FORWARD
2	P16 16RD/LB	PASSENGER SEAT HORIZONTAL FORWARD



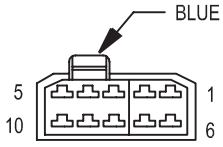
PASSENGER POWER SEAT REAR RISER MOTOR

CAV	CIRCUIT	FUNCTION
1	P10 16YL/WT	PASSENGER SEAT REAR UP
2	P12 16RD/WT	PASSENGER SEAT REAR DOWN



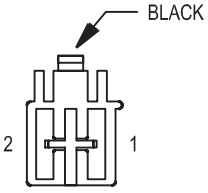
PASSENGER POWER SEAT RECLINER MOTOR

CAV	CIRCUIT	FUNCTION
1	P42 16GY/BK	PASSENGER SEAT RECLINER SWITCH DOWN
2	P44 16GY/DB	PASSENGER SEAT RECLINER SWITCH UP



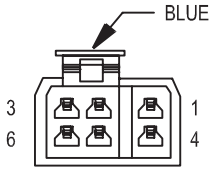
PASSENGER POWER SEAT SWITCH

CAV	CIRCUIT	FUNCTION
1	F35 16RD	FUSED B(+)
2	P42 16GY/BK	PASSENGER SEAT RECLINER SWITCH DOWN
3	P16 16RD/LB	PASSENGER SEAT HORIZONTAL FORWARD
4	P44 16GY/DB	PASSENGER SEAT RECLINER SWITCH UP
5	Z1 16BK	GROUND
6	P18 16YL/LG	PASSENGER SEAT FRONT UP
7	P10 16YL/WT	PASSENGER SEAT REAR UP
8	P12 16RD/WT	PASSENGER SEAT REAR DOWN
9	P20 16RD/LG	PASSENGER SEAT FRONT DOWN
10	P14 16YL/LB	PASSENGER SEAT HORIZONTAL FORWARD



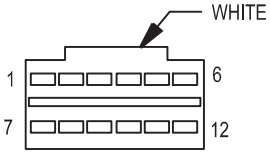
PASSENGER POWER WINDOW MOTOR

CAV	CIRCUIT	FUNCTION
1	Q22 16VT	PASSENGER WINDOW DRIVER (DOWN)
2	Q12 16BR	PASSENGER WINDOW DRIVER (UP)



PASSENGER POWER WINDOW SWITCH

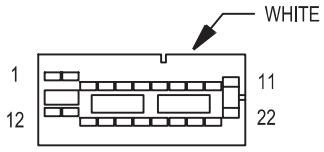
CAV	CIRCUIT	FUNCTION
1	Q22 16VT	PASSENGER WINDOW DRIVER (DOWN)
2	Q16 14BR/WT	MASTER WINDOW SWITCH (RIGHT FRONT UP)
3	-	-
4	Q26 14VT/WT	MASTER WINDOW SWITCH (RIGHT FRONT DOWN)
5	Q12 16BR	PASSENGER WINDOW DRIVER (UP)
6	Q1 14YL	POWER WINDOW SWITCH FEED



POWER AMPLIFIER - C1

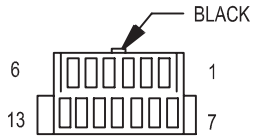
CAV	CIRCUIT	FUNCTION
1	X87 18LG/VT	AMPLIFIED LEFT DOOR SPEAKER (+)
2	X82 18LB/RD	AMPLIFIED RIGHT DOOR SPEAKER (+)
3	X83 18YL/RD	AMPLIFIED LEFT DOOR SAIL SPEAKER (+)
4	X86 18OR/RD	AMPLIFIED RIGHT DOOR SAIL SPEAKER (+)
5	X95 18WT/VT •	AMPLIFIED LOW LEFT REAR SPEAKER (+)
6	X98 18TN/VT •	AMPLIFIED LOW RIGHT REAR SPEAKER (+)
7	X85 18LG/BK	AMPLIFIED LEFT DOOR SPEAKER (-)
8	X80 18LB/BK	AMPLIFIED RIGHT DOOR SPEAKER (-)
9	X81 18YL/BK	AMPLIFIED LEFT DOOR SAIL SPEAKER (-)
10	X84 18OR/BK	AMPLIFIED RIGHT DOOR SAIL SPEAKER (-)
11	X97 18WT/DG •	AMPLIFIED LOW LEFT REAR SPEAKER (-)
12	X96 18TN/DG •	AMPLIFIED LOW RIGHT REAR SPEAKER (-)

• PREMIUM II AUDIO



POWER AMPLIFIER - C2

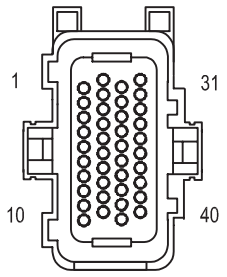
CAV	CIRCUIT	FUNCTION
1	F62 16RD/WT	FUSED B(+)
2	Z2 16BK/LG	GROUND
3	X60 20DG/RD	RADIO 12V OUTPUT
4	X54 18VT	RIGHT FRONT SPEAKER (+)
5	X53 18DG	LEFT FRONT SPEAKER (+)
6	X52 18DB/WT	RIGHT REAR SPEAKER (+)
7	X51 18BR/YL	LEFT REAR SPEAKER (+)
8	-	-
9	X88 18PK/RD	AMPLIFIED CENTER INSTRUMENT PANEL SPEAKER (+)
10	X93 18 WT/RD	AMPLIFIED HIGH LEFT REAR SPEAKER (+)
11	X94 18TN/RD	AMPLIFIED HIGH RIGHT REAR SPEAKER (+)
12	F62 16RD	FUSED B(+)
13	Z2 16BK/LG	GROUND
14	-	-
15	X56 18DB/RD	RIGHT FRONT SPEAKER (-)
16	X55 18BR/RD	LEFT FRONT SPEAKER (-)
17	X58 18DB/OR	RIGHT REAR SPEAKER (-)
18	X57 18BR/LB	LEFT REAR SPEAKER (-)
19	-	-
20	X89 18PK/BK	AMPLIFIED CENTER INSTRUMENT PANEL SPEAKER (-)
21	X91 18WT/BK	AMPLIFIED HIGH LEFT REAR SPEAKER (-)
22	X92 18TN/BK	AMPLIFIED HIGH RIGHT REAR SPEAKER (-)



POWER MIRROR SWITCH

CAV	CIRCUIT	FUNCTION
1	P73 20YL/PK	DRIVER MIRROR COMMON DRIVER (RIGHT/DOWN)
2	-	-
3	-	-
4	-	-
5	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
6	P70 20WT	PASSENGER MIRROR COMMON DRIVER (RIGHT/DOWN)
7	P74 20DB	PASSENGER MIRROR LEFT DRIVER
8	P75 20BK/WT	DRIVER MIRROR LEFT DRIVER
9	Z1 20BK	GROUND
10	-	-
11	M1 20PK	FUSED B(+)
12	P72 20YL/BK	PASSENGER MIRROR UP DRIVER
13	P71 20YL	DRIVER MIRROR UP DRIVER

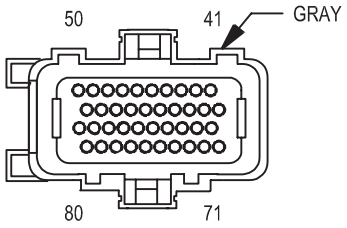
• MEMORY MIRROR



POWERTRAIN CONTROL MODULE - C1

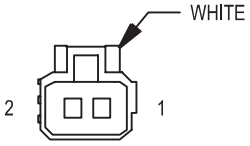
CAV	CIRCUIT	FUNCTION
1	K94 16TN/LG	COIL ON PLUG DRIVER NO. 4
2	K93 16TN/OR	COIL ON PLUG DRIVER NO. 3
3	K92 16TN/PK	COIL ON PLUG DRIVER NO. 2
4	K96 16TN/LB	COIL ON PLUG DRIVER NO. 6
5	V32 20YL/RD	SPEED CONTROL POWER SUPPLY
6	A142 14DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
7	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
8	K20 18DG	GENERATOR FIELD DRIVER
9	-	-
10	Z12 14BK/TN	GROUND
11	K91 16TN/RD	COIL ON PLUG DRIVER NO. 1
12	-	-
13	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
14	K58 18BR/DB	FUEL INJECTOR NO. 6 DRIVER
15	K38 18GY	FUEL INJECTOR NO. 5 DRIVER
16	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
17	K12 18TN/WT ●	FUEL INJECTOR NO. 2 DRIVER
17	K12 18TN ● ●	FUEL INJECTOR NO. 2 DRIVER
18	K236 18GY/PK ● ●	SHORT RUNNER VALVE SOLENOID CONTROL
19	-	-
20	F12 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
21	K95 16TN/DG	COIL ON PLUG DRIVER NO. 5
22	-	-
23	-	-
24	K42 20DB/LG ● ●	KNOCK SENSOR SIGNAL
25	K45 18BK/VT ●	KNOCK SENSOR SIGNAL
25	K45 20BK/VT ● ●	KNOCK SENSOR RETURN
26	K2 20TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
27	K127 18BK/OR	OXYGEN SENSOR GROUND
28	-	-
29	K241 20LG/RD	OXYGEN SENSOR 2/1 SIGNAL
30	K41 20BK/DG	OXYGEN SENSOR 1/1 SIGNAL
31	K90 20TN ●	STARTER RELAY CONTROL
31	K90 20TN/WT ● ●	STARTER RELAY CONTROL
32	K24 20GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
33	K44 20TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
34	K235 20LG/PK	EGR SENSOR SIGNAL
35	K22 20OR/DB	THROTTLE POSITION SENSOR SIGNAL
36	K1 20DG/RD	MAP SENSOR SIGNAL
37	K21 20BK/RD	INTAKE AIR TEMPERATURE SIGNAL
38	-	-
39	K36 18VT/RD	MANIFOLD TUNING VALVE CONTROL
40	K35 20GY/YL	EGR SOLENOID CONTROL

● 2.7L
● ● 3.2L/3.5L



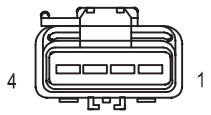
POWERTRAIN CONTROL MODULE - C2

CAV	CIRCUIT	FUNCTION
41	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL
42	C18 20DB	A/C PRESSURE SIGNAL
43	K4 18BK/LB	SENSOR GROUND
44	K7 20OR	8V SUPPLY
45	K10 18DB/LG	POWER STEERING PRESSURE SWITCH SENSE
46	A14 14RD/WT	FUSED B(+)
47	Z11 14BK/WT	GROUND
48	K40 20BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
49	K60 20YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
50	Z12 14BK/TN	GROUND
51	K141 20TN/WT	OXYGEN SENSOR 1/2 SIGNAL
52	-	-
53	K341 20PK/WT	OXYGEN SENSOR 2/2 SIGNAL
54	-	-
55	C24 20DB/PK	LOW SPEED RADIATOR FAN RELAY CONTROL
56	V36 20TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
57	K39 20GY/RD	IDLE AIR CONTROL NO. 1 DRIVER
58	K59 20VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
59	D25 20VT/YL	PCI BUS
60	-	-
61	K6 20VT/WT	5V SUPPLY
62	K29 20WT/PK	BRAKE SWITCH SENSE
63	T10 20YL/DG	TORQUE MANAGEMENT REQUEST SENSE
64	C28 20DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
65	D21 20PK/TN	SCI TRANSMIT
66	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL
67	K51 20DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
68	K52 18PK/BK	EVAPORATIVE EMISSION SOLENOID CONTROL
69	C27 20DB/LG	HIGH SPEED RADIATOR FAN RELAY CONTROL
70	K108 18DG/LG	EVAPORATIVE EMISSION SOLENOID SENSE
71	K71 20WT/RD	EATX RPM SIGNAL
72	K107 18OR/RD	LEAK DETECTION PUMP SWITCH SENSE
73	-	-
74	K31 20BR	FUEL PUMP RELAY CONTROL
75	D20 20LG	SCI RECEIVE
76	T41 20BR/YL	TRS T41 SENSE
77	K106 18WT/DG	LEAK DETECTION PUMP SOLENOID CONTROL
78	-	-
79	-	-
80	V35 20LG/RD	SPEED CONTROL VENT SOLENOID CONTROL



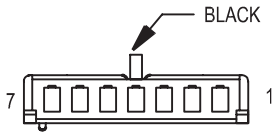
PRNDL ILLUMINATION

CAV	CIRCUIT	FUNCTION
1	E2 20OR	PANEL LAMPS FEED
2	Z1 20BK	GROUND



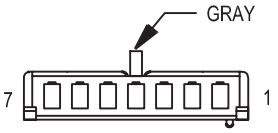
RADIATOR FAN MOTOR ASSEMBLY

CAV	CIRCUIT	FUNCTION
1	Z1 12BK	GROUND
2	Z1 12BK	GROUND
3	C23 12DG	LOW SPEED RADIATOR FAN RELAY OUTPUT
4	C25 14YL	HIGH SPEED RADIATOR FAN RELAY OUTPUT



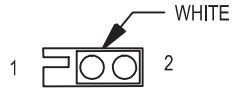
RADIO - C1

CAV	CIRCUIT	FUNCTION
1	X60 20DG/RD	RADIO 12V OUTPUT
2	X51 18BR/YL	LEFT REAR SPEAKER (+)
3	X52 18DB/WT	RIGHT REAR SPEAKER (+)
4	X53 18DG	LEFT FRONT SPEAKER (+)
5	X54 18VT	RIGHT FRONT SPEAKER (+)
6	X57 18BR/LB	LEFT REAR SPEAKER (-)
7	X58 18DB/OR	RIGHT REAR SPEAKER (-)



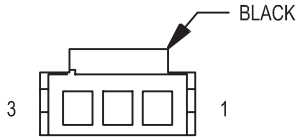
RADIO - C2

CAV	CIRCUIT	FUNCTION
1	-	-
2	X55 18BR/RD	LEFT FRONT SPEAKER (-)
3	X56 18DB/RD	RIGHT FRONT SPEAKER (-)
4	E17 20YL/BK	DAY BRIGHTNESS SENSE
5	E2 20OR	PANEL LAMPS DRIVER
6	X12 20RD	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
7	M1 20PK	FUSED B(+)



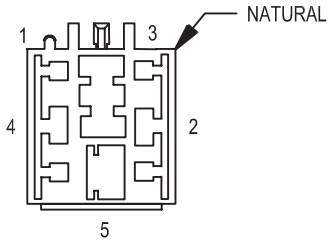
RADIO - C3
(MIDLINE/PREMIUM)

CAV	CIRCUIT	FUNCTION
1	D25 20VT/YL	PCI BUS
2	-	-



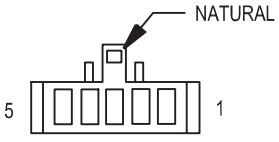
REAR WINDOW
DEFOGGER/ANTENNA
MODULE

CAV	CIRCUIT	FUNCTION
1	X60 20DG/RD	RADIO 12V OUTPUT
2	C15 10BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT
3	-	-



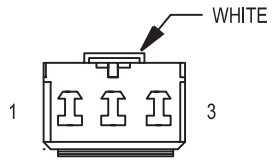
REAR WINDOW
DEFOGGER RELAY

CAV	CIRCUIT	FUNCTION
1	C15 10BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT
2	A4 10BK/PK	FUSED B(+)
3	-	-
4	C80 20DB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
5	A4 10BK/PK	FUSED B(+)



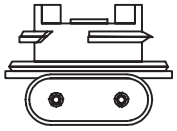
RECIRCULATION
DOOR ACTUATOR

CAV	CIRCUIT	FUNCTION
1	C32 20GY/DB	RECIRCULATION DOOR DRIVER
2	-	-
3	-	-
4	-	-
5	C34 20BR/WT	COMMON DOOR DRIVER



REMOTE KEYLESS ENTRY ANTENNA

CAV	CIRCUIT	FUNCTION
1	P58 18WT	RKE EXTERNAL ANTENNA
2	-	-
3	P58 18WT	RKE EXTERNAL ANTENNA



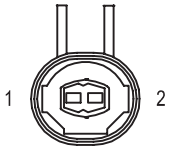
RIGHT BACK-UP LAMP (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L1 18VT/BK	BACK-UP LAMP FEED
2	Z1 18BK	GROUND



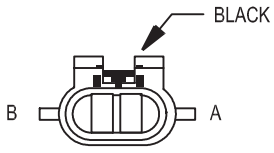
RIGHT BACK-UP LAMP (CONCORDE)

CAV	CIRCUIT	FUNCTION
A	Z1 18BK	GROUND
B	L1 18VT/BK	BACK-UP LAMP FEED



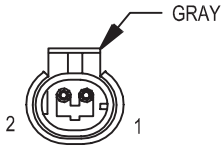
RIGHT BACK-UP LAMP (LHS)

CAV	CIRCUIT	FUNCTION
1	L1 18VT/BK	BACK-UP LAMP FEED
2	Z1 18BK	GROUND



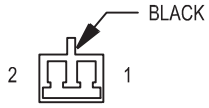
RIGHT FOG LAMP (300M/LHS)

CAV	CIRCUIT	FUNCTION
A	L39 20LB	FOG LAMP RELAY OUTPUT
B	Z1 20BK	GROUND



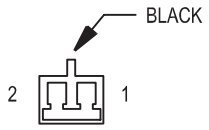
RIGHT FOG LAMP (DODGE)

CAV	CIRCUIT	FUNCTION
1	L39 20LB	FOG LAMP SWITCH OUTPUT
2	Z1 20BK	GROUND



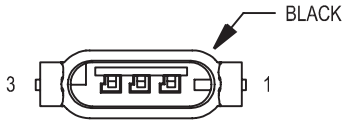
RIGHT FRONT DOOR SAIL SPEAKER

CAV	CIRCUIT		FUNCTION
1	X84 18OR/BK	•	AMPLIFIED RIGHT DOOR SAIL SPEAKER (-)
1	X80 18LB/BK	••	AMPLIFIED RIGHT SPEAKER DOOR (-)
2	X86 18OR/RD	•	AMPLIFIED RIGHT DOOR SAIL SPEAKER (+)
2	X82 18LB/RD	••	AMPLIFIED RIGHT SPEAKER DOOR (+)



RIGHT FRONT DOOR SPEAKER

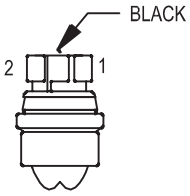
CAV	CIRCUIT	FUNCTION
1	X80 18LB/BK	AMPLIFIED RIGHT DOOR SPEAKER (-)
	X80 18LB/BK	AMPLIFIED RIGHT DOOR SPEAKER (-)
2	X82 18LB/RD	AMPLIFIED RIGHT DOOR SPEAKER (+)
	X82 18LB/RD	AMPLIFIED RIGHT DOOR SPEAKER (+)



RIGHT FRONT PARK/ TURN SIGNAL LAMP

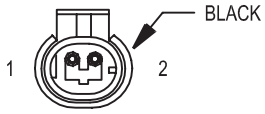
CAV	CIRCUIT	FUNCTION
1	L60 18TN	RIGHT TURN SIGNAL
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND

• PREMIUM AUDIO
•• MIDLINE



RIGHT FRONT SIDE MARKER LAMP (LHS)

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	L60 20TN	RIGHT TURN SIGNAL



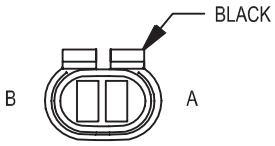
RIGHT FRONT WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)
2	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)



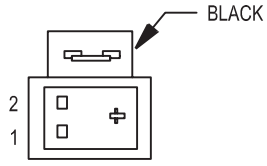
RIGHT HEADLAMP LEVELING MOTOR (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	L13 20BR/YL	HEADLAMP ADJUST SIGNAL
3	Z1 20BK	GROUND



RIGHT HIGH BEAM HEADLAMP

CAV	CIRCUIT	FUNCTION
A	L34 20RD/OR	FUSED RIGHT HIGH BEAM OUTPUT
B	Z1 20BK	GROUND



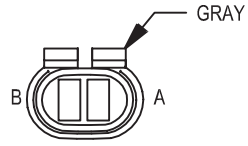
RIGHT HORN

CAV	CIRCUIT	FUNCTION
1	X2 18DG/RD	HORN RELAY OUTPUT
2	Z1 18BK	GROUND



RIGHT LICENSE LAMP (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	L7 18BK/YL	PARK LAMP RELAY OUTPUT
2	Z1 18BK	GROUND



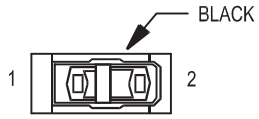
RIGHT LOW BEAM HEADLAMP

CAV	CIRCUIT	FUNCTION
A	L44 20VT/RD	FUSED RIGHT LOW BEAM OUTPUT
B	Z1 20BK	GROUND



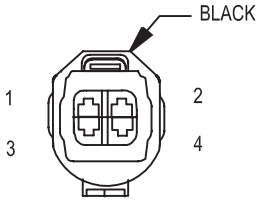
RIGHT POSITION LAMP

CAV	CIRCUIT	FUNCTION
1	L7 20BK/YL	PARK LAMP RELAY OUTPUT
2	Z1 20BK	GROUND



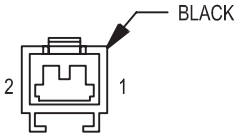
RIGHT REAR DOOR COURTESY LAMP

CAV	CIRCUIT		FUNCTION
1	M1 20PK		FUSED B(+)
2	M2 20YL	•	COURTESY LAMPS DRIVER
2	M42 20LG	••	COURTESY LAMPS DRIVER



RIGHT REAR DOOR LOCK MOTOR/AJAR SWITCH

CAV	CIRCUIT	FUNCTION
1	G74 20TN/RD	DOOR AJAR SWITCH SENSE
2	Z1 20BK	GROUND
3	P34 16PK/BK	UNLOCK RELAY OUTPUT
4	P33 16OR	LOCK RELAY OUTPUT



RIGHT REAR DOOR SPEAKER

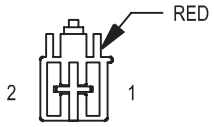
CAV	CIRCUIT	FUNCTION
1	X96 18TN/DG	AMPLIFIED LOW RIGHT REAR SPEAKER (-)
2	X98 18TN/VT	AMPLIFIED LOW RIGHT REAR SPEAKER (+)



RIGHT REAR FOG LAMP (BUILT-UP-EXPORT)

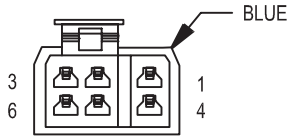
CAV	CIRCUIT	FUNCTION
1	L95 18DG/YL	REAR FOG LAMP RELAY OUTPUT
2	Z1 18BK	GROUND

• BASE
•• EXCEPT BASE



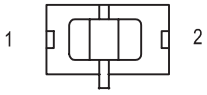
RIGHT REAR POWER WINDOW MOTOR

CAV	CIRCUIT	FUNCTION
1	Q24 16DG	POWER WINDOW RIGHT REAR B(+) DOWN
2	Q14 16GY	POWER WINDOW RIGHT REAR B(+) UP



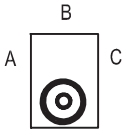
RIGHT REAR POWER WINDOW SWITCH

CAV	CIRCUIT	FUNCTION
1	Q24 16DG	POWER WINDOW RIGHT REAR B(+) DOWN
2	Q18 14GY/BK	RIGHT REAR WINDOW DRIVER (UP)
3	-	-
4	Q28 14DG/WT	RIGHT REAR POWER WINDOW DRIVER DOWN
5	Q14 16GY	POWER WINDOW RIGHT REAR B(+) UP
6	Q1 14YL	POWER WINDOW SWITCH FEED



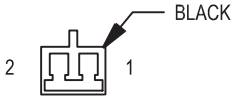
RIGHT REAR READING LAMP

CAV	CIRCUIT		FUNCTION
1	M1 20PK		FUSED B(+)
2	M2 20YL	●●	COURTESY LAMPS DRIVER
2	M42 20LG	●	COURTESY LAMPS DRIVER



RIGHT REAR READING LAMP SWITCH

CAV	CIRCUIT	FUNCTION
A	Z1 20BK	COURTESY LAMPS DRIVER
B	M42 20LG	COURTESY LAMPS DRIVER
C	M2 20YL	GROUND



RIGHT REAR SHELF SPEAKER

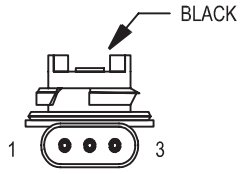
CAV	CIRCUIT		FUNCTION
1	X52 18DB/WT	●●	RIGHT REAR SPEAKER (+)
1	X94 18TN/RD	●	AMPLIFIED HIGH RIGHT REAR SPEAKER (+)
2	X58 18DB/OR	●●	RIGHT REAR SPEAKER (-)
2	X92 18TN/BK	●	AMPLIFIED HIGH RIGHT REAR SPEAKER (-)

●● BASE
● MIDLINE AND PREMIUM AUDIO



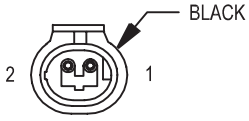
RIGHT REAR SIDE MARKER LAMP (DODGE)

CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT



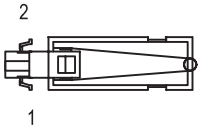
RIGHT REAR TURN SIGNAL LAMP (EXCEPT CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L60 18LG/TN	RIGHT TURN SIGNAL
1	L61 18LG/TN •	RIGHT TURN SIGNAL
2	Z1 18BK	GROUND



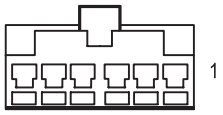
RIGHT REAR WHEEL SPEED SENSOR

CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)



RIGHT SEAT AIRBAG (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	R32 18LB/OR	RIGHT SEAT SQUIB LINE 1
2	R34 18LB/WT	RIGHT SEAT SQUIB LINE 2



RIGHT SIDE IMPACT AIRBAG CONTROL MODULE (BUILT-UP-EXPORT)

CAV	CIRCUIT	FUNCTION
1	F14 18LG/YL	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
2	D25 18VT/YL	PCI BUS
3	R32 18 LB/OR	PASSENGER SIDE SQUIB LINE 1
4	R34 18 LB/WT	PASSENGER SIDE SQUIB LINE 2
5	-	-
6	Z114 18BK/LG	GROUND



RIGHT SIDE REPEATER (BUILT-UP-EXPORT)

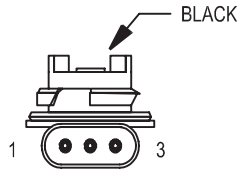
CAV	CIRCUIT	FUNCTION
1	L60 20TN	RIGHT TURN SIGNAL
2	Z1 20BK	GROUND



RIGHT TAIL LAMP (LHS/300M)

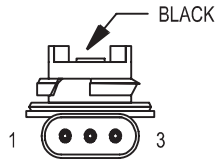
CAV	CIRCUIT	FUNCTION
1	Z1 18BK	GROUND
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT

• DODGE



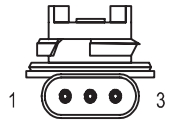
RIGHT TAIL/ STOP LAMP (LHS/CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



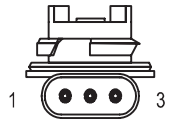
RIGHT TAIL/STOP LAMP NO. 1 (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



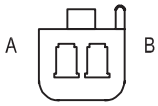
RIGHT TAIL/STOP LAMP NO. 2 (300M/DODGE)

CAV	CIRCUIT	FUNCTION
1	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



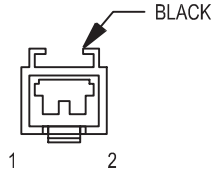
RIGHT TAIL/TURN SIGNAL LAMP (CONCORDE)

CAV	CIRCUIT	FUNCTION
1	L61 18LG/TN	RIGHT TURN SIGNAL
2	L7 18BK/YL	PARK LAMP RELAY OUTPUT
3	Z1 18BK	GROUND



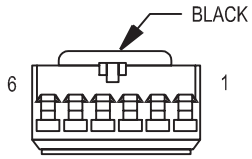
RIGHT VISOR/VANITY LAMP

CAV	CIRCUIT	FUNCTION
A	M1 20PK	FUSED B(+)
B	Z1 20BK	GROUND



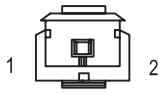
SEAT BELT SWITCH

CAV	CIRCUIT	FUNCTION
1	G10 20LG/RD	SEAT BELT SWITCH SENSE
2	Z2 20BK/LG	GROUND



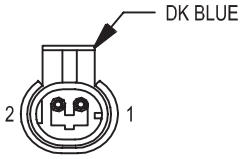
SENTRY KEY IMMOBILIZER MODULE

CAV	CIRCUIT	FUNCTION
1	-	-
2	D25 20VT/YL	PCI BUS
3	-	-
4	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
5	Z2 20BK/LG	GROUND
6	M1 20PK	FUSED B(+)



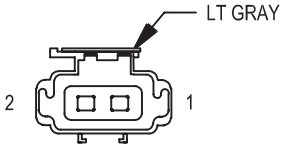
SHIFT INTERLOCK SOLENOID

CAV	CIRCUIT	FUNCTION
1	K29 20WT/PK	BRAKE SWITCH SENSE
2	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



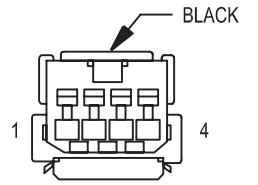
SHORT RUNNER VALVE SOLENOID (3.2L/3.5L)

CAV	CIRCUIT	FUNCTION
1	K236 18GY/PK	SHORT RUNNER VALVE SOLENOID CONTROL
2	F142 18OR/DG	FUSED AUTOMATIC SHUT DOWN RELAY OUTPUT



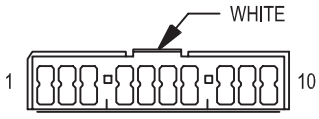
SPEED PROPORTIONAL STEERING SOLENOID

CAV	CIRCUIT	FUNCTION
1	S76 18LG/PK	SPEED PROPORTIONAL STEERING SOLENOID (-)
2	S77 18VT/OR	SPEED PROPORTIONAL STEERING SOLENOID (+)



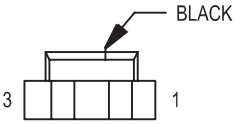
SUN SENSOR/ VTSS LED

CAV	CIRCUIT	FUNCTION
1	M1 20PK	FUSED B(+)
2	G69 22BK/OR	VTSS INDICATOR DRIVER
3	C57 20DB/GY	SENSOR GROUND
4	C38 20DB	SUN SENSOR SIGNAL



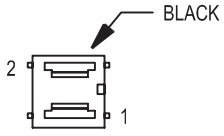
SUNROOF CONTROL MODULE

CAV	CIRCUIT	FUNCTION
1	Q6 16DB	SUNROOF MOTOR B(-)
2	Q5 16DG	SUNROOF MOTOR B(+)
3	G5 20DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
4	A37 16RD	FUSED B(+)
5	Z1 16BK	GROUND
6	Q42 20LB	POWER SUNROOF CLOSE
7	Q41 20WT	POWER SUNROOF OPEN
8	Q42 20LB	POWER SUNROOF CLOSE
9	Q43 20VT	POWER SUNROOF VENT
10	Q46 20OR	POWER SUNROOF LIMIT SWITCH



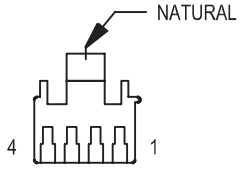
SUNROOF LIMIT SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	Q46 20OR	POWER SUNROOF LIMIT SWITCH
3	-	-



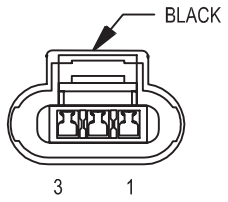
SUNROOF MOTOR

CAV	CIRCUIT	FUNCTION
1	Q6 16DB	SUNROOF MOTOR B(-)
2	Q5 16DG	SUNROOF MOTOR B(+)



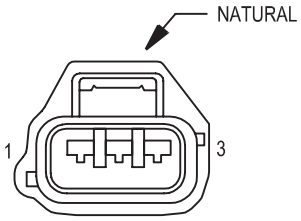
SUNROOF SWITCH

CAV	CIRCUIT	FUNCTION
1	Q41 20WT	POWER SUNROOF OPEN
2	Q42 20LB	POWER SUNROOF CLOSE
3	Z1 20BK	GROUND
4	Q43 20VT	POWER SUNROOF VENT



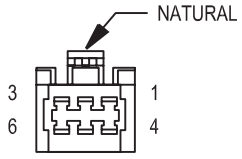
THROTTLE POSITION SENSOR (2.7L)

CAV	CIRCUIT	FUNCTION
1	K6 20VT/WT	5V SUPPLY
2	K22 20OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K4 20 BK/LB	SENSOR GROUND



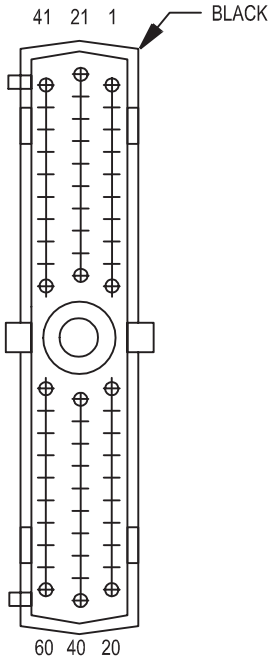
THROTTLE POSITION SENSOR (3.2L/3.5L)

CAV	CIRCUIT	FUNCTION
1	K6 20VT/WT	5V SUPPLY
2	K22 20OR/DB	THROTTLE POSITION SENSOR SIGNAL
3	K4 20BK/LB	SENSOR GROUND



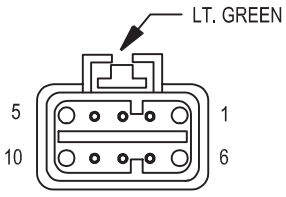
TRACTION CONTROL SWITCH

CAV	CIRCUIT	FUNCTION
1	-	-
2	Z2 22BK/LG	GROUND
3	B27 20RD/YL	TRACTION CONTROL SWITCH SENSE
4	-	-
5	E2 20OR	PANEL LAMP DRIVER
6	-	-



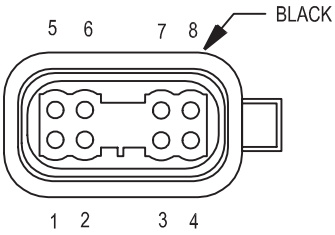
TRANSMISSION CONTROL MODULE

CAV	CIRCUIT	FUNCTION
1	T1 20LG/BK	TRS T1 SENSE
2	-	-
3	T3 20VT	TRS T3 SENSE
4	-	-
5	T5 20LG/RD	AUTOSTICK UPSHIFT SWITCH SENSE
6	K71 20WT/RD	EATX RPM SIGNAL
7	D21 20PK/TN	SCI TRANSMIT
8	A41 14YL	FUSED IGNITION SWITCH OUTPUT (ST)
9	T9 16OR/BK	OVERDRIVE PRESSURE SWITCH SENSE
10	T10 20YL/DG	TORQUE MANAGEMENT REQUEST SENSE
11	F11 20RD/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN-OFF)
12	K22 20OR/DB	THROTTLE POSITION SENSOR SIGNAL
13	T13 20DB/BK	SPEED SENSOR GROUND
14	T14 20LG/WT	OUTPUT SPEED SENSOR SIGNAL
15	T15 20LG	TRANSMISSION CONTROL RELAY CONTROL
16	T16 16RD	TRANSMISSION CONTROL RELAY OUTPUT
17	T16 16RD	TRANSMISSION CONTROL RELAY OUTPUT
18	-	-
19	T19 16WT	2-4 SOLENOID CONTROL
20	T20 16LB	LOW/REVERSE SOLENOID CONTROL
21	-	-
22	-	-
23	-	-
24	-	-
25	-	-
26	-	-
27	-	-
28	-	-
29	-	-
30	-	-
31	-	-
32	-	-
33	-	-
34	-	-
35	-	-
36	-	-
37	-	-
38	-	-
39	-	-
40	-	-
41	T41 20BR/YL	TRS T41 SENSE
42	T42 20VT/WT	TRS T42 SENSE
43	D25 20VT/YL	PCI BUS
44	T44 20YL/LB	AUTOSTICK DOWNSHIFT SWITCH SENSE
45	-	-
46	D6 20PK/LB	SCI RECEIVE
47	T47 16YL/BK	2-4 PRESSURE SWITCH SENSE
48	-	-
49	-	-
50	T50 16DG	LOW/REVERSE PRESSURE SWITCH SENSE
51	K4 20BK/LB	SENSOR GROUND
52	T52 20RD/BK	INPUT SPEED SENSOR SIGNAL
53	Z14 16BK/YL	GROUND
54	T54 20VT/PK	TRANSMISSION TEMPERATURE SENSOR SIGNAL
55	-	-
56	A30 18RD/LB	FUSED B(+)
57	Z13 16BK/RD	GROUND
58	G7 20WT/OR	VEHICLE SPEED SENSOR SIGNAL
59	T59 16PK	UNDERDRIVE SOLENOID CONTROL
60	T60 16BR	OVERDRIVE SOLENOID CONTROL



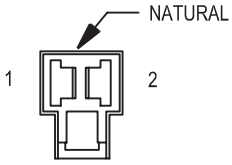
TRANSMISSION RANGE SENSOR

CAV	CIRCUIT	FUNCTION
1	F20 20WT	FUSED IGNITION SWITCH OUTPUT (RUN)
2	-	-
3	T13 20DB/BK	SPEED SENSOR GROUND
4	T54 20VT/PK	TRANSMISSION TEMPERATURE SENSOR SIGNAL
5	T41 20BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
6	L1 20VT/BK	BACK-UP LAMP SENSE
7	T1 20LG/BK	TRS T1 SENSE
8	T3 20VT	TRS T3 SENSE
9	T42 20VT/WT	TRS T42 SENSE
10	T41 20BR/YL	TRS T41 SENSE



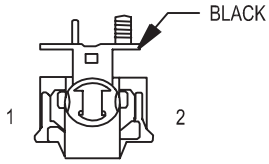
TRANSMISSION SOLENOID/PRESSURE SWITCH ASSEMBLY

CAV	CIRCUIT	FUNCTION
1	T50 16DG	LOW/REVERSE PRESSURE SWITCH SENSE
2	T9 16OR/BK	OVERDRIVE PRESSURE SWITCH SENSE
3	T59 16PK	UNDERDRIVE SOLENOID CONTROL
4	T60 16BR	OVERDRIVE SOLENOID CONTROL
5	T47 16YL/BK	2-4 PRESSURE SWITCH SENSE
6	T16 16RD	TRANSMISSION CONTROL RELAY OUTPUT
7	T19 16WT	2-4 SOLENOID CONTROL
8	T20 16LB	LOW/REVERSE SOLENOID CONTROL



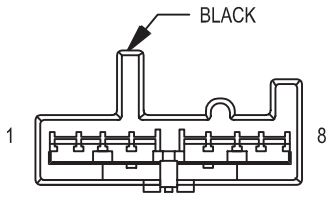
TRUNK KNOCK OUT SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	G71 20VT/YL	DECKLID SECURITY SWITCH SENSE



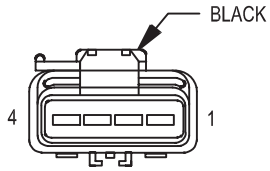
TRUNK LAMP

CAV	CIRCUIT	FUNCTION
1	G78 20TN/BK	DECKLID AJAR SWITCH SENSE
2	M1 20PK	FUSED B(+)



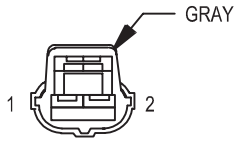
TURN SIGNAL/ HAZARD SWITCH

CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	-	-
4	Z1 20BK	GROUND
5	L91 22DB/PK	COMBINATION FLASHER SWITCHED GROUND
6	L61 18LG	LEFT TURN SIGNAL
7	L32 18RD	COMBINATION FLASHER OUTPUT
8	L60 18TN	RIGHT TURN SIGNAL



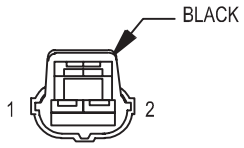
VEHICLE SPEED CONTROL SERVO

CAV	CIRCUIT	FUNCTION
1	V36 20TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
2	V35 20LG/RD	SPEED CONTROL VENT SOLENOID CONTROL
3	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
4	Z1 20BK	GROUND



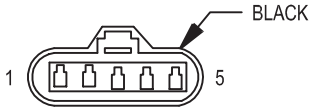
WASHER FLUID LEVEL SWITCH

CAV	CIRCUIT	FUNCTION
1	Z1 20BK	GROUND
2	G29 20BK/TN	WASHER FLUID LEVEL SWITCH SENSE



WINDSHIELD WASHER PUMP MOTOR

CAV	CIRCUIT	FUNCTION
1	V10 20BR	FRONT WASHER PUMP MOTOR CONTROL
2	Z1 20BK	GROUND



WINDSHIELD WIPER MOTOR

CAV	CIRCUIT	FUNCTION
1	V4 14RD/YL	FRONT WIPER RELAY HIGH SPEED OUTPUT
2	V3 14BR/WT	FRONT WIPER RELAY LOW SPEED OUTPUT
3	-	-
4	V55 20TN/RD	FRONT WIPER PARK SWITCH SENSE
5	Z1 14BK	GROUND

8W-90 CONNECTOR/GROUND LOCATIONS

INDEX

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CONNECTOR/GROUND LOCATIONS. 1
INTRODUCTION 1

DESCRIPTION AND OPERATION

INTRODUCTION

This section provides illustrations identifying the general location of components, grounds, and connectors in the vehicle. A index is provided. Use the wiring diagrams in each section for connector/ground number identification. Refer to the index for the proper figure number.

CONNECTOR/GROUND LOCATIONS

For items not shown in this section a N/S is placed in the Fig. column

Connector Name/Number	Color	Location	Fig.
A/C Compressor Clutch	BK	Top of Compressor	5, 6
A/C Pressure Transducer		Right Front Engine Compartment	1, 2
Ambient Temperature Sensor	GY	Front Grille Area	1
Analog Clock	NAT	At Clock	N/S
Ash Receiver Lamp	BK	Lower Center of Instrument Panel	9
Automatic Day/Night Mirror	BK	At Mirror	N/S
Automatic Temperature Control Head	BK	Center of I/P	9
Autostick Switch		Center Console	10
Blend Door Actuator	BK	Right Side of HVAC	N/S
Blower Motor Power Module	BK	Right Side of HVAC	N/S
Blower Motor Resistor Block	BK	Right Side of HVAC	N/S
Body Control Module C1	GY	Left Side of I/P	8
Body Control Module C2	BK	Left Side of I/P	8

Connector Name/Number	Color	Location	Fig.
Body Control Module C3	WT	Left Side of I/P	8
Body Control Module C4	BL	Left Side of I/P	8
Brake Lamp Switch	GY	Top of Brake Pedal	N/S
Brake Pressure Switch	BK	At Master Cylinder	4
C101	BK	Left Front of Engine	5, 6, 7
C102	BK	Left Front of Engine	5, 6, 7
C103	GN	Left Side Instrument Panel	8, 11
C104	OR	Left Side Instrument Panel	8, 11
C105	YL	Left Side Instrument Panel	11
C106		Left Side Instrument Panel	11
C107	GY	Rear of Engine	7
C108	GY	Rear of Engine	7
C109	BK	Under Left Front Headlamp	3

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
C110 (2.7L)		Rear of Engine	N/S
C111	GY	Near Left Headlamp	3
C112	GY	Near Left Headlamp	2
C113	GY	Under Left Headlamp	N/S
C114		Under Left Headlamp	N/S
C200	BL	Left Side Instrument Panel	8, 11
C201	WT	Right Side Instrument Panel	9, 10
C202	WT	Lower Center of Instrument Panel	9
C203	WT	Lower Center of Instrument Panel	9
C204	WT	At Headliner	N/S
C300		Left Cowl	11
C301		Left Cowl	11
C302		Right Cowl	10, 15
C303		Right Cowl	10, 15
C304		Left B Pillar	11
C305		Right B Pillar	10
C306	YL	Under Passenger Seat	10
C307	BK	Under passenger Seat	11
C308	NAT	Under Rear Seat	10
C309		Under Driver Seat	N/S
C310		Under Passenger Seat	N/S
C311		Left Trunk Area	14
C312		Left Trunk Area	13
C313		Right Trunk Area	13
C314		Left Trunk Area	13
C316		Left B Pillar	11
C317		Right B Pillar	10
C318	NAT	Under Passenger Seat	10
C319	NAT	Under Drivers Seat	11
C321 (300M)		Deck Lid	14
Camshaft Position Sensor	BK	Front of Engine	5, 6
Capacitor #1 (2.7L)	BK	Rear of Engine	N/S
Capacitor #2 (2.7L)	BK	Rear of Engine	N/S
Center High Mounted Stop Lamp		At Lamp	N/S
Center Instrument Panel Speaker	BK	At Speaker	9
Cigar Lighter	RD	Lower Center of Instrument Panel	9
Clockspring No. 1	NAT	Rear of Clockspring	8
Clockspring No. 2	YL	Rear of Clockspring	8
Coil On Plug No. 1	BK	At Plug	5, 6
Coil On Plug No. 2	BK	At Plug	5, 6
Coil On Plug No. 3	BK	At Plug	5, 6
Coil On Plug No. 4	BK	At Plug	5, 6
Coil On Plug No. 5	BK	At Plug	5, 6
Coil On Plug No. 6	BK	At Plug	5, 6
Combination Flasher	BK	Left Side Instrument Panel	8, 11
Controller Anti-Lock Brake	BK	Left Fender Side Shield	3
Crankshaft Position Sensor	BK	Rear of Cyl Block	5, 6

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Data Link Connector	BK	LT Side of Steering Column	8
Decklid Release Switch	BK	Left Side of I/P	8
Driver Door Courtesy Lamp		Left Front Door	N/S
Driver Door Cylinder Lock Switch		Left Front Door	N/S
Driver Door Lock Motor/Ajar Switch		Left Front Door	N/S
Driver Door Speaker		Left Front Door	N/S
Driver Heated Seat Switch	YL	At Driver Seat	N/S
Driver Heated Seat Cushion	BK	At Driver Seat	N/S
Driver Heated Seat Back	GN	At Driver Seat	N/S
Driver Power Door Lock Switch		Left Front Door	N/S
Driver Power Mirror		Driver Door	N/S
Driver Power Mirror (Memory)	NAT	Driver Door	N/S
Driver Power Seat Front Riser Motor		At Driver Seat	N/S
Driver Power Seat Front Riser Sensor	BK	At Driver Seat	N/S
Driver Power Seat Horizontal Motor		At Driver Seat	N/S
Driver Power Seat Horizontal Motor Sensor	BK	At Driver Seat	N/S
Driver Power Seat Rear Riser Motor		At Driver Seat	N/S
Driver Power Seat Rear Riser Motor Sensor		At Driver Seat	N/S
Driver Power Seat Recliner Motor		At Driver Seat	N/S

Connector Name/Number	Color	Location	Fig.
Driver Power Seat Recliner Motor Sensor	BK	At Driver Seat	N/S
Driver Power Seat Switch	BL	At Driver Seat	N/S
Driver Power Window Motor	BK	Left Front Door	N/S
Driver Power Window Switch	BL	Driver Door	N/S
Driver Sail Speaker		Driver Door	N/S
Driver Side Airbag		Left B Pillar	N/S
EGR Solenoid	BK	Rear of Engine	5, 6
Engine Coolant Temp Sensor	BK	Front of Engine	5, 6
Engine Oil Pressure Switch (2.7L)	GY	Right Side of Engine	5
Engine Oil Pressure Switch (3.5L)	GY	Left Side of Engine	6
Engine Starter Motor	NAT	Left Side of Engine	5, 6
EVAP/Purge Solenoid	BK	Right Front of Engine Compartment	1
Evaporator Temperature Sensor		On HVAC Unit	N/S
Fuel Injector # 1	BK	At Injector	5, 6
Fuel Injector # 2	BK	At Injector	5, 6
Fuel Injector # 3	BK	At Injector	5, 6
Fuel Injector # 4	BK	At injector	5, 6
Fuel Injecotr # 5	BK	At Injector	5, 6
Fuel Injector # 6	BK	At Injector	5, 6
Fuel Pump Module	GY	Center Rear of Trunk Area	N/S
G100		Rear of Block Right Side	5, 6
G101		Rear of Block Left Side	5, 6
G102		Left Headlamp	N/S
G103		Left Headlamp	N/S
G104		Left Headlamp	N/S

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
G105		Near Right Horn	2
G106		Near Right Horn	2
G107		Left Side of Transmission	7
G108		Near Power Distribution Center	N/S
G200		Lower Center of Instrument Panel	9
G201		Lower Center of Instrument Panel	9
G300		Under Driver Seat	11
G301		Under Passenger Seat	10
G303		Fuel Pump Ground	N/S
G400		Deck Lid Ground	14
Generator	BK	Rear of Generator	5, 6
Generator Output		Rear of Generator	7
Glove Box Lamp	BK	At Lamp	9
Headlamp Switch	BL	At Switch	8
Headlamp Washer Pump Motor		Near Left Headlamp	N/S
Idle Air Control Motor	BK	On Throttle Body	5, 6
Ignition Switch	BK	At Switch	8
Instrument Cluster C1	GN	Rear of Cluster	8
Instrument Cluster C2	BL	Rear of Cluster	8
Intake Air Temp Sensor (2.7L)	GY	Rear of Intake	N/S
Intake Air Temp Sensor (3.5L)	GY	Left Side of Engine	6
Joint Connector		In Power Distribution Center	N/S

Connector Name/Number	Color	Location	Fig.
Junction Block C1	BK	Left Side of I/P	8
Junction Block C2	GY	Left Side of I/P	8
Junction Block C3	BL	Left Side of I/P	8
Junction BLock C4	GN	Left Side of I/P	8
Junction Block C5	WT	Left Side of I/P	8
Junction Block C6		Left Side of I/P	11
Junction Block C7		Left Side of I/P	11
Junction Block C8	GN	Left Side of I/P	11
Junction Block C9	OR	Left Side of I/P	11
Junction Block C10	GY	Left Side of I/P	11
Junction Block C11	NAT	Left Side of I/P	N/S
Knock Sensor (2.7L)	GY	Under Intake Manifold	N/S
Knock Sensor (3.5L)	BK	Under Intake Manifold	N/S
Leak Detection Pump	BK	Center of Trunk Area	N/S
Left Side Impact Airbag Control Module	YL	Left B Pillar	11
Left Back-Up Lamp		At Lamp	N/S
Left Fog Lamp	GY	At Lamp	3
Left Rear Fog Lamp		At Lamp	N/S
Left Front Park/Turn Signal Lamp	BK	At Lamp	N/S
Left Front Position Lamp	GY	At Left Headlamp	3
Left Front Side Marker Lamp	NAT	At Lamp	N/S
Left Front Wheel Speed Sensor	BK	At Sensor	4
Left Headlamp Leveling Motor	BK	At Left Headlamp	3

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Left High Beam Headlamp	BK	At Lamp	3
Left Horn		Left Fender	3
Left License Lamp		At Lamp	N/S
Left Low Beam Headlamp	GY	At Lamp	3
Left Rear Door Courtesy Lamp		At Left Rear Door	N/S
Left Rear Door Lock Motor/Ajar Switch		At Left Rear Door	N/S
Left Rear Door Speaker	BK	At Left Rear Door	N/S
Left Rear Power Window Motor	BK	At Left Rear Door	N/S
Left Rear Power Window Switch		At Left Rear Door	N/S
Left Rear Reading Lamp Switch		At Switch	N/S
Left Rear Shelf Speaker		At Speaker	12
Left Rear Side Marker Lamp		At Lamp	N/S
Left Rear Turn Signal Lamp		At Lamp	N/S
Left Rear Wheel Speed Sensor		Left Rear Trunk Area	N/S
Left Side Repeater		Left Fender Side Shield	N/S
Left Tail Lamp	NAT	At Lamp	N/S
Left Tail / Stop Lamp		At Lamp	N/S
Left Visor/Vanity Lamp		At Lamp	N/S
Manifold Absolute Pressure Sensor (2.7L)	BK	Top Left of Engine	5
Manifold Absolute Pressure Sensor (3.5L)	GY	Left Side of Engine	6
Manifold Tuning Valve	BK	Front of Engine	5, 6

Connector Name/Number	Color	Location	Fig.
Manual Temperature Control Head - C1	WT	Center of I/P	9
Manual Temperature Control Head - C2	BK	Center of I/P	9
Memory Heated Seat / Mirror Module C1		Under Driver Seat	N/S
Memory Heated Seat / Mirror Module C2		Under Driver Seat	N/S
Memory Heated Seat / Mirror Module C3		Under Driver Seat	N/S
Memory Heated Seat / Mirror Module C4	GY	Under Driver Seat	N/S
Memory Set Switch		On Driver Seat	N/S
Mode Door Actuator		On HVAC Unit	N/S
Multi-Function Switch	BK	Steering Column	8
Occupant Restraint Controller	YL	Lower Center of Instrument Panel	9
Output Shaft Speed Sensor	GY	Left Rear of Transmission	7
Overhead Map/Courtesy Lamp		At Lamp	N/S
Overhead Travel Information System		Headliner	N/S
Oxygen Sensor 1/1 Right Bank Up	BK	Right Exhaust manifold	5, 6
Oxygen Sensor 1/2 Right Bank Down	BK	Right Exhaust - Post Convertor	7
Oxygen Sensor 2/1 Left Bank Up	BK	Left Exhaust Manifold	5, 6
Oxygen Sensor 2/2 Left Bank Down	BK	Left Exhaust - Post Convertor	7

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Park Brake Switch		At Park Brake Lever	11
Passenger Airbag	YL	Behind I/P Near Glove Box	9
Passenger Door Lock Motor / Ajar Switch	BK	Passenger Door	15
Passenger Door Courtesy Lamp		Passenger Door	N/S
Passenger Door Cylinder Lock Switch	GY	Passenger Door	15
Passenger Door Speaker		Pasenger Door	N/S
Passenger Heated Seat Back	GN	At Passenger Seat	N/S
Passenger Heated Seat Cushion	BK	At Passenger Seat	N/S
Passenger Heated Seat Switch		At Passenger Seat	N/S
Passenger Power Door Lock Switch		Passenger Door	N/S
Passenger Power Mirror	WT	At Mirror	15
Passenger Power Mirror (Memory)	NAT	Passenger Door	N/S
Passenger Power Seat Front Riser Motor		At Passenger Seat	N/S
Passenger Power Seat Horizontal Motor		At Passenger Seat	N/S
Passenger Power Seat Rear Risor Motor		At Passenger Seat	N/S
Passenger Power Seat Recliner Motor		At Passenger Seat	N/S
Passenger Power Seat Switch	BL	At Seat	N/S
Passenger Power Window Motor		Passenger Door	N/S
Passenger Power Window Switch	BL	Passenger Door	N/S
Passenger Sail Speaker	BK	Passenger Door	15
Passenger Side Airbag		Right B Pillar	N/S
Power Amplifier C1 (Front)	GY	At Amplifier Right Cowl	10
Power Amplifier C2 (Front)	BK	At Amplifier Right Cowl	10
Power Amplifier C1 (Rear)		Left Side Trunk Area	13
Power Amplifier C2 (Rear)		Left Side Trunk Area	13
Power Mirror Switch	BK	Driver Door	N/S
Powertrain Control Module - C1		Near PDC	4, 5
Powertrain Control Module - C2	GY	Near PDC	4
PRNDL Illumination	WT	Lower Center of Instrument Panel	9
Radiator Fan Motor	BK	Rear of Motor	3
Radio - C1	BK	Rear of Radio	9
Radio - C2	GY	Rear of Radio	9
Radio - C3	WT	Rear of Radio	9
Rear Window Defogger Relay	NAT	Left Side Trunk Area	13
Rear Window Defogger/ Antenna Module		Right Side C Pillar	12
Rear Window Defogger/Heated Mirror Fuse		Left Side Trunk Area	13
Recirculation Door Actuator		On HVAC Unit	N/S
Remote Keyless Entry Antenna	WT	Near Body Control Module	8
Right Side Impact Airbag Control Module	YL	Right B Pillar	10
Right Back-Up Lamp		At Lamp	N/S

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Right Front Park/Turn Signal Lamp	BK	At Lamp	N/S
Right Front Position Lamp	GY	At Right Headlamp	2
Right Fog Lamp	GY	At Lamp	2
Right Front Wheel Speed Sensor		Right Fender Side Shield	N/S
Right Headlamp Leveling Motor	BK	At Right Headlamp	2
Right High Beam Headlamp	BK	At Lamp	2
Right Horn	BK	At Horn	1, 2
Right License Lamp		At Lamp	N/S
Right Low Beam Headlamp	GY	At Lamp	2
Right Rear Door Courtesy Lamp		At Lamp	N/S
Right Rear Door Lock Motor/Ajar Switch		At Door	N/S
Right Rear Door Speaker	BK	At Door	N/S
Right Rear Fog Lamp		At Lamp	N/S
Right Rear Power Window Motor		At Door	N/S
Right Rear Power Window Switch	BL	Right Rear Door	N/S
Right Rear Reading Lamp Switch		At Switch	N/S
Right Rear Shelf Speaker		At Speaker	12
Right Rear Turn Signal Lamp		At Lamp	N/S
Right Rear Wheel Speed Sensor	GN	Right Side Trunk Area	10
Right Side Repeater		Right Fender Side Shield	N/S
Right Tail Lamp	NAT	At Lamp	N/S
Right Tail / Stop Lamp		At Lamp	N/S
Right Visor/Vanity Lamp		At Lamp	N/S

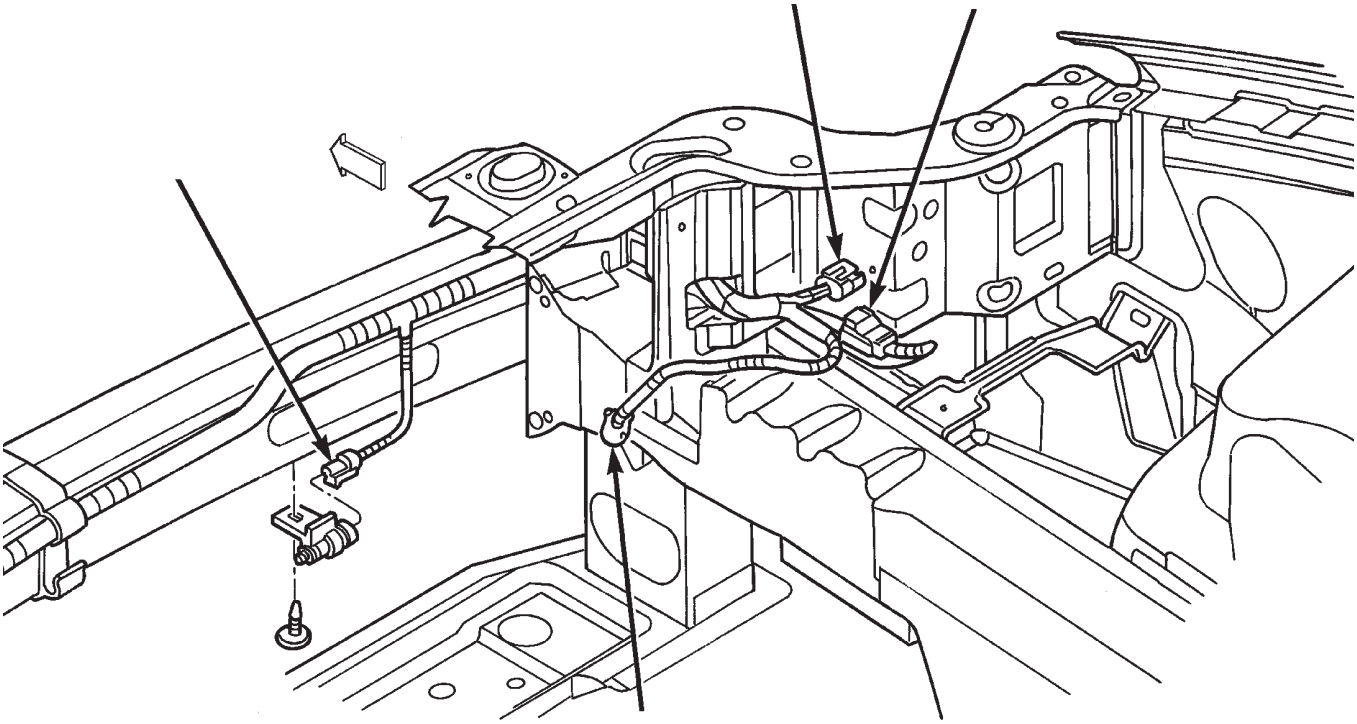
Connector Name/Number	Color	Location	Fig.
Seat Belt Switch		Left B Pillar	11
Sentry Key Immobilizer Module	BK	Steering Column	8
Shift Interlock Solenoid	WT	Steering Column	8
Short Runner Valve	GY	Right Rear of Engine	N/S
Sunroof Motor	WT	At Motor	N/S
Sun Sensor/ VTSS Set LED	BK	Top Center of Instrument Panel	N/S
Sunroof Control Module	WT	At Module	N/S
Sunroof Limit Switch	BK	At Switch	N/S
Sunroof Switch		Headliner	N/S
Throttle Position Sensor	BK	On Throttle Body	5, 6
Traction Control Switch	NAT	Center of I/P	9
Transmission Control Module	BK	Next to PDC	4
Transmission Range Switch	LG	Left Side of Transmision	7
Transmission Solenoid/ Pressure Switch Assembly	BK	Right Side of Transmission	N/S
Trunk Knock Out Switch		Deck Lid	14
Trunk Lamp	BK	At Lamp	12
Trunk Release Solenoid/Ajar Switch		Deck Lid	14
Turbine Speed Sensor	GY	Left Side of Transmission	7
Turn Signal/ Hazard Warning Switch	BK	Steering Column	8
Vehicle Speed Control Servo	BK	Left Side Engine Compartment	4
Washer Fluid Level Switch	GY	Left Fender Side Shield	3

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Windshield Washer Pump Motor	BK	Left Fender Side Shield	3

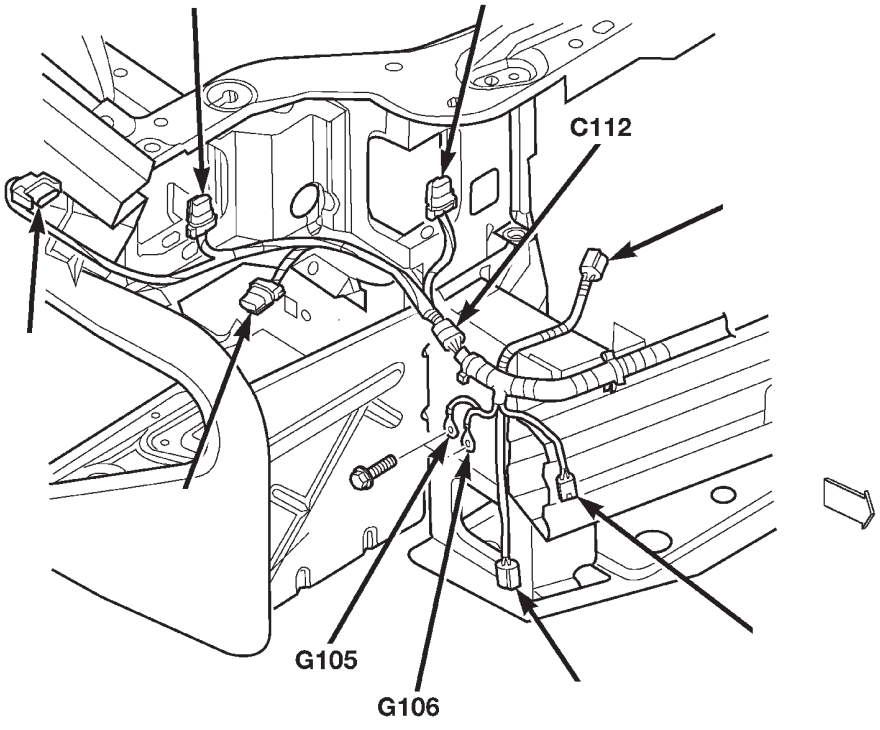
Connector Name/Number	Color	Location	Fig.
Windshield Wiper Motor	BK	At Wiper Motor	4

DESCRIPTION AND OPERATION (Continued)



80c06db7

Fig. 1 Front of Engine



80c06db8

Fig. 2 Right Front Engine Compartment

DESCRIPTION AND OPERATION (Continued)

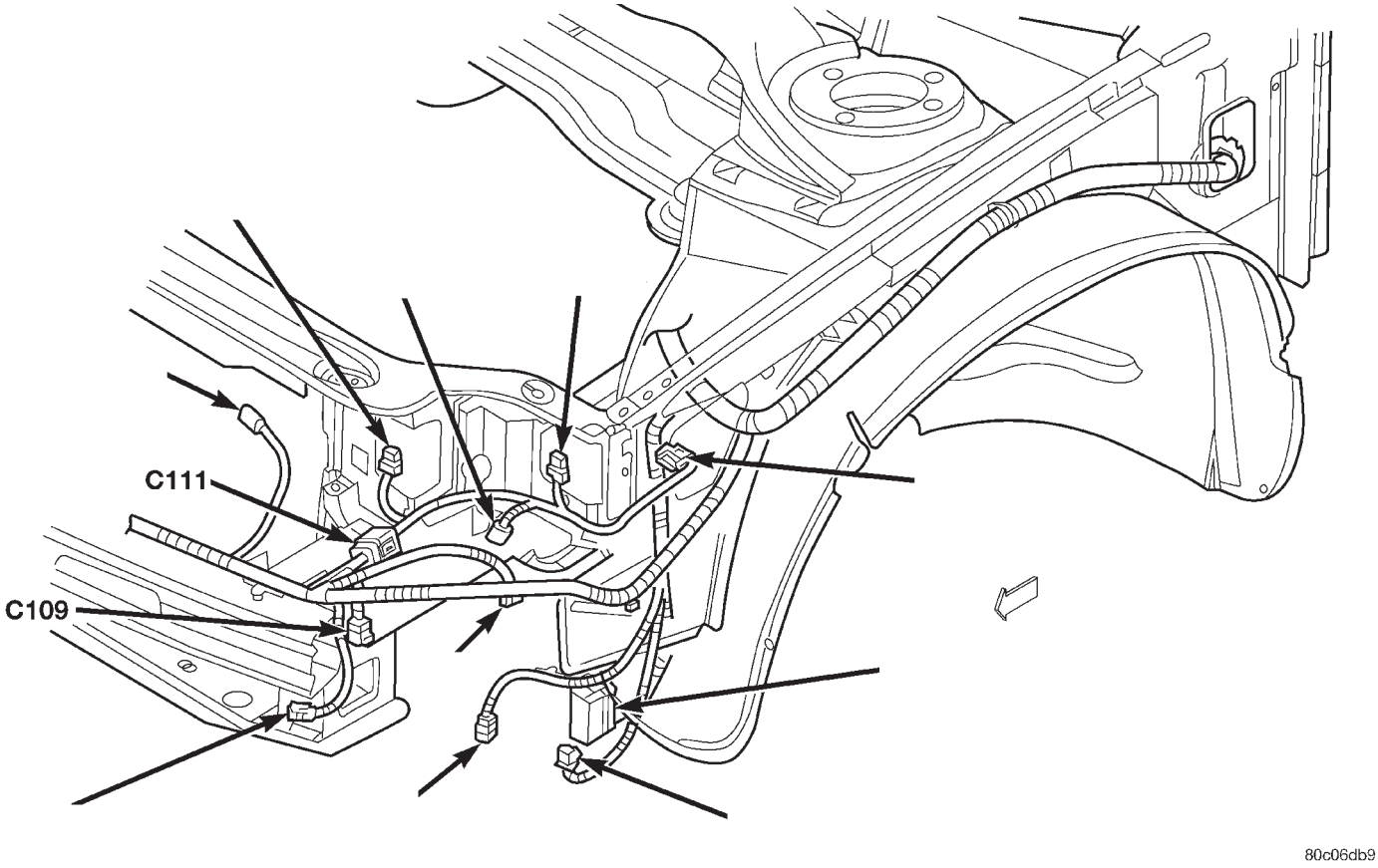


Fig. 3 Left Front Engine Compartment

DESCRIPTION AND OPERATION (Continued)

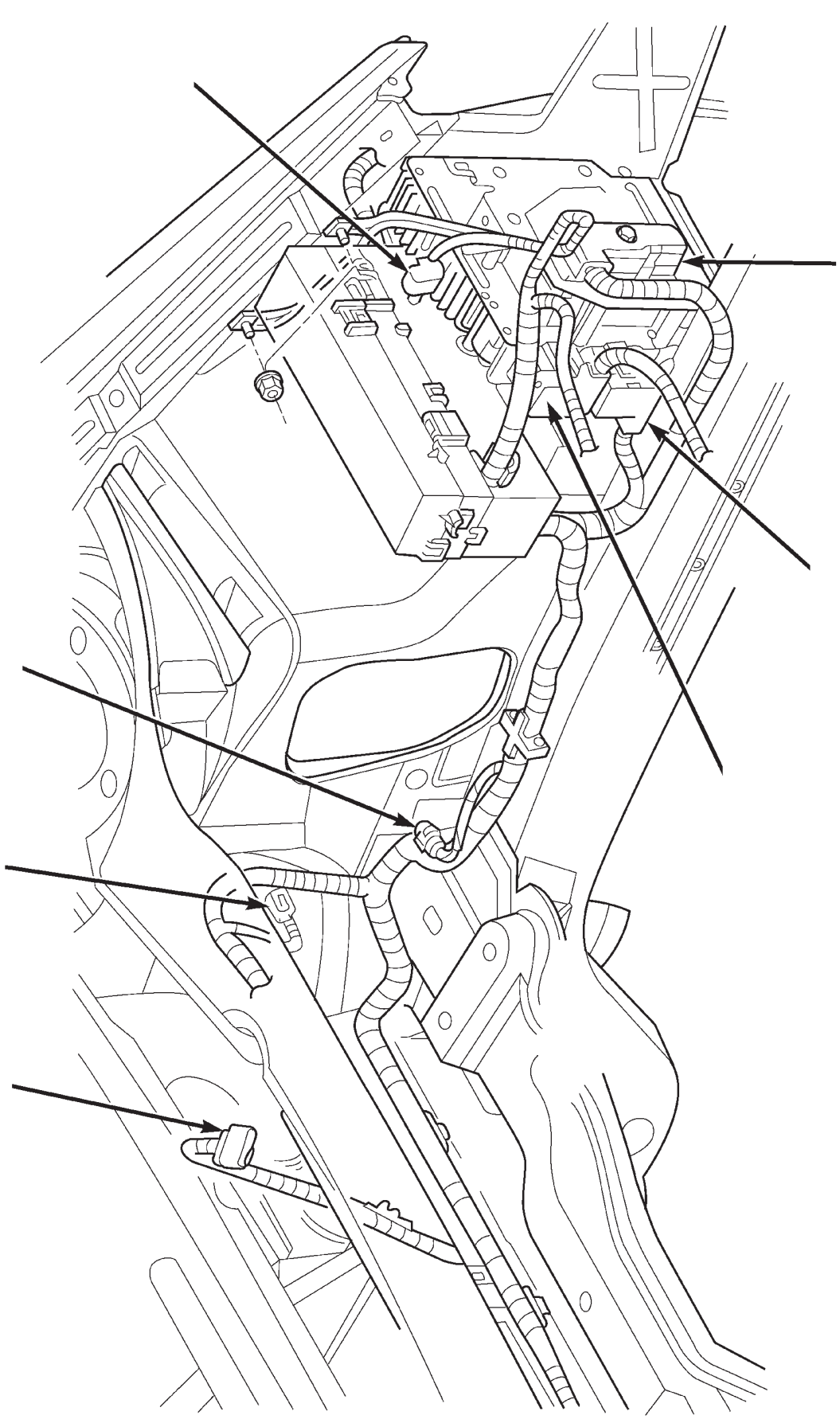


Fig. 4 Left Rear Engine Compartment

DESCRIPTION AND OPERATION (Continued)

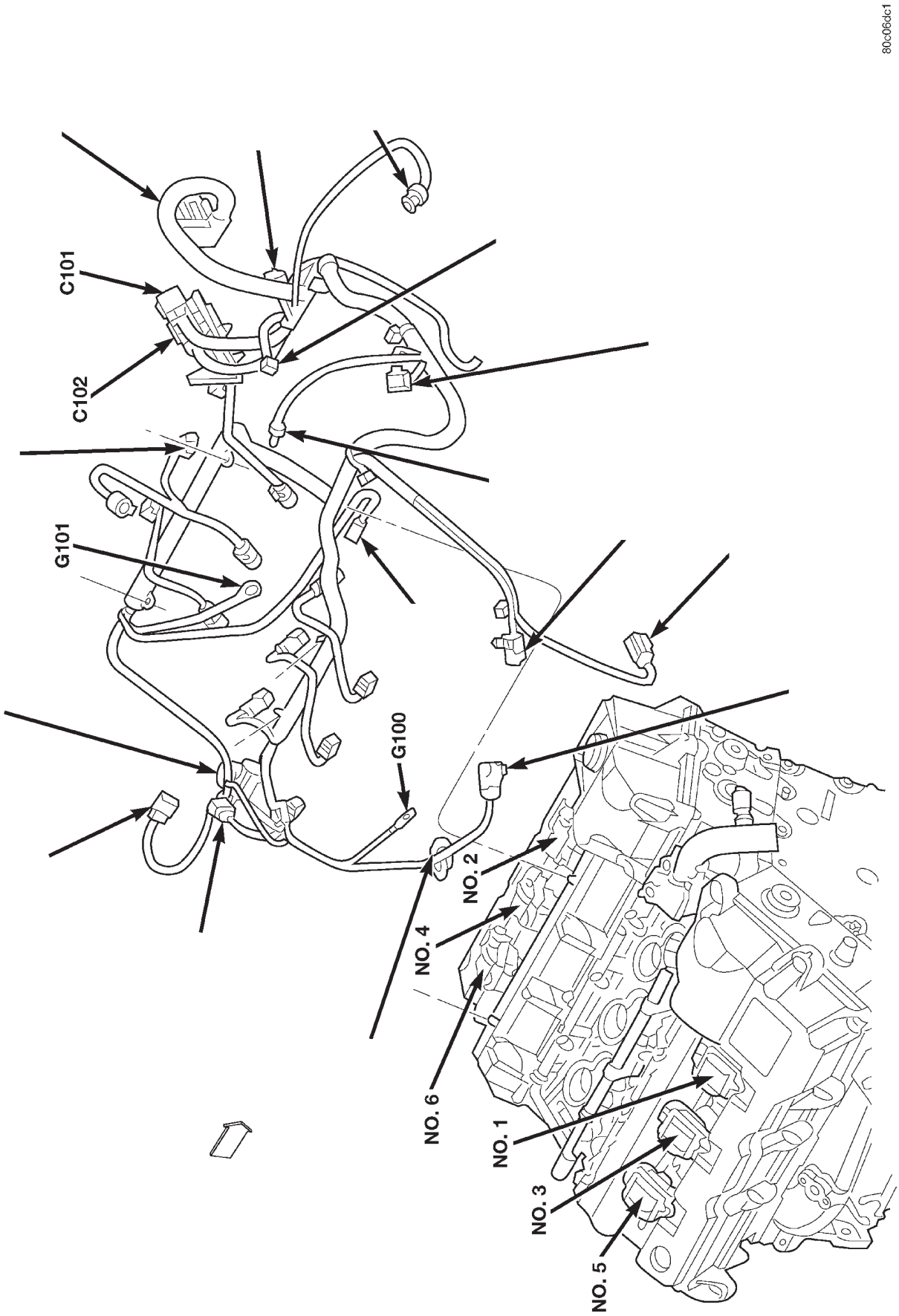


Fig. 5 Engine, 2.7 Liter

DESCRIPTION AND OPERATION (Continued)

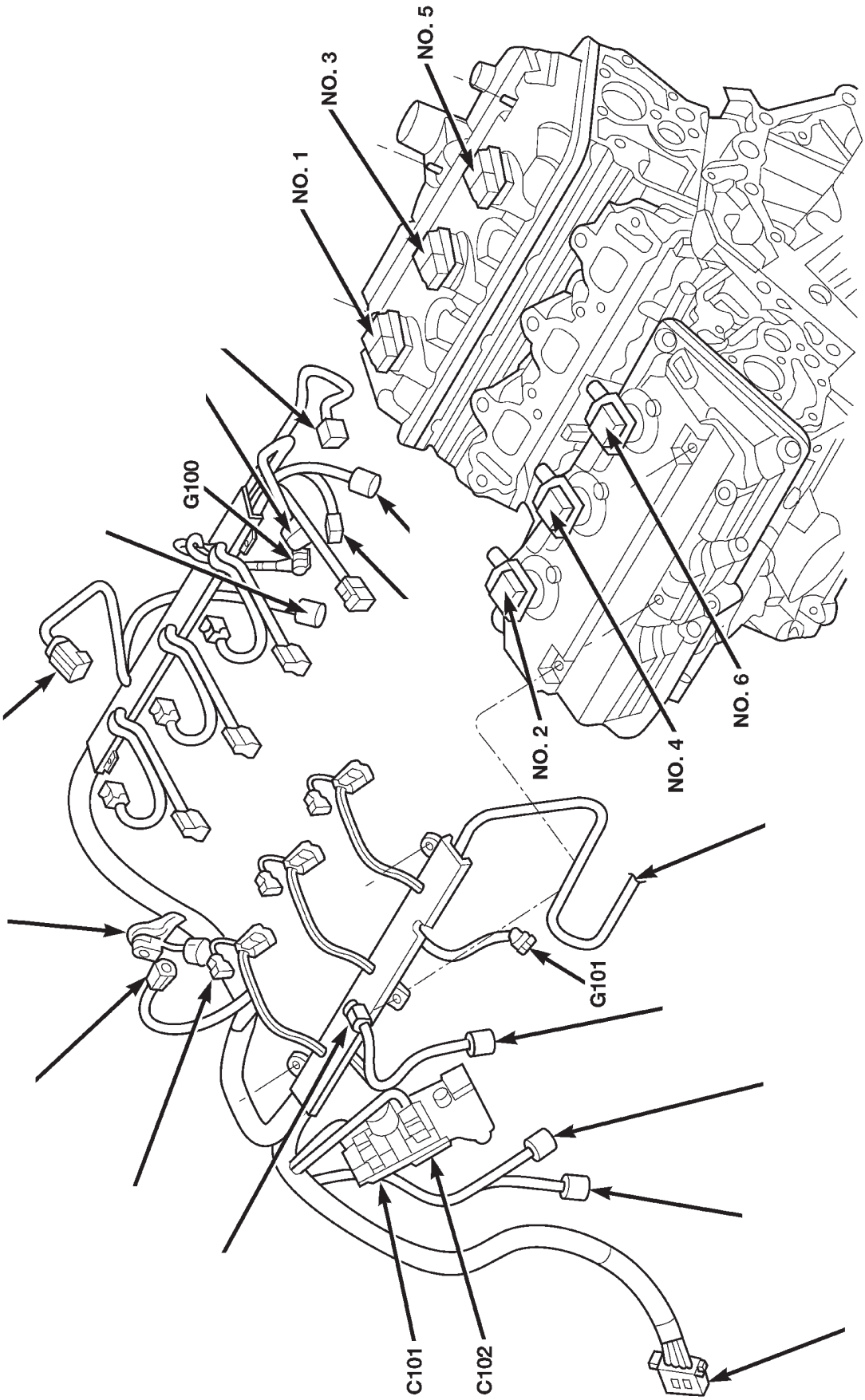


Fig. 6 Engine, 3.5 Liter

DESCRIPTION AND OPERATION (Continued)

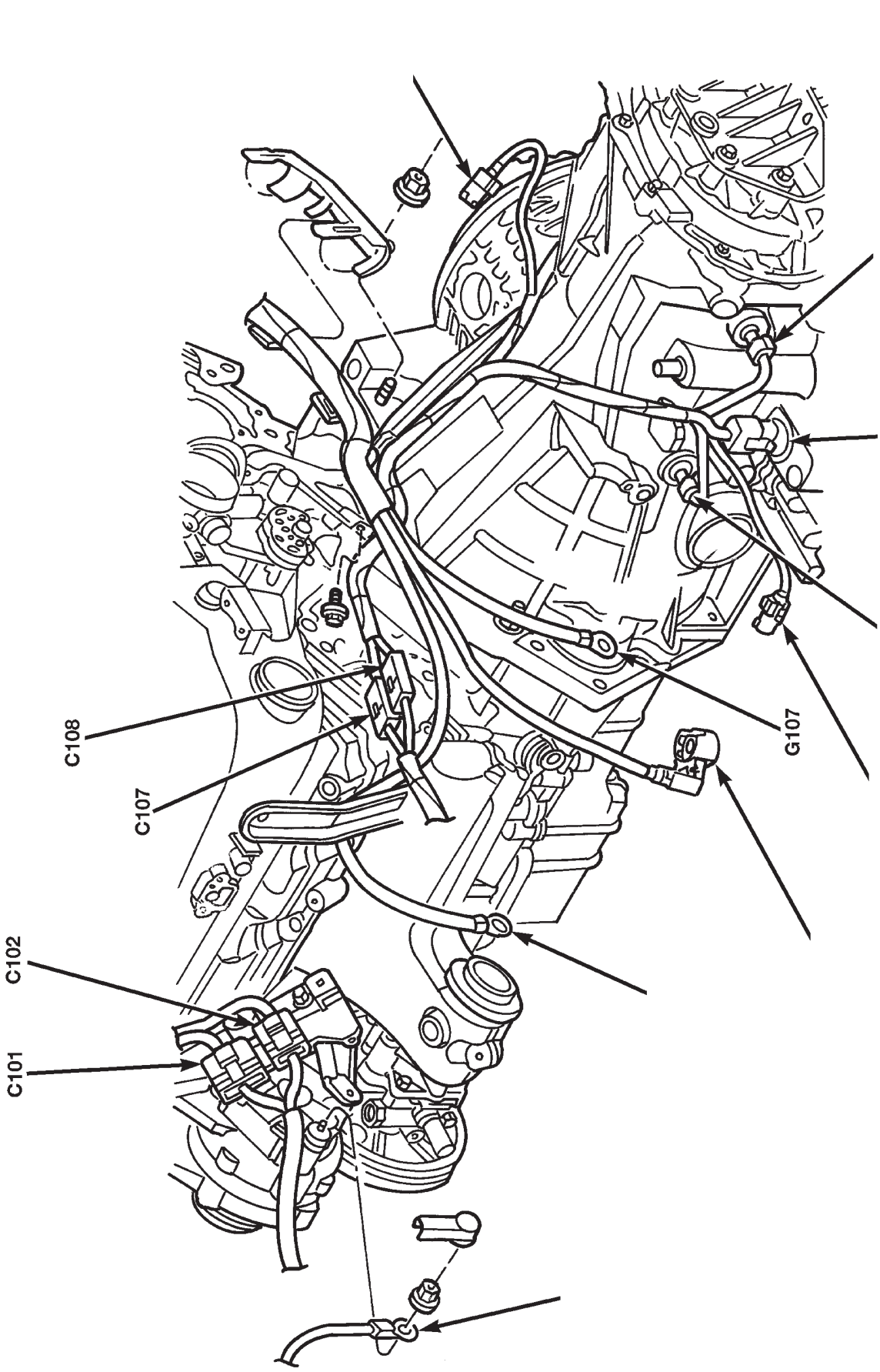


Fig. 7 Transmission

DESCRIPTION AND OPERATION (Continued)

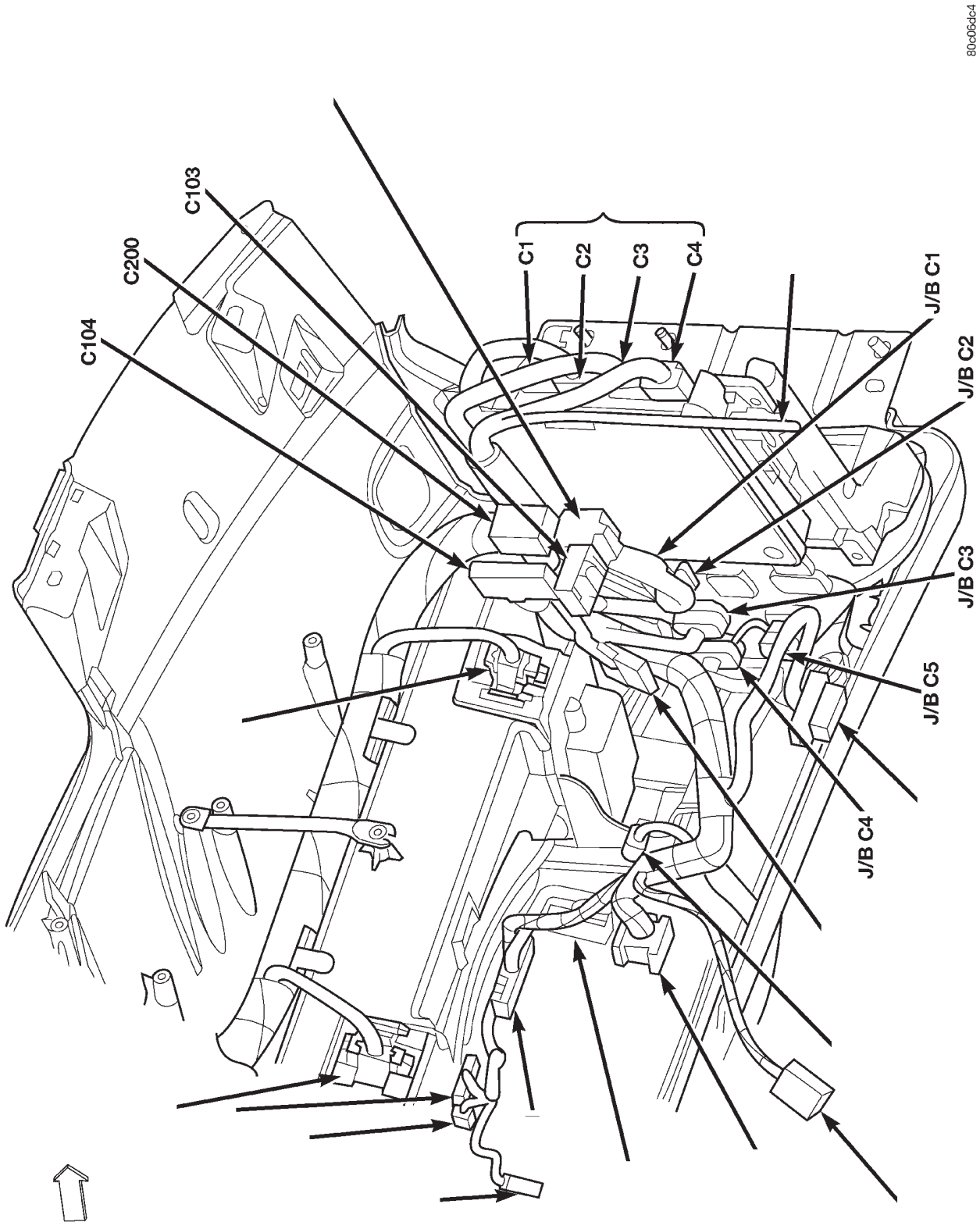


Fig. 8 Left Side of Instrument Panel

DESCRIPTION AND OPERATION (Continued)

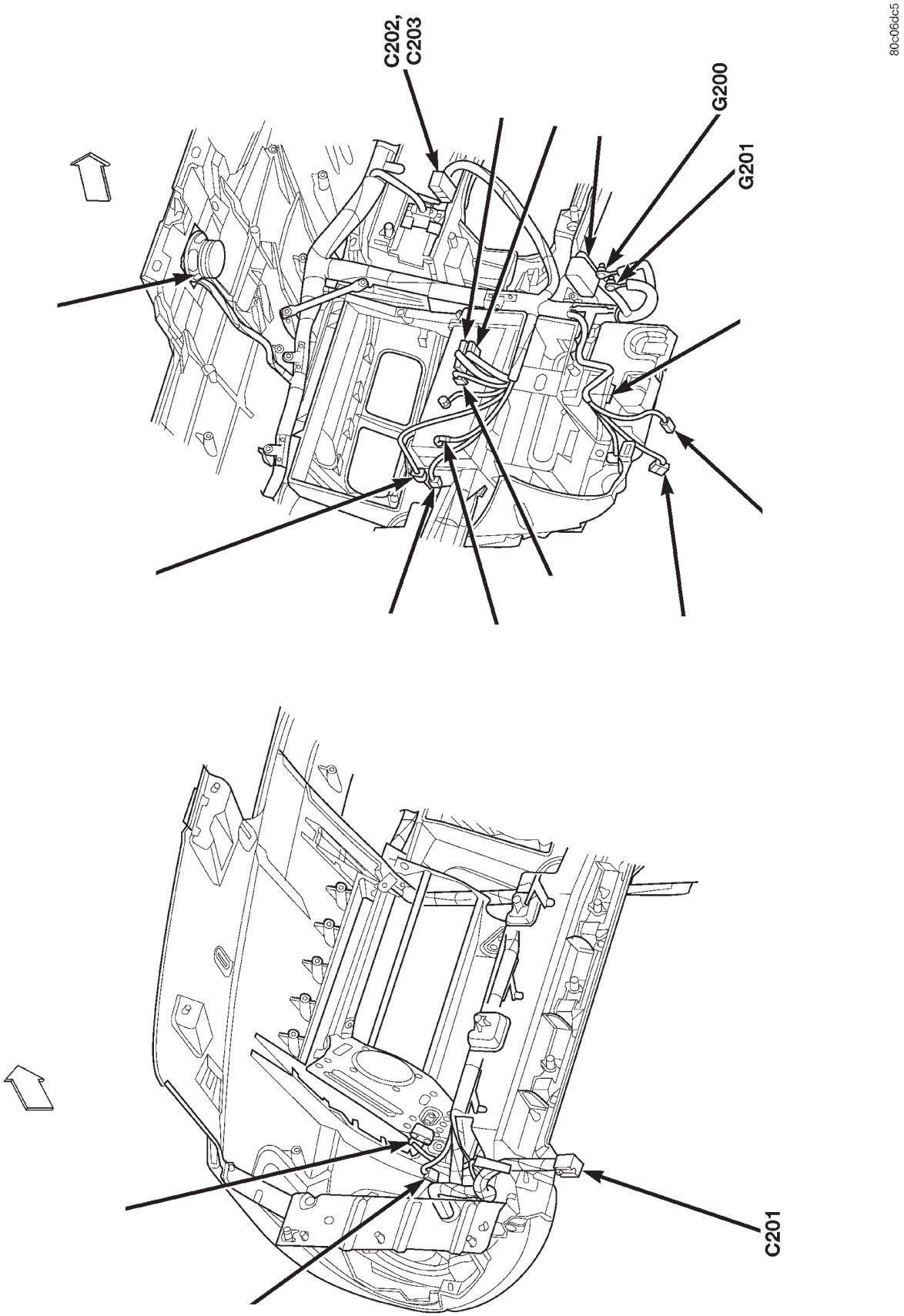


Fig. 9 Instrument Panel

DESCRIPTION AND OPERATION (Continued)

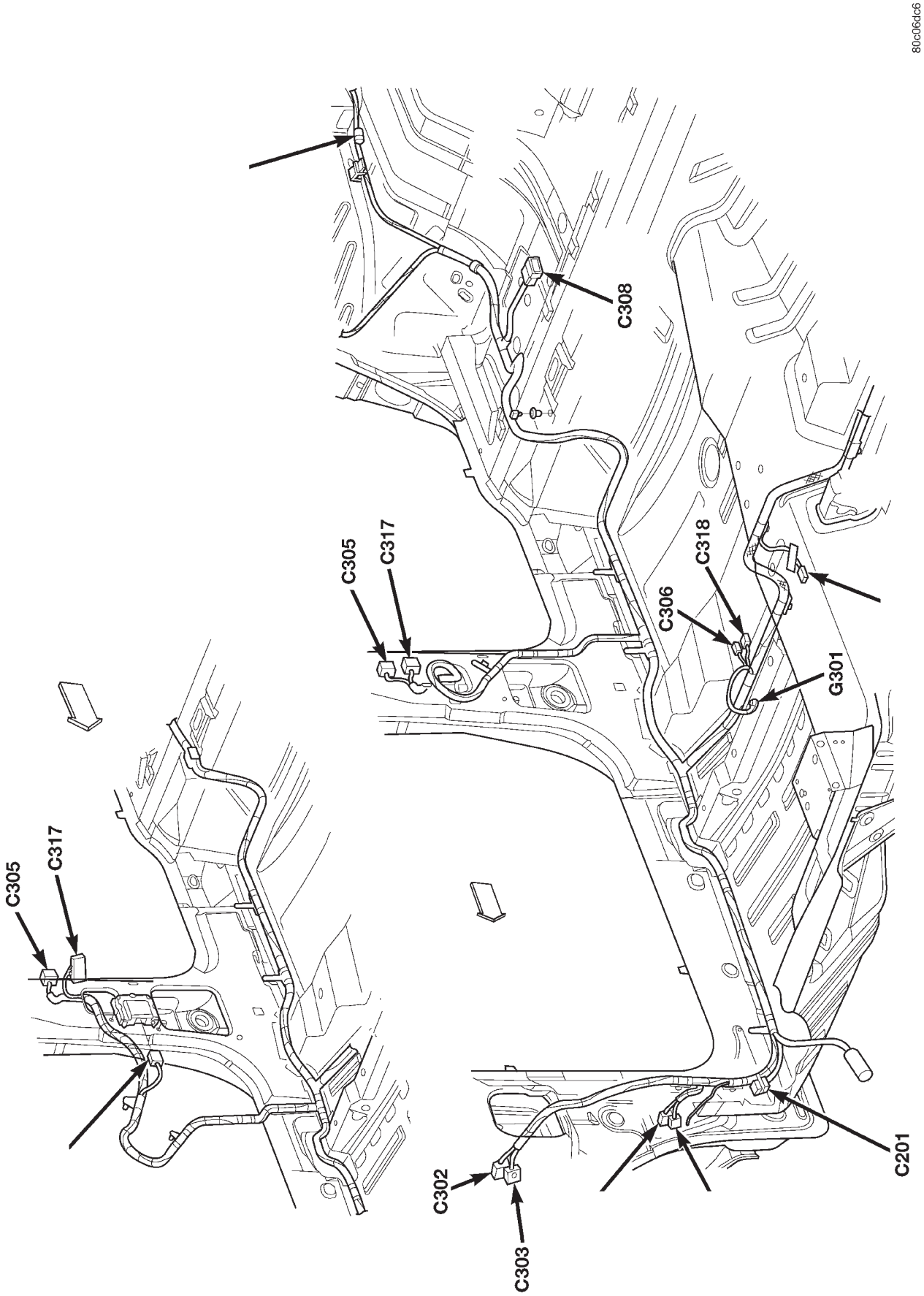


Fig. 10 Right Side Body

DESCRIPTION AND OPERATION (Continued)

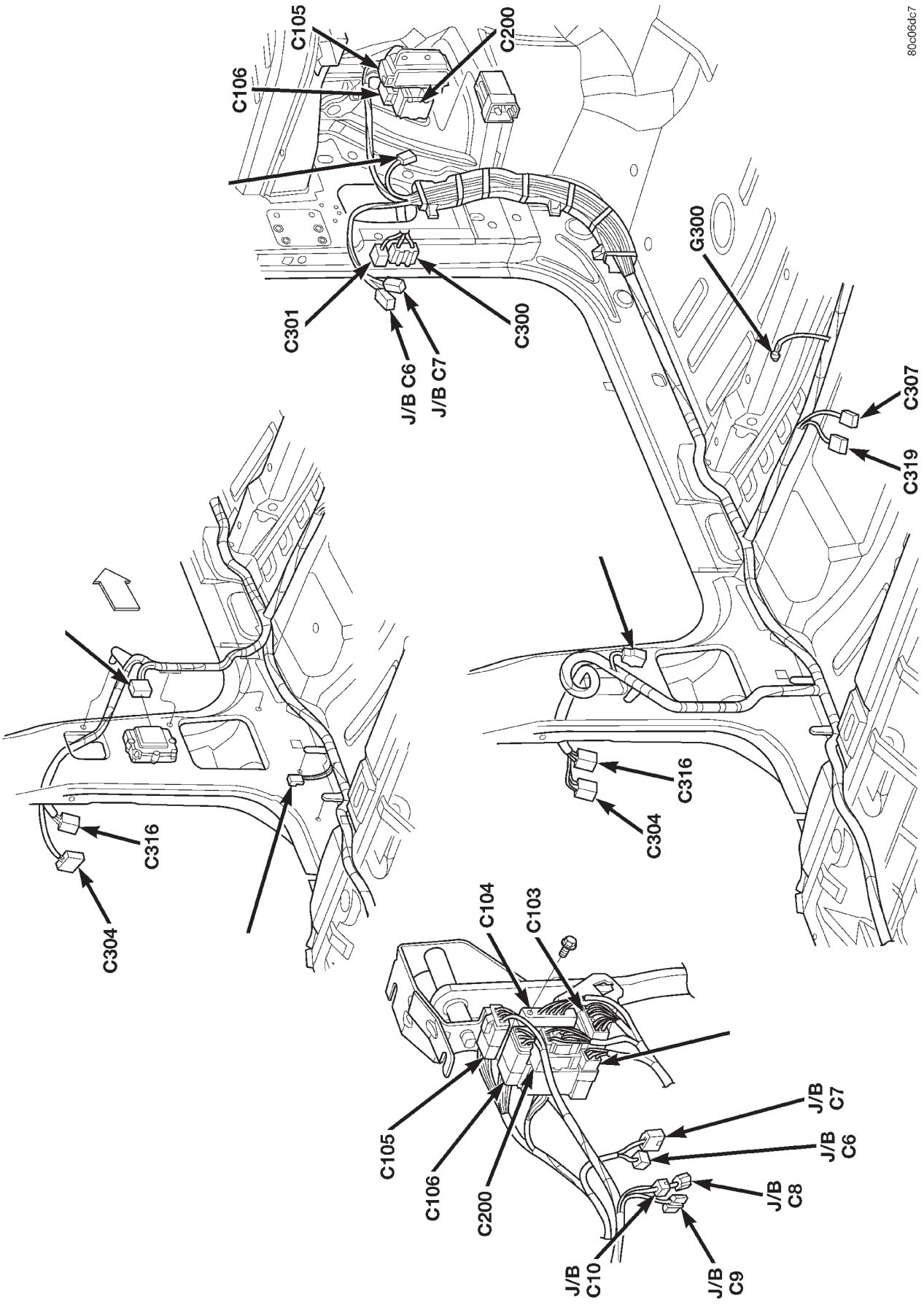
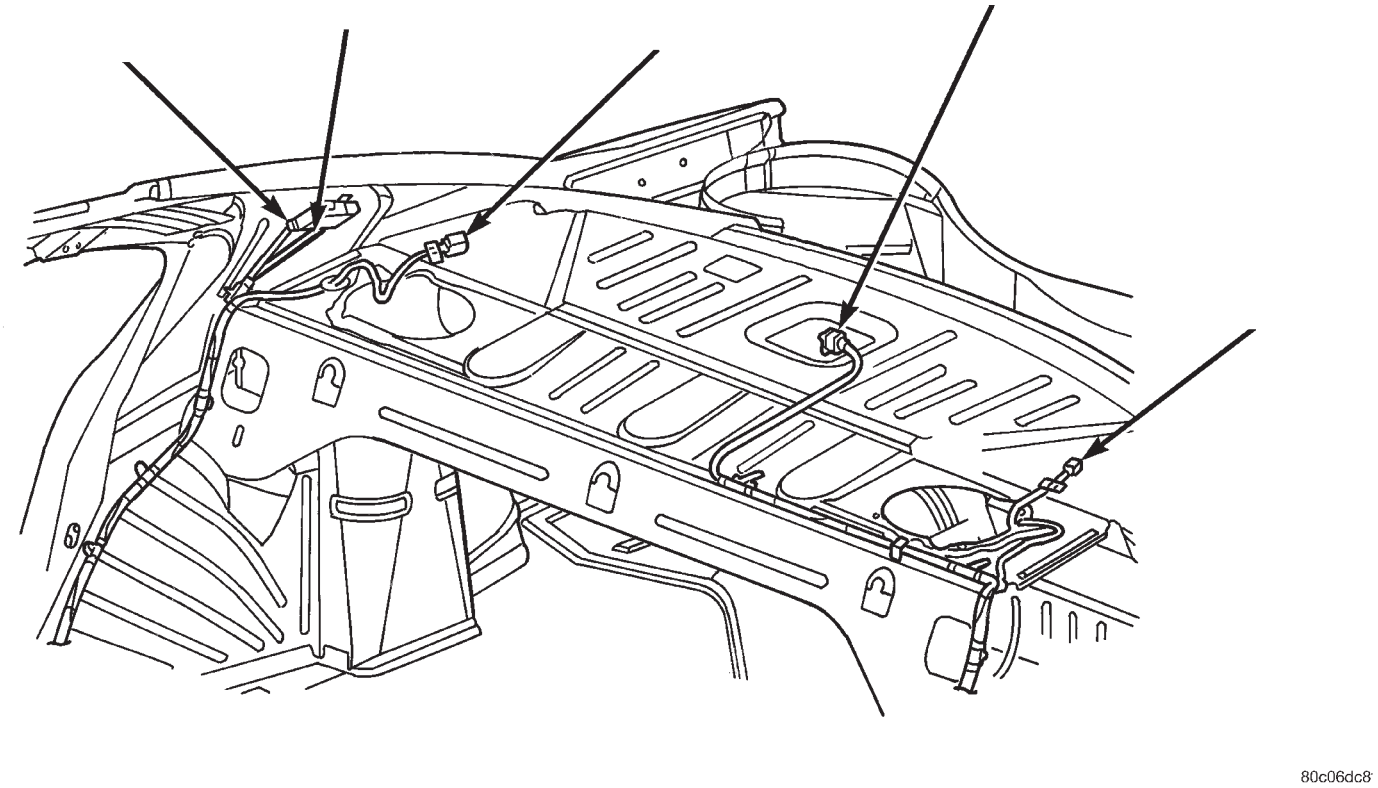


Fig. 11 Left Side Body

DESCRIPTION AND OPERATION (Continued)



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Fig. 12 Shelf Panel

DESCRIPTION AND OPERATION (Continued)

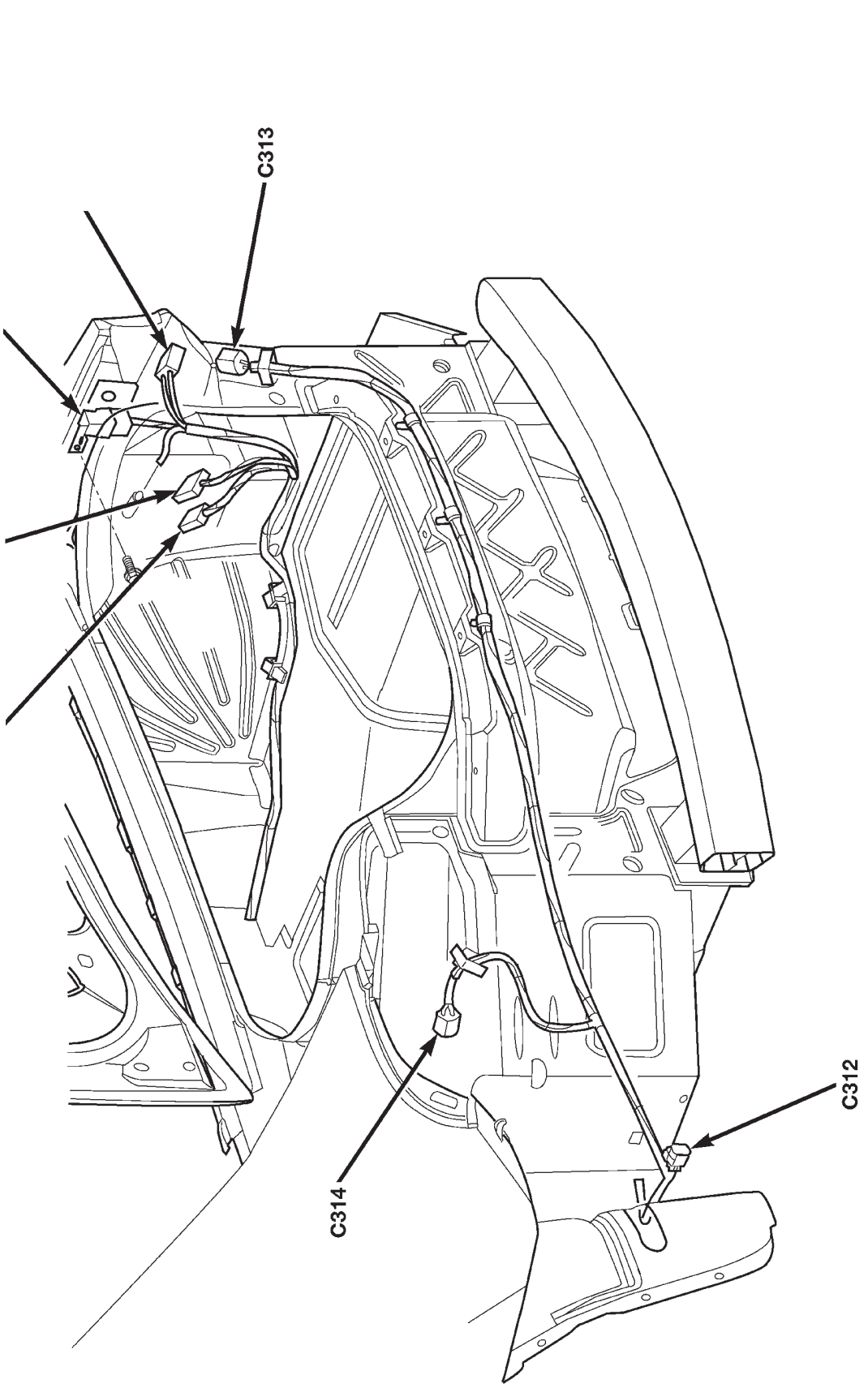
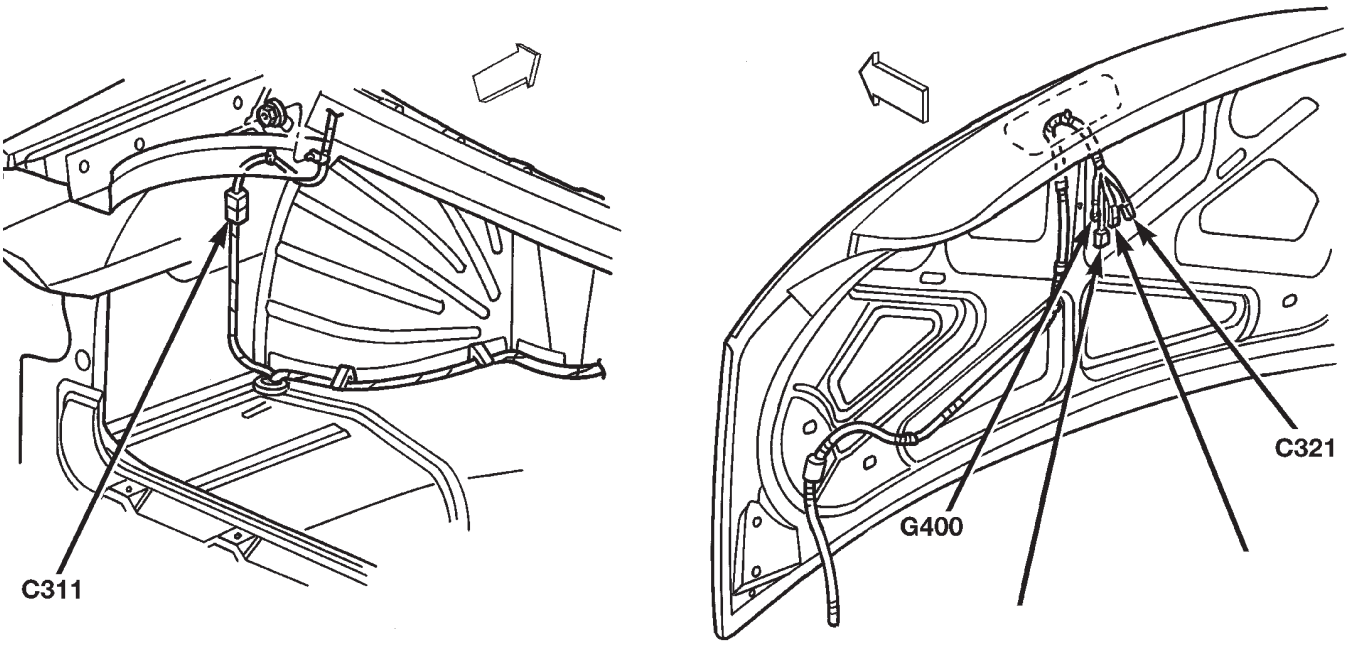


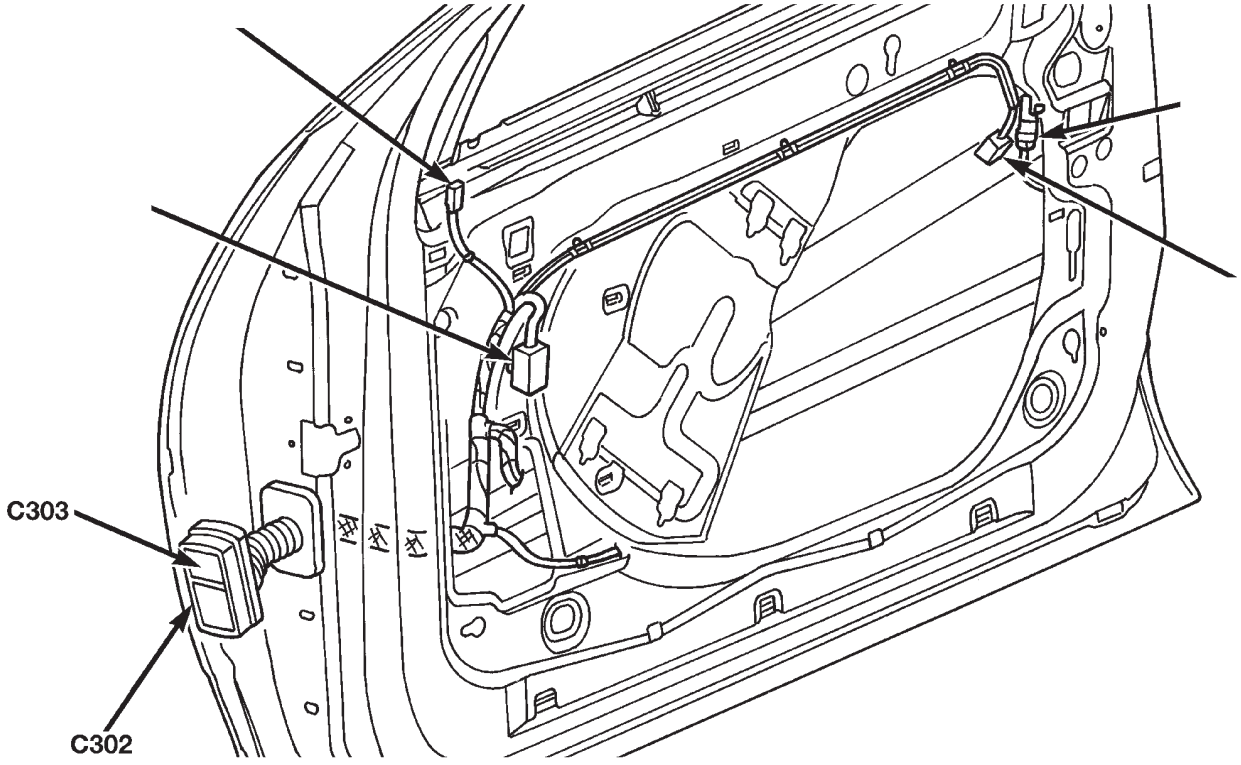
Fig. 13 Tail Lamps

DESCRIPTION AND OPERATION (Continued)



80c06dd1

Fig. 14 Deck Lid



80c06dd2

Fig. 15 Right Front Door

8W-95 SPLICE LOCATIONS

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SPLICE LOCATIONS 1

DESCRIPTION AND OPERATION

INTRODUCTION

This section provides illustrations identifying the general location of the splices in this vehicle. A splice index is provided. Use the wiring diagrams in each section for splice number identification. Refer to the index for the proper splice number.

SPLICE LOCATIONS

For splices that are not shown in the figures in this section a N/S is placed in the Fig. column.

Splice Number	Location	Fig.
S100	Engine Harness in T/O for Powertrain Control Module	3, 4
S101	Engine Harness Front of Engine	3
S102	Engine Harness in T/O for Powertrain Control Module	3, 4
S103	Engine Harness in T/O for Powertrain Control Module (2.7L)	3
S103	Engine Harness Front of Engine (3.5L)	4
S104	Engine Harness Right side of Engine	3
S105	Engine Harness Front of Engine	3, 4
S106	Engine Harness Front of Engine	3, 4
S107	Engine Harness in T/O for Powertrain Control Module	3, 4
S109	Engine Harness Front of Engine (2.7L)	3
S109	Engine Harness Left Side of Engine (3.5L)	4
S110	Engine Harness Right Side (2.7L)	3
S110	Engine Harness Front of Engine (3.5L)	4
S111	Engine Harness Right Side	3, 4

Splice Number	Location	Fig.
S112	Engine Harness Front of Engine	4
S114	Headlamp and Dash in T/O for Transmission Control Module	10
S115	Headlamp and Dash in T/O for Transmission Control Module	10
S116	Headlamp and Dash Left Inner Fender	2
S117	Headlamp and Dash Left Inner Fender	2
S118	Headlamp and Dash Left Inner Fender	2
S119	Headlamp and Dash Left Inner Fender	2
S120	Front Lighting Near T/O for Left Front Lamps	2
S121	Front Lighting Near T/O for Left Front Lamps	2
S122	Headlamp and Dash in Ground T/O from Power Distribution Center	N/S
S123	Headlamp and Dash in Ground T/O from Power Distribution Center	N/S
S124	Headlamp and Dash in Power Distribution Center	N/S
S125	Headlamp and Dash in Power Distribution Center	N/S

DESCRIPTION AND OPERATION (Continued)

Splice Number	Location	Fig.
S127	Headlamp and Dash in Power Distribution Center	N/S
S128	Headlamp and Dash in Power Distribution Center	N/S
S130	Front Lighting Near T/O for Left Front Lamps	2
S131	Front Lighting Near T/O for Left Front Lamps	2
S132	Front Lighting Near T/O for Left Front Lamps	2
S133	Front Lighting Near T/O for Left Front Lamps	2
S134	Front Lighting Near T/O for Left Front Lamps	2
S135	Front Lighting Near T/O for Right Front Lamps	1
S140	Fuel Tank Jumper Near Fuel Pump Module	N/S
S141	Transmission Harness Near T/O for Oxygen Sensors	5
S142	Transmission Harness Near Near T/O for Oxygen Sensors	5
S143	Transmission Harness Near Near T/O for Oxygen Sensors	5
S144	Engine Harness in T/O to Battery	3, 4
S145	Engine Harness in T/O to Battery	3, 4
S146	Transmission Harness Near T/O to Output Shaft Speed Sensor	5
S147	Headlamp and Dash Left Inner Fender	2
S160	Front Fascia Harness Between Right and Left Headlamps	N/S
S161	Front Fascia Harness Between Right and Left Headlamps	N/S
S162	Front Fascia Harness Between Right and Left Headlamps	N/S
S163	Headlamp and Dash Harness Near T/O Brake Pressure Switch	10
S164	Headlamp and Dash Harness Near T/O for Left Front Wheel Speed Sensor	10
S165	Headlamp and Dash Harness in Power Distribution Center	N/S
S166	Headlamp and Dash Harness in Power Distribution Center	N/S
S167	Headlamp and Dash Harness in Power Distribution Center	N/S
S168	Headlamp and Dash Harness in Power Distribution Center	N/S
S170	Headlamp and Dash Harness Near T/O to Front End Lighting	2
S200	Instrument Panel Left Side	6
S201	Instrument Panel Left Side	6
S202	Instrument Panel Left Side	6
S203	Instrument Panel Left Side	6
S204	Instrument Panel Behind Cluster	6
S205	Instrument Panel Left Side	6
S206	Instrument Panel Center	6
S207	Instrument Panel Center	6
S208	Instrument Panel Center	6
S209	Instrument Panel Right Side	6
S210	A/C Heater Harness	N/S
S111	A/C Heater Harness	N/S
S212	A/C Heater Harness	N/S
S213	Instrument Panel Left Side	6
S214	Instrument Panel, Behind Cluster	6
S215	Instrument Panel Left Side	6
S300	Body Harness Left Cowl	8
S301	Body Harness Left Front Sill	8
S302	Body Harness Left Front Sill	8
S303	Body Harness Right Body Rear	9
S304	Body Harness Right Body Rear	9
S305	Body Harness Under Drivers Seat	8
S306	Body Harness Body Rear	N/S
S307	Body Harness Left Body Rear	N/S
S308	Body Harness Left Body Rear	N/S
S309	Body Harness Left Body Rear	N/S
S310	Body Harness Left Body Rear	N/S
S311	Right Front Door Harness	7
S312	Left Front Door Harness	N/S
S313	Right Front Door Harness	7
S314	Left Front Door Harness	N/S
S315	Left Front Door Harness	N/S

DESCRIPTION AND OPERATION (Continued)

Splice Number	Location	Fig.
S316	Left Front Door Harness	N/S
S317	Left Front Door Harness	N/S
S318	Left Front Door Harness	N/S
S319	Headliner Harness Near T/O to Day/Night Mirror	N/S
S320	Headliner Harness Near T/O to Day/Night Mirror	N/S
S321	Headliner Harness Near T/O to Day/Night Mirror	N/S
S322	Headliner Harness Near T/O to Day/Night Mirror	N/S
S323	Headliner Harness Near T/O to Day/Night Mirror	N/S
S324	Headliner Harness Near T/O to Left Rear Door Courtesy Lamp	N/S
S325	Headliner Harness Near T/O to Left Rear Door Courtesy Lamp	N/S
S326	Headliner Harness Near T/O to Right Rear Door Courtesy Lamp	N/S
S327	Headliner Harness Near T/O to Right Rear Door Courtesy Lamp	N/S
S328	Power Seat Harness at Seat	N/S
S329	Body Harness, Right Body Rear	9
S330	Body Harness, Right Body Rear	9
S331	Body Harness, Left Side Body	8
S332	Body Harness, Right Side Body	9
S334	Body Harness, Left Side Body	8
S335	Body Harness, Left Side Body	8
S336	Body Harness, Left Cowl	8
S337	Body Harness, Body Rear	N/S
S338	Body Harness, Right Side Body	9
S341	Memory Seat Harness Near T/O to Seat Motors	N/S
S342	Memory Seat Harness Near Heated Seat Heater Connector	N/S
S343	Memory Seat Harness Near Heated Seat Heater Connector	N/S
S345	Body Harness, Left Front Sill	8
S346	Body Harness, Left Front Sill	8
S347	Body Harness, Left Front Sill	8
S400	Taillamp Harness in T/O to Rear Fog Lamp	N/S
S401	Rear Fascia Harness	N/S
S402	Taillamp Harness, Left Tail Lamps	N/S
S403	Taillamp Harness, Left Tail Lamps	N/S
S404	Taillamp Harness, Left Tail Lamps	N/S
S405	Deck Lid Harness	N/S
S407	Taillamp Harness, Left Tail Lamps	N/S
S408	Taillamp Harness, Left Tail Lamps	N/S
S409	Taillamp Harness, Left Tail Lamps	N/S
S411	Near T/O for Sun Roof Motor Connector	N/S
S412	Near T/O for Sun Roof Motor Connector	N/S
S421	Taillamp Harness in T/O to Rear Fog Lamp	N/S

DESCRIPTION AND OPERATION (Continued)

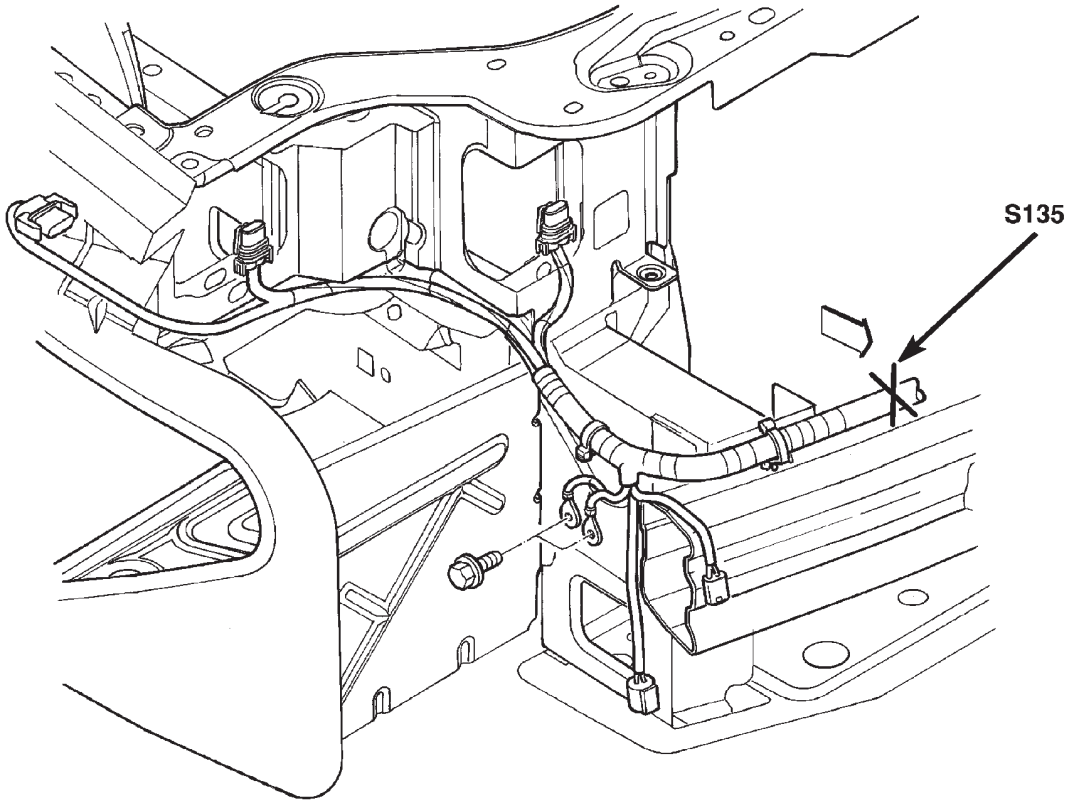


Fig. 1 Right Front Lamps

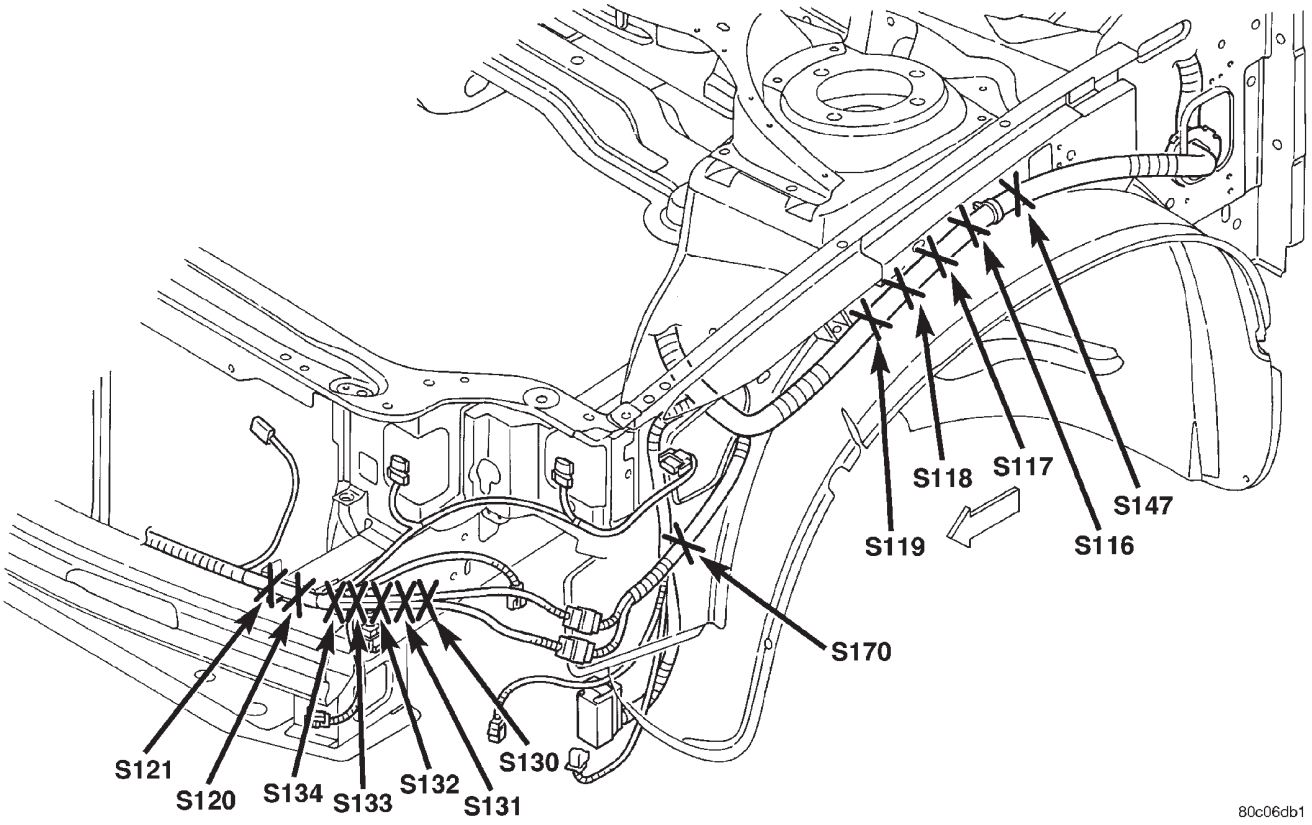


Fig. 2 Left Front Lamps

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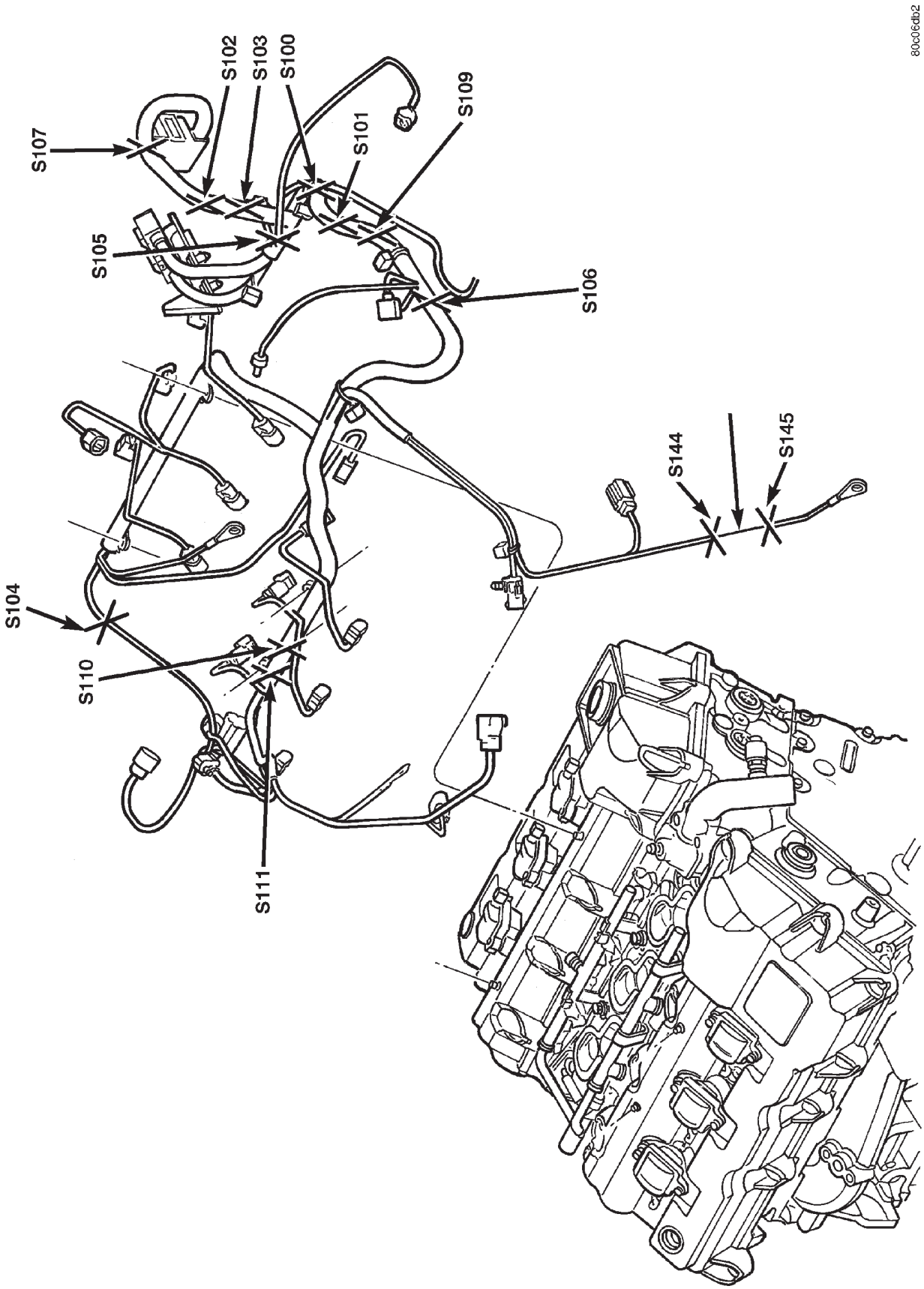


Fig. 3 2.7 Liter Engine

DESCRIPTION AND OPERATION (Continued)

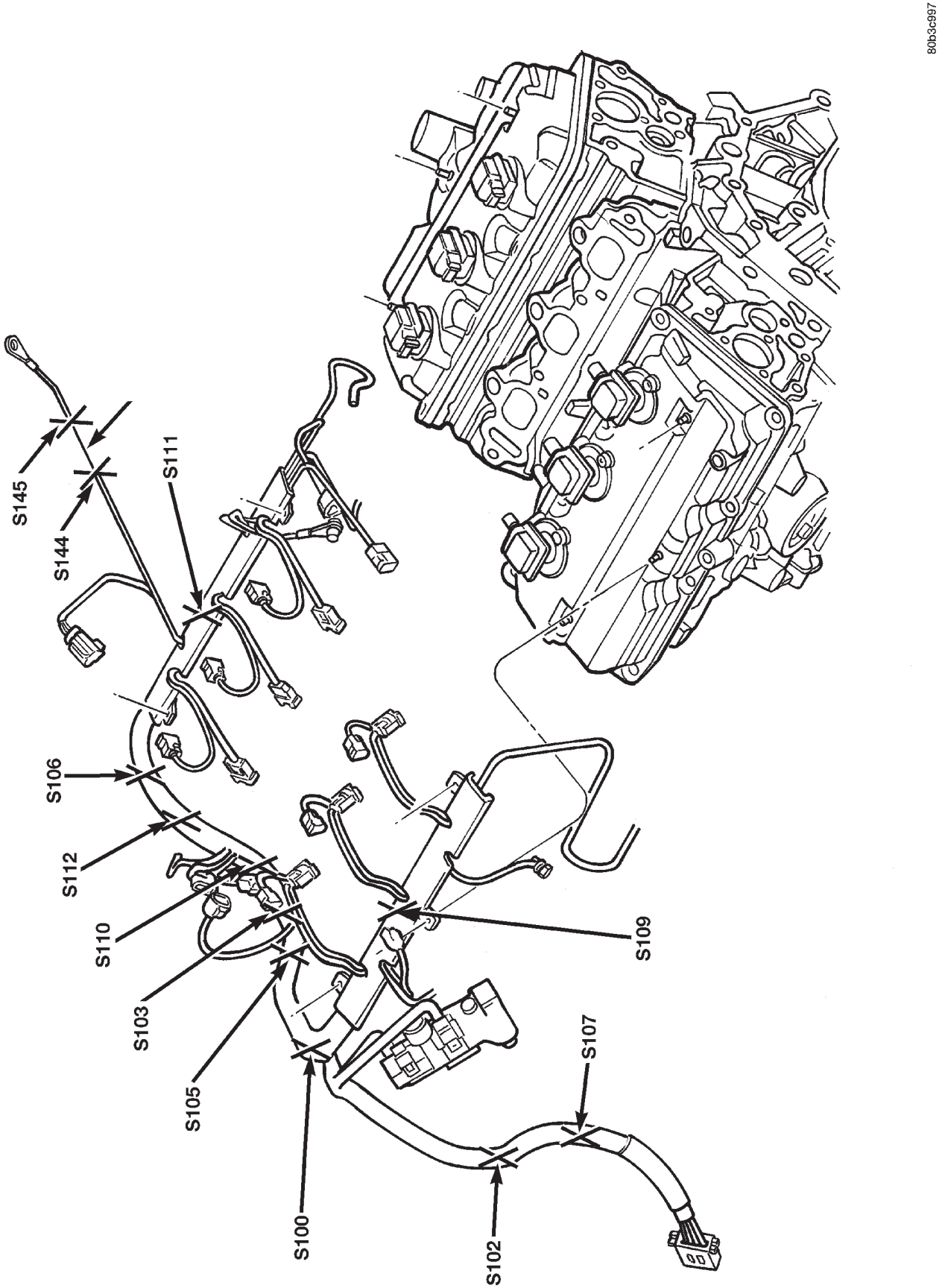


Fig. 4 3.5 Liter Engine

DESCRIPTION AND OPERATION (Continued)

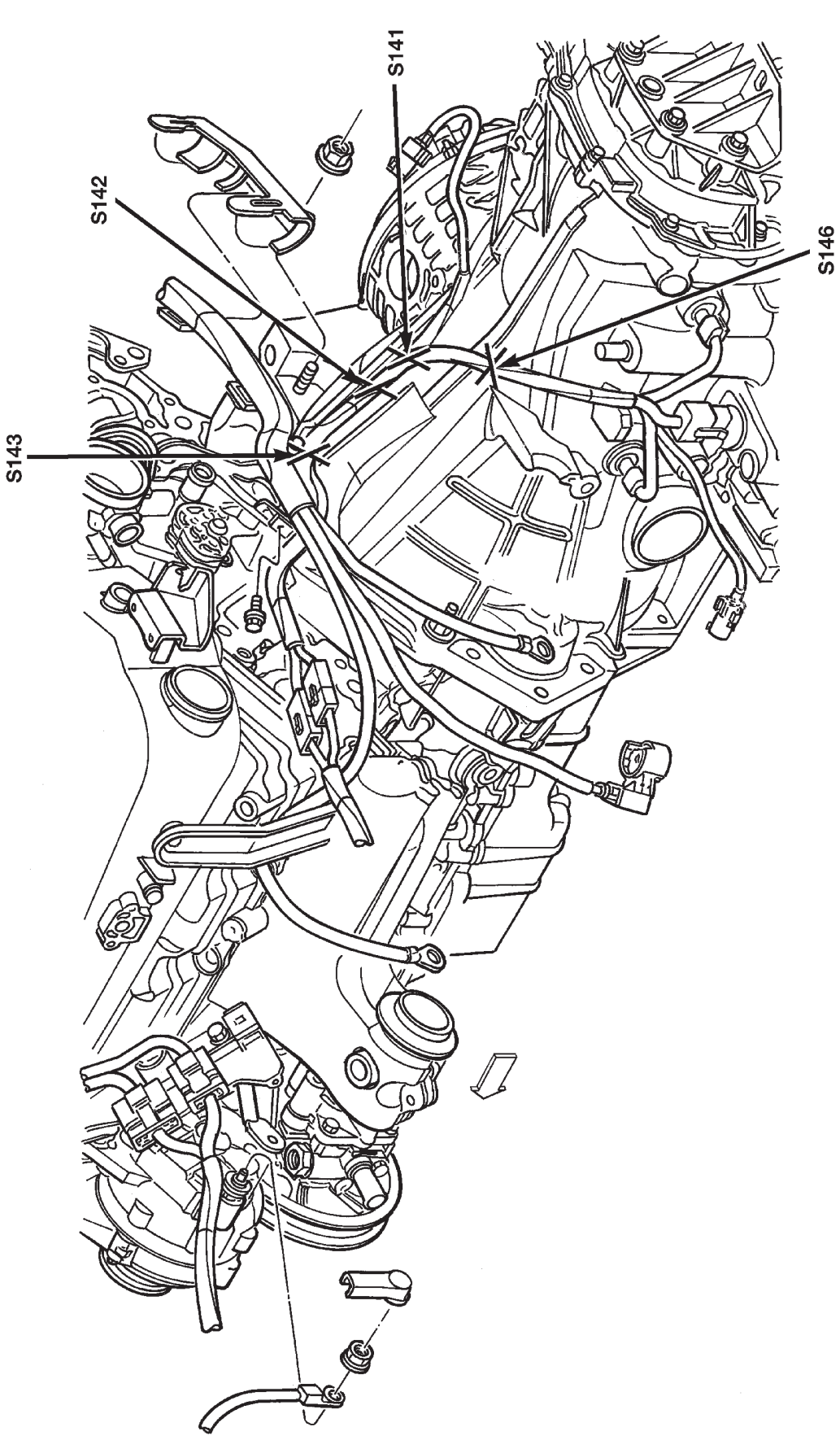


Fig. 5 Transmission

DESCRIPTION AND OPERATION (Continued)

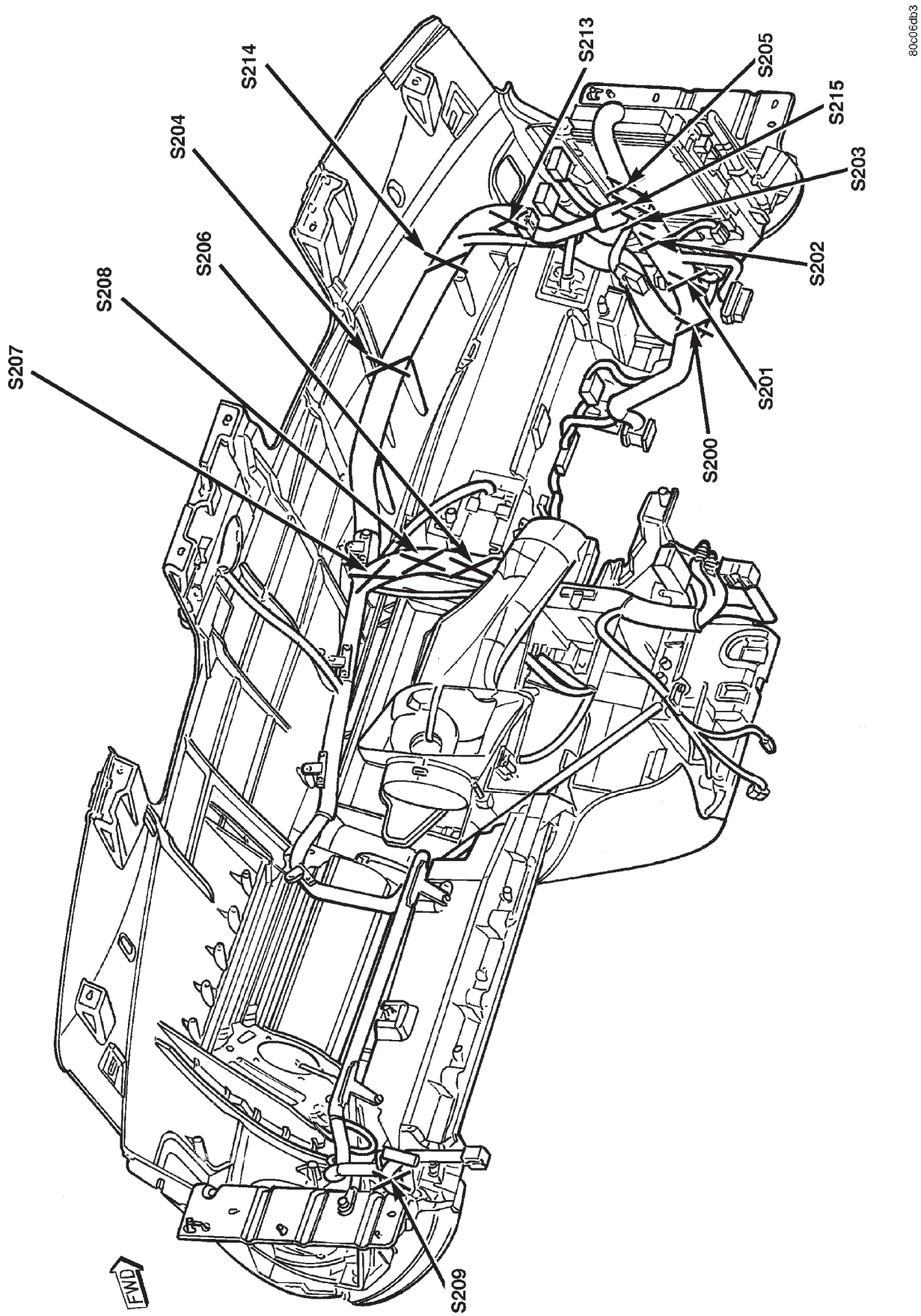


Fig. 6 Instrument Panel

DESCRIPTION AND OPERATION (Continued)

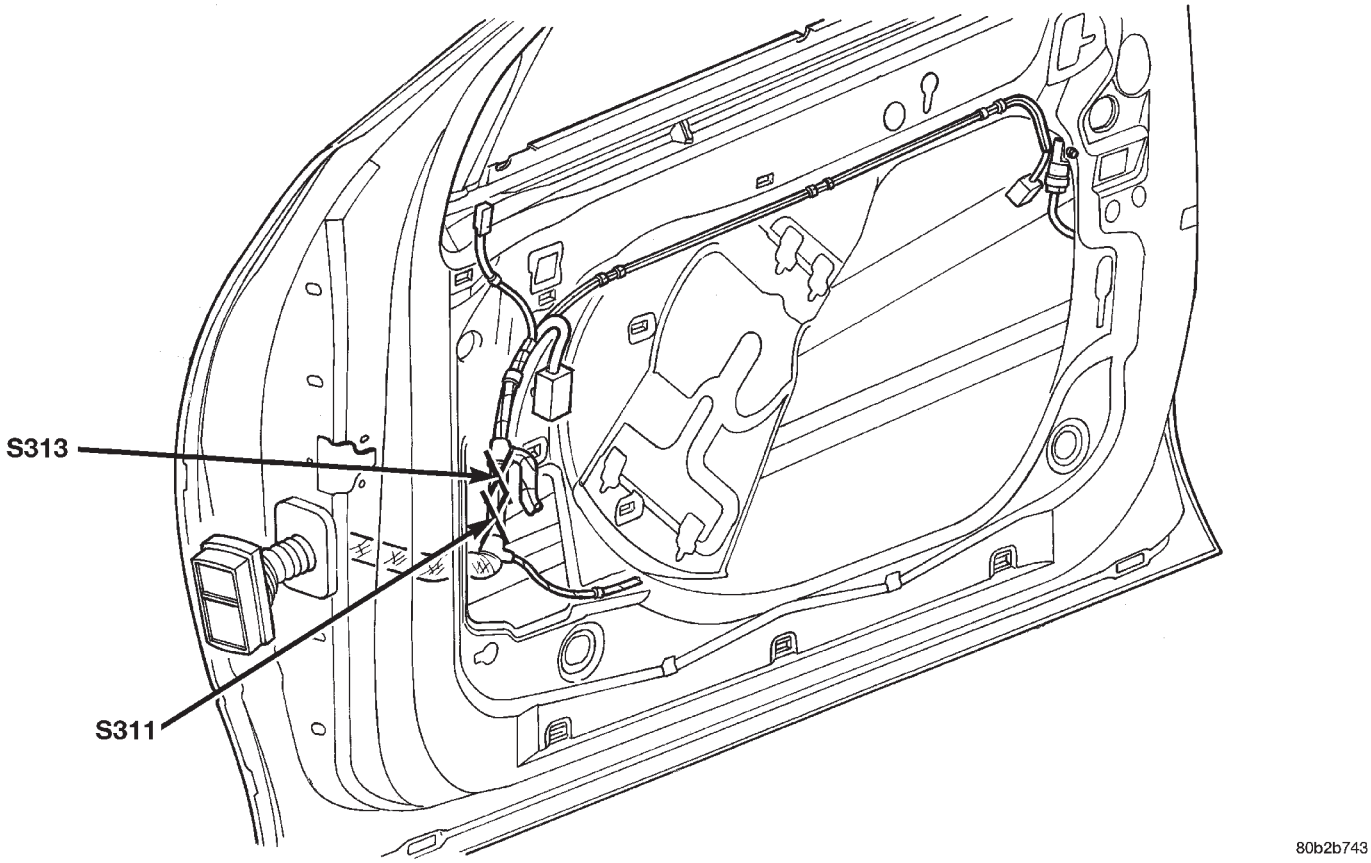


Fig. 7 Right front Door

DESCRIPTION AND OPERATION (Continued)

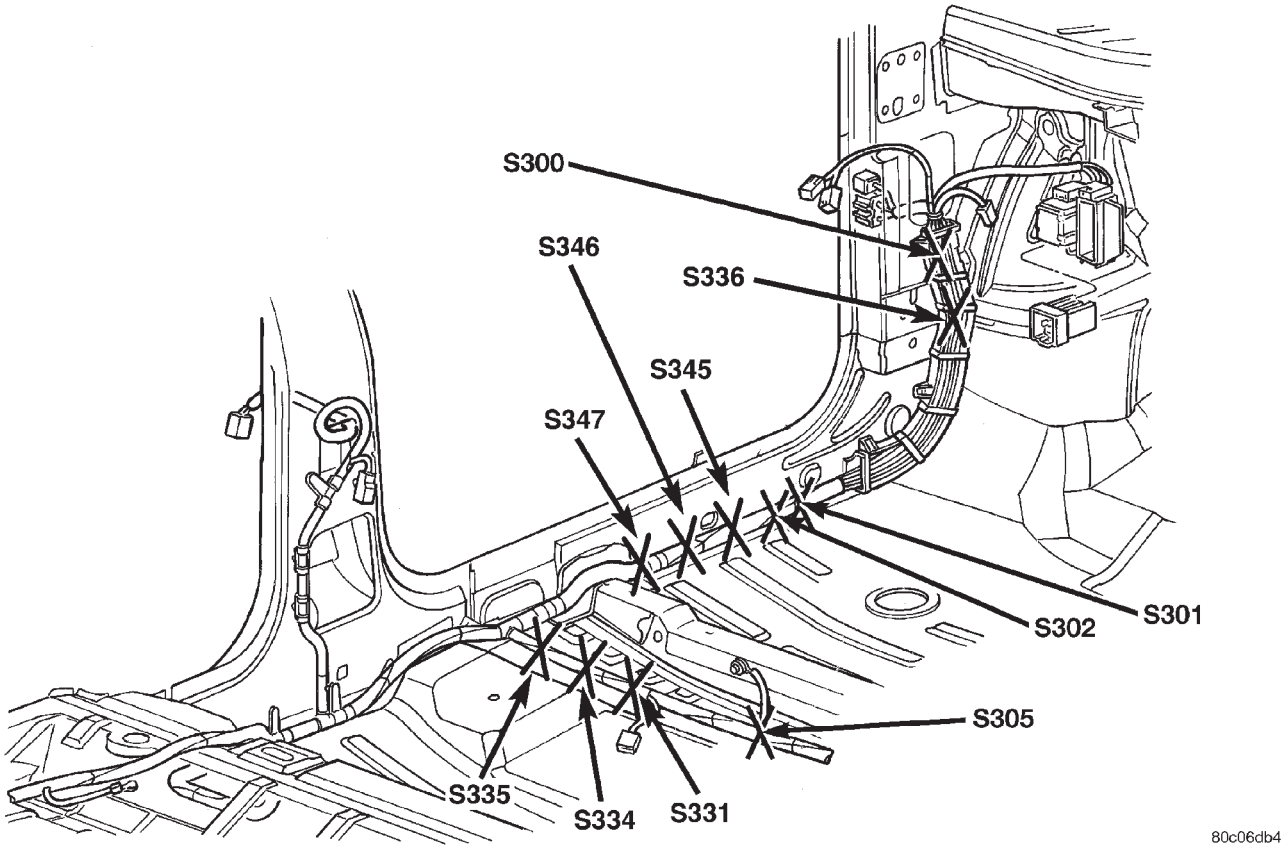


Fig. 8 Left Side Body

DESCRIPTION AND OPERATION (Continued)

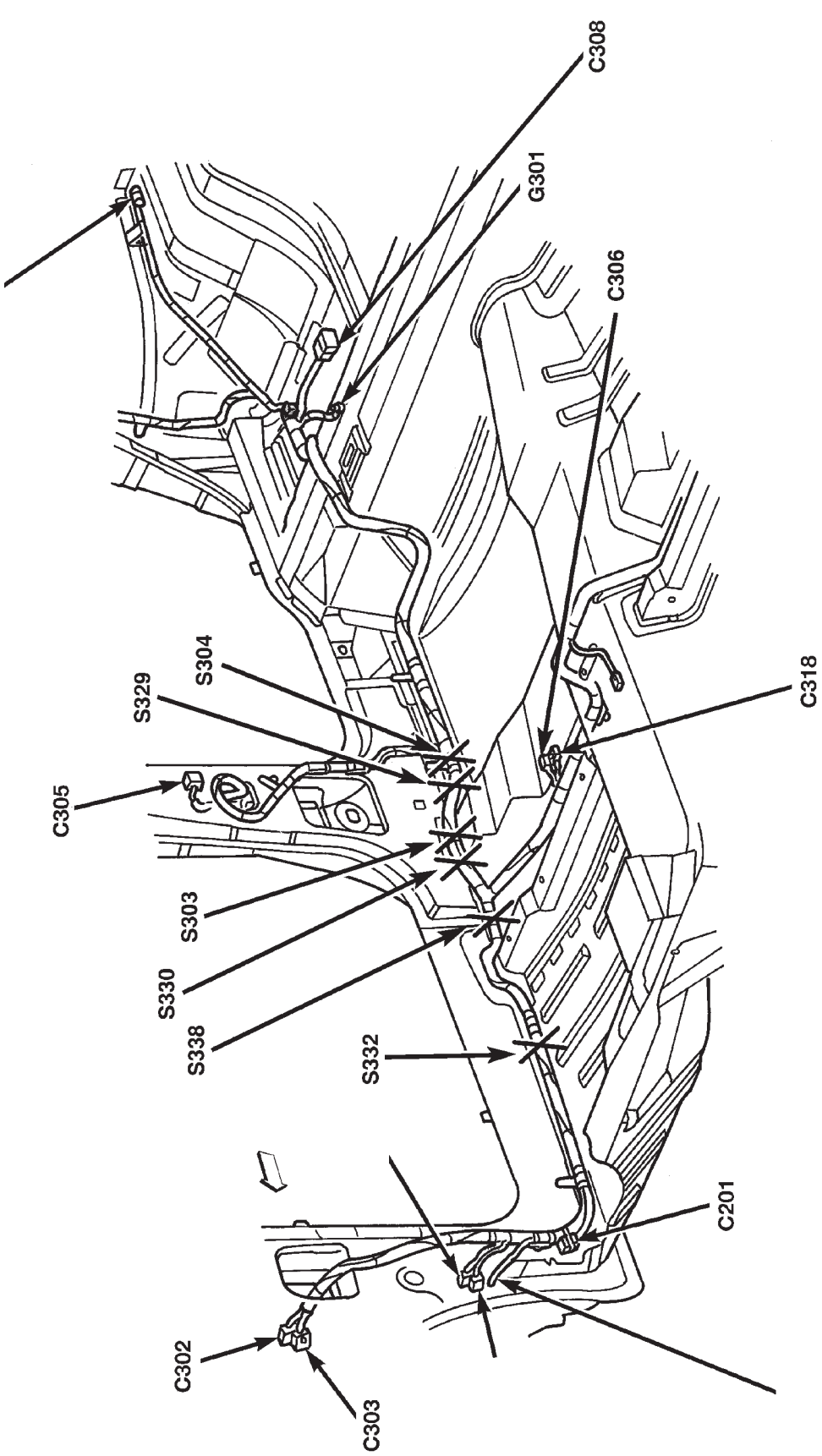


Fig. 9 Right Side Body

DESCRIPTION AND OPERATION (Continued)

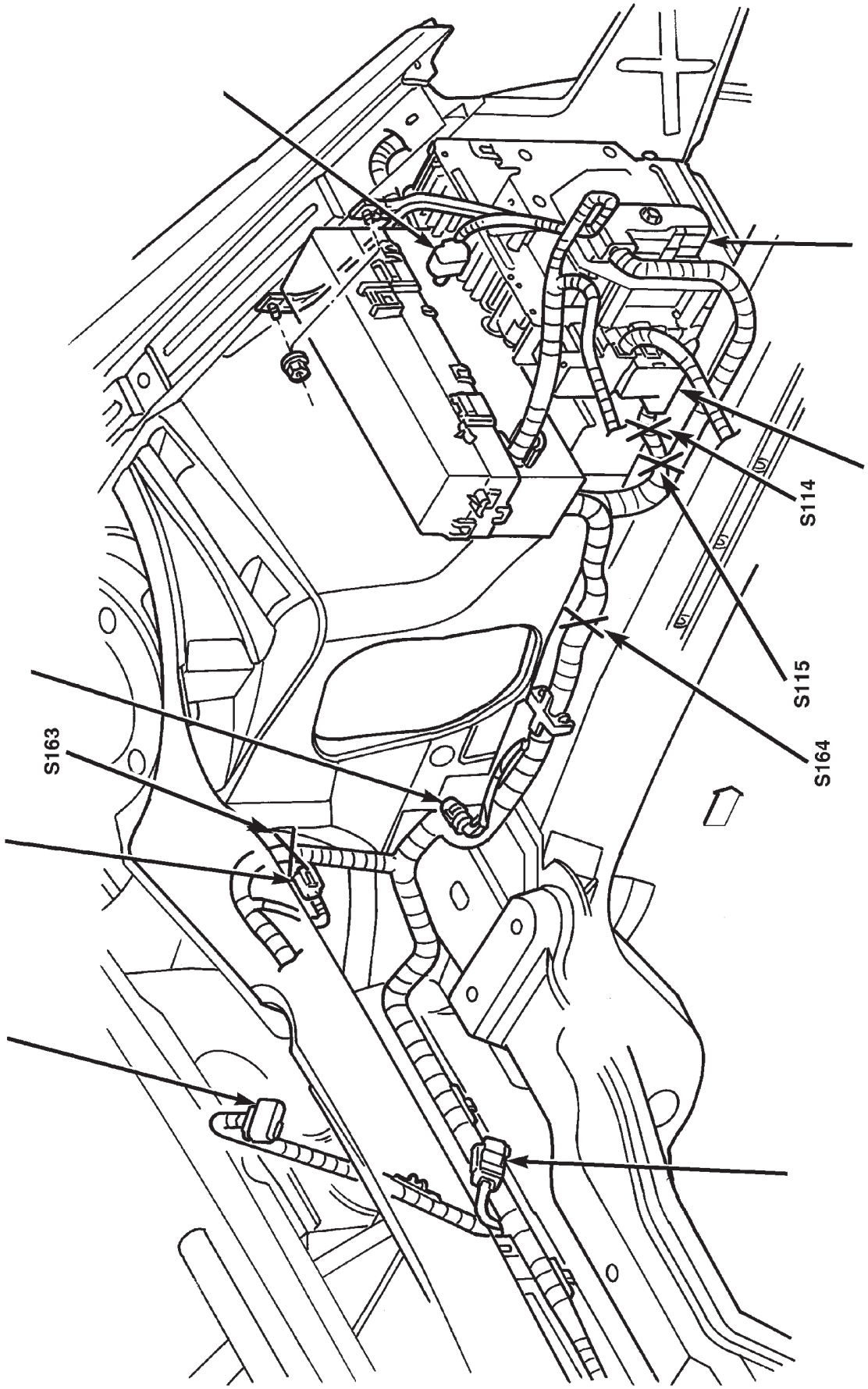


Fig. 10 Left Rear Engine Compartment

ENGINE

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2.7L ENGINE

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2.7L ENGINE

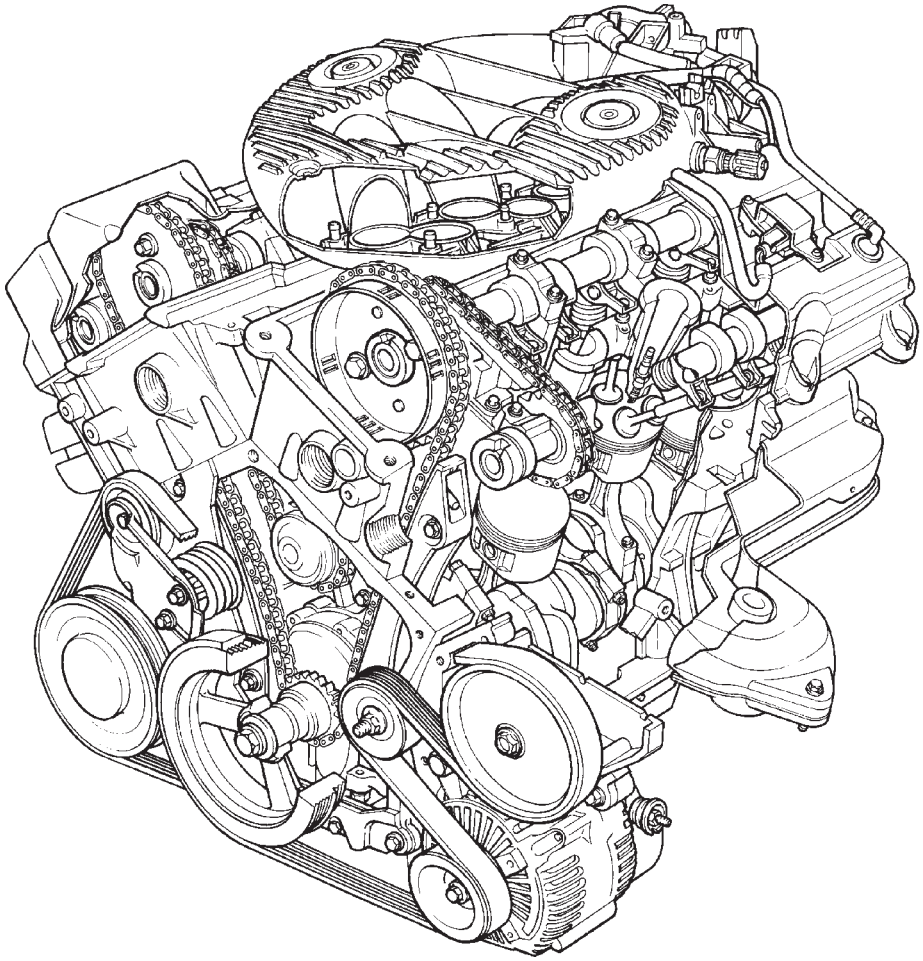


Fig. 1 2.7 Liter Engine

DESCRIPTION AND OPERATION (Continued)

DESCRIPTION

The 2.7 Liter (167 Cubic Inches) 60 degree V-6 engine is a double overhead camshaft design with hydraulic lifters and four valves per cylinder (Fig. 1). The engine does not have provisions for a free wheeling valve train.

The cylinders are numbered from front to rear, with the right bank odd numbered, and the left bank even numbered (Fig. 2). The firing order is 1–2–3–4–5–6.

The engine identification number is located on the rear of the cylinder block just below the left cylinder head (Fig. 3).

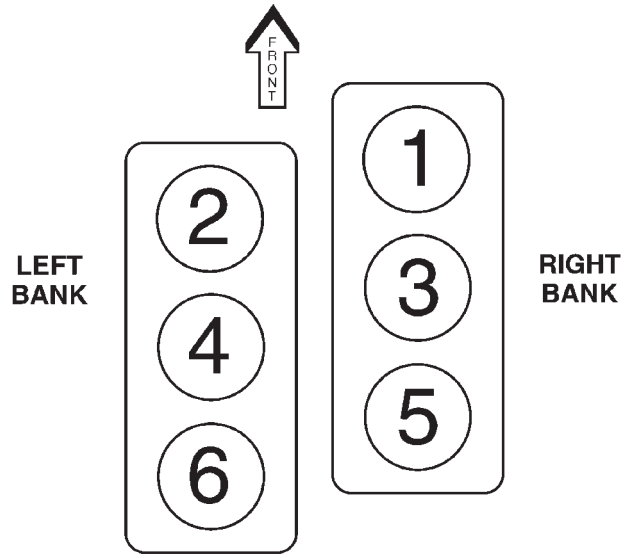
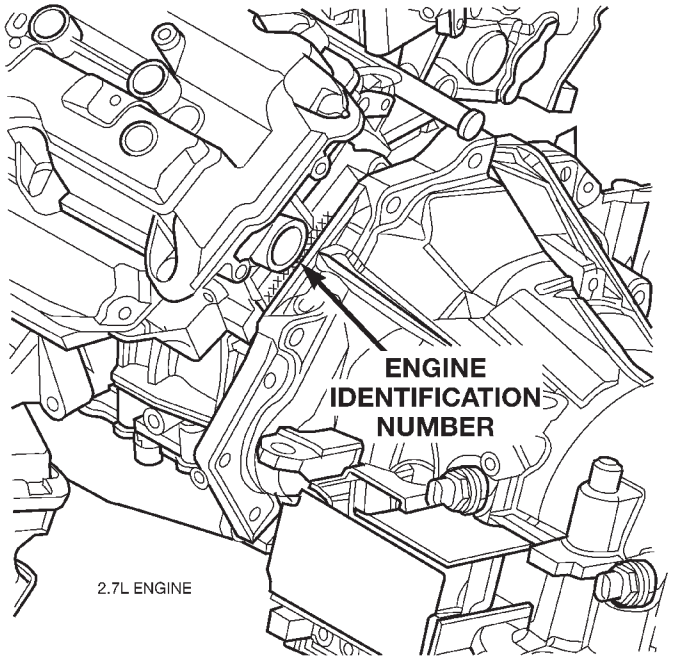


Fig. 2 Cylinder Numbering and Firing Order



X MODEL YEAR	X MANUFACTURING PLANT	XXXXX COMPONENT CODE/ USAGE	XXXX MONTH/ DAY	XXXXX SERIAL CODE
LAST DIGIT OF MODEL YEAR	KENOSHA 9	ENGINE 2.7L USAGE PASS CAR PC		

80ae830a

Fig. 3 Engine Identification

CYLINDER BLOCK

DESCRIPTION

The cylinder block is made of heat treated aluminum with cast-in-place iron liners (Fig. 4). The block is a closed deck design with the right bank forward. To provide high rigidity and improved NVH, the block has cast-in contours and ribs, along with powdered metal 6 bolt main caps (4 vertical, 2 horizontal), with a die cast aluminum structural beam windage tray mounted to the main caps.

The block design allows coolant flow between the cylinder bores and an internal coolant by-pass to the thermostat.

DESCRIPTION AND OPERATION (Continued)

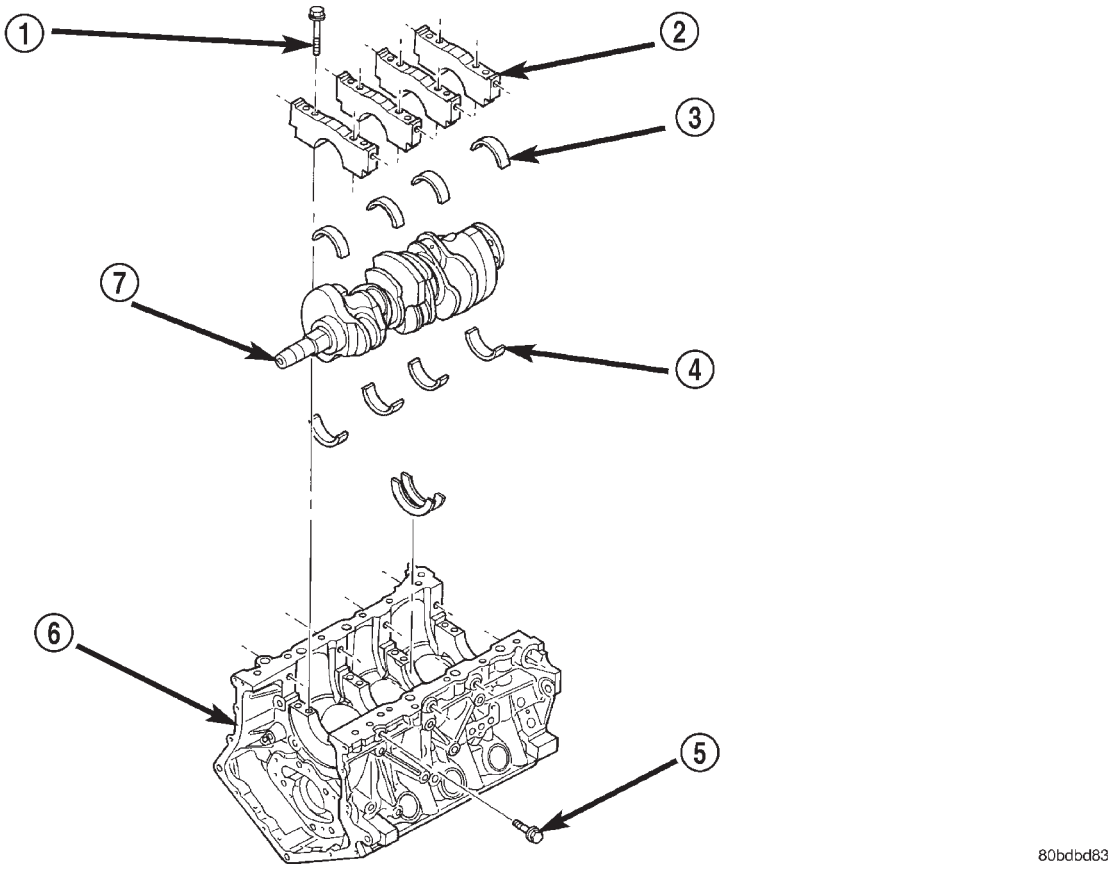


Fig. 4 Cylinder Block and Crankshaft

1 – MAIN CAP BOLT—VERTICAL
2 – MAIN CAP
3 – MAIN BEARING—LOWER
4 – MAIN BEARING—UPPER
5 – MAIN CAP BOLT—HORIZONTAL
6 – CYLINDER BLOCK
7 – CRANKSHAFT

DESCRIPTION AND OPERATION (Continued)

CRANKSHAFT

DESCRIPTION

The crankshaft is constructed of a forged micro alloy steel. The six throw, nine counterweight crankshaft is supported by four select fit main bearings with the number three serving as the thrust washer location (Fig. 4). The select fit identification markings will be on the rear side of the number nine (rearmost) counterweight. The six separate connecting rod throws are an even-firing design which reduces torque fluctuations while a vibration damper is used to control torsional vibration.

The crankshaft oil seals are a one piece design. The front seal is retained by the timing chain cover, and the rear seal in a housing that attaches to the cylinder block.

OPERATION

The crankshaft transfers force generated by combustion within the cylinder to the flywheel or flexplate.

PISTONS AND CONNECTING RODS

DESCRIPTION

The pistons are made of a high strength aluminum alloy with an anodized top ring groove and crown. Piston skirts are coated with a solid lubricant for scuff resistance. The connecting rods are made of powdered metal with a “fractured cap” design. The connecting rod attaches to the piston with a full floating pin retained by lock rings. The piston and connecting rod are serviced as an assembly (Fig. 5).

OPERATION

The piston and connecting rod is the link between the combustion force to the crankshaft.

CYLINDER HEAD

DESCRIPTION

The cylinder heads are made of an aluminum alloy (Fig. 6). The cylinder head features four valves per cylinder with pressed in powdered metal valve guides. The cylinder heads provide enclosures for the timing chain drive, necessitating a unique right and left cylinder head.

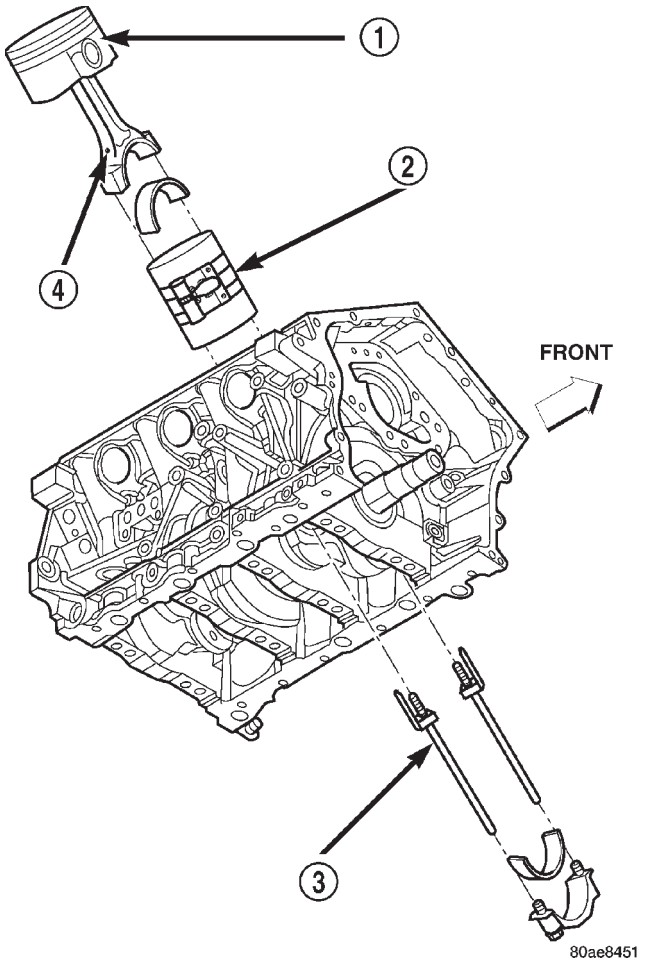


Fig. 5 Piston and Connecting Rod

1 – “F” TOWARD FRONT OF ENGINE
2 – RING COMPRESSOR
3 – SPECIAL TOOL 8189
4 – OIL SQUIRT HOLE

VALVES

DESCRIPTION

The valves are made of heat resistant steel, and have chrome plated stems to prevent scuffing (Fig. 6). The four valves per cylinder (two intake and two exhaust) are actuated by roller rocker arms, which pivot on stationary lash adjusters. All valves use three bead lock keepers to retain springs and to promote valve rotation.

OPERATION

The intake valve allows the air/fuel mixture to enter the combustion chamber. The exhaust valve allows the burned air/fuel mixture to exit the combustion chamber. Also, the intake and exhaust valves seal the combustion chamber during the compression and power strokes.

DESCRIPTION AND OPERATION (Continued)

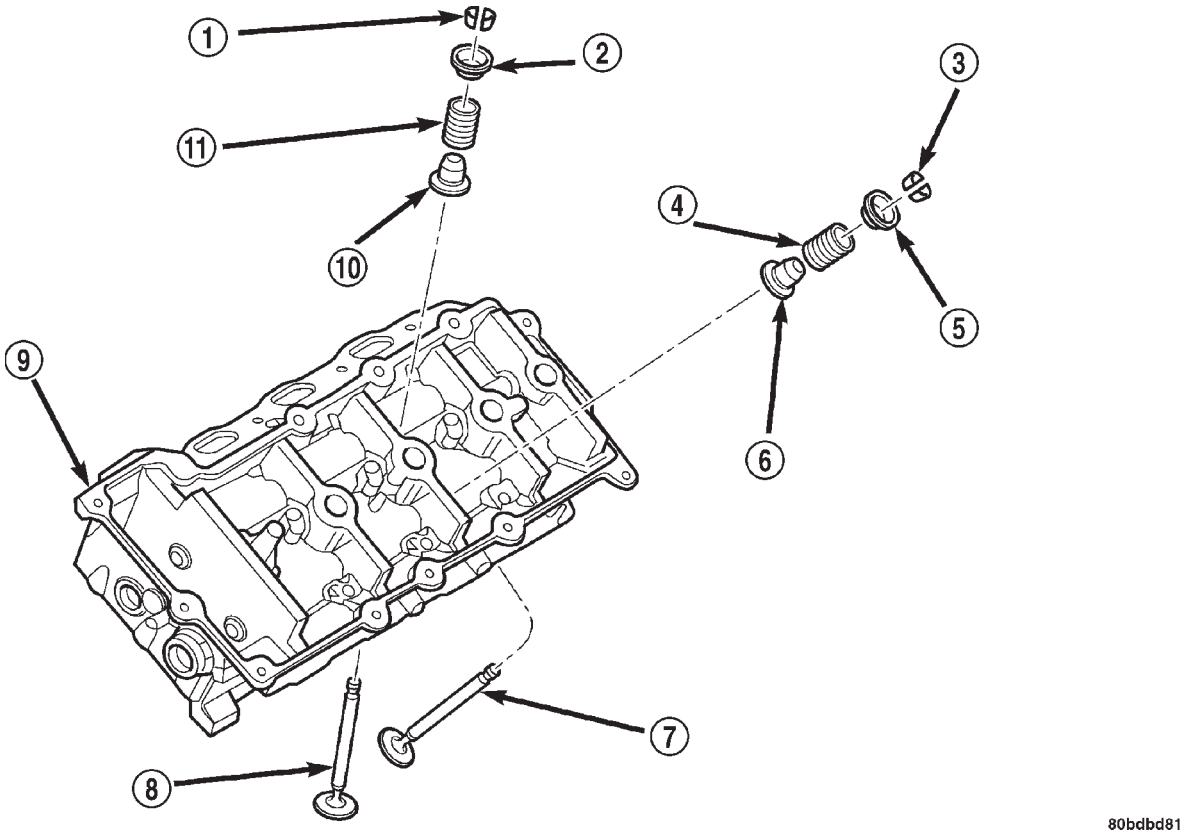


Fig. 6 Cylinder Head, Valves, and Springs

1 – VALVE KEEPER
2 – SPRING RETAINER
3 – VALVE KEEPER
4 – VALVE SPRING-EXHAUST
5 – SPRING RETAINER
6 – VALVE STEM SEAL
7 – VALVE-EXHAUST
8 – VALVE-INTAKE
9 – CYLINDER HEAD
10 – VALVE STEM SEAL
11 – VALVE SPRING-INTAKE

VALVE SPRINGS

DESCRIPTION

The valve springs are made from high strength, chrome-silicon steel (Fig. 6). The springs are common for intake and exhaust applications. The valve spring seat is integral with the valve stem seal, which incorporates a garter spring to maintain consistent lubrication control to the valve stem.

OPERATION

The valve spring returns the valve against its seat for a positive seal of the combustion chamber.

TIMING DRIVE SYSTEM

DESCRIPTION

The timing drive system has been designed to provide quiet performance and reliability to support a **NON** free-wheeling engine. The system consists of a primary and secondary chain drive.

The **primary** timing chain drive (Fig. 7) uses a single, double-flexure, inverted tooth type chain. The primary chain drives both of the intake camshafts directly from a sprocket mounted on the crankshaft. In addition, the water pump is driven by the “back side” of the primary chain, necessitating the double-flexure type chain.

The chain is controlled by three fixed chain guides and a pivoting tensioner arm (Fig. 7). These guides utilize low-friction and long wearing nylon plastic wear faces. To tension the primary chain, a fully automatic spring-loaded, engine oil-fed, hydraulic tensioner is used. The tensioner is mounted in the right cylinder head with the plunger contacting the pivoting tensioner arm. A mechanical ratchet mechanism inside the tensioner prevents excessive chain slack upon engine start-up as the chain wears. The tensioner is designed with an internal oil reservoir to assure noise-free performance, even during engine start-up before oil pressure reaches the tensioner.

DESCRIPTION AND OPERATION (Continued)

To reduce engine NVH and timing chain loads a camshaft damper is used. This damper mounts to the right intake camshaft sprocket. The damper utilizes a synthetic rubber elastomer to provide damping, similar to a crankshaft damper.

For lubrication the primary chain utilizes oil leakage from the front of the oil pump. This oil spills on the crankshaft sprocket, which is then carried by the chain throughout the primary drive.

The **secondary** timing chain drive system uses two conventional roller-type chains, one at each cylinder bank (Fig. 8). The purpose of the secondary chain is to provide a mechanical driven connection between the intake and exhaust camshafts. The intake camshafts drive the exhaust camshafts. The sprockets for both intake and exhaust camshafts are a press-fit and are only serviced as an assembly with the camshafts.

To tension the secondary chain a spring-loaded, hydraulic tensioner is used at each bank and attaches to each cylinder head between the intake and exhaust camshafts (Fig. 8). The tensioner incorporates upper and lower chain guide faces. The lower guide face is attached directly to the tensioner's hydraulic plunger. Also, the tensioner uses an internal oil reservoir design to prevent engine start-up noise. The secondary chains are lubricated via an oil passage through the upper guide face on each tensioner.

CAMSHAFT

DESCRIPTION

The assembled fabricated camshafts are composed of five bearing journals machined into a hollow steel tube (Fig. 8). Six steel lobes, a secondary timing drive sprocket, and a primary sprocket/thrust flange are pressed onto the camshaft tube using a unique assembly process. Camshaft end play is controlled by the primary camshaft sprocket attachment flange on the intake camshafts and by a thrust flange on the exhaust camshafts.

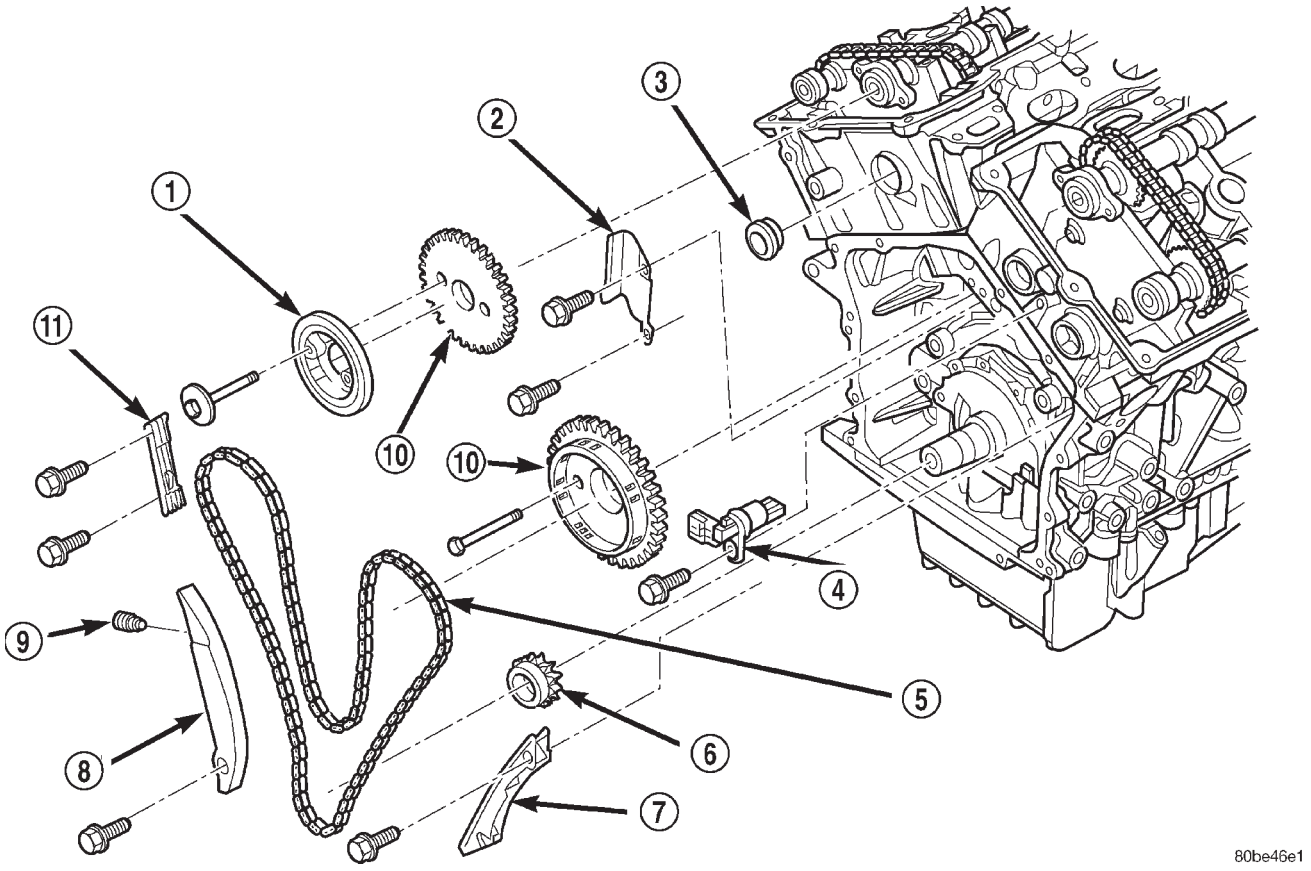


Fig. 7 Timing Drive System

1 – CAMSHAFT DAMPER
2 – CHAIN GUIDE
3 – ACCESS PLUG
4 – CAMSHAFT POSITION SENSOR
5 – PRIMARY TIMING CHAIN
6 – CRANKSHAFT SPROCKET
7 – CHAIN GUIDE
8 – CHAIN TENSIONER ARM
9 – CHAIN TENSIONER
10 – CAMSHAFT SPROCKETS
11 – CHAIN GUIDE

DESCRIPTION AND OPERATION (Continued)

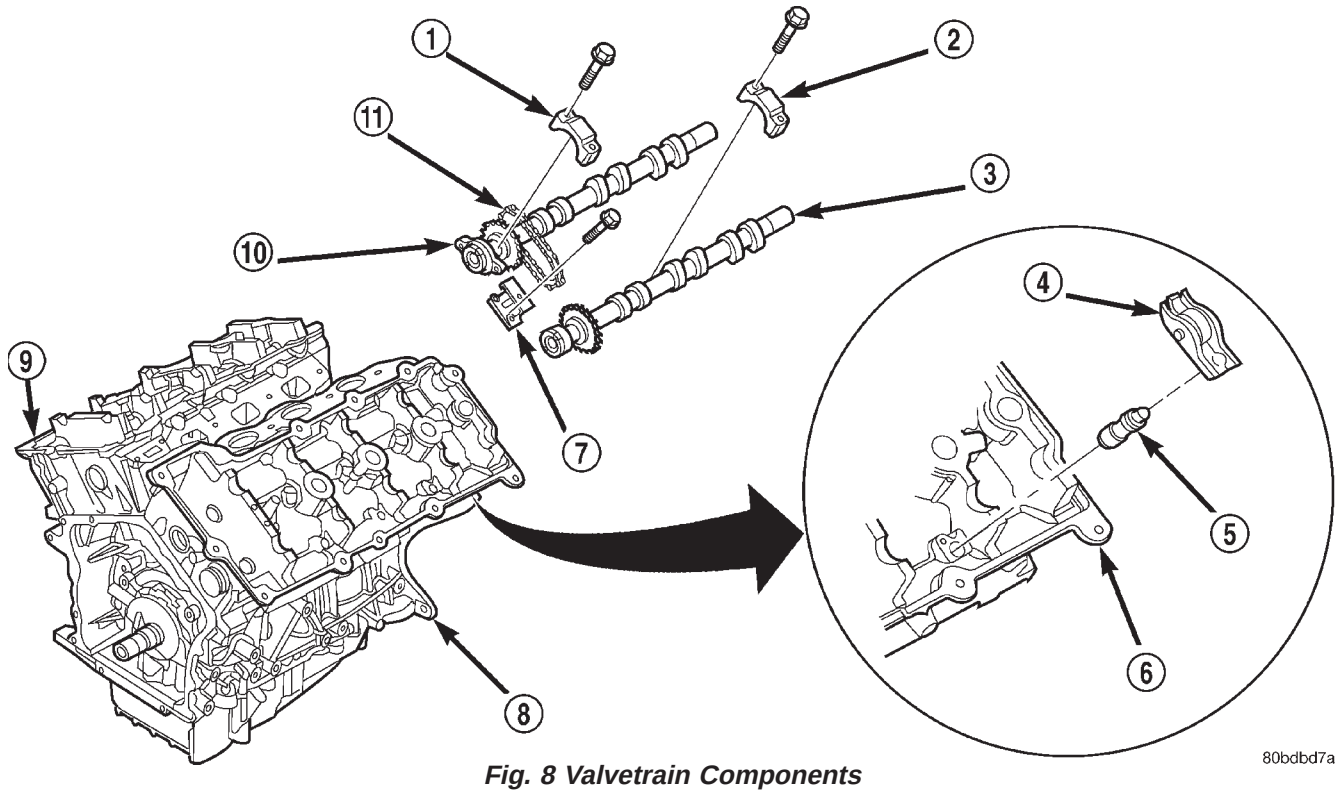


Fig. 8 Valvetrain Components

1 – CAMSHAFT BEARING CAP-INTAKE
2 – CAMSHAFT BEARING CAP-EXHAUST
3 – CAMSHAFT-EXHAUST
4 – ROCKER ARM
5 – HYDRAULIC LIFTER
6 – CYLINDER HEAD
7 – CAMSHAFT (SECONDARY) CHAIN TENSIONER
8 – CYLINDER BLOCK
9 – CYLINDER HEAD
10 – CAMSHAFT-INTAKE
11 – CAMSHAFT (SECONDARY) TIMING CHAIN

OPERATION

The camshaft has precisely machined (egg shaped) lobes to provide accurate valve timing and duration. The camshaft is driven by the crankshaft via drive sprockets and chains.

ROCKER ARMS

DESCRIPTION

The rocker arms are composed of steel stampings with an integral roller bearing (Fig. 9). The rocker arms incorporate a 0.5 mm (0.0197 in.) oil hole in the lash adjuster socket for roller/camshaft lobe lubrication (Fig. 9).

OPERATION

The rocker arm is the pivot point between the camshaft lobe and the valve.

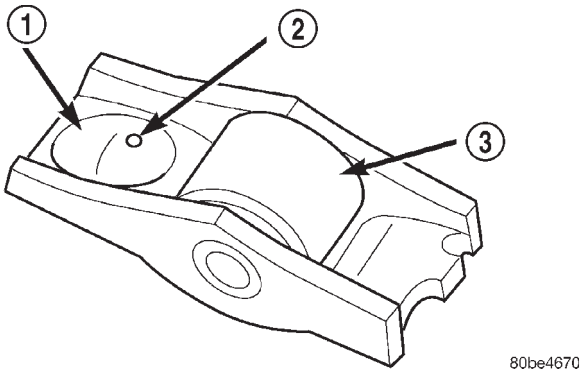


Fig. 9 Rocker Arm

1 – LASH ADJUSTER POCKET
2 – OIL SQUIRT HOLE
3 – ROLLER

DESCRIPTION AND OPERATION (Continued)

INTAKE MANIFOLD

DESCRIPTION

The two piece intake manifold is made of a composite material. The intake manifold features a compact, low rumble design that maximizes engine performance while minimizing induction noise. A manifold tuning valve (MTV) is used on some models.

OPERATION

The intake air plenum chambers absorb air pulsations created during each cylinder's intake stroke.

The manifold tuning valve (if equipped) connects both sides of the intake manifold plenums at specific engine speeds to maximize low RPM torque, without reducing high RPM power.

EXHAUST MANIFOLD

DESCRIPTION

The exhaust manifolds are a log style design and made of cast nodular iron (Fig. 10). The outlets are designed for V-band clamp attachment of close coupled catalytic converters.

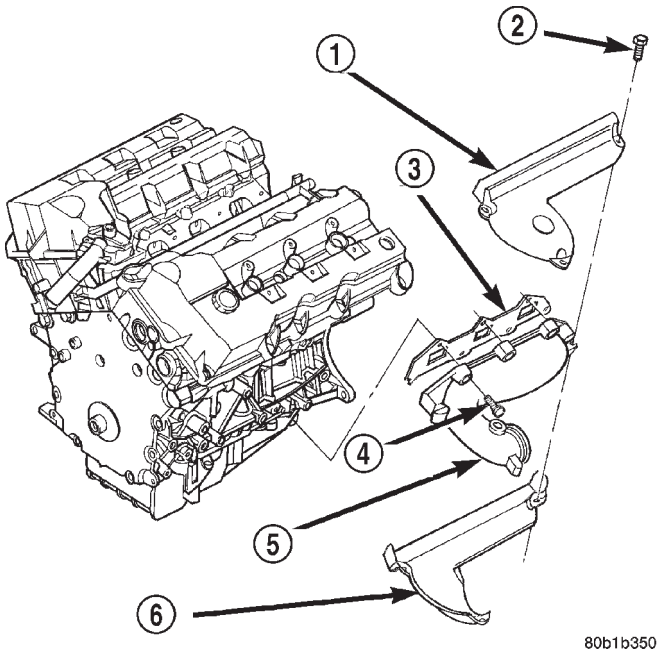


Fig. 10 Exhaust Manifold

1 – HEAT SHIELD
2 – BOLT
3 – GASKET
4 – BOLT
5 – EXHAUST MANIFOLD
6 – HEAT SHIELD

ENGINE LUBRICATION

DESCRIPTION

The lubrication system is a full-flow filtration, pressure feed type. The oil pump body is mounted to the engine block. The pump inner rotor is driven by the crankshaft. A structural windage tray is used to increase power by minimizing oil windage at high engine RPM. An engine oil cooler is used on some models.

OPERATION

Oil from the oil pan is pumped by an geroter type oil pump directly coupled to the crankshaft (Fig. 11). Oil pressure is controlled by a relief valve mounted inside the oil pump housing. See (Fig. 11), (Fig. 12), and (Fig. 13) for engine oil lubrication circuits.

DESCRIPTION AND OPERATION (Continued)

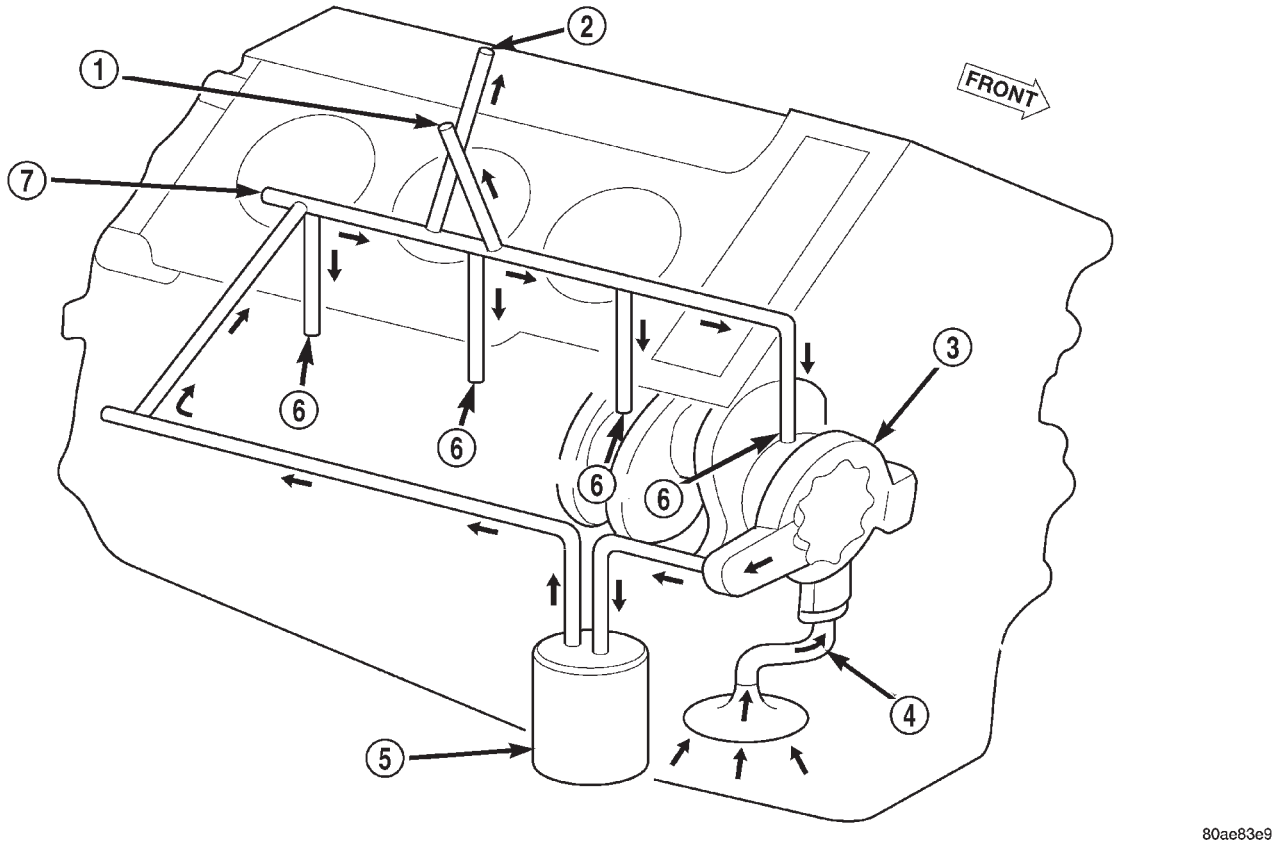


Fig. 11 Cylinder Block Oil Lubrication System

1 – TO RIGHT CYLINDER HEAD
2 – TO LEFT CYLINDER HEAD
3 – OIL PUMP
4 – OIL PICKUP TUBE
5 – OIL FILTER
6 – TO CRANKSHAFT MAIN JOURNALS
7 – MAIN OIL GALLERY

FROM:	TO:	FROM:	TO:
Oil Pump	Oil Filter Mounting (inlet)	Main Oil Gallery – Center of Block	1. Crankshaft Main Bearings
Oil Filter Mounting (inlet)	Oil Filter		2. Left Cylinder Head*
Oil Filter	Oil Filter Mounting (outlet)		3. Right Cylinder Head*
Oil Filter Mounting (outlet)	Oil Gallery – Right side of Block	Crankshaft Main Bearings	Connecting Rod Bearings
Oil Gallery – Right side of Block	Oil Gallery – Rear of Block and to Oil Cooler (some models)	Left Cylinder Head	Refer to (Fig. 12)
Oil Gallery – Rear of Block	Main Oil Gallery – Center of Block	Right Cylinder Head	Refer to (Fig. 13)
* The cylinder head gaskets have an oil restrictor to control oil flow to the cylinder heads.			

DESCRIPTION AND OPERATION (Continued)

LEFT CYLINDER HEAD

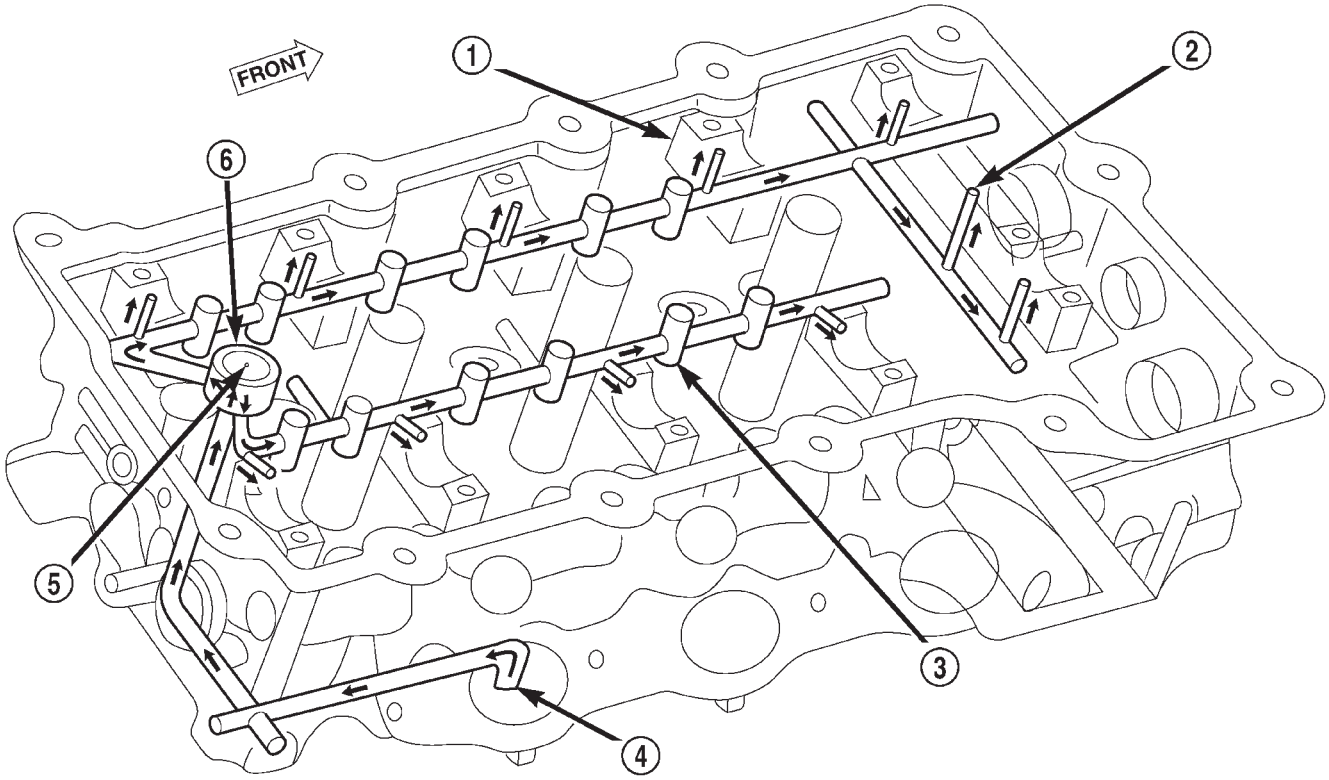


Fig. 12 Cylinder Head Oil Lubrication System—Left Side

1 – CAM JOURNALS
2 – OIL FEED TO CAMSHAFT (SECONDARY) CHAIN TENSIONER
3 – LASH ADJUSTER BORES
4 – OIL FEED FROM BLOCK
5 – VENT HOLE
6 – ACCUMULATOR

FROM:	TO:
Left Cylinder Head Oil Inlet Gallery (intake side of head)	Oil Gallery and Accumulator – Rear of Head*
Oil Gallery and Accumulator – Rear of Head*	1. Exhaust Camshaft Oil Passage 2. Intake Camshaft Oil Passage
Left Exhaust Camshaft Oil Passage	1. Left Exhaust Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms 3. Left Camshaft (Secondary) Chain Tensioner**
Left Intake Camshaft Oil Passage	1. Left Intake Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms
* When oil reaches the back of the cylinder head, the oil gallery feeds oil into an accumulator chamber that is located towards center of the head. The accumulator chamber is closed off with a pressed in core plug that has a small orifice to act as a vent. Oil then travels down at a 45 degree angle from the accumulator into two passages, one for the intake and one for the exhaust side of the cylinder head.	
** The secondary camshaft chain tensioner is the last component to receive oil on the left cylinder head.	

DESCRIPTION AND OPERATION (Continued)

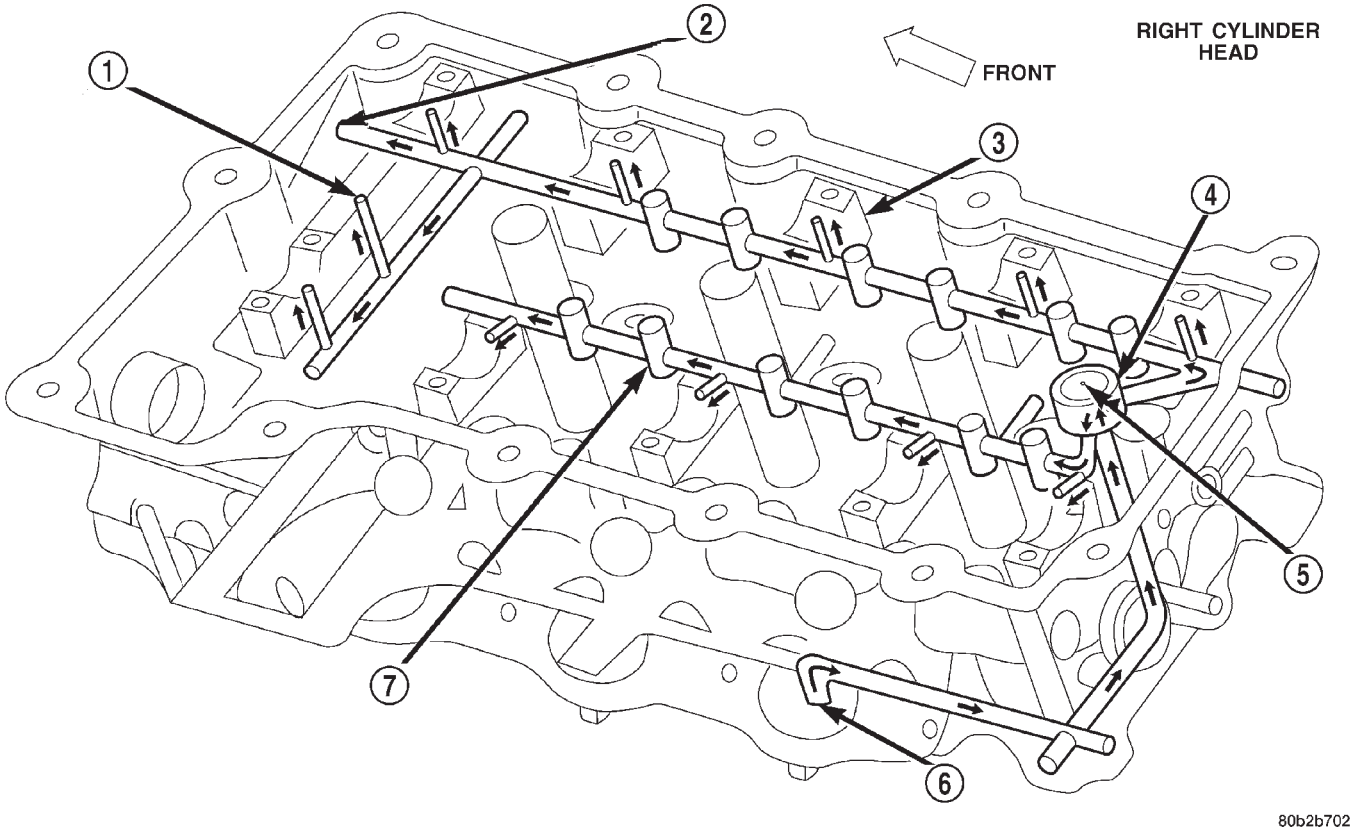


Fig. 13 Cylinder Head Oil Lubrication System—Right Side

1 – OIL FEED TO CAMSHAFT (SECONDARY) CHAIN TENSIONER
2 – OIL FEED TO TIMING CHAIN (PRIMARY) TENSIONER
3 – CAM JOURNALS
4 – ACCUMULATOR
5 – VENT HOLE
6 – OIL FEED FROM BLOCK
7 – LASH ADJUSTOR BORES

FROM:	TO:
Right Cylinder Head Oil Inlet Gallery (intake side of head)	Oil Gallery and Accumulator – Rear of Head*
Oil Gallery and Accumulator – Rear of Head*	1. Exhaust Camshaft Oil Passage 2. Intake Camshaft Oil Passage
Right Exhaust Camshaft Oil Passage	1. Right Exhaust Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms 3. Right Camshaft (Secondary) Chain Tensioner 4. Primary Timing Chain Tensioner - Right Head**
Right Intake Camshaft Oil Passage	1. Right Intake Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms
* When oil reaches the back of the cylinder head, the oil gallery feeds oil into an accumulator chamber that is located towards center of the head. The accumulator chamber is closed off with a pressed in core plug that has a small orifice to act as a vent. Oil then travels down at a 45 degree angle from the accumulator into two passages, one for the intake and one for the exhaust side of the cylinder head.	
** The timing (primary) chain tensioner is the last component to receive oil on the right cylinder head.	

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS—INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

Refer to the Service Diagnosis—Mechanical Chart and the Service Diagnosis—Performance Chart, for possible causes and corrections of malfunctions. Refer to FUEL SYSTEM for the fuel system diagnosis.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that cannot be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following:

- Cylinder Compression Pressure Test
- Cylinder Combustion Pressure Leakage Test
- Cylinder Head Gasket Failure Diagnosis
- Intake Manifold Leakage Diagnosis
- Lash Adjuster (Tappet) Noise Diagnosis
- Engine Oil Leak Inspection

ENGINE DIAGNOSIS—PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test battery. Charge or replace as necessary. Refer to BATTERY.
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to terminals.
	3. Faulty starter.	3. Test starting system. Refer to STARTING.
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. Refer to IGNITION SYSTEM.
	5. Incorrect spark plug gap.	5. Set gap. Refer to IGNITION SYSTEM.
	6. Contamination in fuel system.	6. Clean system and replace fuel filter.
	7. Faulty fuel pump.	7. Test fuel pump and replace as needed. Refer to FUEL SYSTEM.
	8. Incorrect engine timing.	8. Check for a skipped timing belt/chain or a loose camshaft sprocket (3.2/3.5L).
ENGINE STALLS OR IDLES ROUGH	1. Idle speed too low.	1. Test minimum air flow. Refer to FUEL SYSTEM.
	2. Incorrect fuel mixture.	2. Refer to FUEL SYSTEM.
	3. Intake manifold leakage.	3. Inspect intake manifold, manifold gasket, and vacuum hoses.
	4. Faulty coil(s).	4. Test and replace as necessary. Refer to IGNITION SYSTEM.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped plugs.	1. Clean plugs and set gap. Refer to IGNITION SYSTEM.
	2. Contamination in fuel system.	2. Clean system and replace fuel filter.
	3. Faulty fuel pump.	3. Test and replace as necessary. Refer to FUEL SYSTEM.
	4. Incorrect valve timing.	4. Correct valve timing.
	5. Leaking cylinder head gasket.	5. Replace cylinder head gasket.
	6. Low compression.	6. Test compression of each cylinder.
	7. Burned, warped, or pitted valves.	7. Replace valves.
	8. Plugged or restricted exhaust system.	8. Install new parts, as necessary.
	9. Faulty coil(s).	9. Test and replace as necessary. Refer to IGNITION SYSTEM.
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Clean spark plugs and set gap. Refer to IGNITION SYSTEM.
	2. Contamination in Fuel System.	2. Clean fuel system and replace fuel filter.
	3. Burned, warped, or pitted valves.	3. Replace valves.
	4. Faulty coil(s).	4. Test and replace as necessary. Refer to IGNITION SYSTEM.
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap.	1. Clean spark plugs and set gap. Refer to IGNITION SYSTEM.
	2. Faulty coil(s).	2. Test and replace as necessary. Refer to IGNITION SYSTEM.
	3. Dirty fuel injector(s).	Test and replace as necessary. Refer to FUEL SYSTEM.
	4. Contamination in fuel system.	4. Clean system and replace fuel filter.

DIAGNOSIS AND TESTING (Continued)

ENGINE DIAGNOSIS—MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES	1. High or low oil level in crankcase.	1. Check and correct engine oil level.
	2. Thin or diluted oil.	2. Change oil to correct viscosity.
	3. Low oil pressure.	3. Check and correct engine oil level.
	4. Dirt in tappets/lash adjusters.	4. Replace rocker arm/hydraulic lash adjuster assembly.
	5. Worn rocker arms.	5. Inspect oil supply to rocker arms.
	6. Worn tappets/lash adjusters.	6. Install new rocker arm/hydraulic lash adjuster assembly.
	7. Worn valve guides.	7. Ream guides and install new valves with oversize stems.
	8. Excessive runout of valve seats on valve faces.	8. Grind valve seats and valves.
	9. Missing adjuster pivot.	9. Replace rocker arm/hydraulic lash adjuster assembly.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Connecting rod journal out-of-round.	5. Replace crankshaft or grind surface.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check thrust bearing for wear on flanges.
	6. Crankshaft journal out-of-round or worn.	6. Replace crankshaft or grind journals.
	7. Loose flywheel or torque converter.	7. Tighten to correct torque.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL PRESSURE DROP	1. Low oil level.	1. Check engine oil level.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Low oil pressure.	3. Check sending unit and main bearing oil clearance.
	4. Clogged oil filter.	4. Install new oil filter.
	5. Worn parts in oil pump.	5. Replace worn parts or pump.
	6. Thin or diluted oil.	6. Change oil to correct viscosity.
	7. Oil pump relief valve stuck.	7. Remove valve and inspect, clean, or replace.
	8. Oil pump suction tube loose.	8. Remove oil pan and install new tube or clean, if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Excessive bearing clearance.	10. Measure bearings for correct clearance.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket(s).
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Misaligned or deteriorated cup or threaded plug.	3. Replace as necessary.
OIL CONSUMPTION OR SPARK PLUGS FOULED	1. PCV system malfunction.	1. Check system and repair as necessary. Refer to EMISSION CONTROL SYSTEMS.
	2. Worn, scuffed or broken rings.	2. Hone cylinder bores. Install new rings.
	3. Carbon in oil ring slots.	3. Install new rings.
	4. Rings fitted too tightly in grooves.	4. Remove rings and check grooves. If groove is not proper width, replace piston.
	5. Worn valve guide(s).	5. Ream guide(s) and replace valve(s) with oversize valve(s) and seal(s).
	6. Valve stem seal(s) worn or damaged.	6. Replace seal(s).

CHECKING ENGINE OIL PRESSURE

(1) Remove oil pressure sending unit and install an oil pressure test gauge assembly.

(2) Run engine until thermostat opens.

CAUTION: If oil pressure is 0 at idle, Do Not Run engine at 3000 RPM

(3) Oil Pressure: **Curb Idle** 25 kPa (4 psi) minimum **3000 RPM** 170/724 kPa (25/105 psi).

(4) If oil pressure is 0 at idle. Shut off engine, check for pressure relief valve stuck open or a clogged oil pickup screen.

INTAKE MANIFOLD LEAKAGE DIAGNOSIS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING. DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR THE FAN. DO NOT WEAR LOOSE CLOTHING.

(1) Start the engine.

(2) Spray a small stream of water (Spray Bottle) at the suspected leak area.

(3) If engine RPM'S change, the area of the suspected leak has been found.

(4) Repair as required.

DIAGNOSIS AND TESTING (Continued)

CYLINDER COMPRESSION PRESSURE TEST

The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

(1) Check engine oil level and add oil if necessary.

(2) Drive the vehicle until engine reaches normal operating temperature. Select a route free from traffic and other forms of congestion, observe all traffic laws, and accelerate through the gears several times briskly.

(3) Remove all spark plugs from engine. As spark plugs are being removed, check electrodes for abnormal firing indicators fouled, hot, oily, etc. Record cylinder number of spark plug for future reference.

(4) Disconnect coil wire from distributor and secure to good ground to prevent a spark from starting a fire (Conventional Ignition System). For Direct Ignition System DIS disconnect the coil connector.

(5) Be sure throttle blade is fully open during the compression check.

(6) Insert compression gage adaptor Special Tool 8116 or the equivalent, into the #1 spark plug hole in cylinder head. Connect the 0–500 psi (Blue) pressure transducer with cable adaptors to the DRBIII®.

(7) Crank engine until maximum pressure is reached on gage. Record this pressure as #1 cylinder pressure.

(8) Repeat the previous step for all remaining cylinders.

(9) Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.

(10) If one or more cylinders have abnormally low compression pressures, repeat the compression test.

(11) If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question. **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

WARNING: DO NOT REMOVE THE RADIATOR CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

Check the coolant level and fill as required. DO NOT install the radiator cap.

Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.

Clean spark plug recesses with compressed air.

Remove the spark plugs.

Remove the oil filler cap.

Remove the air cleaner.

Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum, with 552 kPa (80 psi) recommended.

Perform the test procedures on each cylinder according to the tester manufacturer's instructions. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage per cylinder.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

CYLINDER HEAD GASKET FAILURE DIAGNOSIS

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
- Loss of engine power
- Engine misfiring
- Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test in this

DIAGNOSIS AND TESTING (Continued)

section. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50–70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

LASH ADJUSTER (TAPPET) NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of a NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following chart indicating possible lash adjuster (tappet) noise sources and possible sources that could lead to a misdiagnosis.

Refer to Lash Adjuster (Tappet) Noise Chart for Possible Causes and Correction of a lash adjuster (tappet) type noise.

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level—too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct engine oil level.
2. Insufficient running time after rebuilding cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in lash adjuster (after 1 hour run time).	3. See below: (a) Check lash adjusters for sponginess while installed in cylinder head. Depress part of rocker arm over adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) If lash adjuster(s) are still spongy, replace with new adjuster/rocker arm assembly.
4. Low oil pressure	4. See below: (a) Check and correct engine oil level. (b) Check engine oil pressure. (c) Check for excessive bearing clearance and correct. (d) Check for worn oil pump.

DIAGNOSIS AND TESTING (Continued)

POSSIBLE CAUSES	CORRECTION
5. Oil passage to cylinder head(s) plugged with debris.	5. Check cylinder head oil passages and cylinder head gasket restrictor for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Ream guide(s) and replace valve(s) with oversize valves and seal(s).
7. Air injested into oil due to broken or cracked oil pump pickup tube.	7. Inspect pickup tube and replace as necessary.
8. Collapsed lash adjuster due to debris injestion.	8. Clean debris from engine and replace lash adjuster(s).

ENGINE OIL LEAK INSPECTION

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

(1) Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.

(2) Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.

(3) Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service manual instructions.

(4) If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

(5) **If the oil leak source is not positively identified at this time**, proceed with the air leak detection test method as follows:

- Disconnect the fresh air hose (make-up air) at the cylinder head cover and plug or cap the nipple on the cover.
- Remove the PCV valve hose from the cylinder head cover. Cap or plug the PCV valve nipple on the cover.
- Attach an air hose with pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kpa (3 PSI) of test pressure.

- Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provides the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service manual procedures.
- If the leakage occurs at the crankshaft rear oil seal area, refer to the section, Inspection for Rear Seal Area Leak.

(6) If no leaks are detected, turn off the air supply. Remove the air hose, all plugs, and caps. Install the PCV valve and fresh air hose (make-up air). Proceed to next step.

(7) Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

NOTE: If oil leakage is observed at the dipstick tube to block location; remove the tube, clean and reseal using Mopar® Stud & Bearing Mount (press fit tube applications only), and for O-ring style tubes, remove tube and replace the O-ring seal.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

(1) Disconnect the battery.

(2) Raise the vehicle.

(3) Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak. If a leak is present in this area, remove transmission for further inspection.

(a) Circular spray pattern generally indicates seal leakage or crankshaft damage.

(b) Where leakage tends to run straight down, possible causes are a porous block, oil gallery cup plug, bedplate to cylinder block mating surfaces and seal bore. See proper repair procedures for these items.

(4) If no leaks are detected, pressurize the crankcase as previously described.

DIAGNOSIS AND TESTING (Continued)

CAUTION: Do not exceed 20.6 kPa (3 psi).

(5) If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

(6) For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

(7) After the oil leak root cause and appropriate corrective action have been identified, refer to Crankshaft Oil Seal—Rear for proper replacement procedures.

SERVICE PROCEDURES

ENGINE OIL LEVEL—CHECKING

The best time to check engine oil level is after it has sat overnight, or if the engine has been running, allow the engine to be shut off for at least 5 minutes before checking oil level.

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading (Fig. 14). Add only when the level is at or below the ADD mark.

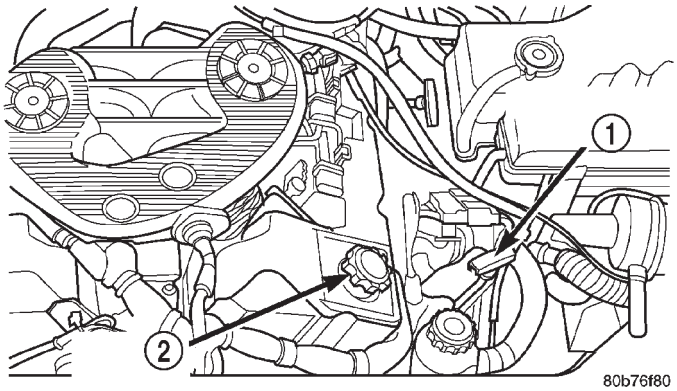


Fig. 14 Engine Oil Fill and Dipstick Locations—2.7L

1 – ENGINE OIL DIPSTICK
2 – ENGINE OIL FILL

ENGINE OIL SERVICE

WARNING: NEW OR USED ENGINE OIL CAN BE IRRITATING TO THE SKIN. AVOID PROLONGED OR REPEATED SKIN CONTACT WITH ENGINE OIL. CONTAMINANTS IN USED ENGINE OIL, CAUSED BY INTERNAL COMBUSTION, CAN BE HAZARDOUS TO YOUR HEALTH. THOROUGHLY WASH EXPOSED SKIN WITH SOAP AND WATER. DO NOT WASH SKIN WITH GASOLINE, DIESEL FUEL, THINNER, OR SOLVENTS, HEALTH PROBLEMS CAN RESULT. DO NOT POLLUTE, DISPOSE OF USED ENGINE OIL PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA.

API SERVICE GRADE CERTIFIED

Use an engine oil that is API Service Grade Certified. MOPAR® provides engine oils that conform to this service grade.

SAE VISCOSITY

An SAE viscosity grade is used to specify the viscosity of engine oil. Use only engine oils with multiple viscosities such as 5W-30 or 10W-30. The preferred viscosity oil for the 2.7L engine is 5W-30. These oils are specified with a dual SAE viscosity grade which indicates the cold-to-hot temperature viscosity range. Select an engine oil that is best suited to your particular temperature range and variation (Fig. 15).

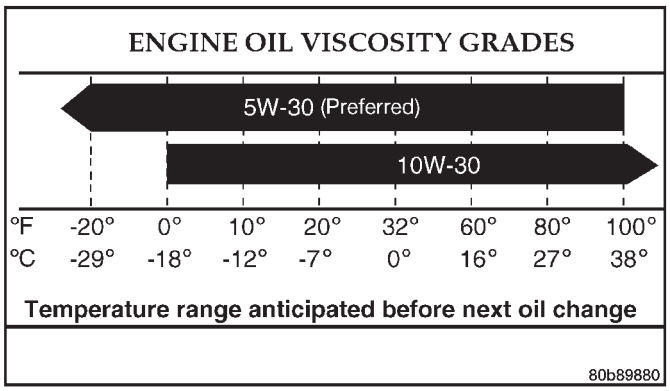


Fig. 15 Temperature/Engine Oil Viscosity—2.7L Engine

ENERGY CONSERVING OIL

An Energy Conserving type oil is recommended for gasoline engines. The designation of ENERGY CONSERVING is located on the label of an engine oil container.

SERVICE PROCEDURES (Continued)

CONTAINER IDENTIFICATION

Standard engine oil identification notations have been adopted to aid in the proper selection of engine oil. The identifying notations are located on the label of engine oil plastic bottles and the top of engine oil cans (Fig. 16).



9400-9

Fig. 16 Engine Oil Container Standard Notations

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in the Maintenance Schedule.

TO CHANGE ENGINE OIL

Run engine until achieving normal operating temperature.

(1) Position the vehicle on a level surface and turn engine off.

(2) Hoist and support vehicle on safety stands. Refer to Hoisting and Jacking Recommendations.

(3) Remove oil fill cap, (Fig. 14).

(4) Place a suitable drain pan under crankcase drain.

(5) Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.

(6) Install drain plug in crankcase.

(7) Lower vehicle and fill crankcase with specified type and amount of engine oil, (Fig. 14). Refer to LUBRICATION AND MAINTENANCE.

(8) Install oil fill cap.

(9) Start engine and inspect for leaks.

(10) Stop engine and inspect oil level.

ENGINE OIL FILTER CHANGE

FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

OIL FILTER REMOVAL

Refer to procedure in this section.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

FORM-IN-PLACE GASKETS & SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II

Mopar® Engine RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV

Mopar® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER

Mopar® Gasket Maker is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® BED PLATE SEALANT

Mopar® Bed Plate Sealant is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bedplate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued

SERVICE PROCEDURES (Continued)

between two metallic surfaces, and will rapidly cure when heat is applied.

MOPAR® GASKET SEALANT

Mopar® Gasket Sealant is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material is used on engines with multi-layer steel (MLS) cylinder head gaskets. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can w/applicator.

FORM-IN-PLACE GASKET AND SEALER APPLICATION

Assembling parts using a form-in-place gasket requires care but it's easier then using precut gaskets.

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can w/applicator can be brushed on evenly over the sealing surfaces. Material in an aerosol can should be used on engines with multi-layer steel gaskets.

ENGINE GASKET SURFACE PREPARATION

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper
- Abrasive pad or paper to clean cylinder block and head
- High speed power tool with an abrasive pad or a wire brush (Fig. 17)

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (Fig. 17)
- Drill motor with 3M Roloc™ Bristle Disc (white or yellow) (Fig. 17)

CAUTION: Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

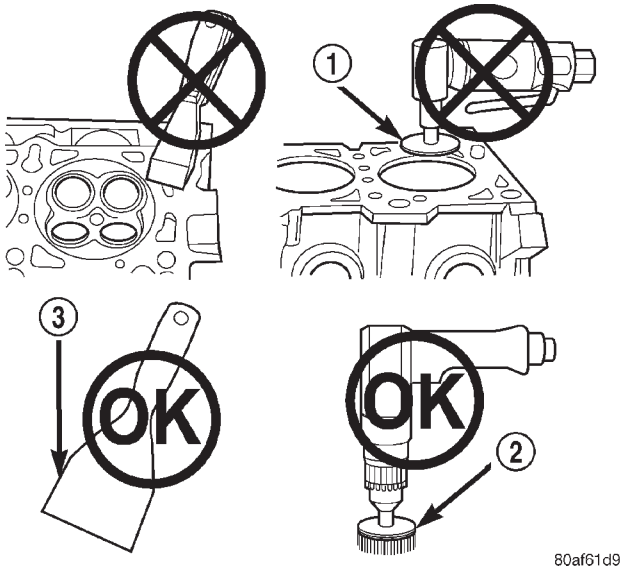


Fig. 17 Proper Tool Usage For Surface Preparation

1 – ABRASIVE PAD
2 – 3M ROLOC™ BRISTLE DISC
3 – PLASTIC/WOOD SCRAPER

REPAIR OF DAMAGED OR WORN THREADS

Damaged or worn threads (excluding spark plug and camshaft bearing cap attaching threads) can be repaired. Essentially, this repair consists of drilling out worn or damaged threads, tapping the hole with a special Heli-Coil Tap, (or equivalent) and installing an insert into the tapped hole. This brings the hole back to its original thread size.

CAUTION: Be sure that the tapped holes maintain the original centerline.

Heli-Coil tools and inserts are readily available from automotive parts jobbers.

SERVICE PROCEDURES (Continued)

CYLINDER BORE—HONING

(1) Used carefully, the cylinder bore resizing hone, recommended tool C-823 or equivalent, equipped with 220 grit stones, is the best tool for this honing procedure. In addition to deglazing, it will reduce taper and out-of-round as well as removing light scuffing, scoring or scratches. Usually a few strokes will clean up a bore and maintain the required limits.

(2) Deglazing of the cylinder walls may be done using a cylinder surfacing hone, recommended tool C-3501 or equivalent, equipped with 280 grit stones, if the cylinder bore is straight and round. 20–60 strokes depending on the bore condition, will be sufficient to provide a satisfactory surface. Inspect cylinder walls after each 20 strokes, using a light honing oil. **Do not use engine or transmission oil, mineral spirits or kerosene.**

(3) Honing should be done by moving the hone up and down fast enough to get a cross-hatch pattern. When hone marks **intersect** at 50-60 degrees, the cross hatch angle is most satisfactory for proper seating of rings (Fig. 18).

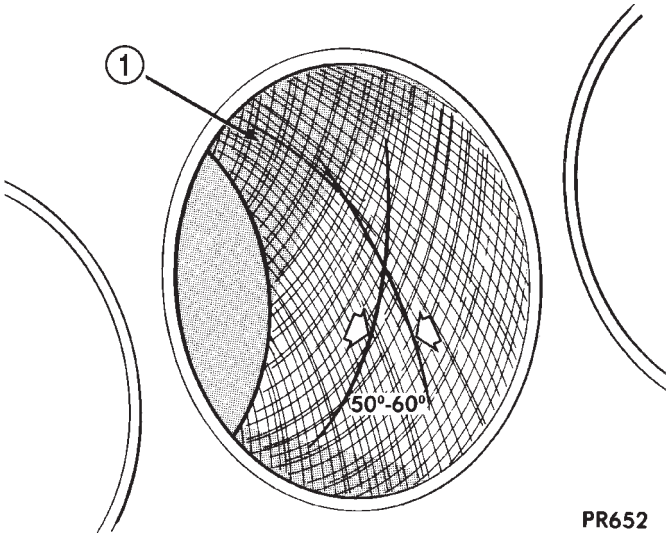


Fig. 18 Cylinder Bore Cross-Hatch Pattern

1 – CROSS-HATCH PATTERN

(4) A controlled hone motor speed between 200–300 RPM is necessary to obtain the proper cross-hatch angle. The number of up and down strokes per minute can be regulated to get the desired 50–60 degree angle. Faster up and down strokes increase the cross-hatch angle.

(5) After honing, it is necessary that the block be cleaned again to remove all traces of abrasive.

CAUTION: Ensure all abrasives are removed from engine parts after honing. It is recommended that a solution of soap and hot water be used with a brush and the parts then thoroughly dried. The bore can be considered clean when it can be wiped clean with a white cloth and cloth remains clean. Oil the bores after cleaning to prevent rusting.

HYDROSTATIC LOCKED ENGINE

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

CAUTION: DO NOT use starter motor to rotate the engine, severe damage may occur.

(1) Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.

(2) Remove negative battery cable.

(3) Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.

(4) With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.

(5) Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).

(6) Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.).

(7) Repair engine or components as necessary to prevent this problem from re-occurring.

CAUTION: Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

(8) Install new spark plugs.

(9) Drain engine oil and remove oil filter.

(10) Fill engine with specified amount of approved oil and install new oil filter.

(11) Connect negative battery cable.

(12) Start engine and check for any leaks.

PISTONS

The pistons have been cast and machined to one size and weight. The piston and rod assemblies are matched to weigh the same for engine balance.

FITTING PISTONS

Piston and cylinder wall must be clean and dry. Piston diameter should be measured 90 degrees to piston pin at size location shown in (Fig. 19). Cylinder bores should be measured halfway down the cylinder bore and transverse to the engine crankshaft center line. Refer to Engine Specifications. **Pistons and cylinder bores should be measured at normal room temperature, 70°F (21°C).**

SERVICE PROCEDURES (Continued)

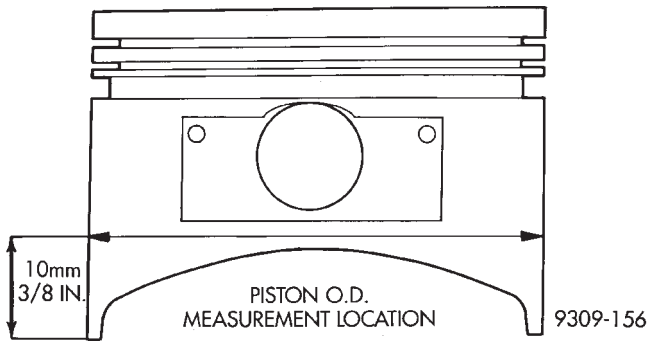


Fig. 19 Piston Measurements

PISTON PINS

The piston pin is full floating and is held in place by lock rings. Pistons and rods are weight matched for balance. **Do Not switch pistons with other rods**. Piston and Rods are serviced as an assembly for balance.

PISTON RING—FITTING

(1) Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 12 mm (0.50 inch.) from bottom of cylinder bore. Check gap with feeler gauge (Fig. 20). Refer to Engine Specifications.

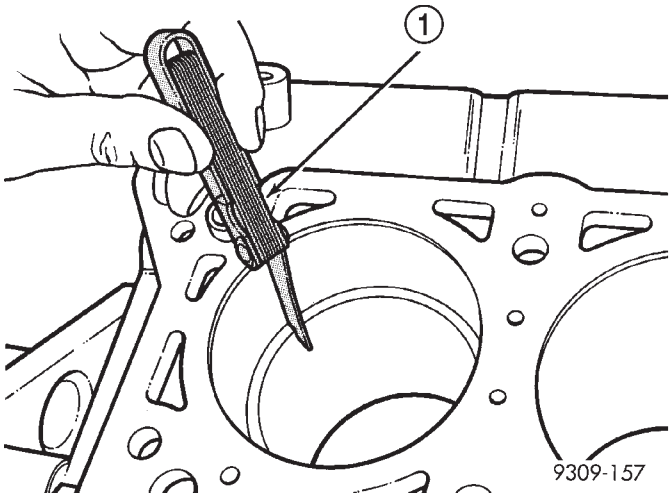


Fig. 20 Check Gap on Piston Rings

1 – FEELER GAUGE

(2) Check piston ring to groove clearance: (Fig. 21). Refer to Engine Specifications.

PISTON RINGS—INSTALLATION

(1) The No. 1 and No. 2 piston rings have a different cross section. Insure that No. 2 ring is installed with the manufacturers I.D. mark (dot) facing up, towards top of the piston (Fig. 22).

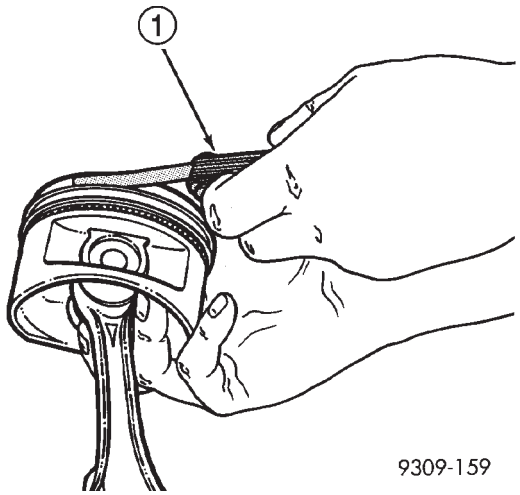


Fig. 21 Measuring Piston Ring Side Clearance

1 – FEELER GAUGE

CAUTION: Install piston rings in the following order:

(2) Oil ring expander.
(3) Upper oil ring side rail.
(4) Lower oil ring side rail.
(5) No. 2 Intermediate piston ring.
(6) No. 1 Upper piston ring.
(7) Install the side rail by placing one end between the piston ring groove and the expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander during this step (Fig. 23).**

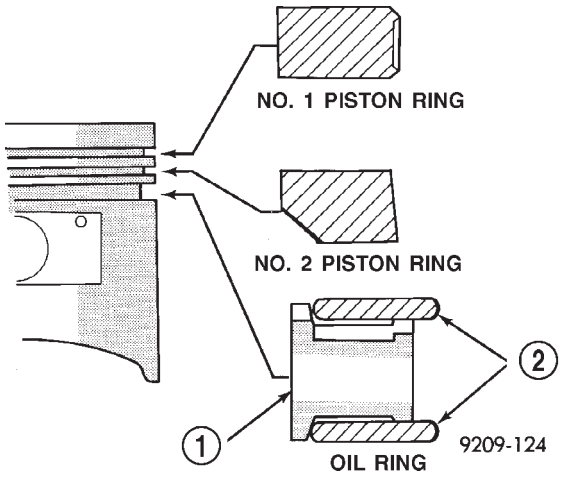


Fig. 22 Piston Ring—Installation

1 – SPACER EXPANDER
2 – SIDE RAIL

SERVICE PROCEDURES (Continued)

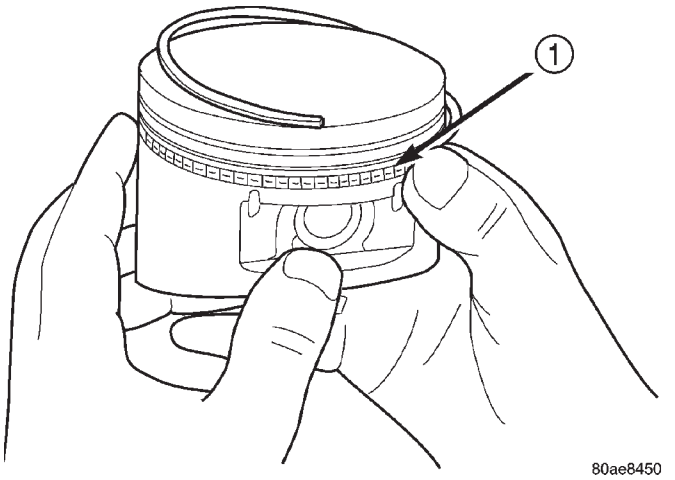


Fig. 23 Side Rail—Installation

1 – SIDE RAIL END

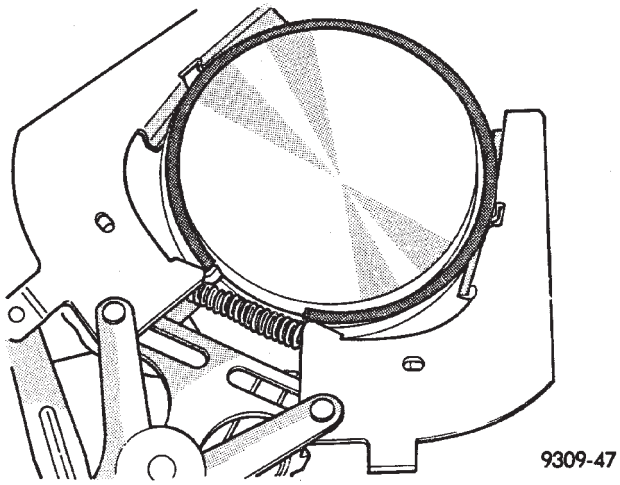


Fig. 24 Upper and Intermediate Rings—Installation

(8) Install upper side rail first and then the lower side rail.

(9) Install No. 2 piston ring and then No. 1 piston ring (Fig. 24).

(10) Position piston ring end gaps as shown in (Fig. 25).

(11) Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

CONNECTING ROD BEARING—INSTALLATION

Fit all rods on one bank until complete.

The bearing caps are not interchangeable and should be marked at removal to insure correct assembly.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces as engine damage may occur.

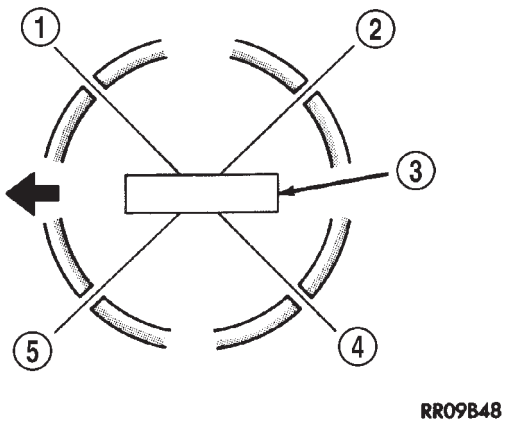


Fig. 25 Piston Ring End Gap Position

1 – SIDE RAIL UPPER
2 – NO. 1 RING GAP
3 – PISTON PIN
4 – SIDE RAIL LOWER
5 – NO. 2 RING GAP AND SPACER EXPANDER GAP

The bearing shells must be installed with the tangs inserted into the machined grooves in the rods and caps. Also, assure that the hole in upper bearing half aligns with oil squirt hole in rod. Install cap with the tangs on the same side as the rod.

CAUTION: Assure that hole in upper bearing half aligns with hole in connecting rod as engine damage may occur.

Limits of taper or out-of-round on any crankshaft journals should be held to 0.015 mm (0.0006 in.). Bearings are available 0.025 mm (0.001 in.) and 0.250 mm (0.010 in.) undersize. **Install the bearings in pairs. Do not use a new bearing half with an old bearing half. Do not file the rods or bearing caps.**

(1) Follow procedure specified in the Standard Service Procedure Section for Selecting and Measuring Main Bearing Clearance and Connecting Rod Bearing Clearance (Fig. 26). Refer to Engine Specifications.

NOTE: The connecting rod bearing cap bolts must be examined before reuse. If the threads are necked down the bolts should be replaced (Fig. 27).

NOTE: Connecting rod bolts are retained in the rod cap with a light press fit. If bolts are to be removed, use a hammer and punch to drive bolts from connecting rod cap using care not to damage fractured cap surface.

SERVICE PROCEDURES (Continued)

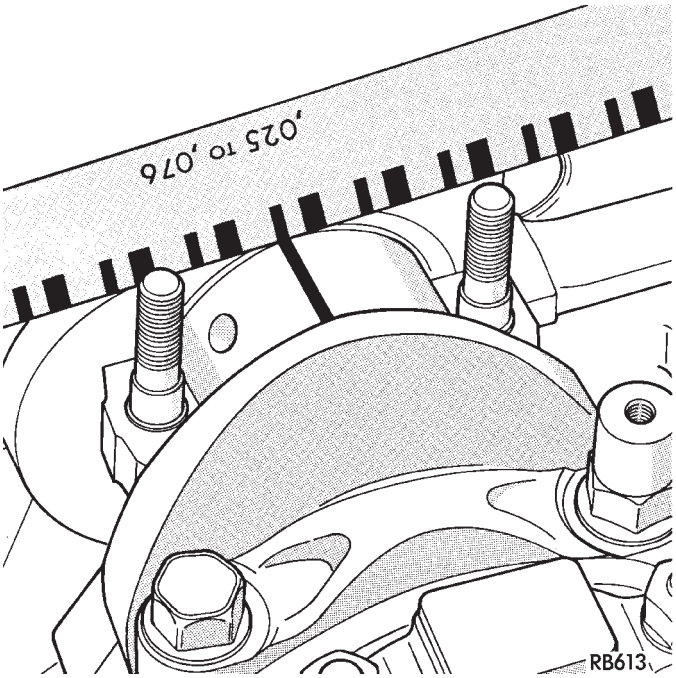


Fig. 26 Checking Connecting Rod Bearing Clearance—Typical

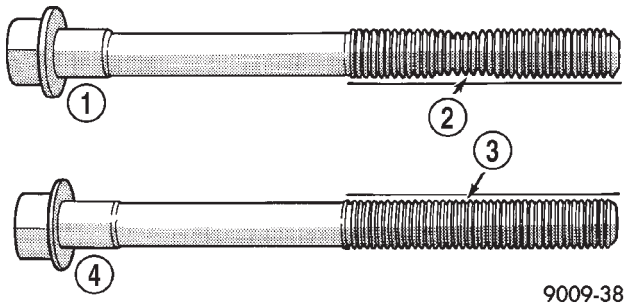


Fig. 27 Check for Stretched Bolts

1 – STRETCHED BOLT
2 – THREADS ARE NOT STRAIGHT ON LINE
3 – THREADS ARE STRAIGHT ON LINE
4 – UNSTRETCHED BOLT

(2) Necking can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt should be replaced.

(3) Before installing the bolts, lubricate the threads with engine oil.

(4) Install bolts finger tight then alternately torque each nut to assemble the cap properly.

(5) Tighten the nuts to 27 N·m PLUS 1/4 turn (20 ft. lbs. PLUS 1/4 turn).

(6) Mount a dial indicator to a stationary point on engine. Locate probe perpendicular to and resting against the connecting rod cap being checked. Move connecting rod all the way to rear of its travel. Zero the dial indicator. Move connecting rod forward to limit of travel and read the dial indicator (Fig. 28). Refer to Engine Specifications. Repeat procedure for each connecting rod. Turn crankshaft for connecting rod accessibility.

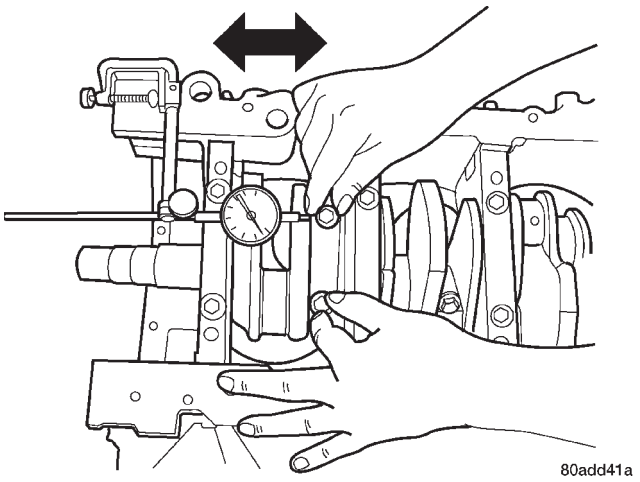


Fig. 28 Connecting Rod Side Clearance Measuring

CRANKSHAFT MAIN BEARING—FITTING

The main bearings are “select fit” to achieve proper oil clearances. For main bearing selection, the block and crankshaft have grade identification marks.

The grade marks for the cylinder block main bearing bore grade is located on the pan rail just below the left side engine mount bracket (Fig. 30). These marks are read left to right, corresponding to main bore 1, 2, 3, 4.

The grade marks for the crankshaft are located on the rearmost crankshaft counter weight as shown in (Fig. 29). The crankshaft journal grade marks are read left to right, corresponding with journal number 1, 2, 3, 4.

Use the Main Bearing Selection Chart to properly select the main bearings. For an example, if the main bore grade is 3 and the journal grade is 2, the proper select fit bearing would be (2) +0.003 mm (+0.0002 in.).

NOTE: Service main bearings have a number from 1 – 5 marked in ink on the bearing surface (Fig. 31). For verification, use the Main Bearing Selection Chart for number to size identification.

The upper main bearing has a oil feed hole and a center groove to allow lubrication of the main journal and must be properly positioned in the block.

NOTE: Although cylinder bores are graded for size, there is only one piston size.

SERVICE PROCEDURES (Continued)

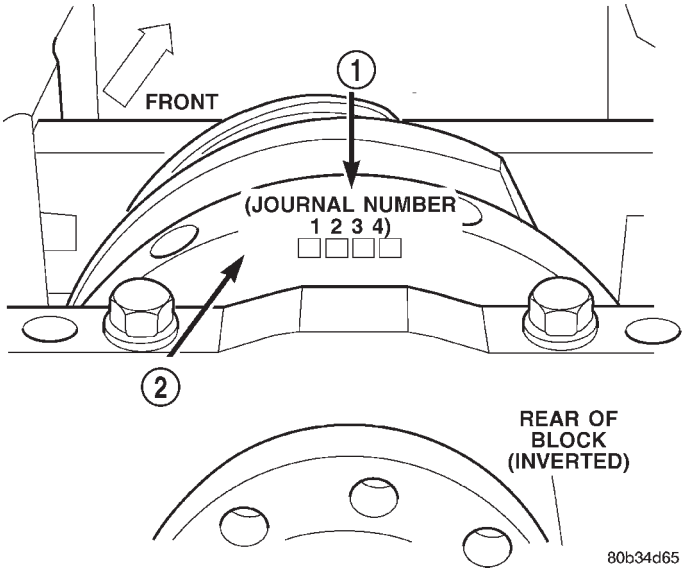


Fig. 29 Crankshaft Main Journal Grade Marking Location

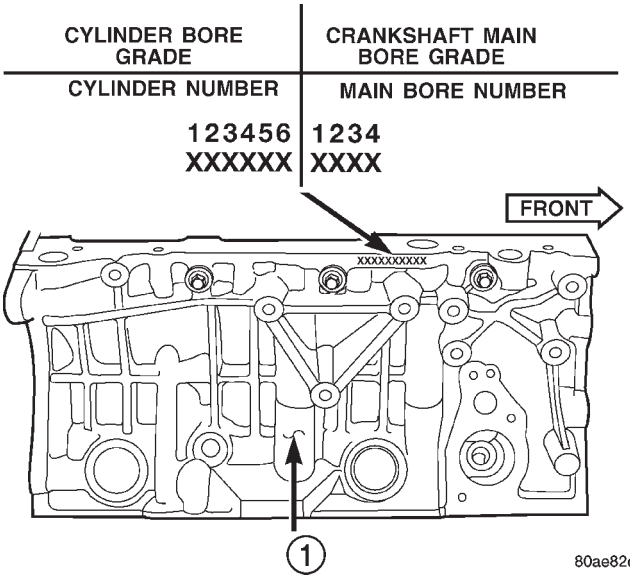


Fig. 30 Cylinder Block Main Bore Grade Marking Location

CRANKSHAFT END PLAY—CHECKING

(1) Mount a dial indicator to a stationary point at front of engine. Locate the probe perpendicular against nose of crankshaft (Fig. 32).

(2) Move crankshaft all the way to the rear of its travel.

(3) Zero the dial indicator.

(4) Move crankshaft all the way to the front and read the dial indicator. Refer to Engine Specifications.

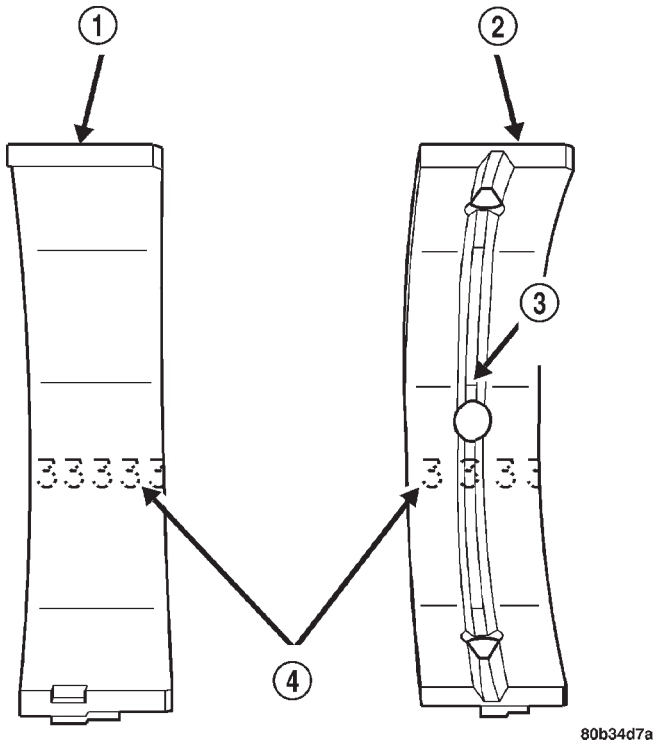


Fig. 31 Main Bearing Grade Marks

1 – LOWER MAIN BEARING
2 – UPPER MAIN BEARING
3 – OIL FEED HOLE AND GROOVE
4 – GRADE SELECTION INK MARKS

MAIN BEARING SELECTION CHART—2.7L

		Main Bearing Bore Grade Mark		
		1	2	3
Crankshaft Main Journal Grade Mark	1	(3) standard	(2) +0.003 mm (+0.0002 in.)	(1) +0.006 mm (+0.0003 in.)
	2	(4) -0.003 mm (-0.0002)	(3) standard	(2) +0.003 mm (+0.0002 in.)
	3	(5) -0.006 mm (-0.0003 in.)	(4) -0.003 mm (-0.0002 in.)	(3) standard

VALVE AND VALVE SEAT—REFACING

The intake and exhaust valves have a 44.5 to 45 degree face angle. The valve seats have a 45 to 45.5 degree face angle. The valve face and valve seat angles are shown in (Fig. 33).

SERVICE PROCEDURES (Continued)

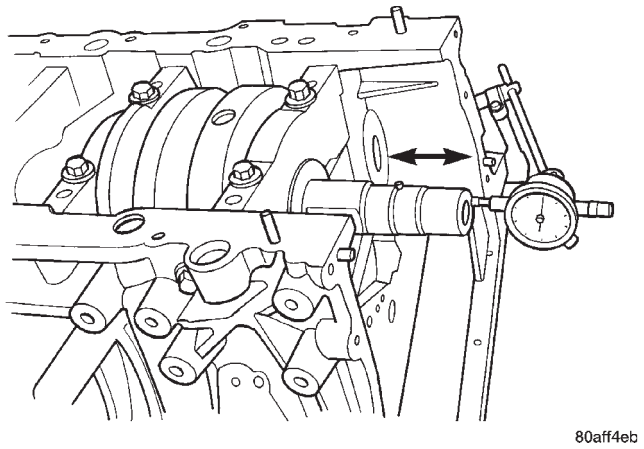


Fig. 32 Checking Crankshaft End Play

VALVES

Inspect the remaining margin after the valves are refaced. Refer to Engine Specifications.

VALVE SEATS

(1) When refacing valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

(2) Measure the concentricity of valve seat using dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.

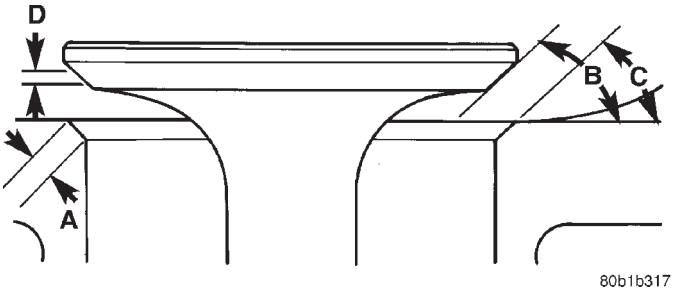


Fig. 33 Valve Seats

ITEM	DESCRIPTION	SPECIFICATION	
A	Seat Width	Intake: 1.00 – 1.50 mm (0.39 – 0.059 in.)	Exhaust: 1.25 – 1.75 mm (0.049 – 0.069 in.)
B	Face Angle	Intake & Exhaust: 44.5 – 45°	
C	Seat Angle	Intake & Exhaust: 45 – 45.5°	
D	Seat Contact Area	Valve to seat contact must be at center of valve face.	

(3) Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat valve seat **LIGHTLY** with Prussian blue then set valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of valve face, contact is satisfactory. If the blue is transferred to top edge of valve face, then lower valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of valve face, then raise valve seat with a 65 degree stone.

NOTE: Valve seats which are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise cylinder head must be replaced.

(4) When seat is properly positioned the width of the intake 1.00 to 1.50 mm (0.0394 to 0.0591 in.) and exhaust seats should be 1.25 to 1.75 mm (0.049 to 0.069 in.) (Fig. 33).

(5) Check the valve spring installed height after refacing the valve and seat (Fig. 35).

VALVE SPRINGS

The valve springs are common for intake and exhaust valves. Refer to Engine Specifications.

TESTING VALVE SPRINGS

Whenever valves have been removed for inspection, reconditioning or replacement, valve springs should be tested (Fig. 34). **As an example;** the compression length of the spring to be tested is 38.00 mm (1.496 in.). Turn table of Tool C-647 until surface is in line with the 38.00 mm (1.496 in.) mark on the threaded stud and the zero mark on the front. Place spring over stud on the table and lift compressing lever to set tone device. Pull on torque wrench until ping is heard. Take reading on torque wrench at this instant. Multiply this reading by two. This will give the spring load at test length. Fractional measurements are indicated on the table for finer adjustments. Refer to Specifications Section to obtain specified height and allowable tensions. Replace any springs that do not meet specifications.

VALVE INSTALLATION

(1) Coat valve stems with clean engine oil and insert them in cylinder head.

(2) If valves or seats have been reground, check valve tip height (A) (Fig. 35). If valve tip height for intake valve is greater than 47.59 (1.8737 in.) or 49.14 (1.9347 in.) for exhaust valve, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

(3) Install valve seal/spring seat assembly over valve guides on all valve stems (Fig. 36). Ensure that

SERVICE PROCEDURES (Continued)

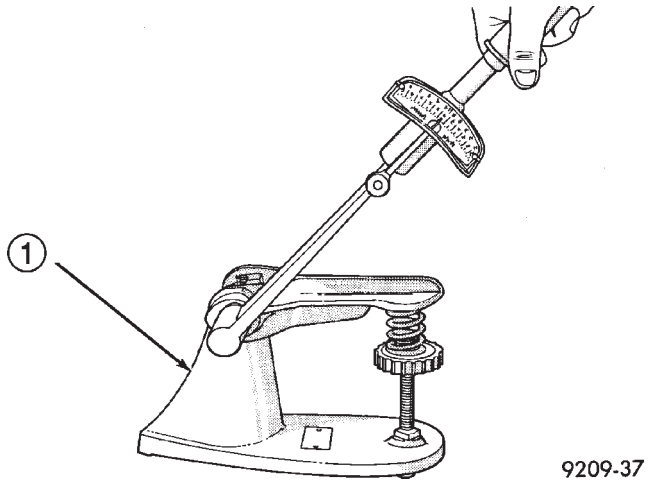


Fig. 34 Testing Valve Spring with Tool C-647

1 – SPECIAL TOOL C-647

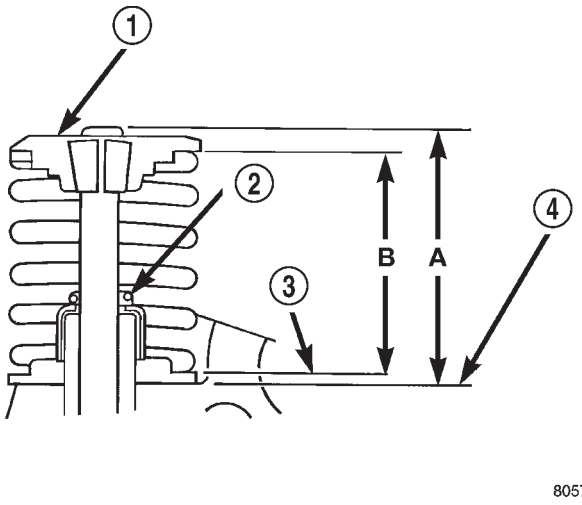


Fig. 35 Checking Valve Tip Height and Valve Spring Installed Height

1 – SPRING RETAINER
2 – GARTER SPRING
3 – VALVE SPRING SEAT TOP
4 – CYLINDER HEAD SURFACE

the garter spring is intact around the top of the rubber seal. Install valve springs, valve retainers.

(4) Compress valve springs with a valve spring compressor install locks and release tool. **If valves and/or seats are reground, measure the installed height of springs (B) (Fig. 35), make sure measurements are taken from top of spring seat to the bottom surface of spring retainer.** If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

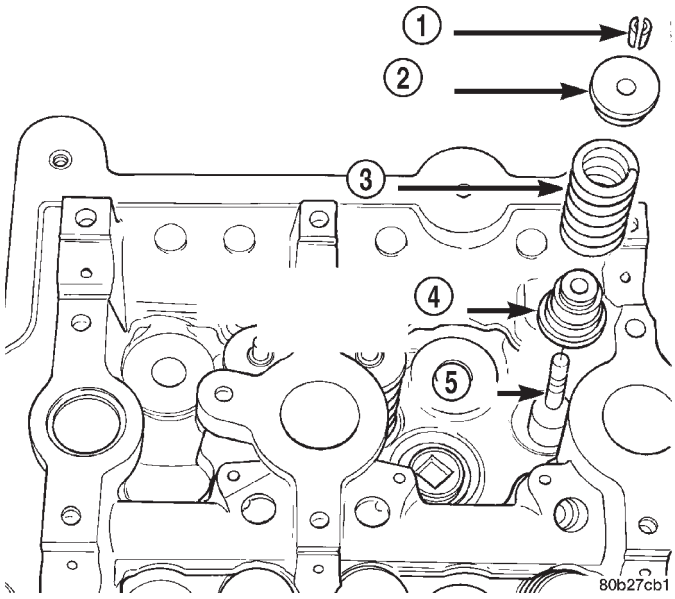


Fig. 36 Valve Seal and Spring

1 – VALVE RETAINING LOCKS
2 – VALVE SPRING RETAINER
3 – VALVE SPRING
4 – VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY
5 – VALVE

ENGINE TIMING—VERIFICATION

Correct timing is critical for the NON free-wheeling designed, 2.7L engine. Engine timing can be verified by using the following procedures:

(1) Remove cylinder head covers. Refer to procedure in this section.

(2) Rotate engine until number one cylinder is at TDC on the EXHAUST stroke.

(3) View the intake camshaft sprocket timing mark. The mark should be 90° from the cylinder head cover sealing surface (Fig. 37) on both right and left cylinder banks.

(4) Count chain pins from the mark on the intake camshaft towards the exhaust camshaft. Engine is timed correctly when there are 12 chain pins between the timing marks on the intake camshaft and exhaust camshaft (Fig. 37).

(5) If marks are not correctly aligned, proceed to Camshafts, Timing Chain and Sprockets, Removal and Installation procedures.

SERVICE PROCEDURES (Continued)

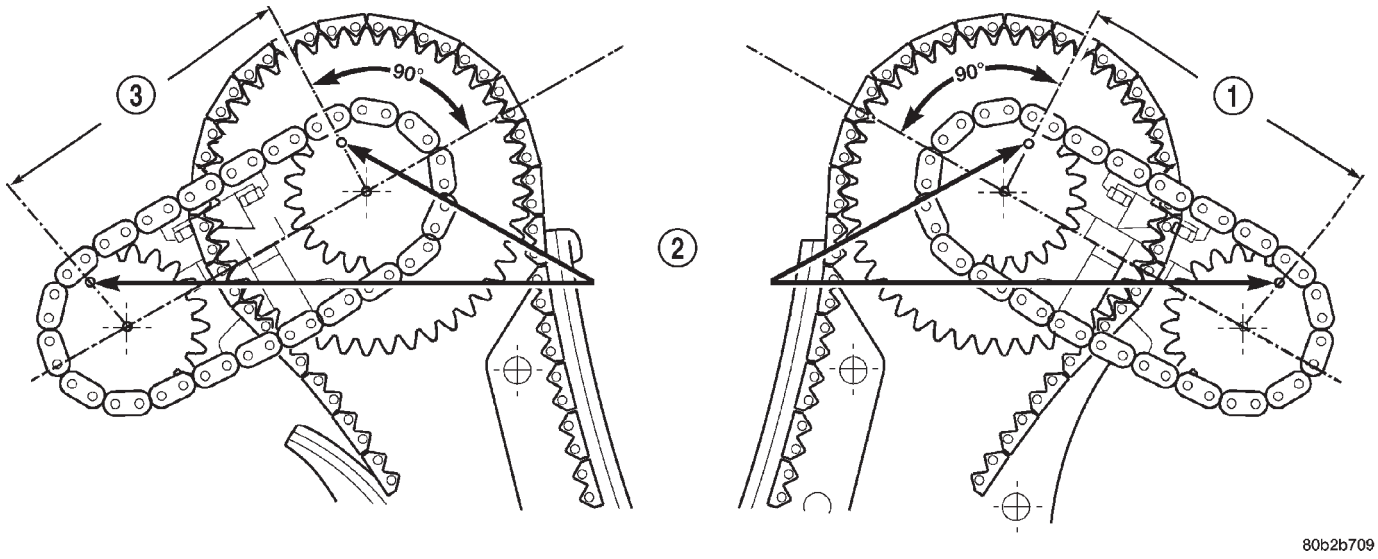


Fig. 37 Engine Timing

1 – 12 PINS
2 – CAMSHAFT TIMING MARKS
3 – 12 PINS

INTAKE MANIFOLD VACUUM PORT REPAIR—2.7L

The composite intake manifold vacuum ports can be repaired. Although, if the manifold plenum chamber is damaged or cracked, the manifold must be replaced.

To repair a broken or damaged vacuum nipple (port) on the composite intake manifold, perform the following procedure:

PARTS REQUIRED	TOOLS REQUIRED
Brass Nipple – 3/8" O.D. x 1/4" pipe thread (Speed Control Port)	Pipe Tap – 1/4" - 18 NPT
Brass Nibble – 1/2" O.D. x 1/4" pipe thread (Brake Booster Port)	Drill Bit – 7/16"
	File/Sand Paper

NOTE: While performing this procedure, avoid getting the manifold material residue into the plenum chamber.

(1) File or sand the remaining port back until a flat surface is obtained (plane normal to nipple (port) axis).

(2) Drill out the nipple (port) base using a 7/16" drill bit (Fig. 38).

(3) Using a 1/4"–18 NPT pipe tap, cut internal threads (Fig. 38). Use caution to start tap in a axis same as original nipple.

(4) Apply Mopar® Thread Sealant to threads of repair nipple(s).

(5) Install repair nipple(s). Do not over torque repair nipple(s).

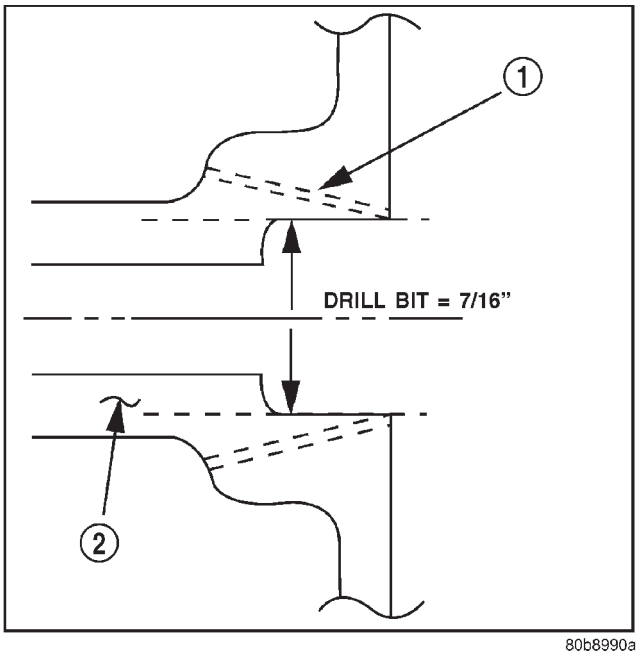


Fig. 38 Manifold Port (Nipple) Repair

1 – 1/4" — 18NPT PIPE TAP
2 – NIPPLE (PORT)

SERVICE PROCEDURES (Continued)

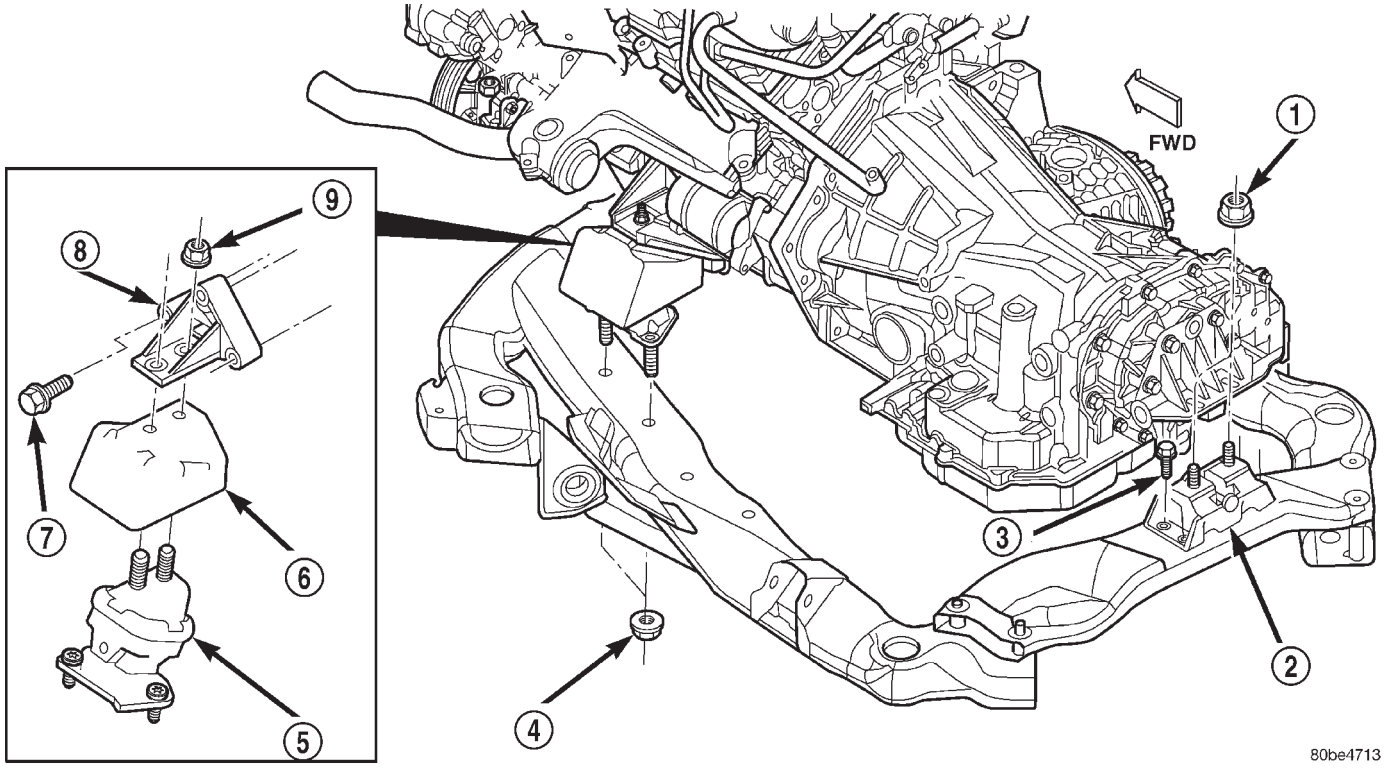


Fig. 39 Engine Mounting—Right, Left, and Rear

1 – NUT
2 – REAR ISOLATOR
3 – BOLT
4 – NUT
5 – ISOLATOR
6 – HEAT SHIELD
7 – BOLT
8 – ENGINE MOUNT BRACKET
9 – NUT

REMOVAL AND INSTALLATION

ENGINE MOUNTS—LEFT AND RIGHT

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove the isolator attaching nuts from top of the mounting bracket (Fig. 39).

(3) Support the engine with a jack and a block of wood across the full width of the oil pan.

(4) Remove the lower attaching nuts from the bottom of the isolator to the frame (Fig. 39).

(5) Raise engine carefully with jack enough to remove the isolator with heat shield from its mount.

INSTALLATION

(1) Install isolator mount with heat shield onto the frame.

(2) Lower the engine onto the isolator mount.

(3) Remove jack from vehicle.

(4) Tighten the isolator to frame nuts to 61 N·m (45 ft. lbs.) (Fig. 39).

(5) Install the upper attaching nuts to mount and tighten to 61 N·m (45 ft. lbs.) (Fig. 39).

(6) Lower vehicle.

ENGINE HYDRO-MOUNT ISOLATORS

Engine hydro-mounts may show surface cracks, this will not effect performance and hydro-mount should not be replaced. Only replace the engine hydro-mounts when leaking fluid:

- Driveshaft Diagnosis. Refer to DIFFERENTIAL AND DRIVELINE.
- Any front end structural damage (after repair).
- Isolator replacement.

ENGINE MOUNT—REAR

REMOVAL

(1) Raise vehicle on hoist.

(2) Support transaxle with a jack.

(3) Remove isolator nuts from the mount to transaxle mount bracket (Fig. 39).

(4) Remove rear mount isolator bolts to crossmember and remove mount (Fig. 39).

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position isolator onto crossmember.
(2) Install bolts attaching isolator to crossmember and tighten to 33 N·m (250 in. lbs.) (Fig. 39).
(3) Lower transaxle onto isolator.
(4) Install isolator nuts and tighten to 61 N·m (45 ft. lbs.) (Fig. 39).
(5) Lower vehicle.

STRUCTURAL COLLAR

REMOVAL

(1) Raise vehicle on hoist.
(2) Remove bolts attaching structural collar to oil pan and transmission housing (Fig. 40).
(3) Remove collar (Fig. 40).

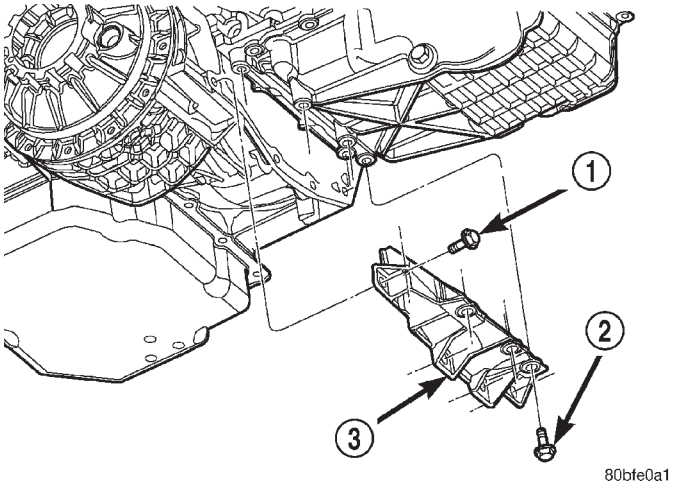


Fig. 40 Structural Collar

1 – BOLT-HORIZONTAL
2 – BOLT-VERTICAL
3 – STRUCTURAL COLLAR

INSTALLATION

CAUTION: The collar must be tighten using this service procedure, as damage to collar and/or oil pan may occur.

(1) Install structural collar (Fig. 40) using the following tightening sequence:
a. Install the **vertical** collar to oil pan bolts. Torque bolts initially to 1.1 N·m (10 in. lbs.).
b. Install the **horizontal** collar to transmission bolts and torque to 55 N·m (40 ft. lbs.).
c. Starting with the center vertical bolts and working outward, final torque bolts to 55 N·m (40 ft. lbs.).
(2) Lower vehicle.

ENGINE ASSEMBLY

REMOVAL

(1) Release fuel pressure. Refer to FUEL SYSTEM for procedure.
(2) Disconnect negative cable at remote jumper terminal located at right strut tower (Fig. 41).
(3) Mark hood position at hinges and remove hood.
(4) Drain cooling system. Refer to COOLING SYSTEM for procedure.
(5) Remove both wiper arms.
(6) Remove right and left cowl covers (Fig. 42).
(7) Remove cowl support (Fig. 43).
(8) Remove air cleaner assembly and air inlet hose (Fig. 44).
(9) Remove upper radiator crossmember. Refer to BODY for procedure.

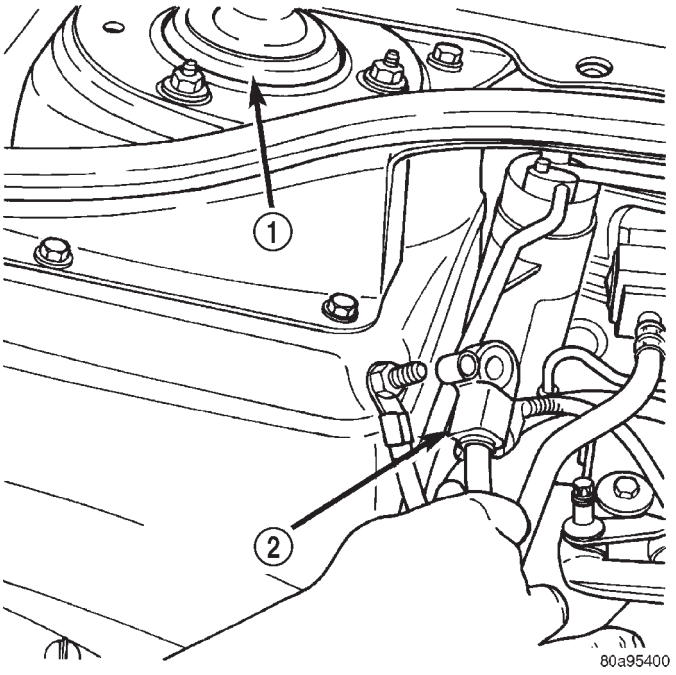


Fig. 41 Negative Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – BATTERY NEGATIVE CABLE

REMOVAL AND INSTALLATION (Continued)

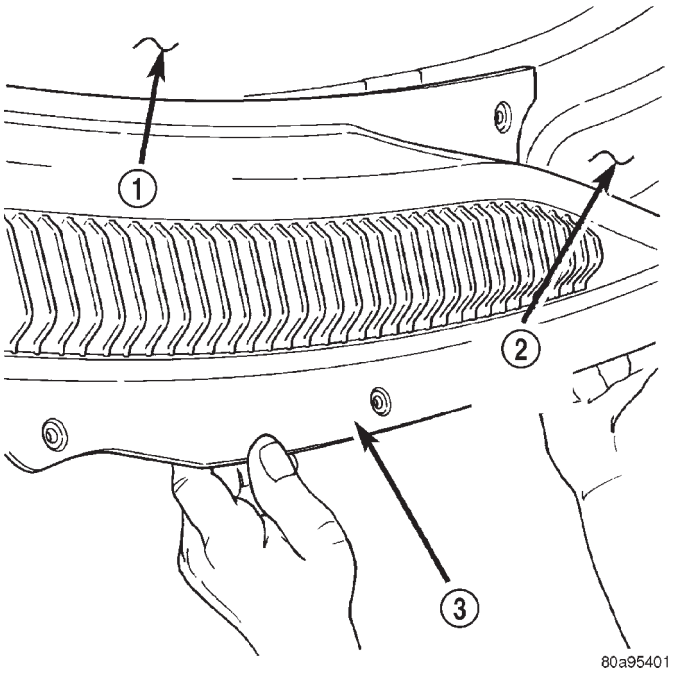


Fig. 42 Cowl Covers

1 – WINDSHIELD
2 – LEFT COWL COVER
3 – RIGHT COWL COVER

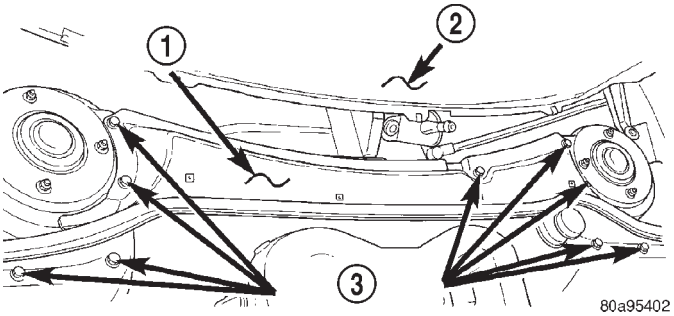


Fig. 43 Cowl Support

1 – COWL SUPPORT
2 – WINDSHIELD
3 – SUPPORT FASTENERS

(11) Disconnect hood release cable from hood latch.
(12) Remove cooling fan module. Refer to COOLING SYSTEM.
(13) Disconnect upper radiator hose at engine.
(14) Disconnect lower radiator hose at radiator.
(15) Disconnect engine oil cooler lines at radiator (if equpped).
(16) Disconnect transmission oil cooler lines at radiator.
(17) Remove fasteners attaching A/C condenser to radiator.
(18) Remove transaxle cooler lines support bracket and attaching screw at left side of radiator.
(19) Remove radiator.

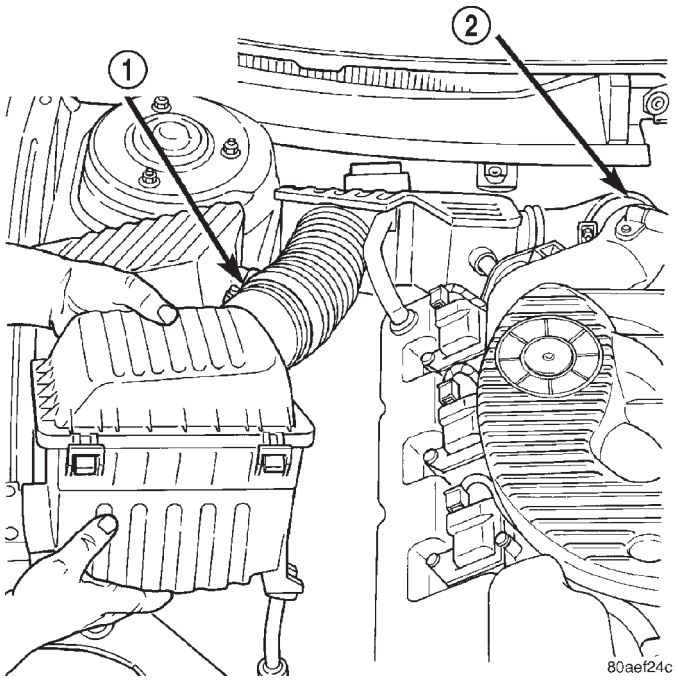


Fig. 44 Air Cleaner and Inlet Hose

1 – AIR CLEANER ASSEMBLY WITH AIR INLET HOSE
2 – THROTTLE BODY

(20) Remove accessory drive belts. Refer to COOLING SYSTEM.
(21) Remove power steering pump mounting bolts and set pump aside. Refer to STEERING for procedure.

NOTE: Generator can be removed with engine assembly.

(22) Disconnect A/C compressor electrical connector.
(23) Remove A/C compressor mounting bolts and set compressor aside.
(24) Loosen and remove V-Band clamps at exhaust manifolds.
(25) Disconnect throttle and speed control cables.
(26) Disconnect coolant hoses at coolant pressure bottle.
(27) Disconnect heater hoses.
(28) Perform fuel pressure release procedure and disconnect fuel line.
(29) Disconnect all vacuum lines and electrical connectors.
(30) Disconnect all ground straps attaching to engine.
(31) Hoist vehicle and drain engine oil.
(32) Remove fasteners supporting catalytic converter down pipes at front and rear mounts.
(33) Remove structural collar bolts from oil pan and transaxle. Remove structural collar.

REMOVAL AND INSTALLATION (Continued)

(34) Mark flex plate to torque converter position. Remove torque converter bolts.
(35) Disconnect both transaxle cooler line brackets from engine.
(36) Remove starter. Refer to STARTING for procedure.
(37) Remove crankshaft position sensor.
(38) Remove the two lower transaxle to block bolts.
(39) Lower vehicle.
(40) Remove EGR valve assembly. Refer to EMISSION CONTROL SYSTEMS for procedure.
(41) Remove screws attaching fuel line and electrical harness to the throttle body bracket.
(42) Remove the fasteners attaching the following brackets to the transaxle to block double-ended bolts:
- Electrical harness attaching bracket.
- Transaxle shift cable attaching bracket.
- Throttle body support bracket.

(43) Remove the upper transaxle to block bolts.
(44) Remove right and left engine mount isolator to engine mount bracket fasteners.

CAUTION: Intake manifolds and cylinder head covers are a composite design. Therefore, care should be taken when lifting the engine from engine compartment.

(45) Attach Special Tool 8342, Engine Lifting Fixture to engine at the locations shown in (Fig. 45).
(46) Support transaxle with a floor jack.
(47) Hoist engine from engine compartment.

INSTALLATION

(1) Attach Special Tool 8342, Engine Lifting Fixture to engine (Fig. 45). Lower engine into engine compartment.

CAUTION: Do not tighten the transaxle case to engine block bolts until all bolts have been hand started, and the two mating surfaces are completely joined together, as damage to cylinder block or transaxle could occur.

(2) Align engine mounts and install fasteners but **do not tighten** until all mounting bolts have been installed.
(3) Install transaxle case to engine block bolts and tighten to 102 N·m (75 ft. lbs.).
(4) Remove Engine Lifting Fixture.
(5) Tighten left and right engine mount isolator to engine mount bracket fasteners to 61 N·m (45 ft. lbs.).
(6) Raise vehicle.
(7) Align flex plate to torque converter and install mounting bolts tighten to 75 N·m (55 ft. lbs.).
(8) Install crankshaft position sensor.
(9) Install starter.
(10) Install the transaxle oil cooler lines bracket to engine
(11) Install structural collar to oil pan and transaxle. Refer to procedure in this section.
(12) Lower vehicle.
(13) Install rear throttle body support bracket.
(14) Install electrical harness and fuel line support brackets to the throttle body support bracket.
(15) Install fastener attaching electrical harness bracket to the transaxle to block bolt.
(16) Install EGR valve assembly. Refer to EMISSION CONTROL SYSTEMS for procedure.
(17) Connect heater hoses.
(18) Connect all ground straps to engine.
(19) Connect all vacuum hoses and electrical connectors.
(20) Connect both hoses at coolant pressure bottle.
(21) Connect throttle and speed control cables.
(22) Connect fuel line.

NOTE: Do not reuse V-Band clamps.

(23) Install new V-Band clamps at exhaust manifolds and tighten to 11 N·m (100 in. lbs.).
(24) Install catalytic converter down pipe front and rear supports.
(25) Install air conditioning compressor and tighten fasteners to 28 N·m (250 in. lbs.)
(26) Install power steering pump and tighten fasteners to 28 N·m (250 in. lbs.).
(27) Install radiator.
(28) Connect engine oil cooler lines to radiator (if equipped).
(29) Connect transmission oil cooler lines to radiator.
(30) Attach A/C condenser to radiator.
(31) Install lower radiator hose.
(32) Install upper radiator hose.
(33) Install accessory drive belts and cooling fan module. Refer to COOLING SYSTEM for procedures.
(34) Refill cooling system. Refer to COOLING SYSTEM for procedure.
(35) Fill engine with proper amount of oil.
(36) Connect hood release cable to hood latch and install upper radiator crossmember.
(37) Install air cleaner and air inlet hose.
(38) Install cowl support.
(39) Install right and left cowl covers.
(40) Install both wiper arms.
(41) Install hood.
(42) Connect negative cable to remote jumper terminal at right strut tower.

REMOVAL AND INSTALLATION (Continued)

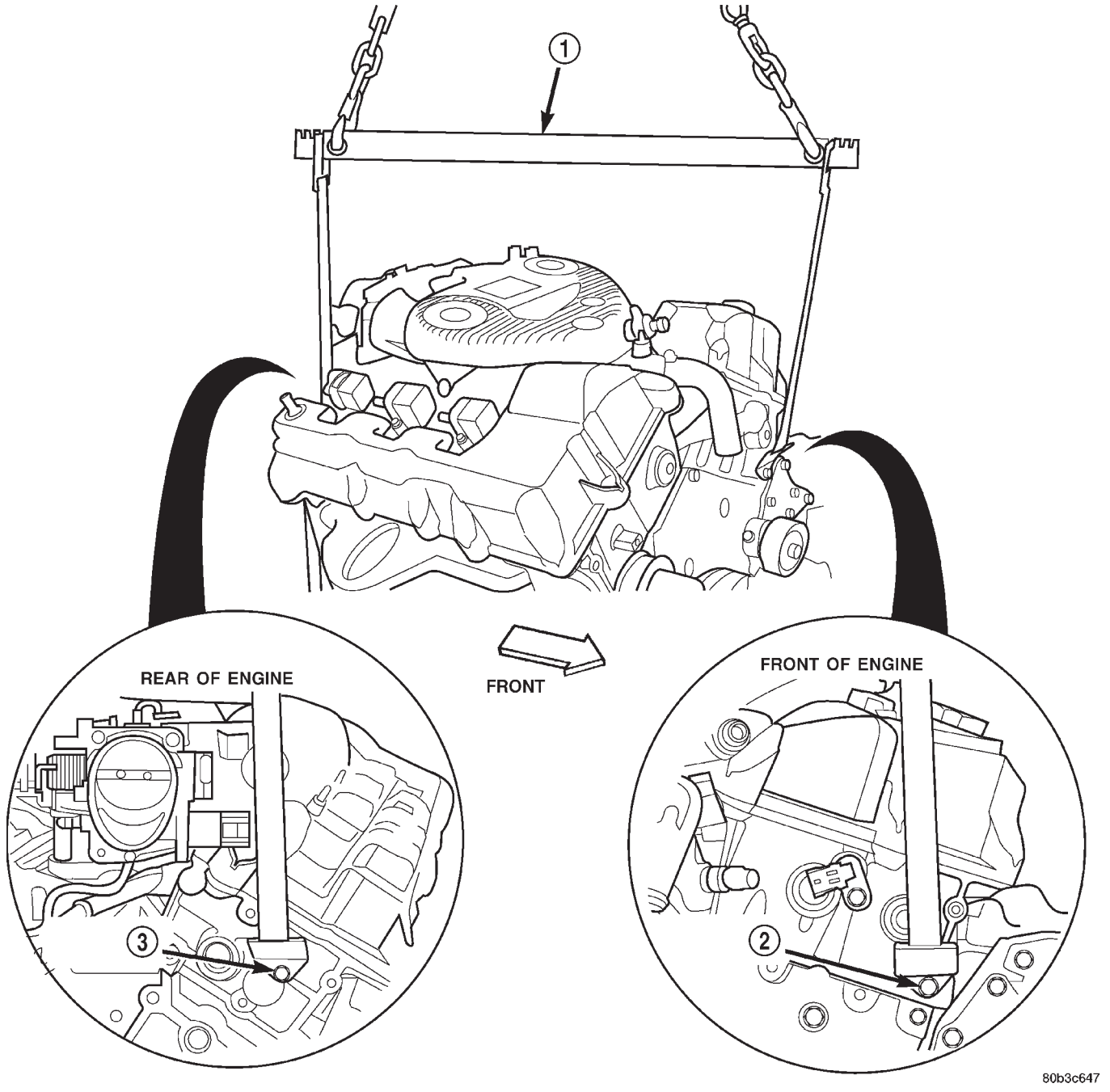


Fig. 45 Engine Lifting Fixture

1 – SPECIAL TOOL 8342 ENGINE LIFTING FIXTURE
2 – ATTACHING LOCATION
3 – ATTACHING LOCATION

CRANKSHAFT DAMPER

REMOVAL

(1) Remove upper radiator crossmember. Refer to BODY for procedure.

(2) Remove fan module and accessory drive belts. Refer to COOLING SYSTEM for procedures.

(3) Remove damper center bolt while holding the damper with Special Tool 8191 (Fig. 46).

CAUTION: Before removing damper, verify that A/C belt tensioner is not contacting the damper, as damage could occur to tensioner, timing chain cover, and/or damper.

REMOVAL AND INSTALLATION (Continued)

(4) Remove damper by using Special Tools 8194 Insert and 1023 Three Jaw Puller (Fig. 47).

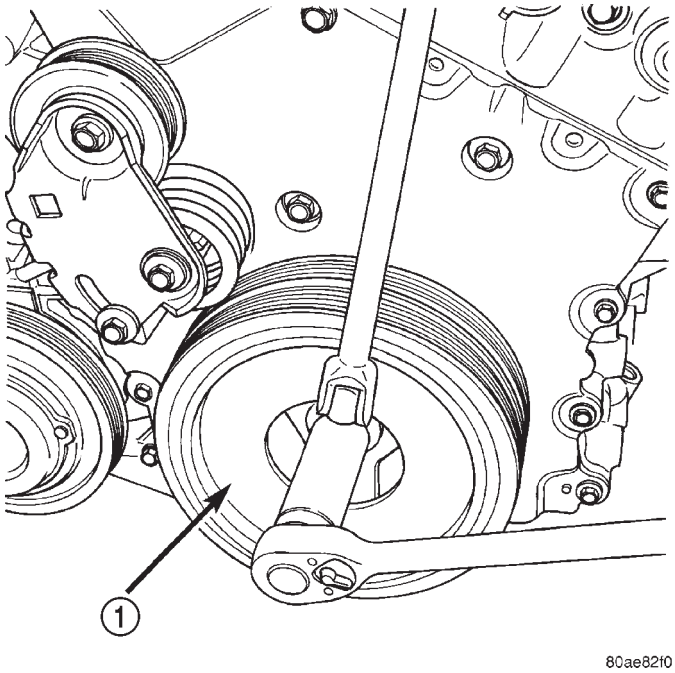


Fig. 46 Crankshaft Damper Center Bolt—Removal and Installation

1 – SPECIAL TOOL 8191

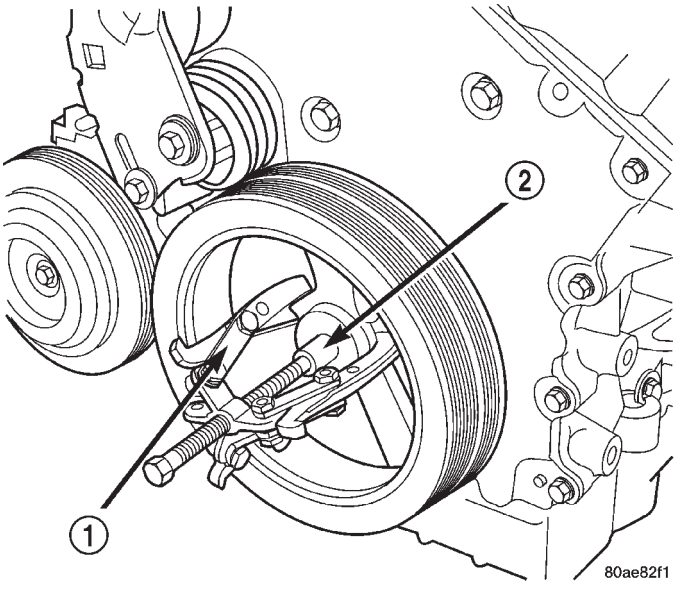


Fig. 47 Crankshaft Damper—Removal

1 – SPECIAL TOOL 1023
2 – SPECIAL TOOL 8194 INSERT

INSTALLATION

(1) Install damper using Special Tools 8179 Screw, with Nut and Thrust Bearing from 6792, and 6792-1 Installer (Fig. 48).

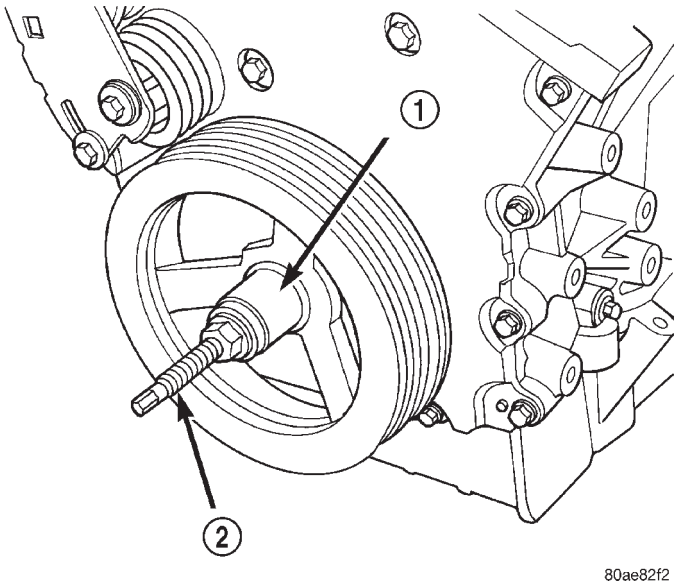


Fig. 48 Crankshaft Damper—Installation

1 – SPECIAL TOOL 6792–1
2 – SPECIAL TOOL 8179

(2) Install damper center bolt. Tighten center bolt while holding the damper with Special Tool 8191 to 170 N·m (125 ft. lbs.) (Fig. 46).

(3) Install accessory drive belts and cooling fan module. Refer to COOLING SYSTEM for procedures.

(4) Install upper radiator crossmember. Refer to BODY for procedure.

INTAKE MANIFOLD—UPPER

REMOVAL

(1) Disconnect negative cable from battery remote jumper terminal.

(2) Remove air inlet resonator and inlet tube.

(3) Remove throttle cable and speed control cable from throttle arm and bracket.

(4) Remove throttle cable bracket.

(5) Disconnect electrical connectors from the following components (Refer to FUEL SYSTEM for component locations):

- Manifold Absolute Pressure (MAP) Sensor
- Intake Air Temperature (IAT) Sensor
- Throttle Position Sensor (TPS) Sensor
- Idle Air Control (IAC) Motor
- Manifold Tuning Valve (MTV)—(if equipped)

(6) Disconnect Vapor Purge hose, Brake Booster hose, Speed Control Servo, Positive Crankcase Ventilation (PCV) hose.

(7) Remove EGR tube. Refer to EMISSION CONTROL SYSTEMS for procedure.

(8) Loosen upper fastener at throttle body support bracket.

REMOVAL AND INSTALLATION (Continued)

(9) Remove engine name cover from manifold by applying upward pressure to release retaining clip.
(10) Remove manifold attaching bolts.
(11) Remove upper manifold.

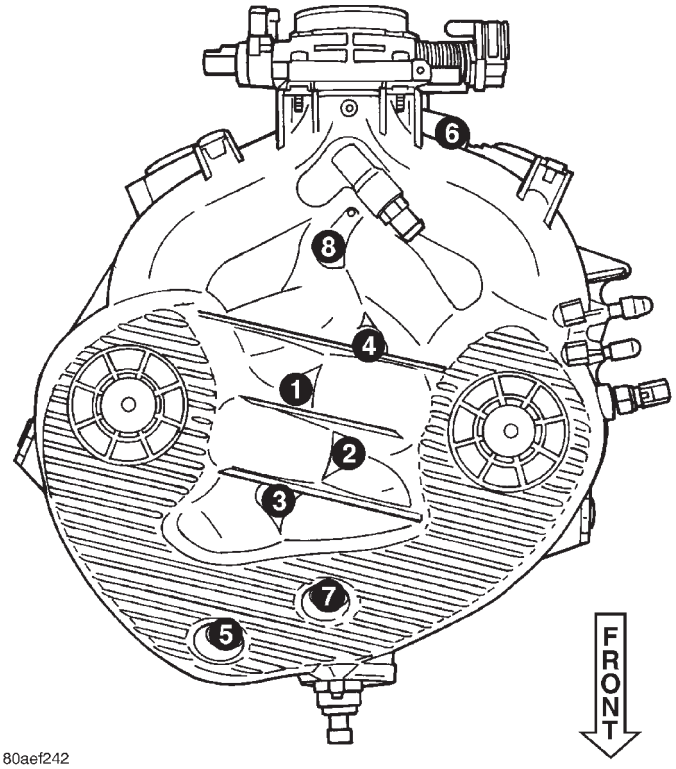


Fig. 49 Upper Intake Manifold Tightening Sequence

INSTALLATION

(1) Clean and inspect sealing surfaces. Gaskets can be reused, if free of cuts or tears.

NOTE: Make sure fuel injectors and wiring harnesses are in correct position to not interfere with upper manifold installation.

(2) Position upper manifold onto lower manifold.
(3) Install manifold attaching bolts and tighten in sequence shown in (Fig. 49) to 12 N·m (105 in. lbs.).
(4) Install engine name cover to manifold.
(5) Tighten upper fastener at throttle body support bracket.
(6) Install EGR tube to manifold. Refer to EMISSION CONTROL SYSTEMS for procedure.
(7) Connect speed control servo hose, PCV hose, and vapor purge hoses.
(8) Connect electrical connectors to the following components:

- Manifold Absolute Pressure (MAP) Sensor
- Intake Air Temperature (IAT) Sensor
- Throttle Position Sensor (TPS) Sensor
- Idle Air Control (IAC) Motor
- Manifold Tuning Valve (MTV)—(if equipped)

(9) Install throttle cable bracket.
(10) Install throttle and speed control cables to bracket and throttle arm.
(11) Connect negative cable to battery remote jumper terminal.

INTAKE MANIFOLD—LOWER

REMOVAL

(1) Release fuel system pressure. Refer to FUEL SYSTEM for procedure.
(2) Remove upper intake manifold. Refer to procedure in this section.
(3) Disconnect electrical connectors from the fuel injectors.
(4) Remove fuel supply hose from fuel rail.
(5) Remove screw attaching fuel rail support bracket to the throttle body support bracket.
(6) Remove bolts attaching fuel rail.
(7) Remove fuel rail and injectors as an assembly.
(8) Remove manifold attaching bolts.
(9) Remove lower manifold.

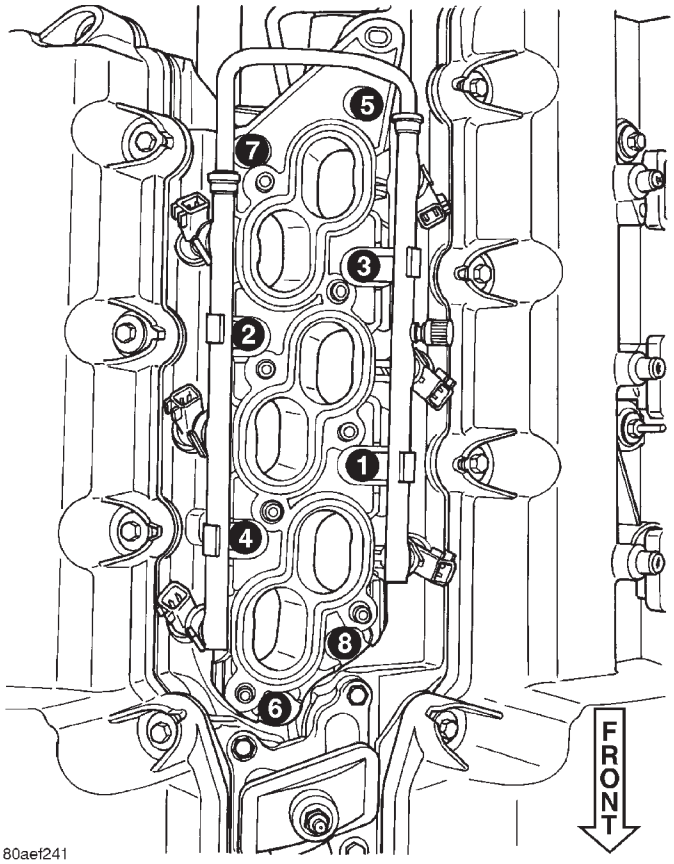


Fig. 50 Lower Intake Manifold Tightening Sequence

INSTALLATION

(1) Clean and inspect sealing surfaces of cylinder head and manifold. Gaskets can be reused provided they are free of cuts or tears.

REMOVAL AND INSTALLATION (Continued)

(2) Position manifold on cylinder head surfaces.

NOTE: For ease of installing upper intake manifold, install a bolt 2 – 3 turns to the rearmost attaching hole of intake. This will properly position lower manifold.

(3) Install fuel rail with injectors.
(4) Install manifold attaching bolts and tighten in sequence shown in (Fig. 50) to 12 N·m (105 in. lbs.). Remove bolt used for aligning manifold.
(5) Connect the fuel injector electrical connectors.

NOTE: Make sure fuel injectors are located in the correct position, as upper intake manifold interference could occur.

(6) Install screw attaching fuel rail support bracket to the throttle body support bracket.
(7) Connect fuel supply hose to fuel rail.
(8) Install upper intake manifold. Refer to procedure in this section.
(9) With the DRB scan tool use ASD Fuel System Test to pressurize system to check for leaks.

CAUTION: When using the ASD Fuel System Test, the Auto Shutdown (ASD relay will remain energized for 7 minutes or until the ignition switch is turned to the OFF position, or Stop All Test is selected.

EXHAUST MANIFOLD

RIGHT EXHAUST MANIFOLD

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.
(2) Remove air intake plenum and air filter housing.
(3) Remove bolt attaching battery cable housing tube to transmission housing.
(4) Remove bolts attaching EGR tube from exhaust manifold and EGR valve. Discard gaskets.
(5) Disconnect electrical connector and remove exhaust manifold mounted oxygen sensor.
(6) Loosen and remove the manifold to catalytic converter V-Band clamp.

NOTE: Do not reuse V-Band clamp.

(7) Remove heat shield attaching screws and remove heat shields (Fig. 51).
(8) Remove exhaust manifold attaching bolts and remove manifold (Fig. 51).

INSTALLATION

(1) Install exhaust manifold and gasket. Tighten bolts working from center outwards to 23 N·m (200 in. lbs.) (Fig. 51).
(2) Install heat shields. Tighten attaching screws to 12 N·m (105 in. lbs.) (Fig. 51).
(3) Install a new V-Band clamp and tighten 10 N·m (100 in. lbs.).
(4) Install oxygen sensor and connect electrical connector.
(5) Install EGR tube using new gaskets. Tighten screws to 11 N·m (95 in. lbs.).
(6) Install bolt attaching battery cable housing tube to transmission housing. Tighten bolt to 101 N·m (75 ft. lbs.).
(7) Install air intake plenum and air filter housing.
(8) Connect negative cable.

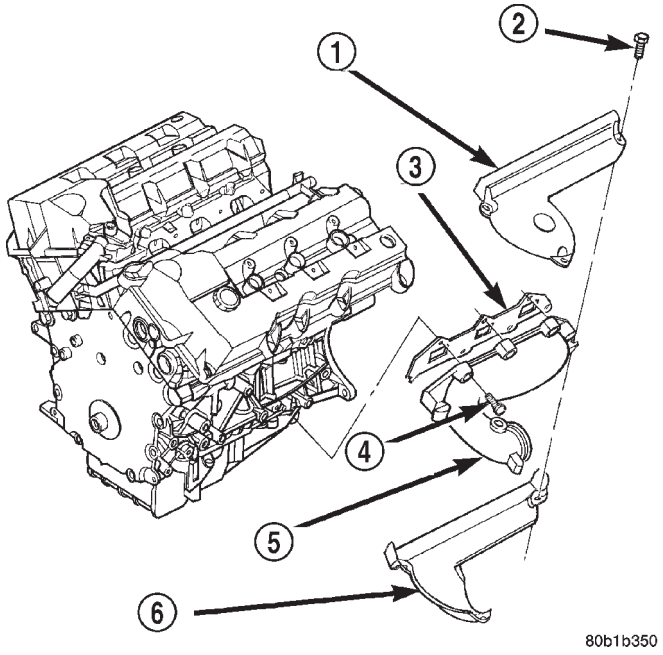


Fig. 51 Exhaust Manifold—2.7L Engine

1 – HEAT SHIELD
2 – BOLT
3 – GASKET
4 – BOLT
5 – EXHAUST MANIFOLD
6 – HEAT SHIELD

LEFT EXHAUST MANIFOLD

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.
(2) Raise vehicle on hoist.
(3) Remove exhaust system. Refer to EXHAUST SYSTEM for procedure.

REMOVAL AND INSTALLATION (Continued)

(4) Remove left catalytic converter. Refer to EXHAUST SYSTEM for procedure.

NOTE: Do not reuse V-Band clamp.

(5) Remove bolt attaching transmission dipstick tube and rotate housing away from engine.
(6) Lower vehicle.
(7) Remove screws attaching the two electrical connectors and harness to support bracket.
(8) Remove engine wiring harness support bracket from cylinder head.
(9) Disconnect exhaust manifold mounted oxygen sensor connector and remove sensor from manifold.
(10) Remove engine oil dipstick tube.
(11) Remove heat shield attaching screws and remove heat shields (Fig. 51).
(12) Remove exhaust manifold attaching bolts and remove manifold (Fig. 51).

INSTALLATION

(1) Install exhaust manifold and gasket. Tighten bolts starting at the center working outward to 23 N·m (200 in. lbs.) (Fig. 51).
(2) Install heat shields. Tighten screws to 12 N·m (105 in. lbs.) (Fig. 51).
(3) Install oxygen sensor and connect electrical connector.
(4) Raise vehicle on hoist.
(5) Install bolt attaching transmission dipstick tube.
(6) Replace the O-ring on engine oil dipstick tube and install tube.
(7) Install catalytic converter. Refer to EXHAUST SYSTEM for procedures.
(8) Install a new V-Band clamp and tighten to 10 N·m (100 in. lbs.).
(9) Install engine wiring harness support bracket to cylinder head and attach connectors to bracket.
(10) Install exhaust system. Refer to EXHAUST SYSTEM for procedure.
(11) Connect negative cable.

CYLINDER HEAD COVERS

REMOVAL

(1) Remove upper intake manifold. Refer to procedure in this section.
(2) Remove electrical connectors from ignition coils.
(3) Remove ground strap from right cylinder head.
(4) Disconnect electrical and vacuum harness retaining clips from cylinder head cover studs.
(5) Remove fasteners attaching ignition coil capacitors.
(6) Loosen all cylinder head cover attaching bolts (Fig. 52).

NOTE: Cylinder head cover attaching bolts are captured to the cover.

(7) Remove cylinder head covers.

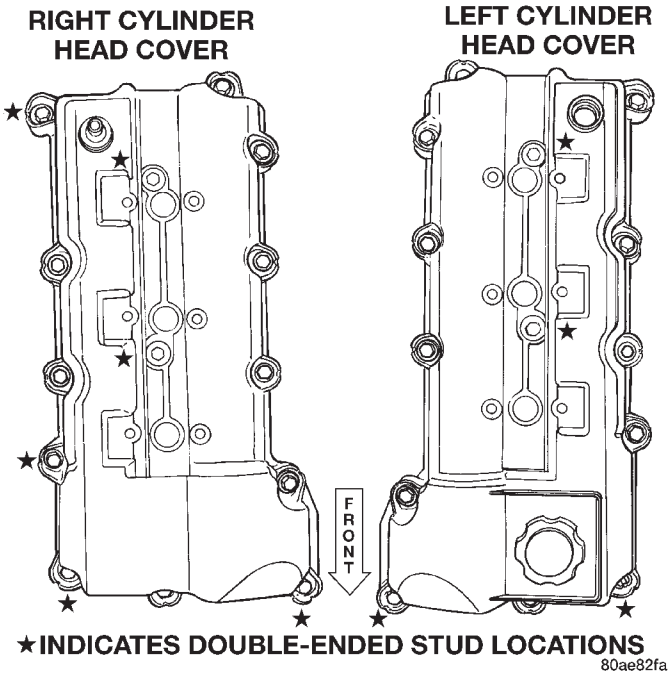


Fig. 52 Cylinder Head Covers

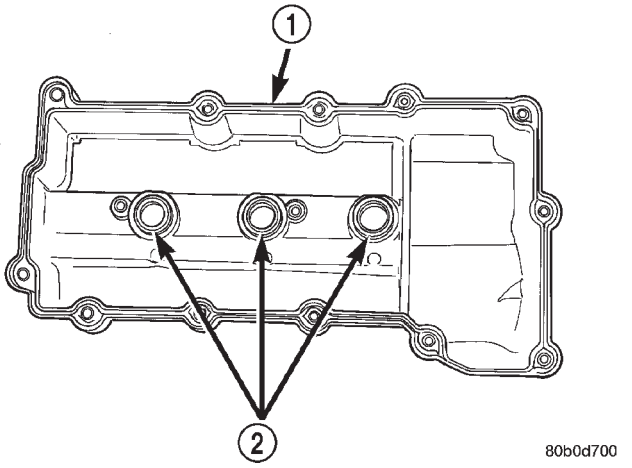


Fig. 53 Cylinder Head Cover Gasket and Spark Plug Seals

1 – ONE PIECE GASKET
2 – SPARK PLUG WELL SEALS

INSTALLATION

(1) Clean cylinder head cover and both sealing surfaces. Inspect and replace gaskets as necessary (Fig. 53).
(2) Install cylinder head covers and hand start all fasteners. Verify that all double-ended studs are in the correct locations as shown in (Fig. 52).

REMOVAL AND INSTALLATION (Continued)

(3) Tighten cylinder head cover attaching bolts and double-ended studs to 12 N·m (105 in. lbs.).

(4) Connect all electrical connectors and harness clips.

(5) Install ignition coil capacitors and fasteners.

(6) Install upper intake manifold. Refer to procedure in this section.

CAMSHAFT

REMOVAL

(1) Remove the primary timing chain. Refer to procedure in this section.

(2) Remove secondary chain tensioner mounting bolts.

NOTE: Camshaft bearing caps have been marked during engine manufacturing. For example, number one exhaust camshaft bearing is marked "1E>"

(3) Slowly loosen camshaft bearing cap bolts in reverse order of installation (Fig. 54).

(4) Remove camshaft bearing caps.

(5) Remove camshafts, secondary chain, and tensioner together as an assembly.

(6) Remove tensioner and camshaft chain from camshafts.

(7) Inspect camshafts. Refer to Cleaning and Inspection in the Section.

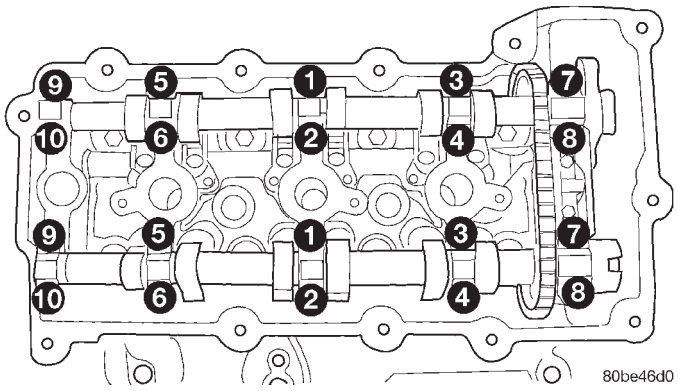


Fig. 54 Camshaft Bearing Cap Tightening Sequence

INSTALLATION

CAUTION: When the timing chain is removed and the cylinder heads are installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

(1) Assemble camshaft chain on the cams. Ensure that plated links are facing toward the front. Align the plated links to the dot on the camshaft sprockets (Fig. 56).

(2) If camshaft chain tensioner is already in the compressed and locked position, proceed to step (4).

(3) When the camshaft chain tensioner is removed, it is necessary to compress and lock the tensioner using the following procedures:

(a) Place tensioner into a soft jaw vise (Fig. 55).

(b) SLOWLY compress tensioner until fabricated lock pin or the equivalent can be inserted into the locking holes.

(c) Remove compressed and locked tensioner from the vise.

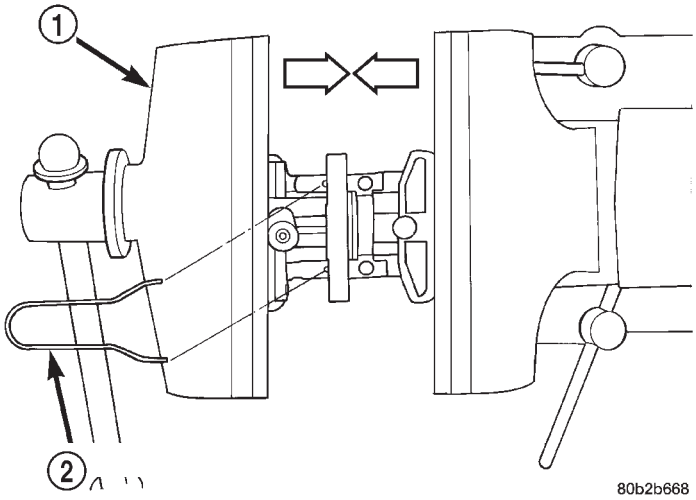


Fig. 55 Locking Camshaft (Secondary) Chain Tensioner

1 – VISE
2 – LOCK PIN

(4) Insert the compressed and locked camshaft chain tensioner in-between the camshafts and chain.

(5) Rotate the cams so that the plated links and dots are facing the 12:00 O'clock position (Fig. 56).

(6) Install cams to cylinder head. Ensure that rocker arms are correctly seated and in proper positions.

(7) Install camshaft bearing caps. Ensure that bearing caps are installed in same position as removed.

(8) Tighten cam bearing cap bolts gradually in sequence shown in (Fig. 54) to 12 N·m (105 in. lbs.).

(9) Install secondary chain tensioner bolts and tighten to 12 N·m (105 in. lbs.).

(10) Remove locking pin from secondary tensioners.

(11) Measure camshafts end play by mounting a dial indicator to a stationary point on cylinder head. Locate the probe perpendicular against the end of camshaft being checked. Move camshaft all the way to the rear of its travel. Zero the dial indicator. Move camshaft forward to limits of travel and read the dial indicator (Fig. 57).

REMOVAL AND INSTALLATION (Continued)

(12) Install primary timing chain. Refer to procedure in this section.

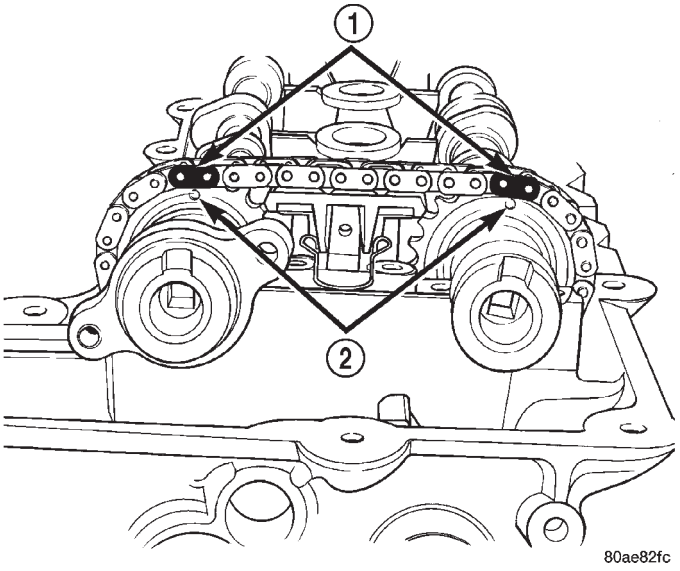


Fig. 56 Camshaft Chain Timing

1 – PLATED CHAIN LINKS
2 – CAMSHAFT TIMING MARKS

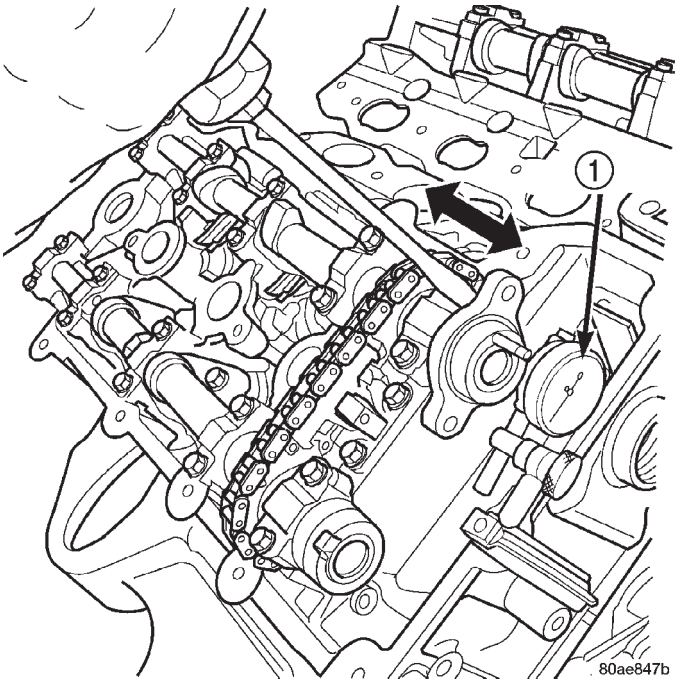


Fig. 57 Camshaft End Play Measuring

1 – DIAL INDICATOR

ROCKER ARMS

REMOVAL

(1) Remove cylinder head cover(s). Refer to procedure in this section.

CAUTION: Always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

(2) Rotate engine until the cam lobe is on its base circle (heel), on the rocker arm being removed.

CAUTION: Depress valve spring only enough to remove rocker arm.

(3) Using Special Tools 8215 and 8216 Adaptor, depress valve spring only enough to release tension on rocker arm (Fig. 58).

(4) Remove rocker arm from cylinder head.

CAUTION: If rocker arms are to be reused, identify position of rocker arms for reassembly in their original positions.

(5) Repeat procedure for each rocker arm being removed.

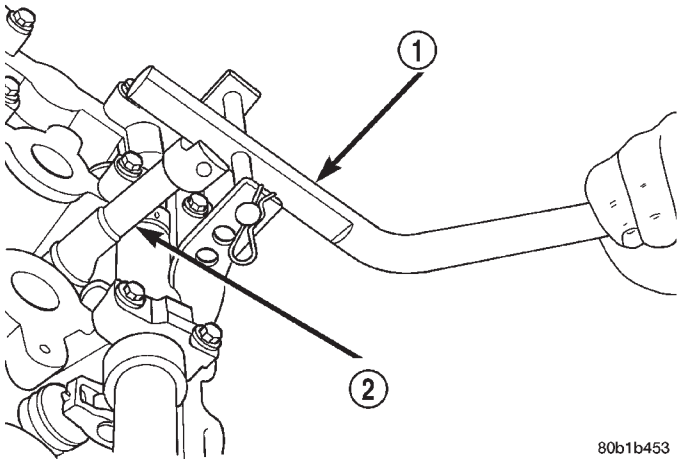


Fig. 58 Rocker Arm—Removal/Installation

1 – SPECIAL TOOL 8215
2 – ADAPTOR 8216

INSPECTION

Inspect the rocker arm for wear or damage (Fig. 59). Replace as necessary.

INSTALLATION

(1) Lubricate rocker arms with clean engine oil before installation.

(2) Rotate engine until cam lobe is on its base circle (heel) of rocker arm being installed.

(3) Using Special Tools 8215 and 8216 Adaptor, depress valve spring only enough to install rocker arm (Fig. 58).

(4) Install rocker arm in original position (if reused) over valve and lash adjuster. Release tension on valve spring.

REMOVAL AND INSTALLATION (Continued)

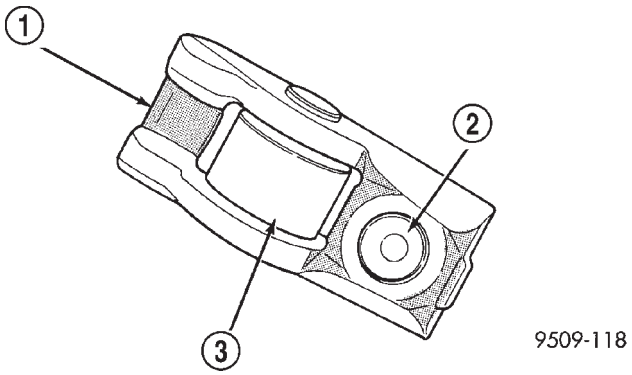


Fig. 59 Rocker Arm

1 – TIP
2 – LASH ADJUSTER POCKET
3 – ROLLER

NOTE: Inspect rocker arm for proper engagement into lash adjuster and valve tip.

(5) Repeat procedure for each rocker arm being installed.

(6) Install cylinder head cover(s). Refer to procedure in this section.

HYDRAULIC LASH ADJUSTER

REMOVAL

(1) Remove cylinder head cover(s). Refer to procedure in this section.

(2) Remove rocker arm(s). Refer to procedure in this section.

CAUTION: If lash adjusters and rocker arms are to be reused, always mark position for reassembly in their original positions.

(3) Remove lash adjuster(s).

INSTALLATION

(1) Install hydraulic lash adjuster making sure adjusters are at least partially full of oil. This can be verified by little or no plunger travel when lash adjuster is depressed.

(2) Install rocker arm(s) and cylinder head covers. Refer to procedure in this section.

VALVE STEM SEALS OR VALVE SPRINGS—IN VEHICLE

REMOVAL

(1) Perform fuel system pressure release procedure **before attempting any repairs.** Refer to FUEL SYSTEM for procedure.

(2) Disconnect negative cable from remote jumper terminal.

(3) Remove air cleaner housing cover and inlet hose.

(4) Remove upper intake manifold. Refer to procedure in this section.

(5) Remove cylinder head cover(s). Refer to procedure in this section.

(6) Remove crankshaft damper, timing chain cover, and timing chain. Refer to procedures in this section.

(7) Remove camshafts. Refer to procedure in this section.

(8) With air hose attached to spark plug adapter installed in the cylinder being serviced, apply 620.5 – 689 kPa (90 – 100 psi) air pressure. This is to hold valves in place while servicing components.

(9) Using Special Tool MD 998772A with adapter 6779, compress valve spring and remove valve locks, retainer, and valve spring.

(10) Remove valve stem seals by using a valve seal tool (Fig. 60).

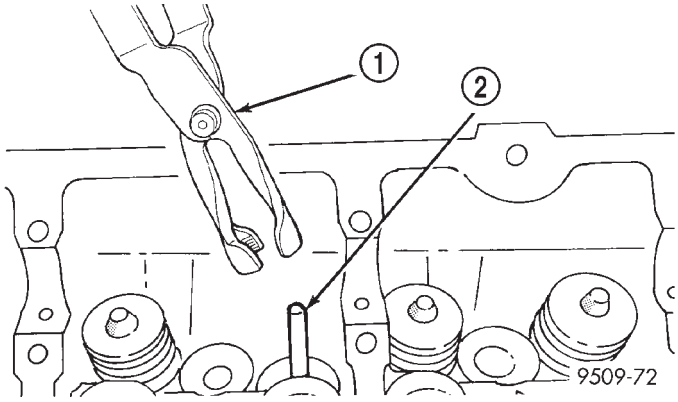


Fig. 60 Valve Stem Seal—Removal

1 – VALVE SEAL TOOL
2 – VALVE STEM

INSTALLATION

(1) The valve stem seal/valve spring seat should be pushed firmly and squarely over the valve guide using the valve stem as guide. **Do Not Force** seal against top of guide. When installing the valve retainer locks, compress the spring **only enough** to install locks

(2) Follow the same procedure on the remaining 5 cylinders using the firing sequence 1-2-3-4-5-6. **Make sure piston is at TDC on the cylinder that the valve spring is to be removed.**

(3) Remove spark plug adapter tool and Special Tool MD 998772A.

(4) Install rocker arm(s). Refer to procedure in this section.

(5) Install camshafts, timing chain, and timing chain cover.

(6) Install cylinder head covers.

(7) Install upper intake manifold.

REMOVAL AND INSTALLATION (Continued)

(8) Connect negative cable.

CYLINDER HEAD

REMOVAL

(1) Perform fuel pressure release procedure **before attempting any repairs.** Refer to FUEL SYSTEM for procedure.

(2) Disconnect negative cable from remote jumper terminal.

(3) Drain cooling system and remove accessory drive belts. Refer to COOLING SYSTEM for procedures.

(4) Remove crankshaft damper.

(5) Remove upper and lower intake manifolds. Refer to procedures in this section.

(6) Remove cylinder head cover and timing chain cover. Refer to procedure in this section.

(7) Remove water outlet connector (Fig. 61). Refer to COOLING SYSTEM for procedure.

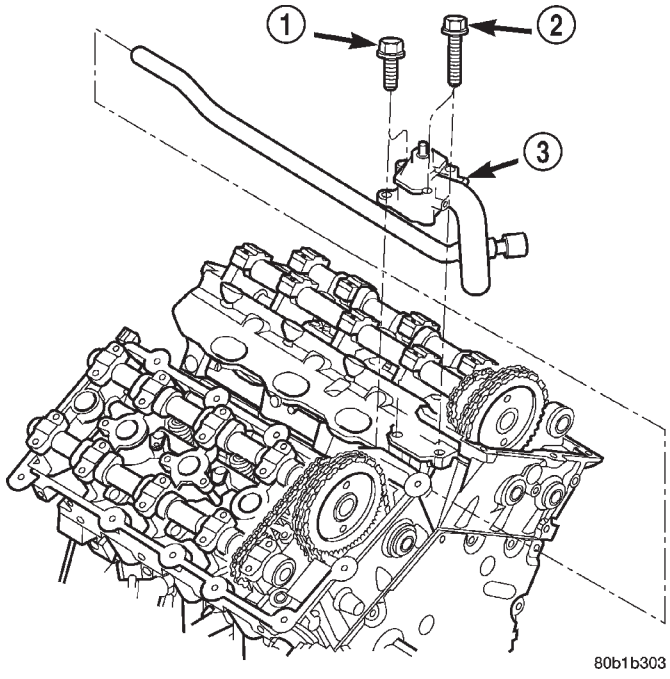


Fig. 61 Water Outlet Connector

1 – BOLT (2)
2 – BOLT (2)
3 – WATER OUTLET CONNECTOR

(8) Rotate crankshaft until crankshaft sprocket timing mark aligns with timing mark on oil pump housing.

(9) Remove primary timing chain. Refer to procedure in this section.

(10) Remove camshaft bearing caps **gradually** in reverse sequence of installation (Fig. 64).

(11) Remove camshafts from cylinder head.

(12) Remove V-Band clamp(s) at exhaust manifold to catalytic converter pipe.

NOTE: Do not reuse V-Band clamp.

CAUTION: Ensure cylinder head bolts 11–9 (Fig. 63) are removed before attempting the removal of cylinder head, as damage to cylinder head and/or block may occur.

(13) Remove cylinder head bolts in reverse sequence of installation (Fig. 63) starting with bolts 11–9, then bolts 8–1.

(14) Remove cylinder head(s).

INSTALLATION

NOTE: The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts should be replaced (Fig. 62).

Necking can be checked by holding a straight edge against the threads. If all the threads do not contact the scale, the bolt should be replaced (Fig. 62).

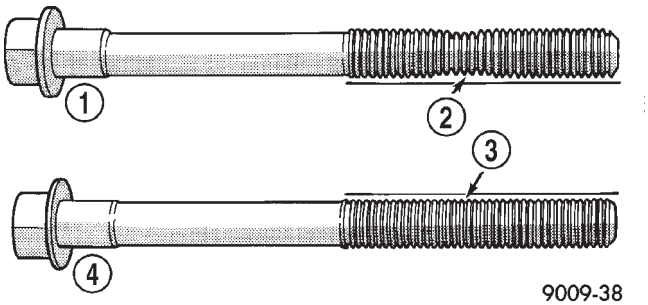


Fig. 62 Checking Cylinder Head Bolts for Stretching (Necking)

1 – STRETCHED BOLT
2 – THREADS ARE NOT STRAIGHT ON LINE
3 – THREADS ARE STRAIGHT ON LINE
4 – UNSTRETCHED BOLT

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

(1) Clean sealing surfaces of cylinder head and block.

(2) Install new head gasket over locating dowels.

(3) Install cylinder head to block, assuring head is properly positioned over locating dowels.

(4) Lubricate bolt threads with clean engine oil and install bolts.

REMOVAL AND INSTALLATION (Continued)

(5) Tighten bolts in sequence shown in (Fig. 63), using the following steps and torque values:

- Step 1: Bolts 1–8 to 48 N·m (35 ft. lbs.)
- Step 2: Bolts 1–8 to 75 N·m (55 ft. lbs.)
- Step 3: Bolts 1–8 to 75 N·m (55 ft. lbs.)
- Step 4: Bolts 1–8 to +90° Turn **Do not use a torque wrench for this step.**
- Step 5: Bolts 9–11 to 28 N·m (250 in. lbs.)

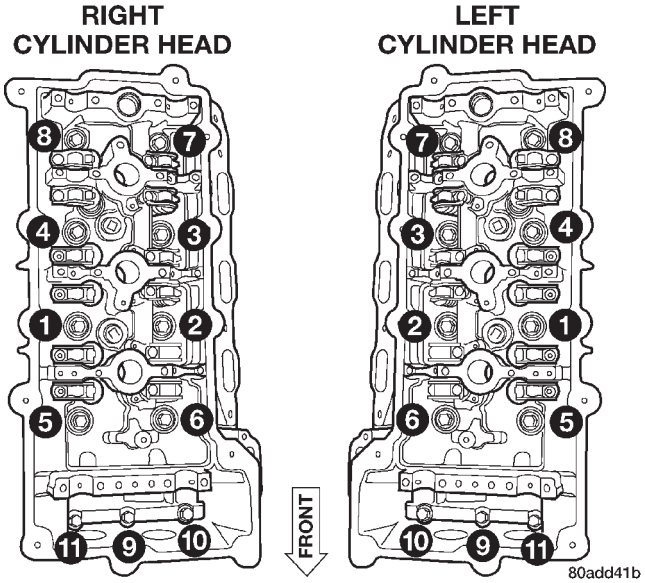


Fig. 63 Cylinder Head Tightening Sequence

(6) Connect catalytic converter to exhaust manifold with a new V-Band clamp. Tighten V-Band clamp to 10 N·m (100 in. lbs.).

(7) Install camshafts. Refer to procedure in the section.

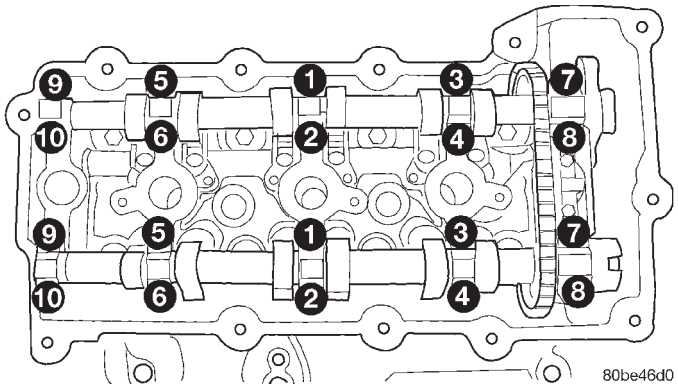


Fig. 64 Camshaft Bearing Cap Tightening Sequence

(8) Install timing chain and sprockets. Refer to procedure in this section.

(9) Install water outlet connector (Fig. 61). Refer to COOLING SYSTEM for procedure.

(10) Install cylinder head covers. Refer to procedure in this section.

(11) Install timing chain cover and crankshaft damper. Refer to procedures in this section.

(12) Install lower and upper intake manifolds. Refer to procedures in this section.

(13) Install accessory drive belts. Refer to COOLING SYSTEM for procedure.

(14) Fill cooling system. Refer to COOLING SYSTEM for procedure.

(15) Connect negative cable to remote jumper terminal.

VALVE AND VALVE SPRINGS

REMOVAL

(1) With cylinder head removed, compress valve springs using a Special Tool C-3422-B, Valve Spring Compressor.

(2) Remove valve retaining locks, valve spring retainers, valve springs and valve spring seat/stem seal assembly.

(3) Before removing valves, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.** Identify valves to insure installation in original location.

INSTALLATION

(1) Coat valve stems with clean engine oil and insert them in cylinder head.

(2) If valves or seats have been reground, check valve tip height (A) (Fig. 65). If valve tip height for intake valve is greater than 47.59 mm (1.8737 in.) or 49.14 mm (1.9347 in.) for exhaust valve, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

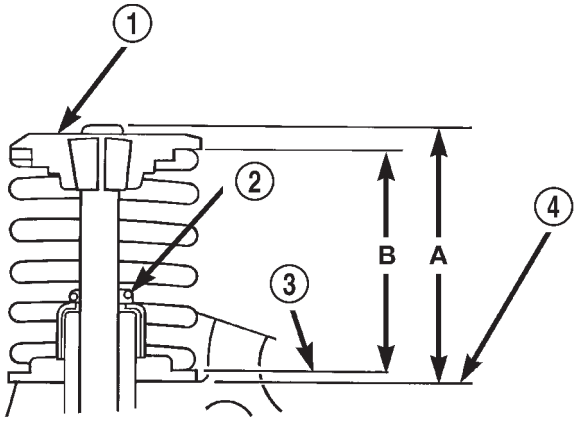


Fig. 65 Valve Tip Height and Valve Spring Installed Height Checking

1 – SPRING RETAINER
2 – GARTER SPRING
3 – VALVE SPRING SEAT TOP
4 – CYLINDER HEAD SURFACE

REMOVAL AND INSTALLATION (Continued)

(3) Install valve seal/spring seat assembly over valve guides on all valve stems (Fig. 66). Ensure that the garter spring is intact around the top of the rubber seal. Install valve springs, valve retainers.

(4) Compress valve springs with a valve spring compressor install locks and release tool. **If valves and/or seats are reground, measure the installed height of springs (B) (Fig. 65), make sure measurements are taken from top of spring seat to the bottom surface of spring retainer.** If height is greater than 38.75 mm (1.5256 inches), install a 0.762 mm (0.030 inch.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

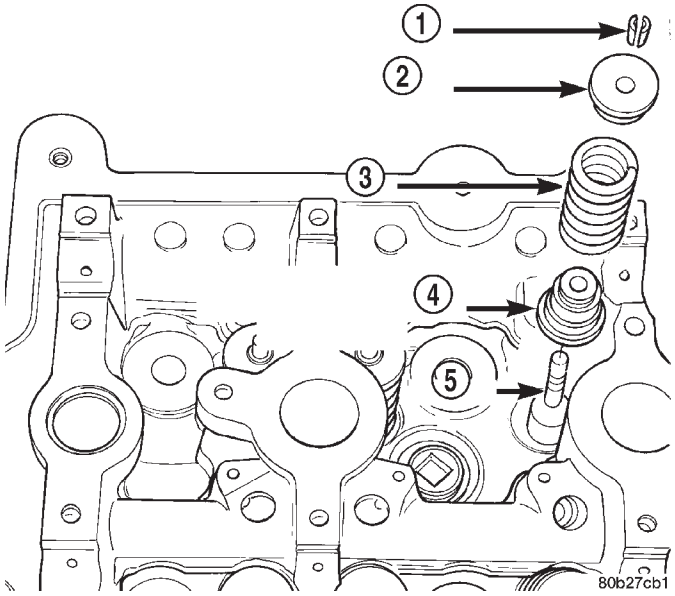


Fig. 66 Valve, Spring, and Valve Stem Seal

1 – VALVE RETAINING LOCKS
2 – VALVE SPRING RETAINER
3 – VALVE SPRING
4 – VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY
5 – VALVE

TIMING CHAIN COVER

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

(2) Remove upper radiator support crossmember. Refer to BODY for procedure.

(3) Remove fan module and accessory drive belts. Refer to COOLING SYSTEM for procedure.

(4) Remove crankshaft damper. Refer to procedure in this section.

(5) Remove power steering pump from mounting bracket.

(6) Remove accessory drive belt tensioner pulley and bracket.

(7) Remove timing chain cover attaching bolts and remove cover (Fig. 67).

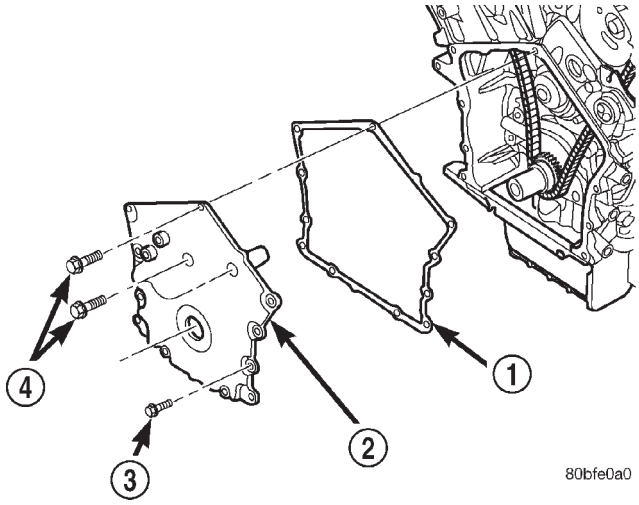


Fig. 67 Timing Chain Cover

1 – GASKET
2 – TIMING CHAIN COVER
3 – BOLT-M6
4 – BOLT-M10

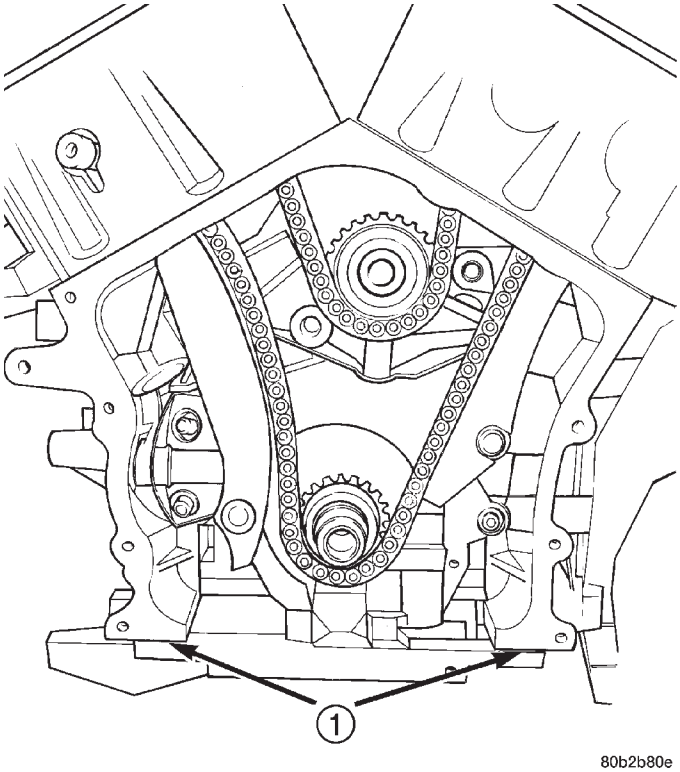


Fig. 68 Timing Chain Cover Sealing

1 – PLACE A 1/8 INCH BEAD OF SEALER AT PARTING LINE

INSTALLATION

(1) Inspect and clean sealing surfaces. Inspect and replace gasket and seal as necessary.

REMOVAL AND INSTALLATION (Continued)

(2) If front crankshaft seal was bench installed, place Special Tool 6780-2, Sleeve over crankshaft nose to guide and protect seal lip.

(3) Before installing timing cover gasket apply a 1/8 inch bead of Mopar® Engine RTV GEN II to the parting lines between the oil pan and cylinder block (Fig. 68).

(4) Install timing cover and gasket. Tighten M10 cover bolts to 54 N·m (40 ft. lbs.) and M6 bolts to 12 N·m (105 in. lbs.) (Fig. 67).

(5) If not previously performed, install crankshaft oil seal using Special Tool 6780-2 sleeve and 6780-2 installer.

(6) Install crankshaft damper and tighten center bolt to 170 N·m (125 ft. lbs.).

(7) Attach power steering pump to bracket.

(8) Install A/C belt tensioner assembly to timing cover.

(9) Install generator/power steering drive belt tensioner pulley and bracket.

(10) Install fan module and accessory drive belts. Refer to COOLING SYSTEM for procedure.

(11) Install upper radiator crossmember. Refer to BODY for procedure.

(12) Connect negative cable.

TIMING CHAIN AND SPROCKETS

REMOVAL

(1) Remove upper intake manifold. Refer to procedure in this section.

(2) Remove cylinder head covers, crankshaft damper, and timing chain cover. Refer to procedures in this section.

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

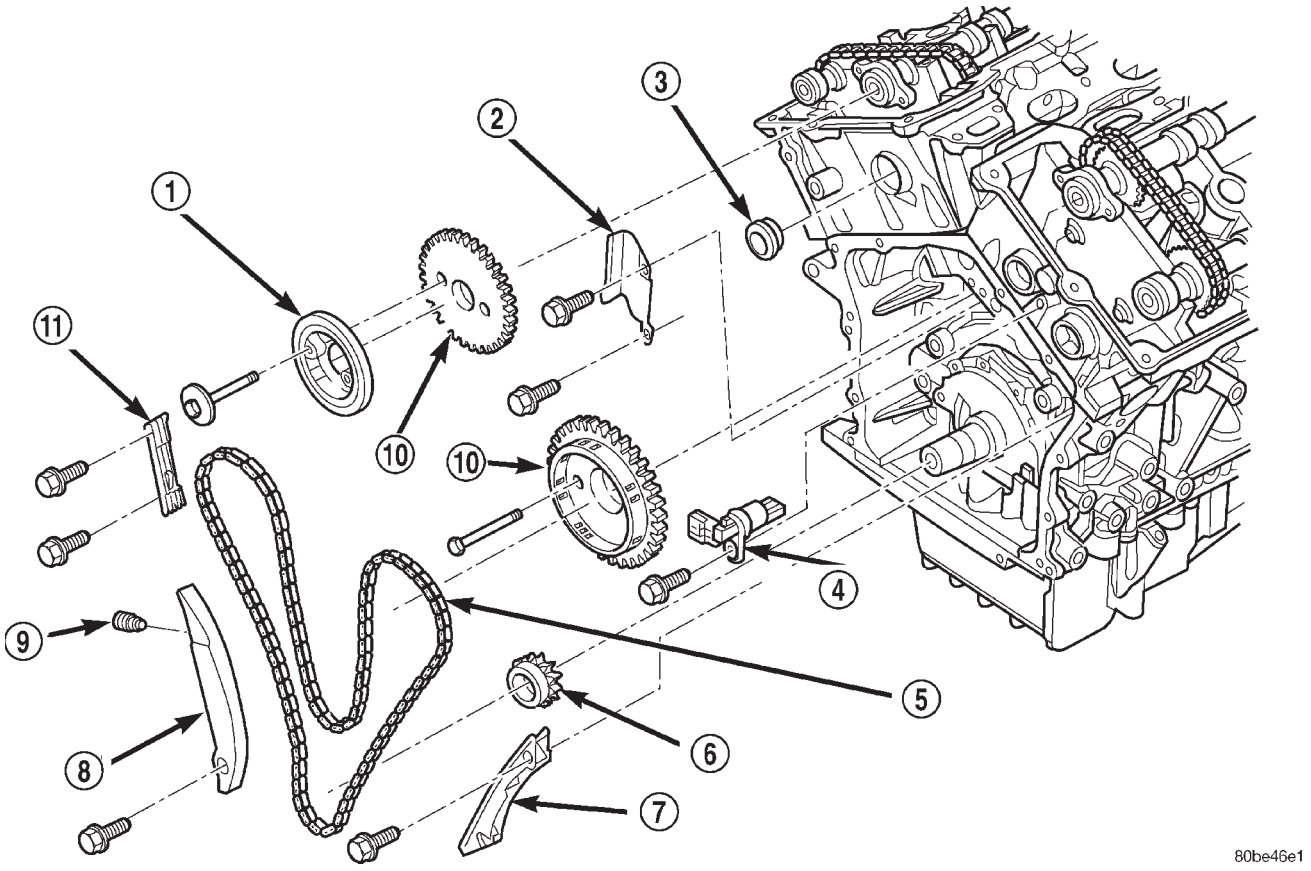


Fig. 69 Primary Timing Drive System

1 – CAMSHAFT DAMPER
2 – CHAIN GUIDE
3 – ACCESS PLUG
4 – CAMSHAFT POSITION SENSOR
5 – PRIMARY TIMING CHAIN
6 – CRANKSHAFT SPROCKET
7 – CHAIN GUIDE
8 – CHAIN TENSIONER ARM
9 – CHAIN TENSIONER
10 – CAMSHAFT SPROCKETS
11 – CHAIN GUIDE

REMOVAL AND INSTALLATION (Continued)

(3) Align crankshaft sprocket timing mark to mark on oil pump housing (Fig. 70). The mark on oil pump housing is 60° ATDC of #1 cylinder.

CAUTION: When the timing chain is removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

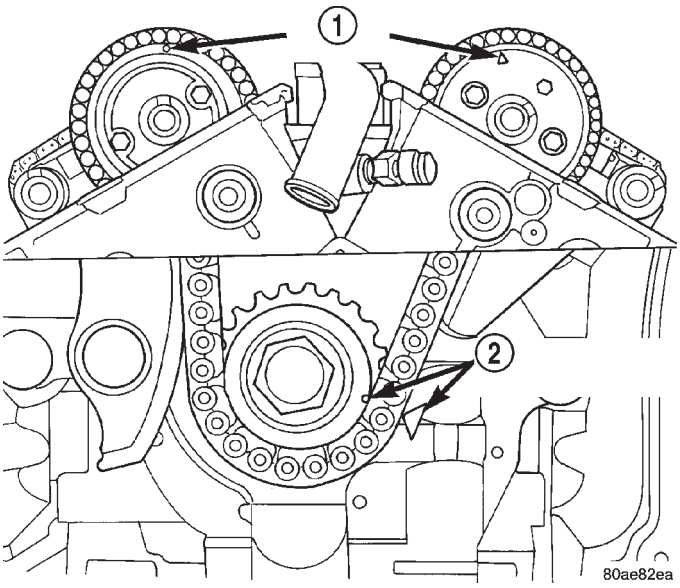


Fig. 70 Timing Mark Alignment

1 – CAMSHAFT TIMING MARKS
2 – CRANKSHAFT TIMING MARKS

(4) Remove primary timing chain tensioner from right cylinder head (Fig. 74).

(5) Remove camshaft position sensor from left cylinder head (Fig. 69).

(6) Remove chain guide access plug from left cylinder head (Fig. 69).

NOTE: When camshaft sprocket bolts are removed, the camshafts will rotate in a clockwise direction.

(7) Starting with the right camshaft sprocket, remove the sprocket attaching bolts. Remove camshaft damper and sprocket (Fig. 69).

(8) Remove left side camshaft sprocket attaching bolts and remove sprocket (Fig. 69).

(9) Remove lower chain guide and tensioner arm (Fig. 69).

(10) Remove the primary timing chain.

INSTALLATION

(1) Inspect all sprockets and chain guides. Replace if worn. Refer to crankshaft sprocket, for removal and installation procedures in this section.

(2) If removed, install right and left side short chain guides (Fig. 69). Tighten attaching bolts to 28 N·m (250 in. lbs.).

(3) Align crankshaft sprocket timing mark to the mark on oil pump housing (Fig. 71).

NOTE: Lubricate timing chain and guides with engine oil before installation.

(4) Place left side primary chain sprocket onto the chain so that the timing mark is located in-between the two (plated) timing links (Fig. 71).

(5) Lower the primary chain with left side sprocket through the left cylinder head opening.

NOTE: The camshaft sprockets can be allowed to float on the camshaft hub during installation.

(6) Loosely position left side camshaft sprocket over camshaft hub.

(7) Align timing (plated) link to the crankshaft sprocket timing mark (Fig. 71).

(8) Position primary chain onto water pump drive sprocket.

(9) Align right camshaft sprocket timing mark to the timing (plated) link on the timing chain (Fig. 71) and loosely position over camshaft hub.

(10) Verify that all chain timing (plated) links are properly aligned to the timing marks on all sprockets (Fig. 71).

(11) Install left side lower chain guide and tensioner arm (Fig. 69). Tighten attaching bolts to 28 N·m (250 in. lbs.).

NOTE: Inspect oil ring on chain guide access plug before installing. Replace O-ring as necessary.

(12) Install chain guide access plug to left side cylinder head (Fig. 69). Tighten plug to 20 N·m (15 ft. lbs.).

NOTE: To reset the primary timing chain tensioner, engine oil will first need to be purged from the tensioner (Fig. 72).

(13) Purge oil from timing chain tensioner using the following procedure:

(a) Place the check ball end of tensioner into the shallow end of Special Tool 8186 (Fig. 72).

(b) Using hand pressure, slowly depress tensioner until oil is purged from tensioner (Fig. 72).

(14) Reset timing chain tensioner using the following procedure:

(a) Position cylinder plunger into the deeper end of Special Tool 8186 (Fig. 73).

(b) Apply a downward force until tensioner is reset (Fig. 73).

REMOVAL AND INSTALLATION (Continued)

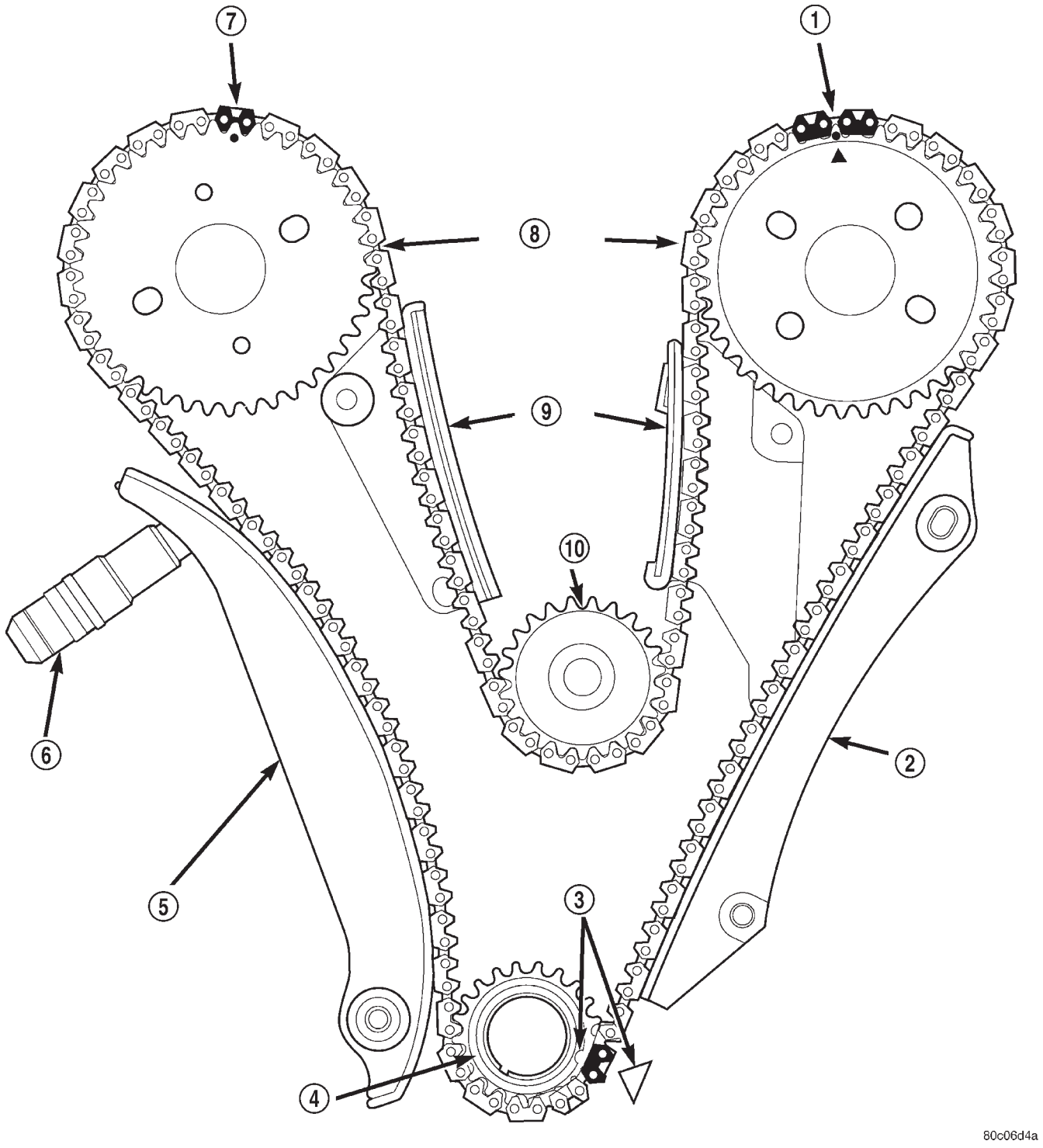


Fig. 71 Primary Timing Chain Marks

1 – CAMSHAFT TIMING MARKS
2 – CHAIN GUIDE
3 – CRANKSHAFT TIMING MARKS
4 – CRANKSHAFT SPROCKET
5 – CHAIN TENSIONER ARM
6 – CHAIN TENSIONER
7 – CAMSHAFT TIMING MARK
8 – INTAKE CAMSHAFT SPROCKETS
9 – CHAIN GUIDES
10 – WATER PUMP SPROCKET

REMOVAL AND INSTALLATION (Continued)

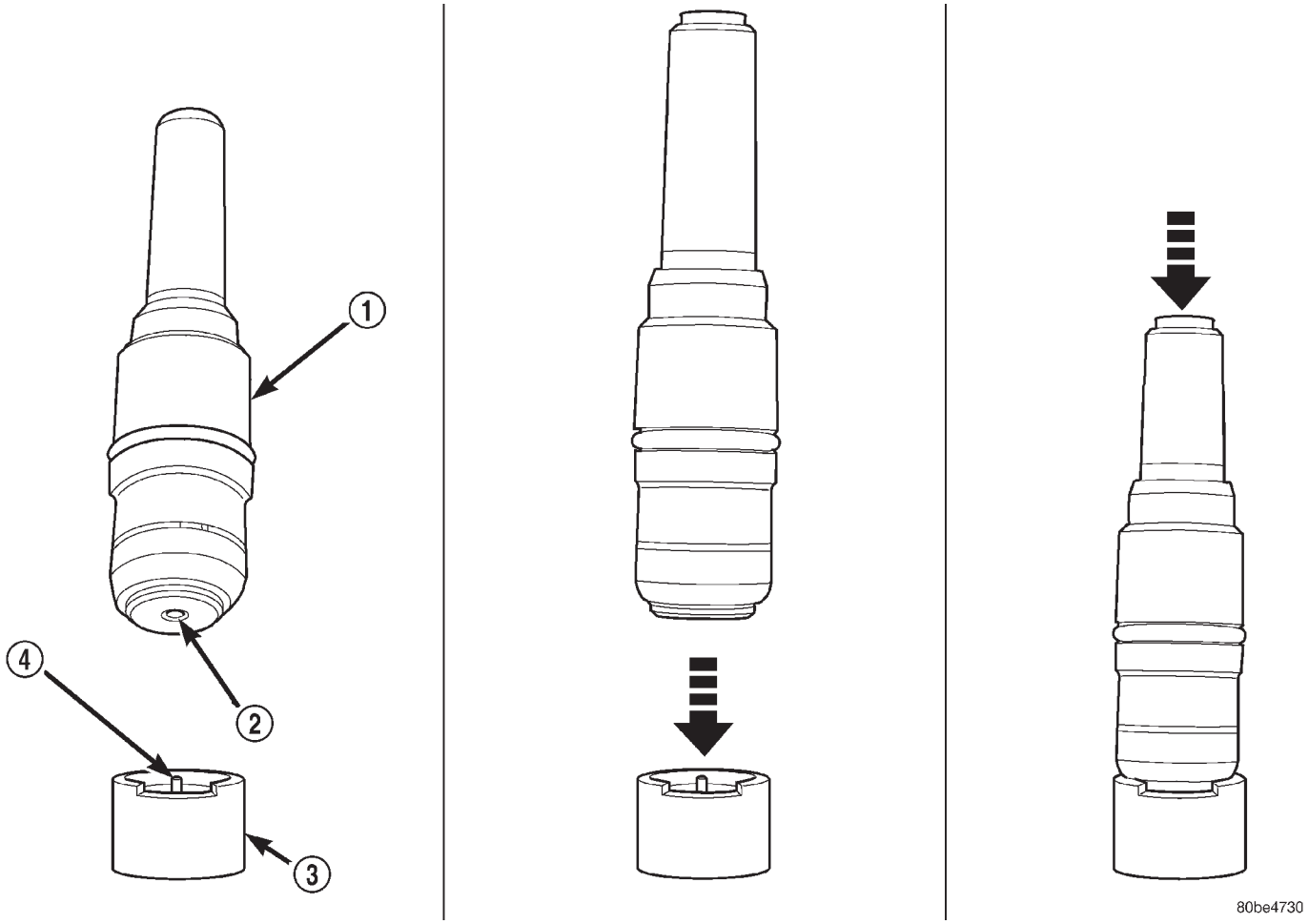


Fig. 72 Timing Chain Tensioner—Oil Purging

1 – TENSIONER
2 – CHECK BALL
3 – SPECIAL TOOL 8186
4 – PIN

NOTE: If oil was not first purged from the tensioner, use slight finger pressure to assist the center arm pin of Special Tool 8186 to unseat the tensioner's check ball.

CAUTION: Ensure the tensioner is properly reset. The tensioner body must bottom against the top edge of Special Tool 8186. Failure to properly perform the resetting procedure may cause tensioner jamming.

REMOVAL AND INSTALLATION (Continued)

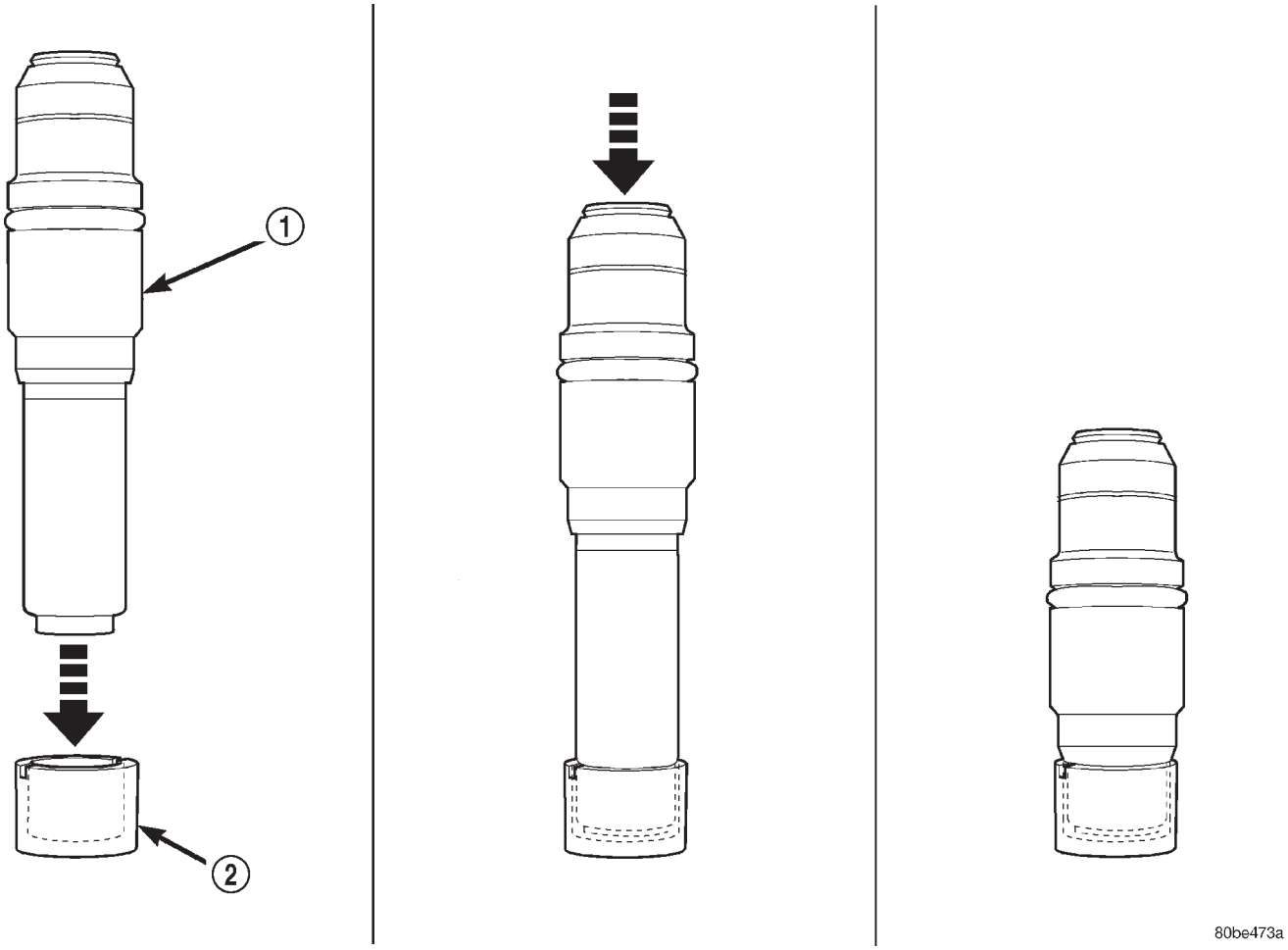


Fig. 73 Timing Chain Tensioner—Resetting

1 – TENSIONER
2 – SPECIAL TOOL 8186

(15) Install the reset chain tensioner into the right cylinder head (Fig. 74).

(16) Position tensioner retaining plate and tighten bolts to 12 N·m (105 in. lbs.) (Fig. 74).

(17) Starting at the right cylinder bank, insert a 3/8" square drive extension with a breaker bar into intake camshaft drive hub. Rotate camshaft until the camshaft hub aligns to the camshaft sprocket and damper attaching holes. Install the sprocket attaching bolts and tighten to 28 N·m (250 in. lbs.) (Fig. 71).

(18) Turn the left side camshaft by inserting a 3/8" square drive extension with a breaker bar into intake camshaft drive hub and rotate camshaft until the sprocket attaching bolts can be installed. Tighten sprocket bolts to 28 N·m (250 in. lbs.) (Fig. 71).

(19) Rotate engine slightly clockwise to remove timing chain slack, if necessary.

(20) To arm the timing chain tensioner: Use a flat bladed pry tool to gently pry tensioner arm towards the tensioner slightly (Fig. 75). Then, release the tensioner arm. Verify the tensioner is armed (extends).

(21) Install the timing chain cover, crankshaft damper, and cylinder head covers.

(22) Install camshaft position sensor and connect electrical connector.

(23) Install upper intake manifold. Refer procedure in this section.

NOTE: After installation of a reset tensioner, engine noise will occur after initial start-up. This noise will normally disappear within 5–10 seconds.

REMOVAL AND INSTALLATION (Continued)

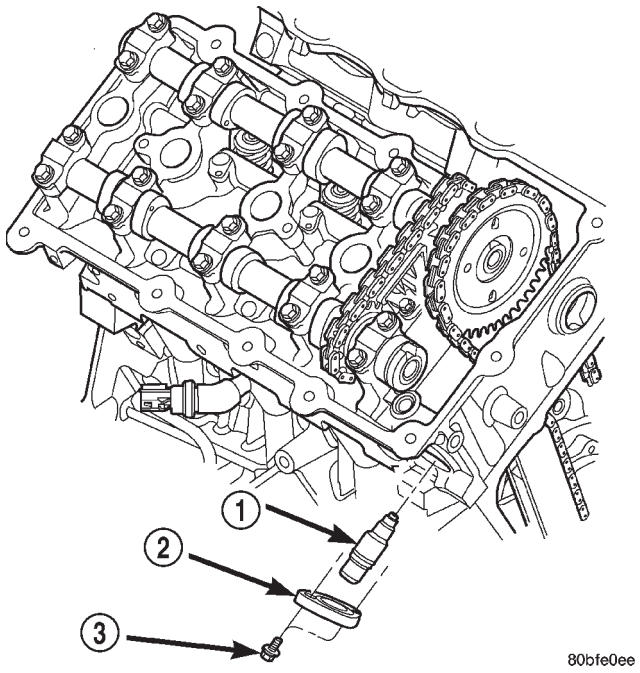


Fig. 74 Primary Timing Chain Tensioner

1 – TENSIONER
2 – RETAINER CAP
3 – BOLT

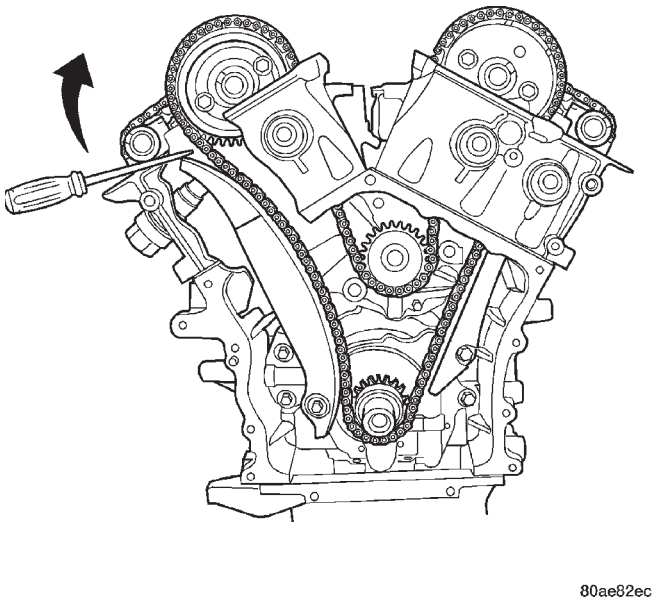


Fig. 75 Timing Chain Tensioner Arming

CRANKSHAFT SPROCKET

REMOVAL

(1) Remove primary timing chain. Refer to procedure in this section.

CAUTION: Use care not to turn crankshaft while removing crankshaft sprocket, as damage to valves and or pistons could occur.

(2) Remove crankshaft sprocket by first installing the crankshaft damper bolt. Apply grease or equivalent to damper bolt head and position Special Tools 5048-1, 5048-6, and 8539 on sprocket and crankshaft nose (Fig. 76). Remove sprocket using care not to rotate the crankshaft.

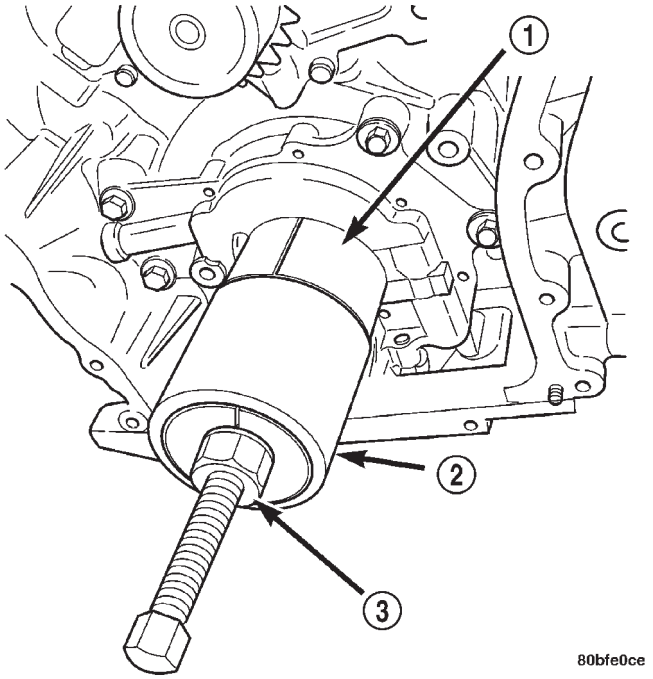


Fig. 76 Crankshaft Sprocket—Removal

1 – SPECIAL TOOL 8539
2 – SPECIAL TOOL 5048-6
3 – SPECIAL TOOL 5048-1

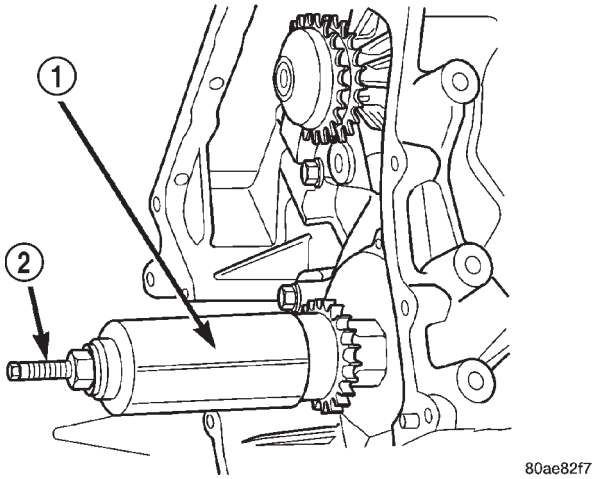


Fig. 77 Crankshaft Sprocket—Installation

1 – SPECIAL TOOL 6780–1
2 – SPECIAL TOOL 8179

INSTALLATION

(1) Install crankshaft sprocket using Special Tools 6780-1 and 8179 (Fig. 77) until sprocket bottoms

REMOVAL AND INSTALLATION (Continued)

against crankshaft step flange. Use care not to rotate crankshaft.

(2) Verify that crankshaft sprocket is installed to proper depth by measuring from sprocket outer face to end of crankshaft (Fig. 78). Measurement should read: 39.05 ±0.50 mm (1.5374 ±0.020 in.).

(3) Install primary timing chain. Refer to procedure in this section.

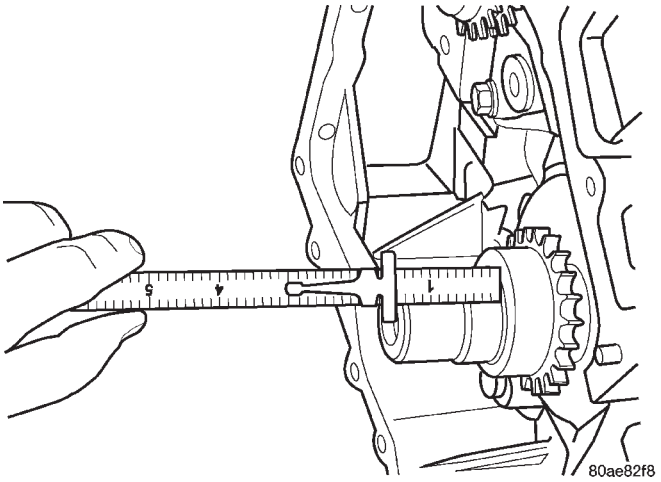


Fig. 78 Crankshaft Sprocket Depth Measurement

CRANKSHAFT OIL SEAL—FRONT

REMOVAL

(1) Remove crankshaft damper. Refer to procedure in this section.

(2) Install Special Tool 8194, Insert into crankshaft nose. Remove seal using Special Tool 6771, Remover (Fig. 79).

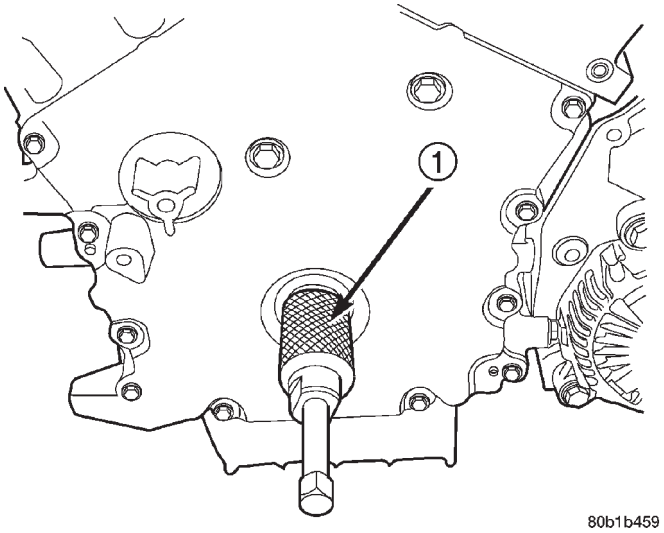


Fig. 79 Crankshaft Front Oil Seal—Removal

1 – SPECIAL TOOL 6771

INSTALLATION

(1) Install new seal using Special Tools 6780-2 Sleeve, 6780-1 Installer, and 8179 Stud (Fig. 80).

(2) Install crankshaft damper.

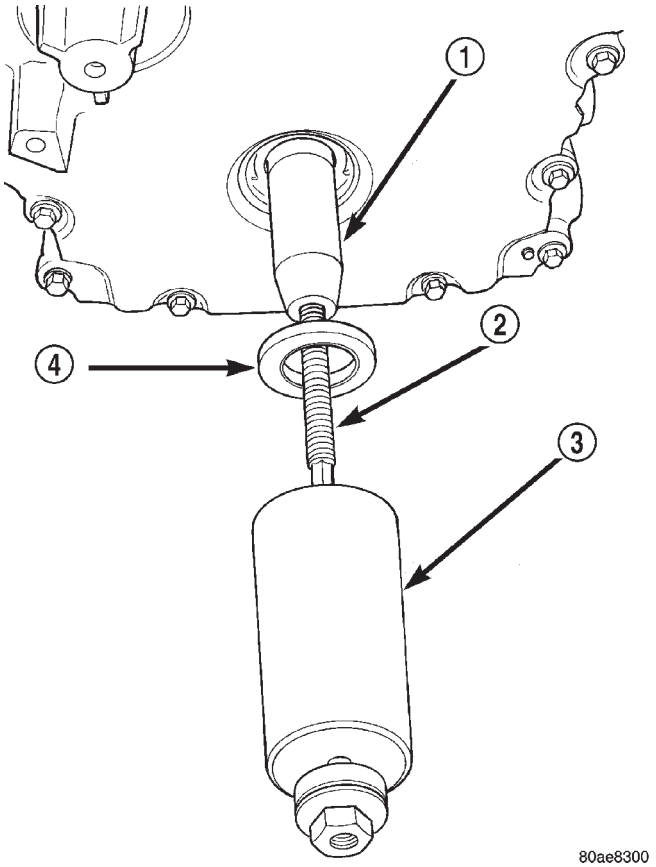


Fig. 80 Crankshaft Front Oil Seal—Installation

1 – SPECIAL TOOL 6780–2
2 – SPECIAL TOOL 8179
3 – SPECIAL TOOL 6780–1
4 – SEAL

CRANKSHAFT OIL SEAL—REAR

REMOVAL

(1) Remove transaxle from vehicle. Refer to TRANSAXLE for procedure.

(2) Remove drive plate.

(3) Insert a 3/16” wide flat bladed screwdriver between the dust lip and the metal case of the crankshaft seal. Angle the screwdriver (Fig. 81) through the dust lip against the metal case of the seal. Pry out seal.

CAUTION: Do not allow the screwdriver blade to contact the crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

REMOVAL AND INSTALLATION (Continued)

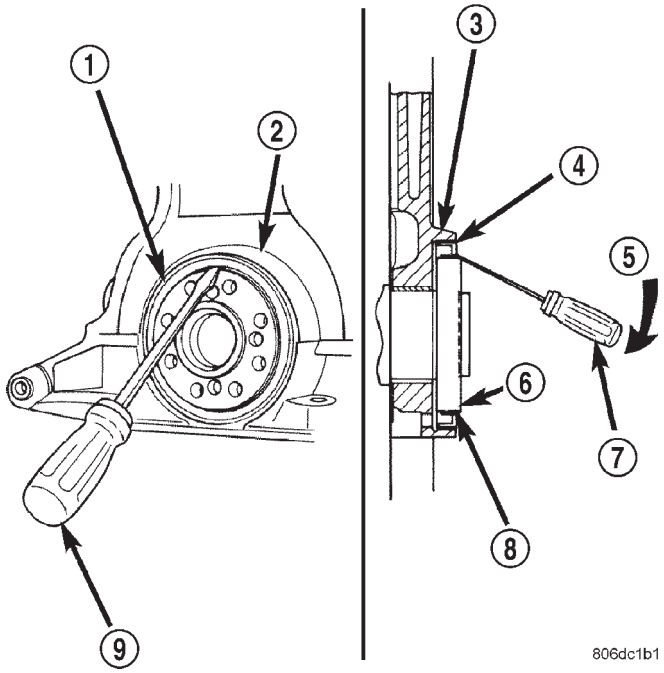


Fig. 81 Rear Crankshaft Oil Seal Removal—Typical

1 – REAR CRANKSHAFT SEAL
2 – ENGINE BLOCK
3 – ENGINE BLOCK
4 – REAR CRANKSHAFT SEAL METAL CASE
5 – PRY IN THIS DIRECTION
6 – CRANKSHAFT
7 – SCREWDRIVER
8 – REAR CRANKSHAFT SEAL DUST LIP
9 – SCREWDRIVER

INSTALLATION

CAUTION: If a burr or scratch is present on the crankshaft edge (chamfer), clean surface using 400 grit sand paper to prevent seal damage during installation.

(1) Place Special Tool 6926-1 Guide on crankshaft (Fig. 82). This is a pilot tool with a magnetic base.
(2) Position seal over pilot tool. Assure that lip of seal is facing towards the crankshaft during installation. The pilot tool remains on crankshaft during seal installation.
(3) Using Special Tool 6926-2 Installer, and C-4171 Handle (Fig. 82), drive seal into the retainer housing until seal is flush with housing surface.
(4) Install drive plate and transaxle. Refer to TRANSAXLE for procedures.

CRANKSHAFT OIL SEAL RETAINER—REAR

REMOVAL

(1) Remove crankshaft rear oil seal and oil pan. Refer to procedures in this section.

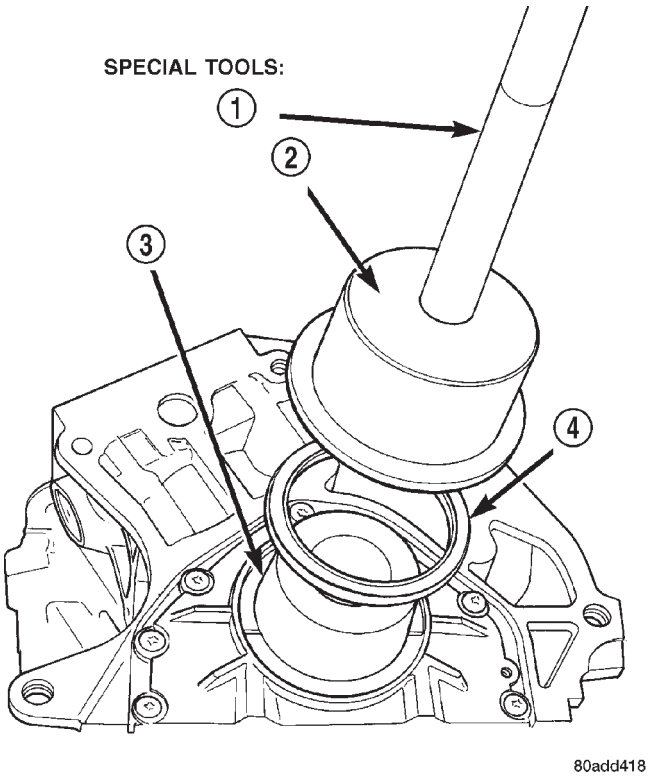


Fig. 82 Crankshaft Rear Seal—Installation

1 – C-4171 HANDLE
2 – 6926–2 INSTALLER
3 – 6926–1 GUIDE
4 – SEAL

(2) Remove seal retainer attaching screws (Fig. 83).
(3) Remove retainer and gasket (Fig. 83).

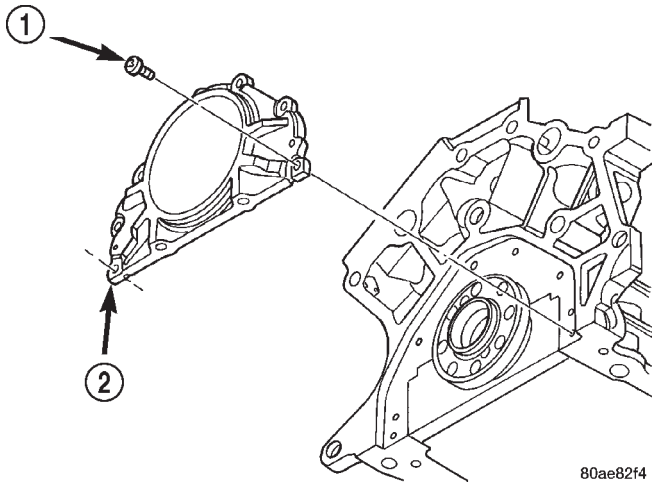


Fig. 83 Oil Seal Retainer

1 – SCREWS (7)
2 – SEAL RETAINER

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Clean sealing surfaces and replace gasket as needed.

(2) Install gasket and loose assemble seal retainer to block.

NOTE: The following steps must be performed to prevent oil leaks at sealing joints.

(3) Attach Special Tools 8225 to pan rail using the oil pan fasteners.

NOTE: Make sure that the "2.7L" stamped on the special tool is facing the cylinder block (flat side of tools against pan rail).

(4) While applying firm pressure to the seal retainer against Special Tools 8225 (Fig. 84), tighten seal retainer screws to 12 N·m (105 in. lbs.).

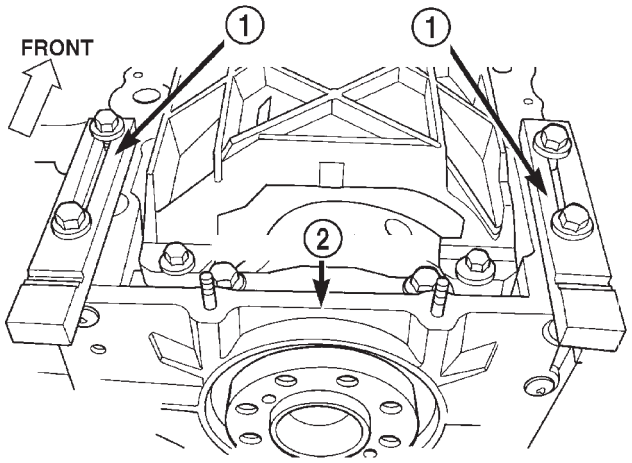


Fig. 84 Rear Crankshaft Seal Retainer Alignment

1 – SPECIAL TOOLS 8225
2 – SEAL RETAINER

(5) Install oil pan and crankshaft rear oil seal. Refer to procedures in this section.

OIL PAN

REMOVAL

(1) Remove dipstick and tube.

(2) Raise vehicle on hoist.

(3) Drain engine oil and remove oil filter.

(4) Disconnect suspension stabilizer bar and reposition for oil pan clearance. Refer to SUSPENSION for procedure.

(5) Remove structural collar from oil pan to transmission housing (Fig. 85).

(6) Remove lower bolt attaching the A/C compressor to oil pan.

(7) Disconnect engine oil cooler line from pan (if equipped).

CAUTION: Assure removal of the two bolts attaching the timing cover to the oil pan, as damage to the timing cover and/or oil pan may occur.

(8) Remove oil pan attaching fasteners. Remove oil pan and gasket (Fig. 86).

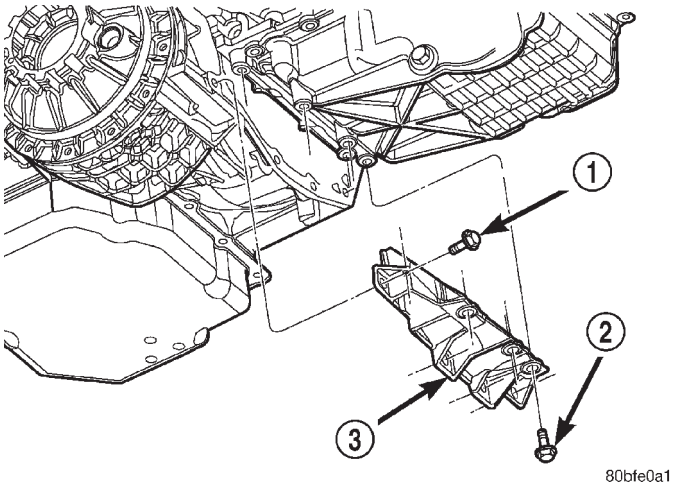


Fig. 85 Structural Collar

1 – BOLT-HORIZONTAL
2 – BOLT-VERTICAL
3 – STRUCTURAL COLLAR

INSTALLATION

(1) Clean oil pan and sealing surfaces. Inspect oil pan and timing chain cover gaskets. Replace as necessary.

(2) Apply a 1/8 inch bead of Mopar® Engine RTV GEN II to the front T-joints (oil pan gasket to timing cover gasket interface) (Fig. 86).

(3) Install oil pan gasket to block.

NOTE: To prevent oil leaks at oil pan to timing chain cover, the following tightening sequence procedure must be performed.

(4) Install oil pan and fasteners (Fig. 86) using the following tightening sequence:

(a) Install oil pan bolts and nuts **finger tight only—just tight enough to compress the gasket's rubber seal**.

(b) Install timing chain cover to pan bolts and tighten to 12 N·m (105 in. lbs.).

(c) Tighten oil pan bolts to 28 N·m (250 in. lbs.).

(d) Tighten oil pan nuts to 12 N·m (105 in. lbs.).

(5) Install lower bolt attaching the A/C compressor to oil pan. Tighten bolt to 28 N·m (21 ft. lbs.).

(6) Connect engine oil cooler line to oil pan (if equipped).

REMOVAL AND INSTALLATION (Continued)

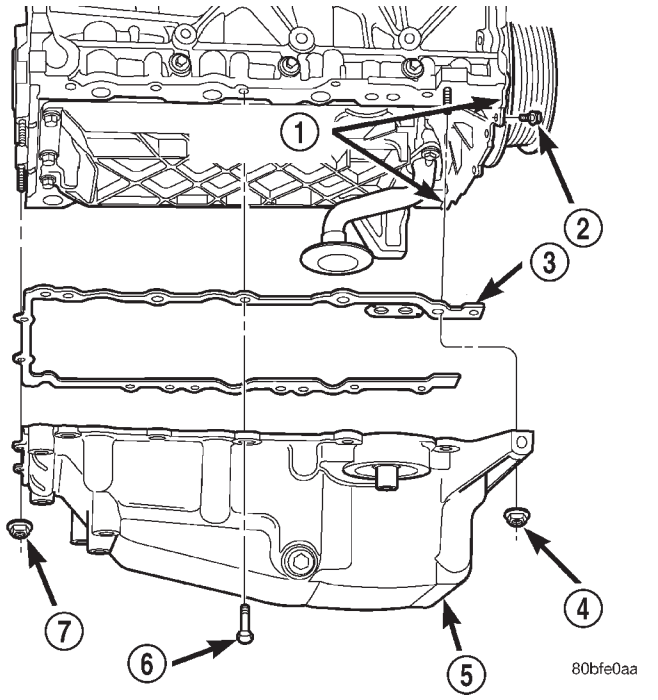


Fig. 86 Oil Pan

1 – SEALER LOCATION
2 – BOLT-M6
3 – GASKET
4 – NUT-M6
5 – OIL PAN
6 – BOLT-M8
7 – NUT-M6

CAUTION: The collar must be tighten using the following procedure, as damage to the collar or oil pan may occur.

(7) Install structural collar (Fig. 85) using the following tightening sequence:

(a) Install the **vertical** collar to oil pan bolts. Torque bolts initially to 1.1 N·m (10 in. lbs.).

(b) Install the **horizontal** collar to transmission bolts and torque to 55 N·m (40 ft. lbs.).

(c) Starting with the center vertical bolts and working outward, final torque bolts to 55 N·m (40 ft. lbs.).

(8) Install oil filter and drain plug.

(9) Connect suspension stabilizer bar. Refer to SUSPENSION for procedure.

(10) Lower vehicle and install oil dipstick and tube.

(11) Fill engine crankcase with proper oil to correct level.

CRANKSHAFT

REMOVAL

(1) Remove engine from vehicle. Refer to procedure in this section.

(2) Mount engine on an engine stand.

(3) Drain engine oil and remove oil filter.

(4) Remove oil pan and oil pick-up tube.

(5) Remove idler pulley bracket for accessory drive belt.

(6) Remove upper intake manifold. Refer to procedure in this section.

(7) Remove cylinder head covers.

(8) Remove timing chain cover.

(9) Remove primary timing chain.

(10) Remove crankshaft sprocket.

(11) Remove oil pump.

(12) Remove crankshaft rear oil seal retainer.

(13) Remove structural windage tray (Fig. 91).

(14) Turn crankshaft until connecting rod cap to be removed is accessible.

NOTE: Connecting rod bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods. Damage to connecting rod could occur.

(15) Mark connecting rod bearing cap positions using a permanent ink marker or scribe tool.

(16) Remove connecting rod bearing caps. Use care to prevent damage to the crankshaft bearing surfaces.

CAUTION: Care should be taken not to damage the fractured rod and cap joint face surfaces or damage to the engine may occur.

(17) Remove main bearing cap bolts and tie bolts (Fig. 87).

(18) Remove main bearing caps (Fig. 87).

CAUTION: When removing crankshaft, use care not to damage bearing surfaces on the crankshaft.

(19) Remove crankshaft from cylinder block.

INSTALLATION

NOTE: Upper and lower bearing halves are NOT interchangeable.

REMOVAL AND INSTALLATION (Continued)

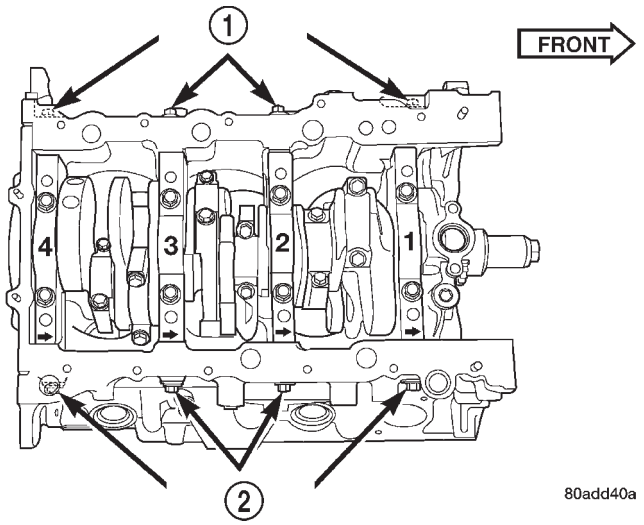


Fig. 87 Main Bearing Cap Identification

1 – TIE BOLTS
2 – TIE BOLTS

CAUTION: Main bearings are select fit. Refer to Crankshaft Main Bearing Fitting in this section for proper bearing selections.

(1) Lubricate upper main bearing halves with engine oil (Fig. 88).

CAUTION: When installing crankshaft, use care not to damage bearing surfaces on the crankshaft.

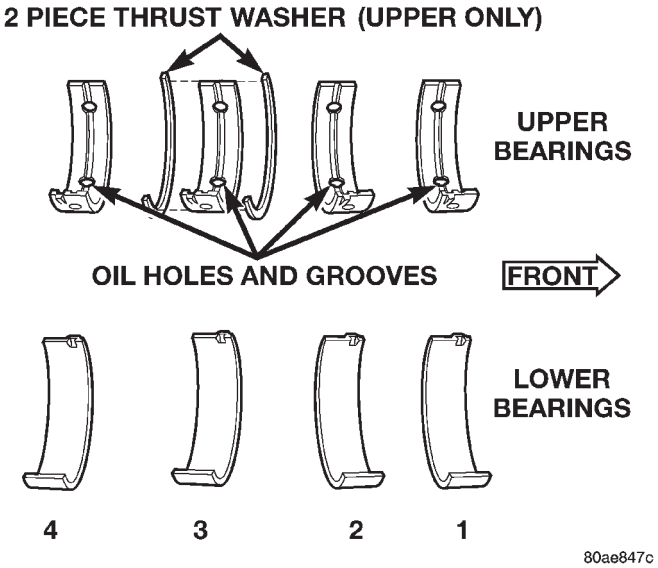


Fig. 88 Main Bearing Identification

(2) Install crankshaft.

NOTE: Make sure that the coated and oil groove side of crankshaft thrust washer faces the crankshaft thrust surface.

(3) Push crankshaft forward. Lubricate and install the front thrust washer by rolling the thrust washer onto the machined shelf between the No. 3 upper main bulk head and crankshaft thrust surface (Fig. 89).

(4) Move crankshaft rearward. Lubricate and install the rear thrust washer by rolling the thrust washer onto the machined shelf between the No. 3 upper main bulk head and crankshaft thrust surface.

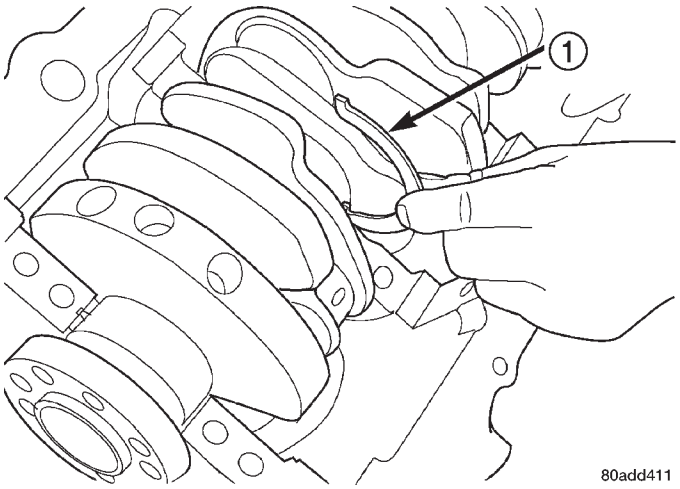


Fig. 89 Thrust Washer—Installation

1 – FRONT THRUST WASHER

(5) Lubricate lower main bearings with engine oil.
(6) Install main bearings and caps.

NOTE: Lubricate main bearing cap bolts with engine oil before installation.

The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, and lastly the main cap tie (horizontal) bolts.

(7) Install the inside main bearing cap bolts and tighten to 20 N·m + 1/4 Turn (15 ft. lbs. + 1/4 Turn) (Fig. 90).

(8) Measure crankshaft end play. Refer to Service Procedures—Crankshaft Bearing Installation for procedure.

(9) Install connecting rods and measure side clearance. Refer to Service Procedures—Connecting Rod Bearing Installation for procedures.

(10) Install windage tray (Fig. 91). Lubricate bolts with engine oil and tighten to 27 N·m + 1/4 Turn (20 ft. lbs. + 1/4 turn).

(11) Install the main cap tie (horizontal) bolts and tighten to 28 N·m (250 in. lbs.) (Fig. 90).

(12) Install rear crankshaft oil seal retainer and oil seal. Refer to procedures in this section.

(13) Install oil pump assembly. Refer to procedure in this section.

REMOVAL AND INSTALLATION (Continued)

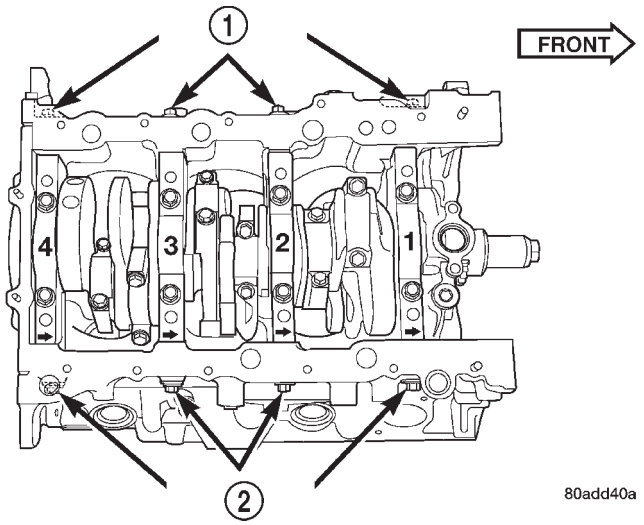


Fig. 90 Main Bearing Cap Identification

1 – TIE BOLTS
2 – TIE BOLTS

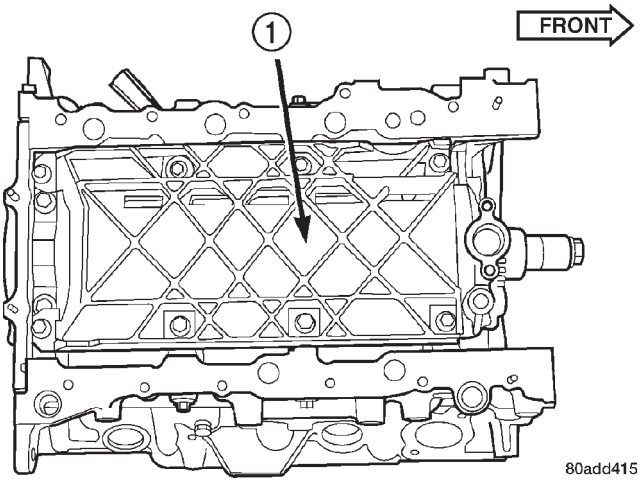


Fig. 91 Windage Tray

1 – STRUCTURAL WINDAGE TRAY

(14) Install crankshaft sprocket. Refer to procedure in this section.

(15) Install timing chain. Refer to procedure in this section.

(16) Install timing chain cover.

(17) Install cylinder head covers.

(18) Install idler pulley bracket for accessory drive belt.

(19) Install oil pick-up tube and O-ring.

(20) Install oil pan and oil filter.

(21) Install oil dipstick tube.

(22) Install engine assembly.

(23) Fill engine crankcase with proper oil to correct level.

OIL FILTER

(1) Remove oil filter using suitable oil filter wrench (Fig. 92). Dispose of oil filter following enviromental guidelines.

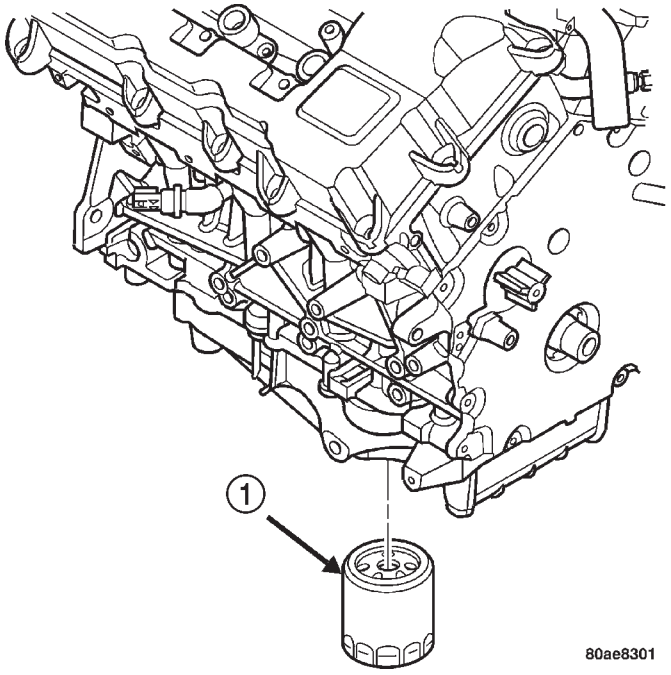


Fig. 92 Engine Oil Filter

1 – OIL FILTER

(2) Wipe filter base clean, then inspect gasket sealing surface.

(3) Lubricate gasket of new filter with clean engine oil.

(4) Install oil filter and tighten to 20 N·m (15 ft. lbs.) of torque after gasket contacts base. Use filter wrench if necessary.

(5) Fill crankcase with proper engine oil to correct level if drained. Start engine and check for leaks.

OIL PUMP

REMOVAL

The oil pump pressure relief valve can be serviced by removing the oil pan.

(1) Refer to procedures in this section for removing the following components:

- Crankshaft Damper
- Timing Chain Cover
- Timing Chain
- Crankshaft Sprocket
- Oil Pan

(2) Remove oil pick-up tube and O-ring (Fig. 94).

(3) Ensure that crankshaft position is at 60° ATDC of No.1 cylinder, or crankshaft sprocket mark aligns

REMOVAL AND INSTALLATION (Continued)

with mark on oil pump (Fig. 93). This position will properly locate oil pump upon installation.

(4) Remove oil pump attaching bolts (Fig. 94).

(5) Remove oil pump.

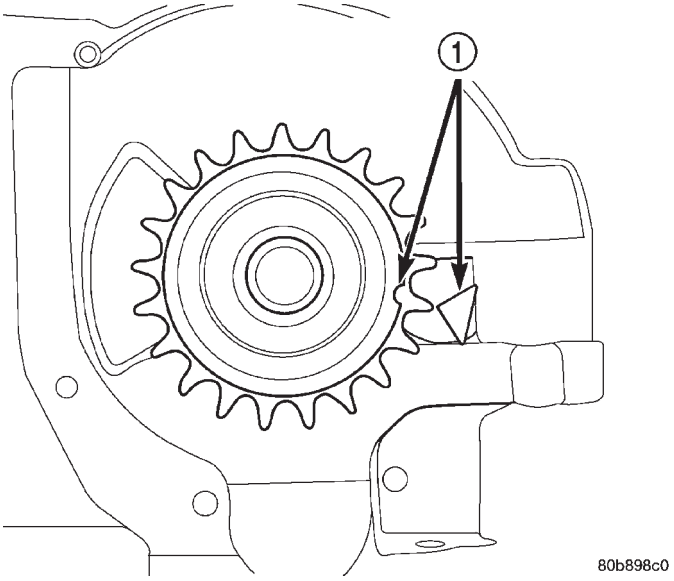


Fig. 93 Crankshaft Positioned At 60° ATDC No.1 Cylinder

1 – CRANKSHAFT POSITION = 60° ATDC NO. 1 CYLINDER

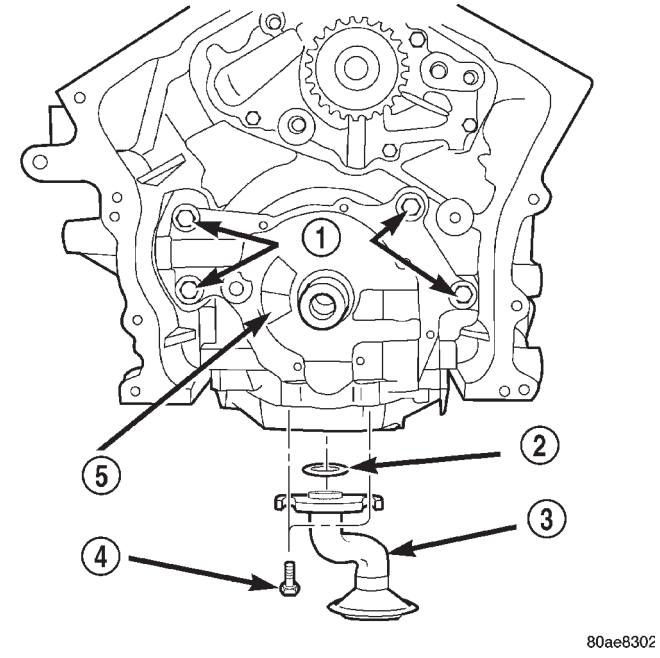


Fig. 94 Oil Pump and Pick-up Tube

1 – BOLTS
2 – O-RING
3 – PICK-UP TUBE
4 – BOLT
5 – OIL PUMP

INSTALLATION

CAUTION: Crankshaft position must be at 60° ATDC of No.1 cylinder before installing oil pump (Fig. 93). This position will properly locate oil pump. If not properly located, severe damage to oil pump can occur.

(1) Prime oil pump before installation by filling rotor cavity with engine oil.

(2) If crankshaft has been rotated, it must be repositioned to 60° ATDC of No.1 cylinder prior to oil pump installation (Fig. 93).

(3) Install oil pump carefully over crankshaft and into position.

(4) Install oil pump attaching bolts. Tighten bolts to 28 N·m (250 in. lbs.) (Fig. 94).

(5) Install oil pick-up tube with new O-ring. Lubricate O-ring before installation. Tighten attaching bolts to 28 N·m (250 in. lbs.) (Fig. 94).

(6) Install the following remaining components following procedures in this section:

- Oil Pan
- Crankshaft Sprocket
- Timing Chain
- Timing Chain Cover
- Crankshaft Damper

(7) Fill Crankcase with proper engine oil to correct level.

PISTON AND CONNECTING ROD

REMOVAL

(1) Remove top ridge of cylinder bores with a reliable ridge reamer before removing pistons from cylinder block. **Be sure to keep tops of pistons covered during this operation. Pistons and connecting rods must be removed from top of cylinder block. When removing piston and connecting rod assemblies from the engine, rotate crankshaft so that each connecting rod is centered in cylinder bore.**

NOTE: Connecting rod bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods. Damage to connecting rod could occur.

(2) Mark connecting rod and bearing cap positions using a permanent ink marker or scribe tool (Fig. 95).

