Chassis and Paint Codes

1996 U.S. Model

Vehicle Identification Number

JH4 UA3 6 4 * T C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
4: without moonroof
5: with moonroof (Premium Package)
Check Digit
Model Year
T: 1996
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 1000001

Transmission Type
Serial Number

Paint Code

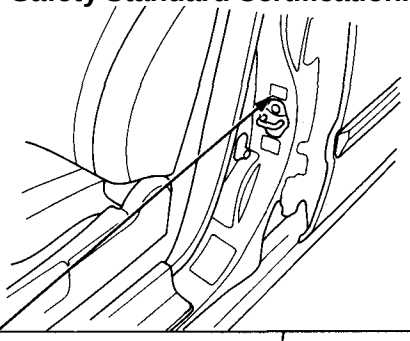
Paint Code	Color
R-91P	Garnet Red Pearl
G-79P	Bayern Green Pearl
NH-503P	Granada Black Pearl
NH-578	Taffeta White
YR-509P	Granite Silver Pearl
YR-506M	Arbere Taupe Metallic
NH-585P	Cayman White Pearl

Engine Number

C32A6 - 13 00001

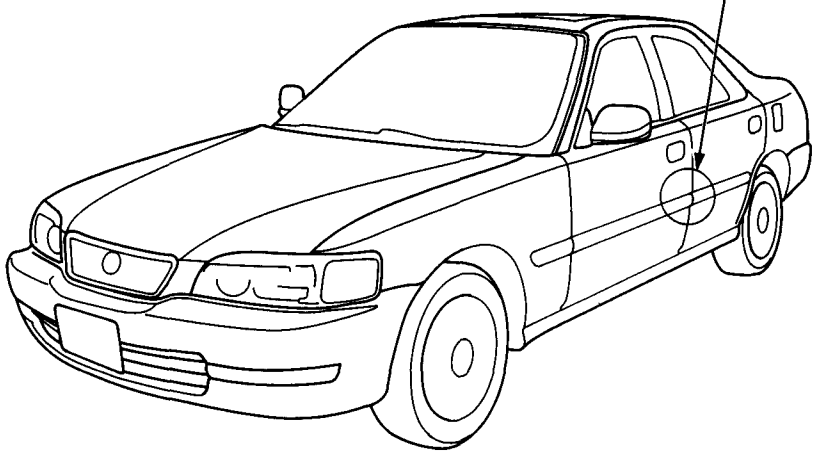
Engine Type
Emission Group
Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



Paint Code

COLOR NH-503P



1997 U.S. Model

Vehicle Identification Number

JH4 UA3 6 4 * V C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
4: without moonroof
5: with moonroof (Premium Package)
Check Digit
Model Year
V: 1997
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 2000001

Transmission Type
Serial Number

Paint Code

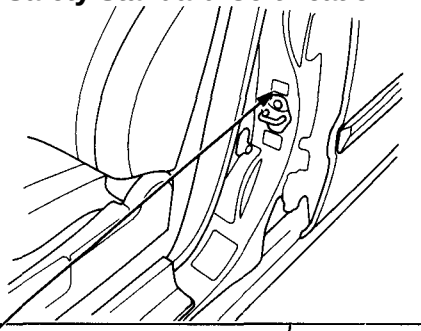
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Juniper Green Pearl
NH-585P	Cayman White Pearl
NH-592P	Flamenco Black Pearl
YR-506M	Desert Mist Metallic
YR-509P	Granite Silver Pearl

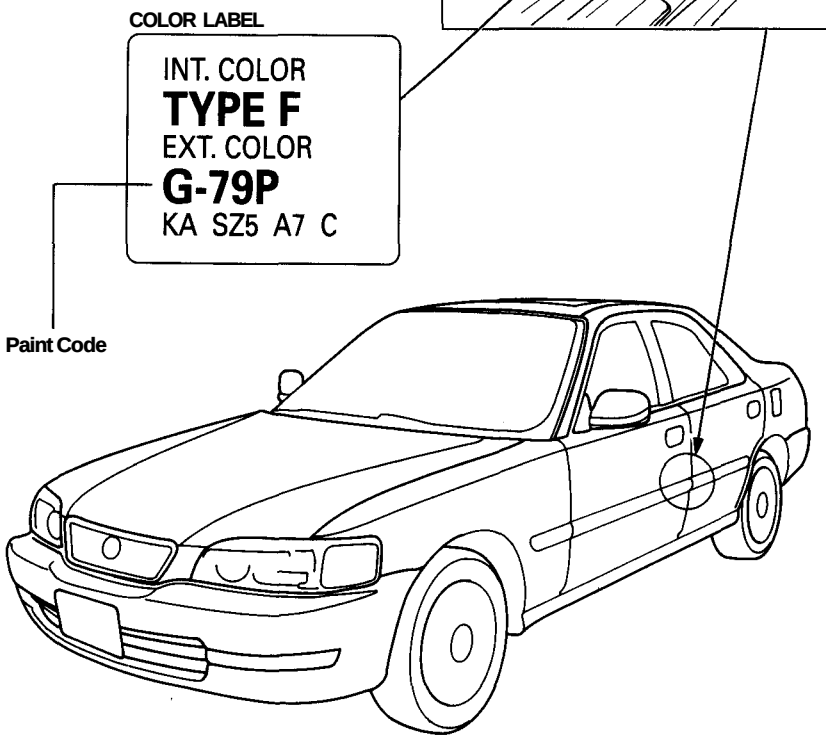
Engine Number

C32A6 - 23 00001

Engine Type
Emission Group
Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.





Chassis and Paint Codes

1998 U.S. Model

Vehicle Identification Number

JH4 UA3 6 4 * W C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
W: 1998
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 3000001

Transmission Type
Serial Number

Paint Code

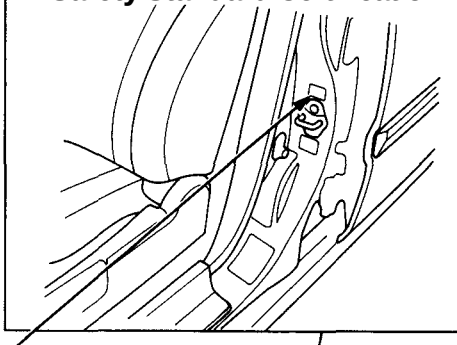
Paint Code	Color
B-68P	Pacific Blue Pearl
B-91M	Crystal Blue Metallic
G-79P	Juniper Green Pearl
NH-585P	Cayman White Pearl
NH-592P	Flamenco Black Pearl
YR-509P	Granite Silver Pearl

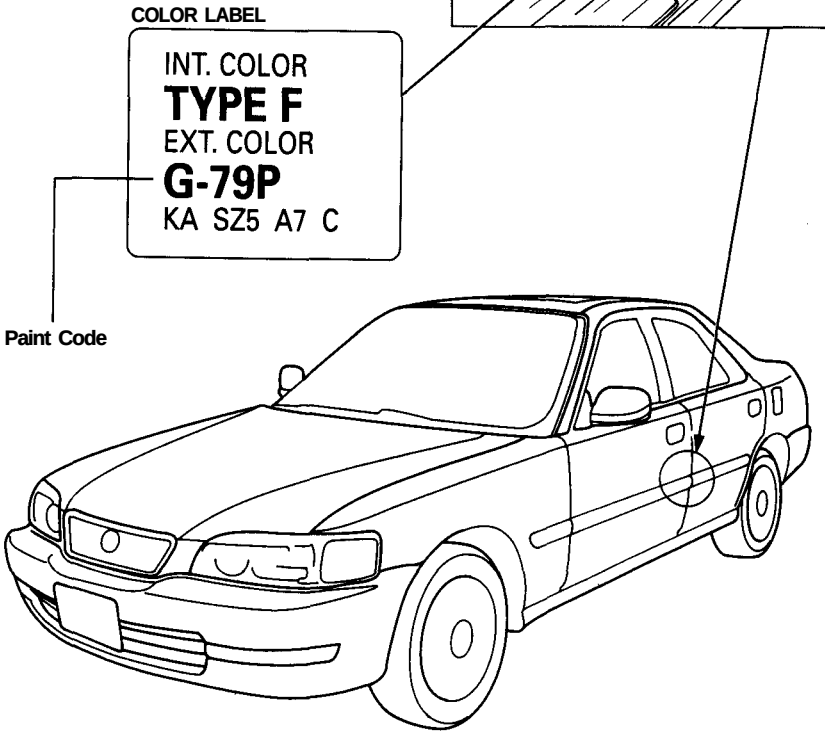
Engine Number

C32A6 - 3300001

Engine Type
Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.





1996 Canada Model

Vehicle Identification Number

JH4 UA3 6 5 * T C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
T: 1996
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 1000001

Transmission Type
Serial Number

Paint Code

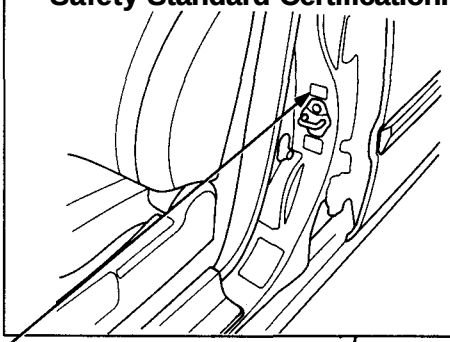
Paint Code	Color
R-91P	Garnet Red Pearl
G-79P	Bayern Green Pearl
NH-503P	Granada Black Pearl
NH-578	Taffeta White
YR-509P	Granite Silver Pearl
YR-506M	Arbere Taupe Metallic
NH-585P	Cayman White Pearl

Engine Number

C32A6 - 1700001

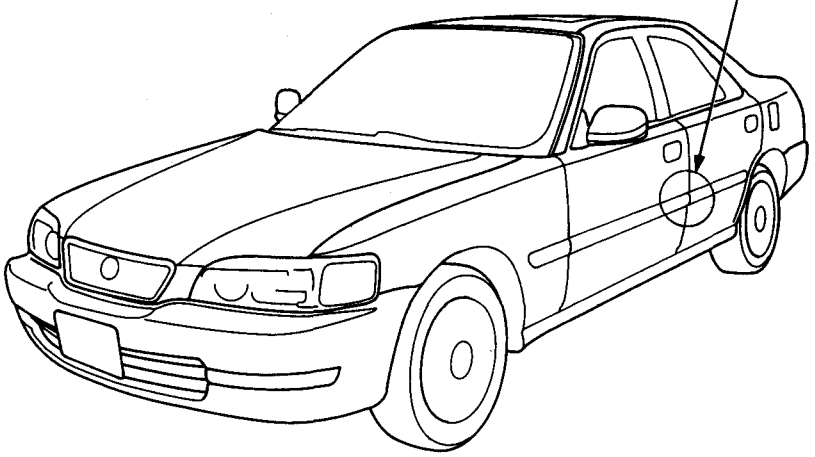
Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



Paint Code

COLOR NH-503P



Chassis and Paint Codes

1997 Canada Model

Vehicle Identification Number

JH4 UA3 6 5 * V C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
V: 1997
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 2000001

Transmission Type
Serial Number

Paint Code

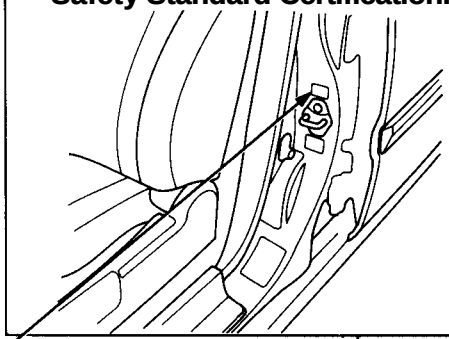
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Juniper Green Pearl
NH-585P	Cayman White Pearl
NH-592P	Flamenco Black Pearl
YR-509P	Granite Silver Pearl

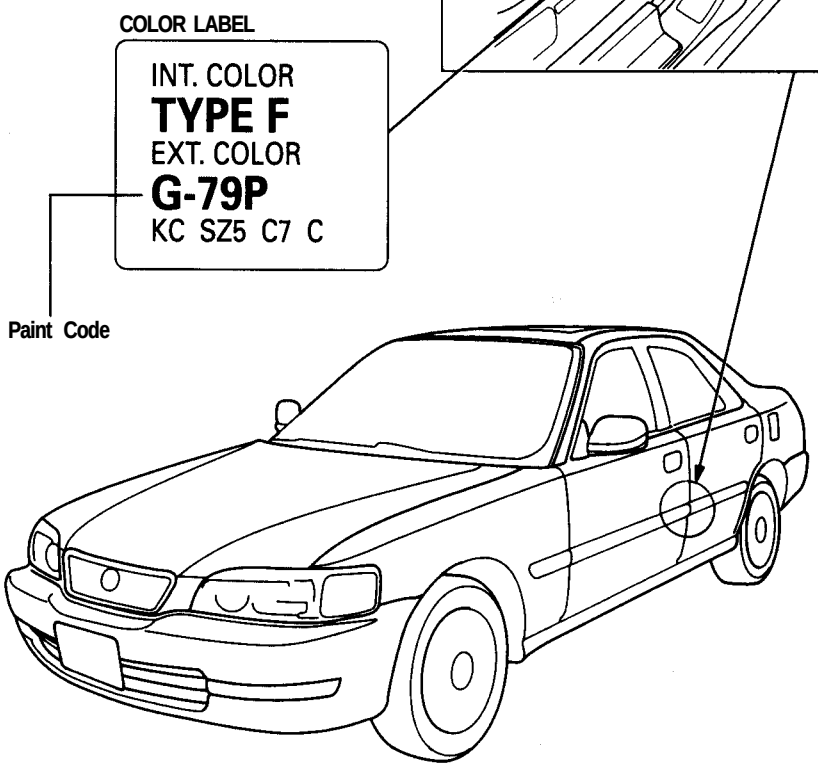
Engine Number

C32A6 - 2700001

Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.





1998 Canada Model

Vehicle Identification Number

JH4 UA3 6 4 * W C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA3: 3.2TL/C32A6
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
W: 1998
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M5HA - 3000001

Transmission Type
Serial Number

Paint Code

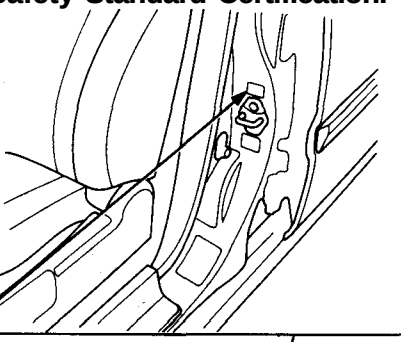
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Bayern Green Pearl
NH-585P	Cayman White Pearl
NH-592P	Starlight Black Pearl
YR-509P	Granite Silver Pearl

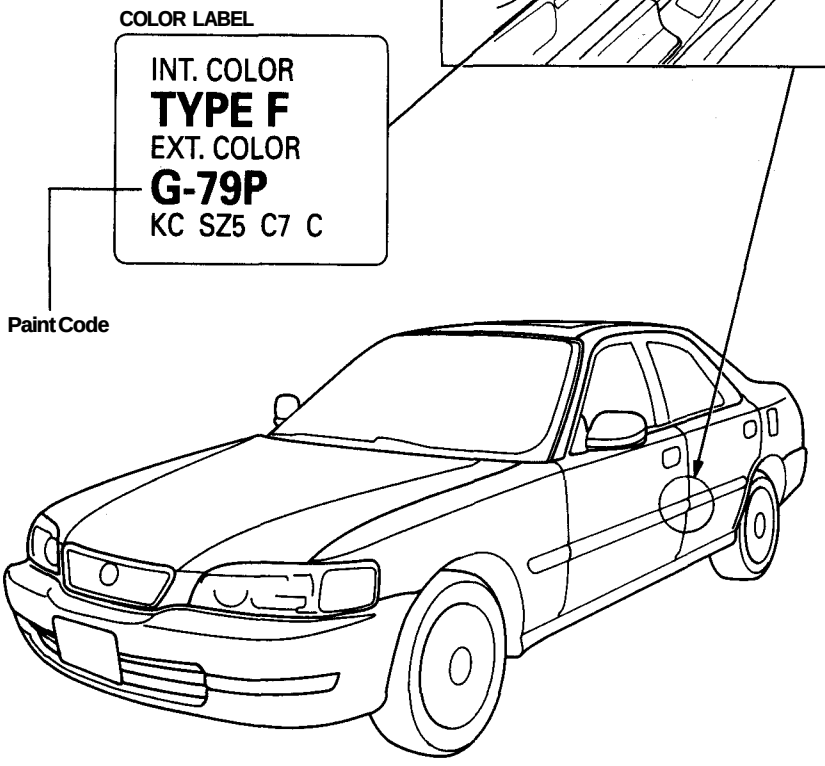
Engine Number

C32A6 - 3700001

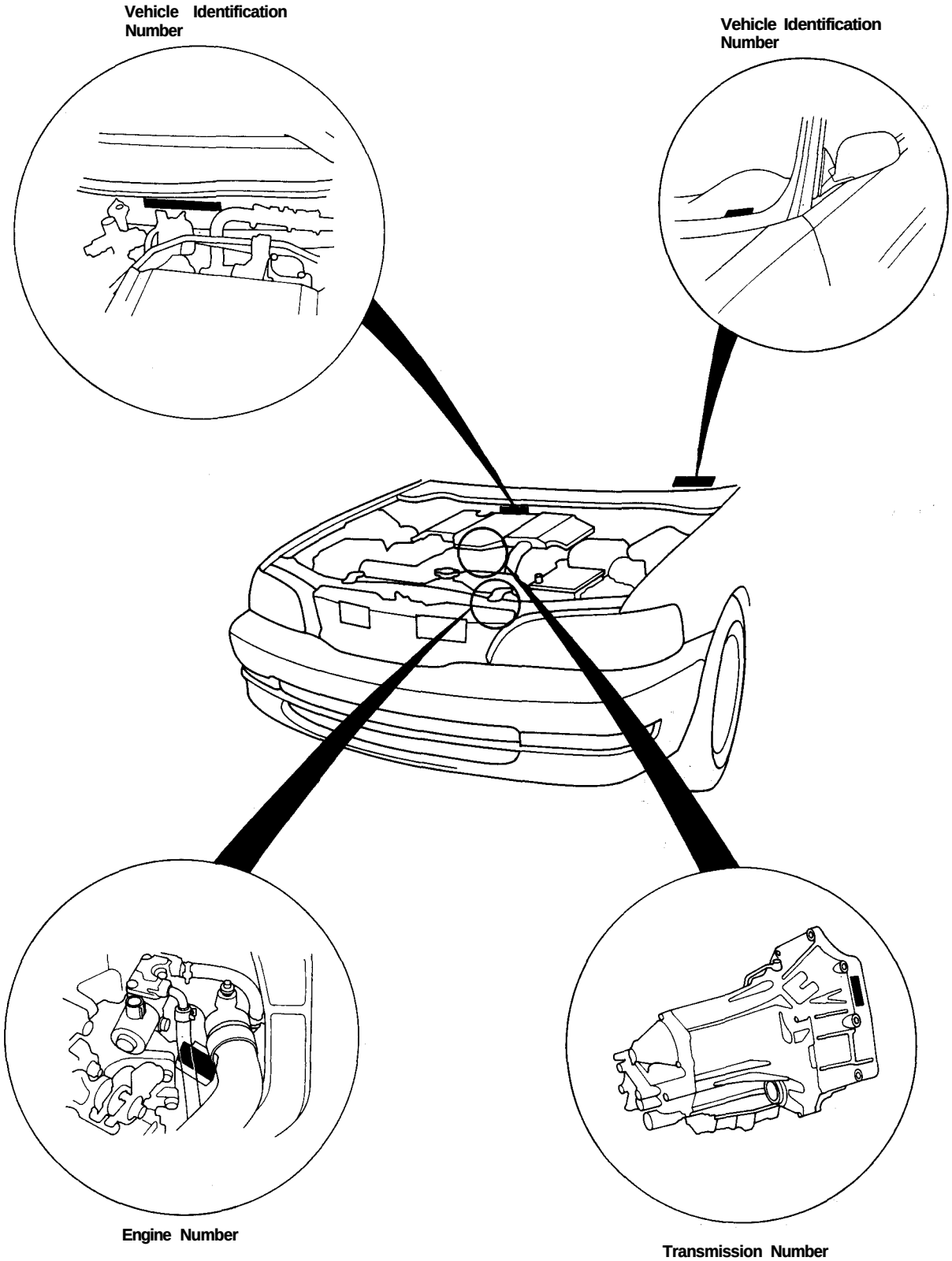
Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.





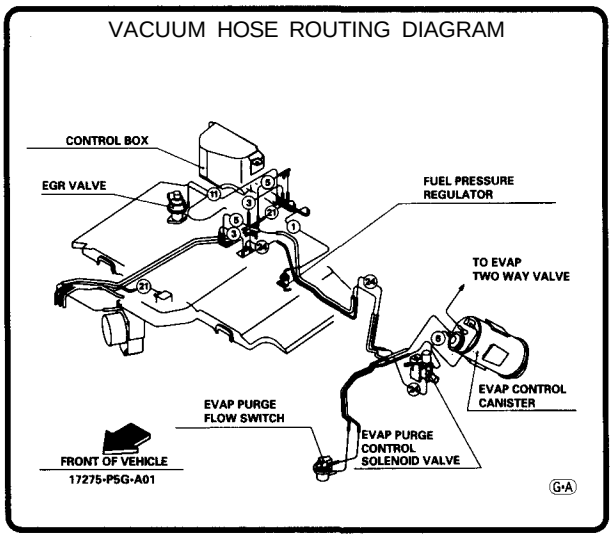
Identification Number Locations

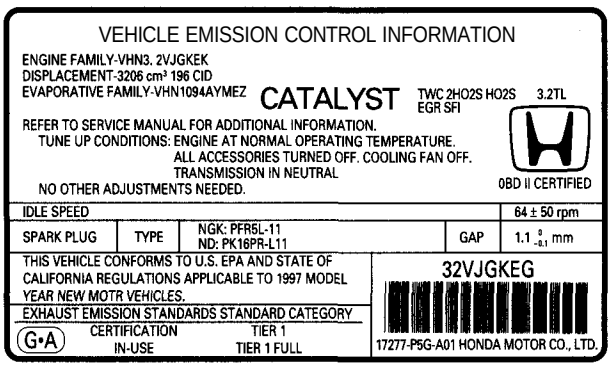


Under-hood Emissions Control Label

Emission Group Identification (1997 model)

Example:





50ST (50 State):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: VHN3.2VJGKEK

Model Year
- T: 1996
- V: 1997

Manufacturer
- HN: Honda

Displacement

Class
- V: Light Duty Vehicle/Passenger Car

Fuel System and Number of Valves
- J: Electronic Sequential Multiport Injection (three or more valves per cylinder)

Fuel Type
- G: Gasoline

Standard
- F: 49 or 50 State Tier 1
- K: 49 or 50 State Tier 1
- 1: California Tier 1
- 2: California TLEV
- 3: California LEV
- 4: California ULEV

Catalyst
- E, F, G, H: Three Way Catalyst

OBD
- K – T: OBD Equipped

Evaporative Family: VHN1094AYMEZ

Model Year
- T: 1996
- V: 1997

Manufacturer
- HN: Honda

Storage System
- 1: Canister

Canister Working Capacity (grams)

Canister Configuration
- A: Plastic Housing (Closed Bottom)
- B: Plastic Housing (Open Bottom)

Fuel System
- Y: Fuel Injection

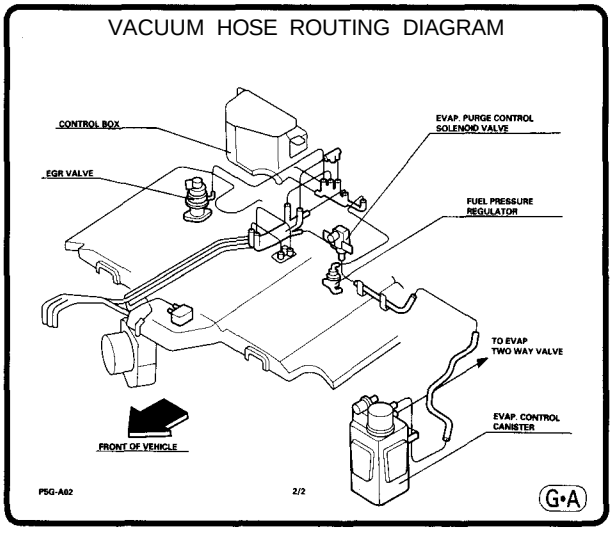
Fuel Tank
- M: Metal

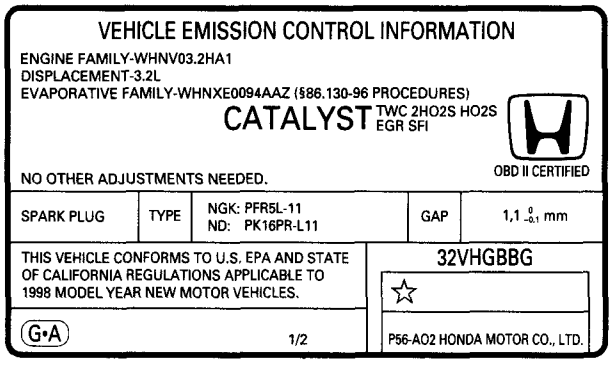
Standard
- A: Current Evap
- E: Enhanced Evap

Wild Card

Emission Group Identification (1998 model)

Example:





50ST (50 States):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):
THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: W HNX V 03.2 HA1

Model Year
W: 1998
Manufacturer
HNX: Honda
Type
V: Light Duty Vehicle/Passenger Car
Displacement
Sequence Characters

Evaporative Family: W HNX E 0094 AAZ

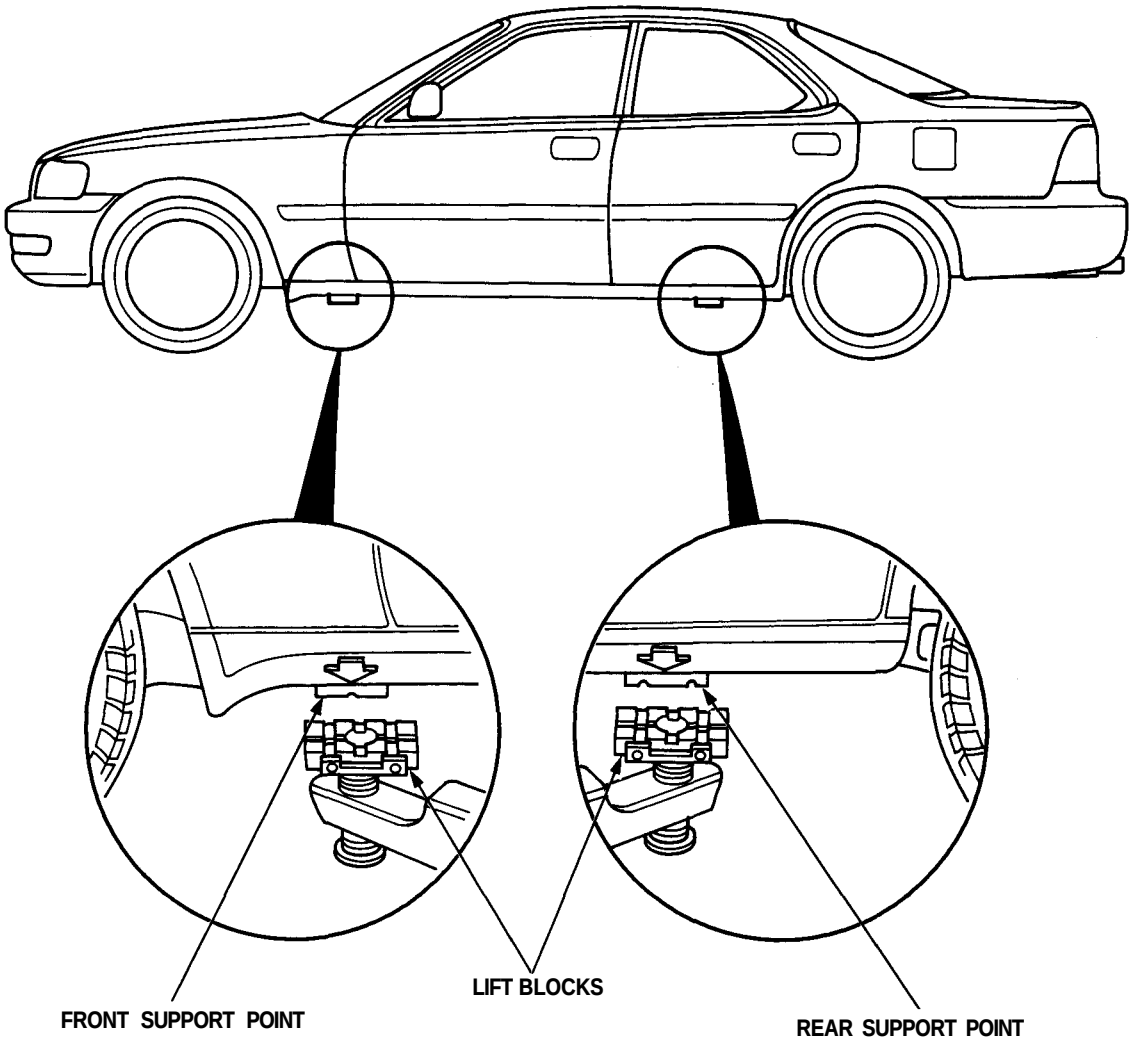
Model Year
W: 1998
Manufacturer
HNX: Honda
Type
E: EVAP
Canister Work Capacity (grams)
Sequence Characters

Lift and Support Points

Lift and Safety Stands

1. Place the lift blocks as shown.
2. Raise the hoist a few inches (centimeters), and rock the vehicle to be sure it is firmly supported.
3. Raise the hoist to full height, and inspect the lift points for solid support.

NOTE: Use the same support points to support the vehicle on safety stands.



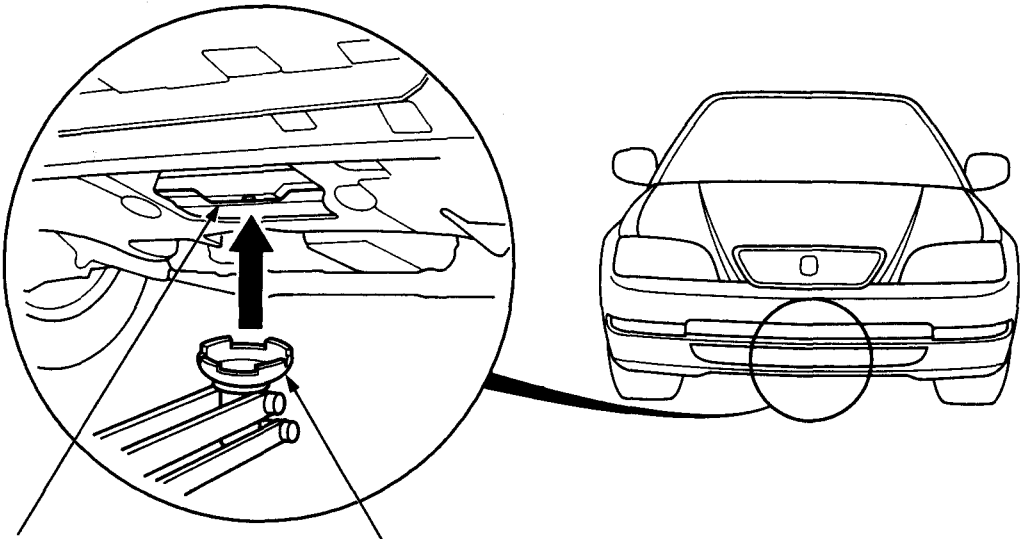
Floor Jack

1. Set the parking brake, and block the wheels that are not being lifted.
2. When lifting the rear of the vehicle, put the shift lever in [P] position.
3. Raise the vehicle high enough to insert the safety stands.
4. Adjust and place the safety stands so the vehicle will be approximately level, then lower the vehicle onto them.

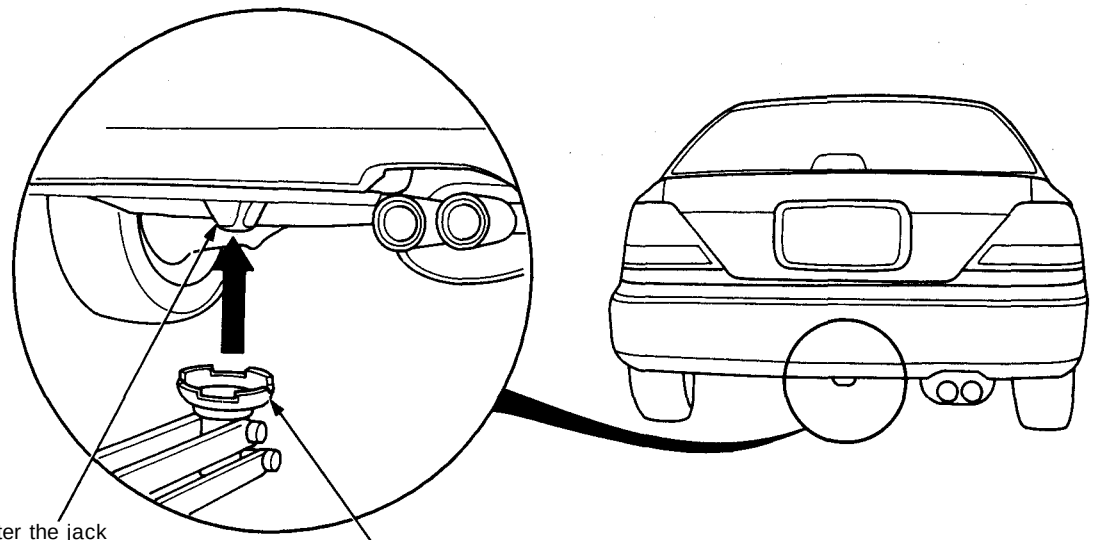
⚠ WARNING

- **Always use safety stands when working on or under any vehicle that is supported by only a jack.**
- **Never attempt to use a bumper jack for lifting or supporting the vehicle.**

Front



Rear



Towing

If the vehicle needs to be towed, call a professional towing service. Never tow the vehicle behind another vehicle with just a rope or chain. It is very dangerous.

Emergency Towing
There are three popular methods of towing a vehicle:

Flat-bed Equipment — The operator loads the vehicle on the back of a truck. This is the best way of transporting the vehicle.

Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two wheels remain on the ground.

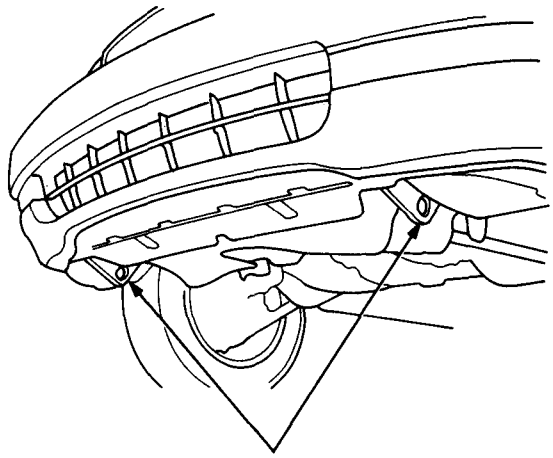
Sling-type Equipment — The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the vehicle off the ground. The vehicle's suspension and body can be seriously damaged if this method of towing is attempted.

If the vehicle cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the vehicle must be towed with the front wheels on the ground, do the following:

- Release the parking brake.
- Start the engine.
- Shift to D4 position, then N position.
- Turn off the engine.

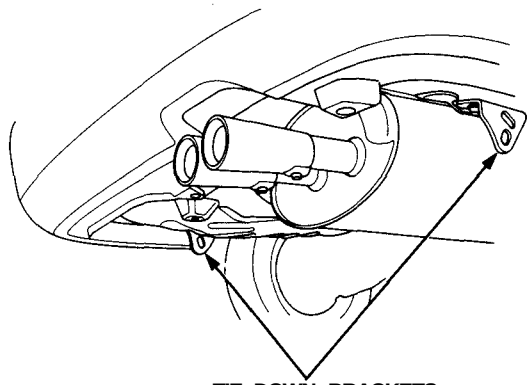
CAUTION:
- **Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine, the vehicle must be transported on a flat-bed.**
- **It is best to tow the vehicle no farther than 50 miles (80 km), and keep the speed below 35 mph (55 km/h).**
- **Trying to lift or tow the vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.**

Front:



TOWING HOOKS and TIE DOWN BRACKETS

Rear:



TIE DOWN BRACKETS

Standards and Service Limits

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	200 rpm and wide open throttle kPa (kgf/cm², psi)	Nominal Minimum Maximum variation	1,370 (14.0, 199) 980 (10.0, 142) 200 (2.0, 28)	
Cylinder head	Warpage		———	0.05 (0.002)
	Height		99.95 – 100.05 (3.935 – 3.939)	———
Camshaft	End play		0.05 – 0.15 (0.002 – 0.006)	0.15 (0.006)
	Camshaft-to-holder oil clearance		0.050 – 0.089 (0.0020 – 0.0035)	0.10 (0.004)
	Total runout		0.03 (0.001) max.	0.04 (0.002)
	Cam lobe height	IN	40.005 (1.5750)	———
		EX	37.766 (1.4868)	———
Valve	Valve clearance	IN	0 (Hydraulic tappets, Auto-adjuster type)	———
		EX	0 (Hydraulic tappets, Auto-adjuster type)	———
	Valve stem O.D.	IN	5.48 – 5.49 (0.2157 – 0.2161)	5.45 (0.215)
		EX	5.45 – 5.46 (0.2146 – 0.2150)	5.42 (0.213)
	Stem-to-guide clearance	IN	0.02 – 0.05 (0.001 – 0.002)	0.08 (0.003)
		EX	0.05 – 0.08 (0.002 – 0.003)	0.11 (0.004)
Valve seat	Width	IN	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
		EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)
	Stem installed height	IN	46.935 – 47.425 (1.8478 – 1.8671)	47.625 (1.8750)
		EX	47.885 – 48.375 (1.8852 – 1.9045)	48.575 (1.9124)
Valve spring	Free length	IN	50.16 (1.975)*1	———
			50.17 (1.975)*2	———
		EX	50.36 (1.983)	———
Valve guide	I.D.	IN and EX	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)
	Installed height	IN and EX	15.75 – 16.25 (0.620 – 0.640)	———
Rocker arm	Arm-to-shaft clearance		0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003)

*1: NIHON HATSUJO manufactured valve spring *2: CHUO HATSUJO manufactured valve spring

Unit of length: mm (in)

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter	A or I	90.010 – 90.020 (3.5437 – 3.5441)	90.070 (3.5461)
		B or II	90.000 – 90.010 (3.5433 – 3.5437)	90.070 (3.5461)
	Bore taper		———	0.05 (0.002)
	Reboring limit		———	0.5 (0.02)
Piston	Skirt O.D. at 17.0 mm (0.67 in) from bottom of skirt	No Letter (A)	89.980 – 89.990 (3.5425 – 3.5429)	89.970 (3.5421)
		B	89.970 – 89.980 (3.5421 – 3.5425)	89.960 (3.5417)
	Clearance in cylinder		0.02 – 0.04 (0.001 – 0.002)	0.08 (0.003)
	Groove width (for ring)	Top	1.240 – 1.250 (0.0488 – 0.0492)	1.25 (0.0492)
		Second	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
		Oil	2.805 – 2.820 (0.1104 – 0.1110)	2.84 (0.112)
Piston ring	Ring-to-groove clearance	Top	0.055 – 0.080 (0.0022 – 0.0031)	0.13 (0.005)
		Second	0.030 – 0.055 (0.0012 – 0.0022)	0.13 (0.005)
	Ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.70 (0.028)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.85 (0.033)
		Oil	0.20 – 0.70 (0.008 – 0.028)*1	0.80 (0.031)
			0.20 – 0.50 (0.008 – 0.020)*2	0.80 (0.031)
Piston pin	O.D.		21.994 – 22.000 (0.8659 – 0.8661)	———
	Pin-to-piston clearance		0.010 – 0.019 (0.0004 – 0.0007)	———
Connecting rod	Pin-to-rod interference		0.013 – 0.032 (0.0005 – 0.0013)	———
	Small end bore diameter		21.968 – 21.981 (0.8649 – 0.8654)	———
	Large end bore diameter	Nominal	57.0 (2.24)	———
	End play installed on crankshaft		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Main journal diameter		67.976 – 68.000 (2.6762 – 2.6772)	———
	Rod journal diameter		53.970 – 53.994 (2.1248 – 2.1257)	———
	Taper		0.005 (0.0002) max.	0.010 (0.0004)
	Out-of-round		0.004 (0.0002) max.	0.010 (0.0004)
	End play		0.10 – 0.29 (0.004 – 0.011)	0.45 (0.018)
	Total runout		0.020 (0.0008) max.	0.030 (0.0012)
Bearings	Main bearing-to-journal oil clearance		0.020 – 0.044 (0.0008 – 0.0017)	0.05 (0.002)
	Rod bearing-to-journal oil clearance		0.022 – 0.046 (0.0009 – 0.0018)	0.05 (0.002)

*1: RIKEN manufactured piston ring.
*2: TEIKOKU PISTON RING manufactured piston ring.

Engine Lubrication — Section 8

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)		5.3 (5.6, 4.7) for engine overhaul 4.7 (5.0, 4.1) for oil change, including filter 4.0 (4.2, 3.5) for oil change, without filter	
Oil pump	Inner-to-outer rotor radial clearance		0.02 – 0.16 (0.001 – 0.006)	0.20 (0.008)
	Housing-to-outer rotor radial clearance		0.10 – 0.18 (0.004 – 0.007)	0.20 (0.008)
	Housing-to rotor axial clearance		0.02 – 0.07 (0.001 – 0.003)	0.12 (0.005)
Relief valve	Pressure setting at oil temperature 176°F (80°C) kPa (kgf/cm², psi)	at idle	70 (0.7, 10) min.	
		at 3,000 rpm	340 (3.5, 50) min.	

Standards and Service Limits

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt, Imp qt) (Including engine, heater, cooling line and reservoir) Reservoir capacity: 0.65 ℓ (0.69 US qt, 0.57 Imp qt)	7.7 (8.1, 6.8) for overhaul 3.2 (3.4, 2.8) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm², psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to open °F (°C) Fully open °F (°C) Valve lift at fully open	169 – 176 (76 – 80) 194 (90) 10.0 (0.39) min.
Cooling fan	Thermoswitch "ON" temperature °F (°C) Thermoswitch "OFF" temperature °F (°C) Fan timer "ON" temperature °F (°C) Fan timer "OFF" temperature °F (°C)	189 – 199 (87 – 93) Subtract 4 – 13 (2 – 7) from actual "ON" temperature 192 – 203 (89 – 95) Subtract 18 – 36 (10 – 20) from actual "ON" temperature

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm², psi)	260 – 309 (2.65 – 3.15, 37.7 – 44.8)
Fuel tank	Capacity ℓ (US gal, Imp gal)	65 (17.2, 14.3)
Engine	Idle speed rpm (with headlight and cooling fan off)	640 ± 50 (N or P position)
	Fast idle rpm	1,300 ± 200
	Idle CO %	0.1 max.

Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt) '96 model	3.3 ℓ (3.5 US qt., 2.9 Imp. qt.) at change 8.7 ℓ (9.2 US qt., 7.7 Imp. qt.) after overhaul	
	'97, '98 models	3.0 ℓ (3.2 US qt., 2.6 Imp. qt.) at change 8.6 ℓ (9.1 US qt., 7.6 Imp. qt.) after overhaul	
Hydraulic pressure '96 model kPa (kgf/cm², psi)	Line pressure at 2,000 rpm in [N] or [P] position	780 – 840 (8.0 – 8.6, 110 – 120)	740 (7.5, 110)
	2nd clutch pressure at 2,000 rpm in [D4] position	390 (4.0, 57) Fully closed throttle | 840 (8.6, 120) More than 1/4 opened throttle	370 (3.8, 54) Fully closed throttle | 740 (7.5, 110) More than 1/4 opened throttle
	3rd clutch pressure at 2,000 rpm in [D4] position		
	4th clutch pressure at 2,000 rpm in [D4] position		
	1st-hold clutch pressure at 2,000 rpm in [1] or [2] position	780 – 840 (8.0 – 8.6, 110 – 120)	740 (7.5, 110)
	2nd clutch pressure at 2,000 rpm in [2] position		
	1st clutch pressure at 2,000 rpm in [1], [D4] or [D3] position		
	Reverse clutch pressure at 2,000 rpm in [R] position	1,170 – 1,250 (11.9 – 12.7, 169 – 181)	1,130 (11.5, 164)
	Throttle B pressure Fully closed throttle	0 – 15 (0 – 0.15, 0 – 2)	———
	Fully open throttle	580 – 630 (5.9 – 6.4, 84 – 91)	540 (5.5, 78)
Hydraulic pressure '97, '98 models kPa (kgf/cm², psi)	Line pressure at 2,000 rpm in [N] or [P] position	520 (5.3, 75) Fully closed throttle | 910 (9.3, 130) Fully opened throttle	500 (5.1, 73) Fully closed throttle | 790 (8.1, 115) Fully opened throttle
	2nd clutch pressure at 2,000 rpm in [D4] position	530 – 590 (5.4 – 6.0, 77 – 85) Fully closed throttle	510 (5.2, 74) Fully closed throttle
	3rd clutch pressure at 2,000 rpm in [D4] position		
	4th clutch pressure at 2,000 rpm in [D4] position		
	1st-hold clutch pressure at 2,000 rpm in [1] or [2] position		
	2nd clutch pressure at 2,000 rpm in [2] position		
	1st clutch pressure at 2,000 rpm in [1], [D4] or [D3] position		
	Reverse clutch pressure at 2,000 rpm in [R] position	760 – 850 (7.7 – 8.7, 110 – 120) Fully closed throttle	740 (7.5, 110) Fully closed throttle
	Throttle B pressure Fully closed throttle	0 – 15 (0 – 0.15, 0 – 2)	———
	Fully open throttle	550 – 590 (5.6 – 6.0, 80 – 85)	510 (5.2, 74)
Stall speed rpm (Check with vehicle on level ground)		2,000	1,850 – 2,150

(cont'd)

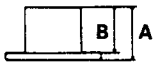
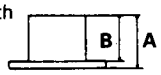
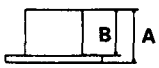
Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Clutch	Clutch initial clearance	1st-hold	0.7 – 0.9 (0.028 – 0.035)	———
		1st	0.65 – 0.85 (0.026 – 0.033)	———
		2nd, 3rd	0.6 – 0.8 (0.024 – 0.031)	———
		4th	0.5 – 0.7 (0.020 – 0.028)	———
		Reverse	0.75 – 0.95 (0.030 – 0.037)	———
	Clutch return spring free length			
	1st-hold, 1st, 2nd, 3rd, 4th		33.7 (1.327)	31.7 (1.248)
	Reverse		30.3 (1.193)	28.3 (1.114)
	Clutch disc thickness			
	1st-hold, 1st, 2nd, Reverse		1.88 – 2.00 (0.074 – 0.079)	Until grooves worn out
	3rd, 4th		2.28 – 2.40 (0.090 – 0.094)	Until grooves worn out
	Clutch plate thickness			
	1st-hold, 1st, 2nd, 3rd, Reverse		1.95 – 2.05 (0.077 – 0.081)	Discoloration
	4th		2.55 – 2.65 (0.100 – 0.104)	
	Clutch end plate thickness (1st, 2nd, 3rd, 4th)	Mark 1	2.05 – 2.10 (0.081 – 0.083)	
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
	Clutch end plate thickness (1st-hold)	Mark L1	2.05 – 2.10 (0.081 – 0.083)	
		Mark L2	2.15 – 2.20 (0.085 – 0.087)	
		Mark L3	2.25 – 2.30 (0.089 – 0.091)	
		Mark L4	2.35 – 2.40 (0.093 – 0.094)	
		Mark L5	2.45 – 2.50 (0.096 – 0.098)	
		Mark L6	2.55 – 2.60 (0.100 – 0.102)	
		Mark L7	2.65 – 2.70 (0.104 – 0.106)	
		Mark L8	2.75 – 2.80 (0.108 – 0.110)	
		Mark L9	2.85 – 2.90 (0.112 – 0.114)	
	Clutch end plate thickness (Reverse)	Mark R1	4.05 – 4.10 (0.159 – 0.161)	
		Mark R2	4.15 – 4.20 (0.163 – 0.165)	
		Mark R3	4.25 – 4.30 (0.167 – 0.169)	
		Mark R4	4.35 – 4.40 (0.171 – 0.173)	
		Mark R5	4.45 – 4.50 (0.175 – 0.177)	
		Mark R6	4.55 – 4.60 (0.179 – 0.181)	
		Mark R7	4.65 – 4.70 (0.183 – 0.185)	
		Mark R8	4.75 – 4.80 (0.187 – 0.189)	
		Mark R9	4.85 – 4.90 (0.191 – 0.193)	Discoloration
Valve body	Stator shaft needle bearing contact I.D. (torque converter side)		28.000 – 28.021 (1.102 – 1.103)	Wear or damage
	Stator shaft needle bearing contact I.D. (ATF pump side)		31.000 – 31.025 (1.220 – 1.221)	———
	ATF pump driven gear I.D.		14.016 – 14.034 (0.552 – 0.553)	Wear or damage
	ATF pump driven gear shaft O.D.		13.980 – 13.990 (0.550 – 0.551)	Wear or damage
	ATF pump gear thrust clearance		0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
	ATF pump gear-to-body clearance	Drive	0.210 – 0.265 (0.0083 – 0.0104)	———
		Driven	0.070 – 0.125 (0.0028 – 0.0049)	———
Regulator valve body	Sealing ring contact I.D.		37.000 – 37.025 (1.457 – 1.458)	37.05 (1.459)
Accumulator body	Sealing ring contact I.D.		42.000 – 42.030 (1.654 – 1.655)	42.05 (1.656)
Parking brake control	Parking brake cone		———	Wear or other defect
	Parking brake pawl		———	
	Parking gear		———	Wear or other defect

Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Mainshaft reverse gear distance collar length	25.95 – 26.05 (1.022 – 1.026)	Wear or damage
	Thrust washer, 29 mm thickness	3.95 – 4.00 (0.156 – 0.157)	
	Mainshaft 2nd gear collar length  A	35.00 – 35.05 (1.378 – 1.380)	
	B	31.06 – 31.09 (1.223 – 1.224)	
	Countershaft reverse gear thrust washer thickness	3.95 – 4.05 (0.156 – 0.159)	
	Countershaft reverse gear collar length A	26.95 – 27.05 (1.061 – 1.065)	
	 B	23.05 – 23.09 (0.907 – 0.909)	
	Reverse clutch distance collar length	35.45 – 35.55 (1.396 – 1.400)	
	Mainshaft 1st gear thrust washer thickness	3.45 – 3.55 (0.136 – 0.140)	
	Mainshaft 1st gear distance collar length	34.05 – 34.08 (1.341 – 1.342)	
	Mainshaft 1st gear collar length A	33.90 – 33.97 (1.335 – 1.337)	
	 B	30.05 – 30.10 (1.183 – 1.185)	Wear or damage
	Thrust washer, 43 x 74 mm (mainshaft 4th gear)	9.67 – 9.70 (0.381 – 0.382)	———
		9.72 – 9.75 (0.383 – 0.384)	———
		9.77 – 9.80 (0.385 – 0.386)	———
		9.82 – 9.85 (0.387 – 0.388)	———
		9.87 – 9.90 (0.389 – 0.390)	———
		9.92 – 9.95 (0.391 – 0.392)	———
		9.97 – 10.00 (0.393 – 0.394)	———
	Thrust washer, 43 x 74 mm difference	4.03 – 4.06 (0.159 – 0.160)	Wear or damage
	Countershaft 2nd gear collar length	35.95 – 36.00 (1.415 – 1.417)	
	Countershaft 1st gear collar length  A	27.95 – 28.05 (1.100 – 1.104)	
	B	23.50 – 23.55 (0.925 – 0.927)	Wear or damage
	1st-hold clutch distance collar length	71.97 – 72.00 (2.833 – 2.835)	———
		72.02 – 72.05 (2.835 – 2.837)	———
		72.07 – 72.10 (2.837 – 2.839)	———
		72.12 – 72.15 (2.839 – 2.841)	———
		72.17 – 72.20 (2.841 – 2.843)	———
		72.22 – 72.25 (2.843 – 2.844)	———
		72.27 – 72.30 (2.845 – 2.846)	———
		72.32 – 72.35 (2.847 – 2.848)	———
		72.37 – 72.40 (2.849 – 2.850)	———
		72.42 – 72.45 (2.851 – 2.852)	———
		72.47 – 72.50 (2.853 – 2.854)	———
	Countershaft 3rd gear collar length  A	28.95 – 29.05 (1.140 – 1.144)	Wear or damage
	B	24.02 – 24.05 (0.946 – 0.947)	
	Diameter of one-way clutch contact area		
	Countershaft 1st gear I.D.	95.764 – 95.790 (3.770 – 3.771)	
	Countershaft 2nd gear I.D.	86.487 – 86.513 (3.405 – 3.406)	
	One-way clutch hub O.D.	79.107 – 79.120 (3.114 – 3.115)	
	Parking gear one-way clutch contact area O.D.	69.833 – 69.846 (2.749 – 2.750)	
	Feed pipe A O.D.	6.97 – 6.98 (0.274 – 0.275)	
	Feed pipe B O.D.	11.47 – 11.48 (0.452 – 0.452)	Wear or damage
	7 mm bushing I.D.	7.018 – 7.030 (0.276 – 0.277)	7.045 (0.277)
	11.5 mm bushing I.D.	11.500 – 11.518 (0.4528 – 0.4535)	11.53 (0.454)
	Mainshaft sealing ring 37 mm thickness	1.87 – 1.97 (0.07 – 0.08)	1.82 (0.072)
	Countershaft sealing ring 42 mm thickness	1.87 – 1.97 (0.07 – 0.08)	1.82 (0.072)
	Mainshaft sealing ring groove width	2.025 – 2.060 (0.080 – 0.081)	2.08 (0.082)
	Countershaft sealing ring groove width	2.025 – 2.060 (0.080 – 0.081)	2.08 (0.082)
	Diameter of needle bearing contact area		
	Mainshaft-stator shaft	24.980 – 24.993 (0.983 – 0.984)	Wear or damage
	Mainshaft 3rd gear	53.968 – 53.984 (2.1247 – 2.1254)	
	Mainshaft 1st gear collar	34.975 – 34.991 (1.377 – 1.378)	
	Mainshaft 1st gear distance collar	34.975 – 34.991 (1.377 – 1.378)	
	Mainshaft 2nd gear collar	34.975 – 34.991 (1.377 – 1.378)	
	Countershaft-torque converter housing	38.505 – 38.515 (1.5159 – 1.5163)	
	Countershaft 3rd gear collar	47.975 – 47.991 (1.8888 – 1.8894)	
	Countershaft 1st gear collar	38.975 – 38.991 (1.534 – 1.535)	
	Countershaft 2nd gear collar	38.975 – 38.991 (1.534 – 1.535)	
	Countershaft reverse gear collar	33.975 – 33.991 (1.3376 – 1.3382)	
	Reverse idler gear shaft	13.99 – 14.00 (0.5508 – 0.5512)	Wear or damage

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Thrust washer, 45.5 x 60 mm thickness (Countershaft 2nd gear/parking gear)		1.27 – 1.30 (0.050 – 0.051)	———
			1.32 – 1.35 (0.052 – 0.053)	———
			1.37 – 1.40 (0.054 – 0.055)	———
			1.42 – 1.45 (0.056 – 0.057)	———
			1.47 – 1.50 (0.058 – 0.059)	———
			1.52 – 1.55 (0.060 – 0.061)	———
			1.57 – 1.60 (0.062 – 0.063)	———
			1.62 – 1.65 (0.064 – 0.065)	———
			1.67 – 1.70 (0.066 – 0.067)	———
			1.72 – 1.75 (0.068 – 0.069)	———
			1.77 – 1.80 (0.070 – 0.071)	———
			1.82 – 1.85 (0.072 – 0.073)	———
			1.87 – 1.90 (0.074 – 0.075)	———
	I.D.			
	Mainshaft 4th gear		59.000 – 59.016 (2.3228 – 2.3235)	Wear or damage
	Mainshaft 2nd gear		40.000 – 40.016 (1.5748 – 1.5754)	↕
	Mainshaft 1st gear		39.000 – 39.016 (1.535 – 1.536)	↕
	Countershaft 3rd gear		54.000 – 54.016 (2.126 – 2.127)	↕
	Countershaft 2nd gear		44.020 – 44.036 (1.733 – 1.734)	↕
	Countershaft 1st gear		44.000 – 44.016 (1.732 – 1.733)	↕
	Countershaft reverse gear		39.000 – 39.016 (1.535 – 1.536)	↕
	Reverse idler gear		18.007 – 18.020 (0.7089 – 0.7094)	Wear or damage
	End play			
	Mainshaft 4th gear		0.03 – 0.18 (0.001 – 0.007)	———
	1st/4th clutch		0 – 0.08 (0 – 0.03)	Adjust with a washer
	Mainshaft 2nd gear		0.06 – 0.16 (0.002 – 0.006)	———
	Mainshaft 1st gear		0.10 – 0.25 (0.004 – 0.010)	———
	Countershaft 3rd gear		0.02 – 0.12 (0.001 – 0.005)	———
	Countershaft 4th gear		0 – 0.08 (0 – 0.003)	Adjust with a washer
	Countershaft 2nd gear		0.05 – 0.13 (0.002 – 0.005)	Adjust with a washer
	Countershaft reverse gear		0.05 – 0.16 (0.002 – 0.006)	———
	Reverse idler gear		0.03 – 0.30 (0.001 – 0.012)	———
	Secondary driven gear shaft tapered roller bearing preload N·m (kgf·cm, lbf·in)		3.4 – 4.4 (35 – 45, 30 – 39)	———
	Thrust washer, 90 mm thickness ('96 model only) (torque converter housing side)		0.99 – 1.01 (0.039 – 0.040)	Wear or damage
	Thrust shim, 75 mm thickness	A	1.56 – 1.58 (0.061 – 0.062)	
		B	1.59 – 1.61 (0.0626 – 0.0634)	
		C	1.62 – 1.64 (0.064 – 0.065)	
		D	1.65 – 1.67 (0.065 – 0.066)	
		E	1.68 – 1.70 (0.066 – 0.067)	
		F	1.71 – 1.73 (0.067 – 0.068)	
		G	1.74 – 1.76 (0.0685 – 0.0693)	
		H	1.77 – 1.79 (0.0697 – 0.0705)	
		I	1.80 – 1.82 (0.071 – 0.072)	
		J	1.83 – 1.85 (0.072 – 0.073)	
		K	1.86 – 1.88 (0.073 – 0.074)	
		L	1.89 – 1.91 (0.074 – 0.075)	
		M	1.92 – 1.94 (0.0756 – 0.0764)	
		N	1.95 – 1.97 (0.077 – 0.078)	
		O	1.98 – 2.00 (0.078 – 0.079)	
		P	2.01 – 2.03 (0.079 – 0.080)	
		Q	2.04 – 2.06 (0.080 – 0.081)	
		R	2.07 – 2.09 (0.081 – 0.082)	
		S	2.10 –2.12 (0.0827 – 0.0835)	
		T	2.13 – 2.15 (0.084 – 0.085)	
		U	2.16 – 2.18 (0.085 – 0.086)	
		V	2.19 – 2.21 (0.086 – 0.087)	
		W	2.22 – 2.24 (0.087 – 0.088)	
		X	2.25 – 2.27 (0.0886 – 0.0894)	
		Y	2.28 – 2.30 (0.090 – 0.091)	
		Z	2.31 – 2.33 (0.091 – 0.092)	
		AA	2.34 – 2.36 (0.092 – 0.093)	
		AB	2.37 – 2.39 (0.093 – 0.094)	
		AC	2.40 – 2.42 (0.094 – 0.095)	
		AD	2.43 – 2.45 (0.0957 – 0.0965)	

Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Springs '96 model	One-way ball spring	0.29 (0.011)	4.0 (0.157)	14.0 (0.551)	13.0
	4-3 kick down valve spring	1.1 (0.043)	7.1 (0.280)	51.3 (2.020)	22.5
	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	86.5 (3.406)	16.5
	Regulator valve spring B	1.7 (0.067)	6.0 (0.236)*	43.0 (1.693)	13.5
	Stator reaction spring	6.5 (0.256)	26.4 (1.039)*	30.3 (1.193)	1.9
	Modulator valve spring	1.5 (0.059)	9.4 (0.370)	30.6 (1.205)	9.9
		1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7
	Relief valve spring	0.9 (0.035)	8.4 (0.331)	56.5 (2.224)	22.4
	Cooler relief valve spring	1.1 (0.043)	8.4 (0.331)	46.8 (1.843)	17.0
	3-4 orifice control valve spring	1.0 (0.039)	6.6 (0.260)	49.6 (1.953)	26.8
	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	55.5 (2.185)	24.0
	2-3, 3-4 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
	4-3 shift timing valve spring	0.7 (0.028)	7.1 (0.280)	35.0 (1.378)	20.4
	1st accumulator spring	2.9 (0.114)	18.0 (0.709)	75.5 (2.972)	11.5
	4th accumulator spring	2.8 (0.110)	16.5 (0.650)	80.8 (3.181)	14.6
	2nd accumulator spring A	3.6 (0.142)	22.0 (0.866)	96.7 (3.807)	13.0
	2nd accumulator spring B	2.0 (0.079)	6.6 (0.260)*	80.0 (3.150)	19.6
	1st-hold accumulator spring	4.0 (0.157)	25.0 (0.984)	68.4 (2.693)	7.2
	3rd accumulator spring	3.2 (0.126)	19.0 (0.748)	78.4 (3.087)	11.1
	Reverse accumulator spring	3.5 (0.138)	18.6 (0.732)	115.5 (4.547)	19.0
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	61.2 (2.409)	38.5
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	36.3 (1.429)	14.1
		0.7 (0.028)	6.6 (0.260)	37.5 (1.476)	24.6
		0.7 (0.028)	6.6 (0.260)	38.5 (1.516)	24.6
	CPC valve spring	1.0 (0.039)	6.8 (0.268)	34.3 (1.350)	14.2
Springs '97, '98 models	Reverse accumulator spring	3.1 (0.122)	18.6 (0.732)	118.4 (4.661)	21.2
	1st-hold accumulator spring	4.0 (0.157)	25.0 (0.984)	68.4 (2.693)	7.2
	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	55.5 (2.185)	24.0
	2-3 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
	3-4 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
	4-3 kick-down valve spring	1.1 (0.043)	7.1 (0.280)	44.6 (1.756)	22.5
	Main orifice control valve spring	1.0 (0.039)	6.6 (0.260)	42.0 (1.654)	21.6
	Relief valve spring	0.9 (0.035)	8.4 (0.331)	56.5 (2.224)	22.4
	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	61.2 (2.409)	38.5
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.6 (1.520)	17.6
		0.7 (0.028)	6.6 (0.260)	39.3 (1.547)	17.6
		0.7 (0.028)	6.6 (0.260)	40.0 (1.575)	17.6
	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	81.9 (3.224)	16.5
	Regulator valve spring B	1.7 (0.067)	6.0 (0.236)*	43.0 (1.693)	7.2
	Stator reaction spring	5.5 (0.217)	26.4 (1.039)*	30.3 (1.193)	2.1
	Cooler relief valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	10.8
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
	Torque converter check valve spring	1.2 (0.047)	8.4 (0.331)	35.7 (1.406)	14.5
	3rd accumulator spring A	3.0 (0.118)	19.6 (0.772)	72.5 (2.854)	10.8
	3rd accumulator spring C	1.8 (0.071)	13.2 (0.520)	15.7 (0.618)	3.13
	4th accumulator spring '97 model	3.0 (0.118)	19.6 (0.772)	67.6 (2.661)	10.0
	4th accumulator spring '98 model	3.3 (0.130)	19.6 (0.722)	77.3 (3.043)	11.7
	3-4 orifice control valve spring	1.1 (0.043)	7.1 (0.280)	47.7 (1.878)	22.9
	4-3 shift timing valve spring	0.7 (0.028)	7.1 (0.280)	35.0 (1.378)	20.4
	Line pressure control valve spring	0.8 (0.031)	6.1 (0.240)	24.1 (0.949)	14.6
	1st accumulator spring	2.7 (0.106)	18.0 (0.709)	83.3 (3.280)	14.4
	2nd accumulator spring A	3.2 (0.126)	23.7 (0.933)	92.8 (3.654)	11.8
	Modulator valve spring	1.2 (0.047)	7.0 (0.276)*	27.6 (1.087)	7.7

*: I.D.

Standards and Service Limits

Differential — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential oil	Capacity ℓ (US qt, Imp qt)	1.10 (1.16, 0.97) for overhaul 1.05 (1.11, 0.92) for oil change	
Differential carrier	Pinion shaft contact area I.D.	20.000 – 20.021 (0.7874 – 0.7882)	———
	Carrier-to-pinion shaft clearance	0.013 – 0.050 (0.0005 – 0.0020)	0.1 (0.004)
	Driveshaft and intermediate shaft contact area I.D.	32.025 – 32.045 (1.2608 – 1.2616)	———
	Carrier-to-driveshaft clearance	0.045 – 0.086 (0.0018 – 0.0034)	0.120 (0.0047)
	Carrier-to-intermediate shaft clearance	0.080 – 0.116 (0.0031 – 0.0046)	0.120 (0.0047)
Differential pinion gear	Backlash	0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
	I.D.	20.042 – 20.066 (0.7891 – 0.7900)	———
	Pinion gear-to-shaft clearance	0.055 – 0.095 (0.0022 – 0.0037)	0.15 (0.006)
Drive pinion gear and ring gear	Backlash at inspection hole	0.06 – 0.14 (0.002 – 0.006)	Adjust with a shim
Drive pinion	Preload N·m (kgf·cm, lbf·in)		
	New bearing	1.82 – 2.49 (18.6 – 25.4, 16.1 – 22.0)	
	Reused bearing	1.42 – 1.91 (14.5 – 19.5, 12.6 – 16.9)	
Drive pinion and differential carrier	Total preload N·m (kgf·cm, lbf·in)		Adjust with a shim
	①	Tp* + 1.04 – 1.26 (10.6 – 12.8, 9.2 – 11.1)	
	②	Tp* + 0.94 – 1.07 (9.6 – 10.9, 8.33 – 9.46)	

①: New differential carrier tapered roller bearing.
②: Reused differential carrier tapered roller bearing.
Tp*: Actual measurement of drive pinion preload.

Unit of length: mm (in)

Steering — Section 17

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Rotational play at steering wheel circumference		0 – 10 (0 – 0.4)
	Starting load at steering wheel circumference N (kgf, lbf)	Engine running	25 (2.5, 5.5) max.
Gearbox	Angle of rack-guide-screw loosened from locked position		20° ± 5°
Pump	Pump pressure with shut-off valve closed (oil temp./speed: 105°F (40°C) min./idle. Do not run for more than 5 seconds). kPa (kgf/cm², psi)		7,800 – 8,800 (80 – 90, 1,138 – 1,280)
Power steering fluid	Recommended fluid		Honda Power Steering Fluid-V or S
	Fluid capacity ℓ (US qt, Imp qt)	System	1.3 (1.4, 1.1)
		Reservoir	0.5 (0.5, 0.4)
Power steering pump belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		11.0 – 13.5 (0.43 – 0.53) with used belt 8.0 – 9.5 (0.31 – 0.37) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge		340 – 540 (35 – 55, 77 – 120) with used belt 690 – 880 (70 – 90, 154 – 200) with new belt

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

Suspension — Section 18

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber	Front	0°00′ ± 1°	———
		Rear	–0°30′ ± 1°	———
	Caster	Front	3°40′ ± 1°	———
	Total toe	Front	OUT 1.0 ± 2.0 (1/16 ± 1/16)	———
		Rear	IN 3.0 ± 2.0 (1/8 ± 1/16)	———
	Front wheel turning angle	Inward wheel	47°30′ ± 2°	———
		Outward wheel	34°30′ (Reference)	———
Wheel	Rim runout (steel wheel)	Axial	0 – 1.0 (0 – 0.04)	2.0 (0.08)
		Radial	0 – 1.0 (0 – 0.04)	1.5 (0.06)
	Rim runout (aluminum wheel)	Axial	0 – 0.7 (0 – 0.03)	2.0 (0.08)
		Radial	0 – 0.7 (0 – 0.03)	1.5 (0.06)
Wheel bearing	End play	Front	0 – 0.05 (0 – 0.002)	———
		Rear	0 – 0.05 (0 – 0.002)	———

Brakes — Section 19

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke at 196 N (20 kgf, 44 lbf) lever force		To be locked when pulled 7 – 11 notches	———
Foot brake pedal	Pedal height (with floor mat removed)		218 (8 11/16)	———
	Free play		1 – 5 (1/16 – 3/16)	———
Master cylinder	Piston-to-pushrod clearance		0 – 0.2 (0 – 0.01)	———
Disc brake	Disc thickness	Front	23.0 (0.91)	21.0 (0.83)
		Rear	9.0 (0.35)	7.5 (0.30)
	Disc runout	Front	———	0.10 (0.004)
		Rear	———	0.10 (0.004)
	Disc parallelism	Front and rear	———	0.015 (0.0006)
	Pad thickness	Front	11.0 (0.43)	1.6 (0.06)
		Rear	9.0 (0.35)	1.6 (0.06)

Standards and Service Limits

Air Conditioning — Section 22

	MEASUREMENT	STANDARD (NEW)
Air conditioning system	Lubricant type: ND-OIL 8 (P/N 38897 – PR7 – A01AH or 38899 – PR7 – A01) (For Refrigerant HFC-134a (R-134a))	
	Lubricant capacity mℓ (fl oz, Imp oz) Condenser	25 (5/6, 0.9)
	Evaporator	50 (1 2/3, 1.8)
	Line or hose	20 (2/3, 0.7)
	Reservoir	15 (1/2, 0.5)
Compressor	Lubricant type: ND-OIL 8 (P/N 38897 – PR7 – A01AH or 38899 – PR7 – A01) (For Refrigerant HFC-134a (R-134a))	
	Lubricant capacity mℓ (fl oz, Imp oz)	140 (4 1/3, 4.9)
	Stator coil resistance Ω at 68°F (20°C)	3.4 – 3.8
	Pulley-to-pressure plate clearance	0.5 ± 0.15 (0.020 ± 0.006)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between the pulleys	8 – 9.5 (0.31 – 0.37) with used belt 5.0 – 6.0 (0.20 – 0.24) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge	390 – 590 (40 – 60, 88 – 132) with used belt 830 – 1,030 (85 – 105, 187 – 231) with new belt

* When using a new belt, adjust deflection to new value. Run the engine for 5 minutes then turn it off. Readjust deflection to used belt value.

Electrical — Section 23

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ignition coil	Rated voltage V	12	
	Primary winding resistance Ω at 77°F (25°C)	0.9 – 1.1	
	Firing order	1 – 4 – 2 – 5 – 3 – 6	
Spark plug	Type	See Section 23	
	Gap	1.0 – 1.1 (0.039 – 0.043)	1.3 (0.051)*2
Ignition timing	At idle °BTDC	15 ± 2 (Red)	
Alternator belt*1	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	9.0 – 11.5 (0.35 – 0.45) with used belt 5.5 – 7.0 (0.22 – 0.28) with new belt	
	Belt tension N (kgf, lbf) Measured with belt tension gauge	390 – 590 (40 – 60, 88 – 132) with used belt 780 – 980 (80 – 100, 176 – 220) with new belt	
Alternator	Output A (at 13.5 V, hot and 6,000 alternator rpm)	110	———
	Brush length	10.5 (0.41)	1.5 (0.06)
Starting motor (DENSO)	Type/Output kW	Planetary gear reduction, field winding/1.8	———
	Mica depth	0.55 – 0.85 (0.022 – 0.033)	0.20 (0.008)
	Commutator runout	0 – 0.02 (0 – 0.0008)	0.05 (0.002)
	Commutator O.D.	34.9 – 35.0 (1.374 – 1.378)	34.0 (1.339)
	Brush length	15.0 – 15.5 (0.59 – 0.61)	9.0 (0.35)
	Brush spring tension N (kgf, lbf)	22 – 27 (2.2 – 2.8, 4.9 – 6.2)	———

*1 When using a new belt, adjust deflection to new value. Run the engine for 5 minutes then turn it off. Readjust deflection to used belt value.
*2 Do not adjust the gap, replace the spark plug if it is out of service limit.

Design Specifications

	ITEM	METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length	4,870 mm	191.7 in	
	Overall Width	1,800 mm	70.9 in	
	Overall Height	1,415 mm	55.7 in	
	Wheelbase	2,840 mm	111.8 in	
	Track Front/Rear	1,550/1,510 mm	61.0/59.4 in	
	Ground Clearance	160 mm	6.3 in	
	Seating Capacity	Five		
WEIGHT (USA)	Gross Vihicle Weight Rating (GVWR)	—	4,410 lbs	
WEIGHT (CANADA)	Gross Vihicle Weight Rating (GVWR)	2,000 kg	—	
ENGINE	Type	Water cooled, 4-stroke SOHC gasoline engine		
	Cylinder Arrangement	90° V6-cylinder		
	Bore and Stroke	90.0 x 84.0 mm	3.54 x 3.31 in	
	Displacement	3,206 cm³ (mℓ)	196 cu-in	
	Compression Ratio	9.6		
	Valve Train	Belt driven, SOHC		
	Lubrication System	Forced and wet sump, trochoid pump		
	Oil Pump Displacement [At oil temp. 248°F (120°C)]	42.3 ℓ/min	44.7 US qt/min 37.2 Imp qt/min	at 6,000 pump rpm
	Fuel Required	Premium UNLEADED gasoline Pump Octane number of 91 or higher		
	Water Pump Displacement [At coolant temp. 77°F (25°C)]	187 ℓ/min	198 US qt/min 165 Imp qt/min	at 5,760 pump rpm
STARTER	Type/Make	Planetary gear reduction, field winding DENSO		
	Normal Output	1.8 kW		
	Nominal Voltage	12 V		
	Hour Rating	30 seconds		
	Direction of Rotation	Clockwise as viewed from gear end		
	Weight	4.9 kg	10.8 lbs	
CLUTCH	Clutch Type	Torque converter		
TRANSMISSION	Transmission	Electronically controlled 4-speed automatic, 1 reverse		
	Primary Reduction	Direct 1 : 1		
	Gear Ratio 1st	2.458		
	2nd	1.454		
	3rd	0.948		
	4th	0.652		
	Reverse	1.880		
	Secondary Reduction Gear type	Single helical gear		
	Gear ratio	1.333		
DIFFERENTIAL	Final Reduction Gear type	Spiral bevel gear		
	Gear ratio	3.133		

(cont'd)

Design Specifications

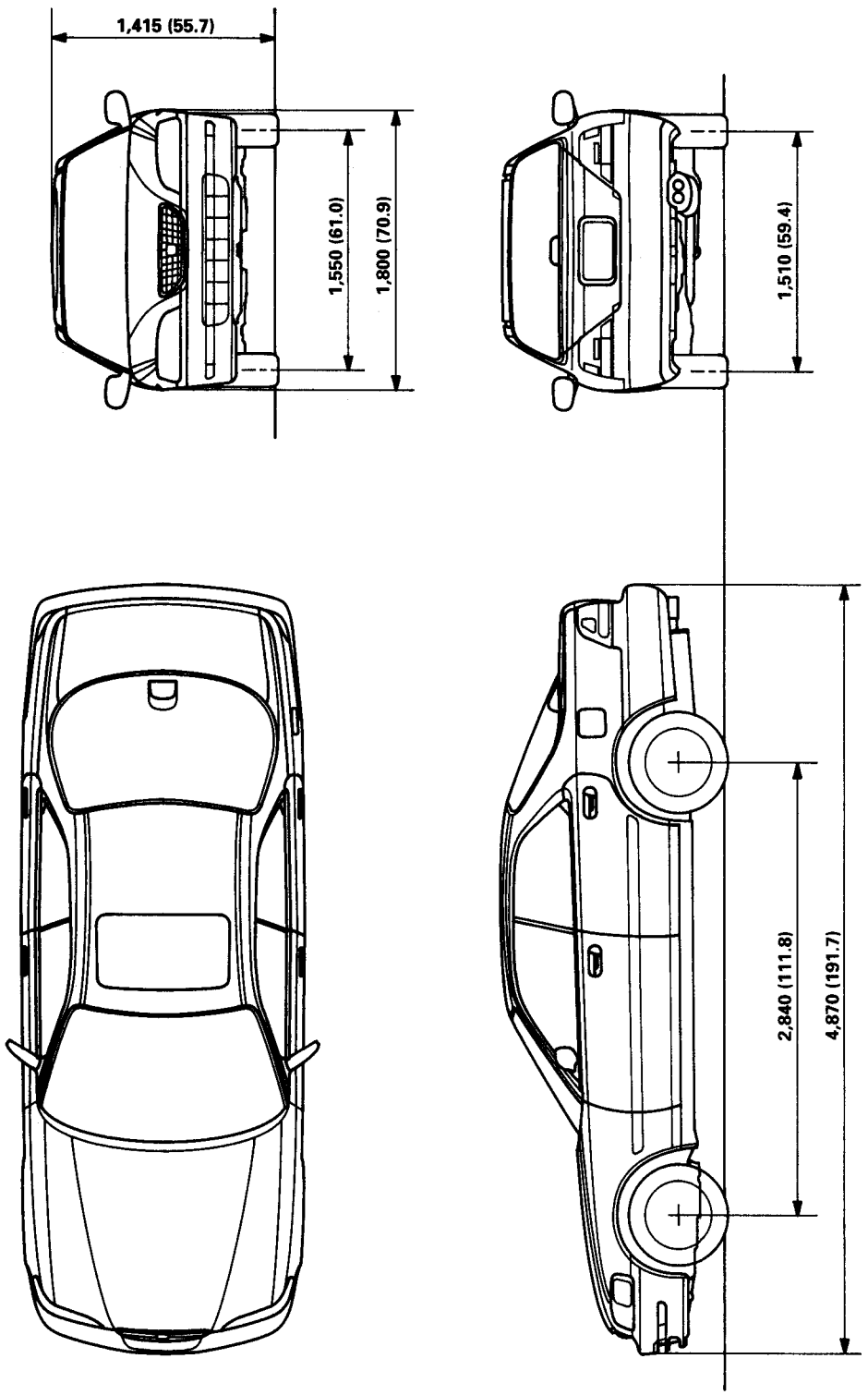
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	ITEM		METRIC	ENGLISH	NOTES
AIR CONDITIONING	Cooling Capacity		4,300 Kcal/h	17,060 BTU/h	
	Compressor	Type/Make	Swash-plate/DENSO		
		No. of Cylinders	10		
		Capacity	207.4 cm^3/rev	12.7 cu-in/rev	
		Max. Speed	7,600 rpm		
		Lubricant Capacity	140 mℓ	4 1/3 fl oz, 4.9 Imp qt	Lubricant type: ND-OIL8
	Condenser	Type	Corrugated fin type		
	Evaporator	Type	Corrugated fin type		
	Blower	Type	Sirocco fan		
		Motor Input	200 W/12 V		
		Speed Control	Infinite variable		
		Max. Capacity	530 m^3/h	18,700 cu-ft/h	at 13.5 V
	Temp Control		Air-mix type		
	Compressor clutch	Type	Dry, single plate, poly-V-belt drive		
		Power Consumption	40 W/12 V		
	Refrigerant	Type	HFC-134a (R-134a)		
		Quantity	750 $^{0}_{-50}$ g	26.5 $^{0}_{-1.8}$ oz	
STEERING SYSTEM	Type		Speed-sensitive, variable power assisted, rack and pinion		
	Overall Ratio		15.7		
	Turns, Lock-to-Lock		3.35		
	Steering Wheel Dia.		380 mm	15.0 in	
SUSPENSION	Type	Front	Independent double wishbone, coil spring with stabilizer		
		Rear	Independent double wishbone, coil spring with stabilizer		
	Shock Absorber	Front and Rear	Telescopic, hydraulic nitrogen gas-filled		
WHEEL ALIGNMENT	Camber	Front	0°00′		
		Rear	−0°30′		
	Caster		3°40′		
	Toe	Front	Out 1.0 mm	Out 1/16 in	
		Rear	In 3.0 mm	In 1/8 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc		
		Rear	Power-assisted self-adjusting solid disc		
	Pad and Lining Surface Area:	Front	58.0 x 2 cm^2	8.99 x 2 sq-in	
		Rear	27.9 x 2 cm^2	4.32 x 2 sq-in	
	Parking Brake	Type	Mechanical actuating, rear two wheel brakes		

	ITEM	METRIC	ENGLISH	NOTES
TIRE	Size	205/65 R15 94 V T135/90 D15 (Spare tire)		
WASHER RESERVOIR	Capacity ℓ (US qt, Imp qt)	2.5 (2.6, 2.2) 6.0 (6.3, 5.3)		USA model Canada model
ELECTRICAL	Battery	12 V – 70 D23R-MF		
	Starter	12 V – 1.8 kW		
	Alternator	12 V – 110 A		
	Fuses			
	In The Under-dash Fuse/Relay Box	7.5 A, 10 A, 15 A, 20 A, 30 A		
	In The Under-hood Fuse/Relay Box	7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A, 50 A, 120 A		
	Headlights High	12 V – 60 W		
	Low	12 V – 55 W		
	Front Turn Signal Lights	12 V – 21 W		
	Front Parking Lights	12 V – 5 W		
	Rear Turn Signal Lights	12 V – 21 W		
	Brake/Taillights	12 V – 21/5 W		
	Rear Side Marker Lights	12 V – 3 CP		
	Front Fog Lights	12 V – 55 W		
	High Mount Brake Light	12 V – 21 W		
	Front Side Marker Lights	12 V – 3 CP		
	Back-up Lights	12 V – 21 W		
	License Plate Light	12 V – 8 W		
	Ceiling Light	12 V – 8 W		
	Spot Light	12 V – 5 W		
	Trunk Lights	12 V – 5 W		
	Door Courtesy Lights	12 V – 3.4 W		
	Vanity Mirror Light	12 V – 2 W		
	Gauge Lights	12 V – 3.4 W, 1.4 W		
	Indicator Lights	12 V – 0.56 W, 0.84 W, 1.12 W, 1.4 W, 2.0 W, 3.0 W		
	Warning Lights	12 V – 1.4 W		
	Illumination and Pilot Lights	12 V – 1.4 W, 1.12 W, 0.84 W		
		12 V – 0.56 W, LED		
	Climate control Illumination Lights	12 V – 1.12 W		

Body Specifications

Unit: mm (in)

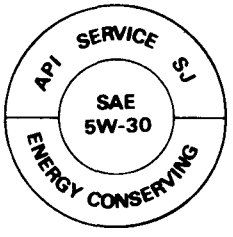


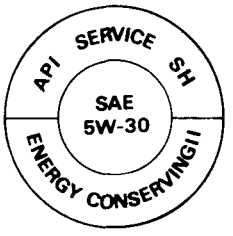
Lubrication Points

For the details of lubrication points and types of lubricants to be applied, refer to the illustrated index and various work procedures (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

No.	LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: Use SH "Energy Conserving II" or SJ "Energy Conserving" grade oil. The oil container may also display the API Certification mark shown below. Make sure it says "For Gasoline Engines." SAE Viscosity: See chart below.
2	Transmission	Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*1
3	Brake Line (Includes Anti-lock brake line)	Genuine Honda DOT3 Brake Fluid*2
4	Power steering gearbox	Steering grease P/N 08733 - B070E
5 6 7 8 9 10 11 12	Steering boots Throttle cable end Steering ball joints Shift lever (Automatic transmission) Pedal linkage Intermediate shaft Brake master cylinder pushrod Fuel fill lid	Multi-purpose grease
13 14 15 16	Trunk hinges Door hinges upper and lower Door opening detents Hood hinges and hood latch	Honda White Lithium Grease
17	Brake pipe joint (Front and rear wheel house)	Rust preventives
18	Caliper Piston seal, Dust seal, Caliper pin, Piston	Silicone grease
19	Power steering system	Genuine Honda Power Steering Fluid-V or S*3
20	Differential	Hypoid gear Oil API service GL4 or GL5 Viscosity: at above -18°C (0°F): SAE 90 at less than -18°C (0°F): SAE 80 W-90
21	A/C compressor	Compressor oil: DENSO: ND-OIL8 (P/N 38897 - PR7 - A01AH or 38899 - PR7-A01) (For Refrigerant: HFC-134a (R-134a))

API SERVICE LABEL



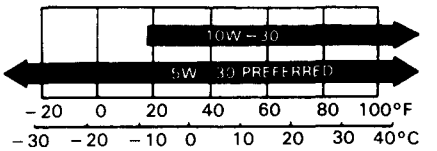


API CERTIFICATION MARK



Recommended Engine Oil

Engine oil viscosity for ambient temperature ranges

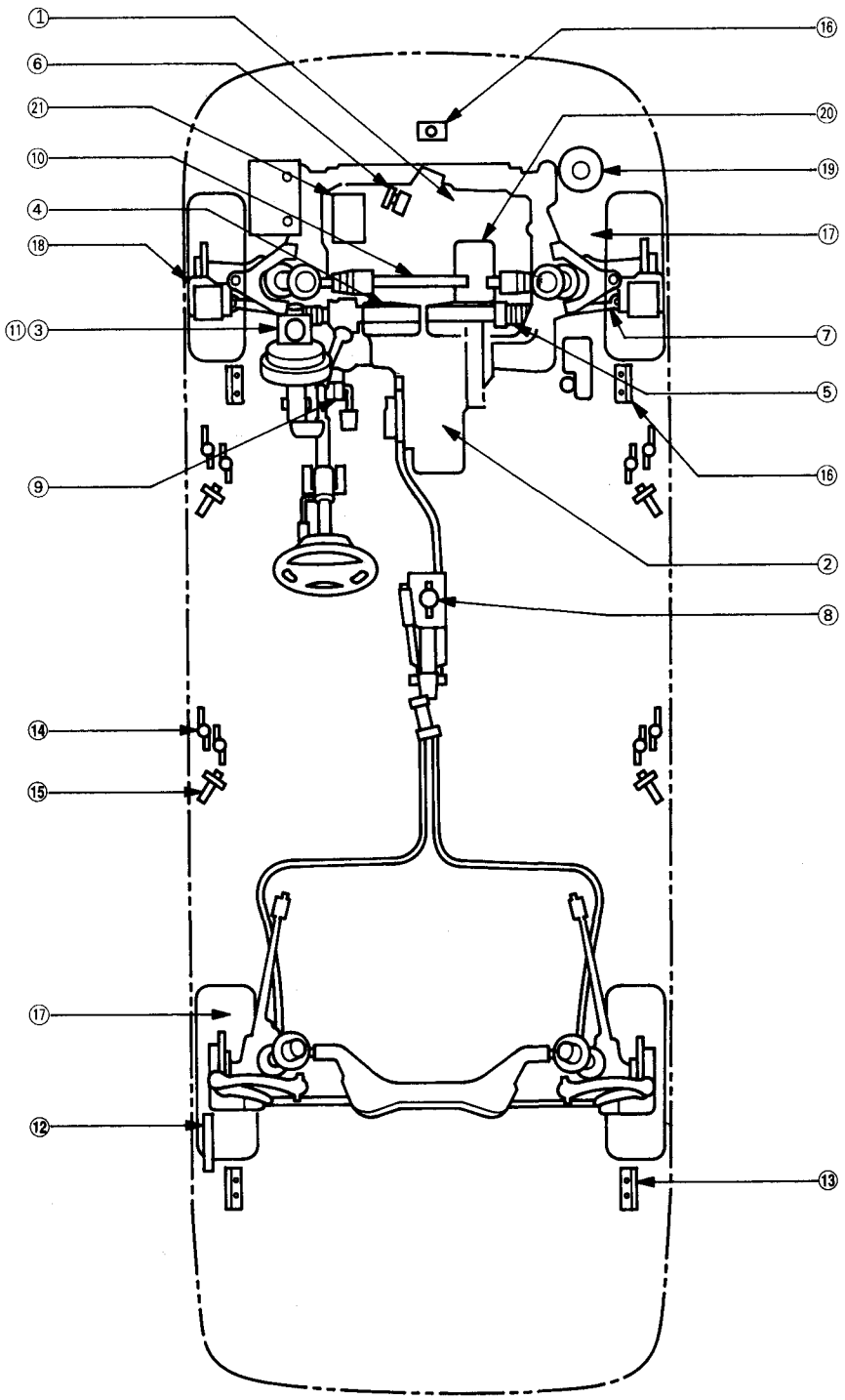


NOTE: The following information as marked *1, *2 and *3 on above chart details for 1997 model:

*1: Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

*2: Always use Genuine Honda DOT3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

*3: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increase wear and poor steering in cold weather.


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Follow the Normal Conditions Maintenance Schedule for 1996 models if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1996 Model on pages 4-6 and 4-7 do not apply.

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Replace engine oil		Replace every 7,500 miles (12,000 km) or 12 months							Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)	8-4
Replace engine oil filter		●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop							Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●			11-134
Replace spark plugs		Every 60,000 miles (96,000 km) or 72 months							NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt and inspect water pump							●			6-6, 10-10
Inspect and adjust drive belts			●		●		●		Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.97 in)	17-4, 22-24, 23-89
Inspect idle speed*					●				640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●	Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●		3.3 ℓ (3.5 US qt, 2.9 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid					●		●		Capacity for change: 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	• Check the brake pad and disc thickness. Check for damage and cracks. • Check the calipers for damage, leaks and tightness.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●		Use Genuine DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	*2 19-7
Check parking brake adjustment		●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)							The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Visually inspect the following items:									• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Brake hoses and lines [including ABS]										*' 19-30
All fluid levels and condition of fluid									Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid.	10-5, 14-112, 15-4, *'19-7
Tie-rod ends, steering gearbox, and boots									• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	*[1]17-22
Suspension components										——
Driveshaft boots		●	●	●	●	●	●	●	Check boots and boot band for cracks. Check rack grease.	16-3
Cooling system hoses and connections									Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*									*Check the catalytic converter heat shield, exhaust pipe and* muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*									Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-116
Inspect supplemental restraint system		10 years after production								——

*1: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1996 Canada Model:
This Maintenance Schedule outlines the minimum required maintenance that you should perform to ensure the trouble-free operation of Canadian model. Due to regional and climactic differences, some additional servicing may be required.

Follow the Severe Conditions Maintenance Schedule for 1996 models if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-7):

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Replace engine oil and oil filter		Replace every 3,750 miles (6,000 km) or 6 months							Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop							Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○		11-134
Replace spark plugs		Every 60,000 miles (96,000 km) or 72 months							NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt*3 and inspect water pump		Replace every 60,000 miles (96,000 km)								6-6, 10-10
Inspect and adjust drive belts			●		●		●		Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.37 in)	17-4, 22-24, 23-89
Inspect idle speed*					●				640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●	Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		3.3 ℓ (3.5 US qt, 2.9 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid		●	●	●	●	●	●	●	Capacity for change: 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		Inspect every 7,500 miles (12,000 km) or 6 months							• Check the brake pad and disc thickness. Check for damage and cracks. • Check the calipers for damage, leaks and tightness.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●		Use Genuine DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	*2 19-7
Check parking brake adjustment		●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)							The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

*3: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Visually inspect the following items:									• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Tie-rod ends, steering gear box, and boots	Every 7,500 miles (12,000 km) or 6 months								• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	*1 17-22
Suspension components										——
Driveshaft boots									Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines [Including ABS]										*1 19-30
All fluid levels and condition of fluid									Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid.	10-5, 14-112, 15-4, *19-7
Cooling system hoses and connections		●	●	●	●	●	●	●	Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*									Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*									Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-116
Inspect supplemental restraint system	10 years after production									——

*1: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule for 1996 Model on pages 4-4 and 4-5.

Follow the Normal Conditions Maintenance Schedule for 1997 models if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1997 Model on pages 4-10 and 4-11 do not apply.

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		Replace every 7,500 miles (12,000 km) or 12 months								Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)	8-4
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-134
Replace spark plugs								●		NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt and inspect water pump								●			6-6, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.37 in)	17-4, 22-24, 23-89
Inspect idle speed								●		640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●		Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			3.0 ℓ (3.2 US qt, 2.6 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid					●		●		●	Capacity for change: 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	*2 19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie-rod ends, steering gearbox, and boots		●	●	●	●	●	●	●	●	• Check steering linkage for looseness. • Check condition of boots. • Check for fluid leaks.	*1 17-22
Suspension components										• Check the bolts for tightness. • Check the conditon of ball joint boots.	——
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines [including ABS]										Check for damage or leakage.	* 19-30
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-112, 15-4, *1 19-7
Cooling system hoses and connections										• Check all hoses for damage, leaks and deterioration. • Check for proper fan operation.	10-3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116
Inspect supplemental restraint system		10 years after production									——

*1: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1997 Canada Model: Follow the Severe Conditions Maintenance Schedule for 1997 Model on pages 4-10 and 4-11.

Severe Conditions

Follow the Severe Conditions Maintenance Schedule for 1997 models if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-11):

Service at the indicated distance or time — whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Replace every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○	●		11-134
Replace spark plugs								●		NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt*3 and inspect water pump								●			6-6, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.37 in)	17-4, 22-24, 23-89
Inspect idle speed								●		640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●		Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●			3.0 ℓ (3.2 US qt, 2.6 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid			●	●	●	●	●	●	●	Capacity for change; 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		Inspect every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	*2 19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-6
Lubricate locks and hinges		●	●	●	●	●	●	●	●		4-2, 4-3
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

*3: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under-20°F,-29°C).

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie-rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								• Check steering linkage for looseness. • Check condition of boots. • Check for fluid leaks.	*1 17-22
Suspension components										• Check the bolts for tightness. • Check the conditon of ball joint boots.	—
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines [Including ABS]										Check for damage or leakage.	* 19-30
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-112, 15-4, *19-7
Cooling system hoses and connections										• Check all hoses for damage, leaks and deterioration. • Check for proper fan operation.	10-3
Exhaust system*		●	●	●	●	●	●	●	●	Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*										Check for leaks.	11-116
Lights and controls										Check all lighting functions.	—
Vehicle underbody										Check for damage and fluid leaks.	—
Inspect supplemental restraint system		10 years after production									—

*1: Refer to Base Service Manual ('95-'97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule for 1997 Model on pages 4-8 and 4-9.

Follow the Normal Conditions Maintenance Schedule for 1998 models if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1998 Model on pages 4-14 and 4-15 do not apply.