REMOVAL AND INSTALLATION (Continued)

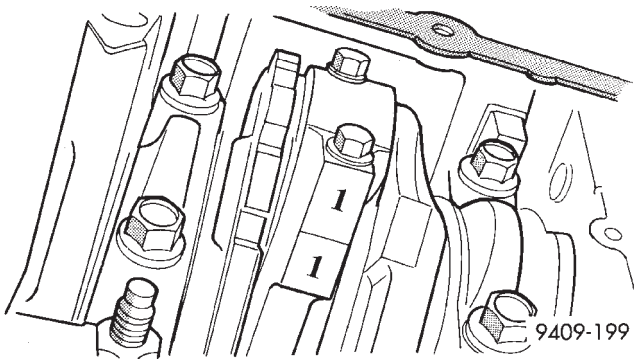


Fig. 95 Identify Connecting Rod to Cylinder—Typical

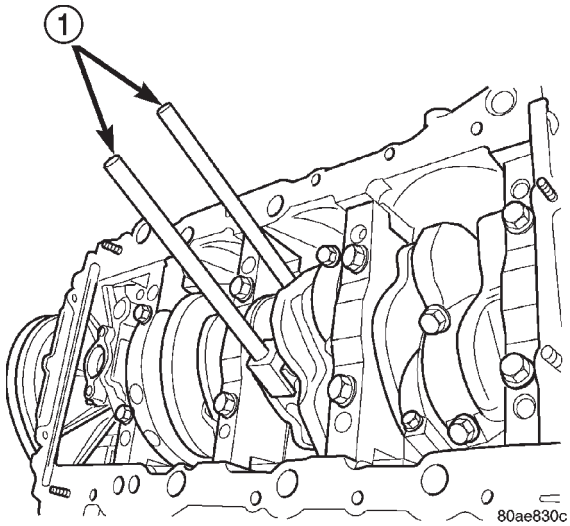


Fig. 96 Connecting Rod Guides

1 – SPECIAL TOOL 8189 CONNECTING ROD GUIDES

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

(3) Remove connecting rod cap. Install Special Tool 8189 Connecting Rod Guides into the connecting rod being removed (Fig. 96). Remove each piston and rod assembly out of cylinder bore.

NOTE: Be careful not to nick crankshaft journals.

(4) After removal, install bearing cap on the mating rod to prevent damage to the fractured cap to rod surfaces.

PISTON RINGS—INSTALLATION

(1) The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (dot) facing up, towards top of the piston (Fig. 97).

CAUTION: Install piston rings in the following order:

(2) Oil ring expander.
(3) Upper oil ring side rail.
(4) Lower oil ring side rail.
(5) No. 2 Intermediate piston ring.
(6) No. 1 Upper piston ring.
(7) Install the side rail by placing one end between the piston ring groove and the expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander during this step (Fig. 98).**

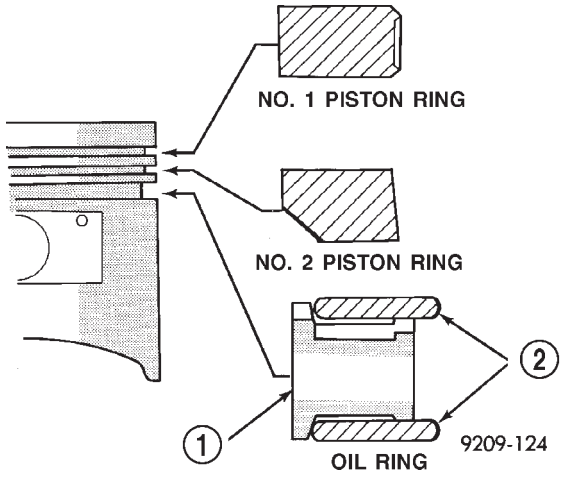


Fig. 97 Piston Ring—Installation

1 – SPACER EXPANDER
2 – SIDE RAIL

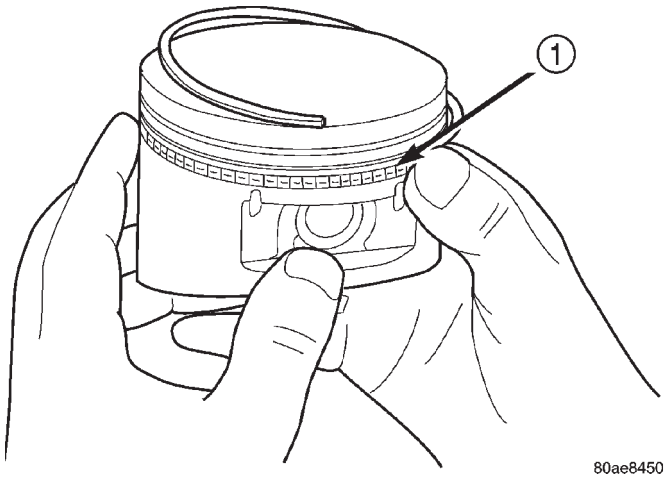


Fig. 98 Side Rail—Installation

1 – SIDE RAIL END

(8) Install upper side rail first and then the lower side rail.
(9) Install No. 2 piston ring and then No. 1 piston ring (Fig. 99).

REMOVAL AND INSTALLATION (Continued)

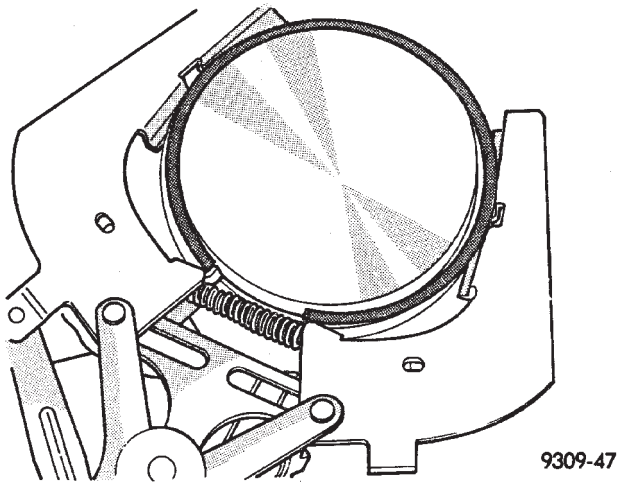


Fig. 99 Upper and Intermediate Rings—Installation

(10) Position piston ring end gaps as shown in (Fig. 100).

(11) Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

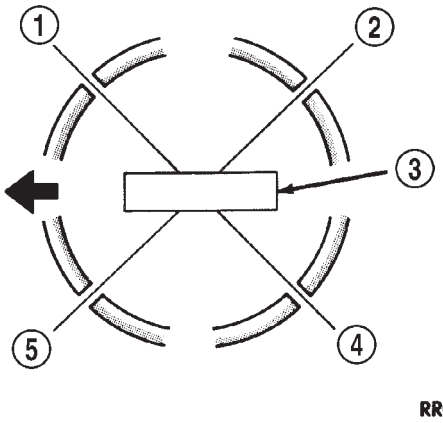


Fig. 100 Piston Ring End Gap Position

1 – SIDE RAIL UPPER
2 – NO. 1 RING GAP
3 – PISTON PIN
4 – SIDE RAIL LOWER
5 – NO. 2 RING GAP AND SPACER EXPANDER GAP

PISTON AND CONNECTING ROD—INSTALLATION

(1) Before installing piston and connecting rod assemblies into the bore, ensure that compression ring gaps are staggered so that neither is in line with oil ring rail gap.

(2) Before installing the ring compressor, make sure the oil ring expander ends are butted and the rail gaps located as shown in (Fig. 100).

(3) Immerse the piston head and rings in clean engine oil, slide the ring compressor over the piston and tighten with the special wrench. **Ensure position of rings does not change during this operation.**

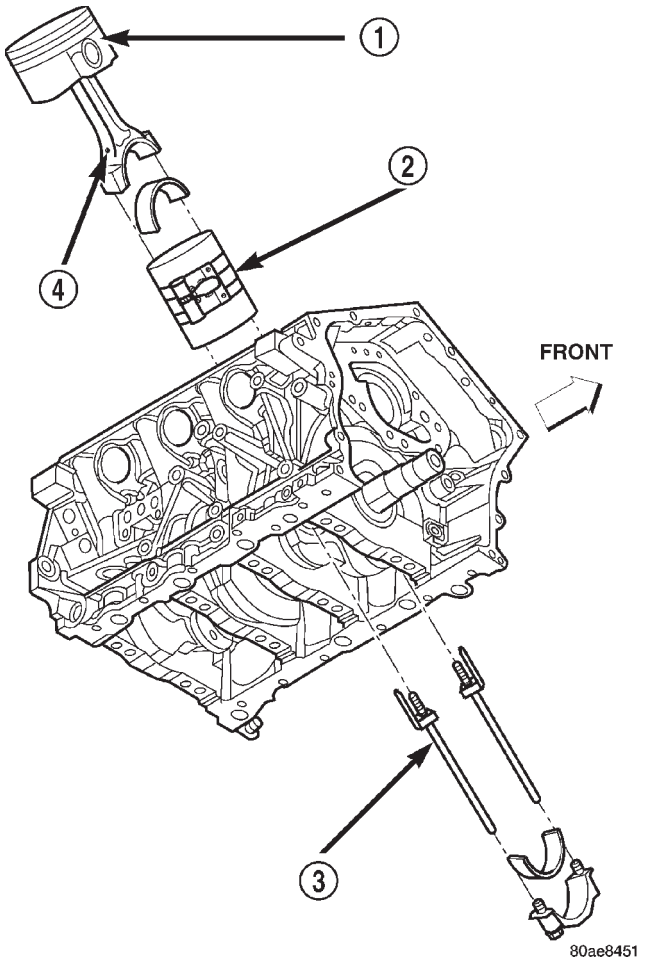


Fig. 101 Piston and Connecting Rod—Installation

1 – "F" TOWARD FRONT OF ENGINE
2 – RING COMPRESSOR
3 – SPECIAL TOOL 8189
4 – OIL SQUIRT HOLE

CAUTION: Ensure the hole in bearing half aligns with hole in connecting rod, as damage to engine may occur.

(4) Position bearing onto connecting rod. Ensure that hole in bearing half is aligned to hole in connecting rod. Lubricate bearing surface with clean engine oil.

(5) Install Special Tools 8189 Connecting Rod Guides into connecting rod (Fig. 96).

(6) The pistons are marked on top with an arrow and with an "F" (Front) above the pin boss. These marks must be pointing toward the front of engine on both cylinder banks. The connecting rod oil squirt hole faces the major thrust (right) side of the block (Fig. 102).

REMOVAL AND INSTALLATION (Continued)

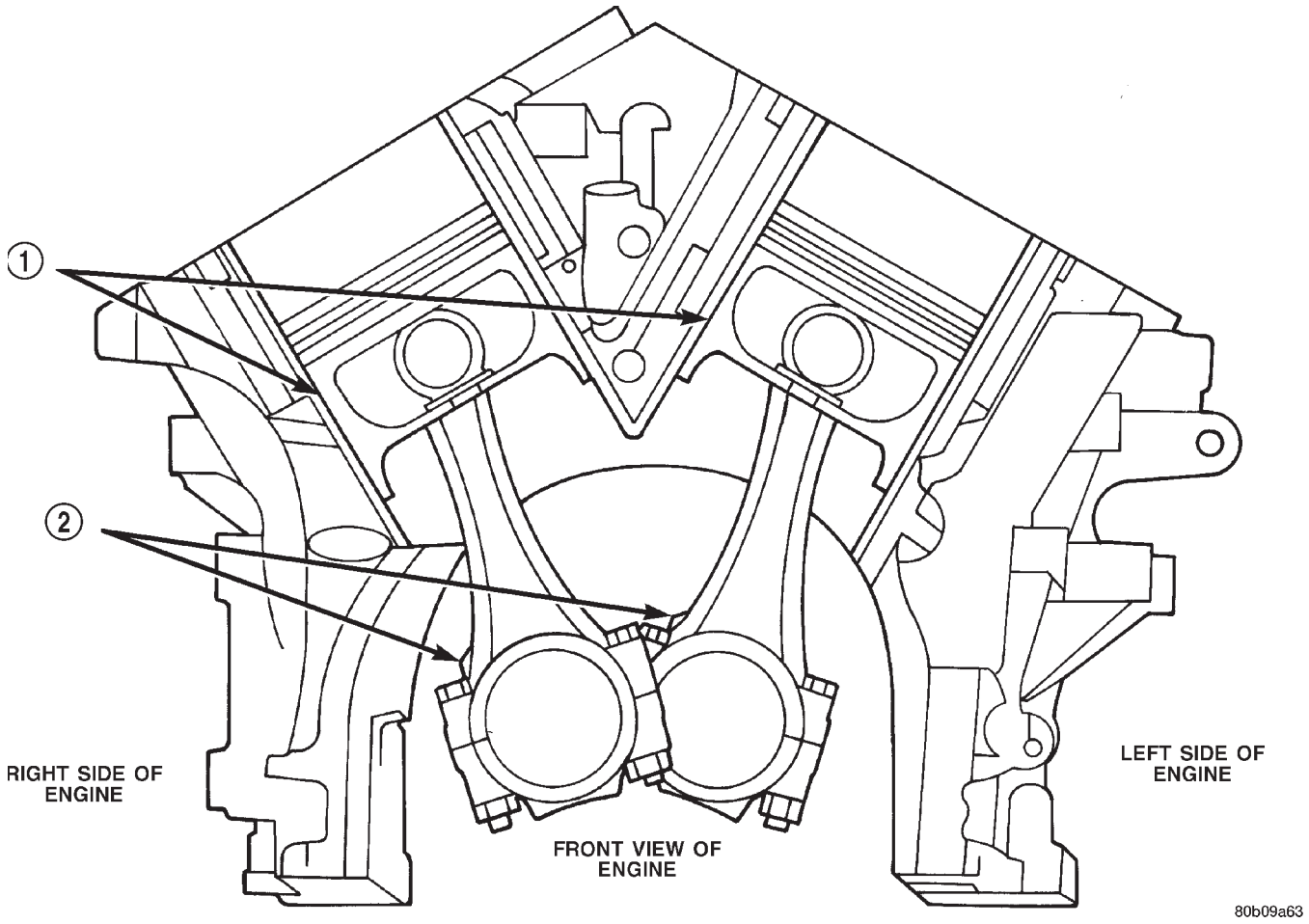


Fig. 102 Piston and Connecting Rod Positioning

1 – MAJOR THRUST SIDE OF PISTON
2 – OIL SQUIRT HOLE

(7) Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and piston into cylinder bore and guide rod over the crankshaft journal (Fig. 101).

CAUTION: Do Not interchange piston assemblies bank to bank, as engine damage may occur.

(8) Tap the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.

(9) Lubricate rod bolts and bearing surface with engine oil. Install connecting rod cap and bearing. Tighten bolts to 27 N·m (20 ft. lbs.) Plus 1/4 turn.

ENGINE CORE AND OIL PLUGS

REMOVAL

Using a blunt tool such as a drift and a hammer, strike the bottom edge of the cup plug. With the cup plug rotated, grasp firmly with pliers or other suitable tool and remove plug (Fig. 103).

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

INSTALLATION

Thoroughly clean inside of cup plug hole in cylinder block or head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount. Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

REMOVAL AND INSTALLATION (Continued)

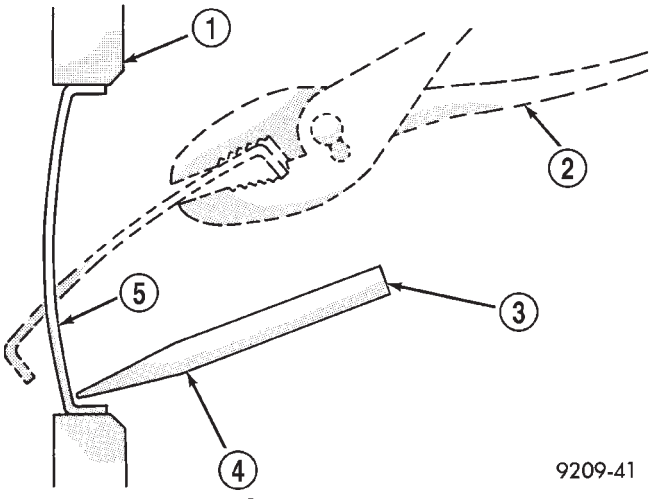


Fig. 103 Core Hole Plug Removal

1 – CYLINDER BLOCK
2 – REMOVE PLUG WITH PLIERS
3 – STRIKE HERE WITH HAMMER
4 – DRIFT PUNCH
5 – CUP PLUG

DISASSEMBLY AND ASSEMBLY

OIL PUMP

(1) Remove the pressure relief valve by remove the threaded retaining cap from the oil pump housing.

CAUTION: Oil pump pressure relief valve must be installed as shown in (Fig. 104) or engine damage may occur.

(2) Remove spring and relief valve.
(3) Remove oil pump cover screws and lift off cover plate (Fig. 105).
(4) Remove pump rotors.
(5) Wash all parts in a suitable solvent. Inspect components carefully for damage or wear. Refer to Cleaning and Inspection, Oil Pump in this section for procedures.
(6) Tighten cover screws to 12 N·m (105 in. lbs.) (Fig. 105). Tighten oil pressure relief valve retaining cap to 12 N·m (105 in. lbs.) (Fig. 104).

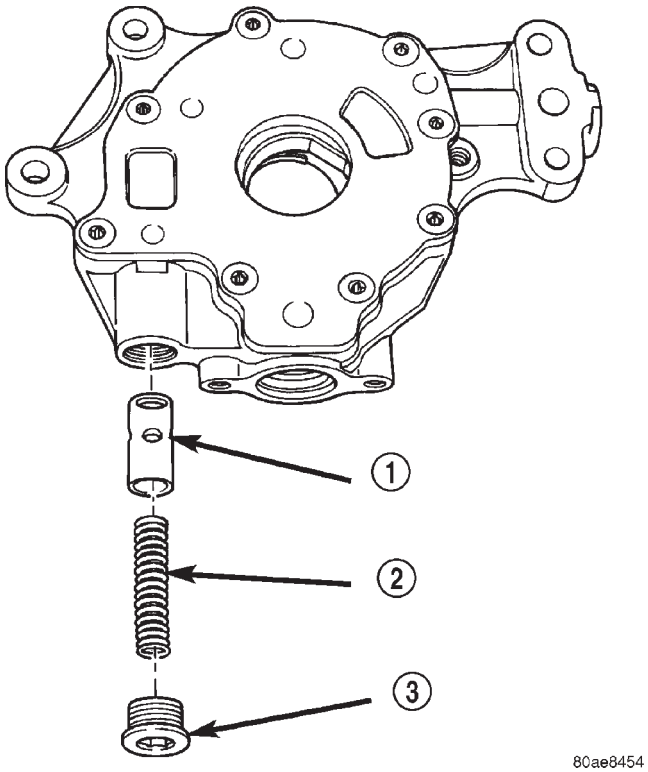


Fig. 104 Oil Pressure Relief Valve

1 – RELIEF VALVE
2 – SPRING
3 – RETAINER CAP

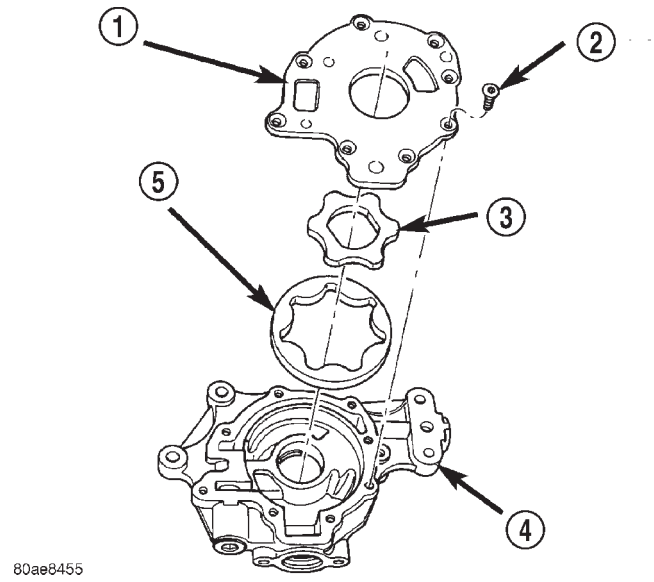


Fig. 105 Oil Pump

1 – OIL PUMP COVER
2 – SCREWS (8)
3 – OIL PUMP INNER ROTOR
4 – OIL PUMP HOUSING
5 – OIL PUMP OUTER ROTOR

CLEANING AND INSPECTION

INTAKE MANIFOLD

Check for:

- Damage and cracks of each section.
- Clogged water passages in end cross over and clogged gas passages.

EXHAUST MANIFOLD

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

CAMSHAFT

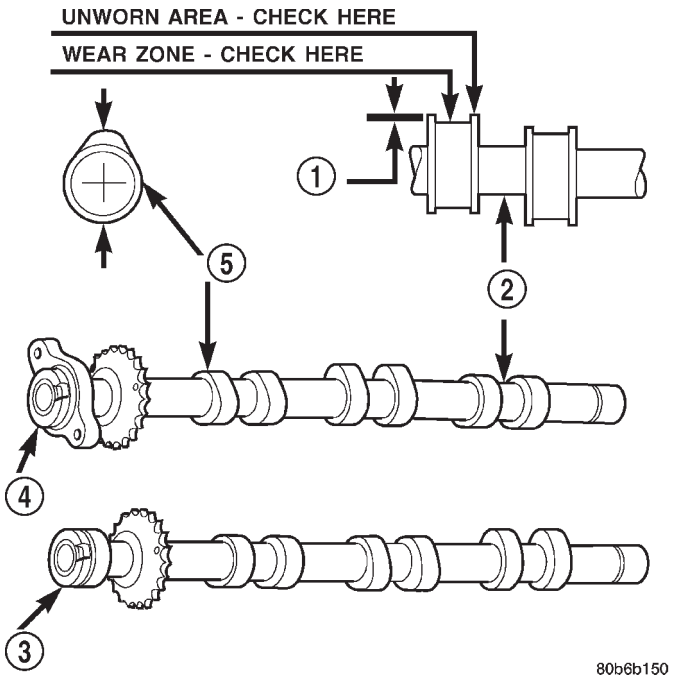


Fig. 106 Camshaft Inspection

1 – ACTUAL WEAR
2 – BEARING JOURNAL
3 – EXHAUST CAMSHAFT
4 – INTAKE CAMSHAFT
5 – LOBE

(1) Inspect camshaft bearing journals for damage and binding (Fig. 106). If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.

(2) Inspect camshaft sprockets for excessive wear. Replace camshafts if necessary.

(3) Check the cam lobe surfaces for abnormal wear and damage. Replace camshaft if defective. Measure the actual wear (Fig. 106) and replace, if out of limits—standard value is 0.0254 mm (0.001 in.); wear **limit** is 0.254 mm (0.010 in.).

CYLINDER HEAD

CLEANING

(1) Use a gasket removal compound to soften the old gasket material.

CAUTION: When cleaning the cylinder head and block mating surfaces, do not use a metal scraper because the sealing surfaces could be cut or ground. Instead, use a wooden or plastic scraper.

(2) Make sure the gasket and/or foreign material does not enter the oil feed hole or the oil return holes.

INSPECTION

(1) Before cleaning, check for leaks, damage and cracks.

(2) Clean cylinder head and oil passages.

(3) Check cylinder head for flatness (Fig. 107).

(4) Cylinder head must be flat within:

- Standard dimension = less than 0.05 mm (0.002 inch.)
- Service Limit = 0.2 mm (0.008 inch.)
- Grinding Limit = Maximum of 0.2 mm (0.008 inch.) is permitted.

CAUTION: 0.20 mm (0.008 in.) MAX is a combined total dimension of the stock removal limit from cylinder head and block top surface (Deck) together.

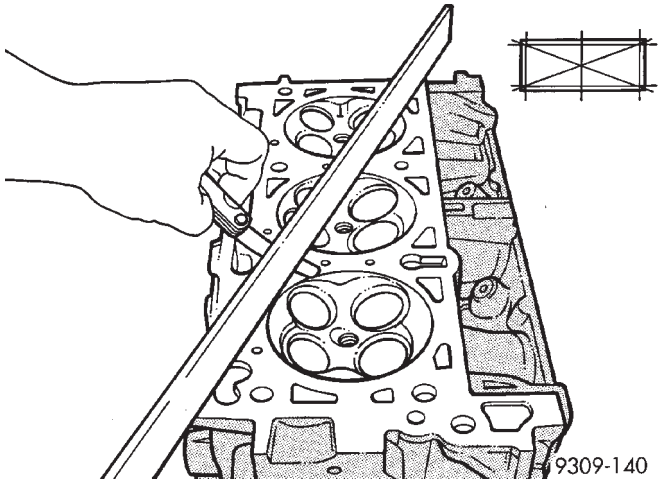


Fig. 107 Checking Cylinder Head Flatness—Typical

CAMSHAFT FOLLOWER

Inspect the cam follower assembly for wear or damage (Fig. 108). Replace as necessary.

VALVE INSPECTION

(1) Clean valves thoroughly and replace burned, warped and cracked valves.

(2) Measure valve stems for wear (Fig. 109). Refer to Engine Specifications.

CLEANING AND INSPECTION (Continued)

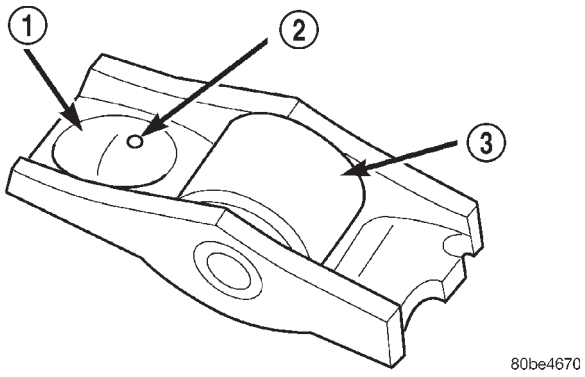


Fig. 108 Cam Follower Assembly

1 – LASH ADJUSTER POCKET
2 – OIL SQUIRT HOLE
3 – ROLLER

NOTE: Valve stems are chrome plated and should not be polished (Fig. 109).

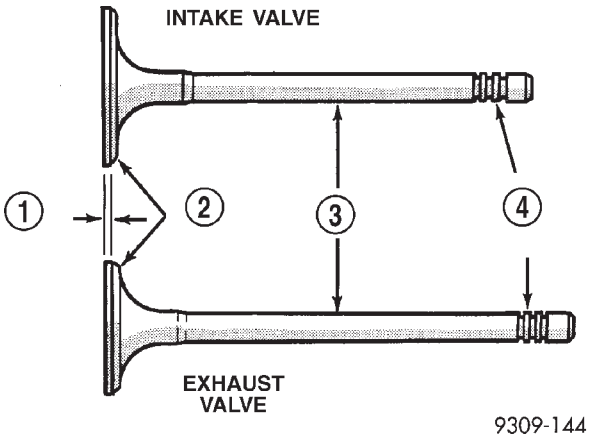


Fig. 109 Intake and Exhaust Valves

1 – MARGIN
2 – FACE
3 – STEM
4 – VALVE SPRING RETAINER LOCK GROOVES

(3) Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.

CHECKING VALVE GUIDES

(1) Measure valve stem-to-guide clearance as follows:

(2) Install valve into cylinder head so it is 15 mm (0.590 inch.) off the valve seat. A small piece of hose may be used to hold valve in place.

(3) Attach dial indicator Tool C-3339 to cylinder head and set it at right angle of valve stem being measured (Fig. 110).

(4) Move valve to and from the indicator. Refer to Engine Specifications.

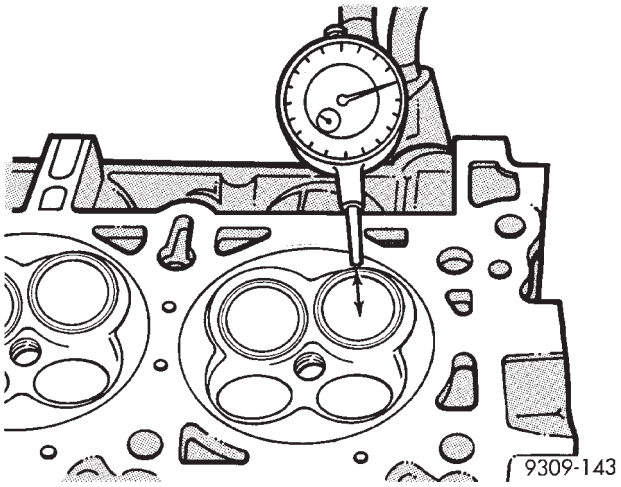


Fig. 110 Measuring Valve Guide Wear—Typical

VALVE GUIDES

NOTE: Replace cylinder head if stem-to-guide clearance exceeds specifications, or if guide is loose in cylinder head.

OIL PUMP

INSPECTION AND REPAIR

(1) Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. Replace pump cover if scratched or grooved.

(2) Lay a straightedge across the pump cover surface (Fig. 111). If a 0.025 mm (0.001 inch.) feeler gauge can be inserted between cover and straight edge, cover should be replaced.

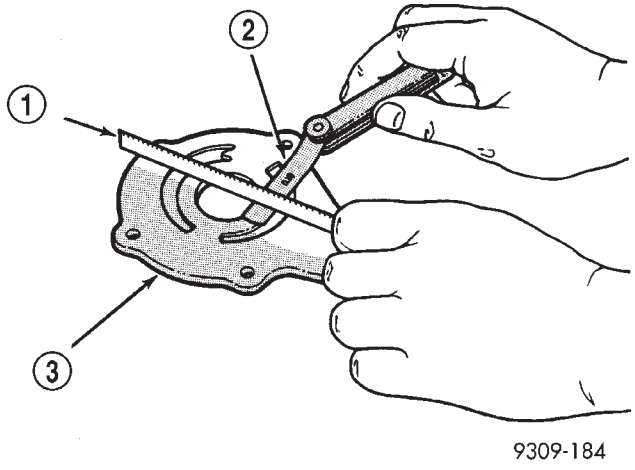


Fig. 111 Checking Oil Pump Cover Flatness—Typical

1 – STRAIGHT EDGE
2 – FEELER GAUGE
3 – OIL PUMP COVER

CLEANING AND INSPECTION (Continued)

(3) Measure thickness and diameter of outer rotor. If outer rotor thickness measures 9.474 mm (0.373 in.) or less (Fig. 112), or if the diameter is 89.174 mm (3.5108 inches.) or less, replace outer rotor.

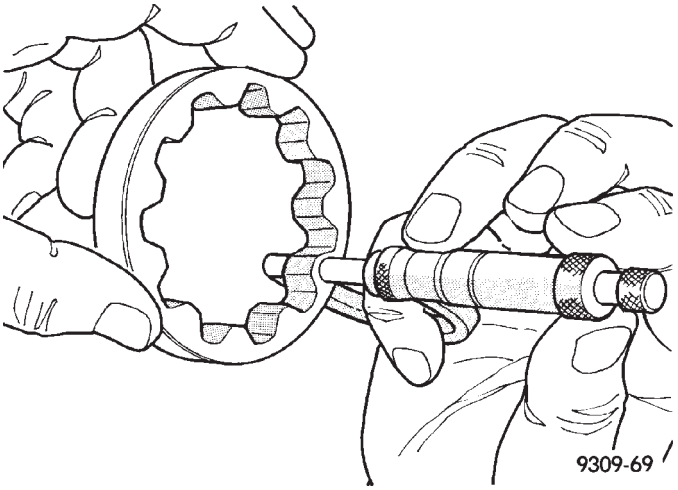


Fig. 112 Measuring Outer Rotor Thickness

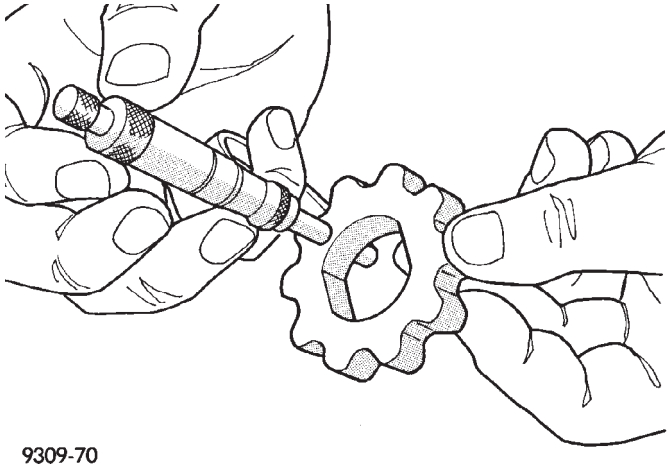


Fig. 113 Measuring Inner Rotor Thickness

(4) If inner rotor measures 9.474 mm (0.373 inch.) or less replace inner rotor (Fig. 113).

(5) Slide outer rotor into body, press to one side with fingers and measure clearance between rotor and body (Fig. 114). If measurement is 0.39 mm (0.015 inch.) or more, replace body only if outer rotor is in specifications.

(6) Install inner rotor into body. If clearance between inner and outer rotors (Fig. 115) is 0.20 mm (0.008 inch.) or more, replace both rotors.

(7) Place a straightedge across the face of the body, between bolt holes. If a feeler gauge of 0.077 mm (0.003 inch.) or more can be inserted between rotors and the straightedge, replace pump assembly (Fig. 116) **ONLY** if rotors are in specs.

(8) Inspect oil pressure relief valve plunger for scoring and free operation in its bore. Small marks may be removed with 400-grit wet or dry sandpaper.

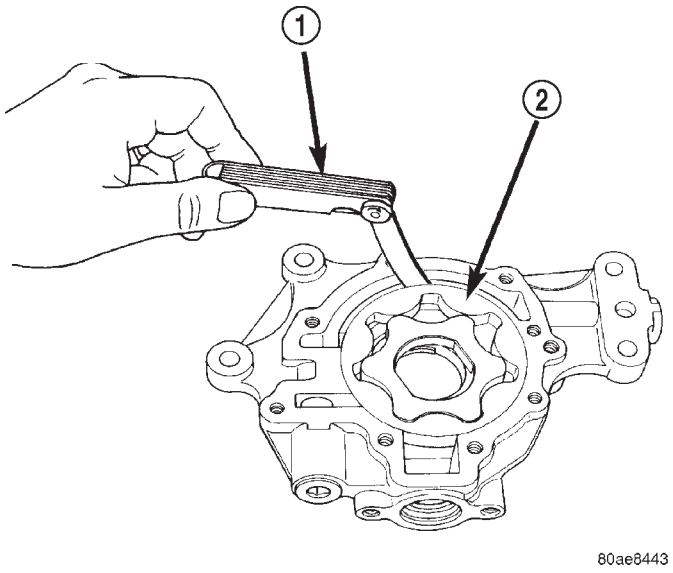


Fig. 114 Measuring Outer Rotor Clearance in Housing

1 – FEELER GAUGE
2 – OUTER ROTOR

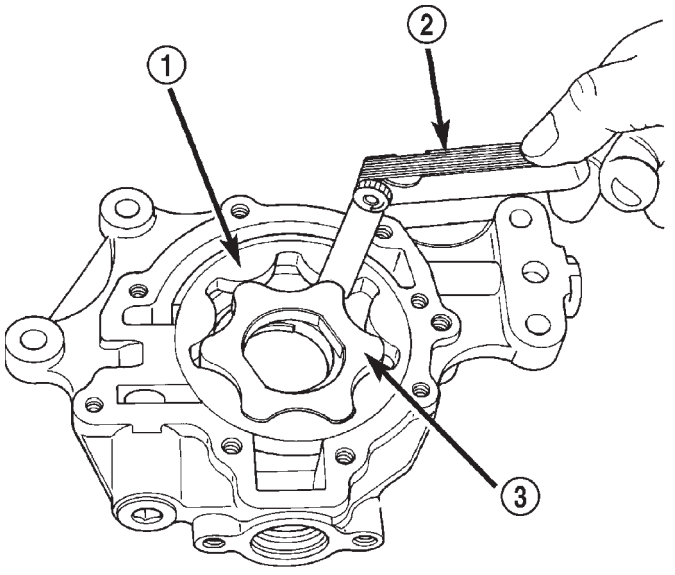


Fig. 115 Measuring Clearance Between Rotors

1 – OUTER ROTOR
2 – FEELER GAUGE
3 – INNER ROTOR

(9) The relief valve spring has a free length of approximately 49.5 mm (1.95 inches) it should test between 23 – 25 pounds when compressed to 34 mm (1.34 in.). Replace spring that fails to meet specifications.

CLEANING AND INSPECTION (Continued)

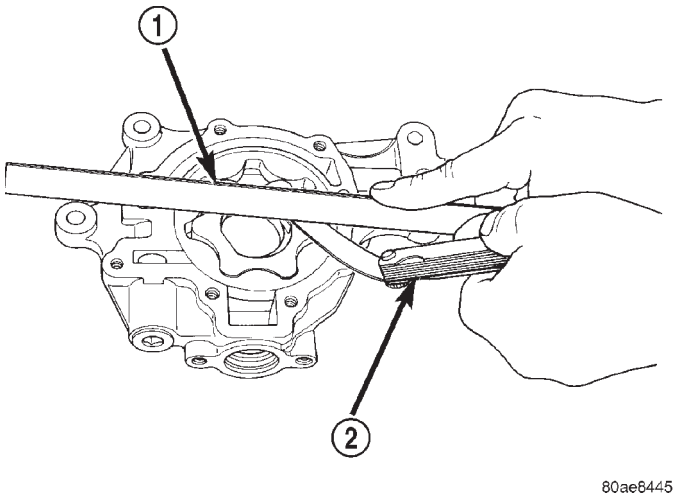


Fig. 116 Measuring Clearance Over Rotors

1 – STRAIGHT EDGE
2 – FEELER GAUGE

OIL PUMP ASSEMBLY

(1) Assemble pump, using new parts as required.
(2) Tighten cover screws to 12 N·m (105 in. lbs.).
(3) Prime oil pump before installation by filling rotor cavity with engine oil.
(4) If oil pressure is low and pump is within specifications, inspect for worn engine bearings or other reasons for oil pressure loss.

CYLINDER BLOCK AND BORE

CLEANING AND INSPECTION

(1) Clean cylinder block thoroughly and check all core hole plugs for evidence of leaking.
(2) If new core plugs are installed, refer to Service Procedures, Engine Core Plugs.
(3) Examine block for cracks or fractures.
(4) Inspect for damaged bolt threads. Repair threads as needed. Refer to Service Procedures, Repair of Damaged or Worn Threads.

NOTE: Refer to Honing Cylinder Bores in the Standard Service Procedures for specification and procedures.

(5) After a cylinder honing or deglazing procedure:
(a) Clean bores with soap and water solution.
(b) Thoroughly rinse cylinder bores with clean water to remove soap/water solution and wipe bores dry with a clean lint-free cloth.
(c) Oil the bores after cleaning to prevent rusting.

CYLINDER BORE INSPECTION

The cylinder walls should be checked for out-of-round and taper with Tool C-119 as shown in (Fig. 117).

Measure the cylinder bore at three levels in directions A and B (Fig. 117). Top measurement should be 12 mm (0.50 inch.) down and bottom measurement should be 12 mm (0.50 inch.) up from bottom of bore. Refer to Engine Specifications.

NOTE: There are no service procedures to bore the cylinder bores for installation of oversized pistons.

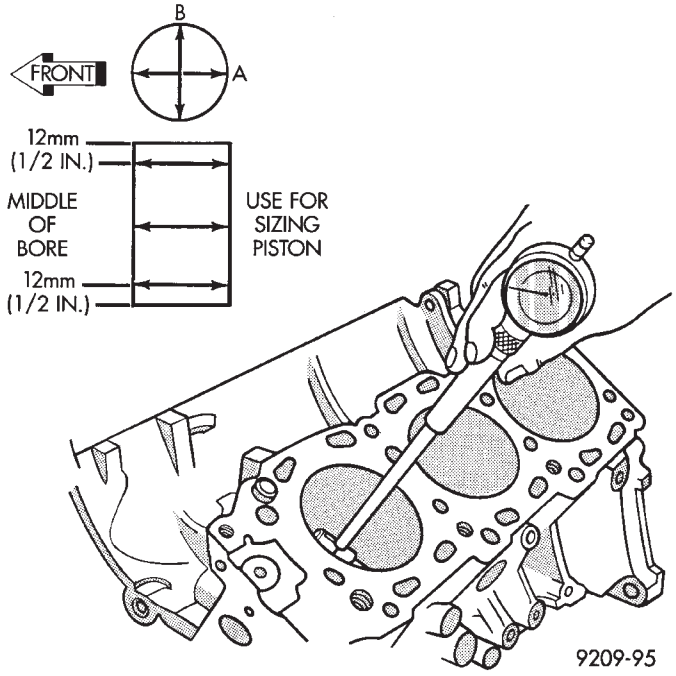


Fig. 117 Cylinder Bore Size Checking

ENGINE HYDRO-MOUNT ISOLATOR

Engine hydro-mounts may show surface cracks. This will not effect performance and mount should not be replaced. Only replace the engine hydro-mounts when leaking fluid:

- Driveshaft diagnosis. Refer to DIFFERENTIAL AND DRIVELINE.
- Any front end structural damage (after repair).
- Isolator replacement.

TIMING DRIVE SYSTEM

INSPECTION

For checking timing drive system wear limits, use the following procedure.
(1) Remove right cylinder head cover.
(2) Viewing through the cylinder head timing drive cavity, inspect the primary chain tensioner plunger. Rotate the engine clockwise to remove any chain slack and to achieve the maximum tensioner exten-

CLEANING AND INSPECTION (Continued)

sion. If a machined groove on the plunger is visible (Fig. 118), the timing chain and/or related components are worn or stretched to service limits.

(3) Inspect all chain guides, sprockets and tensioners for wear. Replace as necessary following the procedures this section.

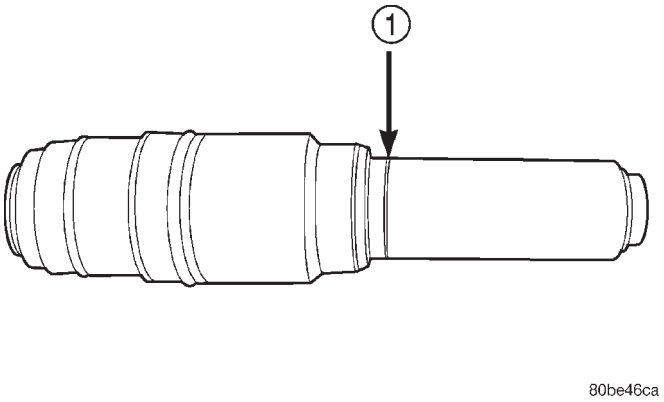


Fig. 118 Primary Timing Chain Tensioner

1 – MAXIMUM WEAR INDICATOR GROOVE

SPECIFICATIONS

2.7L ENGINE

DESCRIPTION	SPECIFICATION
General Specifications	
Type	60° DOHC V-6 24-Valve
Displacement	2.7 Liters (167 Cubic Inches)
Bore & Stroke	86.0 x 78.5 mm (3.386 in. x 3.091 in.)
Compression Ratio	9.67:1
Lead Cylinder	#1 Right Bank
Firing Order	1-2-3-4-5-6
Cylinder Block	
Cylinder Bore Diameter	86.0 mm (3.3859 in.)
Out of Round (Max.)	0.076 mm (0.003 in.)
Taper (Max.)	0.051 mm (0.002 in.)
Pistons	
Material	Aluminum Alloy
Piston Diameter	85.981 mm ±0.013 (3.3851 in. ±0.0006)
Clearance at Size Location	– 0.0016 to +0.0396 mm (– 0.0001 to +0.0016 in.)
Piston Weight	316–326 grams (11.1466–11.4994 oz.)
Piston Ring Groove Diameter—No. 1	77.65–77.85 mm (3.0571–3.065 in.)
Piston Ring Groove Diameter—No. 2	75.72–75.92 mm (2.9811–2.989 in.)
Piston Ring Groove Diameter—No. 3	77.42–77.62 mm (3.0481–3.0559 in.)
Piston Pins	
Type	Full Floating
Pin Diameter	21.997–22.000 mm (0.8661–0.8662 in.)
Clearance in Piston	0.002–0.010 mm (0.0001–0.0004 in.)
Clearance in Rod	0.007–0.018 mm (0.0003–0.0008 in.)
Piston Rings	
Ring Gap—Top Compression Ring	0.20–0.36 mm (0.008–0.014 in.)
Ring Gap—2nd Compression Ring	0.37–0.63 mm (0.0146–0.0249 in.)
Ring Gap—Oil Control (Steel Rails)	0.25–0.76 mm (0.010–0.030 in.)
Piston Ring Side Clearance	
Compression Rings—Top and Second	0.040–0.080 mm (0.0016–0.0031 in.)
Oil Ring (Steel Rails)	0.061–0.207 mm (0.0025–0.0082 in.)
Piston Ring Width	
Compresion Rings—Top and Second	1.47–1.49 mm (0.0579–0.0587 in.)
Oil Ring (Steel Rails)	0.445–0.470 mm (0.0176–0.0186 in.)
Connecting Rods	
Bearing Clearance	0.024–0.064 mm (0.001–0.0026 in.)
Side Clearance	0.13–0.38 mm (0.0052–0.015 in.)

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
Side Clearance (Max.)	0.4318 mm (0.017 in.)
Piston Pin Bore Diameter	22.007–22.015 mm (0.8665–0.8668 in.)
Bearing Bore Out of Round (Max.)	0.004 mm (0.0002 in.)
Total Weight (Less Bearing)	529.9 ±7 grams (18.6917 ±0.247 oz.)
Crankshaft Main Bearing Journals	
Diameter	63.49–63.51 mm (2.4997–2.5004 in.)
Bearing Clearance	0.035–0.053 mm (0.0014–0.0021 in.)
Bearing Clearance (Max.)	0.087 mm (0.0034 in.)
Out of Round (Max.)	0.015 mm (0.0006 in.))
Taper (Max.)	0.015 mm (0.0006 in.)
End Play	0.0475–0.2725 mm (0.0019–0.0108 in.)
End Play (Max.)	0.43 mm (0.017 in.)
Connecting Rod Journals	
Diameter	53.51–53.49 mm (2.1067–2.106 in.)
Bearing Clearance	0.024–0.064 mm (0.001–0.0026 in.)
Out of Round (Max.)	0.015 mm (0.0006 in.)
Taper (Max.)	0.015 mm (0.0006 in.)
Camshaft	
Bore Diameter	24.050–24.071 mm (0.9469–0.09476 in.)
Bearing Journal Diameter	24.000–23.981 (0.9449–0.9441 in.)
Bearing Clearance	0.05–0.09 mm (0.0020–0.0035 in.)
Bearing Clearance (Max.)	0.13 mm (0.0051 in.)
End Play	0.13 mm (0.0051–0.0110 in.)
Valve Timing—Intake Valve	
Opens (ATDC)	2°
Closes (ABDC)	44°
Duration	222°
Valve Timing—Exhaust Valve	
Opens (BBDC)	36°
Closes (ATDC)	4°
Duration	220°
Valve Overlap	2°
Cylinder Head	
Gasket Thickness (Compressed)	1.50 mm ±0.05 (0.0591 in. ±0.002 in.)
Valve Seat Angle	44.5°–45°
Valve Seat Runout (Max.)	0.05 mm (0.002 in.)
Intake Valve Seat Width	1.00–1.5 mm (0.0394–0.0591 in.)
Exhaust Valve Seat Width	1.25–1.75 mm (0.0492–0.0689 in.)
Guide Bore Diameter (Std.)	5.975–6.00 mm (0.2353–0.2363 in.)
Valve Guide Height*—Intake & Exhaust	13.25–13.75 mm (0.5217–0.5414 in.)
*Measured from cylinder head surface to top of guide	
Valves	
Face Angle	45–45.5 mm
Head Diameter—Intake	33.67–33.93 (1.3256–1.3358 in.)
Head Diameter—Exhaust	27.67–27.93 mm (1.0894–1.1000 in.)
Length—Intake (Overall)	107.89–108.39 mm (4.2476–4.2673 in.)
Length—Exhaust (Overall)	105.88–106.38 mm (4.1685–4.1882 in.)
Stem Diameter—Intake	5.934–5.952 mm (0.2337–0.2344 in.)
Stem Diameter—Exhaust	5.906–5.924 mm (0.2326–0.2333 in.)

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
Stem-to-Guide Clearance—Intake (New)	0.023–0.066 mm (0.0009–0.0026 in.)
Stem-to-Guide Clearance—Exhaust (New)	0.051–0.094 mm (0.002–0.0037 in.)
Stem-to-Guide Clearance—Intake (Max., Rocking Method)	0.29 mm (0.0114 in.)
Stem-to-Guide Clearance—Exhaust (Max., Rocking Method)	0.370 mm (0.0146 in.)
Valve Lift—Intake (Zero Lash)	9.0 mm (0.3543 in.)
Valve Lift—Exhaust (Zero Lash)	8.0 mm (0.3150 in.)
Valve Stem Tip Height—Intake	47.120 ±0.467 mm (1.8551 ±0.00184 in.)
Valve Stem Tip Height—Exhaust	48.672 ±0.467 mm (1.9162 ±0.00184 in.)
Valve Spring	
Free Length—Intake & Exhaust (Approx.)	45.63 mm (1.7965 in.)
Spring Force—Intake & Exhaust (Valve Closed)	249–284 N @ 38.0 mm (56.0–64.0 lbs. @ 1.4961 in.)
Spring Force—Intake (Valve Open)	658–721 N @ 29.0 mm (147.9–162.1 lbs. @ 1.1417 in.)
Spring Force—Exhaust (Valve Open)	614–671 N @ 30.0 mm (138.0–150.8 lbs. @ 1.1811 in.)
Number of Coils—Intake & Exhaust	7.35
Wire Diameter—Intake & Exhaust	3.861 mm (0.1520 in.)
Installed Height—Intake & Exhaust (Spring seat to bottom of retainer)	38.0 mm (1.4961 in.)
Oil Pump	
Clearance Over Rotors (Max.)	0.077 mm (0.003 in.)
Cover—Out-of-Flat (Max.)	0.025 mm (0.001 in.)
Inner & Outer Rotor Thickness	9.475–9.500 mm (0.3731–0.3741 in.)
Outer Rotor Clearance (Max.)	0.39 mm (0.015 in.)
Outer Rotor Diameter (Min.)	89.175 mm (3.5109 in.)
Tip Clearance Between Rotors (Max.)	0.20 mm (0.008 in.)
Oil Pressure	
Pressure @ Curb Idle Speed*	34.7 kPa (5 psi)
Pressure @ 3000 rpm	170–724 kPa (25–105 psi)
*CAUTION: If oil pressure is zero at idle, DO NOT run engine at 3000 rpm.	

TORQUE

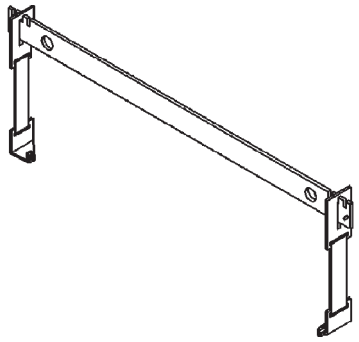
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
A/C Compressor to Engine—Bolts	28	21	—
Camshaft Sprocket—Bolts	28	—	250
Camshaft Chain Tensioner (Secondary)—Bolts	12	—	105
Camshaft Bearing Cap—Bolts	12	—	105
Connecting Rod Cap—Bolts	27 +¼ Turn	20 +¼ Turn	—
Crankshaft Main Bearing Cap			
—Tie Bolts	28	—	250
—Inner Cap Bolts	20 +¼ Turn	15 +¼ Turn	—
—Outer Cap Bolts	27 +¼ Turn	20 +¼ Turn	—
Crankshaft Damper—Bolt	170	125	—
Cylinder Head—Bolts	Refer to Procedure		
Cylinder Head Cover—Bolts	12	—	105
Exhaust Manifold—Bolts	23	—	200
Exhaust Manifold Heat Shield—Bolts	12	—	105
Exhaust Manifold to Catalytic Converter V-Band Clamp	11	—	100

SPECIFICATIONS (Continued)

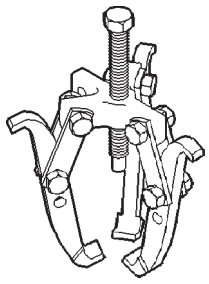
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Engine Mount Bracket to Block—Bolts	61	45	—
Engine Mount Isolator—Nuts	61	45	—
Intake Manifold (Upper and Lower)—Bolts	12	—	105
Generator Bracket—Bolts	41	30	—
Oil Pan			
—Bolts	28	—	250
—Nuts	12	—	105
Oil Pan Drain—Plug	28	—	250
Oil Filter	20	15	—
Oil Pump to Block—Bolts	28	—	250
Oil Pump Cover—Bolts	12	—	105
Oil Pump Pick Up Tube—Bolt	28	—	250
PCV Valve	7	—	60
Crankshaft Rear Seal Retainer—Bolts	12	—	105
Spark Plugs	20	15	—
Starter Mounting—Bolts	41	30	—
Structural Collar	Refer to Procedure		
Thermostat Housing/Water Inlet Connector—Bolts	12	—	105
Throttle Body—Bolts	12	—	105
Timing Chain Cover			
—M6 Bolts	12	—	105
—M10 Bolts	54	40	—
Timing Chain Tensioner (Primary)	54	40	—
Timing Chain Guide Access Plug	20	15	—
Water Pump—Bolts	12	—	105
Cooling System Bleed Screw	12	—	110
Water Outlet Housing—Bolts	12	—	105

SPECIAL TOOLS

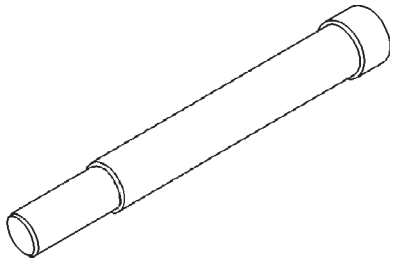
2.7L ENGINE



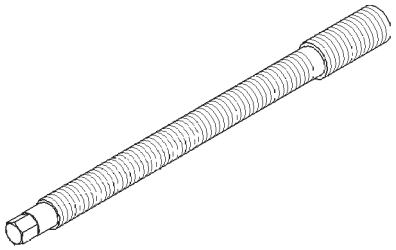
Engine Lifting Fixture 8342



Puller 1023

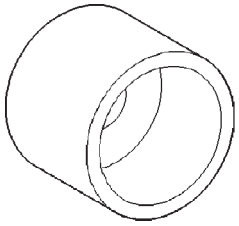


Crankshaft Damper Remover Insert 8194

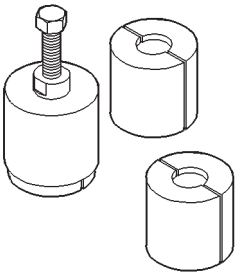


Crankshaft Damper Installer Screw 8179

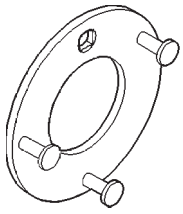
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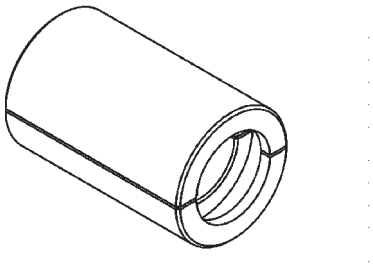
Crankshaft Damper Installer 6792-1



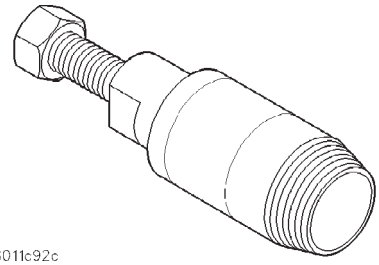
Puller 5048



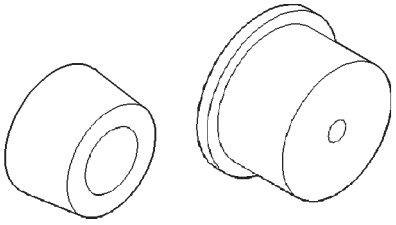
Crankshaft Damper Holder 8191



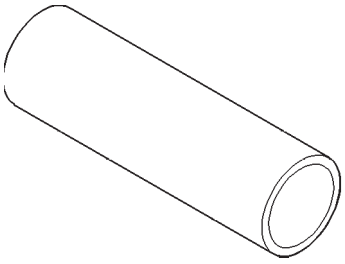
Puller Adaptor 8539



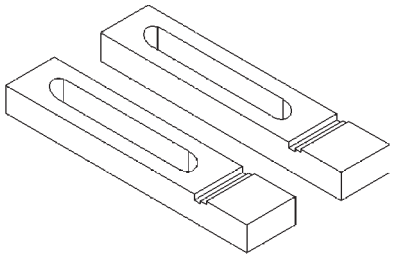
Crankshaft Seal Remover 6771



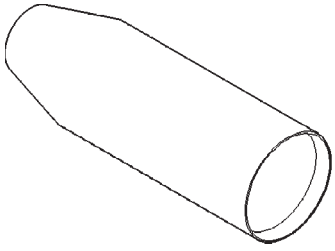
Crankshaft Rear Seal Guide 6926-1 & Installer 6926-2



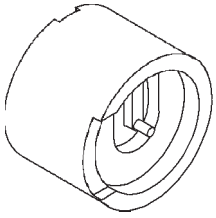
Crankshaft Seal & Sprocket Installer 6780-1



Crankshaft Real Seal Retainer Alignment Fixture 8225

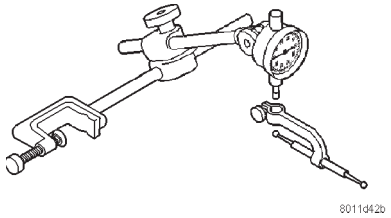


Crankshaft Seal Protector 6780-2

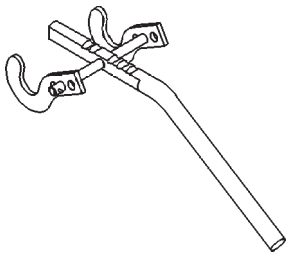


Timing Chain Tensioner Resetting Gauge 8186

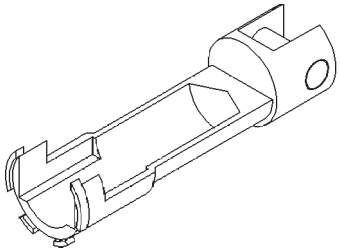
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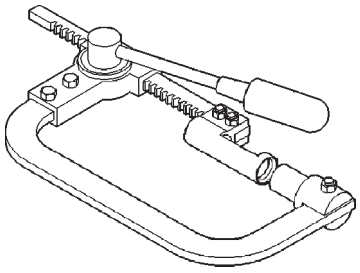
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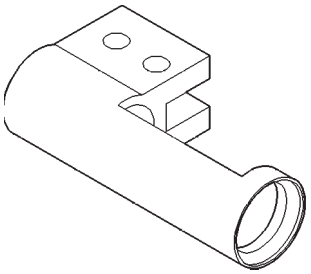
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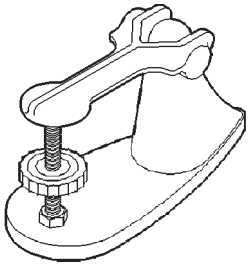
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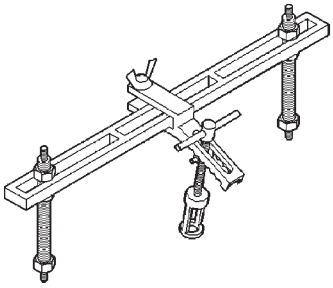
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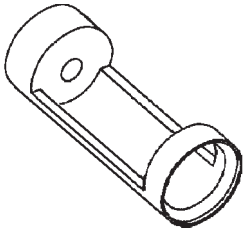
Valve Spring Adapter 6526



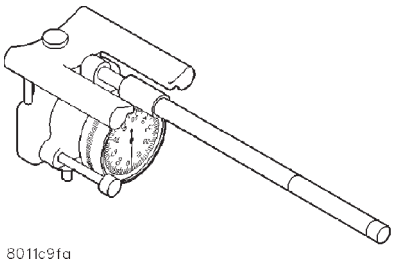
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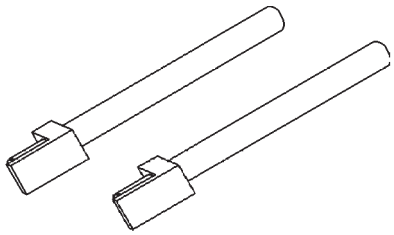
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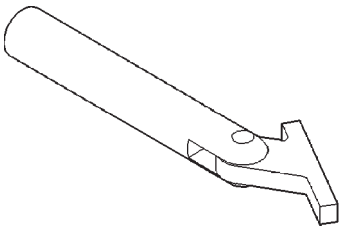


Indicator Bore Size C-119

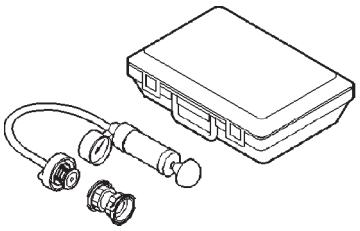


Connecting Rod Installation Guides 8189

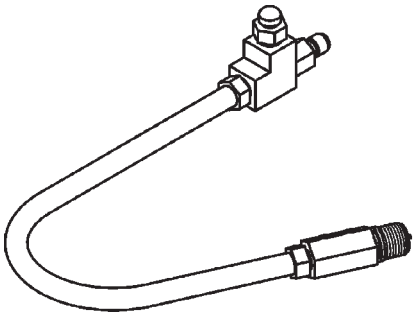
SPECIAL TOOLS (Continued)



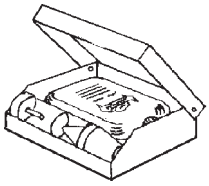
Main Bearing Remover/Installer C-3059



Cooling System Tester 7700



Adaptor 8116



Combustion Leak Tester C-3685-A

3.2/3.5L ENGINE

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DESCRIPTION AND OPERATION

3.2/3.5L ENGINE

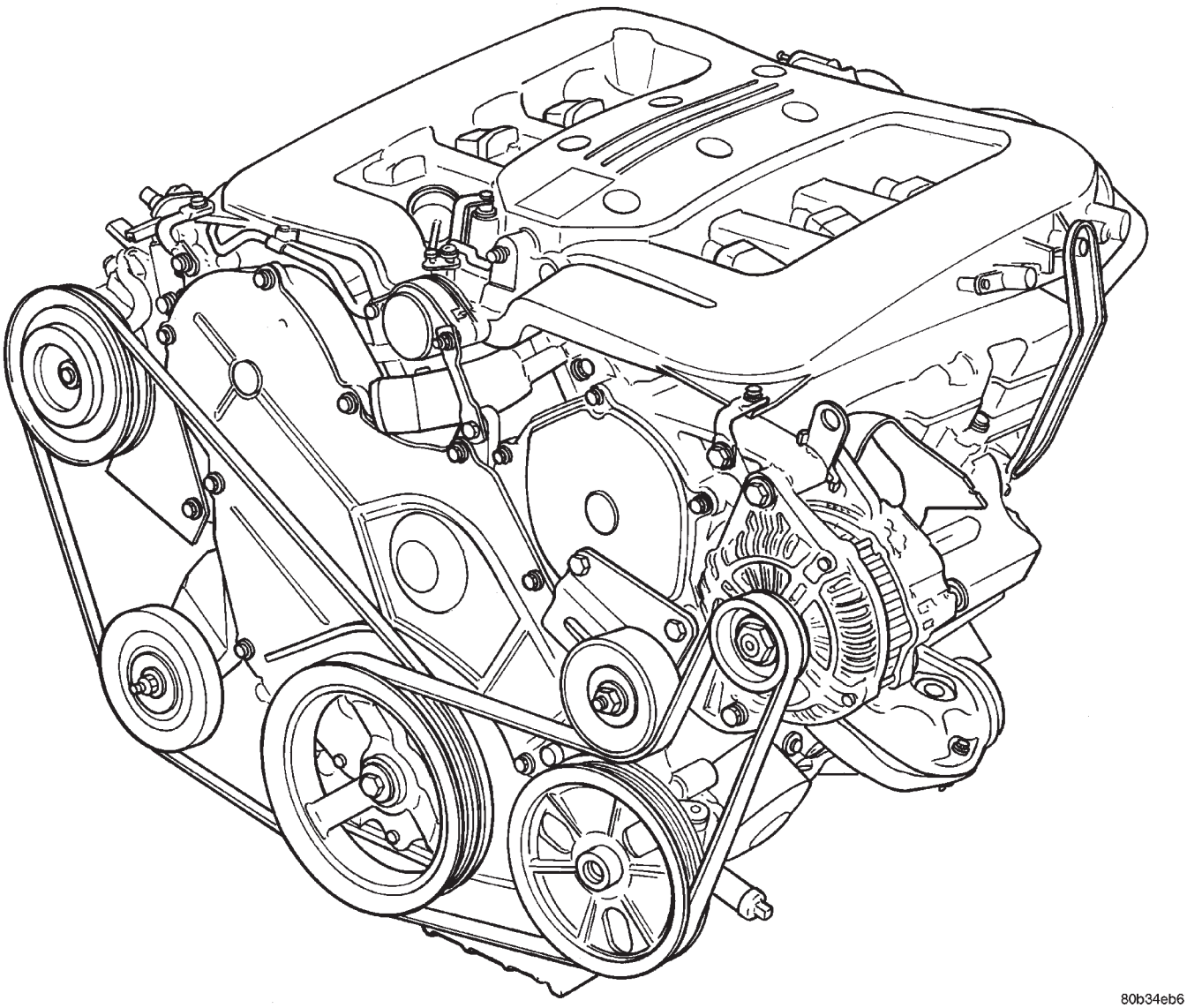


Fig. 1 3.2/3.5L Engine

DESCRIPTION AND OPERATION (Continued)

DESCRIPTION

The 3.2 Liter (167 Cubic Inches) and 3.5 Liter (214 Cubic Inches) 60 degree V-6 engines are a single overhead camshaft design with hydraulic lifters and four valves per cylinder (Fig. 1). The engines do not have provisions for a free wheeling valve train.

The cylinders are numbered from front to rear, with the right bank odd numbered, and the left bank even numbered (Fig. 2). The firing order is 1–2–3–4–5–6.

The engine identification number is located on the rear of engine block just below the cylinder head (Fig. 3).

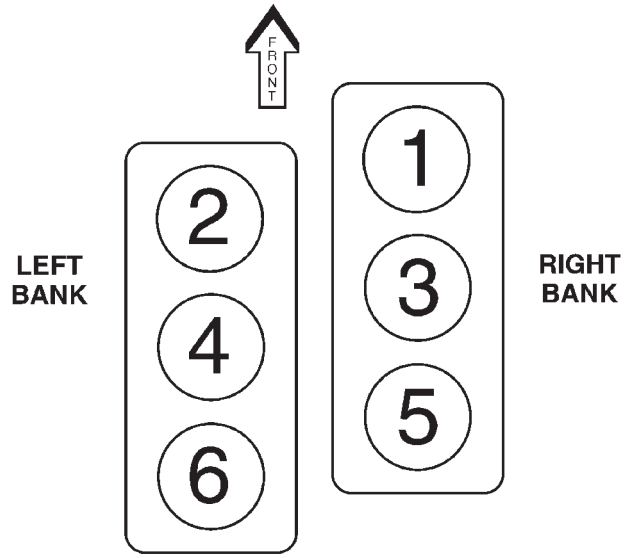
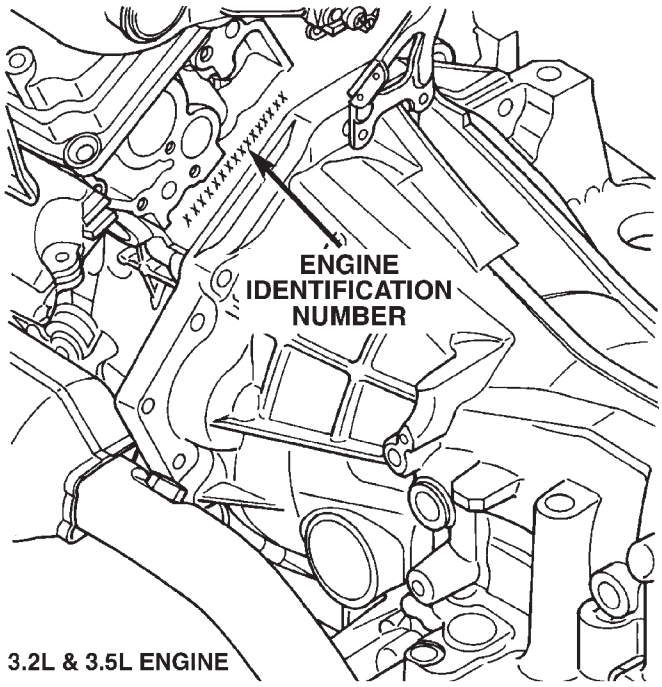


Fig. 2 Cylinder Numbering & Firing Order—3.2/3.5L



X Model Year	X Manufacturing Plant	XXXXX Component Code/Usage	XXXX Month/ Day	XXXXX Serial Code
Last digit of model year	Trenton T	Engine 3.2L 3.5L Usage Pass Car PC		

80ae845a

Fig. 3 Engine Identification

CYLINDER BLOCK

DESCRIPTION

The cylinder block (Fig. 4) is made of heat treated aluminum with cast-in-place iron liners. The block is a closed deck design with the right bank forward. To provide high rigidity and improved NVH, the block has cast-in contours and ribs, along with powdered metal 6 bolt main caps (4 vertical, 2 horizontal), with a die cast aluminum structural beam windage tray mounted to the main caps.

DESCRIPTION AND OPERATION (Continued)

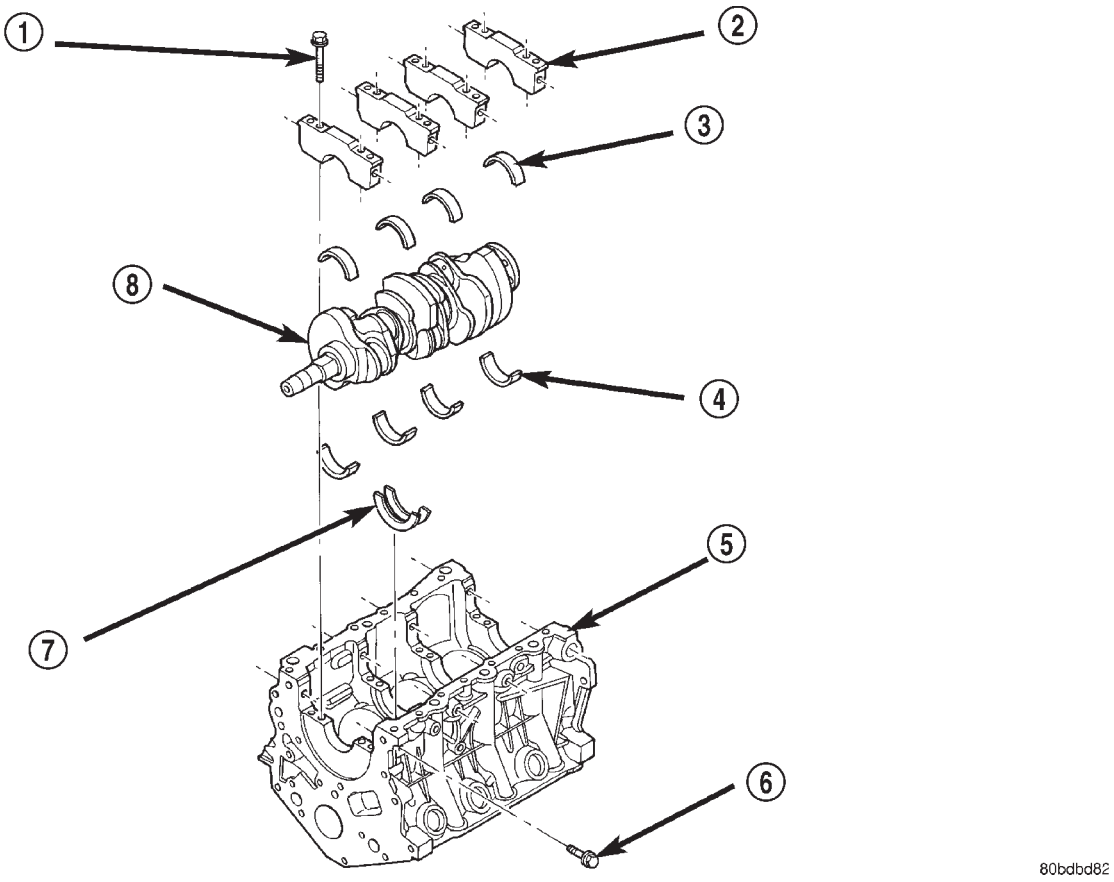


Fig. 4 Cylinder Block and Crankshaft

1 – MAIN CAP BOLT - VERTICAL
2 – MAIN CAP
3 – MAIN BEARING - LOWER
4 – MAIN BEARING - UPPER
5 – CYLINDER BLOCK
6 – MAIN CAP BOLT - HORIZONTAL
7 – CRANKSHAFT THRUST WASHER
8 – CRANKSHAFT

CRANKSHAFT

DESCRIPTION

The crankshaft (Fig. 4) is constructed of a forged micro alloy steel. A six throw, nine counterweight crankshaft is supported by four select fit main bearings with number two serving as the thrust washer location. The six separate connecting rod throws are an even-firing design which reduces torque fluctuations while a torsional vibration damper is used to control torsion caused vibration of the crankshaft. Rubber lipped seals are used at front and rear. The front seal is retained in the oil pump case and the rear seal is retained in a block-mounted housing.

OPERATION

The crankshaft transfers force generated by combustion within the cylinder to the flywheel or flexplate.

DESCRIPTION AND OPERATION (Continued)

PISTONS AND CONNECTING RODS

DESCRIPTION

The pistons are made of a high strength aluminum alloy. Top land height has been decreased to reduce emissions. Piston skirts are coated with a solid lubricant for scuff resistance. Connecting rod is forged steel with a squirt hole and attaches to the piston with a full floating pin retained by lock rings.

CYLINDER HEAD

DESCRIPTION

The aluminum alloy cylinder heads feature cross-flow type intake and exhaust ports. Valve guides and seat inserts are powdered metal. Valves are arranged in a “V”, with each camshaft on center. To improve combustion speed the chambers are a compact spherical design with a squish area of approximately 30 percent of the piston top area. The cylinder heads are common to either cylinder bank by reversing the direction of installation.

VALVES

DESCRIPTION

Valves are made of highly heat-resistant steel and are chrome plated to prevent stem scuffing. The intake valve is a one-piece forging, while the exhaust valve has a forged head with a welded stem for lock groove hardenability. The four valves (two intake and two exhaust) employ a three-groove lock design to help facilitate valve rotation.

OPERATION

The intake valve allows the air/fuel mixture to enter the combustion chamber. The exhaust valve allows the burned air/fuel mixture to exit the combustion chamber. Also, the intake and exhaust valves seal the combustion chamber during the compression and power strokes.

VALVE SPRINGS

DESCRIPTION

Valve springs are unique for intake versus exhaust. Both are made from chrome silicon alloy wire and incorporate a “bee-hive” design. Valve spring retainers and locks are common from valve-to-valve. The valve spring seat is integral with the valve stem oil seal, which incorporates a garter spring to maintain consistent lubrication control to the valve stem.

OPERATION

The valve spring returns the valve against its seat for a positive seal of the combustion chamber.

TIMING DRIVE SYSTEM

DESCRIPTION

The timing drive system (Fig. 5) has been designed to provide quiet performance and reliability to support a **NON** free-wheeling engine.

The timing drive components include a crankshaft sprocket, camshaft sprockets, tensioner pulley, hydraulic tensioner and a timing belt. The water pump is driven by the back side of the timing belt. The right and left camshaft sprockets are not interchangeable because of the cam sensor pick-up wheel on the left sprocket.

DESCRIPTION AND OPERATION (Continued)

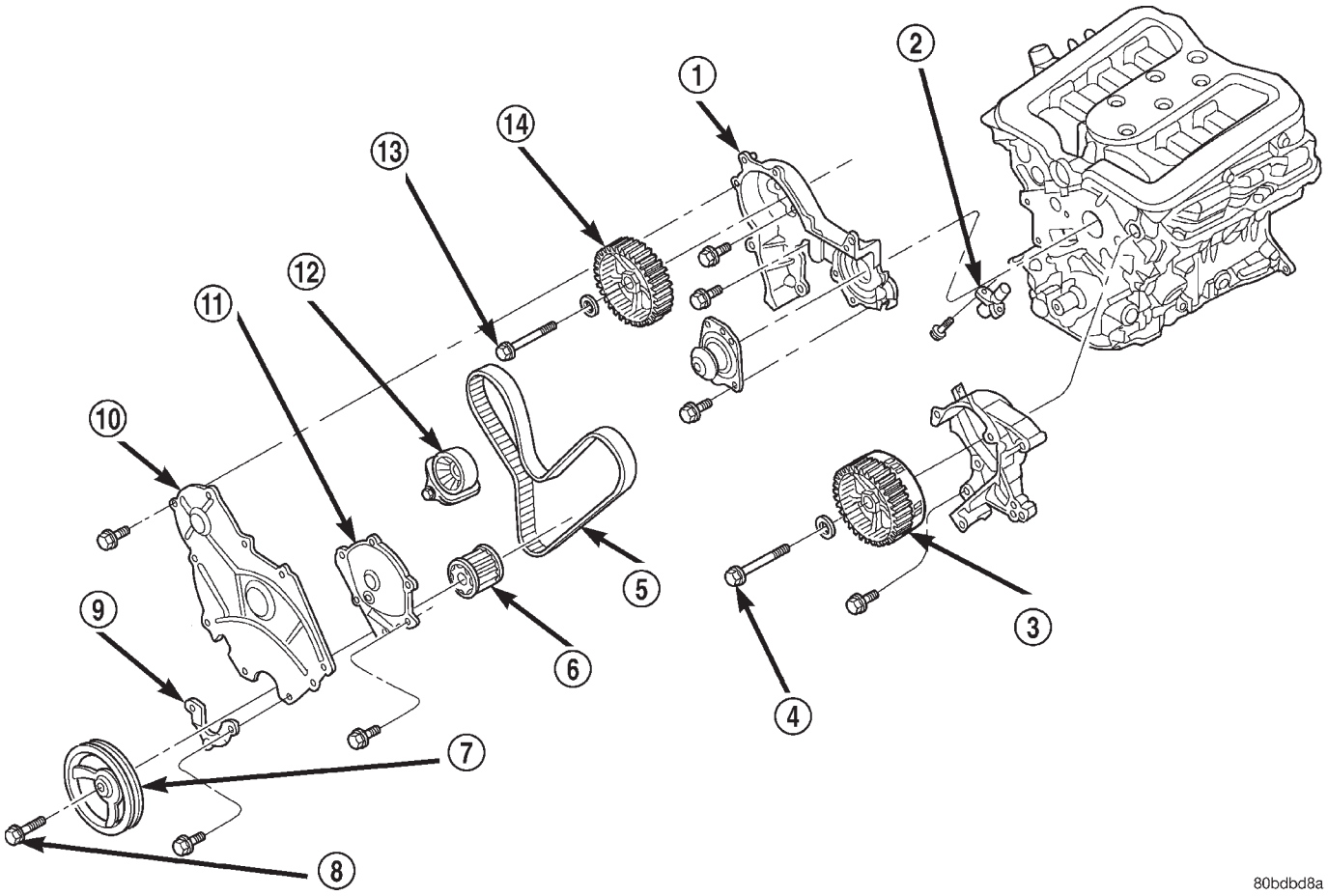


Fig. 5 Timing Drive System

1 – TIMING BELT COVER - RIGHT REAR
2 – TENSIONER-TIMING BELT
3 – CAMSHAFT SPROCKET
4 – BOLT-CAMSHAFT SPROCKET
5 – TIMING BELT
6 – CRANKSHAFT SPROCKET
7 – CRANKSHAFT DAMPER
8 – BOLT-CRANKSHAFT DAMPER
9 – TIMING BELT COVER-LOWER
10 – TIMING BELT COVER-RIGHT
11 – TIMING BELT COVER-LEFT
12 – TENSIONER PULLEY
13 – BOLT-CAMSHAFT SPROCKET
14 – CAMSHAFT SPROCKET

CAMSHAFT

DESCRIPTION

A single overhead camshaft per cylinder head provides valve actuation. The left camshaft accommodates a cam sensor pick-up wheel and is therefore longer. Each camshaft is supported by four bearing journals. Thrust for each camshaft is taken at a thrust plate attached to the rear of each cylinder head. Right and left camshaft driving sprockets are not interchangeable because of the cam sensor pick-up wheel on the left sprocket. Camshaft bearing lubrication is provided via oil feed passage through each rocker shaft pedestal dowel.

ROCKER ARM SHAFTS

DESCRIPTION

The rocker arm shafts (Fig. 6) are tubular steel and are supported by several forged aluminum alloy pedestals, which are fastened to the cylinder head. Four shafts are used, one for each intake and exhaust rocker arm bank on each cylinder head. The shafts are hollow to provide a duct for lubricating oil flow from the cylinder head to the valve mechanisms. One hollow dowel per pedestal is used to locate the pedestal to the cylinder head, orient the exhaust rocker shaft, and serve as a cam bearing oil feed passage.

DESCRIPTION AND OPERATION (Continued)

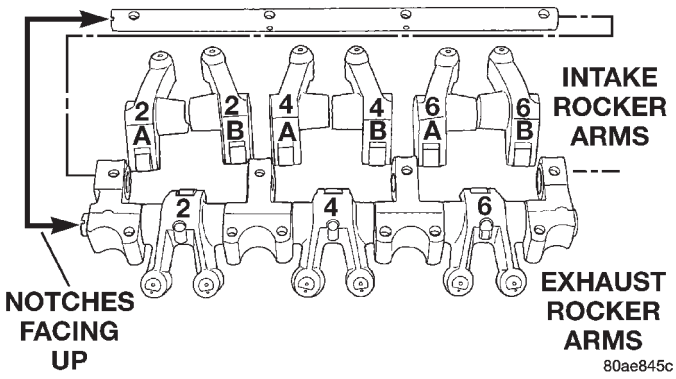


Fig. 6 Rocker Arms and Shafts

ROCKER ARMS

DESCRIPTION

Rocker arms are made of light weight permanent mold aluminum alloy with a roller type follower operating against the camshaft (Fig. 7). The valve actuating end of the rocker arms are machined to retain hydraulic lash adjusters, eliminating the need for manual valve lash adjustment.

OPERATION

The rocker arm is the pivot point between the camshaft lobe and the valve.

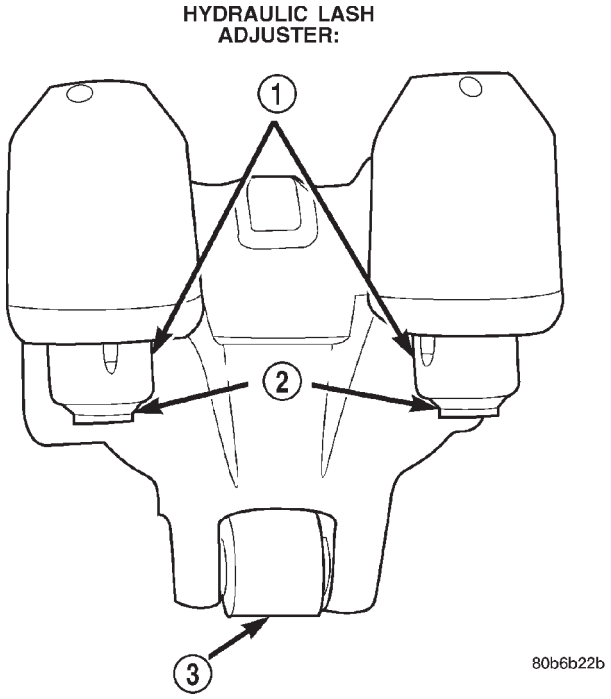


Fig. 7 Rocker Arm Assembly

1 – RETAINER
2 – SWIVEL PAD
3 – ROLLER

INTAKE MANIFOLD

DESCRIPTION

The composite upper intake manifold is a cross-flow type with long runners to improve air charge inertia (Fig. 8). An active Short Runner Valve (SRV) opens during certain operating conditions to improve top end performance. A Manifold Tuning Valve (MTV) connects the plenums at specific engine speeds to maximize low RPM torque without reducing high RPM power.

The aluminum lower intake manifold attaches to each cylinder head and uses a gasket for sealing (Fig. 9). The manifold coolant passage allows coolant to flow between cylinder heads. An attached steel tube, allows coolant flow to the heater.

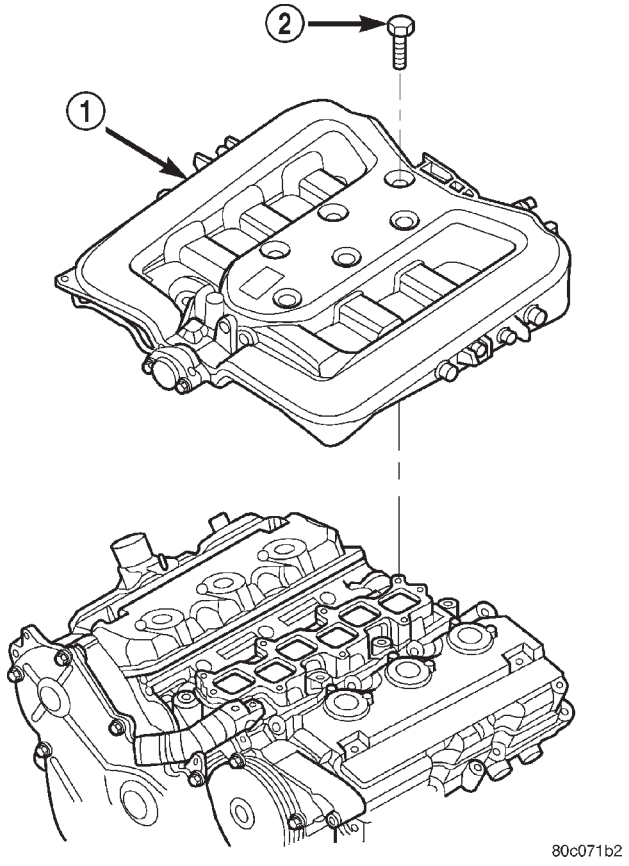


Fig. 8 Upper Intake Manifold

1 – INTAKE MANIFOLD-UPPER
2 – BOLT

DESCRIPTION AND OPERATION (Continued)

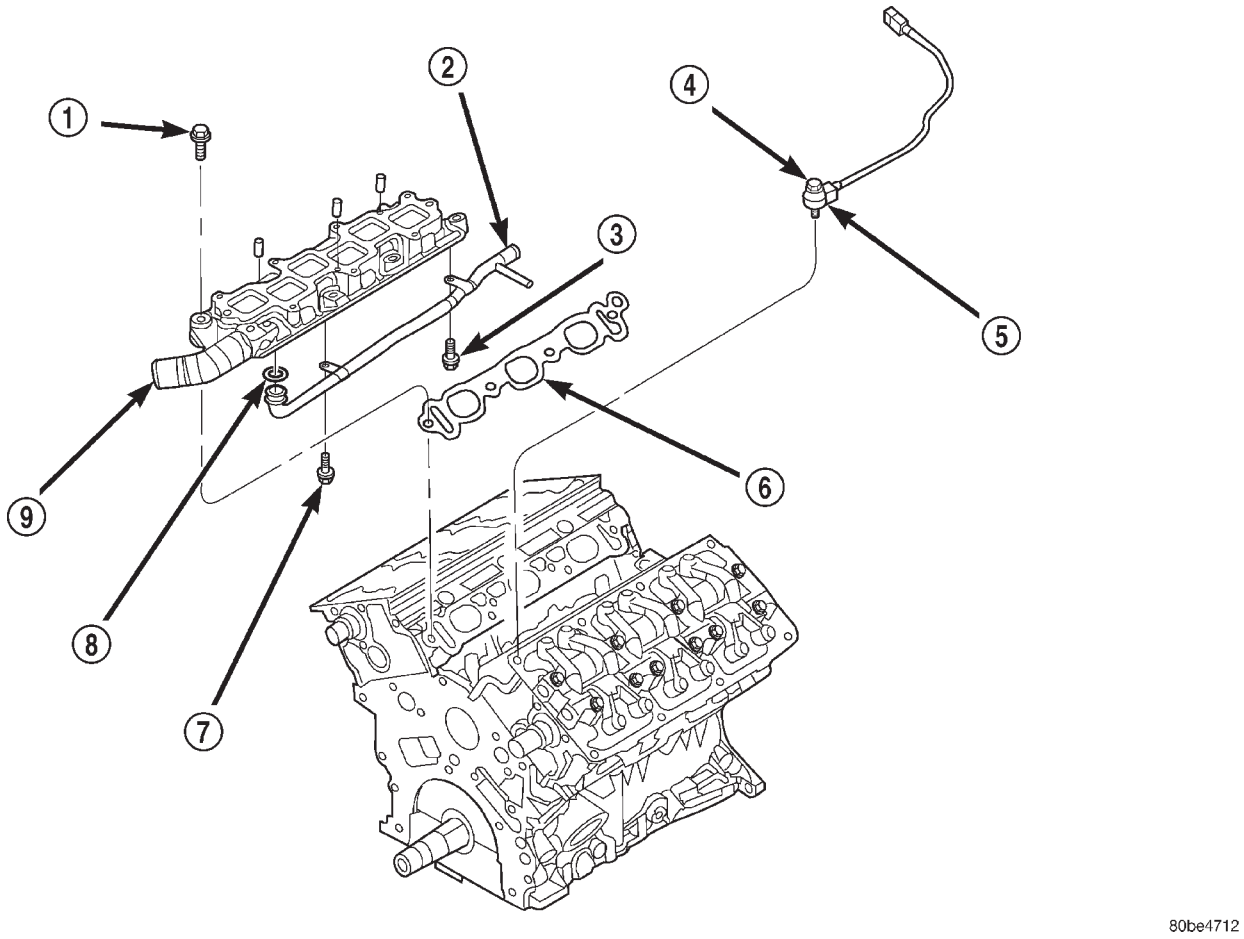


Fig. 9 Lower Intake Manifold

1 – BOLT
2 – HEATER SUPPLY TUBE
3 – BOLT
4 – BOLT
5 – KNOCK SENSOR
6 – GASKET
7 – BOLT
8 – O-RING
9 – INTAKE MANIFOLD-LOWER

EXHAUST MANIFOLD

DESCRIPTION

Both manifolds are a log style made of ductile cast iron (Fig. 10). The outlets are designed for V-Band clamp attachment of close coupled catalytic converters.

ENGINE LUBRICATION SYSTEM

DESCRIPTION

System is a full-flow filtration, pressure feed type. The oil pump body is mounted to the engine block. The pump inner rotor is driven by the crankshaft. A windage tray, increases power by minimizing oil windage at high engine RPM. For increased oil cooling, an oil-to-coolant oil cooler is used. This cooler is mounted inside the radiator tank.

OPERATION

Engine oil stored in the oil pan is drawn in and discharged by a gerotor type oil pump. The oil pump is directly coupled to the crankshaft. Oil pressure is regulated by a relief valve. The oil is fed through an oil filter and to the crankshaft journals from the oil gallery in the cylinder block. This gallery also feeds oil under pressure to the cylinder heads. Oil flows through each cylinder heads oil passage to the rocker shafts. Oil then feeds the camshaft journals, rocker arms, and hydraulic lash adjusters (Fig. 11).

DESCRIPTION AND OPERATION (Continued)

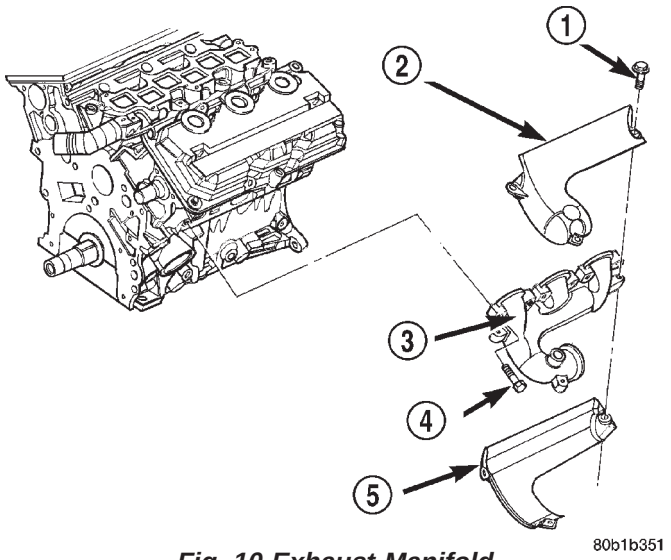


Fig. 10 Exhaust Manifold

1 – BOLT
2 – HEAT SHIELD
3 – EXHAUST MANIFOLD
4 – BOLT
5 – HEAT SHIELD

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS—INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

Refer to the Service Diagnosis—Mechanical Chart and the Service Diagnosis—Performance Chart, for possible causes and corrections of malfunctions. Refer to FUEL SYSTEM for the fuel system diagnosis.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that cannot be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following:

- Cylinder Compression Pressure Test
- Cylinder Combustion Pressure Leakage Test
- Cylinder Head Gasket Failure Diagnosis
- Intake Manifold Leakage Diagnosis

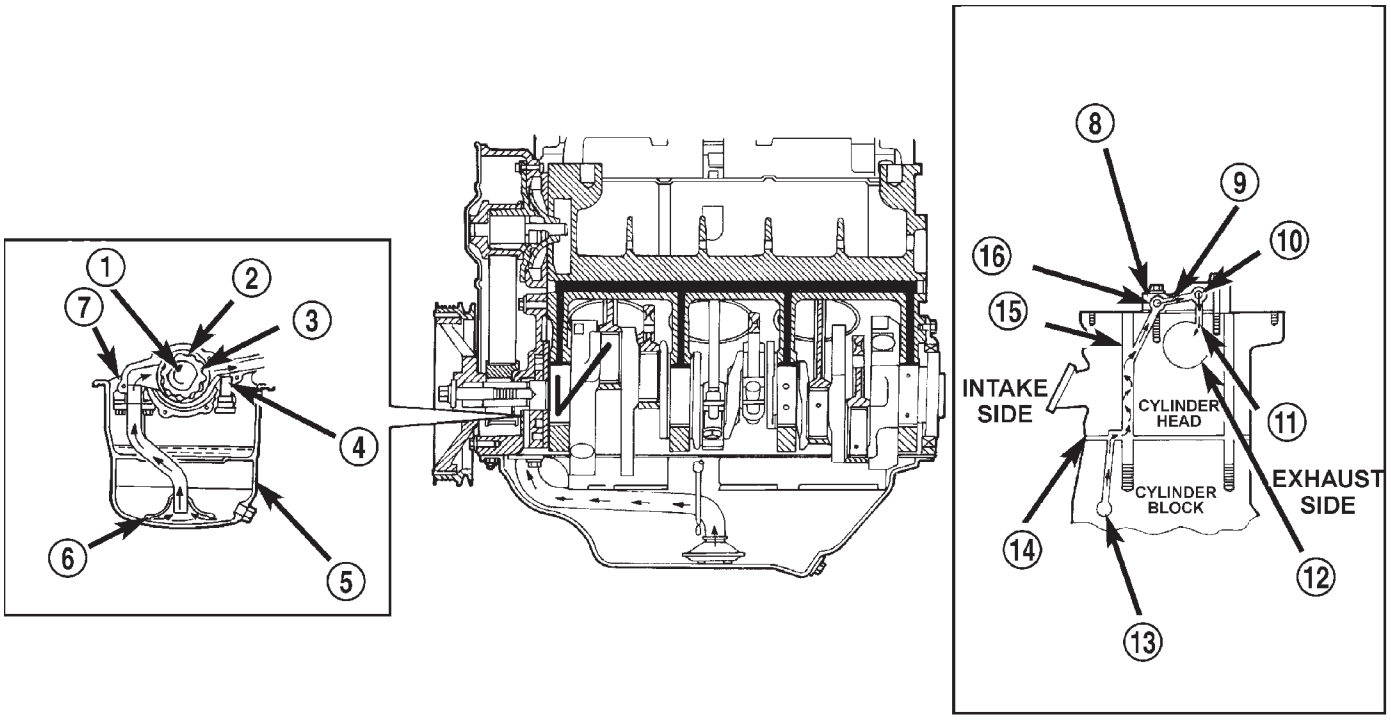


Fig. 11 Oil Lubrication System

1 – CRANKSHAFT
2 – OUTER ROTOR
3 – INNER ROTOR
4 – RELIEF VALVE
5 – OIL PAN
6 – OIL SCREEN
7 – OIL PUMP CASE
8 – OIL FLOWS TO ONLY ONE PEDESTAL AN EACH HEAD. SECOND FROM REAR ON RIGHT HEAD AND SECOND FROM FRONT ON LEFT HEAD.
9 – PEDESTAL DRILLED PASSAGE
10 – EXHAUST ROCKER SHAFT
11 – SHAFT/PEDESTAL DOWEL PASSAGE
12 – CAMSHAFT BEARING BORE
13 – CYLINDER BLOCK OIL GALLERY
14 – CYLINDER HEAD GASKET
15 – HEAD BOLT HOLE
16 – INTAKE ROCKER SHAFT

DIAGNOSIS AND TESTING (Continued)

- Lash Adjuster (Tappet) Noise Diagnosis
- Engine Oil Leak Inspection

ENGINE DIAGNOSIS—PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test battery. Charge or replace as necessary. Refer to BATTERY.
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to terminals.
	3. Faulty starter.	3. Test starting system. Refer to STARTING.
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. Refer to IGNITION SYSTEM.
	5. Incorrect spark plug gap.	5. Set gap. Refer to IGNITION SYSTEM.
	6. Contamination in fuel system.	6. Clean system and replace fuel filter.
	7. Faulty fuel pump.	7. Test fuel pump and replace as needed. Refer to FUEL SYSTEM.
	8. Incorrect engine timing.	8. Check for a skipped timing belt/chain or a loose camshaft sprocket (3.2/3.5L).
ENGINE STALLS OR IDLES ROUGH	1. Idle speed too low.	1. Test minimum air flow. Refer to FUEL SYSTEM.
	2. Incorrect fuel mixture.	2. Refer to FUEL SYSTEM.
	3. Intake manifold leakage.	3. Inspect intake manifold, manifold gasket, and vacuum hoses.
	4. Faulty coil(s).	4. Test and replace as necessary. Refer to IGNITION SYSTEM.
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped plugs.	1. Clean plugs and set gap. Refer to IGNITION SYSTEM.
	2. Contamination in fuel system.	2. Clean system and replace fuel filter.
	3. Faulty fuel pump.	3. Test and replace as necessary. Refer to FUEL SYSTEM.
	4. Incorrect valve timing.	4. Correct valve timing.
	5. Leaking cylinder head gasket.	5. Replace cylinder head gasket.
	6. Low compression.	6. Test compression of each cylinder.
	7. Burned, warped, or pitted valves.	7. Replace valves.
	8. Plugged or restricted exhaust system.	8. Install new parts, as necessary.
	9. Faulty coil(s).	9. Test and replace as necessary. Refer to IGNITION SYSTEM.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Clean spark plugs and set gap. Refer to IGNITION SYSTEM.
	2. Contamination in Fuel System.	2. Clean fuel system and replace fuel filter.
	3. Burned, warped, or pitted valves.	3. Replace valves.
	4. Faulty coil(s).	4. Test and replace as necessary. Refer to IGNITION SYSTEM.
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap.	1. Clean spark plugs and set gap. Refer to IGNITION SYSTEM.
	2. Faulty coil(s).	2. Test and replace as necessary. Refer to IGNITION SYSTEM.
	3. Dirty fuel injector(s).	Test and replace as necessary. Refer to FUEL SYSTEM.
	4. Contamination in fuel system.	4. Clean system and replace fuel filter.

ENGINE DIAGNOSIS—MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES	1. High or low oil level in crankcase.	1. Check and correct engine oil level.
	2. Thin or diluted oil.	2. Change oil to correct viscosity.
	3. Low oil pressure.	3. Check and correct engine oil level.
	4. Dirt in tappets/lash adjusters.	4. Replace rocker arm/hydraulic lash adjuster assembly.
	5. Worn rocker arms.	5. Inspect oil supply to rocker arms.
	6. Worn tappets/lash adjusters.	6. Install new rocker arm/hydraulic lash adjuster assembly.
	7. Worn valve guides.	7. Ream guides and install new valves with oversize stems.
	8. Excessive runout of valve seats on valve faces.	8. Grind valve seats and valves.
	9. Missing adjuster pivot.	9. Replace rocker arm/hydraulic lash adjuster assembly.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Connecting rod journal out-of-round.	5. Replace crankshaft or grind surface.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check thrust bearing for wear on flanges.
	6. Crankshaft journal out-of-round or worn.	6. Replace crankshaft or grind journals.
	7. Loose flywheel or torque converter.	7. Tighten to correct torque.
OIL PRESSURE DROP	1. Low oil level.	1. Check engine oil level.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Low oil pressure.	3. Check sending unit and main bearing oil clearance.
	4. Clogged oil filter.	4. Install new oil filter.
	5. Worn parts in oil pump.	5. Replace worn parts or pump.
	6. Thin or diluted oil.	6. Change oil to correct viscosity.
	7. Oil pump relief valve stuck.	7. Remove valve and inspect, clean, or replace.
	8. Oil pump suction tube loose.	8. Remove oil pan and install new tube or clean, if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Excessive bearing clearance.	10. Measure bearings for correct clearance.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket(s).
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Misaligned or deteriorated cup or threaded plug.	3. Replace as necessary.
OIL CONSUMPTION OR SPARK PLUGS FOULED	1. PCV system malfunction.	1. Check system and repair as necessary. Refer to EMISSION CONTROL SYSTEMS.
	2. Worn, scuffed or broken rings.	2. Hone cylinder bores. Install new rings.
	3. Carbon in oil ring slots.	3. Install new rings.
	4. Rings fitted too tightly in grooves.	4. Remove rings and check grooves. If groove is not proper width, replace piston.
	5. Worn valve guide(s).	5. Ream guide(s) and replace valve(s) with oversize valve(s) and seal(s).
	6. Valve stem seal(s) worn or damaged.	6. Replace seal(s).

DIAGNOSIS AND TESTING (Continued)

CHECKING ENGINE OIL PRESSURE

Check oil pressure using gauge at oil pressure switch location. Oil pressure should be 34 kPa (5 psi) at idle or 205 to 724 kPa (30 to 105 psi.) at 3000 RPM.

(1) Remove pressure sending unit. The pressure sending unit is located on the left front of engine near the oil filter.

(2) Install oil pressure gauge.

CAUTION: If oil pressure is 0 at idle, Do Not Run engine at 3000 RPM.

(3) Warm engine to normal operating temperature.

VALVE SPRING TESTING

VALVE SPRING IDENTIFICATION

The valve springs are of two different lengths and are wound in different directions. The valve springs are color coded: the intake spring has a right hand coil direction with orange dye on the top coils and the exhaust spring has a left hand coil direction with yellow dye on the top coils (Fig. 12).

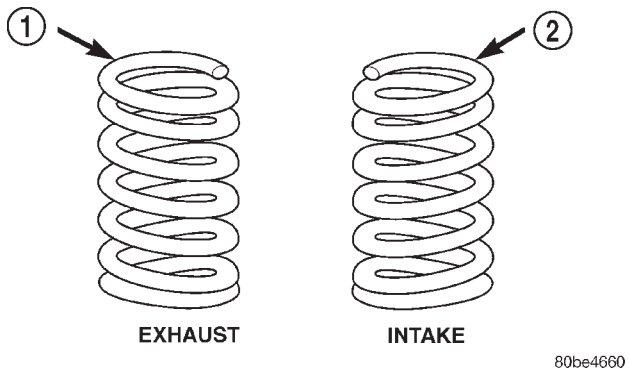


Fig. 12 Valve Spring Identification

1 – YELLOW DYE
2 – ORANGE DYE

TESTING VALVE SPRINGS

When valves have been removed for inspection, reconditioning or replacement, valve springs should be tested (Fig. 13). **As an example;** the compression length of the spring to be tested is 38.00 mm (1.496 in.). Turn table of Tool C-647 until surface is in line with the 38.00 mm (1.496 inches.) mark on the threaded stud and the zero mark on the front. Place spring over stud on the table and lift compressing lever to set tone device. Pull on torque wrench until ping is heard. Take reading on torque wrench at this instant. Multiply this reading by two. This will give the spring load at test length. Fractional measurements are indicated on the table for finer adjustments. Refer to Specifications Section to obtain specified height and allowable tensions. Replace springs that do not meet specifications.

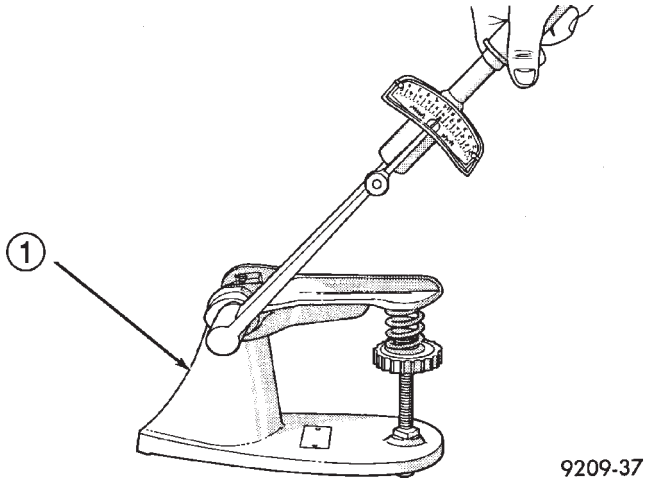


Fig. 13 Testing Valve Spring with Tool C-647

1 – SPECIAL TOOL C-647

INTAKE MANIFOLD LEAKAGE DIAGNOSIS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING. DO NOT STAND IN A DIRECT LINE WITH THE FAN. DO NOT PUT YOUR HANDS NEAR THE PULLEYS, BELTS OR THE FAN. DO NOT WEAR LOOSE CLOTHING.

(1) Start the engine.

(2) Spray a small stream of water (Spray Bottle) at the suspected leak area.

(3) If engine RPM'S change, the area of the suspected leak has been found.

(4) Repair as required.

CYLINDER COMPRESSION PRESSURE TEST

The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

(1) Check engine oil level and add oil if necessary.

(2) Drive the vehicle until engine reaches normal operating temperature. Select a route free from traffic and other forms of congestion, observe all traffic laws, and accelerate through the gears several times briskly.

(3) Remove all spark plugs from engine. As spark plugs are being removed, check electrodes for abnor-

DIAGNOSIS AND TESTING (Continued)

mal firing indicators fouled, hot, oily, etc. Record cylinder number of spark plug for future reference.

(4) Disconnect coil wire from distributor and secure to good ground to prevent a spark from starting a fire (Conventional Ignition System). For Direct Ignition System DIS disconnect the coil connector.

(5) Be sure throttle blade is fully open during the compression check.

(6) Insert compression gage adaptor Special Tool 8116 or the equivalent, into the #1 spark plug hole in cylinder head. Connect the 0–500 psi (Blue) pressure transducer with cable adaptors to the DRBIII®.

(7) Crank engine until maximum pressure is reached on gage. Record this pressure as #1 cylinder pressure.

(8) Repeat the previous step for all remaining cylinders.

(9) Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.

(10) If one or more cylinders have abnormally low compression pressures, repeat the compression test.

(11) If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question. **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

WARNING: DO NOT REMOVE THE RADIATOR CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

Check the coolant level and fill as required. DO NOT install the radiator cap.

Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.

Clean spark plug recesses with compressed air.

Remove the spark plugs.

Remove the oil filler cap.

Remove the air cleaner.

Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum, with 552 kPa (80 psi) recommended.

Perform the test procedures on each cylinder according to the tester manufacturer's instructions. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

All gauge pressure indications should be equal, with no more than 25% leakage per cylinder.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

CYLINDER HEAD GASKET FAILURE DIAGNOSIS

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

- Possible indications of the cylinder head gasket leaking between adjacent cylinders are:
- Loss of engine power
- Engine misfiring
- Poor fuel economy
- Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:
- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test in this section. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50–70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

DIAGNOSIS AND TESTING (Continued)

COOLING SYSTEM TESTER METHOD

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

LASH ADJUSTER (TAPPET) NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of a NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following chart indicating possible lash adjuster (tappet) noise sources and possible sources that could lead to a misdiagnosis.

Refer to Lash Adjuster (Tappet) Noise Chart for Possible Causes and Correction of a lash adjuster (tappet) type noise.

POSSIBLE NOISE SOURCES	POSSIBLE NOISE MISDIAGNOSIS SOURCES
Spongy/soft/aerated lash adjusters.	SRV valve axle chatter.
Missing lash adjuster swivel contact pads.	Exhaust rocker arm-to-cylinder head cover contact.
Intake rocker-to-camshaft bearing journal contact.	Piston pin bore fit.
Rocker arm bind-up.	Timing drive hydraulic tensioner tick.
Intake rocker arm-to-spark plug tube contact.	Accessory drive belt deterioration.
Excessive cam end play.	Piston-to-bore clearance knock.
Broken valve spring.	Crankshaft bearing noise.
Broken/loose camshaft sprocket bolt.	
Incomplete cam lobe machining.	
Cracked lash adjuster cartridge body.	

DIAGNOSIS AND TESTING (Continued)

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level—too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct engine oil level.
2. Insufficient running time after rebuilding cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in lash adjuster (after 1 hour run time).	3. See below: (a) Check lash adjusters for sponginess while installed in cylinder head. Depress part of rocker arm over adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) Before proceeding, perform Lash Adjuster Bleeding procedure. (c) If lash adjuster(s) are still spongy, replace with new adjuster/rocker arm assembly*.
4. Low oil pressure	4. See below: (a) Check and correct engine oil level. (b) Check engine oil pressure. (c) Check for excessive bearing clearance and correct. (d) Check for worn oil pump.
5. Oil passage to cylinder head(s) plugged with debris.	5. Check cylinder head oil passages and cylinder head gasket restrictor for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Ream guide(s) and replace valve(s) with oversize valves and seal(s).
7. Air injested into oil due to broken or cracked oil pump pickup tube.	7. Inspect pickup tube and replace as necessary.
8. Collapsed lash adjuster due to debris injestion.	8. Clean debris from engine and replace lash adjuster/rocker assembly*.
9. Intake rocker arm roller clevis ear(s) contacting camshaft bearing journal(s) on side.	9. Inspect camshaft end play and all valve train components for wear. Replace as necessary.
***3.2/3.5L engine lash adjusters are serviced with the rocker arms—do not disassemble.**	

ENGINE OIL LEAK INSPECTION

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

(1) Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.

(2) Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.

(3) Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service manual instructions.

(4) If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

DIAGNOSIS AND TESTING (Continued)

(5) **If the oil leak source is not positively identified at this time**, proceed with the air leak detection test method as follows:

- Disconnect the fresh air hose (make-up air) at the cylinder head cover and plug or cap the nipple on the cover.
- Remove the PCV valve hose from the cylinder head cover. Cap or plug the PCV valve nipple on the cover.
- Attach an air hose with pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kpa (3 PSI) of test pressure.

- Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provides the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service manual procedures.
- If the leakage occurs at the crankshaft rear oil seal area, refer to the section, Inspection for Rear Seal Area Leak.

(6) If no leaks are detected, turn off the air supply. Remove the air hose, all plugs, and caps. Install the PCV valve and fresh air hose (make-up air). Proceed to next step.

(7) Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

NOTE: If oil leakage is observed at the dipstick tube to block location; remove the tube, clean and reseal using Mopar® Stud & Bearing Mount (press fit tube applications only), and for O-ring style tubes, remove tube and replace the O-ring seal.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

(1) Disconnect the battery.

(2) Raise the vehicle.

(3) Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak. If a leak is present in this area, remove transmission for further inspection.

(a) Circular spray pattern generally indicates seal leakage or crankshaft damage.

(b) Where leakage tends to run straight down, possible causes are a porous block, oil gallery cup plug, bedplate to cylinder block mating surfaces and seal bore. See proper repair procedures for these items.

(4) If no leaks are detected, pressurize the crankcase as previously described.

CAUTION: Do not exceed 20.6 kPa (3 psi).

(5) If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

(6) For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

(7) After the oil leak root cause and appropriate corrective action have been identified, refer to Crankshaft Oil Seal—Rear for proper replacement procedures.

SERVICE PROCEDURES

ENGINE OIL LEVEL—CHECKING

The best time to check engine oil level is after it has sat overnight, or if the engine has been running, allow the engine to be shut off for at least 5 minutes before checking oil level.

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading (Fig. 14). Add only when the level is at or below the ADD mark.

SERVICE PROCEDURES (Continued)

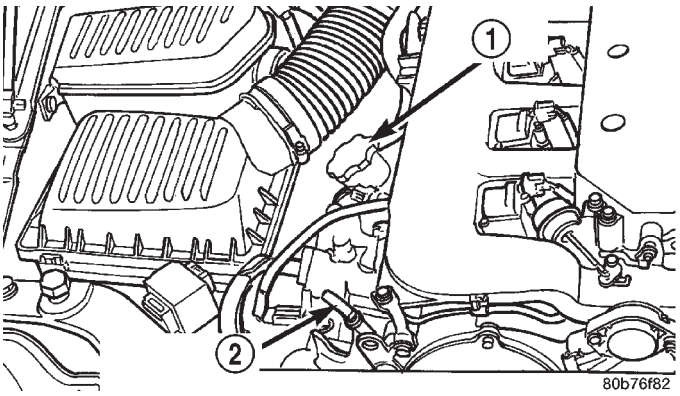


Fig. 14 Engine Oil Fill and Dipstick Locations—3.2/3.5L

1 – ENGINE OIL FILL
2 – ENGINE OIL DIPSTICK

ENGINE OIL SERVICE

WARNING: NEW OR USED ENGINE OIL CAN BE IRRITATING TO THE SKIN. AVOID PROLONGED OR REPEATED SKIN CONTACT WITH ENGINE OIL. CONTAMINANTS IN USED ENGINE OIL, CAUSED BY INTERNAL COMBUSTION, CAN BE HAZARDOUS TO YOUR HEALTH. THOROUGHLY WASH EXPOSED SKIN WITH SOAP AND WATER. DO NOT WASH SKIN WITH GASOLINE, DIESEL FUEL, THINNER, OR SOLVENTS, HEALTH PROBLEMS CAN RESULT. DO NOT POLLUTE, DISPOSE OF USED ENGINE OIL PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA.

API SERVICE GRADE CERTIFIED

Use an engine oil that is API Service Grade Certified. MOPAR® provides engine oils that conform to this service grade.

SAE VISCOSITY

An SAE viscosity grade is used to specify the viscosity of engine oil. Use only engine oils with multiple viscosities such as 5W-30 or 10W-30. The preferred viscosity oil for the 3.2/3.5L engine is 10W-30. These oils are specified with a dual SAE viscosity grade which indicates the cold-to-hot temperature viscosity range. Select an engine oil that is best suited to your particular temperature range and variation (Fig. 15).

ENERGY CONSERVING OIL

An Energy Conserving type oil is recommended for gasoline engines. The designation of ENERGY CONSERVING is located on the label of an engine oil container.

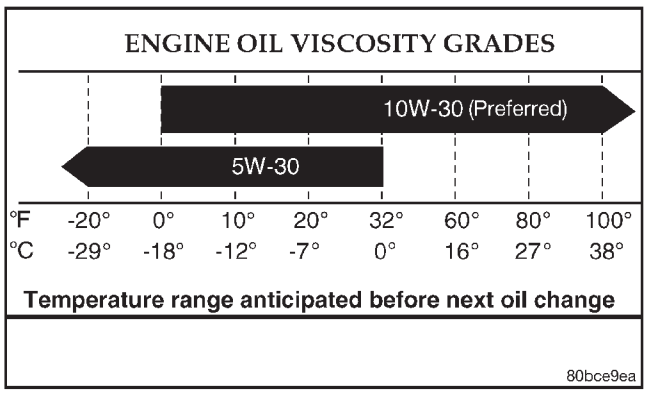


Fig. 15 Temperature/Engine Oil Viscosity—3.2/3.5L Engines

CONTAINER IDENTIFICATION

Standard engine oil identification notations have been adopted to aid in the proper selection of engine oil. The identifying notations are located on the label of engine oil plastic bottles and the top of engine oil cans (Fig. 16).



Fig. 16 Engine Oil Container Standard Notations

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in the Maintenance Schedule.

TO CHANGE ENGINE OIL

Run engine until achieving normal operating temperature.

(1) Position the vehicle on a level surface and turn engine off.

(2) Hoist and support vehicle on safety stands. Refer to Hoisting and Jacking Recommendations.

(3) Remove oil fill cap (Fig. 14).

(4) Place a suitable drain pan under crankcase drain.

(5) Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.

(6) Install drain plug in crankcase.

(7) Lower vehicle and fill crankcase with specified type and amount of engine oil (Fig. 14). Refer to Group 0, Lubrication and Maintenance.

(8) Install oil fill cap.

SERVICE PROCEDURES (Continued)

(9) Start engine and inspect for leaks.
(10) Stop engine and inspect oil level.

ENGINE OIL FILTER CHANGE

FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

OIL FILTER REMOVAL

Refer to Removal and Installation Section in Group 9, Engine for procedure.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

FORM-IN-PLACE GASKETS & SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II

Mopar® Engine RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV

Mopar® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER

Mopar® Gasket Maker is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® BED PLATE SEALANT

Mopar® Bed Plate Sealant is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bedplate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.

MOPAR® GASKET SEALANT

Mopar® Gasket Sealant is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material is used on engines with multi-layer steel (MLS) cylinder head gaskets. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can w/applicator.

FORM-IN-PLACE GASKET AND SEALER APPLICATION

Assembling parts using a form-in-place gasket requires care but it's easier then using precut gaskets.

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can w/applicator can be brushed on evenly over the

SERVICE PROCEDURES (Continued)

sealing surfaces. Material in an aerosol can should be used on engines with multi-layer steel gaskets.

ENGINE GASKET SURFACE PREPARATION

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper
- Abrasive pad or paper to clean cylinder block and head
- High speed power tool with an abrasive pad or a wire brush (Fig. 17)

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (Fig. 17)
- Drill motor with 3M Roloc™ Bristle Disc (white or yellow) (Fig. 17)

CAUTION: Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

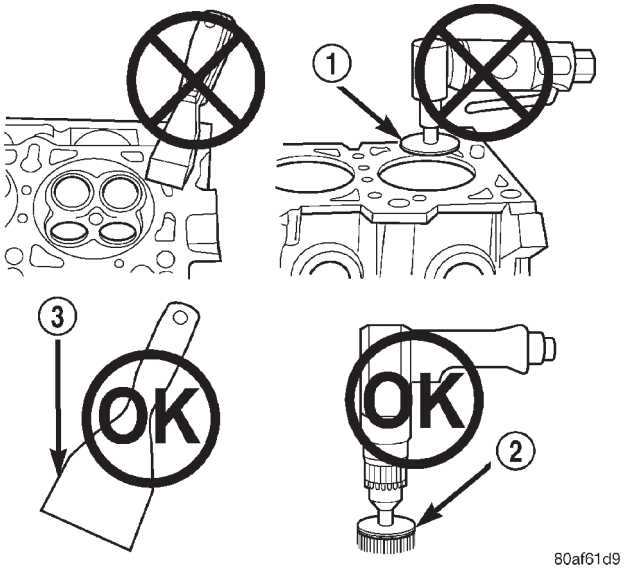


Fig. 17 Proper Tool Usage For Surface Preparation

1 – ABRASIVE PAD
2 – 3M ROLOC™ BRISTLE DISC
3 – PLASTIC/WOOD SCRAPER

REPAIR OF DAMAGED OR WORN THREADS

Damaged or worn threads (excluding spark plug and camshaft bearing cap attaching threads) can be repaired. Essentially, this repair consists of drilling out worn or damaged threads, tapping the hole with a special Heli-Coil Tap, (or equivalent) and installing an insert into the tapped hole. This brings the hole back to its original thread size.

CAUTION: Be sure that the tapped holes maintain the original centerline.

Heli-Coil tools and inserts are readily available from automotive parts jobbers.

CYLINDER BORE—HONING

(1) Used carefully, the cylinder bore resizing hone, recommended tool C-823 or equivalent, equipped with 220 grit stones, is the best tool for this honing procedure. In addition to deglazing, it will reduce taper and out-of-round as well as removing light scuffing, scoring or scratches. Usually a few strokes will clean up a bore and maintain the required limits.

(2) Deglazing of the cylinder walls may be done using a cylinder surfacing hone, recommended tool C-3501 or equivalent, equipped with 280 grit stones, if the cylinder bore is straight and round. 20–60 strokes depending on the bore condition, will be sufficient to provide a satisfactory surface. Inspect cylinder walls after each 20 strokes, using a light honing oil. **Do not use engine or transmission oil, mineral spirits or kerosene.**

(3) Honing should be done by moving the hone up and down fast enough to get a cross-hatch pattern. When hone marks **intersect** at 50-60 degrees, the cross hatch angle is most satisfactory for proper seating of rings (Fig. 18).

(4) A controlled hone motor speed between 200–300 RPM is necessary to obtain the proper cross-hatch angle. The number of up and down strokes per minute can be regulated to get the desired 50–60 degree angle. Faster up and down strokes increase the cross-hatch angle.

(5) After honing, it is necessary that the block be cleaned again to remove all traces of abrasive.

CAUTION: Ensure all abrasives are removed from engine parts after honing. It is recommended that a solution of soap and hot water be used with a brush and the parts then thoroughly dried. The bore can be considered clean when it can be wiped clean with a white cloth and cloth remains clean. Oil the bores after cleaning to prevent rusting.

SERVICE PROCEDURES (Continued)

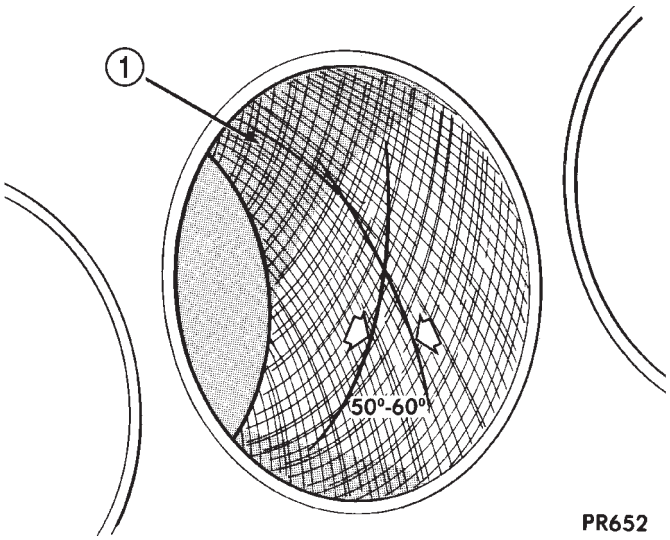


Fig. 18 Cylinder Bore Cross-Hatch Pattern
1 – CROSS-HATCH PATTERN

HYDROSTATIC LOCKED ENGINE

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

CAUTION: DO NOT use starter motor to rotate the engine, severe damage may occur.

(1) Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.
(2) Remove negative battery cable.
(3) Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.
(4) With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.
(5) Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).
(6) Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.)
(7) Repair engine or components as necessary to prevent this problem from re-occurring.

CAUTION: Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

(8) Install new spark plugs.
(9) Drain engine oil and remove oil filter.
(10) Fill engine with specified amount of approved oil and install new oil filter.
(11) Connect negative battery cable.
(12) Start engine and check for any leaks.

LASH ADJUSTER—BLEEDING

Use this procedure to manually bleed aerated oil from the lash adjuster and remove sponginess.
(1) Run the engine, bringing it to operating temperature in order to freshly pressurize and warm the valvetrain system oil supply.
(2) Remove cylinder head cover(s).
(3) Ensure the rocker arm is positioned on the base circle of the cam (Fig. 19). Rotate engine as necessary.
(4) For intake rocker arm positions:
(a) Adjust Special Tool 8351 Release Probe's gauge pin to extend approximately 20 mm (0.787 in.). Then, carefully insert the release probe gauge pin into the lash adjuster service access hole (Fig. 20).

CAUTION: If probe tip breaks off within the lash adjuster, replace the affected rocker arm.

(b) Gently unseat lash adjuster's internal check ball.
(c) While the internal check ball is held unseated, press the rocker arm into the valve tip, allowing the lash adjuster to fully collapse. Hold this fully collapsed position for about one second, or longer.
(d) Slowly release the rocker arm, thereby allowing the lash adjuster to extend, which in turn refills the high pressure chamber with non-aerated oil.
(e) Remove probe to allow check ball to seat.
(f) Recheck for sponginess. If the lash adjuster sponginess is not completely or nearly eliminated, then repeat procedure.
(g) If the spongy condition cannot be removed, replace effected rocker arm(s).
(5) For exhaust rocker arm positions:
(a) Adjust Special Tool 8351 Release Probe's gauge pin to extend approximately 20 mm (0.787 in.). Then, using two release probes, carefully insert gauge pins into the lash adjuster service access holes (Fig. 20).

CAUTION: If probe tip breaks off within the lash adjuster, replace the affected rocker arm.

(b) Gently unseat BOTH lash adjuster's internal check ball at the same time.
(c) While the internal check ball is held unseated, press the rocker arm into the valve tip, allowing the lash adjuster to fully collapse. Hold this fully collapsed position for about one second, or longer.
(d) Slowly release the rocker arm, thereby allowing the lash adjuster to extend, which in turn

SERVICE PROCEDURES (Continued)

refills the high pressure chamber with non-aerated oil.

(e) Remove probes to allow check balls to seat.

(f) Recheck for sponginess. If the lash adjuster sponginess is not completely or nearly eliminated, then repeat procedure.

(g) If the spongy condition cannot be removed, replace effected rocker arm(s).

(6) Install cylinder head cover(s).

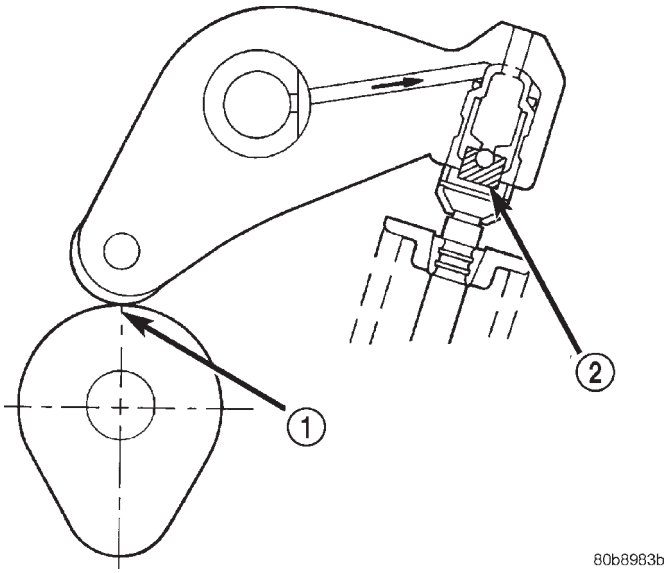


Fig. 19 Rocker Arm Positioned On Base Circle Of Camshaft

1 – CAMSHAFT BASE CIRCLE
2 – HIGH-PRESSURE CHAMBER

PISTONS

Pistons are machined to two different weight specifications and matched to rods based on weight. All piston and rod assemblies weigh the same to maintain engine balance.

FITTING PISTONS

Piston and cylinder wall must be clean and dry. Piston diameter should be measured 90 degrees to piston pin at size location shown in (Fig. 21). Cylinder bores should be measured halfway down the cylinder bore and transverse to the engine crankshaft center line. Refer to Engine Specifications. **Pistons and cylinder bores should be measured at normal room temperature, 70°F (21°C).**

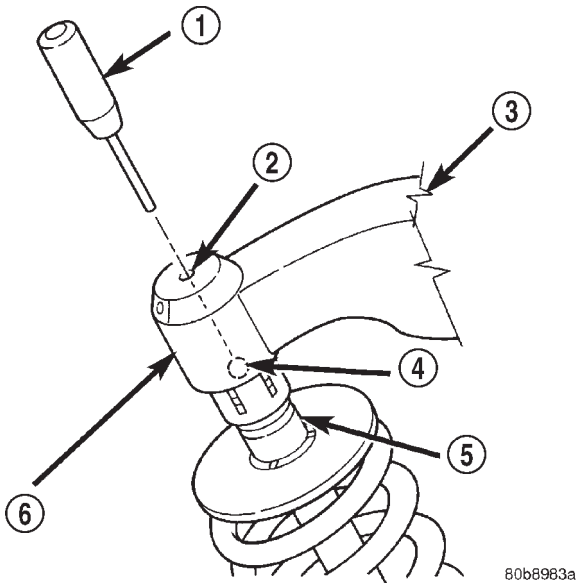


Fig. 20 Purging Air From Lash Adjuster

1 – SPECIAL TOOL 8351
2 – OIL AIR RELIEF SERVICE ACCESS HOLE
3 – ROCKER ARM ASSY
4 – INTERNAL CHECK BALL
5 – VALVE TIP
6 – HYDRAULIC LASH ADJUSTER WITHIN ROCKER ARM

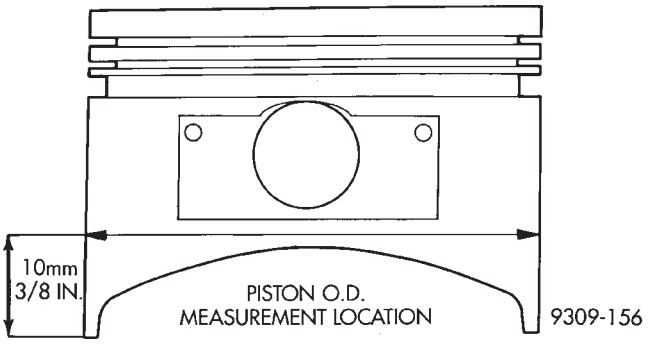


Fig. 21 Piston Measurements

PISTON PINS

The piston pin is full floating and is held in place by lock rings. Pistons and rods are weight matched for balance. **Do Not switch pistons with other rods.** Piston and Rods are serviced as an assembly for balance.

SERVICE PROCEDURES (Continued)

PISTON RING—FITTING

(1) Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 12 mm (0.50 inch.) from bottom of cylinder bore. Check gap with feeler gauge (Fig. 22). Refer to Engine Specifications.

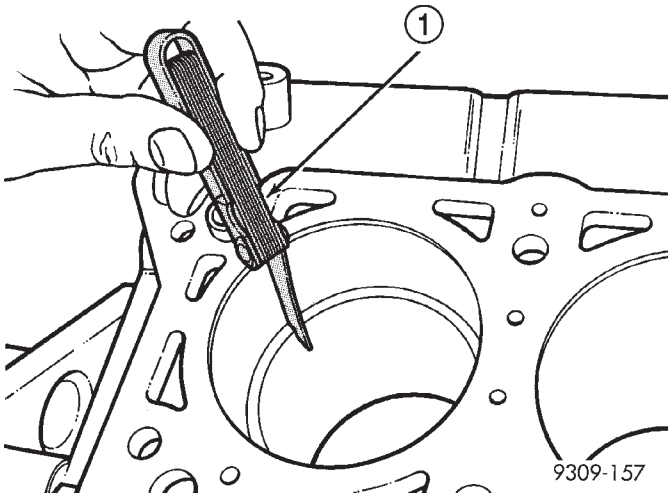


Fig. 22 Check Gap on Piston Rings

1 – FEELER GAUGE

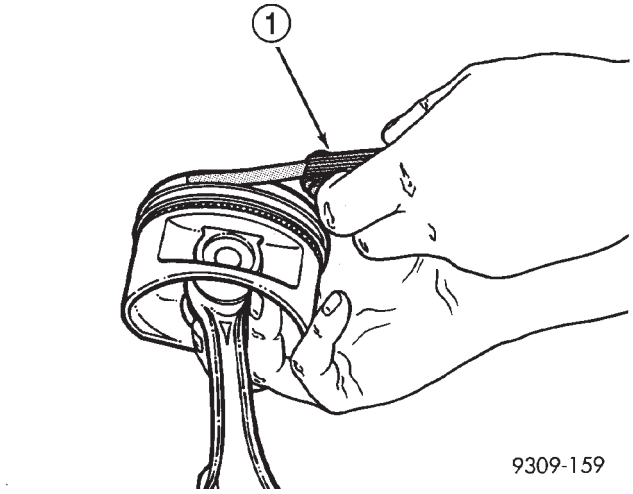


Fig. 23 Measuring Piston Ring Side Clearance

1 – FEELER GAUGE

(2) Check piston ring to groove clearance: (Fig. 23). Refer to Engine Specifications.

PISTON RINGS—INSTALLATION

(1) The No. 1 and No. 2 piston rings have a different cross section. Insure that the No. 2 ring is installed with manufacturers I.D. mark (dot) facing up, towards top of the piston (Fig. 24).

CAUTION: Install piston rings in the following order:

(2) Oil ring expander.
(3) Upper oil ring side rail.
(4) Lower oil ring side rail.
(5) No. 2 Intermediate piston ring.
(6) No. 1 Upper piston ring.
(7) Install the side rail by placing one end between the piston ring groove and the expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander during this step (Fig. 25).**

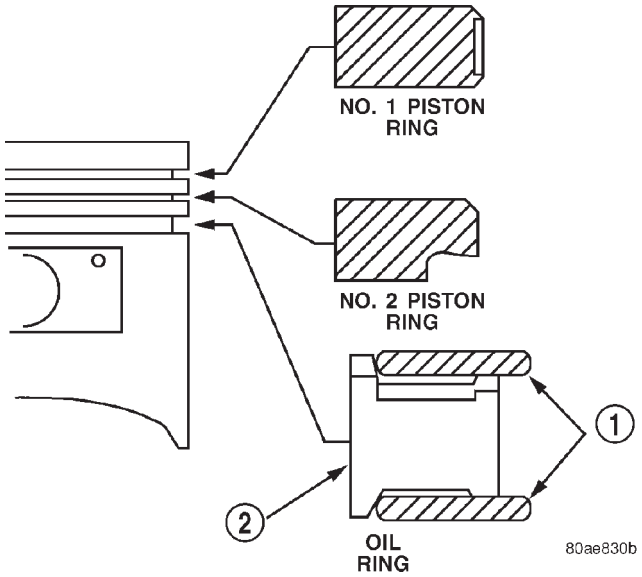


Fig. 24 Piston Ring—Installation

1 – SIDE RAIL
2 – SPACER EXPANDER

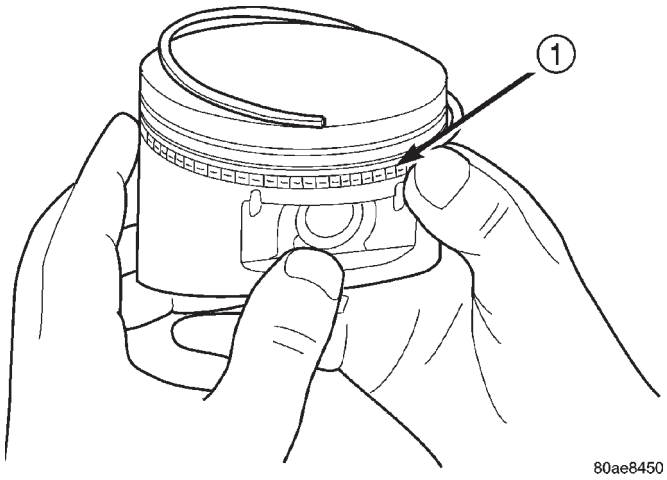


Fig. 25 Side Rail—Installation

1 – SIDE RAIL END

SERVICE PROCEDURES (Continued)

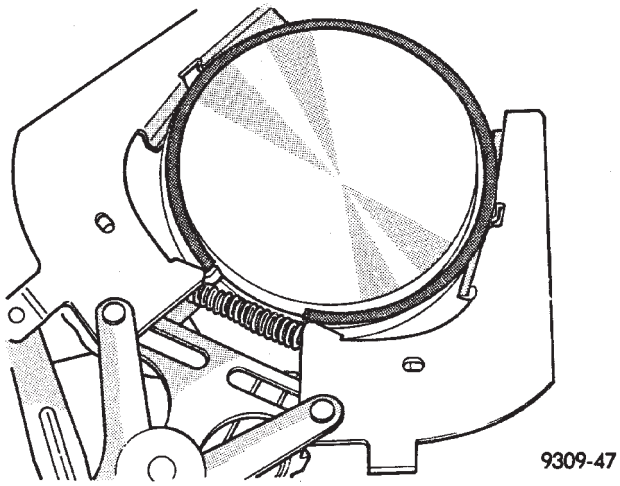


Fig. 26 Upper and Intermediate Rings—Installation

(8) Install upper side rail first and then the lower side rail.

(9) Install No. 2 piston ring and then No. 1 piston ring (Fig. 26).

(10) Position piston ring end gaps as shown in (Fig. 27).

(11) Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

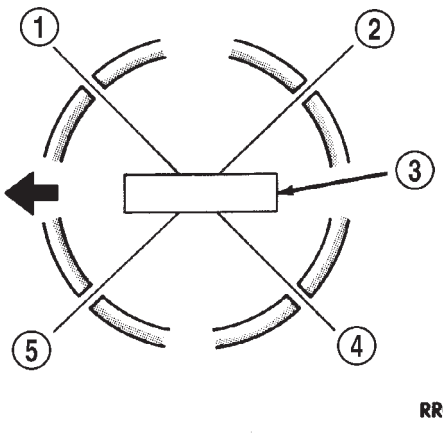


Fig. 27 Piston Ring End Gap Position

1 – SIDE RAIL UPPER
2 – NO. 1 RING GAP
3 – PISTON PIN
4 – SIDE RAIL LOWER
5 – NO. 2 RING GAP AND SPACER EXPANDER GAP

CONNECTING ROD BEARING—INSTALLATION

Fit all rods on one bank until complete.

The bearing caps are not interchangeable and should be marked at removal to insure correct assembly.

The bearing shells must be installed with the tangs inserted into the machined grooves in the rods and caps. Install cap with the tangs on the same side as the rod.

Limits of taper or out-of-round on any crankshaft journals should be held to 0.015 mm (0.0006 in.). Bearings are available in 0.025 mm (0.001 in.) and 0.254 mm (0.010 in.) undersize. **Install the bearings in pairs. Do not use a new bearing half with an old bearing half. Do not file the rods or bearing caps.**

(1) Follow procedure specified in the Standard Service Procedure Section for Measuring Main Bearing Clearance and Connecting Rod Bearing Clearance (Fig. 28). Refer to Engine Specifications.

NOTE: The rod bearing bolts should be examined before reuse. If the threads are necked down the bolts should be replaced (Fig. 29).

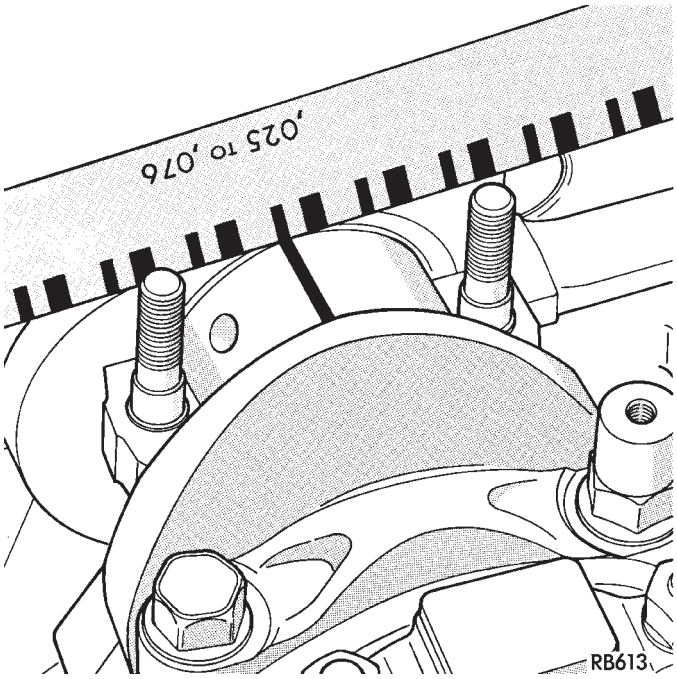


Fig. 28 Checking Connecting Rod Bearing Clearance—Typical

(2) Necking can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt should be replaced.

(3) Before installing the nuts the threads should be oiled with engine oil.

(4) Install nuts on each bolt finger tight then alternately torque each nut to assemble the cap properly.

(5) Tighten the nuts to 54 N·m PLUS 1/4 turn (40 ft. lbs. PLUS 1/4 turn).

(6) Using a feeler gauge, check connecting rod side clearance (Fig. 30). Refer to Engine Specifications.

SERVICE PROCEDURES (Continued)

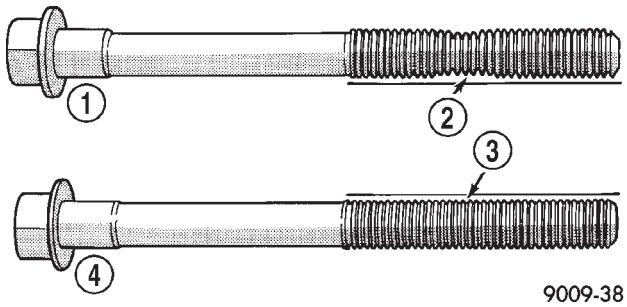


Fig. 29 Check for Stretched Bolts

1 – STRETCHED BOLT
2 – THREADS ARE NOT STRAIGHT ON LINE
3 – THREADS ARE STRAIGHT ON LINE
4 – UNSTRETCHED BOLT

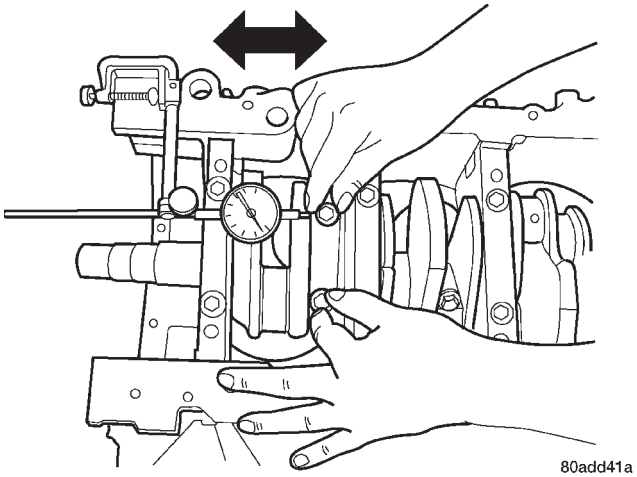


Fig. 30 Connecting Rod Side Clearance Measuring

CRANKSHAFT MAIN BEARING—FITTING

The main bearings are a "select fit" to achieve proper oil clearances. For main bearing selection, the block and crankshaft have grade identification marks.

The marks for the cylinder block main bore grade are located on the left side pan rail, just rear of the left engine mount bracket (Fig. 31). These grade marks (1, 2, or 3) are read left to right, corresponding to main bore 1, 2, 3, 4.

The grade marks for the crankshaft are located on the rearmost crankshaft counter weight as shown in (Fig. 32). The crankshaft journal grade marks (A, B, or C) are read left to right, corresponding with journal number 1, 2, 3, 4.

Use the Main Bearing Selection Chart to properly select the main bearings. For an example, if the main bore grade is 3 and the journal grade is B, the proper select fit bearing would be a (2) +0.003 mm (+0.0002 in.).

NOTE: Service main bearings have a number from (1 – 5) marked in ink on the bearing surface (Fig. 33). For verification, use the Main Bearing Selection Chart for number to size identification.

The upper main bearing has a oil feed hole and a center groove to allow lubrication of the main journal and must be properly positioned in the block.

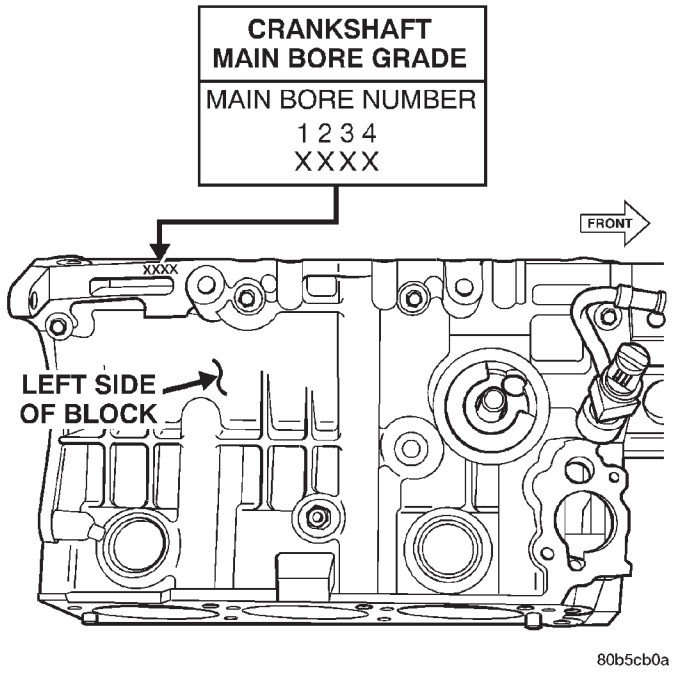


Fig. 31 Cylinder Block Main Bore Grade Marking Location

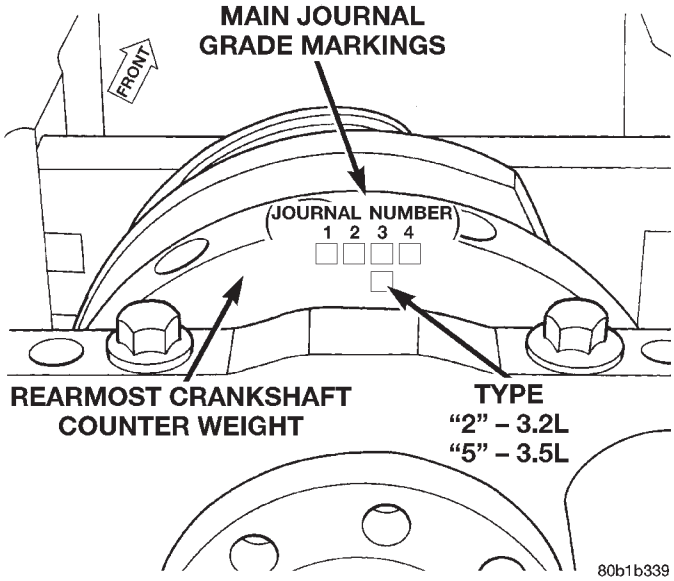


Fig. 32 Crankshaft Main Journal Grade Marking Location—Rear Of Block (Inverted) View

SERVICE PROCEDURES (Continued)

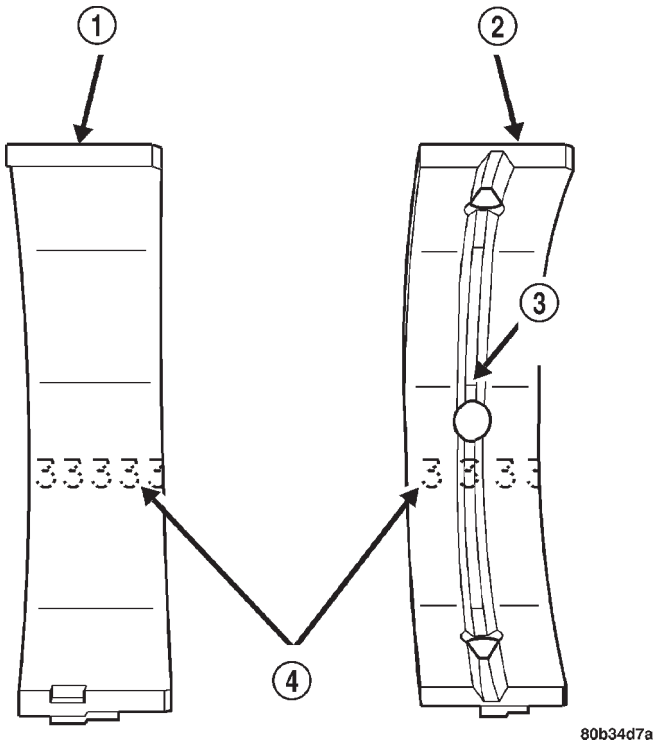


Fig. 33 Main Bearing Grade Marks

1 – LOWER MAIN BEARING
2 – UPPER MAIN BEARING
3 – OIL FEED HOLE AND GROOVE
4 – GRADE SELECTION INK MARKS

MAIN BEARING SELECTION CHART—3.2/3.5L

		Main Bearing Bore Grade Marks		
		1	2	3
Crankshaft Main Journal Grade Marks	A	(3) standard	(2) +003 mm (+0.0002 in.)	(1) +0.006 mm (+0.0003 in.)
	B	(4) -0.003 mm (-0.0002 in.)	(3) standard	(2) +003 mm (+0.0002 in.)
	C	(5) -0.006 mm (-0.0003 in.)	(4) -0.003 mm (-0.0002 in.)	(3) standard

CRANKSHAFT END PLAY—CHECKING

(1) Using Dial Indicator C-3339 and Mounting Post L-4438, attach to front of engine, locating probe perpendicular on nose of crankshaft (Fig. 34).

(2) Move crankshaft all the way to the rear of its travel.

(3) Zero the dial indicator.

(4) Move crankshaft all the way to the front and read the dial indicator. Refer to Engine Specifications.

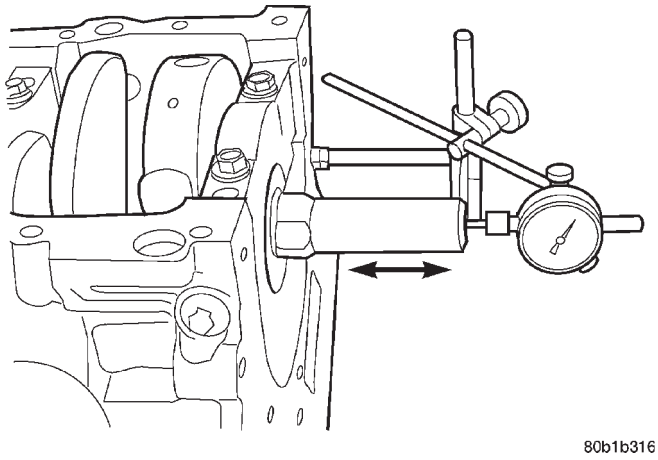


Fig. 34 Checking Crankshaft End Play

VALVE AND VALVE SEAT—REFACING

The intake and exhaust valves have a 44.5 to 45 degree face angle. The valve seats have a 45 to 45.5 degree face angle. The valve face and valve seat angles are shown in (Fig. 36).

VALVES

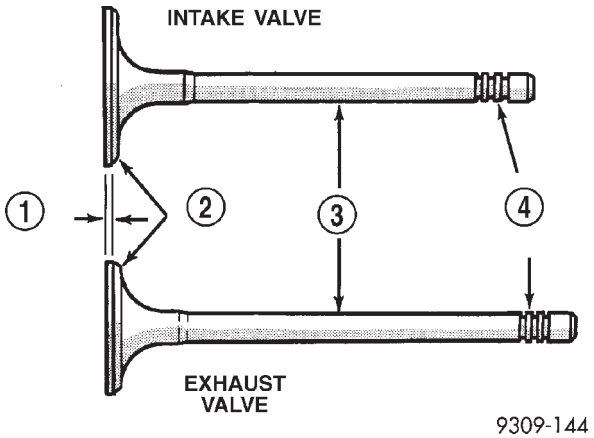


Fig. 35 Intake and Exhaust Valves

1 – MARGIN
2 – FACE
3 – STEM
4 – VALVE SPRING RETAINER LOCK GROOVES

(1) Inspect the remaining margin after the valves are refaced (Fig. 35). Refer to Engine Specifications.

SERVICE PROCEDURES (Continued)

VALVE SEATS

(1) When refacing valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

(2) Measure the concentricity of valve seat using dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.

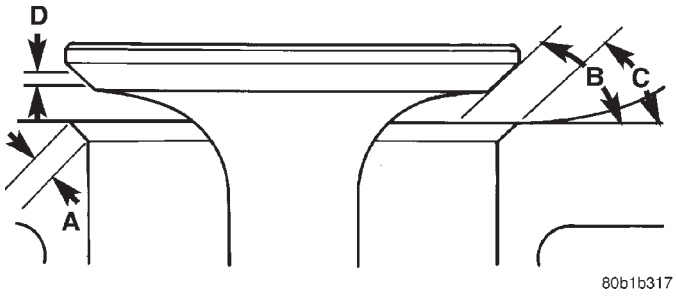


Fig. 36 Valve Seats

ITEM	DESCRIPTION	SPECIFICATION	
A	Seat Width	Intake: 0.75 – 1.25 mm (0.030 – 0.049 in.)	Exhaust: 1.25 – 1.75 mm (0.049 – 0.069 in.)
B	Face Angle	Intake & Exhaust: 44.5 – 45°	
C	Seat Angle	Intake & Exhaust: 45 – 45.5°	
D	Seat Contact Area	Valve to seat contact must be at center of valve face.	

(3) Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat valve seat **LIGHTLY** with Prussian blue then set valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of valve face, contact is satisfactory. If the blue is transferred to top edge of valve face, then lower valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of valve face, then raise valve seat with a 65 degree stone.

NOTE: Valve seats which are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise cylinder head must be replaced.

(4) When seat is properly positioned the width of the intake seats should be 0.75 to 1.25 mm (0.0296 to 0.0493 in.) and exhaust seats should be 1.25 to 1.75 mm (0.049 to 0.069 in.) (Fig. 36).

(5) Check the valve spring installed height after refacing the valve and seat (Fig. 38).

VALVE SPRING IDENTIFICATION

The valve springs are of two different lengths and are wound in different directions. The valve springs are color coded, intake spring is right hand coil direction with orange dye on the top coils and the exhaust spring is left hand coil direction with a yellow dye on the top coils (Fig. 37).

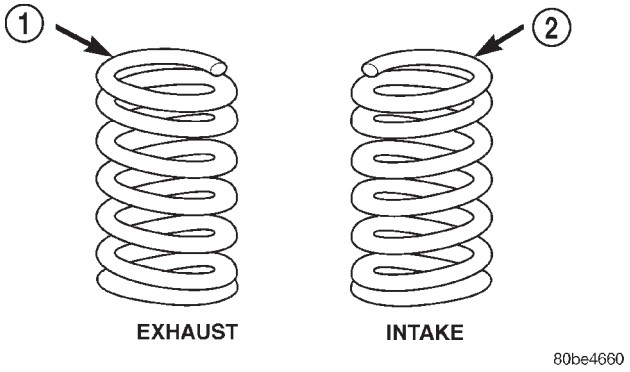


Fig. 37 Valve Spring Identification

1 – YELLOW DYE
2 – ORANGE DYE

VALVE INSTALLATION

(1) Coat valve stems with clean engine oil and insert them in cylinder head.

(2) If valves or seats have been reground, check valve tip height (A) (Fig. 38). If valve tip height is greater than 43.65 mm (1.7185 in.) intake or 45.98 mm (1.8102 in.) exhaust, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

(3) Install valve seal/spring seat assembly over valve guides on all valve stems (Fig. 39). Ensure that the garter spring is intact around the top of the rubber seal. Place valve springs (color-coded end facing up) and valve retainers into position.

(4) Compress valve springs with a valve spring compressor, install locks and release tool. **If valves and/or seats are reground, measure the installed height of springs (B) (Fig. 38), make sure measurements are taken from top of spring seat to the bottom surface of spring retainer.** If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

SERVICE PROCEDURES (Continued)

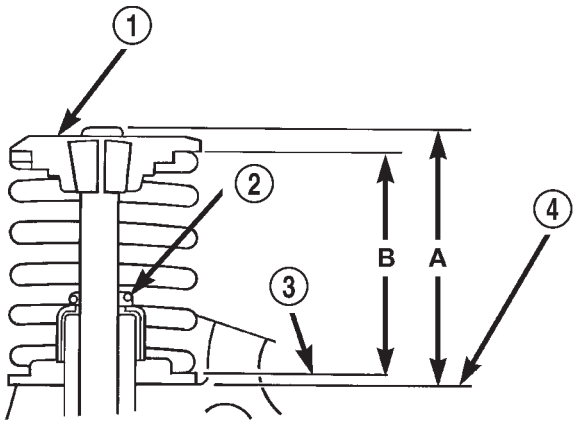


Fig. 38 Checking Valve Tip Height and Valve Spring Installed Height

1 – SPRING RETAINER
2 – GARTER SPRING
3 – VALVE SPRING SEAT TOP
4 – CYLINDER HEAD SURFACE

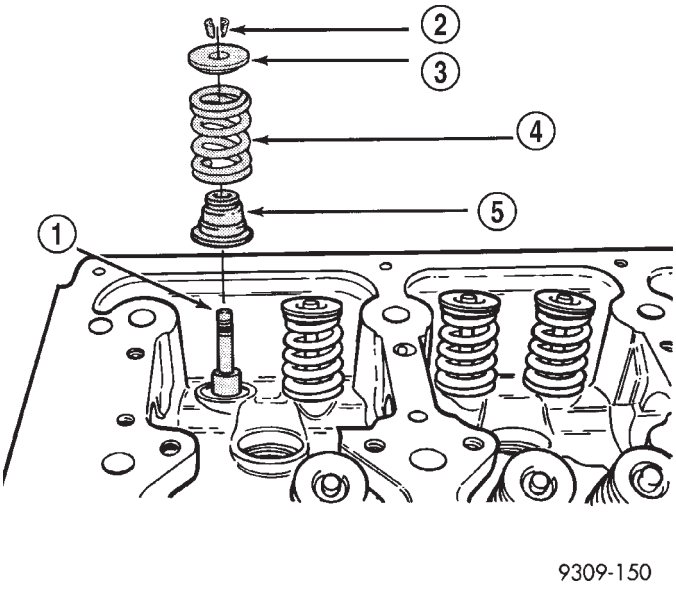


Fig. 39 Valve Seal and Spring—Installation

1 – VALVE
2 – VALVE RETAINING LOCKS
3 – VALVE SPRING RETAINER
4 – VALVE SPRING
5 – VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY

REMOVAL AND INSTALLATION

ENGINE MOUNTS—LEFT AND RIGHT

REMOVAL

(1) Raise vehicle on hoist.
(2) Remove the isolator attaching nuts from top of the mounting bracket (Fig. 40).
(3) Support the engine with a jack and a block of wood across the full width of the oil pan.
(4) Remove the lower attaching nuts from the bottom of the isolator to the frame (Fig. 40).
(5) Raise engine carefully with jack enough to remove the isolator with heat shield from its mount.

INSTALLATION

(1) Install isolator mount with heat shield onto the frame.
(2) Lower the engine onto the isolator mount.
(3) Remove jack from vehicle.
(4) Tighten the isolator to frame nuts to 61 N·m (45 ft. lbs.) (Fig. 40).
(5) Install the upper attaching nuts to mount and tighten to 61 N·m (45 ft. lbs.) (Fig. 40).
(6) Lower vehicle.

ENGINE HYDRO-MOUNT ISOLATORS

Engine hydro-mounts may show surface cracks, this will not effect performance and hydro-mount should not be replaced. Only replace the engine hydro-mounts when leaking fluid:

- Driveshaft Diagnosis. Refer to DIFFERENTIAL AND DRIVELINE.
- Any front end structural damage (after repair).
- Isolator replacement.

ENGINE MOUNT—REAR

REMOVAL

(1) Raise vehicle on hoist.
(2) Support transaxle with a jack.
(3) Remove isolator nuts from the mount to transaxle mount bracket (Fig. 40).
(4) Remove rear mount isolator bolts to crossmember and remove mount (Fig. 40).

INSTALLATION

(1) Position isolator onto crossmember.
(2) Install bolts attaching isolator to crossmember and tighten to 33 N·m (250 in. lbs.) (Fig. 40).
(3) Lower transaxle onto isolator.
(4) Install isolator nuts and tighten to 61 N·m (45 ft. lbs.) (Fig. 40).
(5) Lower vehicle.

STRUCTURAL COLLAR

REMOVAL

(1) Raise vehicle on hoist.
(2) Remove bolts attaching structural collar to oil pan and transmission housing (Fig. 41).
(3) Remove collar (Fig. 41).

REMOVAL AND INSTALLATION (Continued)

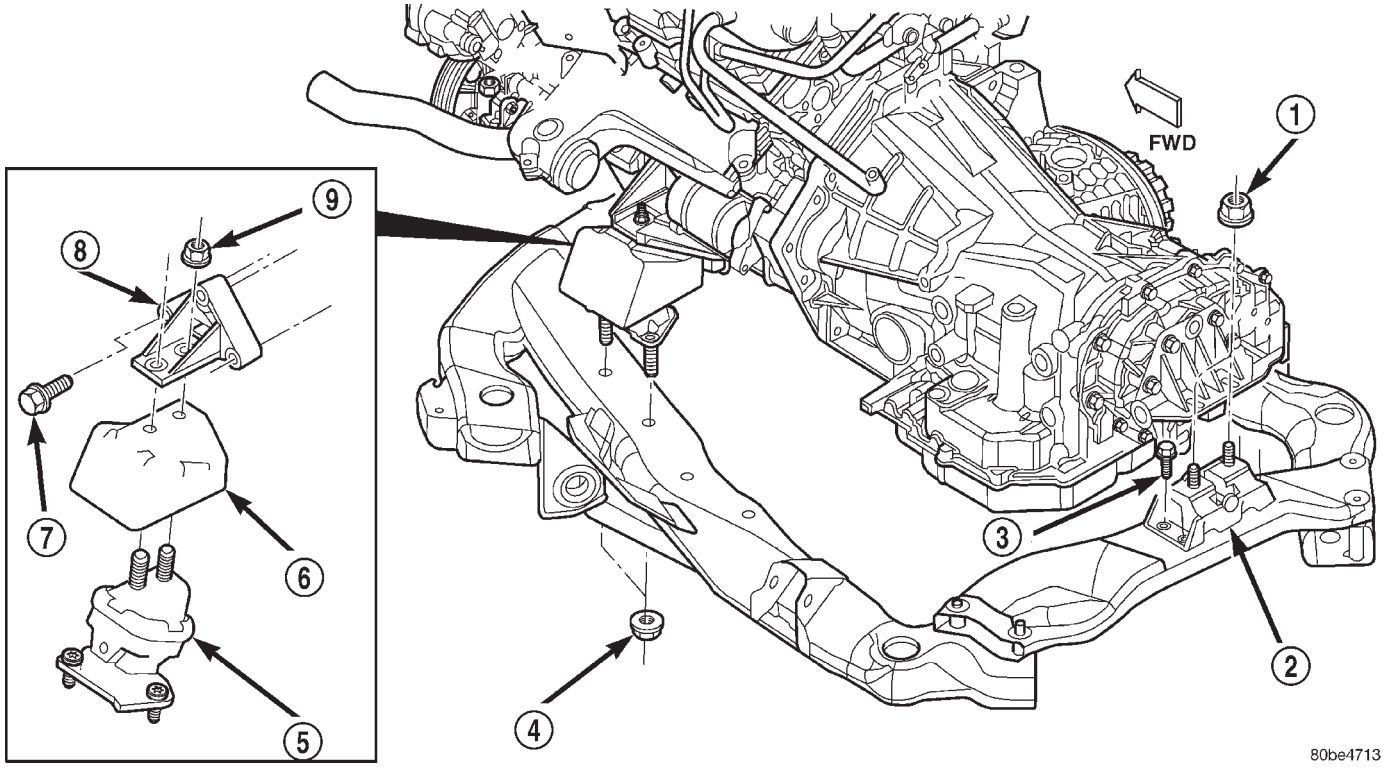


Fig. 40 Engine Mounting—Right, Left, and Rear

1 – NUT
2 – REAR ISOLATOR
3 – BOLT
4 – NUT
5 – ISOLATOR
6 – HEAT SHIELD
7 – BOLT
8 – ENGINE MOUNT BRACKET
9 – NUT

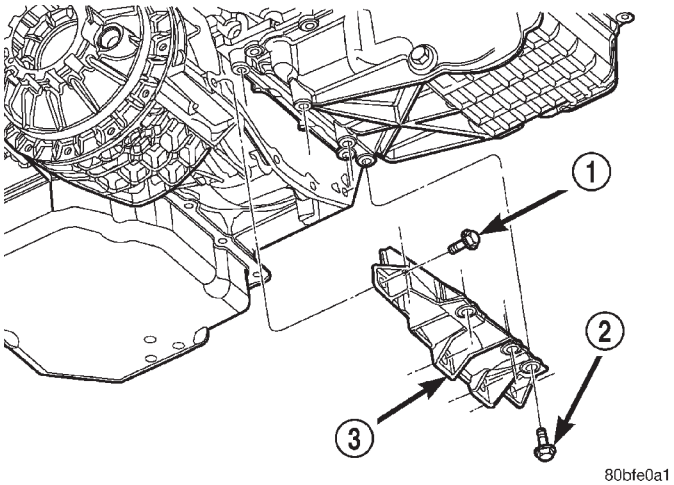


Fig. 41 Structural Collar

1 – BOLT-HORIZONTAL
2 – BOLT-VERTICAL
3 – STRUCTURAL COLLAR

INSTALLATION

CAUTION: The collar must be tighten using this service procedure, as damage to collar and/or oil pan may occur.

(1) Install structural collar (Fig. 41) using the following tightening sequence:

a. Install the **vertical** collar to oil pan bolts. Torque bolts initially to 1.1 N·m (10 in. lbs.).

b. Install the **horizontal** collar to transmission bolts and torque to 55 N·m (40 ft. lbs.).

c. Starting with the center vertical bolts and working outward, final torque bolts to 55 N·m (40 ft. lbs.).

(2) Lower vehicle.

REMOVAL AND INSTALLATION (Continued)

ENGINE ASSEMBLY

REMOVAL

(1) Disconnect negative cable at right strut tower (Fig. 42).
(2) Mark hood position at hinges and remove hood.
(3) Remove both wiper arms.
(4) Remove both cowl covers (Fig. 43).
(5) Remove cowl support (Fig. 44).
(6) Remove air cleaner assembly with air inlet hose (Fig. 45).
(7) Remove upper radiator crossmember. Refer to BODY for procedure.

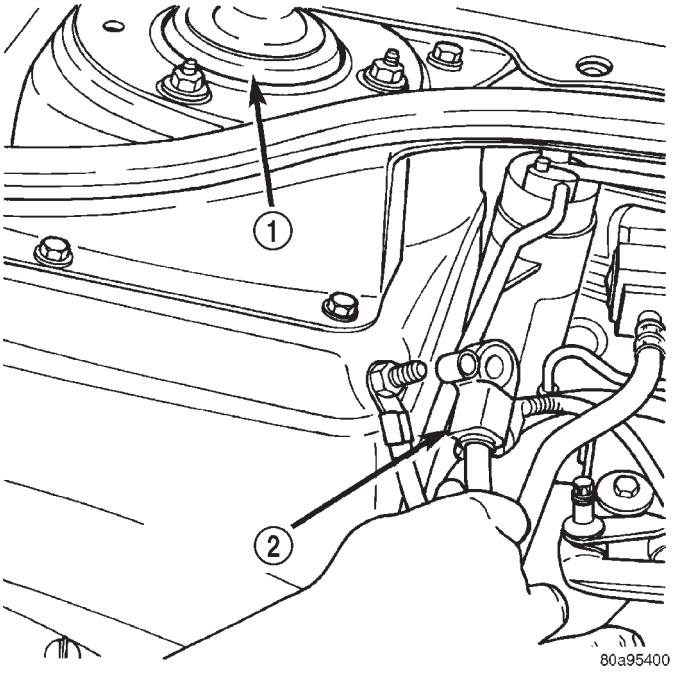


Fig. 42 Negative Cable—Disconnect

1 – RIGHT STRUT TOWER
2 – BATTERY NEGATIVE CABLE

(8) Disconnect hood release cable from hood latch.
(9) Drain cooling system. Refer to COOLING SYSTEM for procedure.
(10) Remove cooling fan module and accessory drive belts. Refer to COOLING SYSTEM for procedures.
(11) Disconnect upper radiator hose at engine.
(12) Disconnect lower radiator hose at radiator.
(13) Disconnect engine oil and transmission cooler lines at radiator.
(14) Remove power steering line bracket at left side of radiator.
(15) Remove fasteners attaching air conditioning condenser to radiator.
(16) Remove radiator.
(17) Remove generator.

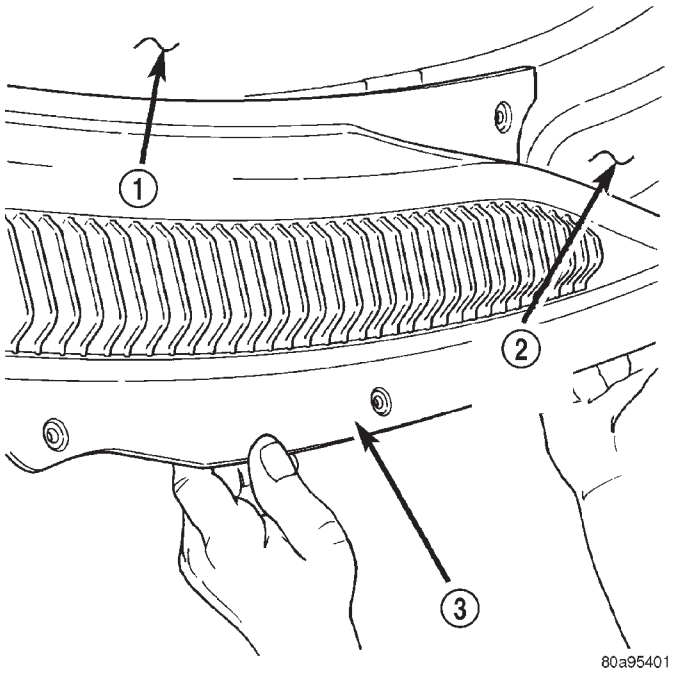


Fig. 43 Cowl Covers

1 – WINDSHIELD
2 – LEFT COWL COVER
3 – RIGHT COWL COVER

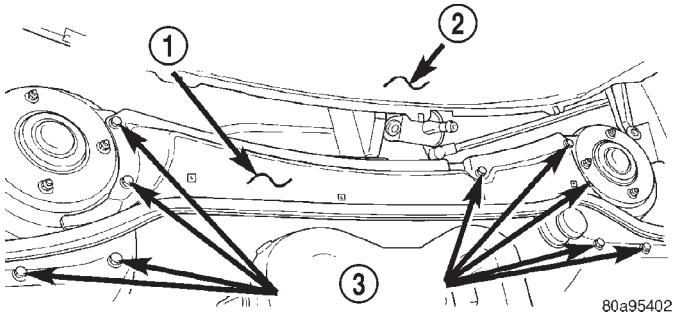


Fig. 44 Cowl Support

1 – COWL SUPPORT
2 – WINDSHIELD
3 – SUPPORT FASTENERS

(18) Remove power steering pump mounting bolts and set pump aside.
(19) Remove air conditioning compressor mounting bolts and set aside.
(20) Loosen and remove V-Band clamp at right exhaust manifold.
(21) Remove front and rear support bracket fasteners attaching right side catalytic converter down pipe.
(22) Release fuel pressure. Refer to FUEL SYSTEM for procedure.
(23) Disconnect fuel line.
(24) Disconnect throttle and speed control cables from bracket.

REMOVAL AND INSTALLATION (Continued)

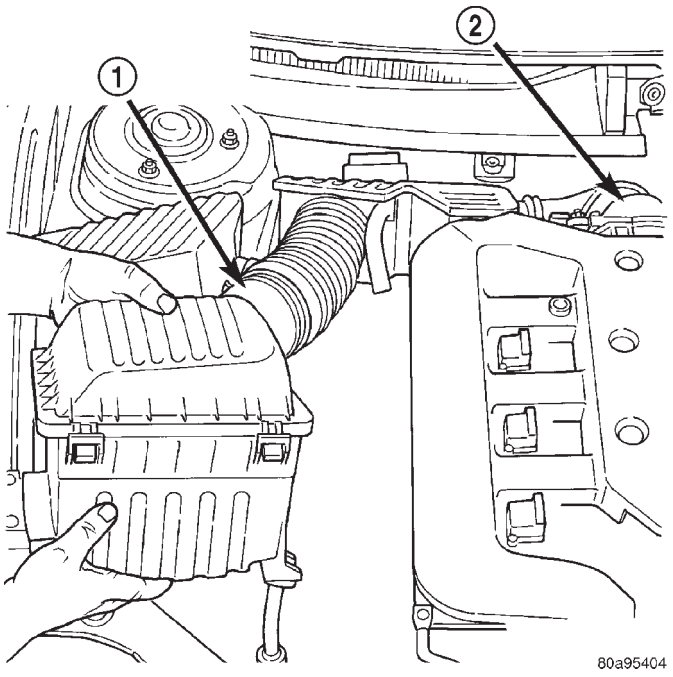


Fig. 45 Air Cleaner With Inlet Hose

1 – AIR CLEANER ASSEMBLY WITH AIR INLET HOSE
2 – THROTTLE BODY

(25) Disconnect both hoses at coolant bottle.
(26) Disconnect all vacuum hoses.
(27) Disconnect ground straps at both cylinder heads.

CAUTION: Upper Intake manifold is a composite design. Therefore, manifold should be removed before lifting engine or damage to the manifold could occur.

(28) Remove upper intake manifold. Cover intake manifold openings with tape.
(29) Disconnect heater hoses.
(30) Remove rear throttle body support bracket.
(31) Remove fastener for water pipe at transmission to block bolt.
(32) Remove four upper transmission to block bolts.
(33) Disconnect all electrical connections.
(34) Hoist vehicle.
(35) Drain engine oil.
(36) Remove structural collar and mark flex plate to torque converter position.
(37) Remove bolts holding torque converter to flex plate.
(38) Disconnect both transmission oil cooler line brackets from engine.
(39) Loosen and remove left exhaust manifold V-Band clamp.
(40) For starter removal, loosen the left converter exhaust pipe band clamp and exhaust pipe support bracket at transaxle.
(41) Remove starter.
(42) Remove left engine mount bolts.
(43) Remove right engine mount bolts.
(44) Remove crankshaft position sensor.
(45) Remove two lower transmission to block bolts.
(46) Lower vehicle.
(47) Attach lifting device to engine.
(48) Insert floor jack with small block of wood under transmission pan to support transmission.
(49) Hoist engine from engine compartment.

INSTALLATION

(1) Attach lifting device and lower engine into engine compartment.
(2) Align engine mounts and install fasteners but **do not tighten** until all mounting bolts have been installed.
(3) Install transmission case to engine block tighten bolts to 102 N·m (75 ft. lbs.).
(4) Remove engine lifting device.
(5) Raise vehicle.
(6) Tighten engine mount fastener to 61 N·m (45 ft. lbs.).
(7) Align flex plate to torque converter and install mounting bolts. Tighten bolts to 75 N·m (55 ft. lbs.).
(8) Install crankshaft position sensor.
(9) Install starter.
(10) Install new V-Band clamp at left side exhaust manifold to catalytic converter. Tighten V-Band clamp to 11 N·m (100 in. lbs.).
(11) Install left side catalytic converter down pipe support fastener at transaxle. Tighten fastener to 47 N·m (35 ft. lbs.).
(12) Tighten the left converter down pipe band clamp.
(13) Install the transmission oil cooler lines bracket to engine.
(14) Install structural collar. Refer to procedure in this section.
(15) Lower vehicle.
(16) Connect all electrical connections.
(17) Install four upper transmission to block bolts tighten to 102 N·m (75 ft. lbs.).
(18) Install water pipe and retaining fasteners to the transaxle/cylinder block double-ended bolts.
(19) Install rear throttle body support bracket.
(20) Connect heater hoses.
(21) Install upper intake manifold. Refer to procedure in this section.
(22) Connect ground straps at both cylinder heads.
(23) Connect all vacuum hoses.
(24) Connect both hoses at coolant bottle.

REMOVAL AND INSTALLATION (Continued)

(25) Connect throttle and speed control cables to bracket and throttle arm.
(26) Connect fuel line.
(27) Install new V-Band clamp at right exhaust manifold. Tighten V-Band clamp to 11 N·m (100 in. lbs.).
(28) Install and tighten right side catalytic converter down pipe support bracket fastener at transaxle mount.
(29) Install air conditioning compressor and tighten fasteners to 28 N·m (250 in. lbs.).
(30) Install power steering pump and tighten fasteners to 28 N·m (250 in. lbs.).
(31) Install generator.
(32) Install radiator.
(33) Attach air conditioning condenser to radiator.
(34) Install power steering line bracket to radiator.
(35) Connect engine oil and transmission cooler lines to radiator.
(36) Install lower radiator hose.
(37) Install upper radiator hose.
(38) Install accessory drive belts and cooling fan module. Refer to COOLING SYSTEM for procedures.
(39) Fill cooling system. Refer to COOLING SYSTEM for procedure.
(40) Fill engine with proper amount of oil.
(41) Connect hood release cable to hood latch and install upper radiator crossmember.
(42) Install air cleaner and air inlet hose.
(43) Install cowl support.
(44) Install both cowl covers.
(45) Install both wiper arms.
(46) Install hood.
(47) Connect negative cable.

CRANKSHAFT DAMPER

REMOVAL

(1) Disconnect negative cable at right strut tower.
(2) Remove upper radiator crossmember. Refer to BODY for procedure.
(3) Remove fan module. Refer to COOLING SYSTEM for procedure.
(4) Remove the accessory drive belts. Refer to COOLING SYSTEM for procedure.
(5) Use Special Tool 8191 to hold crankshaft damper while removing center bolt (Fig. 46).
(6) Use Special Tool 1023 puller, and insert C-4685-C2, remove crankshaft damper (Fig. 47).

INSTALLATION

(1) Install crankshaft damper using Special Tools C-4685-C1 (5.9 in.) Bolt, with Nut and Thrust Bearing from 6792, and 6792-1 Installer (Fig. 48). Install center bolt and tighten to 115 N·m (85 ft. lbs.) (Fig. 46).

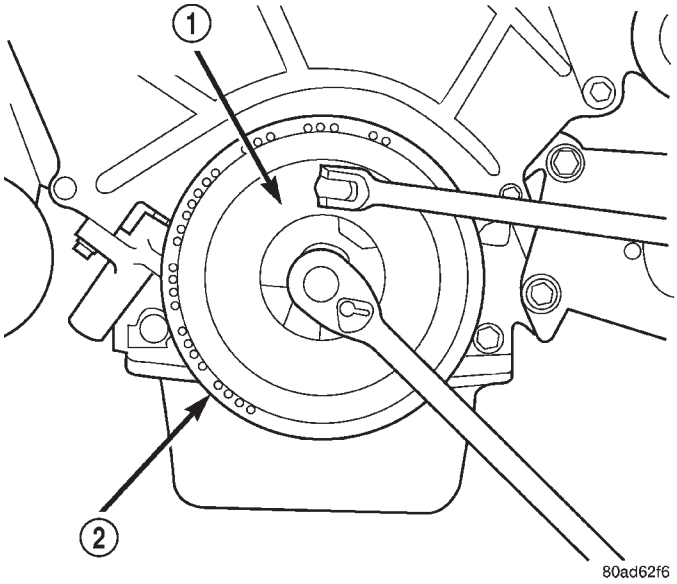


Fig. 46 Crankshaft Damper Center Bolt—Removal and Installation

1 – SPECIAL TOOL 8191
2 – CRANKSHAFT DAMPER

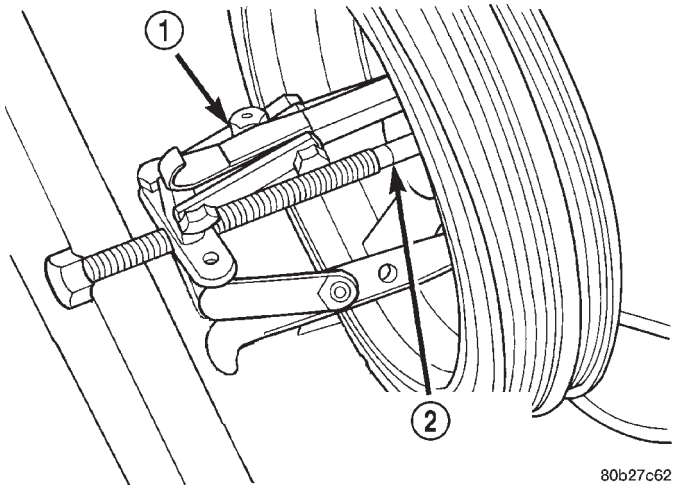


Fig. 47 Crankshaft Damper—Removal

1 – SPECIAL TOOL 1023
2 – SPECIAL TOOL C-4685–C2 INSERT

(2) Install accessory drive belts. Refer to COOLING SYSTEM for procedure.
(3) Install fan module. Refer to COOLING SYSTEM for procedure.
(4) Install upper radiator crossmember. Refer to BODY for procedure.
(5) Connect negative cable.

REMOVAL AND INSTALLATION (Continued)

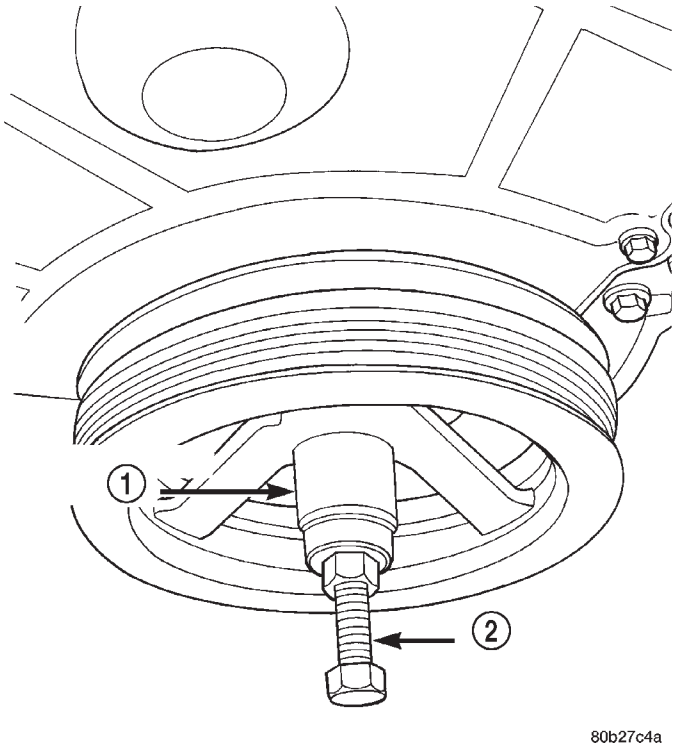


Fig. 48 Crankshaft Damper—Installation

1 – SPECIAL TOOL 6792–1
2 – SPECIAL TOOL C-4685–C1

INTAKE MANIFOLD—UPPER

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

(2) Remove air cleaner housing and inlet hose (Fig. 49).

(3) Remove throttle and speed control cables from throttle arm and bracket.

(4) Disconnect electrical connectors from the following sensors and actuators (Refer to FUEL SYSTEM for component locations):

- Secondary Runner Valve (SRV)
- Manifold Tuning Valve (MTV)
- Throttle Position Sensor (TPS)
- Idle Air Control (IAC)
- Intake Air Temperature/Manifold Absolute Pressure (TMAP)
- Vacuum Reservoir Solenoid

(5) Disconnect vacuum hoses from the following:

- Secondary Runner Valve (SRV) Reservoir
- Speed Control Reservoir
- Positive Crankcase Ventilation (PCV) Valve
- Proportional Purge Solenoid
- Power Brake Booster

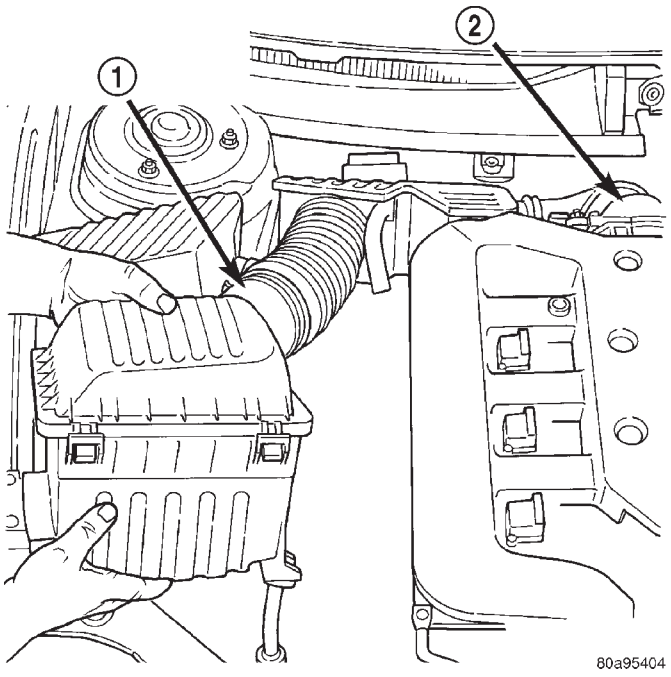


Fig. 49 Air Cleaner Housing and Inlet Hose

1 – AIR CLEANER ASSEMBLY WITH AIR INLET HOSE
2 – THROTTLE BODY

(6) Remove right side (Fig. 50) and left side (Fig. 51) intake manifold supports.

(7) Remove support brackets at intake manifold front corners and at MTV (Fig. 52).

(8) Loosen upper fastener attaching throttle body to support bracket.

(9) Remove clips attaching EGR tubes to intake manifold. Refer to EMISSION CONTROL SYSTEM for procedure.

(10) Remove bolts attaching intake manifold and remove manifold.

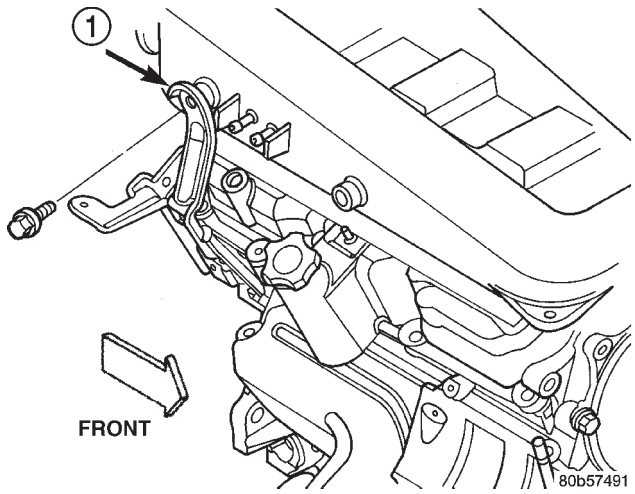


Fig. 50 Intake Manifold Support—Right Side

1 – SUPPORT BRACKET

REMOVAL AND INSTALLATION (Continued)

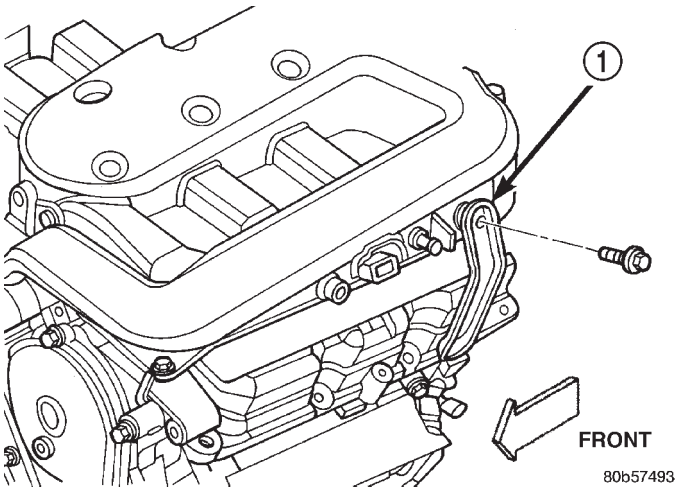


Fig. 51 Intake Manifold Support—Left Side

1 – SUPPORT BRACKET

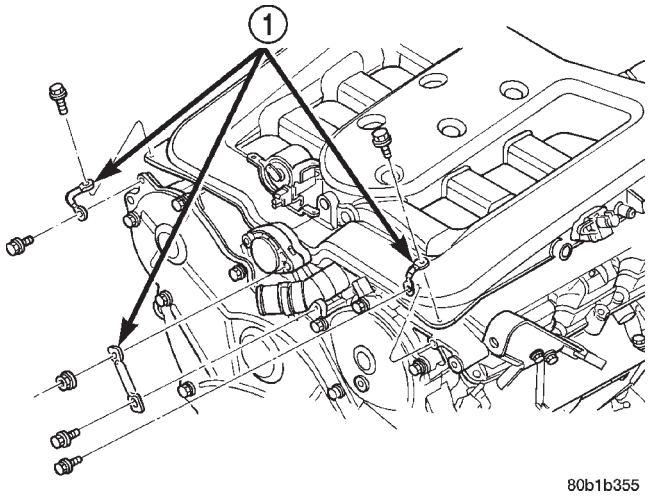


Fig. 52 Intake Manifold Supports—Front

1 – SUPPORT BRACKETS

INSTALLATION

(1) Clean and inspect gasket sealing surfaces.

NOTE: Intake gaskets can be reused, provided they are free of cuts or tears.

(2) Inspect gasket for cuts or tears. Replace gaskets as necessary.

(3) Install intake manifold and hand start all attaching bolts.

(4) Tighten bolts gradually in sequence shown in (Fig. 53) until a torque of 12 N·m (105 in. lbs.) is obtained.

(5) Install right side (Fig. 50) and left side (Fig. 51) intake manifold supports.

(6) Install manifold support brackets at front corners and at MTV (Fig. 52).

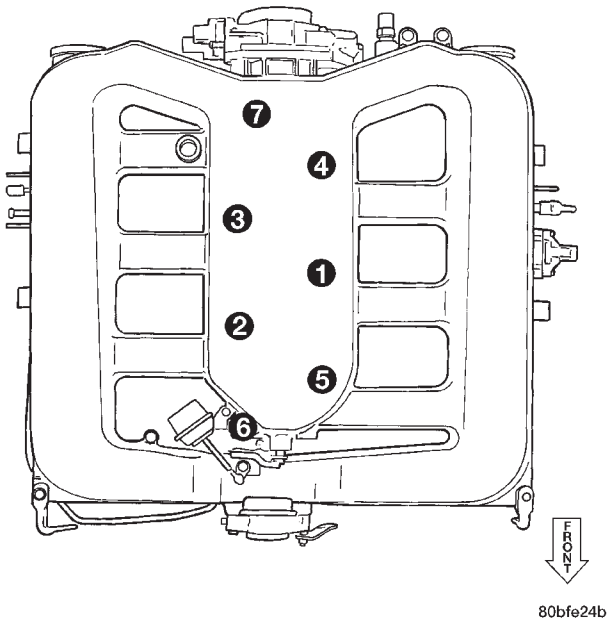


Fig. 53 Upper Intake Manifold Tightening Sequence

(7) Tighten fastener attaching throttle body to support bracket.

(8) Connect vacuum lines to the following:

- Secondary Runner Valve (SRV) Reservoir
- Speed Control Reservoir
- Positive Crankcase Ventilation (PCV) Valve
- Proportional Purge Solenoid
- Power Brake Booster

(9) Connect electrical connectors to the following:

- Secondary Runner Valve (SRV)
- Manifold Tuning Valve (MTV)
- Throttle Position Sensor (TPS)
- Idle Air Control (IAC)
- Intake Air Temperature/Manifold Absolute Pressure (TMAP)
- Vacuum Reservoir Solenoid

(10) Install EGR tubes to intake manifold. Refer to EMISSION CONTROL SYSTEM for procedure.

(11) Install throttle and speed control cables to bracket and throttle arm.

(12) Install air cleaner housing and inlet tube.

(13) Connect negative cable to remote jumper terminal.

INTAKE MANIFOLD—LOWER

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING SYSTEM COMPONENTS. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Perform fuel pressure release. Refer to FUEL SYSTEM for procedure.

(2) Drain cooling system. Refer to COOLING SYSTEM for procedure.

(3) Remove upper intake manifold. Refer to procedure in this section.

(4) Disconnect electrical connectors to fuel injectors and coolant temperature sensor.

(5) Disconnect heater and coolant bottle supply hoses from coolant tube at rear of intake manifold (Fig. 54).

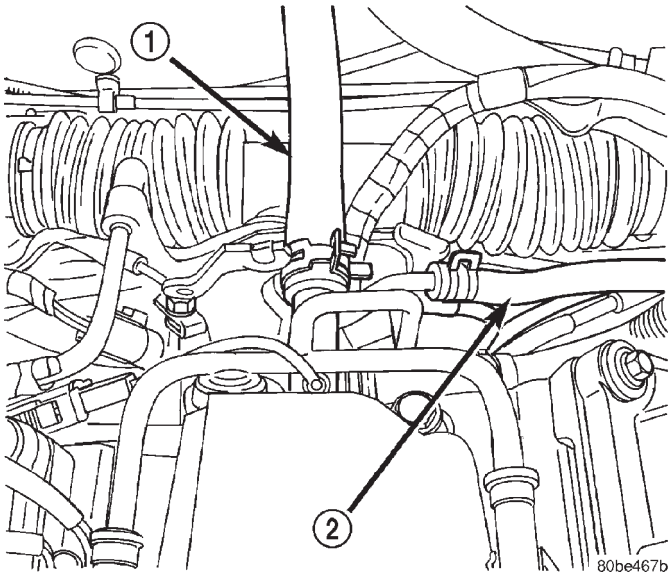


Fig. 54 Heater Supply Hose Connections

1 – HEATER SUPPLY HOSE
2 – COOLANT BOTTLE SUPPLY HOSE

(6) Disconnect fuel supply hose from fuel rail.

(7) Remove screw attaching fuel rail support bracket to the throttle body support bracket.

(8) Remove bolts attaching fuel rail.

(9) Remove fuel rail and injectors as an assembly.

(10) Remove bolts attaching lower intake and remove intake manifold (Fig. 55).

INSTALLATION

(1) Clean all sealing surfaces.

NOTE: Gaskets can be reused provided they are free of tears or cuts.

(2) Inspect gaskets for tears or cuts. Replace as necessary.

(3) Position gaskets and intake manifold on cylinder head surfaces.

(4) Install fuel rail with injectors.

(5) Install intake manifold bolts and gradually tighten in sequence shown in (Fig. 56) until a torque of 28 N·m (250 in. lbs.) is obtained.

(6) Install screw attaching fuel rail support bracket to the throttle body support bracket.

(7) Connect fuel supply hose to fuel rail.

(8) Connect heater and coolant bottle supply hoses to coolant tube at rear of intake manifold (Fig. 54).

(9) Connect electrical connectors to fuel injectors and coolant temperature sensor.

(10) Install upper intake manifold. Refer to procedure in this section.

(11) Fill cooling system. Refer to COOLING SYSTEM for procedure.

(12) With the DRBIII® scan tool use ASD Fuel System Test to pressurize fuel system to check for leaks.

CAUTION: When using the ASD Fuel System Test, the Auto Shutdown (ASD) relay will remain energized for 7 minutes or until the ignition switch is turned to the OFF position, or Stop All Test is selected.

REMOVAL AND INSTALLATION (Continued)

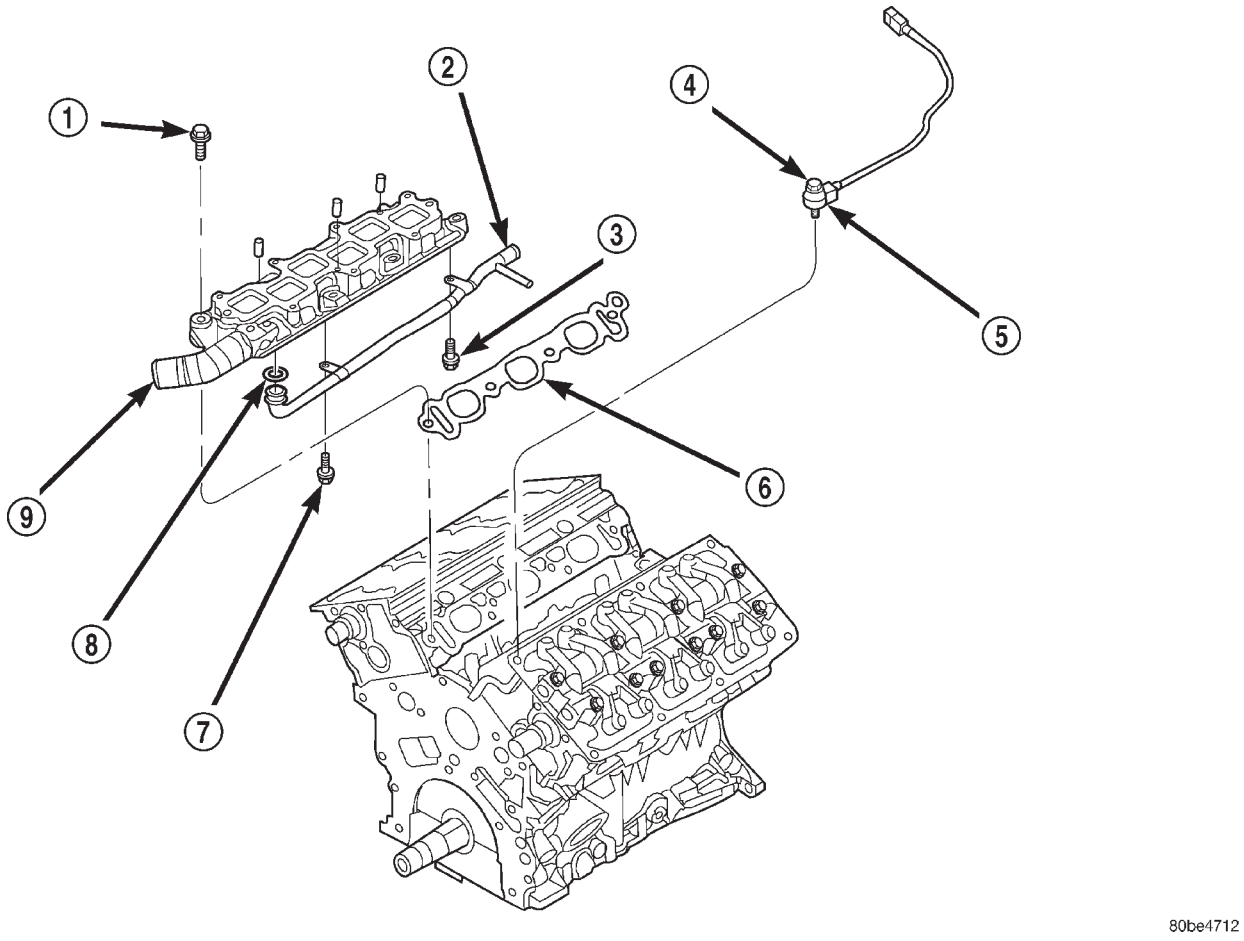


Fig. 55 Lower Intake Manifold

1 – BOLT
2 – HEATER SUPPLY TUBE
3 – BOLT
4 – BOLT
5 – KNOCK SENSOR
6 – GASKET
7 – BOLT
8 – O-RING
9 – INTAKE MANIFOLD-LOWER

REMOVAL AND INSTALLATION (Continued)

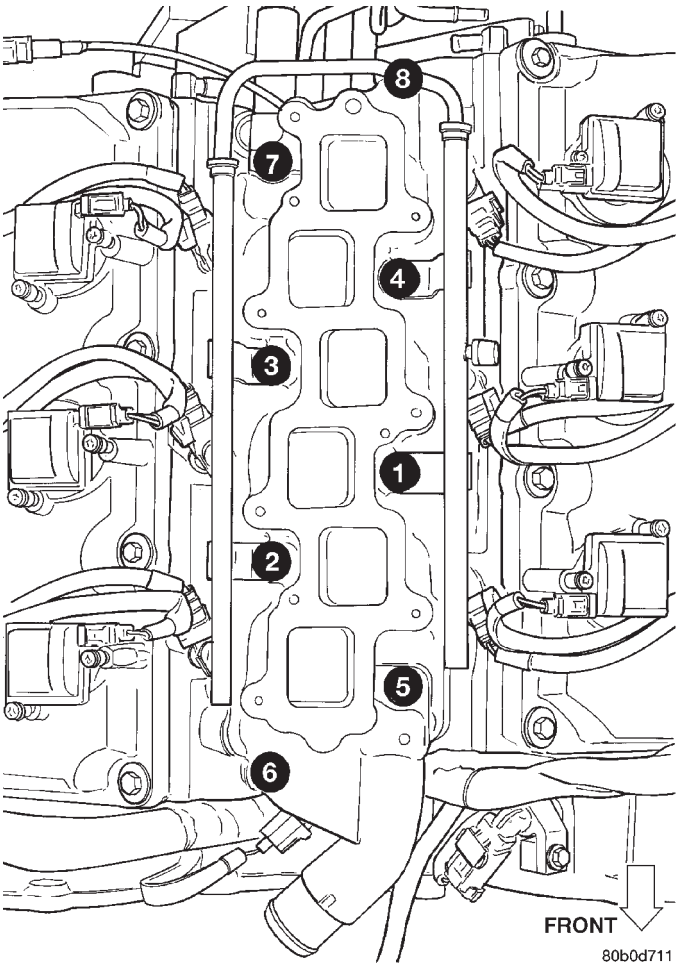


Fig. 56 Lower Intake Manifold Tightening Sequence

EXHAUST MANIFOLD

RIGHT EXHAUST MANIFOLD

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.
(2) Raise vehicle on hoist.
(3) Remove exhaust system. Refer to EXHAUST SYSTEM for procedure.
(4) Loosen converter pipe support attaching bolt at transaxle mount.
(5) Loosen A/C belt. Refer to COOLING SYSTEM for procedure.
(6) Lower vehicle.
(7) Remove air cleaner housing and air inlet tube.
(8) Loosen and remove V-Band clamp at exhaust manifold connector.

NOTE: Do not reuse V-Band clamp.

(9) Remove A/C compressor attaching bolts and set compressor aside.
(10) Remove engine oil dipstick tube.
(11) Remove air conditioning compressor bracket.
(12) Disconnect oxygen sensor electrical connector and remove sensor.
(13) Remove heat shield attaching bolts and remove heat shield (Fig. 57).
(14) Remove exhaust manifold attaching bolts (Fig. 57).
(15) Remove exhaust manifold (Fig. 57).

INSTALLATION

(1) Install exhaust manifold. Tighten bolts starting at the center working outward to 23 N·m (200 in. lbs.) (Fig. 57).
(2) Install heat shields and tighten attaching bolts to 12 N·m (105 in. lbs.) (Fig. 57).
(3) Install oxygen sensor to manifold and connect electrical connector.
(4) Install air conditioning compressor mounting bracket.
(5) Install engine oil dipstick tube.
(6) Install air conditioning compressor and drive belt. Refer to COOLING SYSTEM for belt installation procedure.
(7) Install a new V-Band clamp and tighten to 11 N·m (100 in. lbs.).
(8) Raise vehicle on hoist.
(9) Install exhaust system. Refer to EXHAUST SYSTEM for procedure.
(10) Install and/or tighten nut attaching converter pipe support to transaxle mount to 47 N·m (35 ft. lbs.).
(11) Lower vehicle.
(12) Install air cleaner housing and air inlet tube.
(13) Connect negative cable.

LEFT EXHAUST MANIFOLD

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.
(2) Raise vehicle on hoist.
(3) Remove exhaust system. Refer to EXHAUST SYSTEM for procedure.
(4) Loosen converter pipe support attaching bolt at transaxle mount.
(5) Lower vehicle.
(6) Loosen and remove V-Band clamp at exhaust manifold connector.

NOTE: Do not reuse V-Band clamp.

(7) Remove electrical connector harness bracket.
(8) Disconnect oxygen sensor electrical connector and remove sensor from manifold.
(9) Remove heat shield attaching bolts and remove heat shield (Fig. 57).
(10) Remove manifold attaching bolts (Fig. 57).

REMOVAL AND INSTALLATION (Continued)

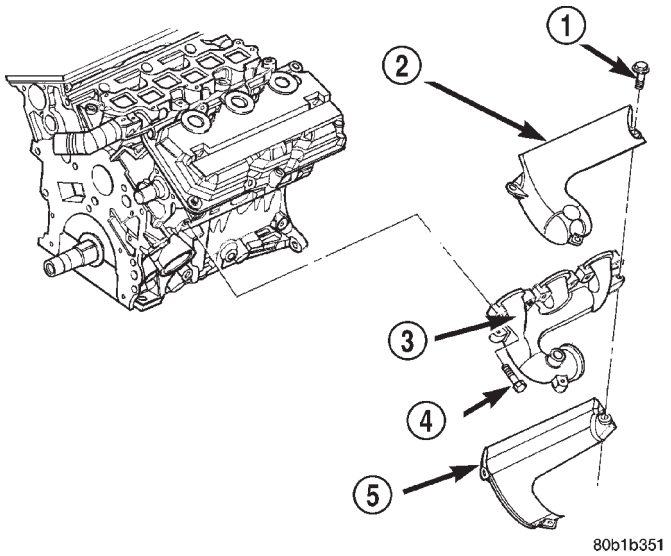


Fig. 57 Exhaust Manifold—3.2/3.5L Engine

1 – BOLT
2 – HEAT SHIELD
3 – EXHAUST MANIFOLD
4 – BOLT
5 – HEAT SHIELD

(11) Remove manifold (Fig. 57).

INSTALLATION

(1) Install exhaust manifold. Tighten bolts starting at the center working outward to 23 N·m (200 in. lbs.) (Fig. 57).

(2) Install heat shields and tighten bolts to 12 N·m (105 in. lbs.) (Fig. 57).

(3) Install oxygen sensor to manifold and connect electrical connector.

(4) Attach electrical connector bracket to brace.

(5) Install a new V-Band clamp and tighten to 11 N·m (100 In. lbs.).

(6) Raise vehicle on hoist.

(7) Install and/or tighten nut attaching converter pipe support to transaxle mount to 47 N·m (35 ft. lbs.).

(8) Install exhaust system. Refer to EXHAUST SYSTEM for procedure.

(9) Lower vehicle and connect negative cable.

CYLINDER HEAD COVER

REMOVAL

WARNING: DO NOT START OR RUN ENGINE WITH CYLINDER HEAD COVER REMOVED FROM THE ENGINE. DAMAGE OR PERSONAL INJURY MAY OCCUR.

(1) Remove air cleaner assembly and upper intake manifold. Refer to Intake Manifold in this section for procedure.

(2) Cover lower intake manifold with a suitable cover during service.

(3) Disconnect electrical connectors and remove ignition coils (Fig. 59).

(4) Remove nuts attaching wire harness to cylinder head cover (Fig. 58). Move harness for cover removal clearance.

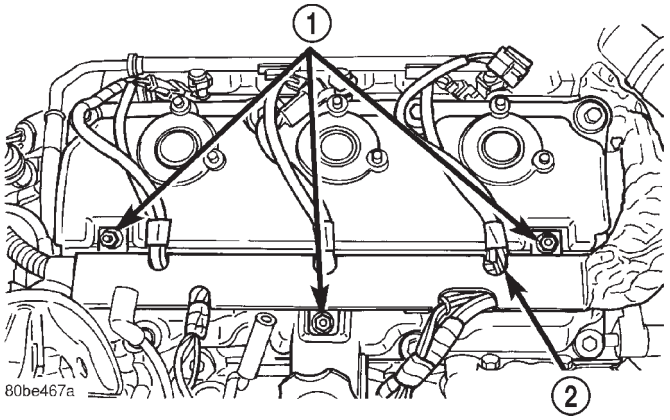


Fig. 58 Wire Harness Retaining Nuts

1 – NUTS
2 – WIRE HARNESS

(5) For right cylinder head cover removal perform the following:

(a) Remove A/C compressor belt. Refer to COOLING SYSTEM for procedure.

(b) Remove A/C compressor mounting bolts.

(c) Move compressor aside for cylinder head cover clearance.

(6) Remove cylinder head cover bolts and remove cover (Fig. 60).

INSTALLATION

(1) Clean cylinder head and cover mating surfaces. Inspect and replace gasket and seals as necessary (Fig. 61).

(2) To replace spark plug tube seals:

(a) Using a suitable pry tool, carefully remove tube seals.

(b) Position new seal with the part number on seal facing cylinder head cover.

(c) Install seals using Special Tool MD-998306 (Fig. 62).

(3) Install cylinder head cover bolts and tighten to 12 N·m (105 in. lbs.) (Fig. 60).

(4) For right cylinder head cover installation perform the following:

(a) Position A/C compressor on bracket and install mounting bolts.

REMOVAL AND INSTALLATION (Continued)

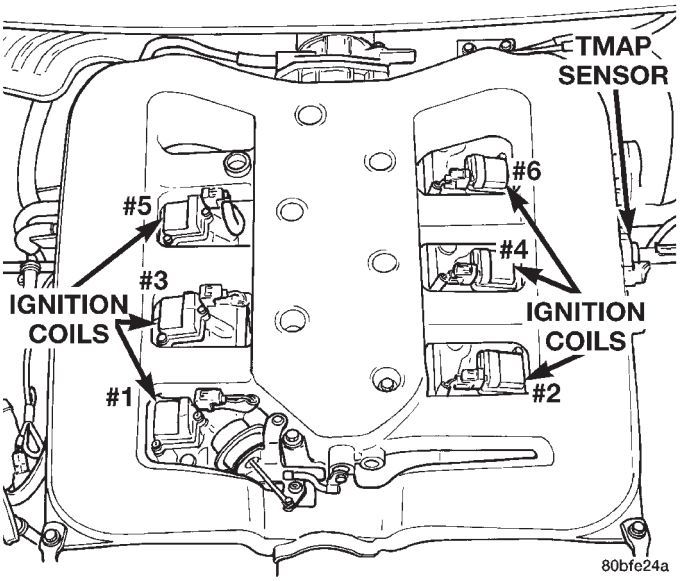


Fig. 59 Ignition Coils

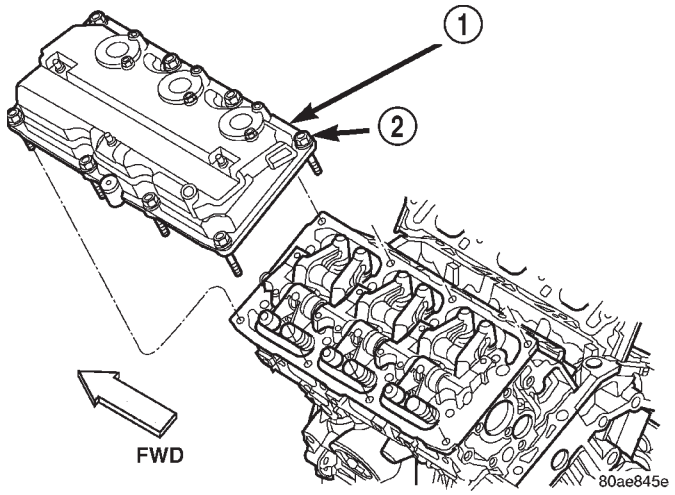


Fig. 60 Cylinder Head Covers

1 – CYLINDER HEAD COVER-LEFT SIDE
2 – BOLTS (8)

(b) Install A/C compressor belt. Refer to COOLING SYSTEM for procedure.

(5) Position wire harness on cylinder head cover and install retaining nuts (Fig. 58).

(6) Install ignition coils and connect all electrical connectors.

(7) Install upper intake manifold and air cleaner assembly.

SPARK PLUG TUBES

REMOVAL

(1) Remove cylinder head cover(s). Refer to procedure in this section.

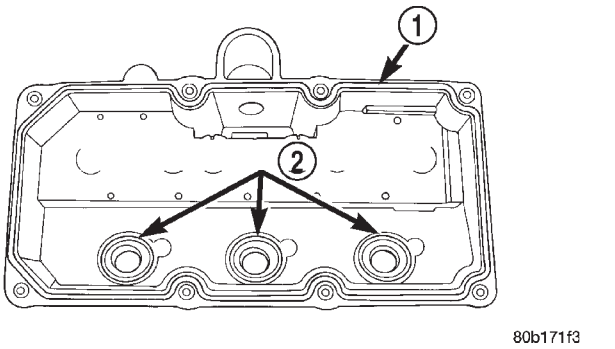


Fig. 61 Cylinder Head Cover Gasket and Spark Plug Tube Seals

1 – CYLINDER HEAD COVER GASKET
2 – SPARK PLUG TUBE SEALS

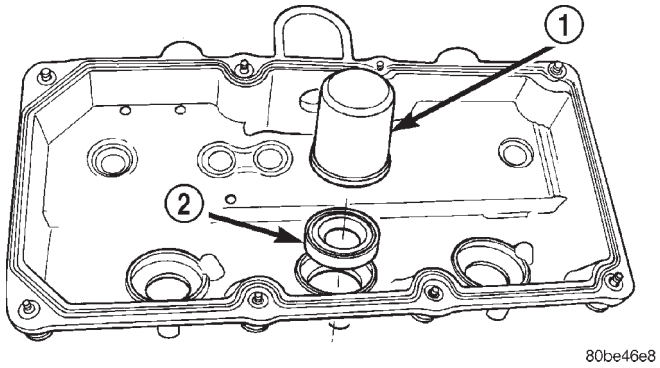


Fig. 62 Spark Plug Tube Seal Installation

1 – SPECIAL TOOL MD-998306
2 – SPARK PLUG TUBE SEAL

(2) Using locking pliers remove the tube from the cylinder head (Fig. 63). Discard old tube.

(3) Clean area around spark plug with Mopar® Parts Cleaner or equivalent.

(4) Refer to Cylinder Head Covers for spark plug tube seal replacement.

INSTALLATION

(1) Apply Mopar® Stud and Bearing Mount to a new tube approximately 1 mm (0.039 in.) from the end of tube, in a 3 mm (0.118 in.) wide area.

(2) Install sealer end of tube into the cylinder head. Then carefully install the tube using a hardwood block and mallet. Install the tube until it is seated into the bottom of the bore.

(3) Install cylinder head cover(s). Refer to procedure in this section.

CYLINDER HEAD

REMOVAL

(1) Drain cooling system. Refer to COOLING SYSTEM for procedure.

REMOVAL AND INSTALLATION (Continued)

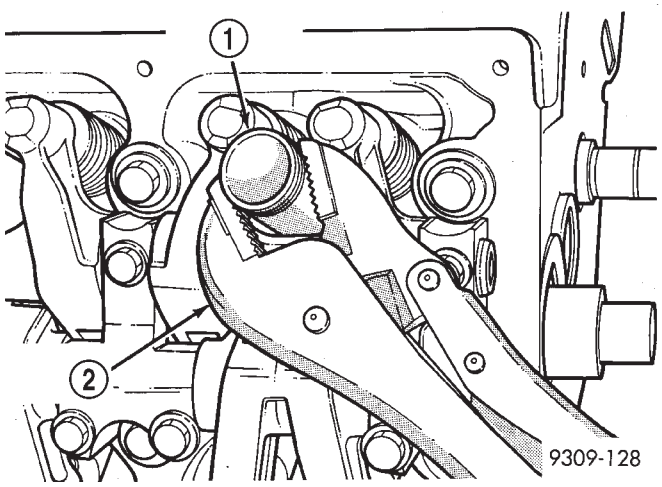
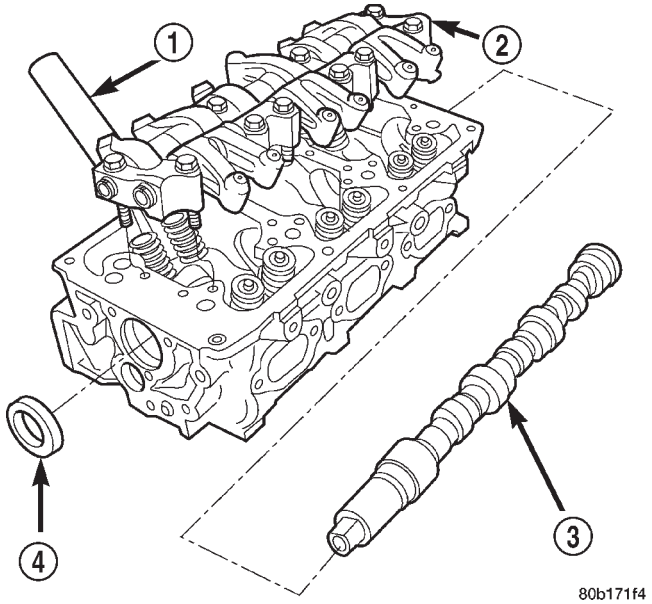


Fig. 63 Servicing Spark Plug Tubes

1 – SPARK PLUG TUBE
2 – LOCKING PLIERS

(2) Remove crankshaft damper.
(3) Remove front timing belt covers.
(4) Remove camshaft sprockets. Refer to Camshaft Sprocket and Engine Timing Procedure in this section.
(5) Remove upper and lower intake manifold. Refer to procedures in this section.



Cylinder Head, Camshaft, and Rocker Arms

1 – SPARK PLUG TUBE
2 – ROCKER ARM ASSEMBLY
3 – CAMSHAFT
4 – SEAL

(6) Remove V-Band clamp(s) at exhaust manifold to catalytic converter pipe connection.

NOTE: Do not reuse V-Band Clamp.

(7) Remove rear timing belt cover to cylinder head fasteners (Fig. 64). Remove the rear covers.
(8) The right side rear timing belt cover has O-rings to seal the water pump passages to cylinder block (Fig. 65). Do not reuse O-rings.

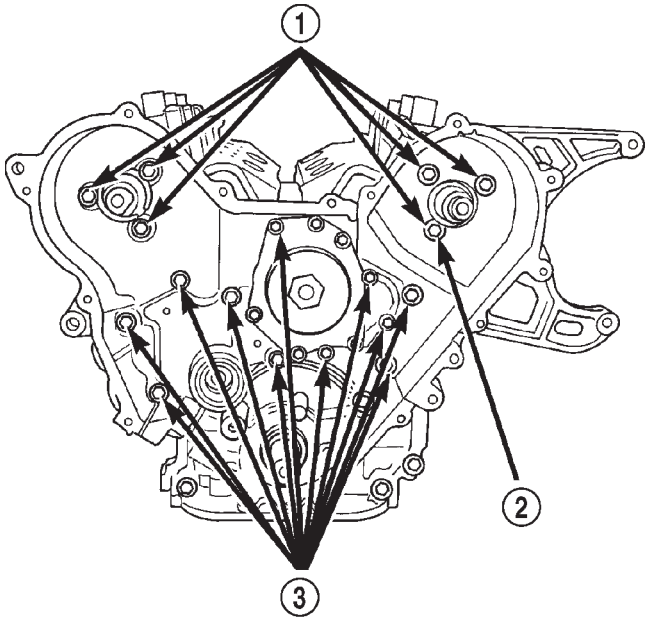


Fig. 64 Rear Timing Belt Cover Attaching Bolts

1 – REAR COVER TO CYLINDER HEAD BOLTS
2 – APPLY SEALANT TO BOLT THREADS
3 – REAR COVER TO CYLINDER BLOCK BOLTS

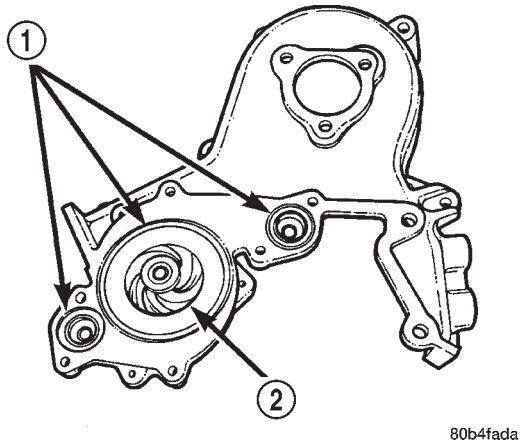


Fig. 65 Right Side Timing Belt Cover Water Pump O-Rings

1 – REAR TIMING BELT COVER TO ENGINE BLOCK O-RINGS
2 – WATER PUMP IMPELLER

(9) Remove cylinder head bolts and remove cylinder head(s).

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts should be replaced (Fig. 66).

Necking can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt should be replaced.

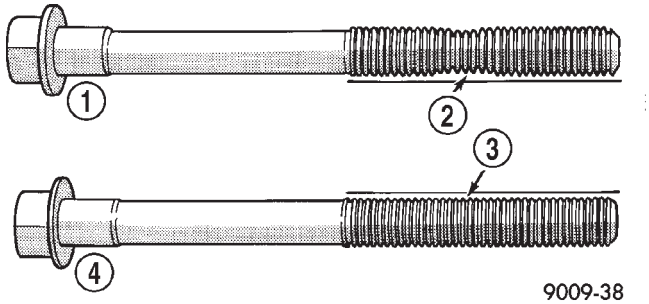


Fig. 66 Checking Bolts for Stretching (Necking)

1 – STRETCHED BOLT
2 – THREADS ARE NOT STRAIGHT ON LINE
3 – THREADS ARE STRAIGHT ON LINE
4 – UNSTRETCHED BOLT

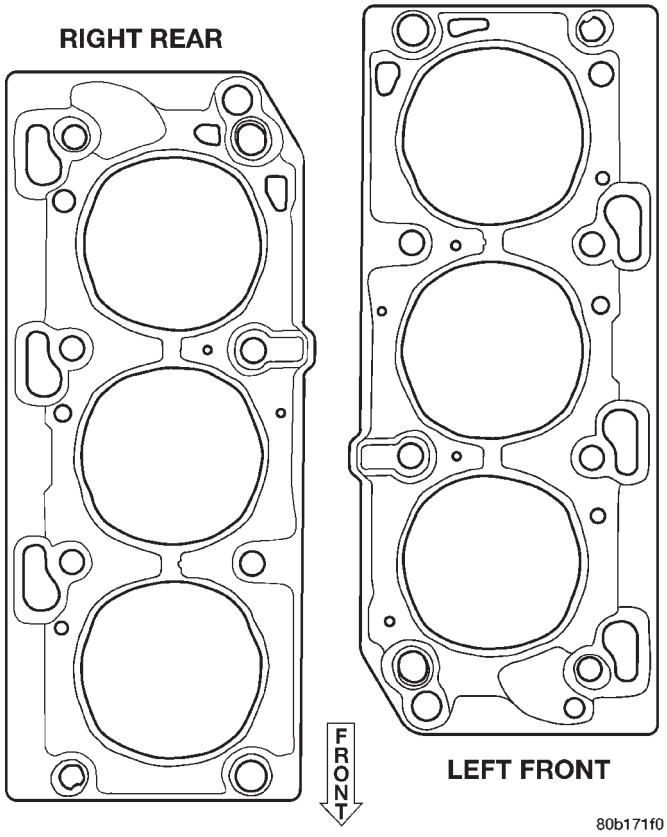


Fig. 67 Cylinder Head Gasket Identification

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

(1) Clean sealing surfaces of cylinder head and block.

CAUTION: Ensure that the correct head gaskets are used and are oriented correctly on cylinder block. The 3.5L engine head gaskets have perfectly round combustion sealing rings. The 3.2L engine does NOT have perfectly round combustion sealing rings.

(2) Install head gasket over locating dowels. Ensure the gasket is installed on the correct side of engine (Fig. 67).

(3) Install cylinder head over locating dowels.

(4) Before installing the bolts, lubricate the threads with engine oil.

(5) Tighten the cylinder head bolts in the sequence shown in (Fig. 68). Using the 4 step torque-turn method, tighten according to the following torque values:

- Step 1: All to 61 N·m (45 ft. lbs.)
- Step 2: All to 88 N·m (65 ft. lbs.)
- Step 3: All (again) to 88 N·m (65 ft. lbs.)
- Step 4: + 90° Turn **Do not use a torque wrench for this step.**

(6) Bolt torque after 90° turn should be over 122 N·m (90 ft. lbs.) in the tightening direction. If not, replace the bolt.

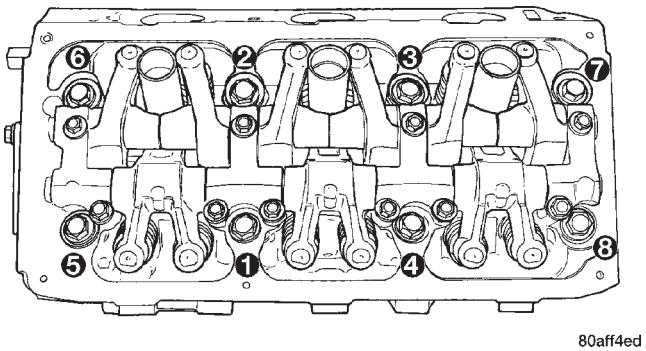


Fig. 68 Cylinder Head Bolt Tightening Sequence

(7) Clean right rear timing belt cover O-ring sealing surfaces and grooves (Fig. 65). Lubricate new O-rings with Mopar® Dielectric Grease or equivalent to facilitate assembly.

(8) Install rear timing belt covers (Fig. 64) and (Fig. 65). Tighten bolts to specified torque:

- M10—54 N·m (40 ft. lbs.)
- M8—28 N·m (20 ft. lbs.)
- M6—12 N·m (105 in. lbs.)

REMOVAL AND INSTALLATION (Continued)

(9) Install camshaft sprockets and timing belt. Refer to procedure in this section.

(10) Install front timing belt covers. Refer to procedure in this section.

(11) Install crankshaft damper.

(12) Install upper and lower intake manifold. Refer to procedures in this section.

(13) Connect catalytic converter to exhaust manifold with a new V-Band clamp(s). Tighten V-Band clamp to 10 N·m (100 in. lbs.).

(14) Fill cooling system. Refer to COOLING SYSTEM for procedure.

CRANKSHAFT

REMOVAL

(1) Remove engine from vehicle. Refer to Engine Assembly Removal and Installation in this section.

(2) Remove oil pan.

(3) Remove oil pickup tube.

(4) Remove crankshaft damper. Refer to procedure in this section.

(5) Remove idler pulley for accessory drive belt.

(6) Remove front lower timing belt cover.

(7) Remove front main timing belt cover.

(8) Remove front left side timing belt cover.

(9) Remove timing belt tensioner and timing belt.

(10) Remove crankshaft sprocket. Refer to Front Crankshaft Oil Seal Removal and Installation for procedure.

(11) Tap dowel pin out of crankshaft. Refer to Front Crankshaft Oil Seal Removal and Installation for procedure.

(12) Remove oil pump assembly.

(13) Remove rear crankshaft oil seal retainer.

(14) Remove connecting rod bearing caps. Connecting rod bearing caps are not interchangeable and should be marked before removal to insure correct assembly (Fig. 69).

(15) Remove main bearing caps. Main bearing caps are not interchangeable and are marked to insure correct assembly (Fig. 70).

(16) Remove Crankshaft.

NOTE: Before installing Crankshaft refer to Fitting Main Bearings and Installation of Connecting Rod Bearings in this section.

INSTALLATION

CAUTION: Main bearings are select fit. Refer to Crankshaft Main Bearing Fitting in this section for proper bearing selection.

(1) Install Crankshaft.

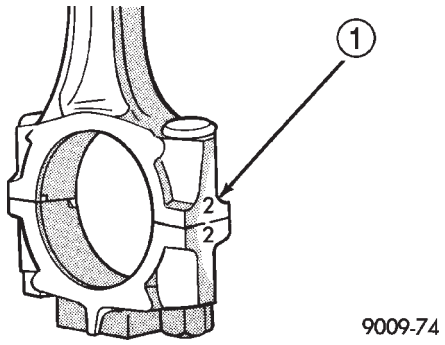


Fig. 69 Connecting Rod to Cylinder Identification

1 – CYLINDER NUMBER

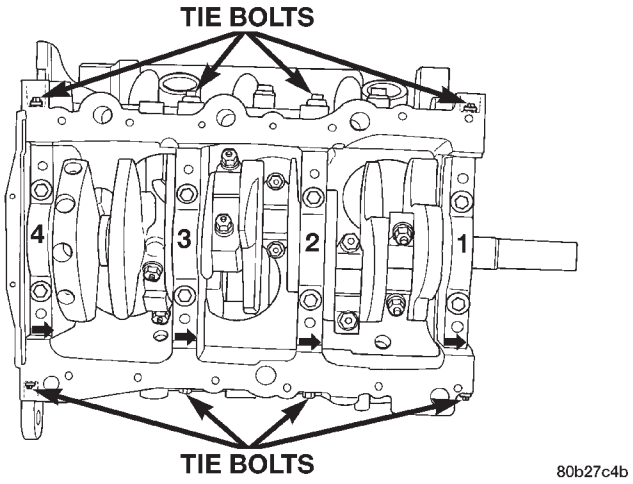


Fig. 70 Main Bearing Cap Identification

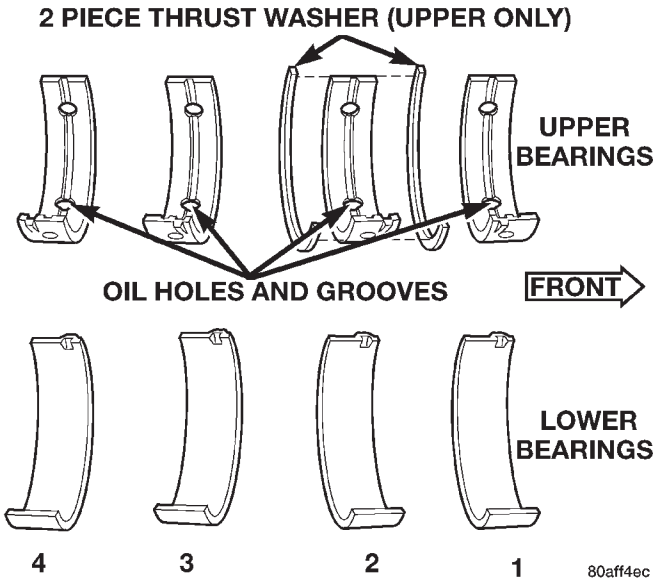


Fig. 71 Main Bearing Identification

(2) Move crankshaft forward to limit of travel. Lubricate and install the front thrust washer by rolling the washer onto the machined shelf between the

REMOVAL AND INSTALLATION (Continued)

No. 2 upper main bulk head and crankshaft thrust surface (Fig. 72).

(3) Move crankshaft rearward to limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

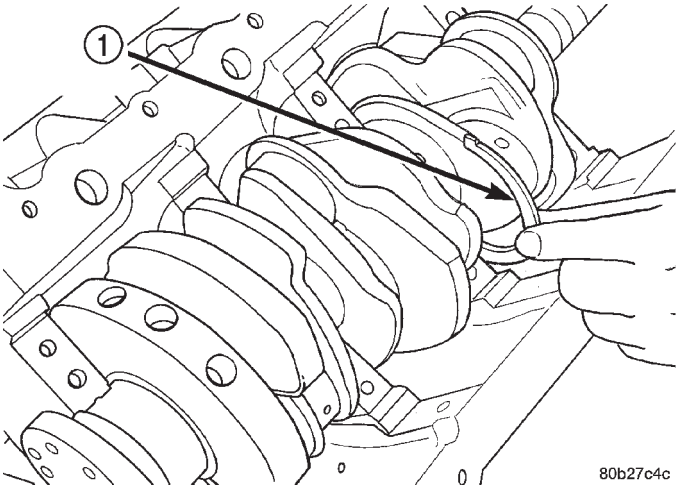


Fig. 72 Thrust Washer Installation

1 – FRONT THRUST WASHER

(4) Lubricate lower main bearings with clean engine oil.

NOTE: Lubricate main bearing cap bolts with engine oil before installation.

(5) Install each main cap and tighten bolts finger tight.

The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, lastly the main cap tie (horizontal) bolts.

(6) Install the inside main bearing cap bolts and tighten to 20 N·m + 1/4 turn (15 ft. lbs. + 1/4 turn).

(7) Measure crankshaft end play. Refer to Service Procedures in this section.

(8) Install connecting rods and measure side clearance. Refer to Service Procedures in this section.

(9) Install windage tray. Lubricate bolts with engine oil and tighten to 27 N·m + 1/4 turn (20 ft. lbs. + 1/4 turn).

(10) Install the main cap tie (horizontal) bolts and tighten to 28 N·m (250 in. lbs.).

(11) Install rear crankshaft oil seal retainer and oil seal. Refer to procedure in this section.

(12) Install oil pump assembly. Refer to Oil Pump Removal and Installation in this section.

(13) Install dowel pin in crankshaft. Refer to Front Crankshaft Oil Seal Removal and Installation for procedure.

(14) Install crankshaft sprocket. Refer to Front Crankshaft Oil Seal Removal and Installation for procedure.

(15) Install Timing Belt. Refer to Camshaft Sprockets and Timing Procedure in this section.

(16) Install (3) timing belt covers.

(17) Install crankshaft damper. Refer to procedure in this section.

(18) Install idler pulley for accessory drive belt.

(19) Install oil pickup tube and tighten bolt to 28 N·m (250 in. lbs.).

(20) Install oil pan. Refer to procedure in this section.

(21) Install engine assembly.

(22) Fill engine crankcase with proper amount of oil.

CAMSHAFT

REMOVAL

Camshafts are serviced from the rear of the cylinder head. The cylinder head must be removed.

(1) Remove Camshaft Sprocket(s). Refer to procedure in this section.

(2) Remove cylinder head(s). Refer to procedure in this section.

(3) Mark the rocker arm and shaft assembly before removal. Remove the rocker arm and shaft assembly from the head.

(4) Remove the rear camshaft cover and O-ring from head.

CAUTION: Be careful not to Nick or Scratch the journals when removing the camshaft.

(5) Carefully remove the camshaft from the rear of the cylinder head.

INSTALLATION

(1) Lubricate camshaft journals and cam with clean engine oil and install camshaft into cylinder head.

(2) Install cylinder head(s). Refer to procedure in this section.

(3) Install the rocker arm assembly. Refer to procedure in this section.

NOTE: Refer to Camshaft Sprocket and Timing Procedure to complete camshaft installation.

REMOVAL AND INSTALLATION (Continued)

CAMSHAFT SPROCKETS AND TIMING PROCEDURE

REMOVAL

CAUTION: The 3.2/3.5L engines are NOT a free-wheeling design. Therefore, care should be taken not to rotate the camshafts or crankshaft with the timing belt removed.

(1) Drain cooling system. Refer to COOLING SYSTEM for procedure.
(2) Remove accessory drive belts. Refer to COOLING SYSTEM for procedure.
(3) Remove crankshaft damper.
(4) Remove timing belt covers and timing belt.

CAUTION: When camshaft sprocket bolts are loosened or removed, the camshafts must be re-timed to the engine. Also, the camshaft sprocket bolts must NOT be reused. Refer to camshaft timing and timing belt installation procedure in this section.

(5) Hold camshaft sprocket with 36 mm (1 7/16 in.) box wrench loosen and remove bolt and washer. To remove the bolt with engine in the vehicle it may be necessary to lift that side of the engine because the right bolt is 213 mm (8 3/8 in.) long and the left bolt is 255 mm (10.0 in.) long.
(6) Remove camshaft sprocket from camshaft. Each sprocket has a D shaped hole that allows it to rotate several degrees in each direction on its shaft. This design must be timed with the engine to ensure proper performance of the engine. Refer to camshaft and timing belt installation in this section for procedures.

TIMING PROCEDURE—3.2/3.5L

CAUTION: The camshaft sprockets are not interchangeable from side to side (Fig. 73).

(1) Place crankshaft sprocket to the TDC mark on the oil pump housing (Fig. 74).
(2) Install a dial indicator in number 1 cylinder to check TDC of the piston (Fig. 79). Rotate the crankshaft until the piston is at exactly TDC.
(3) Install the camshaft alignment Special Tools 6642 to the rear of each cylinder head (Fig. 75).

CAUTION: Compress the tensioner slowly, as damage to the tensioner could result.

(4) Slowly pre-load the tensioner with a vise and install locking pin (Fig. 76).

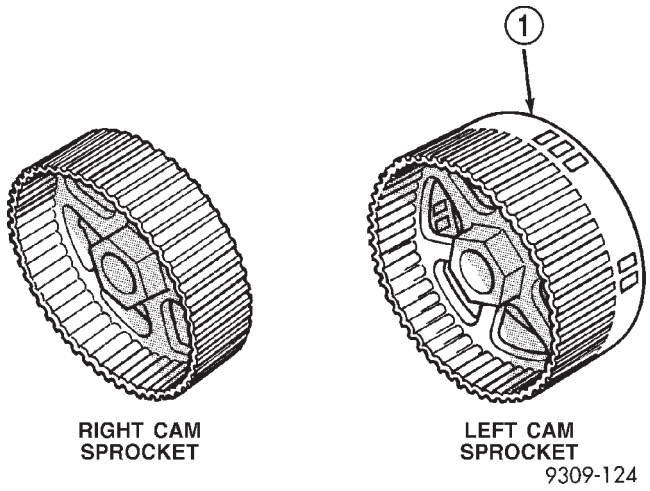


Fig. 73 Camshaft Sprocket Identification
1 – DIS PICKUP SLOTS

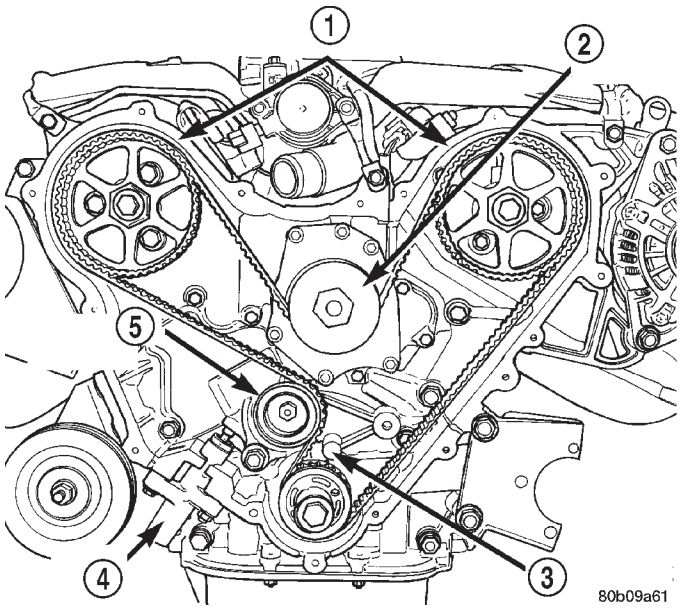


Fig. 74 Timing Belt System
1 – REAR TIMING BELT COVERS
2 – WATER PUMP
3 – TDC INDICATOR
4 – BELT TENSIONER
5 – TENSIONER PULLEY

NOTE: Once pin is installed, the tensioner must be stored with the plunger facing upward until it is ready to be reinstalled.

(5) Install camshaft sprockets onto the camshafts. Install **NEW** sprocket attaching bolts into place. The 255 mm (10 in.) bolt is to be installed in the left camshaft and the 213 mm (8 3/8 in.) bolt is to be installed into the right camshaft. **Do not tighten the bolts.** Camshaft sprocket mark should be posi-

REMOVAL AND INSTALLATION (Continued)

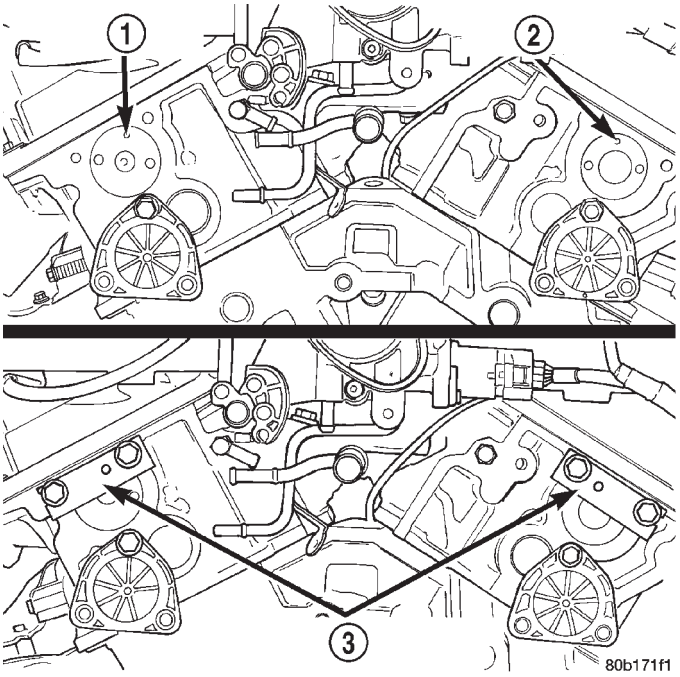


Fig. 75 Camshaft Alignment Special Tools 6642

1 – LEFT CAMSHAFT PILOT HOLE
2 – RIGHT CAMSHAFT PILOT HOLE
3 – CAMSHAFT ALIGNMENT SPECIAL TOOLS 6642

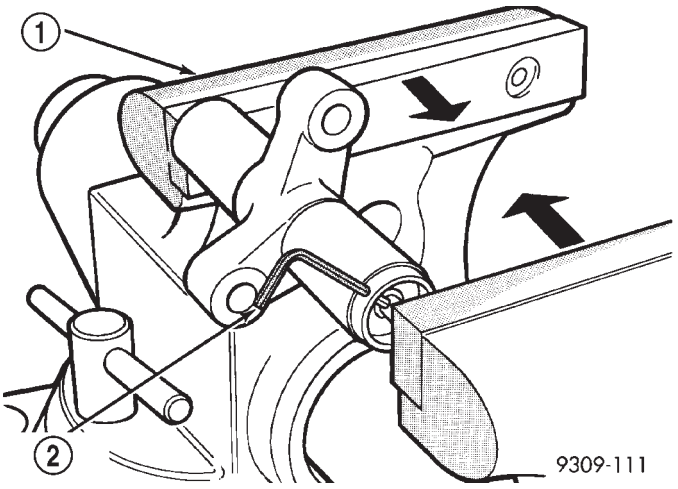


Fig. 76 Compressing Timing Belt Tensioner

1 – VISE
2 – LOCKING PIN

tioned between the marks on the cover (Fig. 77) at both sprocket.

(6) Install the timing belt starting at the crankshaft sprocket going in a counterclockwise direction (Fig. 78). Install the belt around the last sprocket. Maintain tension on the belt as it is positioned around the tensioner pulley. Each camshaft sprockets mark should still fall between the cover marks.

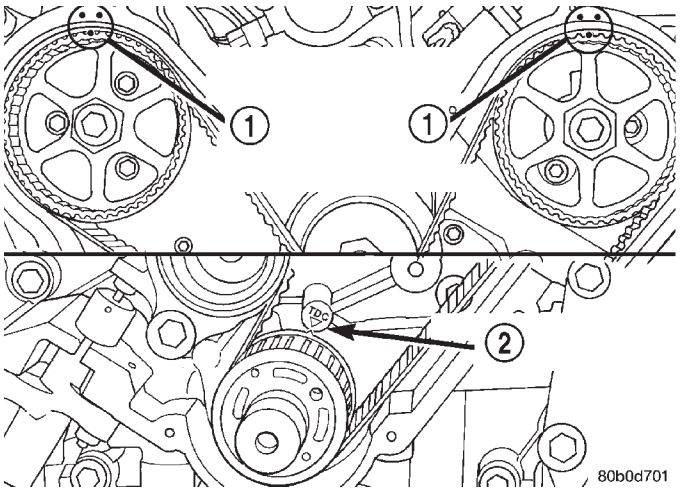


Fig. 77 Camshaft Sprocket Timing Marks

1 – ALIGN CAMSHAFT SPROCKET TIMING MARK BETWEEN MARKS ON REAR TIMING BELT COVER
2 – CRANKSHAFT AT TDC

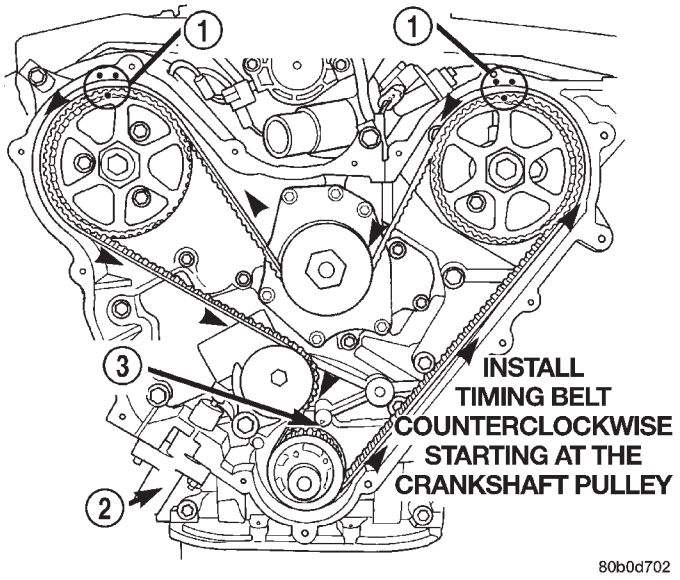


Fig. 78 Timing Belt—Installation

1 – ALIGN CAMSHAFTS WITH TIMING MARKS
2 – INSTALL TENSIONER LOOSE
3 – CRANKSHAFT AT TDC

(7) Holding the tensioner pulley against the belt, install the tensioner into the housing and tighten to 28 N·m (250 in. lbs.).

(8) When tensioner is in place pull retaining pin to allow the tensioner to extend to the pulley bracket.

(9) With number 1 piston at TDC (Fig. 79), hold the camshaft sprocket hex with a 36 mm (1 7/16 in.) wrench and tighten the camshaft bolts to 102 N·m (75 ft. lbs.) plus a 90 degree turn for the Right side and 115 N·m (85 ft. lbs.) plus a 90 degree turn for the Left side.

REMOVAL AND INSTALLATION (Continued)

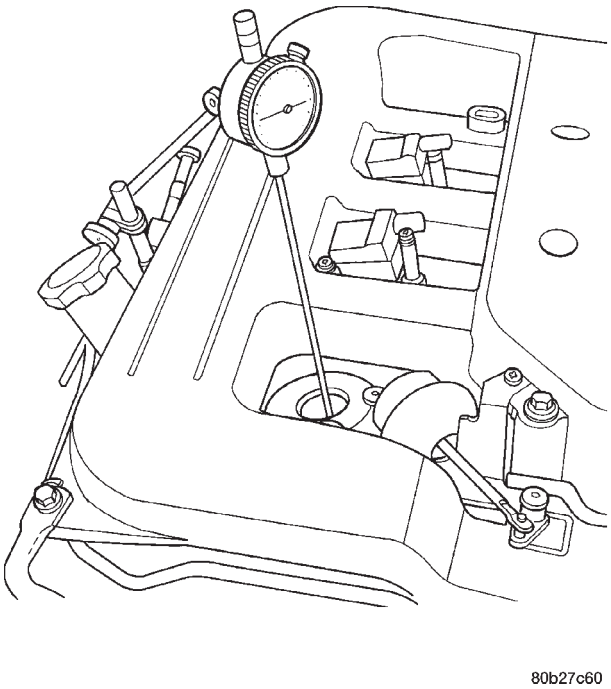


Fig. 79 Dial Indicator Locating Piston at TDC

(10) Remove dial indicator and install spark plug.

(11) Remove camshaft alignment Special Tools 6642 and install cam covers and O-rings. Tighten fasteners to 28 N·m (250 in. lbs.).

(12) Install timing belt covers. Refer to Timing Belt Covers in this section.

(13) Install crankshaft damper.

(14) Install accessory drive belts. Refer to COOLING SYSTEM for procedure.

(15) Fill cooling system. Refer to COOLING SYSTEM for procedure.

(16) Start engine and allow to idle for approximately 1 minute. If a noticeable noise is present from the timing belt/tensioner, air has possibly entered the tensioner.

(a) To remove air from tensioner; using a DRB III®, operate the engine at speed of 1600–2000 RPM for 10 minutes. This will purge air from tensioner and noise will be dissipated.

NOTE: If air is present, the tensioner will be soft and may generate noise. This noise should disappear after no more than 15 minutes of engine running time.

ROCKER ARMS AND SHAFT ASSEMBLY

CAUTION: The rocker arm shafts are hollow and are used as lubrication oil passages. The rocker arm and shaft assembly on the RIGHT side of the engine has an oil passage hole from the cylinder head to the third rocker shaft support. The rocker arm shaft assembly on the LEFT side of the engine has an oil passage hole from the cylinder head to the second rocker shaft support.

REMOVAL

(1) Remove cylinder head covers. Refer to procedure in this section.

(2) Identify the rocker arm assembly and rocker arms before disassembly (Fig. 80).

(3) Remove rocker arm assembly bolts.

(4) Remove rocker arm assembly.

NOTE: To prevent air ingestion into lash adjusters, avoid turning rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjusters and/or plastic retainers.

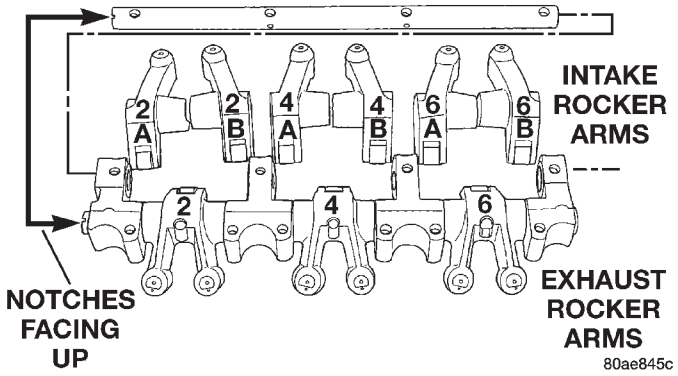


Fig. 80 Rocker Arms and Shaft Identification—Left Bank

DISASSEMBLY

(1) Remove dowel pin using a 4 mm screw, nut, spacer, and washer installed into the pin (Fig. 81). Tighten the screw into the pin, then loosen the nut on the screw. This will pull the dowel out of the shaft support. Do not reuse dowel pins. Remove the rocker arms and pedestals in order.

(2) Check the rocker arm mounting portion of the shafts for wear or damage. Replace if damaged or heavily worn.

(3) Check shaft oil holes for clogging with small wire, clean as required.

ASSEMBLY

CAUTION: New dowel pins must be installed during assembly.

(1) Install the rocker arms, and pedestals onto the shaft.

REMOVAL AND INSTALLATION (Continued)

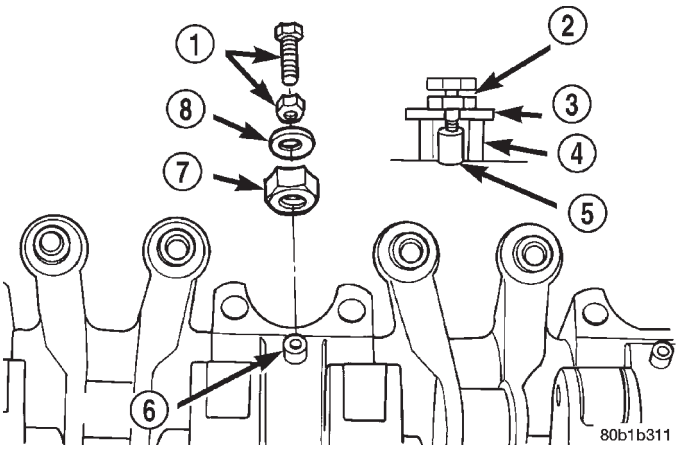


Fig. 81 Rocker Arms and Shaft—Disassembly

1 – 4mm SCREW AND NUT
2 – 4mm SCREW AND NUT
3 – WASHER
4 – SPACER
5 – DOWEL
6 – DOWEL
7 – SPACER
8 – WASHER

NOTE: The notches on the rocker shafts face up (Fig. 80). Notches on the right cylinder bank face towards rear of engine. Notches on left cylinder bank face toward front of engine.

(2) Install dowel pins (Fig. 82). Dowel pins pass through the pedestal into the exhaust rocker shafts. Dowel pins should be pressed in until they bottom-out against the rocker shaft in the pedestal.

CAUTION: Inspect all lash adjuster plastic retaining caps for proper retention before installation.

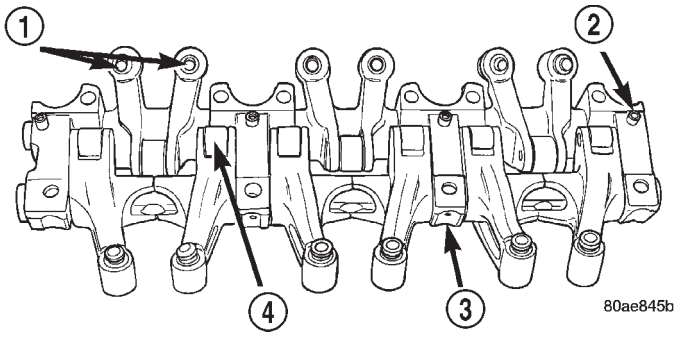


Fig. 82 Assemble Rocker Arms and Shaft

1 – HYDRAULIC LASH ADJUSTERS
2 – DOWEL PIN
3 – PEDESTAL
4 – ROLLER

INSTALLATION

NOTE: Rocker arm and shaft assembly can be installed either prior to or after (preferred) cylinder head installation.

(1) Rotate camshafts to the position shown in (Fig. 83). With the camshafts in these positions the lobes are in a neutral position (no load to the valve). This will allow the rocker arm shaft assembly to be tightened into position with little or no valve spring load on it.

(2) Install the rocker arm and shaft assembly making sure that the identification marks face toward the front of engine for left head and toward the rear of the engine for right head.

(3) Tighten rocker arm/shaft assembly bolts in sequence to 31 N·m (275 in. lbs.) (Fig. 84).

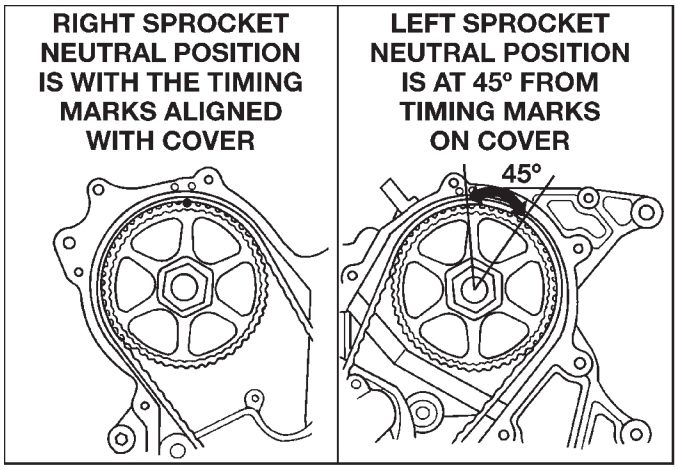


Fig. 83 Camshaft Sprockets Neutral Position

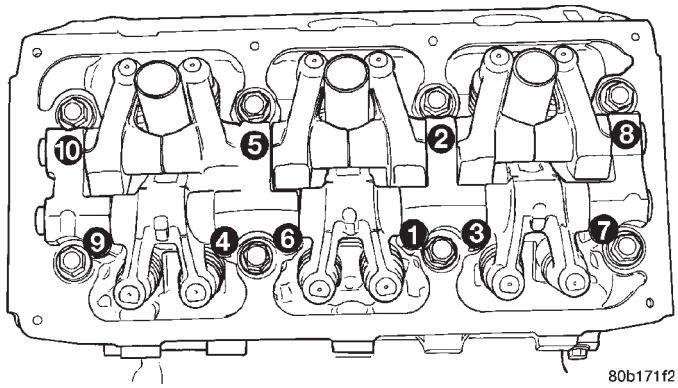


Fig. 84 Rocker Arm and Shaft Assembly Tightening Sequence

VALVE STEM SEALS OR VALVE SPRINGS—IN VEHICLE

(1) Perform fuel system pressure release procedure **before attempting any repairs**. Refer to FUEL SYSTEM for procedure.

REMOVAL AND INSTALLATION (Continued)

(2) Disconnect negative battery cable.
(3) Remove air cleaner housing and hose assembly.
(4) Remove upper intake manifold. Refer to procedure in this section.
(5) Remove cylinder head covers and spark plugs. Refer to procedures in this section.
(6) Remove rocker arm and shaft assembly. Refer to procedure in this section.
(7) Rotate the crankshaft clockwise, until the number 1 piston is at TDC (Top Dead Center) on the compression stroke.
(8) With air hose attached to spark plug adapter installed in number 1 spark plug hole, apply 620.5 to 689 kPa (90 to 100 psi) air pressure. This is to hold valves into place while servicing components.
(9) Using Tool MD 998772A with adapter 6527 or equivalent, compress valve spring and remove valve locks, retainer, and valve spring.
(10) Remove valve stem seals by using a valve stem seal tool (Fig. 85).

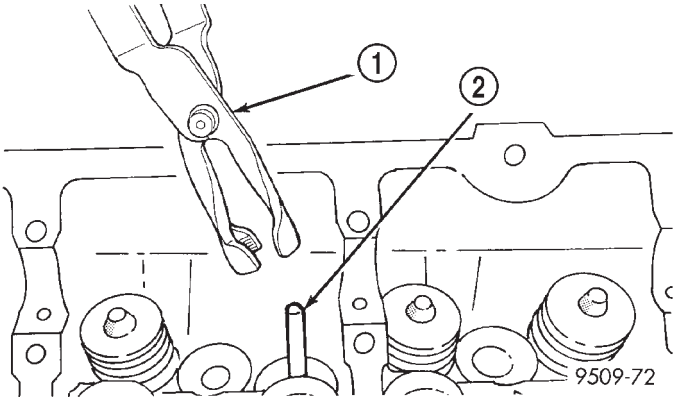


Fig. 85 Valve Stem Seal Removal—Typical
1 – VALVE SEAL TOOL
2 – VALVE STEM

(11) The valve stem seal/valve spring seat should be pushed firmly and squarely over the valve guide using the valve stem as guide. **Do Not Force** seal against top of guide. When installing the valve retainer locks, compress the spring **only enough** to install the locks.

CAUTION: Do not remove garter spring around the seal at the top of the valve stem seal (Fig. 86).

(12) Follow the same procedure on the remaining 5 cylinders using the firing sequence 1-2-3-4-5-6. **Make sure piston in cylinder is at TDC on the valve spring that is being covered.**
(13) Remove spark plug adapter tool.
(14) Remove Special Tool MD 998772A and install rocker arm and shaft assembly. Refer to procedure in this section.

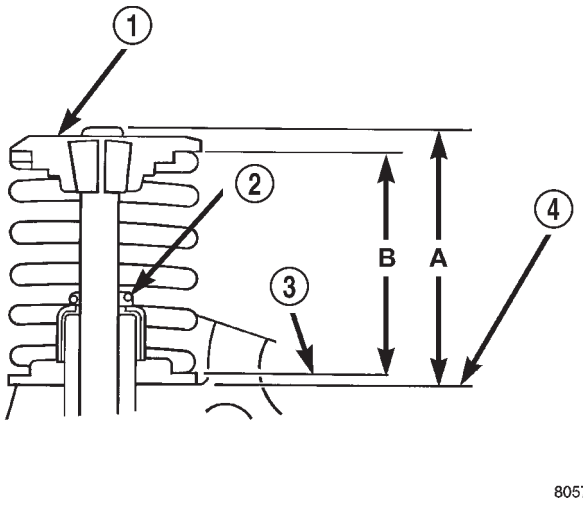


Fig. 86 Valve Seal Garter Spring
1 – SPRING RETAINER
2 – GARTER SPRING
3 – VALVE SPRING SEAT TOP
4 – CYLINDER HEAD SURFACE

(15) Install cylinder head covers. Refer to procedure in this section.
(16) Install ignition coils and connect all electrical connectors.
(17) Install upper intake manifold. Refer to procedure in this section.
(18) Connect negative cable.

VALVE AND VALVE SPRINGS

REMOVAL

(1) With cylinder head removed, compress valve springs using the Valve Spring Compressors shown in (Fig. 87).
(2) Remove valve retaining locks, valve spring retainers, valve springs and valve spring seat/stem seal assembly.
(3) Before removing valves, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.** Identify valves to insure installation in original location.

INSTALLATION

(1) Coat valve stems with clean engine oil and insert them in cylinder head.
(2) If valves or seats have been reground, check valve tip height (A) (Fig. 88). If valve tip height is greater than 43.65 mm (1.7185 in.) intake or 45.98 mm (1.8102 in.) exhaust, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.
(3) Install valve seal/spring seat assembly over valve guides on all valve stems (Fig. 89). Ensure that the garter spring is intact around the top of the rub-

REMOVAL AND INSTALLATION (Continued)

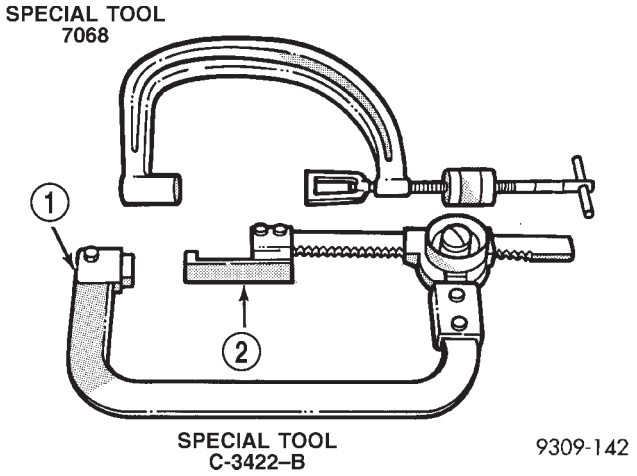


Fig. 87 Valve Spring Compressors

1 – ADAPTER 6537
2 – ADAPTER 6526

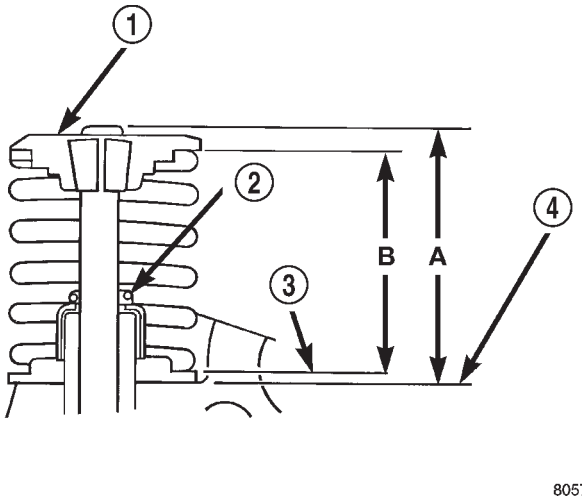


Fig. 88 Checking Valve Tip Height and Valve Spring Installed Height

1 – SPRING RETAINER
2 – GARTER SPRING
3 – VALVE SPRING SEAT TOP
4 – CYLINDER HEAD SURFACE

ber seal. Place valve springs (color-coded end facing up) and valve retainers into position.

(4) Compress valve springs with a valve spring compressor install locks and release tool. **If valves and/or seats are reground, measure the installed height of springs (B) (Fig. 88), make sure measurements are taken from top of spring seat to the bottom surface of spring retainer**. If height is greater than 38.75 mm (1.5256 inches), install a.762 mm (0.030 inch.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

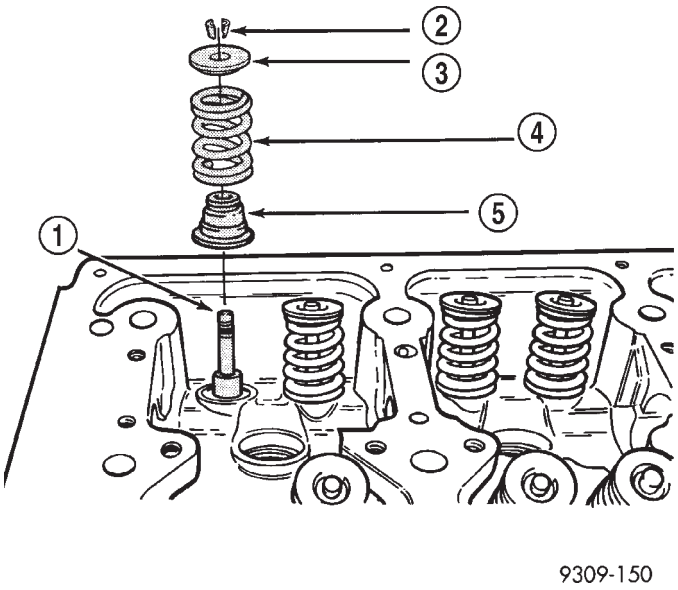


Fig. 89 Valve, Spring, and Valve Seal—Installation

1 – VALVE
2 – VALVE RETAINING LOCKS
3 – VALVE SPRING RETAINER
4 – VALVE SPRING
5 – VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY

TIMING BELT COVERS

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

(2) Remove upper radiator crossmember. Refer to BODY for procedure.

(3) Remove the cooling fan module and accessory drive belts. Refer to COOLING SYSTEM for procedures.

(4) Use Special Tool 8191 to hold crankshaft damper while removing center bolt.

(5) Remove crankshaft damper using Special Tools 1023 and C-4685-C2 (Fig. 90).

(6) Remove the lower belt cover located behind the crankshaft damper (Fig. 92).

(7) Remove the A/C belt guide/lift bracket (Fig. 91).

(8) Remove the stamped steel cover (Fig. 92). **Do not remove the sealer on the cover, it is reusable (Fig. 93).** If some sealer is missing use Mopar® Engine RTV GEN II to replace the missing sealer.

(9) Remove the left cast cover (Fig. 92).

INSTALLATION

(1) Install the left cast cover (Fig. 92) and generator/power steering belt tensioner pulley and bracket.

(2) Install the right stamped steel cover (Fig. 92).

(3) Install A/C belt guide/lift bracket (Fig. 91).

(4) Install the lower cover (Fig. 92).

REMOVAL AND INSTALLATION (Continued)

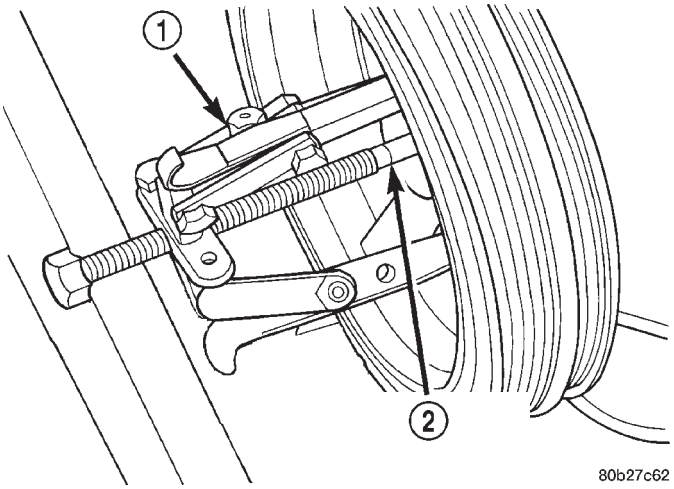


Fig. 90 Crankshaft Damper—Removal

1 – SPECIAL TOOL 1023
2 – SPECIAL TOOL C-4685–C2 INSERT

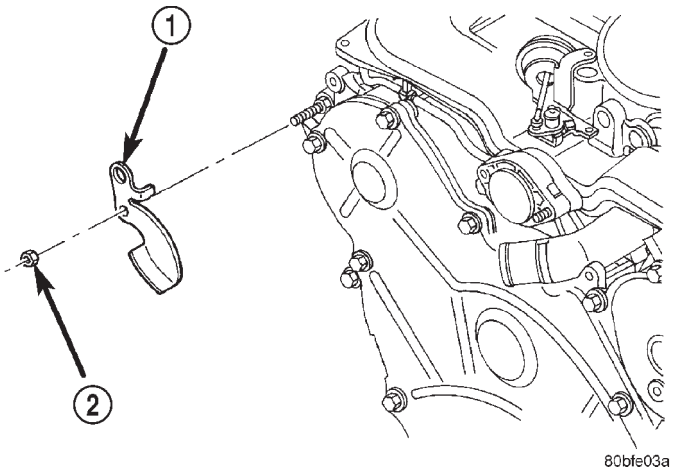


Fig. 91 A/C Belt Guide/Lift Bracket

1 – A/C BELT GUIDE/LIFT BRACKET
2 – NUT

(5) Install the crankshaft damper using Special Tools C-4685-C1 Bolt (5.9 in.) and 6792-1. Install center bolt, and while holding damper with Special Tool 8191, tighten center bolt to 115 N·m (85 ft. lbs.).

(6) Install the cooling fan module, accessory drive belts. Refer to COOLING SYSTEM for procedures.

(7) Install upper radiator crossmember. Refer to BODY for procedure.

(8) Connect negative cable to remote jumper terminal.

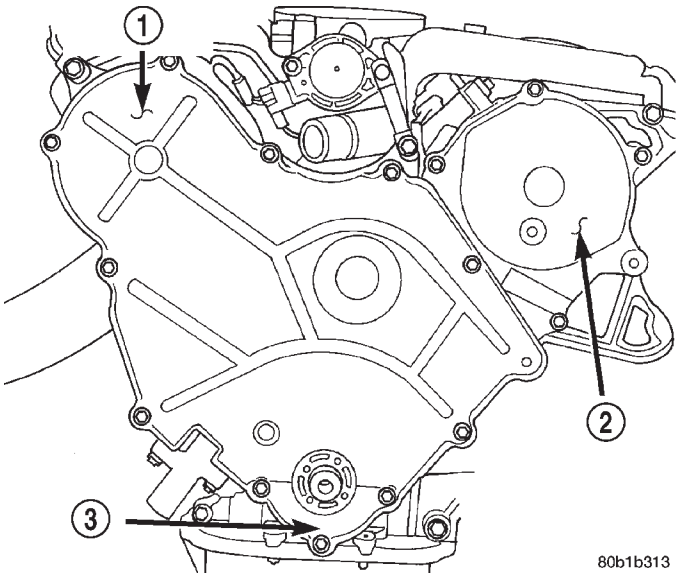


Fig. 92 Timing Belt Covers

1 – RIGHT SIDE COVER (STAMPED)
2 – LEFT SIDE COVER (CAST)
3 – LOWER COVER

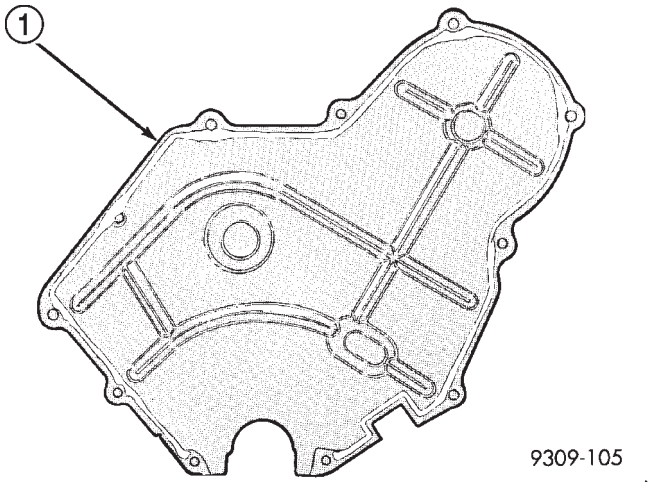


Fig. 93 Sealer, Timing Belt Cover

1 – SEALER

TIMING BELT

REMOVAL

CAUTION: The following procedure can only be used when the camshaft sprockets HAVE NOT BEEN LOOSENED or removed from the camshafts. Refer to Camshaft Sprocket and Engine Timing in this Section, if sprocket(s) or camshaft(s) have been loosened or removed.

REMOVAL AND INSTALLATION (Continued)

CAUTION: The 3.2/3.5L are NOT freewheeling engines. Therefore, care should be taken not to rotate the camshafts or crankshaft with the timing belt removed.

(1) Disconnect negative cable from remote jumper terminal.
(2) Remove upper radiator crossmember. Refer to BODY for procedure.
(3) Disconnect fan module electrical connector.
(4) Remove cooling fan module and accessory drive belts. Refer to COOLING SYSTEM for procedures.
(5) Remove crankshaft damper and front timing belt covers. Refer to procedures this section.
(6) Mark belt running direction, if timing belt is to be reused.

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

(7) Rotate engine clockwise until crankshaft mark aligns with the TDC mark on oil pump housing and the camshaft sprocket timing marks are between the marks on the rear covers (Fig. 94).

CAUTION: Align the camshaft sprockets between the marks on rear belt covers before timing belt removal or damage to valve and/or pistons could occur.

(8) Using a ink or paint marker; mark the exact position of the camshaft sprocket timing mark relative to the two timing marks on the rear timing cover.

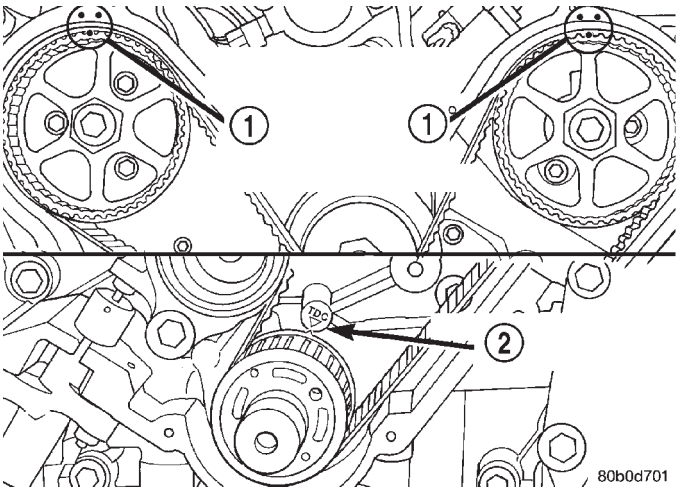


Fig. 94 Engine Timing Mark Alignment

1 – ALIGN CAMSHAFT SPROCKET TIMING MARK BETWEEN MARKS ON REAR TIMING BELT COVER
2 – CRANKSHAFT AT TDC

NOTE: When timing belt tensioner is removed from engine, always store in the vertical (plunger facing upward) position.

(9) Remove the timing belt tensioner (Fig. 95) and remove timing belt.

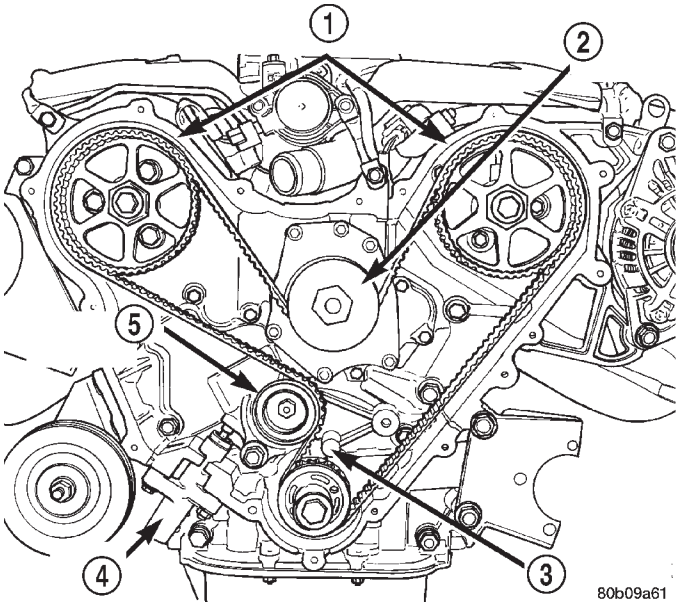


Fig. 95 Timing Belt System

1 – REAR TIMING BELT COVERS
2 – WATER PUMP
3 – TDC INDICATOR
4 – BELT TENSIONER
5 – TENSIONER PULLEY

TIMING BELT TENSIONER

(10) When tensioner is removed from the engine it is necessary to compress the plunger into the tensioner body.

CAUTION: Compress the tensioner slowly, as damage to tensioner could result.

(11) Place the tensioner into a vise and SLOWLY compress the plunger (Fig. 96). Total bleed down of tensioner should take about 5 minutes.

CAUTION: Index the tensioner in the vise the same way it is installed on the engine. This is to ensure proper pin orientation when tensioner is installed on the engine.

(12) When plunger is compressed into the tensioner body install a pin through the body and plunger to retain plunger in place until tensioner is installed.

REMOVAL AND INSTALLATION (Continued)

NOTE: When timing belt tensioner is removed from engine, always store in the vertical (plunger facing upward) position.

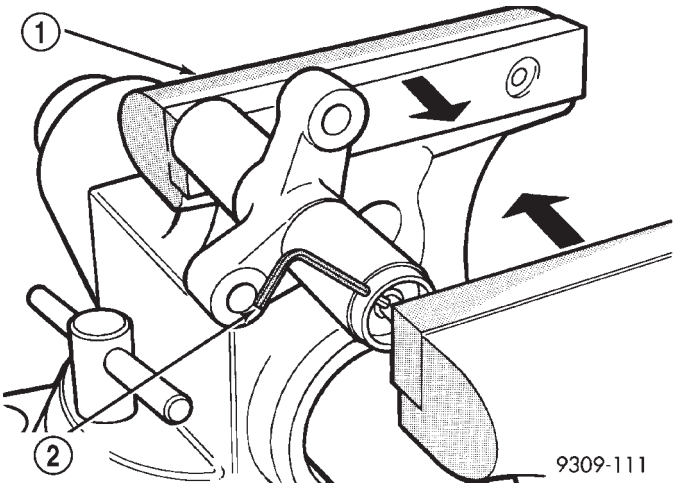


Fig. 96 Compressing Timing Belt Tensioner

1 – VISE
2 – LOCKING PIN

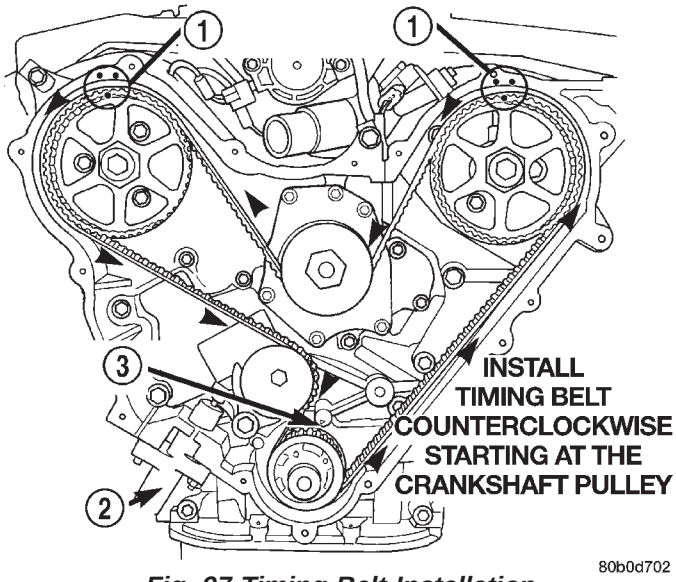


Fig. 97 Timing Belt Installation

1 – ALIGN CAMSHAFTS WITH TIMING MARKS
2 – INSTALL TENSIONER LOOSE
3 – CRANKSHAFT AT TDC

INSTALLATION

CAUTION: This procedure can only be used when the camshaft sprockets HAVE NOT BEEN LOOSENED or removed from the camshafts.

CAUTION: If camshafts have moved from the timing marks, always rotate camshaft towards the direction nearest to the timing marks (DO NOT TURN CAMSHAFTS A FULL REVOLUTION OR DAMAGE to valves and/or pistons could result).

(1) Align the crankshaft sprocket with the TDC mark on oil pump cover (Fig. 97).

(2) Align the camshaft sprockets (to reference mark made upon removal) between the marks on the rear covers (Fig. 94).

(3) Install the timing belt starting at the crankshaft sprocket going in a counterclockwise direction (Fig. 97). Install the belt around the last sprocket. Maintain tension on the belt as it is positioned around the tensioner pulley.

(4) Holding the tensioner pulley against the belt, Install the tensioner into the housing and tighten to 28 N·m (250 in. lbs.). Each camshaft sprocket mark should still fall between the cover marks.

(5) When tensioner is in place pull retaining pin to allow the tensioner to extend to the pulley bracket.

(6) Rotate crankshaft sprocket 2 revolutions and check the timing marks on the camshafts and crankshaft. The marks should line up within their respective locations (Fig. 97). If marks do not line up, repeat procedure.

(7) Install timing belt covers and crankshaft damper. Refer to procedure in this section.

(8) Install accessory drive belts and cooling fan module. Refer to COOLING SYSTEM for procedures.

(9) Install upper radiator crossmember. Refer to BODY for procedure.

(10) Connect negative cable to remote jumper terminal.

(11) Start engine and allow to idle for approximately 1 minute. If a noise is present from the timing belt/tensioner, air has possibly entered the tensioner.

(a) To remove air from tensioner; using a DRB III®, operate the engine at speed of 1600–2000 RPM for 10 minutes. This will purge air from tensioner.

NOTE: If air is present, the timing belt tensioner will be soft and may generate noise. This noise should disappear after no more than 15 minutes of engine running time.

OIL PAN

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

(2) Remove dipstick and tube.

(3) Raise vehicle on hoist and drain engine oil.

(4) Remove structural collar from rear of oil pan and transmission housing (Fig. 98).

(5) Disconnect engine oil cooler line from pan.

REMOVAL AND INSTALLATION (Continued)

(6) Disconnect transmission oil cooler line clips.
(7) Remove oil pan (Fig. 99).
(8) Remove oil pan gasket.
(9) Clean oil pan and all gasket surfaces.

INSTALLATION

(1) Apply a 1/8 inch bead of Mopar® Engine RTV GEN II at the parting line of the oil pump housing and the rear seal retainer (Fig. 100).
(2) Install oil pan gasket to the engine block.
(3) Install pan and attaching fasteners (Fig. 99).
(4) Install the structural collar (Fig. 98), using the follow procedure:
(a) Install the **vertical** collar to oil pan bolts. Pre-torque bolts to 1.1 N·m (10 in. lbs.).
(b) Install the **horizontal** collar to transmission bolts and tighten to 55 N·m (40 ft. lbs.).
(c) Starting with center vertical bolts and working outward, final torque all bolts to 55 N·m (40 ft. lbs.).

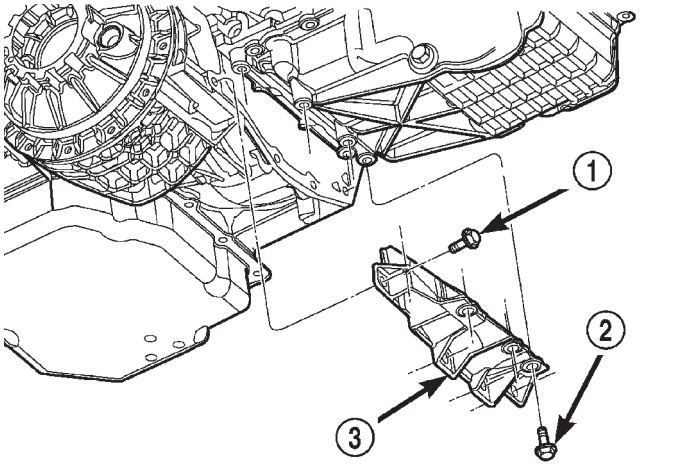


Fig. 98 Structural Collar

1 – BOLT-HORIZONTAL
2 – BOLT-VERTICAL
3 – STRUCTURAL COLLAR

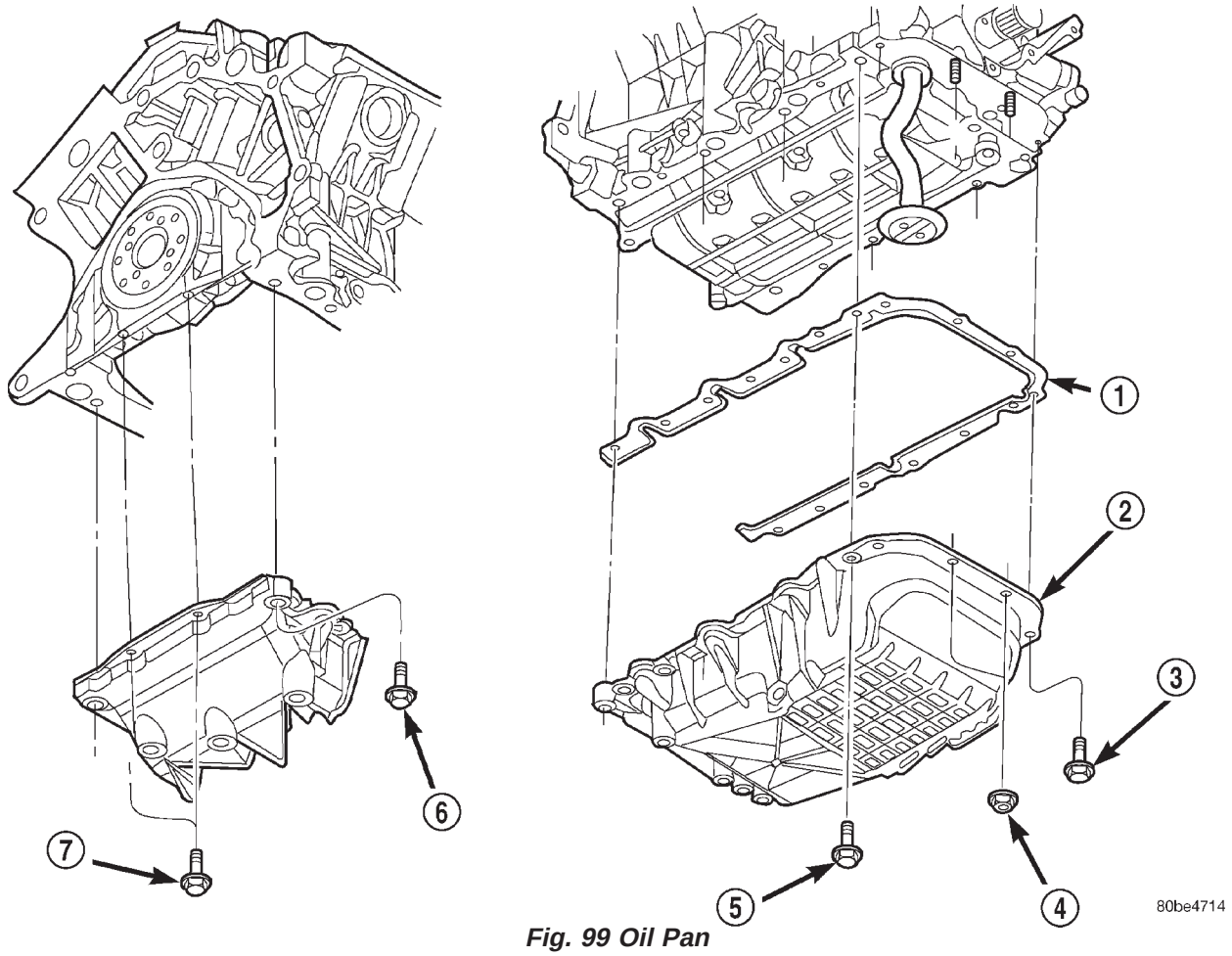


Fig. 99 Oil Pan

1 – GASKET
2 – OIL PAN
3 – BOLT-M6
4 – NUT-M6
5 – BOLT-M8
6 – BOLT-M8
7 – BOLT-M6

REMOVAL AND INSTALLATION (Continued)

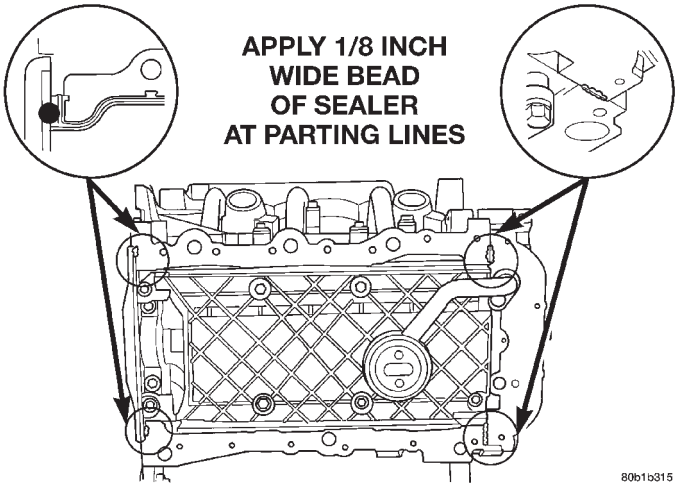


Fig. 100 Oil pan Sealing

(5) Lower vehicle and install dipstick and tube.
(6) Fill engine crankcase with proper oil to correct level.
(7) Connect negative cable.

CAMSHAFT OIL SEAL

REMOVAL

(1) Remove camshaft sprocket(s). Refer to procedure in this section.
(2) Use Special Tool C-3981B to remove camshaft oil seal (Fig. 101).

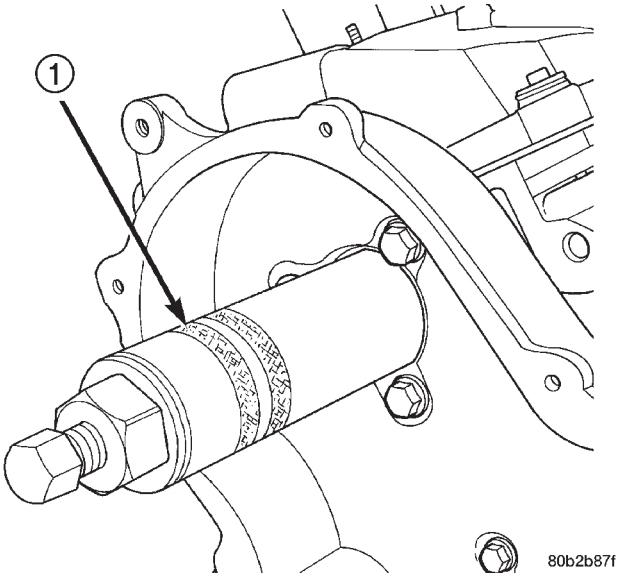


Fig. 101 Camshaft Oil Seal—Removal

1 – SPECIAL TOOL C-3981B

INSTALLATION

(1) Apply light coat of engine oil to the camshaft oil seal lip.
(2) Install the oil seal using Special Tool 6788 Seal Protector Sleeve (Fig. 102) and Seal Installer 6052 (Fig. 103).
(3) Install camshaft sprocket(s). Refer to procedure in this section.

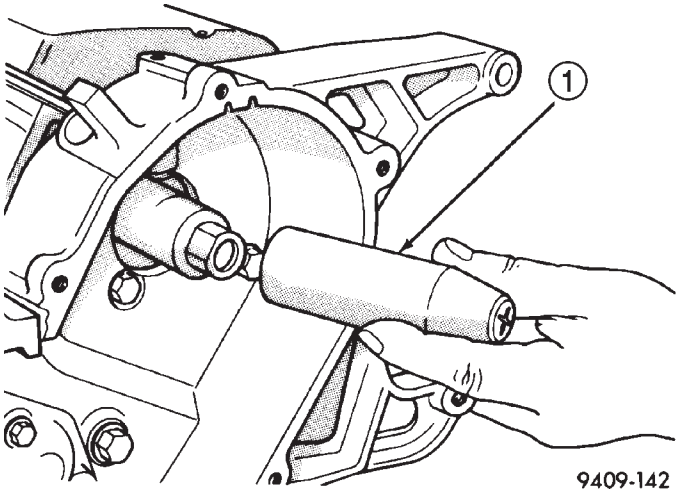


Fig. 102 Camshaft Oil Seal Protector Sleeve

1 – SPECIAL TOOL 6788

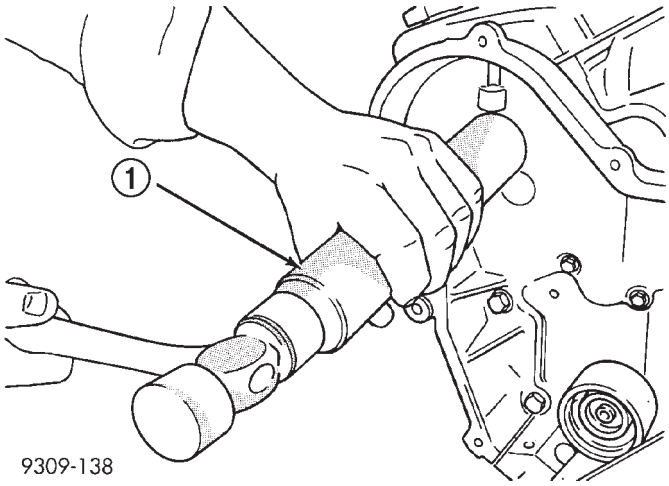


Fig. 103 Camshaft Oil Seal—Installation

1 – SPECIAL TOOL 6052

REMOVAL AND INSTALLATION (Continued)

CRANKSHAFT OIL SEAL—FRONT

REMOVAL

(1) Remove timing belt. Refer to procedure in this section.

(2) Remove crankshaft sprocket using Special Tool L-4407-A (Fig. 104).

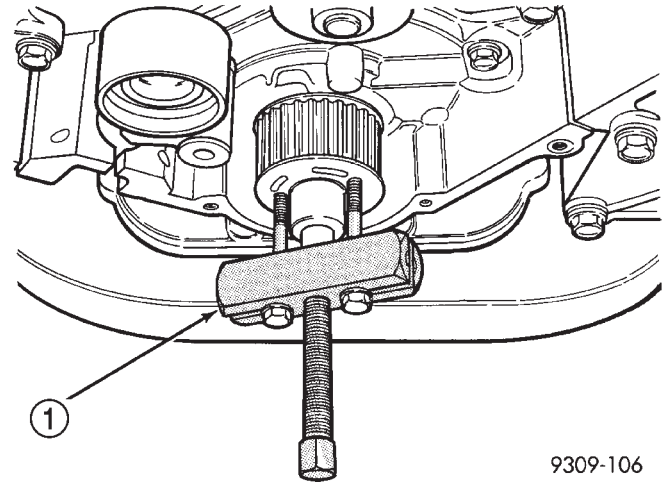


Fig. 104 Crankshaft Sprocket—Removal

1 – SPECIAL TOOL L-4407–A

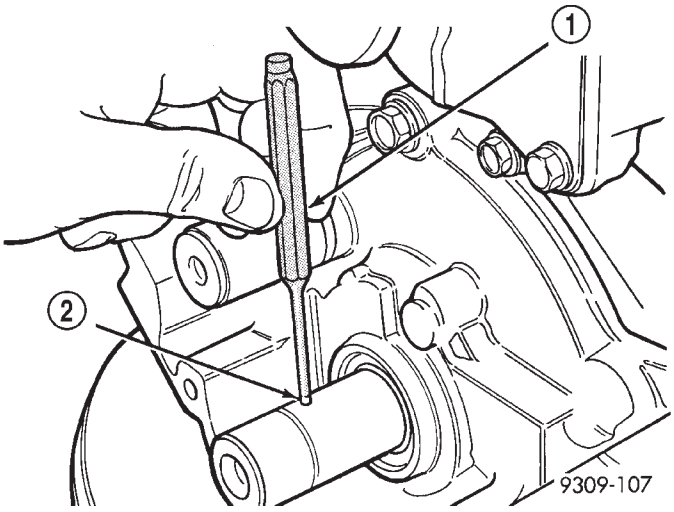


Fig. 105 Crankshaft Sprocket Dowel Pin—Removal/ Installation

1 – PIN PUNCH
2 – DOWEL

(3) Tap the dowel pin out of the crankshaft (Fig. 105).

(4) Remove crankshaft seal using Special Tool 6341A (Fig. 106).

CAUTION: Do not nick shaft seal surface or seal bore.

(5) Shaft seal lip surface must be free of varnish, dirt or nicks. Polish with 400 grit paper if necessary.

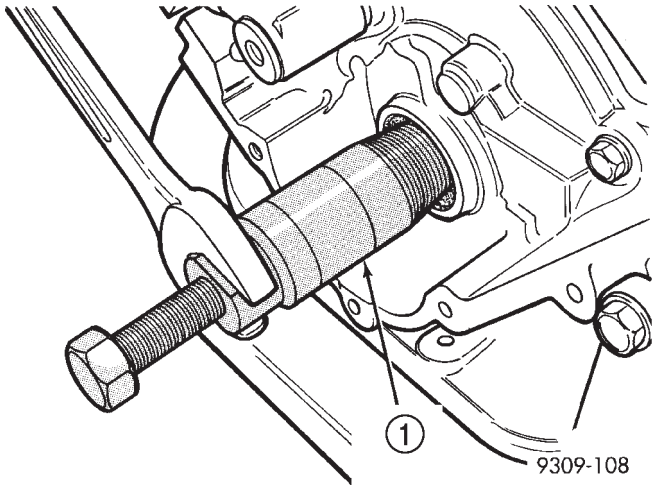


Fig. 106 Crankshaft Oil Seal with Special Tool 6341A—Removal

1 – SPECIAL TOOL 6341A

INSTALLATION

(1) Install crankshaft seal using Special Tool 6342 (Fig. 107).

(2) Install the dowel pin into the crankshaft to 1.2 mm (0.047 in.) protrusion (Fig. 105).

NOTE: To assure proper installation depth of crankshaft sprocket, Special Tool 6641 must be used.

(3) Install crankshaft sprocket using Special Tools 6641 and C-4685-C1 (Fig. 108).

(4) Install timing belt.

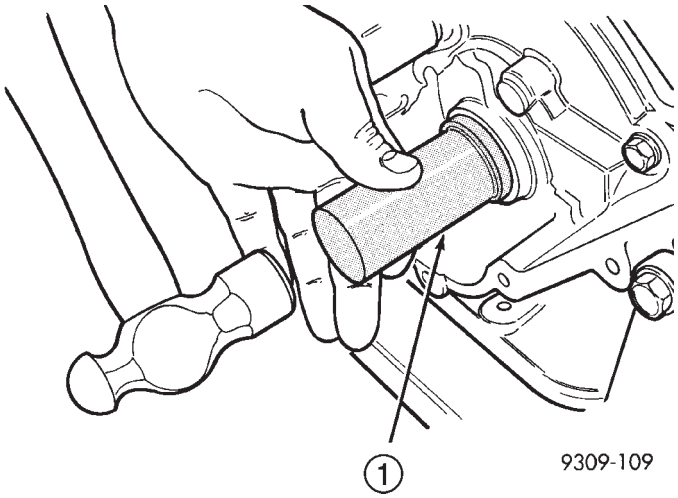


Fig. 107 Crankshaft Oil Seal with Special Tool 6342—Installation

1 – SPECIAL TOOL 6342

REMOVAL AND INSTALLATION (Continued)

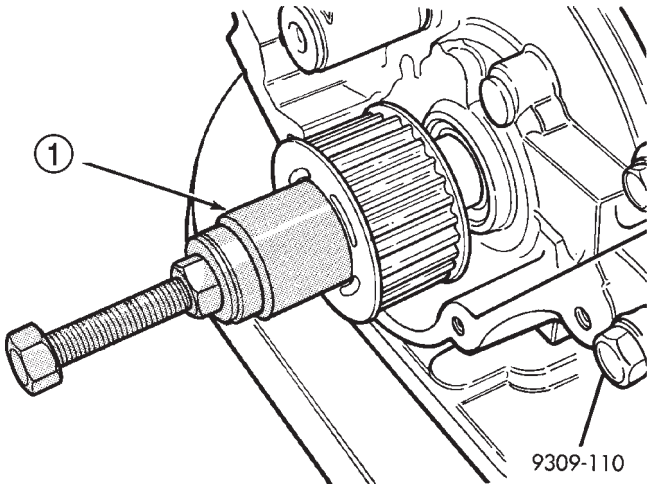


Fig. 108 Crankshaft Sprocket—Installation

1 – INSTALL WITH SPECIAL TOOL 6641 WITH 12mm SCREW C-4685–C1 AND THRUST BEARING AND WASHER

CRANKSHAFT OIL SEAL—REAR

REMOVAL

(1) Remove transaxle from vehicle. Refer to TRANSAXLE for procedure.

(2) Remove drive plate.

(3) Insert a 3/16" wide flat bladed screwdriver between the dust lip and the metal case of the crankshaft seal. Angle the screwdriver (Fig. 109) through the dust lip against the metal case of the seal. Pry out seal.

CAUTION: Do not allow the screwdriver blade to contact the crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

INSTALLATION

CAUTION: If a burr or scratch is present on the crankshaft edge (chamfer), clean surface using 400 grit sand paper to prevent seal damage during installation.

(1) Place Special Tool 6926-1 Guide on crankshaft (Fig. 110). This is a pilot tool with a magnetic base.

(2) Position seal over pilot tool. Assure that lip of seal is facing towards the crankshaft during installation. The pilot tool remains on crankshaft during seal installation.

(3) Using Special Tool 6926-2 Installer, and C-4171 Handle (Fig. 110), drive seal into the retainer housing until seal is flush with housing surface.

(4) Install drive plate and transaxle. Refer to TRANSAXLE for procedures.

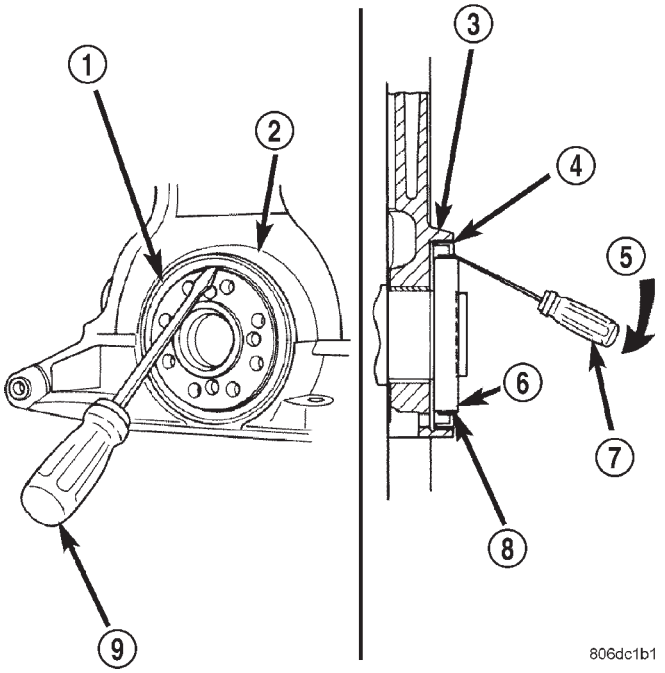


Fig. 109 Rear Crankshaft Oil Seal Removal—Typical

1 – REAR CRANKSHAFT SEAL
2 – ENGINE BLOCK
3 – ENGINE BLOCK
4 – REAR CRANKSHAFT SEAL METAL CASE
5 – PRY IN THIS DIRECTION
6 – CRANKSHAFT
7 – SCREWDRIVER
8 – REAR CRANKSHAFT SEAL DUST LIP
9 – SCREWDRIVER

CRANKSHAFT OIL SEAL RETAINER—REAR

REMOVAL

(1) Remove crankshaft rear oil seal and oil pan. Refer to procedure in this section.

(2) Remove seal retainer attaching screws.

(3) Remove seal retainer (Fig. 111).

NOTE: Seal retainer gasket is bonded to the retainer and must be replaced as an assembly.

INSTALLATION

(1) Clean all sealing surfaces. Replace retainer assembly if gasket is torn or damaged.

(2) Install seal retainer to block, but do not tighten attaching screws at this time.

NOTE: The following steps must be performed to prevent oil leaks at sealing joints.

(3) Attach Special Tools 8225 to pan rail using the oil pan fasteners.

REMOVAL AND INSTALLATION (Continued)

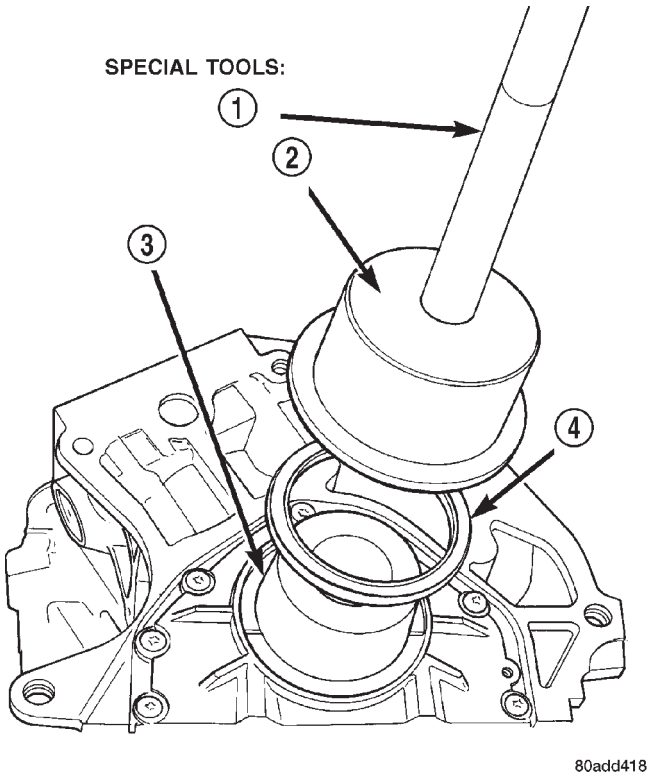


Fig. 110 Crankshaft Rear Seal—Installation

1 – C-4171 HANDLE
2 – 6926–2 INSTALLER
3 – 6926–1 GUIDE
4 – SEAL

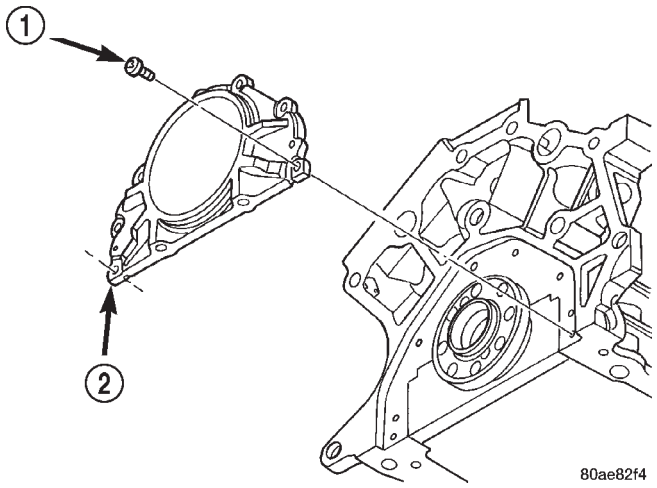


Fig. 111 Oil Seal Retainer

1 – SCREWS (7)
2 – SEAL RETAINER

NOTE: Make sure the marking "3.2/3.5L" on Special Tools 8225, is facing towards the cylinder block pan rail surface (notch on tool is towards the seal retainer).

(4) While applying firm pressure to the seal retainer against Special Tools 8225 (Fig. 112), tighten seal retainer screws to 12 N·m (105 in. lbs.).

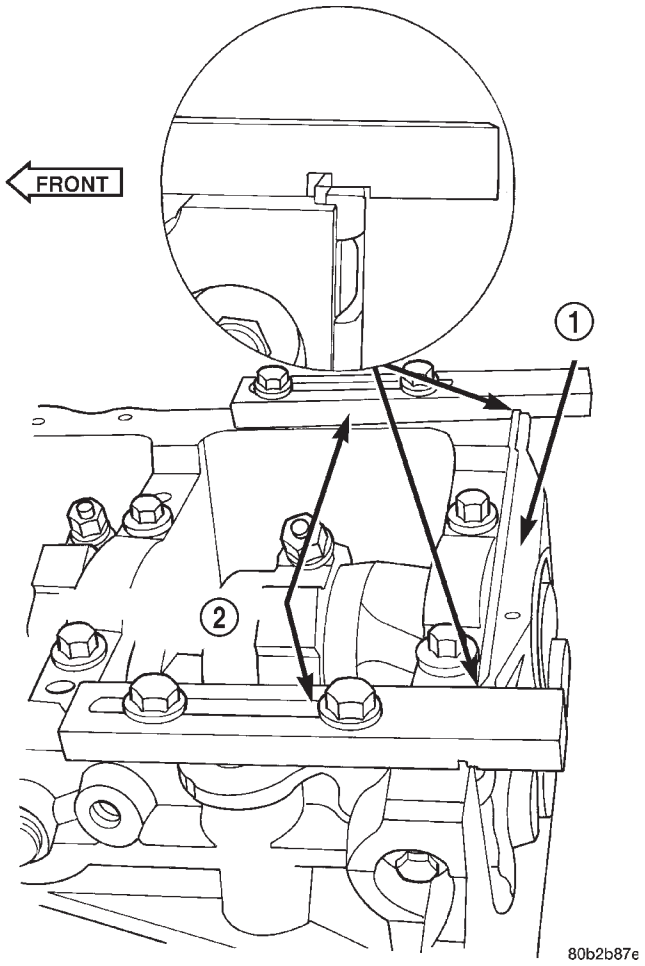


Fig. 112 Rear Crankshaft Seal Retainer Alignment

1 – SEAL RETAINER
2 – SPECIAL TOOLS 8225

(5) Install crankshaft rear oil seal and oil pan. Refer to procedures in this section.

CRANKSHAFT MAIN BEARINGS

Bearing caps are not interchangeable and are marked to insure correct assembly (Fig. 113). Upper and lower bearing halves are NOT interchangeable.

CRANKSHAFT MAIN JOURNALS

The crankshaft journals should be checked for excessive wear, taper and scoring. Limits of taper or out-of-round on any crankshaft journals should be held to 0.015 mm (0.0006 in.). Journal grinding should not exceed 0.305 mm (0.012 inch.) under the standard journal diameter. DO NOT grind thrust faces of Number 2 main bearing. DO NOT nick crank pin or bearing fillets. After grinding, remove rough

REMOVAL AND INSTALLATION (Continued)

edges from crankshaft oil holes and clean out all passages.

CAUTION: With a forged steel crankshaft it is important that the final paper or cloth polish after any journal regrind be in the same direction as normal rotation in the engine.

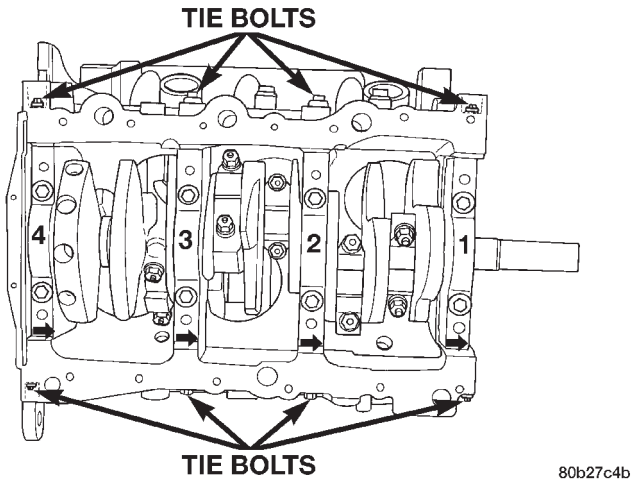


Fig. 113 Main Bearing Cap Identification

The crankshaft thrust is controlled with thrust washers located at the upper No. 2 main bearing bulk head (Fig. 114). All bearing cap bolts removed during service procedures are to be cleaned and oiled before installation. Bearing shells are available in standard and the following undersize: 0.025 mm (0.001 in.) and 0.254 mm (0.010 in.). Never install an undersize bearing that will reduce clearance below specifications.

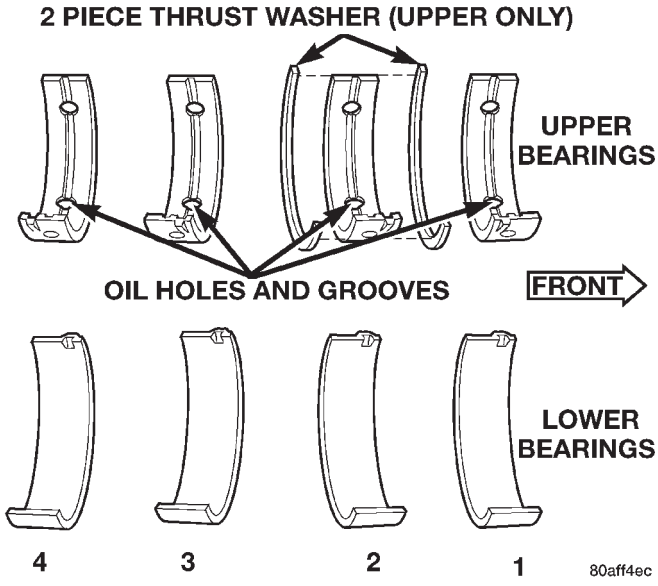


Fig. 114 Main Bearing Identification

REMOVAL

(1) Remove oil pan, pick-up tube, and windage tray. Refer to procedures in this section. Identify bearing caps before removal.

(2) Remove bearing caps one at a time. Remove upper half of bearing by inserting Special Main Bearing Tool C-3059 (Fig. 115) into the oil hole of crankshaft.

(3) Slowly rotate crankshaft clockwise, forcing out upper half of bearing shell.

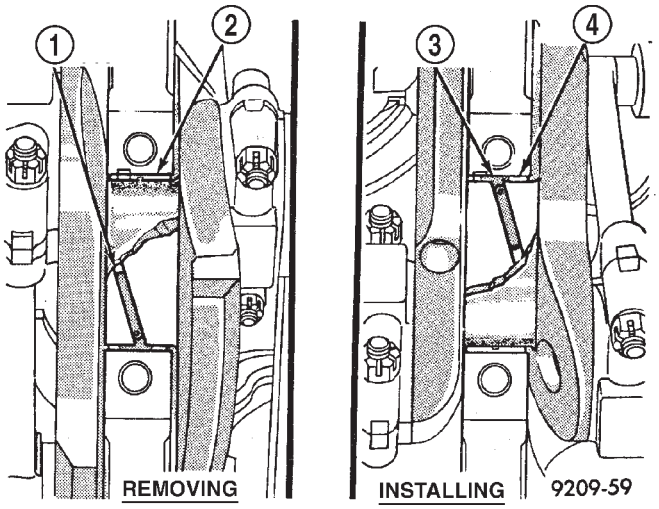


Fig. 115 Removing and Installing Upper Main Bearing With Special Tool C- 3059

1 – SPECIAL TOOL C-3059
2 – BEARING
3 – SPECIAL TOOL C-3059
4 – BEARING

INSTALLATION

CAUTION: Main bearings are select fit. Refer to Crankshaft Main Bearing Fitting in this section for proper bearing selection.

NOTE: Only one main bearing should be selectively fitted while all other main bearing caps are properly tightened.

When installing a new upper bearing shell, slightly chamfer the sharp edges from the plain side.

(1) Lubricate main bearing with clean engine oil.

(2) Start bearing in place, and insert Main Bearing Tool C-3059 into oil hole of crankshaft (Fig. 115).

(3) Slowly rotate crankshaft counterclockwise sliding the bearing into position. Remove Special Main Bearing Tool C-3059.

NOTE: Lubricate main bearing cap bolts with engine oil before installation.

REMOVAL AND INSTALLATION (Continued)

(4) Lubricate and install lower bearing half and main cap Tighten bolts finger tight.

(5) For installing thrust washers at the No. 2 main bearing location, use the following procedure:

(a) Move crankshaft forward to limit of travel. Lubricate and install the front thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface (Fig. 116).

(b) Move crankshaft rearward to limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

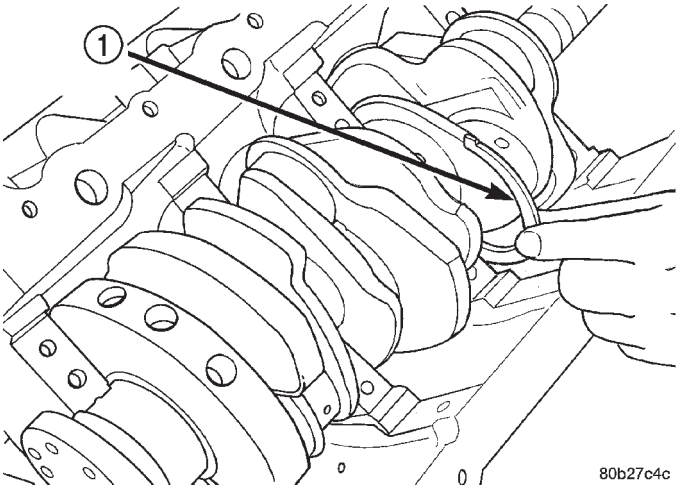


Fig. 116 Thrust Washer Installation

1 – FRONT THRUST WASHER

The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, lastly the main cap tie (horizontal) bolts.

(6) Install each main bearing cap and tighten inner bolts finger tight.

(7) Tighten inner main bearing cap bolts to 20 N·m + 1/4 turn (15 ft. lbs. + 1/4 turn).

(8) Measure crankshaft end play. Refer to Service Procedures in this section.

(9) Install windage tray. Lubricate bolts with engine oil and tighten to 27 N·m + 1/4 turn (20 ft. lbs. + 1/4 turn).

(10) Install the main cap tie (horizontal) bolts and tighten to 28 N·m (250 in. lbs.).

(11) Install oil pump pick-up tube and oil pan.

(12) Fill engine crankcase with proper oil to correct level.

OIL FILTER

NOTE: When servicing the oil filter, avoid deforming the filter can. Install the remove/install tool band strap against the base lock seam. The lock seam joining the can to the base is reinforced by the base plate.

(1) Using a suitable oil filter wrench, unscrew filter from base and discard (Fig. 117).

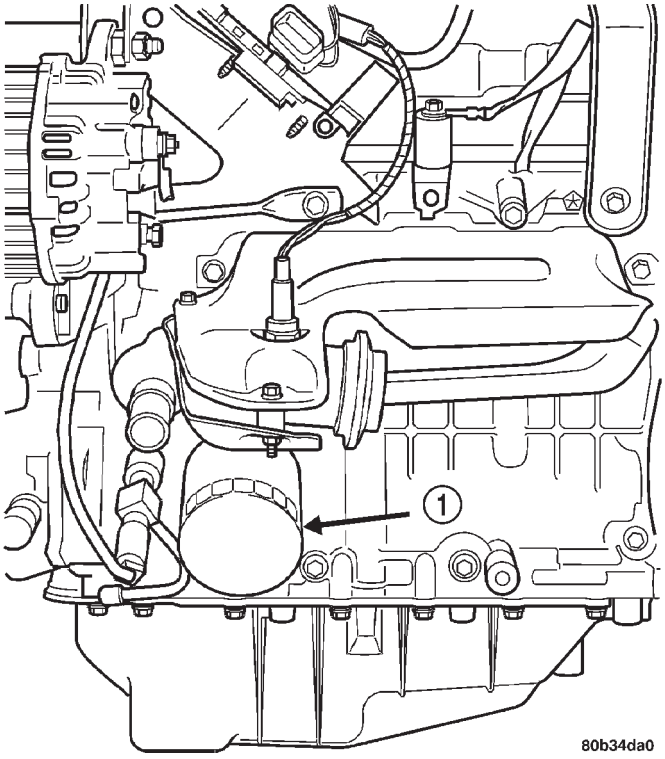


Fig. 117 Oil Filter

1 – OIL FILTER

(2) Wipe base clean, then inspect gasket contact surface.

(3) Lubricate gasket of new filter with clean engine oil.

(4) Install and tighten filter to 20 N·m (15 ft. lbs.) of torque after gasket contacts base. Use filter wrench if necessary.

(5) Start engine and check for leaks.

OIL PUMP

REMOVAL

It is necessary to remove the oil pan, oil pickup and oil pump body to service the oil pump rotors. The oil pump pressure relief valve can be serviced by removing the oil pan.

(1) Drain cooling system and remove fan module. Refer to COOLING SYSTEM for procedures.

(2) Remove the accessory drive belts. Refer to COOLING SYSTEM for procedure.

(3) Remove the crankshaft damper and timing belt covers. Refer to procedures in this section.

REMOVAL AND INSTALLATION (Continued)

(4) Remove timing belt. Refer to procedure in this section.

(5) Remove crankshaft sprocket. Refer to Crankshaft Oil Seal—Front procedure in this section.

(6) Remove oil pan. Refer to procedure in this section.

(7) Remove oil pickup tube.

(8) Remove oil pump fasteners. Remove pump and gasket from engine (Fig. 118).

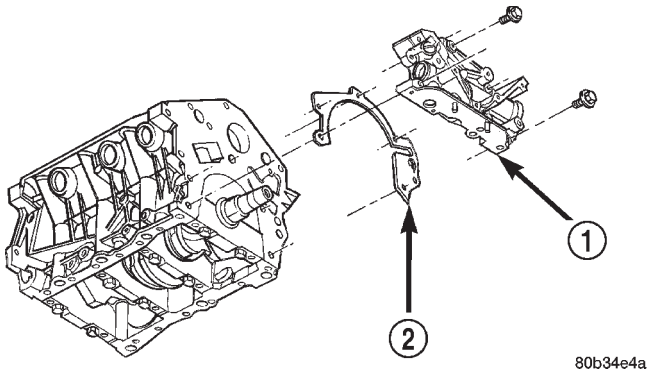


Fig. 118 Oil Pump—Removal and Installation

1 – OIL PUMP
2 – GASKET

INSTALLATION

(1) Prime oil pump before installation by filling rotor cavity with engine oil.

(2) Install oil pump and gasket carefully over the crankshaft. Position pump onto block and tighten bolts to 28 N·m (250 in. lbs.)

(3) Install new O-ring on oil pickup tube.

(4) Install oil pickup tube.

(5) Install oil pan. Refer to procedure in this section.

(6) Install crankshaft sprocket. Refer to Crankshaft Oil Seal—Front procedure in this section.

(7) Install timing belt. Refer to procedure in this section.

(8) Install the timing belt covers and crankshaft damper. Refer to procedures in this section.

(9) Install the accessory drive belts and fan module. Refer to COOLING SYSTEM for procedures.

(10) Fill cooling system. Refer to COOLING SYSTEM for procedure.

PISTON AND CONNECTING ROD

REMOVAL

(1) Remove cylinder heads and oil pan. Refer to procedures in this section.

(2) Remove top ridge of cylinder bores with a reliable ridge reamer before removing pistons from cylinder block. **Be sure to keep tops of pistons covered during this operation. Pistons and connecting rods must be removed from top of cylinder block. When removing piston and connecting rod assemblies from the engine, rotate crankshaft so that each connecting rod is centered in cylinder bore.**

(3) Inspect connecting rods and connecting rod caps for cylinder identification. Identify them if necessary (Fig. 119).

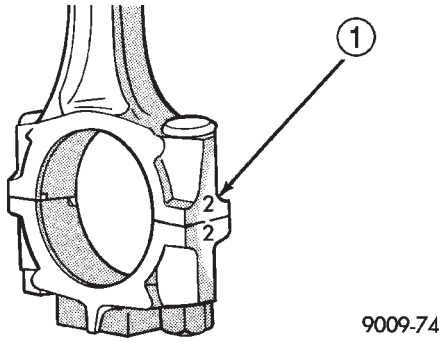


Fig. 119 Identify Connecting Rod to Cylinder

1 – CYLINDER NUMBER

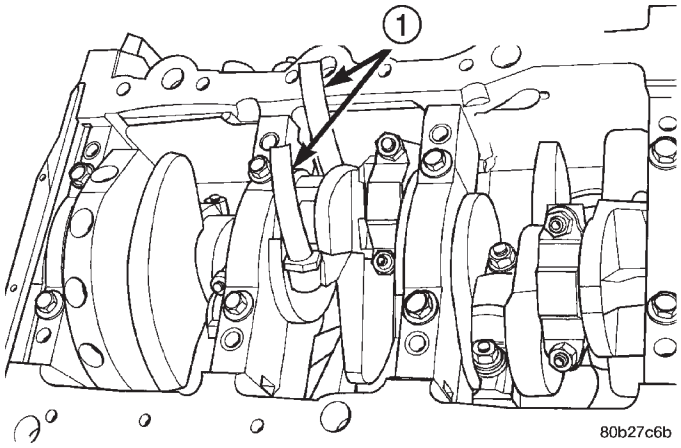


Fig. 120 Connecting Rod Guides and Crankshaft Protectors

1 – COVER ROD BOLTS WITH A SUITABLE COVERING WHEN REMOVING OR INSTALLING PISTON ASSEMBLY

(4) Remove connecting rod cap. Install protectors on connecting rod bolts (Fig. 120). Push each piston and rod assembly out of cylinder bore.

NOTE: Be careful not to nick crankshaft journals.

(5) After removal, install bearing cap on the mating rod.

PISTON RINGS—INSTALLATION

NOTE: Refer to FITTING PISTON RINGS in this section for piston ring specifications.

REMOVAL AND INSTALLATION (Continued)

(1) The No. 1 and No. 2 piston rings have a different cross section. Insure that the No. 2 ring is installed with manufacturers I.D. mark (dot) facing up, towards top of the piston (Fig. 121).

CAUTION: Install piston rings in the following order:

(2) Oil ring expander.
(3) Upper oil ring side rail.
(4) Lower oil ring side rail.
(5) No. 2 Intermediate piston ring.
(6) No. 1 Upper piston ring.
(7) Install the side rail by placing one end between the piston ring groove and the expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander during this step (Fig. 122).**

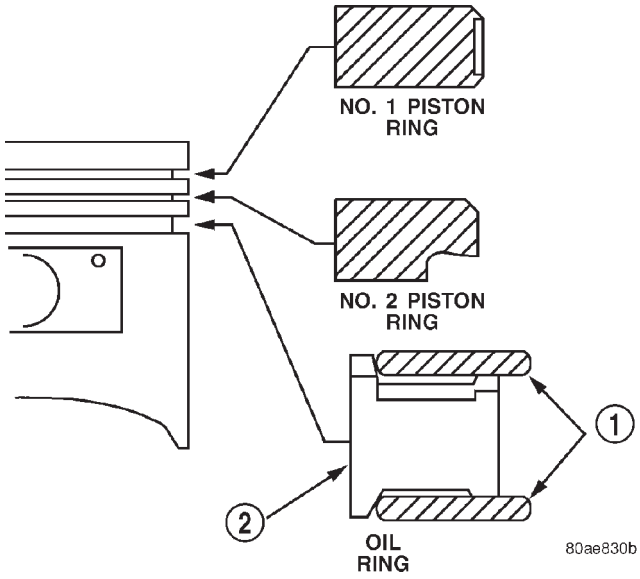


Fig. 121 Piston Ring—Installation

1 – SIDE RAIL
2 – SPACER EXPANDER

(8) Install upper side rail first and then the lower side rail.
(9) Install No. 2 piston ring and then No. 1 piston ring (Fig. 123).
(10) Position piston ring end gaps as shown in (Fig. 124).
(11) Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

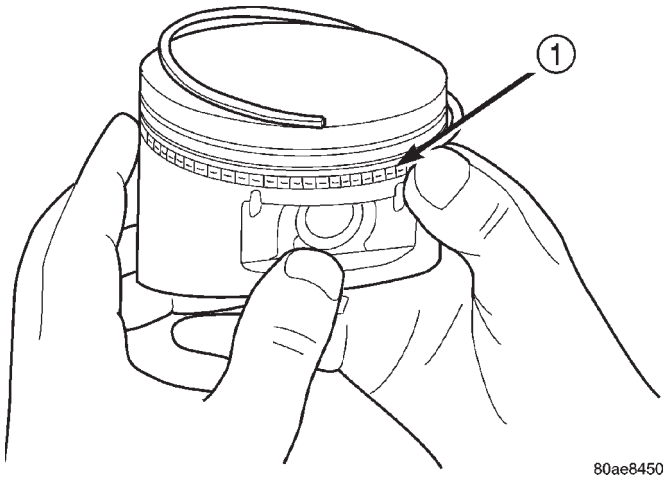


Fig. 122 Side Rail—Installation

1 – SIDE RAIL END

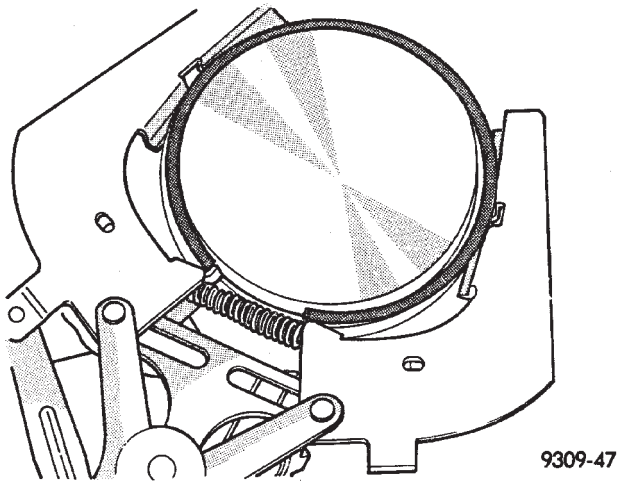


Fig. 123 Upper and Intermediate Rings—Installation

PISTON—INSTALLATION

NOTE: The connecting rod bearing cap bolts must be examined before reuse. If the threads are necked down, the bolts should be replaced.

(1) Check connecting rod bolts for necking by holding a scale or straight edge against the threads. If all threads do not contact the scale, the bolt should be replaced (Fig. 125).
(2) Before installing pistons and connecting rod assemblies into the bore, ensure that compression ring gaps are staggered so that neither is in line with oil ring rail gap (Fig. 124).
(3) Before installing the ring compressor, make sure the oil ring expander ends are butted and the rail gaps located as shown in (Fig. 126).

REMOVAL AND INSTALLATION (Continued)

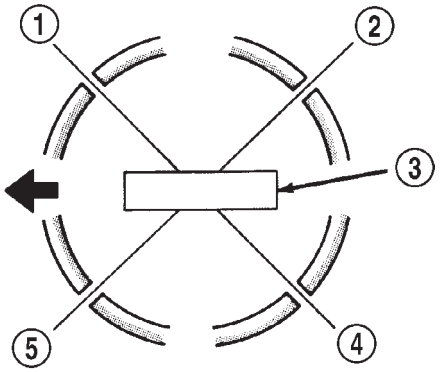


Fig. 124 Piston Ring End Gap Position

1 – SIDE RAIL UPPER
2 – NO. 1 RING GAP
3 – PISTON PIN
4 – SIDE RAIL LOWER
5 – NO. 2 RING GAP AND SPACER EXPANDER GAP

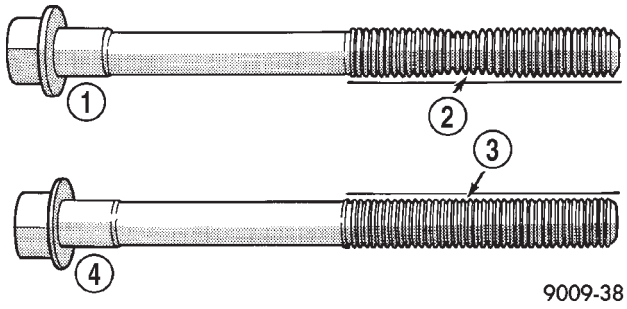


Fig. 125 Check for Stretched Bolts

1 – STRETCHED BOLT
2 – THREADS ARE NOT STRAIGHT ON LINE
3 – THREADS ARE STRAIGHT ON LINE
4 – UNSTRETCHED BOLT

(4) Immerse the piston head and rings in clean engine oil, slide the ring compressor over the piston and tighten with the special wrench. **Ensure position of rings does not change during this operation.**

(5) Install connecting rod bolt protectors on rod bolts (Fig. 120).

(6) Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and piston into cylinder bore and guide rod over the crankshaft journal.

CAUTION: Do Not interchange piston assemblies cylinder-to-cylinder or bank-to-bank.

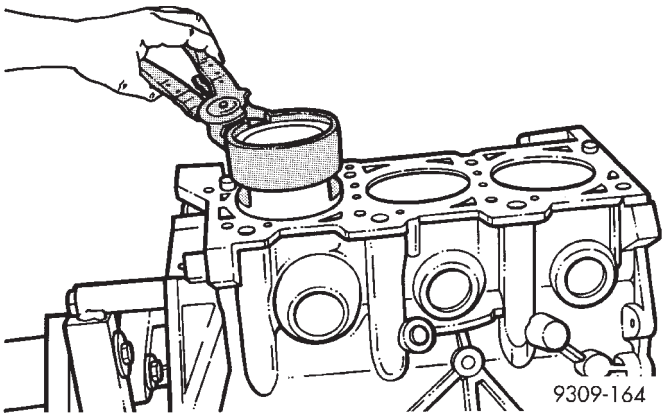


Fig. 126 Piston—Installation

(7) The arrow on top of piston must be pointing toward front of engine (Fig. 127) and oil squirt hole on connecting rod faces the major thrust (right) side of the cylinder bore (Fig. 128).

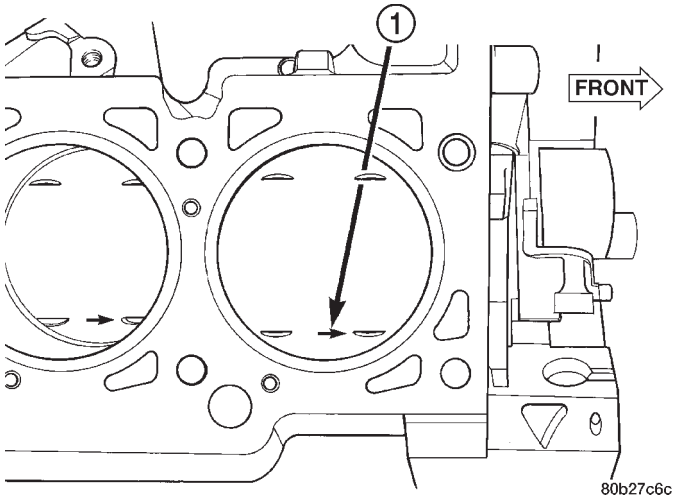


Fig. 127 Piston Orientation

1 – ARROW FACES FRONT OF ENGINE

(8) Tap the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.

(9) Install rod caps. Install nuts on cleaned and oiled rod bolts and tighten nuts to 54 N·m (40 ft. lbs.) Plus 1/4 turn.

(10) Install cylinder heads and oil pan. Refer to procedures in this section.

REMOVAL AND INSTALLATION (Continued)

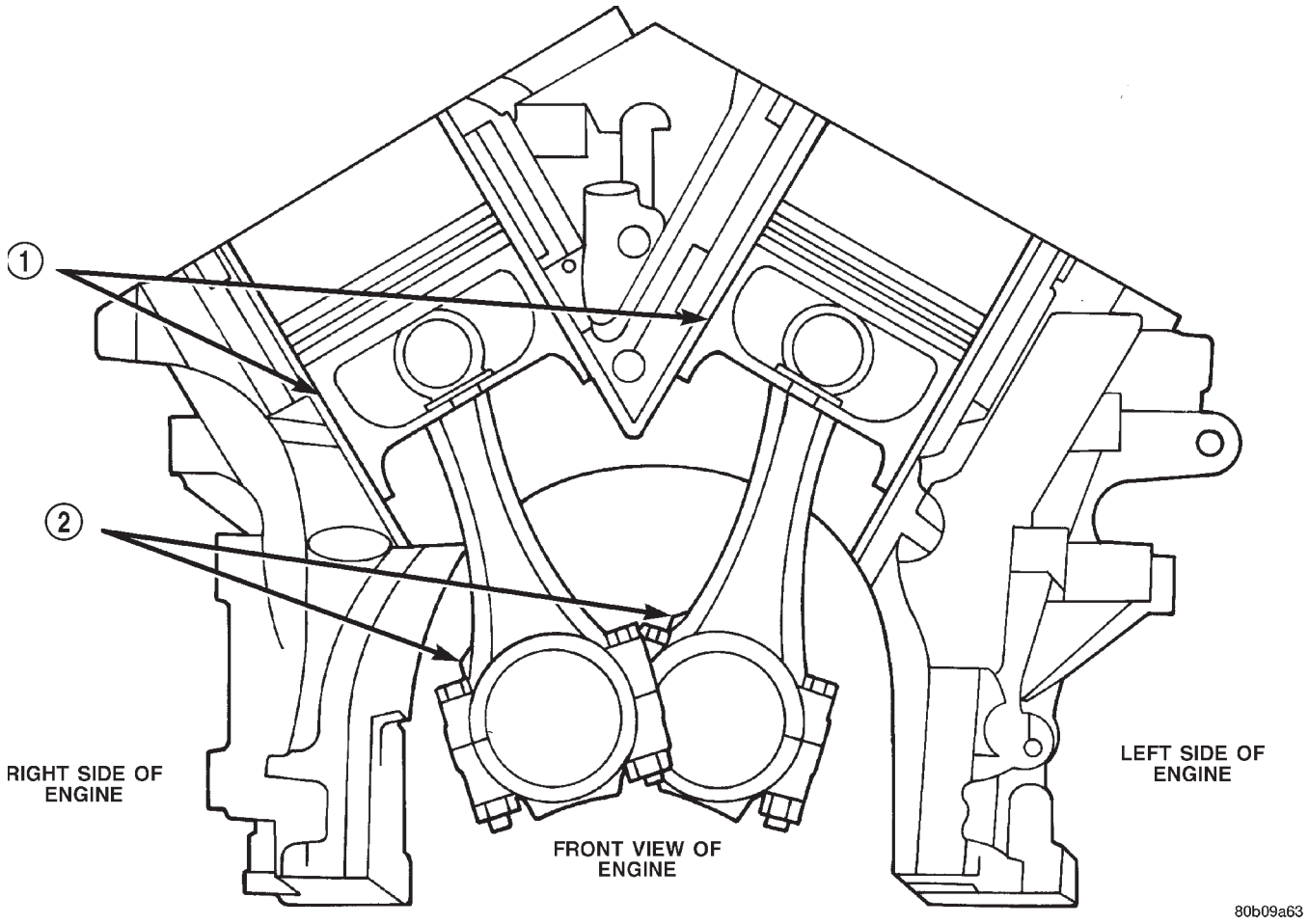


Fig. 128 Connecting Rod Positioning

1 – MAJOR THRUST SIDE OF PISTON
2 – OIL SQUIRT HOLE

ENGINE CORE AND OIL PLUGS

REMOVAL

Using a blunt tool such as a drift and a hammer, strike the bottom edge of the cup plug. With the cup plug rotated, grasp firmly with pliers or other suitable tool and remove plug (Fig. 129).

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

INSTALLATION

Thoroughly clean inside of cup plug hole in cylinder block or head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount. Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

REMOVAL AND INSTALLATION (Continued)

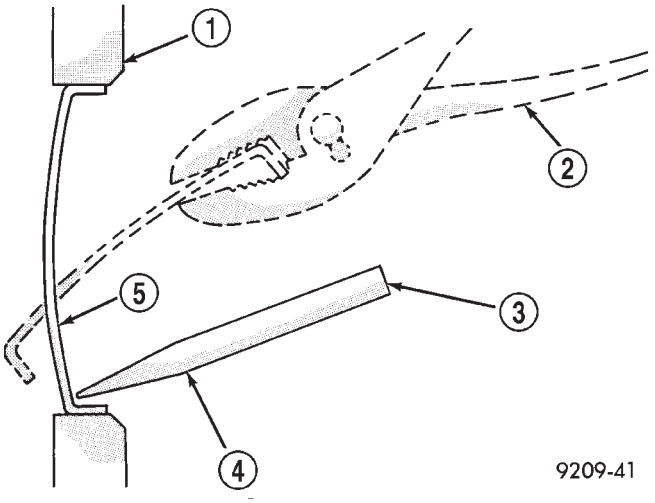


Fig. 129 Core Hole Plug Removal

1 – CYLINDER BLOCK
2 – REMOVE PLUG WITH PLIERS
3 – STRIKE HERE WITH HAMMER
4 – DRIFT PUNCH
5 – CUP PLUG

DISASSEMBLY AND ASSEMBLY

OIL PUMP

DISASSEMBLY

(1) To remove the relief valve, proceed as follows:

(2) Remove cotter pin. Drill a 3.175 mm (1/8 inch.) hole into the relief valve retainer cap and insert a self-threading sheet metal screw into cap.

(3) Clamp screw into a vise and while supporting oil pump body, remove cap by tapping oil pump body using a soft hammer. Discard retainer cap and remove spring and relief valve (Fig. 130).

(4) Remove oil pump cover screws, and lift off cover.

(5) Remove pump rotors.

(6) Wash all parts in a suitable solvent and inspect carefully for damage or wear (Fig. 131).

ROCKER ARMS AND SHAFT ASSEMBLY

DISASSEMBLY

(1) Remove dowel pin using a 4 mm screw, nut, spacer, and washer installed into the pin (Fig. 132). Thread the screw into the pin, then loosen the nut on the screw. This will pull the dowel out of the shaft support. Do not reuse dowel pins. Remove the rocker arms and pedestals in order.

(2) Check the rocker arm mounting portion of the shafts for wear or damage. Replace if damaged or heavily worn.

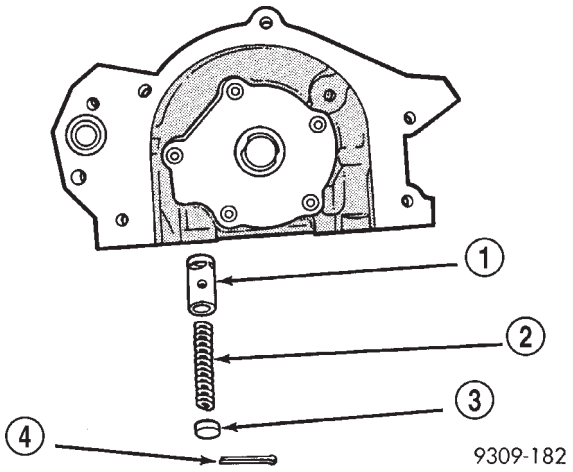


Fig. 130 Oil Pressure Relief Valve

1 – RELIEF VALVE
2 – SPRING
3 – RETAINER CAP
4 – COTTER PIN

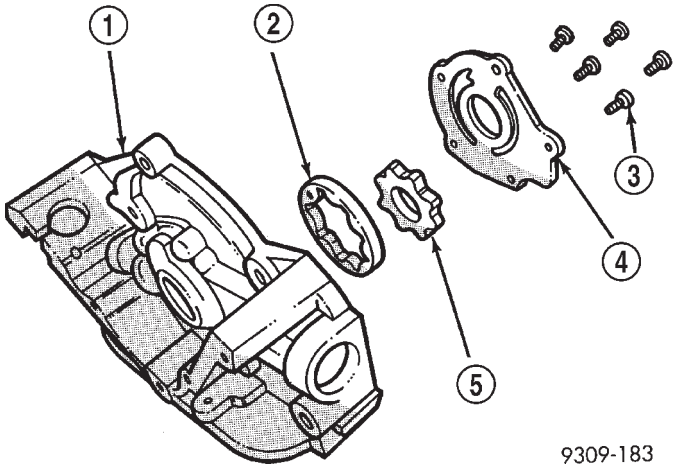


Fig. 131 Oil Pump

1 – OIL PUMP BODY
2 – OIL PUMP OUTER ROTOR
3 – SCREWS
4 – OIL PUMP COVER
5 – OIL PUMP INNER ROTOR

(3) Check shaft oil holes for clogging with small wire, clean as required.

ASSEMBLY

CAUTION: New dowel pins must be installed when reassembling.

(1) Install the rocker arms, and pedestals onto the shaft.

(2) Install dowel pins (Fig. 133). Dowel pins pass through the pedestal into the exhaust rocker shafts.

DISASSEMBLY AND ASSEMBLY (Continued)

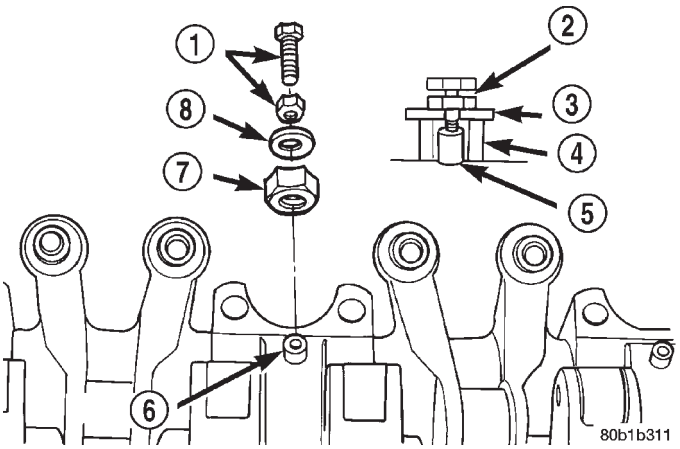


Fig. 132 Rocker Arms and Shaft—Disassembly

1 – 4mm SCREW AND NUT
2 – 4mm SCREW AND NUT
3 – WASHER
4 – SPACER
5 – DOWEL
6 – DOWEL
7 – SPACER
8 – WASHER

Dowel pins should be pressed in until they bottom-out against the rocker shaft in the pedestal.

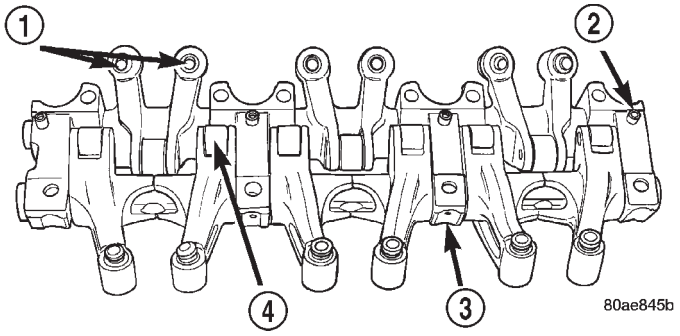


Fig. 133 Assemble Rocker Arms and Shaft

1 – HYDRAULIC LASH ADJUSTERS
2 – DOWEL PIN
3 – PEDESTAL
4 – ROLLER

CLEANING AND INSPECTION

INTAKE MANIFOLD

Check for:

- Damage and cracks of each section.
- Clogged water passages in end cross over and clogged gas passages.

EXHAUST MANIFOLD

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

CYLINDER HEAD

CLEANING

(1) Use a gasket removal compound to soften the old gasket material.

CAUTION: When cleaning the cylinder head and block mating surfaces, do not use a metal scraper because the sealing surfaces could be cut or ground. Instead, use a wooden or plastic scraper.

(2) Make sure the gasket and/or foreign material does not enter the oil feed hole or the oil return holes.

INSPECTION

(1) Before cleaning, check for leaks, damage and cracks.
(2) Clean cylinder head and oil passages.
(3) Check cylinder head for flatness (Fig. 134).
(4) Cylinder head must be flat within:

- Standard dimension = less than 0.05 mm (0.002 inch.)
- Service Limit = 0.2 mm (0.008 inch.)
- Grinding Limit = Maximum of 0.2 mm (0.008 inch.) is permitted.

CAUTION: 0.20 mm (0.008 in.) MAX is a combined total dimension of the stock removal limit from cylinder head and block top surface (Deck) together.

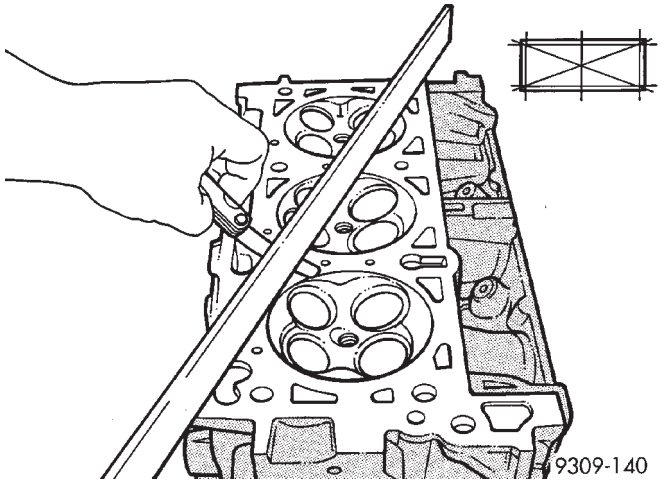


Fig. 134 Checking Cylinder Head Flatness

CAMSHAFT

(1) Inspect camshaft bearing journals for damage and binding (Fig. 135). If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
(2) Check the cam surface for abnormal wear and damage and replace if defective. Measure the actual wear (Fig. 135) and replace if out of limit, standard

CLEANING AND INSPECTION (Continued)

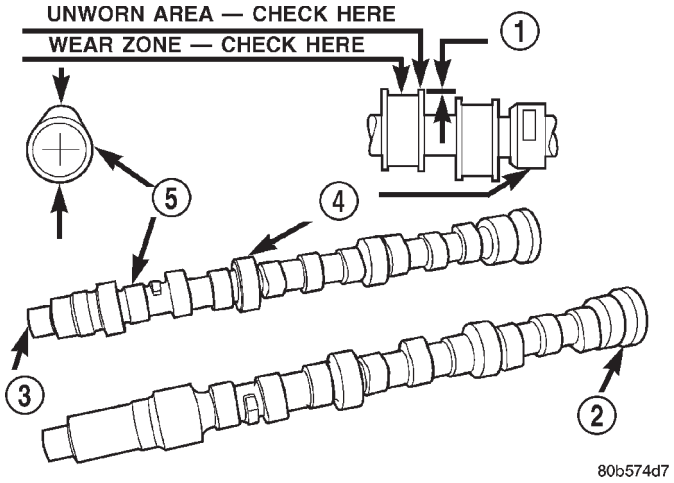


Fig. 135 Camshaft Inspection

1 – ACTUAL WEAR
2 – LEFT CAMSHAFT
3 – RIGHT CAMSHAFT
4 – BEARING JOURNAL
5 – LOBE

value is 0.0254 mm (.001 in.), wear **limit** is 0.254 mm (0.010 in.).

ROCKER ARMS

The rocker arm shafts are hollow and are used as lubrication oil ducts. The rocker arm and shaft assembly on the **right** side of the engine has an oil passage hole from the cylinder head located at the third rocker shaft support pedestal. The rocker arm and shaft assembly on the **left** side of the engine has an oil passage hole from the cylinder head located at the second rocker shaft support pedestal.

NOTE: To prevent air ingestion into lash adjusters, avoid turning rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjuster and plastic retainer.

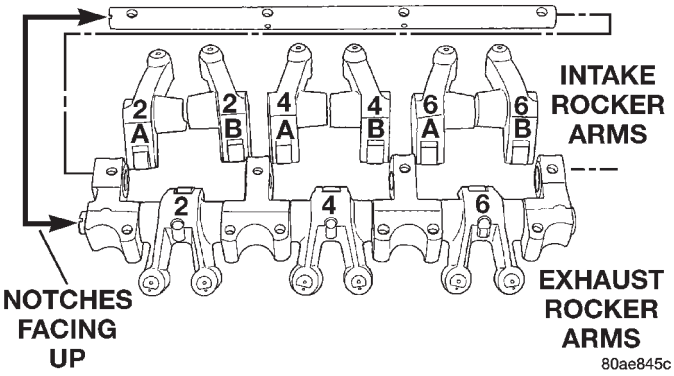


Fig. 136 Intake and Exhaust Rocker Arms—Left Side

The intake and exhaust rocker arms are different. They should be identified before disassembling the assembly (Fig. 136).

Check rocker arms for wear or damage (Fig. 137) :

- Roller scuffing or wear
- Shaft bore scuffing or wear
- Swivel pad on lash adjuster missing or broken
- Rocker arm showing signs of fatigue or cracking
- Roller axle protruding from arm

Replace assembly as necessary if any rocker arms shows signs of wear.

CAUTION: Do Not remove lash adjuster from rocker arm assembly. Damage to the adjuster and rocker arm will result.

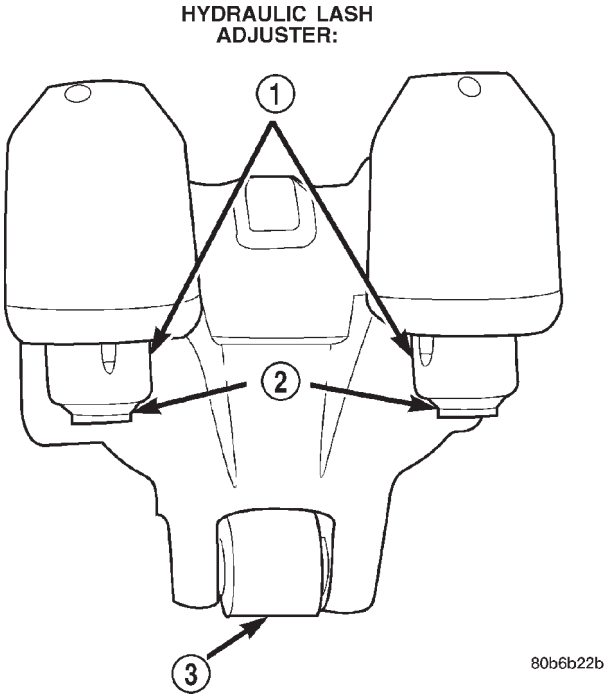


Fig. 137 Rocker Arm/Lash Adjuster—Inspection

1 – RETAINER
2 – SWIVEL PAD
3 – ROLLER

VALVE INSPECTION

(1) Clean valves thoroughly and replace burned, warped and cracked valves.

(2) Measure valve stems for wear (Fig. 138). Refer to Engine Specifications.

NOTE: Valve stems are chrome plated and should not be polished (Fig. 138).

(3) Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.

CLEANING AND INSPECTION (Continued)

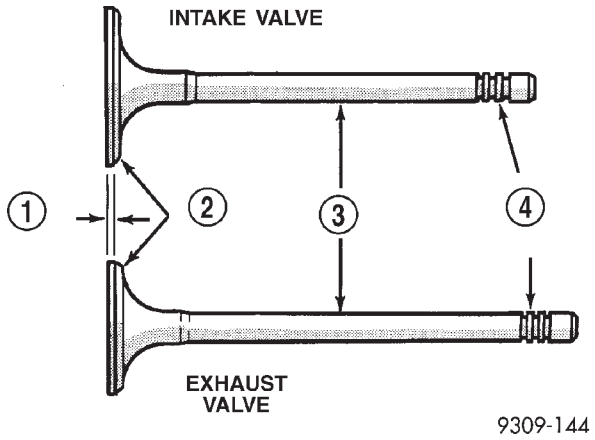


Fig. 138 Intake and Exhaust Valves

1 – MARGIN
2 – FACE
3 – STEM
4 – VALVE SPRING RETAINER LOCK GROOVES

CHECKING VALVE GUIDES

(1) Measure valve stem-to-guide clearance as follows:

(2) Install valve into cylinder head so it is 15 mm (0.590 inch.) off the valve seat. A small piece of hose may be used to hold valve in place.

(3) Attach dial indicator Tool C-3339 to cylinder head and set it at right angle of valve stem being measured (Fig. 139).

(4) Move valve to and from the indicator. Refer to Engine Specifications.

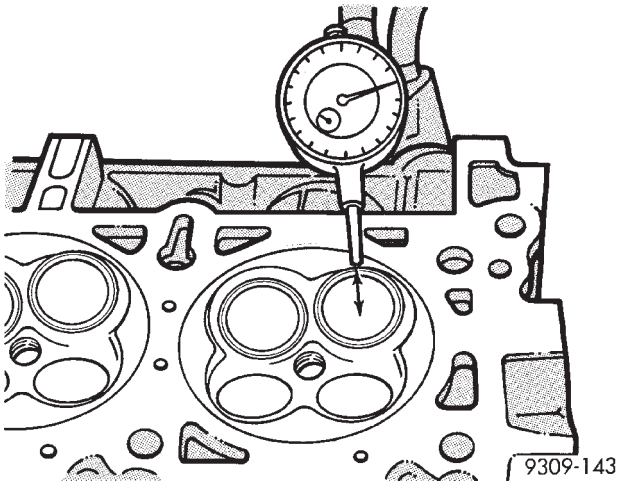


Fig. 139 Measuring Valve Guide Wear

VALVE GUIDES

NOTE: Replace cylinder head if stem-to-guide clearance exceeds specifications, or if guide is loose in cylinder head.

OIL PUMP

INSPECTION AND REPAIR

(1) Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. Replace pump cover if scratched or grooved.

(2) Lay a straightedge across the pump cover surface (Fig. 140). If a 0.025 mm (0.001 in.) feeler gauge can be inserted between cover and straight edge, cover should be replaced.

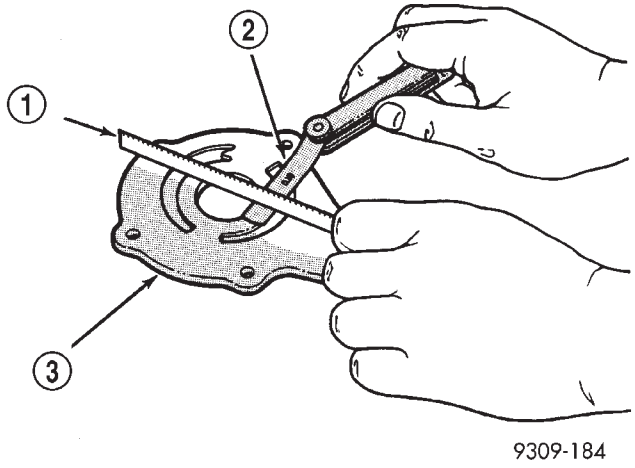


Fig. 140 Checking Oil Pump Cover Flatness

1 – STRAIGHT EDGE
2 – FEELER GAUGE
3 – OIL PUMP COVER

(3) Measure thickness and diameter of outer rotor. If outer rotor thickness measures 14.299 mm (0.563 in.) or less (Fig. 141), or if the diameter is 79.78 mm (3.141 inches.) or less, replace outer rotor.

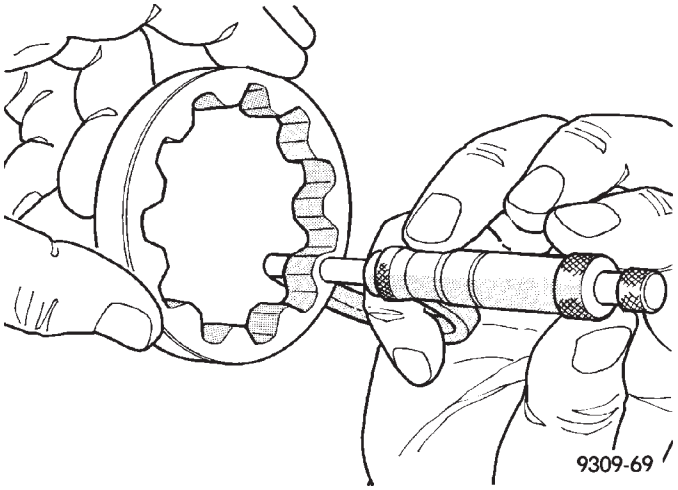


Fig. 141 Measuring Outer Rotor Thickness

CLEANING AND INSPECTION (Continued)

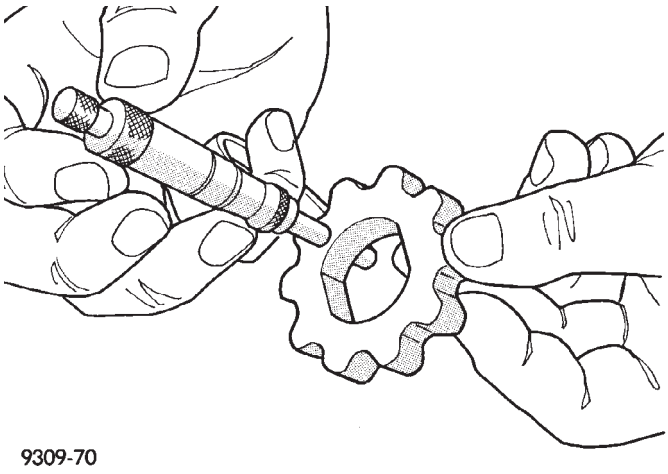


Fig. 142 Measuring Inner Rotor Thickness

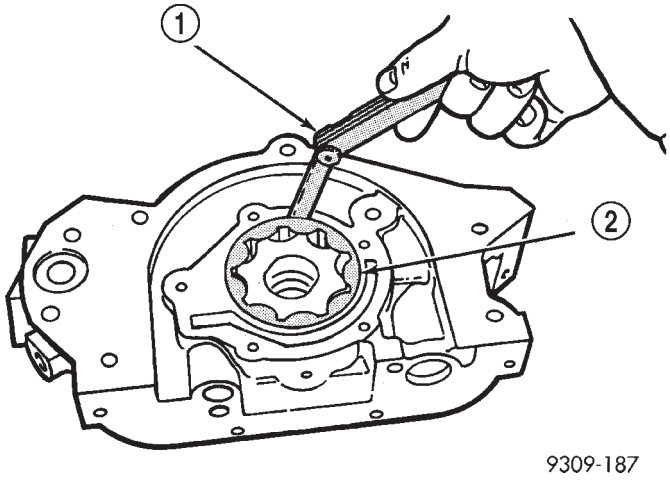


Fig. 143 Measuring Outer Rotor Clearance in Housing

1 – FEELER GAUGE
2 – OUTER ROTOR

(4) If inner rotor measures 14.299 mm (0.563 in.) or less replace inner rotor (Fig. 142).

(5) Slide outer rotor into body, press to one side with fingers and measure clearance between rotor and body (Fig. 143). If measurement is 0.39 mm (0.015 inch.) or more, replace body only if outer rotor is in specifications.

(6) Install inner rotor into body. If clearance between inner and outer rotors (Fig. 144) is 0.20 mm (0.008 inch.) or more, replace both rotors.

(7) Place a straightedge across the face of the body, between bolt holes. If a feeler gauge of 0.077 mm (0.003 in.) or more can be inserted between rotors and the straightedge, replace pump assembly (Fig. 145) **ONLY** if rotors are in specs.

(8) Inspect oil pressure relief valve plunger for scoring and free operation in its bore. Small marks may be removed with 400-grit wet or dry sandpaper.

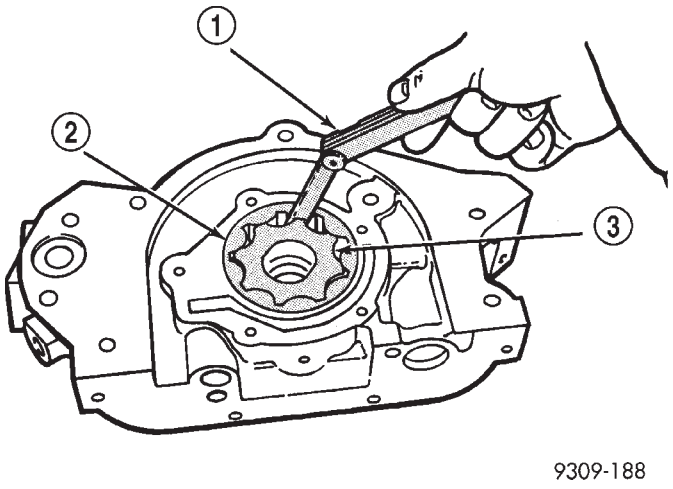


Fig. 144 Measuring Clearance Between Rotors

1 – FEELER GAUGE
2 – OUTER ROTOR
3 – INNER ROTOR

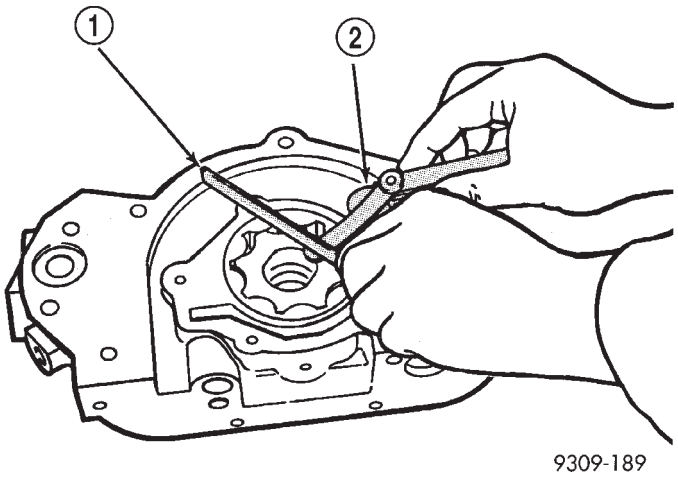


Fig. 145 Measuring Clearance Over Rotors

1 – STRAIGHT EDGE
2 – FEELER GAUGES

(9) The relief valve spring has a free length of approximately 49.5 mm (1.95 inches) it should test between 23 – 25 pounds when compressed to 34 mm (1 – 11/32 inches). Replace spring that fails to meet specifications.

OIL PUMP ASSEMBLY

(1) Assemble pump, using new parts as required.

(2) Tighten cover screws to 12 N·m (105 in. lbs.).

(3) Prime oil pump before installation by filling rotor cavity with engine oil.

(4) If oil pressure is low and pump is within specifications, inspect for worn engine bearings or other reasons for oil pressure loss.

CLEANING AND INSPECTION (Continued)

CYLINDER BLOCK AND BORE

CLEANING AND INSPECTION

(1) Clean cylinder block thoroughly and check all core hole plugs for evidence of leaking.

(2) If new core plugs are installed, Refer to Engine Core Plugs.

(3) Examine block for cracks or fractures.

(4) Inspect for damaged bolt threads. Repair threads as needed. Refer to Service Procedures, Repair of Damaged or Worn Threads.

NOTE: Refer to Honing Cylinder Bores outlined in the Standard Service Procedures for specification and procedures.

(5) After a cylinder bore honing or deglazing procedure:

(a) Clean bores with a soap and water solution.

(b) Thoroughly rinse cylinder bores with clean water to remove soap/water solution and wipe bores with a clean lint-free cloth.

(c) Oil the bores after cleaning to prevent rust.

CYLINDER BORE INSPECTION

The cylinder walls should be checked for out-of-round and taper with Tool C-119 (Fig. 146).

Measure the cylinder bore at three levels in directions A and B (Fig. 146). Top measurement should be 12 mm (0.50 inch.) down and bottom measurement should be 12 mm (0.50 inch.) up from bottom of bore. Refer to Engine Specifications.

NOTE: There are no service procedures to bore the cylinder bores for installation of oversized pistons.

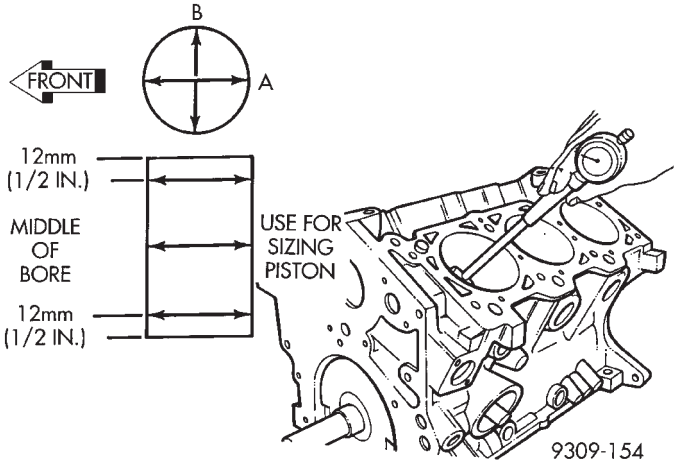


Fig. 146 Checking Cylinder Bore Size

ENGINE HYDRO-MOUNT INSULATORS

Engine hydro-mounts may show surface cracks this will not effect performance and mount should not be replaced. Only replace the engine hydro-mounts when leaking fluid:

- Drive shaft distress: Refer to Driveshafts in Suspension, Group 2.
- Any front end structural damage (after repair).
- Insulator replacement.

TIMING BELT INSPECTION—IN VEHICLE

(1) Remove the accessory drive belts. Refer to COOLING SYSTEM for procedure.

(2) Remove timing belt covers. Refer to procedure in this section.

(3) Inspect both sides of the timing belt. Replace belt if any of the following conditions exist (Fig. 147):

(a) Hardening of back rubber back side is glossy without resilience and leaves no indent when pressed with fingernail.

(b) Cracks on rubber back.

(c) Cracks or peeling of canvas.

(d) Cracks on rib root.

(e) Cracks on belt sides.

(f) Missing teeth.

(g) Abnormal wear of belt sides. The sides are normal if they are sharp as if cut by a knife.

(h) Vehicle mileage at component maintenance requirement. Refer to LUBRICATION AND MAINTENANCE.

(4) If none of the above conditions are seen on the belt, the belt cover can be installed.

NOTE: If belt requires replacing, ensure the proper length belt is used.

CLEANING AND INSPECTION (Continued)

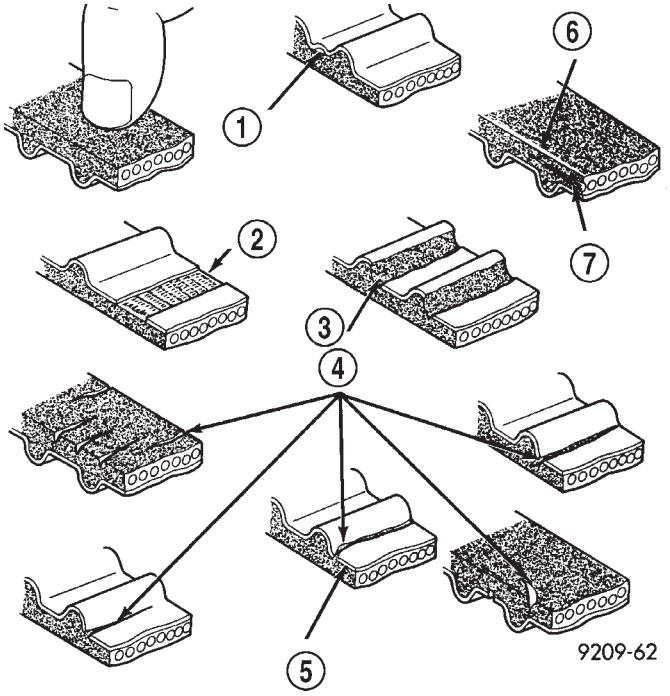


Fig. 147 Timing Belt Inspection

1 – PEELING
2 – TOOTH MISSING AND CANVAS FIBER EXPOSED
3 – RUBBER EXPOSED
4 – CRACKS
5 – PEELING
6 – ROUNDED EDGE
7 – ABNORMAL WEAR (FLUFFY STRAND)

SPECIFICATIONS

3.2L ENGINE

DESCRIPTION	SPECIFICATION
Type	60° SOHC V-6 24-Valve
Displacement	3.2 Liters (195 Cubic Inches)
Bore and Stroke	92.0 x 81.0 mm (3.622 x 3.189 in.)
Compression Ratio	9.5:1
Lead Cylinder	#1 Right Bank
Firing Order	1-2-3-4-5-6
Cylinder Block	
Cylinder Bore Diameter	92.0 mm ±0.0076 (3.622 in. ±0.0003 in.)
Out-of-Round (Max.)	0.076 mm (0.003 in.)
Taper (Max.)	0.051 mm (0.002 in.)
Pistons	
Type Material	Aluminum (Full Floating Pins)
Clearance at Size Location	–0.007 to +0.047 mm (–0.0003 to +0.0018 in.)
Piston Weight	
—A Size	409–414 grams (14.4271–14.6035 oz.)
—B Size	404–409 grams (14.2507–14.427 oz.)
Piston Ring Groove Diameter	
—No. 1	83.69–83.89 mm (3.2949–3.3028 in.)
—No. 2	81.12–81.32 mm (3.1937–3.2016 in.)
—No. 3	82.3–82.5 mm (3.2402–3.2481 in.)
Piston Pins	
Type	Full Floating
Clearance in Piston	0.005–0.015 mm (0.0002–0.0006 in.)
Clearance in Rod	0.007–0.018 mm (0.0003–0.007 in.)
Diameter	23.997–24.000 mm (0.9448–0.9449 in.)
Piston Rings	
Ring Gap—Top Compression Ring	0.20–0.36 mm (0.008–0.014 in.)
Ring Gap—2nd Compression Ring	0.22–0.49 mm (0.0087–0.0193 in.)
Ring Gap—Oil Control (Steel Rails)	0.25–0.76 mm (0.010–0.030 in.)
Ring Side Clearance	
Top and Second Compression Ring	0.040–0.080 mm (0.0016–0.0031 in.)
Oil Ring (Steel Rails)	0.038–0.184 mm (0.0015–0.0073 in.)

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
Ring Width	
Top Compression Ring	1.17–1.19 mm (0.0461–0.0469 in.)
2nd Compression Ring	1.47–1.49 mm (0.0580–0.0587 in.)
Oil Ring (Steel Rings)	0.445–0.470 mm (0.0176–0.0186 in.)
Connecting Rods	
Bearing Clearance	0.019–0.087 mm (0.0007–0.0034 in.)
Piston Pin Bore Diameter	24.0076–24.0153 mm (0.9452–0.9455 in.)
Side Clearance (Max.)	0.40 mm (0.0157 in.)
Total Weight (Less Bearing)	647 grams (22.8223 oz.)
Crankshaft Main Bearing Journals	
Diameter	63.987–64.013 mm (2.519–2.520 in.)
Main Bearing Diametrical Clearance	0.011–0.077 mm (0.0007–0.0030 in.)
—(Max. Allowable)	0.087 mm (0.0034 in.)
Out-of-Round (Max.)	0.015 mm (0.0006 in.)
Taper (Max.)	0.015 mm (0.0006 in)
End Play	0.10–0.30 mm (0.004–0.012 in.)
—(Max.)	0.43 mm (0.017 in.)
Connecting Rod Journals	
Diameter	57.979–58.005 mm (2.283–2.284 in.)
Bearing Diametrical Clearance	0.019–0.087 mm (0.00075–0.0034 in.)
Out-of-Round (Max.)	0.015 mm (0.0006 in.)
Taper (Max.)	0.015 mm (0.0006 in.)

DESCRIPTION	SPECIFICATION
Camshaft	
Bore Diameter	43.038–43.059 mm (1.6944–1.6952 in.)
Bearing Journal Diameter	42.939–42.960 mm (1.6905–1.6913 in.)
Diametrical Clearance	0.078–0.12 mm (0.003–0.0047 in.)
—(Max.)	0.15 mm (0.0059 in.)
End Play	0.11–0.35 mm (0.004–0.014 in.)
Valve Timing—Intake Valve	
Opens (ATDC)	1°
Closes (ABDC)	51°
Duration	230°
Centerline	116°
Valve Timing—Exhaust Valve	
Opens (BBDC)	48°
Closes (ATDC)	12°
Duration	240°
Centerline	108°
Valve Overlap	11°
Cylinder Head	
Gasket Thickness (Compressed)	1.78 mm (0.070 in.)
Valve Seat Angle	45–45.5°
Valve Seat Runout (Max.)	0.051 mm (0.002 in.)
Valve Seat Width—Intake	0.75–1.25 mm (0.0295–0.0492 in.)
Valve Seat Width—Exhaust	1.25–1.75 mm (0.0492–0.0689 in.)
Guide Bore Diameter (Std.)	6.975–7.00 mm (0.2746–0.2756 in.)
Valve Guide Height*	9.5–10.5 mm (0.3740–0.4134 in.)
*Measured from cylinder head surface	

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
Valves	
Face Angle	44.5–45°
Head Diameter—Intake	36.37–36.63 mm (1.4319–1.4421 in.)
Head Diameter—Exhaust	28.87–29.13 mm (1.1366–1.1469 in.)
Length—Intake (Overall)	114.41–114.99 mm (4.5043–4.5272 in.)
Length—Exhaust (Overall)	125.67–126.25 mm (4.9476–4.9705 in.)
Stem Diameter—Intake	6.935–6.953 mm (0.2730–0.2737 in.)
Stem Diameter—Exhaust	6.906–6.924 mm (0.2719–0.2726 in.)
Stem-to-Guide Clearance—Intake	0.022–0.065 mm (0.0009–0.0026 in.)
—(Max.) Rocking Method	0.29 mm (0.0114 in.)
Stem-to-Guide Clearance—Exhaust	0.051–0.094 mm (0.002–0.0037 in.)
—(Max.) Rocking Method	0.370 mm (0.0146 in.)
Valve Lift—Intake (Zero Lash)	8.55 mm (0.3367 in.)
Valve Lift—Exhaust (Zero Lash)	6.53 mm (0.2571 in.)
Valve Stem Tip Height—Intake	42.366–43.655 mm (1.6680–1.7187 in.)
Valve Stem Tip Height—Exhaust	44.705–45.986 mm (1.760–1.8105 in.)
Valve Springs	
Free Length—Intake (Approx.)	43.675 mm (1.7195 in.)
Free Length—Exhaust (Approx.)	44.319 mm (1.7448 in.)
Spring Force—Intake (Valve Closed)	309–358 N @ 38.0 mm (69.5–80.5 lbs. @ 1.4961 in.)
Spring Force—Exhaust (Valve Closed)	314–354 N @ 38.0 mm (71–79 lbs. @ 1.4961 in.)
Spring Force—Intake (Valve Open)	836–907 N @ 29.85 mm (188–204 lbs. @ 1.1594 in.)
Spring Force—Exhaust (Valve Open)	579–640 N @ 31.47 mm (130–144 lbs. @ 1.239 in.)
Number of Coils—Intake	6.86
Number of Coils—Exhaust	7.66
Color of Spring (Top of Coils)	
—Intake (Right Hand Coil Direction)	Orange
—Exhaust (Left Hand Coil Direction)	Yellow
Wire Diameter—Intake	4.29–4.35 mm (0.1689–0.1712 in.)
Wire Diameter—Exhaust	4.09–4.15 mm (0.1608–0.1632 in.)
Spring Installed Height (Spring Seat to Bottom of Retainer)—Intake & Exhaust	38.0 mm (1.4961 in.)
Oil Pump	
Clearance Over Rotors	0.077 mm (0.003 in.)
Cover Out-of-Flat (Max.)	0.025 mm (0.001 in.)
Inner & Outer Rotor Thickness (MIn.)	14.299 mm (0.563 in.)
Outer Rotor Thickness (Max.)	0.39 mm (0.015 in.)
Outer Rotor Diameter (Min.)	79.997 mm (3.149 in.)
Tip Clearance Between Rotors (Max.)	0.20 mm (0.008 in.)
Oil Pressure	
@ Curb Idle Speed*	34.47 kPa (5 psi)
@ 3000 rpm	170–724 kPa (25–105 psi)
*CAUTION: If pressure is zero at curb idle, DO NOT run engine at 3000 rpm.	

SPECIFICATIONS (Continued)

3.5L ENGINE

DESCRIPTION	SPECIFICATION
Type	60° SOHC V-6 24-Valve
Displacement	3.5 Liters (214 Cubic Inches)
Bore and Stroke	96.0 x 81.0 mm (3.780 x 3.189 in.)
Compression Ratio	9.9:1
Lead Cylinder	#1 Right Bank
Firing Order	1-2-3-4-5-6
Cylinder Block	
Cylinder Bore Diameter	96.0 mm ±0.0076 (3.780 in. ±0.0003 in.)
Out-of-Round (Max.)	0.076 mm (0.003 in.)
Taper (Max.)	0.051 mm (0.002 in.)
Pistons	
Type Material	Aluminum (Full Floating Pins)
Clearance at Size Location	–0.007 to +0.047 mm (–0.0003 to +0.0018 in.)
Piston Weight	
—A Size	438–443 grams (15.45–15.62 oz.)
—B Size	433–438 grams (15.27–15.45 oz.)
Piston Ring Groove Diameter	
—No. 1	87.4–87.6 mm (3.441–3.449 in.)
—No. 2	86.3–86.5 mm (3.397–3.4055 in.)
—No. 3	85.8–86.0 mm (3.378–3.385 in.)
Piston Pins	
Type	Full Floating
Clearance in Piston	0.005–0.015 mm (0.0002–0.0006 in.)
Clearance in Rod	0.007–0.018 mm (0.0003–0.007 in.)

DESCRIPTION	SPECIFICATION
Diameter	23.997–24.000 mm (0.9448–0.9449 in.)
Piston Rings	
Ring Gap—Top Compression Ring	0.20–0.36 mm (0.008–0.014 in.)
Ring Gap—2nd Compression Ring	0.23–0.50 mm (0.0091–0.0197 in.)
Ring Gap—Oil Control (Steel Rails)	0.25–0.76 mm (0.010–0.030 in.)
Ring Groove Clearance	
Top and Second Compression Ring	0.035–0.085 mm (0.0014–0.0034 in.)
Oil Ring (Steel Rails)	0.038–0.184 mm (0.0015–0.0073 in.)
Ring Width	
Top Compression Ring	1.17–1.19 mm (0.0461–0.0469 in.)
2nd Compression Ring	1.47–1.49 mm (0.058–0.059 in.)
Oil Ring (Steel Rings)	0.445–0.470 mm (0.0176–0.0186 in.)
Connecting Rods	
Bearing Clearance	0.019–0.087 mm (0.0007–0.0034 in.)
Piston Pin Bore Diameter	24.0076–24.0153 mm (0.9452–0.9455 in.)
Side Clearance (Max.)	0.40 mm (0.0157 in.)
Total Weight (Less Bearing)	647 grams (22.8223 oz.)
Crankshaft Main Bearing Journals	
Diameter	63.987–64.013 mm (2.519–2.520 in.)
Main Bearing Diametrical Clearance	0.011–0.077 mm (0.0007–0.0030 in.)
—(Max. Allowable)	0.087 mm (0.0034 in.)
Out-of-Round (Max.)	0.015 mm (0.0006 in.)
Taper (Max.)	0.015 mm (0.0006 in)

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
End Play	0.10–0.30 mm (0.004–0.012 in.)
—(Max.)	0.43 mm (0.017 in.)
Connecting Rod Journals	
Diameter	57.979–58.005 mm (2.283–2.284 in.)
Bearing Diametrical Clearance	0.019–0.087 mm (0.00075–0.0034 in.)
Out-of-Round (Max.)	0.015 mm (0.0006 in.)
Taper (Max.)	0.015 mm (0.0006 in.)
Camshaft	
Bore Diameter	43.038–43.059 mm (1.6944–1.6952 in.)
Bearing Journal Diameter	42.939–42.960 mm (1.6905–1.6913 in.)
Diametrical Clearance	0.078–0.12 mm (0.003–0.0047 in.)
—(Max.)	0.15 mm (0.0059 in.)
End Play	0.11–0.35 mm (0.004–0.014 in.)
Valve Timing—Intake Valve	
Opens (ATDC)	3°
Closes (ABDC)	61°
Duration	238°
Valve Timing—Exhaust Valve	
Opens (BBDC)	56°
Closes (ATDC)	16°
Duration	252°
Valve Overlap	13°
Cylinder Head	
Gasket Thickness (Compressed)	1.78 mm (0.070 in.)
Valve Seat Angle	45–45.5°
Valve Seat Runout (Max.)	0.051 mm (0.002 in.)
Valve Seat Width—Intake	0.75–1.25 mm (0.0295–0.0492 in.)

DESCRIPTION	SPECIFICATION
Valve Seat Width—Exhaust	1.25–1.75 mm (0.0492–0.0689 in.)
Guide Bore Diameter (Std.)	6.975–7.00 mm (0.2746–0.2756 in.)
Valve Guide Height*	9.5–10.5 mm (0.3740–0.4134 in.)
*Measured from cylinder head surface	
Valves	
Face Angle	44.5–45°
Head Diameter—Intake	36.37–36.63 mm (1.4319–1.4421 in.)
Head Diameter—Exhaust	28.87–29.13 mm (1.1366–1.1469 in.)
Length—Intake (Overall)	114.41–114.99 mm (4.5043–4.5272 in.)
Length—Exhaust (Overall)	125.67–126.25 mm (4.9476–4.9705 in.)
Stem Diameter—Intake	6.935–6.953 mm (0.2730–0.2737 in.)
Stem Diameter—Exhaust	6.906–6.924 mm (0.2719–0.2726 in.)
Stem-to-Guide Clearance—Intake	0.022–0.065 mm (0.0009–0.0026 in.)
—(Max.) Rocking Method	0.29 mm (0.0114 in.)
Stem-to-Guide Clearance—Exhaust	0.051–0.094 mm (0.002–0.0037 in.)
—(Max.) Rocking Method	0.370 mm (0.0146 in.)
Valve Lift—Intake (Zero Lash)	8.55 mm (0.3367 in.)
Valve Lift—Exhaust (Zero Lash)	6.53 mm (0.2571 in.)
Valve Stem Tip Height—Intake	42.366–43.655 mm (1.6680–1.7187 in.)
Valve Stem Tip Height—Exhaust	44.705–45.986 mm (1.760–1.8105 in.)
Valve Springs	
Free Length—Intake (Approx.)	43.675 mm (1.7195 in.)
Free Length—Exhaust (Approx.)	44.319 mm (1.7448 in.)

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATION
Spring Force—Intake (Valve Closed)	309–358 N @ 38.0 mm (69.5–80.5 lbs. @ 1.4961 in.)
Spring Force—Exhaust (Valve Closed)	314–354 N @ 38.0 mm (71–79 lbs. @ 1.4961 in.)
Spring Force—Intake (Valve Open)	836–907 N @ 29.85 mm (188–204 lbs. @ 1.1594 in.)
Spring Force—Exhaust (Valve Open)	579–640 N @ 31.47 mm (130–144 lbs. @ 1.239 in.)
Number of Coils—Intake	6.86
Number of Coils—Exhaust	7.66
Color of Spring (Top of Coils)	
—Intake (Right Hand Coil Direction)	Orange
—Exhaust (Left Hand Coil Direction)	Yellow
Wire Diameter—Intake	4.29–4.34 mm (0.1689–0.1709 in.)
Wire Diameter—Exhaust	4.16–4.22 mm (0.1638–0.1661 in.)
Spring Installed Height (Spring Seat to Bottom of Retainer)—Intake & Exhaust	38.0 mm (1.4961 in.)
Oil Pump	
Clearance Over Rotors	0.077 mm (0.003 in.)
Cover Out-of-Flat (Max.)	0.025 mm (0.001 in.)
Inner & Outer Rotor Thickness (MIn.)	14.299 mm (0.563 in.)
Outer Rotor Thickness (Max.)	0.39 mm (0.015 in.)
Outer Rotor Diameter (Min.)	79.997 mm (3.149 in.)
Tip Clearance Between Rotors (Max.)	0.20 mm (0.008 in.)
Oil Pressure	
@ Curb Idle Speed*	34.47 kPa (5 psi)
@ 3000 rpm	170–724 kPa (25–105 psi)
*CAUTION: If pressure is zero at curb idle, DO NOT run engine at 3000 rpm.	

TORQUE

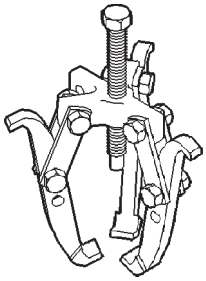
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
A/C Compressor Bracket to Engine—Bolts	54	40	—
A/C Compressor to Bracket	28	—	250
Camshaft Sprocket Bolt—Right Side	102	75	—
Camshaft Sprocket Bolt—Left Side	115	85	—
Camshaft Thrust Plate—Bolts	28	—	250
Connecting Rod Cap—Nuts	54 +¼ Turn	40 +¼ Turn	—
Crankshaft Main Bearing Cap			
—Inner Main Cap Bolts	20 +¼ Turn	15 +¼ Turn	—
—Outer Main Cap Bolts	27 +¼ Turn	20 +¼ Turn	—
—Tie Bolts (Horizontal)	28	—	250
Crankshaft Damper—Bolt	95	70	—
Cylinder Head Bolts*			
—Step 1	61	45	—
—Step 2	88	65	—
—Step 3	88	65	—
—Step 4	+¼ Turn	+¼ Turn	—
*Refer to procedure for tightening sequence			
Cylinder Head Cover—Bolts	12	—	105
Exhaust Manifold to Cylinder Head—Bolts	23	—	200
Exhaust Manifold Heat Shield—Bolts	12	—	105
Engine Mount Bracket to Block—Bolts	61	45	—
Engine Mount Isolator—Nuts	61	45	—
Generator Bracket—Bolts	54	40	—
Intake Manifold			
—M6 Bolts	12	—	105
—M8 Bolts	28	—	250

SPECIFICATIONS (Continued)

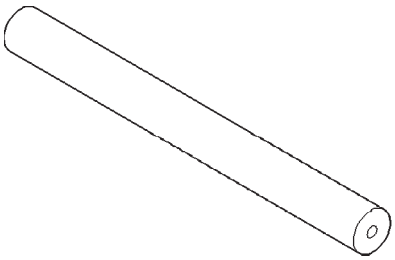
DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Oil Pan			
—M6 Bolts	12	—	105
—M8 Bolts	28	—	250
Oil Pan Drain Plug	35	25	—
Oil Filter	20	15	—
Oil Pump to Block—Bolts	28	—	250
Oil Pump Cover—Bolts	12	—	105
Oil Pump Pick Up Tube—Bolt	28	—	250
PCV Valve	7	—	60
Crankshaft Rear Seal Retainer	12	—	105
Rocker Shaft Pedestal Retaining—Bolts	31	—	275
Spark Plugs	28	20	—
Structural Collar	Refer to Procedure		
Thermostat Housing/Water Inlet Connector—Bolts	12	—	105
Throttle Body—Bolts	12	—	105
Timing Belt Tensioner—Bolts	28	—	250
Timing Belt Tensioner Pulley Assembly—Bolt	61	45	—
Timing Belt Cover			
—M6 Bolts	12	—	105
—M8 Bolts	28	—	250
—M10 Bolts	54	40	—
Water Pump—Bolts	12	—	105
Water Outlet Bleed—Screw	8	—	70

SPECIAL TOOLS

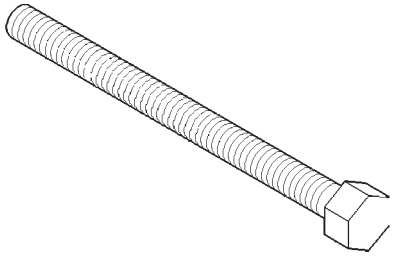
3.2/3.5L ENGINE



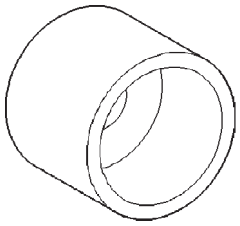
Puller Damper 1023



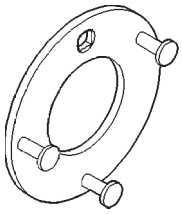
Crankshaft Damper Remover Insert C-4685-C2



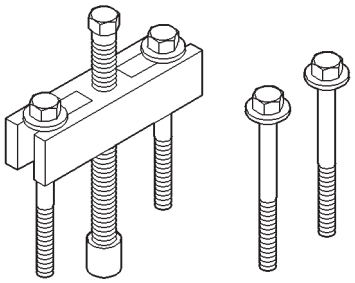
Crankshaft Damper Installer Bolt C-4685-C1



Crankshaft Damper Installer 6792-1

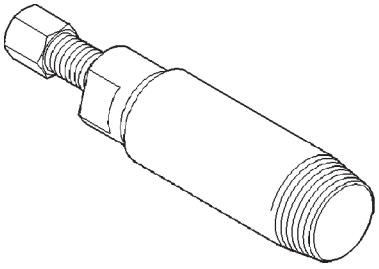


Crankshaft Damper Holder 8191

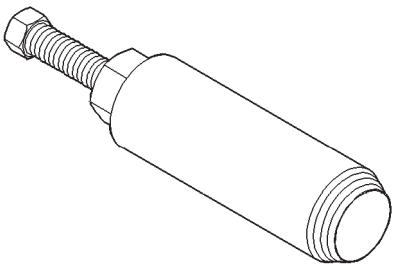


Crankshaft Sprocket Puller L-4407A

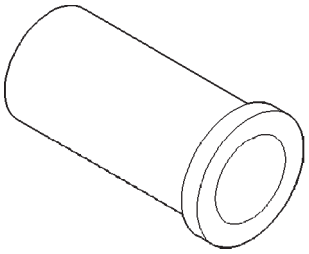
SPECIAL TOOLS (Continued)



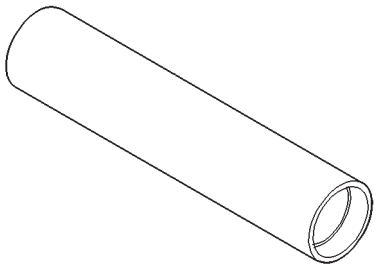
Crankshaft Seal Remover 6341A



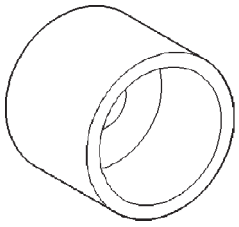
Camshaft Seal Remover C-3981B



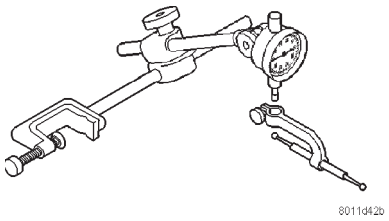
Crankshaft Seal Installer 6342



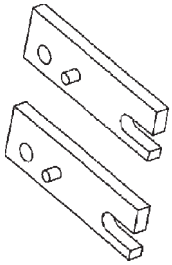
Camshaft Seal Installer 6052



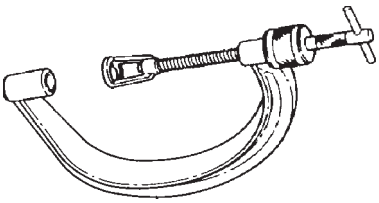
Crankshaft Sprocket Installer 6641



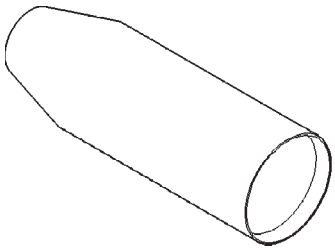
Dial Indicator C-3339



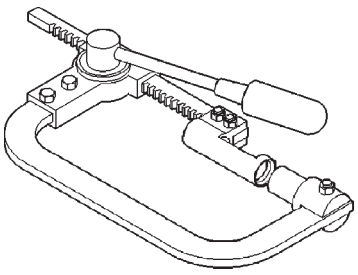
Camshaft Alignment 6642



Valve Spring Compressor 7068

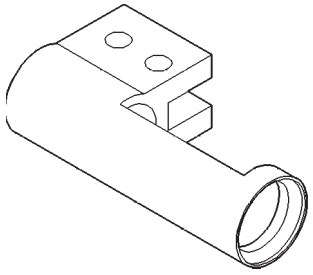


Camshaft Seal Protector 6788

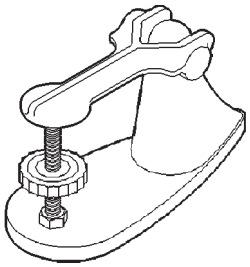


Valve Spring Compressor C-3422-B

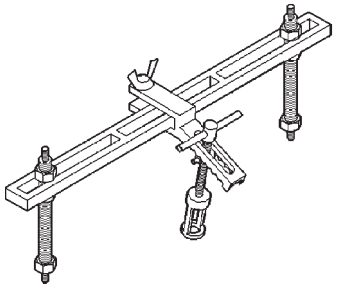
SPECIAL TOOLS (Continued)



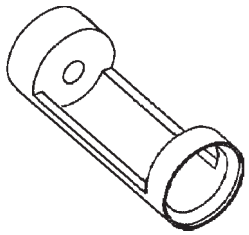
Valve Spring Adapter 6526



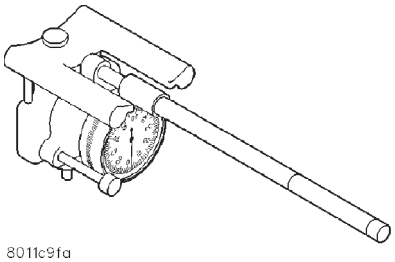
Valve Spring Tester C-647



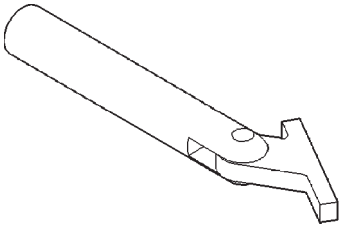
Valve Spring Compressor MD-998772-A



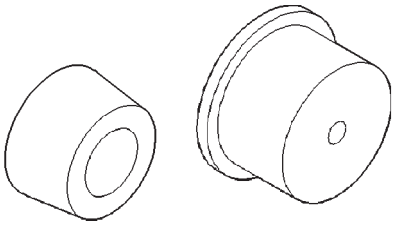
Valve Spring Adapter 6527



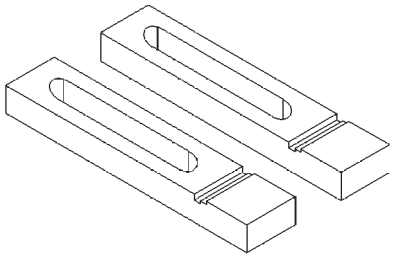
Indicator Bore Size C-119



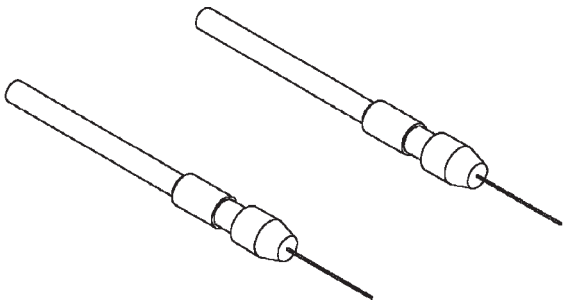
Main Bearing Remover/Installer C-3059



Crankshaft Rear Seal Guide 6926-1 & Installer 6926-2

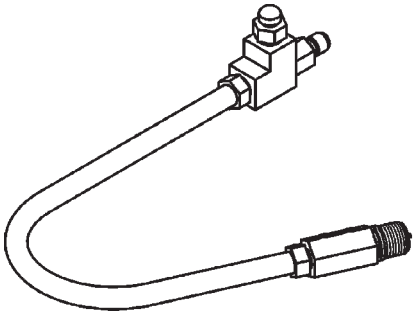


Crankshaft Rear Seal Retainer Alignment Fixture 8225

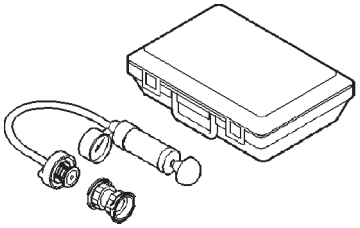


Release Probe 8351

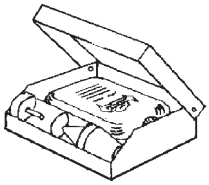
SPECIAL TOOLS (Continued)



Adaptor 8116



Cooling System Tester 7700



Combustion Leak Tester C-3685-A

EXHAUST SYSTEM

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DESCRIPTION AND OPERATION

EXHAUST SYSTEM

WARNING: THE NORMAL OPERATING TEMPERATURE OF THE EXHAUST SYSTEM IS VERY HIGH. THEREFORE, NEVER WORK AROUND OR ATTEMPT TO SERVICE ANY PART OF THE EXHAUST SYSTEM UNTIL IT IS COOLED. SPECIAL CARE SHOULD BE TAKEN WHEN WORKING NEAR THE CATALYTIC CONVERTER. THE TEMPERATURE OF THE CONVERTER RISES TO A HIGH LEVEL AFTER A SHORT PERIOD OF ENGINE OPERATION TIME.

DESCRIPTION

The exhaust system (Fig. 1) consist of two front close coupled catalytic converters. Both converters attach directly to the exhaust manifold using a V-Band clamp. The exhaust down pipes exit the converters and connect into the front resonator. The front resonator, intermediate pipe, and muffler are one single module. The rear resonator and tailpipe connect to the muffler outlet. The upstream oxygen sensors are located in each exhaust manifold. The downstream oxygen sensors are located at the rear of each catalytic converter.

OPERATION

The exhaust system channels the exhaust gases created by engine to the rear of the vehicle. The muffler and resonator quiets the exhaust noises. The catalytic converter reduces exhaust emissions.

CATALYTIC CONVERTERS

DESCRIPTION

The close coupled, three-way catalytic converter inlets are connected to the exhaust manifolds by the use of V-Band clamps (Fig. 2). The left side converter outlet pipe connects to the exhaust system. The right side converter connects to an extension pipe (Fig. 2).

OPERATION

The three-way catalytic converter simultaneously converts three exhaust emissions into harmless gases. Specifically, HC and CO emissions are converted into water (H2O) and carbon dioxide (CO2). Oxides of Nitrogen (NOx) are converted into elemental Nitrogen (N) and water. The three-way catalyst is most efficient in converting HC, CO and NOx at the stoichiometric air fuel ratio of 14.7:1.

The oxygen content in a catalyst is important for efficient conversion of exhaust gases. When a high oxygen content (lean) air/fuel ratio is present for an extended period, oxygen content in a catalyst can reach a maximum. When a rich air/fuel ratio is present for an extended period, the oxygen content in the catalyst can become totally depleted. When this occurs, the catalyst fails to convert the gases. This is known as catalyst “punch through.″

Catalyst operation is dependent on its ability to store and release the oxygen needed to complete the emissions-reducing chemical reactions. As a catalyst deteriorates, its ability to store oxygen is reduced. Since the catalyst’s ability to store oxygen is somewhat related to proper operation, oxygen storage can be used as an indicator of catalyst performance. Refer to the appropriate Powertrain Diagnostic Procedure for diagnosis of a catalyst related Diagnostic Trouble Code (DTC).

DESCRIPTION AND OPERATION (Continued)

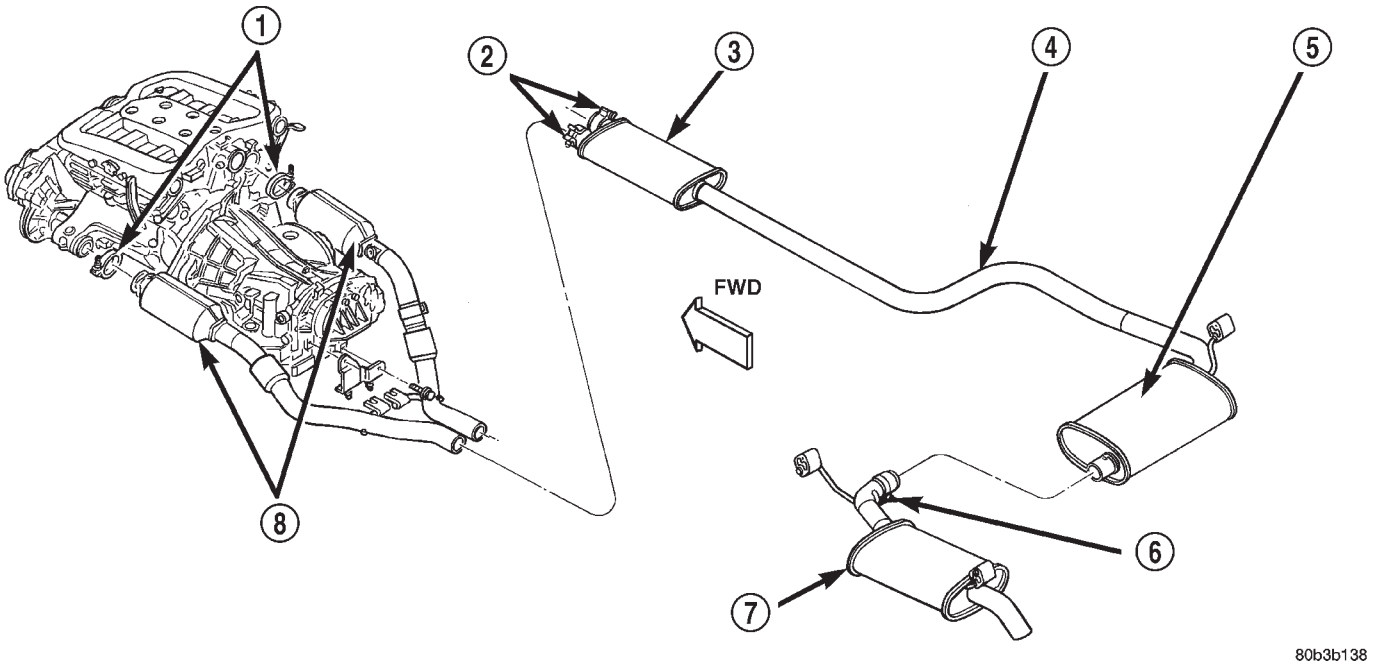


Fig. 1 Exhaust System

1 – V-BAND CLAMPS
2 – BAND CLAMPS
3 – FRONT RESONATOR
4 – EXHAUST MODULE: INTERMEDIATE PIPE
5 – MUFFLER
6 – BAND CLAMP
7 – REAR RESONATOR/PIPE ASSEMBLY
8 – CATALYTIC CONVERTERS

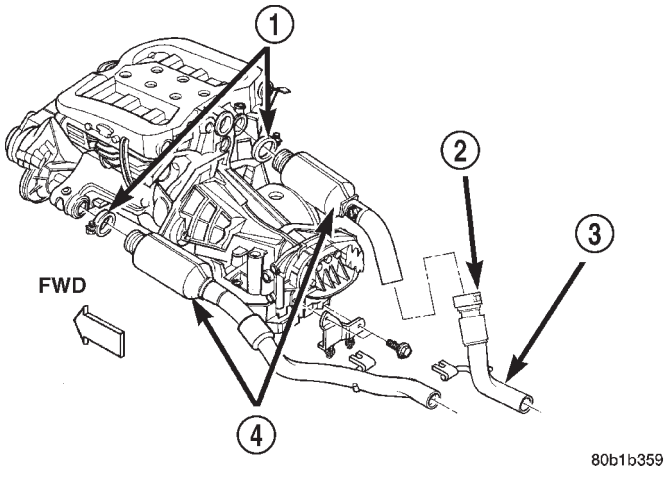


Fig. 2 Catalytic Converters

1 – V-BAND CLAMPS
2 – BAND CLAMP
3 – EXTENSION PIPE
4 – CATALYTIC CONVERTERS

The combustion reaction caused by the catalyst releases additional heat in the exhaust system, causing temperature increases in the area of the reactor under severe operating conditions. Such conditions can exist when the engine misfires or otherwise does not operate at peak efficiency. **Do not** remove spark plug wires from plugs or by any other means short out cylinders, if exhaust system is equipped with a catalytic converter. Failure of the catalytic converter can occur due to temperature increases caused by unburned fuel passing through the converter. This deterioration of the catalyst core can result in excessively high emission levels, noise complaints, and exhaust restrictions.

The use of catalysts also involves some non-automotive problems. Unleaded gasoline must be used to avoid poisoning the catalyst core. Do not allow engine to operate above 1200 RPM in neutral for extended periods over 5 minutes. This condition may result in excessive exhaust system/floor pan temperatures because of no air movement under the vehicle.

CAUTION: Due to exterior physical similarities of some catalytic converters with pipe assemblies, extreme care should be taken with replacement parts. There are internal converter differences required in some parts of the country (particularly vehicles built for States with strict emission requirements).

DESCRIPTION AND OPERATION (Continued)

HEAT SHIELDS

DESCRIPTION

The catalytic converters have an integral heat shield attached to them and are not to be removed.

OPERATION

Heat shields are needed to protect both the car and the environment from the high temperatures developed in the vicinity of the catalytic converters.

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system heat shields on cars if equipped. Light over spray near the edges is permitted. Application of coating will greatly reduce the efficiency of the heat shields resulting in excessive floor pan temperatures and objectionable fumes.

DIAGNOSIS AND TESTING

EXHAUST SYSTEM

CONDITION	POSSIBLE CAUSES	CORRECTION
EXCESSIVE EXHAUST NOISE (UNDER HOOD)	1. Exhaust manifold cracked or broken.	1. Replace manifold.
	2. Manifold to cylinder head leak.	2. Tighten manifold and/or replace gasket.
	3. EGR tube to manifold gasket leakage.	3. Tighten fasteners or replace gasket.
	4. EGR Valve to EGR tube gasket leakage.	4. Tighten fasteners or replace gasket.
	5. Exhaust to manifold leak.	5. Tighten or replace V-Band Clamp.
	6. Pipe and shell noise from front exhaust pipe.	6. Characteristic of single wall pipe.
EXCESSIVE EXHAUST NOISE	1. Leak at exhaust pipe joints.	1. Tighten clamps at leaking joints.
	2. Burned or rusted out muffler assembly or exhaust pipe.	2. Replace exhaust module, rear resonator/tailpipe assembly or exhaust pipe with catalytic converter assembly.
	3. Burned or rusted out resonator(s).	3. Replace resonator assembly.
	4. Restriction in exhaust system.	4. Remove restriction if possible, or replace components as necessary.
	5. Converter material in muffler or resonators.	5. Replace muffler, resonators and converter assemblies. Check fuel injection and ignition systems for proper operation.

REMOVAL AND INSTALLATION

EXHAUST SYSTEM

REMOVAL

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It is easier to service the exhaust system module components (Fig. 3), when system is removed from the vehicle.

(1) Raise vehicle on hoist.

(2) Apply penetrating oil and loosen band clamps at resonator connector.

(3) Separate exhaust module at front resonator from the converter downpipes.

CAUTION: At this time, the exhaust system is held by only isolators. Support the exhaust system underneath the front resonator and the muffler while the isolators are being removed. Do not use any tools to remove the isolators, remove by hand only. Soapy water or silicone-based spray may be used to assist removal. Do Not use a petroleum-based lubricant on the isolators. This will damage the rubber material.

(4) Support exhaust system with jack stand.

(5) Remove screw attaching exhaust system ground strap.

(6) Remove the rubber isolators from the rear suspension crossmember and support brackets on body (Fig. 5) and (Fig. 4).

(7) Lower exhaust system and lay on the ground.

NOTE: When replacement is required on any component of the exhaust system, it is most important that original equipment parts be used for the following reasons:

- To insure proper alignment with other parts in the system.
- Provide acceptable exhaust noise levels and does not change exhaust system back pressure that could affect emissions and performance.

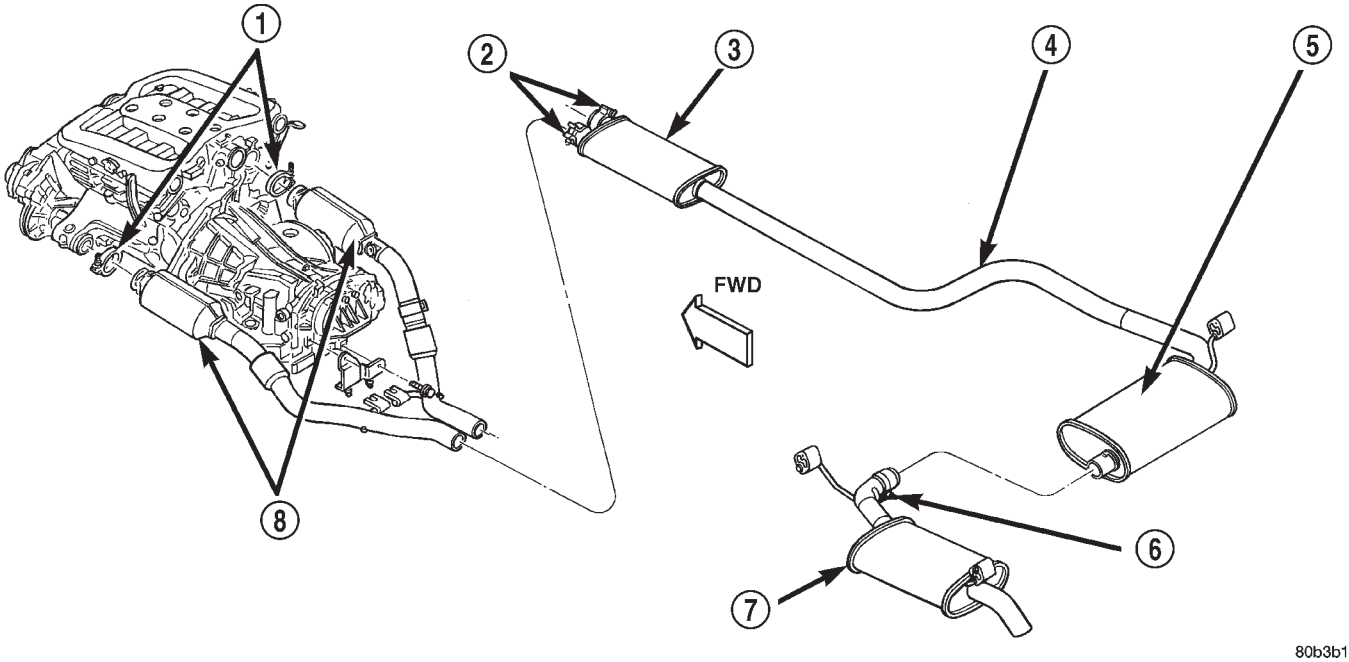


Fig. 3 Exhaust System Components

1 – V-BAND CLAMPS
2 – BAND CLAMPS
3 – FRONT RESONATOR
4 – EXHAUST MODULE: INTERMEDIATE PIPE
5 – MUFFLER
6 – BAND CLAMP
7 – REAR RESONATOR/PIPE ASSEMBLY
8 – CATALYTIC CONVERTERS

REMOVAL AND INSTALLATION (Continued)

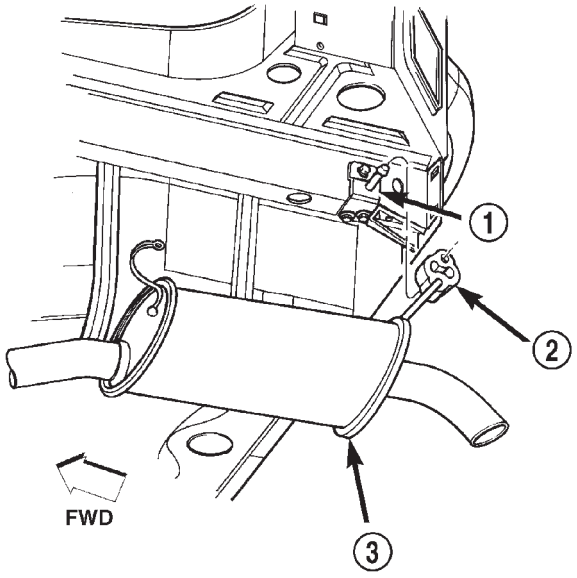


Fig. 4 Rubber Isolator Hanger to Body Support Bracket

1 – SUPPORT BRACKET
2 – ISOLATOR
3 – RESONATOR/PIPE

INSTALLATION

(1) Install and loose assemble the front resonator to the converter pipes.

(2) Place the exhaust system on two supports (one on side of muffler, one behind the resonator). Connect the system to the converter pipes.

(3) Install the system's rubber isolators onto the support brackets.

(4) Install exhaust system ground strap.

(5) Visually inspect the isolators. They should be straight when viewing from front to back of the vehicle. Working from the front of system, align each component to maintain position and proper clearance with underbody parts.

(6) Tighten band clamps to the proper torque.

(7) Lower the vehicle.

MUFFLER AND FRONT RESONATOR

REMOVAL

(1) Remove exhaust system. Refer to procedure in this section.

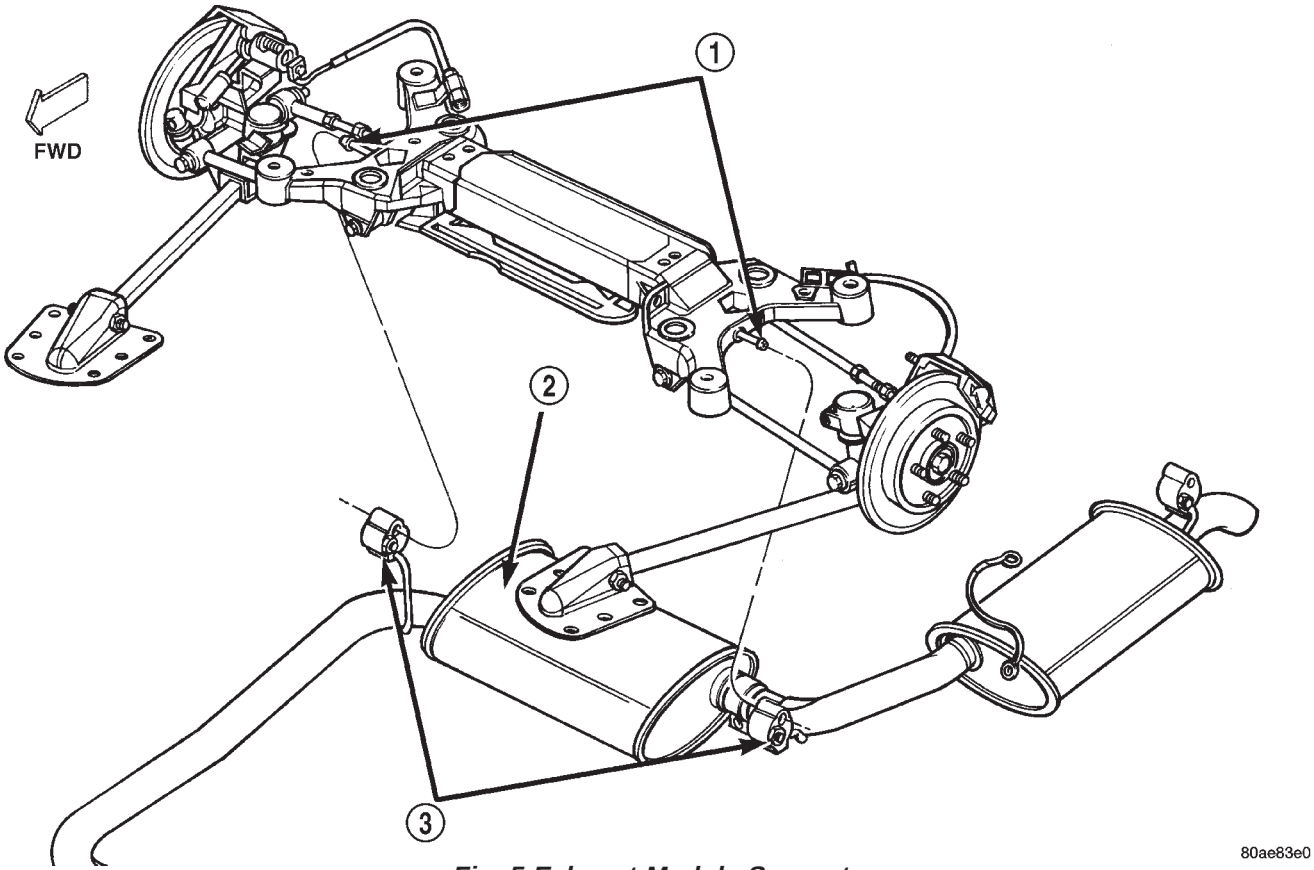


Fig. 5 Exhaust Module Supports

1 – SUPPORTS
2 – MUFFLER
3 – ISOLATORS

REMOVAL AND INSTALLATION (Continued)

(2) Loosen clamp and separate rear resonator/pipe from muffler and front resonator (Fig. 3).

INSTALLATION

(1) Install rear resonator/pipe onto new muffler/resonator (Fig. 3), but do not tighten clamp until exhaust system is installed on vehicle.

(2) Install exhaust system. Refer to procedure in this section.

(3) Tighten all exhaust band clamps to 61 N·m (45 ft. lbs.).

TAILPIPE/REAR RESONATOR

REMOVAL

(1) Remove the exhaust system. Refer to procedure in this section.

(2) Loosen the clamp of the tailpipe/rear resonator assembly to the rear module (Fig. 3).

(3) Remove the tailpipe/rear resonator assembly

INSTALLATION

(1) Install the tailpipe/resonator assembly onto the rear module and loose assemble the accompanying clamp (Fig. 3).

(2) Install exhaust system. Refer to procedure in this section.

(3) Tighten all band clamps to 61 N·m (45 ft. lbs.).

CATALYTIC CONVERTERS

RIGHT CATALYTIC CONVERTER

REMOVAL

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(1) Raise vehicle on hoist.

(2) Remove exhaust system. Refer to procedure in this section.

(3) Loosen or remove nut attaching right pipe to transaxle bracket.

(4) Loosen extension pipe band clamp.

(5) Remove right side converter extension pipe (Fig. 7).

(6) Lower vehicle.

(7) Remove air cleaner assembly with air inlet hose (Fig. 6).

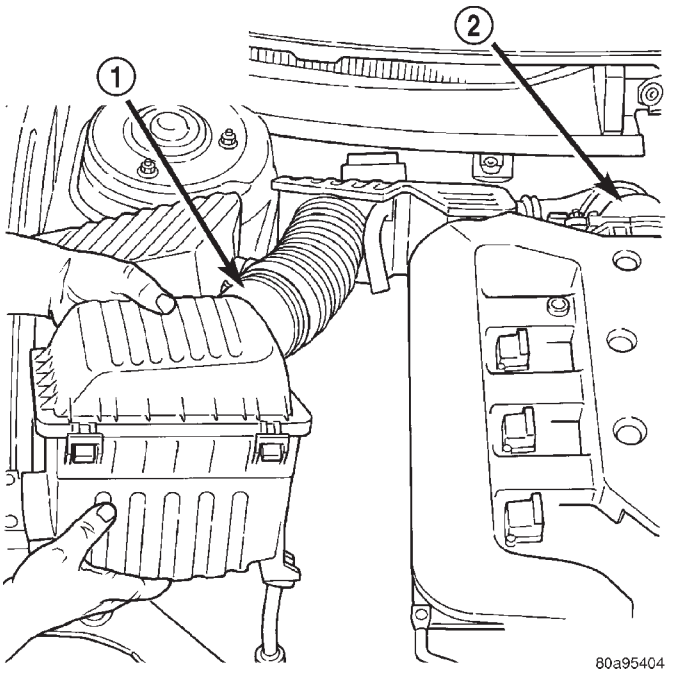


Fig. 6 Air Cleaner With Inlet Hose

1 – AIR CLEANER ASSEMBLY WITH AIR INLET HOSE
2 – THROTTLE BODY

(8) Remove SRV (Single Runner Valve) vacuum reservoir and control valve assembly at right rear of engine (3.2/3.5L engine only).

(9) Disconnect downstream oxygen sensor connector and remove sensor from converter pipe.

(10) Loosen and remove V-Band clamp at exhaust manifold.

NOTE: Do not reuse V-Band clamp.

(11) Remove converter from engine compartment.

INSTALLATION

(1) Position a NEW V-Band clamp onto the exhaust manifold outlet. DO NOT latch the clamp's T-bolt at this time.

(2) Install catalytic converter. If necessary, stretch open the V-Band clamp to allow the converter to engage the manifold outlet.

(3) Latch the V-Band clamp T-bolt.

(4) Raise vehicle on hoist.

(5) Install right side converter extension pipe (Fig. 7), but do not tighten clamp at this time.

(6) Lower vehicle on hoist.

NOTE: Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.

(7) Tighten V-Band clamp to 11 N·m (100 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

(8) Install downstream oxygen sensor and connect electrical connector.

(9) Install SRV (Single Runner Valve) vacuum reservoir and control valve assembly at right rear of engine (3.2/3.5L engine only).

(10) Install air cleaner assembly with air inlet hose.

(11) Raise vehicle on hoist.

(12) Tighten extension pipe band clamp to 61 N·m (45 ft. lbs.) (Fig. 7).

(13) Install and/or tighten nut attaching extension pipe to transaxle bracket to 47 N·m (35 ft. lbs.).

(14) Install exhaust system.

(15) Lower vehicle.

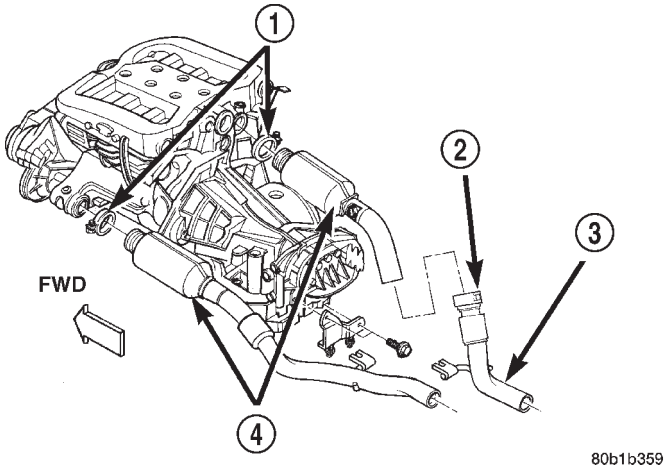


Fig. 7 Catalytic Converters

1 – V-BAND CLAMPS
2 – BAND CLAMP
3 – EXTENSION PIPE
4 – CATALYTIC CONVERTERS

LEFT CATALYTIC CONVERTER

REMOVAL

(1) Loosen and remove V-Band clamp at exhaust manifold joint (Fig. 7).

NOTE: Do not reuse V-Band clamp.

(2) Hoist vehicle.

(3) Remove exhaust system. Refer to procedure in this section.

(4) Disconnect downstream oxygen sensor electrical connector and remove sensor from converter pipe.

(5) Loosen or remove nut attaching left pipe to transaxle bracket (Fig. 7).

CAUTION: Care should be taken when removing converter not to damage driveshaft boot.

(6) Remove converter from below vehicle.

INSTALLATION

(1) Install converter.

(2) Attach a NEW V-Band clamp and tighten to 11 N·m (100 in. lbs.) (Fig. 7).

(3) Install and/or tighten nut attaching pipe to transaxle bracket to 47 N·m (35 ft. lbs.) (Fig. 7).

(4) Install downstream oxygen sensor and connect electrical connector.

(5) Install exhaust system.

(6) Lower vehicle.

CLEANING AND INSPECTION

EXHAUST SYSTEM

INSPECTION

Inspect the exhaust pipes, catalytic converters, muffler, and resonators for cracked joints, broken welds and corrosion damage that would result in a leaking exhaust system. Inspect the clamps, support brackets, and insulators for cracks and corrosion damage.

NOTE: Slip joint band clamps are spot welded to exhaust system. If a band clamp must be replaced, the spot weld must be ground off.

ADJUSTMENTS

EXHAUST SYSTEM ALIGNMENT

A misaligned exhaust system is usually indicated by a vibration, rattling noise, or binding of exhaust system components. These noises are sometimes hard to distinguish from other chassis noises. Inspect exhaust system for broken or loose clamps, heat shields, isolators, and brackets. Replace or tighten as necessary. It is important that exhaust system clearances and alignment be maintained.

Perform the following procedures to align the exhaust system:

(1) Loosen clamps and support brackets.

(2) Align the exhaust system starting at the front, working rearward.

(3) Tighten all clamps and brackets once alignment and clearances are achieved.

SPECIFICATIONS

TORQUE

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Band (Torca) Clamp	61	45	—
Catalytic Converter Pipe to Support Bracket—Nut	47	35	—
V-Band Clamp—Exhaust Manifold to Catalytic Converter	11	—	100
Exhaust Support to Body Bracket—Fasteners	25	—	215
Exhaust Support Bracket to Transmission—Fasteners	47	35	—

FRAMES AND BUMPERS

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DESCRIPTION AND OPERATION

FRAME AND BUMPERS

FRAME

DESCRIPTION

The vehicle does not have a conventional frame. It is constructed as a unitized body and frame. Unibody is constructed from special high strength steel and coated metals. This process reduces weight and provides strength to withstand the forces applied against structural members. The structural members provide a unibody that has great structural strength.

BUMPERS

DESCRIPTION

The bumpers are made up of bumper reinforcement and fascia with air deflector (front bumper) and mounting brackets.

OPERATION

The bumper reinforcement is fastened to the unitized body frame rails. The bumper fascia is fastened to the bumper reinforcement and the body side sheet metal.

REAR SUSPENSION CROSSMEMBER

DESCRIPTION

This vehicle is equipped with a aluminum alloy rear suspension crossmember that spans the distance between the rear frame rails (Fig. 1). It is isolated from the frame rails with the use of rubber isolator bushings. These bushings may be replaced separately.

OPERATION

The purpose of the rear suspension crossmember is to support the lower end of the rear suspension through the use of four lateral links. Two lateral links are mounted on each end of the crossmember (Fig. 1).

DESCRIPTION AND OPERATION (Continued)

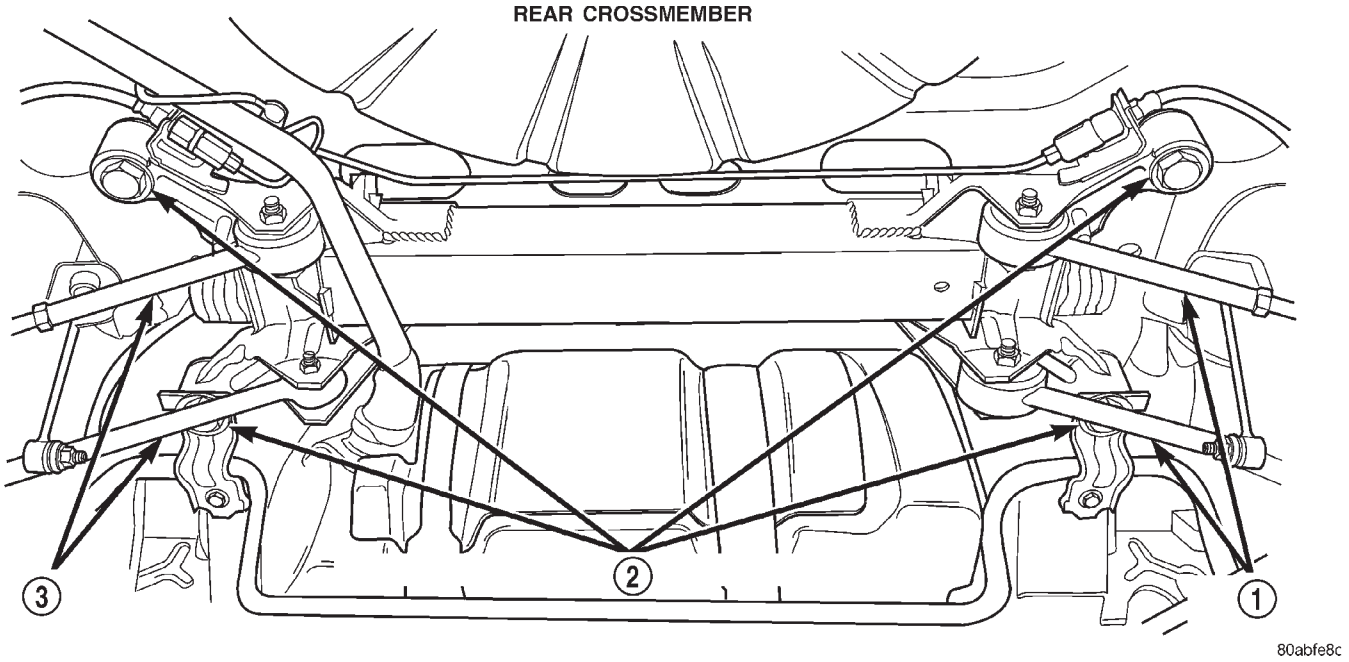


Fig. 1 Rear Suspension Crossmember

1 – LATERAL LINKS
2 – REAR CROSSMEMBER ISOLATOR BUSHINGS
3 – LATERAL LINKS

REAR SUSPENSION CROSSMEMBER BUSHINGS

DESCRIPTION

The rear suspension crossmember has 4 rubber isolator bushings which are replaceable. Once the crossmember is removed from the vehicle, the following procedure may be used to remove each of the crossmember bushings.

REMOVAL AND INSTALLATION

FRONT BUMPER FASCIA - CONCORDE/LHS/ 300M

REMOVE

(1) Release hood latch and open hood.

(2) Remove large rubber grommet (70 mm x 168 mm) from splash shield to gain access to fascia fasteners (Fig. 2).

(3) Remove fasteners attaching fascia to the front fender and splash shield, using access hole in splash shield (Fig. 3).

(4) Remove the fasteners attaching the fascia to the lower crossmember (Fig. 4).

(5) Remove the fasteners attaching the fascia to the upper radiator closure panel (Fig. 4).

(6) Disconnect wire connectors (fog lamps, parking/ turn signal, side marker), if equipped (Fig. 5).

(7) Remove fascia from vehicle.

INSTALLATION

(1) Connect wire connectors.

(2) Place fascia in position on vehicle, by fitting foam to bumper reinforcement. Use care not to scratch fender. Tape may be put on fender for protection.

(3) Install the top center fasteners, to upper radiator closure panel.

(4) Install fasteners attaching fascia to the front fender and splash shield, using access hole in splash shield

REMOVAL AND INSTALLATION (Continued)

(5) Align fascia to bumper reinforcement.

(6) Align the two fascia studs to the fender vertical attachments, at the same time align the fascia groove on the horizontal flange with the fender fasteners. Push fascia rearward to engage the fasteners.

(7) Install nut on fascia stud through the splash shield access hole, on each side.

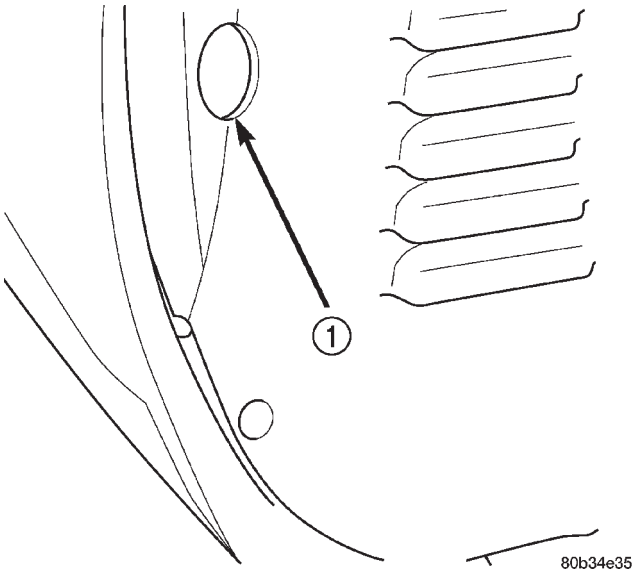


Fig. 2 Access Rubber Grommet

1 – ACCESS RUBBER GROMMET

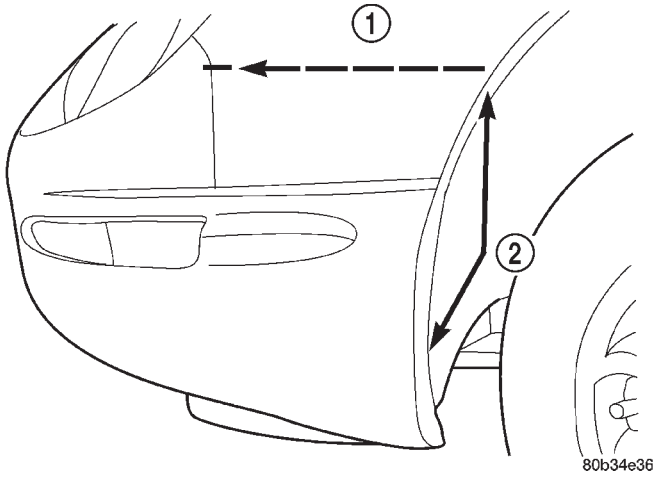


Fig. 3 Fastener Locations

1 – THROUGH ACCESS REMOVE FASTENER
2 – FASTENERS

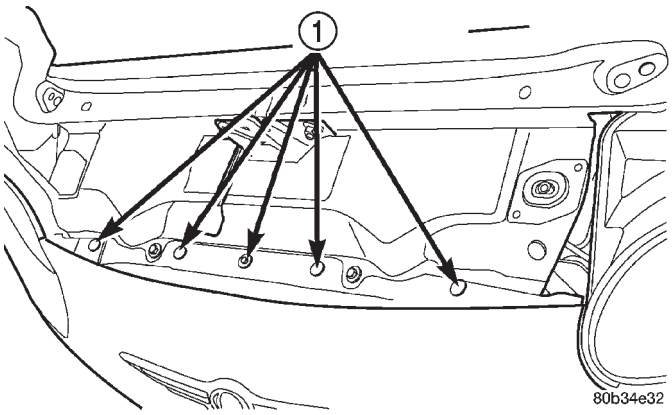


Fig. 4 Remove Push In Fasteners

1 – PUSH IN FASTENERS

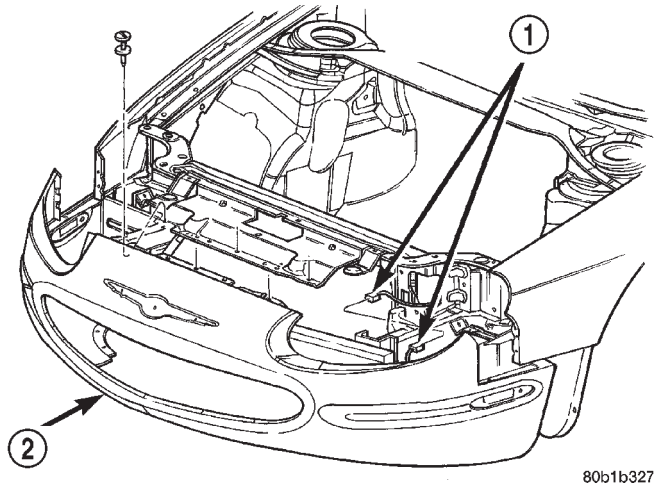


Fig. 5 Front Bumper Fascia

1 – BODY & FASCIA WIRE CONNECTORS
2 – FRONT FASCIA

FRONT BUMPER FASCIA – INTREPID

REMOVAL

(1) Release hood latch and open hood.

(2) Remove push in fasteners attaching bottom of fascia (air dam) to lower crossmember (Fig. 6).

(3) Remove fasteners attaching fascia to front fenders and splash shields (Fig. 7).

REMOVAL AND INSTALLATION (Continued)

(4) Remove push in fasteners attaching the fascia to upper radiator closure panel.

(5) Pull the sides of the fascia outwards to disengage fascia from drive pins then pull fascia forward.

(6) Disconnect fog lamp wire connectors, if equipped.

(7) Remove fascia from vehicle.

INSTALLATION

(1) Connect fog lamp wire connectors, if equipped.

(2) Place fascia in position on vehicle, by fitting foam to bumper beam.

(3) Snap sides of fascia over drive pin fasteners on fenders.

(4) Install fasteners to upper radiator closure.

(5) Install fasteners attaching fascia to front fenders and splash shields.

(6) Install fasteners attaching bottom of fascia to lower crossmember.

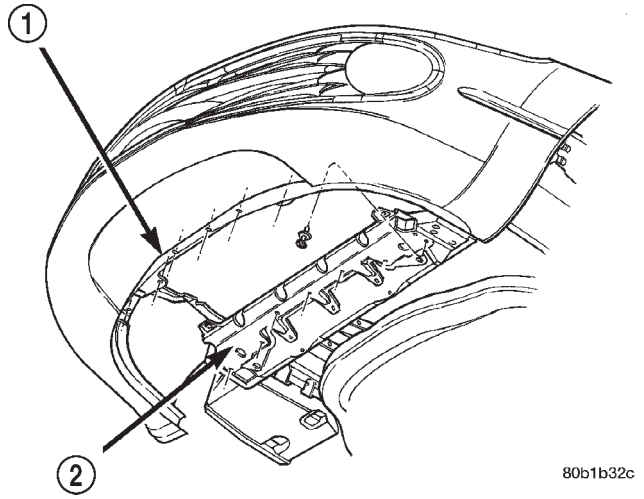


Fig. 6 Air Dam

1 – AIR DAM
2 – AIR DUCT AIR DAM

FRONT BUMPER REINFORCEMENT

REMOVAL

(1) Remove front fascia.

(2) Remove end plugs in ends of bumper after removing screws in front of bumper.

(3) Remove attaching bolts from bumper reinforcement to adapter plate through ends of the bumper. (Fig. 8).

(4) If beam is damaged, the adapter plate to rail welds will have to be cut off

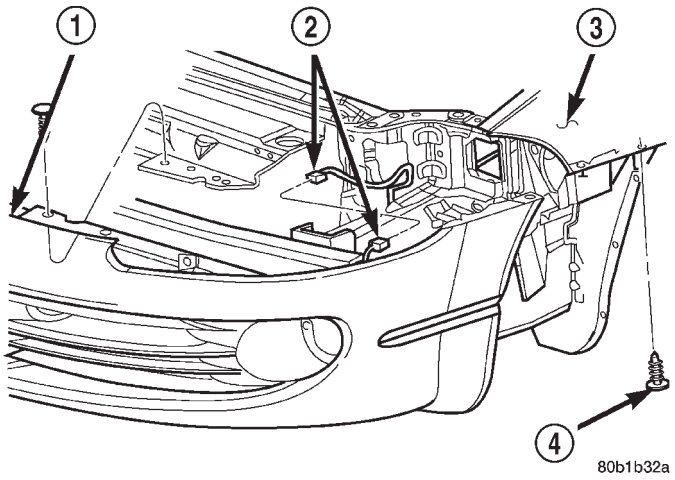


Fig. 7 Front Bumper Fascia

1 – FRONT FASCIA
2 – FOG LAMP CONNECTORS
3 – FRONT FENDER
4 – PUSH IN FASTENER

INSTALLATION

(1) Place reinforcement in position on front of vehicle.

(2) Install attaching bolts to inside of bumper reinforcement to adapter plates.

(3) Install end plugs in ends of bumper, using screws in front of the bumper.

(4) Install front fascia.

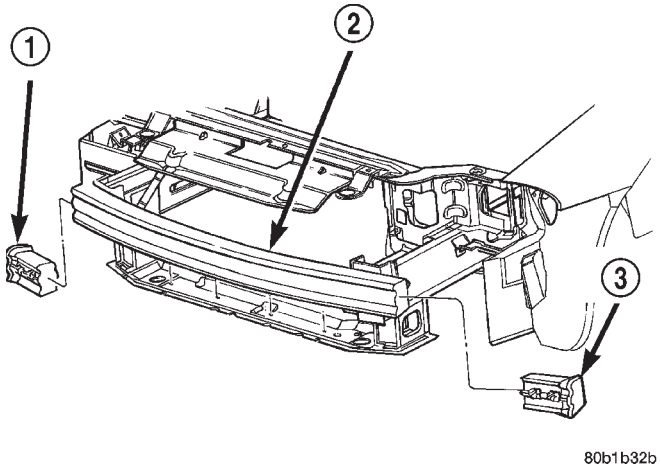


Fig. 8 Front Bumper Reinforcement

1 – END CAP
2 – FRONT BUMPER REINFORCEMENT
3 – END CAP

REMOVAL AND INSTALLATION (Continued)

REAR BUMPER FASCIA – CONCORDE/LHS/ 300M

REMOVAL

(1) Release deck lid latch and open deck lid.
(2) Partially remove trunk carpet to gain access to fascia attaching nuts and remove nuts.
(3) 300M only, remove both tail lamp housings to gain access to fascia attaching nuts and remove attaching nuts.
(4) Remove fasteners attaching fascia to rear quarter and splash shield.
(5) Remove upper push pins attaching the fascia to the body.
(6) Pull fascia with 30 pound force to disengage plastic clip and grommet that attaches the fascia to the quarter panel vertical flange one side at a time (Fig. 9).
(7) Disengage main wire connector from the body harness. The connector is on the left side of vehicle.
(8) Remove fascia from vehicle.

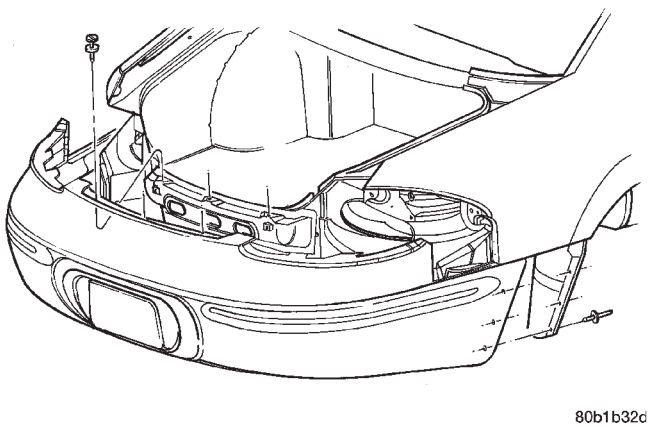


Fig. 9 Rear Bumper Fascia

INSTALLATION

(1) Connect main wire connector to the body harness connector.
(2) Place rear fascia in position on bumper reinforcement.
(3) Align the two fascia studs to the quarter panel vertical attachment, at the same time align the fascia key hole slot on the horizontal flange with the drive pin. Push fascia forward to engage the fasteners.
(4) Install push pins attaching top of fascia to body.
(5) 300M only, install nut on fascia stud and install tail lamp housing.
(6) Install trunk carpet back in position.
(7) Install fasteners attaching fascia to rear quarter panel and splash shields.

REAR BUMPER FASCIA – INTREPID

REMOVAL

(1) Open deck lid and remove tail lamps.
(2) Remove fasteners attaching fascia to rear quarter and splash shields.
(3) Remove fasteners attaching fascia to tail lamp can.
(4) Remove fasteners attaching fascia to lower trunk panel.
(5) Pull sides of fascia outwards to disengage snaps to quarter panel attaching bracket (Fig. 10).
(6) Pull fascia rearward to expose license plate lamp wire connector. Disconnect wire harness connector. The connector is located on the left side of vehicle.

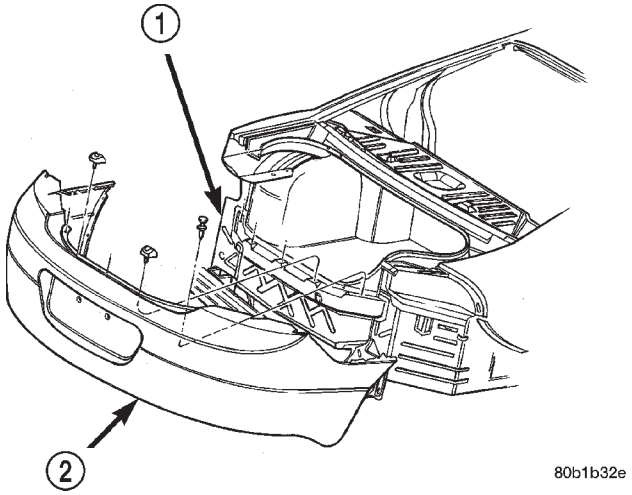


Fig. 10 Rear Bumper Fascia

1 – LOWER TRUNK OPENING
2 – REAR FASCIA

INSTALLATION

(1) Connect the license plate lamp wire connector to the body harness.
(2) Place rear fascia in position on vehicle, by fitting foam to bumper beam.
(3) Install center fastener to lower trunk panel.
(4) Snap sides of fascia between quarter panel and bracket.
(5) Install fasteners to tail lamp can.
(6) Install fasteners attaching fascia to rear quarter panel and splash shields.
(7) Install the remaining fasteners to lower trunk panel.
(8) Install tail lamps.

REMOVAL AND INSTALLATION (Continued)

REAR BUMPER REINFORCEMENT

REMOVAL

(1) Remove rear fascia.
(2) Remove attaching bolts and nuts from attaching bracket to rails (Fig. 11).

INSTALLATION

(1) Place reinforcement in position on rear of vehicle.
(2) Install bracket to rails attaching bolts and nuts.

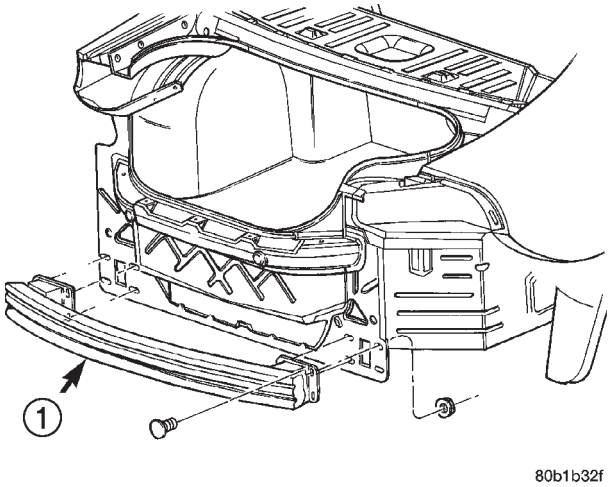


Fig. 11 Rear Bumper Reinforcement

1 – REAR BUMPER REINFORCEMENT

FRAME

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REMOVAL AND INSTALLATION

ENGINE CRADLE CROSSMEMBER

REMOVAL

CAUTION: VERIFY THAT VEHICLE IS PROPERLY SUPPORTED AND SECURED TO THE LIFTING DEVICE. VEHICLE CENTER OF GRAVITY WILL CHANGE WHEN HEAVY COMPONENTS ARE REMOVED CAUSING A HAZARDOUS CONDITION.

(1) Release hood latch and open hood.
(2) Remove nuts holding engine mounts to cradle.
(3) Install a suitable engine support device.
(4) Raise and support vehicle on safety stands.
(5) Remove bolts holding transaxle crossmember to cradle.
(6) Lower vehicle and lift engine and transaxle off cradle.
(7) Raise and support vehicle on safety stands.
(8) Disconnect sway bar links.
(9) Remove bolts retaining suspension lower ball joints to spindles.
(10) Separate lower control arm from spindle. Refer to Group 2, Suspension, for proper procedures.
(11) Support cradle on a 10 cm by 10 cm by 90 cm (4 in. by 4 in. by 36 in.) wood beam and a jack.
(12) Remove bolts holding cradle to body shell (Fig. 1).
(13) Lower cradle away from body shell.

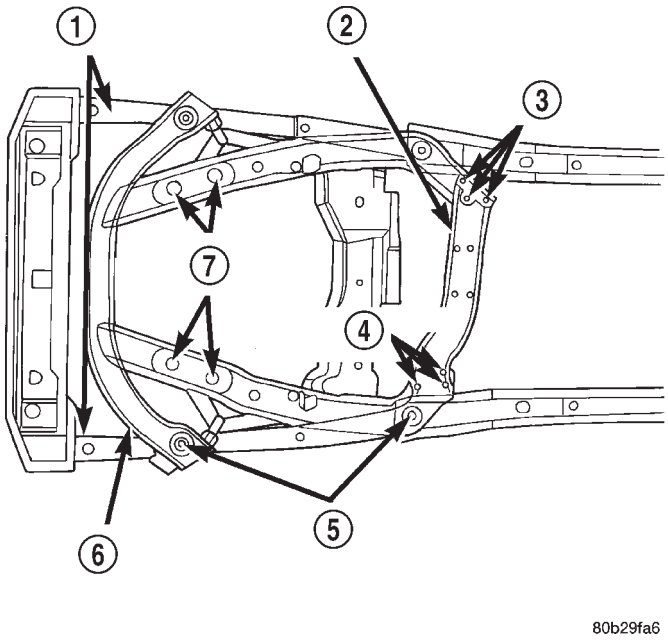


Fig. 1 Engine Cradle
1 – FRONT FRAME RAILS
2 – TRANSAXLE CROSSMEMBER
3 – CROSSMEMBER BOLTS
4 – CROSSMEMBER BOLTS
5 – CRADLE MOUNT BOLTS
6 – ENGINE CRADLE
7 – ENGINE MOUNT BOLTS

INSTALLATION

NOTE: If cradle replacement is required, transfer suspension components and jounce and bounce plates to replacement cradle.

(1) Support cradle on wood beam and a jack.
(2) Position cradle under body shell.
(3) Install bolts to hold cradle to body shell.
(4) Connect lower control arms to spindles. Refer to Group 2, Suspension, for proper procedures.
(5) Install bolts to retain suspension lower ball joints to spindles.
(6) Connect sway bar links.
(7) Lower vehicle and lower engine and transaxle onto cradle.
(8) Raise vehicle.
(9) Install bolts to hold transaxle crossmember to cradle.
(10) Lower vehicle.
(11) Remove engine support device.

REMOVAL AND INSTALLATION (Continued)

(12) Install nuts to hold engine mounts to cradle.
(13) Align front suspension if necessary.

REAR SUSPENSION CROSSMEMBER

REMOVAL

(1) Open the fuel filler door. Remove the 3 fuel filler neck attaching screws. Remove the fuel filler cap.

(2) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(3) Remove both rear wheel and tire assemblies from the vehicle.

(4) Remove the nut and bolt attaching each of the 4 lateral links to the crossmember (Fig. 2). **The bolt for the left front lateral link may not be removed at this time. Remove the nut only. Once the crossmember is lowered, the bolt can be easily removed.** (Fig. 2). Notice the forward attaching bolts face rearward.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 2) to prevent damage to the fuel tank and or fuel tubes in case of an accident. The bolt attaching the left rear lateral link must be installed with the bolt pointing forward to prevent damage to the fuel filler tube.

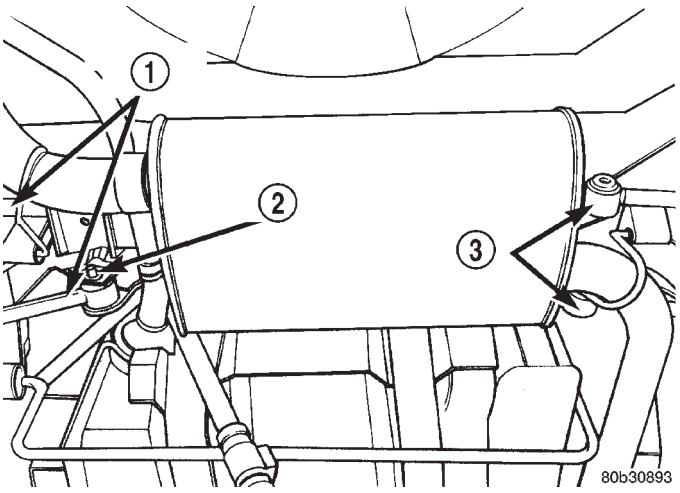


Fig. 2 Lateral Link Attachment To Crossmember

1 – LATERAL LINKS
2 – LEFT FRONT LATERAL LINK BOLT
3 – LATERAL LINKS

(5) Remove the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer.

(6) Remove the 4 bolts attaching both stabilizer bar isolator bushing retainers to the frame rails (the 2 rearward attaching bolts also attach the front corners of the rear suspension crossmember in place). Allow the stabilizer bar to hang down.

(7) Remove the parking brake cable tensioner from the intermediate parking brake cable. Refer to Base Brake System in Group 5 Brakes in this manual for the required service procedure.

(8) Remove the parking brake cable tensioner from the left rear parking brake cable. Refer to Base Brake System in Group 5 Brakes in this manual for the required service procedure.

(9) Remove the right rear parking brake cable from the intermediate parking brake cable. Refer to Base Brake System in Group 5 Brakes in this manual for the required service procedure.

(10) Remove the retainer clips securing both rear parking brake cables assemblies to the rear suspension crossmember (Fig. 3).

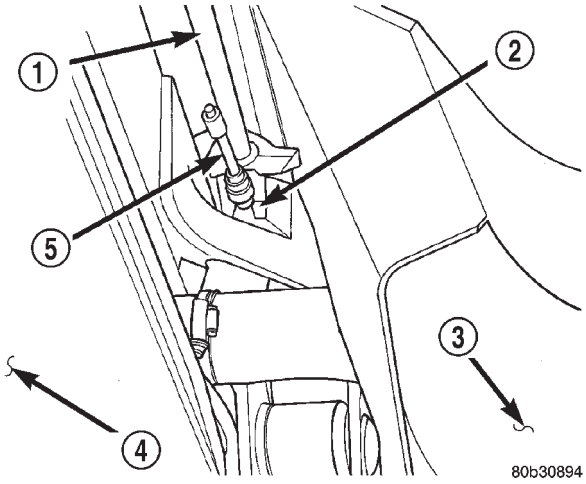


Fig. 3 Rear Parking Brake And Retainer Clip (left)

1 – INTERMEDIATE PARKING BRAKE CABLE
2 – CLIP
3 – FUEL TANK
4 – MUFFLER
5 – REAR PARKING BRAKE CABLE

(11) Remove parking brake cables from crossmember.

(12) Remove nuts attaching both brake proportioning valves to the rear corners of the crossmember (Fig. 4).

(13) Position a transmission jack under the muffler.

(14) Disconnect the hanger securing the exhaust resonator to the rear frame rail.

(15) Disconnect the hangers securing the exhaust muffler to the rear suspension crossmember. There is one hanger on each side of the muffler.

(16) Lower the transmission jack and muffler enough to allow for better access to the rear crossmember.

REMOVAL AND INSTALLATION (Continued)

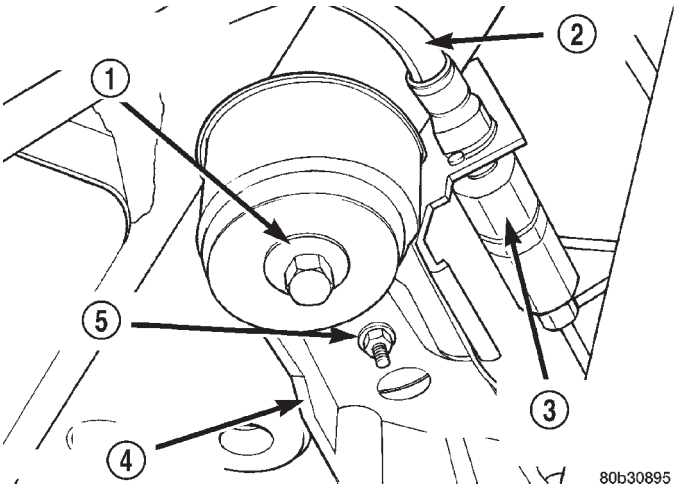


Fig. 4 Rear Brake Proportioning Valve

1 – CROSSMEMBER ATTACHING BOLT
2 – REAR FLEX HOSE
3 – BRAKE PROPORTIONING VALVE
4 – REAR CROSSMEMBER
5 – ATTACHING NUT

(17) Remove the screw securing the fuel filler neck to the left frame rail.

(18) Remove the final 2 bolts attaching the rear suspension crossmember to the frame rails. These are located at the rear corners of the crossmember (Fig. 4).

(19) Lower rear suspension crossmember as low as possible to allow for removal of lateral link attaching bolt at left front corner of crossmember.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 2) to prevent damage to the fuel tank and or fuel tubes. Also, the bolt attaching the left rear lateral link must be installed with the bolt pointing forward to prevent damage to the fuel filler tube.

(20) Remove the link attaching bolt and link from the left front corner of the crossmember.

(21) Remove the rear suspension crossmember from the vehicle.

INSTALLATION

(1) Install the rear suspension crossmember back into vehicle above muffler. Make sure that the brake tubes are properly routed above the crossmember as it is installed.

(2) Install the rear proportioning valve mounting brackets into mounting position at the rear corners of the crossmember (Fig. 4). Install the attaching nuts.

(3) Install Intermediate parking brake cable routing clip into place on left front of crossmember (Fig. 3).

(4) Reattach left forward lateral link to crossmember. Install mounting bolt though the front of the crossmember mount towards the rear. Do not install and torque nut at this time.

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 2) to prevent damage to the fuel tank and or fuel tubes. Also, when installing the bolt attaching the left rear lateral link, install the bolt pointing forward to prevent damage to the fuel filler tube.

(5) Raise the crossmember up against the frame rails. Install, but do not fully tighten, the 2 bolts attaching the rear of the crossmember to the frame rails.

(6) Raise the exhaust into place. Reattach the 3 exhaust hangers previously removed from the muffler and resonator.

(7) Remove transmission jack supporting muffler and exhaust system.

(8) Reinstall the fuel filler neck attaching screw and secure the fuel filler neck to the left frame rail.

(9) Position the rear parking brake cables into crossmember alignment holes (Fig. 3).

(10) Install the retainer clips securing both rear parking brake cables assemblies to the rear suspension crossmember (Fig. 3).

(11) Reconnect the right rear parking brake cable to the intermediate parking brake cable.

(12) Install the parking brake cable tensioner to the left rear parking brake cable.

(13) Install the parking brake cable tensioner to the intermediate parking brake cable. Refer to Base Brake System in Group 5 Brakes in this manual for the required service procedure to install and properly adjust the parking brakes.

(14) Install the 4 bolts attaching both stabilizer bar isolator bushing retainers to the frame rails (the 2 rearward attaching bolts attach the front corners of the rear suspension crossmember in place). Tighten the forward stabilizer bar isolator bushing retainer attaching bolts to 40 N·m (30 ft. lbs.). Tighten the 2 rearward stabilizer bar isolator bushing retainer attaching bolts (which also serve as the front crossmember attaching bolts) to 100 N·m (75 ft. lbs.).

(15) Tighten the rear suspension crossmember rear attaching bolts to 100 N·m (75 ft. lbs.).

(16) Install the screw securing the brake tubes to the left stabilizer bar isolator bushing retainer.

(17) Install the remaining 3 lateral links to the rear suspension crossmember. The forward lateral arm mounting bolts must point rearward, and the rearward lateral arm mounting bolts must point forward.

REMOVAL AND INSTALLATION (Continued)

CAUTION: The bolts attaching the forward lateral links to the crossmember must be installed with the bolts pointing rearward (Fig. 2) to prevent damage to the fuel tank and or fuel tubes. The bolt attaching the left rear lateral link must be installed with the bolt pointing forward to prevent damage to the fuel filler tube.

(18) Install the lateral link attaching nuts, but DO NOT fully tighten at this time.

CAUTION: Tightening the lateral link attaching bolts at this time will cause the bushings contort at curb riding height, leading to premature failure of the bushings. Tighten bolts only when vehicle is at curb riding height.

(19) Install wheel and tire assemblies on vehicle.

(20) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(21) Lower vehicle to the ground.

(22) Install the 3 fuel filler neck attaching screws. Reinstall the fuel filler cap.

(23) Tighten all 4 lateral arm to crossmember attaching bolt and nut assemblies to 95 N·m (70 ft. lbs.).

(24) Check and reset rear wheel TOE to specifications if required.

DISASSEMBLY AND ASSEMBLY

REAR SUSPENSION CROSSMEMBER BUSHINGS

DISASSEMBLY

(1) Lay the crossmember right-side-up on a bench with the bushing to be removed hanging over the edge of the bench.

(2) Install cup, Special Tool 8173–1, in well of press, Special Tool C-4212F.

(3) Install Remover/Installer, Special Tool 8173–2, on end of the threaded push rod on Special Tool C-4212F.

(4) Install Special tool C-4212F with Special Tools 8173–1, and 8173–2, on bushing (Fig. 5).

(5) Turn the threaded rod, pushing bushing down through crossmember and into cup 8173–1.

(6) Remove special tools, and bushing

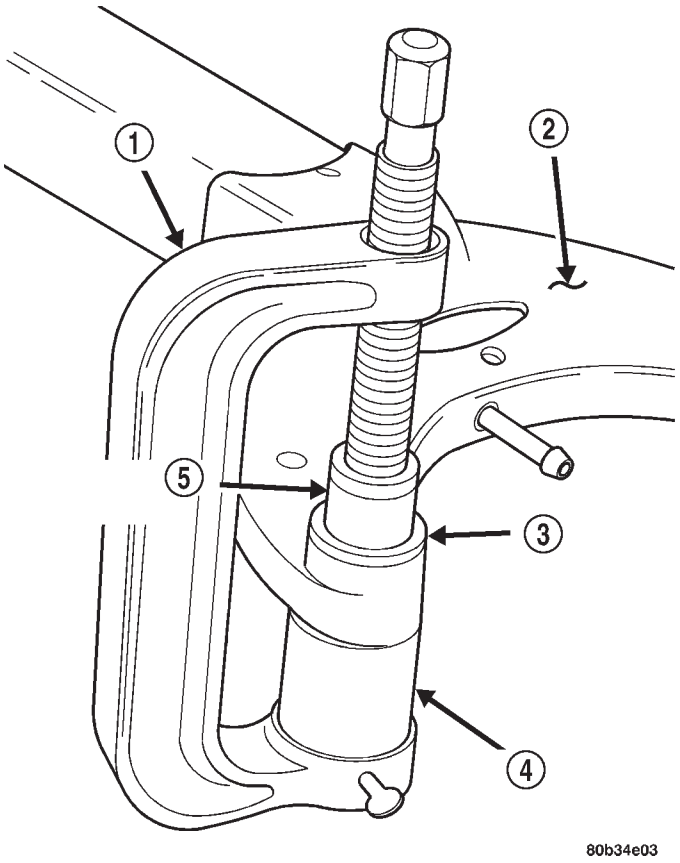


Fig. 5 Bushing Removal

1 – SPECIAL TOOL C-4212F
2 – REAR SUSPENSION CROSSMEMBER
3 – BUSHING
4 – SPECIAL TOOL 8173–1
5 – SPECIAL TOOL 8173–2

ASSEMBLY

(1) Clean bore in crossmember where bushing mounts.

(2) Thoroughly coat new bushing and crossmember bore with Mopar® Rubber Bushing Installation Lube.

(3) Place Installer, Special Tool C-8173–3, on top of crossmember bushing bore with inside taper end facing up. Locater lip on bottom of tool should align the tool with bushing bore.

(4) Coat the tapered bore of Special Tool C-8173–3 with Mopar® Rubber Bushing Installation Lube, then place the bushing in its tapered bore (Fig. 7).

(5) Install Special Tool 8173–4 in the cup, Special Tool 8173–1 (Fig. 6). Install cup, Special Tool 8173–1 into well of press, Special Tool C–4212F (Fig. 6).

DISASSEMBLY AND ASSEMBLY (Continued)

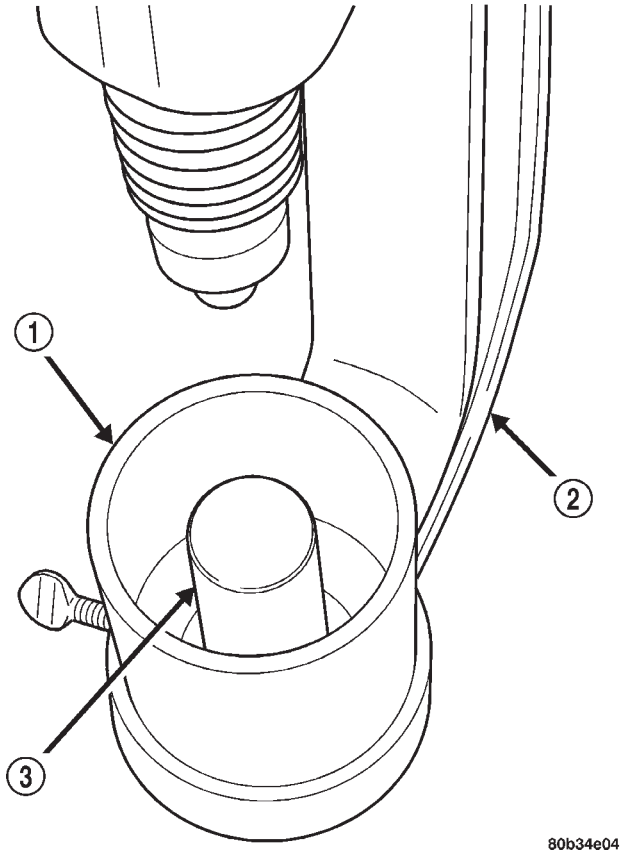


Fig. 6 Special Tools

1 – SPECIAL TOOL 8173–1
2 – SPECIAL TOOL C-4212F
3 – SPECIAL TOOL 8173–4

(6) Install Remover/Installer, Special Tool 8173–2, on end of the threaded push rod on Special Tool C-4212F.

(7) Place special tools on crossmember and bushing (Fig. 7).

(8) Turn the threaded rod, pushing bushing down through Special tool 8173–3 and into place in the crossmember. Continue pushing the bushing until bottoms against Special Tool 8173–4.

(9) Remove special tools.

(10) Verify the bushing is properly centered in the crossmember bore and the outer bushing lips are not pinched.

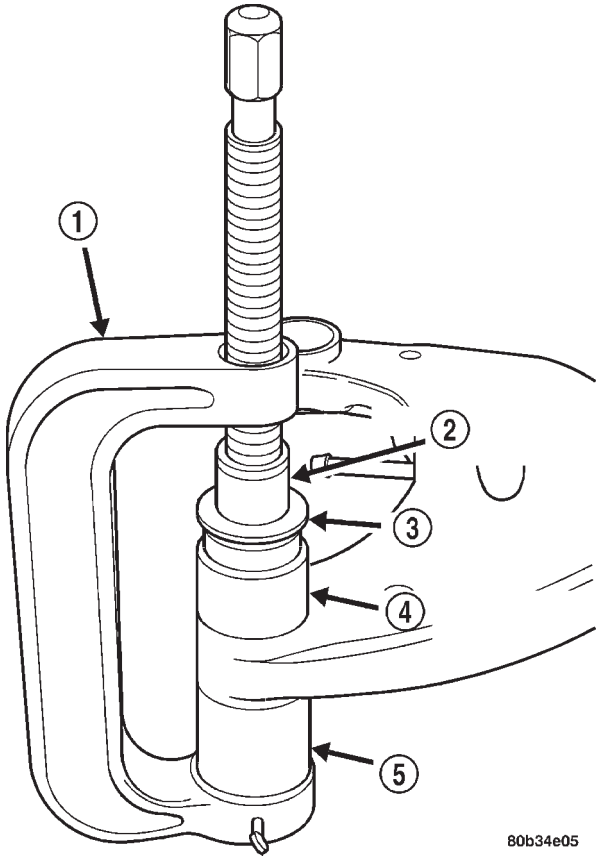


Fig. 7 Bushing Installation

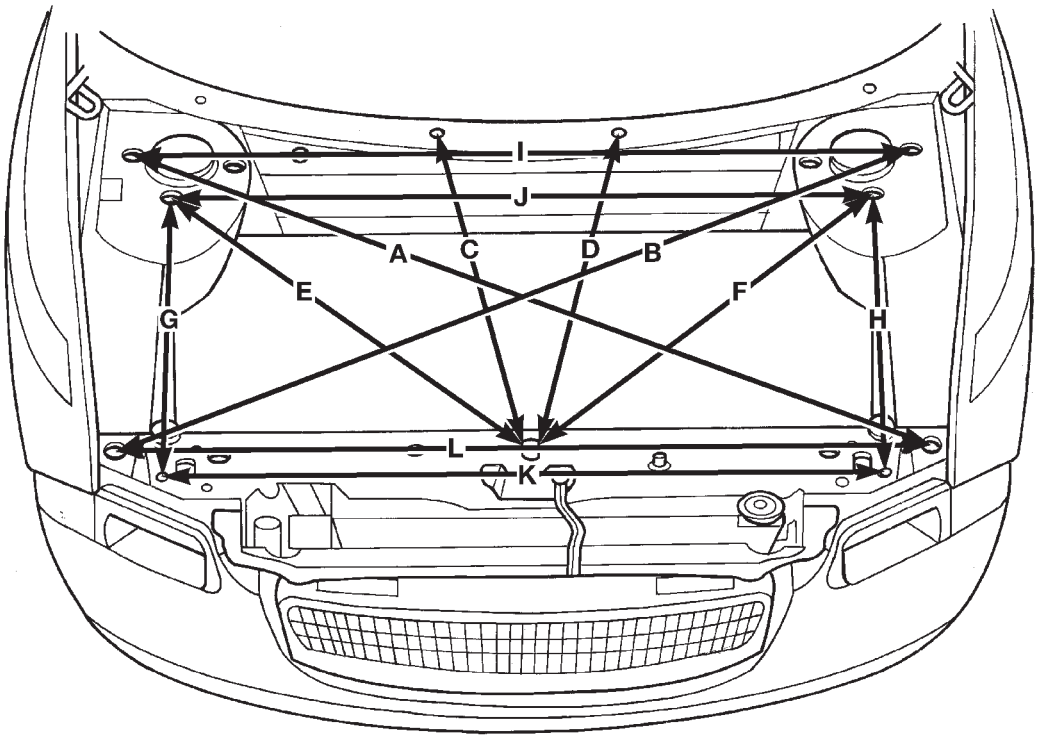
1 – SPECIAL TOOL C-4212F
2 – SPECIAL TOOL 8173–2
3 – BUSHING
4 – SPECIAL TOOL 8173–3
5 – SPECIAL TOOL 8173–1

SPECIFICATIONS

FRAME DIMENSIONS

Frame dimensions are listed in metric scale then converted to inch scale listed in parenthesis. All dimensions are from center to center of Principal Locating Point (PLP), or from center to center of PLP and fastener location. Vertical dimensions can be taken from the work surface to the locations indicated (Fig. 8) through (Fig. 11).

SPECIFICATIONS (Continued)



ENGINE BOX

A.	1497.95
B.	1497.95
C.	586.07
D.	580.38
E.	781.31
F.	781.31
G.	560.71
H.	560.71
I.	1362.51
J.	1217.18
K.	1093.54
L.	1400.52

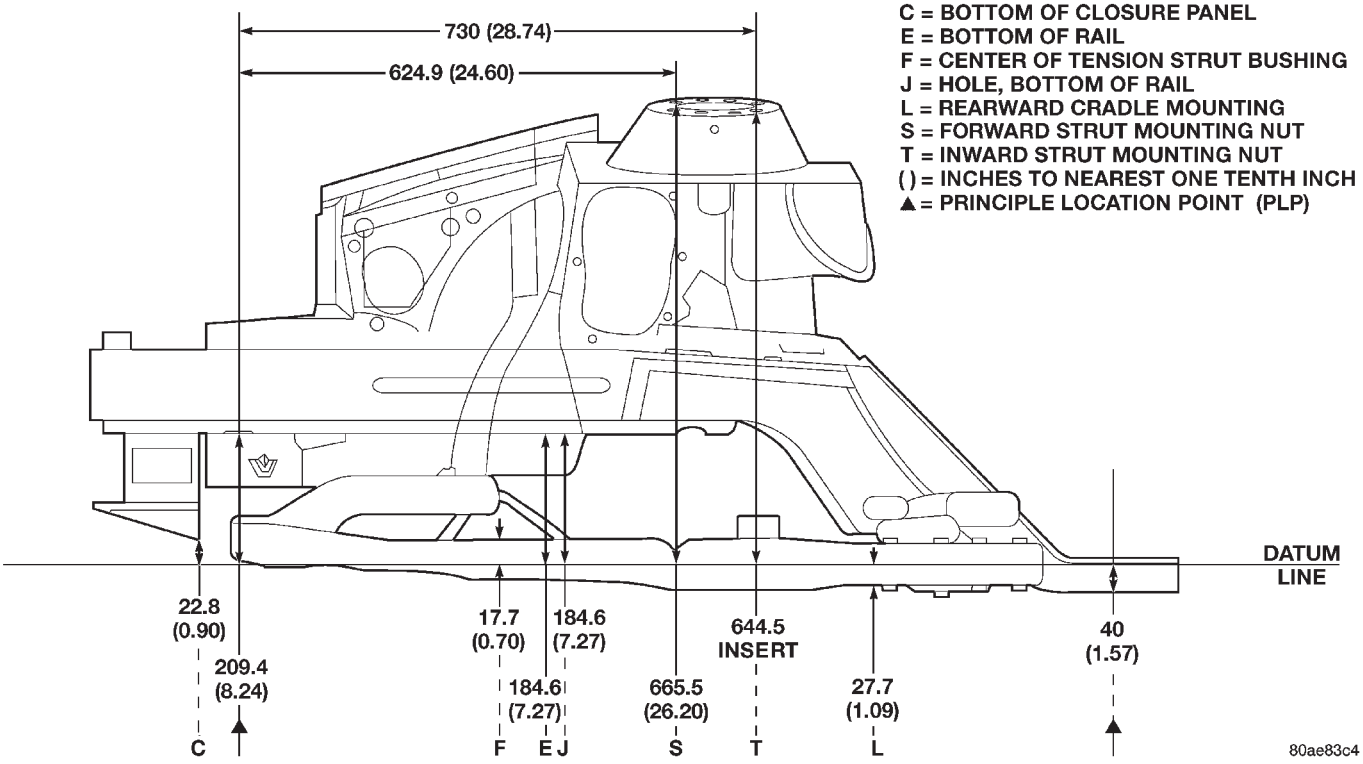
NOTE:

ALL MEASUREMENTS CENTER OF HOLE TO CENTER OF HOLE. MEASUREMENTS ARE THE SAME FOR LWB & SWB

ALL DIMENSIONS IN MILLIMETERS

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Fig. 8 Engine Compartment Top View



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Fig. 9 Engine Compartment Side View

SPECIFICATIONS (Continued)

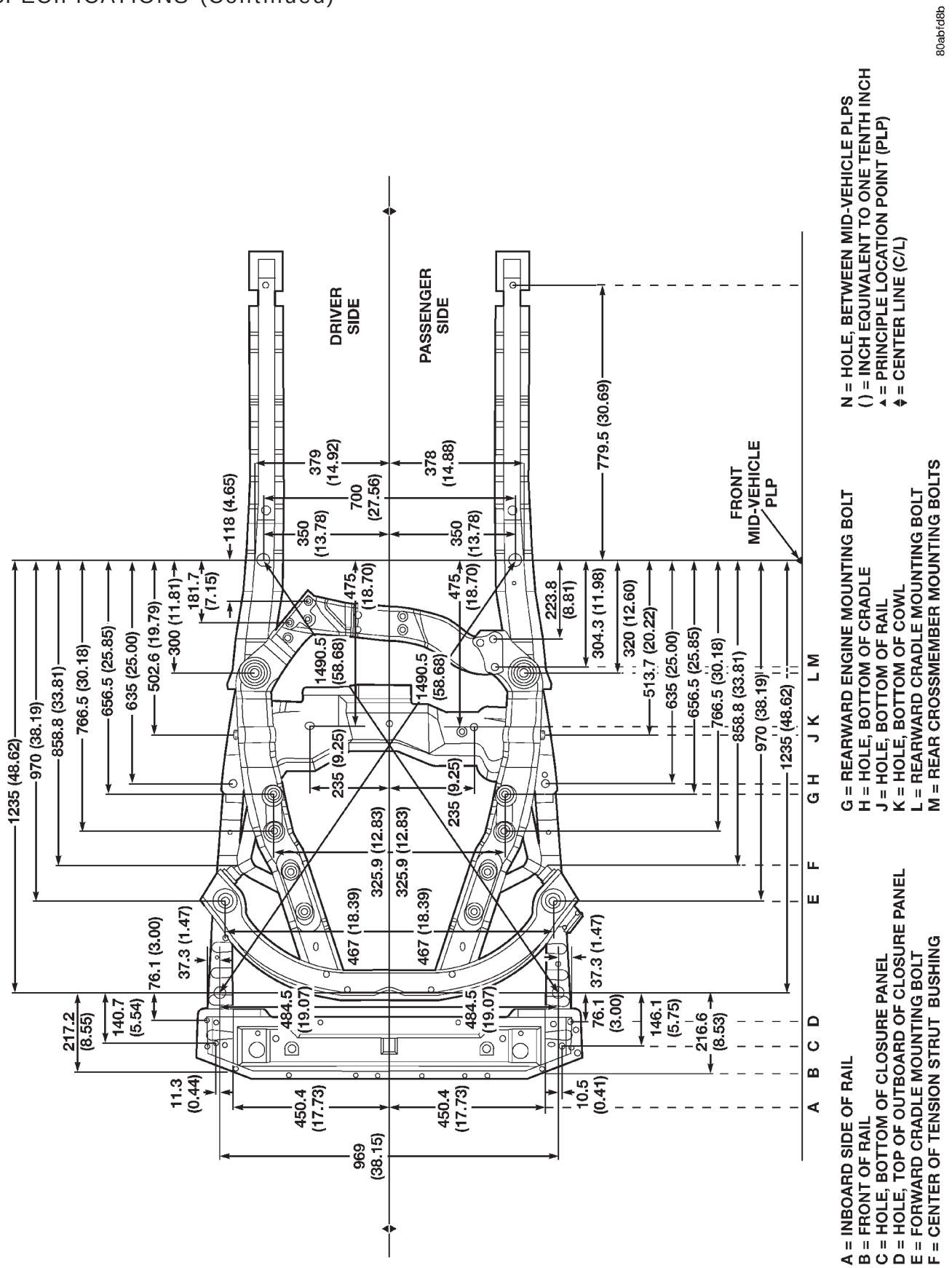
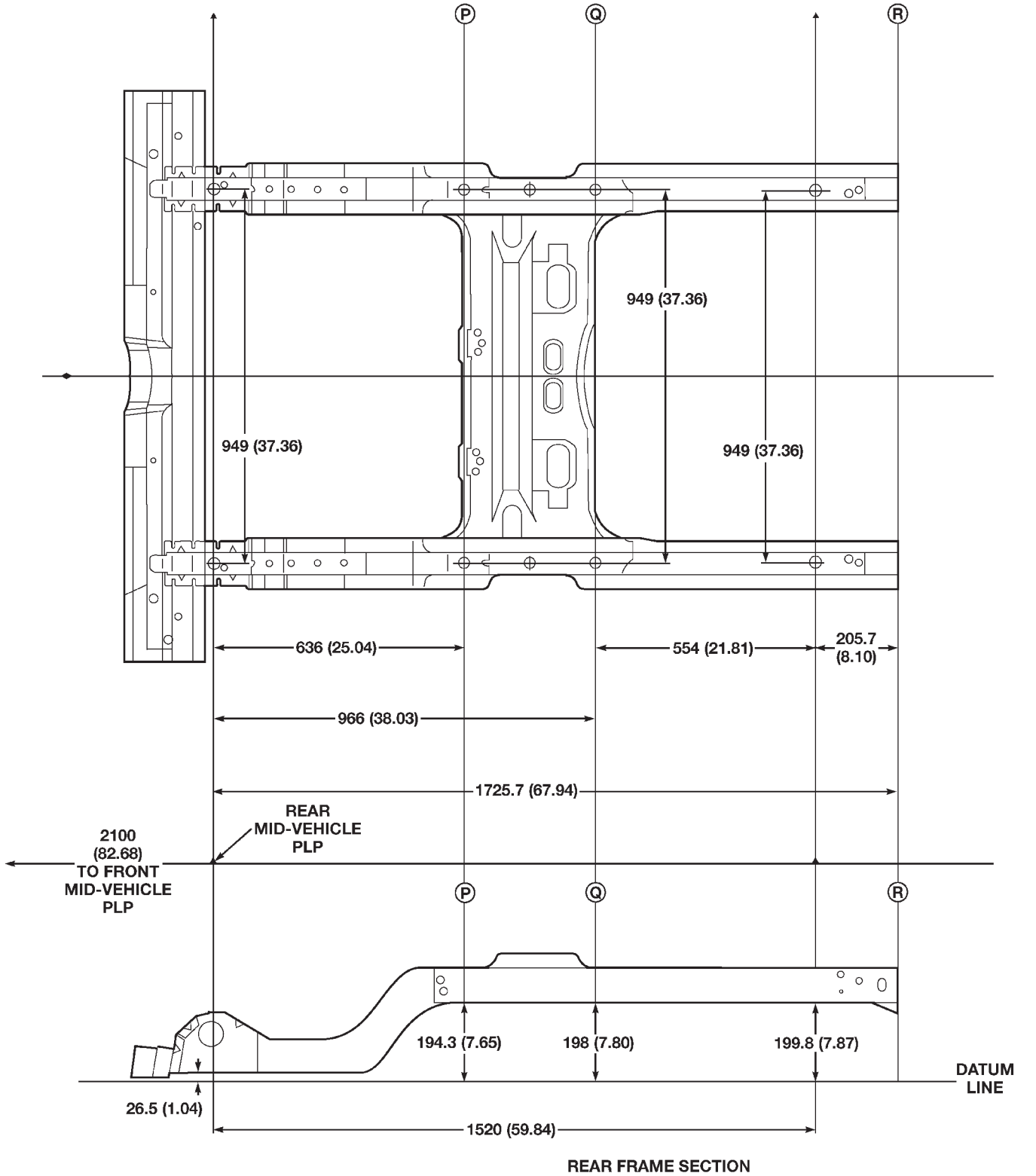


Fig. 10 Forward Frame Section and Engine Cradle

SPECIFICATIONS (Continued)



P = BOLT, SUSPENSION MOUNTING FORWARD
Q = BOLT, SUSPENSION MOUNTING REARWARD
R = END OF FRAME RAIL ADAPTER
( ) = INCH EQUIVALENT TO ONE TENTH INCH
▲ = PRINCIPAL LOCATION POINT (PLP)
◂▸ = CENTER LINE (C/L)

80ae83c5

Fig. 11 Rear Frame Section

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Rear Bumper Reinforcement	
Attaching Nut	28 N·m (21 ft. lbs.)
Front Suspension Crossmember	
Attaching Bolt Front	109 N·m (80 ft. lbs.)
Attaching Bolt Rear	102 N·m (75 ft. lbs.)
Radiator Support Crossmember	
Attaching Bolts	51 N·m (45 ft. lbs.)

FRAME AND BUMPERS

FRAME

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FRONT LICENSE PLATE BRACKET. 1
FRONT TOW HOOK BRACKET 1
REAR TOW HOOK BRACKET 2

REMOVAL AND INSTALLATION

FRONT LICENSE PLATE BRACKET

REMOVAL

(1) Remove the license plate from the bracket.
(2) Remove the license plate bracket attaching screws (Fig. 1).

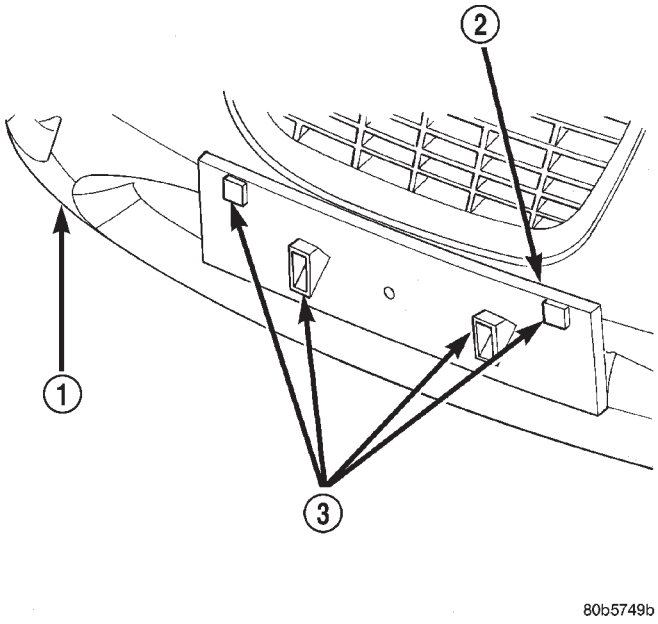


Fig. 1 Front License Plate Bracket

1 – FRONT BUMPER FASCIA
2 – FRONT LICENSE PLATE BRACKET
3 – FRONT LICENSE PLATE BRACKET ATTACHING SCREWS

(3) Remove the license plate bracket from the front bumper fascia.

INSTALLATION

(1) Position the license plate bracket on the front bumper fascia.
(2) Install the attaching screws.
(3) Install the license plate on the license plate bracket.

FRONT TOW HOOK BRACKET

REMOVAL

(1) Remove the tow hook from the tow hook bracket.
(2) Open hood and disconnect the negative battery cable remote terminal from the battery post.
(3) Hoist vehicle.
(4) Partially remove the front fascia to gain access to the windshield/headlamp washer reservoir. Refer to Group 23, Body for Removal and Installation procedures.
(5) Remove the tow hook bracket mounting fasteners.
(6) Remove the tow hook bracket (Fig. 2).

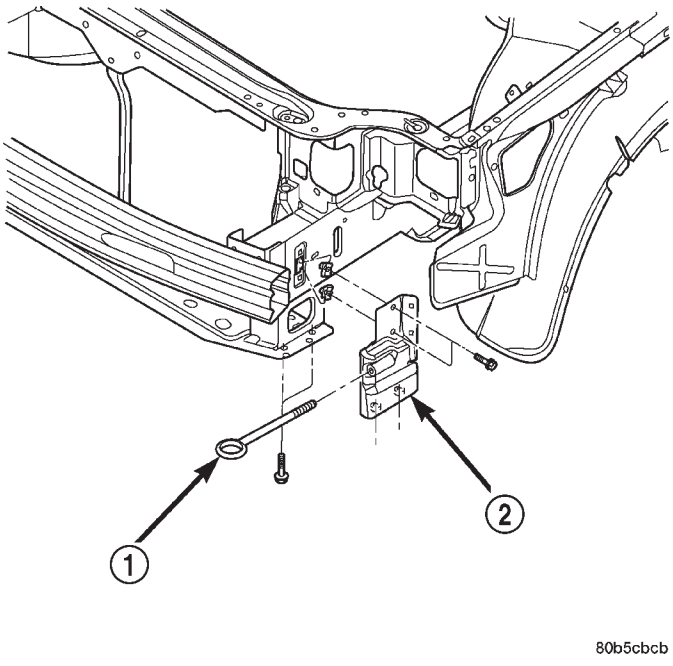


Fig. 2 Front Tow Hook Bracket

1 – FRONT TOE HOOK
2 – FRONT TOE HOOK BRACKET

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Install the front tow hook bracket and fasteners. Torque bolts to 23 to 34 N.m.
(2) Reinstall the front fascia as necessary. Refer to Group 23, Body for Removal and Installation procedures.
(3) Lower vehicle from the hoist.
(4) Install the tow hook into the tow hook bracket.
(5) Reconnect the negative battery cable at the remote battery post.

REAR TOW HOOK BRACKET

REMOVAL

(1) Hoist and support vehicle. Refer to Group 0, Lubrication and Maintenance, for proper lifting procedure.
(2) Remove bolts holding rear tow hook bracket to rear frame rail (Fig. 3) (Fig. 4).
(3) Separate rear tow hook bracket from vehicle.

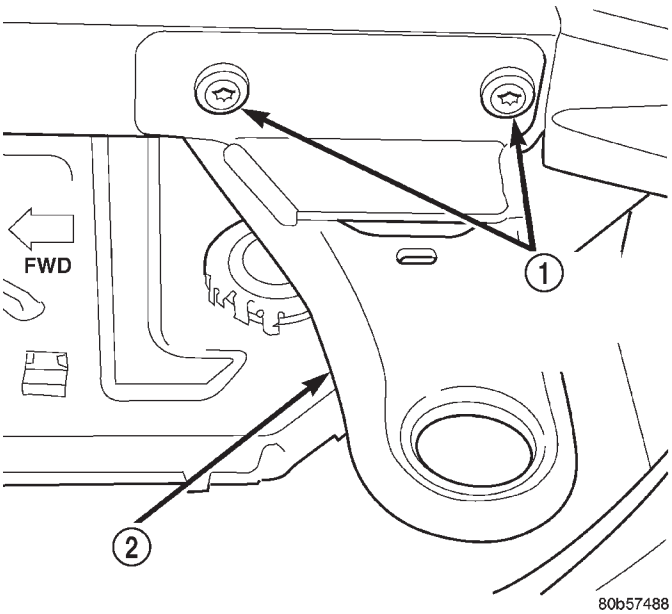


Fig. 3 Rear Tow Hook Bracket

1 – REAR TOW HOOK BRACKET MOUNTING SCREWS
2 – REAR TOW HOOK BRACKET

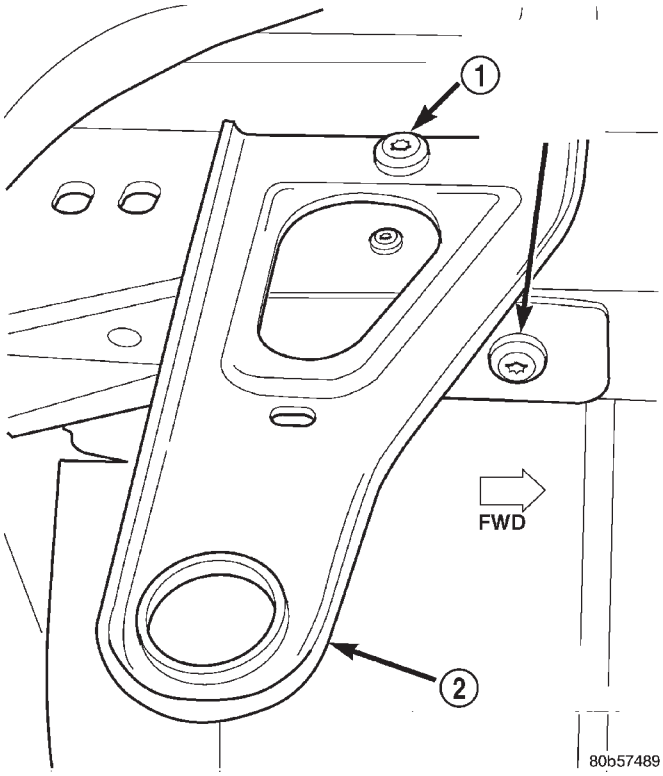


Fig. 4 Rear Tow Hook Bracket

1 – REAR TOW HOOK BRACKET MOUNTING SCREWS
2 – REAR TOW HOOK BRACKET

INSTALLATION

(1) Position rear tow hook bracket on vehicle.
(2) Install bolts to hold rear tow hook bracket to rear frame rail.
(3) Lower vehicle.

FUEL SYSTEM

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FUEL DELIVERY SYSTEM

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DESCRIPTION AND OPERATION

GASOLINE/OXYGENATE BLENDS

DESCRIPTION

Some fuel suppliers blend unleaded gasoline with materials that contain oxygen such as alcohol, MTBE (Methyl Tertiary Butyl Ether) and ETBE (Ethyl Tertiary Butyl Ether). Oxygenates are required in some areas of the country during winter months to reduce carbon monoxide emissions. The type and amount of oxygenate used in the blend is important.

The following are generally used in gasoline blends:

Ethanol - (Ethyl or Grain Alcohol) properly blended, is used as a mixture of 10 percent ethanol and 90 percent gasoline. Gasoline blended with ethanol may be used in your vehicle.

MTBE/ETBE - Gasoline and MTBE (Methyl Tertiary Butyl Ether) blends are a mixture of unleaded gasoline and up to 15 percent MTBE. Gasoline and ETBE (Ethyl Tertiary Butyl Ether) are blends of gasoline and up to 17 percent ETBE. Gasoline blended with MTBE or ETBE may be used in your vehicle.

DESCRIPTION AND OPERATION (Continued)

Methanol - Methanol (Methyl or Wood Alcohol) is used in a variety of concentrations blended with unleaded gasoline. You may encounter fuels containing 3 percent or more methanol along with other alcohols called cosolvents.

DO NOT USE GASOLINE CONTAINING METHANOL.

Use of methanol/gasoline blends may result in starting and driveability problems and damage critical fuel system components.

Problems that are the result of using methanol/gasoline blends are not the responsibility of Chrysler Corporation and may not be covered by the vehicle warranty.

Reformulated Gasoline

Many areas of the country are requiring the use of cleaner-burning fuel referred to as **Reformulated Gasoline**. Reformulated gasoline are specially blended to reduce vehicle emissions and improve air quality.

Chrysler Corporation strongly supports the use of reformulated gasoline whenever available. Although your vehicle was designed to provide optimum performance and lowest emissions operating on high quality unleaded gasoline, it will perform equally well and produce even lower emissions when operating on reformulated gasoline.

Materials Added to Fuel

Indiscriminate use of fuel system cleaning agents should be avoided. Many of these materials intended for gum and varnish removal may contain active solvents of similar ingredients that can be harmful to fuel system gasket and diaphragm materials.

FUEL DELIVERY SYSTEM

DESCRIPTION

The front wheel drive car uses a plastic fuel tank located rear center of the vehicle.

The Fuel Delivery System consists of: the electric fuel pump module, fuel filter, tubes/lines/hoses, fuel rail, and fuel injectors.

The in-tank fuel pump module contains the fuel pump. The pump is serviced as part of the fuel pump module. Refer to Fuel Pump Module.

The fuel filter is replaceable, it is a combination fuel pressure regulator/filter on the fuel pump module. Refer to the Maintenance Schedules in the Introduction section of this manual for recommended fuel filter replacement intervals.

OPERATION

The fuel system is provided fuel pressure by an in-tank pump module. The PCM controls the operation of the fuel system by providing battery voltage to the fuel pump through the fuel pump relay. The PCM requires only three inputs and a good ground to operate the fuel pump relay. The three inputs are:

- Ignition voltage
- Crankshaft Position (CKP) sensor
- Camshaft Position (CMP) sensor

FUEL PUMP MODULE

DESCRIPTION

The fuel pump module contains the fuel pump, fuel reservoir, level sensor, inlet strainer, and fuel pressure regulator/filter (Fig. 1).

OPERATION

The Chrysler fuel pump modul is an in-tank unit with an integral fuel level sensor and pressure regulator. The pump is driven by a 12 volt DC motor any time the fuel pump relay is energized. Serviceable components on the module include:

- Inlet strainer
- Fuel level sensor
- Fuel Filter/Pressure regulator

The pump draws fuel through a strainer and pushes it through the motor to the outlet. The pump contains two check valves. One valve relieves internal fuel pump pressure and regulates maximum pump output. The second valve, in the pump outlet, maintains pump pressure during engine off conditions.

The fuel systems use either a positive displacement, gerotor, (JA/JX) or roller vane pump (PL) immersiable pump with a permanent magnet electric motor. This fuel system does not contain the traditional fuel return lines. The regulator contains a calibrated spring which forces a diaphragm against the fuel filter return port. When pressure exceeds the calibrated amount, the diaphragm retracts, allowing excess pressure and fuel to vent into the tank.

The maximum deadhead pressure is approximately 880 kPa (130 psi). The regulator adjusts fuel system pressure to approximately 338 kPa (49 psi).

The inlet strainer, level sensor and fuel pressure regulator/filter are the only serviceable items.

DESCRIPTION AND OPERATION (Continued)

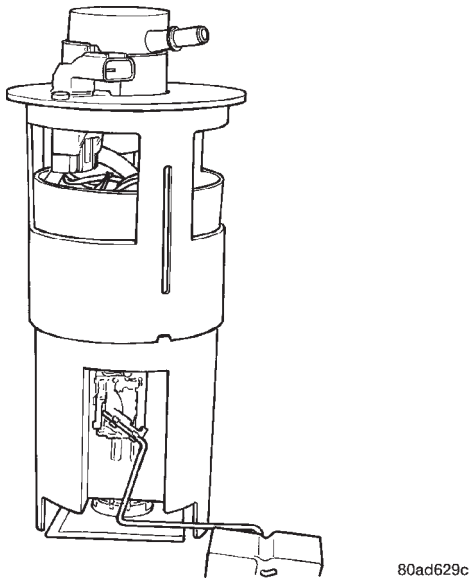


Fig. 1 Fuel Pump Module—Typical

FUEL LEVEL SENSOR

DESCRIPTION

The fuel gauge level sending unit is attached to the side of fuel pump module. The level sensor is a variable resistor.

OPERATION

Its resistance changes with the amount of fuel in the tank. The float arm attached to the sensor moves as the fuel level changes.

The fuel level input is used as an input for OBD II. If the fuel level is below 15% of total tank capacity several monitors are disabled. There are diagnostics for the level circuit open and shorted.

FUEL TANK

DESCRIPTION

The fuel tank is constructed of a plastic material. Its main functions are for fuel storage and for placement of the fuel pump module. The tank is made from High density Polyethylene (HDPE) material.

OPERATION

All models pass a full 360 degree rollover test without fuel leakage. To accomplish this, fuel and vapor flow controls are required for all fuel tank connections.

All models are equipped with either one or two rollover valves mounted into the top of the fuel tank (or pump module).

An evaporation control system is connected to the rollover valve(s) to reduce emissions of fuel vapors into the atmosphere. When fuel evaporates from the fuel tank, vapors pass through vent hoses or tubes to a charcoal canister where they are temporarily held. When the engine is running, the vapors are drawn into the intake manifold. Certain models are also equipped with a self-diagnosing system using a Leak Detection Pump (LDP). Refer to the Emission Control System for additional information.

FUEL INJECTORS

DESCRIPTION

The injectors are positioned in the cylinder heads with the nozzle ends directly above the intake valve port (Fig. 3). The fuel injectors are electrical solenoids (Fig. 2).

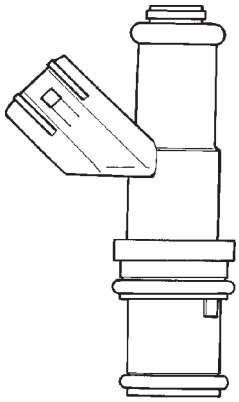


Fig. 2 Fuel Injector

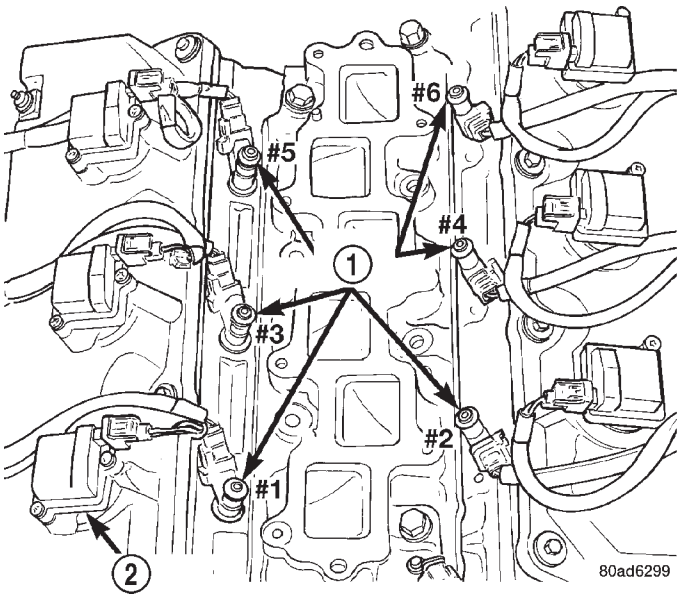


Fig. 3 Fuel Injector Location—Typical

1 – FUEL INJECTORS
2 – IGNITION COILS

DESCRIPTION AND OPERATION (Continued)

OPERATION

The injector contains a pintle that closes off an orifice at the nozzle end. When electric current is supplied to the injector, the armature and needle move a short distance against a spring, allowing fuel to flow out the orifice. Because the fuel is under high pressure, a fine spray is developed in the shape of 2 streams. The spraying action atomizes the fuel, adding it to the air entering the combustion chamber.

The PCM provides battery voltage to each injector through the ASD relay. Injector operation is controlled by a ground path provided for each injector by the PCM. Injector on-time (pulse-width) is variable, and is determined by the PCM processing all the data previously discussed to obtain the optimum injector pulse width for each operating condition. The pulse width is controlled by the duration of the ground path provided.

Fuel injectors are fired one crankshaft revolution before TDC compression. When cylinder #4 is at TDC compression the injector for cylinder #1 will be energized.

FUEL FILTER/FUEL PRESSURE REGULATOR

DESCRIPTION

A combination fuel filter and fuel pressure regulator is used on all gas powered engines. It is located on the top of the fuel pump module.

It contains a diaphragm, calibrated springs and a fuel return valve. The internal fuel filter (Fig. 4) is also part of the assembly.

OPERATION

Fuel Pressure Regulator Operation: The pressure regulator is a mechanical device that is calibrated to maintain fuel system operating pressure of approximately 400 kPa (58 psi) at the fuel injectors.

Fuel is supplied to the filter/regulator by the electric fuel pump through an opening tube at the bottom of filter/regulator.

The fuel pump module contains a check valve to maintain some fuel pressure when the engine is not operating. This will help to start the engine.

If fuel pressure at the pressure regulator exceeds approximately 58 psi, an internal diaphragm closes and excess fuel pressure is routed back into the tank through the pressure regulator. A separate fuel return line is not used with any gas powered engine.

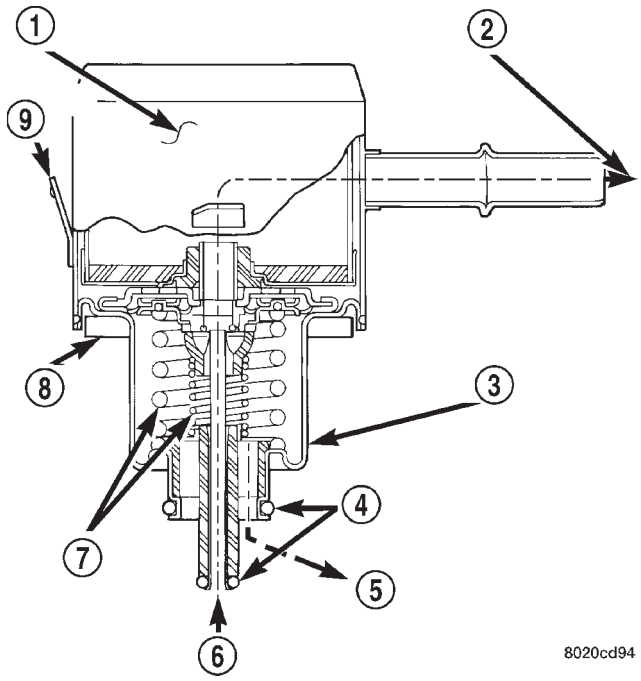


Fig. 4 Side View—Filter/Regulator

1 – INTERNAL FUEL FILTER
2 – FUEL FLOW TO FUEL INJECTORS
3 – FUEL FILTER/FUEL PRESSURE REGULATOR
4 – O-RINGS
5 – EXCESS FUEL BACK TO TANK
6 – FUEL INLET
7 – CALIBRATED SPRINGS
8 – RUBBER GROMMET AT PUMP MODULE
9 – LOCKING TAB

PRESSURE-VACUUM FILLER CAP

DESCRIPTION

The plastic fuel fill cap is threaded/quarter turn onto the end of the fuel filler tube. It's purpose is to retain vapors and fuel in the fuel tank.

OPERATION

The fuel filler cap incorporates a two-way relief valve that is closed to atmosphere during normal operating conditions. The relief valve is calibrated to open when a pressure of 17 kPa (2.5 psi) or vacuum of 2 kPa (0.6 in. Hg) occurs in the fuel tank. When the pressure or vacuum is relieved, the valve returns to the normally closed position.

CAUTION: Remove the fuel filler cap to release fuel tank pressure before disconnecting any fuel system component.

DESCRIPTION AND OPERATION (Continued)

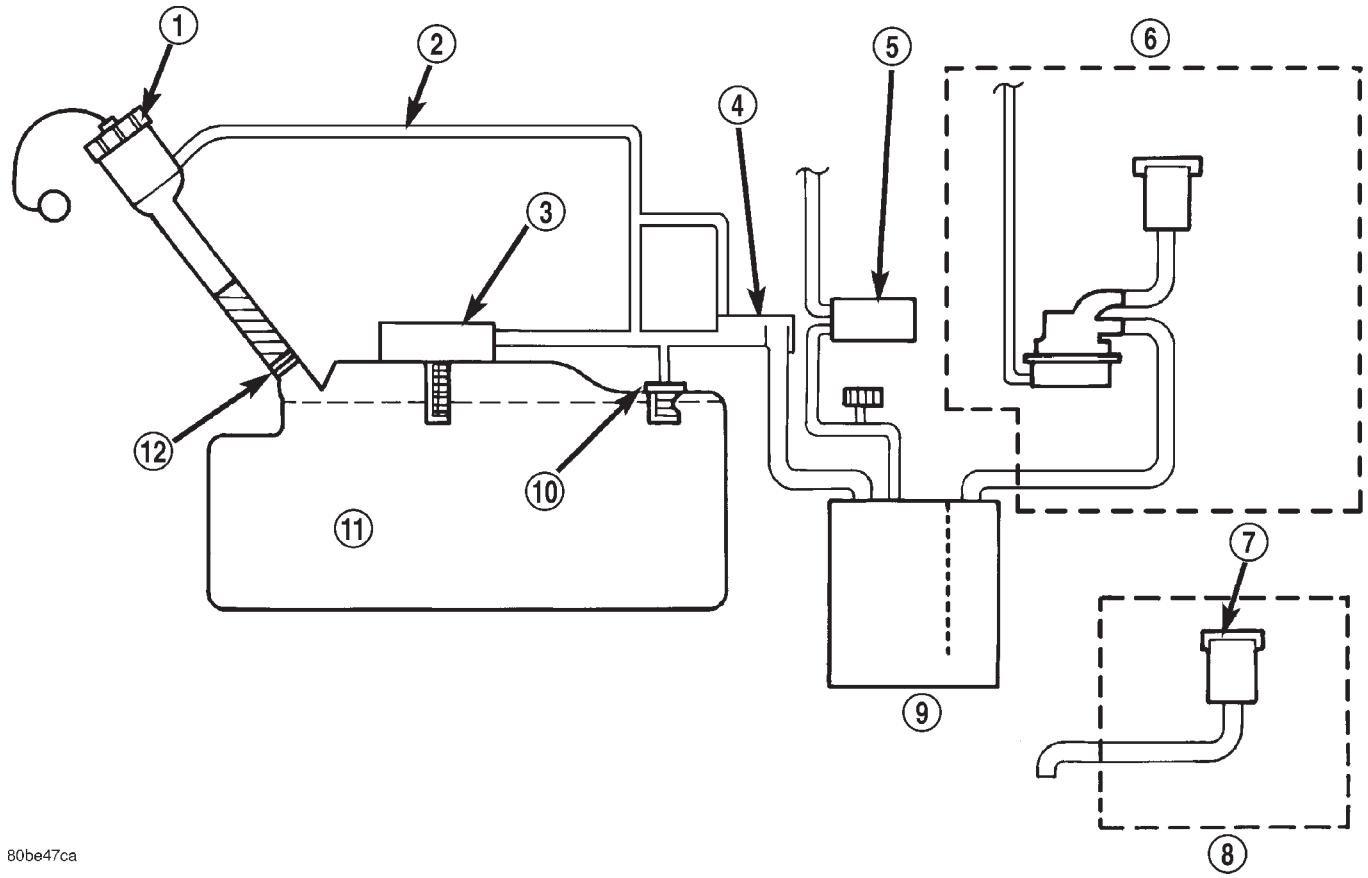


Fig. 5 ORVR System Schematic

1 – FUEL CAP
2 – RECIRCULATION TUBE
3 – CONTROL VALVE
4 – FLOW MANAGEMENT VALVE
5 – PURGE
6 – W/LDP
7 – BREATHER ELEMENT
8 – W/O LDP
9 – CANISTER
10 – ROLLOVER VALVE
11 – FUEL TANK
12 – CHECK VALVE

ONBOARD REFUELING VAPOR RECOVERY (ORVR)

DESCRIPTION

ORVR System Schematic and components.

OPERATION

The emission control principle used in the ORVR system is that the fuel flowing into the filler tube (appx. 1" I. D.) creates an aspiration effect which draws air into the fill tube (Fig. 5). During refueling, the fuel tank is vented to the vapor canister to capture escaping vapors. With air flowing into the filler tube, there are no fuel vapors escaping to the atmosphere. Once the refueling vapors are captured by the canister, the vehicle's computer controlled purge system draws vapor out of the canister for the engine to burn. The vapors flow is metered by the purge solenoid so that there is no or minimal impact on driveability or tailpipe emissions.

As fuel starts to flow through the fill tube, it opens the normally closed check valve and enters the fuel tank. Vapor or air is expelled from the tank through the control valve to the vapor canister. Vapor is absorbed in the canister until vapor flow in the lines stops, either following shut-off or by having the fuel level in the tank rise high enough to close the control valve. The control valve contains a float that rises to seal the large diameter vent path to the canister. At this point in the fueling of the vehicle, the tank pressure increase, the check valve closes (preventing tank fuel from spiting back at the operator), and fuel then rises up the filler tube to shut-off the dispensing nozzle.

If the engine is shut-off while the On-Board diagnostics test is running, low level tank pressure can be trapped in the fuel tank and fuel can not be added

DESCRIPTION AND OPERATION (Continued)

to the tank until the pressure is relieved. This is due to the leak detection pump closing the vapor outlet from the top of the tank and the one-way check valve not allowing the tank to vent through the fill tube to atmosphere. Therefore, when fuel is added, it will back-up in the fill tube and shut off the dispensing nozzle. The pressure can be eliminated in two ways: 1. Vehicle purge must be activated and for a long enough period to eliminate the pressure. 2. Removing the fuel cap and allowing enough time for the system to vent thru the recirulation tube.

FLOW MANAGEMENT VALVE

DESCRIPTION

It is a plastic valve inline between the fuel tank and the EVAP canister.

OPERATION

The flow management valve meters the flow of fuel vapors to the EVAP canister during vehicle run and refueling. Pressure from the tank during refueling opens the main port valve and allows vapors to the EVAP canister. During vehicle run the vapors are metered through an orifice to the EVAP canister. It also is a liquid separator to keep fuel out of the EVAP canister.

ROLLOVER VALVES

DESCRIPTION

All vehicles have rollover valve(s) on top of the fuel tank.

OPERATION

The valves prevent fuel flow through the fuel tank vent valve hoses should the vehicle rollover.

The rollover valves on the fuel tank are not serviceable.

FUEL TUBES/LINES/HOSES AND CLAMPS

DESCRIPTION

Also refer to Quick-Connect Fittings.

WARNING: THE FUEL SYSTEM IS UNDER A CONSTANT PRESSURE (EVEN WITH THE ENGINE OFF). BEFORE SERVICING ANY FUEL SYSTEM HOSES, FITTINGS OR LINES, THE FUEL SYSTEM PRESSURE MUST BE RELEASED. REFER TO THE FUEL SYSTEM PRESSURE RELEASE PROCEDURE IN THIS GROUP.

The lines/tubes/hoses used on fuel injected vehicles are of a special construction. This is due to the higher fuel pressures and the possibility of contaminated fuel in this system. If it is necessary to replace these lines/tubes/hoses, only those marked EFM/EFI may be used.

If equipped: The hose clamps used to secure rubber hoses on fuel injected vehicles are of a special rolled edge construction. This construction is used to prevent the edge of the clamp from cutting into the hose. Only these rolled edge type clamps may be used in this system. All other types of clamps may cut into the hoses and cause high-pressure fuel leaks.

Use new original equipment type hose clamps.

SERVICE PROCEDURES

FUEL SYSTEM PRESSURE RELEASE PROCEDURE

(1) Remove Fuel Pump relay from Power Distribution Center (PDC). For location of relay, refer to label on underside of PDC cover.

(2) Start and run engine until it stalls.

(3) Attempt restarting engine until it will no longer run.

(4) Turn ignition key to OFF position.

CAUTION: Steps 1, 2, 3 and 4 must be performed to relieve high pressure fuel from within fuel rail. Do not attempt to use following steps to relieve this pressure as excessive fuel will be forced into a cylinder chamber.

(5) Place a rag or towel below fuel line quick-connect fitting at fuel rail.

(6) Return fuel pump relay to PDC.

(7) One or more Diagnostic Trouble Codes (DTC's) may have been stored in PCM memory due to fuel pump relay removal. The DRB III® scan tool must be used to erase a DTC.

DRAINING FUEL TANK

Raise and support vehicle on hoist. Obtain the proper container for **GASOLINE**. Remove drain plug and drain fuel tank (Fig. 6).

HOSES AND CLAMPS

Inspect all hose connections (clamps and quick connect fittings) for completeness and leaks. Replace cracked, scuffed, or swelled hoses. Replace hoses that rub against other vehicle components or show sign of wear.

Fuel injected vehicles use specially constructed hoses. When replacing hoses, only use hoses marked EFM/EFI.

When installing hoses, ensure that they are routed away from contact with other vehicle components that could rub against them and cause failure. Avoid

SERVICE PROCEDURES (Continued)

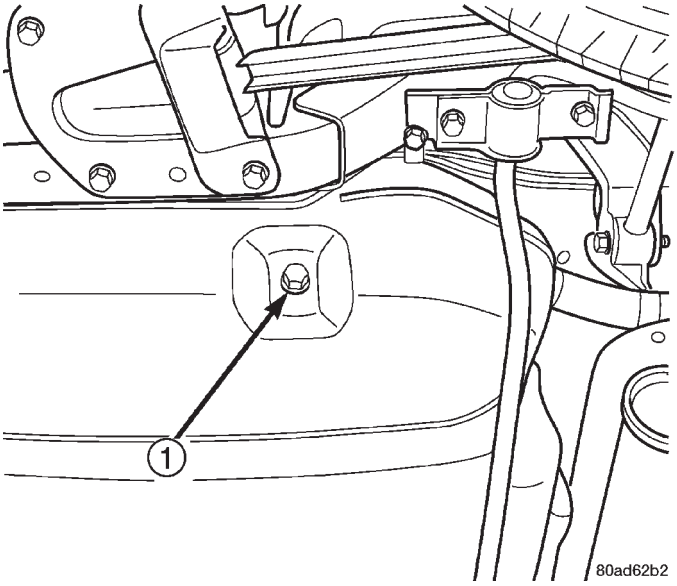


Fig. 6 Fuel Tank Drain Plug

1 – FUEL TANK DRAIN

contact with clamps or other components that cause abrasions or scuffing. Ensure that rubber hoses are properly routed and avoid heat sources.

The hose clamps have rolled edges to prevent the clamp from cutting into the hose. Only use clamps that are original equipment or equivalent. Other types of clamps may cut into the hoses and cause high pressure fuel leaks. Tighten hose clamps to 1 N·m (10 in. lbs.) torque.

Inspect all hose connections such as clamps, couplings and fittings to make sure they are secure and leaks are not present. The component should be replaced immediately if there is any evidence of degradation that could result in failure.

Never attempt to repair a plastic fuel line/tube. Replace as necessary.

Avoid contact of any fuel tubes/hoses with other vehicle components that could cause abrasions or scuffing. Be sure that the plastic fuel lines/tubes are properly routed to prevent pinching and to avoid heat sources.

QUICK-CONNECT FITTINGS

REMOVAL

When disconnecting a quick-connect fitting, the retainer will remain on the fuel tube nipple.

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE DISCONNECTING A QUICK-CONNECT FITTINGS. REFER TO THE FUEL PRESSURE RELEASE PROCEDURE.

(1) Perform Fuel Pressure Release Procedure. Refer to the Fuel Pressure Release Procedure in this section.

(2) Disconnect negative cable from battery or auxiliary jumper terminal.

(3) Squeeze retainer tabs together and pull fuel tube/quick-connect fitting assembly off of fuel tube nipple. The retainer will remain on fuel tube.

INSTALLATION

CAUTION: Never install a quick-connect fitting without the retainer being either on the fuel tube or already in the quick-connect fitting. In either case, ensure the retainer locks securely into the quick-connect fitting by firmly pulling on fuel tube and fitting to ensure it is secured.

(1) Using a clean lint free cloth, clean the fuel tube nipple and retainer.

(2) Prior to connecting the fitting to the fuel tube, coat the fuel tube nipple with clean 30 weight engine oil.

(3) Push the quick-connect fitting over the fuel tube until the **retainer seats and a click is heard.**

(4) The plastic quick-connect fitting has windows in the sides of the casing. When the fitting completely attaches to the fuel tube, the retainer locking ears and the fuel tube shoulder are visible in the windows. If they are not visible, the retainer was not properly installed (Fig. 7). **Do not rely upon the audible click to confirm a secure connection.**

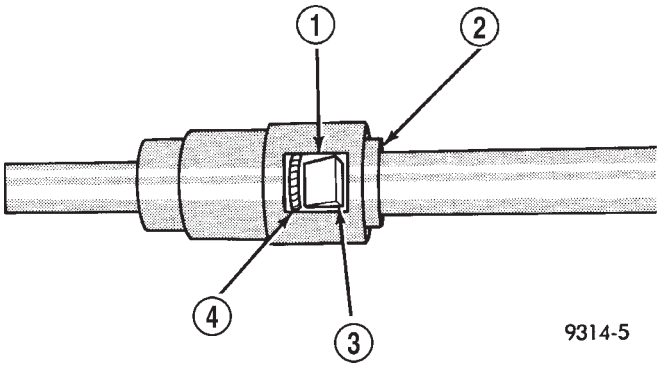


Fig. 7 Plastic Quick-Connect Fitting/Fuel Tube Connection

1 – WINDOW
2 – TAB (2)
3 – EAR
4 – SHOULDER (ON TUBE)

(5) Connect negative cable to battery or auxiliary jumper terminal.

SERVICE PROCEDURES (Continued)

CAUTION: When using the ASD Fuel System Test, the Auto Shutdown (ASD) Relay remains energized for several minutes, until the test is stopped, or until the ignition switch is turned to the Off position.

(6) Use the DRB scan tool ASD Fuel System Test to pressurize the fuel system. Check for leaks.

TWO-TAB TYPE FITTING

This type of fitting is equipped with tabs located on both sides of the fitting (Fig. 8). These tabs are supplied for disconnecting the quick-connect fitting from component being serviced.

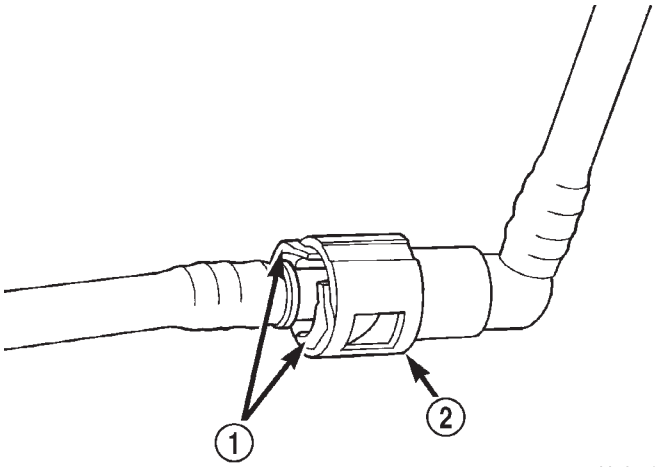


Fig. 8 Typical Two-Tab Type Quick-Connect Fitting
1 – TAB(S)
2 – QUICK-CONNECT FITTING

CAUTION: The interior components (O-rings, spacers) of this type of quick-connect fitting are not serviced separately, but new plastic retainers are available. Do not attempt to repair damaged fittings or fuel lines/tubes. If repair is necessary, replace the complete fuel tube assembly.

WARNING: THE FUEL SYSTEM IS UNDER A CONSTANT PRESSURE (EVEN WITH THE ENGINE OFF). BEFORE SERVICING ANY FUEL SYSTEM HOSES, FITTINGS OR LINES, THE FUEL SYSTEM PRESSURE MUST BE RELEASED. REFER TO THE FUEL PRESSURE RELEASE PROCEDURE IN THIS GROUP.

DISCONNECTION/CONNECTION

(1) Perform fuel pressure release procedure. Refer to Fuel Pressure Release Procedure in this group.

(2) Disconnect negative battery cable from battery or auxiliary jumper terminal.

(3) Clean fitting of any foreign material before disassembly.

(4) To disconnect quick-connect fitting, squeeze plastic retainer tabs (Fig. 8) against sides of quick-connect fitting with your fingers. Tool use is not required for removal and may damage plastic retainer. Pull fitting from fuel system component being serviced. The plastic retainer will remain on component being serviced after fitting is disconnected. The O-rings and spacer will remain in quick-connect fitting connector body.

(5) Inspect quick-connect fitting body and component for damage. Replace as necessary.

CAUTION: When the quick-connect fitting was disconnected, the plastic retainer will remain on the component being serviced. If this retainer must be removed, very carefully release the retainer from the component with two small screwdrivers. After removal, inspect the retainer for cracks or any damage.

(6) Prior to connecting quick-connect fitting to component being serviced, check condition of fitting and component. Clean parts with a lint-free cloth. Lubricate with clean engine oil.

(7) Insert quick-connect fitting to component being serviced and into plastic retainer. When a connection is made, a click will be heard.

(8) Verify a locked condition by firmly pulling on fuel tube and fitting (15-30 lbs.).

(9) Connect negative cable to battery or auxiliary jumper terminal.

(10) Use the DRB scan tool ASD Fuel System Test to pressurize the fuel system. Check for leaks.

PLASTIC RETAINER RING TYPE FITTING

This type of fitting can be identified by the use of a full-round plastic retainer ring (Fig. 9) usually black in color.

CAUTION: The interior components (O-rings, spacers, retainers) of this type of quick-connect fitting are not serviced separately. Do not attempt to repair damaged fittings or fuel lines/tubes. If repair is necessary, replace the complete fuel tube assembly.

WARNING: THE FUEL SYSTEM IS UNDER A CONSTANT PRESSURE (EVEN WITH THE ENGINE OFF). BEFORE SERVICING ANY FUEL SYSTEM HOSES, FITTINGS OR LINES, THE FUEL SYSTEM PRESSURE MUST BE RELEASED. REFER TO THE FUEL SYSTEM PRESSURE RELEASE PROCEDURE IN THIS GROUP.

SERVICE PROCEDURES (Continued)

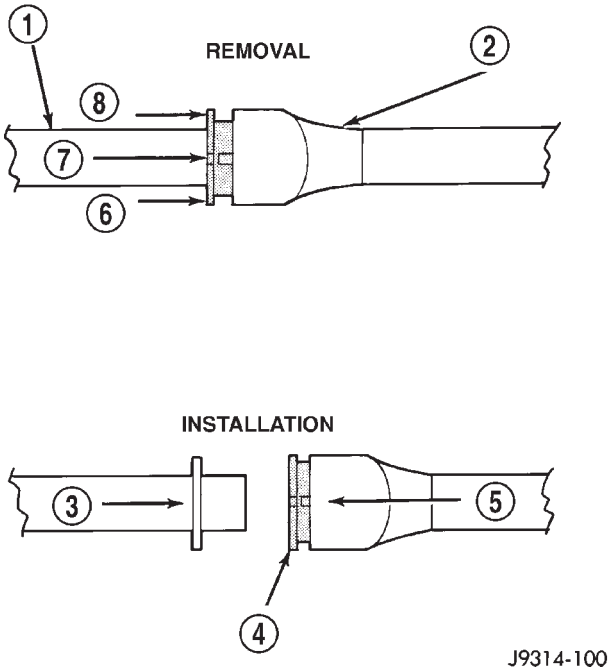


Fig. 9 Plastic Retainer Ring Type Fitting

1 – FUEL TUBE
2 – QUICK CONNECT FITTING
3 – PUSH
4 – PLASTIC RETAINER
5 – PUSH
6 – PUSH
7 – PUSH
8 – PUSH

DISCONNECTION/CONNECTION

(1) Perform fuel pressure release procedure. Refer to Fuel Pressure Release Procedure in this section.

(2) Disconnect negative battery cable from battery or auxiliary jumper terminal.

(3) Clean fitting of any foreign material before disassembly.

(4) To release fuel system component from quick-connect fitting, firmly push fitting towards component being serviced while firmly pushing plastic retainer ring into fitting (Fig. 9). With plastic ring depressed, pull fitting from component. **The plastic retainer ring must be pressed squarely into fitting body. If this retainer is cocked during removal, it may be difficult to disconnect fitting. Use an open-end wrench on shoulder of plastic retainer ring to aid in disconnection.**

(5) After disconnection, plastic retainer ring will remain with quick-connect fitting connector body.

(6) Inspect fitting connector body, plastic retainer ring and fuel system component for damage. Replace as necessary.

(7) Prior to connecting quick-connect fitting to component being serviced, check condition of fitting and component. Clean parts with a lint-free cloth. Lubricate with clean engine oil.

(8) Insert quick-connect fitting into component being serviced until a click is felt.

(9) Verify a locked condition by firmly pulling on fuel tube and fitting (15-30 lbs.).

(10) Connect negative battery cable to battery or auxiliary jumper terminal.

(11) Use the DRB scan tool ASD Fuel System Test to pressurize the fuel system. Check for leaks.

REMOVAL AND INSTALLATION

AUTOMATIC SHUTDOWN RELAY

The relay is located in the Power Distribution Center (PDC) (Fig. 10). For the location of the relay within the PDC, refer to the PDC cover for location. Check electrical terminals for corrosion and repair as necessary.

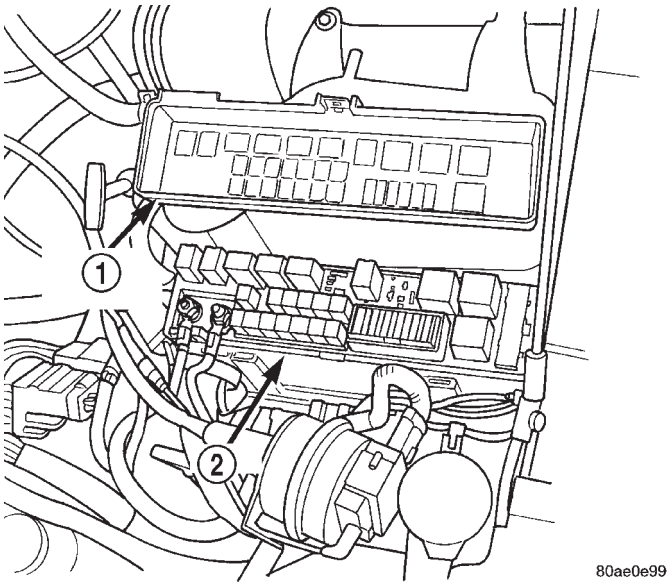


Fig. 10 Power Distribution Center (PDC)

1 – PDC COVER
2 – PDC

FUEL PUMP RELAY

The fuel pump relay is located in the PDC. The inside top of the PDC cover has a label showing relay and fuse location.

FUEL PUMP MODULE

REMOVAL

(1) Release fuel pressure, Refer to Fuel System Pressure Release Procedure in the Fuel Delivery section.

REMOVAL AND INSTALLATION (Continued)

(2) Remove Fuel Tank refer to the Fuel Tank Removal/Installation in this group.

WARNING: THE FUEL RESERVOIR OF THE FUEL PUMP MODULE DOES NOT EMPTY OUT WHEN THE TANK IS DRAINED. THE FUEL IN THE RESERVOIR WILL SPILL OUT WHEN THE MODULE IS REMOVED.

(3) Disconnect fuel line from fuel pump module by depressing quick connect retainers with thumb and fore finger.

(4) Slide fuel pump module electrical connector lock to unlock.

(5) Disconnect the electrical connection from the fuel pump module, by pushing down on connector retainer and pulling connector off of module.

(6) Use Special Tool #6856 to remove fuel pump module locknut (Fig. 11).

(7) Remove fuel pump and O-ring seal from tank. Discard old seal.

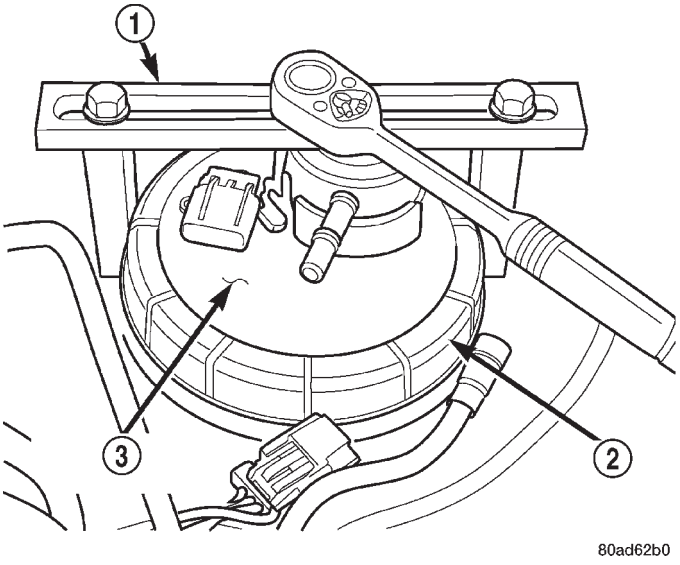


Fig. 11 Fuel Tank Locknut

1 – SPECIAL TOOL #6856
2 – LOCKING RING
3 – FUEL PUMP MODULE

INSTALLATION

(1) Wipe seal area of tank clean and place a new seal in position in the tank opening.

(2) Position fuel pump in the tank. Make sure the alignment tabs on the underside of the fuel pump module flange sits in the notches on the fuel tank (Fig. 12).

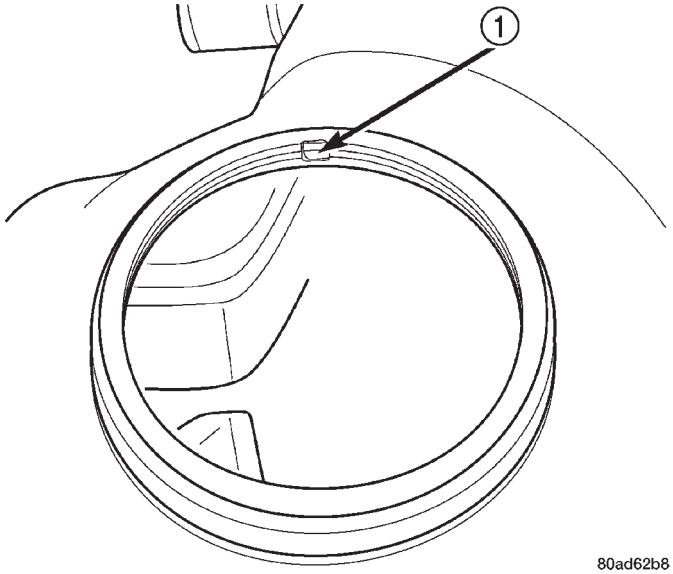


Fig. 12 Fuel Tank Locator Notch

1 – LOCATOR NOTCH

(3) Position the locknut over the fuel pump module.

(4) Tighten the locknut using Special Tool #6856 to 55 N·m (40.5 ft. lbs.).

CAUTION: Over tightening the pump lock ring may result in a leak.

(5) Raise the fuel tank on the transmission stand.

(6) Install fuel pump electrical connector into hole in the body.

(7) Connect the purge and vent lines.

(8) Raise tank into position and install tank straps.

(9) Install the fuel filler tube and tighten the clamp.

(10) Reposition the stabilizer bar and install bolts.

(11) Lower vehicle.

(12) Connect the fuel pump electrical connector that is in the rear seat.

(13) Install the rear seat.

(14) Connect the battery cable.

(15) Fill fuel tank. Use the DRB scan tool to pressurize the fuel system. Check for leaks.

REMOVAL AND INSTALLATION (Continued)

FUEL PRESSURE/REGULATOR

REMOVAL

(1) Release fuel pressure, Refer to Fuel System Pressure Release Procedure in the Fuel Delivery section.

(2) Remove Fuel Tank refer to the Fuel Tank Removal/Installation in this group.

(3) Lower fuel tank and remove the purge line and vent line.

(4) Disconnect fuel line from pressure regulator.

(5) Push locking tab in from locking slot. Turn pressure regulator to unlock it (Fig. 13).

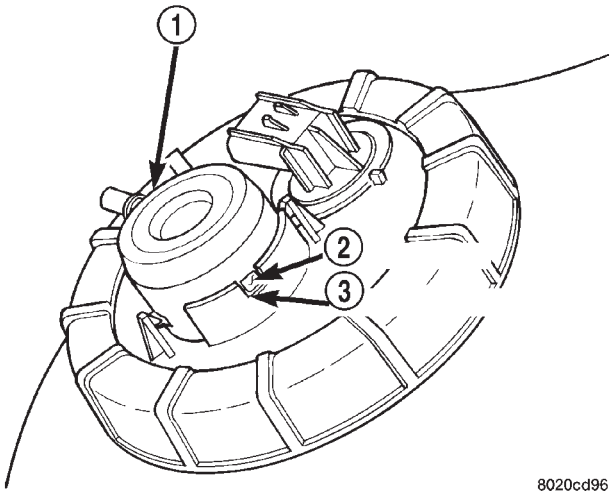


Fig. 13 Fuel Pressure Regulator Locking Tab

1 – FUEL FILTER/PRESSURE REGULATOR
2 – SPRING TAB
3 – LOCATING SLOT

(6) Pull regulator straight up.

INSTALLATION

(1) Push regulator down and into place.

(2) Turn fuel pressure regulator to lock it in place (Fig. 13). Make sure take the locking tab is in the locking slot.

(3) Connect fuel line to regulator

(4) Raise the fuel tank on the transmission stand.

(5) Install fuel pump electrical connector into hole in the body.

(6) Connect the purge and vent lines.

(7) Raise tank into position and install tank straps.

(8) Install the fuel filler tube and tighten the clamp.

(9) Reposition the stabilizer bar and install bolts.

(10) Lower vehicle.

(11) Connect the fuel pump electrical connector that is in the rear seat.

(12) Install the rear seat.

(13) Connect the battery cable.

(14) Fill fuel tank. Use the DRB scan tool to pressurize the fuel system. Check for leaks.

FUEL PUMP INLET STRAINER

REMOVAL

(1) Remove fuel pump module. Refer to Fuel Pump Module Removal in this section.

(2) Using a thin straight blade screwdriver, pry back the locking tabs on fuel pump reservoir and remove the strainer (Fig. 14).

(3) Remove strainer O-ring from the fuel pump reservoir body.

(4) Remove any contaminants in the fuel tank by washing the inside of the fuel tank.

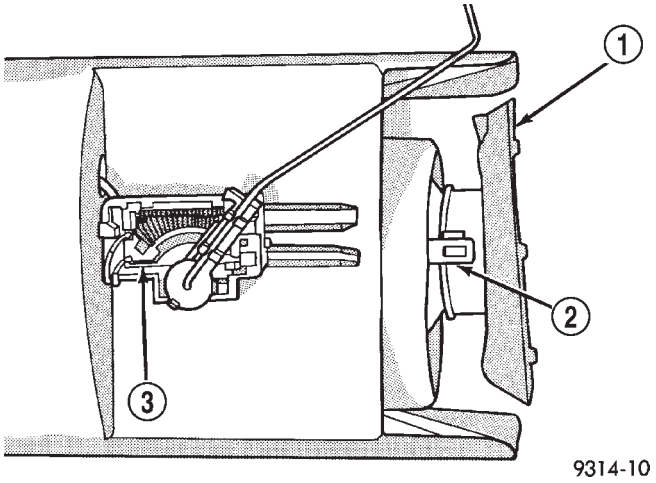


Fig. 14 Inlet Strainer Removal

1 – INLET STRAINER
2 – RETAINING CLIP
3 – FUEL LEVEL SENSOR

INSTALLATION

(1) Lubricate the strainer O-ring with clean engine oil.

(2) Insert strainer O-ring into outlet of strainer so that it sits evenly on the step inside the outlet.

(3) Push strainer onto the inlet of the fuel pump reservoir body. Make sure the locking tabs on the reservoir body lock over the locking tangs on the strainer.

(4) Install fuel pump module. Refer to Fuel Pump Module Installation in this section.

FUEL LEVEL SENSOR

REMOVAL

Remove fuel pump module. Refer to Fuel Pump Module in this section.

REMOVAL AND INSTALLATION (Continued)

(1) Depress the retaining tab and remove the fuel pump/level sensor connector from the bottom of the fuel pump module electrical connector (Fig. 15).

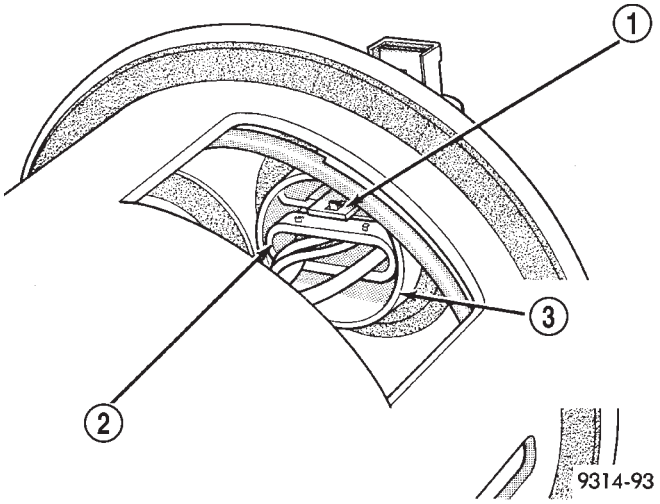


Fig. 15 Fuel Pump/Level Sensor Connector

1 – TAB
2 – FUEL PUMP/LEVEL SENSOR CONNECTOR
3 – BOTTOM OF FUEL PUMP MODULE ELECTRICAL CONNECTOR

(2) Remove wire terminal retaining clip from connector (Fig. 16). Note the location of terminals for the level sensor wires (Fig. 17).

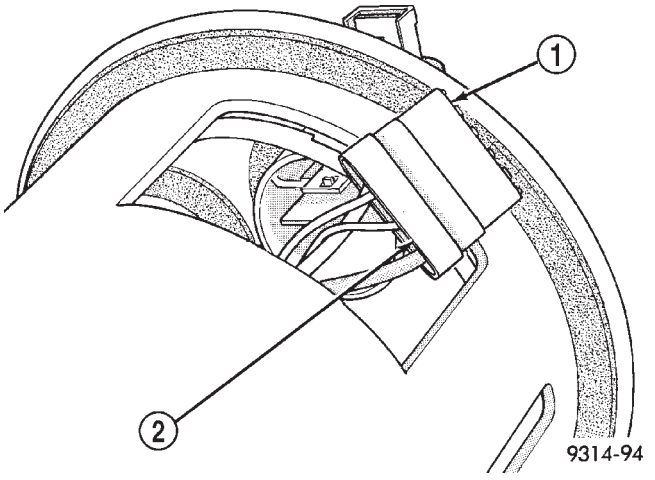


Fig. 16 Wire Terminal Retaining Clip

1 – WIRE TERMINAL RETAINING CLIP
2 – FUEL PUMP/LEVEL SENSOR CONNECTOR

(3) Using special tool 7812 or an equivalent, push level sensor signal and ground terminals out of the connector (Fig. 18).

(4) Insert a screwdriver between the fuel pump module and the top of the level sensor housing (Fig. 19). Push level sensor down slightly.

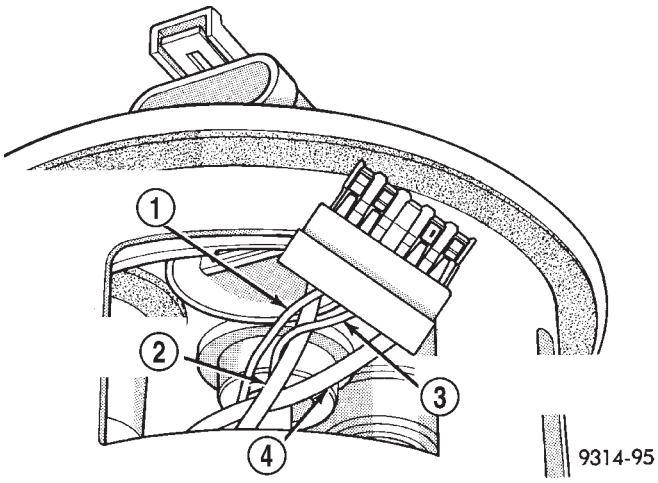


Fig. 17 Wire Terminal Identification

1 – GRAY (LEVEL SENSOR GROUND)
2 – BLACK (FUEL PUMP –)
3 – BLUE (LEVEL SENSOR SIGNAL)
4 – RED (FUEL PUMP +)

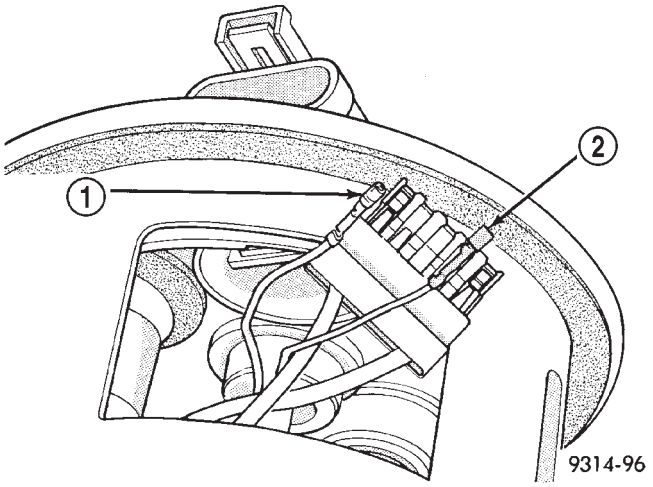


Fig. 18 Level Sensor Signal and Ground Wires

1 – GRAY (LEVEL SENSOR GROUND)
2 – BLUE (LEVEL SENSOR SIGNAL)

(5) Slide level sensor wires through standpipe inside fuel pump module (Fig. 20).

(6) Slide level sensor out of installation channel (Fig. 19).

INSTALLATION

(1) Insert level sensor wires in bottom of standpipe.

(2) Wrap wires into groove in back of level sensor (Fig. 21).

REMOVAL AND INSTALLATION (Continued)

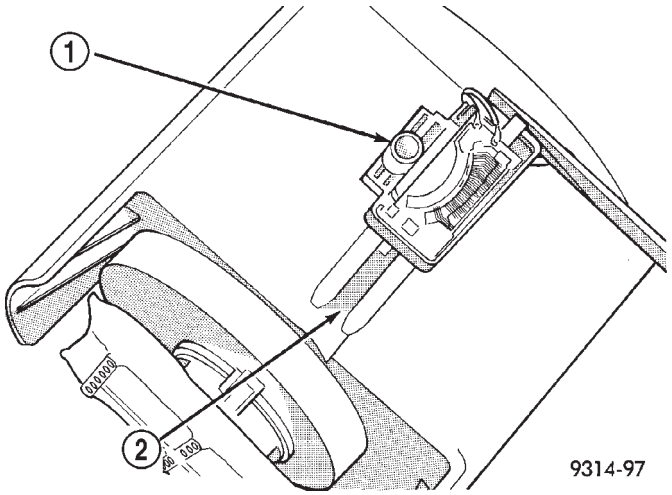


Fig. 19 Fuel Level Sensor Removal

1 – LEVEL SENSOR
2 – INSTALLATION CHANNEL

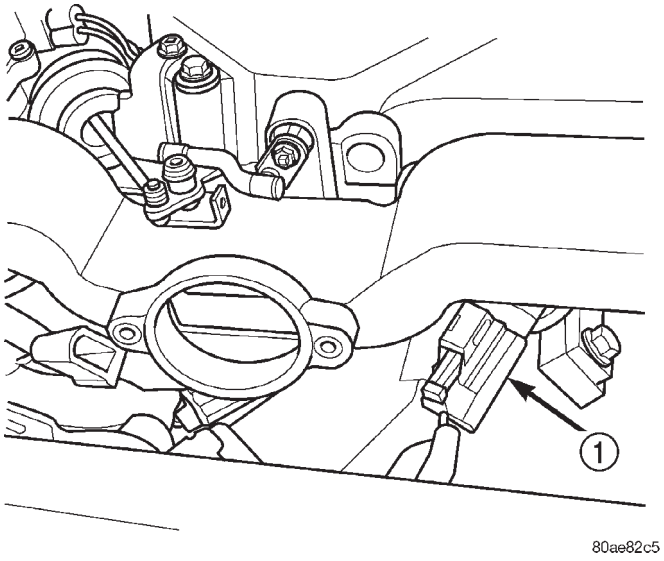


Fig. 20 Standpipe Inside Module

1 – CAMSHAFT SENSOR

(3) While feeding wires into standpipe, slide level sensor up into installation channel until it snaps into place. Ensure tab at bottom of sensor locks in place.

(4) Install level sensor wires in connector. Push the wires up through the connector and then pull them down until they lock in place. Ensure signal and ground wires are installed in the correct position (Fig. 17).

(5) Install retaining clip on connector.

(6) Push fuel pump/level sensor connector up into bottom of fuel pump module electrical connector.

(7) Install fuel pump module. Refer to Fuel Pump Module in this section.

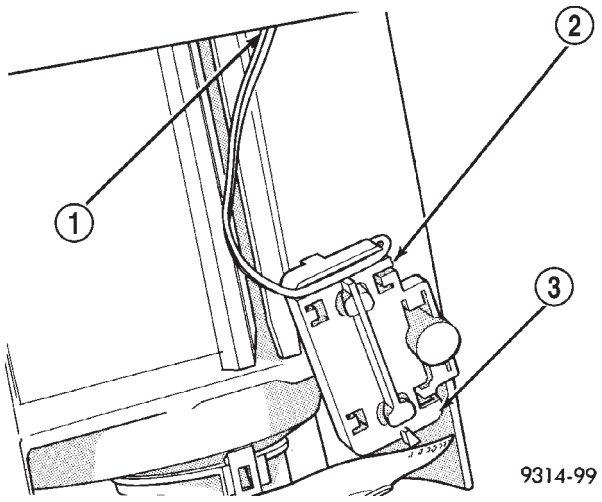


Fig. 21 Level Sensor Installation

1 – STANDPIPE OPENING
2 – GROOVE
3 – BACK OF LEVEL SENSOR

FUEL RAIL—2.7L ENGINE

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING FUEL RAIL. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE.

REMOVAL

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.

(2) Disconnect negative battery cable.

(3) Remove intake manifold plenum. Refer to the Engine section for information.

(4) Remove intake manifold plenum mounting bolts. Lift Plenum up off of engine. Cover intake manifold to prevent foreign material from entering engine.

(5) Disconnect fuel supply tube quick connect fittings at the rear of intake manifold. Refer to Quick Connect Fittings in the Fuel Delivery Section.

(6) If the injector connectors are not tagged with their cylinder number, tag them to identify the correct cylinder

(7) Remove fuel rail mounting bolts.

(8) Lift fuel rail straight up off of cylinder head.

(9) Remove retaining clips from fuel injectors at fuel rail.

(10) Remove fuel injector from fuel rail.

INSTALLATION

(1) Lightly lubricate the fuel injector O-rings with a couple drops of clean engine oil.

(2) Install retaining clips on fuel injectors.

REMOVAL AND INSTALLATION (Continued)

(3) Push injectors into fuel injector rail until clips are in the correct position.

(4) Position fuel rail over cylinder heads, and push rail into place. Tighten fuel rail mounting bolts to 11 N·m (100 in. lbs.) torque.

(5) Install intake manifold plenum. Refer to the Engine section for information.

(6) Connect negative cable to battery.

FUEL RAIL—3.2/3.5L ENGINE

REMOVAL

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING FUEL RAIL. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE.

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.

(2) Disconnect the negative battery cable.

(3) Remove intake manifold plenum. Refer to the Engine section for information.

(4) Remove intake manifold plenum mounting bolts. Lift Plenum up off of engine. Cover intake manifold to prevent foreign material from entering engine.

(5) Disconnect fuel supply tube quick connect fitting at the rear of the fuel rail.

(6) If the injector connectors are not tagged with their cylinder number, tag them to identify the correct cylinder (Fig. 22).

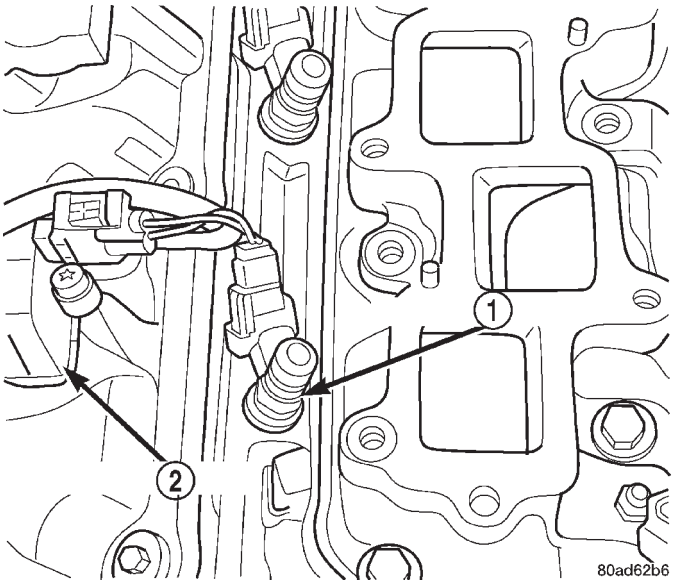


Fig. 22 Injector Electrical Connectors

1 – FUEL INJECTOR
2 – IGNITION COIL

(7) Remove mounting bolts on both sides of fuel rail.

(8) Lift fuel rail straight up off of cylinder head.

(9) Remove retaining clips from fuel injectors at fuel rail.

(10) Remove fuel injector from fuel rail.

INSTALLATION

(1) Lightly lubricate the fuel injector O-rings with a couple drops of clean engine oil.

(2) Install retaining clips on fuel injectors.

(3) Push injectors into fuel injector rail until clips are in the correct position.

(4) Position fuel rail over cylinder heads, and push rail into place. Tighten fuel rail mounting bolts to 11 N·m (100 in. lbs.) torque.

(5) Install intake manifold plenum. Refer to the Engine section for information.

(6) Connect negative cable to battery.

FUEL INJECTORS—2.7L ENGINE

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING FUEL RAIL. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE.

REMOVAL

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.

(2) Disconnect negative cable to battery.

(3) Remove intake manifold plenum. Refer to the Engine section for information.

(4) Remove intake manifold plenum mounting bolts. Lift Plenum up off of engine. Cover intake manifold to prevent foreign material from entering engine.

(5) Disconnect fuel supply tube quick connect fittings at the rear of intake manifold. Refer to Quick Connect Fittings in the Fuel Delivery Section.

(6) If the injector connectors are not tagged with their cylinder number, tag them to identify the correct cylinder

(7) Remove electrical connectors from the fuel injectors.

(8) Remove fuel rail mounting bolts.

(9) Lift fuel rail straight up off of the cylinder head.

(10) Remove retaining clips from fuel injectors at fuel rail.

(11) Remove fuel injectors.

INSTALLATION

(1) Lightly lubricate the fuel injector O-rings with a couple drops of clean engine oil.

REMOVAL AND INSTALLATION (Continued)

(2) Install fuel injectors.
(3) Install retaining clips on fuel injectors.
(4) Push injectors into fuel injector rail until clips are in the correct position.
(5) Position fuel rail over cylinder head, and push rail into place. Tighten fuel rail mounting bolts to 11 N·m (100 in. lbs.) torque.
(6) Connect fuel supply tube quick connect fittings at the rear of intake manifold. Refer to Quick Connect Fittings in the Fuel Delivery Section.
(7) Connect electrical connectors to fuel injectors.
(8) Install intake manifold plenum. Refer to the Engine section for information.
(9) Connect negative cable to battery.

FUEL INJECTORS—3.2/3.5L ENGINE

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING FUEL RAIL. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE.

REMOVAL

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.
(2) Disconnect the negative battery cable.
(3) Remove intake manifold plenum. Refer to the Engine section for information.
(4) Remove intake manifold plenum mounting bolts. Lift Plenum up off of engine. Cover intake manifold to prevent foreign material from entering engine.
(5) Disconnect fuel supply tube quick connect fittings at the rear of intake manifold. Refer to Quick Connect Fittings in the Fuel Delivery Section.
(6) If the injector connectors are not tagged with their cylinder number, tag them to identify the correct cylinder (Fig. 22).
(7) Remove electrical connectors from the fuel injectors.
(8) Remove mounting bolts on both sides of fuel rail.
(9) Lift fuel rail straight up off of cylinder head.
(10) Remove retaining clips from fuel injectors at fuel rail.
(11) Remove fuel injectors.

INSTALLATION

(1) Lightly lubricate the fuel injector O-rings with a couple drops of clean engine oil.
(2) Install retaining clips on fuel injectors.
(3) Push injectors into fuel injector rail until clips are in the correct position.
(4) Position fuel rail over cylinder head, and push rail into place. Tighten fuel rail mounting bolts to 11 N·m (100 in. lbs.) torque.
(5) Connect fuel supply tube quick connect fittings at the rear of intake manifold. Refer to Quick Connect Fittings in the Fuel Delivery Section.
(6) Connect electrical connectors to fuel injectors.
(7) Install intake manifold plenum. Refer to the Engine section for information.
(8) Connect the battery cable.

FUEL TANK

REMOVAL

(1) Release fuel pressure, Refer to Fuel System Pressure Release Procedure.
(2) Remove rear seat.
(3) Disconnect fuel pump electrical connector (Fig. 23).

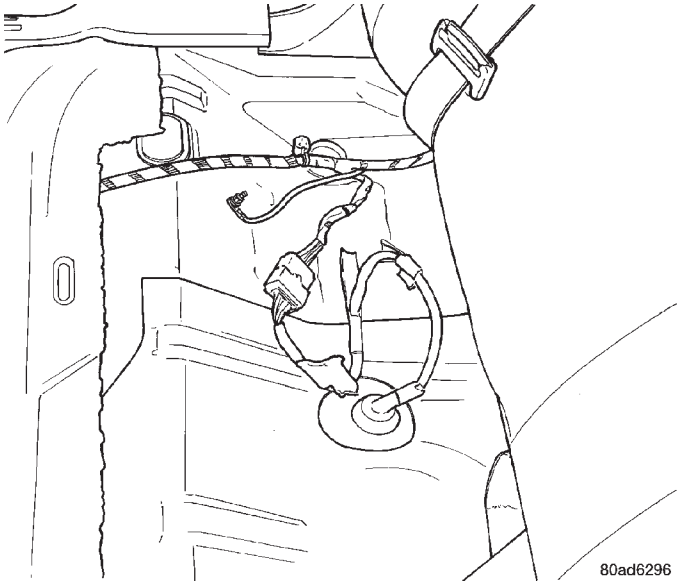


Fig. 23 Electrical Connector

(4) Disconnect battery cable (Fig. 24).
(5) Raise vehicle and support.
(6) Drain fuel tank, refer to Draining Fuel Tank (Fig. 25).
(7) Loosen the rear stabilizer bar brackets from body. Swing stabilizer bar toward rear of vehicle (Fig. 26) and (Fig. 27).
(8) Loosen and remove fuel filler tube from fuel tank (Fig. 28).
(9) Disconnect fuel and EVAP lines (Fig. 29).
(10) Position transmission jack under fuel tank assembly.
(11) Remove fuel tank straps bolts. Passenger side first.
(12) Lower fuel tank and remove the purge line and vent line.

REMOVAL AND INSTALLATION (Continued)

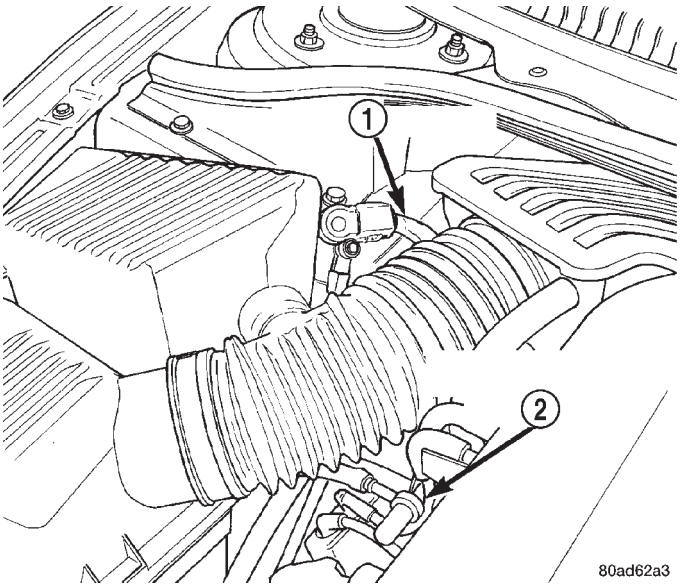


Fig. 24 Battery Cable

1 – BATTERY CABLE
2 – SERVICE VACUUM SUPPLY TEE

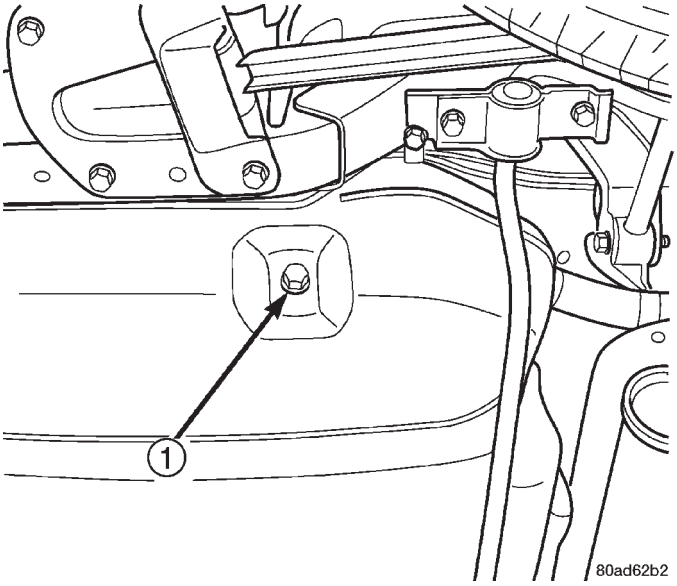


Fig. 25 Fuel Tank Drain

1 – FUEL TANK DRAIN

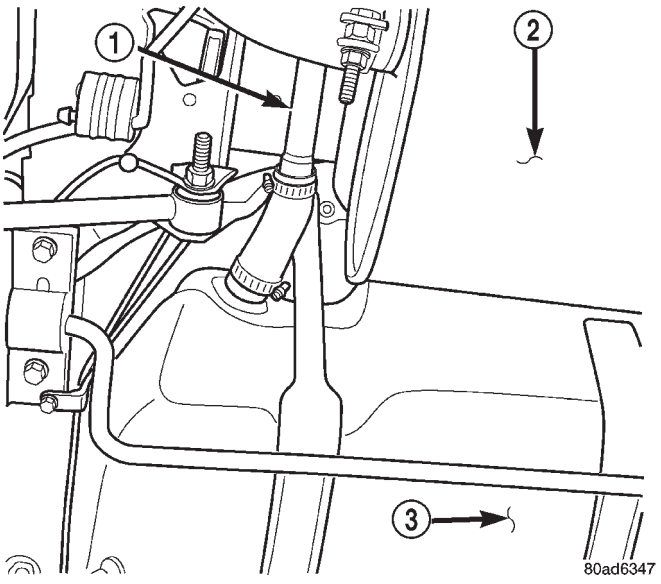


Fig. 26 Stabilizer Bar

1 – FILLER TUBE
2 – MUFFLER
3 – FUEL TANK

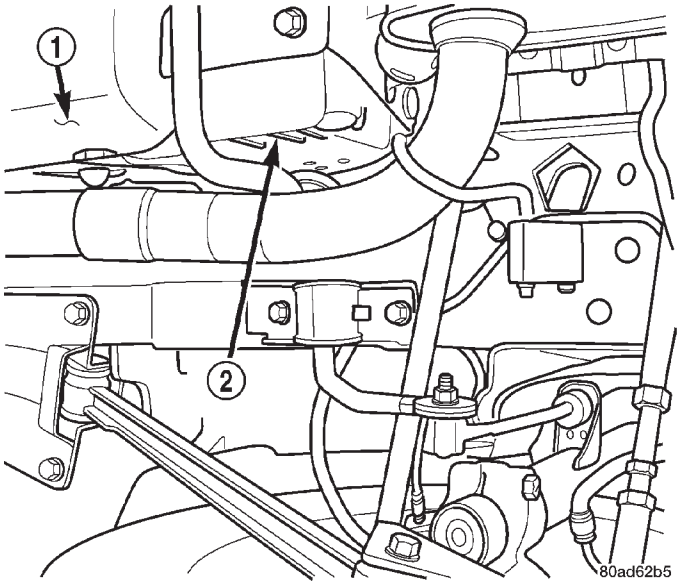


Fig. 27 Stabilizer Bar and EVAP Canister

1 – FUEL TANK
2 – EVAP CANISTER

INSTALLATION

(1) Raise the fuel tank on the transmission stand.
(2) Install fuel pump electrical connector into hole in the body.
(3) Connect the purge and vent lines.
(4) Raise tank into position and install tank straps.
(5) Install the fuel filler tube and tighten the clamp.
(6) Reposition the stabilizer bar and install bolts.
(7) Lower vehicle.
(8) Connect the fuel pump electrical connector that is in the rear seat.
(9) Install the rear seat.
(10) Connect the battery cable.
(11) Fill fuel tank. Use the DRB scan tool to pressurize the fuel system. Check for leaks.

REMOVAL AND INSTALLATION (Continued)

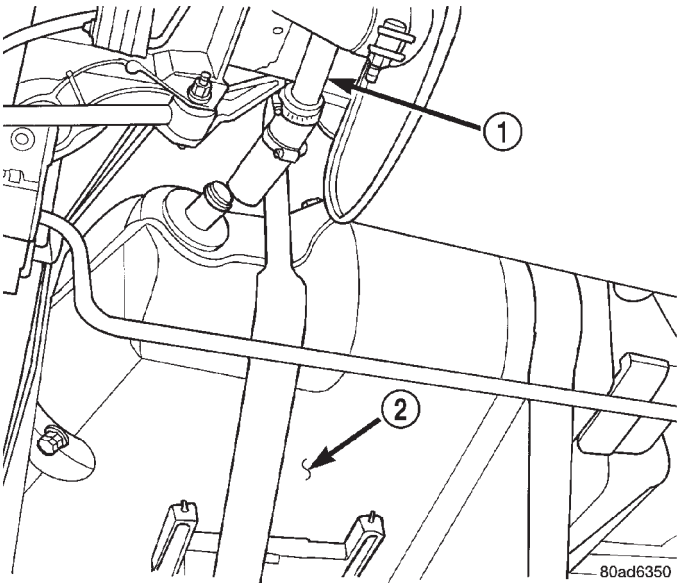


Fig. 28 Fuel Filler Tube

1 – FUEL FILLER TUBE
2 – FUEL TANK

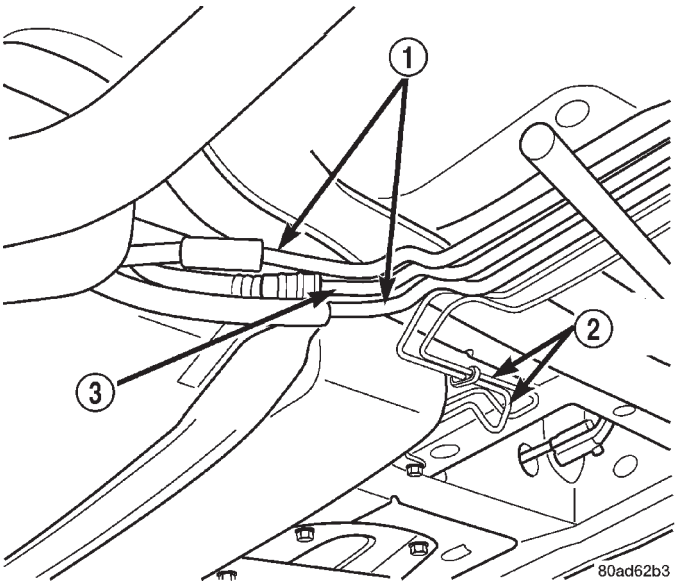


Fig. 29 Fuel and EVAP Lines

1 – EVAP LINES
2 – BRAKE LINES
3 – FUEL LINE

FUEL FILLER NECK

REMOVAL

(1) Disconnect negative cable from battery.
(2) Drain fuel tank.
(3) Remove 3 screws from filler neck to quarter panel.
(4) Raise and support vehicle on host.
(5) Loosen clamps at filler neck.
(6) Remove filler neck.

INSTALLATION

(1) Install filler neck to filler hose.
(2) Tighten clamps.
(3) Lower vehicle.
(4) Install 3 screws to filler neck and quarter panel.
(5) Fill tank and check for leaks.
(6) Connect negative cable from battery.

FUEL FILLER VENT HOSE

REMOVAL

(1) Perform fuel system pressure release.
(2) Disconnect negative cable from battery.
(3) Drain fuel tank.
(4) Raise and support vehicle on host.
(5) Lower fuel tank, refer to Fuel Tank Removal/ Installation in this section.
(6) Remove vent hose from top of tank.
(7) Remove vent hose from fuel filler neck.

INSTALLATION

(1) Install vent hose and tighten clamp.
(2) Install fuel tank, refer to Fuel Tank Removal/ Installation in this section.
(3) Install vent hose to fuel filler neck and tighten clamp.
(4) Lower vehicle.
(5) Fill fuel tank and check for leaks.
(6) Connect negative cable to battery.

ACCELERATOR PEDAL

REMOVAL

(1) Working from the engine compartment, hold the throttle body throttle lever in the wide open position. Remove the throttle cable from the throttle body cam.
(2) From inside the vehicle, hold up the pedal and remove the cable retainer and throttle cable from the upper end of the pedal shaft (Fig. 30) and (Fig. 31).
(3) Working from the passenger compartment, remove nuts from accelerator pedal base (Fig. 32). Remove pedal and base from vehicle.

INSTALLATION

(1) Position accelerator pedal assembly over studs onto dash panel. Ensure carpet and insulation are trapped between the lip of the pedal base and the floor plan (Fig. 33). Install mounting nuts and tighten to 12 N·m (105 in. lbs.) torque.
(2) From inside the vehicle, hold up the pedal and install the throttle cable and cable retainer in the upper end of the pedal shaft.

REMOVAL AND INSTALLATION (Continued)

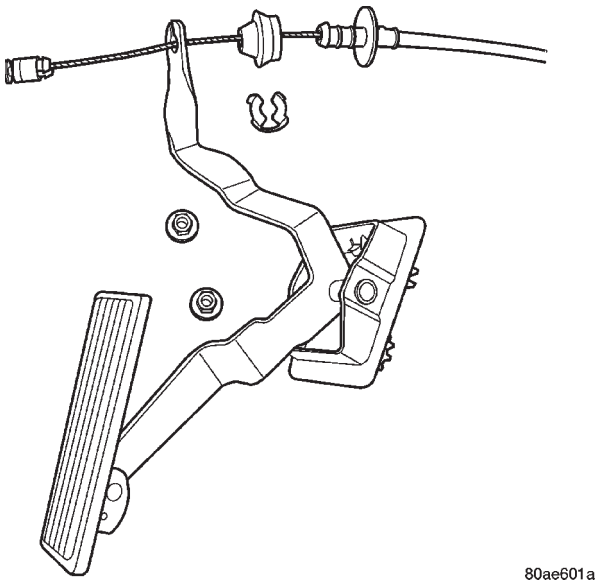


Fig. 30 Accelerator Pedal and Throttle Cable

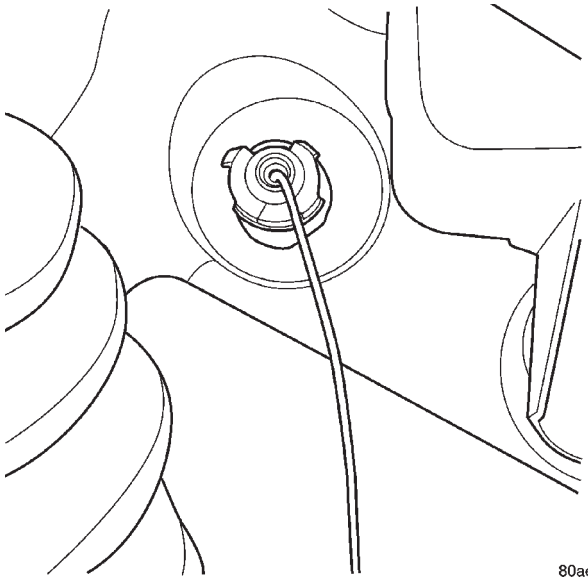


Fig. 31 Retainer Clip

(3) From the engine compartment, hold the throttle body lever in the wide open position and install the throttle cable.

THROTTLE CABLE

CAUTION: When servicing the accelerator pedal, throttle cable or speed control cable, do not damage or kink the core wire inside the cable sheathing.

REMOVAL

(1) Working from the engine compartment, hold the throttle body throttle lever in the wide open position. Pull the cable forward and slide it out of the throttle body cam.

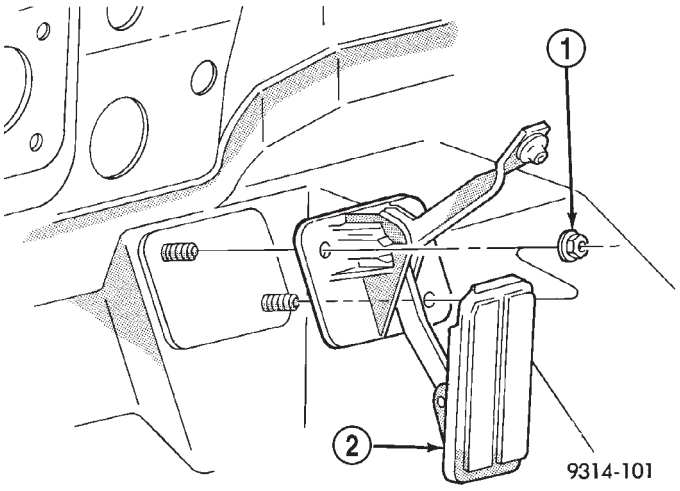


Fig. 32 Accelerator Pedal Removal/Installation

1 – MOUNTING NUTS
2 – ACCELERATOR PEDAL

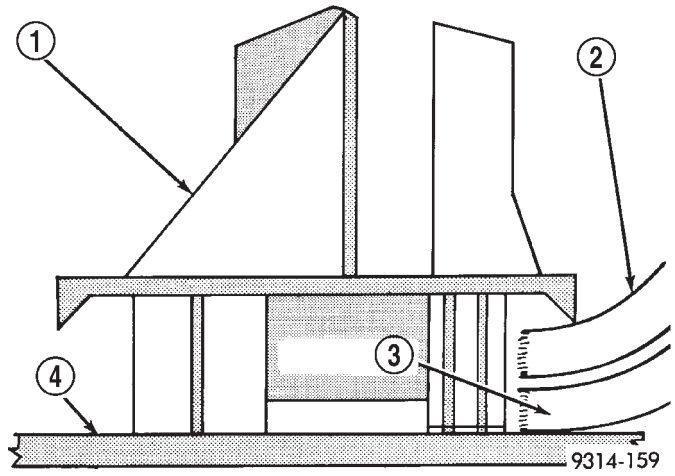


Fig. 33 Carpet and Insulation Placement

1 – PEDAL BASE
2 – CARPET
3 – INSULATION
4 – FLOOR PAN

(2) From inside the vehicle, hold up the pedal and remove the cable retainer and throttle cable from the upper end of the pedal shaft (Fig. 30).

(3) Remove retainer clip from throttle cable and grommet at dash panel (Fig. 31).

(4) From the engine compartment, pull the throttle cable out of the dash panel grommet. The grommet should remain in the dash panel.

(5) Remove the throttle cable from throttle bracket by carefully compressing both retaining ears simultaneously. Then gently pull the throttle cable from throttle bracket.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) From the engine compartment, push the housing end fitting into the dash panel grommet.

(2) Install the cable housing (throttle body end) into the cable mounting bracket on the engine.

(3) From inside the vehicle, hold up the pedal and install throttle cable and cable retainer in the upper end of the pedal shaft (Fig. 30).

(4) At the dash panel, install the cable retainer clip between the end of the throttle cable fitting and grommet (Fig. 31).

(5) From the engine compartment, rotate the throttle lever to wide open and install the throttle cable.

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
Accelerator Pedal to Dash Nuts	12 N·m (105 in. lbs.)
Fuel Pump Module Locknut	55 N·m (40 ft. lbs.)
Fuel Tank strap Bolts	60 N·m (44 ft. lbs.)
Fuel Rail Bolts—2.7L	12 N·m (106 in. lbs.)
Fuel Rail Bolts—3.2L	28 N·m (250 in. lbs.)
Fuel Rail Bolts—3.5L	28 N·m (250 in. lbs.)
Hose Clamps	3 N·m (25 in. lbs.)

FUEL SYSTEM PRESSURE

400 kpa ±34 kpa (58 psi ± 5 psi)

FUEL TANK CAPACITY

Vehicle	Liters	U. S. Gallons
LH	64	17
Nominal refill capacities are shown. A variation may be observed from vehicle to vehicle due to manufacturing tolerance and refill procedure.		

FUEL REQUIREMENTS

Your engine is designed to meet all emissions regulations and provide excellent fuel economy and performance when using high quality unleaded gasoline having an octane rating of 87. The use of premium gasoline is not recommended. The use of premium gasoline will provide no benefit over high quality regular gasoline, and in some circumstances may result in poorer performance.

Light spark knock at low engine speeds is not harmful to your engine. However, continued heavy spark knock at high speeds can cause damage and immediate service is required. Engine damage resulting from operation with a heavy spark knock may not be covered by the new vehicle warranty.

Poor quality gasoline can cause problems such as hard starting, stalling and hesitations. If you experience these symptoms, try another brand of gasoline before considering service for the vehicle.

Over 40 auto manufacturers world-wide have issued and endorsed consistent gasoline specifications (the Worldwide Fuel Charter, WWFC) to define fuel properties necessary to deliver enhanced emissions, performance and durability for your vehicle. We recommend the use of gasolines that meet the WWFC specifications if they are available.

REFORMULATED GASOLINE

Many areas of the country require the use of cleaner burning gasoline referred to as “reformulated” gasoline. Reformulated gasoline contain oxygenates, and are specifically blended to reduce vehicle emissions and improve air quality.

We strongly supports the use of reformulated gasoline. Properly blended reformulated gasoline will provide excellent performance and durability for the engine and fuel system components.

GASOLINE/OXYGENATE BLENDS

Some fuel suppliers blend unleaded gasoline with oxygenates such as 10% ethanol, MTBE, and ETBE. Oxygenates are required in some areas of the country during the winter months to reduce carbon monoxide emissions. Fuels blended with these oxygenates may be used in your vehicle.

CAUTION: DO NOT use gasoline containing METHANOL. Gasoline containing methanol may damage critical fuel system components.

MMT IN GASOLINE

MMT is a manganese-containing metallic additive that is blended into some gasoline to increase octane. Gasoline blended with MMT provide no performance advantage beyond gasoline of the same octane number without MMT. Gasoline blended with MMT reduce spark plug life and reduce emission system performance in some vehicles. We recommend that gasolines free of MMT be used in your vehicle. The MMT content of gasoline may not be indicated on the gasoline pump; therefore, you should ask your gasoline retailer whether or not his/her gasoline contains MMT.

It is even more important to look for gasoline without MMT in Canada because MMT can be used at levels higher than allowed in the United States. MMT is prohibited in Federal and California reformulated gasoline.

SPECIFICATIONS (Continued)

SULFUR IN GASOLINE

If you live in the northeast United States, your vehicle may have been designed to meet California low emission standards with Cleaner-Burning California reformulated gasoline with low sulfur. If such fuels are not available in states adopting California emission standards, your vehicles will operate satisfactorily on fuels meeting federal specifications, but emission control system performance may be adversely affected. Gasoline sold outside of California is permitted to have higher sulfur levels which may affect the performance of the vehicle's catalytic converter. This may cause the Malfunction Indicator Lamp (MIL), Check Engine or Service Engine Soon light to illuminate. We recommend that you try a different brand of unleaded gasoline having lower sulfur to determine if the problem is fuel related prior to returning your vehicle to an authorized dealer for service.

CAUTION: If the Malfunction Indicator Lamp (MIL), Check Engine or Service Engine Soon light is flashing, immediate service is required; see on-board diagnostics system section.

MATERIALS ADDED TO FUEL

All gasoline sold in the United States and Canada are required to contain effective detergent additives. Use of additional detergents or other additives is not needed under normal conditions.

FUEL SYSTEM CAUTIONS

CAUTION: Follow these guidelines to maintain your vehicle's performance:

- The use of leaded gas is prohibited by Federal law. Using leaded gasoline can impair engine performance, damage the emission control system, and could result in loss of warranty coverage.
- An out-of-tune engine, or certain fuel or ignition malfunctions, can cause the catalytic converter to overheat. If you notice a pungent burning odor or some light smoke, your engine may be out of tune or malfunctioning and may require immediate service. Contact your dealer for service assistance.
- When pulling a heavy load or driving a fully loaded vehicle when the humidity is low and the temperature is high, use a premium unleaded fuel to help prevent spark knock. If spark knock persists, lighten the load, or engine piston damage may result.
- The use of fuel additives which are now being sold as octane enhancers is not recommended. Most of these products contain high concentrations of methanol. Fuel system damage or vehicle performance problems resulting from the use of such fuels or additives is not the responsibility of Daimler-Chrysler Corporation and may not be covered under the new vehicle warranty.

NOTE: Intentional tampering with emissions control systems can result in civil penalties being assessed against you.

FUEL INJECTION SYSTEM

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DESCRIPTION AND OPERATION

INJECTION SYSTEM

OPERATION

All engines used in this section have a sequential Multi-Port Electronic Fuel Injection system. The MPI system is computer regulated and provides precise air/fuel ratios for all driving conditions. The Powertrain Control Module (PCM) operates the fuel injection system.

The PCM regulates:
- Ignition timing
- Air/fuel ratio
- Emission control devices
- Cooling fan
- Charging system
- Idle speed
- Vehicle speed control

DESCRIPTION AND OPERATION (Continued)

Various sensors provide the inputs necessary for the PCM to correctly operate these systems. In addition to the sensors, various switches also provide inputs to the PCM.

The PCM can adapt its programming to meet changing operating conditions.

Fuel is injected into the intake port above the intake valve in precise metered amounts through electrically operated injectors. The PCM fires the injectors in a specific sequence. Under most operating conditions, the PCM maintains an air fuel ratio of 14.7 parts air to 1 part fuel by constantly adjusting injector pulse width. Injector pulse width is the length of time the injector is open.

The PCM adjusts injector pulse width by opening and closing the ground path to the injector. Engine RPM (speed) and manifold absolute pressure (air density) are the primary inputs that determine injector pulse width.

PCM REPLACEMENT

DESCRIPTION

USE THE DRB SCAN TOOL TO REPROGRAM THE NEW PCM WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

MODES OF OPERATION

OPERATION

As input signals to the PCM change, the PCM adjusts its response to output devices. For example, the PCM must calculate a different injector pulse width and ignition timing for idle than it does for Wide Open Throttle (WOT). There are several different modes of operation that determine how the PCM responds to the various input signals.

There are two different areas of operation, OPEN LOOP and CLOSED LOOP.

During OPEN LOOP modes the PCM receives input signals and responds according to preset PCM programming. Inputs from the upstream and downstream heated oxygen sensors are not monitored during OPEN LOOP modes, except for heated oxygen sensor diagnostics (they are checked for shorted conditions at all times).

During CLOSED LOOP modes the PCM monitors the inputs from the upstream and downstream heated oxygen sensors. The upstream heated oxygen sensor input tells the PCM if the calculated injector pulse width resulted in the ideal air-fuel ratio of 14.7 to one. By monitoring the exhaust oxygen content through the upstream heated oxygen sensor, the PCM can fine tune injector pulse width. Fine tuning injector pulse width allows the PCM to achieve optimum fuel economy combined with low emissions.

For the PCM to enter CLOSED LOOP operation, the following must occur:

(1) Engine coolant temperature must be over 35°F.

- If the coolant is over 35° the PCM will wait 44 seconds.
- If the coolant is over 50°F the PCM will wait 38 seconds.
- If the coolant is over 167°F the PCM will wait 11 seconds.

(2) For other temperatures the PCM will interpolate the correct waiting time.

(3) O2 sensor must read either greater than 0.745 volts or less than 0.1 volt.

(4) The multi-port fuel injection systems has the following modes of operation:

- Ignition switch ON (Zero RPM)
- Engine start-up
- Engine warm-up
- Cruise
- Idle
- Acceleration
- Deceleration
- Wide Open Throttle
- Ignition switch OFF

(5) The engine start-up (crank), engine warm-up, deceleration with fuel shutoff and wide open throttle modes are OPEN LOOP modes. Under most operating conditions, the acceleration, deceleration (with A/C on), idle and cruise modes, **with the engine at operating temperature** are CLOSED LOOP modes.

IGNITION SWITCH ON (ZERO RPM) MODE

When the ignition switch activates the fuel injection system, the following actions occur:

- The PCM monitors the engine coolant temperature sensor and throttle position sensor input. The PCM determines basic fuel injector pulse width from this input.
- The PCM determines atmospheric air pressure from the MAP sensor input to modify injector pulse width.

When the key is in the ON position and the engine is not running (zero rpm), the Auto Shutdown (ASD) and fuel pump relays de-energize after approximately 1 second. Therefore, battery voltage is not supplied to the fuel pump, ignition coil, fuel injectors and heated oxygen sensors.

ENGINE START-UP MODE

This is an OPEN LOOP mode. If the vehicle is in park or neutral (automatic transaxles) or the clutch pedal is depressed (manual transaxles) the ignition

DESCRIPTION AND OPERATION (Continued)

switch energizes the starter relay. The following actions occur when the starter motor is engaged.

- If the PCM receives the camshaft position sensor and crankshaft position sensor signals, it energizes the Auto Shutdown (ASD) relay and fuel pump relay. If the PCM does not receive both signals within approximately one second, it will not energize the ASD relay and fuel pump relay. The ASD and fuel pump relays supply battery voltage to the fuel pump, fuel injectors, ignition coil and heated oxygen sensors.
- The PCM energizes the injectors (on the 69° degree falling edge) for a calculated pulse width until it determines crankshaft position from the camshaft position sensor and crankshaft position sensor signals. The PCM determines crankshaft position within 1 engine revolution.
- After determining crankshaft position, the PCM begins energizing the injectors in sequence. It adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.
- When the engine idles within ±64 RPM of its target RPM, the PCM compares current MAP sensor value with the atmospheric pressure value received during the Ignition Switch On (zero RPM) mode.

Once the ASD and fuel pump relays have been energized, the PCM determines injector pulse width based on the following:

- Battery voltage
- Engine coolant temperature
- Engine RPM
- Inlet/Intake air temperature (IAT)
- MAP
- Throttle position
- The number of engine revolutions since cranking was initiated

During Start-up the PCM maintains ignition timing at 9° BTDC.

ENGINE WARM-UP MODE

This is an OPEN LOOP mode. The following inputs are received by the PCM:

- Engine coolant temperature
- Manifold Absolute Pressure (MAP)
- Inlet/Intake air temperature (IAT)
- Crankshaft position (engine speed)
- Camshaft position
- Knock sensor
- Throttle position
- A/C switch
- Battery voltage
- Vehicle speed
- Speed control
- O2 sensors

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts ignition timing and engine idle speed. Engine idle speed is adjusted through the idle air control motor.

CRUISE OR IDLE MODE

When the engine is at operating temperature this is a CLOSED LOOP mode. During cruising or idle the following inputs are received by the PCM:

- Inlet/Intake air temperature
- Engine coolant temperature
- Manifold absolute pressure
- Crankshaft position (engine speed)
- Camshaft position
- Knock sensor
- Throttle position
- Exhaust gas oxygen content
- A/C control positions
- Battery voltage
- Vehicle speed

The PCM adjusts injector pulse width and controls injector synchronization by turning the individual ground paths to the injectors On and Off.

The PCM adjusts engine idle speed and ignition timing. The PCM adjusts the air/fuel ratio according to the oxygen content in the exhaust gas (measured by the upstream and downstream heated oxygen sensor).

The PCM monitors for engine misfire. During active misfire and depending on the severity, the PCM either continuously illuminates or flashes the malfunction indicator lamp (Check Engine light on instrument panel). Also, the PCM stores an engine misfire DTC in memory.

The PCM performs several diagnostic routines. They include:

- Oxygen sensor monitor
- Downstream heated oxygen sensor diagnostics during open loop operation (except for shorted)
- Fuel system monitor
- EGR monitor
- Purge system monitor
- All inputs monitored for proper voltage range.
- All monitored components (refer to the Emission section for On-Board Diagnostics).

The PCM compares the upstream and downstream heated oxygen sensor inputs to measure catalytic convertor efficiency. If the catalyst efficiency drops below the minimum acceptable percentage, the PCM stores a diagnostic trouble code in memory.

During certain idle conditions, the PCM may enter a variable idle speed strategy. During variable idle speed strategy the PCM adjusts engine speed based on the following inputs.

DESCRIPTION AND OPERATION (Continued)

- A/C sense
- Battery voltage
- Battery temperature
- Engine coolant temperature
- Engine run time
- Inlet/Intake air temperature
- Vehicle mileage

ACCELERATION MODE

This is a CLOSED LOOP mode. The PCM recognizes an abrupt increase in Throttle Position sensor output voltage or MAP sensor output voltage as a demand for increased engine output and vehicle acceleration. The PCM increases injector pulse width in response to increased fuel demand.

DECELERATION MODE

This is a CLOSED LOOP mode. During deceleration the following inputs are received by the PCM:

- A/C sense
- Battery voltage
- Inlet/Intake air temperature
- Engine coolant temperature
- Crankshaft position (engine speed)
- Exhaust gas oxygen content (upstream heated oxygen sensor)
- Knock sensor
- Manifold absolute pressure
- Throttle position
- IAC motor control changes in response to MAP sensor feedback

The PCM may receive a closed throttle input from the Throttle Position Sensor (TPS) when it senses an abrupt decrease in manifold pressure. This indicates a hard deceleration. In response, the PCM may momentarily turn off the injectors. This helps improve fuel economy, emissions and engine braking.

WIDE-OPEN-THROTTLE MODE

This is an OPEN LOOP mode. During wide-open-throttle operation, the following inputs are used by the PCM:

- Inlet/Intake air temperature
- Engine coolant temperature
- Engine speed
- Knock sensor
- Manifold absolute pressure
- Throttle position

When the PCM senses a wide-open-throttle condition through the Throttle Position Sensor (TPS) it de-energizes the A/C compressor clutch relay. This disables the air conditioning system.

The PCM does not monitor the heated oxygen sensor inputs during wide-open-throttle operation except for downstream heated oxygen sensor and both shorted diagnostics. The PCM adjusts injector pulse width to supply a predetermined amount of additional fuel.

IGNITION SWITCH OFF MODE

When the operator turns the ignition switch to the OFF position, the following occurs:

- All outputs are turned off, unless 02 Heater Monitor test is being run. Refer to the Emission section for On-Board Diagnostics.
- No inputs are monitored except for the heated oxygen sensors. The PCM monitors the heating elements in the oxygen sensors and then shuts down.

SYSTEM DIAGNOSIS

OPERATION

The PCM can test many of its own input and output circuits. If the PCM senses a fault in a major system, the PCM stores a Diagnostic Trouble Code (DTC) in memory.

For DTC information see On-Board Diagnostics.

PROGRAMMABLE COMMUNICATIONS INTERFACE (PCI) BUS

DESCRIPTION

The Programmable Communication Interface Multiplex system (PCI Bus) consist of a single wire. The Body Control Module (BCM) acts as a splice to connect each module and the Data Link Connector (DLC) together. Each module is wired in parallel to the data bus through its PCI chip set and uses its ground as the bus referance. The wiring is a minimum 20 gage wire.

OPERATION

Various modules exchange information through a communications port called the PCI Bus. The Powertrain Control Module (PCM) transmits the Malfunction Indicator Lamp (Check Engine) On/Off signal and engine RPM on the PCI Bus. The PCM receives the Air Conditioning select input, transaxle gear position inputs over the PCI Bus. The PCM also receives the air conditioning evaporator temperature signal from the PCI Bus.

The following components access or send information on the PCI Bus.

- Instrument Panel
- Body Control Module
- Air Bag System Diagnostic Module
- Full ATC Display Head
- ABS Module
- Transmission Control Module
- Powertrain Control Module
- Overhead Travel Module

DESCRIPTION AND OPERATION (Continued)

PCM GROUND

OPERATION

Ground is provided through multiple pins of the PCM connector. Depending on the vehicle there may be as many as three different ground pins. There are power grounds and sensor grounds.

The power grounds are used to control the ground side of any relay, solenoid, ignition coil or injector. The signal ground is used for any input that uses sensor return for ground, and the ground side of any internal processing component.

The SBEC III case is shielded to prevent RFI and EMI. The PCM case is grounded and must be firmly attached to a good, clean body ground.

Internally all grounds are connected together, however there is noise suppression on the sensor ground. For EMI and RFI protection the case is also grounded separately from the ground pins.

FUEL CORRECTION or ADAPTIVE MEMORIES

DESCRIPTION

In Open Loop, the PCM changes pulse width without feedback from the O2 Sensors. Once the engine warms up to approximately 30 to 35° F, the PCM goes into closed loop **Short Term Correction** and utilizes feedback from the O2 Sensors. Closed loop **Long Term Adaptive Memory** is maintained above 170° to 190° F unless the PCM senses wide open throttle. At that time the PCM returns to Open Loop operation.

OPERATION

Short Term

The first fuel correction program that begins functioning is the short term fuel correction. This system corrects fuel delivery in direct proportion to the readings from the Upstream O2 Sensor.

The PCM monitors the air/fuel ratio by using the input voltage from the O2 Sensor. When the voltage reaches its preset high or low limit, the PCM begins to add or remove fuel until the sensor reaches its switch point. The short term corrections then begin.

The PCM makes a series of quick changes in the injector pulse-width until the O2 Sensor reaches its opposite preset limit or switch point. The process then repeats itself in the opposite direction.

Short term fuel correction will keep increasing or decreasing injector pulse-width based upon the upstream O2 Sensor input. The maximum range of authority for short term memory is 25% (+/-) of base pulse-width.

Long Term

The second fuel correction program is the long term adaptive memory. In order to maintain correct emission throughout all operating ranges of the engine, a cell structure based on engine rpm and load (MAP) is used.

There number of cells varies upon the driving conditions. Two cells are used only during idle, based upon TPS and Park/Neutral switch inputs. There may be two other cells used for deceleration, based on TPS, engine rpm, and vehicle speed. The other twelve cells represent a manifold pressure and an rpm range. Six of the cells are high rpm and the other six are low rpm. Each of these cells is a specific MAP voltage range.

As the engine enters one of these cells the PCM looks at the amount of short term correction being used. Because the goal is to keep short term at 0 (O2 Sensor switching at 0.5 volt), long term will update in the same direction as short term correction was moving to bring the short term back to 0. Once short term is back at 0, this long term correction factor is stored in memory.

The values stored in long term adaptive memory are used for all operating conditions, including open loop. However, the updating of the long term memory occurs after the engine has exceeded approximately 17° F, with fuel control in closed loop and two minutes of engine run time. This is done to prevent any transitional temperature or start-up compensations from corrupting long term fuel correction.

Long term adaptive memory can change the pulse-width by as much as 25%, which means it can correct for all of short term. It is possible to have a problem that would drive long term to 25% and short term to another 25% for a total change of 50% away from base pulse-width calculation.

DESCRIPTION AND OPERATION (Continued)

TYPICAL ADAPTIVE MEMORY FUEL CELLS

	Open Throttle	Open Throttle	Open Throttle	Open Throttle	Open Throttle	Open Throttle	Idle	Decel
Vacuum	20	17	13	9	5	0		
Above 1,984 rpm	1	3	5	7	9	11	13 Drive	15
Below 1,984 rpm	0	2	4	6	8	10	12 Neutral	14
MAP volt =	0	1.4	2.0	2.6	3.3	3.9		

Fuel Correction Diagnostics

There are two fuel correction diagnostic routines:

- Fuel System Rich
- Fuel System Lean

A DTC is set and the MIL is illuminated if the PCM detects either of these conditions.

POWERTRAIN CONTROL MODULE

OPERATION

The Powertrain Control Module (PCM) is a digital computer containing a microprocessor (Fig. 1). The PCM receives input signals from various switches and sensors referred to as Powertrain Control Module Inputs. Based on these inputs, the PCM adjusts various engine and vehicle operations through devices referred to as Powertrain Control Module Outputs.

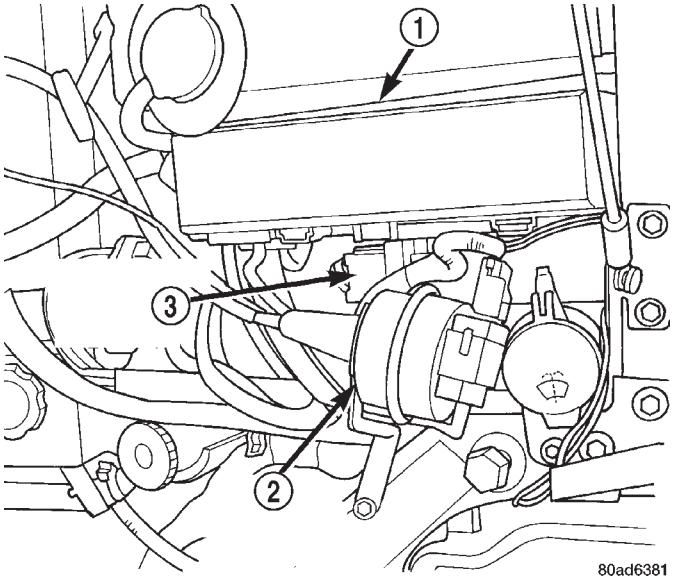


Fig. 1 Powertrain Control Module (PCM)

1 – PDC
2 – SPEED CONTROL SERVO
3 – POWERTRAIN CONTROL MODULE

NOTE: PCM Inputs:

- Air Conditioning Pressure Transducer
- ASD Relay
- Battery Voltage
- Brake Switch
- Camshaft Position Sensor
- Crankshaft Position Sensor
- Distance Sensor (from transmission control module)
- EGR Position Feedback
- Engine Coolant Temperature Sensor
- Heated Oxygen Sensors
- Ignition sense
- Intake Air Temperature Sensor
- Knock Sensor
- Leak Detection Pump Feedback
- Manifold Absolute Pressure (MAP) Sensor
- Park/Neutral (from transmission control module)
- PCI Bus
- Power Steering Pressure Switch
- Proportional Purge Sense
- SCI Receive
- Speed Control
- Throttle Position Sensor
- Torque Management Input (From TCM)
- Transaxle Control Module (TCM)
- Transaxle Gear Engagement (From TCM)
- Vehicle Speed (from transmission control module)

NOTE: PCM Outputs:

- Air Conditioning Clutch Relay
- Automatic Shut Down (ASD) and Fuel Pump Relays
- Data Link Connector (PCI and SCI Transmit)
- Double Start Override
- EGR Solenoid
- Fuel Injectors
- Generator Field
- High Speed Fan Relay
- Idle Air Control Motor
- Ignition Coils

DESCRIPTION AND OPERATION (Continued)

- Leak Detection Pump
- Low Speed Fan Relay
- MTV Actuator
- Proportional Purge Solenoid
- SRV Valve
- Speed Control Relay
- Speed Control Vent Relay
- Speed Control Vacuum Relay
- 8 Volt Output
- 5 Volt Output

Based on inputs it receives, the powertrain control module (PCM) adjusts fuel injector pulse width, idle speed, ignition timing, and canister purge operation. The PCM regulates the cooling fans, air conditioning and speed control systems. The PCM changes generator charge rate by adjusting the generator field.

The PCM adjusts injector pulse width (air-fuel ratio) based on the following inputs.

- Battery Voltage
- Intake Air Temperature Sensor
- Engine Coolant Temperature
- Engine Speed (crankshaft position sensor)
- Exhaust Gas Oxygen Content (heated oxygen sensors)
- Manifold Absolute Pressure
- Throttle Position

The PCM adjusts engine idle speed through the idle air control motor based on the following inputs.

- Brake Switch
- Engine Coolant Temperature
- Engine Speed (crankshaft position sensor)
- Park/Neutral (transmission gear selection)
- Transaxle Gear Engagement
- Throttle Position
- Vehicle Speed (from Transmission Control Module)

The PCM adjusts ignition timing based on the following inputs.

- Intake Air Temperature
- Engine Coolant Temperature
- Engine Speed (crankshaft position sensor)
- Knock Sensor
- Manifold Absolute Pressure
- Park/Neutral (transmission gear selection)
- Transaxle Gear Engagement
- Throttle Position

The automatic shut down (ASD) and fuel pump relays are mounted externally, but turned on and off by the powertrain control module through the same circuit.

The camshaft and crankshaft signals are sent to the powertrain control module. If the PCM does not receive both signals within approximately one second of engine cranking, it deactivates the ASD and fuel pump relays. When these relays are deactivated, power is shut off to the fuel injectors, ignition coils, fuel pump and the heating element in each oxygen sensor.

The PCM contains a voltage converter that changes battery voltage to a regulated 8.0 volts. The 8.0 volts power the camshaft position sensor, crankshaft position sensor and vehicle speed sensor. The PCM also provides a 5.0 volts supply for the engine coolant temperature sensor, intake air temperature sensor, manifold absolute pressure sensor and throttle position sensor.

The PCM engine control strategy prevents reduced idle speeds until after the engine operates for 320 km (200 miles). If the PCM is replaced after 320 km (200 miles) of usage, update the mileage in new PCM. Use the DRB scan tool to change the mileage in the PCM. Refer to the appropriate Powertrain Diagnostic Manual and the DRB scan tool.

AUTOMATIC SHUTDOWN (ASD) SENSE—PCM INPUT

DESCRIPTION

It is an input to the Powertrain Control Module from the rely in the Power Distribution Center, refer to the cover for relay location.

OPERATION

The ASD sense circuit informs the PCM when the ASD relay energizes. A 12 volt signal at this input indicates to the PCM that the ASD has been activated. This input is used only to sense that the ASD relay is energized.

When energized, the ASD relay supplies battery voltage to the fuel injectors, ignition coils and the heating element in each oxygen sensor. If the PCM does not receive 12 volts from this input after grounding the ASD relay, it sets a Diagnostic Trouble Code (DTC).

When energized, the ASD relay provides power to operate the injectors, ignition coil, generator field, O2 sensor heaters (both upstream and downstream), and also provides a sense circuit to the PCM for diagnostic purposes. The PCM energizes the ASD any time there is a Crankshaft Position sensor signal that exceeds a predetermined value. The ASD relay can also be energized after the engine has been turned off to perform an O2 sensor heater test, if vehicle is equipped with OBD II diagnostics.

With SBEC III, the ASD relay's electromagnet is fed battery voltage, not ignition voltage. The PCM still provides the ground. As mentioned earlier, the PCM energizes the ASD relay during an O2 sensor heater test. This test is performed only after the engine has been shut off. The PCM still operates internally to perform several checks, including monitoring the O2 sensor heaters. This and other DTC

DESCRIPTION AND OPERATION (Continued)

tests are explained in detail in the On-Board Diagnostic Student Reference Book.

BATTERY VOLTAGE—PCM INPUT

DESCRIPTION

The direct battery feed to the PCM is used as a reference point to sense battery voltage.

OPERATION

In order for the PCM to operate, it must be supplied with battery voltage and ground. The PCM monitors the direct battery feed input to determine battery charging rate and to control the injector initial opening point. It also has back-up RAM memory used to store Diagnostic Trouble Codes (supply working DTCs). Direct battery feed is also used to perform key-OFF diagnostics and to supply working voltage to the controller for OBDII.

If battery voltage is low the PCM will increase injector pulse width (period of time that the injector is energized).

Effect on Fuel Injectors

Fuel injectors are rated for operation at a specific voltage. If the voltage increases, the plunger will open faster and conversely, if voltage is low the injector will be slow to open. Therefore, if sensed battery voltage drops, the PCM increases injector pulsewidth to maintain the same volume of fuel through the injector.

Charging

The PCM uses sensed battery voltage to verify that target charging voltage (determined by Battery Temperature Sensor) is being reached. To maintain the target charging voltage, the PCM will full field the generator to 0.5 volt above target then turn OFF to 0.5 volt below target. This will continue to occur up to a 100 Hz frequency, 100 times per second.

ENGINE COOLANT TEMPERATURE SENSOR—PCM INPUT

DESCRIPTION

The engine coolant temperature sensor threads into the coolant system (Fig. 2) or (Fig. 3).

OPERATION

The sensor provides an input to the Powertrain Control Module (PCM). As coolant temperature varies, the sensor resistance changes, resulting in a different input voltage to the PCM.

When the engine is cold, the PCM will demand slightly richer air-fuel mixtures and higher idle speeds until normal operating temperatures are reached.

The engine coolant sensor input also determines operation of the low and high speed cooling fans.

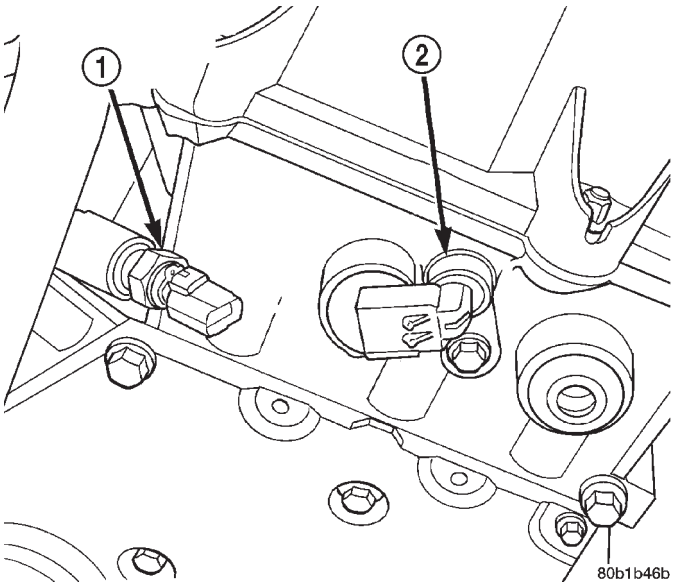


Fig. 2 Engine Coolant Temperature Sensor—2.7L Engine

1 – ENGINE COOLANT TEMPERATURE SENSOR
2 – CAM SENSOR

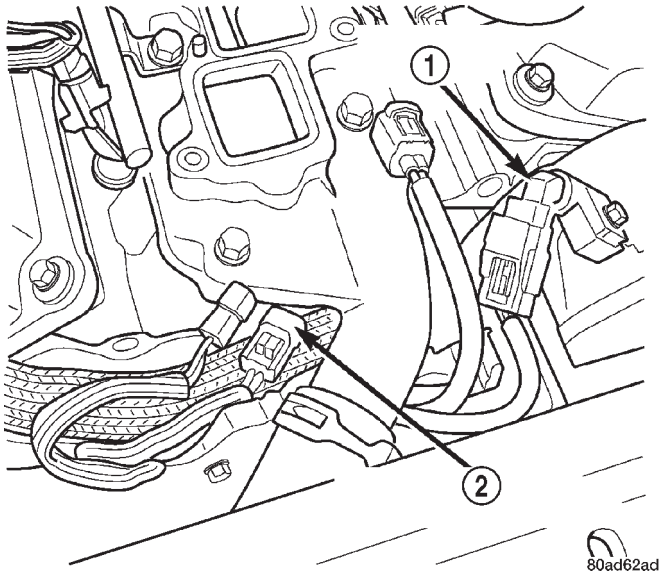


Fig. 3 Engine Coolant Temperature Sensor—3.2/3.5L Engine

1 – CAMSHAFT SENSOR
2 – ENGINE COOLANT TEMPERATURE SENSOR

DESCRIPTION AND OPERATION (Continued)

HEATED OXYGEN SENSOR (O2 SENSOR)— PCM INPUT

DESCRIPTION

The upstream oxygen sensor threads into the outlet flange of the exhaust manifold (Fig. 4) or (Fig. 5).

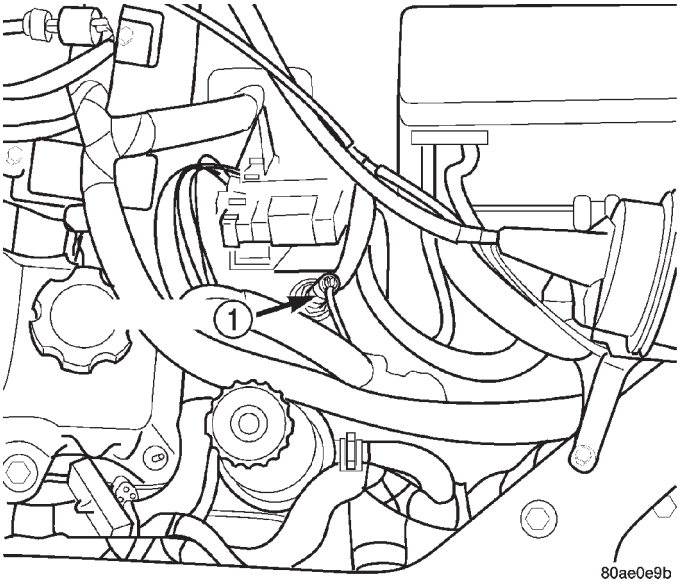


Fig. 4 Upstream Heated Oxygen Sensor 1/1

1 – O2 SENSOR

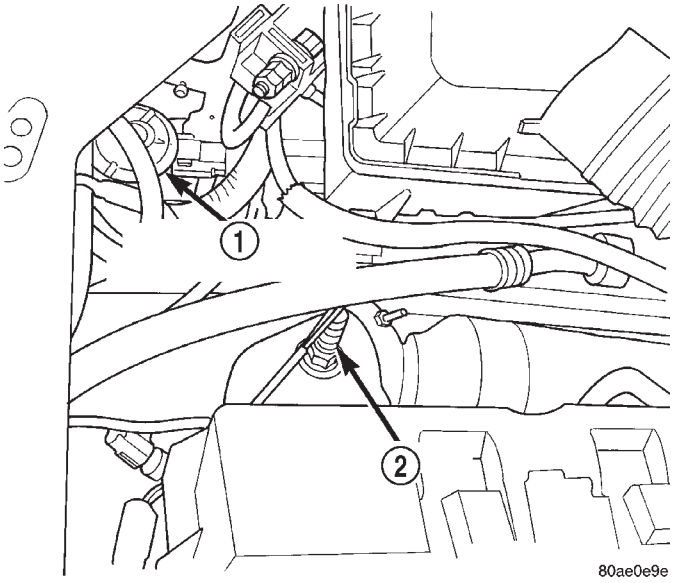


Fig. 5 Upstream Heated Oxygen Sensor 1/1

1 – **PROPORTIONAL PURGE SOLENOID**
2 – **O2 SENSOR**

The downstream heated oxygen sensor threads into the outlet pipe at the rear of the catalytic convertor (Fig. 6).

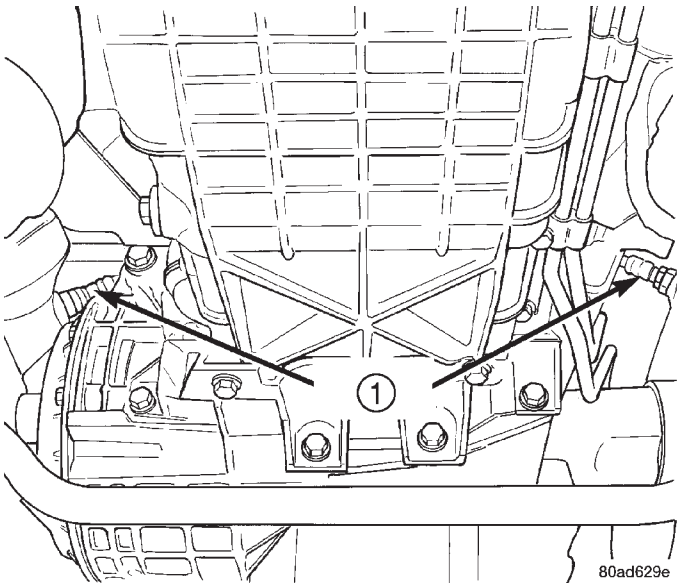


Fig. 6 Downstream Heated Oxygen Sensor 1/2

1 – OXYGEN SENSORS

OPERATION

Separate controlled ground circuits are run through the PCM for the upstream O2 sensors.

As vehicles accumulate mileage, the catalytic convertor deteriorates. The deterioration results in a less efficient catalyst. To monitor catalytic convertor deterioration, the fuel injection system uses two heated oxygen sensors. One sensor upstream of the catalytic convertor, one downstream of the convertor. The PCM compares the reading from the sensors to calculate the catalytic convertor oxygen storage capacity and converter efficiency. Also, the PCM uses the upstream heated oxygen sensor input when adjusting injector pulse width.

When the catalytic converter efficiency drops below emission standards, the PCM stores a diagnostic trouble code and illuminates the malfunction indicator lamp (MIL).

The O2S produce voltages from 0 to 1 volt, depending upon the oxygen content of the exhaust gas in the exhaust manifold. When a large amount of oxygen is present (caused by a lean air/fuel mixture), the sensors produces a low voltage. When there is a lesser amount present (rich air/fuel mixture) it produces a higher voltage. By monitoring the oxygen content and converting it to electrical voltage, the sensors act as a rich-lean switch.

The oxygen sensors are equipped with a heating element that keeps the sensors at proper operating temperature during all operating modes. Maintaining correct sensor temperature at all times allows the system to enter into closed loop operation sooner. Also, it allows the system to remain in closed loop operation during periods of extended idle.

DESCRIPTION AND OPERATION (Continued)

In Closed Loop operation the PCM monitors the O2S input (along with other inputs) and adjusts the injector pulse width accordingly. During Open Loop operation the PCM ignores the O2 sensor input. The PCM adjusts injector pulse width based on preprogrammed (fixed) values and inputs from other sensors.

The Automatic Shutdown (ASD) relay supplies battery voltage to both the upstream and downstream heated oxygen sensors. The oxygen sensors are equipped with a heating element. The heating elements reduce the time required for the sensors to reach operating temperature.

UPSTREAM OXYGEN SENSOR 1/1

The input from the upstream heated oxygen sensor tells the PCM the oxygen content of the exhaust gas. Based on this input, the PCM fine tunes the air-fuel ratio by adjusting injector pulse width.

The sensor input switches from 0 to 1 volt, depending upon the oxygen content of the exhaust gas in the exhaust manifold. When a large amount of oxygen is present (caused by a lean air-fuel mixture), the sensor produces voltage as low as 0.1 volt. When there is a lesser amount of oxygen present (rich air-fuel mixture) the sensor produces a voltage as high as 1.0 volt. By monitoring the oxygen content and converting it to electrical voltage, the sensor acts as a rich-lean switch.

The heating element in the sensor provides heat to the sensor ceramic element. Heating the sensor allows the system to enter into closed loop operation sooner. Also, it allows the system to remain in closed loop operation during periods of extended idle.

In Closed Loop, the PCM adjusts injector pulse width based on the upstream heated oxygen sensor input along with other inputs. In Open Loop, the PCM adjusts injector pulse width based on preprogrammed (fixed) values and inputs from other sensors.

DOWNSTREAM OXYGEN SENSOR 1/2

The downstream heated oxygen sensor input is used to detect catalytic convertor deterioration. As the convertor deteriorates, the input from the downstream sensor begins to match the upstream sensor input except for a slight time delay. By comparing the downstream heated oxygen sensor input to the input from the upstream sensor, the PCM calculates catalytic convertor efficiency.

IGNITION SENSE—PCM INPUT

OPERATION

The ignition sense input informs the Powertrain Control Module (PCM) that the ignition switch is in the crank or run position.

MANIFOLD ABSOLUTE PRESSURE SENSOR—PCM INPUT

DESCRIPTION

The MAP sensor mounts to the driver side of the intake manifold plenum (Fig. 7) or (Fig. 8).

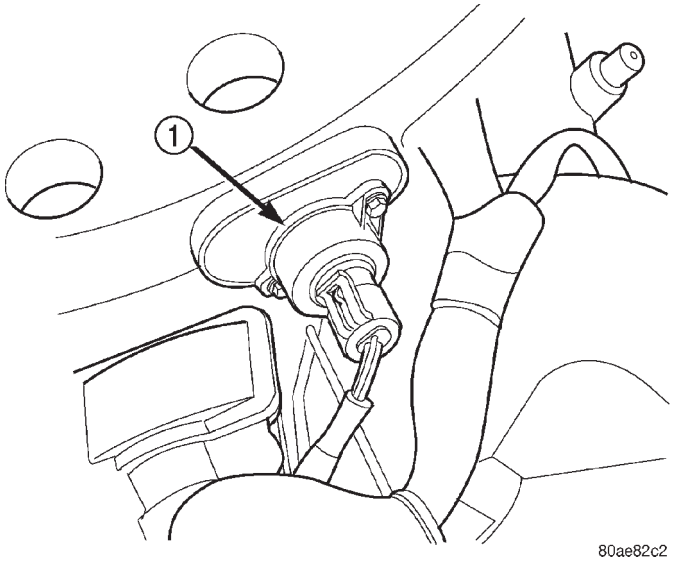


Fig. 7 MAP Sensor—2.7L Engine

1 – MAP SENSOR

OPERATION

The MAP serves as a PCM input, using a silicon based sensing unit, to provide data on the manifold vacuum that draws the air/fuel mixture into the combustion chamber. The PCM requires this information to determine injector pulse width and spark advance. When MAP equals Barometric pressure, the pulse width will be at maximum.

Also like the cam and crank sensors, a 5 volt reference is supplied from the PCM and returns a voltage signal to the PCM that reflects manifold pressure. The zero pressure reading is 0.5V and full scale is 4.5V. For a pressure swing of 0 — 15 psi the voltage changes 4.0V. The sensor is supplied a regulated 4.8 to 5.1 volts to operate the sensor. Like the cam and crank sensors ground is provided through the sensor return circuit.

The MAP sensor input is the number one contributor to pulse width. The most important function of the MAP sensor is to determine barometric pressure. The PCM needs to know if the vehicle is at sea level

DESCRIPTION AND OPERATION (Continued)

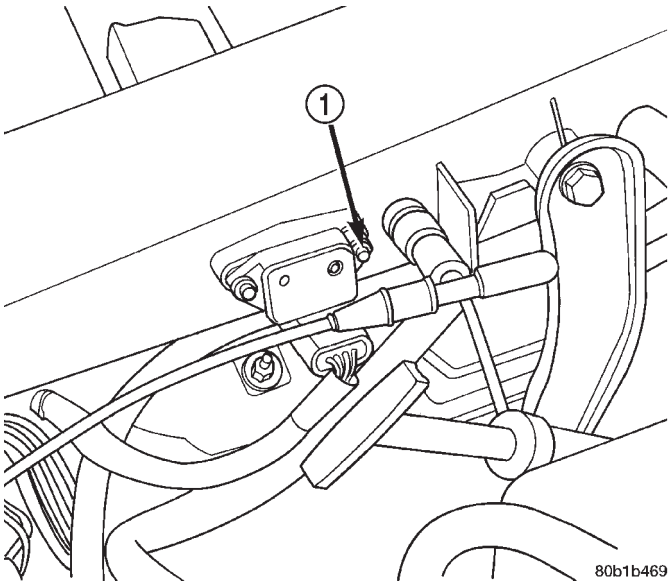


Fig. 8 MAP Sensor—3.2/3.5L Engine

1 – MAP/AIR TEMPERATURE SENSOR

or is it in Denver at 5000 feet above sea level, because the air density changes with altitude. It will also help to correct for varying weather conditions. If a hurricane was coming through the pressure would be very, very low or there could be a real fair weather, high pressure area. This is important because as air pressure changes the barometric pressure changes. Barometric pressure and altitude have a direct inverse correlation, as altitude goes up barometric goes down. The first thing that happens as the key is rolled on, before reaching the crank position, the PCM powers up, comes around and looks at the MAP voltage, and based upon the voltage it sees, it knows the current barometric pressure relative to altitude. Once the engine starts, the PCM looks at the voltage again, continuously every 12 milliseconds, and compares the current voltage to what it was at key on. The difference between current and what it was at key on is manifold vacuum.

During key On (engine not running) the sensor reads (updates) barometric pressure. A normal range can be obtained by monitoring known good sensor in you work area.

As the altitude increases the air becomes thinner (less oxygen). If a vehicle is started and driven to a very different altitude than where it was at key On the barometric pressure needs to be updated. Any time the PCM sees Wide Open throttle, based upon TPS angle and RPM it will update barometric pressure in the MAP memory cell. With periodic updates, the PCM can make its calculations more effectively.

The PCM uses the MAP sensor to aid in calculating the following:

- Barometric pressure
- Engine load
- Manifold pressure
- Injector pulse-width
- Spark-advance programs
- Shift-point strategies (F4AC1 transmissions only, via the CCD bus)
- Idle speed
- Decel fuel shutoff

The MAP sensor signal is provided from a single piezoresistive element located in the center of a diaphragm. The element and diaphragm are both made of silicone. As the pressures changes the diaphragm moves causing the element to deflect which stresses the silicone. When silicone is exposed to stress its resistance changes. As manifold vacuum increases, the MAP sensor input voltage decreases proportionally. The sensor also contains electronics that condition the signal and provide temperature compensation.

The PCM recognizes a decrease in manifold pressure by monitoring a decrease in voltage from the reading stored in the barometric pressure memory cell. The MAP sensor is a linear sensor; as pressure changes, voltage changes proportionately. The range of voltage output from the sensor is usually between 4.6 volts at sea level to as low as 0.3 volts at 26 in. of Hg (Table 1). Barometric pressure is the pressure exerted by the atmosphere upon an object. At sea level on a standard day, no storm, barometric pressure is 29.92 in Hg. For every 100 feet of altitude barometric pressure drops.10 in. Hg. If a storm goes through it can either add, high pressure, or decrease, low pressure, from what should be present for that altitude. You should make a habit of knowing what the average pressure and corresponding barometric pressure is for your area. Always use the Diagnostic Test Procedures Manual for MAP sensor testing.

SENSOR RETURN—PCM INPUT

OPERATION

The sensor return circuit provides a low electrical noise ground reference for all of the systems sensors. The sensor return circuit connects to internal ground circuits within the Powertrain Control Module (PCM).

SCI RECEIVE—PCM INPUT

OPERATION

SCI Receive is the serial data communication receive circuit for the DRB scan tool. The Powertrain Control Module (PCM) receives data from the DRB through the SCI Receive circuit.

DESCRIPTION AND OPERATION (Continued)

PARK/NEUTRAL SWITCH

OPERATION

The automatic transaxle manual valve lever position sensor supplies the park/neutral input to the powertrain control module. The park/neutral switch input tells the PCM whether the transmission is in Park, Neutral, or a drive gear selection. This input effects idle speed, fuel injector pulse width and ignition timing.

THROTTLE POSITION SENSOR—PCM INPUT

DESCRIPTION

The throttle position sensor mounts to the side of the throttle body (Fig. 9) or (Fig. 10). The sensor connects to the throttle blade shaft. The TPS is a variable resistor that provides the Powertrain Control Module (PCM) with an input signal (voltage).

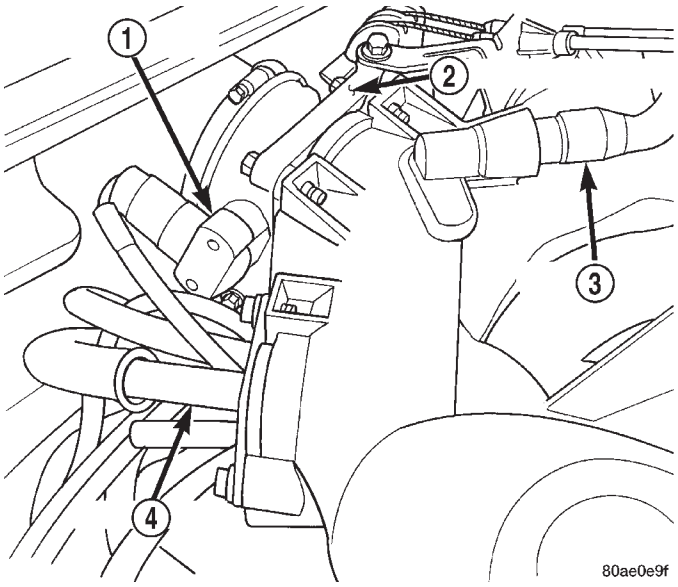


Fig. 9 Throttle Position Sensor—2.7L Engine

1 – TPS SENSOR
2 – THROTTLE BODY
3 – PCV VALVE
4 – EGR TUBE

OPERATION

The signal represents throttle blade position. As the position of the throttle blade changes, the resistance of the TPS changes.

The PCM supplies approximately 5 volts to the TPS. The TPS output voltage (input signal to the powertrain control module) represents throttle blade position. The TPS output voltage to the PCM varies from approximately 0.6 volt at minimum throttle opening (idle) to a maximum of 4.5 volts at wide open throttle.

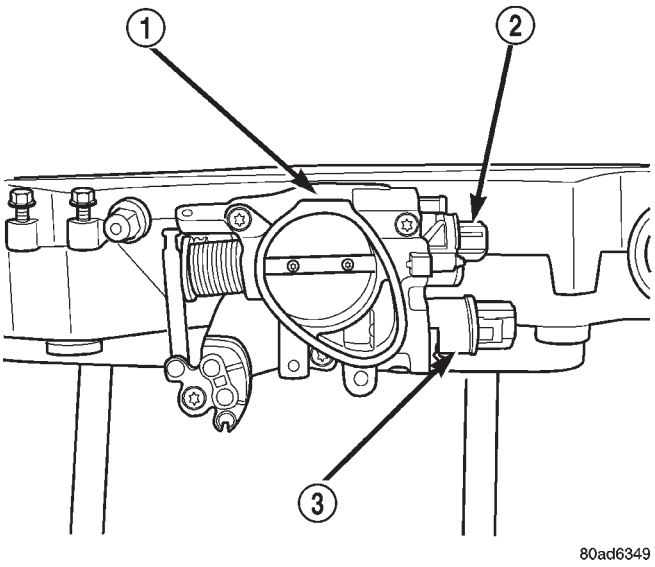


Fig. 10 Throttle Position Sensor—3.2/3.5L Engine

1 – THROTTLE BODY
2 – TPS
3 – IAC

Along with inputs from other sensors, the PCM uses the TPS input to determine current engine operating conditions. The PCM also adjusts fuel injector pulse width and ignition timing based on these inputs.

VEHICLE SPEED AND DISTANCE—PCM INPUT

DESCRIPTION

The PCM receives a signal from the TCM and the transaxle output speed sensor over the bus communication line.

OPERATION

The Transmission Control Module (TCM) supplies the road speed and distance traveled inputs to the PCM. From these inputs and the throttle position sensor input, the PCM determines when a deceleration condition occurs.

AUTOMATIC SHUT DOWN (ASD) AND FUEL PUMP RELAYS—PCM OUTPUT

DESCRIPTION

The ASD relay and fuel pump relay are located in the Power Distribution Center (PDC) near the battery. A decal on the inside of the PDC covers shows the locations of each relay and fuse contained in the PDC.

DESCRIPTION AND OPERATION (Continued)

OPERATION

The PCM operates the Automatic Shut Down (ASD) relay and fuel pump relay through one ground path. The PCM operates them by switching the ground path for the relays on and off. Both relays turn on and off at the same time.

The ASD relay connects battery voltage to the fuel injectors and ignition coil. The fuel pump relay connects battery voltage to the fuel pump.

The PCM turns the ground path off when the ignition switch is in the Off position. Both relays are off. When the ignition switch is in the On or Crank position, the PCM monitors the crankshaft position sensor and camshaft position sensor signals to determine engine speed. If the PCM does not receive a crankshaft position sensor signal and camshaft position sensor signal when the ignition switch is in the Run position, it de-energizes both relays. When the relays are de-energized, battery voltage is not supplied to the fuel injectors, ignition coil and fuel pump.

PROPORTIONAL PURGE SOLENOID—PCM OUTPUT

DESCRIPTION

All vehicles use a proportional purge solenoid. The solenoid regulates the rate of vapor flow from the EVAP canister to the throttle body. The PCM operates the solenoid.

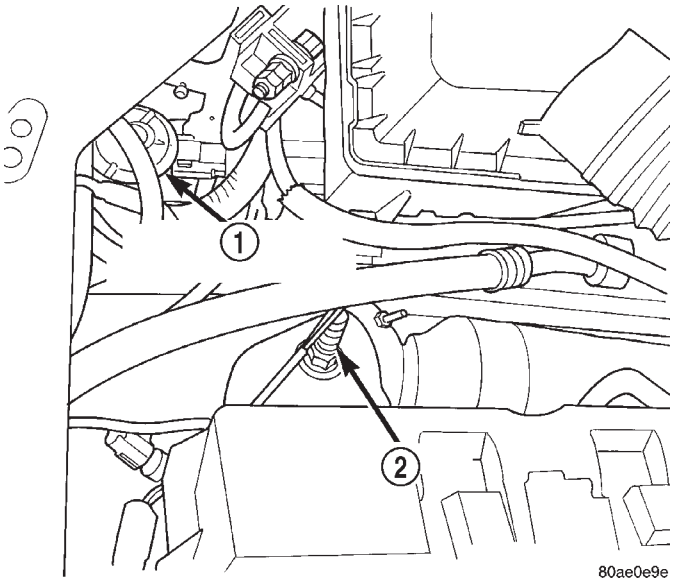


Fig. 11 Proportional Purge Solenoid

1 – PROPORTIONAL PURGE SOLENOID
2 – O2 SENSOR

OPERATION

During the cold start warm-up period and the hot start time delay, the PCM does not energize the solenoid. When de-energized, no vapors are purged.

The proportional purge solenoid operates at a frequency of 200 hz and is controlled by an engine controller circuit that senses the current being applied to the proportional purge solenoid (Fig. 11) and then adjusts that current to achieve the desired purge flow. The proportional purge solenoid controls the purge rate of fuel vapors from the vapor canister and fuel tank to the engine intake manifold.

EXHAUST GAS RECIRCULATION (LSEGR)

DESCRIPTION

The EGR valve consists of three major components. First there is the pintle, valve seat, and housing which contains and regulates the gas flow. Second there is the armature, return spring, and solenoid coil to provide the operating force to regulate the flow by changing the pintle position. The solenoid coil assembly is in parallel with a diode and connects to the two connectors in the connector assembly. The third major component which senses pintle position and is connected to the three connectors in the electrical connector.

OPERATION

The exhaust gas recirculation flow is determined by the engine controller. For a given set of conditions, the engine controller knows the ideal exhaust gas recirculation flow to optimize NOx and fuel economy as a function of the pintle position. Pintle position is obtained from the position sensor. The engine controller adjusts the duty cycle of 128 Hz power supplied to the solenoid coil to obtain the correct position.

MANIFOLD TUNING VALVE (MTV)—PCM OUTPUT

DESCRIPTION

The valve opens a crossover passage in that connects both sides of the intake manifold plenum (Fig. 12). It is an elecrtic motor.

OPERATION

The PCM controls the MTV solenoid. The manifold tuning valve optimizes acoustical tuning of the intake system during wide open throttle operation throughout the RPM range.

DESCRIPTION AND OPERATION (Continued)

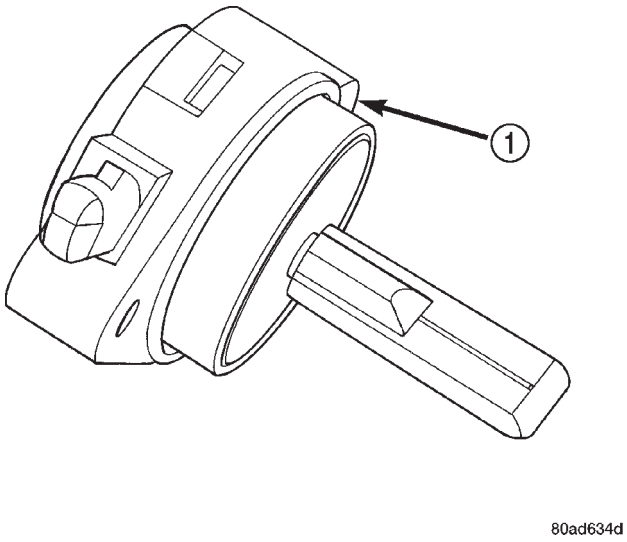


Fig. 12 Manifold Tuning Valve

1 – MTV VALVE

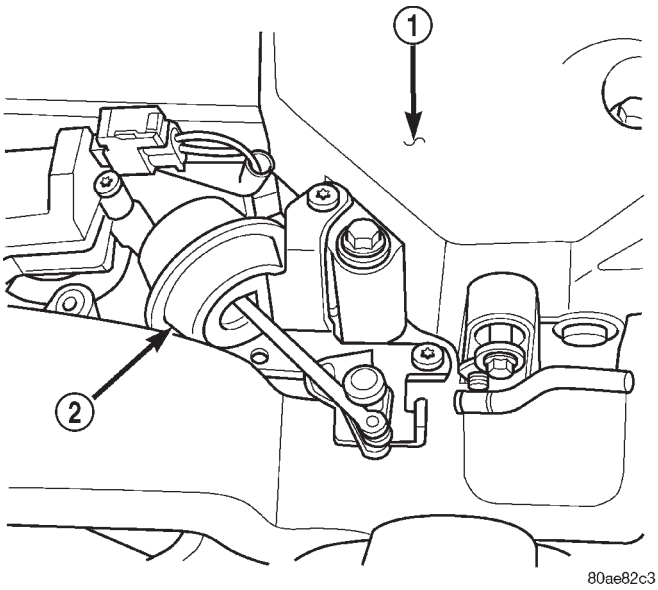


Fig. 13 Short Runner Valve (SRV)

1 – INTAKE MANIFOLD
2 – SRV VALVE

SHORT RUNNER VALVE (SRV)

DESCRIPTION

It is a vacuum actuated actuator attached to the intake manifold (Fig. 13).

OPERATION

The SRV system operates under WOT conditions above 5000 rpm to maximize engine performance. When actuated by the PCM, the SRV solenoid energizes, allowing mechanical linkage to redirect the intake air flow to six short runners. The PCM looks for a current spike when actuating the solenoid. If the spike is not present, the PCM sets the DTC.

IDLE AIR CONTROL MOTOR—PCM OUTPUT

DESCRIPTION

The idle air control motor attaches to the throttle body (Fig. 14). It is an electric stepper motor.

OPERATION

The PCM adjusts engine idle speed through the idle air control motor to compensate for engine load, coolant temperature or barometric pressure changes.

The throttle body has an air bypass passage that provides air for the engine during closed throttle idle. The idle air control motor pintle protrudes into the air bypass passage and regulates air flow through it.

The PCM adjusts engine idle speed by moving the IAC motor pintle in and out of the bypass passage. The adjustments are based on inputs the PCM receives. The inputs are from the throttle position sensor, crankshaft position sensor, coolant temperature sensor, MAP sensor, vehicle speed sensor and various switch operations (brake, park/neutral, air conditioning).

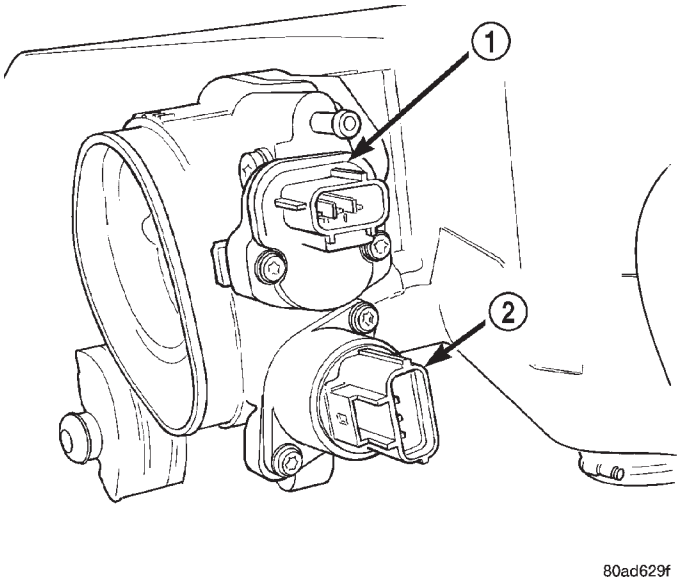


Fig. 14 Idle Air Control Motor

1 – THROTTLE POSITION SENSOR
2 – IDLE AIR CONTROL MOTOR

When engine rpm is above idle speed, the IAC is used for the following functions:

- Off-idle dashpot
- Deceleration air flow control
- A/C compressor load control (also opens the passage slightly before the compressor is engaged so that the engine rpm does not dip down when the compressor engages)

DESCRIPTION AND OPERATION (Continued)

Target Idle

Target idle is determined by the following inputs:

- Gear position
- ECT Sensor
- Battery voltage
- Ambient/Battery Temperature Sensor
- VSS
- TPS
- MAP Sensor

DATA LINK CONNECTOR—PCM OUTPUT

DESCRIPTION

The data link connector is located inside the vehicle, below instrument panel next to the center column (Fig. 15).

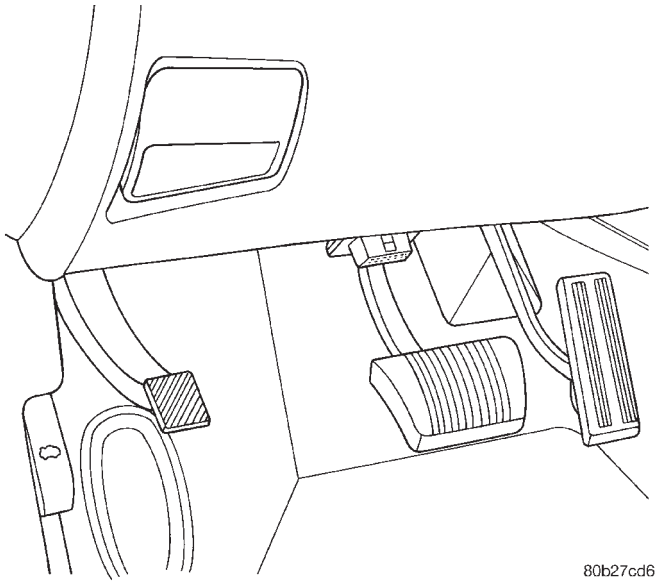


Fig. 15 Data Link Connector

OPERATION

The data link connector (diagnostic connector) links the DRB scan tool with the Powertrain Control Module (PCM). Refer to On-Board Diagnostics in the General Diagnosis section of this group.

MALFUNCTION INDICATOR (CHECK ENGINE) LAMP—PCM OUTPUT

DESCRIPTION

Refer to the Instrument Panel Systems for more information.

OPERATION

The PCM supplies the malfunction indicator (check engine) lamp on/off signal to the instrument panel through the PCI Bus. The PCI Bus is a communications port. Various modules use the PCI Bus to exchange information.

The Check Engine lamp comes on each time the ignition key is turned ON and stays on for 3 seconds as a bulb test.

The Malfunction Indicator Lamp (MIL) stays on continuously, when the PCM has entered a Limp-In mode or identified a failed emission component. During Limp-in Mode, the PCM attempts to keep the system operational. The MIL signals the need for immediate service. In limp-in mode, the PCM compensates for the failure of certain components that send incorrect signals. The PCM substitutes for the incorrect signals with inputs from other sensors.

If the PCM detects active engine misfire severe enough to cause catalyst damage, it flashes the MIL. At the same time the PCM also sets a Diagnostic Trouble Code (DTC).

For signals that can trigger the MIL (Check Engine Lamp) refer to the On-Board Diagnostics section.

RADIATOR FAN RELAYS—PCM OUTPUT

DESCRIPTION

The low speed and high speed fan relays are located in the Power Distribution Center (PDC) near the battery. A decal on the inside of the PDC covers shows the locations of each relay and fuse contained in the PDC. It is an ISO relay.

OPERATION

The cooling system uses two fans. Both fans operate at two different speeds, low and high. Depending on engine coolant temperature and A/C system high side pressure, the both fans operate at either low or high. The PCM controls radiator speed by grounding the coil side of either the low speed fan relay or the high speed fan relay. The ignition switch supplies voltage to the coil sides of the relay. When the PCM grounds the coil side of the relay, the contacts close and the battery supplies power to the fans.

TACHOMETER—PCM OUTPUT

DESCRIPTION

Refer to the Instrument panel System for more information.

OPERATION

The tachometer receives its information across the PCI Bus from the Body Control Module (BCM). Information on engine RPM is transmitted from the Powertrain Control Module (PCM) across the PCI Bus to the BCM. The BCM calculates the position of the tachometer pointer based on the input from the PCM and adjusts the position of the gauge pointer to the

DESCRIPTION AND OPERATION (Continued)

necessary position. This signal is sent over the PCI Bus to the instrument cluster.

TORQUE MANAGEMENT

OPERATION

The PCM receives the torque management input from the transmission control module. The PCM receives the input when the transmission shifts gears. In response, the PCM shuts off a number of fuel injectors when the transmission shifts gears.

5 VOLT SUPPLY—PCM OUTPUT

OPERATION

The PCM supplies 5 volts to the following sensors:

- A/C pressure transducer
- Engine coolant temperature sensor
- Manifold absolute pressure sensor
- Throttle position sensor
- Linear EGR solenoid

8-VOLT SUPPLY—PCM OUTPUT

OPERATION

The PCM supplies 8 volts to the crankshaft position sensor, camshaft position sensor.

REMOVAL AND INSTALLATION

THROTTLE BODY—2.7L ENGINE

REMOVAL

(1) Disconnect negative cable from battery
(2) Disconnect air plenum from throttle body.
(3) Hold throttle lever in wide open position. Remove throttle cable and speed control cables from throttle arm.
(4) Remove throttle cable bracket.
(5) Remove EGR tube from intake manifold to EGR valve.
(6) Disconnect electrical connectors from throttle body.
(7) Remove the throttle body support bracket from the bottom of the throttle body.
(8) Remove 3 throttle body bolts.
(9) Remove purge hose.
(10) Remove throttle body.
(11) Clean mating surfaces.

INSTALLATION

(1) Install throttle body and bolts.
(2) Tighten bolts to 11.8 N·m (105 in. lbs.) torque.
(3) Install the throttle body support bracket to the bottom of the throttle body. Tighten the bolts to 27.1 N·m (20 ft. lbs.) torque.
(4) Hold throttle lever in wide open throttle position. Install throttle cable and speed control cable.
(5) Install throttle cable bracket and tighten bolts.
(6) Install EGR tube from intake manifold to EGR valve. Tighten bolts.
(7) Install air plenum and tighten clamp.
(8) Connect negative cable to battery.

THROTTLE BODY—3.2/3.5L ENGINE

REMOVAL

(1) Disconnect negative cable from battery
(2) Remove wiper arms.
(3) Remove cowl screen.
(4) Remove cowl plenum.
(5) Disconnect air plenum from throttle body.
(6) Remove throttle cable bracket.
(7) Disconnect electrical connectors.
(8) Disconnect top vacuum hose.
(9) Remove the throttle body support bracket from the bottom of the throttle body.
(10) Remove 3 throttle body bolts.
(11) Hold throttle lever in wide open position. Remove throttle cable and speed control cables from throttle arm.
(12) Clean mating surfaces.

INSTALLATION

(1) Hold throttle lever in wide open throttle position. Install throttle cable and speed control cable.
(2) Install throttle body and bolts.
(3) Tighten bolts to 11.8 N·m (105 in. lbs.) torque.
(4) Install the throttle body support bracket to the bottom of the throttle body. Tighten the bolts to 27.1 N·m (20 ft. lbs.) torque.
(5) Install vacuum hose.
(6) Install throttle cable bracket and tighten bolts.
(7) Install air plenum and tighten clamp.
(8) Install cowl plenum.
(9) Install cowl screen.
(10) Install wiper arms.
(11) Connect negative cable to battery.

THROTTLE POSITION SENSOR (TPS)—2.7L ENGINE

REMOVAL

(1) Remove the negative battery cable.
(2) Disconnect the TPS electrical connector (Fig. 16).
(3) Remove the TPS mounting screws.
(4) Remove the TPS.

REMOVAL AND INSTALLATION (Continued)

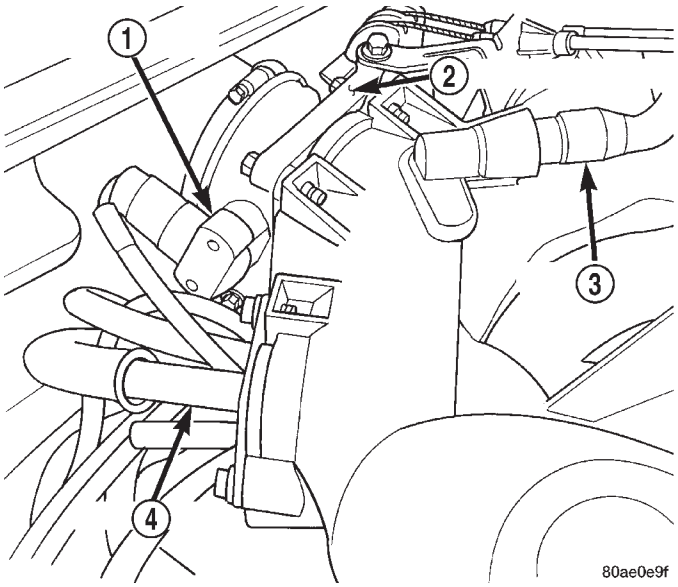


Fig. 16 Throttle Position Sensor—2.7L Engine

1 – TPS SENSOR
2 – THROTTLE BODY
3 – PCV VALVE
4 – EGR TUBE

INSTALLATION

(1) The throttle shaft end of the throttle body slides into a socket in the TPS. The socket has two tabs inside it. The throttle shaft rests against the tabs. When indexed correctly, the TPS can rotate clockwise a few degrees to line up the mounting screw holes with the screw holes in the throttle body. The TPS has slight tension when rotated into position. If it is difficult to rotate the TPS into position, install the sensor with the throttle shaft on the other side of the tabs in the socket. Tighten mounting screws to 3 N·m (25 in. lbs.) torque.

(2) After installing the TPS, the throttle plate should be closed. If the throttle plate is open, install the sensor on the other side of the tabs in the socket.

(3) Attach electrical connector to the TPS.

(4) Install the negative battery cable.

THROTTLE POSITION SENSOR (TPS)—3.2/ 3.5L ENGINE

REMOVAL

(1) Disconnect the negative battery cable.

(2) Disconnect the air plenum.

(3) Disconnect the TPS electrical connector (Fig. 16).

(4) Remove the TPS mounting screws.

(5) Remove the TPS.

INSTALLATION

(1) The throttle shaft end of the throttle body slides into a socket in the TPS. The socket has two tabs inside it. The throttle shaft rests against the tabs. When indexed correctly, the TPS can rotate clockwise a few degrees to line up the mounting screw holes with the screw holes in the throttle body. The TPS has slight tension when rotated into position. If it is difficult to rotate the TPS into position, install the sensor with the throttle shaft on the other side of the tabs in the socket. Tighten mounting screws to 3 N·m (25 in. lbs.) torque.

(2) After installing the TPS, the throttle plate should be closed. If the throttle plate is open, install the sensor on the other side of the tabs in the socket.

(3) Attach electrical connector to the TPS.

(4) Install air plenum and tighten the clamp.

(5) Connect the negative battery cable.

IDLE AIR CONTROL MOTOR—2.7L

REMOVAL

(1) Disconnect the negative battery cable.

(2) Disconnect the TPS electrical connector (Fig. 16).

(3) Remove the TPS mounting screws.

(4) Remove the TPS.

INSTALLATION

(1) The throttle shaft end of the throttle body slides into a socket in the TPS. The socket has two tabs inside it. The throttle shaft rests against the tabs. When indexed correctly, the TPS can rotate clockwise a few degrees to line up the mounting screw holes with the screw holes in the throttle body. The TPS has slight tension when rotated into position. If it is difficult to rotate the TPS into position, install the sensor with the throttle shaft on the other side of the tabs in the socket. Tighten mounting screws to 3 N·m (25 in. lbs.) torque.

(2) After installing the TPS, the throttle plate should be closed. If the throttle plate is open, install the sensor on the other side of the tabs in the socket.

(3) Attach electrical connector to the TPS.

(4) Connect the negative battery cable.

IDLE AIR CONTROL MOTOR—3.2/3.5L

REMOVAL

(1) Disconnect the negative battery cable.

(2) Disconnect the air plenum.

(3) Disconnect the electrical connector (Fig. 17).

(4) Remove the mounting screws.

(5) Remove the IAC.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Install the IAC to the throttle body.
(2) Tighten mounting screws to 3 N·m (25 in. lbs.) torque.
(3) Attach electrical connector to the IAC.
(4) Install air plenum and tighten the clamp.
(5) Connect the negative battery cable.

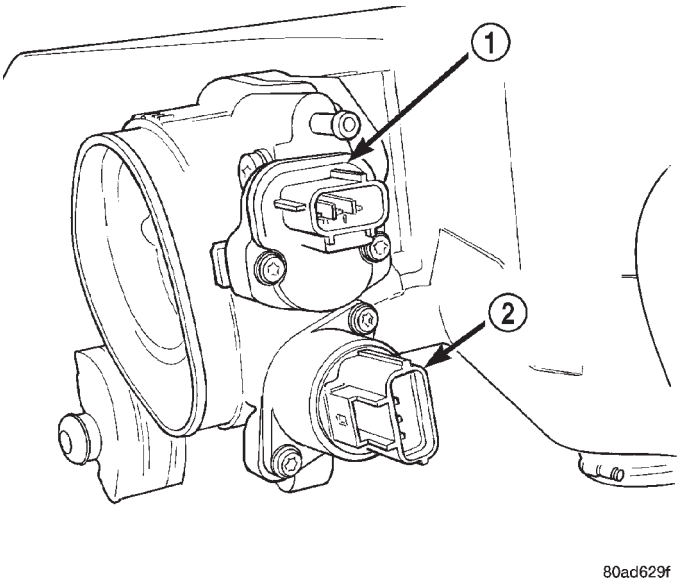


Fig. 17 Idle Air Control Motor

1 – THROTTLE POSITION SENSOR
2 – IDLE AIR CONTROL MOTOR

INTAKE AIR TEMPERATURE SENSOR

REMOVAL

(1) Remove the negative battery cable.
(2) Disconnect electrical connector from sensor.
(3) Remove sensor.

INSTALLATION

(1) Install sensor. Tighten sensor.
(2) Attach electrical connector to sensor.
(3) Install the negative battery cable.

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR—2.7L

On 2.7L engine, the MAP sensor mounts onto the side of the intake manifold plenum (Fig. 18).

REMOVAL

(1) Remove the negative battery cable.
(2) Disconnect the electrical connector from the MAP sensor.
(3) Remove sensor.

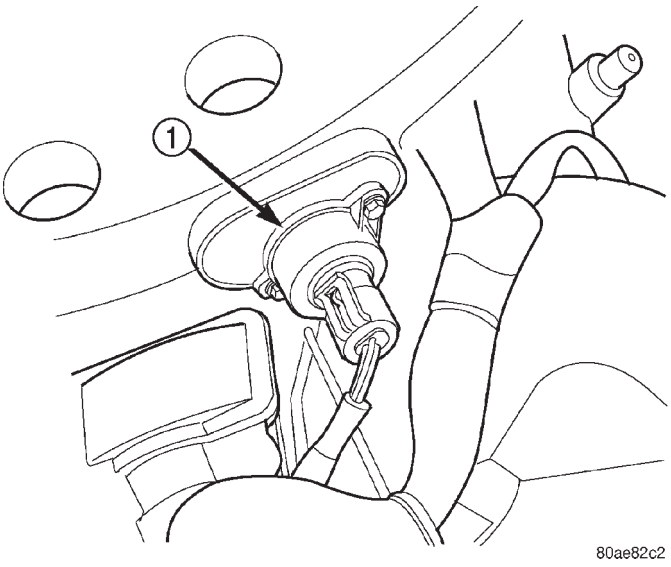


Fig. 18 MAP Sensor—2.7L Engine

1 – MAP SENSOR

INSTALLATION

(1) The sensor mounts onto intake manifold plenum. Tighten screws to 4.5 N·m (40 in. lbs.) torque.
(2) Attach electrical connector to sensor.
(3) Install the negative battery cable.

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR-3.2/3.5L

The MAP sensor mounts onto the left side of the intake manifold plenum (Fig. 19).

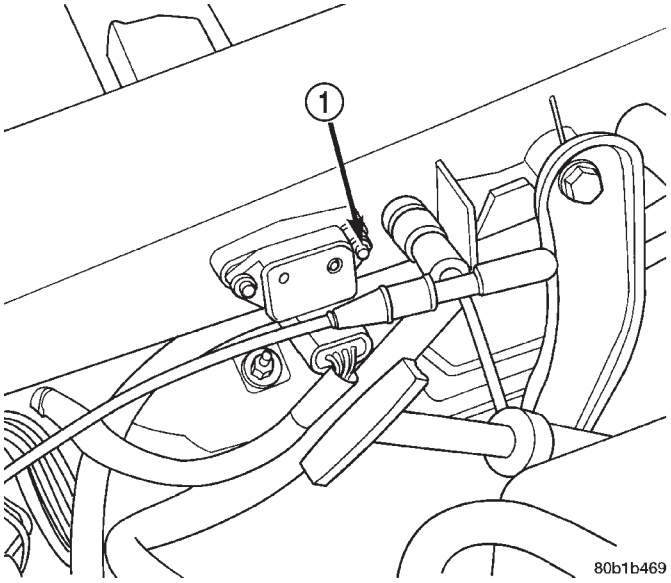


Fig. 19 MAP Sensor—3.5L Engine

1 – MAP/AIR TEMPERATURE SENSOR

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove the negative battery cable.
(2) Disconnect the electrical connector from the MAP sensor.
(3) Remove bolts from sensor.
(4) Remove sensor.

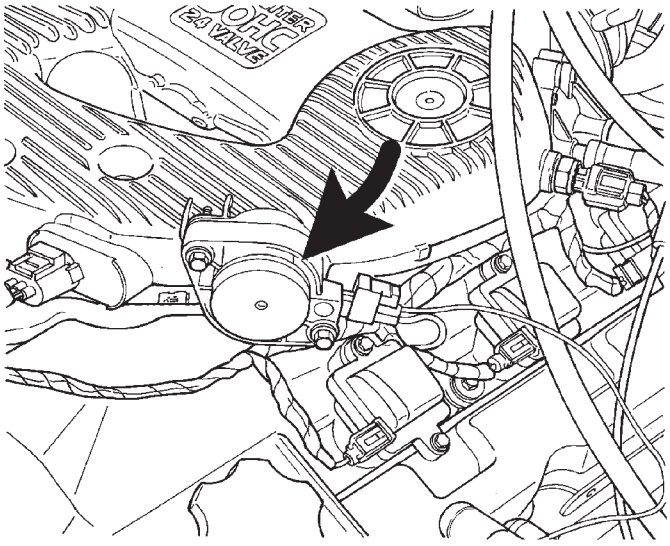
INSTALLATION

(1) Bolt sensor to intake.
(2) Attach electrical connector to sensor.
(3) Install the negative battery cable.

MANIFOLD TUNING VALVE—2.7L ENGINE

REMOVAL

(1) Disconnect negative battery cable.
(2) Disconnect electrical connector (Fig. 20).



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Fig. 20 Manifold Tuning Valve

(3) Remove manifold tuning valve mounting screws. Remove tuning valve (Fig. 21).

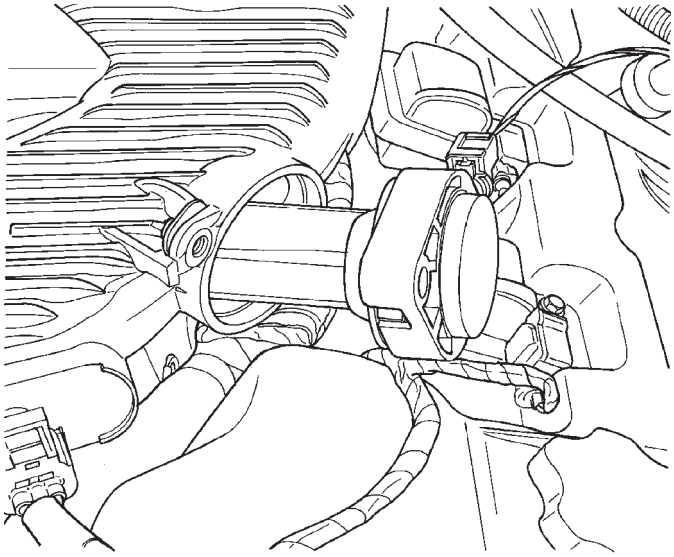
INSTALLATION

(1) Install tuning valve. Tighten mounting screws to 11 N·m (8 ft. lbs.) torque.
(2) Install electrical connector.
(3) Connect negative battery cable.

MANIFOLD TUNING VALVE—3.2/3.5L ENGINE

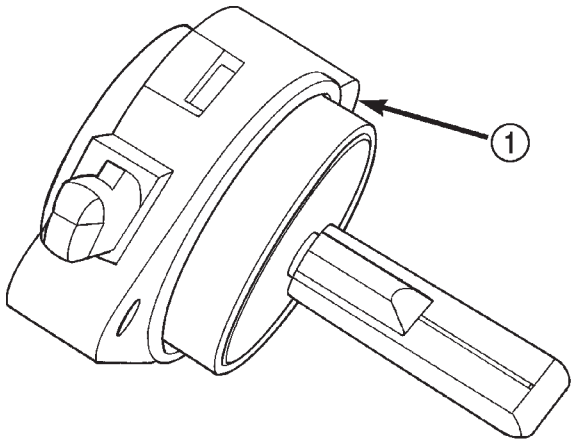
REMOVAL

(1) Disconnect negative battery cable.
(2) Disconnect electrical connector (Fig. 22).
(3) Remove manifold tuning valve mounting screws. Remove tuning valve.



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Fig. 21 Manifold Tuning Valve Removal/Installation



80ad634d

Fig. 22 Manifold Tuning Valve

1 – MTV VALVE

INSTALLATION

(1) Install tuning valve. Tighten mounting screws to 11.9 N·m (105 in. lbs.) torque.
(2) Install electrical connector.
(3) Connect negative battery cable.

SHORT RUNNER VALVE

REMOVAL

(1) Remove the negative battery cable.
(2) Remove link.
(3) Remove 2 bolts.
(4) Remove vacuum hose.
(5) Remove valve.

REMOVAL AND INSTALLATION (Continued)

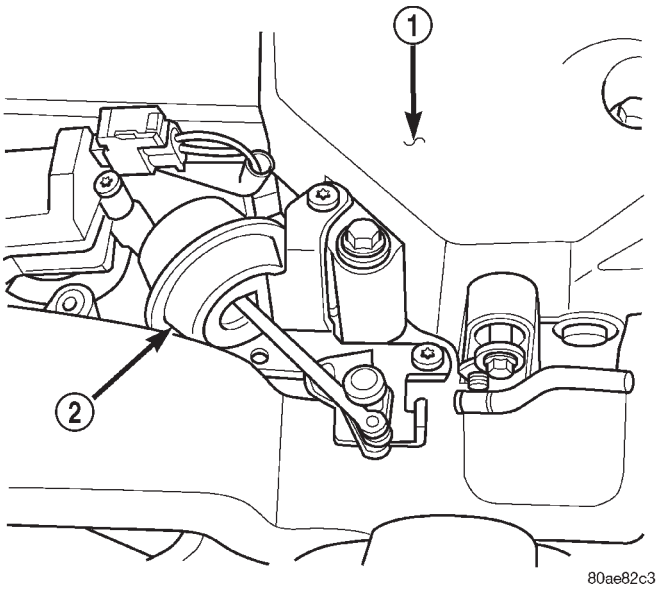


Fig. 23 Retaining Clip

1 – INTAKE MANIFOLD
2 – SRV VALVE

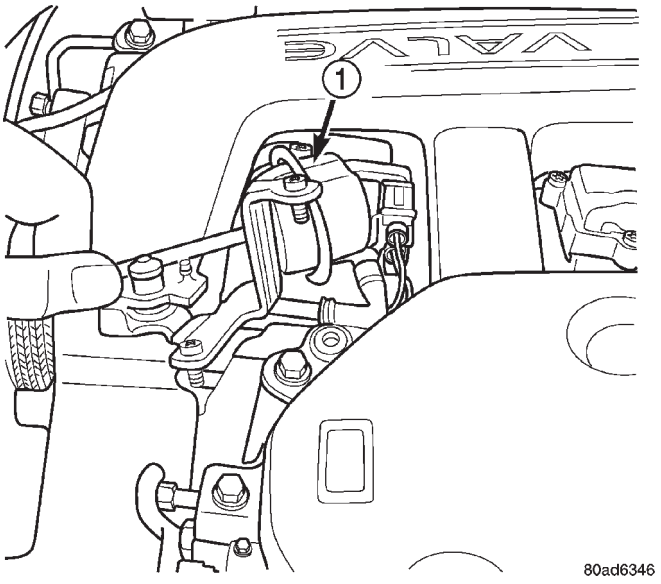


Fig. 24 Short Runner Valve

1 – SRV VALVE

INSTALLATION

(1) Install vacuum hose.
(2) Install 2 bolts.
(3) Install link.
(4) Install the negative battery cable.

VACUUM RESERVOIR SRV

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove air inlet hose and resonator box and air cleaner top.
(3) Remove the 3 fasteners from vacuum reservoir (Fig. 25).
(4) Remove electrical connector.
(5) Remove vacuum hoses.
(6) Remove vacuum reservoir.

INSTALLATION

(1) Install vacuum hoses to reservoir.
(2) Install electrical connector.
(3) Install 3 fasteners and tighten.
(4) Install air inlet hose and resonator box and air cleaner top.
(5) Connect the negative battery cable.

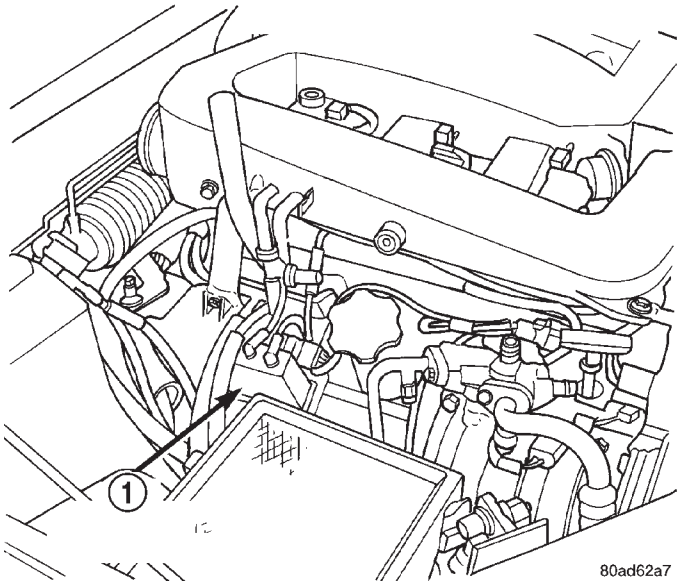


Fig. 25 Vacuum Reservoir

1 – SRV VACUUM RESERVOIR

POWERTRAIN CONTROL MODULE (PCM)

The PCM engine control strategy prevents reduced idle speeds until after the engine operates for 320 km (200 miles). If the PCM is replaced after 320 km (200 miles) of usage, update the mileage and vehicle identification number (VIN) in the new PCM. Use the DRB scan tool to change the millage and VIN in the PCM. If this step is not done a diagnostic trouble code (DTC) may be set and SKIM must be done or car will not start if it is a SKIM equipped car. If a SKIM car you must do a secret key transfer also. Refer to the appropriate Powertrain Diagnostic Manual and the DRB scan tool.

REMOVAL

To avoid possible voltage spike damage to PCM, ignition key must be off, and the negative battery

REMOVAL AND INSTALLATION (Continued)

cable must be disconnected before unplugging the PCM connectors. Note radio programs.

(1) Remove speed control servo and bracket and reposition out of the way (Fig. 26).

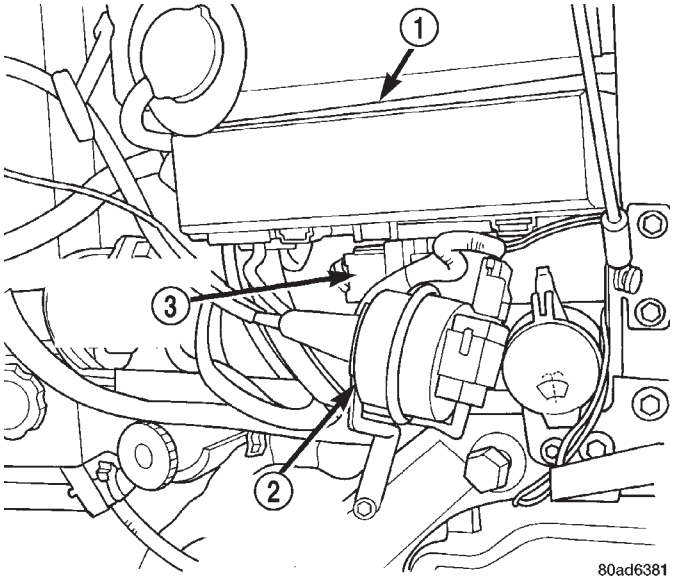


Fig. 26 PCM Location

1 – PDC
2 – SPEED CONTROL SERVO
3 – POWERTRAIN CONTROL MODULE

(2) Reposition wiring harness out of the way.

(3) Remove washer bottle filler neck.

(4) Remove Transmission Control Module (TCM) reposition out of the way (Fig. 27).

(5) Remove PCM

(6) Disconnect PCM 2 40-way connector.

INSTALLATION

(1) Attach 2 40-way connector to PCM.

(2) Install PCM. Tighten bolt to 4 N·m (35 in. lbs.) torque.

(3) Install TCM.

(4) Install washer bottle filler neck.

(5) Reposition wiring harness.

(6) Install speed control servo and bracket and tighten fasteners

(7) Connect negative battery cable and reprogram radio and clock.

(8) Using DRB scan tool, program mileage and vehicle identification number (VIN) into PCM. Refer to the DRB scan tool and the appropriate Powertrain Diagnostic Manual.

UPSTREAM HEATED OXYGEN SENSORS 1/1

The engines uses two heated oxygen sensors, one in each exhaust manifold.

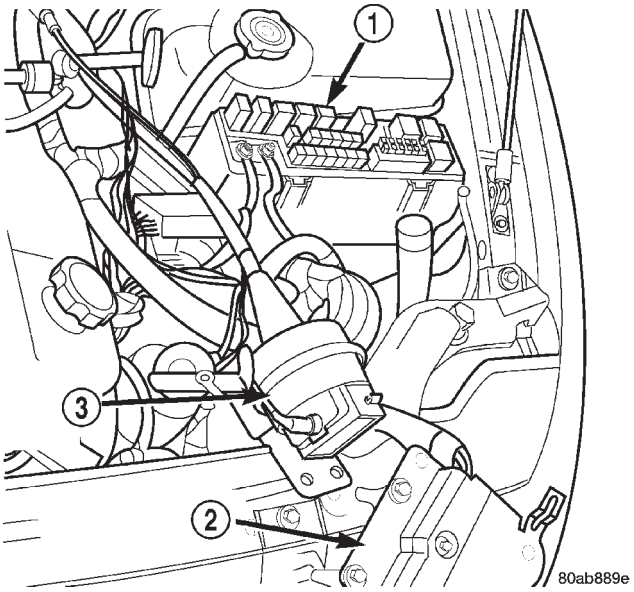


Fig. 27 TCM Location

1 – PDC
2 – TRANSMISSION CONTROLLER
3 – SPEED CONTROL SERVO

WARNING: THE EXHAUST MANIFOLD, EXHAUST PIPES AND CATALYTIC CONVERTER BECOME VERY HOT DURING ENGINE OPERATION. ALLOW ENGINE TO COOL BEFORE REMOVING OXYGEN SENSOR.

REMOVAL

CAUTION: When disconnecting the sensor electrical connector, do not pull directly on wire going into sensor.

(1) Remove the negative battery cable.

(2) Disconnect the heated oxygen sensor electrical connector.

(3) Use a socket such as Snap-On YA8875 or a crow foot wrench to remove oxygen sensor (Fig. 28).

INSTALLATION

(1) After removing the sensor, the exhaust manifold threads must be cleaned with an 18 mm X 1.5 + 6E tap. If reusing the original sensor, coat the sensor threads with an anti-seize compound such as Loctite 771- 64 or equivalent. New sensors have compound on the threads and do not require an additional coating. Tighten the sensor to 28 N·m (20 ft. lbs.) torque.

(2) Connect the heated oxygen sensor electrical connector.

(3) Install the negative battery cable.

REMOVAL AND INSTALLATION (Continued)

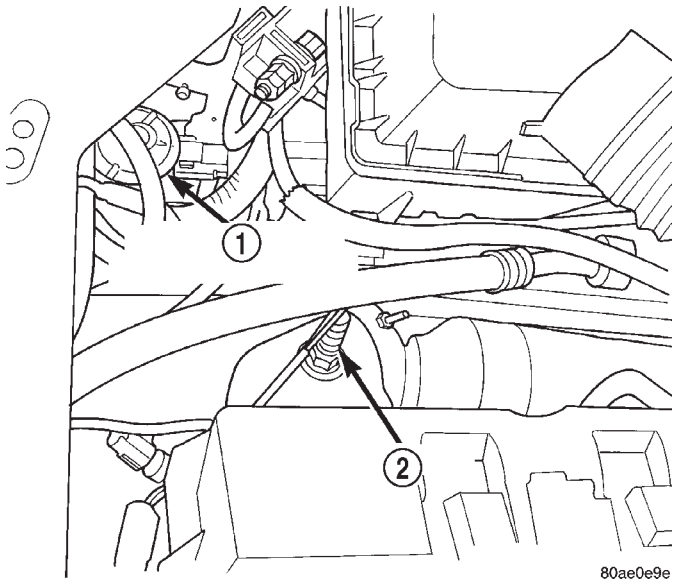


Fig. 28 Heated Oxygen Sensor Removal/Installation

1 – PROPORTIONAL PURGE SOLENOID
2 – O2 SENSOR

DOWNSTREAM HEATED OXYGEN SENSOR 1/2

The O2S are located at the outlet ends of the catalytic converter (Fig. 29).

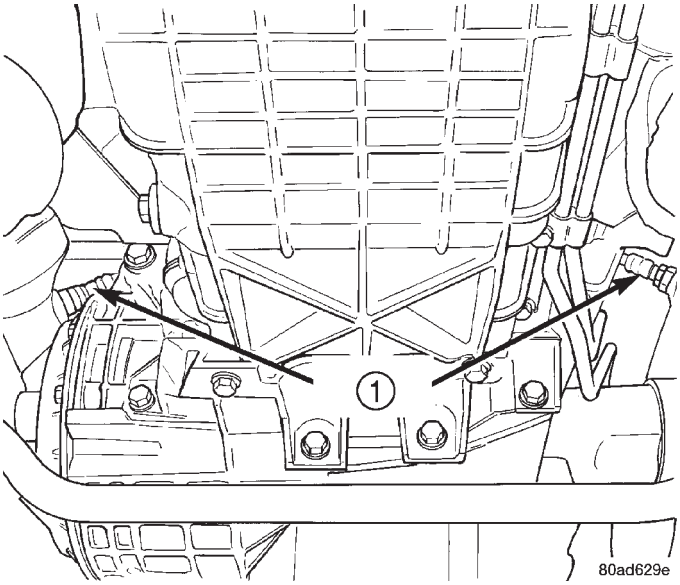


Fig. 29 Downstream Heated Oxygen Sensor

1 – OXYGEN SENSORS

REMOVAL

WARNING: THE EXHAUST MANIFOLD, EXHAUST PIPES AND CATALYTIC CONVERTER BECOME VERY HOT DURING ENGINE OPERATION. ALLOW ENGINE TO COOL BEFORE REMOVING OXYGEN SENSOR.

(1) Remove the negative battery cable.
(2) Raise and support the vehicle.
(3) Disconnect the wire connector from the O2S.

CAUTION: When disconnecting the sensor electrical connector, do not pull directly on wire going into sensor.

(4) Remove the O2S. Snap-On oxygen sensor wrench (number YA 8875) may be used for removal and installation.

INSTALLATION

Threads of new oxygen sensors are factory coated with anti-seize compound to aid in removal. **DO NOT add any additional anti-seize compound to the threads of a new oxygen sensor.**

(1) Install the O2S. Tighten to 30 N·m (22 ft. lbs.) torque.
(2) Connect the O2S wire connector.
(3) Lower the vehicle.
(4) Install the negative battery cable.

AIR CLEANER

LH vehicles do not use a heated air inlet system. The Powertrain Control Module (PCM) adjusts fuel injector pulse width and ignition timing to compensate for different ambient temperatures.

The air cleaner attaches to the a bracket on right inner fender panel (Fig. 30). An opening in the body panel connects the inlet duct to ambient air.

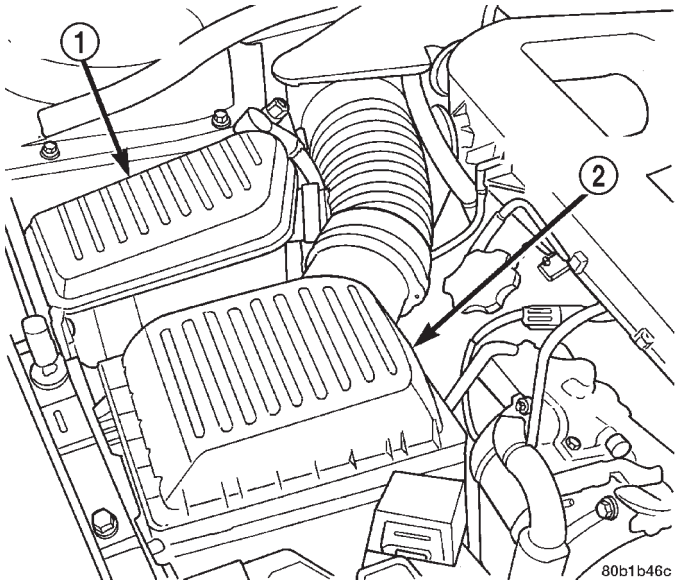


Fig. 30 Air Cleaner and Mounting Bracket

1 – AIR INLET RESONATOR
2 – AIR CLEANER HOUSING

The air induction system uses 2 resonator between the air cleaner and throttle body (Fig. 30).

REMOVAL AND INSTALLATION (Continued)

FILTER ELEMENT REPLACEMENT

(1) Remove air cleaner lid. Lift lid off of air cleaner housing.
(2) Remove filter element (Fig. 31).
(3) If necessary, clean the inside of the air cleaner housing.
(4) Install new filter element.
(5) Place lid over air cleaner housing.

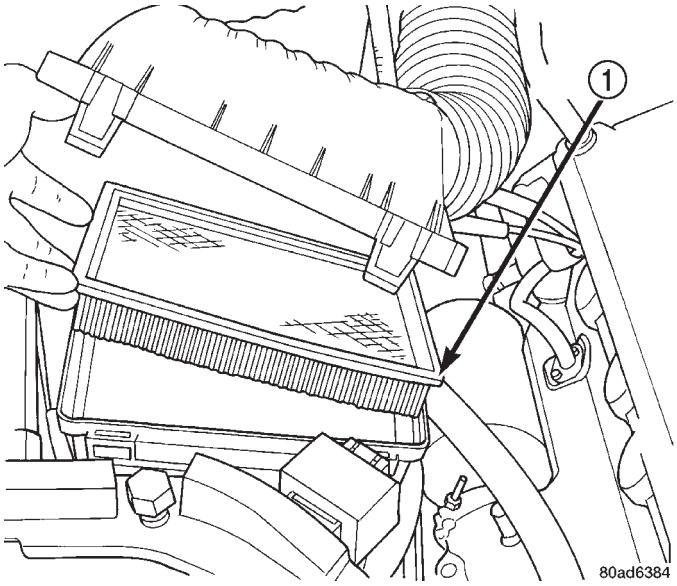


Fig. 31 Air Cleaner Housing and Element

1 – AIR FILTER ELEMENT

ENGINE COOLANT TEMPERATURE SENSOR

The engine coolant temperature sensor is located next to the thermostat housing (Fig. 32) or (Fig. 33).

REMOVAL

(1) Remove the negative battery cable.
(2) With the engine cold, disconnect coolant sensor electrical connector.
(3) Remove sensor.

INSTALLATION

(1) Install engine coolant temperature sensor. Tighten sensor to 28 N·m (20 ft. lbs.) torque.
(2) Attach electrical connector to sensor.
(3) Install the negative battery cable.

KNOCK SENSOR

The sensors screws into the cylinder block, directly below the intake manifold.

REMOVAL

(1) Remove intake manifold plenum refer to the Engine section.
(2) **2.7L** Remove the passenger side cylinder head, refer to the Engine section.

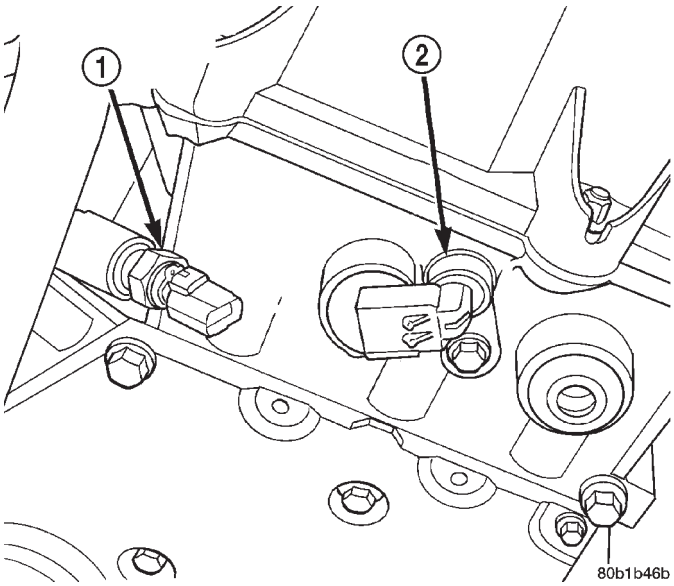


Fig. 32 Engine Coolant Temperature Sensor—2.7L Engine

1 – ENGINE COOLANT TEMPERATURE SENSOR
2 – CAM SENSOR

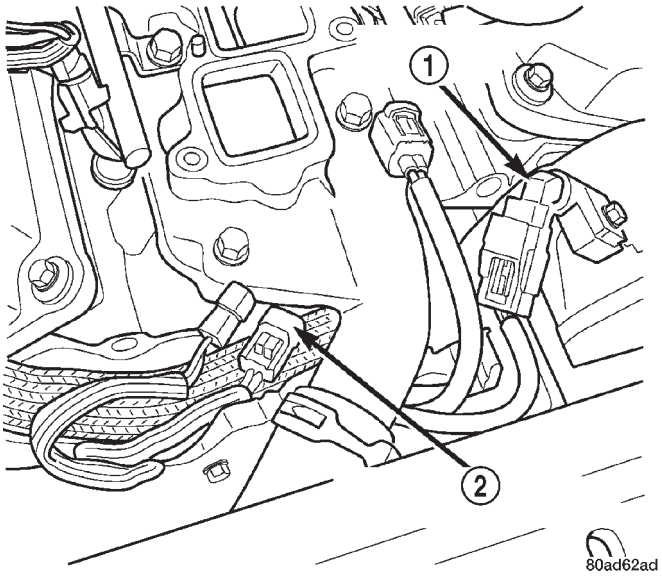


Fig. 33 Engine Coolant Temperature Sensor—3.2/ 3.5L Engine

1 – CAMSHAFT SENSOR
2 – ENGINE COOLANT TEMPERATURE SENSOR

(3) Disconnect electrical connector from knock sensor (Fig. 34) or (Fig. 35).
(4) Use a crows foot socket to remove the knock sensors.

REMOVAL AND INSTALLATION (Continued)

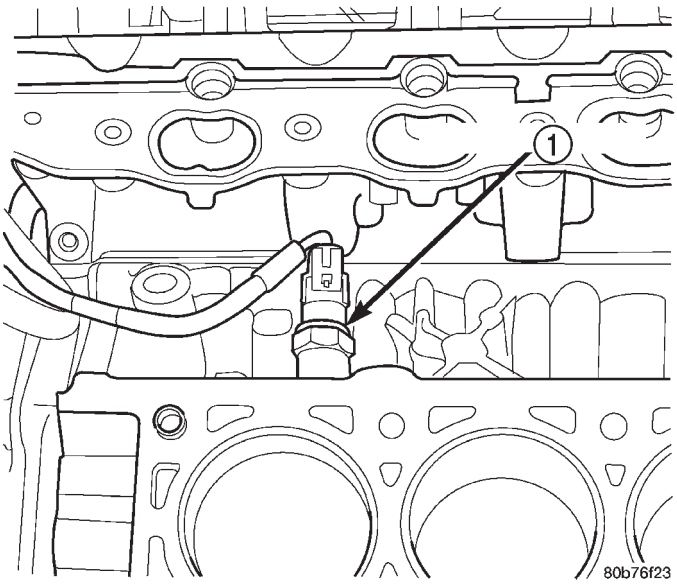


Fig. 34 Knock Sensor Location 2.7L

1 – KNOCK SENSOR

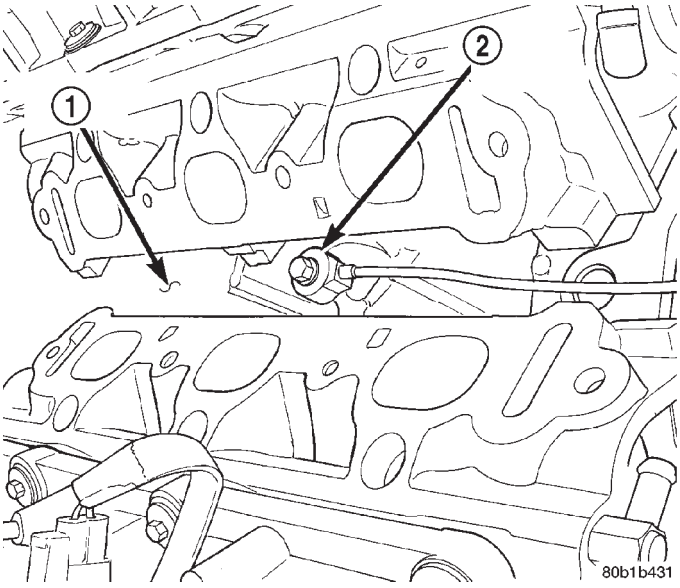


Fig. 35 Knock Sensor Location 3.2/3.5L

1 – CYLINDER BLOCK
2 – KNOCK SENSOR

INSTALLATION

(1) Install knock sensor. Tighten knock sensor to 10 N·m (7 ft. lbs) torque. **Over or under tightening effects knock sensor performance resulting in possible improper spark control.**

(2) **2.7L** Install the passenger side cylinder head, refer to the Engine section.

(3) Attach electrical connector to knock sensor.

(4) Install intake manifold plenum. Refer to the Engine section.

SPECIFICATIONS

VEHICLE EMISSION CONTROL INFORMATION LABEL

DESCRIPTION

All models have a Vehicle Emission Control Information (VECI) Label. Chrysler permanently attaches the label in the engine compartment. It cannot be removed without defacing information and destroying the label.

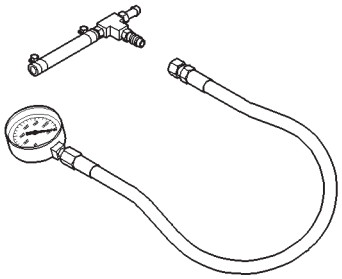
The label contains the vehicle's emission specifications and vacuum hose routings. All hoses must be connected and routed according to the label.

TORQUE

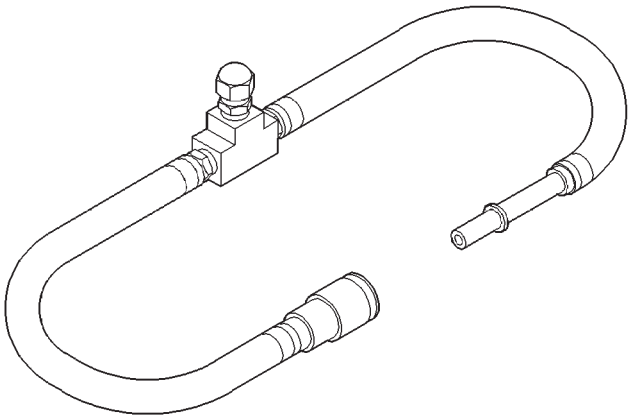
DESCRIPTION	TORQUE
Camshaft Position Semsor	12 N·m (105 in. lbs.)
Crankshaft Position Sensor Mounting Bolts	12 N·m (105 in. lbs.)
Engine Coolant Temperature Sensor	28 N·m (20 ft. lbs.)
Idle Air Control Motor—2.7L	5.1 N·m (45 in. lbs.)
Idle Air Control Motor—3.2/3.5L	6.2 N·m (55 in. lbs.)
Air Temperature Sensor—3.2/3.5L	28 N·m (20 ft. lbs.)
Knock Sensor bolt—3.2/3.5L	10 N·m (7 ft. lbs.)
Knock Sensor—2.7L	10 N·m (7 ft. lbs.)
Manifold Tuning Valve—2.7L	11.9 N·m (105 in. lbs.)
Manifold Tuning Valve—3.2/3.5L	11.9 N·m (105 in. lbs.)
MAP Sensor—2.7L	4.5 N·m (40 in. lbs.)
MAP Sensor—3.2/3.5L	4 N·m (35 in. lbs.)
Oxygen Sensor	28 N·m (20 ft. lbs.)
Powertrain Control Module	4 N·m (35 in. lbs.)
Throttle Body Mounting	11.9 N·m (105 in. lbs.)
Throttle Position Sensor—2.7L	5.1 N·m (45 in. lbs.)
Throttle Position Sensor—3.2/3.5L	6.2 N·m (55 in. lbs.)
Short Runner Valve	6.7 N·m (60 in. lbs.)

SPECIAL TOOLS

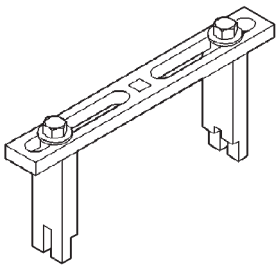
FUEL



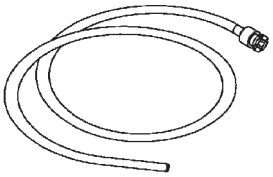
Pressure Gauge Assembly C–4799–B



Fuel Pressure Test Adapter 6539



Spanner Wrench 6856



Fuel Line Adapter 1/4



O2S (Oxygen Sensor) Remover/Installer—C-4907

FUEL SYSTEM

FUEL SYSTEM COMPONENTS

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LOCKING FUEL FILLER NECK CAP. 1

DESCRIPTION AND OPERATION

LOCKING FUEL FILLER NECK CAP

DESCRIPTION

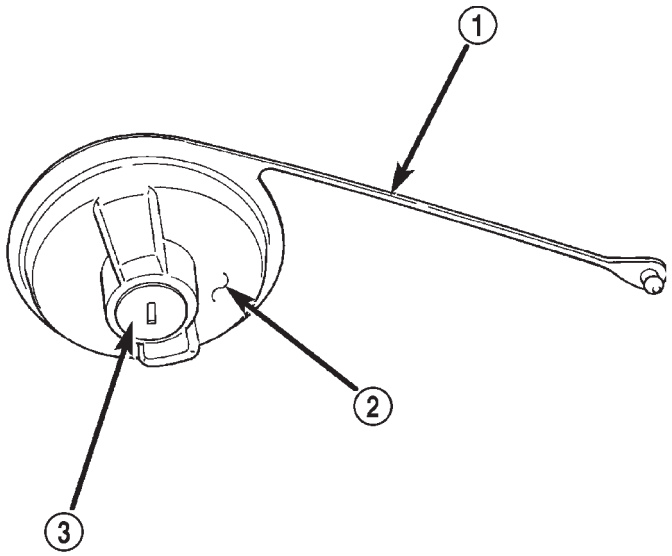


Fig. 1 Locking Fuel Cap

1 – GAS CAP TETHER
2 – LOCKING GAS CAP
3 – LOCK CYLINDER

Some LH vehicles are equipped with a locking fuel filler neck cap tethered to the fuel tank filler neck.

OPERATION

A locking fuel filler neck cap is utilized to prevent refueling the vehicle with the ignition on and/or theft and/or contamination of the vehicle fuel supply. The standard vehicle ignition key is used to lock or unlock the fuel filler cap. By inserting and rotating the ignition key to the right the cap is in the “unlocked” position. Rotating to the left the cap is in the “locked” position.

REMOVAL AND INSTALLATION

FUEL CAP TETHER

For replacement of fuel cap tether, refer to the disassembly and assembly section of this group.

DISASSEMBLY AND ASSEMBLY

LOCKING FUEL FILLER NECK CAP

Ignition, door, deck lid and fuel cap lock cylinders are all codable to one key. Lock barrels, tumblers, and tumbler springs are available to allow the technician to change replacement locks cylinders to match the customer’s original key set. See the appropriate group in the service manual for lock cylinder removal. See the Mopar® catalogue for part numbers and lock coding procedures.

DISASSEMBLY AND ASSEMBLY (Continued)

DISASSEMBLY

(1) Using a flat-bladed pry tool, pry fuel cap retaining ring free from cap assembly (Fig. 2).

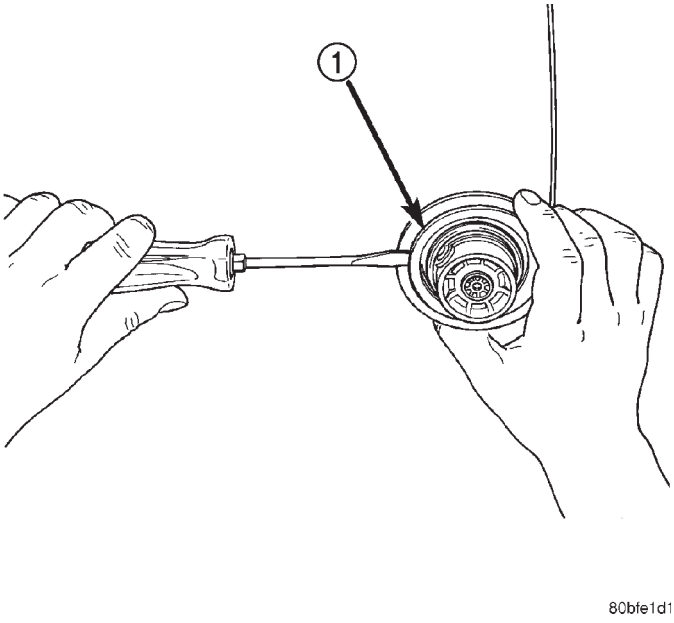


Fig. 2 Removing Retaining Ring

1 – RETAINING RING

(2) Remove threaded portion of cap assembly (Fig. 3).

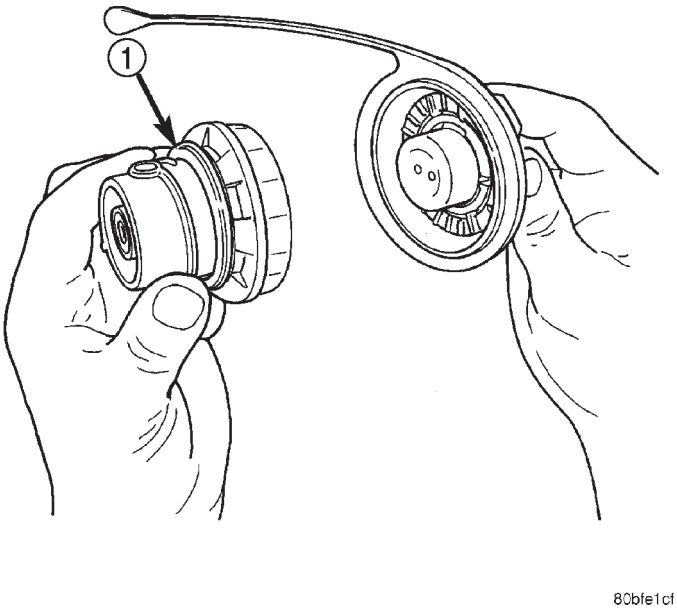


Fig. 3 Step 2

1 – O-RING

(3) Remove lock cylinder engagement collar and tether (Fig. 4).

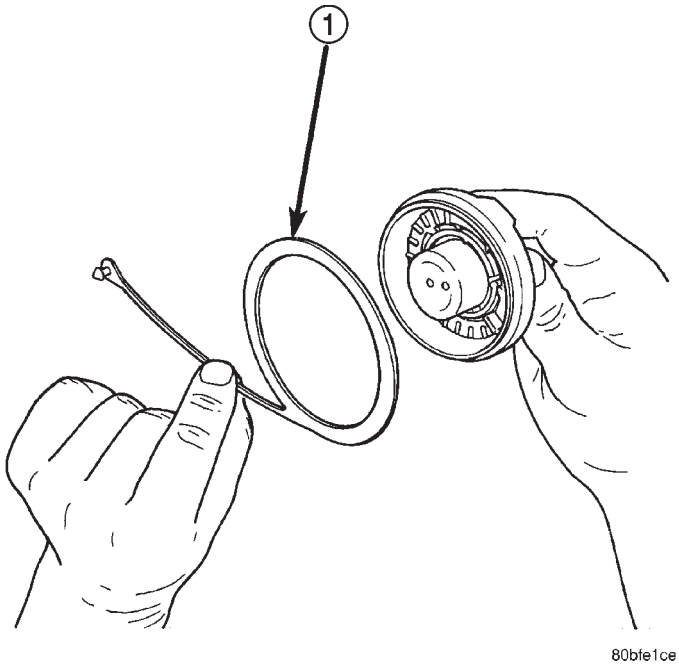


Fig. 4 Step 3

1 – TETHER

(4) Depress the spring loaded lock cylinder retaining clip (Fig. 5) and remove the lock cylinder from the cap (Fig. 6).

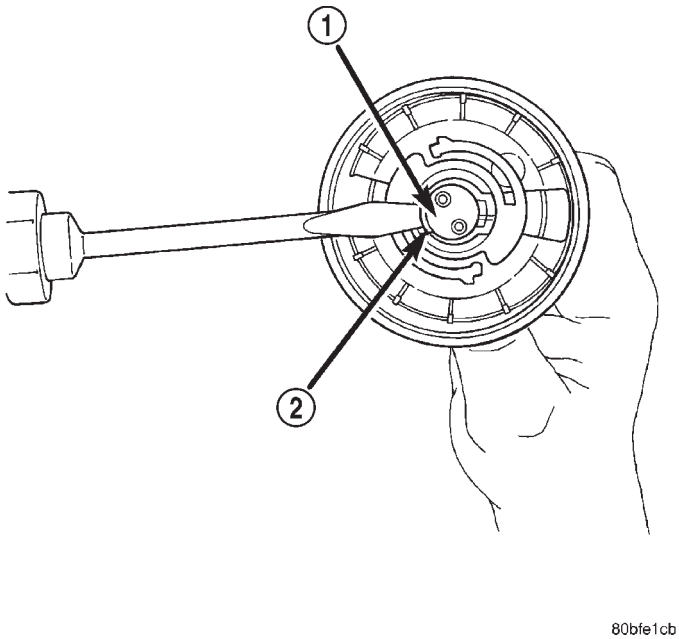


Fig. 5 Step 4

1 – LOCK CYLINDER
2 – LOCK CYLINDER RETAINING CLIP

DISASSEMBLY AND ASSEMBLY (Continued)

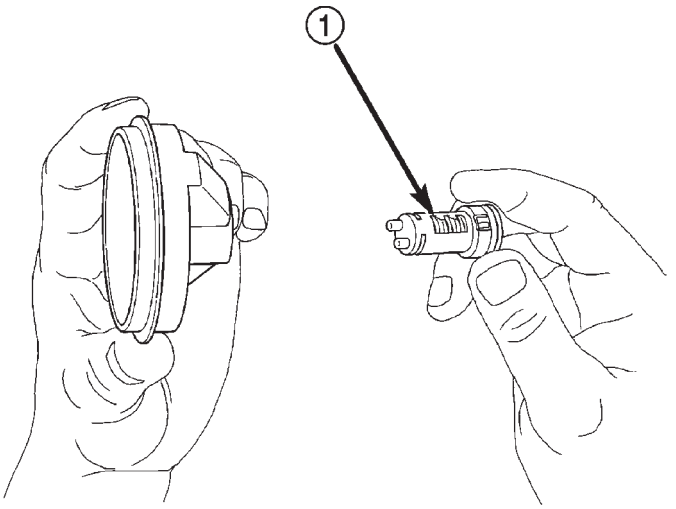


Fig. 6 Lock Cylinder Removed

1 – LOCK CYLINDER

ASSEMBLY

(1) Install the keyed lock cylinder in cap.
(2) Position lock cylinder engagement collar and tether.
(3) Position threaded portion of cap.
(4) Snap retaining ring in position.

2000 LHS, 300M, CONCORDE AND INTREPID

STEERING

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POWER STEERING

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DESCRIPTION AND OPERATION

POWER STEERING SYSTEM

DESCRIPTION

This vehicle is available with 3 different types of power steering. They are standard, firm-feel, or speed-sensitive variable-effort (speed-proportional) power steering.

The firm-feel steering gear is physically the same as the standard gear used on some models. The difference is internal to the gear. The internal calibration gives the driver a more firm feel at the steering wheel. It is serviced the same as the standard steering gear.

The speed-sensitive variable-effort power steering system, better known as speed-proportional steering, is an electronically controlled, variable-effort type power steering system. The steering gear has an externally mounted control valve which in conjunction with mechanical components varies steering effort at different vehicle speeds. At low speeds lower steering effort is provided to allow ease in steering and parking. At higher speeds, higher effort is provided to give a more firm, responsive steering feel.

The power steering system consists of these major components:

- POWER STEERING PUMP
- POWER STEERING GEAR
- POWER STEERING FLUID RESERVOIR
- POWER STEERING FLUID SUPPLY HOSE
- POWER STEERING FLUID PRESSURE HOSE
- POWER STEERING FLUID RETURN HOSE
- POWER STEERING FLUID COOLER

For information on the first two components, refer to their respective sections within this service manual group. Information on the third component can be found in POWER STEERING PUMP. Information on all other components, and diagnosis and testing of the system can be found in this section of this service manual group.

DESCRIPTION AND OPERATION (Continued)

OPERATION

Turning of the steering wheel is converted into lateral (side-to-side) travel through the meshing of the helical pinion teeth with the rack teeth within the steering gear. This lateral travel pushes and pulls the tie rods to change the direction of the vehicle's front wheels.

Power assist steering provided by a rotary type pump. It directs fluid through power steering fluid hoses to the power steering gear where it is used to assist the driver's turning effort.

Manual steering control of the vehicle can be maintained if power steering assist is lost. However, under this condition, steering effort is significantly increased.

Refer to SPEED PROPORTIONAL POWER STEERING GEAR for information on the operation of the speed-sensitive variable-effort power steering.

POWER STEERING FLUID HOSES

DESCRIPTION

The power steering fluid hoses connect the components of the power steering system.

The power steering fluid supply hose (3.2L/3.5L engines only) is a special rubber hose that connects the power steering fluid reservoir to the power steering pump. The hose is secured at each end using a standard adjustable clamp.

The power steering fluid pressure hose is a high pressure hose that connects the power steering pump to the gear. At both ends of the flexible hose portion are steel fittings. A tube nut fitting with an O-ring is used at each end to connect it to either the power steering pump or the gear.

The power steering fluid return hose is a special rubber hose that connects the power steering gear and the power steering fluid cooler, back to the fluid reservoir. A standard tube nut fitting with an O-ring is used to connect it to the power steering gear. The hose is secured to the cooler and reservoir using standard adjustable clamps.

OPERATION

The power steering fluid hoses transfer fluid from one power steering system component to the next.

POWER STEERING FLUID COOLER

DESCRIPTION

All models of this vehicle are equipped with a cooler for the power steering system fluid (Fig. 1). The power steering fluid cooler is located at the front of the vehicle. It is mounted to the radiator lower support just forward of the air-conditioning condenser and just rearward of the front fascia (Fig. 1). The cooler is positioned so it is in the air flow through the front fascia of the vehicle.

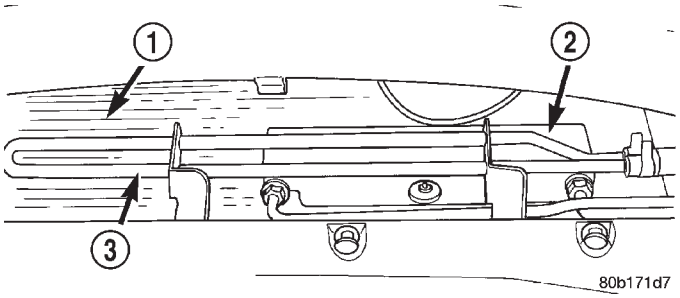


Fig. 1 Power Steering Fluid Cooler

1 – AIR-CONDITIONING CONDENSOR
2 – TRANSMISSION OIL COOLER
3 – POWER STEERING OIL COOLER

OPERATION

The purpose of the cooler is to keep the temperature of the power steering system fluid from rising to a level that would affect the performance of the power steering system.

The cooler used on this vehicle is referred to as a fluid-to-air type cooler. This means that the air flow across the tubes of the cooler is used to extract the heat from the cooler which it has absorbed from the power steering fluid flowing through it. The cooler is placed in series with the power steering fluid return line, between the steering gear and the power steering fluid reservoir. This lowers the temperature of the power steering fluid prior to it entering the power steering fluid reservoir where it is resupplied to the power steering pump.

DIAGNOSIS AND TESTING

STEERING DIAGNOSIS CHARTS

NOTE: There are three diagnosis charts following that cover POWER STEERING NOISE, STEERING WHEEL FEEL, and POWER STEERING FLUID.

DIAGNOSIS AND TESTING (Continued)

POWER STEERING NOISE

CONDITION	POSSIBLE CAUSES	CORRECTION
OBJECTIONABLE HISS OR WHISTLE*	1. Damaged or mispositioned steering column shaft/coupling dash panel seal.	1. Reposition or replace steering column shaft/coupling dash panel seal.
	2. Noisy valve in power steering gear.	2. Replace power steering gear.
RATTLE OR CLUNK	1. Power steering gear loose on front suspension crossmember.	1. Inspect power steering gear mounting bolts. Replace as necessary. Tighten to the specified torque.
	2. Front suspension crossmember mounting fasteners loose at frame.	2. Tighten the front suspension crossmember mounting fasteners to the specified torque.
	3. Loose tie rod (outer or inner).	3. Check tie rod pivot points for wear. Replace worn/loose parts as required.
	4. Loose lower control arm mounting bolts at front suspension crossmember.	4. Tighten control arm mounting bolts to the specified torques.
	5. Lower control arm pivot bushing worn.	5. Replace lower control arm pivot bushing.
	6. Lower control arm tension strut bushing worn.	6. Replace lower control arm tension strut bushing.
	7. Loose strut assembly mounting fasteners at tower.	7. Tighten strut assembly fasteners to the specified torque.
	8. Power steering fluid pressure hose touching the body of the vehicle.	8. Adjust hose to proper position by loosening, repositioning, and tightening fitting to specified torque. Do not bend tubing.
	9. Internal power steering gear noise.	9. Replace power steering gear.
	10. Damaged front suspension crossmember.	10. Replace front suspension crossmember.
	11. Stabilizer bar link ball joints worn.	11. Replace stabilizer bar link.
POPPING NOISE	1. Worn outer tie rod.	1. Replace outer tie rod.
CHIRP OR SQUEAL (POWER STEERING PUMP)	1. Loose power steering pump drive belt.	1. Check and adjust power steering pump drive belt to specifications. Replace belt if worn or glazed.
WHINE OR GROWL (POWER STEERING PUMP)**	1. Low fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
	2. Power steering hose touching vehicle body or frame.	2. Adjust hose to proper position by loosening, repositioning, and tightening fitting to specified torque. Do not bend tubing. Replace hose if damaged.
	3. Extreme wear of power steering pump internal components.	3. Replace power steering pump and flush system as necessary.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. Loose power steering pump drive belt.	4. Check and adjust power steering pump drive belt to specifications. Replace belt if worn or glazed.
	5. Extremely cold temperatures below -18°C (0°F).	5. Noise is typical when starting vehicle in extremely cold temperature. Normal duration of noise at start-up is less than one minute. If noise persists for extended time, verify proper fluid level. If fluid is low, inspect for leaks.
SUCKING AIR SOUND	1. Loose clamp on power steering fluid return hose.	1. Tighten or replace hose clamp.
	2. Missing O-Ring on power steering hose connection.	2. Inspect connection and replace O-Ring as required.
	3. Low power steering fluid level.	3. Fill power steering fluid reservoir to proper level and check for leaks.
	4. Air leak between power steering fluid reservoir and power steering pump.	4. Replace power steering pump (with reservoir).
SQUEAK OR RUBBING SOUND	1. Steering column shroud rubbing.	1. Realign shrouds as necessary.
	2. Steering column shaft rubbing.	2. Move or realign item rubbing shaft.
	3. Clockspring noisy.	3. Remove clockspring. Reinstall wheel. If noise is gone, replace clockspring.
	4. Steering gear internally noisy.	4. Replace steering gear.
SCRUBBING OR KNOCKING NOISE.	1. Incorrect tire or wheel size.	1. Replace incorrect size tire or wheel with size used as original equipment.
	2. Interference between steering gear and other vehicle components.	2. Check for bent or misaligned components and correct as necessary.
	3. Steering gear internal stops worn excessively allowing tires to be steered excessively far.	3. Replace steering gear.

***NOTE: There is some noise in all power steering systems. One of the most common is a hissing sound evident when turning the steering wheel when at a standstill or when parking and the steering wheel is at the end of its travel. Hiss is a very high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results when high velocity fluid passes valve orifice edges. There is no relationship between this noise and the performance of the steering system.**
****NOTE: Power steering pump growl results from the development of high pressure fluid flow. Normally this noise level should not be high enough to be objectionable.**

DIAGNOSIS AND TESTING (Continued)

STEERING WHEEL FEEL

CONDITION	POSSIBLE CAUSES	CORRECTION
STEERING WHEEL/ COLUMN CLICKING, CLUNKING OR RATTLING.	1. Loose steering coupling pinch bolt.	1. Replace pinch bolt and torque to specifications.
	2. Steering column bearings.	2. Replace steering column.
STEERING WHEEL HAS FORE AND AFT LOOSENESS.	1. Steering wheel retaining nut not properly tightened and torqued.	1. Tighten the steering wheel retaining nut to its specified torque.
	2. Steering column lower bearing spring retainer slipped on steering column shaft.	2. Replace steering column.
STEERING WHEEL OR DASH VIBRATES DURING LOW SPEED OR STANDSTILL STEERING MANEUVERS.	1. Air in the fluid of the power steering system.	1. Bleed air from system following the power steering pump initial operation service procedure.*
	2. Tires not properly inflated.	2. Inflate tires to the specified pressure.
	3. Excessive engine vibration.	3. Ensure that the engine is running properly.
	4. Loose tie rod end jam nut.	4. Tighten the inner to outer tie rod jam nut to the specified torque.
	5. Overcharged air conditioning system.	5. Check air conditioning pump head pressure and correct as necessary.
STEERING CATCHES, STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN.	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to specified level and check for leaks.
	2. Tires not inflated to specified pressure.	2. Inflate tires to the specified pressure.
	3. Lack of lubrication in front suspension control arm ball joints.	3. Lubricate ball joints if ball joints are not a lubricated-for-life type ball joint. If ball joint is a lubricated-for-life ball joint, replace ball joint or control arm.
	4. Worn lower control arm ball joint.	4. Replace lower control arm.
	5. Lack of lubrication in steering gear outer tie rod ends.	5. Lubricate tie rod ends if they are not a lubricated-for-life type. If tie rod end is a lubricated-for-life type, replace tie rod end.
	6. Loose power steering pump drive belt.	6. Tighten the power steering pump drive belt to specifications. If drive belt is worn or glazed, replace belt.
	7. Faulty power steering pump flow control (Follow Power Steering System Flow and Pressure Test procedure).	7. Replace power steering pump.
	8. Excessive friction in steering column or intermediate shaft/coupler.	8. Isolate and correct condition.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	9. Binding lower control arm ball joint.	9. Replace the lower control arm.
	10. Excessive friction in power steering gear.	10. Replace power steering gear.
	11. Worn/binding seat and bearing in front strut assembly.	11. Replace seat and bearing in front strut assembly.
STIFF, HARD TO TURN, SURGE, MOMENTARY INCREASE IN EFFORT WHEN TURNING.	1. Tires not properly inflated.	1. Inflate tires to specified pressure.
	2. Low power steering fluid level.	2. Add power steering fluid as required to power steering fluid reservoir to obtain proper level. Check for leaks.
	3. Loose power steering pump drive belt.	3. Tighten the power steering pump drive belt to specifications. If drive belt is worn or glazed, replace belt.
	4. Lack of lubrication in lower control arm ball joints.	4. Lubricate ball joints if ball joints are not a lubricated-for-life type ball joint. If ball joint is a lubricated-for-life ball joint, replace lower control arm.
	5. Low power steering pump pressure (Follow Power Steering System Flow and Pressure Test procedure).	5. Replace the power steering pump as necessary.
	6. High internal leak in power steering gear (Follow Power Steering System Flow and Pressure Test procedure).	6. Replace power steering gear.
STEERING WHEEL DOES NOT RETURN TO CENTER POSITION.	1. Tires not inflated properly.	1. Inflate tires to specified pressure.
	2. Improper front wheel alignment.	2. Check and adjust wheel alignment as necessary.
	3. Lack of lubrication/binding in front lower control arm ball joints.	3. Lubricate ball joints if ball joints are not a lubricated for life type of ball joint, then inspect ball joint for wear, replace lower control arm as necessary. If ball joint is a lubricated for life ball joint, replace lower control arm.
	4. Steering column coupling joints misaligned.	4. Realign steering column coupling joints.
	5. Steering wheel rubbing.**	5. Adjust steering column shrouds to eliminate rubbing condition.
	6. Damaged, mis-positioned or un-lubricated steering column coupler to dash seal.**	6. Replace, reposition, or lubricate dash seal.
	7. Binding seat and bearing in front strut assembly.	7. Replace seat and bearing in front strut assembly.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	8. Tight shaft bearing in steering column.	8. Replace the steering column.
	9. Excessive friction in steering column coupling.	9. Replace steering column coupling.
	10. Excessive friction in power steering gear.	10. Replace power steering gear.
EXCESSIVE STEERING WHEEL KICKBACK OR TOO MUCH STEERING WHEEL FREE PLAY.	1. Air in the fluid of the power steering system.	1. Bleed air from system following the the power steering pump initial operation service procedure.*
	2. Power steering gear loose on crossmember.	2. Inspect power steering gear mounting bolts. Replace as necessary. Tighten to the specified torque.
	3. Power steering gear housing isolator bushings worn.	3. Replace power steering gear housing isolator bushings.
	4. Steering column coupling or intermediate shaft worn, broken or loose.	4. Replace steering column coupling or intermediate shaft.
	5. Free play in steering column.	5. Check all components of the steering column and repair or replace as required.
	6. Worn lower control arm ball joints.	6. Replace lower control arm as required.
	7. Loose steering knuckle-to-ball joint stud pinch bolt.	7. Inspect pinch bolt, replace as necessary, and tighten to specified torque.
	8. Front wheel bearing loose or worn.	8. Replace hub and bearing or knuckle as necessary.
	9. Loose outer tie rod end.	9. Replace outer tie rod end that has excessive free play.
	10. Worn inner tie rod bushing.	10. Replace inner tie rod.
	11. Defective steering gear rotary valve.	11. Replace power steering gear.

***NOTE: Steering shudder can be expected in new vehicles and vehicles with recent steering system repairs. Shudder should dissipate after the vehicle has been driven several weeks.**

****NOTE: To evaluate this condition, it may be necessary to disconnect the coupling at the base of the steering column. Turn the steering wheel and feel or listen for internal rubbing in steering column. To avoid damaging the column clockspring, note the following. Before disconnecting coupling, place tires in the straight-ahead position and center steering wheel. Once disconnected, DO NOT rotate steering wheel more than one revolution in either direction and place steering wheel in original location before reconnecting coupling. If this position is lost, the steering column clockspring must be recentered following the procedure found within the procedure for steering column installation in the steering column section.**

DIAGNOSIS AND TESTING (Continued)

POWER STEERING FLUID

CONDITION	POSSIBLE CAUSES	CORRECTION
LOW FLUID LEVEL WITH VISIBLE LEAK.	1. Loose power steering hose fittings.	1. Tighten the fitting to its specified torque.
	2. Damaged or missing fitting seal, gasket, or O-ring.	2. Replace as necessary.
	3. Power steering fluid cooler leaking.	3. Replace power steering fluid cooler.
	4. Power steering pump or power steering gear leaking.	4. Repair or replace the leaking component as required.
AERATED FLUID.	1. Low fluid level.*	1. Fill power steering fluid reservoir to proper level.
	2. Air leak between power steering fluid reservoir and pump.	2. Inspect for proper sealing. Replace the power steering pump (with reservoir).
	3. Cracked power steering pump housing.	3. Replace the power steering pump.
RESERVOIR FLUID OVERFLOW AND FLUID THAT IS MILKY IN COLOR	1. Water contamination.	1. Drain the power steering fluid from the system. Flush the system with fresh clean power steering fluid, drain, then refill to the proper level.

***NOTE: Extremely cold temperatures may cause power steering fluid aeration if the power steering fluid level is low.**

POWER STEERING SYSTEM FLOW AND PRESSURE TEST

ALL ENGINES

The following procedure is to be used to test the operation of the power steering system on this vehicle. This test will provide the flow rate of the power steering pump along with the maximum relief pressure. This test is to be performed any time a power steering system problem is present to determine if the power steering pump or power steering gear is not functioning properly. The following flow and pressure test is performed using the Power Steering Analyzer Kit, Special Tool 6815 (Fig. 2), hoses, Special Tools 6905 and 6959, and fittings from adapter kit, Special Tool 6893.

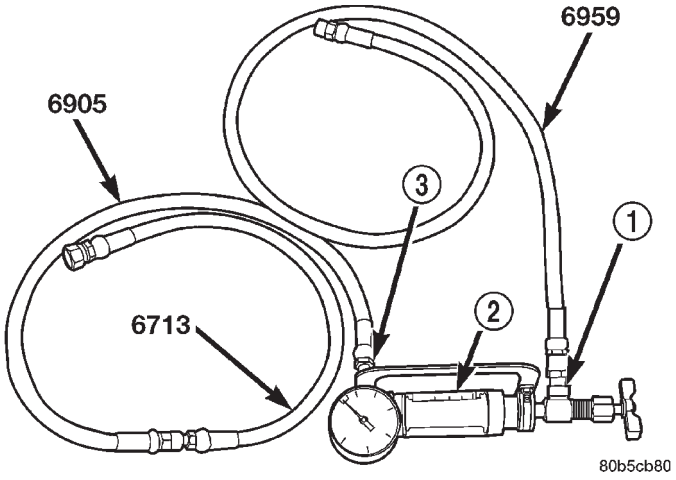


Fig. 2 Power Steering Analyzer With Hoses Installed

1 – OUTLET
2 – SPECIAL TOOL 6815
3 – INLET

DIAGNOSIS AND TESTING (Continued)

(1) Assemble hoses on Power Steering Analyzer, Special Tool 6815, as shown. Install Pressure Hose, Special Tool 6905 (in 6893 kit), in the inlet fitting on Power Steering Analyzer. Install Pressure Hose, Special Tool 6713 (in 6815 kit) on Pressure Hose, Special Tool 6905. Install Pressure Hose, Special Tool 6959, in the outlet fitting on Power Steering Analyzer.

Install the following adapters from Adapter Set, Special Tool 6893 (Fig. 3), on the analyzer hose ends:

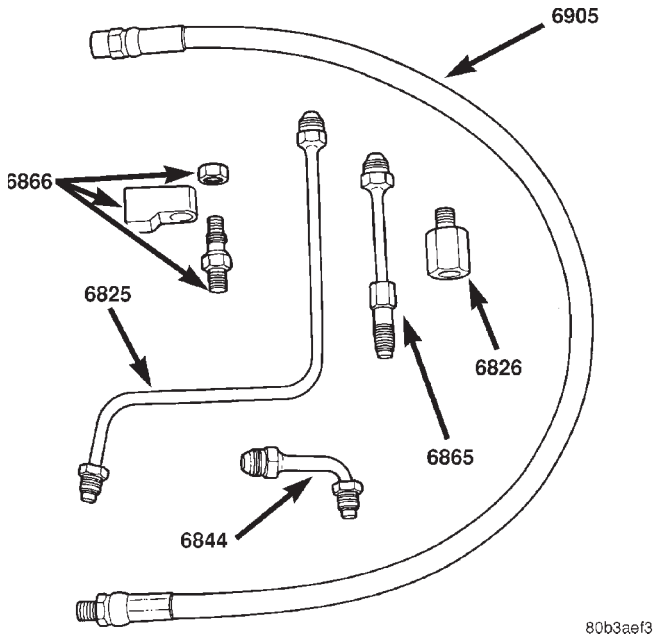


Fig. 3 Power Steering Analyzer Adapters 6893

- **2.7L engine** — Install Adapter Fitting, Special Tool 6844, on Pressure Hose, Special Tool 6713.
- **3.2L or 3.5L engine** — Install Adapter Fitting, Special Tool 6825, on Pressure Hose, Special Tool 6713.
- **All models** — Install Adapter Fitting, Special Tool 6826, on Pressure Hose, Special Tool 6959.

CAUTION: To prevent personal injury, safety goggles should be worn at all times when performing any test procedures on the power steering pump or power steering gear.

The following procedure is to be used to test the operation of the power steering system on the vehicle.

(2) Check belt tension and adjust as necessary.

NOTE: On vehicles with 3.2 and 3.5 liter engines, it may be easier to access the power steering pump pressure fitting from the bottom of the vehicle engine compartment.

(3) Disconnect the power steering fluid pressure hose from the power steering pump (Fig. 4) (Fig. 5).

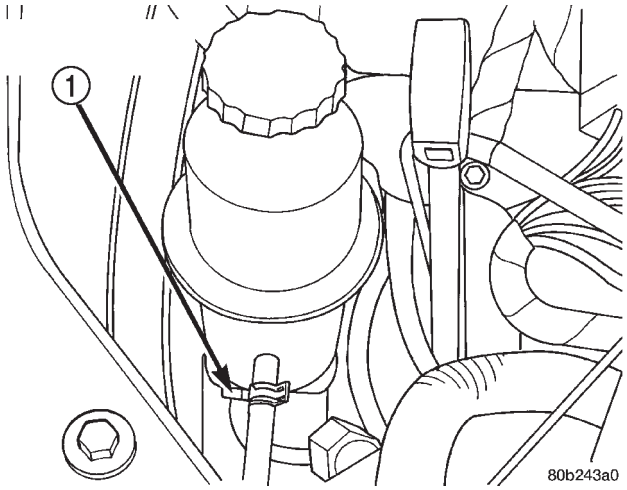


Fig. 4 Pressure Hose Connection To Power Steering Pump (2.7L Engine)

1 – POWER STEERING FLUID PRESSURE HOSE

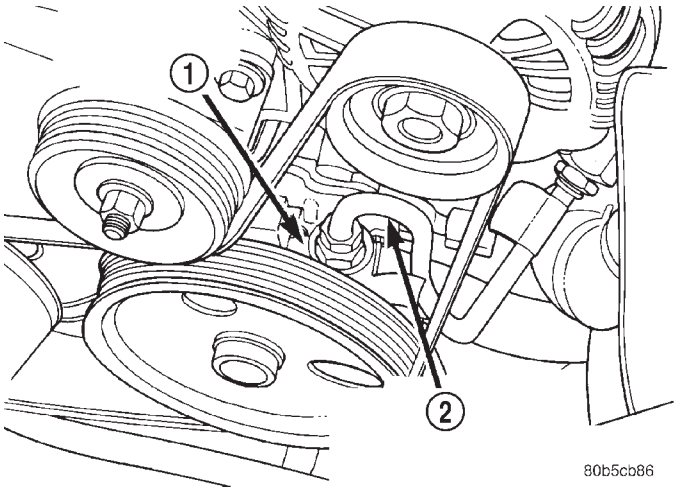


Fig. 5 Pressure Hose Connection To Power Steering Pump (3.2L/3.5L Engine)

1 – POWER STEERING PUMP
2 – POWER STEERING FLUID PRESSURE HOSE

DIAGNOSIS AND TESTING (Continued)

(4) **2.7L engine** — Connect Adapter Fitting, Special Tool 6844 (Fig. 6), attached to pressure hose from inlet (gauge end) of Power Steering Analyzer to the pressure fitting on the power steering pump.

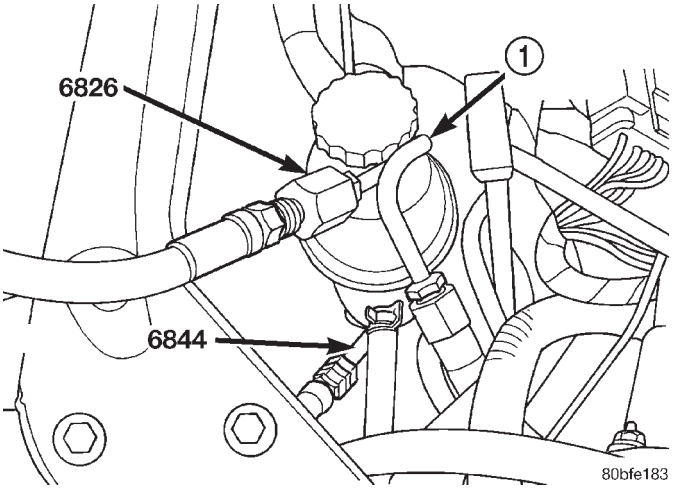


Fig. 6 Analyzer Connected To Power Steering Pump (2.7L Engine)

1 – POWER STEERING FLUID PRESSURE HOSE

(5) **3.2L or 3.5L engine** — Connect Adapter Fitting, Special Tool 6825, attached to pressure hose from inlet (gauge end) of Power Steering Analyzer to the pressure fitting on the power steering pump (Fig. 7).

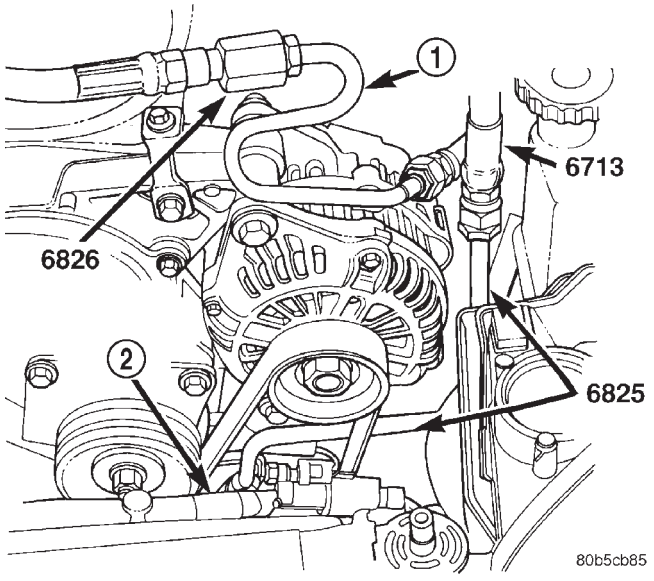


Fig. 7 Analyzer Connected To Power Steering Pump (3.2L/3.5L Engine)

1 – POWER STEERING PRESSURE HOSE
2 – POWER STEERING PUMP

(6) Connect vehicle power steering fluid pressure hose to Adapter Fitting, Special Tool 6826, which should be already installed in the outlet hose (valve end) of Power Steering Analyzer.

(7) Completely open valve on Power Steering Analyzer.

(8) Start engine and let idle long enough to circulate power steering fluid through the analyzer and hoses, until the air is out of the fluid. Shut off engine.

(9) Check power steering fluid level and add fluid as necessary. Start engine again and let idle.

(10) Gauge should read below 862 kPa (125 psi), if above, inspect the hoses for restrictions and repair as necessary. The initial pressure should be in the range of 345-862 kPa (50-125 psi).

CAUTION: The following test procedure involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.

(11) Close valve fully three times and record highest pressure indicated each time. **All three readings must be above specifications and within 345 kPa (50 psi) of each other.**

NOTE: Power steering pump maximum relief pressure is 8275 to 8975 kPa (1250 to 1350 psi.).

- Power steering pump pressures above specifications but not within 345 kPa (50 psi) of each other, replace pump.
- Pressures within 345 kPa (50 psi) of each other but below specifications, replace pump.

CAUTION: Do not force the pump to operate against the stops for more than 2 to 4 seconds at a time because, pump damage will result.

(12) Completely open the valve on the Power Steering Analyzer. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest output pressures are not the same against either stop, the steering gear is leaking internally and must be replaced.

SERVICE PROCEDURES

POWER STEERING FLUID LEVEL CHECK

WARNING: FLUID LEVEL SHOULD BE CHECKED WITH ENGINE OFF TO PREVENT INJURY FROM MOVING PARTS. DO NOT USE AUTOMATIC TRANSMISSION FLUID IN THE POWER STEERING SYSTEM. DO NOT OVERFILL THE POWER STEERING SYSTEM.

Wipe off the power steering fluid reservoir so that it is free of dirt (Fig. 8) (Fig. 9). Check the fill level of the power steering fluid in the reservoir according to the markings on the side of the reservoir. The MAX. COLD/MIN. COLD fluid levels are to be measured with the power steering fluid at a normal ambient temperature of approximately 32°C to 43°C (90°F to 110°F). In all pumps add fluid as necessary, using only **Mopar® Power Steering Fluid, or an equivalent. DO NOT USE ANY TYPE OF AUTOMATIC TRANSMISSION FLUID.**

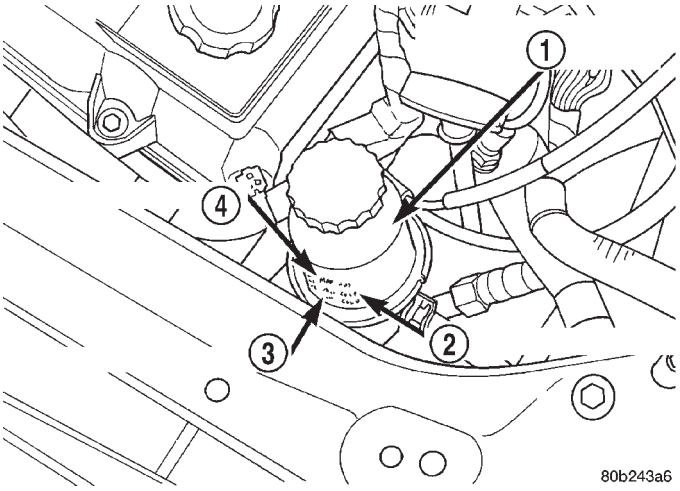


Fig. 8 Power Steering Fluid Reservoir (2.7L Engine)

1 – POWER STEERING FLUID RESERVOIR
2 – MAX. COLD LEVEL
3 – MIN. COLD LEVEL
4 – MAX. HOT LEVEL

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES OR DRIVE BELTS. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

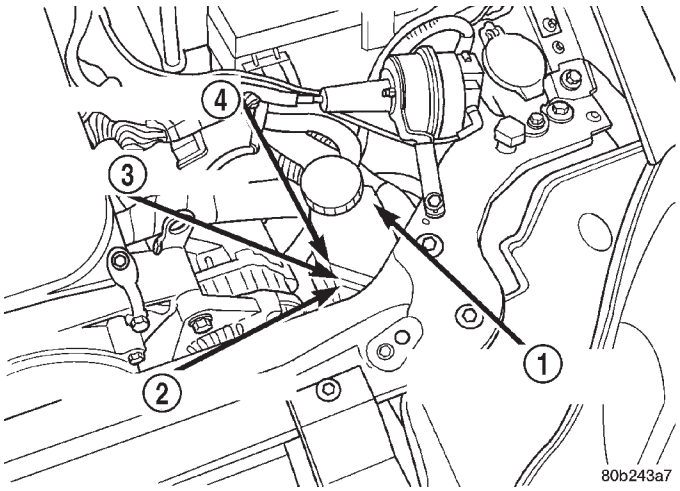


Fig. 9 Power Steering Fluid Reservoir (3.2L/3.5L Engine)

1 – POWER STEERING FLUID RESERVOIR
2 – MIN. COLD LEVEL
3 – MAX. COLD LEVEL
4 – MAX. HOT LEVEL

CAUTION: While disconnected, cap all open ends of the power steering fluid hose connections. This will prevent the entry of foreign material into the components when power steering hoses are removed.

POWER STEERING FLUID HOSES (PRESSURE AND RETURN)

NOTE: On this vehicle the power steering fluid pressure and return hoses are connected together by their mounting brackets. For this reason both hoses need to be removed together if either of the hoses should fail. Use the procedure below for the replacement of either power steering fluid hose.

REMOVE

On this vehicle the steering gear needs to be removed from the crossmember to remove the power steering hoses from the vehicle.

(1) Remove the battery ground cable from the ground stud on the shock tower and isolate the ground cable by installing the cable isolator on the ground stud (Fig. 10).

(2) Position the front tires of the vehicle so that they are facing straight ahead.

(3) Raise the vehicle on a frame contact type hoist until the front tires of the vehicle are just off the floor. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

REMOVAL AND INSTALLATION (Continued)

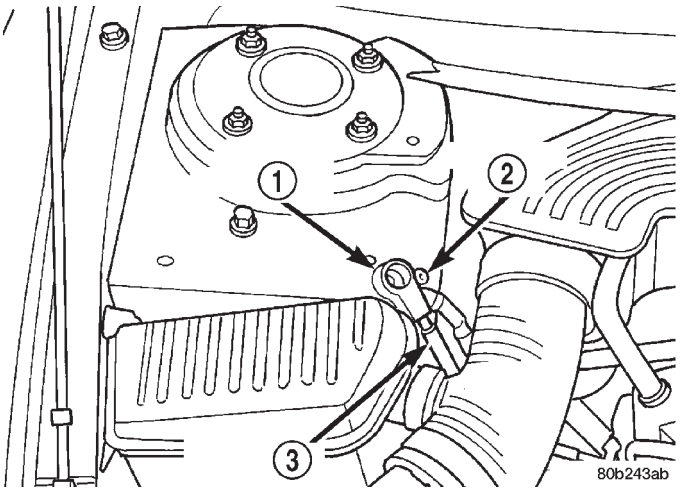


Fig. 10 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(4) Remove caps from both wiper arms at the attachment to the pivots to expose the wiper arm attaching nuts. Remove the nut (Fig. 11) attaching each wiper arm to its pivot

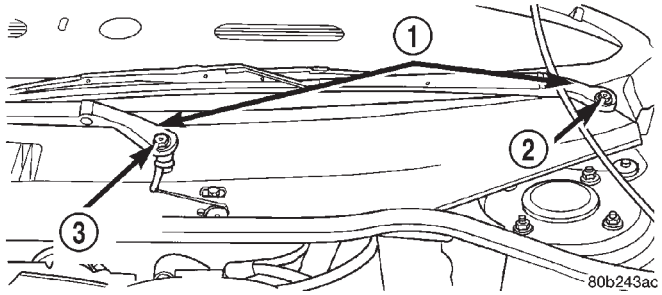


Fig. 11 Wiper Arm Attachment To Pivot

1 – WIPER ARMS
2 – ATTACHING NUT
3 – ATTACHING NUT

(5) Remove the wiper arms from the pivots. Wiper arms are removed from the pivots by rocking them back and force on the pivots until they can be pulled off the pivots.

(6) Remove the wiper module cover and cowl cover (Fig. 12).

(7) Remove the 8 bolts, attaching the reinforcement (Fig. 13) to the strut towers and the 1 bolt (Fig. 13) attaching the wiper module to the reinforcement. Remove the reinforcement from the vehicle.

(8) Remove the in-line resonator and inlet hose (Fig. 14) from the throttle body and air let hose coming from the lid of the air cleaner housing.

NOTE: When locking the steering wheel, the front tires of the vehicle are to be facing straight ahead.

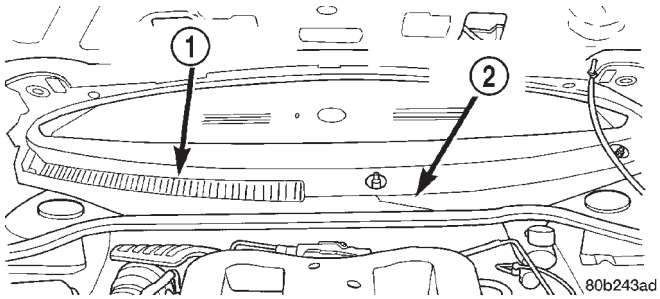


Fig. 12 Wiper Module And Cowl Cover

1 – COWL COVER
2 – WIPER MODULE COVER

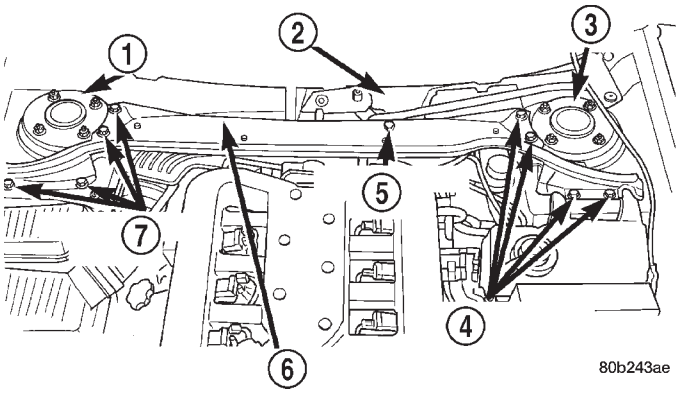


Fig. 13 Reinforcement Attachment To Vehicle

1 – RIGHT STRUT TOWER
2 – WIPER MODULE
3 – LEFT STRUT TOWER
4 – ATTACHING BOLTS
5 – ATTACHING BOLT
6 – REINFORCEMENT
7 – ATTACHING BOLTS

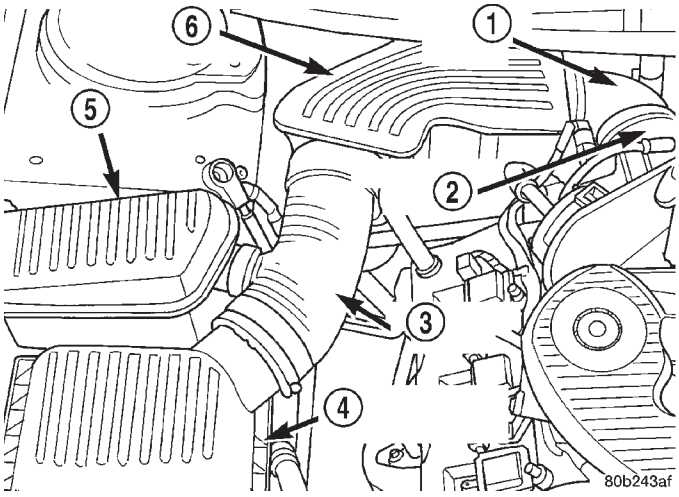


Fig. 14 In-Line Resonator And Air Inlet Hose

1 – AIR INLET HOSE
2 – THROTTLE BODY
3 – AIR INLET HOSE
4 – AIR CLEANER HOUSING LID
5 – RESONATOR
6 – IN-LINE RESONATOR

REMOVAL AND INSTALLATION (Continued)

(9) Using a steering wheel clamp, (Fig. 15) lock the steering wheel from rotating.

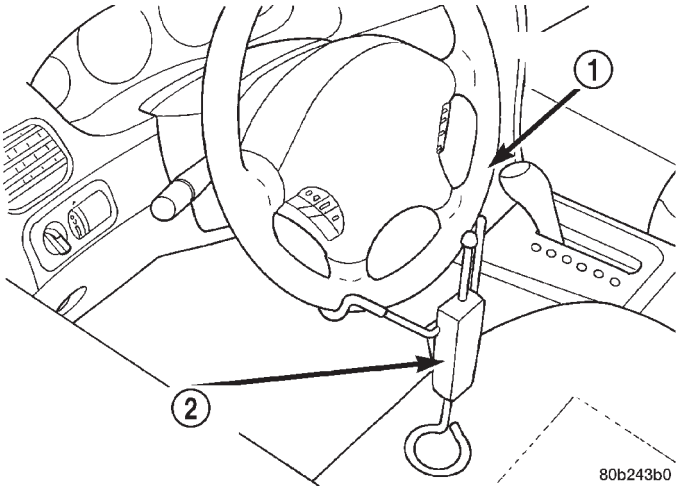


Fig. 15 Steering Wheel Lock Installed (Typical)

1 – STEERING WHEEL
2 – STEERING WHEEL CLAMP

CAUTION: Before removing the steering column coupler from the intermediated steering shaft be sure the steering wheel is locked from rotating (Fig. 15). If the steering wheel is allowed to rotate freely after it is disconnected from the intermediated shaft, the clockspring will be damaged and will need to be replaced.

(10) Remove the retaining pin and the coupler bolt from the steering column coupler (Fig. 16). Separate the intermediate steering shaft from the steering column coupler.

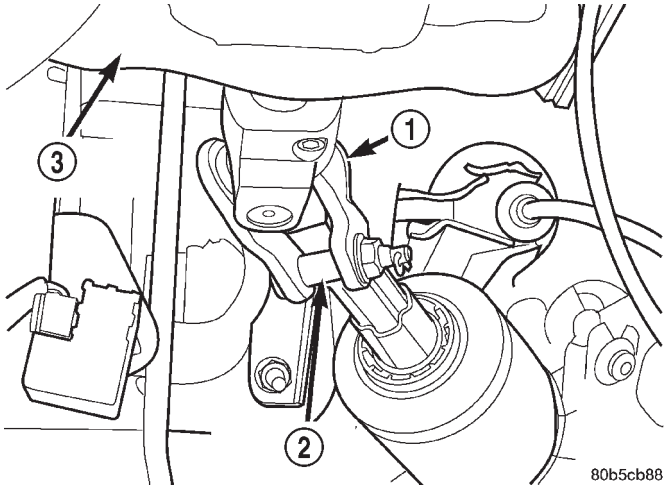


Fig. 16 Steering Column Coupler

1 – COUPLER
2 – PINCH BOLT
3 – STEERING COLUMN

(11) Bend back the retaining tabs on the mounting plate for the tie rod to steering gear mounting bolts (Fig. 17).

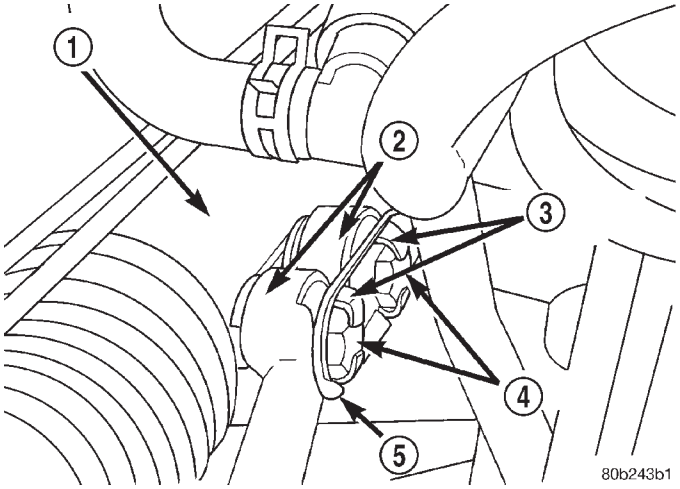


Fig. 17 Tie Rod Attachment Bolt Retaining Tabs

1 – STEERING GEAR
2 – TIE RODS
3 – RETAINING TABS
4 – BOLTS
5 – PLATE

(12) Remove the bolts, mounting plate and washers (Fig. 18) attaching the tie rods to the steering gear. Lay the tie rods on top of the transaxle bell housing.

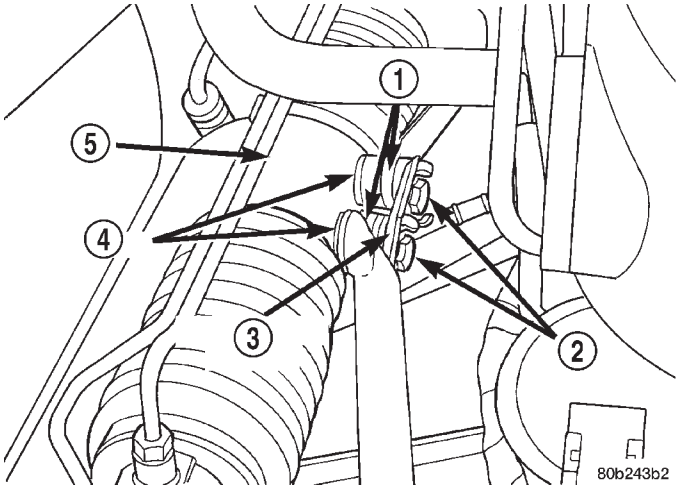


Fig. 18 Tie Rod To Steering Gear Attaching Bolts

1 – TIE RODS
2 – BOLTS
3 – MOUNTING PLATE
4 – WASHERS
5 – STEERING GEAR

REMOVAL AND INSTALLATION (Continued)

NOTE: The following step should be done to prevent excessive spilling of power steering fluid when the power steering fluid lines are removed from the steering gear.

(13) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(14) Remove the 2 nuts (Fig. 19) mounting the master cylinder to the vacuum booster.

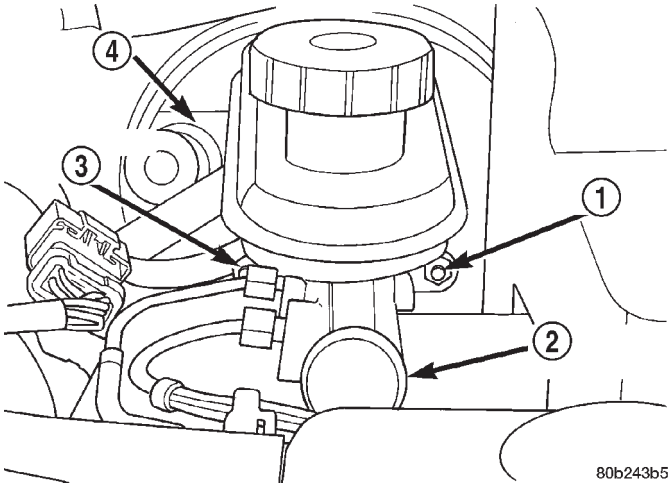


Fig. 19 Master Cylinder To Vacuum Booster Mounting

1 – MOUNTING NUT
2 – MASTER CYLINDER
3 – MOUNTING NUT
4 – VACUUM BOOSTER

(15) Remove the master cylinder with the brake tubes connected, from the vacuum booster. Carefully position the master cylinder in an upright position on the left side valve cover of the engine.

(16) Remove the vacuum supply hose to the vacuum booster at the check valve in the vacuum booster. Position the vacuum hose out of the way.

(17) Remove the power steering fluid pressure hose and return hose (Fig. 20) from the steering gear

(18) Remove the 2 bolts attaching the left side of the steering gear to the crossmember (Fig. 21).

(19) Remove the 2 bolts attaching the steering gears right side mounting bracket (Fig. 22) to the crossmember.

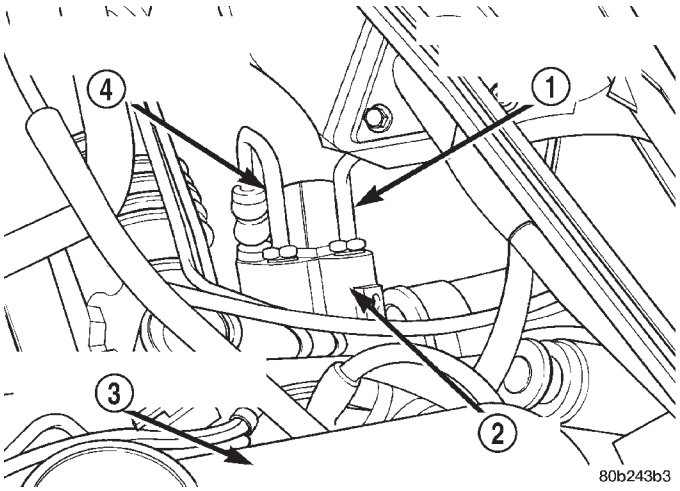


Fig. 20 Power Steering Hose Connections At Steering Gear

1 – POWER STEERING FLUID RETURN HOSE
2 – STEERING GEAR
3 – MASTER CYLINDER FLUID RESERVOIR
4 – POWER STEERING FLUID PRESSURE HOSE

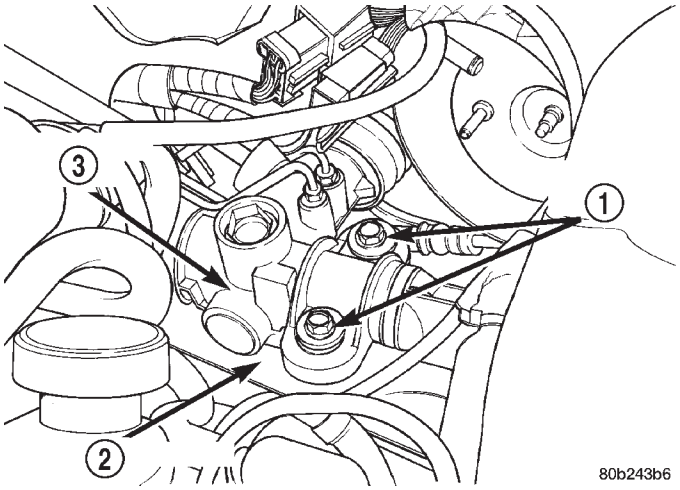


Fig. 21 Steering Gear Attachment To Crossmember (Left Side)

1 – MOUNTING BOLTS
2 – CROSSMEMBER
3 – STEERING GEAR

(20) Move the steering gear to clear the pressure and return lines.

REMOVAL AND INSTALLATION (Continued)

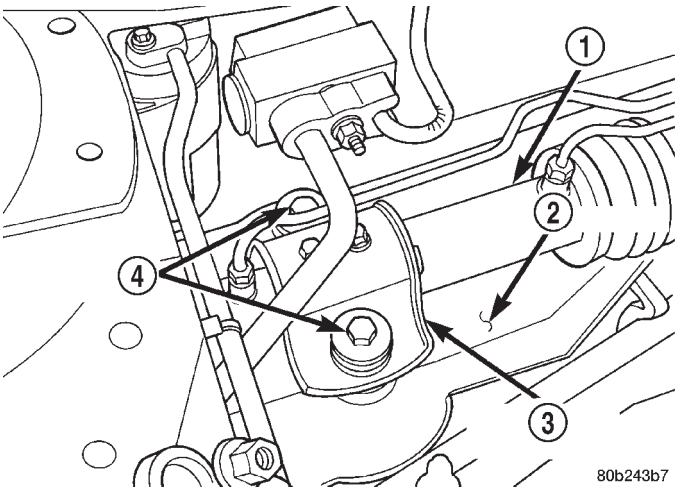


Fig. 22 Steering Gear Attachment To Crossmember (Right Side)

1 – STEERING GEAR
2 – CROSSMEMBER
3 – MOUNTING BRACKET
4 – MOUNTING BOLTS

(21) Remove the bolts mounting the power steering hoses to the left frame rail (Fig. 23).

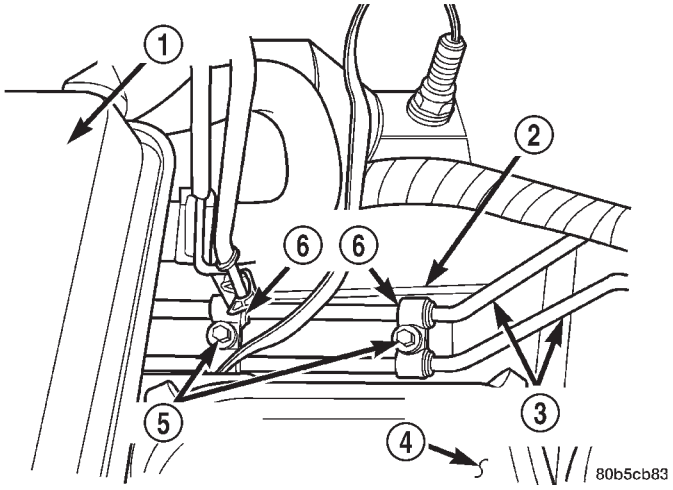


Fig. 23 Power Steering Hose To Frame Rail Mounting

1 – COOLANT RECOVERY BOTTLE
2 – FRAME RAIL
3 – POWER STEERING FLUID TUBES
4 – LEFT STRUT TOWER
5 – BOLTS
6 – ROUTING CLIPS

(22) Raise vehicle.

(23) 300M only — The front fascia will require removal to access the power steering cooler. See Frames and Bumpers, Group 13, in this service manual for required procedure.

(24) Remove the power steering fluid return hose from the power steering fluid cooler (Fig. 24). Let the remaining power steering fluid drain out of the return hose and the power steering fluid cooler.

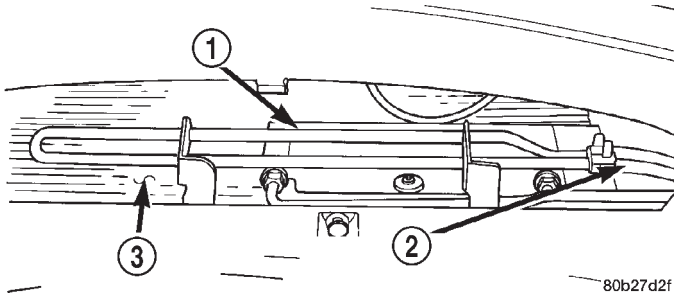


Fig. 24 Power Steering Return Hose At Cooler

1 – POWER STEERING FLUID COOLER
2 – POWER STEERING FLUID RETURN HOSE
3 – AIR CONDITIONING CONDENSER

(25) Lower the vehicle.

(26) Remove the power steering fluid hoses from the vehicle. The power steering fluid hoses are removable from the back of the engine compartment (Fig. 25).

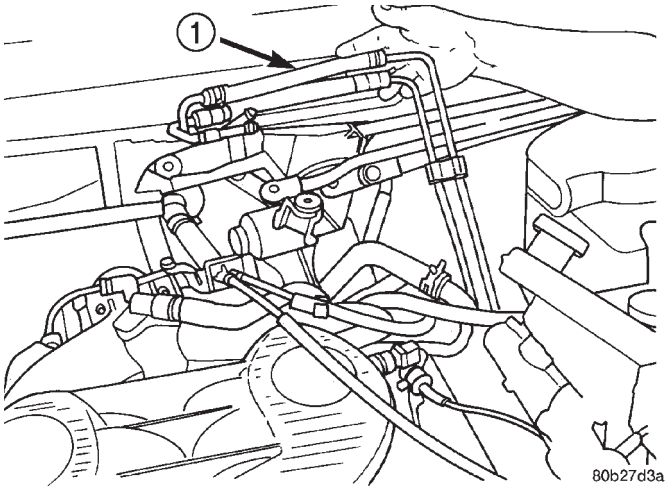


Fig. 25 Power Steering Hose Removal/Installation

1 – POWER STEERING FLUID HOSES

INSTALL

(1) Install the power steering hoses into the vehicle using the reverse of the removal procedure

(2) Raise the vehicle.

(3) Install the power steering fluid return hose on the power steering fluid cooler (Fig. 24). **Be sure the hose clamp is installed past the upset bead on the power steering fluid cooler.**

(4) 300M only — Reinstall front fascia.

(5) Lower the vehicle until the tires are just clear of the floor

(6) Install the power steering hoses onto the left frame rail (Fig. 23) by installing the routing clip bolts. Tighten the bolts to 10 N·m (89 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

(7) Slide steering gear and intermediate shaft back into dash panel sealing boot. Align the steering gear mounting holes with its mounting holes in crossmember.

(8) Loosely install the bolts mounting the left side of the steering gear to the crossmember (Fig. 21).

CAUTION: Tightening the steering gear to crossmember mounting bolts to the proper torque is very important.

(9) Install the bolts mounting the right side mounting bracket for the steering gear to the crossmember (Fig. 22). Tighten the mounting bolts to a torque of 58 N·m (43 ft. lbs.).

(10) Tighten the bolts mounting the left side of the steering gear to the crossmember (Fig. 21) to a torque of 58 N·m (43 ft. lbs.).

(11) Attach power steering fluid, pressure and return lines into proper ports of the steering gear (Fig. 20). Tighten both power steering hose tube nuts to a torque of 47 N·m (35 ft. lbs.).

CAUTION: Before installing tie rods on steering gear be sure the tie rod spacer block inside the steering gear bellows (Fig. 26) is correctly aligned with the bolt holes in the rack of the steering gear and the steering gear bellows.

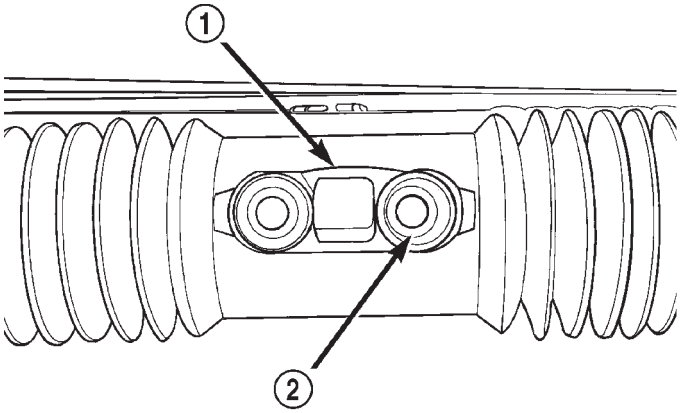


Fig. 26 Tie Rod Spacer Block

1 – STEERING GEAR BOOT
2 – SPACER BLOCK

(12) Align center take off on steering gear with the tie rod assemblies. Install tie rod attaching bolts and washers into steering gear. **Be sure washers are installed between tie rods and steering gear (Fig. 27).** Tighten the tie rod to steering gear bolts to a torque of 82 N·m (60 ft. lbs.).

CAUTION: After tie rod attaching bolts are torqued, bend attaching bolt retaining tabs against heads of attaching bolts (Fig. 17).

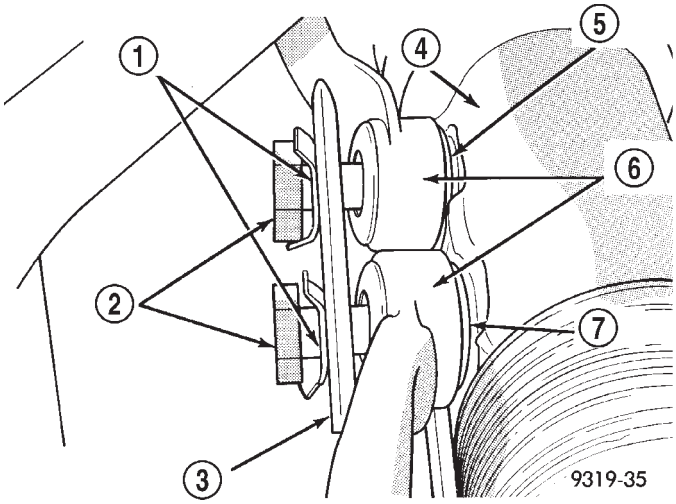


Fig. 27 Tie Rod Attachment To Steering Gear

1 – RETAINING TABS
2 – BOLTS
3 – PLATE
4 – STEERING GEAR
5 – WASHER
6 – TIE RODS
7 – WASHER

(13) Install the vacuum hose for the vacuum booster on intake manifold vacuum port. Install hose clamp on vacuum hose.

(14) Install the master cylinder on the vacuum booster. Install the 2 nuts attaching the master cylinder to the vacuum booster. Tighten the master cylinder mounting nuts to a torque of 28 N·m (250 in. lbs.).

(15) Remove the clamp from the steering wheel (Fig. 15).

(16) Install the intermediate shaft onto the steering column shaft. Install steering column coupler pinch bolt (Fig. 16) and tighten to a torque of 28 N·m (21 ft. lbs.). Install the pinch bolt nut retaining pin in pinch bolt.

(17) Install the reinforcement (Fig. 13) on the vehicle. Install the 8 bolts, attaching the reinforcement (Fig. 13) to the strut towers. Install the bolt (Fig. 13) attaching the wiper module to the reinforcement..

(18) Install the in-line resonator and inlet hose (Fig. 14) on the throttle body and air let hose coming from the lid of the air cleaner housing.

(19) Install the covers (Fig. 12) over the wiper module and the cowl. Install and securely tighten the attaching screws.

(20) Install the wiper arms (Fig. 11) on the pivots. Install and securely tighten the wiper arm to pivot

REMOVAL AND INSTALLATION (Continued)

attaching nuts. Install the caps on the wiper arms covering the pivot nuts.

(21) Install the battery ground cable onto the ground stud on the shock tower.

CAUTION: Do not use automatic transmission fluid. Use only the proper Mopar Power Steering Fluid or equivalent when filling the power steering fluid reservoir.

(22) Perform Power Steering Pump Initial Operation procedure which can be found in the Power Steering Pump section of this group to properly refill and bleed power steering system.

(23) Lower vehicle.

(24) Adjust front toe if necessary. Refer to Suspension, Group 2, for the required procedure.

POWER STEERING FLUID COOLER

REMOVAL

(1) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(2) Raise vehicle using a frame contact type hoist or supported as required using jack stands. See Hoisting in the Lubrication And Maintenance group of this service manual for the required hoisting or jacking procedure to be used for this vehicle.

(3) 300M only - The front fascia will require removal to access the power steering cooler. See Frames and Bumpers, Group 13, in this service manual for required procedure.

(4) Remove the hose clamp from the lower hose at the power steering fluid cooler (Fig. 28). Remove the lower hose from the power steering fluid cooler. Drain remaining power steering fluid from the hoses and the power steering fluid cooler.

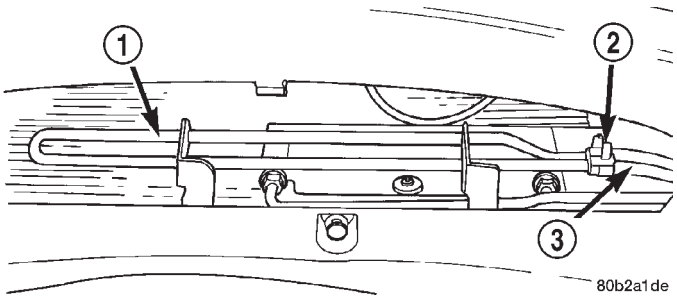


Fig. 28 Lower Hose At Power Steering Fluid Cooler

1 – POWER STEERING FLUID COOLER
2 – HOSE CLAMP
3 – LOWER HOSE

(5) Remove the hose clamp and upper hose (Fig. 29) from the power steering fluid cooler.

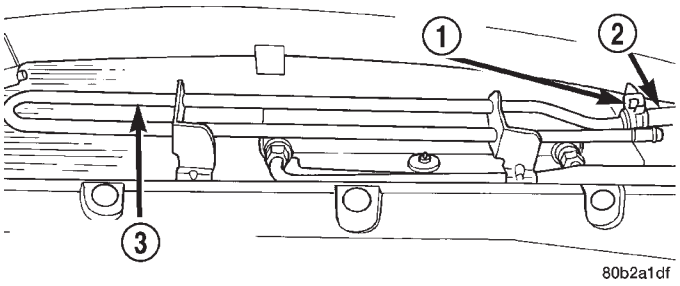


Fig. 29 Upper Hose At Power Steering Fluid Cooler

1 – HOSE CLAMP
2 – UPPER HOSE
3 – POWER STEERING FLUID COOLER

(6) Remove the 6 clips (Fig. 30) mounting the air dam to the radiator lower support.

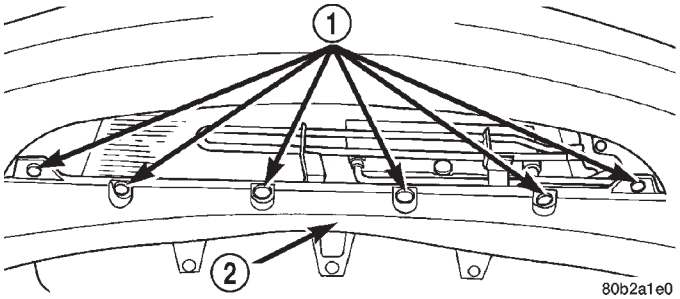


Fig. 30 Air Dam Retaining Clips

1 – RETAINING CLIPS
2 – AIR DAM

(7) Remove the 2 nuts (Fig. 31) attaching the power steering fluid cooler to the radiator lower crossmember.

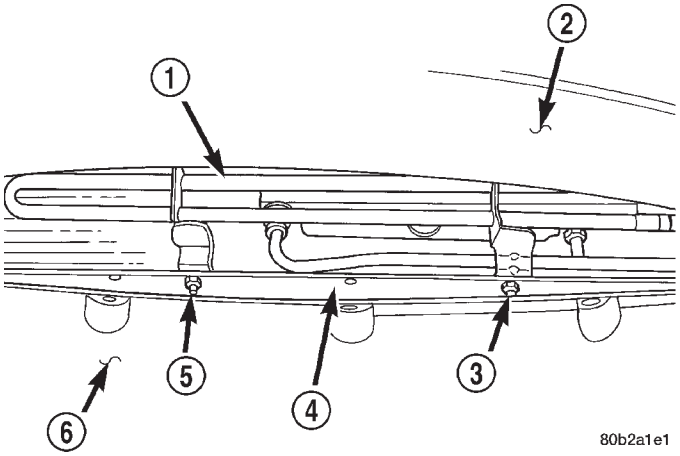


Fig. 31 Power Steering Fluid Cooler Attachment

1 – POWER STEERING FLUID COOLER
2 – FASCIA
3 – NUT
4 – RADIATOR LOWER SUPPORT
5 – NUT
6 – AIR DAM

REMOVAL AND INSTALLATION (Continued)

(8) Remove the power steering fluid cooler from the radiator lower crossmember.

INSTALLATION

(1) Install the power steering fluid cooler on the radiator lower crossmember.

(2) Install the 2 nuts (Fig. 31) attaching the power steering fluid cooler to the radiator lower crossmember. Tighten the attaching nuts to a torque of 10 N·m (89 in. lbs.)

(3) Install the air dam on the radiator lower support. Attach the air dam to the radiator lower support using **new** retaining clips.

(4) Install power steering fluid hoses (Fig. 29) and (Fig. 28) on the power steering fluid cooler.. **Be sure hose clamps are installed on hose past the upset bead on the power steering oil cooler.**

(5) 300M only - Reinstall front fascia.

(6) Lower the vehicle to a point where front tires are just off the ground.

CAUTION: Do not use automatic transmission fluid. Use only the proper Mopar Power Steering Fluid or equivalent when filling the power steering fluid reservoir.

(7) Perform Power Steering Pump Initial Operation procedure which can be found in the Power Steering Pump section of this group to properly refill and bleed power steering system.

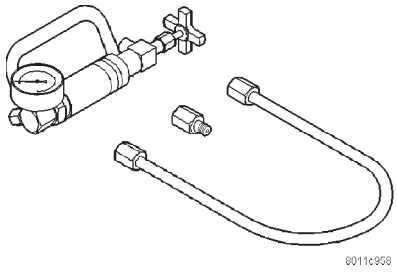
SPECIFICATIONS

POWER STEERING FASTENER TORQUE SPECIFICATIONS

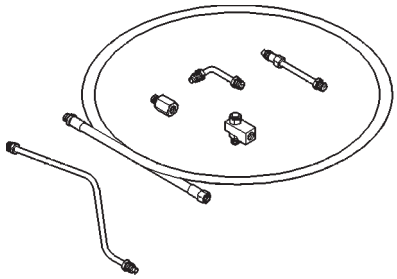
DESCRIPTION	TORQUE
Power Steering Gear:	
Crossmember Bolts	58 N·m (43 ft. lbs.)
Tie Rod Steering Arm Nut	37 N·m (27 ft. lbs.)
Tie Rod Steering Gear Bolt	82 N·m (60 ft. lbs.)
Tie Rod Adjuster Pinch bolt	38 N·m (28 ft. lbs.)
Power Steering Fluid Hoses:	
Hose Tube Nuts	47 N·m (35 ft. lbs.)
Power Steering Pump:	
Discharge Fitting	84 N·m (62 ft. lbs.)
Mounting Bolts	28 N·m (250 in. lbs.)
Power Steering Fluid Reservoir:	
Mounting Bolt-2.7L Pulley Side	13 N·m (115 in. lbs.)
Mounting Bolts-2.7L Rear	24 N·m (212 in. lbs.)
Mounting Screw-3.2L/3.5L	12 N·m (105 in. lbs.)

SPECIAL TOOLS

POWER STEERING



Power Steering Analyzer 6815



Adapters, Power Steering Analyzer 6893

POWER STEERING PUMP

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DESCRIPTION AND OPERATION

POWER STEERING PUMP

DESCRIPTION

Hydraulic pressure for the operation of the power steering system is provided by a belt driven rotary power steering pump. The power steering pump is a constant flow rate and displacement vane type pump. Vehicles equipped with the 2.7 liter engine use a power steering pump that has an integral reservoir for the power steering fluid (Fig. 1). Vehicles equipped with the 3.2 liter or 3.5 liter engine use a power steering pump (Fig. 2) that has a remotely mounted reservoir for the power steering fluid.

Both power steering pumps mount to the front of the engine on the driver's side.

The service procedures for the power steering pump are limited to the areas and components listed below.

- Power steering fluid reservoirs, related components and attaching hardware.
- Power steering pump pulley.

No repair procedures are to be done on the internal components of the power steering pump. Repair of a power steering fluid leak from any area of the power steering pump is not allowed.

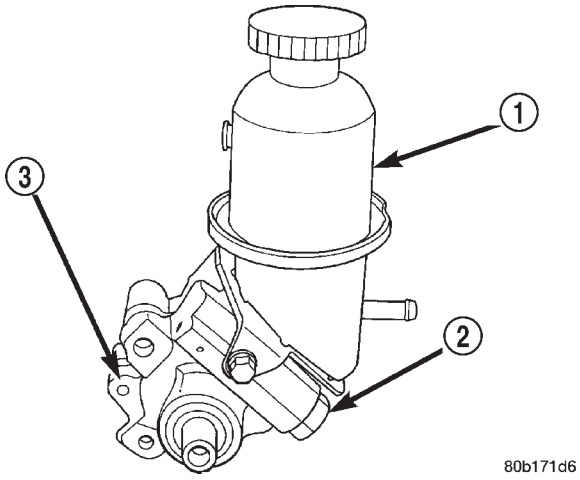


Fig. 1 Power Steering Pump (2.7L Engine)

1 – POWER STEERING FLUID RESERVOIR
2 – POWER STEERING PUMP PRESSURE FITTING
3 – POWER STEERING PUMP

OPERATION

The Power steering pump operates as follows. A belt driven pulley turns a shaft which drives a rotor. Rectangular pumping vanes carried by the shaft driven rotor move the fluid from the intake to the cam ring pressure cavities. As the rotor begins to turn, centrifugal force throws the vanes against the inside surface of the cam ring to pickup residual oil. This oil is then forced into the high pressure area. As more oil is picked up by the vanes, the additional oil is forced into the cavities of the thrust plate through two crossover holes in the cam ring and pressure plate. The crossover holes empty into the high pressure area between the pressure plate and the housing end cover.

When the high pressure area of the power steering pump is filled with power steering fluid, the fluid flows under the vanes in the rotor slots, forcing the vanes to follow the inside oval surface of the cam ring. As the vanes reach the restricted area of the cam ring, oil is forced out from between the vanes. When excess oil flow is generated during high-speed

DESCRIPTION AND OPERATION (Continued)

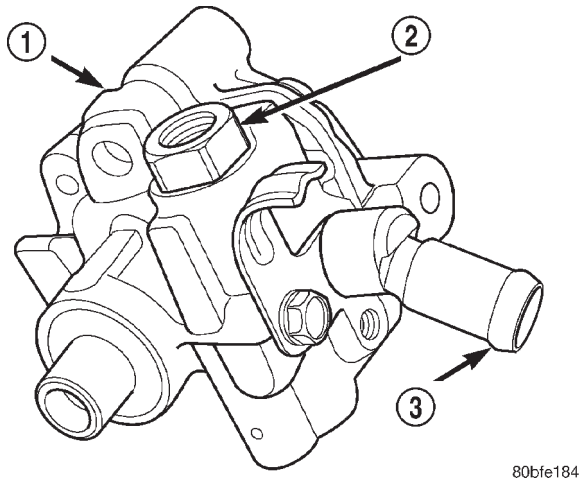


Fig. 2 Power Steering Pump (3.2L/3.5L Engine)

1 – POWER STEERING PUMP
2 – PUMP PRESSURE FITTING
3 – FLUID SUPPLY FITTING

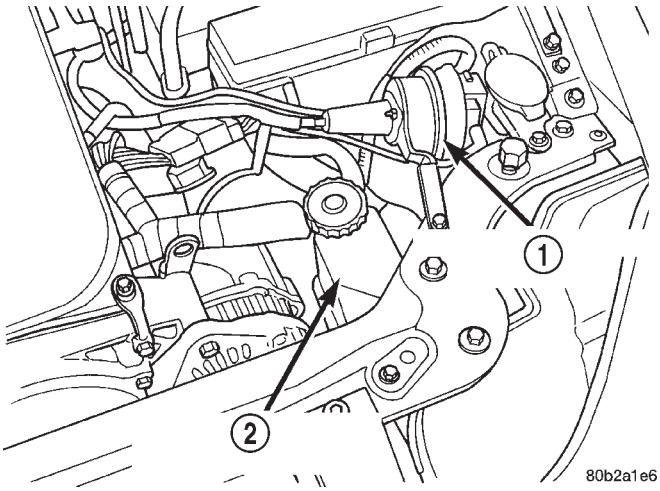


Fig. 3 Power Steering Fluid Reservoir (3.2L/3.5L Engine)

1 – SPEED CONTROL SERVO
2 – POWER STEERING FLUID RESERVOIR

operation, a regulated amount of oil returns to the pump intake side through a flow control valve. The flow control valve reduces the power required to drive the pump and holds down temperature build-up.

When steering conditions exceed maximum pressure requirements, such as turning the wheels against the stops, the pressure built up in the steering gear also exerts pressure on the spring end of the flow control valve. The end of the valve houses the pressure relief valve. High pressure lifts the relief valve ball from its seat and allows oil to flow through a trigger orifice located in the outlet fitting. This reduces pressure on the spring end of the flow control valve which then opens and allows the oil to return to the intake side of the pump. This action limits maximum pressure output of the pump to a safe level.

Under normal power steering pump operating conditions, the pressure requirements of the pump are below maximum, causing the pressure relief valve to remain closed.

In the event of a power steering pump drive belt failure, manual steering control of the vehicle can still to be maintained. However, under these conditions, steering effort will significantly increase.

POWER STEERING FLUID RESERVOIR

DESCRIPTION

Vehicles equipped with the 2.7 liter engine use a power steering pump that has an integral reservoir (Fig. 1). Vehicles equipped with the 3.2 liter or 3.5 liter engine use a power steering pump that has a remotely mounted reservoir (Fig. 3).

OPERATION

The power steering fluid reservoir stores fluid for the power steering system.

SERVICE PROCEDURES

POWER STEERING PUMP INITIAL OPERATION

CAUTION: The fluid level should be checked with engine off to prevent injury from moving components. Use only Mopar® Power Steering Fluid. Do not use automatic transmission fluid. Do not overfill.

Wipe the power steering fluid reservoir and filler cap clean. Check the level of the power steering fluid in the reservoir. The power steering fluid level should be between MAX. COLD and MIN. COLD when the fluid is at a normal ambient temperature of approximately 32°C to 43°C (90°F to 110°F).

(1) Fill the pump fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.

(2) Start the engine and let run for a few seconds. Then turn the engine off.

(3) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(4) Raise the front wheels off the ground.

(5) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops for less than 2 seconds at a time.

(6) Add power steering fluid if necessary.

(7) Lower the vehicle and turn the steering wheel slowly from lock to lock.

SERVICE PROCEDURES (Continued)

(8) Stop the engine. Check the fluid level and refill as required.

(9) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

(10) Lower the vehicle.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES OR DRIVE BELTS. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

CAUTION: While disconnected, cap all open ends of the power steering fluid hose connections. This will prevent the entry of foreign material into the components when power steering hoses are removed.

POWER STEERING PUMP (2.7L ENGINE)

NOTE: Before proceeding, review SERVICE WARNINGS AND CAUTIONS found at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove the battery ground cable from the ground stud on the shock tower and isolate the ground cable by installing the cable isolator on the ground stud (Fig. 4).

NOTE: The following step should be done to prevent excessive spilling of power steering fluid when the power steering fluid lines are removed from the power steering pump.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

CAUTION: When removing the power steering fluid supply hose from the nipple on the power steering fluid reservoir, do not use excessive force. The will result in the nipple being broken off of the power steering fluid reservoir.

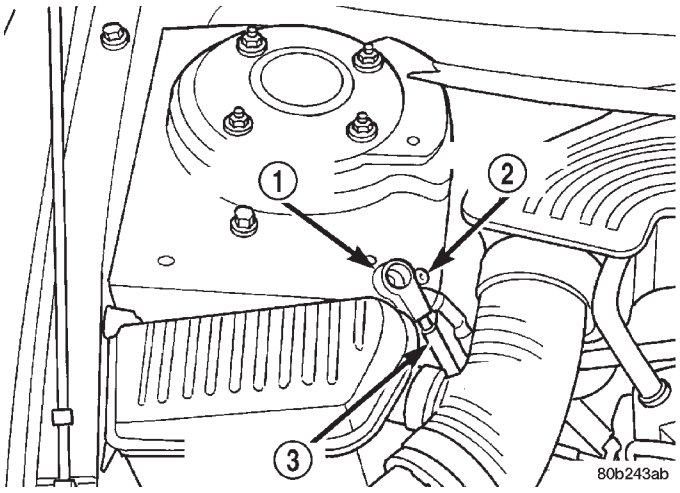


Fig. 4 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(3) Remove the power steering fluid return hose (Fig. 5) from the power steering fluid reservoir.

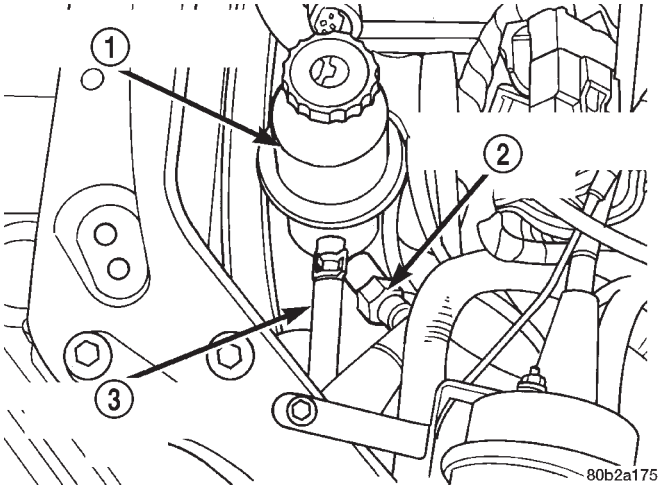


Fig. 5 Return Hose At Power Steering Fluid Reservoir

1 – POWER STEERING FLUID RESERVOIR
2 – POWER STEERING FLUID PRESSURE HOSE
3 – POWER STEERING FLUID RETURN HOSE

(4) Let power steering fluid drain from the power steering fluid reservoir and power steering pump.

(5) Install a cap on the open nipple of the power steering fluid reservoir to prevent power steering fluid from spilling when removing the power steering pump.

REMOVAL AND INSTALLATION (Continued)

(6) Remove the power steering fluid pressure hose (Fig. 6) from the pressure fitting on the power steering pump.

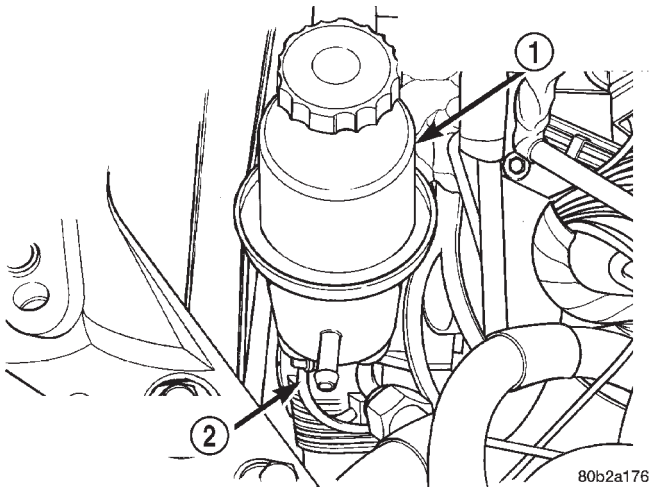


Fig. 6 Pressure Hose At Power Steering Pump

1 – POWER STEERING FLUID RESERVOIR
2 – POWER STEERING FLUID PRESSURE HOSE

(7) Let remaining power steering fluid drain from the power steering pump.

(8) Loosen the lock-nut (Fig. 7) on the front of the pulley for the serpentine drive belt tensioner.

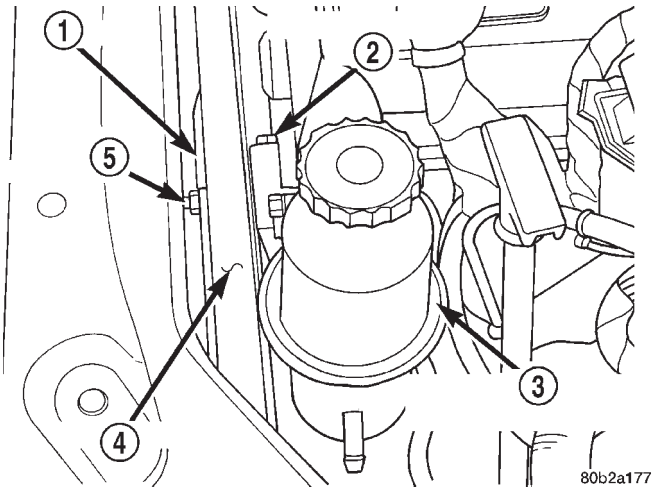


Fig. 7 Drive Belt Tensioner Lock-Nut And Adjustment Bolt

1 – PULLEY
2 – ADJUSTMENT BOLT
3 – POWER STEERING FLUID RESERVOIR
4 – DRIVE BELT
5 – LOCK-NUT

(9) Using the adjustment bolt (Fig. 7) remove the tension from the drive belt for the power steering pump.

(10) Remove the drive belt from the power steering pump pulley.

NOTE: Access for the power steering pump mounting bolts is through the holes in the face of the power steering pump pulley.

(11) Remove the 3 bolts attaching the power steering pump to the power steering pump mounting bracket.

NOTE: The following step must be performed to have the space necessary to remove the power steering pump from the mounting bracket.

(12) Insert a screwdriver between the power steering pump and the sleeve in the tensioner bracket (Fig. 8). Using the screwdriver push the sleeve forward in the tensioner bracket until it is flush with the back side of the tensioner bracket (Fig. 8).

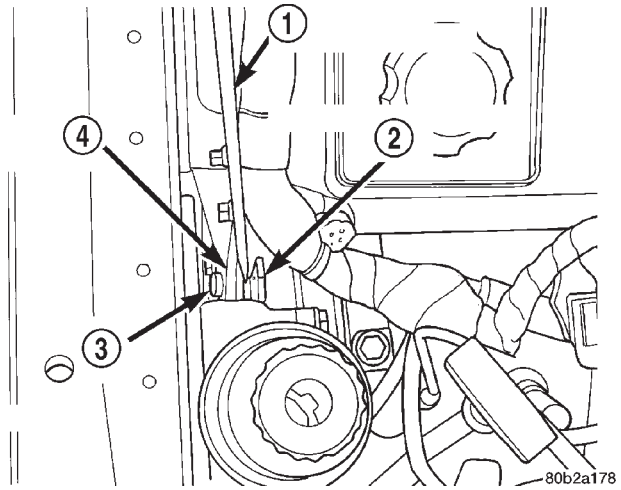


Fig. 8 Tensioner Bracket To Power Steering Pump Sleeve

1 – SCREWDRIVER
2 – POWER STEERING PUMP
3 – SLEEVE
4 – TENSIONER BRACKET

(13) Remove the power steering pump, power steering fluid reservoir and pulley as an assembly from the engine. Power steering pump is removed from the top of the engine.

(14) Transfer the required parts from the removed power steering pump to the replacement power steering pump. See Disassembly and Assembly in this section of this group in the service manual.

INSTALLATION

(1) Install the power steering pump back in the mounting bracket using the reverse sequence of its removal.

REMOVAL AND INSTALLATION (Continued)

NOTE: The long mounting bolt for the power steering pump is installed in the location where the sleeve is in the tensioner bracket.

(2) Loosely install the 3 bolts mounting the power steering pump to the mounting bracket.

NOTE: When tightening the power steering pump mounting bolt going through the sleeve (Fig. 8) be sure the sleeve is fully seated against the power steering pump.

(3) Tighten the power steering pump mounting bolts to a torque of 28 N·m (250 in. lbs.).

(4) Install the drive belt on the power steering pump pulley. Refer to Cooling, Group 7, for required installation and tensioning procedure.

(5) Securely tighten the lock-nut on the pulley of the drive belt tensioner (Fig. 7).

(6) Install the power steering pressure hose in the pressure fitting of the power steering pump (Fig. 6). Tighten the power steering fluid pressure hose tube nut to a torque of 47 N·m (35 ft. lbs.).

(7) Install the power steering fluid return hose on the power steering fluid reservoir. **When installing the hose clamp on the power steering fluid return hose be sure the clamp is installed past the upset bead on the nipple of the power steering fluid reservoir.**

(8) Connect the battery ground cable onto the ground stud located on the strut tower.

CAUTION: Do not use automatic transmission fluid in this vehicles power steering system. Only use Mopar Power Steering Fluid, or equivalent.

(9) Perform Power Steering Pump Initial Operation procedure which can be found in the Power Steering Pump section of this group, to properly refill and bleed power steering system.

POWER STEERING PUMP (3.2L/3.5L ENGINE)

NOTE: Before proceeding, review SERVICE WARNINGS AND CAUTIONS found at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove the battery ground cable from the ground stud on the shock tower and isolate the ground cable by installing the cable isolator on the ground stud (Fig. 9).

NOTE: The following step should be done to prevent excessive spilling of power steering fluid when the power steering fluid lines are removed from the power steering pump.

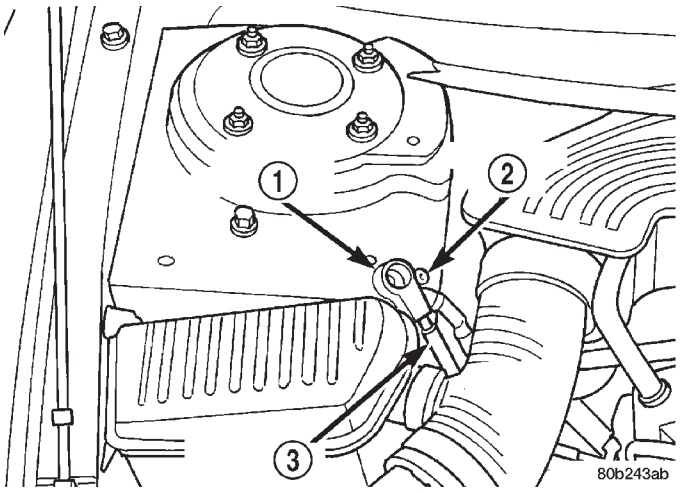


Fig. 9 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Raise vehicle.

(4) Remove the power steering fluid supply hose (Fig. 10) from the supply fitting on the power steering pump.

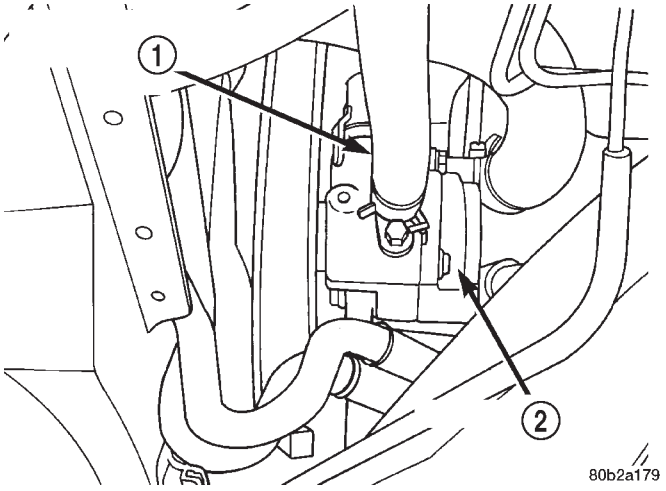


Fig. 10 Power Steering Fluid Supply Hose At Power Steering Pump

1 – POWER STEERING FLUID SUPPLY HOSE
2 – POWER STEERING PUMP

(5) Let power steering fluid drain from the power steering fluid reservoir and power steering pump.

(6) Install a cap on the open nipple of the power steering fluid reservoir to prevent power steering fluid from spilling when removing the power steering pump.

REMOVAL AND INSTALLATION (Continued)

(7) Remove the power steering fluid pressure hose (Fig. 11) from the pressure fitting on the power steering pump.

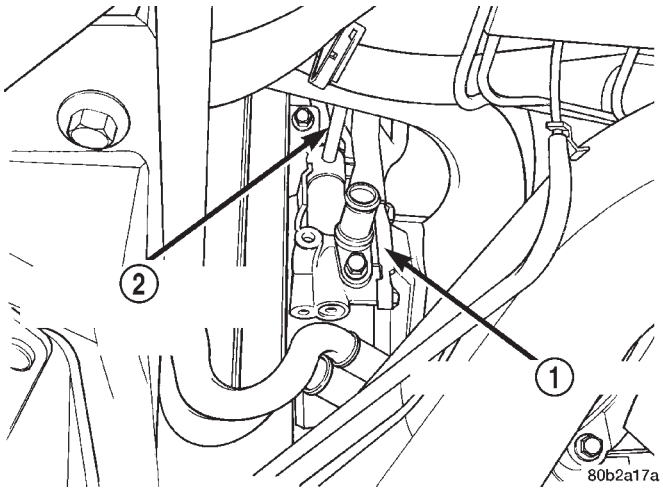


Fig. 11 Pressure Hose At Power Steering Pump

1 – POWER STEERING PUMP
2 – POWER STEERING FLUID PRESSURE HOSE

(8) Let remaining power steering fluid drain from the power steering pump.

(9) Loosen the lock-nut (Fig. 12) on the front of the pulley for the serpentine drive belt tensioner.

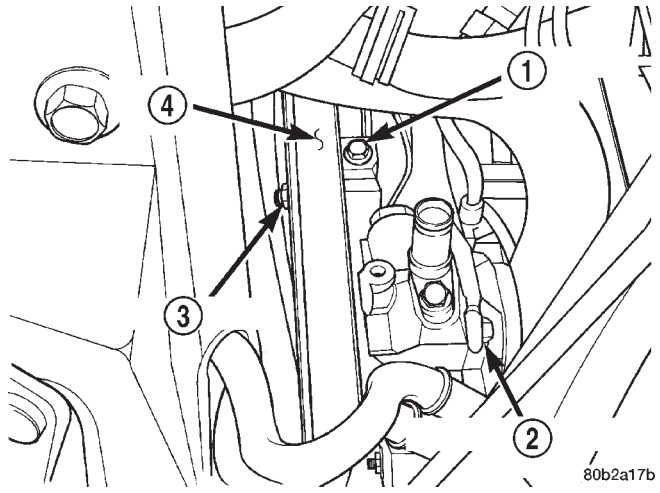


Fig. 12 Drive Belt Tensioner Lock-Nut And Adjustment Bolt

1 – ADJUSTMENT BOLT
2 – POWER STEERING PUMP
3 – LOCK-NUT
4 – DRIVE BELT

(10) Using the adjustment bolt (Fig. 12) remove the tension from the drive belt for the power steering pump.

(11) Remove the drive belt from the power steering pump pulley.

NOTE: Access for the power steering pump mounting bolts is through the holes in the face of the power steering pump pulley.

(12) Remove the 3 bolts attaching the power steering pump to the power steering pump mounting bracket.

(13) Remove the power steering pump from the engine. The power steering pump and pulley are removed as an assembly from the engine. The power steering pump is removed from the bottom of the engine between the radiator lower support and the cradle (Fig. 13).

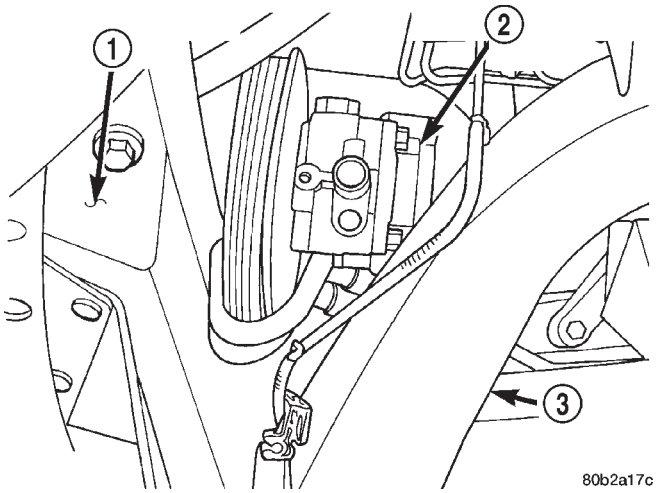


Fig. 13 Power Steering Pump Remove/Install

1 – RADIATOR LOWER SUPPORT
2 – POWER STEERING PUMP
3 – CRADLE

(14) Transfer the required parts from the removed power steering pump to the replacement power steering pump. See Disassembly and Assembly in this section of this group of the service manual.

INSTALLATION

(1) Install the power steering pump back in the mounting bracket using the reverse sequence of its removal (Fig. 13).

(2) Loosely install all 3 bolts mounting the power steering pump to the mounting bracket.

(3) Tighten the power steering pump mounting bolts to a torque of 28 N·m (250 in. lbs.).

(4) Install the drive belt on the power steering pump pulley. Refer to Cooling, Group 7, for required installation and tensioning procedure.

(5) Securely tighten the lock-nut on the pulley of the drive belt tensioner (Fig. 12).

(6) Install the power steering pressure hose on the pressure fitting of the power steering pump (Fig. 11). Tighten the power steering fluid pressure hose tube nut to a torque of 47 N·m (35 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(7) Install the power steering fluid supply hose onto the supply fitting on power steering pump (Fig. 10). **When installing the hose clamp on the power steering fluid return hose be sure the clamp is installed past the upset bead on the nipple of the power steering fluid reservoir.**

(8) Lower vehicle.

(9) Connect the battery ground cable onto the ground stud located on the strut tower.

CAUTION: Do not use automatic transmission fluid in this vehicles power steering system. Only use Mopar Power Steering Fluid, or equivalent.

(10) Perform Power Steering Pump Initial Operation procedure which can be found in the Power Steering Pump section of this group, to properly refill and bleed power steering system.

POWER STEERING FLUID RESERVOIR (3.2L/3.5L Engine)

NOTE: Before proceeding, review SERVICE WARNINGS AND CAUTIONS found at the beginning of the REMOVAL AND INSTALLATION section.

The power steering pump fluid reservoir on this vehicle with these engine applications is remotely mounted from the power steering pump (Fig. 14). The reservoir is located on the left front frame rail.

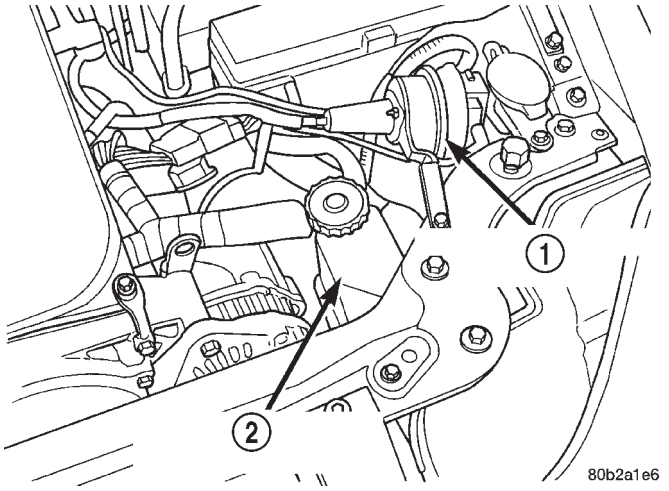


Fig. 14 Power Steering Fluid Reservoir Location

1 – SPEED CONTROL SERVO
2 – POWER STEERING FLUID RESERVOIR

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(2) Remove the power steering return hose from the side of the power steering fluid reservoir. Remove the power steering fluid supply hose going to the power steering pump from the bottom of the power steering fluid reservoir. Let power steering fluid drain from hoses and reservoir.

(3) Lower the vehicle.

(4) Remove the power steering fluid reservoir from the mounting bracket by rotating the rear of the reservoir toward the engine and out of the bracket.

INSTALLATION

(1) Install the power steering fluid reservoir into the mounting bracket. Be sure the retaining tab on the bracket is holding the reservoir in the bracket. Fasten screw to 12 N·m (105 in. lbs.).

(2) Raise vehicle.

(3) Install the power steering return hose onto the nipple on the side of the power steering fluid reservoir. Install the power steering fluid supply hose going to the power steering pump, on the bottom nipple of the power steering fluid reservoir. Install the hose clamps, being sure they are past the hose retention beads on reservoir nipples.

(4) Lower vehicle.

CAUTION: Do not use automatic transmission fluid in power steering system. Only use Mopar Power Steering Fluid, or equivalent.

(5) Fill the power steering pump reservoir to correct fluid level.

(6) Start engine and turn steering wheel several times from stop to stop to bleed air from fluid in system. Stop engine, check fluid level, and inspect system for leaks. See Checking Fluid Level.

DISASSEMBLY AND ASSEMBLY

POWER STEERING FLUID RESERVOIR (2.7L ENGINE)

REMOVE

The 2.7 liter engine uses a power steering fluid reservoir that is integral to the power steering pump. To replace the power steering fluid reservoir used on this power steering pump the power steering pump will need to be removed from the engine.

DISASSEMBLY AND ASSEMBLY (Continued)

(1) Remove the power steering pump from the engine. Refer to the procedure in the Removal And Installation Section in this group of the service manual.

(2) Remove the 3 bolts (Fig. 15) mounting the power steering fluid reservoir to the power steering pump.

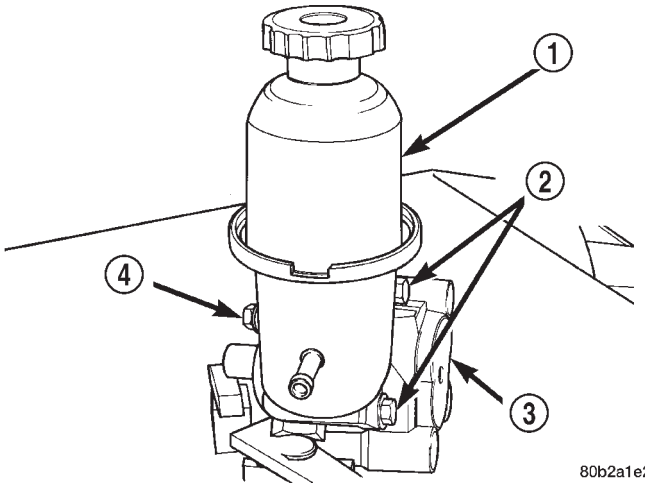


Fig. 15 Fluid Reservoir To Pump Mounting

1 – POWER STEERING FLUID RESERVOIR
2 – MOUNTING BOLTS
3 – POWER STEERING PUMP
4 – MOUNTING BOLT

(3) Separate the power steering fluid reservoir from the power steering pump (Fig. 16). The reservoir is separated from the power steering pump by pulling it straight out of the pump.

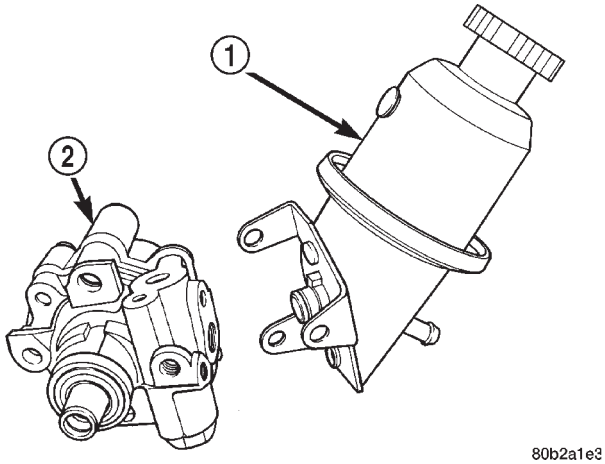


Fig. 16 Fluid Reservoir Removal/Installation

1 – POWER STEERING FLUID RESERVOIR
2 – POWER STEERING PUMP

INSTALL

(1) Lubricate the O-ring seal on the power steering fluid reservoir (Fig. 17) with fresh clean power steering fluid.

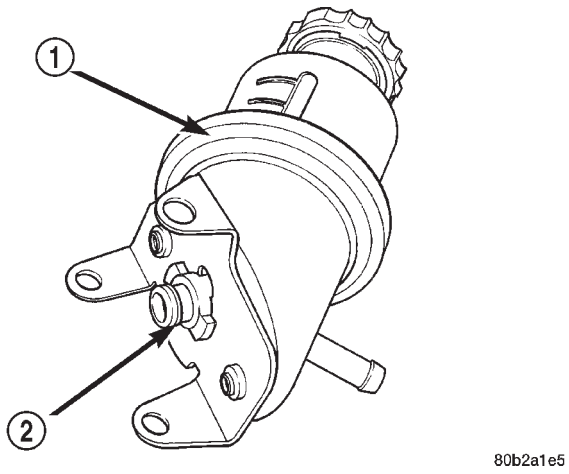


Fig. 17 Reservoir O-Ring Seal

1 – POWER STEERING FLUID RESERVOIR
2 – O-RING

(2) Install the power steering fluid reservoir on the power steering pump (Fig. 16). The reservoir is installed on the pump by pressing the nipple of the reservoir straight into the pump without twisting or rotating the reservoir.

(3) Install and securely tighten the three bolts mounting the power steering fluid reservoir to the power steering pump. Tighten bolt on pulley side to 13 N·m (115 in. lbs.). Tighten bolts on rear to 24 N·m (212 in. lbs.).

(4) Install the power steering pump on the engine. Refer to the procedure in the Removal And Installation Section in this group of the service manual

POWER STEERING PUMP PULLEY

DISASSEMBLE

CAUTION: When mounting the power steering pump in the vise do not clamp the pump in the vise by the body of the power steering pump.

(1) Mount the power steering pump in a vise using the mounting bosses for the power steering pump (Fig. 18).

NOTE: Do not press or hammer on the shaft of the power steering pump in an attempt to remove the pulley. This will damage the internal components of the power steering pump.

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Remove the power steering pump pulley from the power steering pump shaft using Puller, Special Tool C-4333 (Fig. 18).

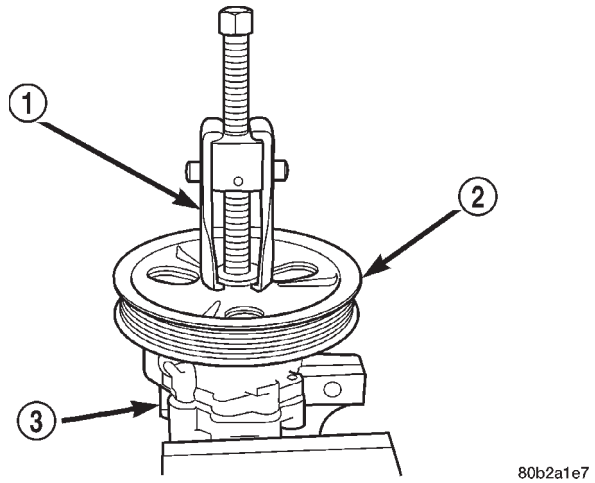


Fig. 18 Power Steering Pump Pulley Removal

1 – SPECIAL TOOL C-4333
2 – POWER STEERING PUMP PULLEY
3 – POWER STEERING PUMP

ASSEMBLE

NOTE: Do not press or hammer on the shaft of the power steering pump in an attempt to install the pulley. This will damage the internal components of the power steering pump.

(1) Place the power steering pump pulley on the end of the power steering pump shaft. Make sure the pulley is installed squarely on the end of the shaft.

CAUTION: When installing the pulley on the power steering pump, Spacer, Special Tool 6936, MUST be used. The spacer provides for the correct pulley location on the power steering pump to provide correct accessory drive belt alignment. The alignment is critical in controlling accessory drive belt noise. It also prevents the pulley from contacting the power steering pump when it is installed, causing power steering pump or pulley damage.

(2) Install Spacer, Special Tool 6936, into the hub of the power steering pump pulley (Fig. 19).

(3) Insert the Pulley Installer, Special Tool C-4063, (without adapters) through hole in spacer. Thread the Installer into the end of the power steering pump shaft (Fig. 20). Tighten the installer into pump shaft.

(4) Holding the Pulley Installer with one wrench so it will not rotate, turn hex (Fig. 20) down threaded rod of installer pushing the pulley onto the shaft of the power steering pump (Fig. 20). Ensure that the tool and the pulley remain aligned with the pump shaft so pulley does not become cocked on shaft.

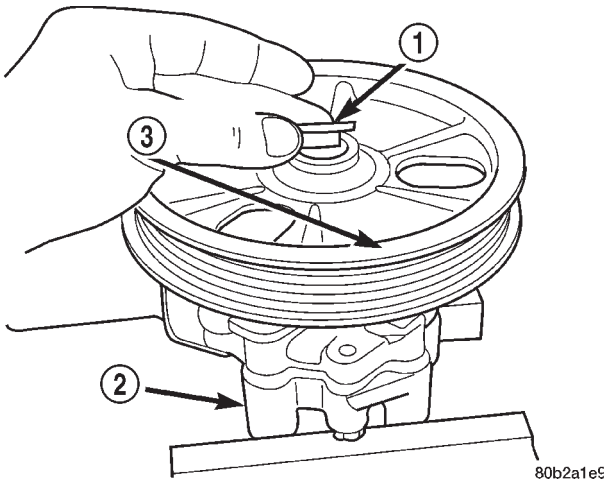


Fig. 19 Spacer Installed In Power Steering Pump Pulley

1 – SPECIAL TOOL 6936
2 – POWER STEERING PUMP
3 – POWER STEERING PUMP PULLER

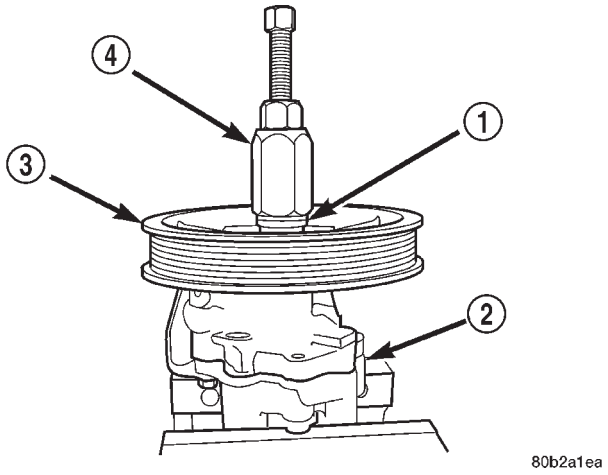


Fig. 20 Installing Power Steering Pump Pulley

1 – SPECIAL TOOL 6936
2 – POWER STEERING PUMP
3 – PULLEY
4 – SPECIAL TOOL C-4063

(5) Continue to push pulley onto shaft of power steering pump until Pulley Installer will no longer turn. This will ensure the spacer provided is fully seated against the front of the power steering pump shaft.

(6) Remove the Pulley Installer from the shaft of the power steering pump. Remove the Spacer from the hub of the power steering pump pulley.

(7) Verify the pulley turns properly on the pump shaft.

SPECIFICATIONS

POWER STEERING PUMP FLOW SPECIFICATIONS

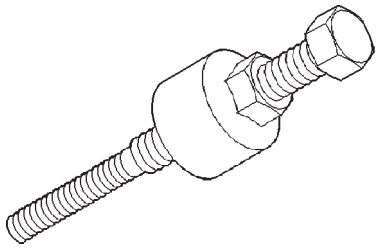
Flow At 1500 RPM and Minimum Pressure	8.0 to 9.5 Liters/Min (2.1 to 2.5 GPM)
Control Valve Pressure Relief	8618 to 9308 kPa (1250 to 1350 psi)

POWER STEERING PUMP FASTENER TORQUE SPECIFICATIONS

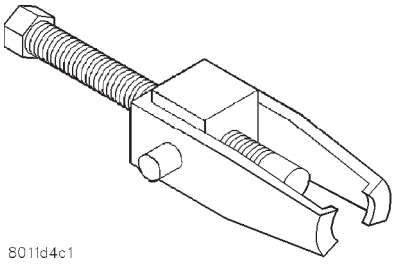
DESCRIPTION	TORQUE
Power Steering Pump:	
Discharge Fitting	84 N·m (62 ft. lbs.)
Mounting Bolts	28 N·m (250 in. lbs.)
Power Steering Fluid Hoses:	
Hose Tube Nuts	47 N·m (35 ft. lbs.)
Power Steering Fluid Reservoir:	
Mounting Bolt-2.7L Pulley Side	13 N·m (115 in. lbs.)
Mounting Bolts-2.7L Rear	24 N·m (212 in. lbs.)
Mounting Screw-3.2L/3.5L	12 N·m (105 in. lbs.)