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		*Every 7,500 miles (12,000 km) or 12 months*								*Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)*	8-4
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-134
Replace spark plugs								●		NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt and inspect water pump								●			6-6, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.37 in)	17-4, 22-24, 23-89
Inspect idle speed								●		640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●		Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			3.0 ℓ (3.2 US qt, 2.6 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid					●		●		●	Capacity for change: 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●			*Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.*	*2 19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.
*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie-rod ends, steering gearbox, and boots		●	●	●	●	●	●	●	●	• Check steering linkage for looseness. • Check condition of boots. • Check for fluid leaks.	*[1]17-22
Suspension components										• Check the bolts for tightness. • Check the conditon of ball joint boots.	———
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines [including ABS]										Check for damage or leakage.	*[1]19-30
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-112, 15-4, *[1]19-7
Cooling system hoses and connections										• Check all hoses for damage, leaks and deterioration. • Check for proper fan operation.	10-3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*										Check for leaks. Retighten loose connections and replace any damaged parts.	11-116

•1: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1997 Canada Model: Follow the Severe Conditions Maintenance Schedule for 1997 Model on pages 4-10 and 4-11.

Follow the Severe Conditions Maintenance Schedule for 1998 models if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-15):

Service at the indicated distance or time — whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 4.7 ℓ (5.0 US qt, 4.1 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○	●		11-134
Replace spark plugs								●		NGK: PFR5L-11 DENSO: PK16PR-L11 Standard gap: 1.0 – 1.1 mm (0.039 – 0.043 in) Service limit: 1.3 mm (0.051 in)*1	23-78
Replace timing belt*3 and inspect water pump								●			6-6, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. *Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension:* Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 11.0 – 13.5 mm (0.43 – 0.53 in) *A/C compressor belt: 8.0 – 9.5 mm (0.31 – 0.37 in)*	17-4, 22-24, 23-89
Inspect idle speed								●		640 ± 50 rpm (in N or P position)	11-114
Replace engine coolant				●		●		●		Capacity for change: 3.2 ℓ (3.4 US qt, 2.8 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		●	3.0 ℓ (3.2 US qt, 2.6 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-112
Replace front differential fluid			●	●	●	●	●	●	●	Capacity for change; 1.05 ℓ (1.11 US qt, 0.92 Imp qt)	15-4
Inspect front and rear brakes		Every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	*2 19-4, 19-8, 19-10, 19-12, 19-15
Replace brake fluid (Including ABS)				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	*2 19-6
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	*2 19-5
Lubricate locks and hinges		●	●	●	●	●	●	●	●		4-2, 4-3
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								*The suggested rotation method is shown in the diagram of* the Owner's Manual.	——

*1: Do not adjust the gap, replace the spark plug if it is out of service limit.

*2: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

*3: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:											
Tie-rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								• Check steering linkage for looseness. • Check condition of boots. • Check for fluid leaks.	*[1]17-22
Suspension components										• Check the bolts for tightness. • Check the conditon of ball joint boots.	———
Driveshaft boots										Check condition of boots.	16-3
Brake hoses and lines [Including ABS]		●	●	●	●	●	●	●	●	Check for damage or leakage.	*[1]19-30
All fluid levels and condition of fluid										Check levels, condition of fluids, and check for leaks. If brake fluid is low, check brake pad thickness.	10-5, 14-112, 15-4, *[1]19-7
Cooling system hoses and connections										• Check all hoses for damage, leaks and deterioration. • Check for proper fan operation.	10-3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe, and muffler for damage, leaks and tightness.	9-4
Fuel lines, and connections*										Check for leaks.	11-116
Lights and controls										Check all lighting functions.	———
Vehicle underbody										Check for damage and fluid leaks.	———

*1: Refer to Base Service Manual ('95 - '97 ACURA 2.5TL, P/N 61SW502)

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

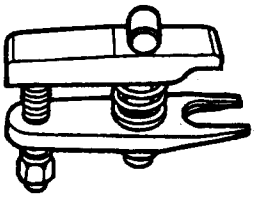
Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the car is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule for 1997 Model on pages 4-8 and 4-9.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07MAC-SL00100	Ball Joint Remover, 32 mm	1	5-8



①

Engine Removal/Installation

Removal

⚠ WARNING

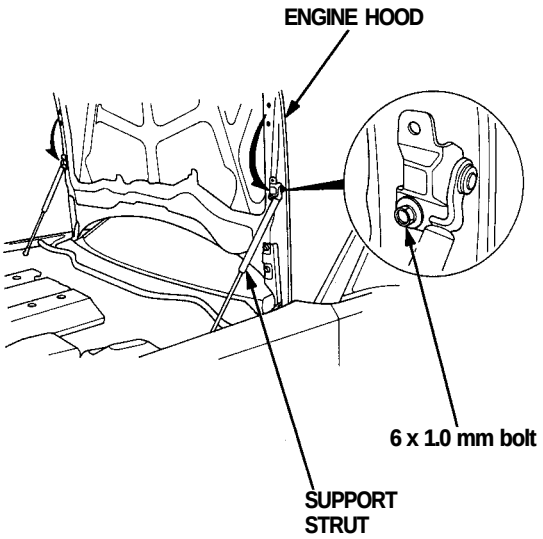
- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine.**
- **Make sure the car will not roll off stands and fall while you are working under it.**

CAUTION:

- **Use fender covers to avoid damaging painted surfaces.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses or interfere with other parts.**

1. Move the front passenger's seat forward.

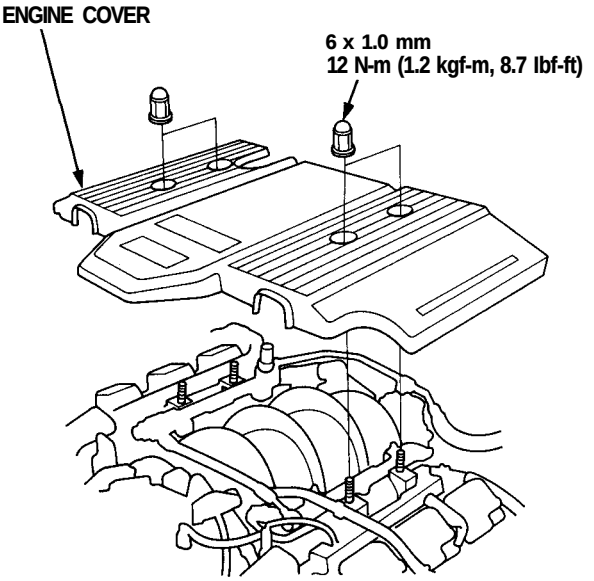
2. Remove the support struts from the engine hood, and fix the engine hood in a vertical position, then reinstall the support struts by using 6 x 1.0 mm bolts.



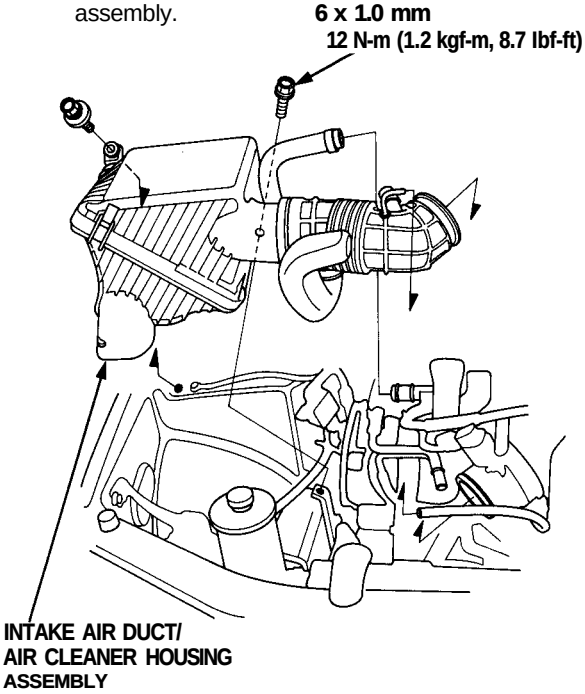
3. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

4. Disconnect the battery negative terminal first, then the positive terminal.

5. Remove the engine cover.



6. Remove the intake air duct and air cleaner housing assembly.



(cont'd)

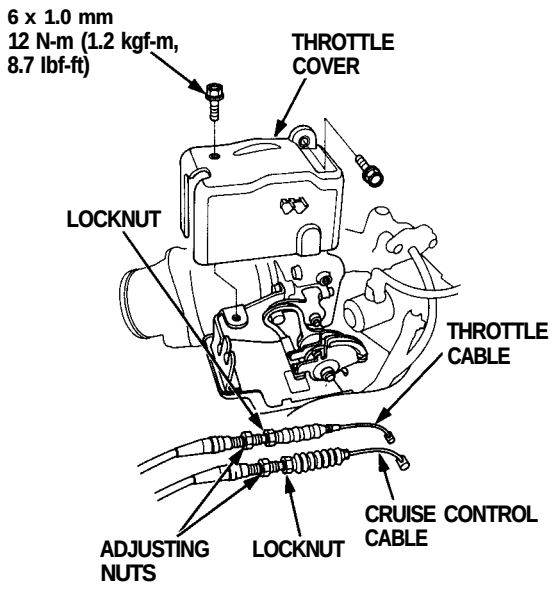
Engine Removal/Installation

Removal (cont'd)

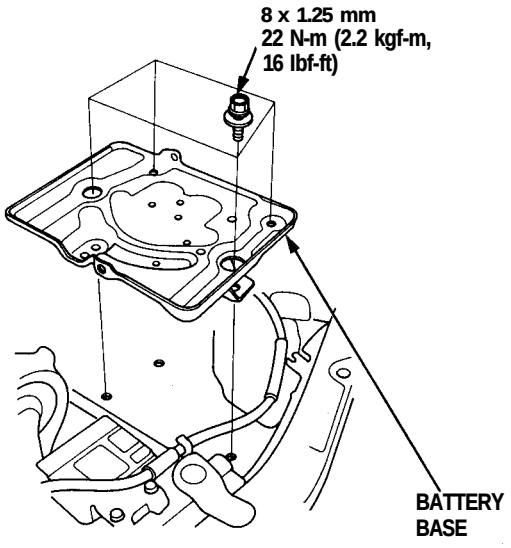
7. Remove the throttle cover.

8. Remove the throttle cable and cruise control cable by loosening the locknuts, then slip the cable ends out of the accelerator linkage.

   NOTE:
   - Take care not to bend a cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable when installing (see section 11).
   - Adjust the cruise control cable when installing (see section 23).

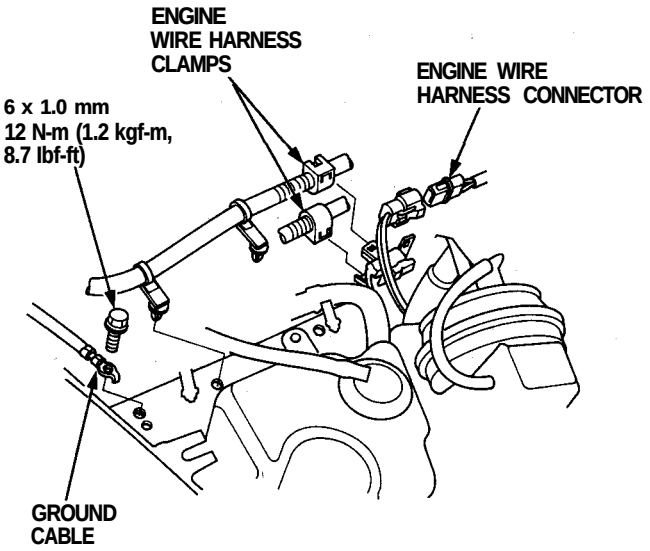


9. Remove the battery and battery base.

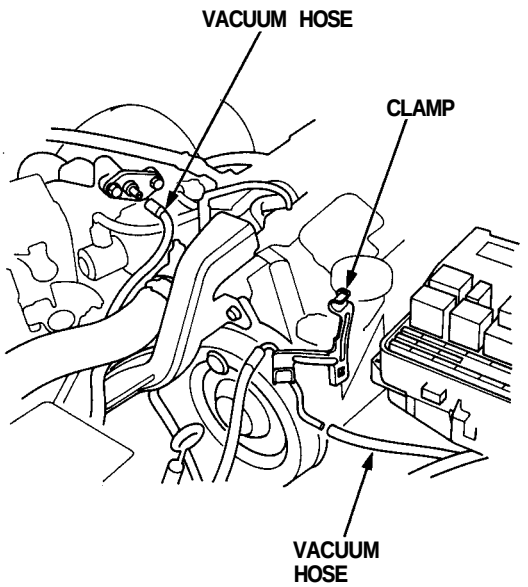


10. Disconnect the engine wire harness connector on the left side of the engine compartment.

11. Remove the engine ground cable and engine wire harness clamps.

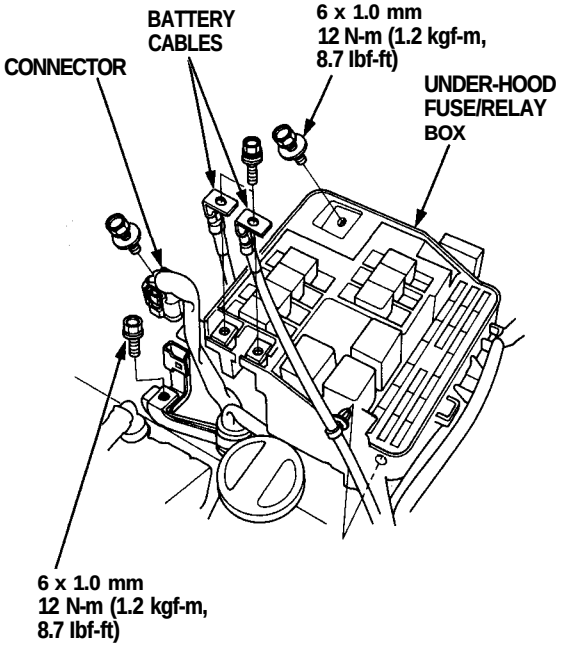


12. Remove the vacuum hoses, then remove the clamp from the under-hood fuse/relay box.



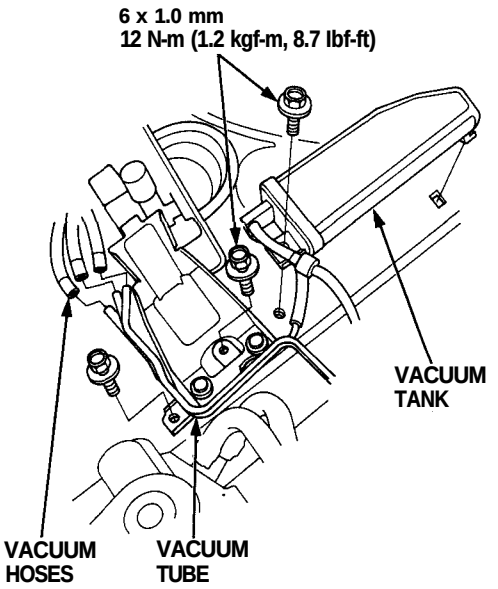
13. Remove the battery cables from the under hood fuse/relay box, then remove the under-hood fuse/relay box.

14. Remove the engine wire harness connector.

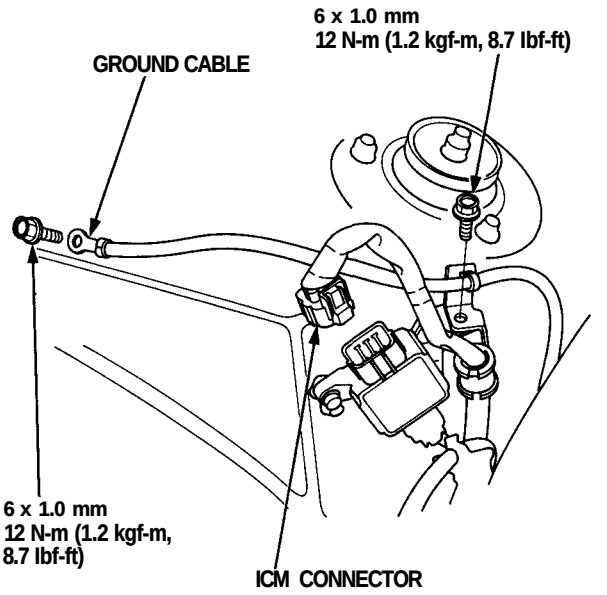


15. Raise the power steering (P/S) fluid reservoir, then remove the vacuum hoses, vacuum tube and vacuum tank.

NOTE: Do not disconnect the P/S hoses.

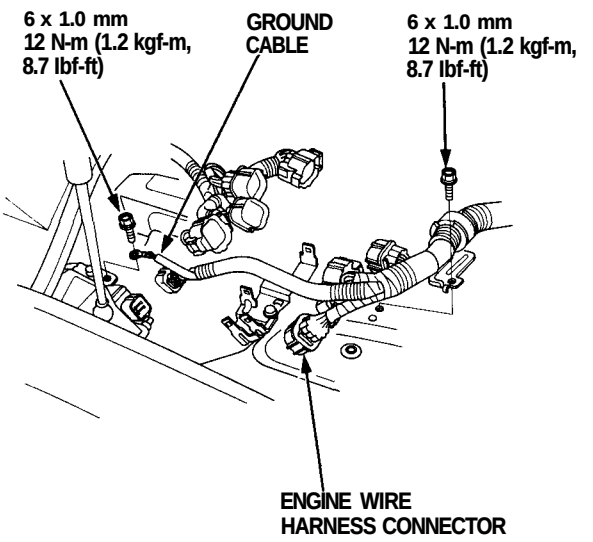


16. Disconnect the ignition control module (ICM) connector, and remove the engine ground cable.



17. Disconnect the engine wire harness connector on the right side of the engine compartment.

18. Remove the ground cable and wire harness clamp.



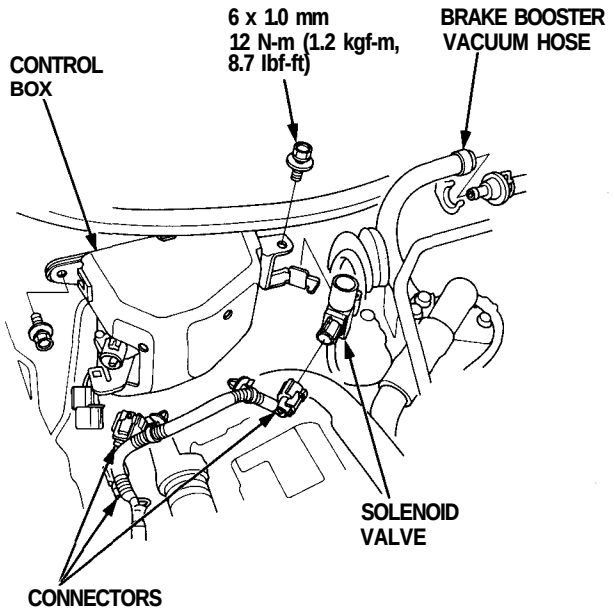
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Engine Removal/Installation

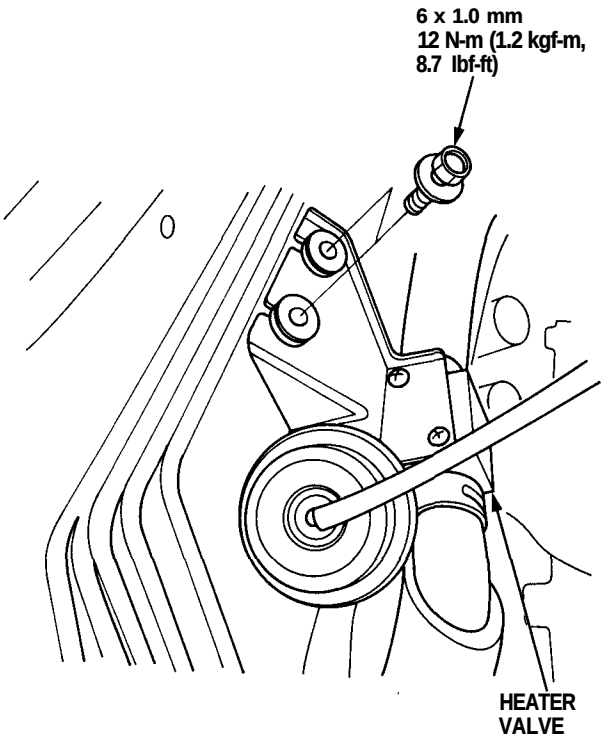
Removal (cont'd)

19. Disconnect the connectors, then remove the control box and solenoid valve.

20. Disconnect the brake booster vacuum hose.



21. Remove the heater valve.

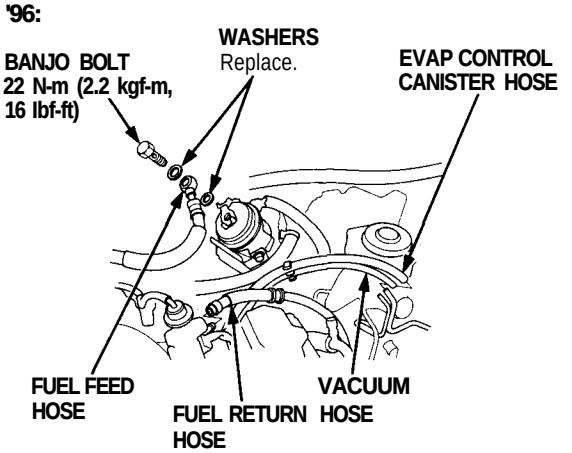


22. Relieve fuel pressure (see section 11).

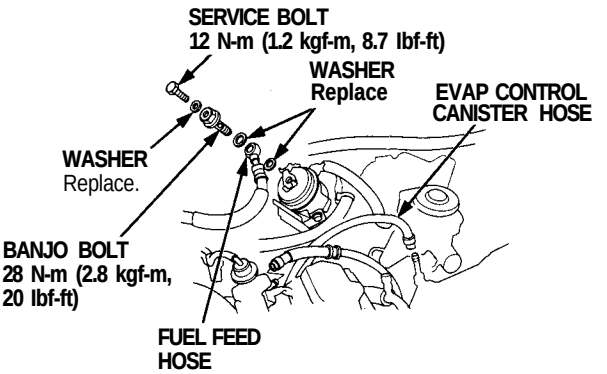
⚠ WARNING Do not smoke while working on the fuel system. Keep open flame or spark away from the work area. Drain fuel only into an approved container.

23. Remove the fuel feed hose, fuel return hose, vacuum hose and evaporative emission (EVAP) control canister hose.

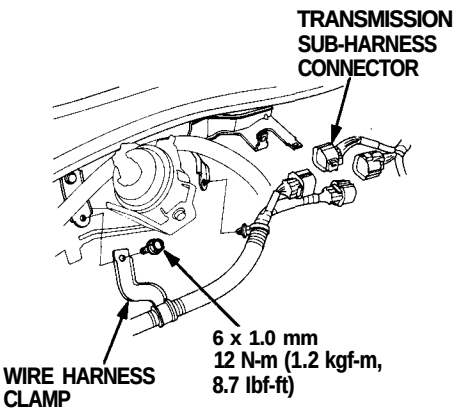
'96:



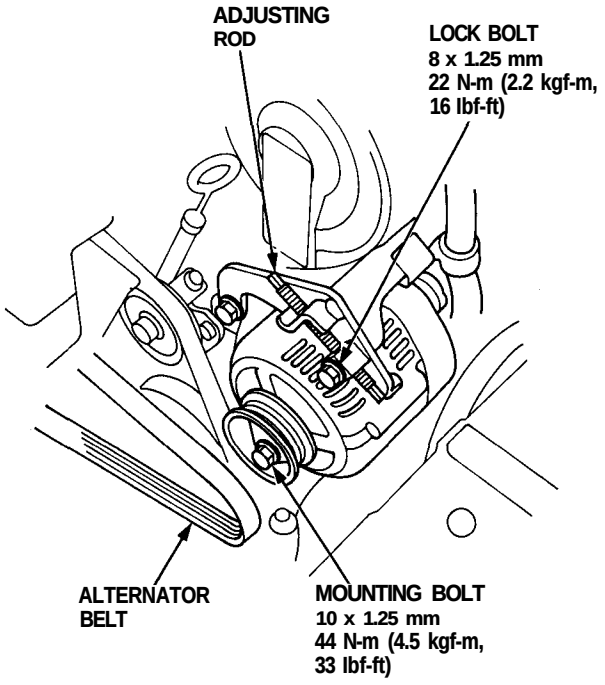
'97 - '98:



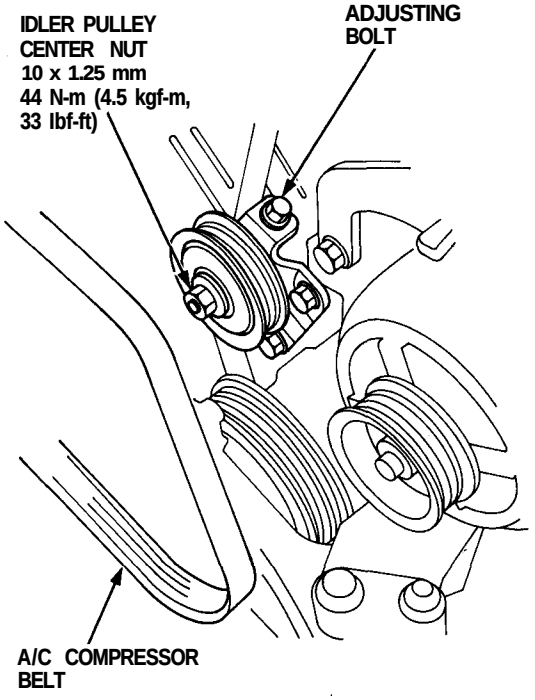
24. Disconnect the transmission sub-harness connector, and remove the wire harness clamp.



25. Loosen the mounting bolt, lock bolt and adjusting rod, then remove the alternator belt.



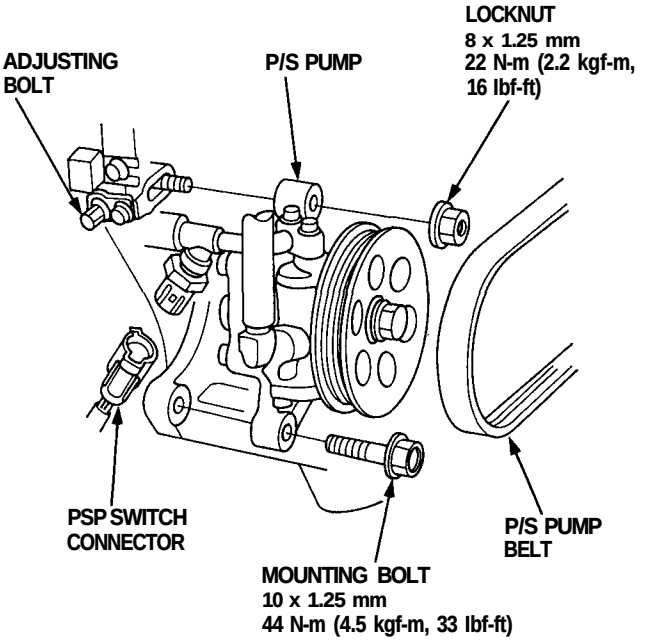
26. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C) compressor belt.



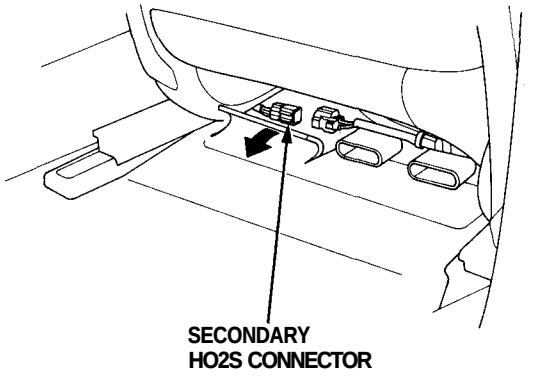
27. Disconnect the power steering pressure (PSP) switch connector.

28. Remove the adjusting bolt, locknut and mounting bolt, then remove the P/S pump belt and pump.

- Do not disconnect the P/S hose.



29. Pull the carpet back to expose the secondary heated oxygen sensor (Secondary HO2S) connector, then disconnect the secondary HO2S connector.



(cont'd)

Engine Removal/Installation

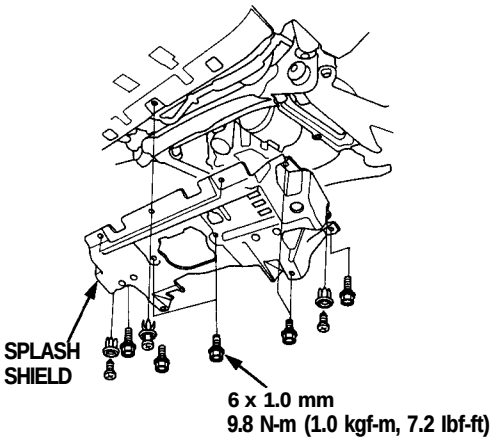
Removal (cont'd)

30. Remove the radiator cap.

⚠ WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

31. Raise the hoist to full height.

32. Remove the front tires/wheels and splash shield.



33. Drain the engine coolant (see page 10-5).

- Loosen the drain plug in the radiator.

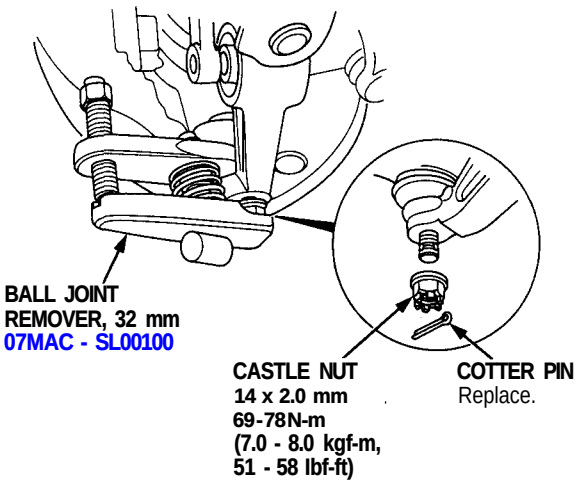
34. Drain the automatic transmission fluid (ATF). Reinstall the drain plug using a new washer (see section 14).

35. Drain the differential oil. Reinstall the drain plug using a new washer (see section 15).

36. Drain the engine oil. Reinstall the drain bolt using a new washer (see page 8-4).

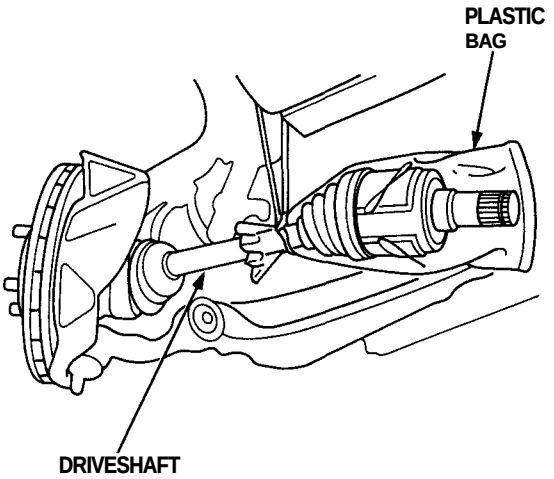
37. Remove the damper forks (see section 18).

38. Disconnect the suspension lower arm ball joints with the special tool. Refer to section 18 for the proper procedure.



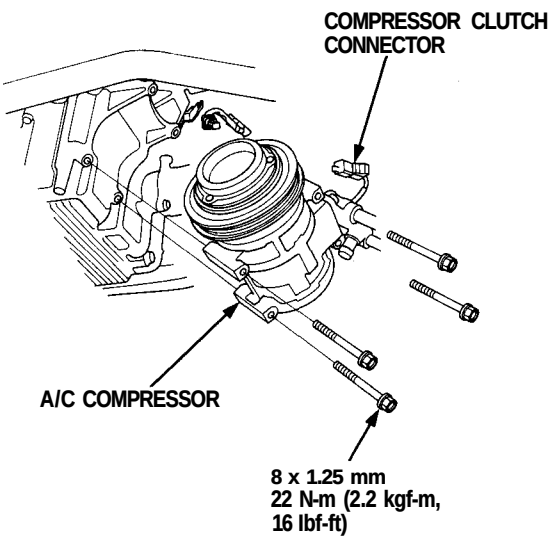
39. Remove the driveshafts (see section 16).

NOTE: Coat all precision finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.



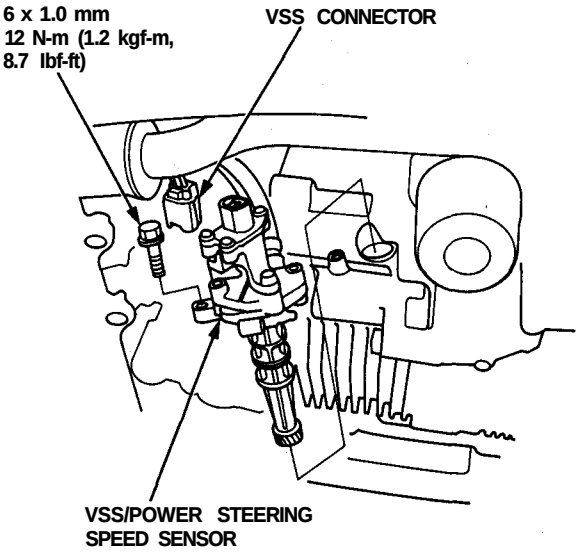
40. Disconnect the compressor clutch connector, then remove the A/C compressor.

NOTE: Do not disconnect the A/C hoses.

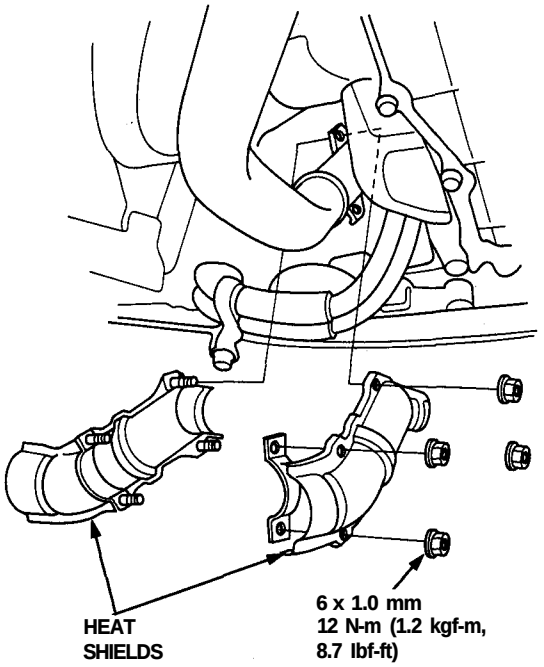


41. Disconnect the vehicle speed sensor (VSS) connector, then remove the VSS/power steering speed sensor.

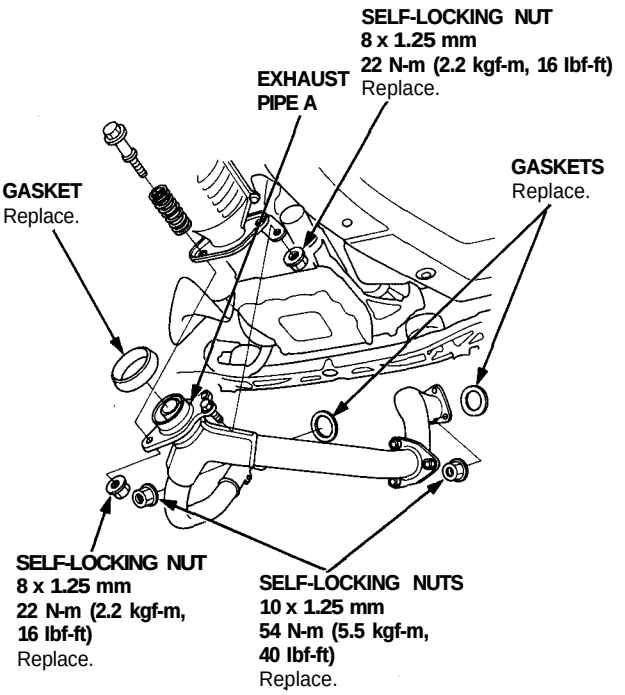
- Do not disconnect the fluid hoses.



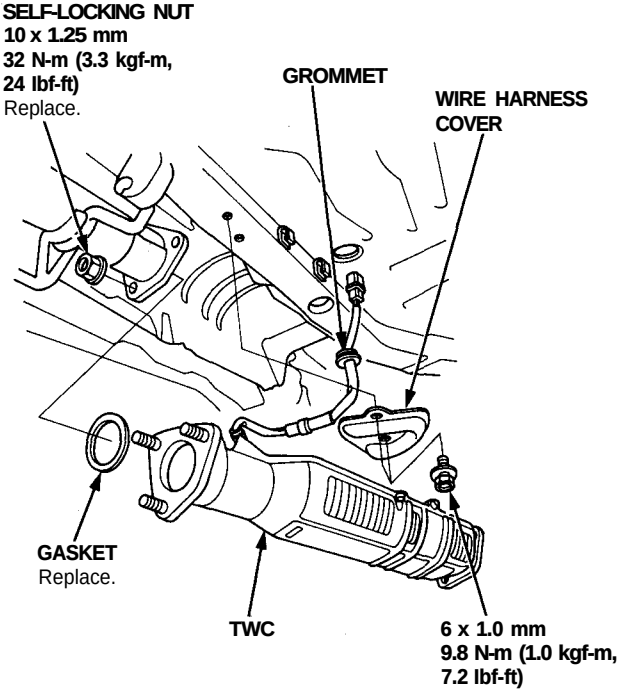
42. Remove the heat shields from exhaust pipe A.



43. Remove exhaust pipe A.



44. Remove the wire harness cover and grommet, then remove the three way catalytic converter (TWC).

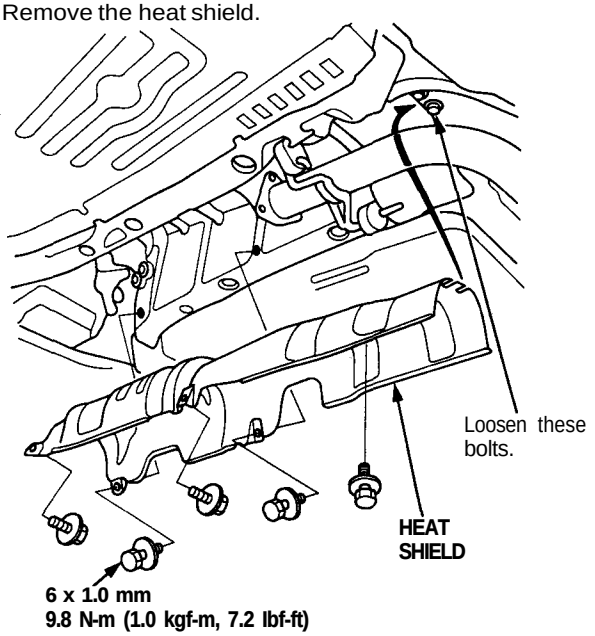


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Engine Removal/Installation

Removal (cont'd)

45. Remove the heat shield.



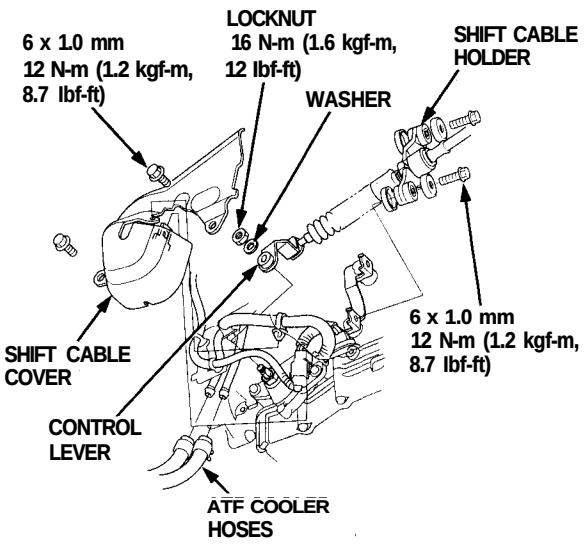
46. Remove the ATF cooler hoses, then plug the ATF cooler hoses and pipes.

47. Remove the shift cable cover mounting bolts, then remove the A/T gear position switch harness clamp and the shift control solenoid valve/linear solenoid harness connector from the shift cable cover.

48. Remove the shift cable cover from the transmission housing.

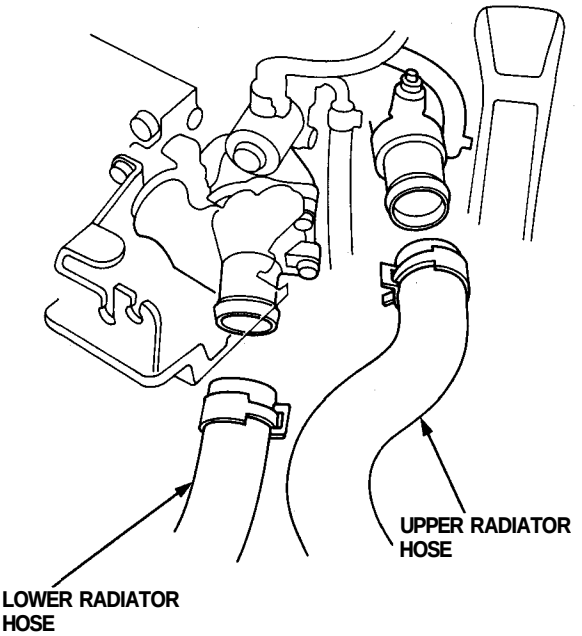
49. Remove the shift cable with shift cable holder from the shift cable holder base.

50. Remove the control lever from the control shaft.



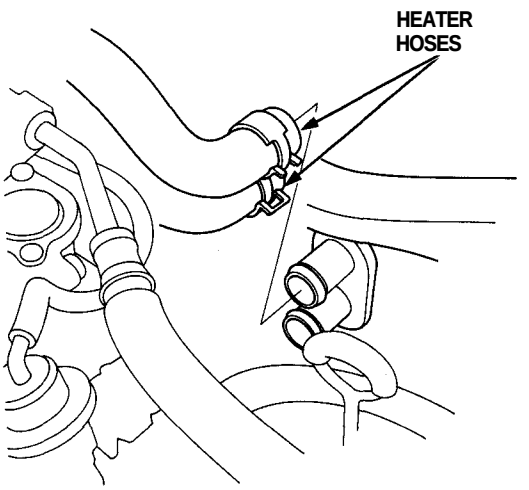
51. Lower the hoist.

52. Remove the upper and lower radiator hoses.

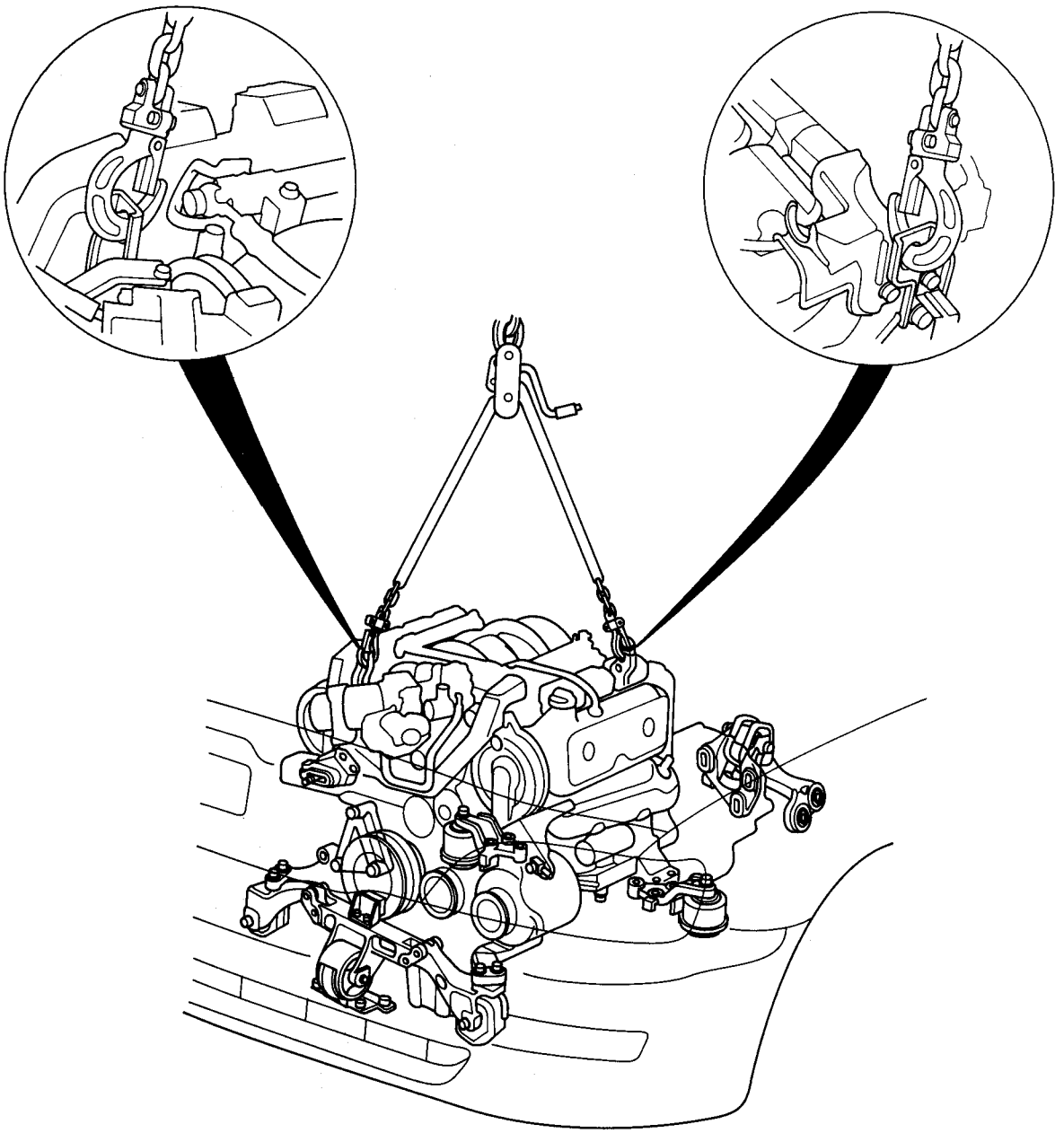


53. Remove the radiator assembly (see page 10-4).

54. Remove the heater hoses.



55. Attach the chain hoist to the engine.

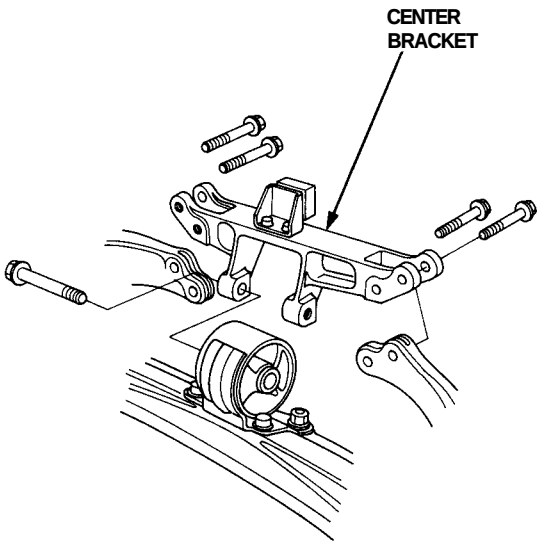


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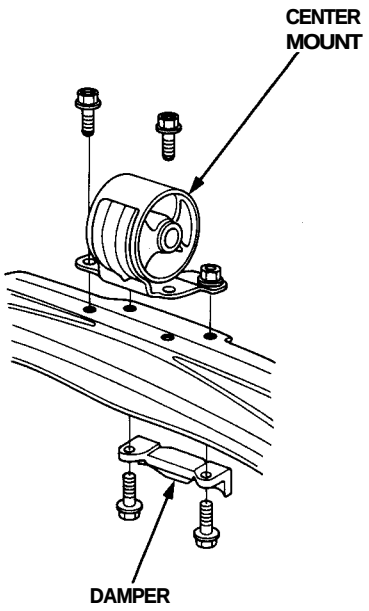
Engine Removal/Installation

Removal (cont'd)

56. Remove the center bracket.

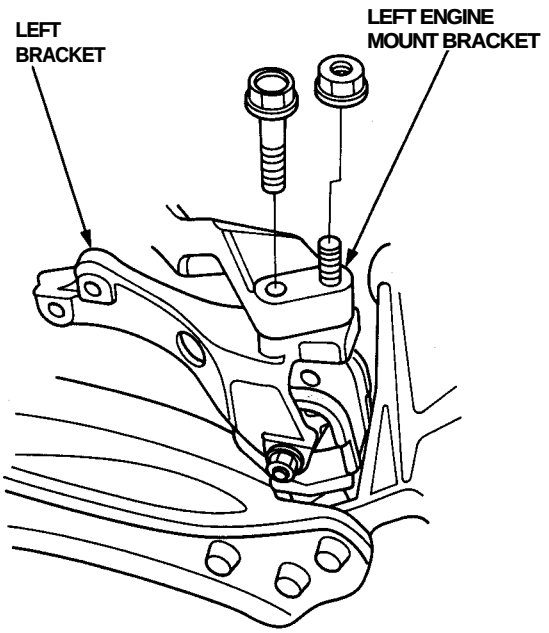


57. Remove the center mount.

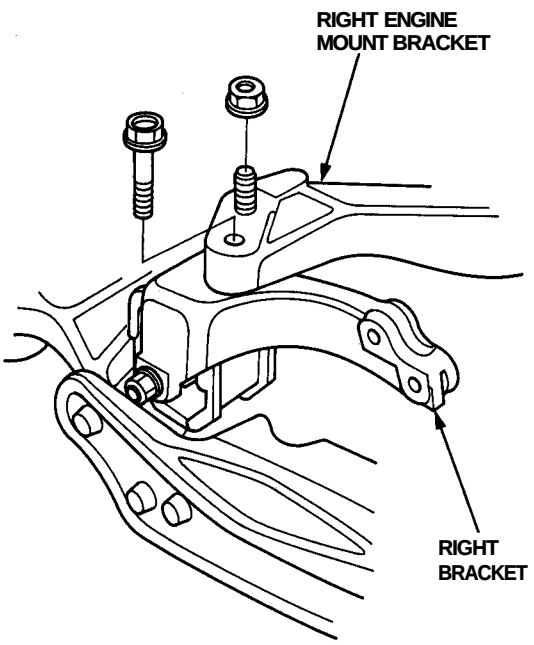


58. Separate the left and right engine mount brackets from the left and right brackets.

LEFT:



RIGHT:

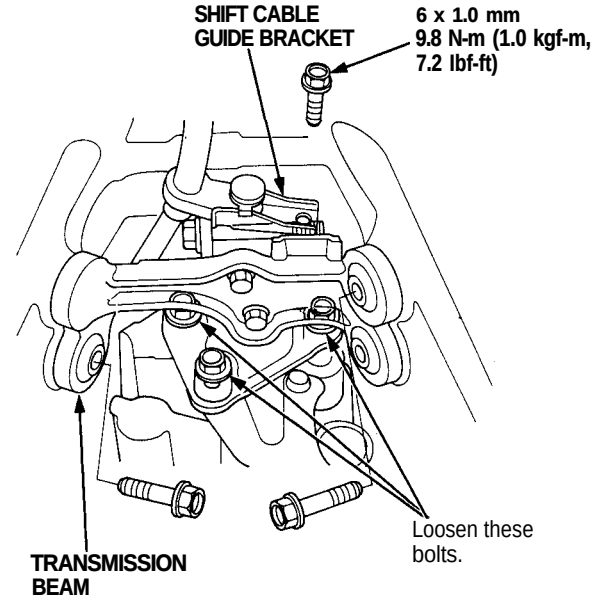


59. Raise the hoist.

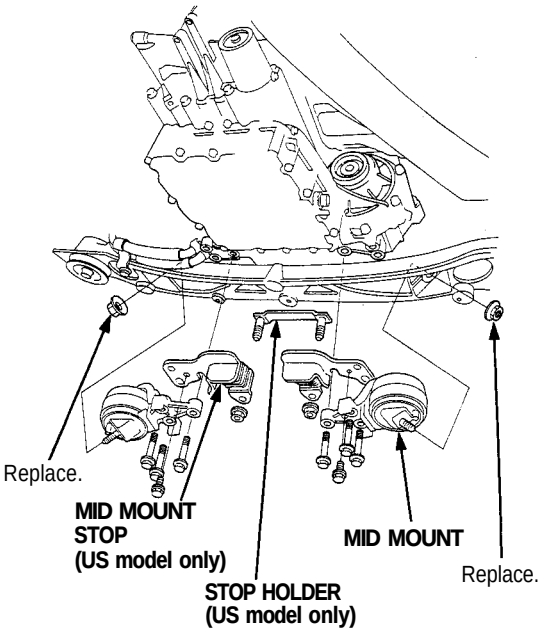
60. Remove the shift cable guide bracket.

CAUTION: Take care not to bend the shift cable.

61. Remove the transmission beam from the body, and loosen the three bolts on the transmission bracket.



62. Remove the stop holder, mid mount stops and mid mounts.



63. Lower the hoist.

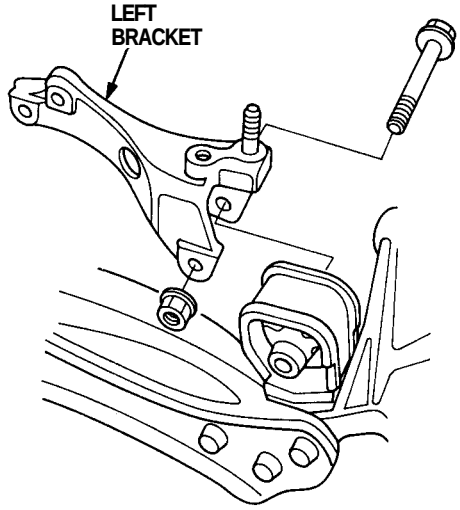
64. Raise the chain hoist to remove all slack from the chain.

65. Check that the engine/transmission is completely free of vacuum hoses, fuel and coolant hoses and electrical wiring.

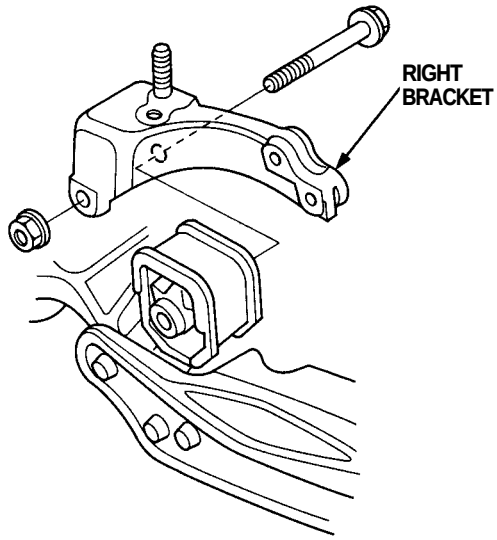
66. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine/transmission.

67. Remove the left and right brackets.

LEFT:



RIGHT:

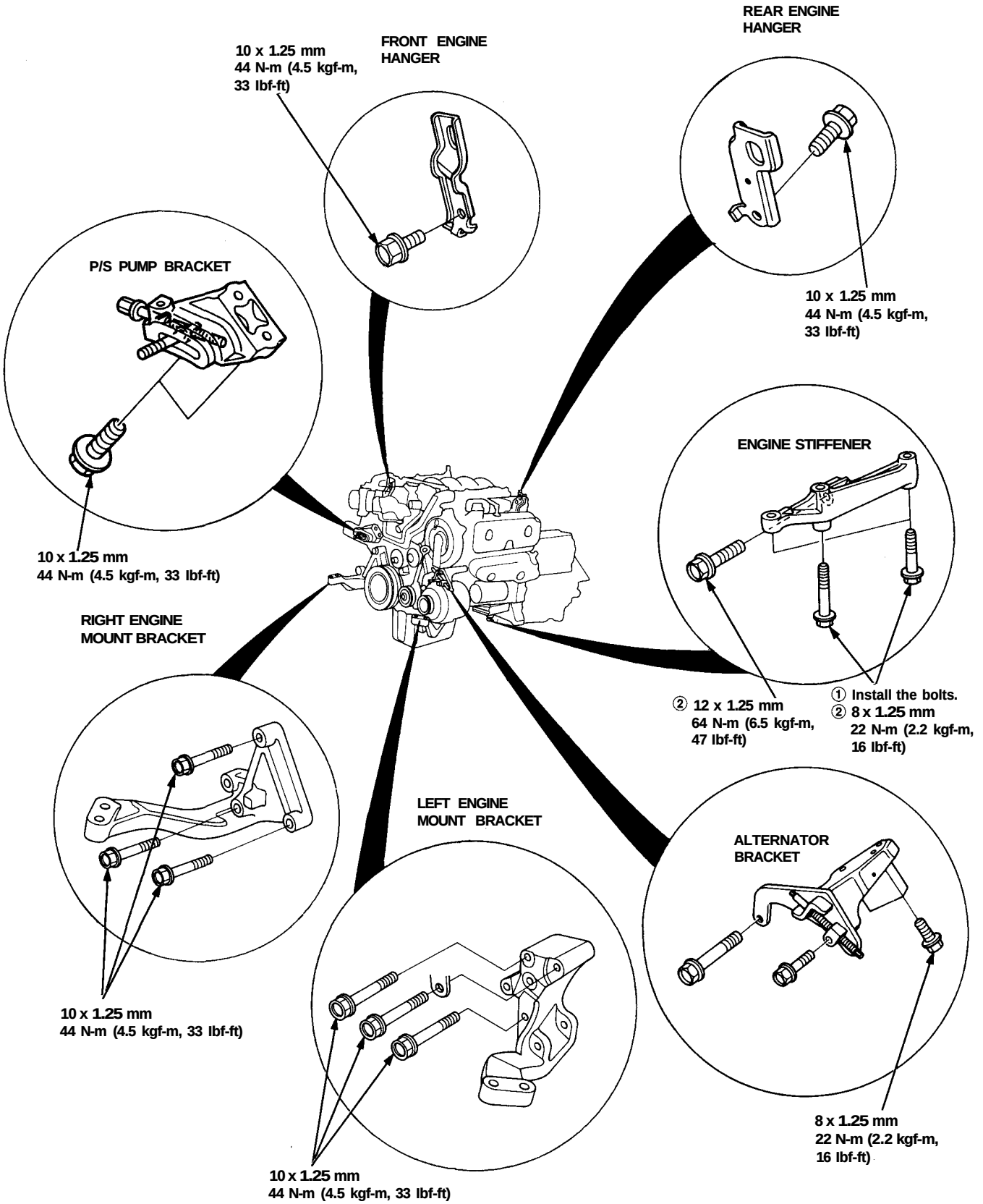


68. Raise the engine all the way and remove it from the vehicle.

Engine Removal/Installation

Installation

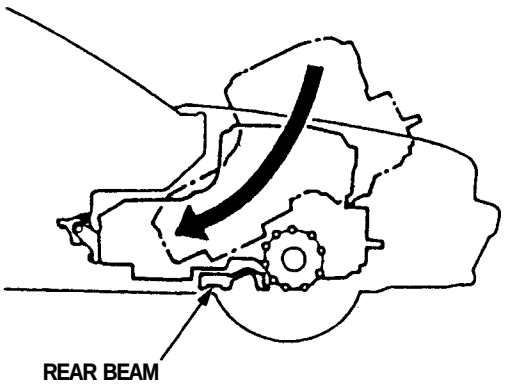
Bracket Bolts Torque Specifications:



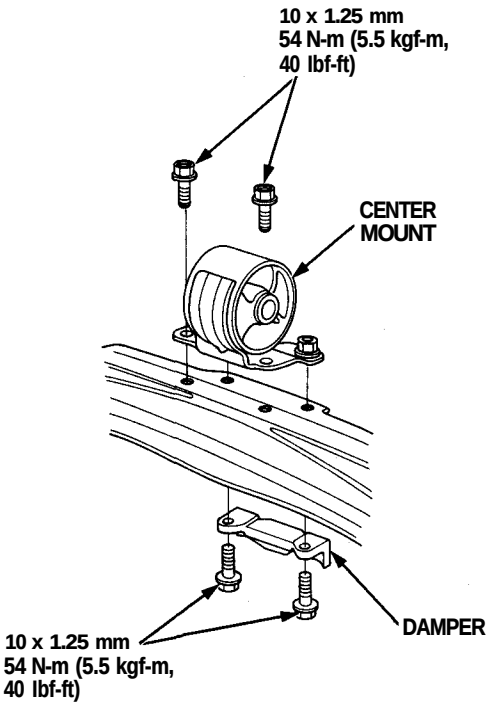
Engine Installation:

Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

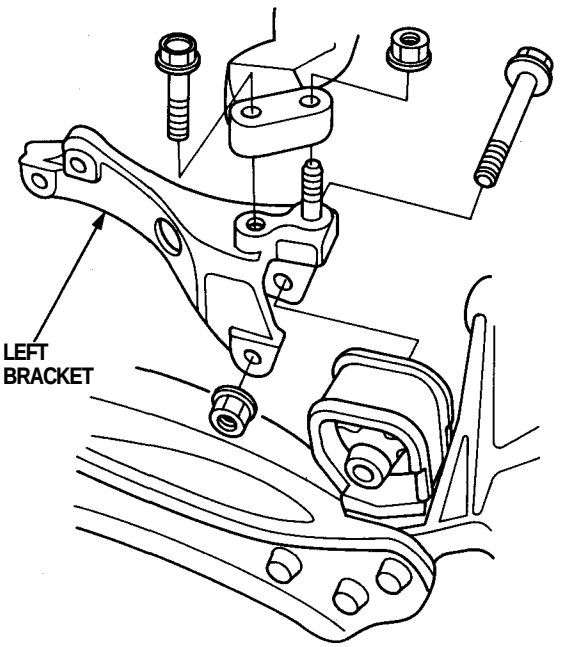
CAUTION: Take care not to damage the rear beam when installing the engine/transmission assembly.



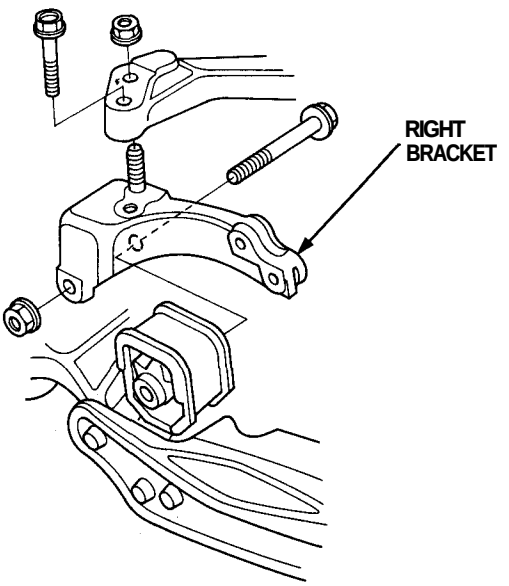
1. Install the center mount, then tighten the bolts.



2. Install the left bracket, then install the bolts/nut.
   - Do not tighten the bolts/nut.



3. Install the right bracket, then install the bolts/nut.
   - Do not tighten the bolts/nut.

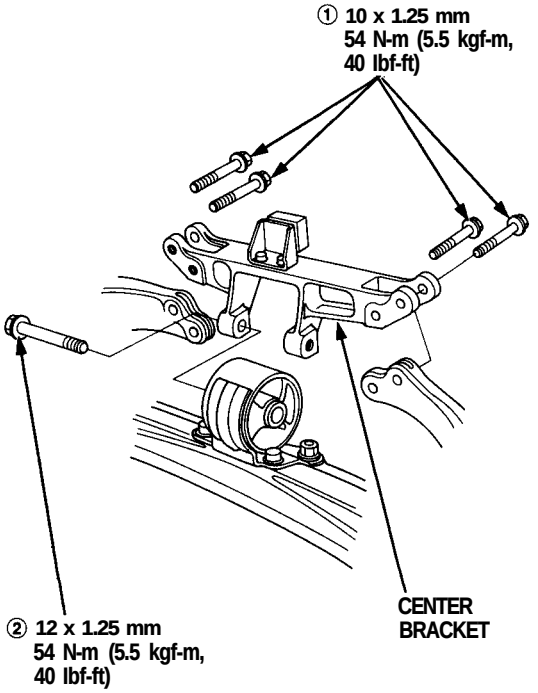


(cont'd)

Engine Removal/Installation

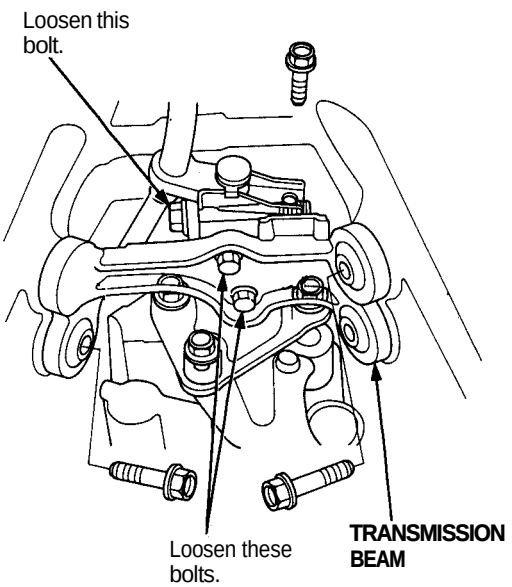
Installation (cont'd)

4. Install the center bracket, then tighten the bolts in the numbered sequence as shown (① – ②).



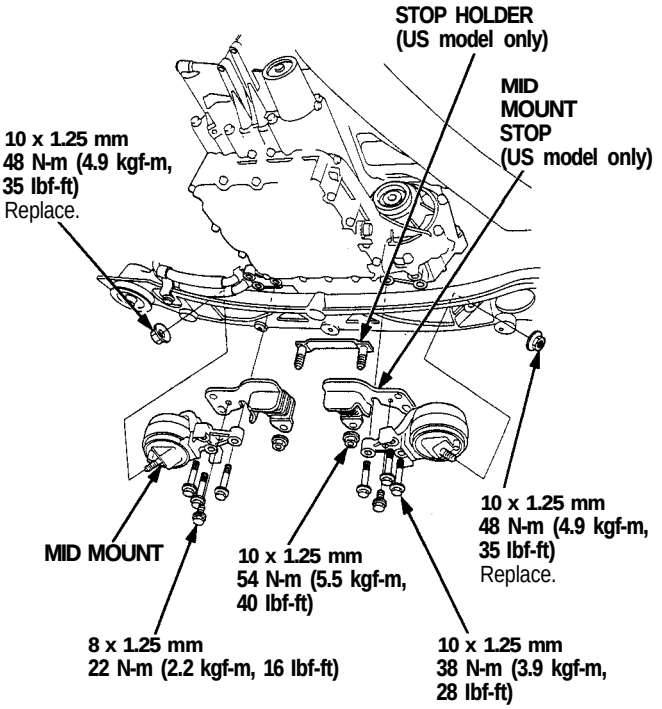
5. Install the transmission beam mounting bolts, then loosen the mount bolts.

NOTE: Do not tighten the transmission beam mounting bolts.

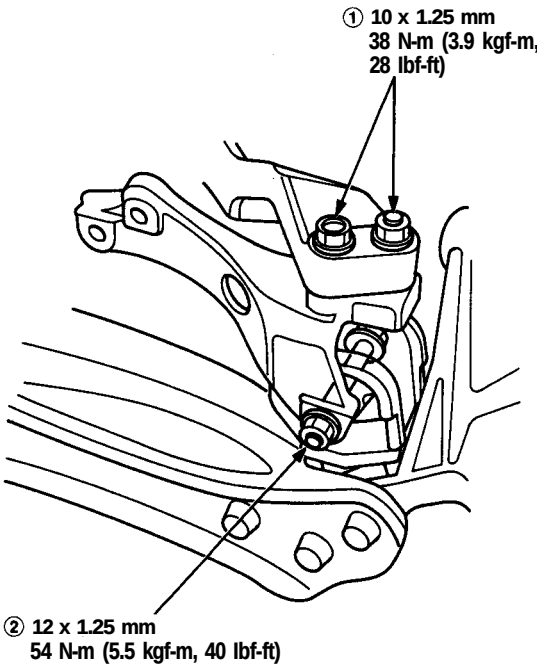


6. Install the mid mounts, then install the mid mount stops on the mid mounts. Tighten the 8 mm bolts loosely, then install the stop holder.

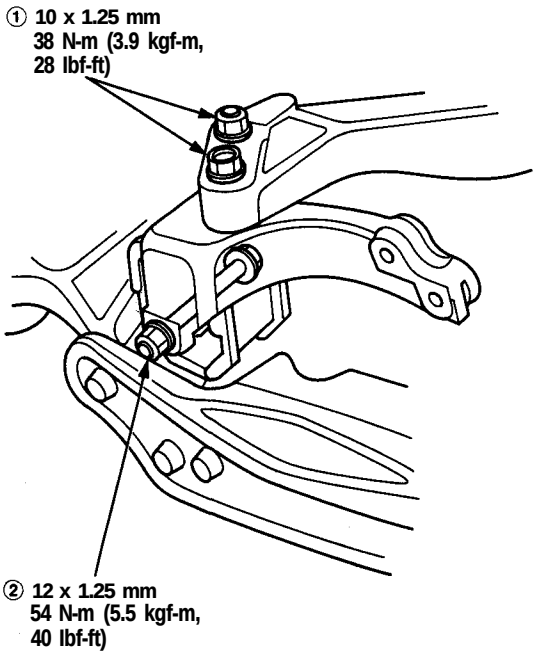
7. Tighten the bolts, then tighten the nuts.



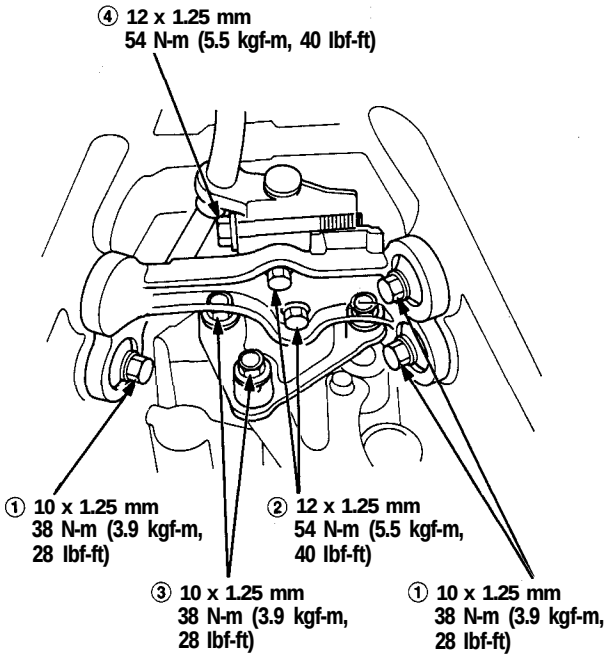
8. Tighten the bolts and nuts on the left bracket in the numbered sequence as shown (① – ②).



9. Tighten the bolts and nuts on the right bracket in the numbered sequence as shown (① – ②).



10. Tighten the bolts on the transmission bracket/ mount and transmission beam in the numbered sequence as shown (① – ④).



11. Do the following checks and adjustments:

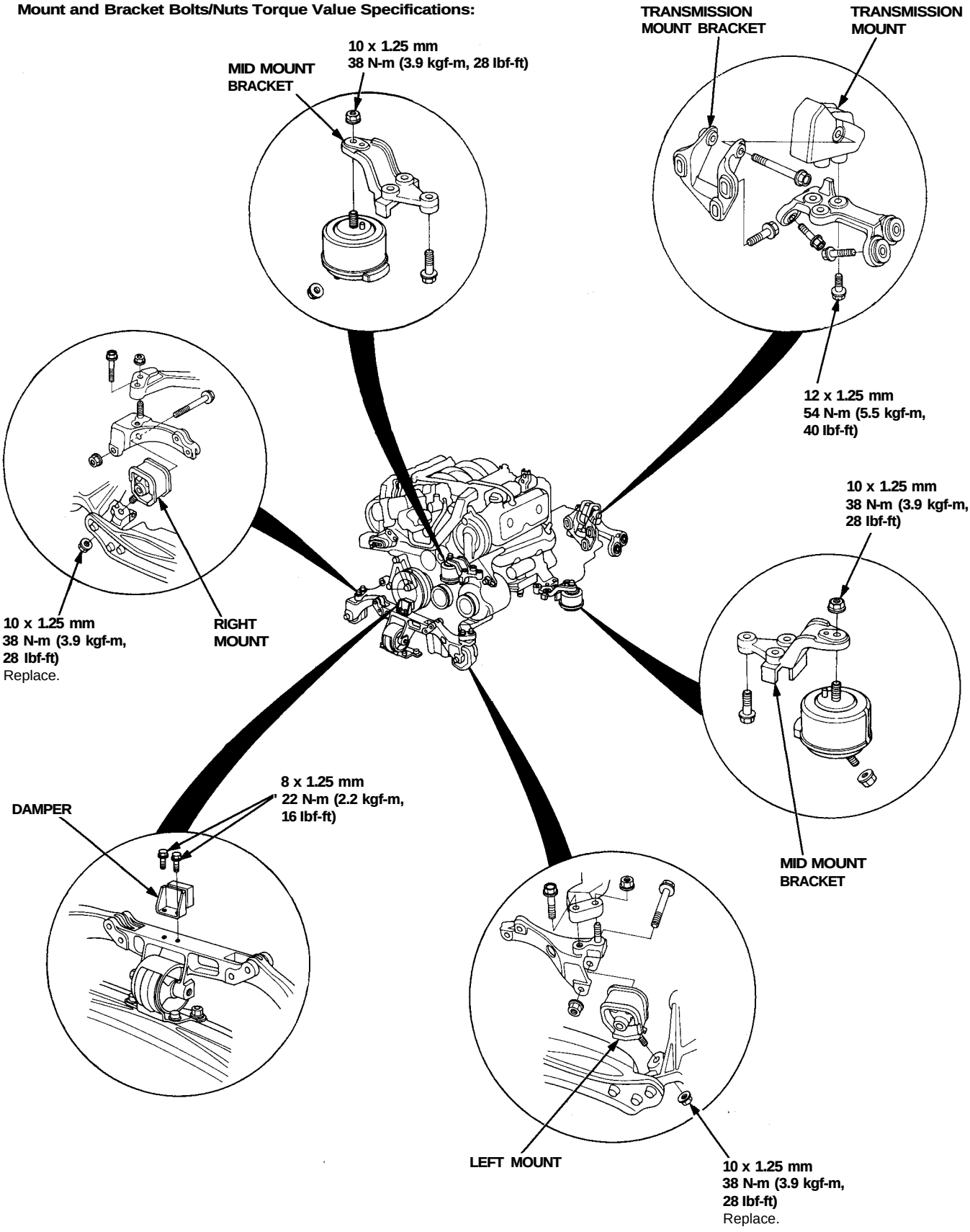
- Check that the spring clips on the ends of the driveshaft and intermediate shaft click into place. **CAUTION: Use new spring clips.**
- Adjust the shift cable (see section 14).
- Adjust the throttle cable (see section 11).
- Adjust the cruise control cable (see section 23).
- Refill the engine with engine oil (see page 8-4).
- Refill the transmission with ATF (see section 14).
- Refill the differential with differential oil (see section 15).
- Refill the radiator with engine coolant (see page 10-5).
- Bleed air from the cooling system at the bleed bolt with the heater valve open (see page 10-5).
- Clean the battery posts and cable terminals with sandpaper, assemble them, then apply grease to prevent corrosion.
- Inspect for fuel leakage (see section 11).
  - After assembling all fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes. Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

(cont'd)

Engine Removal/Installation

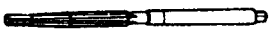
Installation (cont'd)

Mount and Bracket Bolts/Nuts Torque Value Specifications:

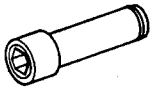


Special Tools

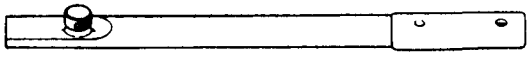
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAH-PJ7010B	Valve Guide Reamer, 5.5 mm	1	6-31
②	07JAA-001020A	Socket, 19 mm	1	6-3
③	07JAB-001020A	Holder Handle	1	6-3
④	07MAB-PY3010A	Holder Attachment, 50 mm Offset	1	6-3
⑤	07742-0010100	Valve Guide Driver, 5.5 mm	1	6-30, 6-31
⑥	07757-PJ1010A	Valve Spring Compressor Attachment	1	6-26



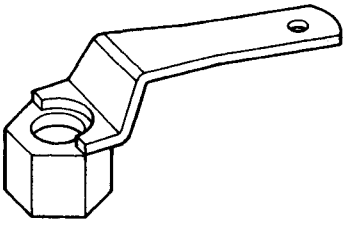
①



②



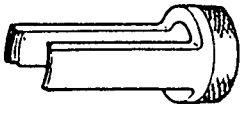
③



④



⑤



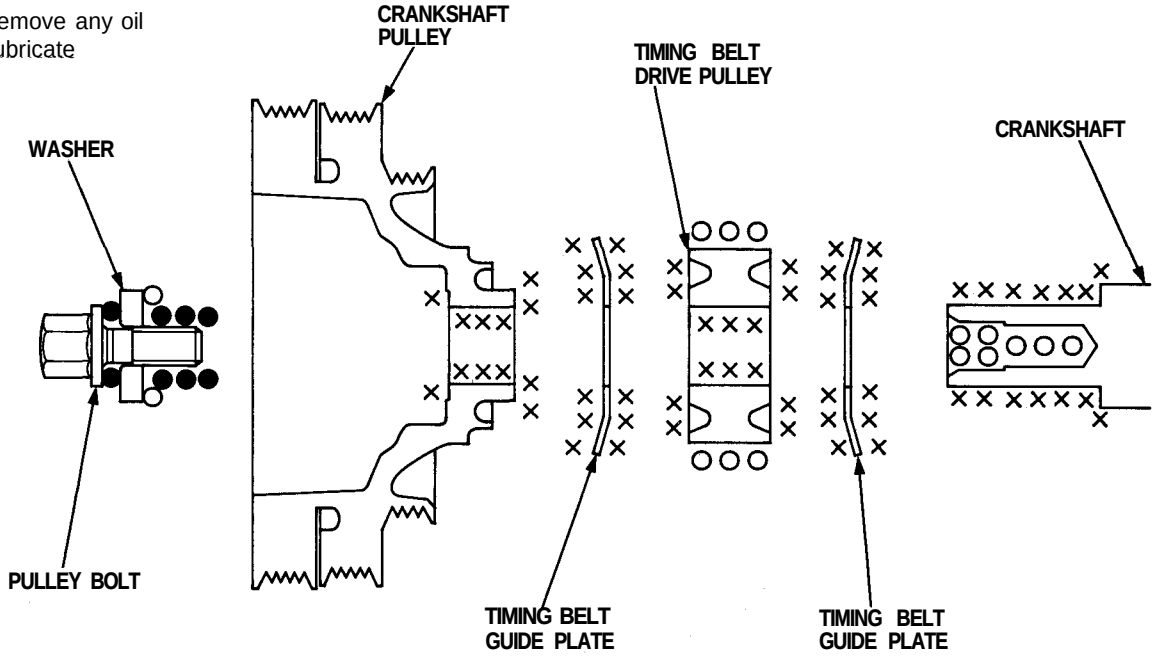
⑥

Crankshaft Pulley and Pulley Bolt

Replacement

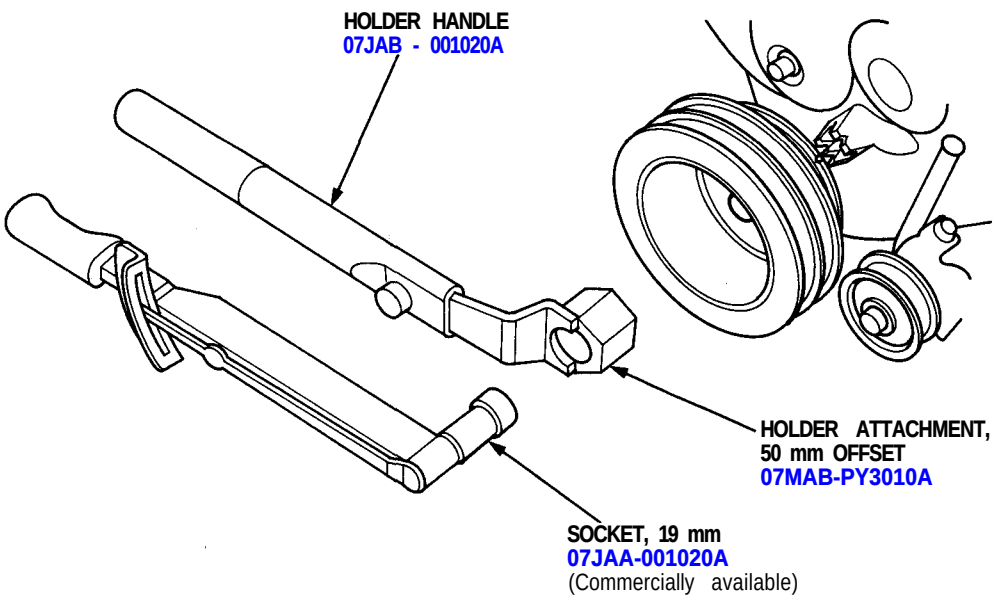
When installing and tightening the pulley, follow the procedure below.

Clean, remove any oil, and lubricate the points shown below.
○ : Clean
× : Remove any oil
● : Lubricate



Crankshaft pulley bolt size and torque value:
16 x 1.5 mm
245 N-m (25.0 kgf-m, 181 lbf-ft)

NOTE:
- Do not use an impact wrench when installing.
- Remove the center bracket before removing the crankshaft pulley (see page 6-5).

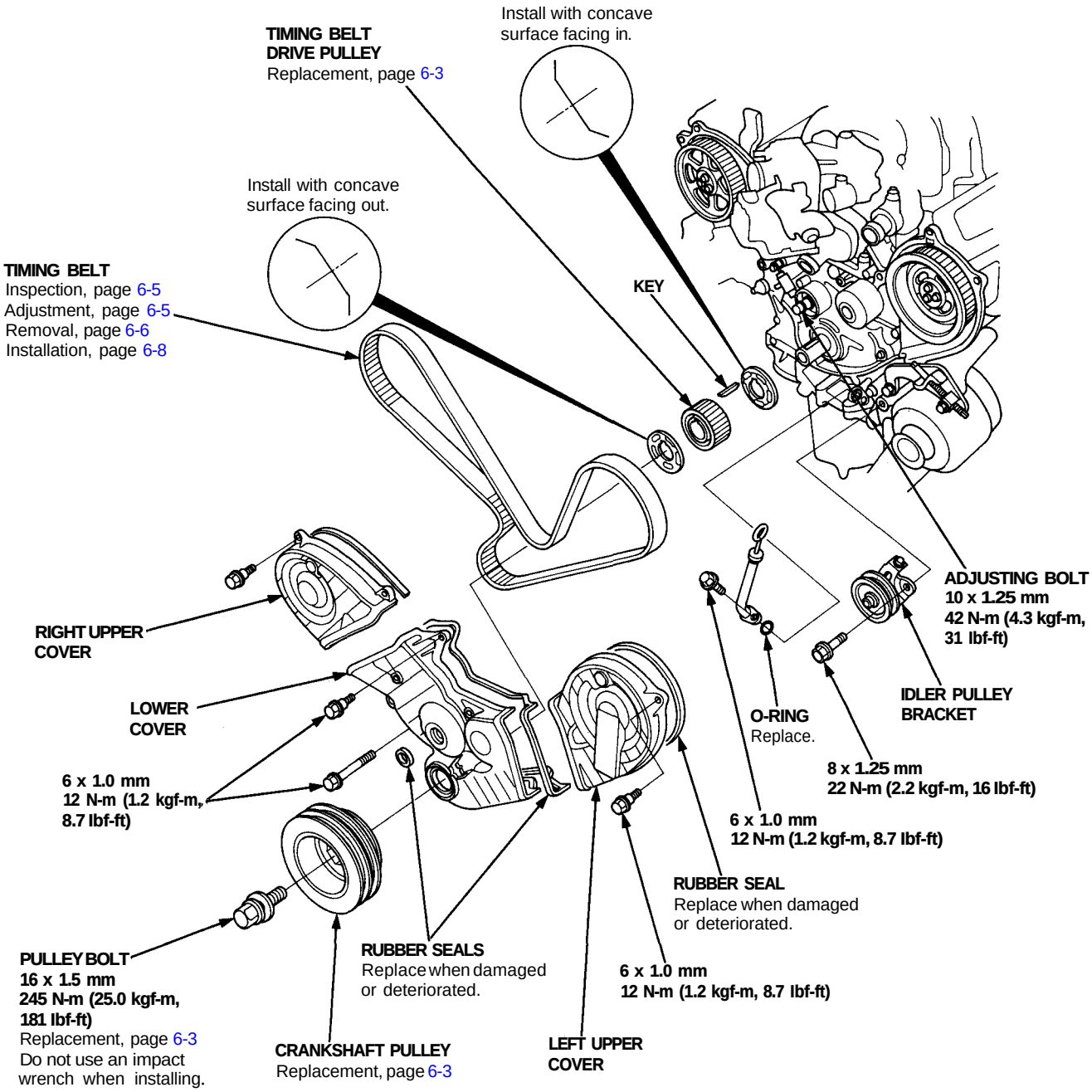


Timing Belt

Illustrated Index

NOTE:

- Refer to page 6-8 for how to position the crankshaft and pulley before installing the belt.
- Mark the direction of rotation on the belt before removing it.
- Do not use the upper covers and lower cover to store removed items.
- Clean the upper covers and lower cover before installing them.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.
- Refer to page 6-3 before installing the timing belt.
- Remove the center bracket before removing the crankshaft pulley (see page 6-5).

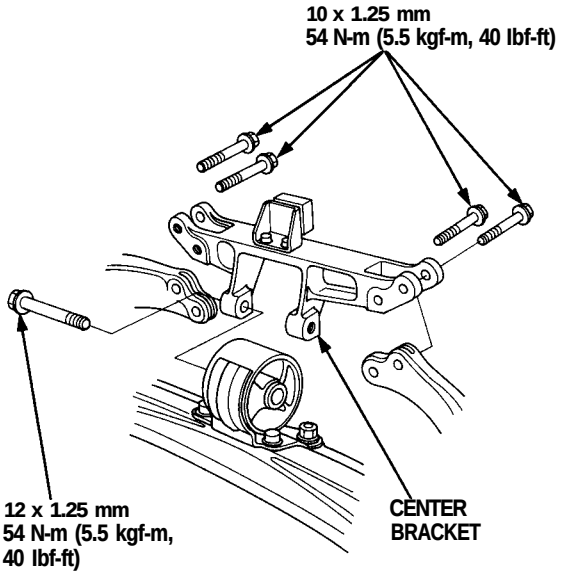


Inspection

1. Remove the left upper cover.

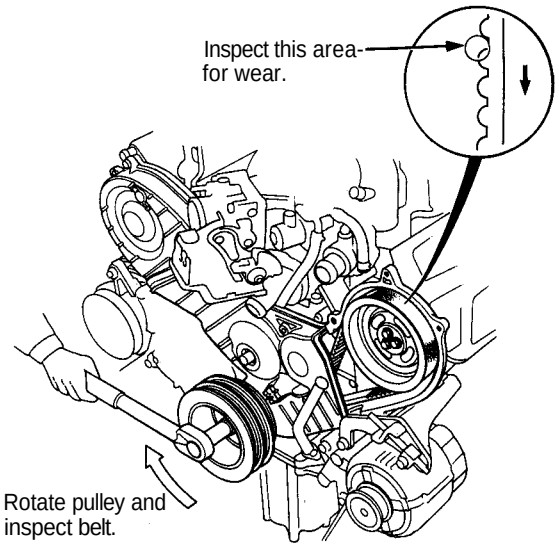
2. Remove the center bracket.

NOTE:
- Support the engine with a jack before removing the center bracket is removed.
- Make sure to place a cushion between the oil pan and the jack.
- Refer to page 5-16 when installing the center bracket.



3. Inspect the timing belt for cracks and oil or coolant soaking.

NOTE:
- Replace the belt if oil or coolant soaked.
- Remove any oil or solvent that gets on the belt.



Tension Adjustment

CAUTION:
- **Always adjust the timing belt tension with the engine cold.**
- **Do not rotate the crankshaft when the adjusting bolt is loose.**

NOTE:
- The tensioner is spring-loaded to apply tension to the belt automatically after making the following adjustment.
- Inspect the timing belt before adjusting the belt tension.
- Always rotate the crankshaft clockwise when viewed from the pulley side. Rotating it counterclockwise may result in improper adjustment of the belt tension.

1. Remove the left upper cover.

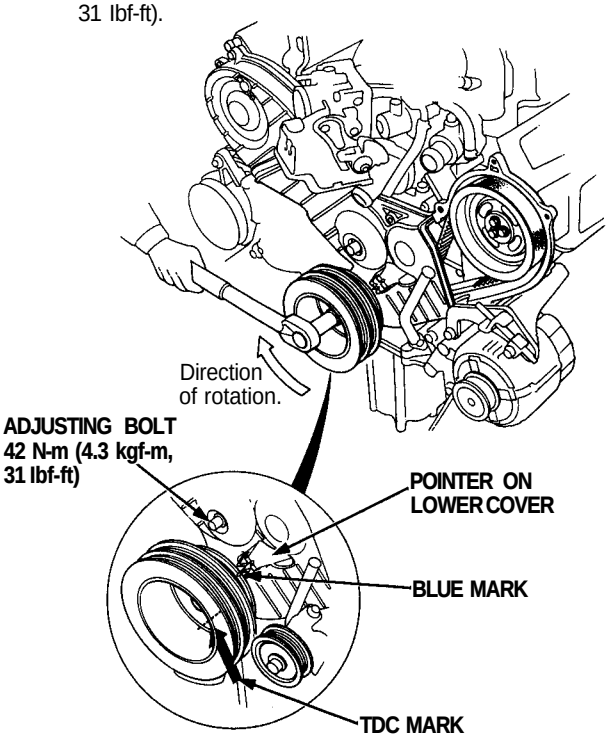
2. Remove the center bracket (As shown in the left column).

3. Set the No. 1 piston at TDC (see page 6-10).

4. Rotate the crankshaft clockwise nine teeth on the camshaft pulley (The blue mark on the crankshaft pulley should line up with the pointer on the lower cover).

5. Loosen the timing belt adjusting bolt 180°.

6. Tighten the adjusting bolt, torque to 42 N-m (4.3 kgf-m, 31 lbf-ft).



Timing Belt

Removal

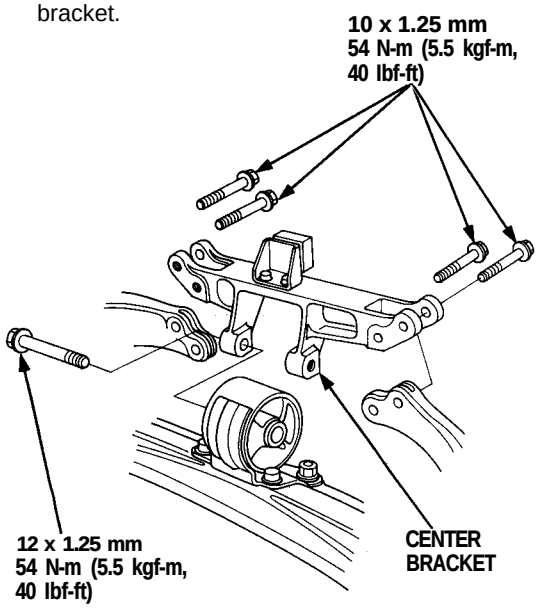
NOTE:
- Replace the timing belt at 105,000 miles (168,000 km) according to the maintenance schedule (normal conditions/severe conditions).
  If the vehicle is regularly driven in one or more of the following conditions, replace the timing belt at 60,000 miles (U.S.A.) 100,000 km (Canada).
  - In very high temperatures (over 110°F, 43°C)
  - In very low temperatures (under -20°F, -29°C)
- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-8).
- Inspect the water pump before installing the timing belt (see page 10-10).

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the negative terminal from the battery.

3. Remove the center bracket.

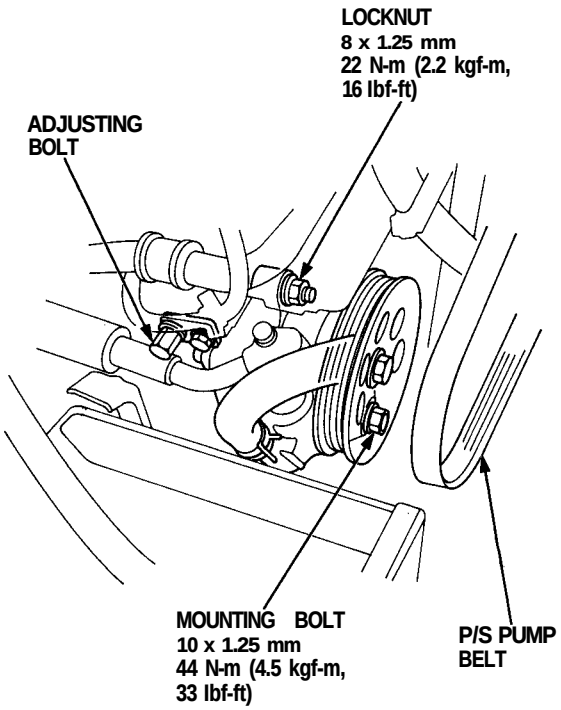
   NOTE:
   - Support the engine with a jack before removing the center bracket is removed.
   - Make sure to place a cushion between the oil pan and the jack.
   - Refer to page 5-16 when installing the center bracket.



4. Loosen the mounting bolt, lock bolt and adjusting rod, then remove the alternator belt (see page 5-7).

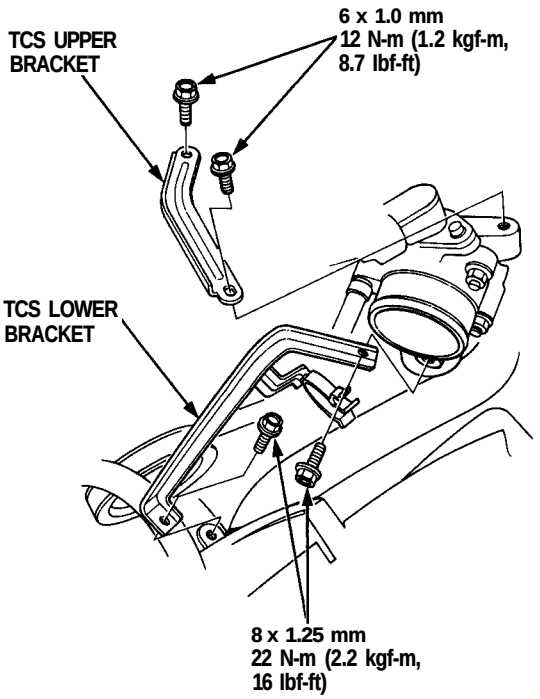
5. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C compressor belt (see page 5-7).

6. Loosen the mounting bolt, locknut and adjusting bolt, then remove the power steering (P/S) pump belt.



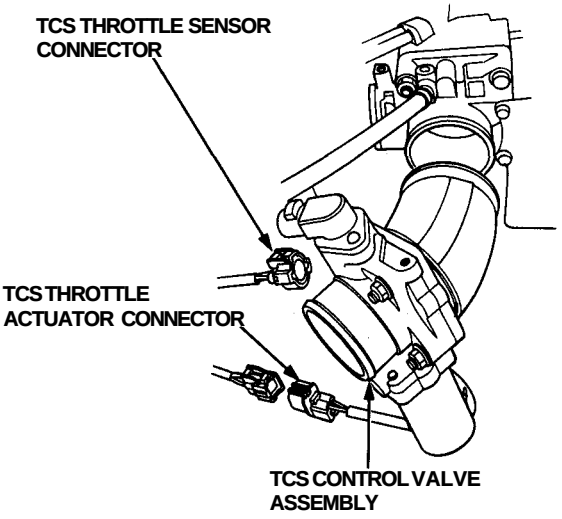
7. Remove the TCS upper and lower brackets.

   NOTE: Refer to section 19 when installing the brackets.

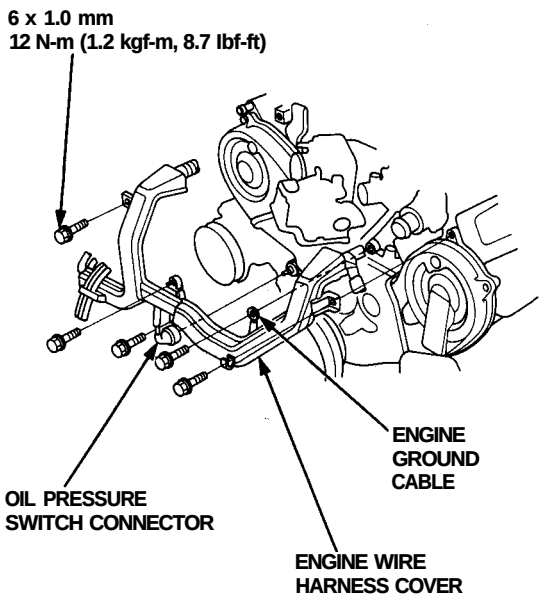


8. Disconnect the TCS throttle sensor connector and TCS throttle actuator connector, then remove the TCS control valve assembly.

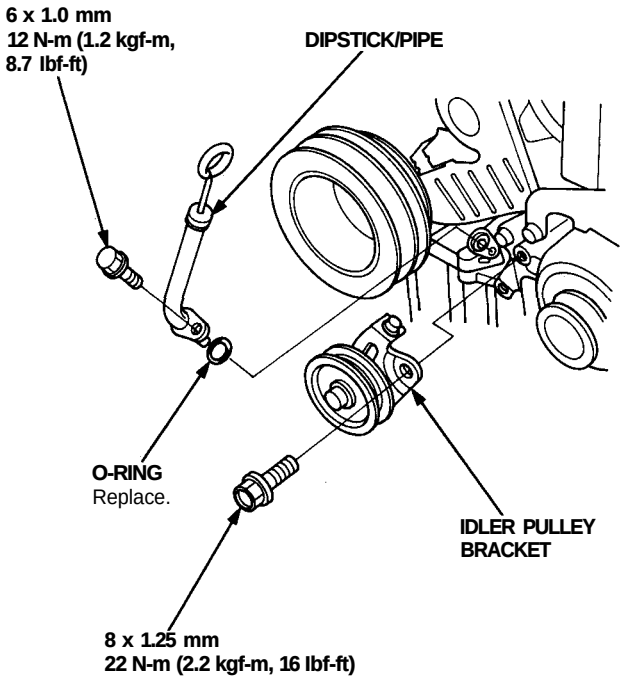
   - Do not disconnect the breather pipe bypass hose.



9. Remove the oil pressure switch connector, engine ground cable and engine wire harness cover.



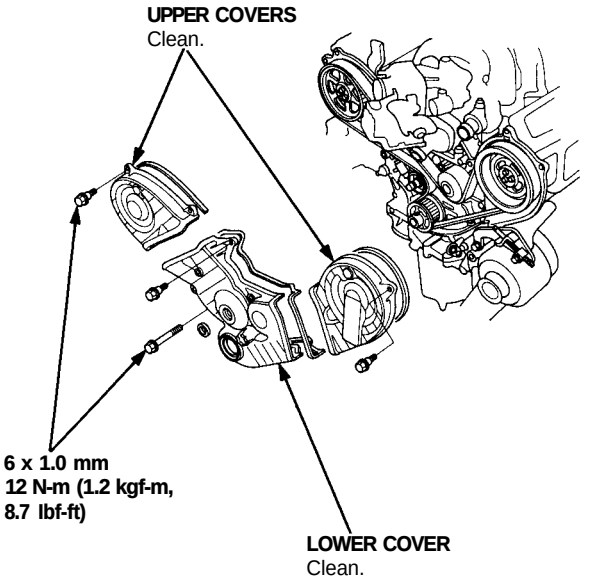
10. Remove the idler pulley bracket, dipstick and pipe.



11. Remove the crankshaft pulley.

12. Remove the upper and lower covers.

    NOTE: Do not use the upper and lower covers to store removed items.

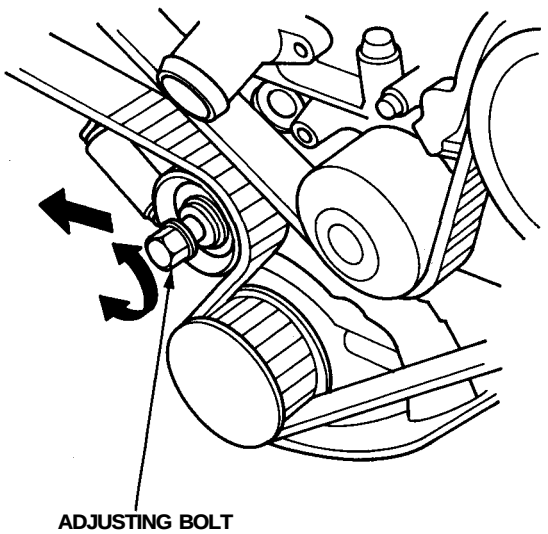


(cont'd)

Timing Belt

Removal (cont'd)

13. Loosen the adjusting bolt 180°. Push the tensioner to remove tension from the timing belt, then retighten the adjusting bolt.



ADJUSTING BOLT
10 x 1.25 mm
42 N-m (4.3 kgf-m, 31 lbf-ft)

14. Remove the timing belt.

Timing Belt

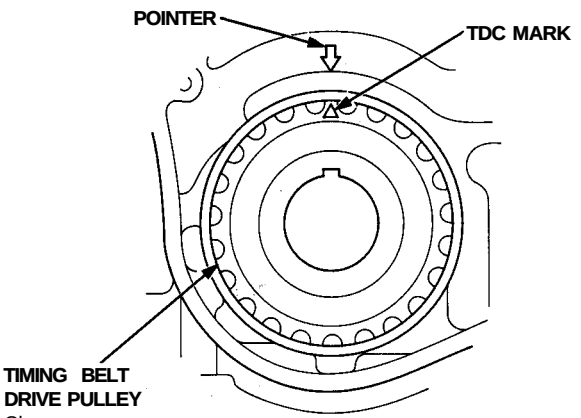
Installation

Install the timing belt in the reverse order of removal; Only key points are described here.

CAUTION: Do not rotate the crankshaft pulley or camshaft pulleys with the timing belt removed. The pistons may hit the valves and cause damage.

1. Remove the spark plugs.

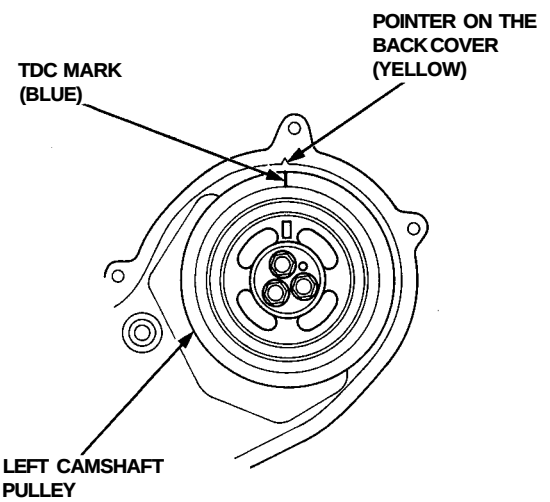
2. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the TDC mark on the tooth of the timing belt drive pulley with the ⇩ pointer on the oil pump.



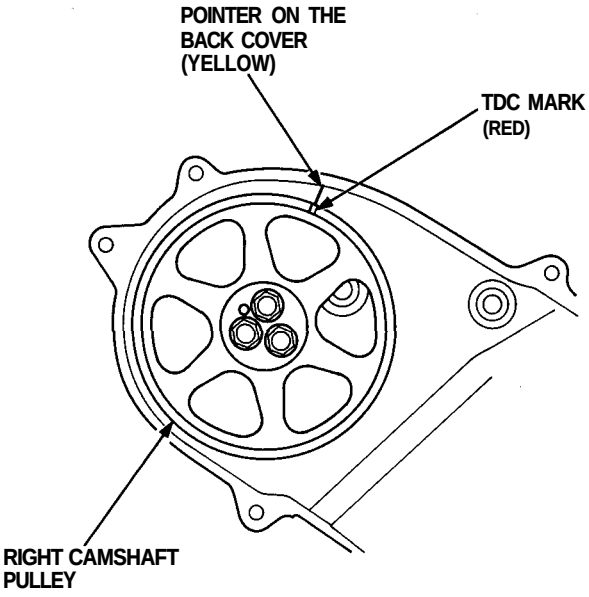
Clean.

3. Set the camshaft pulleys so that the No. 1 piston is at TDC. Align the TDC marks on the camshaft pulleys to the pointers on the back covers.

LEFT:

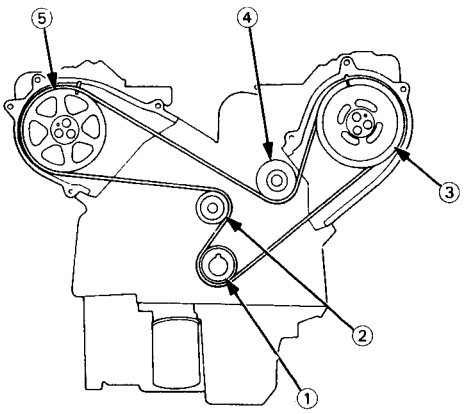


RIGHT:



4. Install the timing belt in the sequence shown.
(1) Timing belt drive pulley (crankshaft) → (2) Adjusting pulley → (3) Left camshaft pulley → (4) Water pump pulley → (5) Right camshaft pulley.

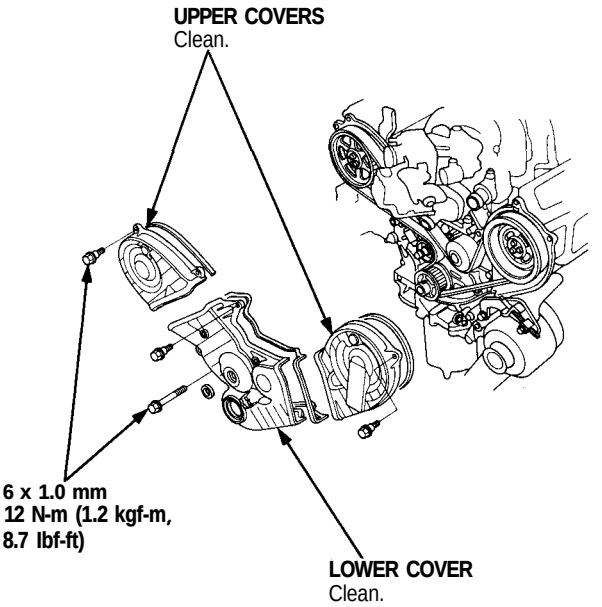
NOTE:
- For easier installation, advance the right camshaft pulley by about a half tooth from the TDC position.
- Make sure the timing belt drive pulley and camshaft pulleys are at TDC.



5. Loosen and retighten the adjusting bolt to tension the timing belt.

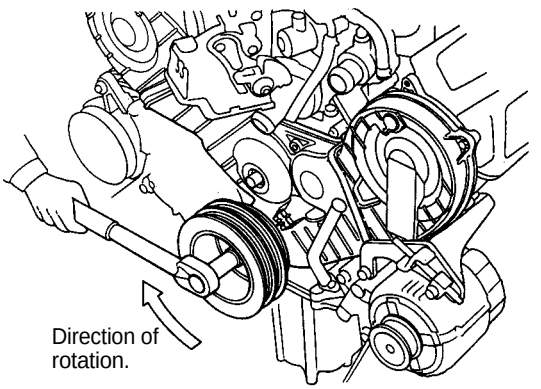
6. Install the upper and lower covers.

NOTE: Clean the upper and lower covers before installation.



7. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-3).

8. Rotate the crankshaft pulley about five or six turns clockwise so that the timing belt positions on the pulleys.



(cont'd)

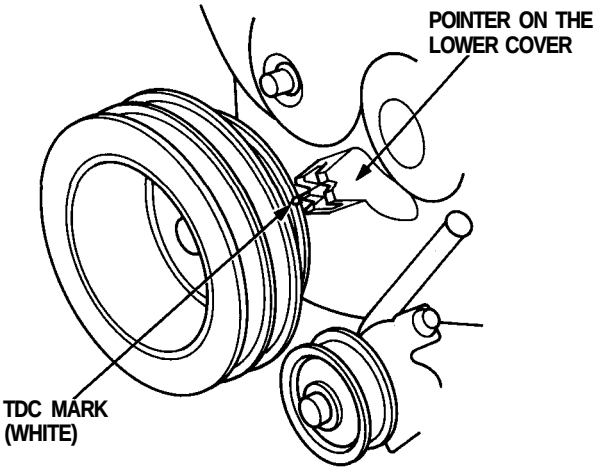
Timing Belt

Installation (cont'd)

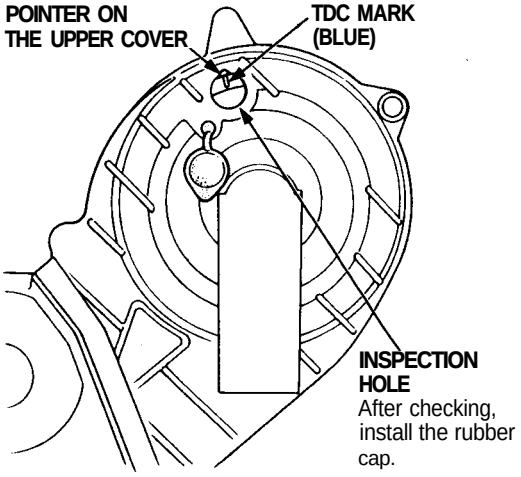
9. Adjust the timing belt tension (see page 6-5).

10. Check that the crankshaft pulley and camshaft pulleys are at TDC.

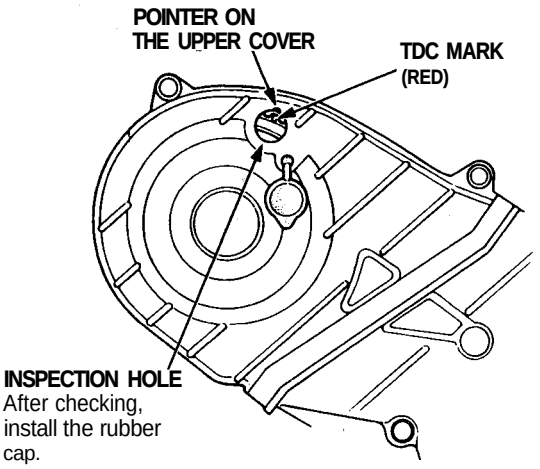
CRANKSHAFT PULLEY:



LEFT CAMSHAFT PULLEY:



RIGHT CAMSHAFT PULLEY:



11. If either camshaft pulley is not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-8, then reinstall the timing belt.

12. After installation, adjust the tension of each belt.

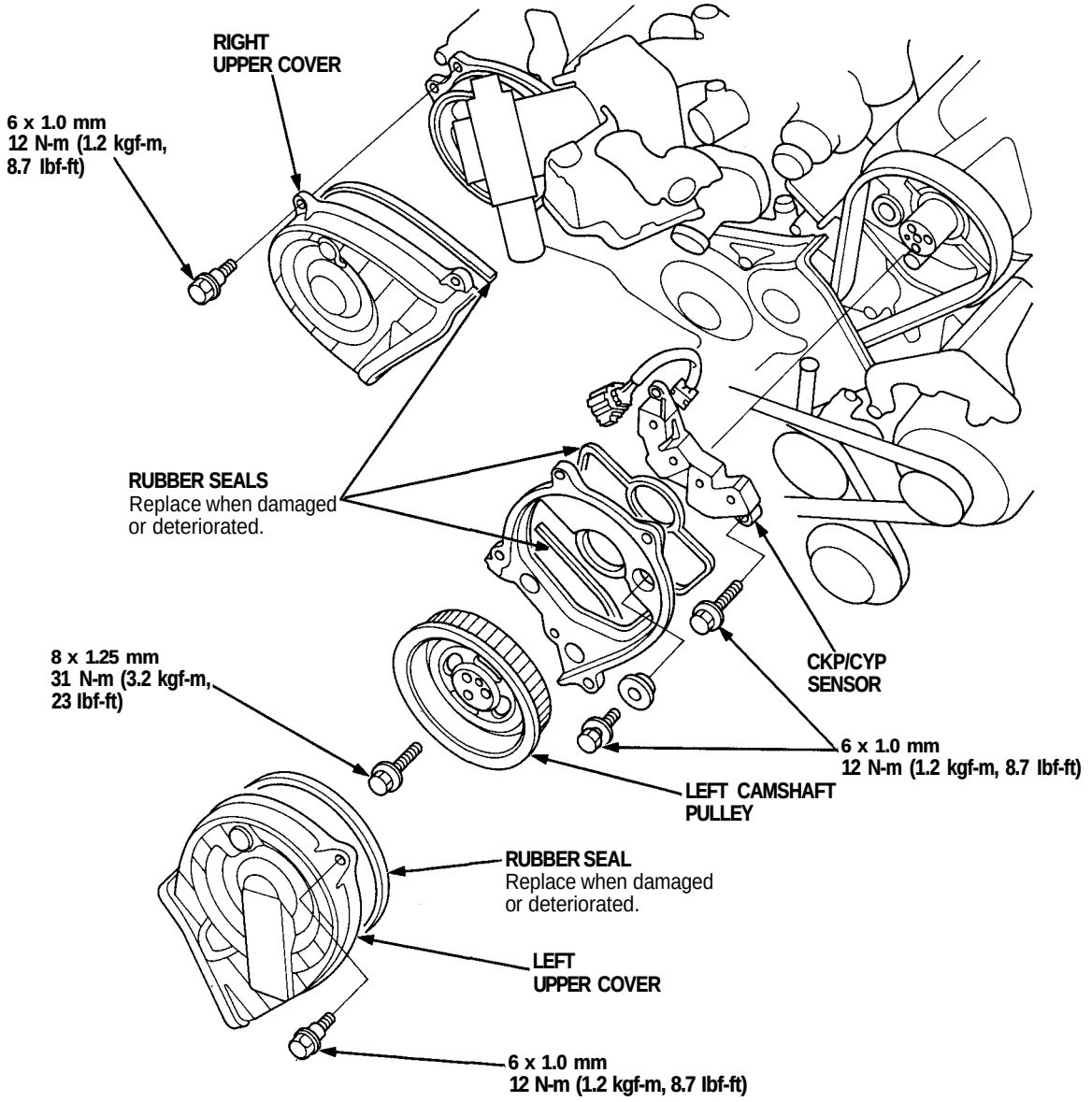
- See section 23 for alternator belt tension adjustment.
- See section 22 for A/C compressor belt tension adjustment.
- See section 17 for P/S pump belt tension adjustment.

13. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

CKP/CYP Sensor

Replacement

1. Remove the center bracket (see page 6-6).
2. Turn the crankshaft so that the No. 1 piston is at top dead center (see page 6-10).
3. Remove the upper covers.
4. Remove the timing belt from the right and left camshaft pulleys (see page 6-6).
5. Remove the left camshaft pulley.
6. Remove the left back cover.
7. Remove the CKP/CYP sensor from the left cylinder head.
8. Install the CKP/CYP sensor in the reverse order of removal;
   - Refer to page 6-8 when installing the timing belt.



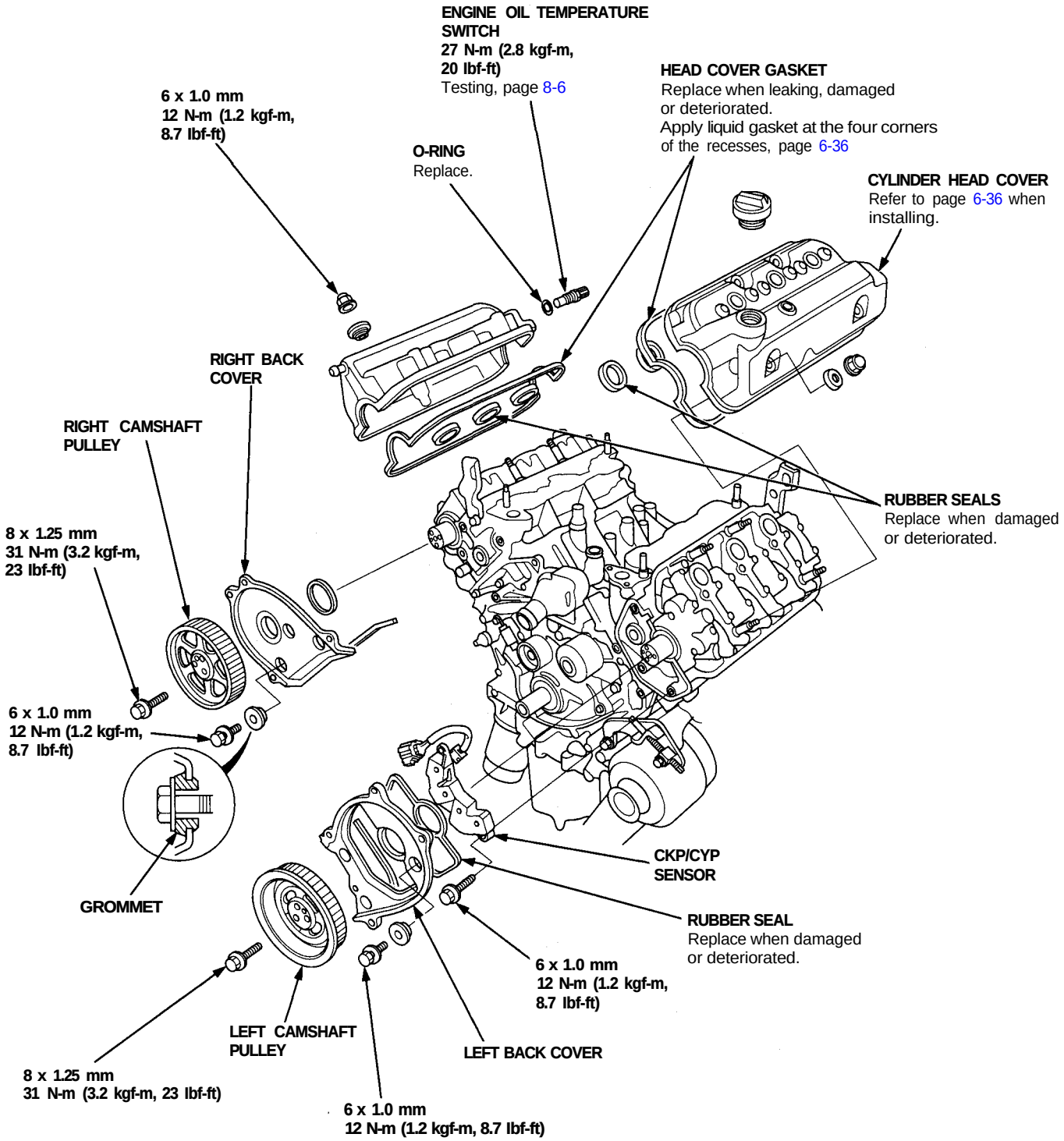
Cylinder Heads

Illustrated Index

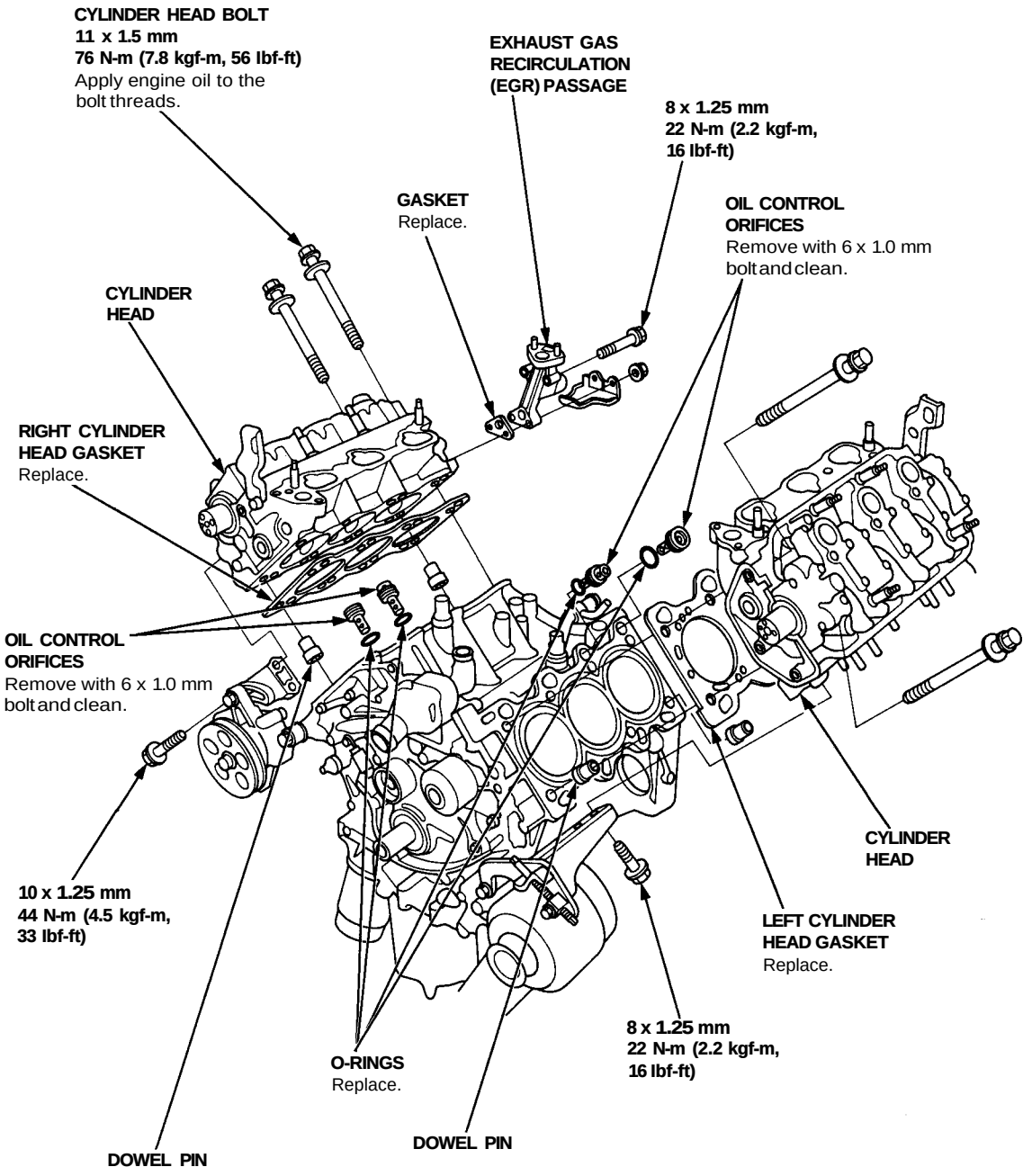
CAUTION:

- **To avoid damage, wait until the engine coolant temperature drops below 100°F (38°C) before removing a cylinder head.**
- **When handling a metal gasket, take care not to fold it or damage the contact surface.**

NOTE: Use new O-rings and gaskets when reassembling.



NOTE: Clean the oil control orifice when installing.



(cont'd)

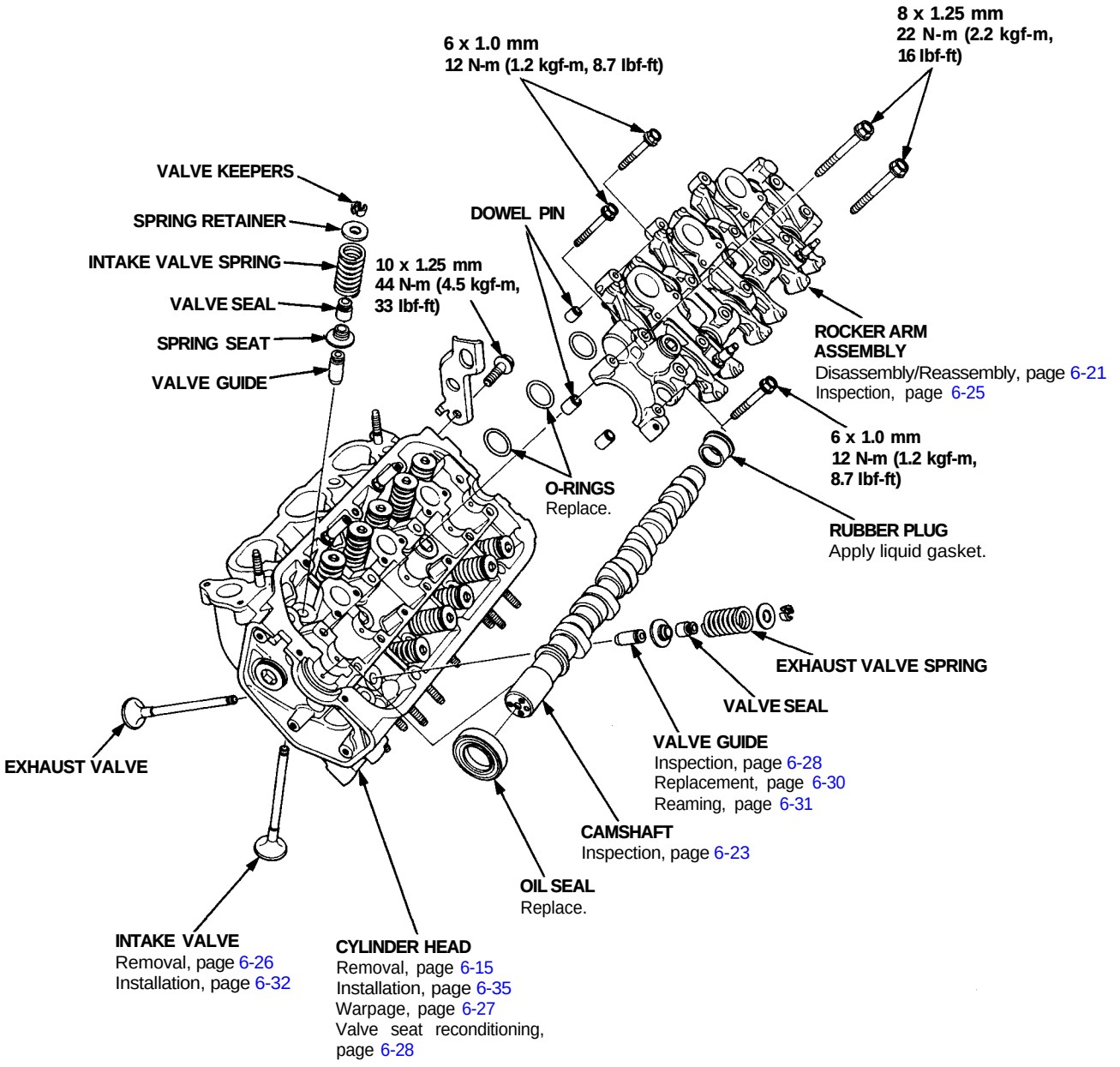
Cylinder Heads

Illustrated Index (cont'd)

NOTE:

- Use new O-rings and gaskets when reassembling.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.

OIL Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



Cylinder Heads

Removal

Engine removal is not required for this procedure.

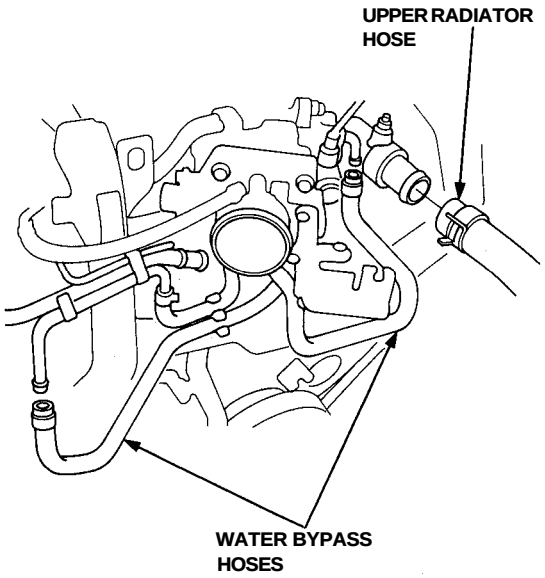
⚠ WARNING Make sure jacks and safety stands are placed properly and hoist brackets are attached the to correct positions on the engine.

CAUTION:
- **Use fender covers to avoid damaging painted surfaces.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the retaining bolts.**

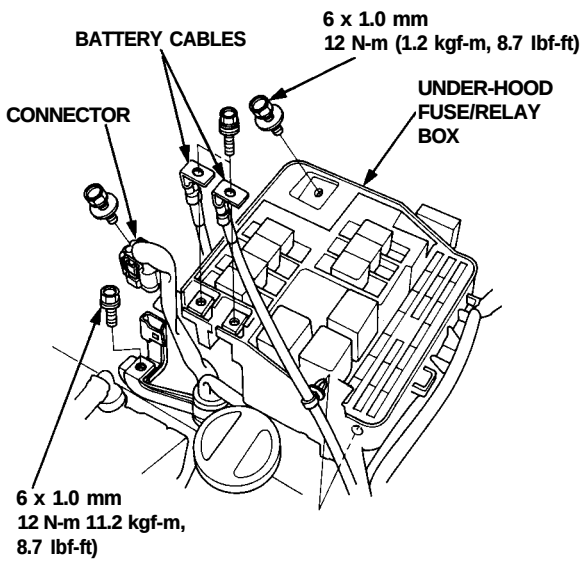
NOTE:
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center (see page 6-10).

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Drain the engine coolant (see page 10-5).
4. Remove the engine cover (see page 5-3).
5. Remove the intake air duct and air cleaner housing assembly (see page 5-3).
6. Remove the throttle cover (see page 5-4).
7. Remove the throttle cable and cruise control cable by loosening the locknuts, then slip the cable ends out of the accelerator linkage (see page 5-4).

   NOTE:
   - Take care not to bend a cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable when installing (see section 11).
   - Adjust the cruise control cable when installing (see section 23).
8. Remove the upper radiator hose and water bypass hoses.



9. Remove the battery and battery base (see page 5-4).
10. Remove the vacuum hoses, then remove the clamp from the under-hood fuse/relay box (see page 5-4).
11. Remove the battery cables from the under-hood fuse/relay box, then remove the under-hood fuse/relay box.
12. Remove the engine wire harness connector.



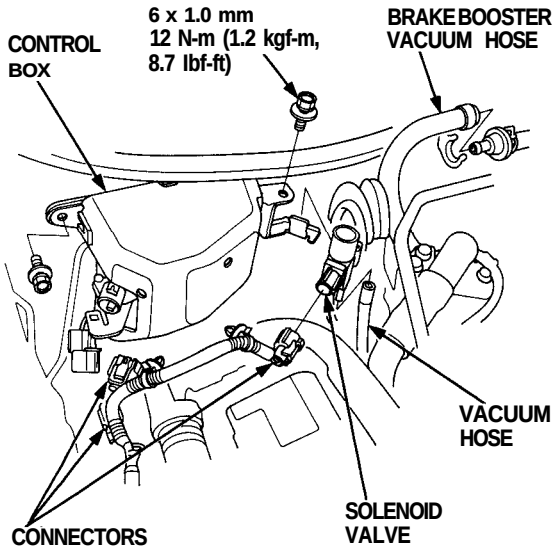
(cont'd)

Cylinder Heads

Removal (cont'd)

13. Disconnect the connectors, then remove the control box, vacuum hose and solenoid valve.

14. Disconnect the brake booster vacuum hose.

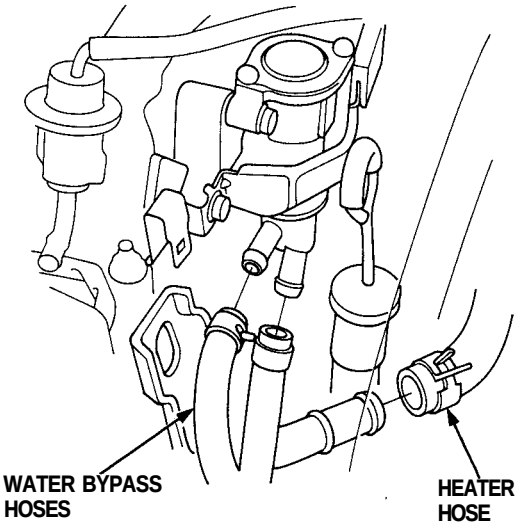


15. Relieve fuel pressure (see section 11).

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame or spark away from the work area. Drain fuel only into an approved container.

16. Remove the fuel feed hose, fuel return hose, vacuum hose and evaporative emission (EVAP) control canister hose (see page 5-6).

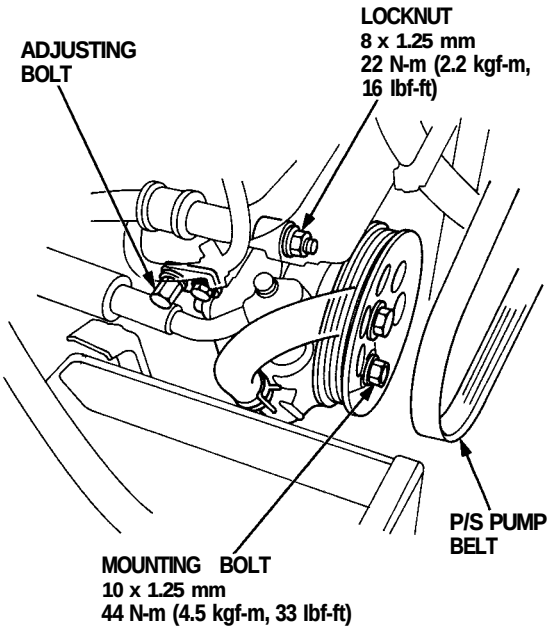
17. Remove the water bypass hoses and heater hose.



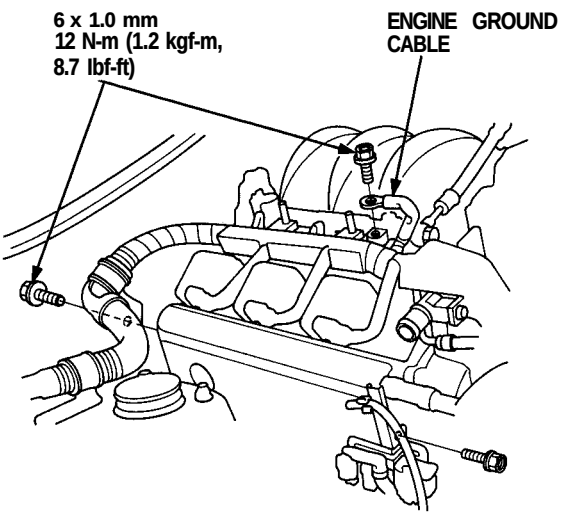
18. Loosen the mounting bolt, lock bolt and adjusting rod, then remove the alternator belt (see page 5-7).

19. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C compressor belt (see page 5-7).

20. Loosen the adjusting bolt, locknut and mounting bolt, then remove the power steering (P/S) pump belt.

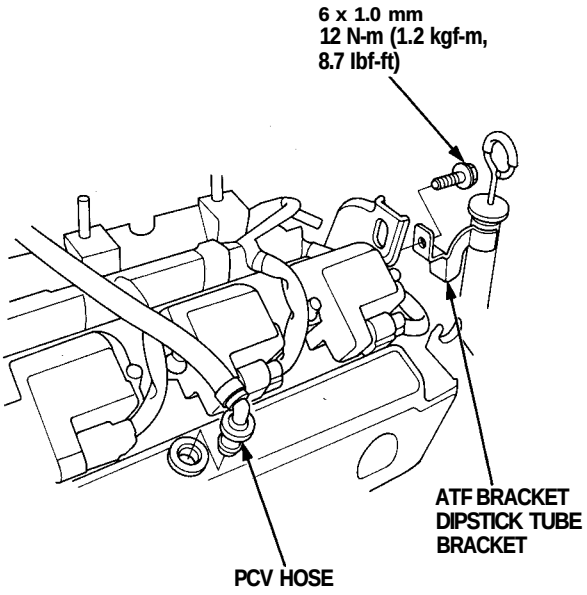


21. Remove the engine ground cable and wire harness clamps.



22. Remove the positive crankcase ventilation (PCV) hose.

23. Remove the bolt securing the automatic transmission fluid (ATF) dipstick tube bracket.

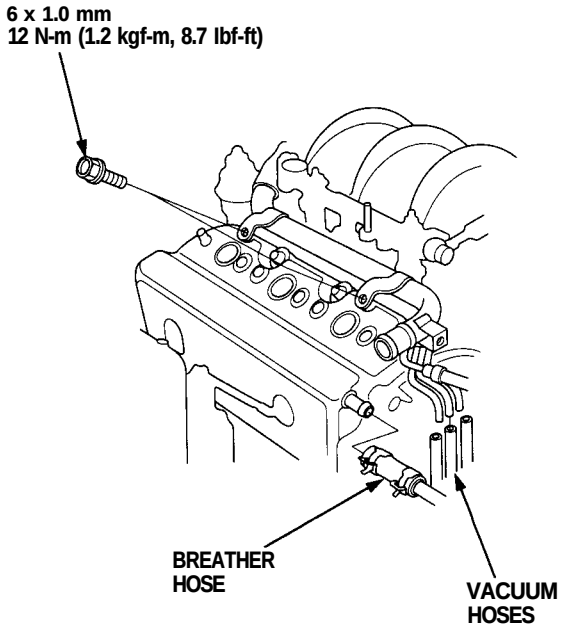


24. Remove the engine wire harness connectors and wire harness clamps from the cylinder heads and intake manifold.

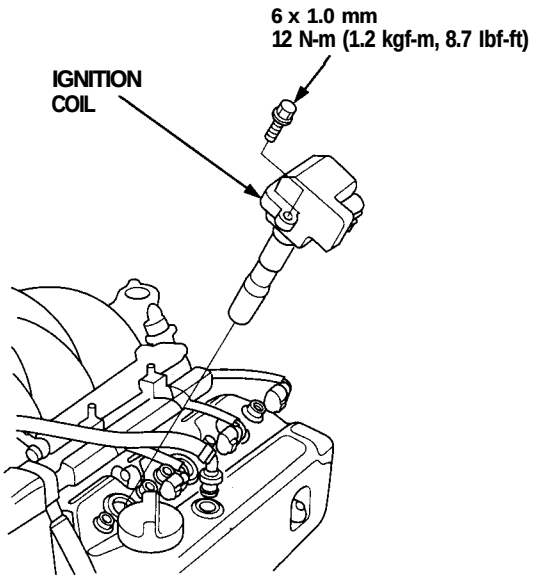
- Six injector connectors
- Six ignition coil connectors
- Throttle position sensor connector
- CKP/CYP sensor connector
- Intake air temperature (IAT) sensor connector
- Exhaust gas recirculation (EGR) valve lift sensor connector
- Idle air control (IAC) valve connector
- Engine coolant temperature (ECT) sensor connector
- ECT gauge sending unit connector
- Engine oil temperature sensor connector
- Left primary heated oxygen sensor (left primary HO2S) connector
- Right primary heated oxygen sensor (right primary HO2S) connector
- Evaporative emission (EVAP) purge control solenoid valve connector ('97 - '98)

25. Remove the inlet pipe mounting bolts from the right cylinder head cover.

26. Remove the vacuum hoses and breather hose.



27. Remove the six ignition coils from the left and right cylinder head covers.



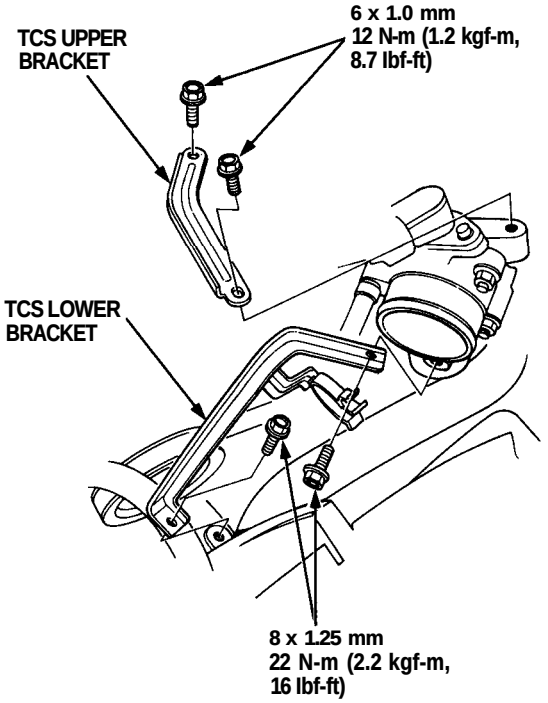
(cont'd)

Cylinder Heads

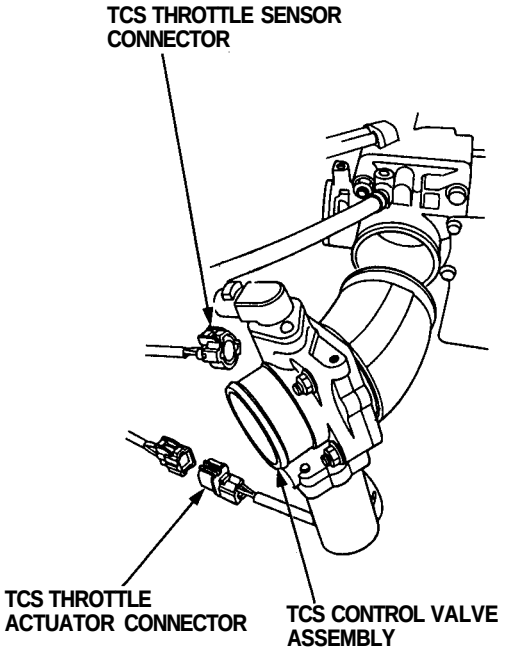
Removal (cont'd)

28. Remove the TCS upper and lower brackets.

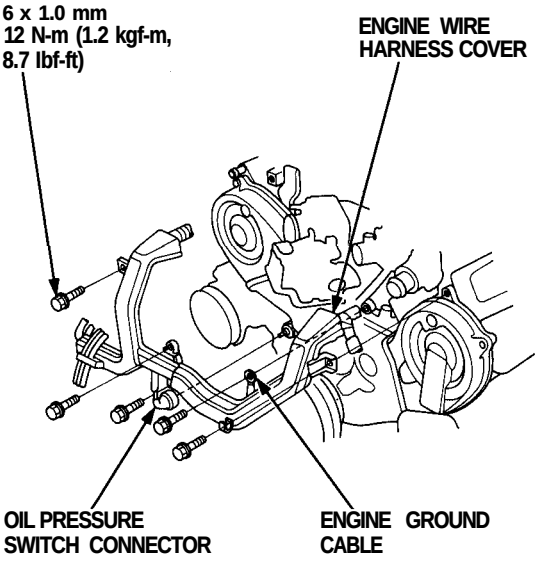
NOTE: Refer to section 19 when installing the brackets.



29. Disconnect the TCS throttle position sensor connector and TCS throttle actuator connector, then remove the TCS control valve assembly.

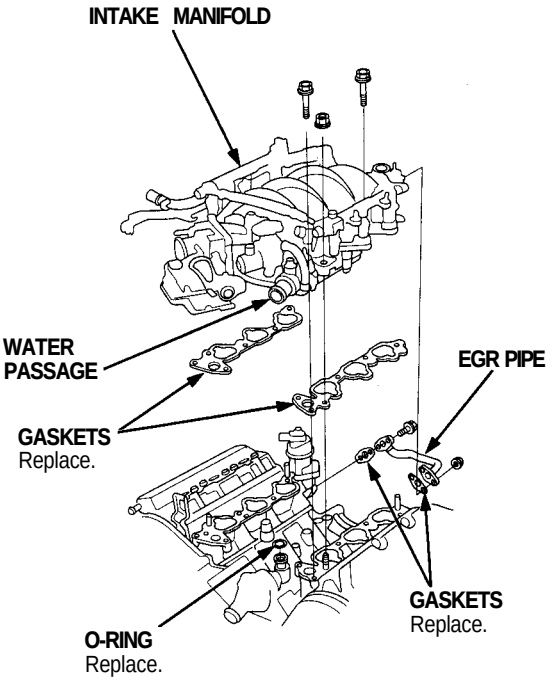


30. Remove the oil pressure switch connector, engine ground cable and engine wire harness cover.



31. Remove the EGR pipe, then remove the intake manifold and water passage.

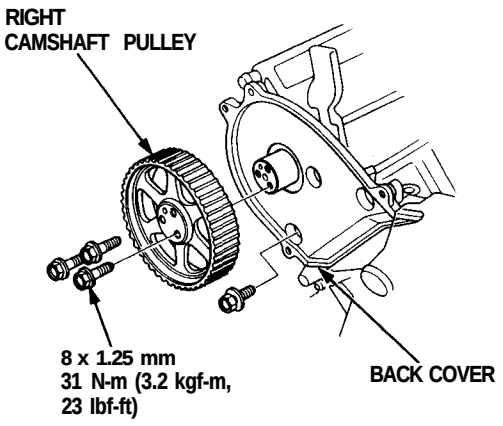
NOTE: Fill the cylinder head intake ports with clean shop towels to prevent foreign materials from getting into the cylinders.

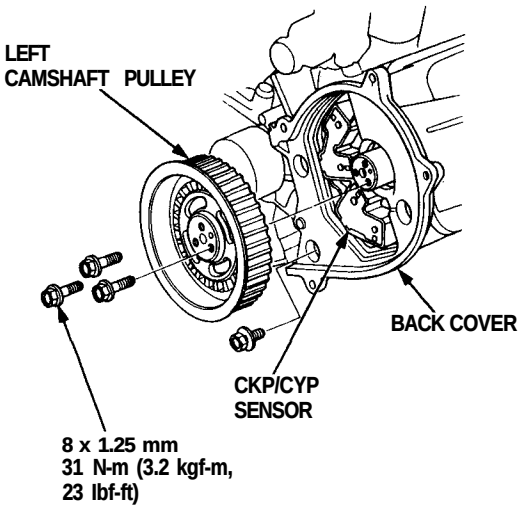


32. Remove the covers, then remove the left and right exhaust manifolds (see page 9-3).

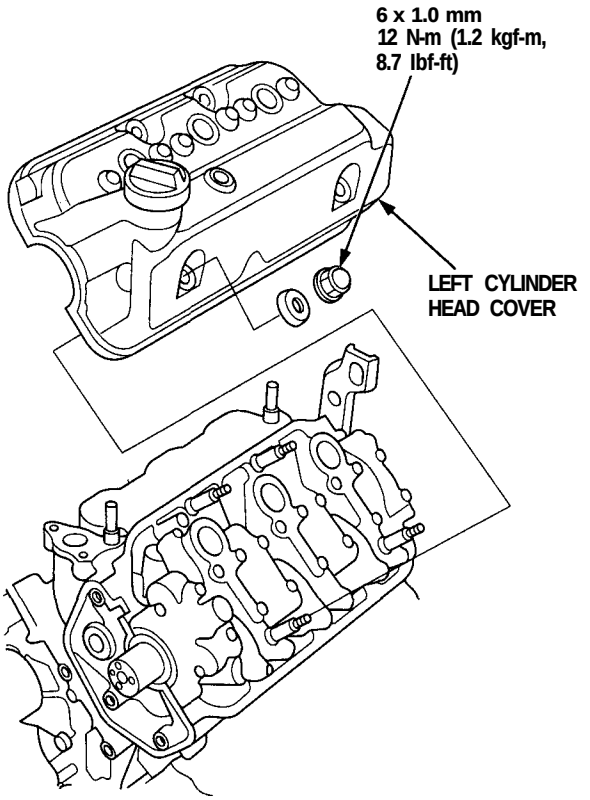
33. Remove the timing belt (see page 6-6).

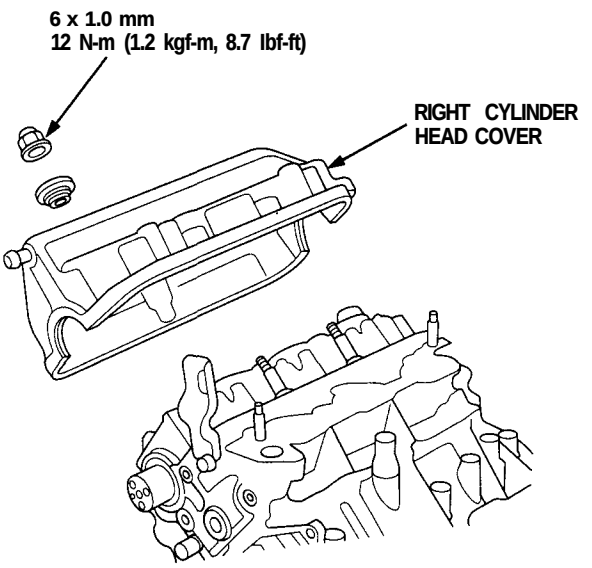
34. Remove the left and right camshaft pulleys, then remove the left and right back covers.





35. Remove the left and right cylinder head covers.



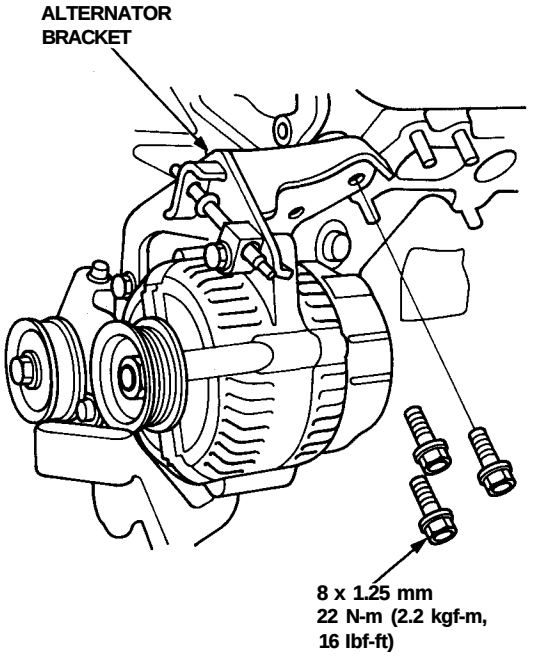


(cont'd)

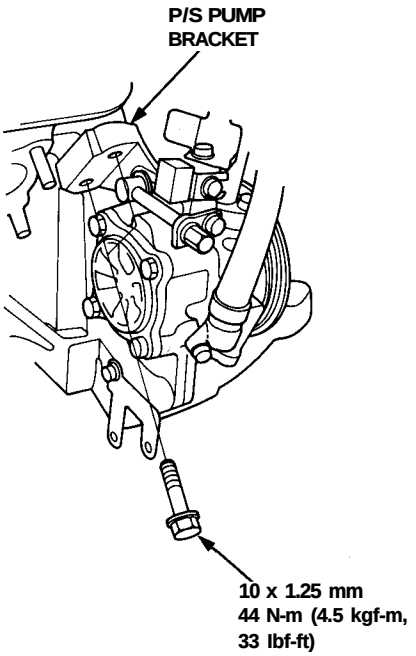
Cylinder Heads

Removal (cont'd)

36. Remove the three bolts securing the alternator bracket.



37. Remove the two bolts securing the P/S pump bracket.

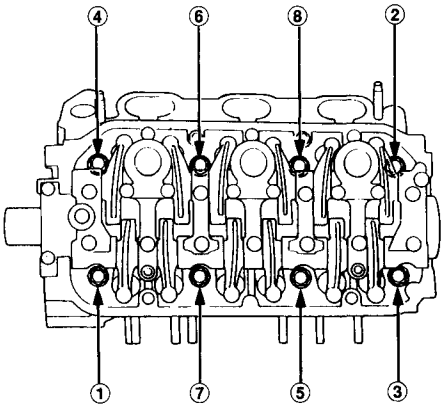


38. Remove the cylinder head bolts, then remove the cylinder heads.

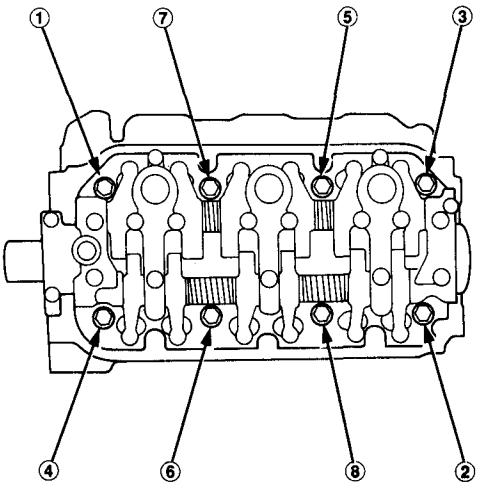
CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loose.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE:

Engine No. 1300001-1309262 (U.S.A.), 1700001-1700751 (Canada):



Engine No. 1309263-, 2300001~, 3300001~ (U.S.A.), 1700752~, 2700001~, 3700001~ (Canada):



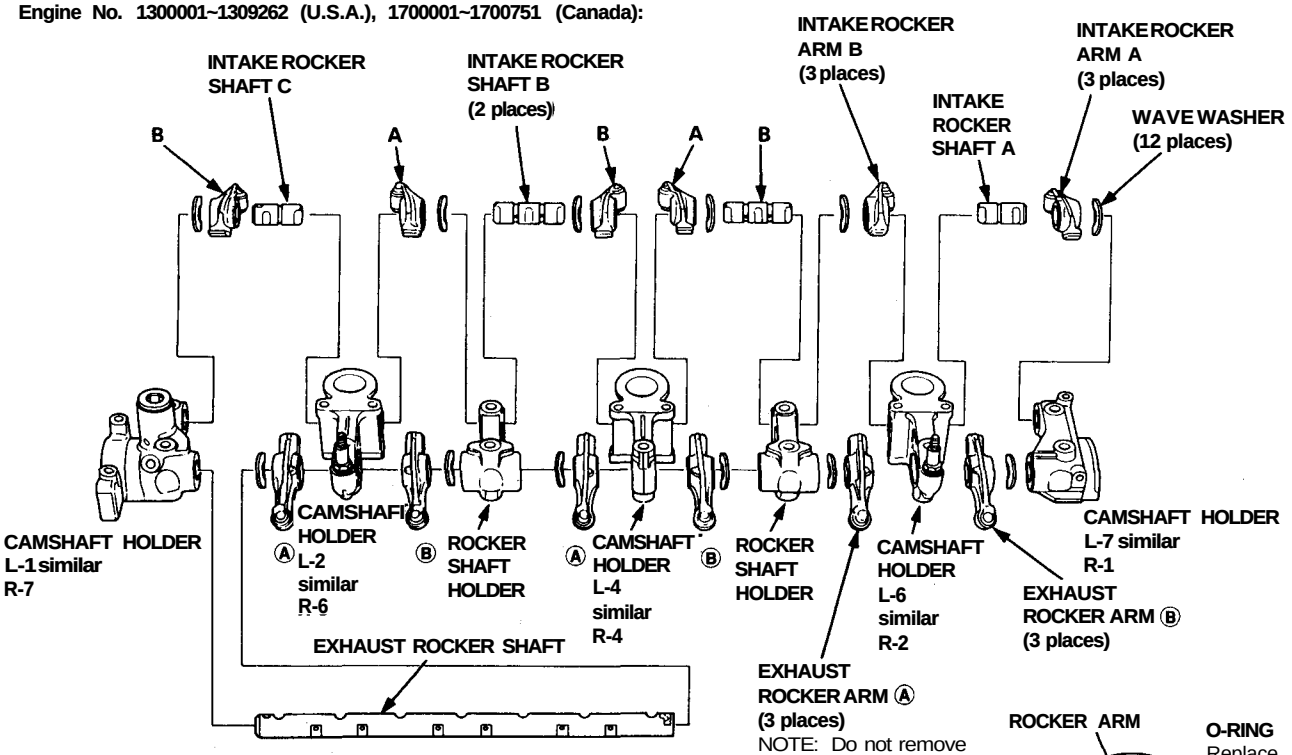
Rocker Arm Assembly

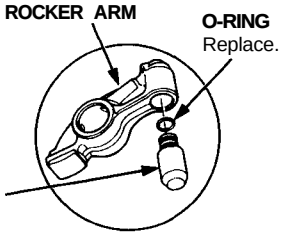
Disassembly/Reassembly

NOTE:

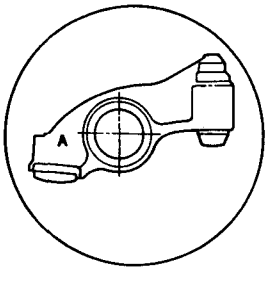
- Refer to page 6-23 for rocker arm assembly removal.
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect the rocker shafts and rocker arms (see page 6-25).
- Rocker arms must be installed in the same position if reused.
- When removing or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.

Engine No. 1300001~1309262 (U.S.A.), 1700001~1700751 (Canada):



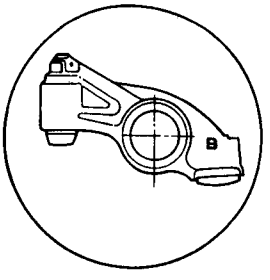


INTAKE ROCKER ARM A



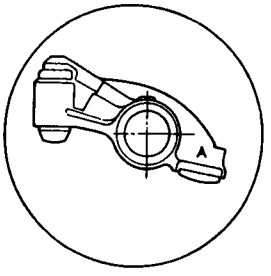
Letter "A" is stamped on rocker arm.

INTAKE ROCKER ARM B



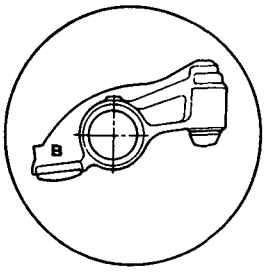
Letter "B" is stamped on rocker arm.

EXHAUST ROCKER ARM A



Letter "A" is stamped on rocker arm.

EXHAUST ROCKER ARM B



Letter "B" is stamped on rocker arm.

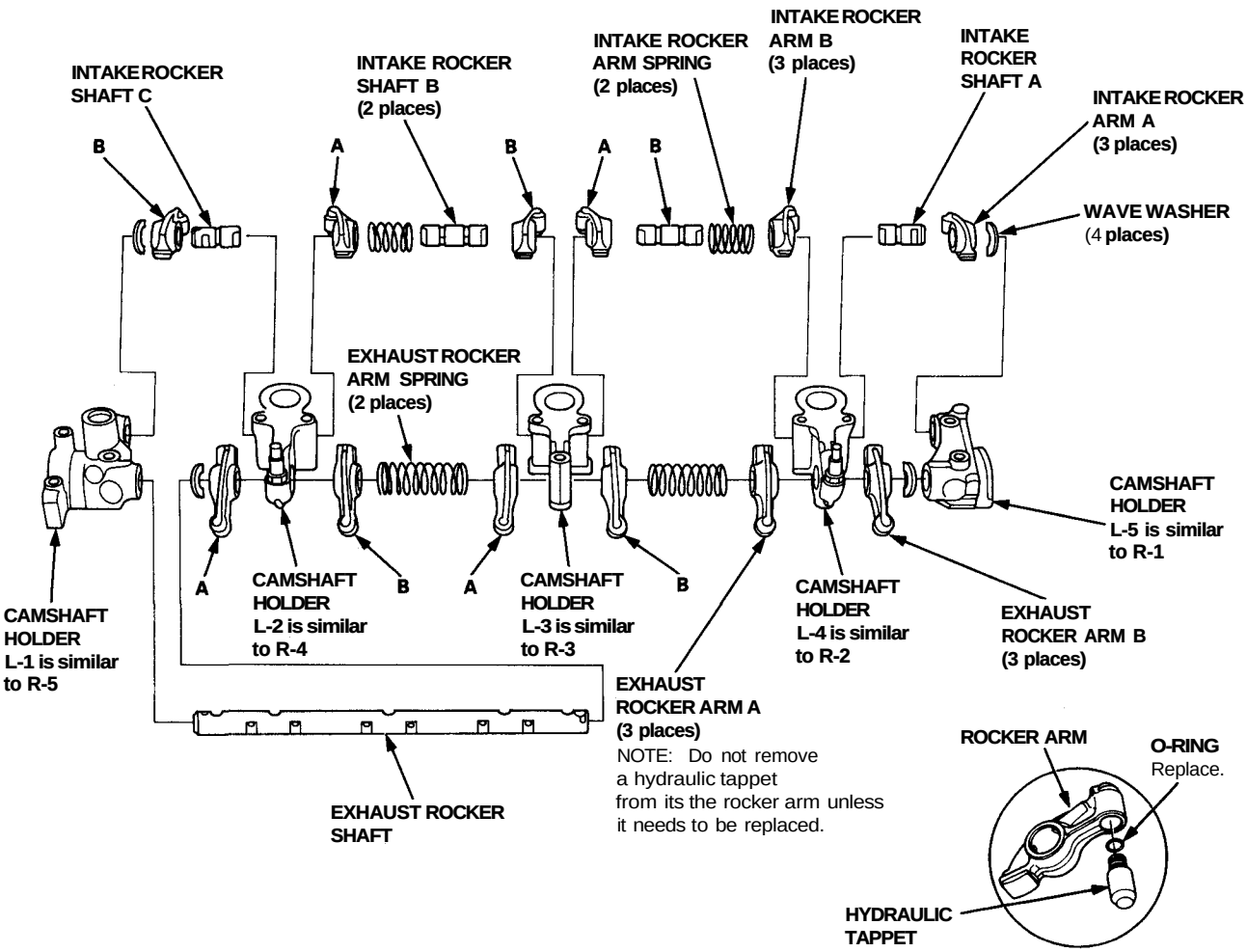
L: Left
R: Right

(cont'd)

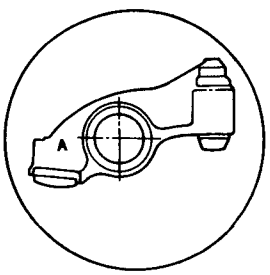
Rocker Arm Assembly

Disassembly/Reassembly (cont'd)

Engine No. 1309263 ~, 2300001 ~, 3300001 ~ (U.S.A.), 1700752 ~, 2700001 ~, 3700001 ~ (Canada):

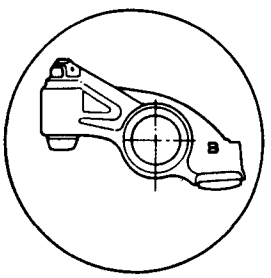


INTAKE ROCKER ARM A



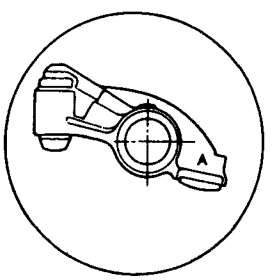
Letter "A" is stamped on rocker arm.

INTAKE ROCKER ARM B



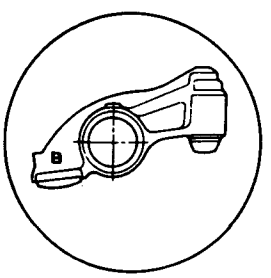
Letter "B" is stamped on rocker arm.

EXHAUST ROCKER ARM A



Letter "A" is stamped on rocker arm.

EXHAUST ROCKER ARM B



Letter "B" is stamped on rocker arm.

L: Left
R: Right

Rocker Arm Assembly

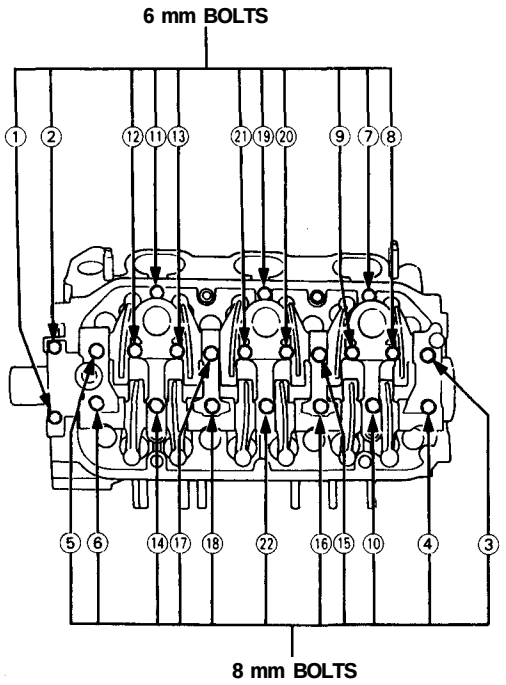
Removal

NOTE:

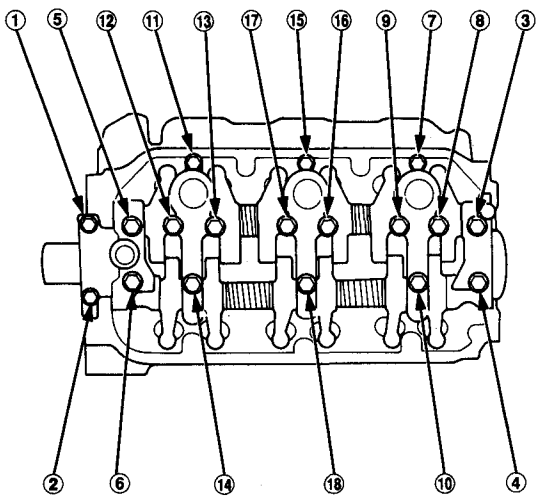
- Unscrew the camshaft holder bolts, two turns at a time in a crisscross pattern, to prevent damaging the valves or rocker arm assembly.
- When removing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the camshaft holders, the springs and the rocker arms on the shafts.

CAMSHAFT HOLDER BOLTS LOOSENING SEQUENCE:

Engine No. 1300001~1309262 (U.S.A.), 1700001~1700751 (Canada):



Engine No. 1309263~, 2300001~, 3300001~ (U.S.A.), 1700752~, 2700001~, 3700001~ (Canada):
8 mm bolts: ③, ④, ⑤, ⑥, ⑩, ⑭, ⑱



NOTE: Refer to page 6-33 when installing.

(cont'd)

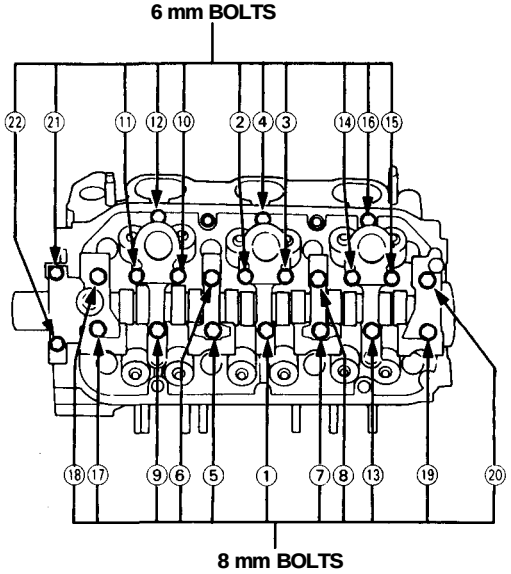
Inspection

NOTE:
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

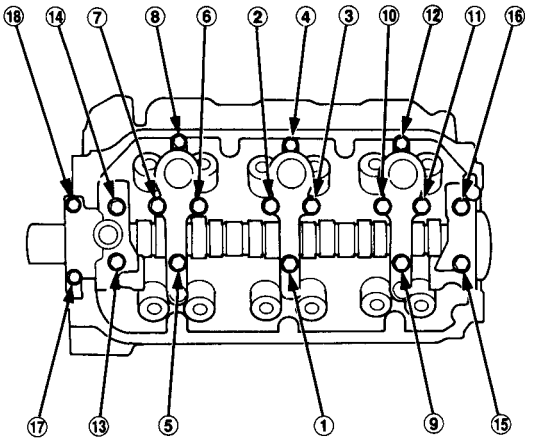
1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

   Specified torque:
   8 mm bolts: 22 N-m (2.2 kgf-m, 16 lbf-ft)
   6 mm bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)

Engine No. 1300001~1309262 (U.S.A.), 1700001~1700751 (Canada):



Engine No. 1309263~, 2300001~, 3300001~ (U.S.A.), 1700752~, 2700001~, 3700001~ (Canada):
8 mm bolts: ③, ④, ⑤, ⑥, ⑩, ⑭, ⑱



2. Seat the camshaft by pushing it toward the rear end of cylinder head.

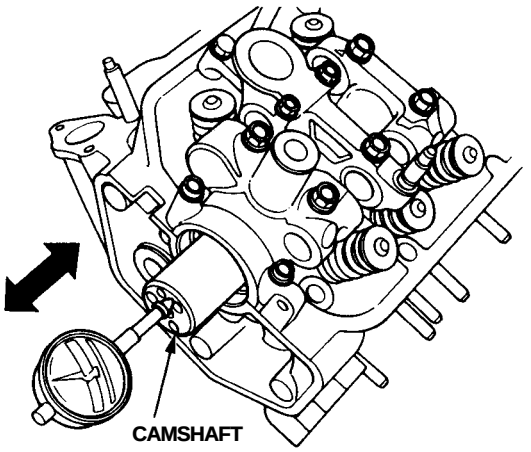
(cont'd)

Camshaft

Inspection (cont'd)

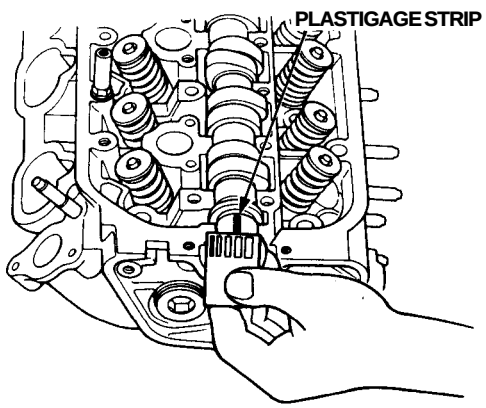
3. Zero the dial indicator against the rear end of the camshaft. Push the camshaft back and forth, and read the end play.

Camshaft End Play:
Standard (New): 0.05 - 0.15 mm (0.002 - 0.006 in)
Service Limit: 0.15 mm (0.006 in)



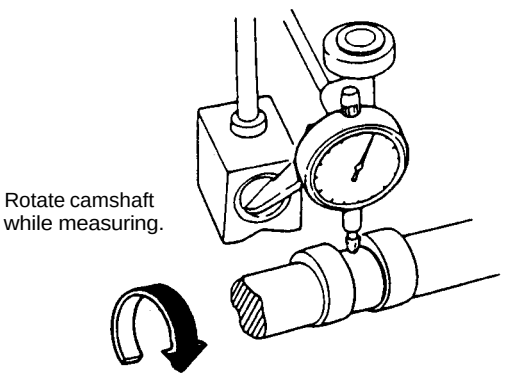
4. Remove the bolts, then remove the camshaft holders from the cylinder head.
5. Lift the camshaft out of the cylinder head, wipe it clean, then inspect the lift ramps. Replace the camshaft if any lobes are pitted, scored, or excessively worn.
6. Clean the camshaft bearing surfaces in the cylinder head, then set the camshaft back in place.
7. Insert a plastigage strip across each journal.
8. Install the camshaft holders, then tighten the bolts to the specified torque shown on the previous page.
9. Remove the camshaft holders. Measure the widest portion of plastigage on each journal.

Camshaft-to-Holder Oil Clearance:
Standard (New): 0.050 - 0.089 mm (0.0020 - 0.0035 in)
Service Limit: 0.10 mm (0.004 in)



10. If camshaft-to-holder oil clearance is out of tolerance:
— And the camshaft has already been replaced, you must replace the cylinder head.
— If the camshaft has not been replaced, first check the total runout with the camshaft supported on V-blocks.

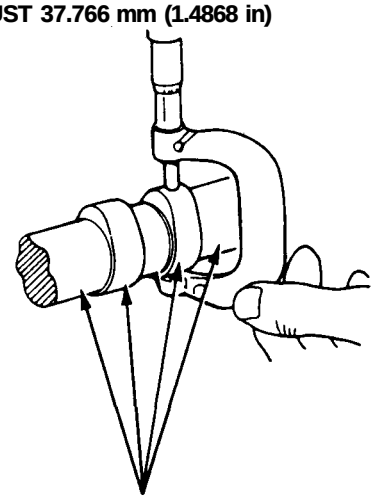
Camshaft Total Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)



— If the total runout of the camshaft is within tolerance, replace the cylinder head.
— If the total runout is out of tolerance, replace the camshaft and recheck. If the oil clearance is still out of tolerance, replace the cylinder head.

11. Check cam lobe height wear.

Cam Lobe Height Standard (New):
INTAKE 40.005 mm (1.5750 in)
EXHAUST 37.766 mm (1.4868 in)

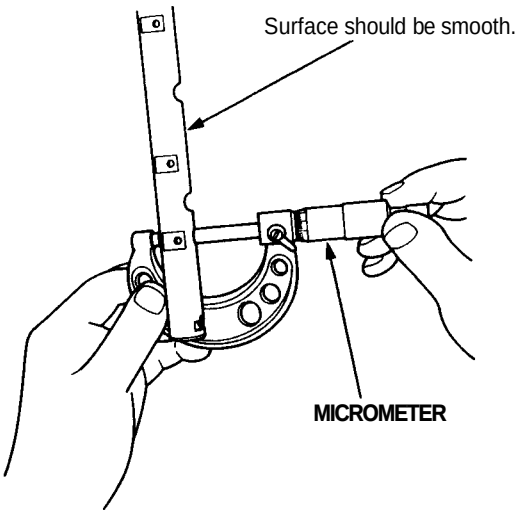


Rocker Arms and Shafts

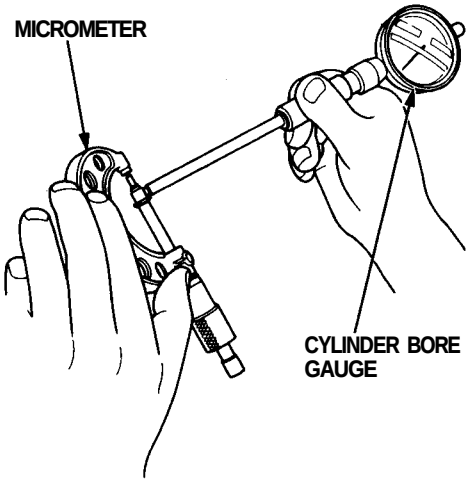
Clearance Inspection

Measure the intake rocker shafts and exhaust rocker shaft.

1. Measure the diameter of the shaft at the first rocker location.

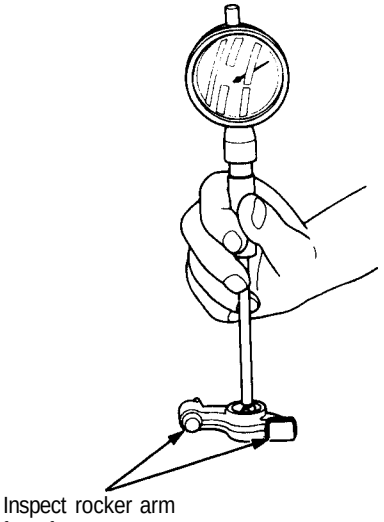


2. Zero the gauge to the shaft diameter.



3. Measure the inside diameter of the rocker arm, and check for an out-of-round condition.

Rocker Arm-to-Shaft Clearance:
Standard (NEW): 0.018 - 0.054 mm
(0.0007 - 0.0021 in)
Service Limit: 0.08 mm (0.003 in)



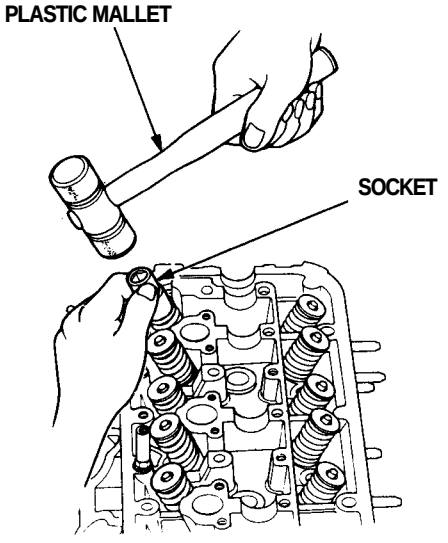
4. Repeat for all rockers.
   — If over the service limit, replace the rocker shaft and all overtolerance rocker arms.

Valves, Valve Springs and Valve Seals

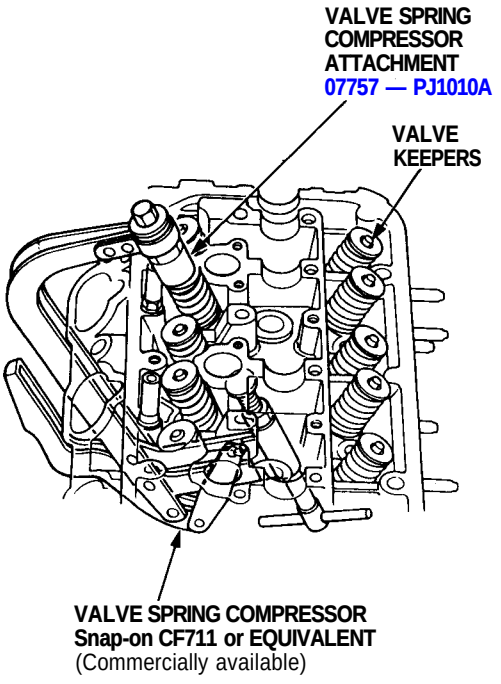
Removal

NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

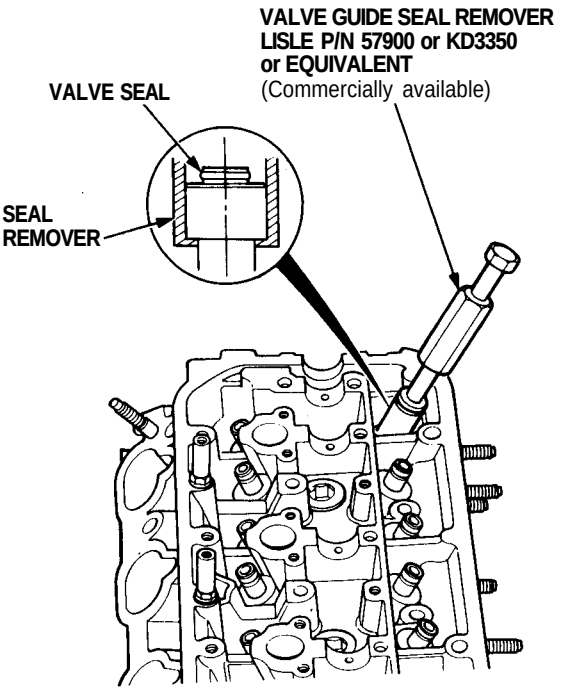
1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



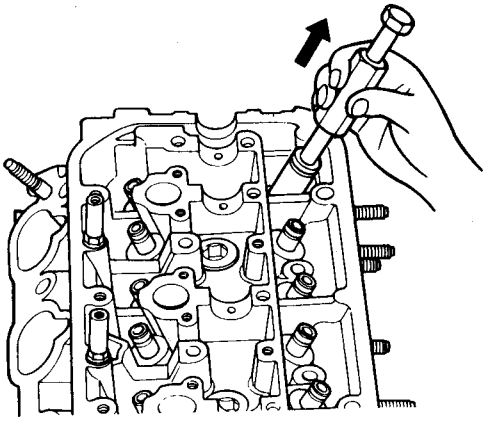
2. Install the valve spring compressor. Compress the spring and remove the valve keepers.

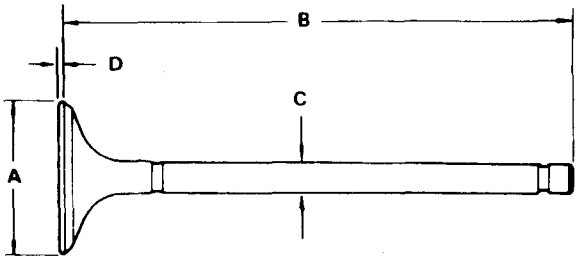


3. Install the special tool as shown.



4. Remove the valve seal.





Intake Valve Dimensions

A	Standard (New):	32.90 - 33.10 mm (1.295-1.303 in)
B	Standard (New):	113.58-113.88 mm (4.472 - 4.483 in)
C	Standard (New):	5.48 - 5.49 mm (0.216-0.216 in)
C	Service Limit:	5.45 mm (0.215 in)
D	Standard (New):	0.85-1.15 mm (0.033 - 0.045 in)
D	Service Limit:	0.65 mm (0.026 in)

Exhaust Valve Dimensions

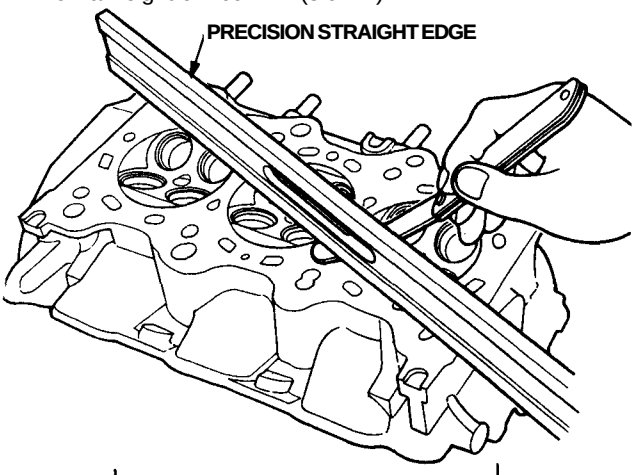
A	Standard (New):	27.90 - 28.10 mm (1.098-1.106 in)
B	Standard (New):	116.03-116.33 mm (4.568 - 4.580 in)
C	Standard (New):	5.45 - 5.46 mm (0.215-0.215 in)
C	Service Limit:	5.42 mm (0.213 in)
D	Standard (New):	1.35-1.65 mm (0.053 - 0.065 in)
D	Service Limit:	1.15 mm (0.045 in)

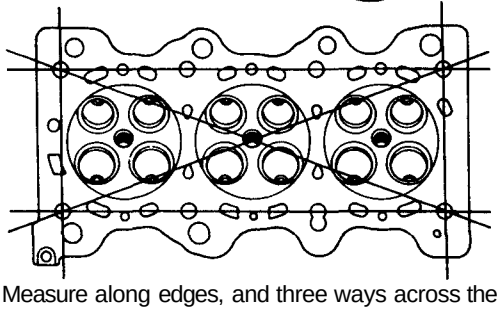
Warpage

NOTE: If camshaft-to-holder oil clearance (see page 6-23) is not within specifications, the cylinder head cannot be resurfaced.

If camshaft-to-holder oil clearance is within specifications, check the cylinder head for warpage.

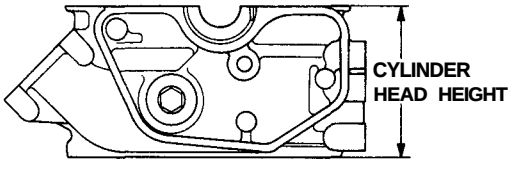
- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface the cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 100 mm (3.94 in).





Measure along edges, and three ways across the center.

Cylinder Head Height:
Standard (New): 99.95 - 100.05 mm (3.935 - 3.939 in)



Measure the cylinder head height at several points.

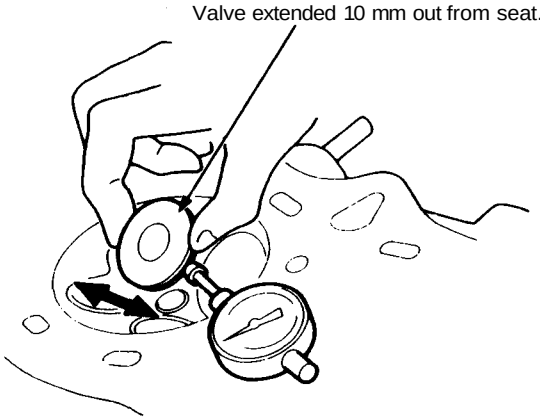
Valve Guides

Valve Movement

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.04 - 0.10 mm (0.002 - 0.004 in)
Service Limit: 0.16 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.10-0.16 mm (0.004-0.006 in)
Service Limit: 0.22 mm (0.009 in)



- If the measurement exceeds the service limit, recheck using a new valve.
- If the measurement is now within the service limit, reassemble using a new valve.
- If the measurement still exceeds the limit, recheck using the alternate method that follows, then replace the valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.02 - 0.05 mm (0.001 - 0.002 in)
Service Limit: 0.08 mm (0.003 in)

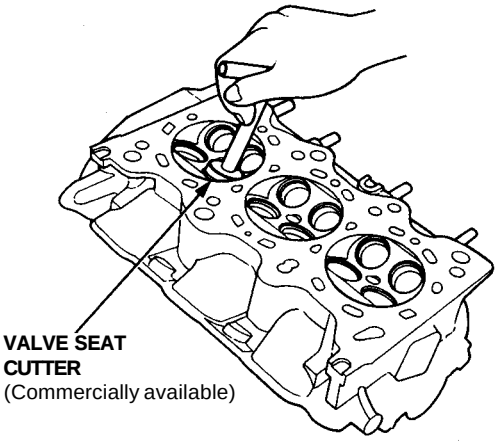
Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.05 - 0.08 mm (0.002 - 0.003 in)
Service Limit: 0.11 mm (0.004 in)

Valve Seats

Reconditioning

1. Renew the valve seats in the cylinder head using a valve seat cutter.

   NOTE: If the guides are worn (see page 6-28), replace them (see page 6-30) before cutting the valve seats.



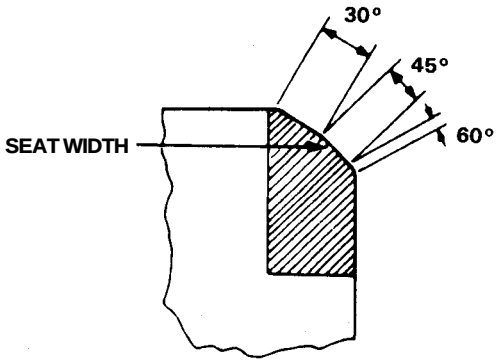
2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.

3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check the width of the seat and adjust accordingly.

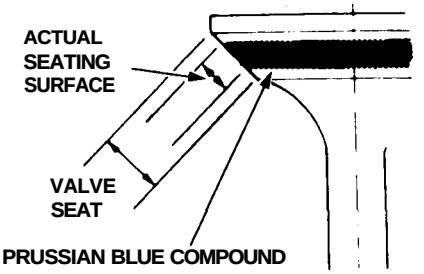
4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width:

Standard (New):	**Intake**	**0.80 - 1.00 mm (0.031 - 0.039 in)**
	Exhaust	**1.25 - 1.55 mm (0.049 - 0.061 in)**
Service Limit:	**Intake**	**2.0 mm (0.08 in)**
	Exhaust	**2.0 mm (0.08 in)**



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.

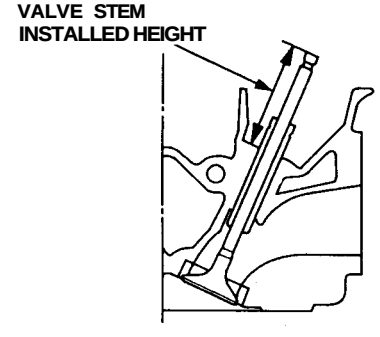
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

   NOTE: The final cut should always be made with the 45° cutter.

7. Insert the intake and exhaust valves in the head and measure the valve stem installed height.

Valve Stem Installed Height:

Standard (New):	**Intake**	**46.935 - 47.425 mm (1.8478-1.8671 in)**
	Exhaust	**47.885 - 48.375 mm (1.8852-1.9045 in)**
Service Limit:	**Intake**	**47.625 mm (1.8750 in)**
	Exhaust	**48.575 mm (1.9124 in)**

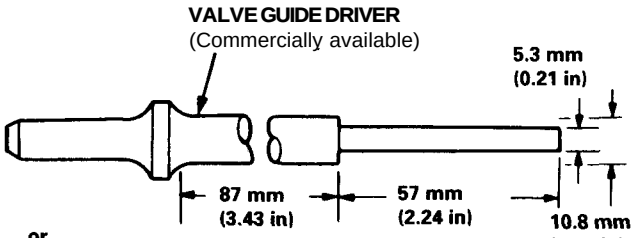


8. If valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

Valve Guides

Replacement

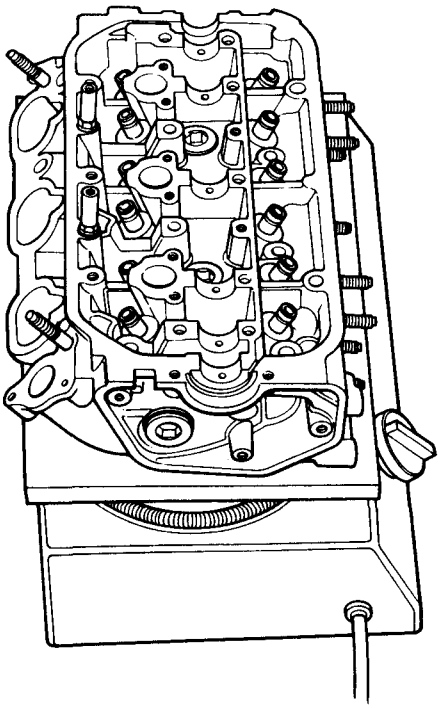
1. As illustrated below, use a commercially - available air-impact valve guide driver attachment modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



or
VALVE GUIDE DRIVER, 5.5 mm
07742-0010100

2. Select the proper replacement guides and chill them in the freezer section of a refrigerator for about an hour.

3. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer.