SPECIAL TOOLS

POWER STEERING PUMP



Installer C-4063B



Puller C-4333

POWER STEERING GEAR

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DESCRIPTION AND OPERATION

POWER STEERING GEAR

DESCRIPTION

This vehicle is equipped with a rack-and-pinion power steering gear (Fig. 1). The gear is a center-take-off type gear. Center-take-off means that the tie rods are connected to the steering gear via a rack guide located at the center of the gear.

The power steering gear is mounted on the cross-member behind the engine. The steering column intermediate shaft connects to the pinion shaft of the gear. The outer ends of the outer tie rods attach to steering arms on the suspension's front struts.

Three different power steering gears are available: a base gear, a firm feel gear, and a speed proportional gear. The base gear and firm feel gear are serviced the same and are covered in this section. The speed proportional steering gear is physically very

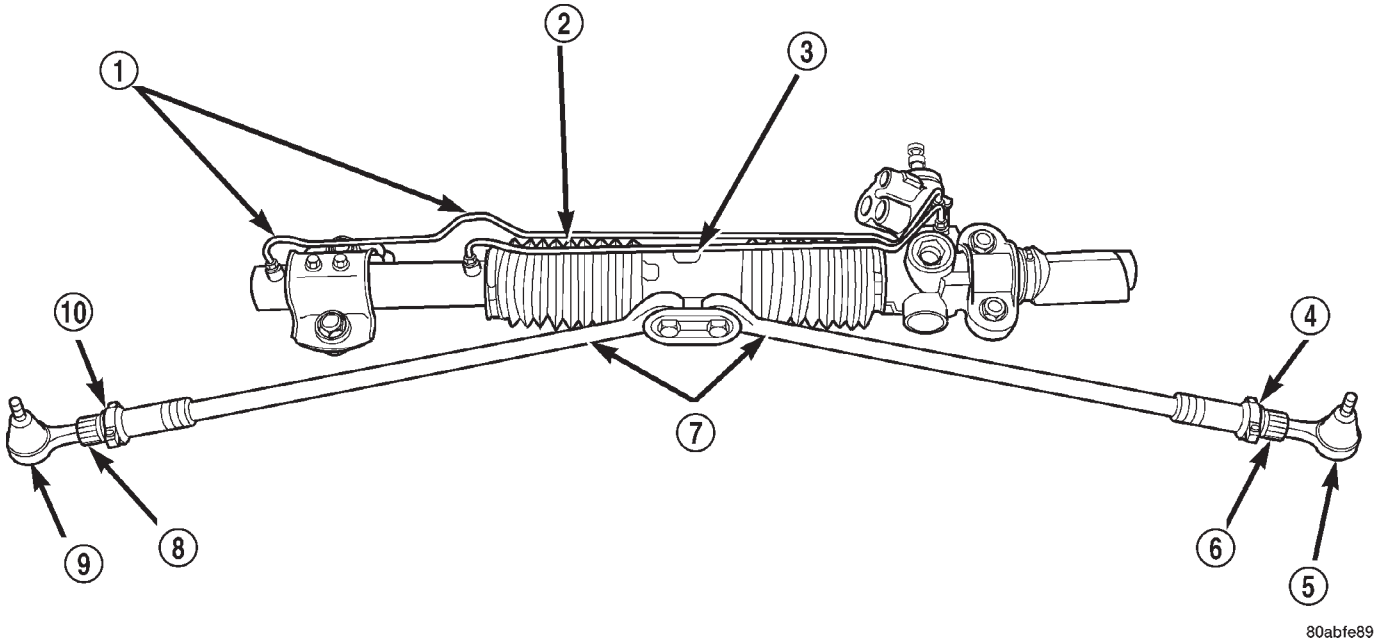


Fig. 1 Power Steering Gear

1 – STEERING GEAR FLUID LINES
2 – STEERING GEAR BOOT
3 – RACK AND PINION STEERING GEAR
4 – CLAMP
5 – TIE ROD END
6 – ADJUSTMENT SLEEVE
7 – INNER TIE ROD
8 – ADJUSTMENT SLEEVE
9 – TIE ROD END
10 – CLAMP

DESCRIPTION AND OPERATION (Continued)

similar to the standard gear except for the solenoid control valve extending from its housing. For information and service procedures on the speed proportional power steering gear or its individual components, refer to the SPEED PROPORTIONAL POWER STEERING GEAR section in this service manual group.

NOTE: The power steering gear should not be serviced or adjusted. If a malfunction or oil leak occurs within the steering gear, the complete steering gear needs to be replaced.

OPERATION

Turning of the steering wheel is converted into lateral (side-to side) travel through the meshing of the helical pinion teeth with the rack teeth within the steering gear. This lateral travel pushes and pulls the tie rods to change the direction of the vehicle's front wheels.

Power assist steering provided by a pump is controlled by an open-center, rotary type control valve. It directs fluid to either side of the gear's integral steering rack piston. Depending on the rotation of the steering wheel, fluid pressure is transferred to one side of the rack piston over the other.

Road feel is controlled by the diameter of a torsion bar which initially steers the vehicle. As steering effort increases as in a turn, the torsion bar twists, causing relative rotary motion between the rotary valve body and valve spool. This movement restricts fluid flow to one side of the integral rack piston and redirects fluid behind the other side of the integral rack piston, building up hydraulic pressure, thus assisting in the turning effort.

Manual steering control of the vehicle can be maintained if power steering assist is lost. However, under this condition, steering effort is significantly increased.

DIAGNOSIS AND TESTING

OUTER TIE ROD SOCKET END PLAY MEASUREMENT

NOTE: When measuring tie rod socket end play the total weight of the vehicle must be supported by the tires and suspension of the vehicle. Do not support the vehicle by other then a drive on hoist or an alignment rack.

(1) Position the vehicle on a drive on hoist or an alignment rack so that the tires are supporting the total weight of the vehicle.

(2) Raise hoist or alignment rack so that the tie rod is positioned at eye level.

(3) Mount a dial indicator to the front strut assembly (Fig. 2).

(4) Install a U-bolt having an inside dimension of 2 inches and a length of 3 inches (minimum) on the tie rod end and steering arm of strut as shown in (Fig. 2). Hand tighten nuts on U-bolt enough to just hold U-bolt in place.

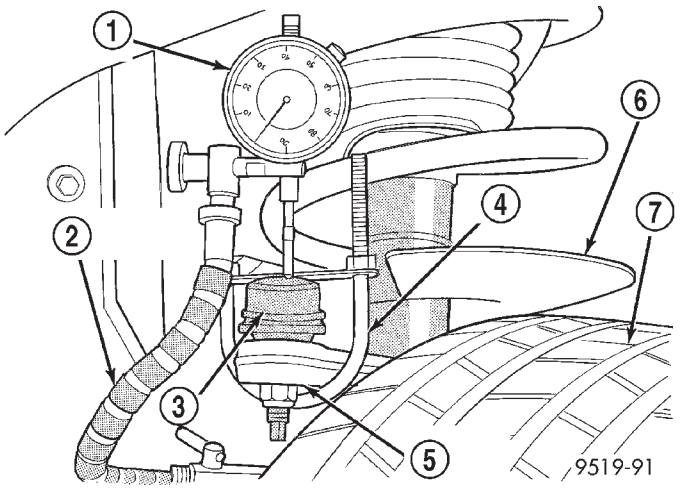


Fig. 2 Checking Tie Rod Socket End Play

1 – DIAL INDICATOR
2 – DIAL INDICATOR MOUNT
3 – TIE ROD
4 – U-BOLT
5 – STEERING ARM
6 – FRONT STRUT
7 – TIRE

(5) Position dial indicator in center of tie rod as shown in (Fig. 2). Zero the dial indicator gauge.

(6) Equally tighten both nuts on the U-bolt until a torque of 2.7 N·m (24 in. lbs.) is achieved on each nut. Listed is the allowable tie rod socket end play. New ball joint end play should not be greater then 0.100 inches. Ball joint in service end play should not be greater then 0.190.

(7) If end play for a ball joint in service is greater then the specification listed in Step 6 the ball joint will require replacement.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: POWER STEERING OIL, ENGINE COMPONENTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES OR DRIVE BELTS. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

CAUTION: While disconnected, cap all open ends of the power steering fluid hose connections. This will prevent the entry of foreign material into the components when power steering hoses are removed.

POWER STEERING GEAR

NOTE: Before proceeding, review SERVICE WARNINGS AND CAUTIONS found at the beginning of the REMOVAL AND INSTALLATION section.

REMOVAL

(1) Remove the battery ground cable from the ground stud on the shock tower and isolate the ground cable by installing the cable isolator on the ground stud (Fig. 3).

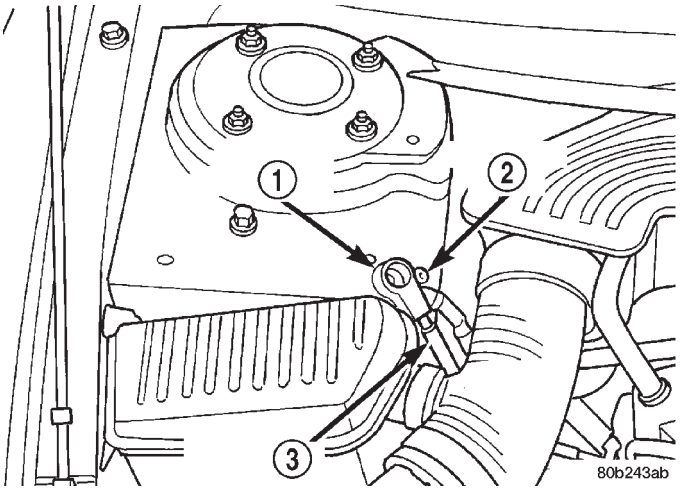


Fig. 3 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

(2) Position the front tires of the vehicle so that they are facing straight ahead.

(3) Raise the vehicle on a frame contact type hoist until the front tires of the vehicle are just off the floor. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(4) Remove caps from both wiper arms at the attachment to the pivots to expose the wiper arm attaching nut. Remove the nut (Fig. 4) attaching each wiper arm to its pivot

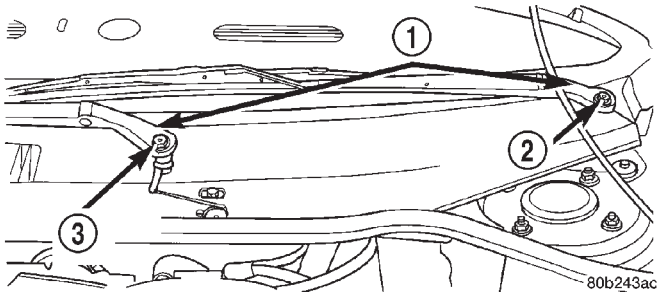


Fig. 4 Wiper Arm Attachment To Pivot

1 – WIPER ARMS
2 – ATTACHING NUT
3 – ATTACHING NUT

(5) Remove the wiper arms from the pivots. Wiper arms are removed from the pivots by rocking them back and force on the pivots until they can be pulled off the pivots.

(6) Remove the wiper module cover and cowl cover (Fig. 5) from the vehicle.

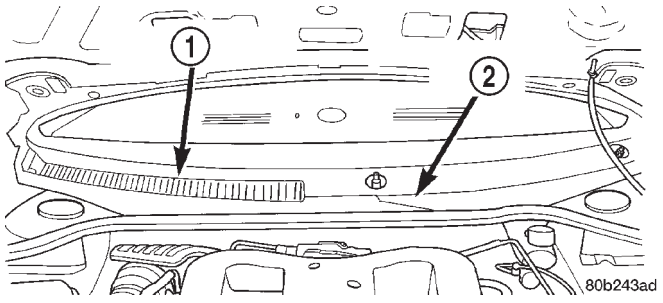


Fig. 5 Wiper Module And Cowl Cover

1 – COWL COVER
2 – WIPER MODULE COVER

REMOVAL AND INSTALLATION (Continued)

(7) Remove the 8 bolts, attaching the reinforcement (Fig. 6) to the strut towers and the 1 bolt (Fig. 6) attaching the wiper module to the reinforcement. Remove the reinforcement from the vehicle.

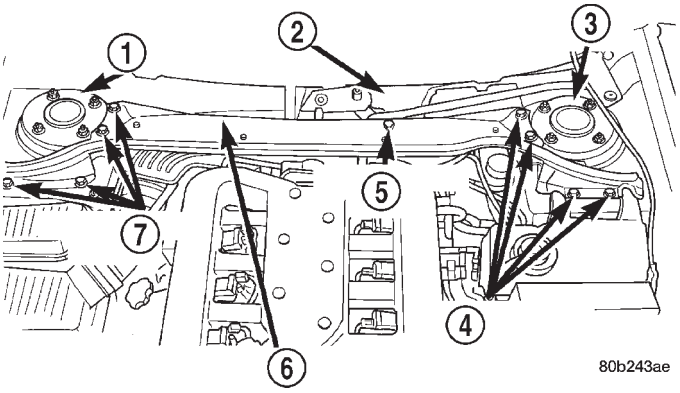


Fig. 6 Reinforcement Attachment To Vehicle

1 – RIGHT STRUT TOWER
2 – WIPER MODULE
3 – LEFT STRUT TOWER
4 – ATTACHING BOLTS
5 – ATTACHING BOLTS
6 – REINFORCEMENT
7 – ATTACHING BOLTS

(8) Remove the in-line resonator and inlet hose (Fig. 7) from the throttle body and air let hose coming from the lid of the air cleaner housing.

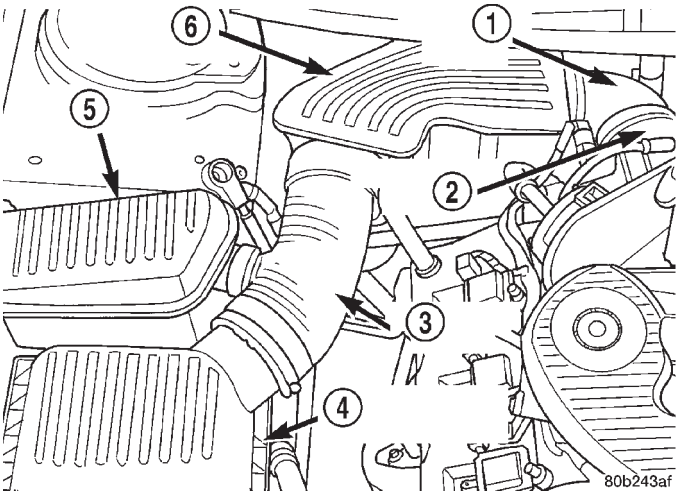


Fig. 7 In-Line Resonator And Air Inlet Hose

1 – AIR INLET HOSE
2 – THROTTLE BODY
3 – AIR INLET HOSE
4 – AIR CLEANER HOUSING LID
5 – RESONATOR
6 – IN-LINE RESONATOR

NOTE: When locking the steering wheel, the front tires of the vehicle are to be facing straight ahead.

(9) Using a steering wheel holding clamp, (Fig. 8) lock the steering wheel from rotating.

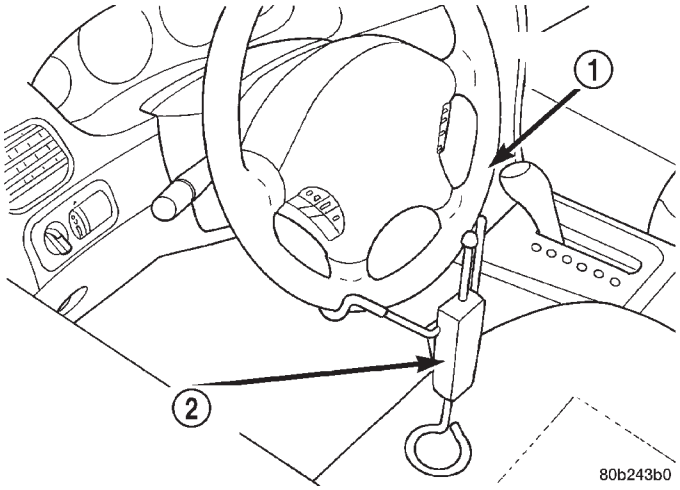


Fig. 8 Steering Wheel Holding Clamp Installed (Typical)

1 – STEERING WHEEL
2 – STEERING WHEEL CLAMP

CAUTION: Before removing the steering column coupler from the intermediated steering shaft be sure the steering wheel is locked from rotating (Fig. 8). If the steering wheel is allowed to rotate freely after it is disconnected from the intermediated shaft, the clockspring will be damaged and will need to be replaced.

(10) Remove the retaining pin and the coupler bolt from the steering column coupler (Fig. 9). Separate the intermediate steering shaft from the steering column coupler.

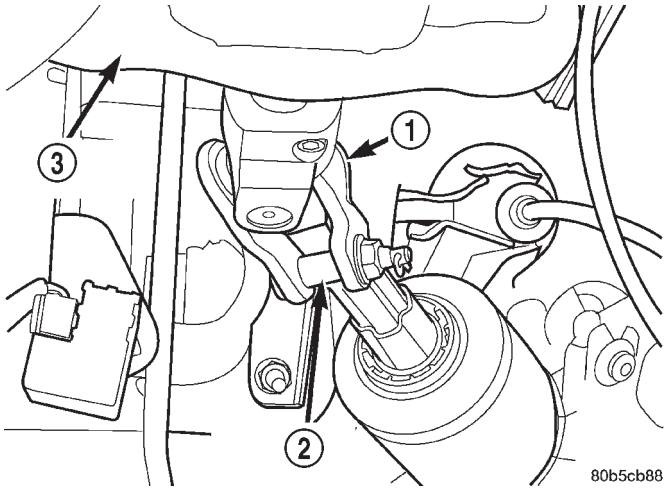


Fig. 9 Steering Column Coupler

1 – COUPLER
2 – PINCH BOLT
3 – STEERING COLUMN

REMOVAL AND INSTALLATION (Continued)

(11) Bend back the retaining tabs on the mounting plate for the tie rod to steering gear mounting bolts (Fig. 10).

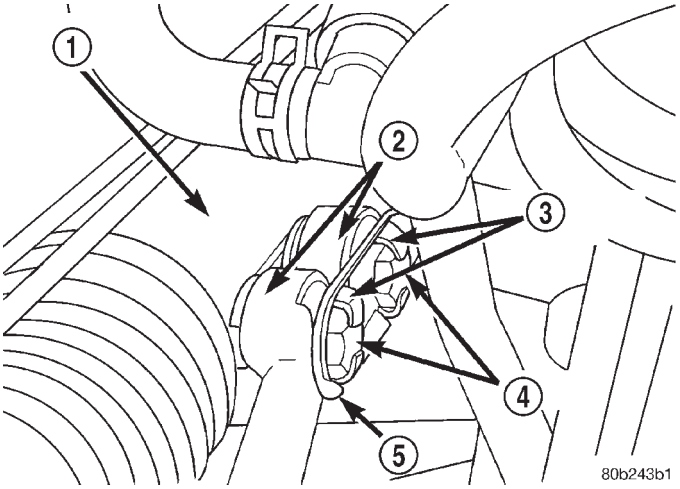


Fig. 10 Tie Rod Attachment Bolt Retaining Tabs

1 – STEERING GEAR
2 – TIE RODS
3 – RETAINING TABS
4 – BOLTS
5 – PLATE

(12) Remove the bolts, mounting plate and washers (Fig. 11) attaching the tie rods to the steering gear. Lay the tie rods on top of the transaxle bell housing.

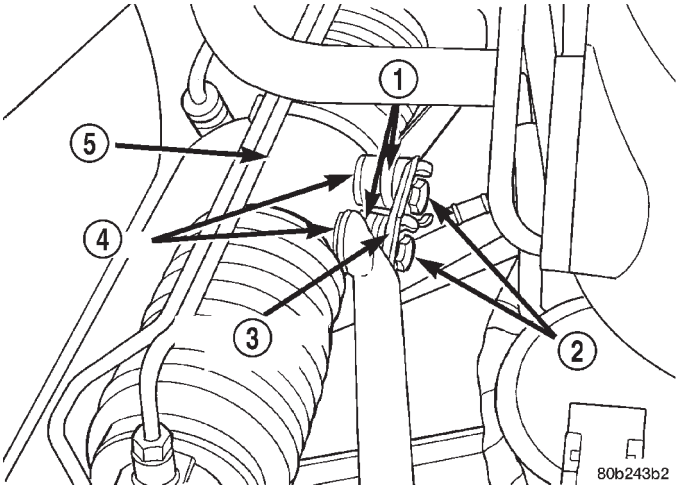


Fig. 11 Tie Rod To Steering Gear Attaching Bolts

1 – TIE RODS
2 – BOLTS
3 – MOUNTING PLATE
4 – WASHERS
5 – STEERING GEAR

NOTE: The following step should be done to prevent excessive spilling of power steering fluid when the power steering fluid lines are removed from the steering gear.

(13) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(14) Remove the power steering fluid pressure hose and return hose (Fig. 12) from the steering gear

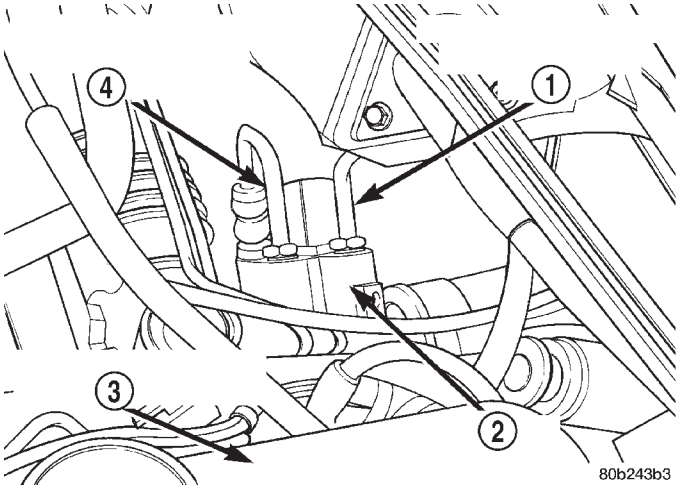


Fig. 12 Power Steering Hose Connections At Steering Gear

1 – POWER STEERING FLUID RETURN HOSE
2 – STEERING GEAR
3 – MASTER CYLINDER FLUID RESERVOIR
4 – POWER STEERING FLUID PRESSURE HOSE

(15) If the steering gear being removed from the vehicle is a speed proportional steering gear, disconnect the wiring harness connector from the solenoid control valve electrical connector located on the steering gear end cap below the brake master cylinder. (Fig. 13).

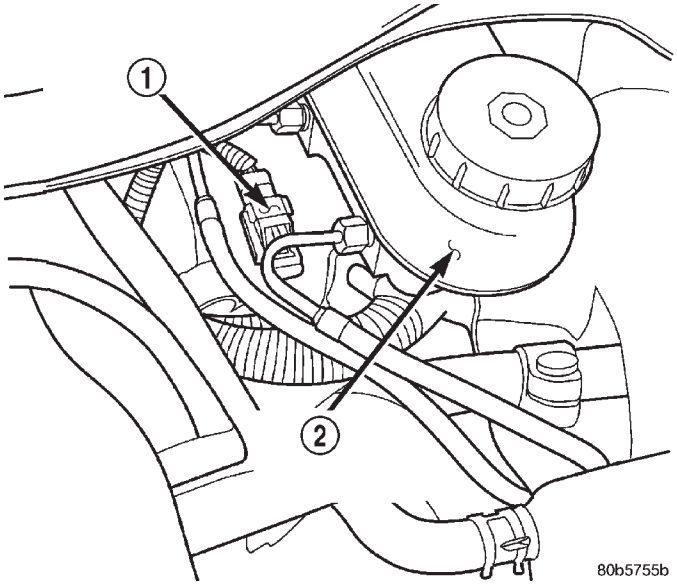


Fig. 13 Wiring Harness Connection

1 – SPEED PROPORTIONAL STEERING SOLENOID CONNECTOR
2 – MASTER CYLINDER RESERVOIR

REMOVAL AND INSTALLATION (Continued)

(16) Remove the 2 nuts (Fig. 14) mounting the master cylinder to the vacuum booster.

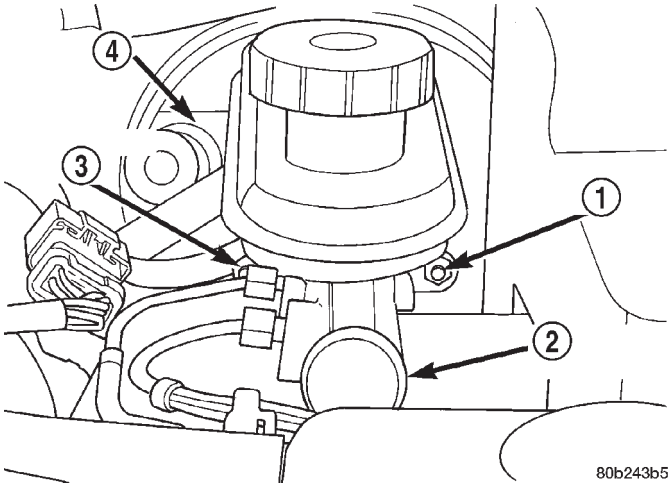


Fig. 14 Master Cylinder To Vacuum Booster Mounting

1 – MOUNTING NUT
2 – MASTER CYLINDER
3 – MOUNTING NUT
4 – VACUUM BOOSTER

(17) Remove the master cylinder with the brake tubes connected, from the vacuum booster. Carefully position the master cylinder in an upright position on the left side valve cover of the engine.

(18) Remove the vacuum supply hose to the vacuum booster at the check valve in the vacuum booster. Position the vacuum hose out of the way.

(19) Remove the 2 bolts attaching the left side of the steering gear to the crossmember (Fig. 15).

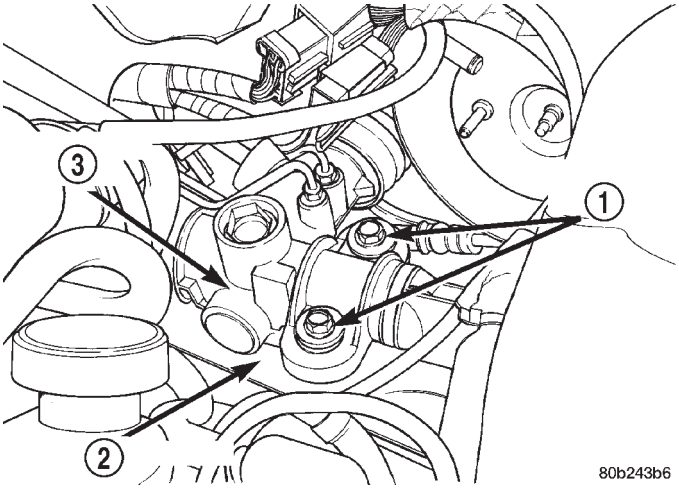


Fig. 15 Steering Gear Attachment To Crossmember (Left Side)

1 – MOUNTING BOLTS
2 – CROSSMEMBER
3 – STEERING GEAR

(20) Remove the 2 bolts attaching the steering gears right side mounting bracket (Fig. 16) to the crossmember.

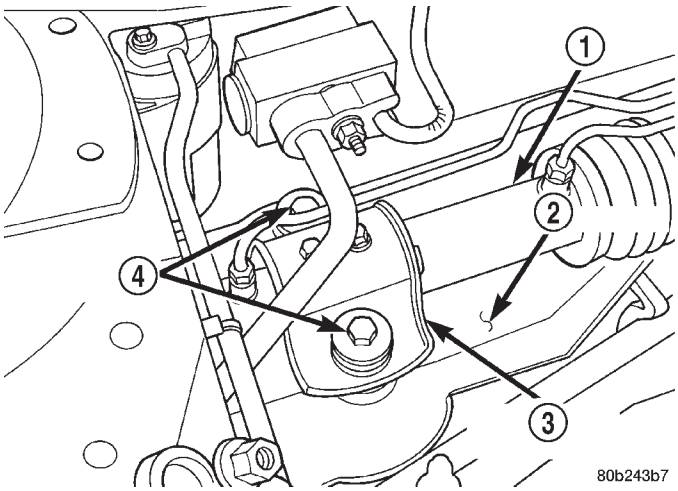


Fig. 16 Steering Gear Attachment To Crossmember (Right Side)

1 – STEERING GEAR
2 – CROSSMEMBER
3 – MOUNTING BRACKET
4 – MOUNTING BOLTS

NOTE: It may be necessary to loosen the 2 mounting bolts (Fig. 17) attaching the right mounting bracket to the steering gear in order to clear the air conditioning lines.

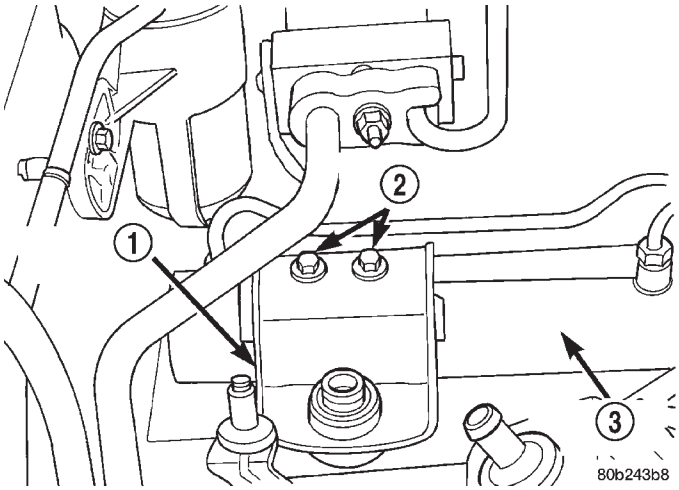


Fig. 17 Steering Gear Mounting Bracket

1 – MOUNTING BRACKET
2 – MOUNTING BOLTS
3 – STEERING GEAR

(21) Slide steering gear and intermediate shaft forward into the engine compartment to allow access to the roll pin retaining the intermediate shaft flex coupler to the steering gear shaft.

REMOVAL AND INSTALLATION (Continued)

(22) Using roll pin remover, Special Tool 6831A, remove roll pin from flex joint of intermediate shaft (Fig. 18). Roll pin is removed from coupler using following procedure. Remove knurled nut from small end of removal tool. Insert small end of removal tool through center of roll pin and then install and hand tighten knurled nut. Position sleeve of removal tool on flex joint as shown in (Fig. 18). Holding threaded shaft of tool from turning tighten nut (Fig. 18) pulling roll pin out of flex joint.

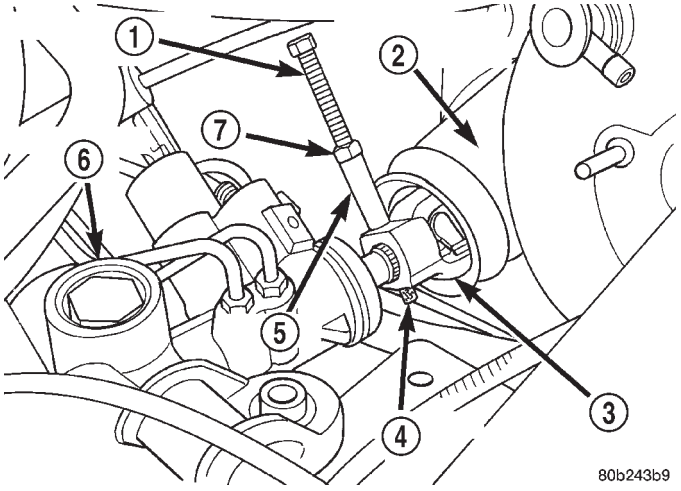


Fig. 18 Steering Coupler Roll Pin Removal

1 – SPECIAL TOOL 6831–A
2 – DASH PANEL SEAL & BOOT
3 – FLEX JOINT
4 – KNURLED NUT
5 – SLEEVE
6 – STEERING GEAR
7 – NUT

(23) Separate the intermediate steering shaft from the steering gear.

(24) Raise vehicle.

(25) Remove the right front tire/wheel.

(26) Remove the nut (Fig. 19) attaching the tie rod end to the steering arm on the right strut.

(27) Remove the tie rod end from the steering arm of the strut using Puller, Special Tool C-3894–A (Fig. 20).

(28) Remove the tie rod from the vehicle.

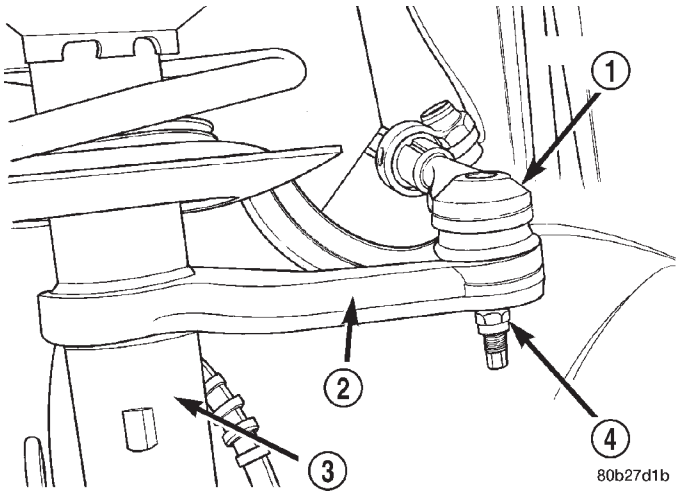


Fig. 19 Tie Rod End Attachment To Strut

1 – TIE ROD END
2 – STEERING ARM
3 – STRUT
4 – NUT

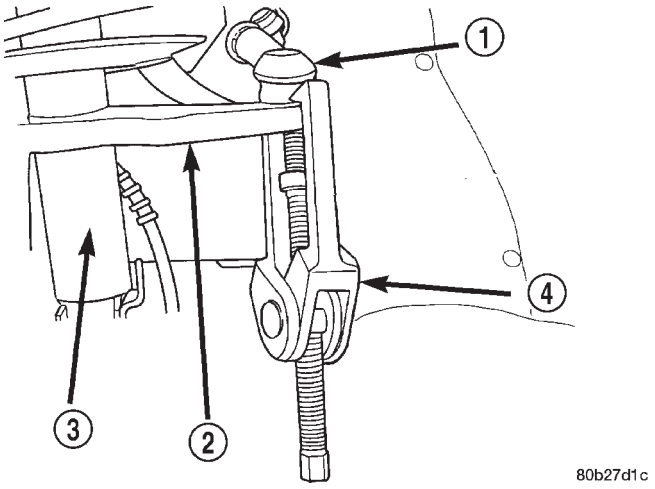


Fig. 20 Tie Rod End Removal From Steering Arm

1 – TIE ROD END
2 – STEERING ARM
3 – STRUT
4 – C-3894A

REMOVAL AND INSTALLATION (Continued)

NOTE: If the vehicle is equipped with a 2.7 liter engine, rotate the front of the left front tire/wheel as far outward as possible (Fig. 21). This is necessary to have the required clearance to allow the removal of the steering gear from a vehicle with this engine application.

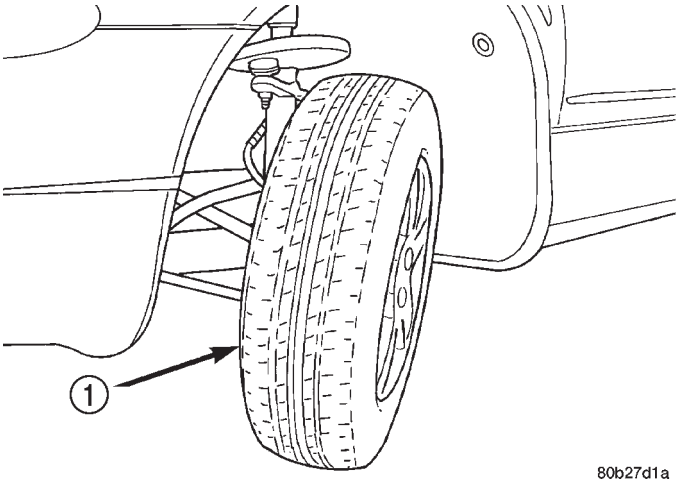


Fig. 21 Required Tire Position

1 – LEFT FRONT TIRE

(29) Remove the steering gear from the vehicle using the following steps.

(a) Slide the end of the steering gear through the tie rod hole in the right side inner fender (Fig. 22). Steering gear needs to be slid through tie rod hole until about half of the steering gear is through the hole (Fig. 22).

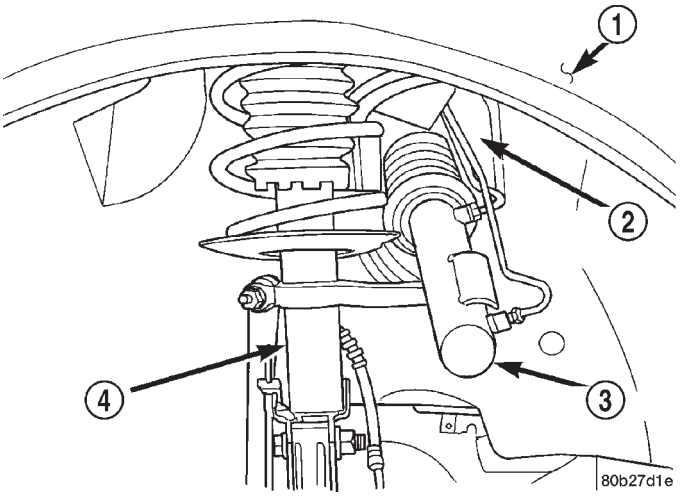


Fig. 22 Steering Gear Through Tie Rod Hole

1 – FENDER
2 – TIE ROD HOLE
3 – STEERING GEAR
4 – STRUT

(b) Lift the left end of the steering gear upward, with the steering gear positioned as shown, between the back of the engine and the front of the cowl (Fig. 23).

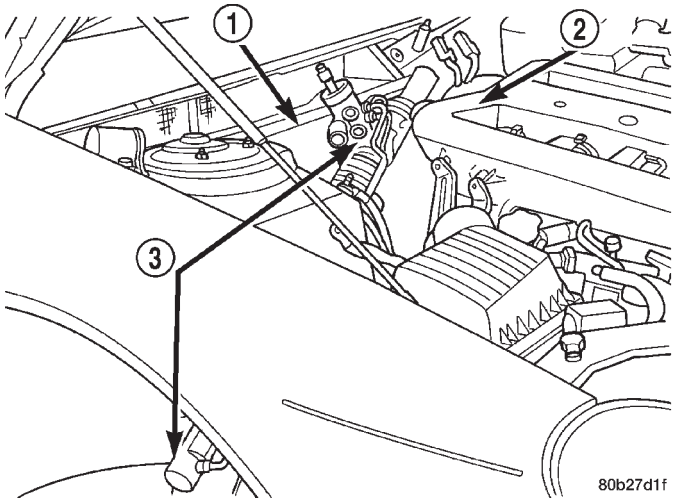


Fig. 23 Steering Gear Positioned For Removal

1 – COWL
2 – ENGINE
3 – STEERING GEAR

(c) To remove the steering gear from the vehicle, pull the steering gear toward the passenger side of the vehicle out from between the cowl and the engine.

INSTALLATION

NOTE: When the original or a replacement steering gear is being installed in vehicle, be sure the tie rod attachment at the steering gear is in the center of steering gear travel.

(1) Install the steering gear in the vehicle using the reverse sequence of the removal steps.

NOTE: If the vehicle is equipped with a 2.7 Liter engine, position the left front tire so it is facing straight forward.

(2) Install the right tie rod through the tie rod hole in the inner fender.

(3) Install the outer tie rod on the steering arm of the right strut. Install the tie rod to steering arm attaching nut (Fig. 19). Tighten the attaching nut to a torque of 37 N·m (27 ft. lbs.).

(4) Install the right side tire/wheel.

(5) Install and tighten wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(6) Lower the vehicle until the front tires are just clear of the floor.

(7) Install the intermediate steering shaft on the steering gear.

(8) Using roll pin installer, Special Tool 6831A, install the roll pin in the flex joint of the intermediate shaft (Fig. 24). Roll pin is installed in coupler using the following procedure. Remove knurled nut from small end of removal tool. Insert small end of removal tool through center of roll pin and then install and hand tighten knurled nut. Position sleeve of removal tool on flex joint as shown in (Fig. 24). Holding threaded shaft of tool from turning tighten nut (Fig. 24) pulling roll pin into flex joint. Roll pin must be equally spaced in flex joint.

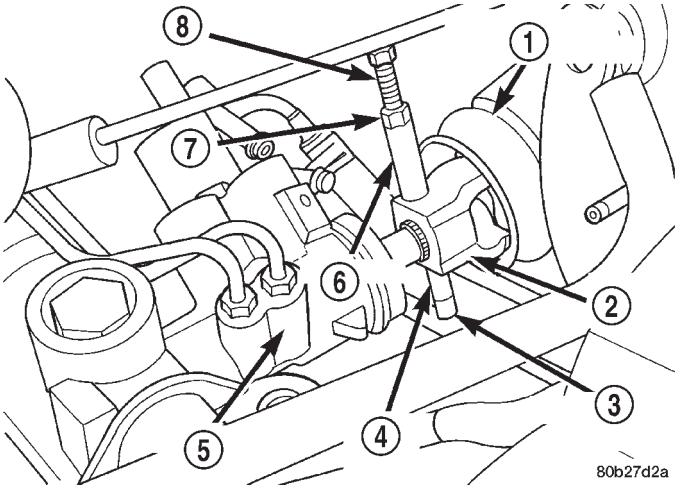


Fig. 24 Steering Coupler Roll Pin Installation

1 – DASH PANEL SEAL AND BOOT
2 – FLEX JOINT
3 – KNURLED NUT
4 – ROLL PIN
5 – STEERING GEAR
6 – SLEEVE
7 – NUT
8 – SPECIAL TOOL 6831A

(9) Slide steering gear and intermediate shaft back into dash panel sealing boot. Align the steering gear mounting holes with its mounting holes in crossmember.

(10) Loosely install the bolts mounting the left side of the steering gear to the crossmember (Fig. 15).

CAUTION: Tightening the steering gear to crossmember mounting bolts to the proper torque is very important.

(11) Install the bolts mounting the right side mounting bracket for the steering gear to the crossmember (Fig. 16). Tighten the mounting bolts to a torque of 58 N·m (43 ft. lbs.).

(12) Tighten the bolts mounting the left side of the steering gear to the crossmember to a torque of 58 N·m (43 ft. lbs.).

(13) If previously loosened, tighten the bolts mounting the steering gear mounting bracket to the right side of the steering gear (Fig. 17) to a torque of 37 N·m (27 ft. lbs.).

CAUTION: Before installing tie rods on steering gear be sure the tie rod spacer block inside the steering gear bellows (boot) (Fig. 25) is correctly aligned with the bolt holes in the rack of the steering gear and the steering gear bellows.

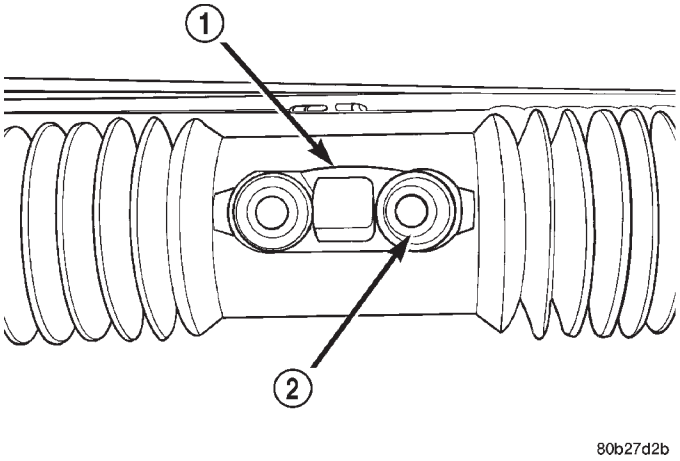


Fig. 25 Tie Rod Spacer Block

1 – STEERING GEAR BOOT
2 – SPACER BLOCK

(14) Attach power steering fluid pressure, and return lines into proper ports of the steering gear (Fig. 12). Tighten both power steering hose tube nuts to a torque of 47 N·m (35 ft. lbs.).

(15) If equipped with speed proportional steering, connect the wiring harness connector to the solenoid control valve electrical connector (Fig. 13).

(16) Align center take off on steering gear with the tie rod assemblies. Install tie rod attaching bolts and washers into steering gear assembly. **Be sure washers are installed between tie rods and steering gear (Fig. 26).** Tighten the tie rod to steering gear bolts to a torque of 82 N·m (60 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

CAUTION: After tie rod attaching bolts are torqued, bend attaching bolt retaining tabs against heads of attaching bolts (Fig. 10).

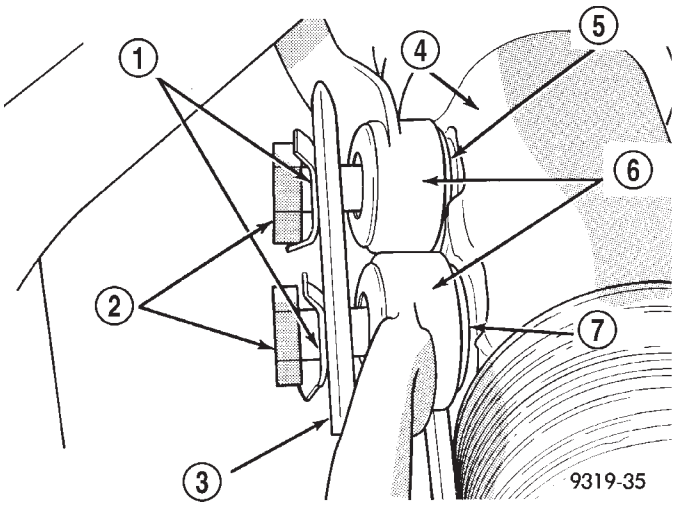


Fig. 26 Tie Rod Attachment To Steering Gear

1 – RETAINING TABS
2 – BOLTS
3 – PLATE
4 – STEERING GEAR
5 – WASHER
6 – TIE RODS
7 – WASHER

(17) Install the vacuum hose for the vacuum booster on intake manifold vacuum port. Install hose clamp on vacuum hose.

(18) Install the master cylinder on the vacuum booster. Install the 2 nuts attaching the master cylinder to the vacuum booster. Tighten the master cylinder mounting nuts to a torque of 28 N·m (250 in. lbs.).

(19) Install the intermediate shaft onto the steering column shaft. Install steering column coupler pinch bolt (Fig. 9) and tighten to a torque of 28 N·m (21 ft. lbs.). Install the pinch bolt nut retaining pin in pinch bolt.

(20) Remove the holding clamp from the steering wheel (Fig. 8)

(21) Install the reinforcement (Fig. 6) on the vehicle. Install the 8 bolts, attaching the reinforcement (Fig. 6) to the strut towers. Install the bolt (Fig. 6) attaching the wiper module to the reinforcement.

(22) Install the in-line resonator and inlet hose (Fig. 7) on the throttle body and air let hose coming from the lid of the air cleaner housing.

(23) Install the covers (Fig. 5) over the wiper module and the cowl. Install and securely tighten the attaching screws.

(24) Install the wiper arms (Fig. 4) on the pivots. Install and securely tighten the wiper arm to pivot attaching nuts. Install the caps on the wiper arms covering the pivot nuts.

(25) Install the battery ground cable onto the ground stud on the shock tower.

CAUTION: Do not use automatic transmission fluid. Use only the proper Mopar Power Steering Fluid or equivalent when filling the power steering fluid reservoir.

(26) Perform Power Steering Pump Initial Operation procedure which can be found in the Power Steering Pump section of this group, to properly refill and bleed power steering system.

(27) Lower vehicle.

(28) Adjust front toe. Refer to Suspension, Group 2, for the proper procedure.

OUTER TIE ROD END

REMOVAL

(1) Raise vehicle on jackstands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual for the required lifting procedure to be used for this vehicle.

(2) Remove tire and wheel assembly.

(3) Loosen the pinch bolt (Fig. 27) at the outer to inner tie rod adjustment sleeve.

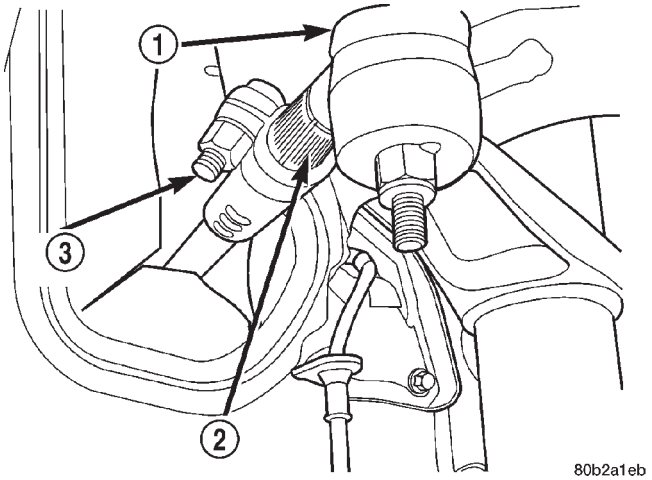


Fig. 27 Tie Rod Adjustment Sleeve Pinch Bolt

1 – OUTER TIE ROD
2 – ADJUSTMENT SLEEVE
3 – PINCH BOLT

(4) Remove the outer tie rod to strut steering arm attaching nut (Fig. 28).

(5) Remove the outer tie rod from the steering arm using Puller, Special Tool C-3894-A (Fig. 29).

(6) Remove outer tie rod from adjustment sleeve.

REMOVAL AND INSTALLATION (Continued)

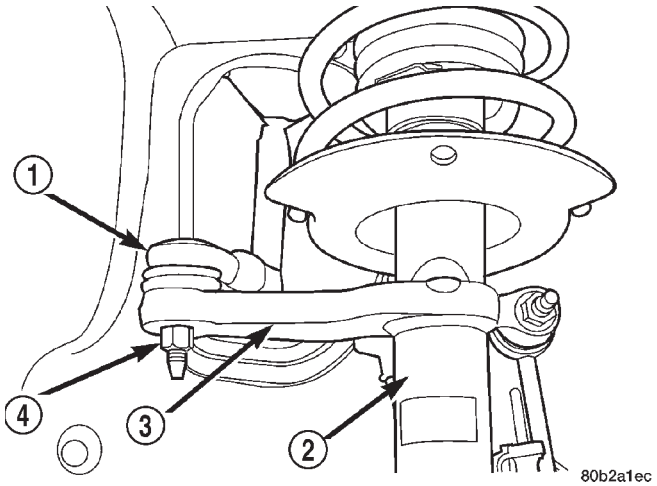


Fig. 28 Tie Rod Nut

1 – OUTER TIE ROD
2 – STRUT
3 – STEERING ARM
4 – NUT

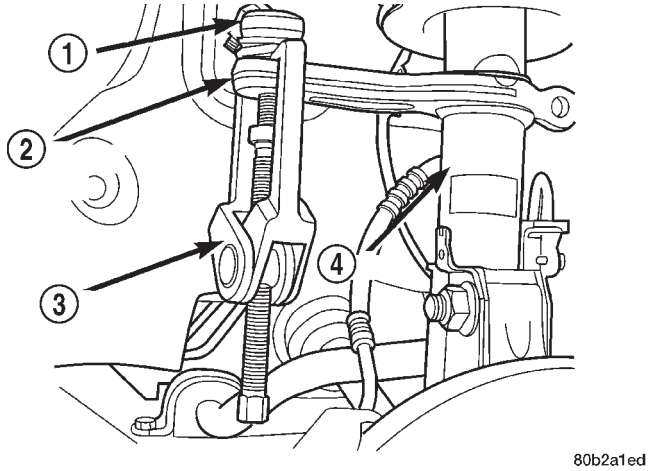


Fig. 29 Tie Rod Removal From Steering Arm

1 – TIE ROD END
2 – STEERING ARM
3 – SPECIAL TOOL C-3894A
4 – STRUT

INSTALLATION

(1) Install the outer tie rod into the adjustment sleeve. **Do not tighten the adjustment pinch bolt at this time.**

(2) Install the outer tie rod into the steering arm on front strut. Install tie rod to steering arm attaching nut (Fig. 28). Tighten the attaching nut a torque of 37 N·m (27 ft. lbs.).

(3) Install the tire and wheel assembly.

(4) Install and tighten the wheel mounting nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(5) Lower vehicle.

CAUTION: When setting the front Toe on the vehicle, the maximum dimension of exposed threads allowed on the adjuster and outer tie rod cannot exceed the distance shown in (Fig. 30). If the maximum distance is exceeded, inadequate retention of either the adjuster or the outer tie rod can result. This condition can cause separation of the outer tie rod end from the inner tie rod. Ensure that adjustment sleeve pinch bolts are torqued to the required specification when Toe setting procedure is completed.

(6) Check the front wheel toe setting on vehicle and make required changes. **When making front wheel toe adjustments, be sure the maximum exposed thread requirements (Fig. 30) are not exceeded.**

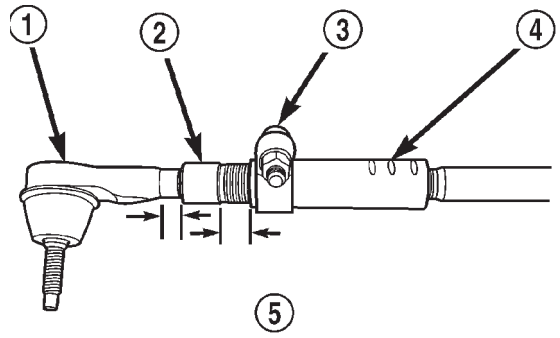


Fig. 30 Tie Rod Thread Engagement Requirements

1 – OUTER TIE ROD
2 – ADJUSTER
3 – PINCH BOLT
4 – INNER TIE ROD
5 – ALLOWABLE THREADS EXPOSED ON OUTER TIE ROD AND ADJUSTER IS A MAXIMUM OF 20 MILLIMETERS. REFER TO AREA INDICATED ABOVE ON THE OUTER TIE ROD AND ADJUSTER.

CAUTION: When torquing the adjuster pinch bolt, the following procedure must be followed to ensure adequate retention of the adjuster is obtained. Not following this procedure, could result in the Toe Setting Adjustment changing and/or the separation of the outer tie rod from the inner tie rod.

(7) After completion of the tie rod end installation and the toe adjustment procedure, tighten adjuster pinch bolt (Fig. 30) to a torque of 38 N·m (28 ft. lbs.). Make sure the outer tie rod maintains correct perpendicular orientation while tightening the adjuster pinch bolt.

DISASSEMBLY AND ASSEMBLY

POWER STEERING GEAR HOUSING BUSHING

The power steering gear must be removed from the vehicle for the bushings to be serviced. Refer to REMOVAL AND INSTALLATION in this section for the required procedure.

REMOVAL

(1) Install the Receiver, Special Tool 8523-2, into the cup of the Ball Joint Press, Special Tool C-4212F, and tighten the set screw. Install the Driver, Special Tool 8523-1, on the tip of the Ball Joint Press screw drive.

(2) Place the power steering gear housing against the Receiver (Fig. 31). Tighten the screw drive until the Driver contacts the outer circumference of the bushing evenly (Fig. 31). Continue to tighten the screw drive until the bushing is pressed completely out of the steering gear housing.

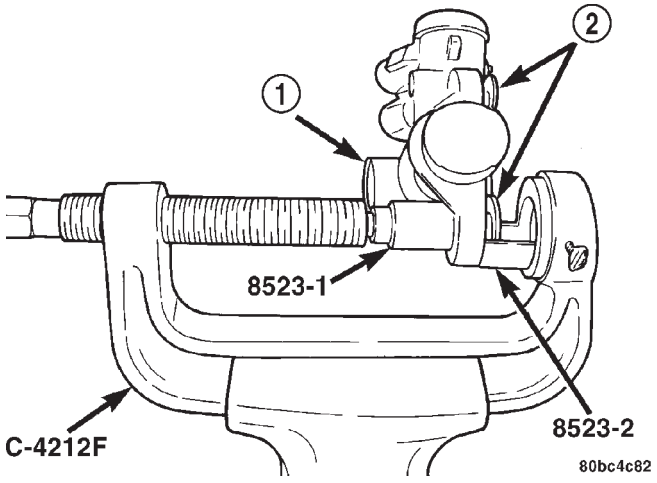


Fig. 31 Removing Bushing

1 – POWER STEERING GEAR HOUSING
2 – BUSHINGS

(3) Back off the screw drive and remove the power steering gear from the Receiver.

(4) Repeat the above procedure on the other power steering gear housing bushing.

INSTALLATION

(1) Install the Receiver, Special Tool 8523-2, into the cup of the Ball Joint Press, Special Tool C-4212F, and tighten the set screw. Install the Driver, Special Tool 8523-1, on the tip of the Ball Joint Press screw drive.

(2) Place the steering gear housing against the Receiver in a way that the Receiver does not come in contact with the support ribs on the gear housing (Fig. 32). Start the bushing in the bottom of the housing and tighten the screw drive until the Driver contacts the bushing retainer washer (Fig. 32). Slowly tighten the screw drive until the bushing bottoms in the recessed area of the steering gear housing.

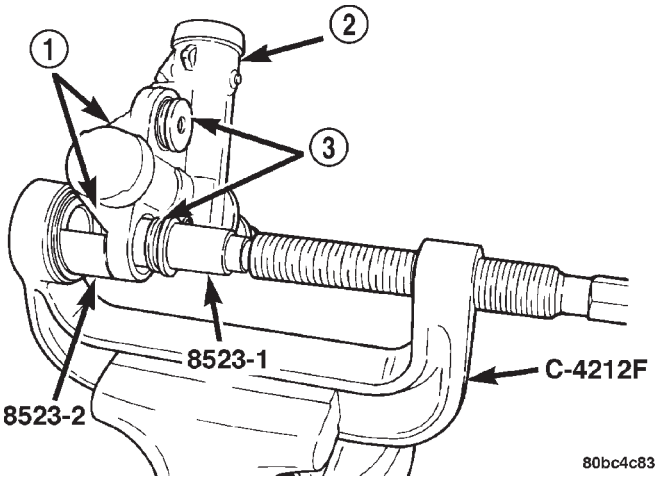


Fig. 32 Installing Bushing

1 – SUPPORT RIBS
2 – POWER STEERING GEAR HOUSING
3 – BUSHINGS

(3) Back off the Ball Joint Press screw drive and remove the power steering gear from the press.

(4) Repeat the above procedure on the other power steering gear housing bushing.

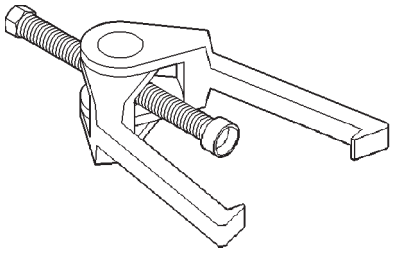
SPECIFICATIONS

POWER STEERING GEAR FASTENER TORQUE SPECIFICATIONS

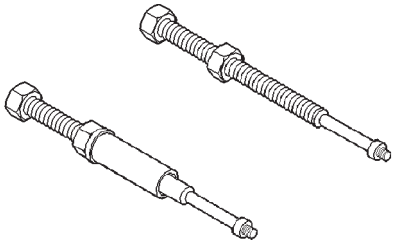
DESCRIPTION	TORQUE
Power Steering Gear:	
Crossmember Bolts	58 N·m (43 ft. lbs.)
Tie Rod Steering Arm Nut	37 N·m (27 ft. lbs.)
Tie Rod Steering Gear Bolt	82 N·m (60 ft. lbs.)
Tie Rod Adjuster Pinch bolt	38 N·m (33 ft. lbs.)
Power Steering Fluid Hoses:	
Hose Tube Nuts	47 N·m (35 ft. lbs.)

SPECIAL TOOLS

POWER STEERING GEAR



Puller C-3894-A



Remover / Installer, Steering Shaft Roll Pin 6831A

SPEED PROPORTIONAL POWER STEERING GEAR

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DESCRIPTION AND OPERATION

SPEED PROPORTIONAL POWER STEERING GEAR

DESCRIPTION

Available on certain models of this vehicle is an electronically controlled, speed-sensitive, variable-effort rack and pinion power steering system, better known as speed-proportional power steering.

The speed proportional power steering gear mounts in the same location as the standard power steering gear. It is mounted on the crossmember behind the engine. Externally, the main difference between a speed proportional power steering gear and a standard power steering gear is the presence of a solenoid control valve on the gear housing (Fig. 1).

OPERATION

The speed-proportional power steering system reduces the steering effort required by the driver for low speed driving and parking maneuvers. Also, at higher speeds, more steering effort is required pro-

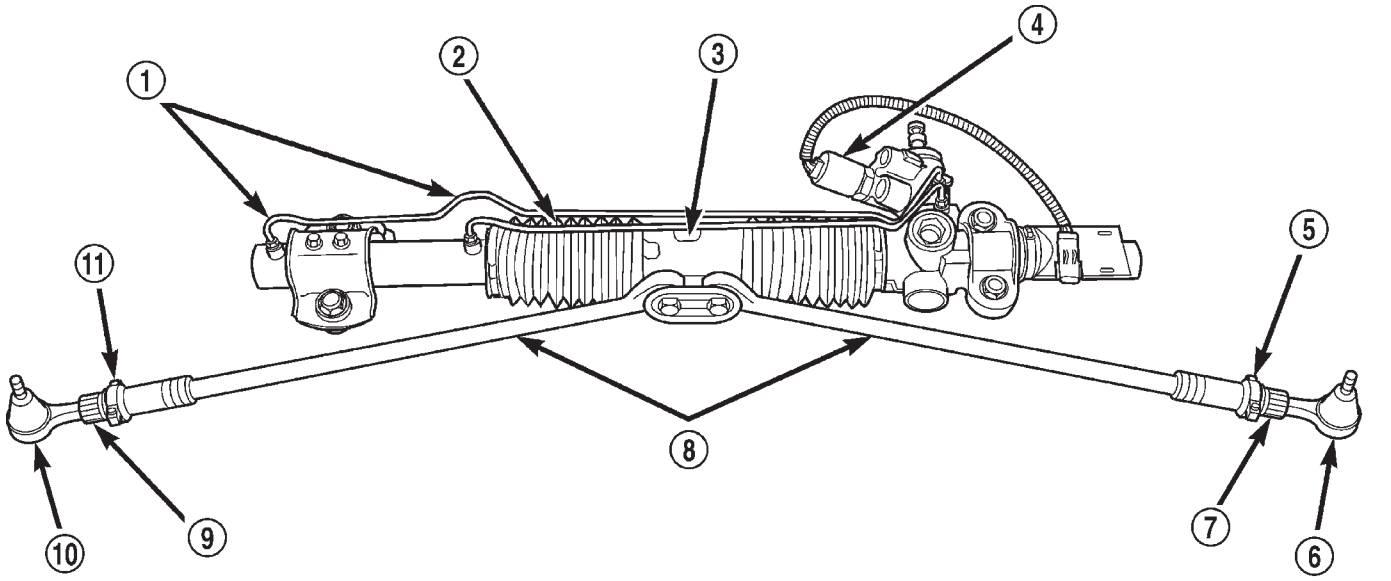


Fig. 1 Variable-Assist Speed-Proportional Power Steering Gear

1 – STEERING GEAR FLUID LINES
2 – STEERING GEAR BOOT
3 – RACK AND PINION STEERING GEAR
4 – SOLENOID CONTROL VALVE
5 – CLAMP
6 – TIE ROD END
7 – ADJUSTMENT SLEEVE
8 – INNER TIE ROD
9 – ADJUSTMENT SLEEVE
10 – TIE ROD END
11 – CLAMP

DESCRIPTION AND OPERATION (Continued)

viding a more firm, responsive feel to the power steering system.

With the engine running and the vehicle speed between 0 kph (0 mph) and approximately 32 kph (20 mph), minimum steering effort is required. Between approximately 32 kph (20 mph) and 100 kph (60 mph), power steering effort will gradually increase based upon vehicle speed. Above approximately 100 kph (60 mph), maximum steering effort is required by the speed proportional steering system.

Variable-effort power steering is provided by controlling power steering fluid pressure at the power steering gear. A solenoid control valve located on the steering gear (Fig. 1) is used to control power steering gear return fluid pressure. The pressure is controlled by varying the size of an orifice.

The variable-assist speed-proportional solenoid control valve is controlled by the Body Control Module (BCM). The BCM receives the vehicle speed signal sent from the Powertrain Control Module (PCM). Upon receiving the vehicle speed signal from the PCM, the BCM converts that speed signal into an electrical current usable by the solenoid control valve for controlling the variable effort of the power steering system.

SOLENOID CONTROL VALVE

DESCRIPTION

The solenoid control valve is mounted on the speed proportional power steering gear housing (Fig. 1).

OPERATION

Variable-effort power steering is provided by controlling power steering fluid pressure at the power steering gear. A solenoid control valve located on the steering gear (Fig. 1) is used to control power steering gear return fluid pressure. The pressure is controlled by varying the size of an orifice.

The variable-assist speed-proportional solenoid control valve is controlled by the Body Control Module (BCM). The BCM receives the vehicle speed signal sent from the Powertrain Control Module (PCM). Upon receiving the vehicle speed signal from the PCM, the BCM converts that speed signal into an electrical current usable by the solenoid control valve for controlling the variable effort of the power steering system.

The solenoid control valve is a serviceable component of the variable-effort, speed-proportional power steering gear assembly.

DIAGNOSIS AND TESTING

SPEED PROPORTIONAL POWER STEERING

Electronic diagnosis of the variable-effort speed-proportional power steering system, if suspected of not functioning properly, is done using the DRB scan tool. Refer to the Body Diagnostic Manual to properly test and diagnosis this steering system.

REMOVAL AND INSTALLATION

SPEED PROPORTIONAL POWER STEERING GEAR

If the variable-effort speed-proportional power steering gear requires removal from the vehicle, refer to POWER STEERING GEAR in the REMOVAL AND INSTALLATION section of POWER STEERING GEAR which can be found elsewhere in this service manual group. The only difference in the removal and installation process is the need to disconnect and connect the solenoid control valve wiring harness connector.

SOLENOID CONTROL VALVE

REMOVE

(1) Disconnect the solenoid control valve electrical connector from the wiring harness at the power steering gear end cap below the brake master cylinder (Fig. 2).

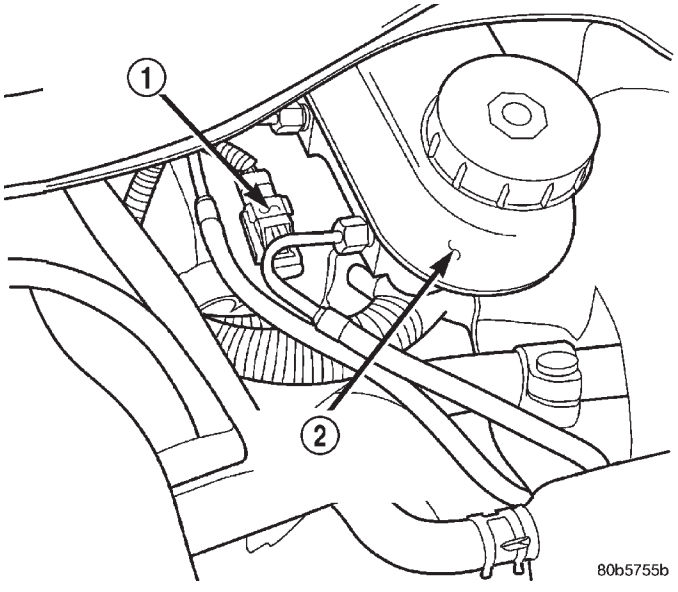


Fig. 2 Wiring Harness Connection

1 – SPEED PROPORTIONAL STEERING SOLENOID CONNECTOR
2 – MASTER CYLINDER RESERVOIR

REMOVAL AND INSTALLATION (Continued)

(2) Unclip the connector from the gear end cap.

(3) Remove the power steering pressure hose (Fig. 3) from the power steering gear.

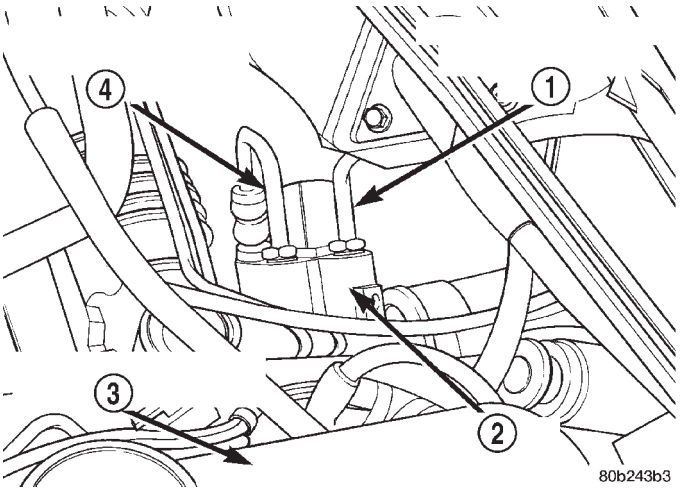


Fig. 3 Power Steering Hoses At Steering Gear

1 – POWER STEERING FLUID RETURN HOSE
2 – STEERING GEAR
3 – MASTER CYLINDER FLUID RESERVOIR
4 – POWER STEERING FLUID PRESSURE HOSE

(4) Remove the power steering return hose (Fig. 3) from the power steering gear.

(5) Using a 1–5/16 inch crow foot, (Fig. 4) loosen the solenoid control valve. Then by hand, remove the solenoid control valve from the power steering gear.

INSTALL

(1) Inspect the O-ring seals on the solenoid control valve to be sure they are not damaged. If the O-rings are not damaged, moisten the O-rings using **only** fresh clean Mopar Power Steering Fluid, or equivalent.

(2) Install the solenoid control valve into the steering gear by hand, until it is fully seated into the steering gear.

(3) Using the 1–5/16 inch crow foot as shown in (Fig. 5) tighten the solenoid control valve to a torque of 14 N·m (124 in. lbs.).

(4) Reconnect the power steering hoses at the gear (Fig. 3). Tighten both hose tube nuts to 31 N·m (275 in lbs.).

(5) Route the solenoid control valve wire harness over the top of the gear and clip it into place on the gear end cap.

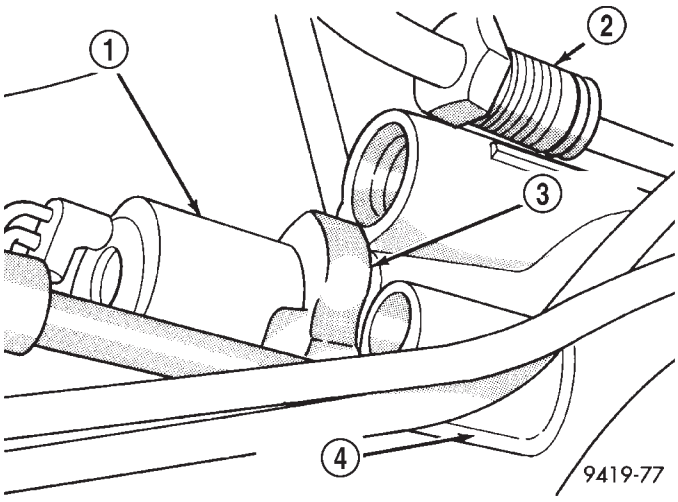


Fig. 4 Loosening Solenoid Control Valve

1 – SOLENOID CONTROL VALVE
2 – RETURN HOSE
3 – 1-5/16 CROW FOOT
4 – STEERING GEAR

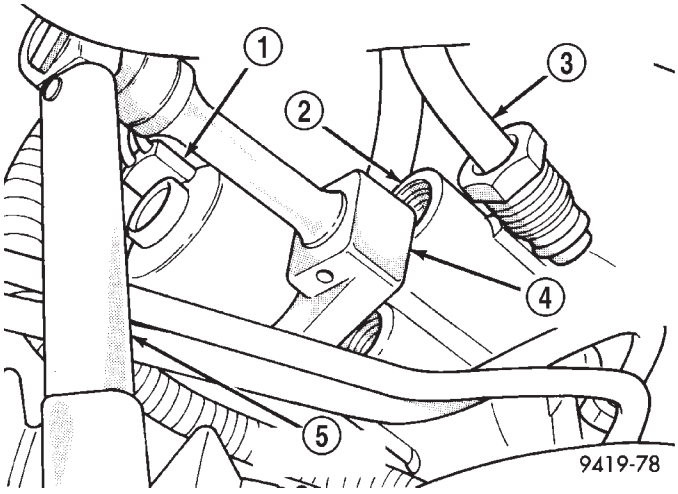


Fig. 5 Torquing Solenoid Control Valve

1 – SOLENOID CONTROL VALVE
2 – STEERING GEAR
3 – POWER STEERING RETURN HOSE
4 – 1-5/16 CROW FOOT
5 – TORQUE WRENCH

(6) Connect the wiring harness connector. **Be sure the wiring harness connector seal is in good condition before installing the connector in the control module.**

(7) Road test vehicle, referring to the test indicated in the Body Diagnostic Manual, to confirm correct operation of the variable-assist speed-proportional power steering gear.

STEERING COLUMN

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DESCRIPTION AND OPERATION

STEERING COLUMN

DESCRIPTION

This vehicle uses a tilt-type steering column (Fig. 1). Two styles are available, one is for floor shift vehicles and the other is for column shift vehicles.

The steering column used on this vehicle (Fig. 1), has been designed to be serviced as an assembly; less wiring, switches, clockspring, gear shift lever, shift ignition interlock, brake interlock solenoid (column shift only), shrouds and steering wheel. These components can be serviced without removing the steering column from the vehicle.

BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID

Column shift vehicles have a brake transmission shift interlock (BTSI) solenoid mounted on the steering column. The BTSI solenoid works in conjunction with the brake lamp switch and will not allow the steering column shift lever to be moved out of the PARK position without the brake pedal being applied. For Description And Operation, Diagnosis And Testing, and Removal And Installation information, refer to the Transaxle section in this service manual.

OPERATION

Turning of the steering wheel mounted to the column shaft, is transferred down the shaft, through the upper coupler and intermediate shaft to the power steering gear pinion shaft. The gear then moves the front strut assemblies steering the vehicle.

DIAGNOSIS AND TESTING

STEERING COLUMN

For diagnosis of conditions relating to the steering column, refer to the steering system diagnosis charts in the diagnosis and testing section at the beginning of this group.

The steering column **MUST** be replaced whenever any of the following conditions exist:

- The steering column must be replaced whenever a vehicle is involved in a collision which deploys the air bag, regardless of the extent of damage done to the vehicle.
- If a vehicle is involved in an impact of the vehicles front suspension or under carriage, which results in any type of damage to the front suspension crossmember.
- Under any conditions which result in the steering column assembly or steering column shaft receiving a force great enough to move the steering column or shaft forward of rearward in a vehicle.

STEERING COLUMN INTERMEDIATE SHAFT

The steering column (to steering gear) intermediate shaft has an integrated lower coupler. The entire assembly **MUST** be replaced whenever any of the following conditions exist.

- Whenever a vehicle is involved in a collision which deploys the air bag, regardless of the extent of damage done to the vehicle.
- If a vehicle is involved in an impact of the vehicles front suspension or under carriage, which results in any type of damage to the front crossmember.

DIAGNOSIS AND TESTING (Continued)

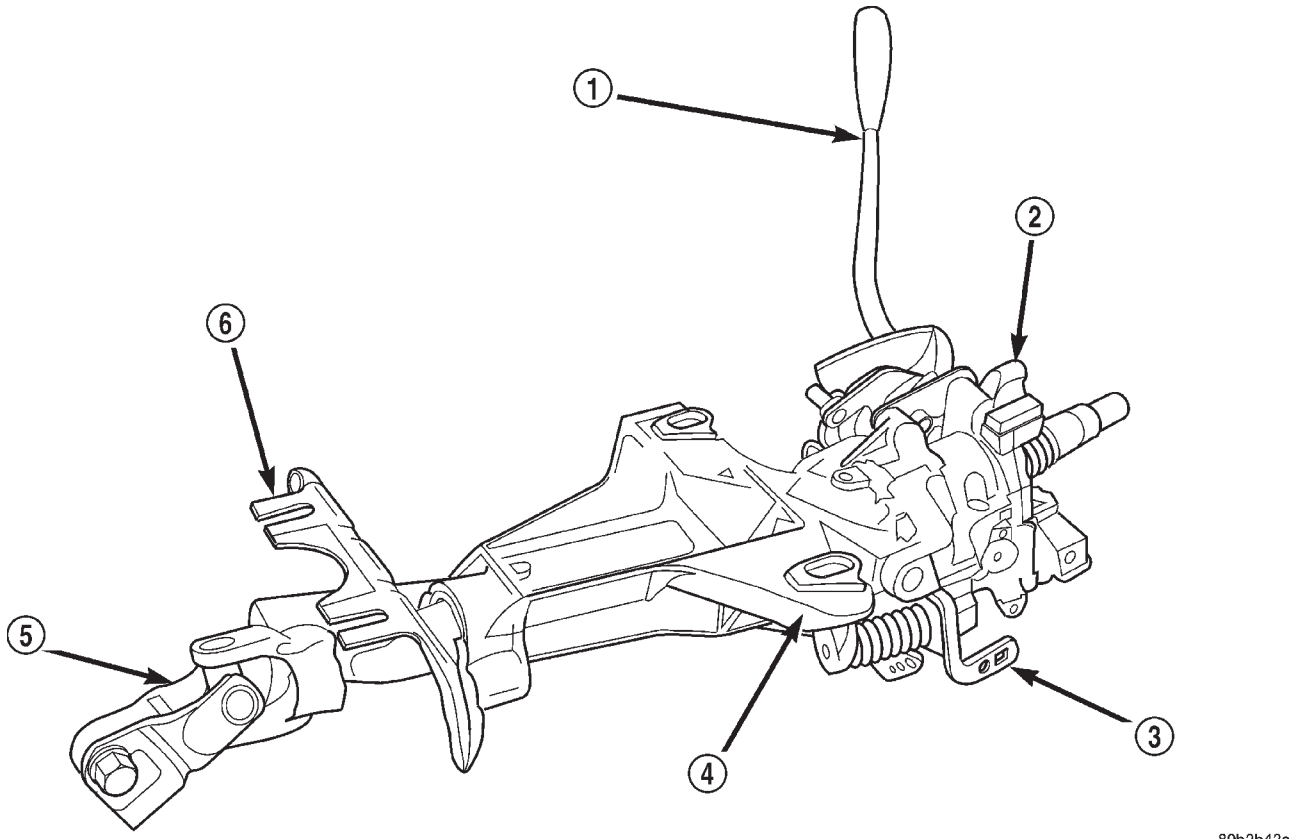


Fig. 1 Steering Column

1 – SHIFT LEVER (COLUMN SHIFT ONLY)
2 – TILT HOUSING
3 – TILT LEVER
4 – STEERING COLUMN MOUNTING BRACKET
5 – STEERING COLUMN COUPLER
6 – STEERING COLUMN LOWER MOUNTING BRACKET

- Under any conditions which result in the steering column assembly or steering column shaft receiving a force great enough to move the steering column or shaft forward of rearward in a vehicle.

Inspect the intermediate shaft and integrated coupler for the following conditions:

- Seized bearing
- Loose bearing stake
- Bearing not seated properly

The steering column intermediate shaft must be replaced as an entire assembly if a problem condition is found.

STEERING COLUMN SHAFT UPPER COUPLER

If the steering column shaft upper coupler is diagnosed to be defective due to any of the following conditions: seized bearing, loose bearing stake or a bearing not fully seated in the yoke of the coupler assembly, the coupler can be serviced as a separate component of the steering column assembly.

REMOVAL AND INSTALLATION

SERVICE WARNINGS AND CAUTIONS

WARNING: BEFORE BEGINNING ANY SERVICE PROCEDURES THAT INVOLVES REMOVING THE AIR BAG. REMOVE AND ISOLATE THE NEGATIVE (-) BATTERY CABLE (GROUND) FROM THE VEHICLE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIR BAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIR BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL AND INSTALLATION (Continued)

WARNING: THE AIR BAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL THE AIR BAG SYSTEM COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIR BAG AND POSSIBLE PERSONAL INJURY. THE FASTENERS, SCREWS, AND BOLTS, ORIGINALLY USED FOR THE AIR BAG COMPONENTS, HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIR BAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANYTIME A NEW FASTENER IS NEEDED, REPLACE WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR FASTENERS LISTED IN THE PARTS BOOKS. BEFORE SERVICING A STEERING COLUMN EQUIPPED WITH AN AIR BAG, REFER TO GROUP 8M, ELECTRICAL FOR PROPER AND SAFE SERVICE PROCEDURES.

WARNING: SAFETY GOGGLES SHOULD BE WORN AT ALL TIMES WHEN WORKING ON STEERING COLUMNS.

CAUTION: Disconnect the negative (ground) cable from the battery, before servicing any column component.

CAUTION: Do not attempt to remove the pivot pins to disassemble the tilting mechanism. Damage will occur.

NOTE: Wait for a minimum of 2 minutes before starting to remove an airbag from steering wheel. This will allow the airbag system capacitor to de-energize.

WARNING: WHEN AN UNDEPLOYED AIRBAG ASSEMBLY IS TO BE REMOVED FROM THE STEERING WHEEL, DISCONNECT BATTERY GROUND CABLE AND ISOLATE. ALLOW SYSTEM CAPACITOR TO DISCHARGE FOR TWO MINUTES, THEN BEGIN AIRBAG REMOVAL.

WARNING: WHEN HANDLING AN UNDEPLOYED AIRBAG MODULE DURING SERVICING OF THE STEERING COLUMN THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED. AT NO TIME SHOULD ANY SOURCE OF ELECTRICITY BE PERMITTED NEAR THE INFLATOR ON THE BACK OF THE AIRBAG MODULE. WHEN CARRYING A LIVE MODULE, THE TRIM COVER SHOULD BE POINTED AWAY FROM THE BODY TO MINIMIZE INJURY IF MODULE ACCIDENTLY DEPLOYS. IF AIRBAG MODULE IS PLACED ON A BENCH OR OTHER SURFACE, PLASTIC COVER SHOULD BE FACE UP TO MINIMIZE MOVEMENT IN CASE OF ACCIDENTAL DEPLOYMENT.

STEERING COLUMN

NOTE: Before proceeding, review SERVICE WARNINGS AND CAUTIONS found at the beginning of the REMOVAL AND INSTALLATION section.

NOTE: This procedure is to be used when replacing the steering column. It is written to reflect that objective. If the column is to be removed as one assembly, or without removing the steering wheel, the steering wheel must be turned from the straight ahead position to the RIGHT 180° and locked in place. Lock the column in this position by removing the key from the key cylinder. This MUST be performed before the steering coupler to the gear is disconnected. This is done to prevent the chance of damaging the clockspring. When reconnecting the steering coupler to the intermediate shaft, verify the front wheels have not moved from their position when column was removed. If during column reinstallation, any doubt is present as to whether the clockspring is properly centered, the clockspring centering procedure in step Step 19 MUST be performed prior to connecting the steering coupler.

REMOVAL

(1) Remove remote ground cable from ground stud on shock tower and isolate ground cable from vehicle by installing isolator on stud (Fig. 2).

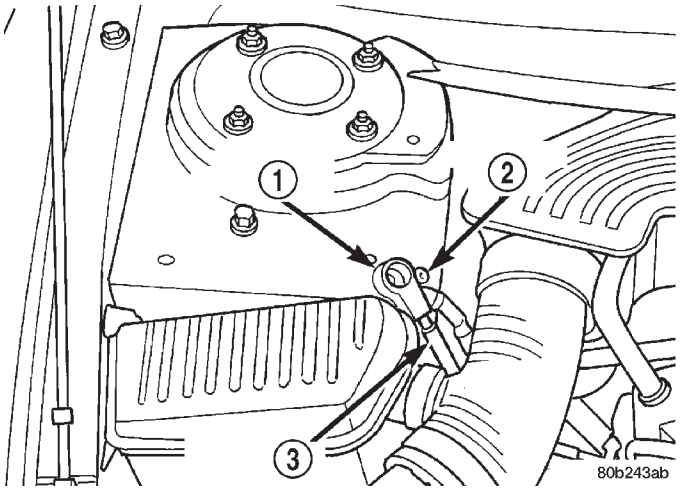


Fig. 2 Correctly Isolated Remote Ground Cable

1 – CABLE ISOLATOR
2 – GROUND STUD
3 – GROUND CABLE

REMOVAL AND INSTALLATION (Continued)

(2) Remove the fuse panel cover from the left end of the instrument panel (Fig. 3).

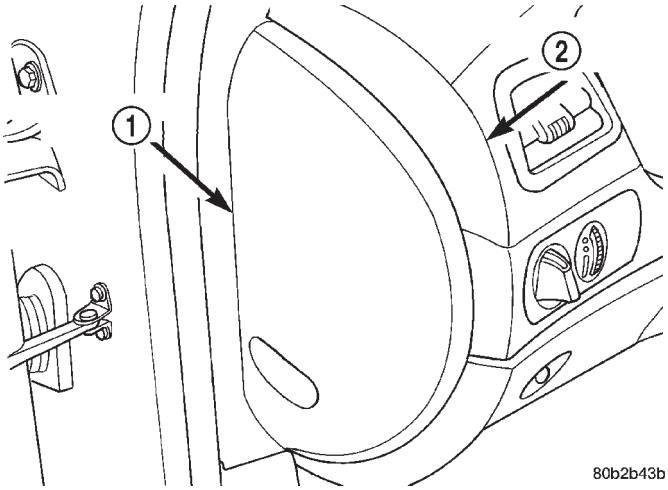


Fig. 3 Fuse Panel Cover

1 – FUSE PANEL COVER
2 – INSTRUMENT PANEL

(3) Remove the 2 screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 4).

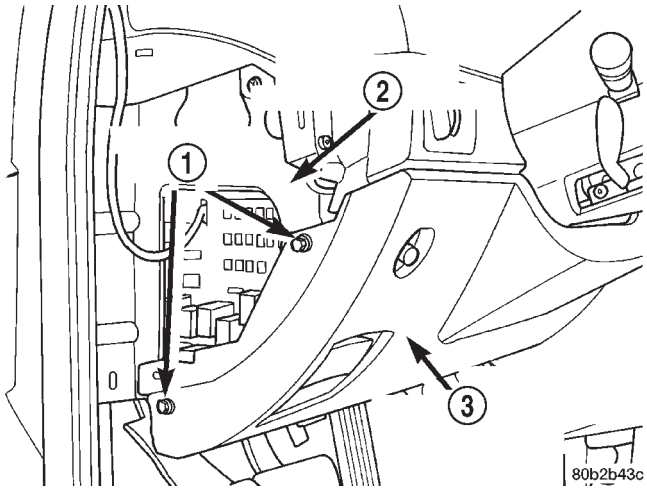


Fig. 4 Lower Instrument Panel Cover Mounting Screws

1 – MOUNTING SCREWS
2 – INSTRUMENT PANEL BRACKET
3 – LOWER INSTRUMENT PANEL COVER

(4) Remove the lower instrument panel cover. The lower instrument panel cover is attached by retaining clips along the top and right edge.

(5) Remove the wiring harness connector from the trunk release switch in the lower instrument panel cover (Fig. 5).

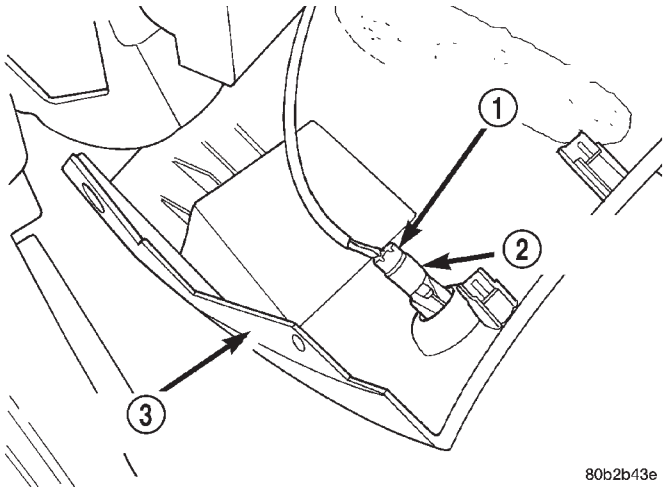


Fig. 5 Trunk Release Wiring

1 – WIRING HARNESS CONNECTOR
2 – TRUNK RELEASE SWITCH
3 – LOWER INSTRUMENT PANEL COVER

(6) Remove the parking brake release cable, from the park brake release handle in the lower instrument panel cover (Fig. 6).

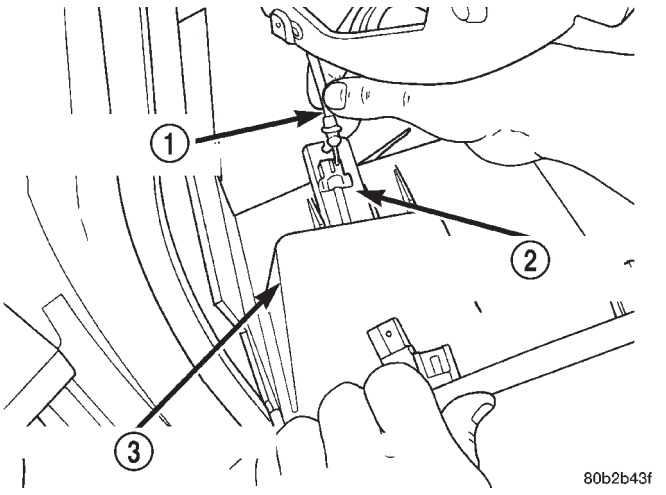


Fig. 6 Park Brake Release Cable

1 – PARK BRAKE RELEASE CABLE
2 – PARK BRAKE RELEASE HANDLE
3 – LOWER INSTRUMENT PANEL COVER

(7) Remove the 4 bolts (Fig. 7) mounting the reinforcement (Fig. 7) to the instrument panel. Remove the reinforcement from the instrument panel. Remove the diagnostic connector (Fig. 8) from the reinforcement.

(8) Before beginning removal of steering column assembly from vehicle, be sure front wheels of vehicle are in the STRAIGHT-AHEAD position.

(9) Remove the speed control switches (Fig. 9) from the steering wheel. The speed control switches

REMOVAL AND INSTALLATION (Continued)

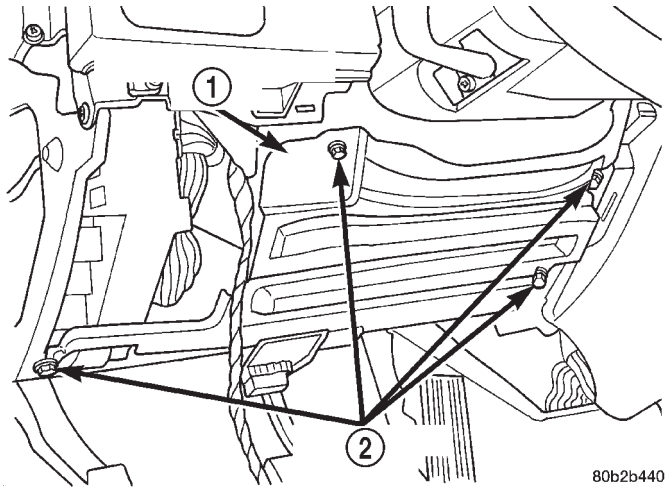


Fig. 7 Reinforcement Panel

1 – REINFORCEMENT PANEL
2 – MOUNTING BOLTS

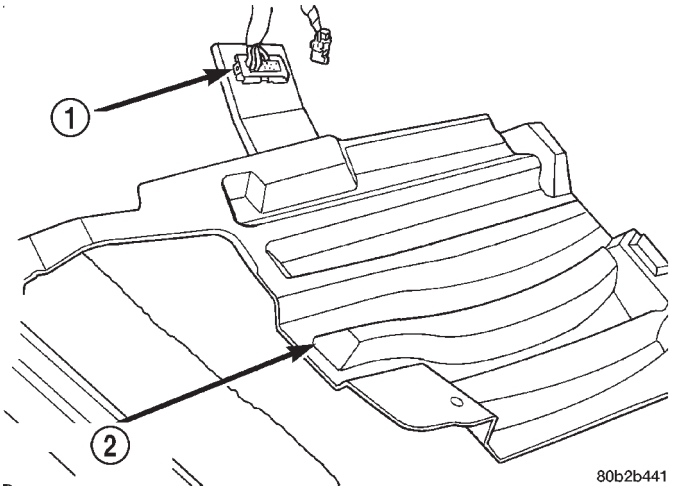


Fig. 8 Diagnostic Connector

1 – DIAGNOSTIC CONNECTOR
2 – REINFORCEMENT PANEL

are mounted to the steering wheel by two screws (one screw, each switch) which are accessible from the back side of the steering wheel.

NOTE: Wait for a minimum of 2 minutes before starting to remove airbag from steering wheel. This will allow the airbag system capacitor to de-energize.

WARNING: WHEN AN UNDEPLOYED AIRBAG ASSEMBLY IS TO BE REMOVED FROM THE STEERING WHEEL, DISCONNECT BATTERY GROUND CABLE AND ISOLATE. ALLOW SYSTEM CAPACITOR TO DISCHARGE FOR TWO MINUTES, THEN BEGIN AIRBAG REMOVAL.

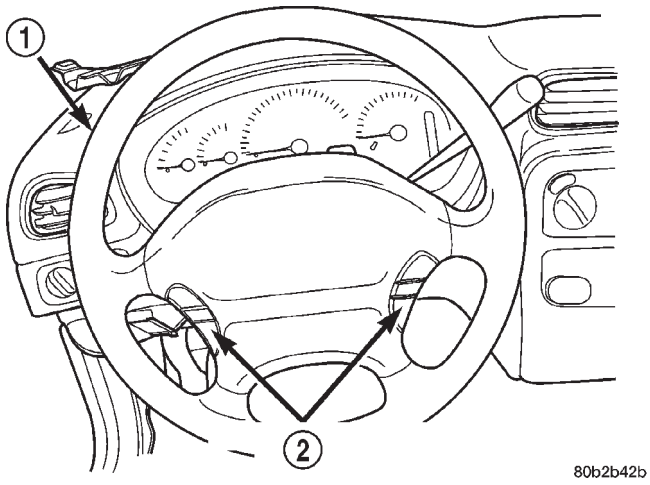


Fig. 9 Speed Control Switches

1 – STEERING WHEEL
2 – SPEED CONTROL SWITCHES

WARNING: WHEN HANDLING AN UNDEPLOYED AIRBAG MODULE DURING SERVICING OF THE STEERING COLUMN THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED. AT NO TIME SHOULD ANY SOURCE OF ELECTRICITY BE PERMITTED NEAR THE INFLATOR ON THE BACK OF THE AIRBAG MODULE. WHEN CARRYING A LIVE MODULE, THE TRIM COVER SHOULD BE POINTED AWAY FROM THE BODY TO MINIMIZE INJURY IF MODULE ACCIDENTLY DEPLOYS. IF AIRBAG MODULE IS PLACED ON A BENCH OR OTHER SURFACE, PLASTIC COVER SHOULD BE FACE UP TO MINIMIZE MOVEMENT IN CASE OF ACCIDENTAL DEPLOYMENT.

(10) Remove the 2 bolts (Fig. 10) attaching the airbag module to the steering wheel.

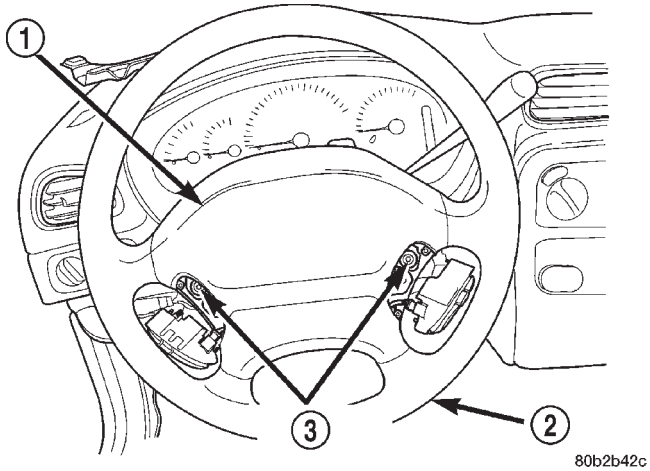


Fig. 10 Airbag Module Attaching Bolts

1 – AIRBAG MODULE
2 – STEERING WHEEL
3 – MOUNTING SCREWS

REMOVAL AND INSTALLATION (Continued)

(11) Remove the airbag module from the steering wheel.

(12) Remove the connector lock from the airbag electrical lead connector (Fig. 11). Connector lock is removed by pulling it straight out of the airbag connector. Do not twist the connector lock when removing it from the airbag.

(13) Disconnect the electrical connector (Fig. 11) from the back of the airbag module. Connector is removed by pulling it straight out of the airbag module. Do not twist the connector when removing it from the airbag.

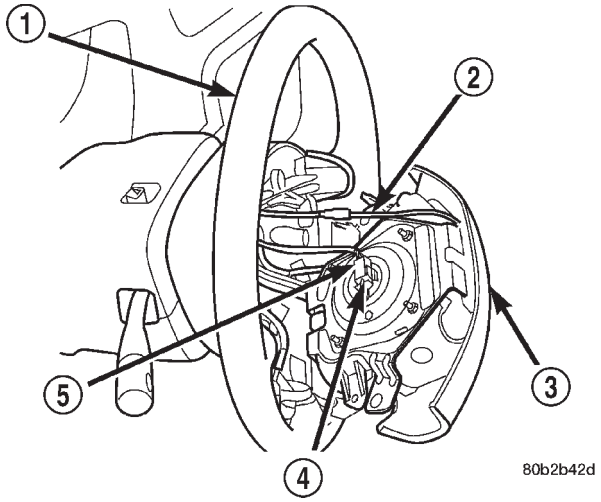


Fig. 11 Airbag Module Electrical Connections

1 – STEERING WHEEL
2 – HORN SWITCH WIRE
3 – AIRBAG MODULE
4 – CONNECTOR LOCK
5 – AIRBAG ELECTRICAL CONNECTOR

(14) Remove the horn switch wire (Fig. 11) from the clockspring horn wire.

(15) Remove the steering wheel attaching nut (Fig. 12) from the steering column shaft.

CAUTION: When installing wheel puller on steering wheel, be sure puller bolts are fully seated in the threaded holes in the steering wheel. If bolts are not fully seated in the threaded holes, threads may be stripped out when removing the steering wheel.

(16) Install puller on steering wheel as shown (Fig. 13).

CAUTION: Do not bump or hammer on steering wheel or steering column shaft when removing steering wheel from steering column.

(17) Remove steering wheel from steering column shaft.

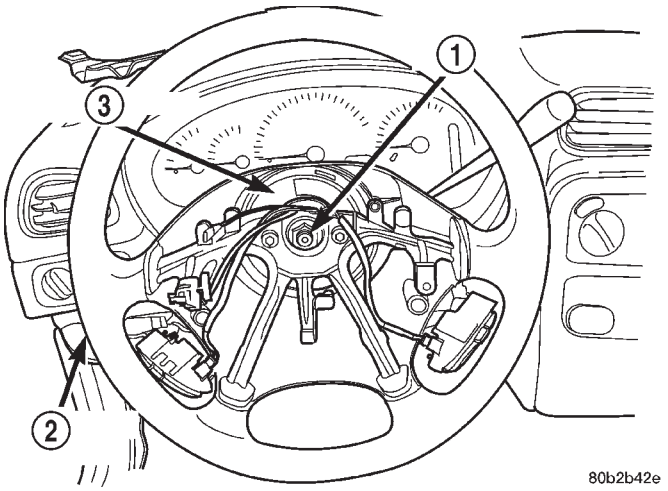


Fig. 12 Steering Wheel Attaching Nut

1 – ATTACHING NUT
2 – STEERING WHEEL
3 – CLOCKSPRING

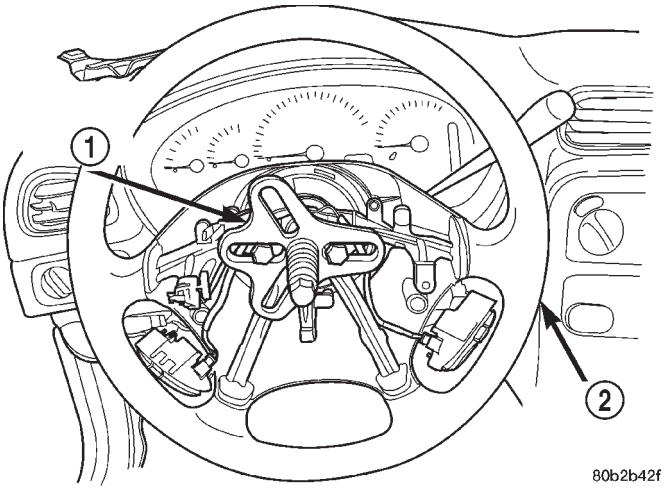


Fig. 13 Puller Installed On Steering Wheel

1 – STEERING WHEEL PULLER
2 – STEERING WHEEL

NOTE: The upper shroud on this steering column is retained to the steering column by a snap fit to the lower shroud. When removing the upper shroud from the steering column lower shroud, DO NOT use a hard or sharp tool. This will damage the shrouds. If a tool must be used, use a soft tool such as a trim stick.

(18) Remove the steering column upper shroud from the steering column using the following procedure. First, on the right seam between the upper and lower shrouds, push in on seam at the forward end. When the upper shroud unsnaps, pull the upper shroud upward away from the lower. Repeat this procedure on the opposite side of the column to release

REMOVAL AND INSTALLATION (Continued)

the upper shroud from the lower. Remove the upper shroud from the steering column.

(19) Remove the tilt lever (Fig. 14) from the steering column.

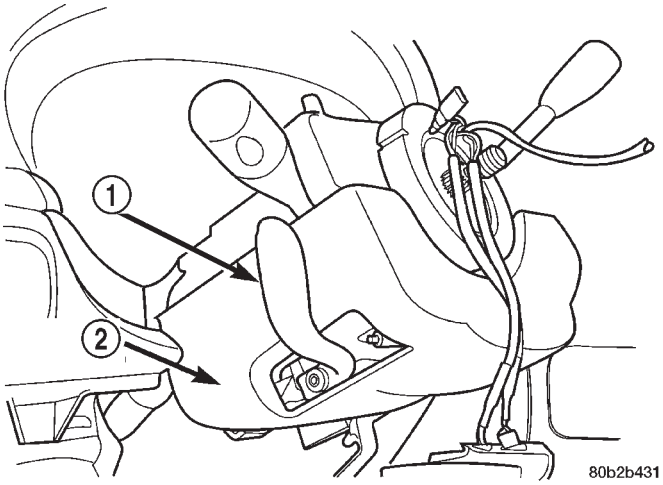


Fig. 14 Tilt Lever

1 – TILT LEVER
2 – LOWER SHROUD

(20) Remove the 2 screws attaching the lower shroud to the steering column (Fig. 15). Remove the lower shroud from the steering column.

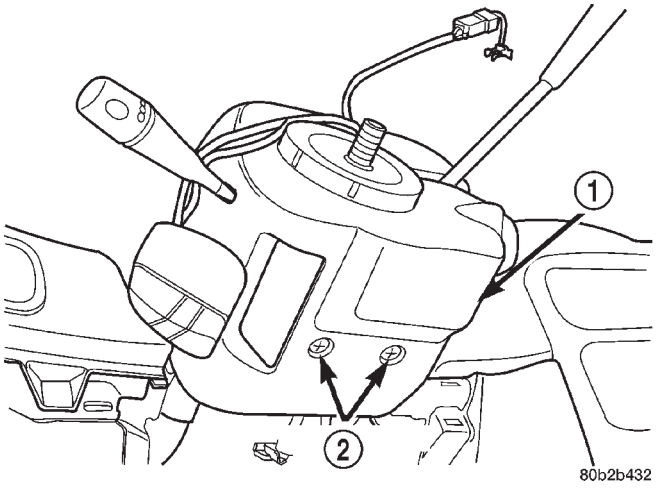


Fig. 15 Lower Shroud Attaching Screws

1 – LOWER SHROUD
2 – MOUNTING SCREWS

(21) Remove the wiring harness connectors (Fig. 16) from the clockspring.

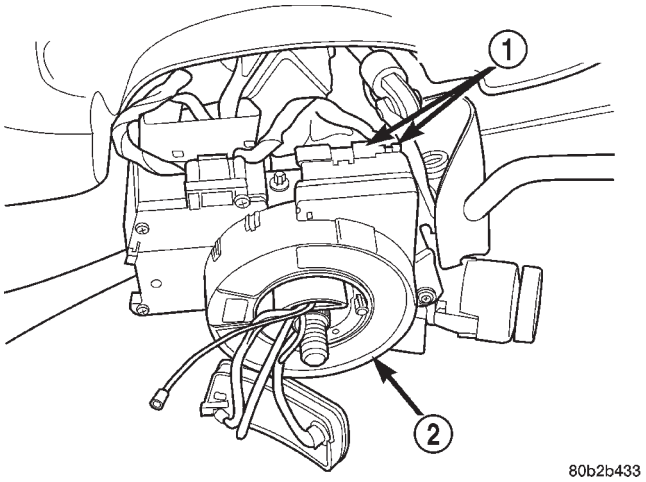


Fig. 16 Wiring Harness Connection To Clock Spring

1 – WIRING HARNESS CONNECTORS
2 – CLOCKSPRING

(22) Remove the 2 screws (Fig. 17) mounting the clockspring to the steering column. Remove the clockspring from the steering column.

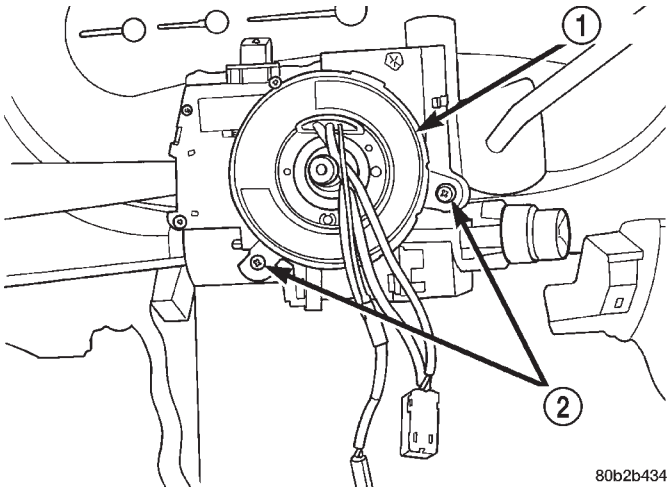


Fig. 17 Clockspring Mounting Screws

1 – CLOCKSPRING
2 – MOUNTING SCREWS

REMOVAL AND INSTALLATION (Continued)

(23) Disconnect the wire harness connector at the SKIM module. Remove the mounting screw and unclip the module from the key cylinder halo bezel.

(24) Remove the wiring harness from the routing clip on the top of the multi-function switch. Remove the 2 screws (Fig. 18) mounting the multi-function switch to the steering column. Remove the multi-function switch, with the wiring harness attached, from the steering column.

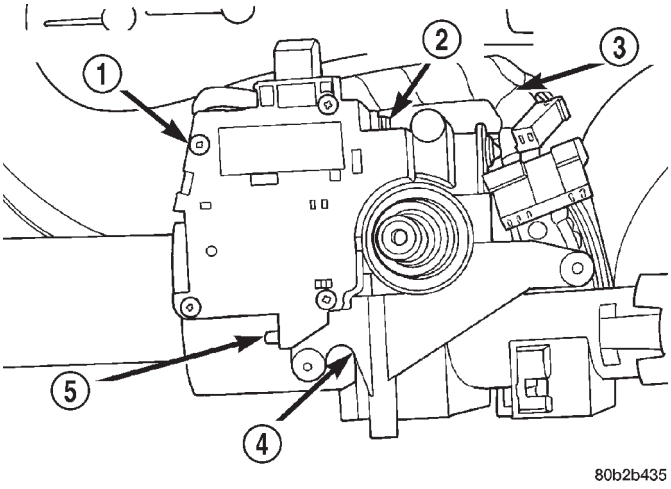


Fig. 18 Multi-Function Switch Mounting Screws

1 – MULTIFUNCTION SWITCH
2 – MOUNTING SCREW
3 – WIRING HARNESS
4 – STEERING COLUMN
5 – MOUNTING SCREW

(25) Remove the 2 screws (Fig. 19) mounting the ignition switch to the steering column. Remove the ignition switch, with the wiring harness attached, from the steering column.

(26) If the vehicle is equipped with a floor mounted shifter, depress the locking tab on the shifter/ignition interlock cable (Fig. 20) and remove the cable from the key lock housing.

(27) If the vehicle is equipped with a steering column mounted shift lever, remove the brake transmission shift interlock (BTSI) solenoid from the shift lever mechanism (Fig. 21). To do so, perform the following:

(a) Disconnect the wiring harness connector from the solenoid.

(b) Remove the retainer clip from the end of the solenoid (Fig. 22).

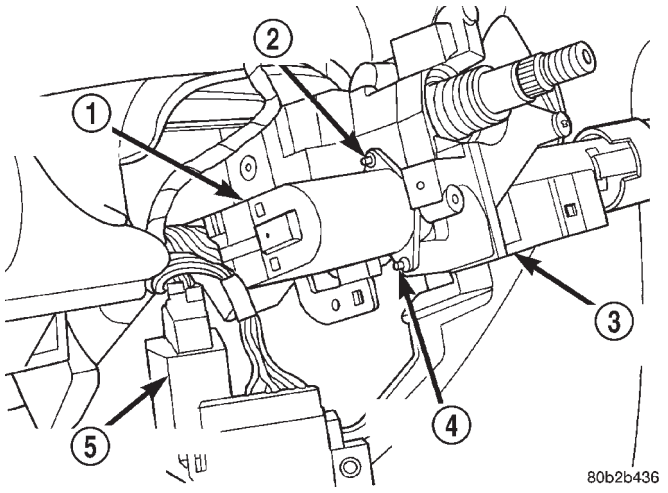


Fig. 19 Ignition Switch Mounting Screws

1 – IGNITION SWITCH
2 – MOUNTING SCREW
3 – STEERING COLUMN
4 – MOUNTING SCREW
5 – MULTIFUNCTION SWITCH

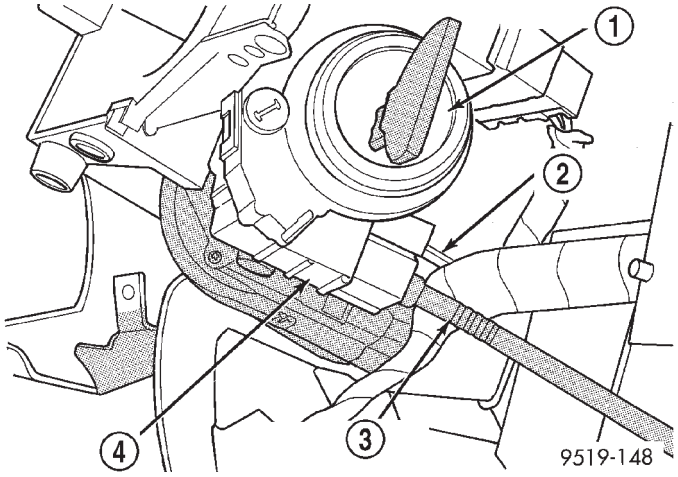


Fig. 20 Shifter/Ignition Cable At Lock Cylinder Housing

1 – KEY CYLINDER
2 – LOCKING TAB
3 – SHIFTER IGNITION INTERLOCK CABLE
4 – KEY LOCK HOUSING

REMOVAL AND INSTALLATION (Continued)

(c) Slide the solenoid straight off the shift lever mounting stud.

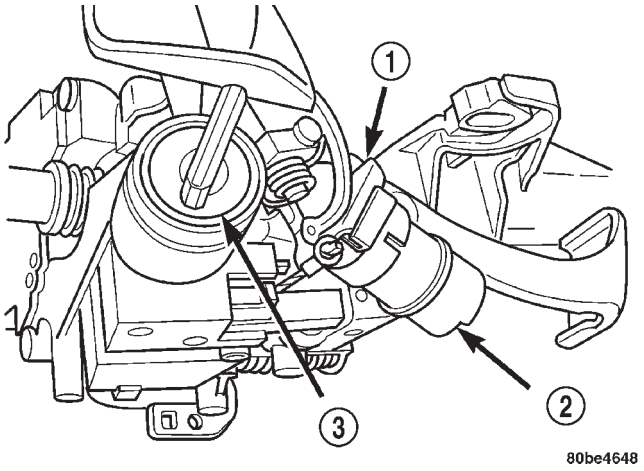


Fig. 21 BTSI Solenoid

1 – SHIFT LEVER BRACKET
2 – SOLENOID
3 – KEY CYLINDER

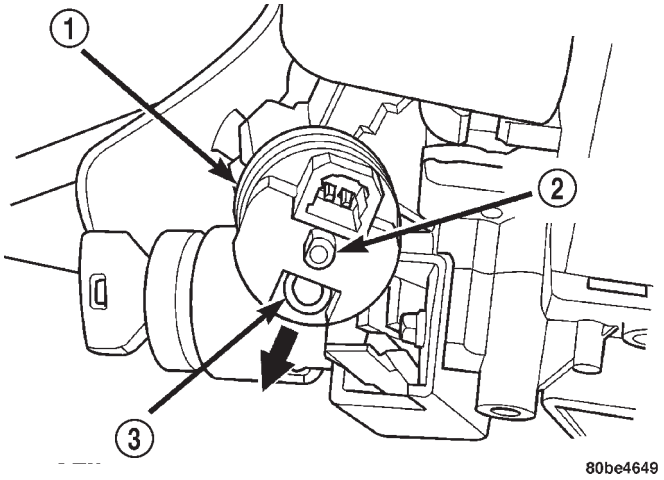


Fig. 22 Solenoid Retainer Clip Removal

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

(28) If the vehicle is equipped with a steering column mounted shift lever, remove the shift cable from the shifter mechanism. Unlock the cable lock, then, the shift cable is removed by inserting a screwdriver between the shift cable and the shifter mechanism and prying the cable off the pin (Fig. 23).

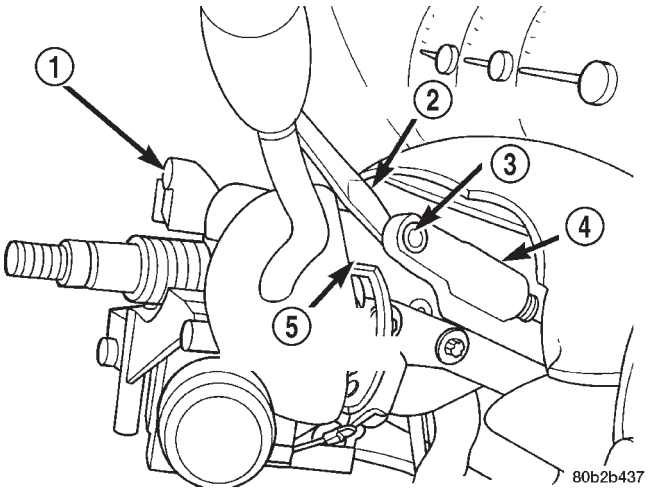


Fig. 23 Shift Cable Removal

1 – STEERING COLUMN
2 – SCREWDRIVER
3 – PIN
4 – SHIFT CABLE
5 – SHIFTER MECHANISM

(29) Remove the shift cable mounting bracket (Fig. 24) from the steering column. The shift cable mounting bracket is mounted to the steering column by the 2 mounting screws (Fig. 24).

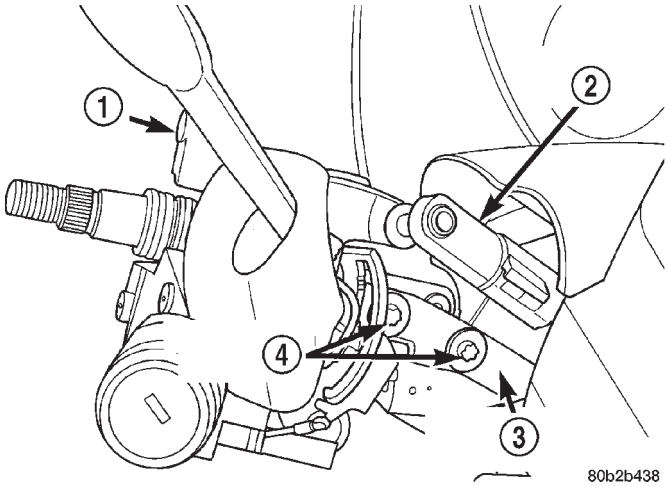


Fig. 24 Shift Cable Bracket Mounting To Steering Column

1 – STEERING COLUMN
2 – SHIFT CABLE
3 – SHIFT CABLE MOUNTING BRACKET
4 – MOUNTING SCREWS

REMOVAL AND INSTALLATION (Continued)

(30) Remove the 2 air ducts (Fig. 25) from under the steering column.

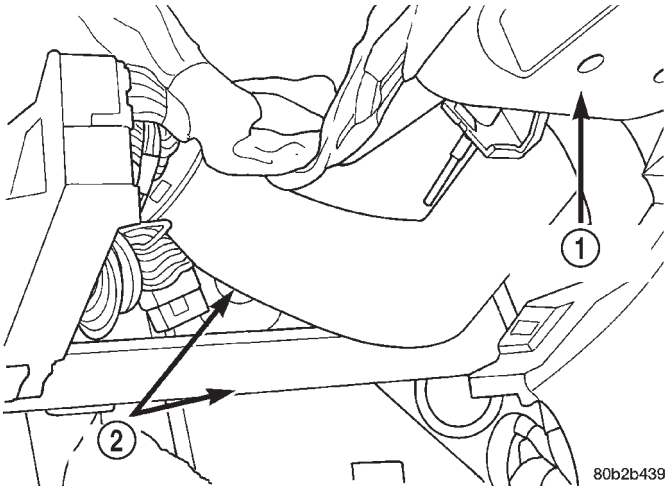


Fig. 25 Air Ducts

1 – STEERING COLUMN
2 – AIR DUCTS

(31) Remove retaining pin in steering column coupler pinch bolt (Fig. 26). Remove the pinch bolt from the steering column coupler. The pinch bolt nut is caged to coupler and is not removable. Separate the steering column flex coupler from steering intermediate shaft.

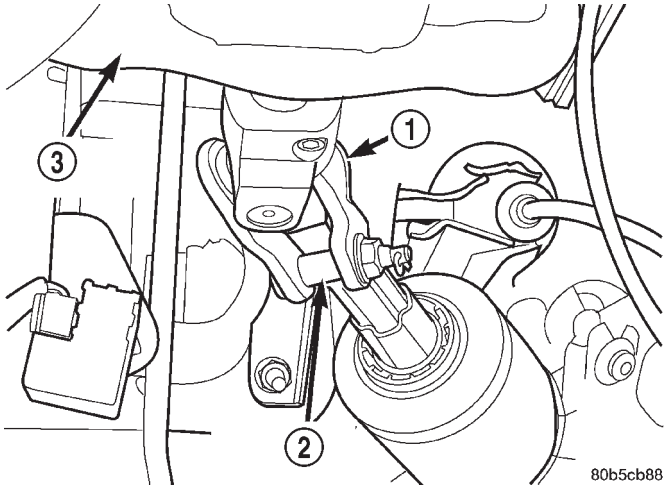


Fig. 26 Steering Column Coupler To Intermediate Shaft Attachment

1 – COUPLER
2 – PINCH BOLT
3 – STEERING COLUMN

(32) Remove the 2 steering column upper mounting bracket to support bracket nuts (Fig. 27). Then loosen the 2 bolts attaching the steering column lower mounting bracket to support bracket (Fig. 27).

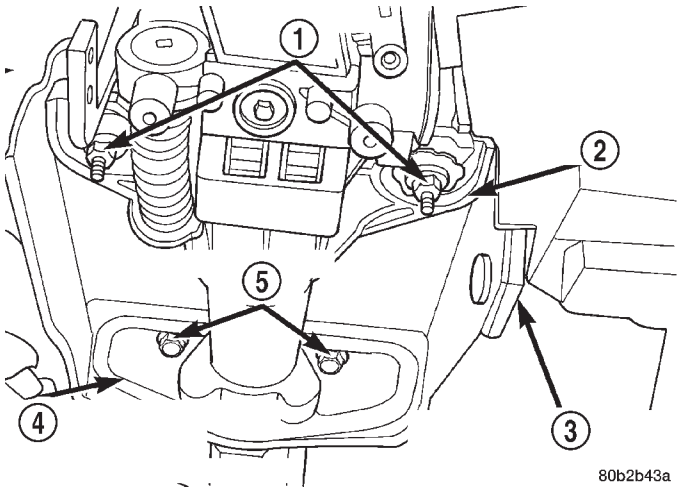


Fig. 27 Steering Column Mounting

1 – MOUNTING NUTS
2 – STEERING COLUMN UPPER MOUNTING BRACKET
3 – STEERING COLUMN SUPPORT BRACKET
4 – STEERING COLUMN LOWER MOUNTING BRACKET
5 – MOUNTING BOLTS

(33) Remove the steering column from the support bracket by pulling it rearward, then out of the car.

INSTALLATION

(1) Install the steering column on the steering column support bracket. Loosely install the 2 steering column attaching nuts.

(2) Loosely tighten the 2 steering column upper mounting nuts (Fig. 27) to hold the steering column in place. Center the steering column in place, side to side, then install the 2 lower mounting bolts (Fig. 27). Then equally tighten both steering column upper mounting nuts until upper steering column mounting bracket is seated against support bracket. Tighten the 4 steering column bracket to support bracket fasteners to 12 N·m (105 in. lbs.), tightening the upper mounting nuts first, then the lower mounting bolts.

(3) Assemble the intermediate steering shaft to the steering column flex coupler (Fig. 26) Tighten the coupler pinch bolt nut to a torque of 27 N·m (240 in. lbs.). Be sure to install steering coupler pinch bolt retaining pin.

(4) Install the 2 air ducts (Fig. 25) under the steering column.

(5) If the vehicle is equipped with a floor shifter, install the shifter/ignition interlock cable (Fig. 20) in the lock cylinder housing.

(6) Install the shift cable mounting bracket (Fig. 24) on the steering column. The shift cable mounting bracket is mounted to the steering column by the 2 mounting screws.

(7) If the vehicle is equipped with a steering column mounted shift lever, first verify that the shift

REMOVAL AND INSTALLATION (Continued)

lever is locked in the park position. Then, install the shift cable on the shifter mechanism (Fig. 28). The shift cable must be fully inserted onto the pin of the shifter mechanism.

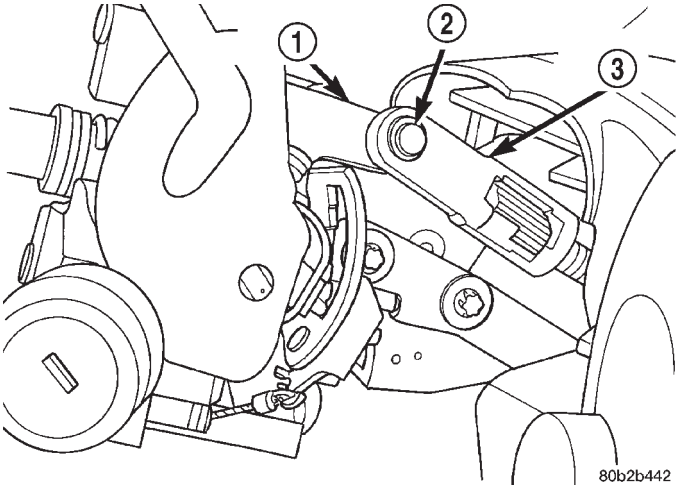


Fig. 28 Installed Shift Cable

1 – SHIFTER MECHANISM
2 – PIN
3 – SHIFT CABLE

(8) If the vehicle is equipped with a steering column mounted shift lever, install the brake transmission interlock solenoid on the shift lever mechanism. To do so, perform the following:

(a) Align the flat inside the solenoid (Fig. 29) with the flat on the shift lever mounting stud.

(b) Slide the solenoid completely onto the shift lever mounting stud aligning the plastic guide formed into the solenoid housing with the flange on the shift lever mechanism bracket (Fig. 30).

(c) Install the retainer clip until it snaps into place in the slot cut into the shift lever mounting stud (Fig. 31).

(d) Verify the solenoid is locked in place and will not slide off the mounting stud.

(e) Connect the wiring harness connector to the solenoid.

(9) Install the ignition switch on the steering column. Install and securely tighten the 2 screws (Fig. 19) mounting the ignition switch to the steering column.

(10) If the vehicle is equipped with a steering column mounted shift lever and if a new ignition shift interlock cassette has been installed, the interlock system must be adjusted. Adjust the interlock system by pushing in on the adjustment tab until it stops (Fig. 32). The adjustment tab will click as it moves into position. Ensure the tab fully depressed.

(11) Install the multi-function switch on the steering column. Install and securely tighten the 2 screws (Fig. 18) mounting the multi-function switch to the

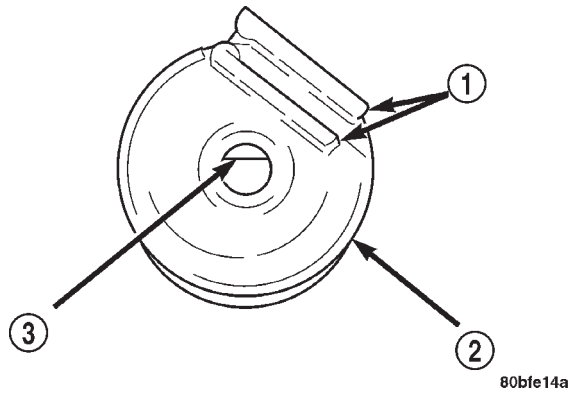


Fig. 29 Flat Inside BTSI Solenoid

1 – GUIDES
2 – SOLENOID
3 – FLAT

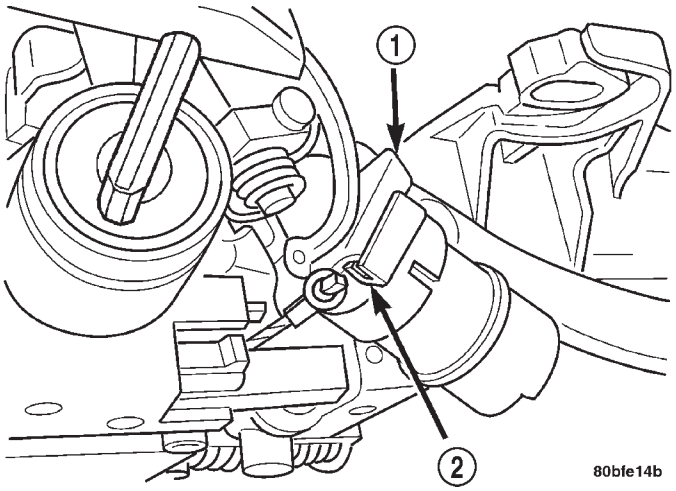


Fig. 30 Guide And Flange Alignment

1 – BRACKET FLANGE
2 – GUIDE

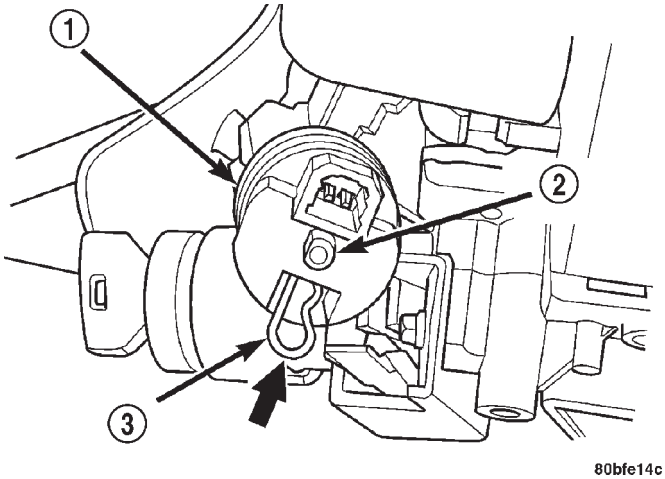


Fig. 31 Solenoid Retainer Clip Installation

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

REMOVAL AND INSTALLATION (Continued)

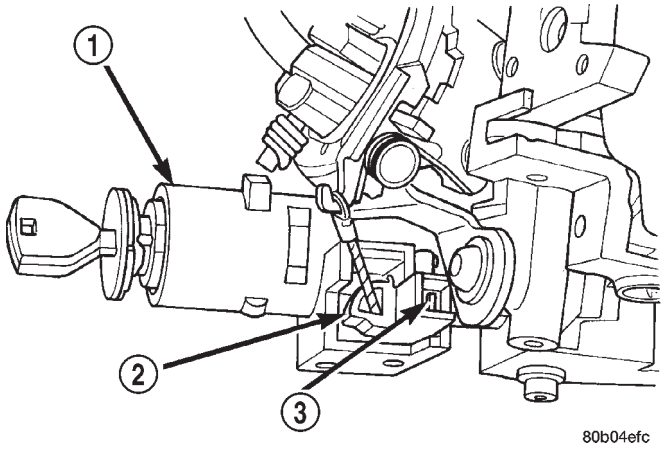


Fig. 32 Ignition Interlock Adjustment Tab

1 – LOCK CYLINDER HOUSING
2 – INTERLOCK CASSETTE
3 – ADJUSTMENT TAB

steering column. Install the clockspring wiring harness on the routing clip on the top of the multi-function switch.

(12) Clip the SKIM module over the key cylinder halo bezel and attach it to the steering column with its mounting screw. Connect the wiring harness to the module.

(13) Install the clockspring on the steering column. Install and securely tighten the 2 screws (Fig. 17) mounting the clockspring to the steering column.

(14) Install the wiring harness connectors (Fig. 16) on the clockspring.

(15) If removed, install the trim ring for the key cylinder on the lock cylinder housing.

(16) Install the lower shroud (Fig. 15) on the steering column. Install and securely tighten the 2 screws attaching the lower shroud to the steering column.

(17) Install the tilt lever (Fig. 14) on the steering column.

(18) Install the upper shroud on the steering column by snapping it onto the lower shroud.

CAUTION: If any doubt is present as to whether the clockspring is properly centered, This clockspring centering procedure MUST be performed prior to installing steering wheel assembly. If clockspring is not centered it may be overextended, causing clockspring assembly to become inoperative. The yellow centering indicator must be present in the centering window of the clockspring and the arrow on the clockspring must be pointing at the drive pin.

(19) Center the clock spring using the following procedure.

- Depress the plastic locking pin to disengage clockspring locking mechanism.
- Keeping locking mechanism disengaged, rotate the clockspring rotor in the CLOCKWISE DIRECTION to the end of the travel. Do not apply excessive torque.
- From the end of clockwise travel, slowly rotate the rotor in the counterclockwise direction until yellow appears in the centering window of clockspring. When yellow appears in the centering window the arrow on the clockspring will be pointing at the drive pin on clock spring rotor.
- Engage the clockspring locking mechanism.

CAUTION: Do not install steering wheel onto shaft of steering column assembly by driving it onto the shaft. Pull steering wheel down onto steering column shaft using ONLY the steering wheel retaining nut.

(20) Feed the clockspring wiring leads through the steering wheel (Fig. 12). Position steering wheel on shaft of steering column, making sure the master serration in the wheel hub and on the steering column shaft line up.

(21) Install steering wheel to steering column shaft retaining nut (Fig. 12) and tighten until the steering wheel is fully installed on the shaft. Tighten steering wheel retaining nut to a torque of 61 N·m (45 ft. lbs.).

(22) Turn the key cylinder to the unlock position, unlocking the steering column shaft.

(23) Connect the horn switch wiring lead from the clockspring to the airbag module horn switch wiring lead (Fig. 11).

(24) Install the airbag electrical lead into connector on back of airbag module (Fig. 11). Insert connector locking into airbag connector (Fig. 11). **Be sure electrical connector from clockspring is securely latched into airbag module connector.**

CAUTION: The fasteners, screws, and bolts, originally used for the airbag components are specifically designed for the airbag system. They must never be replaced with any substitutes. Anytime a new fastener is needed, replace only with correct fasteners provided in service packages or fasteners listed in the parts book.

NOTE: Make sure steering wheel and airbag module are in the right-side-up position before installing airbag module on steering wheel.

(25) Install the airbag module on steering wheel. Install only the 2 original or correct replacement airbag module attaching bolts (Fig. 10). Torque the 2 airbag module attaching bolts to 8 N·m (75 in. lbs.).

(26) Install the speed control switches in the steering wheel (Fig. 9). Install and tighten the screws

REMOVAL AND INSTALLATION (Continued)

attaching the speed control switches to the steering wheel to 1.5 N·m (13 in. lbs.).

(27) Install the diagnostic connector on the reinforcement (Fig. 8).

(28) Install the reinforcement on the instrument panel (Fig. 7). Install the 4 bolts mounting the reinforcement to the instrument panel.

(29) Install the parking brake release cable on the parking brake release handle in the lower instrument panel cover (Fig. 6).

(30) Install the wiring harness connector on the trunk release switch in the lower instrument panel cover (Fig. 5).

(31) Install the lower instrument panel cover.

(32) Install the 2 screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 4).

(33) Install the fuse panel cover on the left end of the instrument panel (Fig. 3).

CAUTION: When reconnecting the battery terminals on a vehicle that has had the airbag module removed, ensure that no occupants are in the vehicle, then perform the following procedure.

(34) Using the following procedure, reconnect the remote ground cable on the shock tower ground stud.

- Connect DRB scan tool to diagnostic connector below the column.
- Turn ignition key to ON position. Exit vehicle with the DRB scan tool. Install the latest version of the proper diagnostic cartridge into the DRB scan tool.
- Ensuring that there are no occupants in the vehicle, connect negative cable to negative post of the battery.
- Using the DRB scan tool read and record active fault codes. Also read and record any stored fault codes. Refer to the Body Diagnostic Test Manual if any faults are found.
- Erase stored faults if there are no active fault codes. If problems remain, fault codes will not erase.
- From the passenger side of the vehicle, turn ignition key to OFF and then ON observing instrument cluster airbag lamp. It should go on for six to eight seconds, then go out. This will indicate that the airbag system is functioning normally.
- If airbag warning lamp fails to light, blinks on and off or goes on and stays on, there is an airbag system malfunction. Refer to the Body Diagnostic Test Manual to diagnose the system malfunction.

(35) Test the operation of the horn, lights and any other functions that are steering column operated. If applicable, reset the radio and the clock.

(36) Road test vehicle to ensure proper operation of the steering system and the speed control system.

STEERING COLUMN GEAR SHIFT LEVER ASSEMBLY

NOTE: The steering column assembly does not require removal from the vehicle to allow replacement of the shift lever assembly.

REMOVAL

(1) Remove the fuse panel cover from the left end of the instrument panel (Fig. 33).

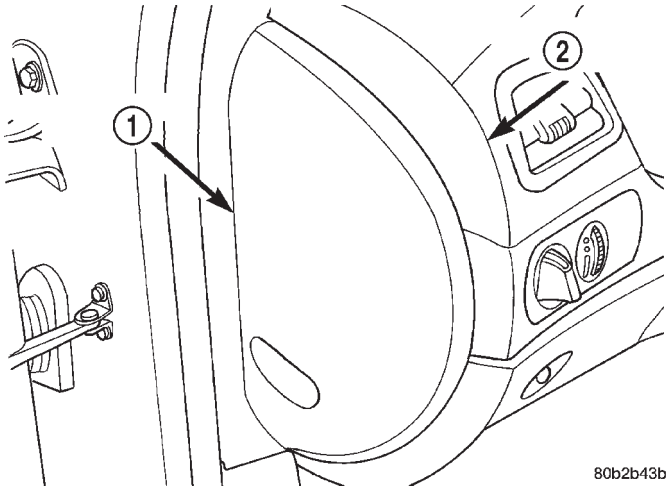


Fig. 33 Fuse Panel Cover

1 – FUSE PANEL COVER
2 – INSTRUMENT PANEL

(2) Remove the 2 screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 34).

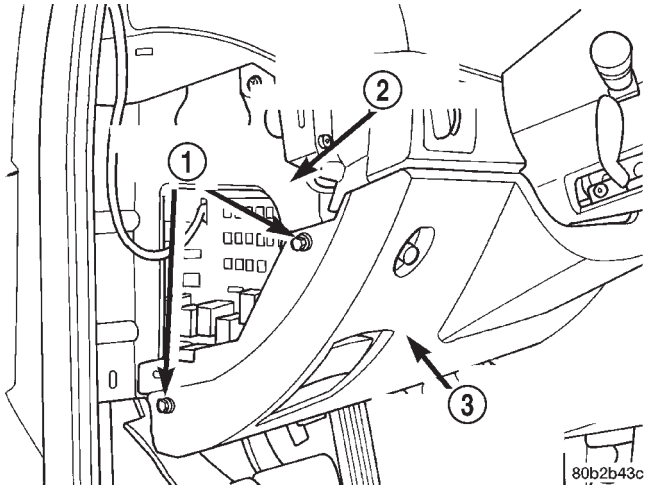


Fig. 34 Lower Instrument Panel Cover Mounting Screws

1 – MOUNTING SCREWS
2 – INSTRUMENT PANEL BRACKET
3 – LOWER INSTRUMENT PANEL COVER

REMOVAL AND INSTALLATION (Continued)

(3) Remove the lower instrument panel cover. The lower instrument panel cover is attached by retaining clips along the top and right edge.

(4) Remove the tilt lever and the upper and lower steering column shrouds from steering column assembly (Fig. 35). Then remove center outlet bezel.

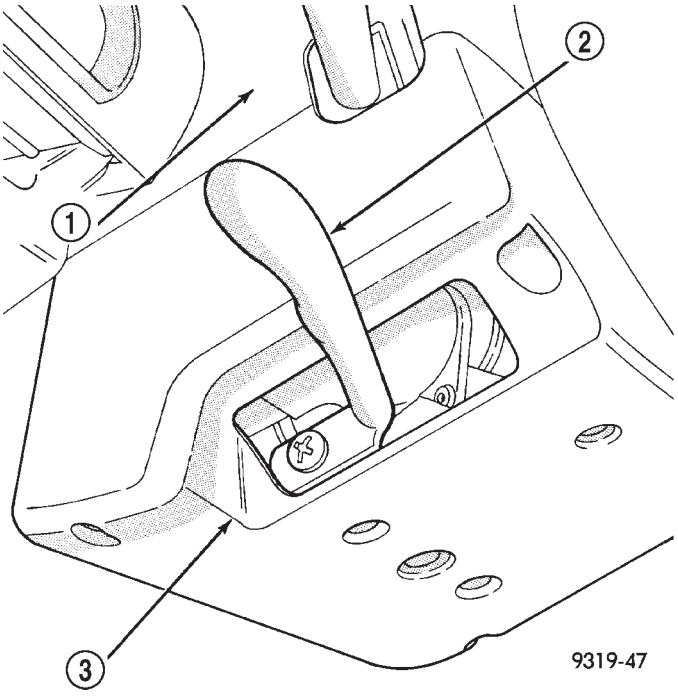


Fig. 35 Tilt Lever And Upper And Lower Shrouds

1 – UPPER SHROUD
2 – TILT LEVER
3 – LOWER SHROUD

(5) Remove the brake transmission shift interlock (BTSI) solenoid from the shift lever mechanism (Fig. 36). To do so, perform the following:

(a) Disconnect the wiring harness connector from the solenoid.

(b) Remove the retainer clip from the end of the solenoid (Fig. 37).

(c) Slide the solenoid straight off the shift lever mounting stud.

(6) Remove the gear shift cable from the attaching pin on the shift lever assembly.

(7) Unlock shift cable adjuster.

(8) Remove the 3 Torx head screws attaching the shift lever assembly to the steering column tilt housing (Fig. 38), then remove shift lever assembly from tilt housing and unhook the ignition interlock cable from shift lever assembly (Fig. 38).

(9) Remove the interlock cassette from the steering column and discard it.

NOTE: A new interlock cassette must be installed when a new shift lever assembly is installed.

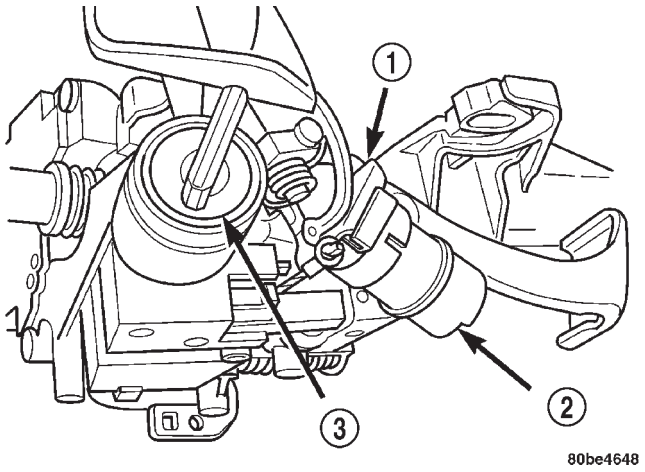


Fig. 36 BTSI Solenoid

1 – SHIFT LEVER BRACKET
2 – SOLENOID
3 – KEY CYLINDER

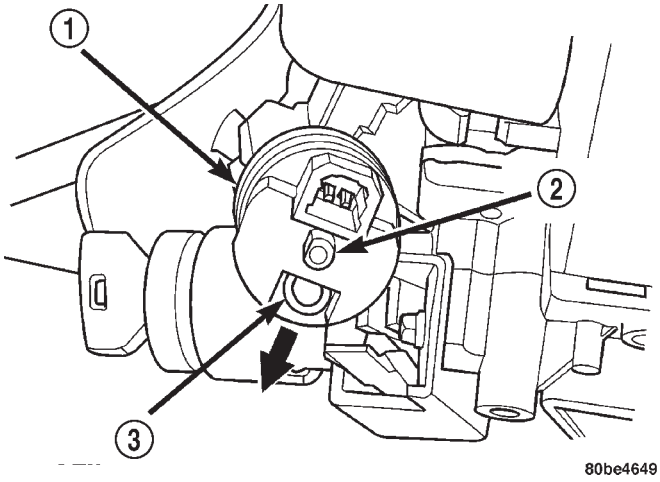


Fig. 37 Solenoid Retainer Clip Removal

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

INSTALLATION

(1) Install new shift lever assembly on tilt housing of steering column. Install and securely tighten the 3 Torx head screws attaching shift lever assembly to tilt housing.

(2) Install the gear shift cable onto the cable attaching pin on shift lever assembly.

(3) Lock the gear shift cable adjuster.

(4) Install the brake transmission interlock solenoid on the shift lever mechanism. To do so, perform the following:

(a) Align the flat inside the solenoid (Fig. 39) with the flat on the shift lever mounting stud.

(b) Slide the solenoid completely onto the shift lever mounting stud aligning the plastic guide

REMOVAL AND INSTALLATION (Continued)

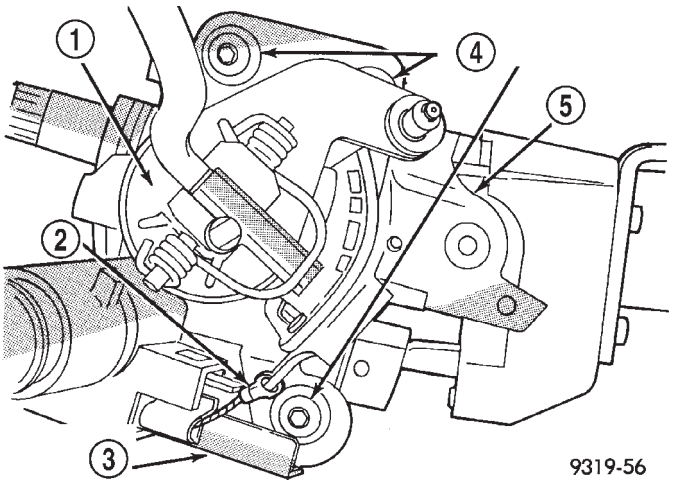


Fig. 38 Shift Lever Assembly Attachment

1 – SHIFTER ASSEMBLY
2 – CABLE
3 – INTERLOCK CASSETTE
4 – SHIFTER ASSEMBLY ATTACHING SCREWS
5 – TILT HOUSING

formed into the solenoid housing with the flange on the shift lever mechanism bracket (Fig. 40).

(c) Install the retainer clip until it snaps into place in the slot cut into the shift lever mounting stud (Fig. 41).

(d) Verify the solenoid is locked in place and will not slide off the mounting stud.

(e) Connect the wiring harness connector to the solenoid.

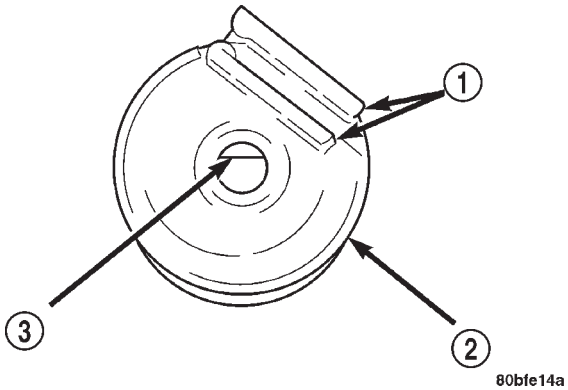


Fig. 39 Flat Inside BTSI Solenoid

1 – GUIDES
2 – SOLENOID
3 – FLAT

(5) Install cable from the new ignition interlock cassette onto the interlock lever of the shift lever assembly (Fig. 38).

(6) With the shift lever assembly in the PARK position and ignition key extracted from ignition switch, install the new interlock cassette into steering column. Be sure interlock cassette locking tab is securely latched.

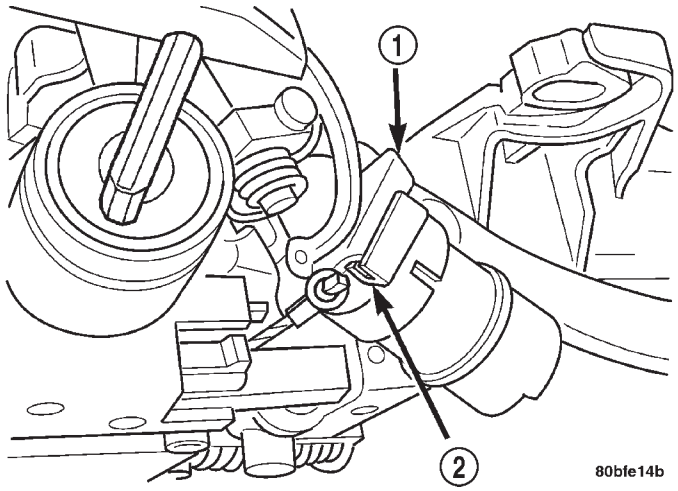


Fig. 40 Guide And Flange Alignment

1 – BRACKET FLANGE
2 – GUIDE

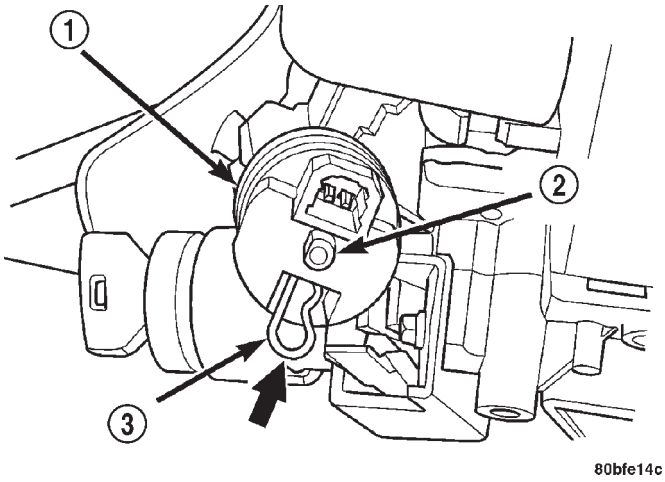


Fig. 41 Solenoid Retainer Clip Installation

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

(7) Adjust the ignition interlock system by pushing in on the adjustment tab until it stops (Fig. 42). The adjustment tab will click as it moves into position. Ensure the tab fully depressed.

(8) Install upper and lower shroud on steering column assembly (Fig. 35).

(9) Install tilt lever (Fig. 35).

(10) Install the lower instrument panel cover.

(11) Install the 2 screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 34).

(12) Install the fuse panel cover on the left end of the instrument panel (Fig. 33).

REMOVAL AND INSTALLATION (Continued)

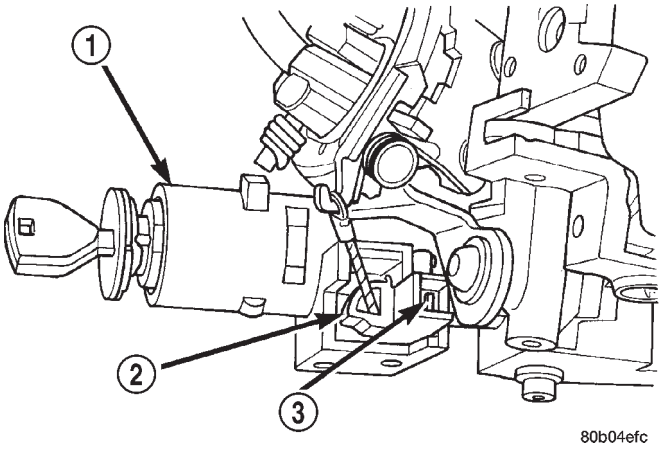


Fig. 42 Ignition Interlock Adjustment Tab

1 – LOCK CYLINDER HOUSING
2 – INTERLOCK CASSETTE
3 – ADJUSTMENT TAB

STEERING COLUMN SHAFT UPPER COUPLER

REMOVE

(1) Remove steering column assembly from vehicle. Refer to the Steering Column Removal Section in this group of the service manual for the required removal procedure.

(2) Install Puller, Special Tool 6831-A, through center of roll pin in flex coupler and install knurled nut (Fig. 43).

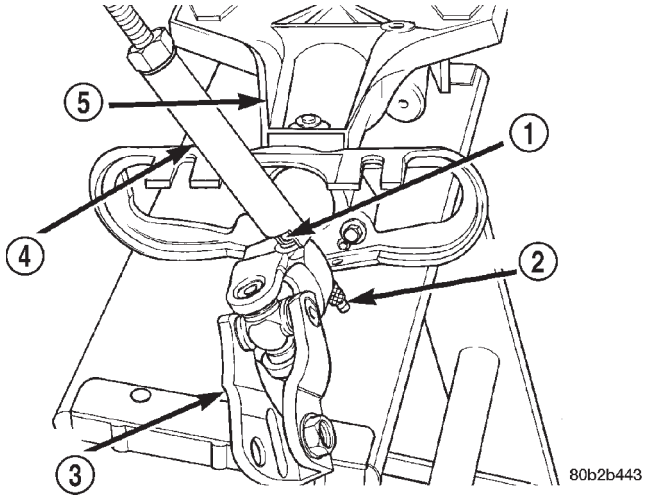


Fig. 43 Removing Roll Pin

1 – ROLL PIN
2 – KNURLED NUT
3 – FLEX COUPLER
4 – SPECIAL TOOL 6831–A
5 – STEERING COLUMN

(3) While holding hex on end threaded rod, tighten the nut on threaded rod of Puller, Special Tool 6831-A. This will pull the roll pin out of the coupler.

(4) Remove the coupler from the steering column shaft

INSTALL

(1) Start roll pin into coupler prior to installing coupler on steering column shaft. Install roll pin into coupler just far enough to square roll pin to hole in flex coupler. If roll pin is installed too far, coupler will not slide onto steering column shaft.

(2) Install coupler on steering shaft until correctly positioned to allow roll pin to be installed in coupler.

(3) Install Puller, Special Tool 6831-A, through center of roll pin and install knurled nut (Fig. 44).

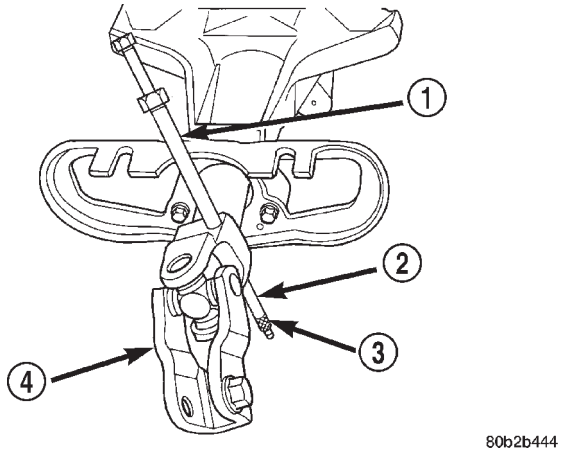


Fig. 44 Tool Set-Up For Installing Roll Pin

1 – SPECIAL TOOL 6831–A
2 – ROLL PIN
3 – KNURLED NUT
4 – FLEX COUPLER

(4) Using Puller, Special Tool, 6831-A, (Fig. 44) install roll pin into the coupler until spring pin is fully installed through both sides of the coupler.

SPECIFICATIONS

STEERING COLUMN FASTENER TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Steering Wheel:	
Retaining Nut	61 N·m (45 ft. lbs.)
Speed Control Switch Screws	1.5 N·m (13 in. lbs.)
Airbag Module Mounting Bolts	8 N·m (75 in. lbs.)
Steering Column:	
Mounting Nuts	12 N·m (105 in. lbs.)
Mounting Bolts	12 N·m (105 in. lbs.)
Upper Coupler Pinch Bolt	27 N·m (240 in. lbs.)

42LE TRANSAXLE

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DESCRIPTION AND OPERATION

42LE TRANSAXLE

DESCRIPTION

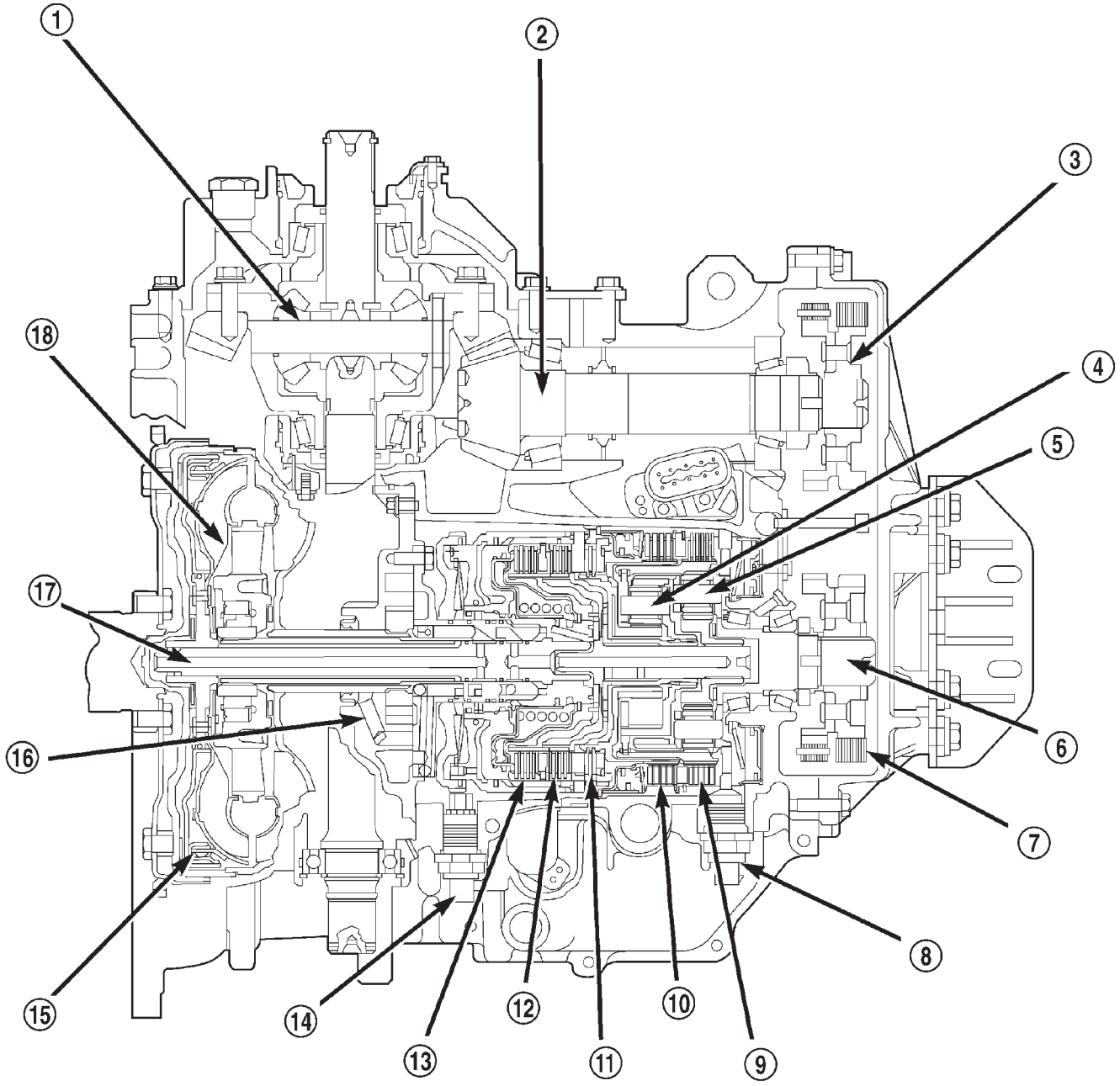


Fig. 1 42LE Transaxle

DESCRIPTION AND OPERATION (Continued)

1 – DIFFERENTIAL
2 – TRANSFER SHAFT
3 – TRANSFER GEAR
4 – FRONT PLANETARY CARRIER
5 – REAR PLANETARY CARRIER
6 – OUTPUT SHAFT
7 – OUTPUT GEAR
8 – OUTPUT SPEED SENSOR
9 – LOW/REVERSE CLUTCH
10 – 2/4 CLUTCH
11 – REVERSE CLUTCH
12 – OVERDRIVE CLUTCH
13 – UNDERDRIVE CLUTCH
14 – INPUT SPEED SENSOR
15 – CONVERTER CLUTCH
16 – OIL PUMP
17 – INPUT SHAFT
18 – TORQUE CONVERTER

The 42LE (Fig. 1) is a four-speed transaxle that is a conventional hydraulic/mechanical assembly with an integral differential, and is controlled with adaptive electronic controls and monitors. The hydraulic system of the transaxle consists of the transaxle fluid, fluid passages, hydraulic valves, and various line pressure control components. An input clutch assembly which houses the underdrive, overdrive, and reverse clutches is used. It also utilizes separate holding clutches: 2nd/4th gear and Low/Reverse. The primary mechanical components of the transaxle consist of the following:

- Three multiple disc input clutches
- Two multiple disc holding clutches
- Four hydraulic accumulators
- Two planetary gear sets
- Hydraulic oil pump
- Valve body
- Solenoid/Pressure switch assembly
- Integral differential assembly

Control of the transaxle is accomplished by fully adaptive electronics. Optimum shift scheduling is accomplished through continuous real-time sensor feedback information provided to the Transmission Control Module (TCM).

The TCM is the heart of the electronic control system and relies on information from various direct and indirect inputs (sensors, switches, etc.) to determine driver demand and vehicle operating conditions. With this information, the TCM can calculate and perform timely and quality shifts through various output or control devices (solenoid pack, transmission control relay, etc.).

The TCM also performs certain self-diagnostic functions and provides comprehensive information (sensor data, DTC's, etc.) which is helpful in proper diagnosis and repair. This information can be viewed with the DRB scan tool.

TRANSAXLE IDENTIFICATION

The 42LE transaxle identification code is a series of digits printed on a bar-code label that is fixed to the transaxle case as shown in (Fig. 2).

For example, the identification code K 821 1125 1316 can be broken down as follows:

- K = Kokomo Transmission Plant
- 821 = Last three digits of the transaxle part number
- 1125 = Build date
- 1316 = Build sequence number

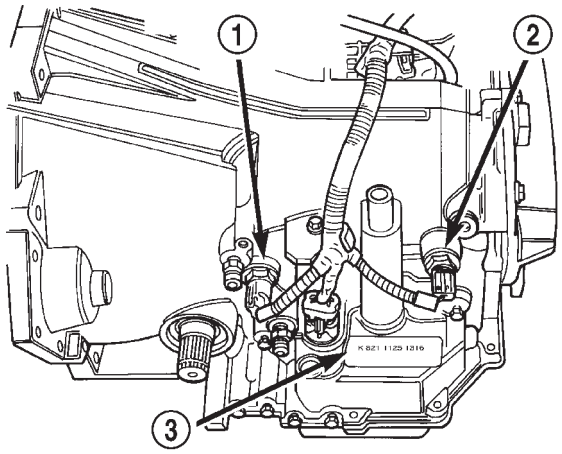


Fig. 2 Transaxle Identification Label

1 – INPUT SPEED SENSOR
2 – OUTPUT SPEED SENSOR
3 – IDENTIFICATION TAG

If the tag is not legible or missing, the "PK" number, which is stamped into the transaxle case, can be referred to for identification. This number differs slightly in that it contains the entire transaxle part number, rather than the last three digits.

OPERATION

Transmission output is directed to an integral differential by a transfer gear system in the following input-to-output ratios:

First	2.84 : 1
Second	1.57 : 1
Third	1.00 : 1
Overdrive	0.69 : 1
Reverse	2.21 : 1

DESCRIPTION AND OPERATION (Continued)

FLUID REQUIREMENT

NOTE: Refer to the maintenance schedules in Group 0, Lubrication and Maintenance for the recommended maintenance (fluid/filter change) intervals for this transaxle.

NOTE: Refer to Service Procedures in this group for fluid level checking procedures.

NOTE: The 42LE transaxle has separate transmission and differential oil sumps, each requiring different fluids.

DESCRIPTION

TRANSMISSION

Mopar® ATF+4 (Automatic Transmission Fluid-Type 9602) is required in this transaxle. Substitute fluids can induce torque converter clutch shudder.

Mopar® ATF+4 (Automatic Transmission Fluid-Type 9602) when new is red in color. The ATF is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, the ATF will begin to look darker in color and may eventually become brown. **This is normal.** A dark brown/black fluid accompanied with a burnt odor and/or deterioration in shift quality may indicate fluid deterioration or transmission component failure.

DIFFERENTIAL

The differential sump should be filled with Mopar® 75W-90 hypoid gear lubricant. Synthetic gear lubricants should be avoided.

FLUID ADDITIVES

DaimlerChrysler strongly recommends against the addition of any fluids to the transmission, other than those automatic transmission fluids listed above. Exceptions to this policy are the use of special dyes to aid in detecting fluid leaks.

Various “special” additives and supplements exist that claim to improve shift feel and/or quality. These additives and others also claim to improve converter clutch operation and inhibit overheating, oxidation, varnish, and sludge. These claims have not been supported to the satisfaction of DaimlerChrysler and these additives **must not be used.** The use of transmission “sealers” should also be avoided, since they may adversely affect the integrity of transmission seals.

TORQUE CONVERTER

DESCRIPTION

The torque converter is located in the bellhousing area of the transaxle, between the engine and transaxle. The torque converter is a fluid coupling that transmits torque from the engine drive plate to the input shaft of the transaxle. The torque converter consists of four main components (Fig. 3) :

- Impeller
- Turbine
- Stator
- Converter Clutch assembly

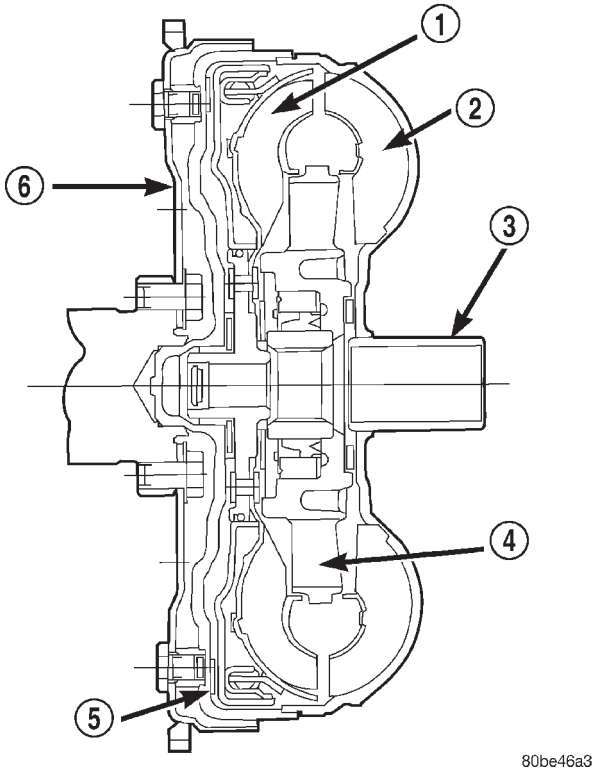


Fig. 3 Torque Converter Assembly

1 – TURBINE
2 – IMPELLER
3 – HUB
4 – STATOR
5 – CONVERTER CLUTCH DISC
6 – DRIVE PLATE

OPERATION

The converter impeller (driving member), which is integral to the converter housing and bolted to the engine drive plate, rotates at engine speed. The converter turbine (driven member), which reacts from fluid pressure generated by the impeller, rotates and turns the transmission input shaft.

Torque is transmitted by fluid passing through curved vanes in both the impeller and turbine. Since

DESCRIPTION AND OPERATION (Continued)

the coupling is produced by transmission fluid, the turbine can slip or turn slower than the impeller.

The stator contains a one-way overrunning clutch, which free-wheels when the impeller and turbine are rotating at the same speed. However, the stator stops when speed reduction or torque increase take place. When the stator stops, it changes the direction of the fluid leaving the turbine vanes. This directs fluid back into the impeller with greater force, resulting in torque multiplication.

The torque converter clutch is hydraulically operated and controlled by the TCM. It consists of a piston and a frictional disc that form a direct mechanical link between the impeller and turbine when slippage is inefficient or unnecessary.

The torque converter hub drives the transmission oil pump.

ELECTRONICALLY MODULATED CONVERTER CLUTCH

In order to reduce heat build-up in the transmission and buffer the powertrain against torsional vibrations, the TCM can duty cycle the LR/CC solenoid to achieve a smooth application of the torque converter clutch. This function, also referred as "Electronically Modulated Converter Clutch (EMCC), can occur at various times depending on the following variables:

- Shift lever position
- Current gear range
- Transmission fluid temperature
- Engine coolant temperature
- Input speed
- Throttle angle
- Engine speed

The TCM controls the torque converter by way of internal logic software. The programming of the software provides the TCM with fine control over the LR/CC solenoid. There are four output logic states that can be applied as follows:

- No EMCC
- Partial EMCC
- Full EMCC
- Gradual-to-no EMCC

NO EMCC

Under No EMCC conditions, the L/R Solenoid is OFF. There are several conditions that can result in NO EMCC operations. No EMCC can be initiated due to a fault in the transaxle or because the TCM does not see the need for EMCC under current driving conditions.

PARTIAL EMCC

Partial EMCC operation modulates the L/R Solenoid (duty cycle) to obtain partial torque converter clutch application. Partial EMCC operation is maintained until Full EMCC is called for an actuated. During Partial EMCC some slip does occur. Partial EMCC will usually occur at low speeds, low load and light throttle situations.

FULL EMCC

During Full EMCC operation, the TCM increases the L/R Solenoid duty cycle to full ON after Partial EMCC control brings the engine speed within the desired slip range of transaxle input speed relative to engine rpm.

GRADUAL-TO-NO EMCC

This operation is to soften the change from Full or Partial EMCC to No EMCC. This is done at mid-throttle by decreasing the L/R Solenoid duty cycle.

OIL PUMP

DESCRIPTION

The oil pump is located in the pump housing inside the bell housing of the transaxle case. The oil pump consists of an inner and outer gear, a housing, and a cover that also serves as the reaction shaft support.

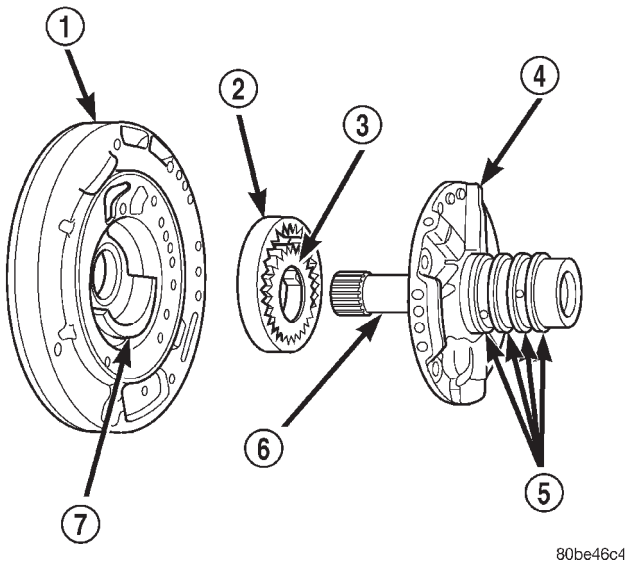


Fig. 4 Oil Pump Assembly

1 – PUMP HOUSING
2 – OUTER PUMP GEAR
3 – INNER PUMP GEAR
4 – REACTION SHAFT SUPPORT
5 – SEAL RINGS (4)
6 – REACTION SHAFT
7 – CRESCENT

DESCRIPTION AND OPERATION (Continued)

OPERATION

As the torque converter rotates, the converter hub rotates the inner and outer gears. As the gears rotate, the clearance between the gear teeth increases in the crescent area, and creates a suction at the inlet side of the pump. This suction draws fluid through the pump inlet from the oil pan. As the clearance between the gear teeth in the crescent area decreases, it forces pressurized fluid into the pump outlet and to the valve body.

VALVE BODY

DESCRIPTION

The valve body assembly (Fig. 5) consists of a cast aluminum valve body, a separator plate, and transfer plate. The valve body contains valves and check balls that control fluid delivery to the torque converter clutch, solenoid/pressure switch assembly, and frictional clutches.

Also mounted to the valve body assembly are the solenoid/pressure switch assembly and the transmission range sensor (Fig. 5).

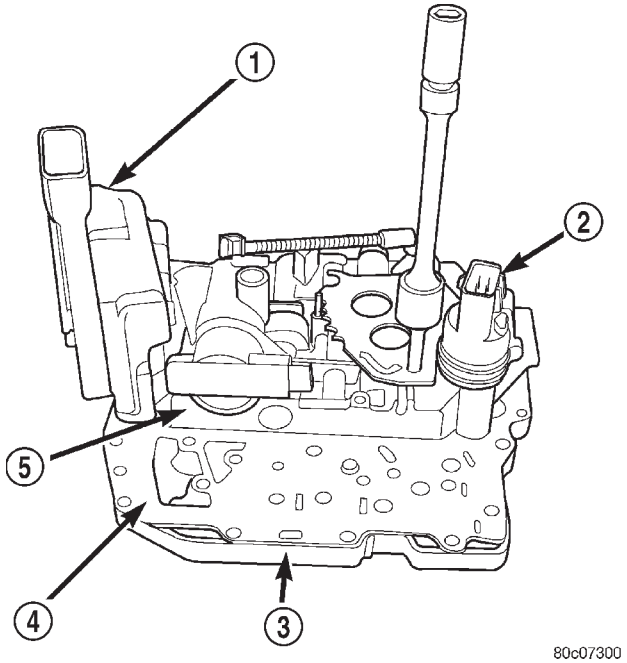


Fig. 5 Valve Body Assembly

1 – SOLENOID/PRESSURE SWITCH ASSEMBLY
2 – TRS
3 – TRANSFER PLATE
4 – SEPARATOR PLATE
5 – VALVE BODY

The valves contained within the valve body include the following (Fig. 6):

- Regulator valve
- Solenoid switch valve
- Manual valve
- Converter clutch switch valve
- Converter clutch control valve
- Torque converter regulator valve
- Low/Reverse switch valve
- Vent reservoir check valve

In addition, the valve body also contains the thermal valve, #2,3,4 & 5 check balls and the 2/4 accumulator assembly. Refer to Valve Body Disassembly & Assembly for the location of these components.

OPERATION

NOTE: Refer to the Hydraulic Schematics for a visual aid in determining valve location, operation and design.

REGULATOR VALVE

The regulator valve controls hydraulic pressure in the transaxle. It receives unregulated pressure from the pump, which works against spring tension to maintain oil at specific pressures. A system of sleeves and ports allows the regulator valve to work at one of three predetermined pressure levels. Regulated oil pressure is also referred to as “line pressure.”

SOLENOID SWITCH VALVE

The solenoid switch valve controls line pressure from the LR/CC solenoid. In one position, it allows the low/reverse clutch to be pressurized. In the other, it directs line pressure to the converter control and converter clutch valves.

MANUAL VALVE

The manual valve is operated by the mechanical shift linkage. Its primary responsibility is to send line pressure to the appropriate hydraulic circuits and solenoids. The valve has three operating ranges or positions.

CONVERTER CLUTCH SWITCH VALVE

The main responsibility of the converter clutch switch valve is to control hydraulic pressure applied to the front (off) side of the converter clutch piston. Line pressure from the regulator valve is fed to the torque converter regulator valve, where it passes through the valve, and is slightly regulated. The pressure is then directed to the converter clutch switch valve and to the front side of the converter clutch piston. This pressure pushes the piston back and disengages the converter clutch.

CONVERTER CLUTCH CONTROL VALVE

The converter clutch control valve controls the back (on) side of the torque converter clutch. When the TCM energizes or modulates the LR/CC solenoid

DESCRIPTION AND OPERATION (Continued)

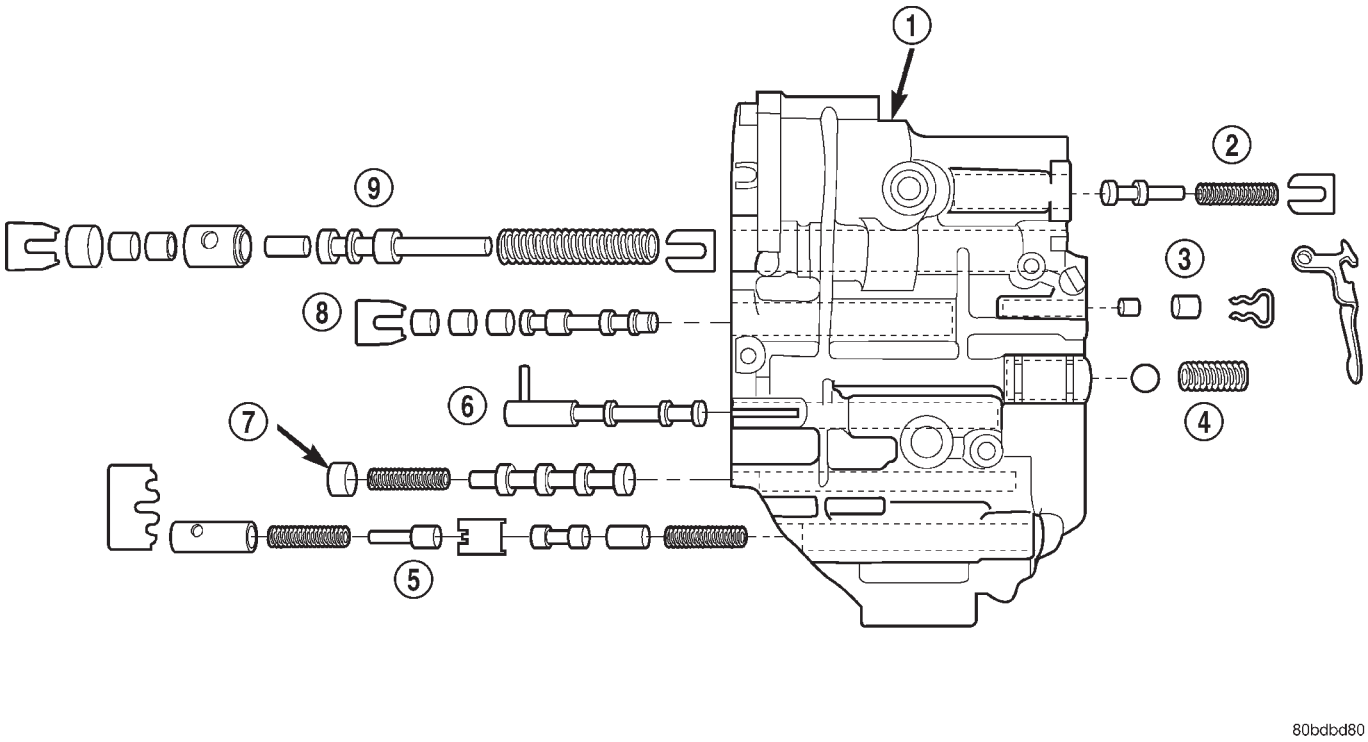


Fig. 6 Valve Body—Exploded

1 – VALVE BODY
2 – T/C REGULATOR VALVE
3 – L/R SWITCH VALVE
4 – VENT RESERVOIR CHECK VALVE
5 – CONVERTER CLUTCH CONTROL VALVE
6 – MANUAL VALVE
7 – CONVERTER CLUTCH SWITCH VALVE
8 – SOLENOID SWITCH VALVE
9 – REGULATOR VALVE

to apply the converter clutch piston, both the converter clutch control valve and the converter control valve move, allowing pressure to be applied to the back side of the clutch.

T/C REGULATOR VALVE

The torque converter regulator valve slightly regulates the flow of fluid to the torque converter.

LOW/REVERSE SWITCH VALVE

The low/reverse clutch is applied from different sources, depending on whether low (1st) gear or reverse is selected. The low/reverse switch valve alternates positions depending on from which direction fluid pressure is applied. By design, when the valve is shifted by fluid pressure from one channel, the opposing channel is blocked. The switch valve alienates the possibility of a sticking ball check, thus providing consistent application of the low/reverse clutch under all operating conditions.

VENT RESERVOIR CHECK VALVE

The vent reservoir check valve is designed for quick venting during garage shifts to prevent the overdrive and reverse clutches from dragging. Inadvertent motion of the reverse/overdrive (push/pull) piston can be caused by the unbalanced centrifugal forces in the reverse and overdrive chambers. By linking the overdrive and reverse vents to the vent reservoir at the manual valve, an equal residual pressure will be maintained, thus balancing the centrifugal forces in the reverse and the overdrive chambers.

ACCUMULATORS

DESCRIPTION

The 42LE underdrive, overdrive, low/reverse, and 2/4 clutch hydraulic circuits each contain an accumulator. An accumulator assembly typically consists of a piston, seals, return spring(s), and a cover or plug (Fig. 7).

The overdrive and underdrive accumulators are located within the transaxle case, and are retained by the valve body (Fig. 8).

The low reverse accumulator (Fig. 8) is also located within the transaxle case, but the assembly is retained by a cover and a snap-ring.

DESCRIPTION AND OPERATION (Continued)

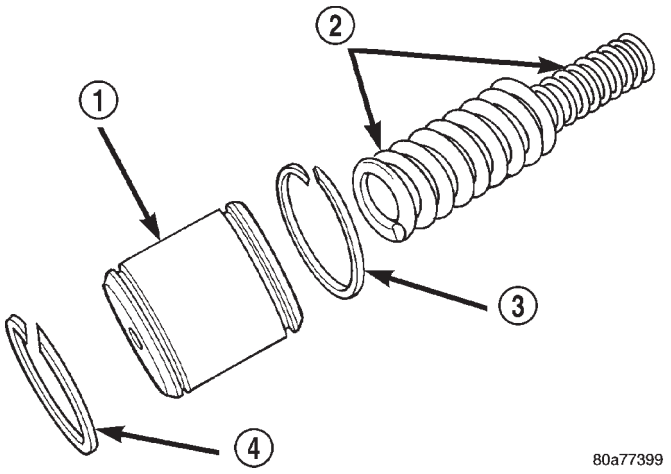


Fig. 7 Accumulator Assembly—Typical

1 – ACCUMULATOR PISTON (UNDERDRIVE)
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

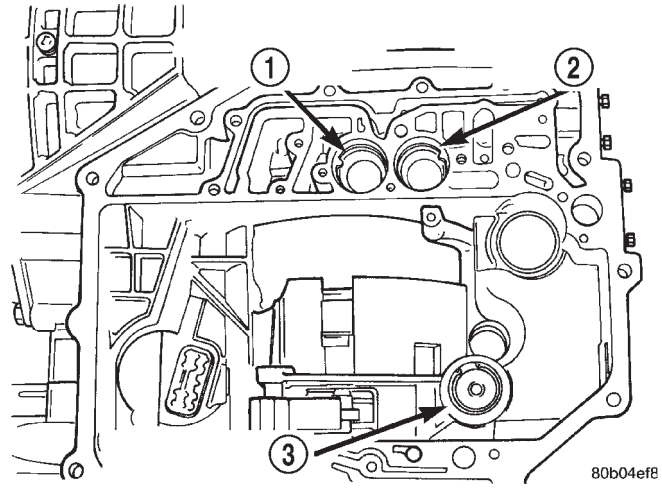


Fig. 8 Overdrive, Underdrive and Low/Reverse Accumulator Location

1 – OVERDRIVE ACCUMULATOR LOCATION
2 – UNDERDRIVE ACCUMULATOR LOCATION
3 – LOW/REVERSE ACCUMULATOR

(1) The 2/4 accumulator is located in the valve body. It is retained by a cover and retaining screws (Fig. 9).

OPERATION

The function of an accumulator is to cushion the application of a frictional clutch element. When pressurized fluid is applied to a clutch circuit, the application force is dampened by fluid collecting in the respective accumulator chamber against the piston and spring(s). The intended result is a smooth, firm clutch application.

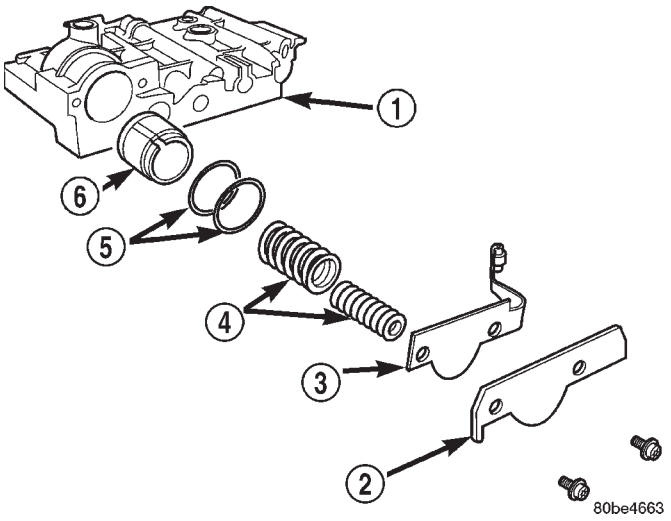


Fig. 9 2/4 Accumulator Assembly

1 – VALVE BODY
2 – RETAINER PLATE
3 – DETENT SPRING
4 – SPRINGS
5 – SEALS
6 – PISTON

INPUT CLUTCHES

DESCRIPTION

Three hydraulically applied input clutches are used to drive planetary components. The underdrive, overdrive, and reverse clutches are considered input clutches and are contained within the input clutch assembly (Fig. 10). The input clutch assembly also contains:

- Input shaft
- Input hub
- Clutch retainer
- Underdrive piston
- Overdrive/reverse piston
- Overdrive hub
- Underdrive hub

OPERATION

The three input clutches are responsible for driving different components of the planetary geartrain.

NOTE: Refer to the "Elements In Use" chart in Diagnosis and Testing for a collective view of which clutch elements are applied at each position of the selector lever.

UNDERDRIVE CLUTCH

The underdrive clutch is hydraulically applied in first, second, and third (direct) gears by pressurized fluid against the underdrive piston. When the under-

DESCRIPTION AND OPERATION (Continued)

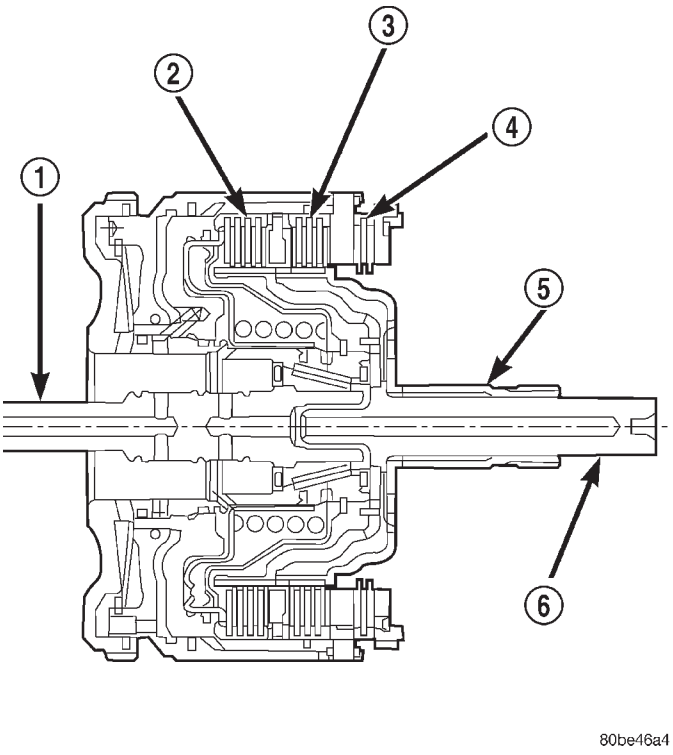


Fig. 10 Input Clutch Assembly

1 – INPUT SHAFT
2 – UNDERDRIVE CLUTCH
3 – OVERDRIVE CLUTCH
4 – REVERSE CLUTCH
5 – OVERDRIVE SHAFT
6 – UNDERDRIVE SHAFT

drive clutch is applied, the underdrive hub drives the rear sun gear.

OVERDRIVE CLUTCH

The overdrive clutch is hydraulically applied in third (direct) and overdrive gears by pressurized fluid against the overdrive/reverse piston. When the overdrive clutch is applied, the overdrive hub drives the front planet carrier.

REVERSE CLUTCH

The reverse clutch is hydraulically applied in reverse gear only by pressurized fluid against the overdrive/reverse piston. When the reverse clutch is applied, the front sun gear assembly is driven.

HOLDING CLUTCHES

DESCRIPTION

Two hydraulically applied multi-disc clutches are used to hold planetary geartrain components stationary while the input clutches drive others. The 2/4 and Low/Reverse clutches are considered holding clutches and are contained at the rear of the transaxle case. (Fig. 11).

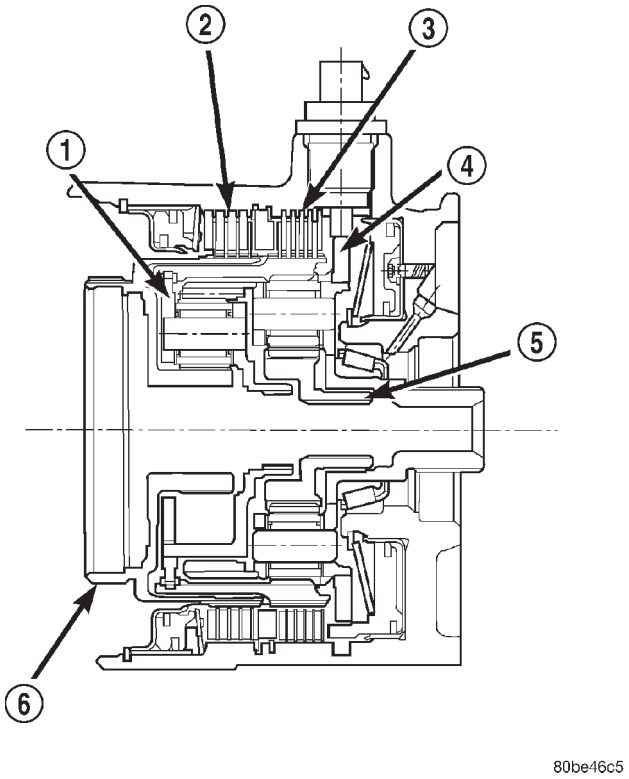


Fig. 11 2/4 and Low/Reverse Clutches

1 – FRONT PLANET CARRIER/REAR ANNULUS
2 – 2/4 CLUTCH
3 – L/R CLUTCH
4 – REAR PLANET CARRIER/FRONT ANNULUS
5 – REAR SUN GEAR
6 – FRONT SUN GEAR ASSEMBLY

OPERATION

NOTE: Refer to the "Elements In Use" chart in Diagnosis and Testing for a collective view of which clutch elements are applied at each position of the selector lever.

2/4 CLUTCH

The 2/4 clutch is hydraulically applied in second and fourth gears by pressurized fluid against the 2/4 clutch piston. When the 2/4 clutch is applied, the front sun gear assembly is held or grounded to the transaxle case.

LOW/REVERSE CLUTCH

The Low/Reverse clutch is hydraulically applied in park, reverse, neutral, and first gears by pressurized fluid against the Low/Reverse clutch piston. When the Low/Reverse clutch is applied, the front planet

DESCRIPTION AND OPERATION (Continued)

carrier/rear annulus assembly is held or grounded to the transaxle case.

PLANETARY GEARTRAIN

DESCRIPTION

The planetary geartrain is located between the input clutch assembly and the rear of the transaxle case. The planetary geartrain consists of two sun gears, two planetary carriers, two annulus (ring) gears, and one output shaft (Fig. 12).

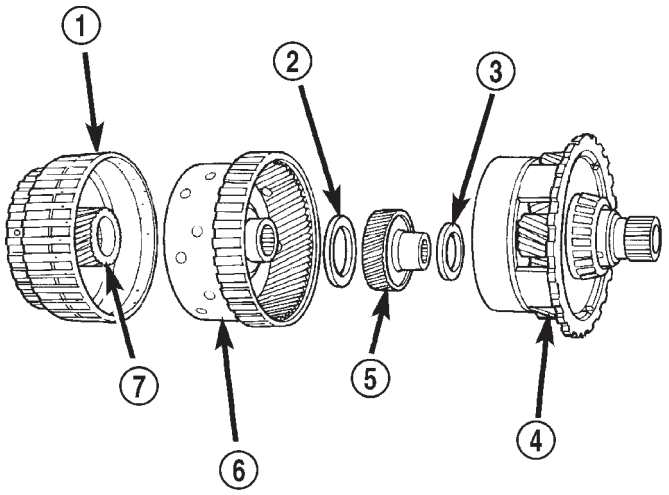


Fig. 12 Planetary Geartrain

1 – FRONT SUN GEAR ASSEMBLY
2 – #6 THRUST BEARING
3 – #7 THRUST BEARING
4 – REAR CARRIER FRONT ANNULUS ASSEMBLY
5 – REAR SUN GEAR
6 – FRONT CARRIER REAR ANNULUS ASSEMBLY
7 – FRONT SUN GEAR

OPERATION

The planetary geartrain utilizes two planetary gear sets that connect the transmission input shaft to the output shaft. Input and holding clutches drive or lock different planetary members to change output ratio or direction.

DIFFERENTIAL

DESCRIPTION

The 42LE differential is a conventional open design. It consists of a hypoid type ring and pinion set, and a differential case. The differential case consists of pinion and side gears, and a pinion shaft. The differential case is supported in the transaxle by tapered roller bearings (Fig. 13).

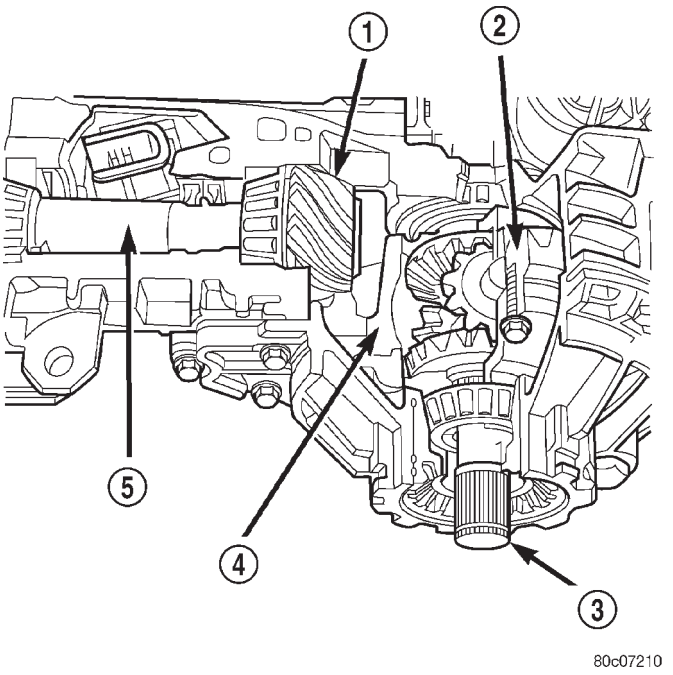


Fig. 13 Differential Assembly

1 – PINION GEAR
2 – RING GEAR
3 – SHORT STUB SHAFT
4 – DIFFERENTIAL CASE ASSEMBLY
5 – TRANSFER SHAFT

OPERATION

The differential assembly is driven by the transfer shaft by way of the differential ring gear. The ring gear drives the differential case, and the case drives the driveshafts through the differential gears. The differential pinion and side gears are supported in the case by thrust washers and a pinion shaft. Differential pinion and side gears make it possible for front tires to rotate at different speeds while cornering.

TRANSMISSION CONTROL MODULE

DESCRIPTION

The Transmission Control Module (TCM) is located in the engine compartment on the left (driver's) side next to the Power Distribution Center (PDC) (Fig. 14).

OPERATION

The TCM is the controlling unit for all electronic operations of the transaxle. The TCM receives information regarding vehicle operation from both direct and indirect inputs, and selects the operational mode of the transaxle. Direct inputs are hard-wired to, and used specifically by the TCM. Indirect inputs origi-

DESCRIPTION AND OPERATION (Continued)

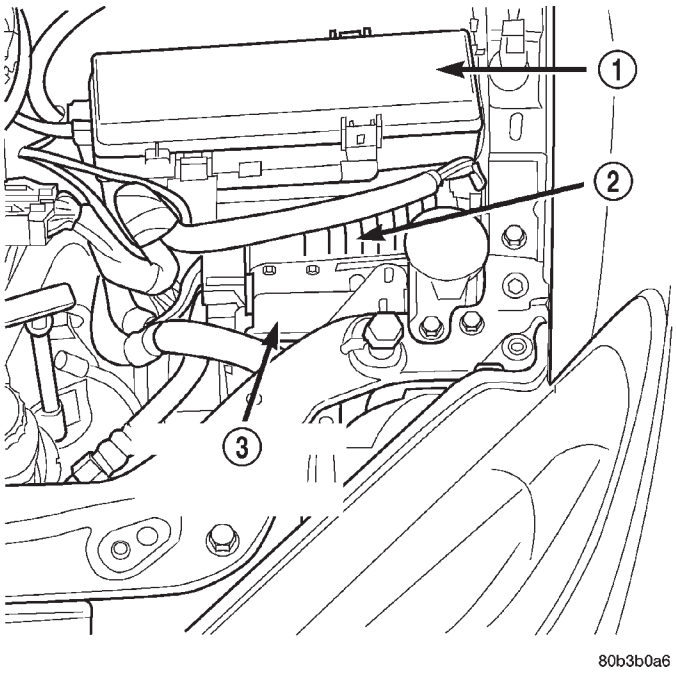


Fig. 14 Transmission Control Module Location (Typical)

1 – PDC
2 – PCM
3 – TRANSMISSION CONTROL MODULE (TCM)

nate from other components/modules, and are shared with the TCM via the PCI bus.

Some examples of **direct inputs** to the TCM are:

- Battery (B+) voltage
- Ignition "ON" voltage
- Transmission Control Relay (Switched B+)
- Throttle Position Sensor
- Crankshaft Position Sensor (CKP)
- Transmission Range Sensor (TRS)
- Pressure Switches (L/R, 2/4, OD)
- Transmission Temperature Sensor (Integral to TRS)
- Input Shaft Speed Sensor
- Output Shaft Speed Sensor
- TRS Hall Effect Switch (Autostick)

Some examples of **indirect inputs** to the TCM are:

- Engine/Body Identification
- Manifold Pressure
- Target Idle
- Torque Reduction Confirmation
- Speed Control ON/OFF Switch
- Engine Coolant Temperature
- Ambient/Battery Temperature
- Brake Switch Status
- DRB Communication

Based on the information received from these various inputs, the TCM determines the appropriate shift schedule and shift points, depending on the present operating conditions and driver demand. This is possible through the control of various direct and indirect outputs.

Some examples of TCM **direct outputs** are:

- Transmission Control Relay
- Solenoids (L/R, 2/4, OD and UD)
- Vehicle Speed (to PCM)
- Torque Reduction Request (to PCM)

Some examples of TCM **indirect outputs** are:

- Transmission Temperature (to PCM)
- PRNDL Position (to BCM)
- Autostick Display (to BCM)

In addition to monitoring inputs and controlling outputs, the TCM has other important responsibilities and functions:

- Storing and maintaining Clutch Volume Indices (CVI)
- Storing and selecting appropriate Shift Schedules
- System self-diagnostics
- Diagnostic capabilities (with DRB III scan tool)

NOTE: If the TCM has been replaced, the "Quick Learn Procedure" must be performed. Refer to "Quick Learn Procedure" in Service Procedures of this group.

CLUTCH VOLUME INDEX (CVI)

An important function of the TCM is to monitor Clutch Volume Index (CVI). CVIs represent the volume of fluid needed to compress a clutch pack.

The TCM monitors gear ratio changes by monitoring the Input and Output Speed Sensors. The Input, or Turbine Speed Sensor sends an electrical signal to the TCM that represents input shaft rpm. The Output Speed Sensor provides the TCM with output shaft speed information.

By comparing the two inputs, the TCM can determine transaxle gear position. This is important to the CVI calculation because the TCM determines CVIs by monitoring how long it takes for a gear change to occur (Fig. 15).

Gear ratios can be determined by using the DRB Scan Tool and reading the Input/Output Speed Sensor values in the "Monitors" display. Gear ratio can be obtained by dividing the Input Speed Sensor value by the Output Speed Sensor value.

For example, if the input shaft is rotating at 1000 rpm and the output shaft is rotating at 500 rpm, then the TCM can determine that the gear ratio is

DESCRIPTION AND OPERATION (Continued)

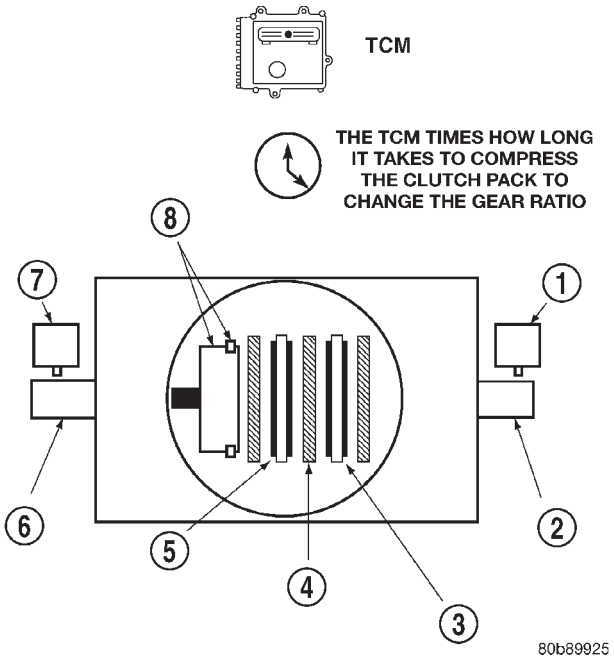


Fig. 15 Example of CVI Calculation

1 – OUTPUT SPEED SENSOR
2 – OUTPUT SHAFT
3 – CLUTCH PACK
4 – SEPARATOR PLATE
5 – FRICTION DISCS
6 – INPUT SHAFT
7 – INPUT SPEED SENSOR
8 – PISTON AND SEAL

2:1. In direct drive (3rd gear), the gear ratio changes to 1:1. The gear ratio changes as clutches are applied and released. By monitoring the length of time it takes for the gear ratio to change following a shift request, the TCM can determine the volume of fluid used to apply or release a friction element.

The volume of transmission fluid needed to apply the friction elements are continuously updated for adaptive controls. As friction material wears, the volume of fluid need to apply the element increases.

Certain mechanical problems within the input clutch assembly (broken return springs, out of position snap rings, excessive clutch pack clearance, improper assembly, etc.) can cause inadequate or out-of-range element volumes. Also, defective Input/Output Speed Sensors and wiring can cause these conditions. The following chart identifies the appropriate clutch volumes and when they are monitored/updated:

CLUTCH VOLUMES				
Clutch	When Updated			Proper Clutch Volume
	Shift Sequence	Oil Temperature	Throttle Angle	
L/R	2-1 or 3-1 coast downshift	> 70°	< 5°	35 to 83
2/4	1-2 shift	> 110°	5 - 54°	20 to 77
OD	2-3 shift			48 to 150
UD	4-3 or 4-2 shift		> 5°	24 to 70

SHIFT SCHEDULES

As mentioned earlier, the TCM has programming that allows it to select a variety of shift schedules. Shift schedule selection is dependent on the following:

- Shift lever position
- Throttle position
- Engine load
- Fluid temperature
- Software level

As driving conditions change, the TCM appropriately adjusts the shift schedule. Refer to the following chart to determine the appropriate operation expected, depending on driving conditions.

DESCRIPTION AND OPERATION (Continued)

Schedule	Condition	Expected Operation
Extreme Cold	Oil temperature at start-up below -16° F	Park, Reverse, Neutral and 2nd gear only (prevents shifting which may fail a clutch with frequent shifts)
Cold	Oil temperature at start-up above -12° F and below 36° F	– Delayed 2-3 upshift (approximately 22-31 mph) – Delayed 3-4 upshift (45-53 mph) – Early 4-3 costdown shift (approximately 30 mph) – Early 3-2 coastdown shift (approximately 17 mph) – High speed 4-2, 3-2, 2-1 kickdown shifts are prevented – No EMCC
Warm	Oil temperature at start-up above 36° F and below 80 degree F	– Normal operation (upshift, kickdowns, and coastdowns) – No EMCC
Hot	Oil temperature at start-up above 80° F	– Normal operation (upshift, kickdowns, and coastdowns) – Full EMCC, no PEMCC except to engage FEMCC (except at closed throttle at speeds above 70-83 mph)
Overheat	Oil temperature above 240° F or engine coolant temperature above 244° F	– Delayed 2-3 upshift (25-32 mph) – Delayed 3-4 upshift (41-48 mph) – 3rd gear FEMCC from 30-48 mph – 3rd gear PEMCC from 27-31 mph
Super Overheat	Oil temperature above 260° F	– All “Overheat” shift schedule features apply – 2nd gear PEMCC above 22 mph – Above 22 mph the torque converter will not unlock unless the throttle is closed or if a wide open throttle 2nd PEMCC to 1 kickdown is made

TRANSMISSION CONTROL RELAY

DESCRIPTION

The transmission control relay is located in the Power Distribution Center (PDC) on the left side of the engine compartment (Fig. 16).

OPERATION

The relay is supplied fused B+ voltage, energized by the TCM, and is used to supply power to the solenoid pack when the transmission is in normal operating mode. When the relay is “off”, no power is supplied to the solenoid pack and the transmission is in “limp-in” mode. After a controller reset (ignition key turned to the “run” position or after cranking engine), the TCM energizes the relay. Prior to this, the TCM verifies that the contacts are open by checking for no voltage at the switched battery terminals. After this is verified, the voltage at the solenoid pack pressure switches is checked. After the relay is energized, the TCM monitors the terminals to verify that the voltage is greater than 3 volts.

DESCRIPTION AND OPERATION (Continued)

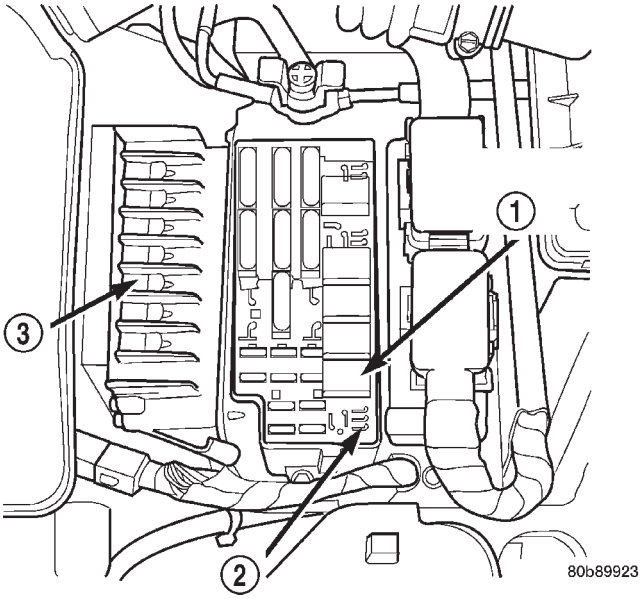


Fig. 16 Transmission Control Relay Location (Typical)

1 – TRANSMISSION CONTROL RELAY
2 – PDC
3 – TCM

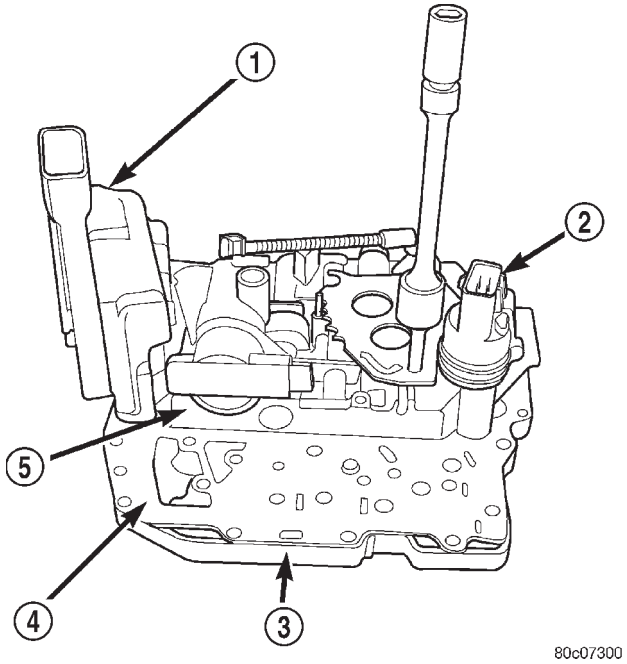


Fig. 17 Solenoid/Pressure Switch Assembly

1 – SOLENOID/PRESSURE SWITCH
2 – TRS
3 – TRANSFER PLATE
4 – SEPARATOR PLATE
5 – VALVE BODY

SOLENOID/PRESSURE SWITCH ASSEMBLY

DESCRIPTION

The Solenoid/Pressure Switch Assembly (Fig. 17) is inside the transaxle and mounted to the valve body assembly. The assembly consists of four solenoids that control hydraulic pressure to the L/R, 2/4, OD, and UD friction elements (transaxle clutches), and the torque converter clutch. The reverse clutch is controlled by line pressure from the manual valve in the valve body. The solenoids are contained within the Solenoid/Pressure Switch Assembly, and can only be serviced by replacing the assembly.

The solenoid assembly also contains pressure switches that monitor and send hydraulic circuit information to the TCM. Likewise, the pressure switches can only be service by replacing the assembly.

OPERATION

SOLENOIDS

The solenoids receive electrical power from the Transmission Control Relay through a single wire. The TCM energizes or operates the solenoids individually by grounding the return wire of the solenoid needed. When a solenoid is energized, the solenoid valve shifts, and a fluid passage is opened or closed (vented or applied), depending on its default operating state. The result is an apply or release of a frictional element.

The 2/4 and UD solenoids are normally applied, which allows fluid to pass through in their relaxed or “off” state. By design, this allows transaxle limp-in (P,R,N,2) in the event of an electrical failure.

The continuity of the solenoids and circuits are periodically tested. Each solenoid is turned on or off depending on its current state. An inductive spike should be detected by the TCM during this test. It no spike is detected, the circuit is tested again to verify the failure. In addition to the periodic testing, the solenoid circuits are tested if a speed ratio or pressure switch error occurs.

PRESSURE SWITCHES

The TCM relies on three pressure switches to monitor fluid pressure in the L/R, 2/4, and OD hydraulic circuits. The primary purpose of these switches is to help the TCM detect when clutch circuit hydraulic failures occur. The range for the pressure switch closing and opening points is 11-23 psi. Typically the switch opening point will be approximately one psi lower than the closing point. For example, a switch may close at 18 psi and open at 17 psi. The switches are continuously monitored by the TCM for the correct states (open or closed) in each gear as shown in the following chart:

A Diagnostic Trouble Code (DTC) will set if the TCM senses any switch open or closed at the wrong time in a given gear.

DESCRIPTION AND OPERATION (Continued)

PRESSURE SWITCH STATES

GEAR	L/R	2/4	OD
R	OP	OP	OP
P/N	CL	OP	OP
1st	CL	OP	OP
2nd	OP	CL	OP
D	OP	OP	CL
OD	OP	CL	CL

OP = OPEN

CL = CLOSED

The TCM also tests the 2/4 and OD pressure switches when they are normally off (OD and 2/4 are tested in 1st gear, OD in 2nd gear, and 2/4 in 2nd gear). The test simply verifies that they are operational, by looking for a closed state when the corresponding element is applied. Immediately after a shift into 1st, 2nd, or 3rd gear with the engine speed above 1000 rpm, the TCM momentarily turns on element pressure to the 2/4 and/or OD clutch circuits to identify that the appropriate switch has closed. If it doesn't close, it is tested again. If the switch fails to close the second time, the appropriate Diagnostic Trouble Code (DTC) will set.

TRANSMISSION RANGE SENSOR

DESCRIPTION

The Transmission Range Sensor (TRS) is mounted to the top of the valve body inside the transaxle and can only be serviced by removing the valve body. The electrical connector extends through the transaxle case (Fig. 18).

The Transmission Range Sensor (TRS) has four switch contacts that monitor shift lever position and send the information to the TCM.

The TRS also has an integrated temperature sensor (thermistor) that communicates transaxle temperature to the TCM and PCM (Fig. 19).

OPERATION

The Transmission Range Sensor (TRS) (Fig. 18) communicates shift lever position (SLP) to the TCM as a combination of open and closed switches. Each shift lever position has an assigned combination of switch states (open/closed) that the TCM receives from four sense circuits. The TCM interprets this information and determines the appropriate transaxle gear position and shift schedule.

Since there are four switches, there are 16 possible combinations of open and closed switches (codes). Seven of these codes are related to gear position and three are recognized as "between gear" codes. This results in six codes which should never occur. These are called "invalid" codes. An invalid code will result in a DTC, and the TCM will then determine the shift lever position based on pressure switch data. This

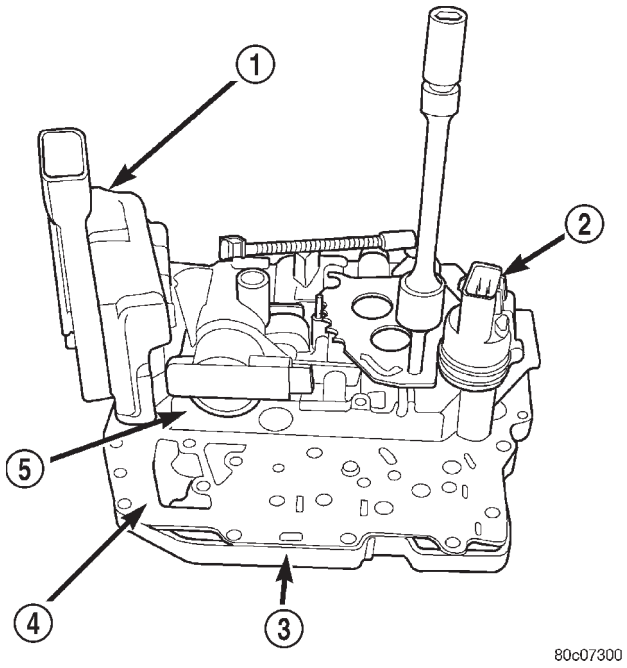


Fig. 18 Transmission Range Sensor (TRS) Location

1 – SOLENOID/PRESSURE SWITCH ASSEMBLY
2 – TRS
3 – TRANSFER PLATE
4 – SEPARATOR PLATE
5 – VALVE BODY

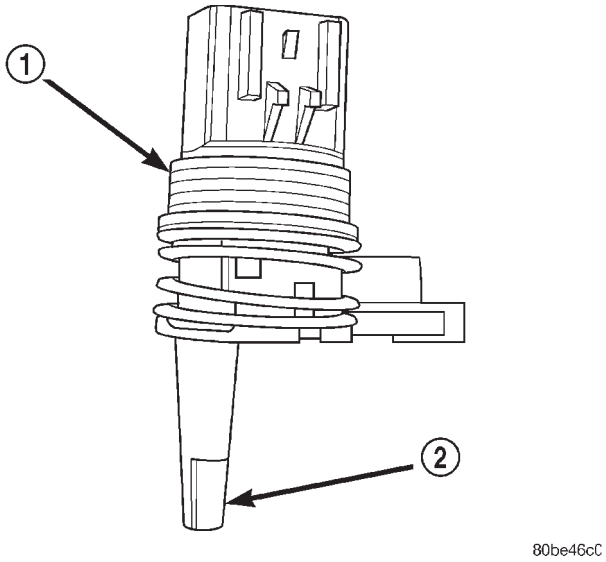


Fig. 19 Transmission Temperature Sensor

1 – TRANSMISSION RANGE SENSOR
2 – TEMPERATURE SENSOR

DESCRIPTION AND OPERATION (Continued)

allows reasonably normal transmission operation with a TRS failure.

TRS SWITCH STATES

SLP	T42	T41	T3	T1
P	CL	CL	CL	OP
R	CL	OP	OP	OP
N	CL	CL	OP	CL
OD	OP	OP	OP	CL
3 (AS)	OP	OP	CL	OP
L	CL	OP	CL	CL

TRANSMISSION TEMPERATURE SENSOR

The TRS has an integrated thermistor (Fig. 19) that the TCM uses to monitor the transmission's sump temperature. Since fluid temperature can affect transmission shift quality and convertor lock up, the TCM requires this information to determine which shift schedule to operate in. The PCM also monitors this temperature data so it can energize the vehicle cooling fan(s) when a transmission "overheat" condition exists. If the thermistor circuit fails, the TCM will revert to calculated oil temperature usage.

CALCULATED TEMPERATURE

A failure in the temperature sensor or circuit will result in calculated temperature being substituted for actual temperature. Calculated temperature is a predicted fluid temperature which is calculated from a combination of inputs:

- Battery (ambient) temperature
- Engine coolant temperature
- In-gear run time since start-up

SHIFT POSITION INDICATOR

DESCRIPTION

The shift position indicator is located in the instrument cluster. It indicates the position of the manual valve lever by illuminating an LED located under the P, R, N, D, 3, or L (or Autostick) gear symbol.

OPERATION

The Transmission Range Sensor (TRS) sends a signal to the Transmission Control Module (TCM) regarding the position of the manual valve lever. The TCM converts this signal into a Shift Lever Position (SLP) and sends the information to the BCM (Body Control Module) and the instrument cluster.

Refer to Group 8E, Instrument Panel And Gauges for repair procedures.

INPUT SPEED SENSOR

DESCRIPTION

The Input Speed Sensor is a two-wire magnetic pickup device that generates AC signals as rotation occurs. It is threaded into the transaxle case (Fig. 20), sealed with an o-ring (Fig. 21), and is considered a primary input to the Transmission Control Module (TCM).

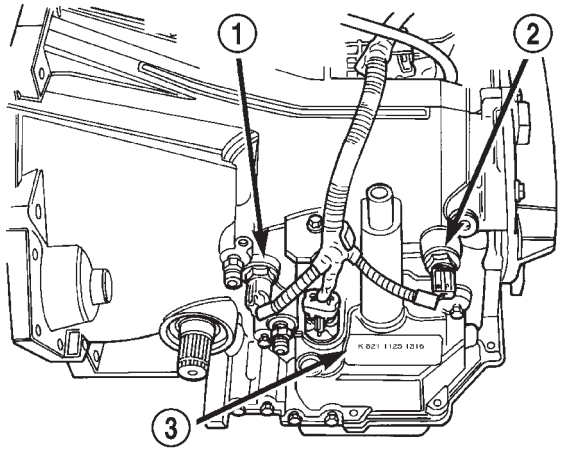


Fig. 20 Input Speed Sensor Location

1 – INPUT SPEED SENSOR
2 – OUTPUT SPEED SENSOR
3 – IDENTIFICATION TAG

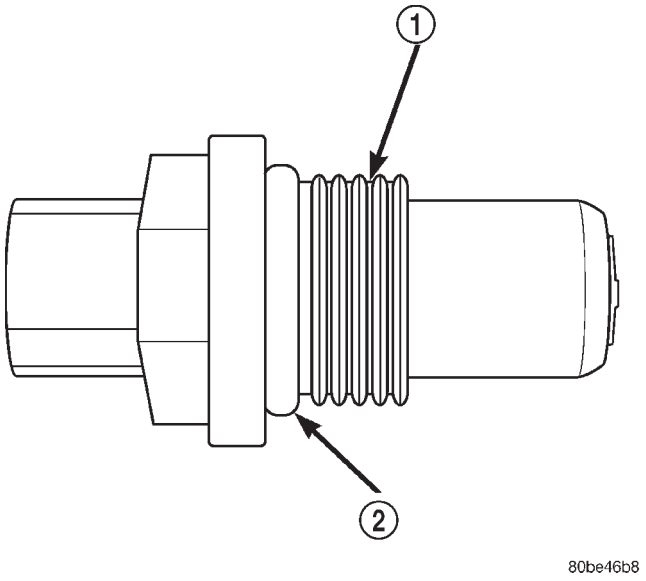


Fig. 21 O-Ring Location

1 – INPUT SPEED SENSOR
2 – O-RING

DESCRIPTION AND OPERATION (Continued)

OPERATION

The Input Speed Sensor provides information on how fast the input shaft is rotating. As the teeth of the input clutch hub pass by the sensor coil (Fig. 22), an AC voltage is generated and sent to the TCM. The TCM interprets this information as input shaft rpm.

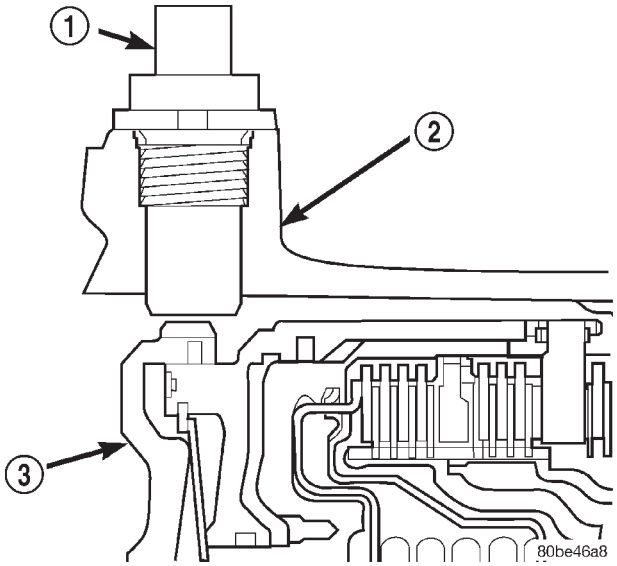


Fig. 22 Sensor Relation to Input Clutch Hub

1 – INPUT SPEED SENSOR
2 – TRANSAXLE CASE
3 – INPUT CLUTCH HUB

The TCM compares the input speed signal with output speed signal to determine the following:

- Transmission gear ratio
- Speed ratio error detection
- CVI calculation

The TCM also compares the input speed signal and the engine speed signal to determine the following:

- Torque converter clutch slippage
- Torque converter element speed ratio

OUTPUT SPEED SENSOR

DESCRIPTION

The Output Speed Sensor is a two-wire magnetic pickup device that generates an AC signal as rotation occurs. It is threaded into the transaxle case (Fig. 23), sealed with an o-ring (Fig. 24), and is considered a primary input to the Transmission Control Module (TCM).

OPERATION

The Output Speed Sensor provides information on how fast the output shaft is rotating. As the rear planetary carrier park pawl lugs pass by the sensor coil (Fig. 25), an AC voltage is generated and sent to the TCM. The TCM interprets this information as output shaft rpm.

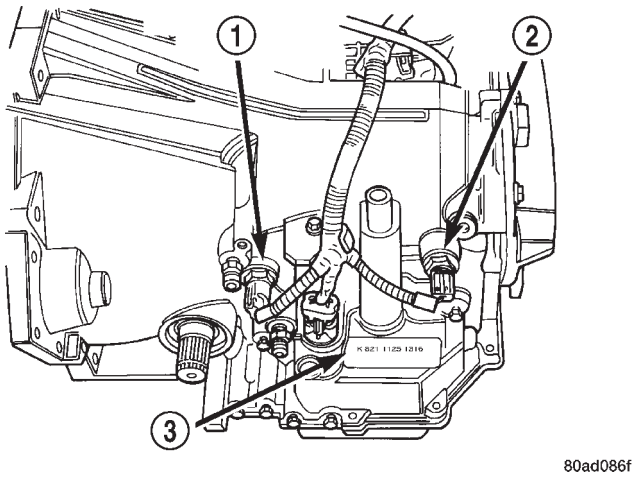


Fig. 23 Output Speed Sensor Location

1 – INPUT SPEED SENSOR
2 – OUTPUT SPEED SENSOR
3 – IDENTIFICATION TAG

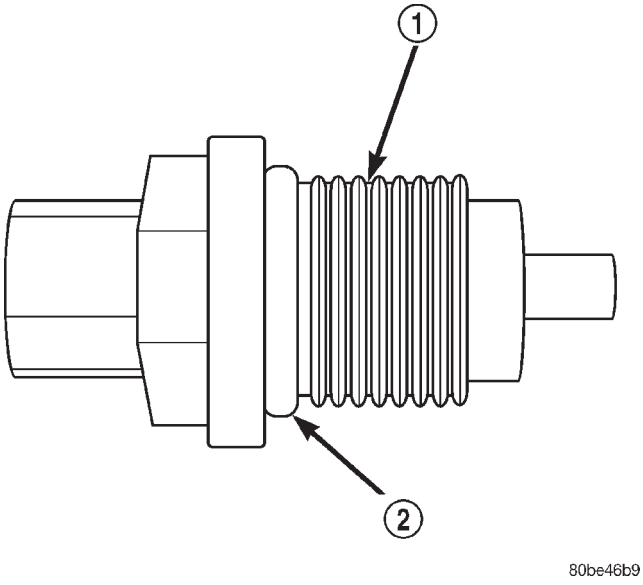


Fig. 24 O-Ring Location

1 – OUTPUT SPEED SENSOR
2 – O-RING

The TCM compares the input and output speed signals to determine the following:

- Transmission gear ratio
- Speed ratio error detection
- CVI calculation

VEHICLE SPEED SIGNAL

The vehicle speed signal is taken from the Output Speed Sensor. The TCM converts this signal into a pulse per mile signal and sends it to the PCM. The PCM, in turn, sends the vehicle speed message across the PCI Bus to the BCM. The BCM sends this

DESCRIPTION AND OPERATION (Continued)

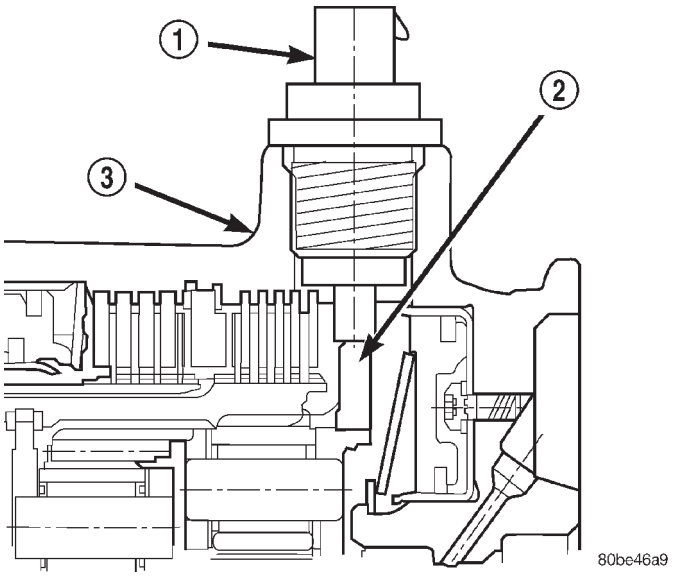


Fig. 25 Sensor Relation to Planet Carrier Park Pawl Lugs

1 – OUTPUT SPEED SENSOR
2 – REAR PLANET CARRIER/OUTPUT SHAFT ASSEMBLY
3 – TRANSAXLE CASE

signal to the Instrument Cluster to display vehicle speed to the driver. The vehicle speed signal pulse is roughly 8000 pulses per mile.

BRAKE TRANSMISSION SHIFT INTERLOCK SYSTEM (FLOOR SHIFT)

DESCRIPTION

The Brake Transmission Shifter/Ignition Interlock (BTSI) is a cable and solenoid operated system that prevents the transmission gear shifter from being moved out of PARK without a driver in place.

Refer to the following chart that expected shifter response, depending on ignition key/switch (Fig. 26) and brake pedal positions.

OPERATION

The Brake Transmission Shifter/Ignition Interlock (BTSI) is engaged whenever the ignition switch is in the LOCK or ACCESSORY position (Fig. 26). An additional electrically activated feature will prevent shifting out of the PARK position unless the brake pedal is depressed at least one-half inch. A magnetic holding device integral to the interlock cable is energized when the ignition is in the ON/RUN position. When the key is in the ON/RUN position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK or ACCESSORY position, unless the shifter is in the gated PARK position.

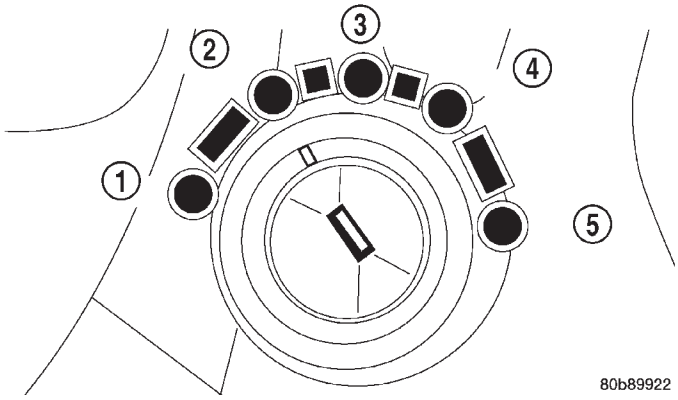


Fig. 26 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

The following chart describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the “expected response” differs from the vehicle’s response, then system repair and/or adjustment is necessary.

ACTION	EXPECTED RESPONSE
1. Turn key to the “OFF” position.	1. Shifter CAN be shifted out of park.
2. Turn key to the ″ON/RUN” position.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the “ON/RUN” position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the “LOCK” or ″ACC” position.	4. Key cannot be returned to the “LOCK” or “ACC” position.
5. Return shifter to “PARK” and try to remove the key.	5. Key can be removed (after returning to “LOCK” position).
6. With the key removed, try to shift out of “PARK”.	6. Shifter cannot be shifted out of “PARK”.
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

BRAKE TRANSMISSION SHIFT INTERLOCK SYSTEM (COLUMN SHIFT)

DESCRIPTION

Vehicles equipped with a column shifter utilize a brake transmission shift interlock (BTSI) solenoid, which prevents the transmission gear shifter from

DESCRIPTION AND OPERATION (Continued)

being moved out of PARK without a driver in place (Fig. 27).

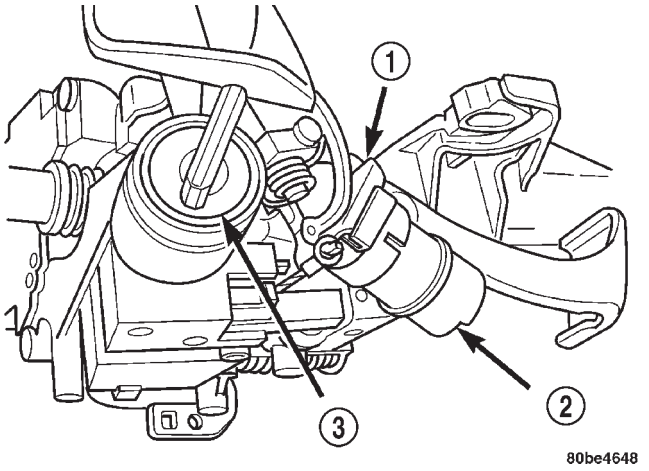


Fig. 27 BTSI Solenoid

1 – SHIFT LEVER BRACKET
2 – SOLENOID
3 – KEY CYLINDER

OPERATION

The Brake Transmission Shifter/Ignition Interlock (BTSI) is engaged whenever the ignition switch is in the LOCK or ACCESSORY position (Fig. 28). An additional electrically activated feature will prevent shifting out of the PARK position unless the brake pedal is depressed at least one-half inch. A magnetic holding device integral to the interlock cable is energized when the ignition is in the ON/RUN position. When the key is in the ON/RUN position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK or ACCESSORY position, unless the shifter is in the gated PARK position.

The following chart describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the “expected response” differs from the vehicle’s response, then system repair and/or adjustment is necessary.

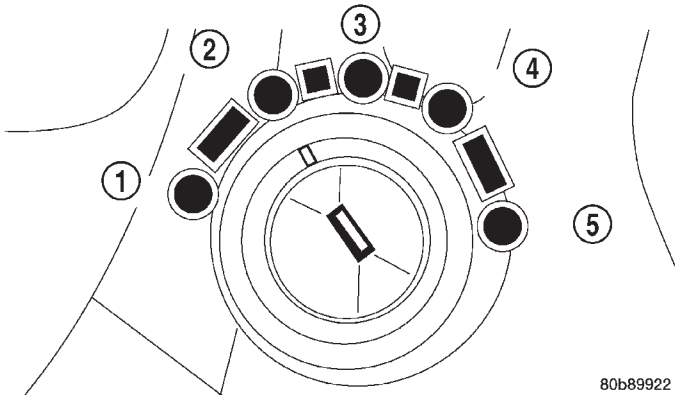


Fig. 28 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

ACTION	EXPECTED RESPONSE
1. Turn key to the “OFF” position.	1. Shifter CAN be shifted out of park.
2. Turn key to the ″ON/RUN” position.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the “ON/RUN” position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the “LOCK” or ″ACC” position.	4. Key cannot be returned to the “LOCK” or “ACC” position.
5. Return shifter to “PARK” and try to remove the key.	5. Key can be removed (after returning to “LOCK” position).
6. With the key removed, try to shift out of “PARK”.	6. Shifter cannot be shifted out of “PARK”.
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

AUTOSTICK

OPERATION

Autostick is a driver–interactive transaxle feature that offers manual gear shifting capability. When the shifter is moved into the Autostick position, the transaxle remains in whatever gear it was using before Autostick was activated. Moving the shifter to the left (towards the driver) causes a downshift and moving to the right (towards the passenger) causes an upshift. The instrument cluster will illuminate the selected gear. The vehicle can be launched in 1st, 2nd, or 3rd gear while in the Autostick mode. The speed control is operable in 3rd and 4th gear Autostick mode. Speed control will be deactivated if the transaxle is shifted to 2nd gear. Shifting into OD position cancels the Autostick mode, and the transaxle resumes the OD shift schedule.

AUTOMATIC OVERRIDES

For safety, durability, and driveability, some shifts are executed automatically or prevented.

DESCRIPTION AND OPERATION (Continued)

AUTOMATIC SHIFTS WILL OCCUR UNDER THE FOLLOWING CONDITIONS

TYPE OF SHIFT	APPROXIMATE SHIFT POINT	
	2.7L / 3.2 L	3.5L
4-3 coast downshift	13 mph	13 mph
3-2 coast downshift	9 mph	9 mph
2-1 coast downshift	5 mph	5 mph
1-2 upshift	6300 engine rpm	6600 engine rpm
2-3 upshift	6300 engine rpm	6600 engine rpm
4-3 kickdown shift	13-47 mph w/sufficient throttle	13-47 mph w/sufficient throttle

MANUAL SHIFTS ARE NOT PERMITTED UNDER THE FOLLOWING CONDITIONS

TYPE OF SHIFT	APPROXIMATE SHIFT POINT
3-4 upshift	Below 15 mph
3-2 downshift	Above 74 mph @ closed throttle or 70 mph otherwise
2-1 downshift	Above 41 mph @ closed throttle or 38 mph otherwise

DIAGNOSIS AND TESTING

42LE GENERAL DIAGNOSIS

CAUTION: Before attempting any repair on the 42LE Four Speed Automatic Transaxle, always check for proper shift linkage adjustment. Also check for diagnostic trouble codes with the DRB scan tool and the 42LE Transaxle Diagnostic Procedure Manual.

42LE automatic transaxle malfunctions may be caused by these general conditions:

- Poor engine performance
- Improper adjustments
- Hydraulic malfunctions
- Mechanical malfunctions
- Electronic malfunctions

When diagnosing a problem always begin with recording the complaint. The complaint should be defined as specific as possible. Include the following checks:

- Temperature at occurrence (cold, hot, both)
- Dynamic conditions (acceleration, deceleration, upshift, cornering)
- Elements in use when condition occurs (what gear is transaxle in during condition)
- Road and weather conditions
- Any other useful diagnostic information.

After noting all conditions, check the easily accessible variables:

- Fluid level and condition
- Shift linkage adjustment
- Diagnostic trouble code inspection

Then perform a road test to determine if the problem has been corrected or that more diagnosis is necessary. If the problem exists after the preliminary tests and corrections are completed, hydraulic pressure checks should be performed.

ROAD TEST

Prior to performing a road test, verify that the fluid level, fluid condition, and linkage adjustment have been approved.

During the road test, the transaxle should be operated in each position to check for slipping and any variation in shifting.

If the vehicle operates properly at highway speeds, but has poor acceleration, the converter stator overrunning clutch may be slipping. If acceleration is normal, but high throttle opening is needed to maintain highway speeds, the converter stator clutch may have seized. Both of these stator defects require replacement of the torque converter and thorough transaxle cleaning.

Slipping clutches can be isolated by comparing the “Elements in Use” chart with clutch operation encountered on a road test. This chart identifies which clutches are applied at each position of the selector lever.

A slipping clutch may also set a DTC and can be determined by operating the transaxle in all selector positions.

DIAGNOSIS AND TESTING (Continued)

ELEMENTS IN USE AT EACH POSITION OF SELECTOR LEVER

Shift Lever Position	INPUT CLUTCHES			HOLDING CLUTCHES	
	Underdrive	Overdrive	Reverse	2/4	Low/Reverse
P - PARK					X
R - REVERSE			X		X
N - NEUTRAL					X
OD - OVERDRIVE					
First	X				X
Second	X			X	
Direct	X	X			
Overdrive		X		X	
D - DRIVE*					
First	X				X
Second	X			X	
Direct	X	X			
L - LOW*					
First	X				X
Second	X			X	
Direct	X	X			
* Vehicle upshift and downshift speeds are increased when in these selector positions.					

The process of elimination can be used to detect any unit which slips and to confirm proper operation of good units. Road test analysis can diagnose slipping units, but the cause of the malfunction cannot be determined. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

HYDRAULIC PRESSURE TESTS

Pressure testing is a very important step in the diagnostic procedure. These tests usually reveal the cause of most transaxle problems.

Before performing pressure tests, be certain that fluid level and condition, and shift cable adjustments have been checked and approved. Fluid must be at operating temperature (150 to 200 degrees F.).

Install an engine tachometer, raise vehicle on hoist which allows front wheels to turn, and position tachometer so it can be read.

Using special adapters (L-4559), attach 300 psi gauge(s) (C-3293SP) to port(s) required for test being conducted.

Test port locations are shown in (Fig. 29).

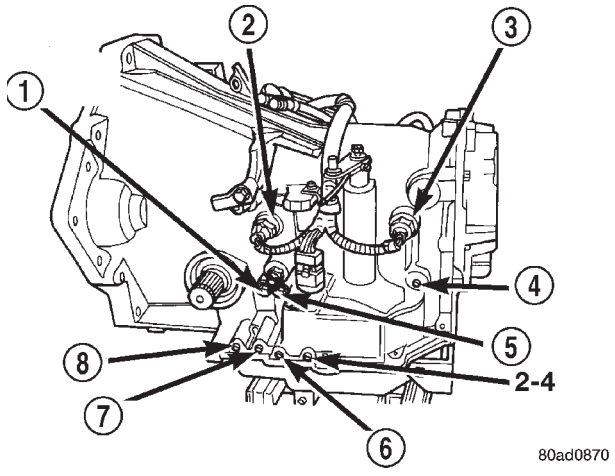


Fig. 29 Pressure Taps

1 – TORQUE CONVERTER CLUTCH OFF
2 – TURBINE SPEED SENSOR
3 – OUTPUT SPEED SENSOR
4 – LOW/REVERSE
5 – REVERSE
6 – UNDERDRIVE
7 – TORQUE CONVERTER CLUTCH ON
8 – OVERDRIVE

DIAGNOSIS AND TESTING (Continued)

TEST ONE-SELECTOR IN L (1st Gear)

NOTE: This test checks pump output, pressure regulation and condition of the low/reverse clutch hydraulic circuit and shift schedule.

(1) Attach pressure gauge to the low/reverse clutch tap.
(2) Move selector lever to the L position.
(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed to 20 mph.
(4) Low/reverse clutch pressure should read 115 to 145 psi.

TEST TWO-SELECTOR IN DRIVE (Second Gear)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

(1) Attach gauge to the underdrive clutch tap.
(2) Move selector lever to the 3 position.
(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph.
(4) In second gear the underdrive clutch pressure should read 110 to 145 psi.

TEST TWO A–SELECTOR IN OD (Fourth Gear)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

(1) Attach gauge to the underdrive clutch tap.
(2) Move selector lever to the OD position.
(3) Allow wheels to rotate freely and increase throttle opening to achieve an indicated speed of 40 mph.
(4) Underdrive clutch pressure should read below 5 psi. If not, than either the solenoid assembly or TCM is at fault.

TEST THREE-SELECTOR IN OVERDRIVE (Third and Second Gear)

NOTE: This test checks the overdrive clutch hydraulic circuit as well as the shift schedule.

(1) Attach gauge to the overdrive clutch tap.
(2) Move selector lever to the OD position.
(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 20 mph.
(4) Overdrive clutch pressure should read 74 to 95 psi.
(5) Move selector lever to the 3 position and increase indicated vehicle speed to 30 mph.
(6) The vehicle should be in second gear and overdrive clutch pressure should be less than 5 psi.

TEST FOUR-SELECTOR IN OD (Fourth Gear)

NOTE: This test checks the 2/4 clutch hydraulic circuit.

(1) Attach gauge to the 2/4 clutch tap.
(2) Move selector lever to the OD position.
(3) Allow vehicle front wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph. Vehicle shoud be in fourth gear.
(4) The 2/4 clutch pressure should read 75 to 95 psi.

TEST FIVE-SELECTOR IN OVERDRIVE (Fourth Gear, CC on)

NOTE: These tests checks the torque converter clutch hydraulic circuit.

(1) Attach gauge to the torque converter clutch off pressure tap.
(2) Move selector lever to the overdrive position.
(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph. Vehicle should be in 4th gear, CC on.

CAUTION: Both wheels must turn at the same speed.

(4) Torque converter clutch off pressure should be less than 5 psi.
(5) Now attach the gauge to the torque converter clutch on pressure tap.
(6) Move selector to the overdrive position.
(7) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph.
(8) Verify the torque converter clutch is applied mode using the RPM display of the DRB scan tool.
(9) Torque converter clutch on pressure should be 60-90 psi.

TEST SIX-SELECTOR IN REVERSE

NOTE: This test checks the reverse clutch hydraulic circuit.

(1) Attach gauge to the reverse and low/reverse clutch tap.
(2) Move selector lever to the reverse position.
(3) Read reverse clutch pressure with output stationary (foot on brake) and throttle opened to achieve 1500 rpm.
(4) Reverse and low/reverse clutch pressure should read 165 to 235 psi.

DIAGNOSIS AND TESTING (Continued)

TEST RESULT INDICATIONS

(1) If proper line pressure is found in any one test, the pump and pressure regulator are working properly.

(2) Low pressure in all positions indicates a defective pump, a clogged filter, or a stuck pressure regulator valve.

(3) Clutch circuit leaks are indicated if pressures do not fall within the specified pressure range.

(4) If the overdrive clutch pressure is greater than 5 psi in Step 6 of Test Three, a worn reaction shaft seal ring or a defective solenoid assembly is indicated.

(5) If the underdrive clutch pressure is greater than 5 psi in Step 4 of Test Two-A, a defective solenoid/pressure switch assembly or TCM is the cause.

CLUTCH AIR PRESSURE TESTS

Inoperative clutches can be located by substituting air pressure for fluid pressure. The clutches may be tested by applying air pressure to their respective passages after the valve body has been removed. Use Special Tool 6599-1 and 6599-2 to perform test (Fig. 30).

To make air pressure tests, proceed as follows:

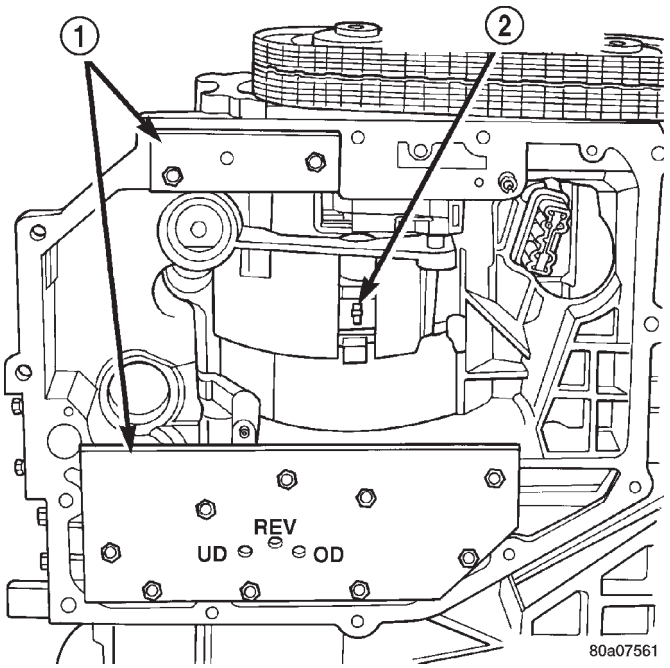


Fig. 30 Air Pressure Test Plate

1 – AIR PRESSURE TEST PLATES
2 – 2/4 CLUTCH RETAINER HOLE

ALL PRESSURE SPECIFICATIONS ARE PSI(ON HOIST, WITH FRONT WHEELS FREE TO TURN)

Gear Selector Position		Actual Gear	PRESSURE TAPS					
			Underdrive Clutch	Overdrive Clutch	Reverse Clutch	Torque Converter Clutch Off	2/4 CLUTCH	Low/ Reverse Clutch
PARK 0 mph	*	PARK	0-2	0-5	0-2	60-110	0-2	X 115-145
REVERSE 0 mph	*	REVERSE	0-2	0-7	165- 235	50-100	0-2	165-235
NEUTRAL 0 mph	*	NEUTRAL	0-2	0-5	0-2	60-110	0-2	115-145
L 20 mph	#	FIRST	110-145	0-5	0-2	60-110	0-2	115-145
3 30 mph	#	SECOND	110-145	0-5	0-2	60-110	115-145	0-2
3 45 mph	#	DIRECT	75-95	75-95	0-2	60-90	0-2	0-2
OD 30 mph	#	OVERDRIVE	0-2	75-95	0-2	60-90	75-95	0-2
OD 50 mph	#	OVERDRIVE WITH TCC	0-2	75-95	0-2	0-5	75-95	0-2

***Engine speed at 1500 rpm**
#CAUTION: Both front wheels must be turning at same speed.

42LE PRESSURE CHECK SPECIFICATIONS

DIAGNOSIS AND TESTING (Continued)

NOTE: The compressed air supply must be free of all dirt and moisture. Use a pressure of 30 psi.

Remove oil pan and valve body. See Valve body recondition.

Apply air pressure to the holes in the special tool, one at a time.

Listen for the clutch to apply. It will give a slight thud sound. If a large amount of air is heard escaping, the transaxle must be removed from vehicle, disassembled and all seals inspected.

OVERDRIVE CLUTCH

Apply air pressure to the overdrive clutch apply passage and watch for the push/pull piston to move forward. The piston should return to its starting position when the air pressure is removed.

UNDERDRIVE CLUTCH

Because this clutch piston cannot be seen, its operation is checked by function. Air pressure is applied to the low/reverse or the 2/4 clutches. This locks the output shaft. Use a piece of rubber hose wrapped around the input shaft and a pair of clamp-on pliers to turn the input shaft. Next apply air pressure to the underdrive clutch (Fig. 31). The input shaft should not rotate with hand torque. Release the air pressure and confirm that the input shaft will rotate.

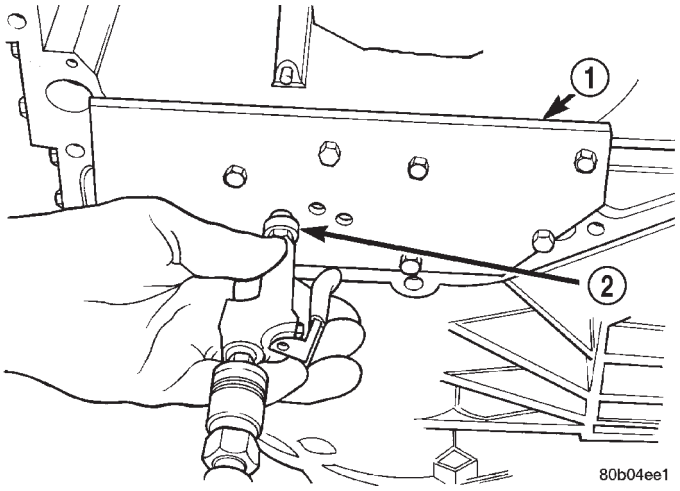


Fig. 31 Testing Underdrive Clutch

1 – AIR PRESSURE TEST PLATE 6599–1
2 – AIR NOZZLE

REVERSE CLUTCH

Apply air pressure to the reverse clutch apply passage and watch for the push/pull piston to move rearward. The piston should return to its starting position when the air pressure is removed.

2/4 CLUTCH

Apply air pressure to the feed hole located on the 2/4 clutch retainer. Look in the area where the 2/4 piston contacts the first separator plate and watch carefully for the 2/4 piston to move rearward. The piston should return to its original position after the air pressure is removed.

LOW/REVERSE CLUTCH

Apply air pressure to the low/reverse clutch feed hole passage. Look in the area where the low/reverse piston contacts the first separator plate. Watch carefully for the piston to move forward. The piston should return to its original position after the air pressure is removed.

FLUID LEAKAGE

The 42LE is a dual sump transaxle. The transaxle uses both automatic transaxle fluid (ATF) for the main sump and hypoid gear lube for the differential sump. When diagnosing a leak, it is important to distinguish which type of fluid is leaking. Factory fill ATF is dyed red, while differential hypoid oil is brown in color and has a distinctive odor.

There are two seals at the boundary of the two sumps. There is a weep hole in the right side of the transaxle case (Fig. 32) which vents the area between the two seals. If oil is leaking from the weep hole, there is at least one seal leaking. Never plug the weep hole to correct a leaking condition. Plugging the weep hole could result in contaminating one or both transaxle sumps, low oil level, poor transaxle performance or transaxle failure. In order to correctly repair this type of leak the transaxle must be removed from the vehicle and both transfer shaft seals replaced. Refer to Transfer Shaft Seal Replacement procedure in this section.

FLUID LEAKAGE-TORQUE CONVERTER HOUSING AREA

(1) Check for source of leakage. Fluid leakage from the torque converter area may originate from an engine oil leak, a differential oil leak or an ATF oil leak. The area should be examined closely.

(2) Prior to removing the transaxle, perform the following checks:

- When leakage is determined to be automatic transmission fluid, check fluid level prior to removal of the transaxle and torque converter.
- High oil level can result in oil leakage out the vent. If the fluid level is high, adjust to proper level.
- After performing this operation, inspect for leakage. If a leak persists, perform the following operation on the vehicle. This will determine if it is the torque converter or transaxle that is leaking.

DIAGNOSIS AND TESTING (Continued)

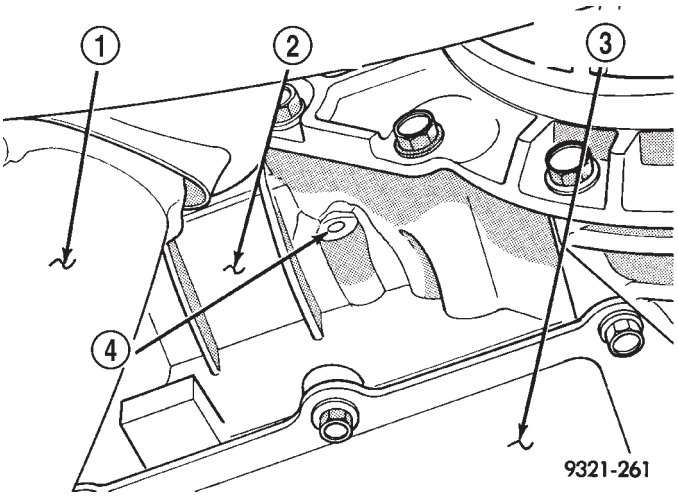


Fig. 32 Weep Hole Location

1 – RIGHT EXHAUST PIPE
2 – TRANSAXLE CASE
3 – TRANSAXLE OIL PAN
4 – WEEP HOLE

TORQUE CONVERTER LEAKAGE

Possible sources of torque converter leakage are:

- Torque converter weld leaks at the outside (peripheral) weld.
- Torque converter hub weld.

NOTE: Hub weld is inside and not visible. Do not attempt to repair. Replace torque converter.

FLUID LEAKAGE—DIFFERENTIAL HOUSING AREA

The differential uses Mopar® 75w-90 Fuel Saving petroleum based hypoid gear lube. It can be distinguished from ATF by its brown color (ATF is dyed red). Also gear lube has a distinctive odor (hypoid smell).

(1) If it is suspected that the leakage is gear lube, check the differential for proper fluid level. High oil level can result in leakage from the differential vent.

CAUTION: A crushed vent baffle will cause oil to leak from vent hose.

(2) If fluid level is correct, add 1/4 to 1/2 ounce of leak detecting florescent dye to the differential.

(3) Clean the suspect area of the transaxle with solvent.

(4) Road test the vehicle until the leak reoccurs.

(5) Using a black light determine the source of the leak and repair as required.

(6) Do not add oil dye to both the ATF sump and the differential sump at the same time. This can cause confusion when trying to pinpoint a leak source.

FLUID LEAKAGE-TORQUE CONVERTER HOUSING AREA

When diagnosing converter housing fluid leaks, three actions must be taken before repair:

(1) Verify proper transmission fluid level.

(2) Verify that the leak originates from the converter housing area and is transmission fluid.

(3) Determine the true source of the leak.

Fluid leakage at or around the torque converter area may originate from an engine oil leak (Fig. 33). The area should be examined closely. Factory fill fluid is red and, therefore, can be distinguished from engine oil.

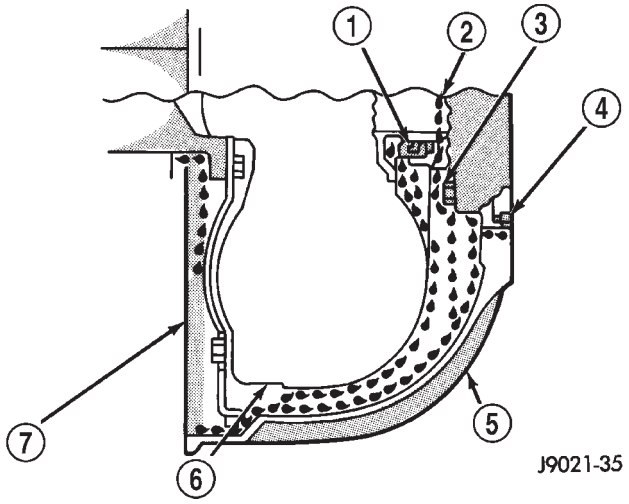


Fig. 33 Converter Housing Leak Paths

1 – PUMP SEAL
2 – PUMP VENT
3 – PUMP BOLT
4 – PUMP GASKET
5 – CONVERTER HOUSING
6 – CONVERTER
7 – REAR MAIN SEAL LEAK

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill, or fill after repair. Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair.

Pump seal leaks tend to move along the drive hub and onto the rear of the converter (Fig. 33). Pump o-ring or pump body leaks follow the same path as a seal leak. Pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself. Pump seal or gasket leaks usually travel down the inside of the converter housing (Fig. 33).

DIAGNOSIS AND TESTING (Continued)

TORQUE CONVERTER LEAKAGE

Possible sources of torque converter leakage are:

- Torque converter weld leaks at the outside diameter weld (Fig. 34).
- Torque converter hub weld (Fig. 34).

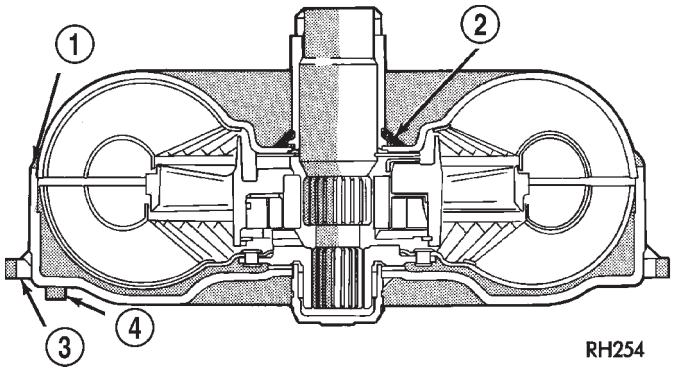


Fig. 34 Converter Leak Points—Typical

1 – OUTSIDE DIAMETER WELD
2 – TORQUE CONVERTER HUB WELD
3 – STARTER RING GEAR
4 – LUG

BRAKE/TRANSMISSION SHIFT INTERLOCK SYSTEM (COLUMN SHIFT)

The following chart describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the "expected response" differs from the vehicle's response, then system repair and/or adjustment is necessary.

Refer to the following chart that expected shifter response, depending on ignition key/switch (Fig. 35) and brake pedal positions.

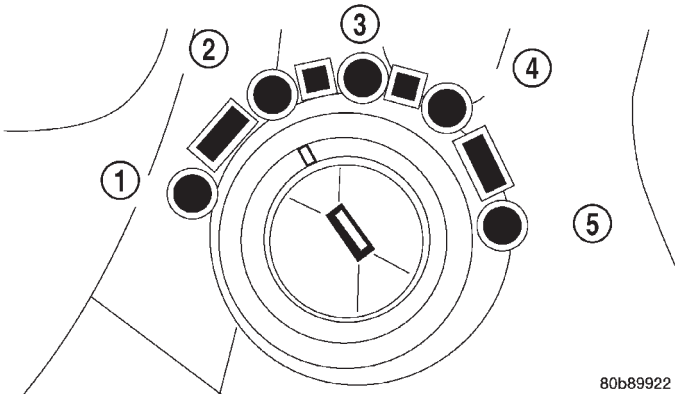


Fig. 35 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

ACTION	EXPECTED RESPONSE
1. Turn key to the "OFF" position.	1. Shifter CAN be shifted out of park.
2. Turn key to the ″ON/RUN" position.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the "ON/RUN" position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the "LOCK" or ″ACC" position.	4. Key cannot be returned to the "LOCK" or "ACC" position.
5. Return shifter to "PARK" and try to remove the key.	5. Key can be removed (after returning to "LOCK" position).
6. With the key removed, try to shift out of "PARK".	6. Shifter cannot be shifted out of "PARK".
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

If the shift lever cannot be moved out of the PARK position, refer to Shift Lever Locked In Place below. If the shift lever can be shifted out of PARK without the brake pedal depressed, refer to Circuit Test below.

SHIFT LEVER LOCKED IN PLACE

(1) Remove the instrument panel cover below the steering column, then remove the steering column shrouds to gain access to the brake transmission shift interlock (BTSI) solenoid.

(2) Disconnect the wire connector from the rear of the BTSI solenoid.

(3) Insert the ignition key and turn it to the ON position.

(4) With the brakes applied, try shifting the transmission shift lever out of the PARK position.

- If the lever now moves freely in and out of PARK, perform the Circuit Test below.
- If the shift lever still does not move from the PARK position, remove the BTSI solenoid from the shift lever assembly.

If the shift lever now moves freely in and out of the park position, the BTSI solenoid is faulty and must be replaced. If the shift lever still does not move from the park position, the problem is in the shift lever assembly or the ignition interlock cassette.

CIRCUIT TEST

(1) Check the system fuse in the junction block (An open or blown fuse would allow the shift lever to be moved in and out of the PARK position without the brake pedal applied).

DIAGNOSIS AND TESTING (Continued)

(2) Remove the instrument panel cover below the steering column, then remove the steering column shrouds to gain access to the brake transmission shift interlock (BTSI) solenoid.

(3) Disconnect the wire connector from the rear of the BTSI solenoid.

(4) Insert the ignition key and turn it to the ON position.

(5) Back-probe the wire connector's terminal number 2 with a test light. The test light should illuminate. If not, there is an open or short in the ignition feed circuit leading to the BTSI solenoid. Repair the open or short.

(6) Next, back-probe the wire connector with a test light, placing the test light in series between the two wires. At this point, the test light should illuminate. If not, there is an open in the ground circuit or brake lamp switch. Repair the open or replace brake lamp switch as necessary.

(7) Depress the brake pedal. The test light should go out. If it does not, there is a short in the ground circuit or brake lamp switch. Repair the short or replace brake lamp switch as necessary.

(8) Reconnect the wire connector to the solenoid.

If the circuit passes the above test and the shift lever can still be moved freely in and out of PARK without the brake pedal depressed, replace the BTSI solenoid.

BRAKE/TRANSMISSION SHIFT INTERLOCK SYSTEM (FLOOR SHIFT)

The following chart describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the "expected response" differs from the vehicle's response, then system repair and/or adjustment is necessary.

Refer to the following chart that expected shifter response, depending on ignition key/switch (Fig. 36) and brake pedal positions.

If the floor shifter cannot be moved out of the PARK position, refer to Shifter Locked In Place below. If the shift lever can be shifted out of PARK without the brake pedal depressed, refer to Circuit Test below.

SHIFTER LOCKED IN PLACE

(1) Remove the instrument panel cover below the steering column, then remove the steering column shrouds to gain access to the brake transmission shift interlock (BTSI) solenoid. The solenoid is part of the interlock cable assembly.

(2) Disconnect the wire connector from the rear of the BTSI solenoid.

(3) Insert the ignition key and turn it to the ON position.

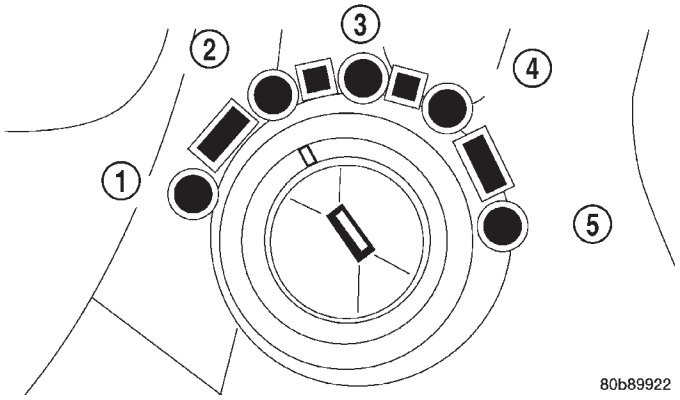


Fig. 36 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

ACTION	EXPECTED RESPONSE
1. Turn key to the "OFF" position.	1. Shifter CAN be shifted out of park.
2. Turn key to the ″ON/RUN" position.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the "ON/RUN" position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the "LOCK" or ″ACC" position.	4. Key cannot be returned to the "LOCK" or "ACC" position.
5. Return shifter to "PARK" and try to remove the key.	5. Key can be removed (after returning to "LOCK" position).
6. With the key removed, try to shift out of "PARK".	6. Shifter cannot be shifted out of "PARK".
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

(4) With the brakes applied, try moving the shifter out of the PARK position.

- If the lever now moves freely in and out of PARK, perform the Circuit Test below.
- If the shift lever still does not move from the PARK position, remove the BTSI solenoid from the shift lever assembly.

If the shift lever now moves freely in and out of the park position, the BTSI solenoid is faulty and the interlock cable must be replaced. If the shift lever still does not move from the park position, the problem is in the shift lever assembly or the ignition interlock cassette.

DIAGNOSIS AND TESTING (Continued)

CIRCUIT TEST

(1) Check the system fuse in the junction block (An open or blown fuse would allow the shift lever to be moved in and out of the PARK position without the brake pedal applied).

(2) Remove the instrument panel cover below the steering column, then remove the steering column shrouds to gain access to the brake transmission shift interlock (BTSI) solenoid.

(3) Disconnect the wire connector from the rear of the BTSI solenoid.

(4) Insert the ignition key and turn it to the ON position.

(5) Back-probe the wire connector's terminal number 2 with a test light. The test light should illuminate. If not, there is an open or short in the ignition feed circuit leading to the BTSI solenoid. Repair the open or short.

(6) Next, back-probe the wire connector with a test light, placing the test light in series between the two wires. At this point, the test light should illuminate. If not, there is an open in the ground circuit or brake lamp switch. Repair the open or replace brake lamp switch as necessary.

(7) Depress the brake pedal. The test light should go out. If it does not, there is a short in the ground circuit or brake lamp switch. Repair the short or replace brake lamp switch as necessary.

(8) Reconnect the wire connector to the solenoid.

If the circuit passes the above test and the shifter can still be moved freely in and out of PARK without the brake pedal depressed, replace the interlock cable.

SHIFT POSITION INDICATOR

The transmission range sensor (on the valve body) sends a signal to the TCM on the position of the transaxle manual valve lever. The TCM receives the switch signal and processes the data. The TCM sends the Shift Lever Position (SLP) information to the BCM via the communication bus. The BCM then outlines the appropriate shifter position indicator in the instrument cluster.

If a problem arises with the shifter position indicator, consult the following chart for diagnostic information. If the malfunction cannot be corrected using the chart, consult the proper diagnostic manual.

To replace the shifter position indicator, refer to Group 8E, Instrument Panel And Gauges.

AUTOSTICK

The autostick feature will be deactivated if one of the following conditions occur:

CONDITION	POSSIBLE CAUSE
ALL PRND3L (PRND1234 if Autostick equipped) DISPLAY LIGHTS "ON" IN P&N GEAR POSITIONS	Check wiring and connectors
	Faulty TRS
	Faulty manual lever
ALL DISPLAY LIGHTS "ON" IN ALL GEAR POSITIONS	Check wiring & connectors
	Faulty trans. range sensor
	Faulty manual lever
	Communication bus malfunction
ALL DISPLAY LIGHTS "OFF"	Normal transient condition between P&R and R&N gear positions
	Check shift lever linkage
	BCM malfunction
	Check wiring and connectors
	Faulty instrument cluster
ALL DISPLAY LIGHTS "OFF" ACCOMPANIED BY A "NO BUS" MESSAGE	Communication bus malfunction
DISPLAY LIGHTS OUT OF SEQUENCE WITH SHIFT LEVER	Check wiring and connectors
	Faulty TRS
	Faulty manual lever
	Communication bus malfunction

- DTC P0705–Check Shifter Signal–usually accompanied by all PRNDL lights turning on in Park and Neutral. This will result in a DTC P0705 if three such errors are detected after any one "key–on".
- DTC P1796–Autostick Input Circuit
- DTC P1797–Manual Shift Overheat–(Transmission oil temperature >275° F) or (Engine coolant temperature >255° F).

Acceptable powertrain temperature must be achieved to reactivate Autostick after a high temperature fault:

- Transmission Oil Temperature <255° F
- Engine Coolant Temperature <240° F

SERVICE PROCEDURES

FLUID LEVEL AND CONDITION CHECK

NOTE: The transmission and differential have separate oil sumps. The transmission sump requires automatic transmission fluid. The differential sump requires petroleum based hypoid gear lube.

TRANSMISSION SUMP

FLUID LEVEL CHECK

The transmission sump has a dipstick to check oil similar to most automatic transmissions. It is located on the left side of the engine. Be sure to wipe all dirt from dipstick handle before removing.

The torque converter fills in both the P Park and N Neutral positions. Place the selector lever in P Park to be sure that the fluid level check is accurate. **The engine should be running at idle speed for at least one minute, with the vehicle on level ground.** At normal operating temperature (approximately 82 C. or 180 F.), the fluid level is correct if it is in the HOT region (cross-hatched area) on the oil level indicator (Fig. 37). The fluid level will be approximately one-quarter inch above the lower hole of the dipstick at 70° F fluid temperature.

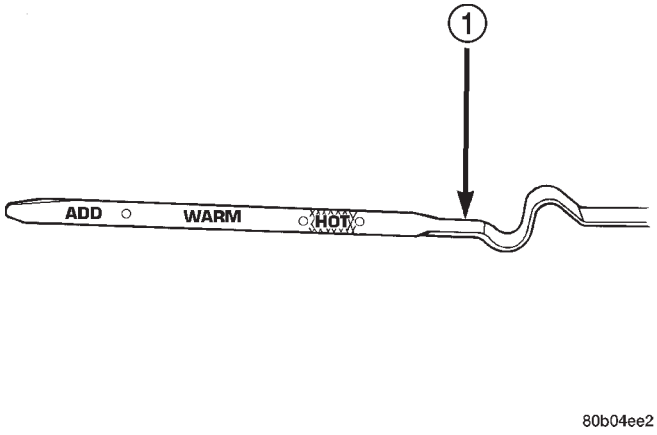


Fig. 37 Dipstick Markings

1 – TRANSAXLE DIPSTICK

FLUID LEVEL CHECK USING DRB

NOTE: Engine and Transaxle should be at normal operating temperature before performing this procedure.

(1) Start engine and apply parking brake.
(2) Hook up DRBIII scan tool and select transmission.
(3) Select sensors.
(4) Read the transmission temperature value.
(5) Compare the fluid temperature value with the chart.
(6) Adjust transmission fluid level shown on the dipstick according to the chart.
(7) Check transmission for leaks.

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transaxle has too much fluid, the gears churn up foam and cause the same conditions which occur with a low fluid level.

In either case, air bubbles can cause overheating and/or fluid oxidation, and varnishing. This can interfere with normal valve, clutch, and accumulator operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.

Along with fluid level, it is important to check the condition of the fluid. When the fluid smells burned, and is contaminated with metal or friction material particles, a complete transaxle recondition is needed. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample for a double check.

After the fluid has been checked, seat the dipstick fully to seal out water and dirt.

The transmission fluid level should be inspected at least every six months.

DIFFERENTIAL SUMP

The differential sump is checked separately from the transmission. A fill plug located on the side of the transaxle must be removed to check fluid level. The fluid should be level with the bottom of the fill hole. The differential capacity is .946 liters (32 ounces).

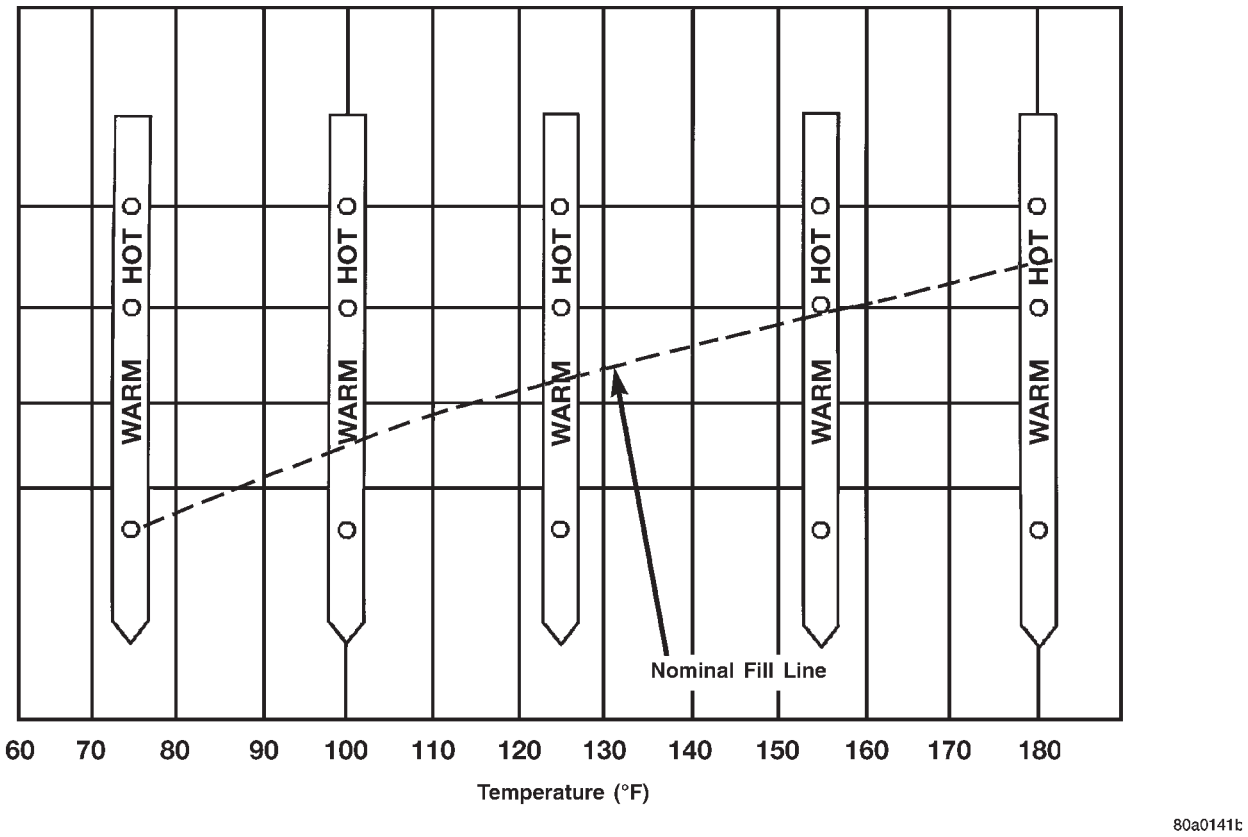
Inspect the differential area during engine oil changes for any leaks. If leakage is present, determine the source of the leak and repair as required. Remove the fill plug and verify the proper level. Adjust if needed.

FLUID AND FILTER SERVICE—TRANSMISSION

NOTE: Refer to Group 0, Lubrication and Maintenance, or the vehicle owner's manual, for the recommended maintenance (fluid/filter change) intervals for this transaxle.

NOTE: The 42LE Transaxle has separate transmission and differential fluid sumps. Refer to Fluid Drain and Refill—Differential for differential fluid service.

SERVICE PROCEDURES (Continued)



Transmission Fluid Temperature Chart

NOTE: Only fluids of the type labeled Mopar® ATF+4 (Automatic Transmission Fluid) Type 9602 should be used. A filter change should be made at the time of the transmission oil change. The magnet (on the inside of the oil pan) should also be cleaned with a clean, dry cloth.

NOTE: If the transaxle is disassembled for any reason, the fluid and filter should be changed.

FLUID/FILTER SERVICE (RECOMMENDED)

(1) Raise vehicle on a hoist (See Lubrication, Group 0). Place a drain container with a large opening, under transaxle oil pan.

(2) Loosen pan bolts and tap the pan at one corner to break it loose allowing fluid to drain, then remove the oil pan.

(3) Install a new filter and o-ring on bottom of the valve body and tighten retaining screws to 5 N·m (40 in. lbs.).

(4) Clean the oil pan and magnet. Reinstall pan using new Mopar Silicone Adhesive sealant. Tighten oil pan bolts to 19 N·m (165 in. lbs.).

(5) Pour four quarts of Mopar® ATF+4 (Automatic Transmission Fluid) Type 9602 through the dipstick opening.

(6) Start engine and allow to idle for at least one minute. Then, with parking and service brakes applied, move selector lever momentarily to each position, ending in the park or neutral position.

(7) Check the transaxle fluid level and add an appropriate amount to bring the transaxle fluid level to 3mm (1/8 in.) below the “ADD” mark on the dipstick (Fig. 38).

(8) Recheck the fluid level after the transaxle has reached normal operating temperature (180°F.).

(9) To prevent dirt from entering transaxle, make certain that dipstick is fully seated into the dipstick opening.

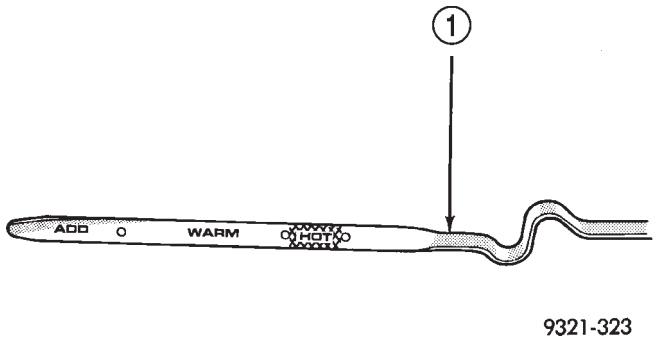


Fig. 38 Dipstick Markings

1 – TRANSAXLE DIPSTICK

SERVICE PROCEDURES (Continued)

ALTERNATIVE MAINTENANCE METHODS

TRANSAXLE FLUID EXCHANGER METHOD

CAUTION: The use of any fluid exchanger that introduces additives into the transaxle is not recommended.

(1) To perform the transaxle fluid exchange, the transaxle must be at operating temperature. Drive the vehicle until it reaches full operating temperature.

(2) Obtain a suitable transaxle fluid exchanger and verify the tank is clean and dry.

(3) Fill the tank to the recommended fill capacity with Mopar® ATF+4 Type 9602.

(4) Connect the machine to the vehicle following the manufacturers instructions. Perform the exchange procedure following the instructions provided with the machine.

(5) Once machine has completed the fluid exchange. Check the fluid level and condition and fill to proper level with Mopar® ATF+4 Type 9602. Refer to Fluid Level and Condition Check in this group for the proper fluid "top-off" procedure.

NOTE: Verify that the transaxle cooler lines are tightened to proper specifications. Cooler line torque specification is 2 N•m (18 in. lbs.).

DIPSTICK TUBE FLUID SUCTION METHOD

(1) When performing the fluid suction method, make sure the transaxle is at full operating temperature.

(2) To perform the dipstick tube fluid suction method, use a suitable fluid suction device (Vacula™ or equivalent).

(3) Insert the fluid suction line into the dipstick tube.

NOTE: Verify that the suction line is inserted to the lowest point of the transaxle oil pan. This will ensure complete evacuation of the fluid in the pan.

(4) Follow the manufacturers recommended procedure and evacuate the fluid from the transaxle.

(5) Remove the suction line from the dipstick tube.

(6) Pour four quarts of Mopar® ATF+4 (Automatic Transmission Fluid) Type 9602 through the dipstick opening.

(7) Start engine and allow to idle for at least one minute. Then, with parking and service brakes applied, move selector lever momentarily to each position, ending in the park or neutral position.

(8) Check the transaxle fluid level and add an appropriate amount to bring the transaxle fluid level to 3mm (1/8 in.) below the "ADD" mark on the dipstick (Fig. 38).

(9) Recheck the fluid level after the transaxle has reached normal operating temperature (180°F.).

(10) To prevent dirt from entering transaxle, make certain that dipstick is fully seated into the dipstick opening.

FLUID DRAIN AND REFILL-DIFFERENTIAL SUMP

The differential fluid can be drained and filled without having to remove the transaxle from the vehicle. Use only Mopar® Fuel Saving 75W-90 petroleum based hypoid gear lubricant when replacing fluid.

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove differential drain plug located on the bottom of the differential housing. Allow the fluid to drain into an oil drain pan.

(3) Remove differential fill plug located on the differential side cover. This will assist the flow of fluid from the drain plug hole.

INSTALLATION

(1) Install drain plug into differential housing. Tighten drain plug to 7 N·m (60 in. lbs.)

(2) Fill differential with Mopar® Fuel Saving 75W-90 petroleum based hypoid gear lubricant. The fluid should be level with the bottom of the fill hole. The differential capacity is.946 liters (32 ounces).

CAUTION: Overfilling the differential can result in oil foaming and/or oil loss from the differential vent.

(3) Install differential fill plug. Tighten fill plug to 47 N·m (35 ft. lbs.).

ALUMINUM THREAD REPAIR

Damaged or worn threads in the aluminum transaxle case and valve body can be repaired by the use of Heli-Coils, or equivalent. This repair consists of drilling out the worn-out damaged threads. Then tap the hole with a special Heli-Coil tap, or equivalent, and installing a Heli-Coil insert, or equivalent, into the hole. This brings the hole back to its original thread size.

Heli-Coil, or equivalent, tools and inserts are readily available from most automotive parts suppliers.

FLUSHING COOLERS AND TUBES

When a transaxle failure has contaminated the fluid, the oil cooler(s) must be flushed. The cooler bypass valve in the transaxle must be replaced also. The torque converter must also be replaced with an

SERVICE PROCEDURES (Continued)

exchange unit. This will insure that metal particles or sludged oil are not later transferred back into the reconditioned (or replaced) transaxle.

The recommended procedure for cooler flushing is to use Tool 6906 Cooler Flusher.

WARNING: WEAR PROTECTIVE EYEWEAR THAT MEETS THE REQUIREMENTS OF OSHA AND ANSI Z87.1–1968. WEAR STANDARD INDUSTRIAL RUBBER GLOVES.

KEEP LIGHTED CIGARETTES, SPARKS, FLAMES, AND OTHER IGNITION SOURCES AWAY FROM THE AREA TO PREVENT THE IGNITION OF COMBUSTIBLE LIQUIDS AND GASES. KEEP A CLASS (B) FIRE EXTINGUISHER IN THE AREA WHERE THE FLUSHER WILL BE USED.

KEEP THE AREA WELL VENTILATED.

DO NOT LET FLUSHING SOLVENT COME IN CONTACT WITH YOUR EYES OR SKIN: IF EYE CONTAMINATION OCCURS, FLUSH EYES WITH WATER FOR 15 TO 20 SECONDS. REMOVE CONTAMINATED CLOTHING AND WASH AFFECTED SKIN WITH SOAP AND WATER. SEEK MEDICAL ATTENTION.

(1) Remove cover plate filler plug on Tool 6906. Fill reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. **DO NOT** use solvents containing acids, water, gasoline, or any other corrosive liquids.

(2) Reinstall filler plug on Tool 6906.

(3) Verify pump power switch is turned OFF. Connect red alligator clip to positive (+) battery post. Connect black (-) alligator clip to a good ground.

NOTE: When flushing transmission cooler and lines, ALWAYS reverse flush.

(4) Connect the BLUE pressure line to the OUTLET (From) cooler line.

(5) Connect the CLEAR return line to the INLET (To) cooler line

(6) Turn pump ON for two to three minutes to flush cooler and lines.

(7) Turn pump OFF.

(8) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.

(9) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.

(10) Place CLEAR suction line into a one quart container of Mopar® ATF+4 (Automatic Transmission Fluid—Type 9602).

(11) Turn pump ON until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler and lines. Turn pump OFF.

(12) Disconnect alligator clips from battery. Reconnect flusher lines to cover plate, and remove flushing adapters from cooler lines.

OIL PUMP VOLUME CHECK

Measuring oil pump output volume will determine if sufficient flow to the transmission oil cooler exists, and whether or not an internal transmission failure is present.

Verify that transmission fluid is at the proper level. Refer to Fluid Level and Condition in this Group. If adding fluid is necessary, fill to the proper level with Mopar® ATF+4 (Automatic Transmission Fluid–Type 9602). The following procedure is to check oil pump output volume:

(1) Disconnect the **To cooler** line at the oil cooler inlet and place a collecting container under the disconnected line (Fig. 39).

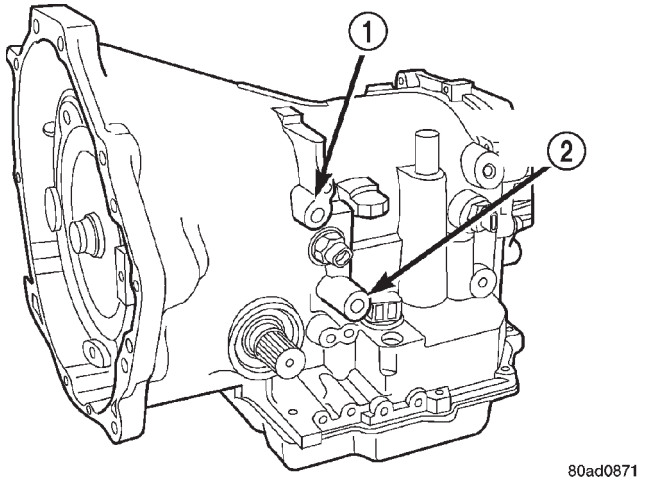


Fig. 39 Cooler Line Location

1 – FROM TRANSAXLE COOLER
2 – TO TRANSAXLE COOLER

CAUTION: With the fluid set at the proper level, fluid collection should not exceed (1) quart or internal damage to the transmission may occur.

(2) Start engine and run **at curb idle speed**, with the shift selector in neutral.

(3) If one quart of ATF is collected in 20 seconds or less, flow is within acceptable limits. If fluid flow is intermittent or it takes more than 20 seconds to collect one quart of ATF, refer to Hydraulic Pressure Tests in this Group.

(4) Inspect the cooler hose for damage. Replace if necessary.

(5) Connect the **To cooler** hose to the oil cooler inlet and torque clamp to 2 N·m (20 in. lbs.) torque.

(6) Refill the transaxle to proper level with Mopar® ATF+4 (Automatic Transmission Fluid–Type 9602).

SERVICE PROCEDURES (Continued)

TRANSAXLE QUICK LEARN PROCEDURE

The quick learn procedure requires the use of the DRB scan tool.

This program allows the electronic transaxle system to recalibrate itself. This will provide the best possible transaxle operation. The quick learn procedure should be performed if any of the following procedures are performed:

- Transaxle Assembly Replacement
- Transmission Control Module Replacement
- Solenoid/Pressure Switch Assembly Replacement
- Clutch Plate and/or Seal Replacement
- Valve Body Replacement or Recondition

To perform the Quick Learn Procedure, the following conditions must be met:

- The brakes must be applied
- The engine speed must be above 500 rpm
- The throttle angle (TPS) must be less than 3 degrees
- The shift lever position must stay until prompted to shift to overdrive
- The shift lever position must stay in overdrive after the Shift to Overdrive prompt until the DRB indicates the procedure is complete
- The calculated oil temperature must be above 60° and below 200°

(1) Plug the DRB scan tool into the data link connector. The connector is located under the instrument panel.

(2) Go to the Transmission screen.

(3) Go to the Miscellaneous screen.

(4) Select Quick Learn Procedure. Follow the instructions of the DRB to perform the Quick Learn Procedure.

PINION FACTOR PROCEDURE

The vehicle speed readings for the speedometer are taken from the output speed sensor. The TCM must be calibrated to the different combinations of equipment available. Pinion Factor allows the technician to set the Transmission Control Module initial setting so that the speedometer readings will be correct.

Failure to perform this procedure will cause a No Speedometer Operation condition.

This procedure must be performed if the Transmission Control Module has been replaced.

To properly read or reset the Pinion Factor, it is necessary to use a DRB scan tool. Perform the following steps with the DRB scan tool to read or reset the Pinion Factor:

(1) Plug the DRB scan tool into the data link connector located under the instrument panel.

(2) Select the Transmission menu.

(3) Select the Miscellaneous menu.

(4) Select Pinion Factor. Then follow the instructions on the DRB scan tool screen.

REMOVAL AND INSTALLATION

GEARSHIFT CABLE–COLUMN SHIFT

REMOVAL

(1) Place vehicle in park, and turn ignition key to the “LOCK” position (Fig. 40).

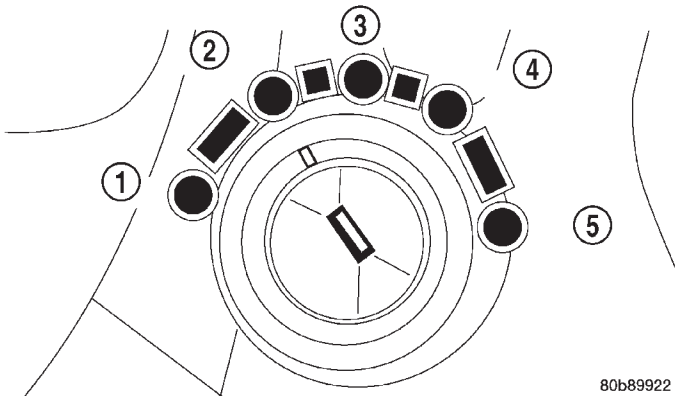


Fig. 40 Ignition Key/Switch Position

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

(2) Remove under panel silencer/duct assembly (Fig. 41).

(3) Remove column cover screws (Fig. 42).

(4) Tilt column down and remove upper half of column cover (Fig. 43).

(5) Tilt the column to the uppermost postion and remove the tilt lever (Fig. 44).

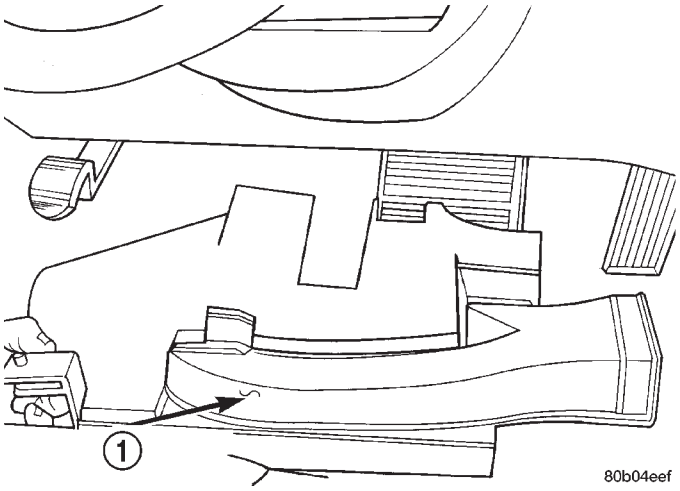


Fig. 41 Panel Removal/Installation

1 – SILENCER/DUCT ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

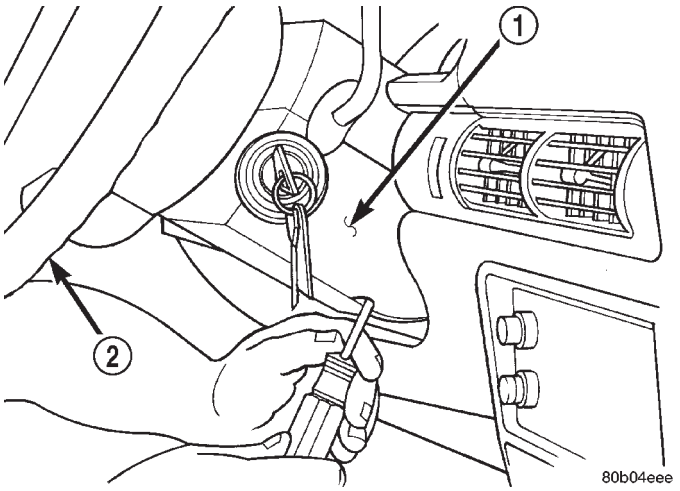


Fig. 42 Lower Column Cover Screw Removal/ Installation

1 – LOWER COLUMN COVER
2 – STEERING WHEEL

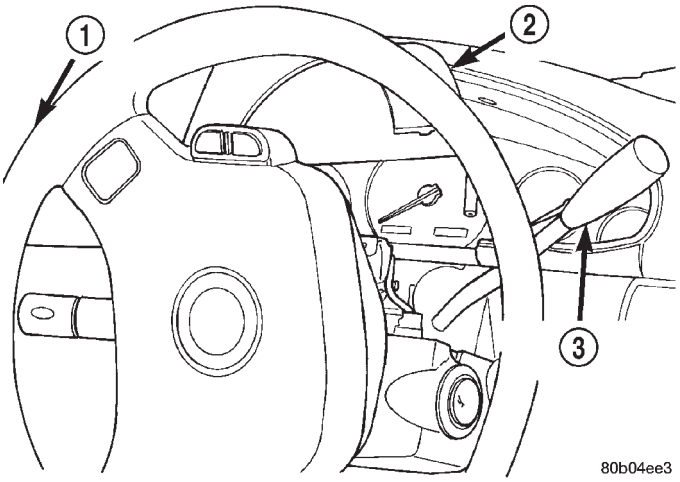


Fig. 43 Upper Column Removal/Installation

1 – STEERING WHEEL
2 – UPPER COLUMN COVER
3 – GEAR SHIFT HANDLE

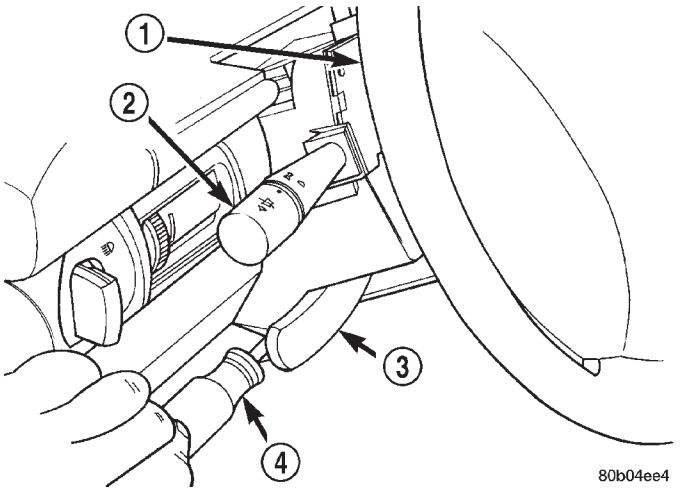


Fig. 44 Tilt Lever Screw Removal/Installation

1 – STEERING WHEEL
2 – TURN SIGNAL LEVER
3 – TILT LEVER
4 – SCREWDRIVER

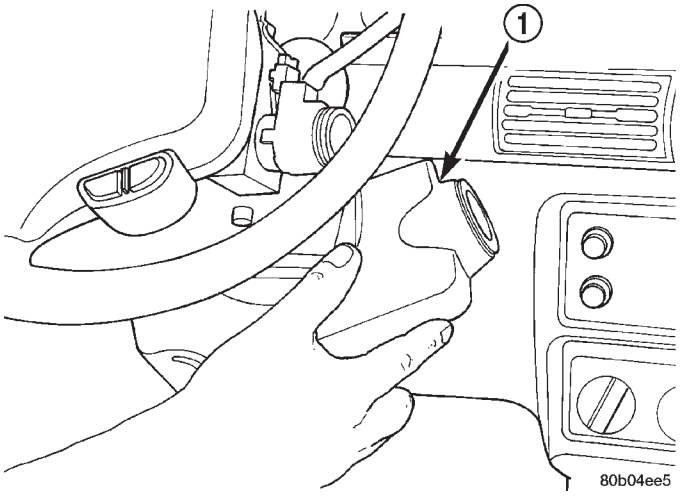


Fig. 45 Lower Column Cover Removal/Installation

1 – LOWER COLUMN COVER

(6) Remove the ignition key and remove lower column cover (Fig. 45).

(7) Remove cable from shift pin (Fig. 46).

(8) Remove cable retainer clip from shift cable conduit bracket (Fig. 46).

CAUTION: Column must be tilted fully upward to remove cable retainer clip.

(9) Raise hood. From inside the engine compartment, remove the gear shift cable from the cable bracket (Fig. 47).

(10) Unseat the cable grommet from the firewall (Fig. 49) and pull the shift cable from the interior of the vehicle.

(11) Raise vehicle on hoist and unbolt fill tube bracket. Rotate fill tube to gain access to the integrated shift cable clamp.

(12) Disconnect cable from routing bracket as shown in (Fig. 48).

(13) Remove shift cable retaining nut and slide cable assy. off of mounting stud (Fig. 49).

(14) Disconnect shifter cable from shift lever assembly at transaxle (Fig. 49).

(15) Remove cable from vehicle.

REMOVAL AND INSTALLATION (Continued)

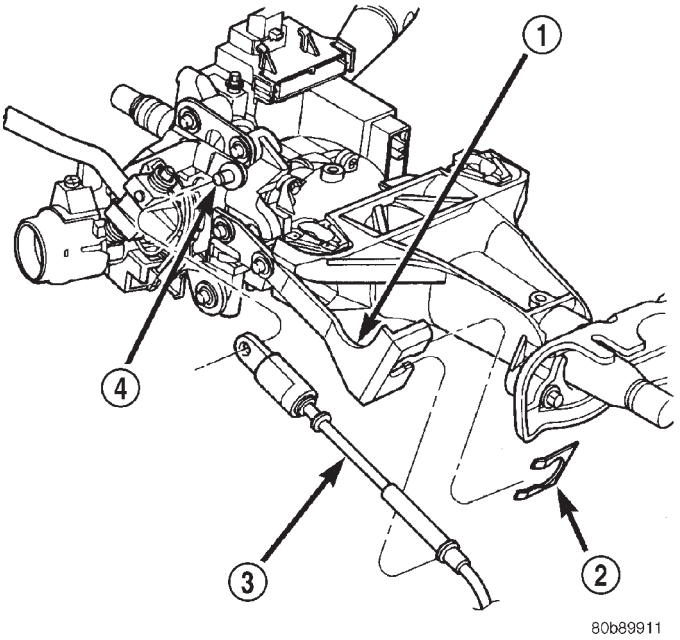


Fig. 46 Column Gear Shift Cable—Removal/ Installation

1 – CONDUIT BRACKET
2 – RETAINER CLIP
3 – GEARSHIFT CABLE
4 – SHIFT PIN

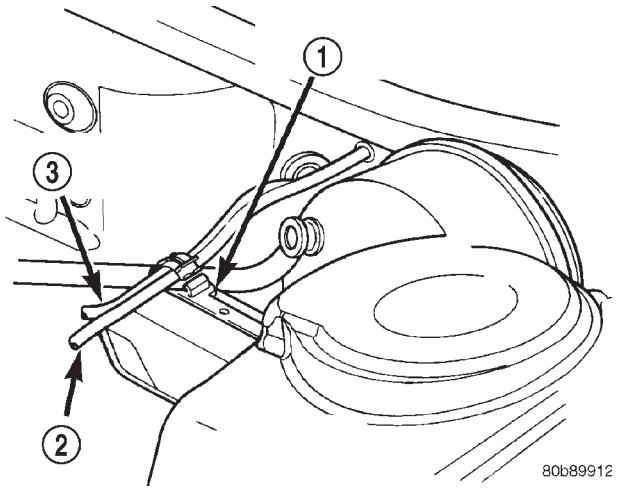


Fig. 47 Throttle/Gearshift Cable Bracket

1 – CABLE BRACKET
2 – GEARSHIFT CABLE
3 – THROTTLE CABLE

INSTALLATION

(1) Make sure transaxle shift lever is in “park.” This is the most rearward position. Verify park sprag is fully engaged by rotating either a tire or an axle shaft.

(2) Position cable in vehicle and connect cable end to the transaxle shift lever (Fig. 49).

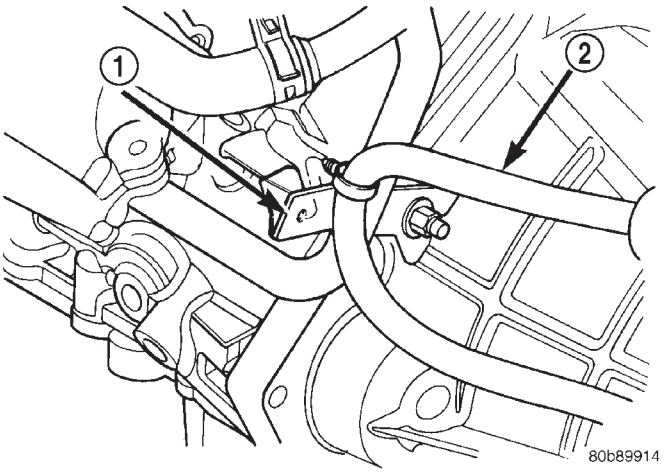


Fig. 48 Cable Routing Bracket—(3.2L/3.5L Shown/ 2.7L Similar)

1 – BRACKET
2 – CABLE

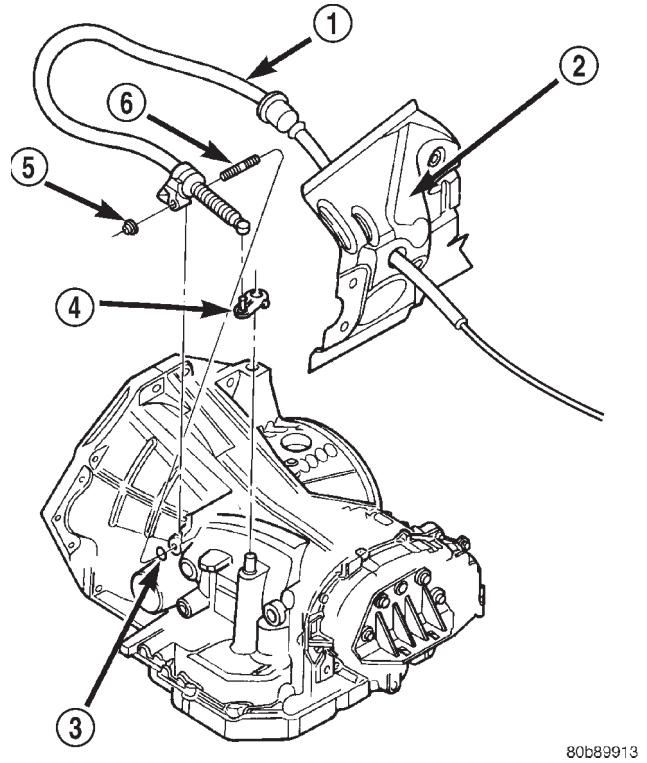


Fig. 49 Gearshift Cable Removal

1 – CABLE
2 – FIREWALL
3 – WASHER
4 – SHIFT LEVER
5 – NUT
6 – STUD

(3) Verify that the washer (Fig. 49) is still in place on the cable mounting stud. Install cable to transaxle and tighten nut to 28 N·m (250 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

(4) Rotate fill tube to original location. Install and tighten fill tube bracket bolt.

(5) Install cable “push pin” into bracket as shown in (Fig. 48).

(6) Route transaxle shift cable through hole in dash panel (Fig. 49) (Fig. 50).

(7) Lubricate cable grommet with a synthetic lubricant (or equivalent) and secure to hole. Verify that it is seated by pulling outward on cable.

(8) Install cable into throttle/gearshift cable bracket (Fig. 47).

(9) Inside the vehicle, route the gearshift between the left a/c duct and the left lower heat duct (Fig. 50) and up to the steering column.

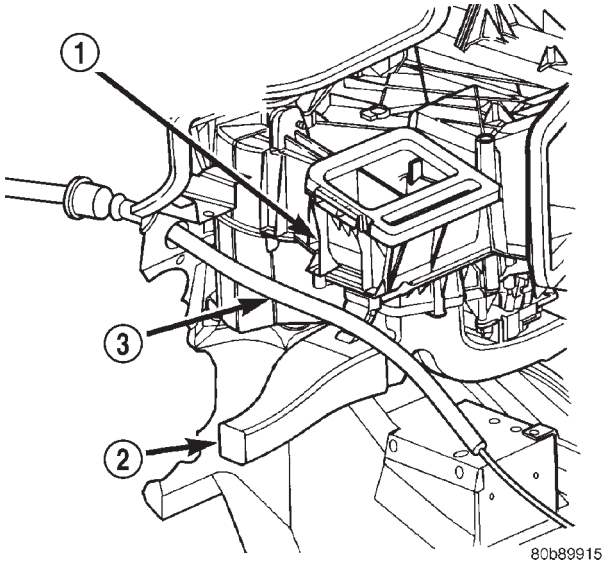


Fig. 50 Shift Cable Routing

1 – LH A/C DUCT OUTLET
2 – LH LOWER HEAT DUCT
3 – GEARSHIFT CABLE

(10) Tilt steering column all the way up and make sure shift lever is still in “park.”

(11) Connect transaxle shift cable to shift cable conduit bracket and secure with new clip (Fig. 46).

(12) Attach shift cable to attaching stud (pin) (Fig. 46) by snapping into place.

(13) Move the steering column to full tilt downward. Put the column shifter in park with key removed.

(14) Adjust cable by rotating the adjuster into lock position (Fig. 51). The adjuster will click when lock is fully adjusted.

(15) Reinstall upper and lower steering column shrouds (Fig. 43) (Fig. 45). Then install underpanel silencer/duct.

(16) Check shifter for proper operation. It should operate smoothly without binding. The engine starter should crank in park or Neutral positions only.

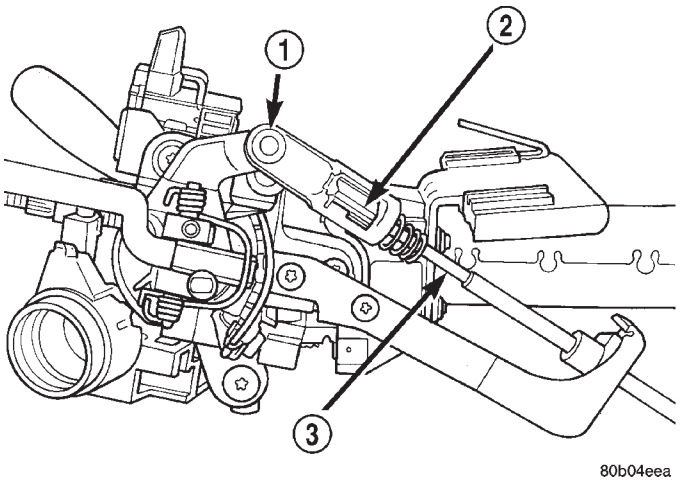


Fig. 51 Shift Cable Adjuster Lock

1 – SHIFTER PIN
2 – CABLE ADJUSTER LOCK
3 – SHIFT CABLE

GEARSHIFT CABLE–FLOOR SHIFT

REMOVAL

(1) Using suitable size allen wrench, remove the shift handle retaining screw (Fig. 52).

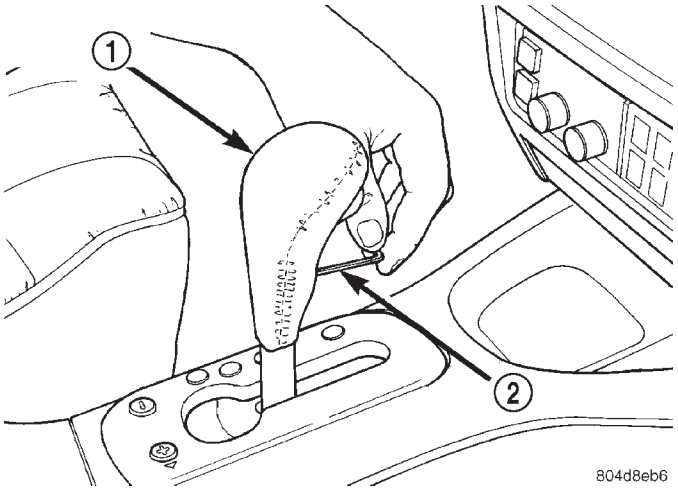


Fig. 52 Shift Handle Retaining Screw

1 – GEARSHIFT KNOB
2 – HEX WRENCH

(2) Remove shift handle from shifter assy.

(3) Remove console bezel from vehicle.

(4) Loosen nut on shift cable adjust lever (Fig. 53).

(5) Remove retaining clip from shift cable conduit bracket (Fig. 54).

(6) Disconnect shifter cable from cable attach stud (pin) (Fig. 54).

(7) Remove cable from center console routing. Leave flat on floor for ease of removal.

REMOVAL AND INSTALLATION (Continued)

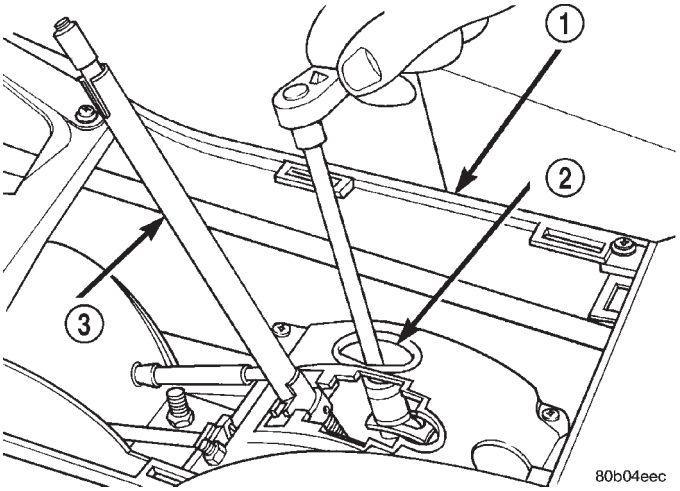


Fig. 53 Shift Cable Adjust Lever Nut

1 – CONSOLE
2 – ACCESS HOLE
3 – SHIFTER HANDLE

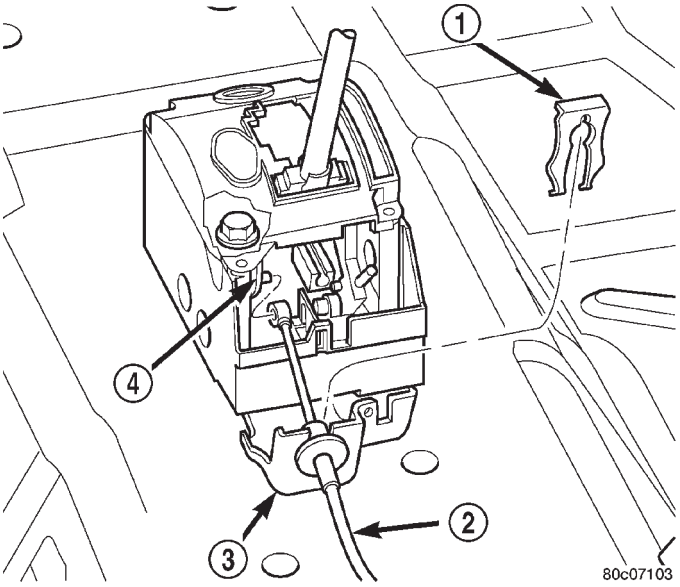


Fig. 54 Floor Gearshift Cable Removal/Installation

1 – CUP
2 – CABLE
3 – CONDUIT BRACKET
4 – PIN

(8) Raise hood. Remove gearshift cable from throttle/gearshift cable bracket (Fig. 55)

(9) Unseat cable grommet at firewall and remove cable from interior of vehicle (Fig. 56).

(10) Raise vehicle on hoist and disconnect fill tube bracket from transaxle. Rotate fill tube to gain access to shift cable clamp.

(11) Remove cable from routing bracket (Fig. 57).

(12) Remove cable-to-transaxle nut and slide cable off of stud (Fig. 56).

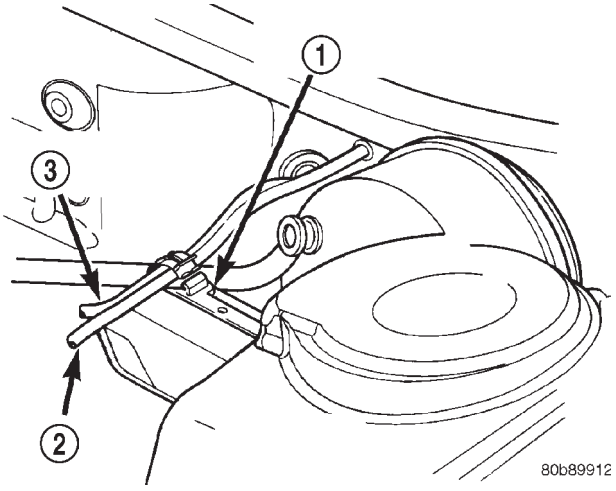


Fig. 55 Throttle/Gearshift Cable Bracket

1 – CABLE BRACKET
2 – GEARSHIFT CABLE
3 – THROTTLE CABLE

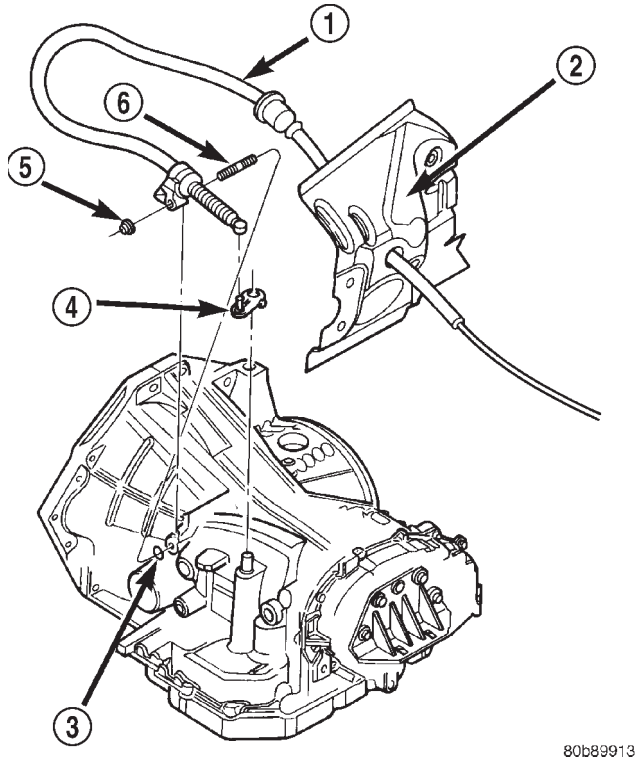


Fig. 56 Gearshift Cable Removal/Installation

1 – CABLE
2 – FIREWALL
3 – WASHER
4 – SHIFT LEVER
5 – NUT
6 – STUD

(13) Disconnect shifter cable from shift lever assembly at transaxle (Fig. 56).

(14) Remove cable from underneath vehicle.

REMOVAL AND INSTALLATION (Continued)

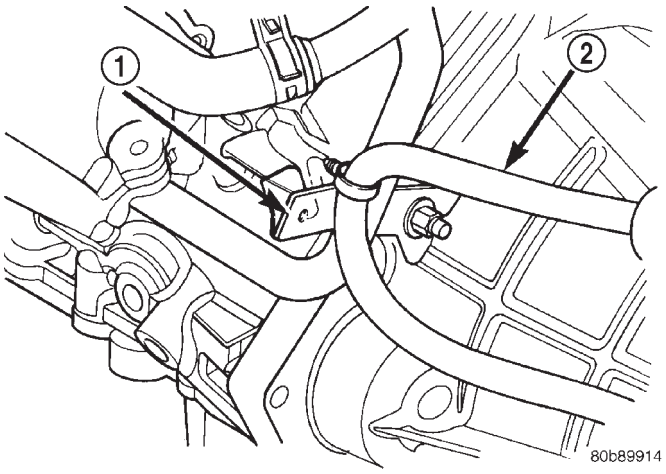


Fig. 57 Gearshift Cable Routing Bracket

1 – BRACKET
2 – CABLE

INSTALLATION

(1) Make sure transaxle shift lever is in "Park." This is the most rearward position. Verify park sprag is fully engaged by rotating either a tire or an axle shaft.

(2) Position cable in vehicle and connect cable end to the transaxle shift lever (Fig. 56).

(3) Verify that the washer (Fig. 56) is still in place on the cable mounting stud. Install cable to transaxle and tighten nut to 28 N·m (250 in. lbs.).

(4) Rotate fill tube to original location. Install and tighten fill tube bracket bolt.

(5) Install cable "push pin" into bracket as shown in (Fig. 55).

(6) Route transaxle shift cable through hole in dash panel (Fig. 56) (Fig. 58).

(7) Lubricate cable grommet with a synthetic lubricant (or equivalent) and secure to hole. Verify that it is seated by gently pulling outward on cable.

(8) Install cable into throttle/gearshift cable bracket (Fig. 55).

(9) Inside the vehicle, route the gearshift cable between the left a/c duct and the left lower heat duct (Fig. 58) and towards the gearshift mechanism.

(10) Route cable through hole in shifter conduit bracket and attach to cable attaching shift pin by snapping into place (Fig. 54).

(11) Install a new clip onto the cable at the shifter bracket (Fig. 54).

(12) Tighten the adjuster nut (Fig. 53).

(13) Reinstall console bezel and shifter handle. Firmly press the shifter handle downward and tighten the screw (Fig. 52).

(14) Check shifter for proper operation. It should operate smoothly without binding. The starter should crank in Park or Neutral only.

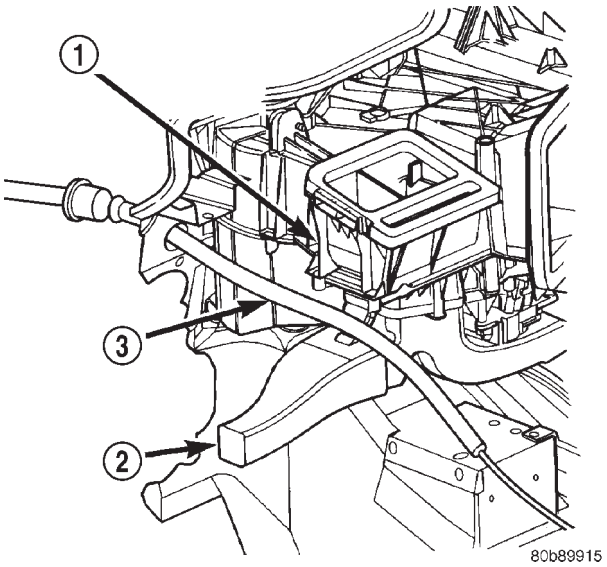


Fig. 58 Gearshift Cable Routing

1 – LH A/C DUCT OUTLET
2 – LH LOWER HEAT DUCT
3 – GEARSHIFT CABLE

FLOOR SHIFTER

REMOVAL

(1) Remove shifter handle and console bezel.

(2) If equipped with Autostick, disconnect the Autostick switch connector.

(3) Loosen adjuster nut on shifter adjuster (Fig. 59).

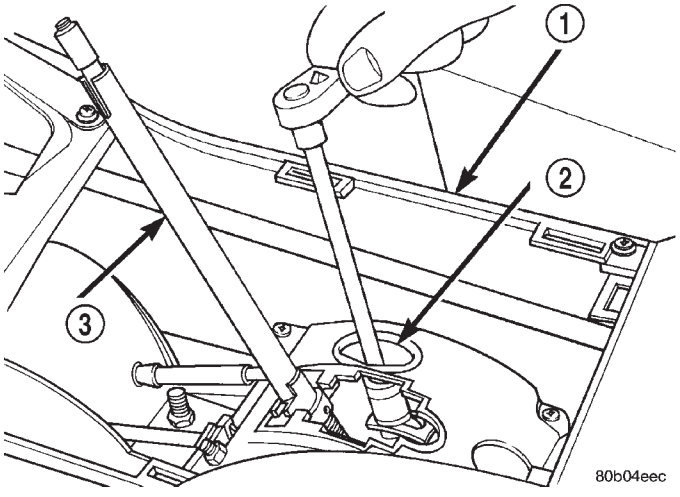


Fig. 59 Shift Cable Adjust Lever Nut

1 – CONSOLE
2 – ACCESS HOLE
3 – SHIFTER HANDLE

(4) Disconnect shifter cable from shift pin (Fig. 60) and disconnect cable from shifter assembly bracket.

REMOVAL AND INSTALLATION (Continued)

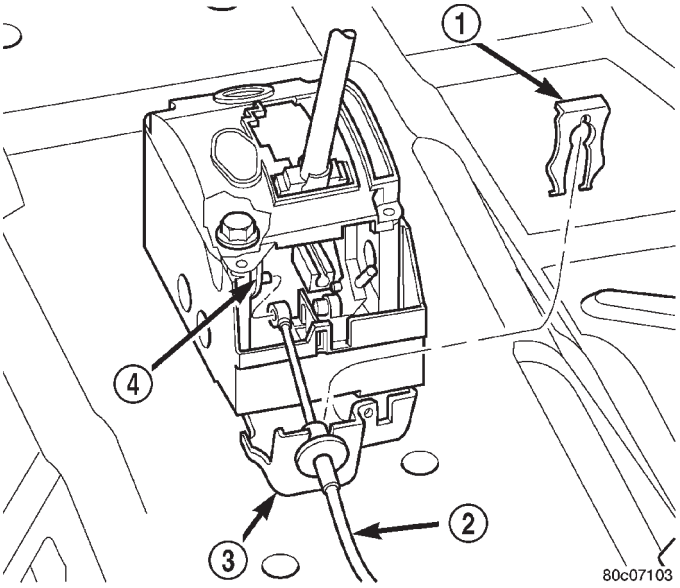


Fig. 60 Shift Cable Removal/Installation

1 – CUP
2 – CABLE
3 – CONDUIT BRACKET
4 – PIN

(5) Disconnect interlock cable from shifter base slot (Fig. 61). Be careful not to break tab on interlock cable conduit end fitting.

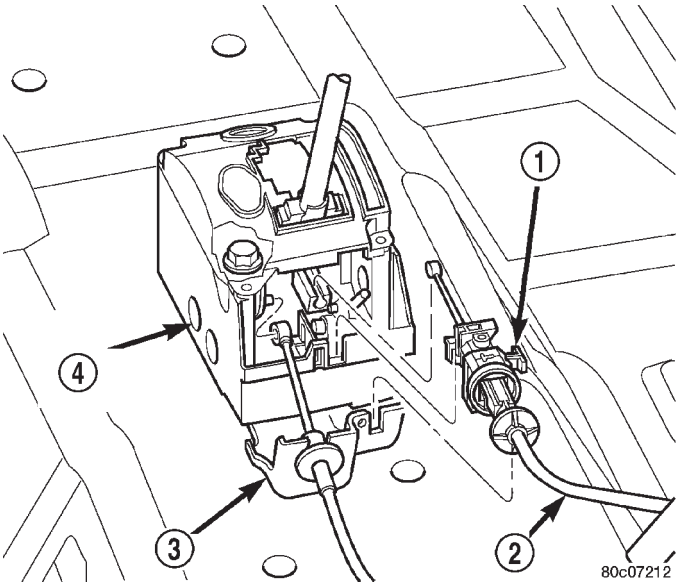


Fig. 61 Interlock Cable Removal/Installation

1 – LOCKING CLIP
2 – INTERLOCK CABLE
3 – BRACKET
4 – SHIFT ASSEMBLY

(6) Remove the five floor pan attaching nuts from the shifter base and shift cable bracket (Fig. 62).

(7) Remove shifter assembly from vehicle (Fig. 62).

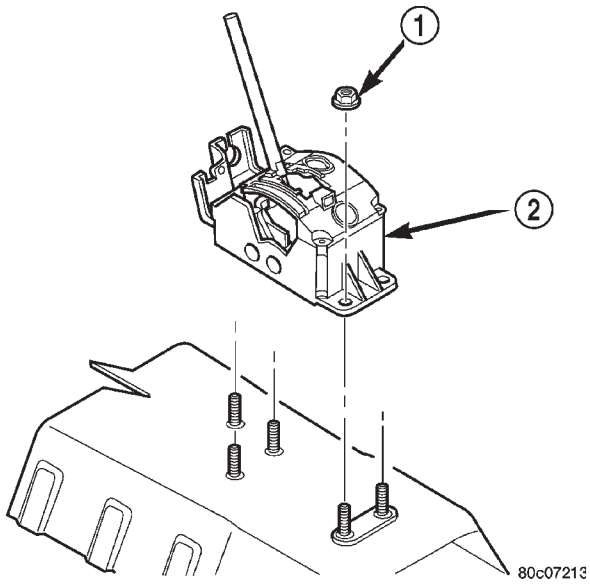


Fig. 62 Shifter Assembly Removal/Installation

1 – NUT
2 – SHIFTER ASSEMBLY

INSTALLATION

(1) Install shifter assembly (Fig. 62).

(2) Install five shifter/cable bracket to floor pan nuts and tighten to 31 N·m (23 ft. lbs.).

(3) Make sure shift lever and transaxle are in "Park."

CAUTION: Park sprag must be engaged when adjusting linkage. Rock vehicle back and forth to ensure that park sprag is fully engaged.

(4) With the ignition in the lock position, attach shift cable eyelet to shift pin (Fig. 60).

(5) Install shift cable to shifter assembly bracket (Fig. 60).

(6) Slip interlock cable core wire into interlock adjustment lever groove (Fig. 61). Make sure the interlock cable slug is seated in the groove.

(7) Slip interlock cable conduit end fitting into bracket and snap into place (Fig. 61).

(8) If equipped with Autostick, connect the Autostick connector.

(9) Adjust gear shift and interlock cables.

NOTE: Gearshift and interlock cables MUST be adjusted. Refer to the Adjustments section in this Group for the correct procedures.

INTERLOCK CASSETTE

The interlock cassette slides into the housing behind the lock cylinder (Fig. 63). The cable at the rear of the cassette attaches to a locking arm on the shifter mechanism. **The column shift interlock**

REMOVAL AND INSTALLATION (Continued)

system is only adjusted after installing a new cassette. It can't be adjusted more than once. If the system operates incorrectly, install and adjust a new interlock cassette.

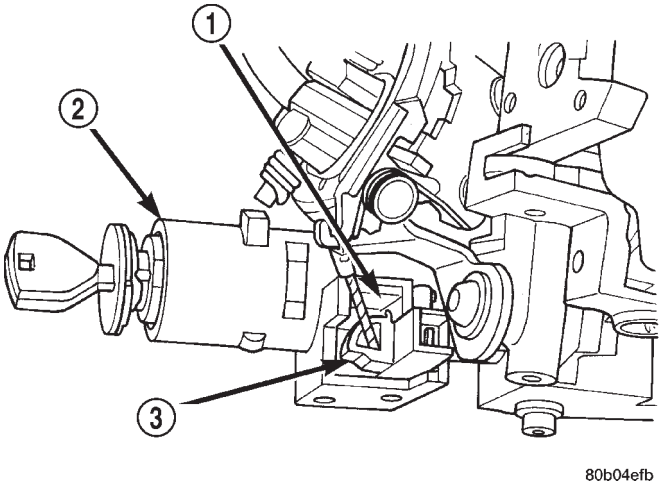


Fig. 63 Ignition Interlock Cassette–Column Shift

1 – RELEASE TAB
2 – LOCK CYLINDER
3 – INTERLOCK CASSETTE

REMOVAL

(1) Depress the tab on the top of the cassette.
(2) Slide the interlock cassette out of the housing.
(3) Remove the cable from the locking arm on the shifter mechanism.

INSTALLATION

(1) Ensure the latch rotates freely on the shifter gate (Fig. 64).

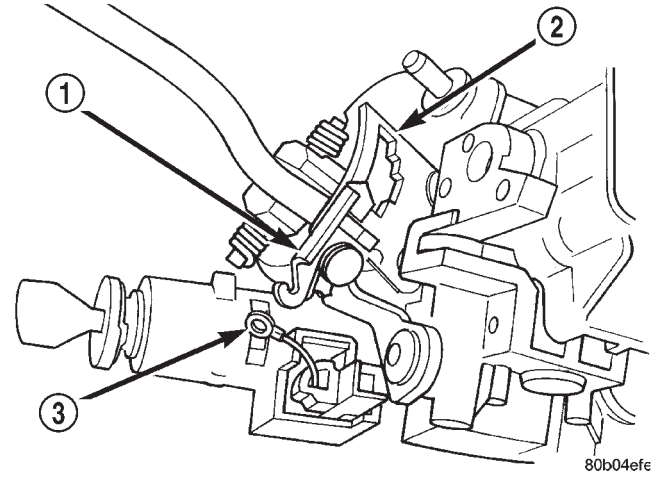


Fig. 64 Latch and Shifter Gate

1 – LATCH
2 – SHIFTER GATE
3 – CASSETTE CABLE

(2) With the shifter in Park and the key removed, install the cable over the hook on locking arm of the shifter mechanism.
(3) Slide the cassette into the housing until it locks in place.
(4) To adjust the interlock system, push the adjustment tab in until it stops (Fig. 65). The adjustment tab will click as it moves into position. Ensure the tab is fully depressed.

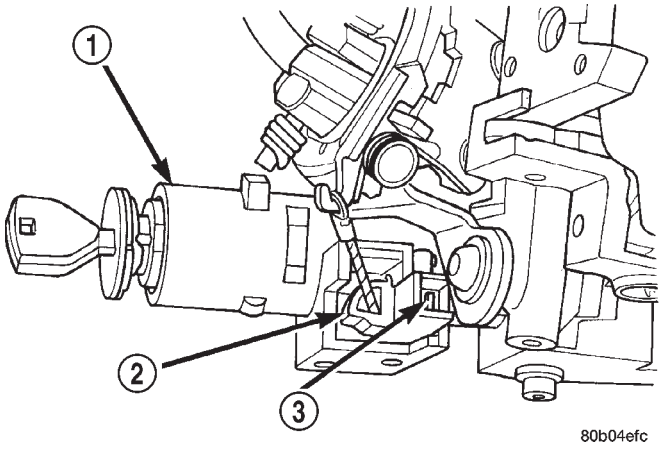


Fig. 65 Ignition Interlock Adjustment Tab–Column Shift

1 – LOCK CYLINDER HOUSING
2 – INTERLOCK CASSETTE
3 – ADJUSTMENT TAB

BRAKE TRANSMISSION SHIFT INTERLOCK SOLENOID (COLUMN)

NOTE: The following procedure applies to vehicles with steering column mounted shift levers only.

REMOVAL

(1) Remove the fuse panel cover from the left end of the instrument panel (Fig. 66).
(2) Remove the two screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 67).
(3) Remove the lower instrument panel cover. The lower instrument panel cover is attached by retaining clips along the top and right edge.

NOTE: The upper shroud on this steering column is retained to the steering column by a snap fit to the lower shroud. When removing the upper shroud from the steering column lower shroud, DO NOT use a hard or sharp tool. This will damage the shrouds. If a tool must be used, use a soft tool such as a trim stick.

REMOVAL AND INSTALLATION (Continued)

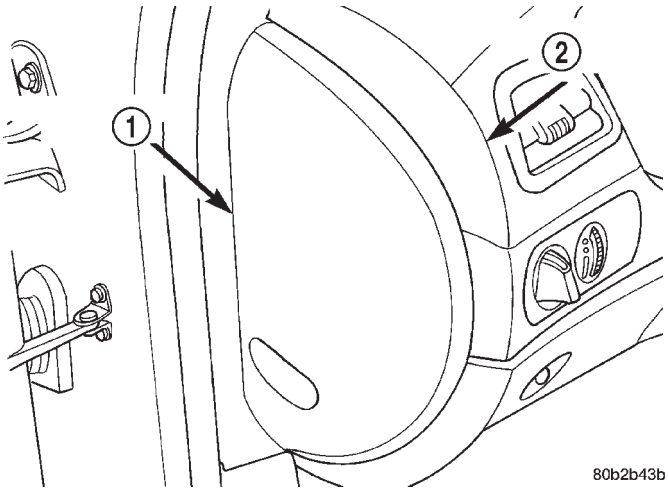


Fig. 66 Fuse Panel Cover

1 – FUSE PANEL COVER
2 – INSTRUMENT PANEL

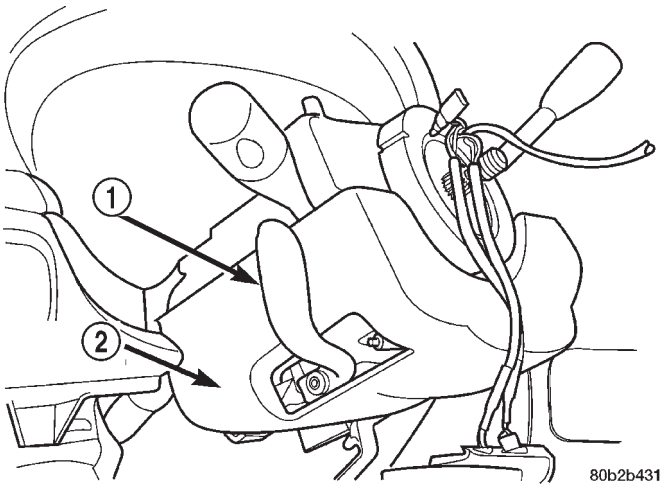


Fig. 68 Tilt Lever

1 – TILT LEVER
2 – LOWER SHROUD

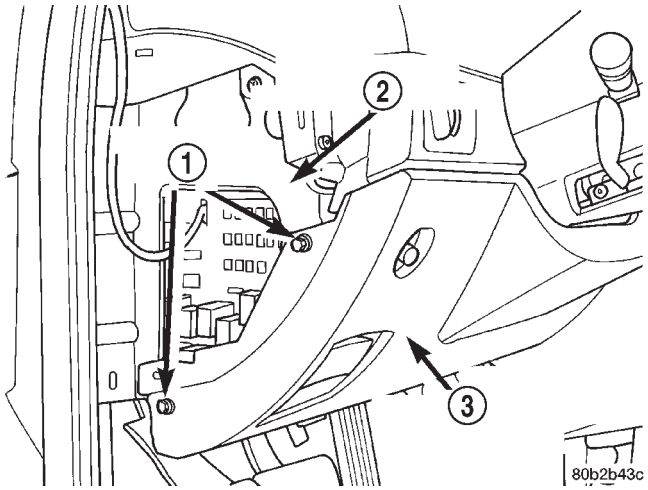


Fig. 67 Lower Instrument Panel Cover Mounting Screws

1 – MOUNTING SCREWS
2 – INSTRUMENT PANEL BRACKET
3 – LOWER INSTRUMENT PANEL COVER

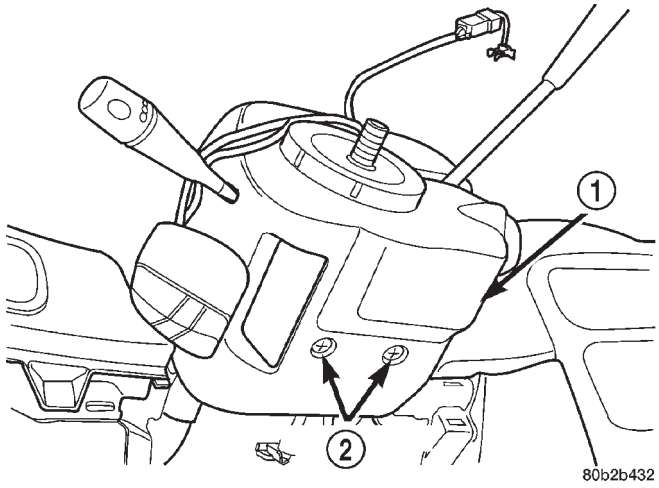


Fig. 69 Lower Shroud Attaching Screws

1 – LOWER SHROUD
2 – MOUNTING SCREWS

(4) Remove the steering column upper shroud from the steering column using the following procedure: First, on the right seam between the upper and lower shrouds, push in on seam at the forward end. When the upper shroud unsnaps, pull the upper shroud upward away from the lower. Repeat this procedure on the opposite side of the column to release the upper shroud from the lower. Remove the upper shroud from the steering column.

(5) Remove the tilt lever (Fig. 68) from the steering column.

(6) Remove the 2 screws attaching the lower shroud to the steering column (Fig. 69). Remove the lower shroud from the steering column.

(7) Disconnect the wiring harness connector from the brake transmission shift interlock (BTSI) solenoid (Fig. 70).

(8) Remove the retainer clip from the end of the BTSI solenoid (Fig. 71).

(9) Slide the BTSI solenoid straight off the shift lever mounting stud.

INSTALLATION

(1) Align the flat inside the brake transmission shift interlock (BTSI) solenoid (Fig. 72) with the flat on the shift lever mounting stud.

(2) Slide the solenoid completely onto the shift lever mounting stud aligning the plastic guide formed into the solenoid housing with the flange on the shift lever mechanism bracket (Fig. 73).

REMOVAL AND INSTALLATION (Continued)

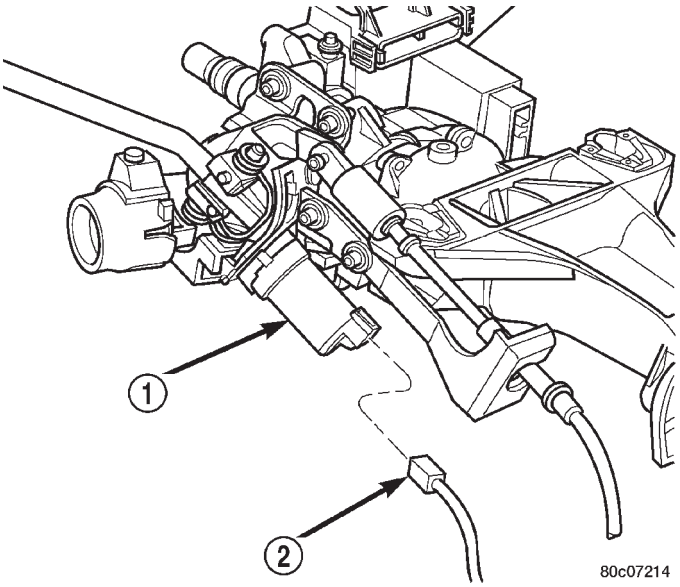


Fig. 70 Solenoid Connector

1 – BTSI SOLENOID
2 – CONNECTOR

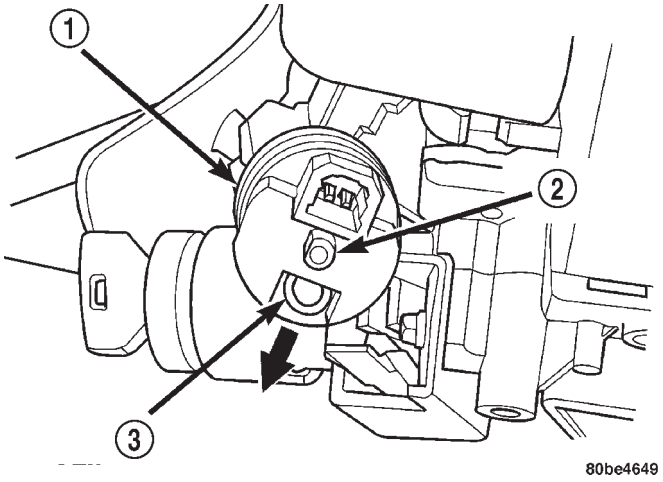


Fig. 71 Solenoid Retainer Clip Removal

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

(3) Install the retainer clip until it snaps into place in the slot cut into the shift lever mounting stud (Fig. 74).

(4) Verify the BTSI solenoid is locked in place and will not slide off the mounting stud.

(5) Connect the wiring harness connector to the BTSI solenoid.

(6) Verify the BTSI is operating properly. With the ignition on (engine not running) and the parking brake applied, try shifting the transmission shift lever out of the PARK position with and without the brake pedal being applied. The shift lever should

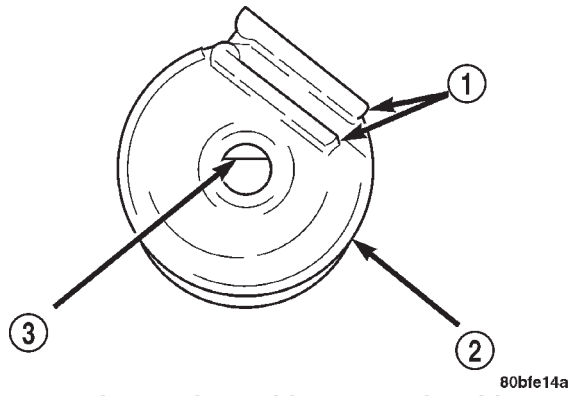


Fig. 72 Flat Inside BTSI Solenoid

1 – GUIDES
2 – SOLENOID
3 – FLAT

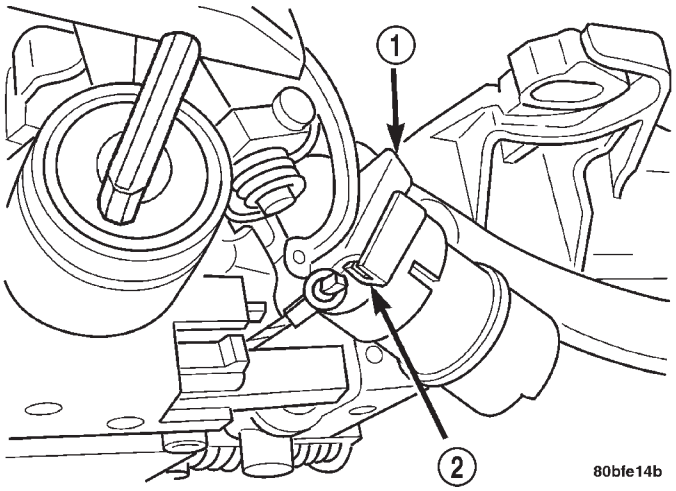


Fig. 73 Guide And Flange Alignment

1 – BRACKET FLANGE
2 – GUIDE

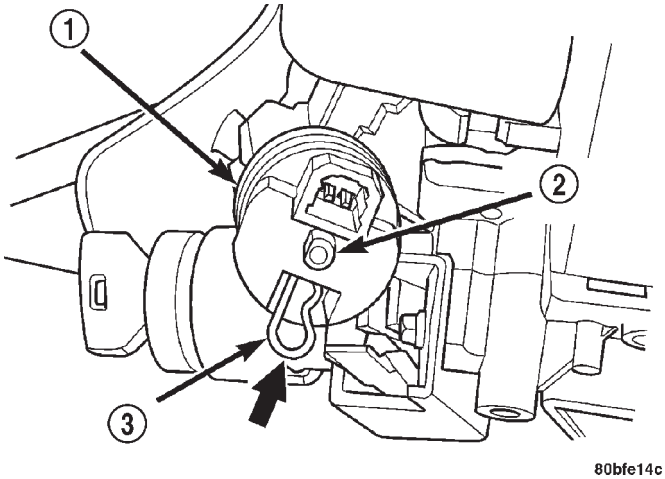


Fig. 74 Solenoid Retainer Clip Installation

1 – SOLENOID
2 – MOUNTING STUD
3 – RETAINER CLIP

REMOVAL AND INSTALLATION (Continued)

only shift out of PARK with the brake pedal being depressed.

(7) Install the lower shroud (Fig. 69) on the steering column. Install and securely tighten the 2 screws attaching the lower shroud to the steering column.

(8) Install the tilt lever (Fig. 68) on the steering column.

(9) Install the upper shroud on the steering column by snapping it onto the lower shroud.

(10) Install the lower instrument panel cover.

(11) Install the two screws behind the fuse panel cover attaching the lower instrument panel cover to the instrument panel (Fig. 67).

(12) Install the fuse panel cover on the left end of the instrument panel (Fig. 66).

BRAKE/TRANSMISSION SHIFT INTERLOCK CABLE (FLOOR)

REMOVAL

(1) Using suitable size allen wrench, remove the gearshift knob retaining screw (Fig. 75).

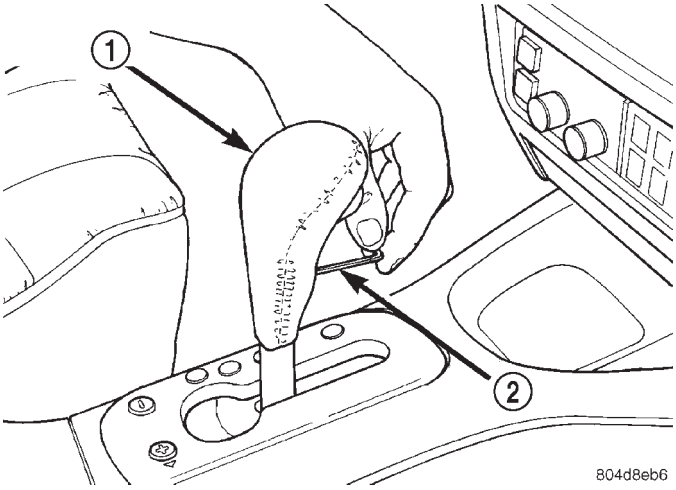


Fig. 75 Shift Handle Retaining Screw

1 – GEARSHIFT KNOB
2 – HEX WRENCH

(2) Remove gearshift knob from shifter assy.

(3) Remove console bezel from vehicle.

(4) Remove under panel silencer/duct assembly (Fig. 76).

(5) Remove column cover screws (Fig. 77).

(6) Tilt column down and remove upper half of column cover (Fig. 78).

(7) Tilt the column to the uppermost position and remove the tilt lever (Fig. 79).

(8) Remove the ignition key and remove lower column cover (Fig. 80).

(9) Remove the interlock cable from the shifter housing. Slide the cable out of the groove in the interlock lever (Fig. 81).

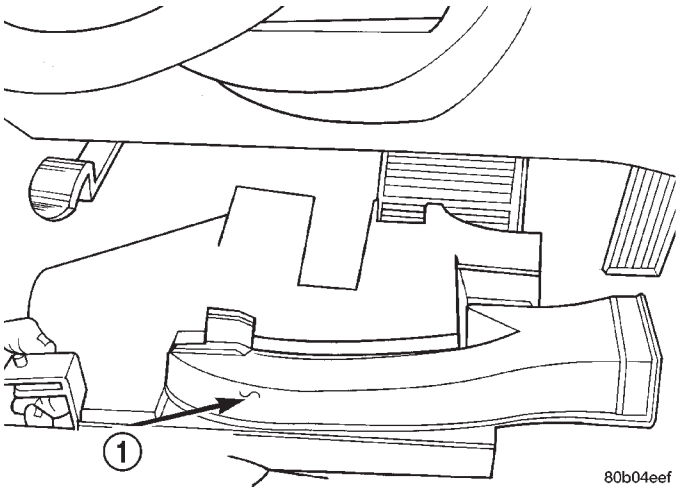


Fig. 76 Panel Removal/Installation

1 – SILENCER/DUCT ASSEMBLY

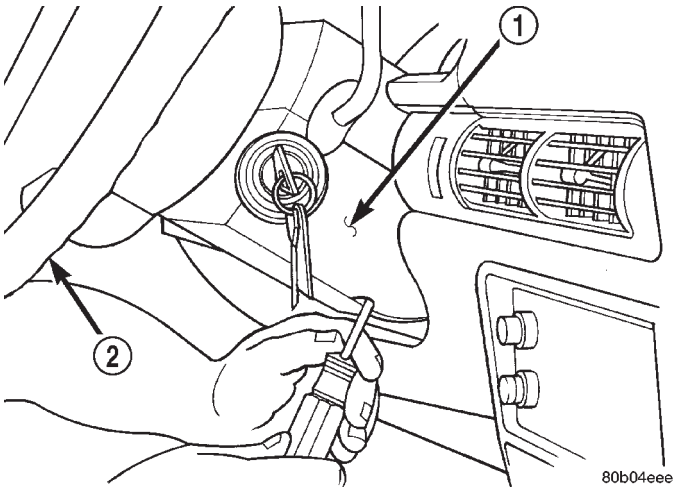


Fig. 77 Lower Column Cover Screw Removal/ Installation

1 – LOWER COLUMN COVER
2 – STEERING WHEEL

(10) Disconnect the BTSI solenoid connector.

(11) Depress the lock tab (Fig. 82) on the interlock cable and pull the cable out of the lock cylinder housing (Fig. 83).

(12) Remove interlock cable. Note cable routing so it can be installed in the same manner.

INSTALLATION

(1) Ensure ignition switch is in the “ON/RUN” position (Fig. 84).

(2) Route the interlock cable into position as previously removed.

(3) Slide the steering column end of the interlock cable into the lock cylinder housing until it snaps into place (Fig. 83).

(4) Connect BTSI solenoid connector.

REMOVAL AND INSTALLATION (Continued)

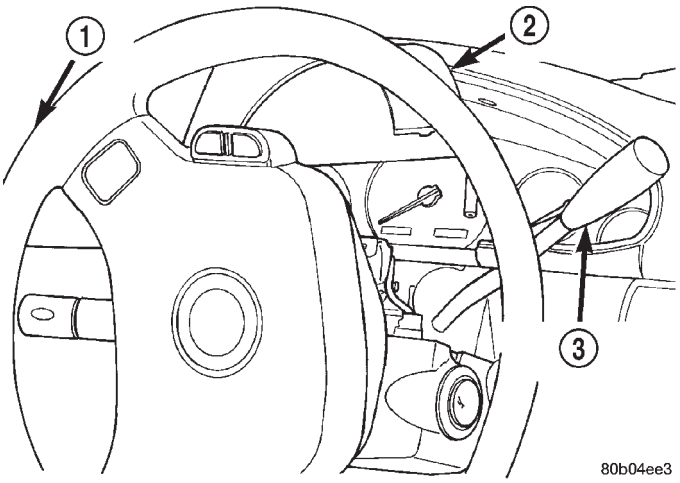


Fig. 78 Upper Column Removal/Installation

1 – STEERING WHEEL
2 – UPPER COLUMN COVER
3 – GEAR SHIFT HANDLE

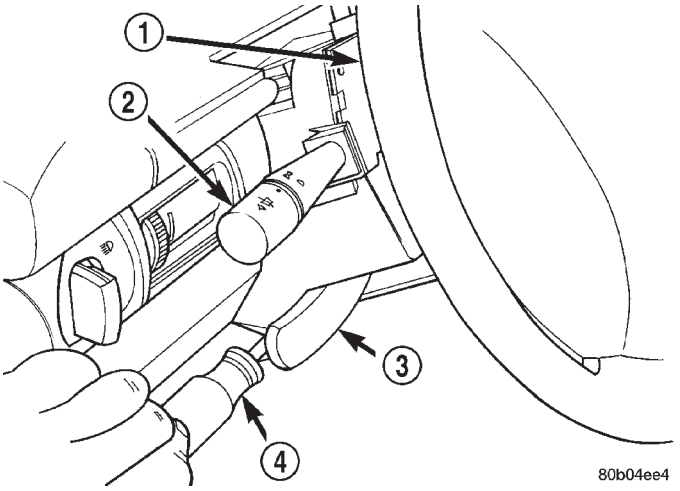


Fig. 79 Tilt Lever Screw Removal/Installation

1 – STEERING WHEEL
2 – TURN SIGNAL LEVER
3 – TILT LEVER
4 – SCREWDRIVER

(5) Turn the ignition key to the "LOCK" position (Fig. 84).

(6) Put the shifter in the PARK position.

(7) Slide the interlock cable core wire into the groove on the lever (Fig. 81). Ensure the cable end seats in the groove.

(8) Slip the cable into the shifter housing until it snaps into place.

(9) Ensure the shift lever remains in PARK. Move the ignition key to the "LOCK" position and remove the key. Tilt the steering column to the full UP position.

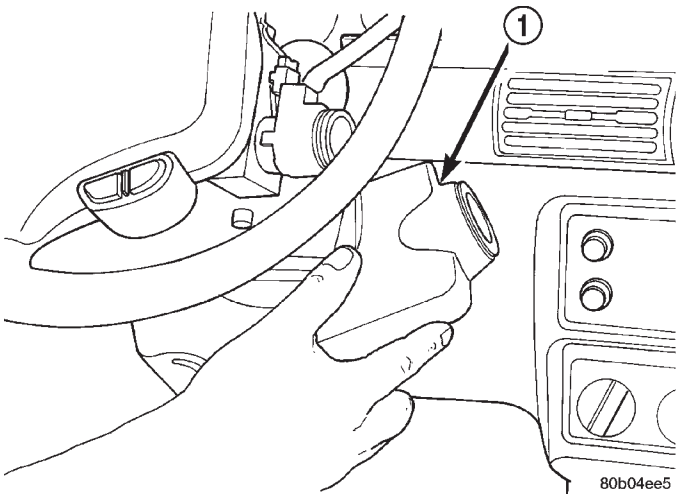


Fig. 80 Lower Column Cover Removal/Installation

1 – LOWER COLUMN COVER

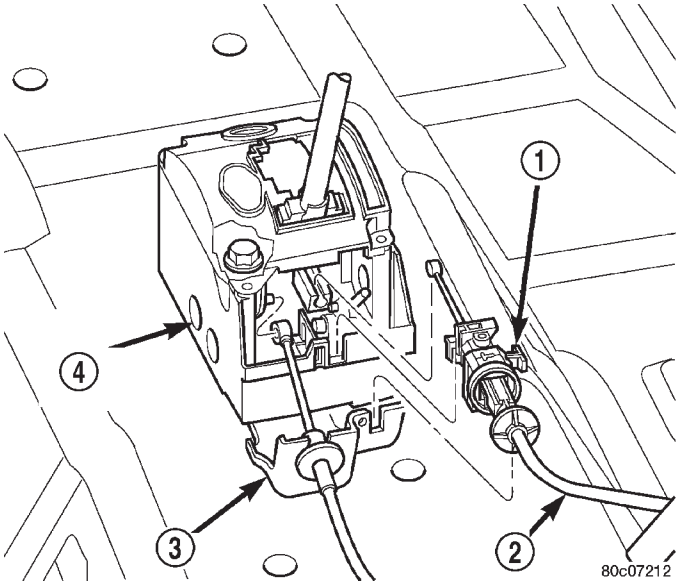


Fig. 81 Interlock Cable at Shifter

1 – LOCKING CLIP
2 – INTERLOCK CABLE
3 – BRACKET
4 – SHIFT ASSEMBLY

(10) If the interlock cable is being replaced, remove the lock pin. Allow the cable to adjust itself to the correct position. Tighten the locking clip (Fig. 81) by pushing it down.

(11) If the interlock cable is being re-used, the lock pin will not exist. Free adjustment by pulling outward on locking clip. The cable will index itself to the correct position. Tighten the locking clip by pushing it down.

(12) Insert the ignition key and verify the ignition interlock adjustment/operation. Refer to Description

REMOVAL AND INSTALLATION (Continued)

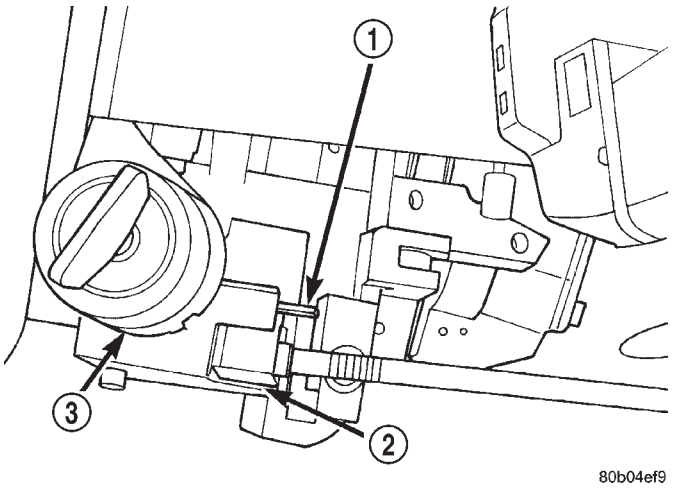


Fig. 82 Interlock Cable Locking Tab

1 – TAB
2 – INTERLOCK CABLE
3 – LOCK CYLINDER HOUSING

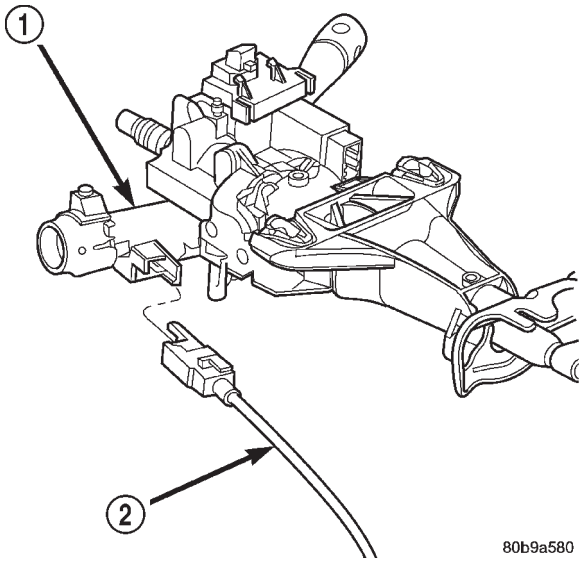


Fig. 83 Interlock Cable Removal/Installation

1 – LOCK CYLINDER HOUSING
2 – INTERLOCK CABLE

and Operation to determine intended operation. If adjustment is necessary, refer to Adjustments.

(13) Install the bezel on the shifter console.

(14) Install gearshift knob (Fig. 75).

(15) Install upper and lower covers from the steering column (Fig. 77).

(16) Install tilt lever (Fig. 79).

(17) Install the lower silencer panel (Fig. 76).

TRANSMISSION RANGE SENSOR

REMOVAL

(1) Disconnect the TRS connector.

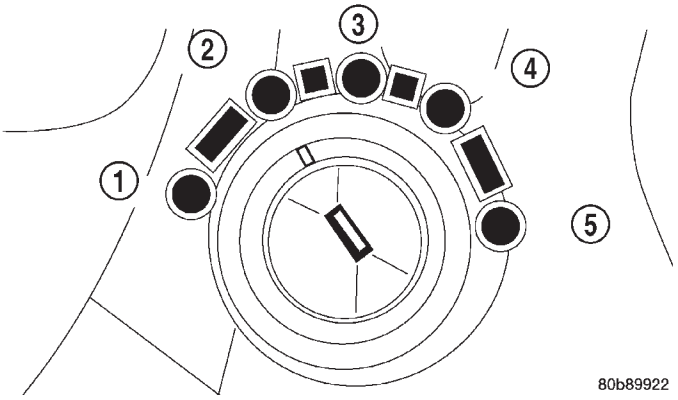


Fig. 84 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

(2) Remove valve body assembly from vehicle. Refer to Valve Body removal and Installation in this group.

(3) Remove the manual shaft seal (Fig. 85).

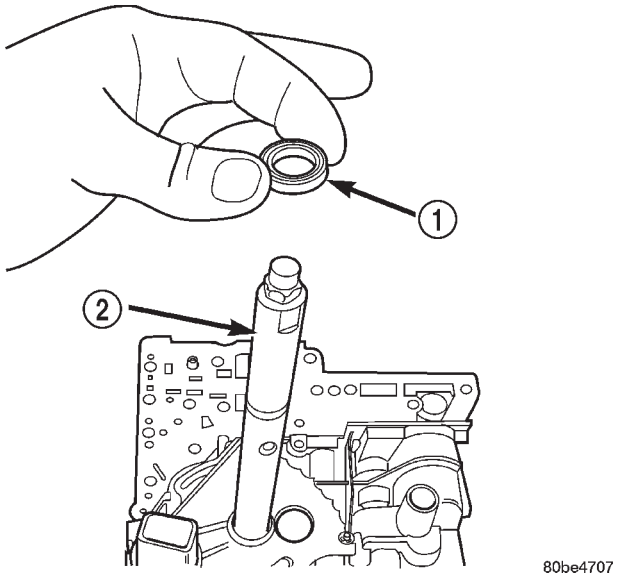


Fig. 85 Manual Shaft Seal—Typical

1 – SEAL
2 – MANUAL SHAFT

(4) Remove manual shaft/TRS retaining screw (Fig. 86).

(5) Slide TRS off of manual valve shaft.

INSTALLATION

(1) Install the TRS to the manual shaft. Make sure TRS locating pin rests in manual valve bore slot.

REMOVAL AND INSTALLATION (Continued)

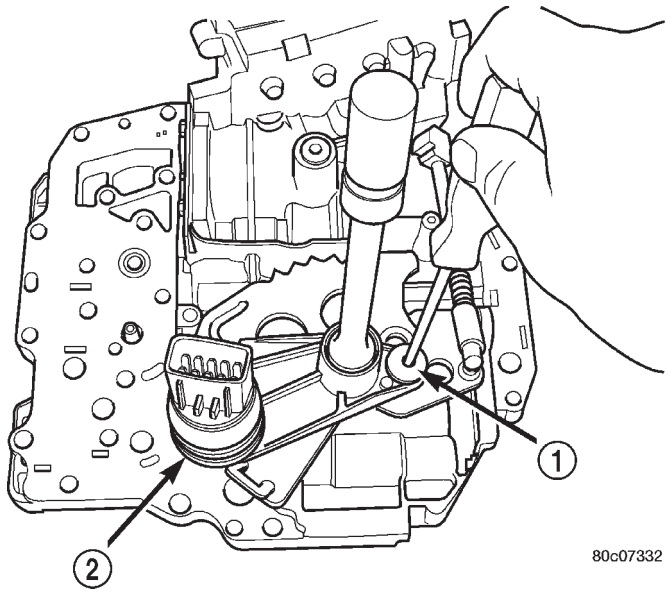


Fig. 86 Manual Shaft Retaining Screw

1 – SCREW
2 – TRS

(2) Install the TRS/manual shaft retaining screw and torque to 5 N·m (45 in. lbs.) torque (Fig. 86).

(3) Install the manual shaft seal (Fig. 85).

(4) Install valve body to transaxle. Refer to Valve Body Removal and Installation in this group.

INPUT SPEED SENSOR

CAUTION: When disconnecting speed sensor connector, be sure that the weather seal does not fall off or remain in the old sensor.

NOTE: The input speed sensor is not interchangeable with the output speed sensor.

REMOVAL

(1) Disconnect the input speed sensor connector (Fig. 87).

(2) Unscrew and remove the input speed sensor.

(3) Inpsect the speed sensor o-ring and replace if necessary (Fig. 88).

INSTALLATION

(1) Verify o-ring is installed into position (Fig. 88).

(2) Install and tighten input speed sensor to 27 N·m (20 ft. lbs.) torque.

(3) Connect speed sensor connector (Fig. 87).

(4) Connect battery negative cable.

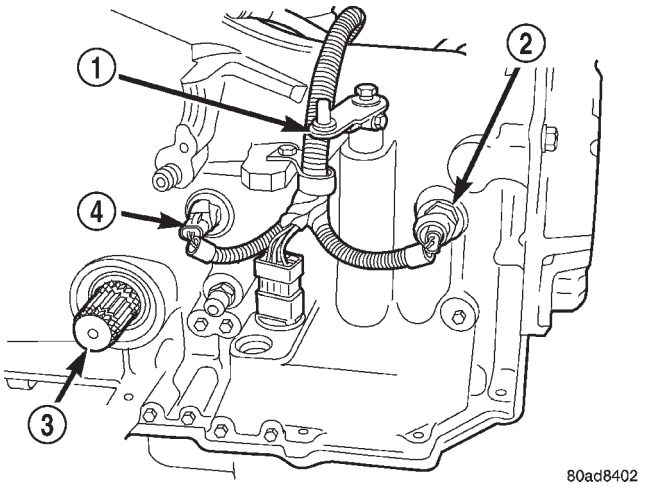


Fig. 87 Speed Sensor/Connector Location

1 – MANUAL SHIFT LEVER
2 – OUTPUT SPEED SENSOR
3 – LONG STUB SHAFT
4 – INPUT SPEED SENSOR

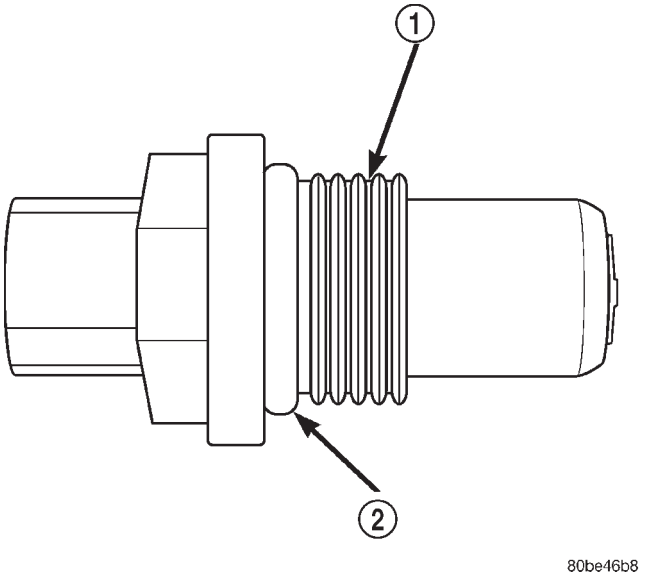


Fig. 88 O-Ring Location

1 – INPUT SPEED SENSOR
2 – O-RING

OUTPUT SPEED SENSOR

CAUTION: When disconnecting speed sensor connector, be sure that the weather seal does not fall off or remain in the old sensor.

NOTE: The output speed sensor is not interchangeable with the input speed sensor.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Disconnect the output speed sensor connector (Fig. 89).

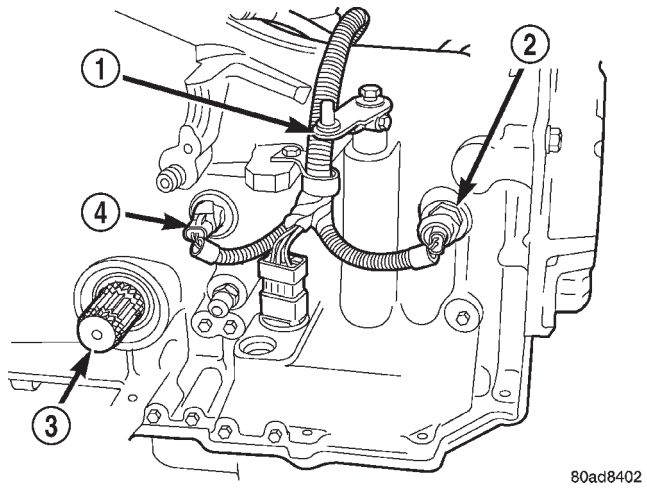


Fig. 89 Speed Sensor/Connector Location

1 – MANUAL SHIFT LEVER
2 – OUTPUT SPEED SENSOR
3 – LONG STUB SHAFT
4 – INPUT SPEED SENSOR

(2) Unscrew and remove the output speed sensor.

(3) Inpsect the speed sensor o-ring and replace if necessary (Fig. 90).

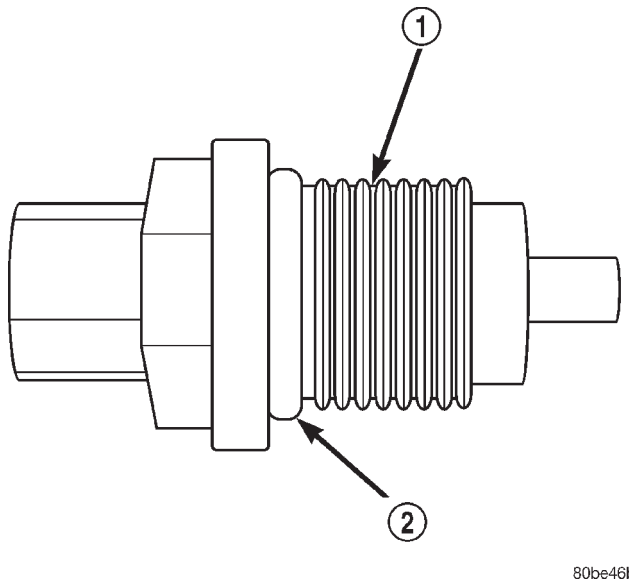


Fig. 90 O-Ring Location

1 – OUTPUT SPEED SENSOR
2 – O-RING

INSTALLATION

(1) Verify o-ring is installed into position (Fig. 90).

(2) Install and tighten output speed sensor to 27 N·m (20 ft. lbs.) torque.

(3) Connect speed sensor connector (Fig. 89).

(4) Connect battery negative cable.

TRANSMISSION CONTROL MODULE

REMOVAL

(1) Remove speed control servo (three fasteners).

(2) Remove windshield washer reservoir fill tube fastener.

(3) Remove one nut and screw holding transmission control module bracket to vehicle.

(4) Lift control module and bracket to gain access to 60-way connector.

(5) Loosen 60-way connector retaining screw, located in the center of the 60 way connector. Then disconnect the 60-way connector on transmission control module.

(6) Remove transmission control module mounting screws and lift module from vehicle (Fig. 91).

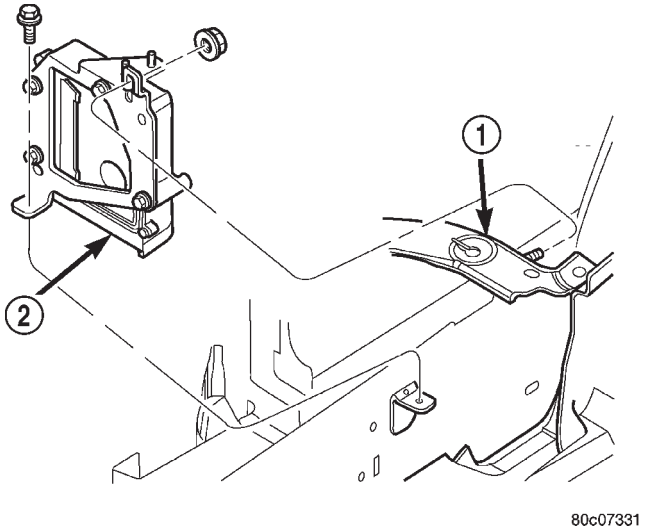


Fig. 91 Transmission Control Module (TCM)— Removal/Installation

1 – RADIATOR UPPER SUPPORT
2 – TCM

INSTALLATION

(1) Install transmission control module and tighten mounting screws.

(2) Install 60 way connector. Tighten 60-way retaining screw to 4 N·m (35 in. lbs.).

(3) Install one nut and screw holding transmission control module bracket to vehicle (Fig. 91). Torque screw to 6 N·m (45 in. lbs.). Torque nut to 12 N·m (107 in. lbs.) torque.

(4) Install windshield washer reservoir fill tube fastener.

(5) Install speed control servo (three fasteners).

REMOVAL AND INSTALLATION (Continued)

TRANSMISSION CONTROL RELAY

REMOVAL

(1) Open hood and locate power distribution center in the engine compartment.

(2) Remove power distribution center plastic cover.

(3) Pull relay out of power distribution center (Fig. 92).

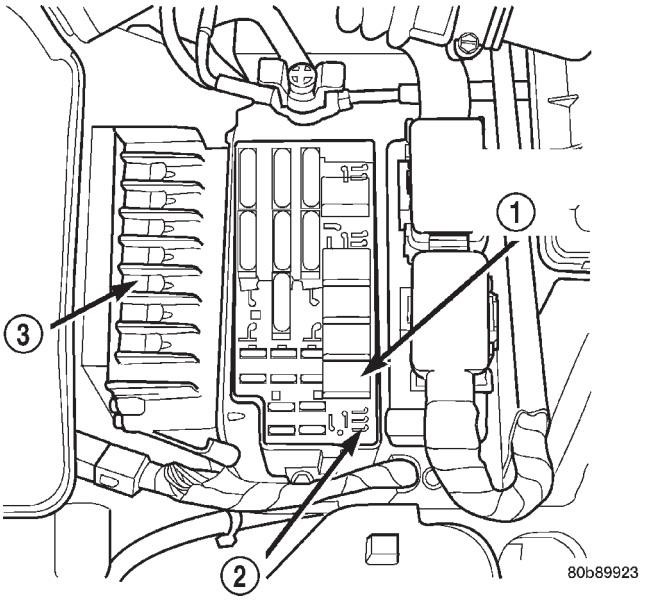


Fig. 92 Transmission Control Relay Location

1 – TRANSMISSION CONTROL RELAY
2 – PDC
3 – TCM

INSTALLATION

(1) To install, reverse removal procedure.

SOLENOID/PRESSURE SWITCH ASSEMBLY

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove valve body assembly from transaxle. Refer to Valve Body Removal and Installation in this section for procedure.

(3) Remove Solenoid/Pressure Switch Assembly retaining screws from solenoid (Fig. 93).

(4) Remove Solenoid/Pressure Switch Assembly and screen from valve body (Fig. 94).

INSTALLATION

(1) Install Solenoid/Pressure Switch Assembly and screen to the separator and transfer plates (Fig. 94).

(2) Install and tighten retaining screws (Fig. 93) to 6 N·m (53 in. lbs.) torque.

(3) Install valve body. Refer to Valve Body Removal and Installation.

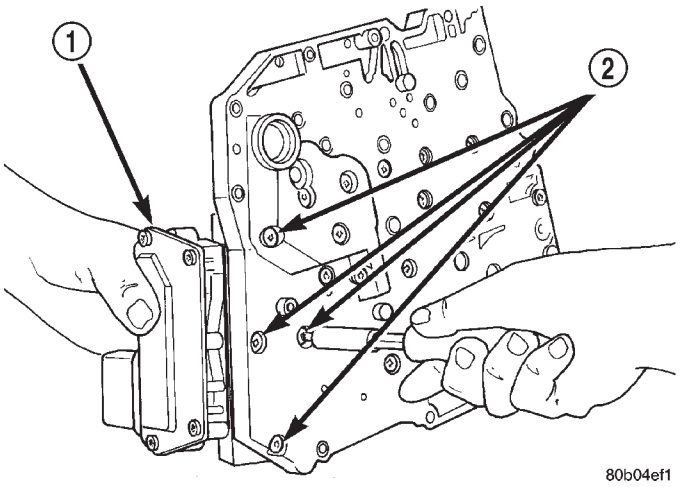


Fig. 93 Solenoid Retaining Screws

1 – SOLENOID PACK
2 – SOLENOID RETAINING SCREWS

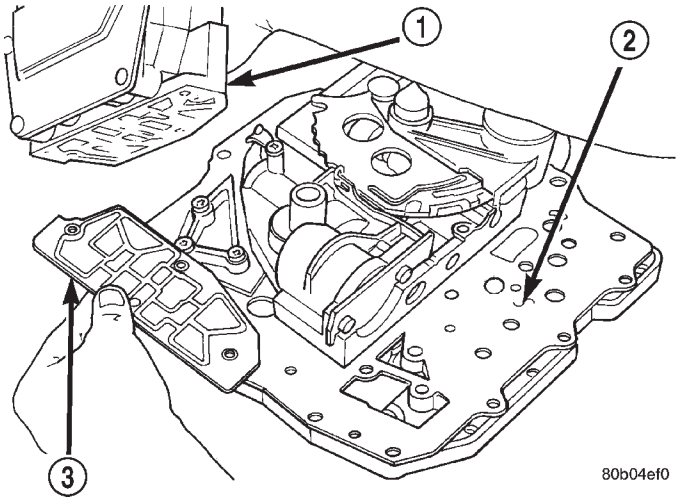


Fig. 94 Solenoid/Pressure Switch Assembly and Screen

1 – SOLENOID PACK
2 – VALVE BODY
3 – SCREEN

VALVE BODY

REMOVAL

(1) Disconnect the TRS wiring connector. The solenoid wiring connector can remain attached to the case.

(2) Disconnect the shift cable from the shift lever (at the transaxle).

(3) Move the shift lever clockwise as far as it will go. This should be one position past the L position. Then remove the shift lever.

(4) Remove transaxle pan bolts (Fig. 95).

REMOVAL AND INSTALLATION (Continued)

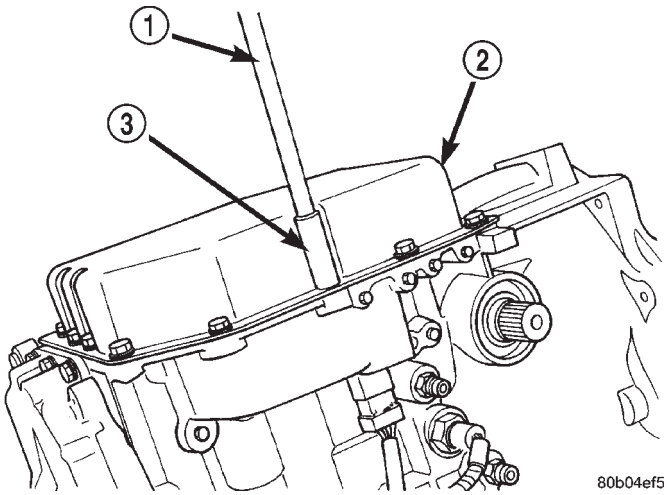


Fig. 95 Transaxle Oil Pan Bolts

1 – EXTENSION
2 – TRANSAXLE OIL PAN
3 – SOCKET

(5) Remove transaxle oil pan (Fig. 96). When reinstalling oil pan be sure that pan flange is clean and oil free. Apply a 1/8 inch bead of Mopar Silicone Sealer onto oil pan flange before installing.

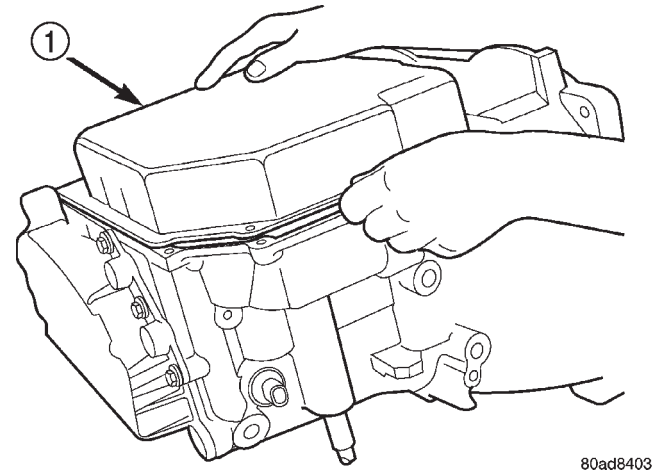


Fig. 96 Transaxle Oil Pan

1 – TRANSAXLE OIL PAN

(6) Remove oil filter from valve body (Fig. 97). It is held in place by two clips.

CAUTION: The 42LE transaxle oil filter is not interchangeable with the 41TE transaxle filter. Installation of a 41TE oil filter in a 42LE may cause transaxle damage.

(7) Remove valve body bolts-to-case (Fig. 98).

(8) Carefully remove valve body assembly from transaxle (Fig. 99).

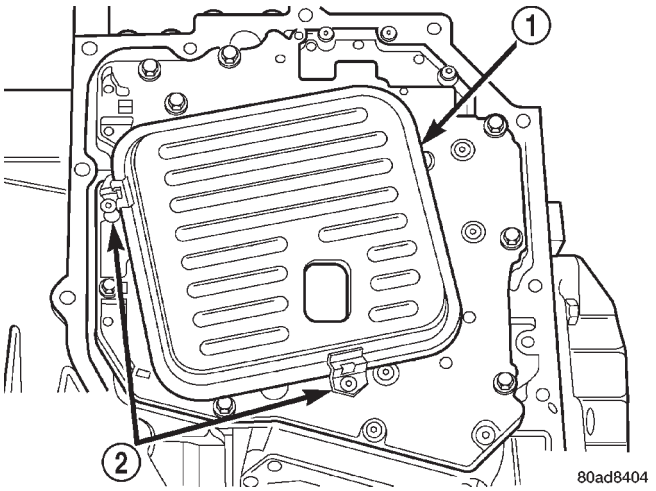


Fig. 97 Transaxle Oil Filter

1 – TRANSAXLE FILTER
2 – FILTER RETAINING CLIPS

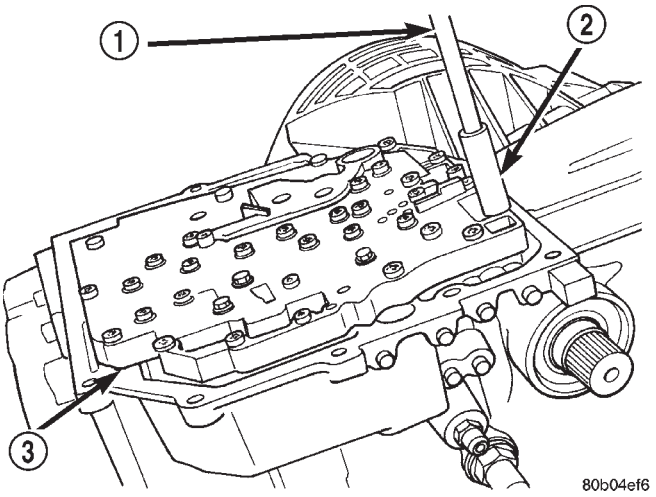


Fig. 98 Valve Body Bolts

1 – EXTENSION
2 – SOCKET
3 – VALVE BODY

CAUTION: The overdrive and underdrive accumulators and springs may fall out when removing the valve body.

INSTALLATION

(1) Install valve body into position and start bolts (Fig. 99).

(2) Torque valve body to transaxle case bolts (Fig. 98) to 12 N·m (105 in. lbs.) torque.

(3) Install transaxle oil filter (Fig. 97).

(4) Make sure oil pan and case rail are clean and dry. Install an 1/8” bead of RTV to the transaxle oil pan and install to case. Tighten bolts (Fig. 95) to 23 N·m (17 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

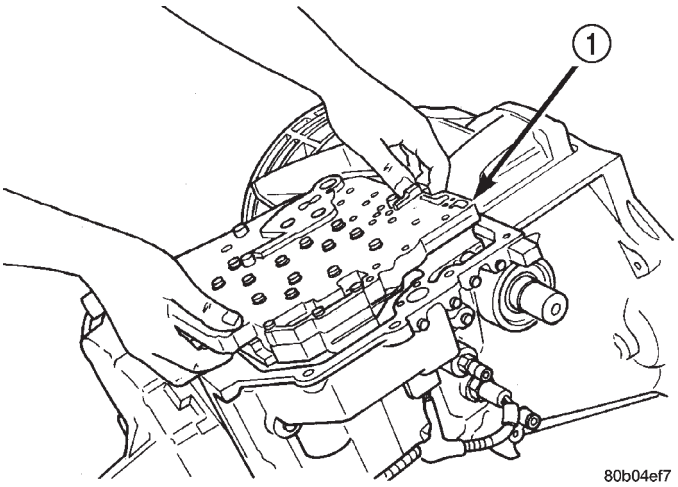


Fig. 99 Valve Body From Transaxle

1 – VALVE BODY

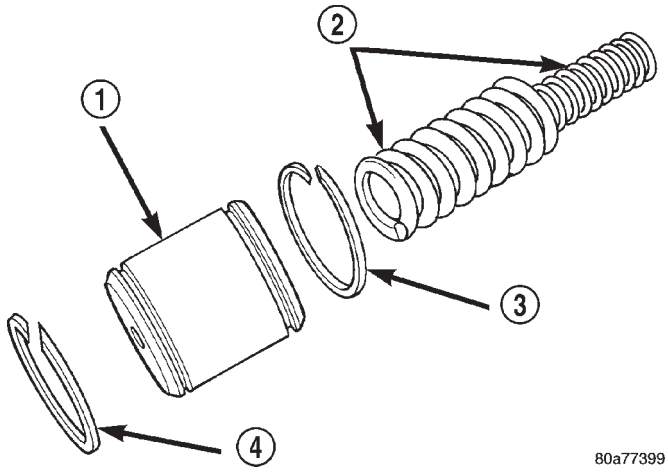


Fig. 100 Underdrive Accumulator and Spring

1 – ACCUMULATOR PISTON (UNDERDRIVE)
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

(5) Lower vehicle and connect the TRS connector.

TRANSAXLE

REMOVAL

The transaxle can be removed **without** having to remove the engine.

(1) Disconnect battery.
(2) Remove wiper blades.
(3) Remove right and left wiper module covers.
(4) Remove steel cowl/strut support.

CAUTION: Be careful of sharp edges around cowl/ wiper area.

(5) Remove engine air inlet tube.

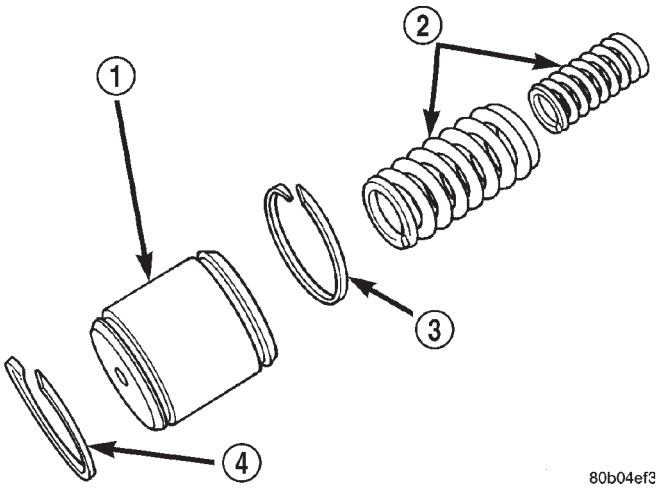


Fig. 101 Overdrive Accumulator and Springs

1 – OVERDRIVE ACCUMULATOR PISTON
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

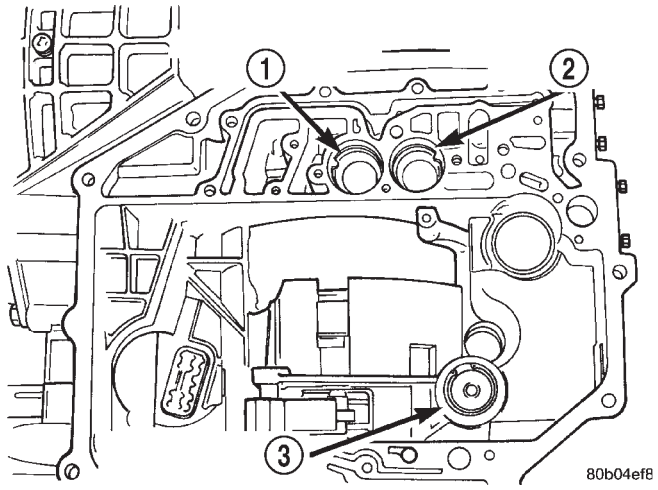


Fig. 102 Accumulator Locations

1 – OVERDRIVE ACCUMULATOR LOCATION
2 – UNDERDRIVE ACCUMULATOR LOCATION
3 – LOW/REVERSE ACCUMULATOR

(6) Remove transaxle harness connectors at cowl area.
(7) Remove upper bell housing stud nuts from bell housing studs. Detach heater hose tube and throttle body support bracket.
(8) Remove upper bell housing studs.
(9) Lift vehicle on hoist.
(10) Loosen clamps at intersection of rear exhaust system to front catalytic converter pipes.
(11) Separate rear exhaust from left catalytic converter pipe and right extension pipe.
(12) Remove rear exhaust system.

REMOVAL AND INSTALLATION (Continued)

(13) Remove nuts retaining exhaust pipes to transmission mount.

(14) Loosen clamp at right extension at right catalytic converter. Remove right extension.

(15) Disconnect crankshaft position sensor connector and remove sensor (Fig. 103). The sensor is located on the upper right side of the transaxle bell housing.

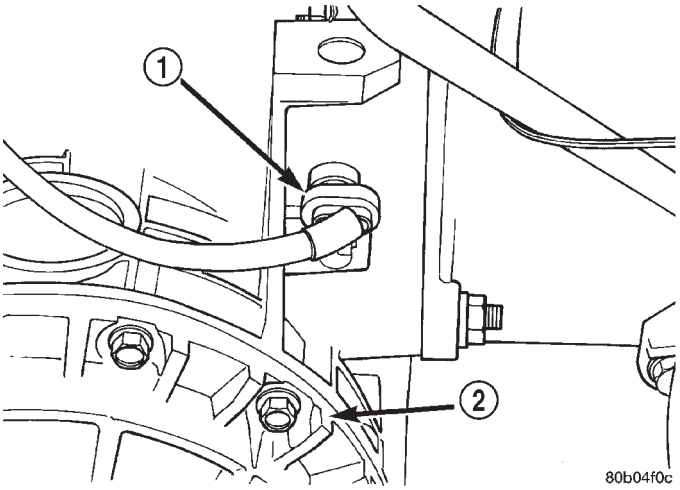


Fig. 103 Crankshaft Position Sensor Location

1 – CRANKSHAFT POSITION SENSOR
2 – DIFFERENTIAL COVER

(16) Remove dipstick tube.

(17) Disconnect the gear selector cable from the transaxle.

(18) Disconnect transmission range sensor connector. Disconnect input and output speed sensor connector.

(19) Disconnect and plug transaxle cooler lines at the transaxle.

(20) Remove lower control arm pinch bolts.

(21) Pry lower control arms down and out of steering knuckles.

CAUTION: Do not allow drive shaft or CV joint to hang freely. Internal joint damage may occur if allowed to hang freely.

CAUTION: Drive shaft retainer clips and seals located on the stub shafts must be replaced before reinstalling drive shafts.

(22) Using a pry bar, disconnect the inner tripod joints from the transaxle (Fig. 104).

(23) Pull bottom of knuckles and drive shafts outward to allow clearance during transaxle removal. The drive shafts do not have to be completely removed from the vehicle. **Do not allow the inner tripod joints to hang unsupported or joint damage may occur.**

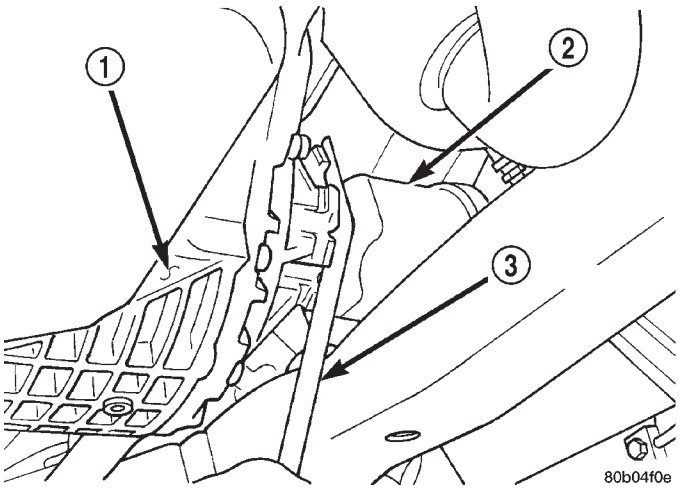


Fig. 104 Drive Shaft Removal

1 – TRANSAXLE DIFFERENTIAL
2 – DRIVE SHAFT
3 – PRY BAR

(24) Disconnect O2 sensor wiring and remove left catalytic converter pipe.

(25) Unbolt starter assembly. Do not disconnect wiring or completely remove the starter from the vehicle. Allow the starter to sit between the engine and the frame.

(26) Remove engine oil pan collar.

(27) Remove torque converter bolts. The torque converter is indexed to the flex plate. Mark the torque converter location to ensure that the torque converter is reinstalled correctly.

CAUTION: The drive plate to torque converter bolts and the drive plate to crankshaft bolts must not be reused. Install new bolts whenever these bolts are removed.

(28) Place a transmission jack under the transaxle. Secure the transaxle to the jack.

(29) Raise transaxle slightly to relieve the weight on the rear transaxle mount.

NOTE: Bolts for the crossmember bridge are different lengths, side to side.

(30) Remove rear crossmember bridge bolts.

(31) Remove rear mount adapter plate mounting bolts.

(32) Remove the rear crossmember bridge, mount, and adapter plate as an assembly.

(33) Lower the rear of the transaxle to gain access to the bell housing bolts.

(34) Remove side bell housing bolts.

(35) Remove dipstick tube from transaxle. Be prepared to plug the dipstick hole when removing dipstick to prevent fluid from spilling out of the transaxle.

REMOVAL AND INSTALLATION (Continued)

(36) Remove connector on top of transaxle for solenoid pack.

(37) The transaxle can now be lowered from the vehicle.

INSTALLATION

(1) When installing transaxle, reverse the above procedure.

CAUTION: To prevent damage to the structural collar, hand tighten all fasteners. This will ensure that the collar is flush against transmission and oil pan before torquing to specifications.

(2) If the torque converter is being replaced, apply a light coating of grease to the crankshaft pilot hole.

(3) Inspect the drive plate for cracks before reinstalling transaxle. If any cracks are found replace the drive plate. Do not attempt to repair a cracked drive plate.

CAUTION: The bolts for the torque converter are a new short-headed design. Bolts from previous year vehicles cannot be used.

(4) Always use new torque converter to drive plate bolts.

NOTE: If the transaxle assembly, TCM, solenoid pack or clutch plates have been replaced, refer to Quick Learn Procedure. This program will allow the transmission control module to compensate for any parts replaced in the electronic transaxle system.

(5) Check and/or adjust gearshift cable. Refer to Shift Linkage in this section for procedure.

(6) Refill transaxle with Mopar ATF Plus 3 (Automatic Transmission Fluid) Type 7176.

OIL PUMP SEAL REPLACEMENT

The transaxle must be removed from the vehicle to replace this oil seal.

REMOVAL

(1) Remove the transaxle from the vehicle.

(2) Remove the torque converter from the transaxle bellhousing.

(3) Use special tool C-3981B to remove oil pump seal (Fig. 105).

INSTALLATION

(1) Clean and inspect oil pump seal seat. Then install seal using special tool C-4193A (Fig. 106).

(2) Clean and inspect torque converter hub. If nicks, scratches or hub wear are found, torque converter replacement will be required.

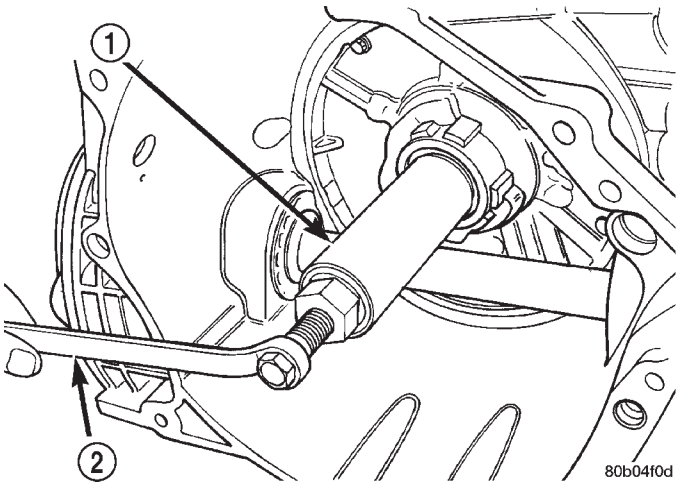


Fig. 105 Oil Seal Removal

1 – SPECIAL TOOL C-3981B
2 – WRENCH

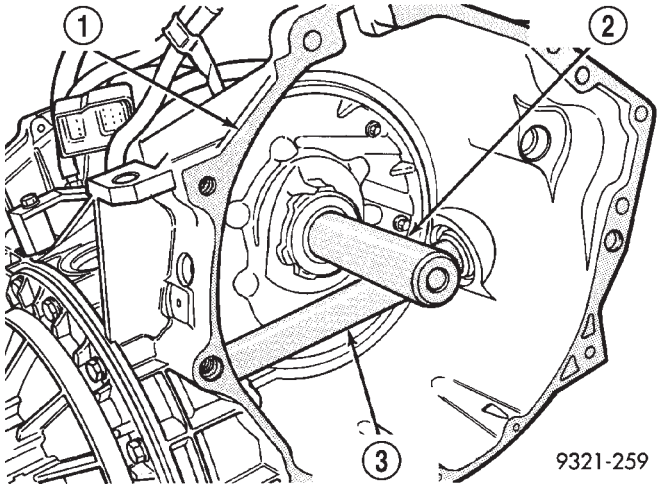


Fig. 106 Oil Seal Installation

1 – TRANSAXLE BELL HOUSING
2 – SPECIAL TOOL C-4193A
3 – LONG STUB SHAFT

CAUTION: If the torque converter is being replaced, apply a light coating of grease to the crankshaft pilot hole. Also inspect the engine drive plate for cracks. If any cracks are found replace the drive plate. Do not attempt to repair a cracked drive plate. Always use new torque converter to drive plate bolts.

(3) Apply a light film of transmission oil to the torque converter hub and oil seal lips. Then install torque converter into transaxle. Be sure that the hub lugs mesh with the front pump lugs when installing.

(4) Reinstall the transaxle into the vehicle.

REMOVAL AND INSTALLATION (Continued)

TRANSFER SHAFT SEAL REPLACEMENT

If it has been diagnosed that one or both of the transfer shaft seals are leaking, the following procedure can be used to replace failed seals. This procedure will allow the technician to replace the seals without having to set backlash and measure differential bearing turning torque.

CAUTION: The transfer shaft rear shim, bearing cups and cones, differential bearings and the differential adjusters must be reused to use this procedure. If any of the items listed above require replacement, refer to Differential Recondition section of this manual.

(1) Remove transaxle from vehicle. Refer to Transaxle Removal and Installation procedure in this section.
(2) Remove valve body from transaxle.
(3) Remove solenoid connector from transaxle case.
(4) Remove long stub shaft from transaxle (Fig. 107).

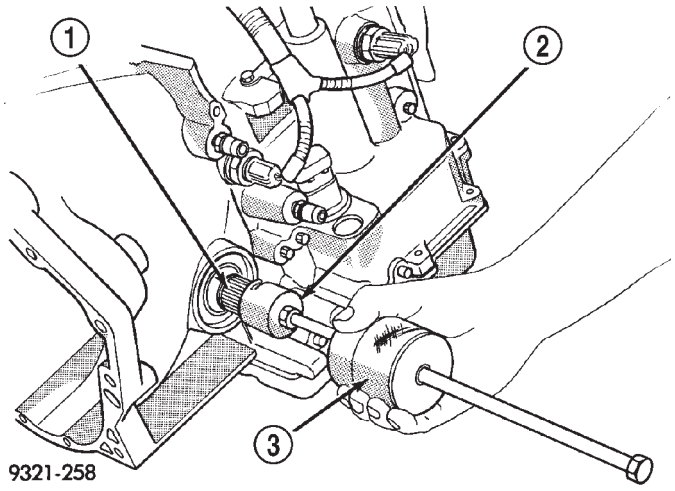


Fig. 107 Long Stub Shaft Removal

1 – LONG STUB SHAFT
2 – SPECIAL TOOL 6669
3 – SLIDE HAMMER C-3752

(5) Index the inner differential adjuster with a cross hair as shown in (Fig. 108).

CAUTION: If short stub shaft has corrosion, use caution when removing differential cover. Inspect seal and shaft for damage after removal of cover. Replace shaft and/or seal as required.

(6) Index outer adjuster (Fig. 109). Remove lock bracket and back out adjuster exactly one revolution. Then remove differential cover.
(7) Remove The inner adjuster lock bracket. Then remove the inner adjuster.

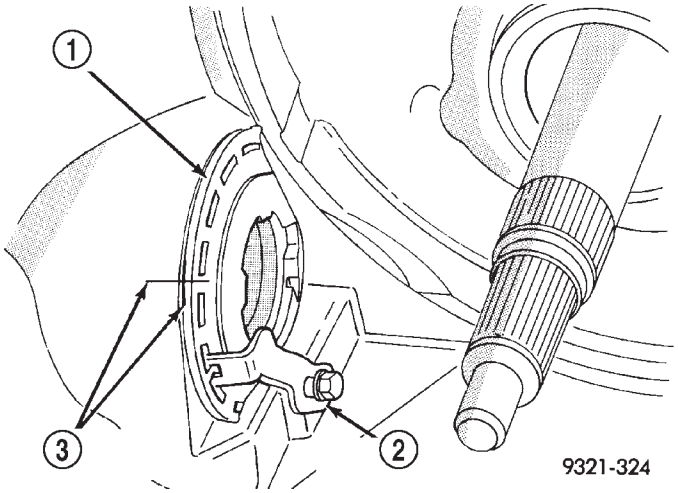


Fig. 108 Indexing Inner Adjuster

1 – INNER ADJUSTER
2 – ADJUSTER LOCK
3 – CROSS HAIR MARKS

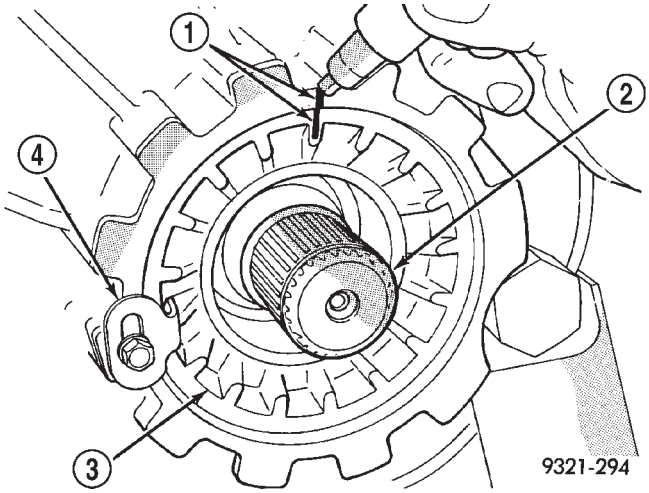


Fig. 109 Indexing Outer Adjuster

1 – INDEXING MARKS
2 – STUB SHAFT
3 – OUTER ADJUSTER
4 – ADJUSTER LOCK

CAUTION: Keep the inner adjuster for reinstallation.

(8) Remove the transfer shaft nut, rear cone, rear cup, oil baffle, rear shim, transfer shaft and transfer shaft seals. Refer to appropriate procedures within this section for detailed removal and installation procedures if required.

CAUTION: Keep rear shim and rear bearing cup cone for reinstallation.

REMOVAL AND INSTALLATION (Continued)

(9) Install transfer shaft, transfer shaft seals, oil baffle, rear cup, rear shim, rear cone and a new nut. Refer to appropriate procedures within this section for detailed removal and installation procedures if required.

(10) Install a new o-ring onto the inner adjuster.

(11) Lube inner adjuster threads and o-ring with gear oil and reinstall to the cross haired index marks.

(12) Reinstall the inner adjuster locking bracket.

(13) Install the differential carrier. Install stub shaft seal protector.

(14) Install the differential cover/outer adjuster assembly with Mopar Silicone Sealant applied. Install and tighten differential cover bolts.

(15) Tighten the outer adjuster 3/4 of a turn. Seat bearings by turning differential carrier three or four turns in both directions. Finish tightening the adjuster 1/4 turn to its index mark (original location).

(16) Reinstall the outer adjuster locking bracket.

LONG STUB SHAFT SEAL REPLACEMENT

If it has been diagnosed that the long stub shaft seal is leaking, the following procedure can be used to replace failed seal. This procedure will allow the replacement of the seals without having to set backlash and measure differential bearing turning torque.

CAUTION: The differential bearings and the differential adjusters must be reused in order to use this procedure. If any of the items listed above require replacement, this procedure cannot be used. Refer to Differential Recondition section of this manual.

(1) Remove transaxle from vehicle. Refer to Transaxle Removal and Installation procedure in this section.

(2) Remove long stub shaft from transaxle (Fig. 110).

To replace the long stub shaft bearing, install stub shaft in soft-jawed vise. Remove the stub shaft bearing C-clip (Fig. 111). Install bearing splitter onto the shaft. Install Special Tool # P-334 under the bearing. Using a shop press, remove the bearing from the stub shaft (Fig. 112).

To install the stub shaft bearing, position new bearing onto the stub shaft. Install stub shaft into shop press. Position Special Tool # 6558 above bearing. Press bearing onto shaft (Fig. 113).

(3) Index the inner differential adjuster with a cross hair as shown in (Fig. 114).

CAUTION: If short stub shaft has corrosion, use caution when removing differential cover. Inspect seal and shaft for damage after removal of cover. Replace shaft and/or seal as required.

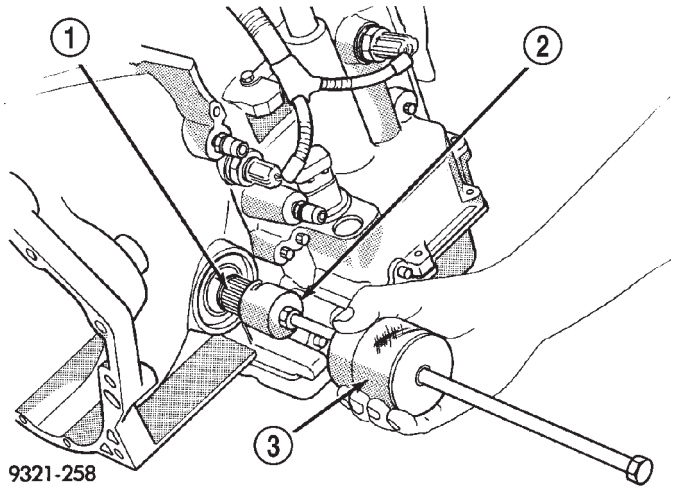


Fig. 110 Long Stub Shaft Removal

1 – LONG STUB SHAFT
2 – SPECIAL TOOL 6669
3 – SLIDE HAMMER C-3752

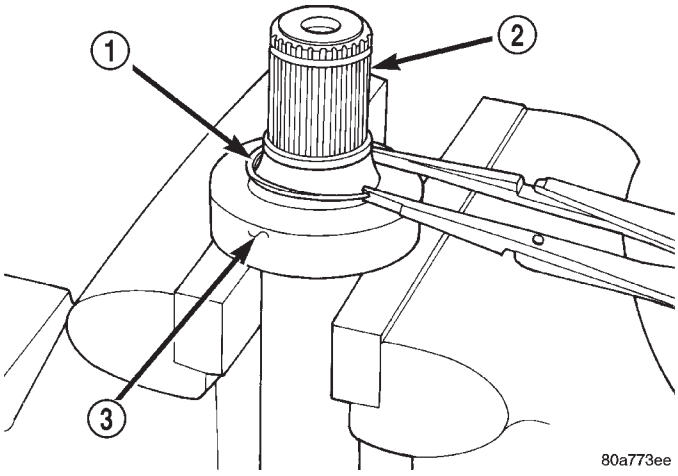


Fig. 111 Stub Shaft Bearing C-clip

1 – C-CLIP
2 – LONG STUB SHAFT
3 – STUB SHAFT BEARING

(4) Index outer adjuster (Fig. 115). Remove lock bracket and back out adjuster exactly one revolution. Then remove differential cover.

(5) Remove The inner adjuster lock bracket. Then remove the inner adjuster.

CAUTION: Keep the inner adjuster for reinstallation.

(6) Lube inner adjuster threads with gear oil and reinstall to the cross haired index marks.

(7) Install the differential carrier. Then install stub shaft seal protector.

(8) Install the differential cover/outer adjuster assembly with sealant applied. Install and tighten differential cover bolts.

REMOVAL AND INSTALLATION (Continued)

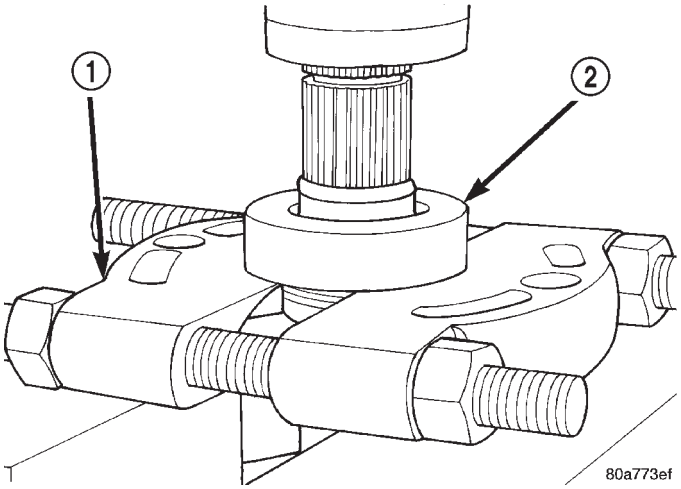


Fig. 112 Remove Stub Shaft Bearing C-clip

1 – BEARING SPLITTER
2 – STUB SHAFT BEARING

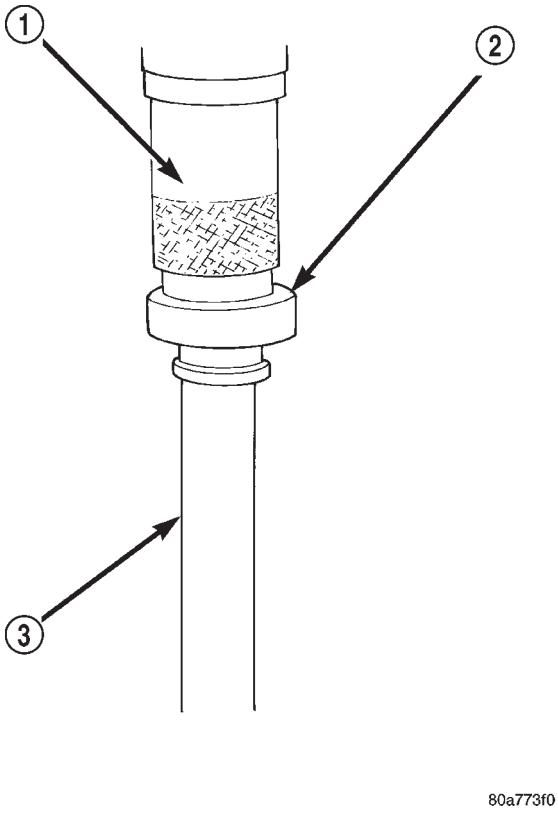


Fig. 113 Install Bearing Onto Shaft

1 – TOOL 6558
2 – STUB SHAFT BEARING
3 – STUB SHAFT

(9) Tighten the outer adjuster 3/4 of a turn. Seat bearings by turning differential carrier three or four turns in both directions. Finish tightening the adjuster 1/4 turn to its index mark (original location).

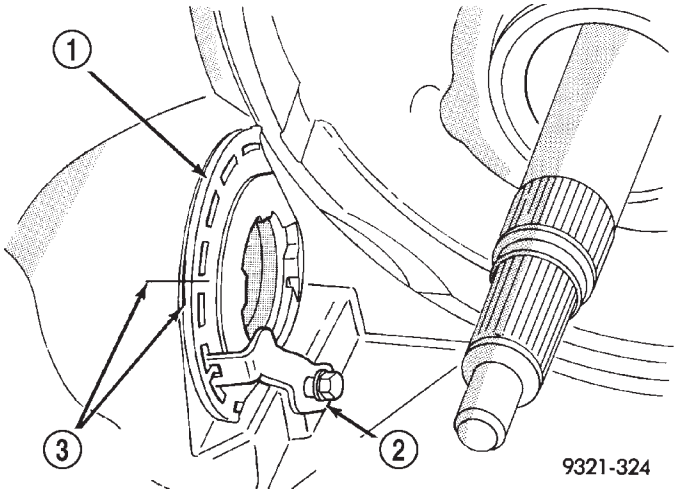


Fig. 114 Indexing Inner Adjuster

1 – INNER ADJUSTER
2 – ADJUSTER LOCK
3 – CROSS HAIR MARKS

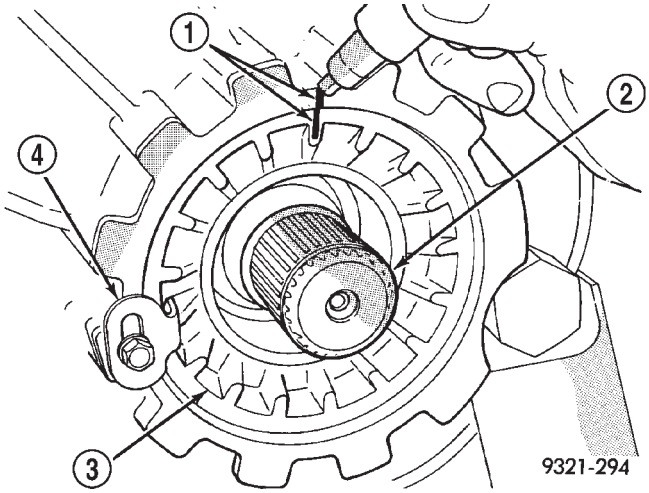


Fig. 115 Indexing Outer Adjuster

1 – INDEXING MARKS
2 – STUB SHAFT
3 – OUTER ADJUSTER
4 – ADJUSTER LOCK

(10) Reinstall long stub shaft, fill differential with fluid and reinstall transaxle.

(11) After installing transaxle check transmission side fluid level.

SHORT STUB SHAFT SEAL REPLACEMENT

The following procedure can be used to replace the short stub shaft seal without having to remove the transaxle from the vehicle. If the adjuster or bearing located behind the adjuster require replacement, do not use this procedure. Refer to Differential Recondition section of this manual.

REMOVAL AND INSTALLATION (Continued)

(1) Place vehicle in neutral and lift vehicle on hoist.
(2) Remove short driveshaft.
(3) Index the outer adjuster (Fig. 116).

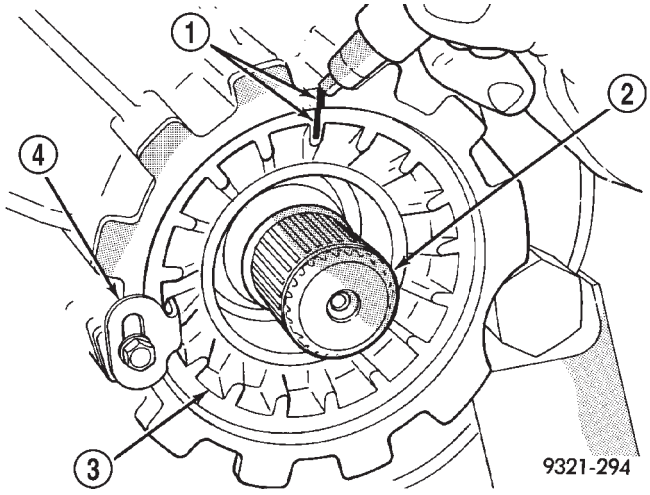


Fig. 116 Indexing Outer Adjuster

1 – INDEXING MARKS
2 – STUB SHAFT
3 – OUTER ADJUSTER
4 – ADJUSTER LOCK

(4) Remove outer adjuster lock (Fig. 117).

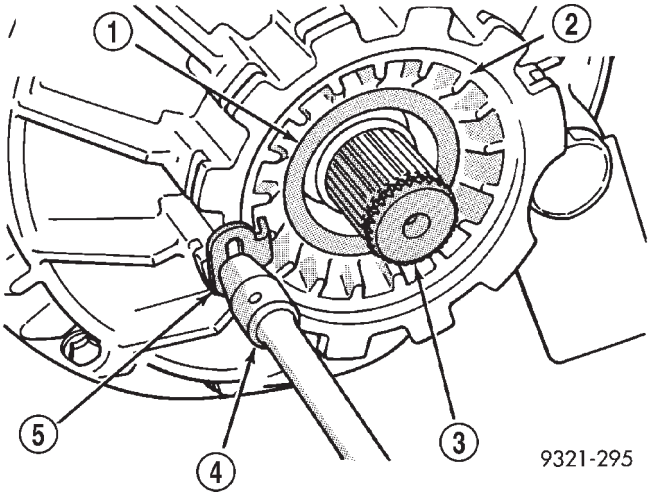


Fig. 117 Outer Adjuster Lock Removal

1 – OIL SEAL
2 – OUTER ADJUSTER
3 – STUB SHAFT
4 – SOCKET
5 – ADJUSTER LOCK

(5) Using special tool 6503 loosen outer adjuster, then retighten to the index mark using a torque wrench. Record the amount of torque required to return the index marks to their original location. Remove the adjuster.

(6) Use special tool 6558 to remove old seal and install new seal (Fig. 118).

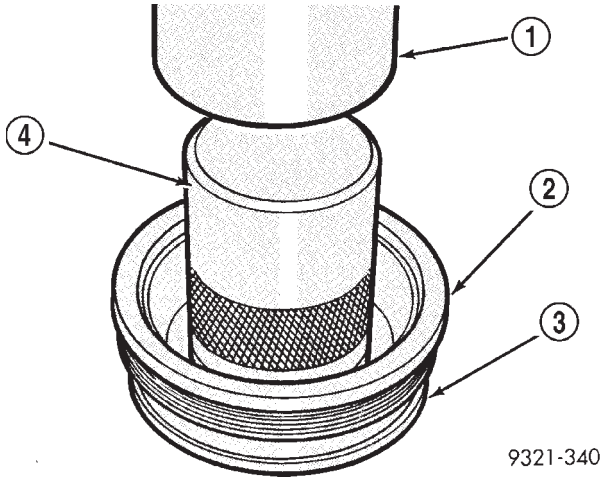


Fig. 118 Seal Removal and Installation

1 – ARBOR PRESS
2 – OUTER DIFFERENTIAL ADJUSTER
3 – O-RING
4 – SPECIAL TOOL 6558

(7) Inspect stub shaft for corrosion (Fig. 119). If corrosion exists, wrap stub shaft with wax paper and install seal protector over wax paper.

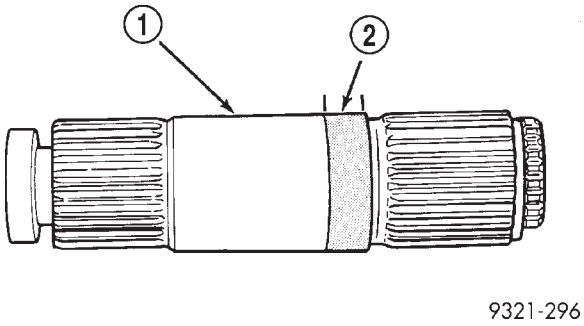


Fig. 119 Stub Shaft Corrosion

1 – STUB SHAFT
2 – CORROSION AREA

(8) Lube O-ring, threads on adjuster, seal protector and seal lips with gear oil before installing.
(9) Install outer adjuster into transaxle case and tighten adjuster within 10 ft. lbs. of the torque reading recorded in step five.
(10) Rotate ring gear three or four revolutions in both directions to seat differential bearings.
(11) Continue tightening outer adjuster until index marks line up (original location).
(12) Install adjuster lock.
(13) Install new driveshaft retaining circlip and O-ring on stub shaft. Then reinstall driveshaft.
(14) Check fluid level in differential and adjust as required.
(15) Road test and recheck for leaks as required.

DISASSEMBLY AND ASSEMBLY

VALVE BODY

DISASSEMBLY

(1) Remove manual shaft seal.
(2) Remove manual shaft screw (Fig. 120).

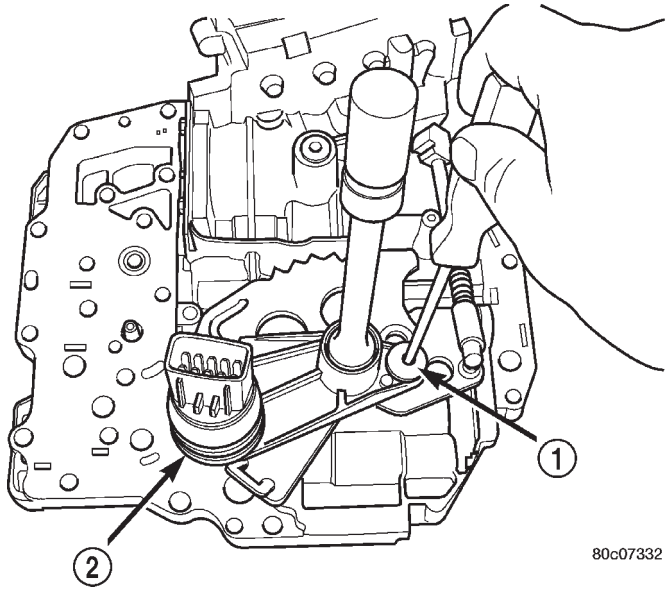


Fig. 120 TRS/Manual Shaft Retaining Screw

1 – SCREW
2 – TRS

(3) Remove Transmission Range Sensor (TRS) and manual shaft (Fig. 121).

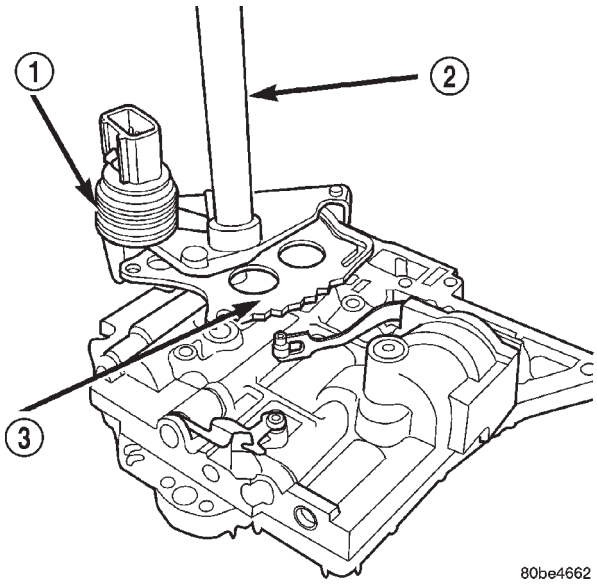


Fig. 121 Manual Shaft/Rooster Comb and Transmission Range Sensor

1 – TRANSMISSION RANGE SENSOR
2 – MANUAL SHAFT
3 – ROOSTER COMB

(4) Remove Solenoid/Pressure Switch Assembly from valve body (Fig. 122).

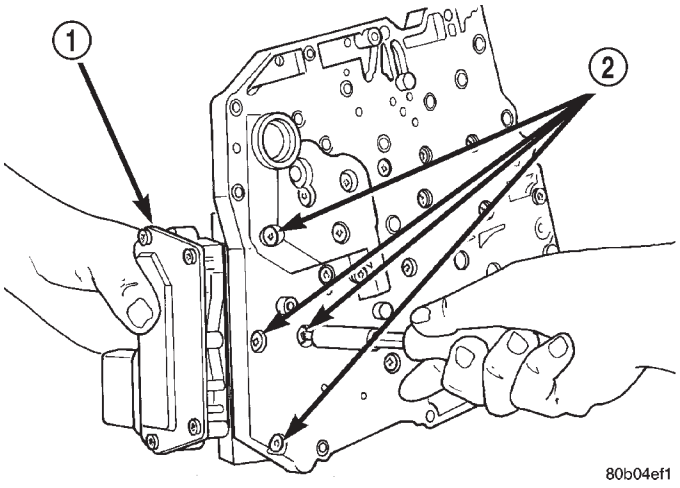


Fig. 122 Solenoid/Pressure Switch Assembly Location

1 – SOLENOID PACK
2 – SOLENOID RETAINING SCREWS

(5) Remove valve body stiffener plate (Fig. 123).

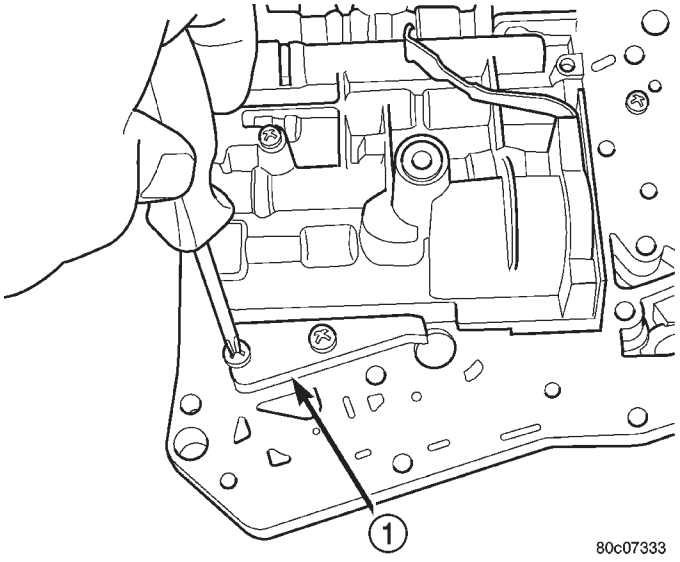


Fig. 123 Stiffener Plate

1 – STIFFENER PLATE

(6) Invert valve body assembly and remove transfer plate-to-valve body screws (Fig. 124).
(7) Remove transfer/separator plate from valve body (Fig. 125)
(8) Remove separator plate-to-transfer plate screws (Fig. 126).
(9) Remove separator plate from transfer plate (Fig. 127).
(10) Remove oil screen (Fig. 128) from transfer plate.

DISASSEMBLY AND ASSEMBLY (Continued)

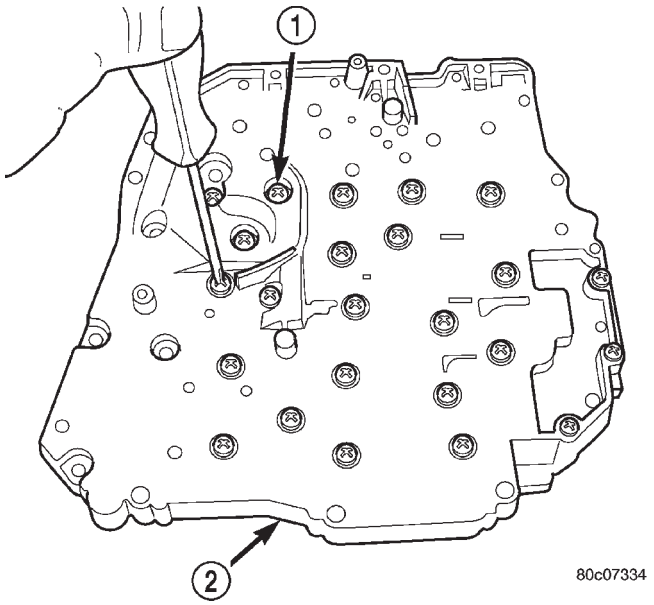


Fig. 124 Transfer Plate-to-Valve Body Screws

1 – SCREW (24)
2 – TRANSFER PLATE

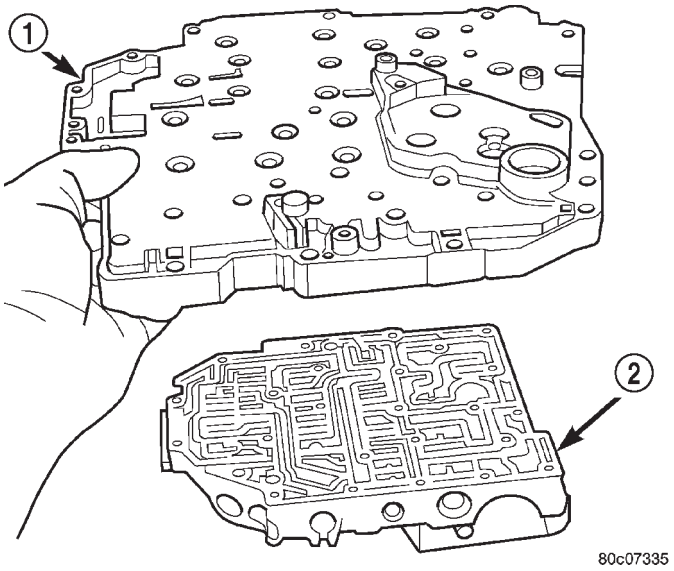


Fig. 125 Transfer Plate and Valve Body

1 – TRANSFER PLATE
2 – VALVE BODY

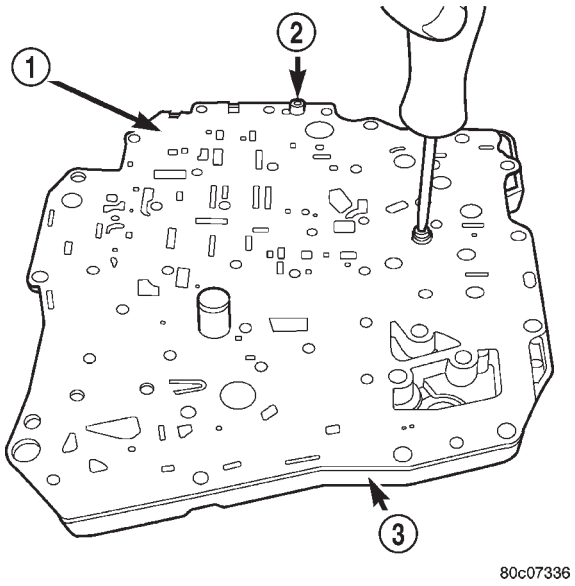


Fig. 126 Separator Plate-to-Transfer Plate Screws

1 – SEPARATOR PLATE
2 – SCREW (2)
3 – TRANSFER PLATE

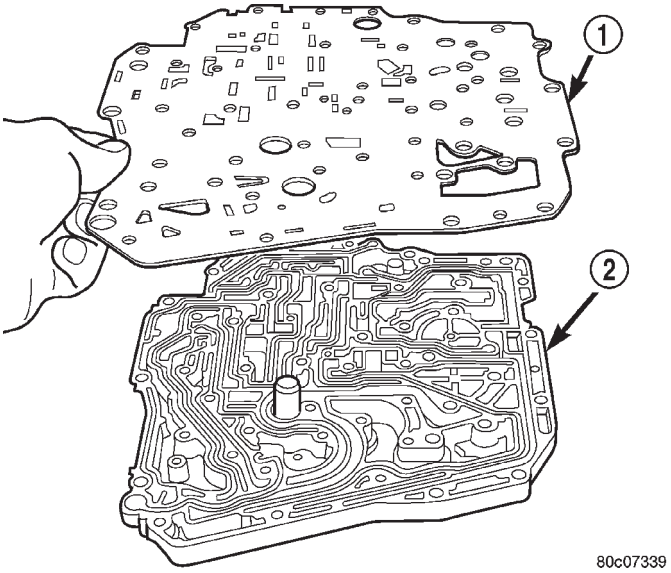


Fig. 127 Separator Plate

1 – SEPARATOR PLATE
2 – TRANSFER PLATE

(11) Remove thermal valve (Fig. 129) from transfer plate.

(12) Remove valve body check balls. Note their location for assembly ease (Fig. 130).

(13) Remove 2/4 accumulator assembly as shown in (Fig. 131).

(14) Remove dual retainer plate from valve body. Use special tool 6301 to remove plate (Fig. 132).

DISASSEMBLY AND ASSEMBLY (Continued)

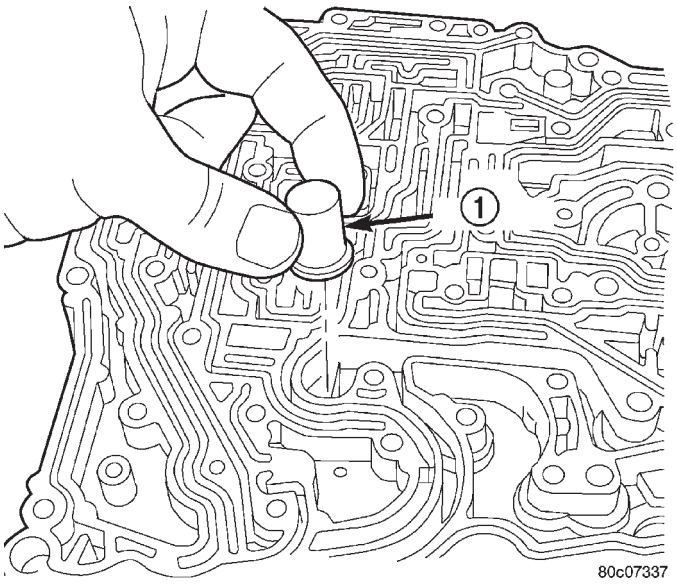


Fig. 128 Oil Screen

1 – OIL SCREEN

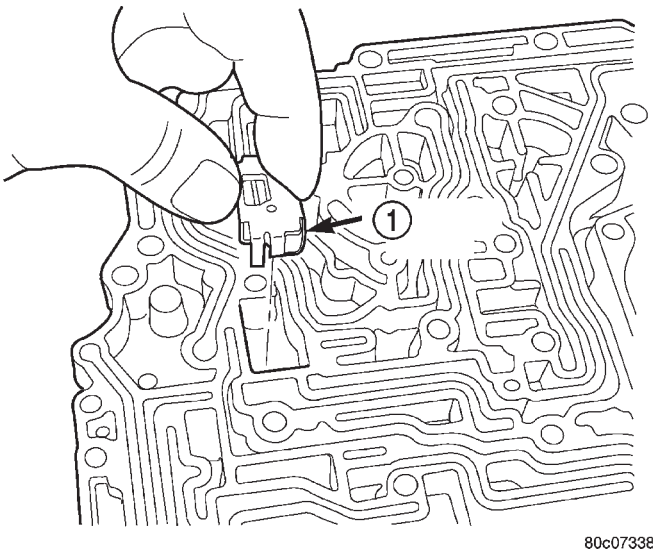


Fig. 129 Thermal Valve

1 – THERMAL VALVE

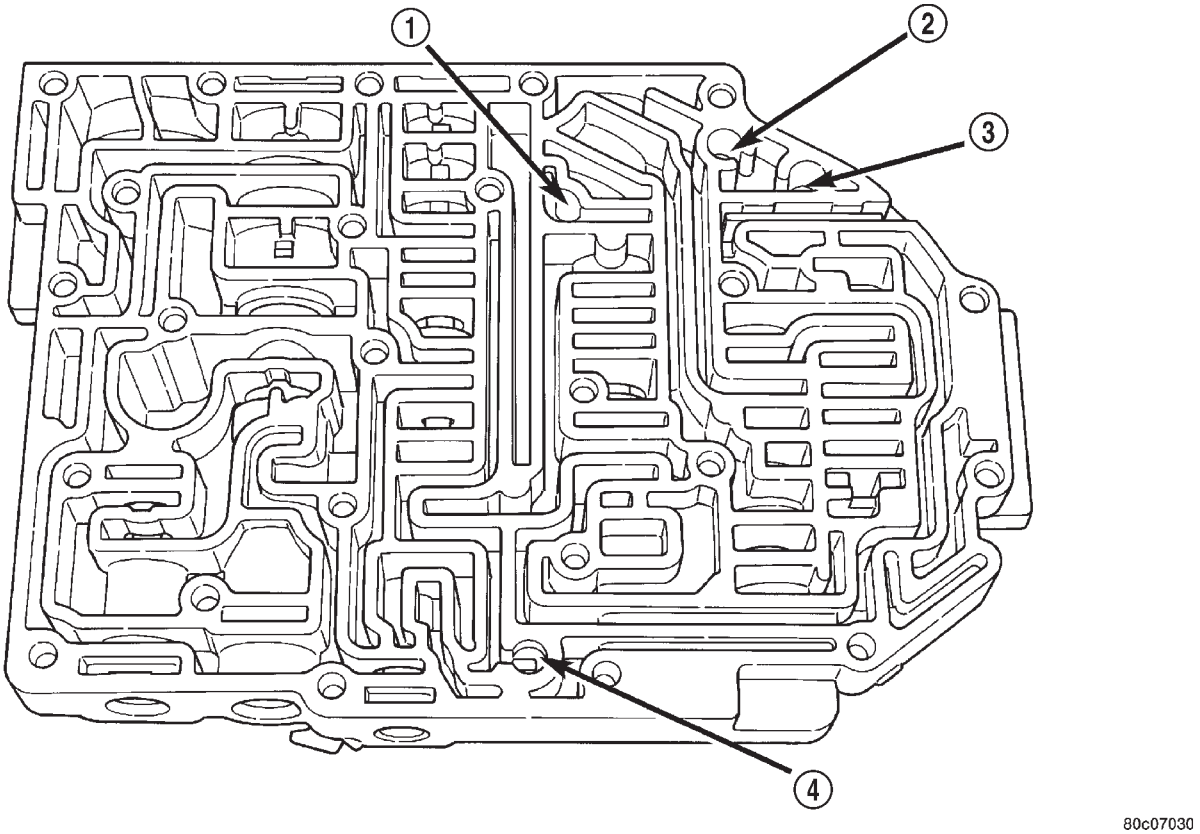


Fig. 130 Ball Check Location

1 – (#4) BALL CHECK LOCATION
2 – (#2) BALL CHECK LOCATION
3 – (#5) BALL CHECK LOCATION
4 – (#3) BALL CHECK LOCATION

DISASSEMBLY AND ASSEMBLY (Continued)

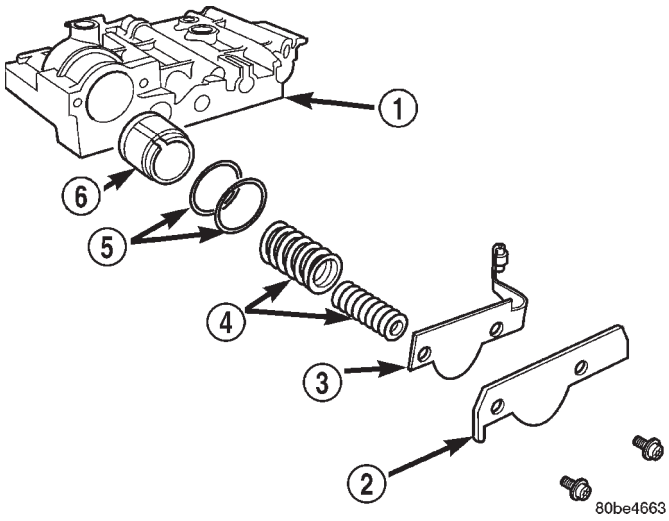


Fig. 131 2/4 Accumulator Assembly

1 – VALVE BODY
2 – RETAINER PLATE
3 – DETENT SPRING
4 – SPRINGS
5 – SEALS
6 – PISTON

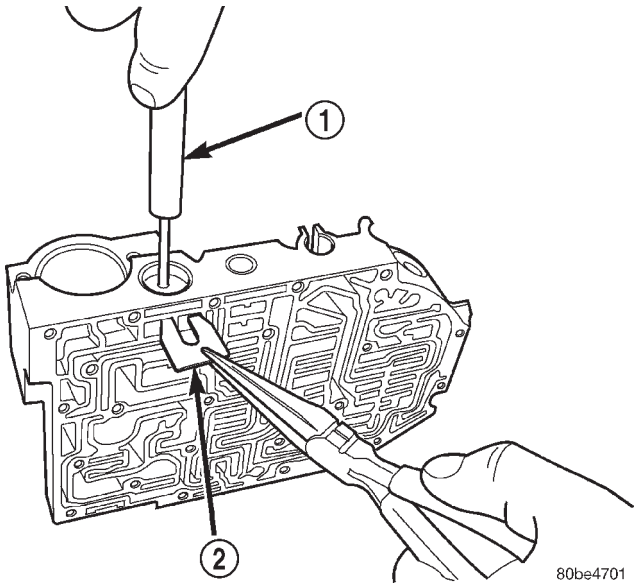


Fig. 133 Remove Regulator Valve Spring Retainer using Tool 6302

1 – TOOL 6302
2 – RETAINER

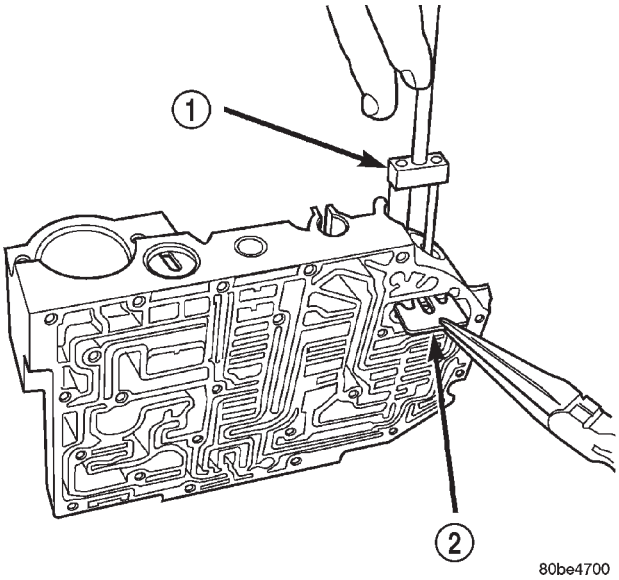


Fig. 132 Remove or Install Dual Retainer Plate

1 – TOOL 6301
2 – RETAINER

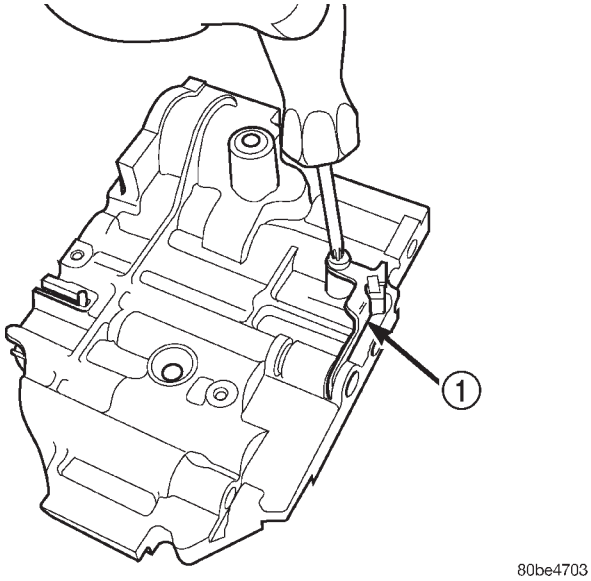


Fig. 134 Remove Vent Reservoir Check Valve Retainer

1 – RETAINER

(15) Remove regulator valve spring retainer (Fig. 133).

(16) Remove the vent reservoir check valve retainer (Fig. 134).

(17) Remove vent reservoir check valve and spring (Fig. 135).

(18) Remove remaining retainers as shown in (Fig. 136).

(19) Remove valves and springs as shown in (Fig. 137).

(20) Cleanliness through entire disassembly and assembly of the valve body cannot be overemphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. **Do not wipe parts with shop towels.** All mating surfaces in the valve body are accurately machined; therefore, careful handling of all parts must be exercised to avoid nicks or burrs.

DISASSEMBLY AND ASSEMBLY (Continued)

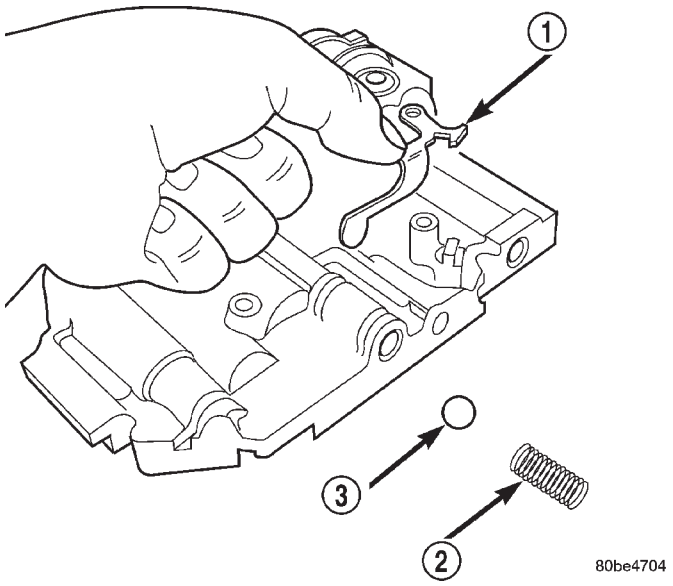


Fig. 135 Vent Reservoir Check Valve and Spring

1 – RETAINER
2 – SPRING
3 – BALL

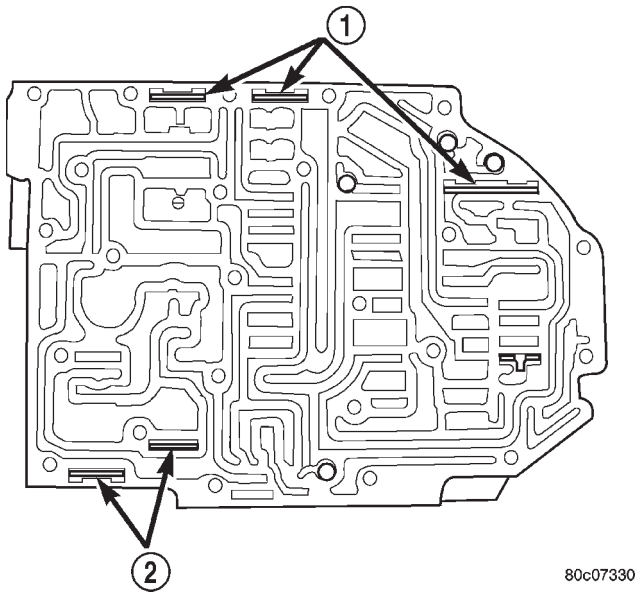


Fig. 136 Valve Retainer Location

1 – RETAINER
2 – RETAINER

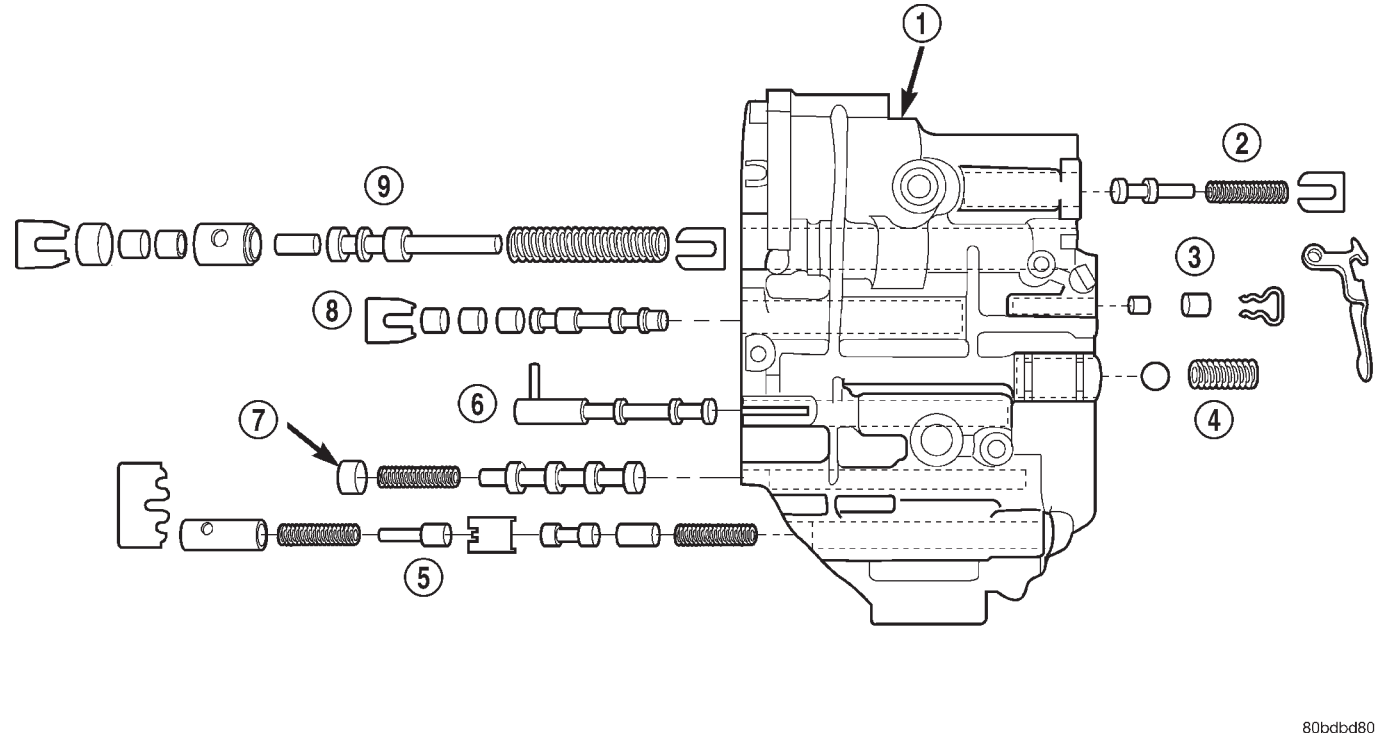


Fig. 137 Springs and Valves Location

1 – VALVE BODY
2 – T/C REGULATOR VALVE
3 – L/R SWITCH VALVE
4 – VENT RESERVOIR CHECK VALVE
5 – CONVERTER CLUTCH CONTROL VALVE
6 – MANUAL VALVE
7 – CONVERTER CLUTCH SWITCH VALVE
8 – SOLENOID SWITCH VALVE
9 – REGULATOR VALVE

DISASSEMBLY AND ASSEMBLY (Continued)

ASSEMBLY

(1) Install valves and springs as shown in (Fig. 137).

(2) Install regulator valve spring retainer (Fig. 138).

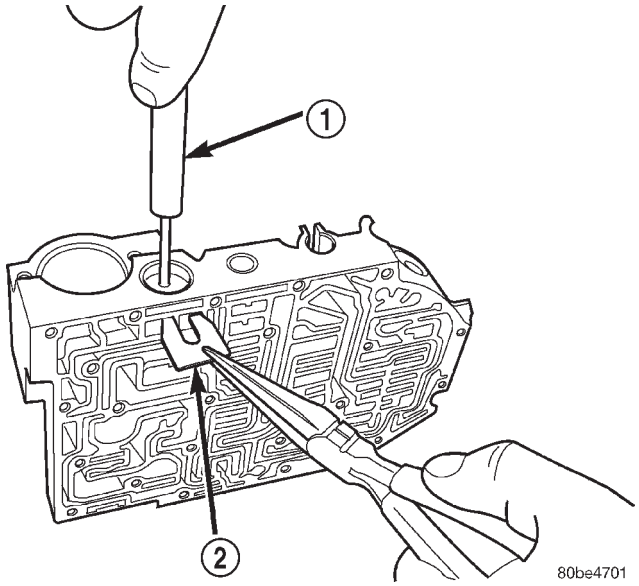


Fig. 138 Install Regulator Valve Spring Retainer using Tool 6302

1 – TOOL 6302
2 – RETAINER

(3) Install dual retainer plate using Tool 6301 (Fig. 139).

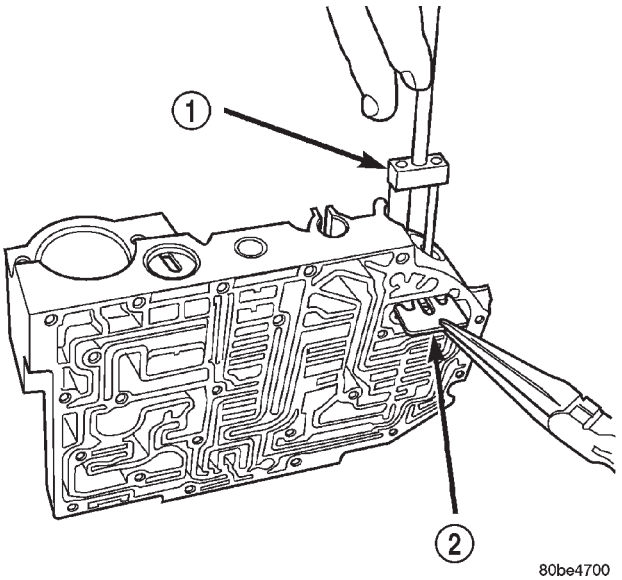


Fig. 139 Install Dual Retainer Plate using Tool 6301

1 – TOOL 6301
2 – RETAINER

(4) Install vent reservoir check valve and spring (Fig. 140).

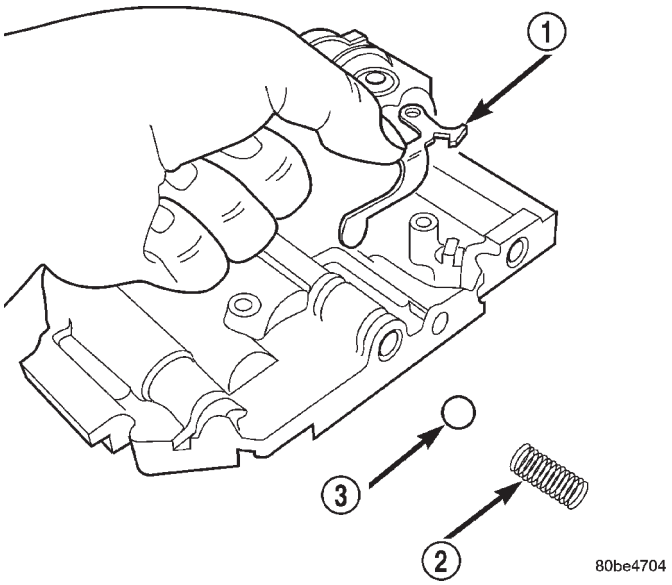


Fig. 140 Vent Reservoir Check Valve and Spring

1 – RETAINER
2 – SPRING
3 – BALL

(5) Install the vent reservoir check valve retainer (Fig. 141).

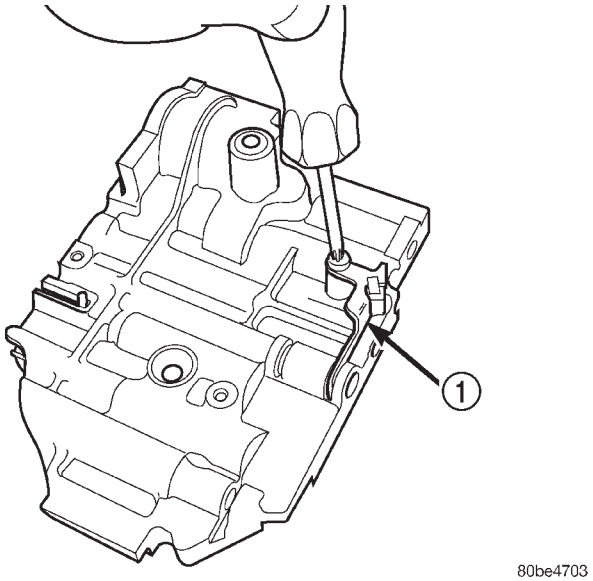


Fig. 141 Install Vent Reservoir Check Valve Retainer

1 – RETAINER

(6) Verify that all retainers are installed as shown in (Fig. 142). Retainers should be flush or below valve body surface.

(7) Install 2/4 Accumulator components as shown in (Fig. 143). Torque 2/4 Accumulator retainer plate to 5 N·m (45 in. lbs.).

(8) Install check balls into position as shown in (Fig. 144). If necessary, secure them with petrolatum or transmission assembly gel for assembly ease.

DISASSEMBLY AND ASSEMBLY (Continued)

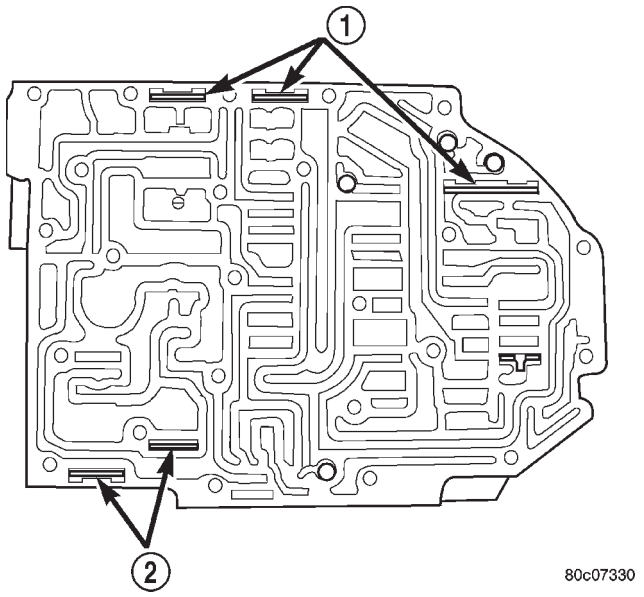


Fig. 142 Valve Retainer Location

1 – RETAINER
2 – RETAINER

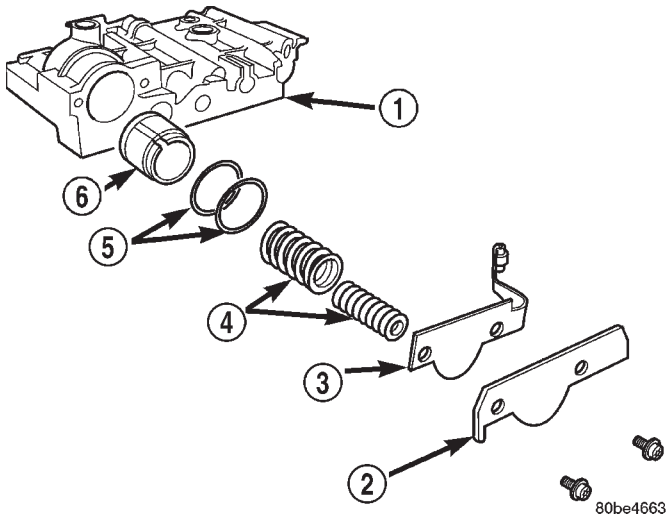


Fig. 143 2/4 Accumulator Assembly

1 – VALVE BODY
2 – RETAINER PLATE
3 – DETENT SPRING
4 – SPRINGS
5 – SEALS
6 – PISTON

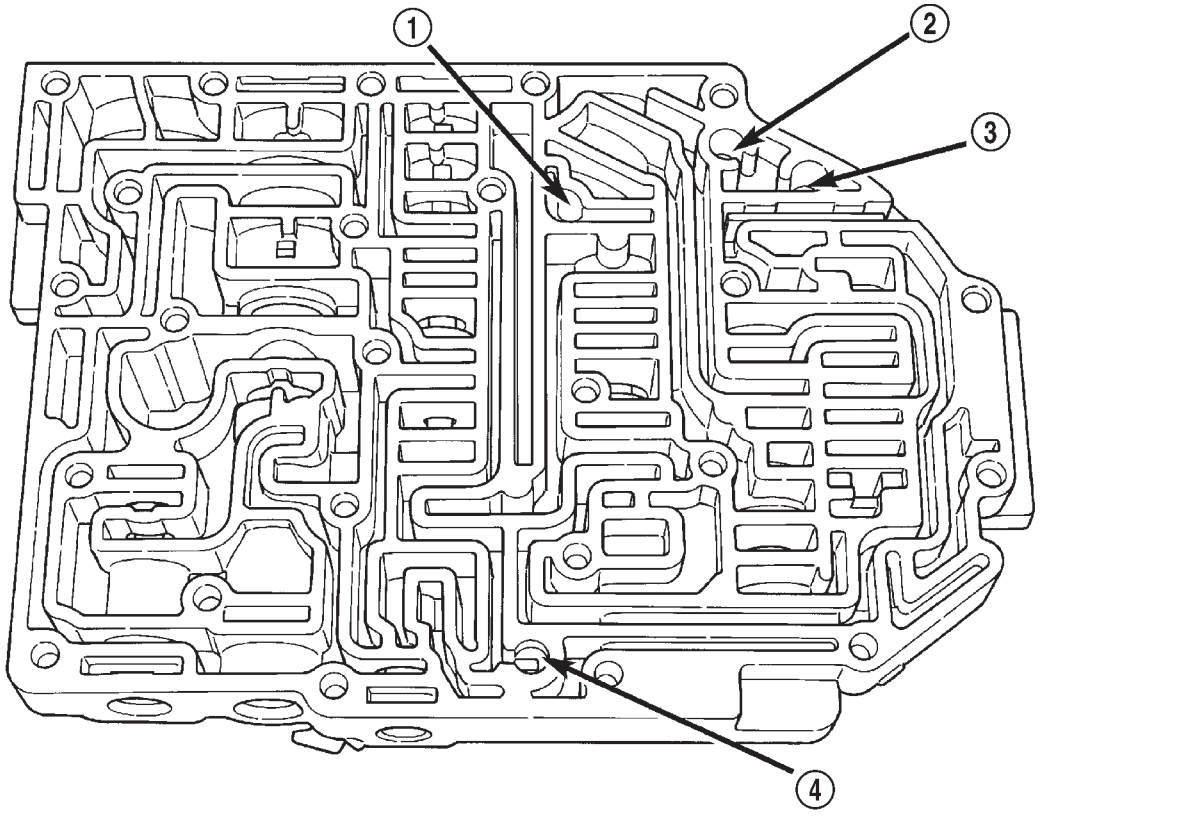


Fig. 144 Ball Check Location

1 – (#4) BALL CHECK LOCATION
2 – (#2) BALL CHECK LOCATION
3 – (#5) BALL CHECK LOCATION
4 – (#3) BALL CHECK LOCATION

DISASSEMBLY AND ASSEMBLY (Continued)

(9) Install thermal valve to the transfer plate (Fig. 145).

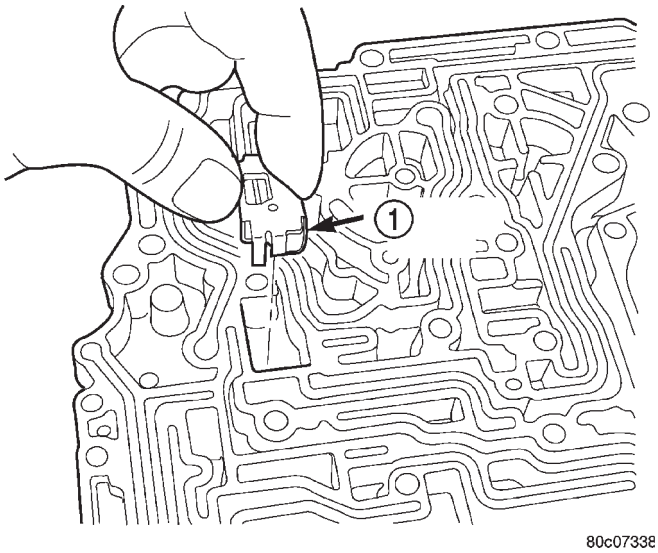


Fig. 145 Install Thermal Valve to Transfer Plate

1 – THERMAL VALVE

(10) Install oil screen to transfer plate (Fig. 146).

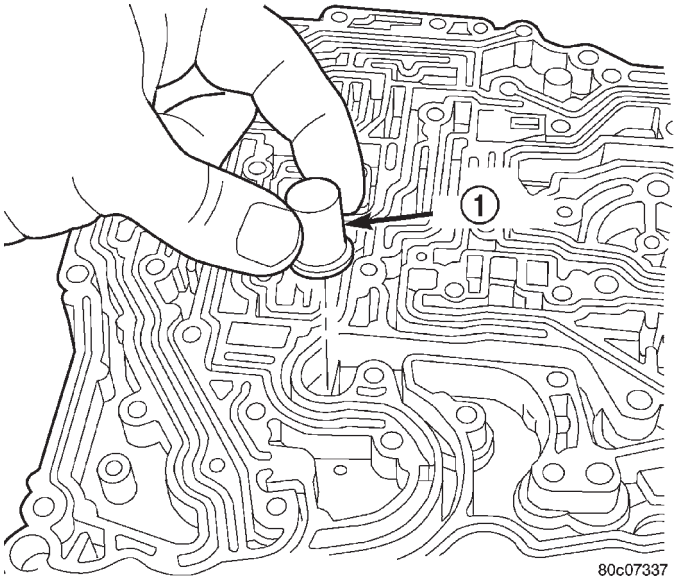


Fig. 146 Install Oil Screen to Transfer Plate

1 – OIL SCREEN

(11) Install separator plate to transfer plate (Fig. 147).

(12) Install the two separator plate-to-transfer plate screws (Fig. 148).

(13) Install the transfer plate to the valve body (Fig. 149).

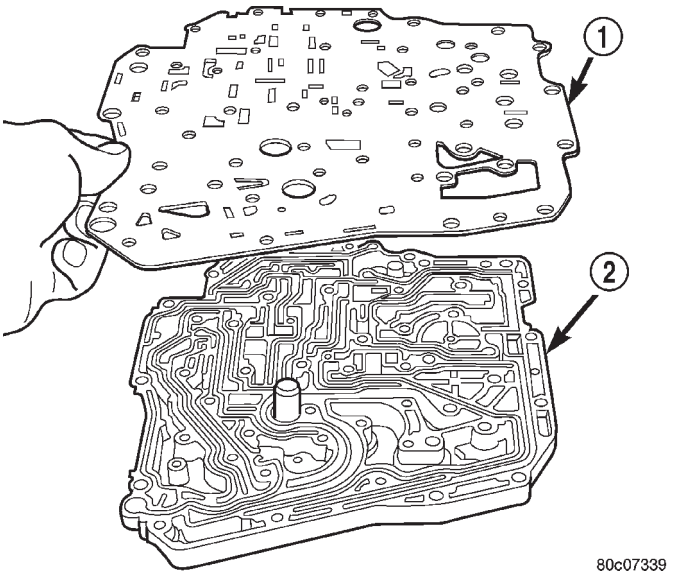


Fig. 147 Install Separator Plate to Transfer Plate

1 – SEPARATOR PLATE
2 – TRANSFER PLATE

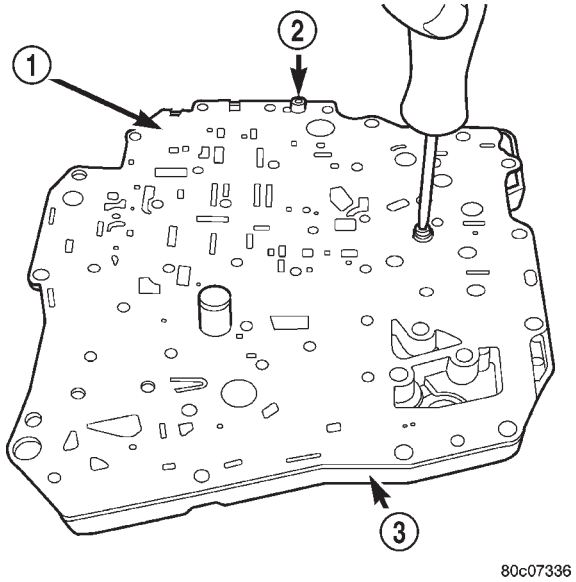


Fig. 148 Install Separator Plate-to-Transfer Plate Screws

1 – SEPARATOR PLATE
2 – SCREW (2)
3 – TRANSFER PLATE

(14) Install the transfer plate-to-valve body screws (Fig. 150) and torque to 5 N·m (45 in. lbs.).

(15) Install the stiffener plate (Fig. 151).

(16) Install the solenoid/pressure switch assembly and to the transfer plate (Fig. 152) and torque to 6 N·m (53 in. lbs.).

DISASSEMBLY AND ASSEMBLY (Continued)

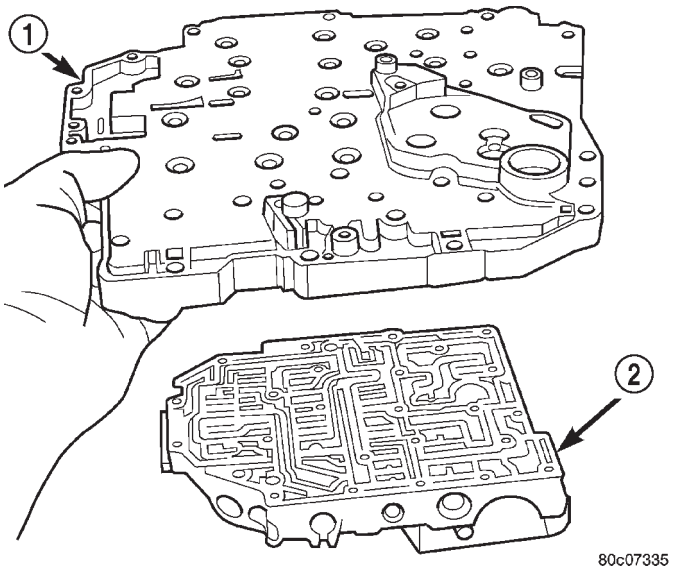


Fig. 149 Install Transfer Plate to Valve Body

1 – TRANSFER PLATE
2 – VALVE BODY

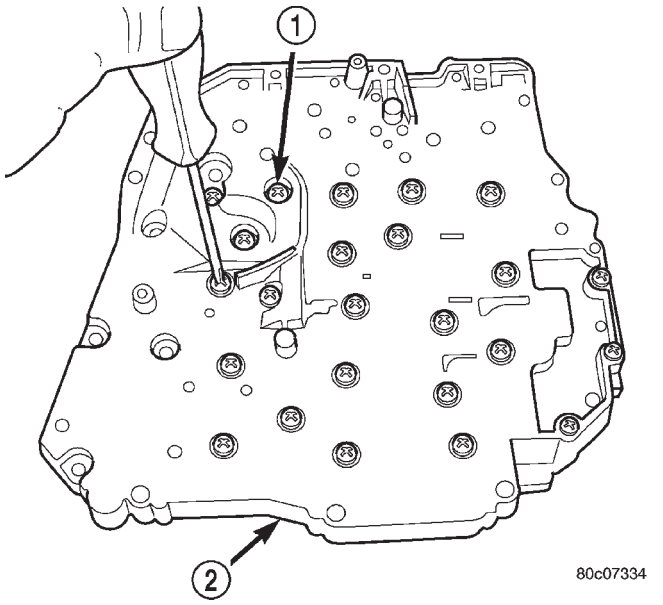


Fig. 150 Install Transfer Plate-to-Valve Body Screws

1 – SCREW (24)
2 – TRANSFER PLATE

(17) Install the manual shaft/rooster comb and transmission range sensor to the valve body (Fig. 153).

(18) Install the TRS/manual shaft retaining screw (Fig. 154) and torque to 5 N·m (45 in. lbs.).

(19) Install manual shaft seal.

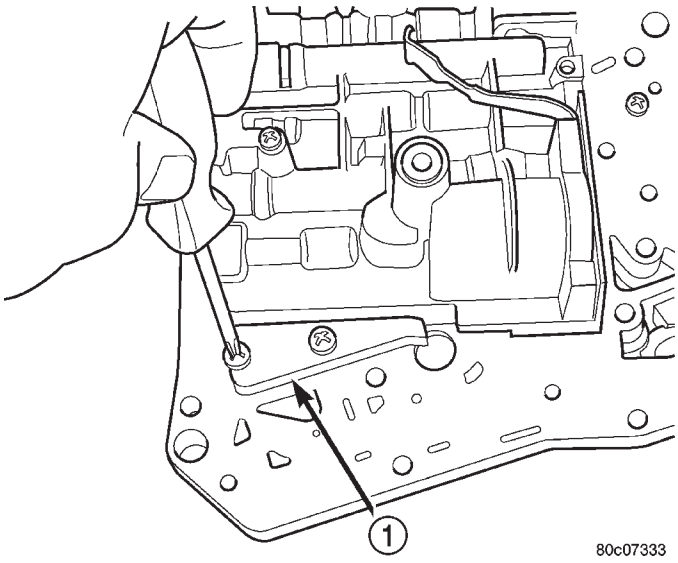


Fig. 151 Install Stiffener Plate

1 – STIFFENER PLATE

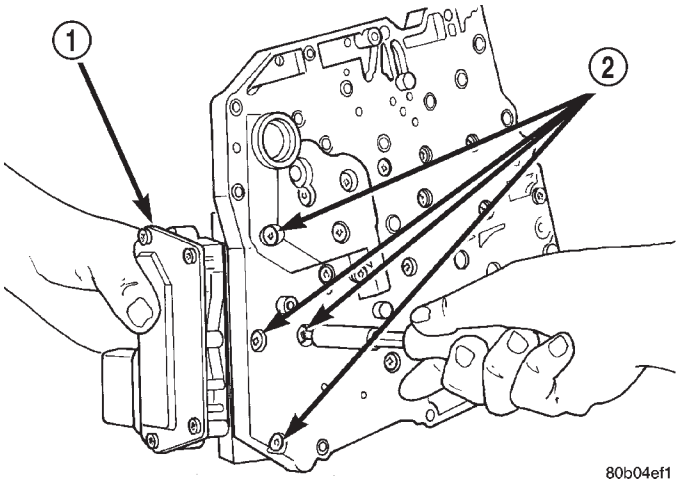


Fig. 152 Solenoid/Pressure Switch Assembly

1 – SOLENOID PACK
2 – SOLENOID RETAINING SCREWS

TRANSAXLE—DISASSEMBLY

Before disassembling transaxle, move the shift lever clockwise as far as it will go. This should be one position past the L position. Then remove the shift lever.

NOTE: Tag all clutch pack assemblies, as they are removed, for reassembly identification.

CAUTION: Do not intermix clutch discs or plates as the unit might then fail.

DISASSEMBLY AND ASSEMBLY (Continued)

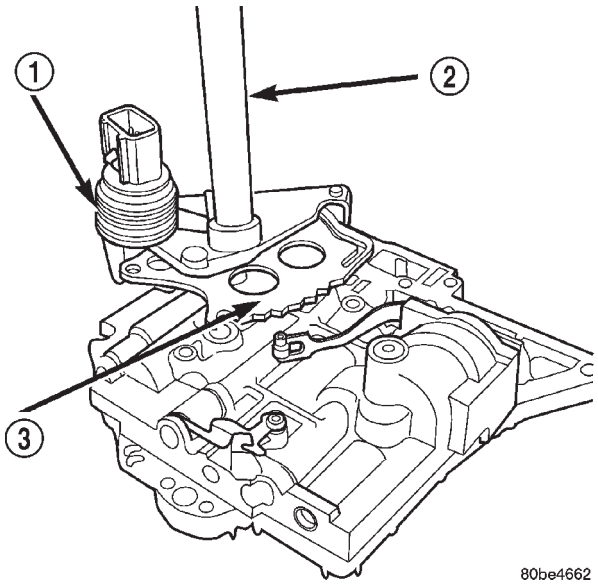


Fig. 153 Manual Shaft/Rooster Comb and Transmission Range Sensor

1 – TRANSMISSION RANGE SENSOR
2 – MANUAL SHAFT
3 – ROOSTER COMB

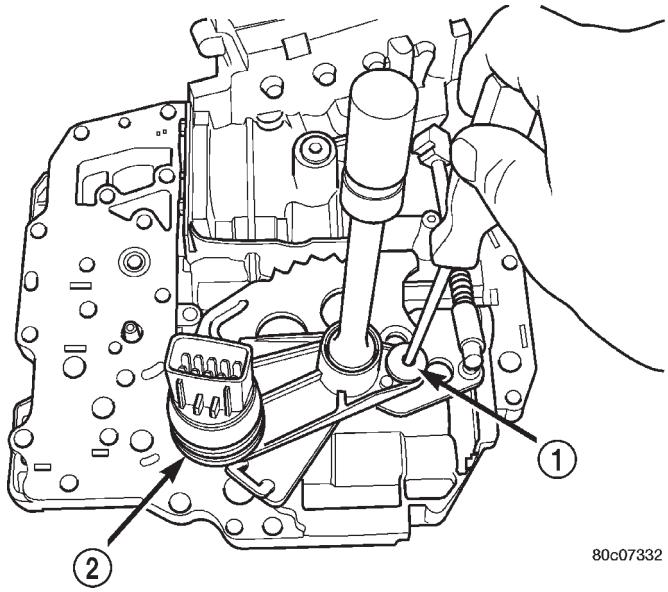


Fig. 154 TRS/Manual Shaft Retaining Screw

1 – SCREW
2 – TRS

Measuring input shaft end play before disassembly will usually indicate when a #4 thrust plate change is required. The number 4 thrust plate is located behind the overdrive clutch hub. Attach a dial indicator to transaxle bell housing with its plunger seated against end of input shaft (Fig. 155). Move input shaft in and out to obtain end play reading. End play specifications are.13 to.64 mm (.005 to.025 inch). Record indicator reading for reference when reassembling the transaxle.

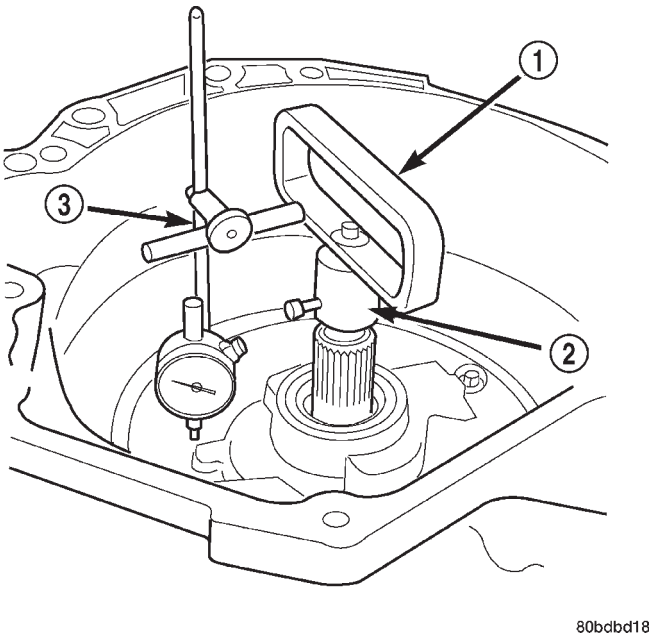


Fig. 155 Measure Input Shaft End Play Using Tool 8266—Typical

1 – TOOL 8266–8
2 – TOOL 8266–2
3 – TOOL C-3339

Remove both speed sensors from transaxle case (Fig. 156).

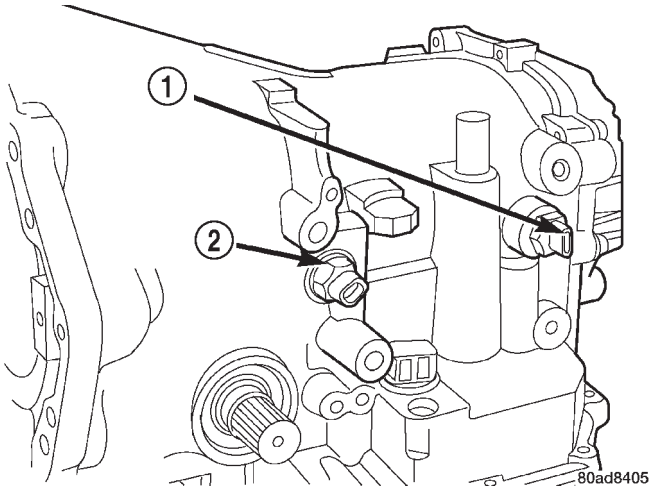


Fig. 156 Remove Input and Output Speed Sensor

1 – OUTPUT SPEED SENSOR
2 – INPUT SPEED SENSOR

CAUTION: Do not handle the valve body by the manual shaft. Damage could result.

DISASSEMBLY AND ASSEMBLY (Continued)

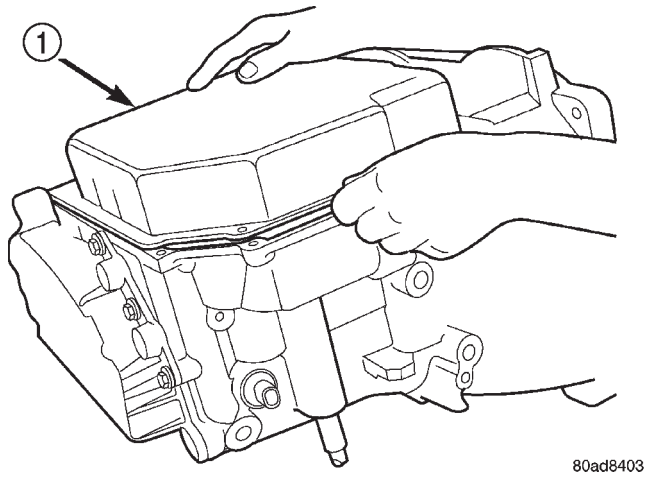


Fig. 157 Remove Transaxle Oil Pan

1 – TRANSAXLE OIL PAN

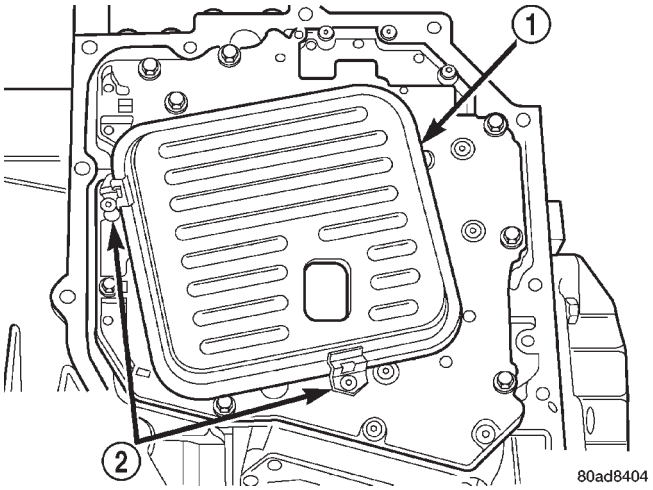


Fig. 158 Remove Transaxle Oil Filter

1 – TRANSAXLE FILTER
2 – FILTER RETAINING CLIPS

NOTE: For valve body recondition procedure, refer to Valve Body in this section.

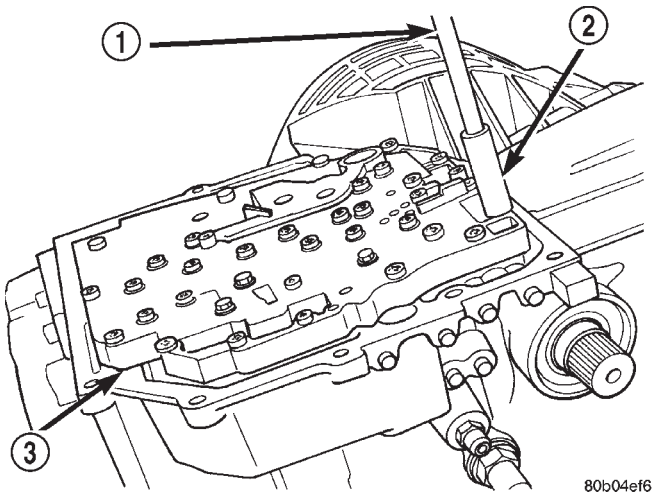


Fig. 159 Remove Valve Body Bolts (17)

1 – EXTENSION
2 – SOCKET
3 – VALVE BODY

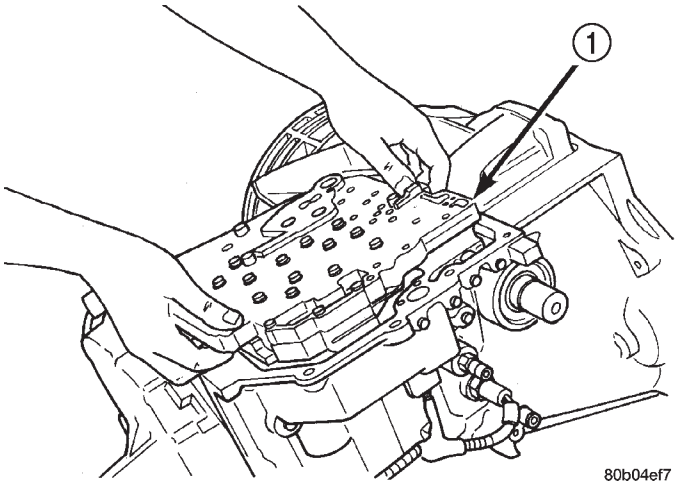


Fig. 160 Remove Valve Body From Transaxle

1 – VALVE BODY

DISASSEMBLY AND ASSEMBLY (Continued)

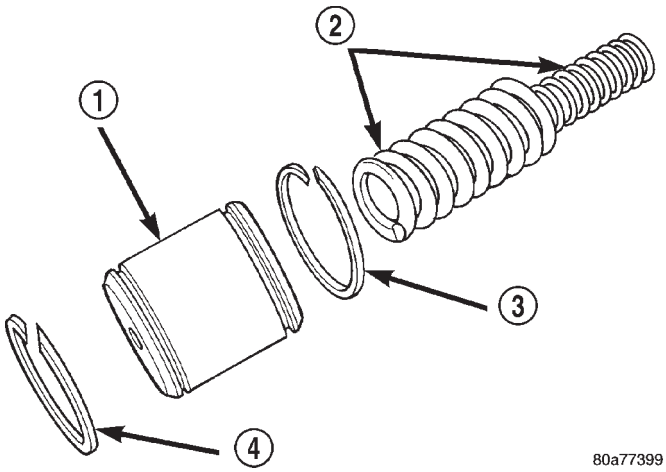


Fig. 161 Remove Underdrive Accumulator and Spring

1 – ACCUMULATOR PISTON (UNDERDRIVE)
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

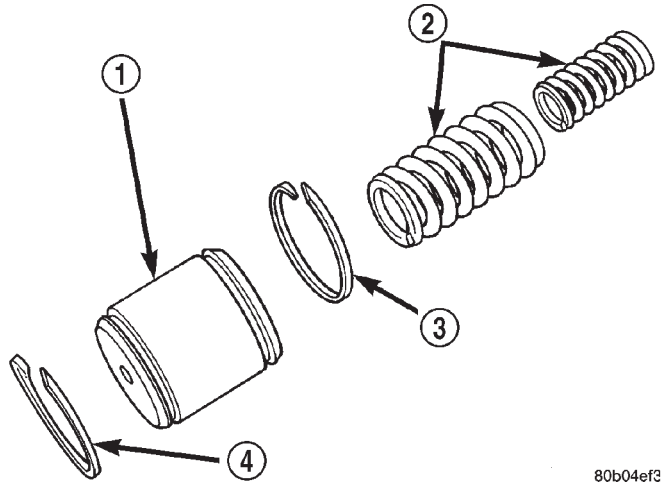


Fig. 162 Remove Overdrive Accumulator and Springs

1 – OVERDRIVE ACCUMULATOR PISTON
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

CAUTION: Tag the springs for the Overdrive Accumulator so that they are not confused with the springs in the Low/Reverse Accumulator.

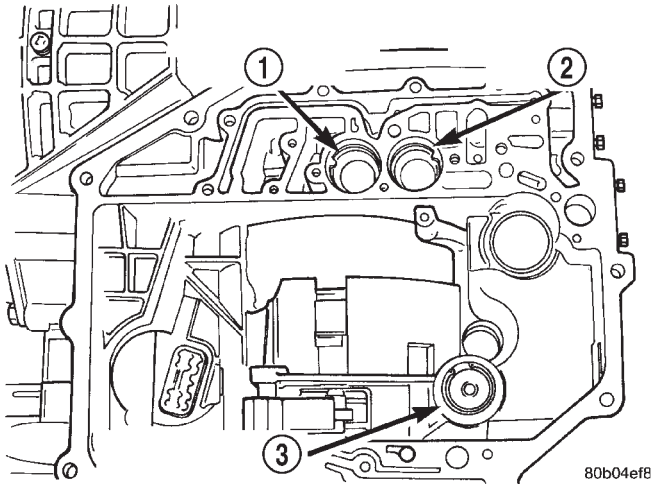


Fig. 163 Accumulator Locations

1 – OVERDRIVE ACCUMULATOR LOCATION
2 – UNDERDRIVE ACCUMULATOR LOCATION
3 – LOW/REVERSE ACCUMULATOR

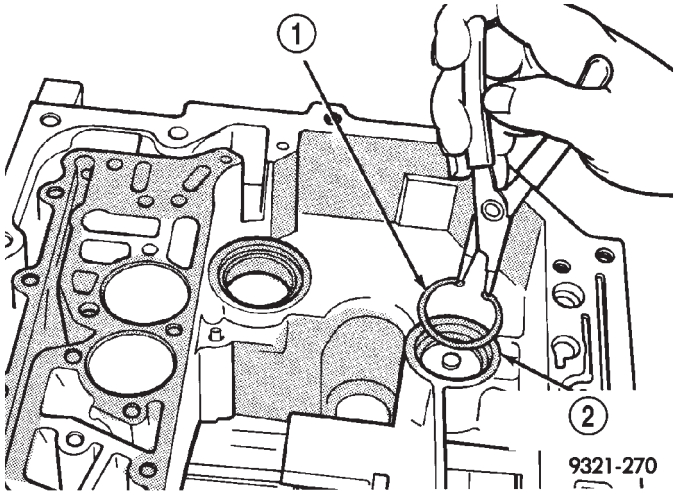


Fig. 164 Remove Low/Reverse Accumulator

1 – SNAP RING
2 – LOW/REVERSE ACCUMULATOR

DISASSEMBLY AND ASSEMBLY (Continued)

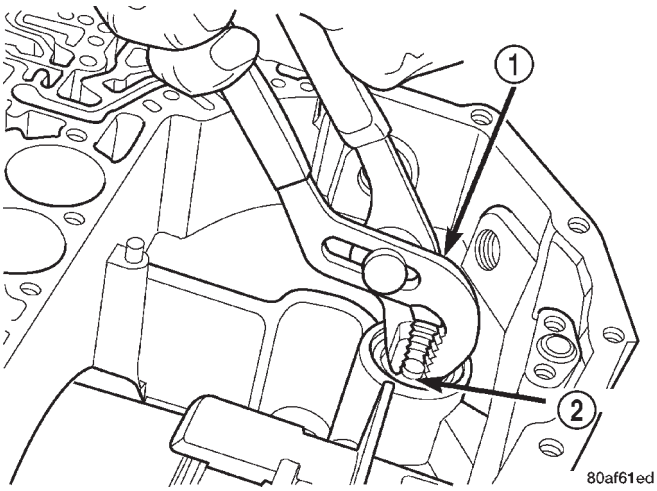


Fig. 165 Remove Low/Reverse Accumulator Plug (Cover)

1 – ADJUSTABLE PLIERS
2 – PLUG

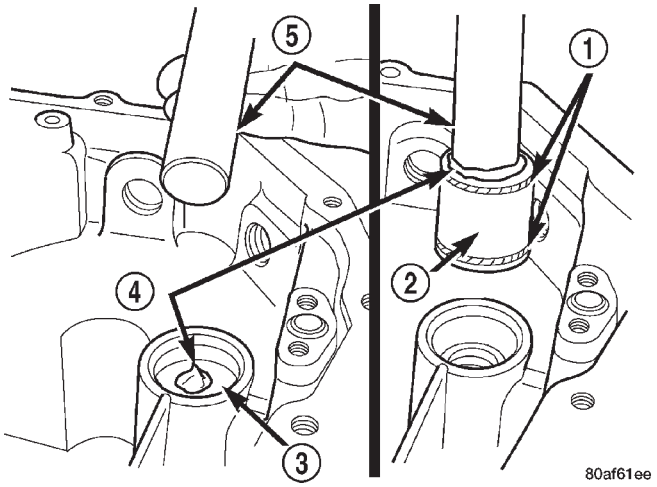


Fig. 166 Remove Low/Reverse Accumulator Piston

1 – SEAL RINGS
2 – PISTON
3 – PISTON
4 – PETROLATUM
5 – SUITABLE TOOL

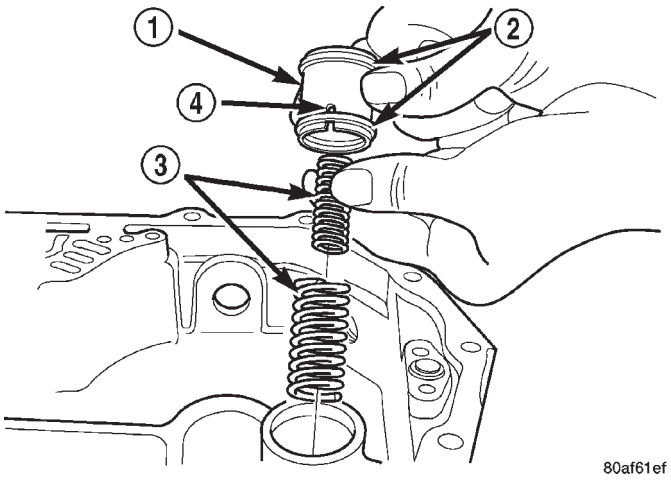


Fig. 167 Low/Reverse Accumulator

1 – ACCUMULATOR PISTON
2 – SEAL RINGS
3 – RETURN SPRINGS
4 – (NOTE NOTCH)

NOTE: Remove driveshaft retainer clips from driveshafts.

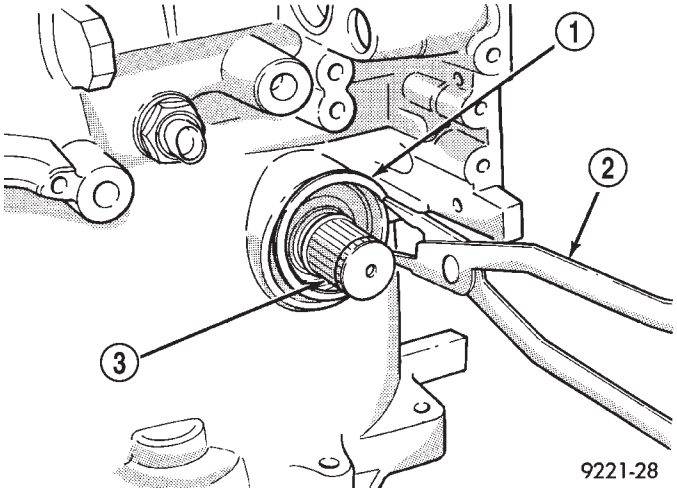


Fig. 168 Remove Long Stub Shaft Snap Ring

1 – SNAP RING
2 – SNAP RING PLIERS
3 – LONG STUB SHAFT

DISASSEMBLY AND ASSEMBLY (Continued)

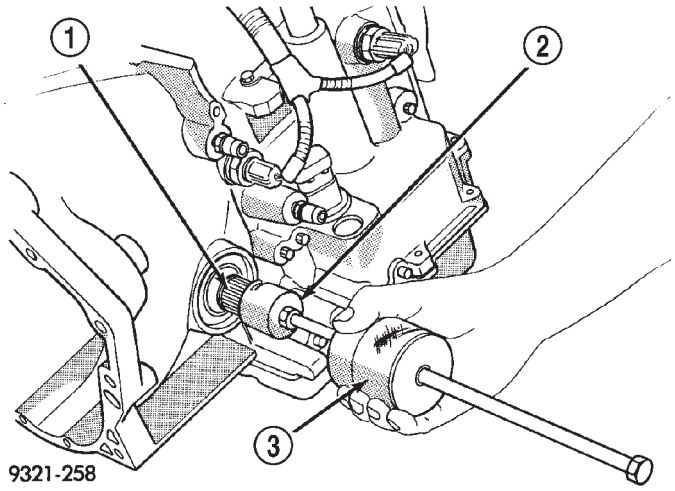


Fig. 169 Remove Long Stub Shaft From Bellhousing

1 – LONG STUB SHAFT
2 – SPECIAL TOOL 6669
3 – SLIDE HAMMER C-3752

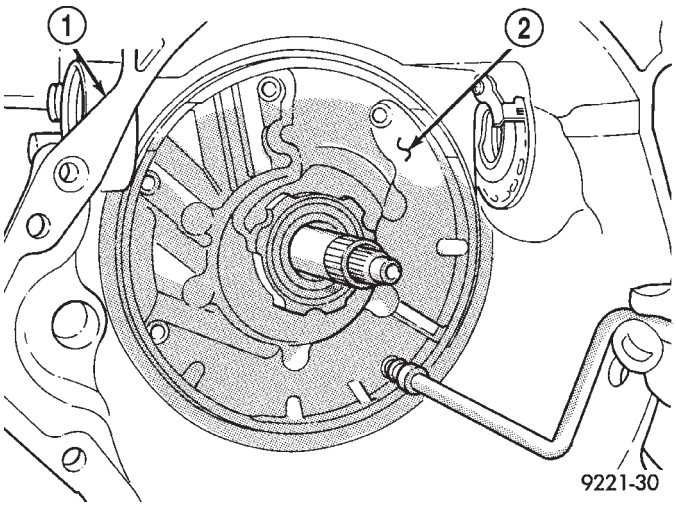


Fig. 170 Remove Oil Pump Attaching Bolts

1 – BELLHOUSING
2 – OIL PUMP

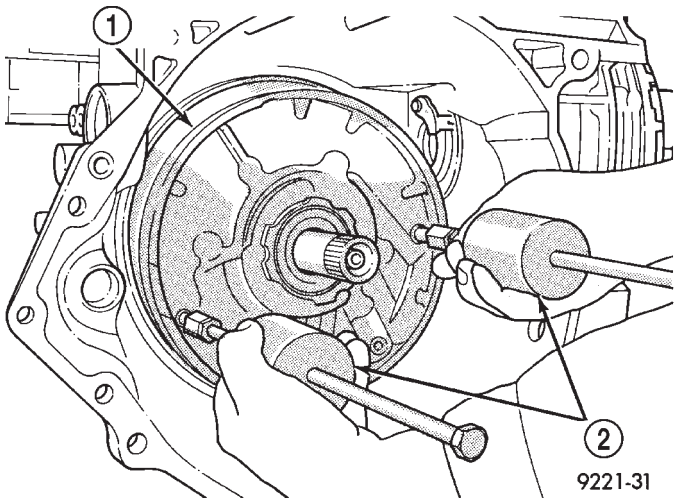


Fig. 171 Oil Pump Pullers

1 – OIL PUMP
2 – PULLERS

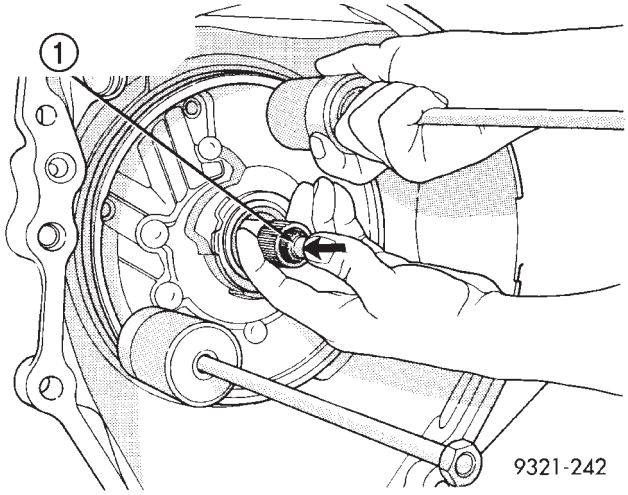


Fig. 172 Remove Oil Pump

1 – "PUSH IN" ON INPUT SHAFT WHILE REMOVING PUMP

NOTE: To align oil pump during installation, use threaded dowels or phillips screwdrivers.

DISASSEMBLY AND ASSEMBLY (Continued)

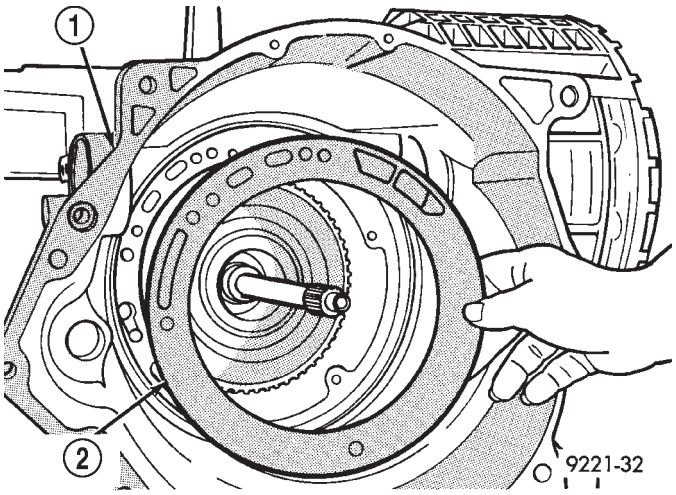


Fig. 173 Remove Oil Pump Gasket

1 – BELL HOUSING
2 – OIL PUMP GASKET

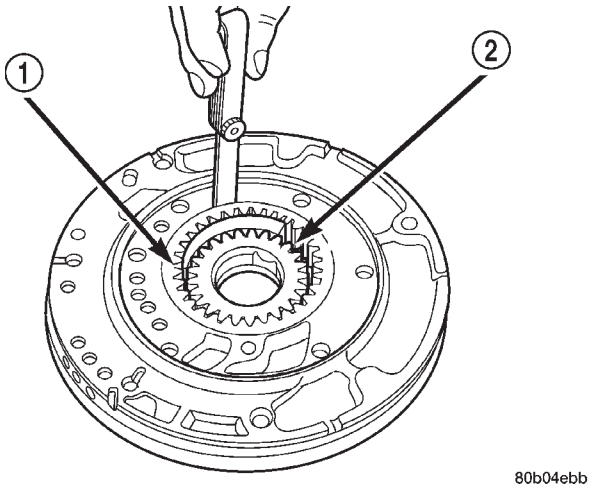


Fig. 175 Measure Outer Gear to Pocket

1 – OUTER GEAR
2 – POCKET

OIL PUMP INSPECTION

When disassembling the transaxle it is necessary to inspect the oil pump for wear and damage.

(1) Remove the reaction shaft support bolts.

(2) Remove reaction shaft support from pump housing (Fig. 174).

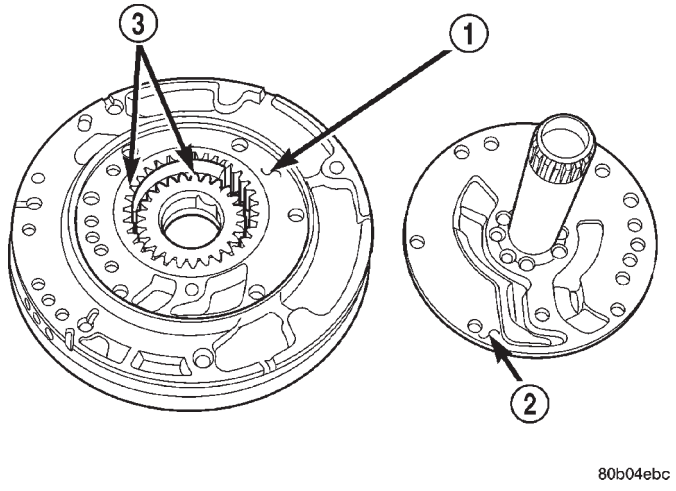


Fig. 174 Reaction Shaft Support

1 – PUMP HOUSING
2 – REACTION SHAFT SUPPORT
3 – PUMP GEARS

(3) Remove the pump gears and check for wear and damage.

(4) Install the gears and check clearances.

(5) Measure the clearance between the outer gear and the pump pocket (Fig. 175). Clearance should be 0.045-0.141mm (0.0018-0.0056 in.)

(6) Position an appropriate piece of Plastigage across both pump gears.

(7) Align the Plastigage to a flat area on the reaction shaft support housing.

(8) Install the reaction shaft to the pump housing. Tighten the bolts to 27 N. M (20 ft. lbs.)

(9) Remove bolts and carefully separate the housings. Measure the Plastigage following the instructions supplied.

(10) Clearance between outer gear side and the reaction shaft support should be 0.020-0.046mm (0.008-0.0018 in.). Clearance between inner gear side and the reaction shaft support should be 0.020-0.046mm (0.008-0.0018 in.).

CAUTION: By-pass valve must be replaced if transmission failure occurs.

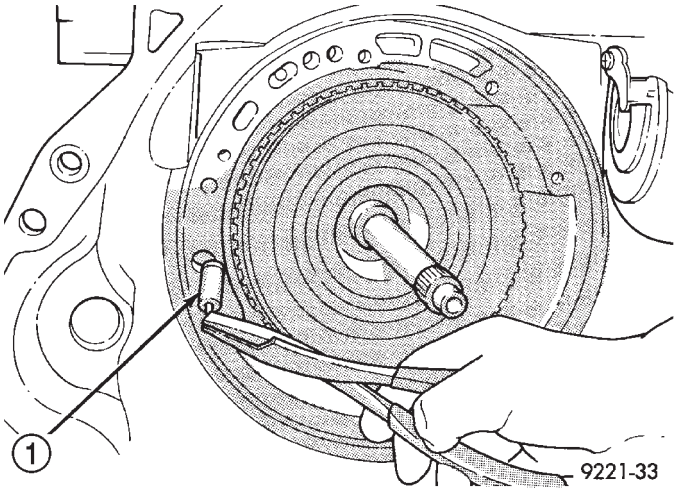


Fig. 176 Remove By-Pass Valve

1 – BY-PASS VALVE

DISASSEMBLY AND ASSEMBLY (Continued)

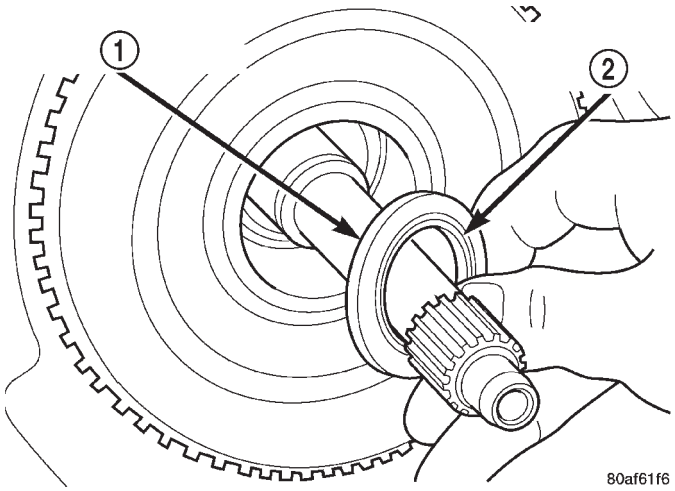


Fig. 177 Remove No. 1 Caged Needle Bearing

1 – #1 CAGED NEEDLE BEARING
2 – NOTE: TANGED SIDE OUT

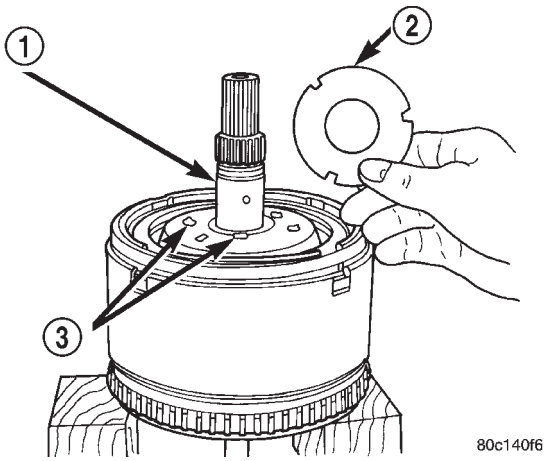


Fig. 179 Remove No. 4 Thrust Plate

1 – OVERDRIVE SHAFT ASSEMBLY
2 – #4 THRUST PLATE (SELECT)
3 – 3 DABS OF PETROLATUM FOR RETENTION

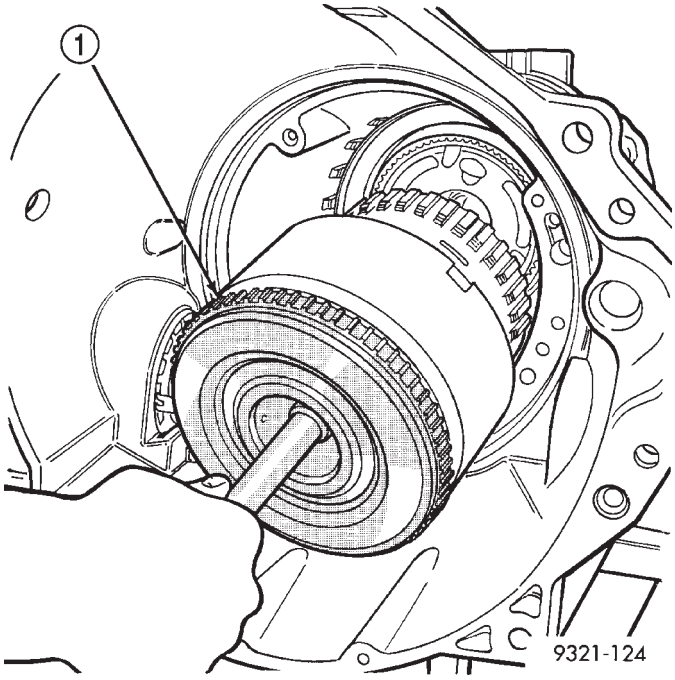


Fig. 178 Remove Input Clutch Assembly

1 – INPUT CLUTCH ASSEMBLY

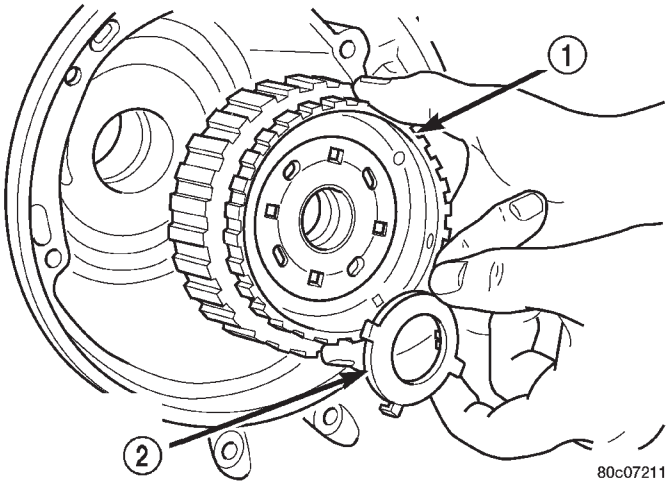


Fig. 180 Remove Front Sun Gear Assembly

1 – FRONT SUN GEAR ASSEMBLY
2 – #4 THRUST WASHER (FOUR TABS)

DISASSEMBLY AND ASSEMBLY (Continued)

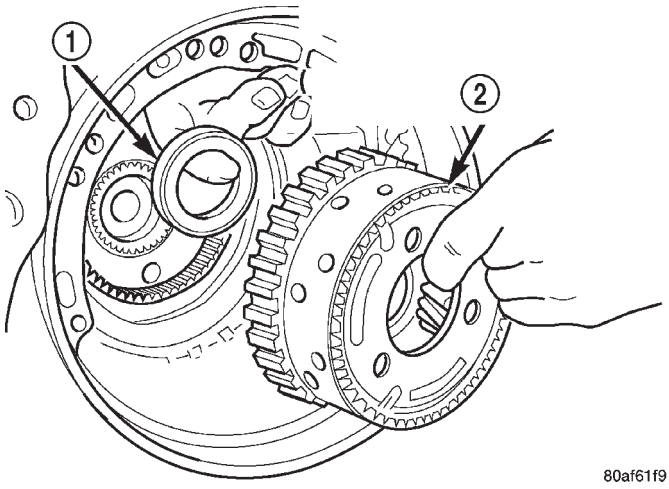


Fig. 181 Remove Front Carrier and Rear Annulus Assembly

1 – #6 NEEDLE BEARING
2 – FRONT CARRIER AND REAR ANNULUS ASSEMBLY (TWIST AND PULL OR PUSH TO REMOVE OR INSTALL).

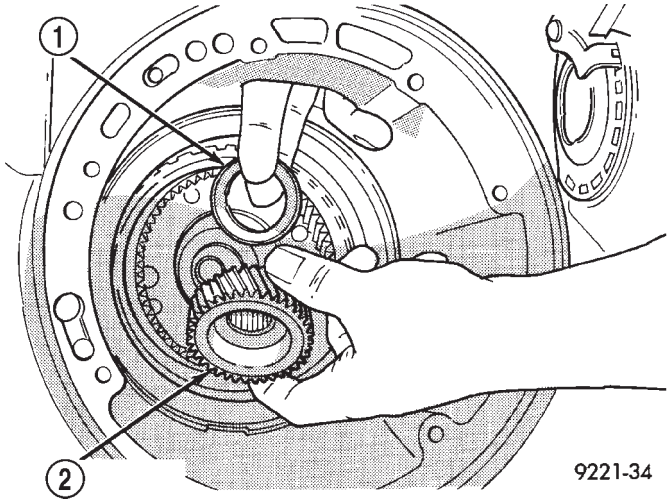


Fig. 182 Remove Rear Sun Gear

1 – #7 NEEDLE BEARING
2 – REAR SUN GEAR

The number seven needle bearing has three antireversal tabs and is common with the number five and number two position. The orientation should allow the bearing to seat flat against the rear sun gear (Fig. 183). A small amount of petrolatum can be used to hold the bearing to the rear sun gear.

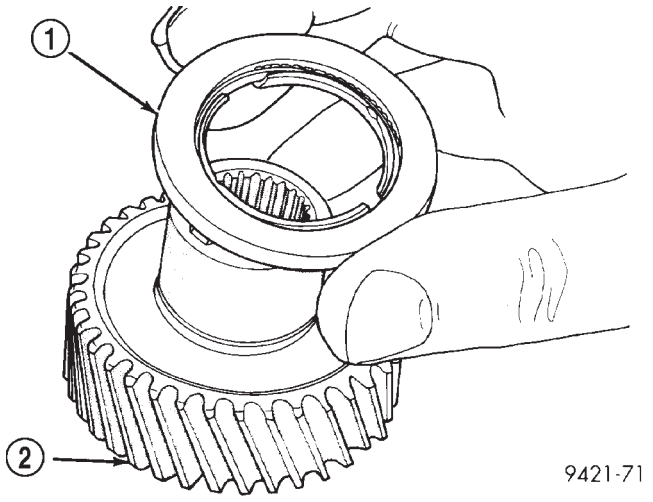


Fig. 183 Number 7 Bearing

1 – #7 BEARING
2 – REAR SUN GEAR

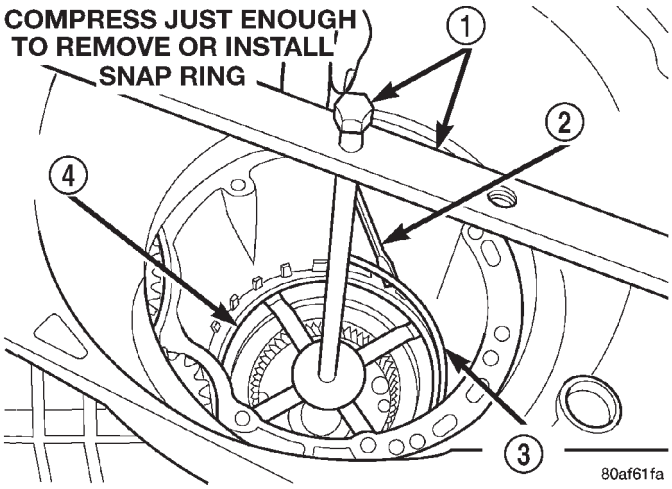


Fig. 184 Remove 2/4 Clutch Retainer Snap Ring

1 – TOOL 5058
2 – SCREWDRIVER
3 – SNAP RING
4 – 2/4 CLUTCH RETAINER

Stand trans upright on bellhousing.

Chain cover must be free of old sealant, dirt and oil before applying new sealant. Apply a 1/8 inch bead of sealant to flange of cover.

DISASSEMBLY AND ASSEMBLY (Continued)

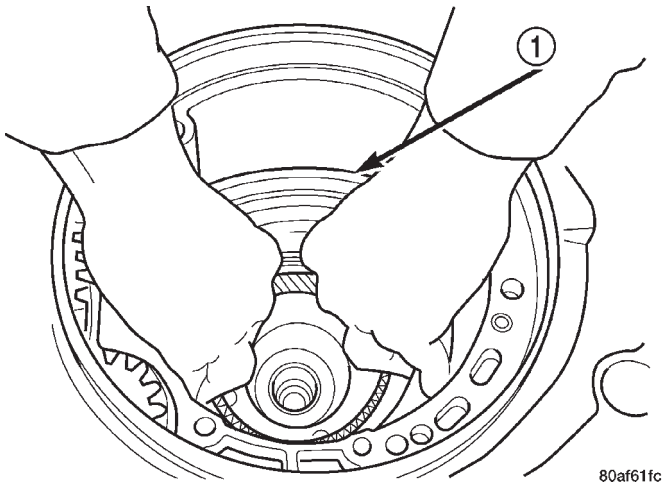


Fig. 185 Remove 2/4 Clutch Retainer

1 – 2/4 CLUTCH RETAINER

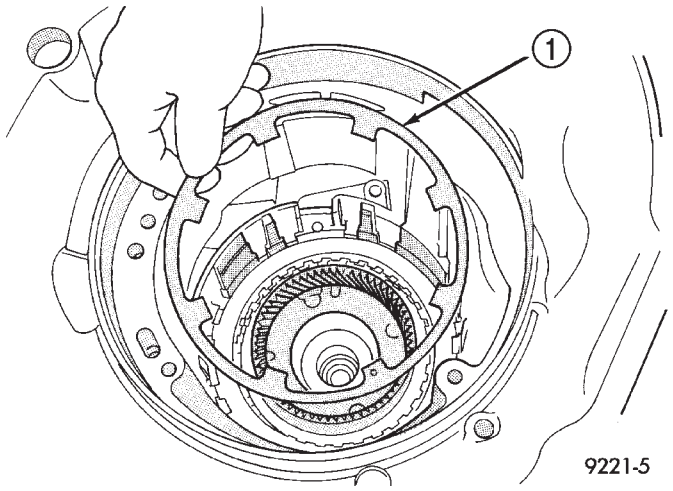


Fig. 187 Remove 2/4 Clutch Return Spring

1 – 24 CLUTCH RETURN SPRING

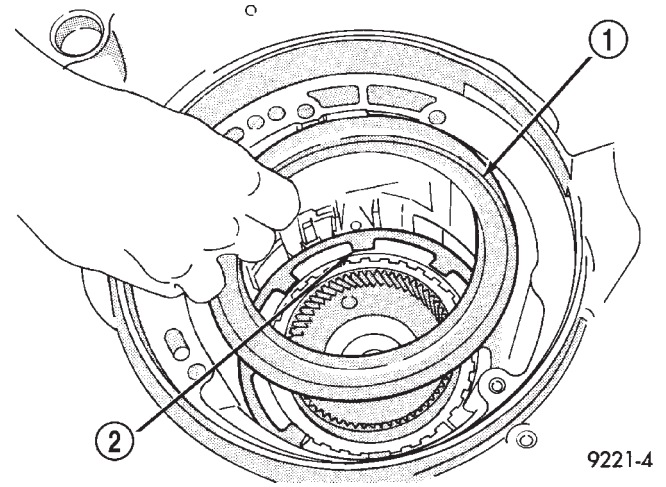


Fig. 186 2/4 Clutch Retainer

1 – 24 CLUTCH RETAINER
2 – 24 CLUTCH RETURN SPRING

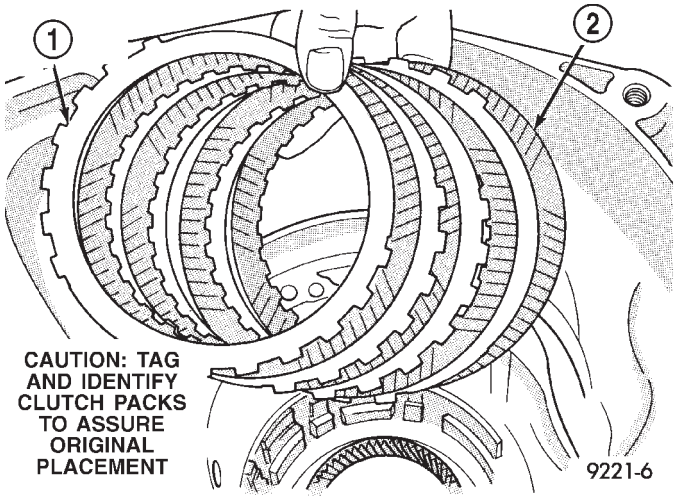


Fig. 188 Remove 2/4 Clutch Pack

1 – CLUTCH PLATE (4)
2 – CLUTCH DISC (4)

DISASSEMBLY AND ASSEMBLY (Continued)

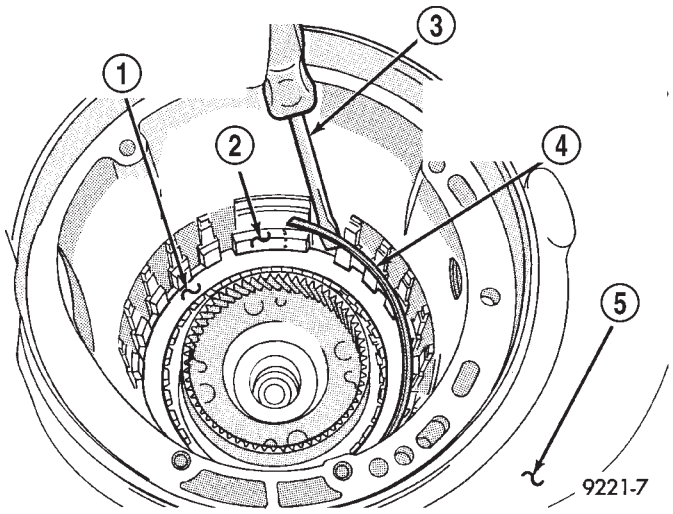


Fig. 189 Remove Tapered Snap Ring

1 – LOW/REVERSE CLUTCH REACTION PLATE
2 – LONG TAB
3 – SCREWDRIVER
4 – LOW/REVERSE TAPERED SNAP RING (TAPERED SIDE UP)
5 – OIL PAN FACE

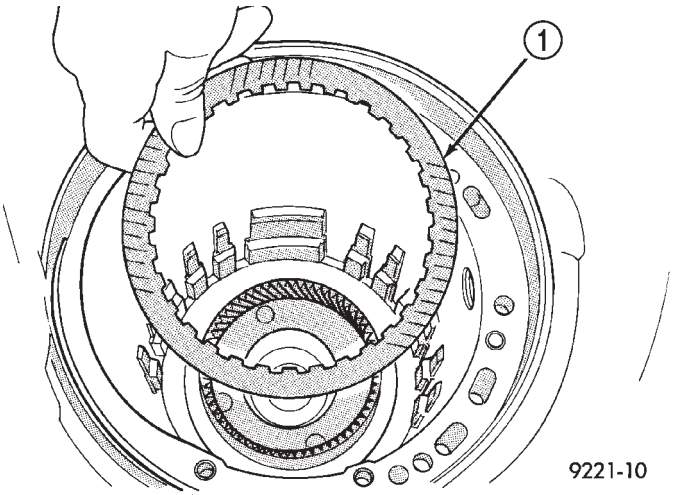


Fig. 190 Remove One Disc

1 – ONE DISC FROM LOW/REVERSE CLUTCH

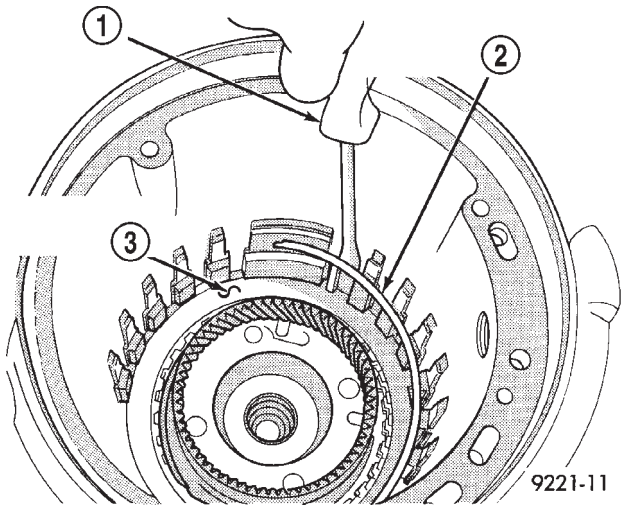


Fig. 191 Remove Low/Reverse Reaction Plate Snap Ring

1 – SCREWDRIVER
2 – LOW/REVERSE REACTION PLATE FLAT SNAP RING
3 – DO NOT SCRATCH CLUTCH PLATE

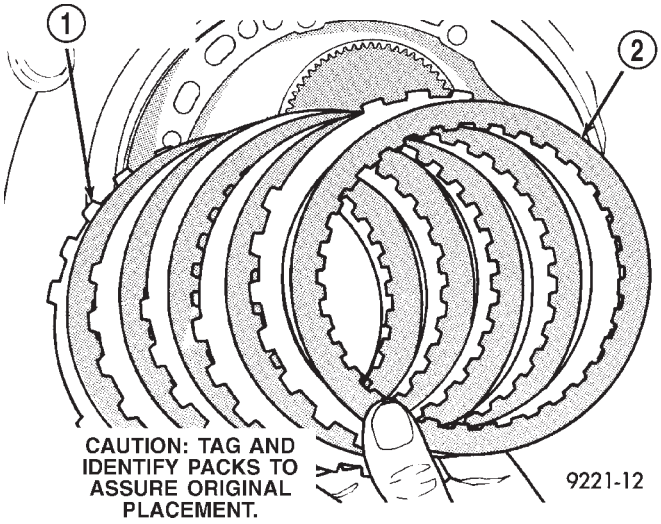


Fig. 192 Remove Low/Reverse Clutch Pack

1 – CLUTCH PLATES (5)
2 – CLUTCH DISCS (5)

DISASSEMBLY AND ASSEMBLY (Continued)

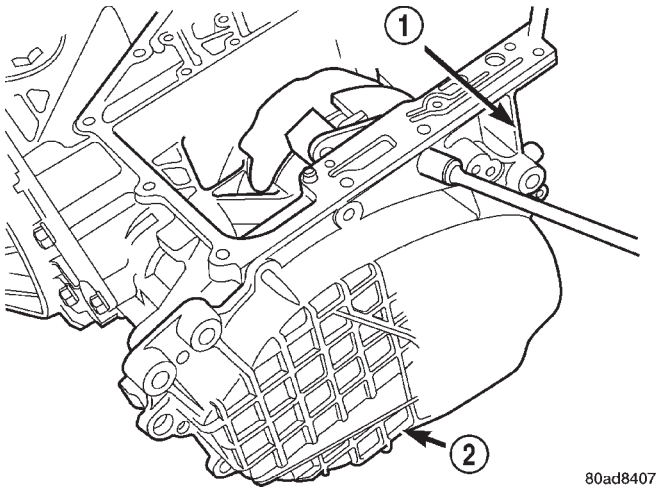


Fig. 193 Remove Chain Cover

1 – TRANSAXLE CASE
2 – CHAIN COVER

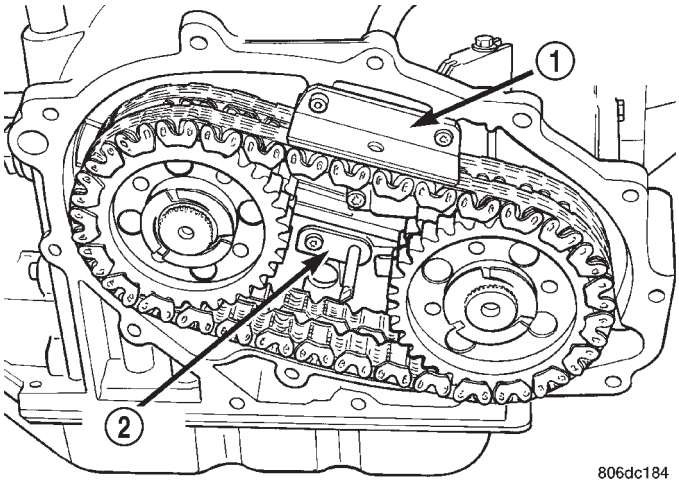


Fig. 194 Remove Chain Oiler

1 – CHAIN SNUBBER
2 – CHAIN OILER

CAUTION: Be sure to reinstall the chain snubber and chain oiler when reassembling.

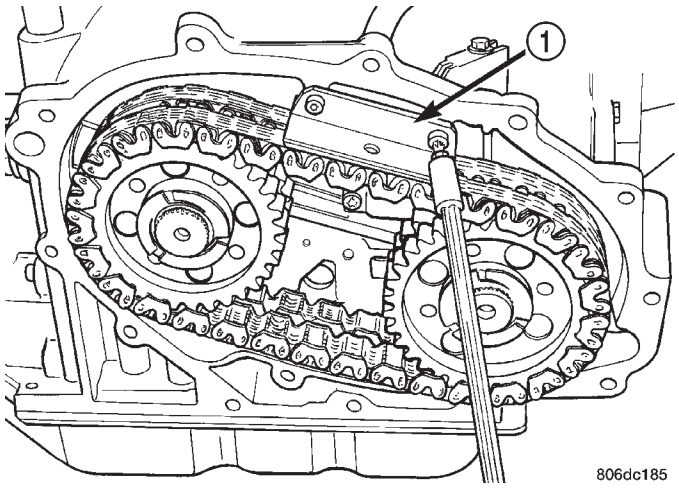


Fig. 195 Remove Chain Snubber

1 – CHAIN SNUBBER

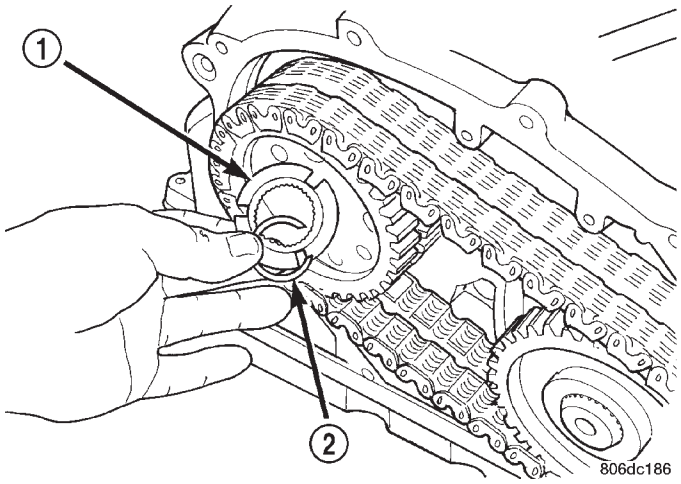


Fig. 196 Remove Output Shaft Sprocket Snap Ring and Wave Washer

1 – WAVE WASHER
2 – SNAP RING

DISASSEMBLY AND ASSEMBLY (Continued)

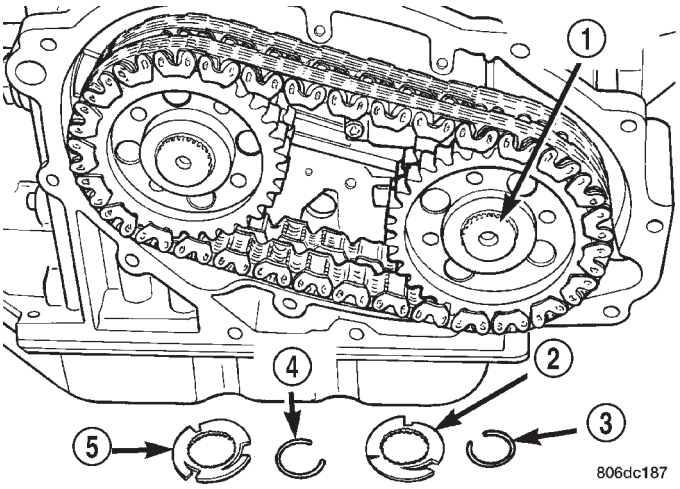


Fig. 197 Remove Transfer Shaft Sprocket Snap Ring and Wave Washer

1 – TRANSFER SHAFT
2 – WAVE WASHER
3 – SNAP RING
4 – SNAP RING
5 – WAVE WASHER

CAUTION: The chain sprockets have a slip fit onto the shafts. Apply only a slight amount of pressure to the chain spreader to release the chain pressure. If chain sprockets are not spread slightly, removal or installation will be difficult. Overspreading of the chain sprockets will also make sprocket removal difficult.

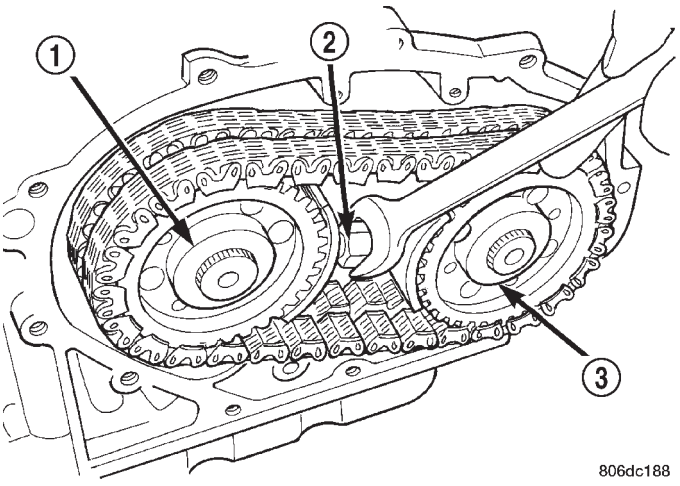


Fig. 198 Install Chain Spreader

1 – OUTPUT SPROCKET
2 – SPECIAL TOOL 6550
3 – TRANSFER SPROCKET

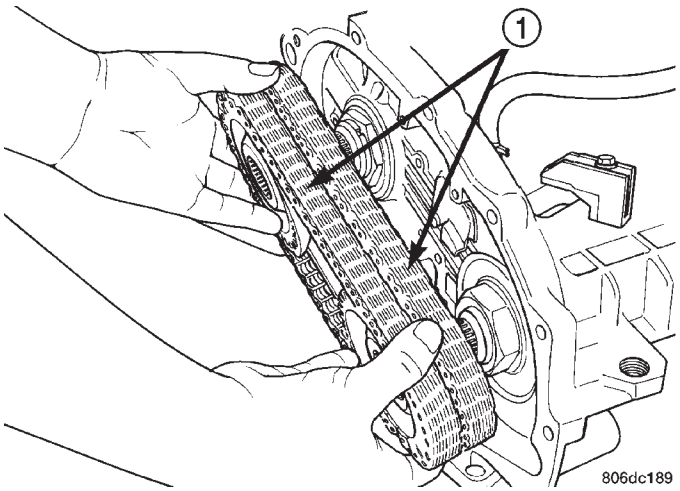


Fig. 199 Remove Chains and Both Sprockets as an Assembly

1 – CHAINS

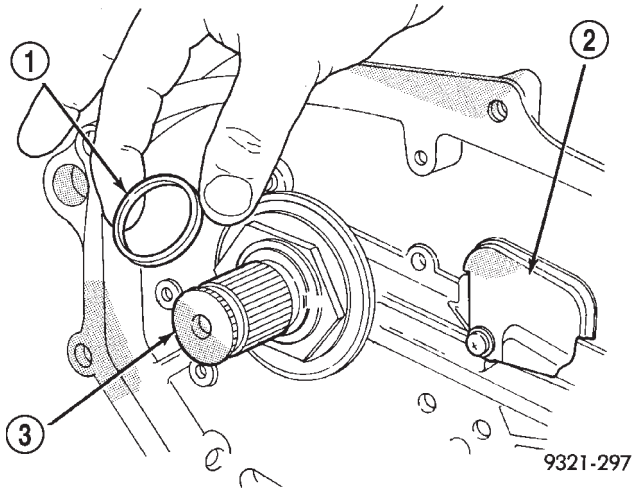


Fig. 200 Output Sprocket Spacer

1 – OUTPUT SPROCKET SPACER
2 – VENT BAFFLE
3 – OUTPUT SHAFT

Remove main sump baffle from transaxle case (Fig. 201).

CAUTION: Failure to grind and open stakes of the output shaft nut and transfer shaft nut will result in thread damage to the shafts during nut removal.

WARNING: WEAR SAFETY GOGGLES WHILE GRINDING STAKE NUTS.

DISASSEMBLY AND ASSEMBLY (Continued)

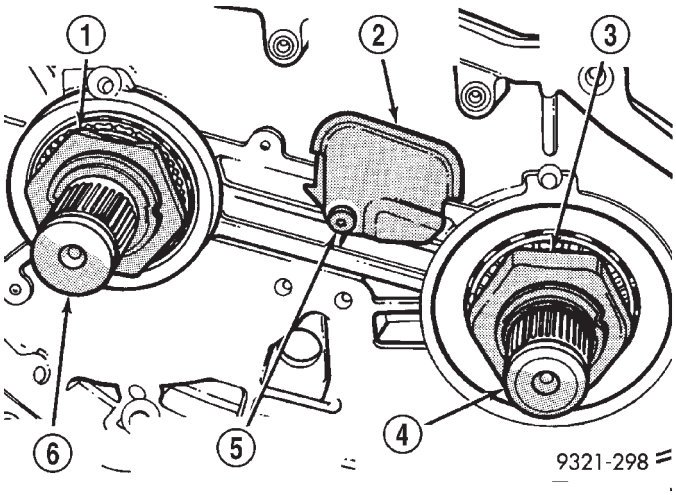


Fig. 201 Main Sump Vent Baffle Location

1 – OUTPUT SHAFT NUT
2 – MAIN SUMP VENT BAFFLE
3 – TRANSFER SHAFT NUT
4 – TRANSFER SHAFT
5 – VENT BAFFLE RETAINING SCREW
6 – OUTPUT SHAFT

Using a die grinder or equivalent, grind the stakes in the shoulder of the shaft nuts as shown in (Fig. 202) and (Fig. 203). Do not grind all the way through the nut and into the shaft. There are two stakes on each nut.

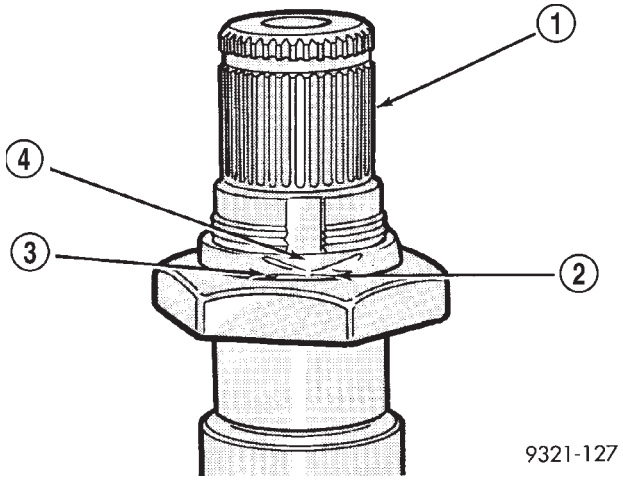


Fig. 202 Grinding Stakes

1 – TRANSFER SHAFT
2 – GRIND HERE
3 – GRIND HERE
4 – NUT STAKE

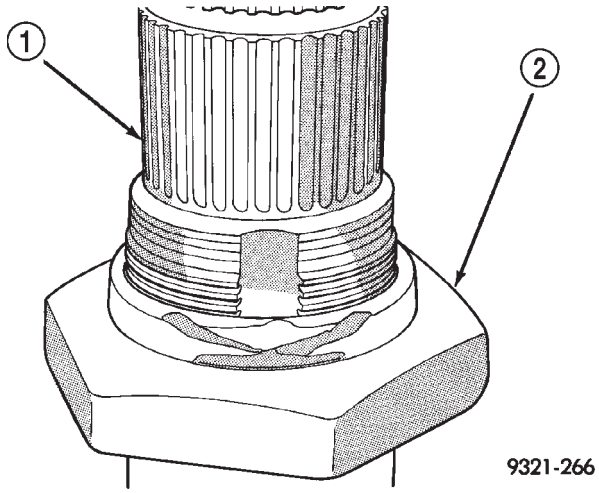


Fig. 203 Stake Grinding Pattern

1 – TRANSFER SHAFT
2 – TRANSFER SHAFT NUT

Using a small chisel, carefully open stakes on nut (Fig. 204).

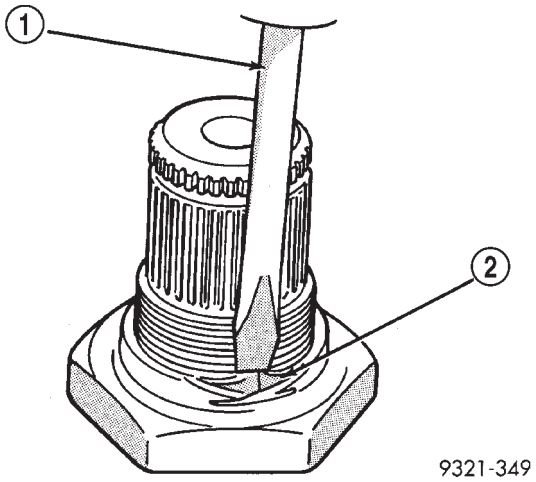


Fig. 204 Opening Nut Stakes

1 – CHISEL
2 – NUT STAKE

Use special tool 6497 and 6498 to remove the transfer shaft nut or the output shaft nut (Fig. 205). Note that your breaker bar will turn clockwise to remove the nut and counter clockwise to install the nut.

Use special tool 6596 to remove front output shaft bearing cup (Fig. 207).

DISASSEMBLY AND ASSEMBLY (Continued)

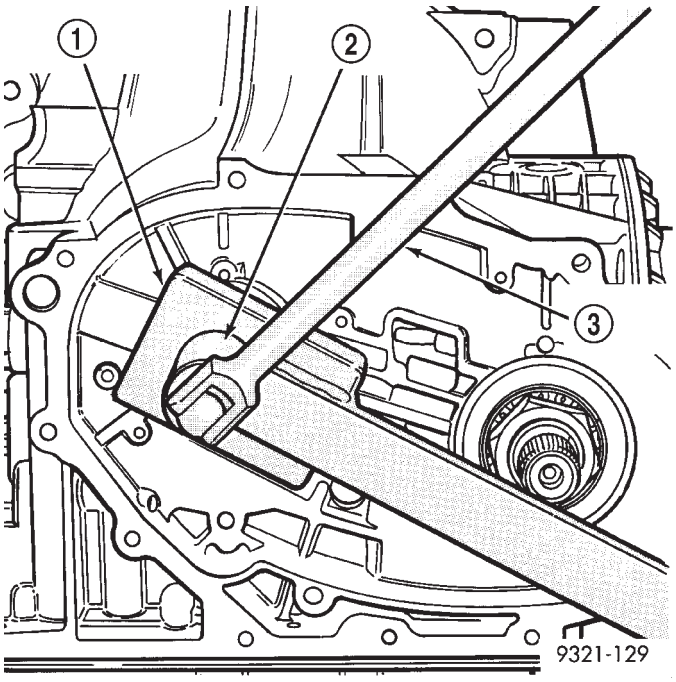


Fig. 205 Remove Output Shaft Nut

1 – SPECIAL TOOL 6497
2 – SPECIAL TOOL 6498
3 – BREAKER BAR

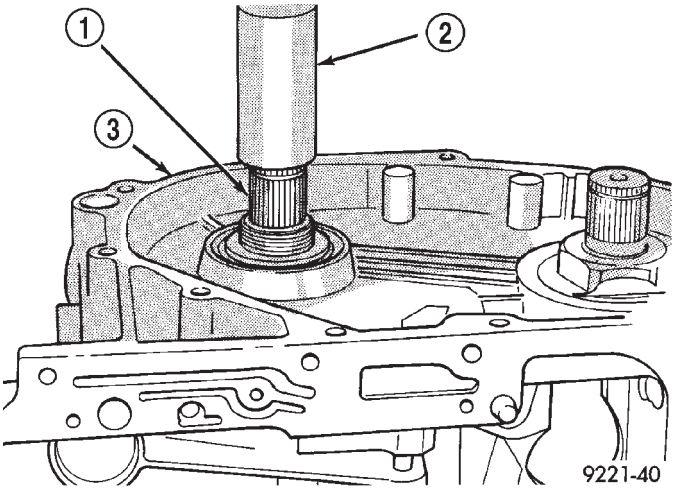


Fig. 206 Use Arbor Press to Remove Output Shaft from Case

1 – OUTPUT SHAFT
2 – ARBOR PRESS
3 – TRANSAXLE CASE

Use special tool 6597 and handle C-4171 and C-4171-2 to press rear output shaft bearing cup rearward (Fig. 208).

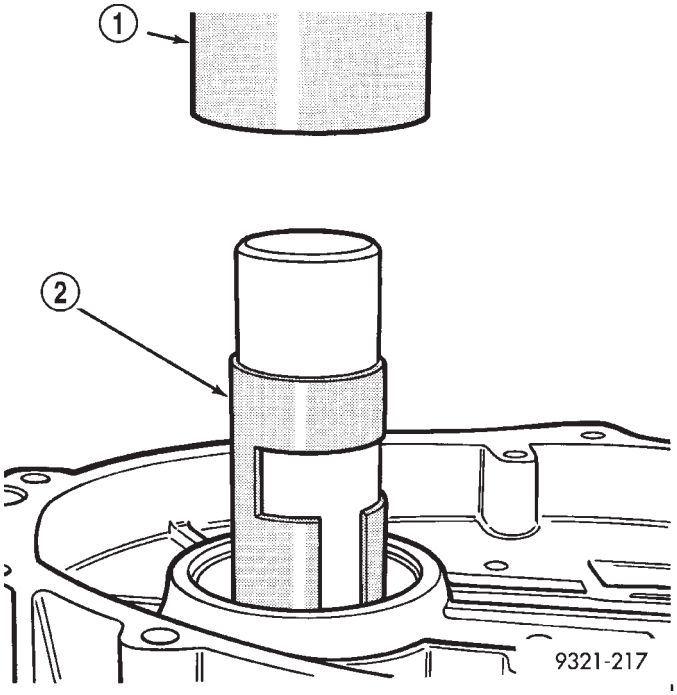


Fig. 207 Remove Front Bearing Cup

1 – ARBOR PRESS
2 – SPECIAL TOOL 6596

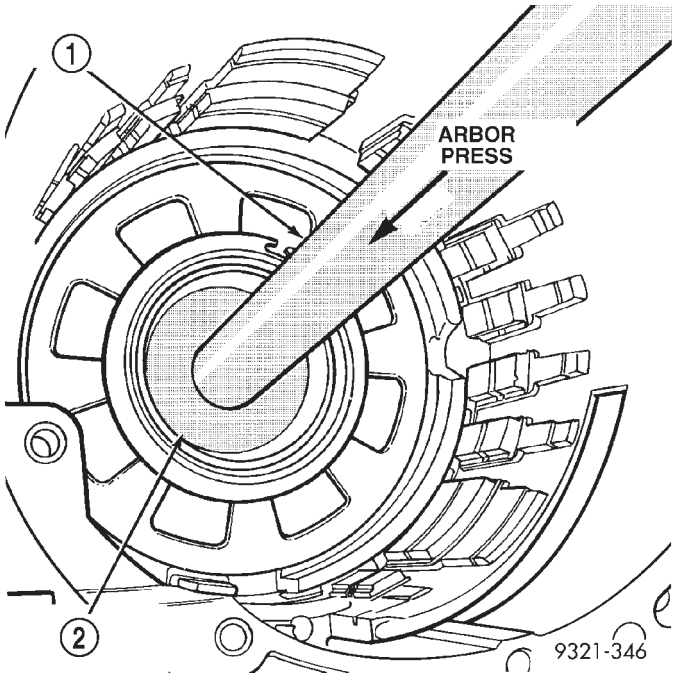


Fig. 208 Remove Rear Bearing Cup

1 – SPECIAL TOOL 4171 AND 4171–2
2 – SPECIAL TOOL 6597

DISASSEMBLY AND ASSEMBLY (Continued)

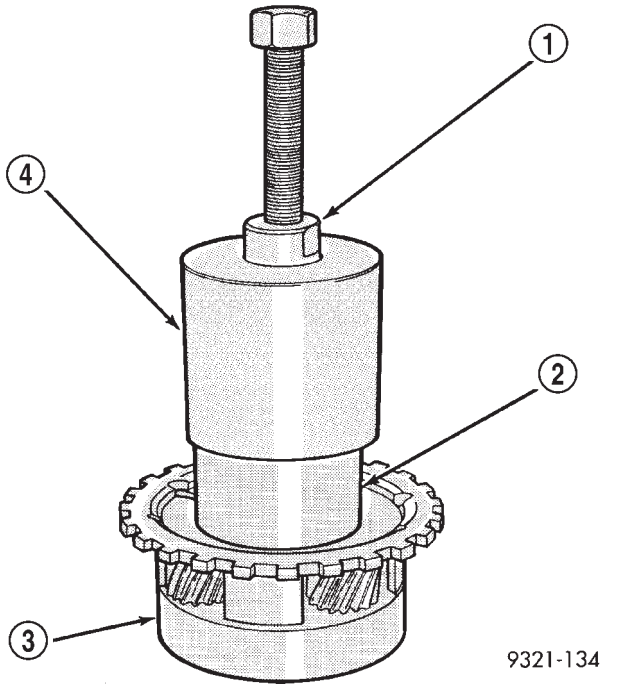


Fig. 209 Remove Rear Carrier Front Bearing Cone

1 – SPECIAL TOOL 5048–1
2 – SPECIAL TOOL 6545
3 – REAR CARRIER
4 – SPECIAL TOOL 5048

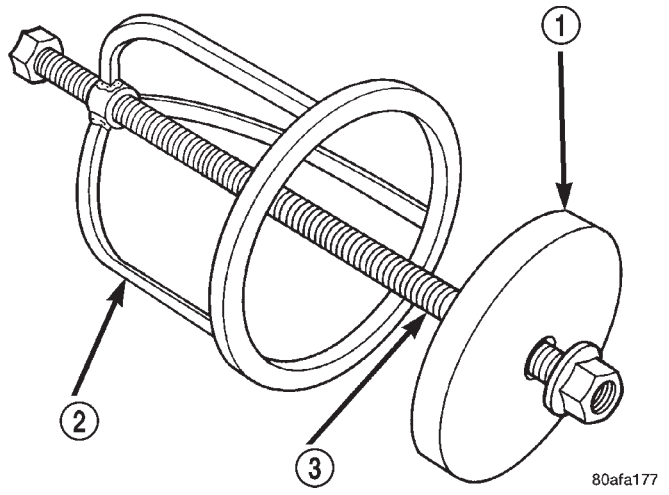


Fig. 210 Low/Reverse Spring Compressor Tool

1 – TOOL 6057
2 – TOOL 5059
3 – TOOL 5058–3

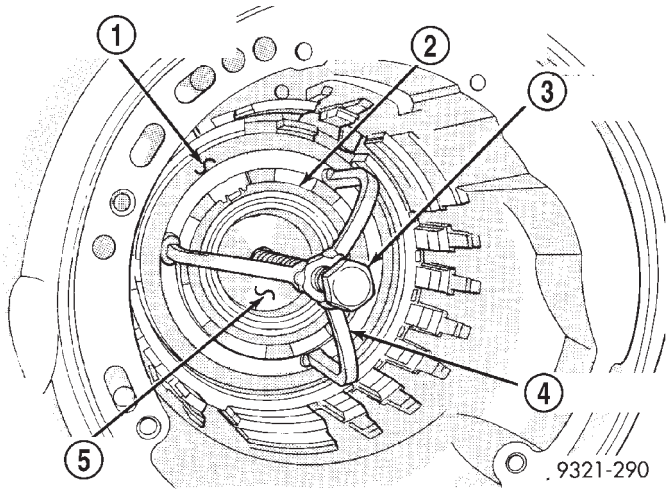


Fig. 211 Compressor Tool in Use

1 – LOW/REVERSE CLUTCH RETURN SPRING
2 – SNAP RING (INSTALL AS SHOWN)
3 – TOOL 5058A-3
4 – TOOL 5059A
5 – SPECIAL TOOL 6057

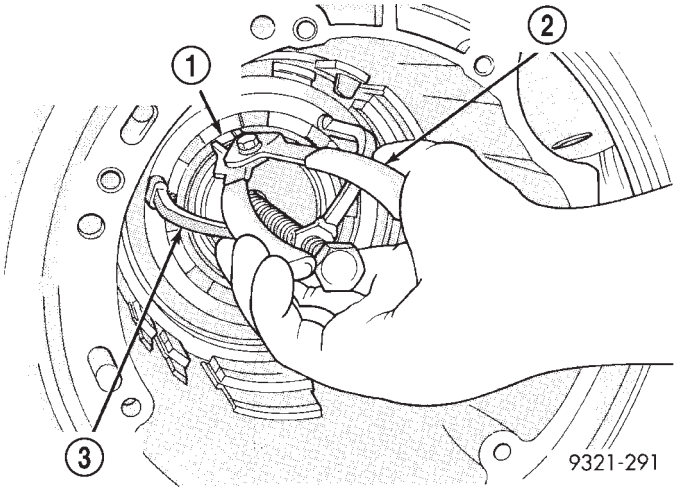


Fig. 212 Remove Snap Ring

1 – SNAP RING OPENING MUST BE BETWEEN SPRING LEVERS (AS SHOWN)
2 – SNAP RING PLIERS
3 – SPECIAL TOOL 5059A

DISASSEMBLY AND ASSEMBLY (Continued)

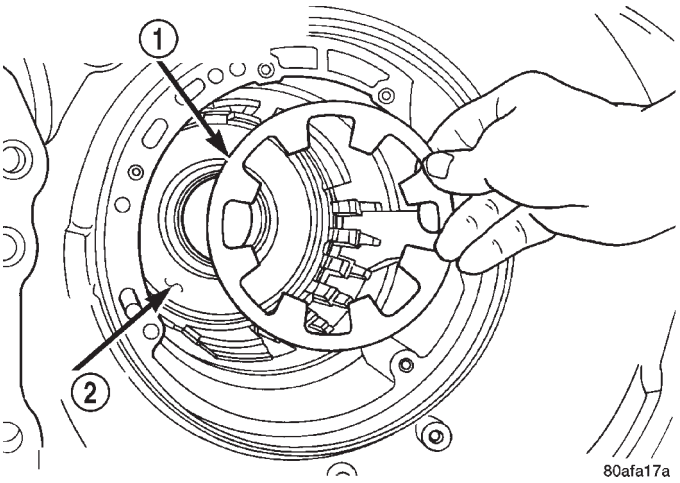


Fig. 213 Low/Reverse Piston Return Spring

1 – LOW/REVERSE PISTON RETURN SPRING
2 – PISTON

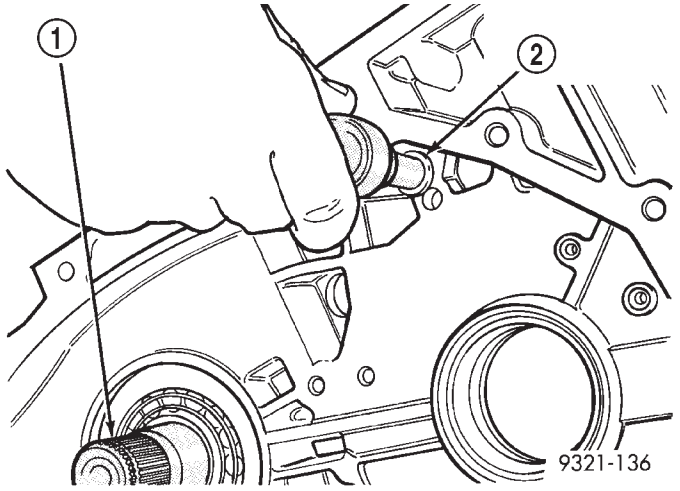


Fig. 214 Remove Parking Sprag Pivot Retaining Screw

1 – TRANSFER SHAFT
2 – PARKING SPRAG PIVOT RETAINING SCREW

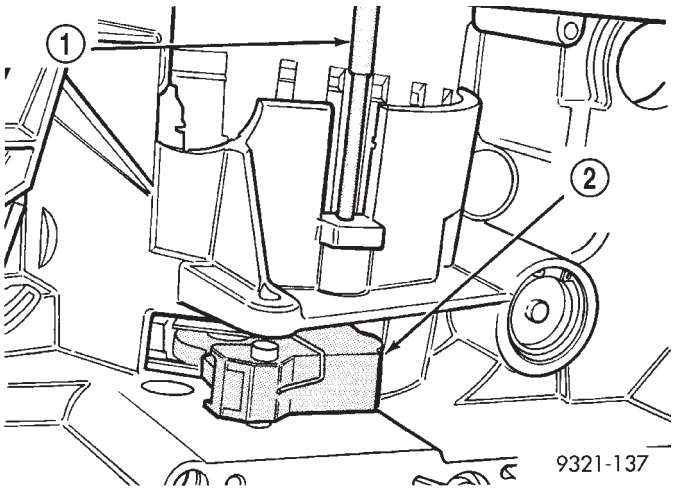


Fig. 215 Anchor Shaft Removal

1 – PIN PUNCH
2 – GUIDE BRACKET ASSEMBLY

NOTE: Using a pin punch, drive out guide bracket pivot shaft.

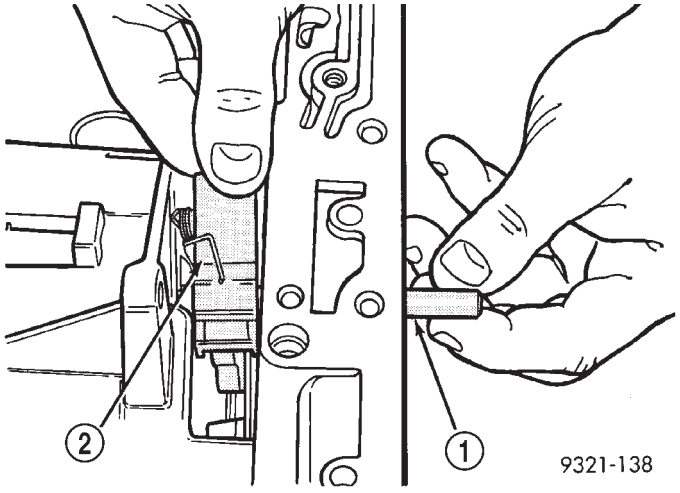


Fig. 216 Guide Bracket Pivot Shaft

1 – PIVOT PIN
2 – GUIDE BRACKET ASSEMBLY

DISASSEMBLY AND ASSEMBLY (Continued)

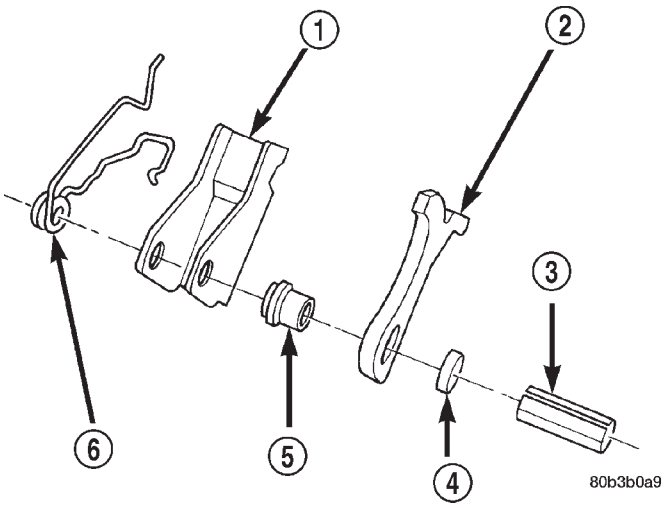


Fig. 217 Guide Bracket Disassembled

1 – GUIDE BRACKET
2 – PAWL
3 – SPLIT SLEEVE
4 – SPACER
5 – STEPPED SPACER
6 – ANTIRATCHET SPRING

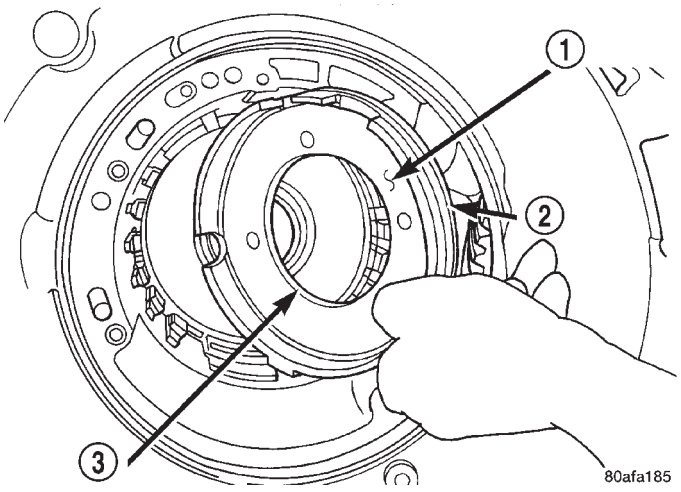


Fig. 218 Remove Low/Reverse Clutch Piston

1 – LOW/REVERSE CLUTCH PISTON
2 – LIP SEAL
3 – LIP SEAL

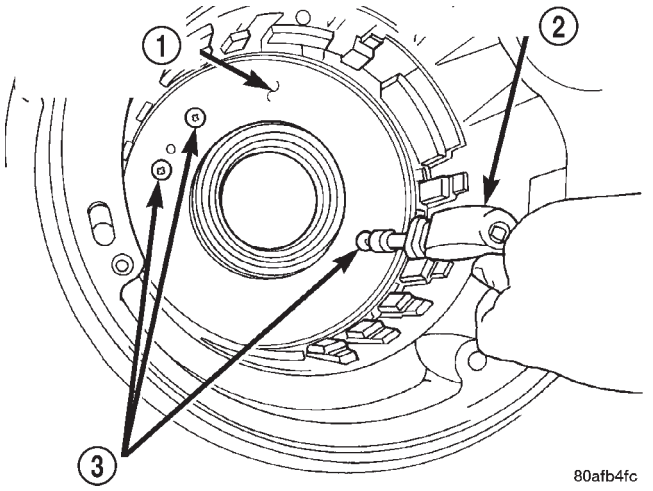


Fig. 219 Remove Piston Retainer Attaching Screws

1 – LOW/REVERSE CLUTCH PISTON RETAINER
2 – SCREWDRIVER
3 – TORX-LOC SCREWS

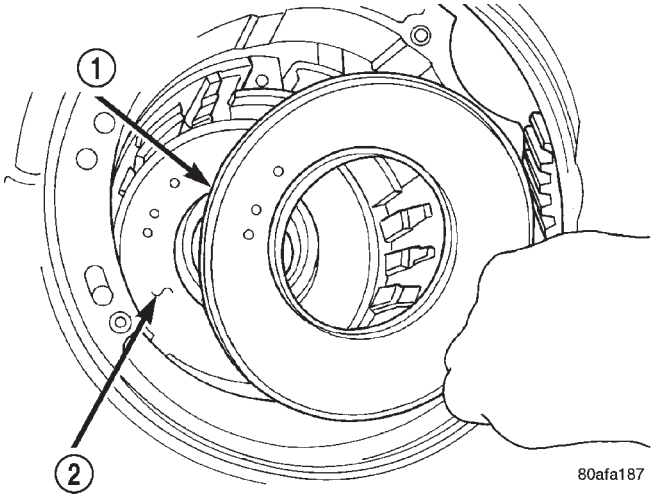


Fig. 220 Remove Piston Retainer

1 – LOW/REVERSE CLUTCH PISTON RETAINER
2 – GASKET

DISASSEMBLY AND ASSEMBLY (Continued)

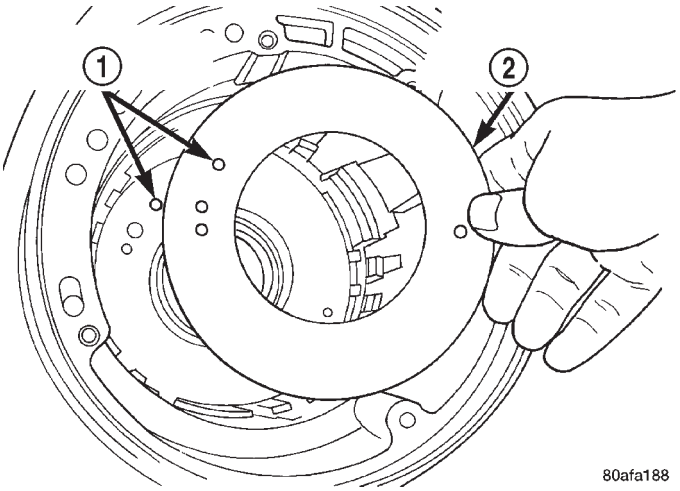


Fig. 221 Remove Piston Retainer Gasket

1 – GASKET HOLES MUST LINE UP
2 – LOW/REVERSE CLUTCH PISTON RETAINER GASKET

At this point the Centerline of the transaxle has been removed. If the condition for disassembly did not pertain to the differential, it's disassembly may not be required. Inspect the rear transfer shaft area and the transfer shaft seal area for contamination. If evidence of contamination is present, replace the rear transfer shaft bearing and/or the transfer shaft seal.

OIL PUMP

DISASSEMBLY, INSPECTION, & ASSEMBLY

When disassembling the transaxle it is necessary to inspect the oil pump for wear and damage.

(1) Remove the reaction shaft support bolts.

(2) Remove reaction shaft support from pump housing (Fig. 222).

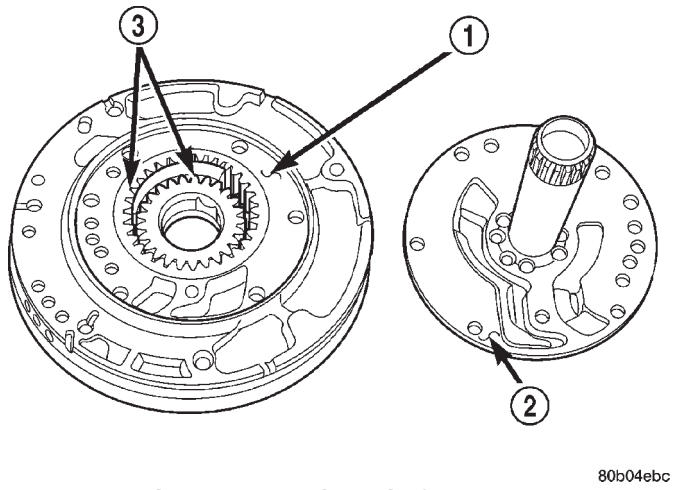


Fig. 222 Reaction Shaft Support

1 – PUMP HOUSING
2 – REACTION SHAFT SUPPORT
3 – PUMP GEARS

(3) Remove the pump gears (Fig. 223) and check for wear and damage.

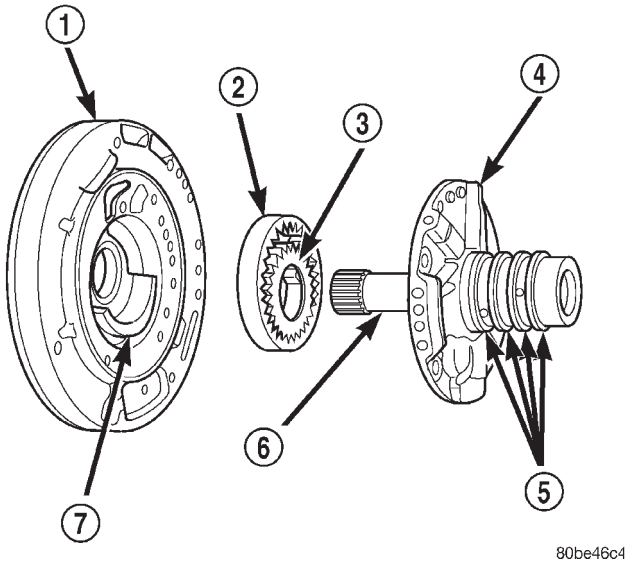


Fig. 223 Oil Pump Assembly

1 – PUMP HOUSING
2 – OUTER PUMP GEAR
3 – INNER PUMP GEAR
4 – REACTION SHAFT SUPPORT
5 – SEAL RINGS (4)
6 – REACTION SHAFT
7 – CRESCENT

(4) Re-install the gears and check clearances.

(5) Measure the clearance between the outer gear and the pump pocket (Fig. 224). Clearance should be 0.045-0.141mm (0.0018-0.0056 in.).

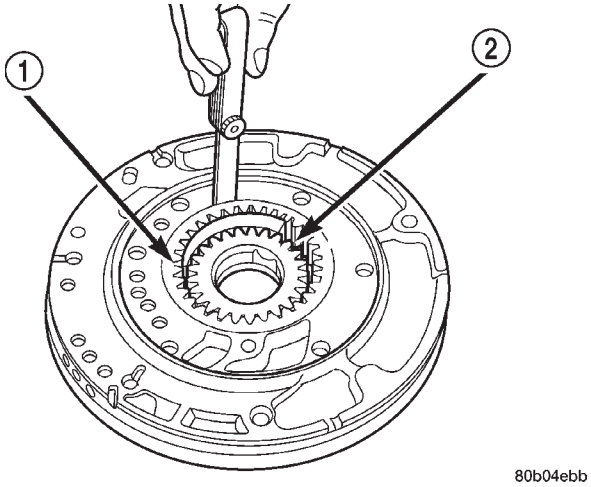


Fig. 224 Measure Outer Gear to Pocket

1 – OUTER GEAR
2 – POCKET

DISASSEMBLY AND ASSEMBLY (Continued)

(6) Position an appropriate piece of Plastigage across both pump gears.

(7) Align the Plastigage to a flat area on the reaction shaft support housing.

(8) Install the reaction shaft to the pump housing. Tighten the bolts to 27 N·M (20 ft. lbs.).

(9) Remove bolts and carefully separate the housings. Measure the Plastigage following the instructions supplied.

(10) Clearance between outer gear side and the reaction shaft support should be 0.020-0.046 mm (0.008-0.0018 in.). Clearance between inner gear side and the reaction shaft support should be 0.020-0.046 mm (0.008-0.0018 in.).

INPUT CLUTCH ASSEMBLY

DISASSEMBLY

(1) Mount input clutch assembly to Input Clutch Pressure Fixture (Tool 8391).

(2) Tap down reverse clutch reaction plate to release pressure from snap ring (Fig. 225).

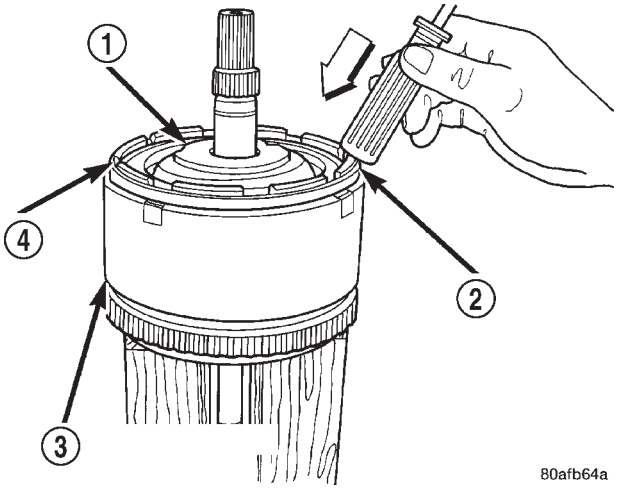


Fig. 225 Tapping Reaction Plate

1 – #4 THRUST PLATE (SELECT)
2 – TAP DOWN REVERSE CLUTCH REACTION PLATE TO REMOVE OR INSTALL SNAP RING
3 – INPUT SHAFT CLUTCHES RETAINER ASSEMBLY
4 – REVERSE CLUTCH REACTION PLATE

(3) Remove reverse clutch snap ring (Fig. 226).

(4) Pry up and remove reverse clutch reaction plate (Fig. 227) (Fig. 228).

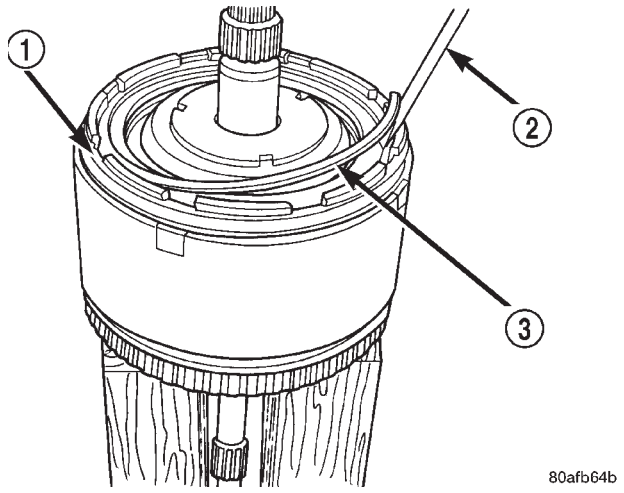


Fig. 226 Reverse Clutch Snap Ring

1 – REACTION PLATE
2 – SCREWDRIVER
3 – REVERSE CLUTCH SNAP RING (SELECT)

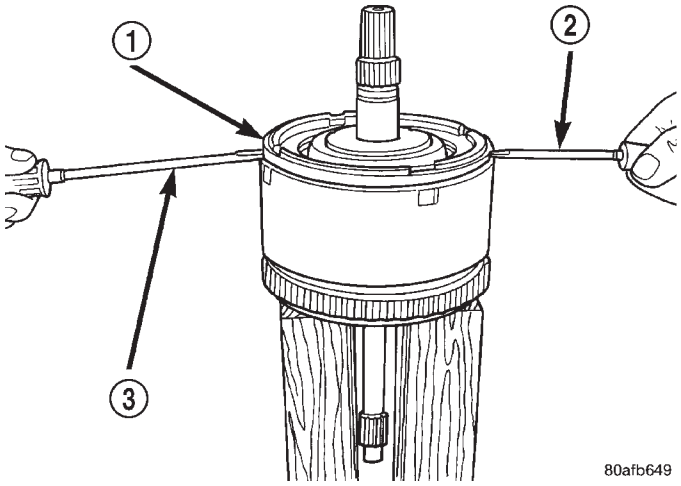


Fig. 227 Pry Reverse Clutch Reaction Plate

1 – REVERSE CLUTCH REACTION PLATE
2 – SCREWDRIVER
3 – SCREWDRIVER

(5) Remove the reverse clutch pack (two fibers/one steel) (Fig. 229).

NOTE: Tag reverse clutch pack for reassembly identification.

DISASSEMBLY AND ASSEMBLY (Continued)

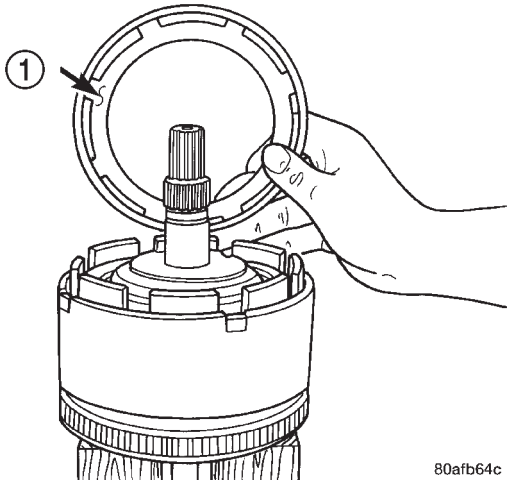


Fig. 228 Reverse Clutch Reaction Plate

1 – REVERSE CLUTCH REACTION PLATE (INSTALL FLAT SIDE DOWN)

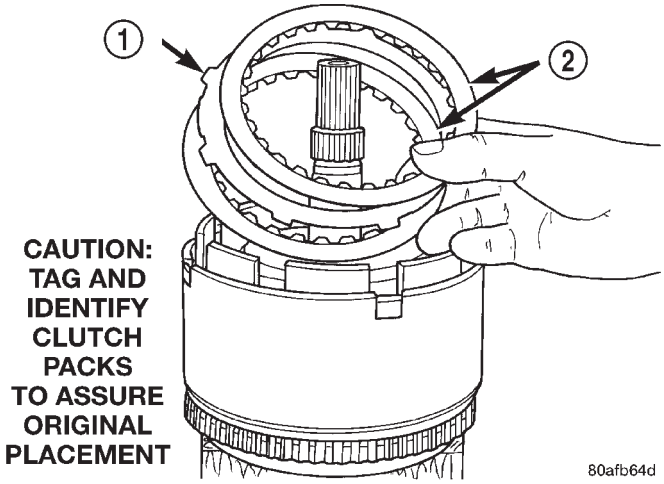


Fig. 229 Reverse Clutch Pack

1 – REVERSE CLUTCH PLATE
2 – REVERSE CLUTCH DISC

(6) Remove the OD/Reverse reaction plate snap ring (Fig. 230).

(7) Remove OD/Reverse reaction plate (Fig. 231).

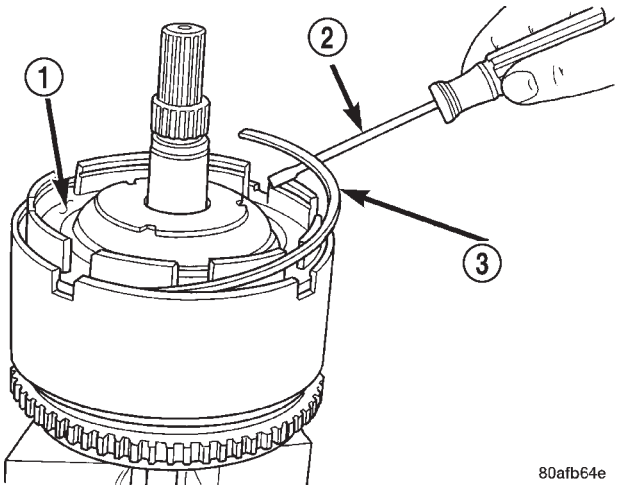


Fig. 230 OD/Reverse Reaction Plate Snap Ring

1 – OD/REVERSE PRESSURE PLATE
2 – SCREWDRIVER
3 – OD/REVERSE PRESSURE PLATE SNAP RING

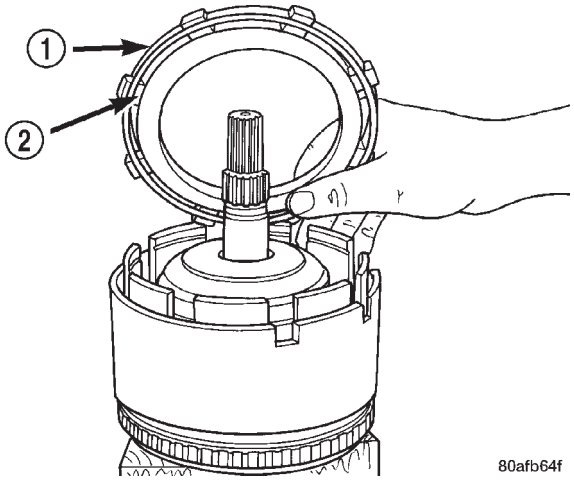


Fig. 231 OD/Reverse Reaction Plate

1 – OD/REVERSE PRESSURE PLATE (STEP SIDE DOWN)
2 – (STEP SIDE DOWN)

(8) Remove OD/Reverse reaction plate wave snap ring (Fig. 232).

DISASSEMBLY AND ASSEMBLY (Continued)

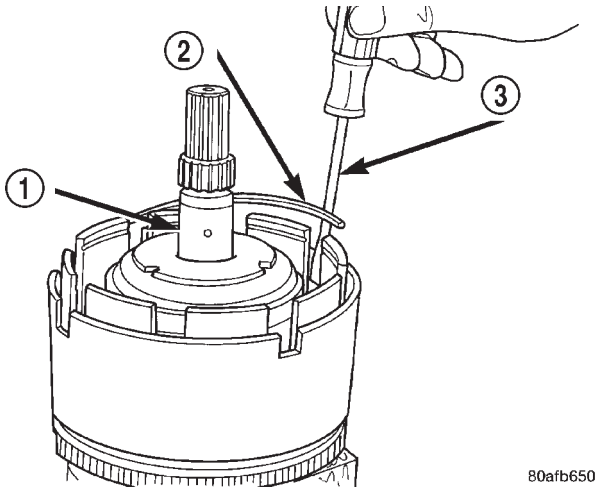


Fig. 232 Waved Snap Ring

1 – OVERDRIVE SHAFT ASSEMBLY
2 – OD/REVERSE CLUTCH WAVED SNAP RING
3 – SCREWDRIVER

(9) Remove OD shaft/hub and OD clutch pack (Fig. 233) (Fig. 234).

NOTE: Tag overdrive clutch pack for reassembly identification.

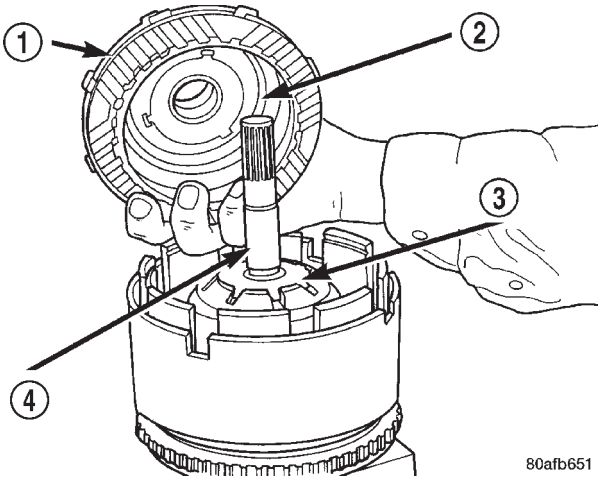


Fig. 233 Remove OD Clutch Pack

1 – OVERDRIVE SHAFT ASSEMBLY AND OD CLUTCH PACK
2 – #3 THRUST PLATE
3 – #3 THRUST WASHER
4 – UNDERDRIVE SHAFT ASSEMBLY

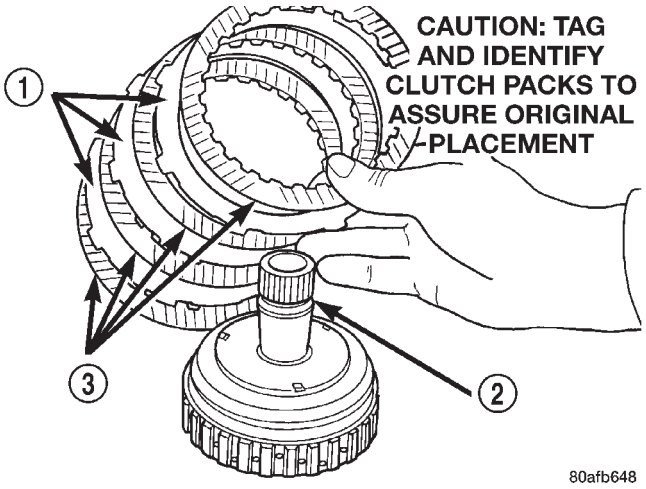


Fig. 234 Overdrive Clutch Pack

1 – OVERDRIVE CLUTCH PLATE
2 – OVERDRIVE SHAFT ASSEMBLY
3 – OVERDRIVE CLUTCH DISC

(10) Remove and inspect #3 & #4 thrust washers (Fig. 235).

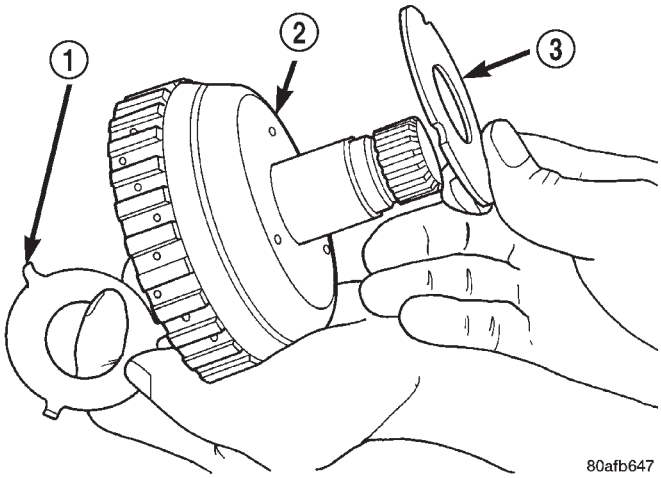


Fig. 235 #3&4 Thrust Washers

1 – #3 THRUST PLATE (3 TABS)
2 – OD SHAFT ASSEMBLY
3 – #4 THRUST PLATE (3 SLOTS)

(11) Remove the underdrive shaft assembly (Fig. 236).

(12) Remove the #2 needle bearing (Fig. 237).

DISASSEMBLY AND ASSEMBLY (Continued)

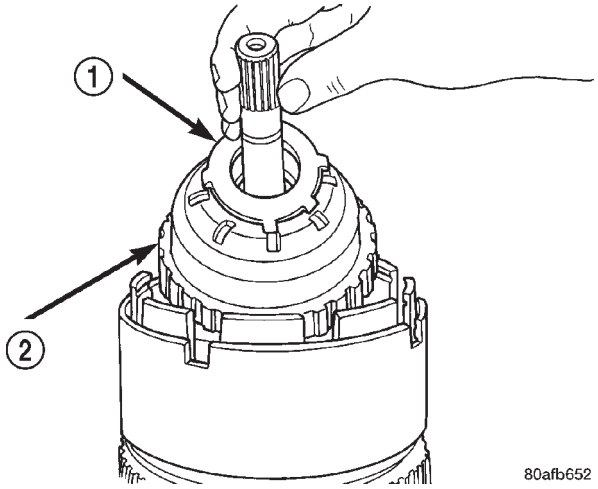


Fig. 236 Underdrive Shaft Assembly

1 – #3 THRUST WASHER (5 TABS)
2 – UNDERDRIVE SHAFT ASSEMBLY

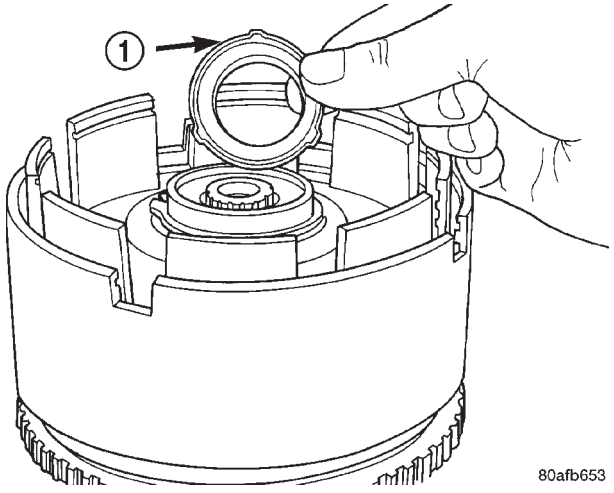


Fig. 237 No. 2 Needle Bearing

1 – #2 NEEDLE BEARING (NOTE 3 TABS)

NOTE: The OD/UD Reaction Plate, Snap Rings, and Input Clutches Retainer is not interchangeable with previous year 41TE components. The snap rings are thicker and the position of the ring lands have changed.

(13) Remove the OD/UD reaction plate tapered snap ring (Fig. 238).

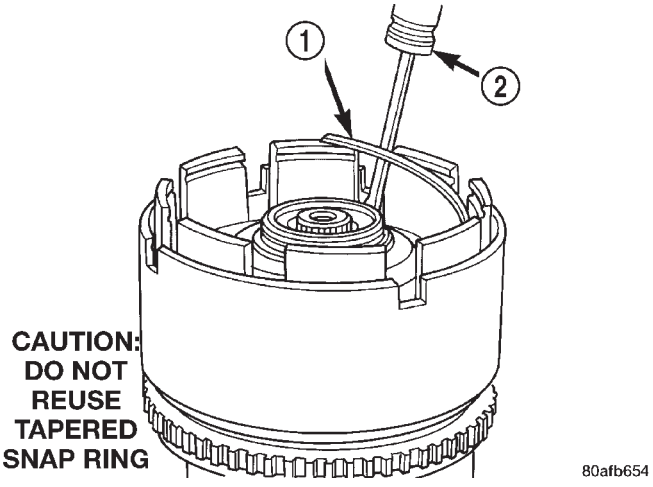


Fig. 238 OD/UD Reaction Plate Tapered Snap Ring

1 – OVERDRIVE/UNDERDRIVE CLUTCHES REACTION PLATE TAPERED SNAP RING
2 – SCREWDRIVER (DO NOT SCRATCH REACTION PLATE)

NOTE: The OD/UD clutch reaction plate has a step on both sides. Install the OD/UD clutches reaction plate tapered step side up.

(14) Remove the OD/UD reaction plate (Fig. 239).

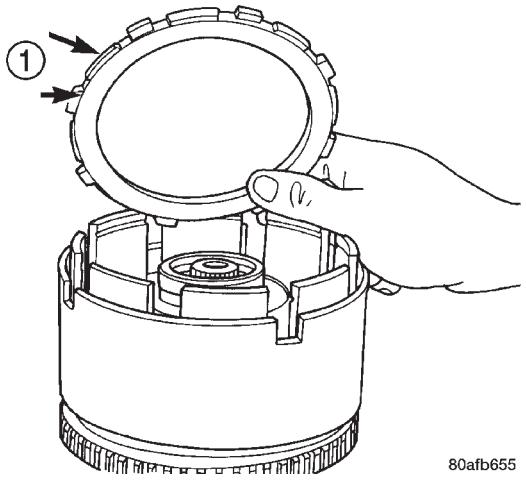


Fig. 239 OD/UD Reaction Plate

1 – OD/UD CLUTCH REACTION PLATE (STEP SIDE DOWN)

(15) Remove the first UD clutch disc (Fig. 240).

(16) Remove the UD clutch flat snap ring (Fig. 241).

DISASSEMBLY AND ASSEMBLY (Continued)

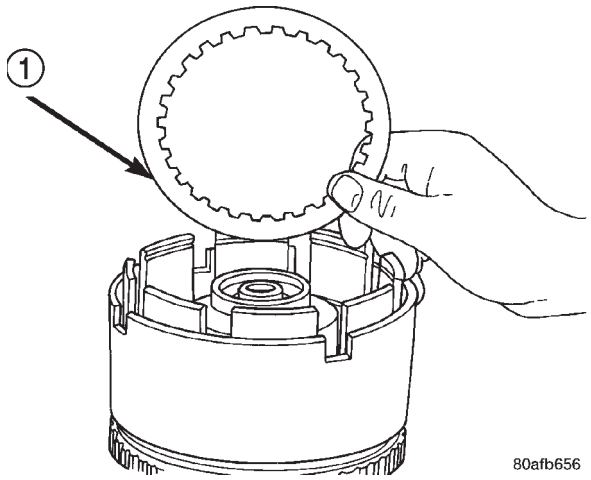


Fig. 240 Remove One UD Clutch Disc

1 – ONE UNDERDRIVE CLUTCH DISC

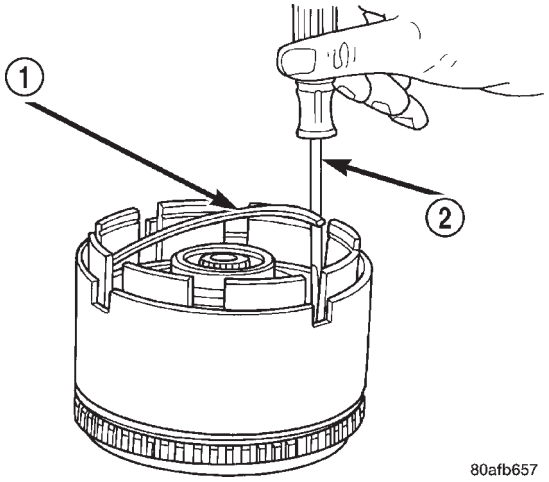


Fig. 241 UD Clutch Flat Snap Ring

1 – UNDERDRIVE CLUTCH REACTION PLATE FLAT SNAP RING
2 – SCREWDRIVER

NOTE: Tag underdrive clutch pack for reassembly identification.

(17) Remove the UD clutch pack (Fig. 242).

CAUTION: Compress return spring just enough to remove or install snap ring.

(18) Using Tool 5059A and an arbor press, compress UD clutch piston enough to remove snap ring (Fig. 243) (Fig. 244).

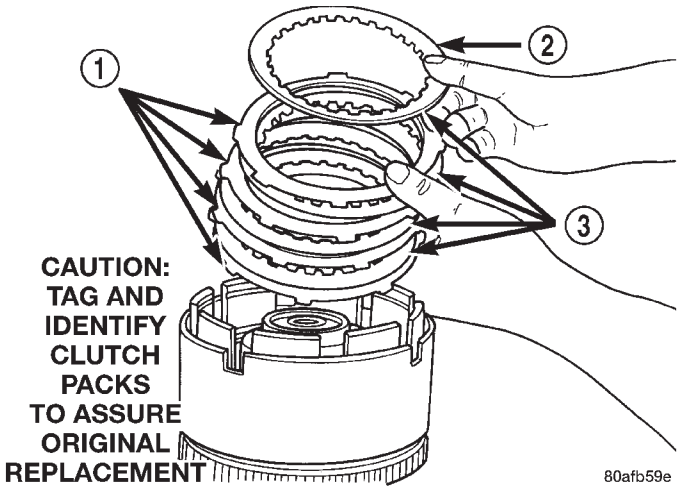


Fig. 242 Underdrive Clutch Pack

1 – CLUTCH PLATE
2 – ONE UD CLUTCH DISC
3 – CLUTCH DISC

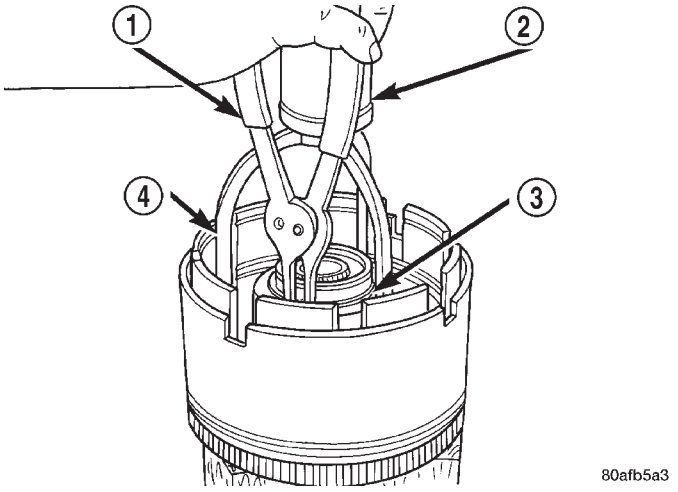


Fig. 243 UD Spring Retainer Snap Ring

1 – SNAP RING PLIERS
2 – ARBOR PRESS RAM
3 – SNAP RING
4 – SPECIAL TOOL 5059A

(19) Remove spring retainer (Fig. 244).

(20) Remove UD clutch piston (Fig. 245).

(21) Remove input hub tapered snap ring (Fig. 246).

(22) Tap on input hub with soft faced hammer and separate input hub from OD/Reverse piston and clutch retainer (Fig. 247) (Fig. 248).

DISASSEMBLY AND ASSEMBLY (Continued)

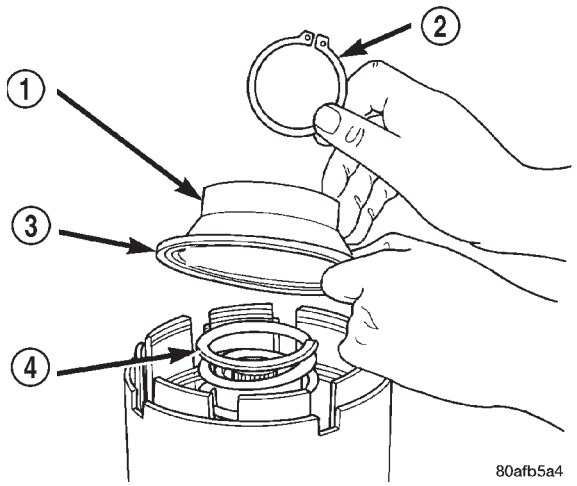


Fig. 244 UD Return Spring and Retainer

1 – UNDERDRIVE SPRING RETAINER
2 – SNAP RING
3 – SEAL
4 – PISTON RETURN SPRING

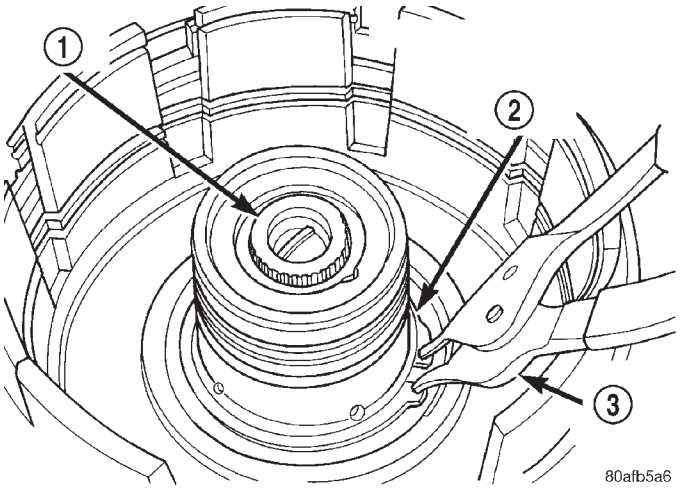


Fig. 246 Input Hub Tapered Snap Ring

1 – INPUT SHAFT
2 – INPUT HUB SNAP RING (TAPERED SIDE UP WITH TABS IN CAVITY)
3 – SNAP RING PLIERS

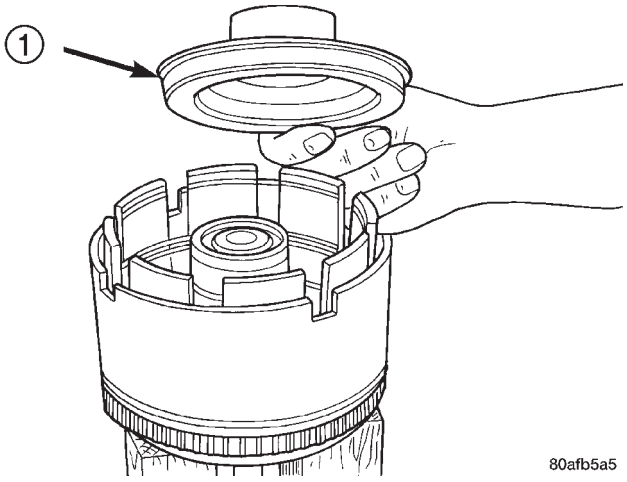


Fig. 245 Underdrive Clutch Piston

1 – PISTON

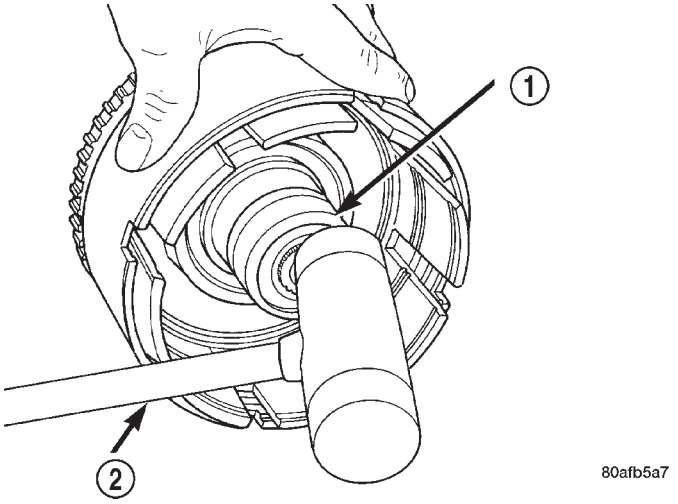


Fig. 247 Tap on Input Hub

1 – INPUT SHAFT AND HUB ASSEMBLY
2 – PLASTIC HAMMER

(23) Separate clutch retainer from OD/Reverse piston (Fig. 249).

DISASSEMBLY AND ASSEMBLY (Continued)

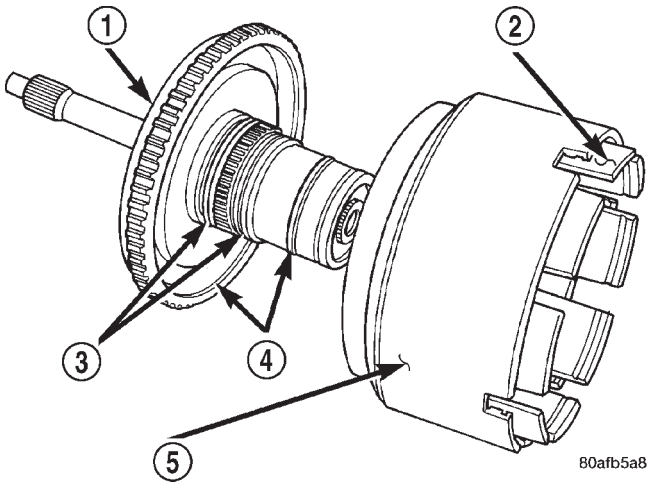


Fig. 248 Input Hub Removed

1 – INPUT SHAFT AND HUB ASSEMBLY
2 – INPUT CLUTCHES RETAINER
3 – O-RING
4 – SEAL
5 – OVERDRIVE/REVERSE PISTON

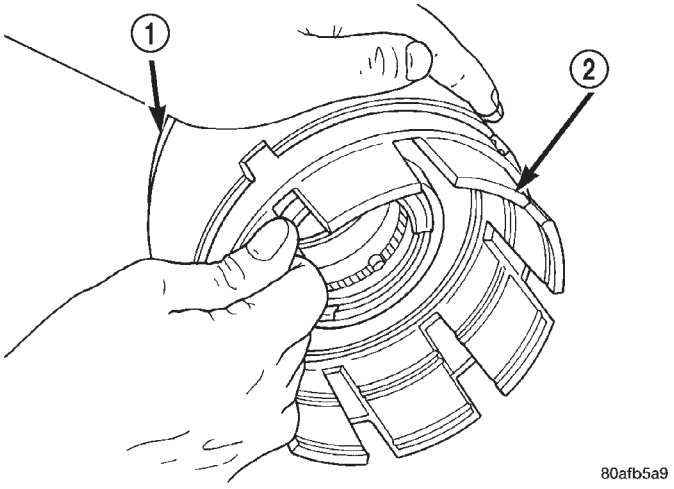


Fig. 249 Pull Retainer from Piston

1 – OVERDRIVE/REVERSE PISTON
2 – INPUT CLUTCHES RETAINER

(24) Using Tool 6057 and an arbor press, compress return OD/Reverse piston return spring just enough to remove snap ring (Fig. 250) (Fig. 251).

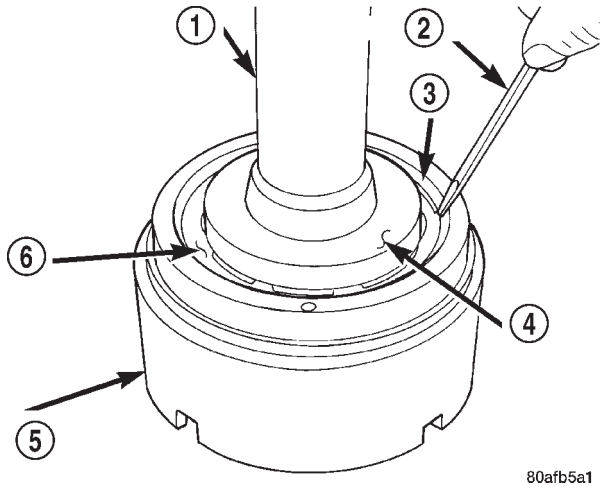


Fig. 250 Remove Snap Ring

1 – ARBOR PRESS RAM (COMPRESS RETURN SPRING JUST ENOUGH TO REMOVE OR INSTALL SNAP RING)
2 – SCREWDRIVER
3 – SNAP RING
4 – SPECIAL TOOL 6057
5 – OD/REVERSE PISTON
6 – RETURN SPRING

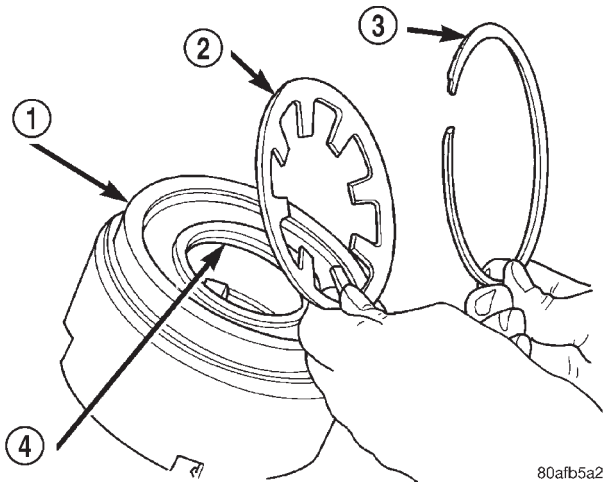


Fig. 251 Snap Ring and Return Spring

1 – OD/REVERSE PISTON
2 – RETURN SPRING
3 – SNAP RING
4 – O-RING

DISASSEMBLY AND ASSEMBLY (Continued)

(25) Remove input shaft to input clutch hub snap ring (Fig. 252).

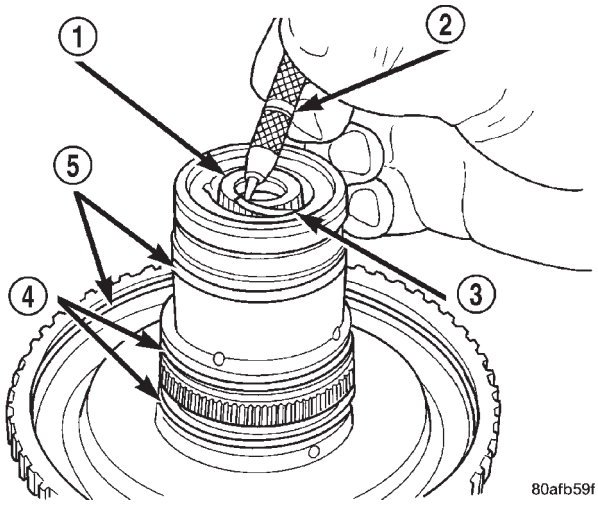


Fig. 252 Remove Input Shaft Snap Ring

1 – INPUT SHAFT
2 – SHARP-POINTED TOOL
3 – SNAP RING
4 – O-RINGS
5 – SEALS

(26) Using a suitably sized socket and an arbor press, remove input shaft from input shaft hub (Fig. 253).

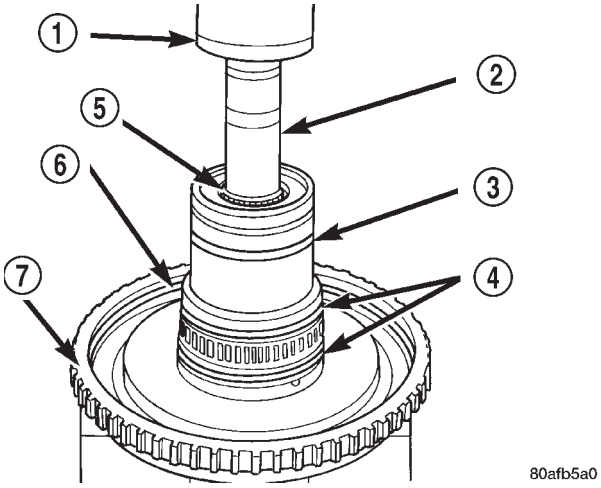


Fig. 253 Remove Input Shaft

1 – ARBOR PRESS RAM
2 – SOCKET
3 – SEAL
4 – O-RINGS
5 – INPUT SHAFT
6 – SEAL
7 – INPUT SHAFT HUB ASSEMBLY

ASSEMBLY

Use petrolatum on all seals to ease assembly of components.

(1) Using an arbor press, install input shaft to input shaft hub (Fig. 254).

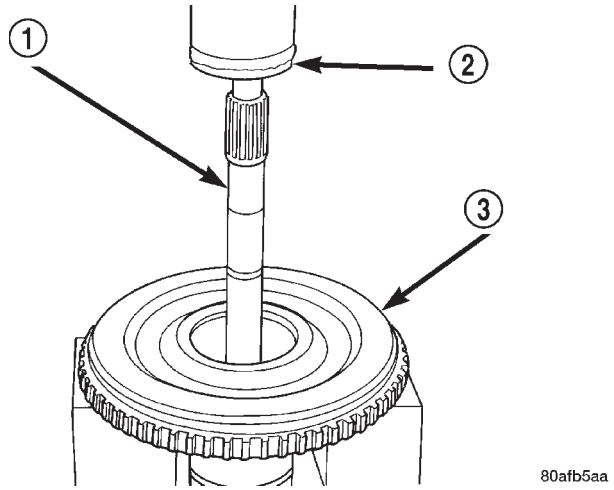


Fig. 254 Install Input Shaft

1 – INPUT SHAFT
2 – ARBOR PRESS RAM
3 – INPUT SHAFT HUB ASSEMBLY

(2) Install input shaft snap ring (Fig. 255).

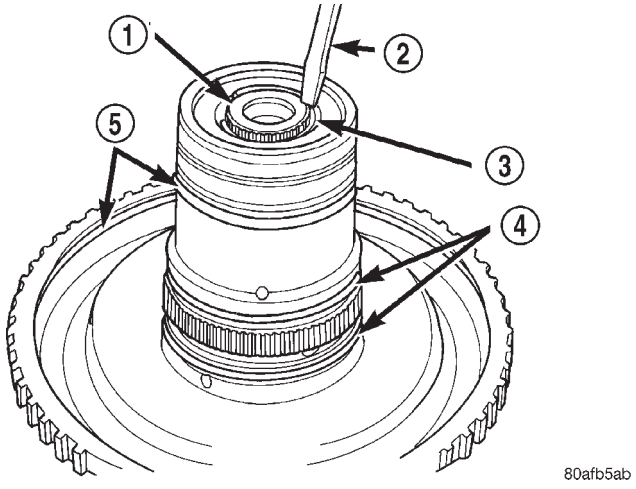


Fig. 255 Install Input Shaft Snap Ring

1 – INPUT SHAFT
2 – SCREWDRIVER (DO NOT SCRATCH BEARING SURFACE)
3 – SNAP RING
4 – O-RINGS
5 – SEALS

(3) Using an arbor press and Tool 6057, Install OD/Reverse piston return spring and snap ring (Fig. 256) (Fig. 257).

DISASSEMBLY AND ASSEMBLY (Continued)

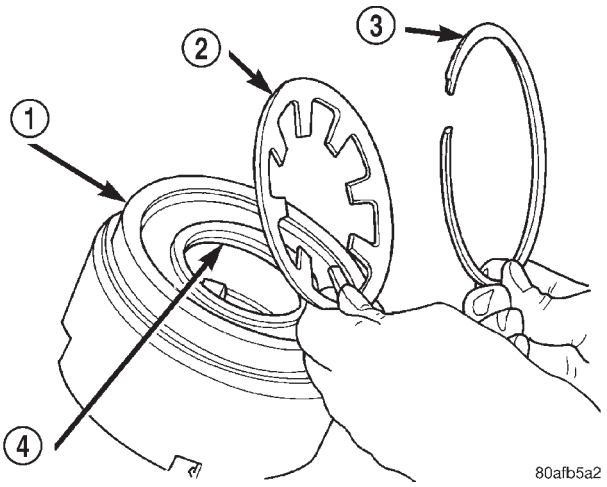


Fig. 256 Return Spring and Snap Ring

1 – OD/REVERSE PISTON
2 – RETURN SPRING
3 – SNAP RING
4 – O-RING

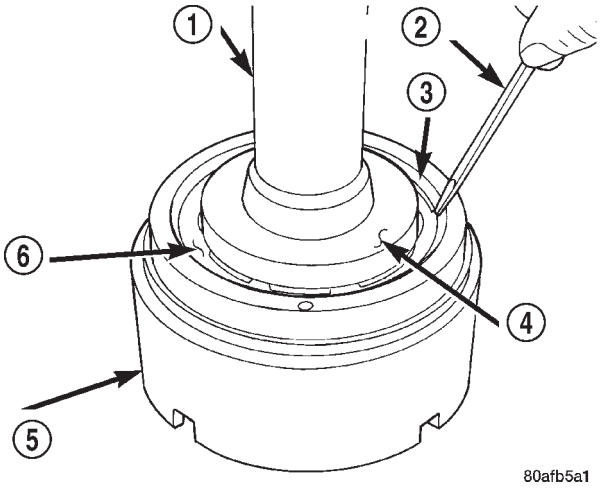


Fig. 257 Install Snap Ring

1 – ARBOR PRESS RAM (COMPRESS RETURN SPRING JUST ENOUGH TO REMOVE OR INSTALL SNAP RING)
2 – SCREWDRIVER
3 – SNAP RING
4 – SPECIAL TOOL 6057
5 – OD/REVERSE PISTON
6 – RETURN SPRING

(4) Install the OD/Reverse piston assembly to the input clutch retainer as shown in (Fig. 258).

NOTE: The OD/UD Reaction Plate, Snap Rings, and Input Clutches Retainer is not interchangeable with previous year 41TE components. The snap rings are thicker and the position of the ring lands have changed.

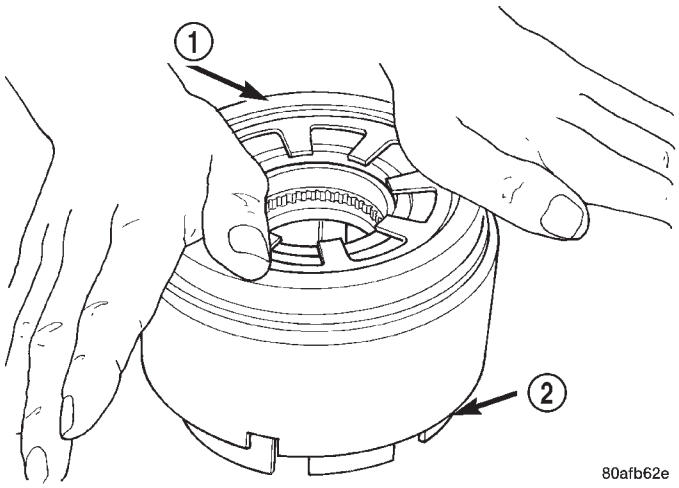


Fig. 258 Install OD/Reverse Piston

1 – PUSH DOWN TO INSTALL OVERDRIVE/REVERSE PISTON
2 – INPUT CLUTCHES RETAINER

(5) Install the input hub/shaft assy. to the OD/Reverse piston/clutch retainer assy. (Fig. 259).

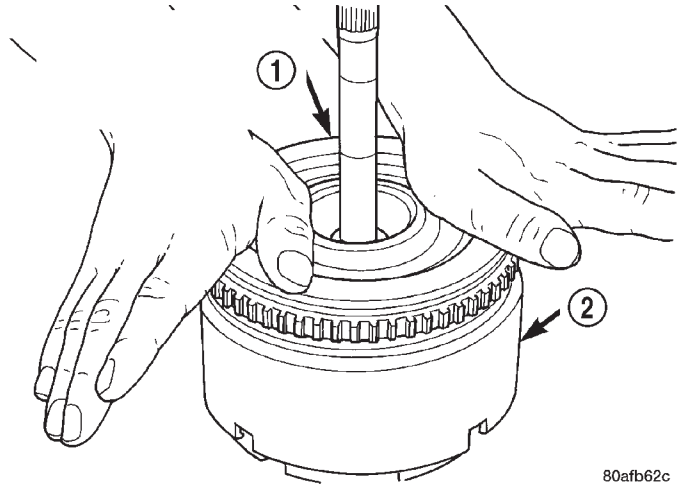


Fig. 259 Install Input Shaft Hub Assembly

1 – PUSH DOWN TO INSTALL INPUT SHAFT HUB ASSEMBLY (ROTATE TO ALIGN SPLINES)
2 – OD/REV. PISTON

(6) Install input hub tapered snap ring (Fig. 260).
(7) Install UD clutch piston (Fig. 261).
(8) Install UD piston return spring and Tool 5067 as shown in (Fig. 262).
(9) Using Tool 5059A and an arbor press, Install the UD spring retainer and snap ring. (Fig. 263) (Fig. 264) Compress just enough to install snap ring.

CAUTION: Compress return spring just enough to install snap ring.

DISASSEMBLY AND ASSEMBLY (Continued)

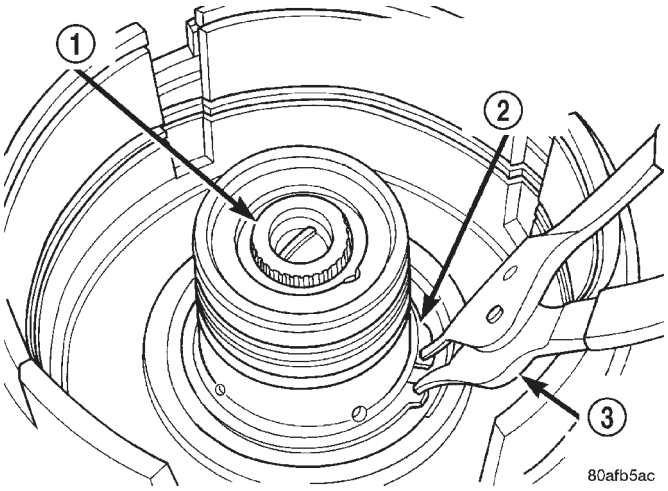


Fig. 260 Install Input Hub Tapered Snap Ring

1 – INPUT SHAFT
2 – INPUT HUB SNAP RING (TAPERED SIDE UP WITH TABS IN CAVITY)
3 – SNAP RING PLIERS

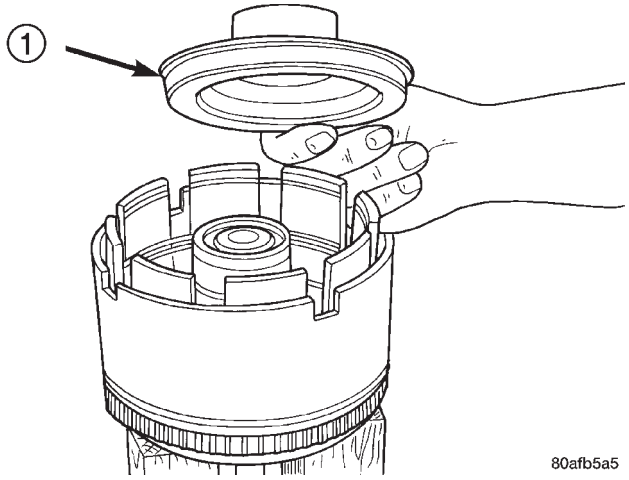


Fig. 261 Underdrive Clutch Piston

1 – PISTON

(10) Install the UD clutch pack (four fibers/four steels) (Fig. 265).

(11) Install the UD clutch flat snap ring (Fig. 266).

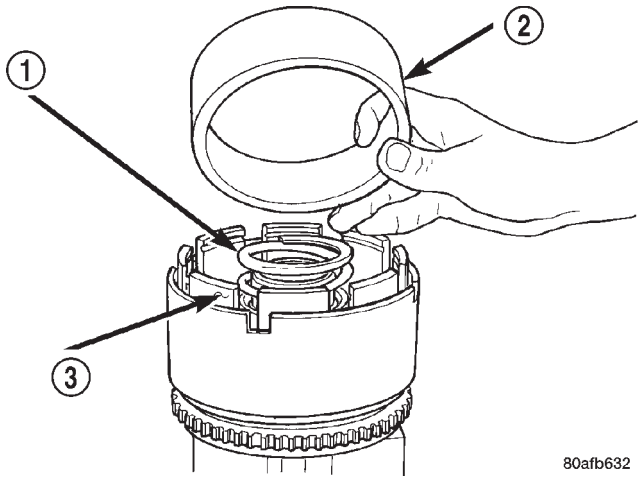


Fig. 262 Seal Compressor Special Tool 5067

1 – PISTON RETURN SPRING
2 – SPECIAL TOOL 5067
3 – INPUT SHAFT CLUTCHES RETAINER ASSEMBLY

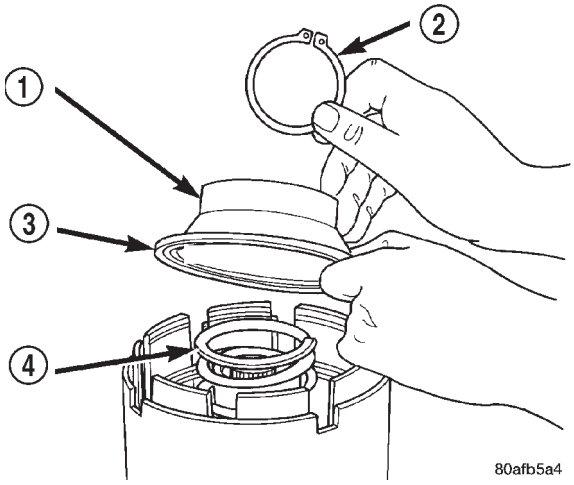


Fig. 263 UD Return Spring and Retainer

1 – UNDERDRIVE SPRING RETAINER
2 – SNAP RING
3 – SEAL
4 – PISTON RETURN SPRING

(12) Install the last UD clutch disc (Fig. 267).

DISASSEMBLY AND ASSEMBLY (Continued)

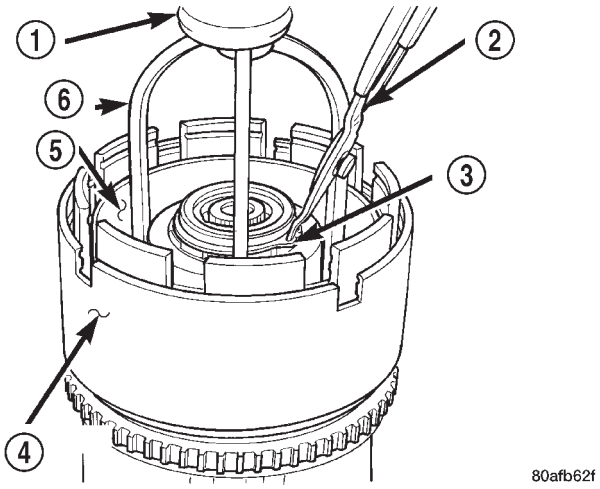


Fig. 264 Install UD Spring Retainer and Snap Ring

1 – ARBOR PRESS RAM
2 – SNAP RING PLIERS
3 – SNAP RING
4 – OD/REVERSE PISTON
5 – TOOL 5067
6 – TOOL 5059A

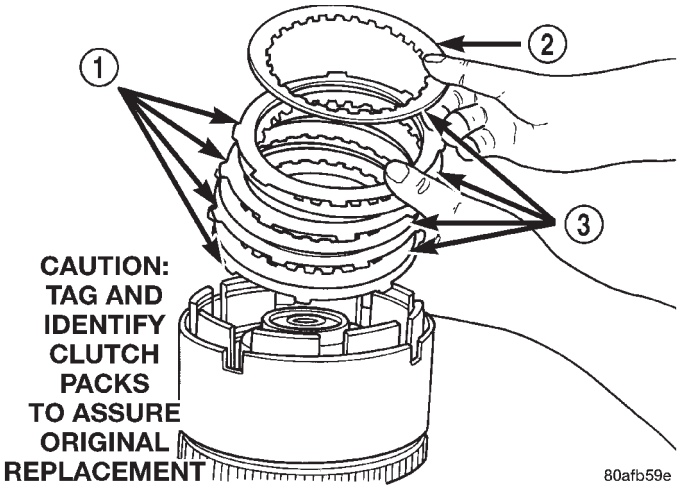


Fig. 265 Underdrive Clutch Pack

1 – CLUTCH PLATE
2 – ONE UD CLUTCH DISC
3 – CLUTCH DISC

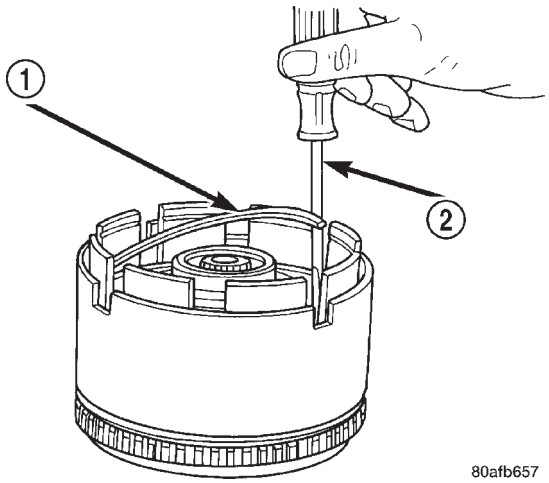


Fig. 266 UD Clutch Flat Snap Ring

1 – UNDERDRIVE CLUTCH REACTION PLATE FLAT SNAP RING
2 – SCREWDRIVER

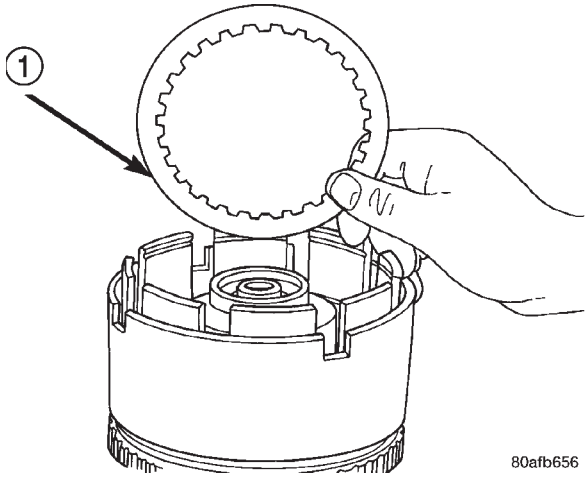


Fig. 267 Install Last UD Clutch Disc

1 – ONE UNDERDRIVE CLUTCH DISC

(13) Install the OD/UD clutch reaction plate and snap ring (Fig. 268) (Fig. 269). The OD/UD clutches reaction plate has a step on both sides. Install the OD/UD clutches reaction plate tapered step side up.

DISASSEMBLY AND ASSEMBLY (Continued)

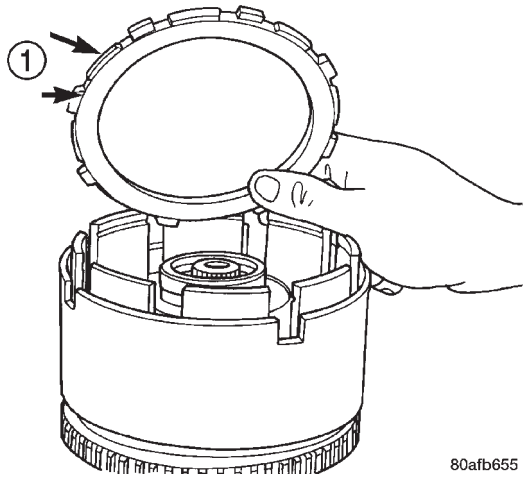


Fig. 268 OD/UD Reaction Plate

1 – OD/UD CLUTCH REACTION PLATE (STEP SIDE DOWN)

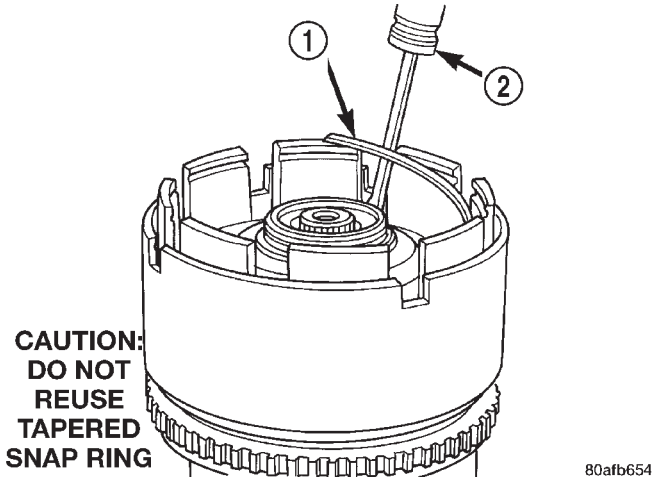


Fig. 269 Tapered Snap Ring

1 – OVERDRIVE/UNDERDRIVE CLUTCHES REACTION PLATE TAPERED SNAP RING
2 – SCREWDRIVER (DO NOT SCRATCH REACTION PLATE)

NOTE: Snap ring ends must be located within one finger of the input clutch hub. Be sure that snap ring is fully seated, by pushing with screwdriver, into snap ring groove all the way around.

(14) Seat tapered snap ring to ensure proper installation (Fig. 270).

(15) Install input clutch assembly to the Input Clutch Pressure Fixture–Tool 8391 (Fig. 271).

(16) Set up dial indicator on the UD clutch pack as shown in (Fig. 272).

(17) Using moderate pressure, press down and hold (near indicator) the UD clutch pack with screwdriver or suitable tool and zero dial indicator (Fig. 273). When releasing pressure on clutch pack, indicator reading should advance 0.005–0.010.

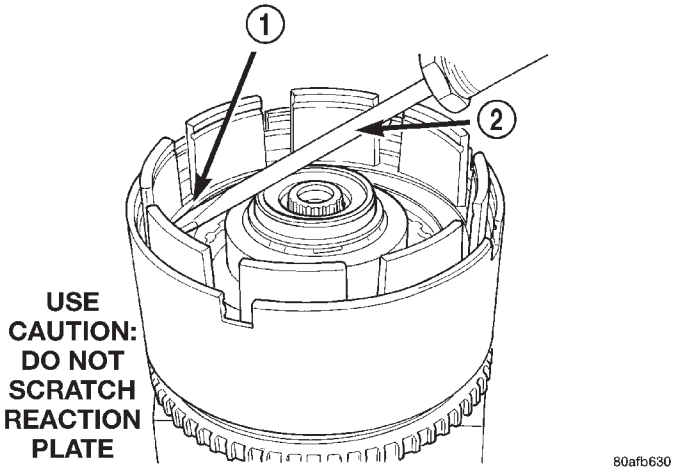


Fig. 270 Seating Tapered Snap Ring

1 – OVERDRIVE/UNDERDRIVE CLUTCHES REACTION PLATE TAPERED SNAP RING
2 – SCREWDRIVER

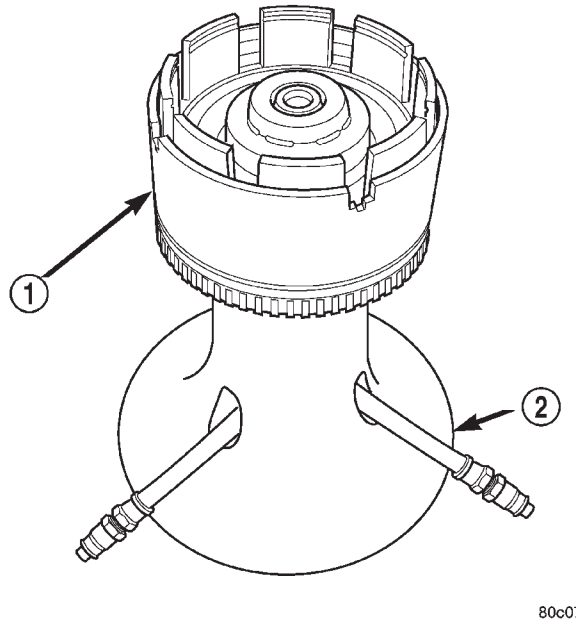


Fig. 271 Input Clutch Assembly on Pressure Fixture Tool 8391

1 – INPUT CLUTCH ASSEMBLY
2 – INPUT CLUTCH PRESSURE FIXTURE 8391

CAUTION: Do not apply more than 30 psi (206 kPa) to the underdrive clutch pack.

(18) Apply 30 psi (206 kPa) to the underdrive hose on Tool 8391 and measure UD clutch clearance. Measure and record UD clutch pack measurement in four (4) places, 90° apart.

DISASSEMBLY AND ASSEMBLY (Continued)

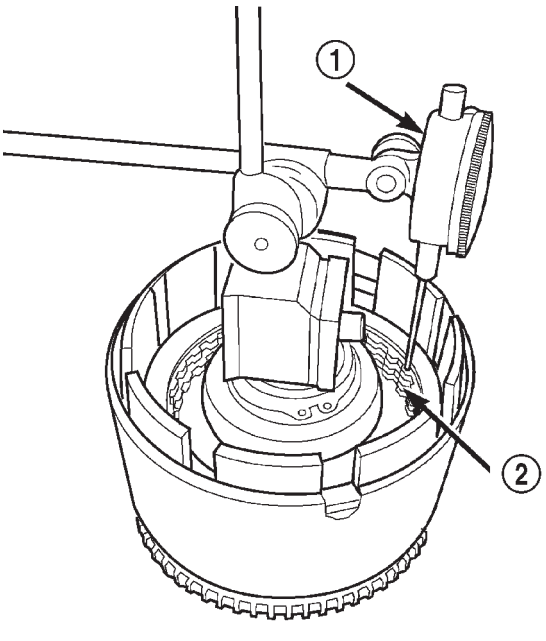


Fig. 272 Set Up Dial Indicator to Measure UD Clutch Clearance

1 – DIAL INDICATOR
2 – UNDERDRIVE CLUTCH

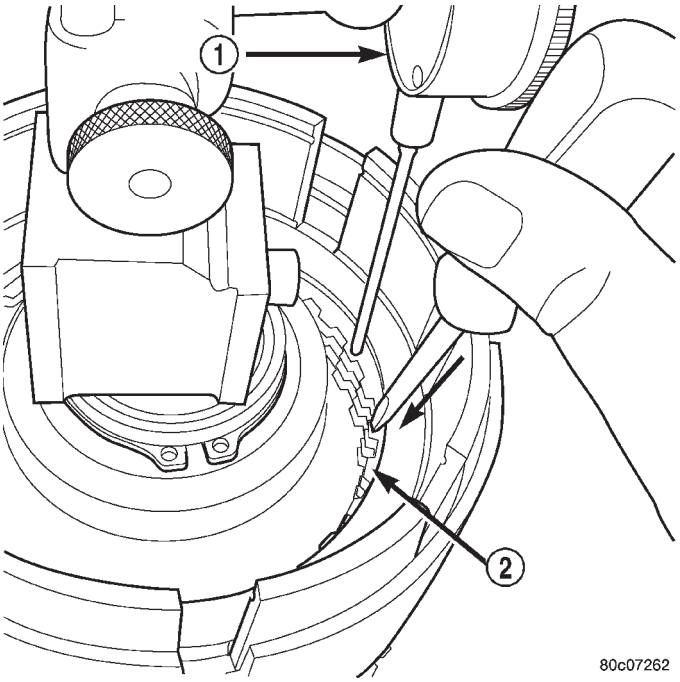


Fig. 273 Press Down on UD Clutch Pack and Zero Dial Indicator

1 – DIAL INDICATOR
2 – UNDERDRIVE CLUTCH

(19) Take average of four measurements and compare with UD clutch pack clearance specification. **Underdrive clutch pack clearance must be 0.94-1.50 mm (0.037-0.059 in.).**

(20) If necessary, select the proper reaction plate to achieve specifications:

UNDERDRIVE REACTION PLATE THICKNESS	
4659939AB	5.837-5.937 mm (0.230-0.234 in.)
4659940AB	6.147-6.248 mm (0.242-0.246 in.)
4659941AB	6.457-6.557 mm (0.254-0.258 in.)

(21) Install the OD clutch pack (four fibers/four steels) (Fig. 274).

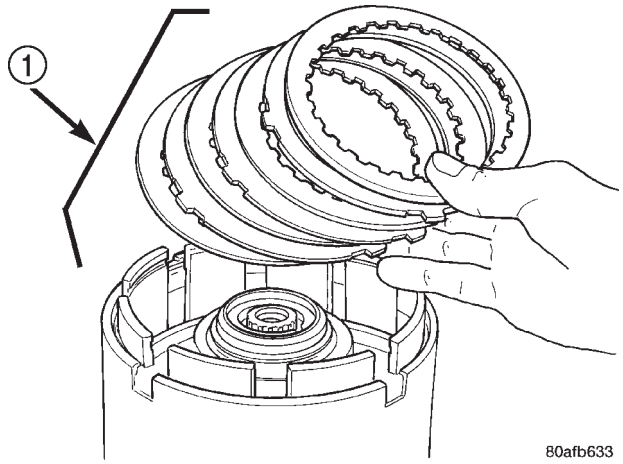


Fig. 274 Install OD Clutch Pack

1 – OVERDRIVE CLUTCH PACK

(22) Install OD reaction plate waved snap ring (Fig. 275).

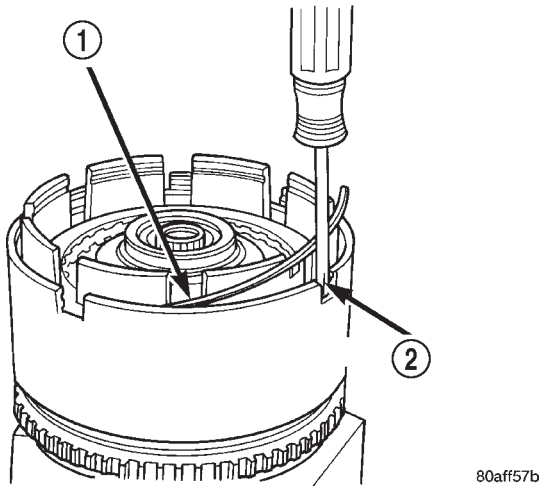


Fig. 275 Install Waved Snap Ring

1 – OVERDRIVE REACTION PLATE WAVED SNAP RING
2 – SCREWDRIVER

(23) Install the OD/Reverse reaction plate with large step down (towards OD clutch pack) (Fig. 276).

(24) Install OD reaction plate flat snap ring (Fig. 277).

DISASSEMBLY AND ASSEMBLY (Continued)

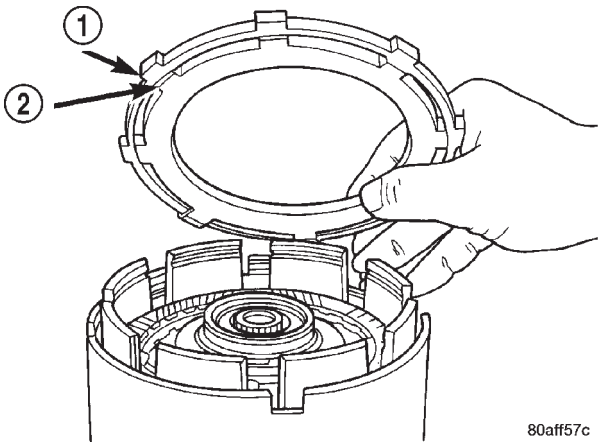


Fig. 276 OD/Reverse Reaction Plate

1 – OVERDRIVE/REVERSE PRESSURE PLATE
2 – (STEP SIDE DOWN)

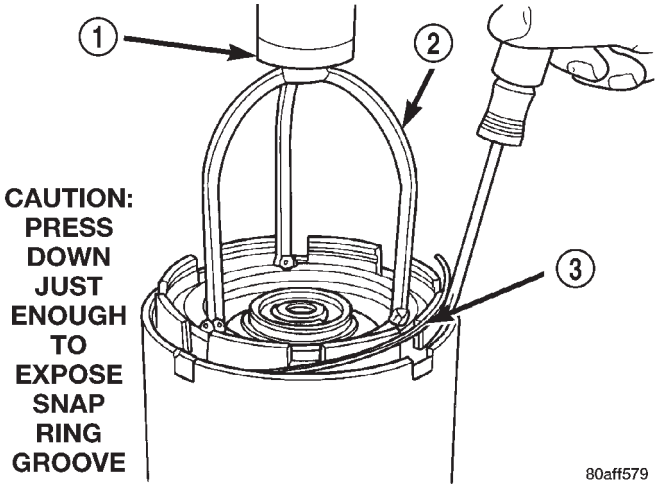


Fig. 277 Install Flat Snap Ring

1 – ARBOR PRESS RAM
2 – TOOL 5059A
3 – FLAT SNAP RING

(25) Measure OD clutch pack clearance. Set up dial indicator on top of the OD/Reverse reaction plate as shown in (Fig. 278).

(26) Zero dial indicator and apply 30 psi (206 kPa) air pressure to the overdrive clutch hose on Tool 8391. Measure and record OD clutch pack measurement in four (4) places, 90° apart.

(27) Take average of four measurements and compare with OD clutch pack clearance specification. **The overdrive (OD) clutch pack clearance is 1.07-3.25 mm (0.042-0.128 in.).**

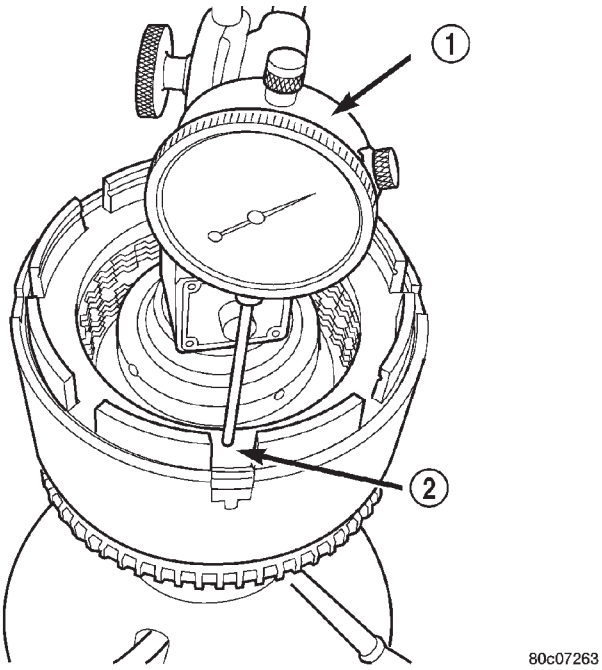


Fig. 278 Measure OD Clutch Pack Clearance

1 – DIAL INDICATOR
2 – OD/REVERSE REACTION PLATE

If not within specifications, the clutch is not assembled properly. There is no adjustment for the OD clutch clearance.

(28) Install reverse clutch pack (two fibers/one steel) (Fig. 279).

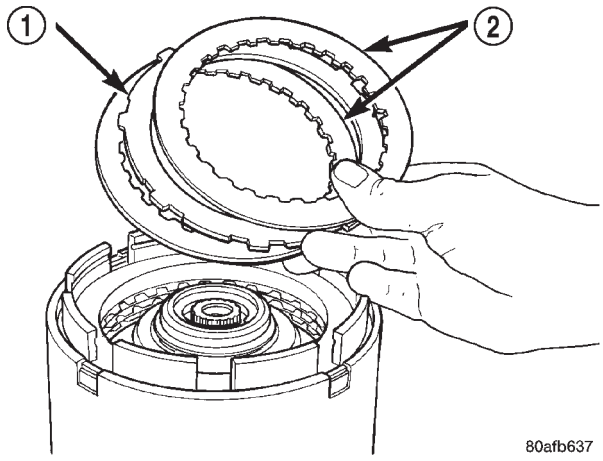


Fig. 279 Install Reverse Clutch Pack

1 – REVERSE CLUTCH PLATE
2 – REVERSE CLUTCH DISCS

DISASSEMBLY AND ASSEMBLY (Continued)

(29) Install reverse clutch reaction plate with the flat side down towards reverse clutch (Fig. 280).

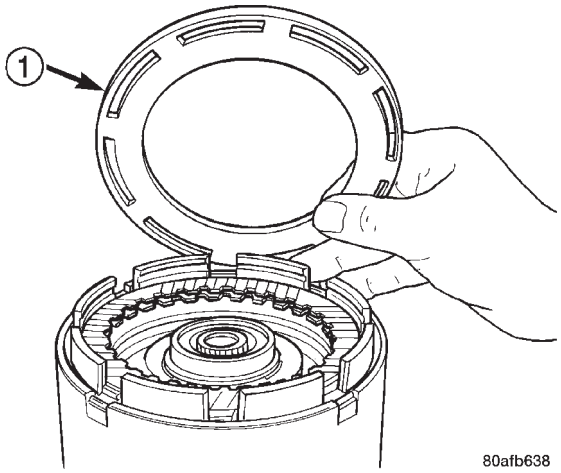


Fig. 280 Install Reaction Plate

1 – REVERSE CLUTCH REACTION PLATE (FLAT SIDE DOWN)

(30) Tap reaction plate down to allow installation of the reverse clutch snap ring. Install reverse clutch snap ring (Fig. 281).

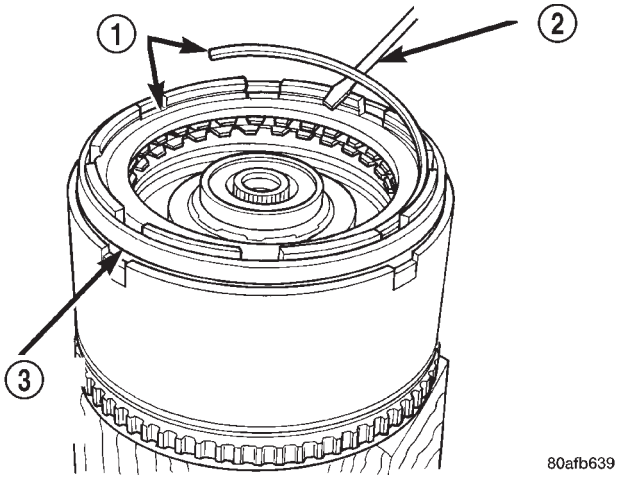


Fig. 281 Install Reverse Clutch Snap Ring

1 – REVERSE CLUTCH SNAP RING (SELECT)
2 – SCREWDRIVER
3 – REVERSE CLUTCH REACTION PLATE

(31) Pry up reverse reaction plate to seat against snap ring (Fig. 282).

(32) Set up a dial indicator on the reverse clutch pack as shown in (Fig. 283).

(33) Using moderate pressure, press down and hold (near indicator) reverse clutch disc with screwdriver or suitable tool and zero dial indicator (Fig. 284). When releasing pressure, indicator should advance 0.005-0.010. as clutch pack relaxes.

(34) Apply 30 psi (206 kPa) air pressure to the reverse clutch hose on Tool 8391. Measure and record

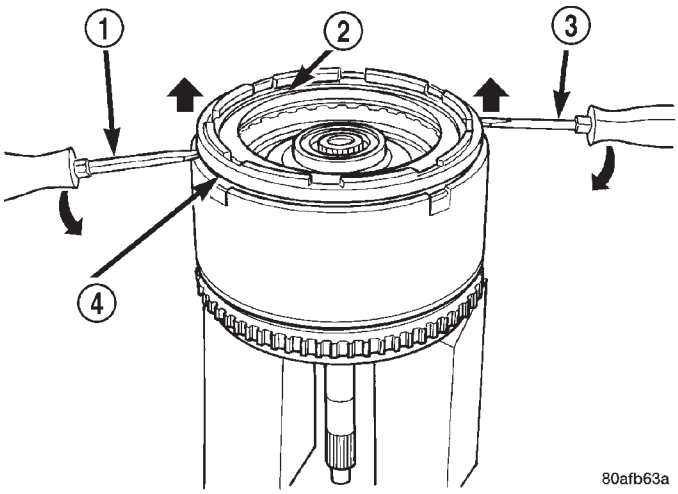


Fig. 282 Pry Up Reaction Plate to Seat Against Snap Ring

1 – SCREWDRIVER
2 – SNAP RING
3 – SCREWDRIVER
4 – MUST RAISE REVERSE REACTION PLATE TO RAISE SNAP RING

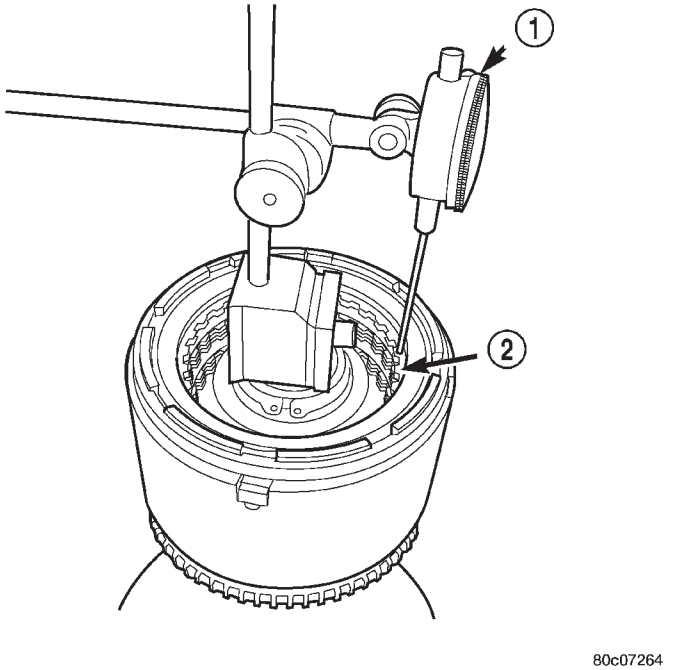


Fig. 283 Measure Reverse Clutch Pack Clearance

1 – DIAL INDICATOR
2 – REVERSE CLUTCH

reverse clutch pack measurement in four (4) places, 90° apart.

(35) Take average of four measurements and compare with reverse clutch pack clearance specification. **The reverse clutch pack clearance is 0.89-1.37 mm (0.035-0.054 in.).** Select the proper reverse clutch snap ring to achieve specifications:

DISASSEMBLY AND ASSEMBLY (Continued)

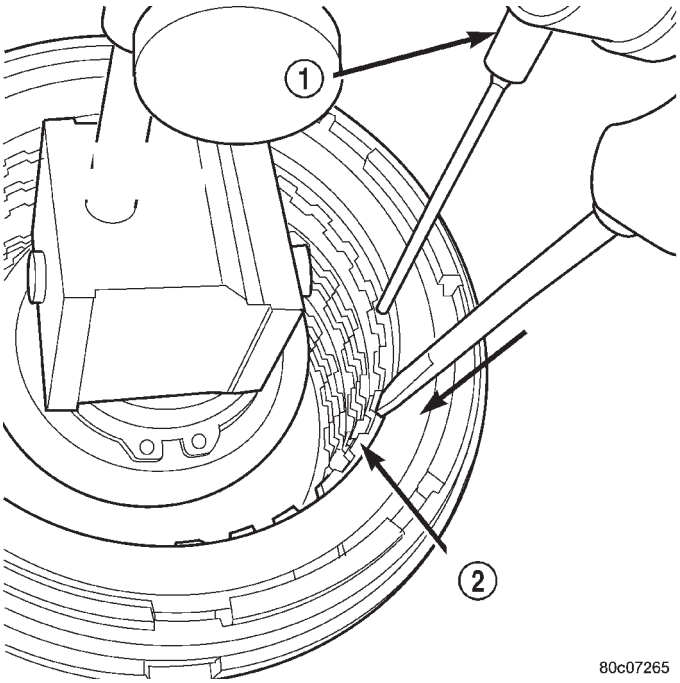


Fig. 284 Press Down on Reverse Clutch and Zero Indicator

1 – DIAL INDICATOR
2 – REVERSE CLUTCH

REVERSE CLUTCH SNAP RING THICKNESS	
4377195	1.53-1.58 mm (0.060-0.062 in.)
4412871	1.77-1.83 mm (0.070-0.072 in.)
4412872	2.02-2.07 mm (0.080-0.082 in.)
4412873	2.27-2.32 mm (0.090-0.091 in.)

(36) To complete the assembly, reverse clutch and overdrive clutch must be removed.

(37) Install the #2 needle bearing (Fig. 285).

(38) Install the underdrive shaft assembly (Fig. 286).

(39) Install the #3 thrust washer to the underdrive shaft assembly. Be sure five tabs are seated properly (Fig. 287).

(40) Install the #3 thrust plate to the bottom of the overdrive shaft assembly. Retain with petrolatum or transmission assembly gel (Fig. 288).

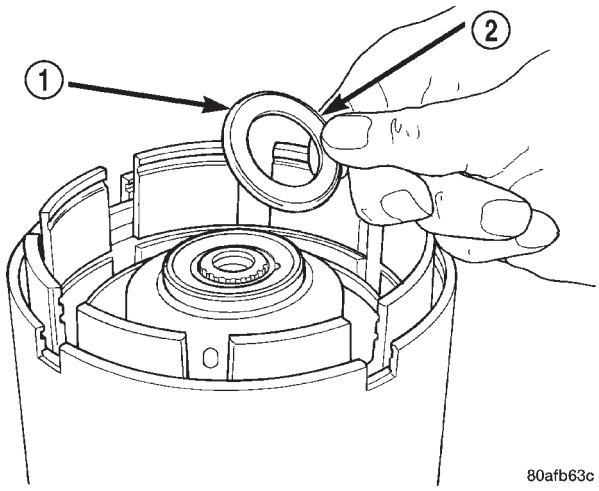


Fig. 285 Install No. 2 Needle Bearing

1 – #2 NEEDLE BEARING (NOTE 3 SMALL TABS)
2 – TABS UP

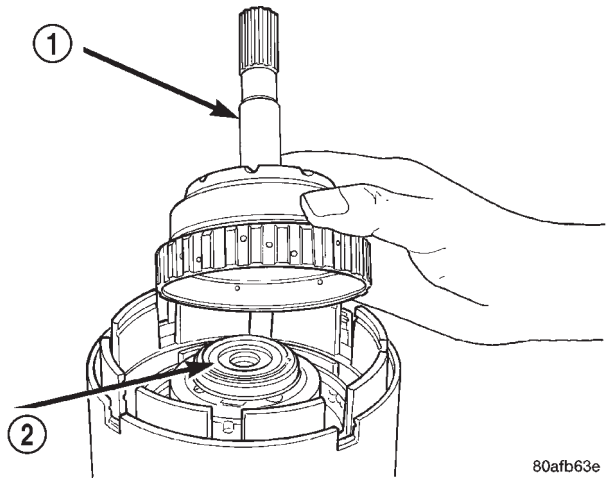


Fig. 286 Install Underdrive Shaft Assembly

1 – UNDERDRIVE SHAFT ASSEMBLY
2 – #2 NEEDLE BEARING

(41) Install the overdrive shaft assembly (Fig. 289).

(42) Reinstall overdrive and reverse clutch as shown. **Rechecking these clutch clearances is not necessary.**

DISASSEMBLY AND ASSEMBLY (Continued)

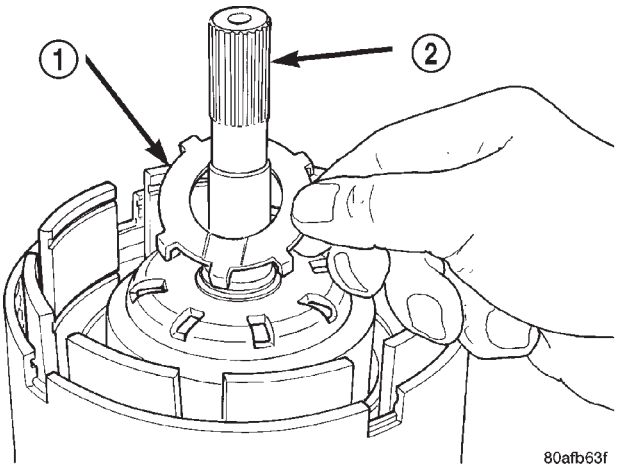


Fig. 287 Install No. 3 Thrust Washer

1 – #3 THRUST WASHER (NOTE 5 TABS)
2 – UNDERDRIVE SHAFT ASSEMBLY

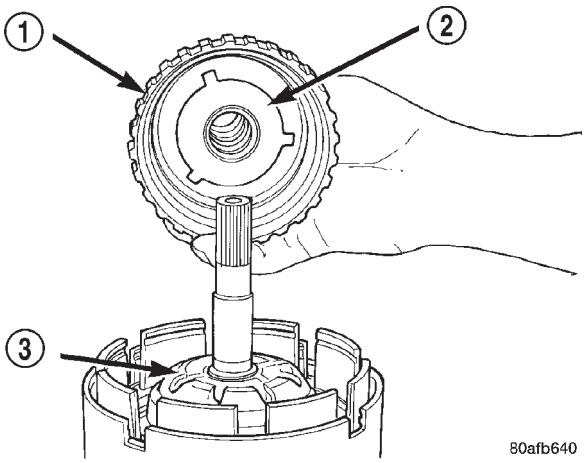


Fig. 289 Install Overdrive Shaft Assembly

1 – OVERDRIVE SHAFT ASSEMBLY
2 – #3 THRUST PLATE
3 – #3 THRUST WASHER

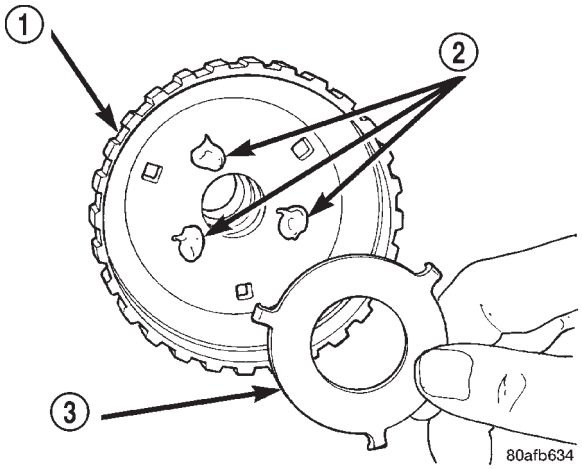


Fig. 288 Install No. 3 Thrust Plate

1 – OVERDRIVE SHAFT ASSEMBLY
2 – DABS OF PETROLATUM (FOR RETENTION)
3 – #3 THRUST PLATE (NOTE 3 TABS)

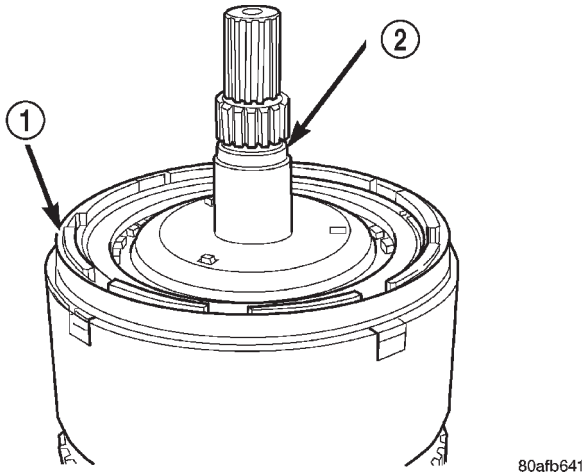


Fig. 290 Input Clutch Assembly

1 – INPUT CLUTCH ASSEMBLY
2 – OVERDRIVE SHAFT ASSEMBLY

DISASSEMBLY AND ASSEMBLY (Continued)

TRANSAXLE—ASSEMBLY

To install the output bearing cups, use Special Tool # 5050A.

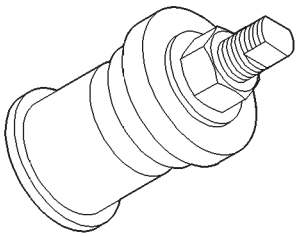


Fig. 291 Bearing Cup Installation Special Tool 5050A

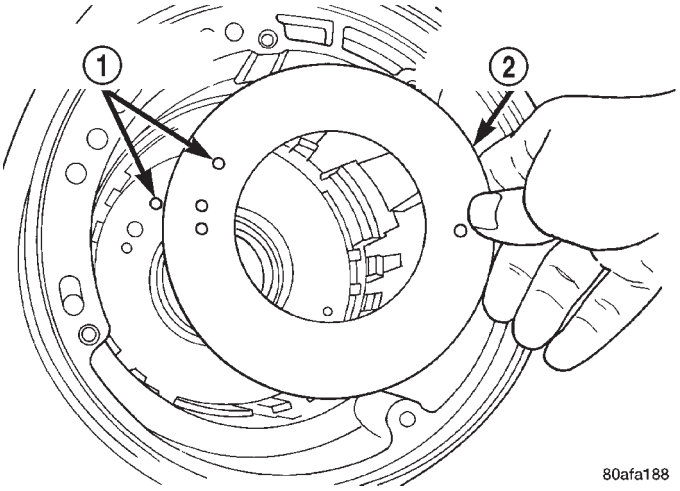


Fig. 292 Install Piston Retainer Gasket

1 – GASKET HOLES MUST LINE UP
2 – LOW/REVERSE CLUTCH PISTON RETAINER GASKET

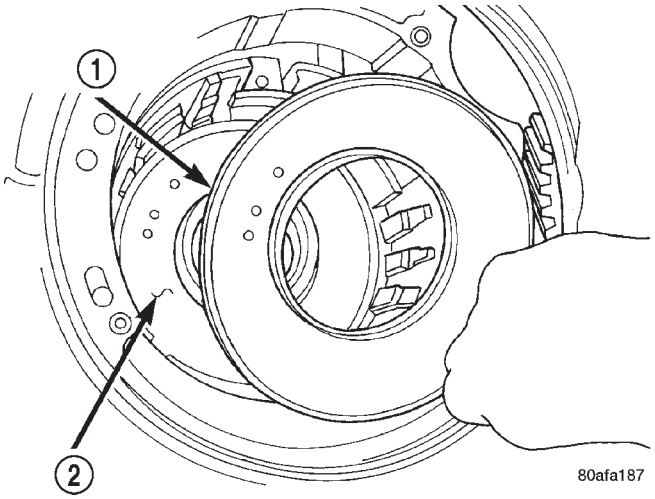


Fig. 293 Install Piston Retainer

1 – LOW/REVERSE CLUTCH PISTON RETAINER
2 – GASKET

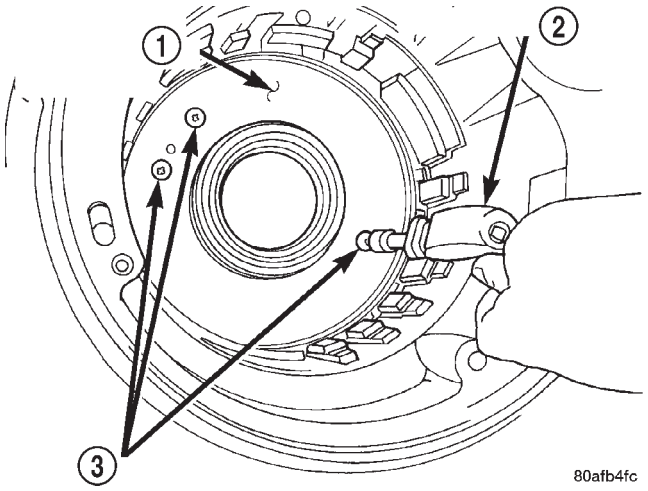


Fig. 294 Install Retainer Attaching Screws

1 – LOW/REVERSE CLUTCH PISTON RETAINER
2 – SCREWDRIVER
3 – TORX-LOC SCREWS

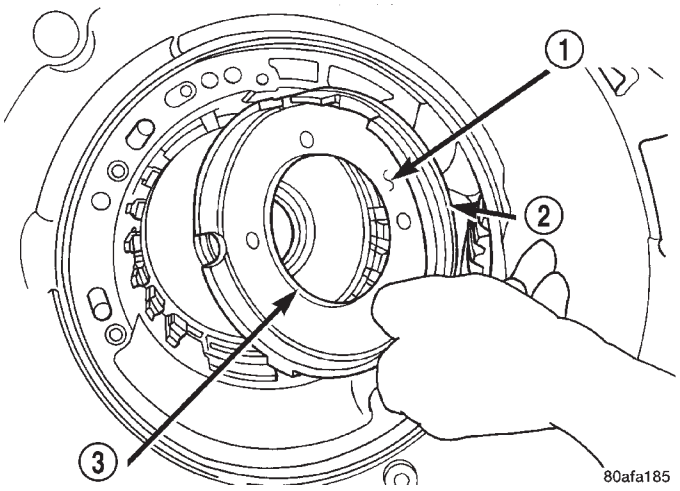


Fig. 295 Install Low/Reverse Clutch Piston

1 – LOW/REVERSE CLUTCH PISTON
2 – LIP SEAL
3 – LIP SEAL

DISASSEMBLY AND ASSEMBLY (Continued)

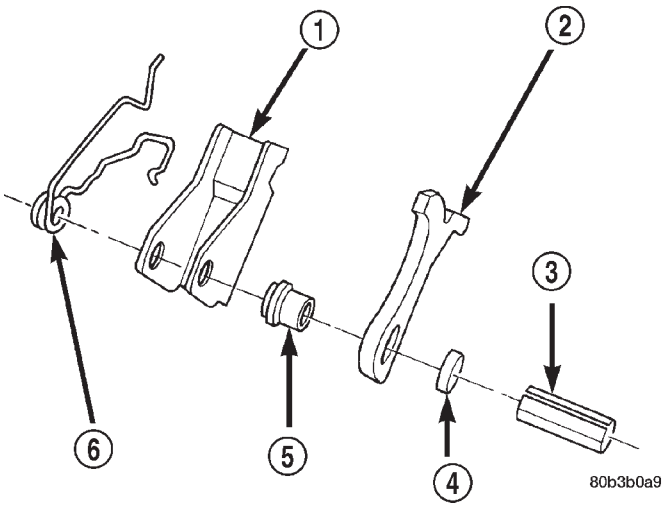


Fig. 296 Guide Bracket Disassembled

1 – GUIDE BRACKET
2 – PAWL
3 – SPLIT SLEEVE
4 – SPACER
5 – STEPPED SPACER
6 – ANTIRATCHET SPRING

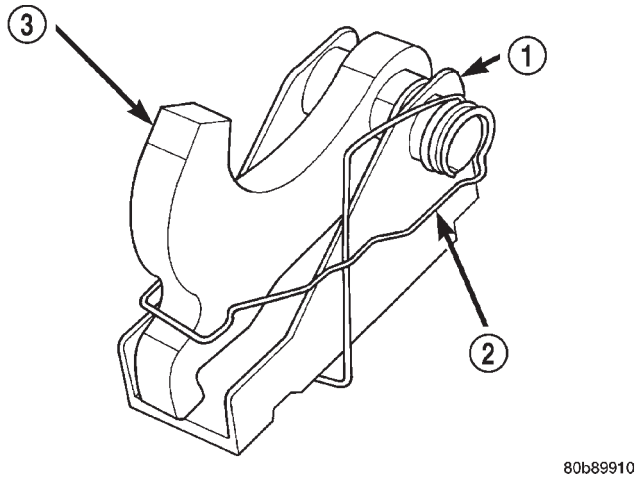


Fig. 297 Guide Bracket

1 – GUIDE BRACKET
2 – ANTIRATCHET SPRING (MUST BE ASSEMBLED AS SHOWN)
3 – PAWL

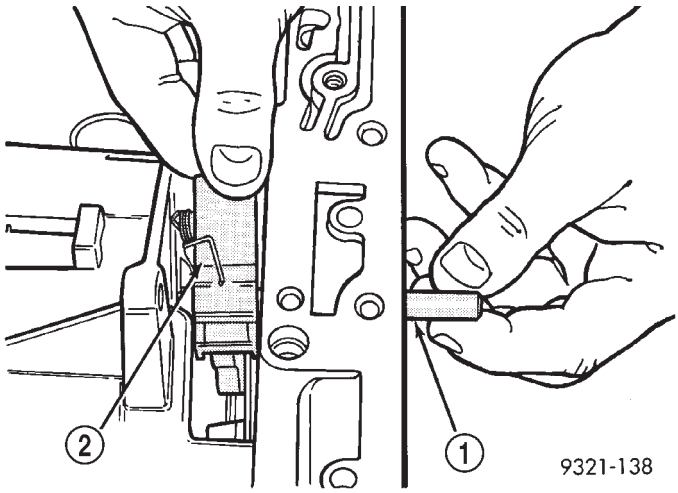


Fig. 298 Install Guide Bracket Pivot Shaft

1 – PIVOT PIN
2 – GUIDE BRACKET ASSEMBLY

CAUTION: When installing, be sure guide bracket and split sleeve touch the rear of the transaxle case.

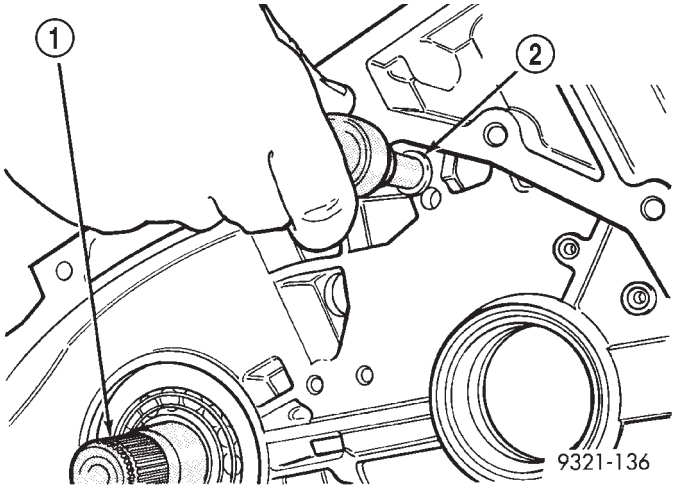


Fig. 299 Install Parking Sprag Pivot Retaining Screw

1 – TRANSFER SHAFT
2 – PARKING SPRAG PIVOT RETAINING SCREW

DISASSEMBLY AND ASSEMBLY (Continued)

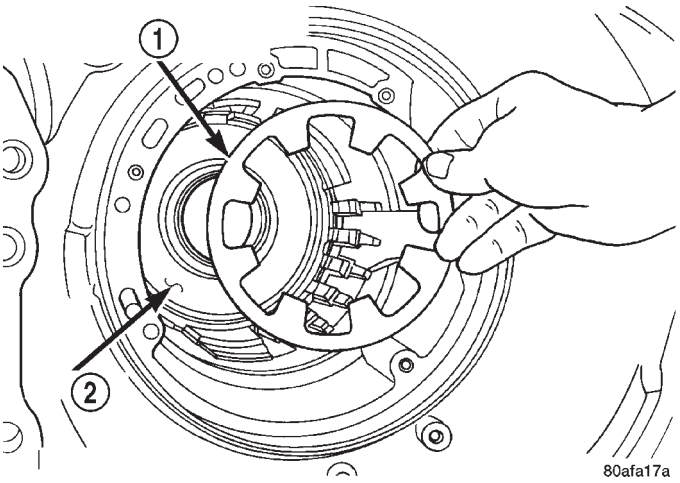


Fig. 300 Install Low/Reverse Piston Return Spring

1 – LOW/REVERSE PISTON RETURN SPRING
2 – PISTON

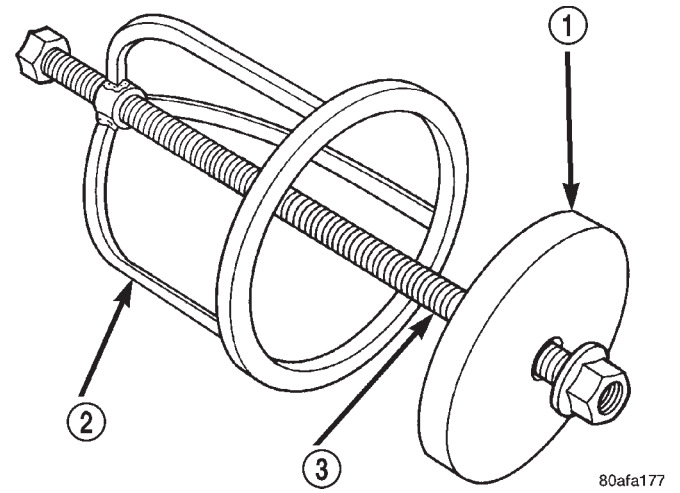


Fig. 301 Low/Reverse Spring Compressor Tool

1 – TOOL 6057
2 – TOOL 5059
3 – TOOL 5058–3

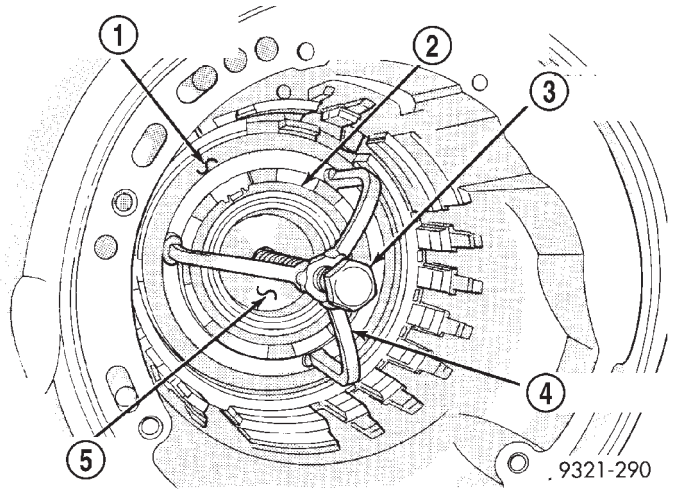


Fig. 302 Compressor Tool in Use

1 – LOW/REVERSE CLUTCH RETURN SPRING
2 – SNAP RING (INSTALL AS SHOWN)
3 – TOOL 5058A-3
4 – TOOL 5059A
5 – SPECIAL TOOL 6057

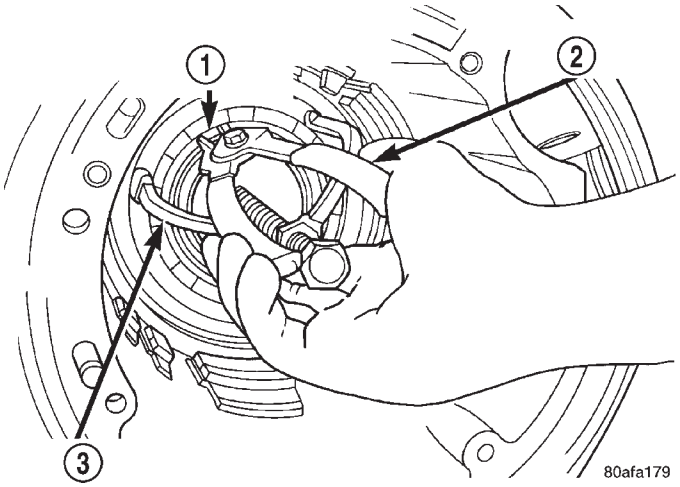


Fig. 303 Install Snap Ring

1 – SNAP RING OPENING MUST BE BETWEEN SPRING LEVERS (AS SHOWN)
2 – SNAP RING PLIERS
3 – TOOL 6057

DISASSEMBLY AND ASSEMBLY (Continued)

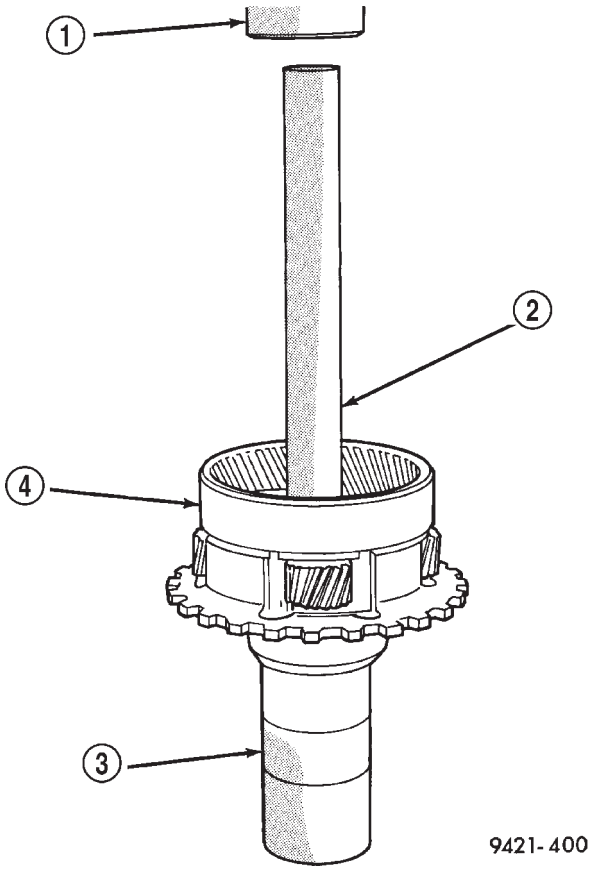


Fig. 304 Install Rear Carrier Front Bearing Cone

1 – ARBOR PRESS
2 – SPECIAL TOOL C-4171
3 – SPECIAL TOOL 6052
4 – REAR CARRIER

OUTPUT SHAFT BEARING PRELOAD SHIM SELECTION

When assembling, the output bearing preload must be checked and/or adjusted if any of the following items have been replaced:

- Output shaft (rear carrier assembly)
- Output shaft bearings
- Transaxle case

SHIM SELECTION

(1) Install rear output shaft bearing cone and special tool 6618A (Fig. 305).

(2) Install special tool 6618A (Fig. 306). Lightly tighten retaining screws. Screws should be below the plate surface, but do not snug screws.

(3) Turn case over on arbor press so that the plate is resting on the press base

CAUTION: The output shaft will extend through the hole of tool 6618A. Ensure your press table has clearance for the output shaft.

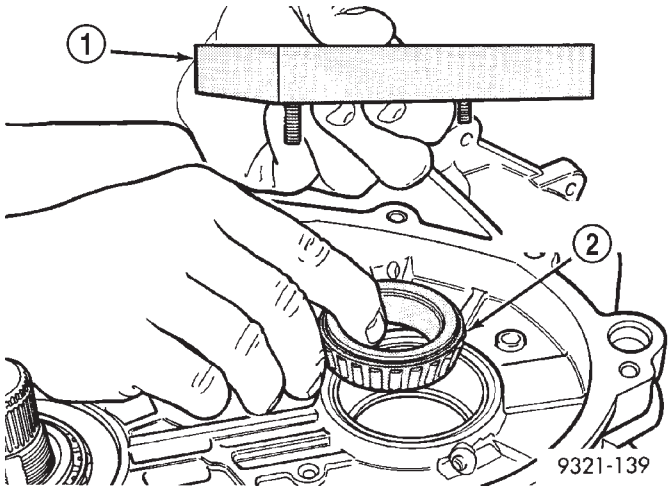


Fig. 305 Bearing Installation

1 – SPECIAL TOOL 6618–A
2 – REAR OUTPUT SHAFT BEARING

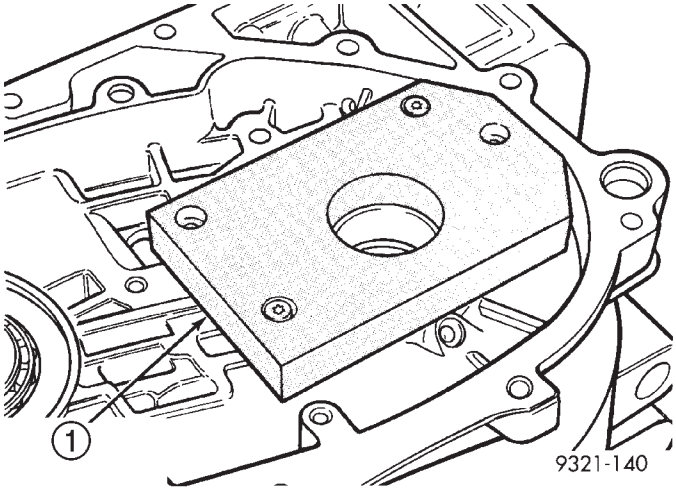


Fig. 306 Special Tool Installed

1 – SPECIAL TOOL 6618–A

(4) Install shim on output shaft (Fig. 307). Apply small amount of petrolatum onto the shim to hold it in place. Use the original shim as a starting point. If original shim is not available, use the thickest shim available. Refer to Output Shaft Rear Shim Chart for available sizes.

(5) Install output shaft/rear carrier into rear bearing. The shaft must be pressed into position. Use special tool MD-998911 (Disc) and C- 4171 and C4171-2 (Handle) to press shaft into rear bearing (Fig. 308).

CAUTION: Do not reuse old transfer shaft nut or output shaft nut because the removed stake weakens the nut flange.

(6) Using special tools 6497 and 6498, install new output shaft nut. Do not reuse old output shaft nut.

DISASSEMBLY AND ASSEMBLY (Continued)

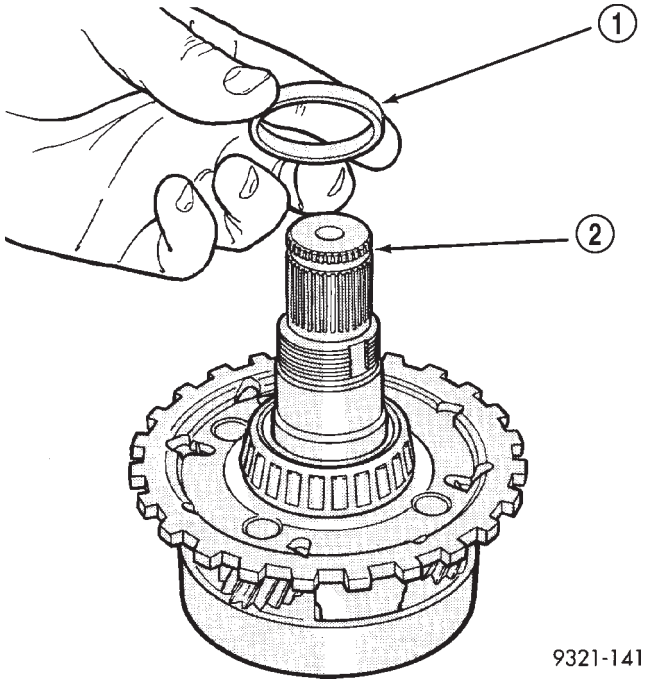


Fig. 307 Shim Installation

1 – SHIM
2 – OUTPUT SHAFT

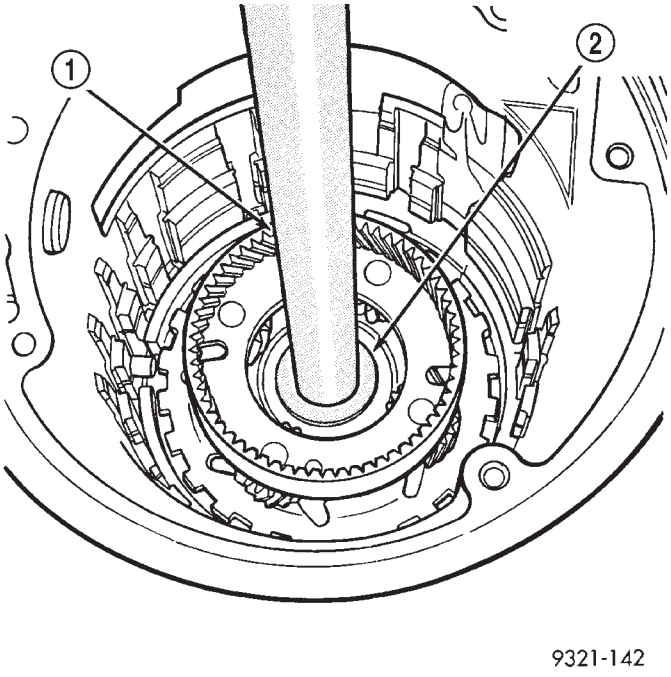


Fig. 308 Press Shaft Into Case

1 – SPECIAL TOOL C-4171 AND C-4171–2
2 – SPECIAL TOOL MD-998911

5.17 - 5.19 mm	5.62 - 5.64 mm
5.20 - 5.22 mm	5.65 - 5.67 mm
5.23 - 5.25 mm	5.68 - 5.70 mm
5.26 - 5.28 mm	5.71 - 5.73 mm
5.29 - 5.31 mm	5.74 - 5.76 mm
5.32 - 5.34 mm	5.77 - 5.79 mm
5.35 - 5.37 mm	5.80 - 5.82 mm
5.38 - 5.40 mm	5.83 - 5.85 mm
5.41 - 5.43 mm	5.86 - 5.88 mm
5.44 - 5.46 mm	5.89 - 5.91 mm
5.47 - 5.49 mm	5.92 - 5.94 mm
5.50 - 5.52 mm	5.95 - 5.97 mm
5.53 - 5.55 mm	5.98 - 6.00 mm
5.56 - 5.58 mm	6.01 - 6.03 mm
5.59 - 5.61 mm	6.04 - 6.06 mm

Output Shaft Rear Shim Chart

Tighten new output shaft nut to 271 N·m (200 ft. lbs.).

(7) Check the turning torque of the output shaft (Fig. 309). The shaft should have 1 to 8 in. lbs. of turning torque. If the turning torque is **higher than** 8 in. lbs., install a thicker shim. If the turning torque is **less than** 1 in. lb., install a thinner shim. Make sure there is no end play.

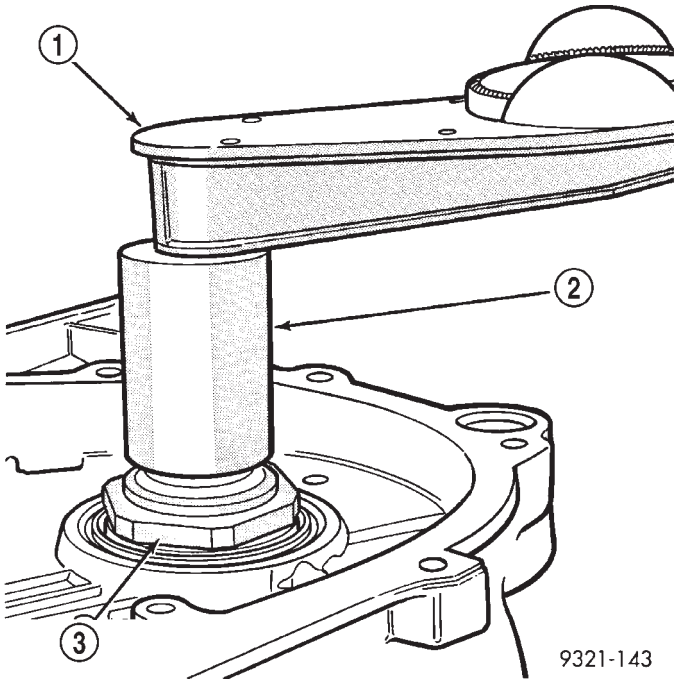


Fig. 309 Checking Turning Torque

1 – TORQUE WRENCH
2 – SPECIAL TOOL 6498
3 – OUTPUT SHAFT NUT

CAUTION: Failure to stake shaft nuts could allow the nuts to back-off during use.

DISASSEMBLY AND ASSEMBLY (Continued)

(8) The new nut must be staked after the correct turning torque is obtained (Fig. 310). Use special tool 6639 to stake output shaft nut and special tool 6589 to stake transfer shaft.

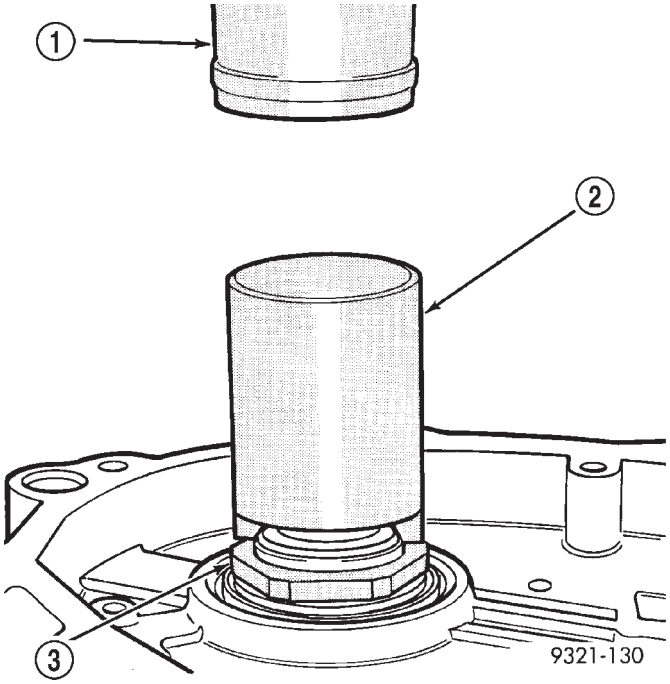


Fig. 310 Staking Output Shaft Nut

1 – ARBOR PRESS
2 – STAKING TOOL
3 – NEW NUT

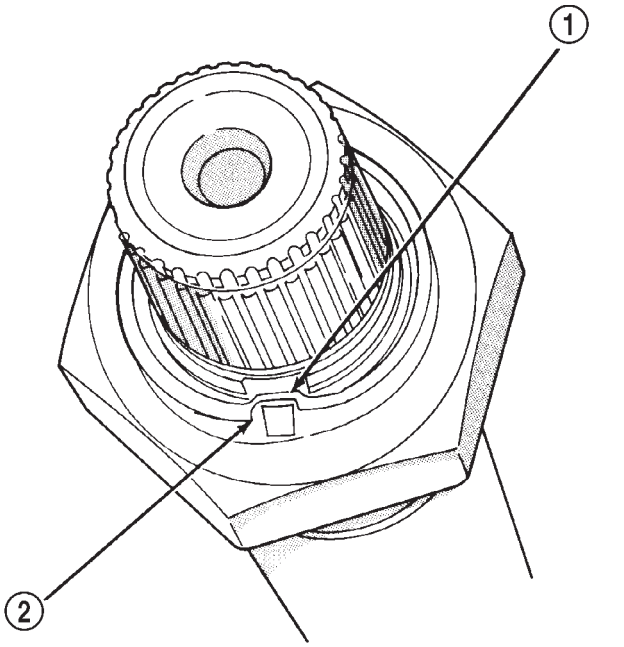


Fig. 311 Correctly Staked Nut

1 – BOTTOMED IN SLOT
2 – CORRECTLY STAKED NUT

When reinstalling main sump baffle apply Mopar Silicone Sealant as shown in (Fig. 312).

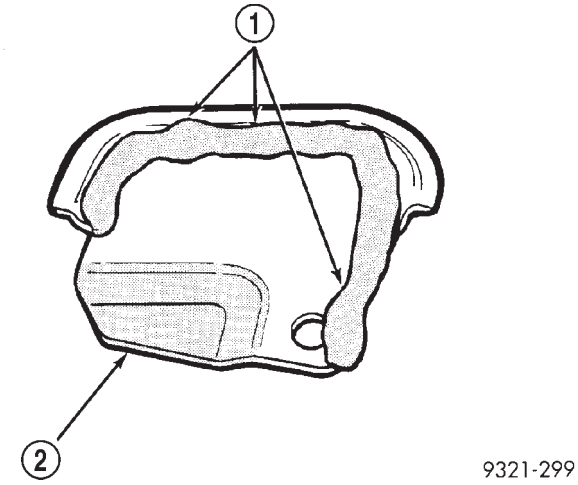


Fig. 312 Correctly Applied Sealant

1 – SEALANT
2 – BACK SIDE OF VENT BAFFLE

Install main sump baffle to transaxle case (Fig. 313).

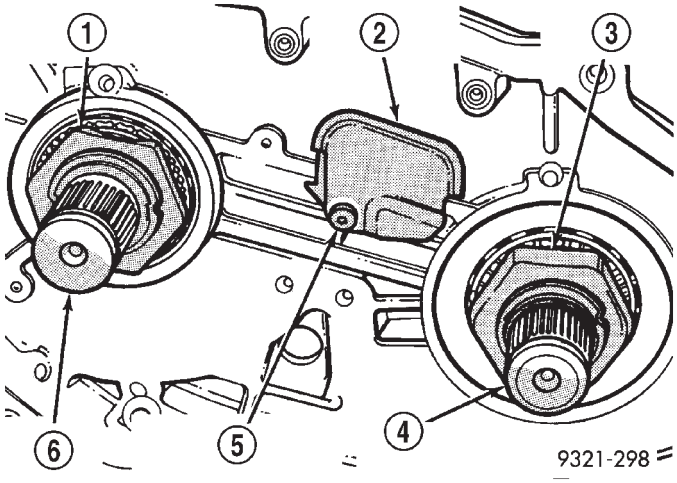


Fig. 313 Main Sump Vent Baffle Location

1 – OUTPUT SHAFT NUT
2 – MAIN SUMP VENT BAFFLE
3 – TRANSFER SHAFT NUT
4 – TRANSFER SHAFT
5 – VENT BAFFLE RETAINING SCREW
6 – OUTPUT SHAFT

CAUTION: When reinstalling drive chains, the blue link must face outward.

CAUTION: The chain sprockets have a slip fit onto the shafts. Apply only a slight amount of pressure to the chain spreader to release the chain pressure. If chain sprockets are not spread slightly, installation will be difficult.

DISASSEMBLY AND ASSEMBLY (Continued)

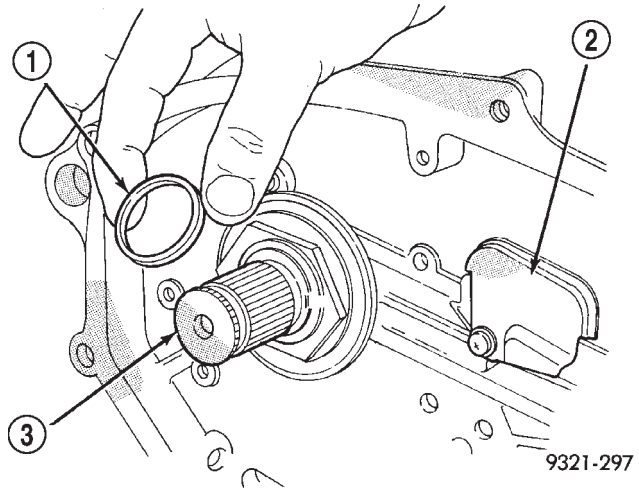


Fig. 314 Output Sprocket Spacer

1 – OUTPUT SPROCKET SPACER
2 – VENT BAFFLE
3 – OUTPUT SHAFT

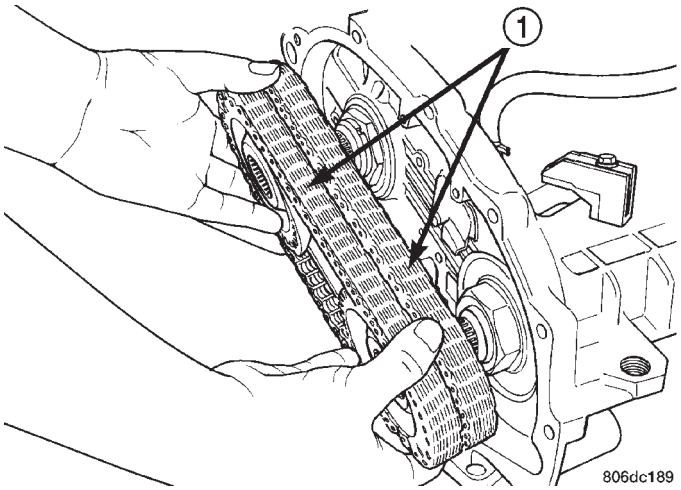


Fig. 315 Install Chains and Both Sprockets as an Assembly

1 – CHAINS

CAUTION: Be sure to reinstall the chain snubber and chain oiler when reassembling.

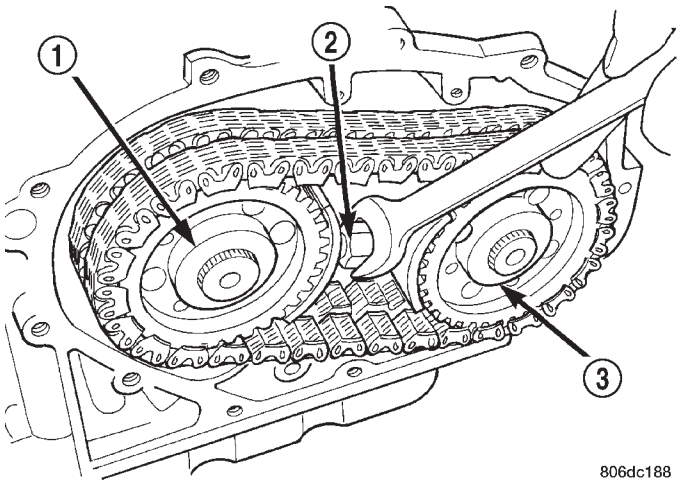


Fig. 316 Remove Chain Spreader

1 – OUTPUT SPROCKET
2 – SPECIAL TOOL 6550
3 – TRANSFER SPROCKET

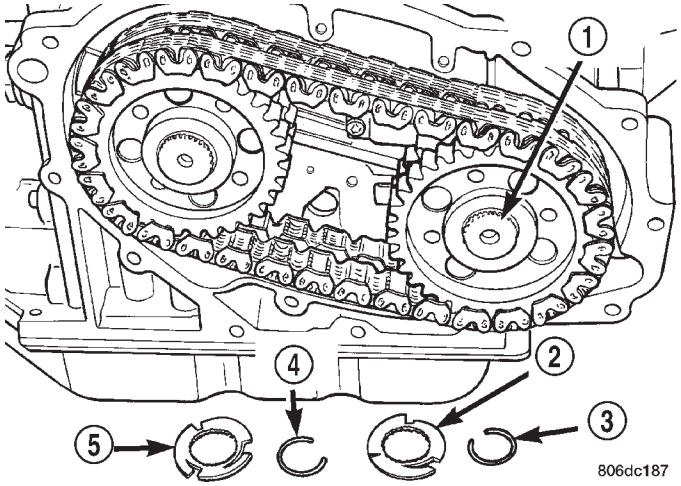


Fig. 317 Install Transfer Shaft Sprocket Snap Ring and Wave Washer

1 – TRANSFER SHAFT
2 – WAVE WASHER
3 – SNAP RING
4 – SNAP RING
5 – WAVE WASHER

DISASSEMBLY AND ASSEMBLY (Continued)

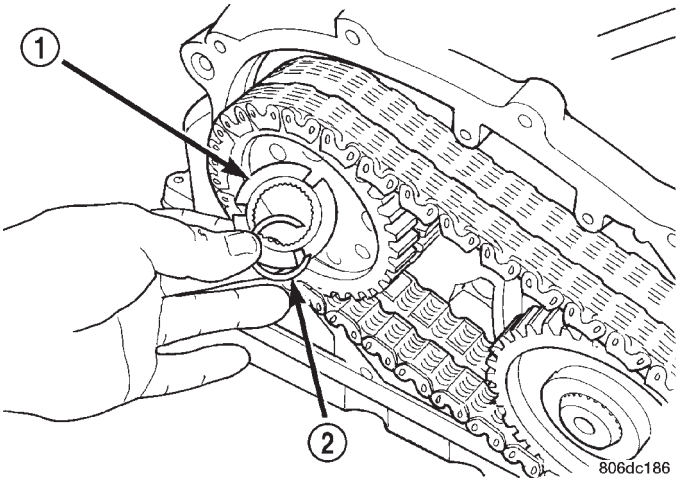


Fig. 318 Install Output Shaft Sprocket Snap Ring and Wave Washer

1 – WAVE WASHER
2 – SNAP RING

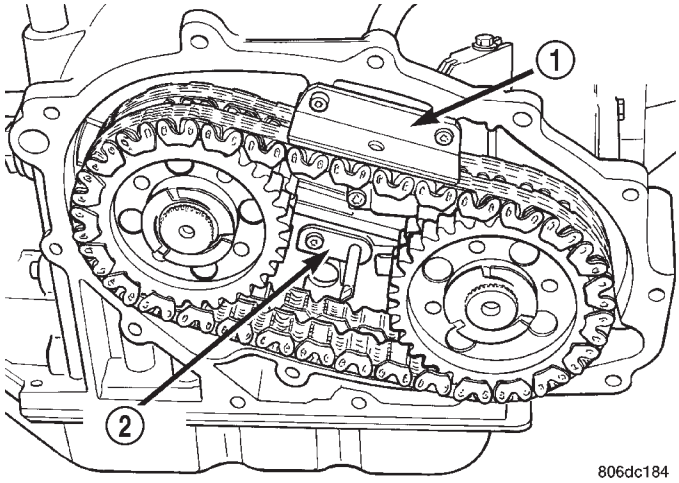


Fig. 320 Install Chain Oiler

1 – CHAIN SNUBBER
2 – CHAIN OILER

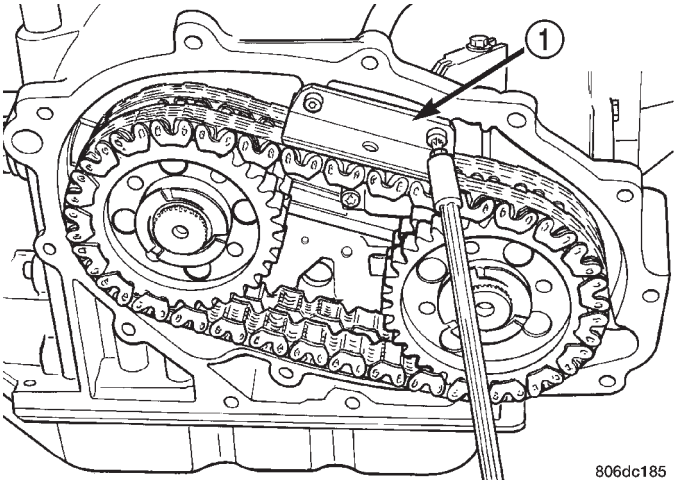


Fig. 319 Install Chain Snubber

1 – CHAIN SNUBBER

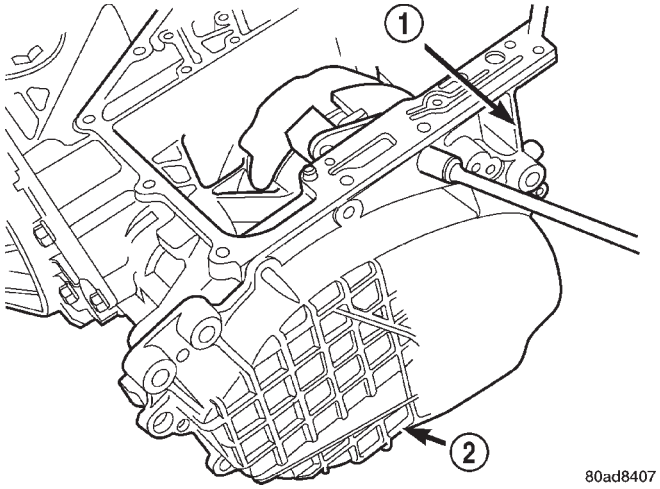


Fig. 321 Install Chain Cover

1 – TRANSAXLE CASE
2 – CHAIN COVER

Stand trans upright on bellhousing

Chain cover must be free of old sealant, dirt and oil before applying new sealant. Apply a 1/8 inch bead of sealant to flange of cover.

DISASSEMBLY AND ASSEMBLY (Continued)

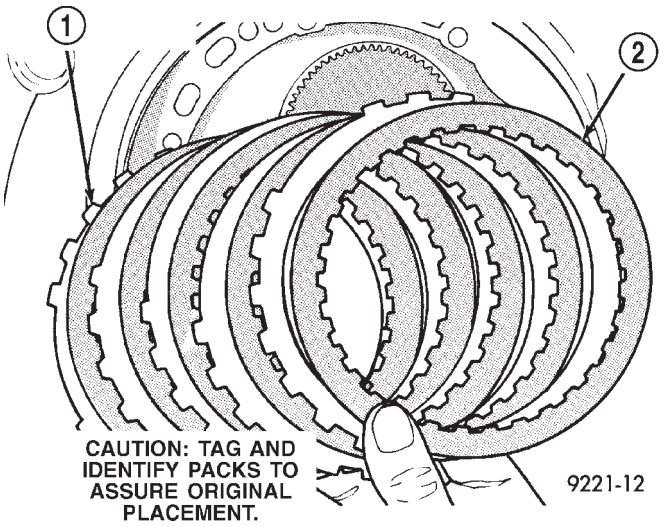


Fig. 322 Install Low/Reverse Clutch Pack

1 – CLUTCH PLATES (5)
2 – CLUTCH DISCS (5)

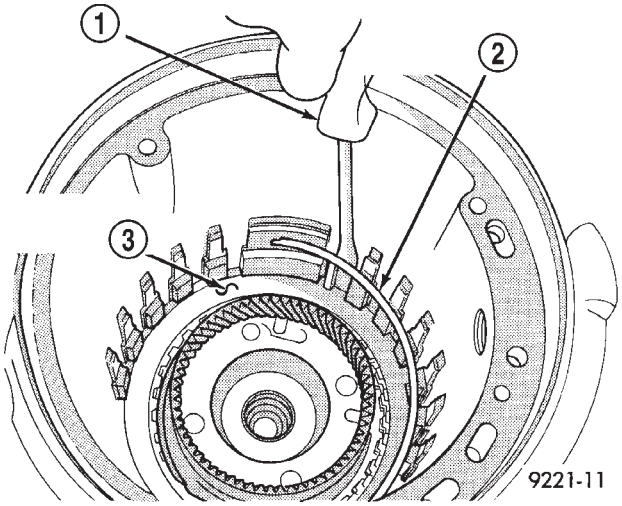


Fig. 323 Install Low/Reverse Reaction Plate Snap Ring

1 – SCREWDRIVER
2 – LOW/REVERSE REACTION PLATE FLAT SNAP RING
3 – DO NOT SCRATCH CLUTCH PLATE

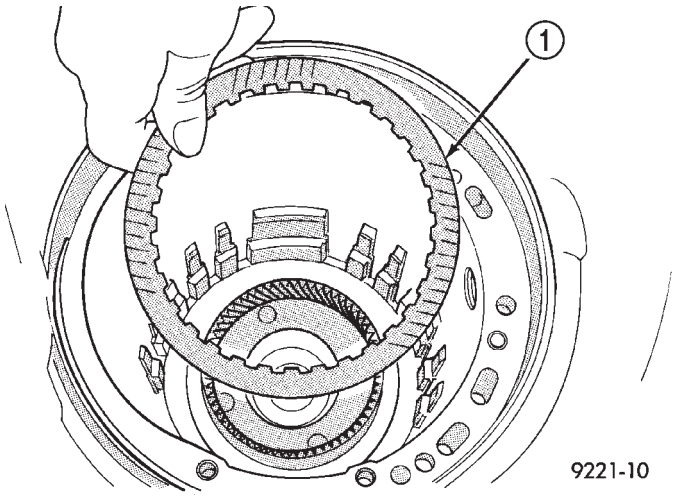


Fig. 324 Install One Disc

1 – ONE DISC FROM LOW/REVERSE CLUTCH

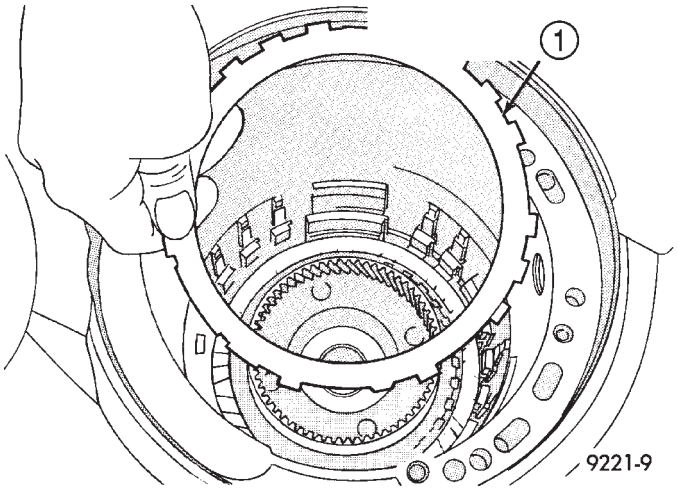


Fig. 325 Install Low/Reverse Reaction Plate

1 – LOW/REVERSE REACTION PLATE (FLAT SIDE UP)

DISASSEMBLY AND ASSEMBLY (Continued)

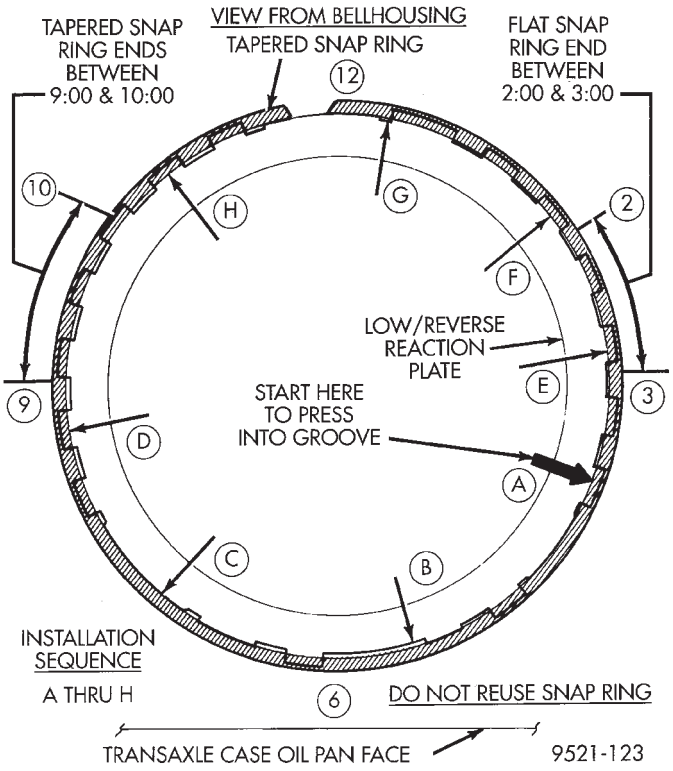


Fig. 326 Tapered Snap Ring Instructions

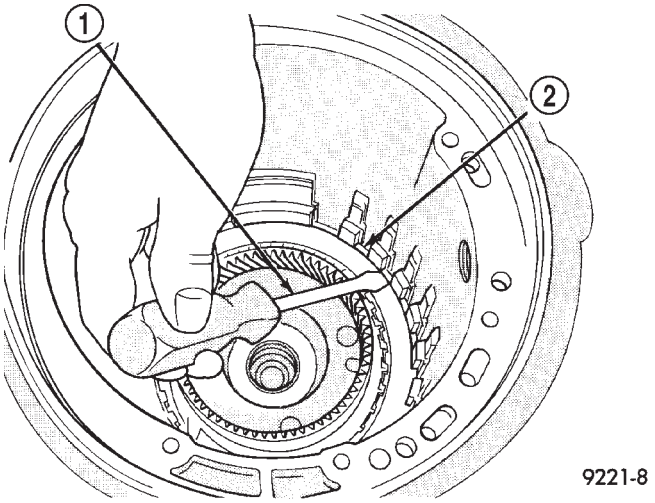


Fig. 327 Snap Ring Installed

1 – SCREWDRIVER
2 – TAPERED SNAP RING (INSTALL AS SHOWN)

Press down clutch pack with finger and zero dial indicator. **Low/Reverse clutch pack clearance is 0.86 to 1.52 (.034 to.060 inch).**

Select the proper low/reverse reaction plate to achieve specifications:

NOTE: When installing the 2-4 clutch plates and discs, the orientation should be alternated so the pilot pads of adjacent plates do not align, refer to (Fig. 330).

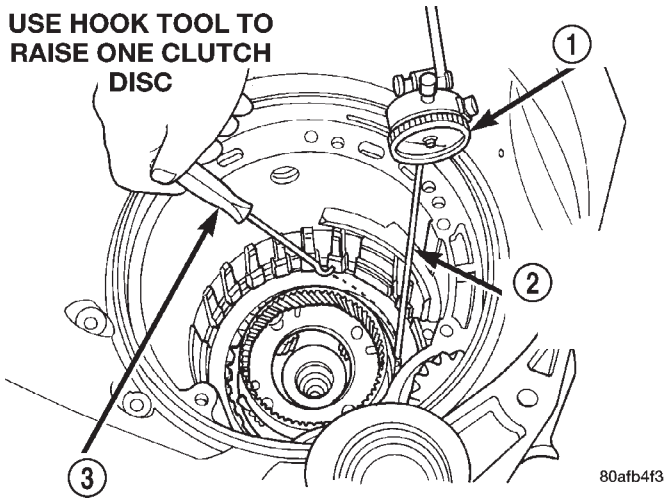


Fig. 328 Check Low/Reverse Clutch Clearance

1 – DIAL INDICATOR
2 – DIAL INDICATOR TIP TOOL 6268
3 – HOOK TOOL

LOW/REVERSE REACTION PLATE CHART

PART NUMBER	THICKNESS
4799846AA	5.88 mm (.232 in.)
4799847AA	6.14 mm (.242 in.)
4799848AA	6.40 mm (.252 in.)
4799849AA	6.66 mm (.262 in.)
4799855AA	6.92 mm (.273 in.)

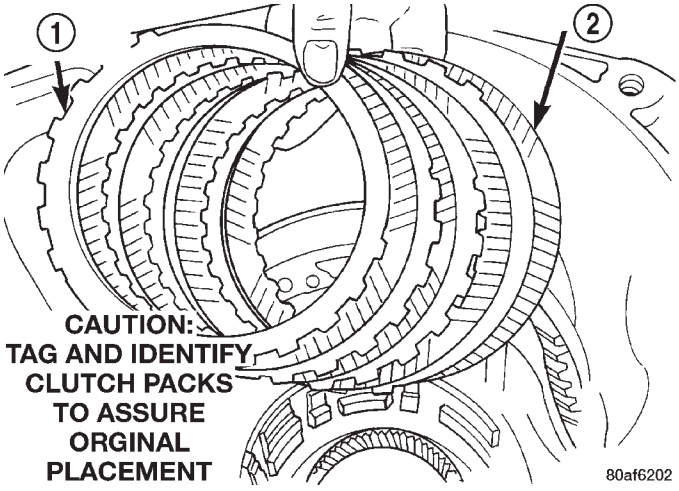


Fig. 329 Install 2/4 Clutch Pack

1 – CLUTCH PLATE (4)
2 – CLUTCH DISC (4)

DISASSEMBLY AND ASSEMBLY (Continued)

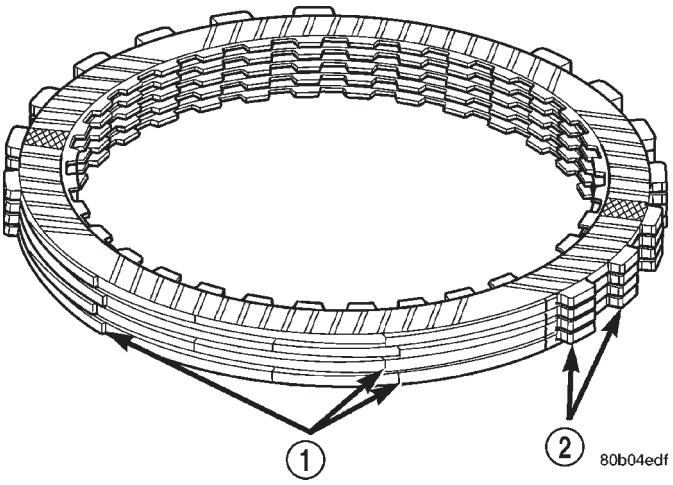


Fig. 330 Stagger 2/4 Clutch Plate Pads

1 – PILOT PADS
2 – LUGS

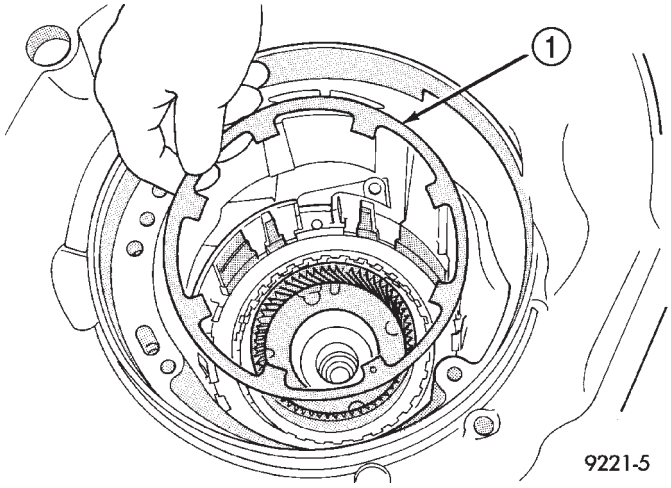


Fig. 331 Install 2/4 Clutch Return Spring

1 – 24 CLUTCH RETURN SPRING

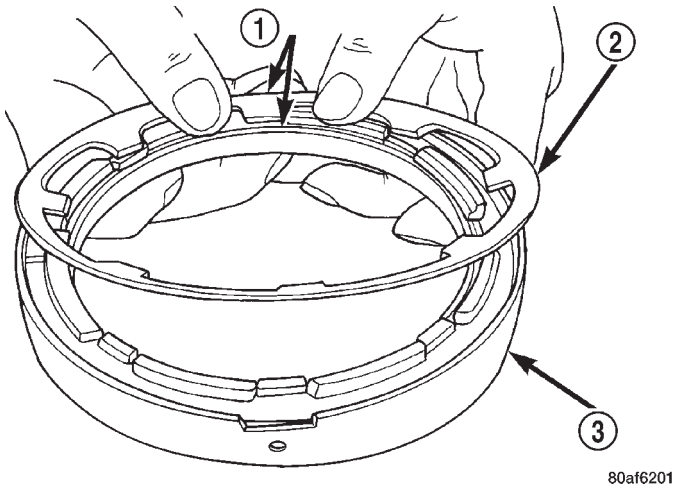


Fig. 332 Proper Orientation of 2/4 Clutch Retainer and Spring

1 – NOTE POSITION
2 – RETURN SPRING
3 – 2/4 CLUTCH RETAINER

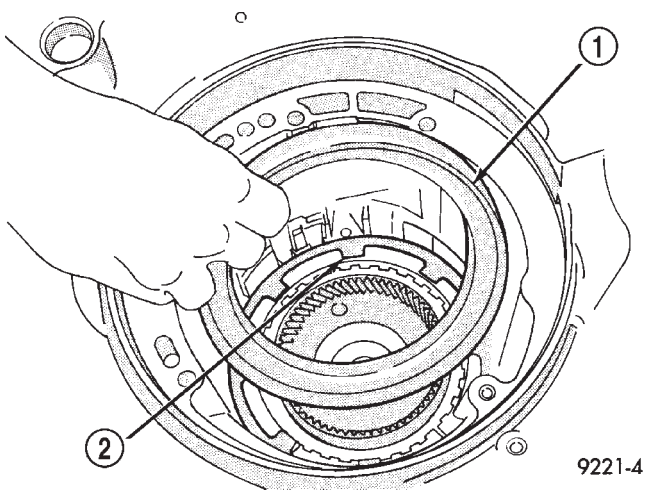


Fig. 333 Install 2/4 Clutch Retainer

1 – 24 CLUTCH RETAINER
2 – 24 CLUTCH RETURN SPRING

DISASSEMBLY AND ASSEMBLY (Continued)

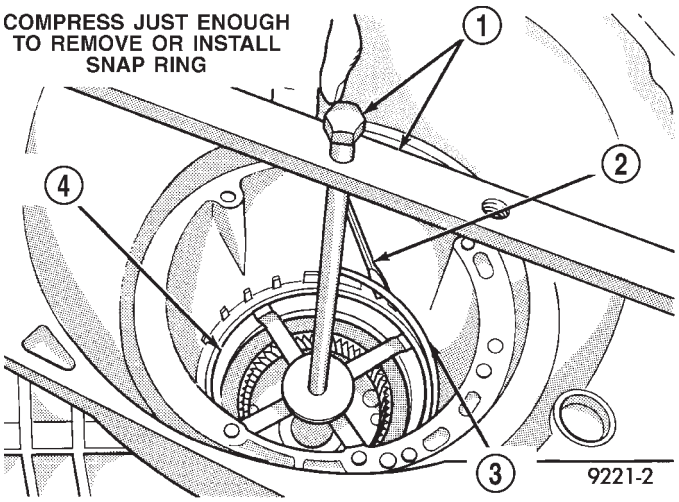


Fig. 334 Install 2/4 Clutch Retainer Snap Ring

1 – TOOL 5058
2 – SCREWDRIVER
3 – SNAP RING
4 – 24 CLUTCH RETAINER

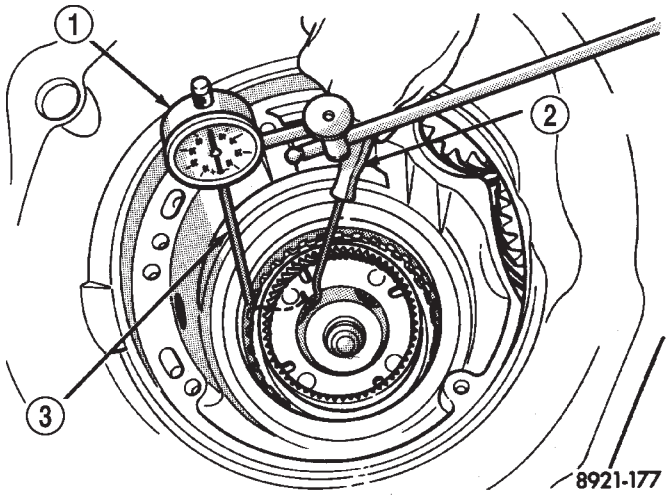


Fig. 335 Check 2/4 Clutch Clearance

1 – DIAL INDICATOR
2 – HOOK TOOL
3 – DIAL INDICATOR TIP TOOL 6268

Press down clutch pack with finger and zero dial indicator. **The 2/4 clutch pack clearance is 0.76 to 2.64 mm (.030 to.104 inch).** If not within specifications, the clutch is not assembled properly. **There is no adjustment for the 2/4 clutch clearance.**

The number 7 needle bearing has three antireversal tabs and is common with the number 5 and number 2 position. The orientation should allow the bearing to seat flat against the rear sun gear (Fig. 336). A small amount of petrolatum can be used to hold the bearing to the rear sun gear.

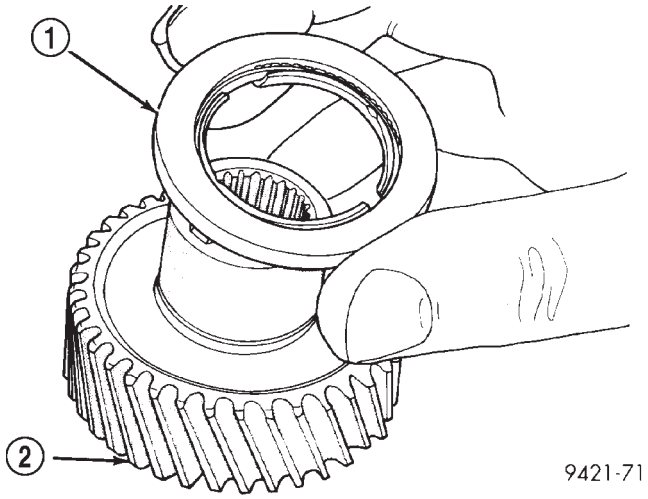


Fig. 336 Number 7 Bearing

1 – #7 BEARING
2 – REAR SUN GEAR

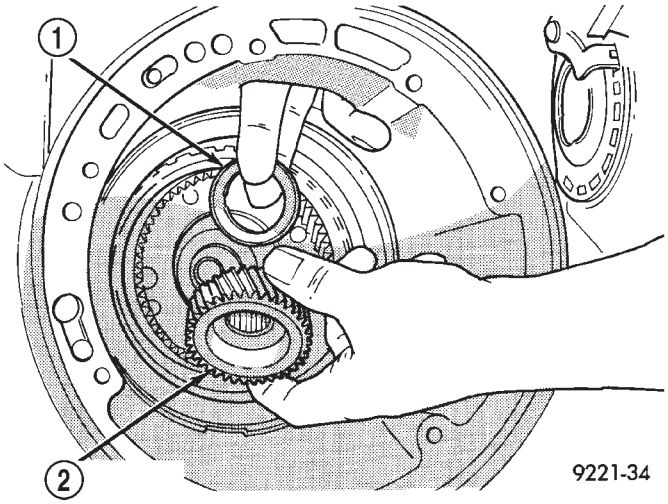


Fig. 337 Install Rear Sun Gear

1 – #7 NEEDLE BEARING
2 – REAR SUN GEAR

DISASSEMBLY AND ASSEMBLY (Continued)

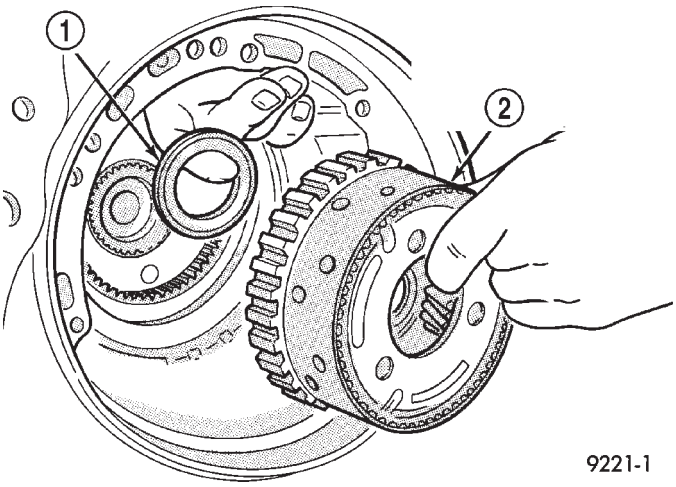


Fig. 338 Install Front Carrier and Rear Annulus Assembly

1 – #6 NEEDLE BEARING
2 – FRONT CARRIER AND REAR ANNULUS ASSEMBLY (TWIST AND PULL OR PUSH TO REMOVE OR INSTALL).

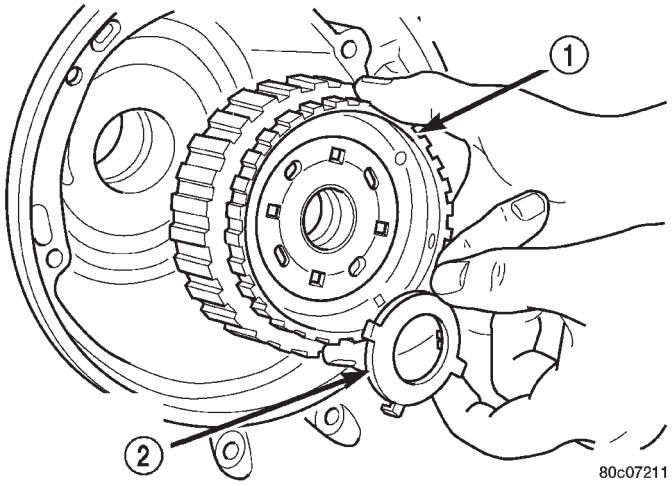


Fig. 339 Install Front Sun Gear Assembly

1 – FRONT SUN GEAR ASSEMBLY
2 – #4 THRUST WASHER (FOUR TABS)

DETERMINING No. 4 THRUST PLATE THICKNESS—INPUT SHAFT END PLAY

To determine the proper thickness of the No. 4 thrust plate, select the thinnest No. 4 thrust plate. Using petrolatum (Fig. 340) to hold thrust plate in position, install input clutch assembly. Be sure the input clutch assembly is completely seated (Fig. 341).

CAUTION: If view through input speed sensor hole is not as shown above, the input clutches assembly is not seated properly.

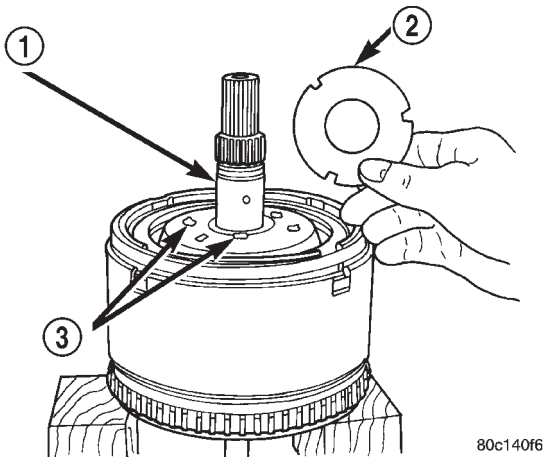


Fig. 340 Select Thinnest No. 4 Thrust Plate

1 – OVERDRIVE SHAFT ASSEMBLY
2 – #4 THRUST PLATE (SELECT)
3 – 3 DABS OF PETROLATUM FOR RETENTION

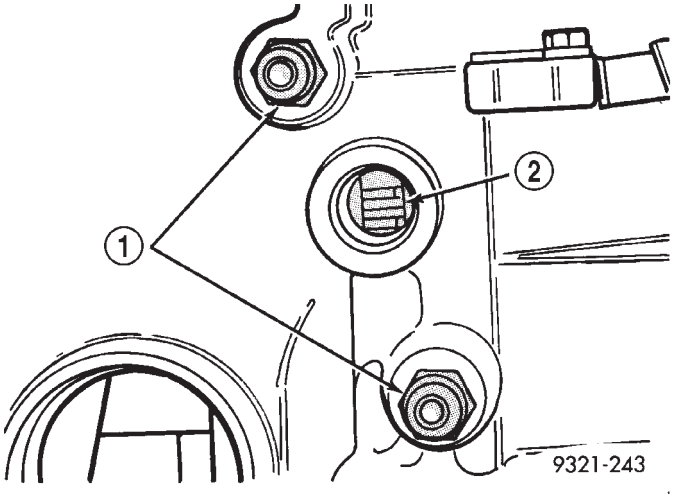


Fig. 341 View Through Turbine Speed Sensor Hole

1 – TRANSAXLE COOLER LINE
2 – TURBINE SPEED SENSOR HOLE

Remove the oil pump O-ring (Fig. 342). You will be able to install and remove the oil pump and gasket very easily to select the proper No. 4 thrust plate.

NOTE: Use screw-in dowels or phillips-head screwdrivers to align pump to case.

CAUTION: Be sure to reinstall O-ring on oil pump after selecting the proper No. 4 thrust plate.

Measure the input shaft end play with the transaxle in the vertical position. This will ensure that the measurement will be accurate.

DISASSEMBLY AND ASSEMBLY (Continued)

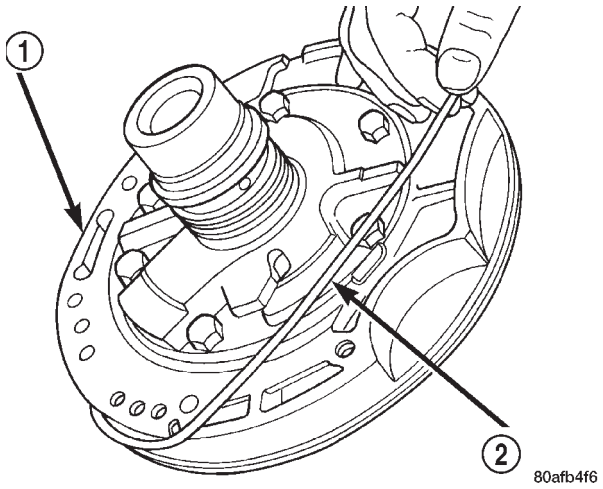


Fig. 342 Remove Oil Pump O-Ring

1 – OIL PUMP ASSEMBLY
2 – O-RING

Set up and measure endplay using End Play Set 8266 and Dial Indicator Set C3339 as shown in (Fig. 343).

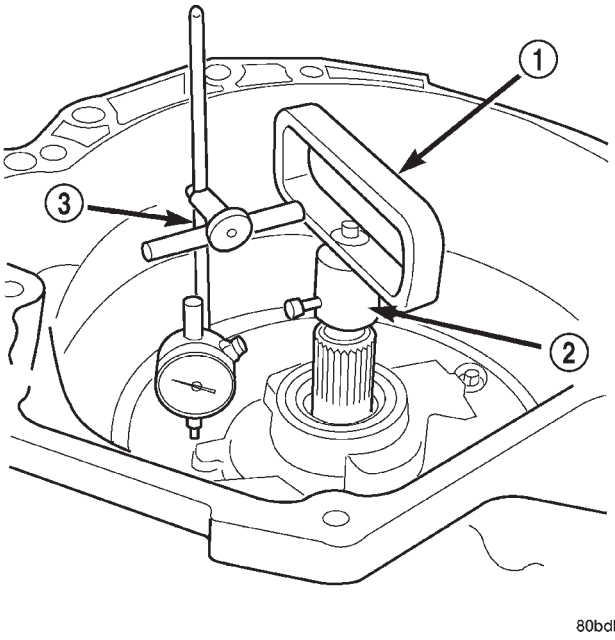


Fig. 343 Measure Input Shaft End Play using End Play Set 8266

1 – TOOL 8266–8
2 – TOOL 8266–2
3 – TOOL C-3339

NOTE: Input shaft end play must be.005 to.025 inch.

For example, if end play reading is.055 inch, select No. 4 Thrust Plate which is.071 to.074 thick. This should provide an input shaft end play reading of.020 inch which is within specifications.

See chart to select the proper No. 4 thrust plate.

NO. 4 THRUST PLATE CHART

PART NUMBER	THICKNESS
4431662	.91mm (.036 in.)
4431663	1.14mm (.045 in.)
4431664	1.37mm (.054 in.)
4431665	1.60mm (.063 in.)
3836237	1.73mm (.068 in.)
4431666	1.80mm (.071 in.)
3836238	1.96mm (.077 in.)
4431667	2.03mm (.080 in.)
3836239	2.16mm (.085 in.)
4431668	2.24mm (.088 in.)
3836240	2.39mm (.094 in.)
4431669	2.46mm (.097 in.)
3836241	2.62mm (.103 in.)
4446670	2.67mm (.105 in.)
4446671	2.90mm (.114 in.)
4446672	3.15mm (.124 in.)
4446601	3.38mm (.133 in.)

Reinstall the input clutches assembly with the selected thrust plate.

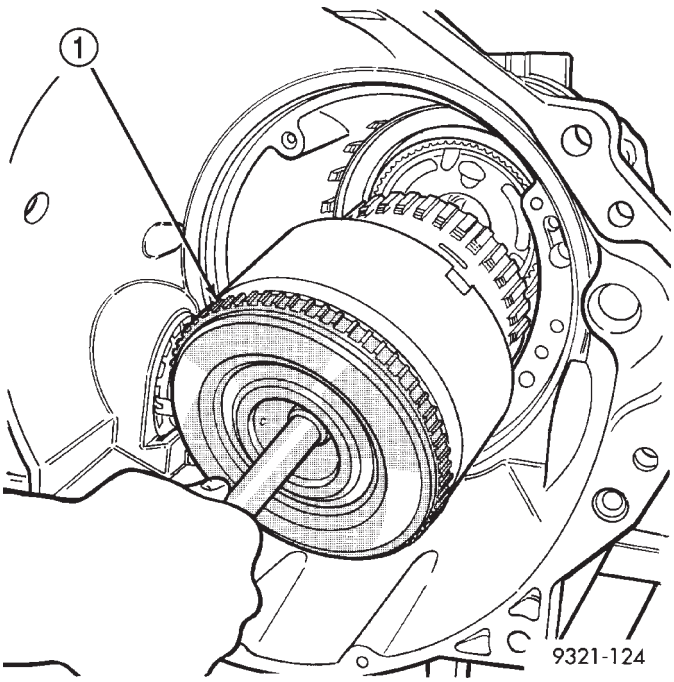


Fig. 344 Install Input Clutch Assembly

1 – INPUT CLUTCH ASSEMBLY

DISASSEMBLY AND ASSEMBLY (Continued)

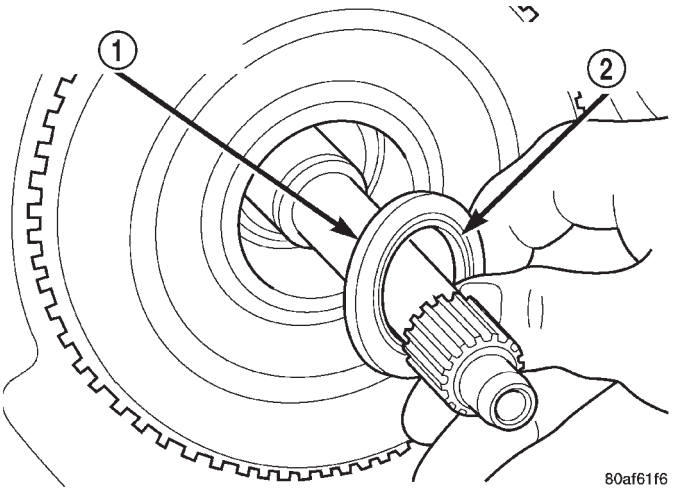


Fig. 345 Install Caged Needle Bearing

1 – #1 CAGED NEEDLE BEARING
2 – NOTE: TANGED SIDE OUT

CAUTION: By-pass valve must be replaced if transmission failure occurs.

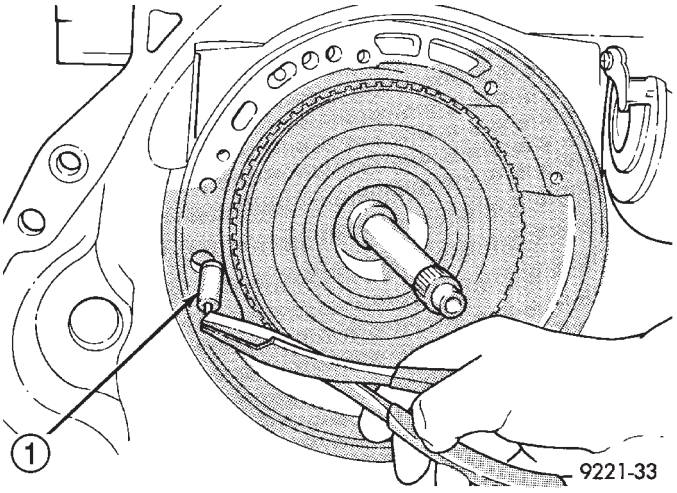


Fig. 346 Install By-Pass Valve

1 – BY-PASS VALVE

NOTE: To align oil pump during installation, use threaded dowels or phillips screwdrivers.

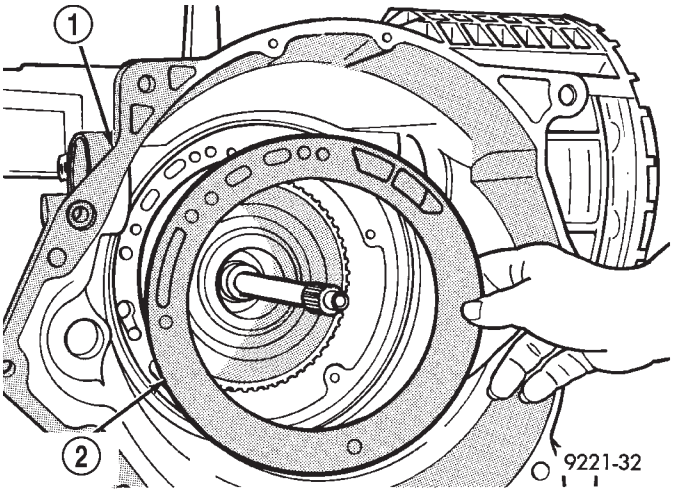


Fig. 347 Install Oil Pump Gasket

1 – BELL HOUSING
2 – OIL PUMP GASKET

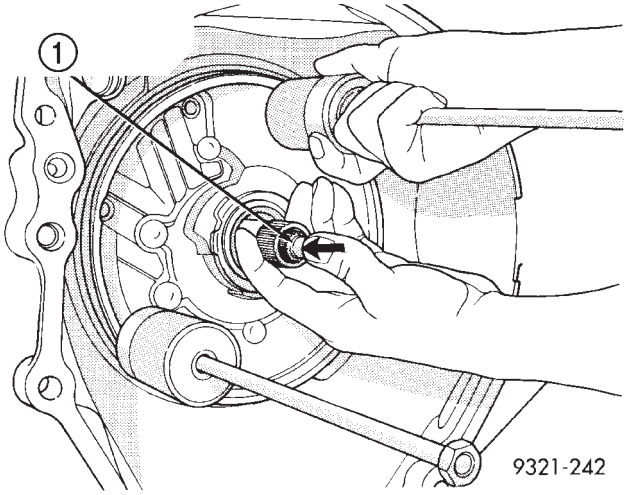


Fig. 348 Install Oil Pump

1 – “PUSH IN” ON INPUT SHAFT WHILE REMOVING PUMP

DISASSEMBLY AND ASSEMBLY (Continued)

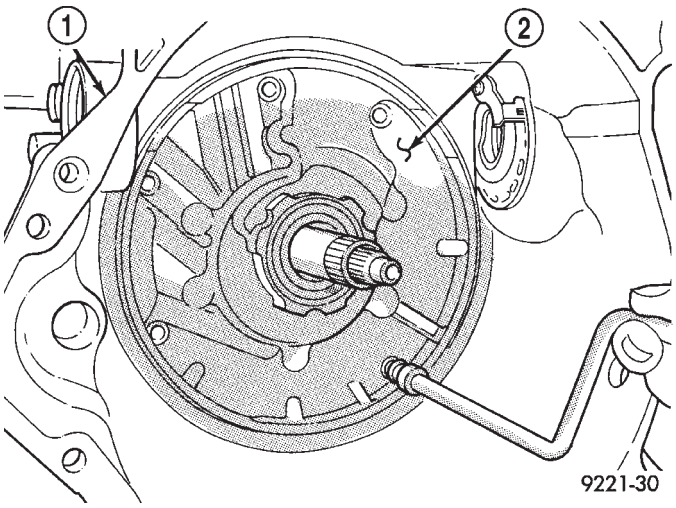


Fig. 349 Install Oil Pump Attaching Bolts

1 – BELLHOUSING
2 – OIL PUMP

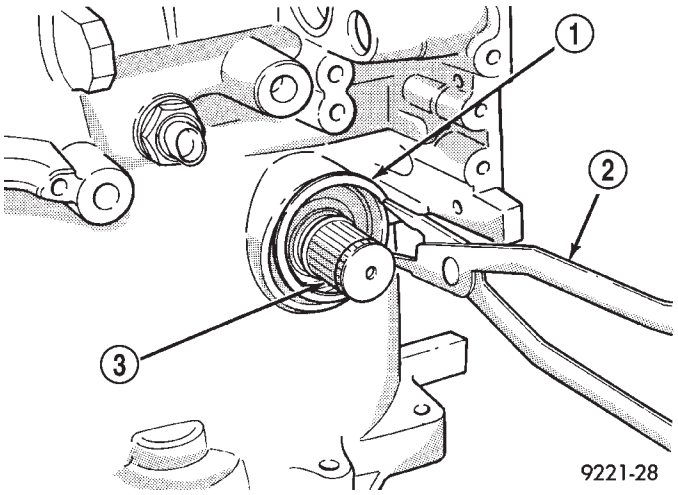


Fig. 351 Install Long Stub Shaft Snap Ring

1 – SNAP RING
2 – SNAP RING PLIERS
3 – LONG STUB SHAFT

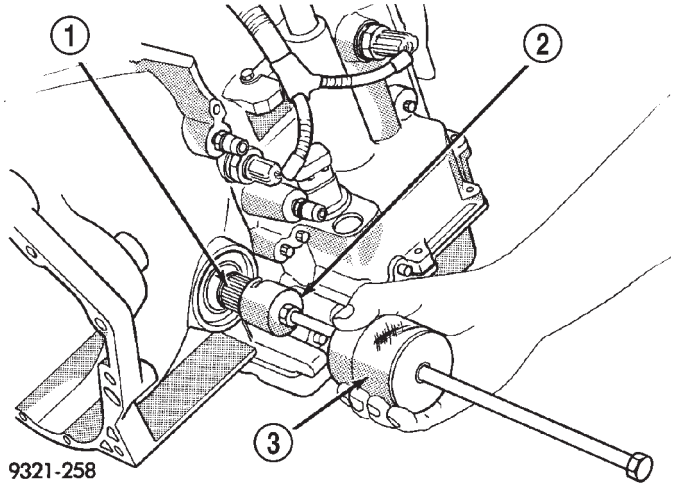


Fig. 350 Install Long Stub Shaft To Bellhousing

1 – LONG STUB SHAFT
2 – SPECIAL TOOL 6669
3 – SLIDE HAMMER C-3752

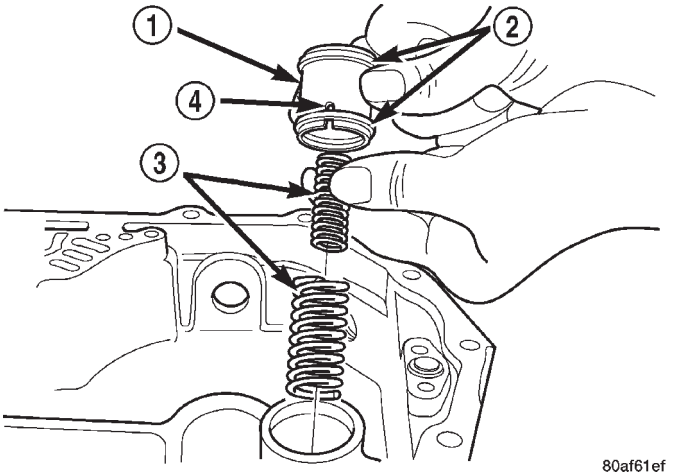


Fig. 352 Install Low/Reverse Accumulator

1 – ACCUMULATOR PISTON
2 – SEAL RINGS
3 – RETURN SPRINGS
4 – (NOTE NOTCH)

NOTE: Install new driveshaft retainer clips to driveshafts.

DISASSEMBLY AND ASSEMBLY (Continued)

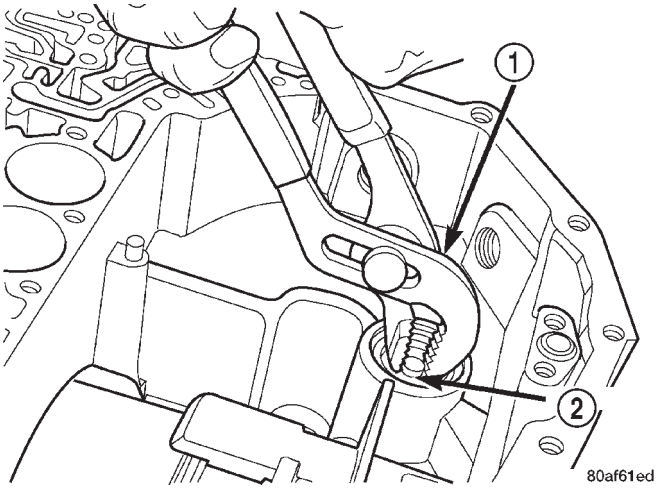


Fig. 353 Install Low/Reverse Accumulator Plug (Cover)

1 – ADJUSTABLE PLIERS
2 – PLUG

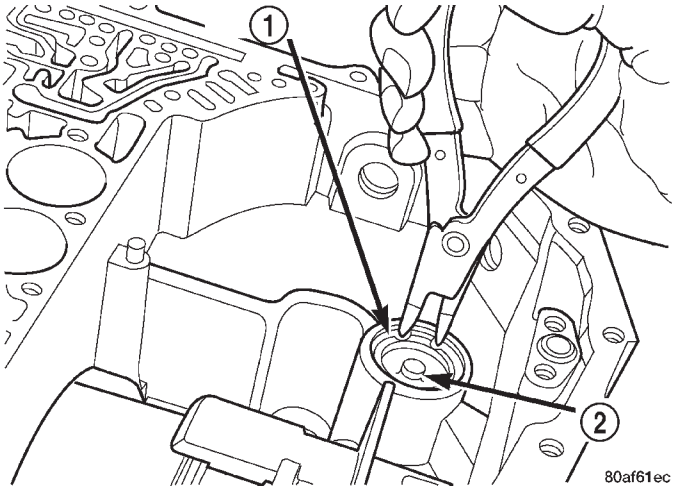


Fig. 354 Install Low/Reverse Accumulator Snap Ring

1 – SNAP RING
2 – PLUG

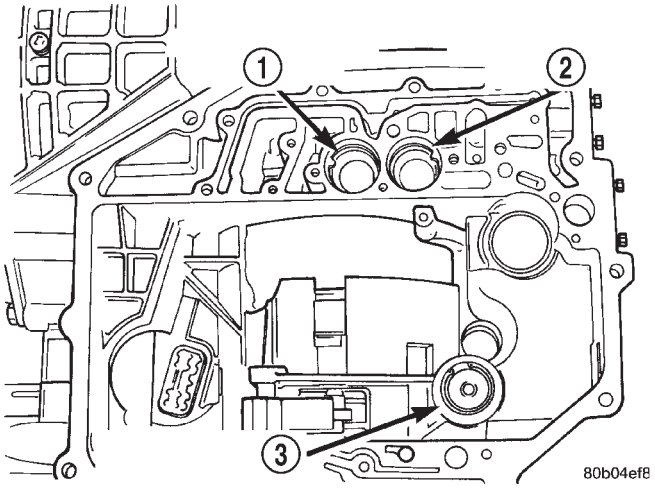


Fig. 355 Accumulator Locations

1 – OVERDRIVE ACCUMULATOR LOCATION
2 – UNDERDRIVE ACCUMULATOR LOCATION
3 – LOW/REVERSE ACCUMULATOR

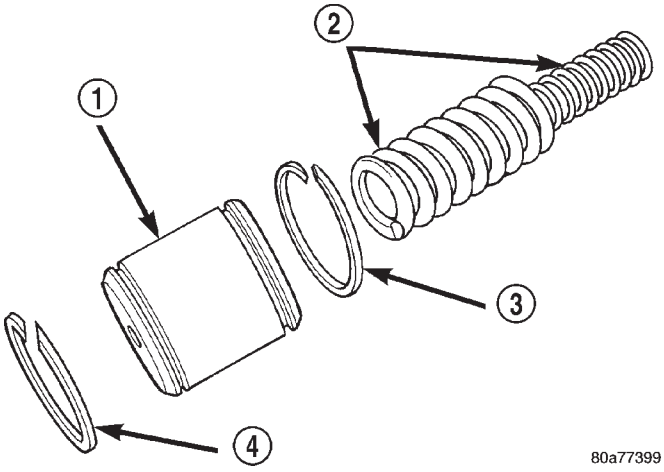


Fig. 356 Install Underdrive Accumulator and Springs

1 – ACCUMULATOR PISTON (UNDERDRIVE)
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

DISASSEMBLY AND ASSEMBLY (Continued)

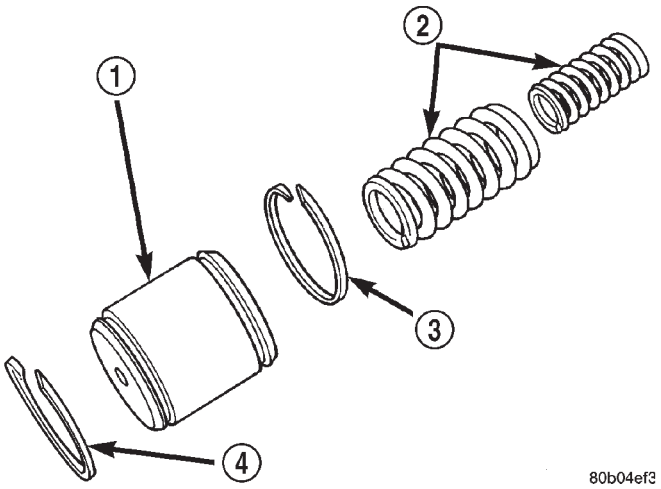


Fig. 357 Install Overdrive Accumulator and Springs

1 – OVERDRIVE ACCUMULATOR PISTON
2 – RETURN SPRINGS
3 – SEAL RING
4 – SEAL RING

CAUTION: Do not handle the valve body by the manual shaft. Damage could result.

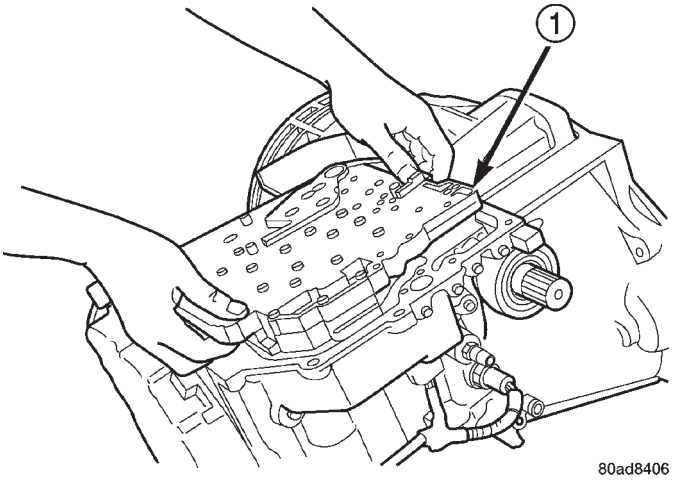


Fig. 358 Install Valve Body To Transaxle

1 – VALVE BODY

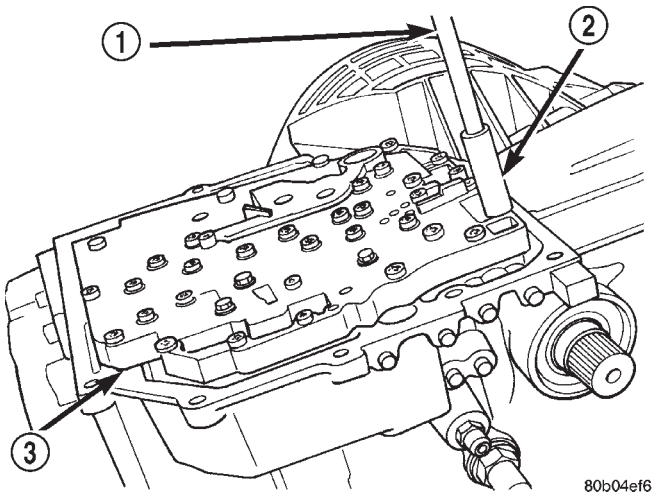


Fig. 359 Install Valve Body Bolts (17)

1 – EXTENSION
2 – SOCKET
3 – VALVE BODY

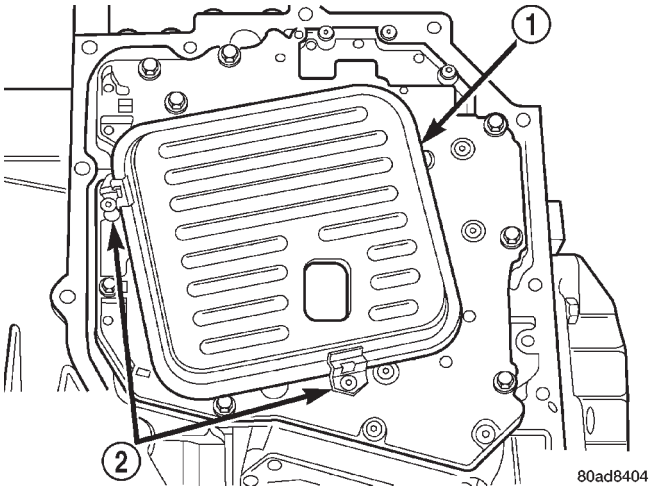


Fig. 360 Install Transaxle Oil Filter

1 – TRANSAXLE FILTER
2 – FILTER RETAINING CLIPS

DISASSEMBLY AND ASSEMBLY (Continued)

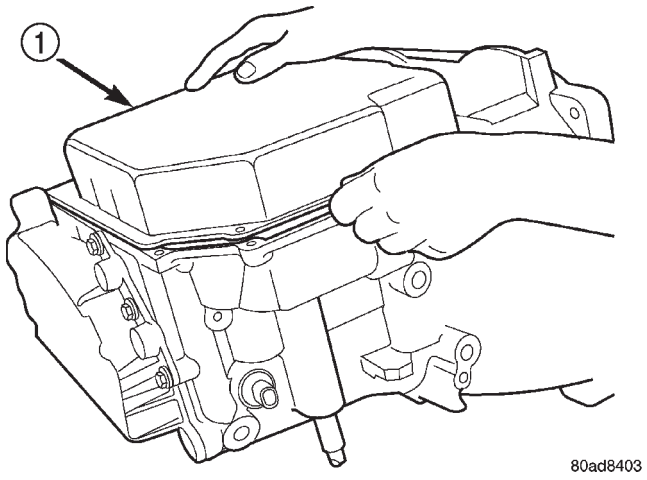


Fig. 361 Install Transaxle Oil Pan

1 – TRANSAXLE OIL PAN

Install both speed sensors from transaxle case (Fig. 362).

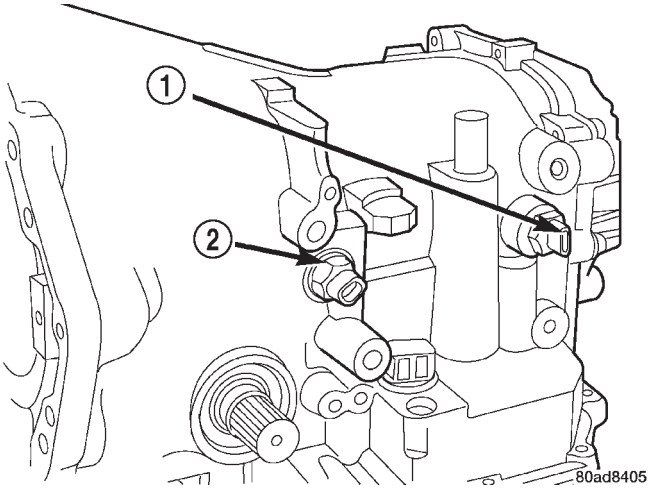


Fig. 362 Install Input and Output Speed Sensor

1 – OUTPUT SPEED SENSOR
2 – INPUT SPEED SENSOR

As a final check of the transaxle, measure the input shaft end play. This will indicate when a #4 thrust plate change is required. The number 4 thrust plate is located behind the overdrive clutch hub. Attach a dial indicator to transaxle bell housing with its plunger seated against end of input shaft (Fig. 363). Move input shaft in and out to obtain end play reading. End play specifications are.13 to.64 mm (.005 to.025 inch). If not within specifications, make the necessary thrust plate adjustment.

DIFFERENTIAL RECONDITION

The valve body and solenoid wiring connector must be removed from the transaxle in order to recondition the transaxle differential. The transfer shaft cannot be removed with the valve body in place. Refer to Valve Body Recondition for removal procedure.

If any bearings in the differential require replacement, all the bearings on the differential carrier and transfer shaft must be replaced. The differential adjusters must also be replaced when differential bearings are replaced.

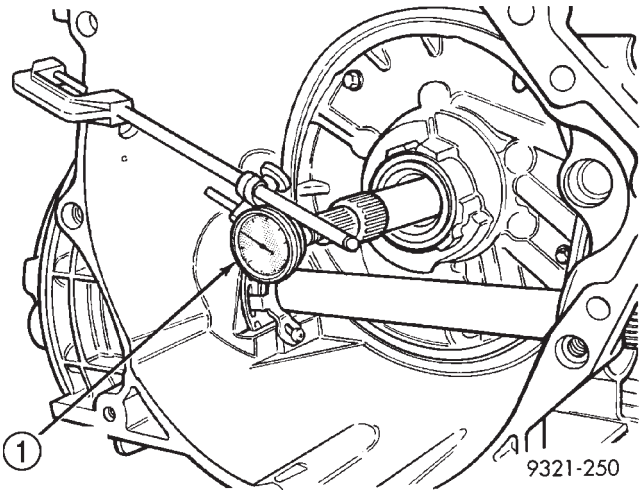


Fig. 363 Measure Input Shaft End Play

1 – DIAL INDICATOR

DISASSEMBLY

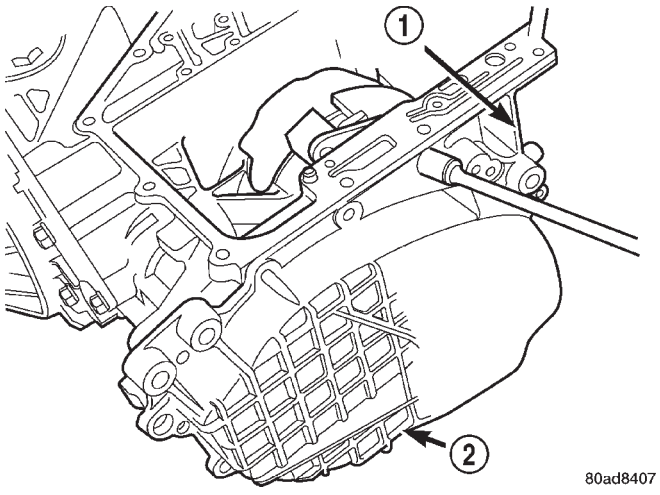


Fig. 364 Remove Chain Cover

1 – TRANSAXLE CASE
2 – CHAIN COVER

CAUTION: The chain sprockets have a slip fit onto their shafts. Apply only a slight amount of pressure to the chain spreader to release the chain pressure. If chain sprockets are not spread slightly removal or installation will be difficult. Overspreading of the chain sprocket will also make sprocket removal difficult.

DISASSEMBLY AND ASSEMBLY (Continued)

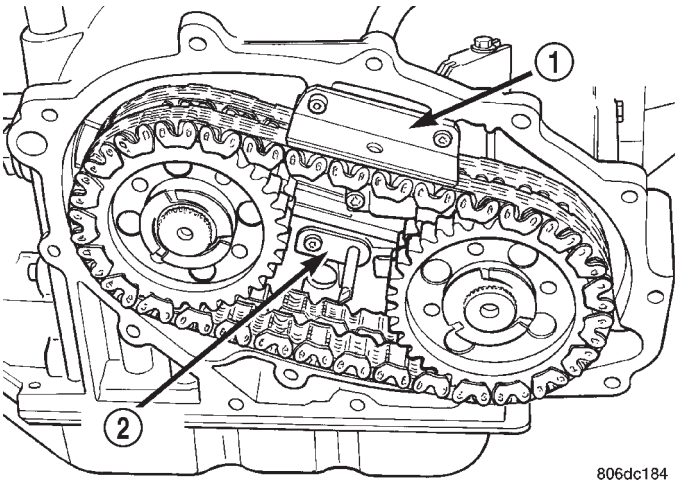


Fig. 365 Remove Chain Oiler

1 – CHAIN SNUBBER
2 – CHAIN OILER

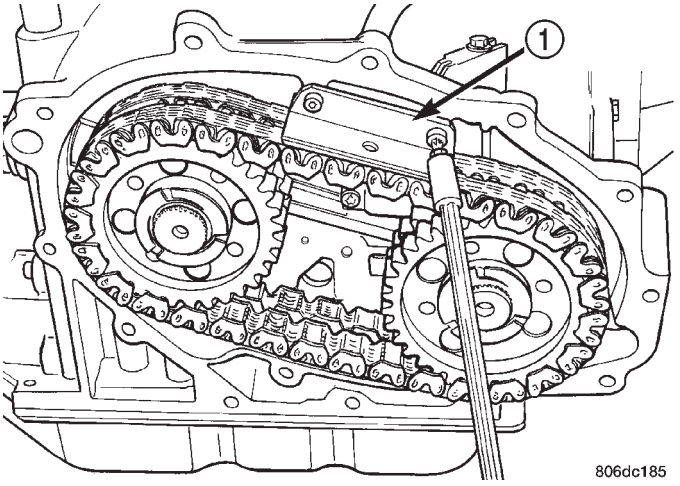


Fig. 366 Remove Chain Snubber

1 – CHAIN SNUBBER

CAUTION: To ensure proper gear ratio, verify that the correct chain and sprocket ratio is selected.

CAUTION: When reinstalling drive chains, the blue link must face outward.

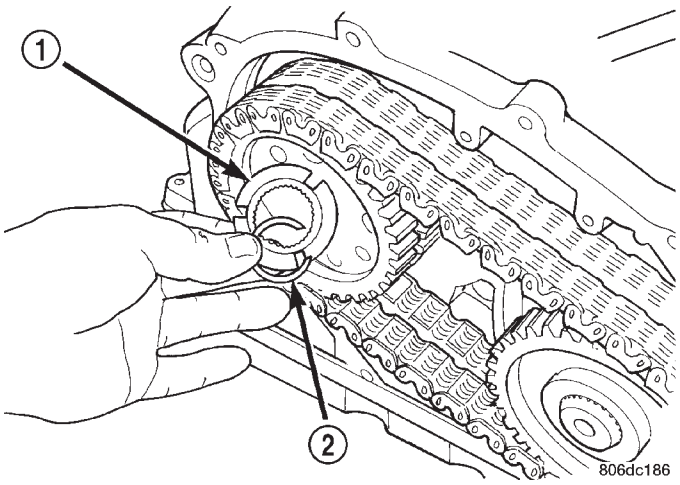


Fig. 367 Remove Output Shaft Sprocket Snap Ring and Wave Washer

1 – WAVE WASHER
2 – SNAP RING

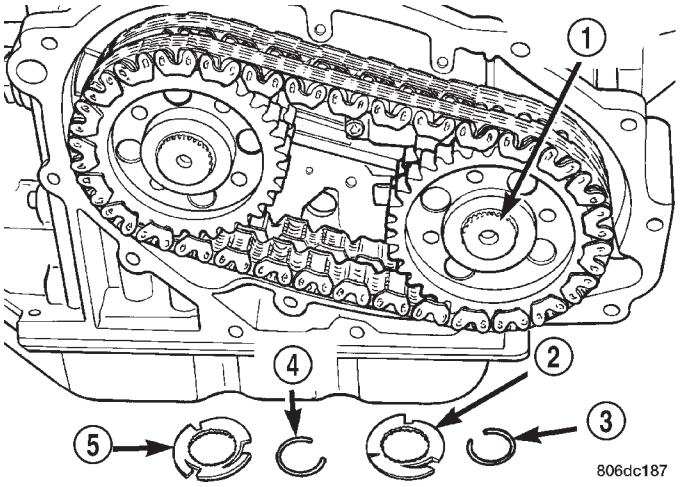


Fig. 368 Remove Transfer Shaft Sprocket Snap Ring and Wave Washer

1 – TRANSFER SHAFT
2 – WAVE WASHER
3 – SNAP RING
4 – SNAP RING
5 – WAVE WASHER

DISASSEMBLY AND ASSEMBLY (Continued)

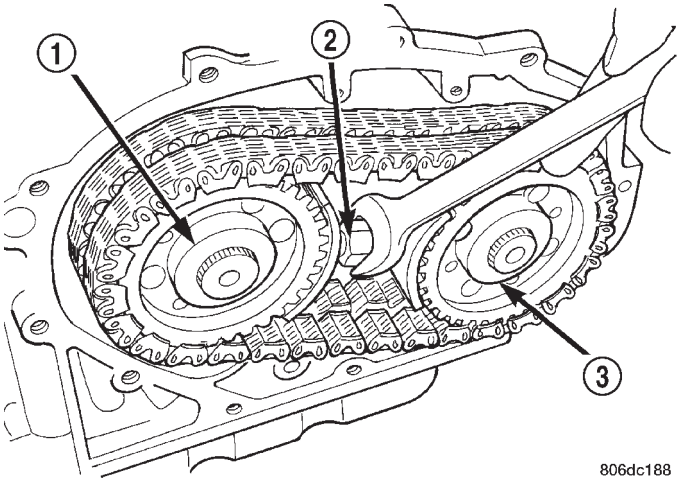


Fig. 369 Install Chain Spreader

1 – OUTPUT SPROCKET
2 – SPECIAL TOOL 6550
3 – TRANSFER SPROCKET

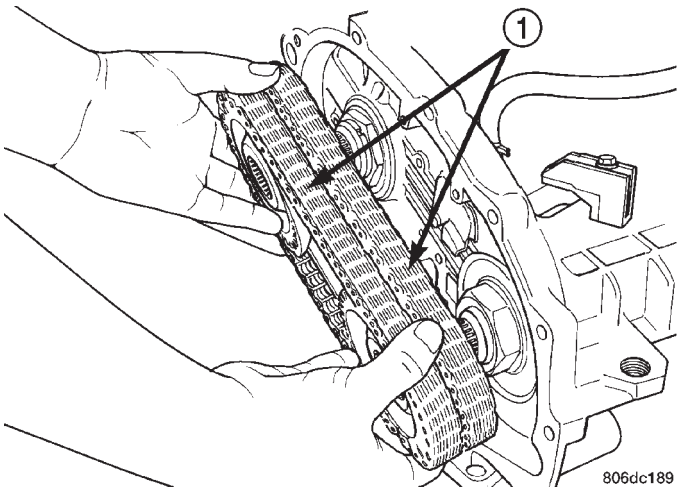


Fig. 370 Remove Chains and Sprockets as an Assembly

1 – CHAINS

CAUTION: Driveshaft retainer clips and seals located on the stub shafts must be replaced before reinstalling driveshafts.

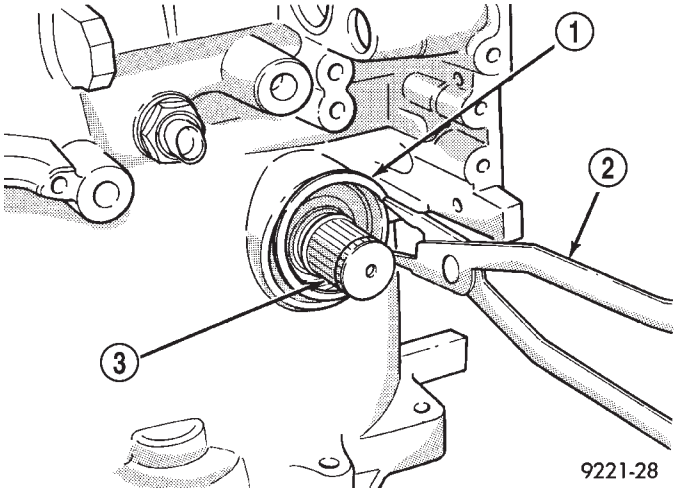


Fig. 371 Remove Long Stub Shaft Snap Ring

1 – SNAP RING
2 – SNAP RING PLIERS
3 – LONG STUB SHAFT

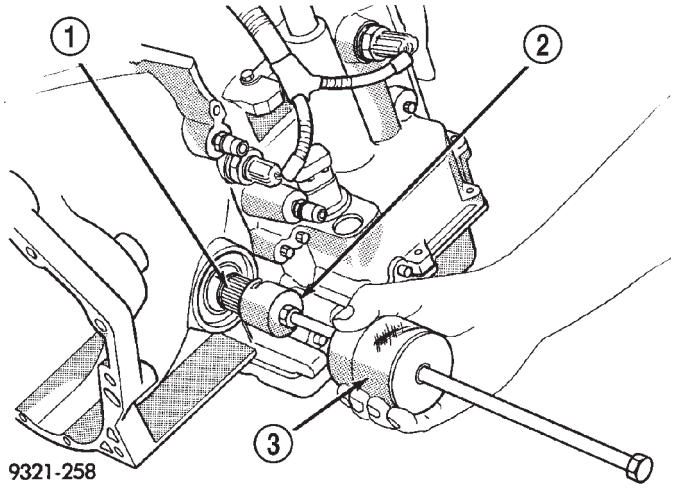


Fig. 372 Remove Long Stub Shaft

1 – LONG STUB SHAFT
2 – SPECIAL TOOL 6669
3 – SLIDE HAMMER C-3752

DISASSEMBLY AND ASSEMBLY (Continued)

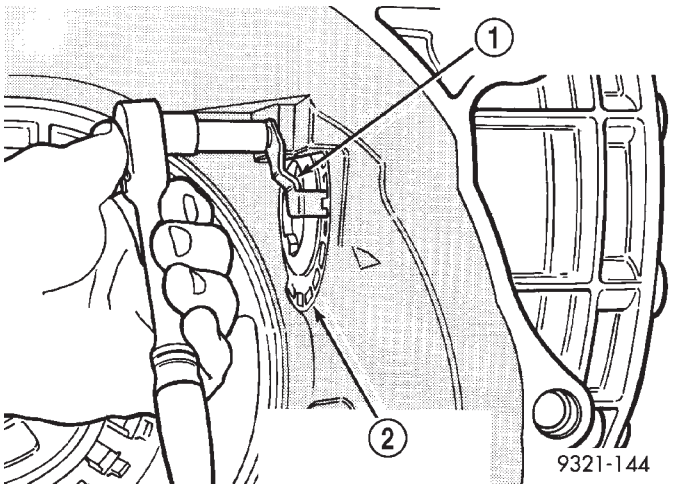


Fig. 373 Remove Inner Differential Adjuster Lock

1 – INNER DIFFERENTIAL ADJUSTER LOCK
2 – INNER DIFFERENTIAL ADJUSTER

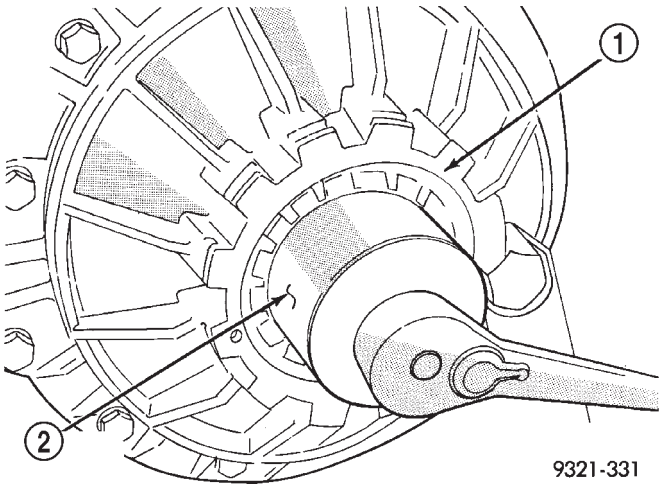


Fig. 375 Loosen Outer Adjuster

1 – OUTER ADJUSTER
2 – SPECIAL TOOL 6503

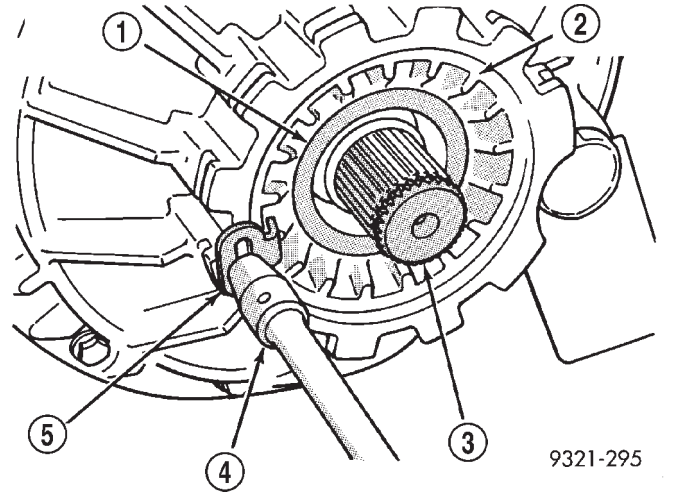


Fig. 374 Remove Outer Adjuster

1 – OIL SEAL
2 – OUTER ADJUSTER
3 – STUB SHAFT
4 – SOCKET
5 – ADJUSTER LOCK

If the carrier requires reconditioning, refer to Differential Carrier Recondition.

CAUTION: Failure to grind and open stakes on the transfer shaft nut will result in thread damage to transfer shaft during nut removal.

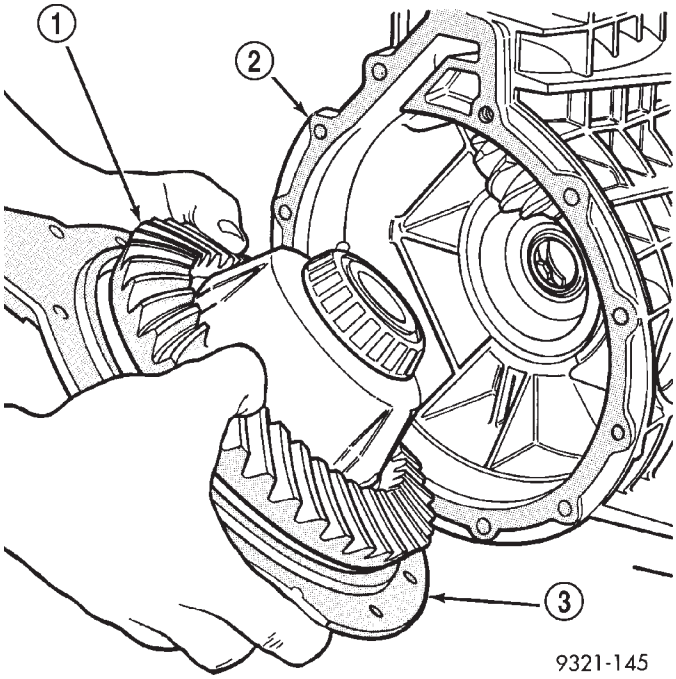


Fig. 376 Remove Differential Side Cover, Carrier and Ring Gear Assembly

1 – RING GEAR
2 – TRANSAXLE CASE
3 – SIDE COVER

DISASSEMBLY AND ASSEMBLY (Continued)

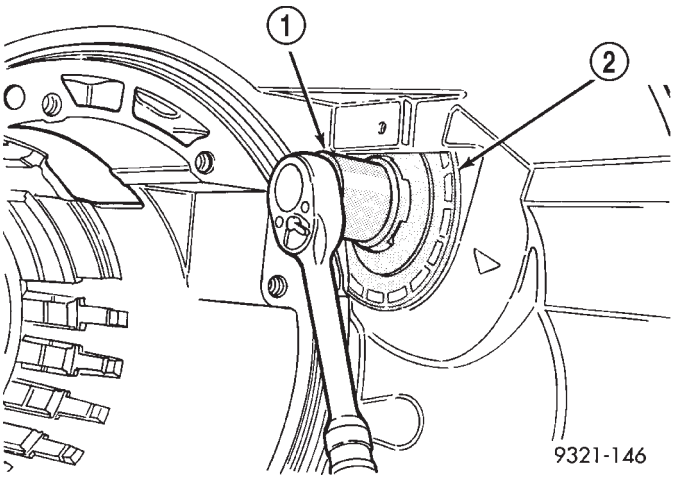


Fig. 377 Remove Inner Adjuster By Turning Clockwise

1 – SPECIAL TOOL 6502–B
2 – INNER DIFFERENTIAL ADJUSTER

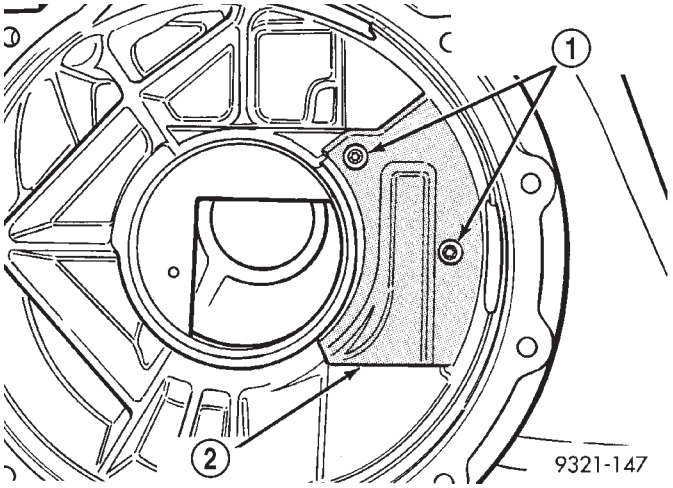


Fig. 378 Remove Differential Vent Baffle

1 – VENT BAFFLE RETAINING SCREWS
2 – VENT BAFFLE

WARNING: WEAR SAFETY GOGGLES WHILE GRINDING STAKE NUTS.

Using a die grinder or equivalent, grind the stakes in the shoulder of the shaft nut as shown in (Fig. 379) and (Fig. 380). Do not grind through the transfer shaft nut into the shaft. There are two stakes on the nut.

Using a small chisel, carefully open stakes on nut (Fig. 381)

Remove the transfer shaft nut.

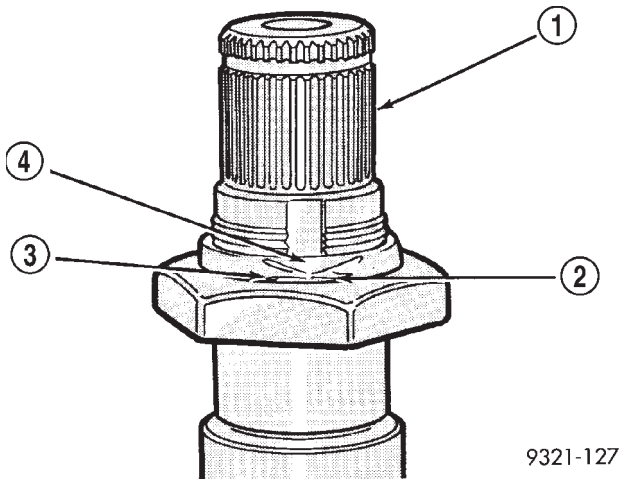


Fig. 379 Grinding Stakes

1 – TRANSFER SHAFT
2 – GRIND HERE
3 – GRIND HERE
4 – NUT STAKE

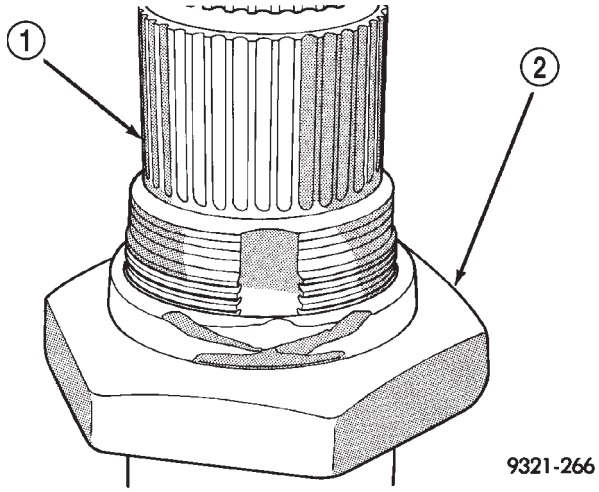


Fig. 380 Stake Grinding Pattern

1 – TRANSFER SHAFT
2 – TRANSFER SHAFT NUT

CAUTION: Do not reuse old transfer shaft nut because the removed stake weakens the nut flange.

CAUTION: The transfer shaft cannot be removed from the case at this time.

Install special tool 6577 to remove rear transfer bearing cup (Fig. 383).

DISASSEMBLY AND ASSEMBLY (Continued)

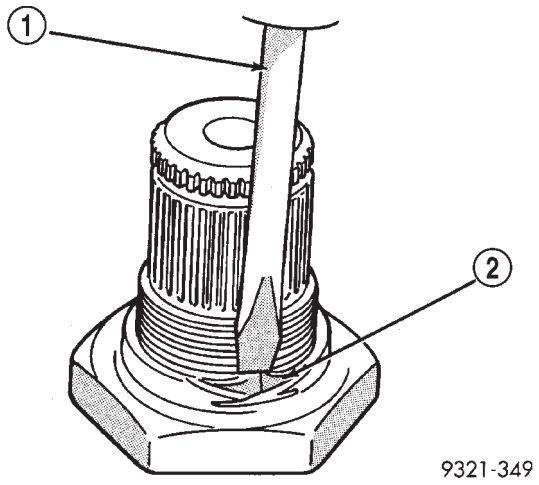


Fig. 381 Opening Nut Stakes

1 – CHISEL
2 – NUT STAKE

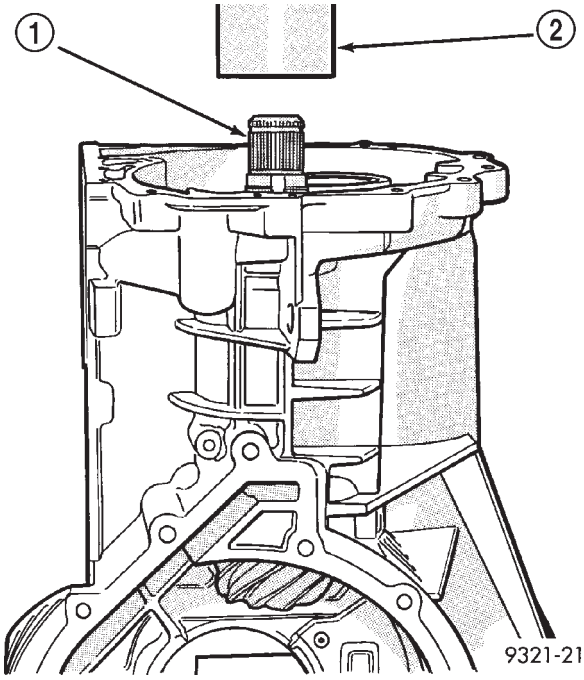


Fig. 382 Press Transfer Shaft Downward to Remove Rear Cone

1 – TRANSFER SHAFT
2 – ARBOR PRESS

Remove transfer shaft preload shim (Fig. 384). If transfer shaft bearings are to be reused, the original shim must also be reused.

CAUTION: If the transfer shaft is removed from the transaxle case for any reason, both seals must be replaced.

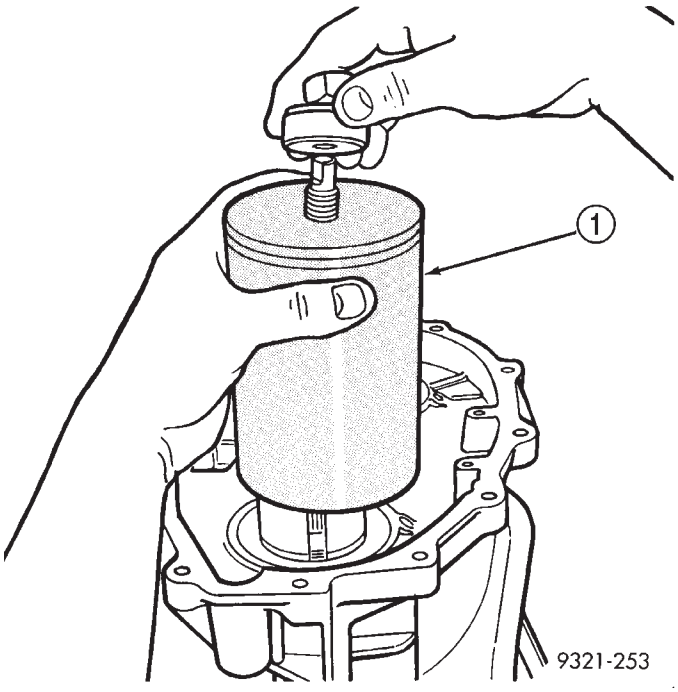


Fig. 383 Transfer Bearing Cup Removal

1 – SPECIAL TOOL 6577

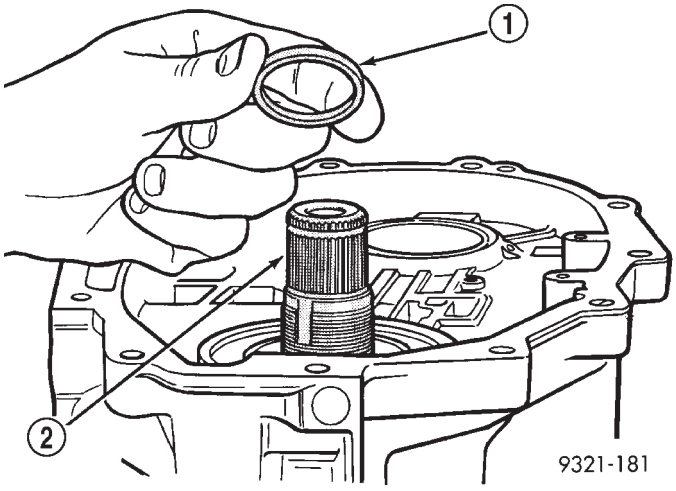


Fig. 384 Preload Shim Removal

1 – TRANSFER SHAFT PRELOAD SHIM
2 – TRANSFER SHAFT

Remove transfer shaft seals (Fig. 386) using special tool 6310 and foot 6310-9 (Tar 960). Do not reuse old seals. The seals will be pulled out the rear of the case.

Remove the front transfer shaft bearing cup using special tool 6495 and handle C-4171 (Fig. 387). Use a press with special tools to remove cup.

DISASSEMBLY AND ASSEMBLY (Continued)

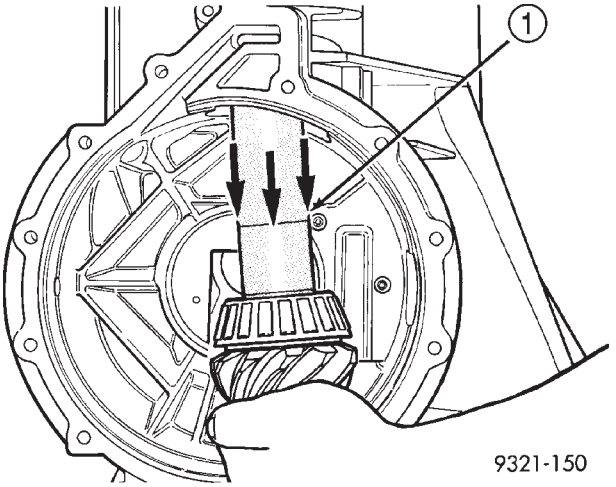


Fig. 385 Remove Transfer Shaft Assembly From Case

1 – TRANSFER SHAFT

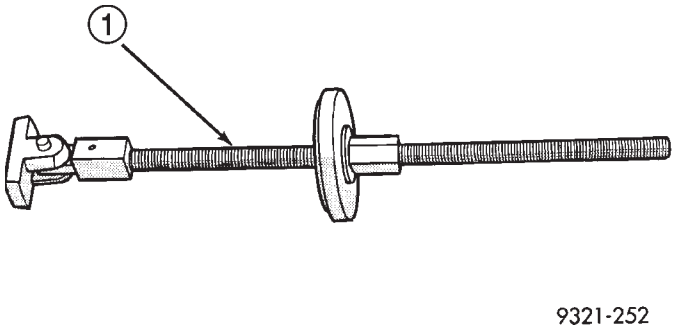


Fig. 386 Transfer Shaft Seal Remover

1 – SPECIAL TOOL 6310

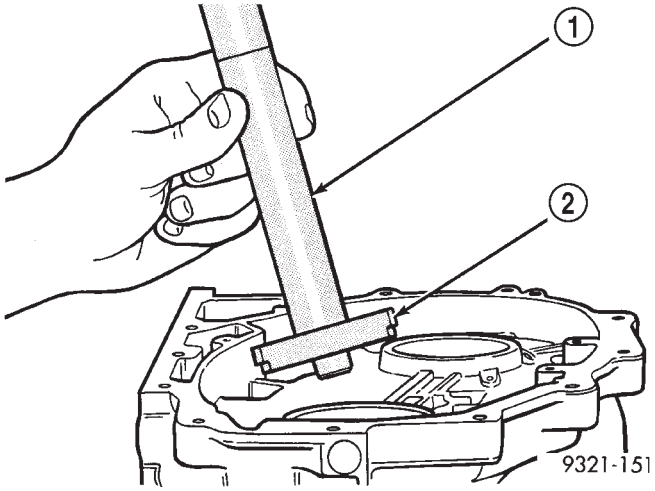


Fig. 387 Front Transfer Shaft Cup Removal

1 – SPECIAL TOOL C-4171
2 – SPECIAL TOOL 6495

Support special tool P-334 on press table so that pinion head of transfer shaft can be pressed through table (Fig. 388).

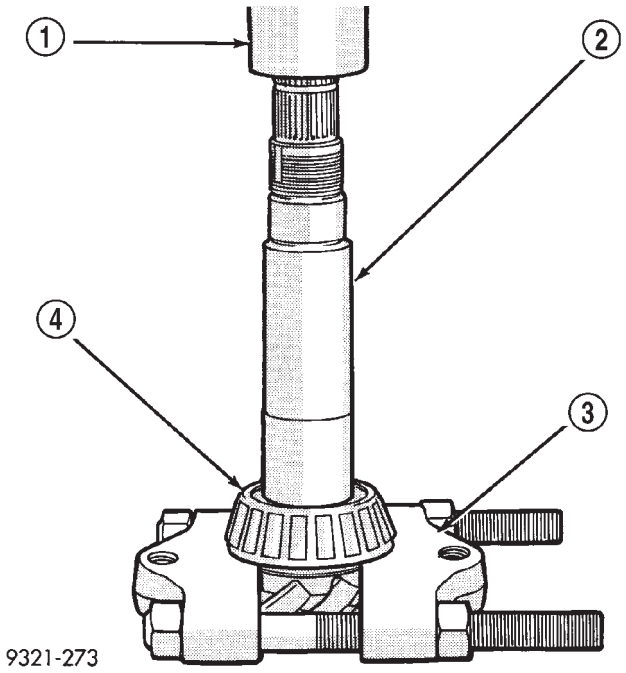


Fig. 388 Remove Front Transfer Shaft Bearing And Pinion Depth Shim

1 – ARBOR PRESS
2 – TRANSFER SHAFT
3 – SPECIAL TOOL P-334
4 – FRONT TRANSFER SHAFT BEARING

ASSEMBLE AND BEARING ADJUSTMENT PROCEDURE

The following steps will determine the correct shim thickness required to obtain proper pinion depth. All special tools described in this procedure must be used to obtain correct results.

CAUTION: Failure to adjust pinion depth correctly could cause gear noise or transaxle failure.

(1) Install front transfer shaft bearing cup (Fig. 389). The transfer shaft bearing cup must be installed before making pinion depth measurement. Use special tool 6494 to install bearing cup. There are no shims located behind this bearing cup.

CAUTION: The bearing cup is seated in the case correctly if there is no clearance between the bottom of the bearing cup and case. If a 0.001" or 0.002" feeler gauge does not fit, the bearing cup is completely seated into transaxle case.

(2) Install centering block (special tool 6549-2) into the transaxle case (Fig. 390). Screw centering block into inner adjuster hole of case until it bottoms. The pegs on the special tool are only used for installation. Orientation with in the case is not required.

DISASSEMBLY AND ASSEMBLY (Continued)

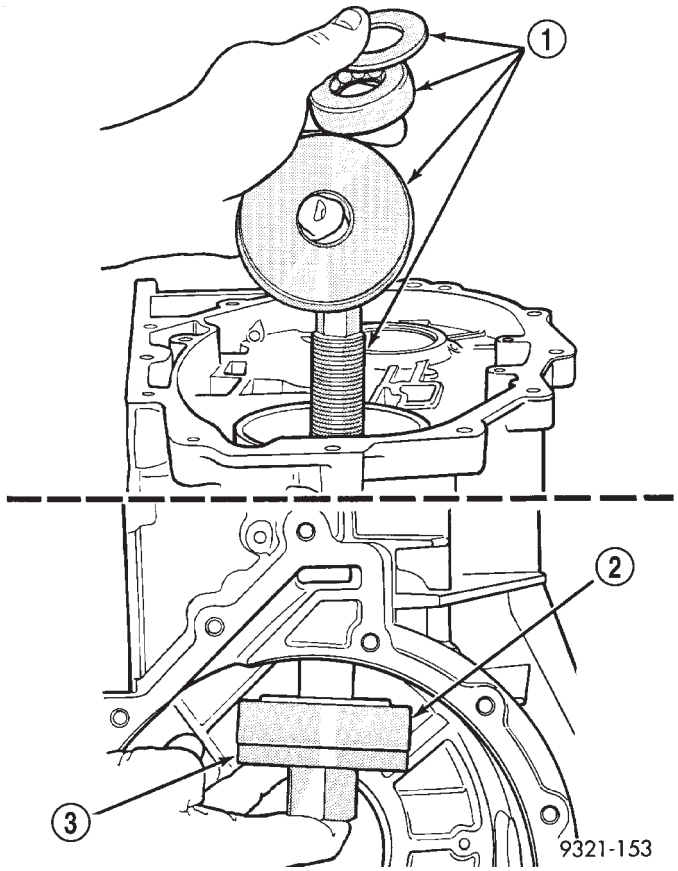


Fig. 389 Install Front Transfer Shaft Cup

1 – SPECIAL TOOL 6494
2 – BEARING CUP
3 – SPECIAL TOOL 6494

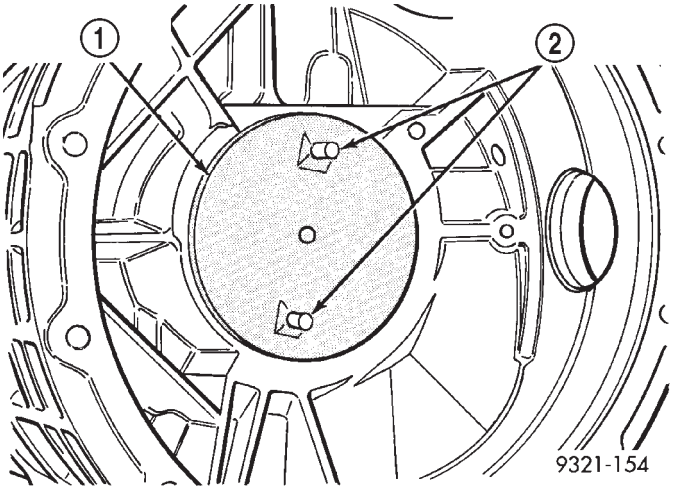


Fig. 390 Installing Centering Block

1 – SPECIAL TOOL 6549–2
2 – TOOL INSTALLATION AND REMOVAL PEGS

(3) Install new front bearing (actual bearing to be used during reassembly) onto gauge disc (special tool 6549-3) (Fig. 391).

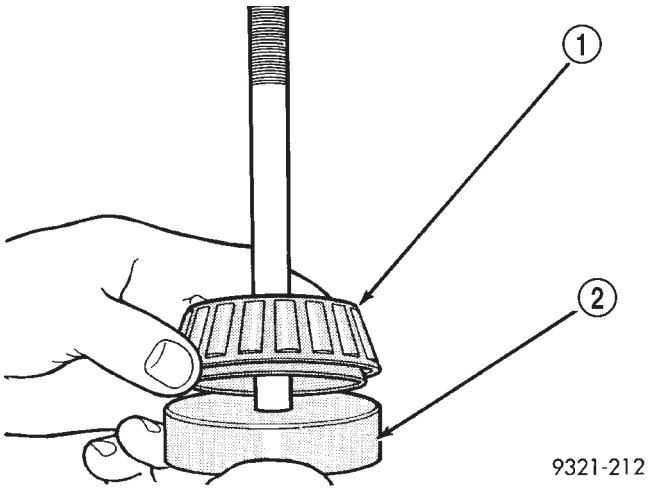


Fig. 391 Gauge Disc and Bearing

1 – FRONT TRANSFER SHAFT BEARING
2 – SPECIAL TOOL 6549–3

(4) Install gauge disc and bearing into case using gauge disc rod Tool 6549-4 (Fig. 392).

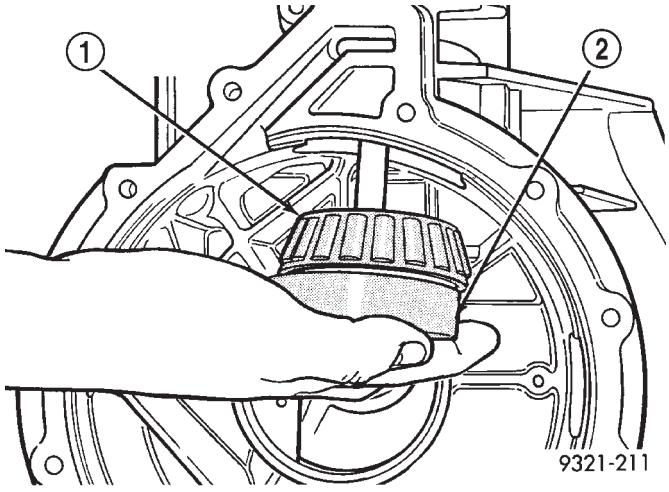


Fig. 392 Installing Gauge Disc with Front Transfer Shaft Bearing

1 – FRONT TRANSFER SHAFT BEARING
2 – SPECIAL TOOL 6549–3

(5) Install centering disc (special tool 6494-2) onto gauge disc rod (Fig. 393).

(6) Install centering nut Tool 6549-5 as shown in (Fig. 394).

(7) Hand tighten centering nut until all play in the tool has been removed.

DISASSEMBLY AND ASSEMBLY (Continued)

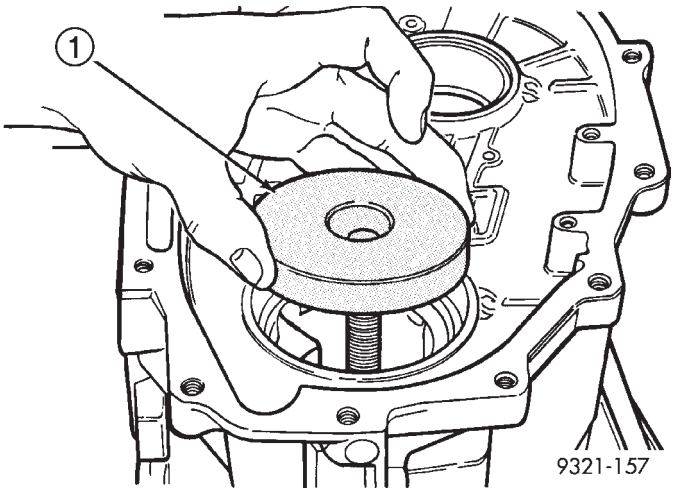


Fig. 393 Disc Installation

1 – SPECIAL TOOL 6494–2

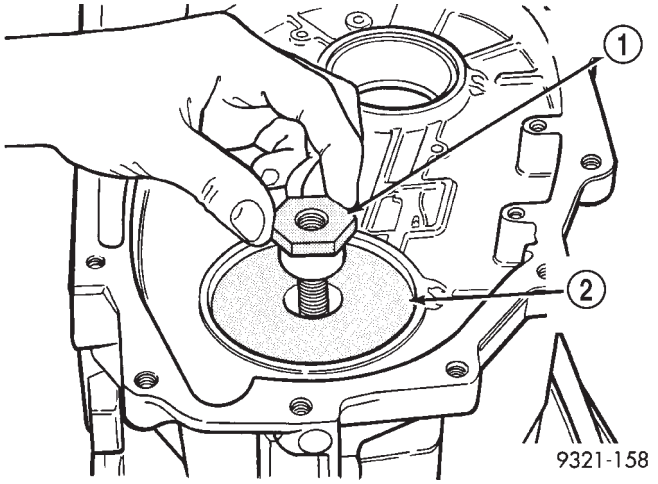


Fig. 394 Installing Centering Nut

1 – CENTERING NUT
2 – CENTERING DISC (6494–2)

(8) Install dial indicator into locating block Tool 6549-1. Then screw extension rod onto dial indicator.

NOTE: The dial indicator used to make this measurement must have a face that shows 0-50-0 (Special Tool C-3339) readings (Fig. 396). All steps from this point forward will reflect this assumption. This will give you proper shim thickness.

(9) Before making a pinion depth measurement the dial indicator must be zeroed. This is done by placing the dial indicator in the zeroing fixture (special tool 6549-6). Then place the zeroing fixture on a flat surface. Adjust the dial face so the pointer on the dial indicator lines up with the zero (Fig. 397).

(10) Compress the dial indicator slightly and insert dial indicator pin into centering block (Fig. 398).

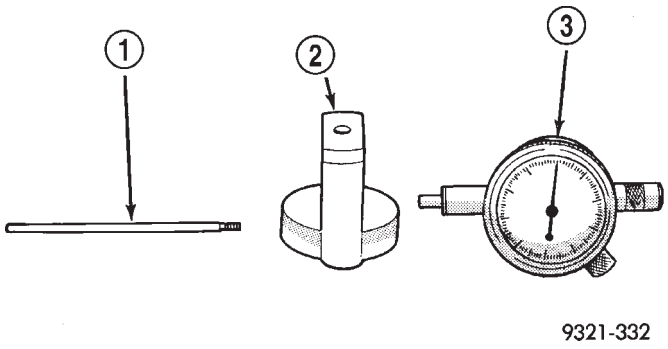


Fig. 395 Dial indicator, Locating Block and Extension Rod

1 – EXTENSION ROD SPECIAL TOOL
2 – LOCATING BLOCK SPECIAL TOOL
3 – DIAL INDICATOR

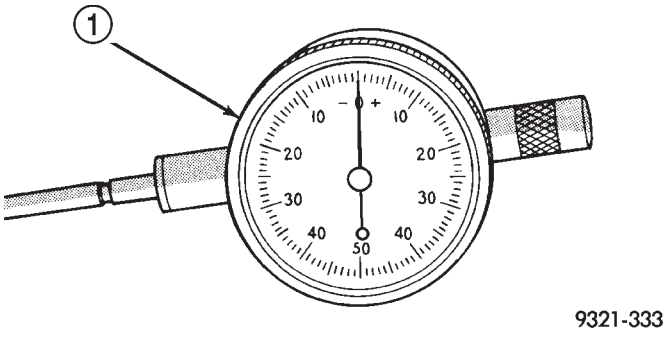


Fig. 396 0-50-0 Dial Indicator

1 – DIAL INDICATOR

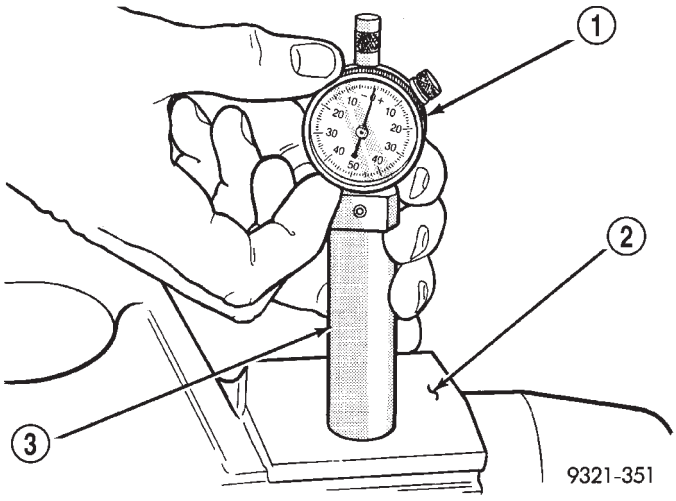


Fig. 397 Zero Dial Indicator

1 – DIAL INDICATOR
2 – FLAT SURFACE
3 – ZEROING FIXTURE

(11) Pivot dial indicator back and forth (Fig. 399) on centering pin to obtain the shortest distance measurement. **This will be the lowest number read-**

DISASSEMBLY AND ASSEMBLY (Continued)

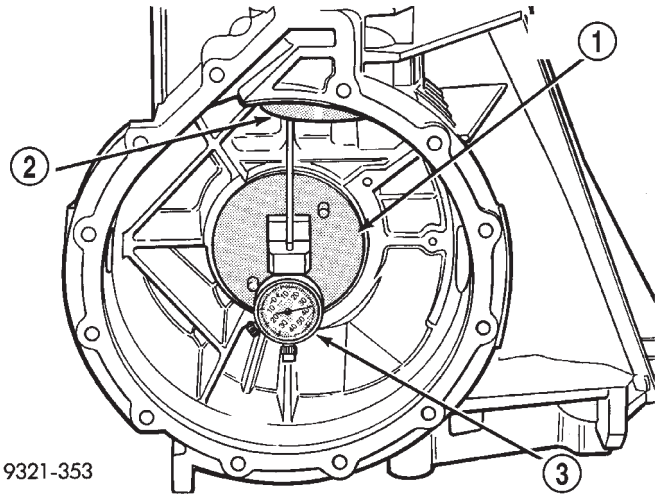


Fig. 398 Mounting Dial Indicator to Centering Block

1 – CENTERING BLOCK
2 – GAUGE DISC
3 – DIAL INDICATOR

ing on dial indicator. Record the number obtained. Now rotate the gauge disc clockwise 1/3 of a turn and recheck readings. Record number obtained. Rotate the gauge disc another 1/3 of a turn clockwise and take another reading. Average the three readings. Record this pinion depth measurement. If the readings differ by more than two thousandths recheck guage disc installation, it may have been installed slightly cocked.

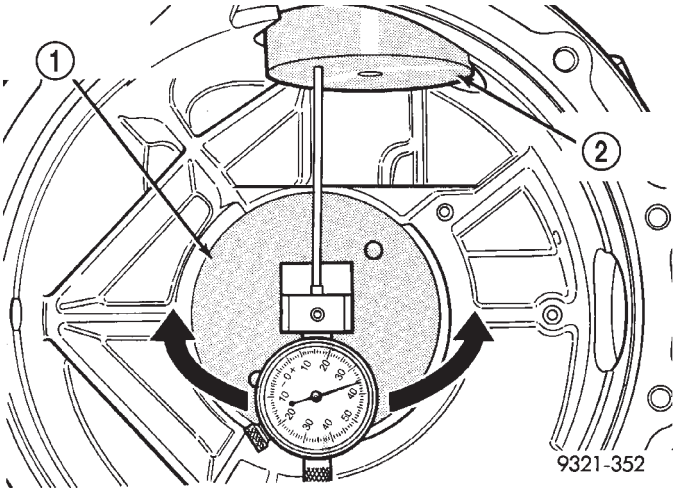


Fig. 399 Pivot Dial Indicator

1 – CENTERING BLOCK
2 – GAUGE DISC

(12) To determine the required shim thickness, the pinion depth measurement must be adjusted. The pinion shim adjustment number is the first of seven digits ink stamped on the shank of the transfer shaft (Fig. 400). Using the adjustment factor chart, convert the adjustment number to the corresponding adjustment factor. Utilizing the pinion depth measurement obtained in Step 11, add or subtract the adjustment factor to calculate the requred shim thickness. Refer to pinion head shim chart for shim selections. This is the shim that will be installed between the transfer shaft pinion head and the front transfer shaft bearing. Refer to the following examples for further explanation:

(13) Example 1 in (MM):

- Measured pinion shim depth: 0.789mm
- Adjustment number on transfer shaft: +2
- Adjustment factor (mm): -0.051mm
- Shim size needed: 0.789-0.051= **0.738mm**

(14) Example 2 in (IN):

- Measured pinion shim depth: 0.032in
- Adjustment number on transfer shaft: -1
- Adjustment factor (in): +0.001
- Shim size needed: 0.032+0.001= **0.033in**

ADJUSTMENT NUMBER	ADJUSTMENT FACTOR mm	ADJUSTMENT FACTOR in
3	–0.076	–0.003
2	–0.051	–0.002
1	–0.025	–0.001
0	0.000	0.000
–1	0.025	0.001
–2	0.051	0.002
–3	0.076	0.003

9421-72

ADJUSTMENT FACTOR CHART

(15) Remove dial indicator, gauge disc and centering block from transaxle.

(16) Install shim selected in Step 12 of this procedure onto the transfer shaft (Fig. 400).