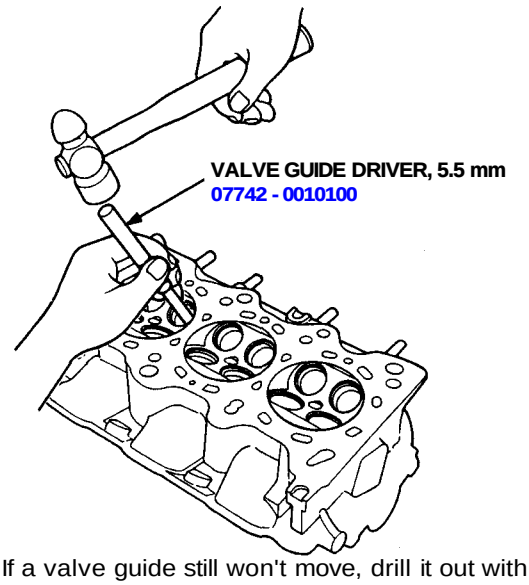
CAUTION:
- **Do not use a torch; it may warp the head.**
- **Do not get the head hotter than 300°F (150°C); excessive heat may loosen the valve seats.**
- **To avoid burns, use heavy gloves when handling the heated cylinder head.**

4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in) towards the combustion chamber. This will knock off some of the carbon and make removal easier.

CAUTION:
- **Always wear safety goggles or a face shield when driving valve guides.**
- **Hold the air hammer directly in line with the valve guide to prevent damaging the driver.**

5. Turn the head over and drive the guide out toward the camshaft side of the head.



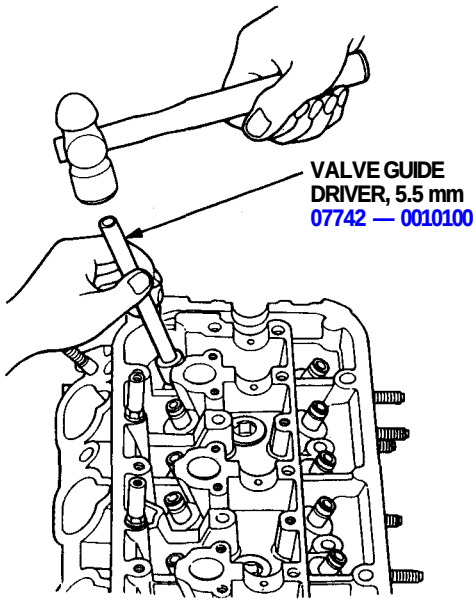


If a valve guide still won't move, drill it out with a 8 mm (5/16 in) bit, then try again.

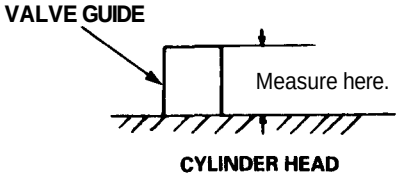
CAUTION: Drill guides only in extreme cases: you could damage the cylinder head if the guide breaks.

6. Remove the new guides from the freezer, one at a time, as you need them. (cont'd)

7. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide in to the specified installed height. If you have all 12 guides to do, you may have to reheat the head.



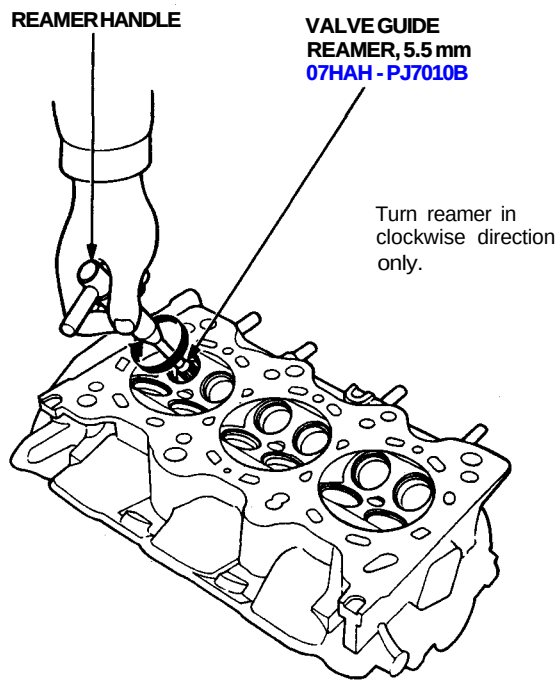
Valve Guide Installed Height:
Intake: 15.75 - 16.25 mm (0.620 - 0.640 in)
Exhaust: 15.75 - 16.25 mm (0.620 - 0.640 in)



Reaming

NOTE: For new valve guides only.

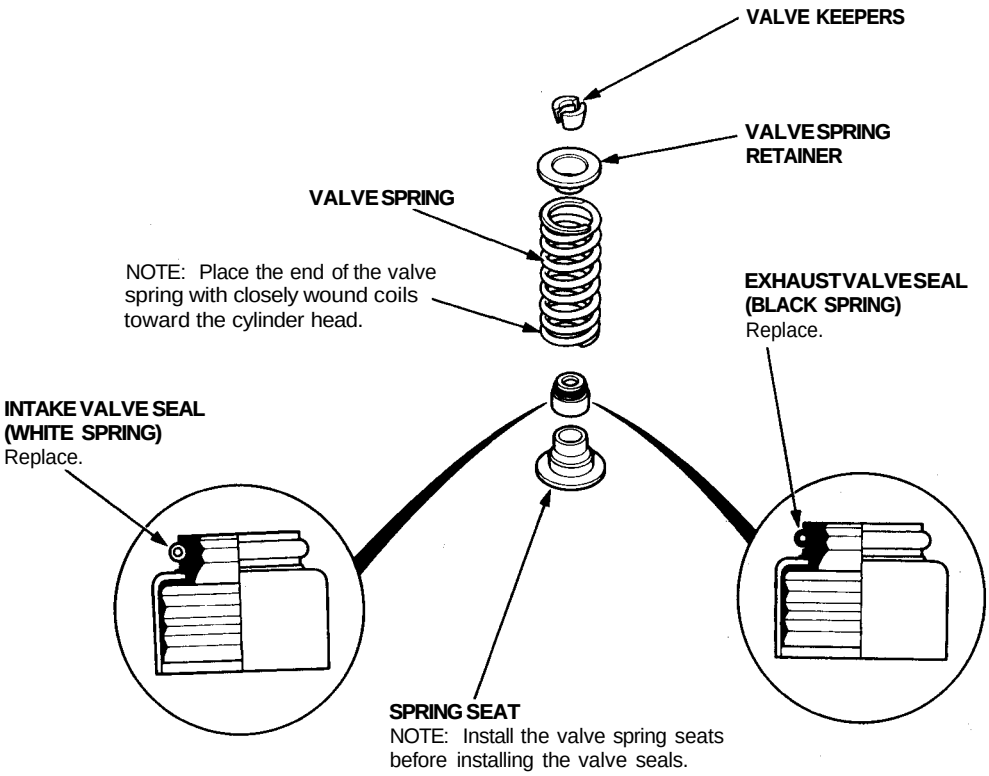
1. Coat both the reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check the clearance with a valve (see page 6-28).
   — Verify that a valve slides in the valve guide without exerting pressure.

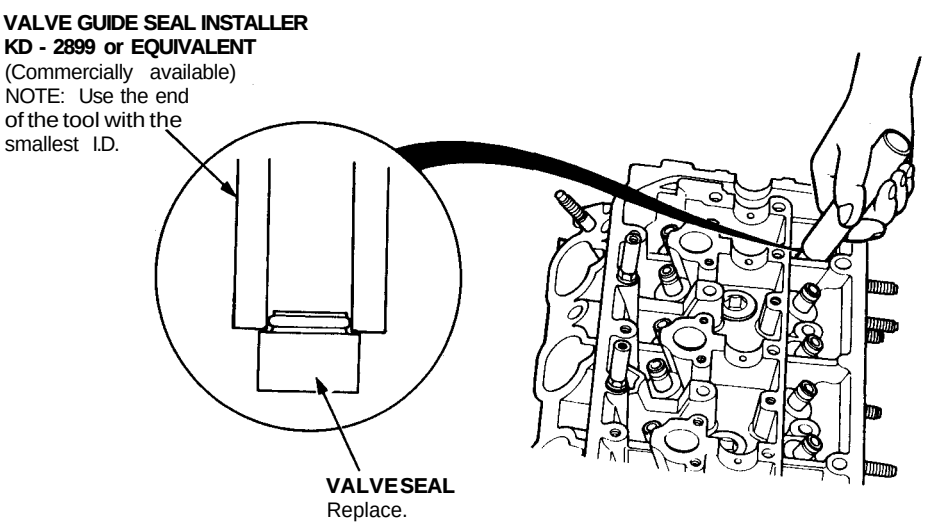


Valves, Valve Springs and Valve Seals

Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.



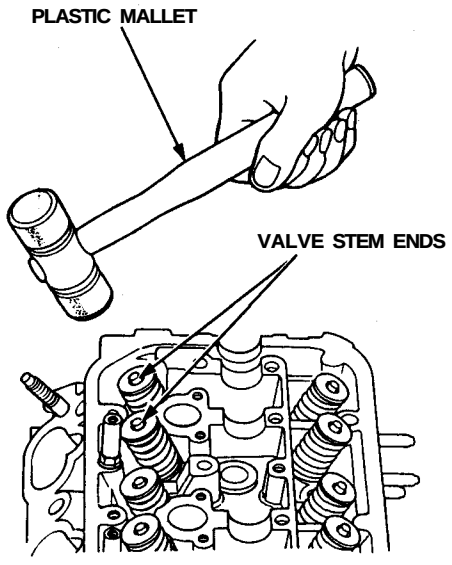


Valve Installation

When installing valves in the cylinder head, coat the valve stems with oil before inserting them into the valve guides. Make sure the valves move up and down smoothly.

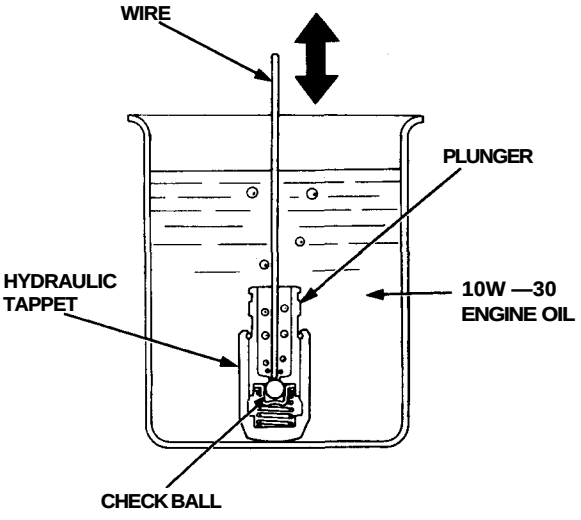
When the valves and springs are in place, lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of the valve and valve keepers.

NOTE:
- Make sure that the valve keepers are properly positioned on the valve stem.
- Tap the valve stem only along its axis so you do not bend the stem.



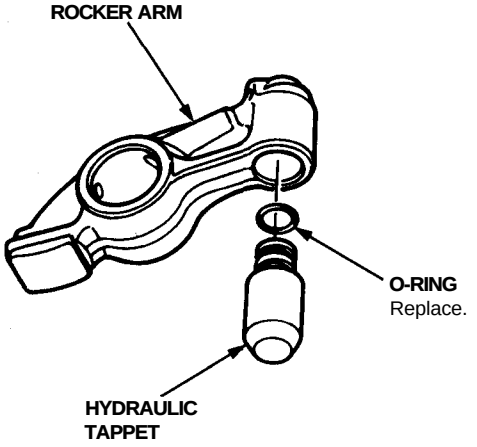
Bleeding

1. Fill a container with 10W - 30 engine oil and place the hydraulic tappet in it. Press down on the check ball with a thin wire. Bleed the tappet of air by pumping the plunger slowly until no bubbles come out of the hydraulic tappet.



2. Install the hydraulic tappet to the rocker arm.

NOTE:
- Use a new O-ring when reassembling.
- Apply oil to the O-ring before installation.



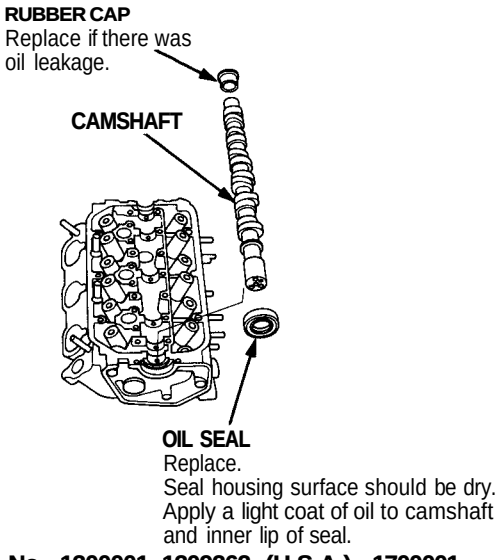
Camshafts/Rocker Arms and Camshaft Seals

Installation

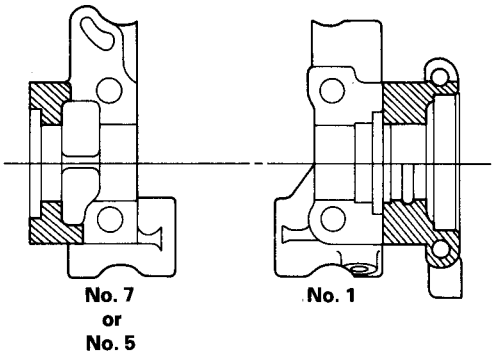
CAUTION:
- **Make sure that all rockers are in alignment with their valves when torquing the rocker assembly bolts.**
- **To prevent the rocker arm assembly from coming apart, leave the camshaft holder bolts in the holes.**
- **Handle the rocker arms carefully so that the oil does not come out of the hydraulic tappets.**

1. Install the camshaft and rubber cap, then install the camshaft seal with the open side (spring) facing in.

   NOTE:
   - Position the camshaft with pin hole at the top.
   - Do not apply oil to the camshaft holder mating surface of the camshaft seal.
   - Apply liquid gasket around the rubber cap.

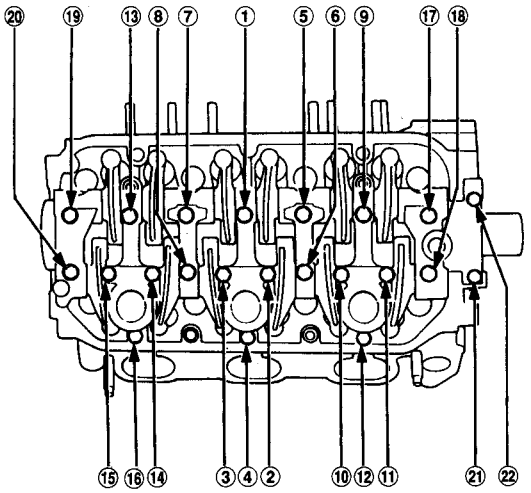


2. **Engine No. 1300001~1309262 (U.S.A.), 1700001~1700751 (Canada):**
   Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 7 camshaft holders.
   Engine No. 1309263~, 2300001 ~, 3300001~ (U.S.A.), 1700752~, 2700001 ~, 3700001~ (Canada):
   Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 5 camshaft holders.
   — Apply liquid gasket to the shaded areas.

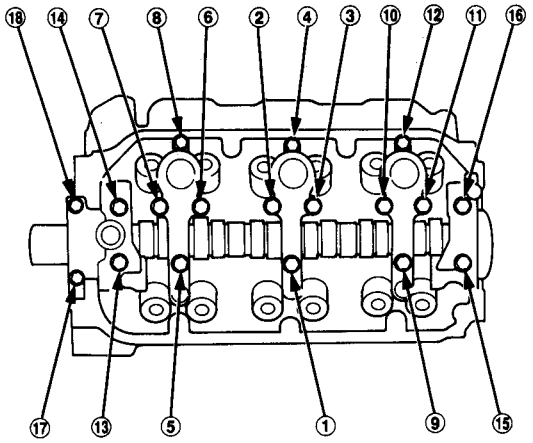


3. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

   Specified torque:
   8 mm bolts: 22 N-m (2.2 kgf-m, 16 lbf-ft)
   6 mm bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)
   Engine No. 1300001~1309262 (U.S.A.), 1700001~1700751 (Canada):
   6 mm bolts: ②, ③, ④, ⑩, ⑪, ⑫, ⑭, ⑮, ⑯, ㉑, ㉒



Engine No. 1309263~, 2300001 ~, 3300001~ (U.S.A.), 1700752~, 2700001 ~. 3700001~ (Canada):
8 mm bolts: ①, ⑤, ⑨, ⑬, ⑭, ⑮, ⑯



Cylinder Heads

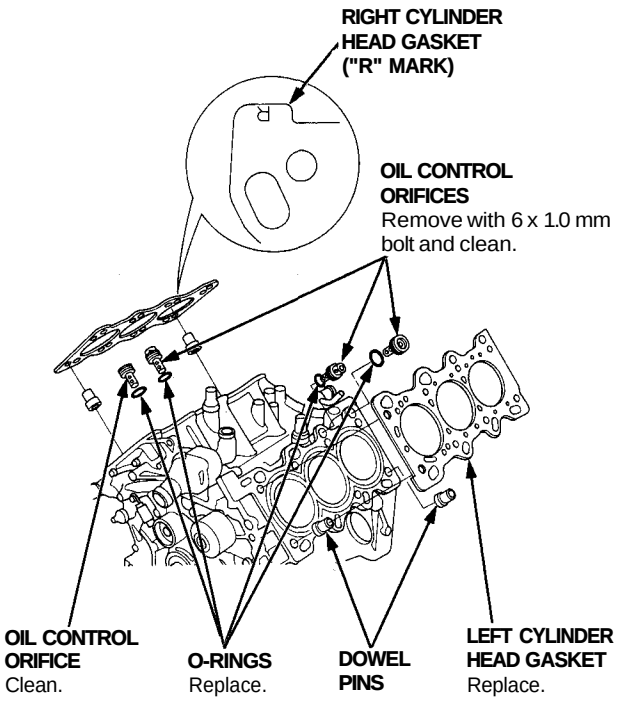
Installation

Install the cylinder heads in the reverse order of removal.

NOTE:
- Always use new cylinder head gaskets.
- Cylinder heads and cylinder block surface must be clean.
- Turn the camshafts so the pulley locating pin holes are at the top.
- Turn the crankshaft so the No. 1 piston is at TDC (see page 6-8).
- Clean the oil control orifices before installing.
- Do not use the upper and lower covers to store removed item.
- Clean the upper and lower covers before installation.

1. Align the cylinder head dowel pins.

2. Install the oil control orifices and cylinder head gaskets.



3. Apply clean engine oil to the threads of the cylinder head bolts.

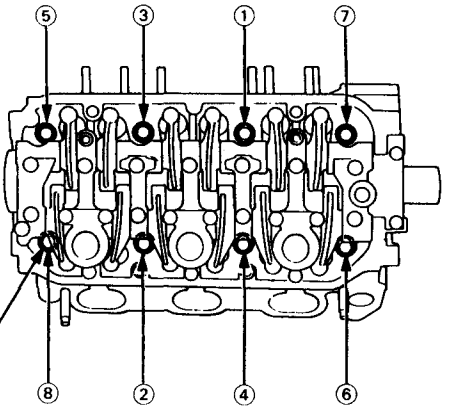
4. Install the cylinder heads on the cylinder block.

5. Tighten the cylinder head bolts sequentially in two or three steps.

Specified Torque:
76 N-m (7.8 kgf-m, 56 lbf-ft)

NOTE:
- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



CYLINDER HEAD BOLTS
Apply engine oil to the bolt threads.

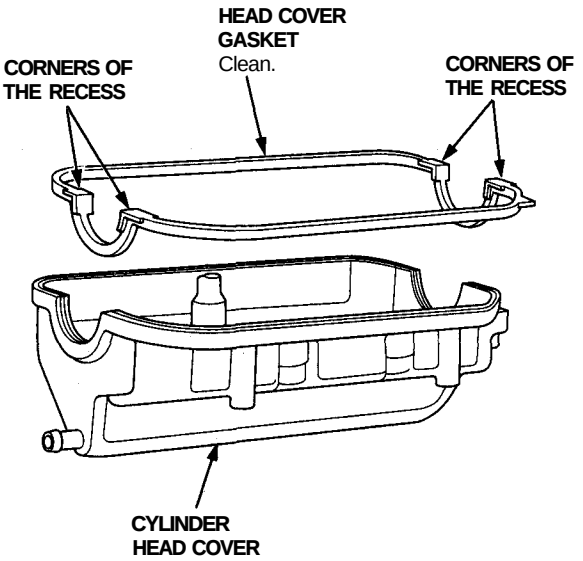
(cont'd)

Cylinder Heads

Installation (cont'd)

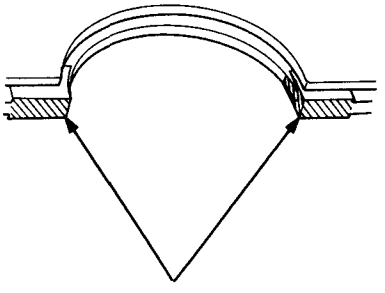
6. Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

NOTE:
- Before installing the cylinder head cover gasket, thoroughly clean the seal and the groove.
- When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.



7. Apply liquid gasket to the head cover gasket at the four corners of the recesses.

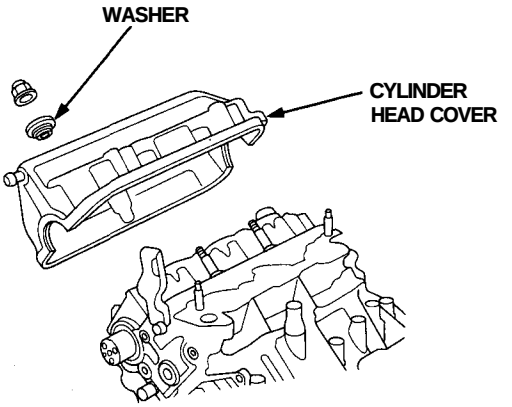
NOTE:
- Use liquid gasket, Part No. 08718 - 0001 or 08718 -003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



Apply liquid gasket to the shaded areas.

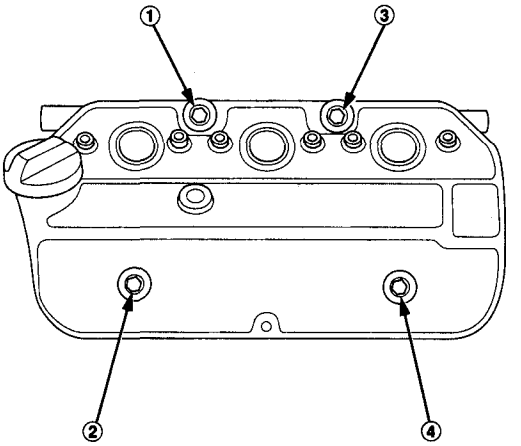
8. When installing the cylinder head cover, hold the head cover gasket in the groove by placing your fingers on the camshaft contacting surfaces (top of the semicircles).
Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

NOTE:
- Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
- Do not touch the parts where liquid gasket was applied.
- Replace the washer when damaged or deteriorated.

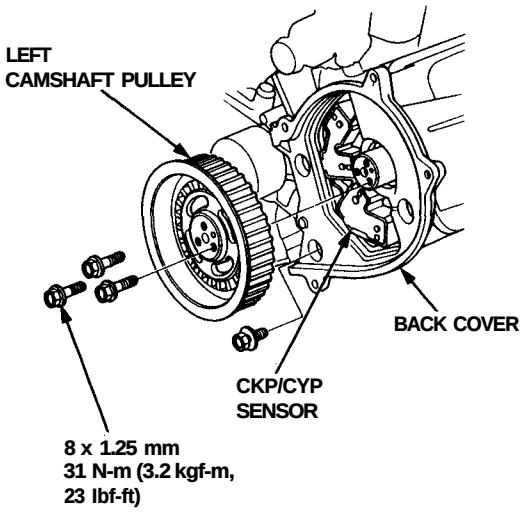


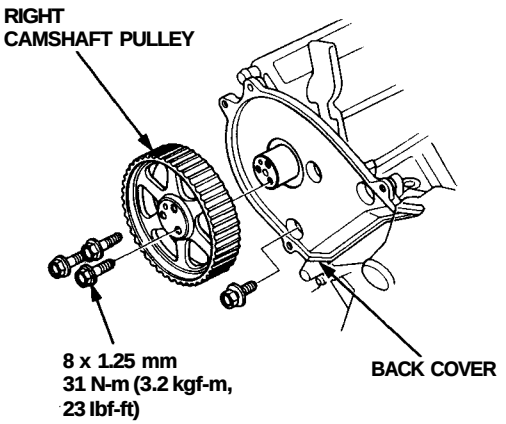
9. Tighten the nuts in two or three steps. In the final step, tighten all nuts, in sequence, to 12 N-m (1.2 kgf-m, 8.7 lbf-ft).

NOTE: After assembly, wait at least 30 minutes before filling the engine with oil.



10. Install the left and right back covers, then install the left and right camshaft pulleys.



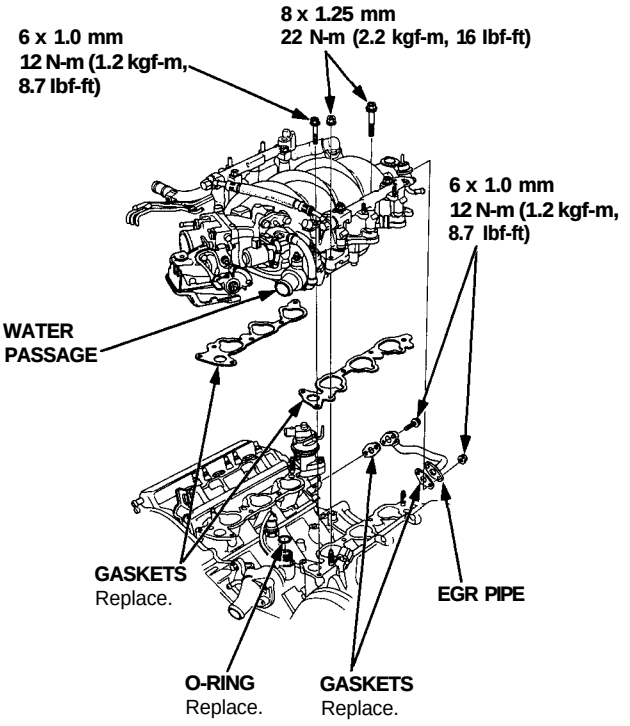


11. Install the timing belt (see page 6-8).

12. Install the intake manifold and water passage, then tighten the intake manifold mounting bolts and nuts in a crisscross pattern in two or three steps, beginning with the inner bolts.

- Always use new intake manifold gaskets.

13. Install the EGR pipe.



14. Install the exhaust manifolds, and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nut (see page 9-3).

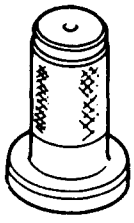
- Always use new exhaust manifold gaskets.

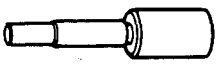
15. After installation, check that all tubes, hoses and connectors are installed correctly.

16. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

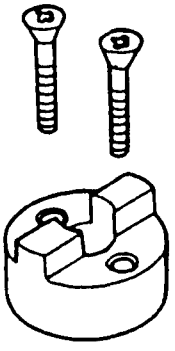
Special Tools

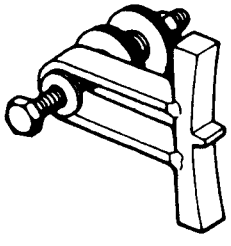
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD - PH70201	Seal Driver	1	7-25
②	07GAF - PH60300	Piston Pin Base Insert	1	7-14, 7-15
③	07GAF-PH70100	Pilot Collar	1	7-14, 7-15
④	07HAF-PL20102	Piston Base Head	1	7-14, 7-15
⑤	07LAB-PV00100	Ring Gear Holder	1	7-6
⑥	07749-0010000	Driver	1	7-20, 7-25
⑦	07948-SB00101	Driver Attachment	1	7-20, 7-25
⑧	07973-PE00310	Piston Pin Driver Shaft	1	7-14, 7-15
⑨	07973 - PE00320	Piston Pin Driver Head	1	7-14, 7-15
⑩	07973 - 6570500	Piston Base	1	7-14, 7-15
⑪	07973 - 6570600	Piston Base Spring	1	7-14, 7-15


①

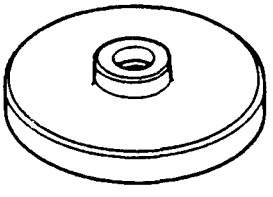

②

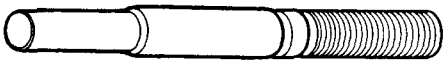

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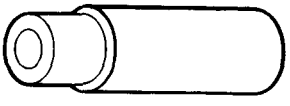

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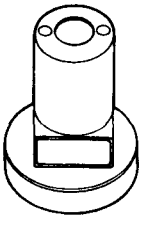

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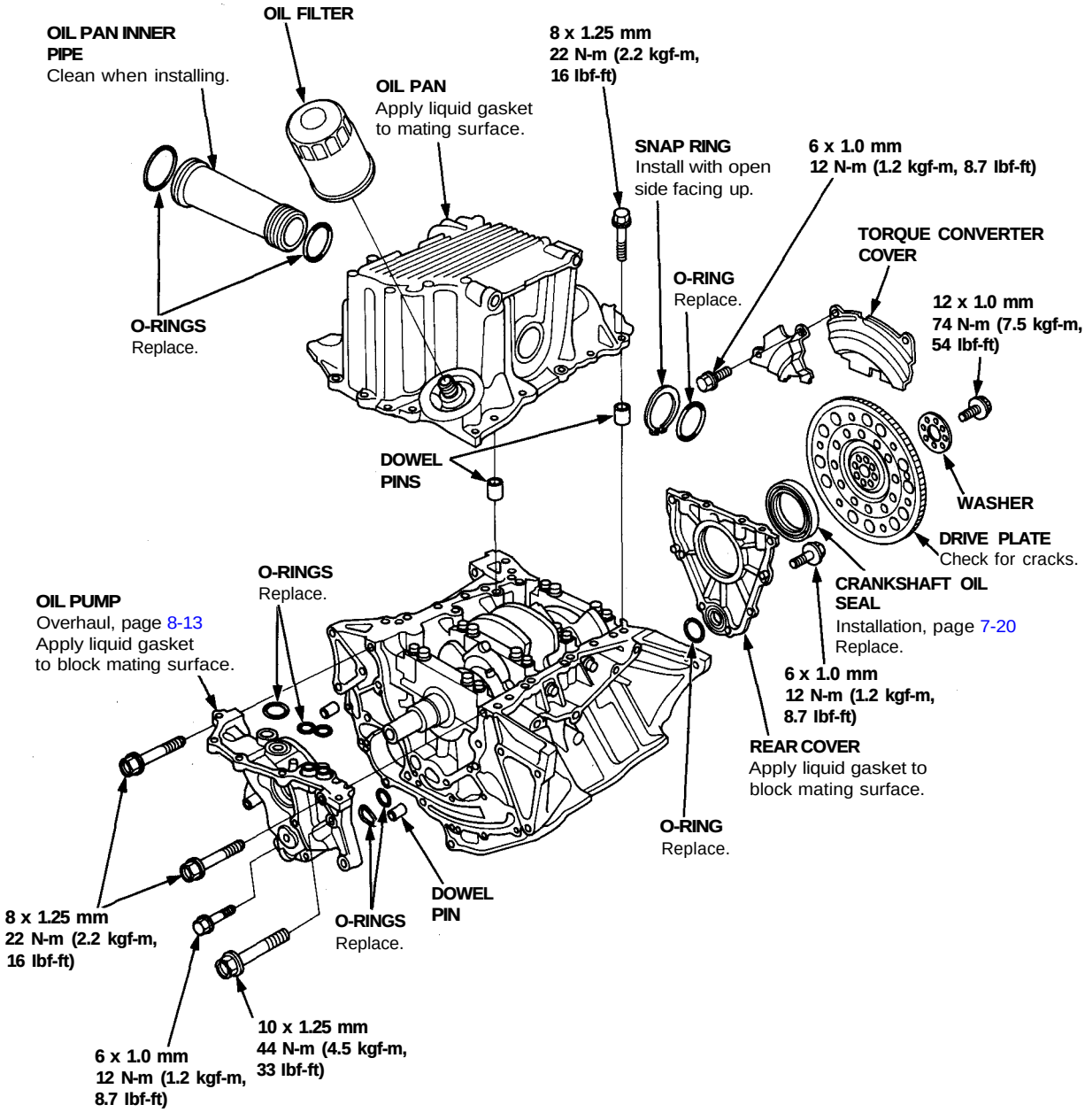

⑩


⑪

Illustrated Index

Lubricate all internal parts with engine oil during reassembly.

NOTE:
- Apply liquid gasket to the mating surfaces of the rear cover and oil pump case before installing them.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.

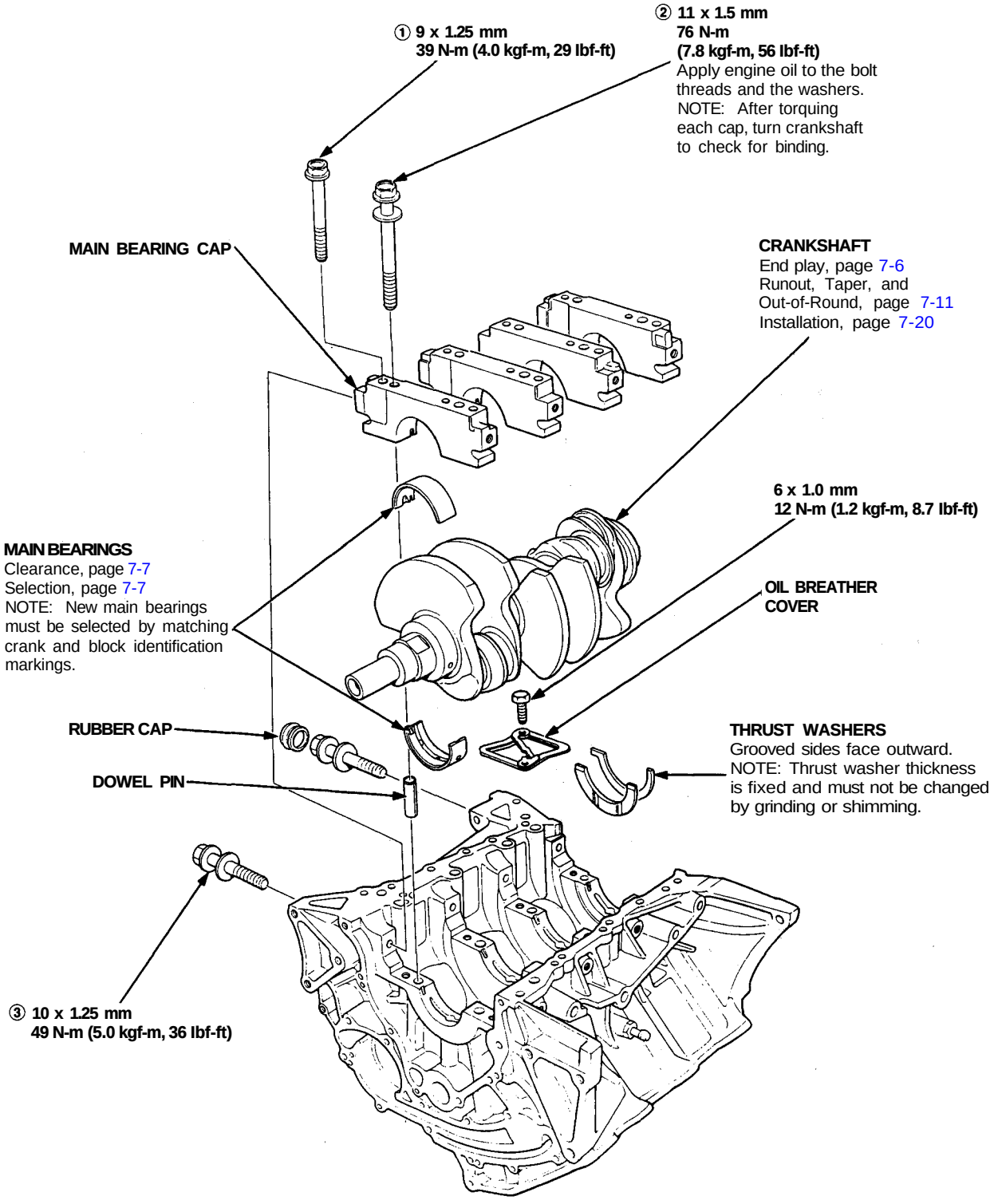


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Illustrated Index

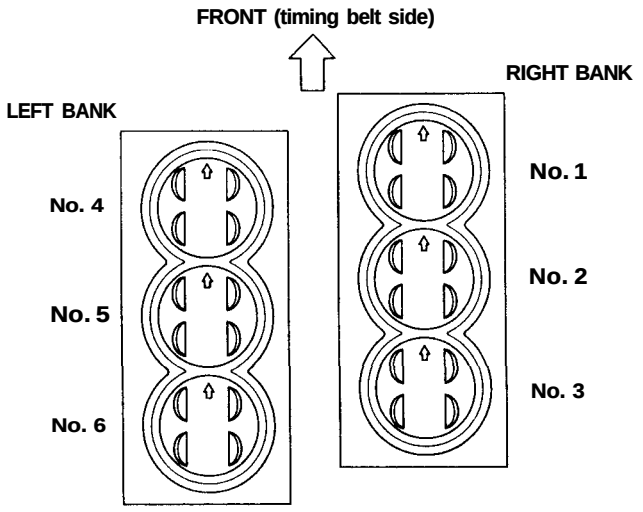
(cont'd)

NOTE:
- Lubricate all internal parts with engine oil during reassembly.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.



NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (see page 7-8).

OIL Lubricate all internal parts with engine oil during reassembly.



PISTON
Inspection, page 7-12
NOTE: To maintain proper clearance, match the letter on the piston top with the letter for each cylinder stamped on the block.
On the piston top — On the block
No letter — A or I
B — B or II

PISTON PIN
Removal, page 7-14
Installation, page 7-15
Inspection, page 7-16

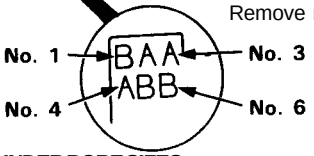
CYLINDER BLOCK
Cylinder bore inspection, page 7-13
Warpage inspection, page 7-13
Cylinder bore honing, page 7-14

CONNECTING ROD BEARING CAP
Installation, page 7-20
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

PISTON RINGS
Replacement, page 7-17
Measurement, pages 7-17 and 7-18
Alignment, page 7-18

CONNECTING ROD
End play, page 7-6
Selection, page 7-15

Inspect the top of each cylinder bore for carbon build-up or a ridge before removing the piston. Remove ridge if necessary, page 7-9



CONNECTING ROD BEARINGS
Clearance, page 7-8
Selection, page 7-8

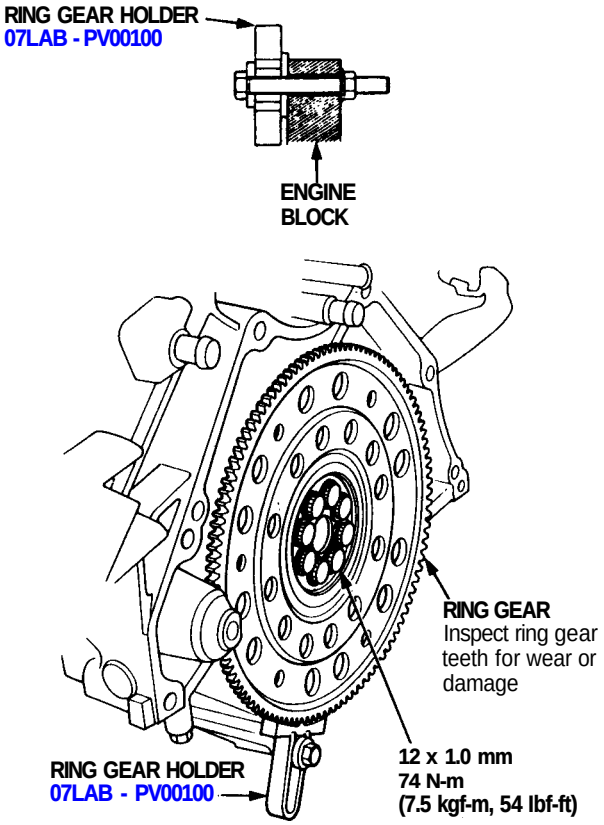
CONNECTING ROD CAP NUT
9 x 0.75 mm
44 N-m (4.5 kgf-m, 33 lbf-ft)
Apply engine oil to the nut threads
NOTE: After torquing each bearing cap, rotate the crankshaft to check for binding.

CYLINDER BORE SIZES
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from front to rear, No. 1 through No. 3 cylinders on the first line and No. 4 through No. 6 cylinders on the second line.
On the block — On the piston top
A or I — No letter
B or II — B

Drive Plate

Replacement

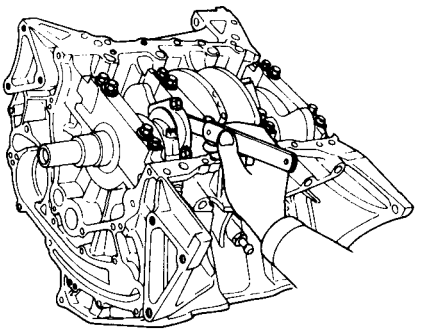
Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



Connecting Rod and Crankshaft

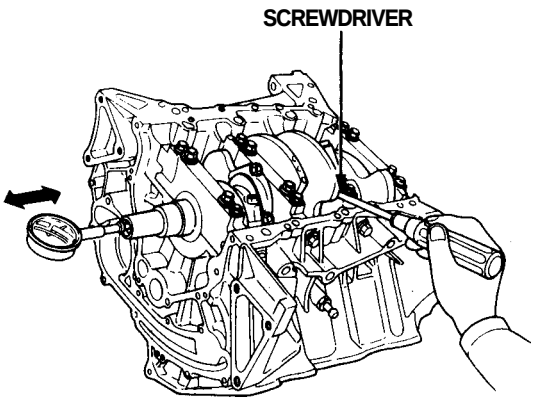
End Play

Connecting Rod End Play:
Standard (New): 0.15 - 0.30 mm (0.006-0.012 in)
Service Limit: 0.40 mm (0.016 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (see pages 7-9 and 7-20).

Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; dial reading should not exceed service limit.



Crankshaft End Play:
Standard (New): 0.10 - 0.29 mm (0.004-0.011 in)
Service Limit: 0.45 mm (0.018 in)

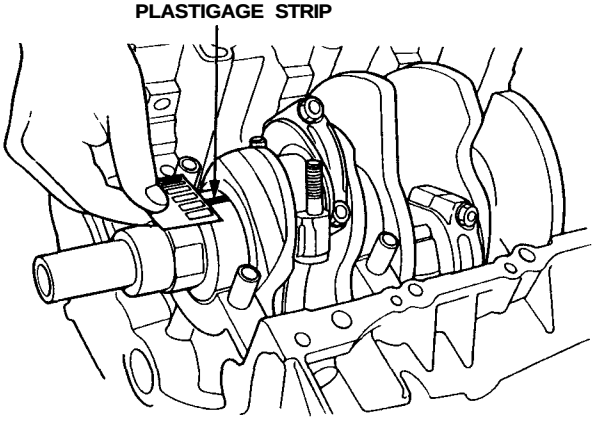
- If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming.
Thrust washers are installed with the grooved side facing outward.

Main Bearings

Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.
   NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crankshaft with a jack under the counterweights and check only one bearing at a time.
4. Reinstall the bearings and caps, then torque the 9 mm cap bolts to 39 N-m (4.0 kgf-m, 29 lbf-ft). Torque the 11 mm cap bolts to 76 N-m (7.8 kgf-m, 57 lbf-ft).
5. Torque the side bolts to 49 N-m (5.0 kgf-m, 36 lbf-ft).
6. Remove the caps and bearings, and measure the widest part of the plastigage.
   Main Bearing-to-Journal Oil Clearance:
   Standard (New): 0.020 - 0.044 mm (0.0008 - 0.0017 in)
   Service Limit: 0.05 mm (0.002 in)



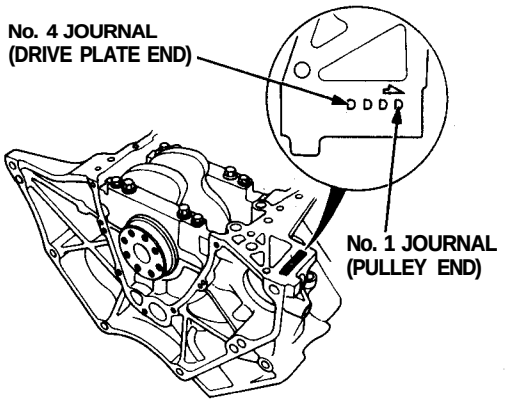
7. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown in the right column of this page), and recheck the clearance.
   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.
8. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

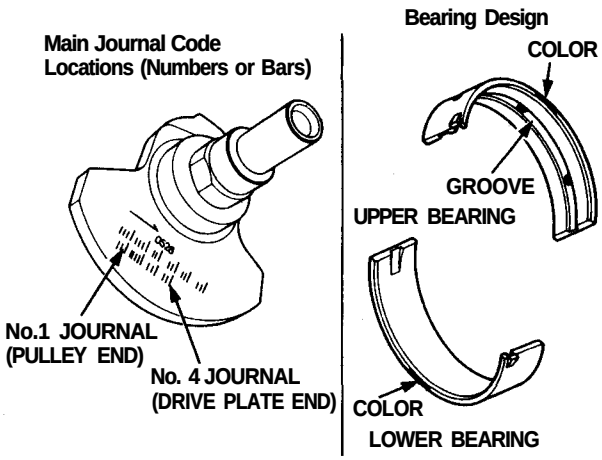
Selection

CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Crankshaft Bore Code Locations

Letters or bars have been stamped on the end of the cylinder block as a code for the size of each of the four main journal bores. Use them, and the numbers or bars stamped on the crankshaft (codes for main journal size), to choose the correct bearings.





Bearing Identification
Color code is on the edge of the bearing.

Larger crank bore →

A or I	B or II	C or III	D or IIII

→ Small bearing (thicker)

Smaller main journal ↓

1 or I	Pink	Pink Yellow	Yellow	Yellow Green
2 or II	Pink Yellow	Yellow	Yellow Green	Green
3 or III	Yellow	Yellow Green	Green	Green Brown
4 or IIII	Yellow Green	Green	Green Brown	Brown
5 or IIIII	Green	Green Brown	Brown	Brown Black
6 or IIIIII	Green Brown	Brown	Brown Black	Black

↓ Smaller bearing (thicker)

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

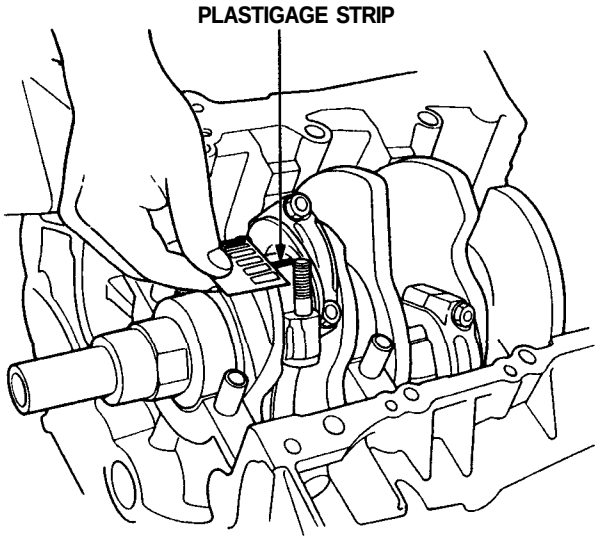
Connecting Rod Bearings

Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place a plastigage strip across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 44 N-m (4.5 kgf-m, 33 lbf-ft).

   NOTE: Do not rotate the crankshaft during inspection.
5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

   Connecting Rod Bearing-to-Journal Oil Clearance:
   Standard (New): 0.022 - 0.046 mm (0.0009 - 0.0018 in)
   Service Limit: 0.05 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown in the right column of this page), and recheck the clearance.

   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

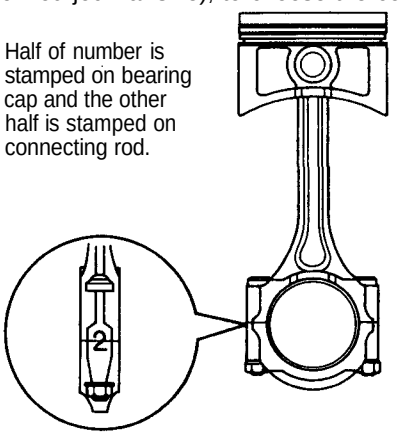
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Selection

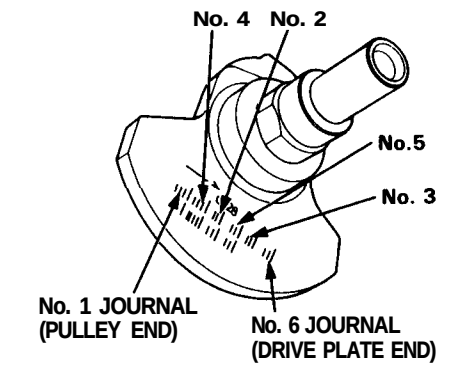
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Code Location

Numbers or bars have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters or bars stamped on the crank (codes for rod journal size), to choose the correct bearings.



Connecting Rod Journal Code Locations (Letters or Bars)



Bearing Identification
Color code is on the edge of the bearing.

Larger big end bore →

1 or I	2 or II	3 or III	4 or IIII

→ Small bearing (thicker)

Smaller rod journal ↓

A or I	Pink	Pink Yellow	Yellow	Yellow Green
B or II	Pink Yellow	Yellow	Yellow Green	Green
C or III	Yellow	Yellow Green	Green	Green Brown
D or IIII	Yellow Green	Green	Green Brown	Brown
E or IIIII	Green	Green Brown	Brown	Brown Black
F or IIIIII	Green Brown	Brown	Brown Black	Black

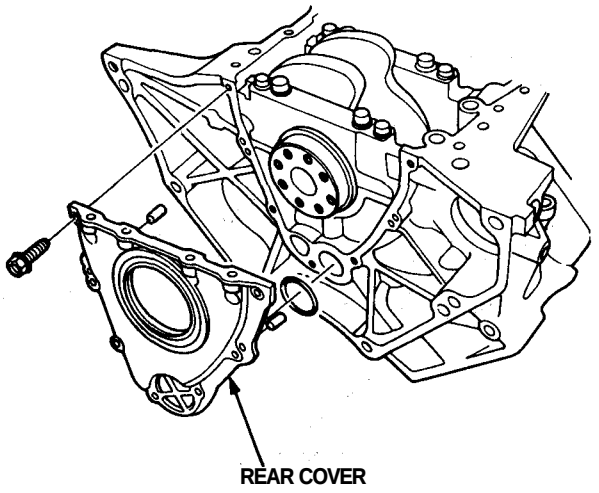
↓ Smaller bearing (thicker)

NOTE: When using bearing halves of different colors, it does not matter which color is used in the top or bottom.

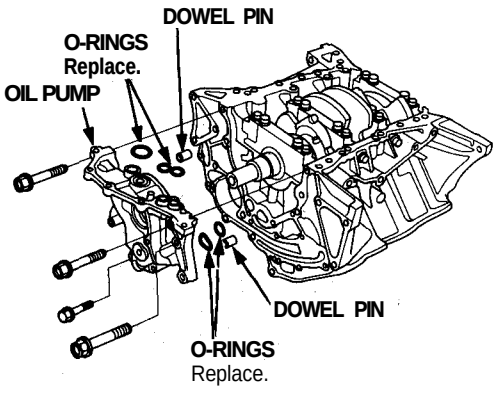
Pistons and Crankshaft

Removal

1. Remove the oil pan assembly.
2. Remove the rear cover.

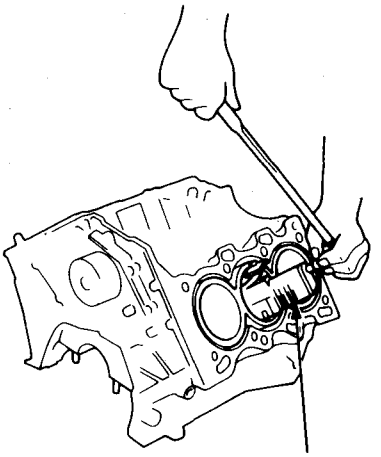


3. Remove the oil pump.



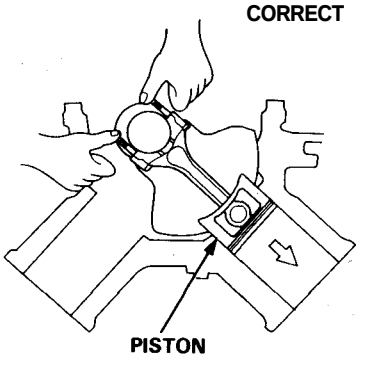
4. If you can feel a ridge of metal or hard carbon around the top of any cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

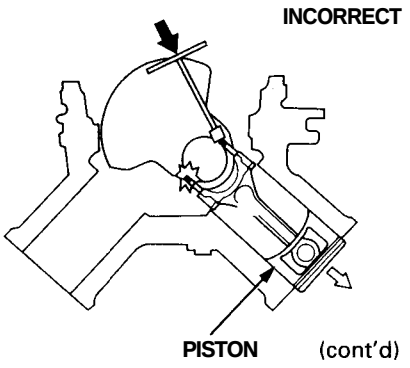
CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



- Remove the connecting rod caps after setting the crank pin at BDC for each cylinder. Remove the piston assembly by pushing on the connecting rod.

CAUTION: Take care not to damage the crank pin or cylinder with the connecting rod.





(cont'd)

Pistons and Crankshaft

Removal (cont'd)

5. Remove the bearing from the cap. Keep all caps/bearings in order.

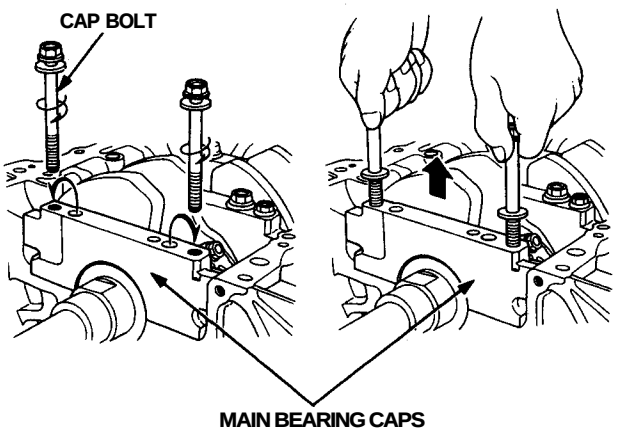
6. Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.

7. Reinstall the cap on the rod after removing each piston/connecting rod assembly.

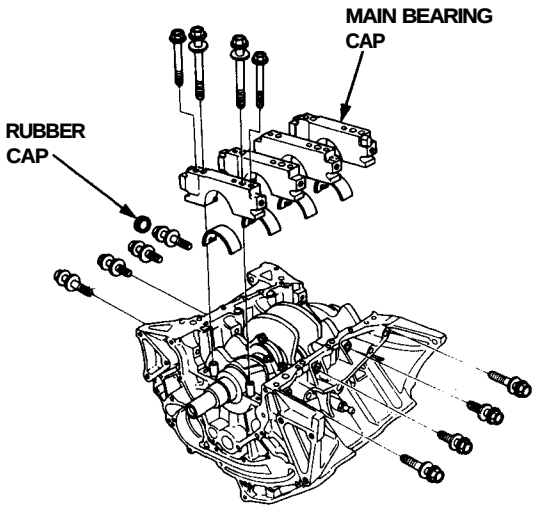
8. To avoid mixup on reassembly, mark each piston/connecting rod assembly with its cylinder number.

   NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

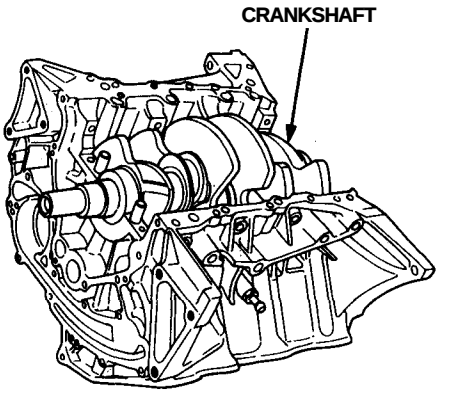
- To help with removal of the caps, install the cap bolts in the outside bolt holes.



9. Remove the bearing cap bolts and bearing cap side bolts, then remove the bearing caps.



10. Lift the crankshaft out of the cylinder block, being careful not to damage the journals.



11. Reinstall the main caps and bearings on the cylinder block in proper order.

Crankshaft

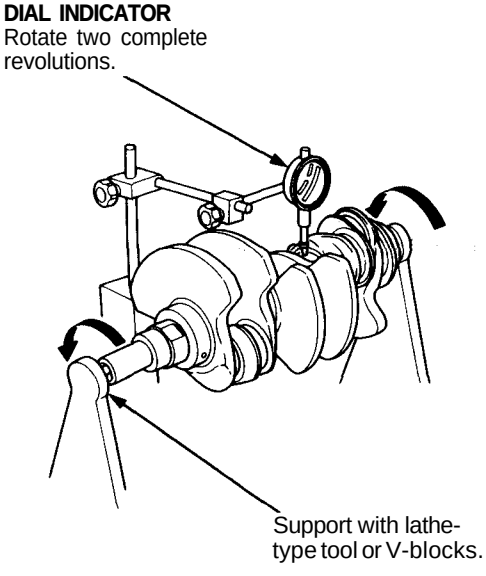
Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crankshaft is not bent.
- The difference between measurements on each journal must not be more than the service limit.

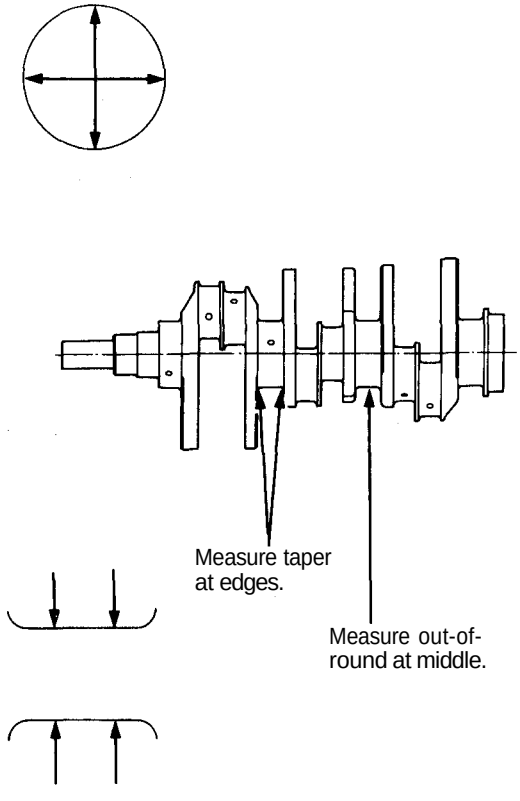
Crankshaft Total Runout:
Standard (New): 0.020 mm (0.0008 in) max.
Service Limit: 0.030 mm (0.0012 in)



Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:
Standard (New): 0.004 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)



- Measure taper at edges of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.

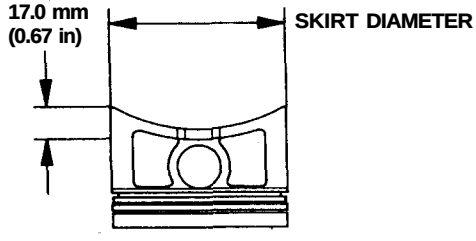
   NOTE: If cylinder is bored, an oversized piston must be used.

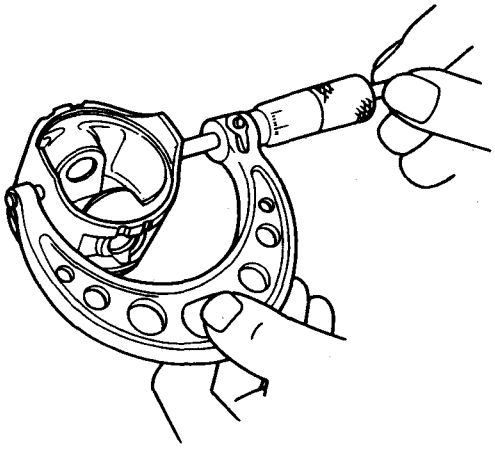
2. Measure piston diameter at a point 17.0 mm (0.67 in) from bottom of skirt.

   NOTE: There are two standard-size pistons (No letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the cylinder block as cylinder bore sizes.

Piston Diameter

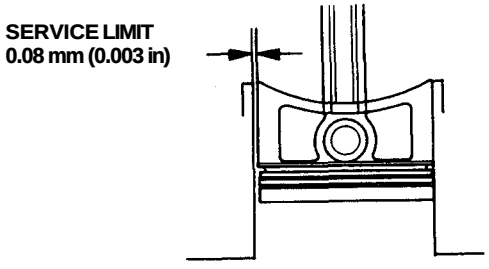
	Standard (New)	Service Limit
No Letter (A)	89.980 - 89.990 mm (3.5425 -3.5429 in)	89.970 mm (3.5421 in)
B	89.970-89.980 mm (3.5421-3.5425in)	89.960mm (3.5417 in)





3. Calculate the difference between cylinder bore diameter on page 7-13 and piston diameter.

Piston-to-Block Clearance
Standard (New): 0.02 - 0.04 mm
(0.001 - 0.002 in)
Service Limit: 0.08 mm (0.003 in)

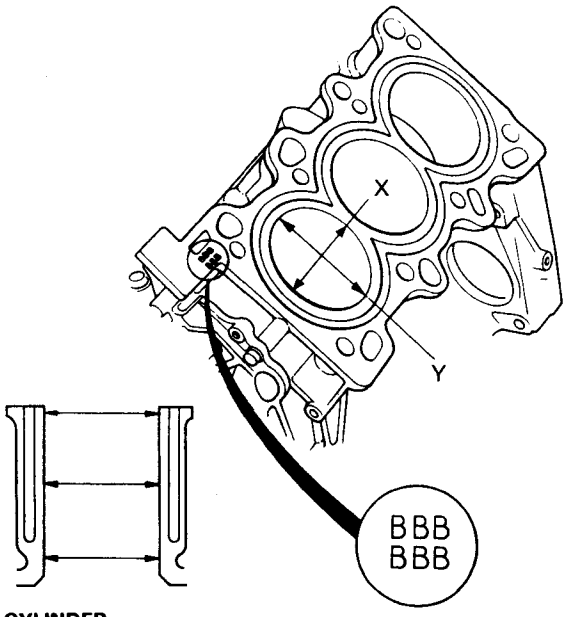


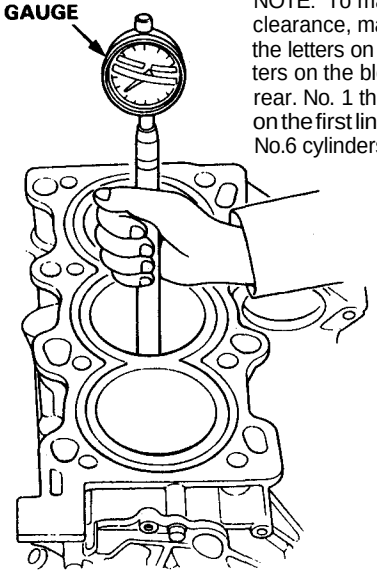
Oversize Piston Diameter
0.25: 90.220 - 90.230 mm (3.5520 - 3.5524 in)
0.50: 90.470 - 90.480 mm (3.5618 - 3.5622 in)

Cylinder Block

Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.





CYLINDER BORE SIZES (A or I, B or II)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from front to rear. No. 1 through No. 3 cylinders on the first line and No. 4 through No.6 cylinders on the second line.

Cylinder Bore Size

	Standard (New)	Service Limit
A or I	90.010-90.020 mm (3.5437 - 3.5441 in)	90.070 mm (3.5461 in)
B or II	90.000 -90.010 mm (3.5433 - 3.5437 in)	90.070 mm (3.5461 in)

Oversize
0.25: 90.250 - 90.270 mm (3.5531 - 3.5539 in)
0.50: 90.500 - 90.520 mm (3.5630 - 3.5638 in)

Bore Taper
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

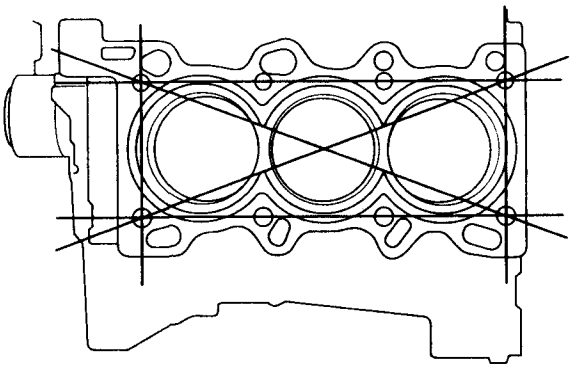
- If measurements in any cylinder are beyond oversize bore service limit, replace the cylinder block.
- If the block is to be rebored, refer to Piston Clearance Inspection (page 7-12) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.5 mm (0.02 in)

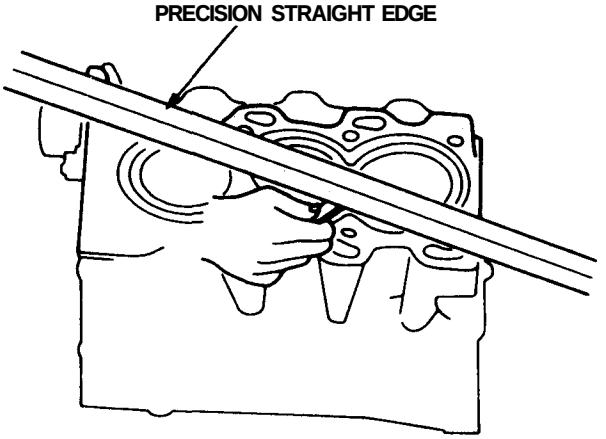
2. Check the top of the cylinder block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Cylinder Block Warpage:
Standard (New): 0.07 mm (0.003 in) max.
Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE



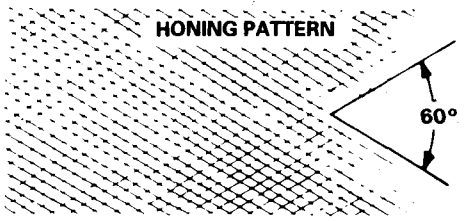
Cylinder Block

Bore Honing

1. Measure the cylinder bores as shown on page 7-13. If the cylinder block is to be reused, hone the cylinders and remeasure the bores.

2. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree crosshatch pattern.

   NOTE:
   - Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
   - Do not use stones that are worn or broken.

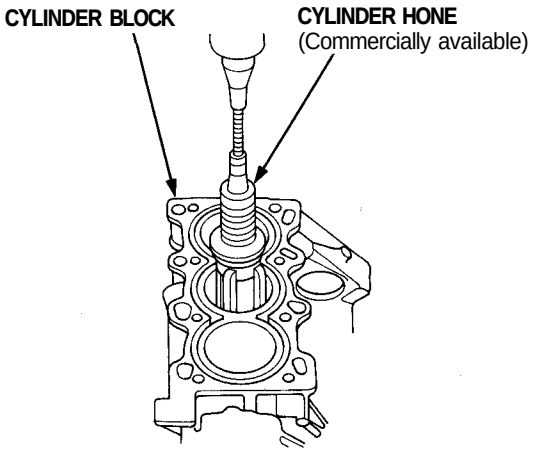


3. When honing is complete, thoroughly clean the cylinder block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them immediately to prevent rusting.

   NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in the cylinder bores after honing to the service limit, rebore the cylinder block.

   NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.

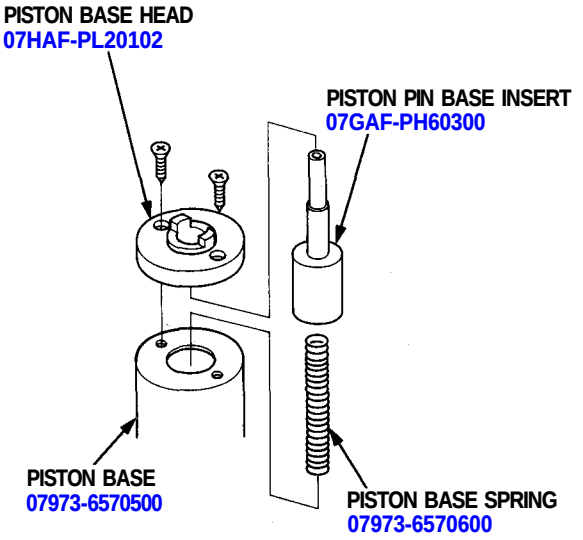


NOTE:
- After honing, clean the cylinder thoroughly with soapy water.
- Only scored or scratched cylinder bores must be honed.

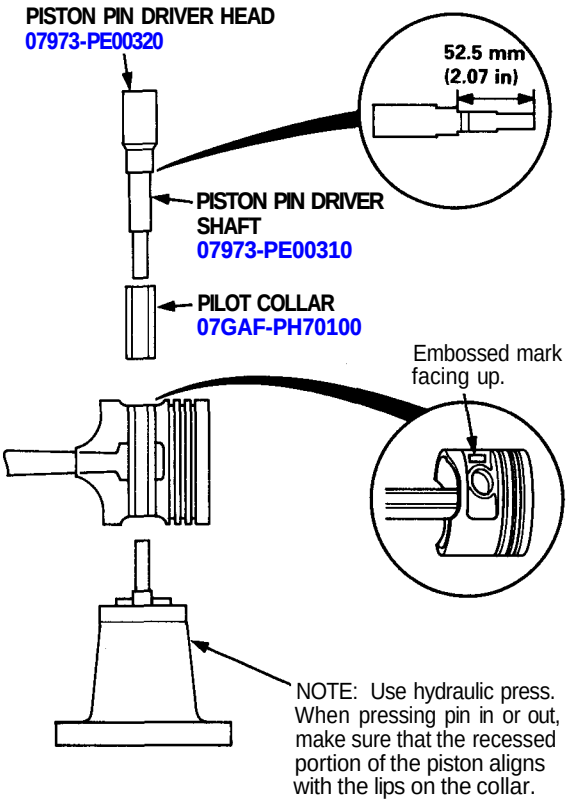
Piston Pins

Removal

1. Assemble the special tool as shown.



2. Adjust the length of the piston pin driver to 52.5 mm (2.07 in) as shown.



3. Place the piston on the piston base and press the pin out with a hydraulic press.

Connecting Rods

Piston Pins

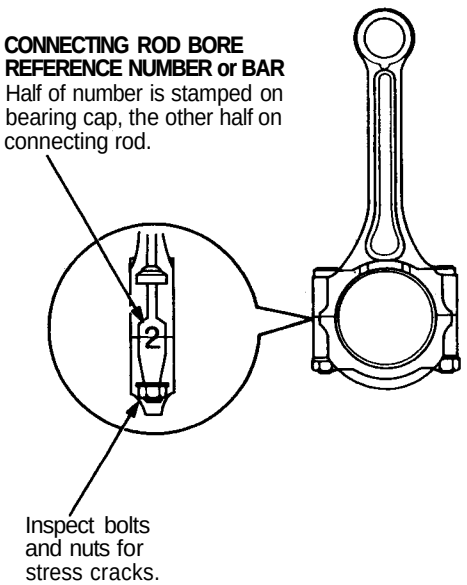
Selection

Each rod falls into one of four tolerance ranges (from O to 0.024 mm (0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore.
It's then stamped with a number (1, 2, 3 or 4/I, II, III or IIII) indicating the range. You may find any combination of 1, 2, 3 or 4/I, II, III or IIII in any engine.

Normal Bore Size: 57.0 mm (2.24 in)

NOTE:

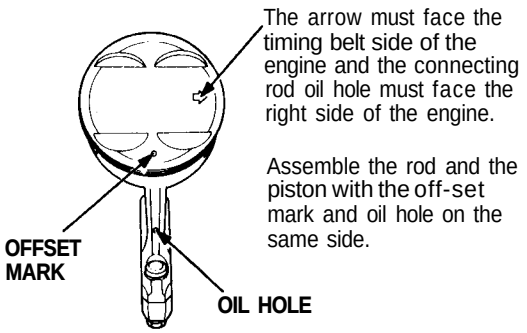
- Reference numbers or bars are for big end bore size and do not indicate the position of the rod in the engine.
- Inspect each connecting rod for cracks and heat damage.

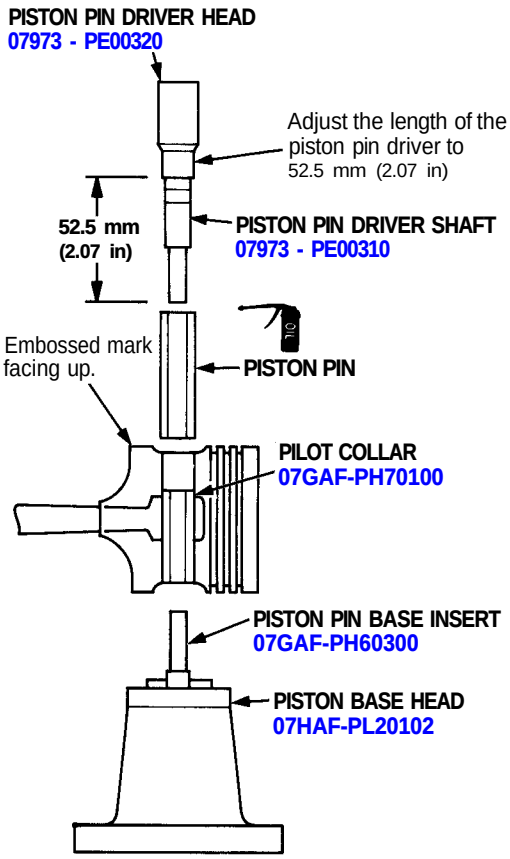


Installation

1. Use a hydraulic press for installation.

   - When pressing the pin in or out, be sure to position the recessed flat on the piston against the lugs on the piston base head.





NOTE: Use a hydraulic press. When pressing the pin in or out, make sure that the recessed portion of the piston aligns with the lugs on the piston base head.

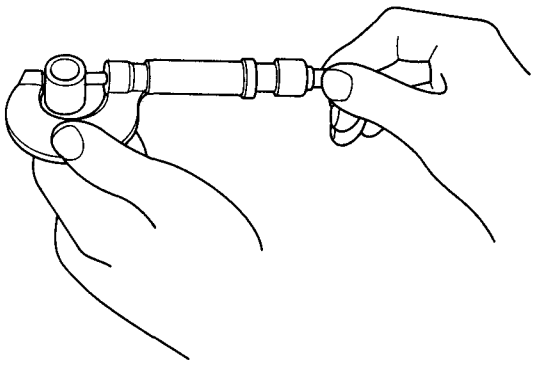
Piston Pins

Inspection

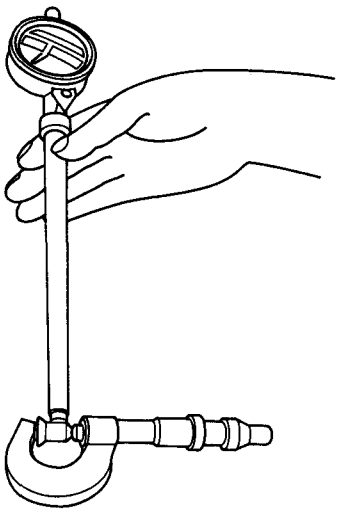
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): 21.994 - 22.000 mm
(0.8659 - 0.8661 in)
Oversize: 21.997 - 22.003 mm
(0.8660 - 0.8663 in)

NOTE: All replacement piston pins are oversize.



2. Zero the dial indicator to the piston pin diameter.

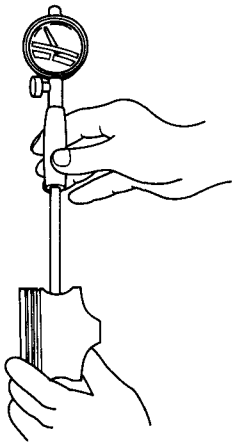


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

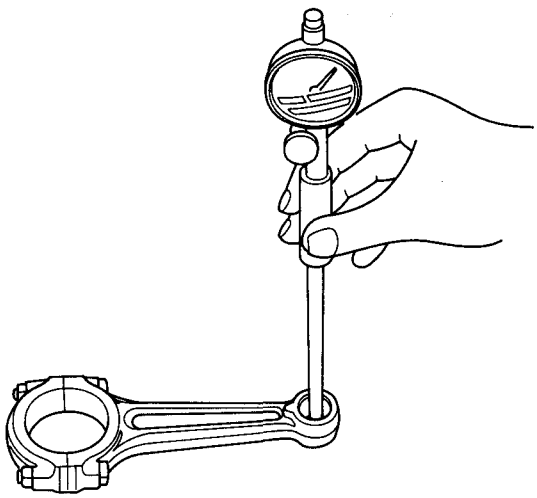
If the piston pin clearance is greater then 0.024 mm (0.0009 in), remeasure using an oversize piston pin.

Piston Pin-to-Piston Clearance:
Standard (New): 0.010 - 0.019 mm
(0.0004 - 0.0007 in)



4. Check the difference between the piston pin diameter and connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference:
Standard (New): 0.013 - 0.032 mm
(0.0005 - 0.0013 in)



Piston Rings

End Gap

1. Using a piston, push a new ring into the cylinder bore 15-20 mm (0.6 - 0.8 in) from the bottom.

2. Measure the piston ring end-gap with a feeler gauge:

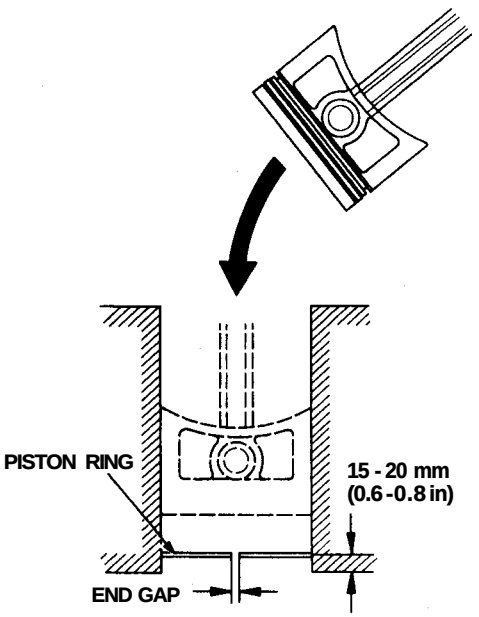
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-13. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:

Top Ring
Standard (New): 0.25 - 0.40 mm (0.010-0.016 in)
Service Limit: 0.70 mm (0.028 in)

Second Ring
Standard (New): 0.40 - 0.55 mm (0.016-0.022 in)
Service Limit: 0.85 mm (0.033 in)

Oil Ring
Standard (New): 0.20 - 0.70 mm (0.008 - 0.028 in) *1
0.20 - 0.50 mm (0.008 - 0.020 in) *2
Service Limit: 0.80 mm (0.031 in)



*1: RIKEN manufactured piston ring.
*2: TEIKOKU PISTON RING manufactured piston ring.

Replacement

1. Using a ring expander, remove the old piston rings.

2. Clean all ring grooves thoroughly.

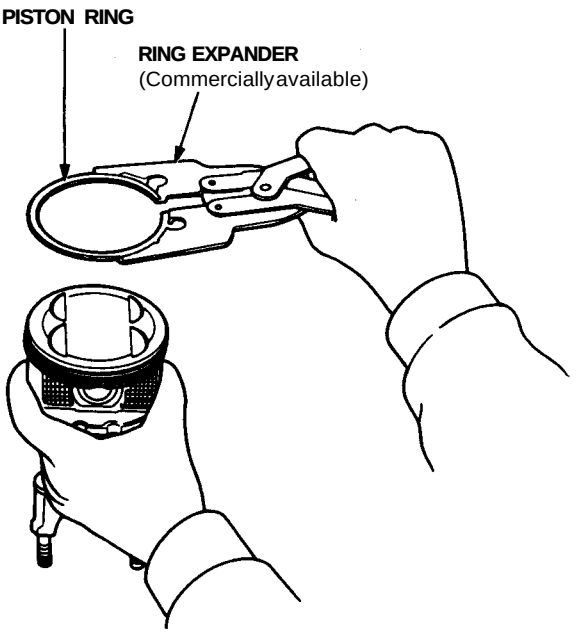
   NOTE:
   - Use a squared-off broken ring or ring groove cleaner with blade to fit the piston grooves. File down blade if necessary.
   - Top and 2nd ring grooves are 1.2 mm (0.05 in) wide and oil ring groove is 2.8 mm (0.11 in) wide.

   CAUTION: Do not use a wire brush to clean the ring grooves, or cut ring grooves deeper with the cleaning tool.

   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (page 7-18).

   NOTE: Do not reuse old piston rings.



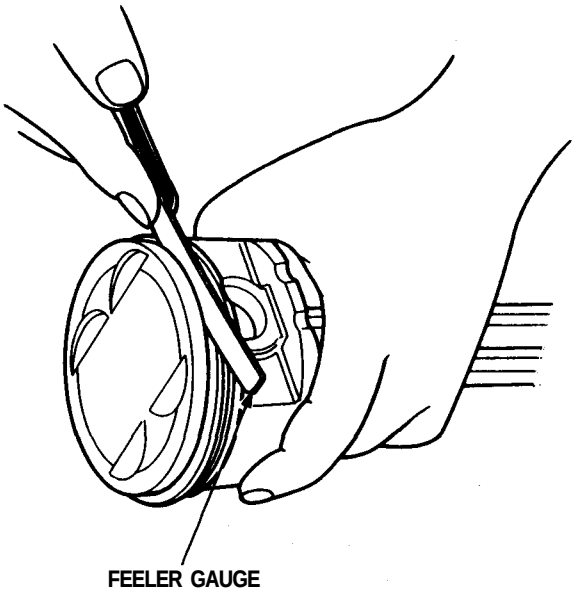
Piston Rings

Ring-to-Groove Clearance

After installing a new set of rings, measure the ring-to-groove clearance:

Top Ring Clearance
Standard (New): 0.055 - 0.080 mm (0.0022 - 0.0031 in)
Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance
Standard (New): 0.030 - 0.055 mm (0.0012 - 0.0022 in)
Service Limit: 0.13 mm (0.005 in)

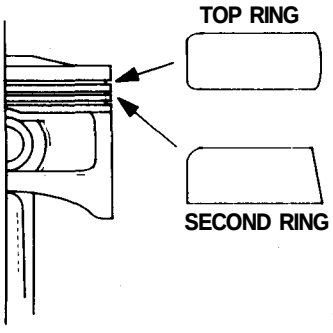


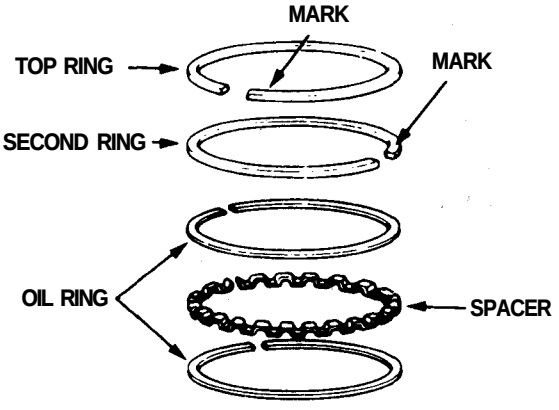
Alignment

1. Install the rings as shown on page 7-17.

   Identify the top and second rings by the chamfer on the edge. Make sure they are in the proper grooves on the piston.

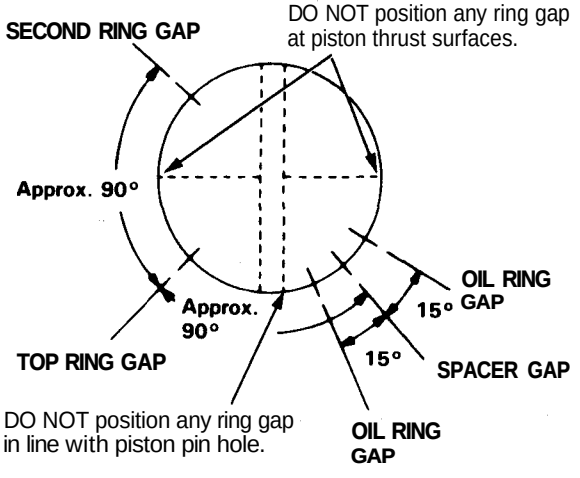
   NOTE: The manufacturing marks must be facing upward.





2. Rotate the rings in the grooves to make sure they do not bind.

3. Position the ring end gaps as shown:

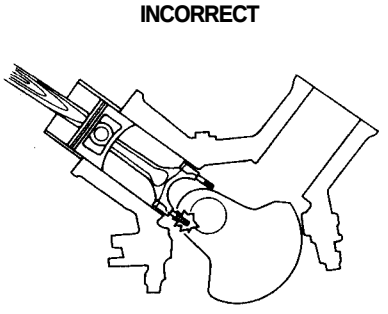


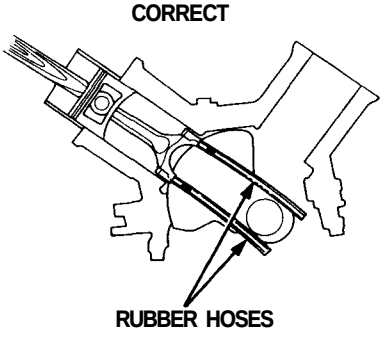
Pistons

Installation

Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

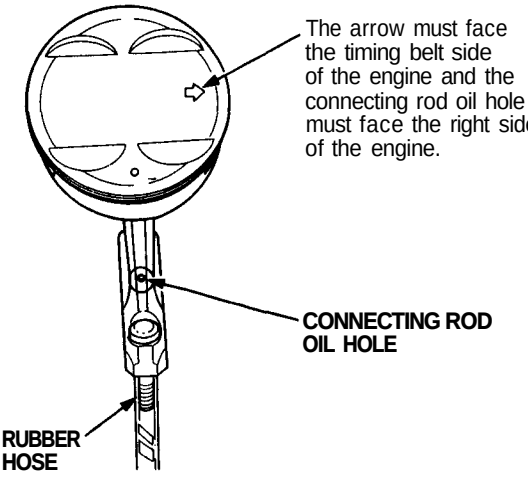
1. If the crankshaft is already installed:
   - Guide the piston carefully to prevent damage.
   - Fit long rubber hoses (about 30 cm (12 in) long) to the connecting rod bolts to protect the crankshaft.
   - Install the pistons after setting the crankshaft to BDC for each cylinder.



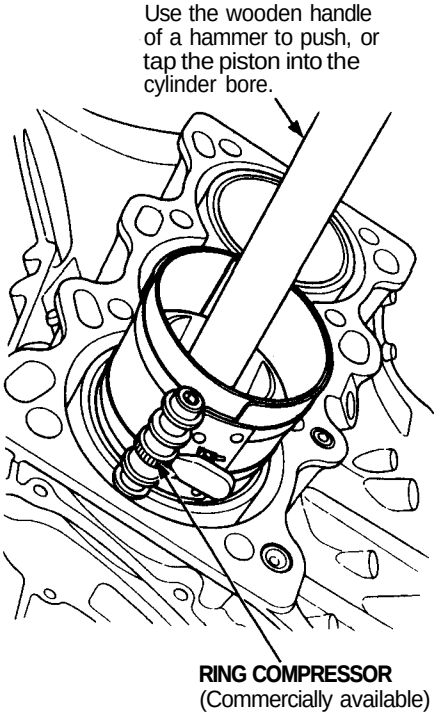


   - Remove the connecting rod caps, then slip the long rubber hoses over the threaded ends of the connecting rod bolts.
   - Install the ring compressor, check that the bearing is securely in place; then position the piston in the cylinder and tap it in using the wooden handle of a hammer.
   - Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
   - Install the rod caps with bearings, and torque the nuts to 44 N-m (4.5 kgf-m, 33 lbf-ft).

2. If the crankshaft is not installed:
   - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and tap it in using the wooden handle of a hammer.



NOTE: Maintain downward force on the ring compressor to prevent rings from expanding before entering the cylinder bore.



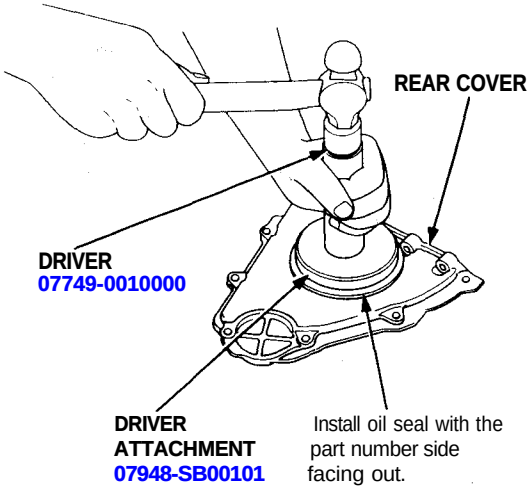
Crankshaft Oil Seal

Installation

OIL

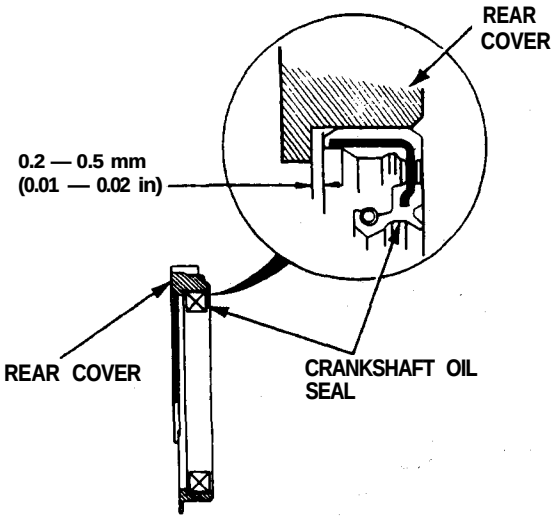
The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of the oil seal.

1. Using the special tool, drive the crankshaft oil seal into the rear cover.



2. Confirm that the clearance is equal all the way around with a feeler gauge.

Clearance: 0.2 - 0.5 mm (0.01 - 0.02 in)



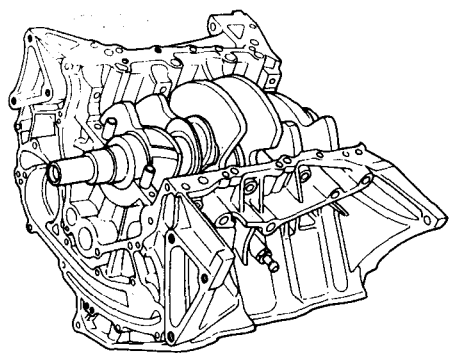
NOTE: Refer to pages 7-25 and 8-12 for installation of the oil pump side oil seal.

Crankshaft

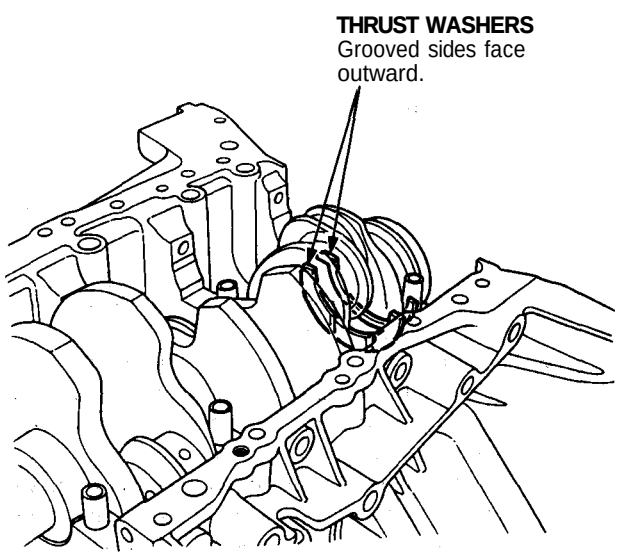
Installation

Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

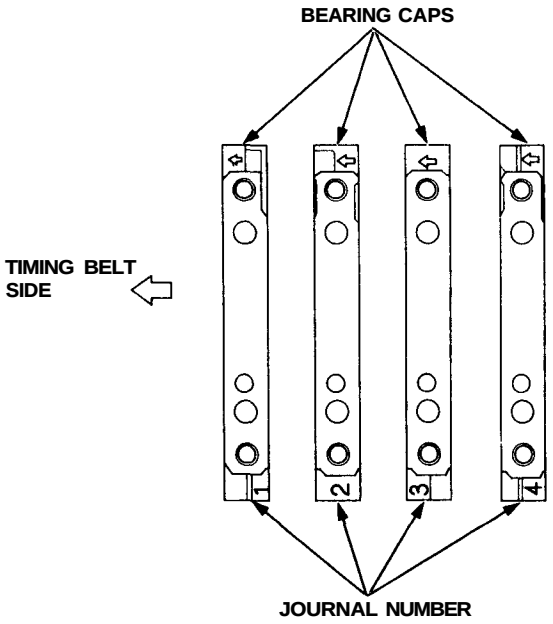
1. Insert the bearing halves in the cylinder block and connecting rods.
2. Lower the crankshaft into the block.

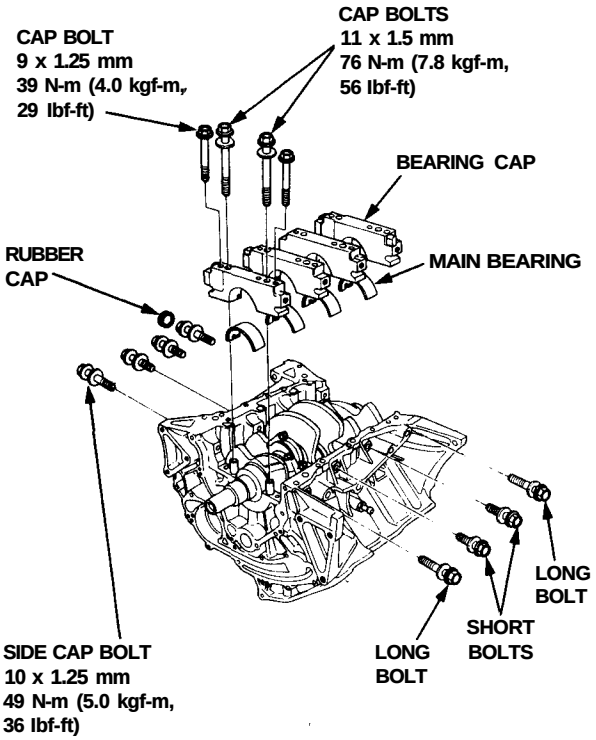


3. Install the thrust washers on the No. 4 journal. Oil the thrust washer surfaces.



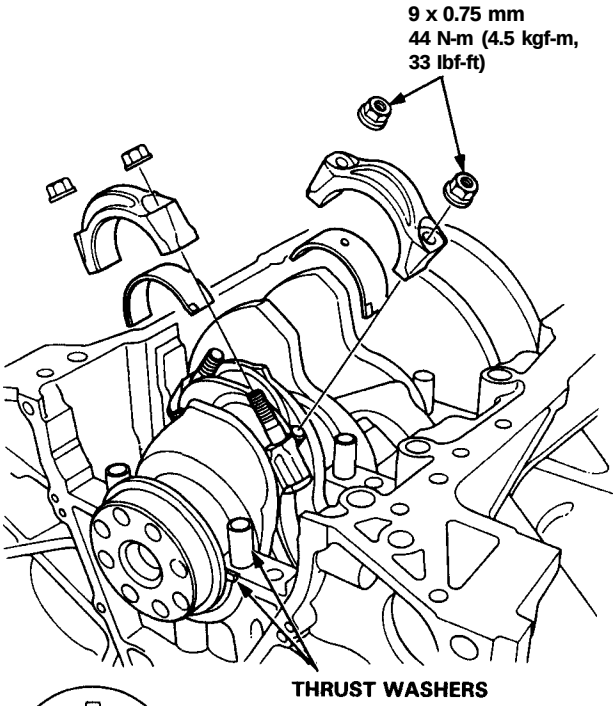
4. Install the bearings and caps. Torque the cap bolts.