(17) Press front transfer shaft bearing onto transfer shaft (special tool 6052). The shim must be in place before pressing on bearing (Fig. 401).

(18) At this point the pinion depth has been determined and the shim has been installed onto the transfer shaft. Before the pinion is installed into the transaxle case, bearing preload must be determined for the differential bearings. The following steps must be performed before the pinion is installed.

(19) The following steps will determine how many foot pounds are required on the outer differential adjuster to obtain the correct turning torque.

CAUTION: Failure to set differential bearing preload correctly may cause bearing failure, gear noise and/or axle shaft seal failure.

DISASSEMBLY AND ASSEMBLY (Continued)

SHIM THICKNESS	
MM	INCH
0.681 - 0.707	0.0265 - 0.0275
0.708 - 0.734	0.0276 - 0.0286
0.735 - 0.761	0.0286 - 0.0296
0.762 - 0.788	0.0297 - 0.0307
0.789 - 0.815	0.0307 - 0.0317
0.816 - 0.842	0.0318 - 0.0328
0.843 - 0.869	0.0328 - 0.0338
0.871 - 0.896	0.0339 - 0.0349
0.897 - 0.923	0.0349 - 0.0359
0.924 - 0.951	0.0360 - 0.0370
0.951 - 0.977	0.0370 - 0.0381
0.978 - 1.004	0.0381 - 0.0391
1.005 - 1.031	0.0391 - 0.0402
1.032 - 1.058	0.0402 - 0.0412
1.059 - 1.085	0.0413 - 0.0423
1.086 - 1.112	0.0423 - 0.0433
1.113 - 1.139	0.0434 - 0.0444

9421-67

PINION HEAD SHIM CHART

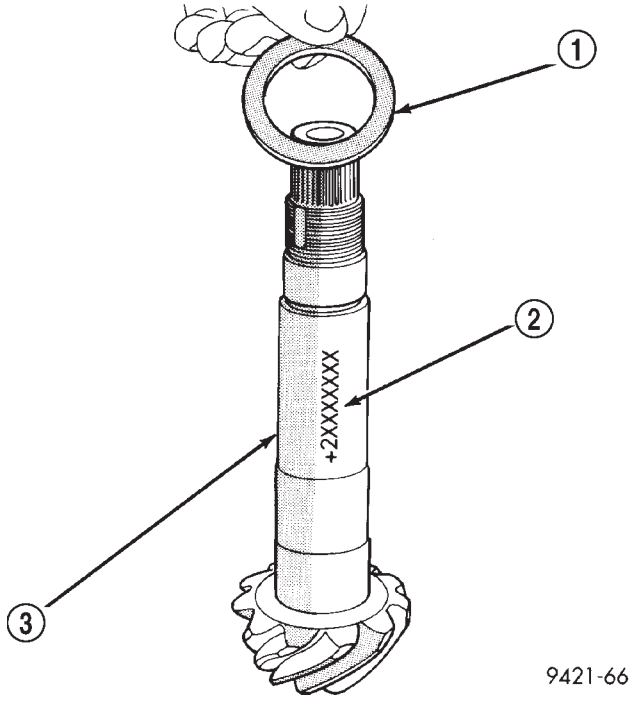


Fig. 400 Shim Installation

1 – PINION DEPTH SHIM
2 – ADJUSTMENT FACTOR
3 – TRANSFER SHAFT

(20) Remove outer adjuster with special tool 6503 (Fig. 402).

(21) Remove old stub shaft seals. Press inner adjuster seal out with special tool 6502B. Press outer adjuster seal out with special tool 6558.

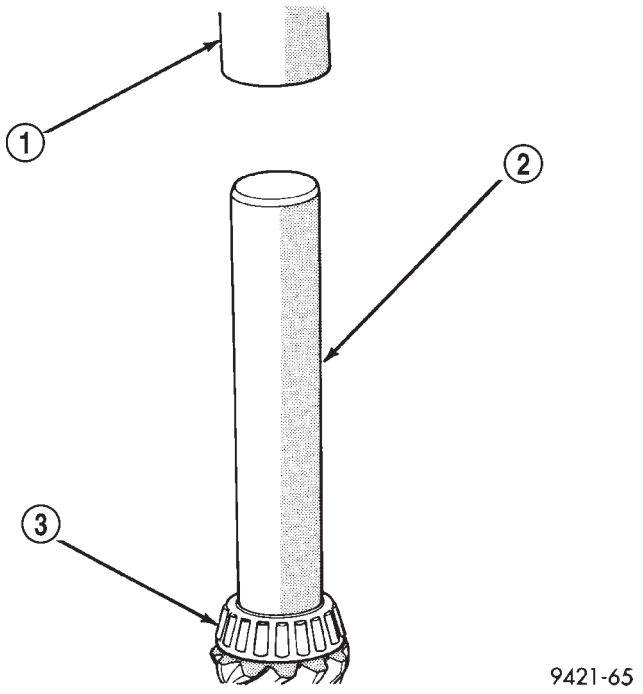


Fig. 401 Bearing Installation

1 – ARBOR PRESS
2 – SPECIAL TOOL 6052
3 – FRONT TRANSFER SHAFT BEARING

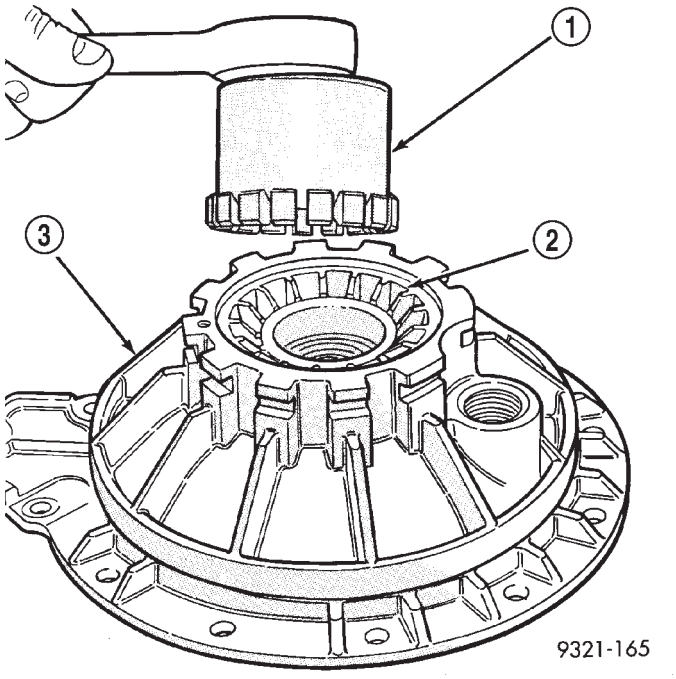


Fig. 402 Outer Adjuster Removal

1 – SPECIAL TOOL 6503
2 – OUTER DIFFERENTIAL ADJUSTER
3 – SIDE COVER

(22) Install new stub shaft seals in both adjusters using special tool 6558 (Fig. 403).

DISASSEMBLY AND ASSEMBLY (Continued)

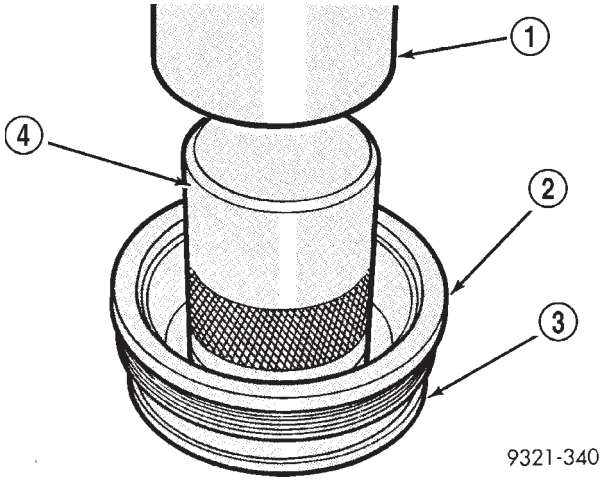


Fig. 403 Axle Shaft Seal Installation

1 – ARBOR PRESS
2 – OUTER DIFFERENTIAL ADJUSTER
3 – O-RING
4 – SPECIAL TOOL 6558

NOTE: To remove inner and outer adjuster races, use Tool 6062–A. To install inner and outer adjuster races, use Tool 6522 and Tool C-4171.

(23) Lube adjuster threads and O-ring with gear oil before installing. Failure to lube threads will result in thread damage to the adjuster and transaxle case.

(24) Screw in the inner adjuster using special tool 6502B (Fig. 404). The inner adjuster should be screwed in until under-flush with inside of the case (viewed from differential side).

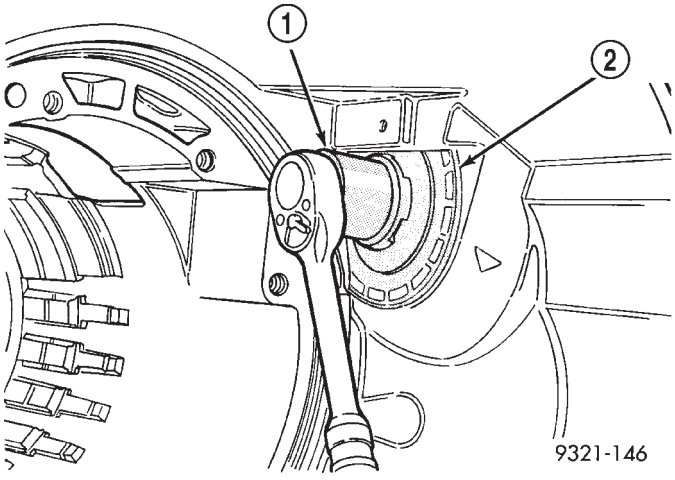


Fig. 404 Inner Adjuster Installation

1 – SPECIAL TOOL 6502–B
2 – INNER DIFFERENTIAL ADJUSTER

(25) Install differential assembly into the transaxle case (Fig. 405).

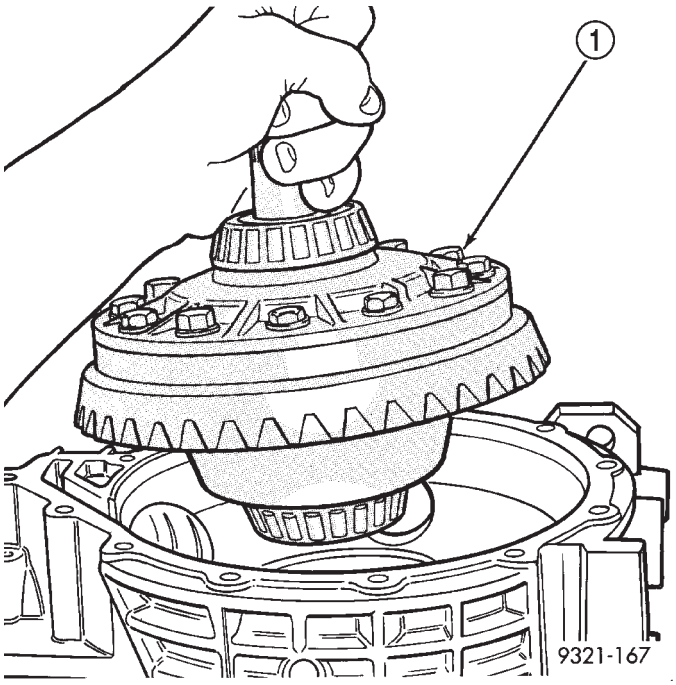


Fig. 405 Differential Assembly Installation

1 – DIFFERENTIAL ASSEMBLY

(26) Install differential cover (Fig. 406). Do not apply silicone sealant at this time. All bolts should be installed and tightened.

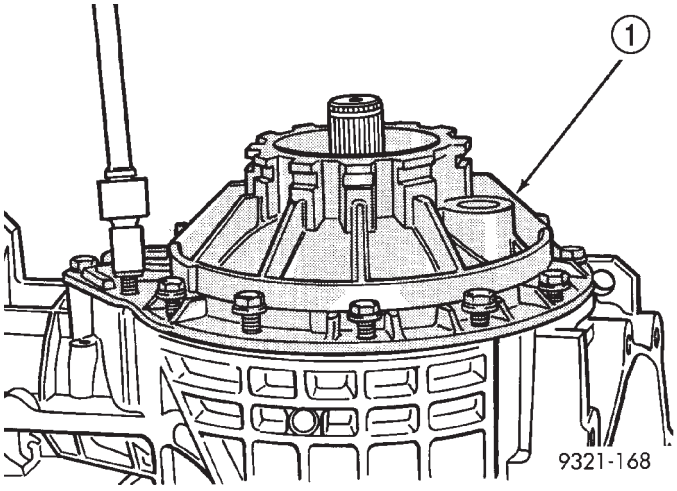


Fig. 406 Differential Cover Installation

1 – SIDE COVER

(27) Install seal protector (special tool 6591) as shown in (Fig. 407). Apply a thin film of gear oil on the protector.

CAUTION: Lube threads and O-ring on adjuster before installing. Failure to due so will result in thread damage to the adjuster and transaxle case.

DISASSEMBLY AND ASSEMBLY (Continued)

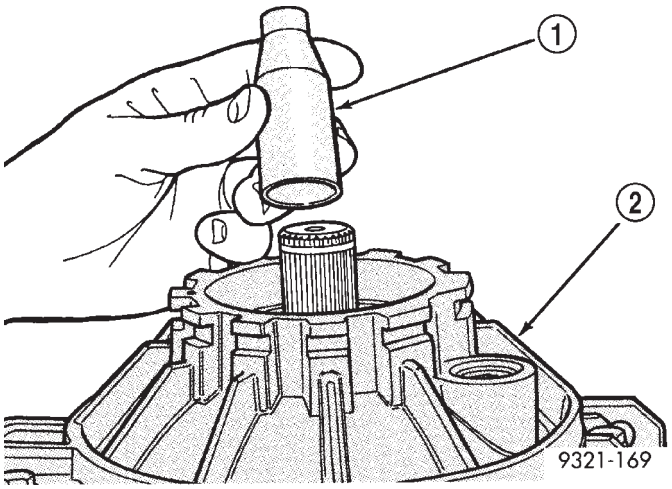


Fig. 407 Seal Protector

1 – SEAL PROTECTOR (6591)
2 – SIDE COVER

(28) Screw on outer adjuster and tighten adjuster down finger tight (Fig. 408).

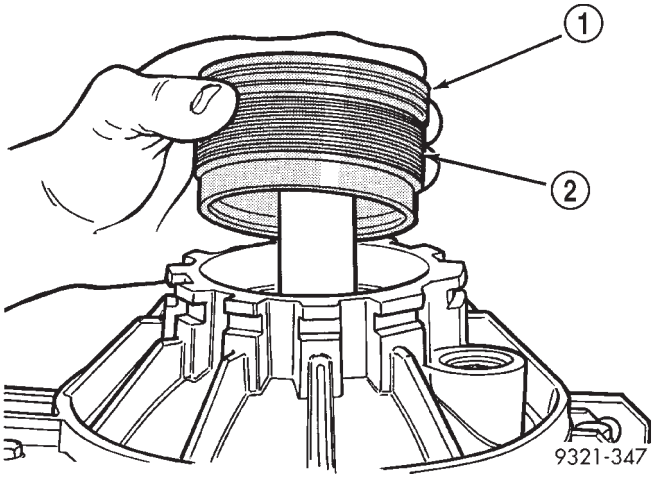


Fig. 408 Outer Adjuster Installation

1 – O-RING
2 – OUTER ADJUSTER

(29) Insert special tool 6548 (Fig. 409). This tool will be used to check turning torque of the differential assembly.

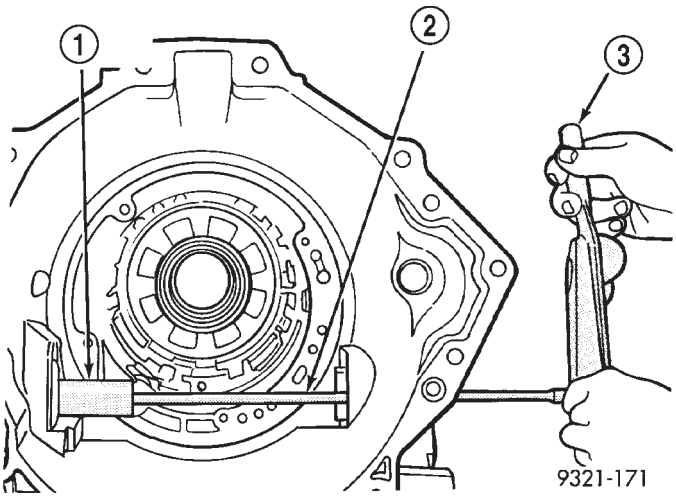


Fig. 409 Special Tool 6548

1 – SPECIAL TOOL 6548
2 – ¼" EXTENSION
3 – TORQUE WRENCH

CAUTION: Differential bearings must be seated before taking turning torque readings. This is done by rotating the differential three or four turns in both directions.

CAUTION: Turning torque of 19 to 23 in. lbs. can only be obtained when using new bearings. Do not attempt to obtain this turning torque with used bearings.

(30) Tighten outer adjuster with tool 6503 until 19 to 23 in. lbs. of turning torque is obtained on tool 6548. **Record how many foot pounds were required on the outer adjuster to obtain the correct turning torque** (Fig. 410). Record the foot pound reading. The reading that you are recording will be used in Step 55 of this procedure.

(31) Remove the differential cover, differential carrier assembly and inner adjuster.

(32) At this point the amount of torque required on the outer differential adjuster has been determined. The transfer shaft can now be installed into the transaxle case. Perform the following steps to install transfer shaft into transaxle case.

DISASSEMBLY AND ASSEMBLY (Continued)

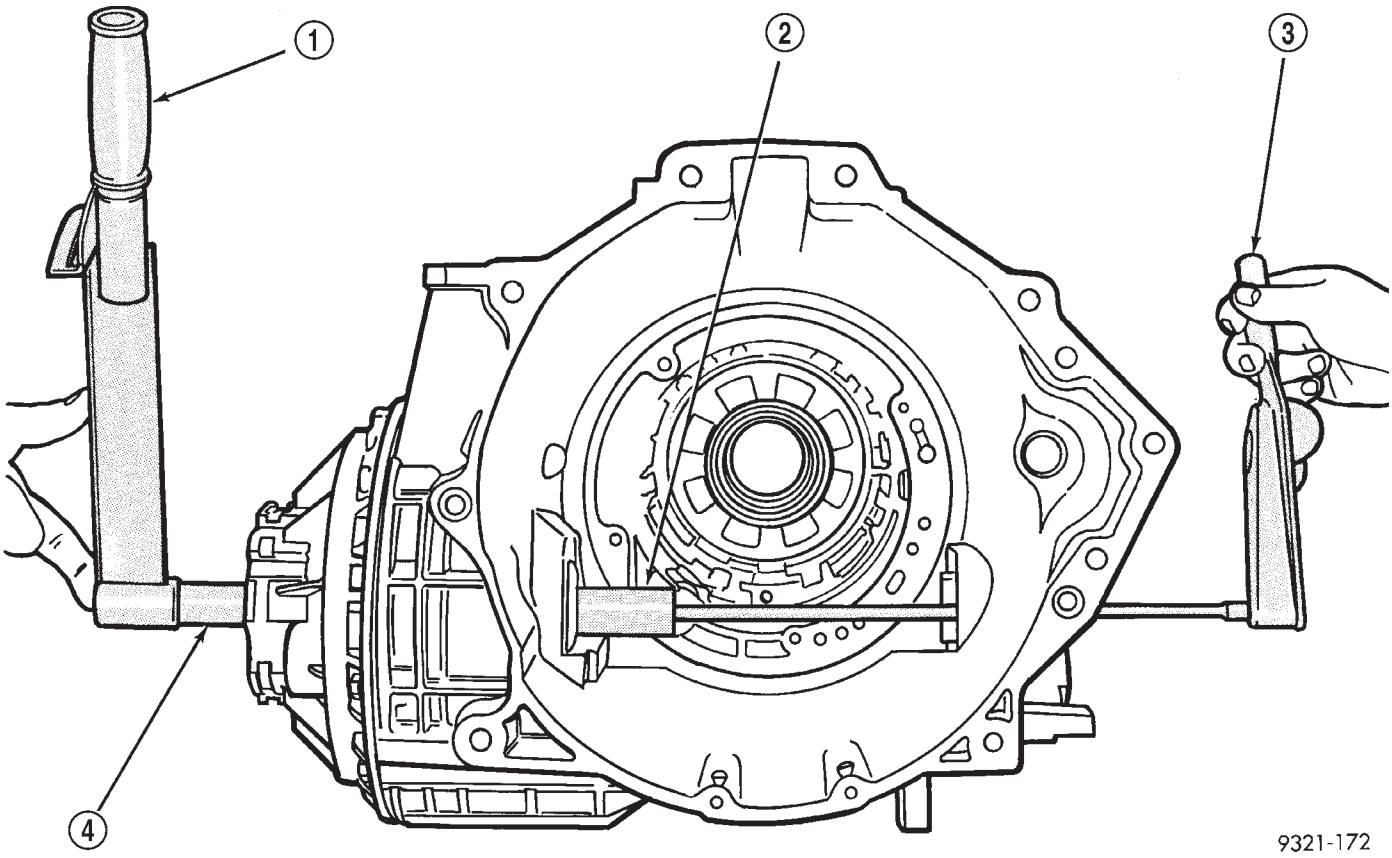


Fig. 410 Determining Turning Torque

1 – FT. LBS. TORQUE WRENCH
2 – SPECIAL TOOL 6548
3 – IN. LBS. TORQUE WRENCH
4 – SPECIAL TOOL 6503

(33) Install transfer shaft into transaxle case (Fig. 411).

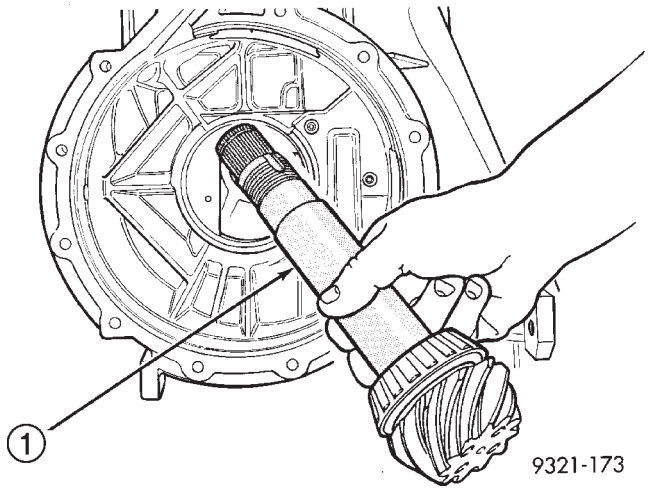


Fig. 411 Transfer Shaft Installation

1 – TRANSFER SHAFT

CAUTION: Bottom of support fixture must be flush with face of bell housing. If the support fixture is not flush, the seals and rear transfer shaft bearing cup will be pressed in cocked.

(34) Install transfer shaft support fixture (special tool 6595) (Fig. 412).

(35) Install transfer shaft seal protector (special tool 6592) (Fig. 413). Apply thin film of gear oil to protector.

(36) Apply a small amount of lube to seal lips and install front transfer shaft seal. The serrated edges must face toward the rear of the transaxle (Fig. 414).

(37) Install seal with special tool 6567A (Fig. 415). Use a press to install seal. The installation tool will set the seal depth. Do not use a hammer to install seal. The seal may be damaged if installed with a hammer.

(38) Install rear transfer shaft seal. The seal must be installed so that the spring side of the seal faces the installation tool (Fig. 416). Use the same special tool (6567A) to install the seal. The installation tool will set the seal depth. Use a press to install this seal. Do not use a hammer.

DISASSEMBLY AND ASSEMBLY (Continued)

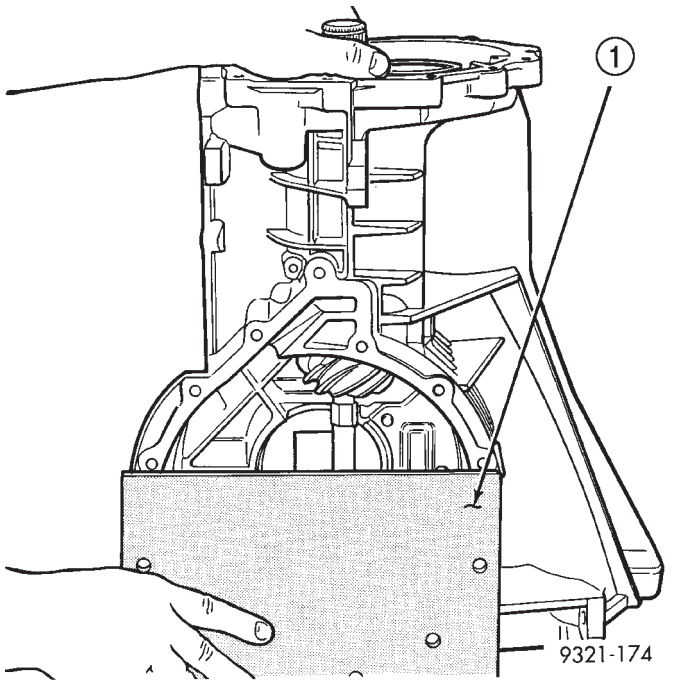


Fig. 412 Transfer Shaft Support Fixture

1 – SUPPORT FIXTURE (6595)

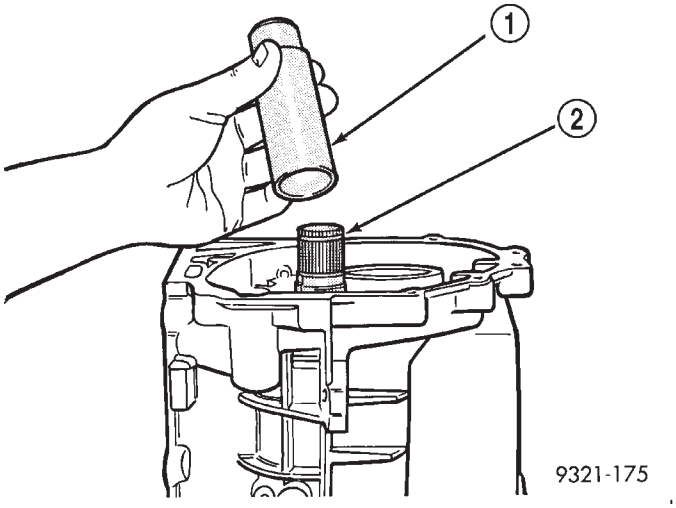


Fig. 413 Seal Protector Installation

1 – SEAL PROTECTOR
2 – TRANSFER SHAFT

(39) Install rear transfer shaft cup into case (Fig. 417).

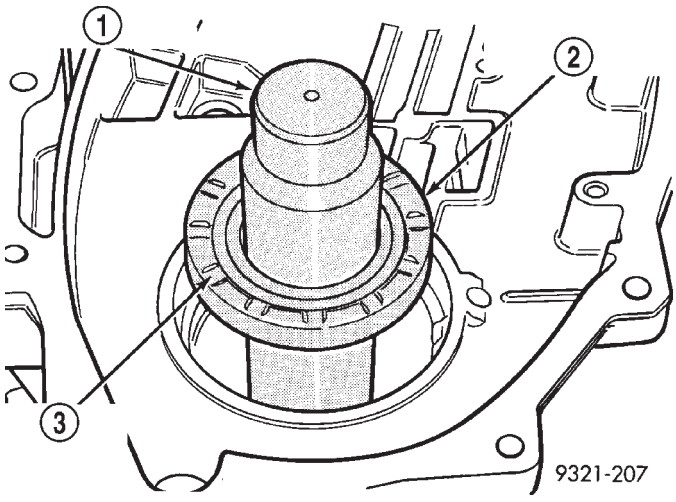


Fig. 414 Correct Seal Orientation

1 – SEAL PROTECTOR
2 – FRONT TRANSFER SHAFT SEAL
3 – SERRATED SIDE REARWARD

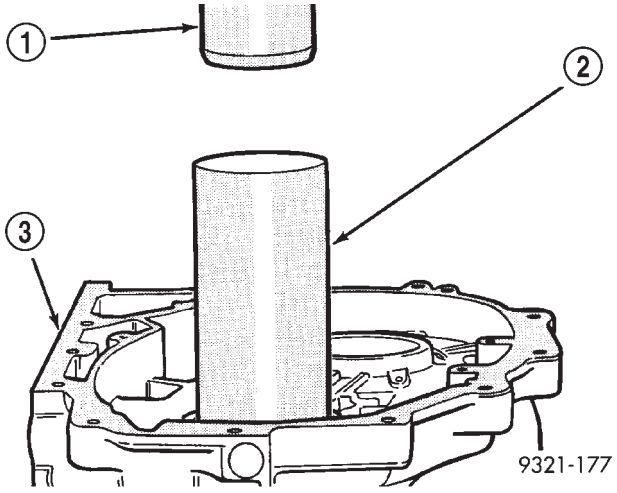


Fig. 415 Seal Installation

1 – ARBOR PRESS
2 – SEAL INSTALLER (6567A)
3 – TRANSAXLE CASE

CAUTION: Properly seated cups are essential in correctly setting bearing preload.

(40) Use special tool 6560 to press cup into case (Fig. 418).

DISASSEMBLY AND ASSEMBLY (Continued)

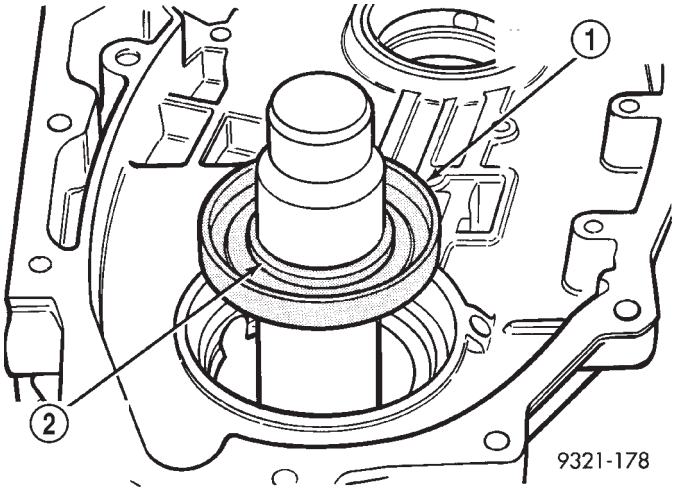


Fig. 416 Correct Seal Orientation

1 – REAR TRANSFER SHAFT SEAL
2 – SPRING SIDE OUTWARD

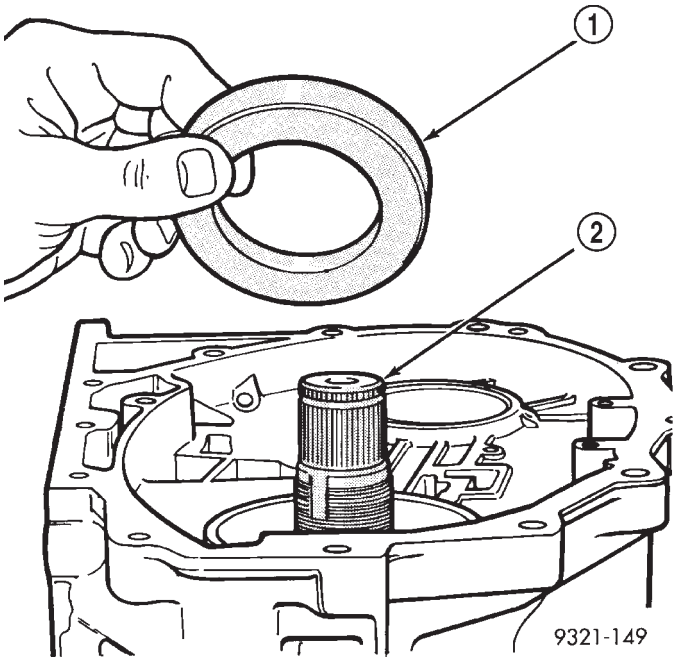


Fig. 417 Rear Transfer Bearing Cup

1 – REAR TRANSFER BEARING CUP
2 – TRANSFER SHAFT

(41) Install Transfer shaft preload shim (Fig. 419). Use the original shim that was taken out of transaxle if possible. If original shim is not available, use the thickest shim as a starting point. Refer to Transfer Shaft Rear Shim Chart for available sizes.

(42) Install rear transfer shaft cone. Press cone on transfer shaft using Special Tool MD998805.

(43) Remove transfer shaft support fixture (special tool 6595).

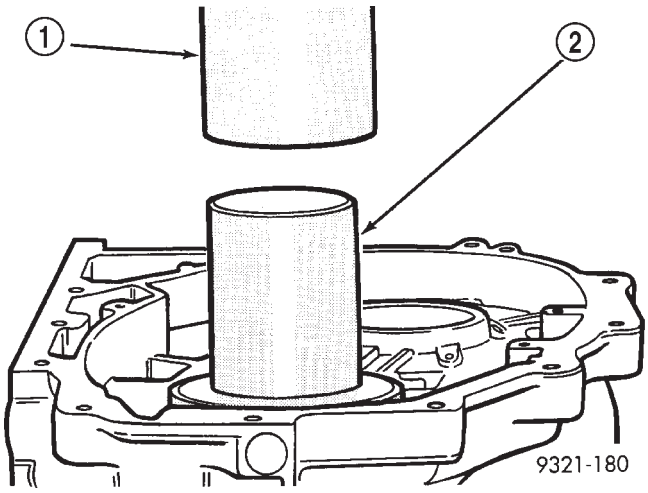


Fig. 418 Rear Transfer Shaft Cup Installation

1 – ARBOR PRESS
2 – SPECIAL TOOL 6560

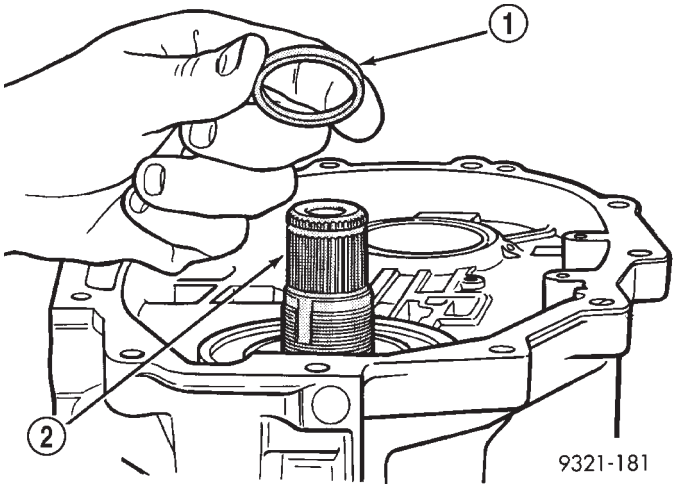


Fig. 419 Transfer Preload Shim Installation

1 – TRANSFER SHAFT PRELOAD SHIM
2 – TRANSFER SHAFT

CAUTION: Always use a new transfer shaft nut. Do not reuse old transfer shaft nut.

(44) Install a new transfer shaft nut (Fig. 420). Tighten nut to 271 N·m (200 ft. lbs.). Use special tools 6497 holder and 6498 shaft socket to tighten nut.

CAUTION: Failure to set the transfer shaft turning torque correctly may cause transfer shaft bearings or seals to fail. Be sure transfer shaft does not have end play. If end play exists, install a thinner preload shim.

(45) Check the turning torque of the transfer shaft using a torque wrench (Fig. 421). The turning torque

DISASSEMBLY AND ASSEMBLY (Continued)

3.53 - 3.55 mm	4.13 - 4.15 mm
3.56 - 3.58 mm	4.16 - 4.18 mm
3.59 - 3.61 mm	4.19 - 4.21 mm
3.62 - 3.64 mm	4.22 - 4.24 mm
3.65 - 3.67 mm	4.25 - 4.27 mm
3.68 - 3.70 mm	4.28 - 4.30 mm
3.71 - 3.73 mm	4.31 - 4.33 mm
3.74 - 3.76 mm	4.34 - 4.36 mm
3.77 - 3.79 mm	4.37 - 4.39 mm
3.80 - 3.82 mm	4.40 - 4.42 mm
3.83 - 3.85 mm	4.43 - 4.45 mm
3.86 - 3.88 mm	4.46 - 4.48 mm
3.89 - 3.91 mm	4.49 - 4.51 mm
3.92 - 3.94 mm	4.52 - 4.54 mm
3.95 - 3.97 mm	4.55 - 4.57 mm
3.98 - 4.00 mm	4.58 - 4.60 mm
4.01 - 4.03 mm	4.61 - 4.63 mm
4.04 - 4.06 mm	4.64 - 4.66 mm
4.07 - 4.09 mm	4.67 - 4.69 mm
4.10 - 4.12 mm	

9421-69

Transfer Shaft Rear Shim Chart

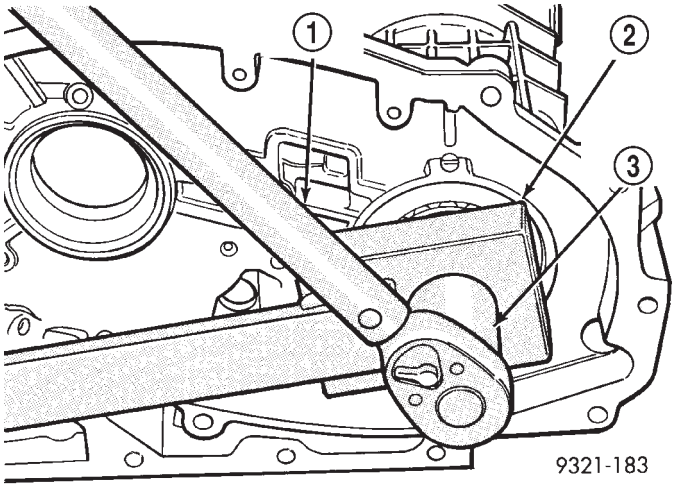


Fig. 420 Transfer Shaft Nut Installation

1 – TORQUE WRENCH
2 – HOLDER (6497)
3 – SHAFT SOCKET (6498)

should be 0.5 to 1.3 N·m (5 to 12 in. lbs.). If the turning torque is too high, install a thicker transfer shaft preload shim. If the turning torque is too low, install a thinner transfer shaft preload shim.

CAUTION: A press and special tool 6589 must be used when staking the transfer shaft nut. Do not use a hammer and the special tool to stake nut. If a hammer is used; seal, bearing, and/or tool damage may result. Also the stake will not be seated against the shaft correctly. This will allow the nut to loosen.

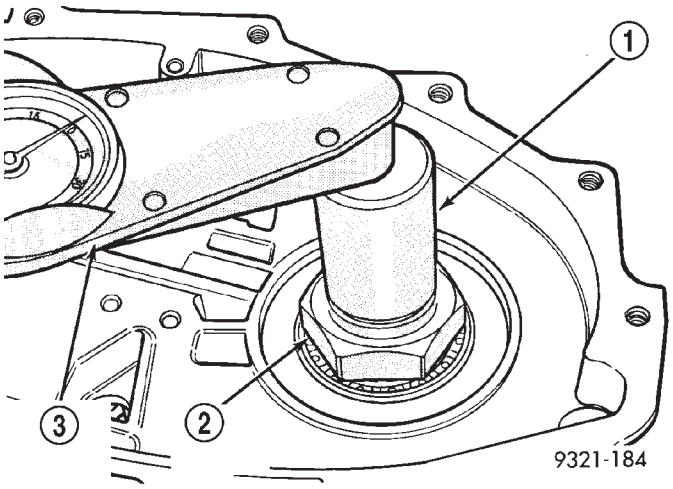


Fig. 421 Checking Turning Torque

1 – SOCKET (6498)
2 – TRANSFER SHAFT NUT
3 – IN. LBS. TORQUE WRENCH

(46) After the correct turning torque is obtained, use special tool 6589 to stake the new transfer shaft nut (Fig. 422). Be sure that the tool arms line up with slots in the transfer shaft. Use a press with the special tool to make the stakes in the nut.

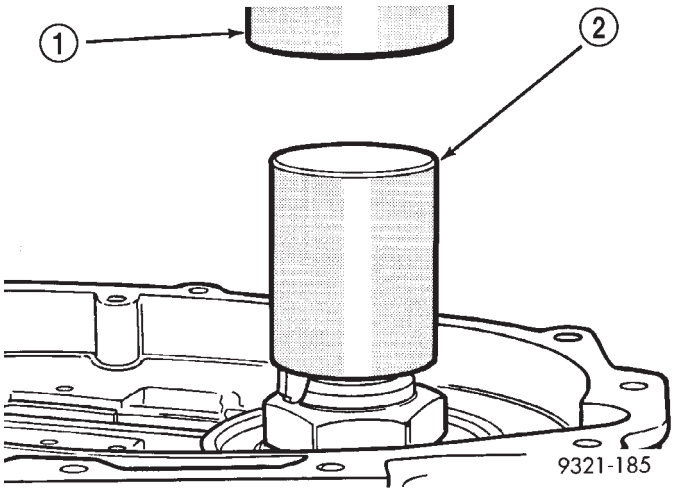


Fig. 422 Staking New Nuts

1 – ARBOR PRESS
2 – STAKING TOOL (6589)

CAUTION: Failure to stake the transfer shaft nut correctly may allow the nut to loosen during transaxle operation. This will cause transaxle failure.

(47) At this point the transfer shaft, new oil seals, pinion depth and transfer shaft preload have been set. The following steps will set the backlash between the transfer shaft and the ring gear.

DISASSEMBLY AND ASSEMBLY (Continued)

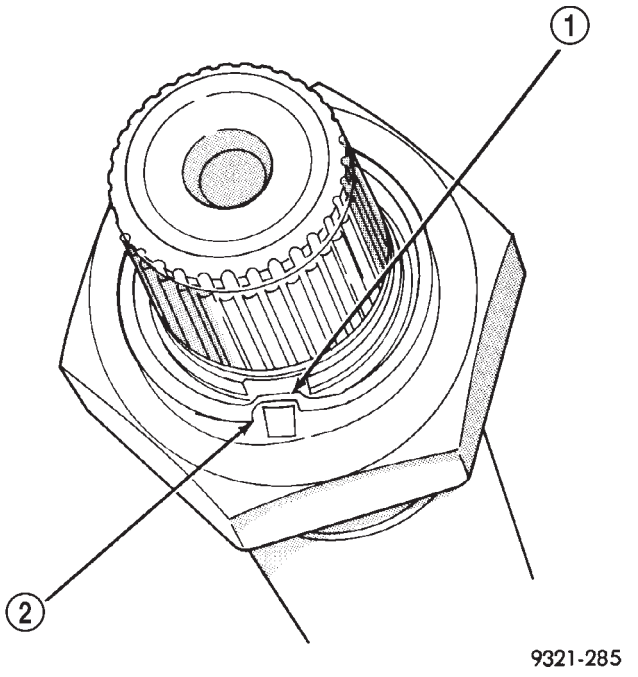


Fig. 423 Correctly Staked Nut

1 – BOTTOMED IN SLOT
2 – CORRECTLY STAKED NUT

(48) If the carrier requires reconditioning, refer to Differential Carrier Recondition.

(49) Install vent baffle. Apply sealer as shown in (Fig. 424).

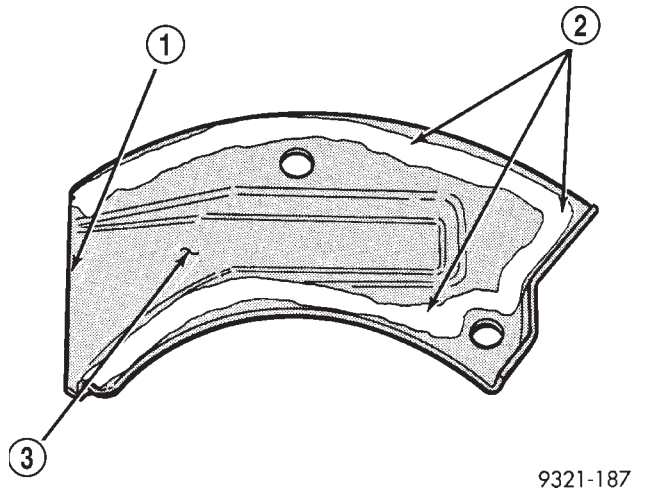


Fig. 424 Baffle Installation

1 – NO SEALER ON THIS EDGE
2 – APPLY SEALER
3 – VENT BAFFLE

(50) Install new inner adjuster O-ring. Lube inner adjuster threads and O-ring. Then install inner adjuster flush with differential side of case.

(51) Install differential assembly (with ring gear attached) into transaxle case (Fig. 425).

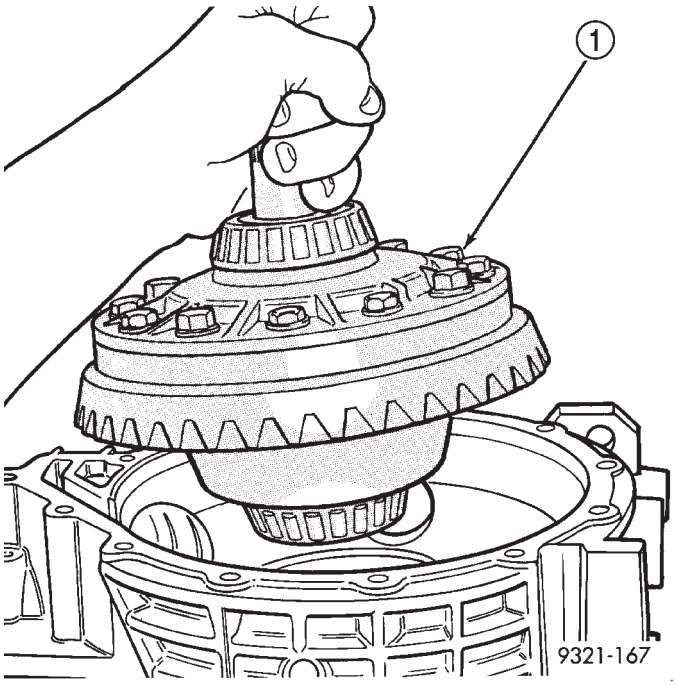


Fig. 425 Differential Assembly Installation

1 – DIFFERENTIAL ASSEMBLY

(52) Transfer shaft to ring gear backlash should be 0.006" to 0.009″ thousands of an inch. To get the backlash close enough to measure, perform the following steps. Hold the transfer shaft with one hand and rock the ring gear back and forth (Fig. 426). You should feel some backlash between the gears. If no backlash is felt use special tool 6502B to turn the inner adjuster so that it raises the differential assembly. This will increase backlash. If there is to much backlash, use special tool 6502B to turn the inner adjuster so that it lowers the differential assembly. This will decrease backlash. Recheck the backlash after each adjustment.

(53) Apply a 1/8 inch bead of sealant to differential cover flange. Then install differential cover with sealant (Fig. 427) and tighten cover bolts.

(54) Install seal protector (special tool 6591) on shaft (Fig. 428).

CAUTION: Lube threads and O-ring on adjuster before installing. Failure to due so will result in thread damage to the adjuster and differential cover.

(55) Install outer adjuster with new O-ring (Fig. 429). Torque the outer adjuster (special tool 6503) to the torque reading recorded in Step 30. Then seat bearings by turning differential three or four revolutions in both directions. Tighten adjuster a second time to same torque recorded in Step 30. Again

DISASSEMBLY AND ASSEMBLY (Continued)

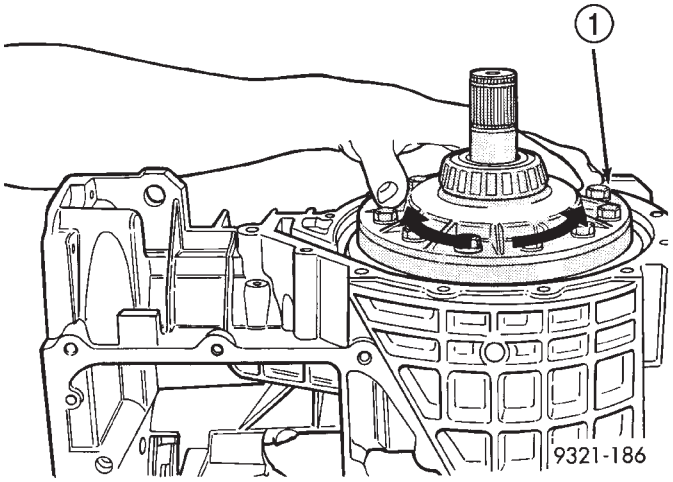


Fig. 426 Rocking Ring Gear Back and Forth

1 – DIFFERENTIAL ASSEMBLY

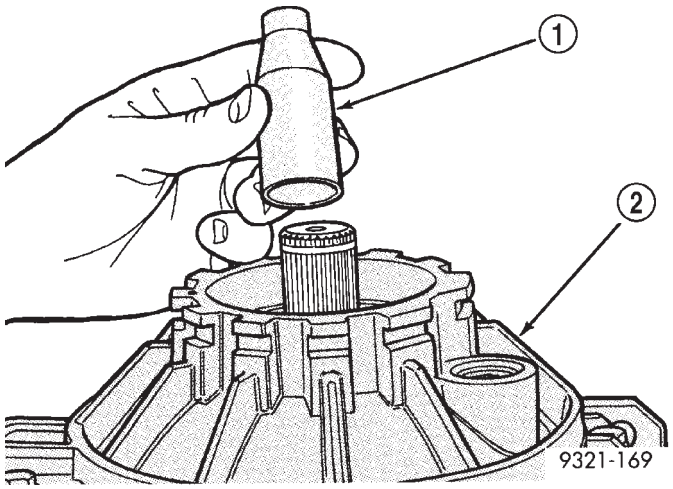


Fig. 428 Seal Protector

1 – SEAL PROTECTOR (6591)
2 – SIDE COVER

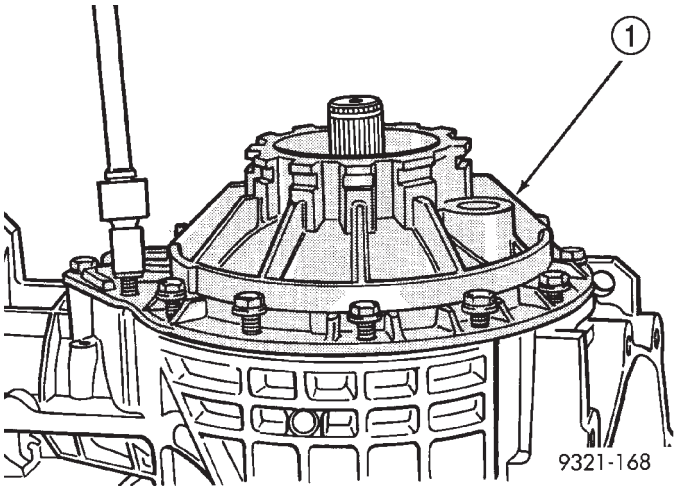


Fig. 427 Differential Cover Installation

1 – SIDE COVER

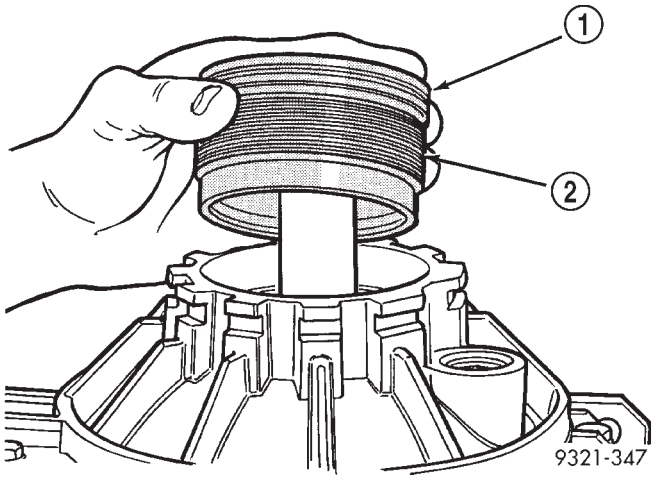


Fig. 429 Outer Adjuster Installation

1 – O-RING
2 – OUTER ADJUSTER

reseat bearings. Repeat this sequence until correct adjuster torque is maintained.

(56) To check and/or adjust backlash, remove the inspection plug from the top of the differential. Install dial indicator as shown in (Fig. 430). The tip of the dial indicator must be perpendicular against one of the ring gear teeth. Hold transfer shaft with locking pliers. Move ring gear back and forth with special tool 6548. Read the amount of backlash with dial indicator. Backlash should be 0.006" to 0.009" thousands of an inch.

(57) If there is too much backlash, loosen the outer adjuster with special tool 6503. Then turn the inner adjuster so that it **moves away from the ring gear.** After adjusting the inner adjuster, retighten the outer adjuster to the torque recorded in Step 30. The inner adjuster should be turned in small increments.

(58) If there is not enough backlash, loosen the outer adjuster with special tool 6503. Then turn the inner adjuster so that it **moves towards the ring gear.** After adjusting the inner adjuster, retighten the outer adjuster to the torque recorded in Step 30. The inner adjuster should be turned in small increments.

(59) Once backlash is with in specifications, recheck backlash in four spots on the ring gear 90 degrees apart. All four readings should be within specifications.

(60) Install inner and outer adjuster locking brackets.

(61) Install new inspection plug. Use a wooden block to tap inspection plug into place.

DISASSEMBLY AND ASSEMBLY (Continued)

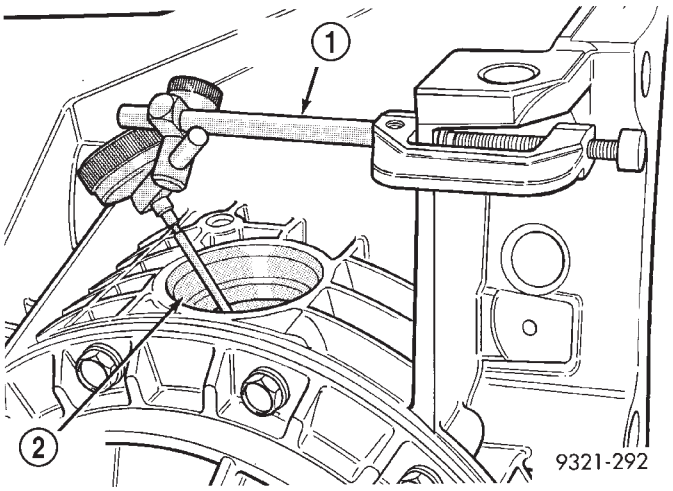


Fig. 430 Dial Indicator Installation

1 – DIAL INDICATOR KIT C-3339
2 – ACCESS HOLE

(62) It is easier to fill the differential prior to installing the transaxle back into the vehicle. The differential holds 32 ounces of fluid.

DIFFERENTIAL CARRIER-RECONDITION

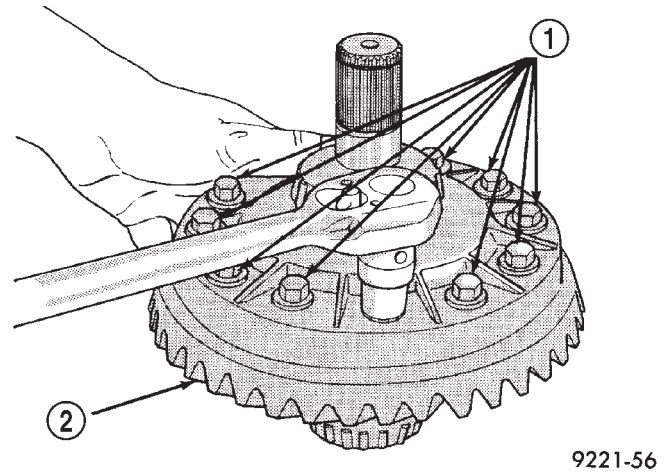


Fig. 431 Remove Ring Gear Bolts

1 – RING GEAR BOLTS
2 – RING GEAR

CAUTION: Ring gear bolts are not reusable. When reassembling use new bolts.

NOTE: Mark ring gear location, if reusing ring gear.

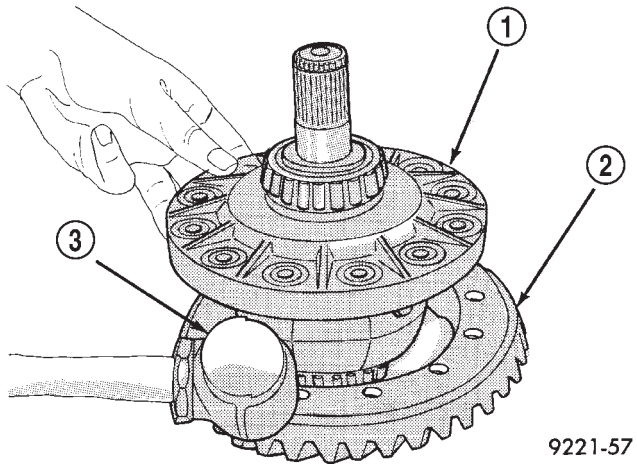


Fig. 432 Tap Off Ring Gear

1 – DIFFERENTIAL CARRIER
2 – RING GEAR
3 – PLASTIC MALLET

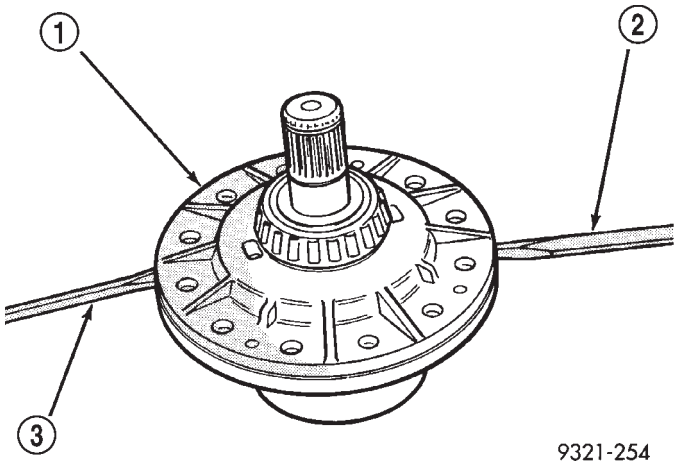


Fig. 433 Pry Differential Carrier Apart

1 – DIFFERENTIAL CARRIER
2 – PRY TOOL
3 – PRY TOOL

NOTE: When reassembling differential, line up notches on side of carrier.

CAUTION: When reassembling use a new roll pin.

NOTE: To remove inner and outer adjuster races, use Tool 6062–A. To install inner and outer adjuster races, use Tool 6522 and Tool C-4171.

DISASSEMBLY AND ASSEMBLY (Continued)

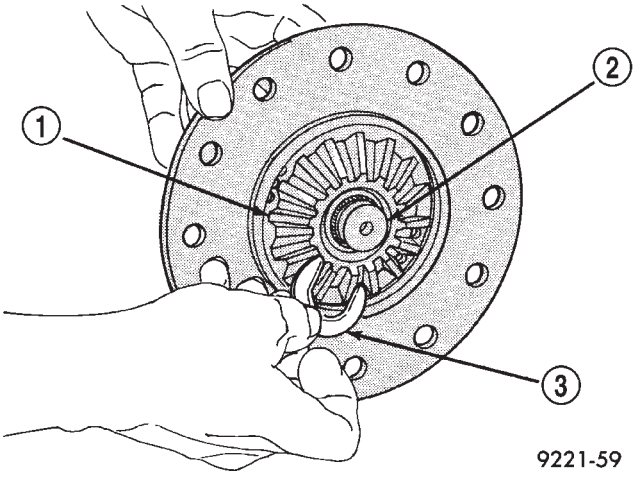


Fig. 434 Remove C-Clip

1 – SIDE GEAR
2 – STUB SHAFT
3 – "C" CLIP

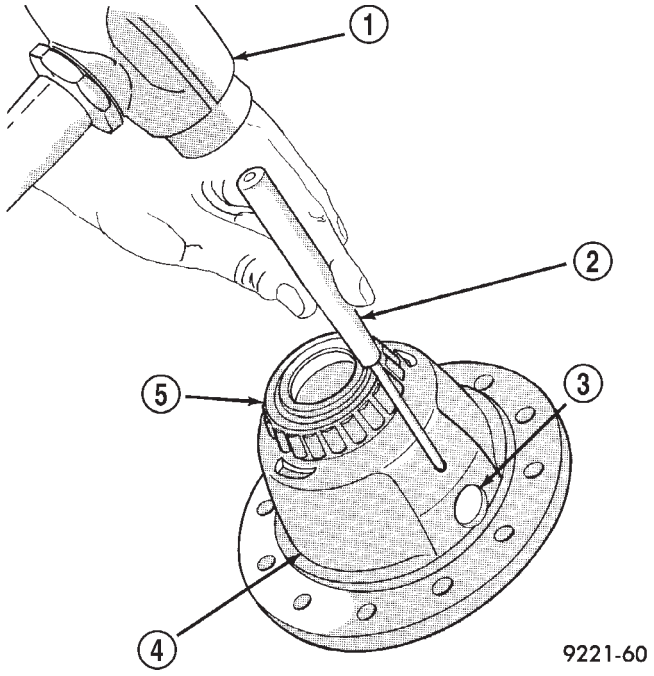


Fig. 435 Remove Pinion Shaft Roll Pin

1 – HAMMER
2 – PIN PUNCH
3 – PINION SHAFT
4 – DIFFERENTIAL CARRIER
5 – DIFFERENTIAL BEARING

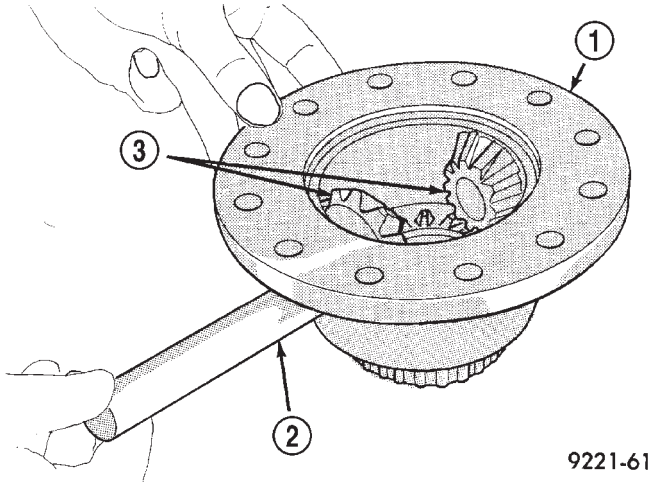


Fig. 436 Slide Out Differential Pinion Shaft and Remove Pinion Gears and Side Gears

1 – DIFFERENTIAL CARRIER
2 – PINION SHAFT
3 – SIDE GEARS

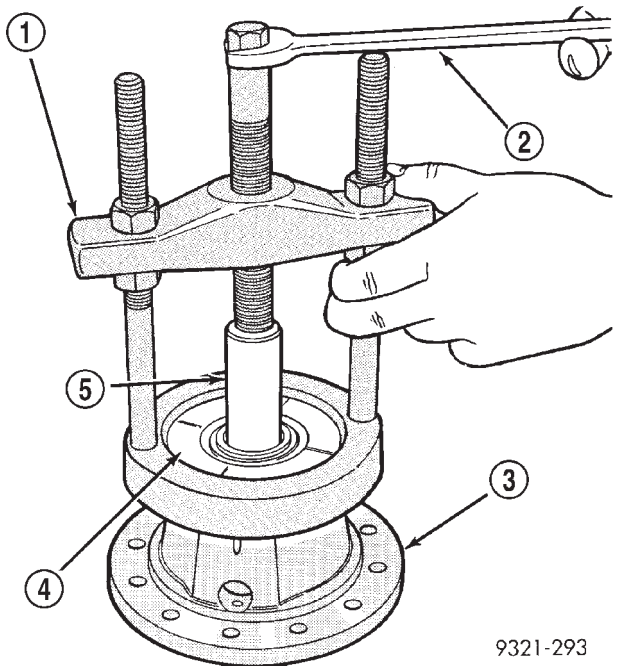


Fig. 437 Carrier Bearing Removal

1 – SPECIAL TOOL C-293 PA
2 – WRENCH
3 – DIFFERENTIAL CARRIER
4 – SPECIAL TOOL JAWS (4) C-293–48
5 – SPECIAL TOOL C-4496

DISASSEMBLY AND ASSEMBLY (Continued)

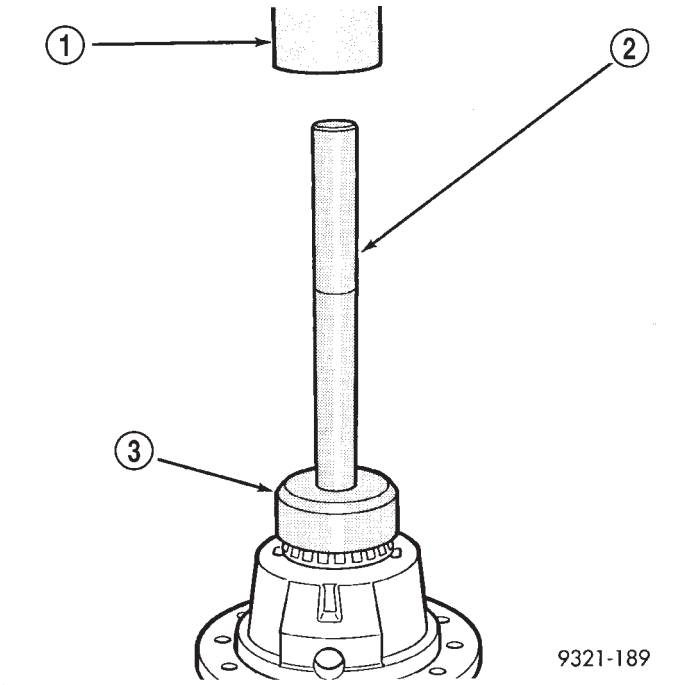


Fig. 438 Carrier Bearing Installation

1 – ARBOR PRESS
2 – HANDLE C-4171
3 – SPECIAL TOOL C-4340

CLEANING AND INSPECTION

TRANSFER CHAINS LENGTH MEASUREMENT

The need to replace the transfer chains because of excessive wear is unlikely. If chain length is suspected to be long, perform the following procedure to measure the chain length:

(1) Insert a screwdriver into the 18 mm hole with the screwdriver **ABOVE** the chains (Fig. 439).

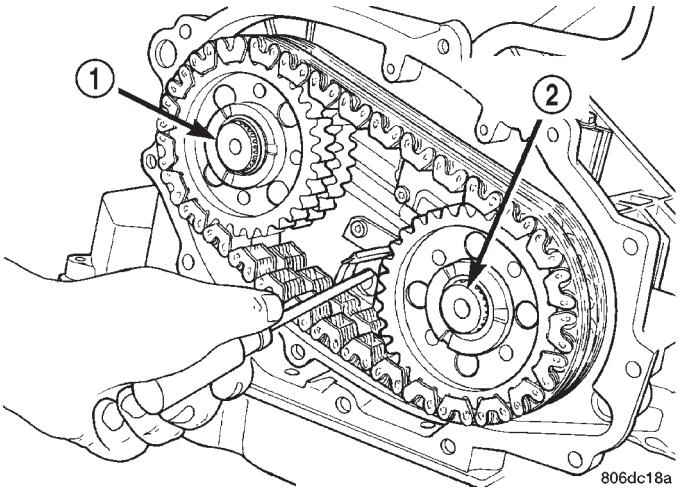


Fig. 439 Screwdriver Placement

1 – OUPUT SHAFT
2 – TRANSFER SHAFT

(2) Pry the chains down at the center of the chains.

(3) Butt a scale against the snubber and mark the scale at the bottom of the chains (Fig. 440).

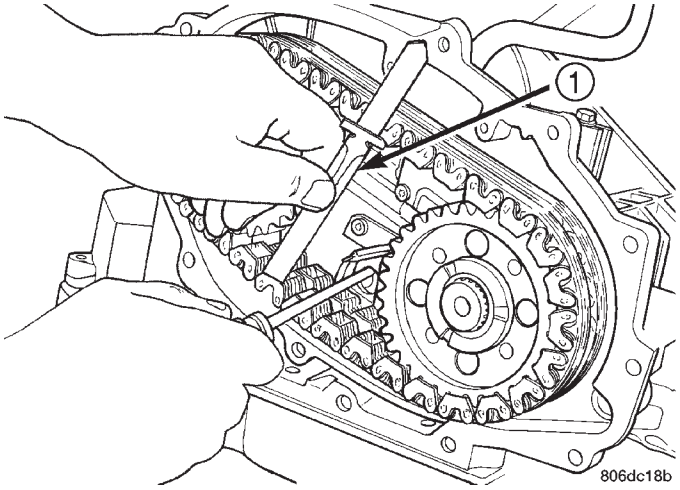


Fig. 440 Chain Measurement

1 – SCALE

(4) Insert a screwdriver into the 18 mm hole with the screwdriver **BELOW** the chains (Fig. 441). An assistant may be needed to perform this step.

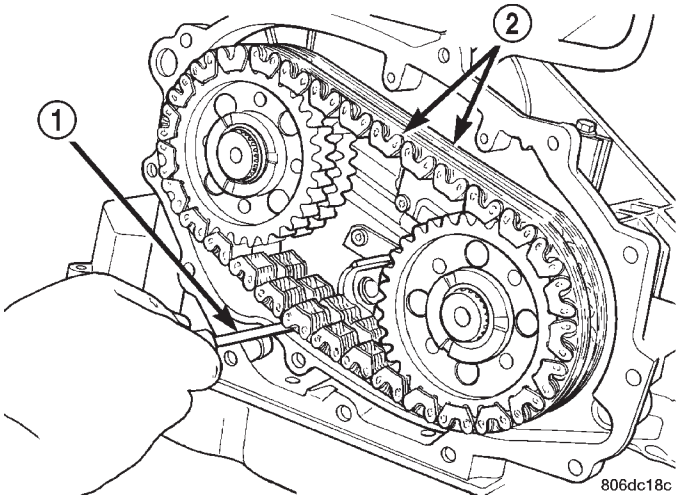


Fig. 441 Screwdriver Placement

1 – PRY TOOL
2 – CHAINS

(5) Pry the chains up at the center of the chain.

(6) Butt a scale against the snubber and place a second mark on the scale at the bottom of the chains (Fig. 442).

(7) Measure the distance between the two marks placed on the scale (Fig. 443). If the two marks on the scale are more than one inch apart, replace the drive chains.

CLEANING AND INSPECTION (Continued)

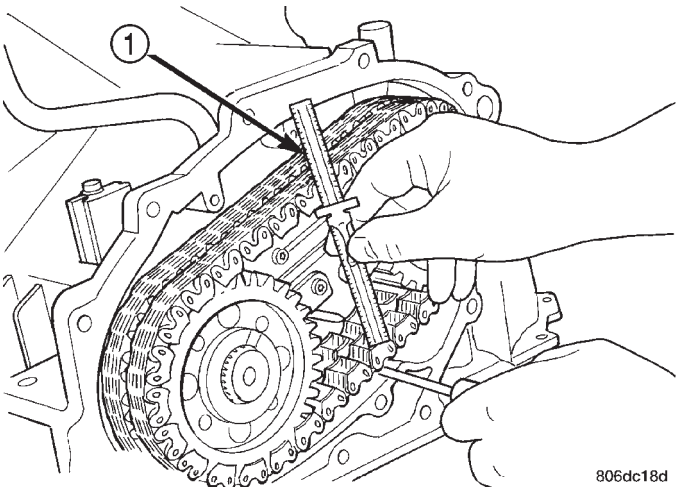


Fig. 442 Chains Measurement

1 – SCALE

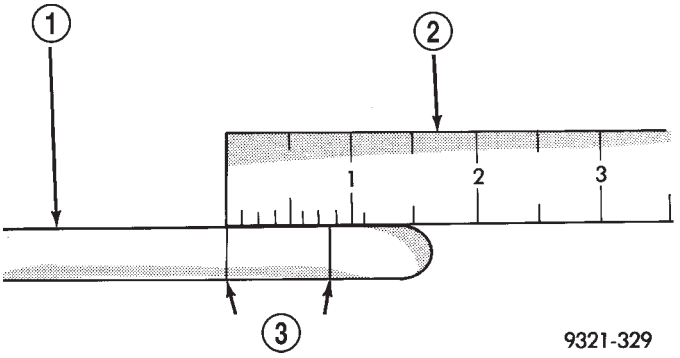


Fig. 443 Measuring Marks on Scale

1 – SCALE
2 – RULER
3 – MARKS PLACED ON SCALE

ADJUSTMENTS

GEARSHIFT CABLE–COLUMN SHIFT

The gearshift cable should be adjusted if any of the following repairs or situations are encountered:

- Transaxle replacement.
- Valve body repair.
- Shift cable replacement.
- Column shifter replacement.
- When there is no cranking in Park or Neutral.

If the following conditions are encountered, the interlock cable is out of adjustment. Refer to Interlock Cable Adjustment procedure.

- When the transaxle can be shifted without the key in the ignition.
- If the key can be removed with the shifter in reverse.
- When the key cannot be removed with the shifter in the park position.

ADJUSTMENT

(1) Remove upper steering column shroud.

(2) Rotate cable adjuster into unlock position. Use a straight blade screwdriver to unlock adjuster (Fig. 444).

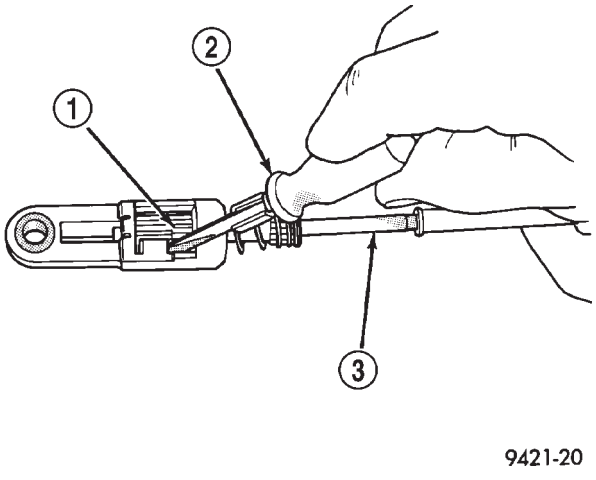


Fig. 444 Cable Lock Mechanism

1 – CABLE ADJUSTER LOCK
2 – SCREWDRIVER
3 – SHIFT CABLE

(3) Make sure that the transaxle shift lever (at transaxle) is in the Park position. This is the most rearward position. Verify park sprag is fully engaged.

CAUTION: Park sprag must be engaged when adjusting linkage. Rock vehicle back and forth to ensure that park sprag is fully engaged.

(4) Tilt the steering column to the full down position.

(5) Place shifter in the park position with the key removed.

(6) Adjust by rotating adjuster into lock position (Fig. 445).

(7) Reinstall upper steering column shroud.

(8) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.

GEARSHIFT CABLE–FLOOR SHIFT

The gearshift cable should be adjusted if any of the following repairs or situations are encountered:

- Transaxle replacement.
- Valve body repair.
- Shift cable replacement.
- Floor shifter replacement
- When there is no cranking in park or neutral.

If the following conditions are encountered, the interlock cable is out of adjustment. Refer to Interlock Cable Adjustment procedure.

ADJUSTMENTS (Continued)

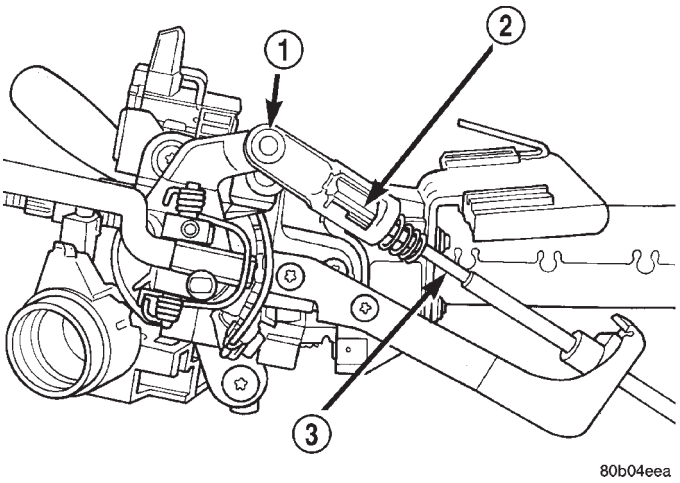


Fig. 445 Shift Cable Adjuster Lock

1 – SHIFTER PIN
2 – CABLE ADJUSTER LOCK
3 – SHIFT CABLE

- When the transaxle can be shifted without the key in the ignition.
- If the key can be removed with the shifter in reverse.
- When the key cannot be removed with the shifter in the park position.

ADJUSTMENT

(1) Remove shifter handle and console bezel.
(2) Loosen nut on shifter cable adjuster (Fig. 446).

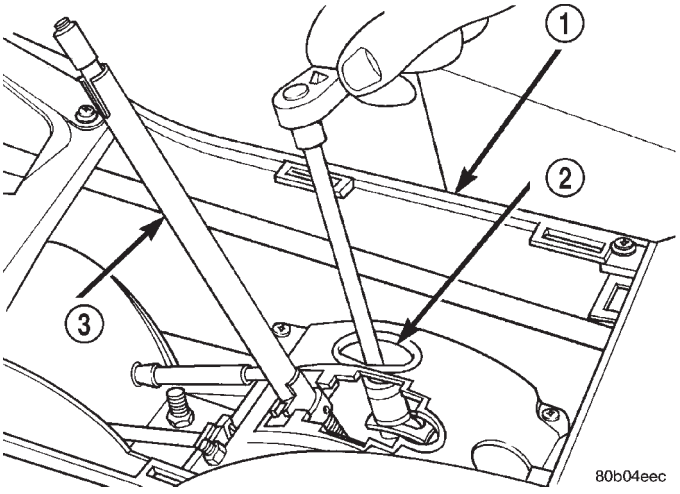


Fig. 446 Shift Cable Adjust Lever Nut

1 – CONSOLE
2 – ACCESS HOLE
3 – SHIFTER HANDLE

(3) Make sure that the transaxle shift lever (at transaxle) is in the Park position. This is the most rearward position. Verify park sprag is fully engaged.

CAUTION: Park sprag must be engaged when adjusting linkage. Rock vehicle back and forth to ensure that park sprag is fully engaged.

(4) Place shifter in park position.
(5) Place ignition in lock with key removed.
(6) Tighten adjuster nut at shifter to 225 in. lbs.
(7) Reinstall console bezel and shifter handle.
(8) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.

BRAKE/TRANSMISSION SHIFT INTERLOCK (FLOOR)

(1) Remove the shifter handle.
(2) Remove the console bezel.
(3) Move the gear shifter to PARK and the ignition key to the LOCK position (Fig. 447).
(4) If the interlock cable is being replaced, remove the pin to allow cable to “self adjust.” Press locking clip (Fig. 448) by hand to secure adjustment.
(5) If the interlock cable is not being replaced, the pin will not exist. Loosen the locking clip (Fig. 448) on the interlock cable to allow cable to “self adjust.” Press locking clip (Fig. 448) by hand to secure adjustment.

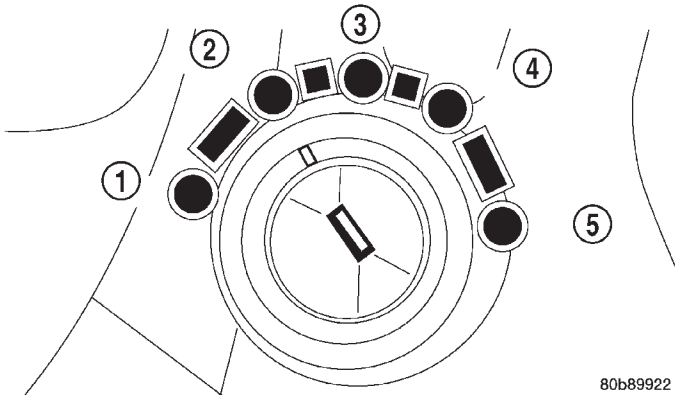


Fig. 447 Ignition Key/Switch Positions

1 – ACC
2 – LOCK
3 – OFF
4 – ON/RUN
5 – START

ADJUSTMENTS (Continued)

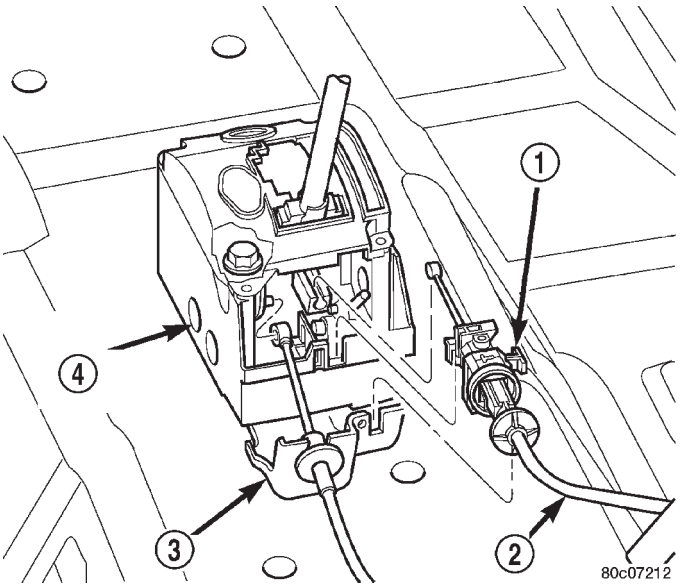


Fig. 448 Interlock Cable at Shifter Assy.

1 – LOCKING CLIP
2 – INTERLOCK CABLE
3 – BRACKET
4 – SHIFT ASSEMBLY

ACTION	EXPECTED RESPONSE
1. Turn key to the “OFF” position.	1. Shifter CAN be shifted out of park.
2. Turn key to the “ON/RUN” position.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the “ON/RUN” position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the “LOCK” or ″ACC” position.	4. Key cannot be returned to the “LOCK” or “ACC” position.
5. Return shifter to “PARK” and try to remove the key.	5. Key can be removed (after returning to “LOCK” position).
6. With the key removed, try to shift out of “PARK”.	6. Shifter cannot be shifted out of “PARK”.
NOTE: Any failure to meet these expected responses requires system adjustment or repair.	

(6) Install the bezel on the shifter console.
(7) Install shifter handle.

AUTOSTICK

The autostick switch is serviced as an assembly with the gearshift mechanism. The switch is not adjustable. If a problem occurs with the switch, refer to the Diagnosis and Testing section.

BEARING ADJUSTMENT PROCEDURES

Take extreme care when removing and installing bearing cups and cones. **Use only an arbor press for installation,** as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat will give a false end play reading, while gauging for proper shims. Improperly seated bearing cup and cones are subject to low-mileage failure.

Bearing cups and cones should be replaced if they show signs of pitting or heat distress.

If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.

NOTE: Bearing end play and drag torque specifications must be maintained to avoid premature bearing failures.

Used (original) bearing may lose up to 50 percent of the original drag torque after break-in.

NOTE: All bearing adjustments must be made with no other component interference or gear intermesh, except the transfer gear bearing.

Oil all bearings before checking turning torque.

MASTER SHIM CHART

Use this chart as a reference guide when selecting the shims needed for the:

- Transfer Shaft
- Output Shaft
- Output Sprocket
- Pinion

ADJUSTMENTS (Continued)

TRANSFER SHAFT REAR SHIMS	
3.53 - 3.55	4.13 - 4.15
3.56 - 3.58	4.16 - 4.18
3.59 - 3.61	4.19 - 4.21
3.62 - 3.64	4.22 - 4.24
3.65 - 3.67	4.25 - 4.27
3.68 - 3.70	4.28 - 4.30
3.71 - 3.73	4.31 - 4.33
3.74 - 3.76	4.34 - 4.36
3.77 - 3.79	4.37 - 4.39
3.80 - 3.82	4.40 - 4.42
3.83 - 3.85	4.43 - 4.45
3.86 - 3.88	4.46 - 4.48
3.89 - 3.91	4.49 - 4.51
3.92 - 3.94	4.52 - 4.54
3.95 - 3.97	4.55 - 4.57
3.98 - 4.00	4.58 - 4.60
4.01 - 4.03	4.61 - 4.63
4.04 - 4.06	4.64 - 4.66
4.07 - 4.09	4.67 - 4.69
4.10 - 4.12	

PINION HEAD SHIMS	
0.681 - 0.707	0.924 - 0.950
0.708 - 0.734	0.951 - 0.977
0.735 - 0.761	0.978 - 1.004
0.762 - 0.788	1.005 - 1.031
0.789 - 0.815	1.032 - 1.058
0.816 - 0.842	1.059 - 1.085
0.843 - 0.869	1.086 - 1.112
0.870 - 0.896	1.113 - 1.139
0.897 - 0.923	

OUTPUT SHAFT REAR SHIMS	
5.17 - 5.19	5.62 - 5.64
5.20 - 5.22	5.65 - 5.67
5.23 - 5.25	5.68 - 5.70
5.26 - 5.28	5.71 - 5.73
5.29 - 5.31	5.74 - 5.76
5.32 - 5.34	5.77 - 5.79
5.35 - 5.37	5.80 - 5.82
5.38 - 5.40	5.83 - 5.85
5.41 - 5.43	5.86 - 5.88
5.44 - 5.46	5.89 - 5.91
5.47 - 5.49	5.92 - 5.94
5.50 - 5.52	5.95 - 5.97
5.53 - 5.55	5.98 - 6.00
5.56 - 5.58	6.01 - 6.03
5.59 - 5.61	6.04 - 6.06

OUTPUT SPROCKET SPACER SHIMS	
2.64 - 2.84	3.48 - 3.68
2.85 - 3.05	3.69 - 3.89
3.06 - 3.26	3.90 - 4.10
3.27 - 3.47	4.11 - 4.31

9321-414

MASTER SHIM CHART

ADJUSTMENTS (Continued)

DRIVE SPROCKET HEIGHT ADJUSTMENT PROCEDURE

A spacer beneath the output sprocket is used to position the output sprocket in line with the transfer sprocket. The sprocket must be within 0.015″ of each other. In order to do this operation, install original spacer over the output shaft. If original spacer is not available, use the thickest available shim as a starting point. Refer to Output Sprocket Spacer Chart for available sizes. Then install the two sprockets without the chain.

The chain sprockets are not reversible. Check the height difference using a straight edge (special tool 6311 or equivalent) and a set of feeler gauges.

If the output sprocket is lower than transfer sprocket, add the amount measured to the shim that was installed (Fig. 449).

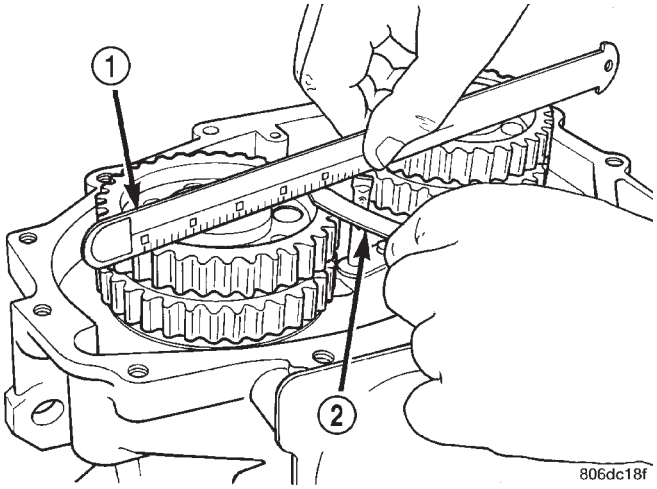


Fig. 449 Checking Sprocket Height

1 – STRAIGHT EDGE
2 – FEELER GAUGE

If the output sprocket is higher than transfer sprocket, subtract the amount measured to the shim that was installed (Fig. 450).

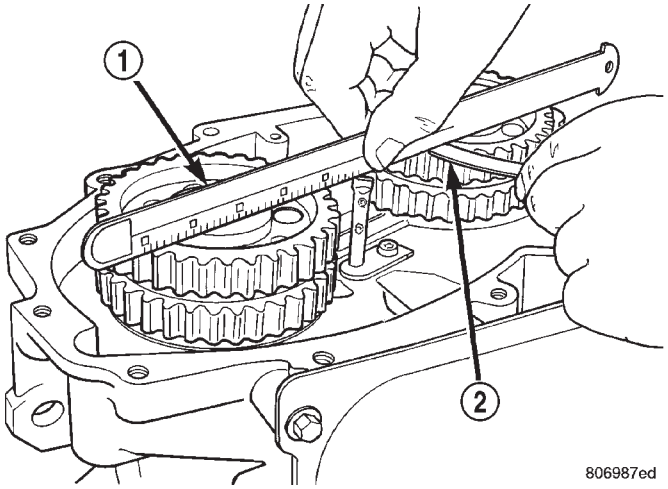


Fig. 450 Checking Sprocket Height

1 – STRAIGHT EDGE
2 – FEELER GAUGE

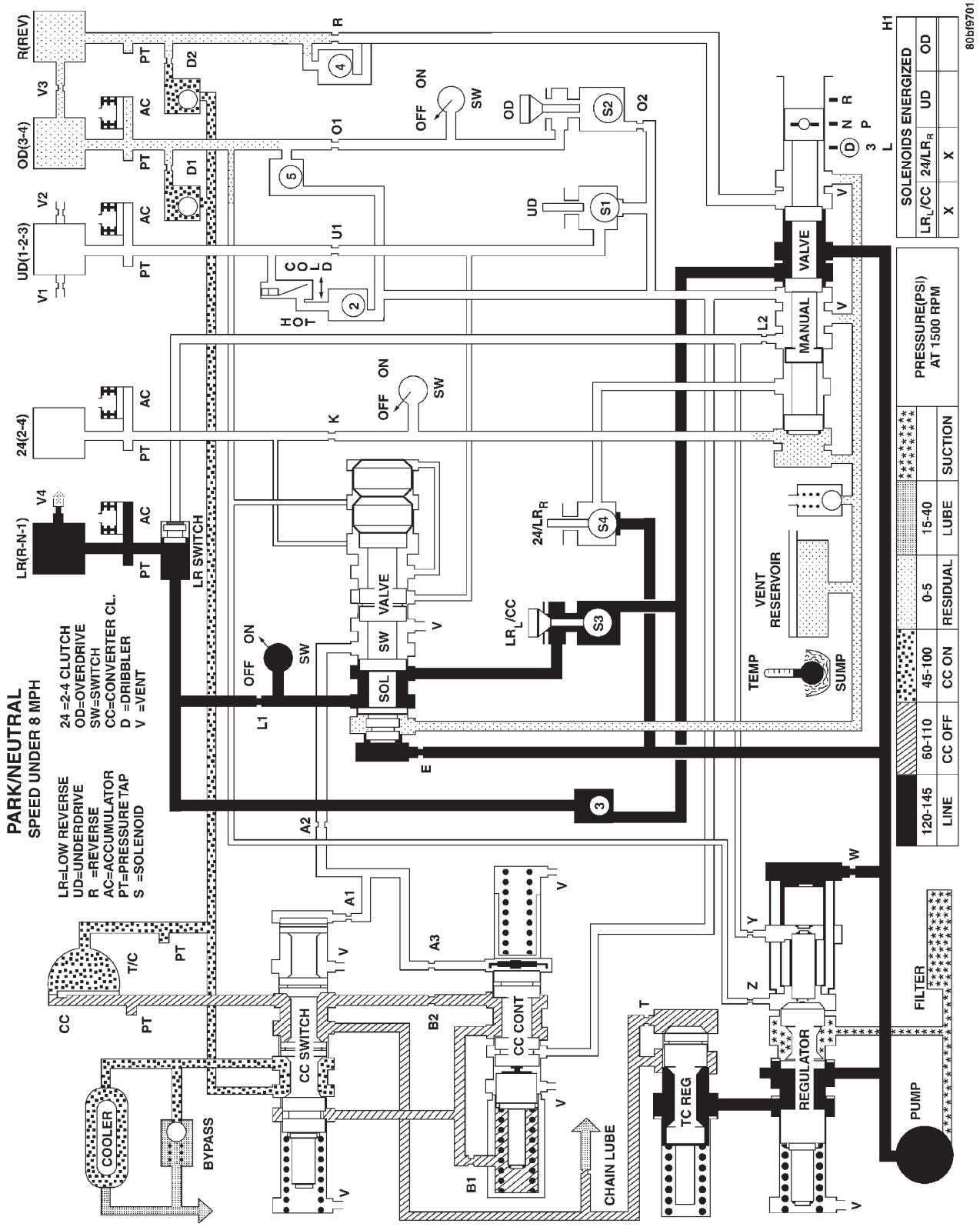
2.64 - 2.84 mm	3.48 - 3.68 mm
2.85 - 3.05 mm	3.69 - 3.89 mm
3.06 - 3.26 mm	3.90 - 4.10 mm
3.27 - 3.47 mm	4.11 - 4.31 mm

9421-68

OUTPUT SPROCKET SPACER CHART

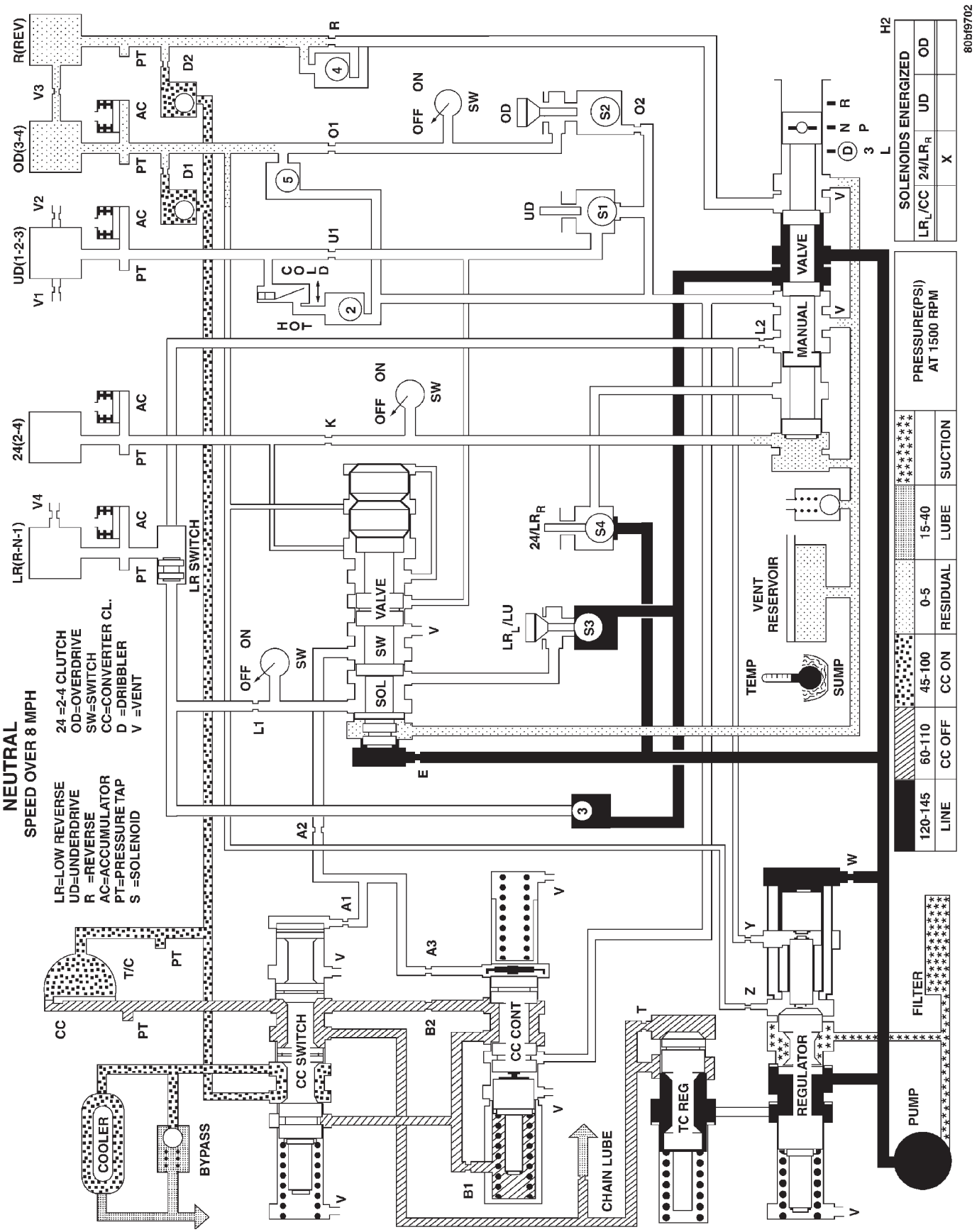
SCHEMATICS AND DIAGRAMS

42LE TRANSAXLE HYDRAULIC SCHEMATICS



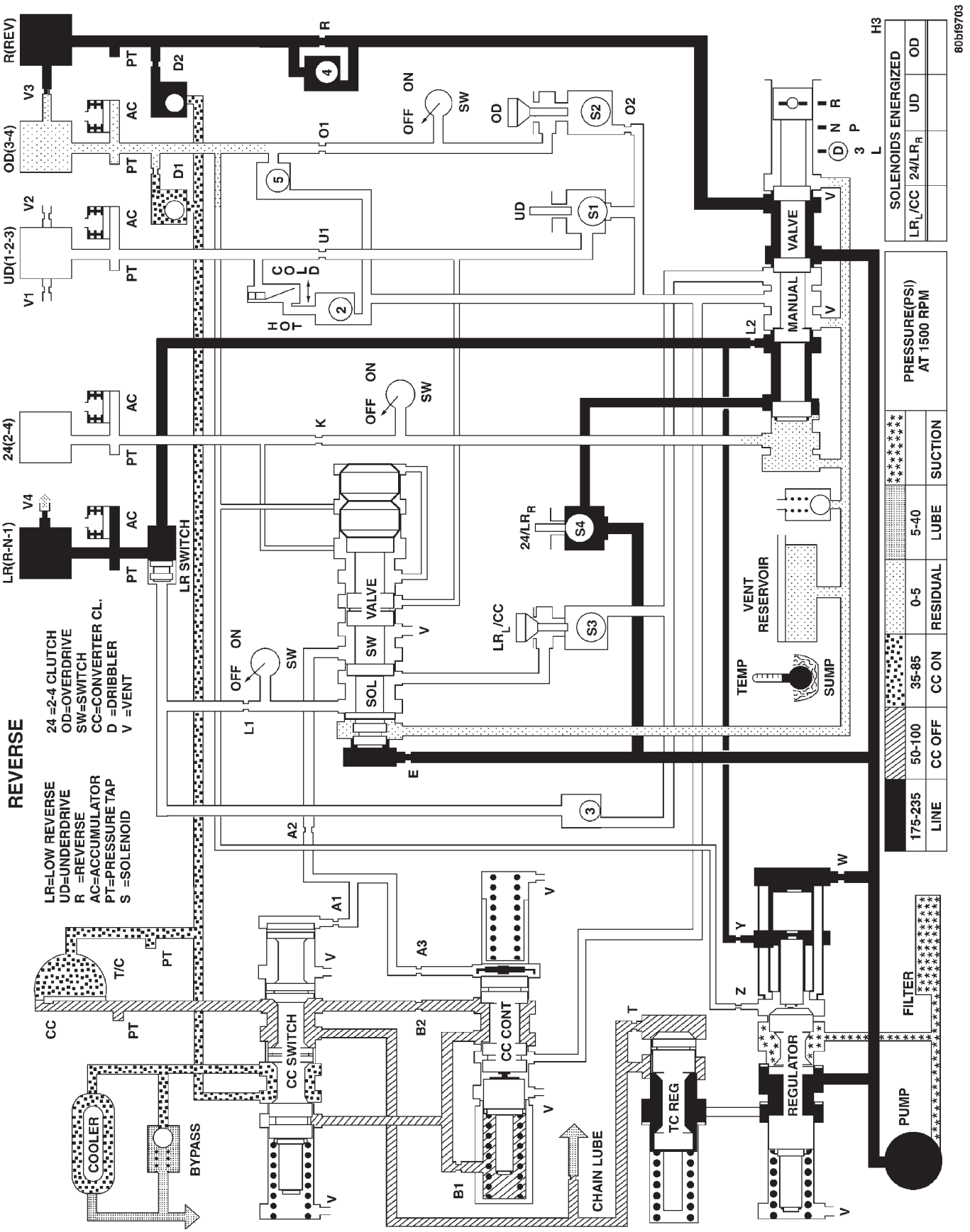
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SCHEMATICS AND DIAGRAMS (Continued)



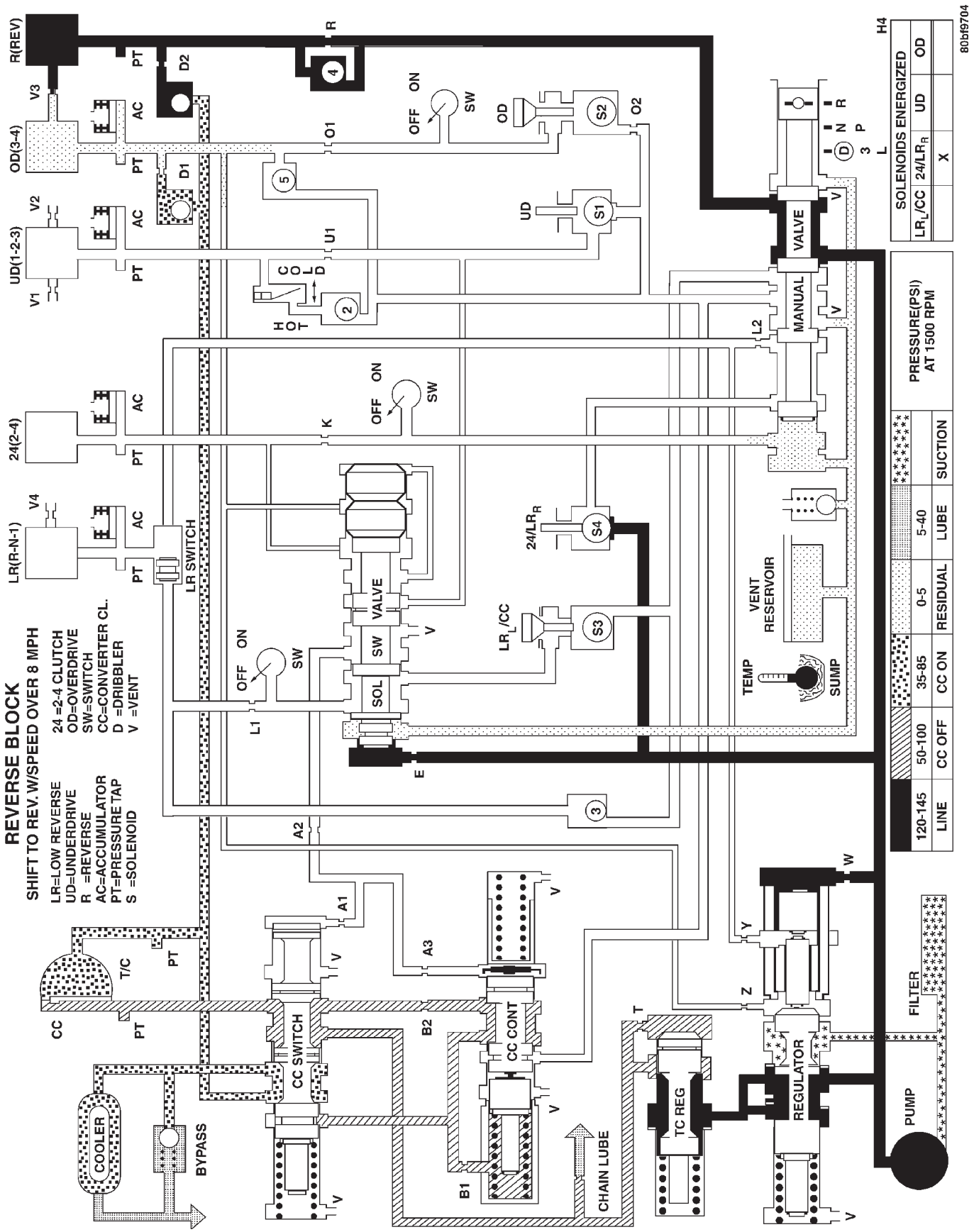
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SCHEMATICS AND DIAGRAMS (Continued)



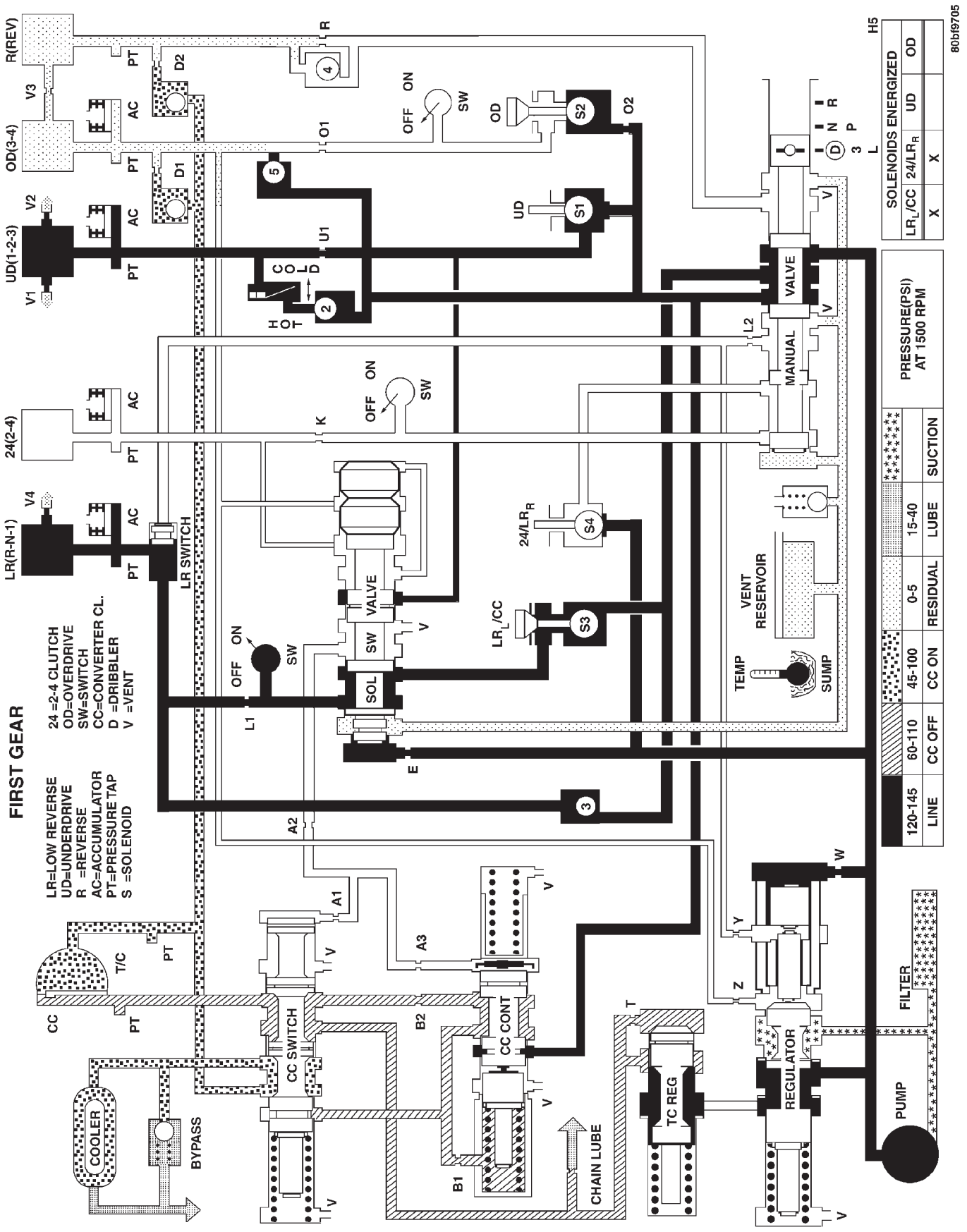
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SCHEMATICS AND DIAGRAMS (Continued)



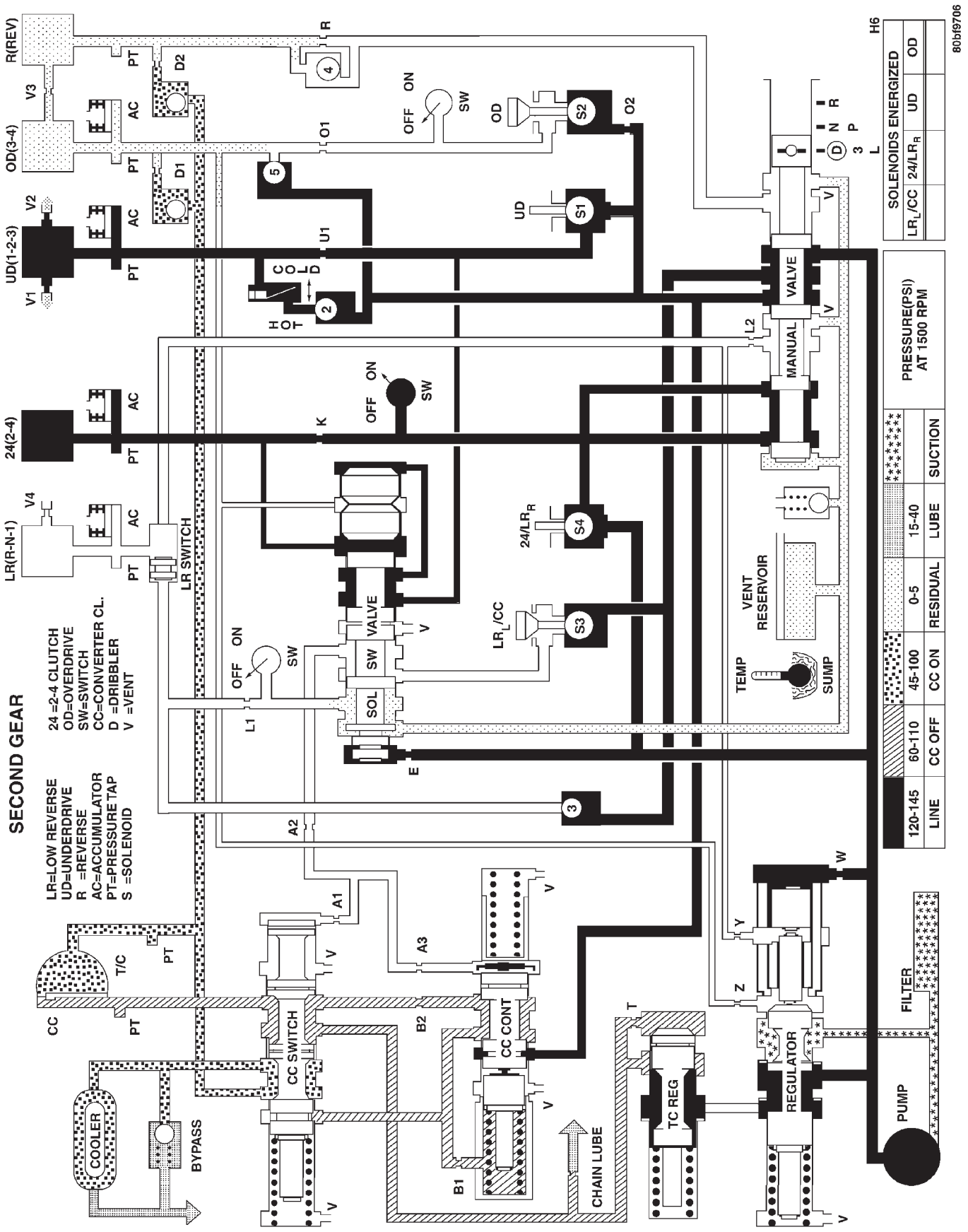
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SCHEMATICS AND DIAGRAMS (Continued)



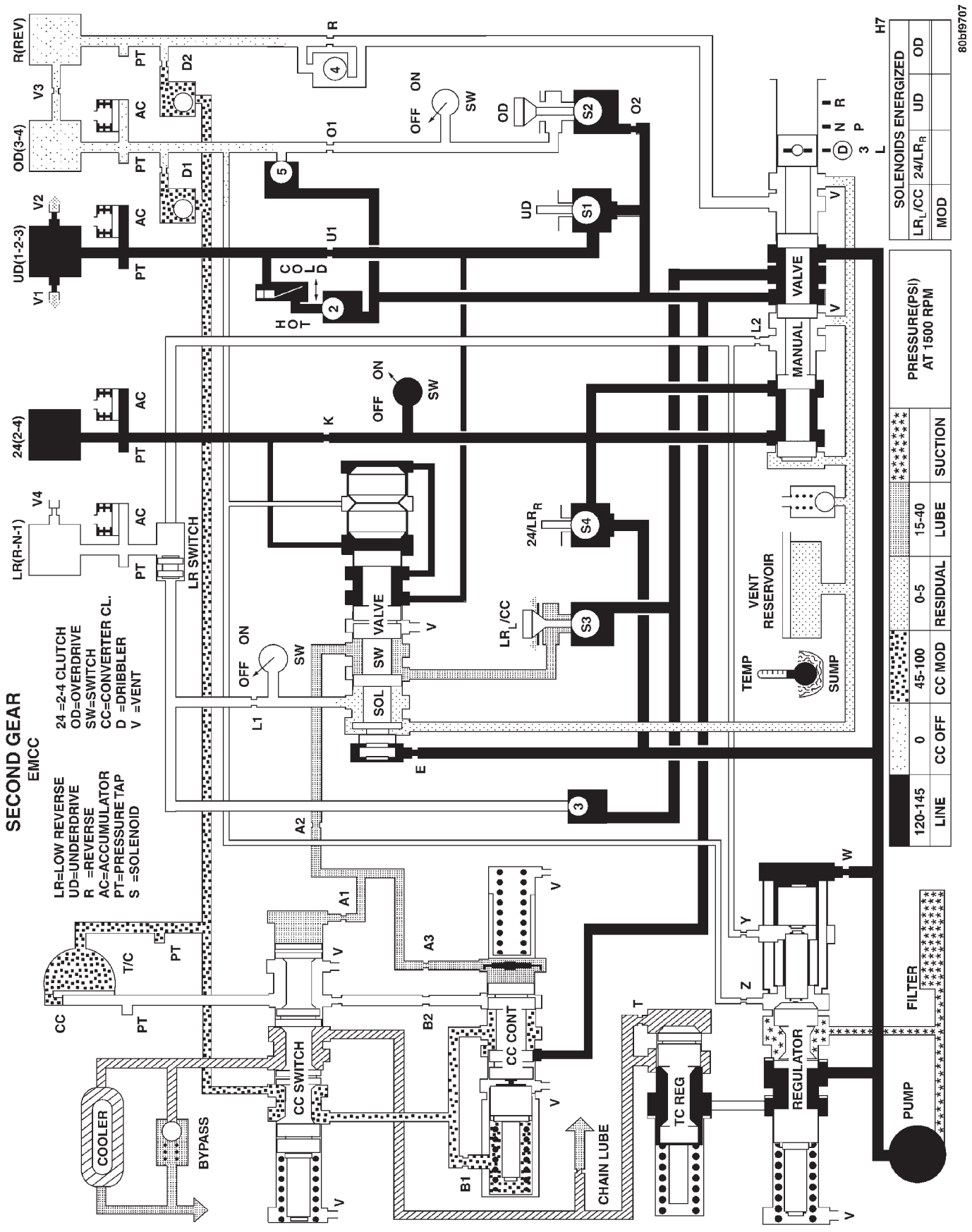
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SCHEMATICS AND DIAGRAMS (Continued)



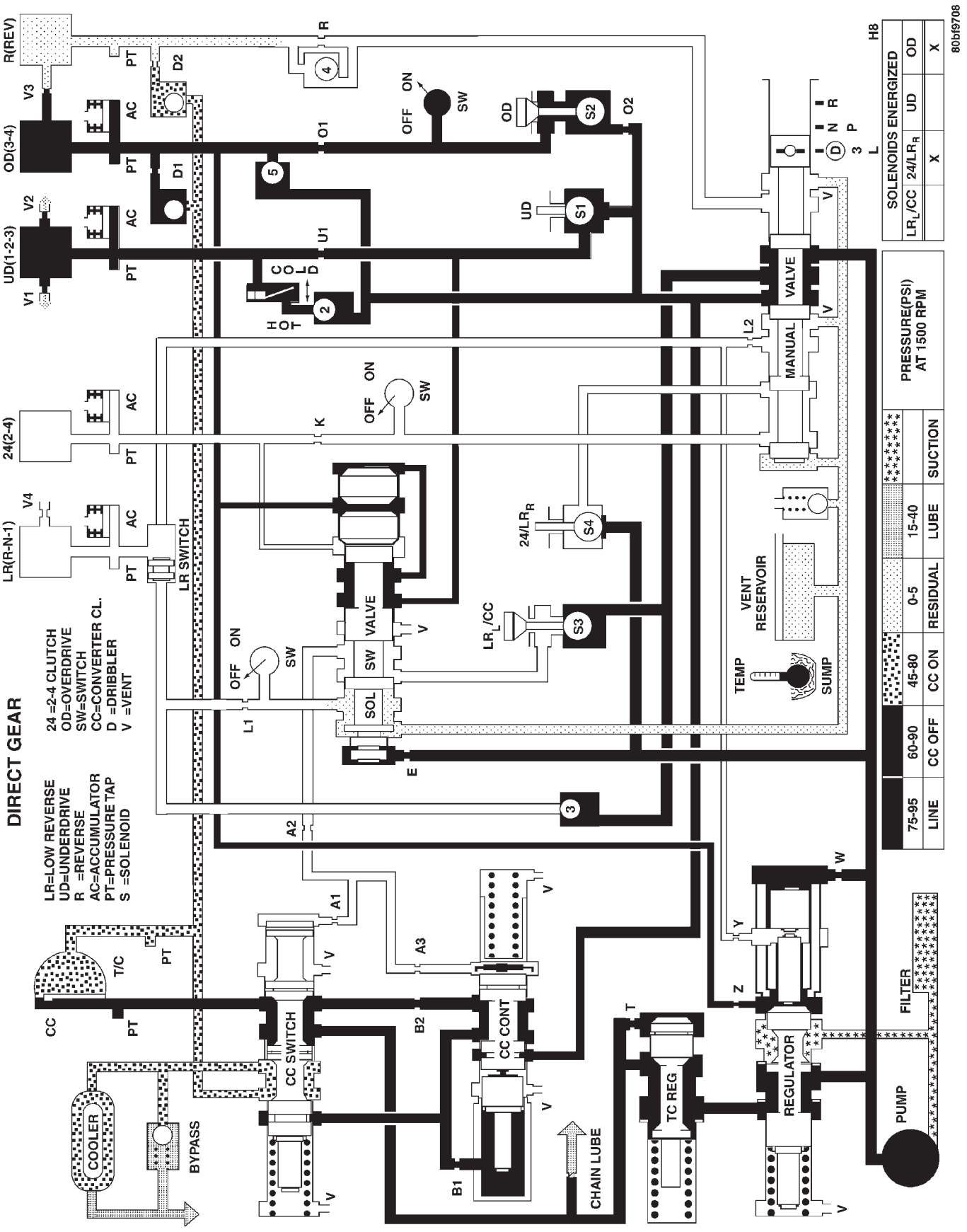
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SCHEMATICS AND DIAGRAMS (Continued)



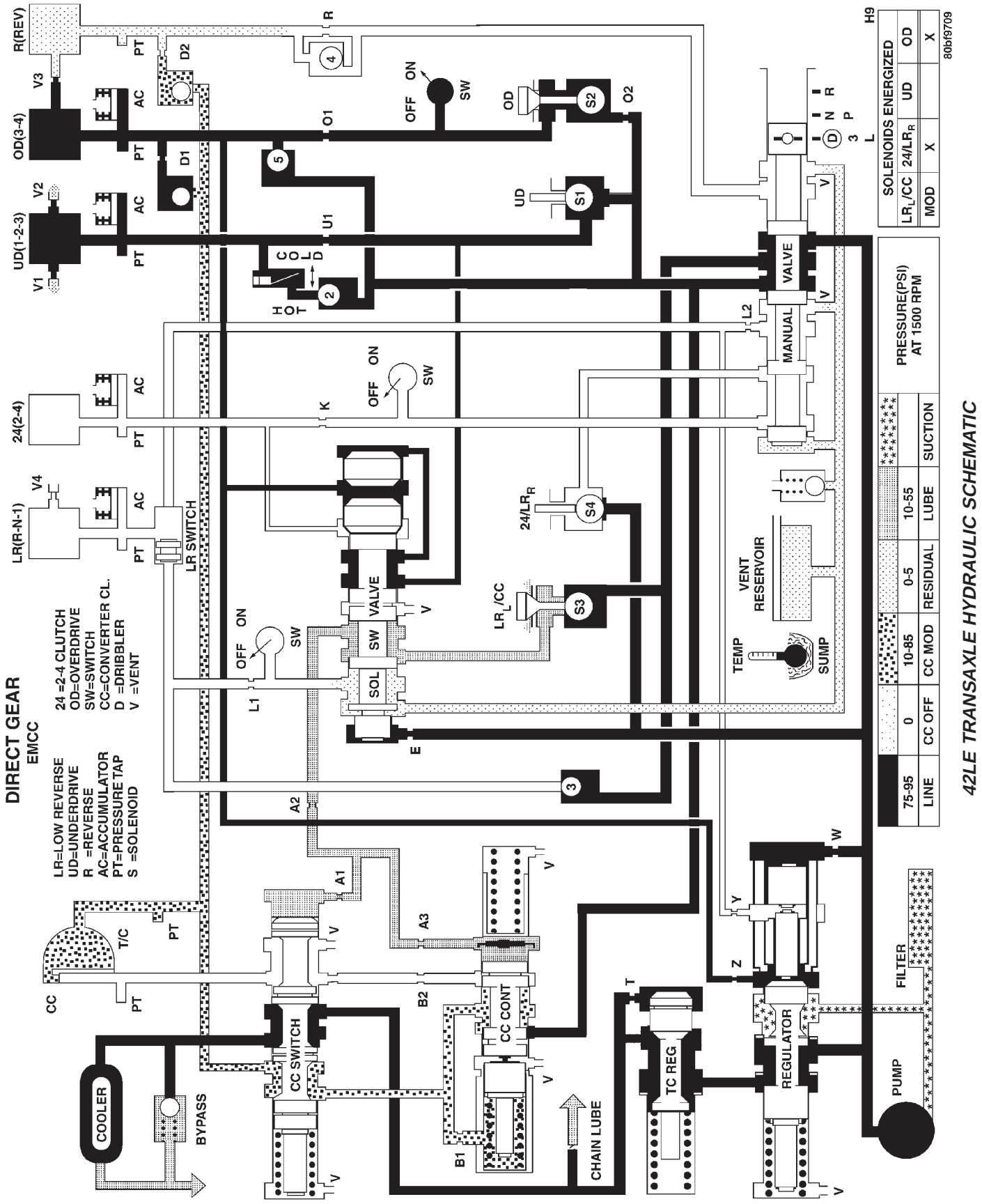
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SCHEMATICS AND DIAGRAMS (Continued)



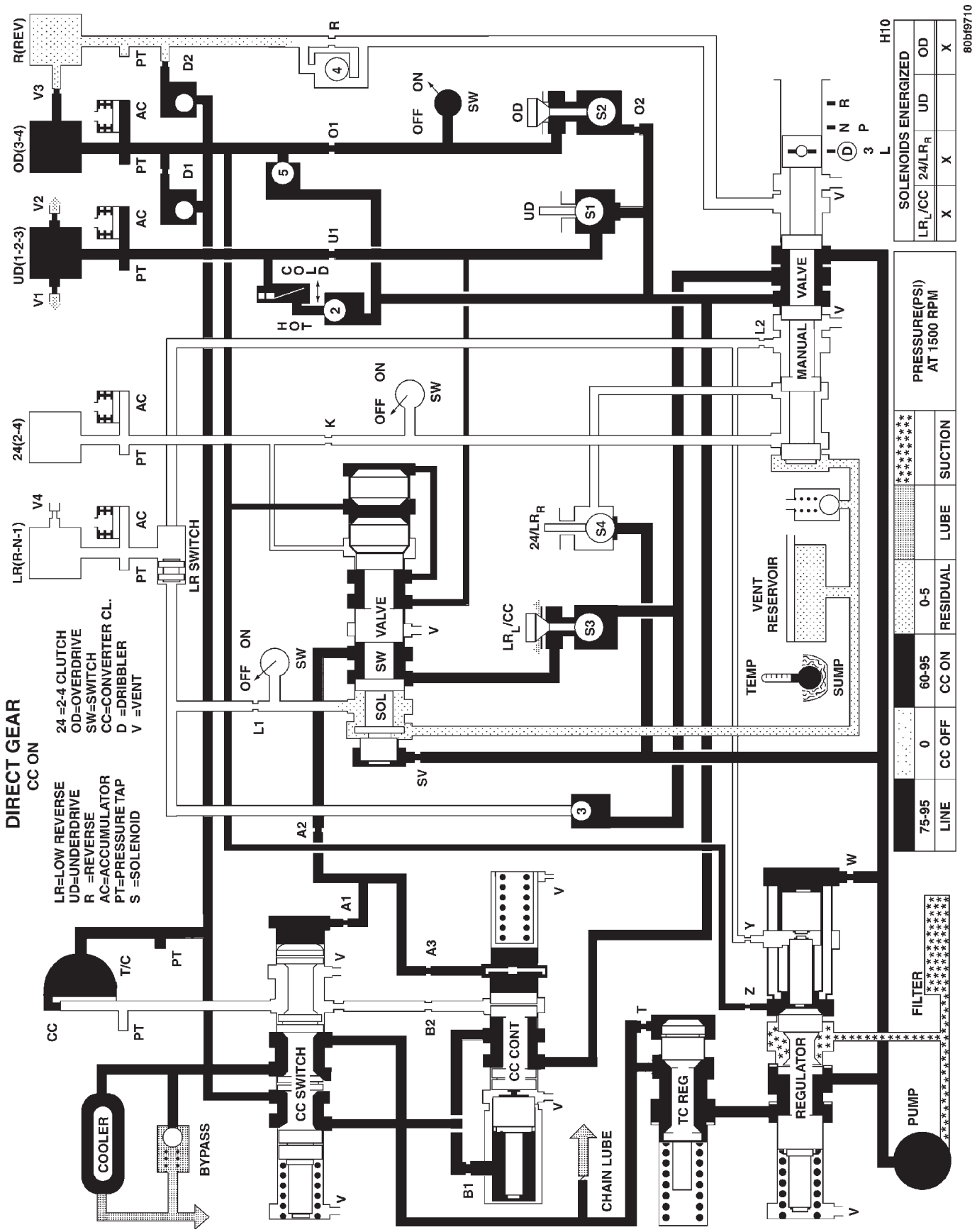
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SCHEMATICS AND DIAGRAMS (Continued)



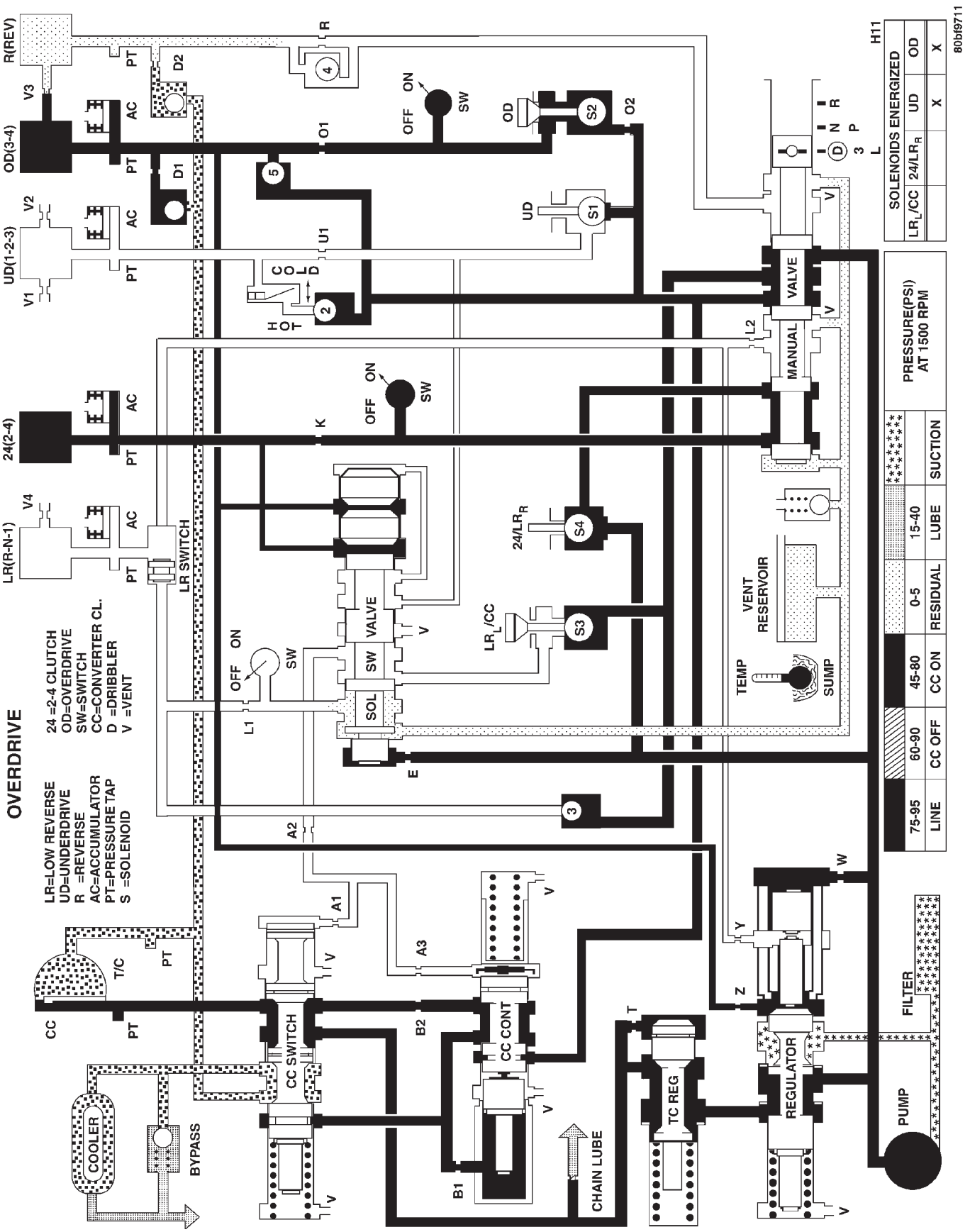
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SCHEMATICS AND DIAGRAMS (Continued)



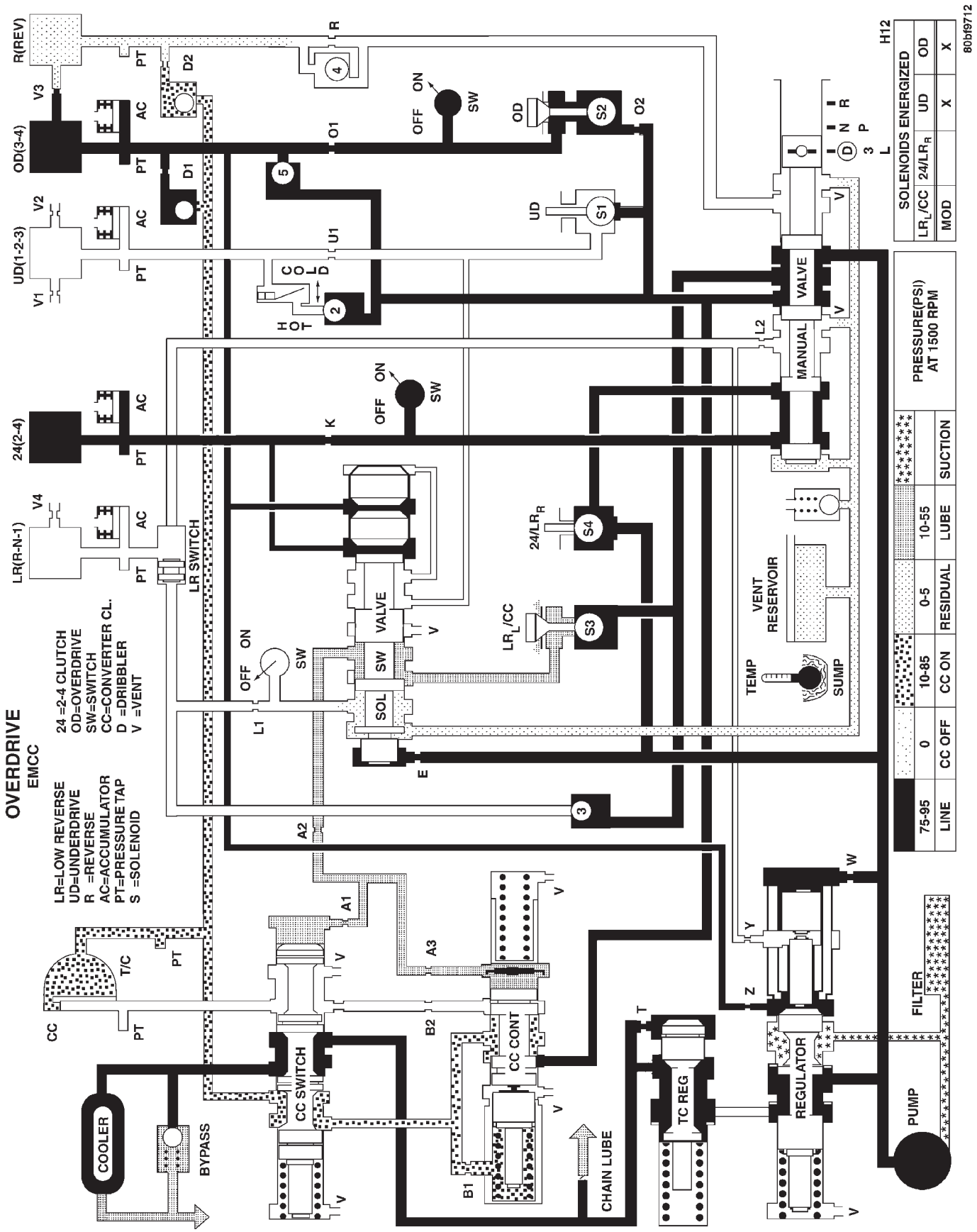
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SCHEMATICS AND DIAGRAMS (Continued)



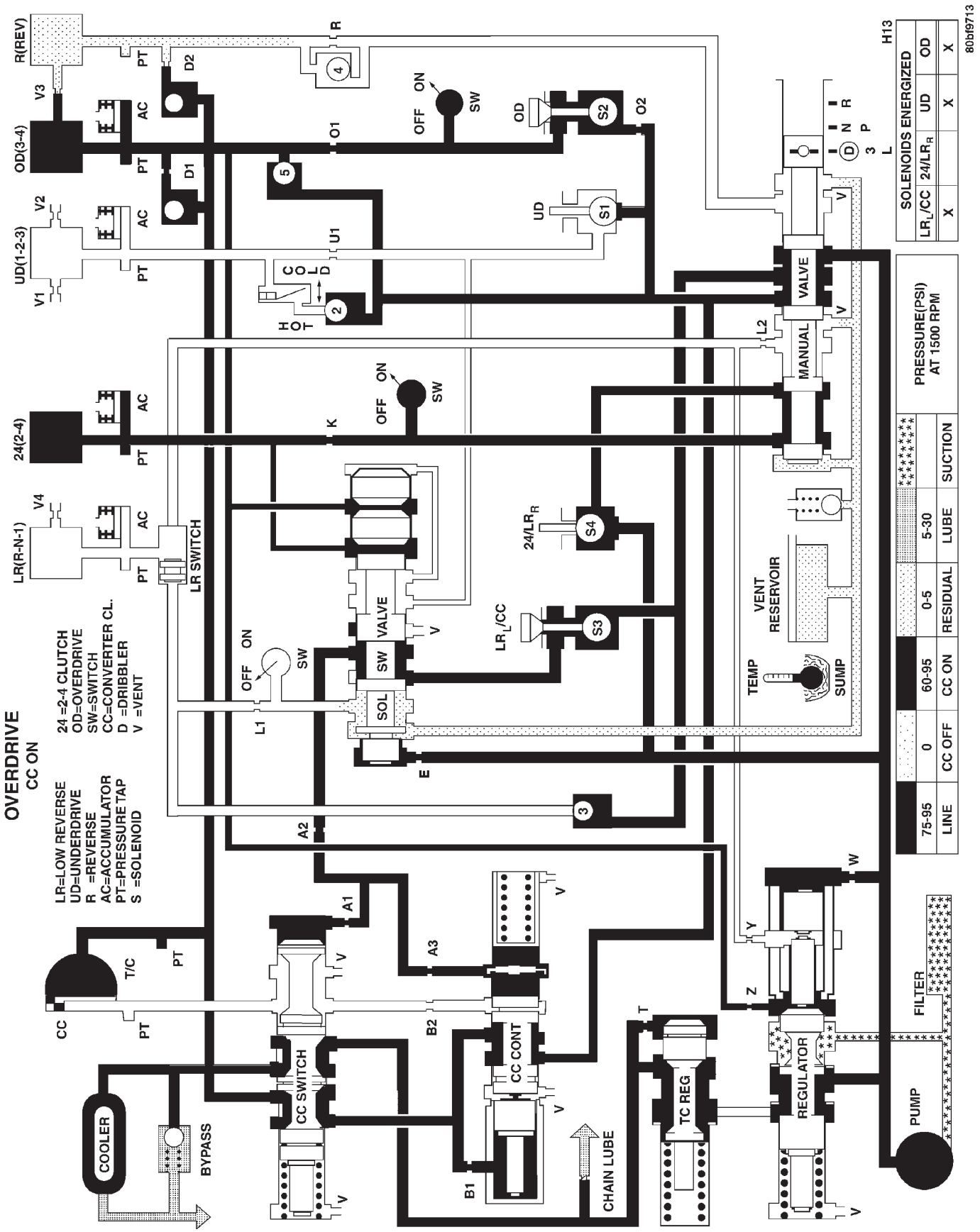
42LE TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



42LE TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



42LE TRANSAXLE HYDRAULIC SCHEMATIC

SPECIFICATIONS

42LE AUTOMATIC TRANSAXLE

Type .... Longitudinally Mounted, Fully Adaptive, Electronically Controlled, Four Speed Automatic. Electronically Modulated Torque Converter. Separate Sump Differential
Torque Converter Diameter ..... 254 millimeters (10.00 in.)

Oil Capacity
Transmission Sump ..... 9.4 Liters (9.9 qts.)
Differential Sump ..... 0.95 Liters (1.0 qts.)

Oil Type
Transmission Sump .... Mopar® ATF+4 Type 9602
Differential Sump ... Mopar® Fuel Saving 75W-90 Petroleum Based Hypoid Gear Lube

Cooling Method .... Water Heat Exchanger and/or Air to Oil Heat Exchanger
Lubrication ... Pump (internal-external gear-type)

Gear Ratios
Transmission Portion
First Gear 2.84
Second Gear 1.57
Direct Gear 1.00
Overdrive Gear 0.69
Reverse Gear 2.21

Overall Top Gear Ratio (In Overdrive)
2.7L 2.68
3.2, 3.5L 2.52

Output Shaft Sprocket Teeth Count
2.7L ..... 31 Teeth
3.2, 3.5L ..... 32 Teeth

Transfer Sprocket Teeth Count
2.7L ..... 34 Teeth
3.2, 3.5L ..... 33 Teeth

Final Drive Ratio
2.7L 3.89
3.2L/3.5L 3.66

Pump Clearances
Outer Gear To Pocket ..... 0.045-0.141mm (0.0018-0.0056 in.)
Outer Gear Side Clearance ..... 0.020-0.046mm (0.0008-0.0018 in.)
Inner Gear Side Clearance ..... 0.020-0.046mm (0.0008-0.0018 in.)

Bearing Preload
Differential Assembly . 7 to 30 in. lbs. Drag Torque
Output Shaft ..... 1 to 8 in. lbs. Drag Torque

Bearing Preload
Transfer Shaft ..... 1 to 8 in. lbs. Drag Torque
Overall Drag At Output Hub ..... 10 to 60 in. lbs. Drag Torque

Sprocket Set Variance
Height Variance ..... ±.457mm (± 0.018 in.)

Differential Backlash
Backlash Setting ..... .14 to.27mm (0.0045 to 0.0105 in.)

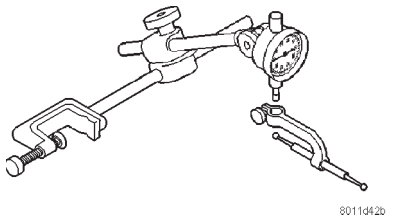
Clutch Pack Clearances
Low/Rev Clutch (Select Reaction Plate) ..... 0.89-1.04 mm (0.035-0.060 in.)
Two/Four Clutch (No Selection) ..... 0.76-2.64 mm (0.030-0.104 in.)
Reverse Clutch (Select Snap Ring) .. 0.89-1.37 mm (0.035-0.054 in.)
Overdrive Clutch (No Selection) .... 1.07-3.25 mm (0.042-0.128 in.)
Underdrive Clutch (Select Pressure Plate) ..... 0.94-1.50 mm (0.037-0.059 in.)
Input Shaft End Play ..... 0.12-0.63 mm (0.005-0.025 in.)

42LE TRANSAXLE TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Adj. Lock Bracket	5 N·m (45 in. lbs.)
Cooler Line Conn.	18 N·m (155 in. lbs.)
Diff. Ass. Partial Bolts	8 N·m (71 in. lbs.)
Diff. Cover Case	28 N·m (250 in. lbs.)
Differential Drain Plug	7 N·m (62 in. lbs.)
Differential Fill Plug	47 N·m (35 ft. lbs.)
Diff. Ring Gear Bolts	95 N·m (70 ft. lbs.)
Diff. Vent Baffle Screw	5 N·m (45 in. lbs.)
Differential Vent	11 N·m (100 in. lbs.)
Driveplate To Crank Bolts	95 N·m (70 ft. lbs.)
End Cover To Case	28 N·m (250 in. lbs.)
Fluid Filter Screw	5 N·m (45 in. lbs.)
Input Sensor To Case	27 N·m (240 in. lbs.)
Low/rev. Clutch Ret. To Case	5 N·m (45 in. lbs.)
Main Sump Vent Screw	5 N·m (45 in. lbs.)
Main Sump Vent	11 N·m (100 in. lbs.)
Man. Lev. To Valve Body	5 N·m (45 in. lbs.)
Oil Pan To Trans. Case Screw	23 N·m (17 ft. lbs.)
Output Sensor To Case	27 N·m (240 in. lbs.)
Output Shaft Nut	271 N·m (200 ft. lbs.)
Park Sprag Ret. Screw	5 N·m (45 in. lbs.)
Pressure Check Plug	6 N·m (53 in. lbs.)
Pump To Case Bolts	29 N·m (250 in. lbs.)
React. Shaft Ass. Bolt	28 N·m (250 in. lbs.)
Snubber Screws	5 N·m (45 in. lbs.)
Sol. Ass. To Transfer Plate	6 N·m (53 in. lbs.)
Solenoid Wiring Conn. Ret.	6 N·m (53 in. lbs.)

SPECIFICATIONS (Continued)

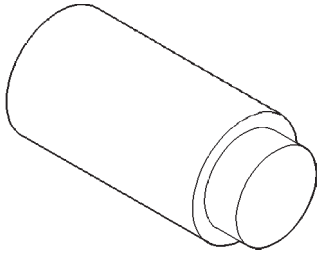
DESCRIPTION	TORQUE
Torque Conv. To Driveplate	88 N·m (65 ft. lbs.)
Transmission Mount	61 N·m (45 ft. lbs.)
Transfer Shaft Stake Nuts	271 N·m (200 ft. lbs.)
Valve Body Assy	12 N·m (105 in. lbs.)
Valve Body Screw	5 N·m (45 in. lbs.)
Wiring Harn. Tie Down	6 N·m (53 in. lbs.)



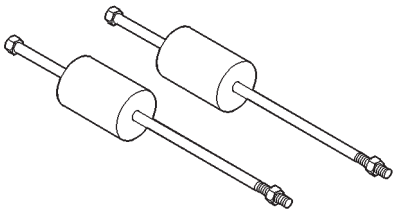
Dial Indicator C-3339

SPECIAL TOOLS

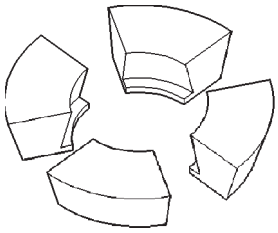
42LE AUTOMATIC TRANSAXLE



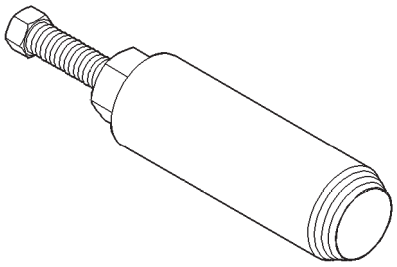
Puller Press Extension C-293-3



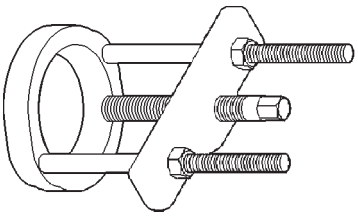
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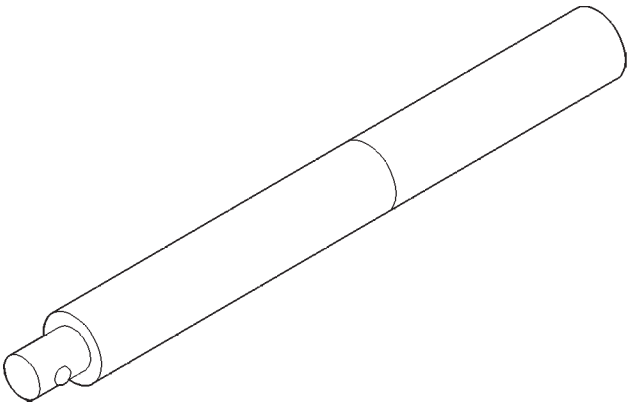
Adapter Blocks C-293–48



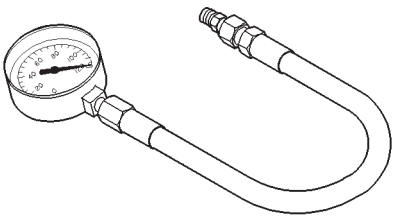
Seal Puller C-3981B



Puller Press C-293–PA

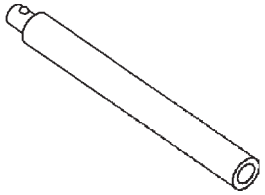


Universal Handle C-4171

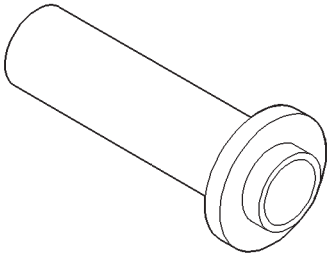


Pressure Gauge (High) C-3293SP

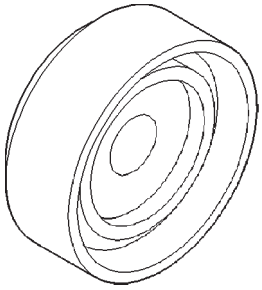
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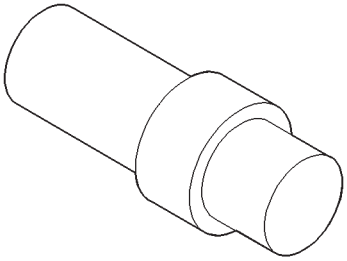
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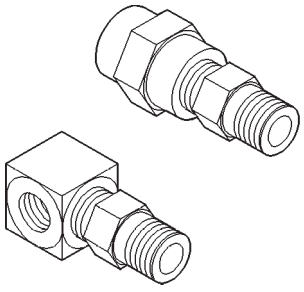
Seal Installer C-4193A



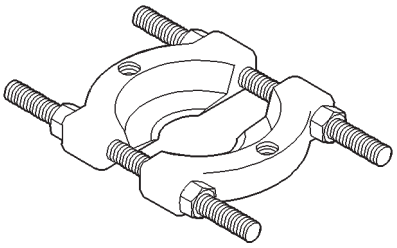
Installer C-4340



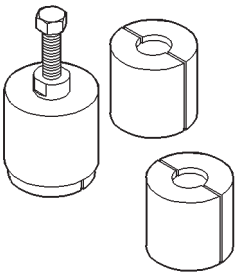
Adapter C-4996



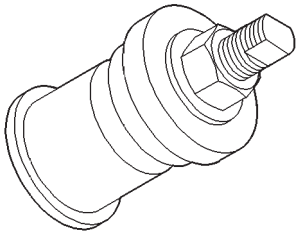
Adapter Set L-4559



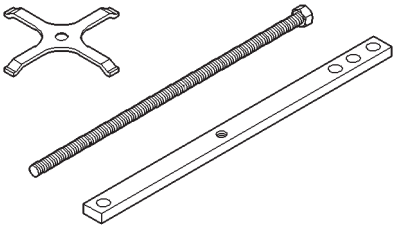
Bearing Splitter P-334



Puller Set 5048

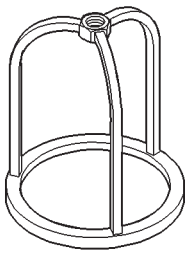


Installer 5050A

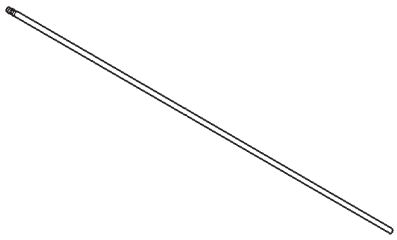


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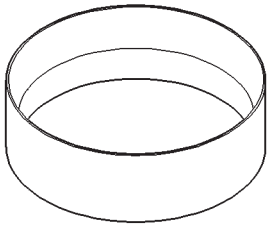
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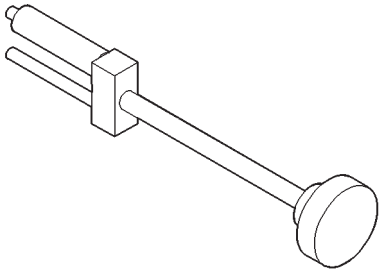
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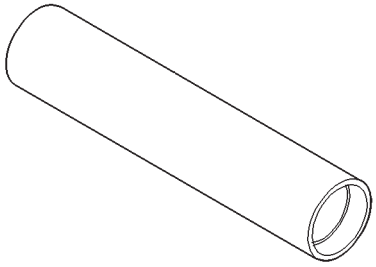
Tip 6268



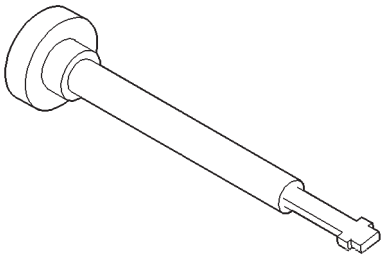
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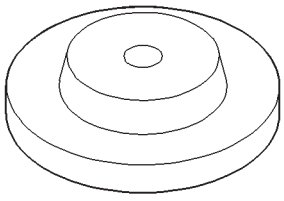
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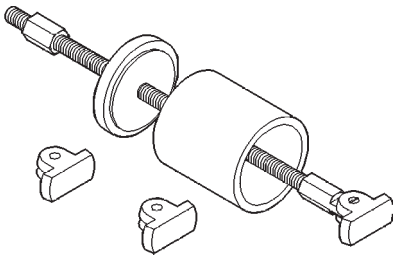
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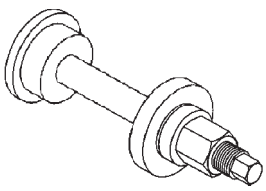
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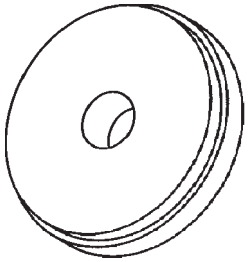


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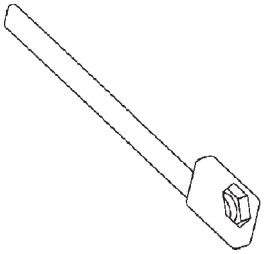


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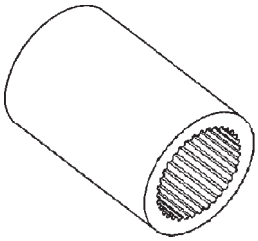
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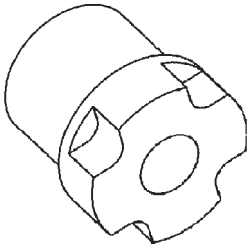
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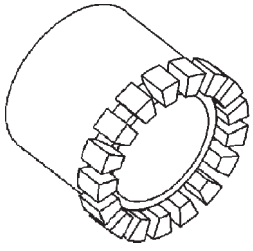
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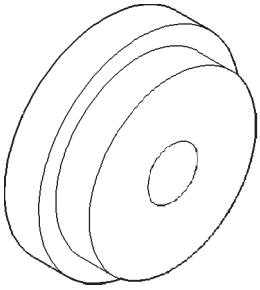
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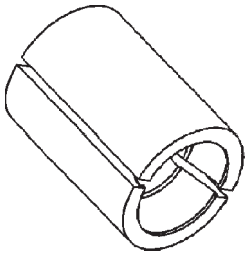
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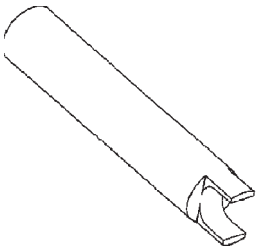
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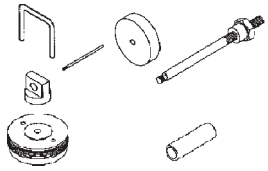
Installer 6522



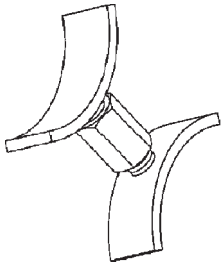
Puller Jaws 6545



Turning Fork 6548

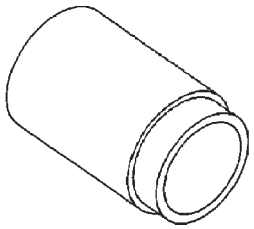


Pinion Gauge Tool Set 6549

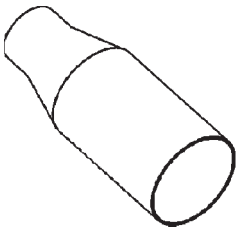


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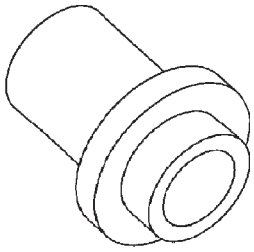
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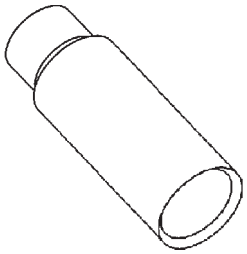
Installer 6558



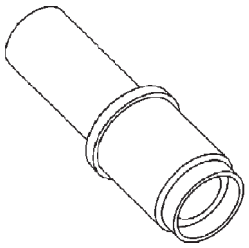
Seal Protector 6591



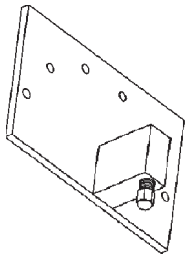
Installer 6560



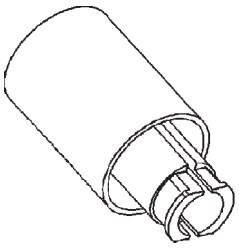
Seal Protector 6592



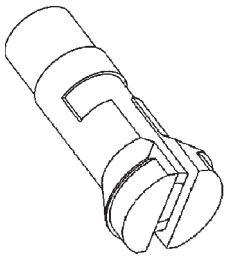
Seal Installer 6567A



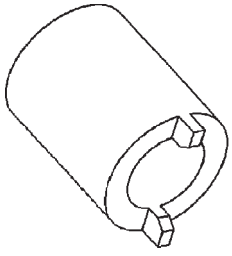
Fixture 6595



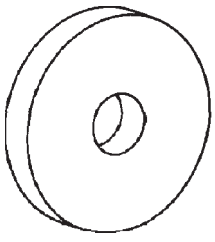
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Staking Tool 6589



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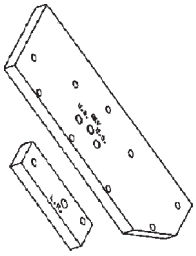
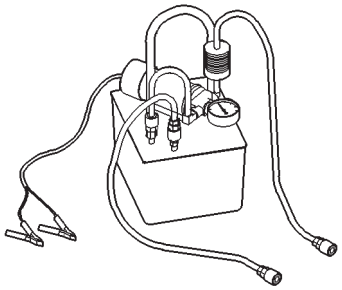
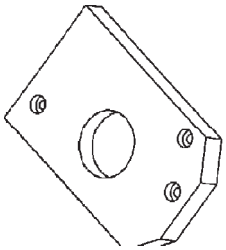


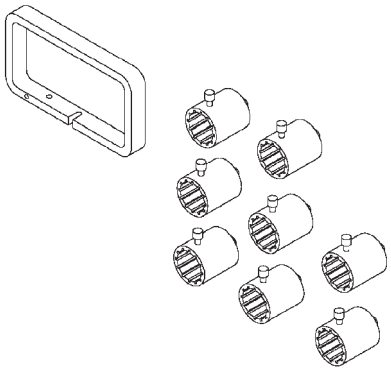
Plate Set 6599



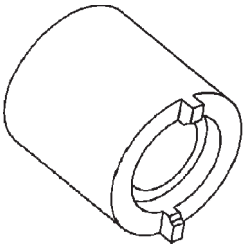
Cooler Flusher 6906



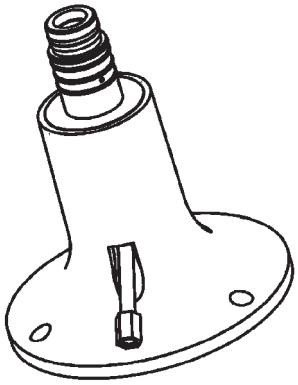
Support Plate 6618A



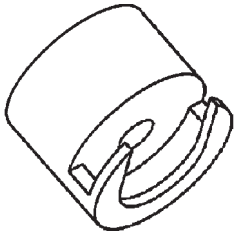
End Play Set 8266



Staking Tool 6639



Pressure Fixture 8391



Remover 6669

TIRES AND WHEELS

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TIRES

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DESCRIPTION AND OPERATION

TIRE

DESCRIPTION

Tires are designed and engineered for each specific vehicle. They provide the best overall performance for normal operation. The ride and handling characteristics match the vehicle's requirements. With proper care they will give excellent reliability, traction, skid resistance, and tread life.

Driving habits have more effect on tire life than any other factor. Careful drivers will obtain, in most cases, much greater mileage than severe use or careless drivers. A few of the driving habits which will shorten the life of any tire are:

- Rapid acceleration
- Severe application of brakes
- High-speed driving
- Taking turns at excessive speeds
- Striking curbs and other obstacles
- Operating vehicle with over or under inflated tire pressures

Radial ply tires are more prone to irregular tread wear. It is important to follow the tire rotation interval shown in the section on Tire Rotation. This will help to achieve a greater tread-life potential.

TIRE IDENTIFICATION

Tire type, size, aspect ratio and speed rating are encoded in the letters and numbers imprinted on the side wall of the tire. Refer to the chart to decipher the tire identification code (Fig. 1).

Performance tires will have a speed rating letter after the aspect ratio number. For example, the letter “S” indicates that the tire is speed rated up to 112 mph (180 km/h). The speed rating is not always printed on the tire sidewall.

- Q -up to 100 mph (160 km/h)
- T -up to 118 mph (190 km/h)
- U -up to 124 mph (200 km/h)
- H -up to 130 mph (210 km/h)
- V -up to 149 mph (240 km/h)
- Z -more than 149 mph (240 km/h) (consult the tire manufacturer for the specific speed rating)

DESCRIPTION AND OPERATION (Continued)

An All Season type tire will have either M + S, M & S or M-S (indicating mud and snow traction) imprinted on the side wall.

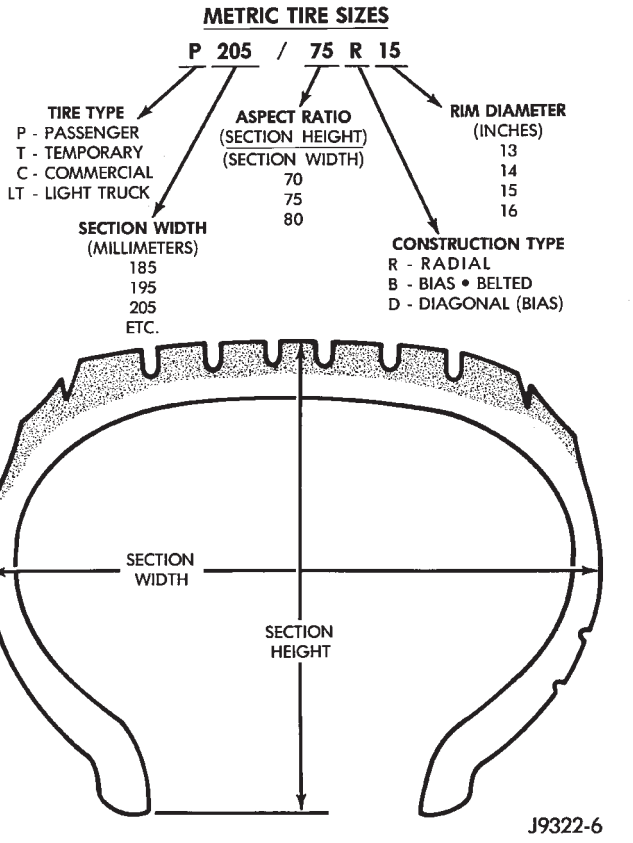


Fig. 1 Tire Identification

TIRE CHAINS

Refer to the owners manual supplied with the vehicle to determine whether the use of tire chains is permitted on this vehicle.

RADIAL-PLY TIRES

DESCRIPTION

Radial-ply tires improve handling, tread life and ride quality, and decrease rolling resistance.

Radial-ply tires must always be used in sets of four. Under no circumstances should they be used on the front only. They may be mixed with temporary spare tires when necessary. A maximum speed of 50 MPH is recommended while a temporary spare is in use.

Radial-ply tires have the same load-carrying capacity as other types of tires of the same size. They also use the same recommended inflation pressures.

The use of oversized tires, either in the front or rear of the vehicle, can cause vehicle drive train failure. This could also cause inaccurate wheel speed signals when the vehicle is equipped with Anti-Lock Brakes.

The use of tires from different manufactures on the same vehicle is NOT recommended. The proper tire pressure should be maintained on all four tires.

SPARE TIRE–TEMPORARY

DESCRIPTION

The temporary spare tire is designed for emergency use only. The original tire should be repaired or replaced at the first opportunity, then reinstalled. Do not exceed speeds of 50 M. P. H. when using the temporary spare tire. Refer to Owner's Manual for complete details.

REPLACEMENT TIRES

DESCRIPTION

The original equipment tires provide a proper balance of many characteristics such as:

- Ride
- Noise
- Handling
- Durability
- Tread life
- Traction
- Rolling resistance
- Speed capability

It is recommended that tires equivalent to the original equipment tires be used when replacement is needed.

Failure to use equivalent replacement tires may adversely affect the safety and handling of the vehicle.

The use of oversize tires may cause interference with vehicle components. Under extremes of suspension and steering travel, interference with vehicle components may cause tire damage.

WARNING: FAILURE TO EQUIP THE VEHICLE WITH TIRES HAVING ADEQUATE SPEED CAPABILITY CAN RESULT IN SUDDEN TIRE FAILURE.

DIAGNOSIS AND TESTING

PRESSURE GAUGES

A quality air pressure gauge is recommended to check tire pressure. After checking the air pressure, replace valve cap finger tight.

TREAD WEAR INDICATORS

Tread wear indicators are molded into the bottom of the tread grooves. When tread depth is 1.6 mm (1/16 in.), the tread wear indicators will appear as a 13 mm (1/2 in.) band (Fig. 2).

DIAGNOSIS AND TESTING (Continued)

Tire replacement is necessary when indicators appear in two or more grooves or if localized balding occurs.

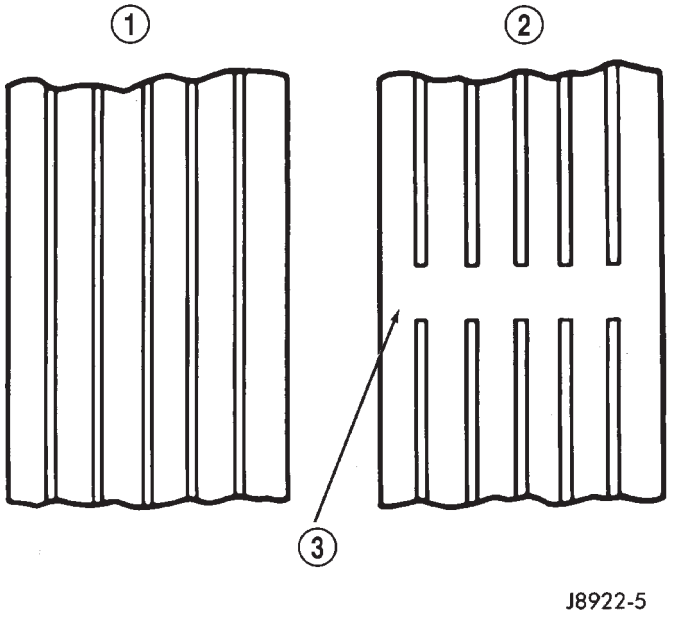


Fig. 2 Tread Wear Indicators

1 – TREAD ACCEPTABLE
2 – TREAD UNACCEPTABLE
3 – WEAR INDICATOR

TIRE WEAR PATTERNS

Under inflation will cause wear on the shoulders of tire. Over inflation will cause wear at the center of tire.

Excessive camber causes the tire to run at an angle to the road. One side of tread is then worn more than the other (Fig. 3).

Excessive toe-in or toe-out causes wear on the tread edges and a feathered effect across the tread (Fig. 3).

TIRE NOISE OR VIBRATION

Radial-ply tires are sensitive to force impulses caused by improper mounting, vibration, wheel defects, or possibly tire imbalance.

To find out if tires are causing the noise or vibration, drive the vehicle over a smooth road at varying speeds. Note the noise level during acceleration and deceleration. The engine, differential and exhaust noises will change as speed varies, while the tire noise will usually remain constant.

VEHICLE LEAD DIAGNOSIS AND CORRECTION

Use the following chart to diagnose a vehicle that has a complaint of a drift or lead condition. The use of the chart will help to determine if the lead condition is the result of a bad tire or is caused by the front wheel alignment.

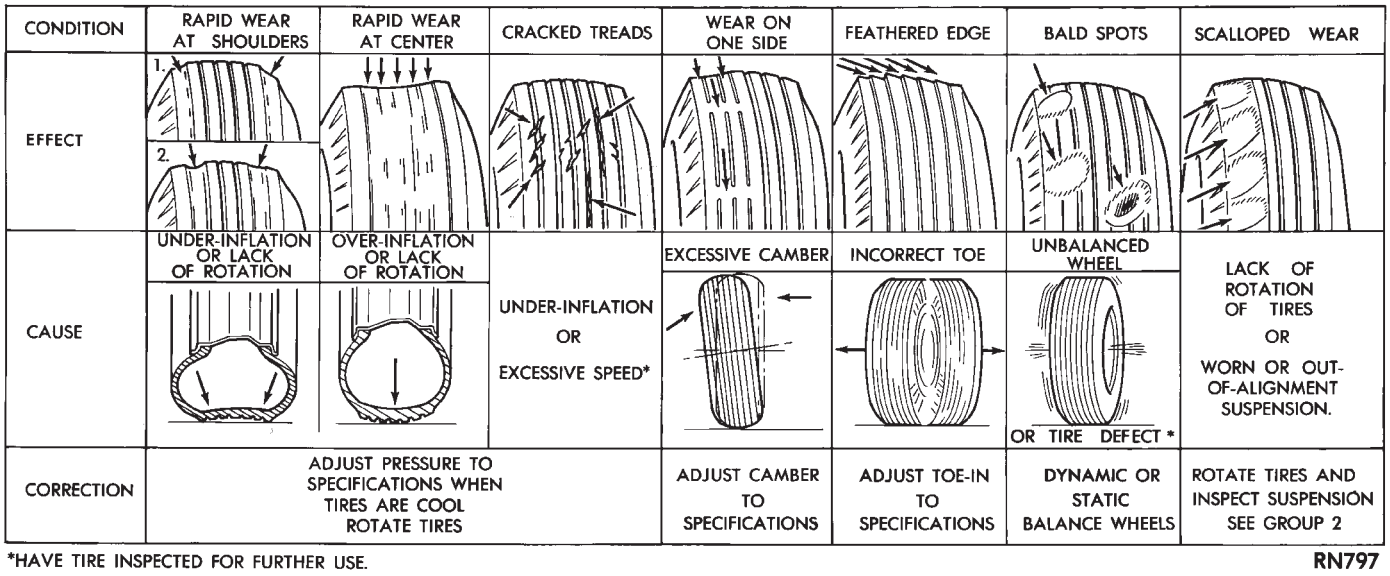
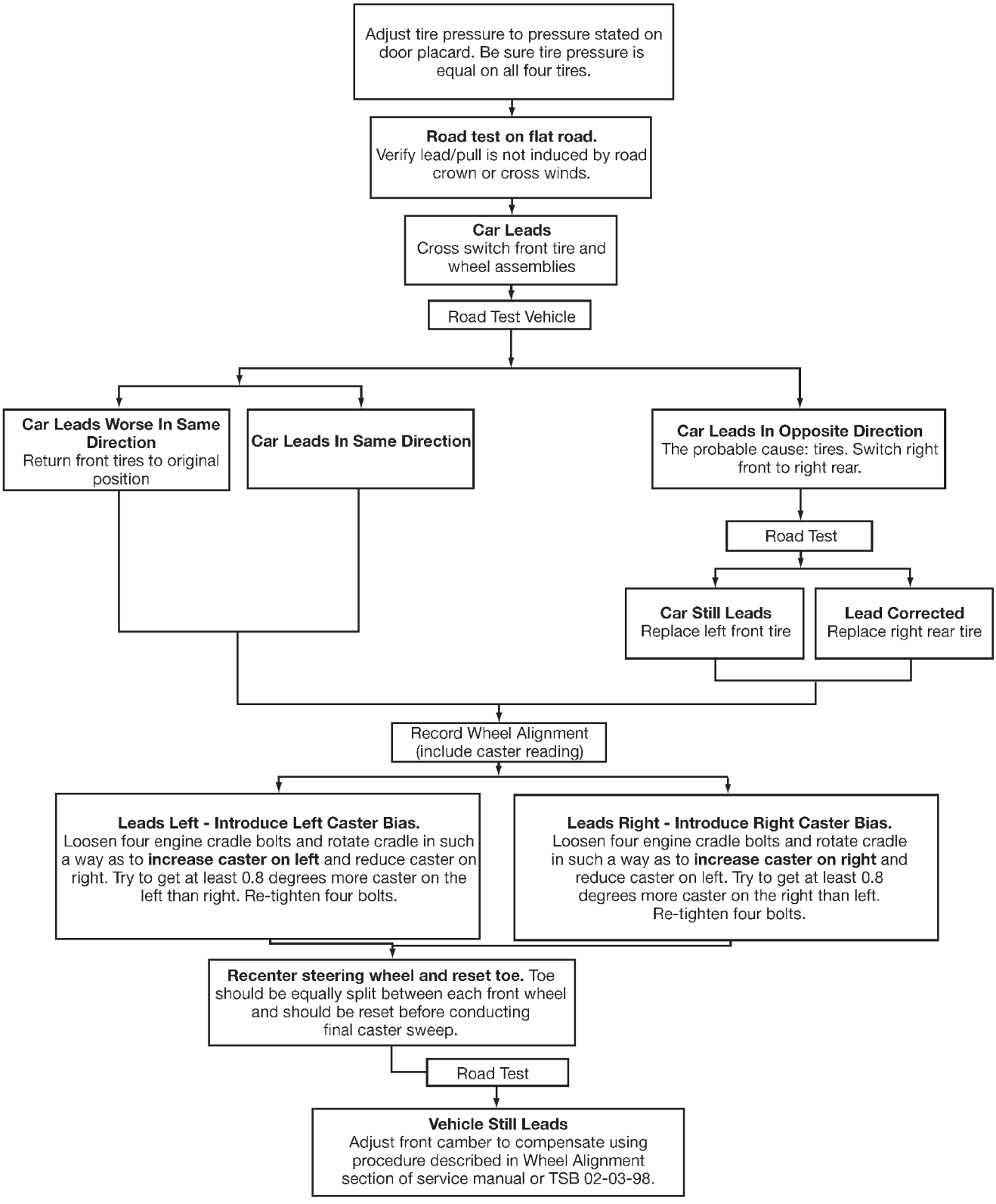


Fig. 3 Tire Wear Patterns

DIAGNOSIS AND TESTING (Continued)

VEHICLE LEAD DIAGNOSIS AND CORRECTION PROCEDURE



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SERVICE PROCEDURES

TIRE INFLATION PRESSURES

Under inflation causes rapid shoulder wear, tire flexing, and can result in tire failure (Fig. 4).

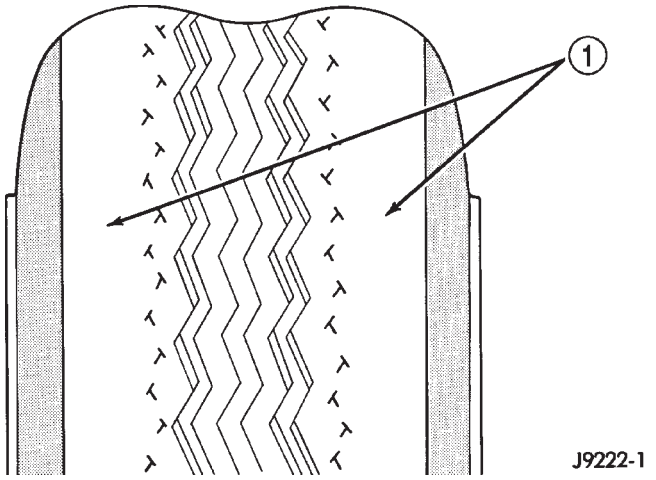


Fig. 4 Under Inflation Wear

1 – THIN TIRE TREAD AREAS

Over inflation causes rapid center wear and loss of the tire's ability to cushion shocks (Fig. 5).

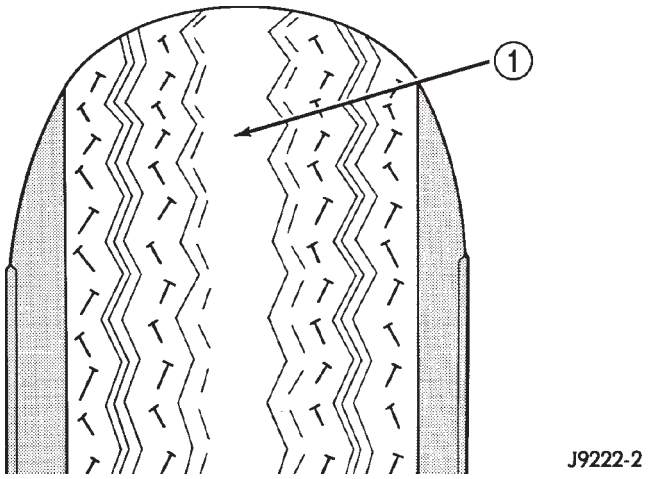


Fig. 5 Over Inflation Wear

1 – THIN TIRE TREAD AREA

Improper inflation can cause:

- Uneven wear patterns
- Reduced tread life
- Reduced fuel economy
- Unsatisfactory ride
- The vehicle to drift.

For proper tire pressure specification refer to the Tire Inflation Pressure Chart Placard provided with the vehicle.

Tire pressures have been chosen to provide safe operation, vehicle stability, and a smooth ride. Tire pressure should be checked cold once per month. Check tire pressure more frequently when the weather temperature varies widely. Tire pressure will decrease when the outdoor temperature drops.

Inflation pressures specified on the placard are always the cold inflation pressure of the tire. Cold inflation pressure is obtained after the vehicle has not been operated for at least 3 hours, or the vehicle is driven less than one mile after being inoperative for 3 hours. Tire inflation pressures may increase from 2 to 6 pounds per square inch (psi) during operation. Do not reduce this normal pressure build-up.

WARNING: OVER OR UNDER INFLATED TIRES CAN AFFECT VEHICLE HANDLING. THE TIRE CAN FAIL SUDDENLY, RESULTING IN LOSS OF VEHICLE CONTROL.

TIRE PRESSURE FOR HIGH SPEED OPERATION

DESCRIPTION

Where speed limits allow the vehicle to be driven at high speeds, correct tire inflation pressure is very important. For speeds up to and including 120 km/h (75 mph), tires must be inflated to the pressures shown on the tire placard. For continuous speeds in excess of 120 km/h (75 mph), tires must be inflated to the maximum pressure specified on the tire sidewall.

Vehicles loaded to the maximum capacity should not be driven at continuous speeds above 75 mph (120 km/h).

For emergency vehicles that are driven at speeds over 90 mph (144 km/h), special high speed tires must be used. Consult tire manufacturer for correct inflation pressure recommendations.

TIRE AND WHEEL ROTATION

NON-DIRECTIONAL TREAD PATTERN TIRES

Tires on the front and rear axles operate at different loads and perform different functions. For these reasons, they wear at unequal rates, and tend to develop irregular wear patterns. These effects can be reduced by timely rotation of tires. The benefits of rotation are especially worthwhile. Rotation will increase tread life, help to maintain mud, snow, and wet traction levels, and contribute to a smooth, quiet ride.

The suggested rotation method is the forward-cross tire rotation method (Fig. 6). This method takes advantage of current tire industry practice which

SERVICE PROCEDURES (Continued)

allows rotation of radial-ply tires. Other rotation methods may be used, but may not have all the benefits of the recommended method.

NOTE: Only the 4 tire rotation method may be used if the vehicle is equipped with a low mileage or temporary spare tire.

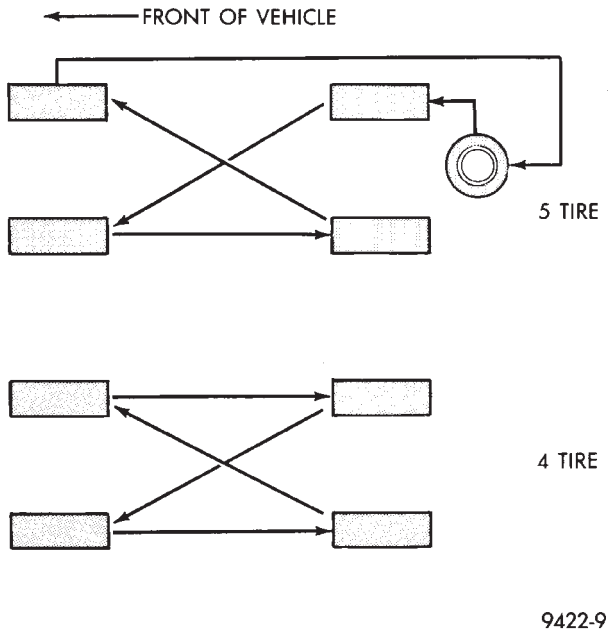


Fig. 6 Forward-Cross Tire Rotation Method

DIRECTIONAL TREAD PATTERN TIRES

Some vehicles are fitted with special high-performance tires having a directional tread pattern. These tires are designed to improve traction on wet pavement. To obtain the full benefits of this design, the tires must be installed so that they rotate in the correct direction. This is indicated by arrows on the tire sidewalls.

When wheels and tires are being installed, extra care is needed to ensure that this direction of rotation is maintained.

Refer to Owner's Manual for rotation schedule.

REPAIRING TIRE LEAKS

For proper repairing, a radial tire must be removed from the wheel. Repairs should only be made if the defect, or puncture, is in the tread area (Fig. 7). The tire should be replaced if the puncture is located in the sidewall.

Deflate tire completely before attempting to dismount the tire from the wheel. **Use a lubricant such as a mild soap solution when dismounting or mounting tire.** Use tools free of burrs or sharp edges which could damage the tire or wheel rim.

Before mounting tire on wheel, make sure all rust is removed from the rim bead and repaint if necessary.

Install wheel on vehicle, and progressively tighten the 5 wheel nuts to a torque of 135 N·m (100 ft. lbs.).

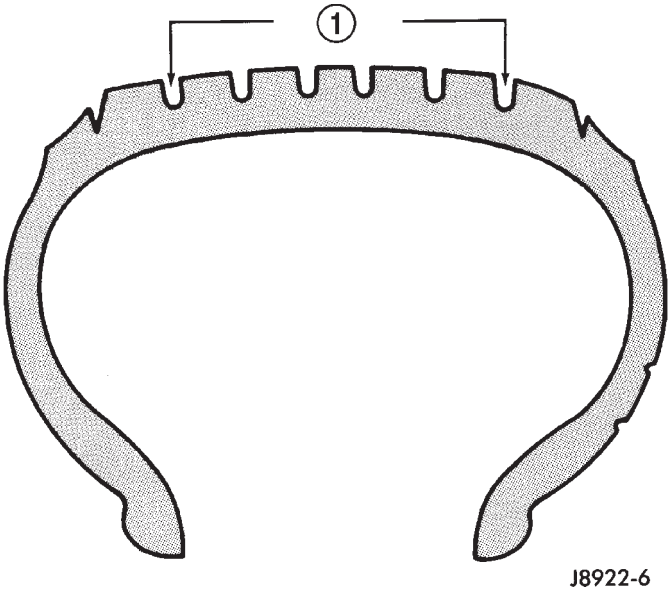


Fig. 7 Tire Repair Area

1 – REPAIRABLE AREA

TIRE AND WHEEL MATCH MOUNTING

Wheels and tires are match mounted at the factory. This means that the high spot of the tire is matched to the low spot on the wheel rim. This technique is used to reduce run-out in the wheel/tire assembly. The high spot on the tire is marked with a paint mark or a bright colored adhesive label on the outboard sidewall. The low spot on the rim is identified with a label on the outside of the rim and a dot or line in the drop well on the tire side of the rim. If the outside label has been removed the tire will have to be removed to locate the dot or line on the inside of the rim.

Before dismounting a tire from its wheel, a reference mark should be placed on the tire at the valve stem location. This reference will ensure that it is remounted in the original position on the wheel.

(1) Measure the total indicator runout on the center of the tire tread rib. Record the indicator reading. Mark the tire to indicate the high spot. Place a mark on the tire at the valve stem location (Fig. 8).

(2) Break down the tire and remount it 180 degrees on the rim (Fig. 9).

(3) Measure the total indicator runout again. Mark the tire to indicate the high spot.

(4) If runout is still excessive (in excess of 1.524 mm or 0.060 in.), the following procedures must be done.

SERVICE PROCEDURES (Continued)

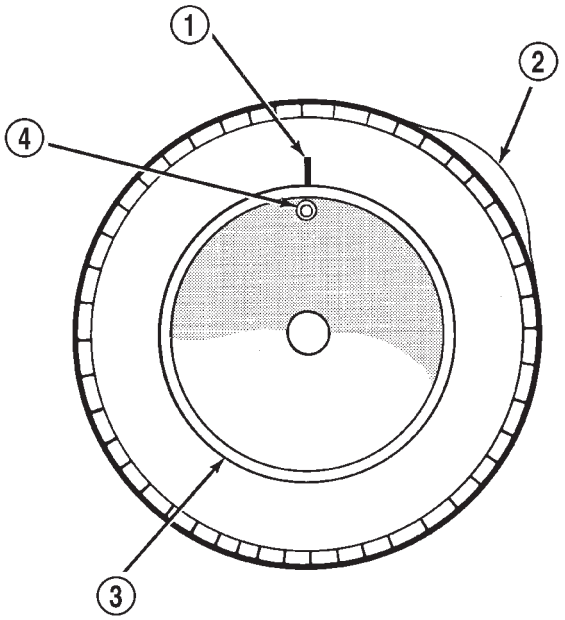


Fig. 8 First Measurement On Tire

1 – REFERENCE MARK
2 – 1ST MEASUREMENT HIGH SPOT MARK TIRE AND RIM
3 – WHEEL
4 – VALVE STEM

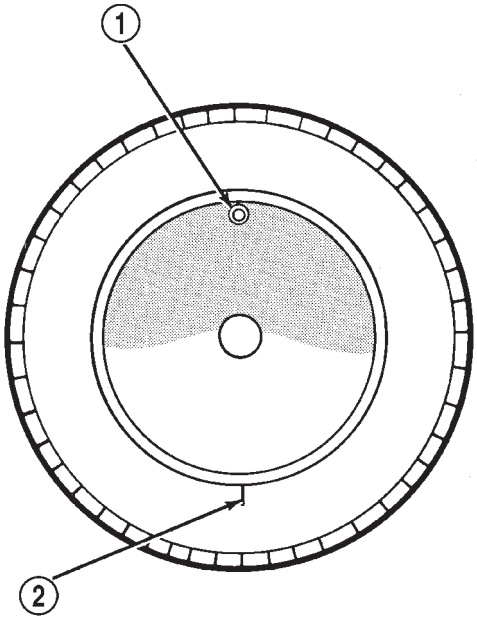


Fig. 9 Remount Tire 180 Degrees

1 – VALVE STEM
2 – REFERENCE MARK

- If the new high spot is within 102 mm (4.0 in.) of the first spot on the tire and is still excessive, replace the tire.
- If the new high spot is within 102 mm (4.0 in.) of the first spot on the wheel, the wheel may be out of specifications. Refer to Tire and Wheel Runout.
- If the new high spot is NOT within 102 mm (4.0 in.) of either high spot, draw an arrow on the tread from new high spot to first. Break down the tire and remount it 90 degrees on rim in that direction (Fig. 10), then remeasure runout. This procedure will normally reduce the runout to an acceptable amount.

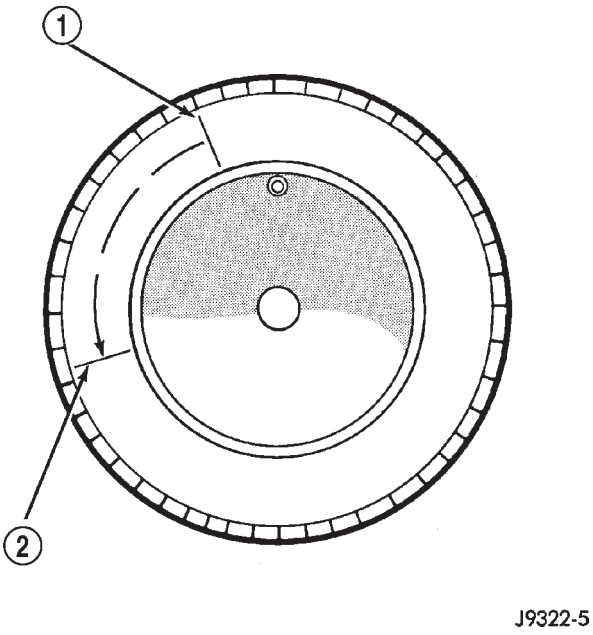


Fig. 10 Remount Tire 90 Degrees In Direction of Arrow

1 – 2ND HIGH SPOT ON TIRE
2 – 1ST HIGH SPOT ON TIRE

CLEANING AND INSPECTION

CLEANING TIRES

Remove the protective coating on the tires before delivery of a vehicle. This coating may cause deterioration of the tires.

To remove the protective coating, apply warm water and let it soak for a few minutes. Afterwards, scrub the coating away with a soft bristle brush. Steam cleaning may also be used to remove the coating.

NOTE: DO NOT use gasoline, mineral oil, oil-based solvent or a wire brush for cleaning.

WHEELS

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DESCRIPTION AND OPERATION

WHEEL

DESCRIPTION

Original equipment wheels are designed for proper operation at all loads up to the specified maximum vehicle capacity.

All models use steel or cast aluminum drop center wheels. Every wheel has raised sections between the rim flanges and rim drop well called safety humps (Fig. 1).

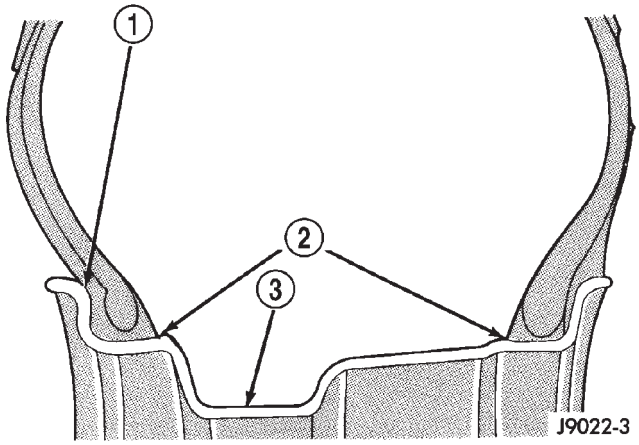


Fig. 1 Safety Rim

1 – FLANGE
2 – RIDGE
3 – WELL

Initial inflation of the tires forces the bead over these raised sections. In case of air loss the raised sections help hold the tire in position on the wheel until the vehicle can be brought to a safe stop.

Cast aluminum wheels require special balance weights to fit on the rim flange of the wheel and special wheel clamps for the alignment equipment.

The wheel studs and nuts are designed for specific wheel applications and must be replaced with equivalent parts. Do not use replacement parts of lesser quality or of a substitute design. All aluminum and some steel wheels have wheel stud nuts with an enlarged nose. This enlarged nose is necessary to ensure proper retention of the wheels.

Before installing a wheel, remove any buildup of corrosion on the wheel mounting surface.

WARNING: INSTALLING WHEELS WITHOUT GOOD METAL-TO-METAL CONTACT COULD CAUSE LOOSENING OF WHEEL LUG NUTS. THIS COULD ADVERSELY AFFECT THE SAFETY AND HANDLING OF YOUR VEHICLE.

WHEEL COVER (BOLT-ON)

DESCRIPTION

This vehicle uses a bolt-on type wheel cover (Fig. 2).

The wheel cover is bolted to the wheel using three of the five wheel nuts (Fig. 3).

This bolt-on wheel cover cannot be removed from the wheel until the three wheel nuts (Fig. 3) are removed. The bolt-on wheel cover can be removed with the remaining two wheel nuts remaining tightened.

DESCRIPTION AND OPERATION (Continued)

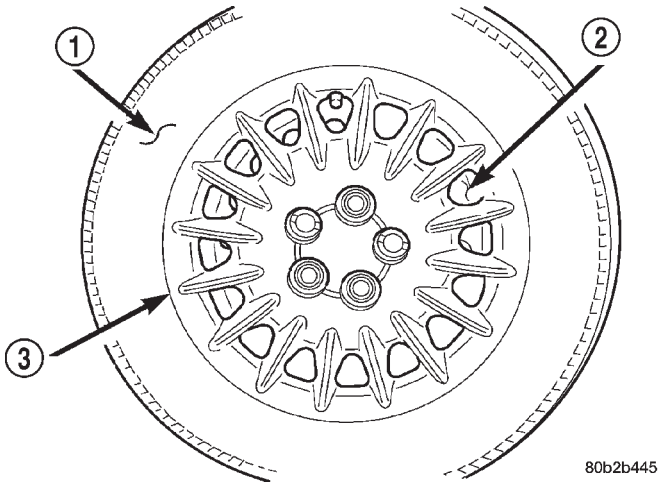


Fig. 2 Bolt-On Wheel Cover

1 – TIRE
2 – WHEEL
3 – BOLT-ON WHEEL COVER (TYPICAL)

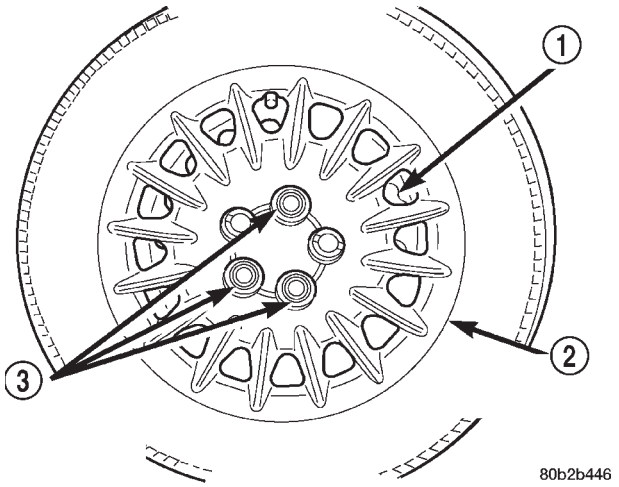


Fig. 3 Bolt-On Wheel Cover Retention To Wheel

1 – WHEEL
2 – BOLT-ON WHEEL COVER
3 – WHEEL COVER RETAINING WHEEL NUTS

DIAGNOSIS AND TESTING

WHEEL INSPECTION

Inspect wheels for:

- Excessive run out
- Dents or cracks
- Damaged wheel lug nut holes
- Air Leaks from any area or surface of the rim

NOTE: Do not attempt to repair a wheel by hammering, heating or welding.

If a wheel is damaged an original equipment replacement wheel should be used. When obtaining replacement wheels, they should be equivalent in load carrying capacity. The diameter, width, offset, pilot hole and bolt circle of the wheel should be the same as the original wheel.

WARNING: FAILURE TO USE EQUIVALENT REPLACEMENT WHEELS MAY ADVERSELY AFFECT THE SAFETY AND HANDLING OF THE VEHICLE. USED WHEELS ARE NOT RECOMMENDED. THE SERVICE HISTORY OF THE WHEEL MAY HAVE INCLUDED SEVERE TREATMENT OR VERY HIGH MILEAGE. THE RIM COULD FAIL WITHOUT WARNING.

TIRE AND WHEEL RUNOUT

Radial run out is the vertical distance between the high and low points on the tire or wheel edge.

Lateral run out is the horizontal movement of the tire or wheel.

Radial run out of more than 1.524 mm (.060 inch) measured at the center line of the tread may cause the vehicle to shake.

Lateral run out of more than 2.032 mm (.080 inch) measured near the shoulder of the tire may cause the vehicle to shake.

Runout should always be measured off the vehicle and on a suitable balance machine.

Usually radial run out can be reduced by relocating the wheel and tire on the wheel studs (See Method 1). If this does not reduce run out to an acceptable level, the tire can be rotated on the wheel. (See Method 2).

METHOD 1 (RELOCATE WHEEL ON HUB)

Check accuracy of the wheel mounting surface; adjust wheel bearings.

Drive vehicle a short distance to eliminate tire flat spotting from a parked position.

Verify all wheel nuts are properly torqued (Fig. 4).

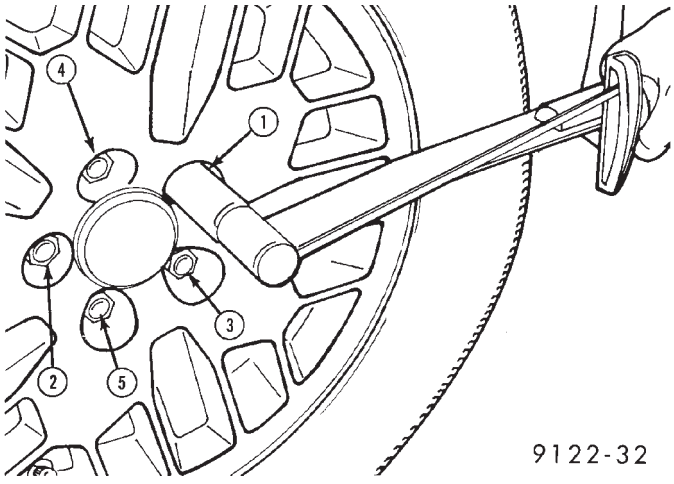


Fig. 4 Tightening Wheel Nuts

DIAGNOSIS AND TESTING (Continued)

Use run out gauge D-128-TR to determine run out (Fig. 5).

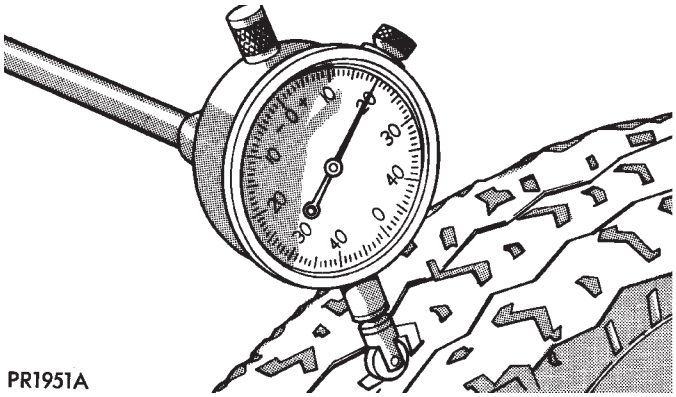


Fig. 5 Run Out Gauge

Relocate wheel on the mounting, two studs over from the original position.

Retighten wheel nuts until all are properly torqued. This will prevent brake distortion.

Check the radial run out of the wheel. If still excessive, mark tire sidewall, wheel, and stud at point of maximum run out (Fig. 6) and proceed to Method 2.

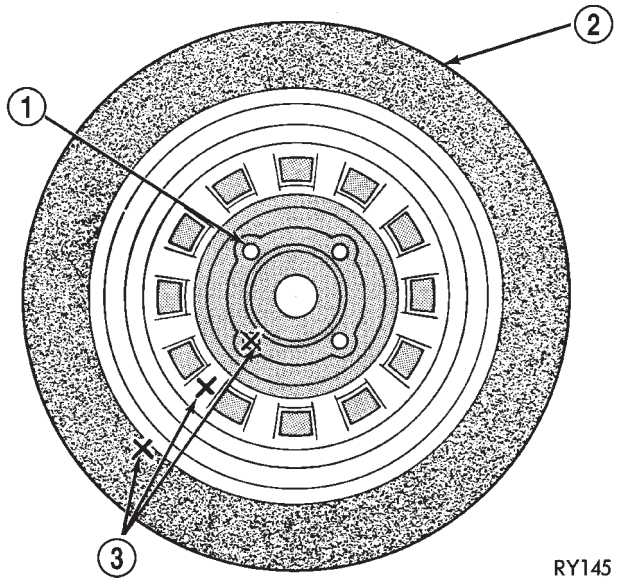


Fig. 6 Chalk Marking On Wheel, Tire And Stud

1 – STUD
2 – TIRE
3 – CHALK MARK LOCATIONS

METHOD 2 (RELOCATE TIRE ON WHEEL)

Rotating tire on wheel is particularly effective when there is run out in both tire and wheel.

Remove tire from wheel and remount wheel on hub in former position.

Check the radial run out of the wheel (Fig. 7). The radial run out of the wheel should be no more than 1.524 mm (0.060 inch).

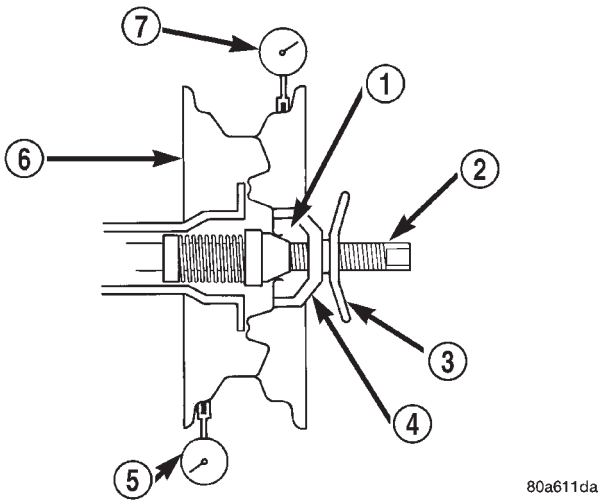


Fig. 7 Checking Radial Run Out Of Wheel

1 – MOUNTING CONE
2 – SPINDLE SHAFT
3 – WING NUT
4 – PLASTIC CUP
5 – DIAL INDICATOR
6 – WHEEL
7 – DIAL INDICATOR

Check the lateral run out of the wheel (Fig. 8). The lateral run out of the wheel should be no more than 0.762 mm (0.030 inch).

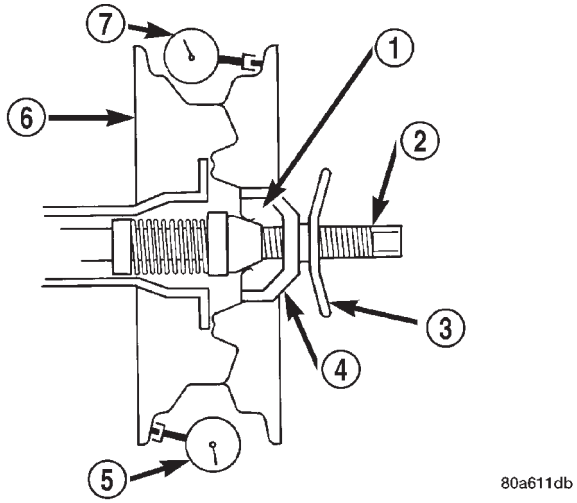


Fig. 8 Checking Lateral Run Out Of Wheel

1 – MOUNTING CONE
2 – SPINDLE SHAFT
3 – WING NUT
4 – PLASTIC CUP
5 – DIAL INDICATOR
6 – WHEEL
7 – DIAL INDICATOR

If point of the most wheel radial run out is near original chalk mark, remount tire 45 degrees from its original spot. Recheck run out.

SERVICE PROCEDURES

TIRE AND WHEEL BALANCE

This vehicle uses a styled wheel weight (Fig. 9). This wheel weight is designed to fit the contoured surface of the wheel (Fig. 9). When balancing, this wheel weight must be used. Do not use any other type of wheel weight. It will not properly fit the contour of the wheel.

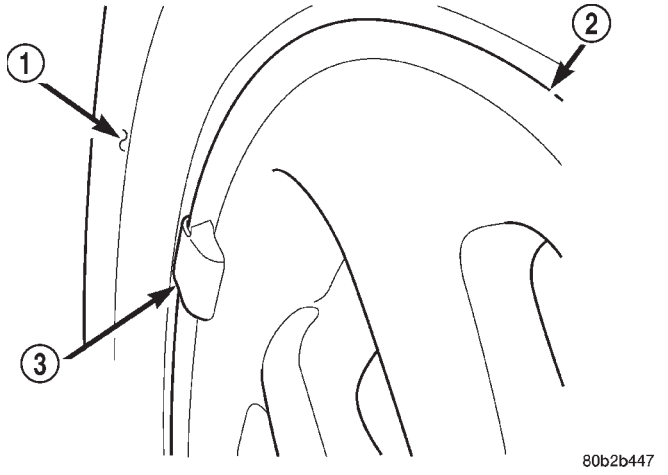


Fig. 9 Styled Wheel Weight

1 – TIRE
2 – WHEEL
3 – STYLED WHEEL WEIGHT

Balancing need is indicated by vibration of seats, floor pan, or steering wheel. The vibration will be noticed mostly when driving over 95 km/h (60 mph) on a smooth road.

It is recommended that a two plane dynamic balancer be used when a wheel and tire assembly require balancing. Static should be used only when a two plane balancer is not available.

For static imbalance, find location of heavy spot causing imbalance. Counter balance wheel directly opposite the heavy spot. Determine weight required to counterbalance the area of imbalance. Place half of this weight on the **inner** rim flange and the other half on the **outer** rim flange (Fig. 10) (Fig. 11). Off-vehicle balancing is necessary.

Wheel balancing can be accomplished with either on or off vehicle equipment. When using on-vehicle balancing equipment, remove the opposite wheel/tire.

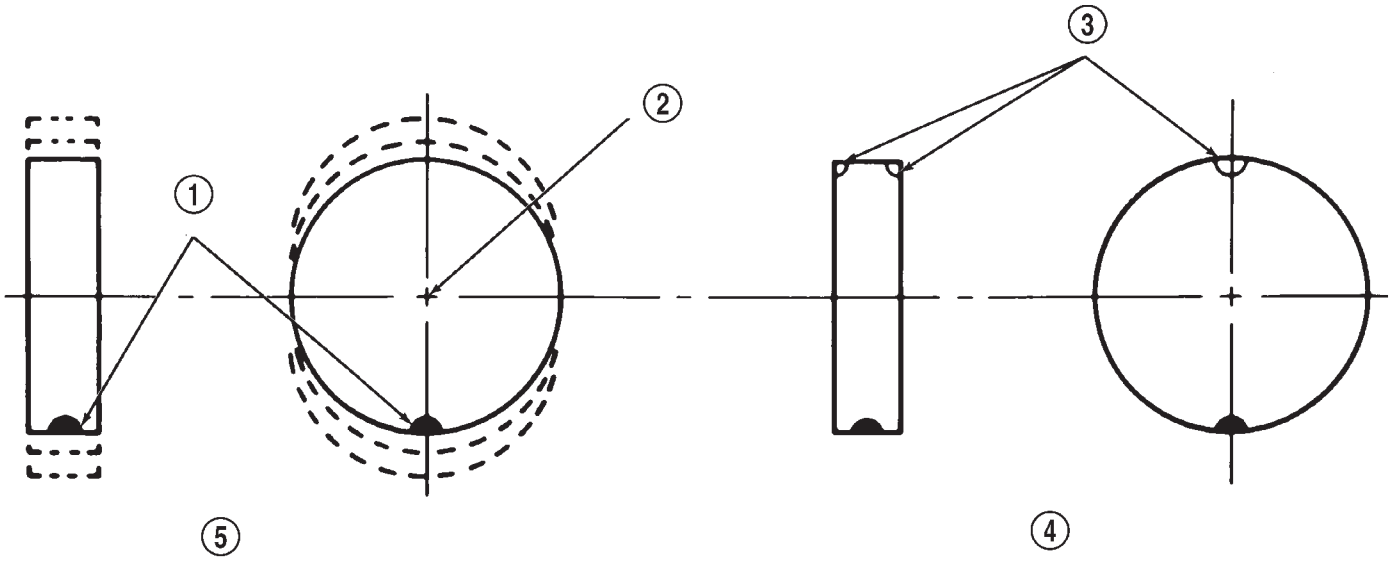


Fig. 10 Static Unbalance & Balance

1 – HEAVY SPOT
2 – CENTER LINE OF SPINDLE
3 – ADD BALANCE WEIGHTS HERE
4 – CORRECTIVE WEIGHT LOCATION
5 – TIRE OR WHEEL TRAMP, OR WHEEL HOP

SERVICE PROCEDURES (Continued)

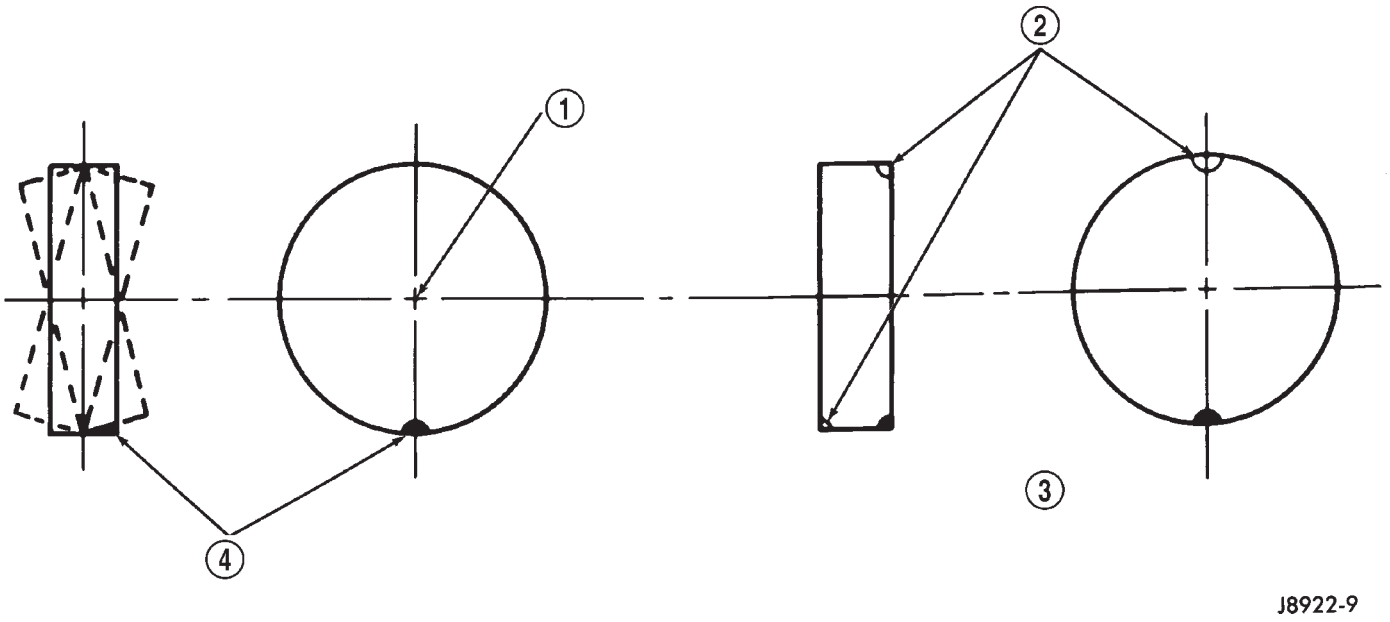


Fig. 11 Dynamic Unbalance & Balance

1 – CENTER LINE OF SPINDLE
2 – ADD BALANCE WEIGHTS HERE
3 – CORRECTIVE WEIGHT LOCATION
4 – HEAVY SPOT WHEEL SHIMMY AND VIBRATION

REMOVAL AND INSTALLATION

WHEEL COVER (BOLT-ON)

REMOVE

(1) Remove the three wheel nuts, (Fig. 12) used to lock the wheel cover to the wheel.

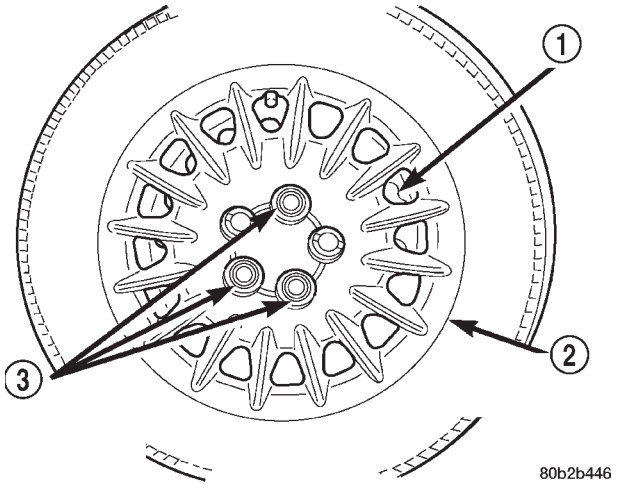


Fig. 12 Wheel Cover Locking Nuts

1 – WHEEL
2 – BOLT-ON WHEEL COVER
3 – WHEEL COVER RETAINING WHEEL NUTS

CAUTION: When removing the wheel cover, do not pry the wheel cover from the wheel. This can result in damage to the wheel cover. The wheel cover is removed by pulling it off the wheel by hand.

(2) Grasp the wheel cover at the edges in line with the remaining installed wheel nuts and pull straight outward from the wheel. This will pop the wheel cover retaining tabs (Fig. 13) over the two remaining wheel nuts, removing the wheel cover from the wheel.

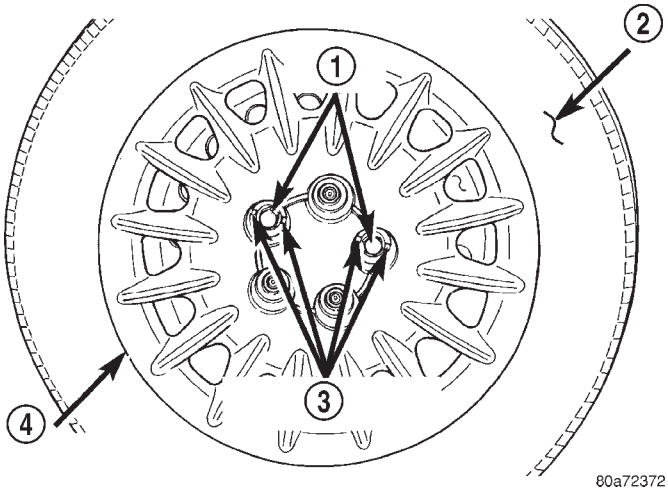


Fig. 13 Wheel Cover Retaining Tabs

1 – WHEEL NUTS
2 – TIRE
3 – WHEEL COVER RETAINING TABS
4 – WHEEL COVER

REMOVAL AND INSTALLATION (Continued)

INSTALL

NOTE: The 2 wheel nuts must be installed on the studs shown to allow the installation of the wheel cover (Fig. 14).

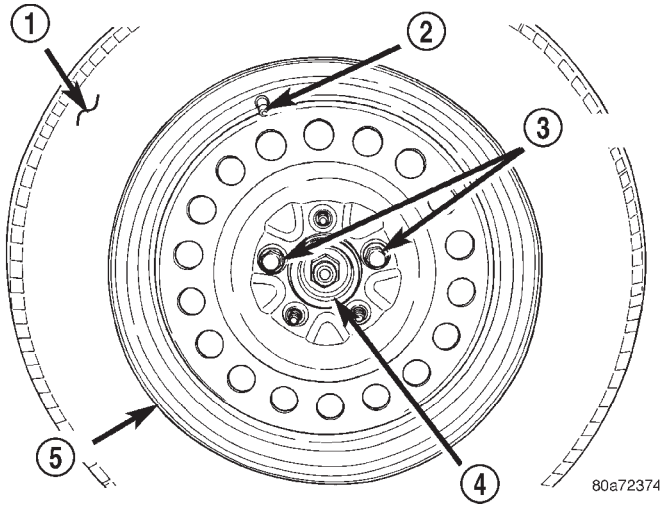


Fig. 14 Wheel Nuts

1 – TIRE
2 – VALVE STEM
3 – WHEEL NUTS
4 – HUB
5 – WHEEL

(1) Align the valve notch in the wheel cover with the valve stem on the wheel (Fig. 15). Align the two holes in the wheel cover having the retaining tabs, with the two installed and properly tightened wheel nuts (Fig. 15).

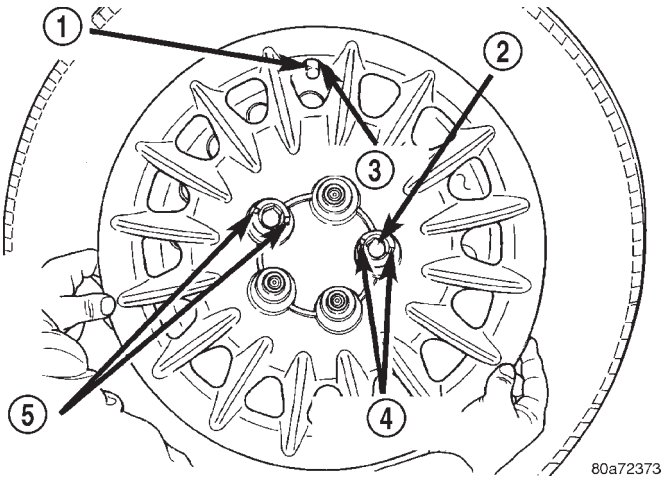


Fig. 15 Wheel Cover Installation Position

1 – VALVE STEM
2 – WHEEL NUT
3 – NOTCH
4 – RETAINING TABS
5 – RETAINING TABS

(2) Press in on center of wheel cover until retaining tabs on wheel cover engage with wheel nuts. This will hold the wheel cover to the wheel.

(3) Install the three remaining wheel nuts.

(4) Tighten all 5 wheel nuts to a torque of 135 N·m (100 ft. lbs.).

TIRE AND WHEEL ASSEMBLY

ALUMINUM WHEEL

REMOVAL

(1) Raise the vehicle so the tire and wheel assembly clears ground level.

(2) Remove the 5 wheel mounting nuts from the studs.

(3) Remove the tire and wheel from the hub.

INSTALLATION

NOTE: Never use oil or grease on studs or wheel mounting nuts.

(1) To install the wheel, first position it properly on the hub mounting surface using the hub pilot as a guide. Loosely install all 5 wheel mounting nuts. All wheel nuts should then be tightened just snug. Next, progressively tighten them in the proper sequence (Fig. 16). Finally, tighten wheel mounting nuts to 135 N·m (100 ft. lbs.).

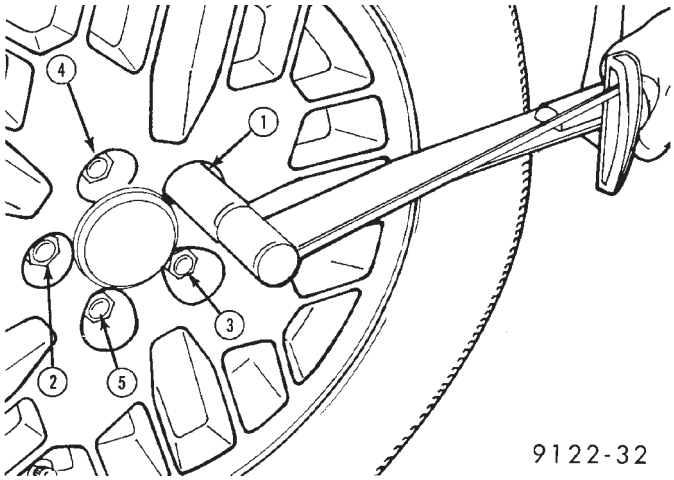


Fig. 16 Tightening Wheel Nuts

(2) Lower the vehicle.

STEEL WHEEL

REMOVAL

(1) Raise the vehicle so the tire and wheel assembly clears ground level.

(2) Remove the three wheel nuts, (Fig. 17) used to lock the wheel cover to the wheel.

REMOVAL AND INSTALLATION (Continued)

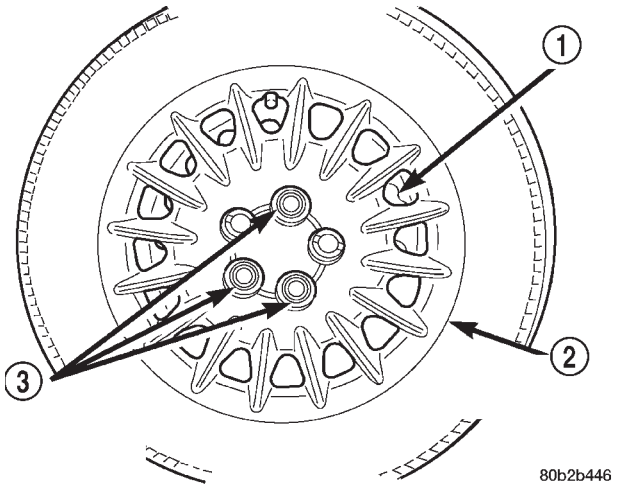


Fig. 17 Wheel Cover Retaining Nuts

1 – WHEEL
2 – BOLT-ON WHEEL COVER
3 – WHEEL COVER RETAINING WHEEL NUTS

CAUTION: When removing the wheel cover, do not pry the wheel cover from the wheel. This can result in damage to the wheel cover. The wheel cover is removed by pulling it off the wheel by hand.

(3) Grasp the wheel cover at the edges in line with the remaining installed wheel nuts and pull straight outward from the wheel. This will pop the wheel cover retaining tabs (Fig. 18) over the two remaining wheel nuts, removing the wheel cover from the wheel.

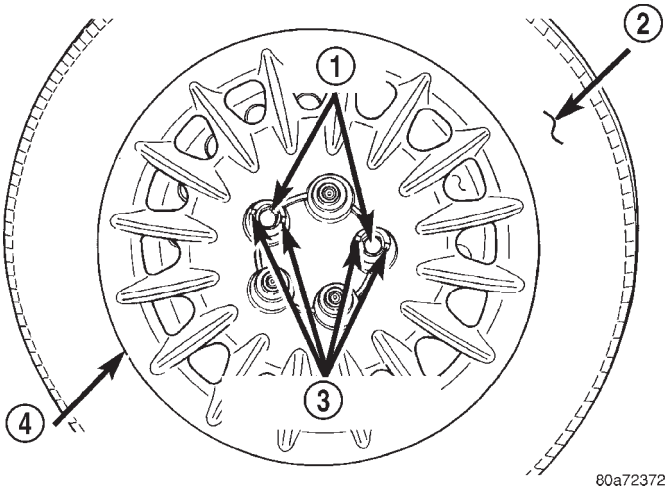


Fig. 18 Wheel Cover Retaining Tabs

1 – WHEEL NUTS
2 – TIRE
3 – WHEEL COVER RETAINING TABS
4 – WHEEL COVER

(4) Remove the two remaining wheel nuts from the studs.

(5) Remove the wheel and tire from the hub.

INSTALLATION

NOTE: The wheel nuts must be installed on the studs shown in (Fig. 19) to allow the installation of the wheel cover.

NOTE: Never use oil or grease on studs or wheel mounting nuts.

(1) To install the wheel, first position it properly on the hub mounting surface using the hub pilot as a guide. Then install and **lightly tighten** the 2 wheel nuts on the studs as shown in (Fig. 19) holding the wheel to the hub.

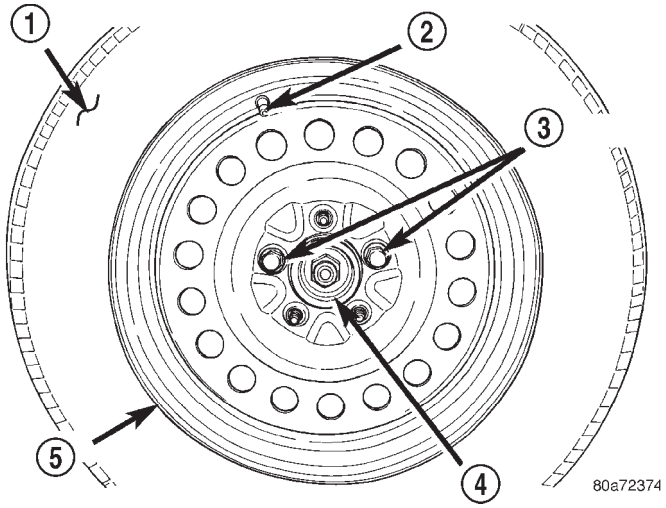


Fig. 19 Wheel Installation

1 – TIRE
2 – VALVE STEM
3 – WHEEL NUTS
4 – HUB
5 – WHEEL

REMOVAL AND INSTALLATION (Continued)

(2) Align the valve notch in the wheel cover with the valve stem on the wheel (Fig. 20). Align the two holes in the wheel cover having the retaining tabs, with the two installed wheel nuts (Fig. 20).

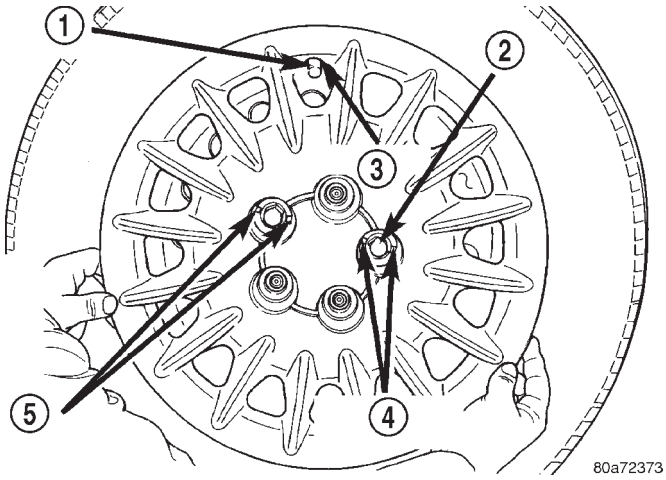


Fig. 20 Wheel Cover Installation Position

1 – VALVE STEM
2 – WHEEL NUT
3 – NOTCH
4 – RETAINING TABS
5 – RETAINING TABS

(3) Press in on center of wheel cover until retaining tabs on wheel cover engage with wheel nuts. This will hold the wheel cover to the wheel.

(4) Install the three remaining wheel nuts (Fig. 17).

(5) Progressively tighten the 5 wheel nuts in the proper sequence (Fig. 21). Tighten wheel nuts to 135 N·m (100 ft. lbs.).

(6) Lower the vehicle.

CLEANING AND INSPECTION

ALUMINUM WHEEL CARE

Chrome plated and painted aluminum wheels should be cleaned regularly using mild soap and water to maintain their luster and to prevent corrosion.

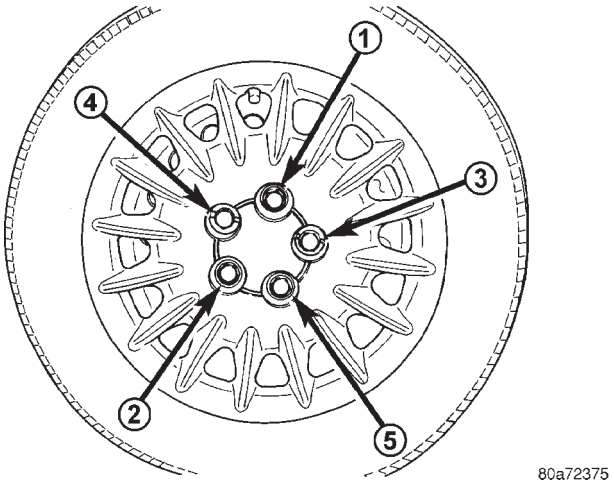


Fig. 21 Wheel Nut Tightening Sequence

Care must be taken in the selection of tire and wheel cleaning chemicals and equipment to prevent damage to the wheels. Any of the “DO NOT USE” items listed below WILL damage chrome plated and painted aluminum wheels.

DO NOT USE:

- any abrasive metal cleaner
- any abrasive cleaning pad or brush
- any cleaner that contains an acid (this will immediately react with and discolor the chromium surface)
- chrome polish (unless it is buffed off immediately after application)
- oven cleaner
- a car wash that uses carbide-tipped wheel cleaning brushes

SPECIFICATIONS

WHEEL SPECIFICATIONS

Wheel:

Mounting Stud Size . . . . . M12 x 1.5mm
Mounting Stud Lug Nut Hex Size 19mm
Wheel Mounting (Lug)
Nut Tightening Torque . . . 135 N·m (100 ft. lbs.)

BODY

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BODY SYSTEMS

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DESCRIPTION AND OPERATION

VEHICLE IDENTIFICATION

DESCRIPTION

Throughout this group, references to the Daimler-Chrysler Corporation vehicle family identification code are used when describing a procedure that is unique to that vehicle. Refer to Introduction Group of this manual for detailed information on vehicle identification. If a procedure is common to all vehicles covered in this manual, no reference will be made to a vehicle family code.

VEHICLE IDENTIFICATION

DESCRIPTION

DaimlerChrysler Corporation uses many different types of push-in fasteners to secure the interior and exterior trim to the body. Most of these fasteners can be reused to assemble the trim during various repair procedures. At times, a push-in fastener cannot be removed without damaging the fastener or the component it is holding. If it is not possible to remove a fastener without damaging a component or body, cut or break the fastener and use a new one when installing the component. Never pry or pound on a plastic or pressed-board trim component. Using a suitable fork-type prying device, pry the fastener from the retaining hole behind the component being removed. When installing, verify fastener alignment with the retaining hole by hand. Push directly on or over the fastener until it seats. Apply a low-force pull to the panel to verify that it is secure.

When it is necessary to remove components to service another, it should not be necessary to apply excessive force or bend a component to remove it. Before damaging a trim component, verify hidden fasteners or captured edges holding the component in place.

SAFETY PRECAUTIONS AND WARNINGS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING GLASS COMPONENTS. PERSONAL INJURY CAN RESULT.

USE A OSHA APPROVED BREATHING FILTER WHEN SPRAYING PAINT OR SOLVENTS IN A CONFINED AREA. PERSONAL INJURY CAN RESULT.

AVOID PROLONGED SKIN CONTACT WITH PETROLEUM OR ALCOHOL BASED CLEANING SOLVENTS. PERSONAL INJURY CAN RESULT.

DO NOT STAND UNDER A HOISTED VEHICLE THAT IS NOT PROPERLY SUPPORTED ON SAFETY STANDS. PERSONAL INJURY CAN RESULT.

DESCRIPTION AND OPERATION (Continued)

CAUTION: When holes must be drilled or punched in an inner body panel, verify depth of space to the outer body panel, electrical wiring, or other components. Damage to vehicle can result.

Do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Fire or hazardous conditions, can result.

Always have a fire extinguisher ready for use when welding.

Disconnect the negative battery cable clamp when servicing electrical components that are live when the ignition is OFF. Damage to electrical system can result.

Do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.

Do not use harsh alkaline based cleaning solvents on painted or upholstered surfaces. Damage to finish or color can result.

Do not hammer or pound on plastic trim panel when servicing interior trim. Plastic panels can break.

BODY COMPONENTS

PAINT

DESCRIPTION

The original equipment finish is a multi-step process that involves cleaning, electrodeposition (e-coat), base coat, and clear coat steps. Additionally, selected areas of the vehicle may be coated with an anti-chip finish.

OPERATION

On most vehicles a two-stage paint application (base coat/clear coat) is used. Color that is applied to primer is called base coat. The clear coat protects the base coat from ultraviolet light and provides a durable high-gloss finish.

STATIONARY GLASS

DESCRIPTION

Windshields and selected stationary glass are structural members of the vehicle. The windshield glass is bonded to the windshield frame with urethane adhesive.

OPERATION

Windshields are made of two pieces of glass with a plastic inner layer. Windshields and other stationary glass protect the occupants from the effects of the elements. Windshields are also used to retain some airbags in position during deployment. Urethane bonded glass is difficult to salvage during removal. The urethane bonding is difficult to cut or clean from any surface. Before removing the glass, check the availability of replacement components.

SEATS

DESCRIPTION

Seat modules are made up of a seat frame, seat cushion, seat back cushion, a covering material, and the electrical components used for power operation, if equipped. Some seat systems also contain seat belt components and supplemental restraint systems.

OPERATION

Seat assemblies transport the occupants in comfort and safety. Seat assemblies also help position occupants correctly in the event of airbag deployment. Seat cushions, coverings, and electrical components are serviceable. Refer to the appropriate group in this manual.

EXTERIOR COMPONENTS

DESCRIPTION

Exterior sheet metal components make up the exterior of the vehicle. Some exterior metal systems are welded assemblies, such as doors and hoods. Some exterior trim items are made of composite.

OPERATION

The exterior is finished in various metal stampings and composite moldings. These assemblies give the vehicle a finished appearance and protect the occupants from the elements. Some components are part of the energy absorbing system used to protect the occupants in collisions. The exterior sheet metal is repairable and adjustable for fit and finish. Welded component systems are adjustable as a system. Trim components made of composite are stamped with the type of material used. DaimlerChrysler uses various fasteners to retain trim items. At times, it is not possible to remove trim items without damaging the fastener. If it is not possible to remove an item without damaging a component, cut or break the fasteners and use new ones when installing the component.

DOOR COMPONENTS

The front and rear door on all LH models require the same basic service procedures regardless of door trim configuration. The art used in this section is typical and features only one of the current production models.

DESCRIPTION AND OPERATION (Continued)

SUNROOF OPERATION

DESCRIPTION

WARNING: Keep fingers and other body parts out of sunroof opening at all times.

The sunroof features a power sliding glass panel and a sunshade which can be manually positioned anywhere along its travel, rearward of glass panel front edge.

OPERATION

The sunroof is electrically operated from a two switches located on the windshield header, rearward of the map lamp. To operate the sunroof the ignition switch must be in the On/Run position. One switch (CLOSE) is a push button type and used too close the sunroof. Pressing and holding the CLOSE button, the sunroof will fully close. If the CLOSE button is released prior to the sunroof reaching the fully closed position, the sunroof will stop in that position. The other switch (OPEN/VENT) is a rocker type for opening and venting the sunroof. Pressing and releasing the OPEN button once the sunroof will express open and the wind deflector will raise. If the button is pressed a second time the sunroof will stop in that position. To open the sunroof from the vent position, push and hold the open button. The sunroof will not express open until you have passed through the full closed position. The OPEN button may be released and the sunroof will continue to open in the express open feature. If the VENT button is pressed and held while the sunroof is in the open position, the sunroof will travel to the close position and then to the vent position. Releasing the button at anytime during the travel will cause the sunroof to stop at that current position.

PAINT

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DESCRIPTION AND OPERATION

PAINT CODE

DESCRIPTION

Exterior vehicle body colors are identified on the Body Code plate. The plate is located on the in the engine compartment and attached to the top of the right frame rail. Refer to the Introduction section at the front of this manual for body code plate description. The paint code is also identified on the Vehicle Safety Certification Label which is located on the drivers door shut face. The first digit of the paint code listed on the vehicle indicates the sequence of application, i.e.: P = primary coat, Q = secondary coat. The codes listed in the Aftermarket Paint Repair Products chart are used for manufacturing purposes. The first digit may vary from the Body Code Plate. The color names provided in the Aftermarket Paint Repair Products chart are the color names used on most repair product containers.

BASE COAT/CLEAR COAT FINISH

On most vehicles a two-part paint application (base coat/clear coat) is used. Color paint that is applied to primer is called base coat. The clear coat protects the base coat from ultraviolet light and provides a durable high-gloss finish.

FINESSE SANDING, BUFFING, AND POLISHING

Minor acid etching, orange peel, or smudging in clear coat or single-stage finishes can be reduced with light finesse sanding, hand buffing, and polishing. **If the finish has been finesse sanded in the past, it cannot be repeated. Finesse sanding operation should be performed by a trained automotive paint technician.**

CAUTION: Do not remove clear coat finish, if equipped. Base coat paint must retain clear coat for durability.

PAINTED SURFACE TOUCH-UP

When a painted metal surface has been scratched or chipped, it should be touched-up as soon as possible to avoid corrosion. For best results, use Mopar® Scratch Filler/Primer, Touch-Up Paints and Clear Top Coat. Refer to Introduction group of this manual for Body Code Plate information.

TOUCH-UP PROCEDURE

(1) Scrape loose paint and corrosion from inside scratch or chip.

(2) Clean affected area with Mopar® Tar/Road Oil Remover, and allow to dry.

(3) Fill the inside of the scratch or chip with a coat of filler/primer. Do not overlap primer onto good surface finish. The applicator brush should be wet enough to puddle-fill the defect without running. Do not stroke brush applicator on body surface. Allow the filler/primer to dry hard.

(4) Cover the filler/primer with color touch-up paint. Do not overlap touch-up color onto the original color coat around the scratch or chip. Butt the new color to the original color, if possible. Do not stroke applicator brush on body surface. Allow touch-up paint to dry hard.

(5) On vehicles without clear coat, the touch-up color can be lightly wet sanded (1500 grit) and polished with rubbing compound.

(6) On vehicles with clear coat, apply clear top coat to touch-up paint with the same technique as described in Step 4. Allow clear top coat to dry hard. If desired, Step 5 can be performed on clear top coat.

DESCRIPTION AND OPERATION (Continued)

AFTER MARKET PAINT REPAIR PRODUCTS

EXTERIOR COLORS

EXTERIOR COLOR	DAIMLER CHRYSLER CODE	PPG	DuPONT	S-W M-S **	AKZO NOBEL SIKKENS	SPIES HECKER	ICI **
Bright Silver Metallic Clear Coat	WS2	5464	F7999	56150	CHA99:WS2	74611	KDP8B
Champagne Pearl Metallic Clear Coat	VTE	5360	B9825	54835 557700	CHA98:VTE	80759	JAF2B
Cinnamon Glaze Metallic Clear Coat	VLB	5313	B9824	54469	CHA98:VLB	80758	HMT2B
Dark Garnet Red Pearl Coat	XRV	5591	M0405	59308	CHA00:XRV	34983	PXD3B
Deep Slate Pearl Coat	VAW	5292	B9774	54118	CHA97:VAW	73719	HMR3B
Inferno Red Tinted Pearl Coat	WEL	5469 5470	B9843	56090	CHA99:WEL	34461	KDR5B
Light Cypress Green Pearl Coat	WG2	5471	B9843	56090	CHA99:WG2	65521	KDH3B
Shale Green Metallic Clear Coat	XGR	5577	F9239	57765	CHA00:XGR	66088	PVJ8B
Steel Blue Pearl Coat	XBQ	5576	F9239	57772	CHA00:XBQ	59675	NGA5B
Stone White Clear Coat	SW1	83542	B9622	51539	CHA96:SW1	15069	8KY5B

*BASF, Glasurit, Herberts and Standox use the DaimlerChrysler paint codes. **S-W = Sherwin-Williams, M-S = Martin Senour, ICI = Autocolor

DESCRIPTION AND OPERATION (Continued)

LOWER BODY APPLIQUE COLORS

LOWER BODY SIDE APPLIQUE COLOR	DAIMLER CHRYSLER CODE	PPG	DUPONT	M-S S-W **	AKZO NOBEL SIKKENS	SPIES HECKER	ICI **
Bright Silver Metallic Clear Coat	WS2	5464	F7999	56150	CHA99:WS2	74611	KDP8B
Champagne Pearl Metallic Pearl Coat	VTE	5360	B9825	54835 557700	CHA98:VTE	80759	JAF2B
Cinnamon Glaze Metallic Clear Coat	VLB	5313	B9824	54469	CHA98:VLB	80758	
Dark Garnet Red Pearl Coat	XRV	5591	MO4O5	59308	CHA00:XRV	34983	PXD3B
Deep Slate Pearl Coat	VAW	5292	B9774	54118	CHA97:VAW	73719	HMR3B
Inferno Red Pearl Coat	WEL	5469 5470	B9 843	56090	CHA99:WEL	34461	KDR5B
Light Cypress Green Pearl Coat	WG2	5471	B9843	56090	CHA99:WG2	65521	KDH3B
Shale Green Metallic Clear Coat	XGR	5577	F9239	57765	CHA00:XGR	66088	PVJ8B
Steel Blue Pearl Coat	XBQ	5579	F9243	57761	CHA00:XBQ	59675	NGA5B
Stone White Clear Coat	SW1	83542	B9622	51539	CHA96:SW1	15069	8KY3B

INTERIOR COLORS

INTERIOR COLOR	DAIMLER CHRYSLER CODE	PPG	DuPONT	S-W M-S **	AKZO NOBEL SIKKENS	SPIES HECKER	ICI **
Agate	AZ	9856 2-1461	C9208	45994	CHLAZI	75016	7WC8
Camel	K9	28589 2-1647	C9846	55935	CHAVK9I	81849	K5/K9
Light Neutral / Dark Tan F1/K9	FK	28594 2-1648	C9499	56173	CHAMF1I		FOK2
		28589 2-1647	C9846	55935	CHAVK9I	81849	KGC6
Quartz	D5	34618 2-1346	C8904	40075	CHAHD5I	74538	4PE6

STATIONARY GLASS

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DESCRIPTION AND OPERATION

WINDSHIELD SAFETY PRECAUTIONS

DESCRIPTION

WARNING: DO NOT OPERATE THE VEHICLE WITHIN 24 HOURS OF WINDSHIELD INSTALLATION. IT TAKES AT LEAST 24 HOURS FOR URETHANE ADHESIVE TO CURE. IF IT IS NOT CURED, THE WINDSHIELD MAY NOT PERFORM PROPERLY IN AN ACCIDENT.

URETHANE ADHESIVES ARE APPLIED AS A SYSTEM. USE GLASS CLEANER, GLASS PREP SOLVENT, GLASS PRIMER, PVC (VINYL) PRIMER AND PINCH WELD (FENCE) PRIMER PROVIDED BY THE ADHESIVE MANUFACTURER. IF NOT, STRUCTURAL INTEGRITY COULD BE COMPROMISED.

DAIMLERCHRYSLER DOES NOT RECOMMEND GLASS ADHESIVE BY BRAND. TECHNICIANS SHOULD REVIEW PRODUCT LABELS AND TECHNICAL DATA SHEETS, AND USE ONLY ADHESIVES THAT THEIR MANUFACTURES WARRANT WILL RESTORE A VEHICLE TO THE REQUIREMENTS OF FMVSS 212. TECHNICIANS SHOULD ALSO INSURE THAT PRIMERS AND CLEANERS ARE COMPATIBLE WITH THE PARTICULAR ADHESIVE USED.

BE SURE TO REFER TO THE URETHANE MANUFACTURER'S DIRECTIONS FOR CURING TIME SPECIFICATIONS, AND DO NOT USE ADHESIVE AFTER ITS EXPIRATION DATE.

VAPORS THAT ARE EMITTED FROM THE URETHANE ADHESIVE OR PRIMER COULD CAUSE PERSONAL INJURY. USE THEM IN A WELL-VENTILATED AREA.

SKIN CONTACT WITH URETHANE ADHESIVE SHOULD BE AVOIDED. PERSONAL INJURY MAY RESULT.

ALWAYS WEAR EYE AND HAND PROTECTION WHEN WORKING WITH GLASS.

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

Be careful not to damage painted surfaces when removing moldings or cutting urethane around windshield.

OPERATION

The windshield is attached to the window frame with urethane adhesive. The urethane adhesive is applied cold and seals the surface area between the window opening and the glass. The primer adheres the urethane adhesive to the windshield.

It is difficult to salvage a windshield during the removal operation. The windshield is part of the structural support for the roof. The urethane bonding used to secure the windshield to the fence is difficult to cut or clean from any surface. If the moldings are set in urethane, it would also be unlikely they could be salvaged. Before removing the windshield, check the availability of the windshield and moldings from the parts supplier.

REMOVAL AND INSTALLATION

WINDSHIELD

The urethane adhesive holding the windshield to the opening pinch weld (fence) can be cut using a sharp cold knife from the exterior of the vehicle. Using the cold knife method is effective if the windshield is already broken. If the glass must be salvaged, cutting the urethane adhesive from the interior of the vehicle using a reciprocating or oscillating power knife is recommended.

REMOVAL

(1) Remove inside rear view mirror.

(2) Remove cowl cover. Refer to Cowl Cover Removal paragraph in this group.

(3) Remove drip rail weatherstrips as necessary to gain access to screws holding windshield side moldings (Fig. 1). Pull outward on molding at the bottom of A-pillars using pliers.

REMOVAL AND INSTALLATION (Continued)

(4) Cut urethane bonding from around windshield using a suitable sharp cold knife. A pneumatic cutting device can be used if available. (Fig. 2)

(5) Remove windshield from vehicle.

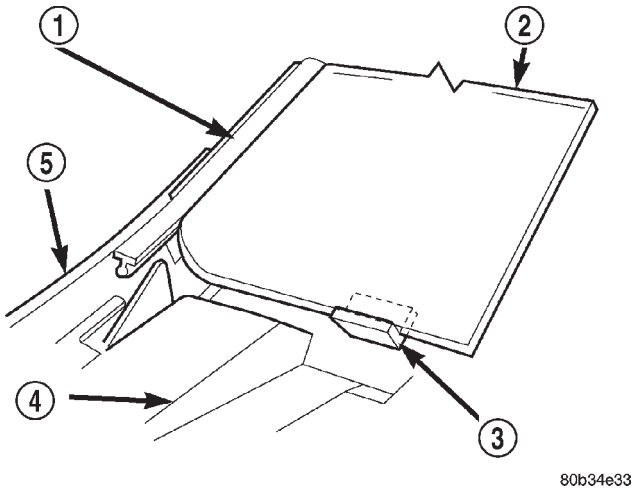


Fig. 1 Windshield Moldings

1 – MOLDING
2 – WINDSHIELD
3 – FOAM BLOCK
4 – COWL
5 – FENDER

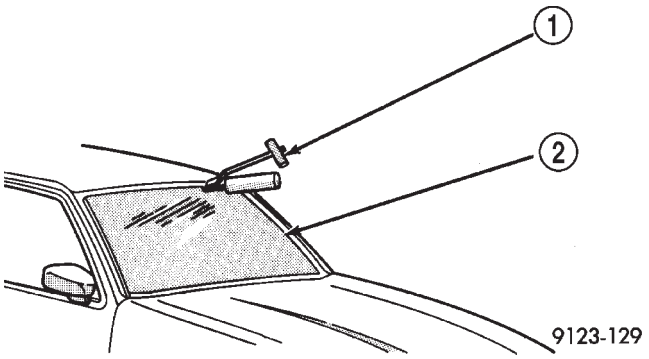


Fig. 2 Cut Urethane Around Windshield

1 – COLD KNIFE
2 – WINDSHIELD

INSTALLATION

CAUTION: Open the left front door glass before installing windshield to avoid pressurizing the passenger compartment, If a door is slammed before urethane bonding is cured, water leaks can result.

Allow the urethane at least 24 hours to cure before returning the vehicle to use.

To avoid stressing the replacement windshield, the urethane bonding material on the windshield fence should be smooth and consistent to the shape of the replacement windshield. The support spacers should be cleaned and properly installed on weld studs or repair screws at bottom of windshield opening.

(1) Place replacement windshield into position and center in the opening against the support spacers.

(2) Verify the glass lays evenly against the pinch weld fence at the sides, top and bottom of the replacement windshield. If not, the pinch weld fence must be formed to the shape of the new glass.

(3) Mark the glass at the support spacers with a grease pencil or pieces of masking tape and ink pen to use as a reference for installation (Fig. 3).

(4) Remove replacement windshield from windshield opening.

(5) Position the windshield inside up on a suitable work surface with two padded, wood 10 cm by 10 cm by 50 cm (4 in. by 4 in. by 20 in.) blocks, placed parallel 75 cm (2.5 ft.) apart (Fig. 4).

WARNING: DO NOT USE SOLVENT BASED GLASS CLEANER TO CLEAN WINDSHIELD BEFORE APPLYING GLASS PREP AND PRIMER. POOR ADHESION CAN RESULT.

(6) Clean inside of windshield with ammonia based glass cleaner and lint-free cloth.

(7) Apply molding to top edge of windshield.

(8) Apply Glass Prep adhesion promoter 25 mm (1 in.) wide around perimeter of windshield and wipe with clean/dry lint-free cloth until no streaks are visible.

(9) Apply Glass Primer 25 mm (1 in.) wide around perimeter of windshield. Allow at least three minutes drying time.

(10) Using a razor knife, remove as much original urethane as possible. Do not damage paint on windshield fence.

(11) Apply pinch weld primer 15 mm (.75 in.) wide around the windshield fence. Allow at least three minutes drying time.

(12) If a low viscosity urethane adhesive is used, install compression spacers on the fence around the windshield opening (Fig. 5).

(13) Apply a 10 mm (0.4 in.) bead of urethane along center line of windshield fence.

(14) With the aid of a helper, position the windshield over the windshield opening. Align the reference marks at the bottom of the windshield to the support spacers.

(15) Slowly lower windshield glass to windshield opening fence. Guide the molding into proper position as necessary. Push windshield inward molding is flush to roof line and A-pillars (Fig. 6).

(16) Clean excess urethane from exterior with Mopar® Super Kleen or equivalent.

REMOVAL AND INSTALLATION (Continued)

(17) Apply 150 mm (6 in.) lengths of 50 mm (2 in.) masking tape spaced 250 mm (10 in.) apart to hold molding in place until urethane cures.
(18) Install A-pillar moldings.
(19) Install cowl cover and wipers.
(20) Install inside rear view mirror.
(21) After urethane has cured, remove tape strips and water test windshield to verify repair.

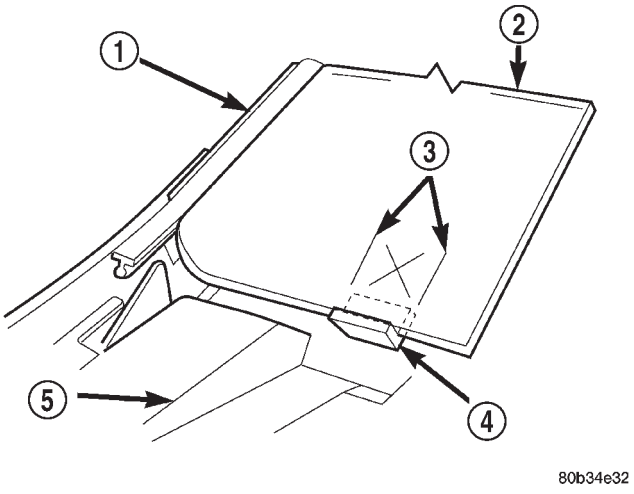


Fig. 3 Center Windshield and Mark at Support Spacers

1 – A-PILLAR
2 – WINDSHIELD
3 – MARKS
4 – FOAM BLOCK
5 – COWL

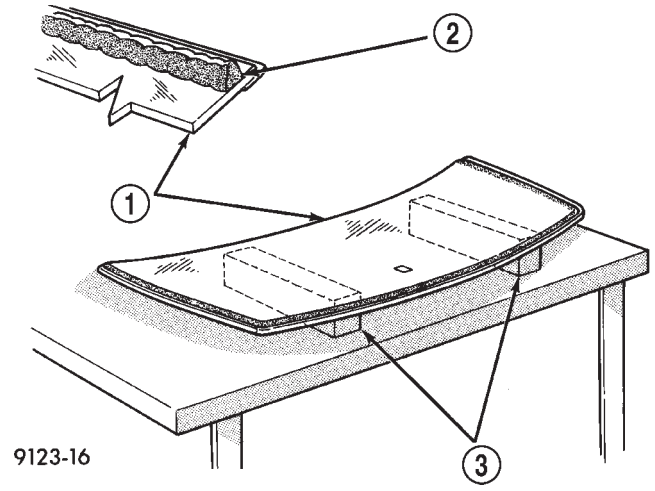


Fig. 4 Work Surface Set up and Molding Installation

1 – WINDSHIELD AND MOULDINGS
2 – URETHANE BEAD AROUND GLASS 7mm (.3 in.) FROM EDGE
3 – BLOCKS

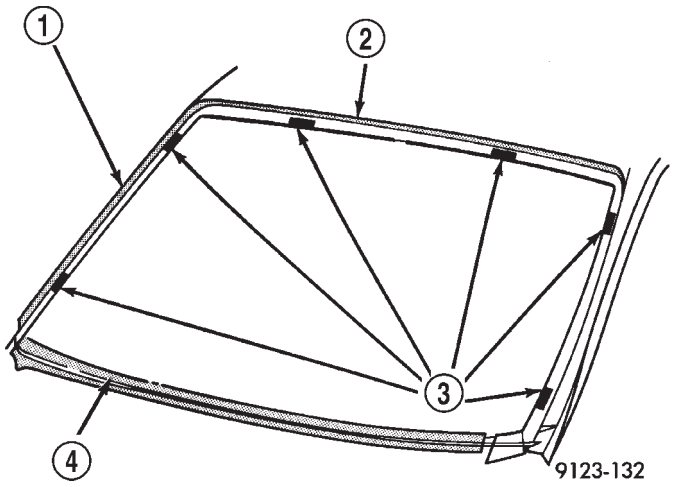


Fig. 5 Position Urethane Compression Spacers

1 – A-PILLAR
2 – ROOF PANEL
3 – SPACERS
4 – WINDSHIELD OPENING

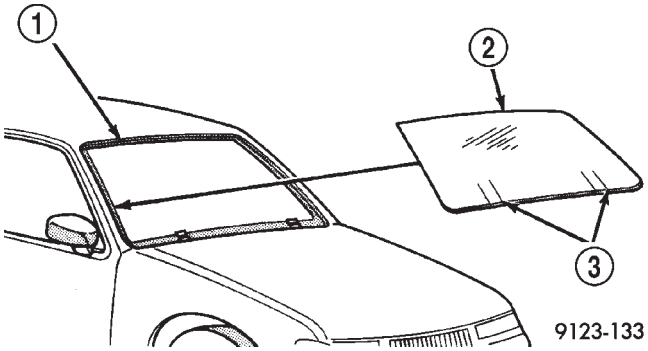


Fig. 6 Lower Windshield Into Position

1 – FENCE
2 – WINDSHIELD WITH URETHANE APPLIED
3 – REFERENCE MARKS

REAR WINDOW GLASS

WARNING: DO NOT OPERATE THE VEHICLE WITHIN 24 HOURS OF REAR WINDOW GLASS INSTALLATION. IT TAKES AT LEAST 24 HOURS FOR URETHANE ADHESIVE TO CURE. IF IT IS NOT CURED, THE REAR WINDOW GLASS MAY NOT PERFORM PROPERLY IN AN ACCIDENT. BE SURE TO REFER TO THE URETHANE MANUFACTURER'S DIRECTIONS FOR CURING TIME SPECIFICATIONS, AND DO NOT USE ADHESIVE AFTER ITS EXPIRATION DATE.

CAUTION: Open the left front door glass before installing the rear window to avoid pressurizing the passenger compartment if a door is slammed before the urethane bonding is fully cured. Water leaks can result

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove upper quarter trim panel.

(2) Disconnect the wire connectors from rear window defogger, and rear window mounted radio antenna, if so equipped.

WARNING: WEAR EYE AND HAND PROTECTION WHEN HANDLING SAFETY GLASS. PERSONAL INJURY CAN RESULT.

CAUTION: Do not damage body or trim finish when cutting out glass or applying fence primer.

(3) Cut the urethane around the perimeter of the rear window glass. Refer to Windshield section of this group for proper procedures.

(4) Remove the rear window from the vehicle.

INSTALLATION

WARNING: DO NOT USE SOLVENT BASED GLASS CLEANER TO CLEAN WINDSHIELD BEFORE APPLYING GLASS PREP AND PRIMER. POOR ADHESION CAN RESULT.

(1) Clean inside of rear window with ammonia based glass cleaner and lint-free cloth.

(2) Apply Glass Prep adhesion promoter 25 mm (1 in.) wide around perimeter of rear window encapsulation (not to the glass) and wipe with clean/dry lint-free cloth until no streaks are visible.

(3) Apply Glass Primer 25 mm (1 in.) wide around perimeter of rear window encapsulation (not to the glass). Allow at least three minutes drying time.

(4) Using a razor knife, remove as much original urethane as possible. Do not damage paint on rear window fence.

(5) Apply pinch weld primer 15 mm (.75 in.) wide around the rear window fence. Allow at least three minutes drying time.

(6) Apply a 10 mm (0.4 in.) bead of urethane to the encapsulation (Fig. 7).

(7) With the aid of a helper, position the rear window over the opening.

(8) Slowly lower rear window glass to the roof fence opening and engage over the two flanges located on the roof fence. Guide the encapsulation into proper position as necessary. Remove the backing paper from the tape on lower appendage and push rear window inward till flush to roof line and C-pillars (Intrepid).

(9) Clean excess urethane from exterior with Mopar® Super Kleen or equivalent.

(10) Connect rear window defogger wiring connector, and rear window mounted radio antenna connector, if so equipped.

(11) Install interior trim.

(12) After urethane has cured, water test rear window to verify repair. Verify rear window defogger operation, refer to Group 8N, Rear Window Defogger.

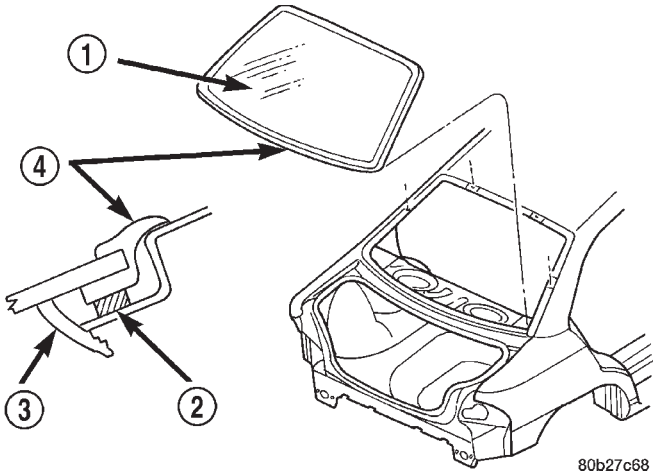


Fig. 7 Rear Window Glass – Typical

1 – REAR WINDOW GLASS
2 – URETHANE
3 – CLIP
4 – MOLDING

SEATS

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REMOVAL AND INSTALLATION

FRONT SEAT

REMOVAL

(1) Position seat far enough forward to gain access to rear mount bolts on floor.
(2) Remove bolts attaching rear of seat track to floor (Fig. 1).
(3) Move seat rearward.
(4) Remove bolts attaching front of the seat track to floor kick up.
(5) Disconnect front seat wire harness connector from body harness connector, if equipped.
(6) Remove front seat from vehicle.

INSTALLATION

NOTE: Ensure that the seat tracks are rearward

(1) Place front seat in position in vehicle.
(2) Connect front seat wire harness connector to body harness connector.
(3) Install bolts to attach front of seat track to the floor kick up. Tighten bolts to 61 N·m (45 ft. lbs.) torque.
(4) Move seat forward and install bolts attaching rear of seat track to the floor. Tighten bolts to 61 N·m (45 ft. lbs.) torque.
(5) Verify front seat operation.

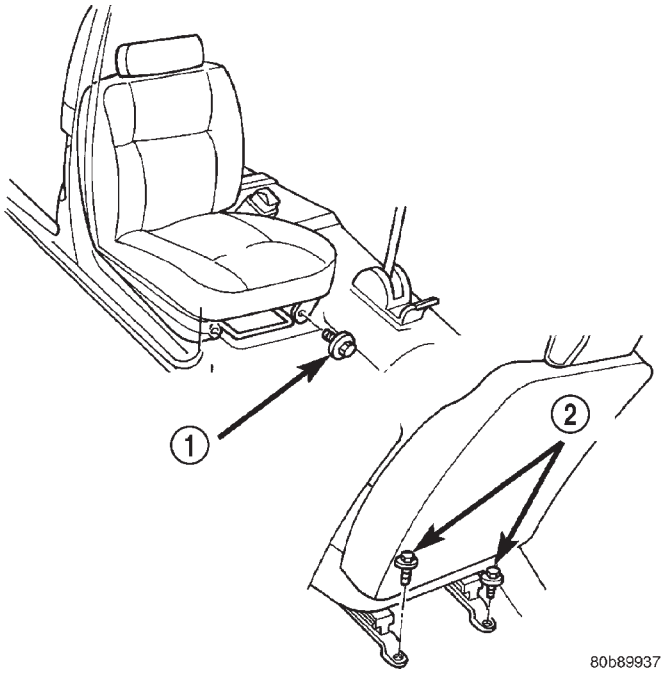


Fig. 1 Front Seat Removal

1 – FRONT BOLTS
2 – REAR BOLTS

FRONT SEAT CUSHION SIDE SHIELD

REMOVAL

(1) Remove seat from vehicle.
(2) Remove screws attaching seat cushion side shield to the bottom and side of seat cushion (Fig. 2) and (Fig. 3).
(3) Remove shield from seat
(4) Disconnect switch wire connectors, if equipped.
(5) Remove seat switches, if equipped.

INSTALLATION

(1) Transfer seat switches, if equipped.
(2) Connect switch wire connectors to cushion side shield, if equipped.

REMOVAL AND INSTALLATION (Continued)

(3) Place shield in position on seat cushion.
(4) Install screws attaching seat cushion side shield. Tighten screws in sequence refer to (Fig. 2).
(5) Install seat. Tighten front screws to 61 N·m (45 ft. lbs.) and the rear screws to 61 N·m (45 ft. lbs.).

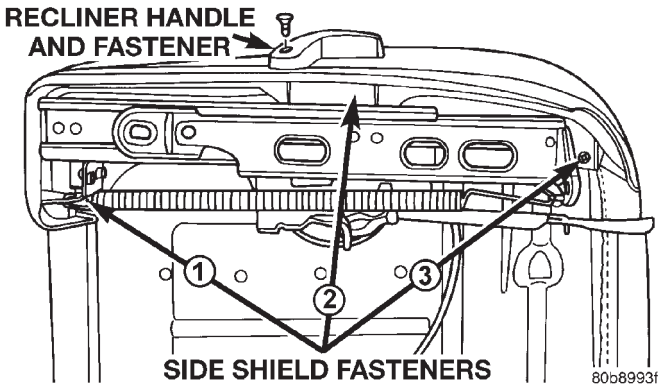


Fig. 2 Bottom View of Side Shield and Tightening Sequence

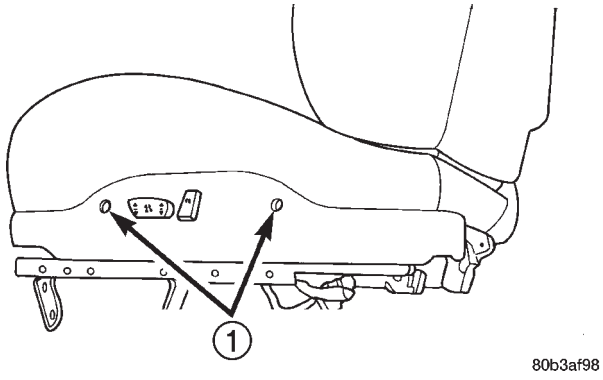


Fig. 3 Side View of Side Shield

1 – SIDESHIELD FASTENERS

FRONT SEAT CUSHION

REMOVAL

(1) Remove seat from vehicle.
(2) Remove front seat cushion side shields and disconnect wire connectors, if equipped.
(3) Remove seat back.
(4) Remove track and recliner assembly.
(5) Disconnect seat cushion heater element connector, if equipped.
(6) Disconnect wire harness fasteners from cushion frame (Fig. 4).
(7) Remove seat cushion (Fig. 5).

INSTALLATION

(1) Install wire harness fasteners to cushion frame.
(2) Connect seat cushion heater element connector, if equipped.
(3) Install track and recliner assembly.
(4) Install seat back. Tighten pivot bolts and recliner bolts to 8 N·m (71 in. lbs.) torque.
(5) Connect switch wire connectors to the cushion side shield, if equipped.
(6) Install cushion side shields.
(7) Install seat in vehicle.

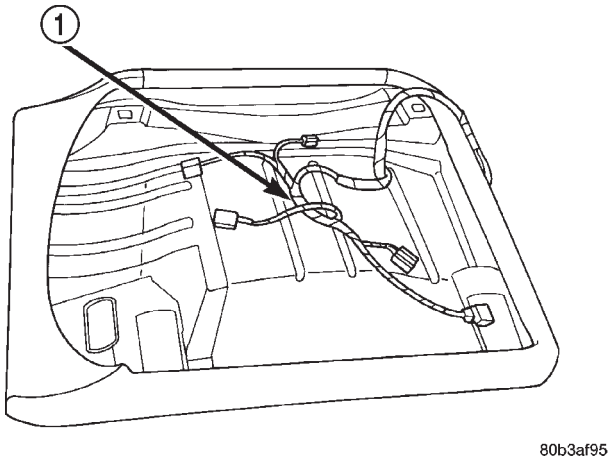


Fig. 4 Front Seat Cushion Wire Harness

1 – WIRE HARNESS

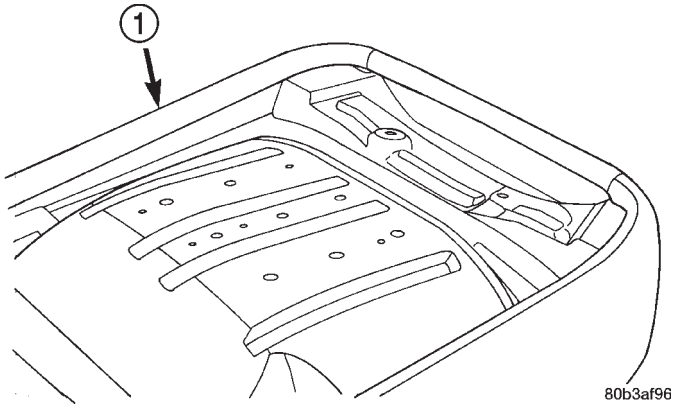


Fig. 5 Front Seat Cushion

1 – FRONT SEAT CUSHION

FRONT SEAT CUSHION COVER/HEATED SEAT COVER

REMOVAL

(1) Remove seat from vehicle.
(2) Remove front seat cushion side shields.
(3) Disconnect seat cushion heater element harness connectors from seat pan, if equipped.
(4) Remove seat back.
(5) Remove track and recliner assembly.

REMOVAL AND INSTALLATION (Continued)

(6) Disengage J-strap attaching seat cover from the seat cushion frame (Fig. 6).

(7) Peel cover from foam and foam from frame access the hog rings (Fig. 7).

(8) Cut hog rings attaching seat cover seat cushion.

(9) Route seat function switches through access hole on outboard side of seat cushion, if equipped.

(10) Remove seat cushion cover from seat cushion.

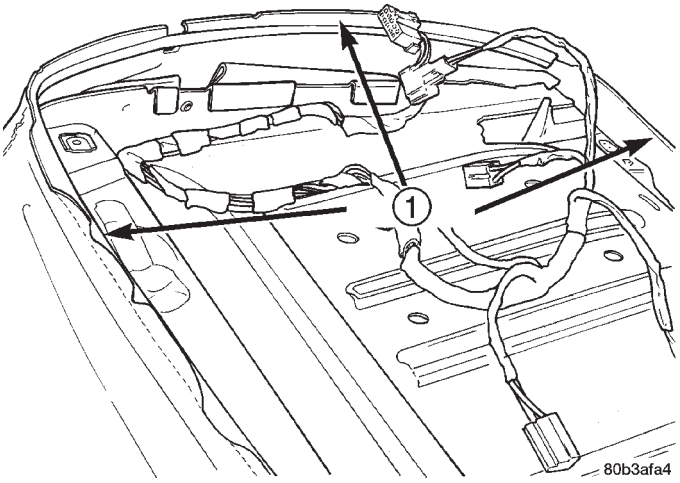


Fig. 6 Front Seat Cushion J- Strap

1 – J-STRAP

INSTALLATION

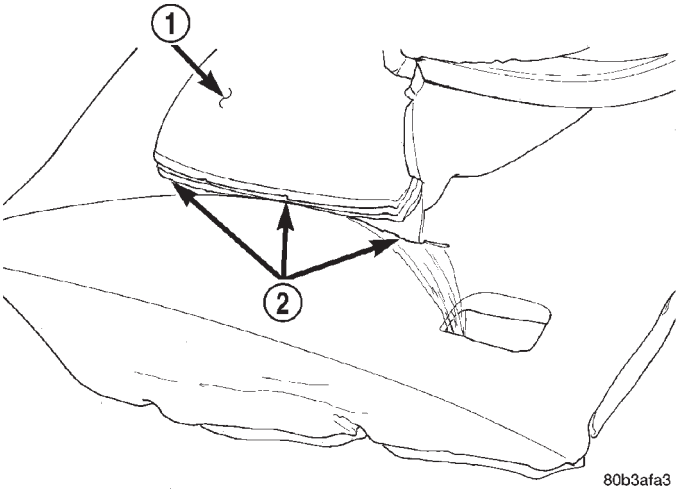


Fig. 7 Seat Cushion Cover

1 – SEAT COVER
2 – HOG RINGS

(1) Position seat cover on cushion. Ensure to reposition seat anti-squeak sheet to frame, if equipped.

(2) Align seat cover with cushion alignment indentations.

(3) Engage seat cushion heater element connector, if equipped.

(4) Install hog rings.

(5) Engage J-strap attaching seat cover to front of seat cushion frame.

(6) Install track and recliner assembly.

(7) Install seat back.

(8) Install front seat cushion side shields.

(9) Install seat in vehicle.

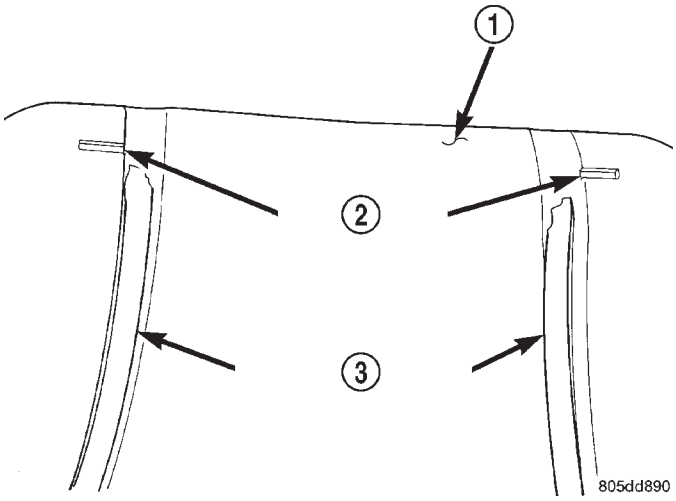


Fig. 8 Seat Cushion Alignment Indentations

1 – SEAT CUSHION
2 – ALIGNMENT INDENTATIONS
3 – HOOK AND LOOP FASTENER

FRONT SEAT ARM REST – 50/50 SPLIT

REMOVAL

(1) Move the driver seat full forward and the passenger seat full rearward.

(2) Open arm rest lid (Fig. 9).

(3) Remove access retaining nut cover.

(4) Remove arm rest retaining nut.

(5) Slide arm rest off of bracket (Fig. 10).

INSTALLATION

(1) Slide arm rest on bracket.

(2) Install arm rest nut. Tighten nut to 25 N·m (18 ft. lbs.) torque.

(3) Install access retaining nut cover.

(4) Reposition the seats.

FRONT SEAT BACK

REMOVAL

(1) Remove seat from vehicle.

(2) Remove seat cushion side shields.

(3) Remove bolts attaching recliner to seat back cushion frame (Fig. 11).

(4) Remove inboard and outboard pivot bolts (Fig. 12).

REMOVAL AND INSTALLATION (Continued)

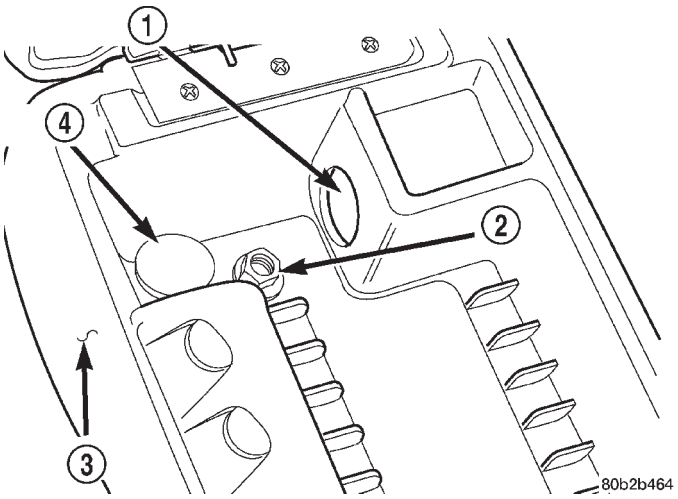


Fig. 9 Arm Rest Access Hole

1 – REMOVE ACCESS HOLE
2 – NUT
3 – ARM REST
4 – COVER

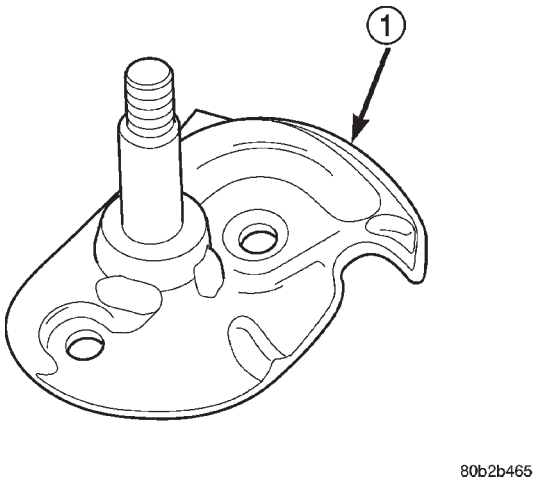


Fig. 10 Arm Rest Bracket

1 – ARMREST BRACKET

(5) Disconnect any electrical connectors to the seat back, if equipped.

(6) Remove seat back from seat cushion.

INSTALLATION

NOTE: Do not reuse the recliner assembly attaching bolts.

(1) Position seat back on cushion.

(2) Connect electrical connectors to the seat back, if equipped.

(3) Install inboard pivot bolt. Tighten bolts to 30 N·m (22 ft. lbs.) torque.

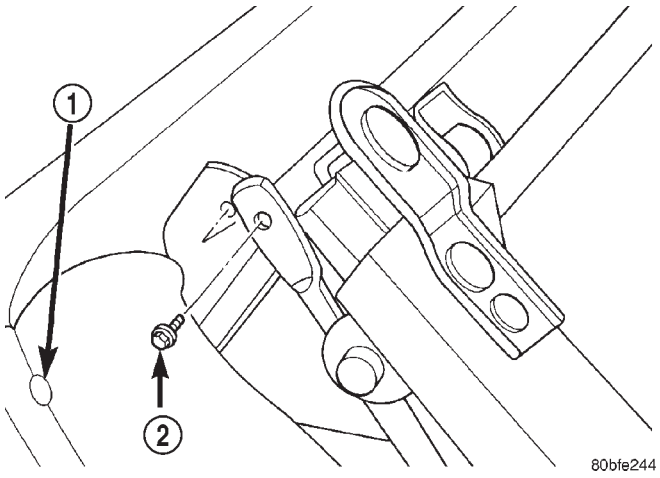


Fig. 11 Recliner Attaching Bolt

1 – PIVOT BOLT
2 – RECLINER BOLT

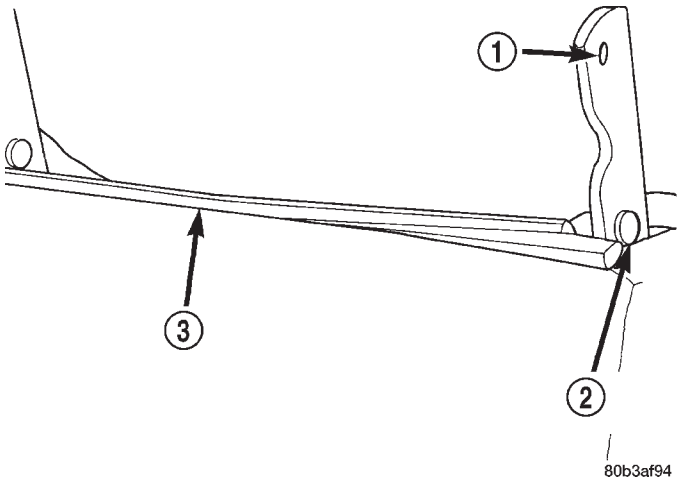


Fig. 12 Remove Seat Back

1 – RECLINER BOLT HOLE
2 – SEAT BACK BOLT HOLE
3 – J-STRAP RETAINER

(4) Install bolts attaching recliner to seat back frame. Tighten bolts to 8 N·m (71 in. lbs.) torque.

(5) Install seat cushion side shields.

(6) Install seat in vehicle.

FRONT SEAT BACK COVER

REMOVAL

(1) Remove seat from vehicle.

(2) Remove head restraint.

(3) Remove front seat back.

(4) Remove lumbar support handle, if equipped.

(5) Disengage the J-strap retainer (Fig. 12).

(6) Roll cover upward to hog rings. Cut hog rings to free cover (Fig. 13).

REMOVAL AND INSTALLATION (Continued)

(7) Roll cover to top of cushion and remove head restraint sleeve guides.
(8) Remove cover from seat back.

INSTALLATION

NOTE: Do not reuse the recliner assembly attaching bolts.

(1) Position cover at the top of seat back.
(2) Carefully roll cover down to the area that hog rings are to be installed.
(3) Install hog rings.
(4) Roll cover downward.
(5) Engage the J-strap retainer
(6) Install lumbar support handle, if equipped.
(7) Install new head restraint sleeve guides.
(8) Install seat back to seat cushion. Tighten bolts to 30 N·m (22 ft. lbs.) torque.
(9) Install seat in vehicle.
(10) Install head restraint.
(11) Check seat back operation.

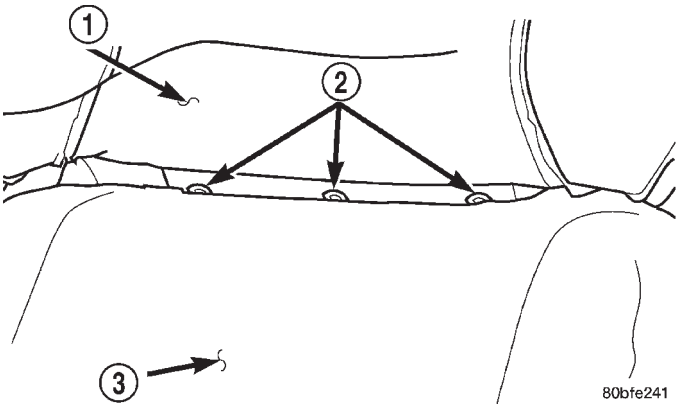


Fig. 13 Front Seat Back Hog Rings

1 – SEAT COVER
2 – HOG RINGS
3 – BACK PAD

FRONT SEAT HEAD RESTRAINT

REMOVAL

(1) Lower head restraint slightly.
(2) Insert a stiff wire into the hole on the right hand side head restraint sleeve/guide and push to release latch (Fig. 14).
(3) At the same time, press the button on the head restraint sleeve/guide left hand side and pull upward to release the head restraint.
(4) Remove head restraint from seat back.

INSTALLATION

(1) Place head restraint in position.
(2) Push head restraint down into the lock position.
(3) Raise head restraint to ensure it locks at the last stop.

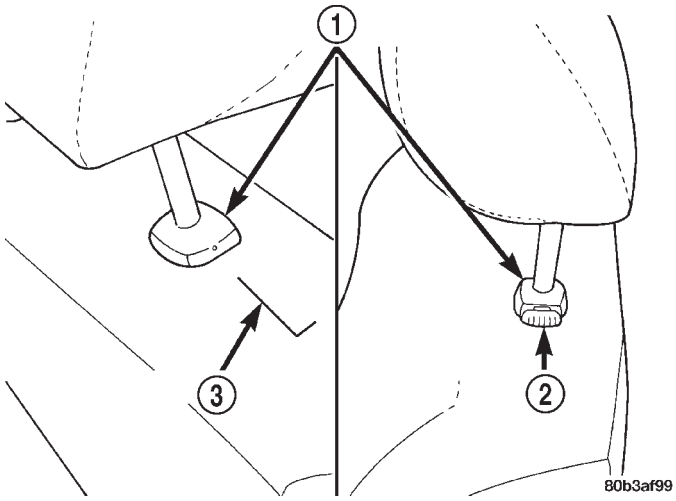


Fig. 14 Head Restraint Removal

1 – SLEEVE GUIDE
2 – BUTTON
3 – STIFF WIRE

FRONT SEAT LUMBAR SUPPORT

The front seat lumbar support is not service separately. The front seat back frame will need to be replaced.

FRONT SEAT TRACK AND RECLINER

REMOVAL

(1) Remove front seat from vehicle.
(2) Remove seat cushion side shield and disconnect switch connector, if equipped.
(3) Remove bolts attaching seat back recliner to seat back frame on each side of seat (Fig. 15).
(4) Remove bolts attaching seat adjuster to cushion pan (Fig. 16).
(5) Disconnect wire harness fasteners from cushion pan.
(6) Remove seat adjuster from seat cushion.

INSTALLATION

(1) Place seat adjuster in position on seat cushion pan.
(2) Connect wire harness fasteners to the cushion pan.
(3) Install bolts attaching seat adjuster to cushion pad.
(4) Install seat back.
(5) Install bolt to attach seat back recliner to seat back on each side of seat. Tighten bolt to 8 N·m (71 in. lbs.) torque.

REMOVAL AND INSTALLATION (Continued)

(6) Connect wire connectors and install the cushion side shields.

(7) Install front seat in vehicle.

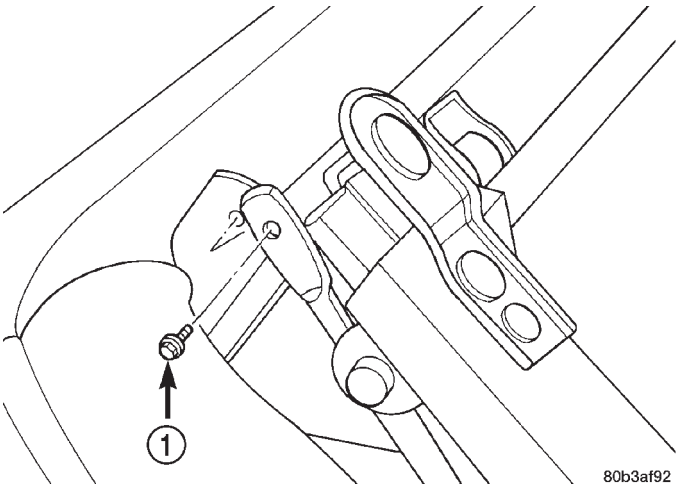


Fig. 15 Recliner Pivot Bolt

1 – RECLINER BOLT

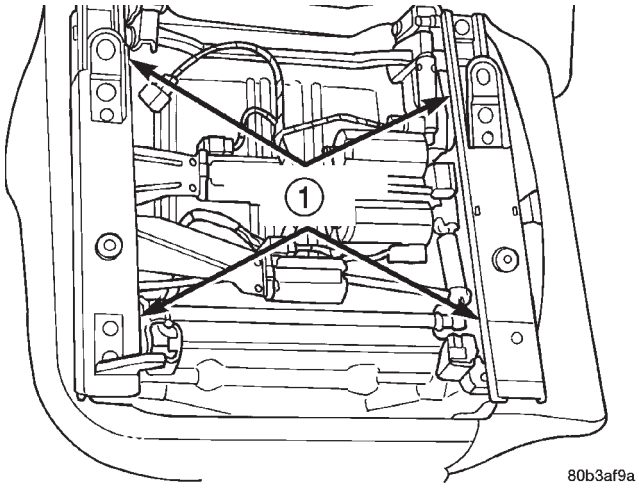


Fig. 16 Front Seat Track – Typical

1 – ATTACHING BOLTS

REAR SEAT CUSHION

NOTE: Fabric covered cushions are serviced as an assembly.

REMOVAL

(1) Pull upward at forward edge of cushion each retainer loop of the rear seat cushion to disengage retainer loops from cups in floor (Fig. 17).

(2) Guild seat belts through loops.

(3) Remove rear seat cushion from vehicle.

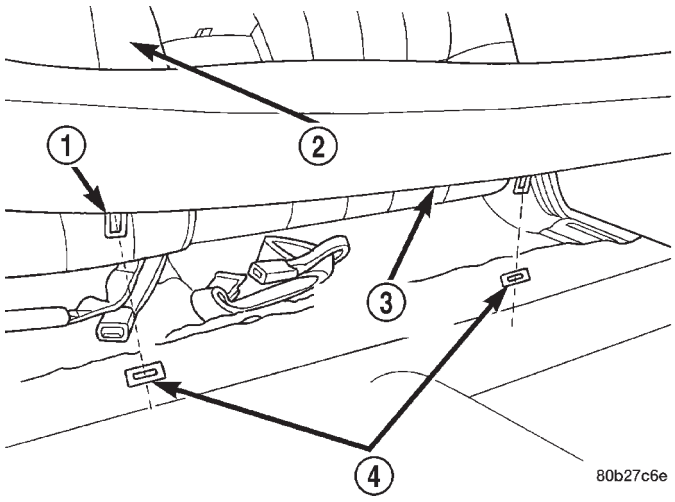


Fig. 17 Rear Seat Cushion

1 – RETAINER LOOP
2 – REAR SEAT BACK
3 – REAR SEAT CUSHION
4 – CUPS

INSTALLATION

(1) Place rear seat cushion in position.

(2) Guild seat belts through loops.

(3) Engage retainer loops into cup on floor kick-up.

(4) Push downward at forward edge at each retainer loop of the rear seat cushion to engage retainers.

REAR SEAT BACK

REMOVAL

(1) Remove rear seat cushion.

(2) Remove nuts attaching rear seat back and belts to floor (Fig. 18).

(3) Pull bottom of seat back out to slide rear seat back mounts off studs. Push rear seat back upward to disengage hooks at top of seat back.

(4) Remove rear seat from vehicle.

INSTALLATION

(1) Place rear seat in position in vehicle.

(2) Engage hooks at top of seat back.

(3) Install nuts attaching rear seat back and belts to floor. Tighten to 40 N·m (29 ft. lbs.) torque.

(4) Ensure inboard seat belts are pushed through elastic straps at bottom edge of seat back.

(5) Install rear seat cushion.

REAR SEAT BACK COVER FIXED SEAT BACK

REMOVAL

(1) Remove rear seat cushion.

(2) Remove rear seat back.

REMOVAL AND INSTALLATION (Continued)

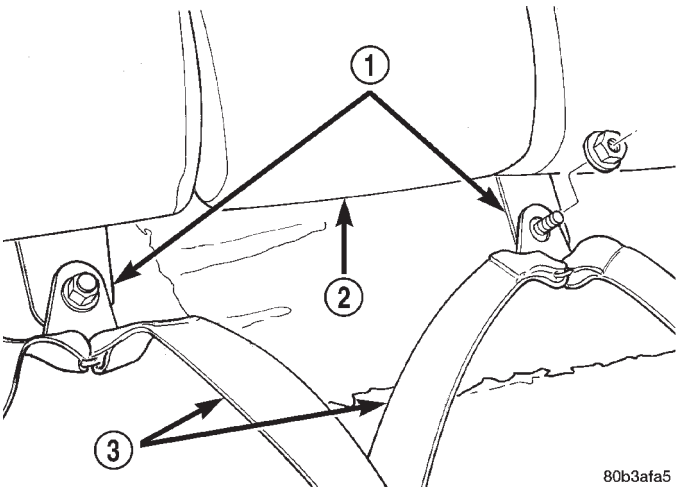


Fig. 18 Rear Seat Back

1 – REAR SEAT BACK MOUNTS
2 – REAR SEAT BACK
3 – REAR SEAT BELTS

(3) Pull cover over edges of the foam.
(4) Cut hog rings to free cover.
(5) Remove rear seat back cover from seat back.

INSTALLATION

(1)
(1) Position seat back cover on seat back.
(2) Install hog ring on right side listing pocket of cover to foam, starting in the middle and lining up the die cuts in the listing pocket with the hog ring windows in the foam (three places).
(3) Repeat for the left side listing pocket of cover.
(4) Place cover seams in salvage trenches of foam.
(5) Roll corners and edges of cover over foam.
(6) Flip seat over making sure cover is pulled up over frame on all corners. Push top, bottom, inside, outside, corners of the foam into the cover and engage J-strap retainers.
(7) Install rear seat back and rear seat cushion.

REAR SEAT ARM REST – 60/40

REMOVAL

(1) Fold down 40 side rear seat back.
(2) Remove arm rest bolt (Fig. 19).
(3) Remove retaining C-clip.
(4) Remove arm rest.

INSTALLATION

(1) Place arm rest in bracket.
(2) Install arm rest bolt. Tighten to 12 N·m (9 ft. lbs.) torque.
(3) Install retaining C-clip.
(4) Reposition the seats.

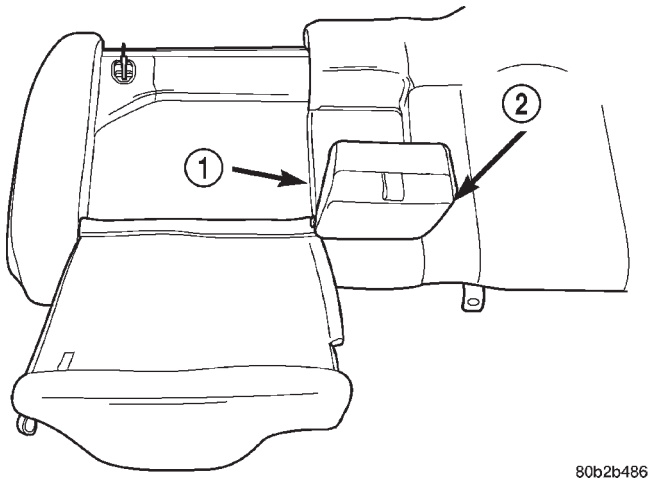


Fig. 19 Rear Seat Arm Rest – 60/40

1 – BOLT
2 – RETAINING C-CLIP

REAR SEAT ARM REST WITH SKI PASS

REMOVAL

(1) Remove rear seat cushion.
(2) Remove nuts attaching rear seat back and belts to the floor.
(3) Push rear seat back with arm rest and ski pass upward to disengage hooks at top of seat back (Fig. 20).
(4) Remove silencer panel fasteners on the back of seat back (Fig. 21).
(5) Remove silencer panel.
(6) Remove fasteners attaching arm rest to seat back (Fig. 22).
(7) Remove arm rest (Fig. 23).

INSTALLATION

(1) Place arm rest into position.
(2) Install fasteners attaching arm rest to seat back. Tighten fasteners to 5 N·m (45 in. lbs.) torque.
(3) Install silencer fasteners. Use new fasteners.
(4) Install seat back.
(5) Install seat cushion.

REAR SEAT BACK – 40 SECTION

REMOVAL

(1) Open door.
(2) Remove seat cushion.
(3) Remove nuts attaching seat back collar assembly.
(4) Remove seat back collar assembly (Fig. 24).
(5) Remove bolt attaching 40 section (Fig. 25).
(6) Slide seat back 40 section off pin and remove from the collar assembly (Fig. 26).

REMOVAL AND INSTALLATION (Continued)

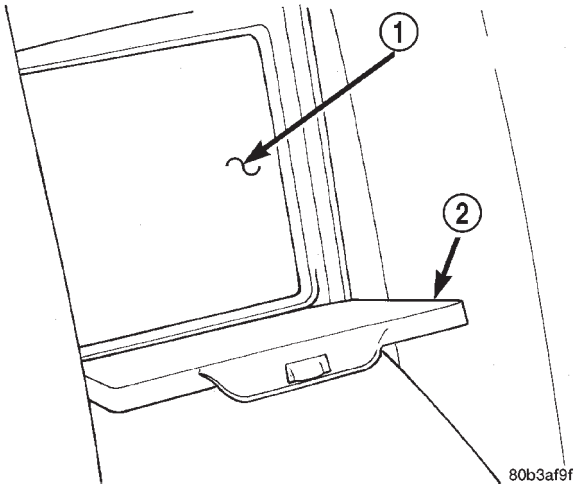


Fig. 20 Arm Rest with Ski Pass

1 – SKI PASS
2 – DOOR

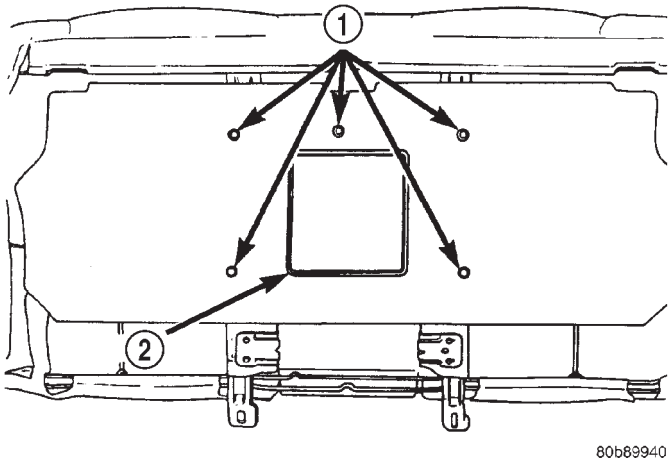


Fig. 21 Rear Seat Silencer

1 – FASTENERS
2 – SKI PASS

INSTALLATION

(1) Place seat back 40 section on pin.
(2) Install bolt attaching 40 section seat back to collar section. Tighten bolt to 16 N·m (12 ft. lbs.) torque.
(3) Place seat back collar assembly in position in vehicle.
(4) Install nuts attaching seat back collar assembly. Tighten nuts to 40 N·m (29 ft. lbs.) torque.
(5) Install seat cushion.

REAR SEAT BACK – 60 SECTION

REMOVAL

(1) Open door.
(2) Remove rear seat cushion.

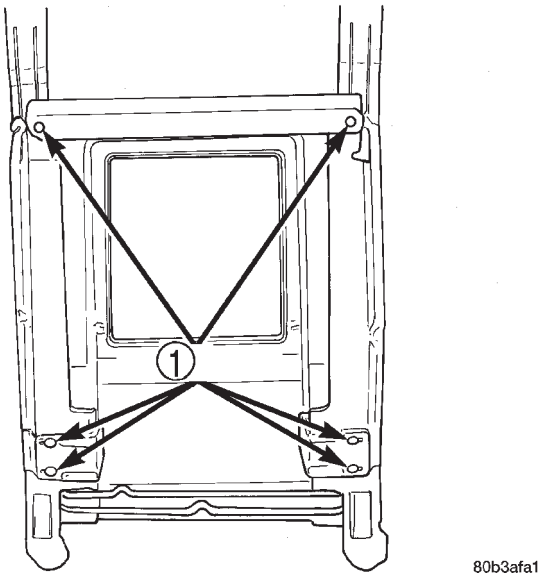


Fig. 22 Rear Seat Arm Rest With Ski Pass

1 – FASTENERS

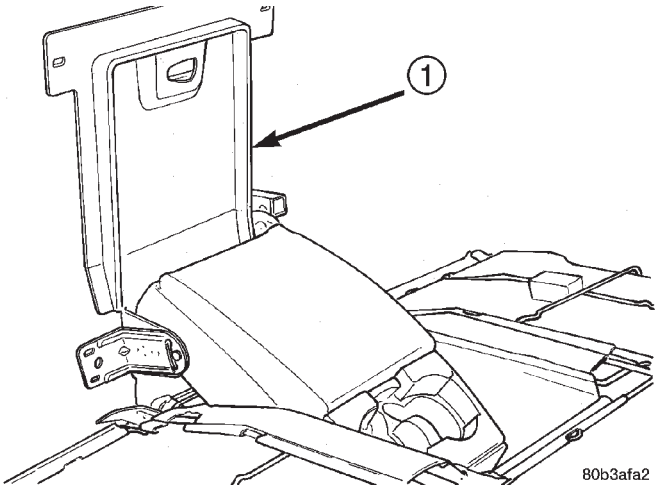


Fig. 23 Arm Rest Removal

1 – ARM REST WITH SKI PASS

(3) Remove nuts attaching seat back collar assembly.
(4) Remove seat back collar assembly.
(5) Remove bolt attaching 40 seat section.
(6) Remove the 40 seat section.
(7) Remove bolt attaching 60 seat section (Fig. 27).
(8) Slide seat back 60 seat section off pivot bracket and remove from the collar assembly.

INSTALLATION

(1) Install the 60 seat section on pivot bracket.
(2) Install bolt attaching 60 seat section. Tighten bolt to 16 N·m (12 ft. lbs.) torque.
(3) Install the 40 seat section on pin.

REMOVAL AND INSTALLATION (Continued)

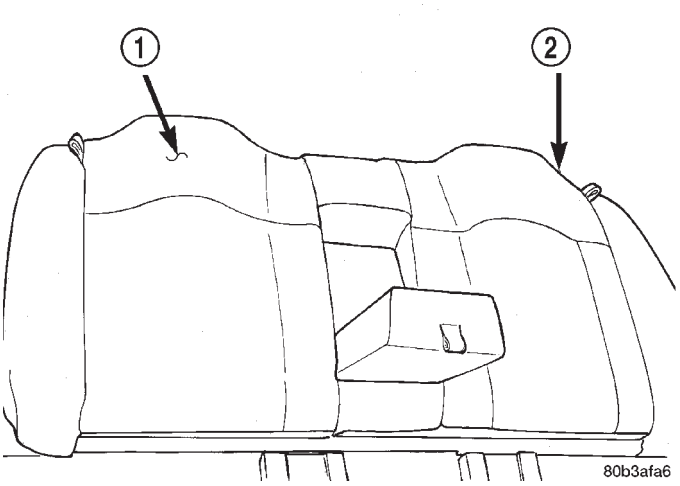


Fig. 24 Collar Assembly

1 – 40–SECTION
2 – 60–SECTION

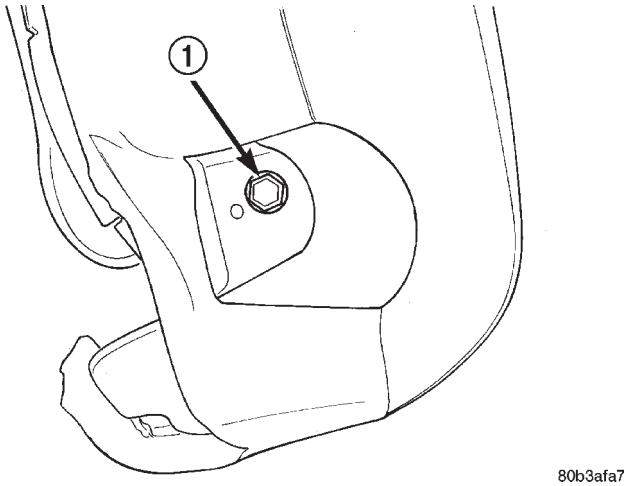


Fig. 25 Remove 40 Section Seat Back

1 – ATTACHING BOLT

(4) Install bolt attaching 40 seat section. Tighten bolt to 16 N·m (12 ft. lbs.) torque.

(5) Place seat back collar assembly in position in vehicle.

(6) Install nuts attaching seat back collar assembly. Tighten nuts to 40 N·m (29 ft. lbs.) torque.

(7) Install the rear seat cushion.

REAR SEAT BACK COLLAR ASSEMBLY – 60/40 SEAT

REMOVAL

(1) Open door.

(2) Remove rear seat cushion.

(3) Remove nuts attaching rear seat back collar assembly.

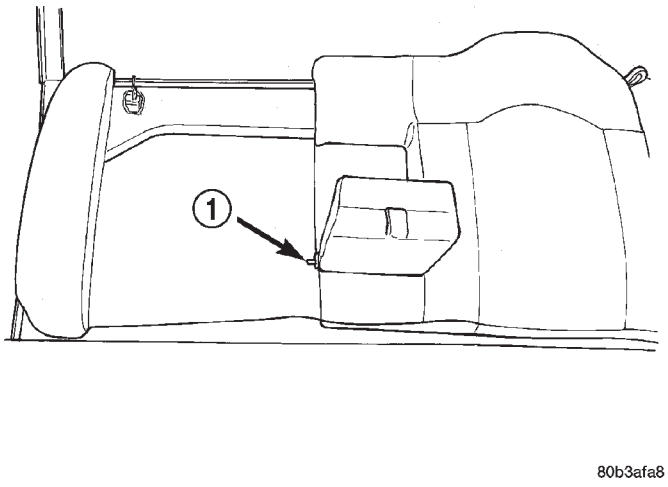


Fig. 26 40 Section Pivot Pin

1 – PIN

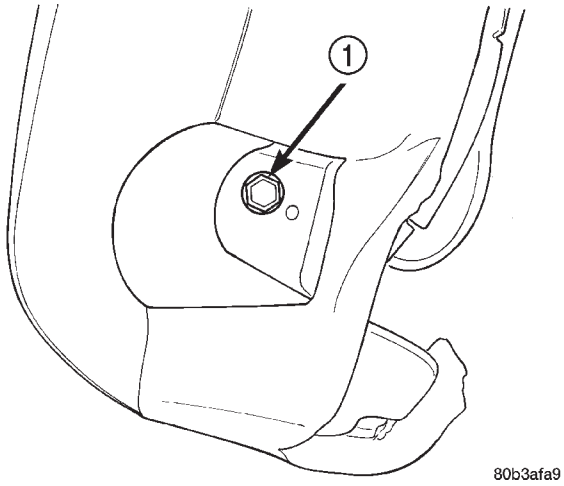


Fig. 27 Rear Seat Back 60 Section

1 – ATTACHING BOLT

(4) Remove rear seat back collar assembly.

(5) Remove the 40 seat section from the rear seat back collar assembly.

(6) Remove the 60 seat section from the rear seat back collar assembly (Fig. 28).

INSTALLATION

(1) Install the 60 seat section from the rear seat back collar assembly.

(2) Install the 40 seat section from the rear seat back collar assembly.

(3) Place the rear seat back collar assembly in position in vehicle.

(4) Install nuts attaching rear seat back collar assembly. Tighten nuts to 40 N·m (29 ft. lbs.) torque.

(5) Install the rear seat cushion.

REMOVAL AND INSTALLATION (Continued)

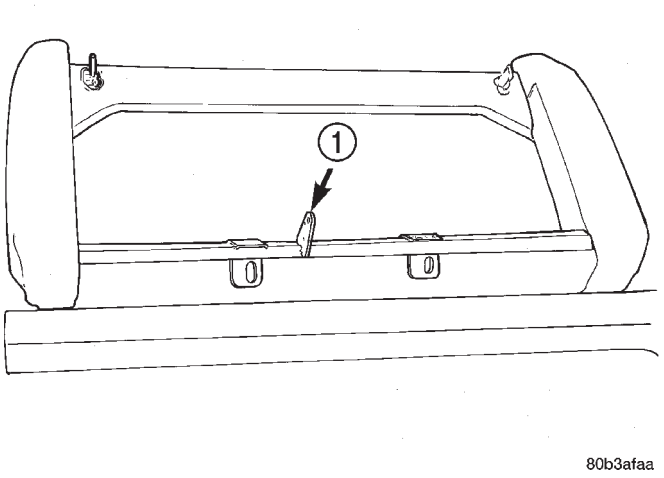


Fig. 28 Rear Seat Back Collar

1 – PIVOT BRACKET

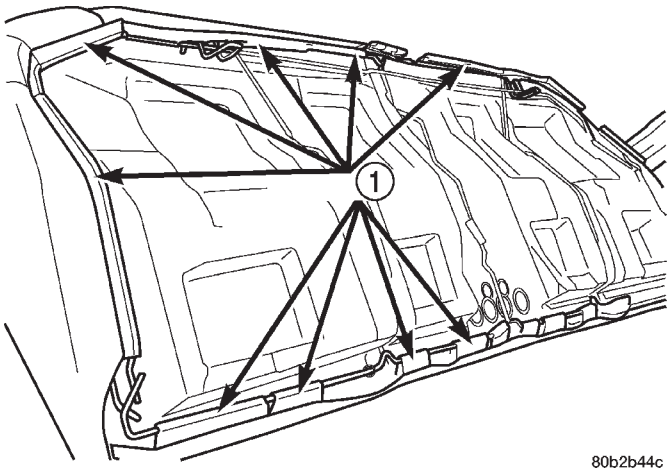


Fig. 29 Rear Seat Cushion Cover J-Straps

1 – J-STRAPS

REAR SEAT CUSHION COVER

REMOVAL

(1) Remove rear seat cushion.
(2) Disengage the J-strap retainers (Fig. 29).
(3) Cut hog rings to free cover (Fig. 30).
(4) Remove seat cushion cover from seat cushion.

INSTALLATION

(1) Position seat cushion cover on cushion.
(2) Install hog rings to seat cover.
(3) Engage the J-strap retainers.
(4) Steam wrinkles from seat cushion, if necessary.

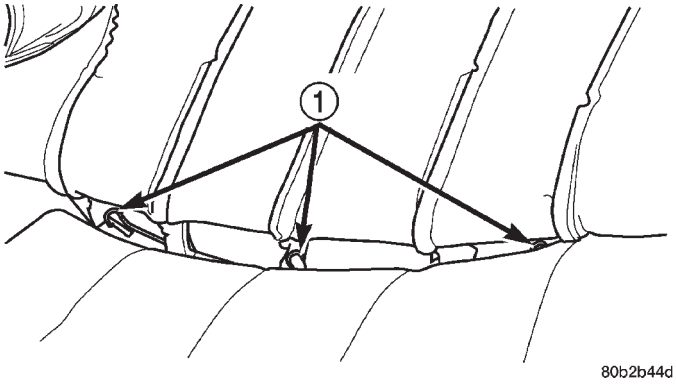


Fig. 30 Rear Seat Cushion Cover Hog Rings

1 – HOG RINGS

(5) Install seat cushion.

SUNROOF

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DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

Before beginning sunroof diagnostics verify that all other power accessories are in proper operating condition. Refer to Sunroof Diagnostic Chart for possible causes. If not, a common electrical problem may exist. Refer to Group 8W, Wiring Diagrams, of this publication for circuit, splice and component descriptions. Check the condition of the circuit protection (20 amp high current fuse (battery feed) located in the Power Distribution Center (PDC). Check the cover of the PDC for location of the fuse. The ten amp fuse (ignition feed) located in cavity 14 of the Junction Block). Inspect all wiring connector pins for proper engagement and continuity. Check for battery voltage at battery and ignition pins of the power sunroof express module wiring connector. Refer to Group 8W, Wiring Diagrams, for circuit information. The controller will not operate at less than 10 volts. Check the ground at the sunroof express module.

Before beginning diagnosis for wind noise or water leaks, verify that the problem was not caused by releasing the control switch before the was sunroof fully closed. The sunroof module has a water-management system. During washing high-pressure water may be forced between the glass panel seal and the roof opening. Normally this water will drain. However, when some type of drying blower system is used, like those found in automatic car washes, the water may not have a chance to drain before the blower forces air between the seal and the roof opening. This causes the water to blow over the edge of the module and onto the headlining.

Refer to (Fig. 1) Sunroof Assembly for exploded view of the sunroof.

DIAGNOSIS AND TESTING (Continued)

SUNROOF DIAGNOSIS CHART

SYMPTOM	POSSIBLE CAUSE
Sunroof motor inoperative.	Faulty control switch. Faulty circuit ground between sunroof express module, drive motor, control switch, and body harness. Faulty power circuit between sunroof express module, drive motor, switch, and body harness. Faulty sunroof drive motor. Faulty sunroof express module. Faulty sunroof drive motor connector.
Audible whine when switch is depressed, sunroof does not operate.	Faulty sunroof drive motor. Binding cable.
Audible clicking or ratcheting when switch is pressed, sunroof does not operate.	Broken or worn drive cable. Worn drive motor gear. Mechanisms not synchronized.
Sunroof vents and opens, but does not close.	Binding cable. Faulty circuit. Faulty control switch. Faulty sunroof express module. Faulty drive motor.
Sunroof vents, but does not open.	Binding linkage. Faulty circuit. Faulty switch. Faulty sunroof controller. Faulty drive motor.
Sunroof does not vent	Binding cable. Faulty circuit. Faulty control switch. Faulty sunroof express module.
Sunroof water leak.	Drain tubes clogged or kinked. Glass panel improperly adjusted. Faulty glass panel seal.
Wind noise from sunroof.	Front of glass panel too high or rear too low. Glass panel not centered in opening. Faulty glass panel seal.
Rattles from open sunroof while driving	Loose or broken attaching hardware. Worn or broken mechanism.
Rattles from closed sunroof while driving	Loose or broken attaching hardware. Worn or broken mechanism

DIAGNOSIS AND TESTING (Continued)

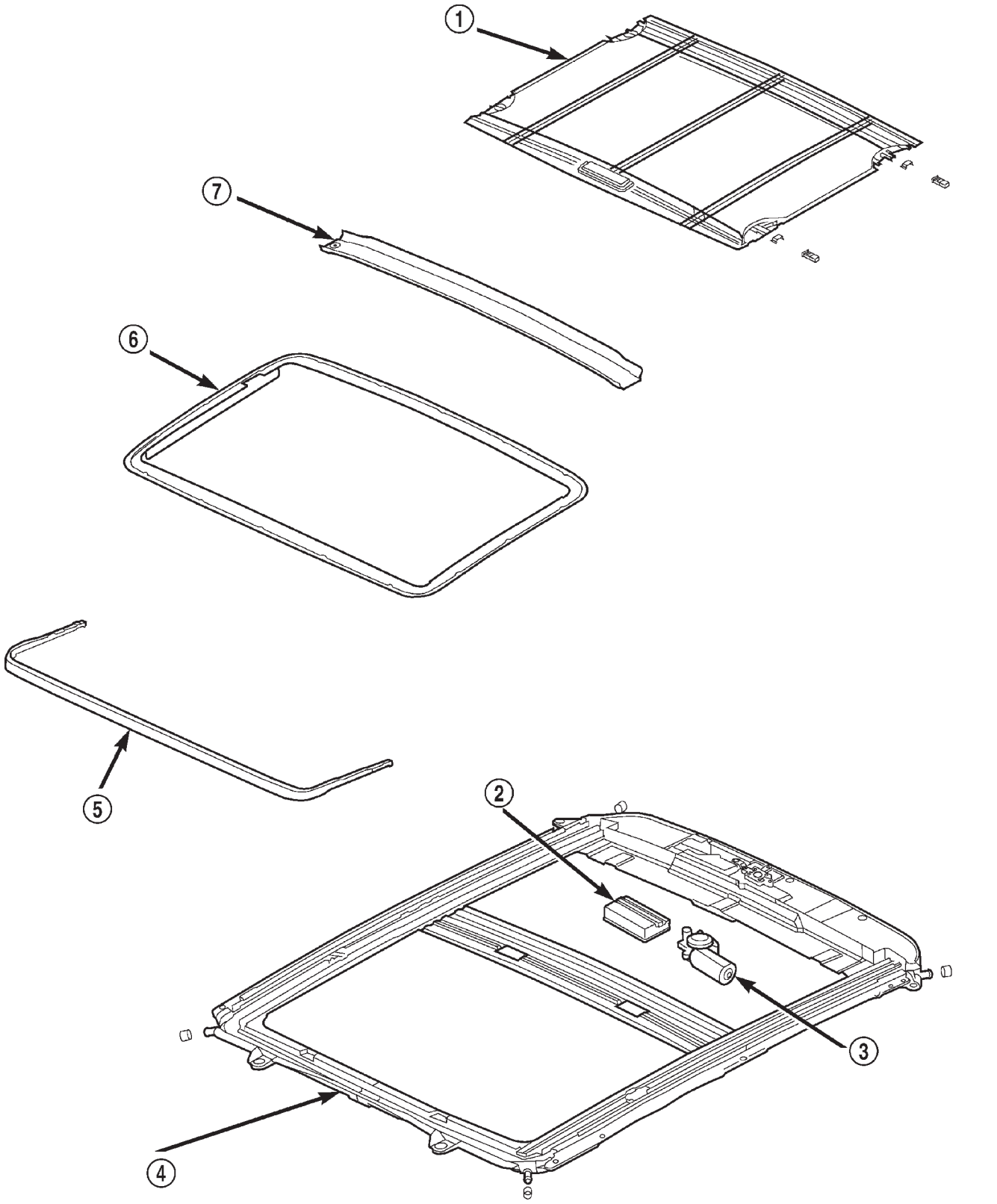


Fig. 1 Sunroof Assembly

DIAGNOSIS AND TESTING (Continued)

1 – SUNSHADE
2 – EXPRESS MODULE
3 – DRIVE MOTOR
4 – FRAME ASSEMBLY
5 – WIND DEFLECTOR
6 – GLASS PANEL
7 – DRAIN CHANNEL

REMOVAL AND INSTALLATION

SUNROOF EXPRESS MODULE

REMOVAL

(1) Move the glass panel to the fully closed position.
(2) Remove A-pillar trim, sun visors, and map lamp/mini console.
(3) Lower headliner as necessary to gain access to the sunroof express module.
(4) Disconnect the express module wire harness connectors. (Fig. 3)
(5) Remove express module screw.
(6) Remove express module from the keyway by sliding module towards the center of the vehicle.

INSTALLATION

(1) Insert sunroof express module in the keyway located in the sunroof module and slide the module outward to lock it into position.
(2) Install the sunroof express module screw.
(3) Connect the wire connectors to the sunroof express module.
(4) Install the headliner into position.
(5) Install the A-pillar trim, sun visors, and map lamp/mini console.
(6) Test sunroof operation, adjust if necessary.

SUNROOF GLASS PANEL

REMOVAL

(1) Slide sunshade rearward to the open position.
(2) Move the glass panel to the fully closed position.
(3) Remove the four attaching screws (Fig. 2).
(4) Lift off glass panel and remove from vehicle.

INSTALLATION

(1) Position glass panel, centered to opening.
(2) Start the four attaching screws.
(3) Tighten screws.
(4) Verify sunroof operation and alignment. Check fit and adjust as necessary, refer to Sunroof Glass Panel Adjustment for proper procedures.

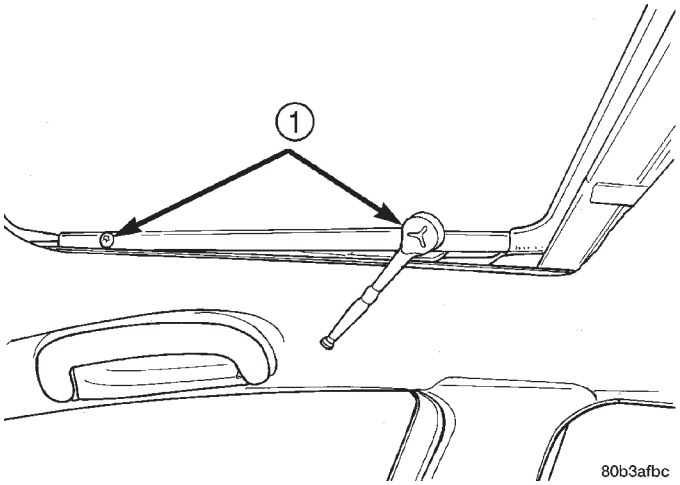


Fig. 2 Sunroof Glass Panel Removal

1 – ATTACHING SCREW

SUNROOF DRIVE MOTOR

REMOVAL

NOTE: The sunroof system is timed from the factory so that the motor shuts off automatically when the sunroof window reaches a certain position. Extreme care must be taken when removing the motor, timing may be thrown off causing possible damage to the sunroof system. Anytime the motor is removed from the sunroof assembly the sunroof glass panel must be in the FULLY CLOSED POSITION or the unit will be out of time. The drive motor cannot be reset to the park position after being removed.

Refer to sunroof timing.

(1) Move glass panel to the fully closed position.
(2) Remove A-pillar trim, sun visors, and map lamps/mini console.
(3) Disconnect the control switch wire connector.
(4) Remove headliner as necessary to gain access to sunroof drive motor. Refer to Headlining Removal and Installation for proper procedures.
(5) Disconnect the drive motor wire harness connectors (Fig. 3).
(6) Remove drive motor fasteners and remove motor from the sunroof housing (Fig. 1).

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Ensure that the glass panel is in the fully closed position before mounting the motor. If motor fails with the window in the open position the sunroof glass panel timing will have to be timed. The new motor comes in the fully closed position and with a gage for setting cable timing. Refer to Sunroof Glass Panel Timing.

(2) Place drive motor into position on the sunroof housing and install fasteners.

(3) Set headliner into position.

(4) Connect express module, drive motor, and control switch wire connectors.

(5) Test sunroof operation, adjust as necessary.

(6) Finish installing the headliner.

(7) Connect the control switch wire connector.

(8) Install A-pillar trim, sun visors, and map lamps/mini console.

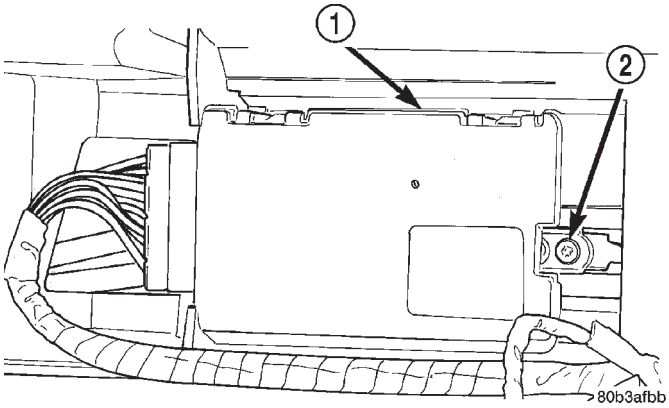


Fig. 3 Sunroof Drive Motor and Express Module

1 – EXPRESS MODULE
2 – SCREW

SUNROOF WIND DEFLECTOR

REMOVAL

(1) Open sunroof glass panel.

(2) Push down one corner of the wind deflector and let the other corner rise up (Fig. 4).

(3) Push the low corner towards the opposite side of the vehicle until tab on sunshade clears the body. Then raise the corner up.

(4) Repeat the procedure to the other corner.

(5) Lift wind deflector to 90% of the way.

(6) Push the attaching ends of the deflector to the rear of the vehicle to disengage the deflector.

INSTALLATION

(1) Place wind deflector at 90% in the vertical position to the sunroof. With the sunroof open.

(2) Push ends of the deflector towards the front of the vehicle to engage ends.

(3) Lower wind deflector to normal position.

(4) Push one corner to the opposite side of the vehicle until tab clears vehicle body and lower deflector for that corner.

(5) Push the side that was just installed completely down.

(6) Push the opposite corner cross vehicle until tab clears the body. Then lower deflector to position.

(7) Test sunroof operation.

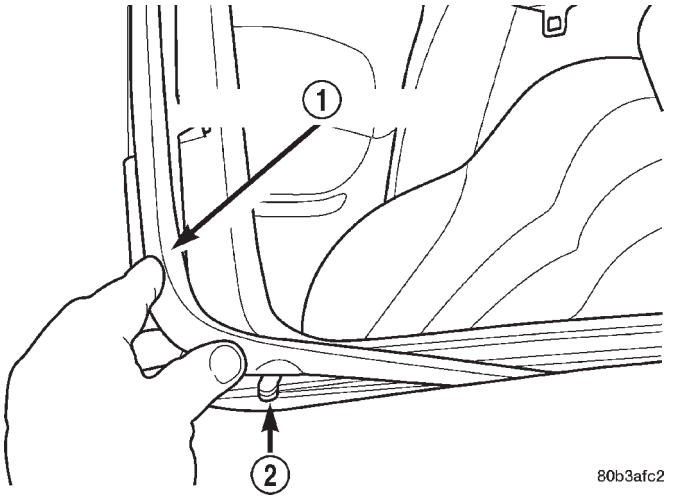


Fig. 4 Wind Deflector

1 – WIND DEFLECTOR
2 – TAB

SUNROOF HOUSING ASSEMBLY

REMOVAL

(1) Move glass panel to the fully closed position.

(2) Remove instrument panel end caps right and left side.

(3) Remove right and left A-post trim panels.

(4) Remove right and left sun visors, and sun visors retainers.

(5) Remove over head console let hang from headliner.

(6) Remove front passenger grab handle.

(7) Remove right and left upper B-post trim panels.

(8) Remove rear right and left grab handle/lamps and let hang from headliner.

(9) Remove right and left C-post trim panels partially.

(10) Recline both front seats.

(11) Disconnect battery negative cable.

(12) Disconnect wire harness connector along A-post to fuse panel.

(13) Disconnect mirror wiring connector.

(14) Disconnect sunroof harness connector at the C-post.

(15) Disengage headliner rear locating clip.

(16) Remove headliner through the rear door.

REMOVAL AND INSTALLATION (Continued)

(17) Disconnect the drain tubes from sunroof housing (Fig. 5).

(18) Loosen fasteners attaching sunroof housing assembly.

(19) With the aid of a helper, remove fasteners attaching sunroof housing assembly to roof panel.

INSTALLATION

(1) With the Glass panel in the fully closed position.

(2) With the aid of a helper, raise rear end of sunroof housing assembly and guide into position and start fasteners.

(3) Tighten the fasteners attaching the sunroof module to roof panel. Tighten the fasteners to 8.5 to 9 N·m (75 to 80 in. lbs.) torque.

(4) Connect the drain tubes to the sunroof housing.

(5) With the aid of a helper move the headliner through the rear door into position.

(6) Engage headliner rear locating clip.

(7) Connect sunroof harness connector at the C-post.

(8) Connect wire harness connector along A-post to fuse panel.

(9) Connect mirror wiring connector.

(10) Connect wire harness connector along A-post to fuse panel.

(11) Connect battery negative cable.

(12) Move both front seats into proper position.

(13) Test sunroof operation, adjust as necessary.

(14) Finish installing the headliner. Ensure that door weatherstrips are in position.

(15) Install right and left C-post trim panels partially.

(16) Install rear right and left grab handle/lamps and let hang from headliner.

(17) Install right and left upper B-post trim panels.

(18) Install front passenger grab handle.

(19) Install over head console let hang from headliner.

(20) Install right and left sun visors, and sun visors retainers.

(21) Install right and left A-post trim panels.

(22) Remove instrument panel end caps right and left side.

SUNROOF SUNSHADE

REMOVAL

(1) Open sunroof approximately 90% of the way.

(2) Push sunshade down until tabs clear glass.

(3) Move sunshade forward of glass panel.

(4) Using a flat blade tool, remove front guide blocks from track. By pushing block toward the center of the vehicle (Fig. 6).

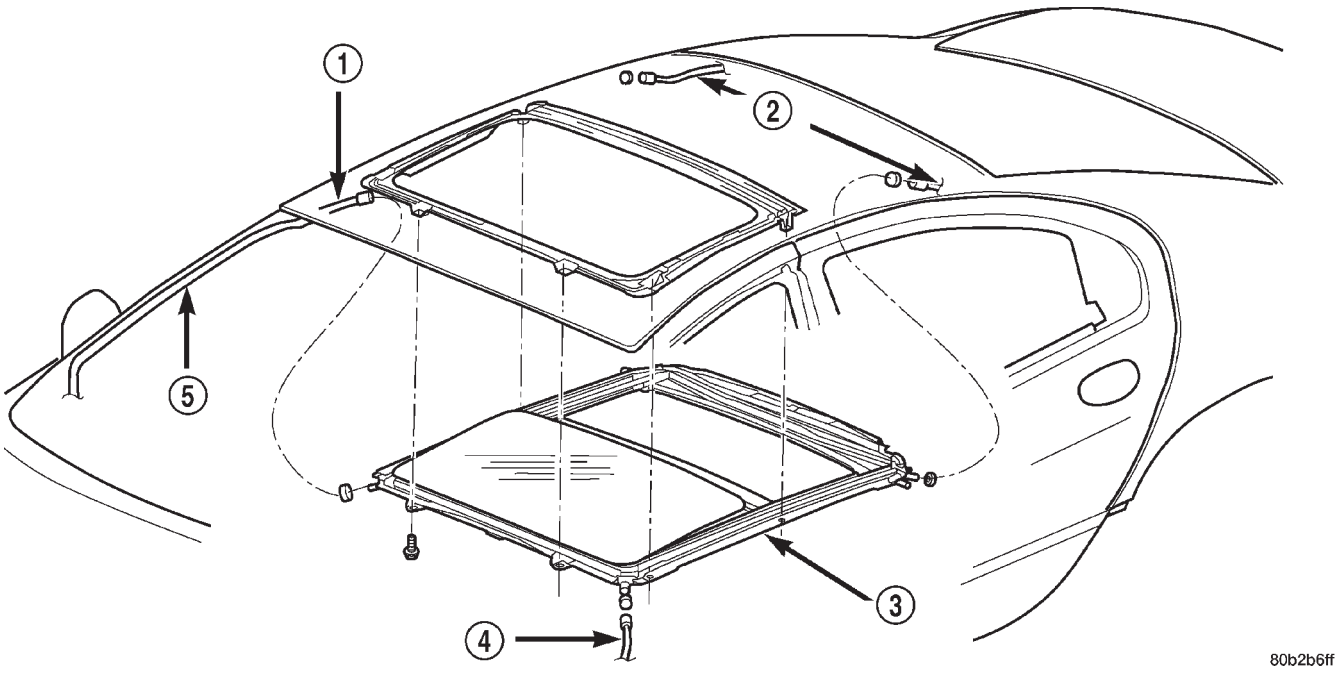


Fig. 5 Sunroof Housing Assembly Removal

1 – DRAIN HOSE
2 – DRAIN HOSE
3 – SUN ROOF FRAME ASSEMBLY
4 – DRAIN HOSE
5 – A-PILLAR

REMOVAL AND INSTALLATION (Continued)

(5) Slide the sunshade forward while lifting the front through the opening until the rear guide blocks are accessible.

CAUTION: Use care not to crease the sunshade when removing or installing.

(6) Disengage rear guide blocks from track.

INSTALLATION

(1) Install the sunshade from outside of the vehicle with the sunroof 90% open.
(2) Put rear guide blocks into sunshade guide track.
(3) Push sunshade back and down through the sunroof opening.
(4) Using a flat blade tool, put front guide blocks into the sunshade track. By pushing the block towards the center of the vehicle.
(5) Push sunshade back to the glass panel.
(6) Push sunshade down until the sunshade clears the glass then move sunshade rearward behind the glass panel.

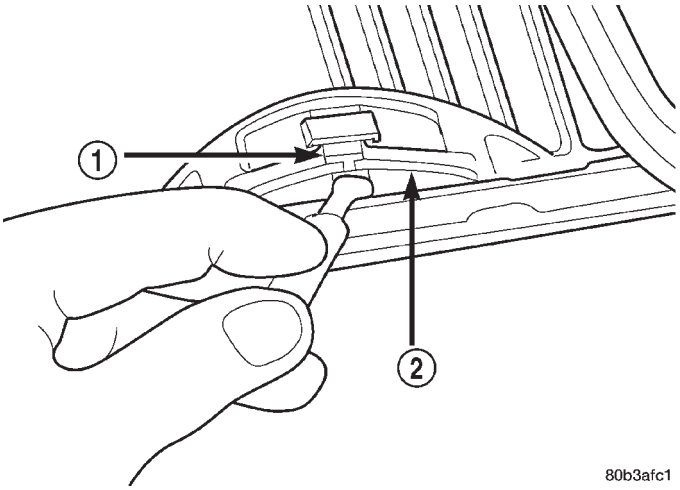


Fig. 6 Sunshade Guide Block

1 – GUIDE BLOCK
2 – GUIDE BLOCK SPRING

SUNROOF HOUSING DRAIN HOSE

FRONT HOSES

REMOVAL

(1) Move glass panel to the fully closed position.
(2) Disconnect the control switch and wire connector.
(3) Remove headliner as necessary.
(4) Remove side kick cowl panel.
(5) Disconnect drain hose clips from body holes (Fig. 7) and/or (Fig. 8).
(6) Drain any liquid from hose connection, if necessary.
(7) Hoses between trim and metal Remove old and replace with new.
(8) Work the hose back and forth to loosen.
(9) Pull the old hose down and through instrument panel dragging new hose with it, until end of new hose is near grommet on side cowl.
(10) Remove drain grommet from sheet metal.
(11) Remove old hose from new hose.

INSTALLATION

(1) Insert end of new hose into drain grommet and replace grommet into sheet metal.
(2) Attach hose upper clips into holes in sheet metal.
(3) Engage upper flair end of hose into sunroof module drain nipple and secure with ratchet clamp.

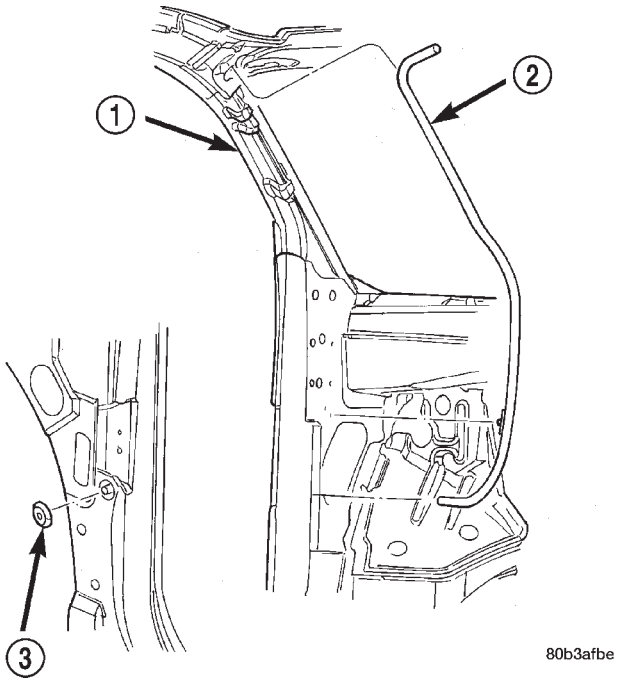


Fig. 7 Front Left Housing Drain Hose

1 – A-PILLAR
2 – DRAIN HOSE
3 – GROMMET

REAR HOUSING HOSE

REMOVAL

(1) Move glass panel to the fully closed position.
(2) Disconnect the control switch and wire connector.
(3) Remove headliner as necessary.
(4) Remove rear shelf panel.

REMOVAL AND INSTALLATION (Continued)

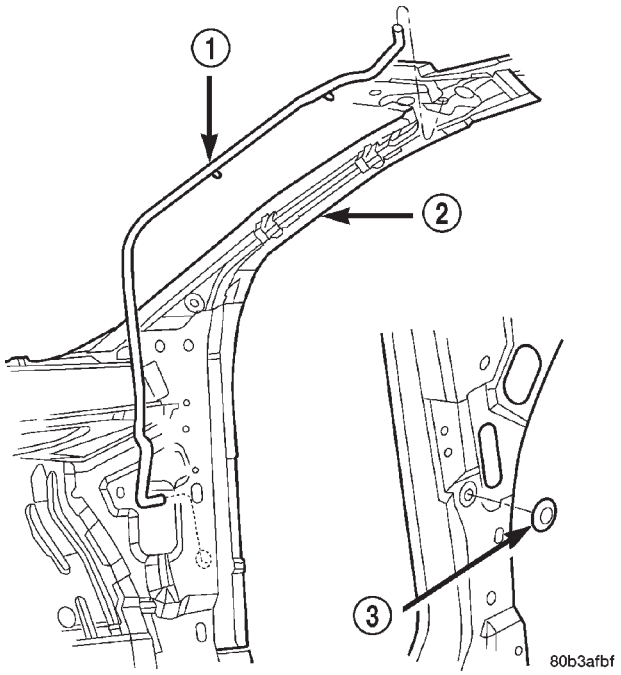


Fig. 8 Front Right Housing Drain Hose

1 – DRAIN HOSE
2 – A-PILLAR
3 – GROMMET

(5) Disconnect the end of the drain tube from the rubber grommet at the end of the drain tube closest to the rear window of the vehicle (Fig. 9) or (Fig. 10).

(6) Drain any liquid from hose connection, if necessary.

(7) Disconnect the top end of the drain hose from the sunroof housing drain nipple.

(8) Remove drain hose clips from the body holes.

INSTALLATION

(1) Using the proper drain hose (there is a right and left side rear hose) attach drain hose clips to body holes, with the flair at the top towards the sunroof nipple.

(2) Connect top flair end of the drain hose to the sunroof housing drain nipple with the ratchet clamp.

(3) Connect the lower end of the drain tube to the rubber grommet near the rear window of the vehicle.

(4) Connect the drain hose to the sunroof housing and test drainage.

(5) Install shelf panel, ensure not to pinch the rubber grommets.

(6) Install headliner.

(7) Connect the control switch wire connector. Install control switch.

(8) Test for proper operation of the sunroof.

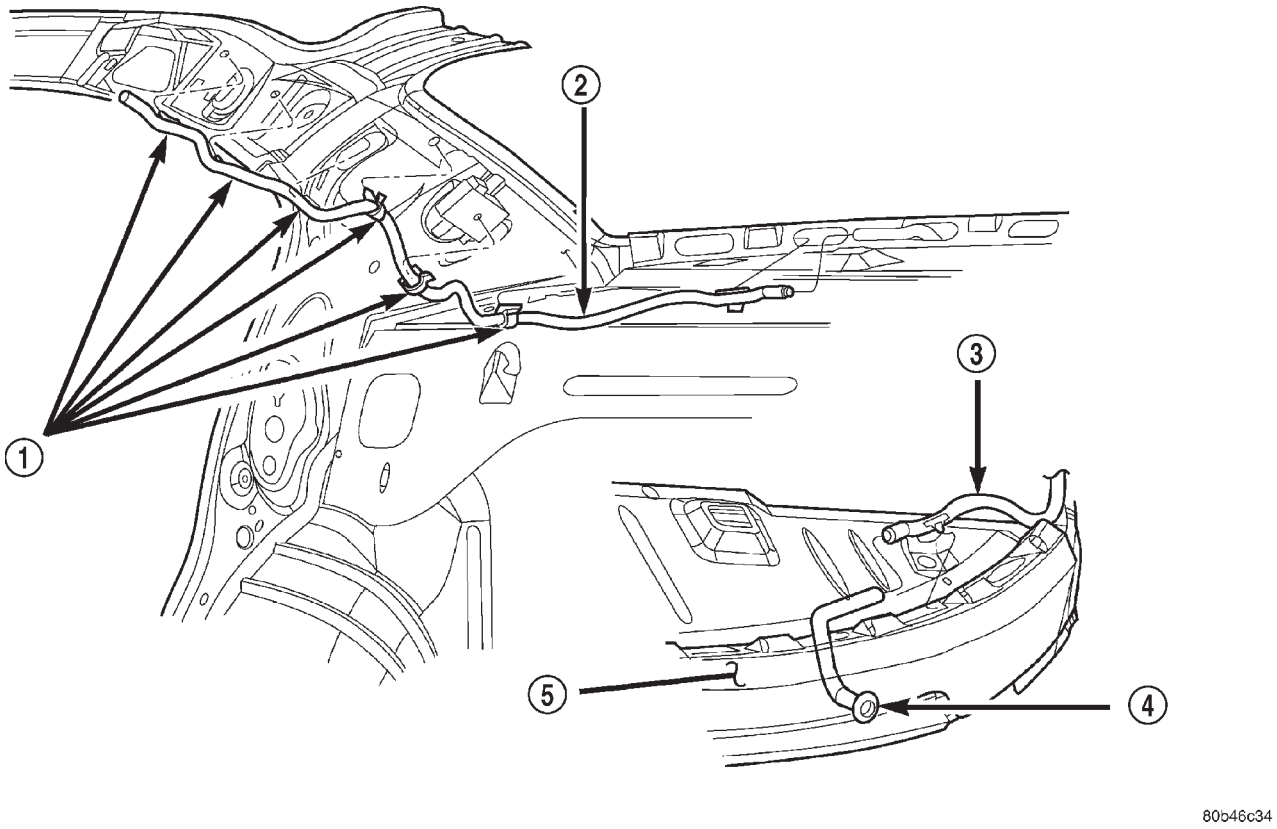


Fig. 9 Rear Drain Hose – Concorde

1 – HOSE FASTENERS
2 – DRAIN HOSE
3 – DRAIN HOSE
4 – DRAIN GROMMET
5 – REAR SHELF PANEL

REMOVAL AND INSTALLATION (Continued)

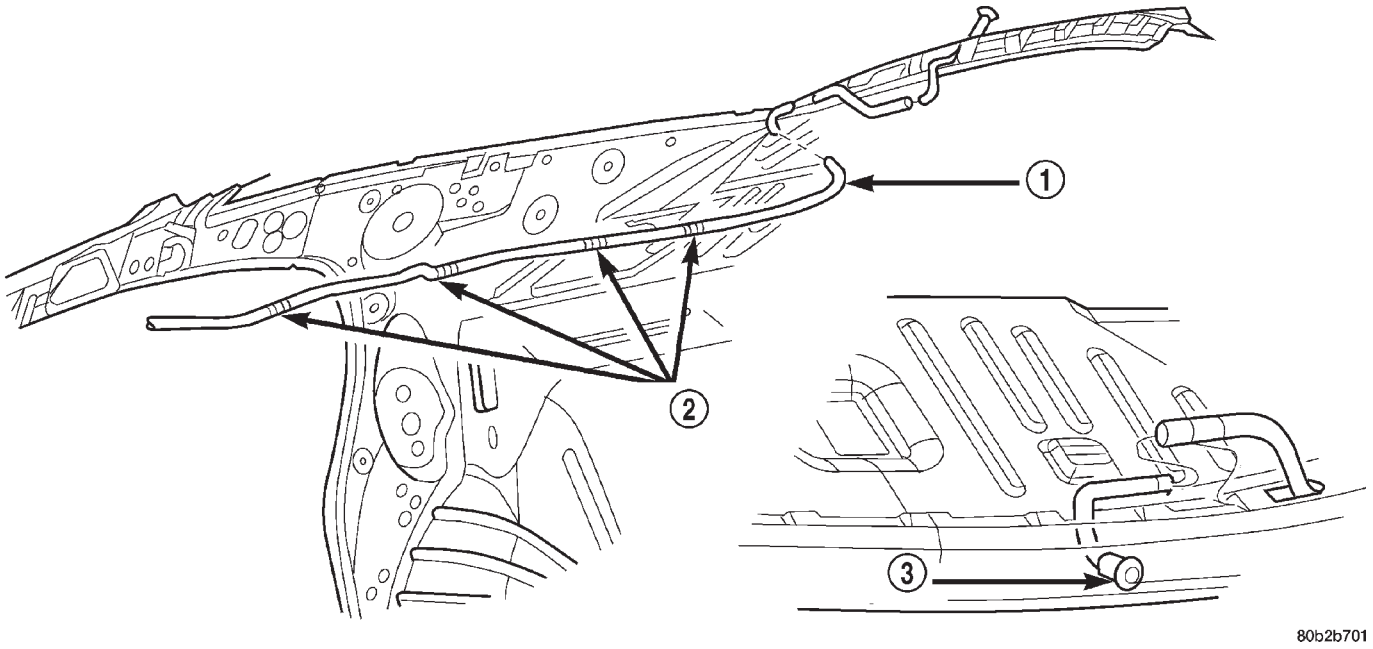


Fig. 10 Rear Drain Hose

1 – DRAIN HOSE
2 – HOSE FASTENERS
3 – DRAIN GROMMET

ADJUSTMENTS

SUNROOF GLASS PANEL ADJUSTMENT

(1) Move the sunshade rearward to the open position.
(2) Move the sunroof glass panel to the fully closed position.
(3) Loosen the forward screws on each side enough to make the front adjustment.
(4) Adjust the front of the sunroof glass panel 1 mm (1/32 inch) below the top surface of the roof panel.
(5) Tighten the front two screws.
(6) Loosen the rear screws on each side enough to make the rear adjustment.
(7) Adjust the rear of the sunroof glass panel 1 mm (1/32 inch) above the top surface of the roof panel.
(8) Tighten the rear two screws.
(9) Check for proper fit. If not OK, repeat glass panel adjustment.

SUNROOF GLASS PANEL TIMING

Sunroof Drive Cable Timing

NOTE: A gage comes with the new motor.

(1) If the glass panel was not in the fully closed position, when the sunroof drive motor was removed, the sunroof glass panel needs to be timed, before the new motor is installed.
(2) Remove sunroof glass panel.
(3) Set gage into the track near the rear of the opening between the move driver slide and the bracket (Fig. 11).
(4) Move the driver slide forward or aft to get proper setting.
(5) Repeat the operation on the other side.
(6) Install sunroof drive motor.

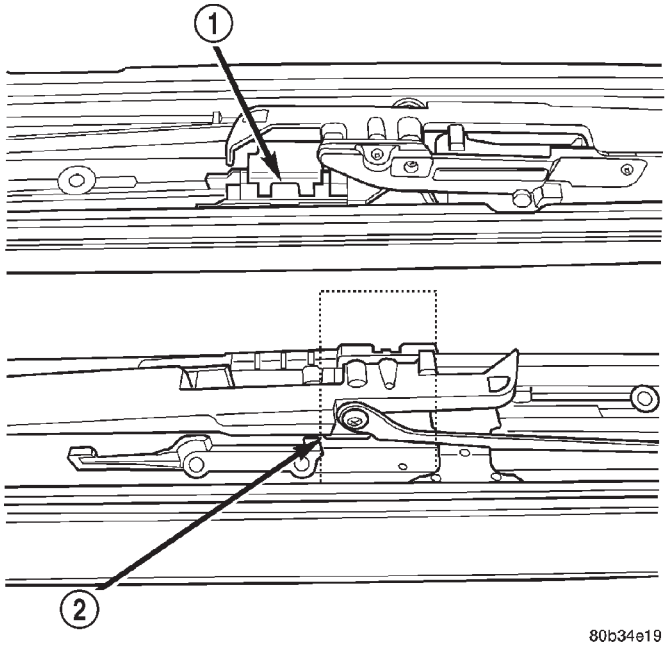


Fig. 11 Sunroof Drive Cable Timing

1 – MOVE DRIVER SLIDE FORWARD/AFT
2 – GAGE

BODY COMPONENTS

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DIAGNOSIS AND TESTING

WATER LEAKS

Water leaks can be caused by poor sealing, improper body component alignment, body seam porosity, missing plugs, or blocked drain holes. Centrifugal and gravitational force can cause water to drip from a location away from the actual leak point, making leak detection difficult. All body sealing points should be water tight in normal wet-driving conditions. Water flowing downward from the front of the vehicle should not enter the passenger or luggage compartment. Moving sealing surfaces will not always seal water tight under all conditions. At times, side glass or door seals will allow water to enter the passenger compartment during high pressure washing or hard driving rain (severe) conditions. Overcompensating on door or glass adjustments to stop a water leak that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After completing a repair, water test vehicle to verify leak has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE WATER LEAK TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate section of this group for proper procedures.

WATER LEAK TESTS

WARNING: DO NOT USE ELECTRIC SHOP LIGHTS OR TOOLS IN WATER TEST AREA. PERSONAL INJURY CAN RESULT.

When the conditions causing a water leak have been determined, simulate the conditions as closely as possible.

- If a leak occurs with the vehicle parked in a steady light rain, flood the leak area with an open-ended garden hose.
- If a leak occurs while driving at highway speeds in a steady rain, test the leak area with a reasonable velocity stream or fan spray of water. Direct the spray in a direction comparable to actual conditions.
- If a leak occurs when the vehicle is parked on an incline, hoist the end or side of the vehicle to simulate this condition. This method can be used when the leak occurs when the vehicle accelerates, stops or turns. If the leak occurs on acceleration, hoist the front of the vehicle. If the leak occurs when braking, hoist the back of the vehicle. If the leak occurs on left turns, hoist the left side of the vehicle. If the leak occurs on right turns, hoist the right side of the vehicle. For hoisting recommendations refer to Group 0, Lubrication and Maintenance, General Information section.

WATER LEAK DETECTION

To detect a water leak point-of-entry, do a water test and watch for water tracks or droplets forming on the inside of the vehicle. If necessary, remove interior trim covers or panels to gain visual access to the leak area. If the hose cannot be positioned without being held, have someone help do the water test.

Some water leaks must be tested for a considerable length of time to become apparent. When a leak appears, find the highest point of the water track or drop. The highest point usually will show the point of entry. After leak point has been found, repair the leak and water test to verify that the leak has stopped.

Locating the entry point of water that is leaking into a cavity between panels can be difficult. The trapped water may splash or run from the cavity, often at a distance from the entry point. Most water leaks of this type become apparent after accelerating, stopping, turning, or when on an incline.

MIRROR INSPECTION METHOD

When a leak point area is visually obstructed, use a suitable mirror to gain visual access. A mirror can also be used to deflect light to a limited-access area to assist in locating a leak point.

BRIGHT LIGHT LEAK TEST METHOD

Some water leaks in the luggage compartment can be detected without water testing. Position the vehicle in a brightly lit area. From inside the darkened luggage compartment inspect around seals and body seams. If necessary, have a helper direct a drop light over the suspected leak areas around the luggage compartment. If light is visible through a normally sealed location, water could enter through the opening.

DIAGNOSIS AND TESTING (Continued)

PRESSURIZED LEAK TEST METHOD

When a water leak into the passenger compartment cannot be detected by water testing, pressurize the passenger compartment and soap test exterior of the vehicle. To pressurize the passenger compartment, close all doors and windows, start engine, and set heater control to high blower in HEAT position. If engine can not be started, connect a charger to the battery to ensure adequate voltage to the blower. With interior pressurized, apply dish detergent solution to suspected leak area on the exterior of the vehicle. Apply detergent solution with spray device or soft bristle brush. If soap bubbles occur at a body seam, joint, seal or gasket, the leak entry point could be at that location.

WIND NOISE

Wind noise is the result of most air leaks. Air leaks can be caused by poor sealing, improper body component alignment, body seam porosity, or missing plugs in the engine compartment or door hinge pillar areas. All body sealing points should be airtight in normal driving conditions. Moving sealing surfaces will not always seal airtight under all conditions. At times, side glass or door seals will allow wind noise to be noticed in the passenger compartment during high cross winds. Over compensating on door or glass adjustments to stop wind noise that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After a repair procedure has been performed, test vehicle to verify noise has stopped before returning vehicle to use.

Wind noise can also be caused by improperly fitted exterior moldings or body ornamentation. Loose moldings can flutter, creating a buzzing or chattering noise. An open cavity or protruding edge can create a whistling or howling noise. Inspect the exterior of the vehicle to verify that these conditions do not exist.

VISUAL INSPECTION BEFORE TESTS

Verify that floor and body plugs are in place and body components are aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate section of this group for proper procedures.

ROAD TESTING WIND NOISE

(1) Drive the vehicle to verify the general location of the wind noise.

(2) Apply 50 mm (2 in.) masking tape in 150 mm (6 in.) lengths along weatherstrips, weld seams or moldings. After each length is applied, drive the vehicle. If noise goes away after a piece of tape is applied, remove tape, locate, and repair defect.

POSSIBLE CAUSE OF WIND NOISE

- Moldings standing away from body surface can catch wind and whistle.
- Gaps in sealed areas behind overhanging body flanges can cause wind-rushing sounds.
- Misaligned movable components.
- Missing or improperly installed plugs in pillars.
- Weld burn through holes.

SERVICE PROCEDURES

HEAT STAKING

(1) Remove trim panel.

(2) Bend or move the trim panel components at the heat staked joints. Observe the heat staked locations and/or component seams for looseness.

(3) Heat stake the components.

(a) If the heat staked or component seam location is loose, hold the two components tightly together and using a soldering gun with a flat tip, melt the material securing the components together. Do not over heat the affected area, damage to the exterior of the trim panel may occur.

(b) If the heat staked material is broken or missing, use a hot glue gun to apply new material to the area to be repaired. The panels that are being heat staked must be held together while the applying the glue. Once the new material is in place, it may be necessary to use a soldering gun to melt the newly applied material. Do not over heat the affected area, damage to the exterior of the trim panel may occur.

(4) Allow the repaired area to cool and verify the repair.

(5) Install trim panel.

PLASTIC BODY PANEL REPAIR

DESCRIPTION

Resin Transfer Molded (RTM) body panels are reinforced with a continuous fiberglass mesh. Epoxy resin is injected into a gel-coated and fiberglass lined mold to form a body panel. Sheet molded compound (SMC) body panels are constructed with fiberglass strands usually 1 inch or shorter, epoxy resin formed into sheet stock and pressed in mold flowing material to form a sheet molded compound (SMC) body panel. RTM and SMC body panels can be repaired with epoxy adhesive after market products. Refer to instructions provided by the manufacturer of products being used to repair RTM or SMC. Daimler-Chrysler Corporation recommends that a trained automotive body technician perform body panel repair procedures (Fig. 1).

SERVICE PROCEDURES (Continued)

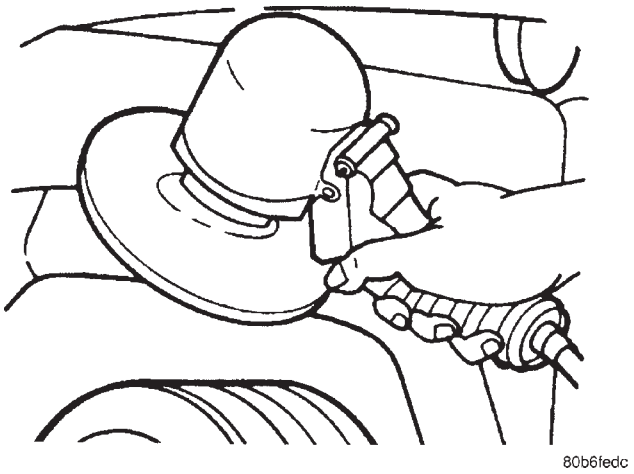


Fig. 1 Panel Repair

SAFETY PRECAUTION AND WARNINGS

WARNING: EYE PROTECTION SHOULD BE USED WHEN SERVICING RTM AND SMC COMPONENTS. PERSONAL INJURE CAN RESULT.

USE AN OSHA APPROVED BREATHING DEVICE WHEN MIXING EPOXY, GRINDING RTM AND SMC, AND SPRAYING PAINT OR SOLVENTS IN A CONFINED AREA. PERSONAL INJURY CAN RESULT.

AVOID PROLONGED SKIN CONTACT WITH EPOXY RESIN, PETROLEUM, OR ALCOHOL BASED SOLVENTS. PERSONAL INJURY CAN RESULT.

DO NOT VENTURE UNDER A HOISTED VEHICLE THAT IS NOT PROPERLY SUPPORTED ON SAFETY STANDS. PERSONAL INJURY CAN RESULT.

- When holes must be drilled or cut in body panels, verify locations of internal body components and electrical wiring. Damage to vehicle can result.
- Do not use abrasive chemicals or compounds on undamaged painted surfaces around repair areas. Damage to finish can result.

PANEL SECTIONING

If it is required to section a large panel for an SMC or RTM repair, it will be necessary to reinforce the panel with epoxy structural adhesive (rigid repair adhesive) (Fig. 2). To bond two plastic panels together, a reinforcement must overlap both panels. The panels must be "V'd" at a 20 degree angle. The area to be reinforced should be washed, then sanded. Be sure to wipe off any excess soap and water when finished. Lightly sand or abrade the plastic with an abrasive pad or sandpaper. Blow off any dust with compressed air or wipe with a clean dry rag.

When bonding SMC or RTM panels, use a two-part epoxy adhesive. Properly mix parts A and B, and apply it to the panels being repaired. Be sure that enough adhesive has been applied to allow squeeze out and to fill the full bond line. Once the pieces have been brought together, do not move them until the adhesive is cured. The assembly can be held together with clamps, rivets, etc. A faster cure can be obtained by heating with a heat lamp or heat gun.

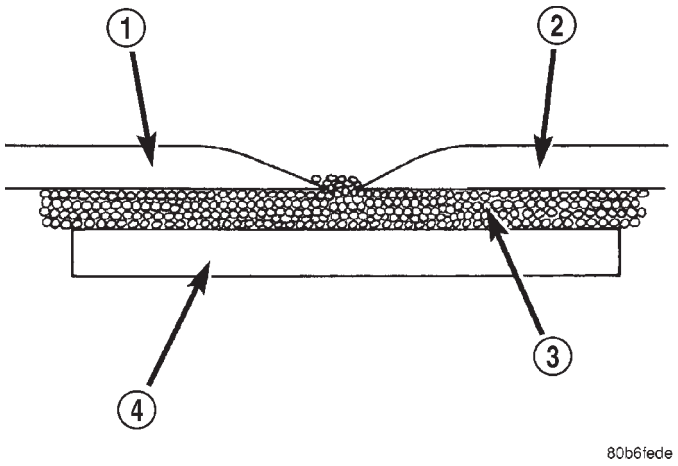


Fig. 2 Panel Sectioning

1 – EXISTING PANEL
2 – NEW PANEL
3 – PANEL ADHESIVE
4 – BONDING STRIP

After the parts have been bonded and have had time to cure, rough sand the seam and apply the final adhesive filler to the area being repaired. Smooth the filler with a spatula, wooden tongue depressor, or squeegee. For fine texturing, a small amount of water can be applied to the filler surface while smoothing. The cured filler can be sanded as necessary and, as a final step, cleanup can be done withy soapy water. Wipe the surface clean with a dry cloth allowing time for the panel to dry before moving on with the repair.

PANEL REINFORCEMENT

Structural repair procedures for rigid panels such as Sheet Molded compound (SMC) or Resin Transfer Molded (RTM) with large cracks and holes will require a reinforcement backing. Reinforcements can be made with several applications of glass cloth saturated with epoxy structural adhesive, semirigid or flexible repair materials should be used for semirigid or flexible part repairs (Fig. 3) and (Fig. 4). Open meshed fiberglass dry wall tape can be used to form a reinforcement. The dry wall tape allows the resin to penetrate through and make a good bond between the panel and the epoxy adhesive. Structurally, the more dry wall tape used, the stronger the repair.

Another kind of repair that can be done to repair large cracks and holes is to use a scrap piece of similar plastic and bond with structural adhesive. The reinforcement should cover the entire break and

SERVICE PROCEDURES (Continued)

should have a generous amount of overlap on either side of the cracked or broken area.

When repairing plastic, the damaged area is first "V'd" out, or beveled. Large bonding areas are desirable when repairing plastic because small repairs are less likely to hold permanently. Beveling the area around a crack at a 20 degree angle will increase the bonding surface for a repair (Fig. 5). It is recommended that sharp edges be avoided because the joint may show through after the panel is refinished.

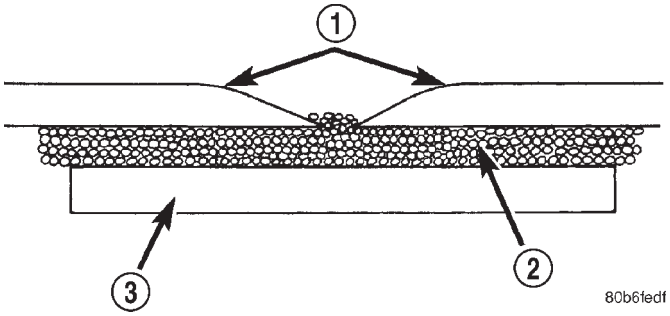


Fig. 3 Softened Edges

1 – SOFTENED EDGES
2 – PANEL ADHESIVE
3 – BONDING STRIP

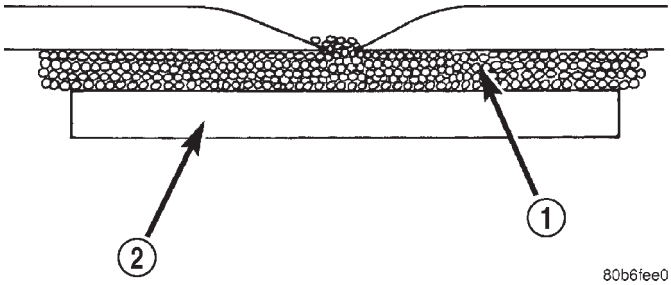


Fig. 4 Panel Reinforcement

1 – PANEL ADHESIVE
2 – REINFORCEMENT

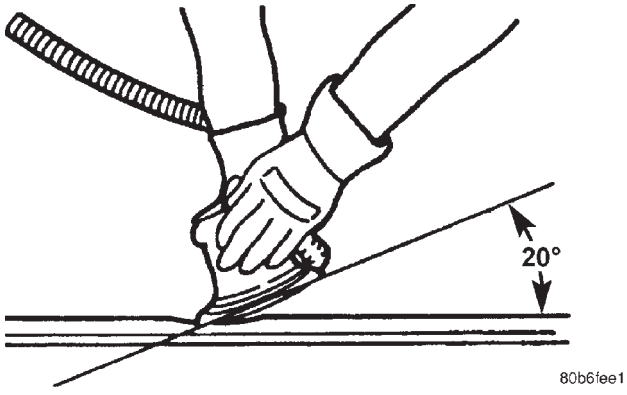


Fig. 5 Beveling Angle – 20 Degree

- Panel repair for both flexible and rigid panels are basically the same. The primary difference between flexible panel repair and rigid panel repair is in the adhesive materials used (Fig. 6).
- The technician should first decide what needs to be done when working on any type of body panel. One should determine if it is possible to return the damage part to its original strength and appearance without exceeding the value of the replacement part.
- When plastic repairs are required, it is recommended that the part be left on the vehicle when every possible. That will save time, and the panel will remain stationary during the repair. Misalignment can cause stress in the repair areas and can result in future failure.

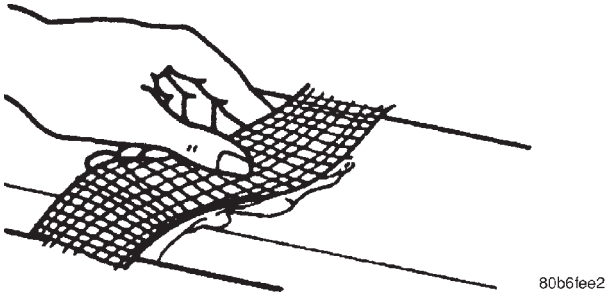


Fig. 6 Fiberglass Tape

VISUAL INSPECTION

Sheet Molded Compound (SMC) and Resin Transfer Molded (RTM), because they are composites, react differently to impact that sheet metal does. Composite materials can mask the severity of an accident. Adhesive bond lines, interior structure of the doors, and steel structure need to be inspected carefully to get a true damage assessment. Close inspection may require partial removal of interior trim or inner panels.

Identify the type of repair:

Puncture or Crack – Damage that has penetrated completely through the panel. Damage is confined to one general area; a panel section is not required. However, a backer panel, open fiberglass tape, or matted material must be bonded from behind (Fig. 7).

PANEL SURFACE PREPARATION

If a body panel has been punctured, cracked, or crushed, the damaged area must be removed from the panel to achieve a successful repair. All spider web cracks leading away from a damaged area must be stopped or removed. To stop a running crack in a SMC or RTM panel, drill a 6 mm (0.250 in.) hole at the end of the crack farthest away from the damage. If spider web cracks can not be stopped, the panel would require replacement. The surfaces around the damaged area should be stripped of paint and freed

SERVICE PROCEDURES (Continued)

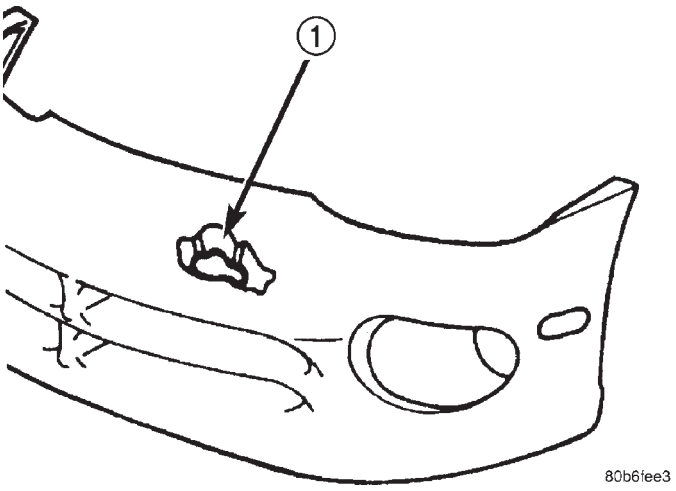


Fig. 7 Damage Component

1 – PUNCTURE

from was and oil. Scuff surfaces around repair area with 360 grit wet/dry sand paper, or equivalent, to assure adhesion of epoxy repair materials.

PATCHING PANELS

An RTM or SMC panel that has extensive puncture type damage can be repaired by cutting out the damaged material (Fig. 8). Use a suitable reciprocating saw or cut off wheel to remove the section of the SMC or RTM panel that is damaged. The piece cut out can be used as a template to shape the new patch. It is not necessary to have access to the back of the panel to install a patch. Bevel edges of cutout at 20 degrees to expose a larger bonding area on the outer side. This will allow for an increased reinforcement areas.

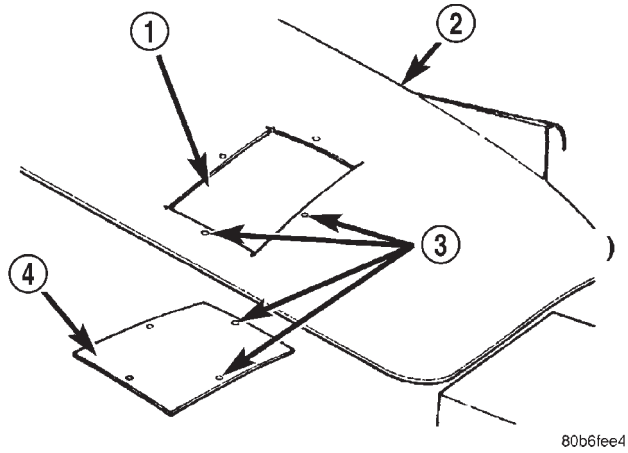


Fig. 8 Damaged Panel Cutout and Patch

1 – CUTOUT
2 – DAMAGED BODY PANEL
3 – 4MM (0.160 IN.) HOLES
4 – PATCH CUT TO SIZE

PANEL PATCH FABRICATIONS

A patch can be fabricated from any rigid fiberglass panel that has comparable contour with the repair area. discard SMC or RTM panels. Lift gates and fenders can be used to supply patch material. If existing material is not available or compatible, a patch can be constructed with epoxy and reinforcement mesh (dry wall tape). Perform the following operation if required:

(1) Cover waxed paper or plastic with adhesive backed nylon mesh (dry wall tape) larger than the patch required (Fig. 9).

(2) Tape waxed paper or plastic sheet with mesh to a surface that has a compatible contour to the repair area.

(3) Apply a liberal coat of epoxy adhesive over the reinforcement mesh (Fig. 9). If necessary apply a second or third coat of epoxy and mesh after firs coat has cured. The thickness of the patch should be the same as the repair area.

(4) After patch has cured, peel waxed paper or plastic from the back of the patch.

(5) If desired, a thin film coat of poesy can be applied to the back of the patch to cover mesh for added strength.

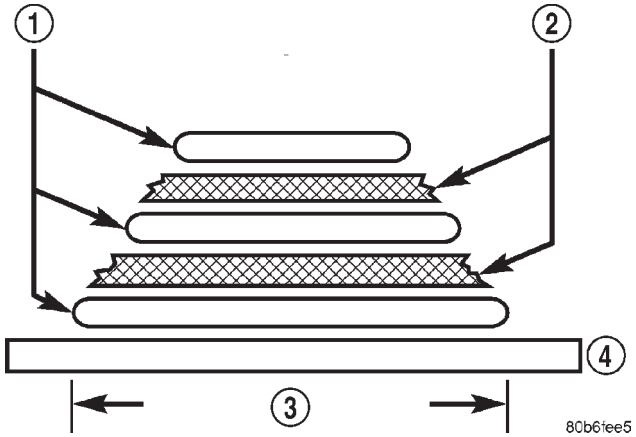


Fig. 9 Fabricated Panel

1 – STRUCTURAL ADHESIVE OR EPOXY RESIN
2 – FIBERGLASS CLOTH OR FIBERGLASS MESH TAPE
3 – WIDTH OF V-GROOVE
4 – WAXED PAPER

PANEL PATCH INSTALLATION

(1) Make a paper or cardboard pattern the size and shape of the cutout hole in the panel.

(2) Trim 3 mm (0.125 in.) from edges of pattern so patch will have a gap between connecting surfaces.

(3) Using the pattern as a guide, cut the patch to size.

(4) Cut scrap pieces of patch material into 50 mm (2 in.) squares to use as patch supports to sustain the patch in the cutout.

SERVICE PROCEDURES (Continued)

(5) Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) in from edge of cutout hole (Fig. 8).

(6) Drill 3 mm (0.125 in.) holes in the support squares 13 mm (0.5 in.) from the edge in the center of one side.

(7) Scuff the backside of the body panel around the cutout hole with a scuff pad or sandpaper.

(8) Mix enough epoxy to cover one side of all support squares.

(9) Apply epoxy to the support squares on the half with the hole pre-drilled in it.

(10) Using number 8 sheet metal screws, secure support squares to back side of body panel with epoxy sandwiched between the panel and squares (Fig. 10).

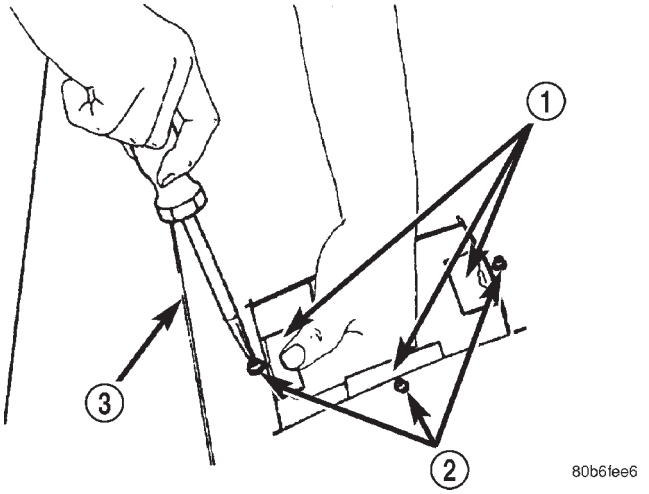


Fig. 10 Secure Support Squares To Body Panel

1 – SUPPORT SQUARES
2 – SCREWS
3 – DAMAGED BODY PANEL

(11) Position patch in cutout against support squares and adjust patch until the gap is equal along all sides (Fig. 11).

(12) Drill 3 mm (0.125 in.) holes in the support squares through the pre-drilled holes in the patch.

(13) Apply a coat of epoxy to the exposed ends of the support squares (Fig. 12).

(14) Install screws to hold the patch to support squares (Fig. 13). Tighten screws until patch surface is flush with panel surface.

(15) Allow epoxy to cure, and remove all screws.

(16) Using a 125 mm (5 in.) 24 grit disc grinder, grind a 50 mm (2 in.) to 75 mm (3 in.) wide and 2 mm (0.080 in.) deep path across the gaps around the patch (Fig. 14). With compressed air, blow dust from around patch.

(17) Apply adhesive backed nylon mesh (dry wall tape) over gaps around patch (Fig. 15).

(18) Mix enough epoxy to cover the entire patch area.

(19) Apply epoxy over the mesh around patch, and smooth epoxy with a wide spreader to reduce finish grinding. Use two to three layers of mesh and epoxy to create a stronger repair (Fig. 16).

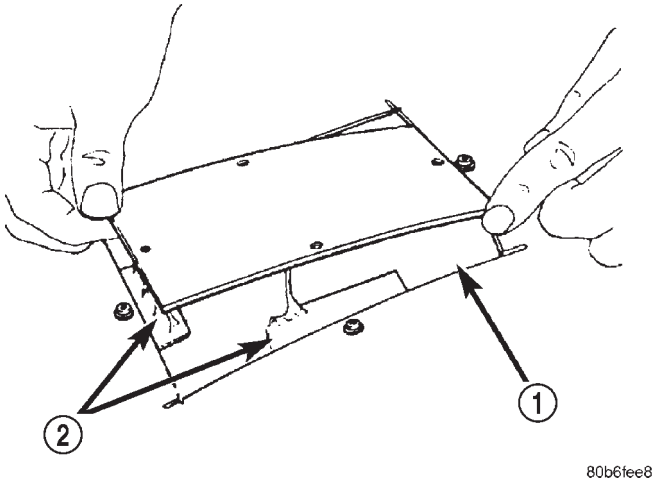


Fig. 11 Position Patch In Cutout And Align

1 – CUTOUT
2 – SUPPORT SQUARES

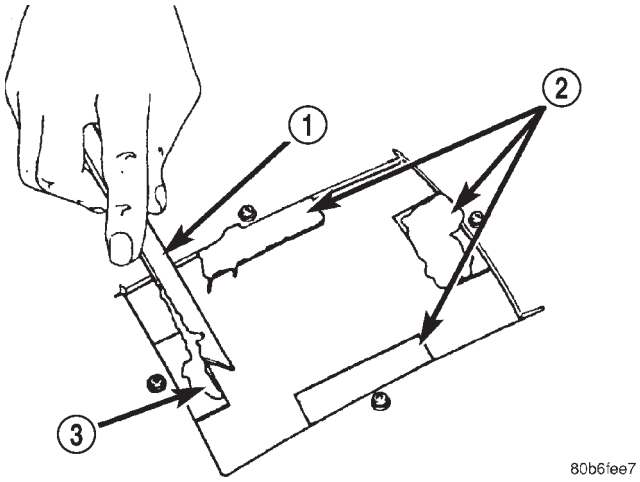


Fig. 12 Apply Epoxy To Support Squares

1 – APPLICATOR
2 – SUPPORT SQUARES
3 – EPOXY

PATCHED PANEL SURFACING

After patch panel is installed, the patch area can be finished using the same methods as finishing other types of body panels. If mesh material is exposed in the patched area, grind surface down, and apply a coat of high quality rigid plastic body filler. Prime, block sand, and paint as required.

SERVICE PROCEDURES (Continued)

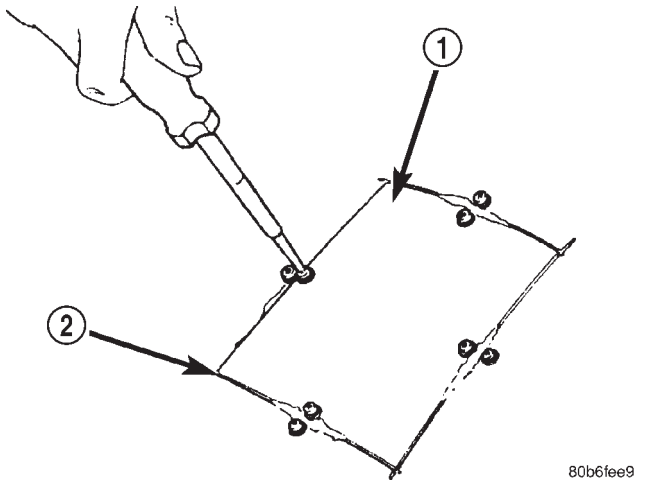


Fig. 13 Install Screws

1 – PATCH
2 – GAP

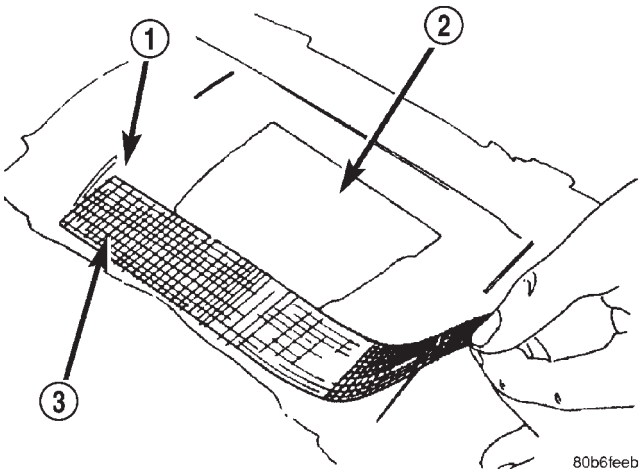


Fig. 15 Cover Gaps With Mesh

1 – GROUND DOWN AREA
2 – PATCH
3 – MESH

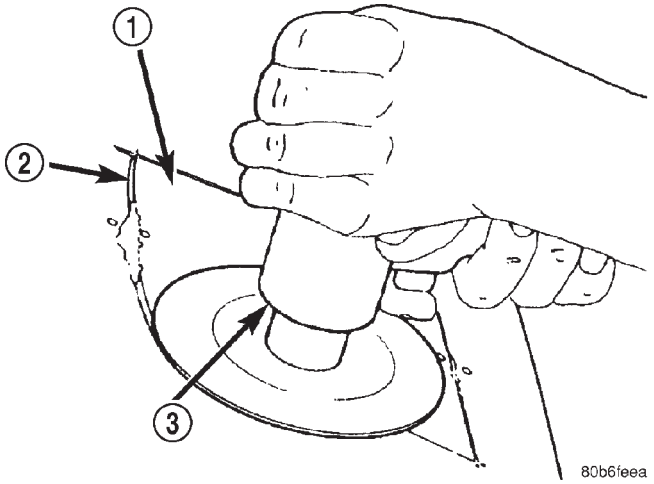


Fig. 14 Grind Surface

1 – PATCH
2 – GAP
3 – DISC GRINDER

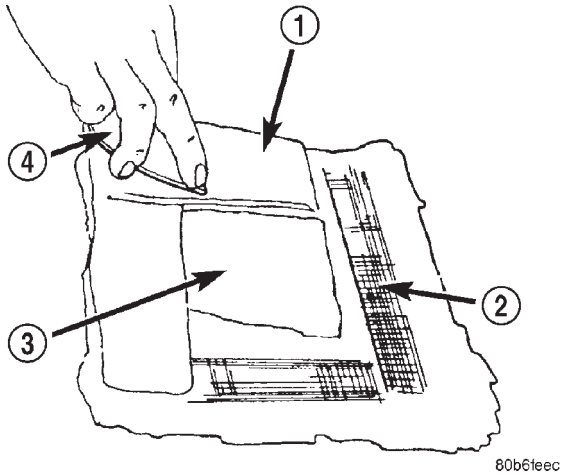


Fig. 16 Cover Mesh With Epoxy

1 – EPOXY
2 – MESH
3 – PATCH
4 – SPREADER

REMOVAL AND INSTALLATION

UPPER RADIATOR CLOSURE PANEL

REMOVAL

(1) Open hood.

(2) Mark bolt locations on the upper radiator closure panel.

(3) Remove bolts attaching windshield washer bottle and speed control servo, if equipped (Fig. 17).

(4) Remove headlamp jackscrews both sides.

(5) Remove fasteners attaching upper bumper fascia.

(6) Remove bolts attaching the forward edge of upper radiator closure panel.

(7) Remove bolts attaching upper radiator closure panel.

(8) Disconnect hood latch cable from hood latch.

(9) Remove upper radiator closure panel from vehicle.

(10) For replacement of upper radiator closure panel, remove hood latch, and any other hardware.

INSTALLATION

(1) Place in position the upper radiator closure panel.

(2) Connect hood latch cable to hood latch.

(3) Install bolts attaching upper radiator closure panel. Check bolt alignment marks.

REMOVAL AND INSTALLATION (Continued)

(4) Install bolts attaching the forward edge of upper radiator closure panel.

(5) Install fasteners attaching upper bumper fascia.

(6) Install headlamp jackscrews both sides.

(7) Check hood latch operation.

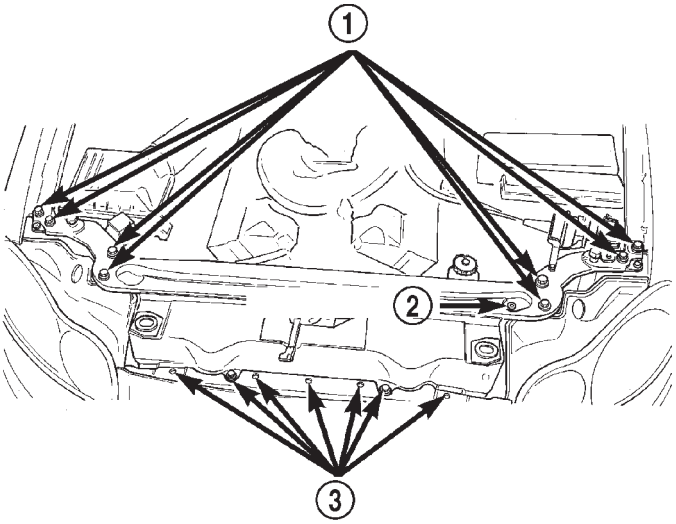


Fig. 17 Upper Radiator Closure Panel

1 – ATTACHING BOLTS
2 – JACKSCREW
3 – FASTENERS

HOOD LATCH

REMOVAL

(1) Release hood latch and open hood.

(2) Remove nuts attaching hood latch to crossmember (Fig. 18) or (Fig. 19).

(3) Remove hood latch from crossmember.

(4) Disconnect hood release cable from hood latch.

INSTALLATION

(1) Connect hood release cable to hood latch.

(2) Place hood latch in position on crossmember.

(3) Install nuts to attach hood latch to crossmember. Tighten nuts to 22.6 to 33.9 N·m (200 to 300 in. lbs.) torque.

(4) Verify hood latch operation before closing hood.

HOOD RELEASE CABLE

REMOVAL

(1) Release hood latch by using the inside release, if still functioning. If not reach up through the bottom of the fascia opening and release the latch pawl lever.

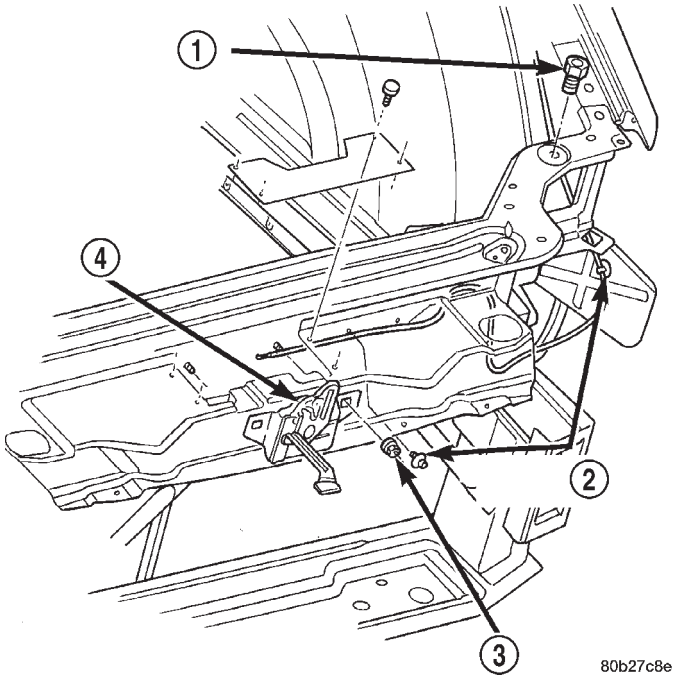


Fig. 18 Hood Latch – Concorde/LHS/300M

1 – HOOD BUMPER ADJUSTER
2 – HOOD RELEASE CABLE CLIPS
3 – NUTS
4 – HOOD LATCH

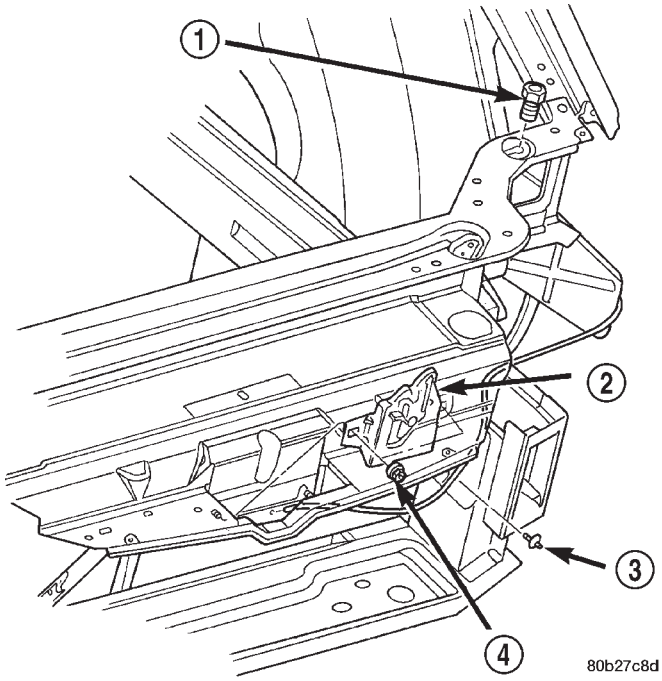


Fig. 19 Hood Latch – Intrepid

1 – HOOD BUMPER ADJUSTER
2 – HOOD LATCH
3 – RELEASE CABLE CLIP
4 – NUTS

REMOVAL AND INSTALLATION (Continued)

(2) Disconnect hood release cable ferrule and cable end from hood latch assembly (Fig. 20) or (Fig. 21).
(3) Remove left cowl side trim panel.
(4) Remove screws attaching hood latch release cable handle to the cowl side.
(5) Remove left wheel splash shield.
(6) Disengage release cable from routing clips.
(7) Roll carpet back to expose cable.
(8) Release taped on cable clip from dash liner (Fig. 22).
(9) Release the rubber grommet from the dash panel. Pull cable through the dash panel access hole.
(10) Remove cable from vehicle.

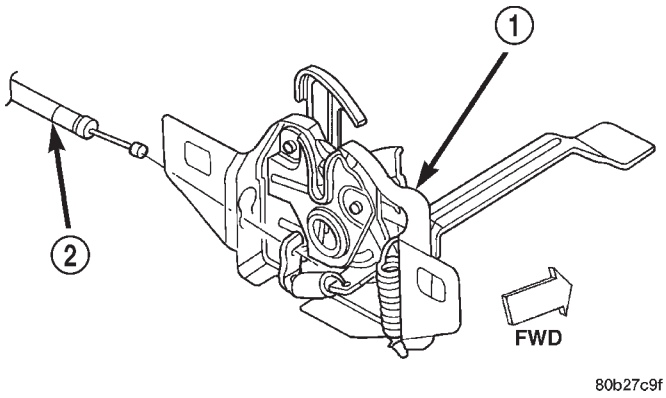


Fig. 20 Hood Release Cable – Concorde/LHS/300M
1 – HOOD LATCH
2 – HOOD RELEASE CABLE

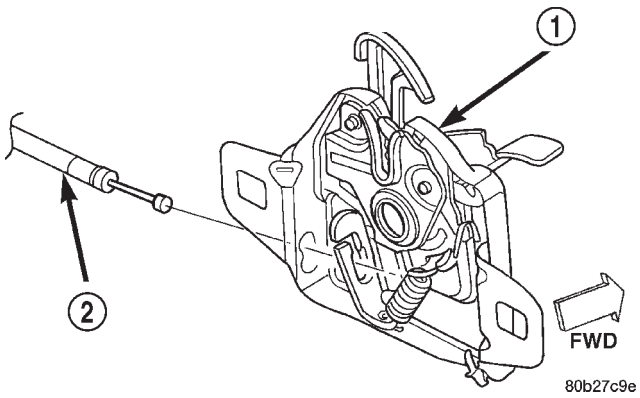


Fig. 21 Hood Release Cable – Intrepid
1 – HOOD LATCH
2 – HOOD RELEASE CABLE

INSTALLATION

(1) Place cable in position on vehicle.
(2) Push cable through access hole in dash panel.
(3) Install release cable rubber grommet into access hole in dash panel.
(4) Install screws to attach hood latch release cable handle to the cowl side. Tighten screws to 2.3 to 3.4 N·m (20 to 30 in. lbs.) torque.

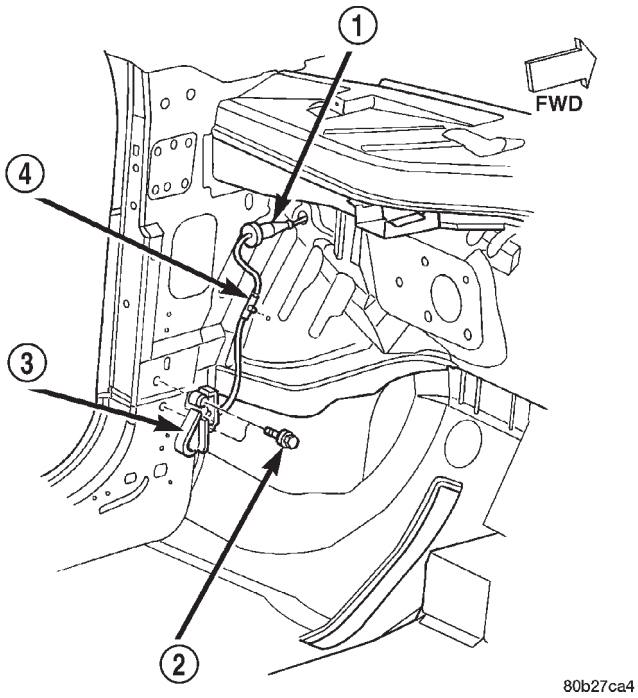


Fig. 22 Hood Release Handle
1 – RUBBER GROMMET
2 – SCREWS
3 – HOOD RELEASE HANDLE
4 – HOOD RELEASE CABLE

(5) Install cable clips.
(6) Place carpet into position.
(7) Install left wheel splash shield.
(8) Install left cowl side trim panel.
(9) Connect hood release cable ferrule and cable end to hood latch.
(10) Verify hood latch operation before closing hood.

HOOD GAS PROPS

REMOVAL

(1) Open hood.
(2) Support hood with a suitable prop device.
(3) Remove gas prop lock caps on each end (Fig. 23).
(4) Remove gas prop from vehicle.

INSTALLATION

(1) Place gas prop in position on vehicle.
(2) Install the lock caps on the gas prop.
(3) Verify hood lid operation.

HOOD

REMOVAL

(1) Raise hood to full up position.

REMOVAL AND INSTALLATION (Continued)

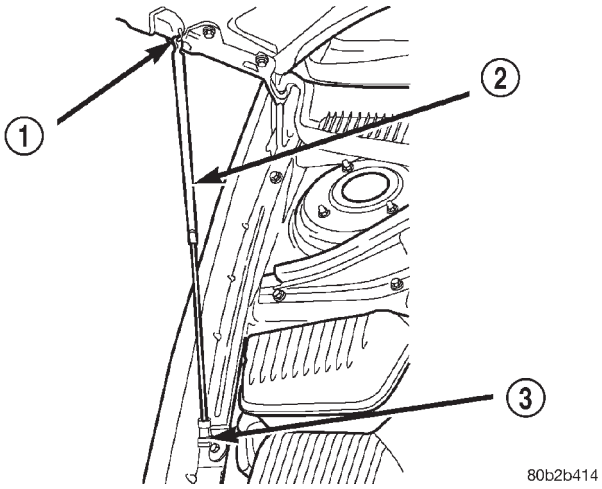


Fig. 23 Hood Gas Prop

1 – LOCK CAP
2 – GAS PROP
3 – LOCK CAP

(2) Mark all bolt and hinge attachment locations with a grease pencil or other suitable device to provide reference marks for installation.

(3) Remove the top bolts attaching hood to hinge and loosen the bottom bolts until they can be removed by hand (Fig. 24).

(4) With assistance from a helper at the opposite side of the vehicle to support the hood, remove bottom bolts attaching hood to hinge. Remove the hood from the vehicle.

INSTALLATION

(1) Place hood in position on vehicle. With assistance from a helper at the opposite side of the vehicle to support the hood, install bottom bolts to hold hood to hinge finger tight.

(2) Install top bolts to attach hood to hinge finger tight. When installing hood, align all marks and secure bolts. The hood should be aligned to 4 mm (0.160 in.) gap to the front fenders and flush across the top surfaces along fenders.

(3) Position bolts at marks and tighten bolts to 22.6 to 33.9 N·m (200 to 300 in. lbs.) torque. The hood should be aligned to 4 mm (0.160 in.) gap to the front fenders and flush across the top surfaces along fenders.

(4) Verify hood operation and alignment.

HOOD HINGE

REMOVAL

(1) Support hood on the side that requires hinge replacement.

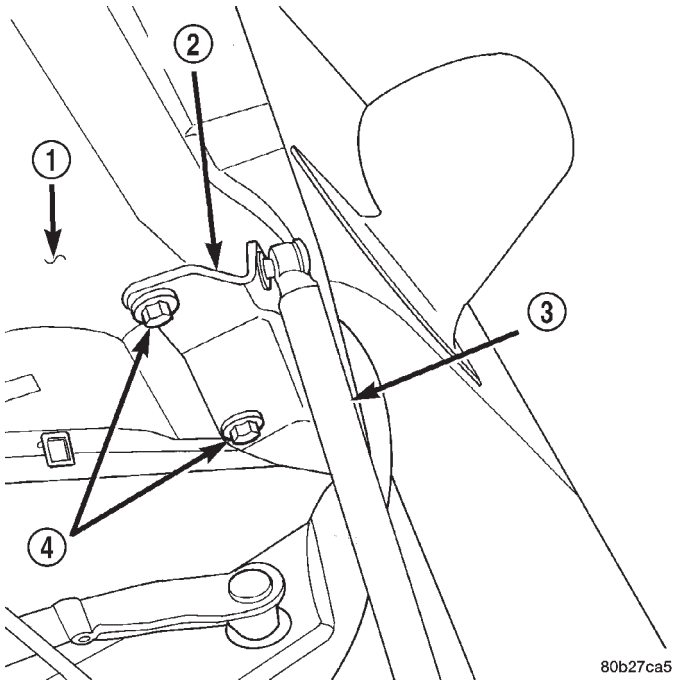


Fig. 24 Hood

1 – HOOD
2 – HOOD HINGE
3 – GAS PROP
4 – BOLTS

(2) Mark all bolt and hinge attachment locations with a grease pencil or other suitable device to provide reference marks for installation.

(3) Remove bolts attaching hood to hinge.

(4) Remove bolts attaching hood hinge to vertical wall of load beam and remove hinge from vehicle (Fig. 25). To gain access to the lower left hood hinge the wiper motor assembly will have to be removed. Refer to Group 8K, Windshield Wipers and Washers for Wiper Motor Assembly Removal procedures.

INSTALLATION

(1) If necessary, paint new hinge before installation.

(2) Place hinge in position on vehicle.

(3) Install bolts to attach hood hinge to vertical wall of load beam.

(4) Install bolts to attach hood to hinge. When installing hood hinge, align all marks and secure bolts. The hood should be aligned to 4 mm (0.160 in.) gap to the front fenders and flush across the top surfaces along fenders. Hinge can be adjusted up or down by hinge to body attaching bolts to achieve proper hood height.

(5) Align all marks and tighten bolts to 22.6 to 33.9 N·m (200 to 300 in. lbs.) torque. The hood should be aligned to 4 mm (0.160 in.) gap to the front

REMOVAL AND INSTALLATION (Continued)

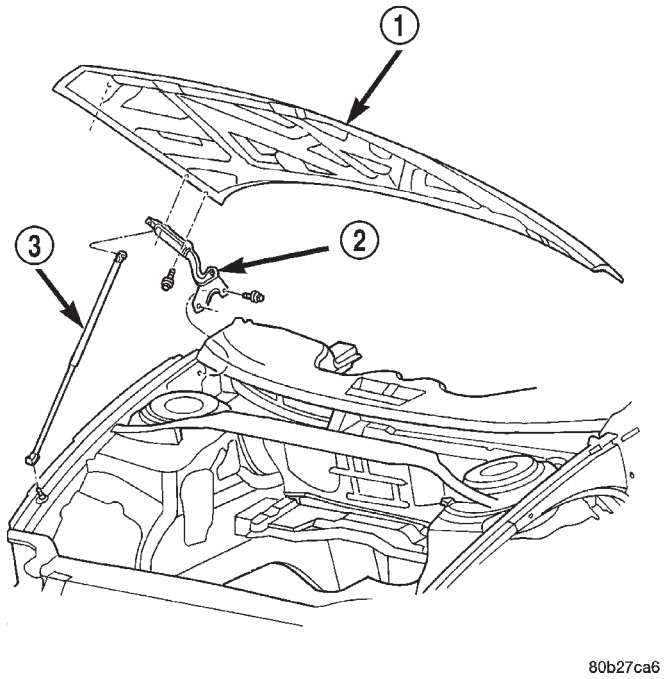


Fig. 25 Hood Hinge

1 – HOOD
2 – HOOD HINGE
3 – GAS PROP

fenders and flush across the top surfaces along fenders.

(6) Remove support from under hood and verify hood operation.

COWL SCREEN

REMOVAL

(1) Release hood latch and open hood.

(2) Remove wiper arms. Refer to Group 8K, Windshield Wiper and Washer Systems.

(3) Remove screws attaching cowl screen at the windshield and under hood (Fig. 26).

(4) Remove cowl screen from vehicle.

INSTALLATION

(1) Place cowl screen in position on vehicle.

(2) Install cowl screen screws, starting at fender moving inboard.

(3) Install wiper arms. Refer to Group 8K, Windshield Wiper and Washer Systems.

GRILLE - CONCORDE

REMOVAL

(1) Open hood.

(2) Remove fascia.

(3) Remove two screws attaching foam.

(4) Remove ten attaching grille clips.

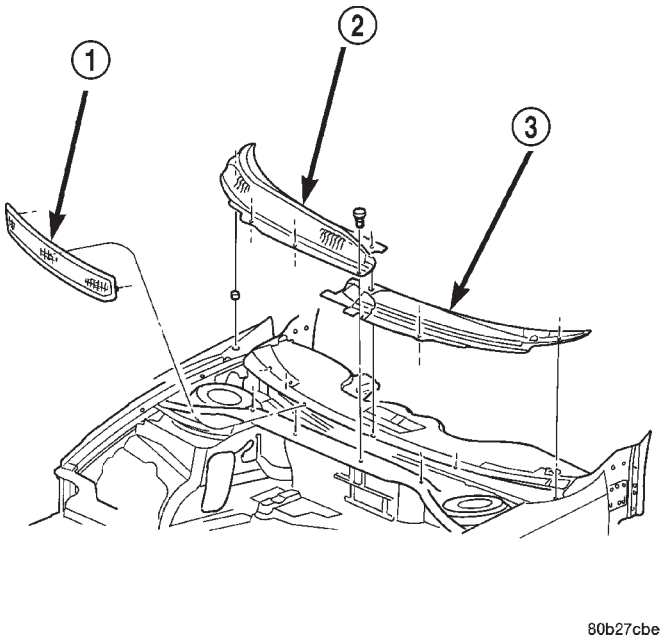


Fig. 26 Cowl Screen

1 – PLENUM COWL SCREEN
2 – COWL SCREEN RIGHT
3 – COWL SCREEN LEFT

(5) Remove grille.

INSTALLATION

(1) Place grille into position on vehicle.

(2) Install ten attaching grille clips.

(3) Install two screws attaching foam.

(4) Install fascia.

(5) Close hood and check alignment of the grille.

GRILLE - UPPER - 300M

REMOVAL

(1) Open hood.

(2) Remove fascia.

(3) Drill out rivets attaching cross bracket to grille.

(4) Remove upper grille six attaching clips.

(5) Remove grille.

INSTALLATION

(1) Place grille into position on vehicle.

(2) Install six attaching grille clips.

(3) Install rivets attaching cross bracket to grille.

(4) Install two screws attaching foam.

(5) Install fascia.

(6) Close hood and check alignment of the grille.

REMOVAL AND INSTALLATION (Continued)

GRILLE - LOWER - 300M

REMOVAL

(1) Open hood.
(2) Remove fascia.
(3) Remove two screws attaching foam.
(4) Remove lower grille eight attaching clips.
(5) Remove grille.

INSTALLATION

(1) Place grille into position on vehicle.
(2) Install eight attaching grille clips.
(3) Install two screws attaching foam.
(4) Install fascia.
(5) Check alignment of the grille.

EXTERIOR BADGEING ATTACHED WITH DOUBLE SIDED FOAM TAPE

REMOVAL

(1) Mark reference points before removing.
(2) Using a heat gun gently apply heat in a circular motion to loosen the adhesive bond.
(3) Using a nonmetallic prying device, such as a plastic or wood trim stick gently pry up at corners and remove.
(4) Clean off all traces of adhesive or double sided tape from the panel with a general purpose adhesive remover.

INSTALLATION

(1) Clean panel surface with isopropy alcohol.
(2) Align badgeing to reference points.
(3) Install and press securely to full adhesive contact
(4) Clean away any reference points.

EXTERIOR BADGEING/TAPE STRIPES ATTACHED WITH ADHESIVES

REMOVAL

(1) Mark reference points before removing.
(2) Using a heat gun gently apply heat in a circular motion to loosen the adhesive bond.
(3) With your fingernail lift up and peel away badgeing/tape from panel, using a heat gun as you go.
(4) Clean off all traces of adhesive from the panel(s) with a general purpose adhesive remover.

INSTALLATION

(1) Clean panel surface with isopropy alcohol.
(2) Remove paper carrier and align badgeing/tape to reference points or adjacent panel.
(3) Install and press securely, using a plastic spreader to eliminate all air bubbles.
(4) Remove top protective carrier.
(5) Clean away any reference points.

WHEELHOUSE SPLASH SHIELD – FRONT

REMOVAL

(1) Hoist and support vehicle on safety stands.
(2) Remove front wheel.
(3) Remove strut assembly from vehicle. Refer to Group 2, Suspension.
(4) Remove screws attaching speed sensor bracket (Fig. 27). Move bracket to access speed sensor wire connector.
(5) Disconnect speed sensor wire connector.
(6) Remove fasteners attaching splash shield to inner wheelhouse.
(7) Remove splash shield from vehicle.

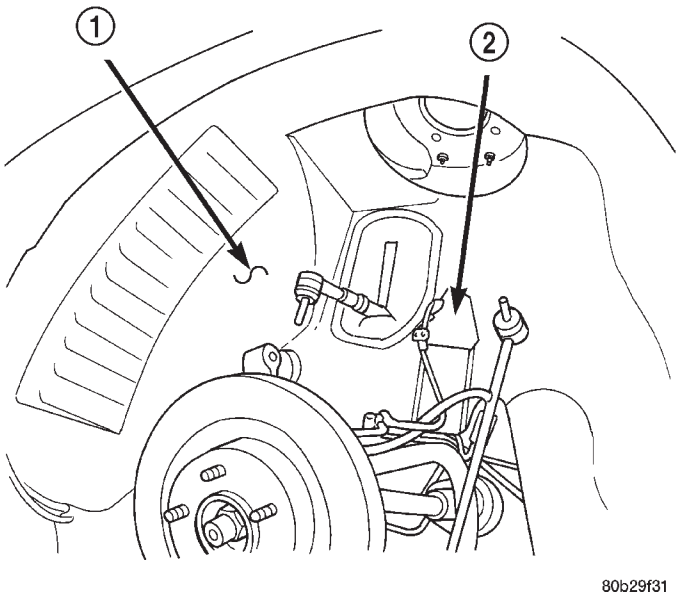


Fig. 27 Wheelhouse Splash Shield

1 – SPLASH SHIELD
2 – SPEED SENSOR BRACKET

INSTALLATION

(1) Place splash shield into position.
(2) Install fasteners to attach splash shield.
(3) Connect speed sensor wire connector.
(4) Install screws attaching speed sensor bracket.
(5) Install strut assemble
(6) Install front wheel.
(7) Lower vehicle.

REMOVAL AND INSTALLATION (Continued)

FENDER

REMOVAL

(1) Remove headlamp housing.
(2) Remove splash shield to fascia plastic rivets.
(3) Remove splash shield to sill cladding.
(4) First remove fender bolt to lower cowl.
(5) Next drill a 30 mm (1 1/16 in.) hole in the splash shield to access the upper cowl bolt. Remove bolt.
(6) Then loosen fender bolt to upper cowl.
(7) Pull fascia away from fender.
(8) Remove bolts to lower radiator closure panel.
(9) Support the hood and disconnect hood prop rod.
(10) From inside engine compartment, remove bolts attaching fender to upper rail.
(11) Remove fender from vehicle (Fig. 28).

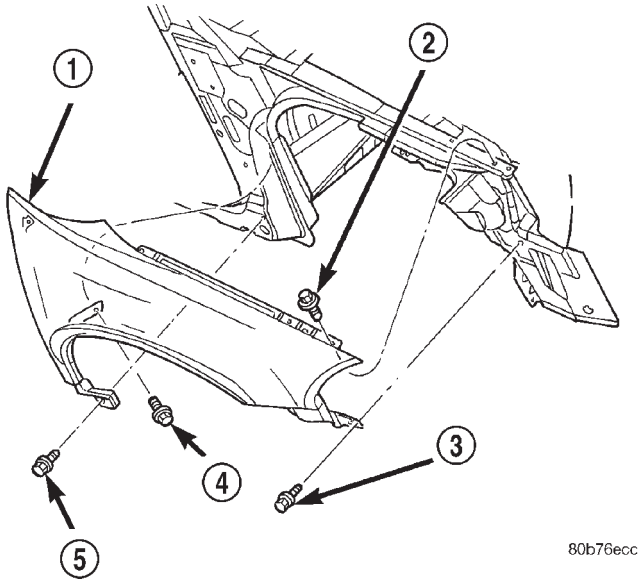


Fig. 28 Fender

1 – FRONT FENDER
2 – TO UPPER RAIL
3 – TO RADIATOR CLOSURE PANEL
4 – TO LOWER COWL
5 – TO UPPER COWL

INSTALLATION

(1) Place fender in position on vehicle.
(2) From inside engine compartment, install bolts to attach fender to upper rail.
(3) Connect hood prop rod and support the hood
(4) Install fender bolts to lower radiator closure panel.
(5) Place fascia into position.
(6) Tighten fender bolt to the upper cowl. Use plug that come with fender to fill drilled hole in splash shield.
(7) Install fender bolt to lower cowl.
(8) Install splash shield plastic rivets to sill cladding.
(9) Install splash shield plastic rivets to fascia.
(10) Install headlamp assembly.
(11) Check fender for flush and gap.

FRONT STRUT TOWER TO TOWER BRACE

REMOVAL

(1) Open hood.
(2) Remove the cowl screen.
(3) Mark bolt locations on front strut tower to tower brace.
(4) Remove attaching bolts from the brace (Fig. 29).
(5) Remove front strut tower to tower brace from vehicle.
(6) For replacement remove weatherstrip.

INSTALLATION

(1) Place in position the front strut tower to tower brace.
(2) Install front strut tower to tower brace attaching bolts. Check bolt alignment marks.
(3) Install cowl screen.

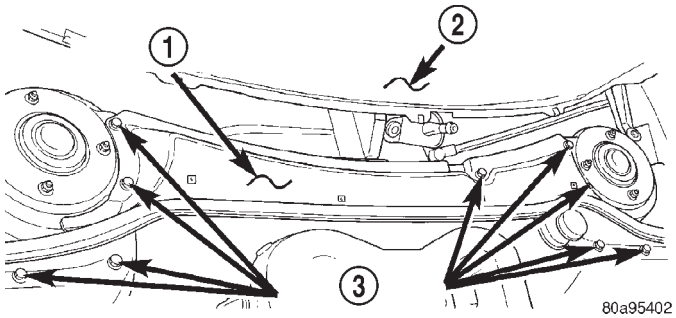


Fig. 29 Front Strut Tower to Tower Brace

1 – COWL SUPPORT
2 – WINDSHIELD
3 – SUPPORT FASTENERS

FRONT DOOR FLAG ENCLOSURE COVER/ PLATE

REMOVAL

(1) Open the front door.
(2) Remove fasteners attaching the front door flag enclosure cover to the door. Remove speaker from cover, if necessary (Fig. 30).
(3) Remove fasteners attaching the front door flag enclosure plate to front door, if necessary.

INSTALLATION

(1) Install fasteners attaching the front door flag enclosure plate to front door.

REMOVAL AND INSTALLATION (Continued)

(2) Install speaker to front door flag enclosure cover, if necessary.

(3) Install fasteners attaching the front door flag enclosure cover to the door.

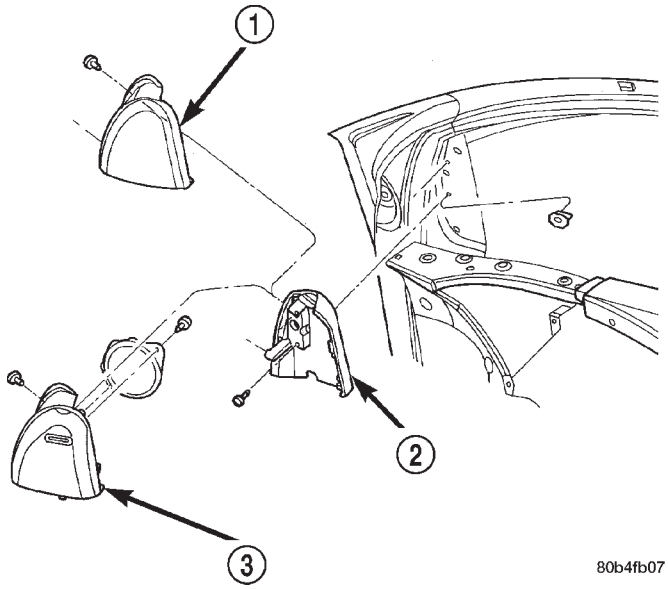


Fig. 30 Front Door Flag Enclosure Cover and Plate

1 – FRONT DOOR W/O SPEAKER COVER
2 – FRONT DOOR ENCLOSURE PLATE
3 – FRONT DOOR WITH SPEAKER COVER

FRONT DOOR TRIM PANEL

REMOVAL

CAUTION: Do not pry on door trim panel, damage to trim panel will result.

(1) Remove speaker flag.

(2) Remove speaker grille by inserting trim tool at the rear of the grille and disengaging clips holding to trim panel. Remove grille (Fig. 31).

(3) Remove trim plug from the pull cup and remote bezel by inserting a small flat blade tool into the notch and remove.

(4) Remove three screws from bottom of door.

(5) Remove screw in pull cup.

(6) Remove screw in remote bezel.

(7) Remove two screws in the instrument panel interface area.

(8) Remove three screws in the speaker area.

(9) Using an trim tool, disengage the retainer clips from the door trim panel to the door panel.

(10) Raise trim panel up to disengage from the belt being careful to hold the panel securely.

(11) Disconnect the linkage from the remote handle assembly (Fig. 32).

(12) Disconnect the power mirror switch.

(13) Disconnect the power door lock switch wire connector.

(14) Disconnect the power window switch wire connector.

(15) Disconnect the radio speaker wire connector.

(16) Disconnect wiring harness clips from trim panel.

(17) Disconnect the courtesy lamp.

(18) Remove trim panel from vehicle.

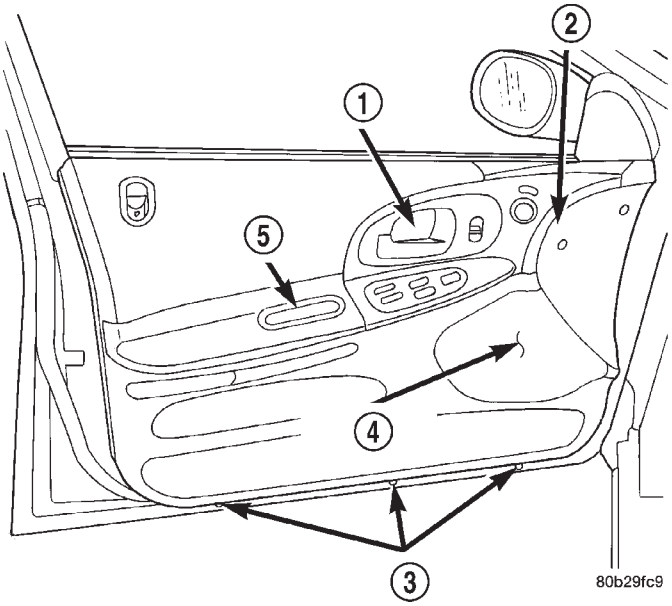


Fig. 31 Front Door Trim Panel – Typical

1 – REMOTE BEZEL
2 – I/P INTERFACE
3 – SCREWS
4 – SPEAKER GRILLE
5 – PULL CUP

INSTALLATION

(1) Place door trim panel in position.

(2) Install wire harness clips into door trim panel.

(3) Connect the courtesy lamp.

(4) Connect the radio speaker wire connector.

(5) Connect the power window switch wire connector.

(6) Connect the power door lock switch wire connector.

(7) Connect the power mirror switch wire connector.

(8) Connect the linkage to the handle assembly.

(9) Install the water shield. Ensure that the water shield locator holes align. Ensure that the shield is sealed.

(10) Insert trim panel into channel retainer at top door.

(11) Insert the forward four way alignment guide into position. Insert the rearward two way alignment guide into position.

REMOVAL AND INSTALLATION (Continued)

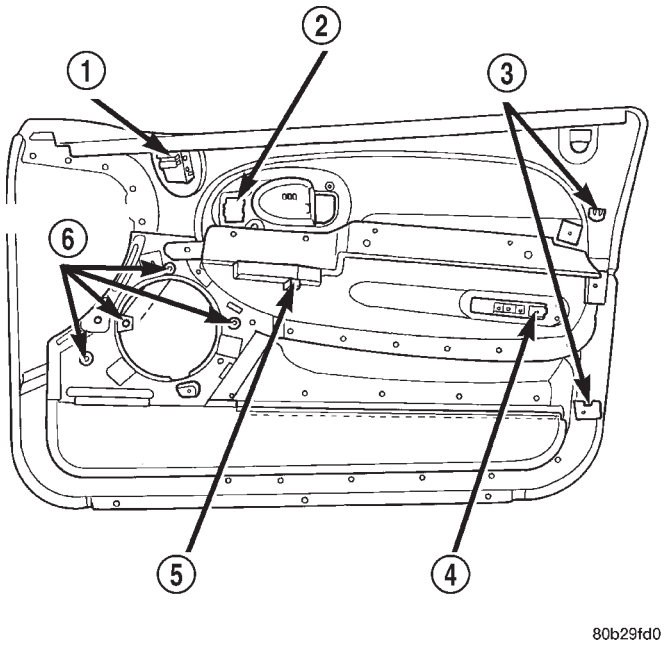


Fig. 32 Inner Front Door Trim Panel – Typical

1 – POWER MIRROR SW.
2 – POWER DOOR LOCK SWITCH
3 – RETAINER CLIPS
4 – COURTESY LAMP
5 – POWER WINDOW SWITCH
6 – WIRE HARNESS CLIPS

(12) Install new retaining clips to attach door trim panel to door panel.

(13) Install three screws in the speaker area.

(14) Install two screws in the instrument panel interface area.

(15) Install screw in the remote bezel.

(16) Install screw in pull cup. Tighten screw to 1.7 to 2.3 N·m (15 to 20 in. lbs.) torque.

(17) Install three screws to the bottom of the door. Tighten screws to 1.7 to 2.3 N·m (15 to 20 in. lbs.) torque.

(18) Install pull cup and remote bezel trim plug, if equipped.

(19) Place speaker grille in position on trim panel. Attach door speaker clips to trim panel.

FRONT AND REAR DOOR WATER DAM

REMOVAL

(1) Remove door trim panel.

(2) Carefully remove by pulling water dam from door inner panel.

INSTALLATION

(1) Apply an appropriate adhesive/sealant to water dam edges before installing.

(2) Position water dam on door inner panel. Ensure that the water dam locator holes align.

(3) Press inward on areas with adhesive to attach dam to inner door. Ensure that the dam is sealed.

(4) Install trim panel.

FRONT DOOR LATCH

REMOVAL

(1) Close door glass.

(2) Remove door trim panel.

(3) Remove water shield as necessary.

(4) Remove rear glass channel.

(5) Disconnect lock button link from door latch.

(6) Disconnect lock cylinder link from door latch.

(7) Disconnect outside door handle link from door latch.

(8) Remove screws holding door latch to door end frame (Fig. 33).

(9) Remove latch from door.

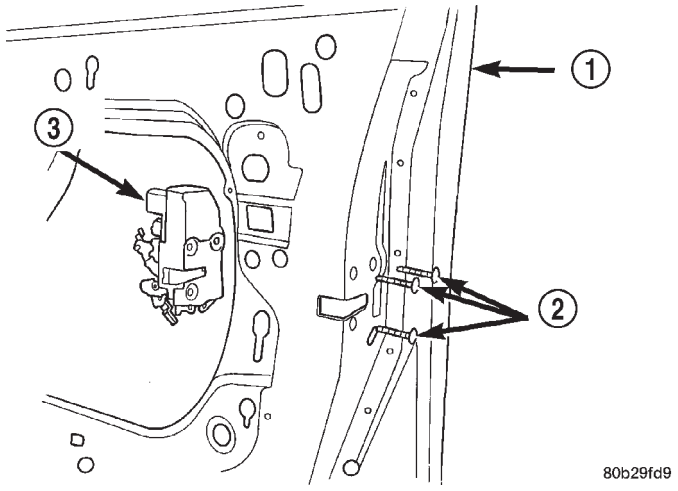


Fig. 33 Front Door Latch

1 – FRONT DOOR
2 – SCREWS
3 – DOOR LATCH

INSTALLATION

(1) Place latch in position in door.

(2) Install screws to hold door latch to door end frame.

(3) Connect outside door handle link to door latch.

(4) Connect lock cylinder link to door latch.

(5) Connect door lock button link to door latch.

(6) Install rear glass channel.

(7) Verify latch operation.

(8) Install water shield.

(9) Install door trim panel.

REMOVAL AND INSTALLATION (Continued)

OUTSIDE FRONT DOOR HANDLE

REMOVAL

(1) Remove door trim panel.
(2) Remove water shield as necessary.
(3) Remove door glass.
(4) Disengage clips holding latch release link and lock link to door at latch.
(5) Disconnect links from latch.
(6) Remove screws attaching handle to door through access hole in door inner pane (Fig. 34).
(7) Remove door handle from door.

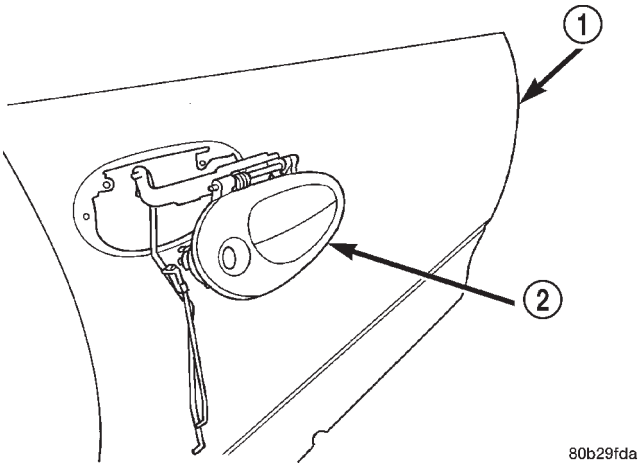


Fig. 34 Outside Front Door Handle

1 – FRONT DOOR
2 – DOOR HANDLE

INSTALLATION

(1) Place door handle in position on door.
(2) Install screws to attach to handle to door.
(3) Insert links into clips on latch.
(4) Engage clips to attach latch release link and lock link to door latch.
(5) Verify door latch handle operation.
(6) Install door glass.
(7) Install water shield.
(8) Install door trim panel.

DOOR LOCK CYLINDER

REMOVAL

(1) Remove door trim panel.
(2) Remove water shield, as necessary
(3) Raise door glass.
(4) Disengage clip holding lock link to lock cylinder.
(5) Disconnect link from lock cylinder.
(6) Disconnect clip attaching lock cylinder to door handle.
(7) Pull lock cylinder from door handle (Fig. 35).

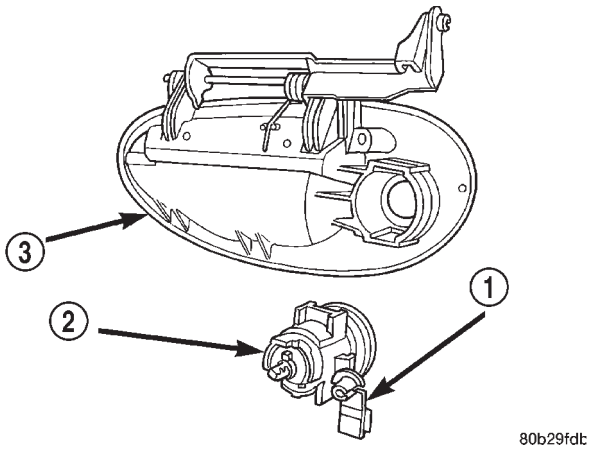


Fig. 35 Door Lock Cylinder

1 – CLIP
2 – LOCK CYLINDER
3 – DOOR HANDLE

INSTALLATION

(1) Push lock cylinder into socket on door handle.
(2) Insert link into clip on lock cylinder.
(3) Engage clip to fasten lock link to lock cylinder.
(4) Verify lock operation.
(5) Install water shield.
(6) Install door trim panel.

LOCK CYLINDERS

Ignition, door, deck lid, and rear hatch lock cylinders are all codable to the key. Lock barrels, tumblers, and tumbler springs are available to allow the technician to change replacement locks cylinders to match the customer's original key set. See the appropriate section in this manual for lock cylinder removal. See the Mopar® catalogue for part numbers and lock coding procedures.

FRONT DOOR LATCH STRIKER

REMOVAL

(1) Open front door.
(2) Mark location of door latch striker on B-pillar to assist installation alignment.
(3) Remove bolts holding striker to B-pillar (Fig. 36).
(4) Remove door latch striker from vehicle.

INSTALLATION

(1) Place door latch striker in position on vehicle.
(2) Install bolts to hold striker to B-pillar.
(3) Verify alignment and operation of door, adjust as necessary.

REMOVAL AND INSTALLATION (Continued)

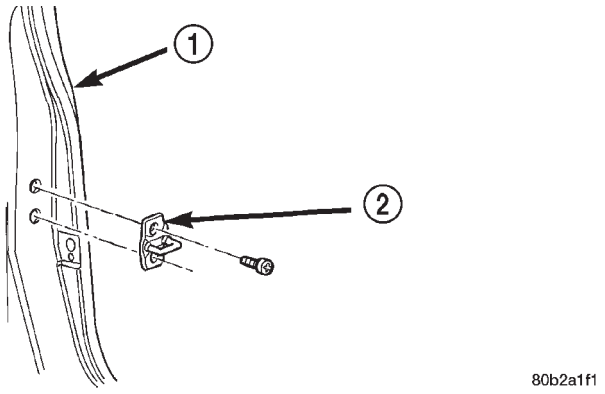


Fig. 36 Front Door Latch Striker

1 – B-PILLAR
2 – DOOR LATCH STRIKER

FRONT DOOR GLASS RUN WEATHERSTRIP

REMOVAL

(1) Remove flag cover, door trim panel, water dam as necessary, and pull cup support bracket.
(2) Remove door glass.
(3) Loosen side view mirror.
(4) Pull weatherstrip from lower front channel above door latch.
(5) Pull run weatherstrip from window frame channel (Fig. 37).

INSTALLATION

(1) Clean butyl material from door flange area.
(2) Place door run weatherstrip in position on window frame channel.
(3) Push door run weatherstrip into window frame channel.
(4) Push weatherstrip into lower front channel above door latch.
(5) Install door glass.
(6) Tighten side view mirror.
(7) Install pull cup support bracket, water shield, door trim panel and flag trim.

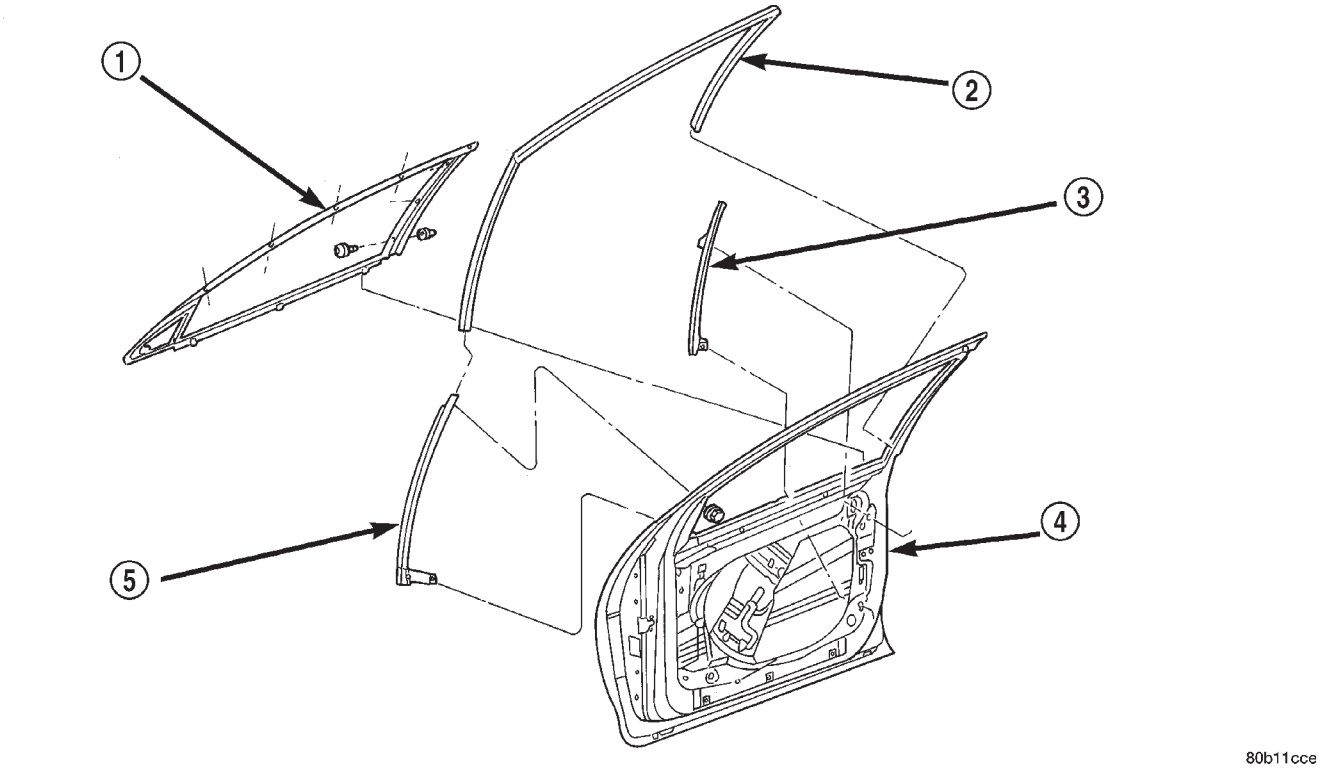


Fig. 37 Door Glass Run Weatherstrip

1 – FRONT DOOR MOLDING
2 – GLASS RUN WEATHERSTRIP
3 – REAR GLASS RUN CHANNEL
4 – FRONT DOOR
5 – FRONT GLASS RUN CHANNEL

REMOVAL AND INSTALLATION (Continued)

FRONT DOOR WINDOW FRAME MOLDING

REMOVAL

(1) Remove flag trim, speaker, door trim panel, water shield as necessary, and mirror.

(2) Remove door glass run weatherstrip as necessary to gain access to applique fasteners.

(3) Remove screws attaching molding to window frame (Fig. 38).

(4) Remove molding from door.

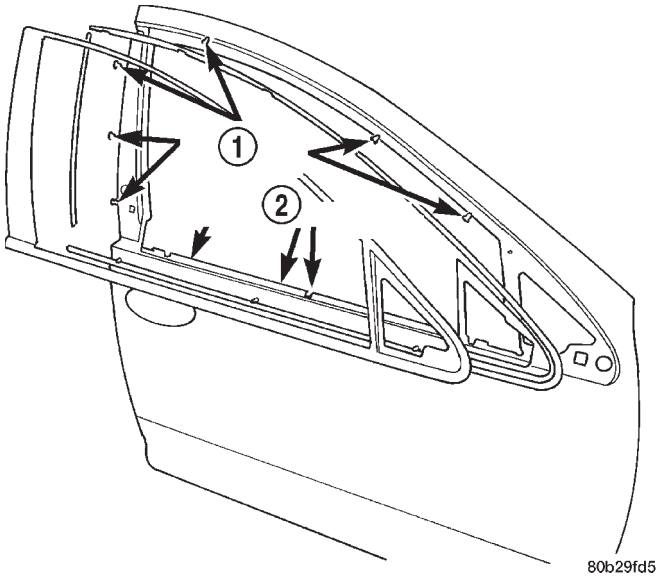


Fig. 38 Front Door Frame Window Molding

1 – REMOVE SCREWS
2 – LOOSEN HALFWAY

INSTALLATION

(1) Place molding in position on door.

(2) Install screws to attach molding to window frame.

(3) Install door glass run weatherstrip.

(4) Install the mirror, water shield, door trim panel, speaker and flag trim.

FRONT DOOR GLASS

REMOVAL

(1) Remove flag cover, door trim panel, water shield as necessary, and pull cup support bracket.

(2) Connect power window switch and lower window 150 mm (6 in.) from full up position.

(3) Loosen nuts attaching regulator roller channel to glass and lift plates.

(4) Slide roller channel rearward to allow lift plate nuts to pass through key hole slots in channel (Fig. 39).

(5) Remove glass from roller channel.

(6) Raise glass upward and out of the opening at top of door.

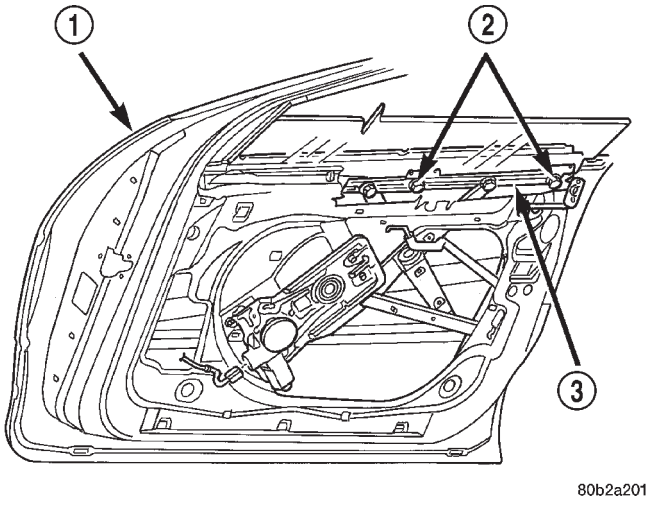


Fig. 39 Front Door Glass

1 – FRONT DOOR
2 – LIFT PLATE NUTS
3 – GLASS ROLLER CHANNEL

INSTALLATION

(1) Lower glass into opening at top of door.

(2) Place glass in position against roller channel.

(3) Insert lift plate nuts into key hole slots in roller channel and slide channel forward to locked position.

(4) Tighten nuts to attach regulator roller channel to glass and lift plates.

(5) Install pull cup support bracket, water shield, door trim panel, and flag cover.

FRONT DOOR GLASS REGULATOR

REMOVAL

(1) Remove flag cover, door trim panel, water shield as necessary, and pull cup support bracket.

(2) Slide glass from regulator roller channel.

(3) Disconnect power window motor wire connector.

(4) Loosen bolt attaching regulator support brace to door panel.

(5) Remove screw and bolt heads from keyhole slots in door panel.

(6) Loosen bolts attaching regulator to door panel.

(7) Remove regulator from door panel.

(8) Slide regulator rearward and rotate forward end of roller channel through access hole in door panel (Fig. 40).

REMOVAL AND INSTALLATION (Continued)

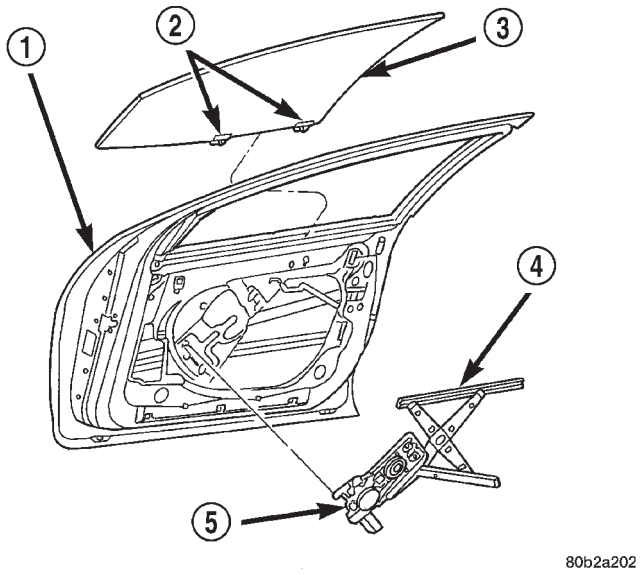


Fig. 40 Window Regulator

1 – FRONT DOOR
2 – LIFT PLATES
3 – GLASS
4 – GLASS ROLLER CHANNEL
5 – WINDOW REGULATOR

INSTALLATION

(1) Insert roller channel through access hole in door panel.
(2) Insert bolt heads on regulator through key hold slots in door panel.
(3) Tighten bolts attaching regulator to door panel.
(4) Tighten bolt to attach regulator support brace to door panel.
(5) Tighten screw to attach regulator scissor channel to door panel.
(6) Connect power window motor wire connector.
(7) Lower door glass on to regulator roller channel.
(8) Align glass and verify operation.
(9) Install pull cup support bracket, water shield, door trim panel and flag cover.

FRONT DOOR CHECK STRAP

REMOVAL

(1) Place door glass in the full up position.
(2) Remove door trim panel.
(3) Remove water shield as necessary.
(4) Remove bolts holding check strap to door end frame and body.
(5) Remove check strap from vehicle (Fig. 41).

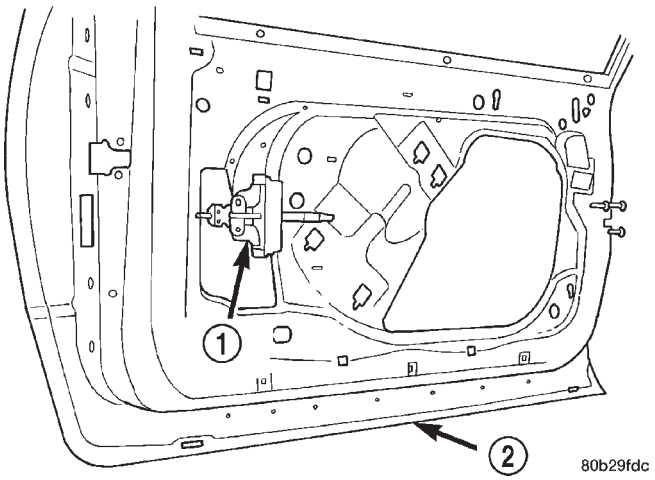


Fig. 41 Front Door Check Strap

1 – CHECK STRAP
2 – FRONT DOOR

INSTALLATION

(1) Place check strap in position on vehicle.
(2) Install bolts to hold check strap to door end frame and body.
(3) Install water shield.
(4) Install door trim panel.

FRONT DOOR

REMOVAL

(1) Open front door.
(2) Mark location of hinge on door end frame.
(3) Disengage clips holding wire harness connector and boot to hinge pillar.
(4) Remove connector from hinge pillar.
(5) Disengage clip holding wire connector together on hinge pillar side of the connector.
(6) Remove door wire harness from instrument panel harness.
(7) Disengage door check stop from pin on upper door hinge.
(8) Support door on suitable lifting device.
(9) Remove bolt and nut attaching lower hinge to door end frame (Fig. 42).
(10) Steady door on lifting device and remove bolt and nut attaching upper hinge to door end frame.
(11) Remove door from vehicle.

INSTALLATION

(1) Place door in position on vehicle.
(2) Engage door onto pin on upper door hinge.
(3) Steady door on lifting device and install bolt and nut attaching upper hinge to door end frame. Tighten the hinge bolt and nut to 28 N·m (21 ft. lbs.) torque. If the double ended stud is loosen or replaced tighten the stud to 14 N·m (10 ft. lbs.) torque.

REMOVAL AND INSTALLATION (Continued)

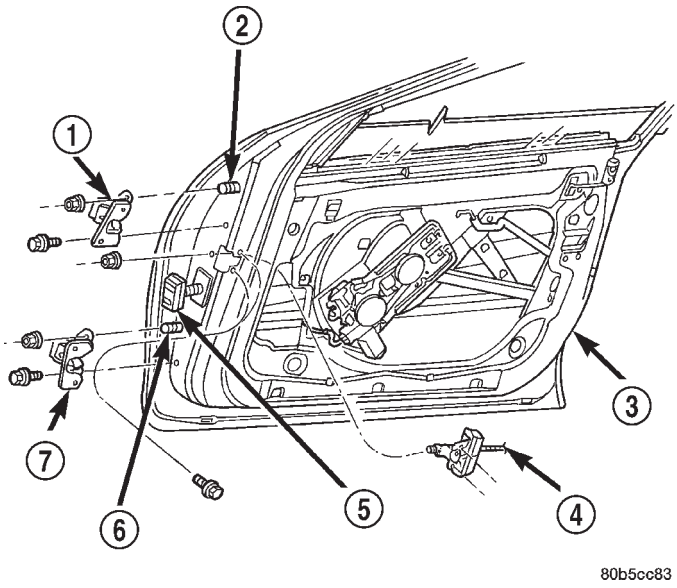


Fig. 42 Front Door and Hinge

1 – UPPER HINGE
2 – DOUBLE ENDED STUD
3 – FRONT DOOR
4 – CHECK STRAP
5 – DOOR WIRE HARNESS CONNECTOR
6 – DOUBLE ENDED STUD
7 – LOWER HINGE

(4) Install bolt and nut attaching lower hinge to door end frame.

(5) Verify door alignment and operation.

(6) Connect door wire harness to instrument panel wire harness.

(7) Attach check strap.

(8) Align door to achieve equal spacing to surrounding body panels. Panels should be flush across all gaps. If door needs to be aligned (damages or hinge replacement) and can not be achieved, may be necessary to remove the double ended stud and replaced it with a bolt. This may allow extra movement to achieve the proper alignment.

FRONT DOOR HINGE

REMOVAL

(1) Mark location of hinge on hinge pillar.

(2) Remove bolt and nut attaching hinge to front door.

(3) Remove bolts attaching hinge to hinge pillar (Fig. 43).

(4) Remove hinge from vehicle.

INSTALLATION

(1) Place hinge in position on vehicle.

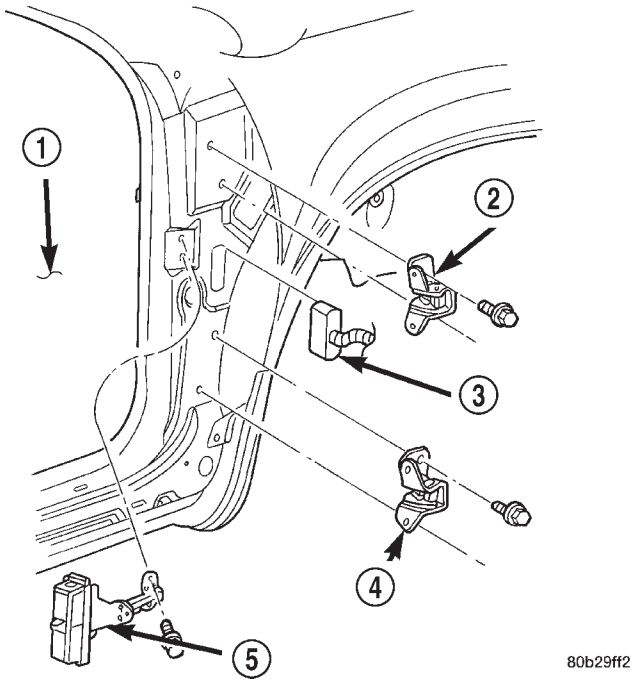


Fig. 43 Front Door Hinges

1 – FRONT OPENING
2 – UPPER HINGE
3 – DOOR WIRE HARNESS CONNECTOR
4 – LOWER HINGE
5 – CHECK STRAP

(2) Install bolt and nut attaching hinge to hinge pillar. Tighten the hinge bolt to 28 N·m (250 in lbs.) torque.

(3) Install bolt and nut attaching hinge to front door. Tighten the hinge bolt and nut to 28 N·m (250 in lbs.) torque. If the double ended stub is removed or replaced tighten the stud to 14 N·m (120 in. lbs.) torque.

(4) Verify door alignment and operation, adjust as necessary.

DOOR HINGE DOUBLE ENDED STUD

REMOVAL

(1) Remove door hinge.

(2) To remove double ended stud, double nut stud and back stud out of door frame. If stud is broken, use locking pliers on the shoulder of the double ended stud and back stud out of door frame (Fig. 44).

INSTALLATION

NOTE: Replacement hinge studs have thread sealer on threads. When reusing original studs, use Mopar® Lock and Seal Adhesive or equivalent on stud threads.

REMOVAL AND INSTALLATION (Continued)

(1) Install double ended stud into the door frame. Tighten the double ended stud to 14 N·m (120 in. lbs.) torque.

(2) Install hinge. Tighten the hinge bolt and nut to 28 N·m (250 in lbs.) torque.

(3) Verify door alignment and operation, adjust as necessary.

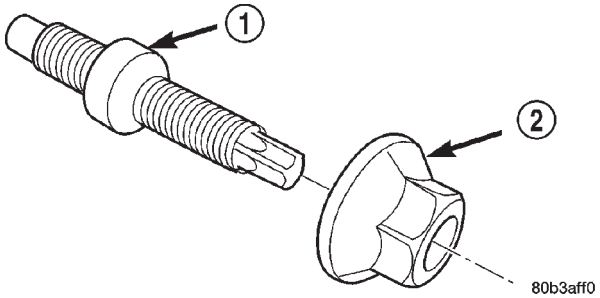


Fig. 44 Door Hinge Double Ended Stud

1 – DOUBLE ENDED STUD
2 – NUT

FRONT DOOR BODY MOUNTED WEATHERSTRIP

REMOVAL

(1) Open front door.

(2) Remove door opening sill plate.

(3) Pull body mounted weatherstrip from fence around door opening (Fig. 45).

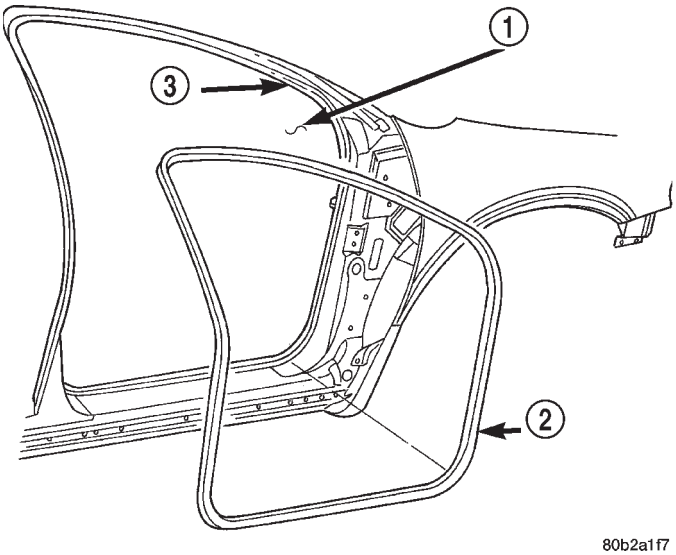


Fig. 45 Front Door Body Mounted Weatherstrip

1 – FRONT DOOR OPENING
2 – FRONT DOOR BODY MOUNTED WEATHERSTRIP
3 – PINCH FLANGE

INSTALLATION

(1) Position color dot on weatherstrip at the B-pillar upper corner.

(2) Engage weatherstrip on the fence at upper B-pillar and work down the B-pillar.

(3) Engage weatherstrip along the header and down the A-pillar.

(4) Engage weatherstrip along the sill. There may be slack material work it to the front of the opening.

(5) Verify weatherstrip sealing.

FRONT DOOR MOUNTED WEATHERSTRIP

REMOVAL

(1) Open front door.

(2) Using a fork type prying tool, disengage push in fasteners attaching weatherstrip to lower door (Fig. 46).

(3) Remove weatherstrip from door.

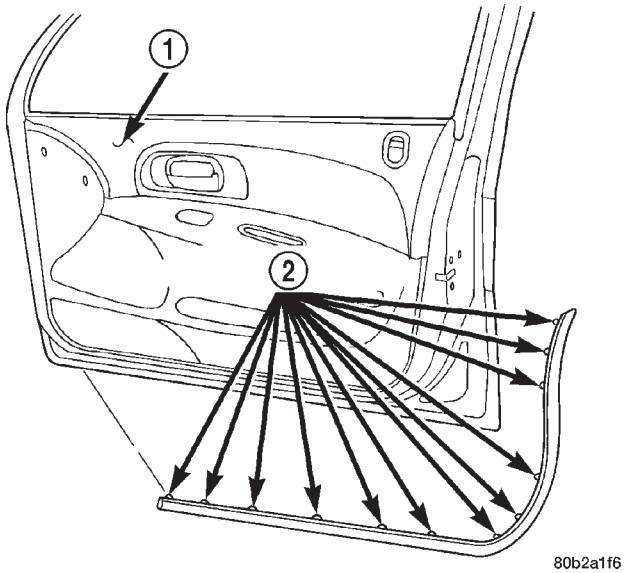


Fig. 46 Front Door Mounted Weatherstrip

1 – FRONT DOOR
2 – PUSH-IN FASTENERS

INSTALLATION

(1) Place door mounted weatherstrip in position.

(2) Engage push in fasteners to attach weatherstrip to lower door.

(3) Verify door alignment and seal

REAR DOOR TRIM PANEL

REMOVAL

CAUTION: Do not pry on door trim panel, damage to trim panel will result.

(1) Remove trim plug from the pull cup and remote bezel by inserting a small flat blade tool into the notch and remove, if equipped (LHS/300M).

(2) Remove screw in the pull cup.

(3) Remove screw in remote bezel.

REMOVAL AND INSTALLATION (Continued)

(4) Remove three screws from the bottom edge of door (Fig. 47).

(5) Using an trim tool, disengage the retaining clips from the door trim panel to the door panel. Two clips at the rear of panel and one at the front of the panel (Fig. 48).

(6) Raise trim panel up over the door flange and being careful to hold the panel securely.

(7) Disconnect the remote linkage from the door remote handle.

(8) Remove the wire connect from the rear door speaker.

(9) Disconnect power window switch wire connector.

(10) Disconnect wiring harness clips from the trim panel.

(11) Disconnect the courtesy lamp.

(12) Remove trim panel from door.

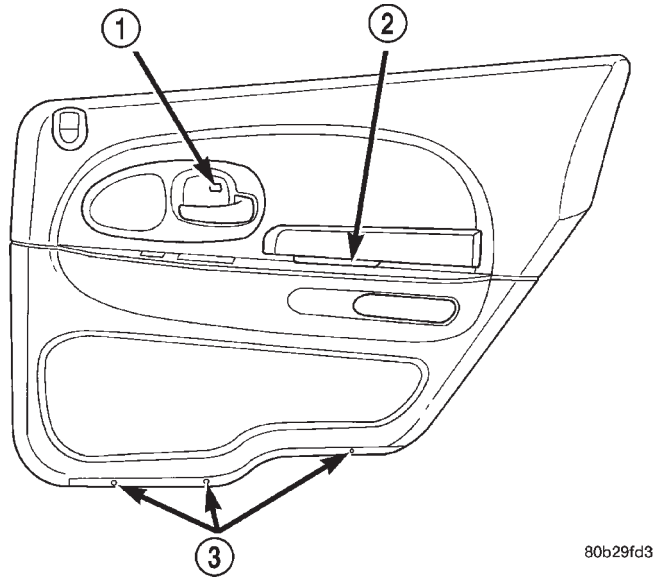


Fig. 47 Rear Door Trim Panel – Typical

1 – REMOTE BEZEL
2 – PULL CUP
3 – SCREWS

INSTALLATION

(1) Place trim panel in position on door.

(2) Connect the courtesy lamp.

(3) Connect the wiring harness clips to the trim panel.

(4) Connect the power window switch wire harness connector.

(5) Connect the rear door speaker wire connect.

(6) Connect the remote handle linkage.

(7) Install the water shield. Ensure that the water shield locator holes align. Ensure that the shield is sealed.

(8) Place trim panel into channel retainer at top door.

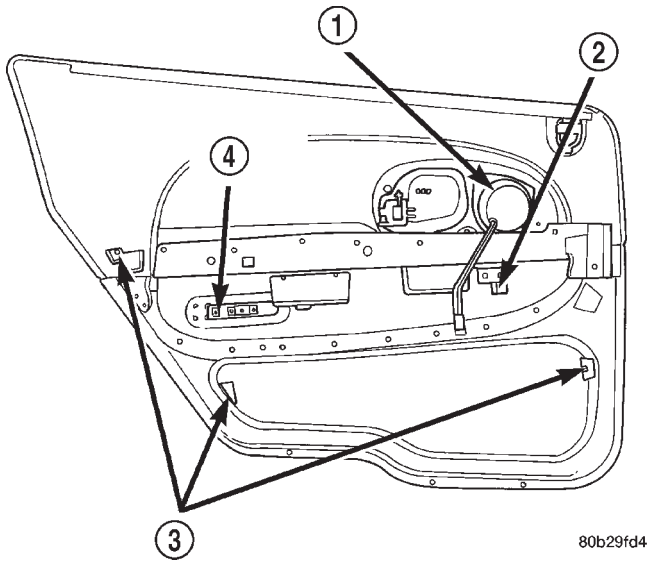


Fig. 48 Rear Door Inner Trim Panel – Typical

1 – REAR DOOR SPEAKER
2 – POWER WINDOW SWITCH
3 – RETAINER CLIPS
4 – COURTESY LAMP

(9) Insert trim panel into channel retainer at top door.

(10) Insert the forward four way alignment guide into position. Insert the rearward two way alignment guide into position.

(11) Install new retaining clips to attach door trim panel to door panel.

(12) Engage retaining clips attach door trim panel to door panel.

(13) Install three screws to the bottom of the door. Tighten screws 1.7 to 2.3 N·m (15 to 20 in. lbs.) torque.

(14) Install screw in the remote bezel.

(15) Install screw in pull cup. Tighten screw 1.7 to 2.3 N·m (15 to 20 in. lbs.) torque.

(16) Install pull cup and remote bezel trim plug, if equipped.

REAR DOOR LATCH

REMOVAL

(1) Close door glass.

(2) Remove door trim panel.

(3) Remove rear glass channel.

(4) Disconnect lock button link from door latch.

(5) Disconnect outside door handle link from door latch.

(6) Remove screws attaching door latch to door end frame (Fig. 49).

(7) Remove latch from door.

REMOVAL AND INSTALLATION (Continued)

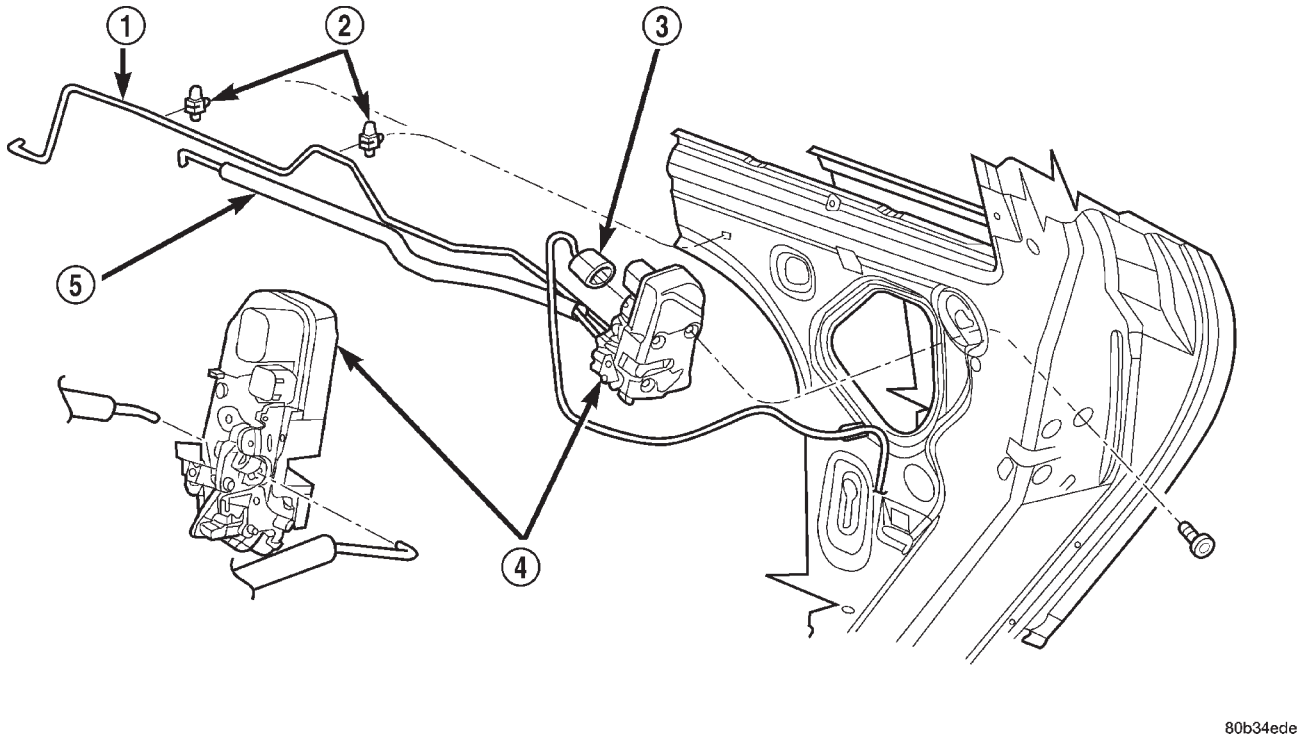


Fig. 49 Rear Door Latch

1 – TO LOCK BUTTON
2 – CLIPS
3 – WIRE CONNECT
4 – REAR DOOR LATCH
5 – TO DOOR HANDLE

INSTALLATION

(1) Place latch in position in door.
(2) Install screws attaching door latch to door end frame.
(3) Connect outside door handle link to door latch.
(4) Connect lock button link to door latch.
(5) Install rear glass channel.
(6) Verify door latch operation.
(7) Install door trim panel.

REAR DOOR LATCH STRIKER

REMOVAL

(1) Open rear door.
(2) Mark location of door latch striker on C-pillar to assist installation alignment.
(3) Remove bolts holding striker to C-pillar (Fig. 50).
(4) Remove door latch striker from vehicle.

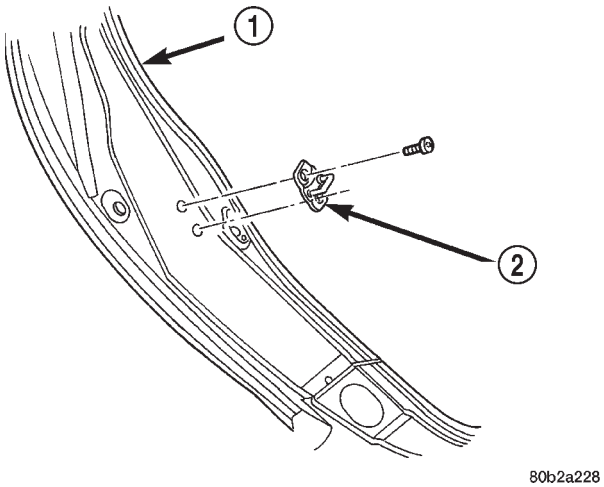


Fig. 50 Rear Door Latch Striker

1 – C-PILLAR
2 – DOOR LATCH STRIKER

INSTALLATION

(1) Place door latch striker in position on vehicle.
(2) Install bolts to hold striker to C-pillar.
(3) Align striker to marked location on C-pillar and tighten bolts.
(4) Verify alignment and operation of door, adjust as necessary.

REMOVAL AND INSTALLATION (Continued)

REAR DOOR GLASS RUN WEATHERSTRIP

REMOVAL

(1) Remove flag cover, door trim panel, water shield as necessary, and pull cup support bracket.
(2) Remove door glass.
(3) Pull weatherstrip from lower rear channel above door latch (Fig. 51).
(4) Pull run weatherstrip from window frame channel.

INSTALLATION

(1) Clean butyl material from door flange area.
(2) Place door run weatherstrip in position on window frame channel.
(3) Push door run weatherstrip in position on window frame channel.
(4) Push weatherstrip into lower rear channel above door latch.
(5) Install door glass.
(6) Install pull cup support bracket, water shield, door trim panel and flag trim.

REAR DOOR GLASS REGULATOR

REMOVAL

(1) Remove flag cover, door trim panel, water shield as necessary, and pull cup support bracket.
(2) Slide glass from regulator roller channel (Fig. 52).
(3) Disconnect power window motor wire connector.
(4) Loosen screw attaching regulator scissor channel to door panel.
(5) Remove screw and bolt heads from keyhole slots in door panel.
(6) Loosen bolt attaching regulator support brace to door panel.
(7) Loosen bolts attaching regulator to door panel.
(8) Remove regulator from door panel.
(9) Slide regulator rearward and rotate forward end of roller channel through access hole in door panel.

INSTALLATION

(1) Insert roller channel through access hole in door panel.

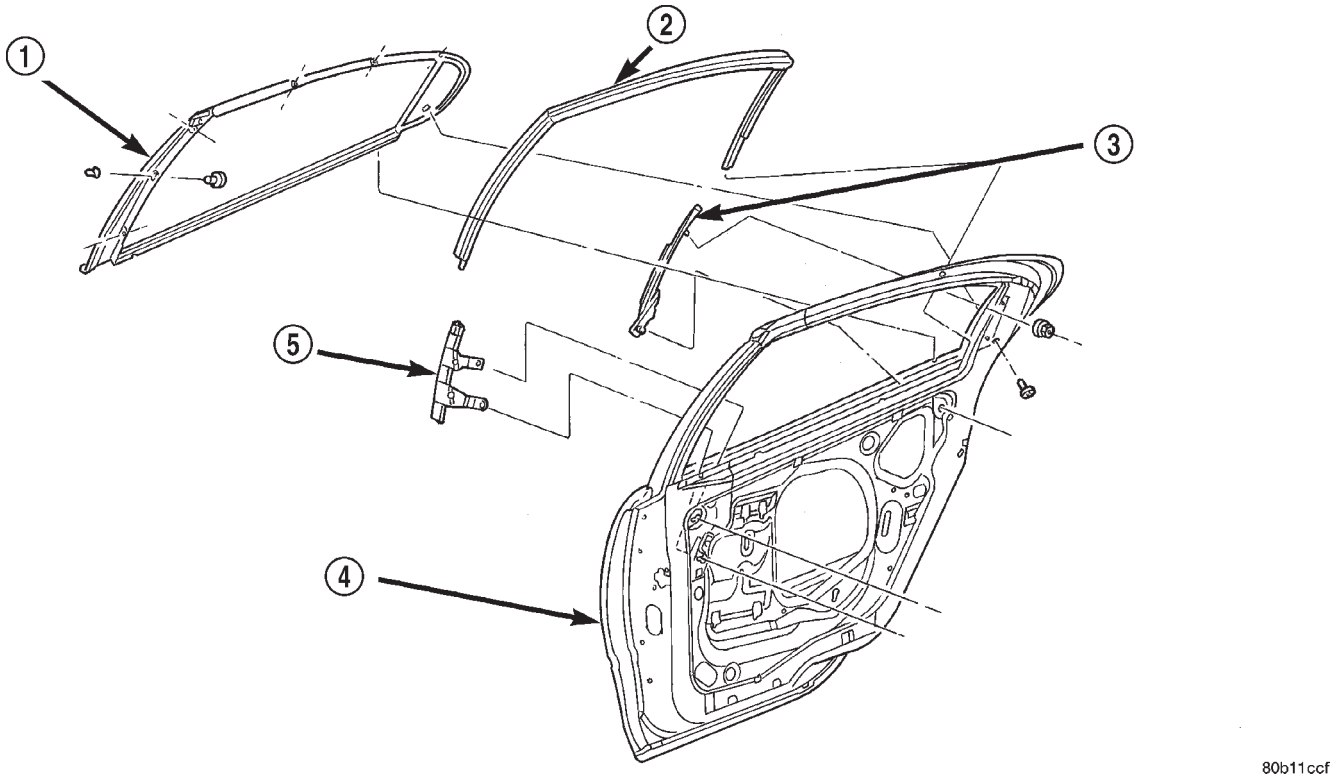


Fig. 51 Rear Door Glass Run Weatherstrip

1 – REAR DOOR MOLDING
2 – GLASS RUN
3 – REAR GLASS RUN CHANNEL
4 – REAR DOOR
5 – FRONT GLASS RUN CHANNEL

REMOVAL AND INSTALLATION (Continued)

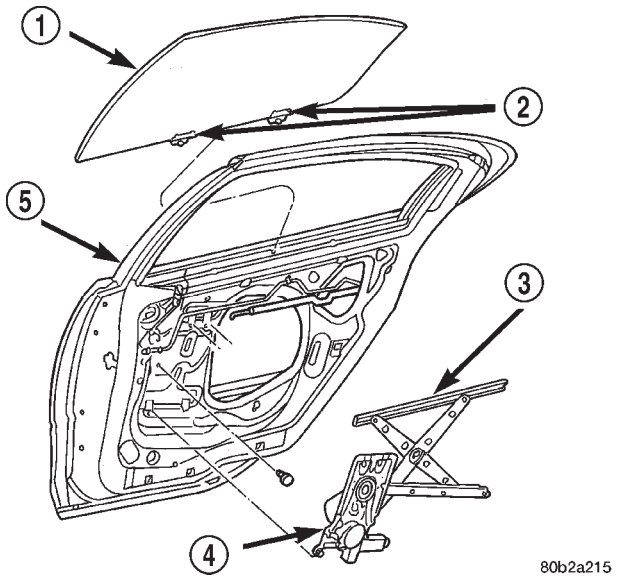


Fig. 52 Rear Door Window Regulator

1 – GLASS
2 – LIFT PLATES
3 – GLASS ROLLER CHANNEL
4 – WINDOW REGULATOR
5 – REAR DOOR

(2) Insert bolt and screw heads through key hole slots in door panel.
(3) Tighten bolts attaching regulator to door panel.
(4) Tighten bolt to attach regulator support brace to door panel.
(5) Tighten screw to attach regulator scissor channel to door panel.
(6) Connect power window motor wire connector.
(7) Lower door glass on to regulator roller channel.
(8) Align glass and verify operation.
(9) Install pull cup support bracket, water shield, door trim panel and flag cover.

REAR DOOR GLASS

REMOVAL

(1) Remove door trim panel.
(2) Remove water shield as necessary.
(3) Raise door glass to gain access to roller channel to glass fasteners through holes in inner door panel.
(4) Loosen lift plate nuts attaching regulator roller channel to glass (Fig. 53).
(5) Slide roller channel rearward to allow lift plate nuts to pass through key hole slots in channel.
(6) Remove glass from roller channel.
(7) Raise glass upward and out of the opening at top of door.

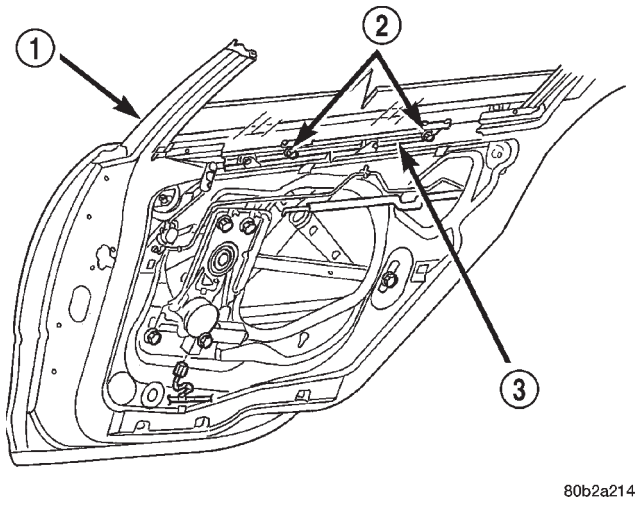


Fig. 53 Rear Door Glass

1 – REAR DOOR
2 – LIFT PLATE NUTS
3 – GLASS ROLLER CHANNEL

INSTALLATION

(1) Lower glass into opening at top of door.
(2) Place glass in position against roller channel.
(3) Insert lift plate nuts into key hole slots in roller channel and slide channel forward to locked position.
(4) Tighten nuts to attach regulator roller channel to glass and lift plate.
(5) Install upper trim retainer channel.
(6) Install water shield.
(7) install door trim panel.

REAR DOOR SAIL PANEL

REMOVAL

(1) Open the rear door.
(2) Using an trim stick, release clip attaching sail panel to the door.
(3) Remove sail panel.

INSTALLATION

(1) Position sail panel on door.
(2) Press on sail panel to engage clips.

REAR DOOR CHECK STRAP

REMOVAL

(1) Close door glass.
(2) Remove door trim panel.
(3) Remove water shield as necessary.
(4) Remove bolt and nut attaching check strap to door end and body.
(5) Remove check strap from vehicle (Fig. 54).

REMOVAL AND INSTALLATION (Continued)

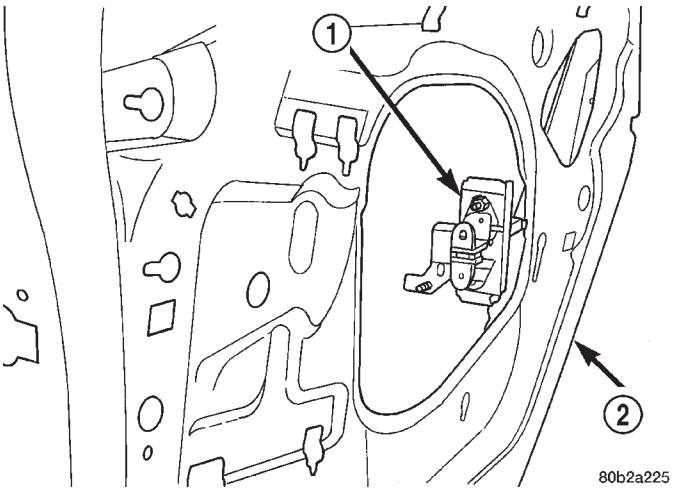


Fig. 54 Rear Door Check Strap

1 – CHECK STRAP
2 – REAR DOOR

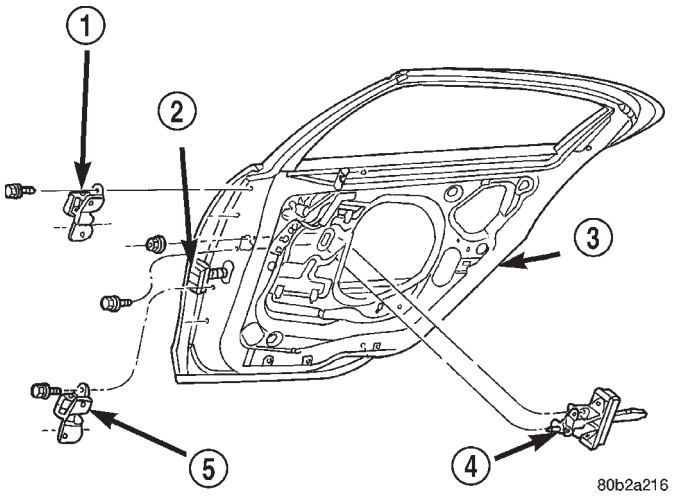


Fig. 55 Rear Door

1 – UPPER HINGE
2 – DOOR WIRE HARNESS CONNECTOR
3 – REAR DOOR
4 – CHECK STRAP
5 – LOWER HINGE

INSTALLATION

(1) Place check strap in position on vehicle.
(2) Install bolt and nut to attach check strap to door end and body.
(3) Verify check strap operation.
(4) Install water shield.
(5) Install door trim panel.

REAR DOOR

REMOVAL

(1) Open rear door.
(2) Mark location of hinge on door end frame.
(3) Disengage clips holding wire harness connector and boot to hinge pillar.
(4) Remove connector from hinge pillar.
(5) Disengage clip holding wire connector together on hinge pillar side of the connector.
(6) Remove door wire harness from instrument panel harness.
(7) Disengage door check stop from pin on upper door hinge.
(8) Support door on suitable lifting device.
(9) Remove bolt and nut attaching lower hinge to door end frame (Fig. 55).
(10) Steady door on lifting device and remove bolt and nut attaching upper hinge to door end frame.
(11) Remove door from vehicle.

INSTALLATION

(1) Place door in position on vehicle.
(2) Engage door onto pin on upper door hinge.
(3) Steady door on lifting device and install bolt and nut attaching upper hinge to door end frame. Tighten the hinge bolt and nut to 28 N·m (250 in lbs.) torque. If the double ended stud is loosen or replaced tighten the stud to 14 N·m (120 in. lbs.) torque.
(4) Install bolt and nut attaching lower hinge to door end frame.
(5) Verify door alignment and operation.
(6) Connect door wire harness to instrument panel wire harness.
(7) Attach check strap.
(8) Align door to achieve equal spacing to surrounding body panels. Panels should be flush across all gaps. If door needs to be aligned (damages or hinge replacement) and can not be achieved, may be necessary to remove the double ended stud and replaced it with a bolt. This may allow extra movement to achieve the proper alignment.

REAR DOOR HINGE

REMOVAL

(1) Mark outline of hinge on B-pillar and door end frame.
(2) Remove nut and bolt attaching hinge to B-pillar. Refer to Rear Door Removal procedure.
(3) Remove bolts attaching hinge to door end frame (Fig. 56).
(4) Remove hinge from door.

INSTALLATION

(1) Align hinge to marks on door end frame.
(2) Place hinge in position on door.
(3) Install bolts to attach hinge to door end frame.
(4) Align hinge to marks on B-pillar.
(5) Install nut and bolt to attach hinge to B-pillar.

REMOVAL AND INSTALLATION (Continued)

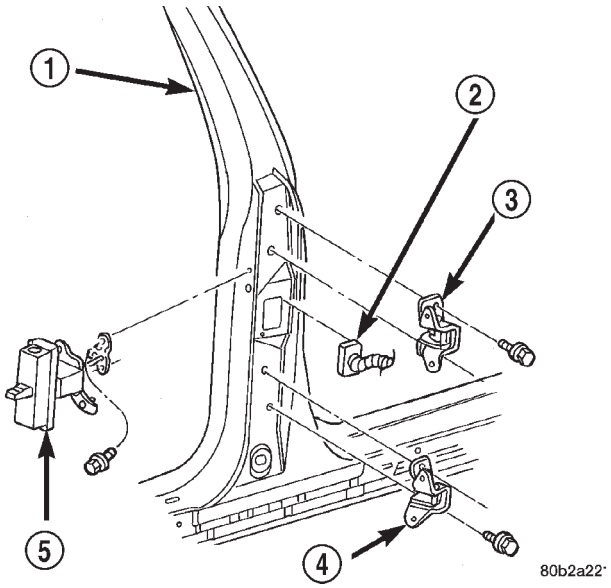


Fig. 56 Rear Door Hinge

1 – B-PILLAR
2 – DOOR WIRE HARNESS CONNECTOR
3 – UPPER HINGE
4 – LOWER HINGE
5 – CHECK STRAP

(6) Verify door alignment and operation, adjust as necessary.

REAR DOOR MOUNTED WEATHERSTRIP

REMOVAL

(1) Open rear door.
(2) Using a fork type prying tool, disengage push in fasteners attaching weatherstrip to lower door.
(3) Remove body mounted weatherstrip from pinch weld around door opening (Fig. 57).

INSTALLATION

(1) Place door mount weatherstrip in position on door with the paint dot in the upper corner of the B-pillar.
(2) Install push in fasteners to attach door mounted weatherstrip to lower door.
(3) Verify door alignment and seal.

REAR DOOR BODY MOUNTED WEATHERSTRIP

REMOVAL

(1) Open rear door.
(2) Remove door opening sill plate.
(3) Pull body mounted weatherstrip from fence around door opening (Fig. 58).

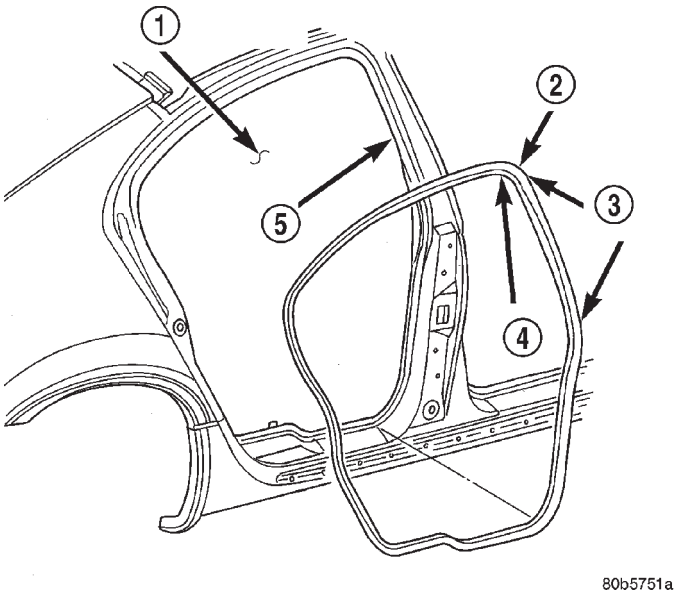


Fig. 57 Rear Door Mounted Weatherstrip

1 – REAR DOOR OPENING
2 – REAR DOOR BODY MOUNTED WEATHERSTRIP
3 – SEAL INSERT
4 – PAINT DOT
5 – PINCH FLANGE

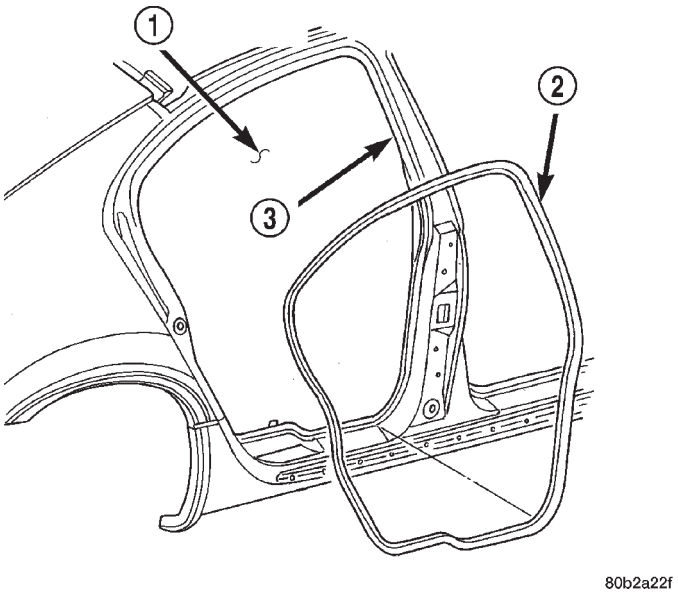


Fig. 58 Rear Door Body Mounted Weatherstrip

1 – REAR DOOR OPENING
2 – REAR DOOR BODY MOUNTED WEATHERSTRIP
3 – PINCH FLANGE

INSTALLATION

(1) Position color dot on weatherstrip at the B-pillar upper corner.
(2) Engage weatherstrip on the fence at upper B-pillar and work down the B-pillar.

REMOVAL AND INSTALLATION (Continued)

(3) Engage weatherstrip along the header and down the C-pillar.

(4) Engage weatherstrip along the sill. There may be slack material, work the slack material to the front of the opening.

(5) Verify weatherstrip sealing.

BODY SIDE MOLDING AND APPLIQUE

REMOVAL

(1) Warm the effected stick-on molding and body metal to approximately 38° C (100° F) using a suitable heat lamp or heat gun.

(2) Pull stick-on molding from painted surface.

(3) Remove adhesive tape residue from painted surface of vehicle.

INSTALLATION

(1) If molding is to be reused, remove tape residue from molding. Clean back of molding with Mopar® Super Kleen solvent or equivalent. Wipe molding dry with lint free cloth. Apply new body side molding (two sided adhesive) tape to back of molding.

(2) Clean body surface with Mopar® Super Kleen solvent or equivalent. Wipe surface dry with lint free cloth.

(3) Apply a length of masking tape on the body, parallel to the top edge of the molding to use as a guide, if necessary.

(4) Remove protective cover from tape on back of molding. Apply molding to body below the masking tape guide.

(5) Remove masking tape guide and heat body and molding, see step one. Firmly press molding to body surface to assure adhesion.

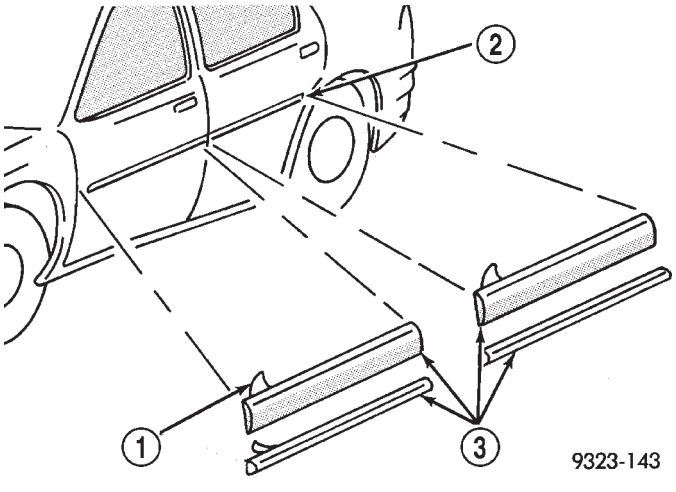


Fig. 59 Body Side Molding

1 – PROTECTIVE COVER
2 – MASKING TAPE GUIDE
3 – MOLDINGS

WHEELHOUSE SPLASH SHIELD – REAR

REMOVAL

(1) Hoist and support vehicle on safety stands.

(2) Remove rear wheel.

(3) Remove fasteners attaching splash shield.

(4) The shock tower area will have to be cut out of the splash shield. This will ease the removal or Installation of the slash shield.

(5) Remove splash shield from vehicle.

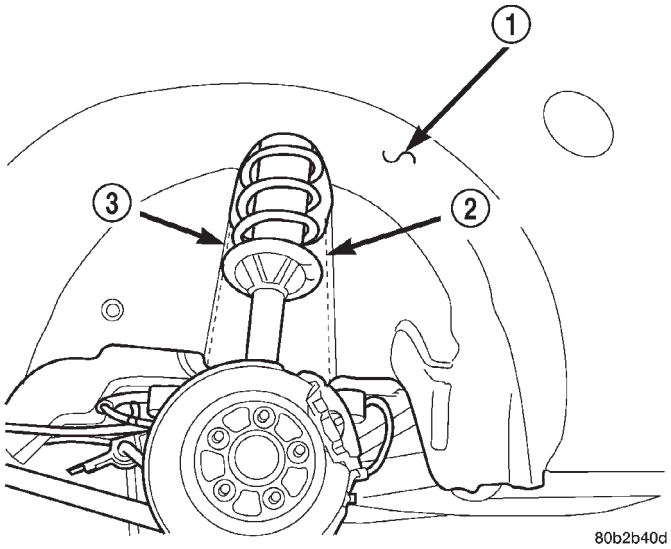


Fig. 60 Rear Wheelhouse Splash Shield

1 – REAR WHEELHOUSE SPLASH SHIELD
2 – CUT LINE
3 – CUT LINE

INSTALLATION

(1) Place splash shield in position on vehicle with the shock tower cut out.

(2) Install fasteners to hold splash shield place.

(3) Install rear wheel.

(4) Lower vehicle.

DECKLID COVER

REMOVAL

(1) Release decklid latch and open decklid.

(2) Remove fasteners attaching decklid cover to decklid.

(3) Remove decklid cover from vehicle.

INSTALLATION

(1) Place decklid cover in position on vehicle.

(2) Install fastener attaching decklid cover to decklid.

REMOVAL AND INSTALLATION (Continued)

DECKLID LATCH

REMOVAL

(1) Open decklid.
(2) Remove fasteners attaching decklid lining to rear of decklid as necessary.
(3) Remove bolts attaching decklid latch to decklid (Fig. 61), (Fig. 62) or (Fig. 63).
(4) Remove decklid latch from decklid.
(5) Disconnect power lock connector from latch solenoid.
(6) Disconnect decklid ajar switch connector from latch.
(7) Remove latch from vehicle.

INSTALLATION

(1) Place latch in position on vehicle.
(2) Connect decklid ajar switch connector on latch.
(3) Connect power lock connector on latch solenoid.
(4) Place decklid latch in position on decklid.
(5) Install bolts to attach decklid latch to decklid.
(6) Adjust decklid latch for proper decklid to quarter panel alignment and weatherstrip sealing.
(7) Install fasteners to attach decklid lining to rear of decklid.
(8) Verify decklid latch operation.

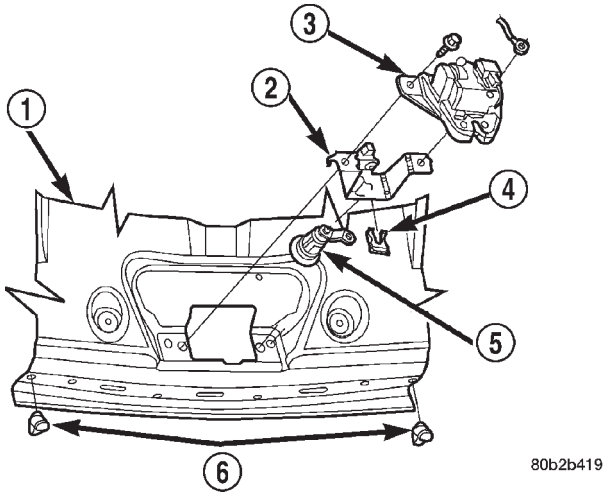


Fig. 61 Decklid Latch – Concorde/LHS

1 – TRUNK LID
2 – TRUNK LID CYLINDER BRACKET
3 – TRUNK LID LATCH
4 – LOCK SET
5 – TRUCK LID LOCK CYLINDER
6 – TRUNK LID OVER SLAM BUMPERS

DECKLID LOCK CYLINDER

REMOVAL

(1) Open decklid.
(2) Remove fasteners attaching decklid lining to rear of decklid.

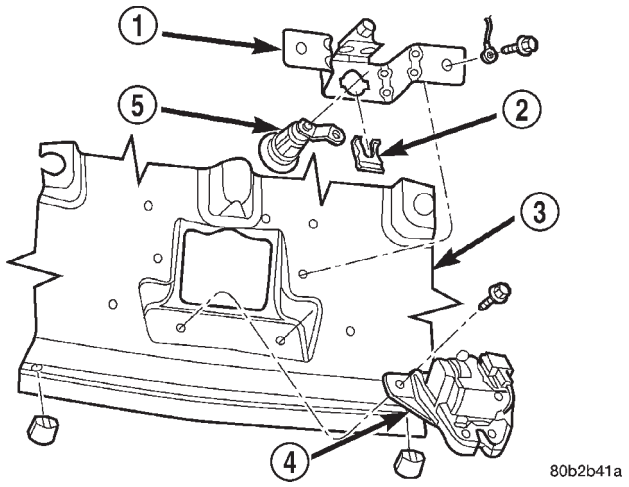


Fig. 62 Decklid Latch – Intrepid

1 – LOCK CYLINDER BRACKET
2 – LOCK SET
3 – TRUNK LID
4 – TRUNK LID LATCH
5 – TRUNK LOCK CYLINDER

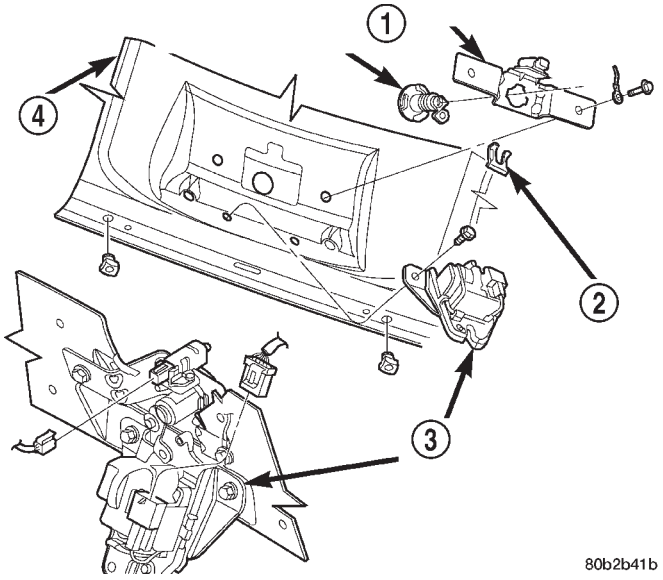


Fig. 63 Decklid Latch – 300M

1 – LOCK CYLINDER BRACKET AND LOCK CYLINDER
2 – LOCK SET
3 – TRUNK LID LATCH
4 – TRUNK LID

(3) Remove bolts attaching decklid latch to decklid (Fig. 61), (Fig. 62) or (Fig. 63).
(4) Remove decklid latch from decklid.
(5) Disconnect power lock connector from latch solenoid.
(6) Disconnect decklid ajar switch connector from latch.
(7) Remove latch from vehicle.

REMOVAL AND INSTALLATION (Continued)

(8) Remove decklid lock set.
(9) Remove decklid lock cylinder.

INSTALLATION

(1) Install decklid lock cylinder.
(2) Install decklid lock set.
(3) Place latch in position on vehicle.
(4) Connect decklid ajar switch connector on latch.
(5) Connect power lock connector on latch solenoid.
(6) Place decklid latch in position on decklid.
(7) Install bolts to attach decklid latch to decklid.
(8) Adjust decklid latch for proper decklid to quarter panel alignment and weatherstrip sealing.
(9) Install fasteners to attach decklid lining to rear of decklid.
(10) Verify decklid latch operation.

DECKLID LATCH STRIKER

REMOVAL

(1) Open decklid.
(2) Remove trunk liner as necessary.
(3) Remove bolts attaching latch striker (Fig. 64).
(4) Remove latch striker from vehicle.

INSTALLATION

(1) Place latch striker in position.
(2) Install bolts attaching latch striker.
(3) Verify decklid operation and alignment.
(4) Place decklid liner in position.

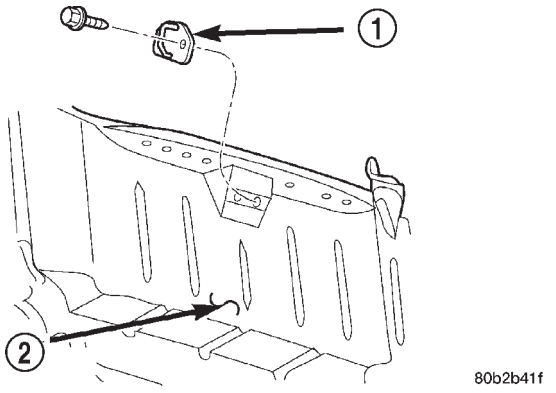


Fig. 64 Decklid Latch Striker

1 – TRUNK LIP LATCH STRIKER
2 – TRUNK COMPARTMENT

DECKLID GAS PROPS

REMOVAL

(1) Open decklid.
(2) Support decklid with a suitable prop device.
(3) Remove gas prop lock caps on each end (Fig. 65).
(4) Remove gas prop from vehicle.

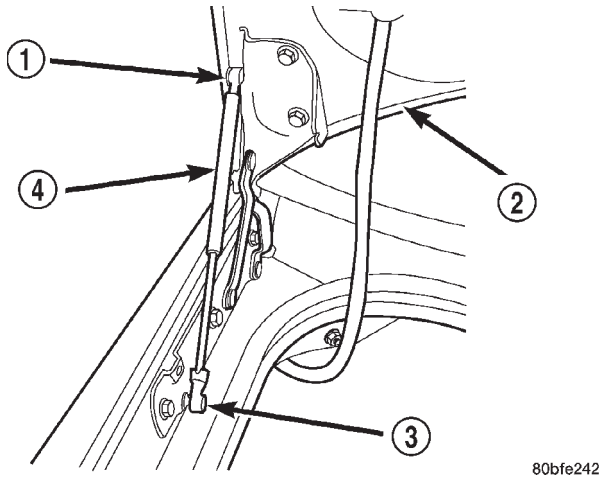


Fig. 65 Decklid Gas Prop

1 – LOCK CAP
2 – DECKLID
3 – LOCK CAP
4 – GAS PROP

INSTALLATION

(1) Place gas prop in position on vehicle.
(2) Install the lock caps on the gas prop.
(3) Verify decklid operation.

DECKLID

REMOVAL

(1) Release decklid latch and open decklid.
(2) Mark hinge locations on inside of decklid to aid installation.
(3) Disconnect the wire harness connector, if equipped.
(4) Remove bolts attaching top of hinge to decklid.
(5) Remove bolts attaching bottom of hinge to decklid (Fig. 66).
(6) With aid from a helper, remove decklid from vehicle.

INSTALLATION

(1) With aid from a helper, place decklid in position on vehicle.
(2) Install bolts attaching bottom of hinge to decklid.
(3) Install bolts to attach top of hinge to decklid.
(4) Connect wire harness connector.
(5) Align decklid to achieve equal spacing on all sides and flush across gaps.
(6) Verify decklid operation and sealing.

REMOVAL AND INSTALLATION (Continued)

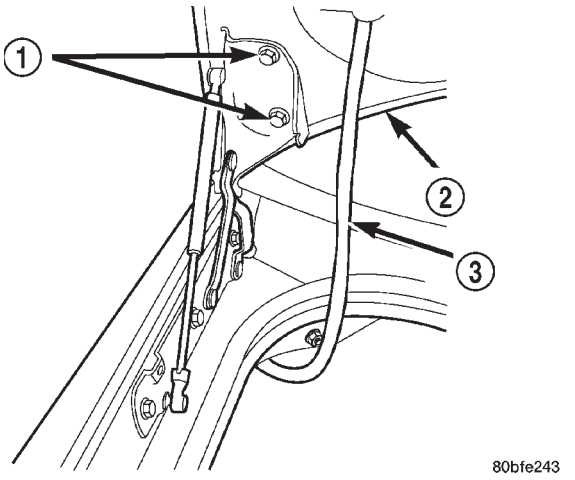


Fig. 66 Decklid

1 – REMOVE BOLTS
2 – DECKLID
3 – WIRE HARNESS

DECKLID HINGE

REMOVAL

(1) Open decklid.
(2) Support decklid with a suitable prop device or block.
(3) Remove hinge bolts (Fig. 67).
(4) Remove hinge from vehicle.

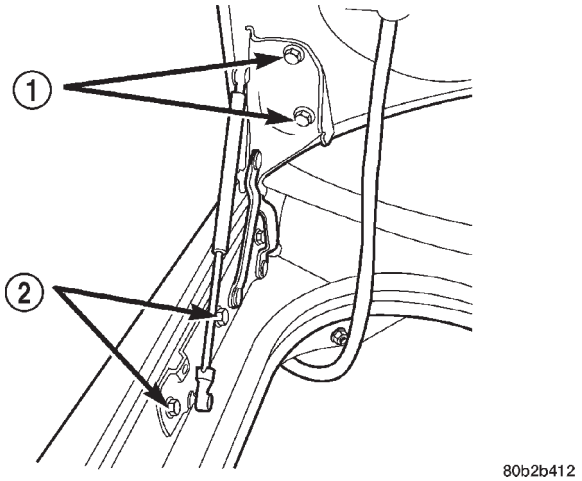


Fig. 67 Decklid Gas Prop

1 – UPPER HINGE BOLTS
2 – LOWER HINGE BOLTS

INSTALLATION

(1) Place hinge in position on vehicle.
(2) Install hinge bolts.
(3) Verify decklid operation and alignment.

DECKLID SLAM BUMPER

REMOVAL

(1) Open decklid.
(2) Pull slam bumper from decklid.
(3) Remove slam bumper from decklid.

INSTALLATION

(1) Place slam bumper in position on decklid.
(2) Push slam bumper into decklid.
(3) Verify decklid alignment.

DECKLID WEATHERSTRIP

REMOVAL

(1) Open decklid.
(2) Pull decklid weatherstrip from decklid opening fence (Fig. 68).
(3) Remove weatherstrip from vehicle.

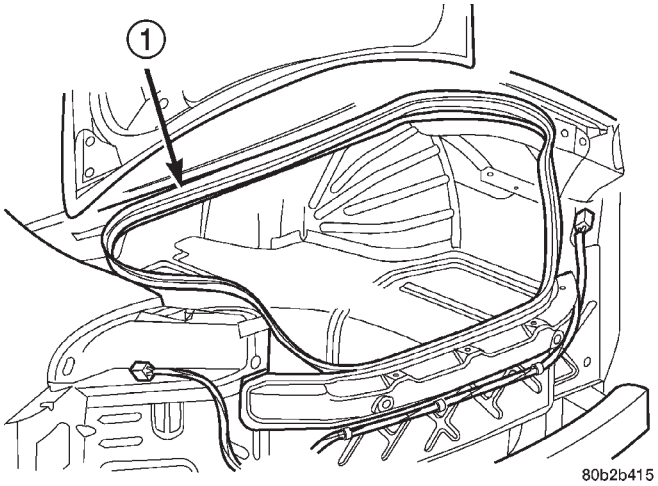


Fig. 68 Decklid Weatherstrip – Typical

1 – TRUNK LID WEATHERSTRIP

INSTALLATION

(1) Place weatherstrip in position on vehicle.
(2) Push decklid weatherstrip onto decklid opening fence with molded joint at striker location.
(3) Verify decklid operation and sealing.

DRIP RAIL WEATHERSTRIP

REMOVAL

(1) Open front and rear doors.
(2) Remove fasteners attaching drip rail weatherstrip to body and fender tip. (Fig. 69).
(3) Remove drip rail weatherstrip from vehicle.

REMOVAL AND INSTALLATION (Continued)

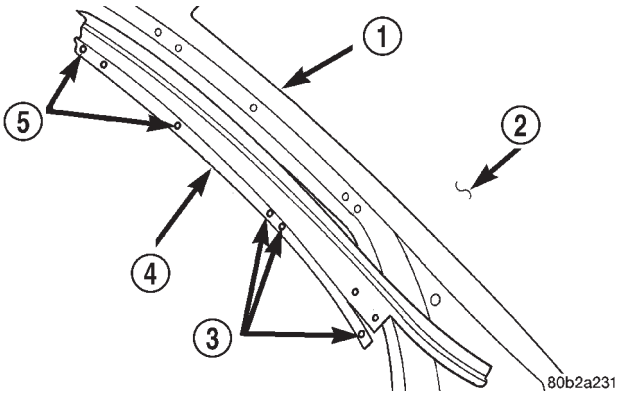


Fig. 69 Drip Rail Weatherstrip

1 – A-PILLAR
2 – WINDSHIELD
3 – FASTENERS
4 – DRIP RAIL WEATHER-STRIP
5 – FASTENERS

INSTALLATION

(1) Place drip rail weatherstrip in position on vehicle.
(2) Start position clip at the fender tip.
(3) Press down till holes are align with fastener holes in the body.
(4) Install fasteners to attach drip rail weatherstrip to roof rail.
(5) Close doors and verify fit.

DOOR SILL TRIM

REMOVAL

The door sills are attached with push in fasteners
(1) Remove fasteners attaching door sill trim to sill panel (Fig. 70).
(2) Remove sill trim from vehicle.

INSTALLATION

(1) Place sill trim in position on vehicle.
(2) Install fasteners to attach door sill trim to sill panel.

A-PILLAR TRIM

REMOVAL

(1) Remove instrument panel end cap.
(2) Disengage clips attaching trim to A-pillar by pulling on trim (Fig. 71).
(3) Slide A-pillar trim rearward, to disengaging from instrument panel top cover.
(4) Remove A-pillar trim from vehicle.

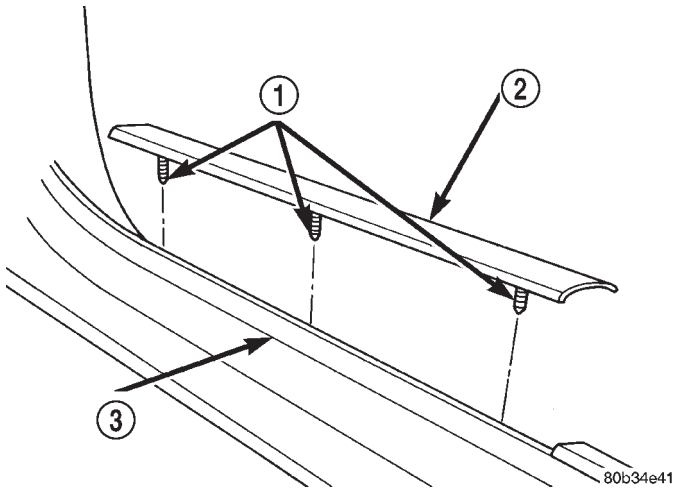


Fig. 70 Door Sill Trim

1 – FASTENERS
2 – DOOR SILL TRIM
3 – DOOR OPENING SILL

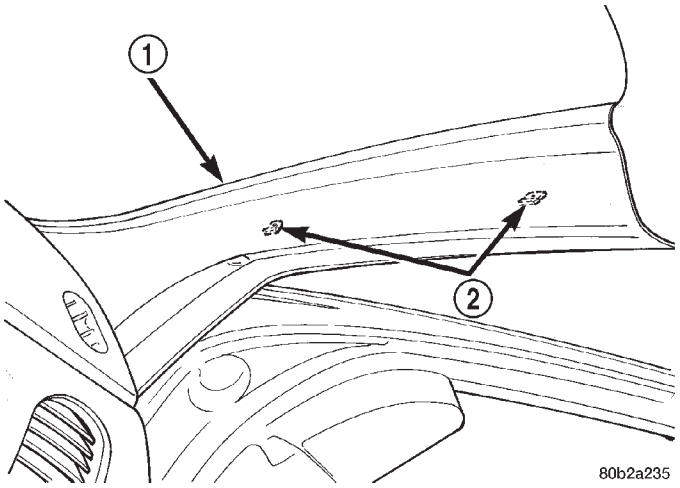


Fig. 71 A-Pillar Trim

1 – A-PILLAR TRIM
2 – CLIPS

INSTALLATION

(1) Slide A-pillar trim forward ensuring that the trim engages with the instrument panel top cover.
(2) Engage clips to attach trim to A-pillar.
(3) Install instrument panel end cap.

CROSS CAR BEAM

REMOVAL

(1) Remove steering column and instrument panel from vehicle.
(2) Remove fasteners attaching cross car beam to plenum in both locations (Fig. 72).

REMOVAL AND INSTALLATION (Continued)

(3) Remove left side fasteners attaching the cross car beam to cowl side panel.
(4) Remove right side fasteners attaching the cross car beam to cowl side panel.
(5) Remove cross car beam from vehicle.

INSTALLATION

(1) Place cross car beam in position in vehicle.
(2) Install right side fasteners attaching the cross car beam to cowl side panels.
(3) Install left side fasteners attaching the cross car beam to cowl side panels.
(4) Install fasteners to plenum in both locations.
(5) Install steering column and instrument panel.

B-PILLAR LOWER TRIM

REMOVAL

(1) Remove seat belt height adjuster knob.
(2) Remove upper B-pillar trim.
(3) Remove bolt attaching seat belt to floor below B-pillar (Fig. 73).
(4) Remove access door from above seat belt slot on B-pillar trim.
(5) Disengage clips attaching lower trim to B-pillar.
(6) Slide seat belt through the B-pillar trim.
(7) Remove B-pillar trim from vehicle.

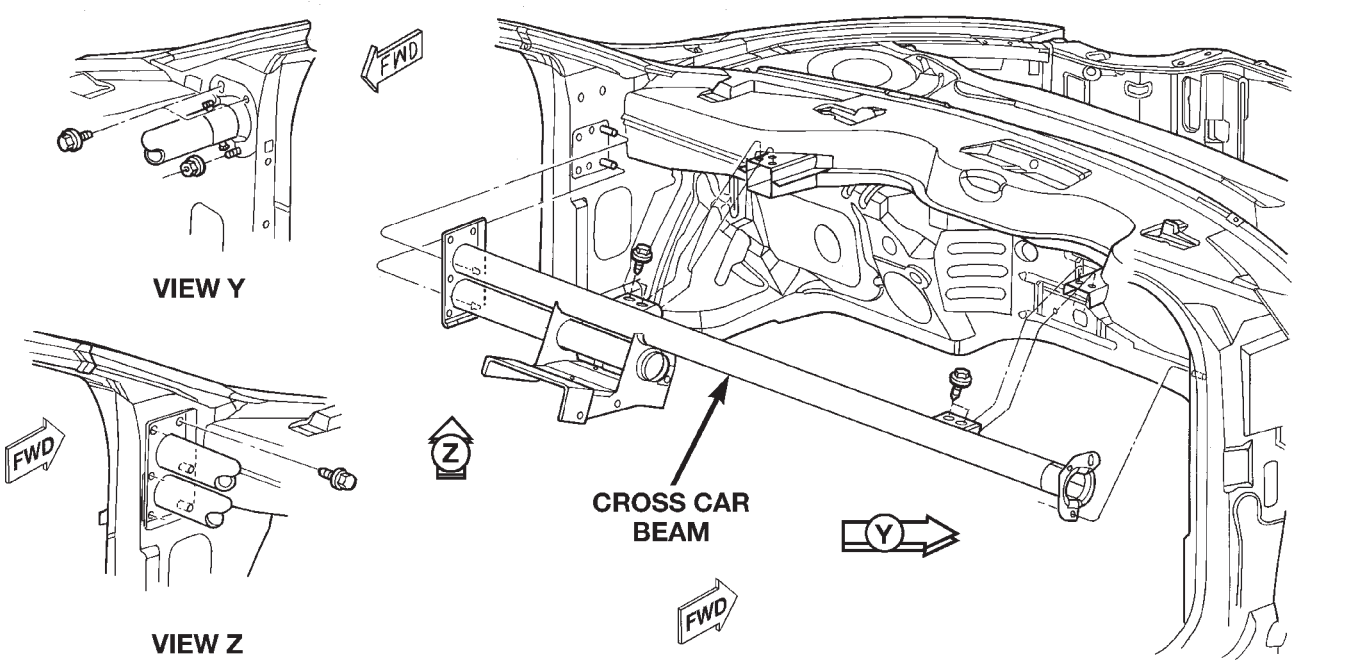
INSTALLATION

(1) Slide seat belt through the B-pillar trim.
(2) Place B-pillar trim in position on vehicle.
(3) Engage clips to hold lower trim to B-pillar.
(4) Install access door above seat belt slot on B-pillar trim.
(5) Install bolt to hold seat belt to floor below B-pillar.
(6) Install upper B-pillar trim.
(7) Install seat belt height adjuster knob.
(8) Refit weatherstrip.

B-PILLAR UPPER TRIM

REMOVAL

(1) Disengage shoulder belt turning loop cover.
(2) Remove bolt holding turning loop to shoulder belt height adjuster.
(3) Remove turning loop from adjuster.
(4) Remove adjuster knob.
(5) Disengage clips holding upper trim to B-pillar (Fig. 73).
(6) Remove B-pillar trim from vehicle.



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Fig. 72 Cross Car Beam

REMOVAL AND INSTALLATION (Continued)

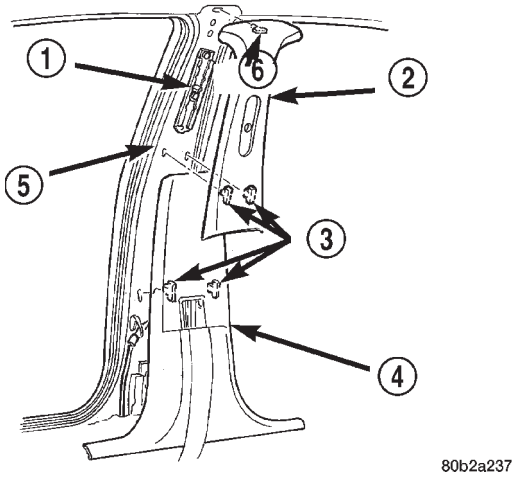


Fig. 73 B-Pillar Lower and Upper Trim

1 – SHOULDER HARNESS ADJUSTER
2 – UPPER B-PILLAR TRIM
3 – CLIPS
4 – LOWER B-PILLAR TRIM
5 – B-PILLAR
6 – CLIP

INSTALLATION

(1) Place B-pillar trim in position on vehicle.
(2) Engage clips to hold upper trim to B-pillar.
(3) Place shoulder belt turning loop in position on adjuster.
(4) Install bolt to hold turning loop to shoulder belt height adjuster.
(5) Install shoulder belt turning loop cover.
(6) Refit weatherstrip.

QUARTER TRIM LOWER (C-PILLAR)

REMOVAL

(1) Remove rear seat cushion and back.
(2) Pull upper quarter trim from panel (Fig. 74).
(3) Remove sill trim as necessary to clear quarter trim removal path.
(4) Disengage clips attaching lower quarter trim to inner quarter trim from vehicle.
(5) Remove quarter trim from vehicle.

INSTALLATION

(1) Place quarter trim in position on vehicle.
(2) Engage clips to attach lower quarter trim to inner quarter panel.
(3) Install upper quarter trim.
(4) Install sill trim.
(5) Install rear seat cushion and back.

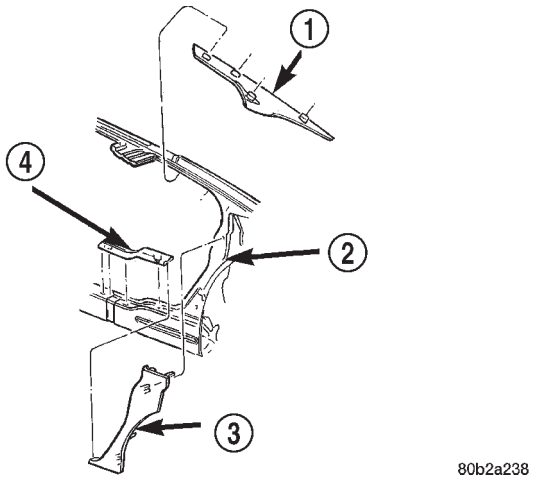


Fig. 74 Lower Quarter Trim

1 – UPPER QUARTER TRIM
2 – QUARTER PANEL
3 – LOWER QUARTER TRIM
4 – DOOR SILL TRIM

QUARTER TRIM UPPER (C-PILLAR)

REMOVAL

(1) Disengage clips holding upper quarter trim to inner quarter panel (Fig. 74).

NOTE: Start at top forward area of trim and pull inboard.

(2) Remove seat cushion.
(3) Remove lower seat belt anchor nut.
(4) Slide seat belt through trim panel.
(5) Remove upper quarter trim from vehicle.

INSTALLATION

(1) Slide belt through trim panel.
(2) Place upper quarter trim in position on vehicle.
(3) Engage clips to attach upper quarter trim to inner quarter panel.

NOTE: Start at lower attachments first and work up.

(4) Install seat belt anchor nut.
(5) Install seat cushion.

FRONT SEAT BELT RETRACTOR

CAUTION: Inspect the condition of the shoulder belt and lap belt. Replace any belt that is cut, frayed, torn, or damaged in any way. Also, replace the shoulder belt if the retractor is either damaged or inoperative.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) If necessary, move the front seat(s) all the way forward for access.
(2) Remove turning loop adjuster knob.
(3) Detach the turning loop cover from the upper anchor bolt.
(4) Remove upper anchor bolt (Fig. 75).
(5) Remove B-pillar upper trim.
(6) Remove lower anchor bolt.
(7) Remove B-pillar lower trim panel.
(8) Remove the retractor anchor bolt.
(9) Remove lower B-pillar trim.
(10) Disconnect retractor wire harness connector.
(11) Remove retractor from vehicle.

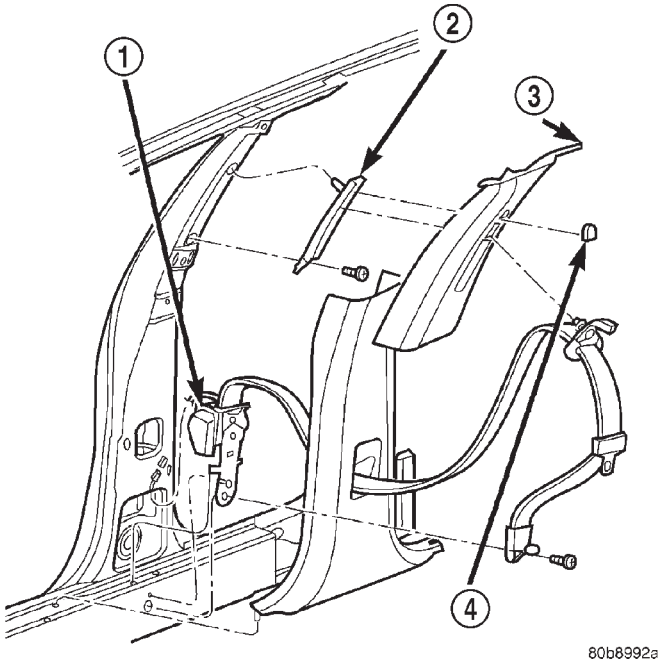


Fig. 75 Front Shoulder Belt Adjuster

1 – FRONT SEAT BELT RETRACTOR
2 – TURNING LOOP ADJUSTER
3 – B-PILLAR UPPER
4 – TURNING LOOP ADJUSTER KNOB

INSTALLATION

(1) Position the retractor in the vehicle.
(2) Connect retractor wire harness connector.
(3) Install lower B-pillar trim.
(4) Install the retractor anchor bolt. Tighten to 60 N·m (44 ft. lbs.) torque.
(5) Route the belt webbing through the access slots in B-pillar upper trim.
(6) Install B-pillar upper trim.
(7) Install the upper anchor bolt. Tighten to 60 N·m (44 ft. lbs.) torque.
(8) Close turning loop covers.
(9) Install turning loop adjuster knob.

FRONT SEAT CENTER OCCUPIED BELT BUCKLE – CONCORDE/INTREPID

REMOVAL

(1) Move or remove front seat as necessary to gain access to seat belt buckle anchor bolt.
(2) Remove bolt attaching buckle and reinforcement to front seat track (Fig. 76).
(3) Remove seat belt buckle from vehicle.

INSTALLATION

(1) Place seat belt buckle in position on vehicle.
(2) Install bolt attaching buckle and reinforcement to front seat track or floor. Tighten bolt to 60 N·m (44 ft. lbs.) torque.
(3) Install front seat, if it was removed.

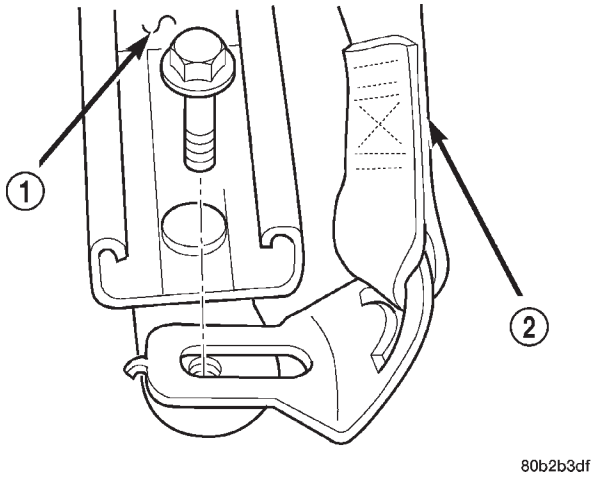


Fig. 76 Front Seat Center Occupied Belt Buckle – Typical

1 – FRONT SEAT TRACK
2 – FRONT SEAT BELT BUCKLE

REAR SEAT BELT RETRACTOR

CAUTION: Inspect the condition of the shoulder belt and lap belt. Replace any belt that is cut, frayed, torn, or damaged in any way. Also, replace the shoulder belt if the retractor is either damaged or inoperative.

REMOVAL

(1) Remove seat cushion and back.
(2) Remove upper quarter trim panel.
(3) Remove lower quarter trim panel.
(4) Remove nut attaching lower seat belt anchor to floor.
(5) Remove turning loop bolt.

REMOVAL AND INSTALLATION (Continued)

(6) Remove bolt attaching belt retractor to quarter panel. (Fig. 77).

(7) Remove belt from vehicle.

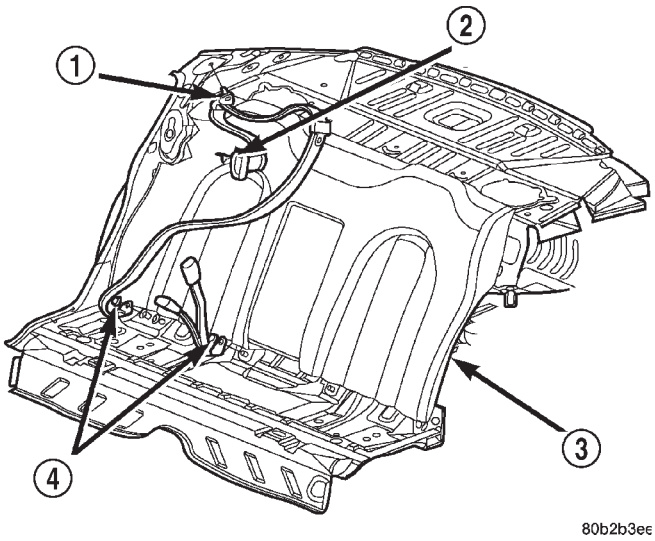


Fig. 77 Rear Seat Belt Retractor

1 – TURNING LOOP
2 – REAR SEAT BELT RETRACTOR
3 – SEAT BACK
4 – ANCHOR NUT

INSTALLATION

(1) Place belt in position on vehicle.

(2) Install bolt to attach belt retractor to quarter panel.

(3) Install the turning loop.

(4) Route anchor end of seat belt through upper quarter trim opening. Tighten to 60 N·m (44 ft. lbs.).

(5) Install nut to attach lower seat belt anchor to floor.

(5) Tighten nut to 60 N·m (44 ft. lbs.) torque.

(6) Install lower quarter trim panel.

(7) Install upper quarter trim panels.

(8) Install seat back and cushion.

REAR SEAT BELT BUCKLE

REMOVAL

(1) Remove rear seat cushion.

(2) Remove seat belt anchor nut (Fig. 78).

(3) Remove seat belt buckle(s) from stud on floor.

INSTALLATION

(1) Place seat belt buckle(s) anchor over stud on floor.

(2) Install rear seat belt anchor nut. Tighten to 60 N·m (44 ft. lbs.).

(3) Install rear seat cushion.

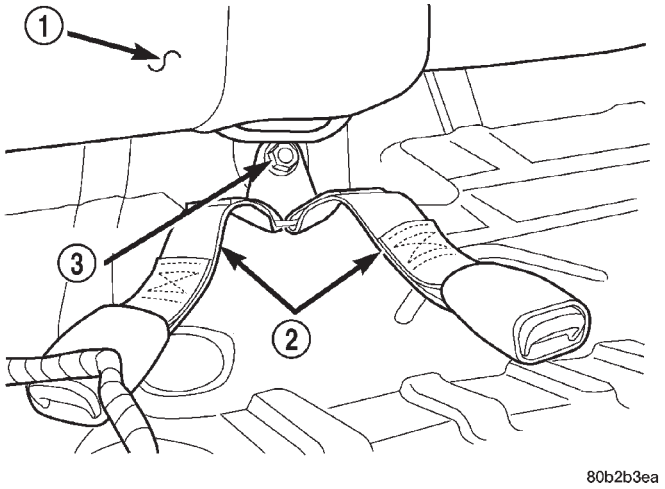


Fig. 78 Rear Seat Belt Buckle(s)

1 – REAR SEAT BACK
2 – SEAT BELT BUCKLES
3 – ANCHOR

FLOOR CONSOLE ARMREST LID

REMOVAL

(1) Open armrest lid.

(2) Remove lid attaching screws.

(3) Remove lid from console.

INSTALLATION

(1) Place lid in position.

(2) Install screws to attach lid to console.

(3) Check operation of lid.

FLOOR CONSOLE ARMREST LATCH

REMOVAL

(1) Open armrest lid.

(2) Remove latch attaching screws.

(3) Remove latch from console.

INSTALLATION

(1) Place latch in position.

(2) Install screws to attach latch to console.

(3) Check operation of latch.

FLOOR CONSOLE END CAP

REMOVAL

(1) Disengage tabs on sides at bottom (Fig. 79)

(2) Open arm rest lid and remove rear end cap attaching screws.

(3) Remove rear bezel.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Align rear end cap in position on console.
(2) Install rear end cap attaching screws.
(3) Push forward at the bottom to lock tabs in position.

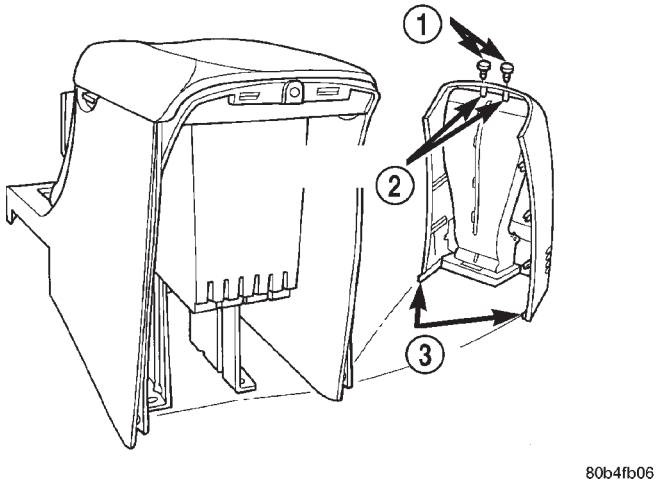


Fig. 79 Floor Console End Cap

1 – FASTENERS
2 – LOCATOR PINS
3 – TABS

FLOOR CONSOLE

REMOVAL

(1) Remove shift knob.
(2) Remove floor console shift bezel.
(3) Disconnect wire connectors.
(4) Remove side panels (Fig. 80), or (Fig. 81).
(5) Remove fasteners attaching forward bracket to instrument panel.
(6) Remove fasteners attaching bottom of console storage bin to rear mounting bracket (Fig. 82).
(7) Remove floor console from vehicle.

INSTALLATION

(1) Place center console in position on vehicle.
(2) Install fasteners to attach forward bracket to instrument panel.
(3) Install fasteners to attach bottom of console storage bin to rear mounting bracket.
(4) Install side panels.
(5) Install center console shift bezel.
(6) Install shift knob.

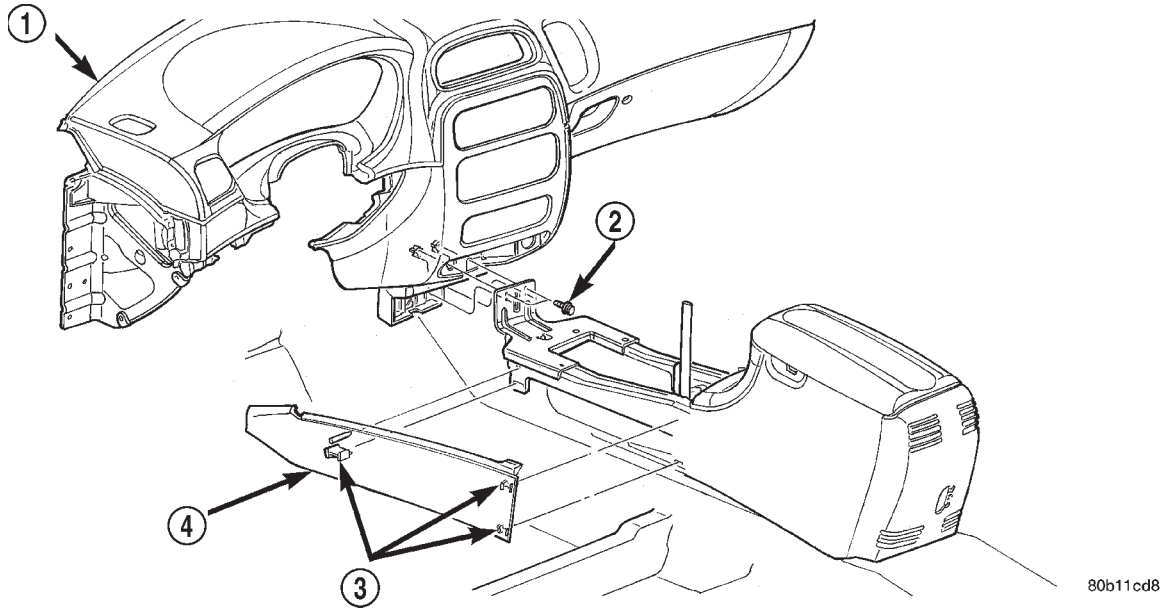


Fig. 80 Front Floor Console Side Panels – Concorde

1 – INSTRUMENT PANEL
2 – FASTENERS
3 – CLIPS
4 – SIDE PANEL

REMOVAL AND INSTALLATION (Continued)

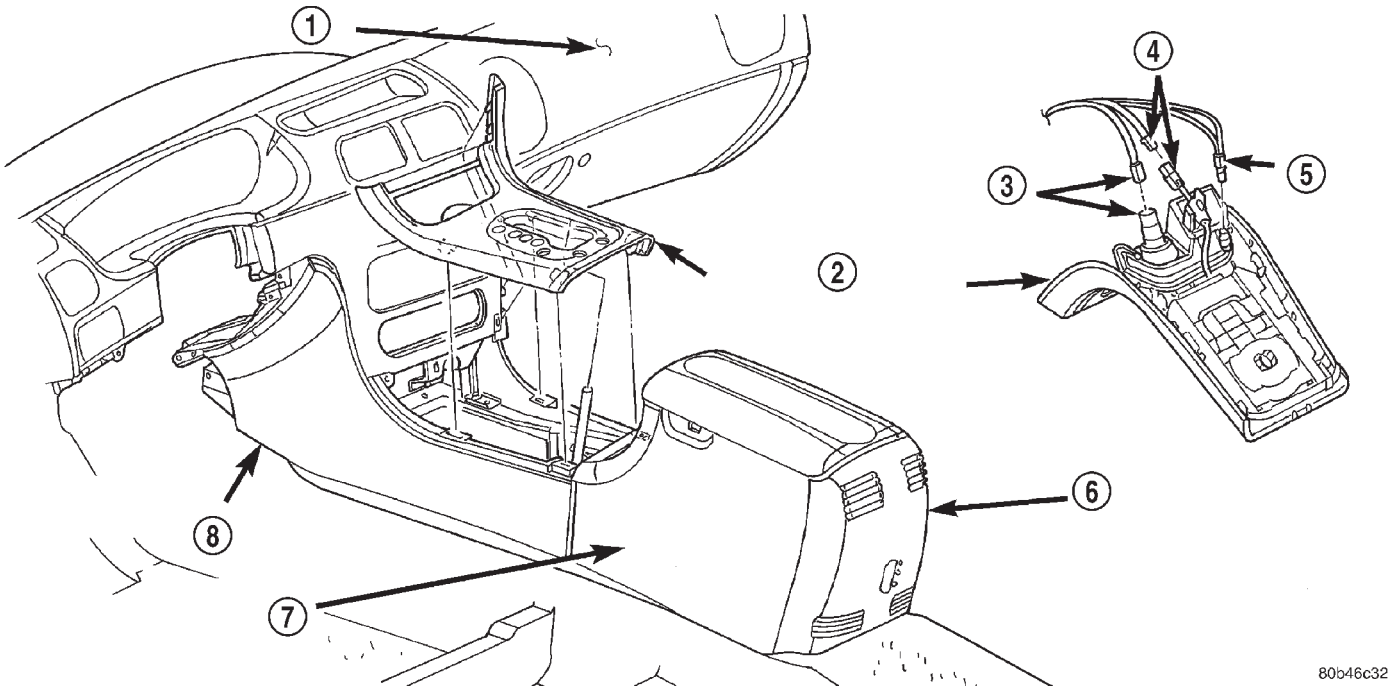


Fig. 81 Front Floor Console Side Panels – Intrepid Shown – LHS/300M Similar

1 – INSTRUMENT PANEL
2 – FLOOR CONSOLE BEZEL
3 – POWER OUTLET/CIGAR LIGHTER CONNECTORS
4 – TRANSMISSION RANGE INDICATOR ILLUMINATION CONNECTORS
5 – ASH RECEIVER LAMP
6 – REAR END CAP
7 – FLOOR CONSOLE
8 – FRONT FLOOR CONSOLE PANEL

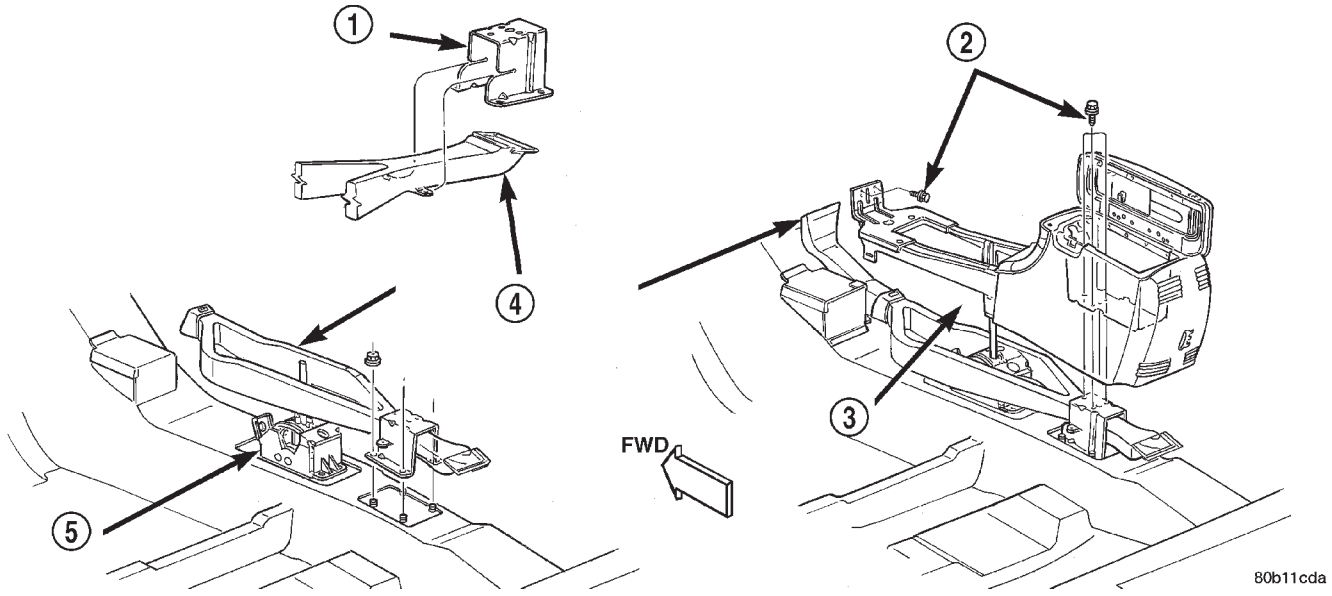


Fig. 82 Floor Console

1 – CONSOLE BRACKET
2 – FASTENERS
3 – FLOOR CONSOLE
4 – FLOOR CONSOLE DUCT
5 – SHIFTER ASSEMBLY

REMOVAL AND INSTALLATION (Continued)

FLOOR CONSOLE SHIFT BEZEL

REMOVAL

NOTE: The Transmission Range Indicator Lamp (electroluminescent) is not serviceable. Replace Floor Console Panel for replacement of the lamp.

(1) Place gear selector in neutral.
(2) Loosen set screw attaching gear shift knob to gear shift.
(3) Remove gear shift knob from gear shift.
(4) Disengage clips attaching bezel to floor console (Fig. 83), or (Fig. 84).
(5) Disconnect the ash tray light and power outlet, if equipped.
(6) Disconnect the transmission range indicator illumination connector.
(7) Remove bezel from vehicle.

INSTALLATION

(1) Connect the transmission range indicator illumination connector.
(2) Connect ash tray light, if equipped.
(3) Place bezel in position on vehicle.
(4) Engage clips attaching bezel to floor console.
(5) Push gear shift knob onto gear shift.
(6) Tighten set screw attaching gear shift knob to gear shift.

FLOOR CONSOLE CUP HOLDER ASSEMBLY

REMOVAL

(1) Remove shift knob.
(2) Remove floor console shift bezel (Fig. 83), or (Fig. 84).
(3) Raise console armrest lid.
(4) Remove screws at top and bottom of cup holder assembly (Fig. 85).
(5) Lift up and forward to remove assembly.

INSTALLATION

(1) Place cup holder into floor console and align screw holes.
(2) Install upper and lower screws.
(3) Lower console armrest lid.
(4) Install floor console shift bezel.
(5) Install shift knob.

FRONT FLOOR CONSOLE PANEL – CONCORDE

REMOVAL

(1) Remove shift knob.
(2) Remove floor console shift bezel (Fig. 83).

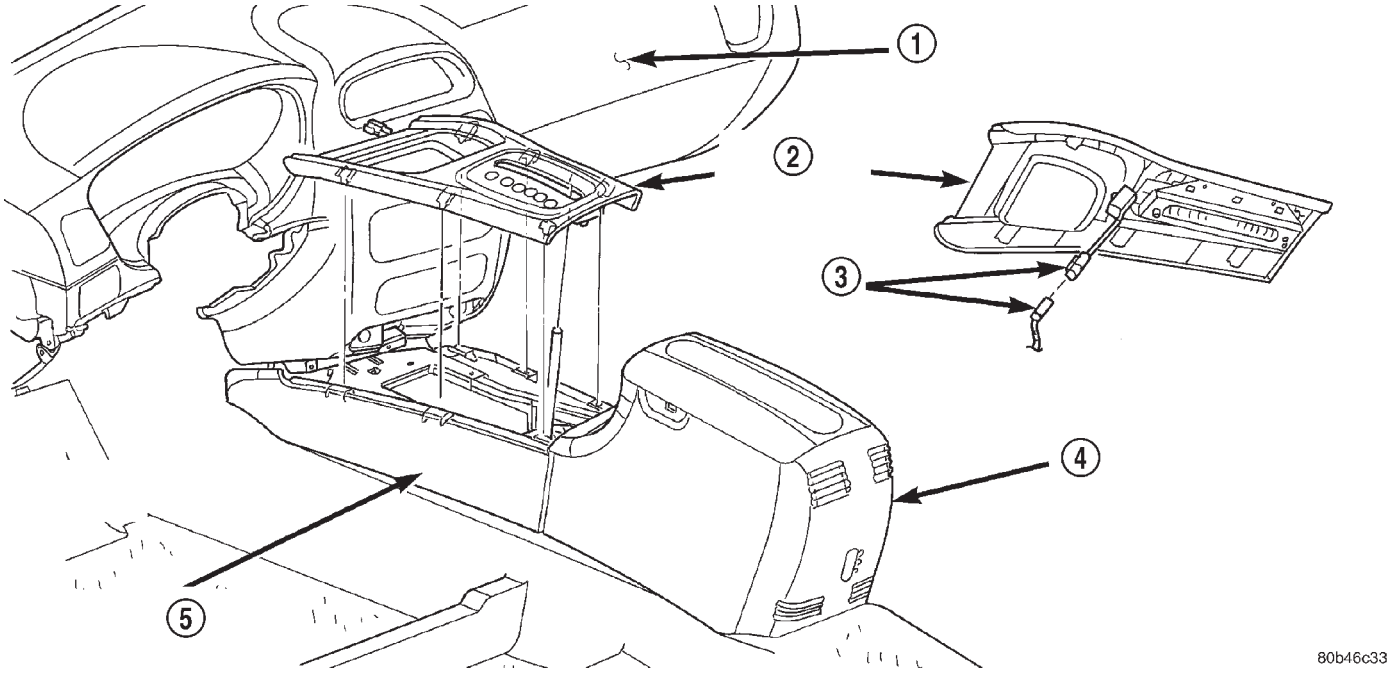


Fig. 83 Floor Console Bezel – Concorde

1 – INSTRUMENT PANEL
2 – FLOOR CONSOLE SHIFT BEZEL
3 – TRANSMISSION RANGE INDICATOR ILLUMINATION CONNECTORS
4 – REAR BEZEL
5 – FLOOR CONSOLE

REMOVAL AND INSTALLATION (Continued)

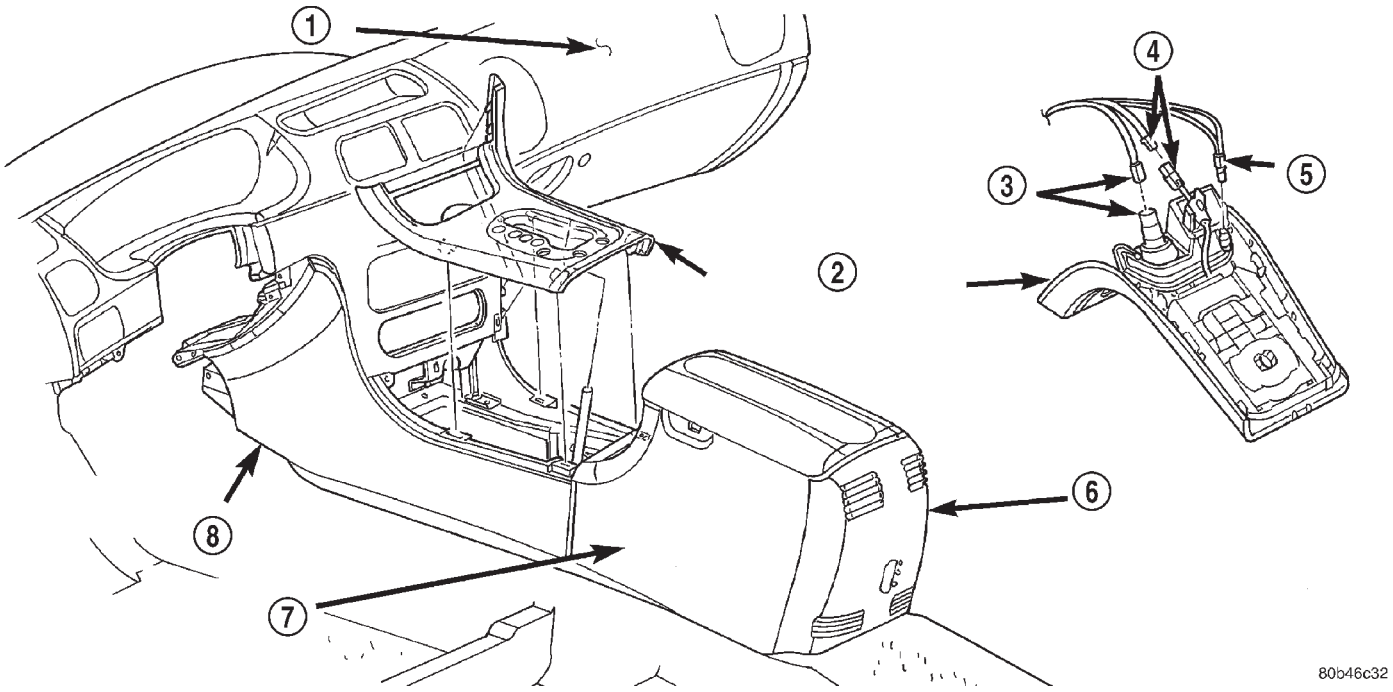


Fig. 84 Floor Console Bezel – Intrepid Shown – LHS/300M Similar

1 – INSTRUMENT PANEL
2 – FLOOR CONSOLE BEZEL
3 – POWER OUTLET/CIGAR LIGHTER CONNECTORS
4 – TRANSMISSION RANGE INDICATOR ILLUMINATION CONNECTORS
5 – ASH RECEIVER LAMP
6 – REAR END CAP
7 – FLOOR CONSOLE
8 – FRONT FLOOR CONSOLE PANEL

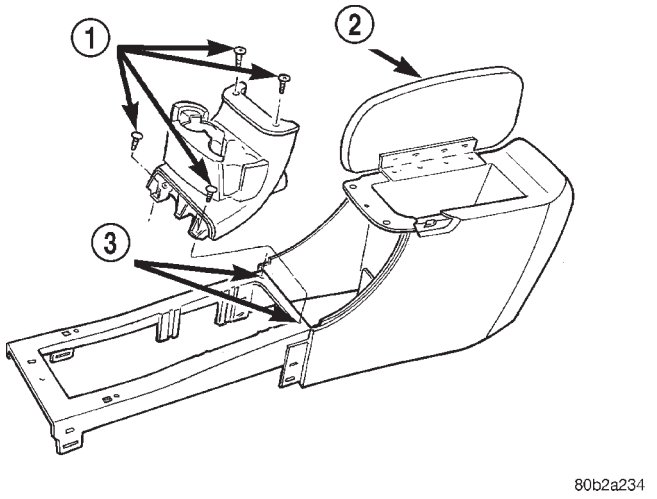


Fig. 85 Floor Console Cup Holder Assembly

1 – SCREWS
2 – ARMREST LID
3 – SCREW HOLES

(3) For right side panel, open the glove box door and remove side panel screws

(4) For left side panel, remove steering column cover and side panel screws.

(5) Disengage clips from floor console.

(6) Remove floor console side panel(s).

INSTALLATION

(1) Place front floor console side panel in position on vehicle.

(2) Press on the side panel to seat clips.

(3) Install side panel(s) screws.

(4) Install floor console shift bezel.

(5) Install shift knob.

FRONT FLOOR CONSOLE SIDE PANEL – INTREPID, LHS, 300M

REMOVAL

(1) Remove shift knob.

(2) Remove console shift bezel (Fig. 84).

(3) To remove right side panel, open glove box and remove side panel attaching screws.

(4) To remove left side panel, remove steering column cover and remove side panel attaching screws.

(5) Disengage clips from center console.

(6) Remove floor console side panel.

INSTALLATION

(1) Place front floor console side panel in position on vehicle.

REMOVAL AND INSTALLATION (Continued)

(2) Press on the side panel to seat clips.
(3) Install attaching screws.
(4) Install floor console shift bezel.
(5) Install shift knob.

FLOOR CARPET

REMOVAL

(1) Remove floor mats.
(2) Remove door sill trim covers.
(3) Remove cowl side trim covers.
(4) Remove front seats.
(5) Remove bolts attaching front seat belt lower anchors to floor below B-pillar trim panels.
(6) Remove center console, if equipped.
(7) Remove rear seat cushion.
(8) Remove gas pedal bracket.
(9) Remove carpet fasteners.
(10) Remove carpet from vehicle (Fig. 86).

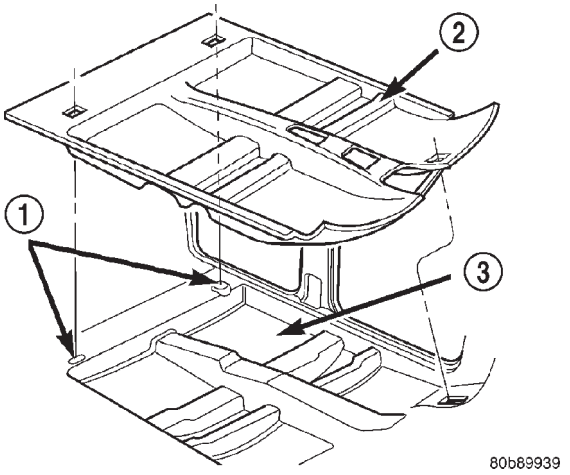


Fig. 86 Floor Carpet

1 – REAR SEAT HOLDDOWN CUPS
2 – FLOOR CARPET
3 – FLOOR

INSTALLATION

(1) Place carpet in proper position on floor of vehicle.
(2) Install carpet fasteners.
(3) Using double back tape or hook and loop, secure carpet strap behind the instrument panel center support bracket.
(4) Install cowl side trim covers.
(5) Install door sill trim covers.
(6) Install rear seat cushion.
(7) Install gas pedal bracket.
(8) Install center console, if equipped.
(9) Install bolts to attach seat belt lower anchors to floor below B-pillar trim panels.
(10) Install front seats.
(11) Install floor mats.

SUN VISOR

All vehicles with driver and passenger side air bags must have a colored coded five Bullet point air bag warning label applied to the sun visor, verify label availability and ensure the label is installed.

REMOVAL

(1) Remove screw attaching inboard visor retainer to over head. (Fig. 87).
(2) Remove screws holding outboard visor pivot base to roof.
(3) Disconnect visor vanity lamp wire connector, if equipped.
(4) Remove visor from vehicle.

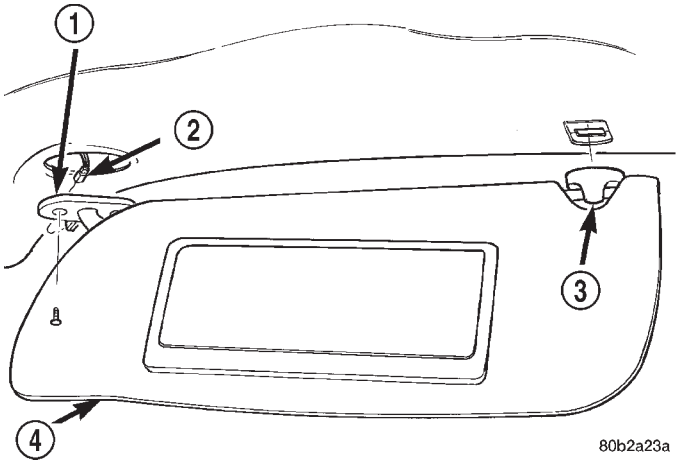


Fig. 87 Sun Visor

1 – VISOR PIVOT BASE
2 – WIRE CONNECT
3 – RETAINER
4 – VISOR

INSTALLATION

(1) Engage visor vanity lamp wire connector, if equipped.
(2) Place visor in position on header.
(3) Install screws to attach outboard visor pivot base to over head.
(4) Install screw to attach inboard visor retainer to over head.

FRONT ASSIST HANDLE

REMOVAL

(1) Pull and hold assist handle down.
(2) Remove screws attaching assist handle to roof (Fig. 88).
(3) Remove assist handle from vehicle.

INSTALLATION

(1) Place assist handle in position on vehicle.
(2) Install screws to attach assist handle to roof.

REMOVAL AND INSTALLATION (Continued)

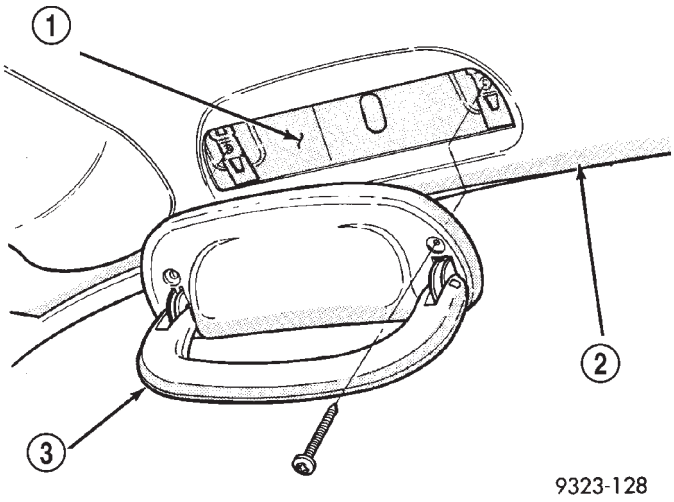


Fig. 88 Front Assist Handle

1 – ROOF
2 – HEADLINING
3 – ASSIST HANDLE

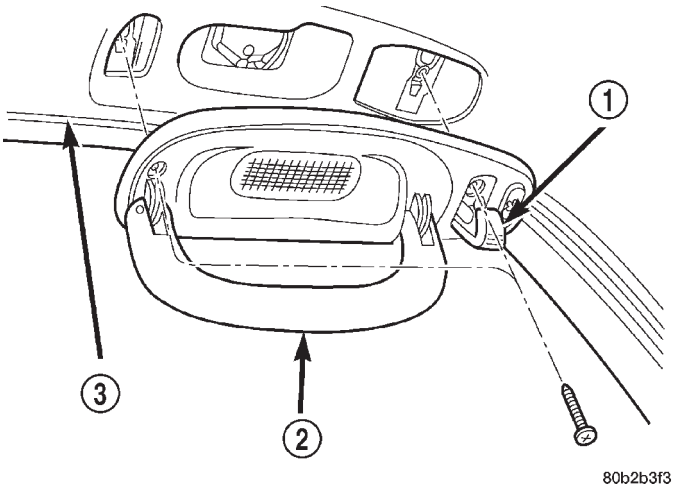


Fig. 89 Rear Assist Handle and Reading Lamp

1 – COAT HOOK
2 – ASSIST HANDLE
3 – HEADLINING

REAR ASSIST HANDLE AND READING LAMP

REMOVAL

(1) Pull down coat hook.
(2) Remove screw holding assist handle to roof from behind coat hook.
(3) Pull and hold assist handle down.
(4) Remove front screw attaching assist handle to roof (Fig. 89).
(5) Remove assist handle from roof.
(6) Disengage clips attaching reading lamp socket to back of assist handle base.
(7) Disconnect reading lamp switch from slot on back of assist handle base.
(8) Separate assist handle from vehicle.

INSTALLATION

(1) Place assist handle in position on vehicle.
(2) Connect reading lamp switch into slot on back of assist handle base.
(3) Engage clips to attach reading lamp socket to back of assist handle base.
(4) Place assist handle in position on roof.
(5) Pull and hold assist handle down.
(6) Install front screw to attach assist handle to roof.
(7) Install screw behind coat hook to attach assist handle to roof.

HEADLINER

NOTE: The first time the headliner is removed, it is necessary to pull on the headliner until the four glue bonds break free from the structural membrane (21 x 25 cardboard). The membrane is to stay as a permanently bonded member to the roof panel. DO NOT apply any glue to the headliner on installation; it is not necessary.

REMOVAL

(1) Remove front passenger seat for ease of removal of headliner.
(2) Remove right and left A-pillar trim panels.
(3) Remove right and left sun visors and retainers.
(4) Remove overhead console or front interior lights.
(5) Disconnect wire harness along A-pillar and wire connector to the fuse panel.
(6) Remove upper B-pillar trim panels.
(7) Remove front and rear assist handles.
(8) Remove quarter trim upper panels partial, keeping belt attached.
(9) Fully recline seat.
(10) Disengage rear headliner locating clip, using Headliner Clip Pliers, Special Tool C-6967.
(11) Pull headliner down, beginning from the rear. Four corner glue bond of structural membrane to back of headliner must be overcome.

REMOVAL AND INSTALLATION (Continued)

NOTE: No special tools are required to release the membrane from the headliner. Pull down use hand force only to release the membrane.

(12) Remove headliner from vehicle through the rear door, using two people (Fig. 90).

(13) Ensure that the rear locator flexible clip is removed from the roof steel. Install rear locator flexible clip into the base located on the headliner before installing the headliner (Fig. 91).

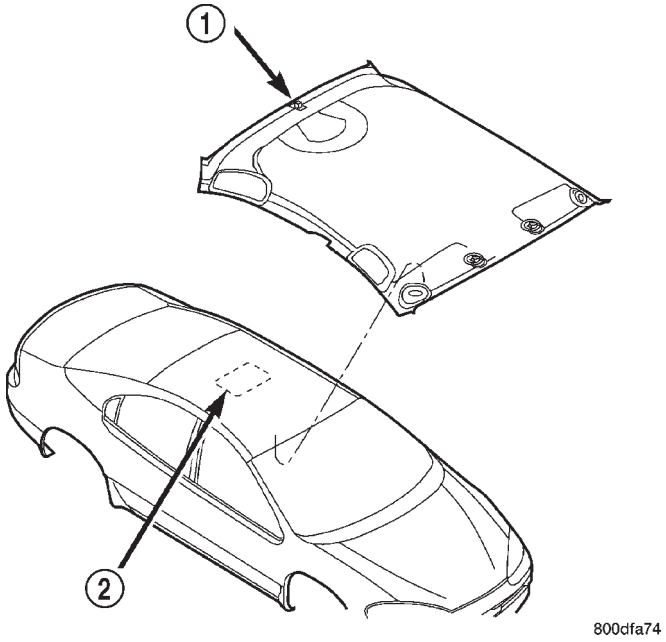


Fig. 90 Headliner

1 – REAR CLIP
2 – MEMBRANE

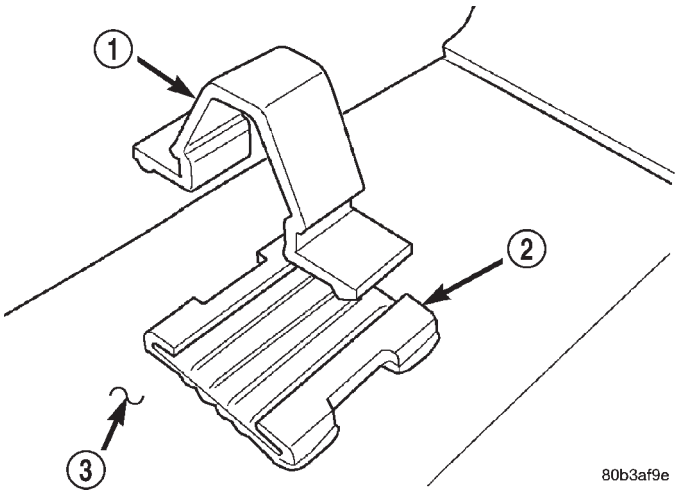


Fig. 91 Locator Flexible Clip

1 – FLEXIBLE CLIP
2 – BASE
3 – HEADLINER

INSTALLATION

NOTE: The DO NOT remove headliner membrane from vehicle. No additional use of any additional adhesives is needed.

(1) Place headliner in proper position in vehicle.

(2) Engage the locator flexible clip to attach headliner to roof above rear window and press on the membrane to ensure contact.

(3) Install upper right and left quarter trim panels.

(4) Install front and rear assist handles.

(5) Install upper right and left B-pillar trim panels.

(6) Install wire harness along A-pillar and connect wire connector to the fuse panel.

(7) Install overhead console or front interior lights

(8) Install right and left sun visors and retainers.

(9) Install right and left A-pillar trim panels.

(10) Install seat, and return seats to up the right position.

(11) Engage the hook and loop patch fasteners around the sun roof opening.

ROOF STRUCTURAL MEMBRANE

REMOVAL

(1) Remove headliner.

(2) Remove roof support membrane, using a Molding Removal Tool, 3-M p/n 08978.

(3) Carefully pull down corner of roof structural membrane enough to insert molding removal tool between roof panel and adhesive. Activate air chisel, while keeping the blade at an angle, ensuring not to flex the roof panel. Evenly separate the adhesive strips from the roof panel until the structural membrane is removed.

NOTE: USE EXTREME CARE WHEN PULLING ON THE STRUCTURAL MEMBRANE, THE ROOF PANEL WILL DENT/DING/CREASE/FLEX AND CAUSE PERMANENT DAMAGE.

(4) Using a razor blade scraper tool, scrape off remaining adhesive residue.

INSTALLATION

(1) Place headliner in vehicle allowing it to rest in a down position on the seats.

(2) Outside of the vehicle, using the adhesive supplied, apply five 10 mm (0.39 inch) diameter beads of adhesive within the printed black lines or at the center of membrane strips for the length of the new structural membrane, stopping 38 mm (1.5 inches) before each end (Fig. 92).

REMOVAL AND INSTALLATION (Continued)

NOTE: ADHESIVE MUST BE APPLIED UNIFORMLY IN 10 mm (0.39 INCHES) BEADS. TOO MUCH OR TOO LITTLE ADHESIVE WILL CAUSE ROOF PANEL TO WARP AS ADHESIVE CURES.

(3) Apply a 25 mm (1.0 inch) diameter hot glue spot to each location where the glue bond between the headliner and structural membrane had previously been broken free. This bond is not critical to performance but allows the membrane to remain in place while the headliner is installed.

(4) Place the structural membrane, adhesive side up, onto the headliner over the glue spots to attach the membrane to the headliner.

(5) Install headlining in proper position in vehicle.

NOTE: IT IS NOT NECESSARY TO APPLY LOCAL PRESSURE IN THE AREA OF THE STRUCTURAL MEMBRANE, THE SHAPE AND STIFFNESS OF THE HEADLINER WILL PROVIDE PROPER PRESSURE TO ALLOW THE ADHESIVE TO CURE PROPERLY.

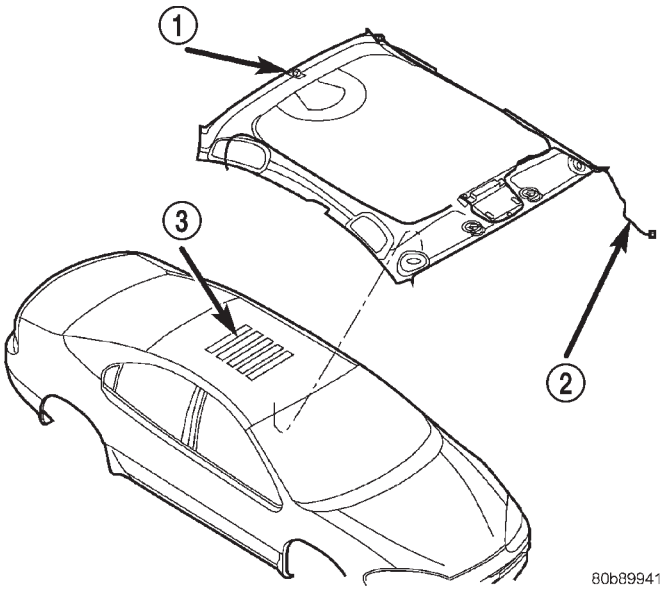


Fig. 92 Membrane Strips

1 – REAR CLIP
2 – WIRE HARNESS
3 – STRUCTURAL MEMBRANE

REAR SHELF TRIM PANEL

REMOVAL

(1) Remove seat cushion and back.

(2) Remove quarter trim lower and upper trim panels.

(3) Remove push in fasteners.

(4) Pull rear shelf trim panel away from rear glass to disengage clips (Fig. 93).

(5) Disengage CHMSL wire connector, if equipped.

(6) Remove rear shelf trim panel from vehicle.

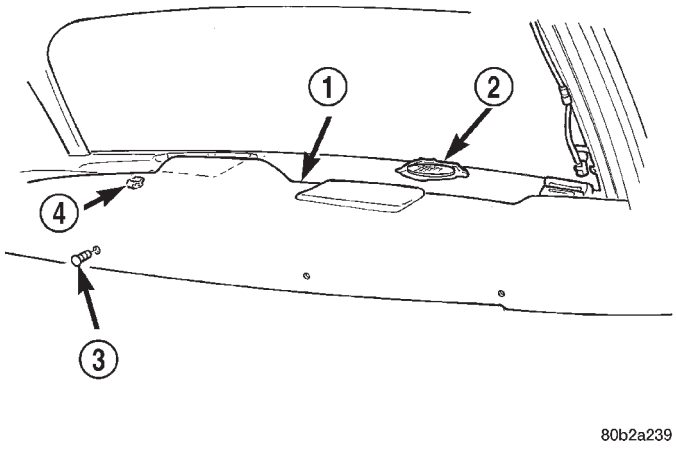


Fig. 93 Parcel Shelf Trim Panel

1 – REAR SHELF TRIM
2 – REAR SPEAKER
3 – PUSH-IN FASTENER
4 – CLIP

INSTALLATION

(1) Place rear shelf trim panel in position in vehicle.

(2) Connect CHMSL wire connector.

(3) Push parcel shelf trim rearward toward rear glass and engage clips.

(4) Insert push in fasteners into position.

(5) Install quarter trim lower and upper panels.

(6) Install seat back and cushion.

CHILD TETHER ASSEMBLY CUP

REMOVAL

(1) Remove rear shelf trim panel from vehicle.

(2) Turn shelf panel over so that the bottom side is upward to access Child Tether Assembly Cup locks.

(3) With a flat tool, push attachment locks toward center of cup to release the Child Tether Assembly Cup from the rear shelf panel.

(4) Remove Child Tether Cup.

INSTALLATION

(1) Place Child Tether Assembly Cup into position on top of the rear shelf trim panel.

(2) Press rearward until cup engages into rear shelf trim panel.

(3) Push front of cup down into rear shelf trim panel.

(4) Install rear shelf panel.

CHILD TETHER ASSEMBLY CUP COVER

REMOVAL

(1) Open Child Tether Assembly Cup Cover to the full open position.

REMOVAL AND INSTALLATION (Continued)

(2) Push cover towards rear of the vehicle until cover detaches from cup.

INSTALLATION

(1) Place Child Tether Assembly Cup cover into position on top of the rear shelf trim panel.

(2) Push downward on Child Tether Assembly Cup Cover till it locks into position (will hear part click).

CHILD TETHER ASSEMBLY

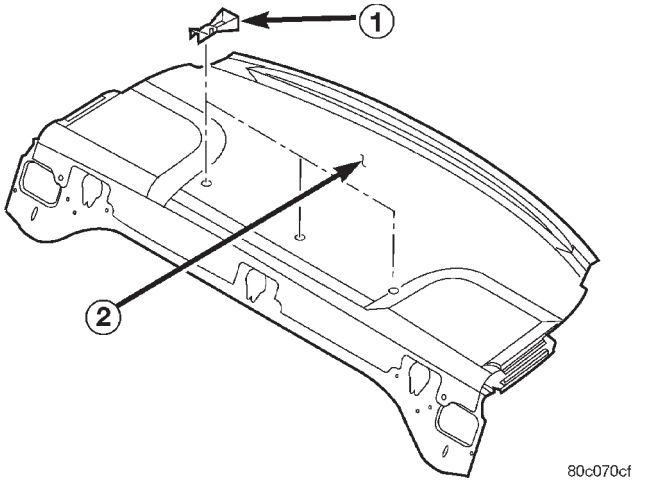
REMOVAL

(1) Open the Child Tether Cap to allow access to the Child Tether Assembly bolt.

(2) Remove bolt attaching Child Tether Assembly to vehicle (Fig. 94)

(3) Remove Child Tether Assembly (bolt, anchor plate, cap and spacer) from vehicle.

CHILD TETHER ASSEMBLY



1. Child Tether
2. Rear Shelf Panel

Fig. 94

INSTALLATION

(1) Place Child Tether Assembly into position on the rear shelf panel with the cap open.

(2) Insert the dog point into the hole if the sheet metal

(3) Hand start bolt.

(4) Tighten bolt(s) to 20 N·m (15 ft. lbs.) torque.

(5) Close Child Tether Assembly Cap.

TRUNK CARPET

REMOVAL

(1) Remove rear seat cushion and back.

(2) Remove fasteners at forward edge along wheelhousing

(3) Remove spare tire board, jack, and tire.

(4) Remove fasteners at back panel and sides.

(5) Remove carpet.

INSTALLATION

(1) Fold carpet and load into position in the trunk.

(2) Install fasteners at back and sides panel.

(3) Install spare tire board, jack, and tire.

(4) Install fasteners at forward edge along wheelhousing

(5) Install rear seat back and cushion.

AIR EXHAUSTER VENT

REMOVAL

(1) Open decklid.

(2) Move trunk carpet to access the air exhauster in the right/left rear corner of the trunk (Fig. 95).

(3) From inside trunk push the air exhauster outward to release clips.

(4) Reach under fascia and pull air exhauster outward from trunk side panel.

(5) Remove air exhauster from vehicle.

INSTALLATION

(1) Place air exhauster in position. Ensure that the locator tab is aligned.

(2) Engage the upper half of the air exhauster then push the lower half in until the clips click into place.

(3) Install trunk carpet into position.

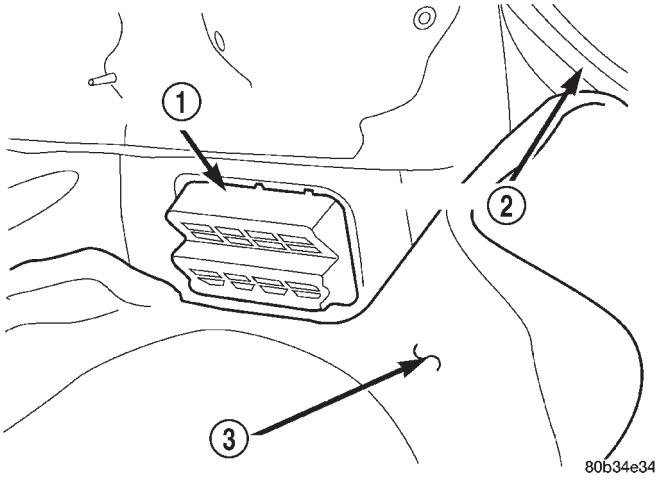


Fig. 95 Air Exhauster

1 – AIR EXHAUSTER
2 – REAR TRUNK FENCE
3 – TRUNK CARPET

ADJUSTMENTS

FRONT DOOR GLASS ADJUSTMENT

(1) Remove door trim panel.
(2) Remove water shield as necessary.
(3) Loosen fastener attaching scissor channel to door panel at rear of access hole (Fig. 96).
(4) Position glass in run weatherstrips to achieve smooth operation and proper fit.
(5) Push glass aft and apply slight downward pressure on scissor channel and tighten screw.
(6) Tighten all fasteners.
(7) Install water shield.
(8) Install door trim panel.

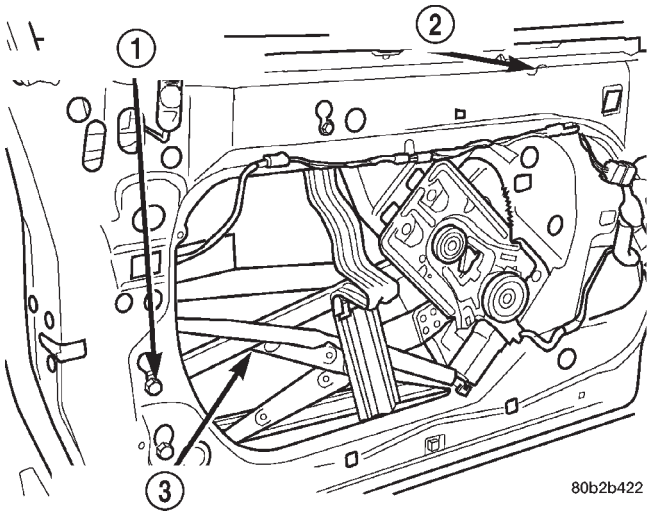


Fig. 96 Front Door Glass Adjustment

1 – DOOR GLASS ADJUSTMENT POINT
2 – FRONT DOOR
3 – SCISSOR CHANNEL

REAR DOOR GLASS ADJUSTMENT

(1) Remove door trim panel.
(2) Remove water shield as necessary.
(3) Loosen fastener attaching scissor channel to door panel at rear of access hole (Fig. 97).
(4) Position glass in run weatherstrips to achieve smooth operation and proper fit.
(5) Push glass aft and apply slight downward pressure on scissor channel and tighten screw.
(6) Tighten all fasteners.
(7) Install water shield.
(8) Install door trim panel.

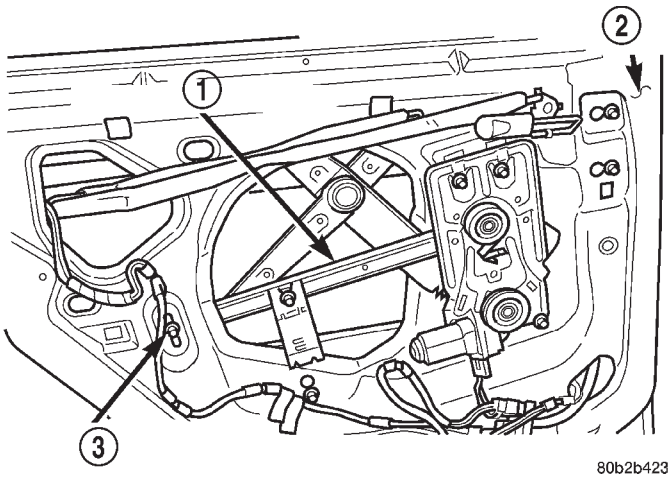
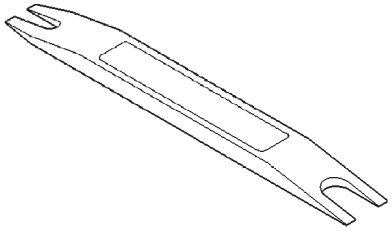


Fig. 97 Rear Door Glass Adjustment

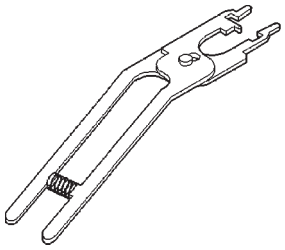
1 – SCISSOR CHANNEL
2 – REAR DOOR
3 – DOOR GLASS ADJUSTMENT

SPECIAL TOOLS

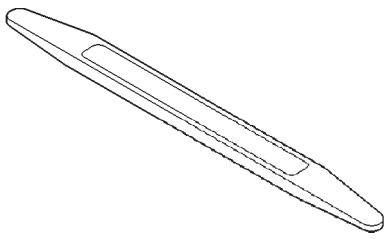
BODY



Remover, Moldings C-4829



Pliers, Headliner Clip C–6967



Stick, Trim C-4755

SPECIFICATIONS

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SPECIFICATIONS

BODY LUBRICATION SPECIFICATIONS

LUBRICATION REQUIREMENTS

Body mechanisms and linkages should be inspected, cleaned, and lubricated, as required, to maintain ease of operation and to provide protection against rust and wear. When performing other under hood services, the hood latch release mechanism and safety catch should be inspected, cleaned, and lubricated. During the winter season, external door lock cylinders should be lubricated to assure proper operation when exposed to water and ice.

Prior to the application of any lubricant, the parts concerned should be wiped clean to remove dust and grit. If necessary, a suitable solvent can be used to clean the item to be lubricated. After lubricating a component, any excess oil or grease should be removed.

LUBRICANT APPLICATION

DOOR LOCK CYLINDERS

(1) Apply a small amount of lubricant directly into the lock cylinder.

(2) Apply a small amount of lubricant to the key.

(3) Insert key into lock cylinder and cycle the mechanism from the locked to the unlocked position.

NOTE: Do not add more lubricant.

(4) Cycle the lock cylinder mechanism several times to allow the lubricant to flow throughout the cylinder.

(5) Wipe all lubricant from exterior of lock cylinder and key.

ALL OTHER BODY MECHANISMS

(1) Clean component as described above.

(2) Apply specified lubricant to all pivoting and sliding contact areas of component.

LUBRICANT USAGE

ENGINE OIL

- Door Hinges – Hinge Pin and Pivot Contact Areas
- Hood Hinges – Pivot Points
- Liftgate Hinges
- Decklid Hinges

MOPAR® SPRAY WHITE CUBE OR EQUIVALENT

- Door Check Straps
- Liftgate Latches
- Liftgate Prop Pivots
- Ash Receiver
- Fuel Filler Door Remote Control Latch Mechanism
- Parking Brake Mechanism
- Sliding Seat Tracks
- Decklid Latch

MOPAR® Multipurpose GREASE OR EQUIVALENT

- All Other Hood Mechanisms

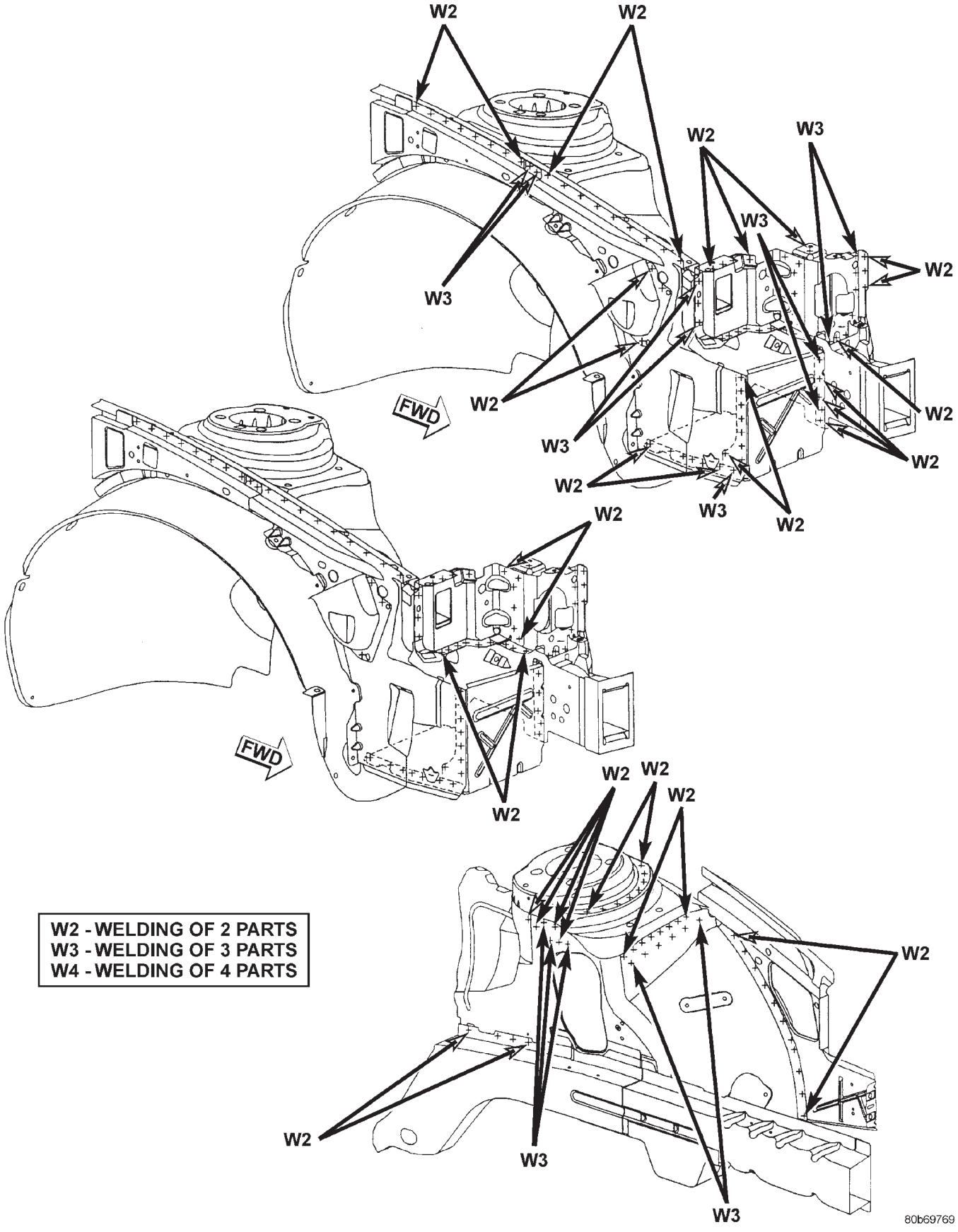
MOPAR® LOCK CYLINDER LUBRICANT OR EQUIVALENT

- Door Lock Cylinders
- Decklid Lock Cylinder

SPECIFICATIONS (Continued)

WELD LOCATIONS

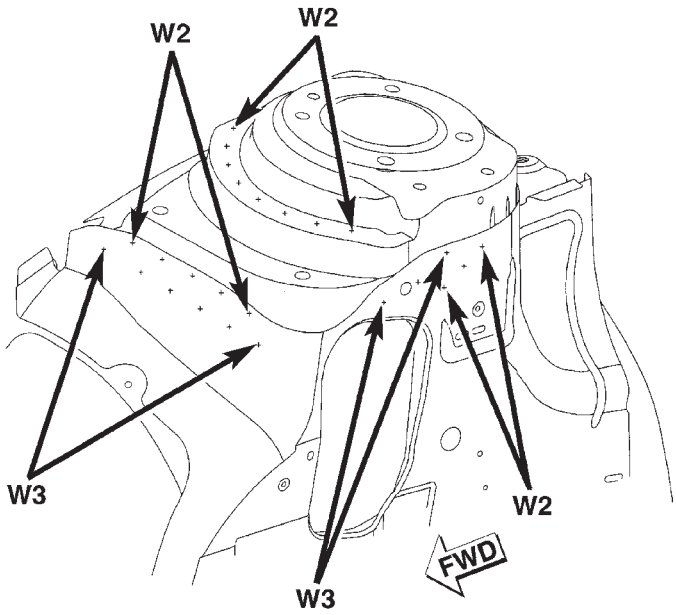
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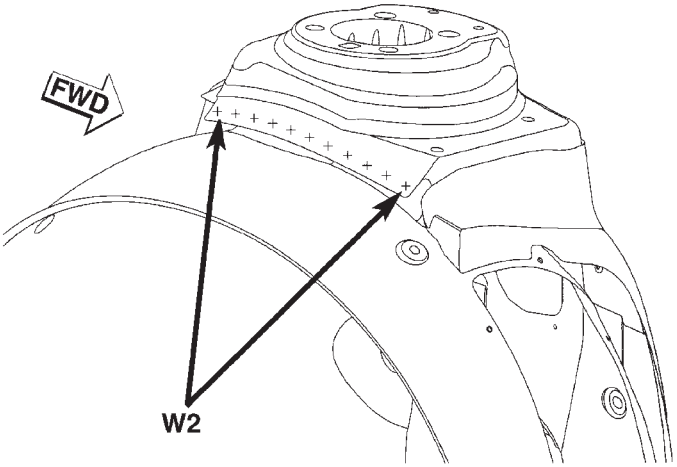
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W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

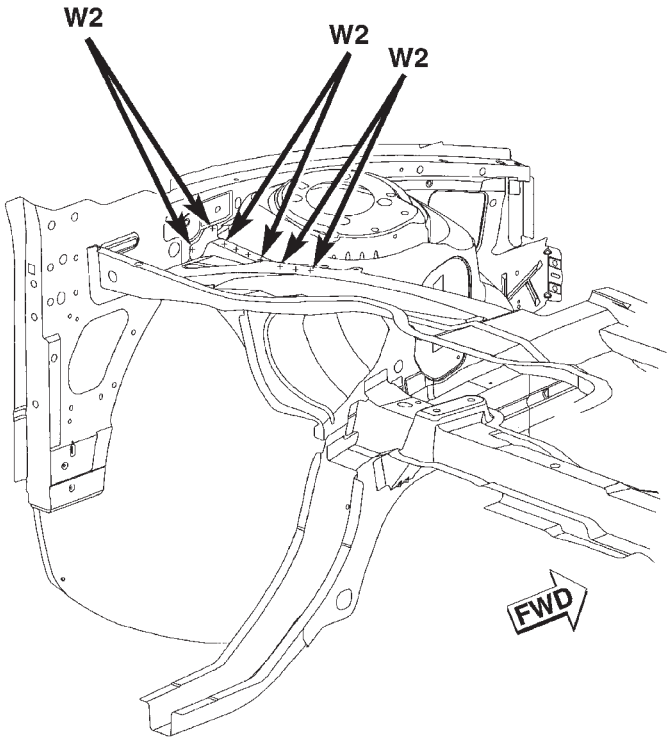
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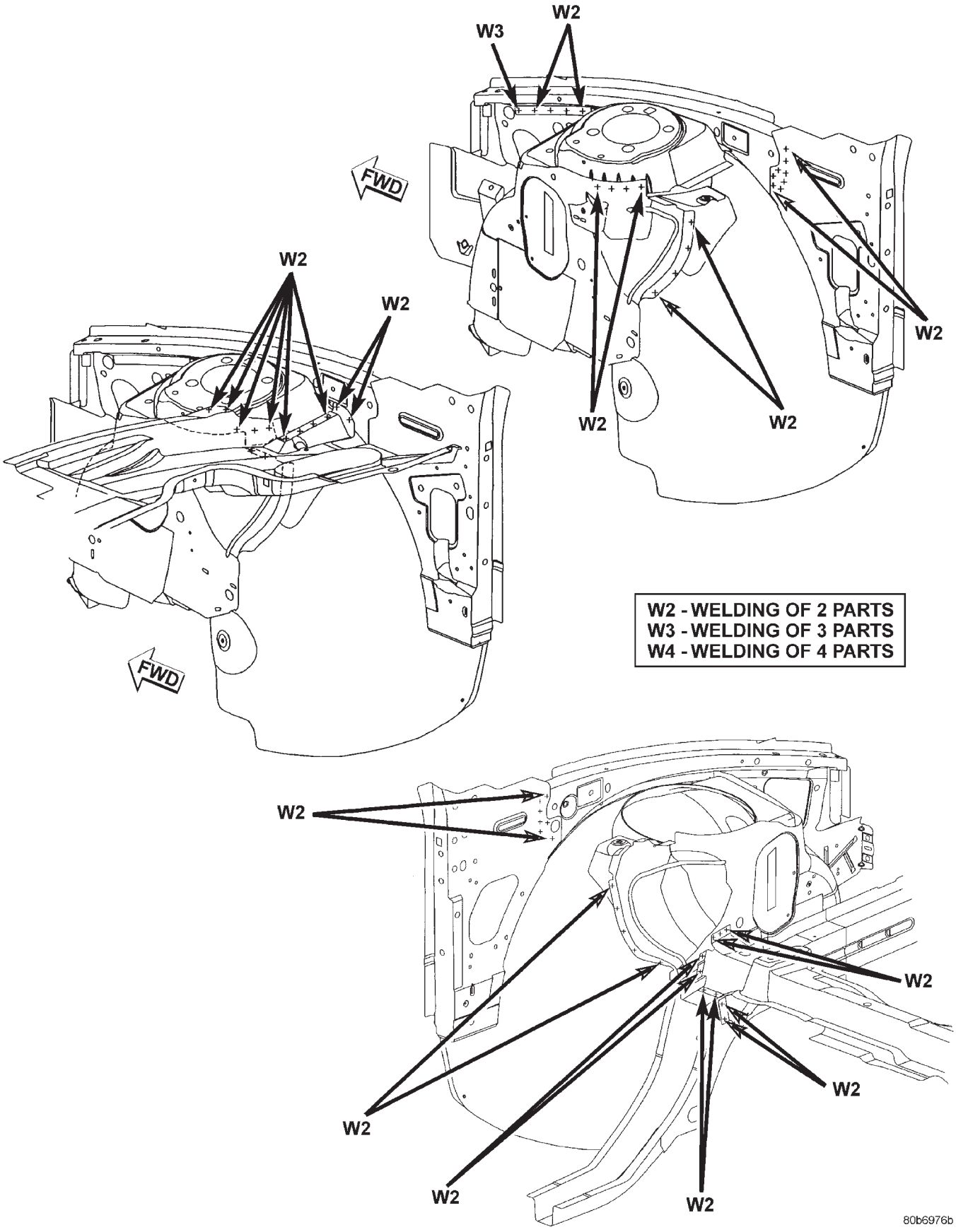




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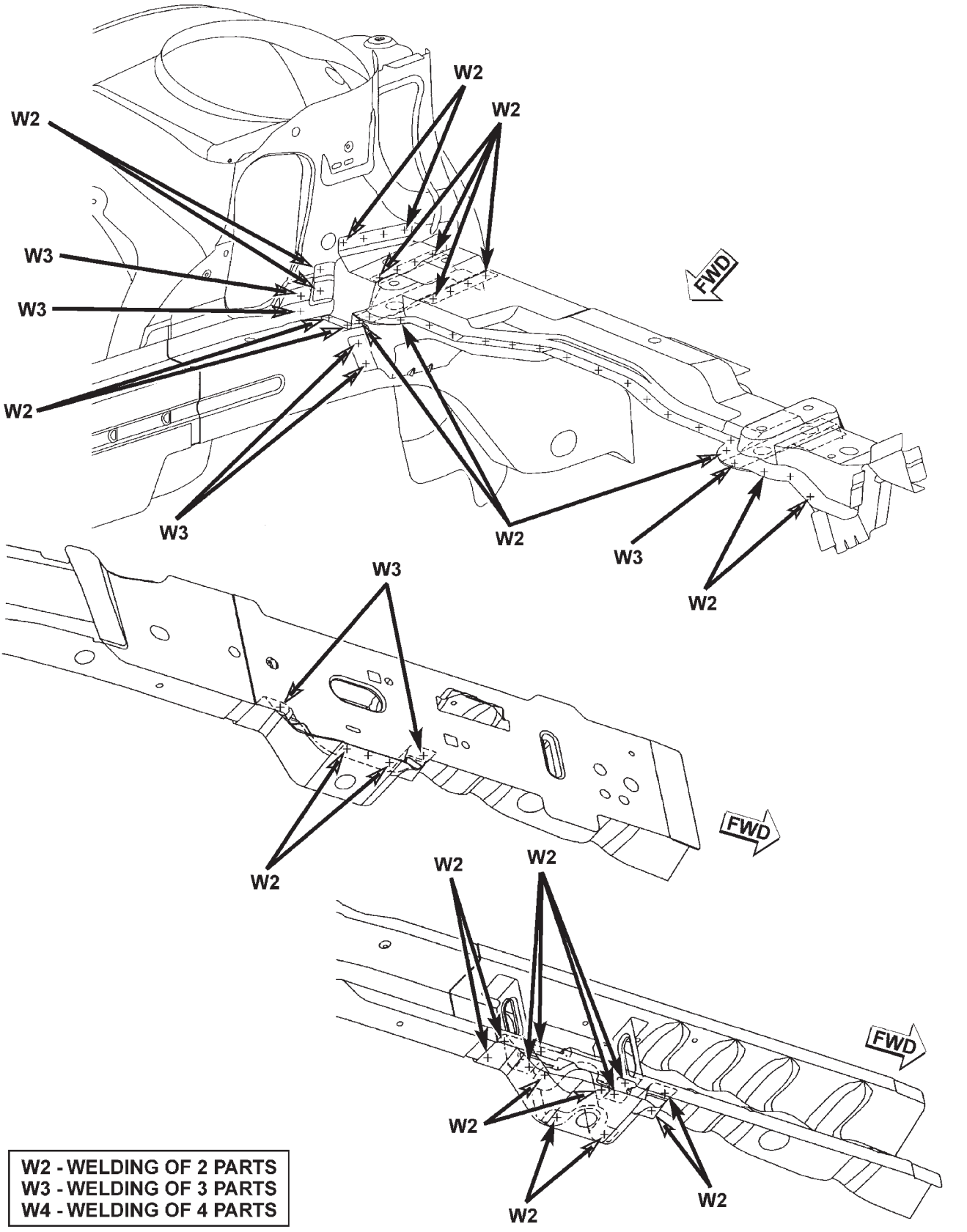
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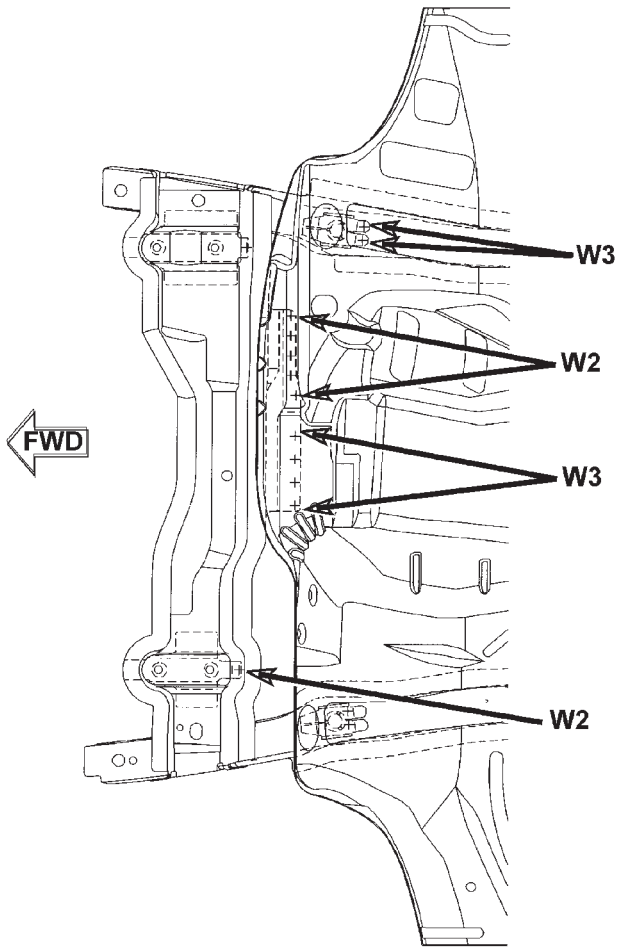
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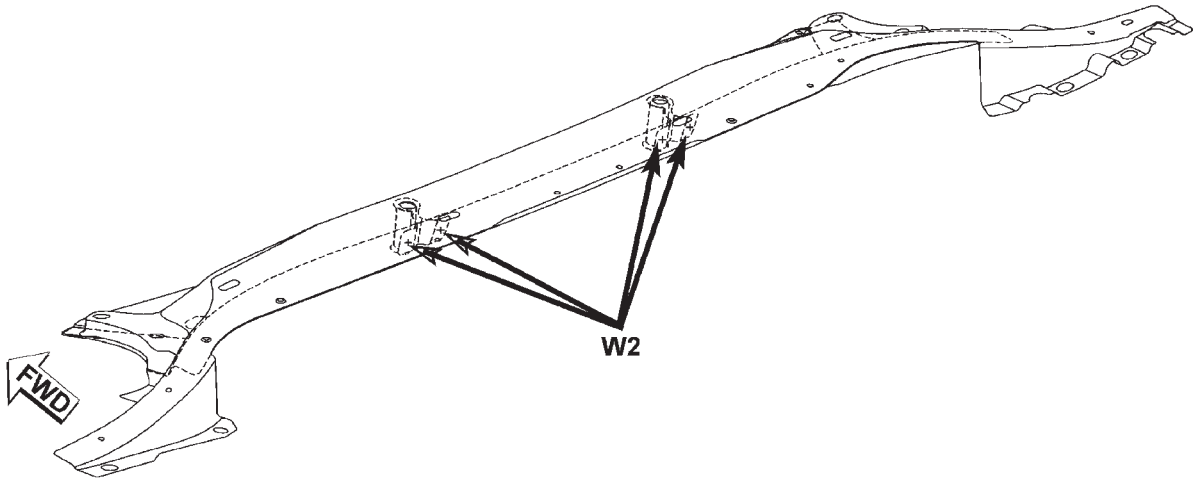


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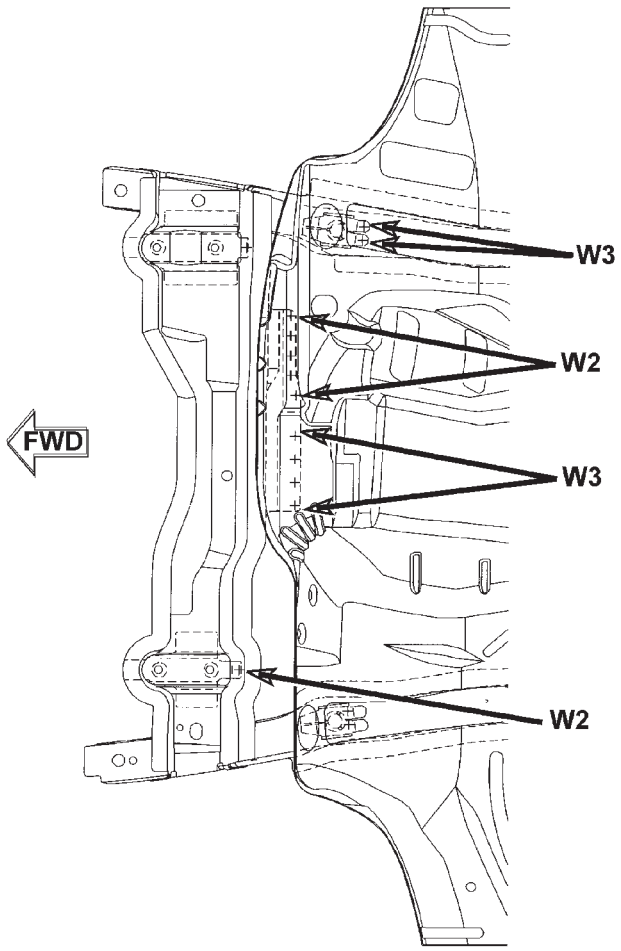
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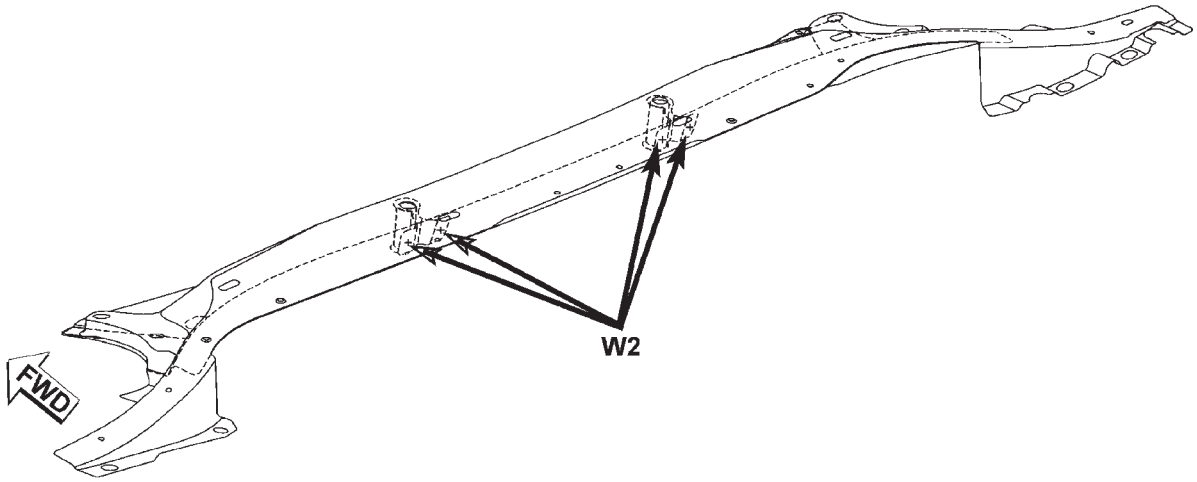
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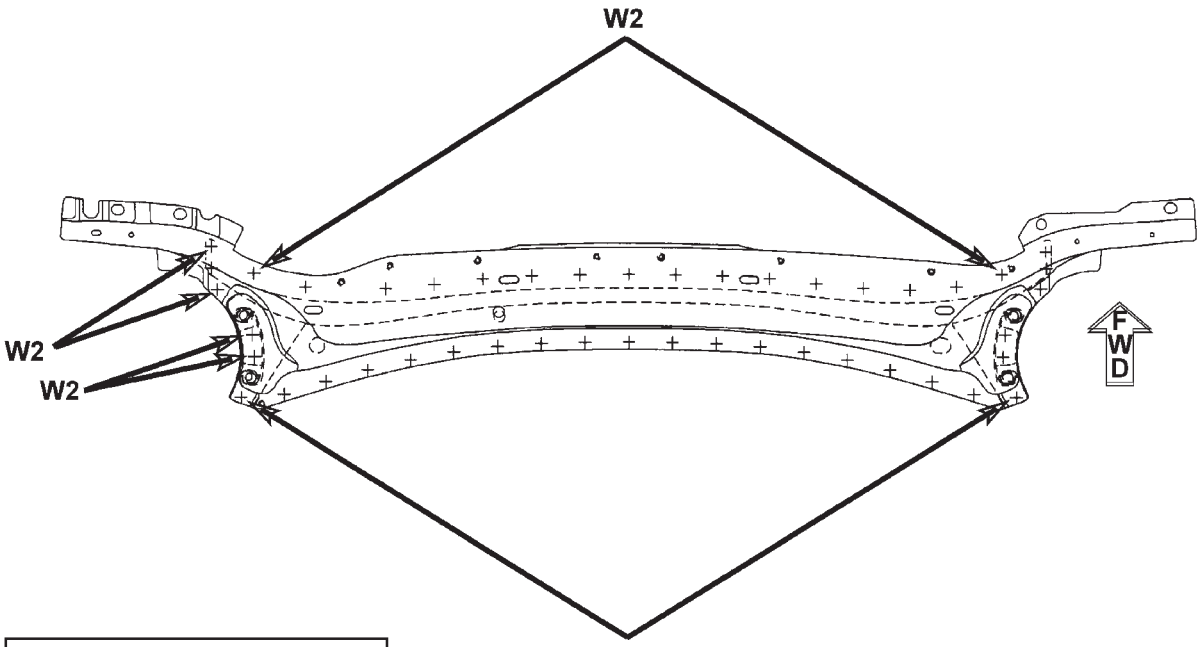
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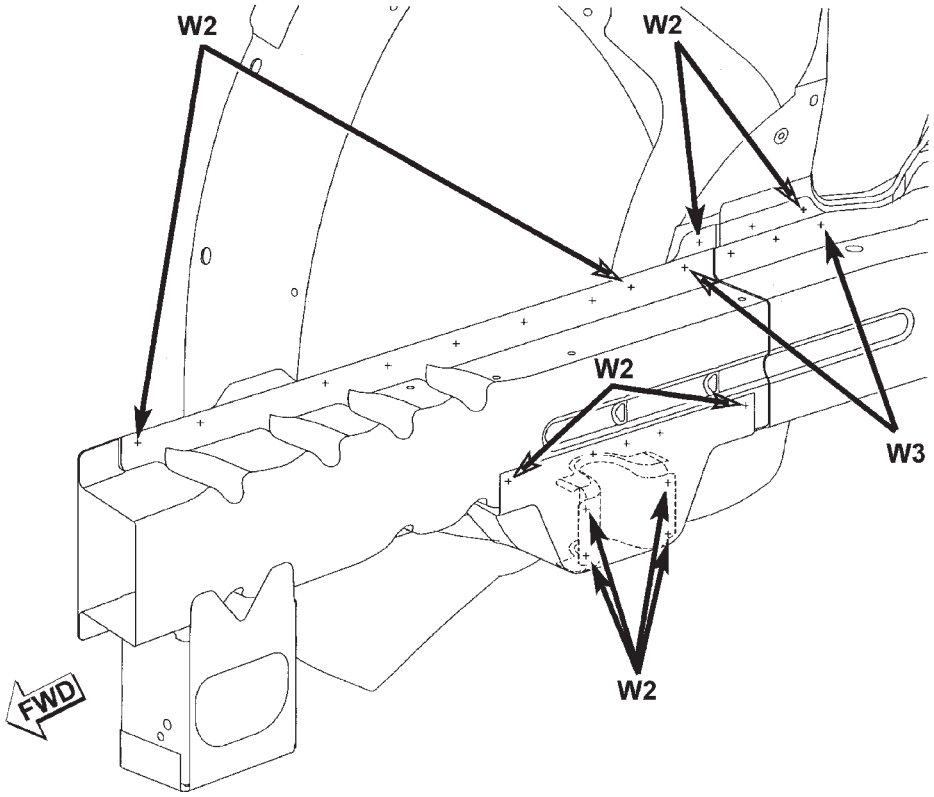
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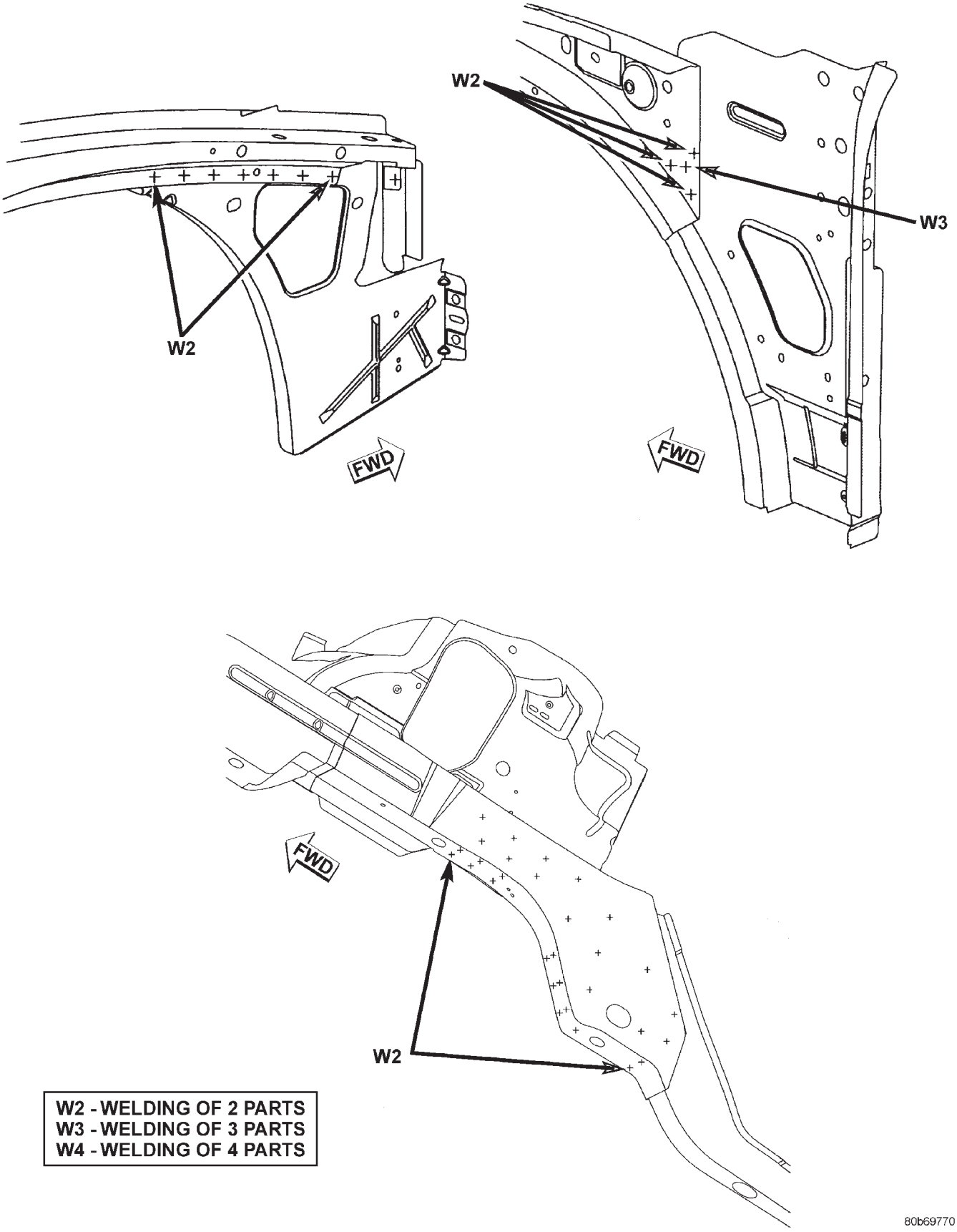
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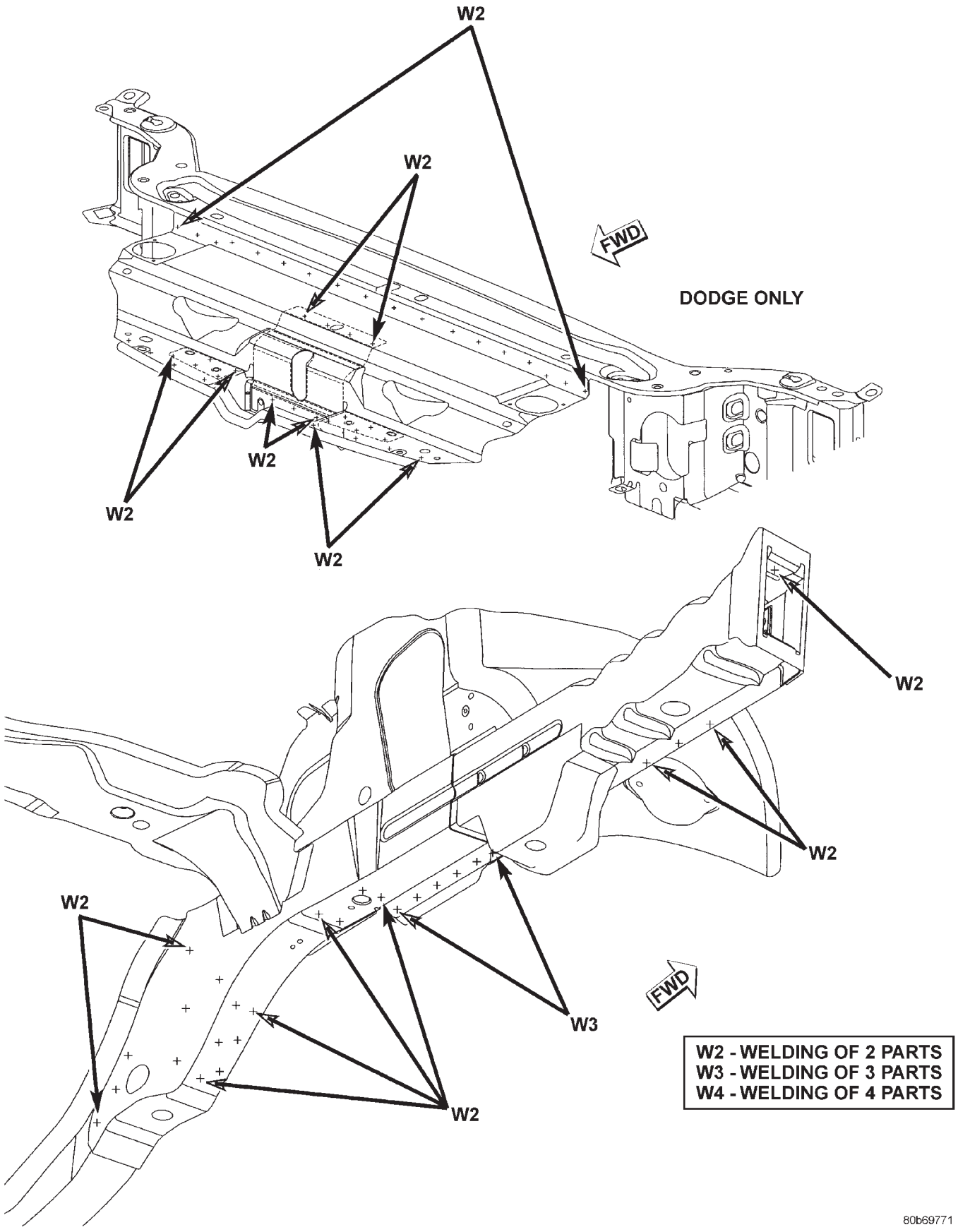
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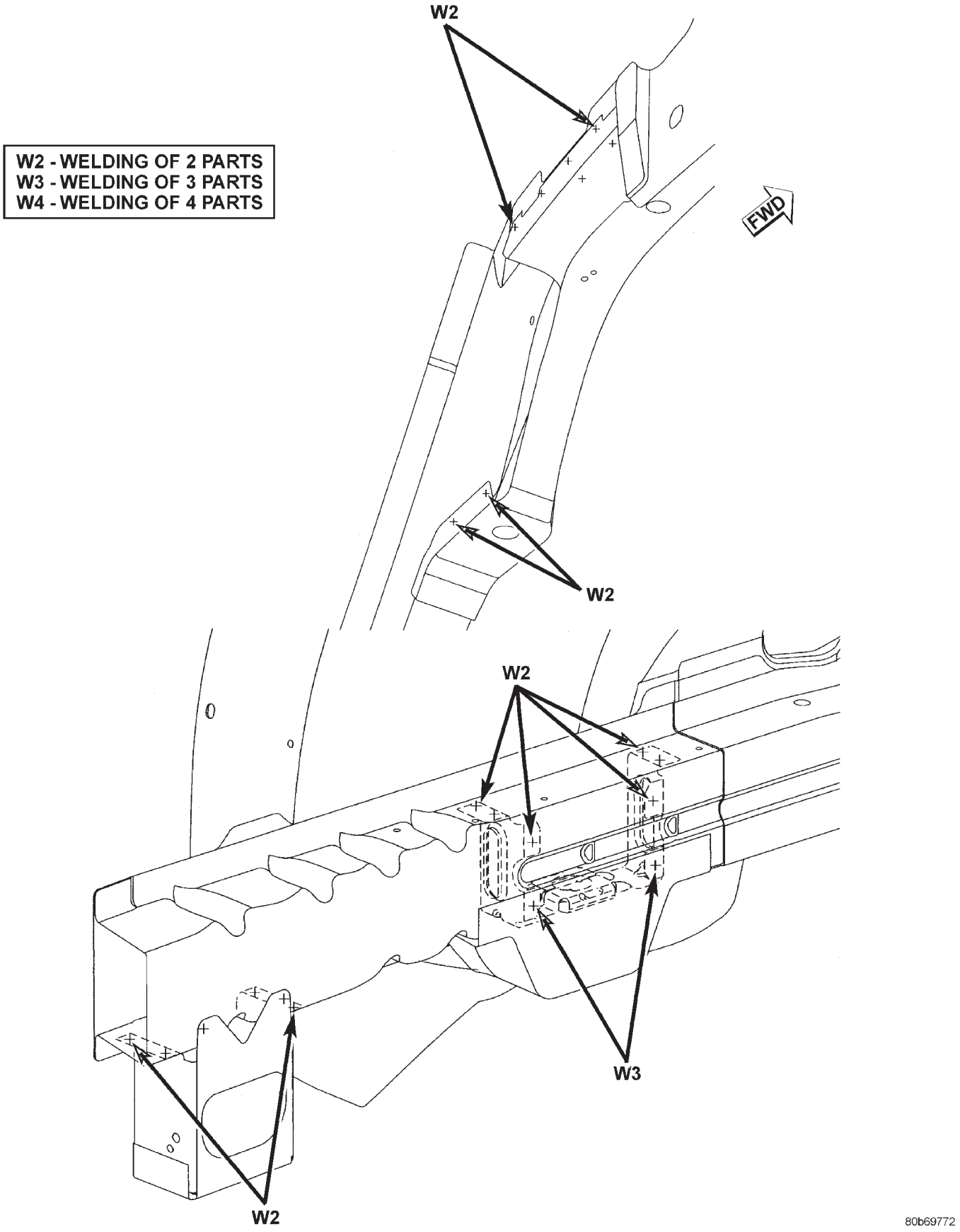
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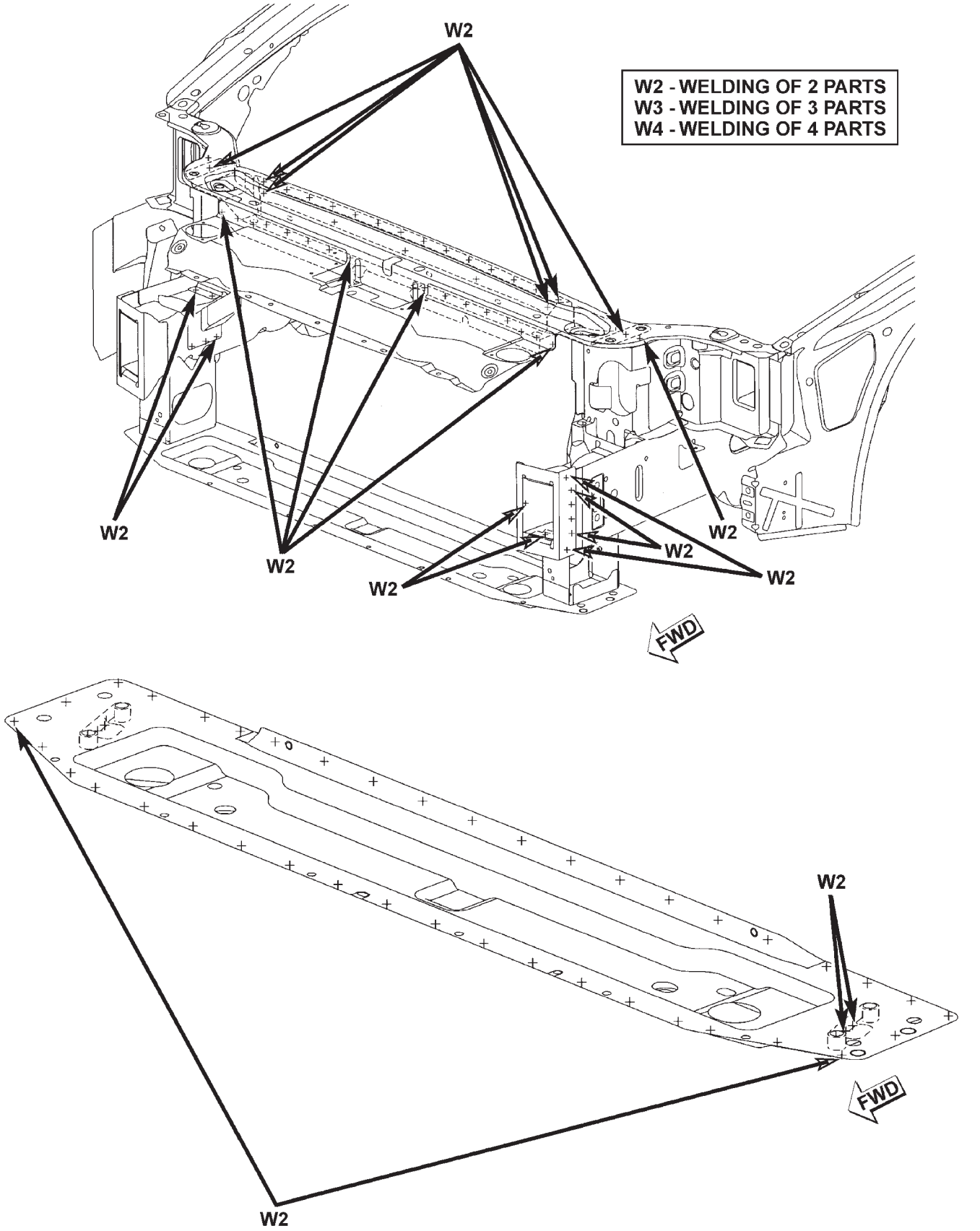
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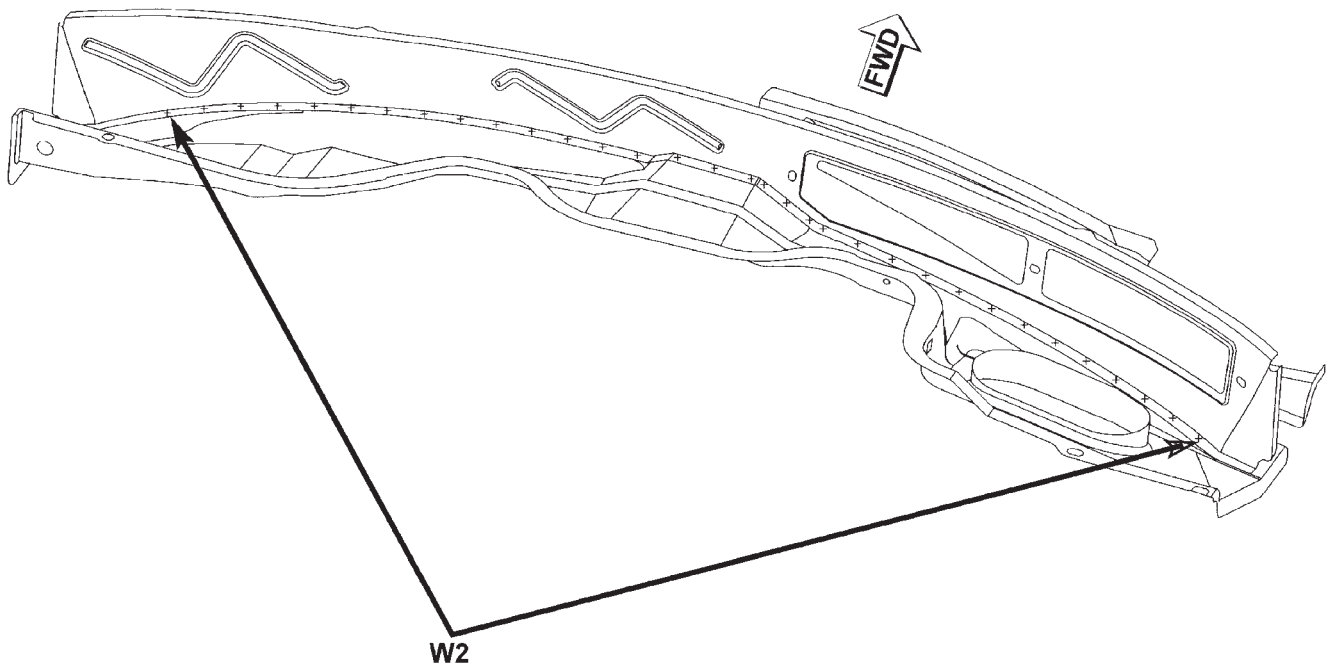
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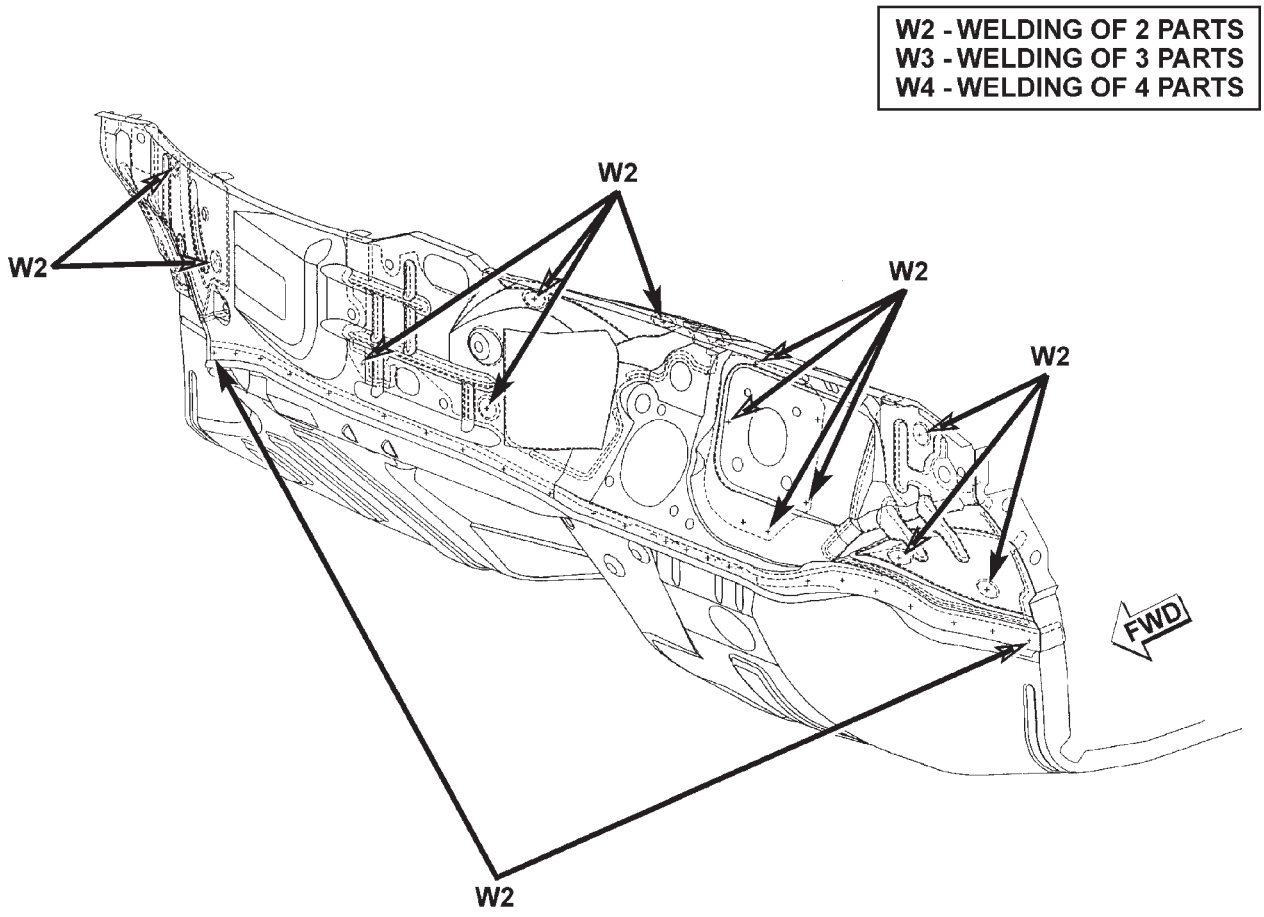
ENGINE COMPARTMENT



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DASH AND COWL

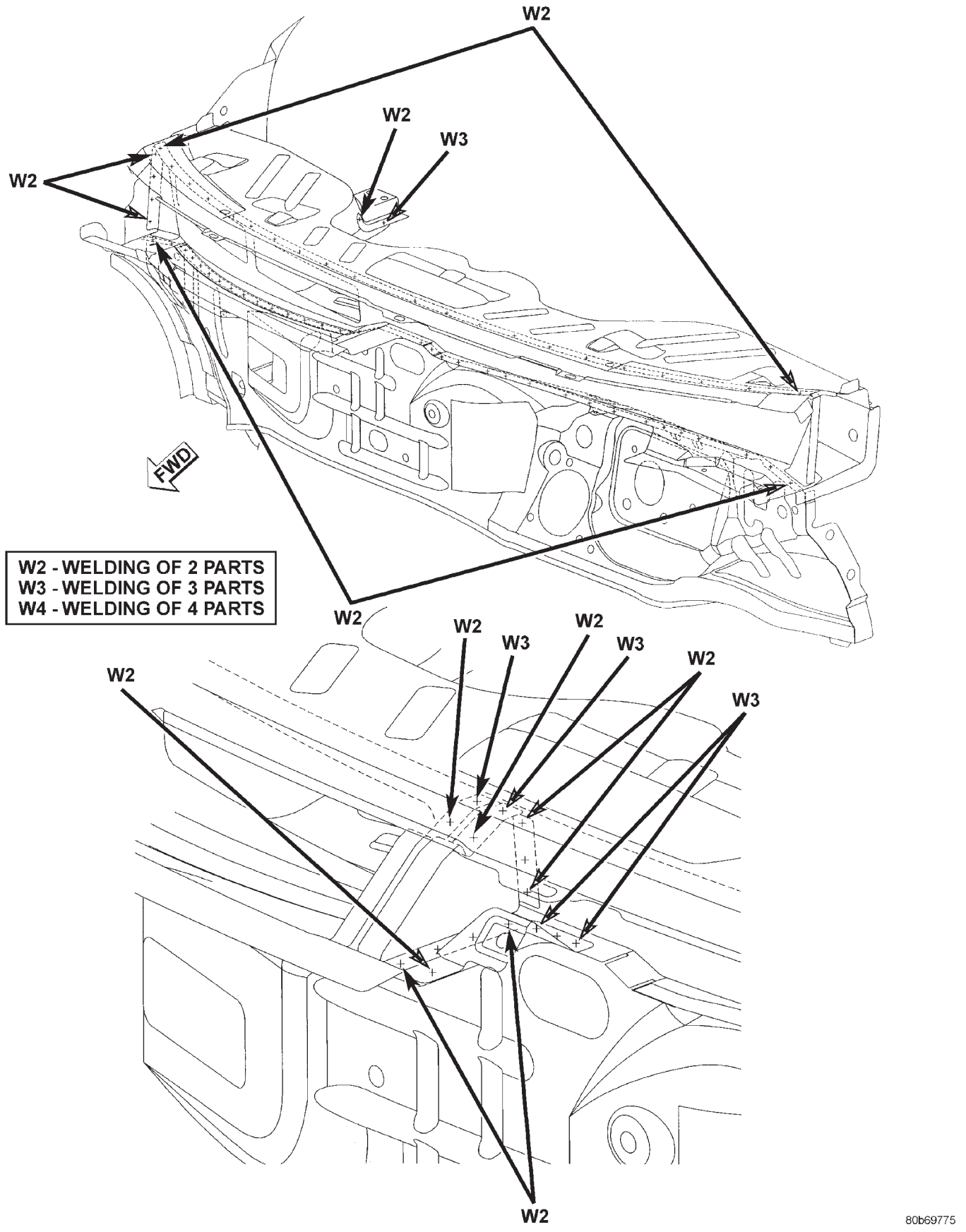




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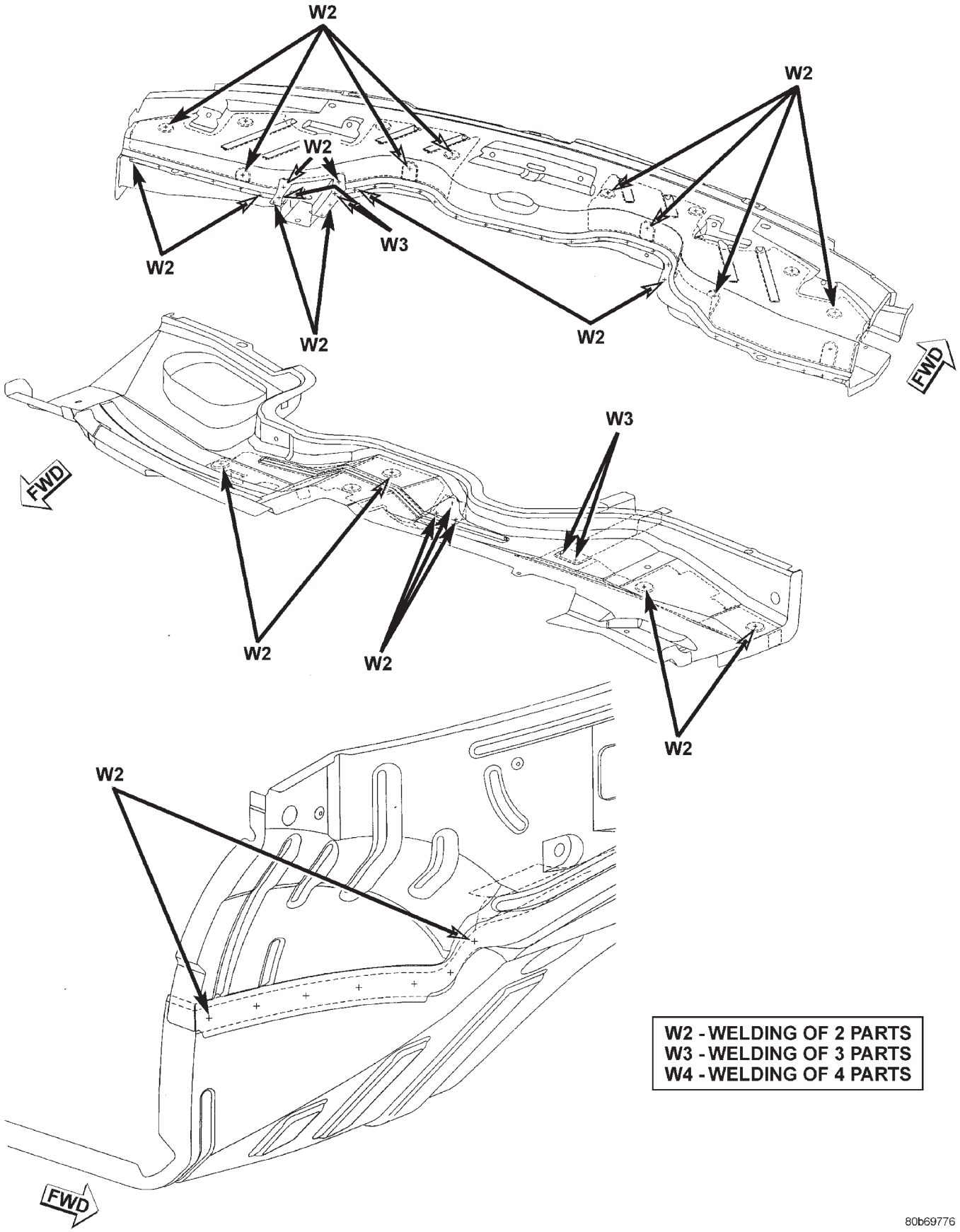
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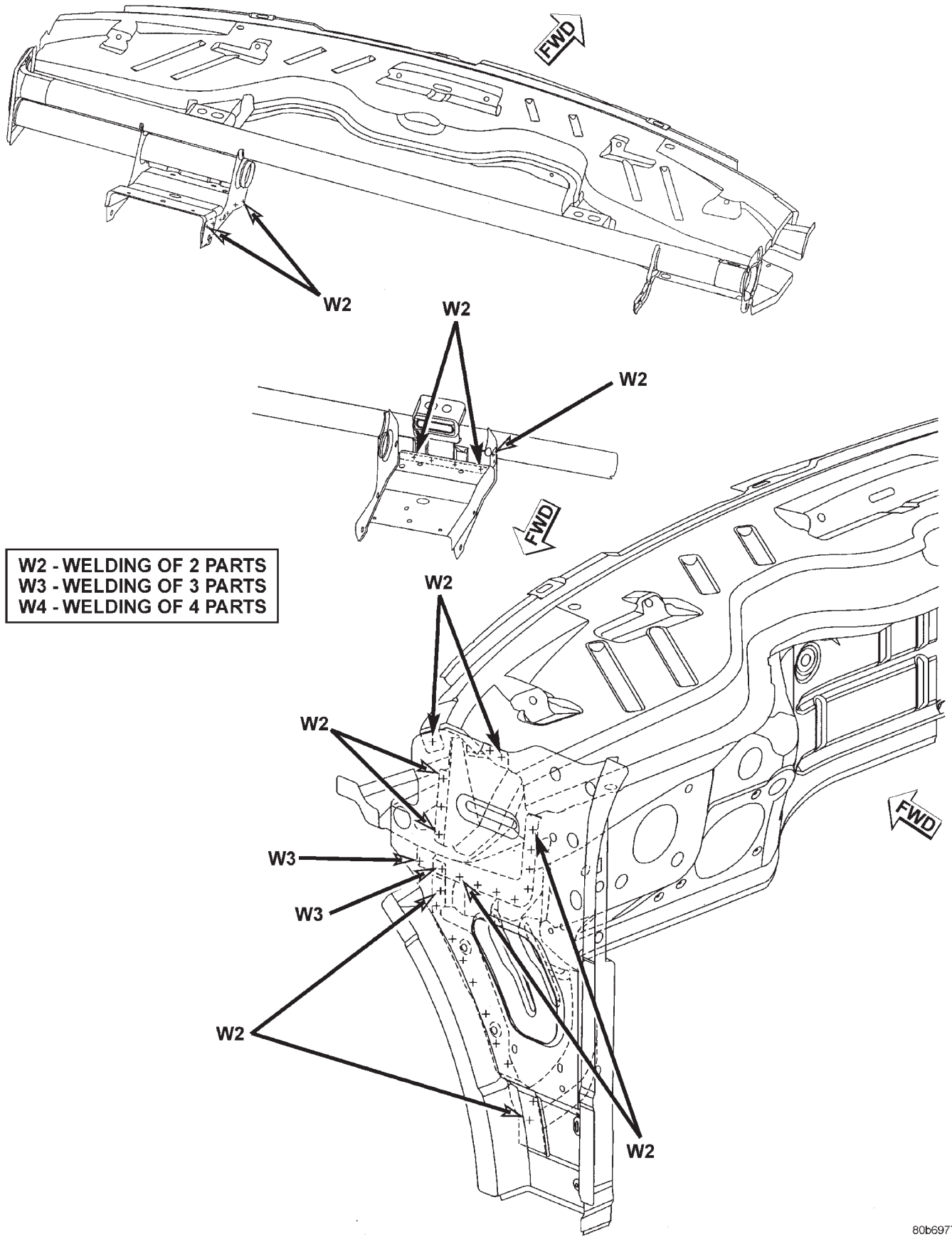
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DASH AND COWL



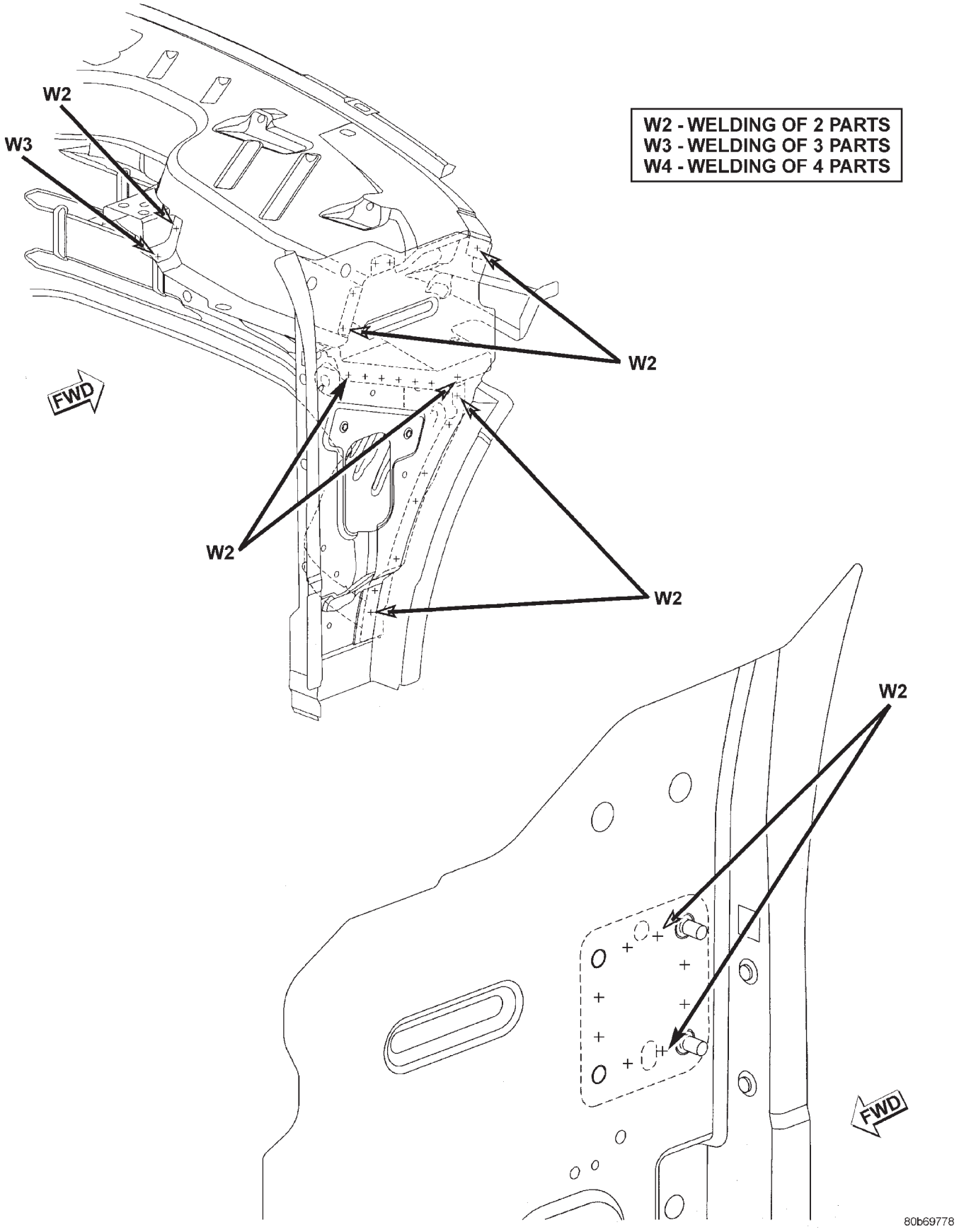
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DASH AND COWL



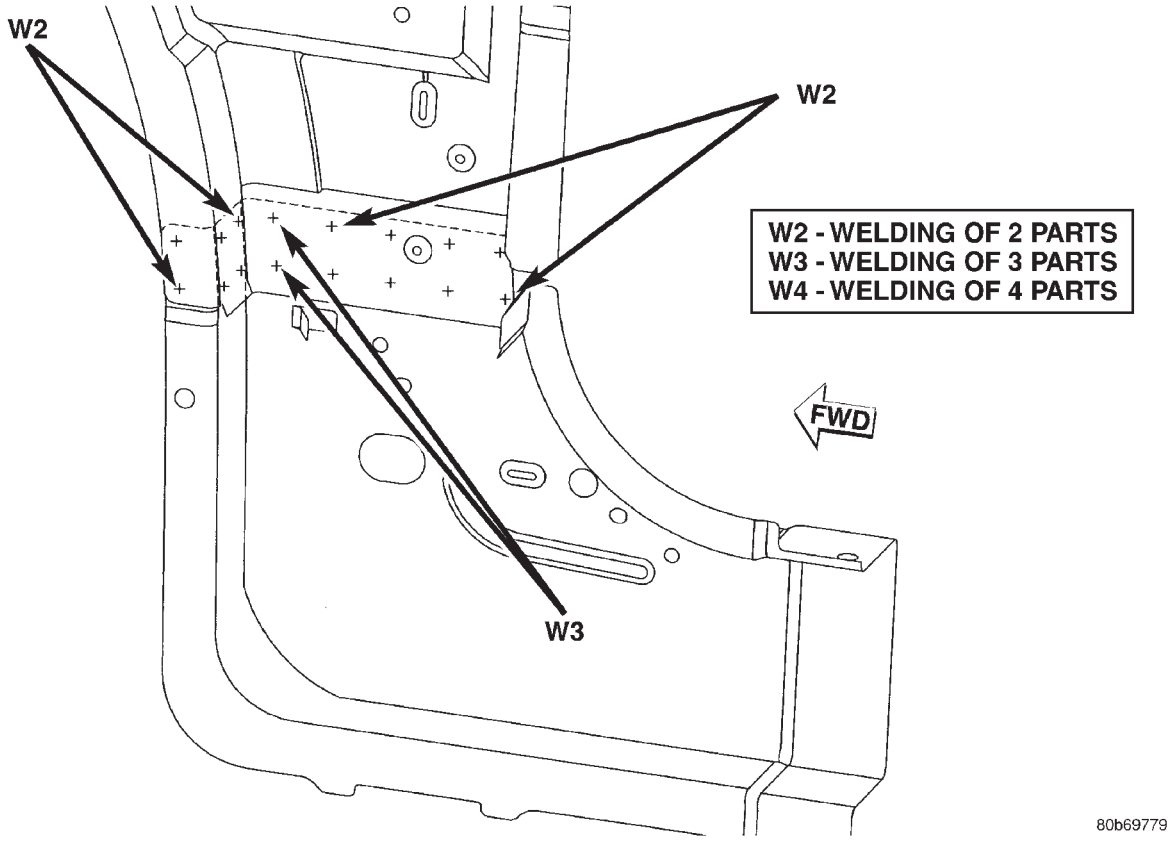
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DASH AND COWL



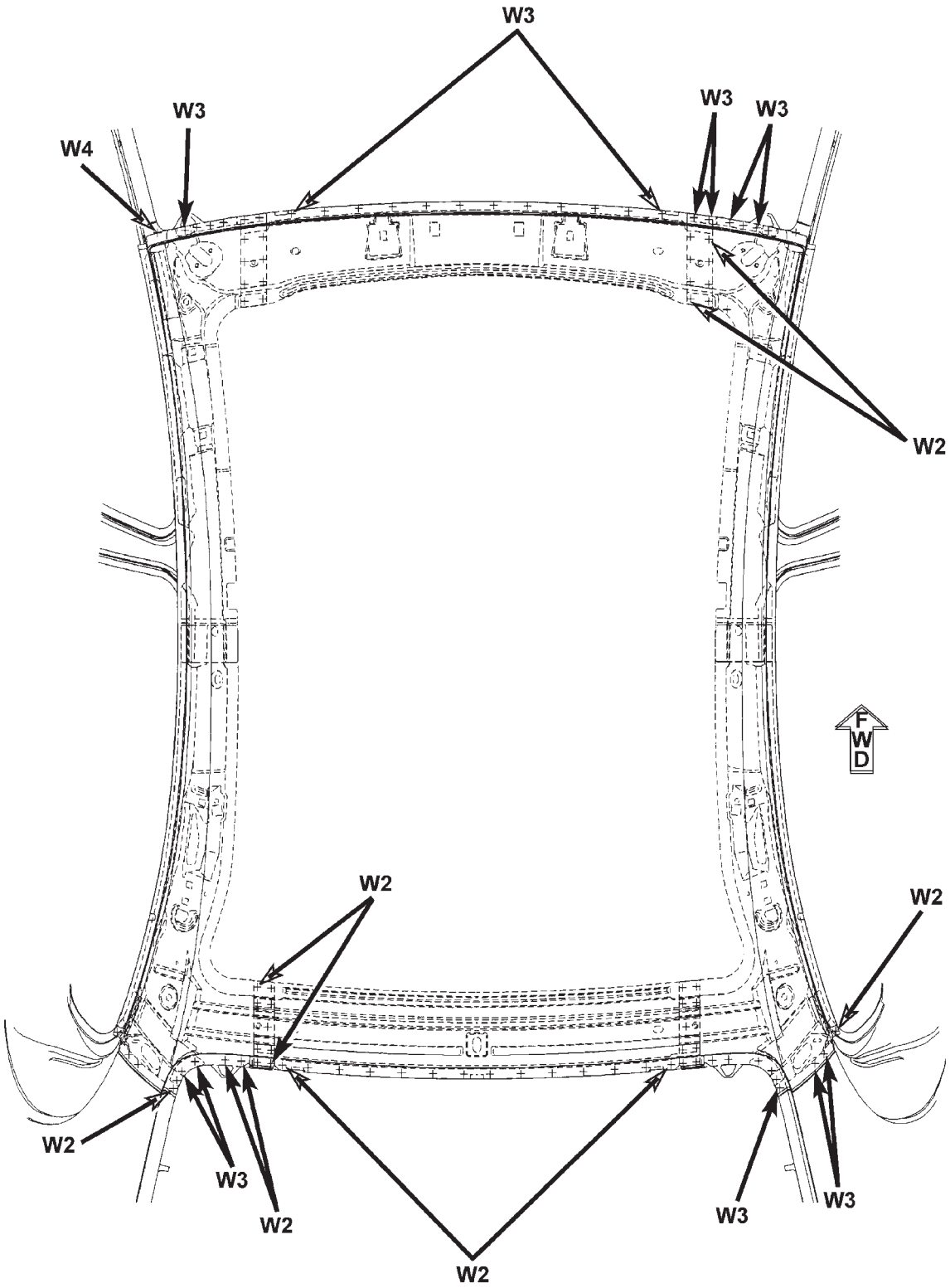
SPECIFICATIONS (Continued)

DASH AND COWL



SPECIFICATIONS (Continued)

ROOF PANEL AND ROOF BOWS



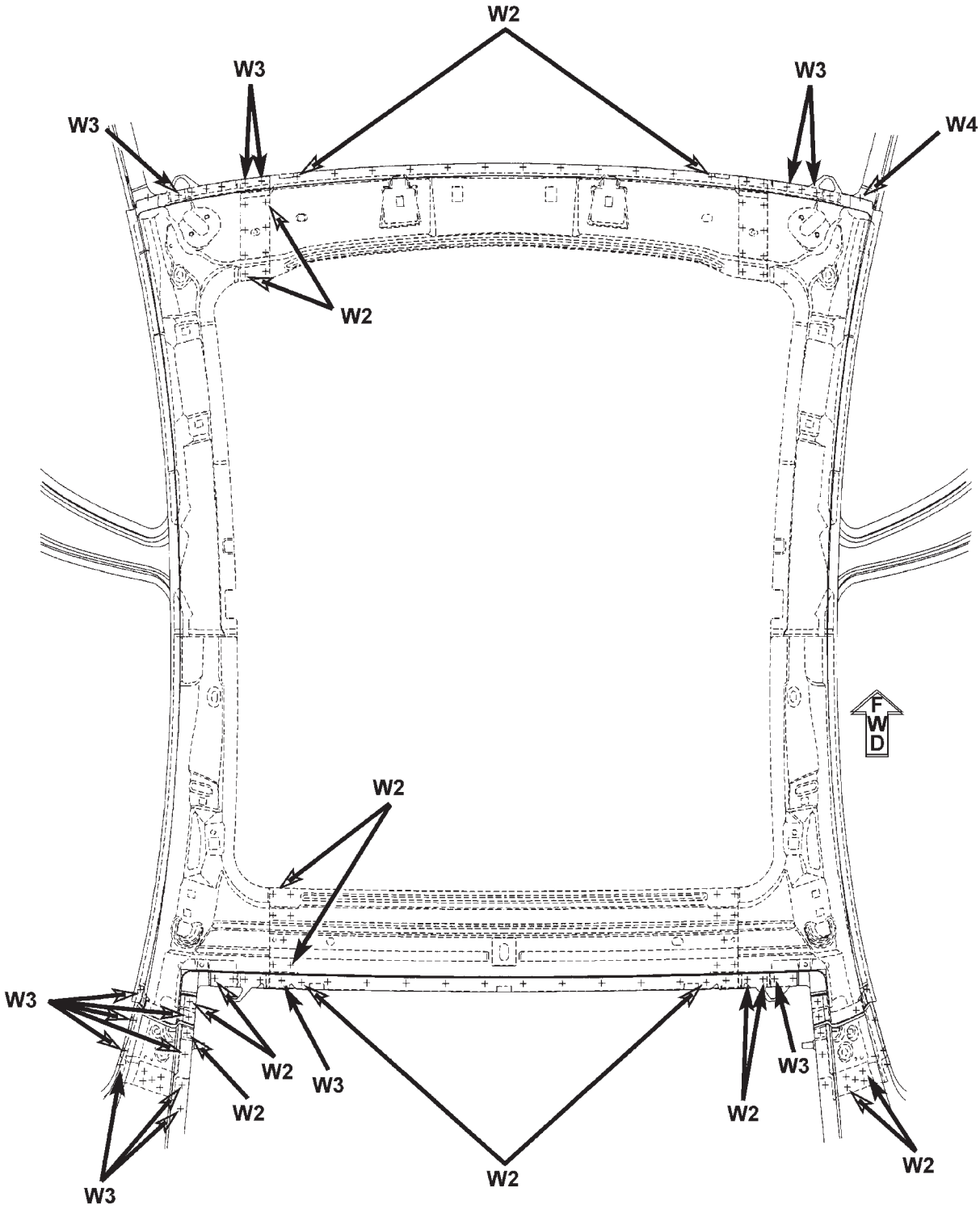
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

CHRYSLER

80b6977a

SPECIFICATIONS (Continued)

ROOF PANEL AND ROOF BOWS



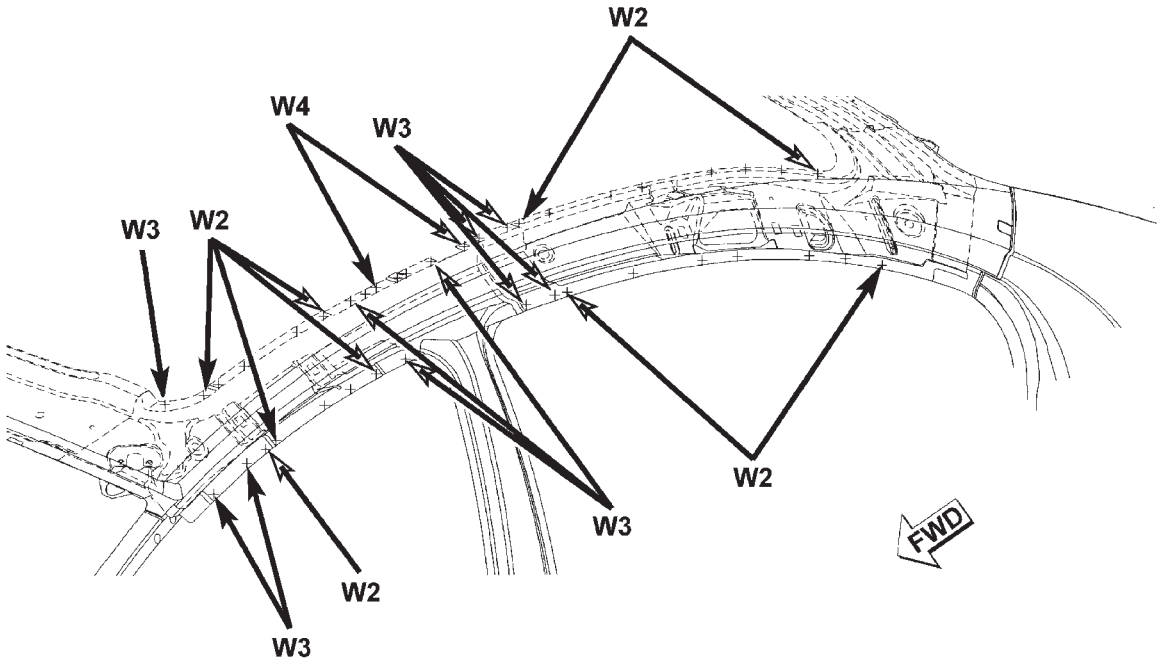
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

DODGE

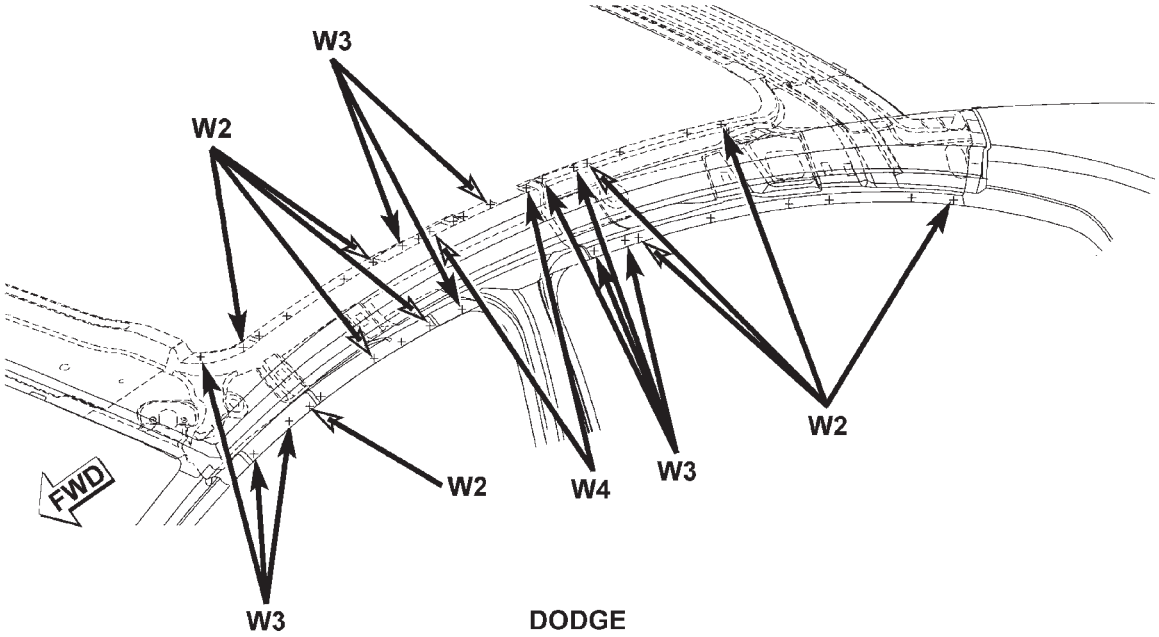
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SPECIFICATIONS (Continued)

ROOF PANEL AND ROOF BOWS



CHRYSLER



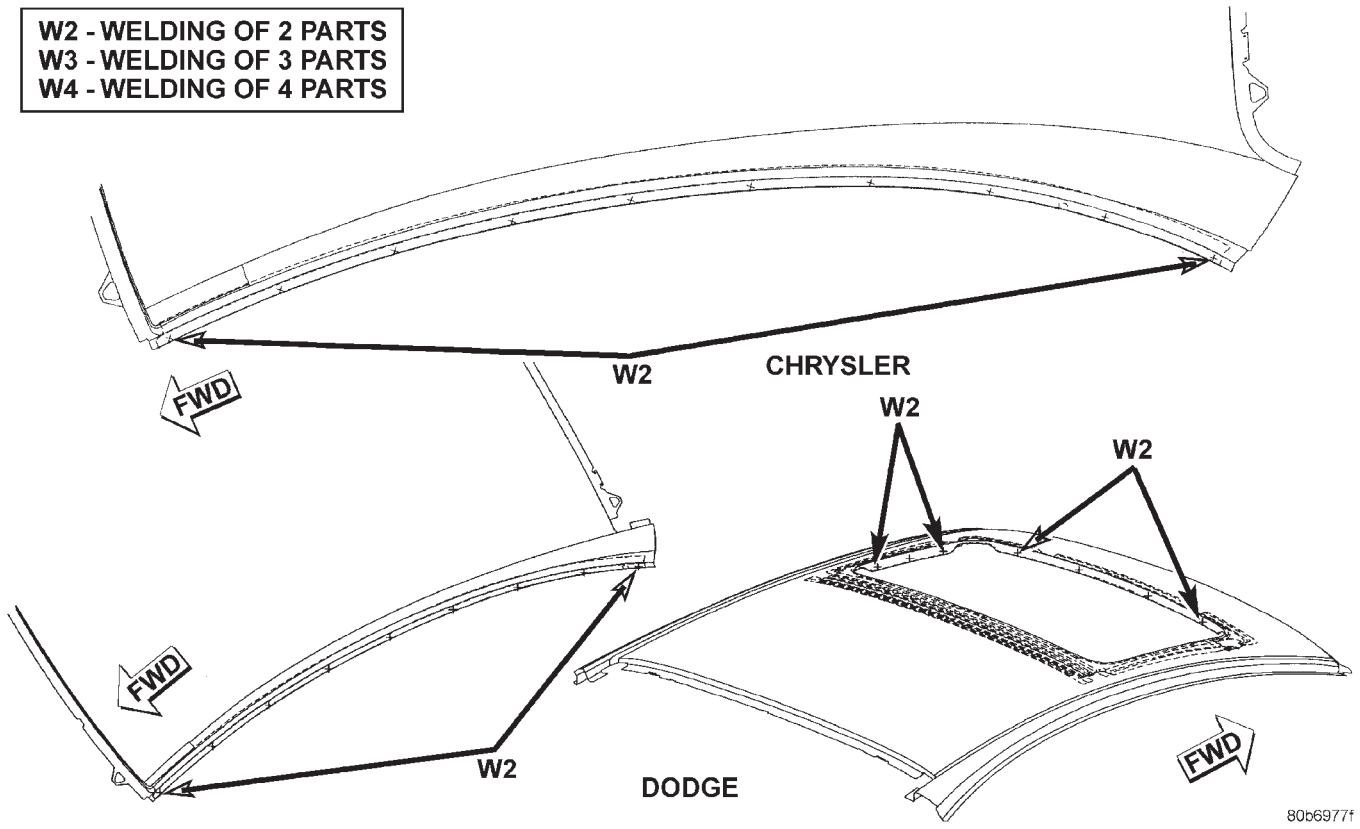
DODGE

W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

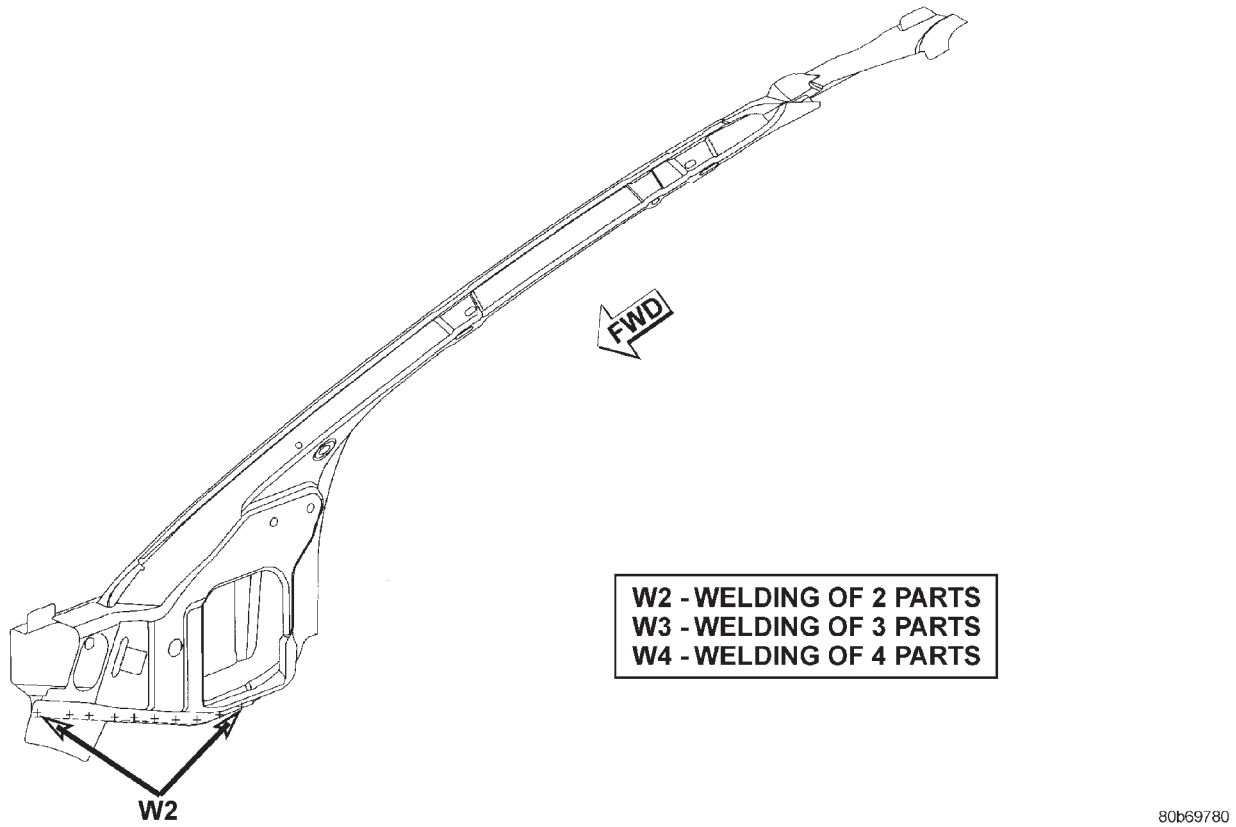
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SPECIFICATIONS (Continued)

ROOF PANEL AND ROOF BOWS

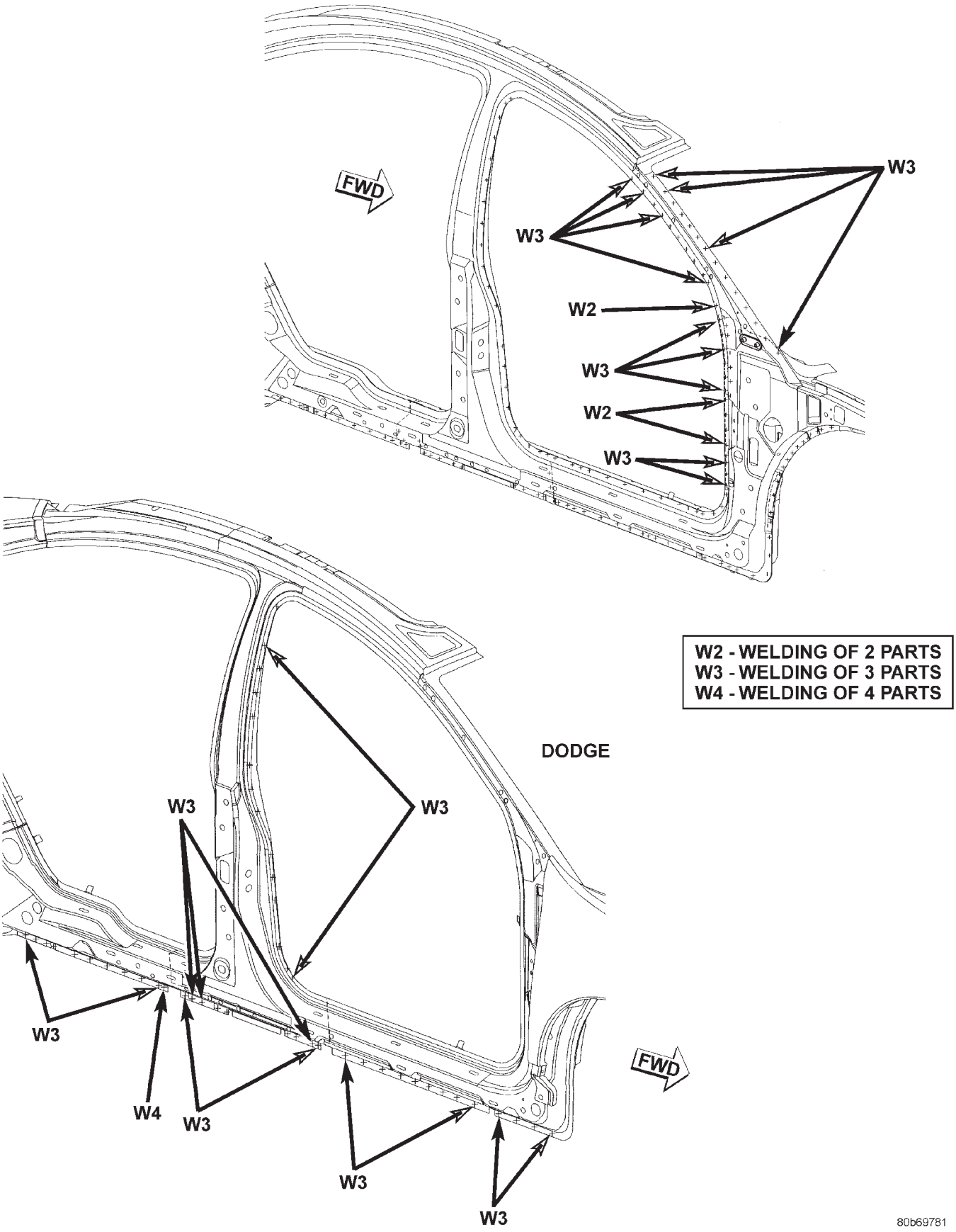


BODY SIDE APERTURE



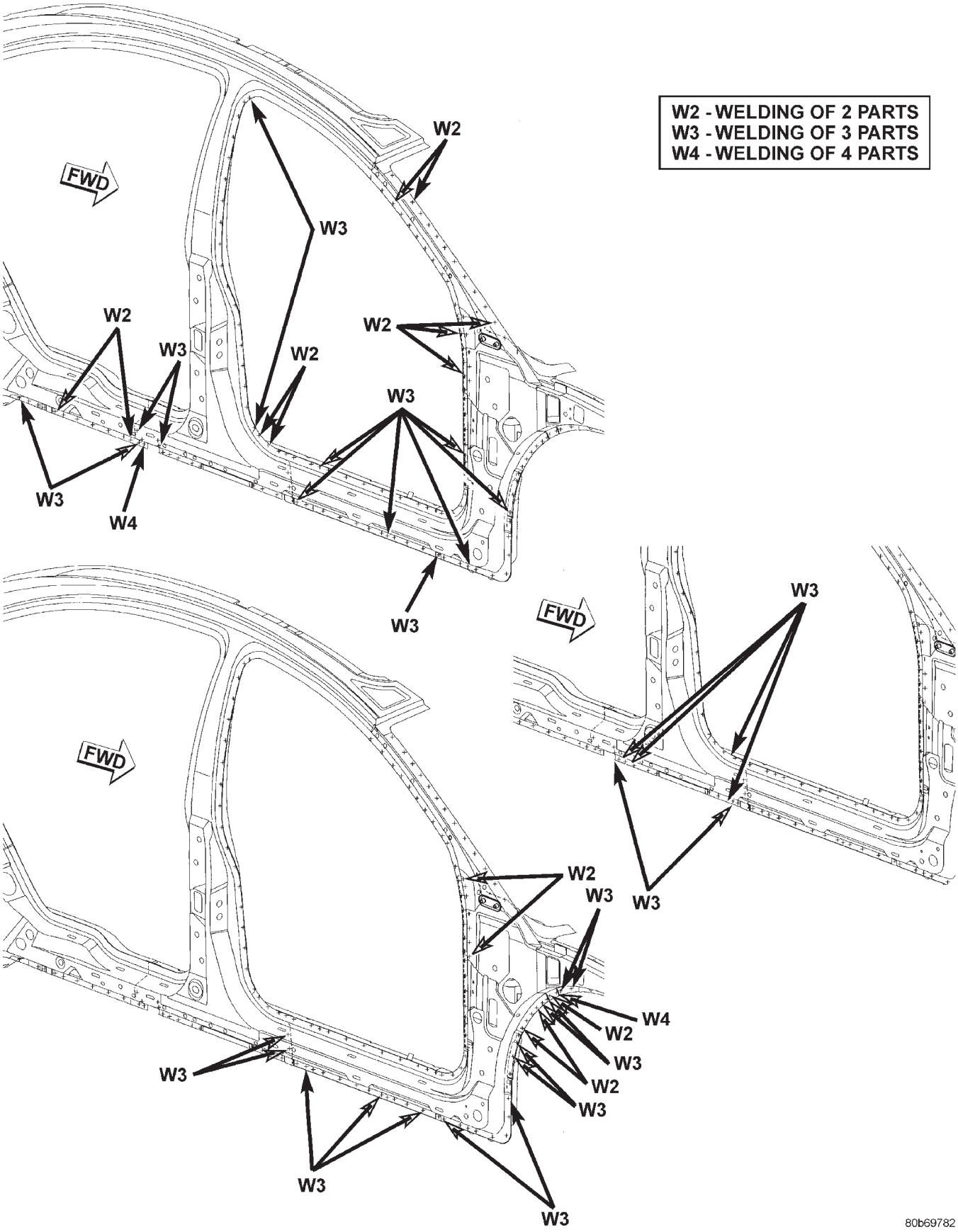
SPECIFICATIONS (Continued)

BODY SIDE APERTURE



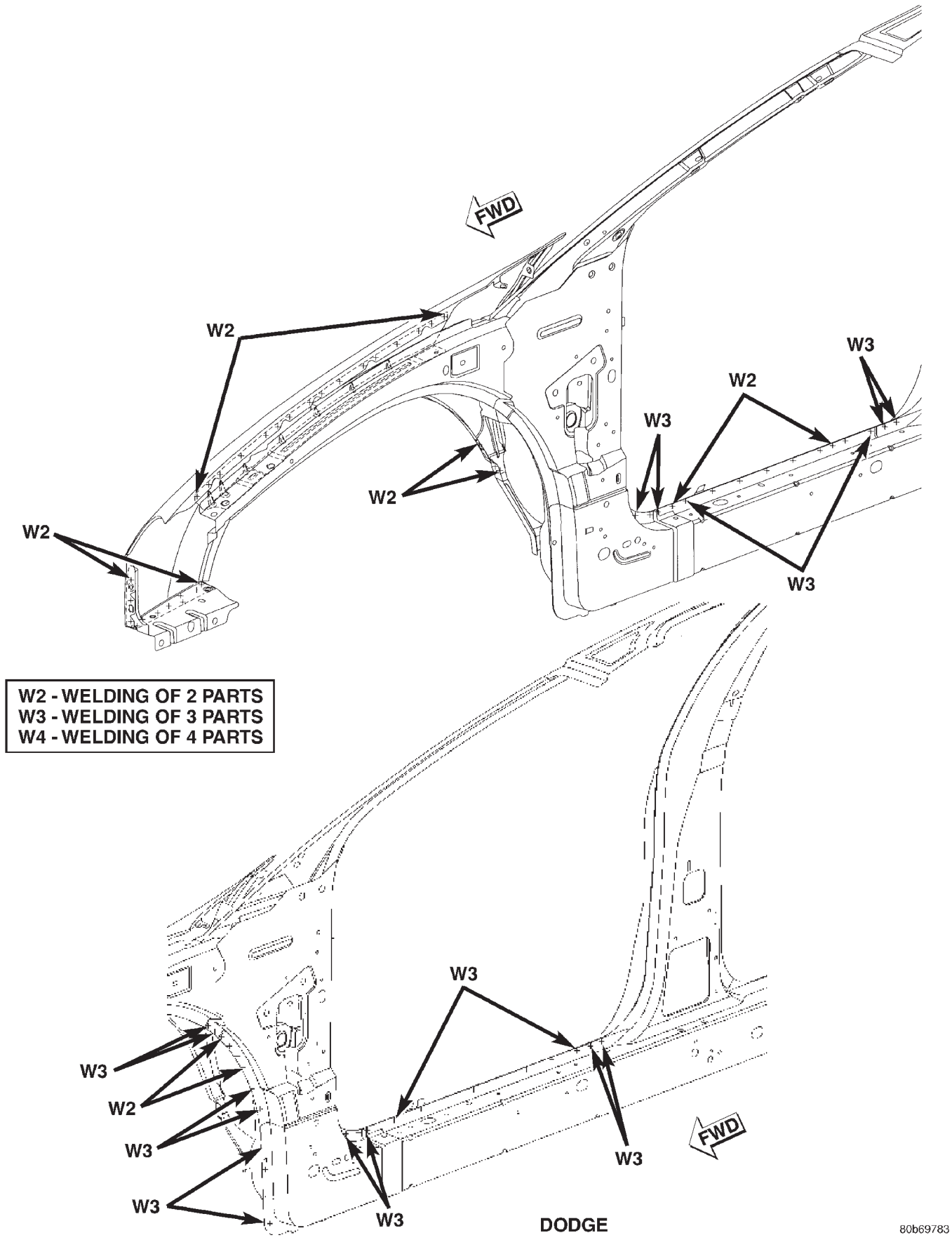
SPECIFICATIONS (Continued)

BODY SIDE APERTURE



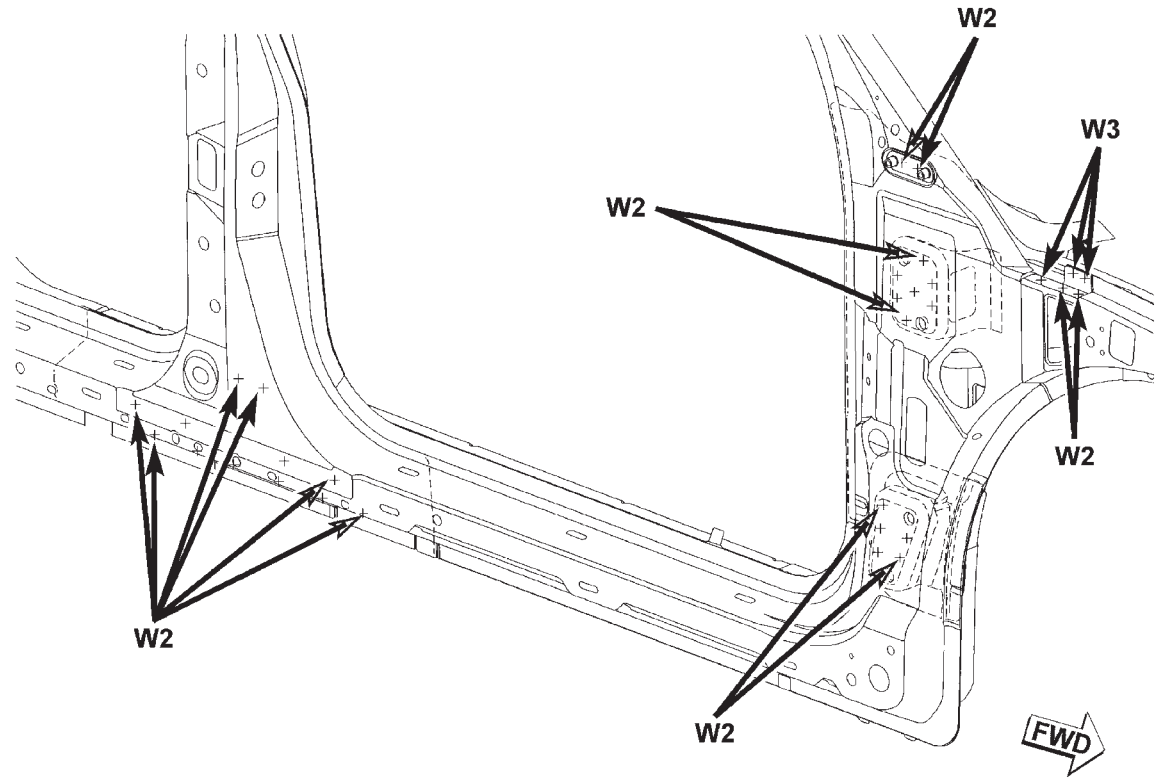
SPECIFICATIONS (Continued)

BODY SIDE APERTURE

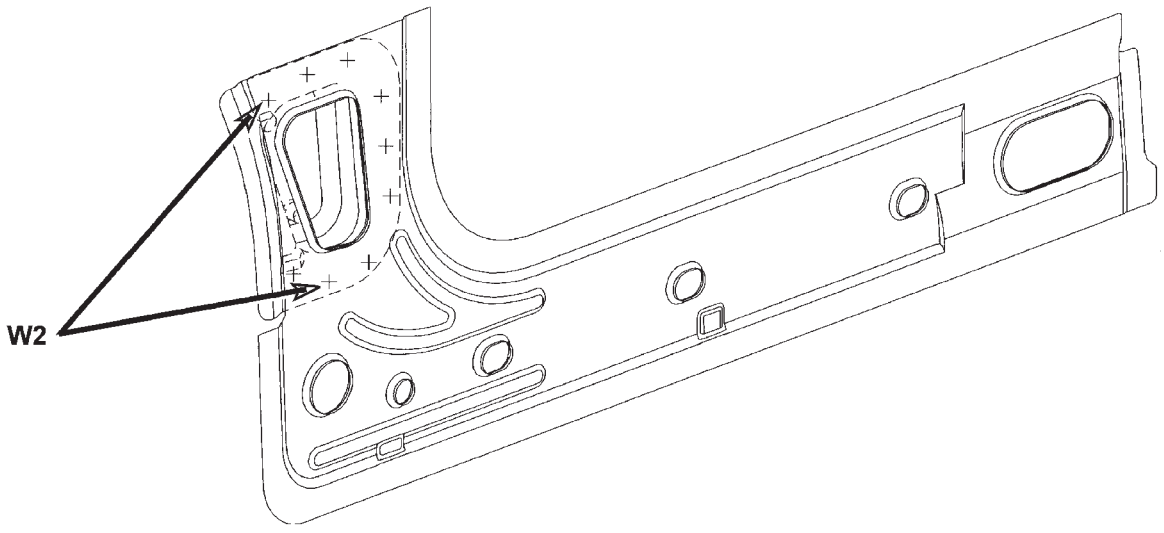


SPECIFICATIONS (Continued)

BODY SIDE APERTURE



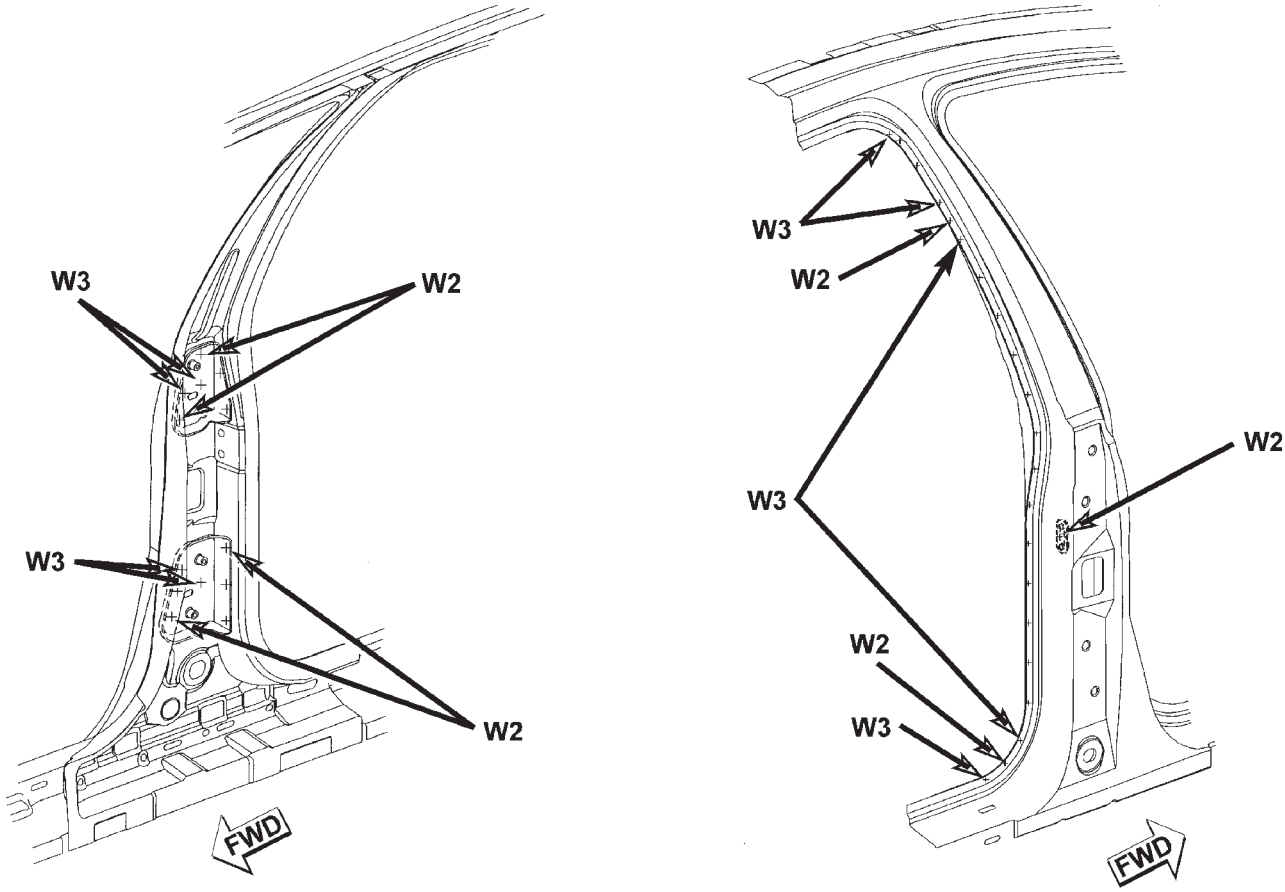
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



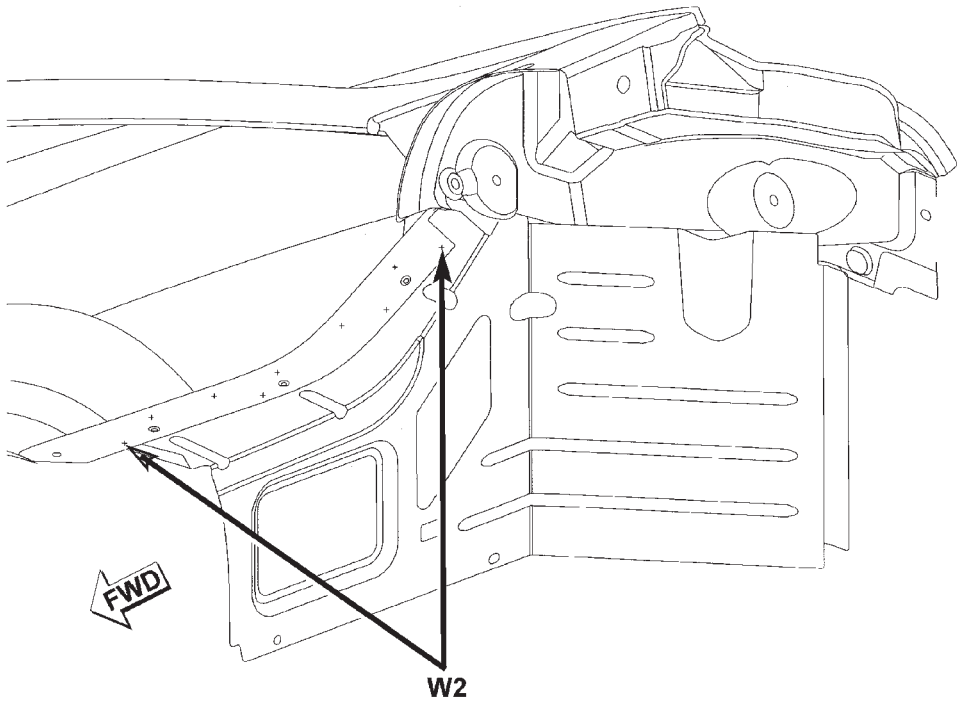
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SPECIFICATIONS (Continued)

BODY SIDE APERTURE



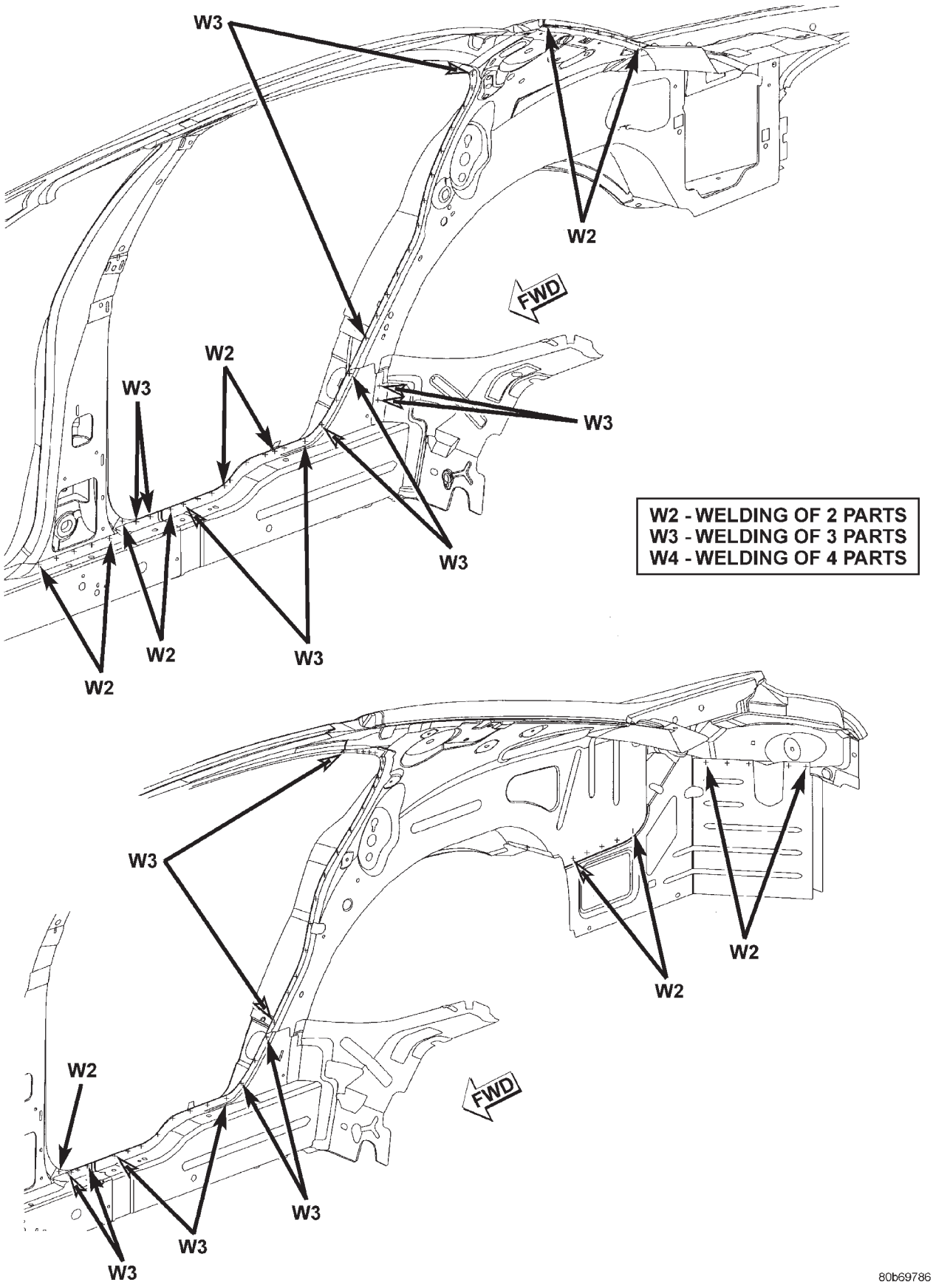
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



80b69785

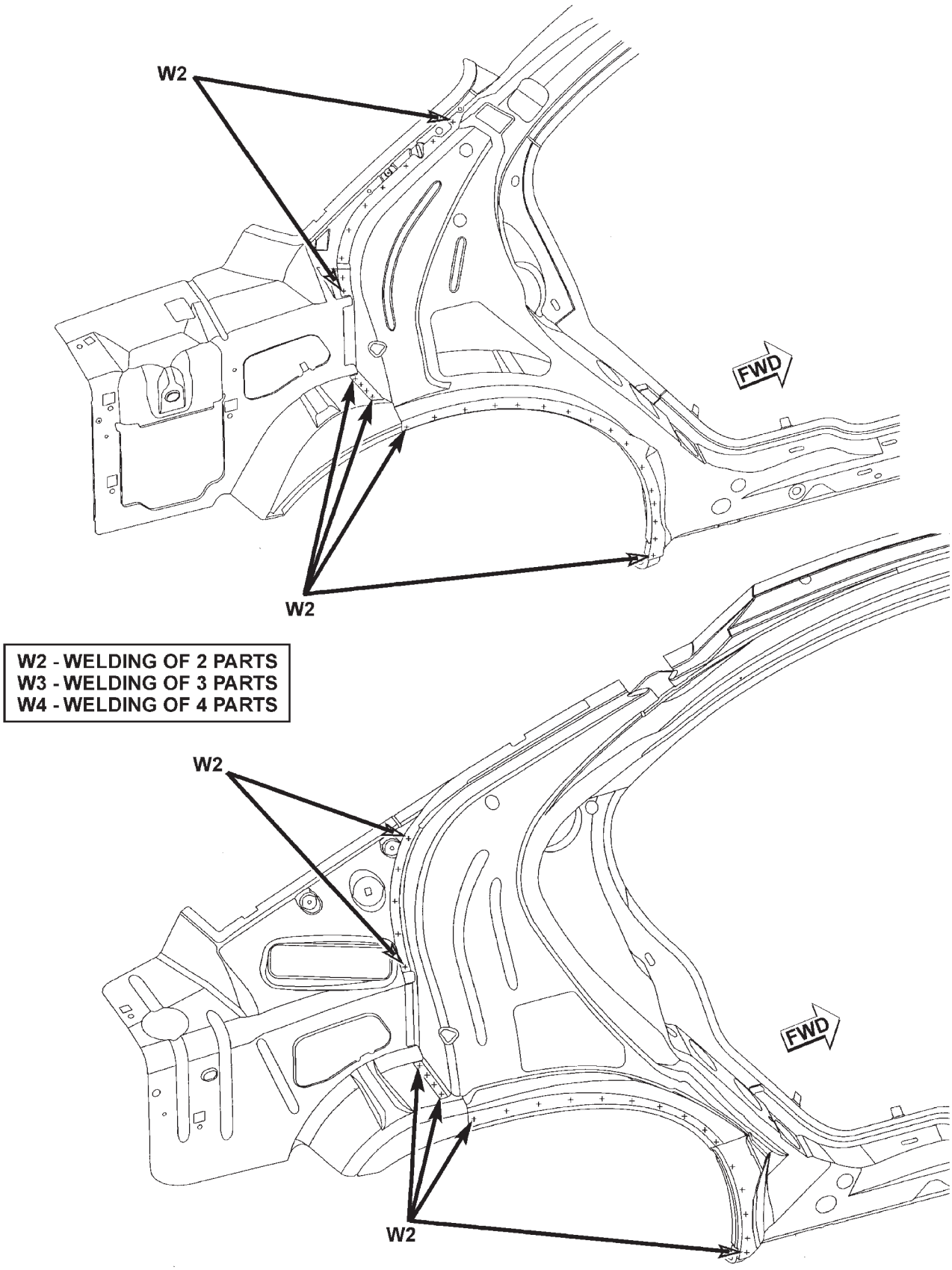
SPECIFICATIONS (Continued)

BODY SIDE APERTURE



SPECIFICATIONS (Continued)

BODY SIDE APERTURE

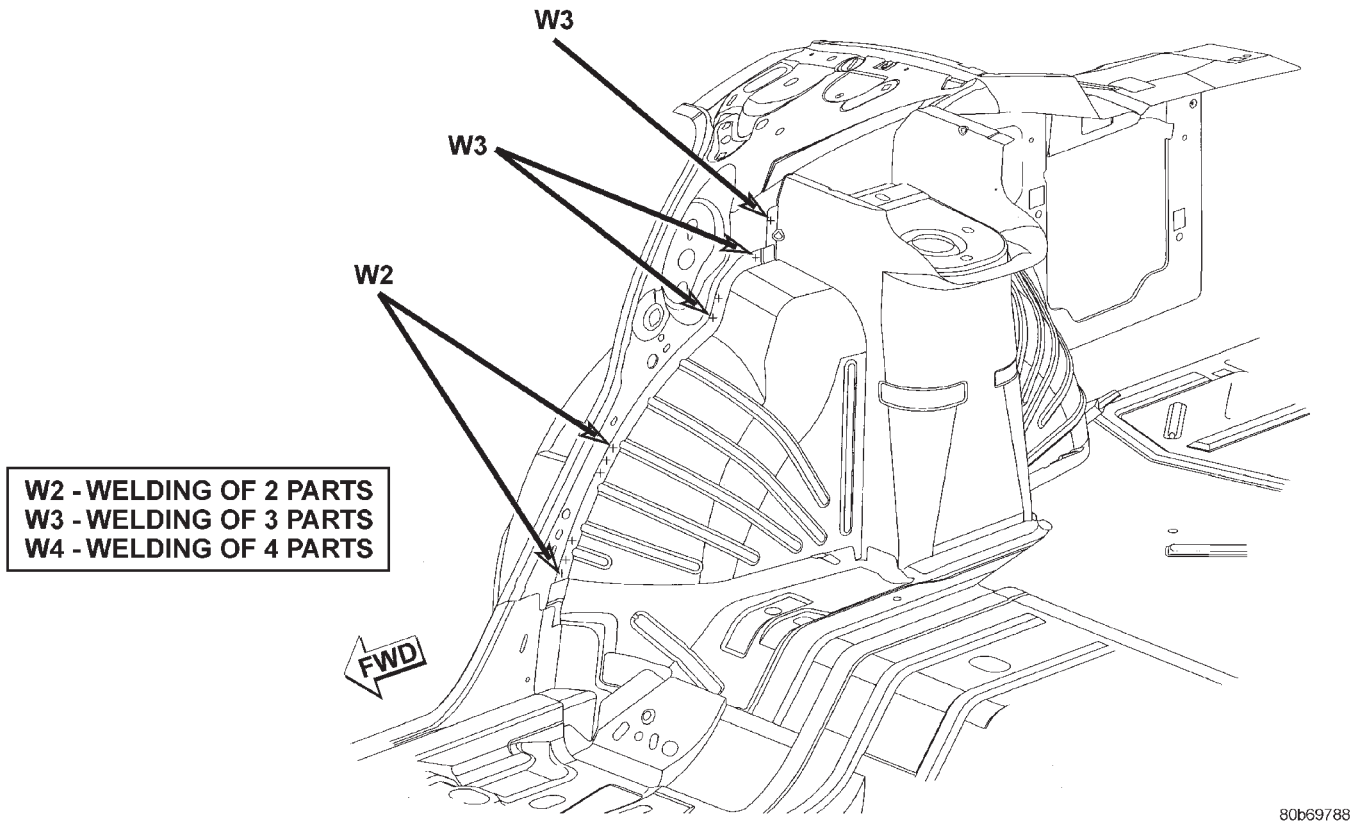


DODGE

80b69787

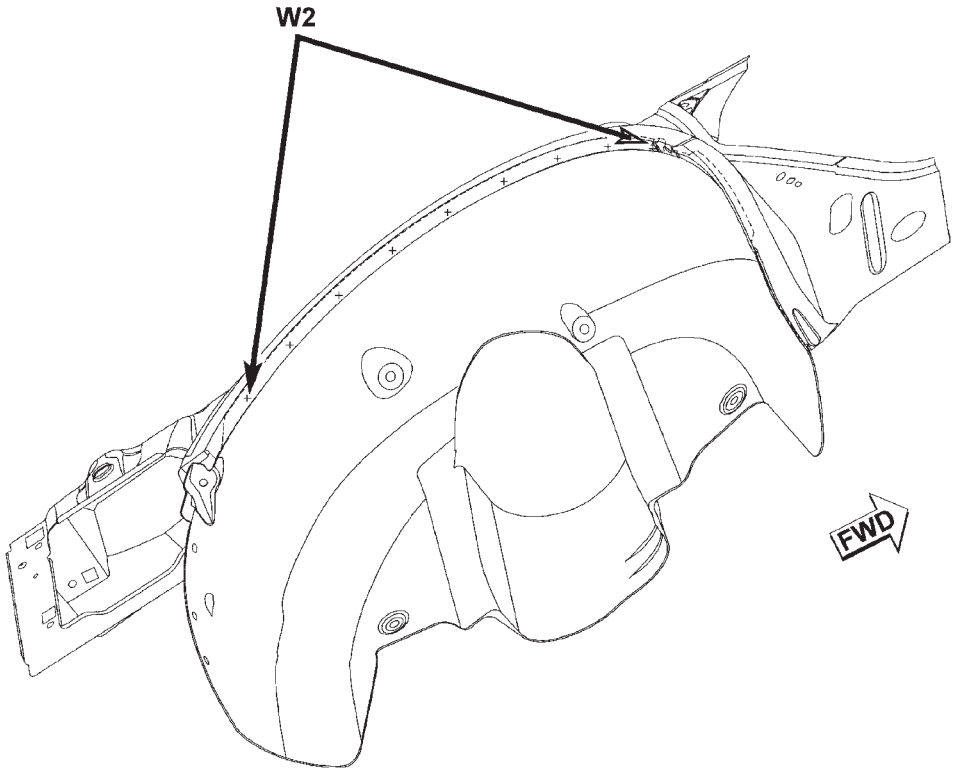
SPECIFICATIONS (Continued)

BODY SIDE APERTURE

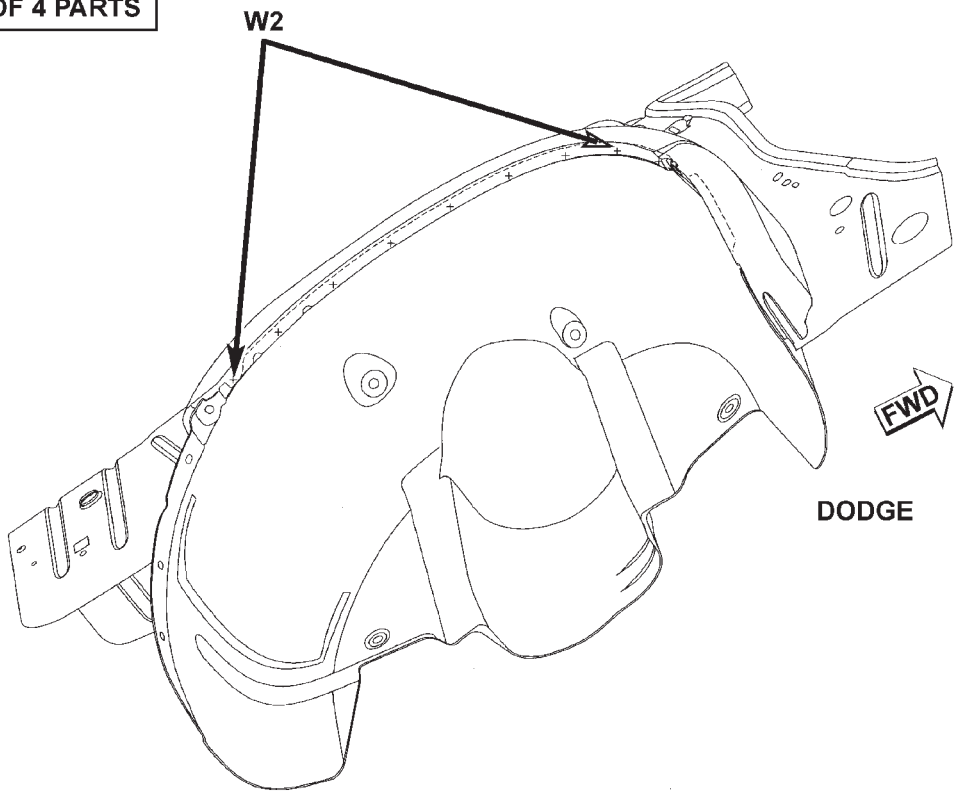


SPECIFICATIONS (Continued)

BODY SIDE APERTURE



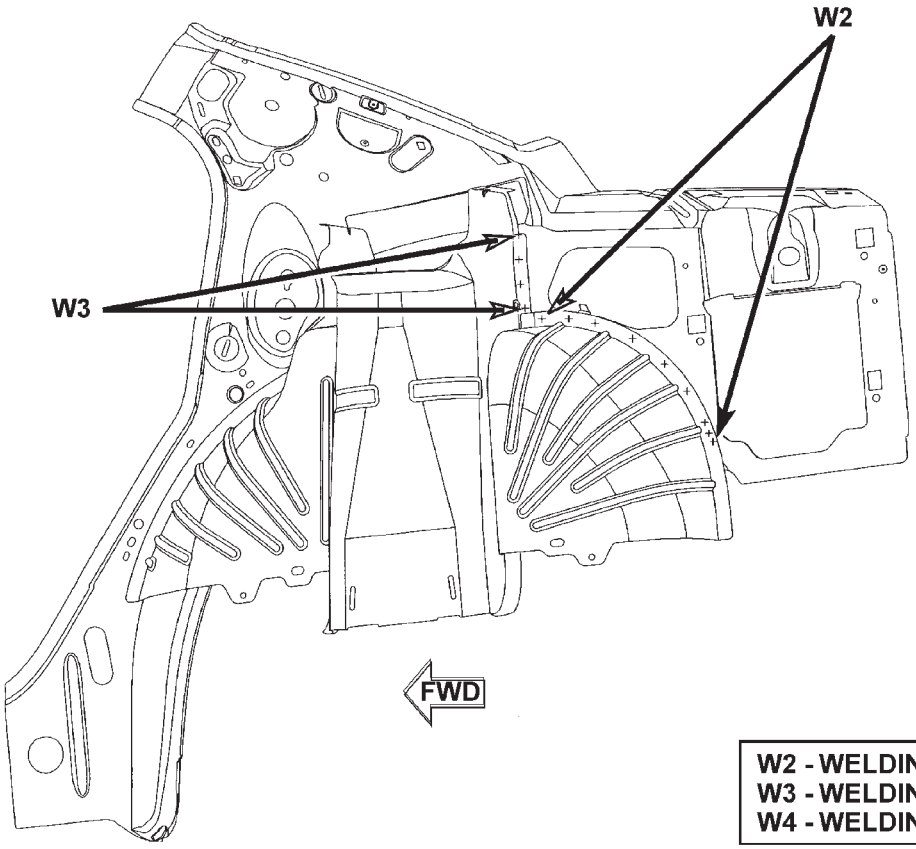
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



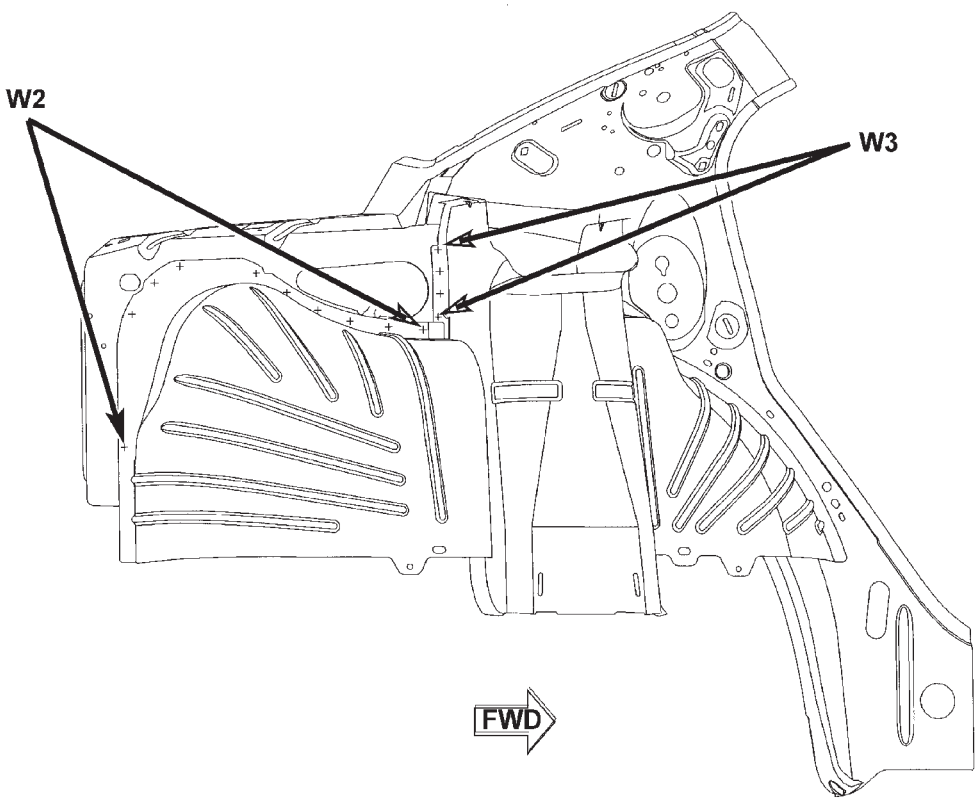
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SPECIFICATIONS (Continued)

BODY SIDE APERTURE



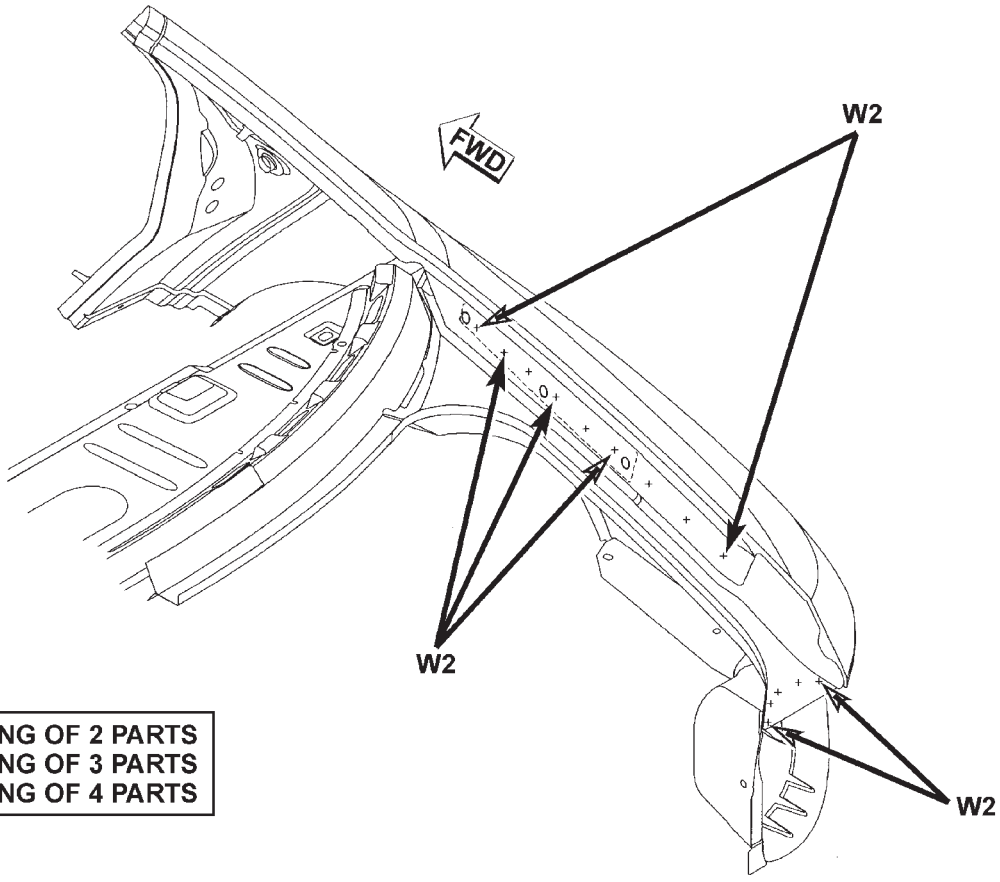
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



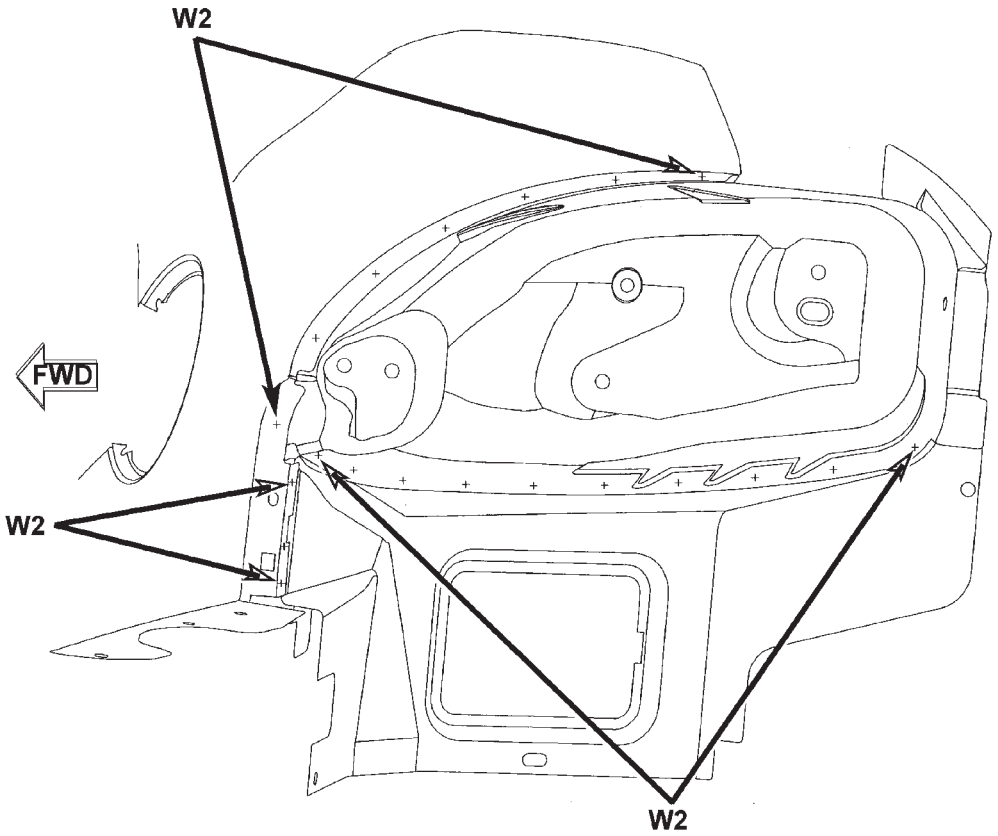
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SPECIFICATIONS (Continued)

BODY SIDE APERTURE



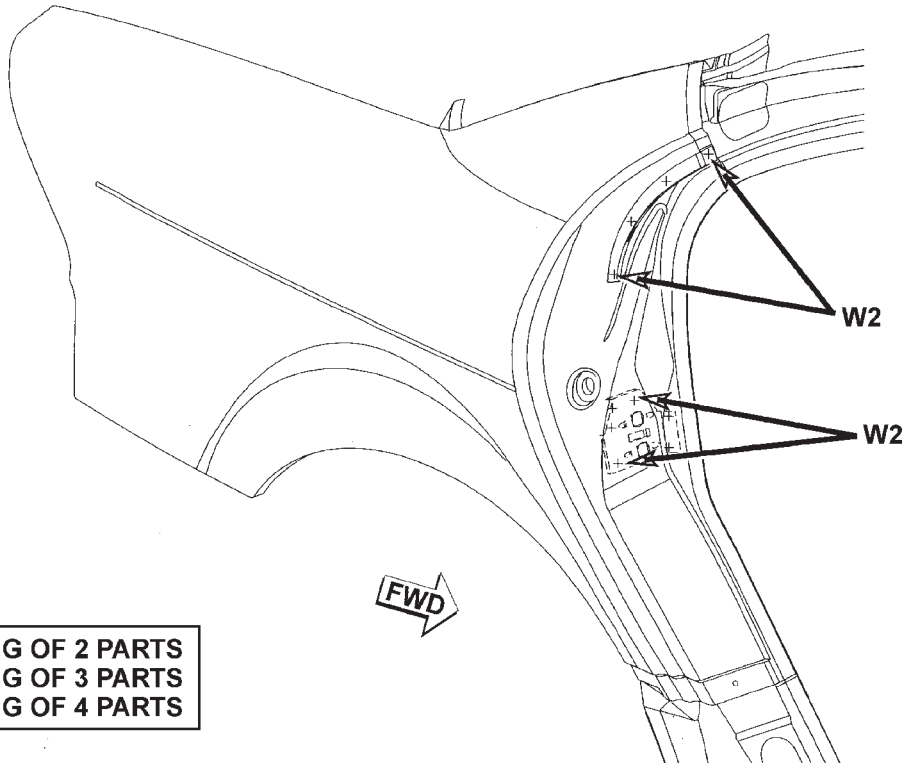
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



80b6978b

SPECIFICATIONS (Continued)

BODY SIDE APERTURE

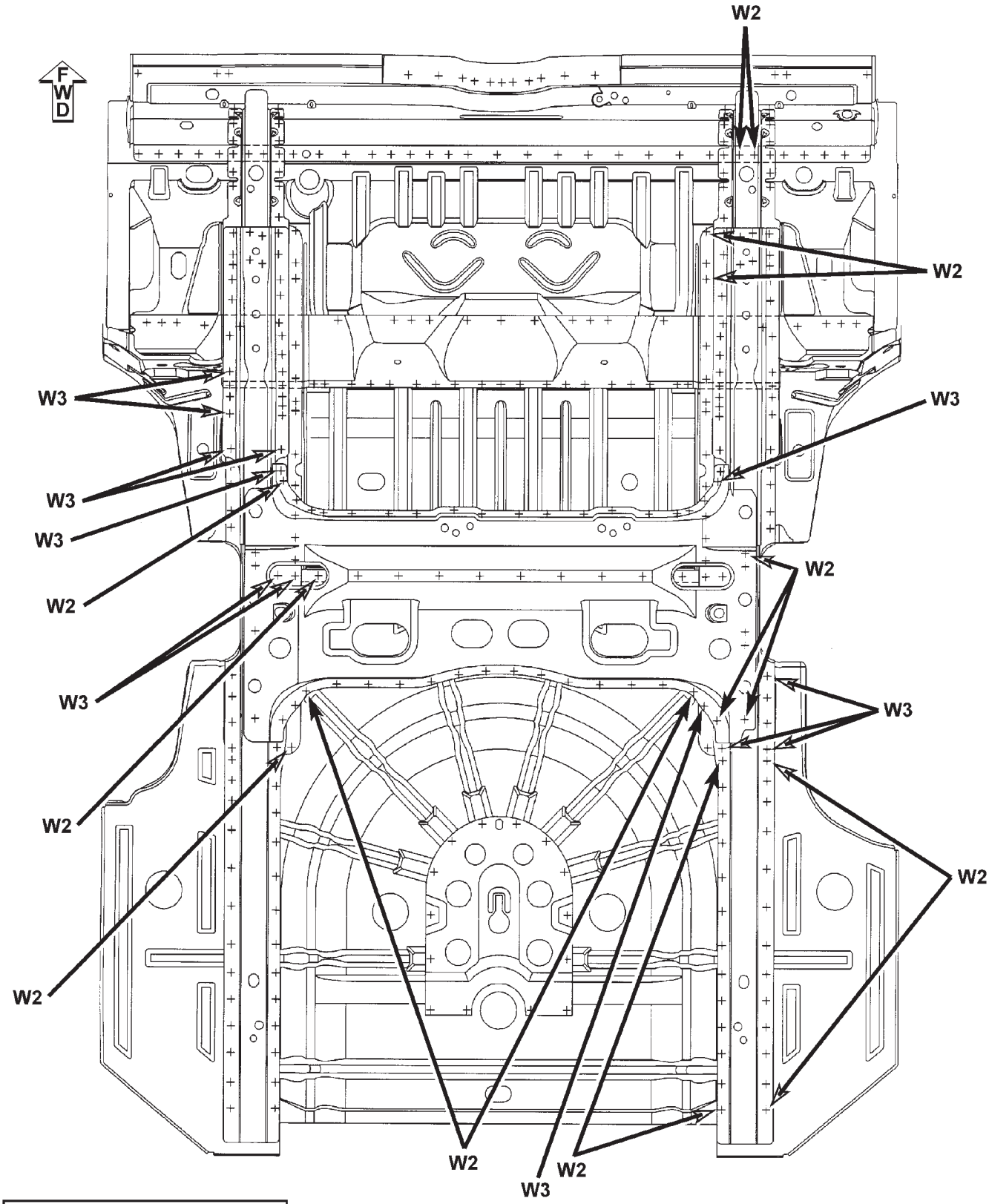


W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

80b6978c

SPECIFICATIONS (Continued)

FLOOR PAN

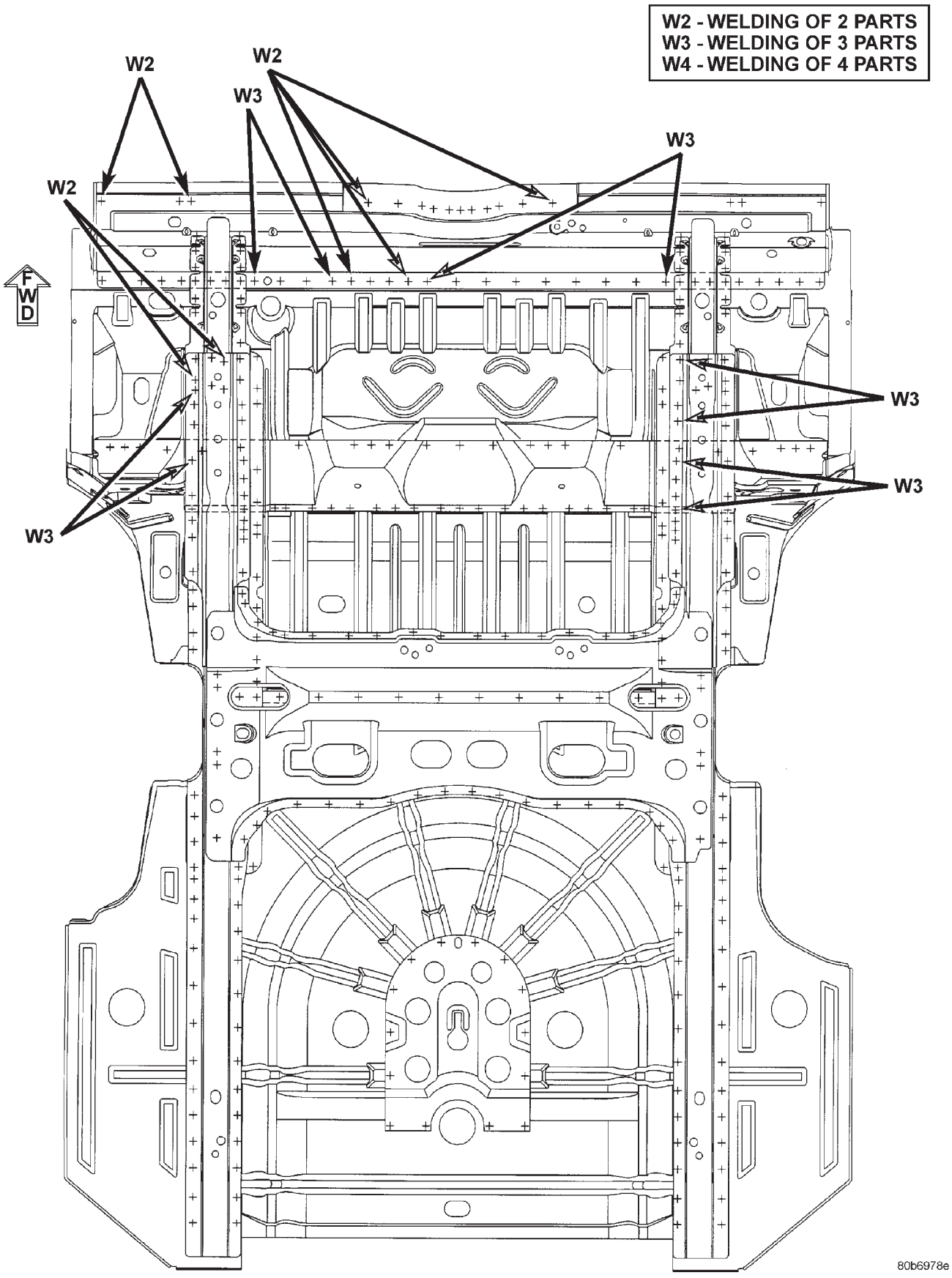


W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

80b6978d

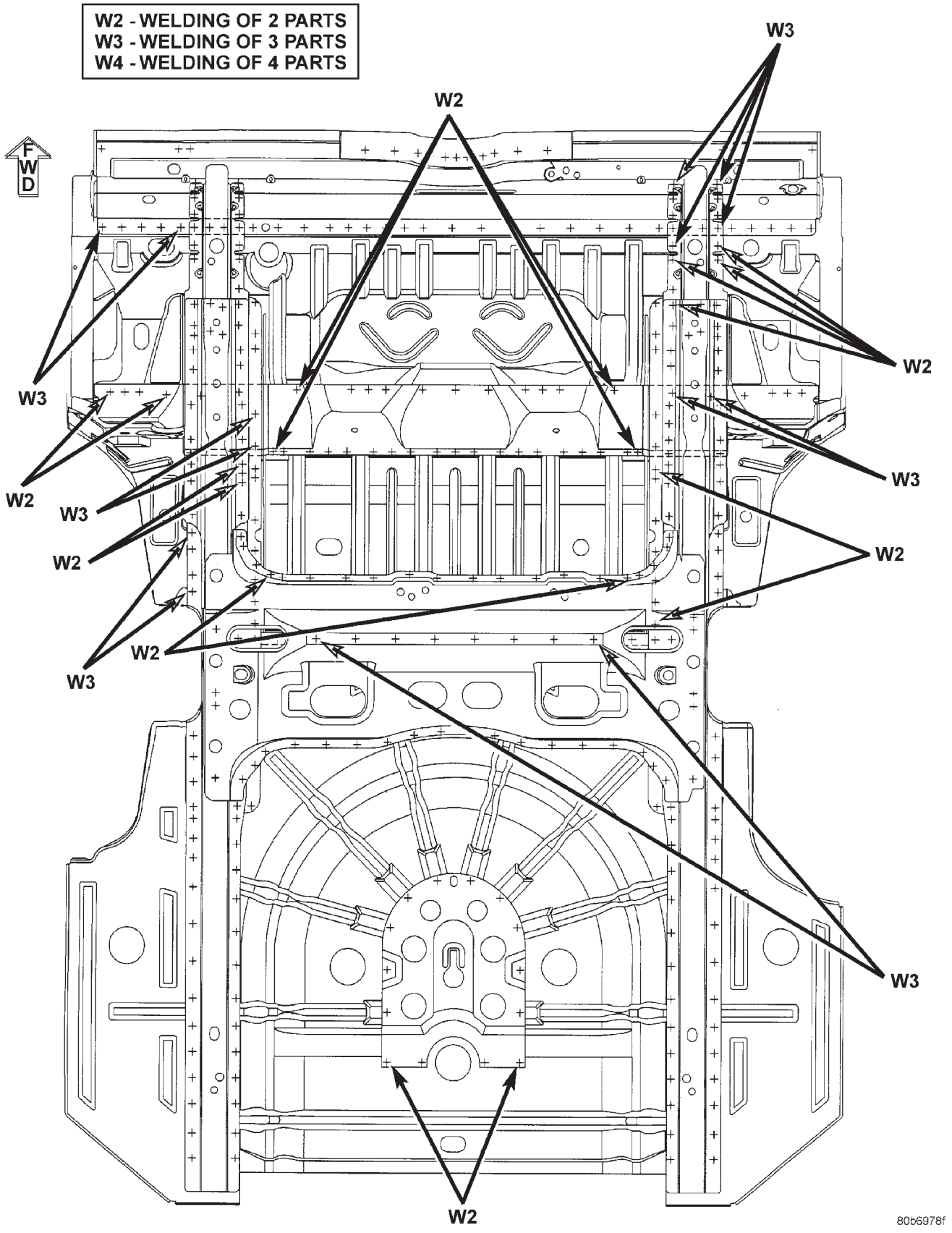
SPECIFICATIONS (Continued)

FLOOR PAN



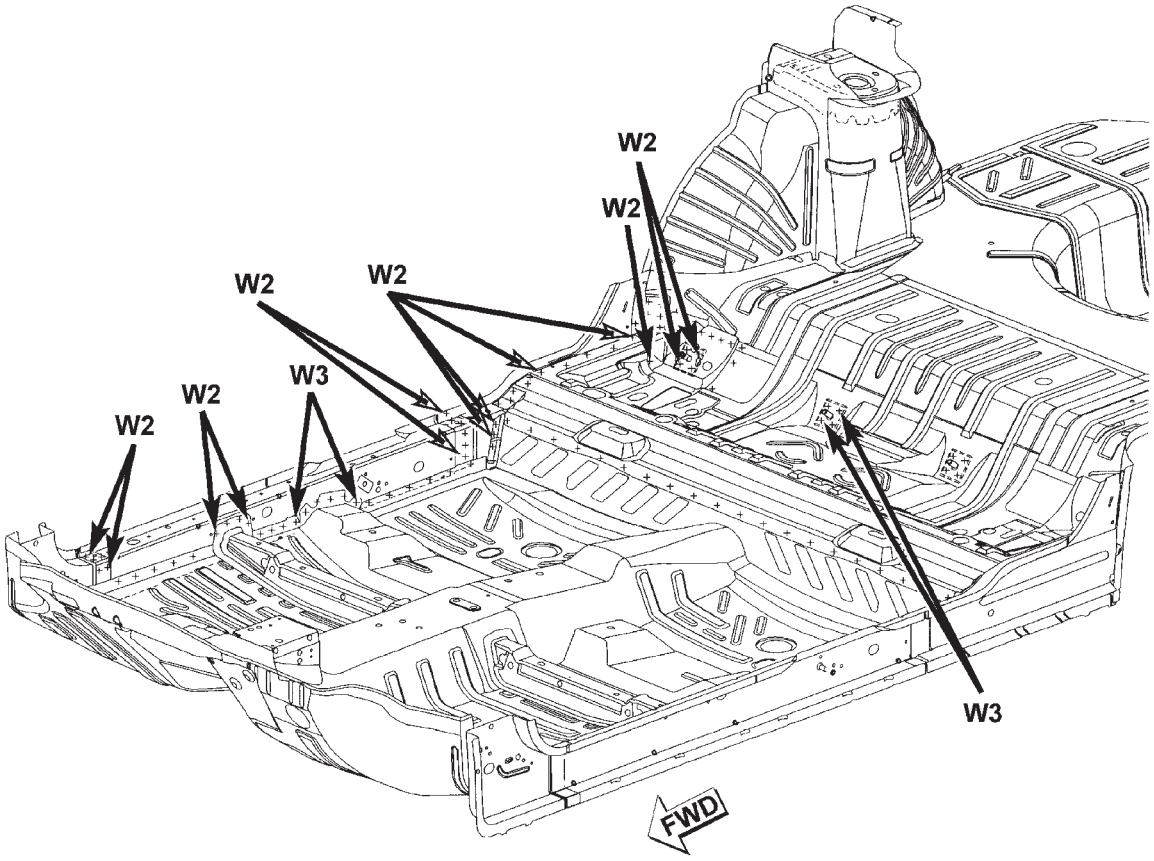
SPECIFICATIONS (Continued)

FLOOR PAN

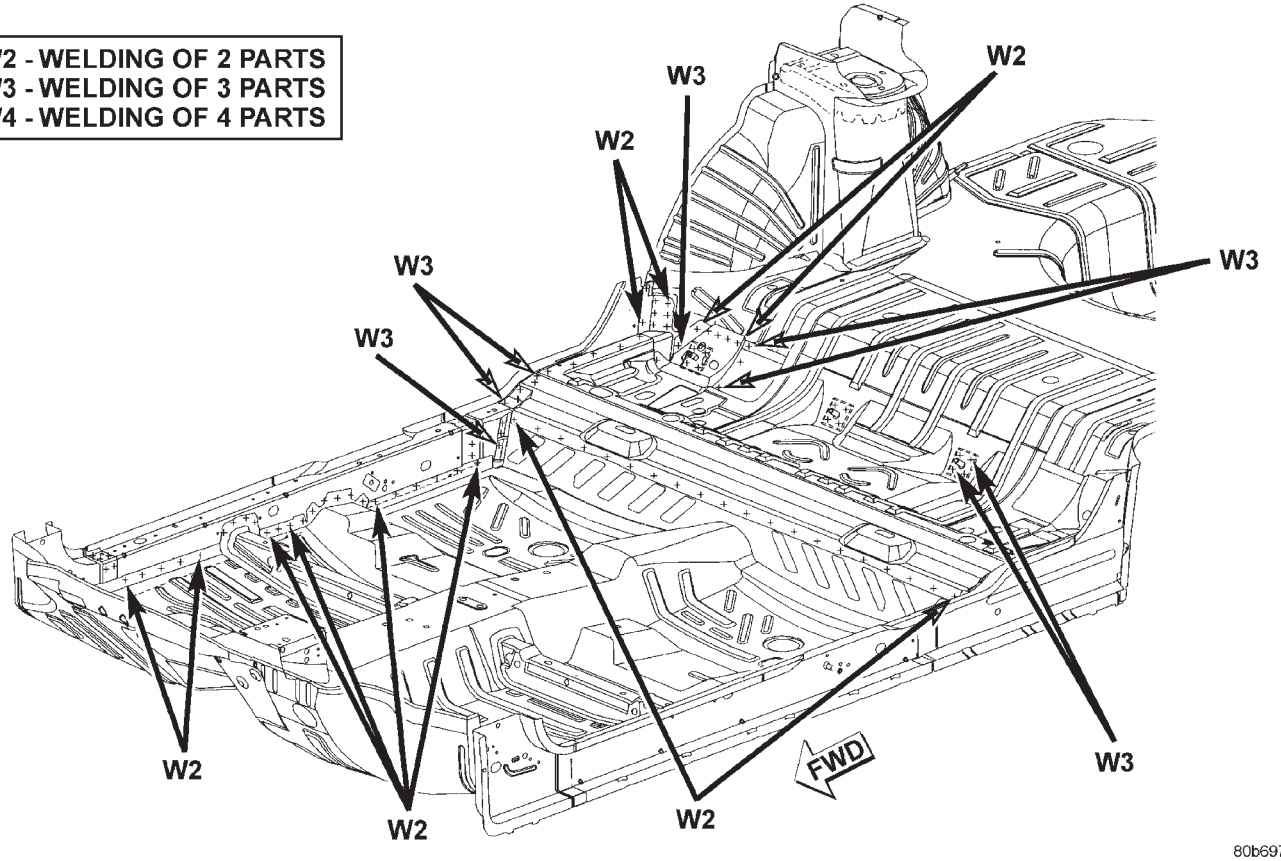


SPECIFICATIONS (Continued)

FLOOR PAN



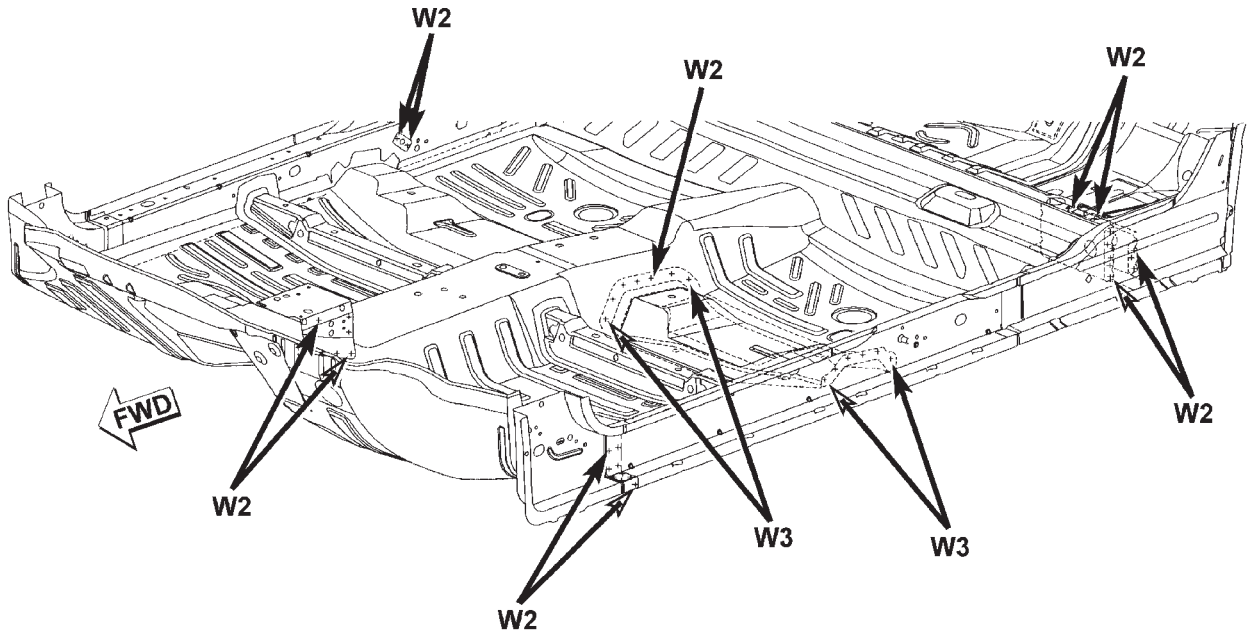
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



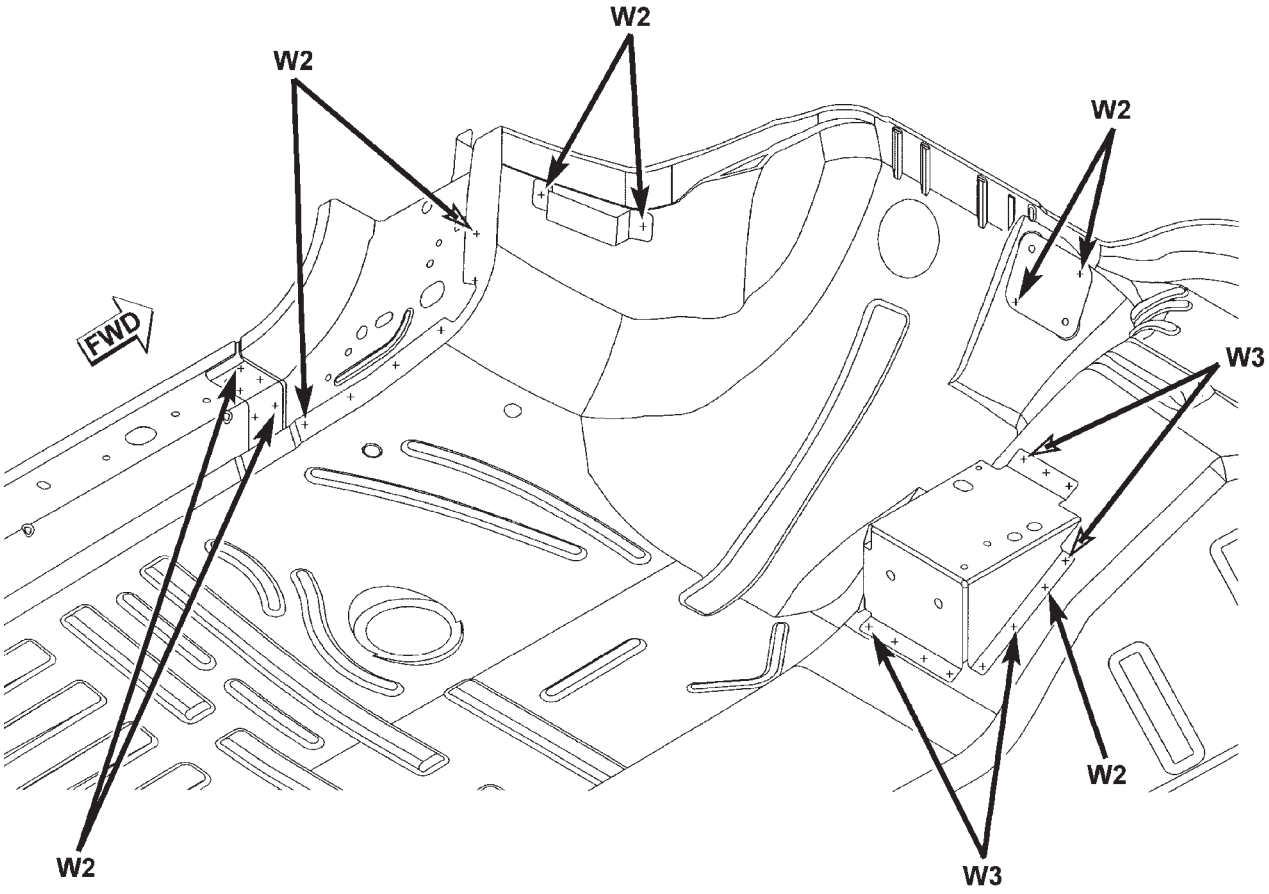
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SPECIFICATIONS (Continued)

FLOOR PAN



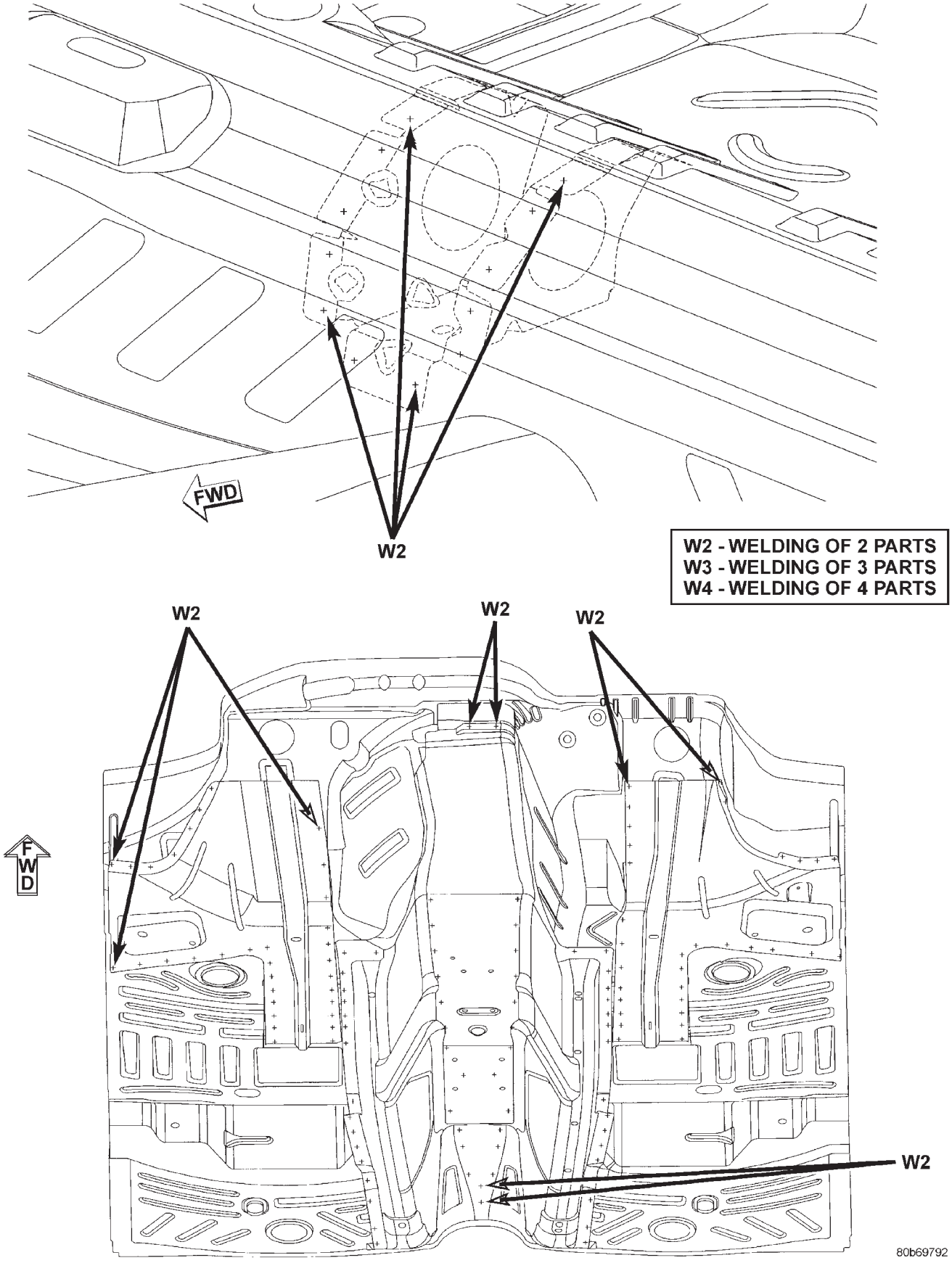
W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



80b69791

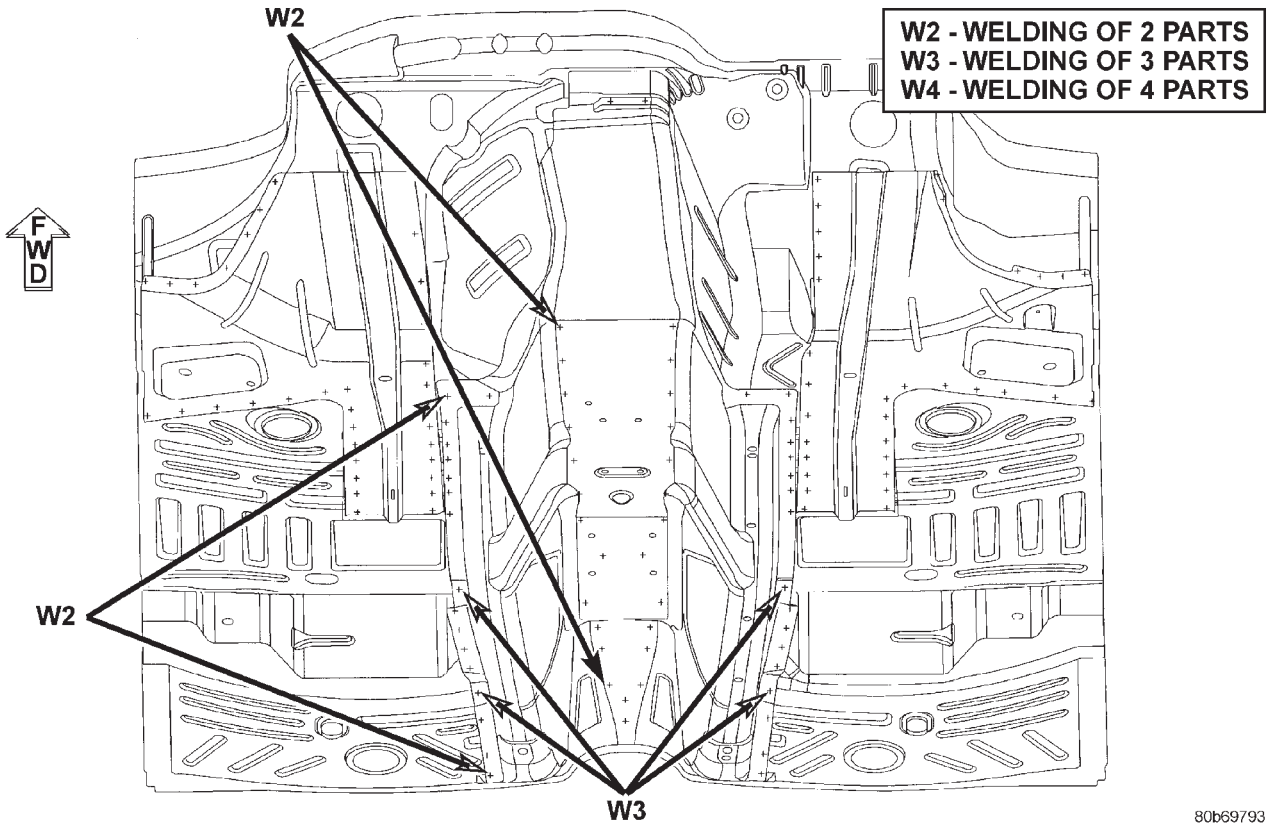
SPECIFICATIONS (Continued)

FLOOR PAN



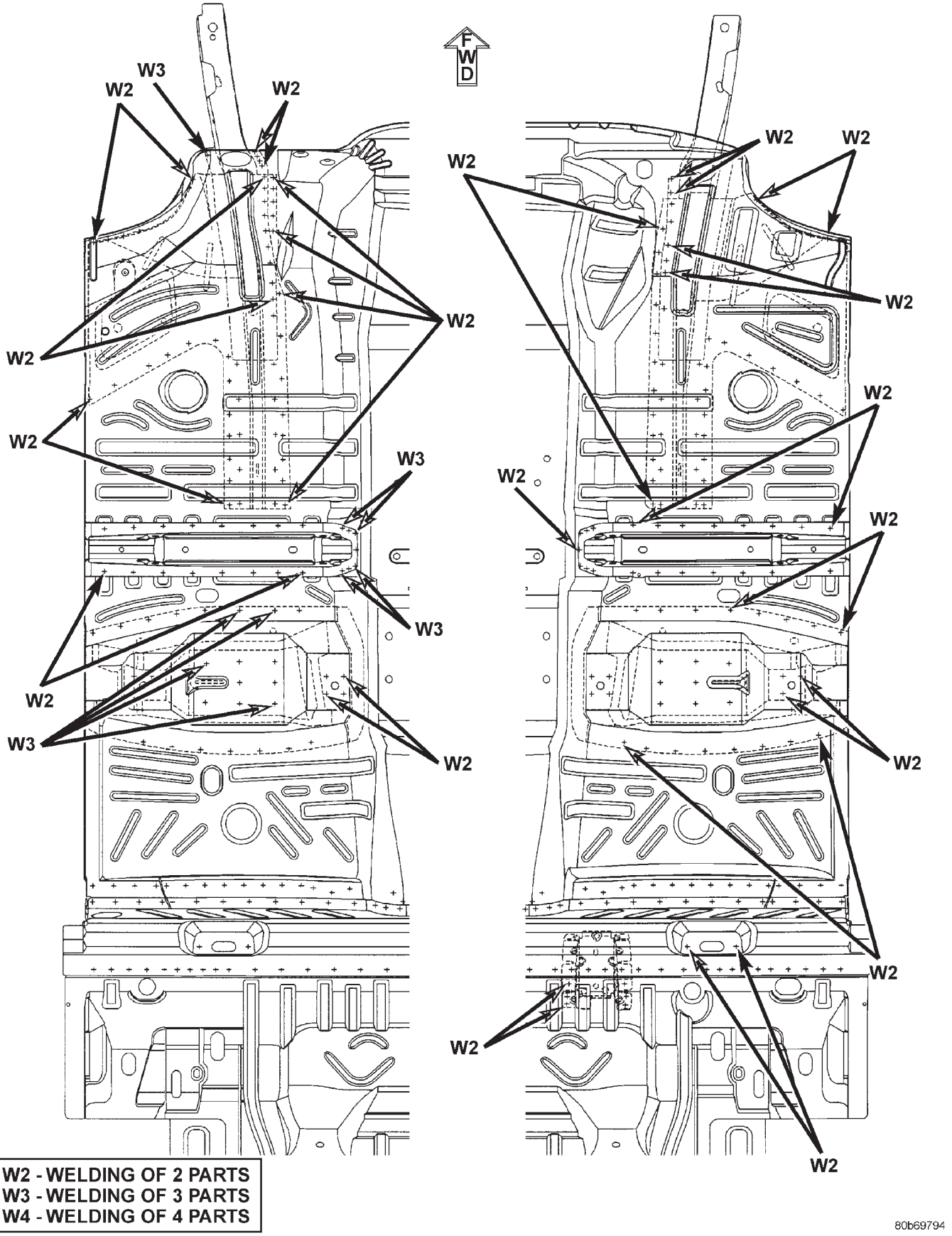
SPECIFICATIONS (Continued)

FLOOR PAN



SPECIFICATIONS (Continued)

FLOOR PAN

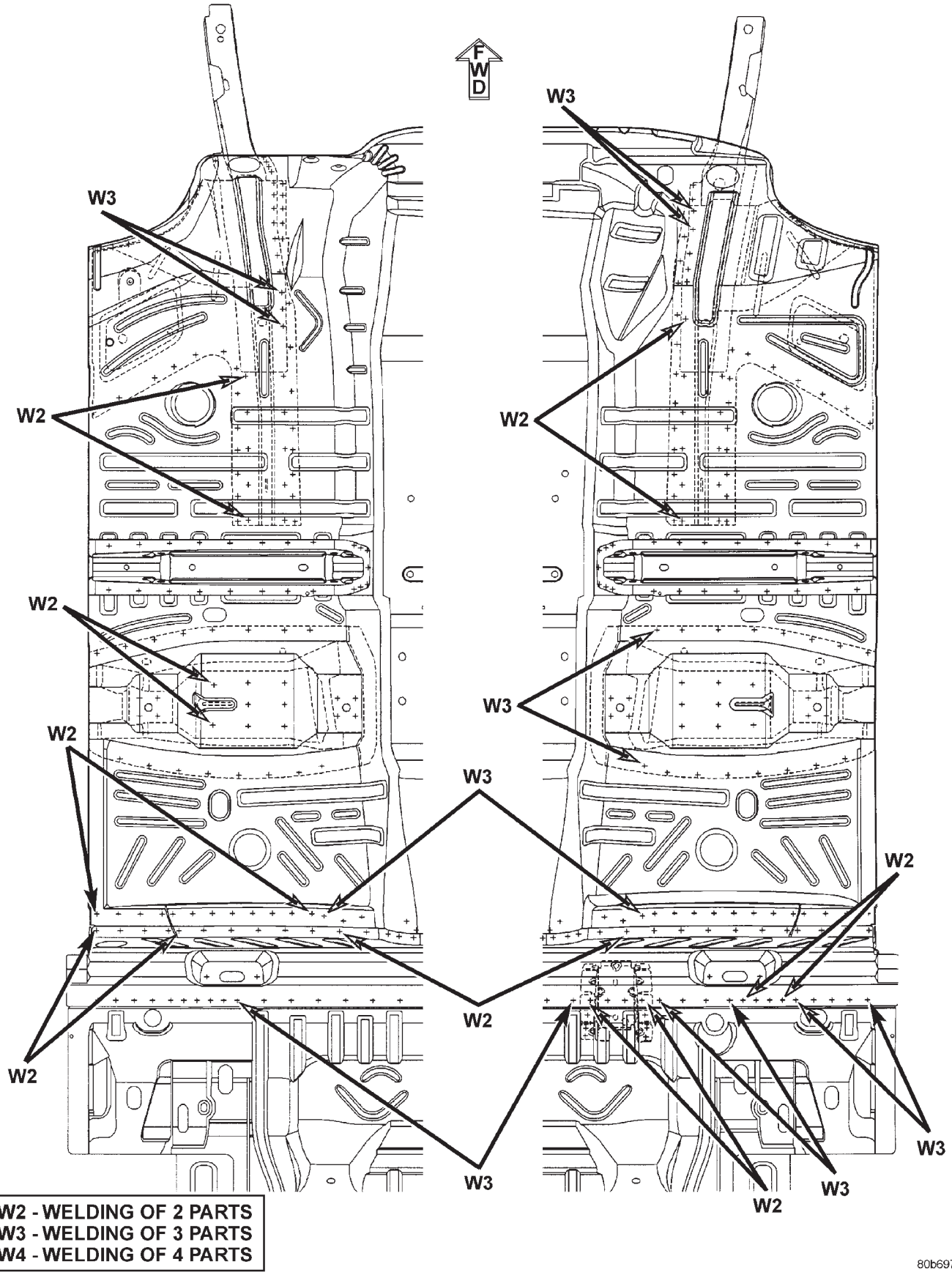


W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

80b69794

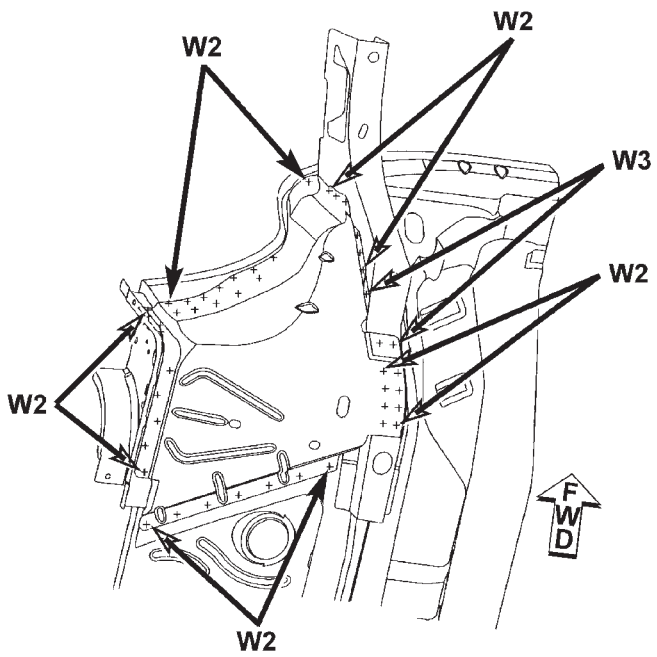
SPECIFICATIONS (Continued)

FLOOR PAN

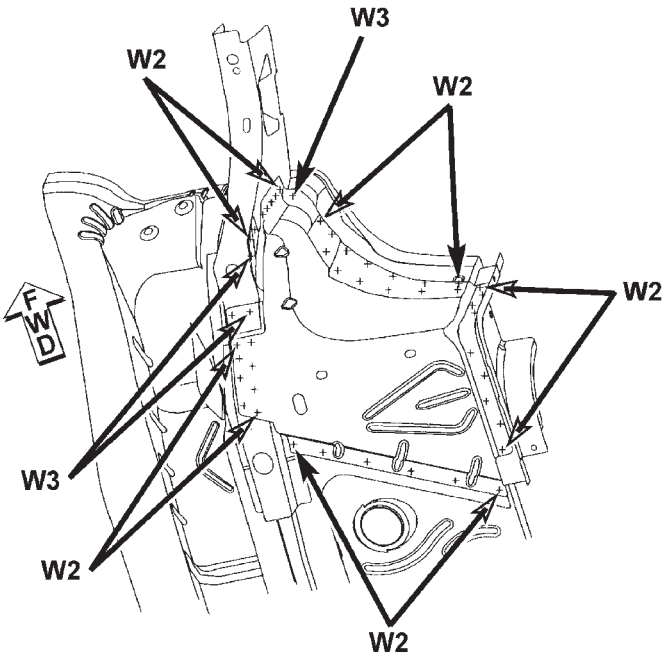


SPECIFICATIONS (Continued)

FLOOR PAN

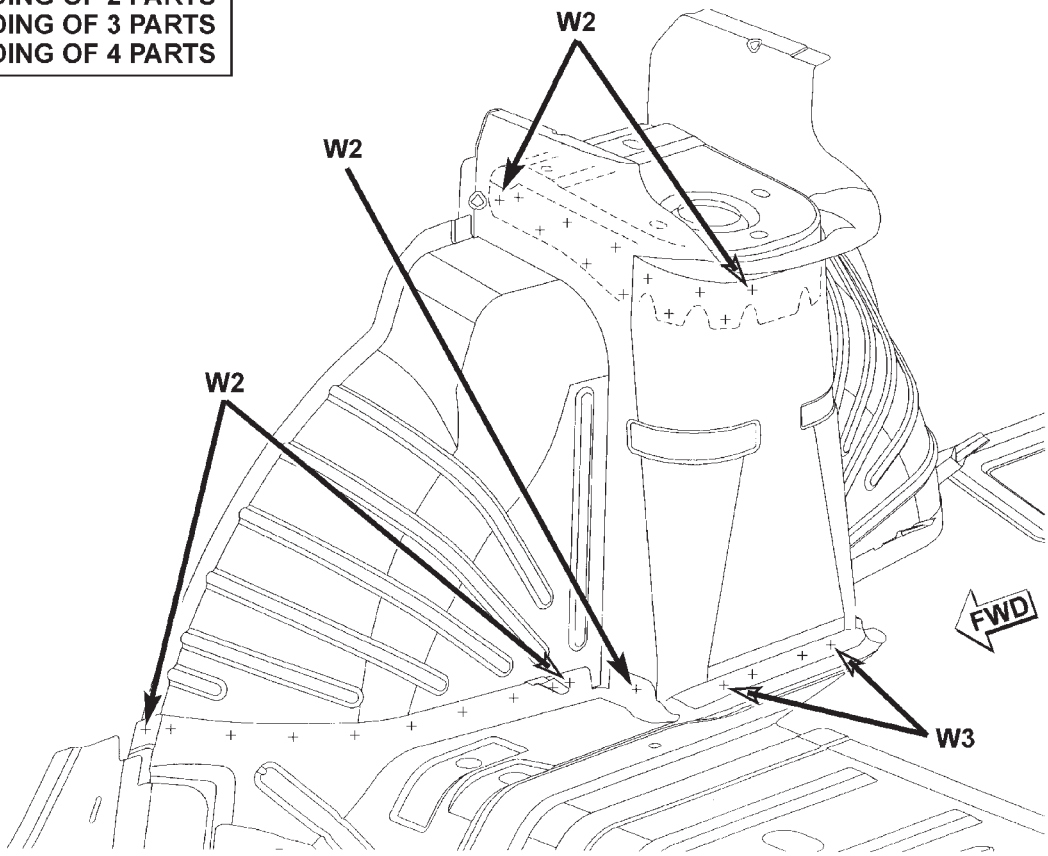


RIGHT SIDE



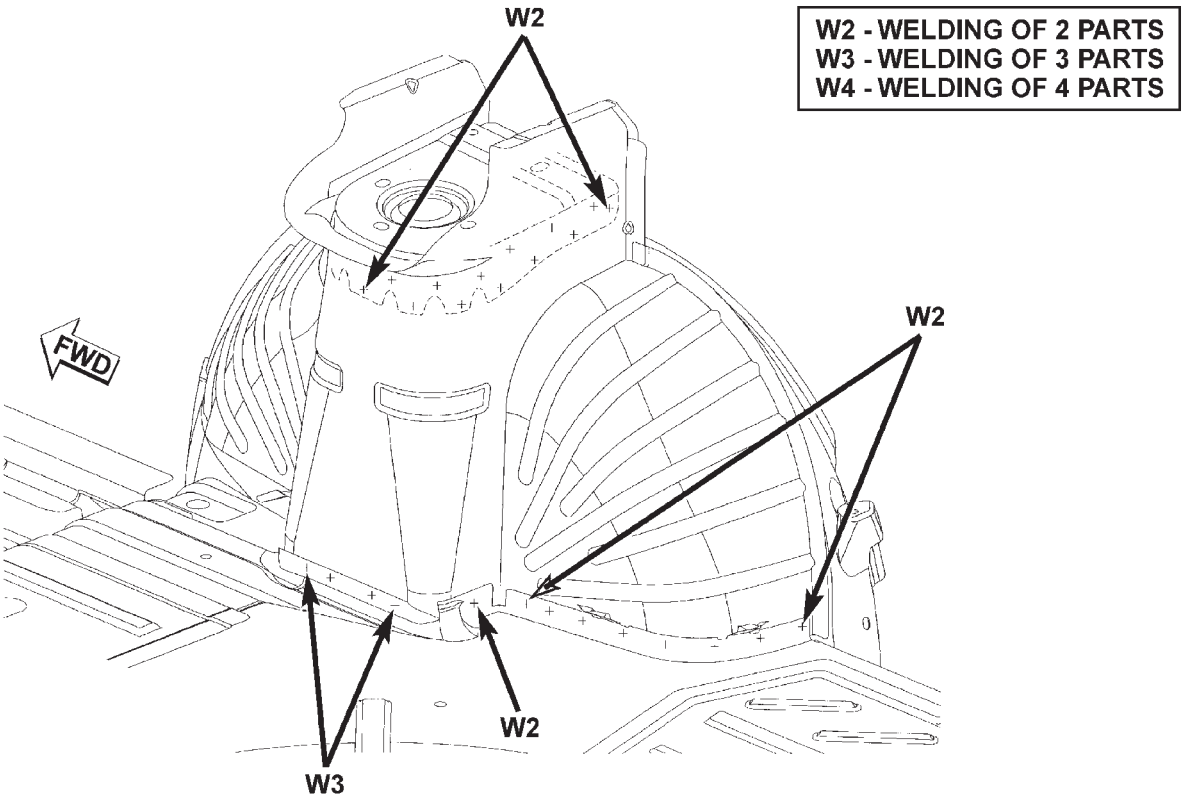
LEFT SIDE

W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS



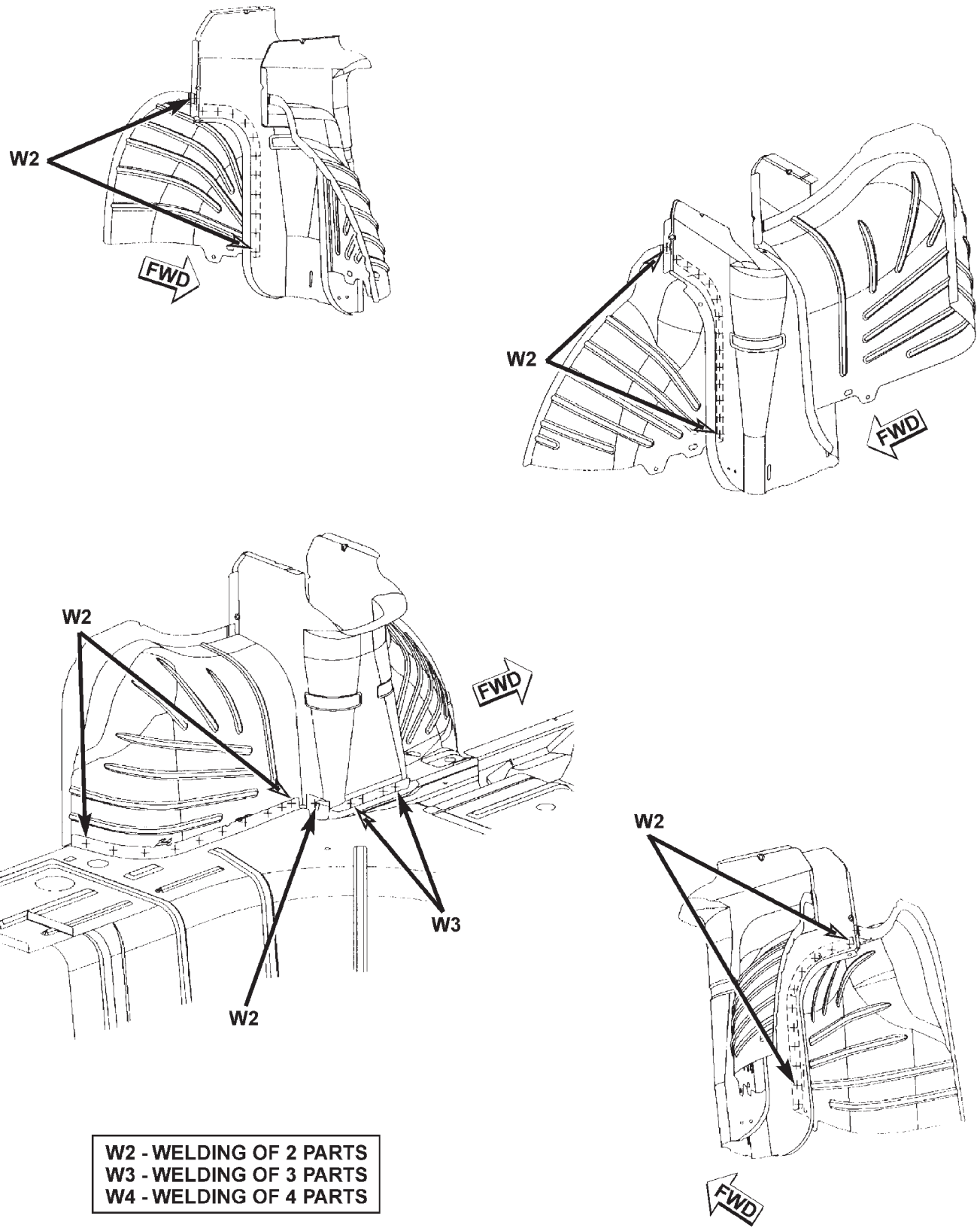
SPECIFICATIONS (Continued)

FLOOR PAN



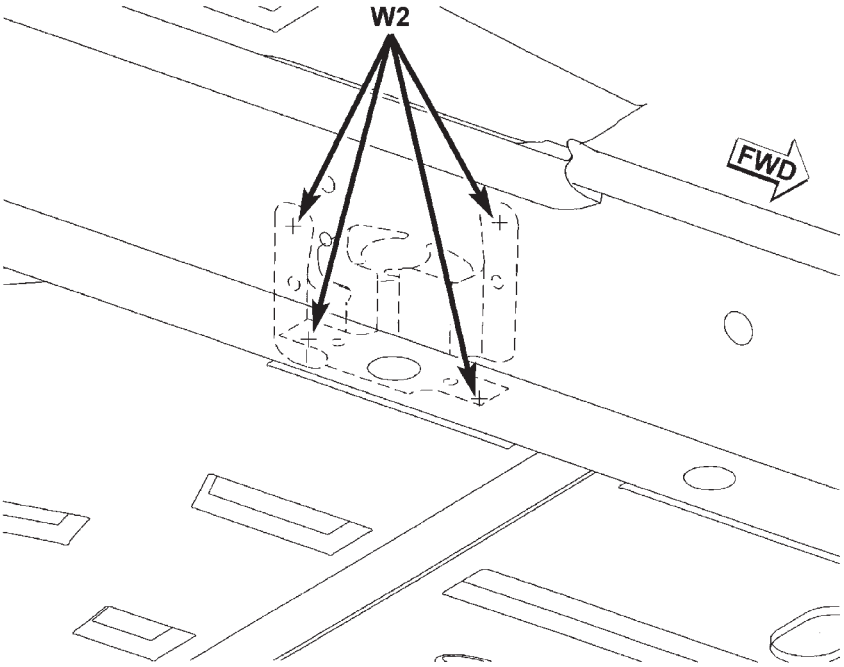
SPECIFICATIONS (Continued)

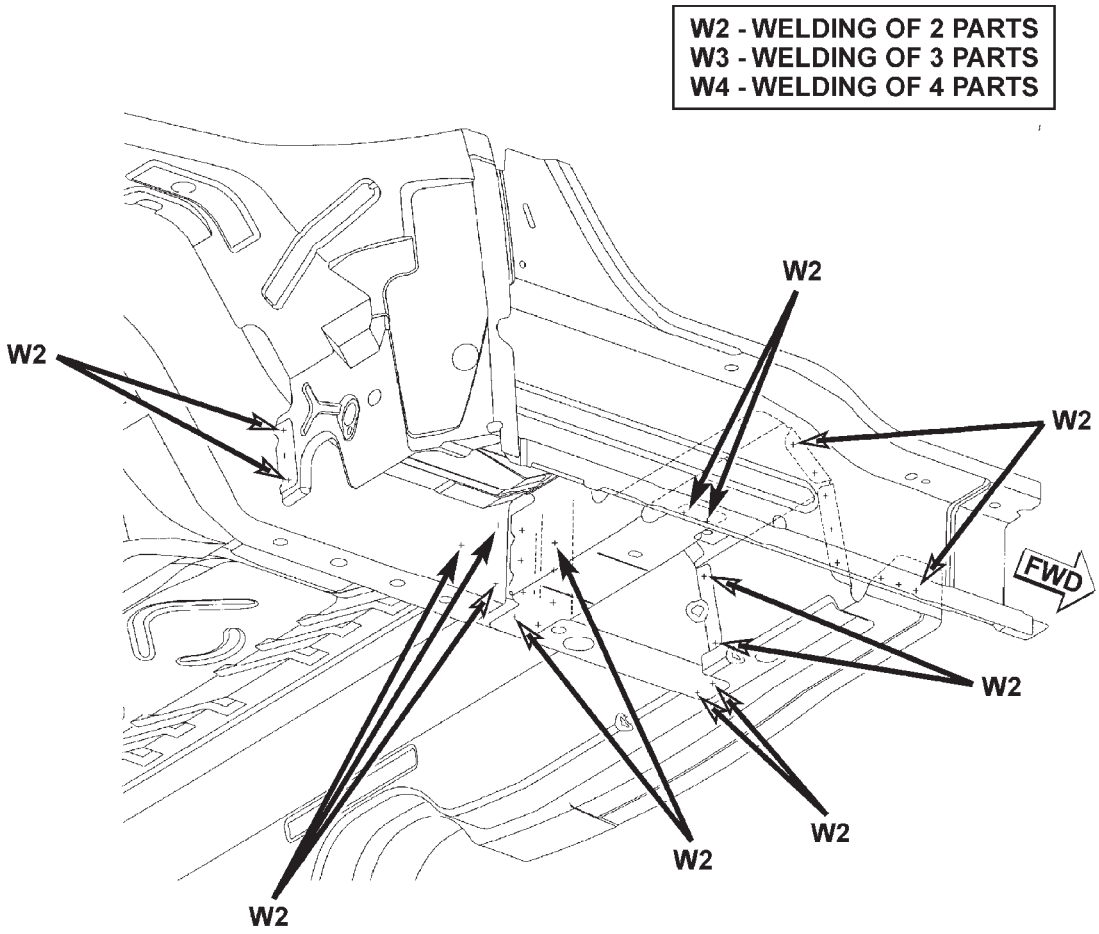
FLOOR PAN



SPECIFICATIONS (Continued)

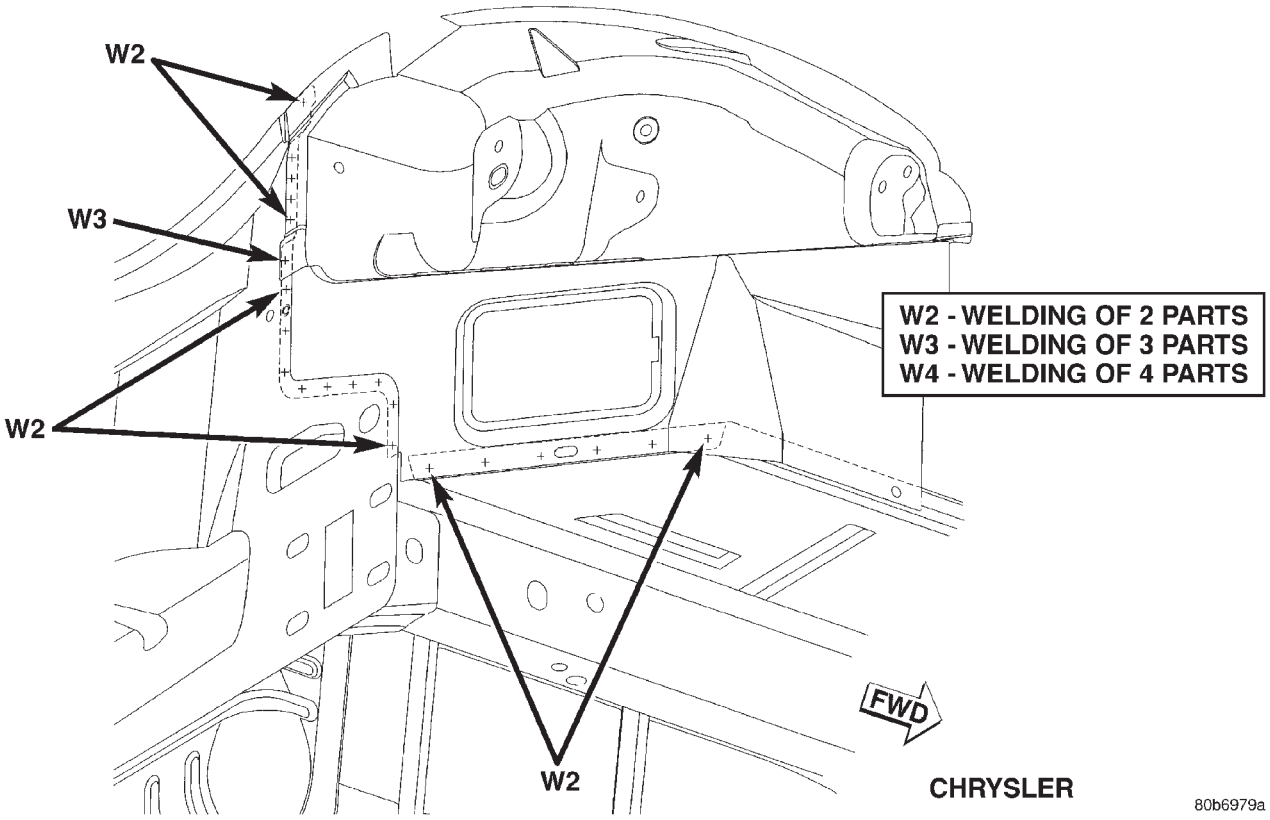
FLOOR PAN





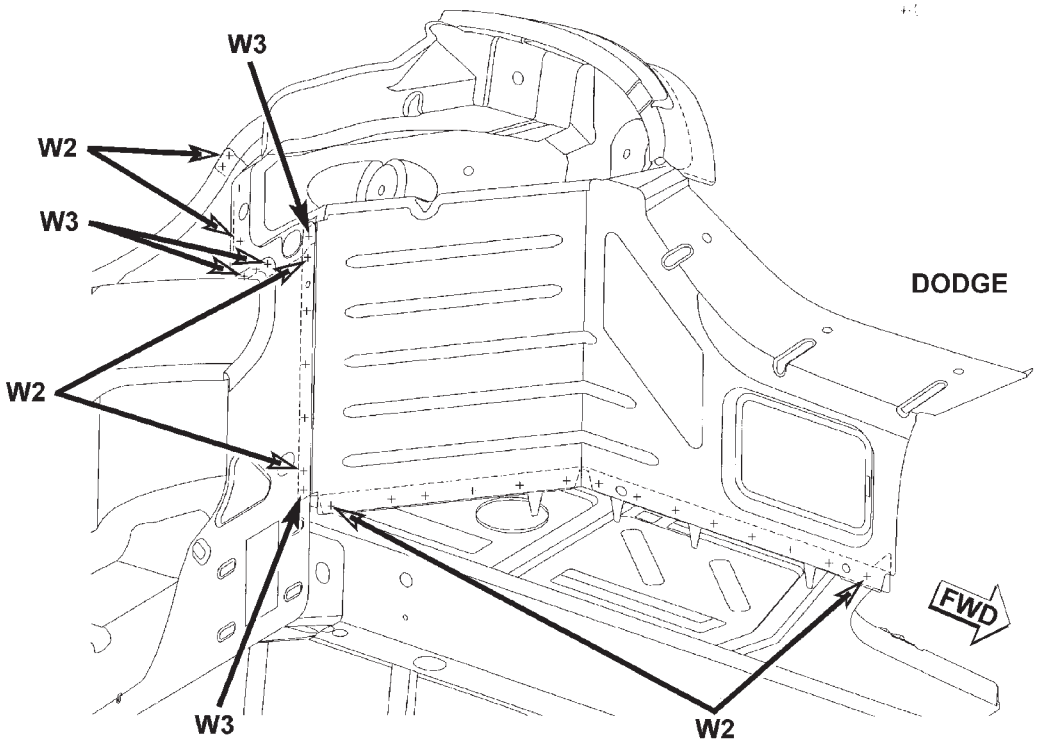
SPECIFICATIONS (Continued)

FLOOR PAN

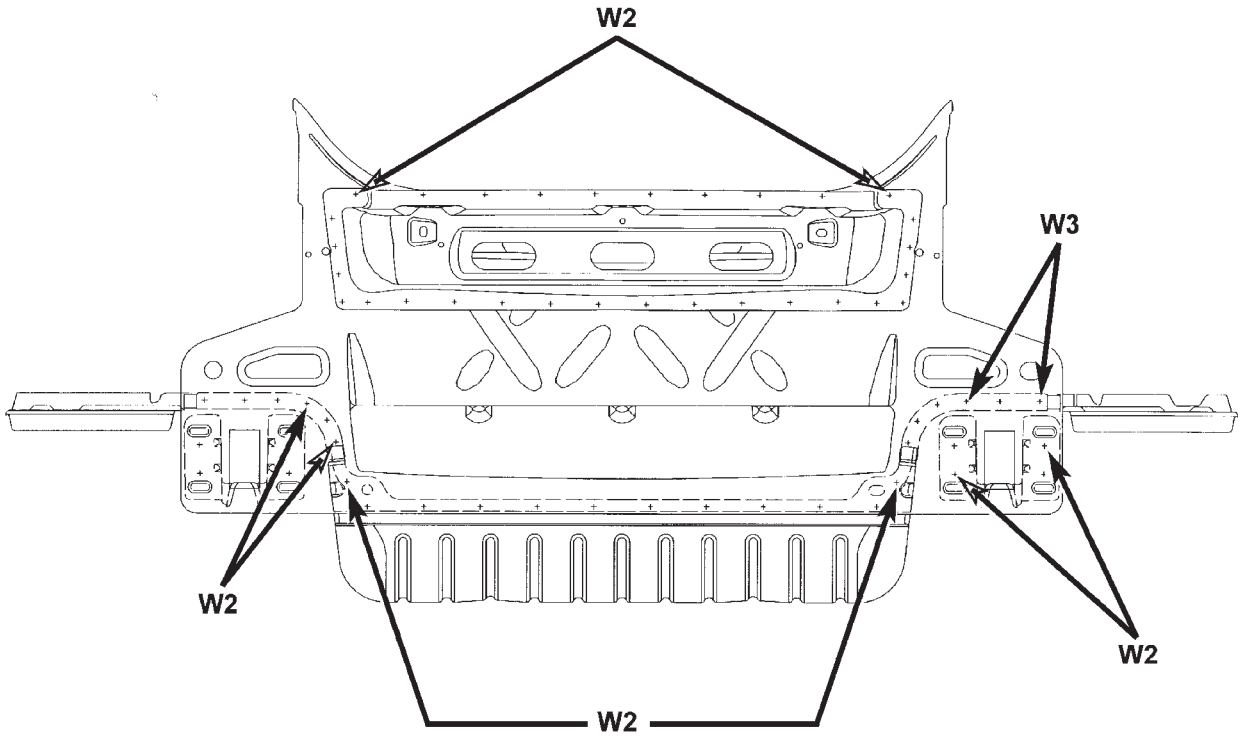


SPECIFICATIONS (Continued)

FLOOR PAN



W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

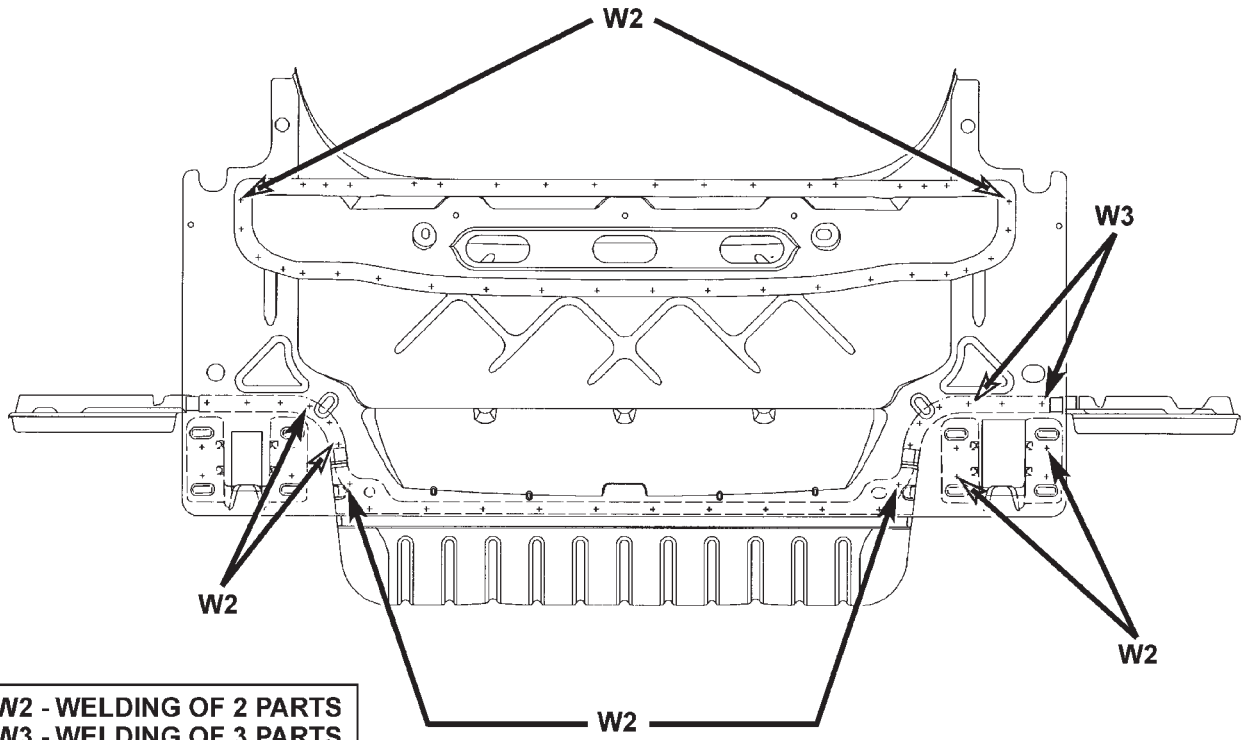


CHRYSLER

80b6979b

SPECIFICATIONS (Continued)

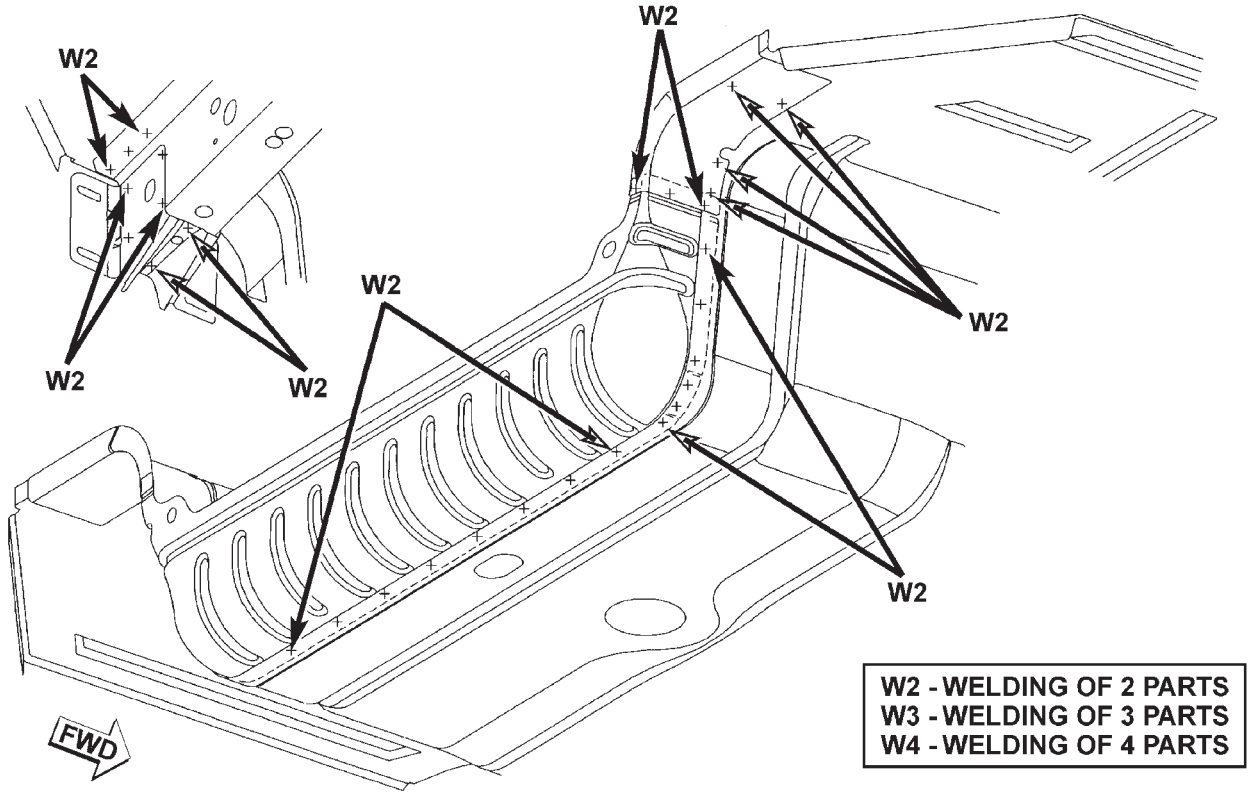
FLOOR PAN



DODGE

80b6979c

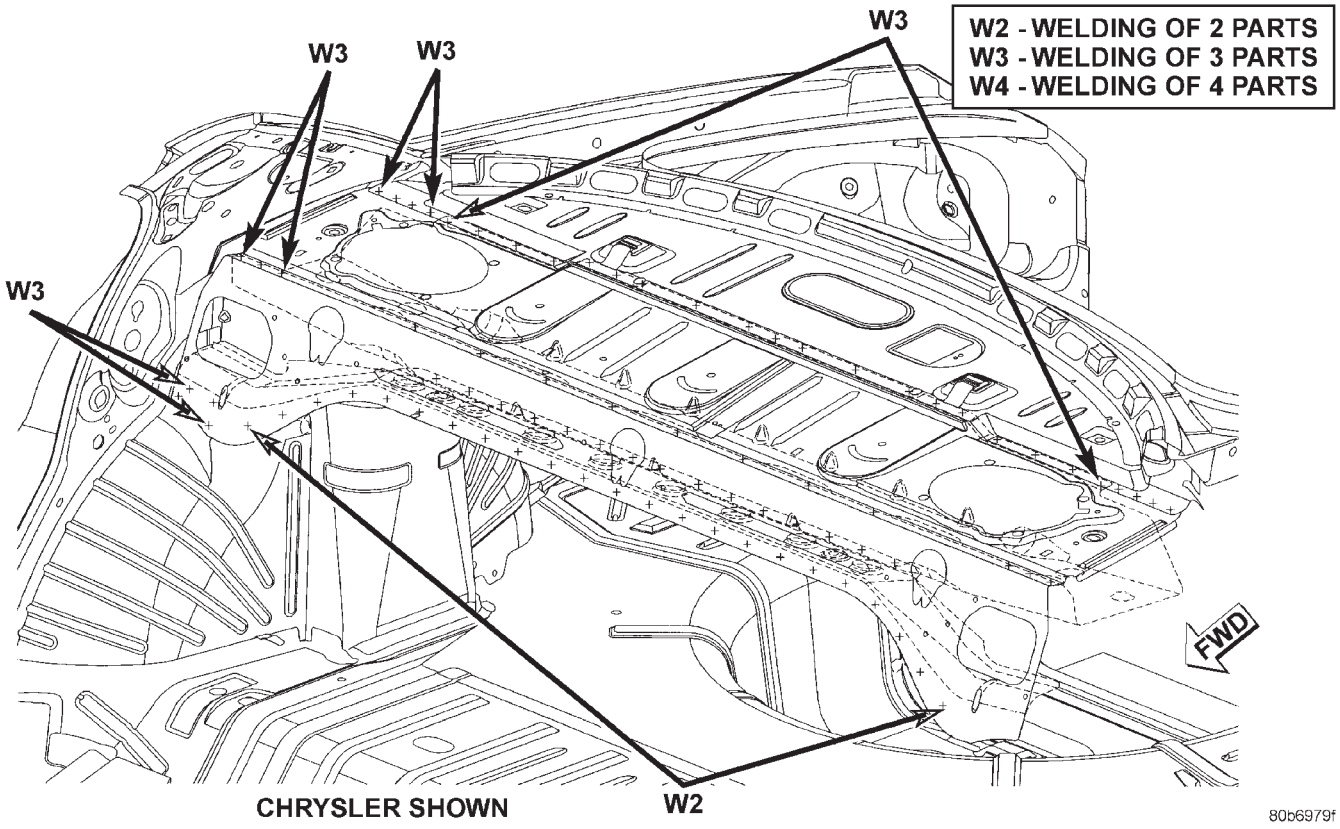
FLOOR PAN



80b6979e

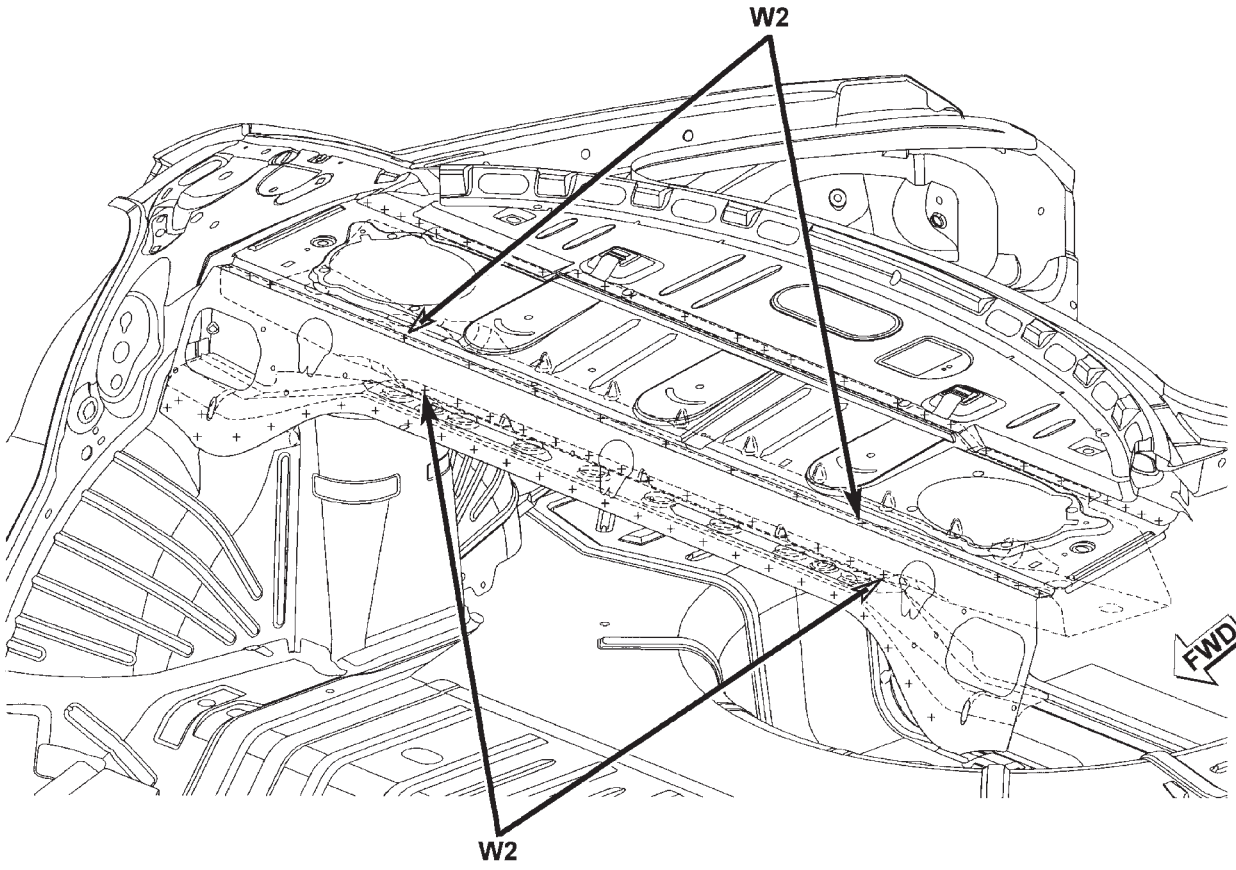
SPECIFICATIONS (Continued)

REAR SHELF



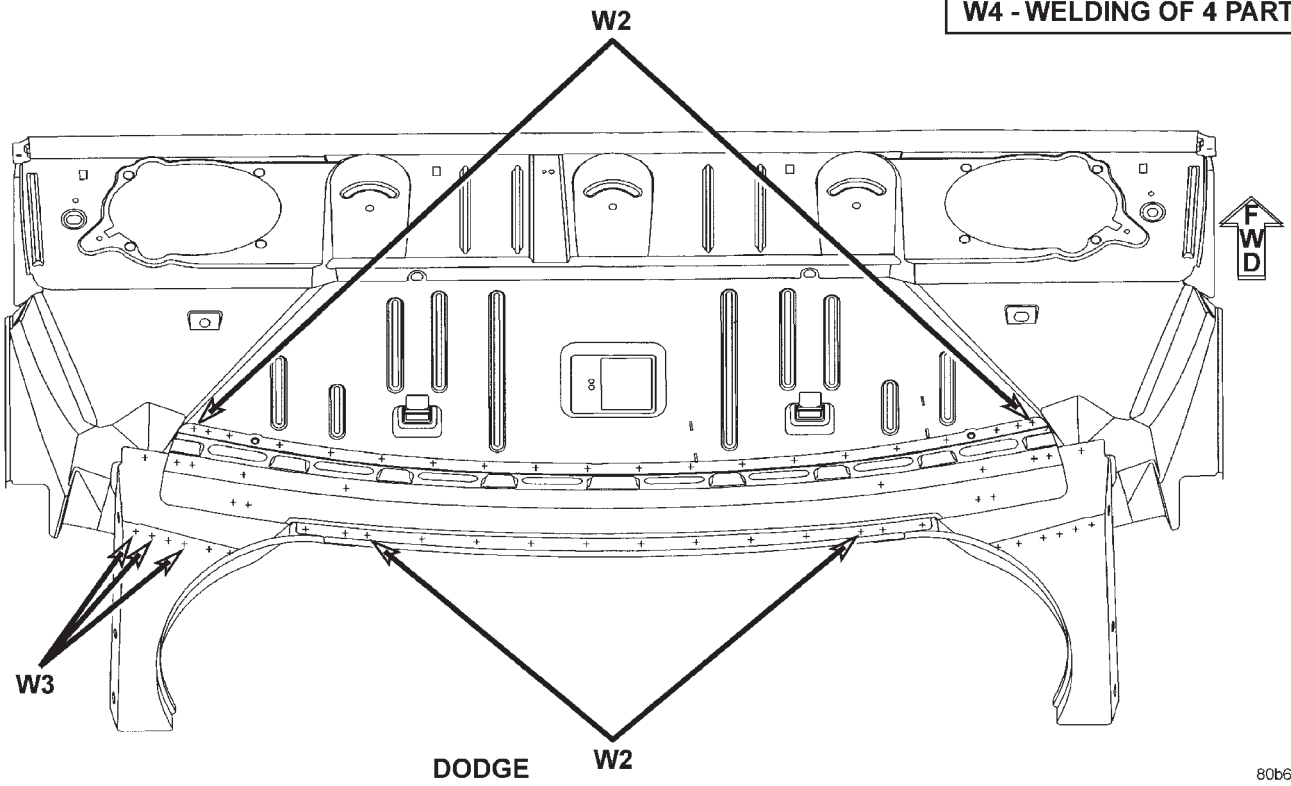
SPECIFICATIONS (Continued)

REAR SHELF



CHRYSLER SHOWN

W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

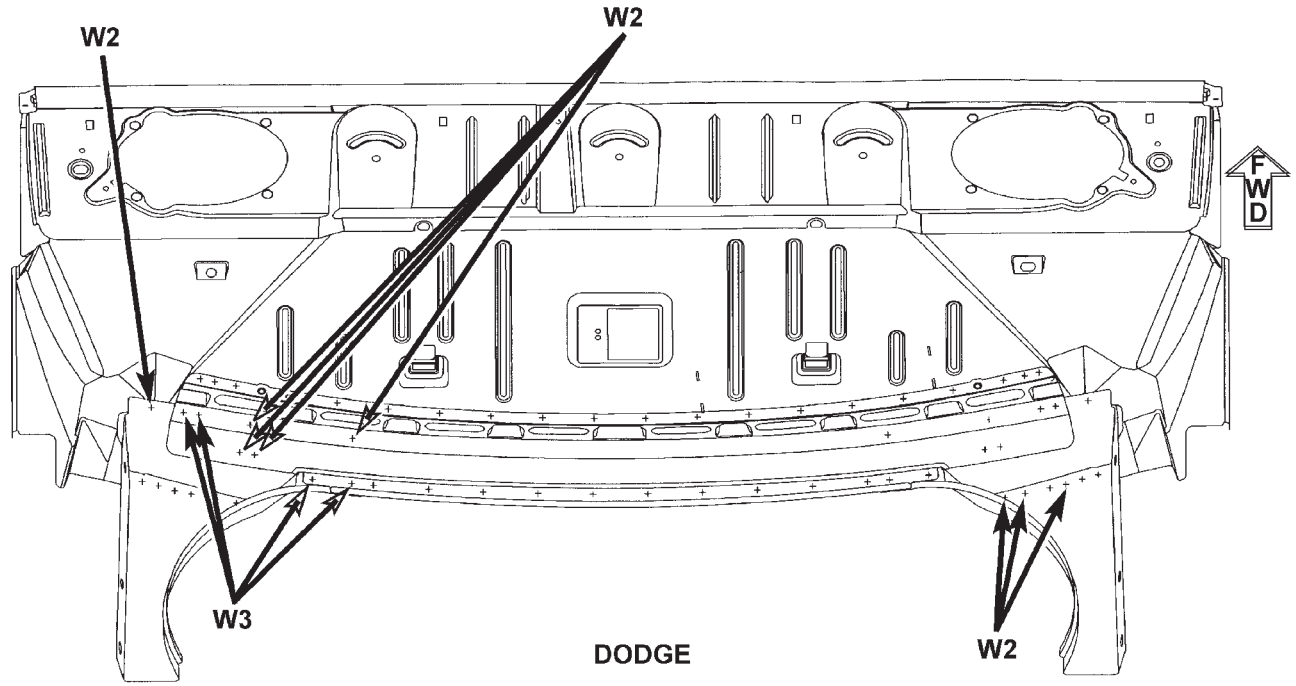


DODGE

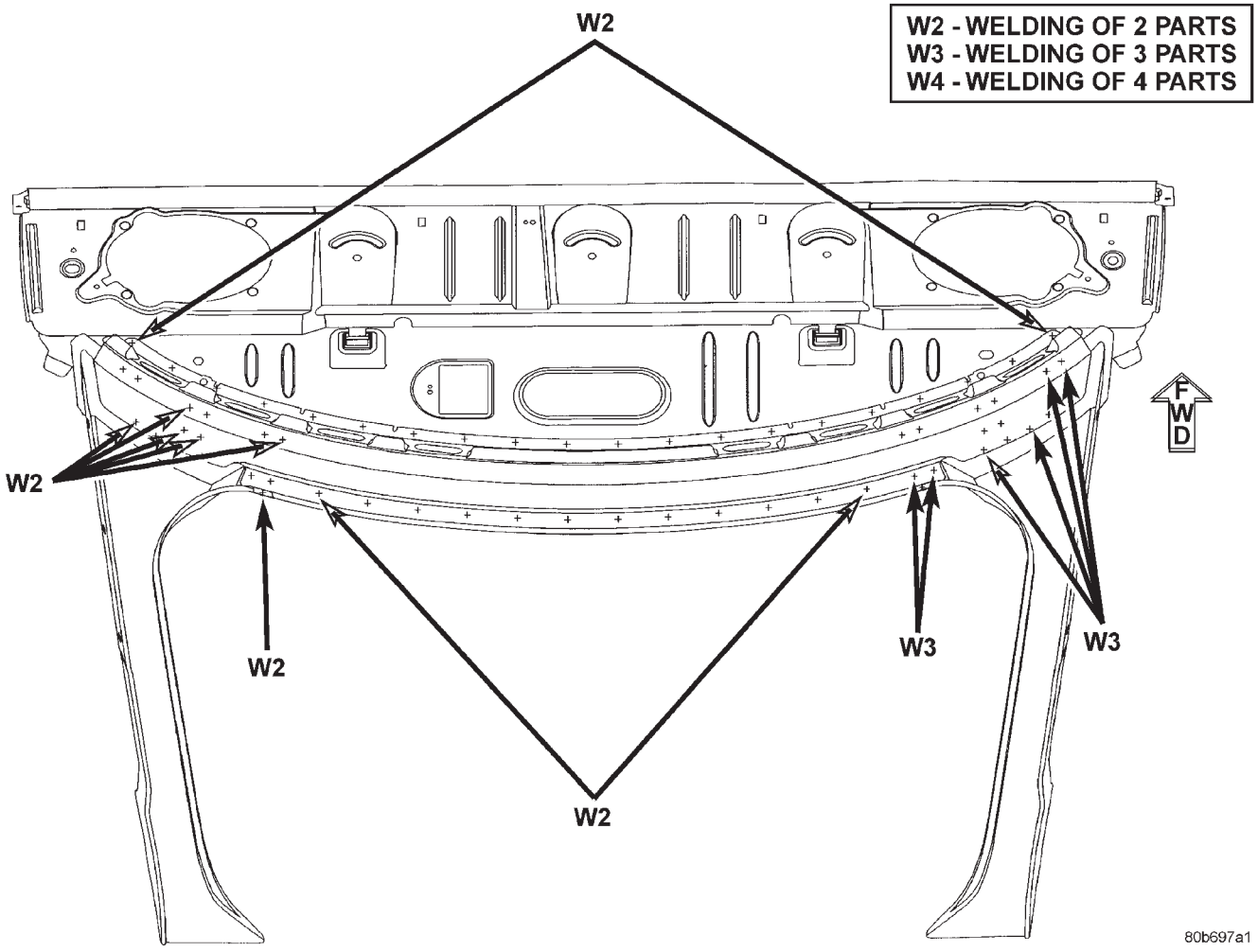
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SPECIFICATIONS (Continued)

REAR SHELF



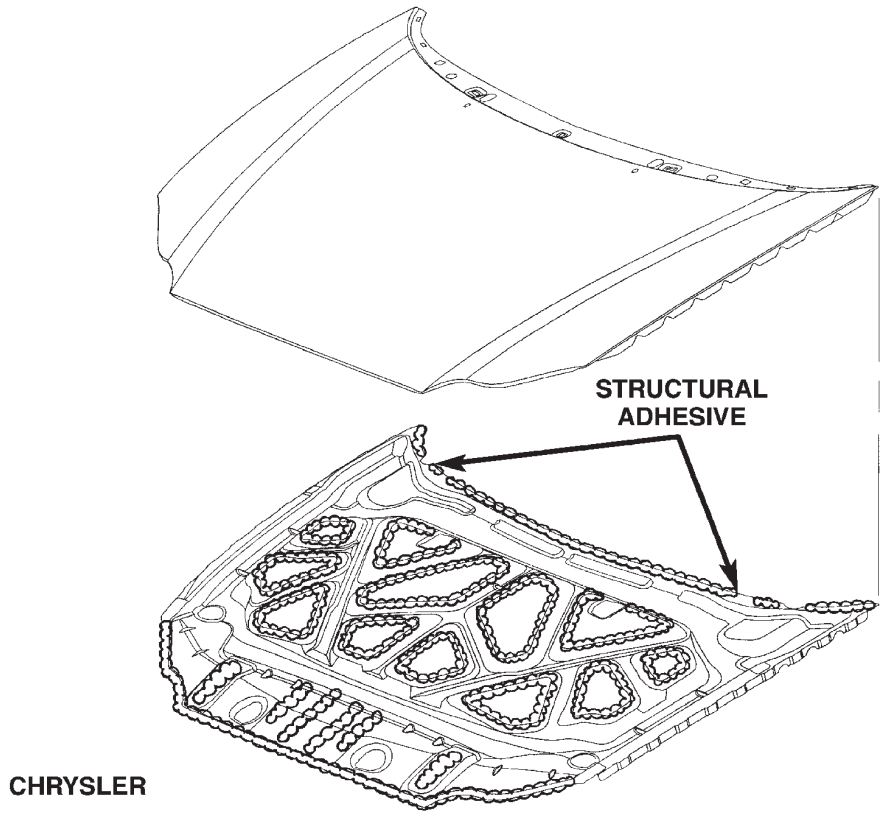
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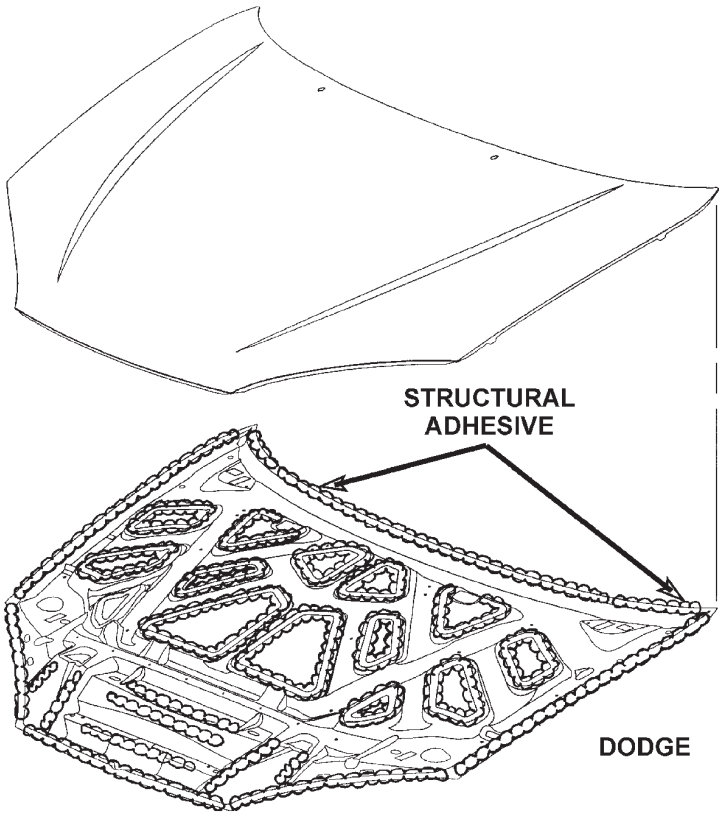
SPECIFICATIONS (Continued)

STRUCTURAL ADHESIVE LOCATIONS

HOOD – CONCORDE, LHS, AND 300M

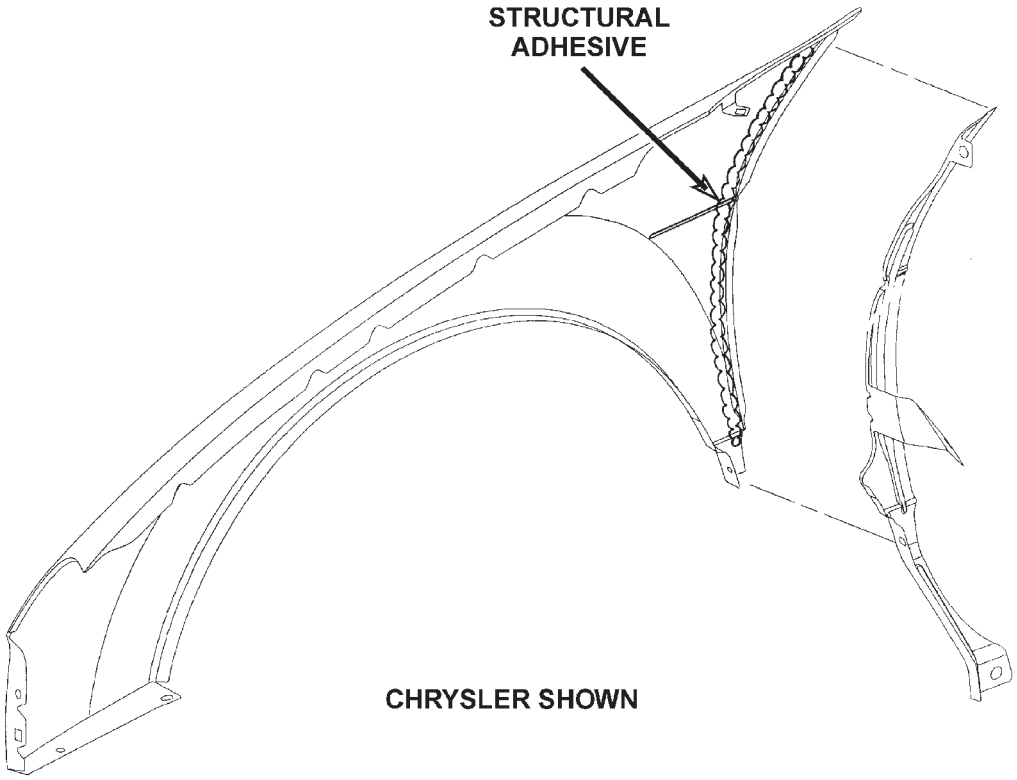


HOOD – INTREPID



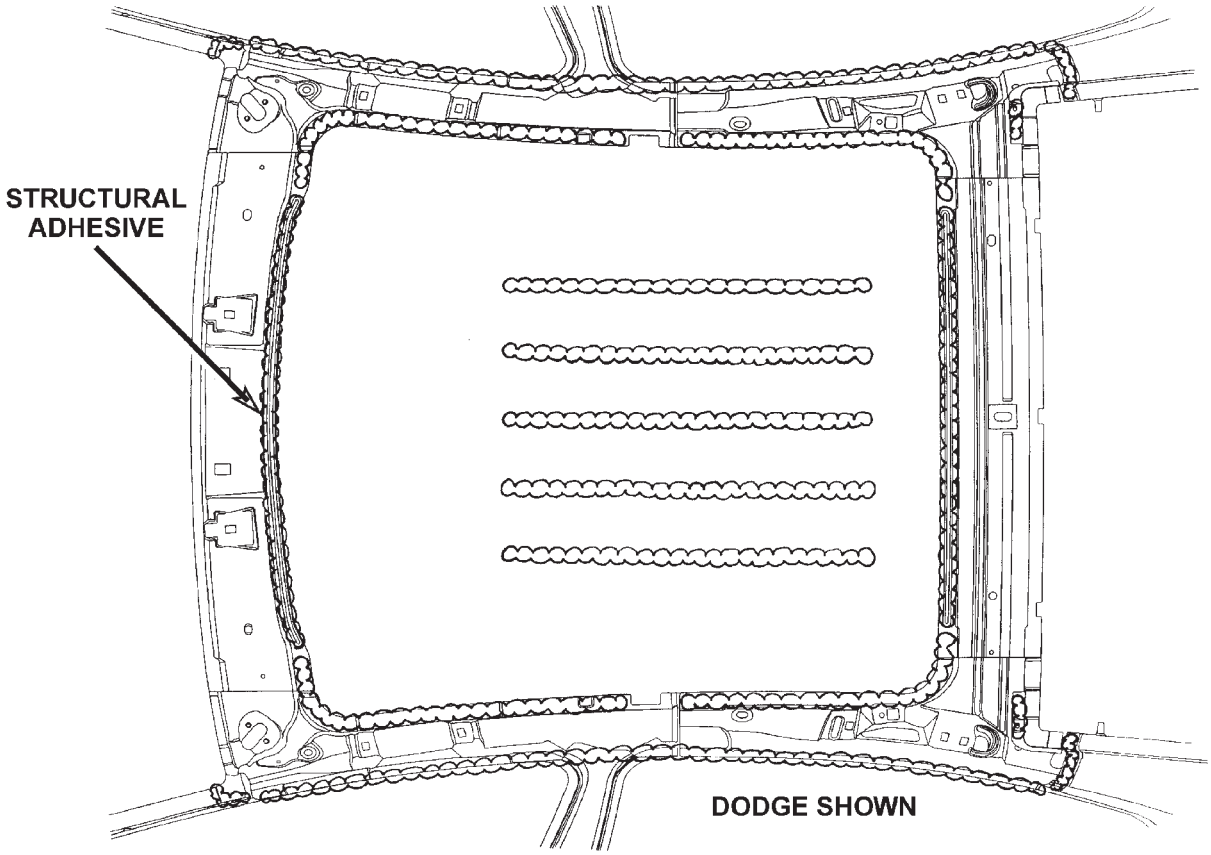
SPECIFICATIONS (Continued)

FRONT FENDER



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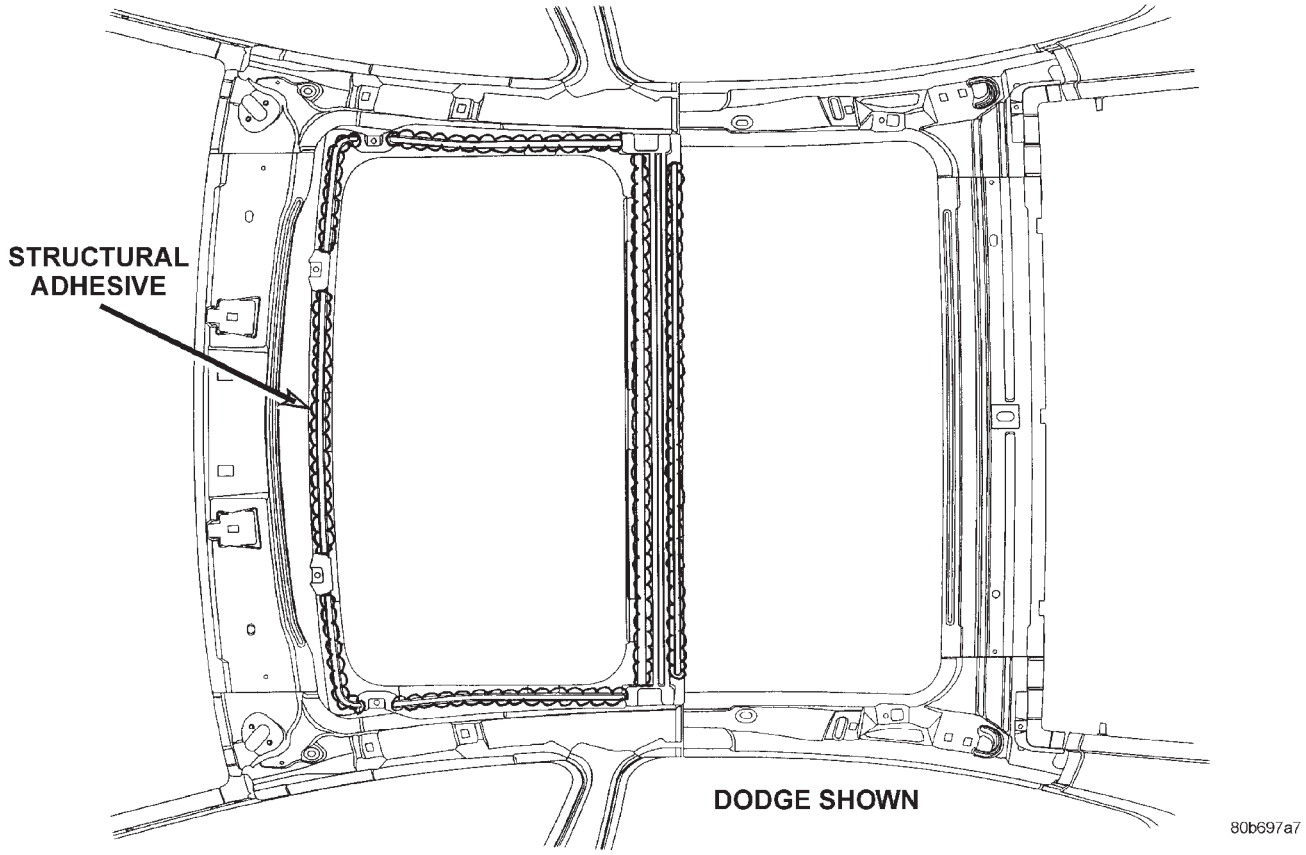
ROOF



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SPECIFICATIONS (Continued)

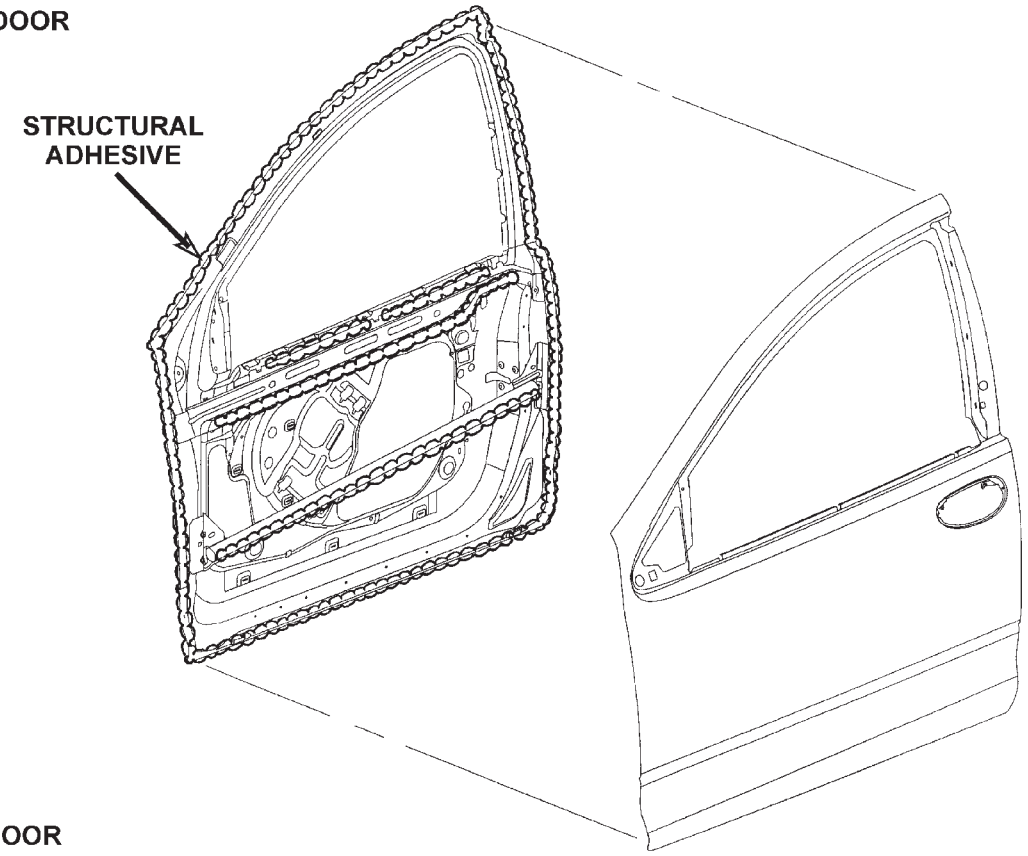
SUNROOF



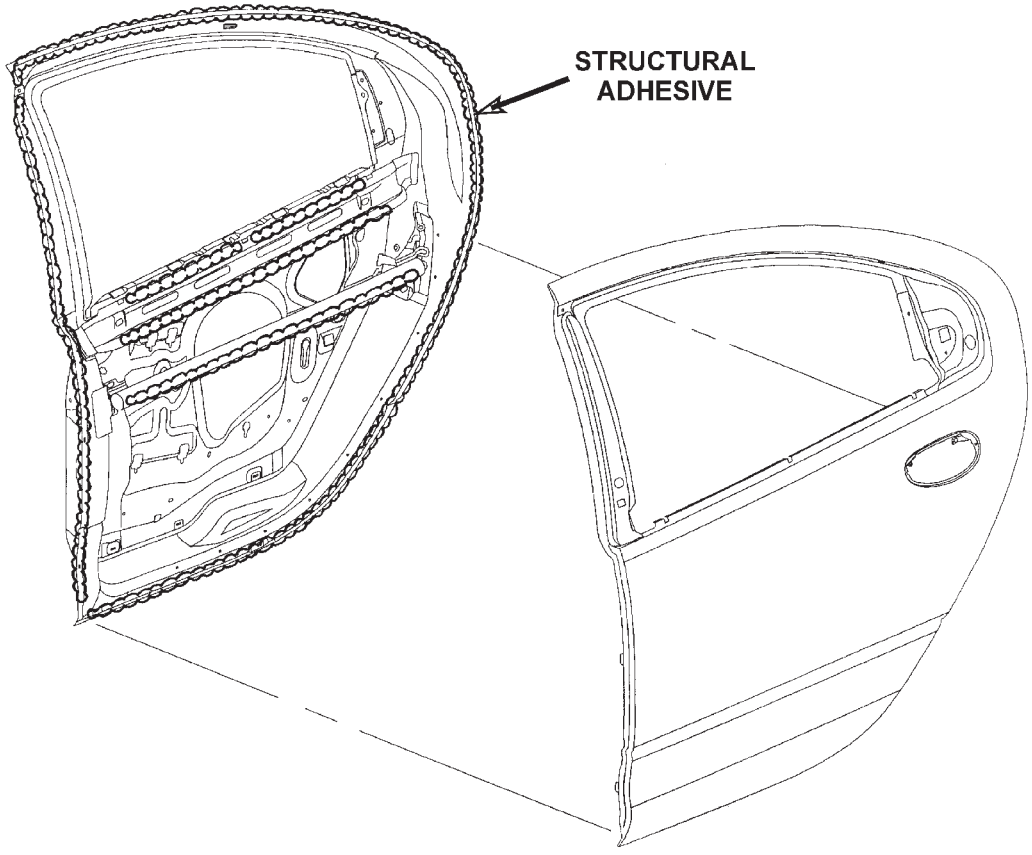
SPECIFICATIONS (Continued)

DOORS

FRONT DOOR



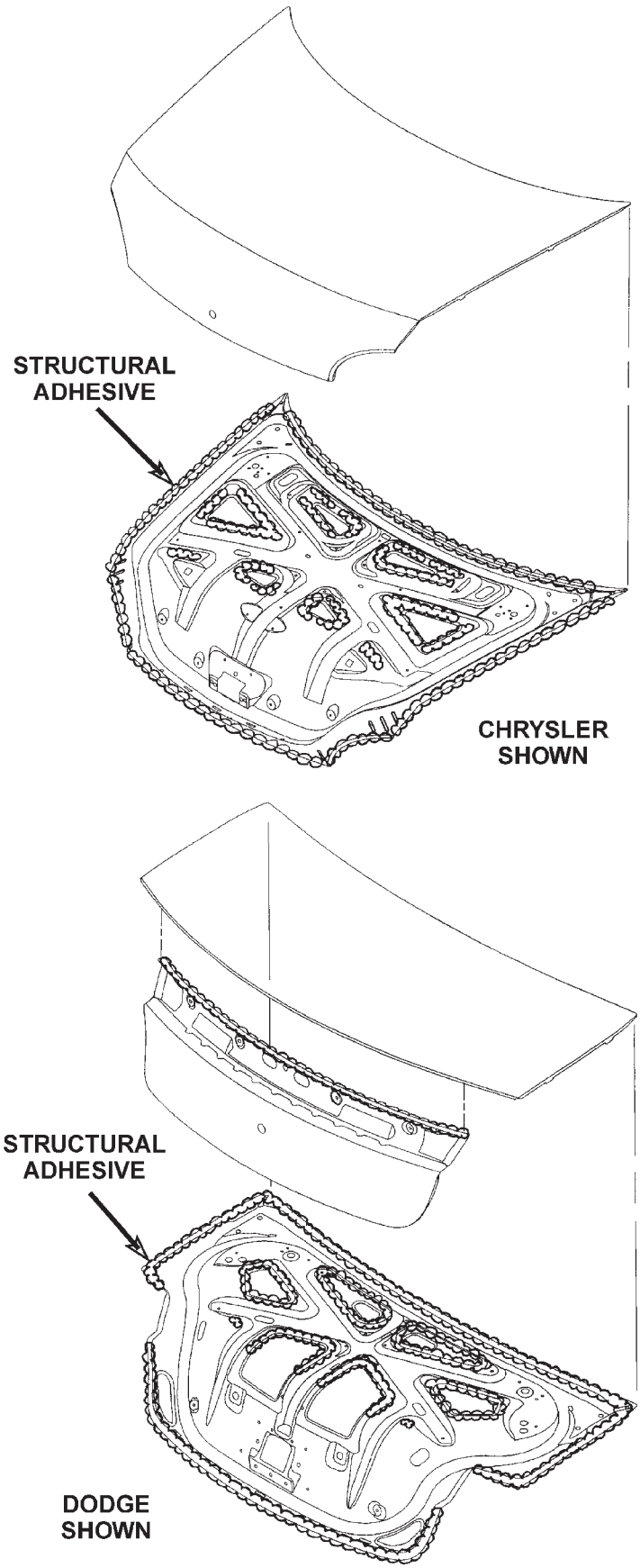
REAR DOOR



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SPECIFICATIONS (Continued)

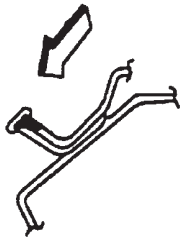
DECKLID



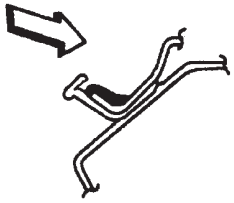
SPECIFICATIONS (Continued)

SEALER LOCATIONS

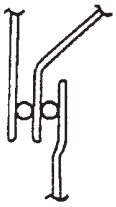
METHODS OF APPLYING AUTO BODY SEALANT



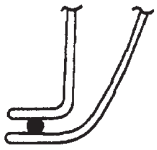
HOLD GUN NOZZLE IN DIRECTION OF ARROW IN ORDER TO EFFECTIVELY SEAL METAL JOINTS.