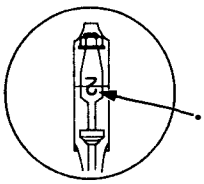




5. Check the connecting rod bearing clearance with plastigage (see page 7-7), then torque the connecting rod cap nuts.

NOTE: Reference numbers on the connecting rods are for big-end bore tolerance and do NOT indicate the position of the piston in the engine.





• Line up the mark when installing the connecting rod cap.

(cont'd)

Crankshaft

Installation (cont'd)

6. Tighten the 9 x 1.25 mm cap bolts to the specified torque.

   Torque: 39 N-m (4.0 kgf-m, 29 lbf-ft)

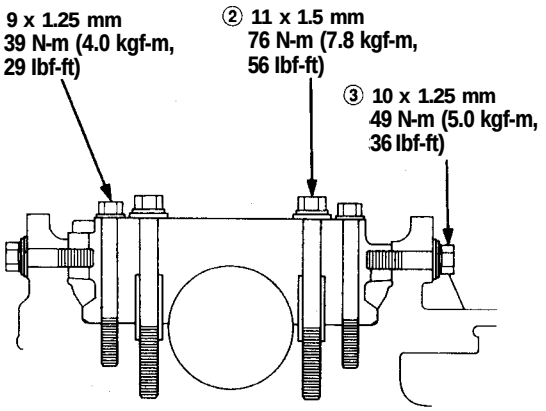
7. Tighten the 11 x 1.5 mm cap bolts to the specified torque.

   Torque: 76 N-m (7.8 kgf-m, 56 lbf-ft)

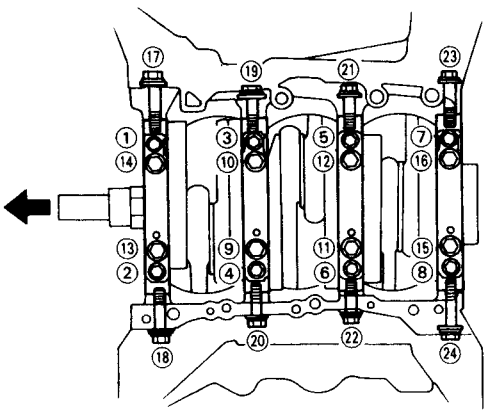
8. Tighten the 10 x 1.25 mm cap side bolts to the specified torque.

   Torque: 49 N-m (5.0 kgf-m, 36 lbf-ft)

   - Coat the bolt thread and seat surfaces with engine oil.

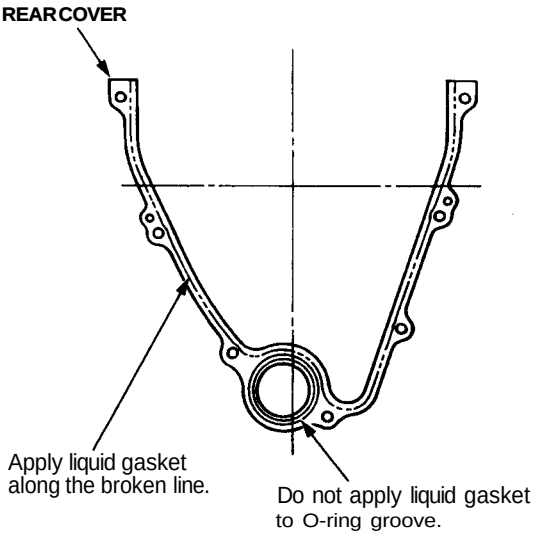


BEARING CAP BOLTS TORQUE SEQUENCE



CAUTION: Whenever any crankshaft bearing or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

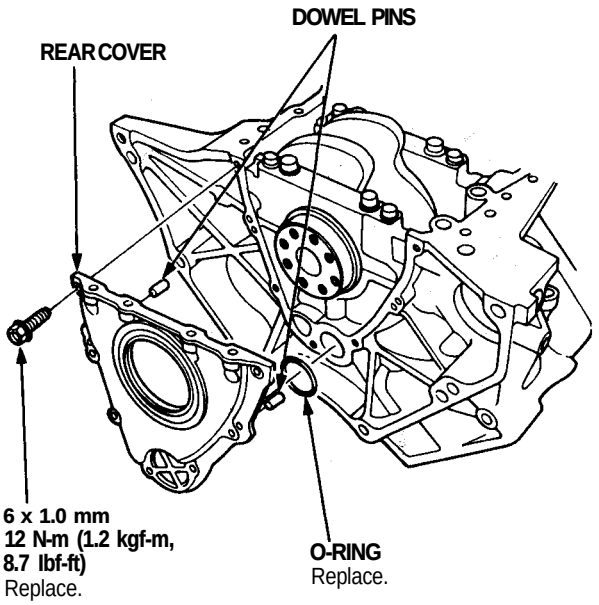
9. Apply liquid gasket to the cylinder block mating surface of the rear cover, then install it on the cylinder block.



NOTE:

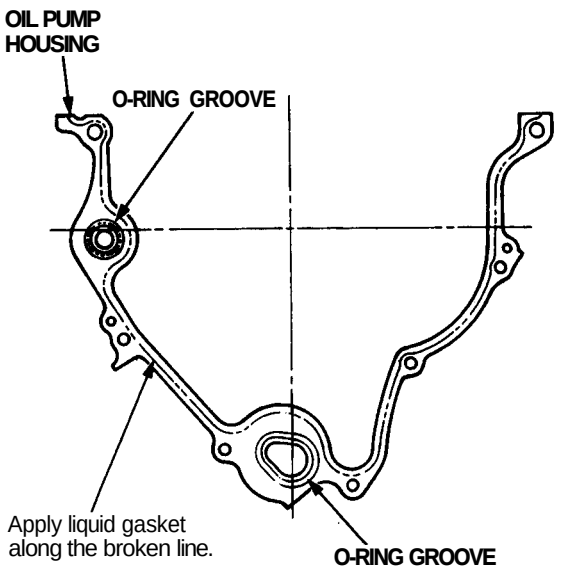
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent oil leakage, apply liquid gasket to the inner threads of the bolt holes.
- Do not apply liquid gasket to O-ring grooves.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

NOTE:
- Apply a light coat of oil to the crankshaft and to the lip of the oil seal.
- Use a new O-ring and apply oil when installing it.
- Use new special bolts when installing the rear cover.



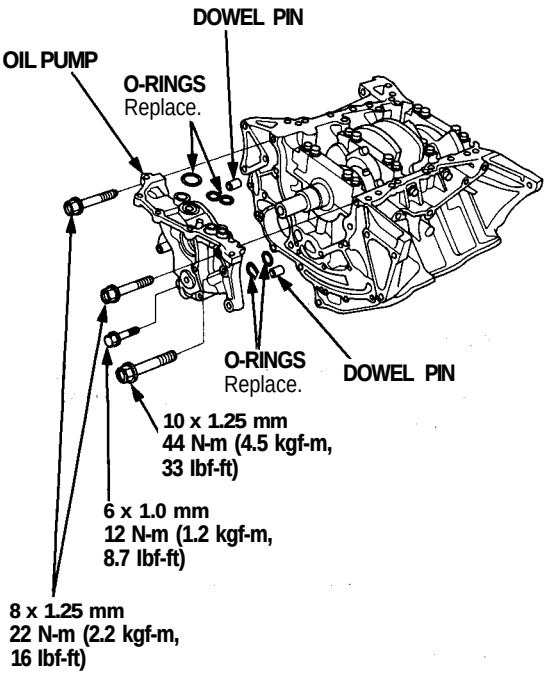
10. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE: Do not apply liquid gasket to O-ring grooves.



NOTE:
- Apply a light coat of oil to the crankshaft and to the lip of the seal.
- Use new O-rings and apply oil when installing them.
- Use new special bolts when installing the oil pump housing.

11. Install the oil pump with new O-rings.

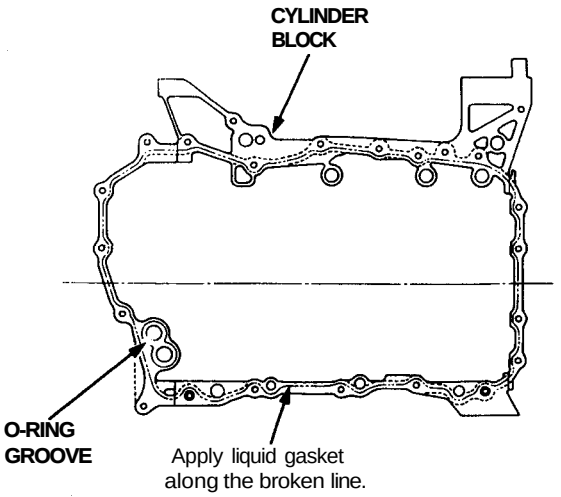


(cont'd)

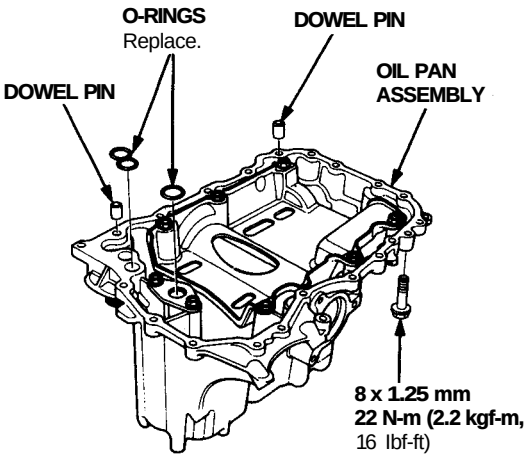
Crankshaft

Installation (cont'd)

12. Apply liquid gasket to the cylinder block, then install the oil pan.

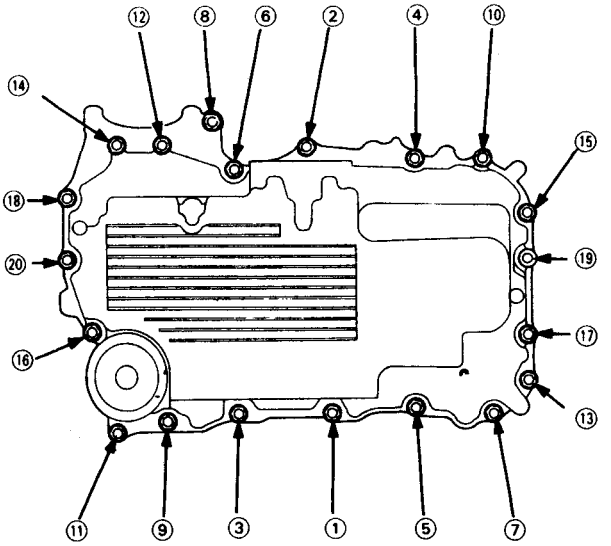


NOTE:
- Do not apply liquid gasket to the O-ring grooves.
- Use new O-rings and apply oil when installing them.



13. Tighten the oil pan bolts as shown.

OIL PAN BOLT TIGHTENING SEQUENCE
8 x 1.25 mm: 22 N-m (2.2 kgf-m, 16 lbf-ft)

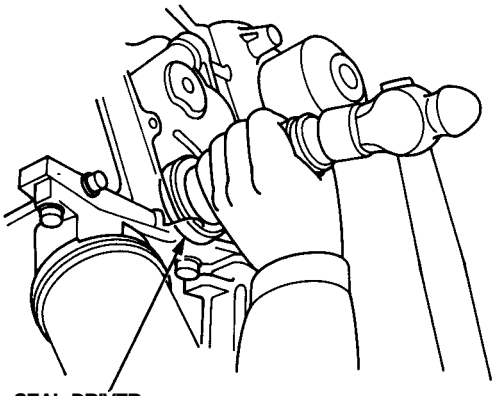


Crankshaft Oil Seals

Installation (engine removal not required)

NOTE: The seal surface on the block should be dry. Apply a light coat of grease to the crankshaft and to the lips of the seals.

1. Using the special tool, drive in the crankshaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

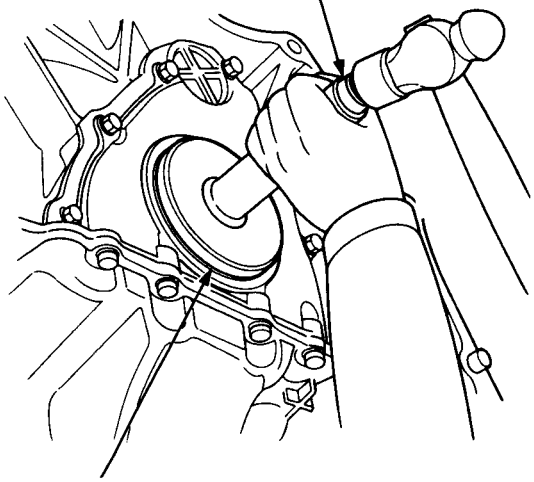


SEAL DRIVER
07GAD - PH70201
Install seal with the part number side facing out.

2. Measure the crankshaft oil seal thickness and the oil seal housing depth. Using the special tool, drive the crankshaft oil seal into the rear cover to the point where the clearance between the bottom of the oil seal and the rear cover is 0.2 - 0.5 mm (0.01 - 0.02 in) (see page 7-20).

NOTE: Align the hole in the driver attachment with the pin on the crankshaft.

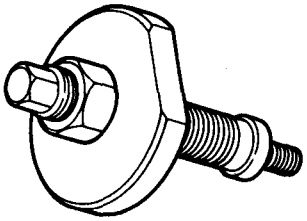
DRIVER
07749 - 0010000



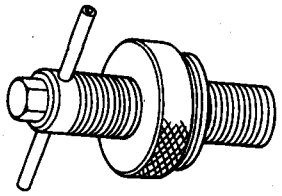
DRIVER ATTACHMENT
07948 - SB00101
Install seal with the part number side facing out.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAC-PW50101	Extension Shaft Puller	1	8-8
②	07MAF-PY40101	Extension Shaft Installer	1	8-10
③	07746-0010500	Attachment, 62 x 68 mm	1	8-13
④	07749-0010000	Driver	1	8-13
⑤	07912-6110001	Oil Filter Wrench	1	8-5



①



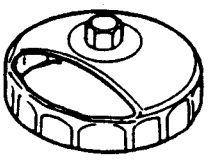
②



③



④

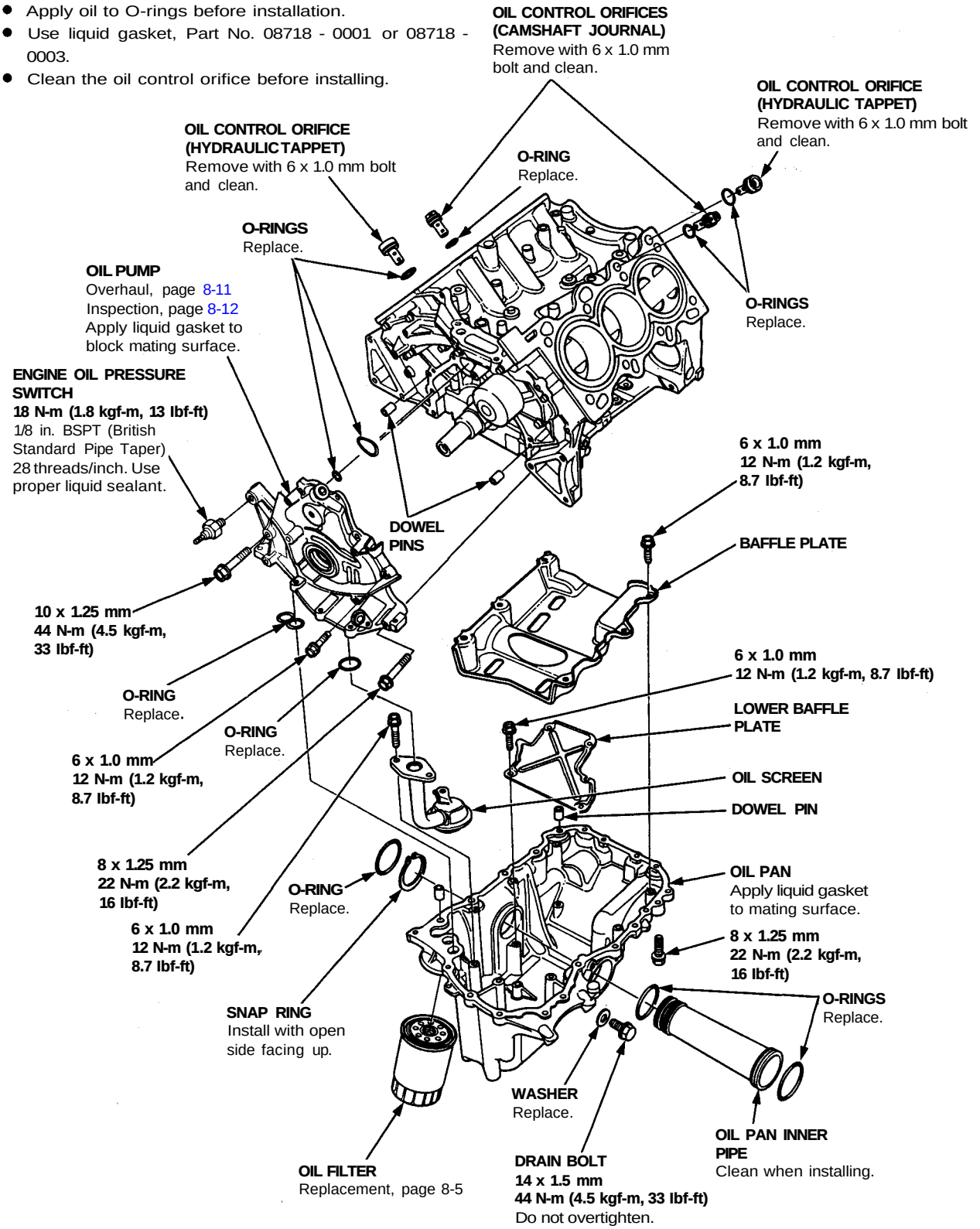


⑤

Illustrated Index

NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- Clean the oil control orifice before installing.



Engine Oil

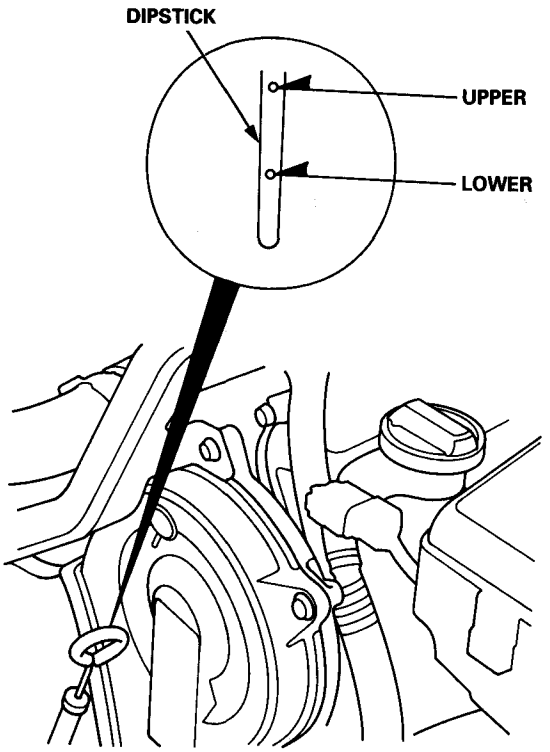
Inspection

1. Check engine oil with the engine off and the car parked on level ground.

2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.

3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

CAUTION: Insert the dipstick carefully to avoid bending it.

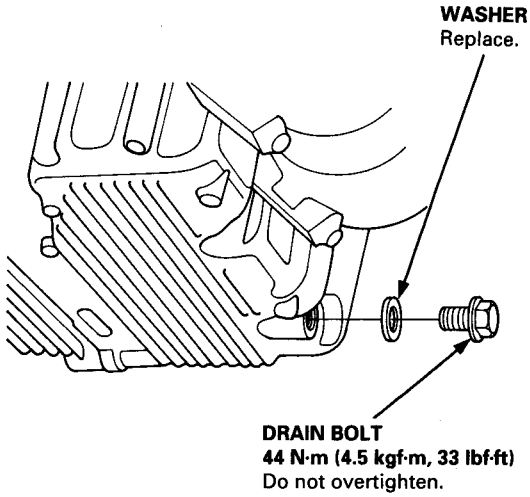


Engine Oil

Replacement

CAUTION: Remove the drain bolt carefully while the engine is hot; the hot oil may cause scalding.

1. Warm up the engine.
2. Drain the engine oil.

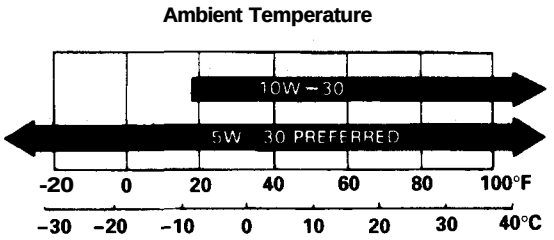


3. Reinstall the drain bolt with a new washer, and refill with the recommended oil.

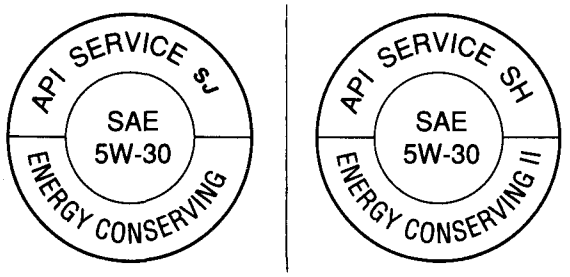
Requirement	API Service Grade: Use an "Energy Conserving" SJ grade oil or an "Energy Conserving II" SH grade oil, SAE 5 W – 30 preferred. You can also use an oil that bears the API CERTIFICATION mark.
Capacity	4.0 ℓ (4.2 US qt, 3.5 Imp qt) at oil change. 4.7 ℓ (5.0 US qt, 4.1 Imp qt) at oil change including filter. 5.3 ℓ (5.6 US qt, 4.7 Imp qt) after engine overhaul.
Change interval	Every 7,500 miles (12,000 km) or 12 months (Normal conditions) Every 3,750 miles (6,000 km) or 6 months (Severe conditions).

NOTE: Under normal conditions, the oil filter should be replaced at every oil change. Under severe conditions, the oil filter should be replaced at each oil change.

The numbers in the middle of the API Service label tell you the oil's SAE viscosity or weight. Select the oil for your car according to this chart:



An oil with a viscosity of 5W - 30 is preferred for improved fuel economy and year-round protection in the car. You may use a 10W - 30 oil if the climate in your area is limited to the temperature range shown on the chart.



API SERVICE LABEL



API CERTIFICATION MARK

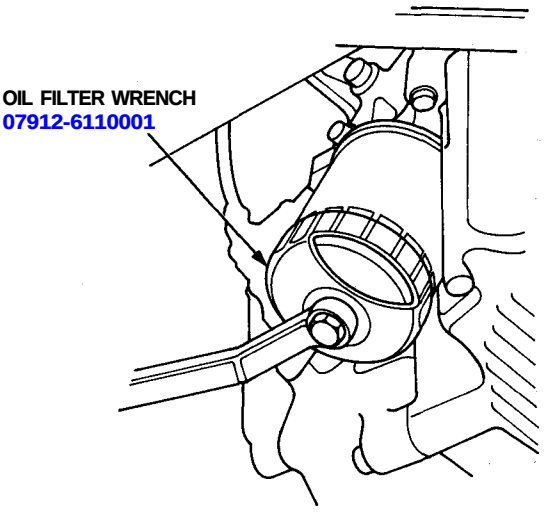
4. Run the engine for more than three minutes, then check for oil leakage.

Oil Filter

Replacement

CAUTION: Loosen the engine oil filter carefully while the engine is hot, the hot oil may cause scalding.

1. Remove the engine oil filter with the oil filter wrench.

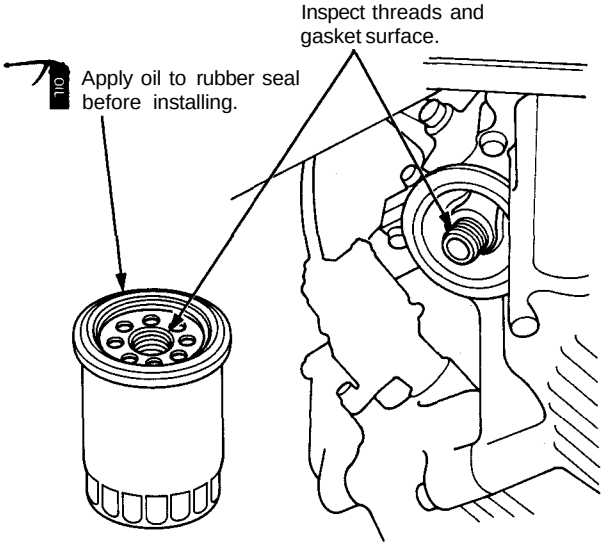


2. Inspect the threads and rubber seal on the new filter. Wipe off the seat on the oil filter base, then apply a light coat of oil to the rubber seal.

3. Install the oil filter by hand.

4. After the rubber seal is seated, tighten the oil filter by turning it approximately one turn.

Torque: One turn or 22 N-m (2.2 kgf-m, 16 lbf-ft).



4. Start the engine and check the filter for oil leakage.

Oil Pressure

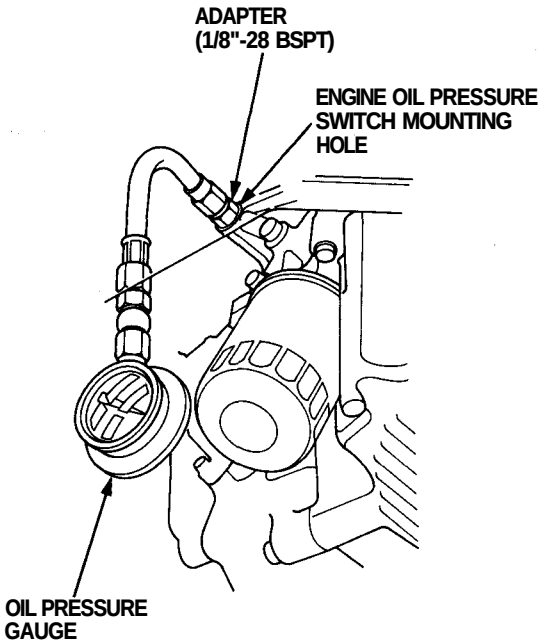
Testing

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Connect a tachometer.
2. Remove the engine oil pressure switch and install an oil pressure gauge.
3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

Engine Oil Temperature: 176°F (80°C)
Engine Oil Pressure:
At Idle: 70 kPa (0.7 kgf/cm^2,10 psi) minimum
At 3,000 rpm: 340 kPa (3.5 kgf/cm^2,50 psi) minimum

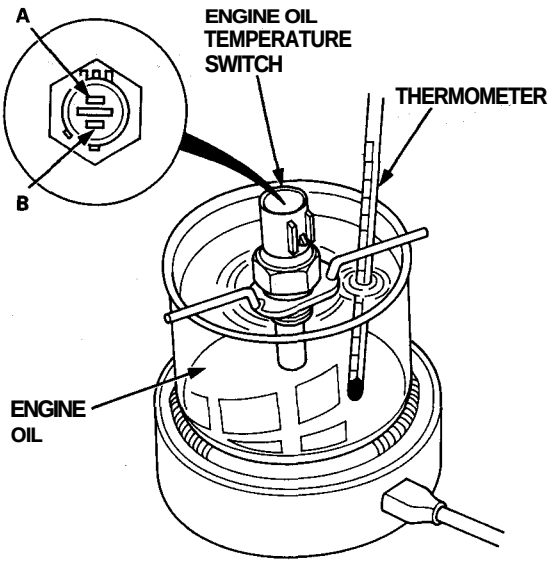
- If oil pressure is within specifications, replace the oil pressure switch and recheck.
- If oil pressure is NOT within specifications, inspect the oil pump (see page 8-12).



Engine Oil Temperature Switch

Testing

1. Remove the engine oil temperature switch from the right cylinder head cover (see page 6-12).
2. Suspend the engine oil temperature switch in a container of engine oil as shown.



3. Heat the engine oil and check the temperature with a thermometer.

CAUTION: Do not let the thermometer touch the bottom of the hot container.

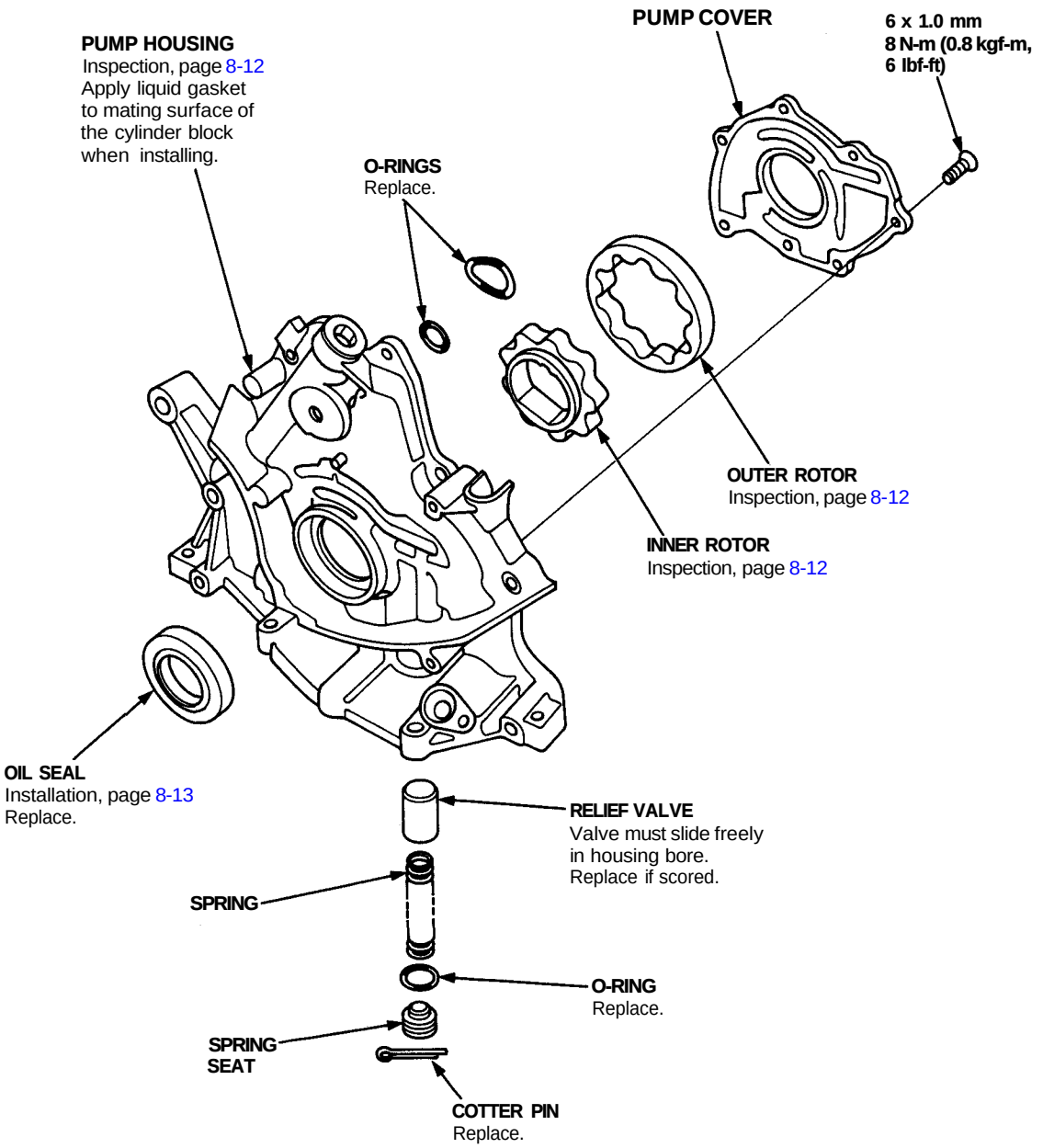
4. Measure the resistance between the A and B terminals according to the table.

Operation		Temperature	Terminal A	Terminal B
SWITCH	ON	192° – 203°F (89° – 95°C)	○	○
	OFF	18° – 36°F (10° – 20°C) lower than the temperature when it goes on		

Oil Pump

Overhaul

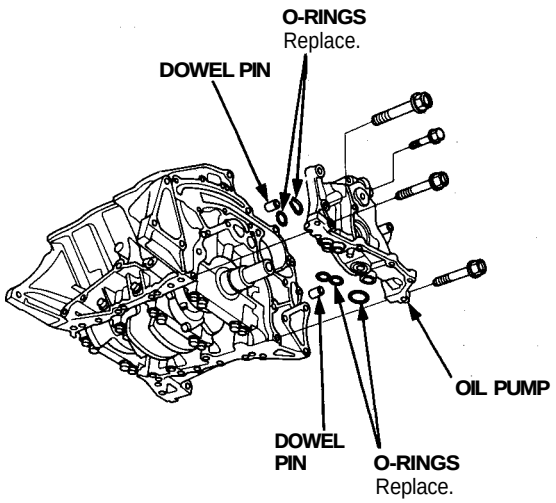
NOTE:
- Use new O-rings when reassembling.
- Apply oil to the O-rings before installation.
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- The rotors must be installed in the same direction.
- After reassembly, check that the rotors move without binding.



Oil Pump

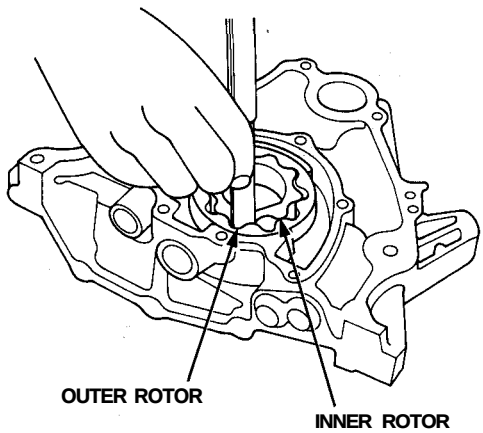
Removal/Inspection/Installation

1. Drain the engine oil and the differential oil.
2. Turn the crankshaft to TDC (see page 6-10).
3. Remove the timing belt (see page 6-6).
4. Remove the oil pan (see page 8-7).
5. Remove the special bolts, then remove the oil pump.



6. Remove the screws from the pump housing, then separate the housing and cover.
7. Check the inner-to-outer rotor radial clearance on the pump rotor.

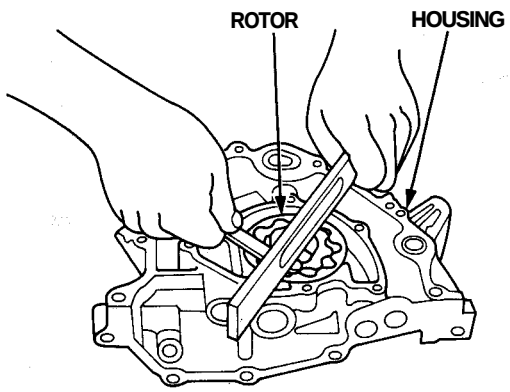
Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.02 - 0.16 mm (0.001 - 0.006 in)
Service Limit: 0.20 mm (0.008 in)



— If the inner-to-outer rotor clearance exceeds the service limit, replace the inner and outer rotors.

8. Check the housing-to-rotor axial clearance on the pump rotor.

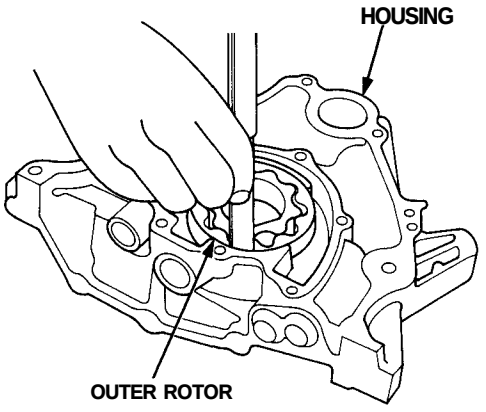
Housing-to-Rotor Axial Clearance
Standard (New): 0.02 - 0.07 mm (0.001 - 0.003 in)
Service Limit: 0.12 mm (0.005 in)



— If the housing-to-rotor axial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

9. Check the housing-to-outer rotor radial clearance.

Housing-to-Outer Rotor Radial Clearance
Standard (New): 0.10 - 0.18 mm (0.004 - 0.007 in)
Service Limit: 0.20 mm (0.008 in)

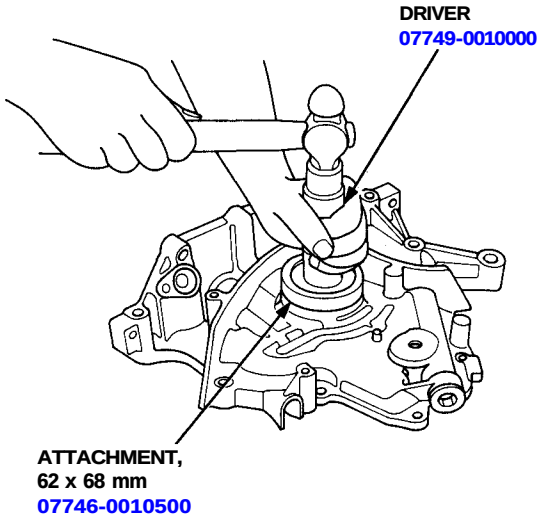


— If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

10. Inspect both rotors and the pump housing for scoring or other damage. Replace parts if necessary.

11. Remove the old oil seal from the oil pump.

12. Using the special tool, gently tap in the new crankshaft oil seal until the tool bottoms on the pump.



13. Reassemble the oil pump, applying liquid thread lock to the pump housing screws.

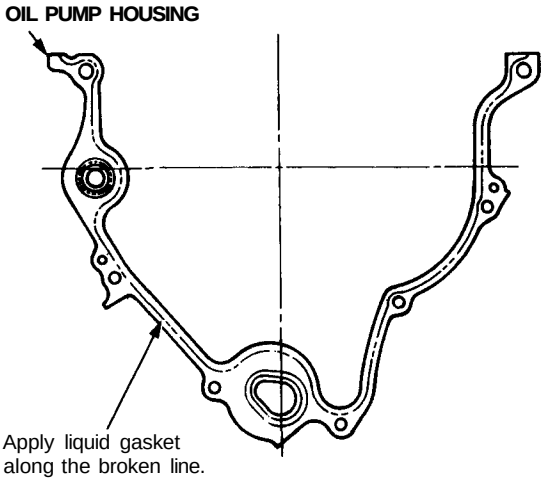
14. Check that the oil pump turns freely.

15. Apply a light coat of oil to the seal lip.

16. Install the two dowel pins and new O-ring on the cylinder block.

17. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE:
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- Do not apply liquid gasket to the O-ring grooves.
- To prevent leakage, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

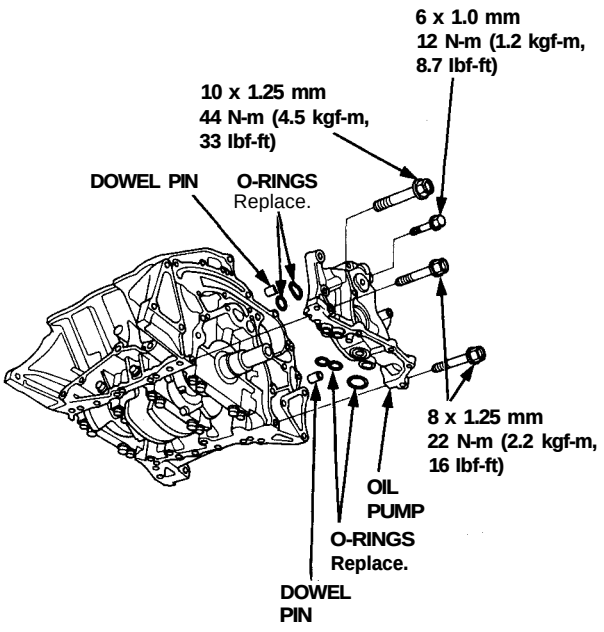


(cont'd)

Oil Pump

Removal/Inspection/Installation (cont'd)

18. Install the oil pump to the cylinder block.



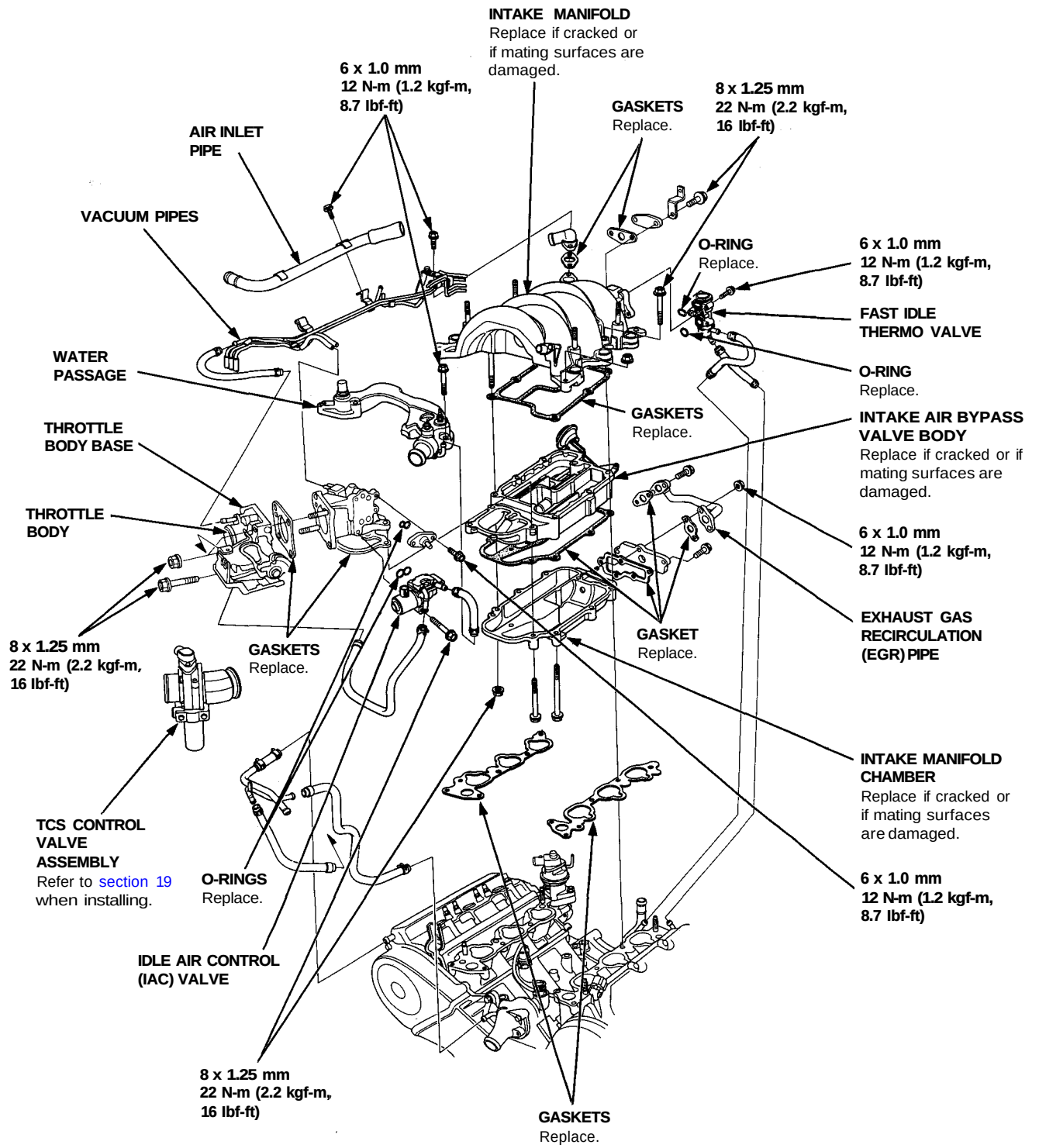
19. Install the oil pan (see page 8-9).

20. Install the timing belt (see page 6-8).

Intake Manifold

Replacement

NOTE: Use new O-rings and gaskets when reassembling.

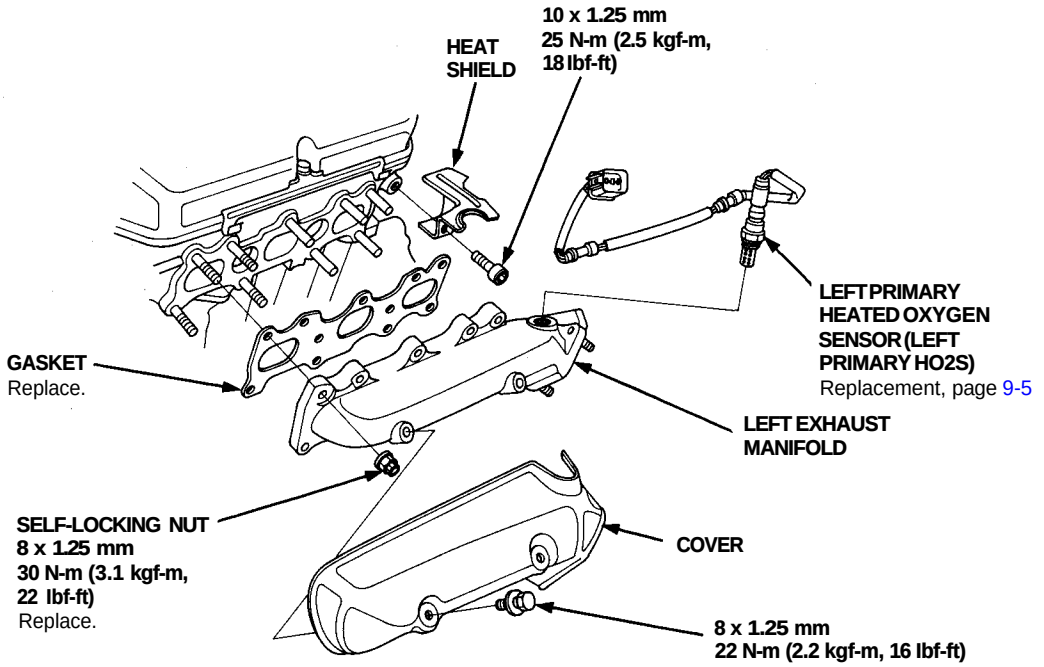


Exhaust Manifold

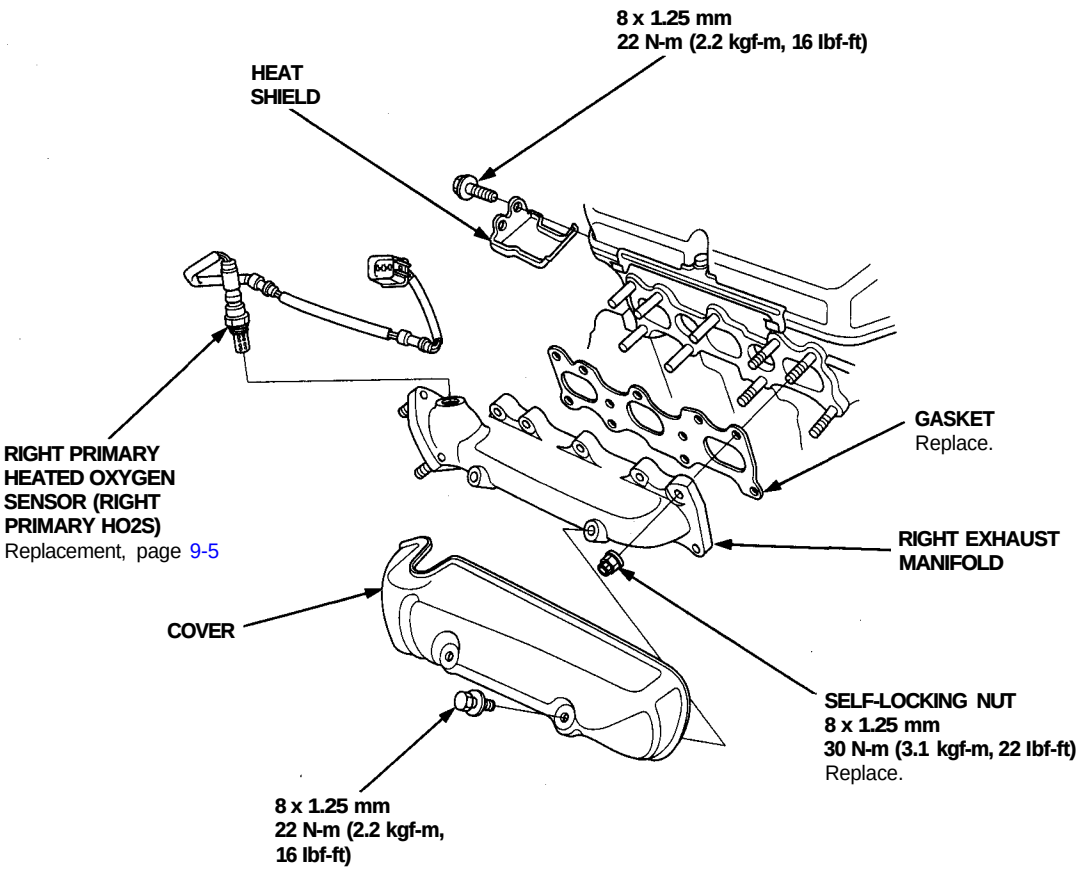
Replacement

NOTE: Use new gaskets and self-locking nuts when reassembling.

LEFT:



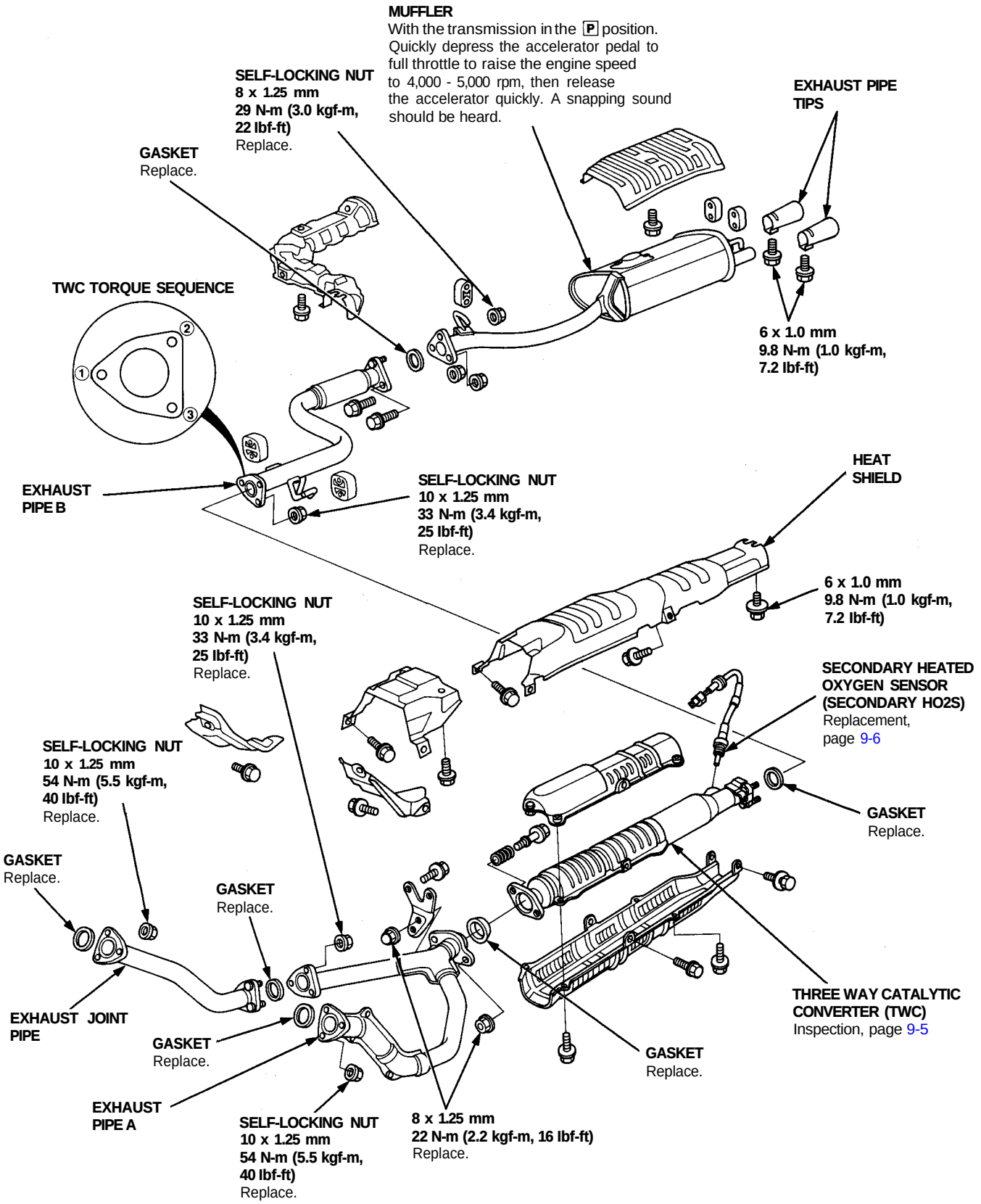
RIGHT:



Exhaust Pipe and Muffler

Replacement

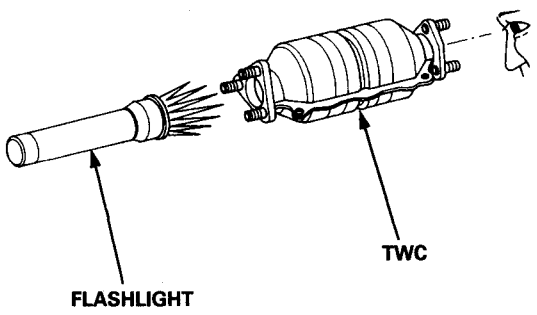
NOTE: Use new gaskets and self-locking nuts when reassembling.



TWC

Inspection

1. Using a flashlight, make a visual check for plugging, melting or cracking of the catalyst.



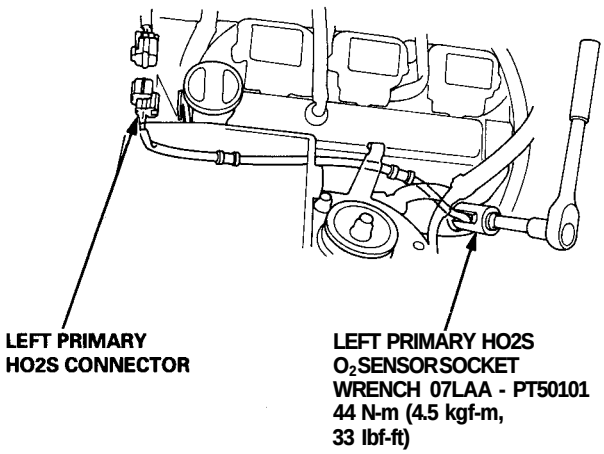
HO2S

Replacement

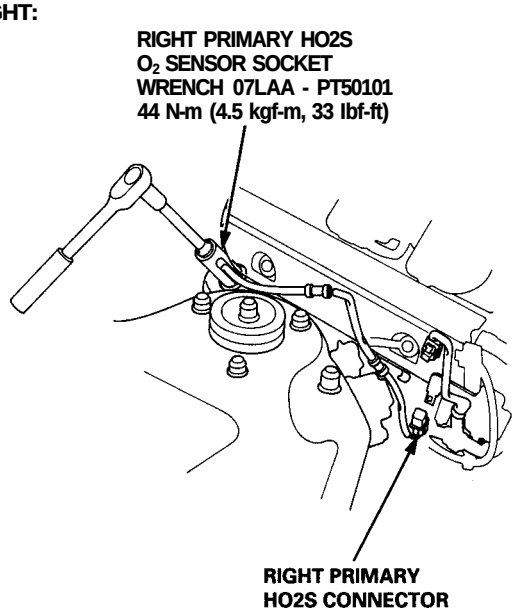
Primary HO2S:

1. Disconnect the left and/or right primary HO2S connector, then remove the left and/or right primary HO2S.

LEFT:



RIGHT:



2. Install the left and/or right primary HO2S in reverse order of removal.

(cont'd)

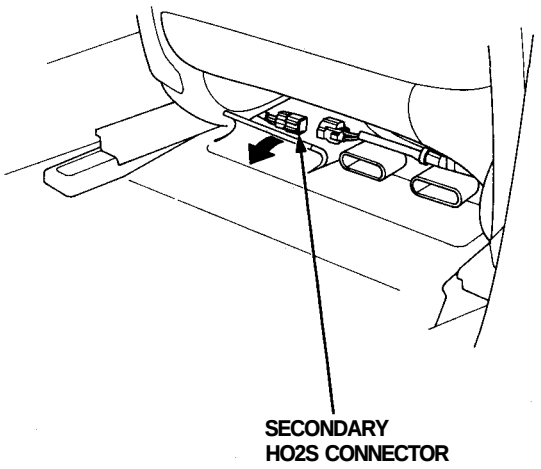
HO2S

Replacement (cont'd)

Secondary HO2S:

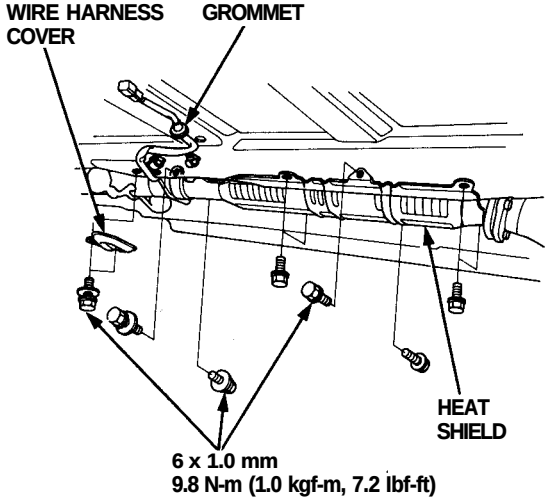
1. Move the front passenger's seat forward. Pull the carpet back to expose the secondary H02S connector.

2. Disconnect the secondary H02S connector.

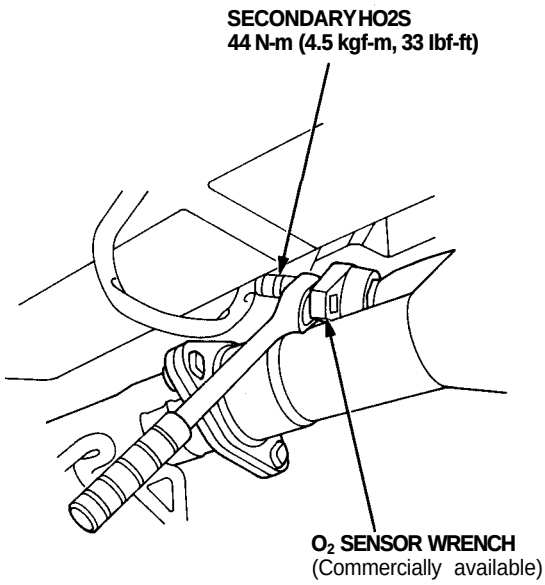


3. Remove the wire harness cover, then remove the grommet.

4. Remove the heat shields.



5. Remove the secondary H02S.



6. Install the secondary H02S in reverse order of removal.

Radiator

Illustrated Index

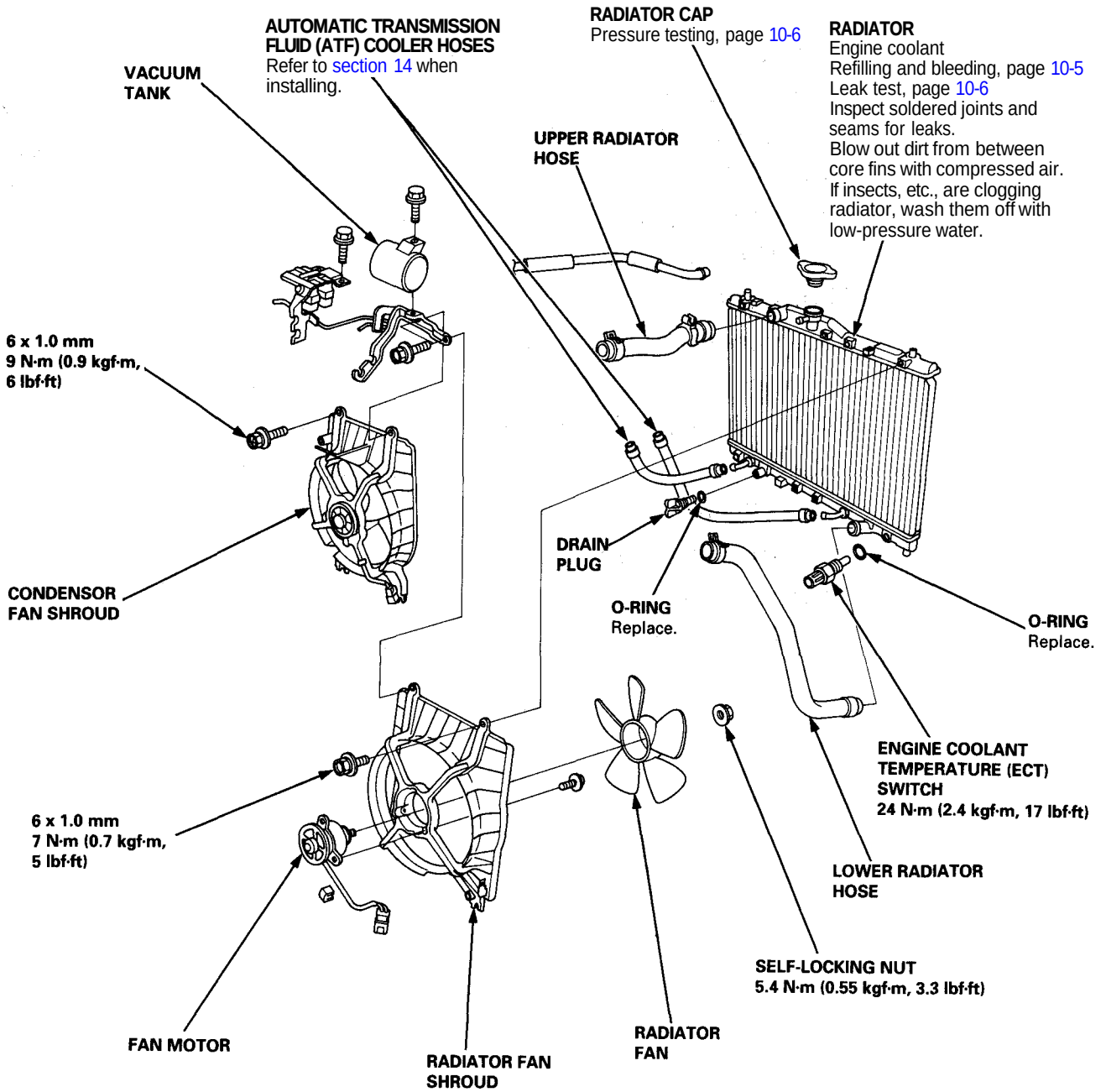
⚠ WARNING **System is under high pressure when the engine is hot. To avoid danger of releasing scalding coolant, remove the cap only when the engine is cool.**

Total Cooling System Capacity (Including heater and reservoir)

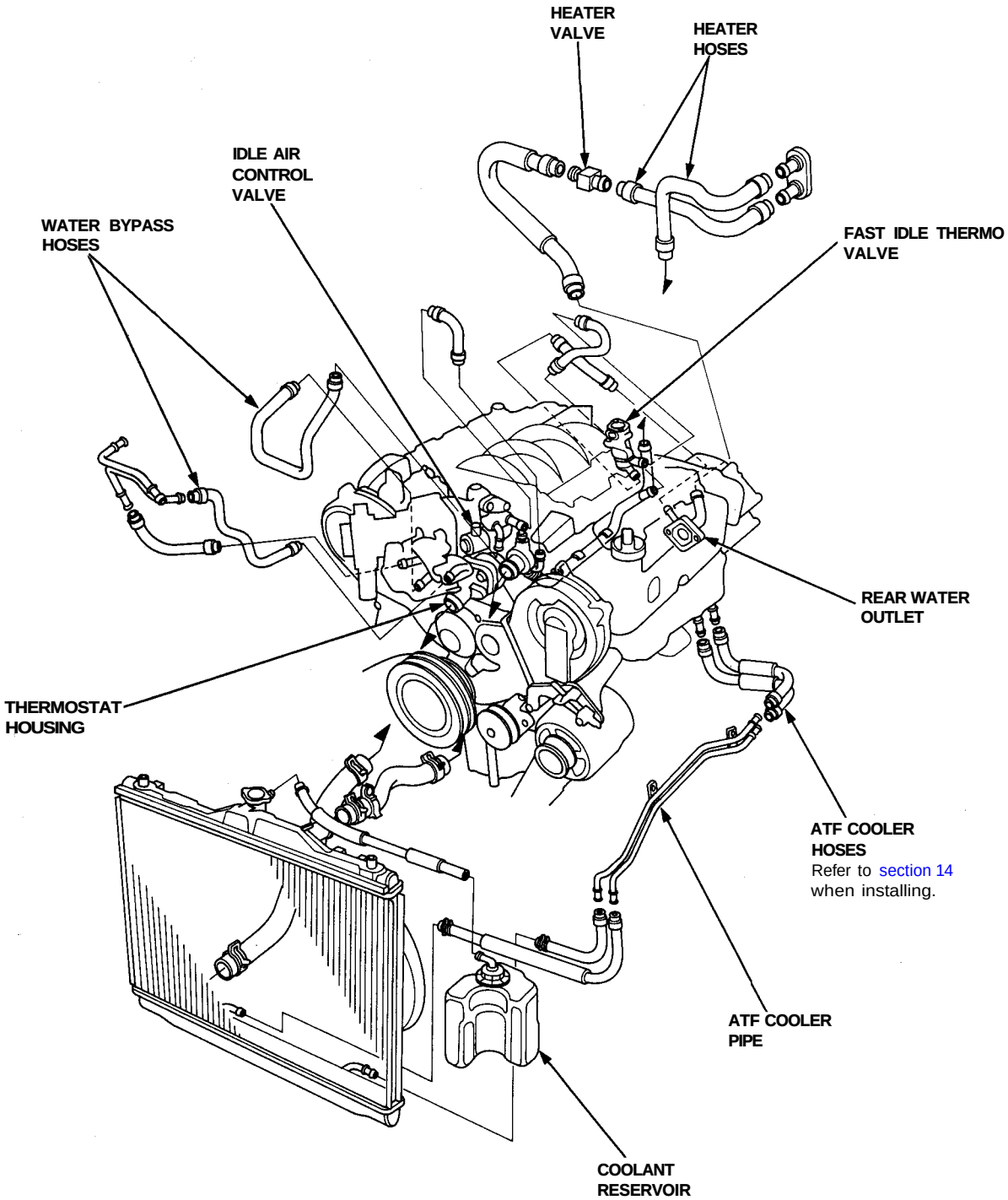
7.7 ℓ (8.1 US qt, 6.8 Imp qt)
Reservoir capacity: 0.65 ℓ (0.69 US qt, 0.57 Imp qt)

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to spill coolant on the electrical parts or the painted portion. If any coolant spills, rinse it off immediately.

NOTE:
- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.



Engine Hose Connections:



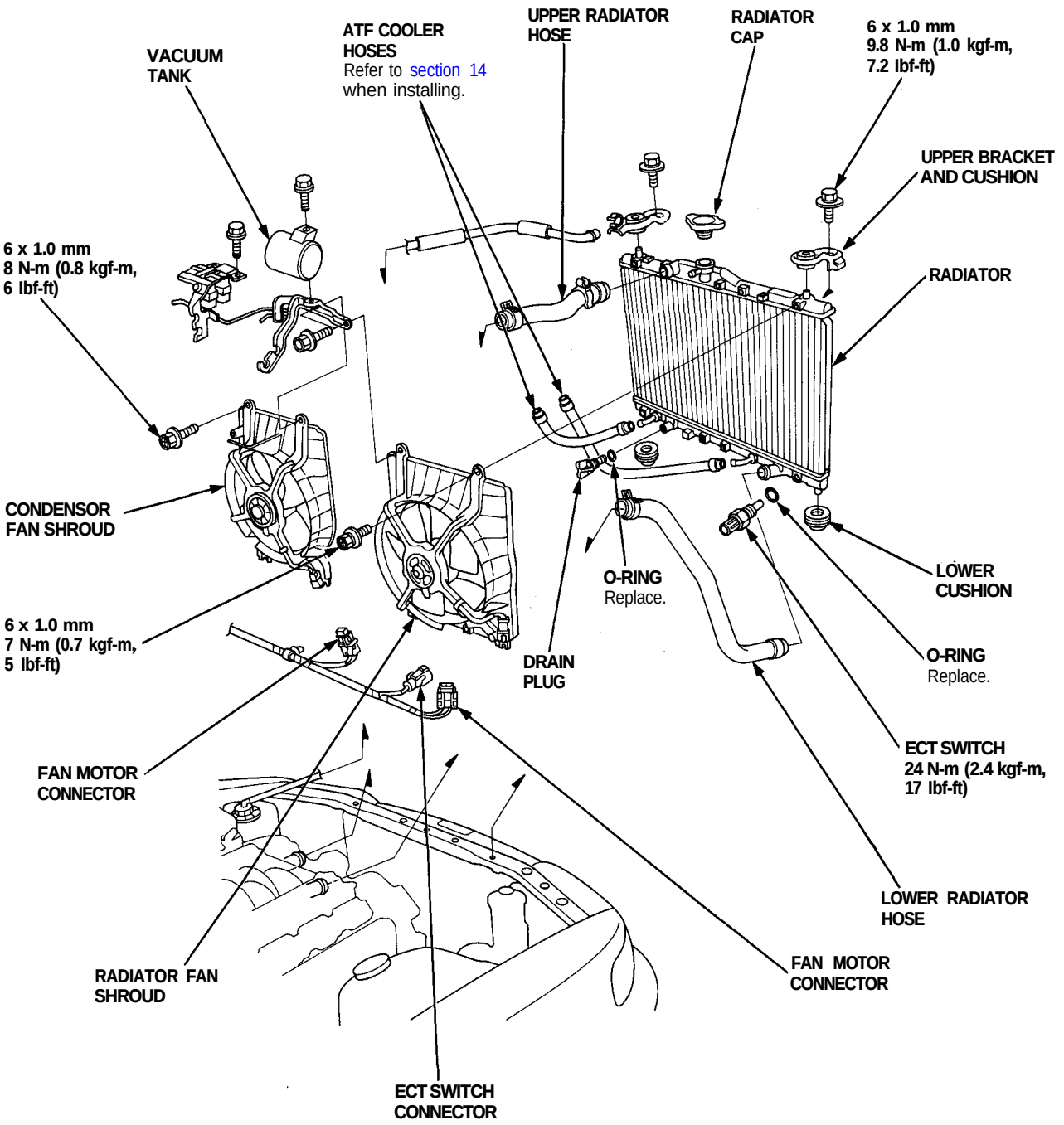
Radiator

Replacement

1. Drain the engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connectors and ECT switch connector.
4. Remove the radiator upper brackets, then pull up the radiator.
5. Remove the fan shroud assemblies and other parts from the radiator.

Install the radiator in the reverse order of removal:

NOTE:
- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.



Engine Coolant Refilling and Bleeding

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

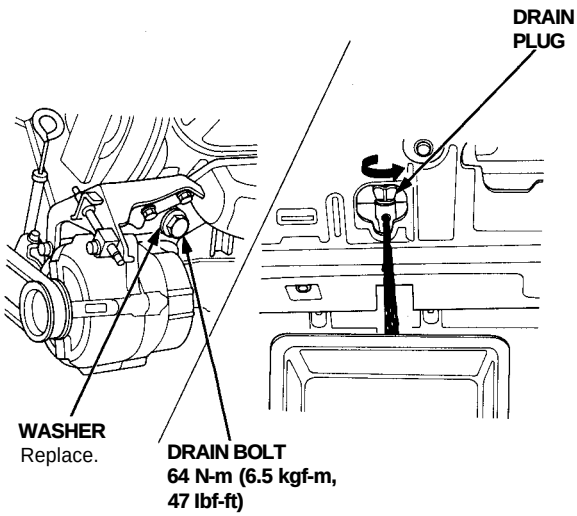
NOTE:
- Perform this procedure when the engine is cool.
- Before replacing the coolant, turn the ignition ON (II), slowly turn the climate control temperature knob to 90° and turn off the ignition. This will allow the coolant in the heater to drain out with the rest of the system.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative terminal first, then the positive terminal, then remove the battery and battery base (see page 5-4).

3. When the radiator is cool, remove the radiator cap. Loosen the drain plug, and drain the coolant.

4. Remove the drain bolt from the left side of the cylinder block to drain the block.



5. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.

6. Tighten the radiator drain plug securely.

7. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.

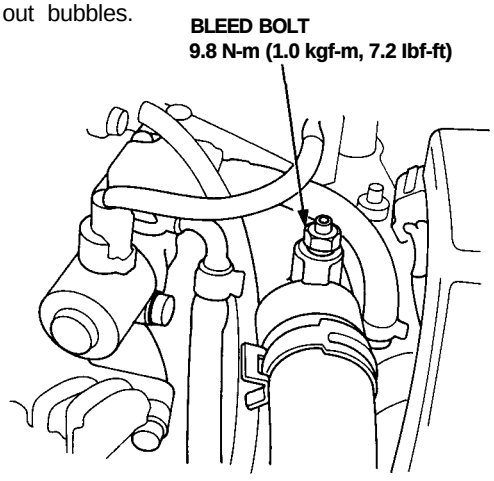
8. Mix the recommended antifreeze with an equal amount of water in a clean container.

NOTE:
- Use only genuine Honda antifreeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

CAUTION:
- **Do not mix different brands of antifreeze/coolants.**
- **Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the coolant.**

Engine Coolant Refill Capacity [Including reservoir (0.65 ℓ (0.69 US qt, 0.57 Imp qt))]:
3.2 ℓ (3.4 US qt, 2.8 Imp qt)

9. Loosen the air bleed bolt in the water passage, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.



10. With the radiator cap off, start the engine and let it run until warmed up (radiator fan comes on at least twice). Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.

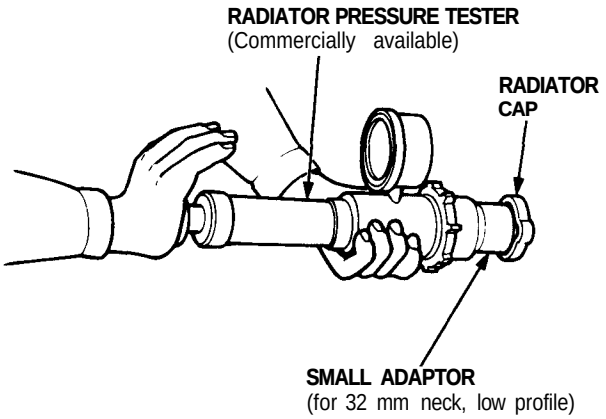
11. Put the radiator cap on tightly, then run the engine again and check for leaks.

12. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Radiator

Cap Testing

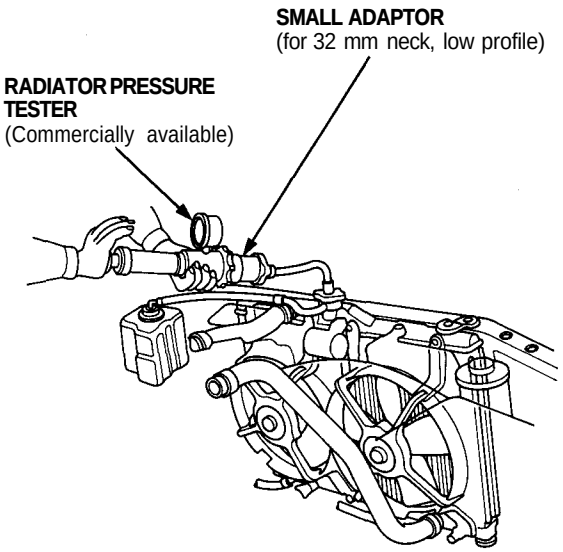
1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93-123 kPa (0.95-1.25 kgf/cm^2, 14- 18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



Testing

1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 93-123 kPa (0.95 - 1.25 kgf/cm^2, 14 - 18 psi).
3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the radiator cap.

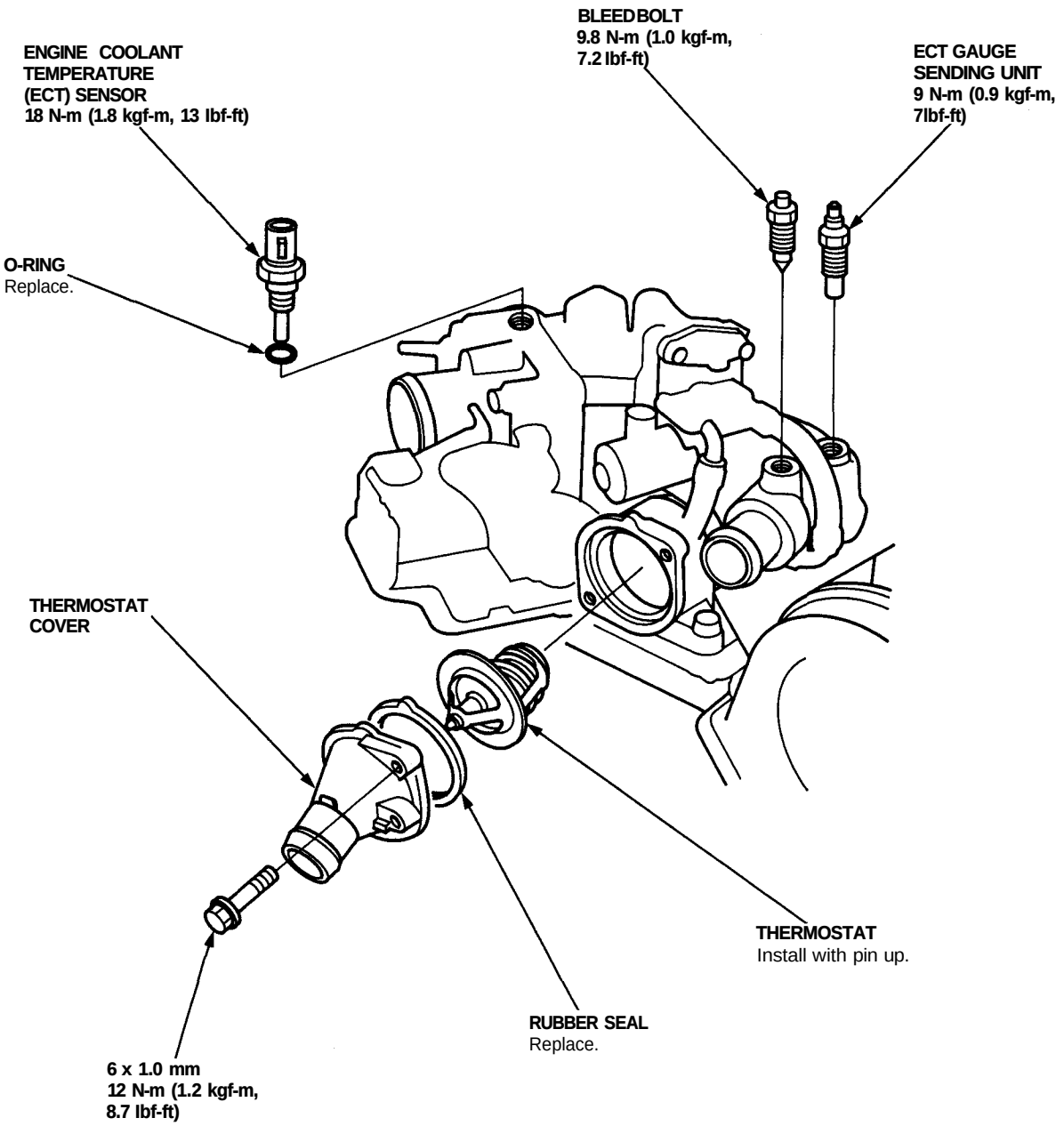
   NOTE: Check for engine oil in the coolant and/or coolant in the engine oil.



Thermostat

Replacement

NOTE: Use new O-rings when reassembling.



Thermostat

Testing

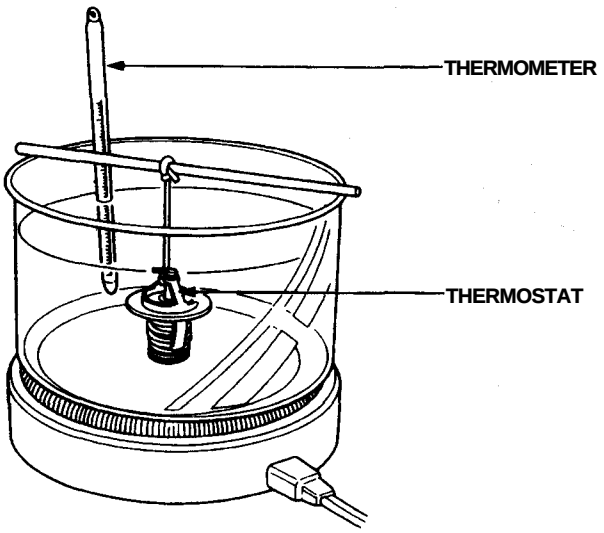
Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

1. Suspend the thermostat in a container of water as shown.
2. Heat the water, and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.

   CAUTION: Do not let the thermometer touch the bottom of the hot container.
3. Measure lift height of the thermostat when it is fully open.

STANDARD THERMOSTAT
Lift height: above 10.0 mm (0.39 in)
Starts opening: 169-176°F (76-80°C)
Fully open: 194°F (90°C)



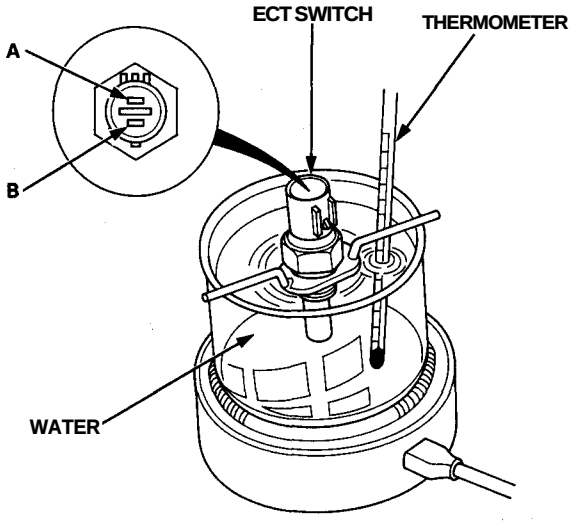
ECT Switch

Testing

⚠ WARNING Removing the ECT switch while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the ECT switch.

NOTE: Bleed air from the cooling system after installing the ECT switch (see page 10-5).

1. Remove the ECT switch from the radiator (see page 10-2).
2. Suspend the ECT switch in a container of water as shown.



3. Heat the water and check the temperature with a thermometer.

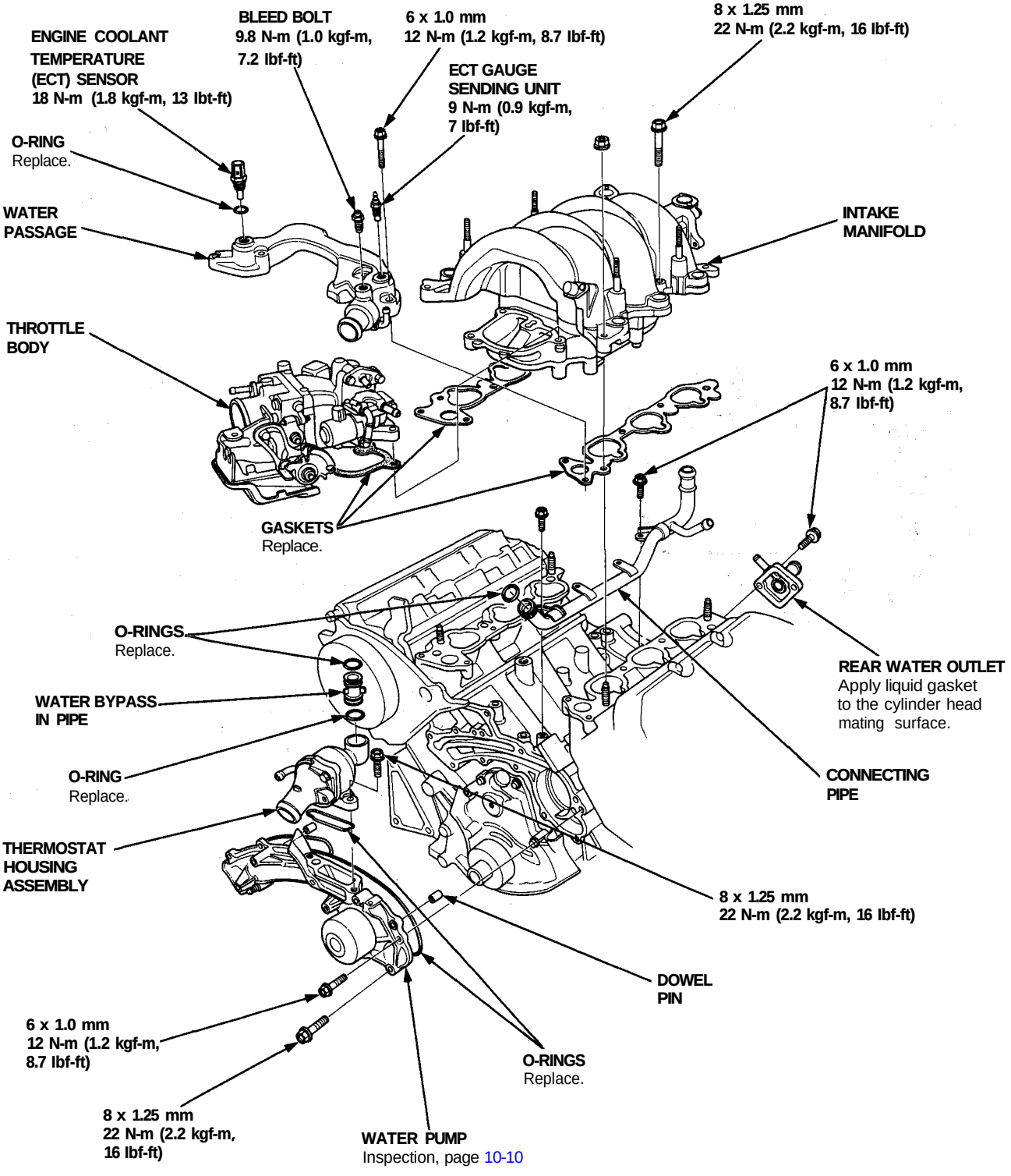
   CAUTION: Do not let the thermometer touch the bottom of the hot container.
4. Measure the resistance between the A and B terminals according to the table.

Operation		Temperature	Terminal A	Terminal B
SWITCH	ON	189 – 199°F (87 – 93°C)	○	○
	OFF	4 – 13°F (2 – 7°C) lower than the temperature when it goes on		

Water Pump

Illustrated Index

NOTE:
- Use new O-rings when reassembling.
- Use liquid gasket, Part No. 08718-0001 or 08718 - 0003.

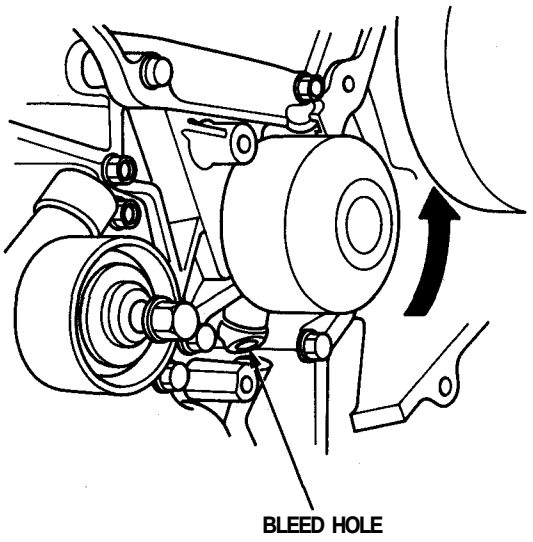


Water Pump

Inspection

1. Remove the timing belt (see page 6-6).
2. Turn the water pump pulley counterclockwise. Check that it turns freely.
3. Check for signs of seal leakage.

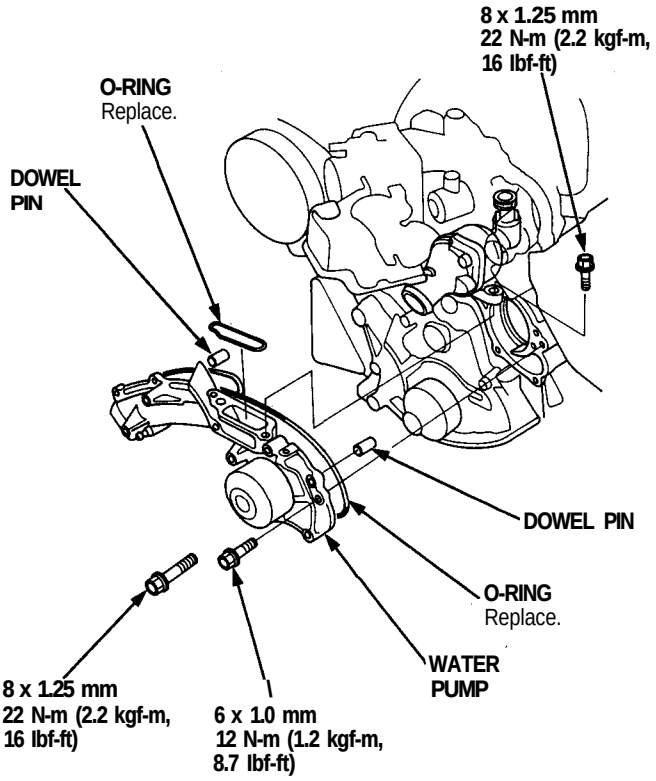
   NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see page 6-6).
2. Remove the left camshaft pulley and back cover (see page 6-19).
3. Remove the water pump.

   NOTE: Inspect, repair and clean the O-ring groove and mating surface with the cylinder block.

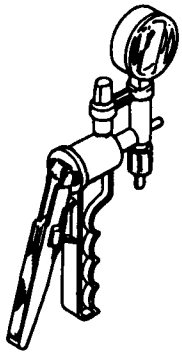


4. Install the water pump in the reverse order of removal.

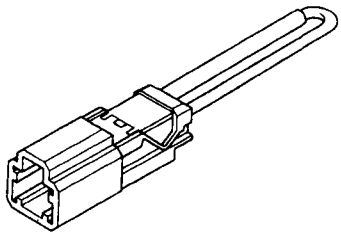
   NOTE:
   - Keep the O-ring in position when installing.
   - Clean the spilled engine coolant.

Special Tools

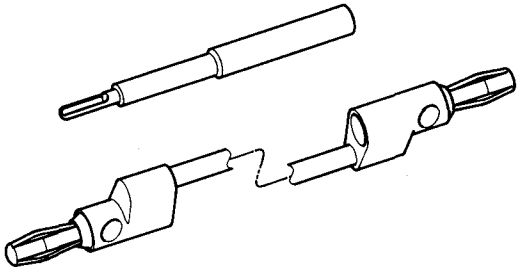
Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X - 041 - XXXXX	Vacuum Pump/Gauge, 0-30 in.Hg	1	11-136, 11-139, 11-140,11-143,11-148, 11-149,11-150,11-155, 11-156,11-161,11-162, 11-164, 11-166, 11-167
②	07PAZ-0010100	SCS Service Connector	1	11-32
③	07SAZ-001000A	Backprobe Set	2	11-34
④	07406 - 0040001	Fuel Pressure Gauge	1	11-120, 11-124



①



②



③

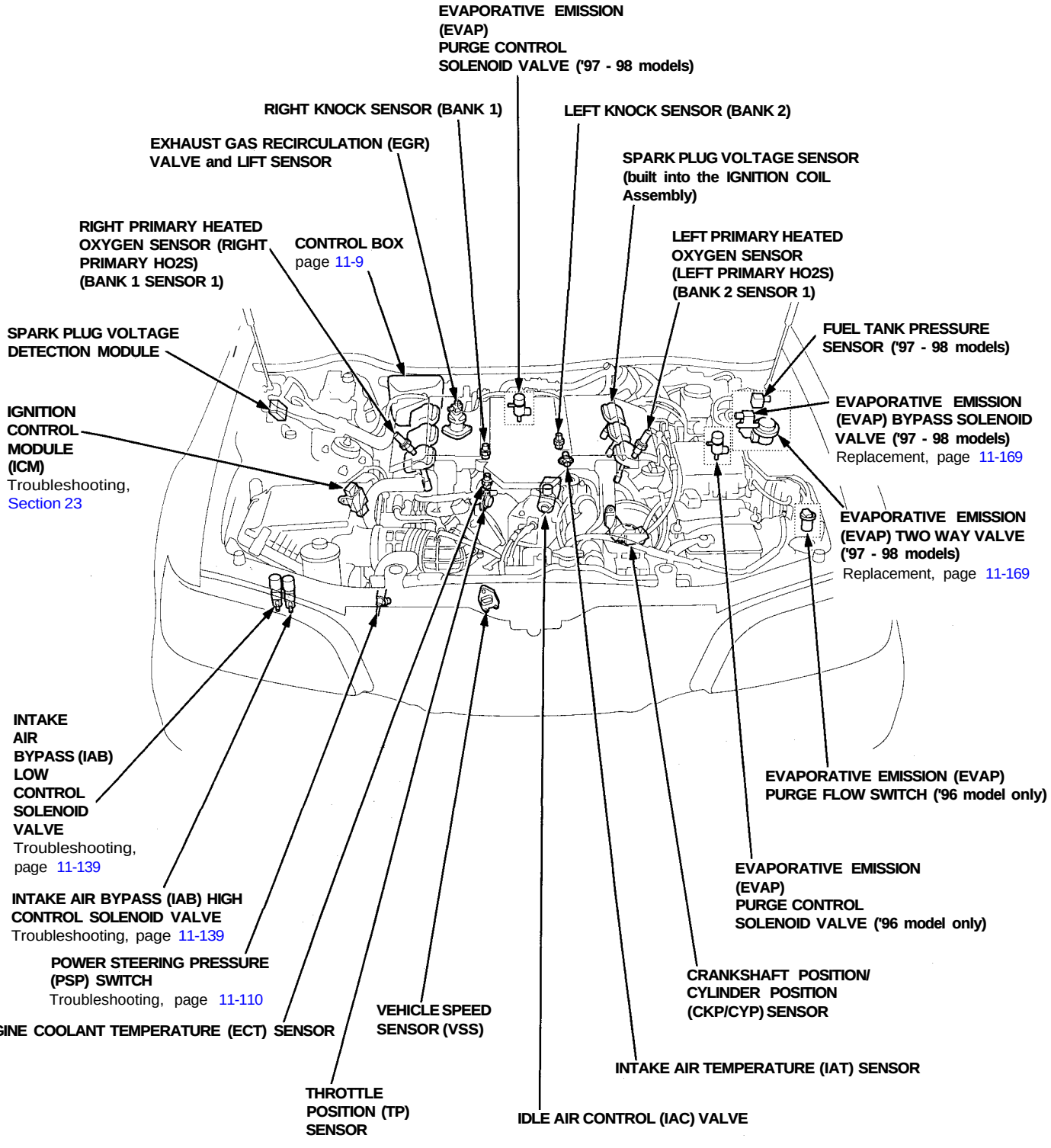


④

Component Locations

Index

For Troubleshooting of DTC related components, see chart on page 11-45.