DO NOT HOLD GUN NOZZLE IN DIRECTION OF ARROW. SEALER APPLIED AS SHOWN IN INEFFECTIVE.



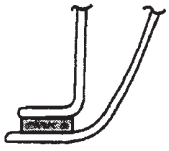
3 METAL THICKNESS



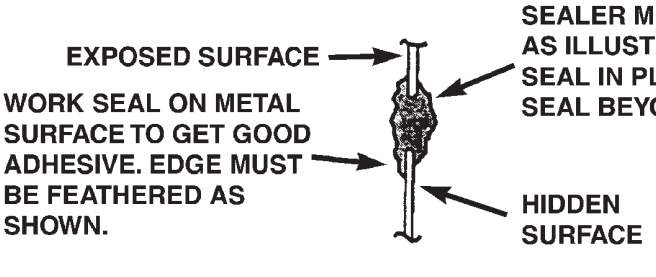
2 METAL THICKNESS

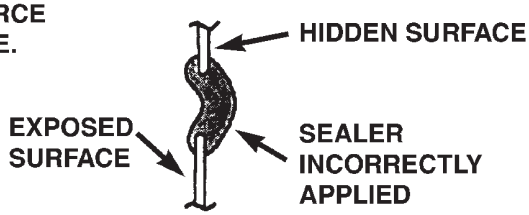


3 METAL THICKNESS



2 METAL THICKNESS





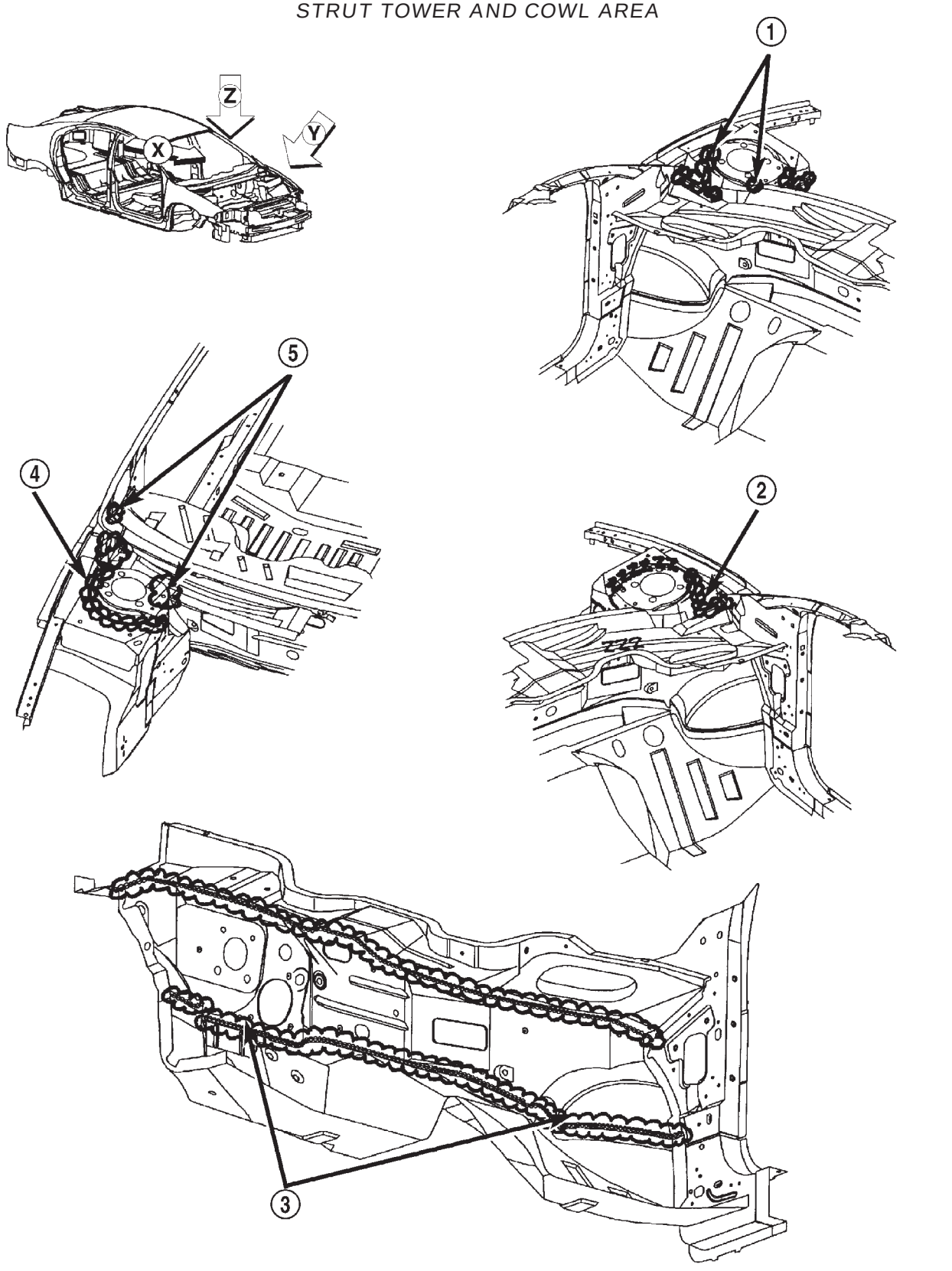
SYMBOLS

	THUMBGRADEABLE SEALER
	EXTRUDABLE THERMOPLASTIC
	EXPOSED THERMOPLASTIC SEALANT
zzzzzzzz	HIDDEN SEALANT

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SPECIFICATIONS (Continued)

STRUT TOWER AND COWL AREA

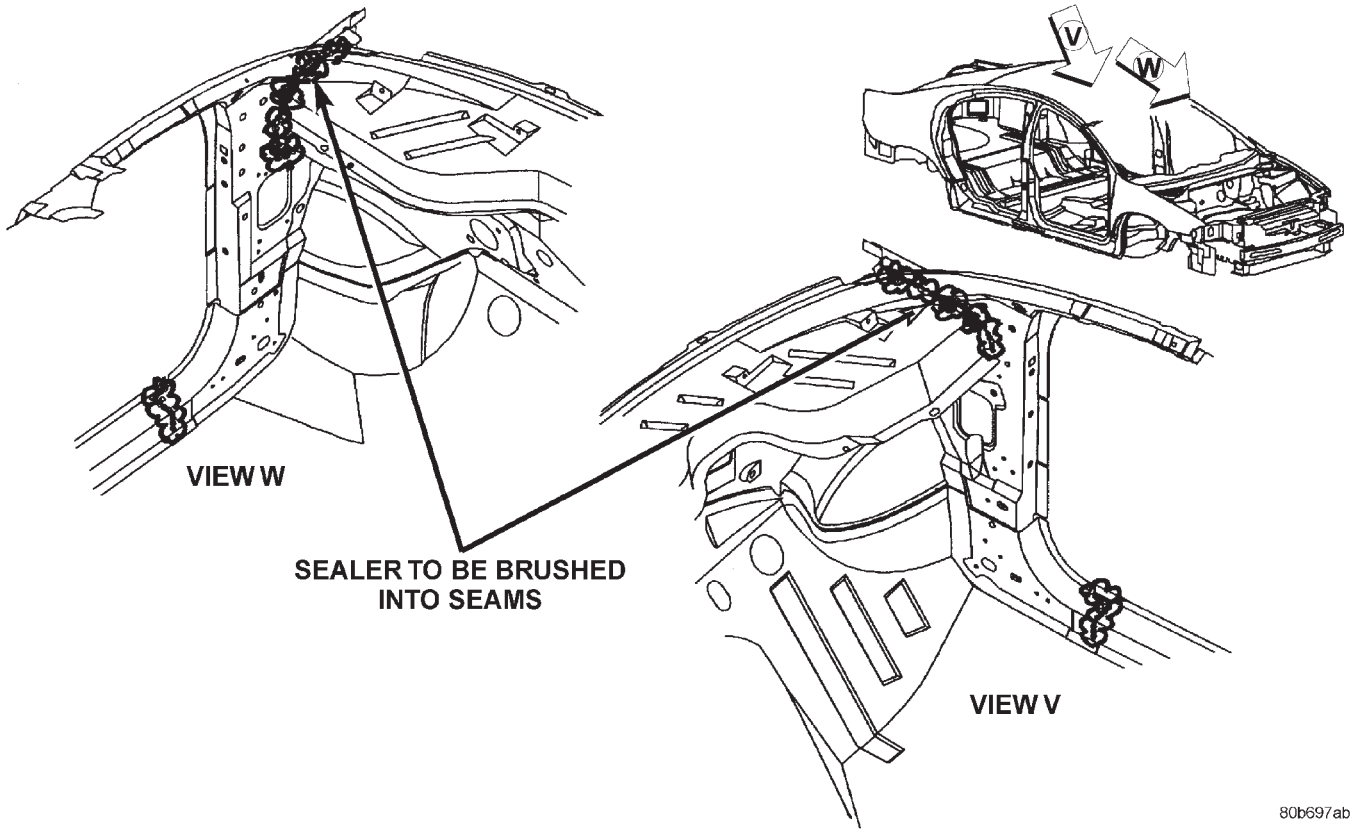


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1 – SEALER TO BE BRUSHED INTO SEAMS
2 – SEALER TO BE BRUSHED INTO SEAMS
3 – SEALER TO BE BRUSHED INTO SEAMS
4 – SEALER TO BE BRUSHED INTO SEAMS
5 – SEALER TO BE BRUSHED INTO SEAMS

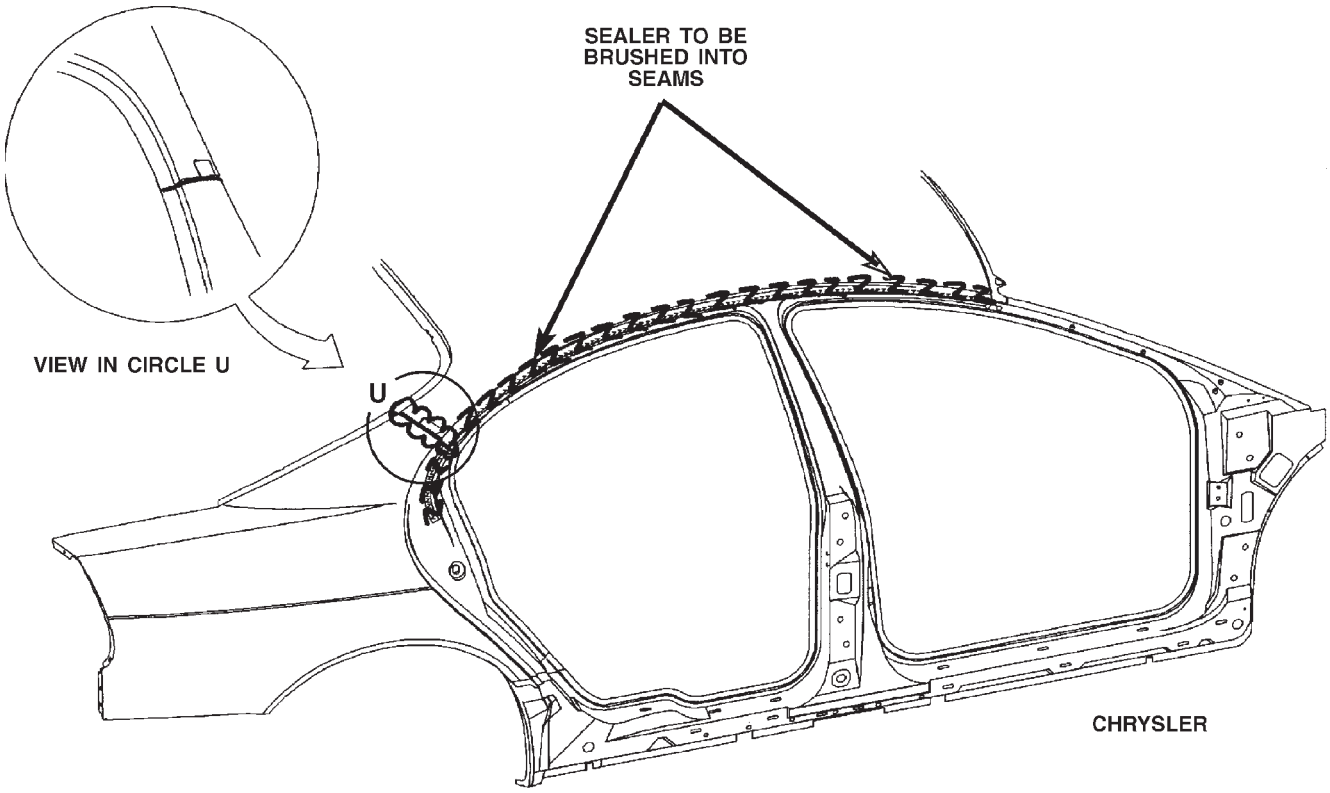
SPECIFICATIONS (Continued)

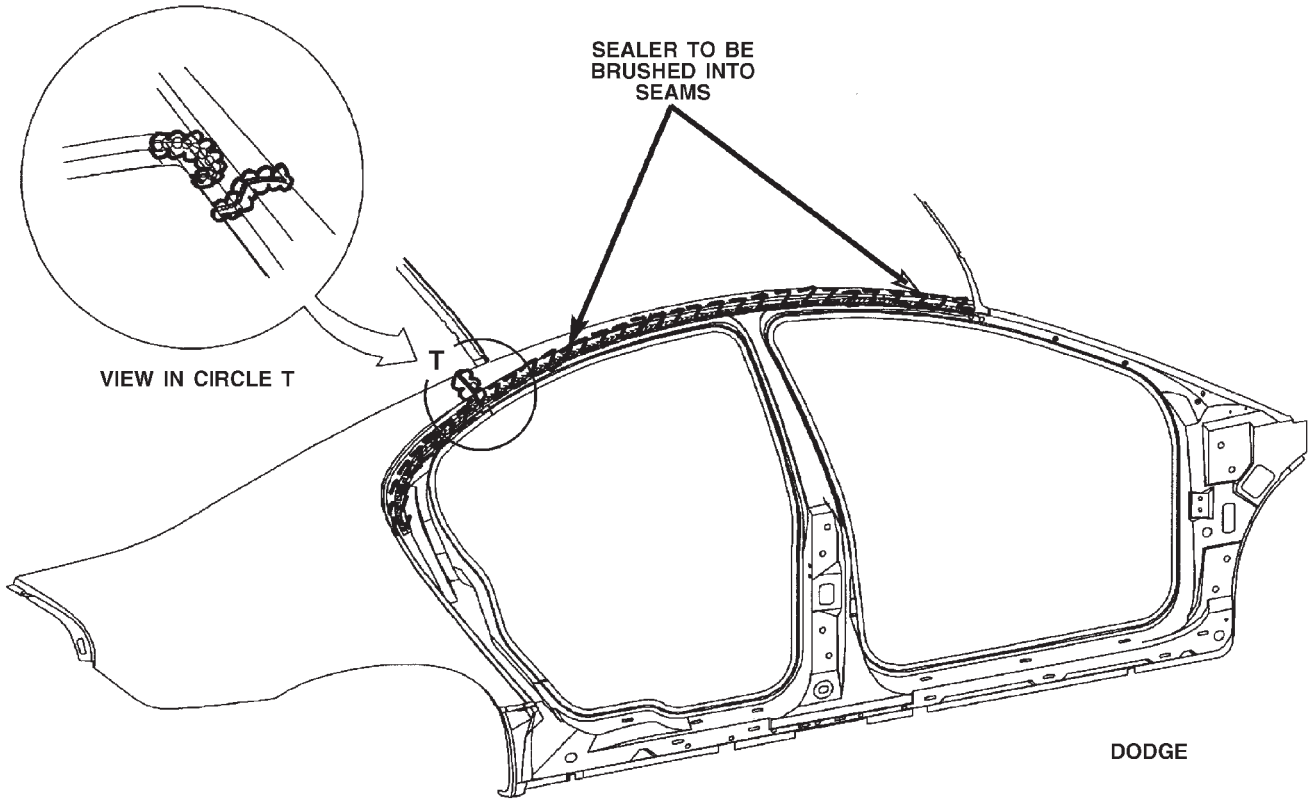
LOAD BEAM AND COWL AREA



SPECIFICATIONS (Continued)

BODY SIDE APERTURE

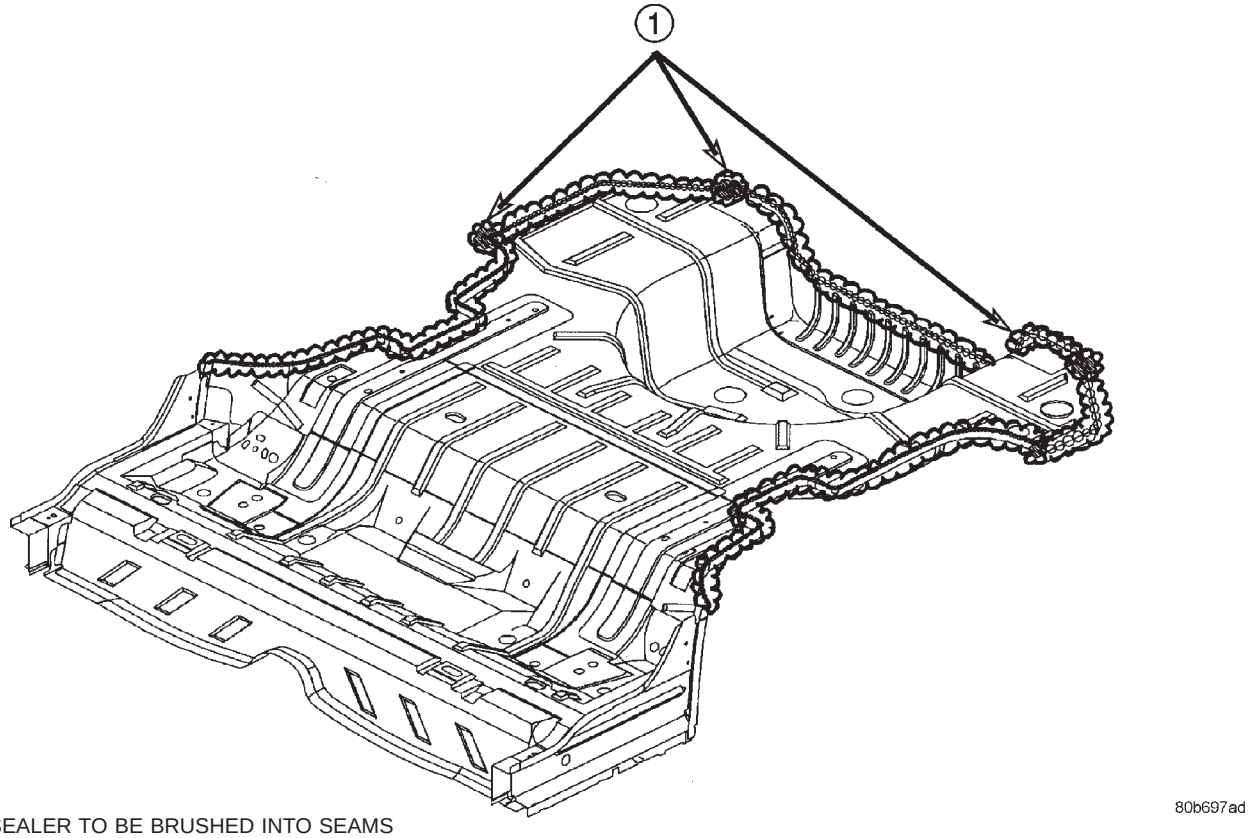




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SPECIFICATIONS (Continued)

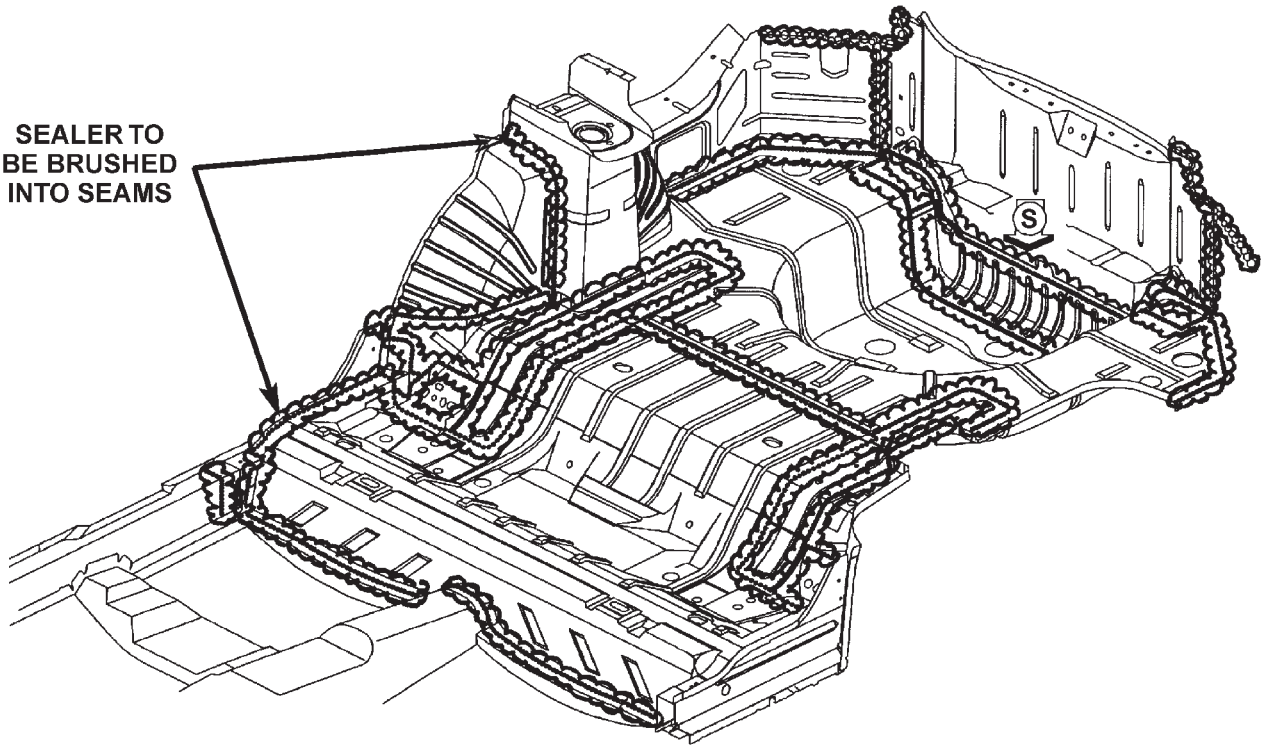
FLOOR PAN

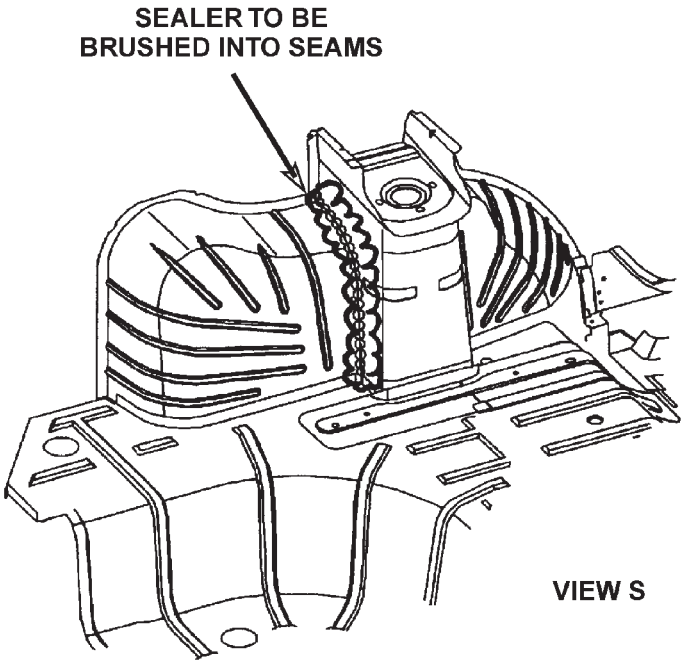


1 – SEALER TO BE BRUSHED INTO SEAMS

SPECIFICATIONS (Continued)

FLOOR PAN

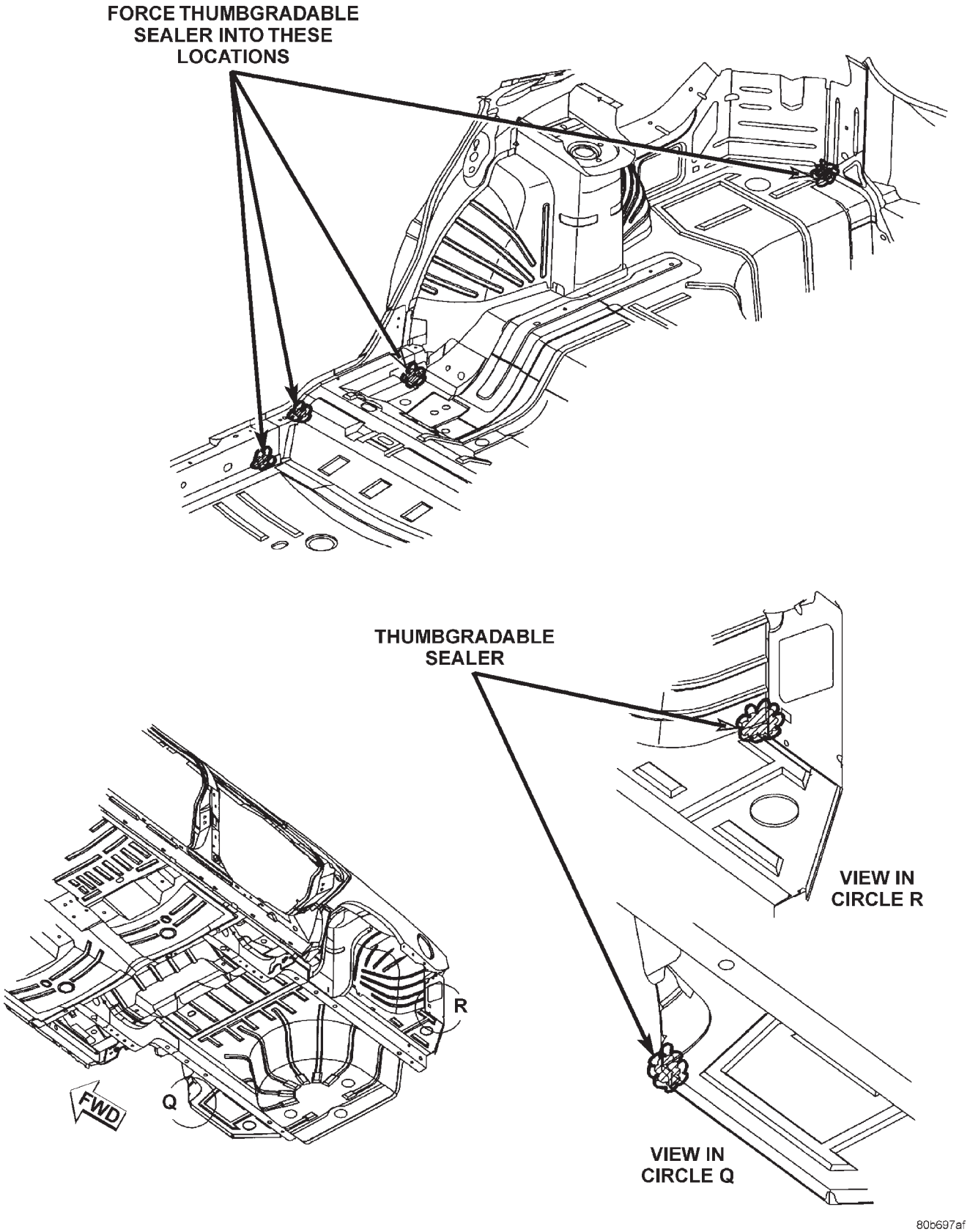




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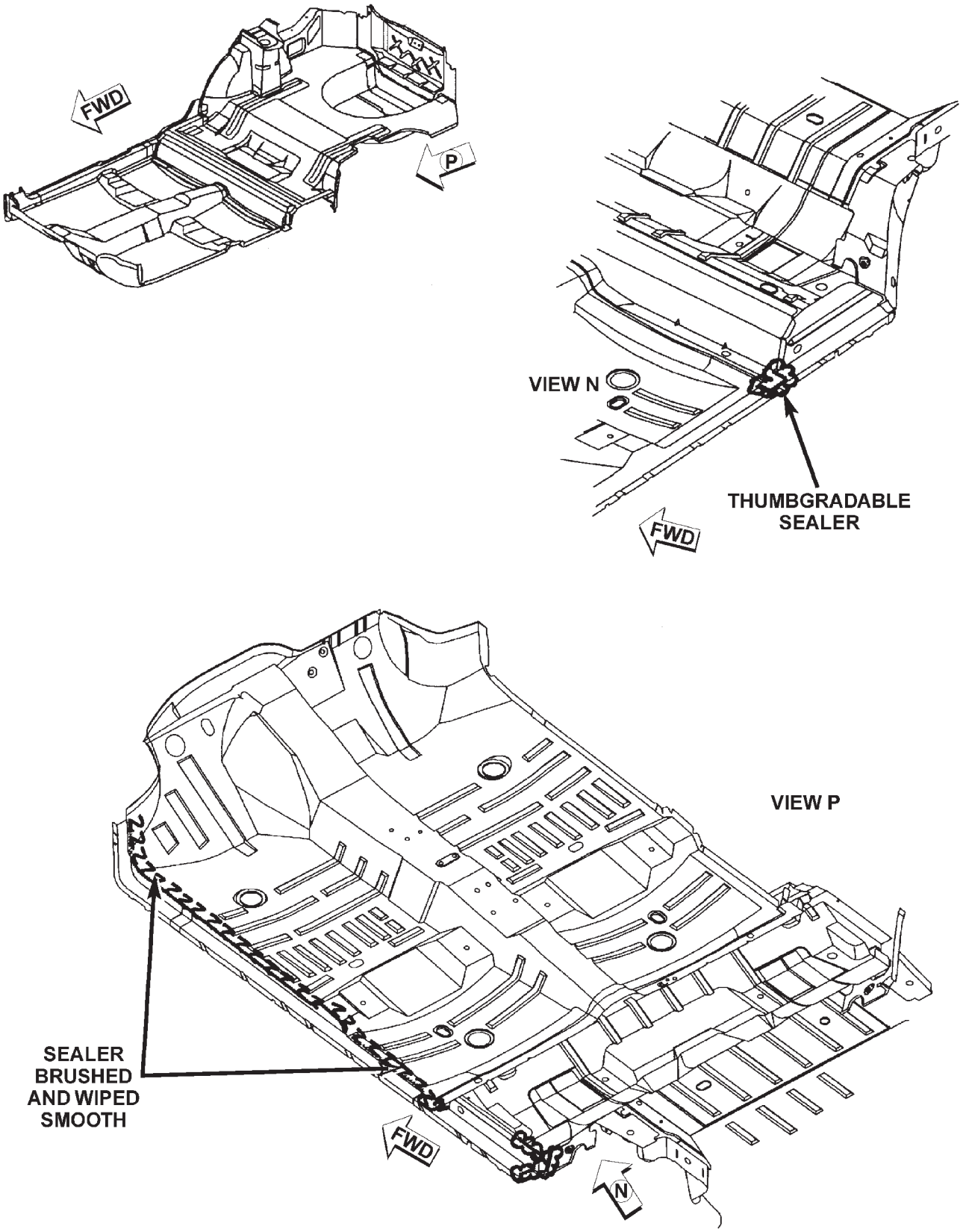
SPECIFICATIONS (Continued)

FLOOR PAN



SPECIFICATIONS (Continued)

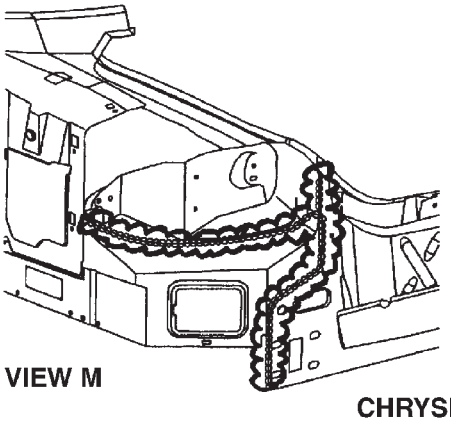
FLOOR PAN



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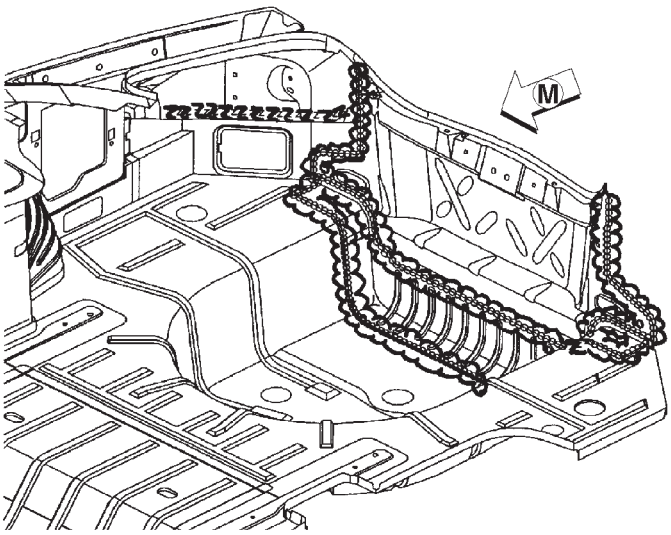
SPECIFICATIONS (Continued)

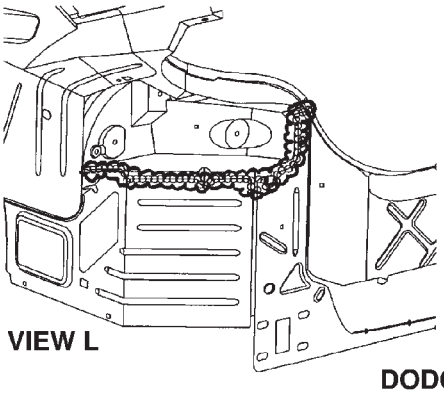
REAR TRUNK AREA



VIEW M

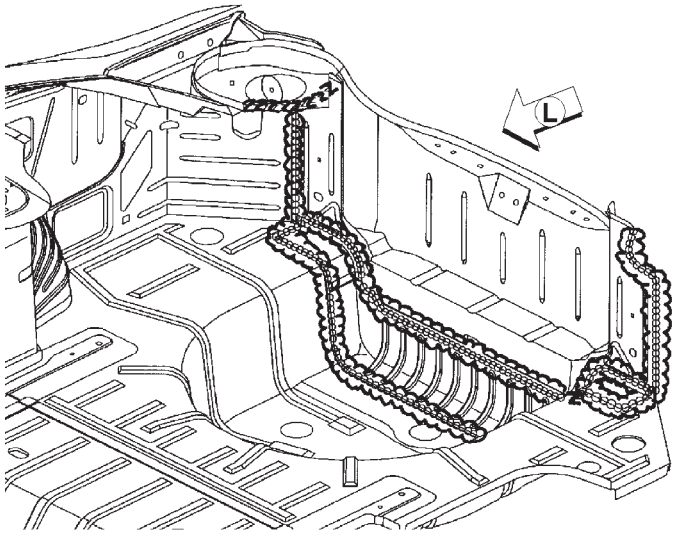
CHRYSLER





VIEW L

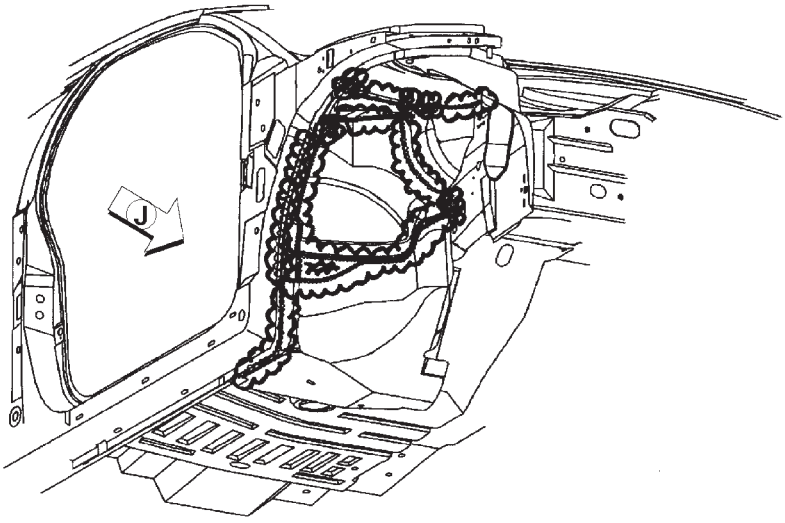
DODGE

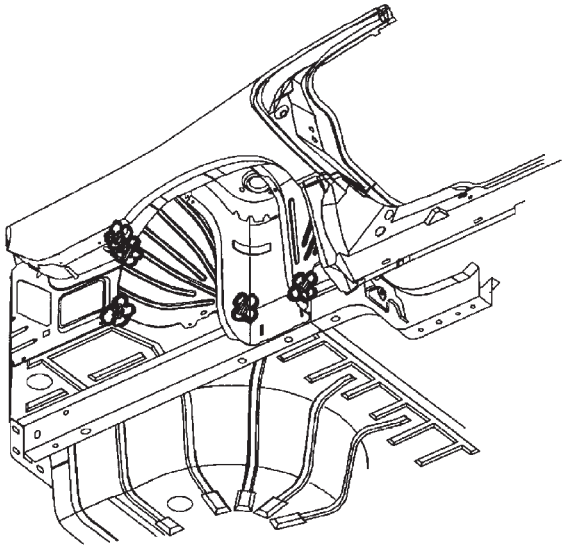


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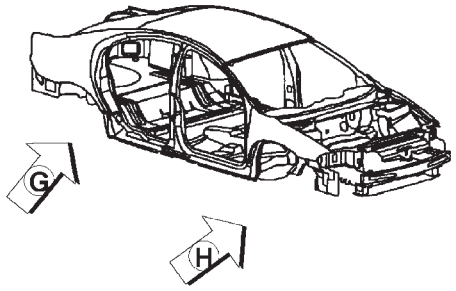
SPECIFICATIONS (Continued)

INNER WHEELHOUSE

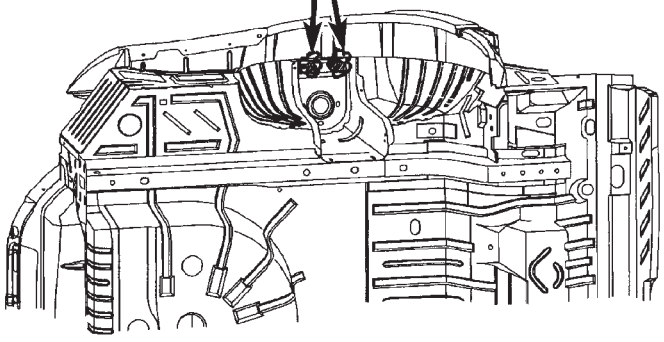




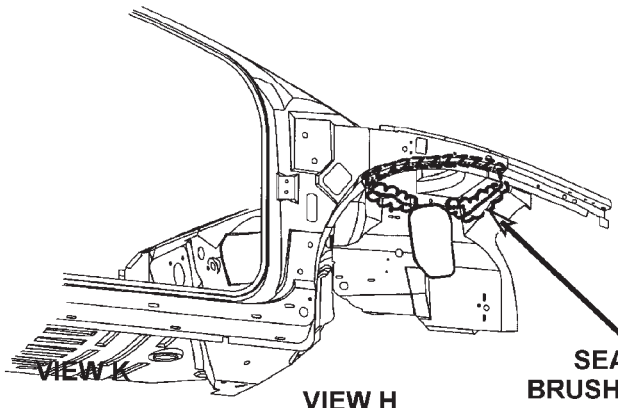
VIEW J



THUMBGRADABLE SEALER



VIEW G



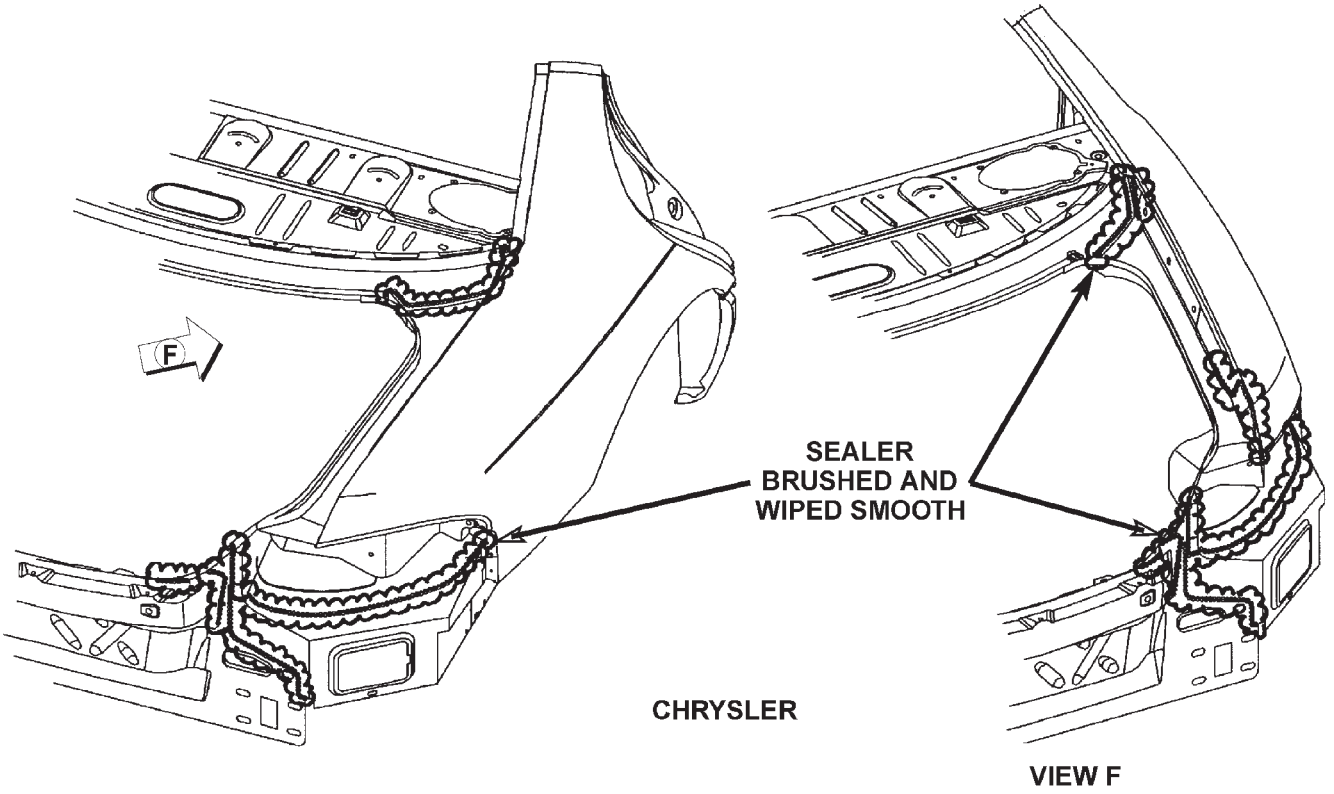
VIEW H

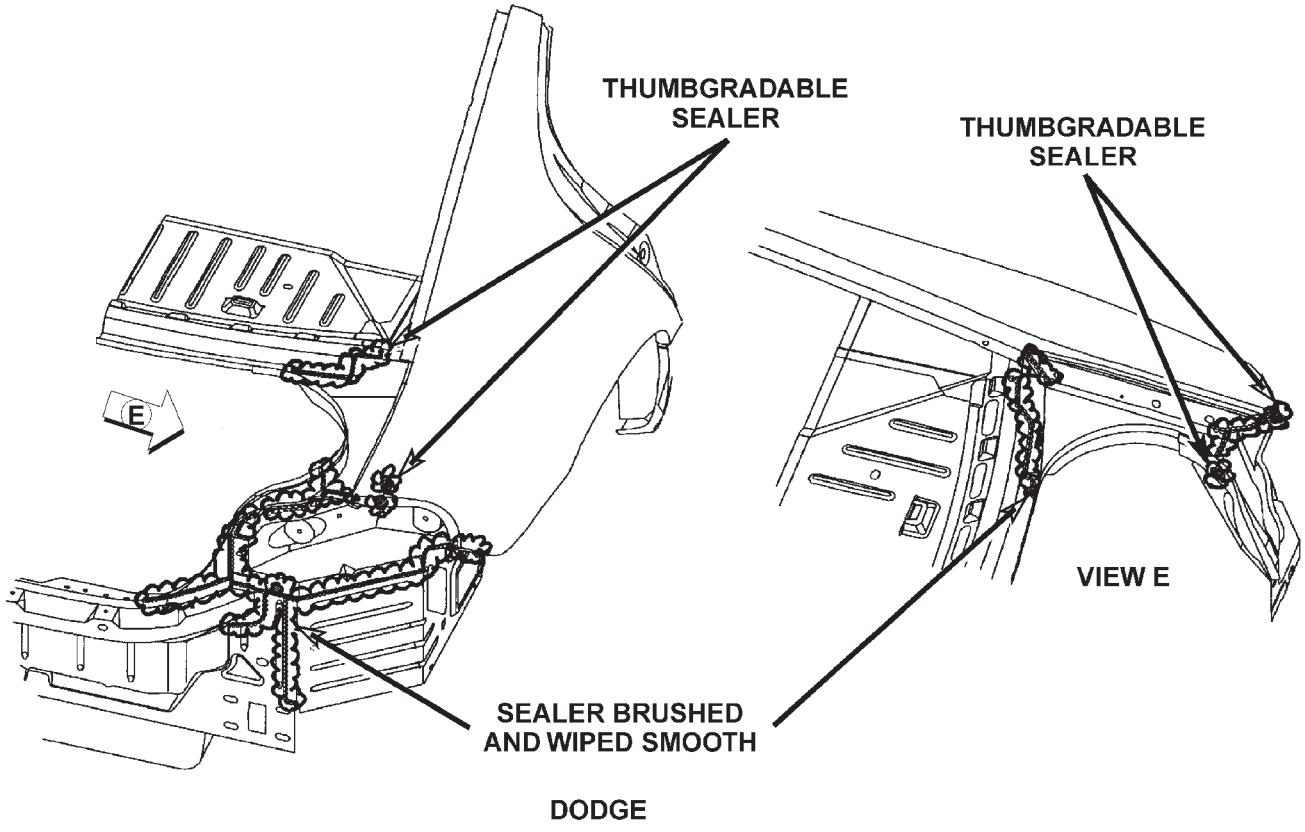
SEALER BRUSHED INTO SEAMS

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SPECIFICATIONS (Continued)

REAR QUARTER PANEL

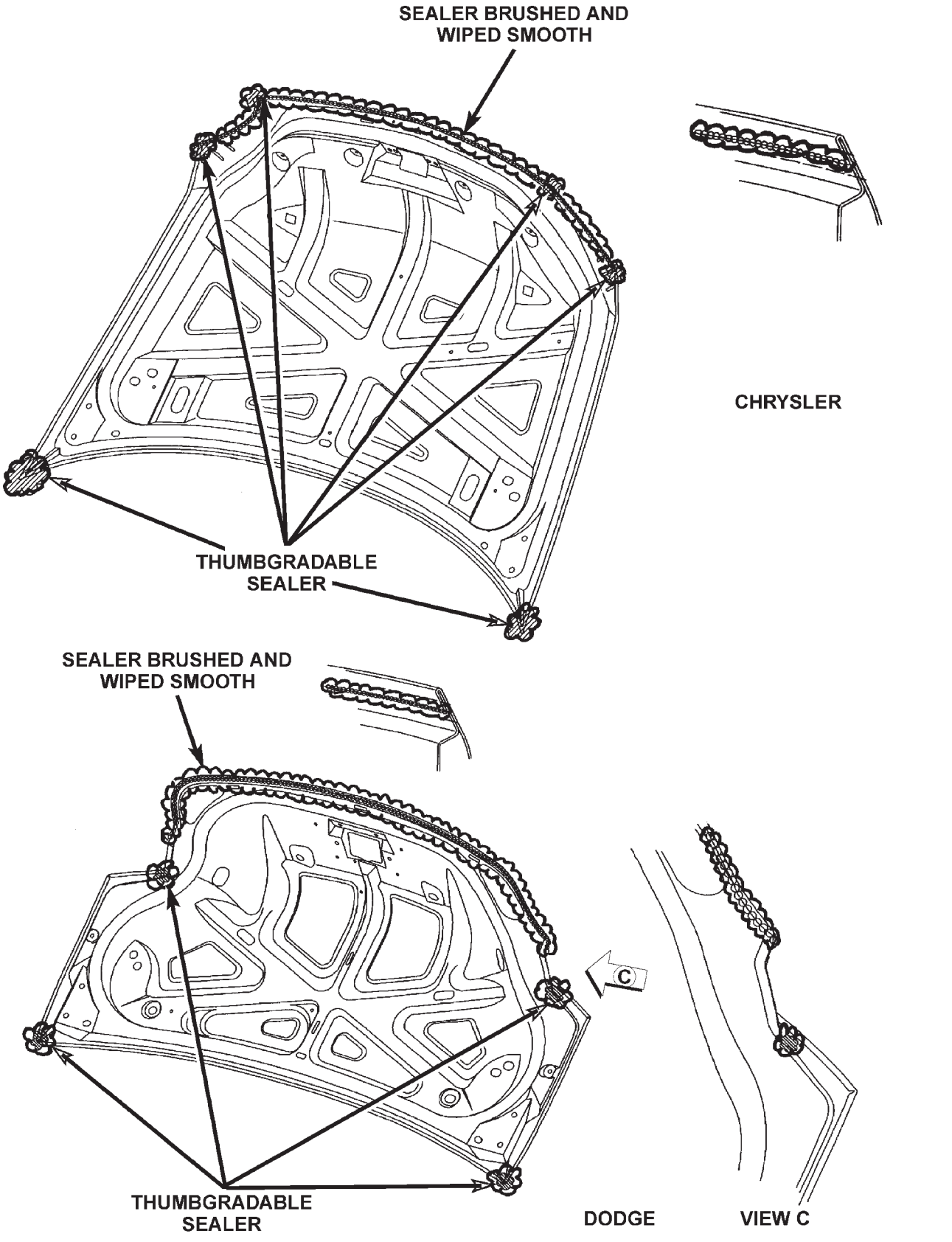




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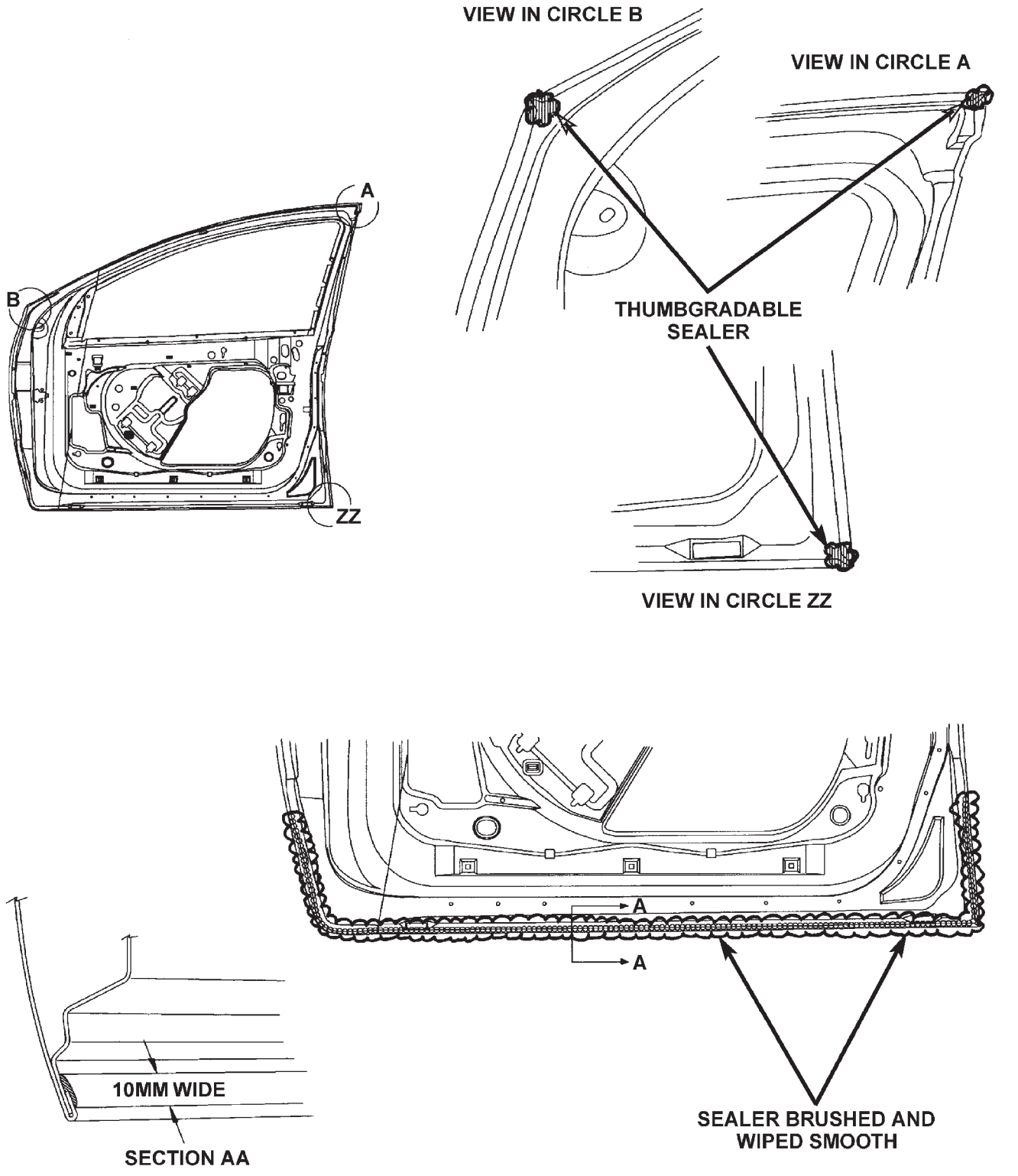
SPECIFICATIONS (Continued)

DECKLID



SPECIFICATIONS (Continued)

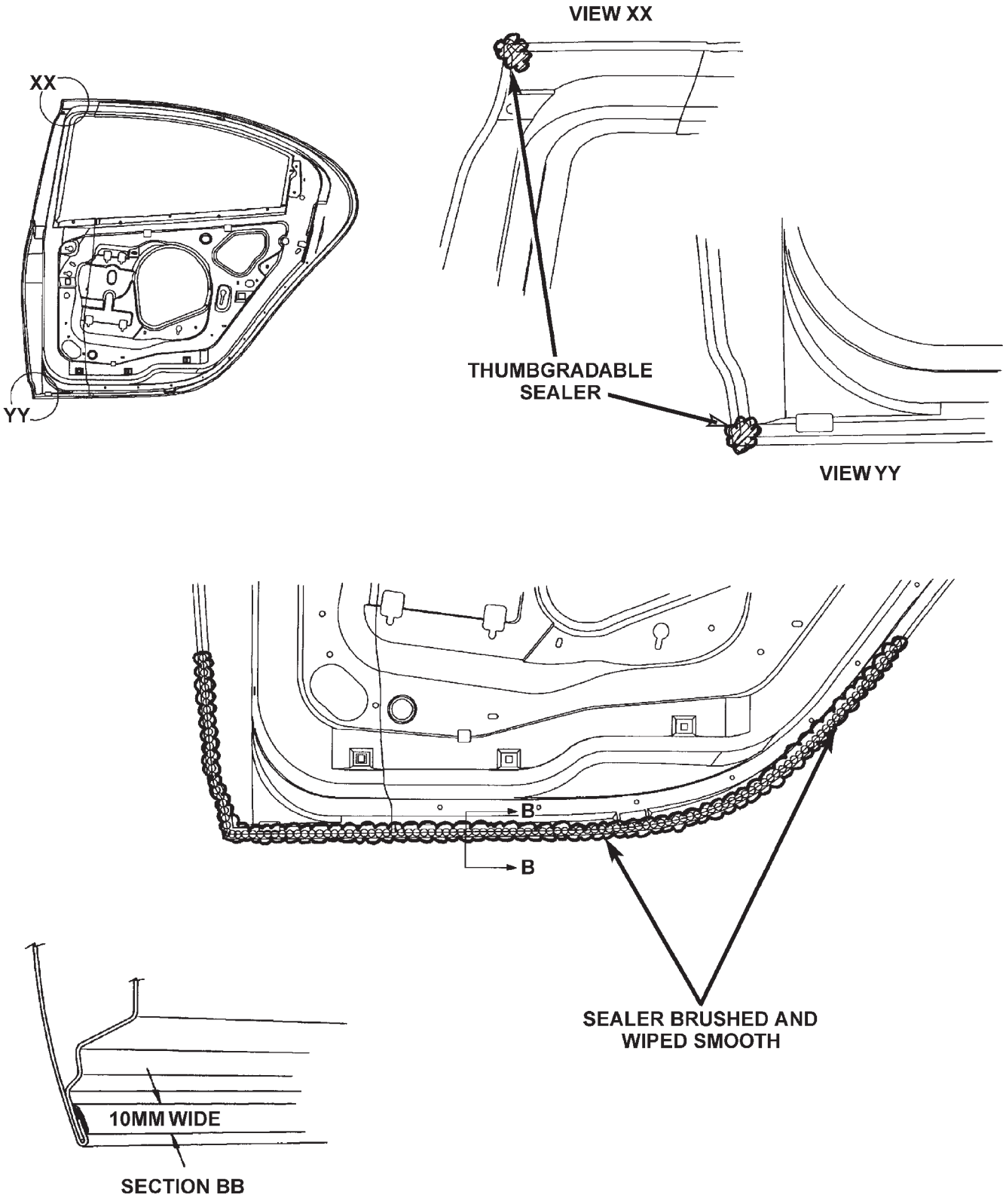
FRONT DOORS



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SPECIFICATIONS (Continued)

REAR DOORS

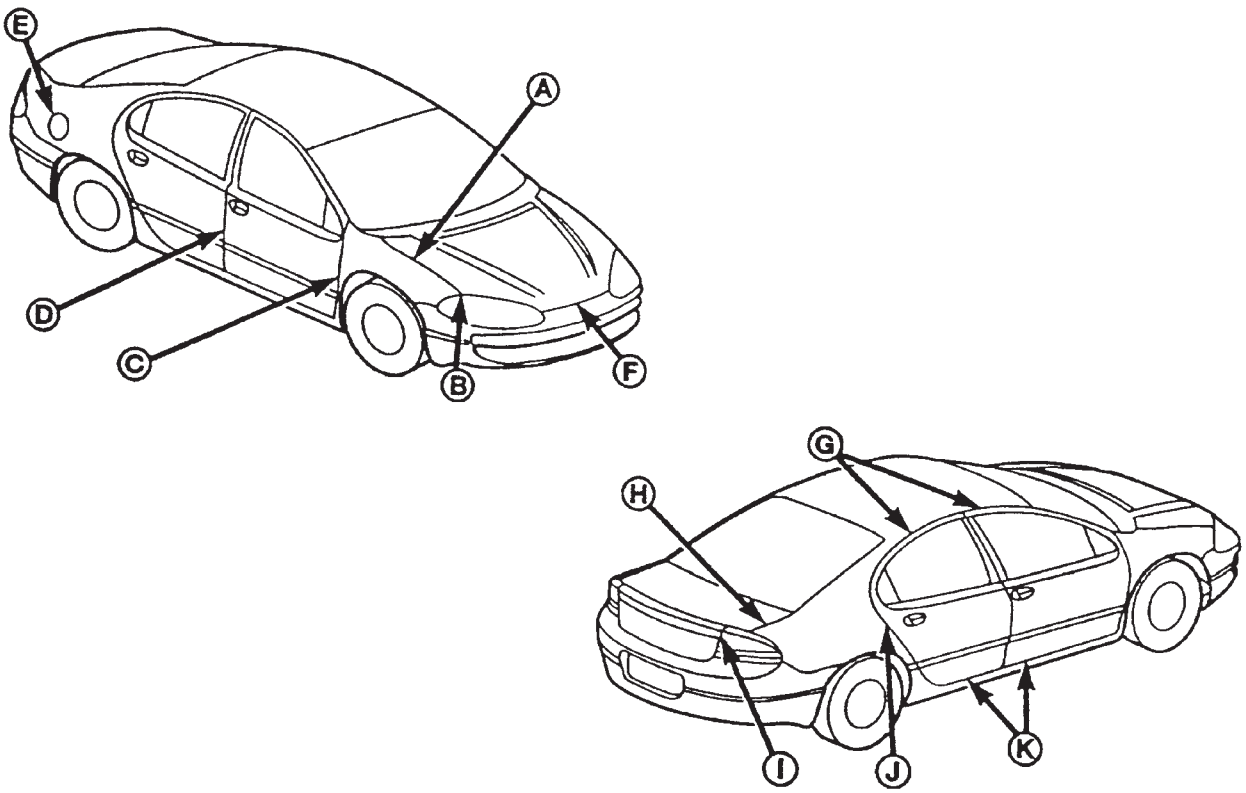


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SPECIFICATIONS (Continued)

BODY GAP AND FLUSH MEASUREMENTS

BODY GAP AND FLUSH – INTREPID

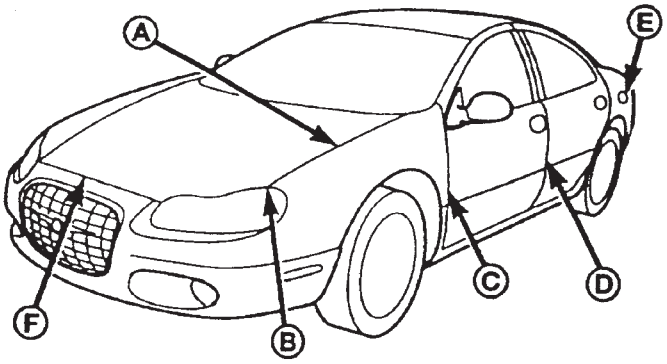


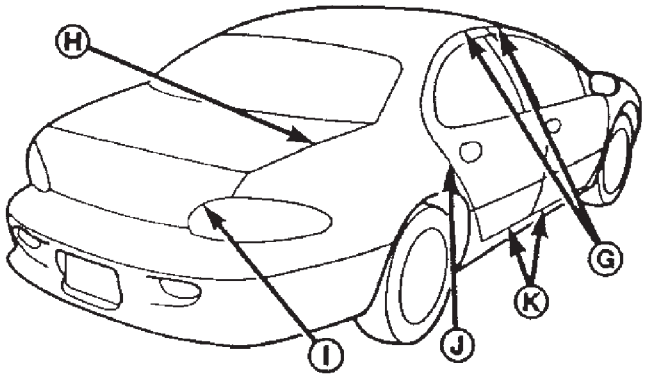
	LOCATION	GAP	FLUSH
A	Hood to Fender	4.0 +/- 1.0	0 - 1.0
B	Hood to Fender Fore and Aft	0 +/- 1.0	0 +/- 1.0
C	Front Door to Fender	5.0 +/- 1.5	0 - 1.0
D	Rear Door to Front Door	5.0 +/- 1.5	0 - 1.0
E	Fuel Filler Door to Quarter	3.0 +/- 0.75	0 - 1.0
F	Fascia to Hood	5.0 +/- 2.5	0 - 1.5
G	Front and Rear Door to Roof	5.0 +/- 2.5	0 +/- 2.0
H	Deck Lid to Quarter Panel	4.0 +/- 1.5	0 +/-1.5
I	Taillamp to Applique and Deck Lid	5.0 +/- 1.5	0 +/- 2.0
J	Rear Door to Quarter Panel	5.0 +/- 1.5	0 - 1.0
K	Front Rear Door to Sill	7.0 +/- 2.0	0 - 2.0

NOTE: ALL MEASUREMENTS ARE IN MM.

SPECIFICATIONS (Continued)

BODY GAP AND FLUSH – CONCORDE, LHS, AND 300M





	LOCATION	GAP	FLUSH
A	Hood to Fender	4.0 +/- 1.5	0 +/- 1.5
B	Hood to Fender Fore and Aft	0 +/- 1.0	0 +/- 2.0
C	Front Door to Fender	5.0 +/- 1.5	0 - 1.0
D	Rear Door to Front Door	5.0 +/- 1.5	0 - 1.0
E	Fuel Filler Door to Quarter	3.0 +/- 0.75	0 - 1.5
F	Fascia to Hood	5.0 +/- 1.5	1.0 +/- 1.5
G	Front and Rear Door to Roof	5.0 +/- 1.5	0 - 1.0
H	Deck Lid to Quarter Panel	4.0 +/- 1.5	0 +/-1.0
I	Taillamp to Applique and Deck Lid	5.0 +/- 1.5	NA
J	Rear Door to Quarter Panel	5.0 +/- 1.5	0 - 1.0

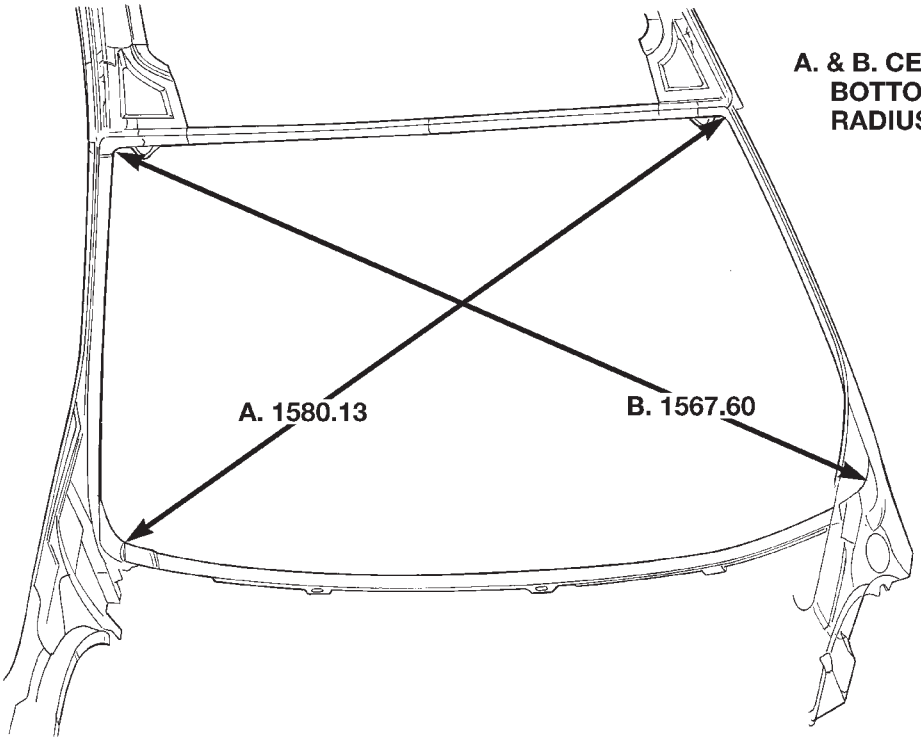
NOTE: ALL MEASUREMENTS ARE IN MM.

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SPECIFICATIONS (Continued)

BODY OPENING DIMENSION

WINDSHIELD AND FRONT DOOR OPENINGS

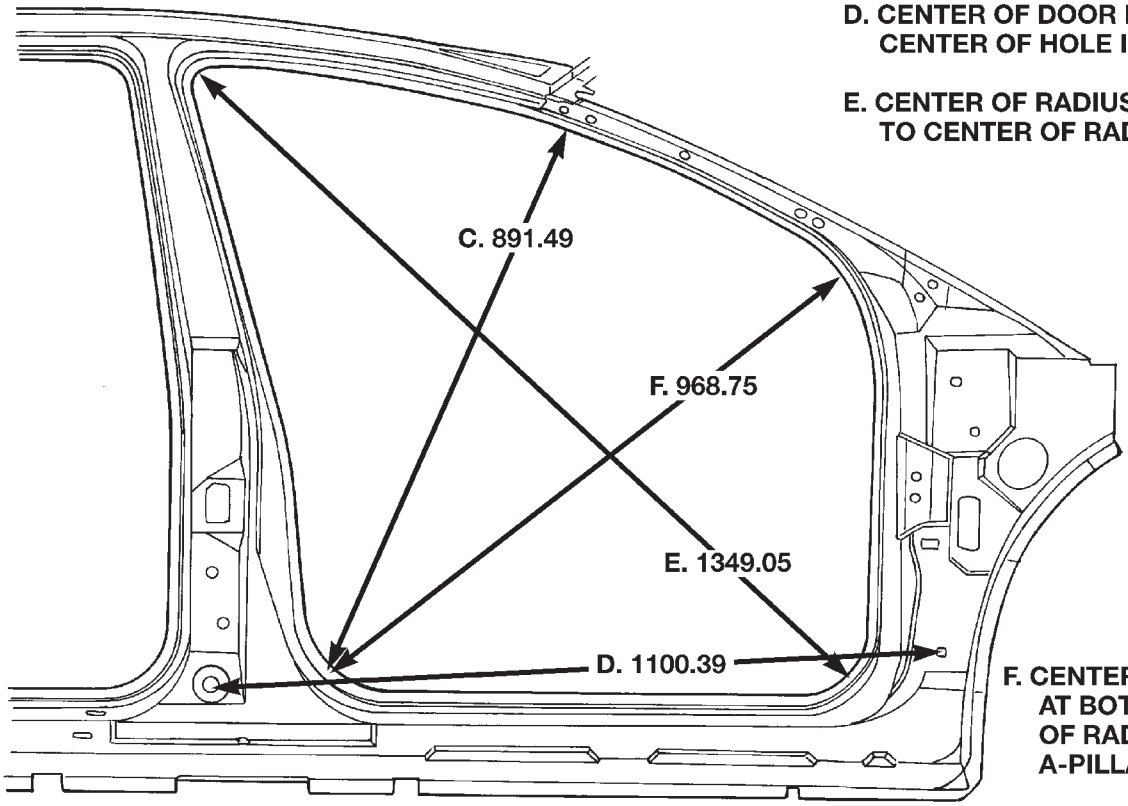


A. & B. CENTER OF RADIUS AT BOTTOM TO CENTER OF RADIUS AT TOP.

C. CENTER OF FRONT DOOR LOWER REAR CORNER RADIUS TO FRONT EDGE OF ROOF PANEL AT A-PILLAR.

D. CENTER OF DOOR HINGE BOLT TO CENTER OF HOLE IN B-PILLAR.

E. CENTER OF RADIUS AT BOTTOM TO CENTER OF RADIUS AT TOP.

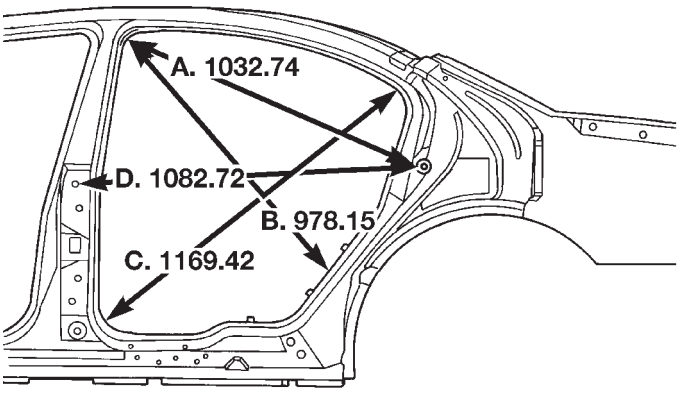


F. CENTER OF RADIUS AT BOTTOM TO CENTER OF RADIUS AT LOWER A-PILLAR.

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SPECIFICATIONS (Continued)

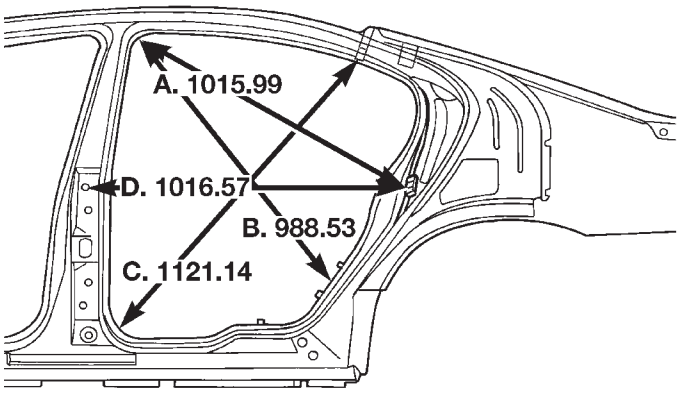
REAR DOOR OPENINGS – CONCORDE/LHS/ 300M



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- A. Center of radius at top to door latch hole.
- B. Center of radius at bottom to center of radius at top.
- C. Center of radius at bottom to edge of quarter panel at C-pillar.
- D. Upper rear door hinge rear bolt hole to door latch hole.

REAR DOOR OPENINGS – INTREPID

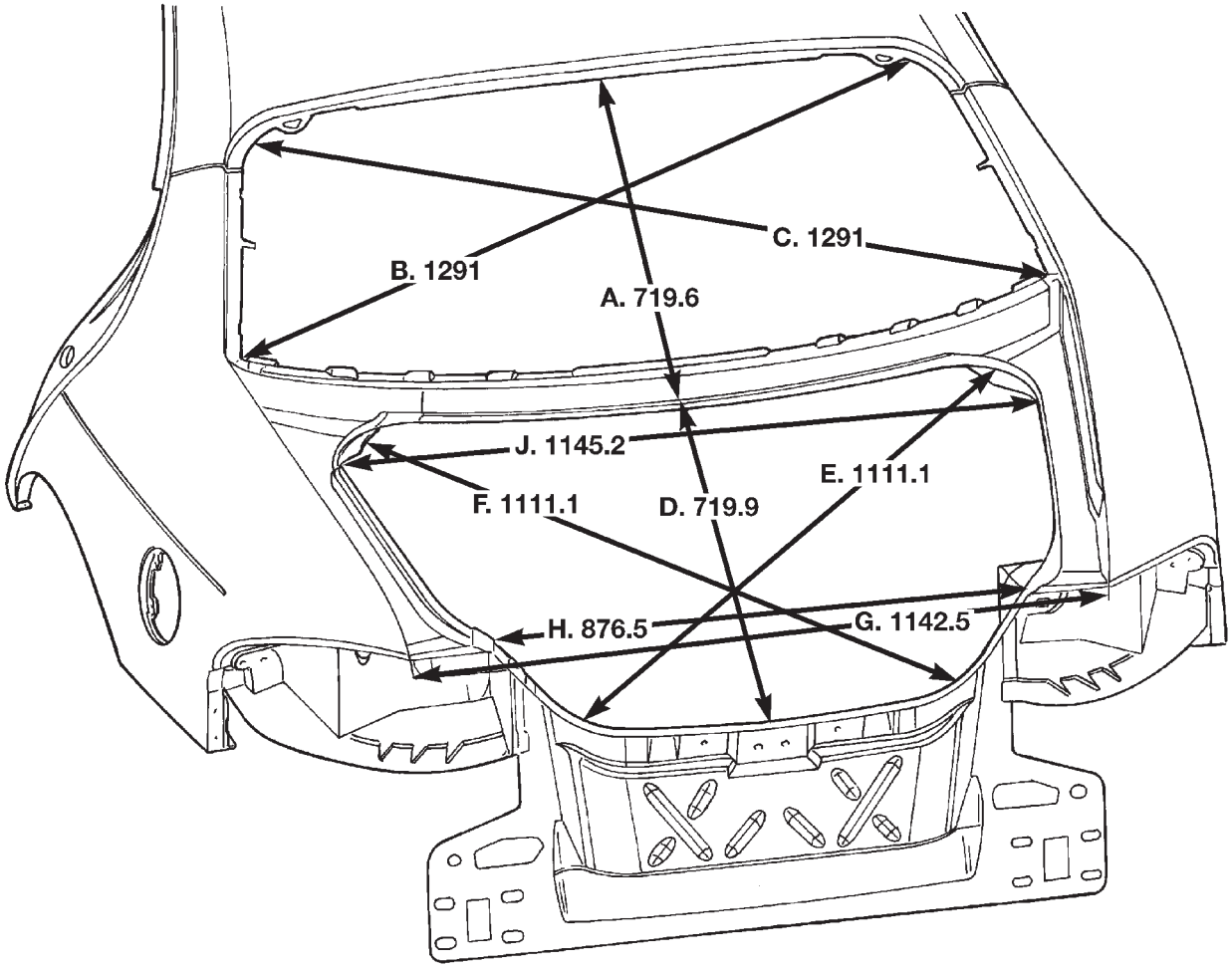


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- A. Center of radius at top to door latch hole.
- B. Center of radius at bottom to center of radius at top.
- C. Center of radius at bottom to edge of quarter panel at C-pillar.
- D. Upper rear door hinge rear bolt hole to door latch hole.

SPECIFICATIONS (Continued)

REAR WINDOW AND TRUNK OPENING – CONCORDE/LHS



A. LOWER EDGE OF BACK GLASS UPPER MOUNTING FLANGE TO FRONT OF REAR DECK OPENING WEATHERSTRIP FLANGE.

B. & C. UPPER REAR CORNER OF GLASS MOUNTING FLANGE TO EDGE OF REAR QUARTER PANEL.

D. FRONT DECK OPENING WEATHERSTRIP FLANGE TO DECK OPENING TAILPANEL WEATHERSTRIP FLANGE.

E. & F. CENTER OF DECK OPENING FRONT CORNER RADIUS TO REAR TAILPANEL DECK OPENING RADIUS.

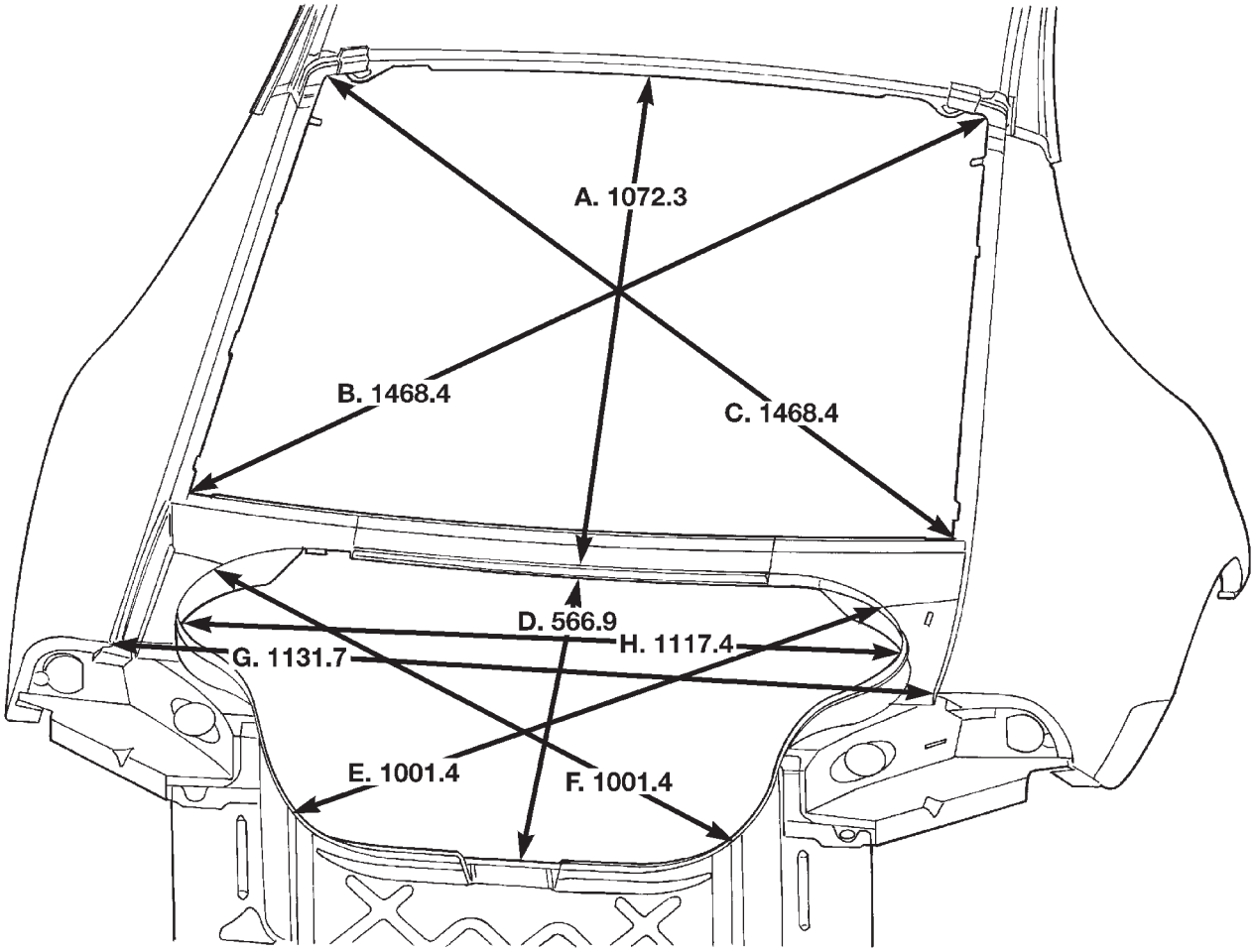
G. REAR TIP OF QUARTER PANELS.

H. REAR EDGE OF TROUGH RAILS.

J. FRONT EDGE OF TROUGH RAILS.

SPECIFICATIONS (Continued)

REAR WINDOW AND TRUNK OPENINGS – INTREPID



A. LOWER EDGE OF BACK GLASS UPPER MOUNTING FLANGE TO FRONT OF REAR DECK OPENING WEATHERSTRIP FLANGE.

B. & C. UPPER REAR CORNER OF GLASS MOUNTING FLANGE TO EDGE OF REAR QUARTER PANEL.

D. FRONT DECK OPENING WEATHERSTRIP FLANGE TO DECK OPENING TAILPANEL WEATHERSTRIP FLANGE.

E. & F. CENTER OF DECK OPENING FRONT CORNER RADIUS TO REAR TAILPANEL DECK OPENING RADIUS.

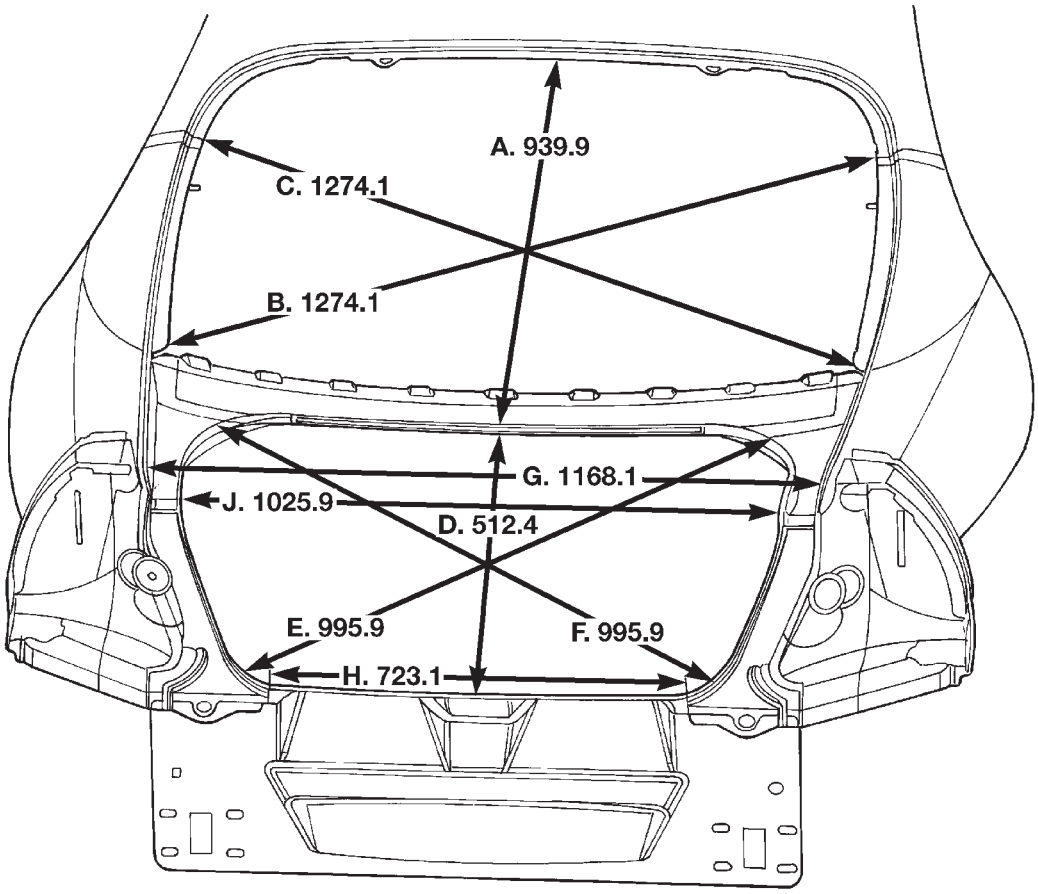
G. REAR TIP OF QUARTER PANELS.

H. REAR EDGE OF TROUGH RAILS.

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SPECIFICATIONS (Continued)

REAR WINDOW AND TRUNK OPENINGS – 300M



A. LOWER EDGE OF BACK GLASS UPPER MOUNTING FLANGE TO FRONT OF DECK OPENING WEATHERSTRIP FLANGE.

B. & C. UPPER CORNER OF REAR QUARTER PANEL GLASS OPENING TO LOWER GLASS OPENING AT QUARTER PANEL.

D. FRONT DECK OPENING WEATHERSTRIP FLANGE TO DECK OPENING TAILPANEL WEATHERSTRIP FLANGE.

E. & F. CENTER OF DECK OPENING FRONT CORNER RADIUS TO REAR TAILPANEL DECK OF OPENING RADIUS.

G. REAR TIP OF QUARTER PANELS.

H. REAR EDGE OF TROUGH RAILS.

J. FRONT EDGE OF TROUGH RAILS.

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS

BODY COMPONENTS

DESCRIPTION	TORQUE
Front seat track to floor pan bolts	61 N·m (45 ft. lbs.)
Front seat inboard pivot bolt	40 N·m (30 ft. lbs.)
Front seat recliner to seat cushion frame	12 N·m (9 ft. lbs.)
Front seat track to cushion frame bolt	12 N·m (9 ft. lbs.)
Front seat back	40 N·m (30 ft. lbs.)
Front seat back to seat cushion	30 N·m (22 ft. lbs.)
Front seat arm rest – 60/40	12 N·m (9 ft. lbs.)
Front arm rest – 50/50 split	25 N·m (18 ft. lbs.)
Front seat back recliner to seat back	12 N·m (9 ft. lbs.)
Front seat belt buckle anchor nut	40 N·m (29 ft. lbs.)
Front seat belt retractor bolt	38 N·m (28 ft. lbs.)
Front seat belt buckle anchor bolt	40 N·m (29 ft. lbs.)
Front door hinge to hinge pillar bolt	28 N·m (21 ft. lbs.)
Front door hinge to door nuts and bolt	28 N·m (21 ft. lbs.)
Front door latch striker	28 N·m (20 ft. lbs.)
Front seat rear outboard seat track to floor pan bolts	28 N·m (20 ft. lbs.)
Decklid latch striker	22 N·m (16 ft. lbs.)
Door hinge bolt and nut	28 N·m (21 ft. lbs.)
Door hinge double ended stud	14 N·m (120 in. lbs.)
Hood latch release cable handle to the cowl side	2.3 to 3.4 N·m (20 to 30 in. lbs.)
Hood latch to crossmember	22.6 to 33.9 N·m (200 to 300 in. lbs.)
Hood hinges	22.6 to 33.9 N·m (200 to 300 in. lbs.)
Rear Child Tether anchor	20 N·m (15 ft. lbs.)
Rear door glass to regulator bolt	11 N·m (105 in. lbs.)
Rear seat arm rest to seat back with ski pass	5 N·m (46 in. lbs.)
Rear seat back and belts to floor	44 N·m (32 ft. lbs.)
Rear seat back 40 section to collar section	60 N·m (44 ft. lbs.)
Rear seat back 60 section	16 N·m (12 ft. lbs.)
Rear seat back collar assembly	60 N·m (44 ft. lbs.)
Rear door hinge to B-pillar bolt	28 N·m (20 ft. lbs.)
Rear door hinge to door bolt	28 N·m (20 ft. lbs.)
Rear door latch striker	28 N·m (20 ft. lbs.)
Sunroof module to roof panel	11 N·m (97 in. lbs.)

BODY

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SEATS

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FRONT SEAT BACK - AIRBAG EQUIPPED 5
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DESCRIPTION AND OPERATION

SIDE IMPACT AIRBAG RESTRAINT SYSTEM

DESCRIPTION

Vehicles equipped with the side impact airbag restraint system utilize two airbags mounted to each front seat back frame (Fig. 1). This system designed to protect occupants in the event of a side impact collision.

OPERATION

The side impact airbag control module (SIACM) controls the seat back mounted airbags. If the SIACM determines the impact is severe enough, the appropriate airbag/s will inflate, tearing open the front seat back trim cover/s protecting the passenger/s. Once a seat back mounted airbag has been deployed, all damaged parts must be replaced.

REMOVAL AND INSTALLATION

FRONT SEAT - AIRBAG EQUIPPED

REMOVAL

(1) Position the seat far enough forward to allow removal of the rear retaining bolts (Fig. 3).

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(2) Disconnect and isolate the remote negative battery cable (Fig. 2).
(3) Remove bolts attaching rear of seat track to floor.

REMOVAL AND INSTALLATION (Continued)

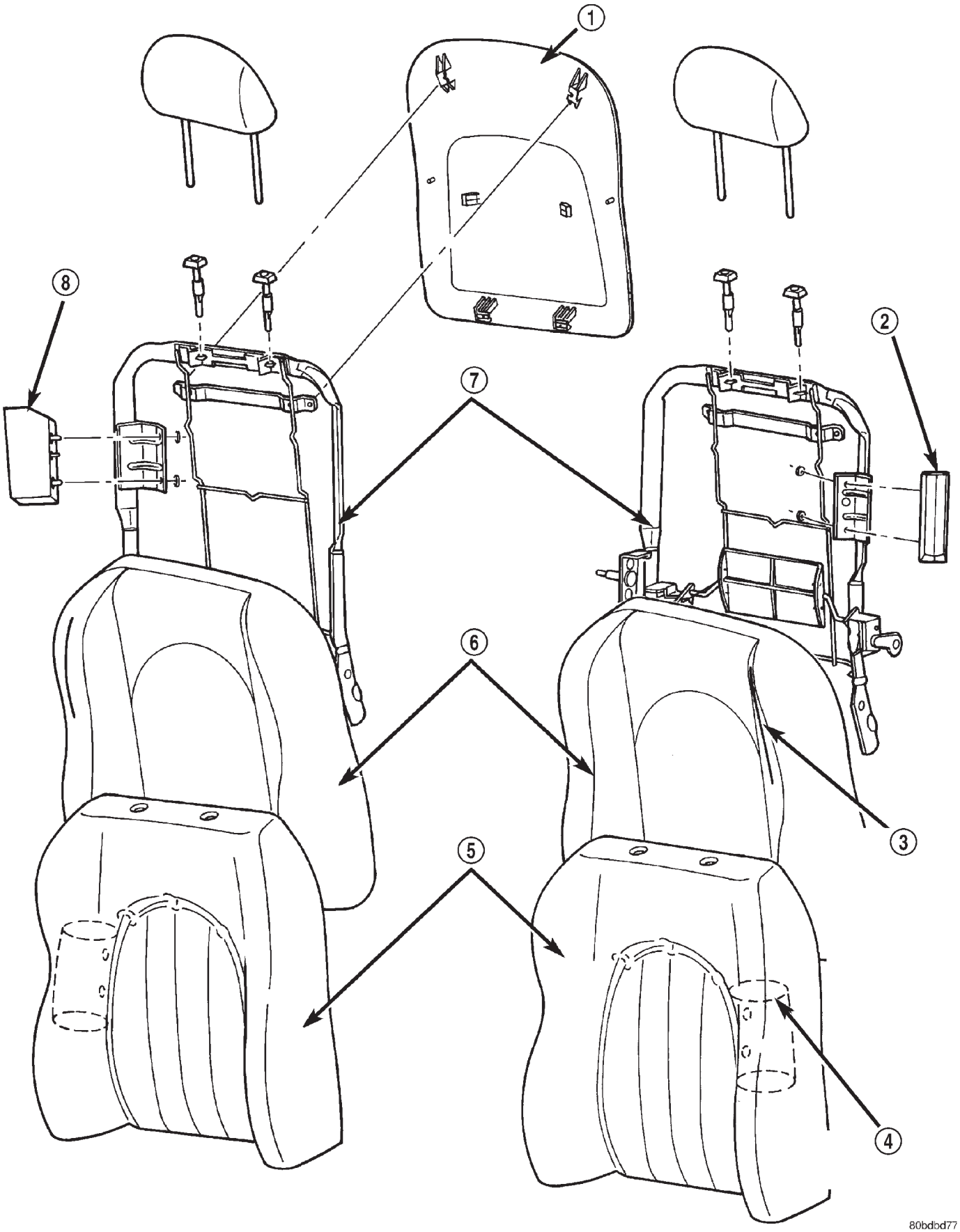


Fig. 1 LH FRONT SEAT BACKS EQUIPPED WITH AIRBAGS

REMOVAL AND INSTALLATION (Continued)

1 – FRONT SEAT BACK PANEL
2 – LEFT SEAT AIRBAG MODULE
3 – HOLE PROVIDED IN SEAT BACK FOAM FOR SEAT AIRBAG MODULE
4 – SIDE AIRBAG MODULE NYLON SLEEVE
5 – SEAT BACK TRIM COVERS
6 – SEAT BACK CUSHIONS
7 – SEAT BACK FRAMES
8 – RIGHT SEAT AIRBAG MODULE

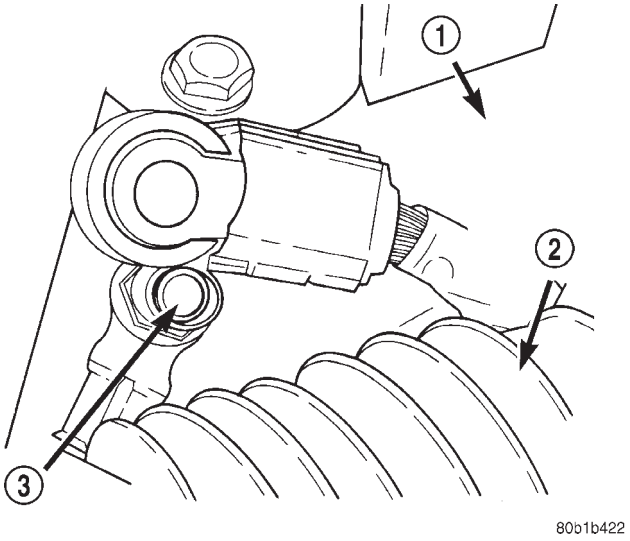


Fig. 2 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

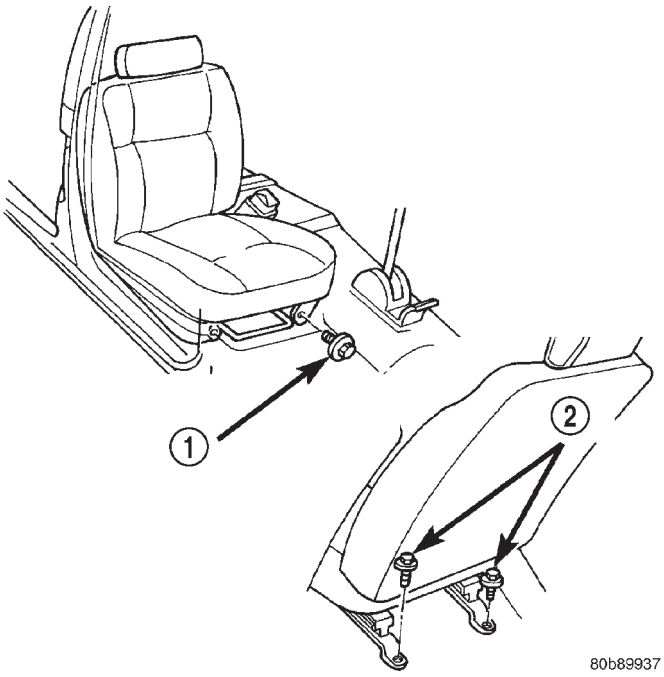


Fig. 3 Front Seat Retaining Bolts

1 – FRONT BOLTS
2 – REAR BOLTS

(4) Remove bolts attaching front of the seat track to floor kick up (Fig. 3).
(5) Tilt seat upward to access and disconnect the front seat wire harness connector from body harness connector.
(6) Disconnect airbag wire harness connector by first sliding connector lock to the “unlocked” position, then depress connector retaining tab and pull straight apart.
(7) Remove front seat from vehicle.

INSTALLATION

(1) Place front seat in position in vehicle.
(2) Connect front seat wire harness connector to body harness connector.
(3) Connect airbag wire harness connector. Be certain airbag connector is secure and locking tab is in the “locked” position before installing seat retaining bolts.
(4) Install bolts attaching the front of seat track to the floor kick up. Tighten bolts to 61 N·m (45 ft. lbs.) torque.
(5) Install bolts attaching rear of seat track to the floor. Tighten bolts to 61 N·m (45 ft. lbs.) torque.
(6) Connect the remote negative battery cable.
(7) Using the DRB III Scan Tool erase all DTC’s and perform airbag system diagnostics.
(8) Verify front seat operation.

FRONT SEAT CUSHION SIDE SHIELD - AIRBAG EQUIPPED

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(1) Disconnect and isolate the remote negative battery cable.

REMOVAL AND INSTALLATION (Continued)

(2) Remove seat from vehicle. Refer to the procedure in this group.
(3) Remove screws attaching seat cushion side shield to the bottom and side of seat cushion (Fig. 4) and (Fig. 5).
(4) Remove shield from seat
(5) Disconnect switch wire connectors, if equipped.
(6) Remove seat switches, if equipped.

INSTALLATION

(1) Transfer seat switches, if equipped.
(2) Connect switch wire connectors to cushion side shield, if equipped.
(3) Place shield in position on seat cushion.
(4) Install screws attaching seat cushion side shield. Tighten screws in sequence refer to (Fig. 4).
(5) Install seat. Tighten front screws to 61 N·m (45 ft. lbs.) and the rear screws to 61 N·m (45 ft. lbs.).

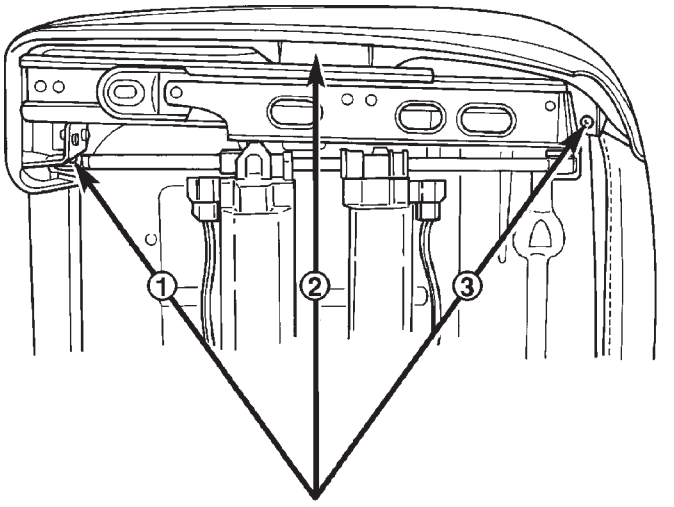


Fig. 4 Bottom View of Side Shield and Tightening Sequence

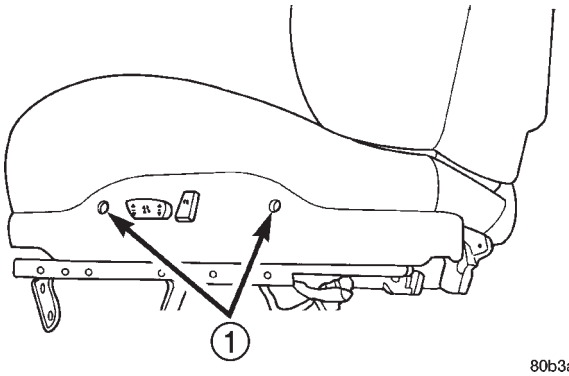


Fig. 5 Side View of Side Shield

1 – SIDESHIELD FASTENERS

(1) Connect the remote negative battery cable.
(2) Using the DRB III Scan Tool erase all DTC's and perform airbag system diagnostics.

FRONT SEAT BACK PANEL - AIRBAG EQUIPPED

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

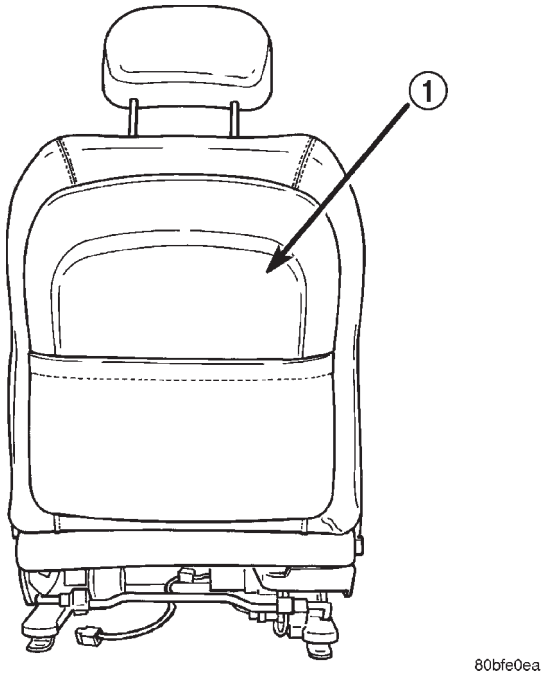


Fig. 6 Front Seat Back Panel

1 – FRONT SEAT BACK PANEL

(1) Disconnect and isolate the remote negative battery cable.
(2) Using a flat bladed trim tool, insert between upper portion of seat back cover and seat back panel. Gently pry panel away from seat back to free push pins (Fig. 7).
(3) Grasp the middle edge portion of back panel and push inboard while pulling sharply to release retaining tabs (Fig. 7).

REMOVAL AND INSTALLATION (Continued)

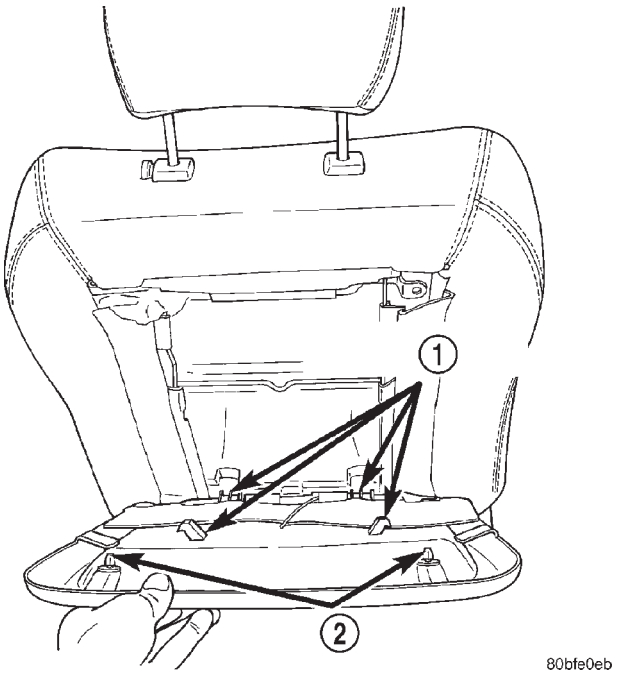


Fig. 7 Back Panel Mounting

1 – BACK PANEL RETAINING TABS
2 – BACK PANEL RETAINING PUSHPINS

(4) Remove back panel from seat back frame.

INSTALLATION

CAUTION: Always install new push pins in the upper mounting location of back panel. Failure to do so could adversely affect the airbag system.

(1) Starting at the bottom, line-up back panel retaining tabs and new push pins. Then push sharply to snap in place.
(2) Check back panel fit and finish. Run a finger down the sides of back panel to be certain panel fits tight to the rear of trim cover.

CAUTION: Be certain seat back panel is properly secured in place. Failure to do so could adversely affect the airbag system.

(3) Connect the negative battery cable.

FRONT SEAT BACK - AIRBAG EQUIPPED

REMOVAL

(1) Position seat forward enough to allow removal of the rear seat track to floor pan bolts.

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(2) Disconnect and isolate the remote negative battery cable (Fig. 8).

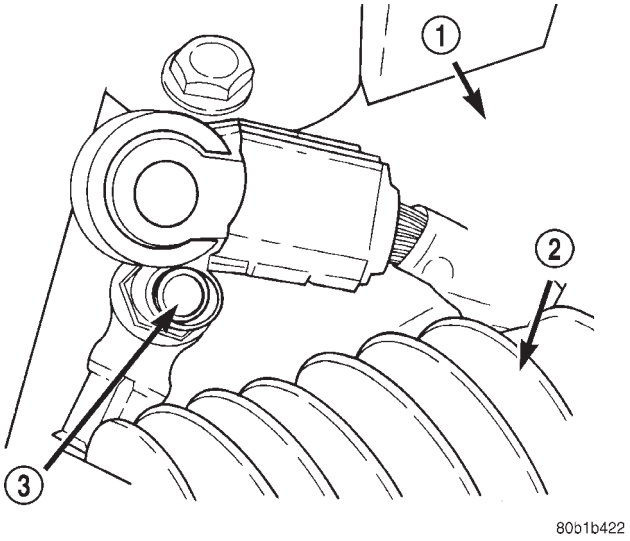


Fig. 8 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(3) Remove the front seat from the vehicle. Refer to the procedure in this group.
(4) Remove the front seat cushion side shields. Refer to the procedure in this group.
(5) Disengage push pin and disconnect the yellow airbag wire harness connector located on the bottom of the seat cushion pan (Fig. 9).
(6) Disengage push pin and disconnect the heated seat element wire connector also located on the cushion pan.
(7) Remove bolts attaching recliner to seat back cushion frame (Fig. 10).
(8) Remove inboard and outboard pivot bolts connecting the seat cushion to the seat back.
(9) Feed wire harnesses between the seat track and cushion pan and remove seat back from seat cushion.
(10) Remove necessary components from seat back for reuse if possible. Refer to the procedures in this group.

REMOVAL AND INSTALLATION (Continued)

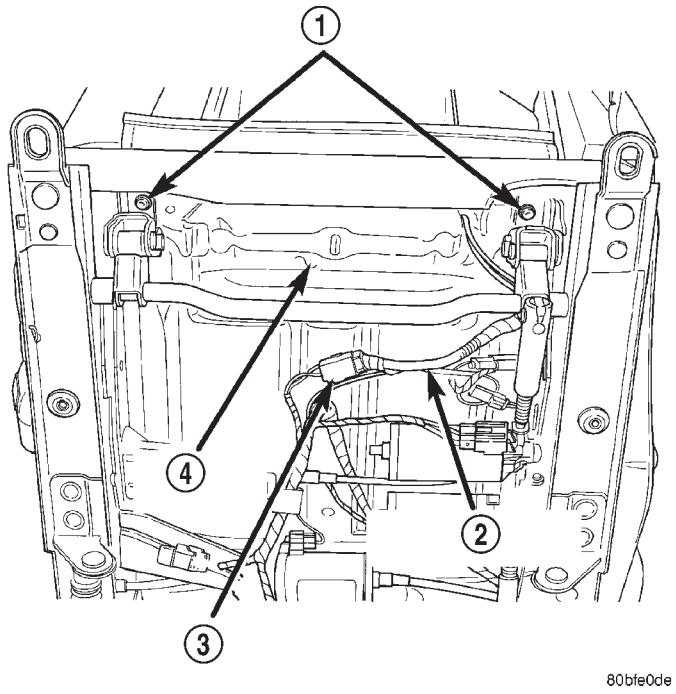


Fig. 9 Seat Back Wire Connectors

1 – SEAT TRACK RETAINING BOLTS
2 – SEAT AIRBAG WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS CONNECTOR
4 – CUSHION PAN

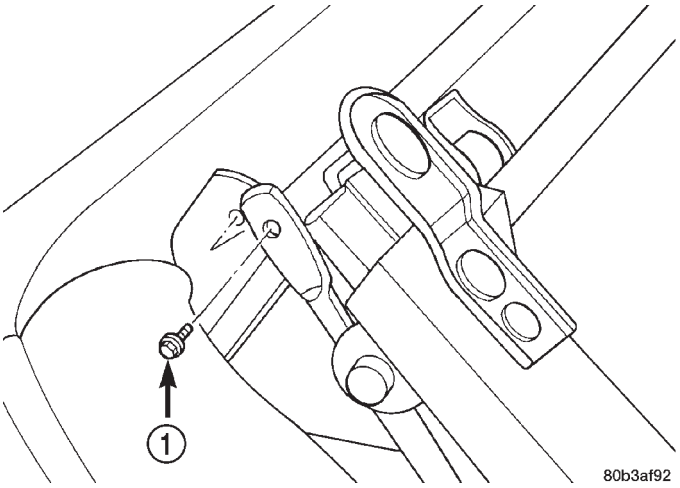


Fig. 10 Recliner Attaching Bolts

1 – RECLINER BOLT

INSTALLATION

(1) Position the assembled seat back and feed wire harness down into lower seat cushion (Fig. 11). Be certain harness is routed along the leading edge of seat frame.

(2) Install inboard and outboard pivot bolts. Tighten bolt to 30 N·m (23 ft. lbs.) torque.

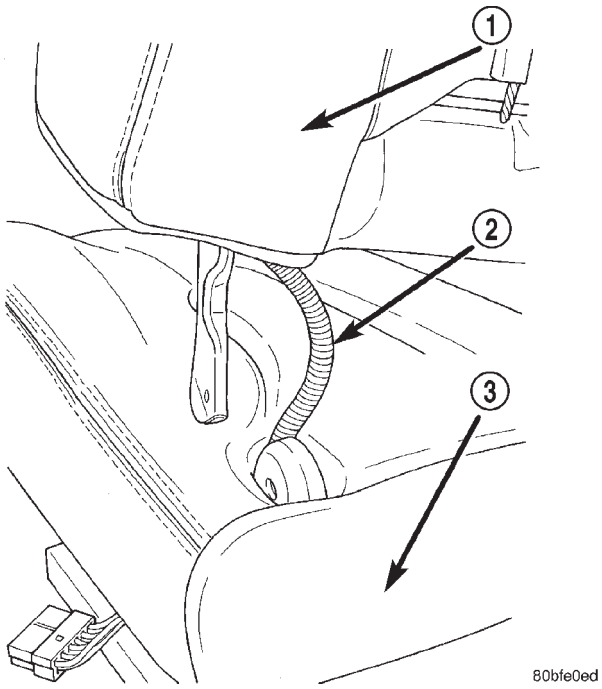


Fig. 11 Seat Back Wire Harness

1 – FRONT SEAT BACK
2 – SEAT AIRBAG WIRE HARNESS
3 – FRONT SEAT CUSHION

CAUTION: Do not reuse recliner assembly attaching bolts. Due to the nylon coating on these bolts they are not reusable.

(3) Install bolts attaching recliner to seat back frame (Fig. 12). Tighten bolts to 8 N·m (71 in. lbs.) torque.

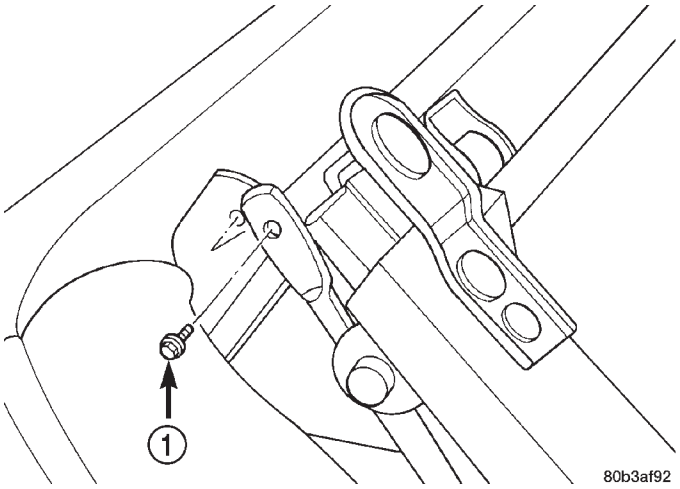


Fig. 12 Recliner Attaching Bolts

1 – RECLINER BOLT

REMOVAL AND INSTALLATION (Continued)

(4) Connect airbag wire harness connector and secure push pin. Be certain connector is securely connected.
(5) Connect heated seat element connector and secure push pin.
(6) Install seat cushion side shields. Refer to the procedure in this group.
(7) Install seat in vehicle. Refer to the procedure in this group.
(8) Connect the negative battery cable.
(9) Using the DRB III Scan Tool erase all DTC's and perform airbag system diagnostics.

FRONT SEAT HEAD RESTRAINT - AIRBAG EQUIPPED

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(1) Disconnect the remote negative battery cable.
(2) If fully extended, lower head restraint slightly.
(3) Insert a stiff wire into the hole on the right hand side head restraint sleeve/guide and push to release latch (Fig. 13).
(4) At the same time, press the button on the head restraint sleeve/guide and pull upward to release the head restraint.
(5) Remove head restraint from seat back.

INSTALLATION

(1) Place head restraint in position.
(2) Push head restraint down into the lock position.
(3) Raise head restraint to ensure it locks at the last stop.
(1) Connect the remote negative battery cable.

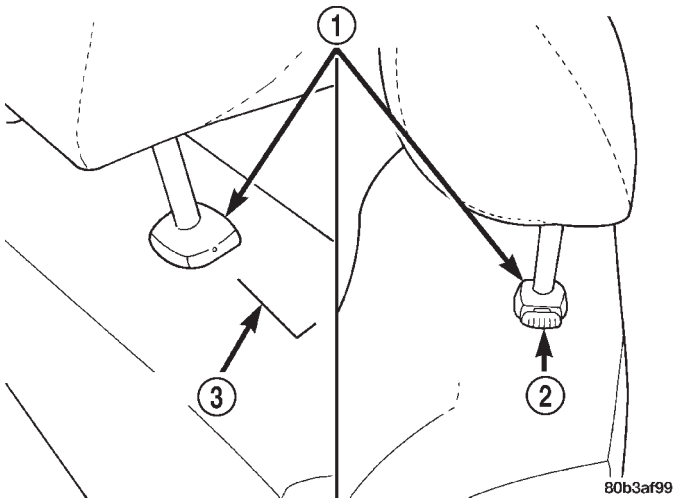


Fig. 13 Head Restraint Removal

1 – SLEEVE GUIDE
2 – BUTTON
3 – STIFF WIRE

FRONT SEAT HEAD RESTRAINT GUIDE SLEEVES - AIRBAG EQUIPPED

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(1) Disconnect the remote negative battery cable.
(2) Remove the head restraint from the seat back. Refer to the procedure in this group.
(3) Remove the back panel from the seat back. Refer to the procedure in this group.
(4) Disengage upper J-strap from seat back trim cover.
(5) Working through the rear of seat back, depress the two head restraint guide sleeve retaining tabs and pull guide straight up and out of the seat back.

INSTALLATION

NOTE: The head restraint guide sleeve equipped with height adjustment button is always installed on the left side of the seat back.

REMOVAL AND INSTALLATION (Continued)

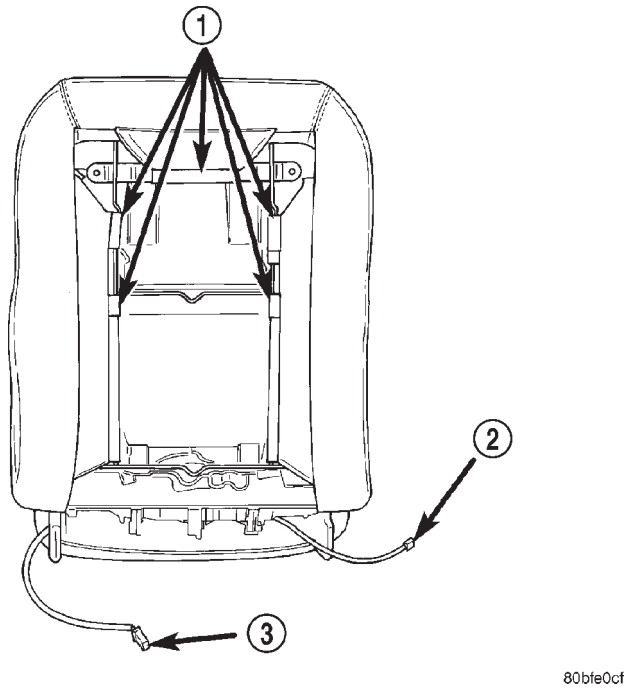


Fig. 14 Trim Cover J-strap Position & Orientation

1 – TRIM COVER J-STRAPS
2 – SEAT HEATER WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS

(1) Install guides in seat back making sure they are snapped in place.
(2) Install J-strap retainer.
(3) Install the back panel on the seat back. Refer to the procedure in this group.
(4) Install the head restraint on the seat back. Refer to the procedure in this group.
(5) Connect the remote negative battery cable.

FRONT SEAT BACK COVER - AIRBAG EQUIPPED

REMOVAL

CAUTION: DO NOT REPLACE A DEPLOYED AIRBAG. IF SEAT AIRBAG HAS BEEN DEPLOYED THE ENTIRE SEAT OR SEAT BACK MUST BE REPLACED.

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(1) Disconnect and isolate the negative battery cable (Fig. 15).

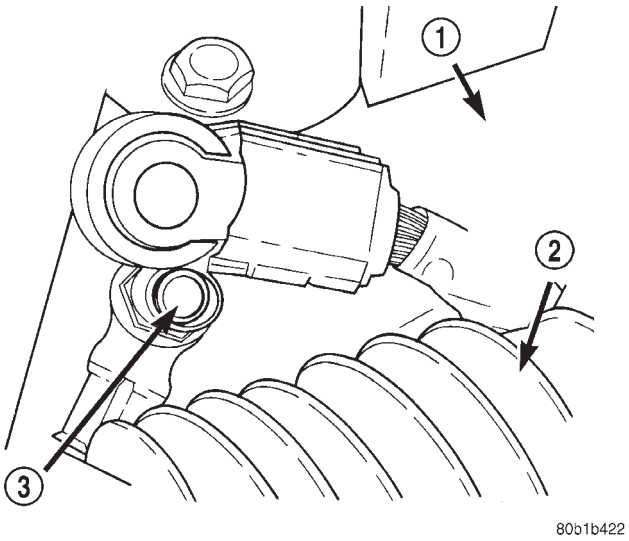


Fig. 15 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Remove the front seat from the vehicle. Refer to the procedure in this group.
(3) Remove the front seat head restraint. Refer to the procedure in this group.
(4) Remove the front seat back panel (Fig. 16). Refer to the procedure in this group.
(5) Remove the head restraint guide sleeves from the seat back. Refer to the procedure in this group.
(6) Remove the front seat cushion side shield. Refer to the procedure in this group.
(7) Release all J-strap retaining clips (Fig. 17).
(8) Remove the outboard recliner attaching bolt (Fig. 18). This will allow access to the seat back heating element wire harness.
(9) Disconnect heating element wire connector.
(10) Disconnect seat airbag module electrical connector at the module. Slide the yellow locking tab down to release lock function. Then depress the two retaining tangs (located on the sides of the connector) and pull straight out (Fig. 19).
(11) Remove the seat airbag module retaining nuts and carefully slide module from nylon sleeve (Fig. 19).

CAUTION: During module removal, be certain not to tear nylon sleeve. This will adversely affect the function of the airbag system.

REMOVAL AND INSTALLATION (Continued)

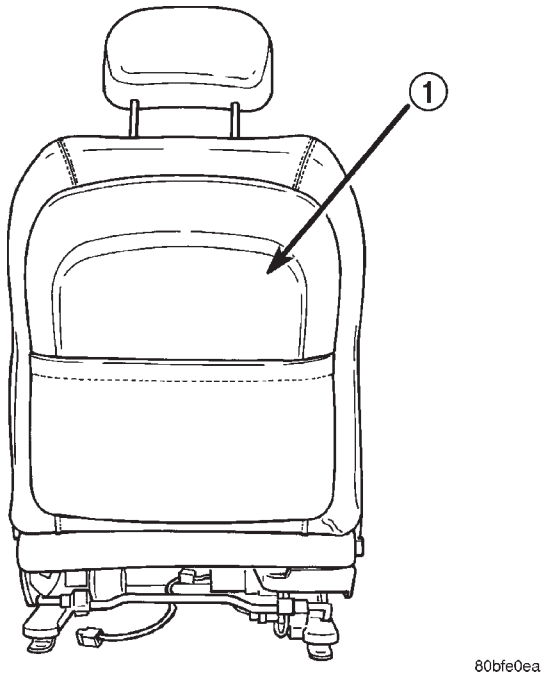


Fig. 16 Front Seat Back Panel

1 – FRONT SEAT BACK PANEL

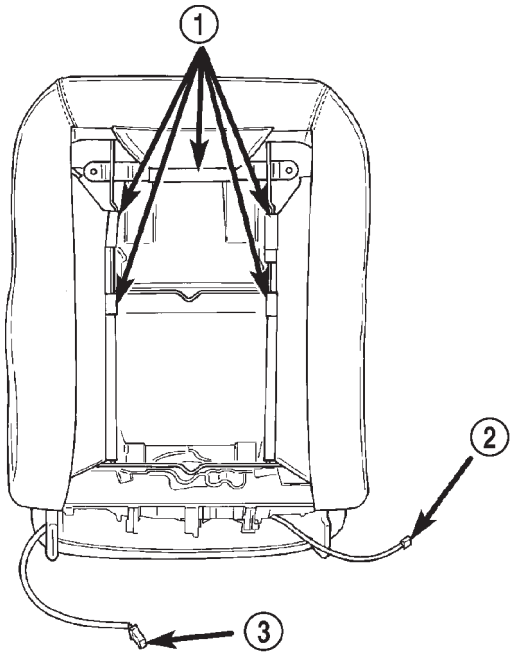


Fig. 17 Seat Back J-strap Position & Orientation

1 – TRIM COVER J-STRAPS
2 – SEAT HEATER WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS

(12) Remove seat back foam and cover from frame.

(13) Disengage velcro from cover. With one hand, hold velcro that is glued to seat back foam. With the other hand, grasp opposite velcro strip and pull apart to separate. This will prevent tearing velcro out of seat back foam.

(14) Pull cover up far enough to access the remaining three hog rings. Cut hog rings from cover.

(15) Remove cover from seat back foam.

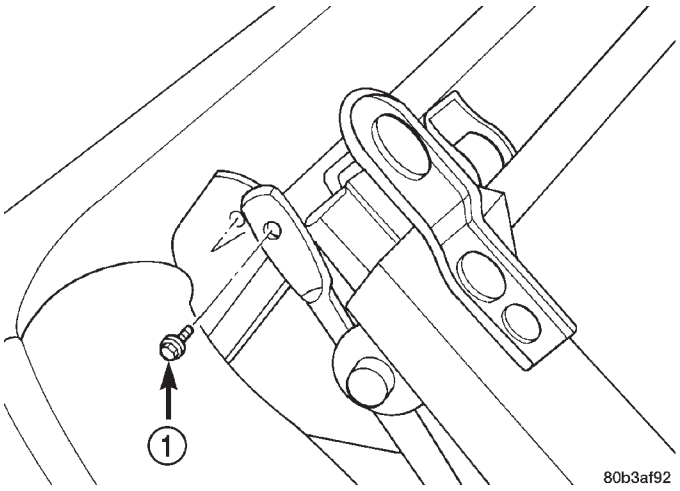


Fig. 18 Recliner Attaching Bolt

1 – RECLINER BOLT

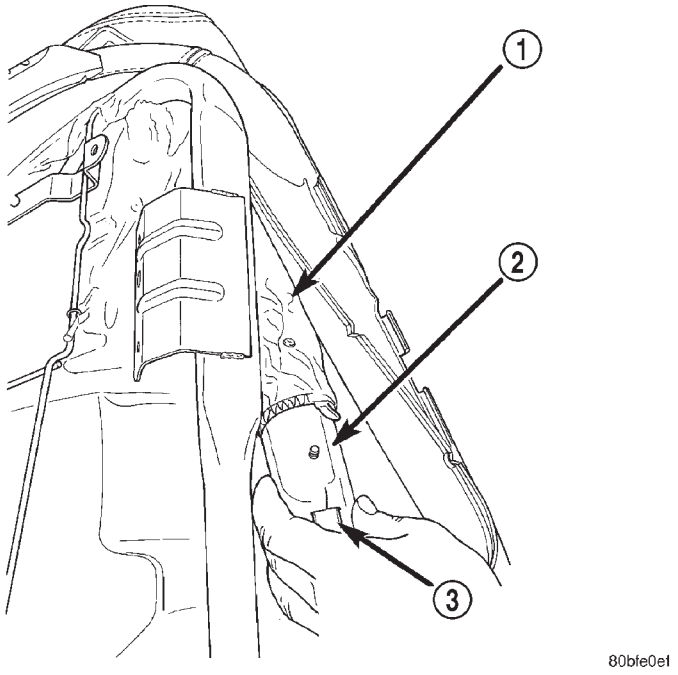


Fig. 19 Seat Airbag Module Electrical Connector Location

1 – AIRBAG MODULE NYLON SLEEVE
2 – AIRBAG MODULE
3 – AIRBAG MODULE ELECTRICAL CONNECTOR

INSTALLATION

(1) Position cover on seat back foam.

REMOVAL AND INSTALLATION (Continued)

(2) Carefully roll cover down to the area that hog rings are to be installed. Install hog rings.
(3) Roll cover downward, fastening velcro as you go.
(4) Position seat back foam and cover on frame.
(5) Carefully slide the seat airbag module in nylon sleeve (Fig. 20) and install retaining nuts (Fig. 21). Torque the nuts to 7 N·m (62 in. lbs.).

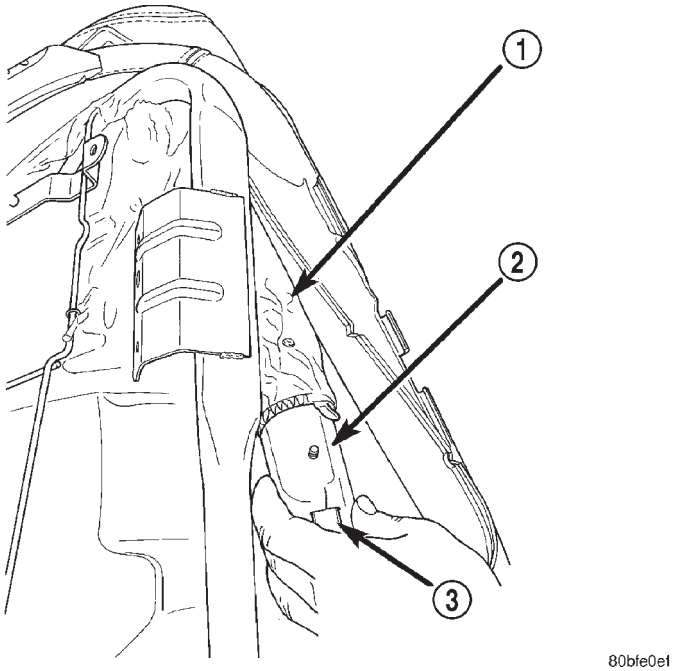


Fig. 20 Installing Seat Airbag Module in Nylon Sleeve

1 – AIRBAG MODULE NYLON SLEEVE
2 – AIRBAG MODULE
3 – AIRBAG MODULE ELECTRICAL CONNECTOR

CAUTION: Seat Airbag Module Must Be Installed IN Nylon Sleeve. Failure To Do So Will Adversely Affect Function Of Airbag System.

(6) Connect seat airbag module electrical connector (Fig. 20). Be certain yellow locking tab is in the locked position after connection is made. Upon connection completion, double check connection by trying to disconnect without releasing yellow lock. If connector cannot be removed connection is secure.
(7) Connect heating element wire connector.
(8) Install the outboard recliner attaching bolt (Fig. 22). Torque the bolt to 8 N·m (71 in. lbs.).
(9) Engage J- strap retaining clips.
(10) Install the front seat cushion side shield. Refer to the procedure in this group.
(11) Install the head restraint guide sleeves in the seat back. Refer to the procedure in this group.
(12) Install the front seat back panel. Refer to the procedure in this group.

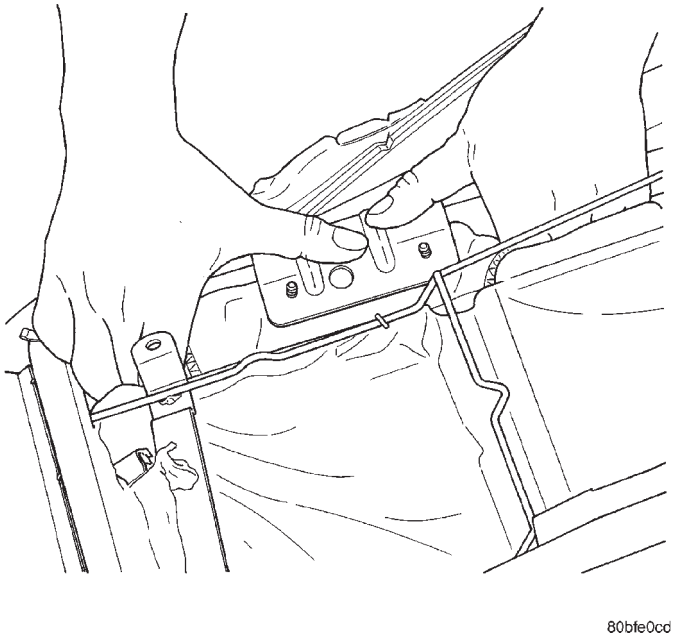


Fig. 21 Installing Seat Airbag Module on Seat Back Frame

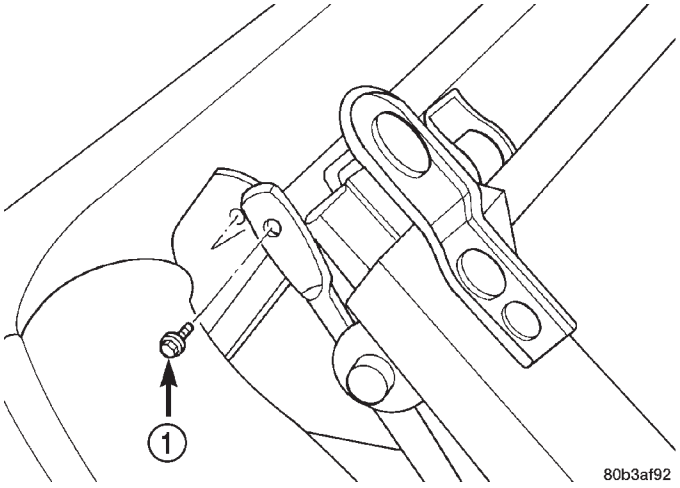


Fig. 22 Recliner Attaching Bolt

1 – RECLINER BOLT

(13) Install the front seat head restraint. Refer to the procedure in this group.
(14) Install the front seat in the vehicle. Refer to the procedure in this group.
(15) Connect the negative battery cable.
(16) Using the DRB III Scan Tool erase all DTC's and perform airbag system diagnostics.
(17) Check trim cover fit and finish and verify seat operation.

FRONT SEAT LUMBAR SUPPORT

The front seat lumbar support is not serviced separately. The front seat back frame will need to be replaced.

REMOVAL AND INSTALLATION (Continued)

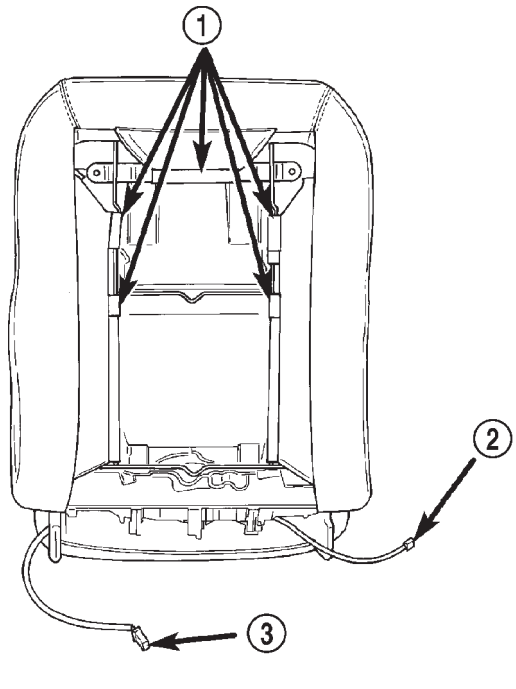


Fig. 23 Seat Back J-strap Position & Orientation

1 – TRIM COVER J-STRAPS
2 – SEAT HEATER WIRE HARNESS
3 – SEAT AIRBAG WIRE HARNESS

FRONT SEAT ADJUSTER – POWER SEAT AIRBAG EQUIPPED

REMOVAL

WARNING: DISCONNECT AND ISOLATE THE NEGATIVE BATTERY CABLE REMOTE TERMINAL BEFORE BEGINNING ANY FRONT SEAT REMOVAL OR INSTALLATION PROCEDURE. THIS WILL DISABLE THE AIRBAG SYSTEM. FAILURE TO DISCONNECT THE BATTERY COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: ONCE THE NEGATIVE CABLE IS DISCONNECTED WAIT FOR 2 MINUTES BEFORE REMOVING ANY AIRBAG SYSTEM COMPONENTS.

(1) Disconnect and isolate the remote negative battery cable.
(2) Remove the front seat back. Refer to the procedure in this group.
(3) Remove bolts attaching seat adjuster to cushion pan (Fig. 24).
(4) Disconnect wire harness from cushion pan.
(5) Remove seat adjuster from seat cushion.

INSTALLATION

(1) Place seat adjuster in position on seat cushion pan.
(2) Connect wire harness to the cushion pan.
(3) Install bolts attaching seat adjuster to cushion pad.
(4) Install seat back. Refer to the procedure in this group.
(5) Install bolt to attach seat back recliner to seat back on each side of seat. Tighten bolt to 8 N·m (71 in. lbs.) torque.
(6) Connect the negative battery cable.
(7) Using the DRB III Scan Tool erase all DTC's and perform airbag system diagnostics.

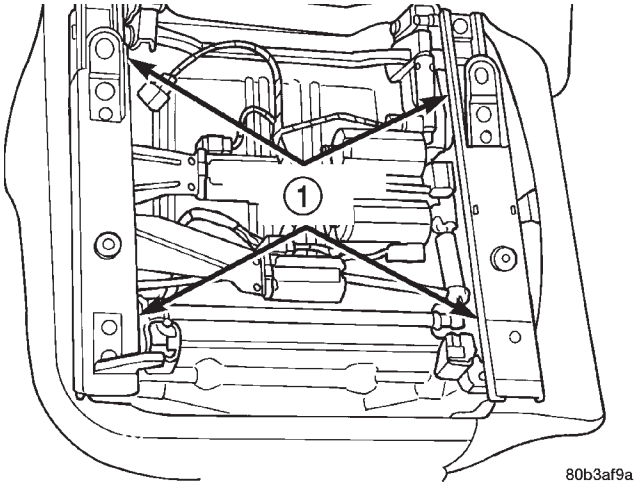


Fig. 24 Front Seat Track – Typical

1 – ATTACHING BOLTS

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DESCRIPTION AND OPERATION

REAR SEAT CHILD TETHER

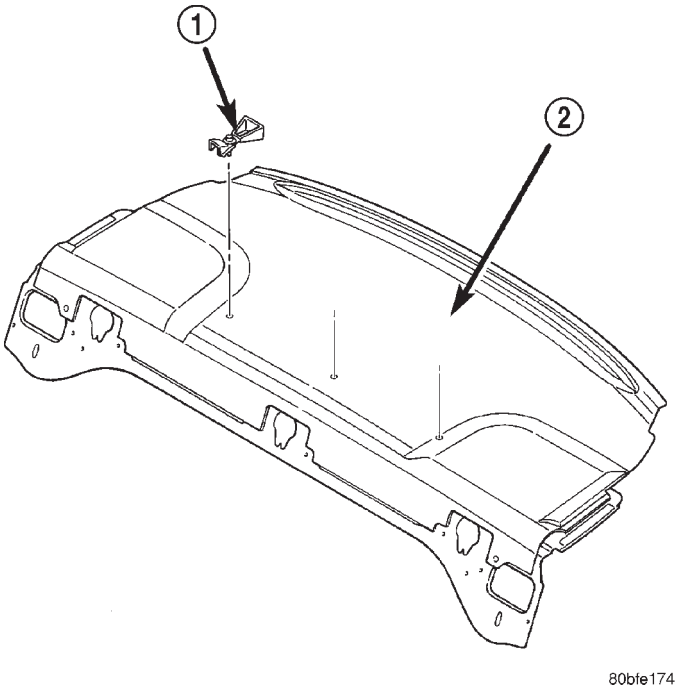


Fig. 1 Child Tether Bracket Position & Orientation
1 – REAR SEAT CHILD TETHER
2 – REAR SHELF TRIM PANEL

DESCRIPTION

Some LH vehicles are equipped with a rear seat child tether anchor system. This system is designed to provide a spot in which to anchor small children (seats) in the rear seat. There are three child tether brackets per vehicle and can be found on the rear shelf panel above the rear seat back (Fig. 1). Refer to the vehicle Owner Manual for more information.

REMOVAL AND INSTALLATION

FRONT SEAT BELT RETRACTOR

CAUTION: Inspect the condition of the shoulder belt and lap belt. Replace any belt that is cut, frayed, torn, or damaged in any way. Also, replace the shoulder belt if the retractor is either damaged or inoperative.

REMOVAL

(1) If necessary, move the front seat(s) all the way forward for access.
(2) Remove turning loop adjuster knob.
(3) Detach the turning loop cover from the upper anchor bolt.
(4) Remove upper anchor bolt (Fig. 2).
(5) Remove B-pillar upper trim.
(6) Remove lower anchor bolt.
(7) Remove B-pillar lower trim panel.
(8) Remove the retractor anchor bolt.
(9) Remove lower B-pillar trim.
(10) Disconnect retractor wire harness connector.
(11) Remove retractor from vehicle.

INSTALLATION

(1) Position the retractor in the vehicle.
(2) Connect retractor wire harness connector.
(3) Install lower B-pillar trim.
(4) Install the retractor anchor bolt. Tighten to 60 N·m (44 ft. lbs.) torque.
(5) Route the belt webbing through the access slots in B-pillar upper trim.
(6) Install B-pillar upper trim.
(7) Install the upper anchor bolt. Tighten to 60 N·m (44 ft. lbs.) torque.
(8) Close turning loop covers.
(9) Install turning loop adjuster knob.

REMOVAL AND INSTALLATION (Continued)

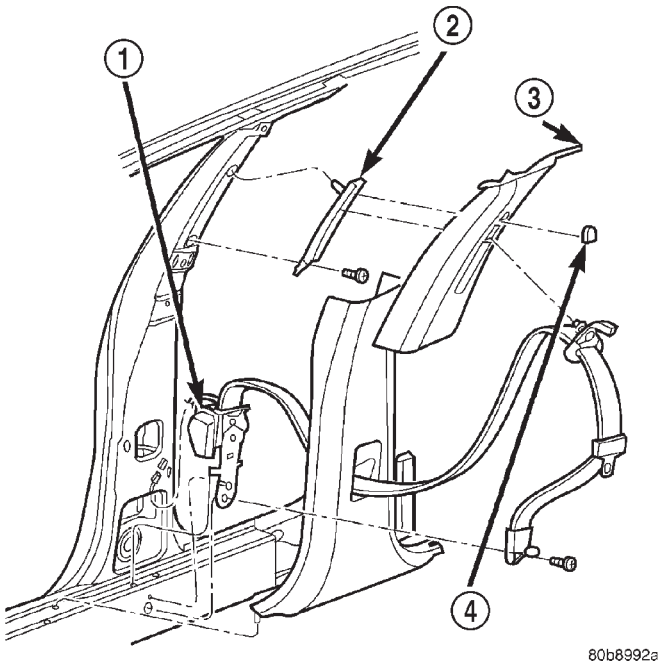


Fig. 2 Front Shoulder Belt Adjuster

1 – FRONT SEAT BELT RETRACTOR
2 – TURNING LOOP ADJUSTER
3 – B-PILLAR UPPER
4 – TURNING LOOP ADJUSTER KNOB

REAR SEAT BELT RETRACTOR

CAUTION: Inspect the condition of the shoulder belt and lap belt. Replace any belt that is cut, frayed, torn, or damaged in any way. Also, replace the shoulder belt if the retractor is either damaged or inoperative.

REMOVAL

(1) Remove seat cushion and back.
(2) Remove upper quarter trim panel.
(3) Remove lower quarter trim panel.
(4) Remove nut attaching lower seat belt anchor to floor.
(5) Remove turning loop bolt.
(6) Remove bolt attaching belt retractor to quarter panel..
(7) Remove belt from vehicle.

INSTALLATION

(1) Place belt in position on vehicle.
(2) Install bolt to attach belt retractor to quarter panel.
(3) Install the turning loop.
(4) Route anchor end of seat belt through upper quarter trim opening. Tighten to 60 N·m (44 ft. lbs.).
(5) Install nut to attach lower seat belt anchor to floor.
(5) Tighten nut to 60 N·m (44 ft. lbs.) torque.
(6) Install lower quarter trim panel.
(7) Install upper quarter trim panels.
(8) Install seat back and cushion.

CHILD TETHER ASSEMBLY

REMOVAL

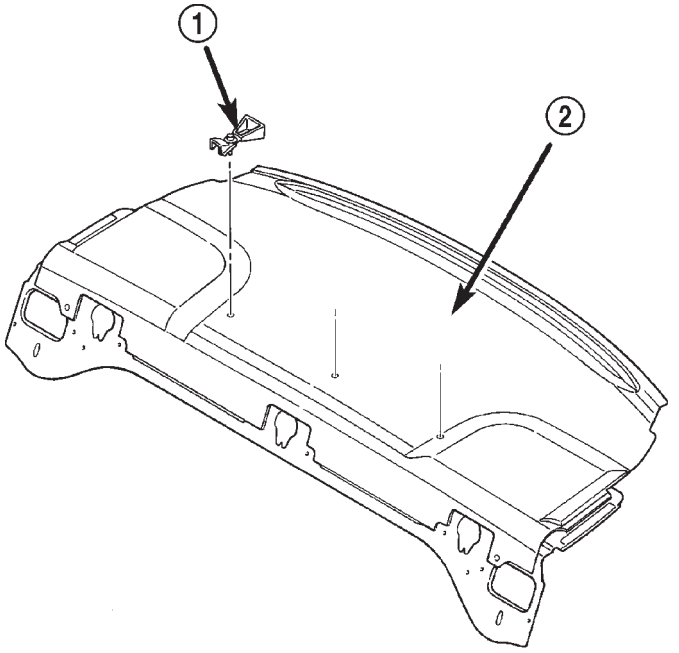


Fig. 3 Child Tether Bracket Position & Orientation

1 – REAR SEAT CHILD TETHER
2 – REAR SHELF TRIM PANEL

(1) Flip up child tether cover to allow access to child tether bracket retaining bolt.
(2) Remove bracket retaining bolt, anchor plate, cap and spacer from rear shelf.

INSTALLATION

(1) Position spacer, cap, anchor plate and retaining bolt on the rear shelf.
(2) Be certain dog point on the tether bracket is inserted in the hole on the rear shelf panel.
(3) Start retaining bolt by hand and while holding bracket in position, torque bolt to 20 N·m (180 in. lbs.).

NOTE: Be certain the dog point of the tether bracket is inserted in hole on rear shelf panel after installation.

(4) Close child tether cap.

REMOVAL AND INSTALLATION (Continued)

CENTER REAR SEAT BELT RETRACTOR

CAUTION: Inspect the condition of the shoulder belt and lap belt. Replace any belt that is cut, frayed, torn, or damaged in any way. Also replace the shoulder belt if the retractor is either damaged or inoperative.

REMOVAL

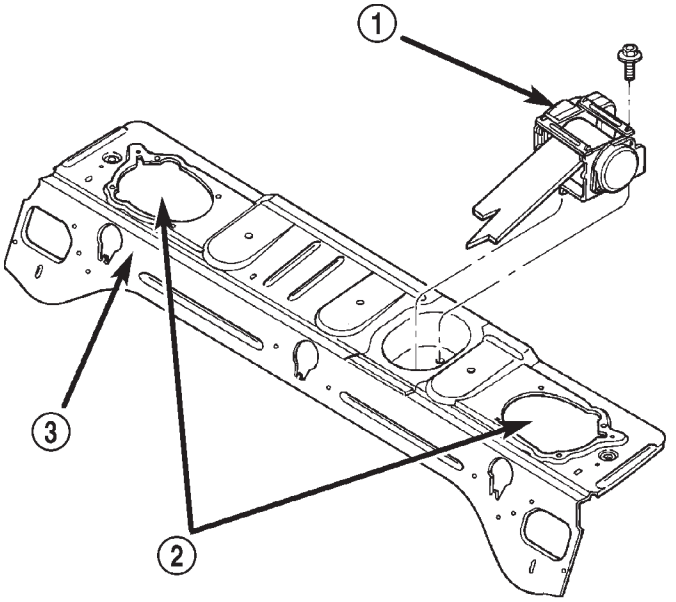


Fig. 4 Center Rear Seat Belt Retractor

1 – CENTER REAR SEAT BELT RETRACTOR
2 – REAR SHELF
3 – REAR SPEAKER LOCATIONS

(1) Remove the rear shelf trim panel. Refer to the procedure in this group.
(2) Remove the bolt attaching the center rear seat belt retractor to the rear shelf.
(3) Remove the center rear seat belt retractor assembly from the vehicle.

INSTALLATION

(1) Install the center rear seat belt retractor assembly on the rear shelf. Torque the bolt to 60 N·m (44 ft. lbs.).
(2) Install the rear shelf trim panel. Refer to the procedure in this group.

NOTE: The rear seat back retaining nut also serves as the center seat belt anchor (Fig. 5). Be certain to torque this nut to 60 N·m (44 ft. lbs.).

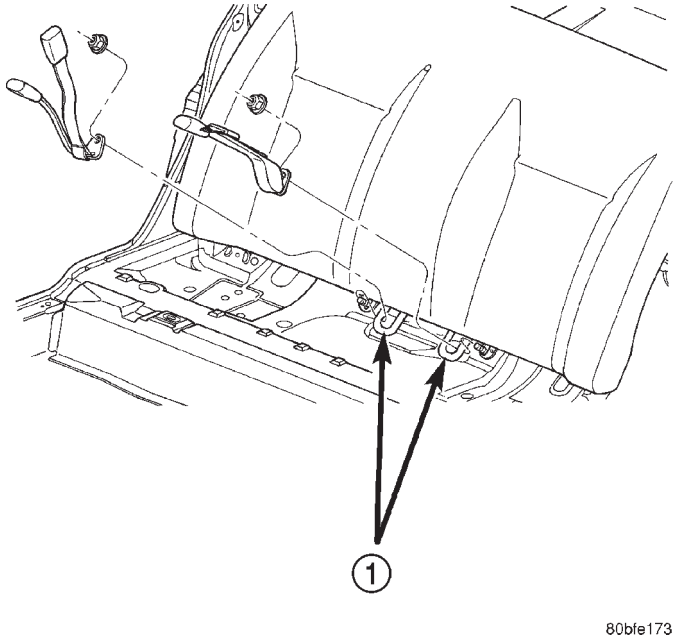


Fig. 5 Rear Seat Back Retaining Nuts

1 – ELASTIC STRAPS

(3) Install the rear seat back. Be certain rear seat belts are properly routed to avoid twisted or tangled belts and/or buckles (Fig. 5).

REAR SEAT BELT BUCKLES

REMOVAL

(1) Remove rear seat cushion.
(2) Remove seat belt anchor nut (Fig. 6).
(3) Remove seat belt buckle(s) from stud on floor.

INSTALLATION

(1) Place seat belt buckle(s) anchor over stud on floor.
(2) Install rear seat belt anchor nut. Tighten to 60 N·m (44 ft. lbs.).
(3) Install rear seat cushion.

REAR SHELF TRIM PANEL

REMOVAL

(1) Remove the rear seat cushion. Refer to Group 23, Body for the procedure.
(2) Remove the rear seat back. Refer to Group 23, Body for the procedure.
(3) Remove the upper and lower quarter trim panels. Refer to Group 23, Body for the procedure.
(4) Remove the rear shelf retaining pushpins (Fig. 7).
(5) Pull rear shelf trim panel away from rear glass to disengage clips.
(6) If equipped disconnect the CHMSL wire connector,.

REMOVAL AND INSTALLATION (Continued)

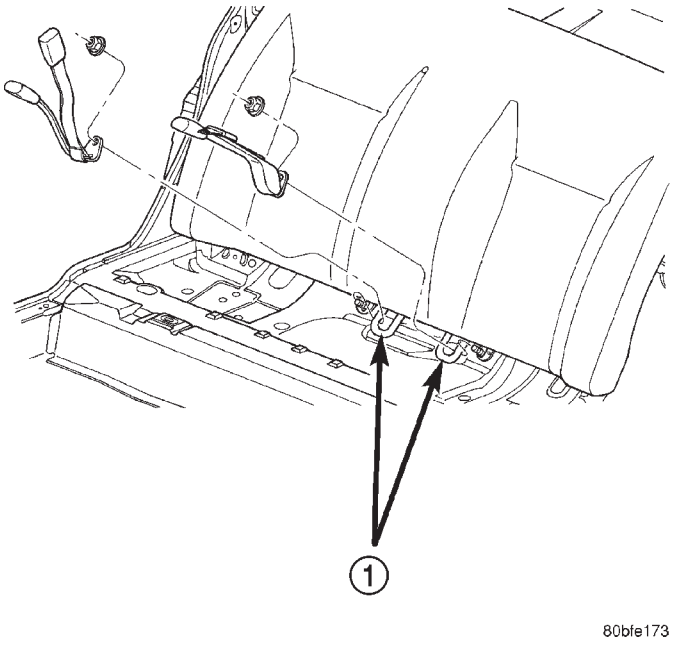


Fig. 6 Rear Seat Belt Buckle(s)

1 – ELASTIC STRAPS

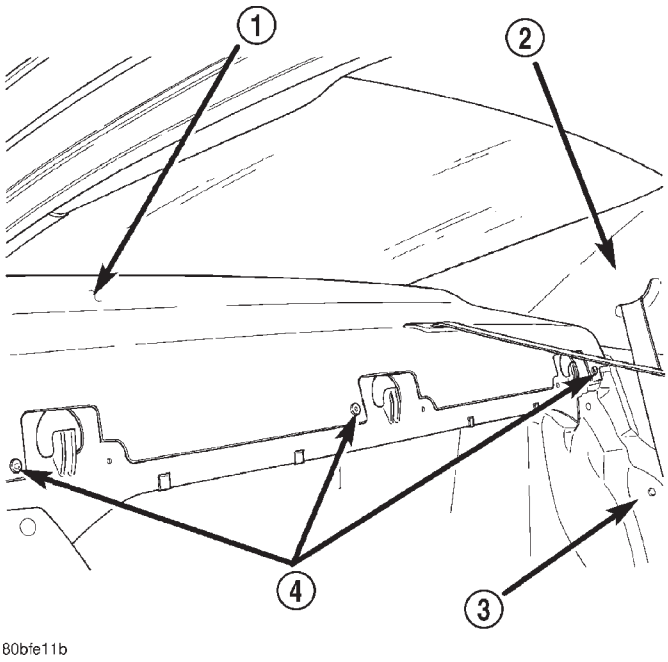


Fig. 7 Parcel Shelf Trim Panel

1 – REAR SHELF TRIM
2 – UPPER QUARTER TRIM PANEL
3 – LOWER QUARTER TRIM PANEL
4 – REAR SHELF RETAINING PUSHPINS

(7) Unsnap center seat belt bezel from rear shelf and feed bezel, belt and buckle through the hole in the rear shelf (Fig. 7).

(8) Remove rear shelf trim panel from the vehicle.

INSTALLATION

(1) Place rear shelf trim panel in position in vehicle.

(2) Feed the seat belt bezel, belt and buckle through the hole in the rear shelf. Be certain belt is not twisted or tangled after installation.

(3) If equipped, connect CHMSL wire connector.

(4) Line up rear shelf trim clips by looking under trim panel. Push parcel shelf trim rearward toward rear glass to fully engage clips.

(5) Install the rear shelf retaining pushpins (Fig. 7).

(6) Install the upper and lower quarter trim panels. Refer to Group 23, Body for the procedure.

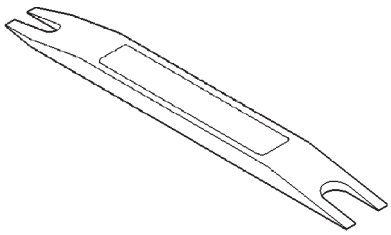
NOTE: The rear seat back retaining nut also serves as the center seat belt anchor. Be certain to torque this nut to 60 N·m (44 ft. lbs.).

(7) Install the rear seat back. Refer to Group 23, Body for the procedure.

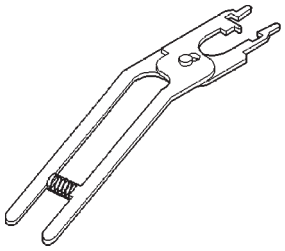
(8) Install the rear seat cushion. Refer to Group 23, Body for the procedure.

SPECIAL TOOLS

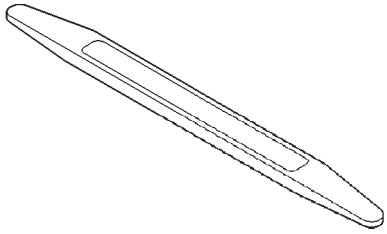
BODY



Remover, Moldings C-4829



Pliers, Headliner Clip C–6967



Stick, Trim C-4755

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TORQUE SPECIFICATIONS

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Front seat track to floor pan bolts	61 N·m (45 ft. lbs.)
Front seat inboard and outboard pivot bolts	30 N·m (23 ft. lbs.)
Front seat recliner to seat cushion frame	12 N·m (9 ft. lbs.)
Front seat track to cushion frame bolt	12 N·m (9 ft. lbs.)
Front seat back	40 N·m (30 ft. lbs.)
Front seat back to seat cushion	30 N·m (22 ft. lbs.)
Front seat back recliner to seat back	8 N·m (71 in. lbs.)
Front seat rear outboard seat track to floor pan bolts	28 N·m (20 ft. lbs.)
Front seat airbag module to seat back frame	7 N·m (62 in. lbs.)
Rear seat center seat belt retractor to shelf	60 N·m (44 ft. lbs.)

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DESCRIPTION AND OPERATION

ATC IN-CAR TEMPERATURE SENSOR

DESCRIPTION

The Automatic Temperature Control (ATC) In-Car Temperature Sensor returns electrical signals to the Body Control Module (BCM). The In-Car Temperature Sensor is used on ATC equipped vehicles only. The In-Car Temperature Sensor is made up of two parts. One part is the in-car sensor motor fan assembly and the second part is a temperature thermistor. The in-car sensor motor fan assembly attaches to the back of the ATC Control head (Fig. 1). This assembly has a small fan and a motor which draws air through the intake on the front of the ATC control. The in-car sensor thermistor is located inside of the ATC Control Head. Air drawn from the passenger compartment by the in-car sensor motor-fan assembly, flows over the thermistor. The in-car sensor thermistor

DESCRIPTION AND OPERATION (Continued)

changes resistance with air temperature. The BCM measures this resistance and calculates the temperature of the air drawn into the ATC Control. The ATC system then makes adjustments to maintain the optimum passenger compartment comfort. Refer to the ATC Sensor Motor-Fan Operation table for when the ATC Sensor is operating.

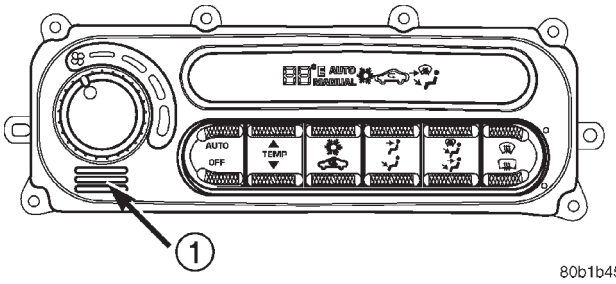


Fig. 1 ATC In-Car Temperature Sensor

1 – ATC IN-CAR TEMPERATURE SENSOR

OPERATION

ATC SENSOR MOTOR-FAN OPERATION

CONDITION	ATC SENSOR MOTOR OPERATION
IGNITION SWITCH IS ON.	MOTOR ALWAYS OPERATES, EVEN WHEN ATC CONTROL HEAD "OFF" BUTTON IS PUSHED.
VEHICLE IS DRIVEN, THEN THE IGNITION SWITCH IS TURNED OFF.	MOTOR TURNS OFF WHEN THE IGNITION SWITCH IS TURNED OFF.
VEHICLE DOOR IS OPENED WITHOUT TURNING ON THE IGNITION SWITCH AND LEFT OPEN.	MOTOR TURNS OFF IN APPROXIMATELY 2 MINUTES AFTER DOOR IS OPENED.
VEHICLE DOOR IS OPENED AND THEN CLOSED WITHOUT TURNING ON THE IGNITION SWITCH.	MOTOR TURNS OFF IN APPROXIMATELY 2 MINUTES AFTER DOOR IS SHUT.

The in-car sensor motor is an integral part of the Control Head and not a separate serviceable part. The ATC Control Head must be replaced if there is a fault relating to the motor. See Diagnosis and Testing in this section for proper check of airflow. The In-Car Sensor Thermistor is part of the ATC Control Head and not a separate serviceable part. One must replace the ATC Control Head if the ATC self-diagnostics indicates a fault code. See Self-Diagnostics in this section for information on diagnosing wiring and thermistor.

BLOWER MOTOR RESISTOR

DESCRIPTION

Vehicles with manual air conditioning (non-ATC) systems will have a blower motor resistor. The resistor is mounted to the lower right side of the heater-A/C housing in the passenger compartment, where it can be accessed for service. See Blower Motor Resistor in the Removal and Installation section of this group for more information.

The blower motor resistor has multiple resistor wires, each of which will change the resistance in the blower motor ground path to change the blower motor speed. The blower motor switch directs the ground path through the correct resistor wire to obtain the selected blower motor speed.

The blower motor resistor cannot be repaired and, if faulty or damaged, it must be replaced.

OPERATION

With the blower motor switch in the lowest speed position the ground path for the motor is applied through all of the resistor wires. Each higher speed selected with the blower motor switch applies the blower motor ground path through fewer of the resistor wires, increasing the blower motor speed. When the blower motor switch is in the highest speed position, the blower motor resistor is bypassed and the blower motor receives a direct path to ground.

BLOWER MOTOR POWER MODULE

DESCRIPTION

The blower motor power module is only used in vehicles equipped with Automatic Temperature Control (ATC). It is located on the lower right side of the HVAC unit housing, and is controlled by the Body Control Module (BCM).

OPERATION

The power module receives pulse width modulated (PWM) signals from the BCM. The power module varies voltage to the blower motor for different blower speeds based on the ATC software. There are 14 selectable speeds, while the Auto mode provides 256 variations.

COMPRESSOR

DESCRIPTION

The air conditioning system uses a Nippondenso 10PA17 ten cylinder, double-acting swash plate-type compressor on all models. This compressor has a

DESCRIPTION AND OPERATION (Continued)

fixed displacement of 170 cubic centimeters (10.374 cubic inches), and has both the suction and discharge ports located on the cylinder head. A label identifying the use of R-134a refrigerant is located on the compressor.

OPERATION

The compressor is driven by the engine through an electric clutch, drive pulley and belt arrangement. The compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant.

The compressor draws in low-pressure refrigerant vapor from the evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the condenser through the compressor discharge port.

The compressor cannot be repaired. If faulty or damaged, the entire compressor assembly must be replaced. The compressor clutch, pulley and clutch coil are available for service.

ENGINE COOLING SYSTEM REQUIREMENTS

DESCRIPTION

To maintain the performance level of the heating/air-conditioning system, the engine cooling system must be prepared as shown in this manual.

The use of a bug screen is not recommended. Any obstructions in front of the radiator or condenser can reduce the performance of the A/C and/or engine cooling system.

WARNING: DO NOT OPEN COOLING SYSTEM WHEN HOT AS PERSONAL INJURY OR DAMAGE TO VEHICLE MAY RESULT.

OPERATION

The engine cooling system is designed to develop internal pressure of 97 to 123 kPa (14 to 18 psi). Wait 15 minutes (after the engine is shut off), or until safe temperature and pressure is attained, before opening cooling system. Refer to Group 7, Cooling System. Coolant temperature can be checked using the scan tool (DRBIII®).

When additional coolant is needed, it should be added to the coolant pressure bottle. Use only 50/50 mix of Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (orange in color), or the equivalent and distilled water. This coolant must not be mixed with other (green in color) coolants. If this occurs, a reduction in the extended service interval will result. Refer to LUBRICATION AND MAINTENANCE for service schedules.

CAUTION: Do not add additional inhibitors, anti-rust products, or soluble oil (sold as "water pump lubricants"). These products may not be compatible with the engine coolant.

Refer to Group 7, Cooling System for cooling system procedures.

EVAPORATOR TEMPERATURE SENSOR

DESCRIPTION

The evaporator temperature sensor is a temperature sensing element located at the coldest point on the face of the evaporator. The evaporator temperature sensor prevents condensate water on the evaporator coil from freezing which can block airflow. The probe is a thermistor inside a metal tube which is wedged between the evaporator fins. The metal tube is tightly held by the evaporator fins so that the thermistor in the tube will detect the temperature of the evaporator. The thermistor will change resistance as the temperature changes.

OPERATION

The Body Control Module (BCM) will send a Programmable Communications Interface (PCI) bus message to the Powertrain Control Module (PCM), which will check engine, coolant temperature, and refrigerant pressure temperature before turning ON the A/C Compressor Clutch. Turning ON the A/C Compressor Clutch will allow the system to cool the evaporator. The BCM will send a message to the PCM when the evaporator temperature becomes too cold. The PCM will then turn OFF the A/C Compressor Clutch, before evaporator freeze up occurs. The DRBIII® scan tool can be used to monitor this operation. The temperature setpoint at which the clutch is turned OFF varies with the outside ambient temperature. The temperature at which the clutch is turned ON is preset to 2° F above the OFF setpoint mentioned above. Refer to Evaporator Temperature Sensor Setpoint table and (Fig. 2) for the correct setpoint.

EXPANSION VALVE

DESCRIPTION

The "H valve" type thermal expansion valve (TXV) is located at the point where the refrigerant lines join the evaporator coil on the engine compartment side of the dash panel.

The expansion valve is a factory calibrated unit and cannot be adjusted or repaired. If faulty or damaged, the expansion valve must be replaced.

DESCRIPTION AND OPERATION (Continued)

EVAPORATOR TEMPERATURE SENSOR SETPOINT

AMBIENT TEMPERATURE SENSOR READING ° F (° C)	A/C CLUTCH OFF EVAPORATOR TEMPERATURE SETPOINT ° F (° C)
185 (85)	31 (-.5)
100 (37.7)	31 (-.5)
77 (25)	34 (1.1)
60 (15.5)	35 (1.6)
-70 (-56.6)	36 (2.2)

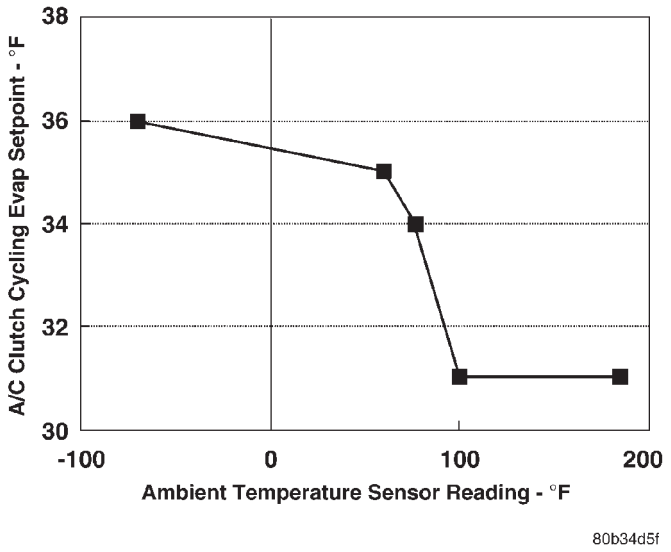


Fig. 2 Evaporator Temperature Sensor Setpoint

OPERATION

High-pressure, high temperature liquid refrigerant from the liquid line passes through the expansion valve orifice, converting it into a low-pressure, low-temperature mixture of liquid and gas before it enters the evaporator coil. A temperature sensor in the expansion valve control head monitors the temperature of the refrigerant leaving the evaporator coil through the suction line, and adjusts the orifice size at the liquid line to let the proper amount of refrigerant into the evaporator coil to meet the vehicle cooling requirements. Controlling the refrigerant flow through the evaporator ensures that none of the refrigerant leaving the evaporator is still in a liquid state, which could damage the compressor.

FILTER-DRIER

DESCRIPTION

The filter-drier is located in the engine compartment near the dash panel on the passenger side of the vehicle. The filter-drier incorporates a sight glass for visual diagnosis of the refrigerant system

OPERATION

High-pressure liquid refrigerant from the condenser flows into the filter-drier. A drying agent, called a desiccant, is used to remove any traces of moisture from the refrigerant system. The filter-drier also performs a filtering action to prevent foreign material in the refrigerant from contaminating the expansion valve. In addition, during periods of high demand air conditioner operation, the filter-drier acts as a reservoir to store surplus refrigerant.

The A/C refrigerant must be removed from the system before removing the filter/drier using a refrigerant recovery machine. Replace the filter/drier if an A/C system is left open for an extended period of time.

The filter-drier cannot be repaired and, if faulty, must be replaced.

HANDLING TUBING AND FITTINGS

DESCRIPTION

Kinks in the refrigerant tubing or sharp bends in the refrigerant hose lines will greatly reduce the capacity of the entire system.

DESCRIPTION AND OPERATION (Continued)

CAUTION: The system must be completely empty before opening any fitting or connection in the refrigeration system. Open fittings with caution even after the system has been emptied. If any pressure is noticed as a fitting is loosened, retighten fitting and evacuate the system again.

A good rule for the flexible hose lines is to keep the radius of all bends at least 10 times the diameter of the hose. Sharper bends will reduce the flow of refrigerant. The flexible hose lines should be routed so they are at least 3 inches (80 mm) from the exhaust manifold. Inspect all flexible hose lines to make sure they are in good condition and properly routed.

The use of correct wrenches when making connections is very important. Improper wrenches or improper use of wrenches can damage the fittings.

The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities.

When opening a refrigeration system, have everything you will need to repair the system ready. This will minimize the amount of time the system must be opened. Cap or plug all lines and fittings as soon as they are opened. This will help prevent the entrance of dirt and moisture. All new lines and components should be capped or sealed until they are ready to be used.

All tools, including the refrigerant dispensing manifold, the manifold gauge set, and test hoses should be kept clean and dry.

OPERATION

High pressures are produced in the system when it is operating. Extreme care must be exercised to make sure that all connections are pressure tight. Dirt and moisture can enter the system when it is opened for repair or replacement of lines or components. The refrigerant oil will absorb moisture readily out of the air. This moisture will convert into acids within a closed system.

HVAC FORCED RECIRCULATION

DESCRIPTION

The HVAC system (both Manual A/C and ATC) may force itself into recirculated airflow when extremely hot outside ambient conditions exist. This action can occur at a range of approximately 95°F to 120°F.

OPERATION

The Body Control Module (BCM) receives a Programmable Communications Interface (PCI) bus message from the Powertrain Control Module (PCM) with the feedback from the A/C Pressure Transducer. The BCM will force the system into the Recirculation mode, reducing the A/C refrigerant pressure under these extreme conditions. The reduced operating pressure offers improved A/C system performance and reduced wear on A/C components.

REFRIGERANT LINES

DESCRIPTION

The air conditioning lines used on this vehicle are made from reinforced rubber with a nylon liner on the inner walls. The ends of the A/C lines are made with light weight aluminum fittings.

CAUTION: Never attempt to disconnect an A/C line without reclaiming all refrigerant from the air conditioning system. The system must be empty.

OPERATION

The O-rings are made from a special type of rubber that is not affected by R-134a refrigerant. O-ring replacement is required whenever lines are removed and installed. Use only O-rings specified for this vehicle. Failure to use the correct type of O-ring will cause the connection to leak within a short period of time.

When it is necessary to open the refrigeration system, have everything needed to service the system ready. The system should not be left open any longer than necessary. Cap or plug all lines and fittings as soon as they are opened. This will prevent the entrance of dirt and moisture into the system. All new lines and components should be capped or sealed until they are ready to be used.

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

DESCRIPTION AND OPERATION (Continued)

SIDE WINDOW DEMISTERS

DESCRIPTION

The side window demisters direct air from the heater assembly through the outlets located on the top corners of the instrument panel, to the side windows.

OPERATION

Side window demisting is performed when the mode selector is on FLOOR, DEFROST, MIX OR BI-LEVEL setting.

SUN SENSOR

DESCRIPTION

The sun sensor is only used on vehicles equipped with Automatic Temperature Control (ATC). The sensor is mounted on the top of the instrument panel below the instrument panel top cover (Fig. 3).

OPERATION

The sun sensor is not a thermistor type sensor but rather a photo diode. For this reason the sun sensor responds to sun light intensity rather than temperature. It is used to aid in determining proper mode door position, temperature door position and blower speed. The sun sensor is also used to sense day/night conditions for automatic headlight control if so equipped, and has an LED indicator for the vehicle security system.

The sun sensor is not serviceable and must be replaced if found to be defective.

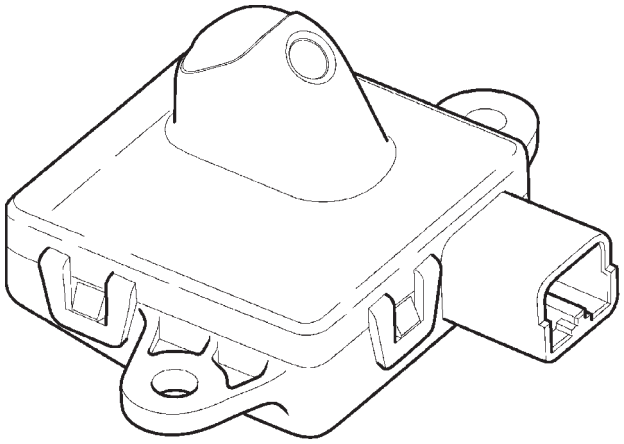


Fig. 3 Sun Sensor

SYSTEM AIRFLOW

DESCRIPTION

The system draws outside air through the cowl opening at the base of the windshield. Then it goes into the plenum chamber above the Heater A/C unit housing and passes through the evaporator. At this point airflow can be directed either through or around the heater core.

OPERATION

Airflow can be adjusted by the blend-air door with the TEMP control on the control head. After the air passes the blend air door, the air flow is then directed from the PANEL, BI-LEVEL (panel and floor), and FLOOR-DEFROST outlets. Air flow velocity can be adjusted with the blower speed selector switch on the control head.

Ambient air intake can be shut off by closing the recirculating air door. This will recirculate the air that is already inside the vehicle. See owners manual for recirculation operation.

DIAGNOSIS AND TESTING

A/C PERFORMANCE TEST

The air conditioning system is designed to remove heat and humidity from the air entering the passenger compartment. The evaporator, located in the heater A/C unit, is cooled to temperatures near the freezing point. As warm damp air passes over the fins in the evaporator, moisture in the air condenses to water, dehumidifying the air. High humidity reduces the evaporator's ability to cool the air. During periods of high heat and humidity, an air conditioning system will be less effective. With the control module set to RECIRC, only air from the passenger compartment passes through the evaporator. As the passenger compartment air dehumidifies, A/C performance levels rise.

PERFORMANCE TEST PROCEDURE

Review Safety Precautions and Warnings in this group before proceeding with this procedure. Air temperature in test room and in vehicle must be 21° C (70°F) minimum for this test.

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

(1) Connect a tachometer and manifold gauge set.
(2) Set controls:

MANUAL A/C

- A/C ON
- Panel Recirculation
- Temperature to full cold
- High blower

DIAGNOSIS AND TESTING (Continued)

ATC (Automatic Temperature Control) System:

- Rotate blower knob to high position (full clockwise)
- Set temperature to the LO position
- Push panel mode button
- Push RECIRC (Recirculation) button (A/C and RECIRC symbols should be lit)

NOTE: The word MANUAL should appear in the ATC display, confirming that the system is set manually.

(3) Start engine and hold at 1000 rpm with A/C clutch engaged.

(4) Engine should be warmed up with doors and windows closed.

(5) Insert a thermometer in the left center A/C outlet and operate the engine for five minutes. The A/C clutch may cycle depending on ambient conditions.

(6) **With the A/C clutch engaged**, compare the discharge air temperature to the A/C Performance Temperature table.

A/C PERFORMANCE TEMPERATURE AND PRESSURE

AMBIENT TEMPERATURE	21°C (70°F)	26.5°C (80°F)	32.5°C (90°F)	37°C (100°F)	43°C (110°F)
MAXIMUM ALLOWABLE AIR TEMPERATURE AT CENTER LEFT PANEL OUTLET	6°C (42°F)	7°C (45°F)	10°C (50°F)	12°C (54°F)	15°C (59°F)
COMPRESSOR DISCHARGE PRESSURE	1379–1585 kPa (200–230 psi)	1448–1723 kPa (210–250 psi)	1654–1930 kPa (240–280 psi)	1930–2206 kPa (280–320 psi)	2206–2516 kPa (320–365 psi)
COMPRESSOR SUCTION PRESSURE	103–172 kPa (15–25 psi)	139–208 kPa (20–30 psi)	172–241 kPa (25–35 psi)	208–276 kPa (30–40 psi)	241–310 kPa (35–45 psi)

ATC IN-CAR TEMPERATURE SENSOR

(1) Perform air flow test to check motor/fan assembly.

(a) Turn ignition to the ON position and push the OFF button to stop the ATC system airflow. This will make it easier to observe paper in the step Step b.

(b) Place a small piece of newspaper in front of the sensor/motor opening on the ATC control. If the paper sticks to the opening, the In-Car sensor/motor is operating properly. The piece of paper should be only large enough to cover the grille opening.

(2) Check if the electrical connection and connector are OK.

COMPRESSOR

The compressor used on this vehicle is a Nippondenso 10PA17 R134a. This compressor uses an aluminum swash plate, teflon coated pistons and aluminum cylinder walls. One-way check valves are used to regulate refrigerant flow through the compressor.

CAUTION: A 10PA17 R-12 compressor looks identical to a 10PA17 R134a and will bolt up to this vehicle. It is extremely important that a R-134a compressor is identified prior to using compressor in question. Check tag located on compressor for model number.

Excessive noise that occurs when the air-conditioning is being used may be caused by:

- Loose Bolts
- Mounting Brackets
- Loose Compressor Clutch
- Excessive High Refrigerant Operating Pressure

Verify the following before compressor repair is performed:

(1) Compressor drive belt condition

(2) Proper refrigerant charge

(3) Thermal expansion valve (TXV) operating correctly

(4) Head pressure is normal

EXPANSION VALVE

The expansion valve is located on the engine side of the dash panel, near the right shock tower.

The expansion valve can fail in three different positions (open, closed or restricted). **Note, that in each case, it is defective and requires replacement.**

DIAGNOSIS AND TESTING (Continued)

In an Open Position: this will result in a noisy compressor or no cooling. The cause can be a broken spring, broken ball or excessive moisture in the A/C system. If the spring or ball are found to be defective, replace the expansion valve. If excessive moisture is found in the A/C system, recycle the refrigerant.

In a Closed Position: There will be low suction pressure and no cooling. This may be caused by a failed power dome or excessive moisture in the A/C system. If the power dome on the expansion valve is found to be defective replace the expansion valve. If excessive moisture is found recycle the refrigerant.

A Restricted Orifice: There will be low suction pressure and no cooling. This may be caused by debris in the refrigerant system. If debris is believed to be the cause, recycle the refrigerant and replace the expansion valve and filter/drier.

SELF DIAGNOSTICS

DIAGNOSTIC TROUBLE CODES (DTC's)

Both the ATC and the Manual A/C system are controlled by the Body Control Module (BCM). Both systems can be diagnosed by the DRBIII® scan tool or the vehicles own control head display. Refer to the DRBIII® menu for checking Diagnostic Trouble Codes (DTC's) Note that there are three DTC tables. The ATC and Manual A/C DTC table contain faults that are common to both the ATC and the Manual A/C system. The same diagnosis can be used for both systems. The DTC's cover operation of the climate control unit actuators, doors, evaporator temperature sensor, ambient temperature sensor and the A/C refrigerant system. The Manual A/C DTC table covers Fault Codes that are for the manual A/C Control Head and wiring and are not used on an ATC system. The ATC DTC table has DTC's for ATC Head Communications, In-Car Temperature Sensor and Sun Sensor which are not in a Manual A/C system.

TROUBLE CODES FROM THE ATC CONTROL

The trouble codes can be checked with the ATC control if a DRBIII® scan tool is not available. The control head can only be placed into the diagnostic mode while the engine is running and the vehicle is not moving. Set the control to a 75° F setting (so there is no confusion with the 23-51 Diagnostic Trouble Codes (DTC's).

To place the system into it's diagnostic mode, press and hold the Floor, Mix and Defrost buttons (at the same time). The ATC head display will begin to blink. Release the Floor, Mix and Defrost buttons. Once the control head enters the diagnostic mode, the display on the control head will continue to blink. This occurs until it completes its tests and climate control unit door/actuator calibrations. Then it will

ATC AND MANUAL A/C DTC'S

CODE	DESCRIPTION
23	BLEND DOOR ACTUATOR FEEDBACK FAILURE
24	MODE DOOR ACTUATOR FEEDBACK FAILURE
25	AMBIENT SENSOR
31	RECIRCULATION DOOR ACTUATOR STALL FAILURE
32	BLEND DOOR ACTUATOR STALL FAILURE
33	MODE DOOR ACTUATOR STALL FAILURE
35	EVAPORATOR SENSOR FAILURE
37	BLEND DOOR ACTUATOR OUTPUT SHORTED TO BATTERY
38	BLEND DOOR ACTUATOR OUTPUT SHORTED TO GROUND
39	MODE DOOR ACTUATOR OUTPUT SHORTED TO BATTERY
40	MODE DOOR ACTUATOR OUTPUT SHORTED TO GROUND
41	RECIRC DOOR ACTUATOR OUPUT SHORTED TO BATTERY
42	RECIRC DOOR ACTUATOR OUTPUT SHORTED TO GROUND
43	COMMON DOOR OUTPUT SHORTED TO BATTERY
44	COMMON DOOR OUTPUT SHORTED TO GROUND
51	SYSTEM VOLTAGE TOO LOW FOR DOOR CALIBRATION

MANUAL A/C DTC'S

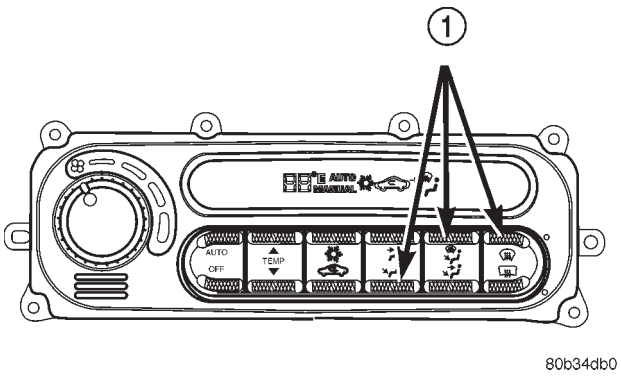
CODE	DESCRIPTION
45	A/C CONTROL BLEND DOOR INPUT OPEN OR SHORTED TO GROUND
46	A/C CONTROL BLEND DOOR SHORTED TO BATTERY
47	A/C CONTROL - A/C SWITCH FAILURE
48	A/C CONTROL MODE DOOR INPUT SHORTED TO GROUND
49	A/C CONTROL MODE DOOR INPUT SHORTED TO BATTERY
50	A/C CONTROL ELECTRIC BACKLITE (EBL) SWITCH FAILURE

DIAGNOSIS AND TESTING (Continued)

ATC DTC'S

CODE	DESCRIPTION
26	ATC IN-CAR TEMPERATURE THERMISTER FAILURE
27	ATC IN-CAR SENSOR FAILURE
34	ENGINE TEMPERATURE MESSAGE NOT RECEIVED
36	ATC CONTROL COMMUNICATION FAILURE

display any diagnostic trouble codes that are present in the BCM. If there are no diagnostic trouble codes, the system will return to its normal operation as indicated by the temperature symbol (a C or a F). Diagnostic trouble codes related to the ATC and climate control unit will appear on the display in numerical form. The diagnostic trouble codes are stored in the BCM and can range between 23 and 51. The ATC control can only show one diagnostic trouble code at a time. Under certain circumstances, more than one diagnostic trouble code could be in the memory. To scroll through any additional diagnostic trouble codes, press the Panel Mode button on the ATC control. **It is important that no other knob or button is pushed until all codes are read. Pushing any button except Panel Mode or turning a knob will end the diagnostic test without showing the rest of the trouble codes. There also may be other trouble codes stored in the BCM not related to the Climate Control System. These codes can only be found using the DRBIII® scan tool.**



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Fig. 4 Entering Self-Diagnostic Mode

1 – PRESS BUTTONS SIMULTANEOUS

TROUBLE CODES FROM THE MANUAL A/C CONTROL

The trouble codes can be checked with the Manual A/C control and the Odometer Display of the Mechanical Instrument Cluster if a DRBIII® scan tool is not available. The Manual A/C Control Head can only be placed into the diagnostic mode while the engine is running and the vehicle is not moving. To place the system into it's diagnostic mode, adjust the Manual A/C Control to the following settings:

(1) The engine must be running with vehicle not moving.

(2) The Fan Speed set to any speed except OFF.

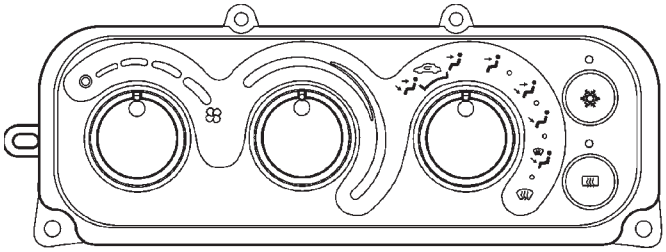
(3) The Temperature Knob in full cold (full counterclockwise position).

(4) The mode knob must be placed in defrost position (full clockwise position).

(5) The A/C button can be ON or OFF.

(6) Press and hold the EBL button until the Mechanical Instrument Cluster Odometer display indicates an "AC00". The body control module (BCM) will chime once and the Manual A/C control A/C button LED will begin blinking.

(7) Release the EBL button and wait until the Manual A/C Control A/C button LED stops blinking. This means that the error check and climate control unit door calibration is complete.



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Fig. 5 Manual A/C Control Head

Diagnostic trouble codes related to the Manual A/C Control and the climate control unit will appear on the odometer display in numerical form after the letters "AC". The diagnostic trouble codes are stored in the BCM and can range between 23 and 51. The odometer display will return to normal operation if no trouble codes are found. If a problem is found, then the odometer will display the letters "A/C" followed by the trouble code number. The odometer display can only show one diagnostic trouble code at a time. Under certain circumstances, more than one diagnostic trouble code could be in the memory. To scroll through any additional diagnostic trouble codes, press the A/C button on the Manual-A/C control. The BCM will beep each time the A/C button is pushed. Continue pushing the A/C button and recording the trouble code numbers until the odometer returns to normal operation (note the letters AC will disappear). **It is important that no other knob or button is pushed until all codes are read. Push-**

DIAGNOSIS AND TESTING (Continued)

ing any button except the A/C button or turning a knob will end the diagnostic test without showing the rest of the trouble codes. There also may be other trouble codes stored in the BCM not related to the Climate Control System. These codes can only be found using the DRBIII® scan tool.

ERASING DIAGNOSTIC TROUBLE CODES (DTC's)

Diagnostic trouble codes can be cleared from the memory two ways:

- The DRBIII® scan tool
- Power to the BCM can be disconnected for ten minutes by disconnecting the battery negative remote cable.

If the scan tool is to be used, refer to the proper LH Body Diagnostic Procedures Manual.

CAUTION: Fault code 26 can be created if the in-car sensor thermistor is disconnected while the BCM is operating. This can happen by disconnecting connectors from the BCM or the ATC Control Head when the battery is connected (even if the ignition switch is OFF). To correct, clear the fault code 26 from the BCM.

HEATER PERFORMANCE TEST

PRE-DIAGNOSTIC PREPARATIONS

Review Safety Precautions and Warnings in this group before performing the following procedures.

Check the coolant level, drive belt tension, vacuum line connections, radiator air flow and fan operation. Start engine and allow to warm up to normal temperature.

WARNING: DO NOT REMOVE RADIATOR CAP WHEN ENGINE IS HOT, SEVERE PERSONAL INJURY CAN RESULT.

If vehicle has been run recently, wait until engine is cool before removing cap. Squeeze the radiator hose to check temperature, and for pressure in the system. If the hose is very firm, allow time to cool down. Place a rag over the cap and turn it to the first safety stop. Allow pressure to escape through the overflow tube. When the system stabilizes, remove the cap completely.

MAXIMUM HEATER OUTPUT: TEST AND ACTION

Engine coolant is provided to the heater system by two 19 mm (3/4 inch inside diameter) heater hoses. With engine idling at normal running temperature, set the control to maximum heat, floor, and high blower setting. Using a test thermometer, check the air temperature coming from the floor outlets. Refer to Temperature Reference Table.

TEMPERATURE REFERENCE TABLE

Ambient Temp.		Minimum Outlet Floor Temp.	
Celsius	Fahrenheit	Celsius	Fahrenheit
15.5°	60°	62.2°	144°
21.1°	70°	63.8°	147°
26.6°	80°	65.5°	150°
32.2°	90°	67.2°	153°

If the floor outlet air temperature is insufficient, refer to Group 7, Cooling Systems for specifications. Both heater hoses should be HOT to the touch (coolant return hose should be slightly cooler than the supply hose). If coolant return hose is much cooler than the supply hose, locate and repair engine coolant flow obstruction in heater system.

POSSIBLE LOCATIONS OR CAUSE OF OBSTRUCTED COOLANT FLOW

(1) Pinched or kinked heater hoses.
(2) Improper heater hose routing.
(3) Plugged heater hoses or supply and return ports at cooling system connections, refer to Group 7, Cooling System.
(4) Plugged heater core.
(5) Air locked heater core.
(6) If coolant flow is verified and outlet temperature is insufficient, a mechanical problem may exist.

POSSIBLE LOCATION OR CAUSE OF INSUFFICIENT HEAT

(1) Obstructed cowl air intake.
(2) Obstructed heater system outlets.
(3) Blend-air door not functioning properly.

TEMPERATURE CONTROL

If temperature cannot be adjusted with the TEMP knob/button on the control panel, the following could require service:

(1) Blend-air door binding.
(2) Faulty blend-air door motor.
(3) Improper engine coolant temperature.
(4) Faulty Instrument Panel Control.
(4) Refer to the appropriate LH Body Diagnostic Procedures Manual.

SUN SENSOR

The sun sensor is located so the sun hits the sensor in the same way that it hits the driver and the passenger. It is important that the area in front of

DIAGNOSIS AND TESTING (Continued)

the sensor be unobstructed. Check that the following items are not in the way of the sun sensor.

- Windshield wipers that are adjusted too high.
- Stickers on the windshield that are directly in front of the sensor.
- Top cover which is not properly installed. The sun sensor should be 1/4 inch. above the top cover.
- Caps or papers which might cover the sensor.

Refer to the proper LH Body Diagnostic Procedures Manual for electrical test.

SYSTEM OIL LEVEL

It is important to have the correct amount of lubricant in the A/C system to ensure proper lubrication of the compressor. Too little lubricant will result in damage to the compressor. Too much lubricant will reduce the cooling capacity of the system and consequently result in higher discharge air temperatures.

The lubricant used in the compressor is polyalkalene glycol PAG lubricant. Only the refrigerant lubricant approved for use with this vehicle (ND8 PAG oil) should be used to service the system. Do not use any other lubricant. The lubricant container should be kept tightly capped until it is ready for use. Refrigerant lubricant will quickly absorb any moisture it comes in contact with.

It is not necessary to check or add lubricant unless it has been lost. Lubricant loss at the leak point will be evident by the presence of a wet, shiny surface around the leak.

REFRIGERANT OIL LEVEL CHECK

When an air conditioning system is first assembled, all components (except the compressor) are refrigerant oil free. After the system has been charged with (R-134a) refrigerant and operated, the oil in the compressor is dispersed through the lines and components. The evaporator, condenser, and receiver/drier will retain a significant amount of oil. Refer to the A/C Component Refrigerant Oil Capacities table. When a component is replaced, the specified amount of refrigerant oil must be added. When the compressor is replaced, the amount of oil that is retained in the rest of the system must be drained from the replacement compressor. The oil capacity of the system, minus the amount of oil still in the remaining components (refer to the oil capacity chart below) can be measured and poured into the suction port of the compressor. When a line or component has ruptured and oil has escaped, the receiver/drier must be replaced along with the ruptured part.

Example: On an A/C system the evaporator retains 60 ml. (2 oz.). The condenser retains 30 ml. (1 oz.) of oil, and system capacity may be 150 ml. (5.00 oz.) of oil.

150 ml. minus 90 ml. equals 60 ml. (2.00 oz.).

A/C COMPONENT REFRIGERANT OIL CAPACITIES

COMPONENT NAME	ml.	oz.
Total Air Conditioning System	150 ml.	5.00 oz.
Condenser	30 ml.	1.00 oz.
Evaporator	59 ml.	2.00 oz.
Filter/Drier	30 ml.	1.00 oz.
Line Blown	44 ml.	1.50 oz.

CAUTION: The refrigerant oil used in a R-134a A/C system is unique. Use only oils which were designed to work with R-134a refrigerant. The oil designated for this vehicle is ND 8 PAG (polyalkalene glycol).

VERIFY REFRIGERANT ND8 LUBRICANT LEVEL

(1) Discharge refrigerant system using a recycling/reclaiming equipment if a charge is present.

(2) Disconnect refrigerant lines from A/C compressor. Cap the open lines to prevent moisture from entering system.

(3) Remove compressor from vehicle.

(4) From suction and discharge ports on top of compressor, drain lubricant from compressor.

(5) Add system capacity minus the capacity of components that have not been replaced. Refer to the A/C Component Refrigerant Oil Capacities chart above. Add lubricant through the suction and discharge ports on compressor. This is not to exceed 150 ml. (5.00 oz.) in total.

(6) Install compressor and connect refrigerant lines. Then evacuate and charge refrigerant system.

(7) Most reclaim/recycling equipment will measure the lubricant being removed. This amount of lubricant should be added back to the system. If a new compressor is being installed, drain lubricant from old compressor, measure the amount drained and discard old lubricant. Drain the lubricant from the new compressor into a clean container. Return the amount of lubricant measured from the old compressor, plus the amount reclaimed from the system back into the new compressor.

SERVICE PROCEDURES

EVACUATING REFRIGERANT SYSTEM

NOTE: Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

SERVICE PROCEDURES (Continued)

If a compressor designed to use R-134a refrigerant is left open to the atmosphere for an extended period of time. It is recommended that the refrigerant oil be drained and replaced with new oil or a new compressor be used. This will eliminate the possibility of contaminating the refrigerant system.

If the refrigerant system has been open to the atmosphere, it must be evacuated before the system can be filled. Moisture and air mixed with the refrigerant will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the air conditioner and damage the compressor. Moisture will boil at near room temperature when exposed to vacuum. To evacuate the refrigerant system:

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

(1) Connect a suitable charging station, refrigerant recovery machine, and a manifold gauge set with vacuum pump (Fig. 6).

(2) Open suction and discharge valves and start vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to charge, to eliminate all moisture in system. When suction gauge reads -88 kPa (-26 in. Hg) vacuum or greater for 45 minutes, close all valves and turn off vacuum pump. **If the system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected.** If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the suction and discharge valves. Then allow the system to evacuate an additional 10 minutes.

(3) Close all valves. Turn off and disconnect the vacuum pump.

(4) The refrigerant system is prepared to be charged with refrigerant.

R-134a REFRIGERANT

This vehicle uses a refrigerant called R-134a. It is a non-toxic, non-flammable, clear colorless liquefied gas.

R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. Even a small amount of R-12 in a R-134a system could cause compressor failure, refrigerant oil sludging or poor performance. **Never add R-12 to a system designed to use R-134a. System failure will occur.**

The service ports for the 3.2 / 3.5L applications are located on the compressor (Fig. 7). The service ports for the 2.7L application are located on the A/C liquid (high pressure) and suction (low pressure) lines. R-134a service ports have been used to ensure that the system is not accidentally filled with the wrong refrigerant.

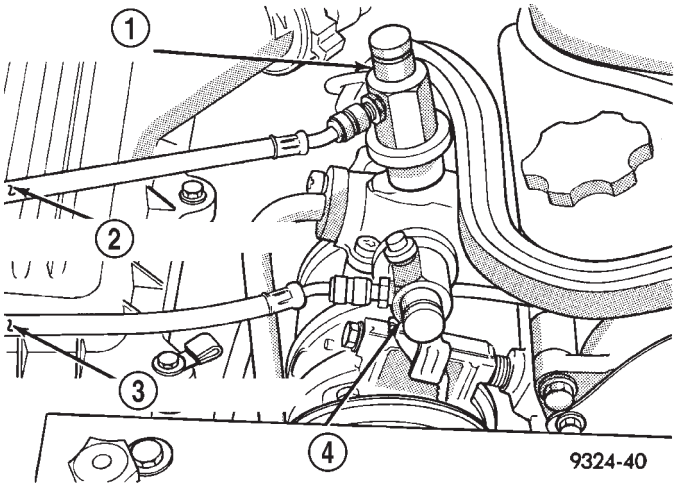


Fig. 6 Gauge Set or Refrigerant Recovery Machine Hookup (3.2 / 3.5L)

1 – HIGH SIDE CONNECTOR
2 – TO MANIFOLD GAUGE SET
3 – TO MANIFOLD GAUGE SET
4 – LOW SIDE CONNECTOR

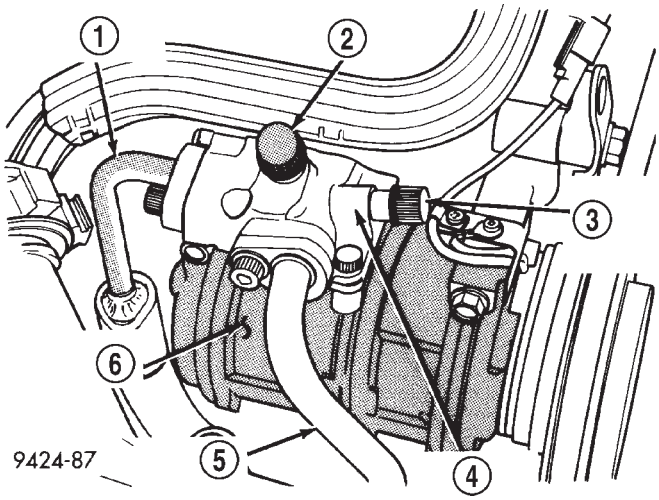


Fig. 7 A/C Service Ports (3.2 / 3.5L)

1 – DISCHARGE LINE
2 – HIGH SIDE SERVICE PORT
3 – LOW SIDE SERVICE PORT
4 – MANIFOLD
5 – SUCTION LINE
6 – A/C COMPRESSOR

When servicing a system, it is required that an air conditioning charging recovery/recycling machine be used (Fig. 8). Contact an automotive service equipment supplier for proper equipment. Refer to the operating instructions provided with the equipment for proper operation.

SERVICE PROCEDURES (Continued)

A manifold gauge set (Fig. 9) must also be used in conjunction with the charging and/or recovery/recycling device. Only use gauges that have not been used for R-12. The service hoses on the gauge set should have manual (turn wheel) or automatic back flow valves at the service port connector ends. This will prevent refrigerant R-134a from being released into the atmosphere.

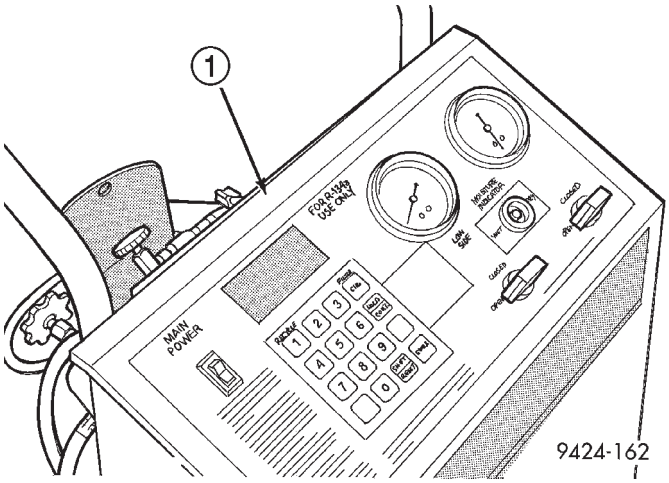


Fig. 8 Refrigerant Recovery/Recycling Station - Typical

1 – R-134 REFRIGERANT RECOVERY MACHINE

R-134a refrigerant requires a special type of compressor oil. When adding oil, make sure that it is designed to be used in a R-134a system. Refer to the label under the hood for proper oil and refrigerant charge levels

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO RECLAIM R-134a SYSTEMS. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR and R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

The use of R-134a will have a positive environmental impact due to it's zero ozone depletion and low global warming impact.

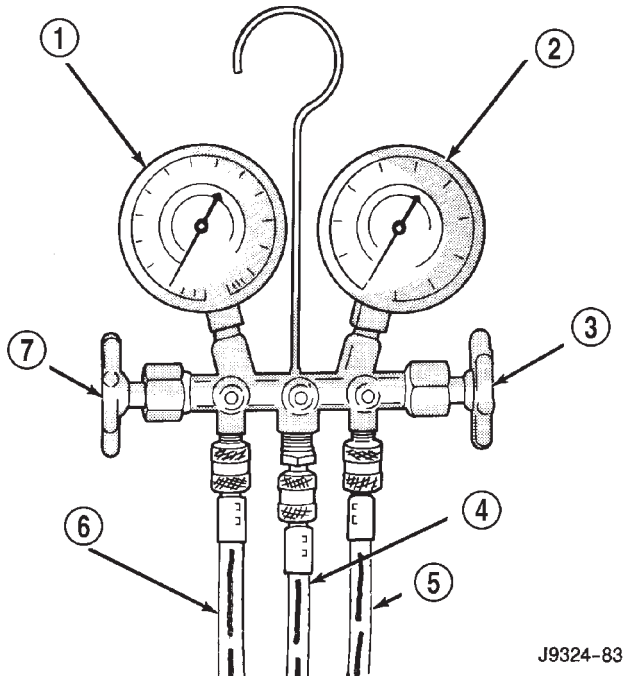


Fig. 9 Manifold Gauge Set - Typical

1 – LOW PRESSURE GAUGE
2 – HIGH PRESSURE GAUGE
3 – VALVE
4 – VACUUM/REFRIGERANT HOSE (YELLOW W/BLACK STRIP)
5 – HIGH PRESSURE HOSE (RED W/BLACK STRIP)
6 – LOW PRESSURE HOSE (BLUE W/BLACK STRIP)
7 – VALVE

THERMOCOUPLE PROBE

To diagnose the LH A/C system, a temperature probe is required to measure liquid line temperature. The clamp-on type K probe shown in this manual is available through the Chrysler Professional Service Equipment (PSE) program. This probe is compatible with temperature-measuring instruments that accept Type K Thermocouples and have a miniature connector input. Other temperature probes are available through aftermarket sources. All references in this manual will reflect the use of the probe made available through the Professional Service Equipment program.

In order to use the temperature probe, a digital thermometer will be required. If a digital thermometer is not available, an adapter is available through the Professional Service Equipment program. It can convert any standard digital multimeter into a thermometer. This adapter is designed to accept any standard K-type thermocouple.

If a digital multimeter is not available, it to can be ordered through Professional Service Equipment program.

SERVICE PROCEDURES (Continued)

SYSTEM CHARGE LEVEL

TO CHECK OR FILL SYSTEM

The procedure below should be used to check and/or fill the refrigerant charge in the air conditioning system.

NOTE: The air conditioning system in this vehicle holds 0.71 Kg. (25 oz. or 1.56 lbs.) of R-134a refrigerant.

This procedure can be performed two different ways:

- With a scan tool (DRBIII®) and a thermocouple (Fig. 10).
- Using a manifold gauge set (Fig. 11), a thermocouple and the Charge Determination Graph (Fig. 12). It is recommended to use the gauges or reclaim/ recycle equipment.

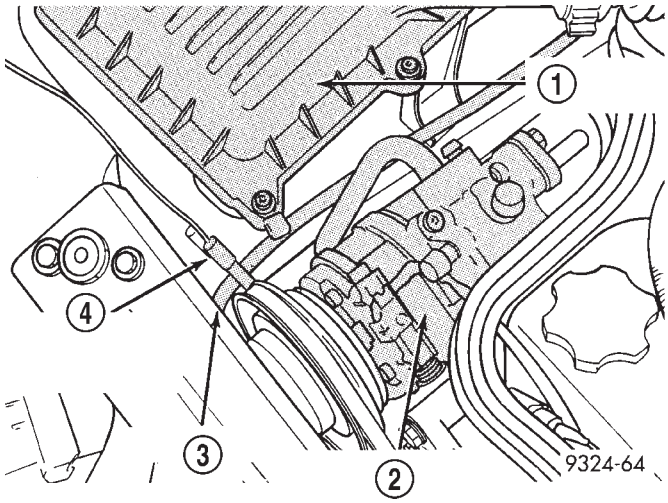


Fig. 10 Thermocouple Attachment Point (3.2 / 3.5L)

1 – AIR CLEANER HOUSING
2 – A/C COMPRESSOR
3 – LIQUID LINE
4 – CLAMP-ON THERMOCOUPLE PROBE

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR and R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

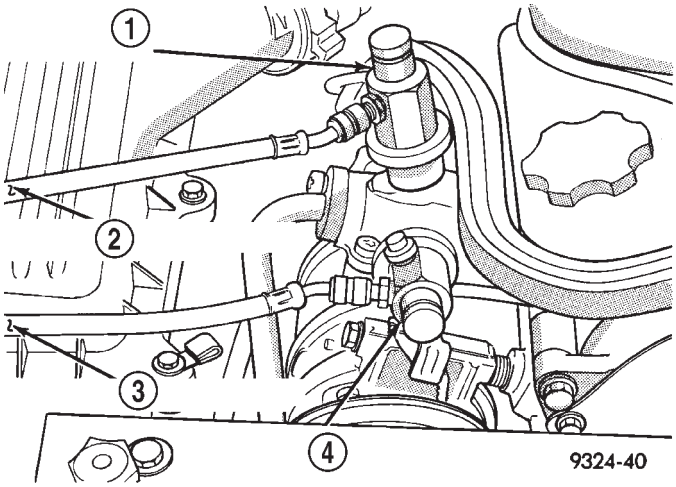


Fig. 11 Manifold Gauge Hook-up (3.2 / 3.5L)

1 – HIGH SIDE CONNECTOR
2 – TO MANIFOLD GAUGE SET
3 – TO MANIFOLD GAUGE SET
4 – LOW SIDE CONNECTOR

(1) Establish your preferred method of measuring compressor discharge pressure. Use a manifold gauge set or a scan tool.

(2) Attach a clamp-on thermocouple (P. S. E. 66-324-0014 or 80PK-1A) or equivalent to the liquid line (Fig. 10). It must be placed as close to the condenser outlet as possible to observe liquid line tubing temperature. Refer to “Thermocouple Probe” in this section for more information on probe.

(3) The vehicle must be in the following modes:

- Transaxle in Park
- Engine Idling
- A/C Controls Set to Outside Air
- Panel Mode
- Full Cool
- High Blower
- A/C Button in the ON position
- Vehicle Windows Open.
- Recirc button turned OFF on ATC equipped vehicles

(4) Operate system for a couple of minutes to allow the system to stabilize.

(5) Set system pressure to about 1793 kPa (260 psi) by blocking off the airflow to the front grill area. This will maintain a constant pressure and stop the cooling fans from alternating between high and low speeds.

(6) Observe Discharge pressure and Liquid line temperature. Using the Charge Determination Graph determine where the system is currently operating (Fig. 12). If the system is in the undercharged region,

SERVICE PROCEDURES (Continued)

ADD 0.057 Kg. (2 oz.) to the system and recheck readings. If the system is in the overcharged region, RECLAIM 0.057 Kg. (2 oz.) from the system and recheck readings. Continue this process until the system readings are in the proper charge area on the Charge Determination Chart (Fig. 12).

If the A/C system is not cooling properly, determine if the refrigerant system is fully charged with R-134a. This is accomplished by performing a system Charge Level-Check or Fill. If while performing this test A/C liquid line pressure is less than 207 kPa (30 psi) proceed to Empty Refrigerant System Leak Test.

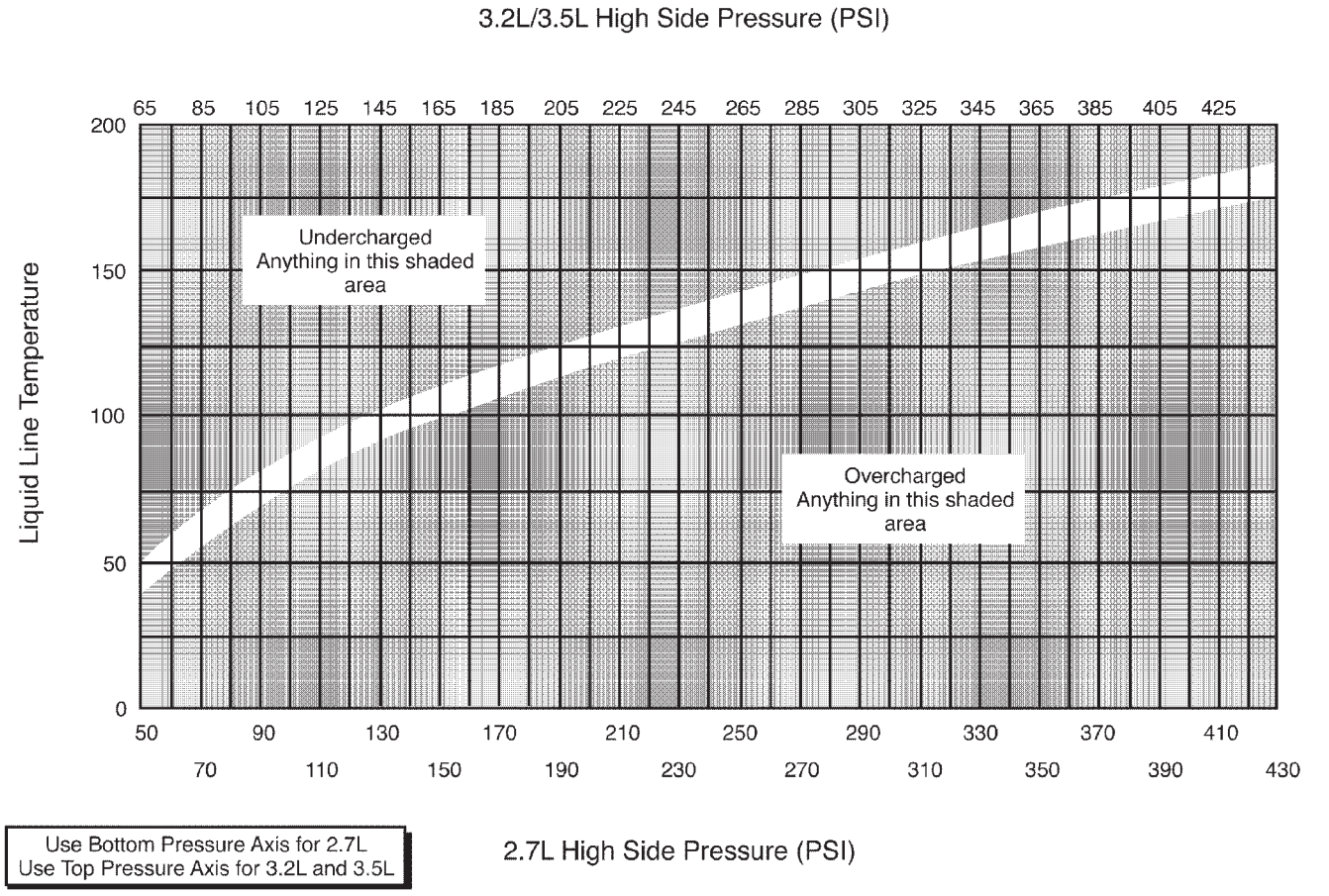


Fig. 12 Charge Determination Graph

SYSTEM LEAK CHECKING

WARNING: R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. MIXTURE OF AIR and R-134a CAN BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

If liquid line pressure is greater than 207 kPa (30 psi) proceed to low refrigerant level leak test. If the refrigerant system is empty or low in refrigerant charge, a leak at any line fitting or component seal is likely. A review of the fittings, lines and components for oily residue is an indication of the leak location. To detect a leak in the refrigerant system, perform one of the following procedures as indicated by the symptoms.

EMPTY REFRIGERANT SYSTEM LEAK TEST

(1) Evacuate the refrigerant system (minimum evacuation time of 15 min.) to the lowest degree of vacuum possible (approx. 28 in Hg.). Determine if the system holds a vacuum for at least 15 minutes after pump is off. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed with this procedure.

SERVICE PROCEDURES (Continued)

(2) Prepare a.284 Kg. (10 oz.) refrigerant charge to be injected into the system.

(3) Connect and dispense.284 Kg. (10 oz.) of refrigerant into the evacuated refrigerant system.

(4) Proceed to Step 2 of Low Refrigerant Level Leak Test.

LOW REFRIGERANT LEVEL LEAK TEST

(1) Determine if there is any (R-134a) refrigerant in the system. Use the scan tool (DRBIII®) partial charge test or pressure gauge liquid line temperature partial charge check. See system charge level check or fill for procedure.

(2) Position the vehicle in a wind free work area. This will aid in detecting small leaks.

(3) Bring the refrigerant system up to operating temperature and pressure. This is done by allowing the engine to run for five minutes with the system set to the following:

- Transaxle in Park
- Engine Idling
- A/C Controls Set in 100 percent outside air
- Blower switch in the high A/C position
- A/C in the ON position
- Open all windows

CAUTION: A leak detector designed for R-12 refrigerant may not detect leaks in a R-134a refrigerant system. Check specifications on leak detector.

(4) Shut off the vehicle and wait 2 to 7 minutes. Then use an Electronic Leak Detector that is designed to detect R-134a type refrigerant and search for leaks. Fittings, lines, or components that appear to be oily usually indicates a refrigerant leak. To inspect the evaporator core for leaks, insert the leak detector probe into the drain tube opening or a heat duct.

If a thorough leak check has been completed without indication of a leak, proceed to System Charge Level.

NOTE: If leak is not detected but known to exist, further diagnosis may be necessary using a refrigerant dye and the recovery machine. Refer to recovery machine instructions for proper dye injection procedures.

REMOVAL AND INSTALLATION

SAFETY PRECAUTIONS AND WARNINGS

WARNING: WEAR EYE PROTECTION WHEN SERVICING THE AIR CONDITIONING REFRIGERANT SYSTEM. SERIOUS EYE INJURY CAN RESULT FROM EYE CONTACT WITH REFRIGERANT. IF EYE CONTACT IS MADE, SEEK MEDICAL ATTENTION IMMEDIATELY.

DO NOT EXPOSE REFRIGERANT TO OPEN FLAME. POISONOUS GAS IS CREATED WHEN REFRIGERANT IS BURNED. AN ELECTRONIC TYPE LEAK DETECTOR IS RECOMMENDED.

LARGE AMOUNTS OF REFRIGERANT RELEASED IN A CLOSED WORK AREA WILL DISPLACE THE OXYGEN AND CAUSE SUFFOCATION.

THE EVAPORATION RATE OF REFRIGERANT AT AVERAGE TEMPERATURE AND ALTITUDE IS EXTREMELY HIGH. AS A RESULT, ANYTHING THAT COMES IN CONTACT WITH THE REFRIGERANT WILL FREEZE. ALWAYS PROTECT SKIN OR DELICATE OBJECTS FROM DIRECT CONTACT WITH REFRIGERANT. R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR.

SOME MIXTURES OF AIR and R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. SEEK MEDICAL ATTENTION IMMEDIATELY IF SWALLOWED OR INHALED. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN AND PETS.

DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT RUNNING TEMPERATURE. PERSONAL INJURY CAN RESULT.

CAUTION: The engine cooling system is designed to develop internal pressure of 97 to 123 kPa (14 to 18 psi). Allow the vehicle to cool a minimum of 15 minutes before opening the cooling system. Refer to Group 7, Cooling System.

A/C PRESSURE TRANSDUCER

CAUTION: A/C pressure transducer switch connector terminal contacts can be damaged by probing tools during system diagnosis and repair. Failure to use their respective mating terminals or pin gauge to check for tightness will cause contact beam spreads. This will result in loss of continuity.

REMOVAL AND INSTALLATION (Continued)

O-ring replacement is required whenever the pressure transducer is serviced. Be sure to use the O-ring specified for this vehicle.

The A/C pressure transducer is screwed on to a valve on the discharge line. The transducer can be removed or installed without evacuating the refrigerant from the A/C system.

NOTE: For 3.2/3.5L applications, the passenger side headlamp must be rotated out of the way to access the A/C pressure transducer.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

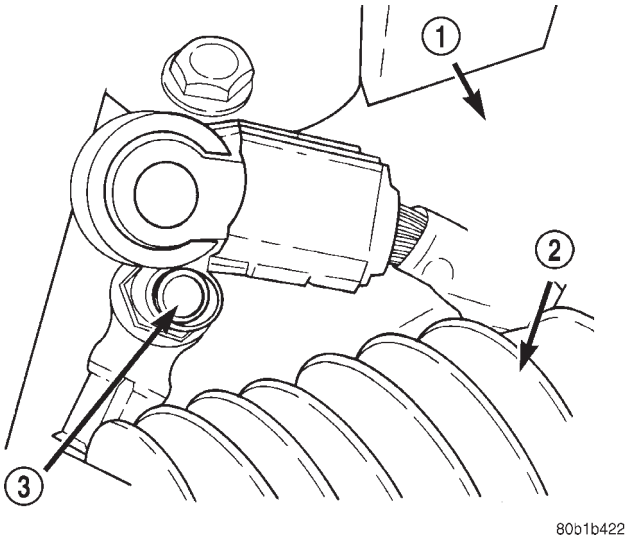


Fig. 13 Negative Battery Cable Remote Terminal

1 – RIGHT STRUT TOWER
2 – AIR CLEANER INLET TUBE
3 – REMOTE TERMINAL

(2) Disconnect the wire harness connector from the A/C pressure transducer.

CAUTION: A slight release of pressure trapped in the fitting may be experienced. It is not necessary to discharge the refrigerant system.

(3) Remove the transducer with a counterclockwise rotation using a 14 mm open-end wrench.

INSTALLATION

For installation, reverse the above procedures. Tighten pressure transducer to 6 N·m (50 in. lbs.).

AMBIENT TEMPERATURE SENSOR

The ambient air temperature sensor is located on the inside of the right front bumper beam (Fig. 14). This sensor will inform the ATC system of the ambient temperature outside the vehicle. This sensor is used by the ATC system to adjust blower speed, temperature offsets, evaporator temperatures and mode control.

The ambient sensor is not serviceable and must be replaced if found to be defective.

The ambient temperature sensor is used on all LH vehicles with or without ATC systems.

To test Ambient Temperature Sensor, refer to proper LH Body Diagnostic Manual.

REMOVAL

(1) Remove sensor mounting screw.
(2) Disconnect sensor wiring connector.

INSTALLATION

For installation, reverse the above procedures.

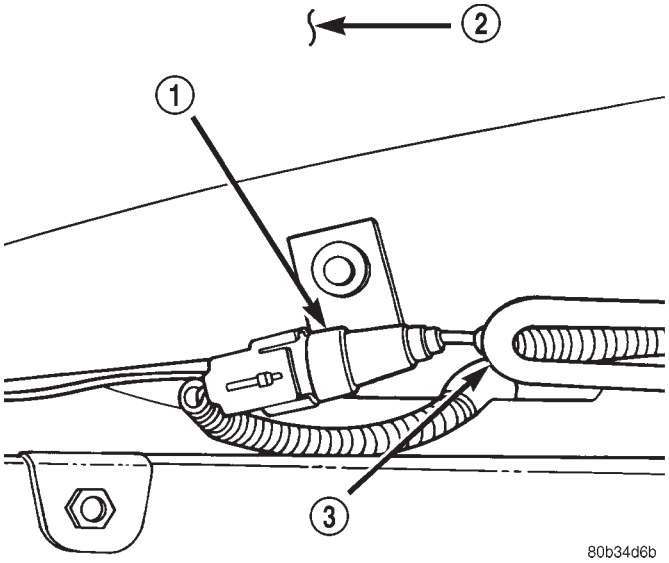


Fig. 14 Ambient Temperature Sensor Location

1 – AMBIENT TEMPERATURE SENSOR
2 – FRONT FASCIA
3 – POWER STEERING COOLER

ATC IN-CAR TEMPERATURE SENSOR

The ATC In-Car Temperature Sensor is located in the Control Head. The Control Head must be removed for service to the sensor.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove snap-on center bezel which holds the ATC Control.

(3) Disconnect the ATC Control from the vehicle wiring harness.

REMOVAL AND INSTALLATION (Continued)

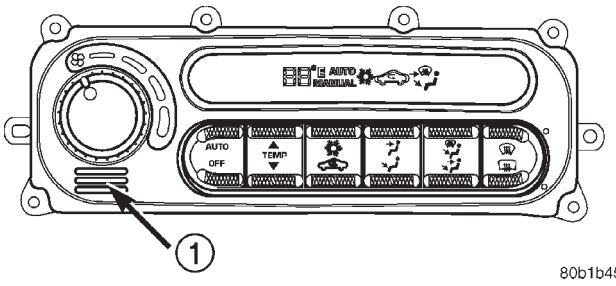


Fig. 15 ATC In-Car Temperature Sensor

1 – ATC IN-CAR TEMPERATURE SENSOR

(4) If the ATC in-car temperature sensor (fault 26) is verified to be bad, then the ATC control section of the assembly must be replaced. If the ATC in-car sensor does not pass the paper test, then the problem may only be with the ATC In-Car Sensor Fan-Motor assembly.

(5) Remove the fan-motor assembly from the ATC control with two screws located on the back of the ATC control.

(6) Replace only the fan-motor assembly if control does not pass the paper test, but passes with no fault code 26 (bad thermistor).

NOTE: Retest control. If ATC control still fails the paper test, then replace the ATC control and the fan-motor assembly. The ATC Control must be replaced if the part fails fault code 26 (after confirming proper wiring connections).

INSTALLATION

For installation, reverse the above procedures.

BLOWER MOTOR AND WHEEL ASSEMBLY

The blower motor is located on the right side of the heater housing. The blower motor and the blower motor wheel must be replaced as an assembly.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove lower right under panel duct.

(3) Remove blower motor connector from resistor block/power module.

(4) Squeeze blower motor wiring grommet and push grommet through blower motor housing cover.

(5) Remove blower motor housing cover.

(6) Remove blower motor retaining screws.

(7) Lower blower motor from housing.

INSTALLATION

For installation, reverse the above procedures.

BLOWER MOTOR POWER MODULE

REMOVAL

The Blower Motor Power Module is used on ATC systems only.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove lower right underpanel silencer/duct.

(3) Disconnect wiring connectors on blower motor resistor.

(4) Remove blower motor resistor retaining screws.

(5) Pull blower motor resistor out of heater housing.

INSTALLATION

For installation, reverse the above procedures.

BLOWER MOTOR RESISTOR

REMOVAL

The Blower Motor Resistor is used on manual Heater-A/C systems only.

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove lower right underpanel silencer/duct.

(3) Disconnect wiring connectors on blower motor resistor.

(4) Remove blower motor resistor retaining screws.

(5) Pull blower motor resistor out of heater housing.

INSTALLATION

For installation, reverse the above procedures.

BLOWER MOTOR WHEEL

The blower motor wheel is only serviced with the blower motor. The wheel and the motor are balanced as an assembly. If the blower motor wheel requires replacement, the blower motor must also be replaced. Refer to blower motor for replacement procedure.

COMPRESSOR

The A/C compressor may be unbolted and repositioned without discharging the refrigerant system. Discharging is not necessary if removing the compressor clutch/coil assembly, engine, cylinder head, or alternator.

WARNING: REFRIGERANT PRESSURES REMAIN HIGH EVEN THOUGH THE ENGINE MAY BE TURNED OFF. DO NOT TWIST OR KINK THE REFRIGERANT LINES WHEN REMOVING A FULLY CHARGED COMPRESSOR. SAFETY GLASSES MUST BE WORN.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Disconnect Negative battery cable.

(2) Loosen and remove drive belts (refer to Group 7, Engine Cooling) and disconnect compressor clutch wire lead.

(3) Remove refrigerant from the A/C system (with a refrigerant recovery machine) if the compressor is being replaced.

(4) Remove refrigerant lines from compressor and disconnect electrical connector.

(5) If system is left open place plug/cap over open lines.

(6) Remove compressor attaching bolts (Fig. 16) and (Fig. 17).

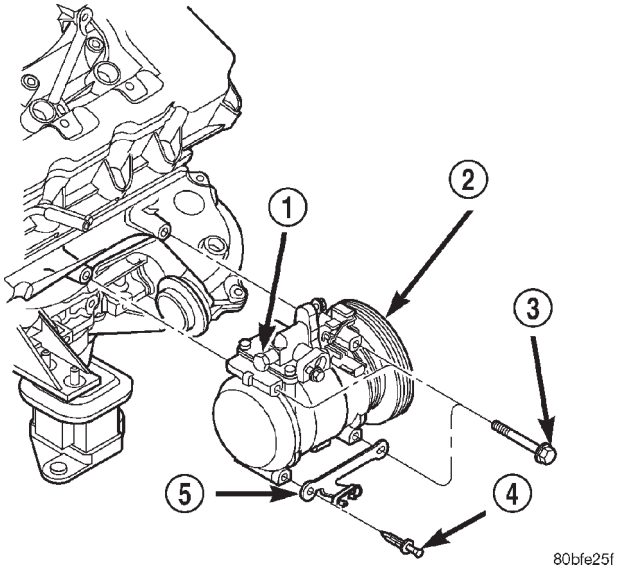


Fig. 16 Compressor Mounting 2.7L

1 – HIGH PRESSURE RELIEF VALVE
2 – A/C COMPRESSOR
3 – MOUNTING BOLTS
4 – PUSH PIN
5 – ENGINE OIL COOLER BRACKET

(7) Remove compressor. If refrigerant lines were not removed, lift compressor/clutch assembly and tie it to a suitable component.

INSTALLATION

For installation, reverse the above procedures. Torque Compressor bolts to 28 N·m (21 ft. lbs.)

COMPRESSOR HIGH-PRESSURE RELIEF VALVE

The high pressure relief valve is located on the A/C compressor manifold (Fig. 16) and (Fig. 17).

REMOVAL

(1) Remove refrigerant from A/C system using a refrigerant recovery machine.

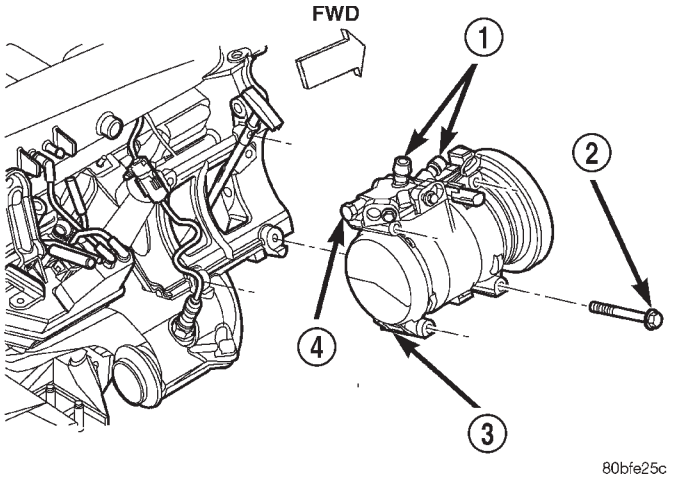


Fig. 17 Compressor Mounting 3.2L/3.5L

1 – SERVICE PORTS
2 – MOUNTING BOLTS
3 – A/C COMPRESSOR
4 – HIGH PRESSURE RELIEF VALVE

(2) Rotate the high pressure relief valve counterclockwise and separate relief valve from the vehicle.

INSTALLATION

For installation, reverse the above procedures using a new O-ring seal. Evacuate and charge the refrigerant system. Torque 5/8” Hex to 13.5 N·m (10 ft. lbs.).

COMPRESSOR CLUTCH/COIL ASSEMBLY

REMOVAL

Compressor assembly must be removed from mounting. Although, refrigerant discharge is not necessary.

(1) Remove the compressor shaft bolt (Fig. 18). A band type oil filter removal tool can be placed around the clutch plate to aid in bolt removal.

(2) Tap the clutch plate with a plastic hammer and remove clutch plate and shim(s) (Fig. 19).

CAUTION: Do not use screwdrivers between the clutch plate assembly and pulley to remove front plate as this may damage the front plate assembly.

(3) Remove pulley retaining snap ring with Snap Ring Pliers (C-4574), and slide pulley assembly off of compressor (Fig. 20).

(4) Remove coil wire bracket/ground clip screw and wire harness.

(5) Remove snap ring retaining field coil onto compressor housing (Fig. 21). Slide field coil off of compressor housing.

(6) Examine frictional faces of the clutch pulley and front plate for wear. The pulley and front plate

REMOVAL AND INSTALLATION (Continued)

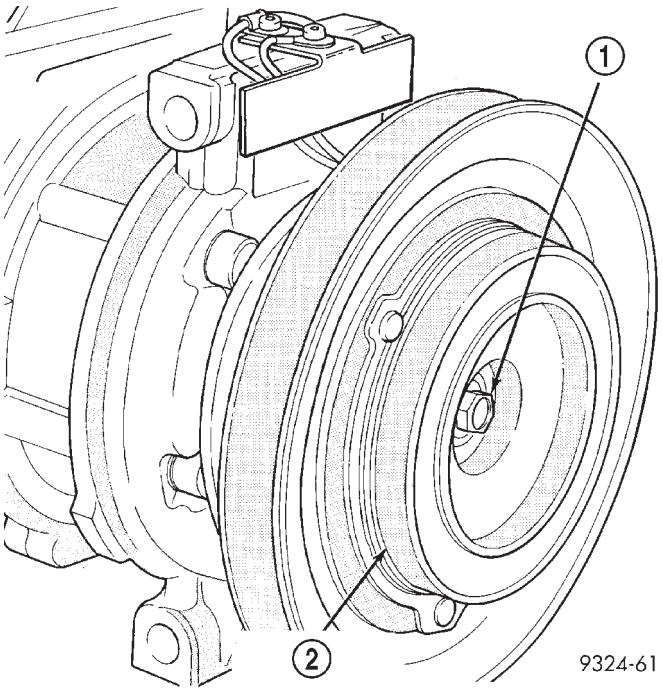


Fig. 18 Compressor Shaft Bolt and Clutch Plate

1 – COMPRESSOR SHAFT BOLT
2 – COMPRESSOR CLUTCH PLATE

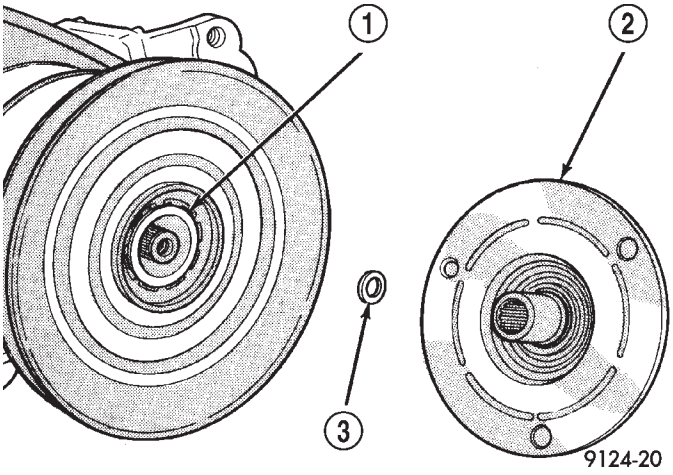


Fig. 19 Clutch Plate and Shim(s)

1 – COMPRESSOR SHAFT
2 – CLUTCH PLATE
3 – CLUTCH PLATE SHIM

should be replaced if there is excessive wear or scoring. If the friction surfaces are oily, inspect the shaft nose area of the compressor for oil and remove the felt from the front cover. If the compressor felt is saturated with oil, the shaft seal is leaking and will have to be replaced.

(7) Check bearing for roughness or excessive leakage of grease. Replace bearing as required.

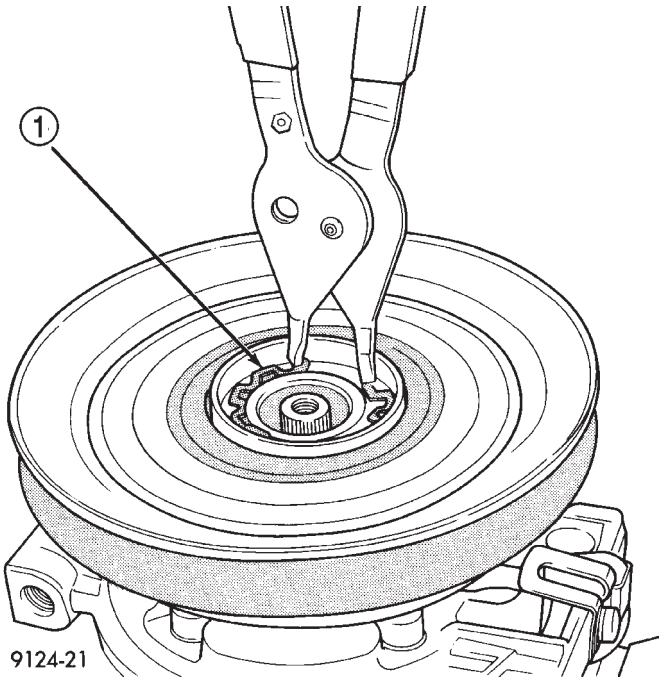


Fig. 20 Removing Pulley Snap Ring

1 – SNAP RING

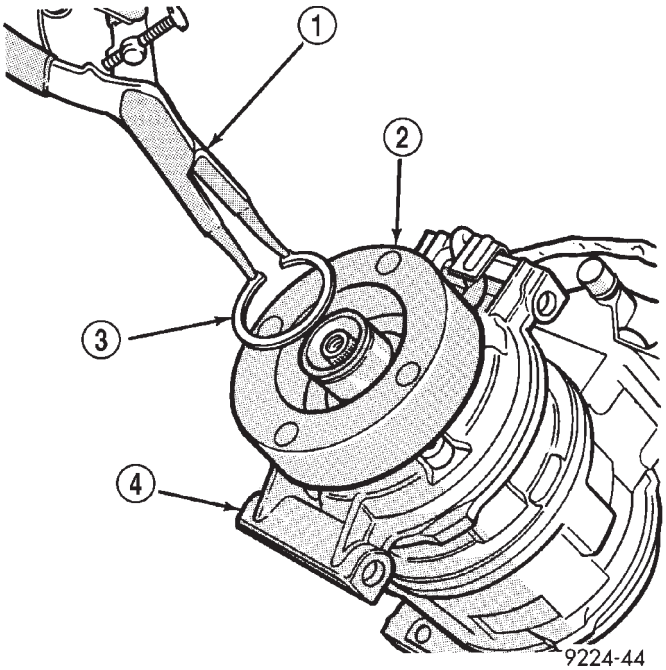


Fig. 21 Clutch Coil Snap Ring

1 – SNAP RING PLIERS
2 – CLUTCH COIL
3 – SNAP RING
4 – COMPRESSOR

INSTALLATION

(1) Align pin in back of field coil with hole in compressor end housing, and position field coil into place.

REMOVAL AND INSTALLATION (Continued)

Make sure that lead wires are properly routed, and fasten the diode and coil wire bracket with retaining screw.

(2) Install field coil retaining snap ring with Snap Ring Pliers (C- 4574). Press snap ring to make sure it is properly seated in the groove.

NOTE: The bevel side of the snap ring must be outward. Also both eyelets must be to the right or left of the pin on the compressor.

CAUTION: If snap ring is not fully seated it will vibrate out, resulting in a clutch failure and severe damage to the front face of the compressor.

Do not mar the pulley frictional surface.

(3) Install pulley assembly to compressor. If necessary, tap gently with a block of wood on the friction surface (Fig. 22).

(4) Install pulley assembly retaining snap ring (bevel side outward) with Snap Ring Pliers (C-4574). Press the snap ring to make sure it is properly seated in the groove.

NOTE: The bevel side of the snap ring must be facing outward.

(5) If the original front plate assembly and pulley assembly are to be reused, the old shim(s) can be used. If not, place a trial stack of shims, 2.54 mm (0.10 in.) thick, on the shaft against the shoulder.

(6) Install front plate assembly onto shaft.

(7) If installing a new front plate and/or pulley assembly, the gap between front plate and pulley face must be checked. Use the following procedure:

(a) Attach a dial indicator to front plate so that movement of the plate can be measured.

(b) With the dial indicator zeroed on the front plate, energize the clutch and record the amount of movement.

(c) The readings should be 0.35 to 0.65 mm (0.014 to 0.026 in.). If proper reading is not obtained, add or subtract shims until desired reading is obtained.

(8) Install compressor shaft bolt. Tighten to 17.5 ±2 N·m (155 ±20 in. lbs.).

NOTE: Shims may compress after tightening shaft nut. Check air gap in four or more places to verify if air gap is still correct. Spin pulley for final check.

CLUTCH BREAK-IN

After new clutch installation, cycle the A/C clutch 20 times (5 seconds ON and 5 seconds OFF). During this procedure, set the system to the A/C mode, engine rpm at 1500-2000, and high blower speed.

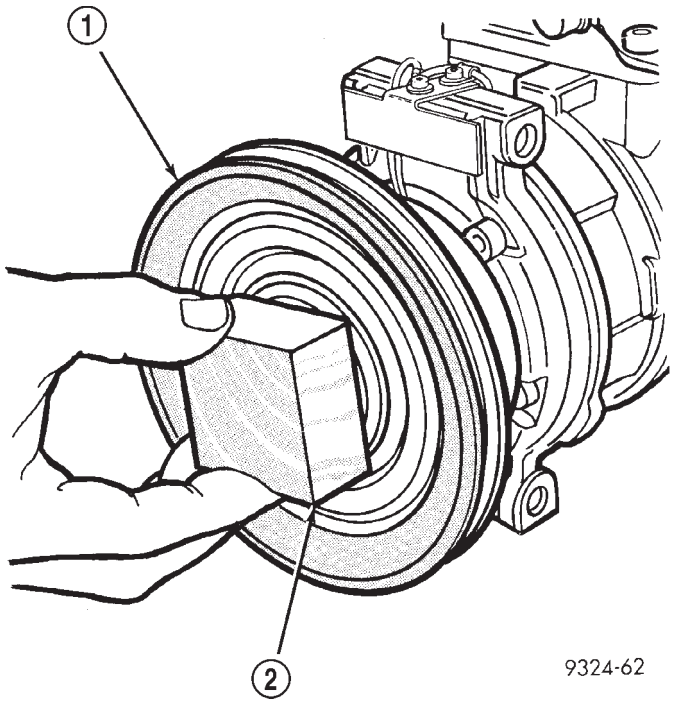


Fig. 22 Installing Pulley Assembly

1 – PULLEY ASSEMBLY
2 – WOOD BLOCK

This procedure (burnishing) will seat the opposing friction surfaces and provide a higher clutch torque capability.

NOTE: Excessive clutch gap will result in clutch slippage or non-engagement.

CONDENSER

The condenser is located between the radiator and the front bumper. The condenser can be serviced without having to drain the cooling system or remove the radiator.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Using a refrigerant recovery machine, remove refrigerant from the A/C system.

(3) Remove five push pin fasteners retaining the center front fascia.

(4) Remove two right wheel well push pin fasteners retaining front fascia.

(5) Remove right headlamp housing. Refer to Group 8L, Lamps for Removal and Installation procedure.

(6) Remove two push pin fasteners to air flow deflectors.

REMOVAL AND INSTALLATION (Continued)

(7) Remove upper radiator core support. Refer to Group 23, Body for Removal and Installation procedures.

NOTE: If equipped with 3.2/3.5L engine, remove two cooler lines to engine oil cooler and the hose retainer.

(8) Remove upper hose to auxiliary transmission cooler (Fig. 23).

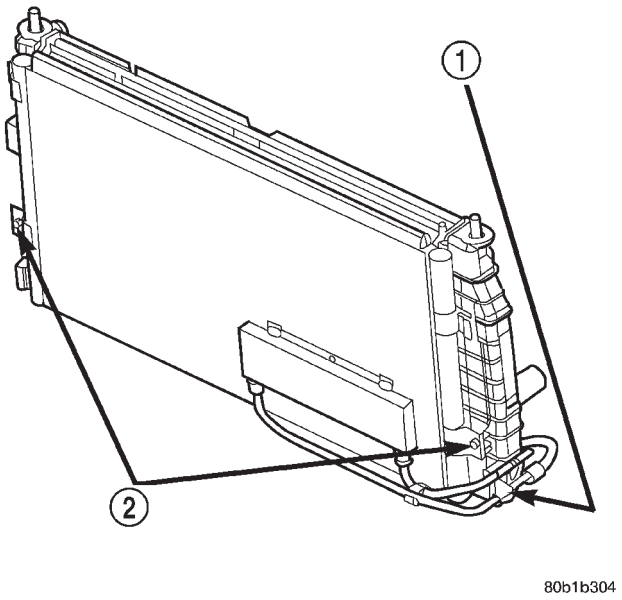


Fig. 23 A/C Condenser and Auxiliary Transmission Oil Cooler

1 – TRANSMISSION OIL COOLER LINE MOUNTING BRACKET
2 – A/C CONDENSER TO RADIATOR MOUNTING SCREWS

(9) Remove the upper A/C discharge line fastener at condenser.

(10) Remove the lower A/C liquid line fastener at condenser. On the 300M, the lower fastener may be more easily accessed by removing the passenger side fog lamp. Refer to Section 8L Lamps, for procedures.

(11) Remove both auxiliary transmission cooler lines.

(12) Cut auxiliary transmission cooler zip strips.

(13) Remove two bolts retaining condenser to radiator.

(14) Separate condenser from radiator.

(15) Transfer auxiliary transmission cooler to new condenser.

NOTE: The new condenser will include new zip ties for the auxiliary transmission cooler attachment to new condenser assembly.

CAUTION: Avoid bending or breaking condenser inlet tube when lifting radiator/condenser assembly from the vehicle.

INSTALLATION

For installation, reverse the above procedures.

CONTROL HEAD

The Heater A/C Control Head is located in the instrument panel center bezel. Refer to Group 8E, Instrument Panel and System for Removal and Installation procedures.

DISCHARGE LINE

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Disconnect A/C pressure transducer wire harness (Fig. 24) and (Fig. 25).

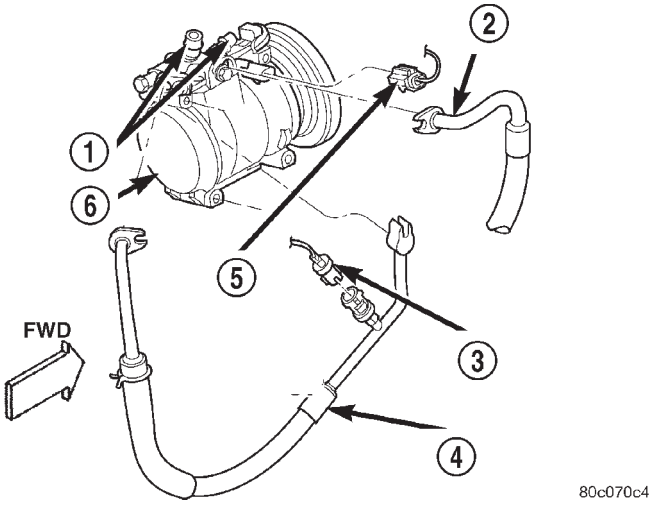


Fig. 24 A/C Pressure Transducer and Discharge Line 3.2L/3.5L

1 – SERVICE PORTS
2 – SUCTION LINE
3 – A/C PRESSURE TRANSDUCER AND CONNECTOR
4 – DISCHARGE LINE
5 – A/C COMPRESSOR CLUTCH ELECTRICAL CONNECTOR
6 – A/C COMPRESSOR

(3) Disconnect discharge line at compressor using a M13 Hex wrench for 2.7L, 6 mm allen wrench for 3.2/3.5L.

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

(4) Disconnect line at A/C condenser using a M13 Hex wrench.

REMOVAL AND INSTALLATION (Continued)

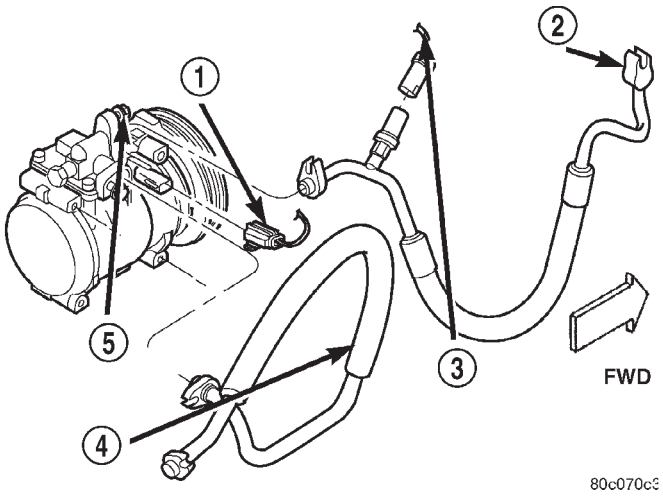


Fig. 25 A/C Pressure Transducer and Discharge Line 2.7L

1 – A/C COMPRESSOR CLUTCH ELECTRICAL CONNECTOR
2 – DISCHARGE LINE
3 – A/C PRESSURE TRANSDUCER AND CONNECTOR
4 – SUCTION LINE
5 – A/C COMPRESSOR

INSTALLATION

For installation, reverse the above procedures. Then, tighten bolts to 23 N·m (17 ft. lbs.) at condenser and compressor.

EVAPORATOR

The Heater A/C housing must be removed from the vehicle when replacing the evaporator.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

CAUTION: The refrigerant must be removed from the system before removing Heater-A/C housing. Use a refrigerant recovery machine. A/C lines at Thermostatic Expansion Valve must be removed and the exposed fittings must be capped off to prevent moisture from entering the system.

(2) Remove heater housing from vehicle. Refer to Heater-A/C Housing Removal and Installation in this section for procedure.
(3) Remove recirculation door actuator.
(4) Remove recirculation door and housing.
(5) Remove upper housing retaining screws.
(6) Remove upper half of heater housing.
(7) Lift evaporator out of lower housing.
(8) Transfer evaporator probe. Place the evaporator probe in the same location as on the previous evaporator.

INSTALLATION

For installation, reverse the above procedures.

EVAPORATOR TEMPERATURE SENSOR

The Evaporator Temperature Sensor is located on the lower right side of the heater housing.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).
(2) Remove right under panel silencer.
(3) Disconnect wiring connector for evaporator probe.
(4) At center of heater housing, locate evaporator probe access plate. Using a flat blade pry tool, pull back on the locking tab. Twist the access plate counter clockwise one-quarter turn and remove plate.
(5) Pull probe out of evaporator core. This plate must be pushed inside the A/C unit and orientated in such a way that the plate can be removed.

INSTALLATION

For installation, reverse the above procedures. **The new probe must not go into the same hole (in the evaporator coil) that the old probe was removed.** The evaporator is manufactured with three holes for probe insertion. Insert the probe in the uppermost hole (Fig. 26).

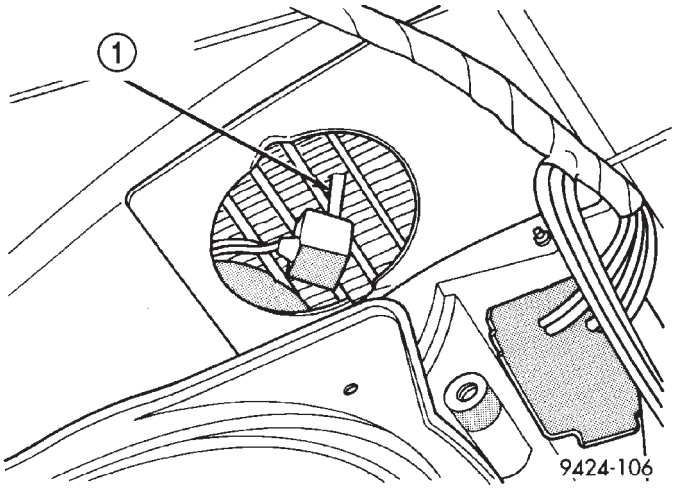


Fig. 26 Evaporator Probe Needle

1 – EVAPORATOR PROBE

EXPANSION VALVE

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

REMOVAL AND INSTALLATION (Continued)

(2) Remove engine air inlet tube and the air distribution duct on vehicles equipped with 3.2/3.5 liter engine.
(3) Remove one nut to A/C lines at expansion valve.
(4) Loosen bolt at Filter/Drier to pivot lines away from expansion valve.
(5) Place plug/cap over open end of refrigerant lines.
(6) Gently pull A/C line out of expansion valve.
(7) Remove two #30 torx bolts retaining expansion valve to evaporator coil.
(8) Remove expansion valve from vehicle.

CAUTION: Always install new O-rings when replacing expansion valve.

INSTALLATION

For installation, reverse the above procedures.

FILTER/DRIER

CAUTION: When installing new filter/drier do not leave open to atmosphere for a long period of time. The filter/drier contains moisture absorbing materials which will absorb moisture in the atmosphere.

REMOVAL

(1) Remove refrigerant from A/C system using a refrigerant recovery machine.
(2) Remove engine air inlet tube and the air distribution duct on vehicles equipped with 3.2/3.5 liter engine.
(3) Remove one 8mm hex bolt to filter/drier bracket.
(4) Remove one nut retaining A/C lines to expansion valve.
(5) Gently pry filter/drier bracket out of strut tower.
(6) Remove one A/C line at filter/drier (tubing to condenser).
(7) Remove filter/drier from vehicle.
(8) Transfer small line from filter/drier to expansion valve to new filter/drier.

NOTE: Always install new O-rings when replacing filter/drier.

(9) Plug or cap liquid line fittings while system is open to prevent moisture intrusion.

INSTALLATION

For installation, reverse the above procedures.

NOTE: Upon installation, loosely fit all parts and lines together before individually tightening them to prevent damage. Torque filter/drier plumbing fasteners to 10 ft–lbs.

HEATER CORE

The HVAC unit housing must be removed from the vehicle to service the heater core.

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).
(2) Remove the HVAC unit housing from vehicle. Refer to Unit Housing Removal and Installation procedures in this section.
(3) With the HVAC unit housing out of the vehicle, remove (2) screws retaining the heater core. Then pull the heater core out of the heater housing.

INSTALLATION

For installation, reverse the above procedures.
(1) Push new heater core into the unit housing.
(2) Fasten heater core to HVAC unit housing with (2) screws.

LIQUID LINES

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
(2) Remove engine air inlet tube and the air distribution duct on vehicles equipped with 3.2/3.5 liter engine.
(3) Remove A/C plumbing to expansion valve fastener using a M13 Hex wrench. Remove suction line block from expansion valve, cap and swing out of the way.

CAUTION: Cap off all lines that are not being replaced. Cap/plug the expansion valve and condenser fittings.

(4) Disconnect liquid line fastener at filter-drier (short filter-drier to evaporator line may be removed at this step).
(5) Disconnect filter/drier bracket fastener and separate bracket from strut panel (there are two hidden plastic fasteners to pry out).
(6) Disconnect liquid line fastener at condenser (M13 Hex).

NOTE: Radiator upper crossmember must be removed to access the liquid line fastener. Refer to Group 23, Body for Removal and Installation procedures.

REMOVAL AND INSTALLATION (Continued)

(7) Remove liquid line mounting clamp fastener located near service port (Fig. 27).

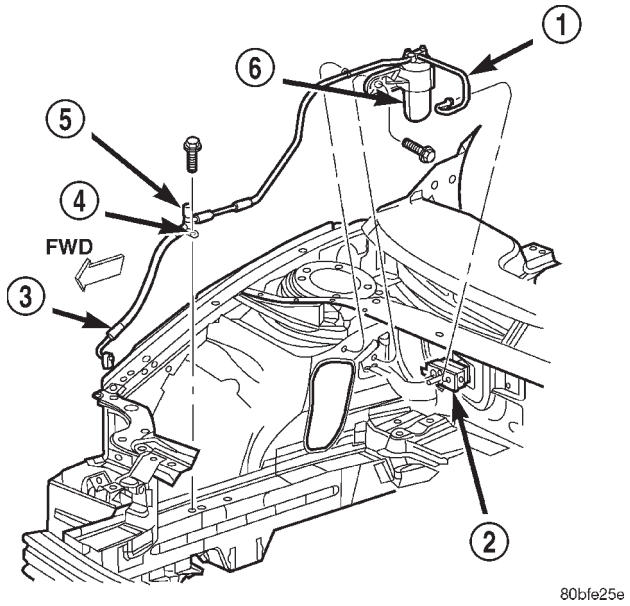


Fig. 27 Liquid Lines

1 – LIQUID LINE
2 – EXPANSION VALVE
3 – LIQUID LINE
4 – MOUNTING CLAMP
5 – SERVICE PORT
6 – FILTER-DRIER AND BRACKET

(8) Disconnect liquid line fastener at filter-drier. Remove liquid line from vehicle. Cap off all fittings if reusing to prevent moisture from entering system.

INSTALLATION

For installation, reverse the above procedures. Torque liquid line fasteners as follows: TXV and condenser: 20.3 N·m (15 ft. lbs.). Filter-drier line fasteners 13.6 N·m (10 ft. lbs.). Plastic bracket and screws: 6.8 N·m (5 ft. lbs.).

MODE DOOR ACTUATOR

The mode door actuator is an electric motor. It mechanically positions the A/C unit panel/bi-level door and the floor/defrost door. This actuator contains a feedback strip which allows the computer control to know the exact position of the mode door at all times. The mode door actuator is not serviceable and must be replaced if found to be defective.

The mode door actuator is located on the lower left side of the HVAC unit housing (Fig. 28).

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

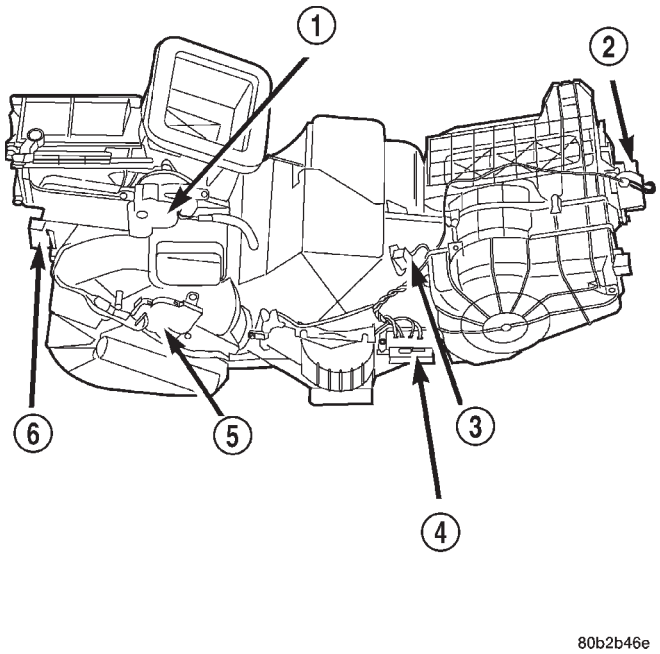


Fig. 28 Mode Door Actuator Location

1 – MODE DOOR ACTUATOR
2 – RECIRCULATION DOOR ACTUATOR
3 – EVAPORATOR TEMPERATURE SENSOR
4 – POWER MODULE OR BLOWER RESISTOR
5 – BLEND DOOR ACTUATOR
6 – HVAC PLENUM CONNECTOR

(2) Remove left and right underpanel ducts.
(3) Remove floor console.
(4) Remove center floor heat adaptor duct.
(5) Remove rear seat heat forward adaptor duct.
(6) Loosen center support bracket and pry rearward to gain access to the actuator.
(7) Remove actuator retaining screws. Then pull actuator straight down. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.
(8) Remove electrical connection on actuator.

INSTALLATION

For installation, reverse the above procedures.

RECIRCULATION DOOR ACTUATOR

The recirculation door actuator is located on the right side of the heater housing (Fig. 28).

The recirculation door actuator is an electric motor. It mechanically positions the recirculation door in either the open or closed position. The recirculation door actuator does not have a feedback signal. The outside Air/Recirc door actuator is not serviceable and must be replaced if found to be defective.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove instrument panel. Refer to Group 8E, Instrument Panel and Systems for Removal and Installation procedures.

(3) Remove actuator retaining screws. Pull actuator straight off recirculation door shaft. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.

(4) Disconnect electrical connection.

(5) Remove recirculation door motor from vehicle.

INSTALLATION

For installation, reverse the above procedures.

SERVICE PORT VALVE CORES

The 3.2 / 3.5L service port valve cores are located on the top of the manifold (High Side) and front side of the manifold (Low Side) (Fig. 29). The 2.7L service port valve ports are located on the A/C liquid line (high side) (Fig. 27) and suction line (low side) (Fig. 31).

REMOVAL

(1) Remove the valve caps. Remove refrigerant from A/C system using a refrigerant recovery machine.

(2) Using a standard valve core tool, remove the valve core. **Be careful to prevent any dirt/debris from entering the valve core opening or getting on the replacement valve core.**

CAUTION: A valve that is not fully seated can lead to damage to the valve during evacuation and charge. This can result in system refrigerant discharge while uncoupling the charge adapters.

INSTALLATION

For installation, reverse the above procedures. Evacuate and charge the A/C system.

NOTE: When assembling the new valve core into the manifold, the core should be oiled with clean ND8 PAG compressor oil.

SUCTION LINE

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

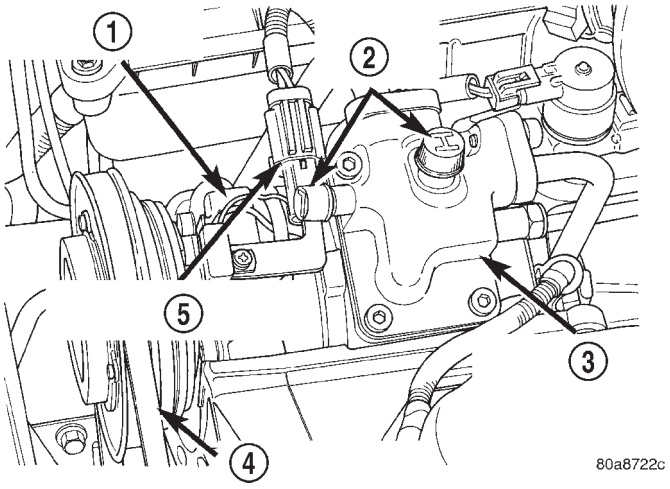


Fig. 29 A/C Compressor Service Ports 3.2L/3.5L

1 – A/C COMPRESSOR
2 – A/C SERVICE PORTS
3 – COMPRESSOR MANIFOLD
4 – A/C DRIVE BELT
5 – COMPRESSOR WIRE CONNECTOR

(2) Remove one M13 nut holding suction line at expansion valve (Fig. 30) and (Fig. 31).

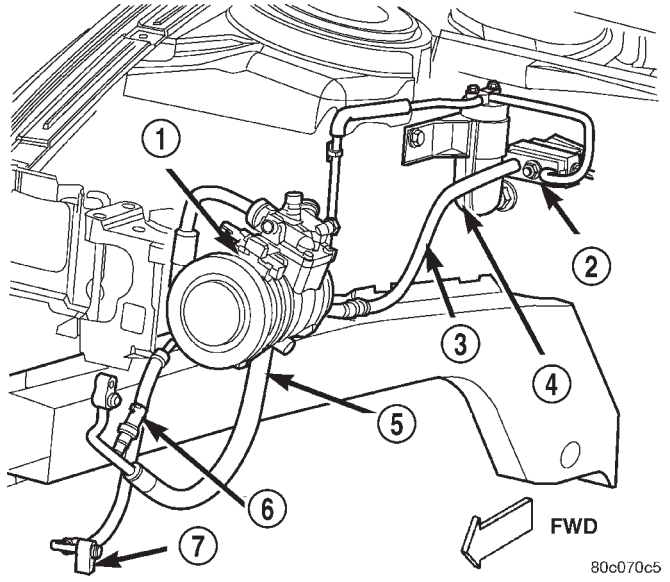


Fig. 30 A/C Refrigerant Lines and Expansion Valve 3.2L/3.5L

1 – A/C COMPRESSOR
2 – EXPANSION VALVE
3 – SUCTION LINE
4 – FILTER-DRIER
5 – DISCHARGE LINE
6 – A/C PRESSURE TRANSDUCER
7 – LIQUID LINE

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

REMOVAL AND INSTALLATION (Continued)

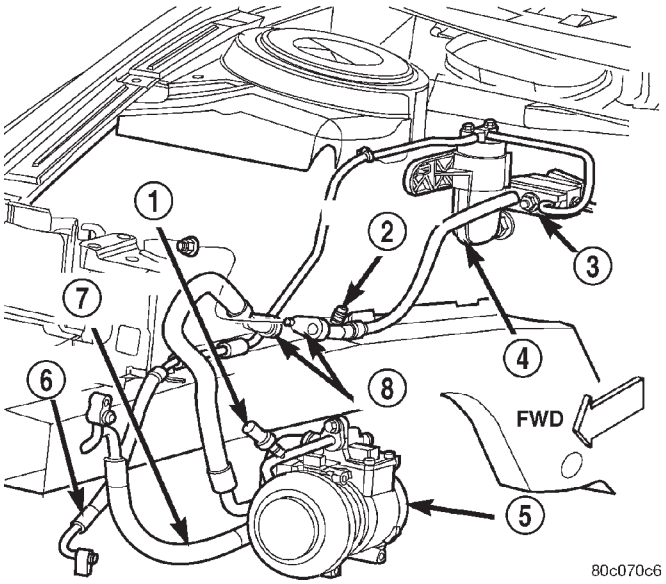


Fig. 31 A/C Refrigerant Lines and Expansion Valve 2.7L

1 – A/C PRESSURE TRANSDUCER
2 – SERVICE PORT
3 – EXPANSION VALVE
4 – FILTER-DRIER
5 – A/C COMPRESSOR
6 – LIQUID LINE
7 – DISCHARGE LINE
8 – SUCTION LINES

(3) Remove engine air inlet tube and air distribution duct for access to compressor lines.

(4) Remove bolt holding line at compressor using a 6mm allen wrench (3.2/3.5L), or M10 Hex (2.7L) (Fig. 32) and (Fig. 33).

(5) Remove line by pulling rear end of line up out of vehicle with compressor end following through the tie-rod area.

INSTALLATION

For installation, reverse the above procedures. Tighten TXV and compressor fasteners to 23 N·m (17 ft. lbs.). 2.7L: Rail screw and mid-line nut to 7 N·m (5ft. lbs.).

SUN SENSOR

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove instrument panel top cover.

(3) Remove two Sun Sensor mounting screws.

(4) Lift sensor out of instrument panel and disconnect wiring.

(5) Remove sensor from vehicle.

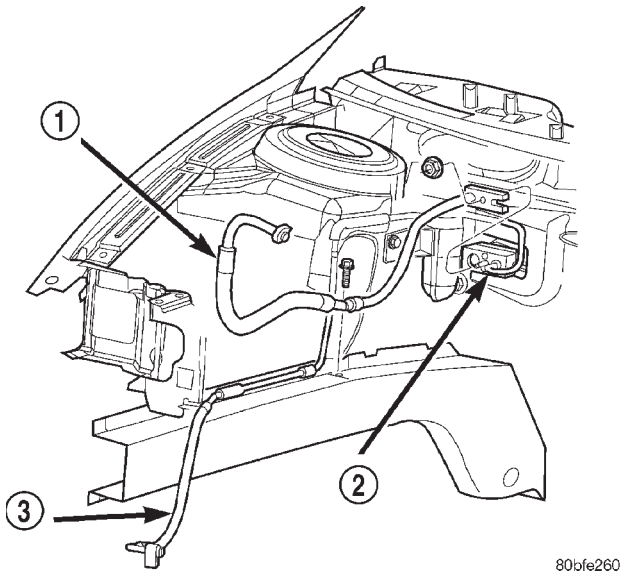


Fig. 32 Suction Line 3.2L/3.5L

1 – SUCTION LINE
2 – EXPANSION VALVE
3 – LIQUID LINE

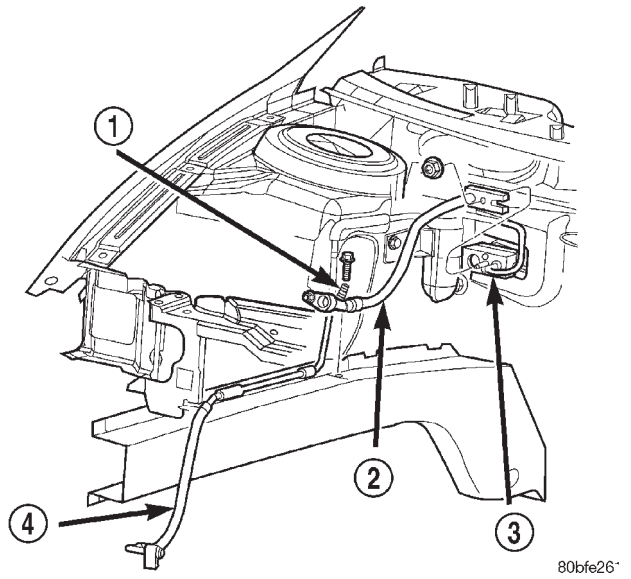


Fig. 33 Suction Line 2.7L

1 – SERVICE PORT
2 – SUCTION LINE
3 – EXPANSION VALVE
4 – LIQUID LINE

INSTALLATION

CAUTION: The sun sensor must protrude approximately 1/4 inch above the instrument panel top cover. This will ensure proper operation.

For installation, reverse the above procedures.

REMOVAL AND INSTALLATION (Continued)

Some ATC equipped vehicles may exhibit a lack of passenger comfort in sunny weather. This will not occur in night operation. This most likely occur in the early afternoon. Verify that the ATC system is functioning properly. Inspect the location of the sun sensor. The sun sensor must protrude approximately 1/4 inch above the instrument panel top cover to insure proper operation. If the sensor does not protrude 1/4 inch, perform the following procedure:

- Confirm that the top cover is properly installed
- Remove the top cover
- Remove fasteners from sun sensor
- Install one 1/4-20 nut per fastener under the sun sensor so that it is shimmed higher
- Reinstall the sun sensor. Do not overtighten screw. If a longer screw is required, use 8-15x1 inch.

TEMPERATURE DOOR ACTUATOR

The blend-air (temperature) door actuator is an electric motor which mechanically positions the temperature door. A feedback strip in the actuator allows the computer control to know the exact position of the temperature door at all times. The blend-air door actuator is not serviceable and must be replaced if found to be defective.

The temperature door actuator is located at the bottom of the heater housing at the center tunnel (Fig. 28).

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13).

(2) Remove left and right underpanel silencer/ducts.

(3) Remove two screws from actuator which are accessible from the right side of center stack.

(4) Remove one screw from actuator on left side.

(5) Pull actuator straight down from shaft and disconnect electrical connection. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.

INSTALLATION

For installation, reverse the above procedures.

HVAC UNIT HOUSING

REMOVAL

(1) Open hood and disconnect the negative battery cable remote terminal from the remote battery post (Fig. 13). This must be done to prevent accidental air bag deployment.

(2) Remove instrument panel from vehicle. Refer to Group 8E, Instrument Panel and Systems for Removal and Installation procedures.

(3) Using an A/C recovery unit, remove all R-134a refrigerant from the A/C system.

(4) Drain the engine cooling system.

(5) Remove air cleaner hose and air distribution duct from the engine.

(6) Remove spring type fasteners to heater hoses at the dash panel and remove hoses from heater core. Plug the heater core inlet and outlet tubes to prevent anti-freeze from spilling on the vehicle interior during removal. If an appropriate plug cannot be found pull back carpet and use caution when removing unit. Keep the heater tubes elevated to prevent spillage of coolant.

(7) Remove one nut at expansion valve retaining both A/C lines to expansion valve. After removing lines cap the expansion valve openings and the A/C hose openings. This will prevent any dirt or moisture from entering the refrigerant system during servicing.

CAUTION: The lubricant used in this air conditioning system absorbs moisture readily (similar to brake fluid). Do not leave any portion of the system open for extended periods of time.

(8) Remove the three retaining nuts from the studs. These studs project through the dash panel into the engine compartment.

(9) Remove two screws to defrost duct and remove.

(10) Remove two nuts, two screws attaching hvac housing to dash panel.

(11) Remove four nuts retaining rear seat heat duct and remove.

(12) Remove rear seat heat duct elbow push pin fastener.

(13) Disconnect HVAC harness connector.

(14) Gently pull hvac unit housing rearward from dash panel, being careful not to spill any coolant into passenger compartment.

INSTALLATION

For installation, reverse the above procedures.

DISASSEMBLY AND ASSEMBLY

HVAC UNIT HOUSING RECONDITION

Heater-A/C unit housing must be removed from vehicle before performing this operation. Refer to Unit Housing Removal and Installation.

The heater a/c unit housing need not be disassembled to remove the heater core. Refer to Heater Core Removal and Installation.

DISASSEMBLE

(1) Place heater-A/C unit assembly on workbench.
(2) Remove core retaining screws. Pull back on retaining tabs and remove heater core from housing.
(3) Remove recirculation door actuator wiring. Remove actuator from recirculation housing.
(4) Remove lower distribution housing. Remove mode door actuator.
(5) Remove blend air door actuator.
(6) Remove recirculation housing screws and clip.
(7) Remove blower motor wiring at resistor.
(8) Squeeze blower motor wiring grommet and push grommet through blower motor cover.
(9) Remove blower motor cover.
(10) Remove screws at blower motor mounts. Remove motor.
(11) Remove blower motor resistor.
(12) Remove wiring at evaporator temperature probe.
(13) Using a screwdriver, pry up on tab at evaporator probe. Twist probe counterclockwise and push tab into the housing.
(14) Pull the evaporator probe needle out of the evaporator fins. Remove the evaporator probe through the opening at the blower motor housing.
(15) Remove vent door seal from housing.
(16) Remove evaporator seal from housing.
(17) Remove upper housing screws and clips.
(18) Separate upper housing from lower housing.
(19) Remove evaporator assembly from lower housing.
(20) Remove blend air door from lower housing.
(21) Using a flat blade screwdriver, pinch in the retaining tab at the base of the vent door. Pull up on door and remove from housing.
(22) Remove mode door actuating cam.
(23) Remove screw at defrost door actuating arm. Remove defrost door link from arm.
(24) Remove defrost door arm from lower housing.
(25) Remove link and defrost door from housing.
(26) Remove vent door actuating arm from lower housing.

ASSEMBLE

(1) Install vent door actuating arm to lower housing.
(2) Install defrost door link to defrost door.
(3) Install door and link into A/C housing.
(4) Install defrost door actuating arm and retaining screw at housing.
(5) Install defrost door link to actuating arm.
(6) Line up the slots to the pegs on the mode door cam. Install the mode door cam.
(7) Turn housing over and snap in the vent door to the vent door arm.
(8) Install blend-air door in the housing.
(9) Install evaporator into the lower housing.
(10) Install upper housing onto lower housing.
(11) Install screws to retain the upper housing to the lower housing.
(12) Install evaporator and vent door seals onto the A/C housing.
(13) Install evaporator probe assembly into the housing. Insert probe needle into evaporator.
(14) Position the evaporator probe assembly at the housing face. Twist assembly clockwise to lock tab into slot on housing face.
(15) Install wiring at evaporator temperature probe.
(16) Install blower motor resistor.
(17) Install blower motor into housing. Install blower motor mounting screws.
(18) Thread the blower motor wiring through the blower motor cover. Install the blower motor cover.
(19) Seat blower motor wiring grommet at blower motor cover.
(20) Install blower motor wiring to the blower motor resistor.
(21) Position recirculation housing to A/C housing. Install retaining screws and clip.
(22) Install blend-air door actuator.
(23) Install mode door actuator.
(24) Install lower distribution housing.
(25) Install recirculation door actuator and wiring.
(26) Install heater core into A/C housing. Retain core with screws.

SPECIFICATIONS

A/C APPLICATION TABLE-ATC

Item	Description	Notes
Vehicle	LH - Intrepid, Concorde, 300M, LHS	Automatic Temperature Control (ATC)
System	R134a w/expansion valve	
Compressor	Nippondenso 10PA17	ND-8 PAG oil
Freeze-up Control	2-wire evaporator temp probe	BCM controlled, clutch OFF < 33° F, resets > 37° F
Low psi Control	pressure transducer line mounted	opens < 29.4 psi PCM input
High psi Control		opens > 431.0 psi PCM input
Forced Recirc Mode	System forced into Recirc at high pressures	BCM steps HVAC into recirc at 375 psi, steps out at 325 psi
Control head	automatic ATC type	Programmable Communication Interface (PCI)
Mode Door	electric actuator	BCM controlled actuators use a common ground
Blend Air Door	electric actuator	
Fresh/Recirc door	electric actuator	
Blower Motor	controlled via power module	Pulse Width Modulation (PWM)
Cooling Fans	2 fans, low speed and high speed	PCM controlled fan module via 2 relays
Clutch		
Control	relay	PCM
Draw	2.2 amps @ 12 V ±0.5V	
Gap	0.014” - 0.026″	
DRB III®		
Reads	TPS, RPM, A/C switch test	
Actuators	mode doors, clutch and fan relays	

A/C APPLICATION TABLE-MANUAL

Item	Description	Notes
Vehicle	LH - Intrepid, Concorde, 300M, LHS	manual A/C control
System	R134a w/expansion valve	
Compressor	Nippondenso 10PA17	ND-8 PAG oil
Freeze–up Control	2-wire evaporator temp probe	BCM controlled, clutch OFF < 33° F, resets > 37° F
Low psi Control	pressure transducer line mounted	opens < 29.4 psi PCM input
High psi Control		opens > 431.0 psi PCM input
Forced Recirc Mode	System forced into Recirc at high pressures	BCM steps HVAC into recirc at 375 psi, steps out at 325 psi
Control Head	manual type	BCM diagnostics
Mode Door	electric actuator	BCM controlled actuators use a common ground
Blend-Air Door	electric actuator	
Fresh/Recirc door	electric actuator	
Blower Motor	hardwired to control head	resistor block
Cooling Fans	2 fans, low speed and high speed	PCM controlled via 2 relays
Clutch		
Control	relay	PCM
Draw	2.2 amps @ 12 V ±0.5V	
Gap	0.014” - 0.026″	
DRB III®		
Reads	TPS, RPM, A/C switch test	
Actuators	mode doors, clutch and fan relays	

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ON-BOARD DIAGNOSTICS

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DESCRIPTION AND OPERATION

SYSTEM DESCRIPTION

OPERATION

The Powertrain Control Module (PCM) monitors many different circuits in the fuel injection, ignition, emission and engine systems. If the PCM senses a problem with a monitored circuit often enough to indicate an actual problem, it stores a Diagnostic Trouble Code (DTC) in the PCM's memory. If the code applies to a non-emissions related component or system, and the problem is repaired or ceases to exist, the PCM cancels the code after 40 warmup cycles. Diagnostic trouble codes that affect vehicle emissions illuminate the Malfunction Indicator Lamp (MIL). Refer to Malfunction Indicator Lamp in this section.

Certain criteria must be met before the PCM stores a DTC in memory. The criteria may be a specific range of engine RPM, engine temperature, and/or input voltage to the PCM.

The PCM might not store a DTC for a monitored circuit even though a malfunction has occurred. This may happen because one of the DTC criteria for the circuit has not been met. **For example**, assume the diagnostic trouble code criteria requires the PCM to monitor the circuit only when the engine operates between 750 and 2000 RPM. Suppose the sensor's output circuit shorts to ground when engine operates above 2400 RPM (resulting in 0 volt input to the PCM). Because the condition happens at an engine speed above the maximum threshold (2000 rpm), the PCM will not store a DTC.

There are several operating conditions for which the PCM monitors and sets DTC's. Refer to Monitored Systems, Components, and Non-Monitored Circuits in this section.

NOTE: Various diagnostic procedures may actually cause a diagnostic monitor to set a DTC. For instance, pulling a spark plug wire to perform a spark test may set the misfire code. When a repair is completed and verified, use the DRB scan tool to erase all DTC's and extinguish the MIL.

Technicians can display stored DTC's. Refer to Diagnostic Trouble Codes in this section. For DTC information, refer to charts in this section.

DIAGNOSTIC TROUBLE CODES

DESCRIPTION

A Diagnostic Trouble Code (DTC) indicates the PCM has recognized an abnormal condition in the system.

DESCRIPTION AND OPERATION (Continued)

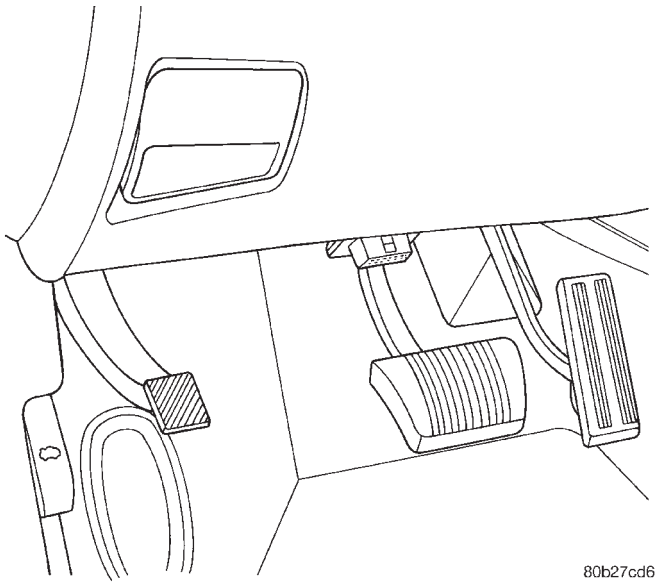


Fig. 1 Data Link (Diagnostic) Connector

Remember that DTC's are the results of a system or circuit failure, but do not directly identify the failed component or components.

NOTE: For a list of DTC's, refer to the charts in this section.

OPERATION

BULB CHECK

Each time the ignition key is turned to the ON position, the malfunction indicator (check engine) lamp on the instrument panel should illuminate for approximately 2 seconds then go out. This is done for a bulb check.

OBTAINING DTC'S USING DRB SCAN TOOL

(1) Connect the DRB scan tool to the data link (diagnostic) connector. This connector is located in the passenger compartment; at the lower edge of instrument panel; near the steering column.

(2) Turn the ignition switch on and access the "Read Fault" screen.

(3) Record all the DTC's and "freeze frame" information shown on the DRB scan tool.

(4) To erase DTC's, use the "Erase Trouble Code" data screen on the DRB scan tool. **Do not erase any DTC's until problems have been investigated and repairs have been performed.**

DIAGNOSTIC TROUBLE CODE DESCRIPTIONS

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0106 (M)	Barometric Pressure Out of Range	MAP sensor input voltage out of an acceptable range detected during reading of barometric pressure at key-on.
P0107 (M)	Map Sensor Voltage Too Low	MAP sensor input below minimum acceptable voltage.
P0108 (M)	Map Sensor Voltage Too High	MAP sensor input above maximum acceptable voltage.
P0112 (M)	Intake Air Temp Sensor Voltage Low	Intake air (charge) temperature sensor input below the minimum acceptable voltage.
P0113 (M)	Intake Air Temp Sensor Voltage High	Intake air (charge) temperature sensor input above the maximum acceptable voltage.
P0116		A rationatilty error has been detected in the coolant temp sensor.
P0117 (M)	ECT Sensor Voltage Too Low	Engine coolant temperature sensor input below the minimum acceptable voltage.
P0118 (M)	ECT Sensor Voltage Too High	Engine coolant temperature sensor input above the maximum acceptable voltage.
P0121 (M)	TPS Voltage Does Not Agree With MAP	TPS signal does not correlate to MAP sensor signal.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0122 (M)	Throttle Position Sensor Voltage Low	Throttle position sensor input below the acceptable voltage range.
P0123 (M)	Throttle Position Sensor Voltage High	Throttle position sensor input above the maximum acceptable voltage.
P0125 (M)	Closed Loop Temp Not Reached	Time to enter Closed Loop Operation (Fuel Control) is excessive.
P0130	1/1 O2 Sensor Heater Relay Circuit	An open or shorted condition detected in the ASD or CNG shutoff relay control ckt.
P0131 (M)	1/1 O2 Sensor Shorted To Ground	Oxygen sensor input voltage maintained below normal operating range.
P0132 (M)	1/1 O2 Sensor Shorted To Voltage	Oxygen sensor input voltage maintained above normal operating range.
P0133 (M)	1/1 O2 Sensor Slow Response	Oxygen sensor response slower than minimum required switching frequency.
P0134 (M)	1/1 O2 Sensor Stays at Center	Neither rich or lean condition is detected from the oxygen sensor input.
P0135 (M)	1/1 O2 Sensor Heater Failure	Oxygen sensor heater element malfunction.
P0136	1/2 O2 Sensor Heater Relay Circuit	An open or shorted condition detected in the ASD or CNG shutoff relay control ckt.
P0137 (M)	1/2 O2 Sensor Shorted To Ground	Oxygen sensor input voltage maintained below normal operating range.
P0138 (M)	1/2 O2 Sensor Shorted To Voltage	Oxygen sensor input voltage maintained above normal operating range.
P0139 (M)	1/2 O2 Sensor Slow Response	Oxygen sensor response not as expected.
P0140 (M)	1/2 O2 Sensor Stays at Center	Neither rich or lean condition is detected from the oxygen sensor.
P0141 (M)	1/2 O2 Sensor Heater Failure	Oxygen sensor heater element malfunction.
P0143	1/3 O2 Sensor Shorted To Ground	Oxygen sensor input voltage maintained below normal operating range.
P0144	1/3 O2 Sensor Shorted To Voltage	Oxygen sensor input voltage maintained above normal operating range.
P0145	1/3 O2 Sensor Slow Response	Oxygen sensor response slower than minimum required switching frequency.
P0146	1/3 O2 Sensor Stays at Center	Neither rich or lean condition is detected from the oxygen sensor.
P0147	1/3 O2 Sensor Heater Failure	Oxygen sensor heater element malfunction.
P0151 (M)	2/1 O2 Sensor Shorted To Ground	Oxygen sensor input voltage maintained below normal operating range.
P0152 (M)	2/1 O2 Sensor Shorted To Voltage	Oxygen sensor input voltage sustained above normal operating range.
P0153 (M)	2/1 O2 Sensor Slow Response	Oxygen sensor response slower than minimum required switching frequency.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0154 (M)	2/1 O2 Sensor Stays at Center	Neither rich or lean condition is detected from the oxygen sensor.
P0155 (M)	2/1 O2 Sensor Heater Failure	Oxygen sensor heater element malfunction.
P0157 (M)	2/2 O2 Sensor Shorted To Ground	Oxygen sensor input voltage maintained below normal operating range.
P0158 (M)	2/2 O2 Sensor Shorted To Voltage	Oxygen sensor input voltage maintained above normal operating range.
P0159	2/2 O2 Sensor Slow Response	Oxygen sensor response slower than minimum required switching frequency.
P0160 (M)	2/2 O2 Sensor Stays at Center	Neither rich or lean condition is detected from the oxygen sensor.
P0161 (M)	2/2 O2 Sensor Heater Failure	Oxygen sensor heater element malfunction.
P0165	Starter Relay Control Circuit	An open or shorted condition detected in the starter relay control circuit.
P0171 (M)	1/1 Fuel System Lean	A lean air/fuel mixture has been indicated by an abnormally rich correction factor.
P0172 (M)	1/1 Fuel System Rich	A rich air/fuel mixture has been indicated by an abnormally lean correction factor.
P0174 (M)	2/1 Fuel System Lean	A lean air/fuel mixture has been indicated by an abnormally rich correction factor.
P0175 (M)	2/1 Fuel System Rich	A rich air/fuel mixture has been indicated by an abnormally lean correction factor.
P0178	Water in Fuel Sensor Voltage Too Low	Flex fuel sensor input below minimum acceptable voltage.
P0179	Flex Fuel Sensor Volts Too High	Flex fuel sensor input above maximum acceptable voltage.
P0182	CNG Temp Sensor Voltage Too Low	Compressed natural gas temperature sensor voltage below acceptable voltage.
P0183	CNG Temp Sensor Voltage Too High	Compressed natural gas temperature sensor voltage above acceptable voltage.
P0201 (M)	Injector #1 Control Circuit	An open or shorted condition detected in control circuit for injector #1 or the INJ 1 injector bank.
P0202 (M)	Injector #2 Control Circuit	An open or shorted condition detected in control circuit for injector #2 or the INJ 2 injector bank.
P0203 (M)	Injector #3 Control Circuit	An open or shorted condition detected in control circuit for injector #3 or the INJ 3 injector bank.
P0204 (M)	Injector #4 Control Circuit	Injector #4 or INJ 4 injector bank output driver stage does not respond properly to the control signal.
P0205 (M)	Injector #5 Control Circuit	Injector #5 output driver stage does not respond properly to the control signal.
P0206 (M)	Injector #6 Control Circuit	Injector #6 output driver stage does not respond properly to the control signal.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0207	Injector #7 Control Circuit	Injector #7 output driver stage does not respond properly to the control signal.
P0208	Injector #8 Control Circuit	Injector #8 output driver stage does not respond properly to the control signal.
P0209	Injector #9 Control Circuit	Injector #9 output driver stage does not respond properly to the control signal.
P0210	Injector #10 Control Circuit	Injector #10 output driver stage does not respond properly to the control signal.
P0300 (M)	Multiple Cylinder Mis-fire	Misfire detected in multiple cylinders.
P0301 (M)	CYLINDER #1 MISFIRE	Misfire detected in cylinder #1.
P0302 (M)	CYLINDER #2 MISFIRE	Misfire detected in cylinder #2.
P0303 (M)	CYLINDER #3 MISFIRE	Misfire detected in cylinder #3.
P0304 (M)	CYLINDER #4 MISFIRE	Misfire detected in cylinder #4.
P0305 (M)	CYLINDER #5 MISFIRE	Misfire detected in cylinder #5.
P0306 (M)	CYLINDER #6 MISFIRE	Misfire detected in cylinder #6.
P0307 (M)	CYLINDER #7 MISFIRE	Misfire detected in cylinder #7
P0308 (M)	CYLINDER #8 MISFIRE	Misfire detected in cylinder #8.
P0309 (M)	CYLINDER #9 MISFIRE	Misfire detected in cylinder #9.
P0310 (M)	CYLINDER #10 MISFIRE	Misfire detected in cylinder #10.
P0320	No Crank Referance Signal at PCM	No reference signal (crankshaft position sensor) detected during engine cranking.
P0325	Knock Sensor #1 Circuit	Knock sensor (#1) signal above or below minimum acceptable threshold voltage at particular engine speeds.
P0330	Knock Sensor #2 Circuit	Knock sensor (#2) signal above or below minimum acceptable threshold voltage at particular engine speeds.
P0340 (M)	No Cam Signal At PCM	No fuel sync
P0350	Ignition Coil Draws Too Much Current	A coil (1-5) is drawing too much current.
P0351 (M)	Ignition Coil # 1 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
P0352 (M)	Ignition Coil # 2 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
P0353 (M)	Ignition Coil # 3 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
P0354 (M)	Ignition Coil # 4 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time (High Impedance).
P0355 (M)	Ignition Coil # 5 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time (High Impedance).
P0356 (M)	Ignition Coil # 6 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time (high impedance).

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0357	Ignition Coil # 7 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time (high impedance).
P0358	Ignition Coil # 8 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time (high impedance).
P0401 (M)	EGR System Failure	Required change in air/fuel ration not detected during diagnostic test.
P0403 (M)	EGR Solenoid Circuit	An open or shorted condition detected in the EGR solenoid control circuit.
P0404 (M)	EGR Position Sensor Rationality	EGR position sensor signal does not correlate to EGR duty cycle.
P0405 (M)	EGR Position Sensor Volts Too Low	EGR position sensor input below the acceptable voltage range.
P0406 (M)	EGR Position Sensor Volts Too High	EGR position sensor input above the acceptable voltage range.
P0412	Secondary Air Solenoid Circuit	An open or shorted condition detected in the secondary air (air switching/aspirator) solenoid control circuit.
P0420 (M)	1/1 Catalytic Converter Efficiency	Catalyst 1/1 efficiency below required level.
P0432 (M)	1/2 Catalytic Converter Efficiency	Catalyst 2/1 efficiency below required level.
P0441 (M)	Evap Purge Flow Monitor	Insufficient or excessive vapor flow detected during evaporative emission system operation.
P0442 (M)	Evap Leak Monitor Medium Leak Detected	A small leak has been detected in the evaporative system.
P0443 (M)	Evap Purge Solenoid Circuit	An open or shorted condition detected in the EVAP purge solenoid control circuit.
P0455 (M)	Evap Leak Monitor Large Leak Detected	A large leak has been detected in the evaporative system.
P0456	Evap Leak Monitor Small Leak Detected	A small leak has been detected in the evaporative system.
P0460	Fuel Level Unit No Change Over Miles	No movement of fuel level sender detected.
P0461	Fuel Level Unit No Changeover Time	No level of fuel level sender detected.
P0462	Fuel Level Sending Unit Volts Too Low	Fuel level sensor input below acceptable voltage.
P0463	Fuel Level Sending Unit Volts Too High	Fuel level sensor input above acceptable voltage.
P0500 (M)	No Vehicle Speed Sensor Signal	No vehicle speed sensor signal detected during road load conditions.
P0505 (M)	Idle Air Control Motor Circuits	Replace
P0522	Oil Pressure Sens Low	Oil pressure sensor input below acceptable voltage.
P0523	Oil Pressure Sens High	Oil pressure sensor input above acceptable voltage.
P0551 (M)	Power Steering Switch Failure	Incorrect input state detected for the power steering switch circuit. PL: High pressure seen at high speed.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0600 (M)	PCM Failure SPI Communications	No communication detected between co-processors in the control module.
P0601 (M)	Internal Controller Failure	Internal control module fault condition (check sum) detected.
P0604	Internal Trans Controller	Transmission control module RAM self test fault detected. -Aisin transmission.
P0605	Internal Trans Controller	Transmission control module ROM self test fault detected -Aisin transmission.
P0622 (G)	Generator Field Not Switching Properly	An open or shorted condition detected in the generator field control circuit.
P0645	A/C Clutch Relay Circuit	An open or shorted condition detected in the A/C clutch relay control circuit.
P0700 (M)	EATX Controller DTC Present	This SBEC III or JTEC DTC indicates that the EATX or Aisin controller has an active fault and has illuminated the MIL via a CCD (EATX) or SCI (Aisin) message. The specific fault must be acquired from the EATX via CCD or from the Aisin via ISO-9141.
P0703 (M)	Brake Switch Stuck Pressed or Released	Incorrect input state detected in the brake switch circuit. (Changed from P1595).
P0711	Trans Temp Sensor, No Temp Rise After Start	Relationship between the transmission temperature and overdrive operation and/or TCC operation indicates a failure of the Transmission Temperature Sensor. OBD II Rationality.
P0712	Trans Temp Sensor Voltage Too Low	Transmission fluid temperature sensor input below acceptable voltage.
P0713	Trans Temp Sensor Voltage Too High	Transmission fluid temperature sensor input above acceptable voltage.
P0720	Low Output SPD Sensor RPM, Above 15 MPH	The relationship between the Output Shaft Speed Sensor and vehicle speed is not within acceptable limits.
P0740 (M)	Torq Con Clu, No RPM Drop at Lockup	Relationship between engine and vehicle speeds indicated failure of torque convertor clutch lock-up system (TCC/PTU sol).
P0743	Torque Converter Clutch Solenoid/ Trans Relay Circuits	An open or shorted condition detected in the torque converter clutch (part throttle unlock) solenoid control circuit. Shift solenoid C electrical fault - Aisin transmission
P0748	Governor Pressur Sol Control/Trans Relay Circuits	An open or shorted condition detected in the Governor Pressure Solenoid circuit or Trans Relay Circuit in JTEC RE transmissions.
P0751	O/D Switch Pressed (Lo) More Than 5 Minutes	Overdrive override switch input is in a prolonged depressed state.
P0753	Trans 3-4 Shift Sol/Trans Relay Circuits	An open or shorted condition detected in the overdrive solenoid control circuit or Trans Relay Circuit in JTEC RE transmissions.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P0756	AW4 Shift Sol B (2-3) Functional Failure	Shift solenoid B (2-3) functional fault - Aisin transmission
P0783	3-4 Shift Sol, No RPM Drop at Lockup	The overdrive solenoid is unable to engage the gear change from 3rd gear to the overdrive gear.
P0801	Reverse Gear Lockout Circuit Open or Short	An open or shorted condition detected in the transmission reverse gear lock-out solenoid control circuit.
P01192	Inlet Air Temp. Circuit Low	Inlet Air Temp. sensor input below acceptable voltage
P01193	Inlet Air Temp. Circuit High	Inlet Air Temp. sensor input above acceptable voltage.
P1195 (M)	1/1 O2 Sensor Slow During Catalyst Monitor	A slow switching oxygen sensor has been detected in bank 1/1 during catalyst monitor test. (was P0133)
P1196 (M)	2/1 O2 Sensor Slow During Catalyst Monitor	A slow switching oxygen sensor has been detected in bank 2/1 during catalyst monitor test. (was P0153)
P1197	1/2 O2 Sensor Slow During Catalyst Monitor	A slow switching oxygen sensor has been detected in bank 1/2 during catalyst monitor test. (was P0139)
P1198	Radiator Temperature Sensor Volts Too High	Radiator coolant temperature sensor input above the maximum acceptable voltage.
P1199	Radiator Temperature Sensor Volts Too Low	Radiator coolant temperature sensor input below the minimum acceptable voltage.
P1281	Engine is Cold Too Long	Engine coolant temperature remains below normal operating temperatures during vehicle travel (Thermostat).
P1282	Fuel Pump Relay Control Circuit	An open or shorted condition detected in the fuel pump relay control circuit.
P1288	Intake Manifold Short Runner Solenoid Circuit	An open or shorted condition detected in the short runner tuning valve circuit.
P1289	Manifold Tune Valve Solenoid Circuit	An open or shorted condition detected in the manifold tuning valve solenoid control circuit.
P1290	CNG Fuel System Pressure Too High	Compressed natural gas system pressure above normal operating range.
P1291	No Temp Rise Seen From Intake Heaters	Energizing Heated Air Intake does not change intake air temperature sensor an acceptable amount.
P1292	CNG Pressure Sensor Voltage Too High	Compressed natural gas pressure sensor reading above acceptable voltage.
P1293	CNG Pressure Sensor Voltage Too Low	Compressed natural gas pressure sensor reading below acceptable voltage.
P1294 (M)	Target Idle Not Reached	Target RPM not achieved during drive idle condition. Possible vacuum leak or IAC (AIS) lost steps.
P1295	No 5 Volts to TP Sensor	Loss of a 5 volt feed to the Throttle Position Sensor has been detected.
P1296	No 5 Volts to MAP Sensor	Loss of a 5 volt feed to the MAP Sensor has been detected.
P1297 (M)	No Change in MAP From Start To Run	No difference is recognized between the MAP reading at engine idle and the stored barometric pressure reading.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P1298	Lean Operation at Wide Open Throttle	A prolonged lean condition is detected during Wide Open Throttle.
P1299 (M)	Vacuum Leak Found (IAC Fully Seated)	MAP Sensor signal does not correlate to Throttle Position Sensor signal. Possible vacuum leak.
P1388	Auto Shutdown Relay Control Circuit	An open or shorted condition detected in the ASD or CNG shutoff relay control ckt.
P1389	No ASD Relay Output Voltage At PCM	No Z1 or Z2 voltage sensed when the auto shutdown relay is energized.
P1390 (M)	Timing Belt Skipped 1 Tooth or More	Relationship between Cam and Crank signals not correct.
P1391 (M)	Intermittent Loss of CMP or CKP	Loss of the Cam Position Sensor or Crank Position sensor has occurred. For PL 2.0L
P1398 (M)	Mis-Fire Adaptive Numerator at Limit	PCM is unable to learn the Crank Sensor's signal in preparation for Misfire Diagnostics. Probable defective Crank Sensor.
P1399	Wait To Start Lamp Cicuit	An open or shorted condition detected in the Wait to Start Lamp circuit.
P1403	No 5 Volts to EGR Sensor	Loss of 5v feed to the EGR position sensor.
P1476	Too Little Secondary Air	Insufficient flow of secondary air injection detected during aspirator test.(was P0411)
P1477	Too Much Secondary Air	Excessive flow of secondary air injection detected during aspirator test (was P0411).
P1478 (M)	Battery Temp Sensor Volts Out of Limit	Internal temperature sensor input voltage out of an acceptable range.
P1479	Transmission Fan Relay Circuit	An open or shorted condition detected in the transmission fan relay circuit.
P1480	PCV Solenoid Circuit	An open or shorted condition detected in the PCV solenoid circuit.
P1482	Catalyst Temperature Sensor Circuit Shorted Low	Catalyst temperature sensor circuit shorted low.
P1483	Catalyst Temperature Sensor Circuit Shorted High.	Catalyst temperature sensor circuit shorted high.
P1484	Catalytic Converter Overheat Detected	A catalyst overheat condition has been detected by the catalyst temperature sensor.
P1485	Air Injection Solenoid Circuit	An open or shorted condition detected in the air assist solenoid circuit.
P1486 (M)	Evap Leak Monitor Pinched Hose Found	LDP has detected a pinched hose in the evaporative hose system.
P1487	Hi Speed Rad Fan CTRL Relay Circuit	An open or shorted condition detected in the control circuit of the #2 high speed radiator fan control relay.
P1488	Auxiliary 5 Volt Supply Output Too Low	Auxiliary 5 volt sensor feed is sensed to be below an acceptable limit.
P1489 (M)	High Speed Fan CTRL Relay Circuit	An open or shorted condition detected in the control circuit of the high speed radiator fan control relay.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P1490 (M)	Low Speed Fan CTRL Relay Circuit	An open or shorted condition detected in control circuit of the low speed radiator fan control relay.
P1491	Rad Fan Control Relay Circuit	An open or shorted condition detected in the radiator fan control relay control circuit. This includes PWM solid state relays.
P1492 (M,G)	Ambient/Batt Temp Sen Volts Too High	External temperature sensor input above acceptable voltage.
P1493 (M,G)	Ambient/Batt Temp Sen Volts Too Low	External temperature sensor input below acceptable voltage.
P1494 (M)	Leak Detection Pump Sw or Mechanical Fault	Incorrect input state detected for the Leak Detection Pump (LDP) pressure switch.
P1495 (M)	Leak Detection Pump Solenoid Circuit	An open or shorted condition detected in the Leak Detection Pump (LDP) solenoid circuit.
P1496 (M)	5 Volt Supply, Output Too Low	5 volt sensor feed is sensed to be below an acceptable limit. (< 4v for 4 sec).
P1498	High Speed Rad Fan Ground CTRL Rly Circuit	An open or shorted condition detected in the control circuit of the #3 high speed radiator fan control relay.
P1594 (G)	Charging System Voltage Too High	Battery voltage sense input above target charging voltage during engine operation.
P1595	Speed Control Solenoid Circuits	An open or shorted condition detected in either of the speed control vacuum or vent solenoid control circuits.
P1596	Speed Control Switch Always High	Speed control switch input above maximum acceptable voltage.
P1597	Speed Control Switch Always Low	Speed control switch input below minimum acceptable voltage.
P1598	A/C Pressure Sensor Volts Too High	A/C pressure sensor input above maximum acceptable voltage.
P1599	A/C Pressure Sensor Volts Too Low	A/C pressure sensor input below minimum acceptable voltage.
P1680	Clutch Released Switch Circuit	
P1681	No I/P Cluster CCD/J1850 Messages Received	No CCD/J1850 messages received from the cluster control module.
P1682 (G)	Charging System Voltage Too Low	Battery voltage sense input below target charging voltage during engine operation and no significant change in voltage detected during active test of generator output circuit.
P1683	SPD CTRL PWR Relay; or S/C 12v Driver CKT	An open or shorted condition detected in the speed control servo power control circuit. (SBECII: ext relay).
P1684		The battery has been disconnected within the last 50 starts.
P1685	Skim Invalid Key	The engine controler has received an invalid key from the SKIM.

DESCRIPTION AND OPERATION (Continued)

(M) Check Engine Lamp (MIL) will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		
(G) Generator Lamp Illuminated		
GENERIC SCAN TOOL CODE	DRB SCAN TOOL DISPLAY	DESCRIPTION OF DIAGNOSTIC TROUBLE CODE
P1686	No SKIM BUS Messages Received	No CCD/J1850 messages received from the Smart Key Immobilizer Module (SKIM).
P1687	No MIC BUS Message	No CCD/J1850 messages received from the Mechanical Instrument Cluster (MIC) module.
P1693	DTC Detected in Companion Module	A fault has been generated in the companion engine control module.
P1694	Fault In Companion Module	No CCD/J1850 messages received from the powertrain control module-Aisin transmission.
P1695	No CCD/J1850 Message From Body Control Module	No CCD/J1850 messages received from the body control module.
P1696 (M)	PCM Failure EEPROM Write Denied	Unsuccessful attempt to write to an EEPROM location by the control module.
P1697 (M)	PCM Failure SRI Mile Not Stored	Unsuccessful attempt to update Service Reminder Indicator (SRI or EMR) mileage in the control module EEPROM.
P1698 (M)	No CCD/J1850 Message From TCM	No CCD/J1850 messages received from the electronic transmission control module (EATX) or the Aisin transmission controller.
P1719	Skip Shift Solenoid Circuit	An open or shorted condition detected in the transmission 2-3 gear lock-out solenoid control circuit.
P1756	GOV Press Not Equal to Target @ 15-20 PSI	The requested pressure and the actual pressure are not within a tolerance band for the Governor Control System which is used to regulate governor pressure to control shifts for 1st, 2nd, and 3rd gear. (Mid Pressure Malfunction)
P1757	GOV Press Not Equal to Target @ 15-20 PSI	The requested pressure and the actual pressure are not within a tolerance band for the Governor Control System which is used to regulate governor pressure to control shifts for 1st, 2nd, and 3rd gear (Zero Pressure Malfunction)
P1762	Gov Press Sen Offset Volts Too Lo or High	The Governor Pressure Sensor input is greater than a calibration limit or is less than a calibration limit for 3 consecutive park/neutral calibrations.
P1763	Governor Pressure Sensor Volts Too Hi	The Governor Pressure Sensor input is above an acceptable voltage level.
P1764	Governor Pressure Sensor Volts Too Low	The Governor Pressure Sensor input is below an acceptable voltage level.
P1765	Trans 12 Volt Supply Relay CTRL Circuit	An open or shorted condition is detected in the Transmission Relay control circuit. This relay supplies power to the TCC>
P1899 (M)	P/N Switch Stuck in Park or in Gear	Incorrect input state detected for the Park/Neutral switch.

DESCRIPTION AND OPERATION (Continued)

MONITORED SYSTEMS

OPERATION

There are new electronic circuit monitors that check fuel, emission, engine and ignition performance. These monitors use information from various sensor circuits to indicate the overall operation of the fuel, engine, ignition and emission systems and thus the emissions performance of the vehicle.

The fuel, engine, ignition and emission systems monitors do not indicate a specific component problem. They do indicate that there is an implied problem within one of the systems and that a specific problem must be diagnosed.

If any of these monitors detect a problem affecting vehicle emissions, the Malfunction Indicator (Check Engine) Lamp will be illuminated. These monitors generate Diagnostic Trouble Codes that can be displayed with the check engine lamp or a scan tool.

The following is a list of the system monitors:

- EGR Monitor
- Misfire Monitor
- Fuel System Monitor
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Catalyst Monitor
- Evaporative System Leak Detection Monitor

Following is a description of each system monitor, and its DTC.

Refer to the appropriate Powertrain Diagnostics Procedures manual for diagnostic procedures.

OXYGEN SENSOR (O2S) MONITOR

Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperatures of 300° to 350°C (572° to 662°F), the sensor generates a voltage that is inversely proportional to the amount of oxygen in the exhaust. The information obtained by the sensor is used to calculate the fuel injector pulse width. This maintains a 14.7 to 1 air fuel (A/F) ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrous oxide (NOx) from the exhaust.

The O2S is also the main sensing element for the EGR, Catalyst and Fuel Monitors.

The O2S may fail in any or all of the following manners:

- Slow response rate
- Reduced output voltage
- Dynamic shift
- Shorted or open circuits

Response rate is the time required for the sensor to switch from lean to rich once it is exposed to a richer than optimum A/F mixture or vice versa. As the sensor starts malfunctioning, it could take longer to detect the changes in the oxygen content of the exhaust gas.

The output voltage of the O2S ranges from 0 to 1 volt. A good sensor can easily generate any output voltage in this range as it is exposed to different concentrations of oxygen. To detect a shift in the A/F mixture (lean or rich), the output voltage has to change beyond a threshold value. A malfunctioning sensor could have difficulty changing beyond the threshold value.

OXYGEN SENSOR HEATER MONITOR

If there is an oxygen sensor (O2S) DTC as well as a O2S heater DTC, the O2S fault MUST be repaired first. After the O2S fault is repaired, verify that the heater circuit is operating correctly.

Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperatures of 300° to 350°C (572 ° to 662°F), the sensor generates a voltage that is inversely proportional to the amount of oxygen in the exhaust. The information obtained by the sensor is used to calculate the fuel injector pulse width. This maintains a 14.7 to 1 Air Fuel (A/F) ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrogen oxide (NOx) from the exhaust.

The voltage readings taken from the O2S are very temperature sensitive. The readings are not accurate below 300°C. Heating of the O2S is done to allow the engine controller to shift to closed loop control as soon as possible. The heating element used to heat the O2S must be tested to ensure that it is heating the sensor properly.

The O2S circuit is monitored for a drop in voltage. The sensor output is used to test the heater by isolating the effect of the heater element on the O2S output voltage from the other effects.

EGR MONITOR

The Powertrain Control Module (PCM) performs an on-board diagnostic check of the EGR system.

The EGR monitor is used to test whether the EGR system is operating within specifications. The diagnostic check activates only during selected engine/driving conditions. When the conditions are met, the EGR is turned off (solenoid energized) and the O2S compensation control is monitored. Turning off the EGR shifts the air fuel (A/F) ratio in the lean direction. The O2S data should indicate an increase in the

DESCRIPTION AND OPERATION (Continued)

O2S concentration in the combustion chamber when the exhaust gases are no longer recirculated. While this test does not directly measure the operation of the EGR system, it can be inferred from the shift in the O2S data whether the EGR system is operating correctly. Because the O2S is being used, the O2S test must pass its test before the EGR test.

MISFIRE MONITOR

Excessive engine misfire results in increased catalyst temperature and causes an increase in HC emissions. Severe misfires could cause catalyst damage. To prevent catalytic convertor damage, the PCM monitors engine misfire.

The Powertrain Control Module (PCM) monitors for misfire during most engine operating conditions (positive torque) by looking at changes in the crankshaft speed. If a misfire occurs the speed of the crankshaft will vary more than normal.

FUEL SYSTEM MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide. The catalyst works best when the air fuel (A/F) ratio is at or near the optimum of 14.7 to 1.

The PCM is programmed to maintain the optimum air/fuel ratio of 14.7 to 1. This is done by making short term corrections in the fuel injector pulse width based on the O2S output. The programmed memory acts as a self calibration tool that the engine controller uses to compensate for variations in engine specifications, sensor tolerances and engine fatigue over the life span of the engine. By monitoring the actual air-fuel ratio with the O2S (short term) and multiplying that with the program long-term (adaptive) memory and comparing that to the limit, it can be determined whether it will pass an emissions test. If a malfunction occurs such that the PCM cannot maintain the optimum A/F ratio, then the MIL will be illuminated.

CATALYST MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide.

Normal vehicle miles or engine misfire can cause a catalyst to decay. A meltdown of the ceramic core can cause a reduction of the exhaust passage. This can increase vehicle emissions and deteriorate engine performance, driveability and fuel economy.

The catalyst monitor uses dual oxygen sensors (O2S's) to monitor the efficiency of the converter. The dual O2S's strategy is based on the fact that as a catalyst deteriorates, its oxygen storage capacity and its efficiency are both reduced. By monitoring the oxygen storage capacity of a catalyst, its efficiency can be indirectly calculated. The upstream O2S is used to detect the amount of oxygen in the exhaust gas before the gas enters the catalytic converter. The PCM calculates the A/F mixture from the output of the O2S. A low voltage indicates high oxygen content (lean mixture). A high voltage indicates a low content of oxygen (rich mixture).

When the upstream O2S detects a lean condition, there is an abundance of oxygen in the exhaust gas. A functioning converter would store this oxygen so it can use it for the oxidation of HC and CO. As the converter absorbs the oxygen, there will be a lack of oxygen downstream of the converter. The output of the downstream O2S will indicate limited activity in this condition.

As the converter loses the ability to store oxygen, the condition can be detected from the behavior of the downstream O2S. When the efficiency drops, no chemical reaction takes place. This means the concentration of oxygen will be the same downstream as upstream. The output voltage of the downstream O2S copies the voltage of the upstream sensor. The only difference is a time lag (seen by the PCM) between the switching of the O2S's.

To monitor the system, the number of lean-to-rich switches of upstream and downstream O2S's is counted. The ratio of downstream switches to upstream switches is used to determine whether the catalyst is operating properly. An effective catalyst will have fewer downstream switches than it has upstream switches i.e., a ratio closer to zero. For a totally ineffective catalyst, this ratio will be one-to-one, indicating that no oxidation occurs in the device.

The system must be monitored so that when catalyst efficiency deteriorates and exhaust emissions increase to over the legal limit, the MIL (Check Engine lamp) will be illuminated.

LEAK DETECTION PUMP MONITOR

The leak detection assembly incorporates two primary functions: it must detect a leak in the evaporative system and seal the evaporative system so the leak detection test can be run.

The primary components within the assembly are: A three port solenoid that activates both of the functions listed above; a pump which contains a switch, two check valves and a spring/diaphragm, a canister vent valve (CVV) seal which contains a spring loaded vent seal valve.

Immediately after a cold start, between predetermined temperature thresholds limits, the three port solenoid is briefly energized. This initializes the pump by drawing air into the pump cavity and also closes the vent seal. During non test conditions the

DESCRIPTION AND OPERATION (Continued)

vent seal is held open by the pump diaphragm assembly which pushes it open at the full travel position. The vent seal will remain closed while the pump is cycling due to the reed switch triggering of the three port solenoid that prevents the diaphragm assembly from reaching full travel. After the brief initialization period, the solenoid is de-energized allowing atmospheric pressure to enter the pump cavity, thus permitting the spring to drive the diaphragm which forces air out of the pump cavity and into the vent system. When the solenoid is energized and de energized, the cycle is repeated creating flow in typical diaphragm pump fashion. The pump is controlled in 2 modes:

Pump Mode: The pump is cycled at a fixed rate to achieve a rapid pressure build in order to shorten the overall test length.

Test Mode: The solenoid is energized with a fixed duration pulse. Subsequent fixed pulses occur when the diaphragm reaches the Switch closure point.

The spring in the pump is set so that the system will achieve an equalized pressure of about 7.5" H20. The cycle rate of pump strokes is quite rapid as the system begins to pump up to this pressure. As the pressure increases, the cycle rate starts to drop off. If there is no leak in the system, the pump would eventually stop pumping at the equalized pressure. If there is a leak, it will continue to pump at a rate representative of the flow characteristic of the size of the leak. From this information we can determine if the leak is larger than the required detection limit (currently set at .040" orifice by CARB). If a leak is revealed during the leak test portion of the test, the test is terminated at the end of the test mode and no further system checks will be performed.

After passing the leak detection phase of the test, system pressure is maintained by turning on the LDP's solenoid until the purge system is activated. Purge activation in effect creates a leak. The cycle rate is again interrogated and when it increases due to the flow through the purge system, the leak check portion of the diagnostic is complete.

The canister vent valve will unseal the system after completion of the test sequence as the pump diaphragm assembly moves to the full travel position.

Evaporative system functionality will be verified by using the stricter evap purge flow monitor. At an appropriate warm idle the LDP will be energized to seal the canister vent. The purge flow will be clocked up from some small value in an attempt to see a shift in the 02 control system. If fuel vapor, indicated by a shift in the 02 control, is present the test is passed. If not, it is assumed that the purge system is not functioning in some respect. The LDP is again turned off and the test is ended.

TRIP DEFINITION

OPERATION

A "Trip" means vehicle operation (following an engine-off period) of duration and driving mode such that all components and systems are monitored at least once by the diagnostic system. The monitors must successfully pass before the PCM can verify that a previously malfunctioning component is meeting the normal operating conditions of that component. For misfire or fuel system malfunction, the MIL may be extinguished if the fault does not recur when monitored during three subsequent sequential driving cycles in which conditions are similar to those under which the malfunction was first determined.

Anytime the MIL is illuminated, a DTC is stored. The DTC can self erase only when the MIL has been extinguished. Once the MIL is extinguished, the PCM must pass the diagnostic test for the most recent DTC for 40 warm-up cycles (80 warm-up cycles for the Fuel System Monitor and the Misfire Monitor). A warm-up cycle can best be described by the following:

- The engine must be running
- A rise of 40°F in engine temperature must occur from the time when the engine was started
- Engine coolant temperature must reach at least 160°F
- A "driving cycle" that consists of engine start up and engine shut off.

Once the above conditions occur, the PCM is considered to have passed a warm-up cycle. Due to the conditions required to extinguish the MIL and erase the DTC, it is most important that after a repair has been made, all DTC's be erased and the repair verified.

MONITORED COMPONENT

DESCRIPTION

There are several components that will affect vehicle emissions if they malfunction. If one of these components malfunctions the Malfunction Indicator Lamp (Check Engine) will illuminate.

Some of the component monitors are checking for proper operation of the part. Electrically operated components now have input (rationality) and output (functionality) checks. Previously, a component like the Throttle Position sensor (TPS) was checked by the PCM for an open or shorted circuit. If one of these conditions occurred, a DTC was set. Now there is a check to ensure that the component is working. This is done by watching for a TPS indication of a greater or lesser throttle opening than MAP and engine rpm indicate. In the case of the TPS, if engine

DESCRIPTION AND OPERATION (Continued)

vacuum is high and engine rpm is 1600 or greater and the TPS indicates a large throttle opening, a DTC will be set. The same applies to low vacuum and 1600 rpm.

Any component that has an associated limp in will set a fault after 1 trip with the malfunction present.

Refer to the Diagnostic Trouble Codes Description Charts in this section and the appropriate Powertrain Diagnostic Procedure Manual for diagnostic procedures.

The following is a list of the monitored components:

- Comprehensive Components
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Catalyst Monitor

COMPREHENSIVE COMPONENTS

Along with the major monitors, OBD II requires that the diagnostic system monitor any component that could affect emissions levels. In many cases, these components were being tested under OBD I. The OBD I requirements focused mainly on testing emissions-related components for electrical opens and shorts.

However, OBD II also requires that inputs from powertrain components to the PCM be tested for **rationality**, and that outputs to powertrain components from the PCM be tested for **functionality**. Methods for monitoring the various Comprehensive Component monitoring include:

(1) Circuit Continuity
- Open
- Shorted high
- Shorted to ground

(2) Rationality or Proper Functioning
- Inputs tested for rationality
- Outputs tested for functionality

NOTE: Comprehensive component monitors are continuous. Therefore, enabling conditions do not apply.

Input Rationality— While input signals to the PCM are constantly being monitored for electrical opens and shorts, they are also tested for rationality. This means that the input signal is compared against other inputs and information to see if it makes sense under the current conditions.

PCM sensor inputs that are checked for rationality include:

- Manifold Absolute Pressure (MAP) Sensor
- Oxygen Sensor (O2S)
- Engine Coolant Temperature (ECT) Sensor
- Camshaft Position (CMP) Sensor
- Vehicle Speed Sensor
- Crankshaft Position (CKP) Sensor
- Intake Air Temperature (IAT) Sensor
- Throttle Position (TPS) Sensor
- Ambient/Battery Temperature Sensors
- Power Steering Switch
- Oxygen Sensor Heater
- Engine Controller
- Brake Switch
- Leak Detection Pump Switch
- P/N Switch
- Trans Controls

Output Functionality— PCM outputs are tested for functionality in addition to testing for opens and shorts. When the PCM provides a voltage to an output component, it can verify that the command was carried out by monitoring specific input signals for expected changes. For example, when the PCM commands the Idle Air Control (IAC) Motor to a specific position under certain operating conditions, it expects to see a specific (target) idle speed (RPM). If it does not, it stores a DTC.

PCM outputs monitored for functionality include:

- Fuel Injectors
- Ignition Coils
- Torque Converter Clutch Solenoid
- Idle Air Control
- Purge Solenoid
- EGR Solenoid
- LDP Solenoid
- Radiator Fan Control
- Trans Controls

OXYGEN SENSOR (O2S) MONITOR

DESCRIPTION— Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperature 300° to 350°C (572° to 662°F), the sensor generates a voltage that is inversely proportional to the amount of oxygen in the exhaust. When there is a large amount of oxygen in the exhaust caused by a lean condition, the sensor produces a low voltage, below 450 mV. When the oxygen content is lower, caused by a rich condition, the sensor produces a higher voltage, above 450mV.

The information obtained by the sensor is used to calculate the fuel injector pulse width. This maintains a 14.7 to 1 air fuel (A/F) ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrous oxide (NOx) from the exhaust.

The O2S is also the main sensing element for the EGR, Catalyst and Fuel Monitors.

The O2S may fail in any or all of the following manners:

- Slow response rate (Big Slope)
- Reduced output voltage (Half Cycle)

DESCRIPTION AND OPERATION (Continued)

- Heater Performance

Slow Response Rate (Big Slope)— Response rate is the time required for the sensor to switch from lean to rich signal output once it is exposed to a richer than optimum A/F mixture or vice versa. As the PCM adjusts the air/fuel ratio, the sensor must be able to rapidly detect the change. As the sensor ages, it could take longer to detect the changes in the oxygen content of the exhaust gas. The rate of change that an oxygen sensor experiences is called 'Big Slope'. The PCM checks the oxygen sensor voltage in increments of a few milliseconds.

Reduced Output Voltage (Half Cycle)— The output voltage of the O2S ranges from 0 to 1 volt. A good sensor can easily generate any output voltage in this range as it is exposed to different concentrations of oxygen. To detect a shift in the A/F mixture (lean or rich), the output voltage has to change beyond a threshold value. A malfunctioning sensor could have difficulty changing beyond the threshold value. Each time the voltage signal surpasses the threshold, a counter is incremented by one. This is called the Half Cycle Counter.

Heater Performance— The heater is tested by a separate monitor. Refer to the Oxygen Sensor Heater Monitor.

OPERATION— As the Oxygen Sensor signal switches, the PCM monitors the half cycle and big slope signals from the oxygen sensor. If during the test neither counter reaches a predetermined value, a malfunction is entered and a Freeze Frame is stored. Only one counter reaching its predetermined value is needed for the monitor to pass.

The Oxygen Sensor Monitor is a two trip monitor that is tested only once per trip. When the Oxygen Sensor fails the test in two consecutive trips, the MIL is illuminated and a DTC is set. The MIL is extinguished when the Oxygen Sensor monitor passes in three consecutive trips. The DTC is erased from memory after 40 consecutive warm-up cycles without test failure.

Enabling Conditions— The following conditions must typically be met for the PCM to run the oxygen sensor monitor:

- Battery voltage
- Engine temperature
- Engine run time
- Engine run time at a predetermined speed
- Engine run time at a predetermined speed and throttle opening
- Transmission in gear (automatic only)
- Fuel system in Closed Loop
- Long Term Adaptive (within parameters)
- Power Steering Switch in low PSI (no load)
- Engine at idle
- Fuel level above 15%
- Ambient air temperature
- Barometric pressure
- Engine RPM within acceptable range of desired idle
- Closed throttle speed

Pending Conditions— The Task Manager typically does not run the Oxygen Sensor Monitor if overlapping monitors are running or the MIL is illuminated for any of the following:

- Misfire Monitor
- Front Oxygen Sensor and Heater Monitor
- MAP Sensor
- Vehicle Speed Sensor
- Engine Coolant Temperature Sensor
- Throttle Position Sensor
- Engine Controller Self Test Faults
- Cam or Crank Sensor
- Injector and Coil
- Idle Air Control Motor
- EVAP Electrical
- EGR Solenoid Electrical
- Intake Air Temperature
- 5 Volt Feed

Conflict— The Task Manager does not run the Oxygen Sensor Monitor if any of the following conditions are present:

- A/C ON (A/C clutch cycling temporarily suspends monitor)
- Purge flow in progress

Suspend— The Task Manager suspends maturing a fault for the Oxygen Sensor Monitor if an of the following are present:

- Oxygen Sensor Heater Monitor, Priority 1
- Misfire Monitor, Priority 2

OXYGEN SENSOR HEATER MONITOR

DESCRIPTION— If there is an oxygen sensor (O2S) DTC as well as a O2S heater DTC, the O2S fault MUST be repaired first. After the O2S fault is repaired, verify that the heater circuit is operating correctly.

The voltage readings taken from the O2S are very temperature sensitive. The readings are not accurate below 300°C. Heating of the O2S is done to allow the engine controller to shift to closed loop control as soon as possible. The heating element used to heat the O2S must be tested to ensure that it is heating the sensor properly.

The heater element itself is not tested. The sensor output is used to test the heater by isolating the effect of the heater element on the O2S output voltage from the other effects. The resistance is normally between 100 ohms and 4.5 megaohms. When oxygen sensor temperature increases, the resistance in the internal circuit decreases. The PCM sends a 5 volts biased signal through the oxygen sensors to ground

DESCRIPTION AND OPERATION (Continued)

this monitoring circuit. As the temperature increases, resistance decreases and the PCM detects a lower voltage at the reference signal. Inversely, as the temperature decreases, the resistance increases and the PCM detects a higher voltage at the reference signal. an The O2S circuit is monitored for a drop in voltage.

OPERATION— The Oxygen Sensor Heater Monitor begins after the ignition has been turned OFF and the O2 sensors have cooled. The PCM sends a 5 volt bias to the oxygen sensor every 1.6 seconds. The PCM keeps it biased for 35 ms each time. As the sensor cools down, the resistance increases and the PCM reads the increase in voltage. Once voltage has increased to a predetermined amount, higher than when the test started, the oxygen sensor is cool enough to test heater operation.

When the oxygen sensor is cool enough, the PCM energizes the ASD relay. Voltage to the O2 sensor begins to increase the temperature. As the sensor temperature increases, the internal resistance decreases. The PCM continues biasing the 5 volt signal to the sensor. Each time the signal is biased, the PCM reads a voltage decrease. When the PCM detects a voltage decrease of a predetermined value for several biased pulses, the test passes.

The heater elements are tested each time the engine is turned OFF if all the enabling conditions are met. If the monitor fails, the PCM stores a maturing fault and a Freeze Frame is entered. If two consecutive tests fail, a DTC is stored. Because the ignition is OFF, the MIL is illuminated at the beginning of the next key cycle.

Enabling Conditions— The following conditions must be met for the PCM to run the oxygen sensor heater test:

- Engine run time of at least 5.1 minutes
- Key OFF power down
- Battery voltage of at least 10 volts
- Sufficient Oxygen Sensor cool down

Pending Conditions— There are not conditions or situations that prompt conflict or suspension of testing. The oxygen sensor heater test is not run pending resolution of MIL illumination due to oxygen sensor failure.

Suspend— There are no conditions which exist for suspending the Heater Monitor.

CATALYST MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide.

Normal vehicle miles or engine misfire can cause a catalyst to decay. A meltdown of the ceramic core can cause a reduction of the exhaust passage. This can increase vehicle emissions and deteriorate engine performance, driveability and fuel economy.

The catalyst monitor uses dual oxygen sensors (O2S's) to monitor the efficiency of the converter. The dual O2S strategy is based on the fact that as a catalyst deteriorates, its oxygen storage capacity and its efficiency are both reduced. By monitoring the oxygen storage capacity of a catalyst, its efficiency can be indirectly calculated. The upstream O2S is used to detect the amount of oxygen in the exhaust gas before the gas enters the catalytic converter. The PCM calculates the A/F mixture from the output of the O2S. A low voltage indicates high oxygen content (lean mixture). A high voltage indicates a low content of oxygen (rich mixture).

When the upstream O2S detects a lean condition, there is an abundance of oxygen in the exhaust gas. A functioning converter would store this oxygen so it can use it for the oxidation of HC and CO. As the converter absorbs the oxygen, there will be a lack of oxygen downstream of the converter. The output of the downstream O2S will indicate limited activity in this condition.

As the converter loses the ability to store oxygen, the condition can be detected from the behavior of the downstream O2S. When the efficiency drops, no chemical reaction takes place. This means the concentration of oxygen will be the same downstream as upstream. The output voltage of the downstream O2S copies the voltage of the upstream sensor. The only difference is a time lag (seen by the PCM) between the switching of the O2S's.

To monitor the system, the number of lean-to-rich switches of upstream and downstream O2S's is counted. The ratio of downstream switches to upstream switches is used to determine whether the catalyst is operating properly. An effective catalyst will have fewer downstream switches than it has upstream switches i.e., a ratio closer to zero. For a totally ineffective catalyst, this ratio will be one-to-one, indicating that no oxidation occurs in the device.

The system must be monitored so that when catalyst efficiency deteriorates and exhaust emissions increase to over the legal limit, the MIL (check engine lamp) will be illuminated.

Monitor Operation— To monitor catalyst efficiency, the PCM expands the rich and lean switch points of the heated oxygen sensor. With extended switch points, the air/fuel mixture runs richer and leaner to overburden the catalytic converter. Once the test is started, the air/fuel mixture runs rich and lean and the O2 switches are counted. A switch is counted when an oxygen sensor signal goes from below the lean threshold to above the rich threshold. The number of Rear O2 sensor switches is divided by

DESCRIPTION AND OPERATION (Continued)

the number of Front O2 sensor switches to determine the switching ratio.

The test runs for 20 seconds. As catalyst efficiency deteriorated over the life of the vehicle, the switch rate at the downstream sensor approaches that of the upstream sensor. If at any point during the test period the switch ratio reaches a predetermined value, a counter is incremented by one. The monitor is enabled to run another test during that trip. When the test fails three times, the counter increments to three, a malfunction is entered, and a Freeze Frame is stored. When the counter increments to three during the next trip, the code is matured and the MIL is illuminated. If the test passes the first, no further testing is conducted during that trip.

The MIL is extinguished after three consecutive good trips. The good trip criteria for the catalyst monitor is more stringent than the failure criteria. In order to pass the test and increment one good trip, the downstream sensor switch rate must be less than 80% of the upstream rate (60% for manual transmissions). The failure percentages are 90% and 70% respectively.

Enabling Conditions— The following conditions must typically be met before the PCM runs the catalyst monitor. Specific times for each parameter may be different from engine to engine.

- Accumulated drive time
- Enable time
- Ambient air temperature
- Barometric pressure
- Catalyst warm-up counter
- Engine coolant temperature
- Accumulated throttle position sensor
- Vehicle speed
- MAP
- RPM
- Engine in closed loop
- Fuel level

Pending Conditions—

- Misfire DTC
- Front Oxygen Sensor Response
- Front Oxygen Sensor Heater Monitor
- Front Oxygen Sensor Electrical
- Rear Oxygen Sensor Rationality (middle check)
- Rear Oxygen Sensor Heater Monitor
- Rear Oxygen Sensor Electrical
- Fuel System Monitor
- All TPS faults
- All MAP faults
- All ECT sensor faults
- Purge flow solenoid functionality
- Purge flow solenoid electrical
- All PCM self test faults
- All CMP and CKP sensor faults
- All injector and ignition electrical faults
- Idle Air Control (IAC) motor functionality
- Vehicle Speed Sensor
- Brake switch
- Intake air temperature

Conflict— The catalyst monitor does not run if any of the following are conditions are present:

- EGR Monitor in progress
- Fuel system rich intrusive test in progress
- EVAP Monitor in progress
- Time since start is less than 60 seconds
- Low fuel level
- Low ambient air temperature

Suspend— The Task Manager does not mature a catalyst fault if any of the following are present:

- Oxygen Sensor Monitor, Priority 1
- Upstream Oxygen Sensor Heater, Priority 1
- EGR Monitor, Priority 1
- EVAP Monitor, Priority 1
- Fuel System Monitor, Priority 2
- Misfire Monitor, Priority 2

NON-MONITORED CIRCUITS

OPERATION

The PCM does not monitor all circuits, systems and conditions that could have malfunctions causing driveability problems. However, problems with these systems may cause the PCM to store diagnostic trouble codes for other systems or components. For example, a fuel pressure problem will not register a fault directly, but could cause a rich/lean condition or misfire. This could cause the PCM to store an oxygen sensor or misfire diagnostic trouble code.

The major non-monitored circuits are listed below along with examples of failures modes that do not directly cause the PCM to set a DTC, but for a system that is monitored.

FUEL PRESSURE

The fuel pressure regulator controls fuel system pressure. The PCM cannot detect a clogged fuel pump inlet filter, clogged in-line fuel filter, or a pinched fuel supply or return line. However, these could result in a rich or lean condition causing the PCM to store an oxygen sensor or fuel system diagnostic trouble code.

SECONDARY IGNITION CIRCUIT

The PCM cannot detect an inoperative ignition coil, fouled or worn spark plugs, ignition cross firing, or open spark plug cables.

CYLINDER COMPRESSION

The PCM cannot detect uneven, low, or high engine cylinder compression.

DESCRIPTION AND OPERATION (Continued)

EXHAUST SYSTEM

The PCM cannot detect a plugged, restricted or leaking exhaust system. It may set a EGR or Fuel system fault or O2S.

FUEL INJECTOR MECHANICAL MALFUNCTIONS

The PCM cannot determine if a fuel injector is clogged, the needle is sticking or if the wrong injector is installed. However, these could result in a rich or lean condition causing the PCM to store a diagnostic trouble code for either misfire, an oxygen sensor, or the fuel system.

EXCESSIVE OIL CONSUMPTION

Although the PCM monitors engine exhaust oxygen content when the system is in closed loop, it cannot determine excessive oil consumption.

THROTTLE BODY AIR FLOW

The PCM cannot detect a clogged or restricted air cleaner inlet or filter element.

VACUUM ASSIST

The PCM cannot detect leaks or restrictions in the vacuum circuits of vacuum assisted engine control system devices. However, these could cause the PCM to store a MAP sensor diagnostic trouble code and cause a high idle condition.

PCM SYSTEM GROUND

The PCM cannot determine a poor system ground. However, one or more diagnostic trouble codes may be generated as a result of this condition. The module should be mounted to the body at all times, also during diagnostic.

PCM CONNECTOR ENGAGEMENT

The PCM may not be able to determine spread or damaged connector pins. However, it might store diagnostic trouble codes as a result of spread connector pins.

HIGH AND LOW LIMITS

OPERATION

The PCM compares input signal voltages from each input device with established high and low limits for the device. If the input voltage is not within limits and other criteria are met, the PCM stores a diagnostic trouble code in memory. Other diagnostic trouble code criteria might include engine RPM limits or input voltages from other sensors or switches that must be present before verifying a diagnostic trouble code condition.

SPECIFICATIONS

LOAD VALUE

ENGINE	IDLE/NEUTRAL	2500 RPM/NEUTRAL
2.7L	to Maximum	to Maximum
3.2L	2% to 9% Maximum	10% to 18% Maximum
3.5L	1% to 8% Maximum	4% to 6% Maximum

EVAPORATIVE EMISSION CONTROLS

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DESCRIPTION AND OPERATION

EVAPORATION CONTROL SYSTEM

OPERATION

The evaporation control system prevents the emission of fuel tank vapors into the atmosphere. When fuel evaporates in the fuel tank, the vapors pass through vent hoses or tubes to an activated carbon filled evaporative canister. The canister temporarily holds the vapors. The Powertrain Control Module (PCM) allows intake manifold vacuum to draw vapors into the combustion chambers during certain operating conditions (Fig. 1).

All engines use a proportional purge solenoid system. The PCM controls vapor flow by operating the purge solenoid. Refer to Proportional Purge Solenoid in this section.

NOTE: The evaporative system uses specially manufactured hoses. If they need replacement, only use fuel resistant hose. Also the hoses must be able to pass an Ozone compliance test.

NOTE: For more information on Onboard Refueling Vapor Recovery (ORVR), refer to the Fuel Delivery section.

EVAP CANISTER

DESCRIPTION

The canister protrudes through the top of the bracket. The vacuum and vapor tubes connect to the top of the canister (Fig. 2). It is a charcoal canister.

OPERATION

All vehicles use a, maintenance free, evaporative (EVAP) canister. Fuel tank vapors vent into the canister. The canister temporarily holds the fuel vapors until intake manifold vacuum draws them into the combustion chamber. The Powertrain Control Module (PCM) purges the canister through the proportional purge solenoid. The PCM purges the canister at predetermined intervals and engine conditions.

PROPORTIONAL PURGE SOLENOID—PCM OUTPUT

DESCRIPTION

All vehicles use a proportional purge solenoid. The solenoid regulates the rate of vapor flow from the EVAP canister to the throttle body. The PCM operates the solenoid.

DESCRIPTION AND OPERATION (Continued)

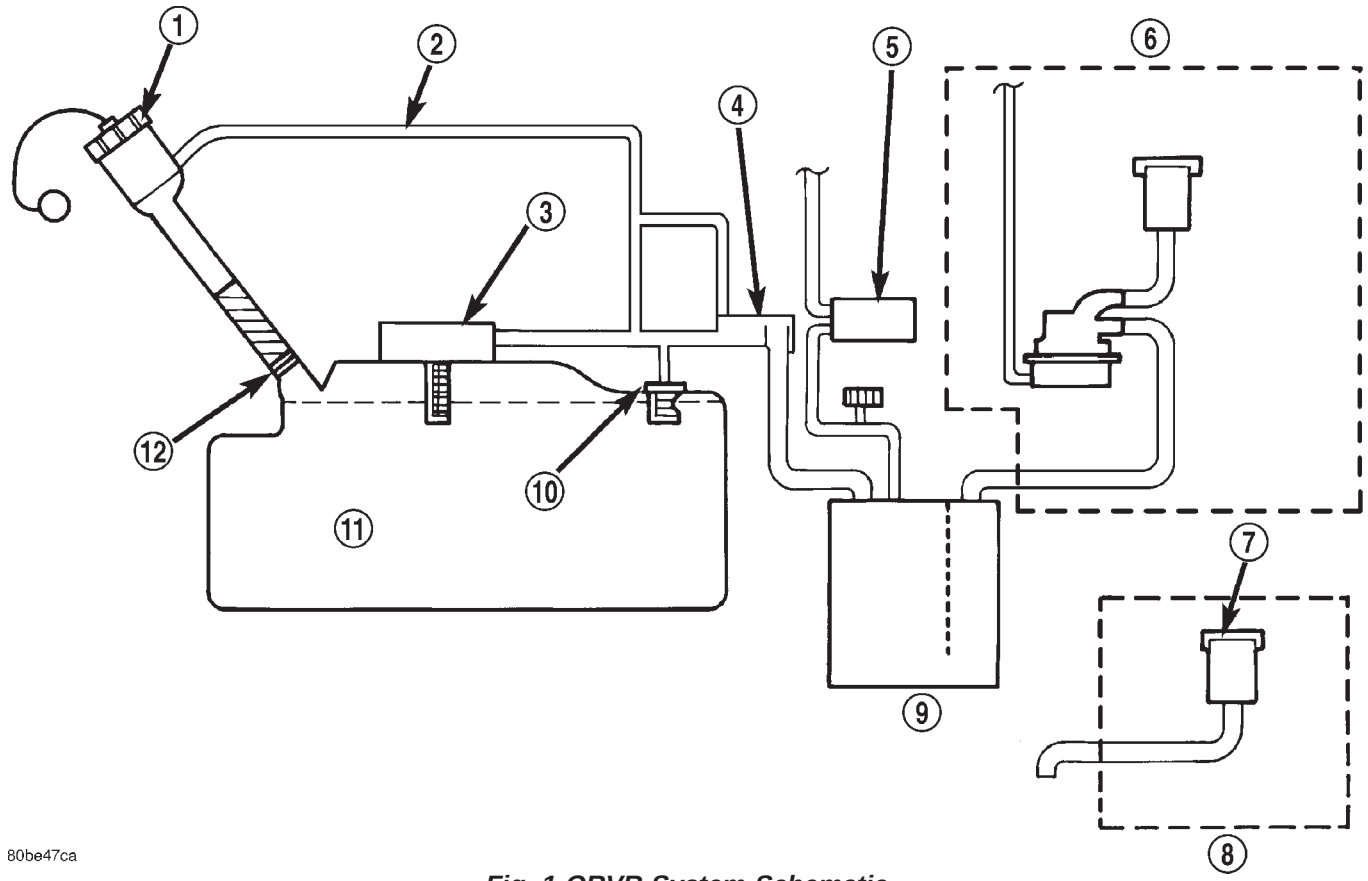


Fig. 1 ORVR System Schematic

1 – FUEL CAP
2 – RECIRCULATION TUBE
3 – CONTROL VALVE
4 – FLOW MANAGEMENT VALVE
5 – PURGE
6 – W/LDP
7 – BREATHER ELEMENT
8 – W/0 LDP
9 – CANISTER
10 – ROLLOVER VALVE
11 – FUEL TANK
12 – CHECK VALVE

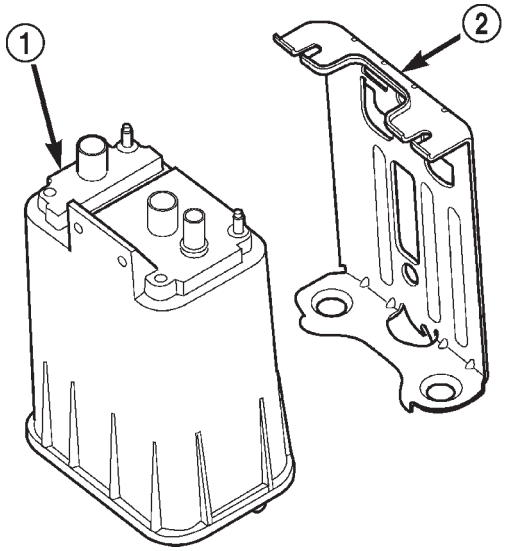


Fig. 2 EVAP Canister

1 – **EVAP CANISTER**
2 – **EVAP CANISTER BRACKET**

OPERATION

During the cold start warm-up period and the hot start time delay, the PCM does not energize the solenoid. When de-energized, no vapors are purged.

The proportional purge solenoid operates at a frequency of 200 hz and is controlled by an engine controller circuit that senses the current being applied to the proportional purge solenoid (Fig. 3) and then adjusts that current to achieve the desired purge flow. The proportional purge solenoid controls the purge rate of fuel vapors from the vapor canister and fuel tank to the engine intake manifold.

LEAK DETECTION PUMP

DESCRIPTION

The leak detection pump is a device used to detect a leak in the evaporative system.

The pump contains a 3 port solenoid, a pump that contains a switch, a spring loaded canister vent valve seal, 2 check valves and a spring/diaphragm.

DESCRIPTION AND OPERATION (Continued)

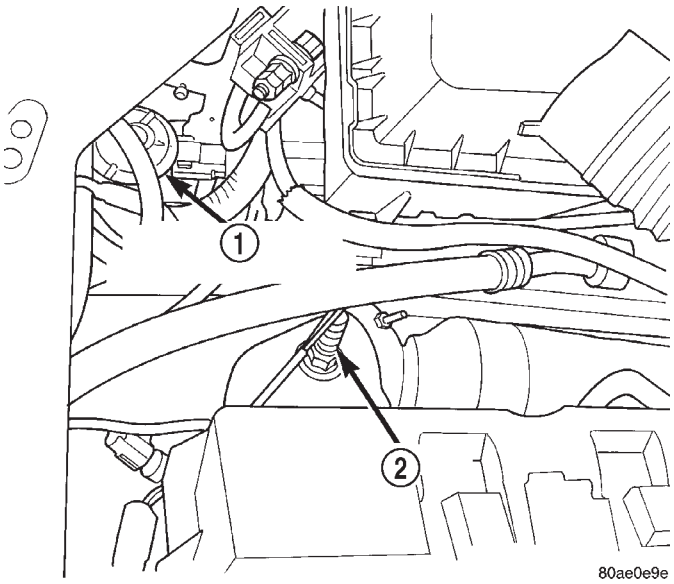


Fig. 3 Proportional Purge Solenoid

1 – PROPORTIONAL PURGE SOLENOID
2 – O2 SENSOR

OPERATION

Immediately after a cold start, when the engine temperature is between 40°F and 86°F, the 3 port solenoid is briefly energized. This initializes the pump by drawing air into the pump cavity and also closes the vent seal. During non-test test conditions, the vent seal is held open by the pump diaphragm assembly which pushes it open at the full travel position. The vent seal will remain closed while the pump is cycling. This is due to the operation of the 3 port solenoid which prevents the diaphragm assembly from reaching full travel. After the brief initialization period, the solenoid is de-energized, allowing atmospheric pressure to enter the pump cavity. This permits the spring to drive the diaphragm which forces air out of the pump cavity and into the vent system. When the solenoid is energized and de-energized, the cycle is repeated creating flow in typical diaphragm pump fashion. The pump is controlled in 2 modes:

PUMP MODE: The pump is cycled at a fixed rate to achieve a rapid pressure build in order to shorten the overall test time.

TEST MODE: The solenoid is energized with a fixed duration pulse. Subsequent fixed pulses occur when the diaphragm reaches the switch closure point.

The spring in the pump is set so that the system will achieve an equalized pressure of about 7.5 inches of water.

When the pump starts, the cycle rate is quite high. As the system becomes pressurized, pump rate drops. If there is no leak, the pump will quit. If there is a leak, the test is terminated at the end of the test mode.

If there is no leak, the purge monitor is run. If the cycle rate increases due to the flow through the purge system, the test is passed and the diagnostic is complete.

The canister vent valve will unseal the system after completion of the test sequence as the pump diaphragm assembly moves to the full travel position.

LEAK DETECTION PUMP PRESSURE SWITCH

DESCRIPTION

The primary components within the leak detection pump assembly are: a three-port leak detection solenoid valve, a pump assembly that includes a spring loaded diaphragm, a reed switch which is used to monitor the pump diaphragm movement (position), two check valves, and a spring loaded vent seal valve.

OPERATION

The leak detection pump LDP assembly incorporates two primary functions: it detects a leak in the evaporative system, and it seals the evaporative system so that the required leak detection monitor test can be run.

The three-port LDP solenoid valve is used to expose either engine vacuum or atmospheric pressure to the top side of the leak detection pump diaphragm.

When the LDP solenoid valve is deenergized its port (opening) to engine vacuum is blocked off. This allows ambient air (atmospheric pressure) to enter the top of the pump diaphragm. The spring load on the diaphragm will push the diaphragm down, as long as there is no pressure present in the rest of the evaporative system. If there is sufficient evaporative system pressure present, then the pump diaphragm will stay in the “up” position. If the evaporative system pressure decays, then the pump diaphragm will eventually fall. The rate of this decent is dependent upon the size of the evaporative system leak (Large or small).

When the LDP solenoid valve is energized the port (opening) to atmosphere is blocked off. At the same time, the port to engine vacuum is opened. Engine vacuum replaces atmospheric pressure. When engine vacuum is sufficient, it over comes the spring pressure load on the pump diaphragm and causes the diaphragm to rise to its “up” position. The reed switch will change state depending upon the position of the pump diaphragm.

If the diaphragm is in the “up” position the reed switch will be in its “open” state. This means that the 12 volt signal sense to the PCM is interrupted. Zero volts is detected by the PCM. If the pump dia-

DESCRIPTION AND OPERATION (Continued)

phragm is in the “down” position the reed switch will be in its “closed” state. 12 volts is sent to the PCM via the switch sense circuit.

The check valves are one-way valves. The first check valve is used to draw outside air into the lower chamber of the LDP (the space that is below the pump diaphragm). The second check valve is used to vent this outside air, which has become pressurized from the fall of the pump diaphragm, into the evaporative system.

The spring loaded vent seal valve, inside the LDP is used to seal off the evaporative system. When the pump diaphragm is in the “up” position the spring pushes the vent seal valve closed. The vent seal valve opens only when the pump diaphragm is in its “full down” position. When the pump assembly is in its pump mode the pump diaphragm is not allowed to descend (fall) so far as to allow the vent seal valve to open. This allows the leak detection pump to develop the required pressure within the evaporative system for system leak testing.

A pressure build up within the evaporative system may cause pressure on the lower side of the LDP diaphragm. This will cause the LDP diaphragm to remain in its “up” position (stuck in the up position). This condition can occur even when the solenoid valve is deenergized. This condition can be caused by previous cycling (pumping) of the LDP by the technician (dealer test). Another way that this condition is created is immediately following the running of the vehicle evaporative system monitor. In this case, the PCM has not yet opened the proportional purge solenoid in order to vent the pressure that has been built up in the evaporative system to the engine combustion system. The technician will need to vent the evaporative system pressure via the vehicle fuel filler cap and its fuel filler secondary seal (if so equipped in the fuel filler neck). This will allow the technician to cycle the LDP and to watch switch state changes.

After passing the leak detection phase of the test, system pressure is maintained until the purge system is activated, in effect creating a leak. If the diaphragm falls (as is expected), causing the reed switch to change state, then the diagnostic test is completed.

When of the evaporative system leak monitor begins its various tests, a test is performed to determine that no part of the evaporative system is blocked. In this test, the LDP is cycled (pumped) a calibrated (few) number of times. Pressure should not build up in the evaporative system. If pressure is present, then LDP diaphragm is forced to stay in its “up” position. The reed switch now stays open and the PCM senses this open (incorrect) state. The evaporative system monitor will fail the test because of a detected obstruction within the system.

Possible causes:

- Open or shorted LDP switch sense circuit
- Leak Detection Pump switch failure
- Open fused ignition switch output
- Restricted, disconnected, or blocked manifold vacuum source
- Obstruction of hoses or lines
- PCM failure

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEMS

OPERATION

Intake manifold vacuum removes crankcase vapors and piston blow-by from the engine. Emissions pass through the PCV valve into the intake manifold plenum (Fig. 4) or (Fig. 5). The vapors become part of the calibrated air-fuel mixture, are burned and expelled with the exhaust gases. The air cleaner supplies make up air when the engine does not have enough vapor or blow-by gases.

It has a heat exchange system to help improve cold weather operation.

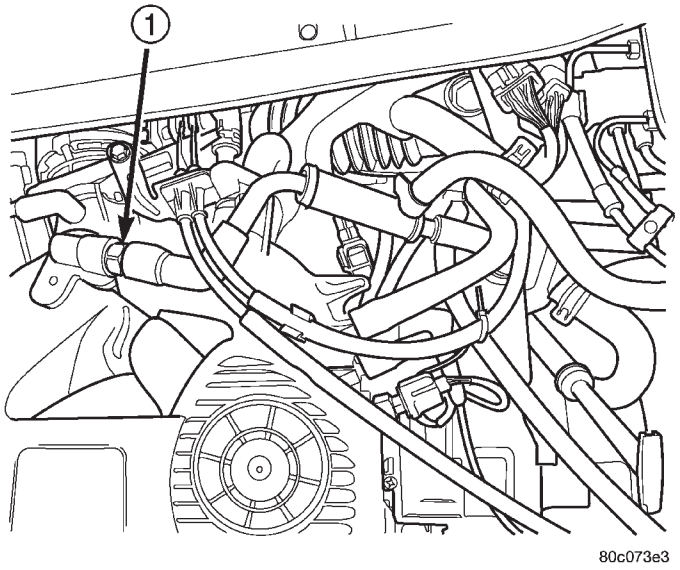


Fig. 4 PCV Valve—2.7L Engine

1 – PCV VALVE

POSITIVE CRANKCASE VENTILATION VALVE

OPERATION

The PCV valve contains a spring loaded plunger. The plunger meters the amount of crankcase vapors routed into the combustion chamber based on intake manifold vacuum.

DESCRIPTION AND OPERATION (Continued)

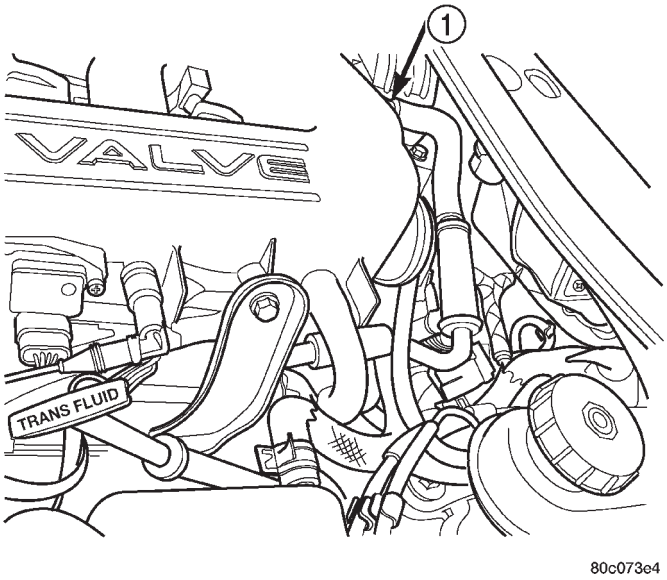


Fig. 5 PCV Valve—3.2/3.5L Engine

1 – PCV VALVE

When the engine is not operating or during an engine backfire, the spring forces the plunger back against the seat. This prevents vapors from flowing through the valve (Fig. 6).

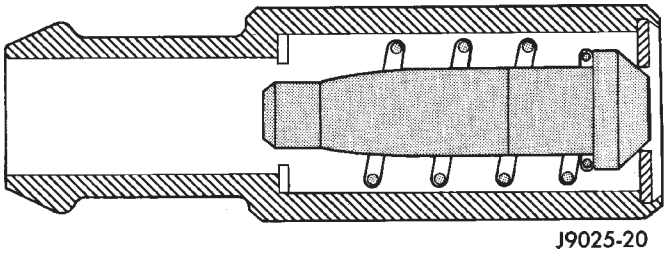


Fig. 6 Engine Off or Engine Backfire—No Vapor Flow

When the engine is at idle or cruising, high manifold vacuum is present. At these times manifold vacuum is able to completely compress the spring and pull the plunger to the top of the valve (Fig. 7). In this position there is minimal vapor flow through the valve.

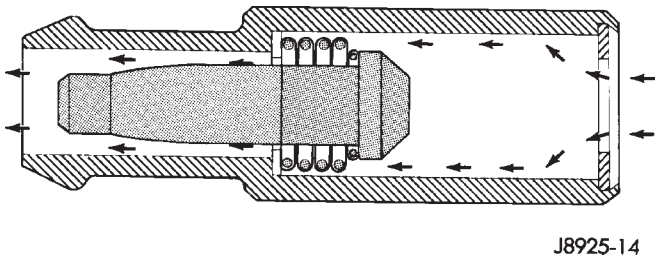


Fig. 7 High Intake Manifold Vacuum—Minimal Vapor Flow

During periods of moderate intake manifold vacuum the plunger is only pulled part way back from the inlet. This results in maximum vapor flow through the valve (Fig. 8).

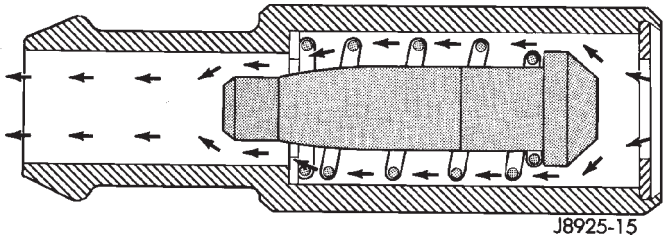


Fig. 8 Moderate Intake Manifold Vacuum—Maximum Vapor Flow

VEHICLE EMISSION CONTROL INFORMATION LABEL

DESCRIPTION

All models have a Vehicle Emission Control Information (VECI) Label. Chrysler permanently attaches the label in the engine compartment. It cannot be removed without defacing information and destroying the label.

The label contains the vehicle's emission specifications and vacuum hose routings. All hoses must be connected and routed according to the label.

DIAGNOSIS AND TESTING

PCV SYSTEM INSPECTION

WARNING: APPLY PARKING BRAKE AND/OR BLOCK WHEELS BEFORE PERFORMING ANY TEST OR ADJUSTMENT WITH THE ENGINE OPERATING.

(1) With engine idling, remove the hose from the PCV valve. If the valve is not plugged, a hissing noise will be heard as air passes through the valve. A strong vacuum should also be felt when a finger is placed over the valve inlet.

(2) Install hose on PCV valve. Remove the make-up air hose from the air plenum at the rear of the engine. Hold a piece of stiff paper (parts tag) loosely over the end of the make-up air hose.

(3) After allowing approximately one minute for crankcase pressure to reduce, the paper should draw up against the hose with noticeable force. If the engine does not draw the paper against the grommet after installing a new valve, replace the PCV valve hose.

(4) Turn the engine off. Remove the PCV valve from intake manifold. The valve should rattle when shaken.

DIAGNOSIS AND TESTING (Continued)

(5) Replace the PCV valve and retest the system if it does not operate as described in the preceding tests. **Do not attempt to clean the old PCV valve.** If the valve rattles, apply a light coating of Loctite® Pipe Sealant With Teflon to the threads. Thread the PCV valve into the manifold plenum and tighten to 7 N·m (60 in. lbs.) torque.

LEAK DETECTION PUMP

Refer to the appropriate Powertrain Diagnostic Procedures Manual for testing procedures.

REMOVAL AND INSTALLATION

EVAP CANISTER

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove fuel tank refer to the Fuel Delivery section.
(3) Disconnect the hoses from the EVAP canister (Fig. 9).

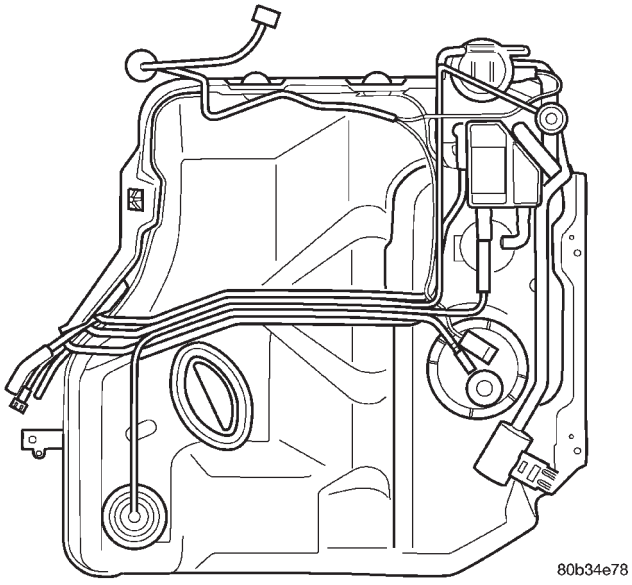


Fig. 9 EVAP Canister and LDP

(4) Remove 2 nuts from the upper bracket of the EVAP canister (Fig. 10).

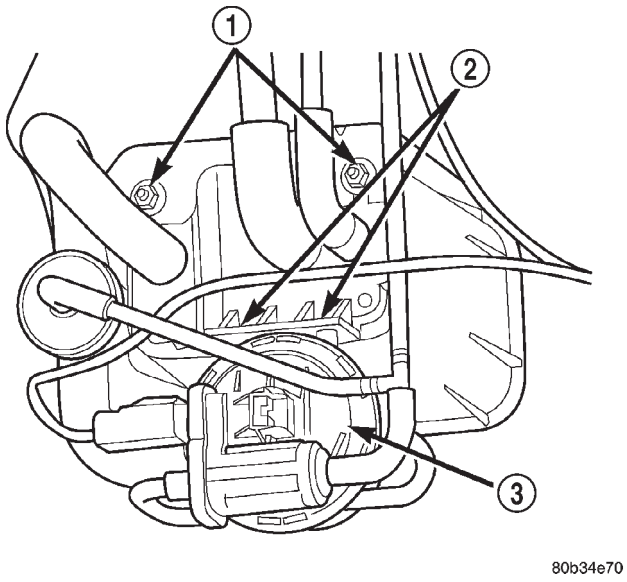


Fig. 10 EVAP Bracket

1 – NUTS
2 – LDP MOUNTING SCREWS
3 – LDP

(5) Remove EVAP canister from bracket (Fig. 12).

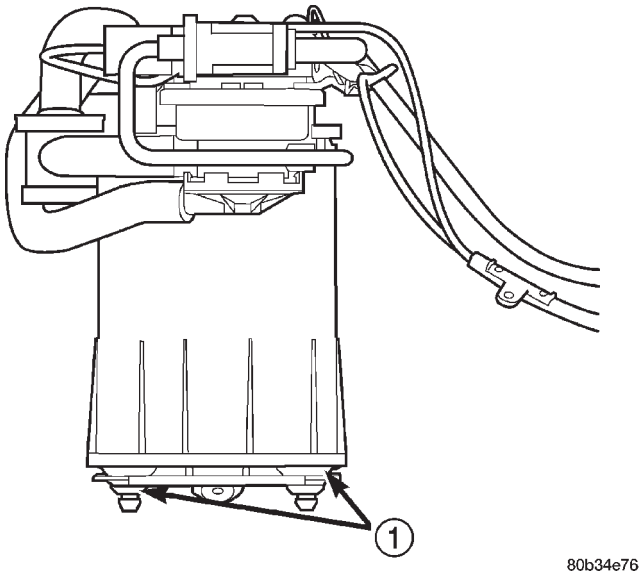


Fig. 11 EVAP Mounting Grommets

1 – RUBBER MOUNTING GROMMETS

(6) Remove LDP from EVAP canister upper bracket (Fig. 13).

INSTALLATION

(1) Install LDP to EVAP Canister. (Fig. 13).
(2) Install EVAP canister to Bracket (Fig. 12).
(3) Install 2 nuts to EVAP canister bracket.
(4) Connect hoses.

REMOVAL AND INSTALLATION (Continued)

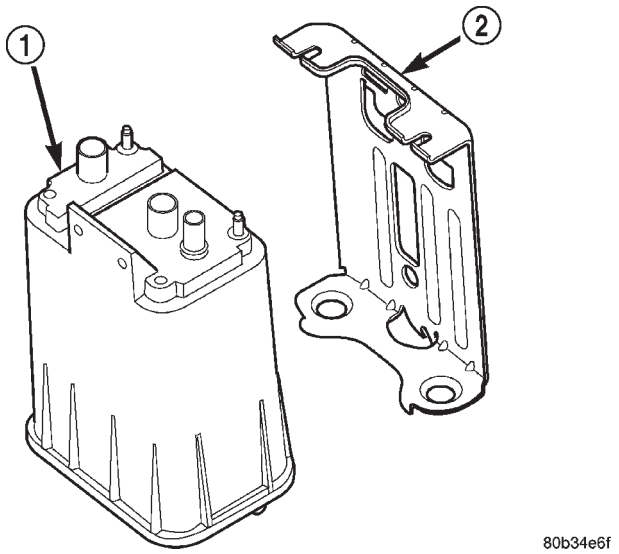


Fig. 12 EVAP Canister Bracket

1 – EVAP CANISTER
2 – EVAP CANISTER BRACKET

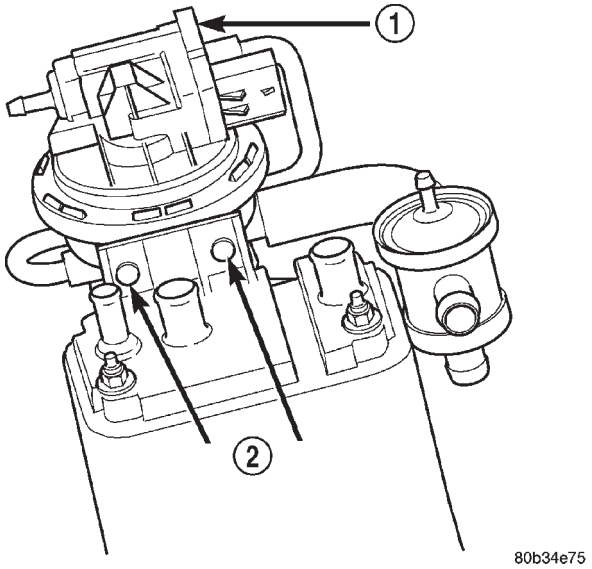


Fig. 13 LDP Mounting Screws

1 – LDP
2 – LDP MOUNTING SCREWS

(5) Install fuel tank refer to the Fuel Delivery section.
(6) Connect negative battery cable.

LEAK DETECTION PUMP

REMOVAL

(1) Disconnect the negative battery cable.
(2) Remove fuel tank refer to Group 14, Fuel Delivery.
(3) Disconnect the hoses from the EVAP canister (Fig. 9).
(4) Remove 2 nuts from the upper bracket of the EVAP canister (Fig. 10).
(5) Remove EVAP canister from bracket (Fig. 12).
(6) Remove LDP from EVAP canister upper bracket (Fig. 13).

INSTALLATION

(1) Install LDP to EVAP Canister. (Fig. 13).
(2) Install EVAP canister to Bracket (Fig. 12).
(3) Install 2 nuts to EVAP canister bracket.
(4) Connect hoses.
(5) Install fuel tank refer to Group 14, Fuel Delivery.
(6) Connect negative battery cable.

PROPORTIONAL PURGE SOLENOID VALVE

The solenoid attaches to a bracket near the air cleaner (Fig. 14). The solenoid will not operate unless it is installed correctly.

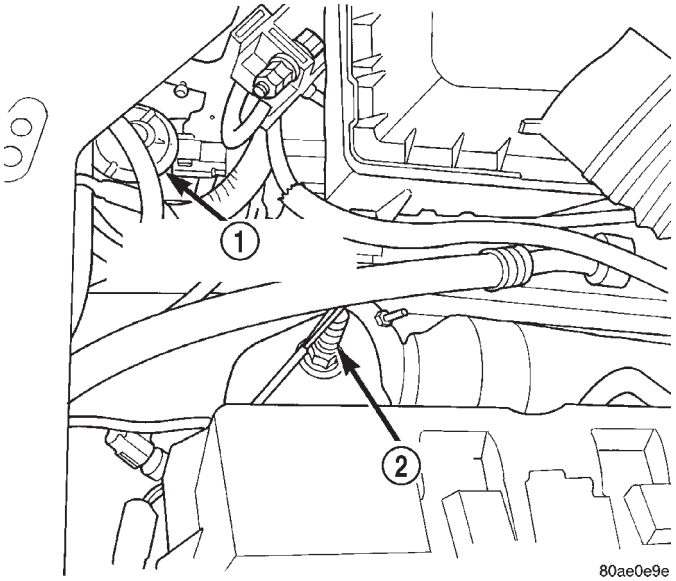


Fig. 14 Proportional Purge Solenoid Valve

1 – PROPORTIONAL PURGE SOLENOID
2 – O2 SENSOR

REMOVAL

(1) Disconnect electrical connector from solenoid.
(2) Disconnect vacuum tubes from solenoid.
(3) Remove solenoid from bracket.

INSTALLATION

The top of the solenoid has TOP printed on it. The solenoid will not operate unless it is installed correctly.
(1) Install solenoid on bracket.
(2) Connect vacuum tube to solenoid.
(3) Connect electrical connector to solenoid.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

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DESCRIPTION AND OPERATION

EXHAUST GAS RECIRCULATION (LSEGR)

DESCRIPTION

The EGR valve consists of three major components. First there is the pintle, valve seat, and housing which contains and regulates the gas flow. Second there is the armature, return spring, and solenoid coil to provide the operating force to regulate the flow by changing the pintle position. The solenoid coil assembly is in parallel with a diode and connects to the two connectors in the connector assembly. The third major component which senses pintle position and is connected to the three connectors in the electrical connector.

OPERATION

The exhaust gas recirculation flow is determined by the engine controller. For a given set of conditions, the engine controller knows the ideal exhaust gas recirculation flow to optimize NOx and fuel economy as a function of the pintle position. Pintle position is obtained from the position sensor. The engine controller adjusts the duty cycle of 128 Hz power supplied to the solenoid coil to obtain the correct position.

REMOVAL AND INSTALLATION

EGR VALVE—2.7L

REMOVAL

The EGR valve attaches to the rear of the right cylinder head.

(1) Disconnect negative battery cable.
(2) Remove air inlet tube and resonator and bracket.
(3) Disconnect electrical connector from solenoid.
(4) Remove EGR upper tube screws at EGR valve.
(5) Remove EGR valve mounting screws.
(6) Remove screws from EGR lower tube at exhaust manifold.
(7) Remove EGR valve and lower tube as an assembly.
(8) Clean gasket surfaces. Discard old gasket. If necessary, clean EGR passages.

INSTALLATION

(1) Loosely install EGR valve and lower tube, use a new gasket between tube and EGR valve.
(2) Install EGR valve to rear of Cylinder head, do not tighten screws.
(3) Loosely install screws to lower EGR tube to exhaust manifold, use new gasket between tube and exhaust manifold.
(4) Install new gasket between the EGR valve and upper tube and install bolts.
(5) Tighten EGR lower tube to exhaust manifold screws to 31 N·m (275 in. lbs.) torque.
(6) Tighten the EGR tube's to EGR valve bolts to 11 N·m (95 in. lbs.) torque.
(7) Tighten EGR valve to cylinder head screws to 31 N·m (275 in. lbs.) torque.
(8) Attach electrical connector to solenoid.
(9) Install the resonator bracket.
(10) Install air inlet tube and resonator.
(11) Connect negative battery cable.

EGR VALVE—3.2/3.5L

REMOVAL

(1) Disconnect negative battery cable.
(2) Remove air inlet tube and resonator.
(3) Disconnect electrical connector from EGR valve.
(4) Remove EGR tube mounting screws at EGR valve.

The EGR valve attaches to the rear of the right cylinder head.

(5) Remove EGR valve mounting screws.
(6) Clean gasket surfaces. Discard old gasket. If necessary, clean EGR passages.

REMOVAL AND INSTALLATION (Continued)

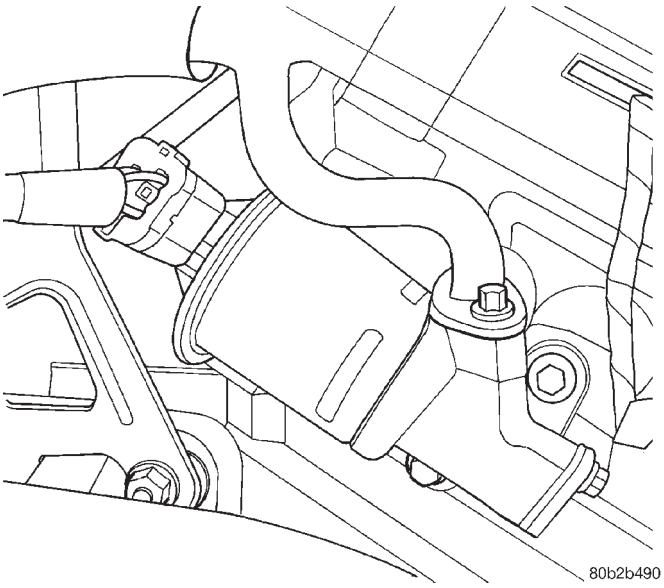


Fig. 1 EGR Valve—2.7 L

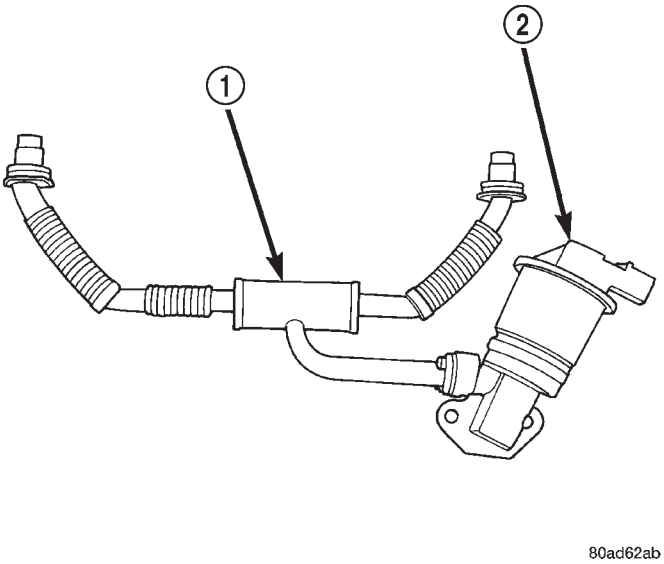


Fig. 2 EGR tube and Valve

1 – EGR TUBE
2 – EGR VALVE

INSTALLATION

(1) Loosely install EGR valve and new gasket on cylinder head.

(2) Using a new gasket, loosely install the EGR tube and mounting screws..

(3) Tighten EGR valve to cylinder head screws to 31 N·m (275 in. lbs.) torque.

(4) Tighten the EGR tube to EGR valve screws to 11 N·m (95 in. lbs.) torque.

(5) Attach electrical connector to solenoid.

(6) Install air inlet tube and resonator.

(7) Connect negative battery cable.

EGR TUBE UPPER—2.7L

The EGR tube attaches to the intake manifold plenum on both sides of the throttle body and the EGR valve.

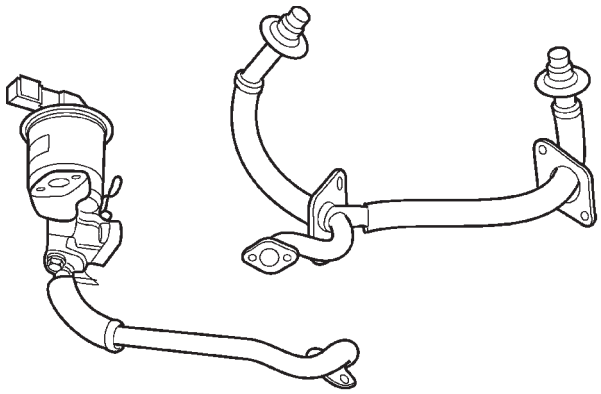


Fig. 3 EGR Tube—2.7L

REMOVAL

(1) Disconnect negative battery cable.

(2) Remove air inlet tube and resonator.

(3) Remove throttle cable bracket and reposition.

(4) Remove EGR tube mounting screws at intake manifold plenum (Fig. 4).

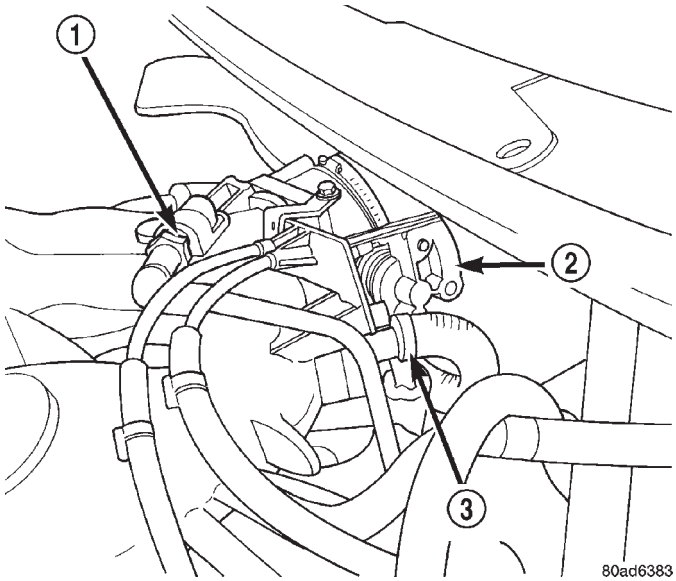


Fig. 4 EGR Tube at Intake Manifold

1 – PCV VALVE
2 – THROTTLE BODY
3 – EGR TUBE

(5) Remove EGR tube mounting screws at EGR valve.

(6) Remove EGR upper tube.

REMOVAL AND INSTALLATION (Continued)

(7) When removing EGR upper tube assembly being careful not to drop the silicone rubber seals in the intake manifold. Clean gasket surfaces on the EGR valve. Note that any loose dirt can lodge between the pintle and the seat and cause valve leakage that will give a rough idle and depressed manifold vacuum.

INSTALLATION

(1) inspect rubber silicone seals on intake manifold end of EGR tube.

(2) Install upper tube into the intake manifold, being careful that the silicone rubber seals are correctly installed and undamaged..

(3) Install new gasket between the EGR valve and tube and install bolts.

(4) Tighten the EGR upper tube to intake manifold plenum screws to 11 N·m (95 in. lbs.) torque.

(5) Tighten the EGR upper tube to EGR valve bolts to 11 N·m (95 in. lbs.) torque.

(6) Install the throttle cable bracket to intake manifold.

(7) Install air inlet tube and resonator.

(8) Connect negative battery cable.

EGR TUBE LOWER—2.7L

REMOVAL

(1) Disconnect negative battery cable.

(2) Remove air inlet tube and resonator and bracket

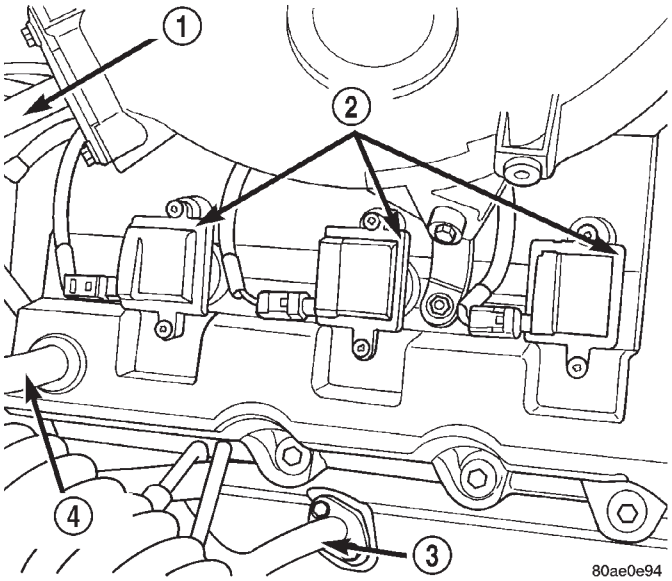


Fig. 5 EGR Tube at Intake Manifold

1 – EGR TUBE
2 – IGNITION COILS
3 – EGR TUBE
4 – MAKE UP AIR TUBE

(3) Remove EGR tube mounting screws at EGR valve (Fig. 5).

(4) Remove EGR tube mounting screws at exhaust manifold.

INSTALLATION

(1) Install new gasket between the EGR valve and tube and loosely install bolts.

(2) Install new gasket between the exhaust manifold and tube and loosely install bolts.

(3) Tighten the EGR tube to EGR valve bolts to 11 N·m (95 in. lbs.) torque.

(4) Tighten the EGR tube to exhaust manifold bolts to 31 N·m (275 in. lbs.) torque.

(5) Install air inlet tube and resonator and bracket.

(6) Connect negative battery cable.

EGR TUBE—3.2/3.5L

The EGR tube attaches to the bottom of the intake manifold plenum beside the throttle body (Fig. 7).

REMOVAL

(1) Disconnect negative battery cable.

(2) Remove air inlet tube and resonator.

(3) Remove EGR tube mounting clips at intake manifold plenum (Fig. 6).

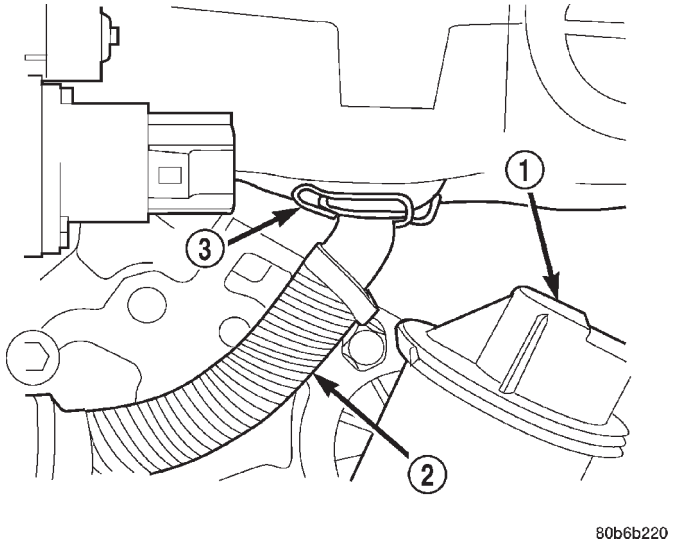


Fig. 6 EGR Tube Clips

1 – EGR VALVE
2 – EGR TUBE
3 – CLIP

(4) Loosen transmission to throttle body bracket (Fig. 7). Remove 2 nuts and 1 bolt and remove bracket off of studs.

(5) Remove EGR tube mounting screws at EGR valve.

REMOVAL AND INSTALLATION (Continued)

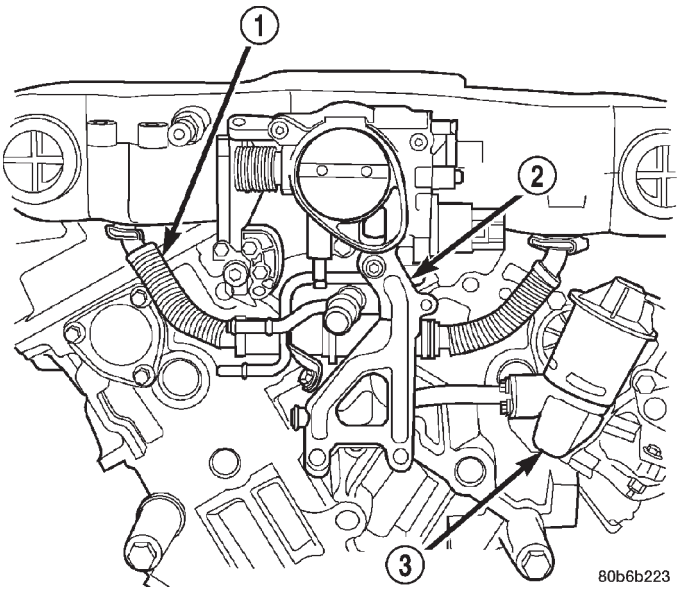


Fig. 7 Bracket and EGR Tube

1 – EGR TUBE
2 – BRACKET
3 – EGR VALVE

When removing EGR upper tube assembly being careful not to drop the silicone rubber seals in the intake manifold. Clean gasket surfaces on the EGR valve. Note that any loose dirt can lodge between the pintle and the seat and cause valve leakage that will give a rough idle and depressed manifold vacuum.

(6) Remove EGR tube.

INSTALLATION

(1) Install rubber silicone seals on intake manifold end of EGR tube (Fig. 8), being careful to be sure silicone rubber seals is correctly installed and undamaged.

(2) Using a new gasket, loosely install the EGR tube into the intake manifold and loosely install EGR tube to EGR valve.

(3) Tighten the EGR tube to EGR valve screws to 11 N·m (95 in. lbs.) torque.

(4) Install clips for the EGR tube to intake manifold plenum (Fig. 9).

(5) Install transmission to throttle body bracket.

(6) Install air inlet tube and resonator.

(7) Connect negative battery cable.

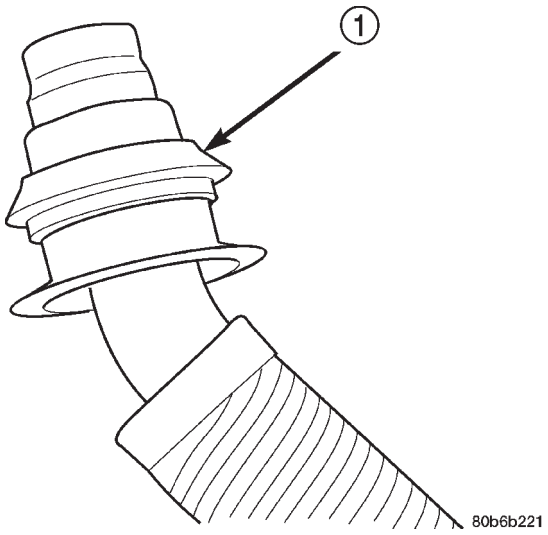


Fig. 8 EGR tube Seal

1 – SILICONE SEAL

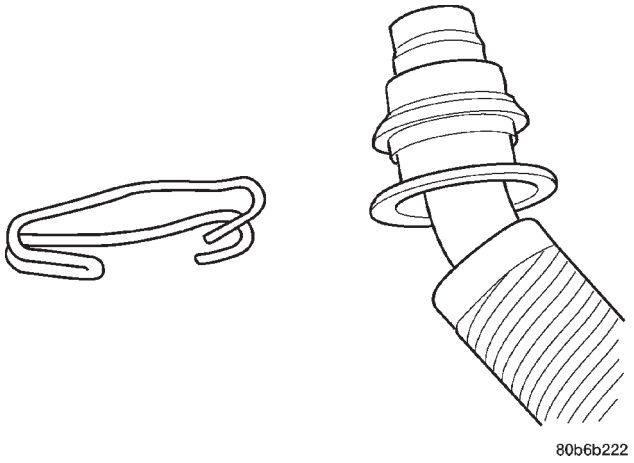


Fig. 9 EGR Tube and Clip

SPECIFICATIONS

TORQUE

Description	Torque
EGR valve to cyl. head	31 N·m (275 in. lbs.)
EGR tube to EGR valve	11 N·m (95 in. lbs.)
EGR tube to intake manifold	11 N·m (95 in. lbs.)
EGR tube to exhaust manifold	31 N·m (275 in. lbs.)

EMISSION CONTROL SYSTEMS

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ON-BOARD DIAGNOSTICS

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GENERAL INFORMATION

SYSTEM DESCRIPTION

The Powertrain Control Module (PCM) monitors many different circuits in the fuel injection, ignition, emission and engine systems. If the PCM senses a problem with a monitored circuit often enough to indicate an actual problem, it stores a Diagnostic Trouble Code (DTC) in the PCM's memory. If the code applies to a non-emissions related component or system, and the problem is repaired or ceases to exist, the PCM cancels the code after 40 warmup cycles. Diagnostic trouble codes that affect vehicle emissions illuminate the Malfunction Indicator Lamp (MIL). Refer to Malfunction Indicator Lamp in this section.

Certain criteria must be met before the PCM stores a DTC in memory. The criteria may be a specific range of engine RPM, engine temperature, and/or input voltage to the PCM.

The PCM might not store a DTC for a monitored circuit even though a malfunction has occurred. This may happen because one of the DTC criteria for the circuit has not been met. **For example**, assume the diagnostic trouble code criteria requires the PCM to monitor the circuit only when the engine operates between 750 and 2000 RPM. Suppose the sensor's output circuit shorts to ground when engine operates above 2400 RPM (resulting in 0 volt input to the PCM). Because the condition happens at an engine speed above the maximum threshold (2000 rpm), the PCM will not store a DTC.

NOTE: Various diagnostic procedures may actually cause a diagnostic monitor to set a DTC. For instance, disconnecting the TP Sensor with the ignition on may set the TP Sensor High code. When a repair is completed and verified, use the DRB scan tool to erase all DTC's and extinguish the MIL.

Technicians can display stored DTC's. Refer to Diagnostic Trouble Codes in this section. For DTC information, refer to charts in this section.

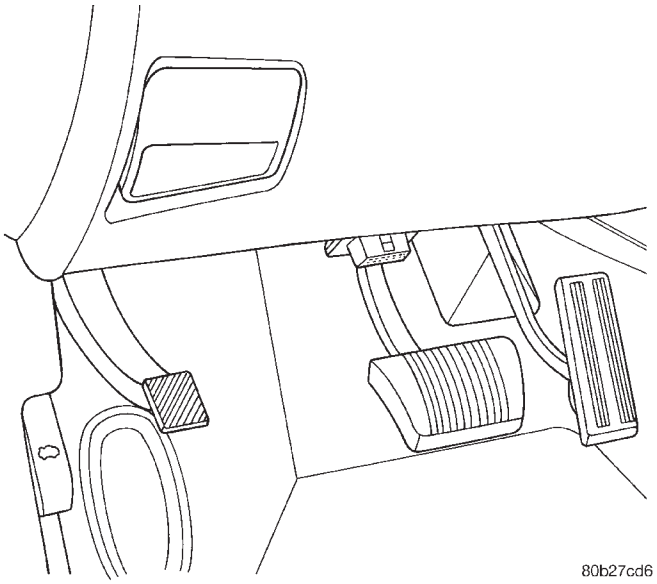


Fig. 1 Data Link (Diagnostic) Connector

DESCRIPTION AND OPERATION

MALFUNCTION INDICATOR LAMP (MIL)

As a functional test, the Malfunction Indicator Lamp (MIL) illuminates at key-on before engine cranking. Whenever the Powertrain Control Module (PCM) sets a Diagnostic Trouble Code (DTC) that affects vehicle emissions, it illuminates the MIL. If a problem is detected, the PCM sends a message over the PCI Bus to the instrument cluster to illuminate the lamp. The PCM illuminates the MIL only for DTC's that affect vehicle emissions. The MIL stays on continuously when the PCM has entered a Limp-In mode or identified a failed emission component or system. The MIL remains on until the DTC is erased. Refer to the Diagnostic Trouble Code charts in this group for emission related codes.

Additionally, the PCM may reset (turn off) the MIL when one of the following occur:

- PCM does not detect the malfunction for 3 consecutive trips.
- PCM does not detect a malfunction while performing three successive engine misfire or fuel system tests. The PCM performs these tests while the engine is operating within ± 375 RPM of and within 10 % of the load of the operating condition at which the malfunction was first detected.

DRB III STATE DISPLAY TEST MODE

OPERATION

The switch inputs to the Powertrain Control Module (PCM) have two recognized states; HIGH and LOW. For this reason, the PCM cannot recognize the difference between a selected switch position versus an open circuit, a short circuit, or a defective switch. If the State Display screen shows the change from HIGH to LOW or LOW to HIGH, assume the entire switch circuit to the PCM functions properly. From the state display screen, access either State Display Inputs and Outputs or State Display Sensors.

DRB III CIRCUIT ACTUATION TEST MODE

OPERATION

The Circuit Actuation Test Mode checks for proper operation of output circuits or devices the Powertrain Control Module (PCM) may not internally recognize. The PCM attempts to activate these outputs and allow an observer to verify proper operation. Most of the tests provide an audible or visual indication of device operation (click of relay contacts, fuel spray, etc.). Except for intermittent conditions, if a device functions properly during testing, assume the device, its associated wiring, and driver circuit work correctly.

DIAGNOSTIC TROUBLE CODES

A Diagnostic Trouble Code (DTC) indicates the PCM has recognized an abnormal condition in the system.

The preferred and most accurate method of retrieving a DTC is by using the DRB scan tool. The scan tool supplies detailed diagnostic information which can be used to more accurately diagnose causes for a DTC.

Remember that DTC's are the results of a system or circuit failure, but do not directly identify the failed component or components.

NOTE: For a list of DTC's, refer to the charts in this section.

BULB CHECK

Each time the ignition key is turned to the ON position, the malfunction indicator (Check Engine) lamp on the instrument panel should illuminate for approximately 2 seconds then go out. This is done for a bulb check.

OBTAINING DTC'S USING DRB SCAN TOOL

(1) Connect the DRB scan tool to the data link (diagnostic) connector. This connector is located in the passenger compartment; at the lower edge of instrument panel; near the steering column.

(2) Turn the ignition switch on and access the "Read Fault" screen.

(3) Record all the DTC's and "freeze frame" information shown on the DRB scan tool.

(4) To erase DTC's, use the "Erase Trouble Code" data screen on the DRB scan tool. **Do not erase any DTC's until problems have been investigated and repairs have been performed.**

DESCRIPTION AND OPERATION (Continued)

DIAGNOSTIC TROUBLE CODE DESCRIPTIONS

Hex Code	Generic Scan Tool Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
01	P0340	No Cam Signal at PCM	No camshaft signal detected during engine cranking.
02	P0601	Internal Controller Failure	PCM Internal fault condition detected.
05	P1682	Charging System Voltage Too Low	Battery voltage sense input below target charging during engine operation. Also, no significant change detected in battery voltage during active test of generator output circuit.
06	P1594	Charging System Voltage Too High	Battery voltage sense input above target charging voltage during engine operation.
0A	P1388	Auto Shutdown Relay Control Circuit	An open or shorted condition detected in the auto shutdown relay circuit.
0B	P0622	Generator Field Not Switching Properly	An open or shorted condition detected in the generator field control circuit.
0F	P1595	Speed Control Solenoid Circuits	An open or shorted condition detected in the Speed Control vacuum or vent solenoid circuits.
10	P0645	A/C Clutch Relay Circuit	An open or shorted condition detected in the A/C clutch relay circuit.
11	P0403	EGR Solenoid Circuit	An open or shorted condition detected in the EGR transducer solenoid circuit.
12	P0443	EVAP Purge Solenoid Circuit	An open or shorted condition detected in the duty cycle purge solenoid circuit.
13	P0203	Injector #3 Control Circuit	Injector #3 output driver does not respond properly to the control signal.
14	P0202	Injector #2 Control Circuit	Injector #2 output driver does not respond properly to the control signal.
15	P0201	Injector #1 Control Circuit	Injector #1 output driver does not respond properly to the control signal.
19	P0505	Idle Air Control Motor Circuits	A shorted or open condition detected in one or more of the idle air control motor circuits.
1A	P0122	Throttle Position Sensor Voltage Low	Throttle position sensor input below the minimum acceptable voltage.
1B	P0123	Throttle Position Sensor Voltage High	Throttle position sensor input above the maximum acceptable voltage.
1E	P0117	ECT Sensor Voltage Too Low	Engine coolant temperature sensor input below minimum acceptable voltage.
1F	P0118	ECT Sensor Voltage Too High	Engine coolant temperature sensor input above maximum acceptable voltage.
20	P0134	1/1 O2S Stays At Center	Neither rich or lean condition detected from the oxygen sensor.
21	P1281	Engine Is Cold Too Long	Engine did not reach operating temperature within acceptable limits.
23	P0500	No Vehicle Speed Sensor Signal	No vehicle speed sensor signal detected during road load conditions.

DESCRIPTION AND OPERATION (Continued)

Hex Code	Generic Scan Tool Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
24	P0107	MAP Sensor Voltage Too Low	MAP sensor input below minimum acceptable voltage.
25	P0108	MAP Sensor Voltage Too High	MAP sensor input above maximum acceptable voltage.
27	P1297	No Change in MAP From Start to Run	No difference recognized between the engine MAP reading and the barometric (atmospheric) pressure reading from start-up.
28	P0320	No Crank Reference Signal at PCM	No crank reference signal detected during engine cranking.
29	P0353	Ignition Coil #3 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
2A	P0352	Ignition Coil #2 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
2B	P0351	Ignition Coil #1 Primary Circuit	Peak primary circuit current not achieved with maximum dwell time.
2C	P1389	No ASD Relay Output Voltage at PCM	An Open condition Detected In The ASD Relay Output Circuit.
30	P1697	PCM Failure SRI Miles Not Stored	Unsuccessful attempt to update EMR mileage in the PCM EEPROM.
31	P1698	PCM Failure EEPROM Write Denied	Unsuccessful attempt to write to an EEPROM location by the PCM.
39	P0112	Intake Air Temp Sensor Voltage Low	Intake air temperature sensor input below the maximum acceptable voltage.
3A	P0113	Intake Air Temp Sensor Voltage High	Intake air temperature sensor input above the minimum acceptable voltage.
3B	P0325	Knock Sensor Circuit	Sensor is either shorted to ground or 12 volts. Will not detect open circuit.
3C	P0106	Baro Pressure Out of Range	Barometric pressure out of out of range.
3D	P0204	Injector #4 Control Circuit	Injector #4 output driver does not respond properly to the control signal.
3E	P0132	1/1 O2S Shorted To Voltage	Oxygen sensor input voltage maintained above the normal operating range.
41	P0154	Left Front O2S Stays at Center	Neither rich or lean condition detected from the oxygen sensor.
42	P0152	2/1 O2S Shorted To Voltage	Oxygen sensor input voltage maintained above the normal operating range.
44	P0600	PCM Failure SPI Communications	PCM Internal fault condition detected.
45	P0205	Injector #5 Control Circuit	Injector #5 output driver does not respond properly to the control signal.
46	P0206	Injector #6 Control Circuit	Injector #6 output driver does not respond properly to the control signal.
4C	P0354	Ignition coil #4 ckt	Peak primary circuit current not achieved with maximum dwell time.
4D	P0355	Ignition coil #5 ckt	Peak primary circuit current not achieved with maximum dwell time.

DESCRIPTION AND OPERATION (Continued)

Hex Code	Generic Scan Tool Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
52	P1683	SPD CTRL PWR RLY; or S/C 12v Driver CKT	Malfunction detected with power feed to speed control servo solenoids.
56	P1596	Speed Control Switch Always High	Speed control switch input above the maximum acceptable voltage.
57	P1597	Speed Control Switch Always Low	Speed control switch input below the minimum acceptable voltage.
58	P1289	Manifold Tune Valve Solenoid Circuit	An open or shorted condition detected in the MTV solenoid control circuit.
5A	P1598	A/C Pressure Sensor Volts Too High	Sensor input voltage is above 4.9 volts.
5B	P1599	A/C Pressure Sensor Volts Too Low	Sensor input voltage is below.098 volts.
5C	P1490	Low Speed Fan CTRL Relay Circuit	An open or shorted condition detected in the control circuit of the low speed radiator fan relay.
5D	P1489	Hi Speed Fan Relay Circuit	An open or shorted condition detected in the control circuit of the high speed radiator fan relay.
60**	P1698	No PCI Messages From TCM	No messages received from Transmission Control Module.
61	P1695	No PCI Message From Body Control Module	No messages received from Body Control Module.
65	P1282	Fuel Pump Relay Control Circuit	An open or shorted condition detected in the fuel pump relay control circuit.
67	P0135	1/1 O2S Heater Failure	Upstream oxygen sensor heating element circuit malfunction.
69	P0141	1/2 O2S Heater Failure	Oxygen sensor heating element circuit malfunction.
72	P1899	P/N Switch Stuck in Park or in Gear	Incorrect input state detected for the Park/Neutral switch, auto. trans. only.
73	P0551	Pwr steering sw perf	Incorrect input state detected for the power steering switch circuit.
76	P0172	1/1 Fuel System Lean	A rich air/fuel mixture has been indicated by an abnormally lean correction factor.
77	P0171	1/1 Fuel System Rich	A lean air/fuel mixture has been indicated by an abnormally rich correction factor.
78	P0175	2/1 Fuel System Rich	A rich air/fuel mixture has been indicated by an abnormally lean correction factor.
79	P0174	2/1 Fuel System Lean	A lean air/fuel mixture has been indicated by an abnormally rich correction factor.
7C	P0155	2/1 O2S Heater Failure	Oxygen sensor heater element malfunction.
7D	P0161	2/2 O2S Heater Failure	Oxygen sensor heater element malfunction.
7E	P0138	1/2 O2S Shorted to Voltage	Oxygen sensor input voltage maintained above the normal operating range.
7F	P0158	2/2 O2S Shorted to Voltage	Oxygen sensor input voltage maintained above the normal operating range.
81	P0140	1/2 O2S Stays at Center	Neither rich or lean condition detected from the downstream oxygen sensor.

DESCRIPTION AND OPERATION (Continued)

Hex Code	Generic Scan Tool Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
82	P0160	2/2 O2S Stays at Center	Neither rich or lean condition detected from the downstream oxygen sensor.
84	P0121	TPS Voltage Does Not Agree With MAP	TPS signal does not correlate to MAP sensor.
89	P0700	EATX Controller DTC Present	An automatic transmission input DTC has been set in the transmission controller. Refer to Group 21.
91	P1299	Vacuum Leak Found (IAC Fully Seated)	MAP sensor signal does correlate to TPS signal. Possible vacuum leak.
92	P1496	5 Volt Supply Output Too Low	5 volt output from regulator does not meet minimum requirement.
99	P1493	Ambient/Batt Temp Sen Volts Too Low	Battery temperature sensor input voltage below an acceptable range.
9A	P1492	Ambient/Batt Temp Sensor Volts Too High	Battery temperature sensor input voltage above an acceptable range.
9B	P0131	1/1 O2S Shorted to Ground	O2 sensor voltage too low, tested after cold start.
9C	P0137	1/2 O2S Shorted to Ground	O2 sensor voltage too low, tested after cold start.
9D	P1391	Intermittent Loss of CMP or CKP	Intermittent loss of either camshaft or crankshaft position sensor.
B5	P0151	2/1 O2S Shorted to Ground	O2 sensor voltage too low, tested after cold start.
B6	P0157	2/2 O2S Shorted to Ground	O2 sensor voltage too low, tested after cold start.
D8	P0356	Ignition coil #6 ckt	Peak primary circuit current not achieved with max. dwell time.
D9	P1288	Short run valve ckt	An open or shorted condition detected in the SRV tuning circuit.

SERVICE MANUAL COMMENTS

What features do you find most useful? _____

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What errors have you found? Please include page number. _____

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What topics are hard to locate, confusing, or not covered completely? _____

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What comments or suggestions do you have? _____

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Your Name: _____ **Dealership/Distributor:** _____

Address: _____

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Vehicle Identification Number _____

Manual Name, Year, Language and Number: _____

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