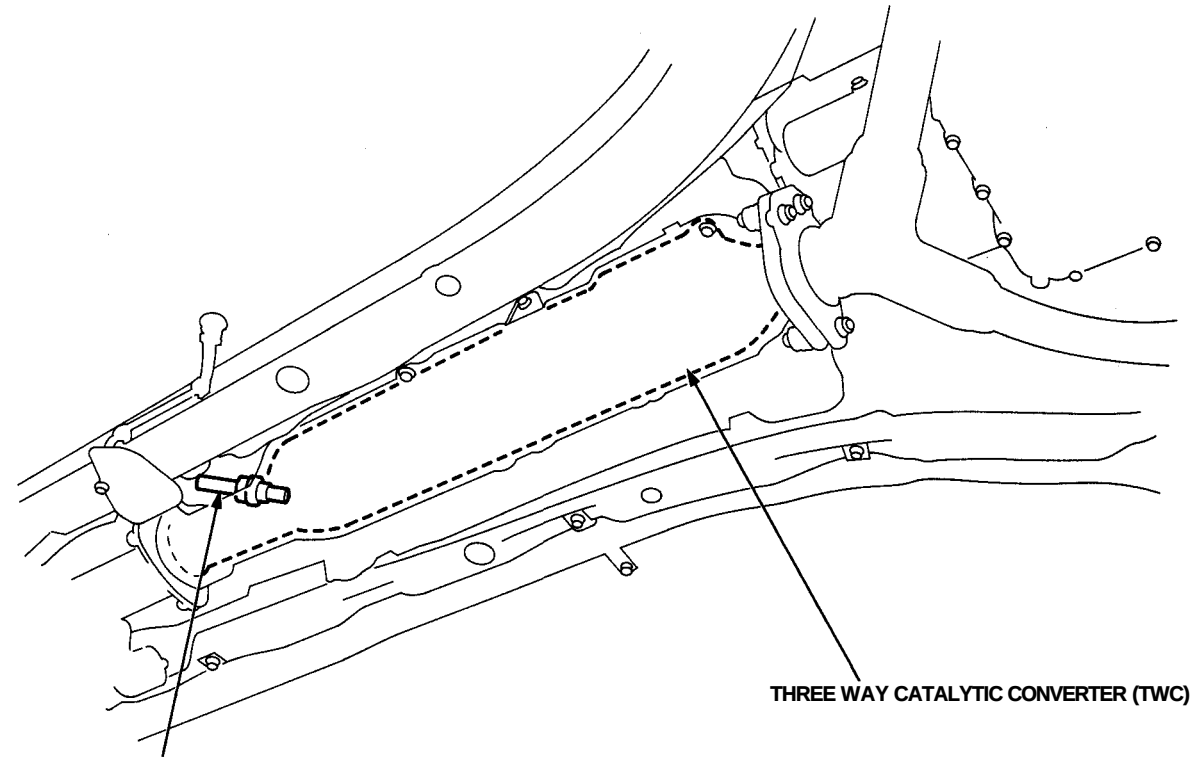


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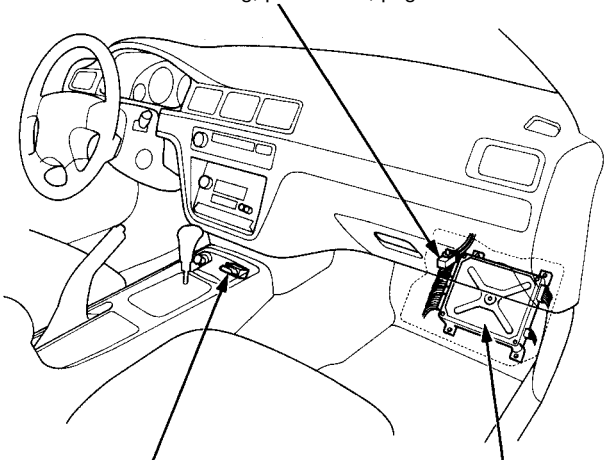
Component Locations

Index (cont'd)

For Troubleshooting of DTC related components, see chart on page 11-45.

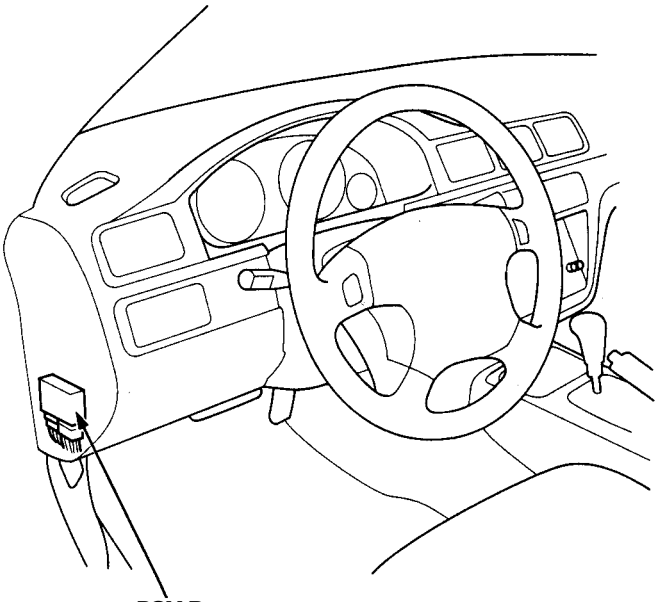


SERVICE CHECK CONNECTOR (2P)
Troubleshooting, procedures, page 11-32



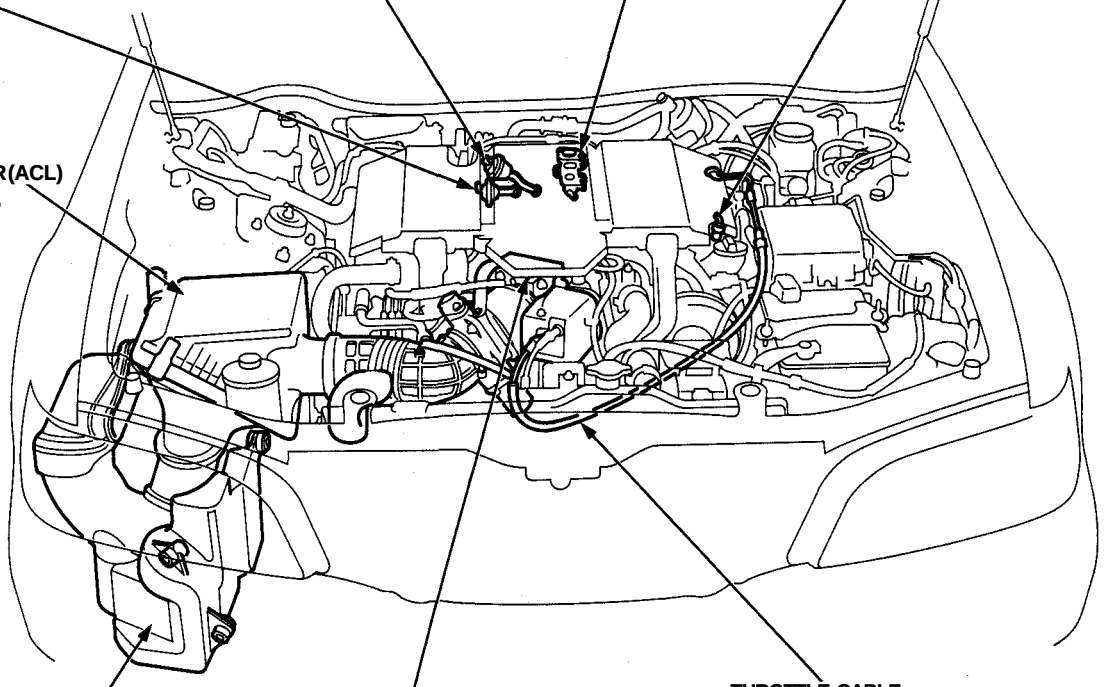
DATA LINK CONNECTOR (16P)
Troubleshooting procedures, page, 11-32

POWERTRAIN CONTROL MODULE (PCM)
Troubleshooting, page 11-53



PGM-R MAIN RELAY
Relay Testing, page 11-129
Troubleshooting, page 11-130

For Troubleshooting of DTC related components, see chart on page 11-45.



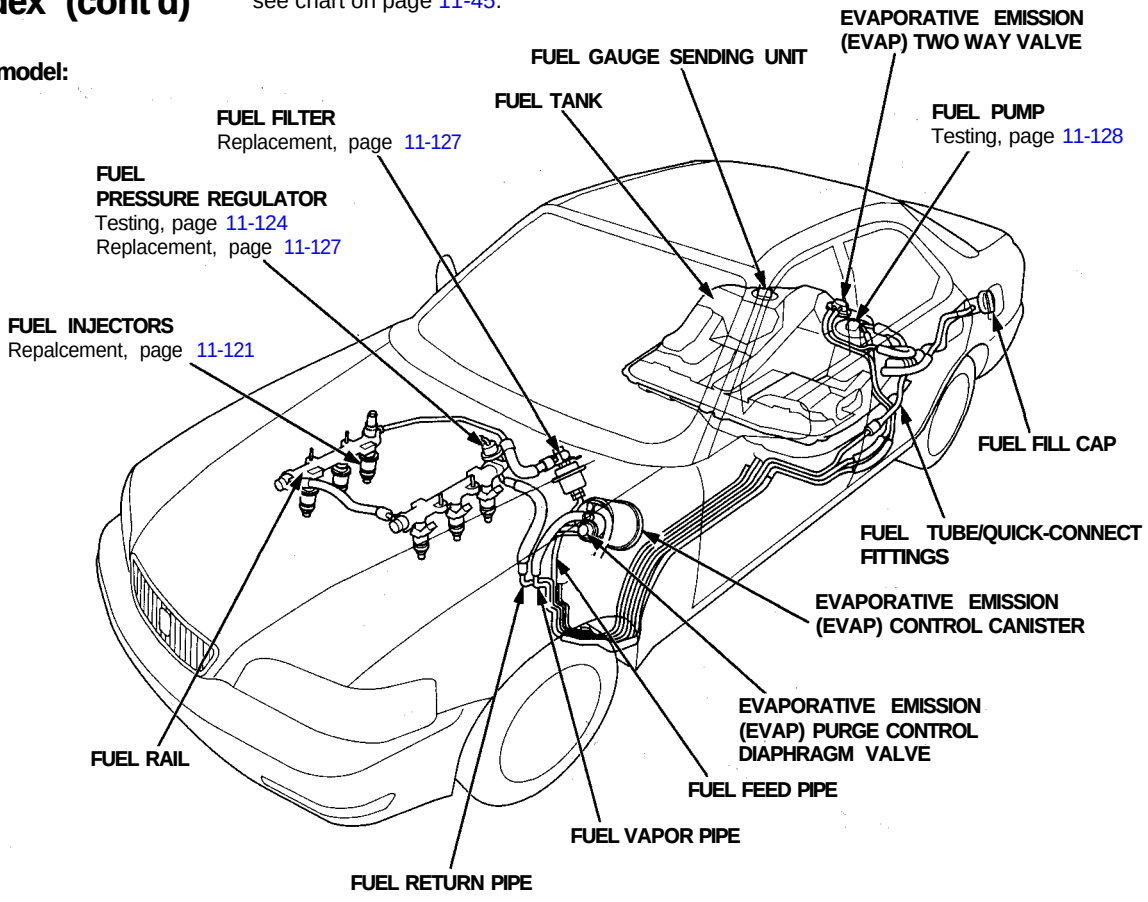
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Component Locations

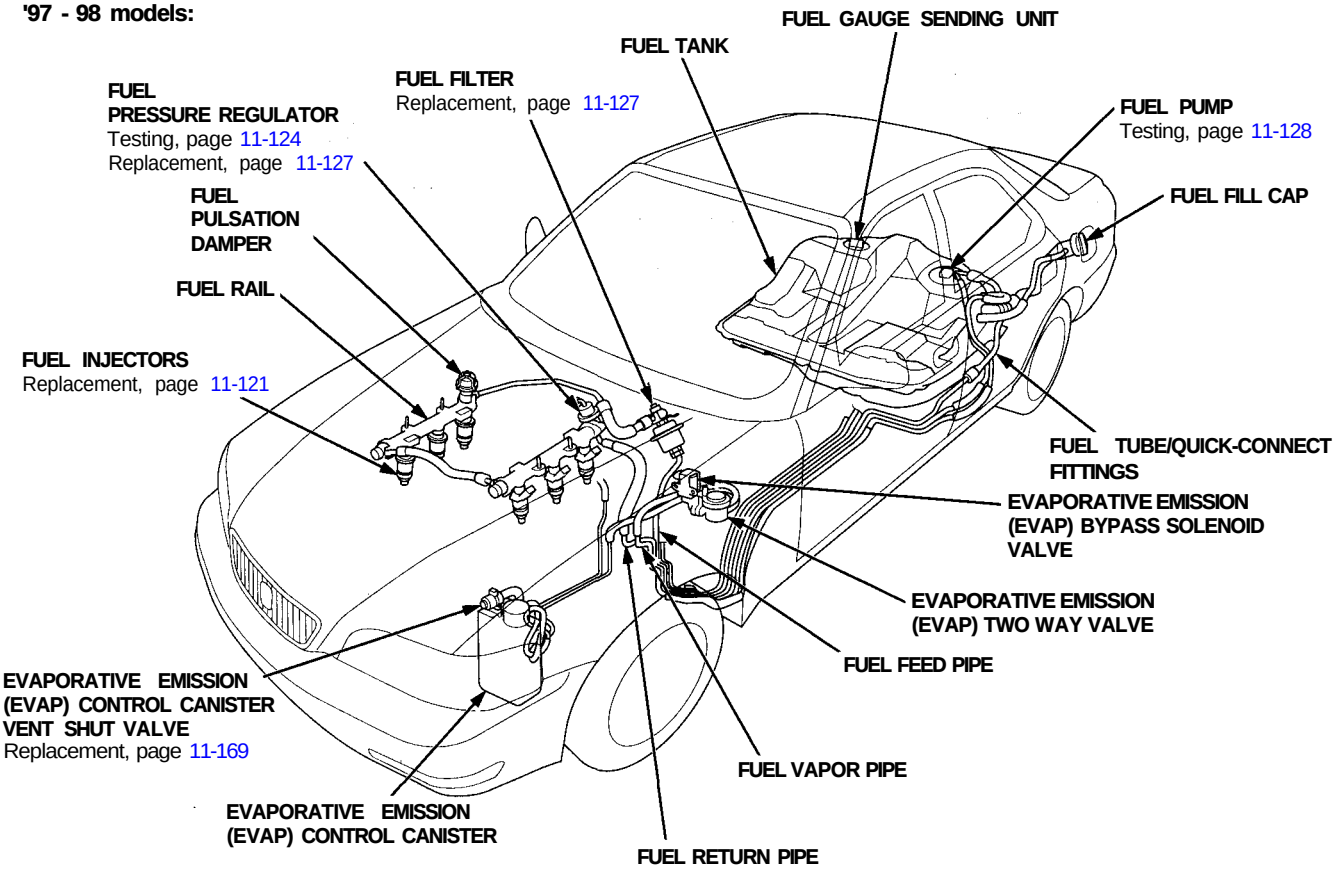
Index (cont'd)

For Troubleshooting of DTC related components, see chart on page 11-45.

'96 model:



'97 - 98 models:

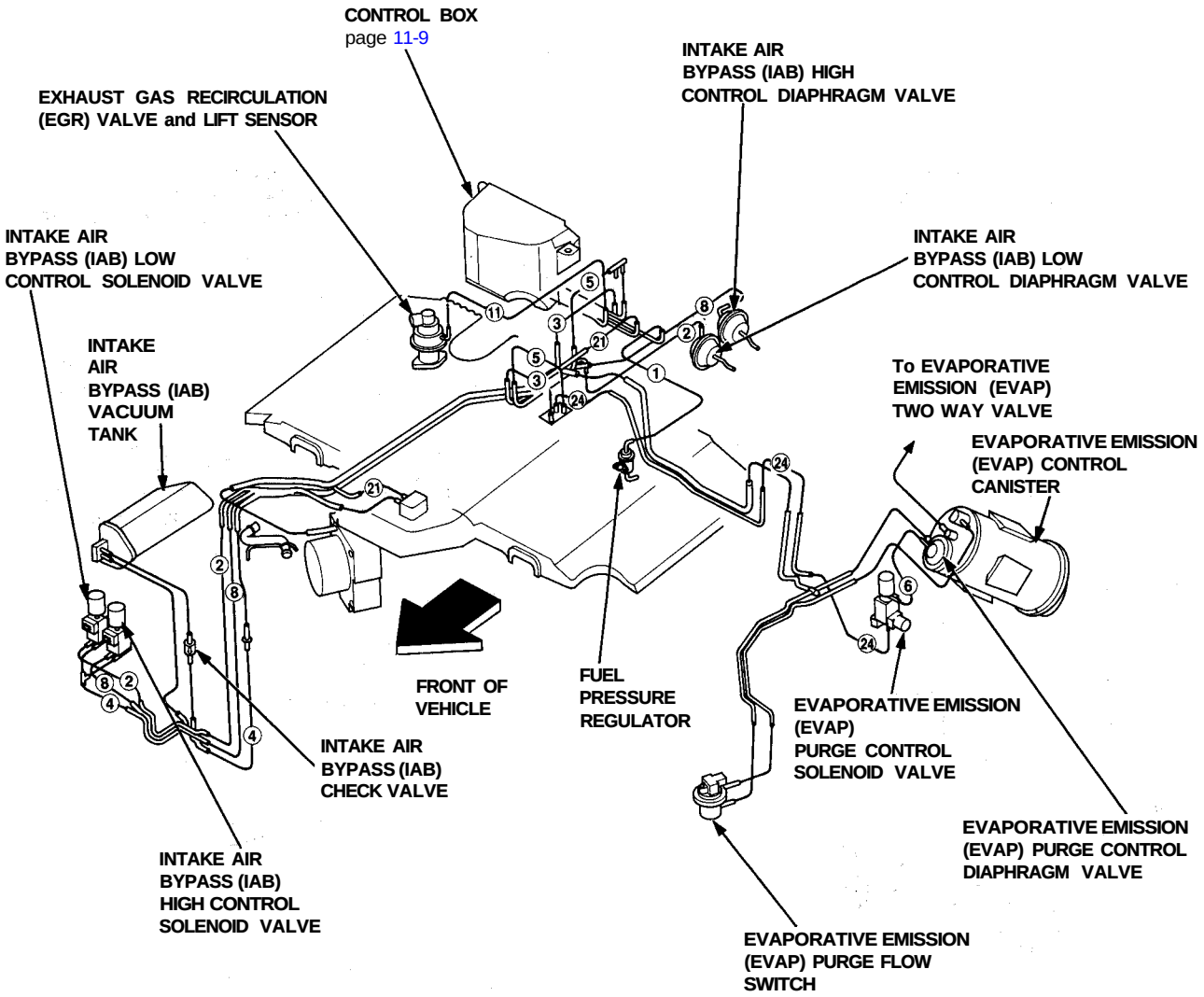


System Description

Vacuum Connections

'96 model:

For Troubleshooting of DTC related components, see chart on page 11-45.



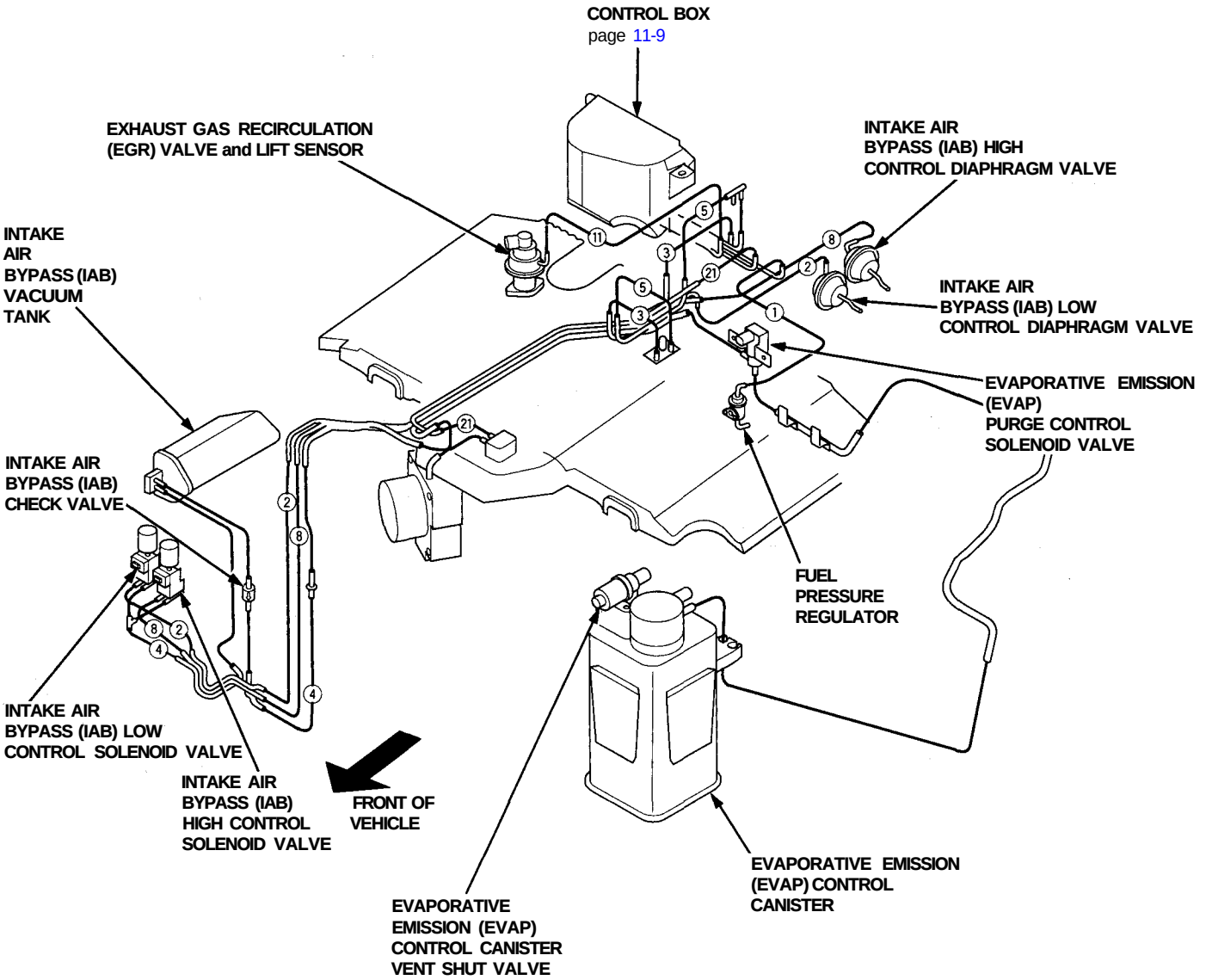
(cont'd)

System Description

Vacuum Connections (cont'd)

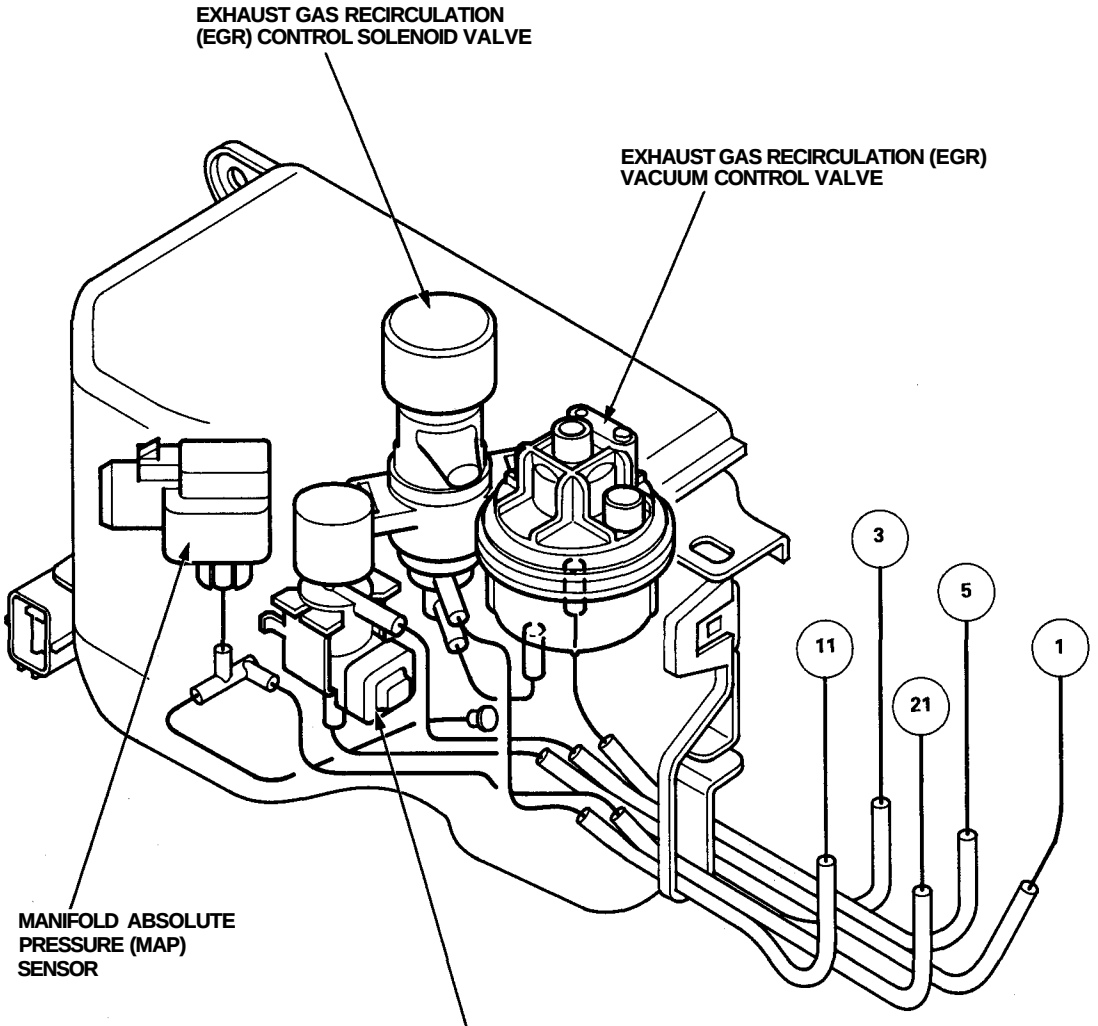
'97-98 models:

For Troubleshooting of DTC related components, see chart on page 11-45.



Control Box:

For Troubleshooting of DTC related components, see chart on page 11-45.

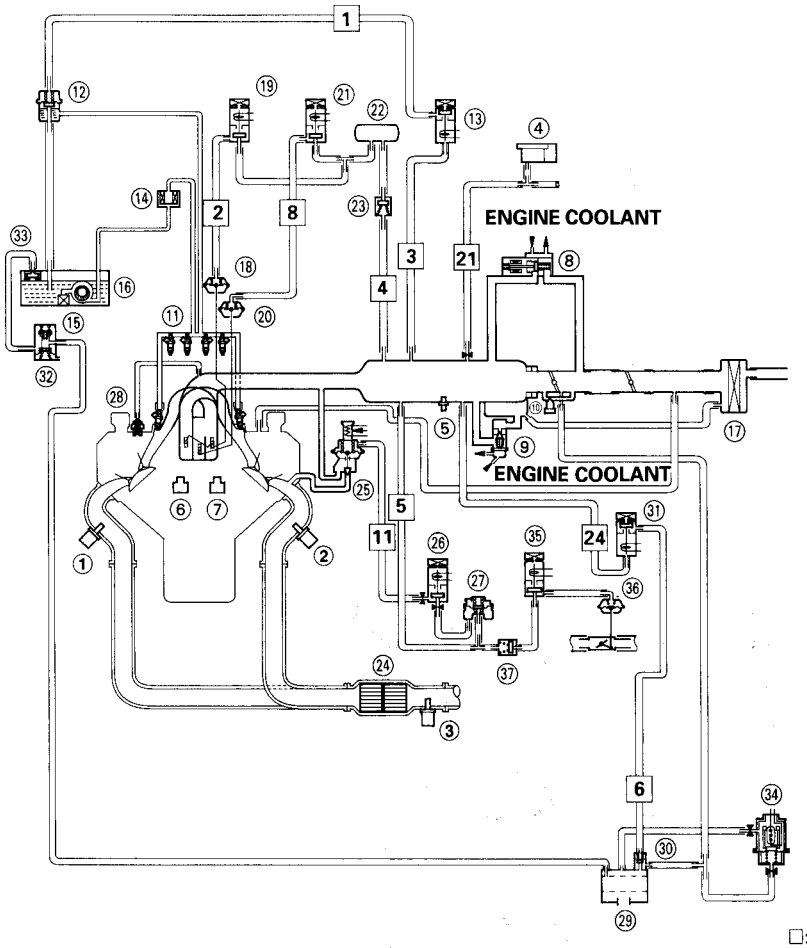


(cont'd)

System Description

Vacuum Connections (cont'd)

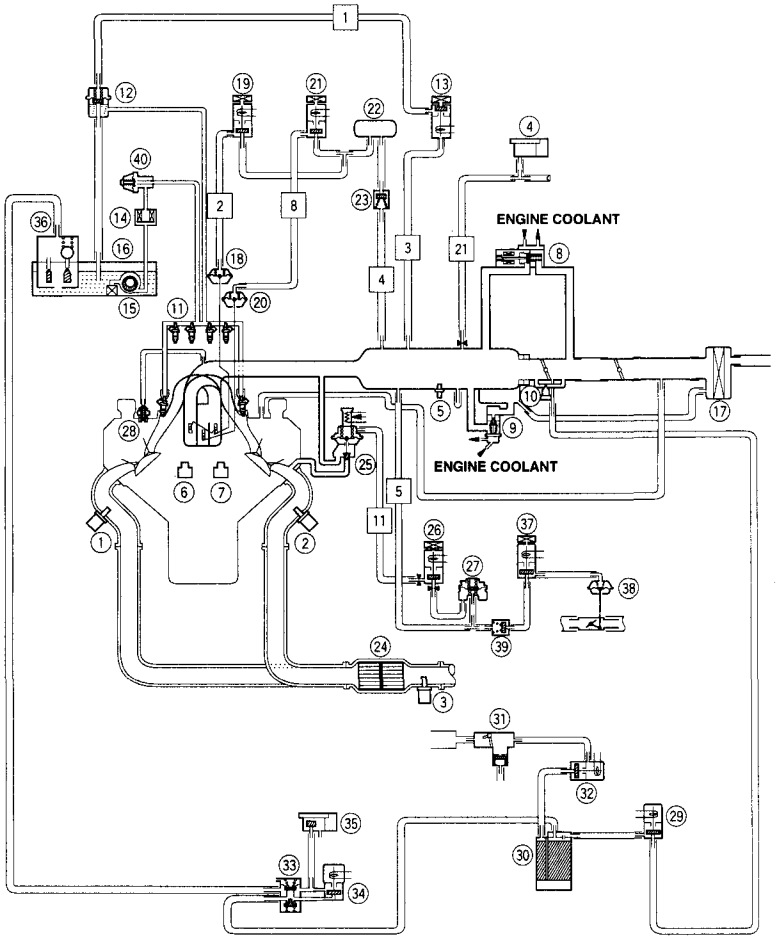
'96 model:



□: Vacuum hose No.

① LEFT PRIMARY HEATED OXYGEN SENSOR (LEFT PRIMARY HO2S) (BANK 2 SENSOR 1)
② RIGHT PRIMARY HEATED OXYGEN SENSOR (RIGHT PRIMARY HO2S) (BANK 1 SENSOR 1)
③ SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) (SENSOR 2)
④ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ LEFT KNOCK SENSOR (LEFT KS) (BANK 2)
⑦ RIGHT KNOCK SENSOR (RIGHT KS) (BANK 1)
⑧ IDLE AIR CONTROL (IAC) VALVE
⑨ FAST IDLE THERMO VALVE
⑩ IDLE ADJUSTING SCREW
⑪ FUEL INJECTOR
⑫ FUEL PRESSURE REGULATOR
⑬ FUEL PRESSURE REGULATOR CONTROL SOLENOID VALVE
⑭ FUEL FILTER
⑮ FUEL PUMP (FP)
⑯ FUEL TANK
⑰ AIR CLEANER (ACL)
⑱ INTAKE AIR BYPASS (IAB) LOW CONTROL DIAPHRAGM VALVE
⑲ INTAKE AIR BYPASS (IAB) LOW CONTROL SOLENOID VALVE
⑳ INTAKE AIR BYPASS (IAB) HIGH CONTROL DIAPHRAGM VALVE
㉑ INTAKE AIR BYPASS (IAB) HIGH CONTROL SOLENOID VALVE
㉒ INTAKE AIR BYPASS (IAB) VACUUM TANK
㉓ INTAKE AIR BYPASS (IAB) CHECK VALVE
㉔ THREE WAY CATALYTIC CONVERTER (TWC)
㉕ EXHAUST GAS RECIRCULATION (EGR) VALVE AND LIFT SENSOR
㉖ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉗ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉘ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉙ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉚ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL DIAPHRAGM VALVE
㉛ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉜ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉝ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
㉞ EVAPORATIVE EMISSION (EVAP) PURGE FLOW SWITCH
㉟ WATER VALVE CONTROL SOLENOID VALVE
㊱ WATER VALVE CONTROL DIAPHRAGM
㊲ WATER VALVE CHECK VALVE

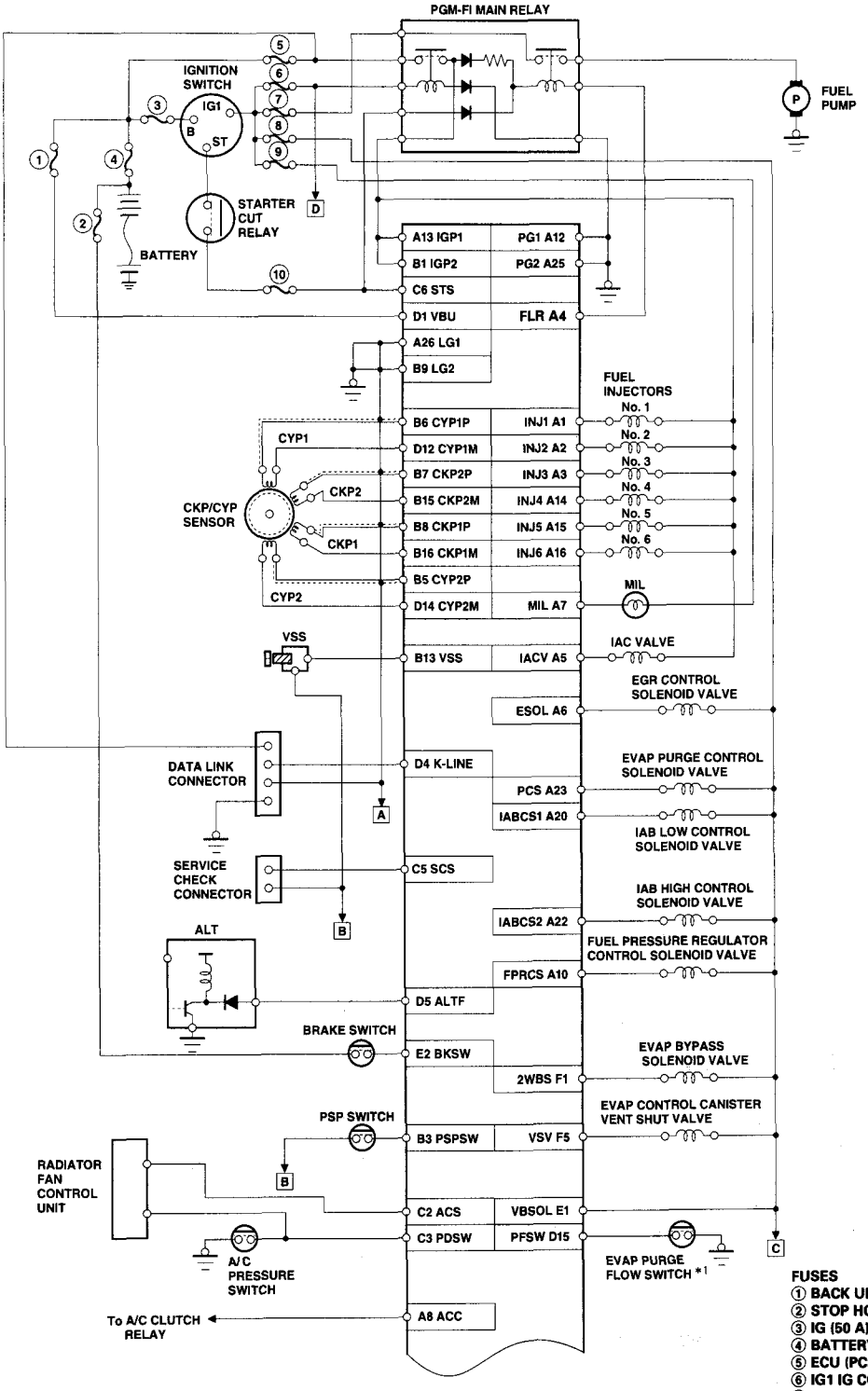
'97 - 98 models:



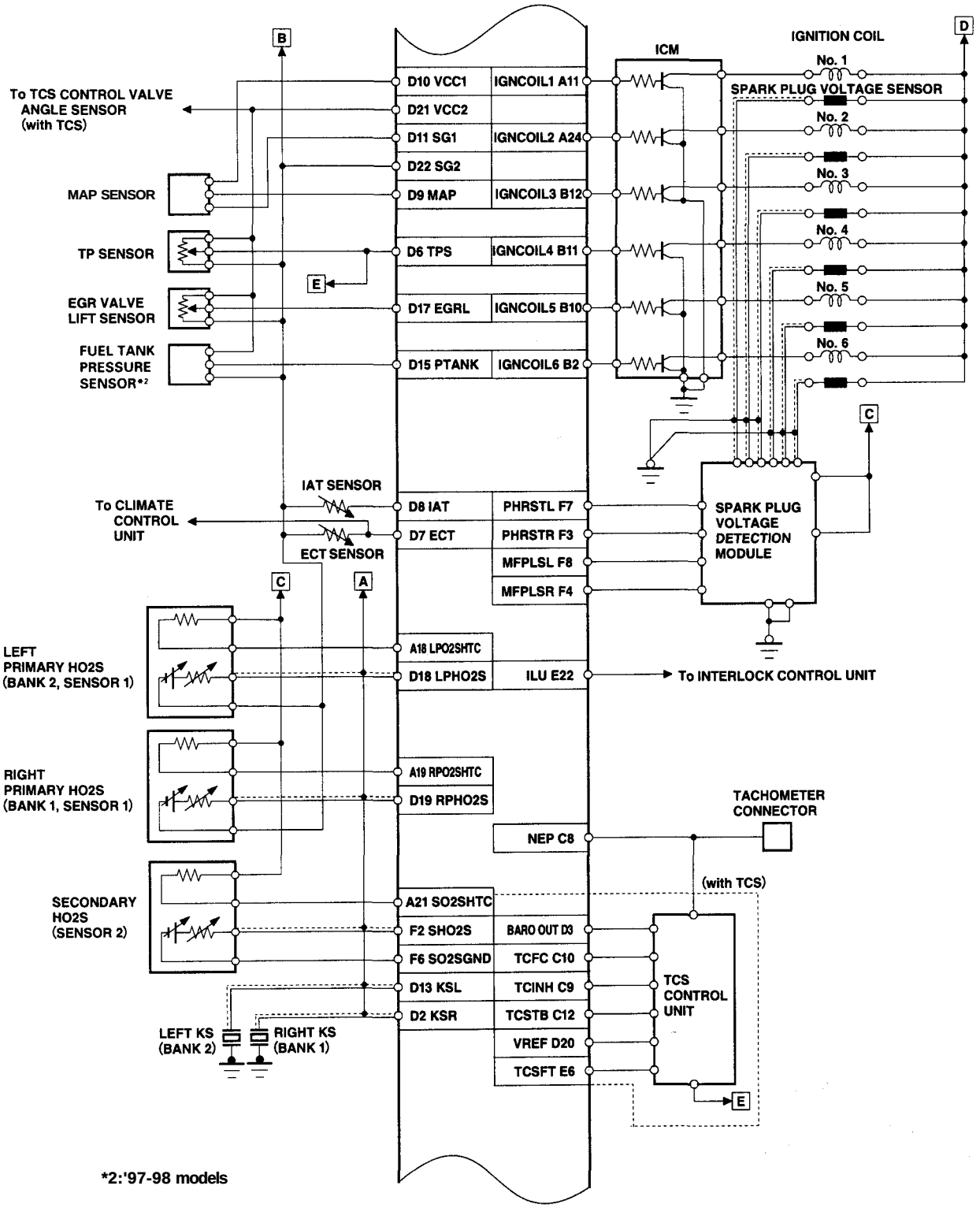
① LEFT PRIMARY HEATED OXYGEN SENSOR (LEFT PRIMARY HO2S) (BANK 2 SENSOR 1)
② RIGHT PRIMARY HEATED OXYGEN SENSOR (RIGHT PRIMARY HO2S) (BANK 1 SENSOR 1)
③ SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) (SENSOR 2)
④ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ LEFT KNOCK SENSOR (LEFT KS) (BANK 2)
⑦ RIGHT KNOCK SENSOR (RIGHT KS) (BANK 1)
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⑨ FAST IDLE THERMO VALVE
⑩ IDLE ADJUSTING SCREW
⑪ FUEL INJECTOR
⑫ FUEL PRESSURE REGULATOR
⑬ FUEL PRESSURE REGULATOR CONTROL SOLENOID VALVE
⑭ FUEL FILTER
⑮ FUEL PUMP (FP)
⑯ FUEL TANK
⑰ AIR CLEANER (ACL)
⑱ INTAKE AIR BYPASS (IAB) LOW CONTROL DIAPHRAGM VALVE
⑲ INTAKE AIR BYPASS (IAB) LOW CONTROL SOLENOID VALVE
⑳ INTAKE AIR BYPASS (IAB) HIGH CONTROL DIAPHRAGM VALVE
㉑ INTAKE AIR BYPASS (IAB) HIGH CONTROL SOLENOID VALVE
㉒ INTAKE AIR BYPASS (IAB) VACUUM TANK
㉓ INTAKE AIR BYPASS (IAB) CHECK VALVE
㉔ THREE WAY CATALYTIC CONVERTER (TWC)
㉕ EXHAUST GAS RECIRCULATION (EGR) VALVE AND LIFT SENSOR
㉖ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉗ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉘ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉙ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉚ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉛ EVAPORATIVE EMISSION (EVAP) THREE WAY VALVE
㉜ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE
㉝ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉞ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE
㉟ FUEL TANK PRESSURE SENSOR
㊱ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
㊲ WATER VALVE CONTROL SOLENOID VALVE
㊳ WATER VALVE CONTROL DIAPHRAGM
㊴ WATER VALVE CHECK VALVE
㊵ FUEL PULSATION DAMPER

System Description

Electrical Connections



FUSES
① BACK UP (RADIO) (10 A)*
② STOP HORN (20 A)*
③ IG (50 A)*
④ BATTERY (120 A)*
⑤ ECU (PCM) (20 A)*
⑥ IG1 IG COIL (30 A)
⑦ No. 2 FUEL PUMP (15 A)
⑧ No. 4 ECU (PCM) (15 A*1, 20 A*2)
⑨ No. 1 BACK UP LIGHTS (10 A)
⑩ No. 9 STARTER SIGNAL (7.5 A)
*: in the under-hood fuse/relay box
*1: '96 model
*2: '97 – 98 models

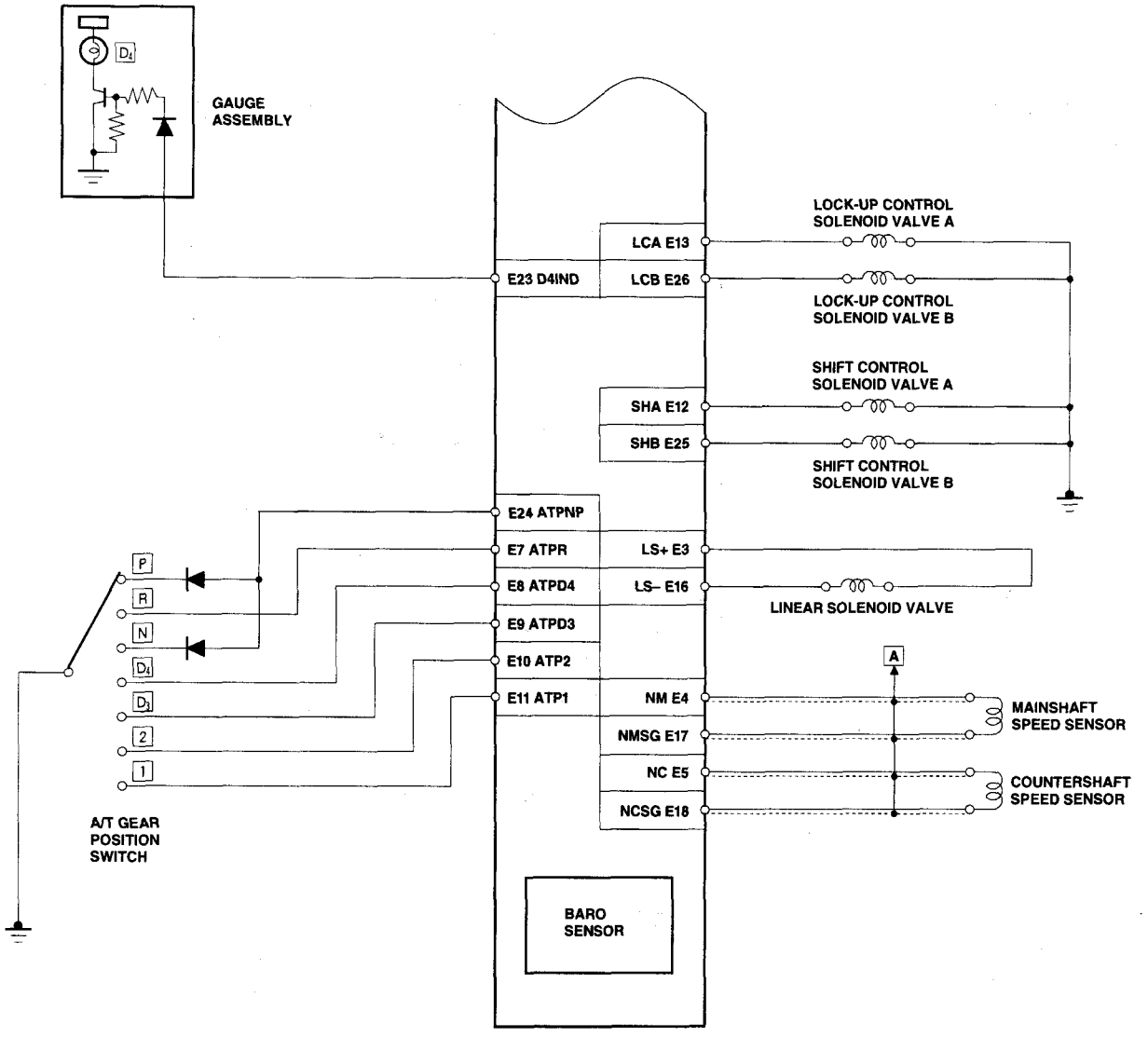


*2:'97-98 models

(cont'd)

System Description

Electrical Connections (cont'd)



PCM A(26P)

1	2	3	4	5	6	7	8		10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26

PCM B(16P)

1	2	3		5	6	7	8
9	10	11	12	13		15	16

PCM C(12P)

	2	3	4	5	6
	8	9	10	11	12

PCM D(22P)

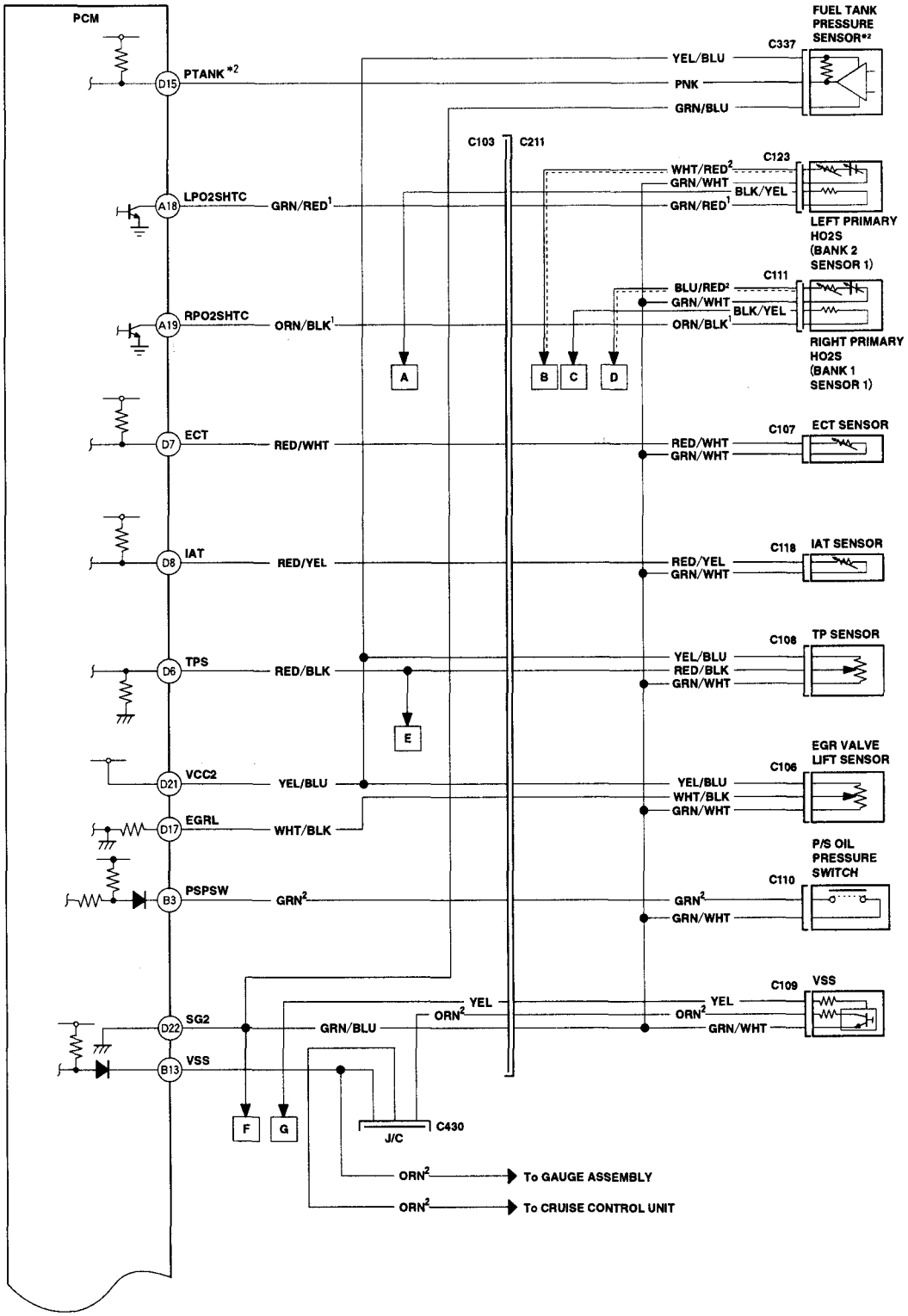
1	2	3	4	5	6	7	8	9	10	11
12	13	14	15		17	18	19	20	21	22

PCM E(26P)

1	2	3	4	5	6	7	8	9	10	11	12	13
		16	17	18				22	23	24	25	26

PCM F(8P)

1	2	3	4
5	6	7	8

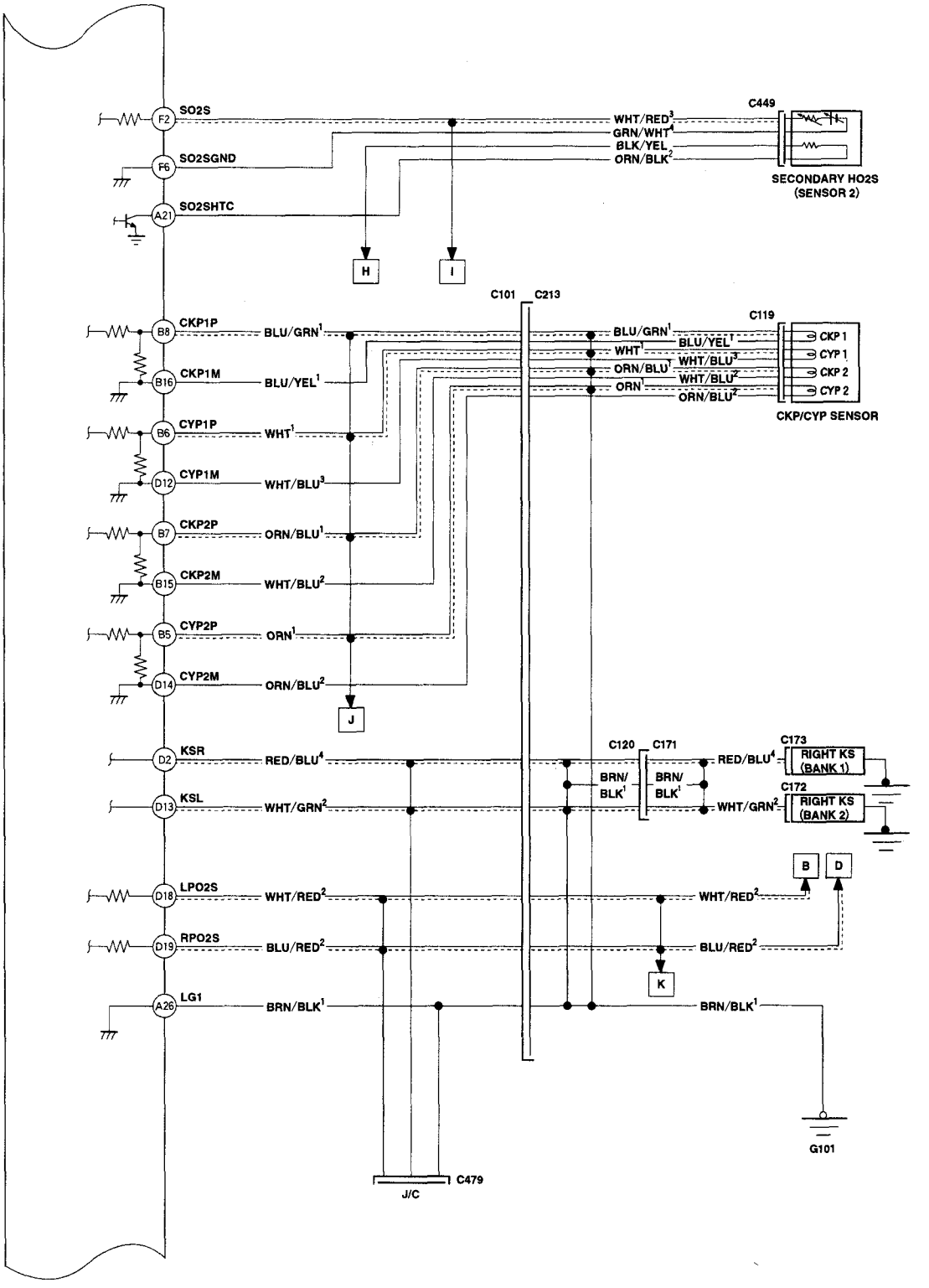


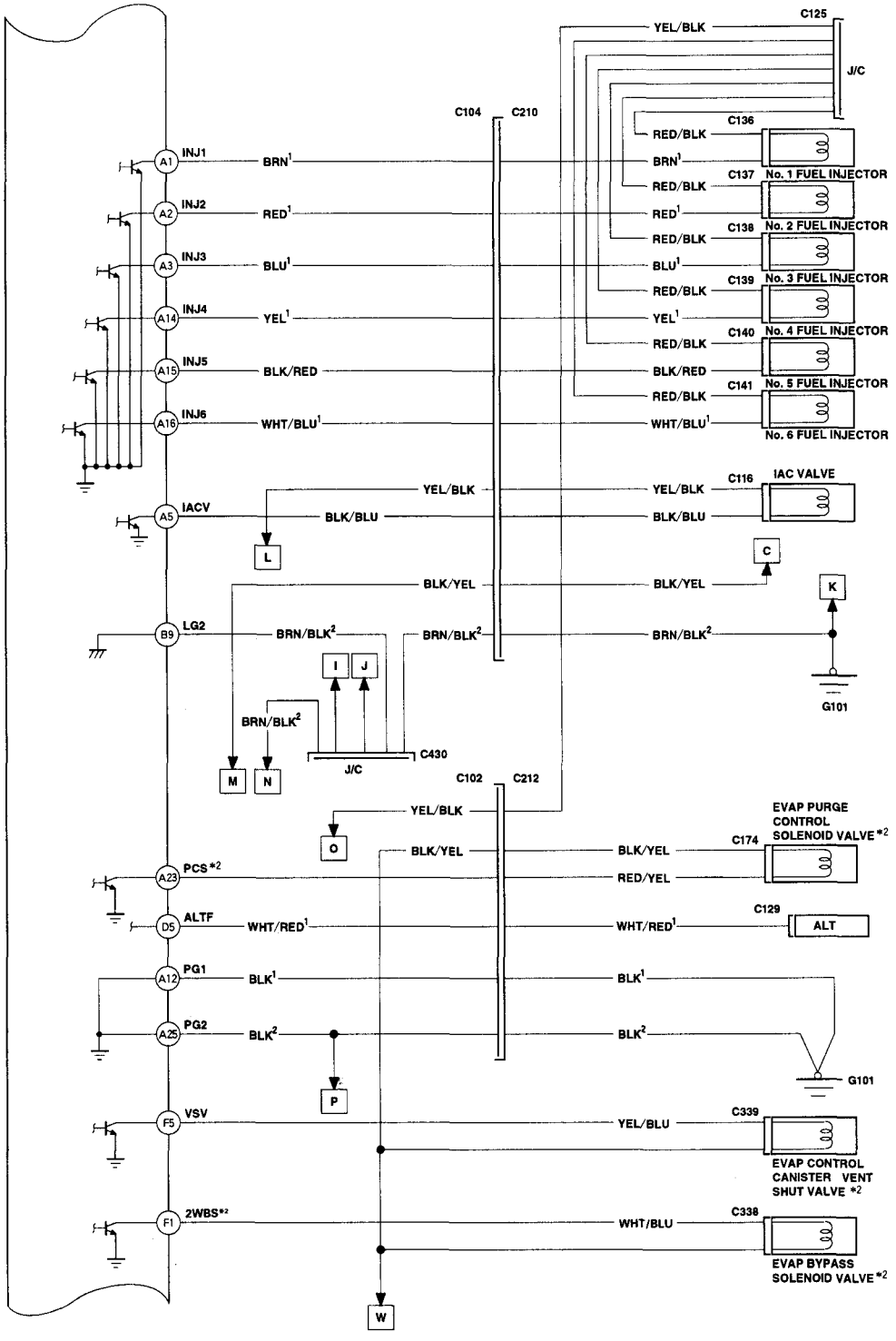
*2: '97-98 models

(cont'd)

System Description

Electrical Connections (cont'd)



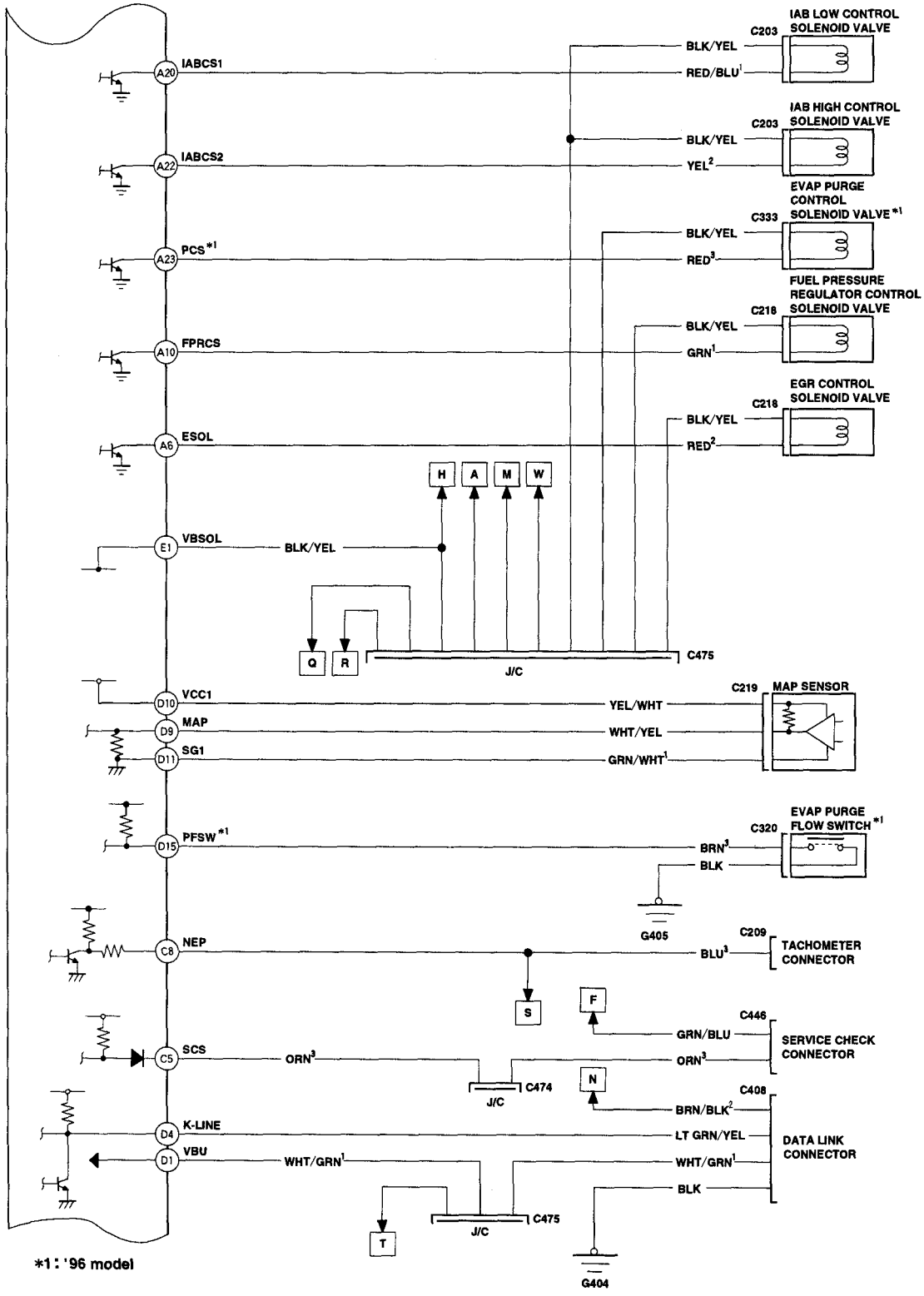


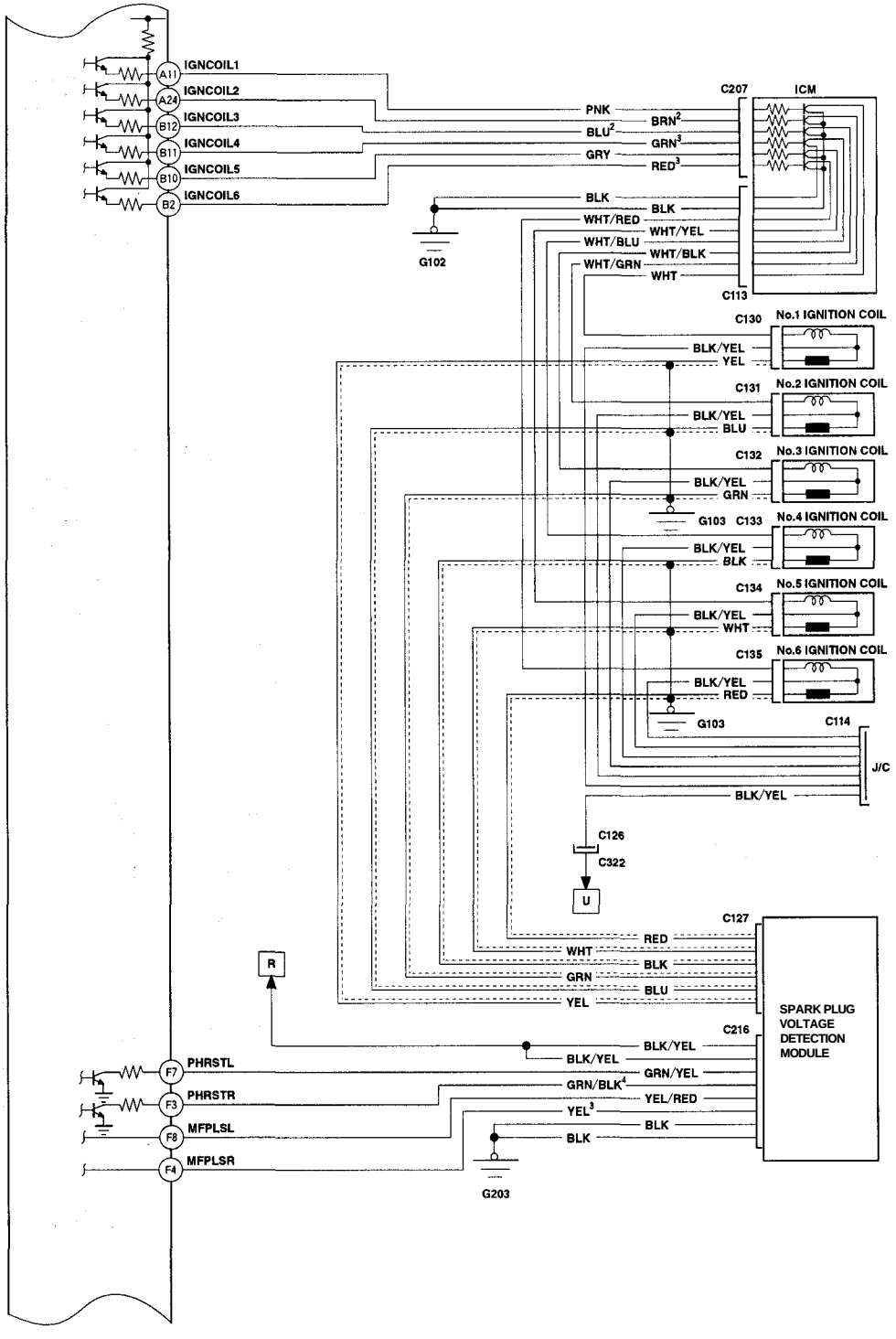
*2: '97-98 models

(cont'd)

System Description

Electrical Connections (cont'd)

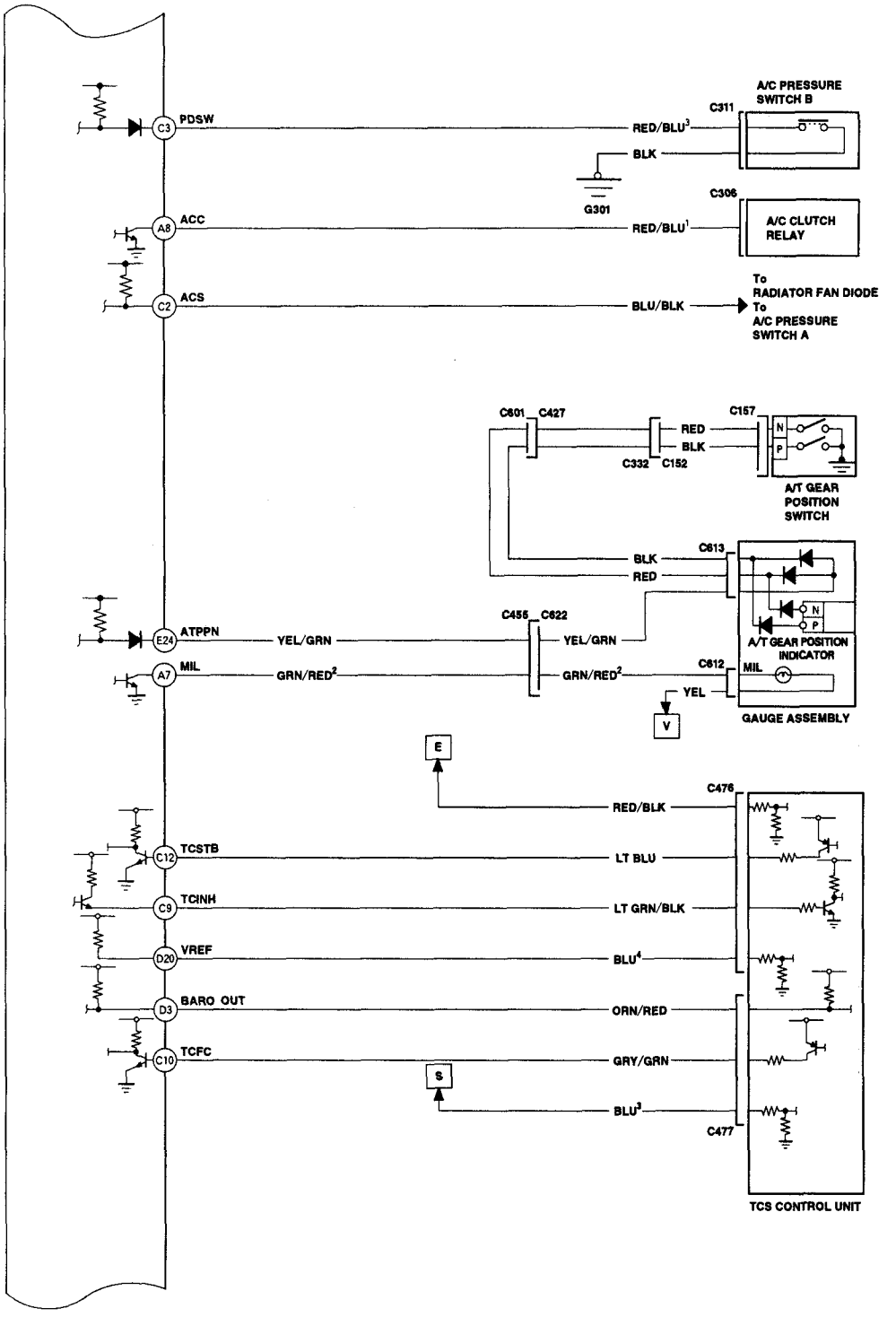


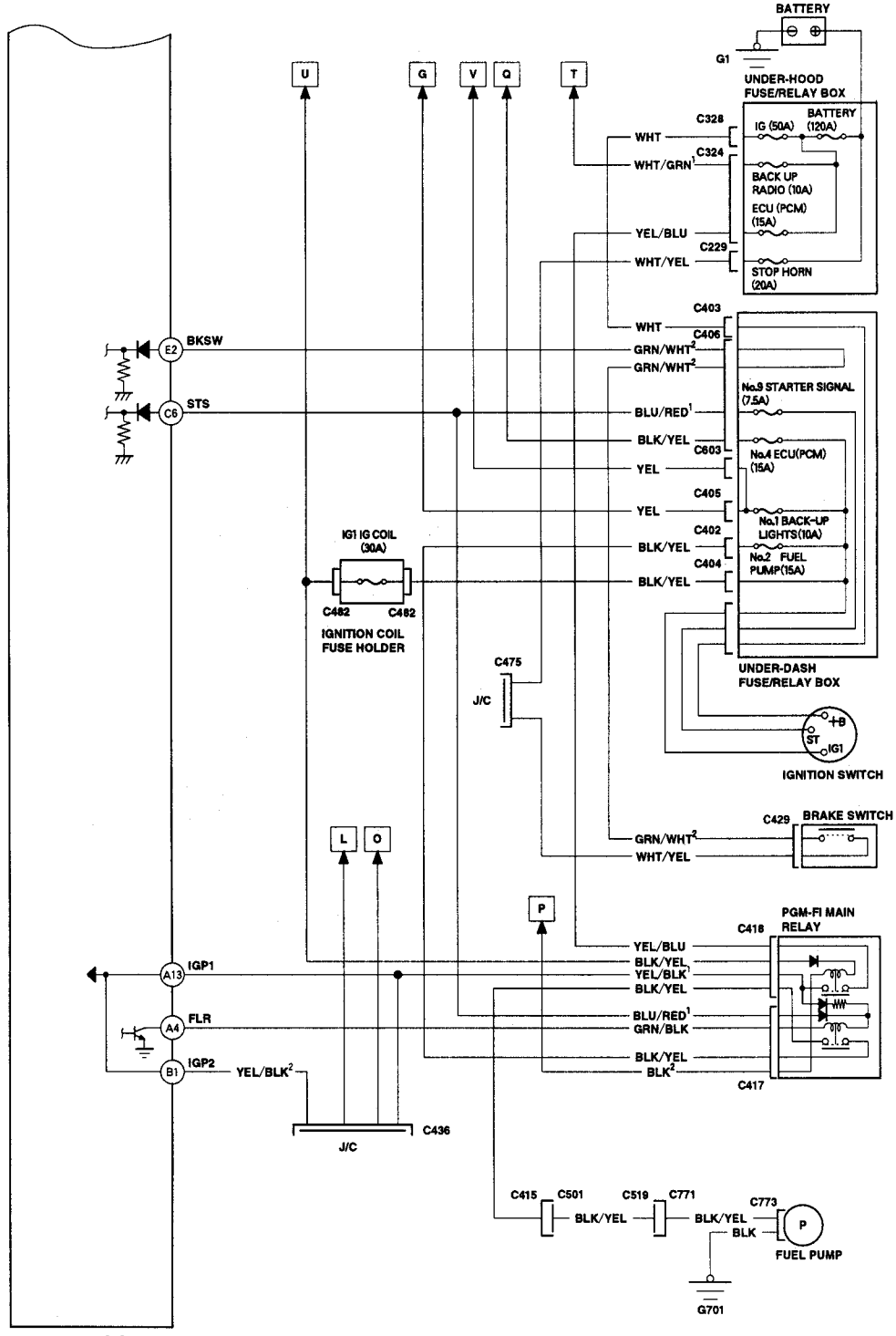

IGNCOIL1
IGNCOIL2
IGNCOIL3
IGNCOIL4
IGNCOIL5
IGNCOIL6
A11
A24
B12
B11
B10
B2
C207
ICM
PNK
BRN2
BLU2
GRN3
GRY
RED3
BLK
WHT/RED
WHT/BLU
WHT/GRN
BLK
WHT/YEL
WHT/BLK
WHT
G102
C113
C130
No.1 IGNITION COIL
BLK/YEL
YEL
C131
No.2 IGNITION COIL
BLK/YEL
BLU
C132
No.3 IGNITION COIL
BLK/YEL
GRN
G103
C133
No.4 IGNITION COIL
BLK/YEL
BLK
C134
No.5 IGNITION COIL
BLK/YEL
WHT
C135
No.6 IGNITION COIL
BLK/YEL
RED
G103
C114
J/C
BLK/YEL
C126
C322
U
C127
RED
WHT
BLK
GRN
BLU
YEL
R
SPARK PLUG VOLTAGE DETECTION MODULE
C216
BLK/YEL
BLK/YEL
GRN/YEL
GRN/BLK4
YEL/RED
YEL3
BLK
BLK
PHRSTL
PHRSTR
MFPLSL
MFPLSR
F7
F3
F8
F4
G203

(cont'd)

System Description

Electrical Connections (cont'd)

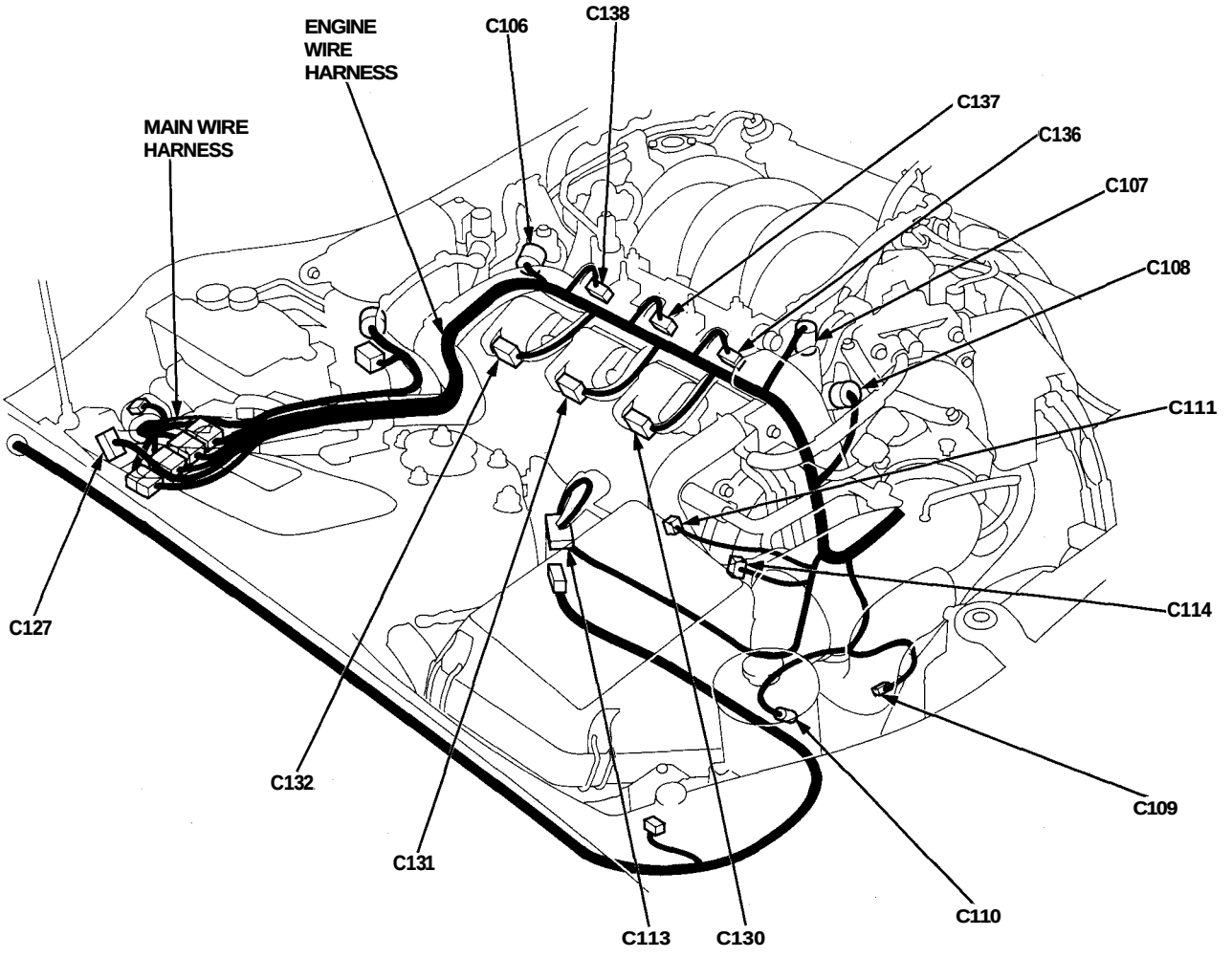




*1: '96 model
*2: '97-98 models

System Description

System Connectors [Engine Compartment]



C106



①	WHT/BLK
②	GRN/WHT
③	YEL/BLU

C107



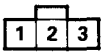
①	GRN/WHT
②	RED/WHT

C108



①	GRN/WHT
②	RED/BLK
③	YEL/BLU

C109



①	GRN/WHT
②	YEL
③	ORN[2]

C110



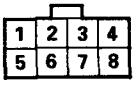
①	GRN[2]
②	GRN/WHT

C111



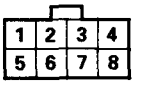
①	BLU/RED[2]
②	GRN/WHT
③	BLK/YEL
④	ORN/BLK[1]

C113



①	WHT/BLK	⑤	WHT/RED
②	BLK	⑥	WHT/YEL
③	WHT/GRN	⑦	BLK
④	WHT	⑧	WHT/BLU

C114



①	BLK/YEL	⑤	BLK/YEL
②	BLK/YEL	⑥	BLK/YEL
③	BLK/YEL	⑦	BLK/YEL
④	BLK/YEL	8	BLK/YEL

C127



①	GRN
②	BLU
③	YEL
④	RED
⑤	WHT
⑥	BLK

C130



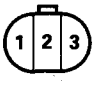
①	BLK/YEL
②	WHT
③	YEL

C131



①	BLK/YEL
②	WHT/GRN
③	BLU

C132



①	BLK/YEL
②	WHT/BLK
③	GRN

C136



①	BRN[1]
②	RED/BLK

C137



①	RED[1]
②	RED/BLK

C138



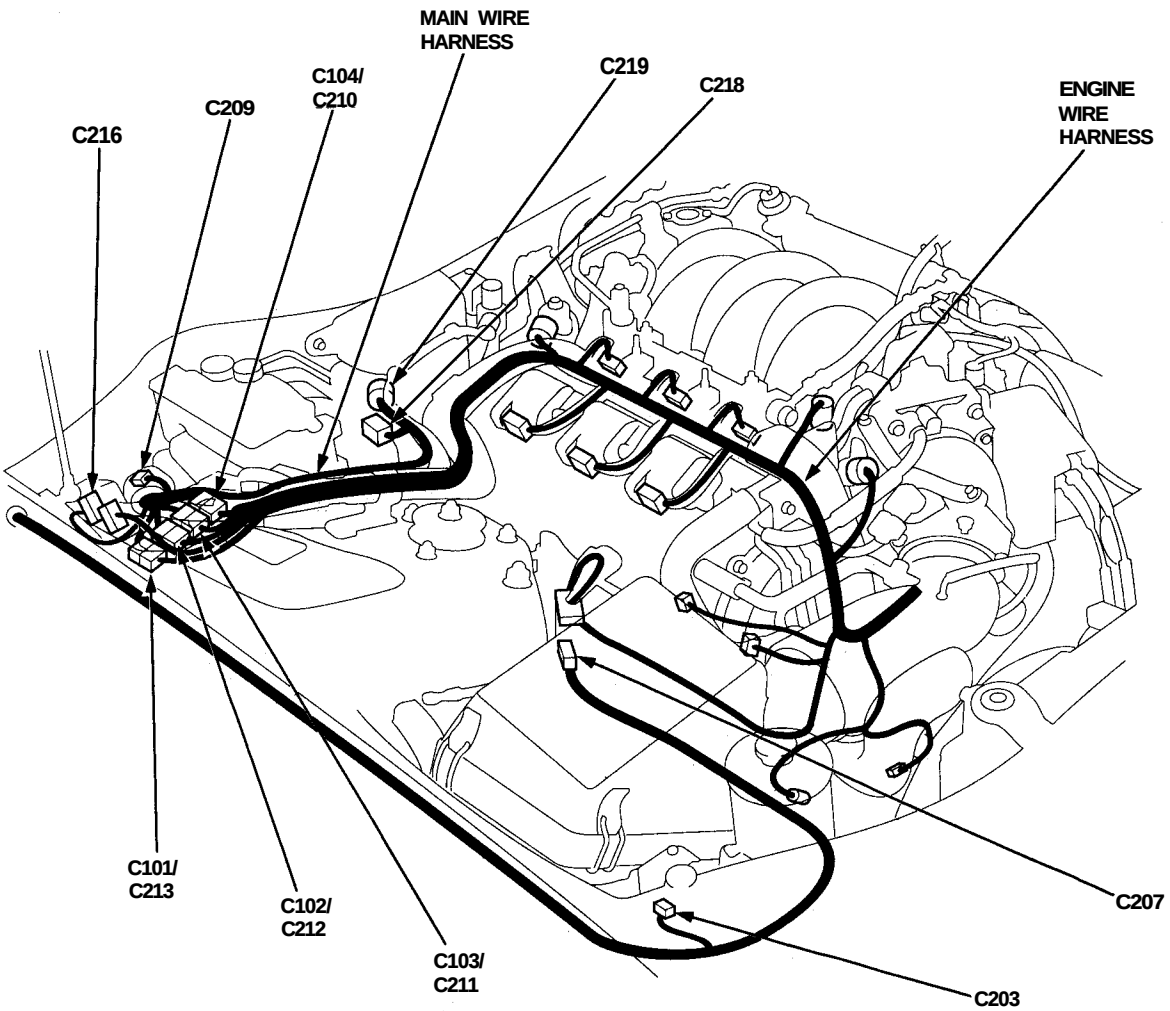
①	BLU[1]
②	RED/BLK

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
● — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Engine Compartment] (cont'd)



C203



①	BLK/YEL
②	BLK/YEL
③	YEL[2]
④	RED/BLU[1]

C207



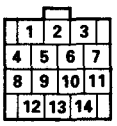
①	PNK
②	BRN[2]
③	BLU[2]
④	GRN[2]
⑤	GRY
⑥	RED[2]

C209



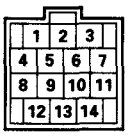
1	—
②	BLU[3]

C210



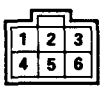
①	BRN/BLK[2]	⑧	YEL[1]
②	BLK/BLU	⑨	BLK/RED
③	YEL/BLK	⑩	WHT/BLU[1]
④	BRN[1]	⑪	BLK/YEL
⑤	RED[1]	12	RED
⑥	BLU[1]	13	YEL/RED
7	YEL/GRN	14	BLU/GRN

C211



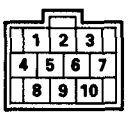
①	GRN[2]	⑧	ORN/BLK[1]
②	BLK/YEL	⑨	YEL
③	ORN[2]	⑩	RED/WHT
④	YEL/BLU	⑪	GRN/BLU
⑤	WHT/BLK	⑫	GRN/RED[1]
⑥	RED/BLK	13	BLK/YEL
⑦	YEL/BLU	⑭	RED/YEL

C212 (Without TCS)



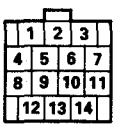
①	BLK[1]
②	BLK[2]
3	WHT/BLU
④	YEL/BLK
5	WHT/GRN
⑥	WHT/RED[1]

C212 (With TCS)



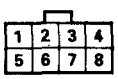
①	BLK[1]	⑥	WHT/RED[1]
②	BLK[2]	7	WHT/BLU
③	YEL/BLU	8	—
④	YEL/BLK	9	BLU/YEL
5	WHT/GRN	10	BLU/BLK

C213



1	ORN	⑧	ORN[1]
②	BLU/RED[2]	⑨	WHT/BLU[3]
③	WHT/RED[2]	⑩	WHT[1]
④	ORN/BLU[1]	⑪	ORN/BLU[2]
⑤	BLU/YEL[1]	⑫	BRN/BLK[1]
⑥	BLU/GRN[1]	⑬	RED/BLU[4]
⑦	WHT/BLU[2]	⑭	WHT/GRN[2]

C216



①	BLK	⑤	BLK/YEL
②	GRN/BLK[4]	⑥	YEL/RED
③	YEL[5]	⑦	GRN/YEL
④	BLK/YEL	⑧	BLK

C218



①	BLK/YEL
②	RED[2]
③	GRN[1]
④	BLK/YEL

C219



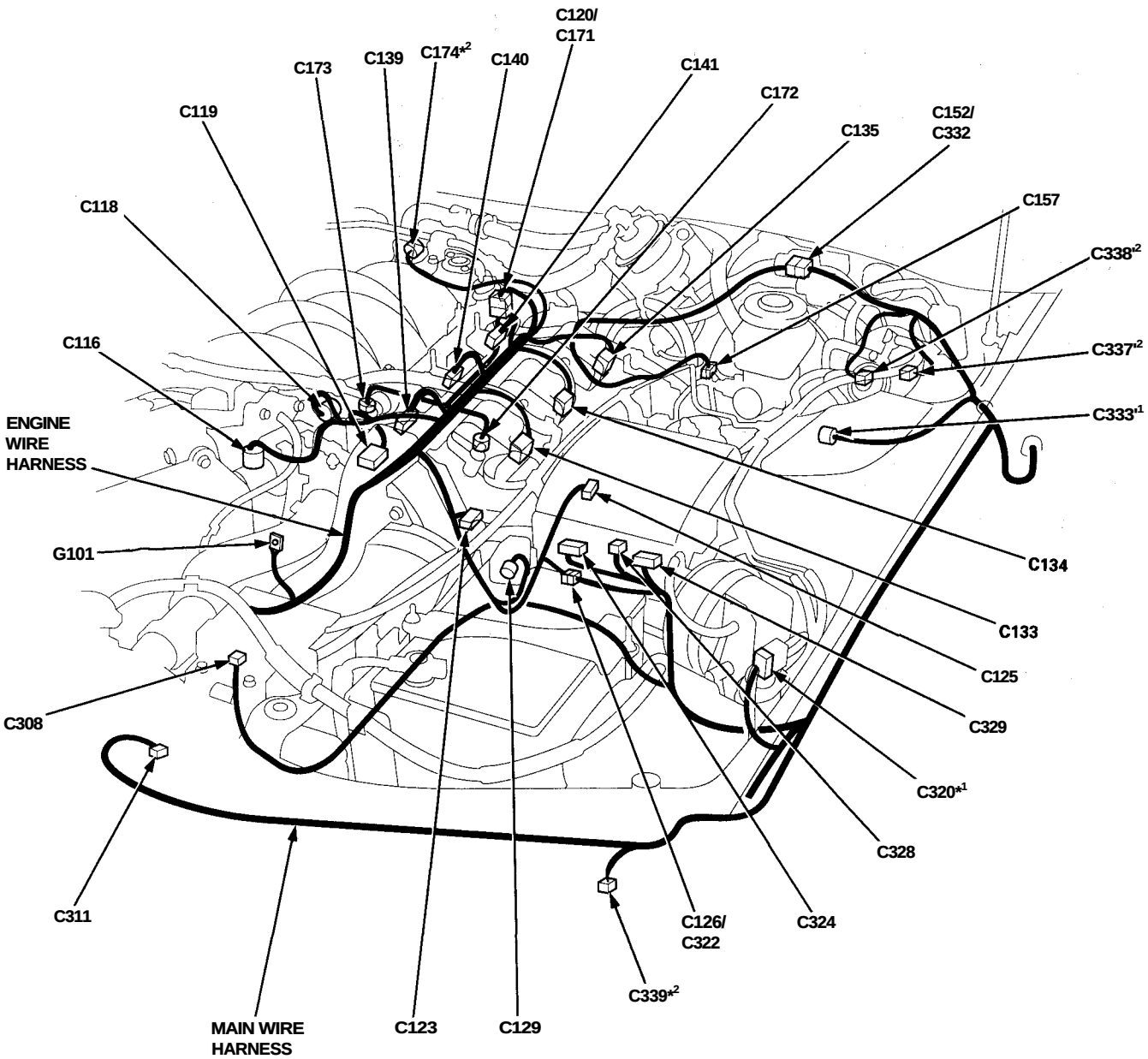
①	YEL/WHT
②	GRN/WHT[1]
③	WHT/YEL

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
● — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Engine Compartment] (cont'd)



*1:'96 model
*2: '97 - 98 models

C116



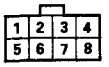
①	BLK/BLU
②	YEL/BLK

C118



①	GRN/WHT
②	RED/YEL

C119



①	BLU/GRN[1]	⑤	ORN[1]
②	BLU/YEL[1]	⑥	ORN/BLU[2]
③	WHT/BLU[2]	⑦	WHT/BLU[3]
④	ORN/BLU[1]	⑧	WHT[1]

C120



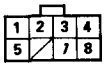
①	RED/BLU
②	BRN/BLK[1]
③	WHT/GRN[2]

C123



①	WHT/RED[2]
②	GRN/WHT
③	BLK/YEL
④	GRN/RED[1]

C125



①	RED/BLK	⑤	YEL/BLK
②	RED/BLK	6	——
③	RED/BLK	⑦	RED/BLK
④	RED/BLK	⑧	RED/BLK

C129



1	WHT/GRN
②	WHT/RED[1]
3	BLK/YEL
4	WHT/BLU

C133



①	BLK/YEL
②	WHT/BLU
③	BLK

C134



①	BLK/YEL
②	WHT/YEL
③	WHT

C135



①	BLK/YEL
②	WHT/RED
③	RED

C139



①	YEL[1]
②	RED/BLK

C140



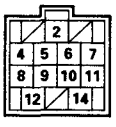
①	BLK/RED
②	RED/BLK

C141



①	WHT/BLU[1]
②	RED/BLK

C157



1	——	8	PNK
②	BLK	9	GRY
3	——	10	BRN
4	GRN	11	BLU
5	BLU/WHT	12	GRN/BLK
⑥	RED	13	——
7	WHT	14	YEL

C172



①	WHT/GRN[2]
2	——

C173



①	RED/BLU[4]
2	——

C308



1	RED
②	RED/BLU[1]
3	WHT
4	BLK/YEL

C311



①	BLK
2	PNK
3	BLU/BLK
④	RED/BLU[3]

C320



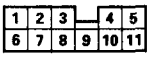
①	BRN[3]
②	BLK

C322



1	BLK/WHT
②	BLK/YEL

C324



1	WHT/GRN	6	WHT/RED
2	WHT/BLU	⑦	WHT/GRN[1]
3	BLU/WHT	8	BLU/RED
4	WHT/GRN	⑨	YEL/BLU
5	GRN	10	RED/GRN
		11	WHT

C328



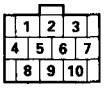
①	WHT

C329



1	YEL/RED
2	YEL/BLK
3	RED/WHT
4	WHT/GRN
⑤	WHT/YEL

C332



①	BLK	6	BLU
2	WHT	7	BRN
③	RED	8	BLK
4	YEL	9	PNK
5	GRN	10	GRY

C333



①	BLK/YEL
②	RED[3]

C337



①	YEL/BLU
②	GRN/BLU
③	PNK

C338



①	BLK/YEL
②	WHT/BLU

C339



①	RED/YEL
②	BLK/YEL

C174

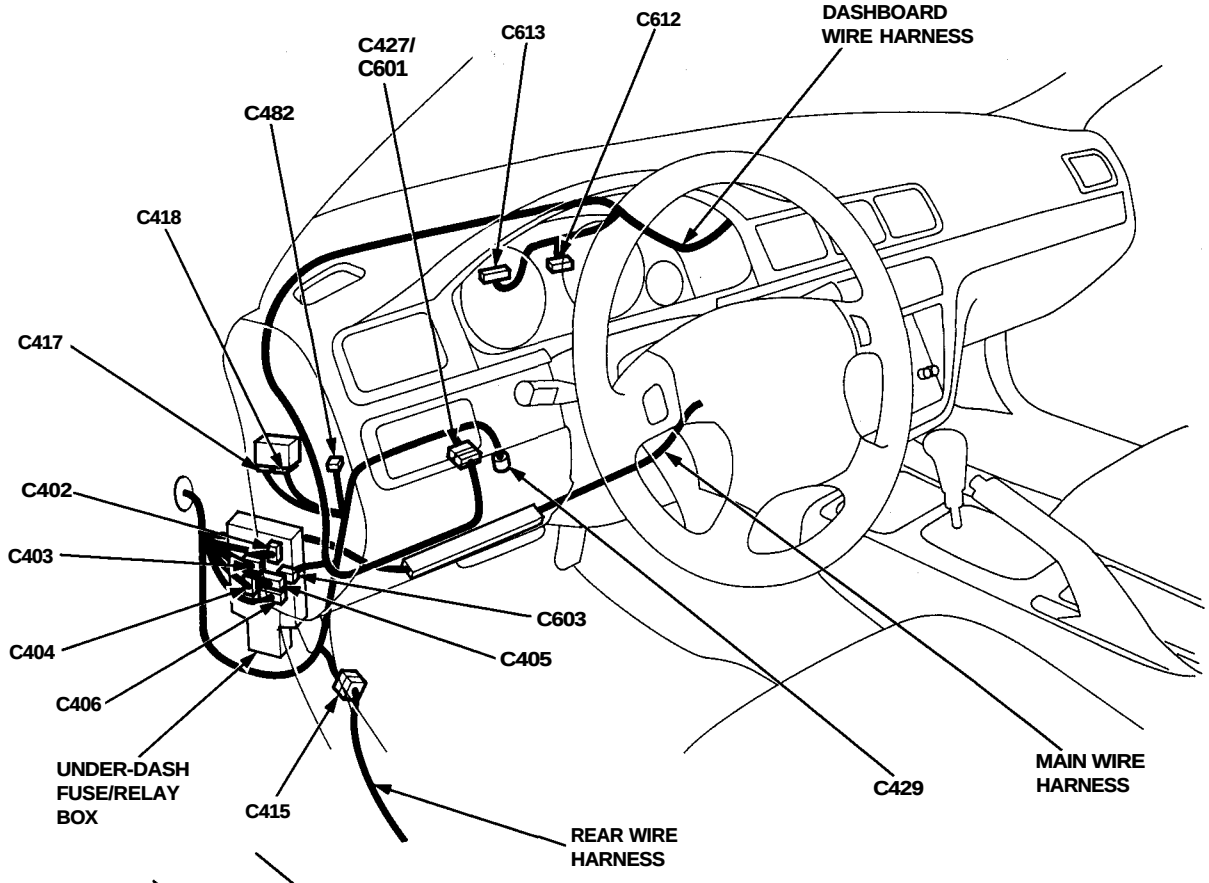


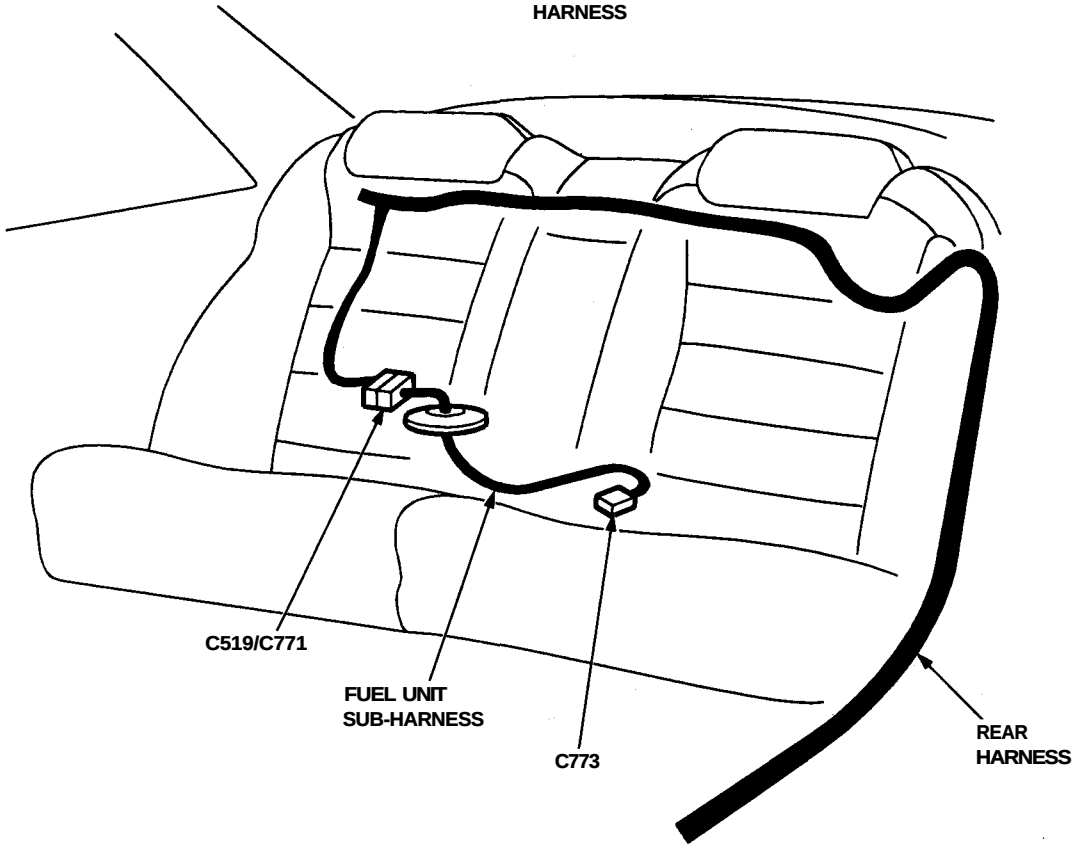
①	BLK/YEL
②	YEL/BLU

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
● — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

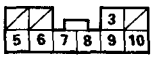
System Description

System Connectors [Dash and Floor]





C402



1	——	6	BLK
2	——	7	BLK
③	BLK/YEL	8	BLK
4	——	9	BLK
5	BLK/YEL	10	BLK

C404



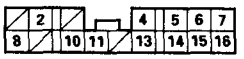
1	WHT/RED		
②	BLK/YEL		
3	——		
4	WHT/YEL		
5	BLK/YEL		

C403



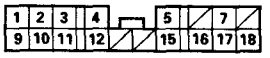
①	WHT		
2	WHT/BLU		
3	YEL/GRN		

C405



1	——	9	——
2	RED/BLK	10	BLU
3	——	11	BLU
4	BLU/WHT	12	——
5	GRN	13	BLK/YEL
6	BLK	14	GRN/RED
7	BLU/YEL	15	YEL
8	BLU	⑯	YEL

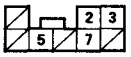
C406



①	GRN/WHT[2]	⑩	GRN/WHT[2]
2	GRN/WHT	11	YEL/BLK*
3	YEL/BLK	⑫	BLU/RED
4	YEL/BLK	13	——
5	GRN/YEL	14	——
6	——	15	WHT/BLU
⑦	BLK/YEL	16	BLU/RED
8	——	17	GRN/BLU
9	GRN/WHT	18	BLK/YEL

*: Canada

C417



1	——	⑤	BLK/YEL
②	GRN/BLK[1]	6	——
③	BLU/RED[1]	⑦	BLK[2]
4	——	8	——

C418



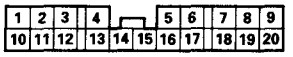
①	YEL/BLK		
②	BLK/YEL		
③	YEL/BLU		
④	BLK/YEL		

C482



①	BLK/YEL		
②	BLK/YEL		

C415



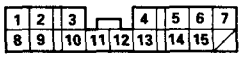
1	WHT/RED	11	GRY
2	BLU/YEL	12	LT BLU
3	GRN/YEL	13	GRN/YEL
4	GRN/BLK	14	GRN/BLU
5	YEL/RED	⑲	BLK/YEL
6	GRN/BLK	16	WHT/RED
7	GRN/YEL	17	GRN
8	RED/YEL	18	GRN/ORN
9	WHT/BLK	19	BLU/GRN
10	WHT/GRN	20	WHT/BLU

C415



1	WHT/RED	10	GRY
2	BLU/YEL	11	LT BLU
3	GRN/YEL	12	GRN/YEL
4	GRN/BLK	13	GRN/BLU
5	YEL/RED	⑭	BLK/YEL
6	GRN/BLK	15	WHT/RED
7	GRN/YEL	16	GRN
8	RED/YEL	17	GRN/ORN
9	WHT/GRN	18	BLU/GRN

C427



1	YEL/GRN	9	RED
2	BLK/YEL	10	BLU/WHT
3	BLU	⑪	BLK
4	BLU/GRN	12	GRN/RED
5	GRY/BLK	13	LT GRN
6	BLU/BLK	14	YEL/WHT
7	YEL/BLU	15	LT GRN
⑧	RED	16	——

C429



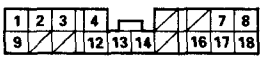
1	GRY		
②	WHT/YEL		
③	GRN/WHT[2]		
4	LT GRN		

C519



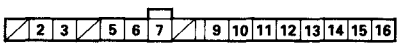
1	YEL/BLU		
2	LT GRN/RED		
③	BLK/YEL		

C603



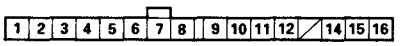
1	BLU/RED	10	——
2	BLU	11	RED/BLK
3	GRN/BLU	12	GRN/YEL
4	BLU/RED	13	YEL/GRN
5	——	14	BLK
6	——	15	——
7	GRN/BLU	16	BLK/YEL
⑧	YEL	17	GRN/RED
9	YEL/BLK	18	GRN/WHT

C612



1	——	⑨	YEL
2	RED	10	YEL/BLU
3	ORN	11	BRN
4	——	12	BLU
⑤	GRN/RED[2]	13	GRN
6	LT GRN/RED	14	BLK
7	BLU/RED	15	RED/BLK
8	GRY/BLK	16	BLU/RED

C613



1	GRN/BLU	⑨	BLK
2	GRN/YEL	10	WHT
3	GRN/RED	⑪	RED
4	RED/BLU	12	BLU
5	RED/GRN	13	——
6	BLU/RED	14	GRN/BLK
7	BLU/BLK	15	ORN
⑧	YEL/GRN	16	GRN/WHT

C773



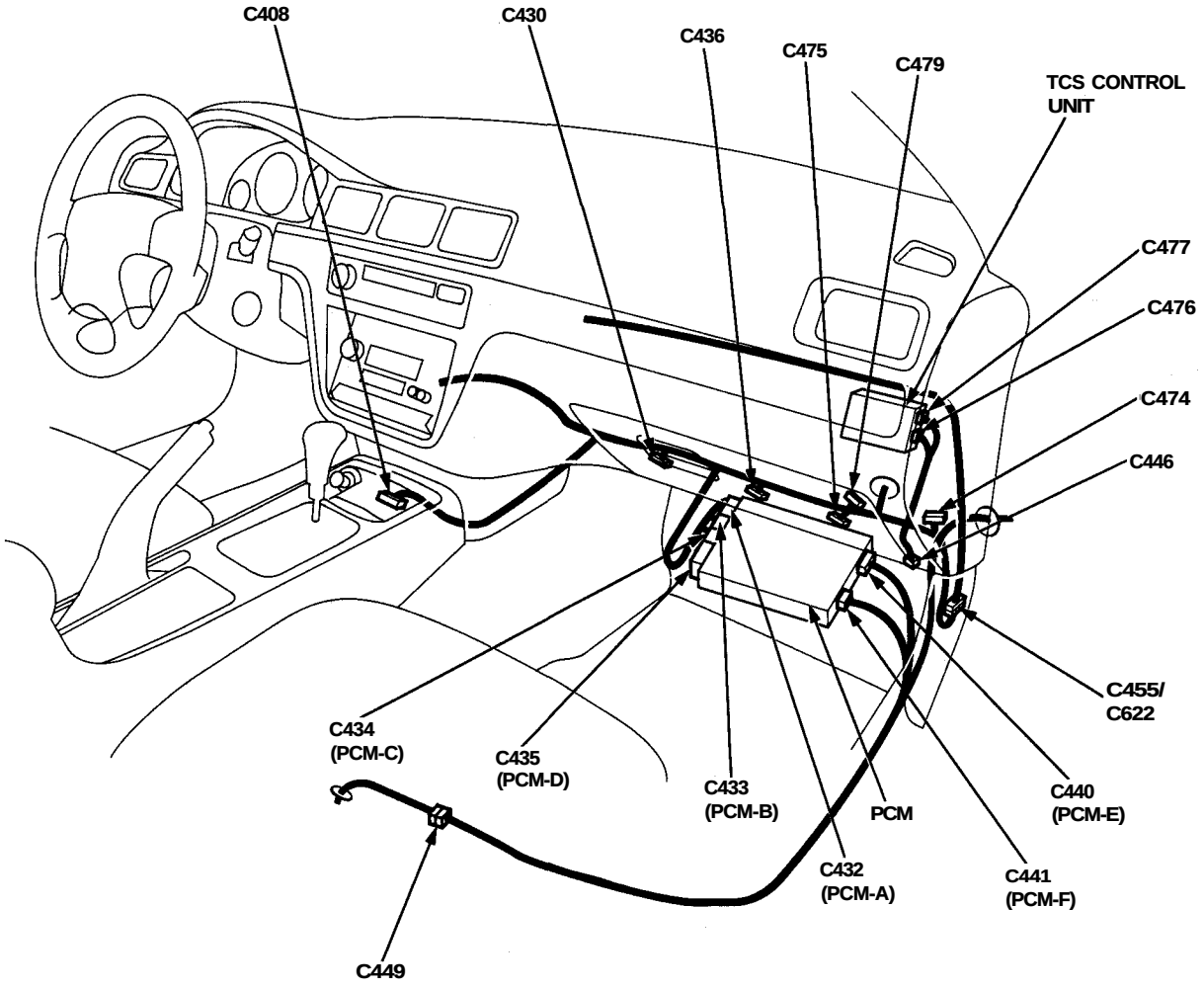
①	BLK		
②	BLK/YEL		

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
● — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Dash and Floor] (cont'd)

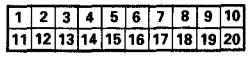


C408



1	——	9	——
2	——	10	——
3	——	11	——
4	——	12	BLK
5	——	⑬	BRN/BLK
6	LT BLU	14	——
7	——	⑮	LT GRN/YEL
⑧	WHT/GRN	16	——

C430



①	BRN/BLK[2]	11	RED
②	BRN/BLK[2]	12	RED
③	BRN/BLK[2]	13	RED
④	BRN/BLK[2]	14	RED
5	GRN/WHT	15	BLK/YEL
6	GRN/WHT	16	BLK/YEL
7	GRN/WHT	17	BLK/YEL
8	GRN/RED	⑱	ORN[2]
9	GRN/RED	⑲	ORN[2]
10	GRN/RED	⑳	ORN[2]

C432 (PCM-A)



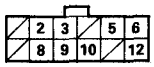
①	BRN[1]	⑭	YEL[1]
②	RED[1]	⑮	BLK/RED
③	BLU[1]	⑯	WHT/BLU[1]
④	GRN/BLK[1]	17	——
⑤	BLK/BLU	⑱	GRN/RED[1]
⑥	RED[2]	⑲	ORN/BLK[1]
⑦	GRN/RED[2]	⑳	RED/BLU[1]
⑧	RED/BLU[2]	㉑	ORN/BLK[2]
9	——	㉒	YEL[2]
⑩	GRN[1]	㉓	RED[3]
⑪	PNK	㉔	BRN[2]
⑫	BLK[1]	㉕	BLK[2]
⑬	YEL/BLK[1]	㉖	BRN/BLK[1]

C433 (PCM-B)



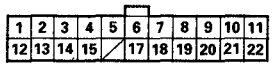
①	YEL/BLK[2]	⑨	BRN/BLK[2]
②	RED[3]	⑩	GRY
③	GRN[2]	⑪	GRN[3]
4	——	⑫	BLU[2]
⑤	ORN[1]	⑬	ORN[2]
⑥	WHT[1]	14	——
⑦	ORN/BLU[1]	⑮	WHT/BLU[2]
⑧	BLU/GRN[1]	⑯	BLU/YEL[1]

C434 (PCM-C)



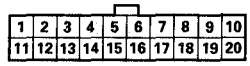
1	——	7	——
②	BLU/BLK	⑧	BLU[3]
③	RED/BLU[3]	⑨	LT GRN/BLK
4	——	⑩	GRY/GRN
⑤	ORN[3]	11	——
⑥	BLU/RED[1]	⑫	LT BLU

C435 (PCM-D)



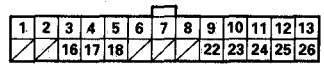
①	WHT/GRN[1]	⑫	WHT/BLU[3]
②	RED/BLU[4]	⑬	WHT/GRN[2]
③	ORN/RED	⑭	ORN/BLU[2]
④	LT GRN/YEL	⑮	BRN[3] (PNK*2)
⑤	WHT/RED[1]	16	——
⑥	RED/BLK	⑰	WHT/BLK
⑦	RED/WHT	⑱	WHT/RED[2]
⑧	RED/YEL	⑲	BLU/RED[2]
⑨	WHT/YEL	⑳	BLU[4]
⑩	YEL/WHT	㉑	YEL/BLU
⑪	GRN/WHT[1]	㉒	GRN/BLU

C436



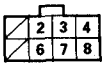
1	RED/BLK	⑪	YEL/BLK
2	RED/BLK	⑫	YEL/BLK
3	RED/BLK	⑬	YEL/BLK
4	RED/BLK	14	YEL/BLK
5	RED/BLK	15	BLU/YEL
6	RED/BLK	16	BLU/YEL
7	RED/BLK	17	BLU/GRN
8	RED/BLK	18	BLU/GRN
9	RED/BLK	19	ORN
10	RED/BLK	20	ORN

C440 (PCM-E)



1	BLK/YEL	14	——
②	GRN/WHT[2]	15	——
3	RED[5]	16	WHT[3]
4	ORN/BLU[3]	17	WHT/BLU[4]
5	BLU/GRN[2]	18	BLU/YEL[3]
6	BLU/RED[3]	19	——
7	WHT[2]	20	——
8	YEL[3]	21	——
9	GRN[4]	22	WHT/GRN
10	BLU[5]	23	GRN/BLK[2]
11	BRN[4]	㉔	YEL/GRN
12	BLU/YEL[2]	25	GRN/WHT[3]
13	YEL[4]	26	GRN/BLK[3]

C441 (PCM-F)



1	——	5	——
②	WHT/RED[3]	⑥	GRN/WHT[4]
③	GRN/BLK[4]	⑦	GRN/YEL
④	YEL[5]	⑧	YEL/RED

C446



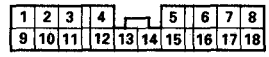
①	GRN/BLU
②	ORN[3]

C449



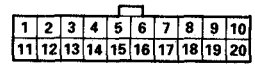
①	WHT/RED[3]
②	GRN/WHT[4]
③	BLK/YEL
④	ORN/BLK[2]

C455



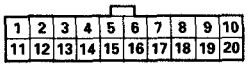
1	BLU/RED	10	WHT/GRN
②	GRN/RED[2]	11	RED/GRN
3	ORN	12	BLK/GRN
4	RED/BLU	13	ORN/WHT
5	GRN	14	GRN/BLK
6	BLU	⑮	YEL/GRN
7	BRN	16	YEL/RED
8	PNK	17	WHT
9	WHT/BLU	18	BLU/WHT

C474



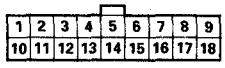
1	GRN/YEL	11	GRN/YEL
2	YEL/RED	12	WHT/RED
3	YEL/RED	13	WHT/RED
4	YEL/RED	14	WHT/RED
5	GRY	15	ORN
6	GRY	⑯	ORN[3]
7	GRY	⑰	ORN[3]
8	GRN/RED	18	BLU/WHT
9	GRN/RED	19	BLU/WHT
10	GRN/RED	20	BLU/WHT

C475



①	BLK/YEL	11	WHT/GRN
②	BLK/YEL	12	WHT/GRN
③	BLK/YEL	⑬	WHT/GRN[1]
④	BLK/YEL	⑭	WHT/GRN[1]
⑤	BLK/YEL	15	WHT/GRN
⑥	BLK/YEL	⑯	WHT/GRN[1]
7	BLK/YEL	⑰	WHT/YEL
⑧	BLK/YEL	18	WHT/YEL
⑨	BLK/YEL	⑲	WHT/YEL
10	BLK/YEL	20	WHT/YEL

C476



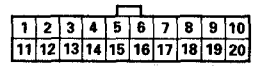
1	GRN/BLK	⑧	LT GRN/BLK
2	GRY/BLK	9	GRY
3	GRN/BLU	⑩	LT BLU
4	BRN/BLK	11	WHT/BLK
5	GRN/YEL	⑫	BLU[4]
6	BLU/GRN	13	WHT
7	LT BLU	⑭	RED/BLK

C477



1	BLK/YEL	11	GRN/WHT
2	GRN/RED	⑫	BLU[3]
3	ORN	⑬	ORN/RED
4	BLU	⑭	GRY/GRN
5	BLU/RED	15	BRN/BLK
6	RED/BLK	16	WHT/GRN
7	——	17	GRY/BLK
8	——	18	BLK
9	BLK	19	BLU/BLK
10	BRN/WHT	20	BLU/YEL

C479



①	BRN/BLK[1]	11	WHT/BLU
②	BRN/BLK[1]	12	WHT/BLU
③	BRN/BLK[1]	13	WHT/BLU
④	BRN/BLK[1]	14	WHT/BLU
⑤	BRN/BLK[1]	15	WHT/BLU
⑥	BRN/BLK[1]	16	WHT/BLU
7	RED/BLU	17	GRN/RED
8	RED/BLU	18	GRN/RED
9	RED/BLU	19	GRN/RED
10	RED/BLU	20	GRN/RED

NOTE: ● Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
● — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

*2: '97 - 98 models

Troubleshooting

Troubleshooting Procedures

I. How To Begin Troubleshooting

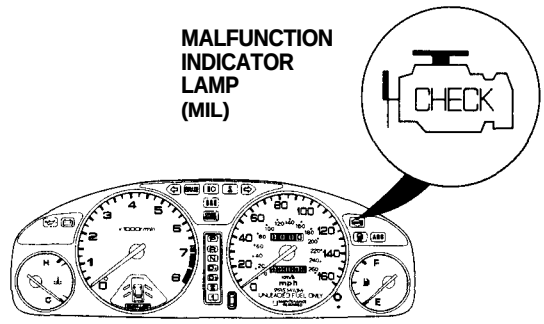
When the Malfunction Indicator Lamp (MIL) has been reported on, or there is a driveability problem, use the appropriate procedure below to diagnose and repair the problem.

A. When the MIL has come on:

1. Connect the Honda PGM Tester or an OBD II scan tool to the 16P Data Link Connector (DLC) located on the center console behind the ashtray.

2. Turn the ignition switch ON (II).

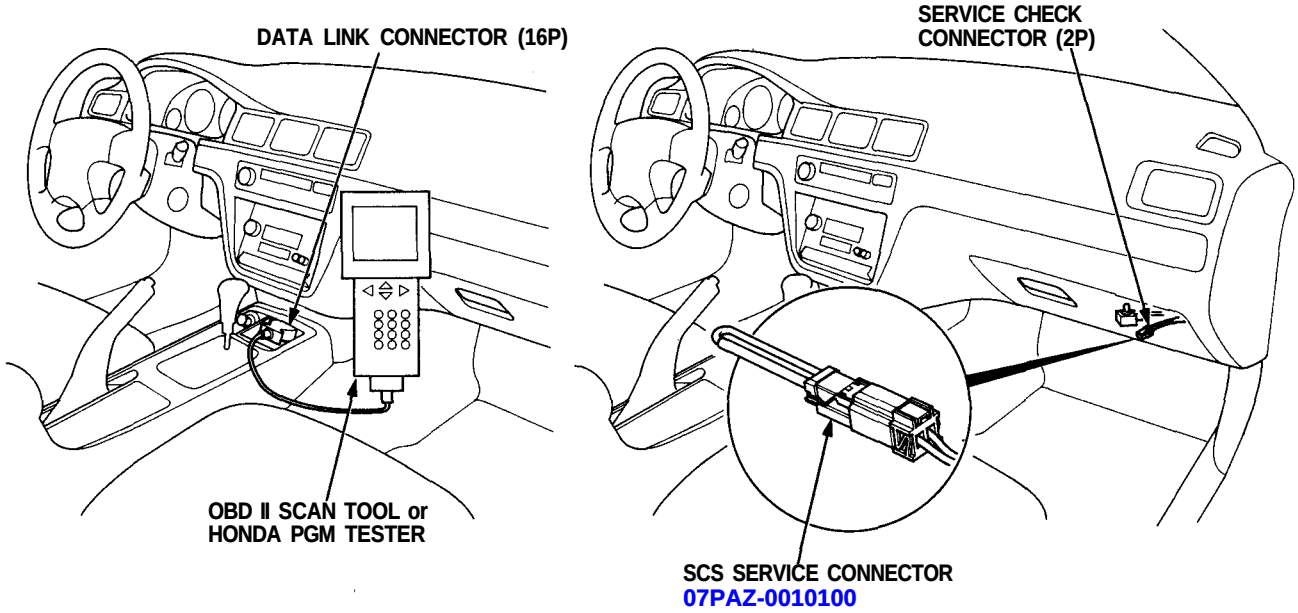
3. Check the DTC and note it. Also check and note the freeze frame data.
   Refer to the Diagnostic Trouble Code Chart and begin troubleshooting.



NOTE:
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.
- The scan tool or tester can read the Diagnostic Trouble Codes (DTC), freeze frame data, current data, and other Powertrain Control Module (PCM) data.
- Freeze frame data indicates the engine conditions when the first malfunction, misfire or fuel trim malfunction was detected. It can be useful information when troubleshooting.

B. When the MIL has not come on, but there is a driveability problem, refer to the Symptom Chart on page 11-34.

C. DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.
- Connect the SCS service connector to Service Check Connector as shown. (The 2P Service Check Connector is located under the dash on the passenger's side of the car.) Turn the ignition switch ON (II).



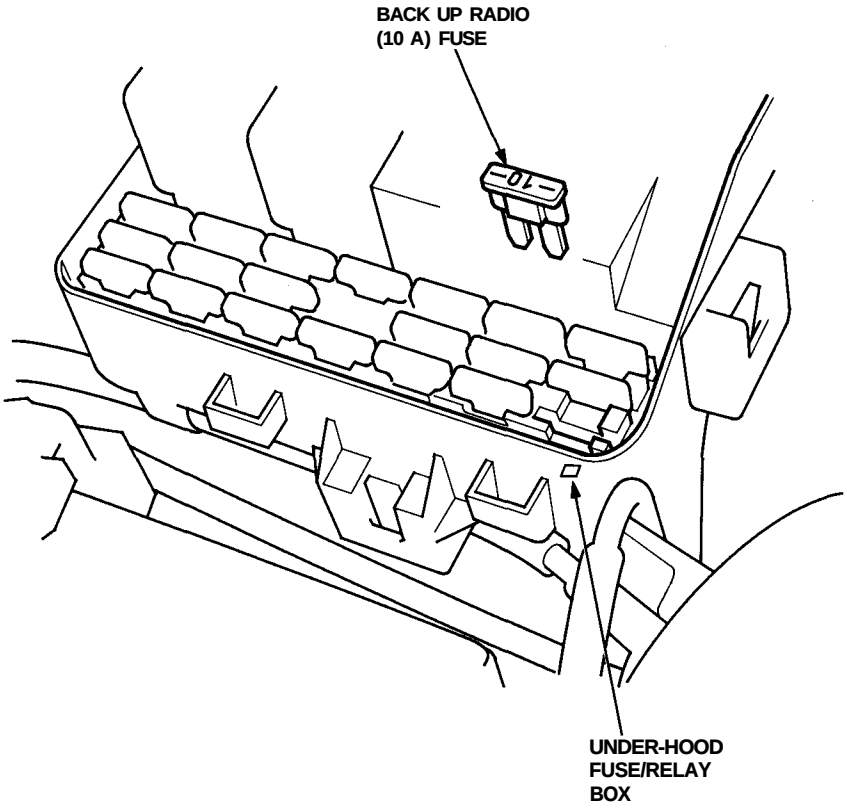
II. Powertrain Control Module (PCM) Reset Procedure

Either of the following actions will reset the PCM

- Use the OBD II scan tool or Honda PGM Tester to clear the PCM's memory.

  NOTE: See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

- Turn the ignition switch OFF. Remove the BACK UP RADIO (10 A) fuse from the under-hood fuse/relay box for 10 seconds.



III. Final Procedure (this procedure must be done after any troubleshooting)

1. Remove the SCS Service Connector if it is connected.

   NOTE: If the SCS service connector is connected and there are no DTCs stored in the PCM, the MIL will stay on when the ignition switch is turned ON (II).

2. Do the PCM Reset Procedure.

3. Turn the ignition switch OFF.

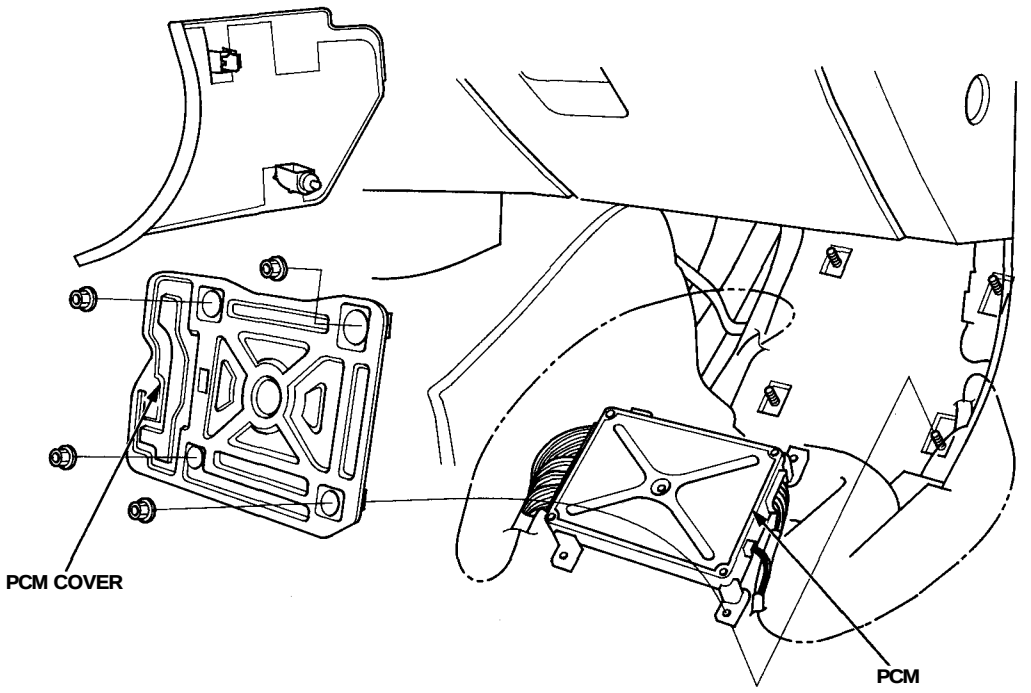
4. Disconnect the OBD II scan tool or Honda PGM Tester from the Data Link Connector (16P).

(cont'd)

Troubleshooting

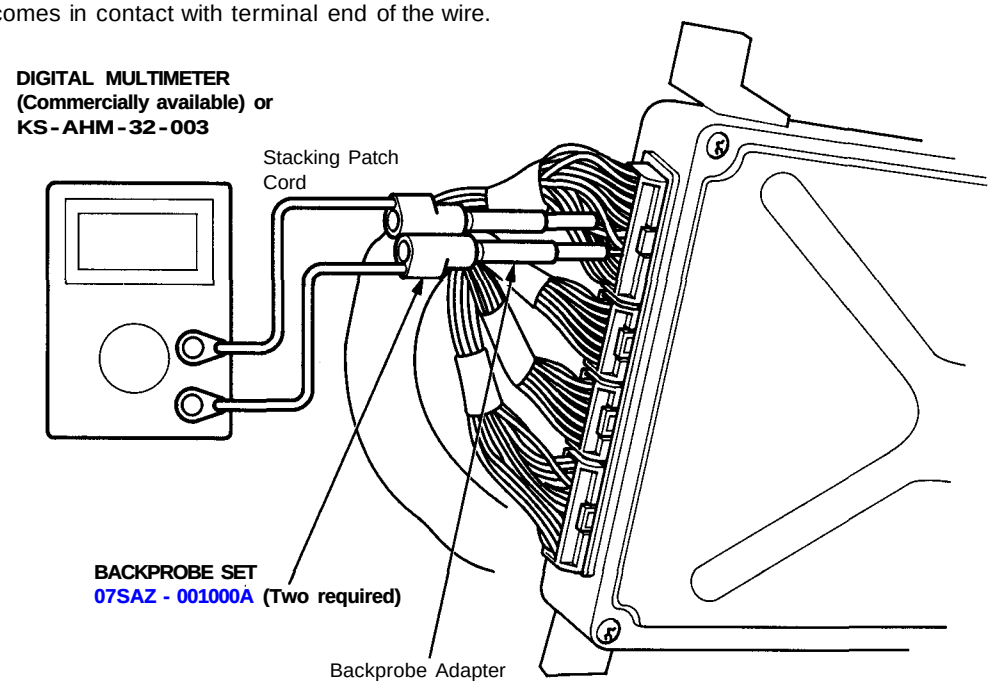
Troubleshooting Procedures (cont'd)

If the inspection for a particular code requires voltage or resistance checks at the PCM connectors, remove the right door sill molding. Pull the carpet back to expose the PCM. Unbolt the PCM cover, and connect the backprobe sets and a digital multimeter as described below. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.



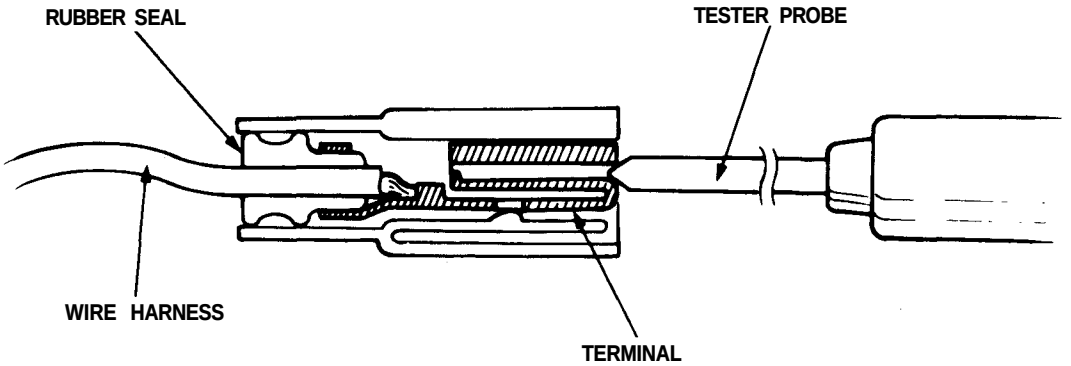
How to Use the Backprobe Sets

Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with terminal end of the wire.



CAUTION:

- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **Bring the tester probe into contact with the terminal from the terminal side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.**



(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

Symptom Chart

Listed below are symptoms and probable causes for problems that DO NOT cause the Malfunction Indicator Lamp (MIL) to come on. If the MIL was reported on, go to page 11-32.
Troubleshoot each probable cause in the order listed (from left to right) until the symptom is eliminated.
The probable cause and troubleshooting page reference can be found below.

SYMPTOM	PROBABLE CAUSE
Engine will not start	2, 3, 21, 13, 1
Hard starting	2, 10, 12, 20, 21
Cold fast idle too low	5, 6, 7, 4
Cold fast idle too high	5, 6, 7, 9, 8
Idle speed fluctuates	5, 14, 15, 6, 7, 9, 8
Misfire or rough running	Troubleshoot for misfire on pages 11-85, 11-89
Low power	2, 8, 9, 11, 18, 17, 19, 10
Engine stalls	2, 5, 10, 21, 7, 3, 16

Other Probable Causes for an engine that will not start:
- — Compression
- — PGM-FI main relay
- — Engine locked up
- — Timing belt
- — Starting system
- — Ignition system
- — Overheating
- — Battery

Probable Cause List (for DTC chart see page 11-45).

Probable Cause	Page	System
1	11-53, 11-54	Powertrain Control Module (PCM)
2	11-119	Fuel pressure
3	(See DTC chart)	Crankshaft Position/Cylinder Position sensor circuit
4	(See DTC chart)	Intake Air Temperature (IAT) sensor circuit
5	(See DTC chart)	Idle Air Control (IAC) Valve
6	11-113	Fast idle thermo valve
7	11-114	Idle speed adjustment
8	11-136	Throttle body
9	11-135	Throttle cable
10	(See DTC chart)	Manifold Absolute Pressure (MAP) sensor
11	(See DTC chart)	Throttle Position (TP) sensor
12	(See DTC chart)	Barometric pressure (BARO) sensor
13	Section 14	A/T gear position signal
14	11-104	Air Conditioning Signal
15	11-106	Alternator FR Signal
16	11-112	Brake switch signal
17	11-134	Air Cleaner
18	11-138	Intake Air Bypass (IAB) control system and intake air duct
19	11-144	Three Way Catalytic Converter (TWC)
20	11-153	Evaporative emission (EVAP) control
21	———	Contaminated fuel

Powertrain Control Module Data

By connecting the OBD II scan tool or the Honda PGM Tester to the 16P data link connector (DLC), various data can be retrieved from the PCM. The items listed in the table below conform to the SAE recommended practice.
The Honda PGM Tester also reads data beyond that recommended by SAE.
Understanding this data will help to find the causes of intermittent failures or engine problems.

NOTE:

- The "operating values" given below are approximate values and may be different depending on the environment and the individual car.
- Unless noted otherwise, "at idle speed" means idling with the engine completely warmed up, transmission in [P] or [N] position, and the A/C and all accessories turned off.

Data	Description	Operating Value	Freeze Data
Diagnostic Trouble Code (DTC)	If the PCM detects a problem, it will store it as a code consisting of one letter and four numbers. Depending on the problem, an SAE-defined code (P0xxx) or a Honda-defined code (P1xxx) will be output to the tester.	If no problem is detected, there is no output.	○
Engine Speed	The PCM computes engine speed from the signals sent from the Crankshaft Position sensor. This data is used for determining the time and amount of fuel injection.	Nearly the same as tachometer indication at idle speed: 640 ± 50 rpm	○
Vehicle Speed	The PCM converts pulse signals from the Vehicle Speed Sensor (VSS) into speed data.	Nearly the same as speedometer indication	○
Manifold Absolute Pressure (MAP)	The absolute pressure created in the intake manifold by engine load and speed.	With engine stopped: Nearly the same as atmospheric pressure at idle speed: 24-37 kPa (180-280 mmHg, 7.1-11.0 inHg)	○
Engine Coolant Temperature (ECT)	The ECT sensor converts coolant temperature into voltage and signals the PCM. The sensor is a thermistor whose internal resistance changes with coolant temperature. The PCM uses the voltage signals from the ECT sensor to determine the amount of injected fuel.	With cold engine: Same as ambient temperature and IAT With engine warmed up: approx. 158-212°F (70-100°C)	○
Heated Oxygen Sensor (H02S) (Bank 1, Sensor 1) (Bank 2, Sensor 1) (Sensor 2)	The Heated Oxygen Sensor detects the oxygen content in the exhaust gas and sends voltage signals to the PCM. Based on these signals, the PCM controls the air/fuel ratio. When the oxygen content is high (that is, when the ratio is leaner than the stoichiometric ratio), the voltage signal is lower. When the oxygen content is low (that is, when the ratio is richer than the stoichiometric ratio), the voltage signal is higher.	0.0-1.25 V At idle speed: about 0.1-0.9 V	O (Sensor 1)

(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

Data	Description	Operating Value	Freeze Data
HO2S Feedback Loop Status (Bank 1: Right) (Bank 2: Left)	Loop status is indicated as "open" or "closed". Closed: Based on the HO2S output, the PCM determines the air/fuel ratio and controls the amount of injected fuel. Open: Ignoring H02S output, the PCM refers to signals from the TP, MAP, and ECT sensors to control the amount of injected fuel.	At idle speed: closed	○
Short Term Fuel Trim (Bank 1: Right) (Bank 2: Left)	The air/fuel ratio correction coefficient for correcting the amount of injected fuel when HO2S feedback is in the closed loop status. When the signal from the HO2S is weak, short term fuel trim gets higher, and the PCM increases the amount of injected fuel. The air/fuel ratio gradually gets richer, causing a higher HO2S output. Consequently, the short term fuel trim is lowered, and the PCM reduces the amount of injected fuel. This cycle keeps the air/fuel ratio close to the stoichiometric ratio when in closed loop status.	-30%-+43%	○
Long Term Fuel Trim (Bank 1: Right) (Bank 2: Left)	Long term fuel trim in computed from short term fuel trim and indicates changes occurring in the fuel supply system over a long period. If long term fuel trim is higher than 1.00, the amount of injected fuel must be increased. If it is lower than 1.00, the amount of injected fuel must be reduced.	-19%-+25%	○
Intake Air Temperature (IAT)	The IAT sensor converts intake air temperature into voltage and signals the PCM. When intake air temperature is low, the internal resistance of the sensor increases, and the voltage signal is higher.	With cold engine: Same as ambient temperature and ECT	○
Throttle Position	Based on the accelerator pedal position, the opening angle of the throttle valve is indicated.	At idle: Approx. 10% At full throttle: Approx. 90%	○
Ignition Timing	The ignition advance angle is set by the PCM. The PCM matches ignition timing to the driving conditions.	At idle speed: 15 + 2° BTDC with the SCS service connector connected.	×
Calculated Load Value (CLV)	CLV is the engine load calculated from the MAP data.	At idle speed: 15-35% At 2,500 rpm with no load: 12-30%	○

Powertrain Control Module Terminal Arrangement

PCM CONNECTOR A (26P)

1 INJ1	2 INJ2	3 INJ3	4 FLR	5 IACV	6 ESOL	7 MIL	8 ACC		10 FP RCS	11 IGN COIL1	12 PG1	13 IGP1
14 INJ4	15 INJ5	16 INJ6		18 LPO2S HTC	19 RPO2S HTC	20 IAB CS1	21 SO2S HTC	22 IAB CS2	23 PCS	24 IGN COIL2	25 PG2	26 LG1

Wire side of female terminals

PCM CONNECTOR A (26P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	BRN	INJ1 (No. 1 FUEL INJECTOR)	Drives No. 1 fuel injector.	With engine running: pulses
2	RED	INJ2 (No. 2 FUEL INJECTOR)	Drives No. 2 fuel injector.	
3	BLU	INJ3 (No. 3 FUEL INJECTOR)	Drives No. 3 fuel injector.	
4	GRN/BLK	FLR (FUEL PUMP RELAY)	Drives fuel pump relay.	0 V for two seconds after turning ignition switch ON (II), then battery voltage
5	BLK/BLU	IACV (IDLE AIR CONTROL VALVE)	Drives IAC valve.	With engine running: pulses
6	RED	ESOL (EGR CONTROL SOLENOID VALVE)	Drives EGR control solenoid valve.	With EGR operating during driving with fully warmed up engine: duty controlled With EGR not operating: battery voltage
7	GRN/RED	MIL (MALFUNCTION INDICATOR LAMP)	Drives MIL.	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
8	RED/BLU	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay.	With compressor ON: 0 V With compressor OFF: battery voltage
10	GRN	FP RCS (FUEL PRESSURE REGULATOR CONTROL SOLENOID VALVE)	Drives Fuel Pressure Regulator Control Solenoid Valve	Within a few minutes after restart with high ECT: 0 V
11	PNK	IGN COIL1 (No. 1 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulses
12	BLK	PG1 (POWER GROUND)	Ground for the PCM power circuit.	Less than 1.0 V at all times
13	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the PCM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
14	YEL	INJ4 (No. 4 FUEL INJECTOR)	Drives No. 4 fuel injector.	With engine running: pulses
15	BLK/RED	INJ5 (No. 5 FUEL INJECTOR)	Drives No. 5 fuel injector.	
16	WHT/BLU	INJ6 (No. 6 FUEL INJECTOR)	Drives No. 6 fuel injector.	
18	GRN/RED	LPO2SHTC (LEFT PRIMARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives left primary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
19	ORN/BLK	RPO2SHTC (RIGHT PRIMARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives right primary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
20	RED/BLU	IABCS1 (IAB CONTROL SOLENOID VALVE1)	Drives IAB low control solenoid valve.	With engine speed below 3,400 rpm: battery voltage With engine speed above 3,400 rpm: 0 V
21	ORN/BLK	SO2SHTC (SECONDARY HEATED OXYGEN SENSOR HEATER CONTROL)	Drives secondary heated oxygen sensor heater.	With ignition switch ON (II): battery voltage With fully warmed up engine running: pulses
22	YEL	IABCS2 (IAB CONTROL SOLENOID VALVE2)	Drives IAB high control solenoid valve.	With engine speed below 4,300 rpm: battery voltage With engine speed above 4,300 rpm: 0 V
23*1	RED	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve.	With engine running, engine coolant below 158°F (70°C): battery voltage With engine running, engine coolant above 158°F (70°C): 0 V
23*2	RED/YEL	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Driver EVAP purge control solenoid valve.	With engine running, engine coolant below 99°F (37°C): battery voltage With engine running, engine coolant above 99°F (37°C): duty controlled
24	BRN	IGN COIL2 (No. 2 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulses
25	BLK	PG2 (POWER GROUND)	Ground for the PCM power circuit.	Less than 1.0 V at all times
26	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the PCM control circuit.	Less than 1.0 V at all times

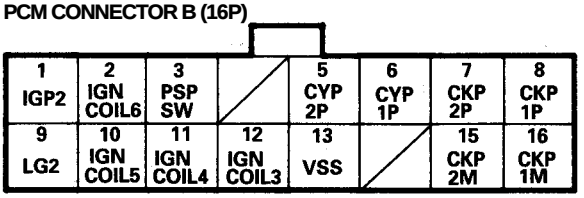
*1: '96 model
*2: '97 - 98 models

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Troubleshooting

Powertrain Control Module Terminal Arrangement (cont'd)

PCM CONNECTOR B (16P)



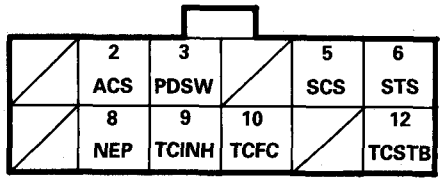
Wire side of female terminals

PCM CONNECTOR B (16P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the PCM control circuit.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
2	RED	IGN COIL6 (No. 6 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulses
3	GRN	PSPSW (P/S OIL PRESSURE SWITCH)	Detects PSP switch signal.	At idle with steering wheel in straight ahead position: 0 V At idle with steering wheel at full lock: battery voltage
5	ORN	CYP 2P (CYP SENSOR 2P SIDE)	Detects CYP sensor 2.	With engine running: pulses
6	WHT	CYP 1P (CYP SENSOR 1P SIDE)	Detects CYP sensor 1.	With engine running: pulses
7	ORN/BLU	CKP 2P (CKP SENSOR 2P SIDE)	Detects CKP sensor 2.	With engine running: pulses
8	BLU/GRN	CKP 1P (CKP SENSOR 1P SIDE)	Detects CKP sensor 1.	With engine running: pulses
9	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the PCM control circuit.	Less than 1.0 V at all times
10	GRY	IGN COIL5 (No. 5 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulse
11	GRN	IGN COIL4 (No. 4 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulses
12	BLU	IGN COIL3 (No. 3 IGNITION COIL part of IGNITION CONTROL MODULE)	Sends ignition pulse.	With ignition switch ON (II): 0 V With engine running: pulse
13	ORN	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal.	With ignition switch ON (II) and front wheels rotating: cycles 0 V – 5 V
15	WHT/BLU	CKP 2M (CKP SENSOR 2 M SIDE)	Ground for CKP sensor 2.	
16	BLU/YEL	CKP 1M (CKP SENSOR 1 M SIDE)	Ground for CKP sensor 1.	

PCM CONNECTOR C (12P)



Wire side of female terminals

PCM CONNECTOR C (12P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
2	BLU/BLK	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal.	With A/C switch ON: 0 V With A/C switch OFF: approx. 10 V
3	RED/BLU	PDSW (A/C PRESSURE SWITCH B)	Detects A/C pressure switch B signal.	With A/C pressure switch B ON: 0 V With A/C pressure switch B OFF: approx. 5 V
5	ORN	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the connector connected: 0 V With the connector disconnected: about 5 V or battery voltage
6	BLU/RED	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal.	With starter switch ON: battery voltage With starter switch OFF: 0 V
8	BLU	NEP (ENGINE SPEED PULSE)	Outputs engine speed pulse.	With engine running: pulses
9*3	LT GRN/BLK	TCINH (TRACTION CONTROL INHIBIT)	FI → TCS, TCS operation permission signal	With engine running: pulses
10*3	GRY/GRN	TCFC (TRACTION CONTROL FUEL CUT)	TCS → FI, Fuel cut (torque down) signal	With engine running: pulses
12*3	LT BLU	TCSTB (TRACTION CONTROL STANDBY)	TCS → FI, TCS operation start signal	With TCS OFF: approx. 5 V With TCS ON: 0 V

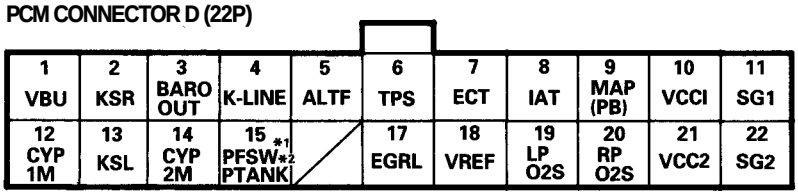
*3: with TCS only.

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Troubleshooting

Powertrain Control Module Terminal Arrangement (cont'd)

PCM CONNECTOR D (22P)



Wire side of female terminals

PCM CONNECTOR D (22P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	WHT/GRN	VBU (VOLTAGE BACK UP)	Power source for the PCM control circuit. Power source for the DTC memory.	Battery voltage at all times
2	RED/BLU	KSR (RIGHT KNOCK SENSOR (BANK 1))	Detects knock sensor signal.	With engine knocking: pulses
3*3	ORN/RED	BARO OUT (BAROMETRIC SENSOR OUTPUT SIGNAL)	Sends barometric sensor output signal.	With ignition switch ON (II): about 3 V (depending on barometric pressure)
4	LT GRN/YEL	K-LINE	Sends and receives OBD II scan tool and PGM tester signal.	With ignition switch ON (II): about 5 V
5	WHT/RED	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal.	With fully warmed up engine running: 0 V – battery voltage (depending on electrical load)
6	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal.	With throttle fully open: about 4.8 V With throttle fully closed: about 0.5 V
7	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR)	Detects ECT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
8	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal.	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
9	WHT/YEL	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal.	With ignition switch ON (II): about 3 V At idle: about 1.0 V (depending on engine speed)
10	YEL/WHT	VCC1 (SENSOR VOLTAGE)	Power source for MAP sensor.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
11	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor.	
12	WHT/BLU	CYP 1M (CYP SENSOR 1 M SIDE)	Ground for CYP sensor 1.	
13	WHT/GRN	KSL (LEFT KNOCK SENSOR (BANK 2))	Detects knock sensor signal.	With engine knocking: pulses
14	ORN/BLU	CYP 2M (CYP SENSOR 2 M SIDE)	Ground for CYP sensor 2.	
15*1	BRN	PFSW (EVAP PURGE FLOW SWITCH)	Detects the EVAP purge flow.	During purge flow: battery voltage No purge flow: 0 V
15*2	PNK	PTANK (FUEL TANK PRESSURE SENSOR)	Detects fuel tank pressure sensor signal.	With fuel fill cap opened: about 2.5 V
17	WHT/BLK	EGRL (EGR VALVE LIFT SENSOR)	Detects EGR valve lift sensor signal.	At idle without vacuum: about 1.2 V With 27 kPa (200 mmHg, 8 in.Hg): about 4.3 V
18	WHT/RED	LPO2S (LEFT PRIMARY OXYGEN SENSOR)	Detects primary oxygen sensor signal.	With throttle fully opened, fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
19	BLU/RED	RPO2S (RIGHT PRIMARY OXYGEN SENSOR)	Detects primary oxygen sensor signal.	With throttle fully opened, fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
20*3	BLU	VREF (REFERENCE VOLTAGE)	Provides reference voltage to TCS control unit.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
21	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Provides sensor voltage.	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
22	GRN/BLU	SG2 (SENSOR GROUND)	Sensor ground.	

*1:'96 model
*2: '97 - 98 models
*3: with TCS

PCM CONNECTOR E (26P)

1	2	3	4	5	6	7	8	9	10	11	12	13
VB SOL	BKSW	LS+	NM	NC	TC SFT	ATPR	ATPD4	ATPD3	ATP2	ATP1	SHA	LCA
		16	17	18				22	23	24	25	26
		LS–	NMSG	NCSG				ILU	D4IND	ATPPN	SHB	LCB

Wire side of female terminals

PCM CONNECTOR E (26P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	BLK/YEL	VB SOL (VOLTAGE BACK-UP SOLENOID VALVE)	Power source for solenoid valves.	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
2	GRN/WHT	BKSW (BRAKE SWITCH)	Detects brake switch signal.	With brake pedal released: 0 V With brake pedal depressed: battery voltage
3	RED	LS + (LINEAR SOLENOID VALVE +)	Drives linear solenoid valve.	With ignition switch ON (II): pulses
4	ORN/BLU*1 WHT/GRN*2	NM (MAINSHAFT SPEED SENSOR)	Detects mainshaft speed sensor signal.	With engine running: pulses
5	BLU/GRN*1 RED/BLU*2	NC (COUNTERSHAFT SPEED SENSOR)	Detects countershaft speed sensor signal.	With engine running: pulses
6	BLU/RED	TCSFT (TCS SHIFT CONTROL)	Sends TCS shift control signal.	With engine running: pulses
7	WHT	ATPR (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In R position: 0 V In any other position: battery voltage
8	YEL	ATPD4 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D4 position: 0 V In any other position: battery voltage
9	GRN	ATPD3 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In D3 position: 0 V In any other position: battery voltage
10	BLU	ATP2 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 2 position: 0 V In any other position: battery voltage
11	BRN	ATP1 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In 1 position: 0 V In any other position: battery voltage
12	BLU/YEL	SHA (SHIFT CONTROL SOLENOID VALVE A)	Drives shift control solenoid valve A.	With engine running in 2, 3: battery voltage With engine running in 1, 4: about 0 V
13	YEL	LC A (LOCK-UP CONTROL SOLENOID VALVE A)	Drives lock-up control solenoid valve A.	With lock-up ON: battery voltage With lock-up OFF: 0 V
16	WHT	LS – (LINEAR SOLENOID VALVE –)	Drives linear solenoid valve.	With ignition switch NO (II): pulses
17	WHT/BLU	NMSG (MAINSHAFT SPEED SENSOR GROUND)	Ground for mainshaft speed sensor.	
18	BLU/YEL	NCSG (COUNTERSHAFT SPEED SENSOR GROUND)	Ground for countershaft speed sensor.	
22	WHT/GRN	ILU (INTERLOCK CONTROL UNIT)	Detects interlock control unit signal.	With ignition switch ON (II) and brake pedal depressed: battery voltage
23	GRN/BLK	D4 IND (D4 INDICATOR LIGHT)	Drives D4 indicator light.	With D4 indicator light turned ON: 0 V With D4 indicator light turned OFF: battery voltage
24	YEL/GRN	ATPNP (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal.	In N or P position: 0 V In any other position: battery voltage
25	GRN/WHT	SHB (SHIFT CONTROL SOLENOID VALVE B)	Drives shift control solenoid valve B.	With engine running in 1, 2: battery voltage With engine running in 3, 4: about 0 V
26	GRN/BLK	LC B (LOCK-UP CONTROL SOLENOID VALVE B)	Drives lock-up control solenoid valve B.	With lock-up ON: battery voltage With lock-up OFF: 0 V

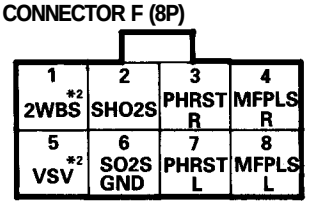
*1: '96 model
*2: '97 - 98 models

(cont'd)

Troubleshooting

Powertrain Control Module Terminal Arrangement (cont'd)

PCM CONNECTOR F (8P)



Wire side of male terminals

PCM CONNECTOR F (8P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1*2	WHT/BLU	2WBS (EVAP BYPASS SOLENOID VALVE)	Drives EVAP bypass solenoid valve	With ignition switch ON (II): battery voltage
2	WHT/RED	SHO2S (SECONDARY HEATED OXYGEN SENSOR, SENSOR 2)	Detects secondary heated oxygen sensor (sensor 2) signal	With throttle fully opened, fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
3	GRN/BLK	PHRST R (RIGHT PEAK HOLD RESET)	Sends peak hold reset signal	With engine running: pulses
4	YEL	MFPLS R (RIGHT MISFIRE PULSE)	Detects misfire pulse	With engine running: pulses
5*2	YEL/BLU	VSV (EVAP CONTROL CANISTER VENT SHUT VALVE)	Drives EVAP control canister vent shut valve	With ignition switch ON (II): battery voltage
6	GRN/WHT	SO2SGND (SECONDARY OXYGEN SENSOR, SENSOR 2 GROUND)	Sensor ground for secondary heated oxygen sensor (sensor 2)	
7	GRN/YEL	PHRST L (LEFT PEAK HOLD RESET)	Sends peak hold reset signal	With engine running: pulses
8	YEL/RED	MFPLS L (LEFT MISFIRE PULSE)	Detects misfire pulse	With engine running: pulses

*2: '97 - 98 models

Diagnostic Trouble Code (DTC) Chart

DTC (MIL indication*1)	Detection Item	Probable Cause	Page
P0106 (5)*2	Manifold Absolute Pressure Circuit Range/Performance Problem	• Vacuum connection • MAP sensor	11-57
P0107 (3)	Manifold Absolute Pressure Circuit Low Input	• Open or short in MAP sensor circuit • MAP sensor • PCM	11-59
P0108 (3)	Manifold Absolute Pressure Circuit High Input	• Open in MAP sensor circuit • MAP sensor • PCM	11-61
P0111 (10)*4	Intake Air Temperature Circuit Range/Performance Problem	• IAT sensor	11-63
P0112 (10)	Intake Air Temperature Circuit Low Input	• Short in IAT sensor circuit • IAT sensor • PCM	11-64
P0113 (10)	Intake Air Temperature Circuit High Input	• Open in IAT sensor circuit • IAT sensor • PCM	11-65
P0116 (86)	Engine Coolant Temperature Circuit Range/Performance Problem	• ECT sensor • Cooling system	11-66
P0117 (6)	Engine Coolant Temperature Circuit Low Input	• Short in ECT sensor circuit • ECT sensor • PCM	11-67
P0118 (6)	Engine Coolant Temperature Circuit High Input	• Open in ECT sensor circuit • ECT sensor • PCM	11-68
P0122 (7)	Throttle Position Circuit Low Input	• Open or short in TP sensor circuit • TP sensor • PCM	11-69
P0123 (7)	Throttle Position Circuit High Input	• Open in TP sensor circuit • TP sensor • PCM	11-71
P0131 (2)	Right Primary Heated Oxygen Sensor Circuit Low Voltage (Bank 1, Sensor 1)	• Short in Right Primary H02S (Bank 1, Sensor 1) circuit • Right Primary H02S (Bank 1, Sensor 1) • Fuel supply system • PCM	11-73
P0132 (2)	Right Primary Heated Oxygen Sensor Circuit High Voltage (Bank 1, Sensor 1)	• Open in Right Primary HO2S (Bank 1, Sensor 1) circuit • Right Primary HO2S (Bank 1, Sensor 1) • PCM	11-75
P0133 (62)	Right Primary Heated Oxygen Sensor Slow Response (Bank 1, Sensor 1)	• Right Primary H02S (Bank 1, Sensor 1) • Exhaust system	11-76
P0135 (42)	Right Primary Heated Oxygen Sensor Heater Circuit Malfunction (Bank 1, Sensor 1)	• Open or short in Right Primary HO2S (Bank 1, Sensor 1) heater circuit • PCM	11-80

*1: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected
*2: '96 model
*4: '97 model

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0137 (63)	Secondary Heated Oxygen Sensor Circuit Low Voltage (Sensor 2)	• Short in Secondary H02S (Sensor 2) circuit • Secondary HO2S (Sensor 2) • PCM	11-77
P0138 (63)	Secondary Heated Oxygen Sensor Circuit High Voltage (Sensor 2)	• Open in Secondary H02S (Sensor 2) circuit • Secondary H02S (Sensor 2) • PCM	11-78
P0139 (63)	Secondary Heated Oxygen Sensor Slow Response (Sensor 2)	• Secondary H02S (Sensor 2)	11-79
P0141 (65)	Secondary Heated Oxygen Sensor Heater Circuit Malfunction (Sensor 2)	• Open or short in Secondary H02S (Sensor 2) heater circuit • PCM	11-80
P0151 (1)	Left Primary Heated Oxygen Sensor Circuit Low Voltage (Bank 2, Sensor 1)	• Short in Left Primary H02S (Bank 2, Sensor 1) circuit • Left Primary H02S (Bank 2, Sensor 1) • Fuel supply system • PCM	11-73
P0152 (1)	Left Primary Heated Oxygen Sensor Circuit High Voltage (Bank 2, Sensor 1)	• Open in Left Primary HO2S (Bank 2, Sensor 1) circuit • Left Primary HO2S (Bank 2, Sensor 1) • PCM	11-75
P0153 (61)	Left Primary Heated Oxygen Sensor Slow Response (Bank 2, Sensor 1)	• Left Primary H02S (Bank 2, Sensor 1) • Exhaust system	11-76
P0155 (41)	Left Primary Heated Oxygen Sensor Heater Circuit Malfunction (Bank 2, Sensor 1)	• Open or short in Left Primary HO2S (Bank 2, Sensor 1) heater circuit • PCM	11-80
P0171 (46)	System Too Lean [Right Bank (Bank 1)]	• Fuel supply system • Right Primary H02S (Bank 1, Sensor 1) • MAP sensor • Contaminated fuel • Valve clearance • Exhaust leakage	11-82
P0172 (46)	System Too Rich [Right Bank (Bank 1)]	• Fuel supply system • Right Primary HO2S (Bank 1, Sensor 1) • MAP sensor • Contaminated fuel • Valve clearance	11-82
P0174 (45)	System Too Lean [Left Bank (Bank 2)]	• Fuel supply system • Left Primary H02S (Bank 2, Sensor 1) • MAP sensor • Contaminated fuel • Exhaust leakage	11-82
P0175 (45)	System Too Rich [Left Bank (Bank 2)]	• Fuel supply system • Left Primary H02S (Bank 2, Sensor 1) • MAP sensor • Contaminated fuel	11-82

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0325 (53)	Right Knock Sensor (Bank 1) Circuit Malfunction	• Open or short in Right Knock Sensor (Bank 1) circuit • Right Knock Sensor (Bank 1) • PCM	11-84
P0330 (23)	Left Knock Sensor (Bank 2) Circuit Malfunction	• Open or short in Left Knock Sensor (Bank 2) circuit • Left Knock Sensor (Bank 2) • PCM	11-84
P0335 (4)	Crankshaft Position Sensor 1 Circuit Malfunction	• Crankshaft Position Sensor 1 • Crankshaft Position Sensor 1 circuit • PCM	11-94
P0336 (4)	Crankshaft Position Sensor 1 Range/Performance	• Crankshaft Position Sensor 1 • Timing belt skipped teeth	11-94
P0401 (80)	Exhaust Gas Recirculation Insufficient Flow Detected	• EGR valve • EGR line	11-147
P0420 (67)	Catalyst System Efficiency Below Threshold	• Three Way Catalytic converter • Secondary HO2S	11-145
P0441 (92)*2	Evaporative Emission Control System Incorrect Purge Flow	• EVAP Purge Control Solenoid valve • EVAP Purge Control Solenoid valve circuit • EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Throttle Body (purge port) • Tubing • PCM	11-155
P0452 (91)	Evaporative Emission Control System Pressure Sensor (Fuel Tank Pressure Sensor) Circuit Low Input	• Open or short in Fuel Pressure Sensor circuit • Fuel Tank Pressure Sensor • PCM	11-157
P0453 (91)	Evaporative Emission Control System Pressure Sensor (Fuel Tank Pressure Sensor) Circuit High Input	• Open in Fuel Tank Pressure Sensor circuit • Fuel Tank Pressure Sensor • PCM	11-159
P0505 (14)	Idle Control System Malfunction	• IAC valve • Fast idle thermo valve • Throttle Body	11-101
P0700 P0715 P0720 P0730 P0740 P0753 P0758 (70)*5	Automatic Transaxle	——	Section 14
P1106 (13)*3	Barometric Pressure Circuit Range/Performance Problem	• PCM (Baro sensor)	11-96
P1107 (13)	Barometric Pressure Circuit Range/Performance Problem	• PCM (Baro sensor)	11-97
P1108 (13)	Barometric Pressure Circuit High Input	• PCM (Baro sensor)	11-97

*2: '96 model
*3: '97 - 98 models
*5: The D4 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1121 (7)*3	Throttle Position Lower Than Expected	• TP sensor	11-72
P1122 (7)*3	Throttle Position Higher Than Expected	• TP sensor	11-72
P1128 (5)*3	Manifold Absolute Pressure Lower Than Expected	• MAP sensor	11-62
P1129 (5)*3	Manifold Absolute Pressure Higher Than Expected	• MAP sensor	11-62
P1201 (71) P1202 (72) P1203 (73) P1204 (74) P1205 (75) P1206 (76)	— Cylinder 1 — Cylinder 2 —Cylinder3 — Cylinder 4 — Cylinder 5 — Cylinder 6 Misfire Detected	• Fuel injector • Fuel injector circuit • Ignition system • Low compression	11-85
P1300 (71, 72, 73, 74, 75, 76)	Random Misfire	• Ignition system • Fuel supply system • MAP sensor • EGR system • Contaminated fuel • Lack of fuel	11-89
P1301 (71) P1302 (72) P1303 (73) P1304 (74) P1305 (75) P1306 (76)	— Cylinder 1 — Cylinder 2 — Cylinder 3 — Cylinder 4 — Cylinder 5 — Cylinder 6 Misfire Detected	• Ignition system	11-85
P1316 (79)	Spark Plug Voltage Detection Circuit Malfunction [Left Bank (Bank 2)]	• Open or short in Spark Plug Voltage Detection Module circuit • Spark Plug Voltage Detection Module • PCM	11-90
P1317 (79)	Spark Plug Voltage Detection Circuit Malfunction [Right Bank (Bank 1)]	• Open or short in Spark Plug Voltage Detection Module circuit • Spark Plug Voltage Detection Module • PCM	11-90
P1318 (79)	Spark Plug Voltage Detection Module Reset Circuit Malfunction [Left Bank (Bank 2)]	• Open or short in Spark Plug Voltage Detection Module Reset circuit • Spark Plug Voltage Detection Module • PCM	11-92
P1319 (79)	Spark Plug Voltage Detection Module Reset Circuit Malfunction [Right Bank (Bank 1)]	• Open or short in Spark Plug Voltage Detection Module Reset circuit • Spark Plug Voltage Detection Module • PCM	11-92
P1336 (54)	Crankshaft Position Sensor 2 Circuit Range/Performance Problem	• Crankshaft Position Sensor 2 • Timing belt skipped teeth	11-94
P1337 (54)	Crankshaft Position Sensor 2 Circuit Malfunction	• Crankshaft Position Sensor 2 • Crankshaft position Sensor 2 circuit • PCM	11-94
P1381 (9)	Cylinder Position Sensor 1 Range/Performance Problem	• Cylinder Position Sensor 1	11-94
P1382 (9)	Cylinder Position Sensor 1 Circuit Malfunction	• Cylinder Position Sensor 1 • Cylinder Position Sensor 1 circuit • PCM	11-94
P1386 (59)	Cylinder Position Sensor 2. Range/Performance Problem	• Cylinder Position Sensor 2	11-94

*3: '97 - 98 models

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1387 (59)	Cylinder Position Sensor 2 Circuit Malfunction	• Cylinder Position Sensor 2 • Cylinder Position Sensor 2 circuit • PCM	11-94
P1456 (90)	Evaporative Emission Control System Leak Detected (Fuel Tank Area)	• Vacuum connection • Fuel tank • Fuel tank pressure sensor • Fuel fill cap • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • EVAP control canister • EVAP purge control solenoid valve	11-161
P1457 (90)	Evaporative Emission Control System Leak Detected (EVAP Control Canister Area)	• Vacuum connection • EVAP control canister • Fuel tank pressure sensor • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • Fuel Tank • EVAP purge control solenoid valve	11-161
P1459 (92)*2	Evaporative Emission Purge Flow Switch Malfunction	• EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Tubing • PCM	11-166
P1491 (12)	EGR Valve Lift Insufficient Detected	• EGR valve (with lift sensor) • EGR valve lift sensor circuit • EGR control solenoid valve • EGR control solenoid valve circuit • EGR line • PCM	11-148
P1498 (12)	EGR Valve Lift Sensor High Voltage	• EGR valve (with lift sensor) • EGR valve lift sensor circuit • PCM	11-151
P1508 (14)	Idle Air Control Valve Circuit Failure	• IAC valve • IAC valve circuit • PCM	11-103
P1607 (–)	Powertrain Control Module Internal Circuit Failure	• PCM	11-98
P1690 (35)*6	TCSTB Line Failure	• TCSTB Line • TCS Control unit • PCM	Section 19
P1696 (36)*6	TCFC Signal Low Input	• TCFC Line • TCS Control Unit • PCM	Section 19
P1697 (36)*6	TCFC Signal High Input	• TCFC Line • TCS Control Unit • PCM	Section 19
P1705 P1706 P1753 P1758 P1768 P1791 (70)*5	Automatic Transaxle	——	Section 14

*2: '96 model
*5: The D4 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously.
*6: with TCS

Troubleshooting

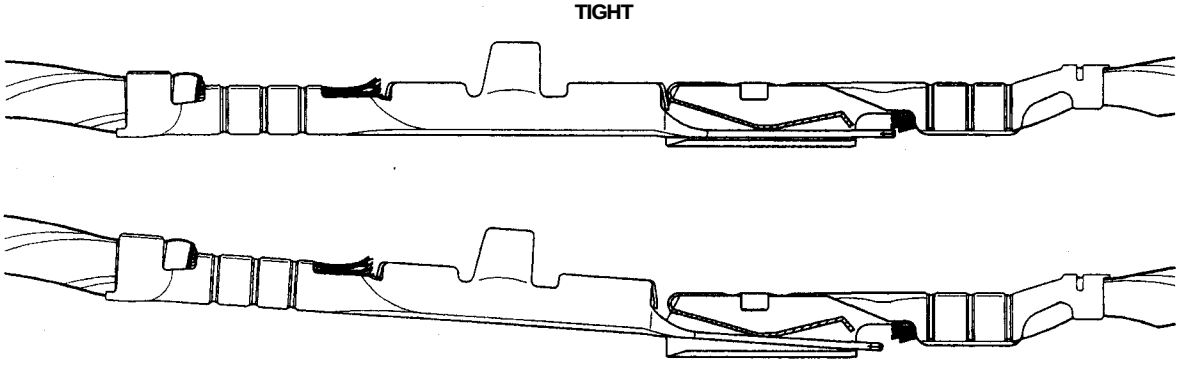
How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: if you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START (bold type)	Describes the conditions or situation to start a troubleshooting flowchart.
ACTION	Asks you to do something; perform a test, set up a condition etc.
DECISION	Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

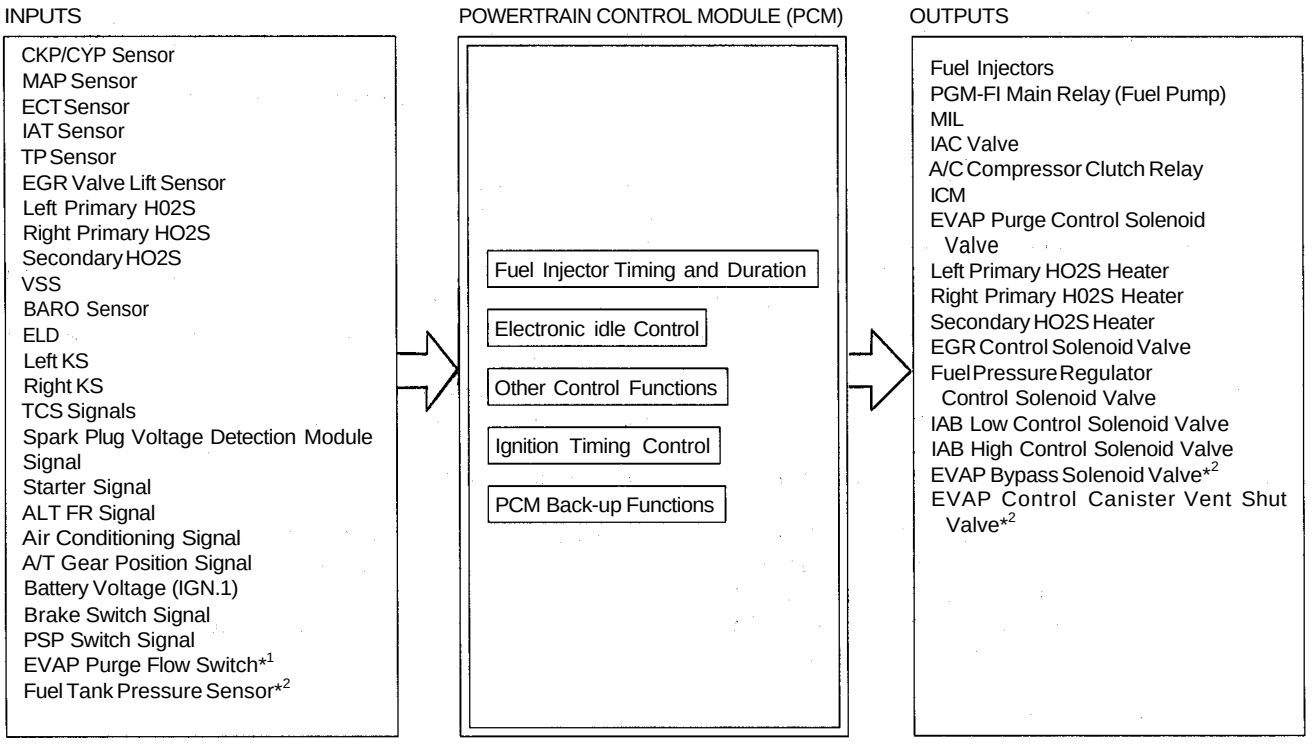
NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK at this time. If the Malfunction Indicator Lamp (MIL) on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting (see illustration below).
- Most of the troubleshooting flowcharts have you reset the Powertrain Control Module (PCM) and try to duplicate the Diagnostic Trouble Code (DTC). If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly, a needlessly replaced PCM.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of *a* wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like PCM's), this can sometimes mean something works, but not the way it's supposed to.



PGM-FI System

System Description



*1:'96 model
*2:'97 - 98 models

PGM-FI System
The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel Injector Timing and Duration
The PCM contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control
When the engine is cold, the A/C compressor is on, the transmission is in gear, the brake pedal is depressed, the P/S load is high, or the alternator is charging, the PCM controls current to the Idle Air Control Valve (IAC Valve) to maintain the correct idle speed.

Ignition Timing Control
- The PCM contains memories for basic ignition timing at various engine speeds and manifold air flow rates. Ignition timing is also adjusted for engine coolant temperature.
- A knock control system is also used. When detonation is detected by a knock sensor (KS), the ignition timing is retarded.

Other Control Functions
1. Starting Control
   When the engine is started, the PCM provides a rich mixture by increasing fuel injector duration.
2. Fuel Pump Control
   - When the ignition switch is initially turned on, the PCM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
   - When the engine is running, the PCM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the PCM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.

(cont'd)

PGM-FI System

System Description (cont'd)

3. Fuel Cut-off Control
   - During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 1,000 rpm.
   - Fuel cut-off action also takes place when engine speed exceeds 6,500 rpm, regardless of the position of the throttle valve, to protect the engine from over-revving.
4. A/C Compressor Clutch Relay .
   When the PCM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure a smooth transition to the A/C mode.
5. Evaporative Emission (EVAP) Purge Control Solenoid Valve
   '96 model: When the engine coolant temperature is below 158°F (70°C), the PCM controls the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister diaphragm.
   '97 - 98 models: When the engine coolant temperature is above 99°F (37°C), the PCM controls the EVAP purge control solenoid valve which controls vacuum to the EVAP purge control canister.
6. Intake Air Bypass (IAB) Low Control Solenoid Valve, Intake Air Bypass (IAB) High Control Solenoid Valve
   When engine speed is below 3,350 rpm, the IAB High Control Solenoid Valve and IAB Low Control Solenoid Valve are activated by a signal from the PCM. Intake air flows through a long chamber path, increasing torque at low RPM.
   When engine speed is 3,350 - 3,950 rpm, the IAB Low Control Solenoid Valve is deactivated by the PCM. Intake air flows through a short chamber path, increasing mid-range torque.
   When the engine rpm is above 3,950 rpm, the IAB Low Control Solenoid Valve and IAB High Control Solenoid Valve are deactivated by the PCM. This creates a very short intake path and increases high-speed torque.
7. Exhaust Gas Recirculation (EGR) Control Solenoid Valve
   When the EGR is required for control of oxides of nitrogen (NOx) emissions, the PCM controls the EGR control solenoid valve which supplies regulated vacuum to the EGR valve.

ECM Fail-safe/Back-up Functions

1. Fail-safe Function
   When an abnormality occurs in a signal from a sensor, the PCM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.
2. Back-up Function
   When an abnormality occurs in the PCM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.
3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]
   When an abnormality occurs in a signal from a sensor, the PCM supplies ground for the MIL and stores the DTC in erasable memory. When the ignition is initially turned on, the PCM supplies ground for the MIL for two seconds to check the MIL bulb condition.
4. Two Driving Cycle Detection Method
   To prevent false indications, the two driving cycle detection method is used for the H02S, fuel metering-related, idle control system, ECT sensor, EGR system, TWC, EVAP control system and other self-diagnostic functions. When an abnormality occurs, the PCM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the PCM informs the driver by lighting the MIL.
   However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

Powertrain Control Module (PCM)

The Malfunction Indicator Lamp (MIL) never comes on (even for two seconds) after ignition is turned on (II).

NOTE: If this symptom is intermittent, check for a loose fuse No. 1 (BACK UP LIGHTS, METER LIGHTS, 10 A) in the under-dash fuse/relay box, a poor connection at PCM terminal A7, or an intermittent open in the GRN/RED wire between the PCM (A7) and the gauge assembly.

Turn the ignition switch ON (II).

Is the low oil pressure light on?

NO

- **Repair short or open in the wire between NO. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse and gauge assembly.**
- **Replace No. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse.**

YES

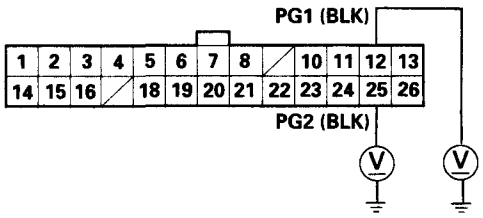
Try to start the engine.

Does the engine start?

NO

Check for an open in the wires (PG1, PG2 lines):
1. Turn the ignition switch ON (II).
2. Measure voltage between body ground and PCM connector terminals A12 and A25 individually.

PCM CONNECTOR A (26P)



Wire side of female terminals

YES

Check for an open in the wire or bulb (MIL line):
1. Turn the ignition switch OFF.
2. Connect the PCM connector terminal A7 to body ground with a jumper wire.
3. Turn the ignition switch ON (II).

Is there less than 1.0 V?

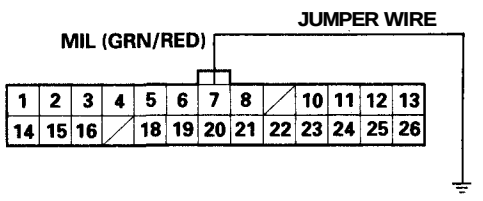
NO

Repair open in the wire(s) between PCM and G101 (located at intake manifold) that had more than 1.0 V.

YES

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PCM CONNECTOR A (26P)



Wire side of female terminals

Is the MIL on?

NO

- **Repair open in the wires between PCM (A7) and gauge assembly.**
- **Replace the MIL bulb.**

YES

Substitute a known-good PCM, and recheck. If symptom/indication goes away, replace the original PCM.

(cont'd)

PGM-FI System

Powertrain Control Module (PCM) (cont'd)

The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Check the Diagnostic Trouble Code (DTC):
1. Connect a scan tool or Honda PGM Tester.
2. Turn the ignition switch ON (II).
3. Read the DTC with the scan tool or Honda PGM Tester.

Are any DTC(s) indicated?

YES → **Go to troubleshooting procedures. (see page 11-32)**

NO

Check the DTC by MIL indication:
1. Turn the ignition switch OFF.
2. Connect the SCS service connector to the service check connector.
3. Turn the ignition switch ON (II).

Does the MIL indicate any DTC?

YES → **— Repair open or short in wire between the PCM (D4) and Data Link Connector.**
— Go to troubleshooting procedures. (see page 11-32)

NO

Try to start the engine.

Does the engine start?

NO → (A) (To page 11-55)

YES

Check for a short in the wire (SCS line):
1. Stop the engine and turn the ignition switch ON (II).
2. Measure voltage between the PCM connector terminal C5 and body ground.

Is there approx. 5 V?

NO → **Repair short to body ground in the wire between PCM (C5) and service check connector.**

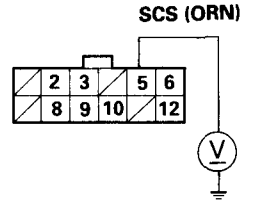
YES

(To page 11-55)

NOTE:
- When there is no Diagnostic Trouble Code (DTC) stored, the MIL will stay on if the SCS service connector is connected and the ignition switch is on.
- If this symptom is intermittent, check for:
  - — A loose ECU (PCM) (20 A) fuse in the under-hood fuse/relay box
  - — A loose No. 2 FUEL PUMP (10 A) fuse in the under-dash fuse/relay box
  - — An intermittent short in the wire between the PCM (C5) and the service check connector
  - — An intermittent short in the wire between the PCM (A7) and the gauge assembly
  - — An intermittent short in the wire between the PCM (D10) and the MAP sensor
  - — An intermittent short in the wire between the PCM (D21) and the TP sensor, EGR valve lift sensor, TCS control valve angle sensor, Fuel tank pressure sensor*
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

*: '97 - 98 models

PCM CONNECTOR C (12P)



Wire side of female terminals

(From page 11-54)

Check for a short in the wire (MIL line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (26P).
3. Turn the ignition switch ON (II).

Is the MIL ON?

YES → **Repair short to body ground in the wire between the PCM (A7) and MIL.**

NO

Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

(From page 11-54)

A

Inspect ECU (PCM) (20 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO → **— Repair short in the wire between ECU (PCM) (20 A) fuse and PGM-FI main relay.**
— Replace ECU (PCM) (20 A) fuse.

YES

Inspect IG1 IG COIL (30 A) fuse in the ignition coil fuse holder box.

Is the fuse OK?

NO → **— Repair short in the wire between IG1 IG COIL (30 A) fuse and PGM-FI main relay.**
— Replace IG1 IG COIL (30 A)

YES

Check for a short in a sensor:
1. Turn the ignition switch ON (II).
2. Disconnect the 3P connector of each sensor one at time:
   - MAP sensor
   - TP sensor
   - EGR valve lift sensor
   - TCS control valve angle sensor
   - Fuel tank pressure sensor ('97-98 models)

Does the MIL go OFF momentarily?

YES → **Replace the sensor that caused the light to go out.**

NO

(To page 11-56)

(cont'd)

PGM-FI System

Powertrain Control Module (PCM) (cont'd)

(From page 11-55)

Check for a short in the wires (VCC lines):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector D (22P).
3. Check for continuity between body ground and PCM connector terminals D10 and D21 individually.

Is there continuity? YES

— Repair short to body ground in the wire between PCM (D10) and MAP sensor.
— Repair short to body ground in the wire between PCM (D21) and EGR valve lift sensor, TP sensor, TCS control valve angle sensor or fuel tank pressure sensor ('97 - 98 models).

NO

Check for an open in the wires (IGP lines):
1. Turn the ignition switch ON (II).
2. Measure voltage between body ground and PCM connector terminals A13 and B1 individually.

Is there battery voltage? NO

— Repair open in the wire(s) between PCM (A13, B1) and PGM-FI main relay.
— Check for poor connections or loose wires at the PGM-FI main relay.
— Test the PGM-FI main relay (see page 11-129).

YES

Check for an open in the wires (LG lines):
1. Reconnect all sensor connectors.
2. Reconnect the PCM connector D (22P).
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and PCM connector terminals A26 and B9 individually.

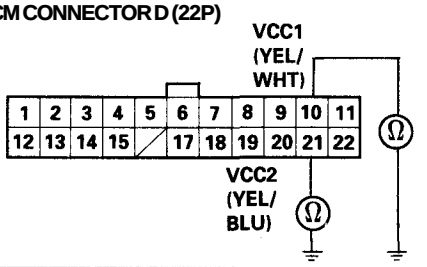
Is there less than 1.0 V? NO

Repair open in the wire(s) between PCM (A26, B9) and G101 that had more than 1.0 V.

YES

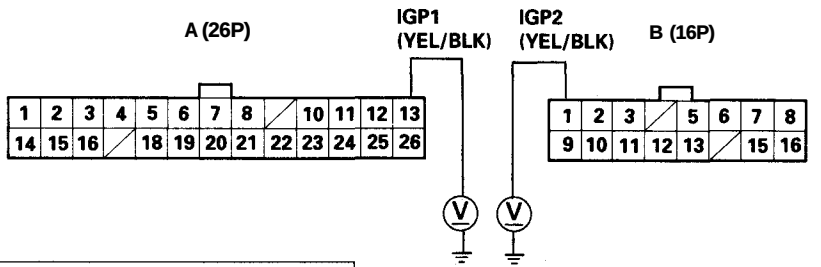
Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.

PCM CONNECTOR D (22P)



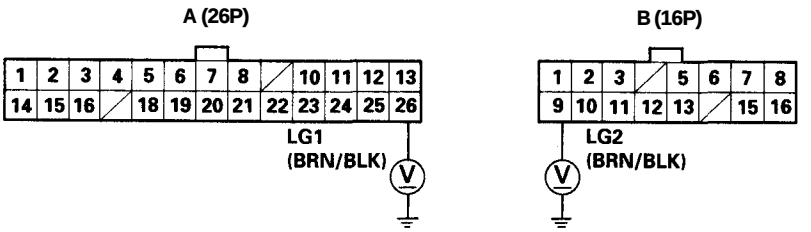
Wire side of female terminals

PCM CONNECTORS



Wire side of female terminals

PCM CONNECTORS

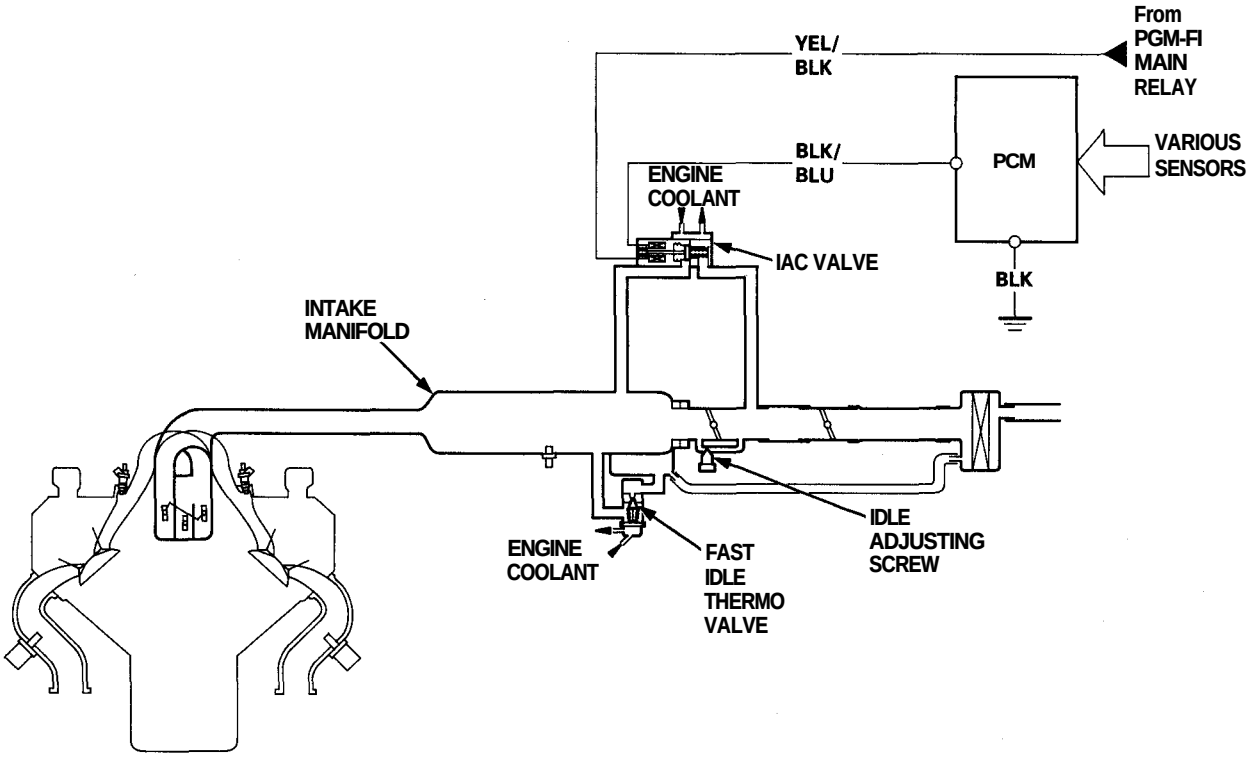


Wire side of female terminals

Idle Control System

System Description

The idle speed of the engine is controlled by the Idle Air Control (IAC) Valve.
The valve changes the amount of air bypassing into the intake manifold in response to electric current controlled by the PCM. When the IAC Valve is activated, the valve opens to maintain the proper idle speed.



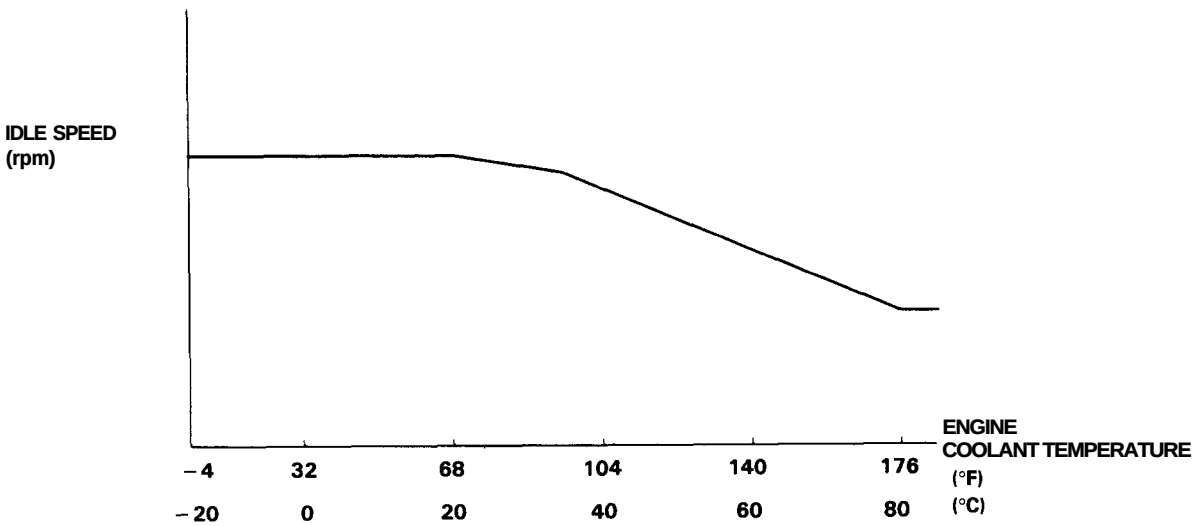
(cont'd)

Idle Control System

System Description (cont'd)

1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150-300 rpm.

2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.



3. When the idle speed is out of specification and the scan tool does not indicate Diagnostic Trouble Code (DTC) P0505 or P1508, check the following items:
   - Adjust the idle speed (see page 11-114)
   - Air conditioning signal (see page 11-104)
   - ALT FR signal (see page 11-106)
   - Starter switch signal (see page 11-107)
   - A/T gear position signal (see page 11-108)
   - PSP switch signal (see page 11-110)
   - Brake switch signal (see page 11-112)
   - Fast idle thermo valve (see page 11-113)
   - Hoses and connections
   - IAC valve and its mounting O-rings

4. If the above items are normal, substitute a known-good IAC valve and readjust the idle speed (see page 11-114).

   - If the idle speed still cannot be adjusted to specification (and the scan tool does not indicate DTC P0505 or P1508) after IAC valve replacement, substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.

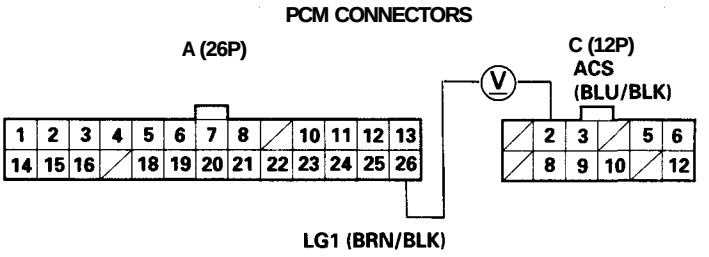
Idle Control System

Air Conditioning Signal

This signals the PCM when there is a demand for cooling from the air conditioning system.

Inspection of Air Conditioning Signal.

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the A/C pressure switch A connector and radiator fan diode connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals C2 and A26.

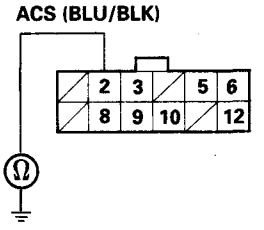


Wire side of female terminals

Is there battery voltage?

NO

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector C (12P).
3. Check for continuity between body ground and PCM connector terminal C2.



Is there continuity?

YES

Repair short in the wire between the PCM (C2) and the A/C pressure switch A or radiator fan diode.

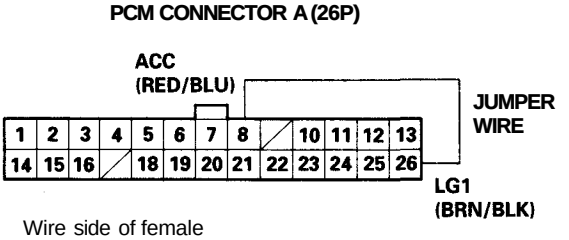
NO

— Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.
— See the air conditioner inspection (see section 22).

YES

Check for an open in the wire (ACC line):
1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch A connector and radiator fan diode connector.
3. Turn the ignition switch ON (II).
4. Momentarily connect PCM connector terminals A8 and A26 with a jumper wire several times.

(To page 11-105)



Wire side of female terminals

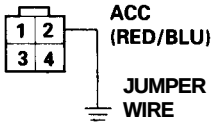
(From page 11-104)

Is there a clicking noise from the A/C compressor clutch?

NO

Check for an open in the wire (ACC line):
Momentarily connect the A/C clutch relay 4P connector terminal No. 2 to body ground with a jumper wire several times.

A/C CLUTCH RELAY CONNECTOR (C308)



Wire side of female terminals

Is there a clicking noise from the A/C compressor clutch?

NO

See air conditioner inspection (see section 22).

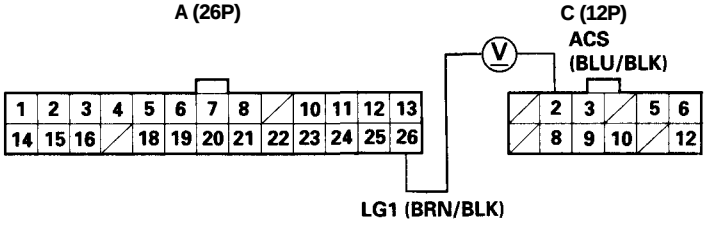
YES

Repair open in the wire between the PCM (A8) and the A/C clutch relay.

YES

Check for the operation of the A/C:
1. Start the engine.
2. Turn the blower switch ON.
3. Turn the A/C switch ON.

PCM CONNECTORS



Wire side of female terminals

Does the A/C operate?

NO

Check for an open in the wire (ACS line):
Measure voltage between PCM connector terminals A26 and C2.

YES

Air conditioning signal is OK.

Is voltage less than 1.0 V?

NO

Repair open in the wire between the PCM (C2) and the A/C pressure switch A or radiator fan diode.

YES

- **Substitute a known-good PCM and recheck. If symptom/indication goes away, replace the original PCM.**
- **See the air conditioner inspection (see section 22).**

Idle Control System

Alternator (ALT) FR Signal

This signals the PCM when the Alternator (ALT) is charging.

Inspection of ALT FR Signal.

Check for a short in the wire (ALT F line):
1. Disconnect the GRN 4P connector from the ALT.
2. Turn the ignition switch ON (II).
3. Measure voltage between PCM connector terminals D5 and A26.

Is there approx. 5 V?

NO

Check for a short in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect the PCM connector D (22P).
4. Check for continuity between body ground and PCM connector terminal D5.

Is there continuity?

YES

Repair short in the wire between the PCM (D5) and the ALT.

NO

Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.

YES

Check the operation of the ALT:
1. Turn the ignition switch OFF.
2. Reconnect the ALT GRN 4P connector to the ALT.
3. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in [N] or [P] position) until the radiator fan comes on, then let it idle.
4. Measure voltage between PCM connector terminals D5 and A26.

Does the voltage decrease when headlights and rear defogger are turned on?

YES

ALT FR signal is OK.

NO

Check for an open in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect the PCM connector D (22P).
4. Disconnect the GRN 4P connector from the ALT.
5. Connect the ALT 4P connector terminal No. 2 to body ground with a jumper wire.
6. Check for continuity between body ground and PCM connector terminal D5.

Is there continuity?

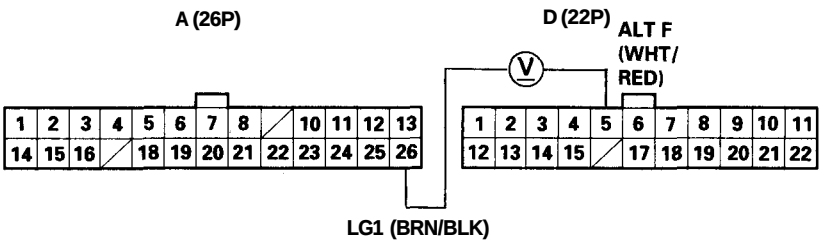
NO

Repair open wire between the PCM (D5) and the ALT.

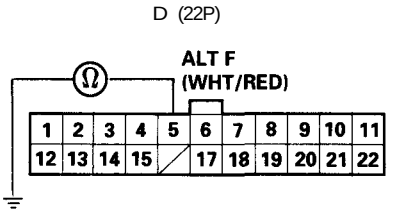
YES

See the ALT inspection (see section 23).

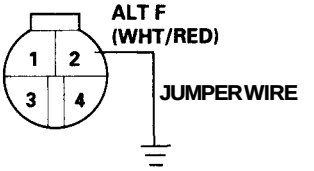
PCM CONNECTORS



Wire side of female terminals

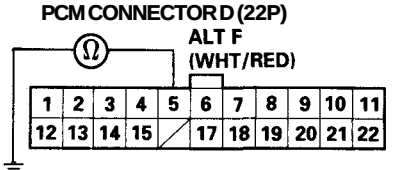


ALT GRN 4P CONNECTOR (C129)



Wire side of female terminals

PCM CONNECTOR D (22P)



Wire side of female terminals

Starter Switch Signal

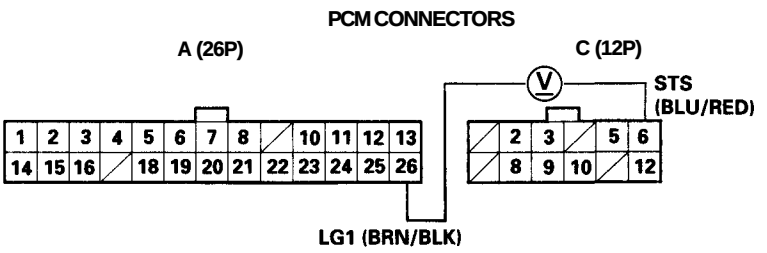
This signals the PCM when the engine is cranking.

Inspection of Starter Switch Signal.

NOTE: Transmission in [N] or [P] position.

Check for an open or short in the wire (STS line):
Measure voltage between PCM connector terminals C6 and A26 with the ignition switch in the start position (III).

PCM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO → Inspect the No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

YES

Starter switch signal is OK.

Is the fuse OK?

NO → **— Repair short in the wire between the PCM (C6) and the No. 9 STARTER SIGNAL (7.5 A) fuse or the PGM-FI main relay.**
— Replace the No. 9 STARTER SIGNAL (7.5 A) fuse.

YES

Repair open in the wire between the PCM (C6) and the No. 9 STARTER SIGNAL (7.5 A) fuse.

Idle Control System

Automatic Transaxle (A/T) Gear Position/Signal

This signals the PCM when the transmission is in [N] or [P] position.

Inspection of A/T Gear Position Signal.

Check the operation of the A/T gear position switch:
1. Turn the ignition switch ON (II).
2. Observe the A/T shift position indicator and select each position separately.

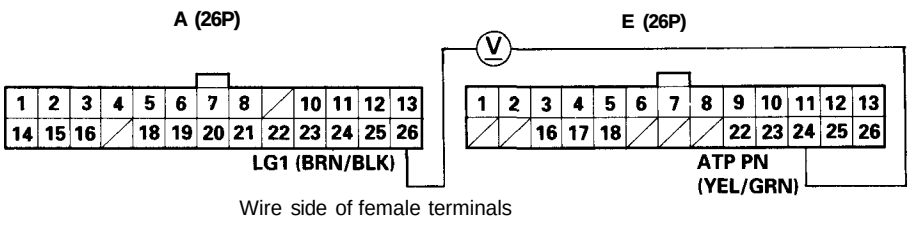
Does the indicator light properly?

NO → **See the A/T gear position indicator inspection (see section 23).**

YES

Check for a short in the wire (ATP PN line):
1. Turn the ignition switch OFF.
2. Disconnect the 16P connector from the gauge assembly.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals E24 and A26.

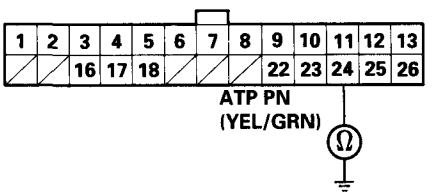
PCM CONNECTORS



Wire side of female terminals

Is there approx. 5 V?

NO → **Check for a short in the wire (ATP PN line):**
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector E (26P).
3. Check for continuity between body ground and PCM connector terminal E24.



Is there continuity?

YES → **Repair short in the wire between the PCM (E24) and the gauge assembly.**

NO → **Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.**

A

(To page 11-109)

(From page 11-108)

A

Check for an open in the wire (ATP PN line):
1. Turn the ignition switch OFF.
2. Reconnect the 16P connector to the gauge assembly.
3. Start the engine.
4. Measure voltage between PCM connector terminals E24 and A26 with the transmission in N position.

PCM CONNECTORS

A (26P)

1	2	3	4	5	6	7	8		10	11	12	13
14	15	16		18	19	20	21	22	23	24	25	26

LG1 (BRN/BLK)

E (26P)

1	2	3	4	5	6	7	8	9	10	11	12	13
		16	17	18				22	23	24	25	26

ATP PN (YEL/GRN)

Wire side of female terminals

Is there less than 1.0 V?

NO → **Repair open in the wire between the PCM (E24) and the gauge assembly.**

YES

Check for an open in the wire (ATP **PN** line):
Measure voltage between PCM connector terminals E24 and A26 with the transmission in P position.

Is there less than 1.0 V?

NO → **Repair open in the gauge assembly.**

YES

A/T gear position signal is OK.

Idle Control System

Power Steering Pressure (PSP) Switch Signal

This signals the PCM when the power steering load is high.

Inspection of PSP switch signal.

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch ON (II).
2. Measure voltage between PCM connector terminals B3 and A26.

Is there less than 1.0 V?

NO

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the PSP switch 2P connector.
3. Turn the ignition switch ON (II).
4. At the harness side, connect the PSP switch 2P connector terminals No. 1 and No. 2 with a jumper wire.
5. Measure voltage between PCM connector terminals B3 and A26.

Is there less than 1.0 V?

NO

— Repair open in the wire between the PCM (B3) and the PSP switch.
— Repair open in wire between the PCM (D22) and the PSP switch.

YES

Replace the PSP switch.

YES

Check the operation of the PSP switch:
1. Start the engine
2. Turn steering wheel to full lock.
3. Measure voltage between PCM connector terminals B3 and A26.

Is there battery voltage?

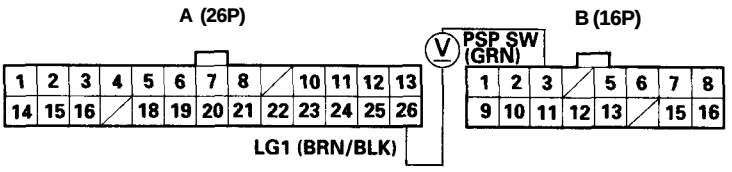
NO

YES

PSP switch signal is OK.

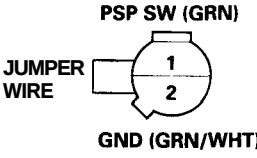
(To page 11-111)

PCM CONNECTORS



Wire side of female terminals

PSP SWITCH CONNECTOR (C110)

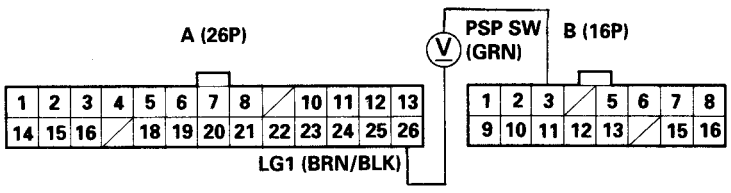


Wire side of female terminals

(From page 11-110)

Check for a short in the PSP switch:
1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the PSP switch.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals B3 and A26.

PCM CONNECTORS

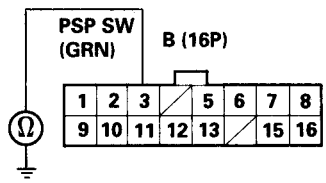


Wire side of female terminals

Is there battery voltage?

NO

Check for a short in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector B (16P).
3. Check for continuity between body ground and PCM connector terminal B3.



YES

Replace the PSP switch.

Is there continuity?

YES

Repair short in the wire between the PCM (B3) and the PSP switch.

NO

Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.

Idle Control System

Brake Switch Signal

This signals the PCM when the brake pedal is depressed.

Inspection of Brake Switch Signal.

Are the brake lights on without depressing the brake pedal?

YES → **Inspect the brake switch (see section 19).**

NO

Depress the brake pedal.

Do the brake lights come on?

NO → Inspect the STOP HORN (20 A) fuse in the under-hood fuse/ relay box.

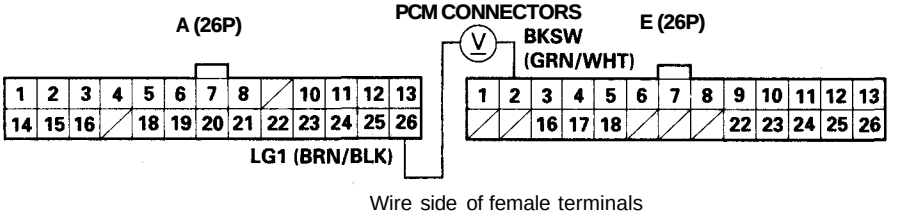
YES

Is the fuse OK?

NO → **— Repair short in the wire between the brake switch and the STOP HORN (20 A) fuse.**
— Replace the STOP HORN (20 A) fuse.

YES → **— Repair open in the wire between the brake switch and the STOP HORN (20 A) fuse.**
— Inspect the brake switch (see section 19).

Check for an open in the wire (BKSW line):
1. Depress the brake pedal.
2. Measure voltage between PCM connector terminals E2 and A26 with the brake pedal depressed.



Is there battery voltage?

NO → **Repair open in the wire between the PCM (E2) and the brake switch.**

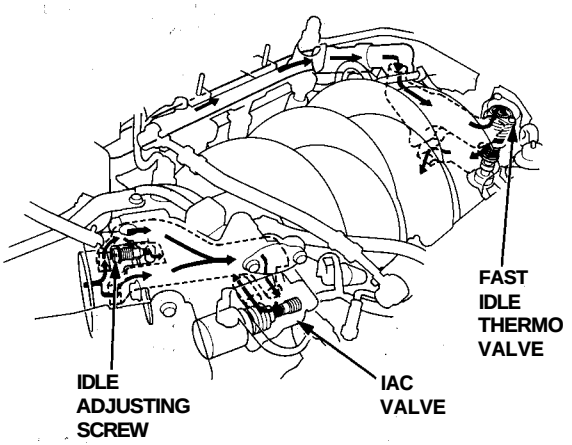
YES

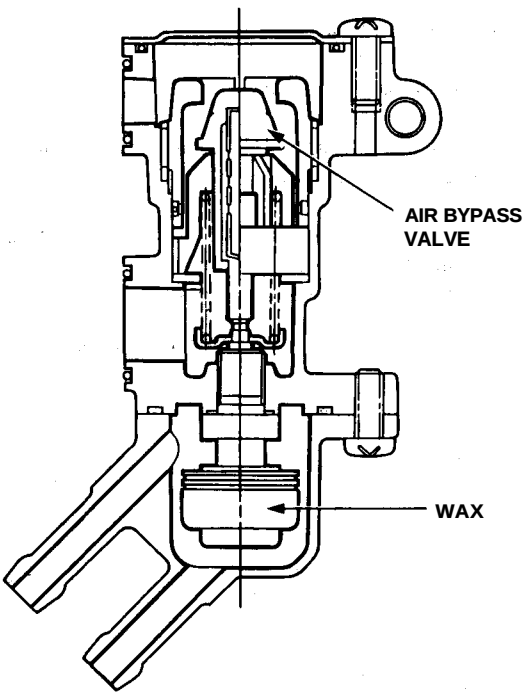
Brake switch signal is OK.

Fast Idle Thermo Valve

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle thermo valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the intake manifold.

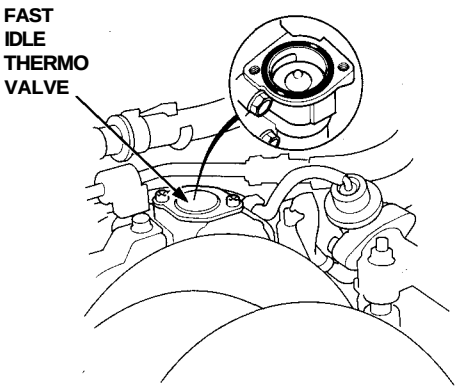




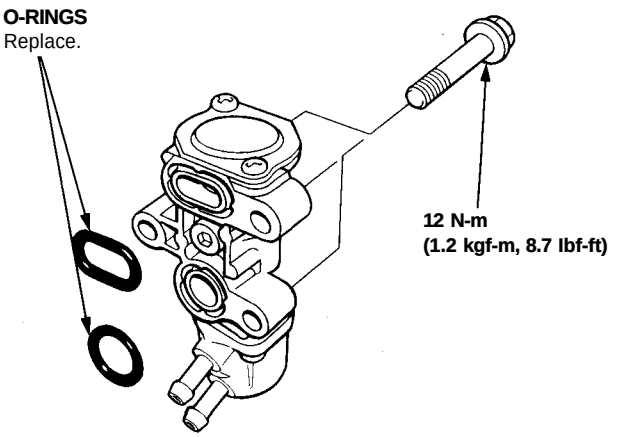
Inspection

NOTE: The fast idle thermo valve is factory adjusted; it should not be disassembled.

1. Remove the cover of the fast idle thermo valve.
2. Start the engine.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (engine coolant temperature below 86°F, 30°C) and idling.



- If not, replace the fast idle thermo valve and retest.



4. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
5. Check that the valve is completely closed. If not, air suction can be felt in the valve seat area.
   - If any suction is felt, the valve is leaking.
     Check engine coolant level and for air in the engine cooling system (see section 10).
     If OK, replace the fast idle thermo valve and recheck.

NOTE: If the cover of fast idle thermo valve was removed, do the PCM reset procedure.

Idle Control System

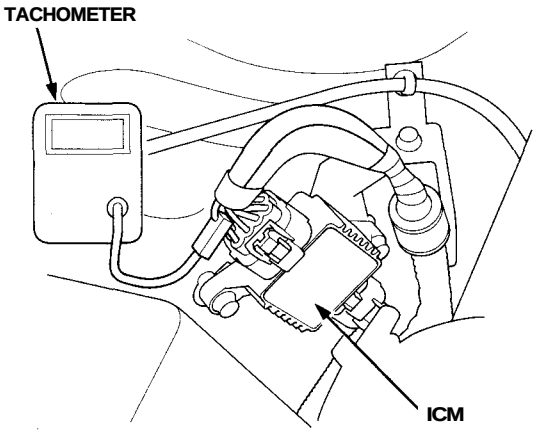
Idle Speed Setting

Inspection/Adjustment

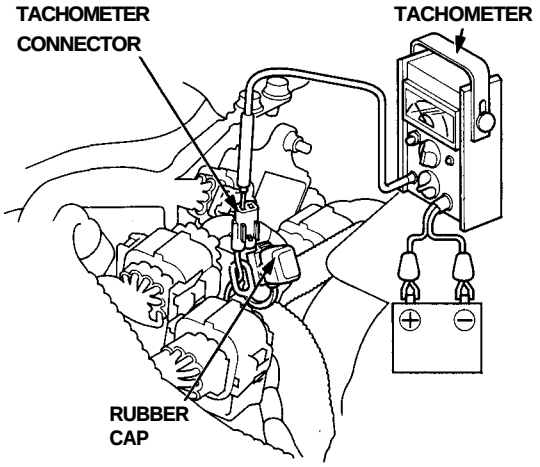
NOTE:
- Before setting the idle speed, check the following items:
  — The MIL has not been reported on.
  — Ignition timing
  — Spark plugs
  — Air cleaner (ACL)
  — PCV system
- (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.

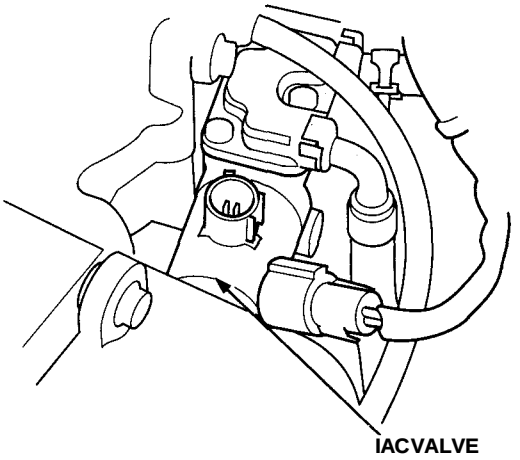
2. Connect a OBDII scan tool (see page 11-32) or tachometer.
   • Connect a tachometer to the ignition control module (ICM) secondary, or...



- Remove the rubber cap from the tachometer connector and connect a tachometer.



3. Disconnect the IAC valve connector.



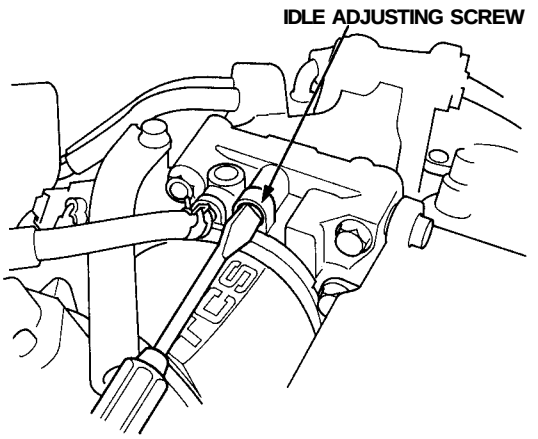
4. Start the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1,000, then slowly release the pedal until the engine idles.

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

   Idle speed should be:
   480 ± 50 rpm
   (in N or P position)

   Adjust the idle speed, if necessary, by turning the idle adjusting screw.

   NOTE: After adjusting the idle speed in this step, recheck the ignition timing (see section 23).
   If it is out of spec, go back to step 4.



6. Turn the ignition switch OFF.

7. Reconnect the 2P connector on the IAC valve, then do the PCM reset procedure.

8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

   NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

   Idle speed should be:
   640 ± 50 rpm
   (in [N] or [P] position)

9. Idle the engine for one minute with headlights (Low) ON and check the idle speed.

   Idle speed should be:
   650 ± 50 rpm
   (in [N] or [P] position)

10. Turn the headlights off.
    Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

    Idle speed should be:
    650 ± 50 rpm
    (in [N] or [P] position)

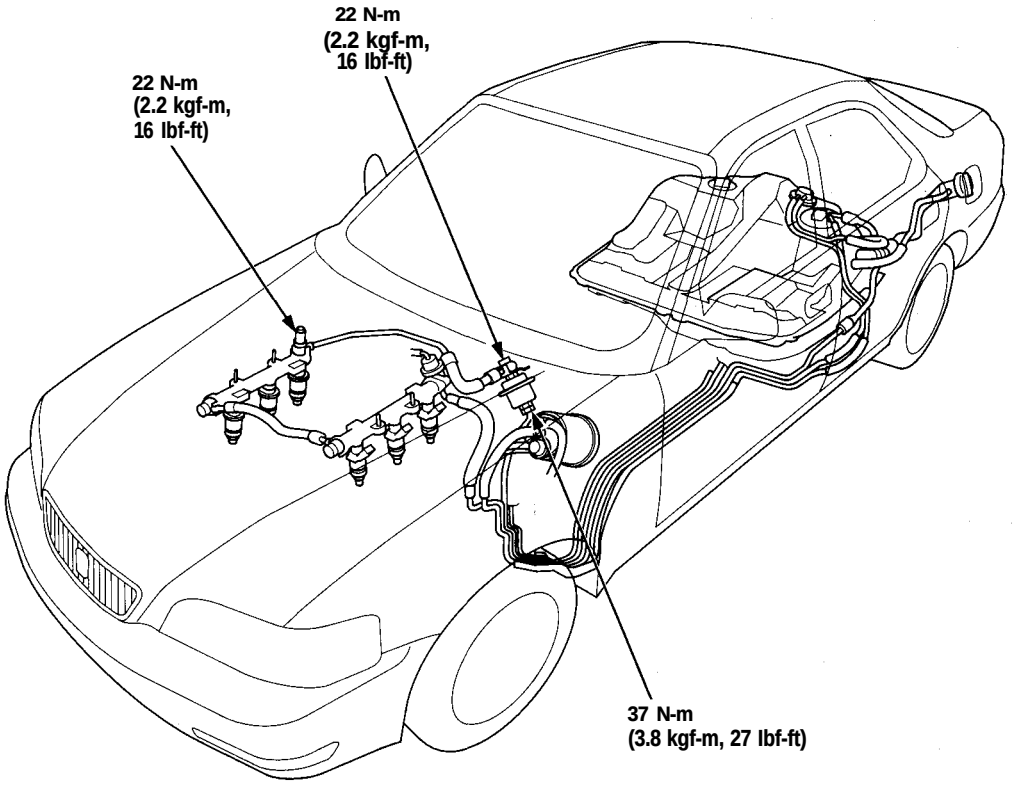
    NOTE: If the idle speed is not within specification, see Symptom Chart on page 11-36.

Fuel Supply System

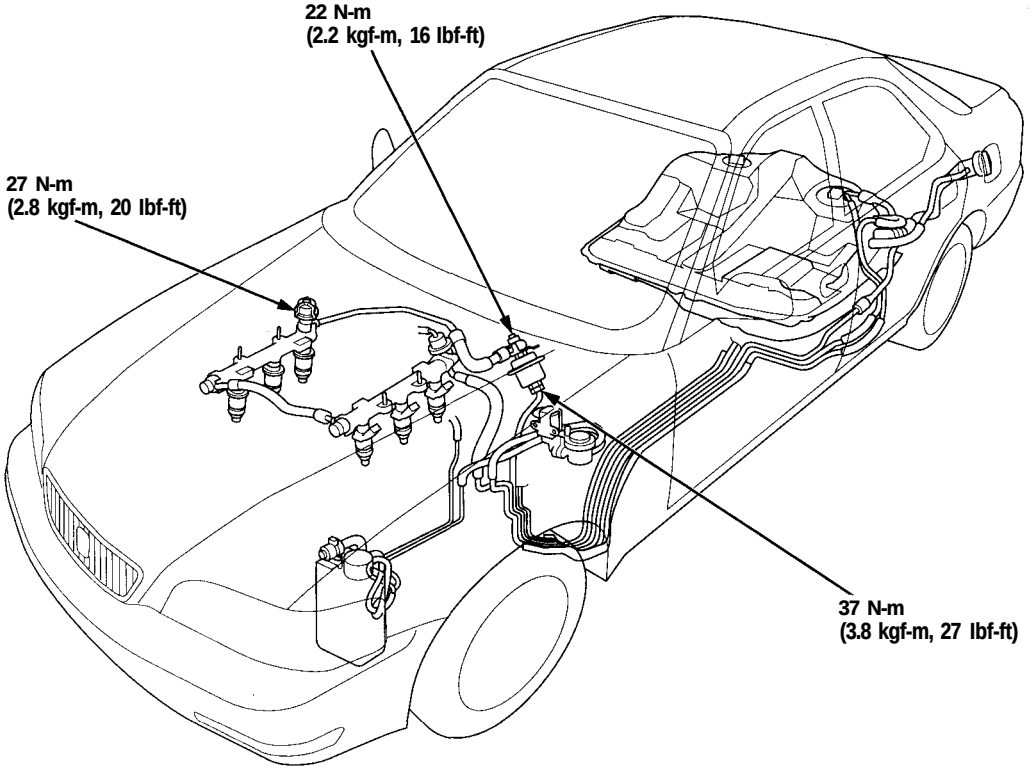
Fuel Lines

NOTE: Check fuel system lines, hoses, filter and other components for damage, leaks or deterioration, and replace if necessary.

'96 model:

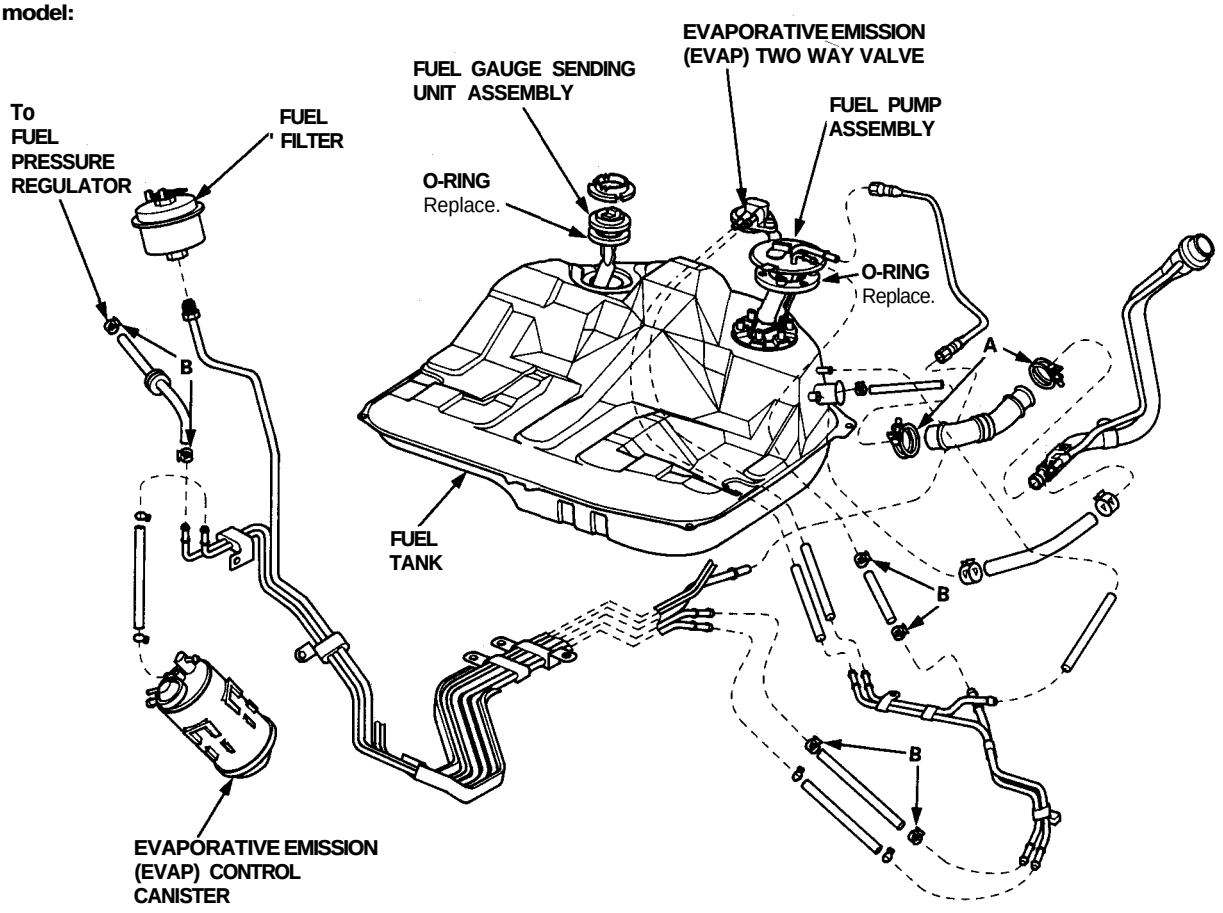


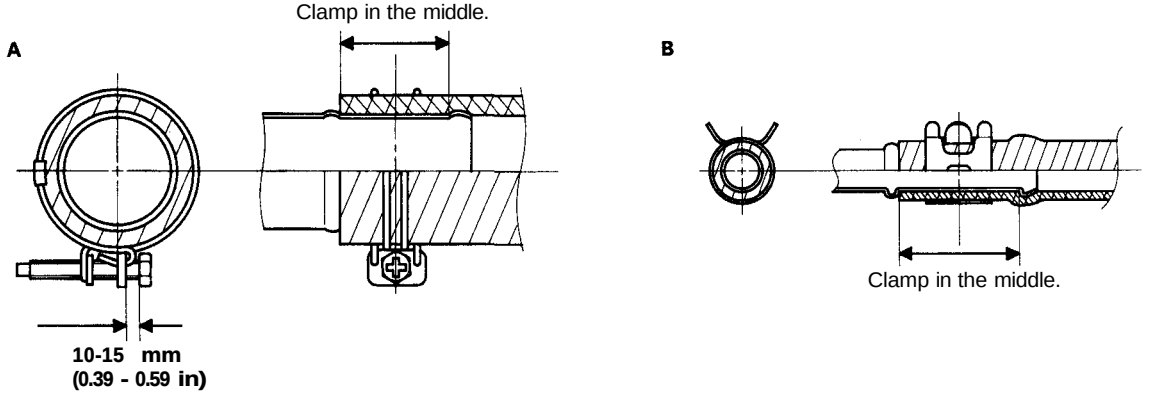
'97 - 98 models:



NOTE: Check all hose clamps and retighten if necessary.

'96 model:



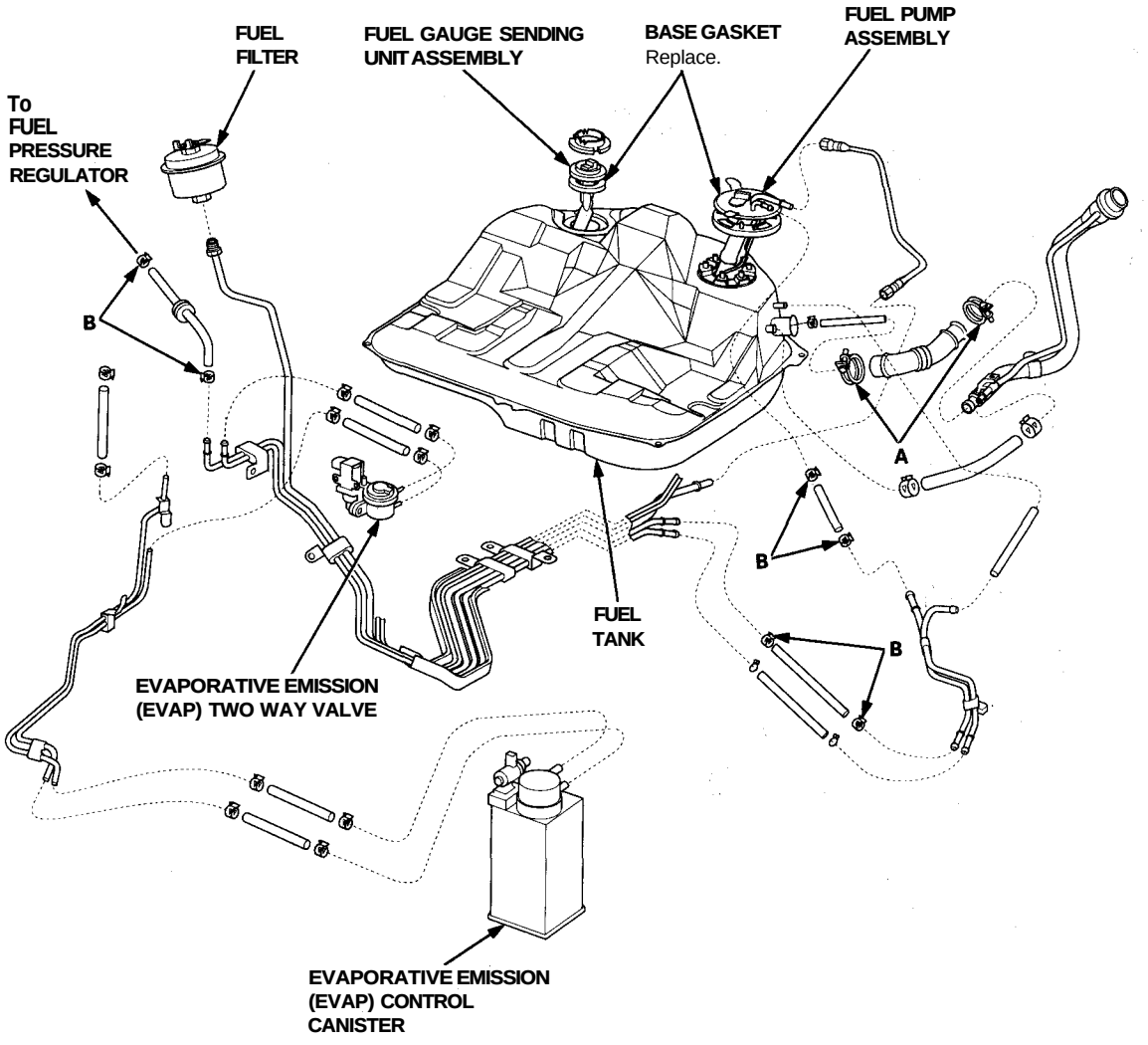


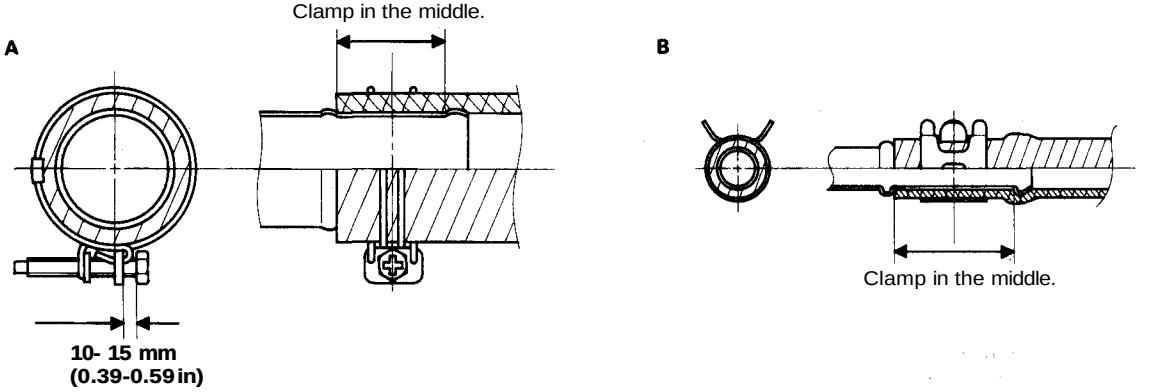
(cont'd)

Fuel Supply System

Fuel Lines (cont'd)

'97 - 98 models:







System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel pressure regulator control solenoid valve, fuel injectors, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

Relieving

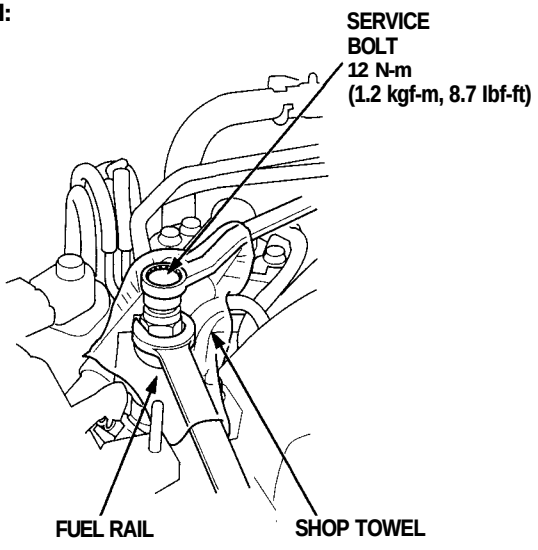
Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the service bolt on top of the fuel rail ('97 - 98 models: top of fuel filter).

⚠ WARNING

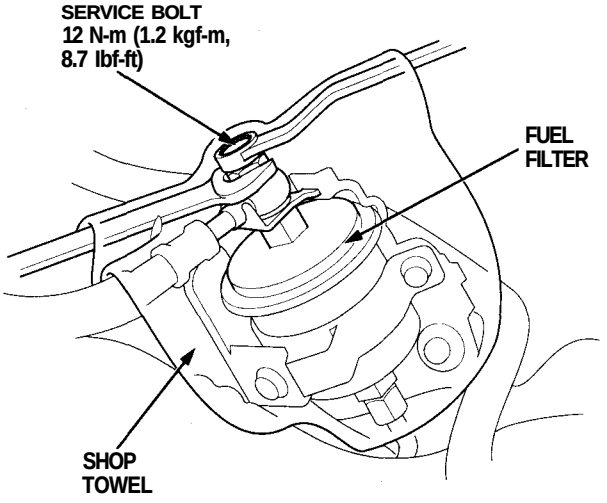
- **Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.**
- **Be sure to relieve fuel pressure while the ignition switch is off.**

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Remove the fuel fill cap.
4. Use a box end wrench on the service bolt on the fuel rail ('97 model: on the fuel filter) while holding the banjo bolt with another wrench.
5. Place a rag or shop towel over the service bolt.
6. Slowly loosen the service bolt one complete turn.

'96 model:



'97 - 98 models:



NOTE:

- A fuel pressure gauge can be attached at the service bolt hole.
- Always replace the washer between the service bolt and the banjo bolt whenever the service bolt is loosened.
- Replace all washers whenever the bolts are removed.

(cont'd)

Fuel Supply System

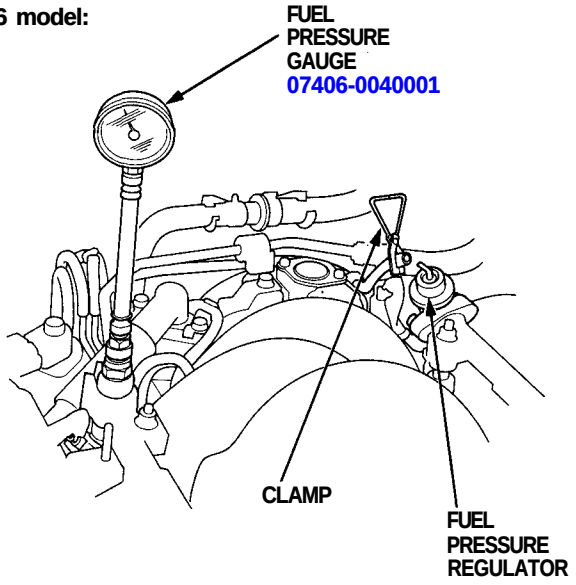
Fuel Pressure (cont'd)

Inspection

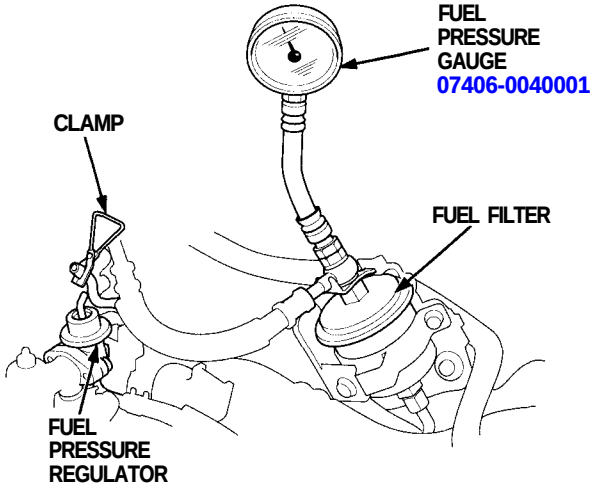
1. Relieve fuel pressure (see page 11-119).

2. Remove the service bolt on the fuel rail ('97 - 98 models: on the fuel filter) while holding the banjo bolt with another wrench. Attach the special tool.

'96 model:



'97 - 98 models:



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch ON (II), wait for two seconds, turn it OFF, then back on again and read the fuel pressure.

Pressure should be:
260 - 310 kPa (2.65 - 3.15 kgf/cm^2, 38 - 45 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

Pressure should be:
190 - 240 kPa (1.94 - 2.45 kgf/cm^2, 28 - 35 psi)

If the fuel pressure is not as specified, first check the fuel pump (see page 11-128). If the fuel pump is OK, check the following:

- If the fuel pressure is higher than specified, inspect for:
  — Pinched or clogged fuel return hose or line.
  — Faulty fuel pressure regulator (see page 11-124).
- If the fuel pressure is lower than specified, inspect for:
  — Clogged fuel filter.
  — Faulty fuel pressure regulator (see page 11-124).
  — Leakage in the fuel line.

Fuel Injectors

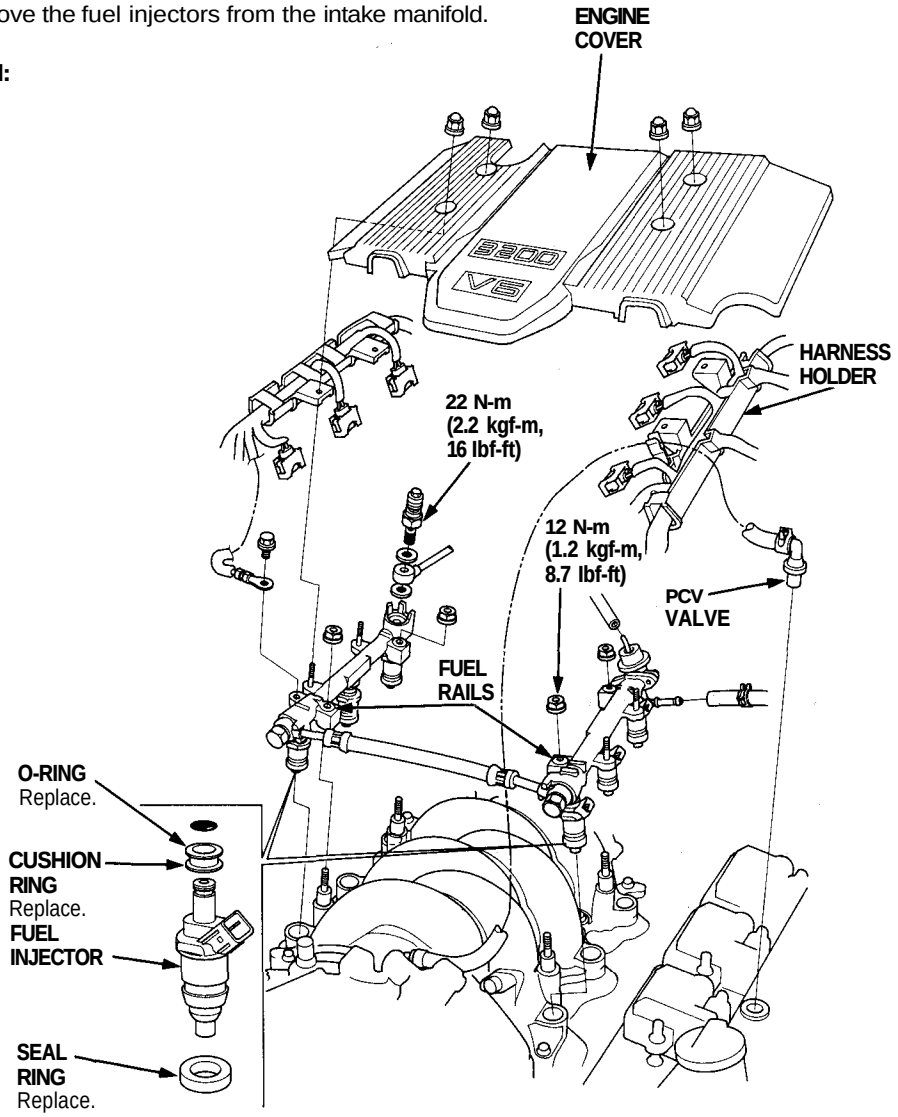
Replacement

⚠ WARNING **Do not smoke when working on the fuel system. Keep open flames away from your work area.**

1. Relieve fuel pressure (see page 11-119).
2. Remove the engine cover.
3. Disconnect the connectors from the fuel injectors.
4. Disconnect the vacuum hose and fuel return hose from the fuel pressure regulator.

   NOTE: Place a rag or shop towel over the hoses before disconnecting them.
5. Disconnect the fuel hose from the fuel rail.
6. Remove the retainer nuts from the fuel rail and harness holder.
7. Disconnect the fuel rail.
8. Remove the fuel injectors from the intake manifold.

'96 model:

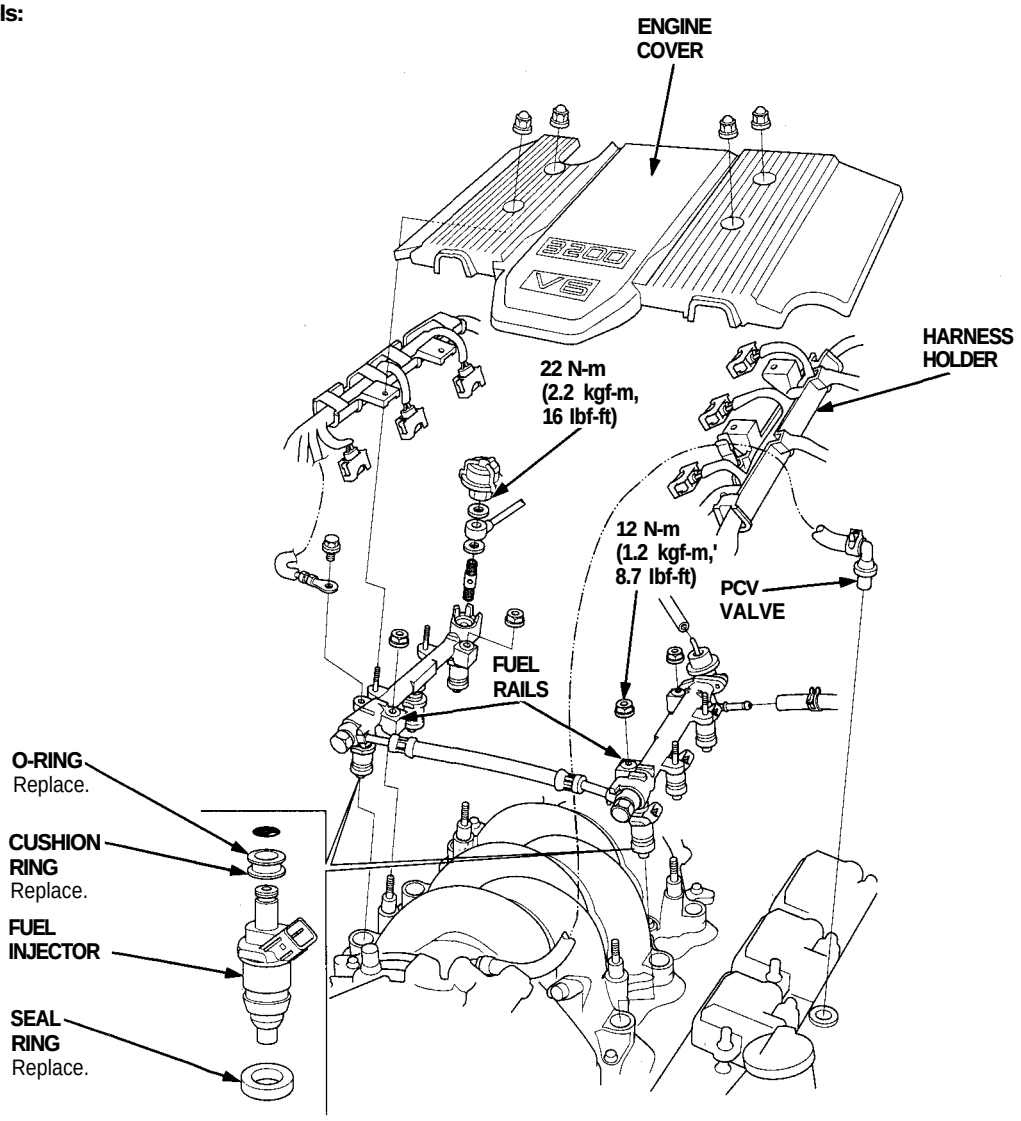


(cont'd)

Fuel Supply System

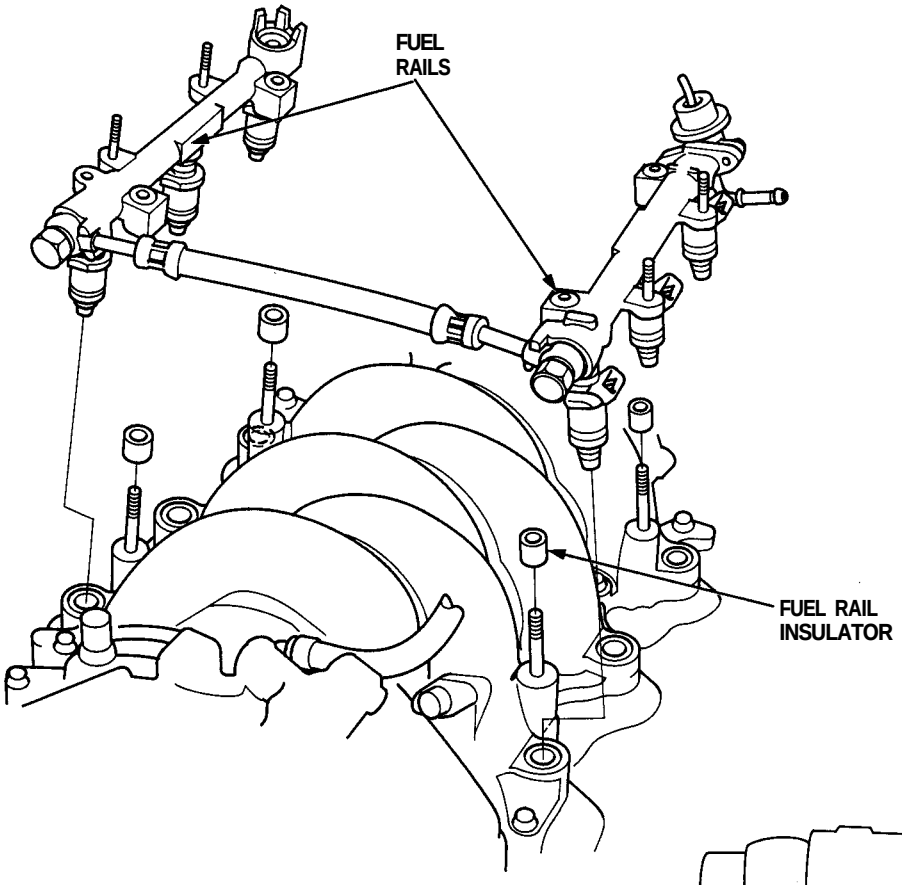
Fuel Injectors (cont'd)

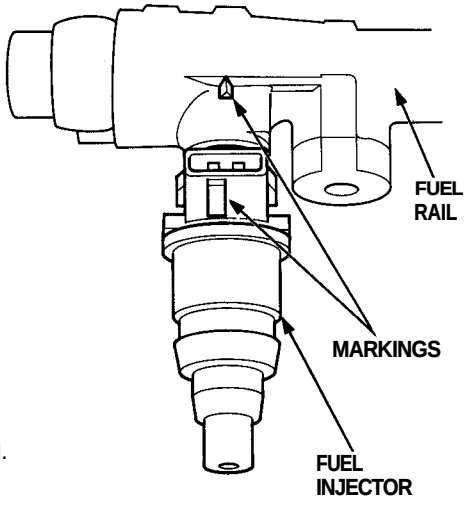
'97 - 98 models:



9. Slide new cushion rings onto the fuel injectors.
10. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
11. Insert the fuel injectors into the fuel rail first.
12. Coat new seal rings with clean engine oil and press them into the intake manifold.
13. Install the fuel injectors and fuel rail assembly in the intake manifold.

CAUTION: To prevent damage to the O-ring, install the fuel injectors in the fuel rail first, then install them in the intake manifold.





14. Align the center line on the connector with the mark on the fuel rail.
15. Install and tighten the retainer nuts.
16. Connect the fuel hose to the fuel rail.
17. Connect the vacuum hose and fuel return hose to the fuel pressure regulator.
18. Install the connectors on the fuel injectors.
19. Install the engine cover.
20. Turn the ignition switch ON (II) but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

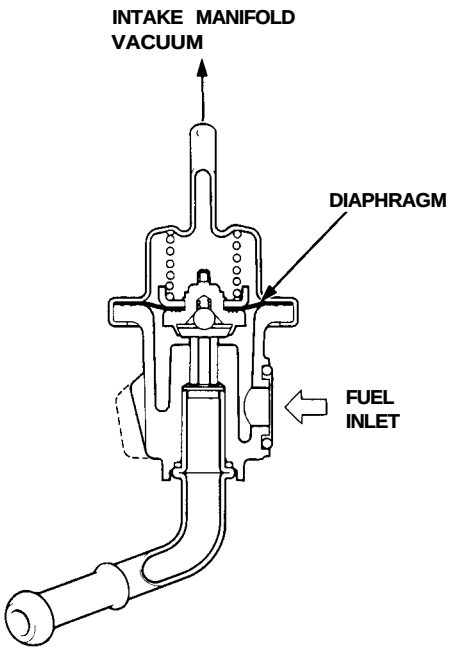
Fuel Supply System

Fuel Pressure Regulator

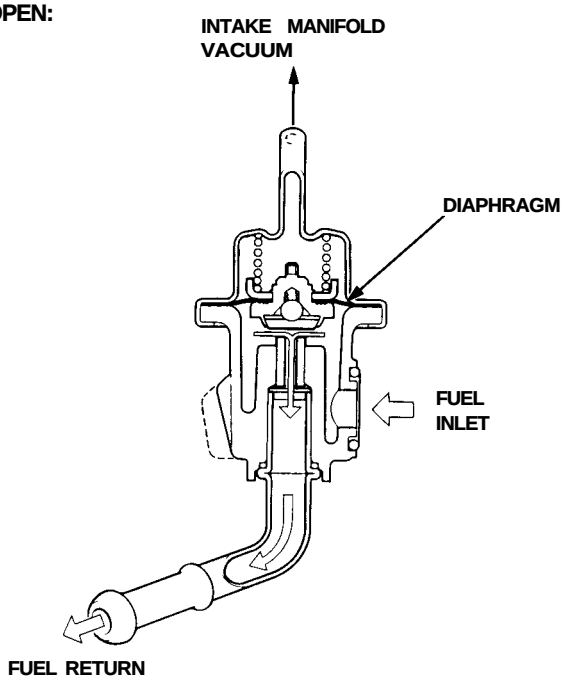
Description

The fuel pressure regulator maintains a constant fuel pressure to the fuel injectors. When the difference between the fuel pressure and manifold pressure exceeds 250 kPa (2.55 kgf/cm^2, 36.3 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSED:



OPEN:



Testing

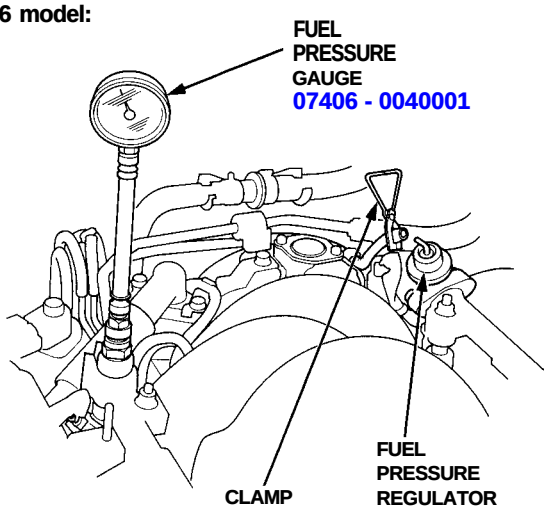
⚠ WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach the special tool to the service port on the fuel rail ('97 - 98 models: fuel filter) (see page 11-120).

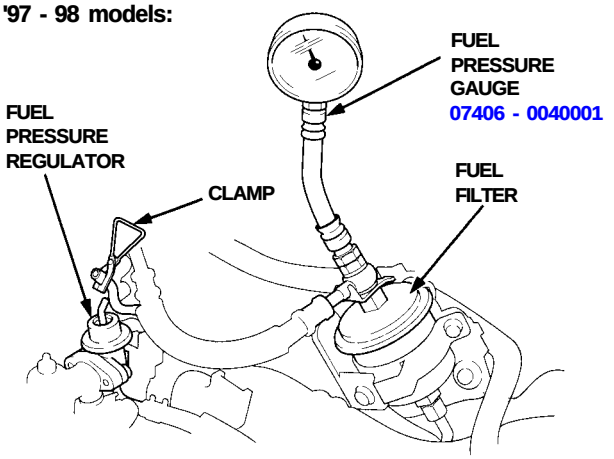
2. Start the engine.

   Pressure should be:
   260 - 310 kPa (2.65 - 3.15 kgf/cm^2, 38 - 45 psi)
   (with the fuel pressure regulator vacuum hose disconnected and pinched)

'96 model:



'97 - 98 models:



3. Reconnect the vacuum hose to the fuel pressure regulator.

4. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again. If the fuel pressure did not rise, replace the fuel pressure regulator.

Troubleshooting Flowchart

Inspection of Fuel Pressure Regulator Control Solenoid Valve.

Check for vacuum at idle:
1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on.
2. Disconnect the No. 1 vacuum hose from the fuel pressure regulator and connect a vacuum gauge to the hose.

Is there manifold vacuum?

NO → Disconnect the 4P connector from the control box.

Is there vacuum?

NO → **Check the No. 1 and No. 3 vacuum hose. If hoses are OK, replace the fuel pressure regulator control solenoid valve.**

YES → **Inspect for a short to ground in wire between PCM (A10) and the 4P connector. If the wire is OK, substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.**

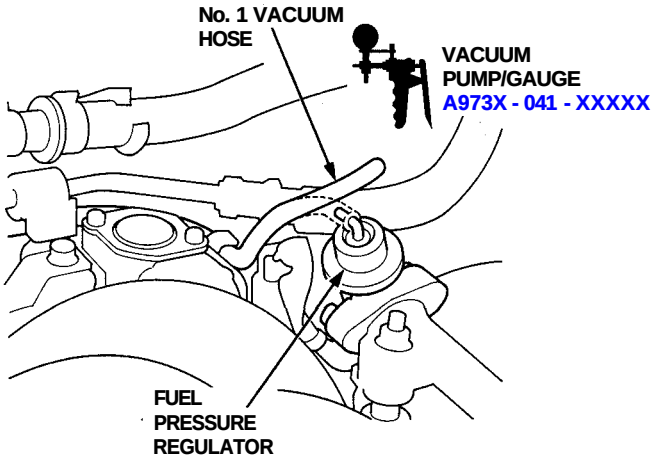
YES → **Check the Fuel Pressure Regulator Control Solenoid Valve:**
1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the control box.
3. Connect battery positive to terminal No. 4 and battery negative to terminal No. 3 on the 4P connector.
4. Start the engine and allow it to idle.

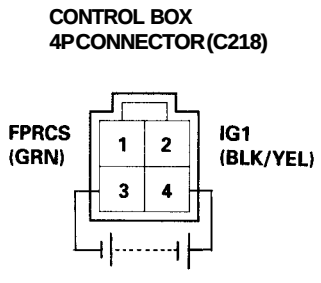
Is there manifold vacuum?

YES → **Replace the fuel pressure regulator control solenoid valve.**

NO

(To page 11-126)





Terminal side of male terminals

(cont'd)

Fuel Supply System

Fuel Pressure Regulator (cont'd)

(From page 11-125)

Check for an open in the wire:
Measure voltage between the control box 4P connector terminal No. 4 and body ground.

Is there battery voltage?

NO → **Repair open in wire between No. 4 ECU (PCM) (15 A) or (20 A) fuse in the under-dash fuse/relay box and the 4P connector.**

YES

Check for an open in the wire:
1. Turn the ignition switch OFF.
2. Reconnect the 4P connector to the control box.
3. Start the engine and allow it to idle.
4. Connect PCM connector terminal A10 and body ground with a jumper wire.

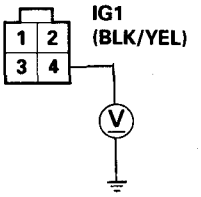
Is there manifold vacuum?

YES → **Repair open in wire between PCM (A10) and the 4P connector.**

NO

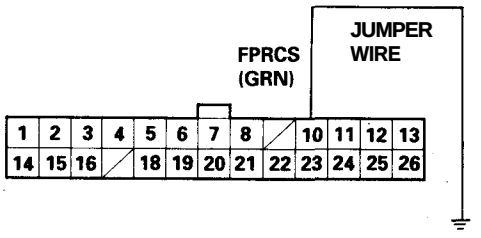
Fuel Pressure Regulator Control Solenoid Valve is OK.

CONTROL BOX 4P CONNECTOR (C218)



Wire side of female terminals

PCM CONNECTOR A (26P)

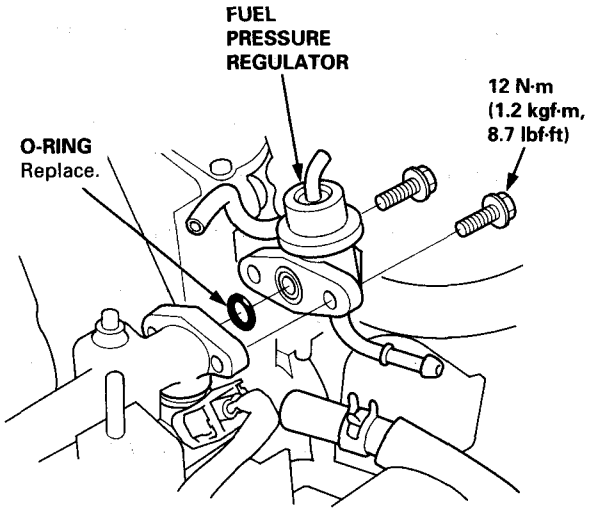


Wire side of female terminals

Replacement

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from your work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-119).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:
- Replace the O-ring.
- When assembling the fuel pressure regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

Fuel Filter

Replacement

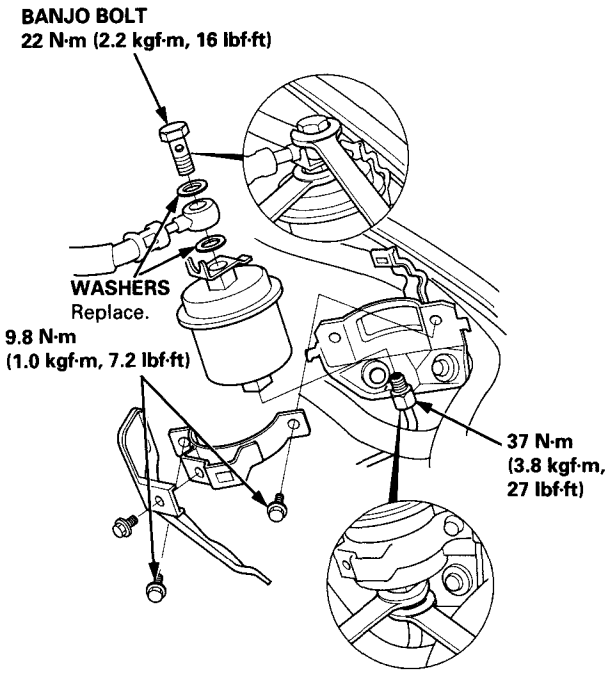
⚠ WARNING

- **Do not smoke while working on fuel system. Keep open flame away from your work area.**
- **While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.**

The fuel filter should be replaced whenever the fuel pressure drops below the specified value [260 - 310 kPa (2.65 - 3.15 kgf/cm^2, 37.7 - 44.8 psi) with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Place a shop towel under and around the fuel filter.
4. Relieve fuel pressure (see page 11-119).
5. Remove the banjo bolt and the fuel feed pipe while supporting the fuel filter with another wrench, as shown.
6. Remove the fuel filter clamp and fuel filter.
7. When assembling, use new washers as shown.
   NOTE: Clean the flared joint of high pressure hoses thoroughly before reconnecting them.

'96 model:

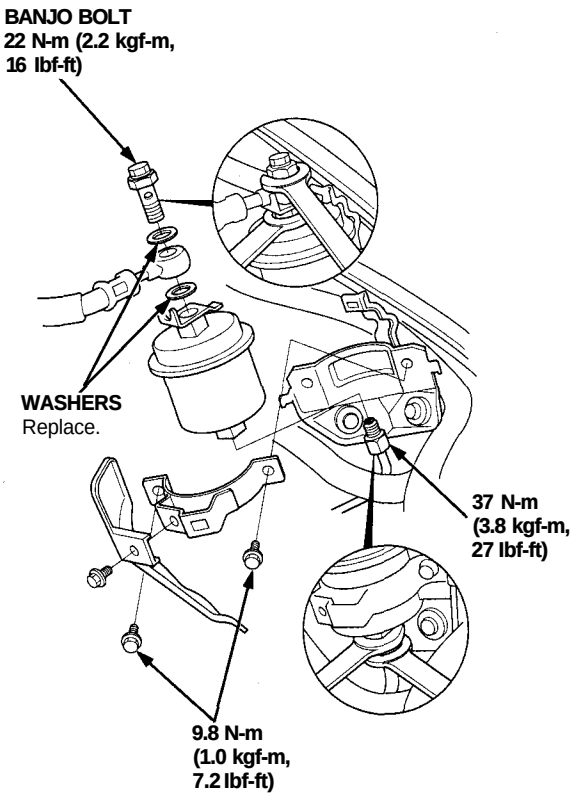


(cont'd)

Fuel Supply System

Fuel Filter (cont'd)

'97 - 98 models:



Fuel Supply System

Fuel Pump

Testing

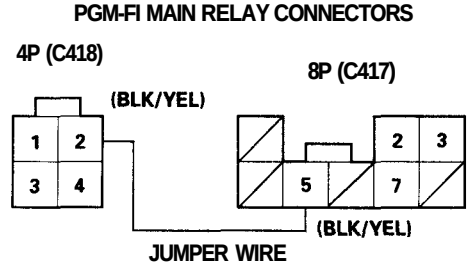
⚠ WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds when ignition switch is first turned on. If the fuel pump does not make noise, check as follows:

1. Remove the trunk floor.
2. Disconnect the 3P connector.

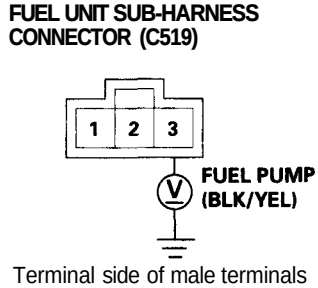
CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Disconnect the PGM-FI main relay connector and connect the No. 2 terminal and No. 5 terminal* with a jumper wire. *: 8P connector



Wire side of female terminals

4. Check that battery voltage is available between the fuel unit sub-harness connector terminal No. 3 and body ground when the ignition switch is turned ON (II).



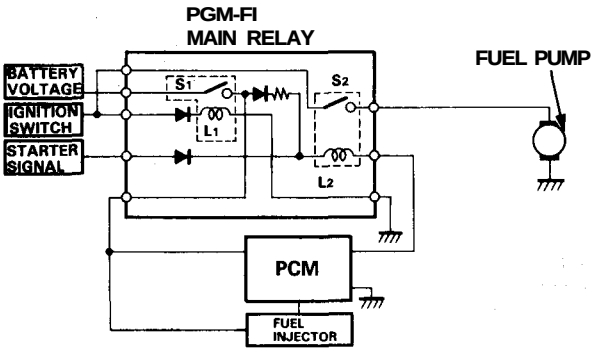
Terminal side of male terminals

- If battery voltage is available, check the fuel pump ground. If the ground is OK, replace the fuel pump.
- If there is no voltage, check the wire harness (see page 11-130).

PGM-FI Main Relay

Description

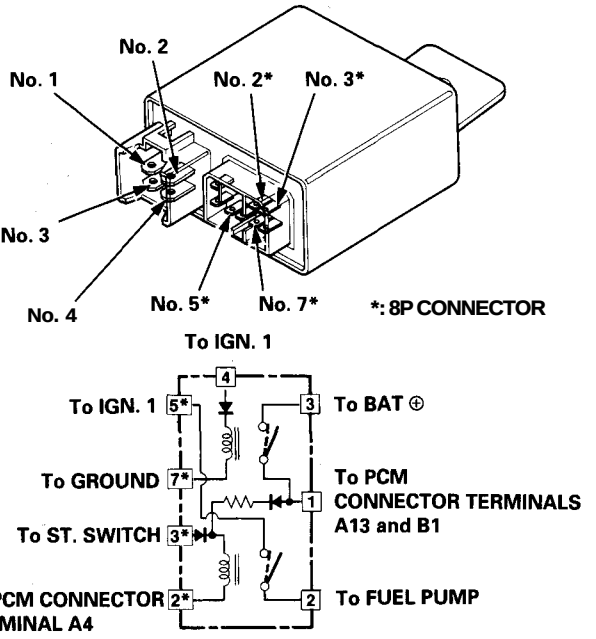
This PGM-FI main relay is located at the left side of the cowl. The PGM-FI main relay actually contains two individual relays. One relay is energized whenever the ignition is on. It supplies battery voltage to the PCM, power to the fuel injectors, and power for the second relay. The second relay is energized for two seconds when the ignition is switched on, and when the engine is running. It supplies power to the fuel pump.



Relay Testing

NOTE: If the car starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.
2. Attach the battery positive terminal to the No. 3* terminal and the battery negative terminal to the No. 2* terminal of the PGM-FI main relay. Then check for continuity between the No. 5* terminal and No. 2 terminal of the PGM-FI main relay.
   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the relay and retest.



3. Attach the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 7* terminal of the PGM-FI main relay. Then check that there is continuity between the No. 3 terminal and No. 1 terminal of the PGM-FI main relay.
   - If there is continuity, go on to step 4,
   - If there is no continuity, replace the relay and retest.
4. Attach the battery positive terminal to the No. 1 terminal and battery negative terminal to the No. 2* terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5* terminal and No. 2 terminal of the PGM-FI main relay.
   - If there is continuity, the relay is OK;
     If the fuel pump still does not work, go to Harness Testing on the next page.
   - If there is no continuity, replace the relay and retest.

(cont'd)

Fuel Supply System

PGM-FI Main Relay (cont'd)

Troubleshooting Flowchart

— Engine will not start.
— Inspection of PGM-FI main relay and relay harness.

Check for an open in the wire (PG1 line):
1. Turn the ignition switch OFF.
2. Disconnect the PGM-FI main relay 4P connector and 8P connector.
3. Check for continuity between the PGM-FI main relay 8P connector terminal No. 7 and body ground.

Is there continuity?

NO → **Repair open in the wire between the PGM-FI main relay and G101 (located at right middle of engine).**

YES

Check for an open or short in the wire (BAT line):
Measure voltage between the PGM-FI main relay 4P connector terminal No. 3 and body ground.

Is there battery voltage?

NO → **— Repair open or short in the wire between the PGM-FI main relay and the ECU (PCM) (20 A) fuse.**
— Replace the ECU (PCM) (20 A) fuse in the under-hood fuse/relay box.

YES

Check for an open or short in the wire (IGSW line):
1. Turn the ignition switch ON (II).
2. Measure voltage between the PGM-FI main relay 8P connector terminal No. 5 and body ground.

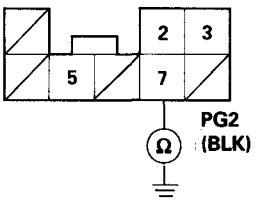
Is there battery voltage?

NO → **— Repair open or short in the wire between the PGM-FI main relay and the No. 2 FUEL PUMP (15 A) fuse.**
— Replace the No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

YES

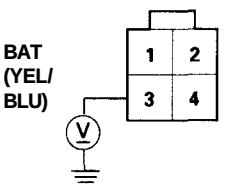
(To page 11-131)

PGM-FI MAIN RELAY 8P CONNECTOR (C417)

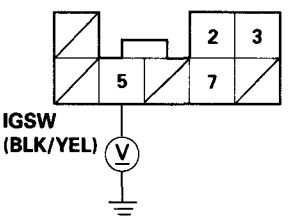


Wire side of female terminals

PGM-FI MAIN RELAY 4P CONNECTOR (C418)



Wire side of female terminals



(From page 11-130)

Check for an open in the wire (IGSW line):
Measure voltage between the PGM-FI main relay 4P connector terminal No. 4 and body ground.

Is there battery voltage?

NO

- **Repair open or short in the wire between the PGM-FI main relay and the IG COIL (30 A) fuse.**
- **Replace the IG1 1G COIL (30 A) fuse in the ignition coil fuse holder.**

YES

Check for an open or short in the wire (STS line):
1. Turn the ignition switch to the START (III) position (Transmission in [N] or [P] position).
2. Measure the voltage between the PGM-FI main relay 8P connector terminal No. 3 and body ground.

Is there battery voltage?

NO

- **Repair open or short in the wire between the PGM-FI main relay and the No. 9 STARTER SIGNAL (7.5 A) fuse.**
- **Replace the No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.**

YES

Check for an open in the wire (FLR1 line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (26 P) from the PCM.
3. Check for continuity between the PGM-FI main relay 8P connector terminal No. 2 and PCM connector terminal A4.

Is there continuity?

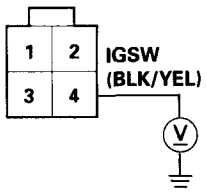
NO

Repair open in the wire between the PCM (A4) and the PGM-FI main relay.

YES

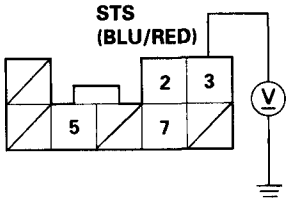
(To page 11-132)

PGM-FI MAIN RELAY 4P CONNECTOR (C418)

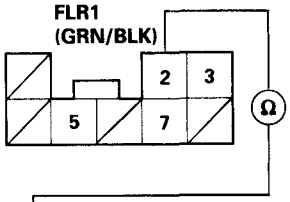


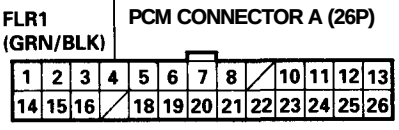
Wire side of female terminals

PGM-FI MAIN RELAY 8P CONNECTOR (C417)



Wire side of female terminals





Wire side of female terminals

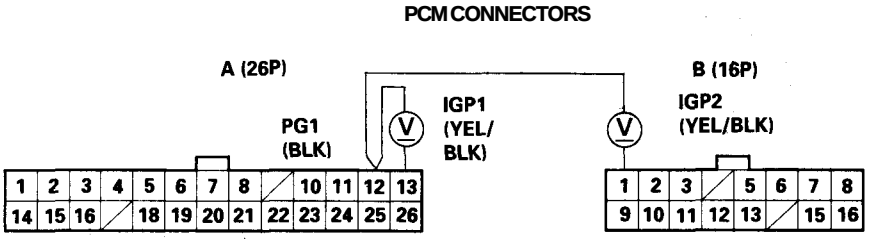
(cont'd)

Fuel Supply System

PGM-FI Main Relay (cont'd)

(From page 11-131)

Check for an open in the wires (IGP1, IGP2 lines):
1. Reconnect the PCM connector A (26P).
2. Reconnect the PGM-FI main relay 4P and 8P connectors.
3. Turn the ignition switch ON (II).
4. Measure voltage between PCM connector terminals A13 and A12, and between terminals B1 and A12.



Wire side of female terminals

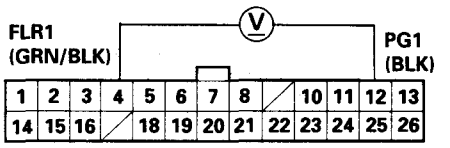
Is there battery voltage?

NO

- **Repair open in the wire between the PCM (A13, B1) and the PGM-FI main relay.**
- **Replace the PGM-FI main relay.**

YES

Check for an open in the PCM:
1. Turn the ignition switch OFF.
2. Measure voltage between PCM connector terminals A4 and A12 when the ignition switch is first turned ON (II) for two seconds.



Is there 1.0 V or less?

NO

Substitute a known-good PCM and recheck. If prescribed voltage is now available, replace the original PCM.

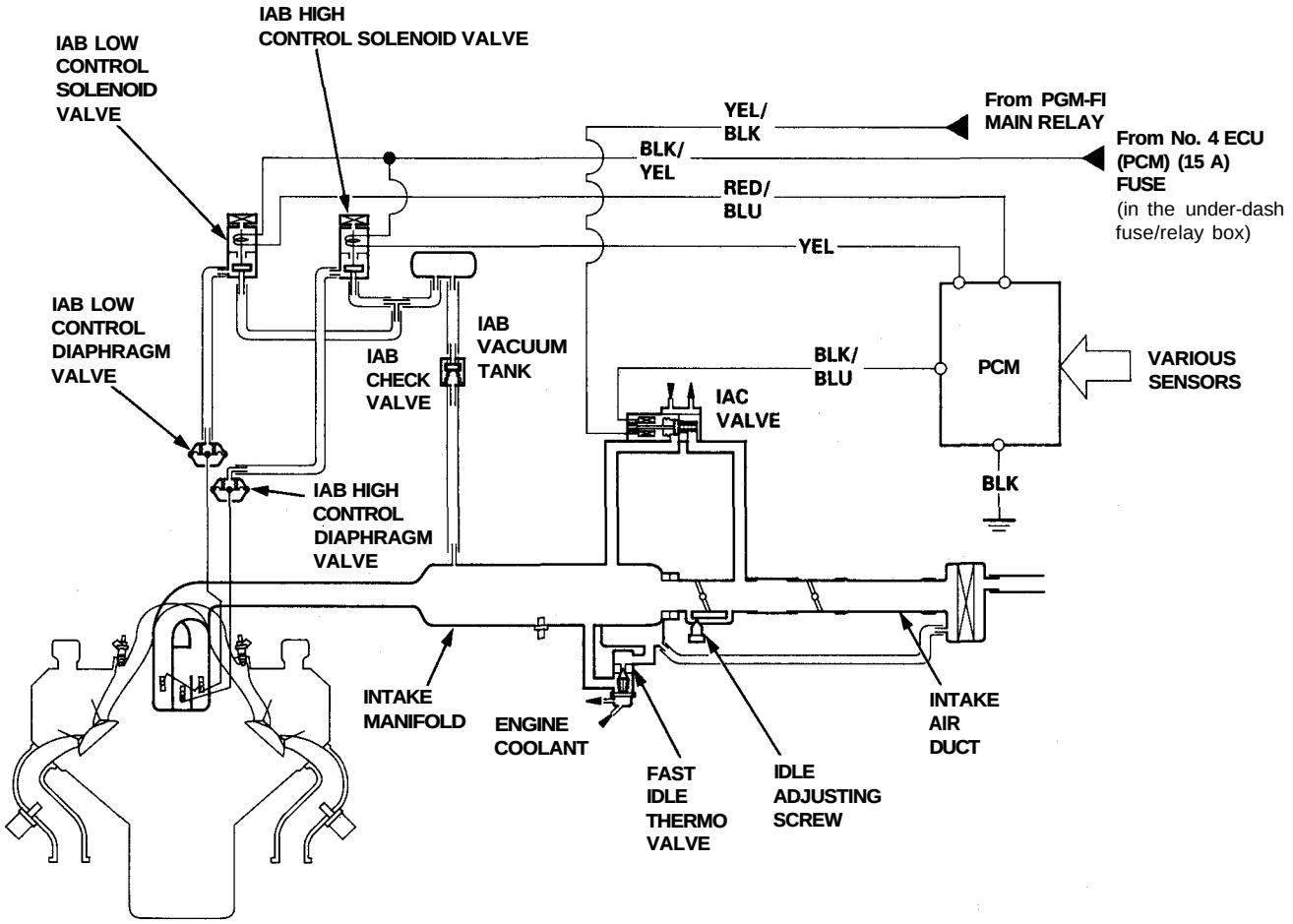
YES

Check the PGM-FI main relay (see page 11-129).

Intake Air System

System Description

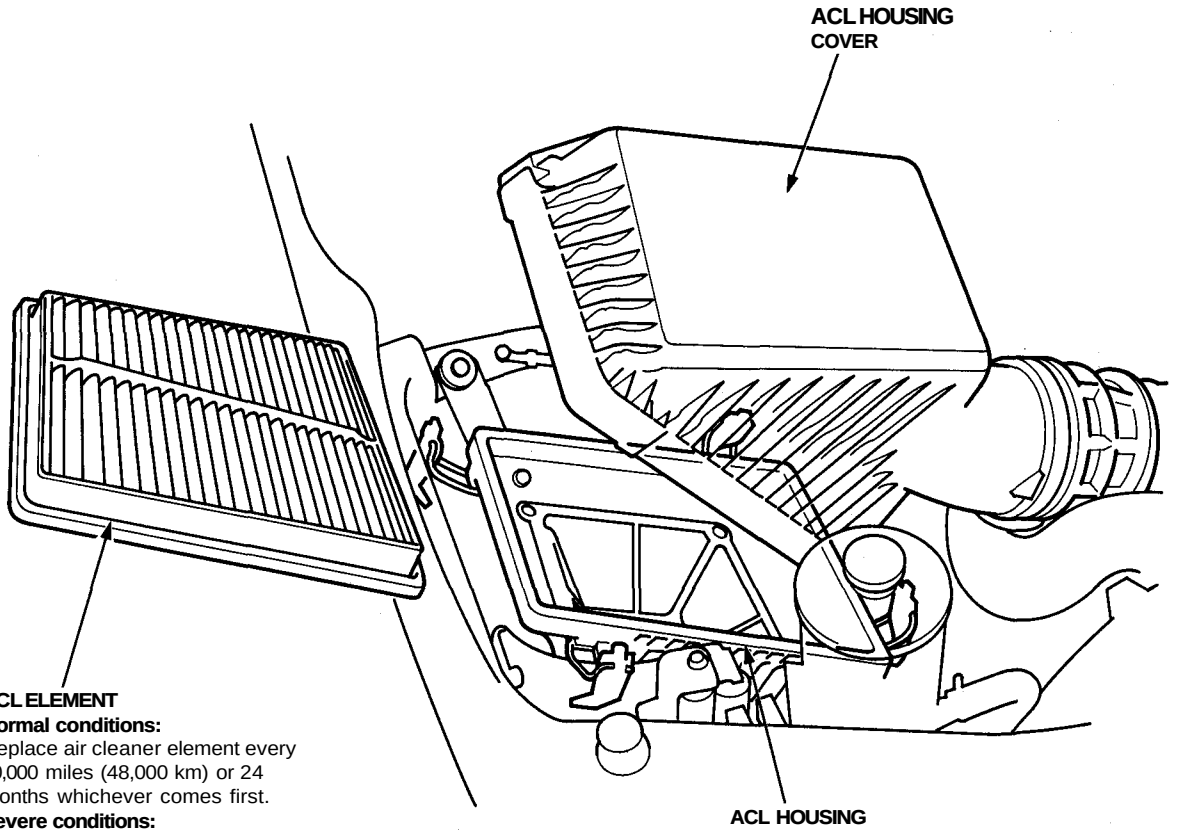
The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve, and intake manifold.
A resonator in the intake air pipe provides additional silencing as air is drawn into the system.



Intake Air System

Air Cleaner (ACL)

ACL Element Replacement

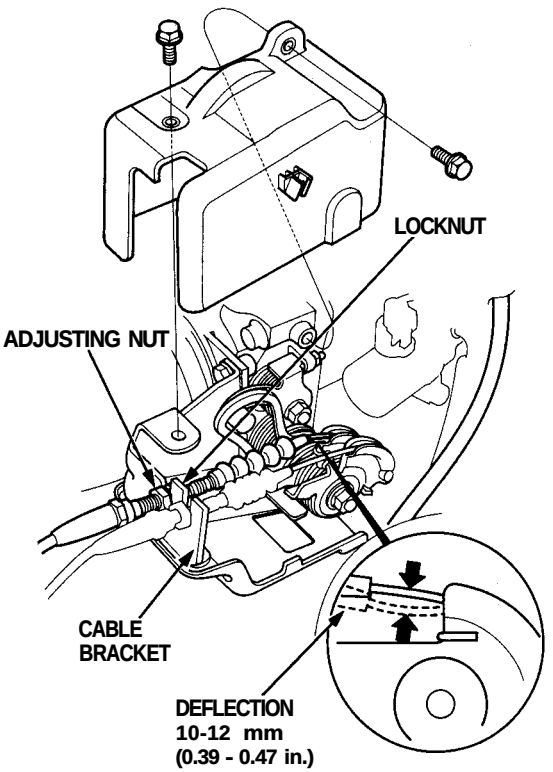


ACL ELEMENT
Normal conditions:
Replace air cleaner element every 30,000 miles (48,000 km) or 24 months whichever comes first.
Severe conditions:
Clean air cleaner element every 15,000 miles (24,000 km) or 12 months and replace every 30,000 miles (48,000 km) or 24 months whichever comes first.

Throttle Cable

Inspection/Adjustment

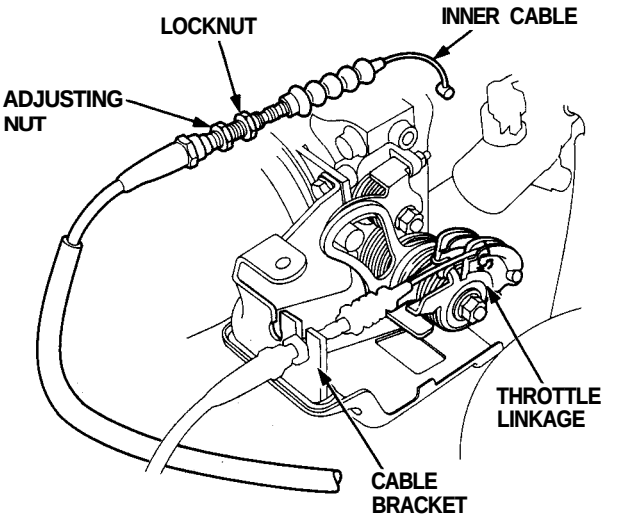
1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 - 12 mm (0.39 - 0.47 in.)



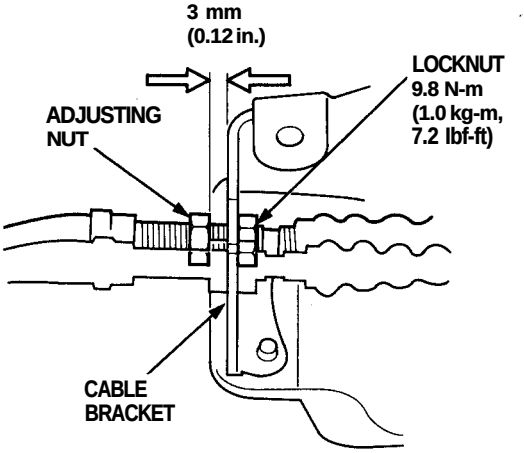
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.



2. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm (0.12 in.) away from the cable bracket.

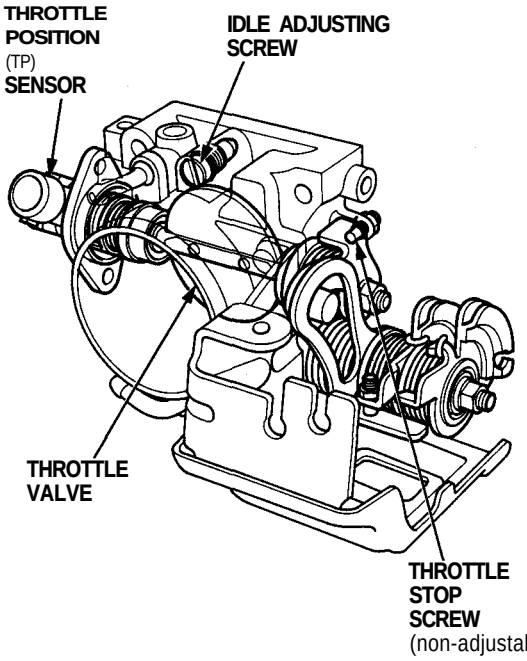


5. Tighten the locknut. The cable deflection should now be 10 - 12 mm (0.39 - 0.47 in.). If not, see inspection/adjustment.

Intake Air System

Throttle Body

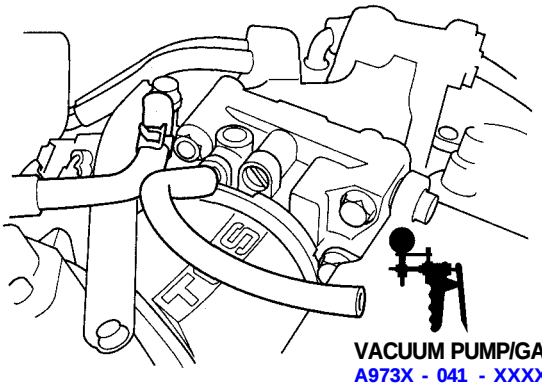
Description
The throttle body is a single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw, which increases/decreases bypass air, and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body.



Inspection
CAUTION: Do not adjust the throttle stop screw. It is preset at the factory.

1. Disconnect the vacuum hose (to the EVAP control canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.

2. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in [N] or [P] position) until the radiator fan comes on, then let it idle.



3. Allow the engine to idle, and check that the gauge indicates no vacuum.

   - If there is vacuum, check the throttle cable (see page 11-135).

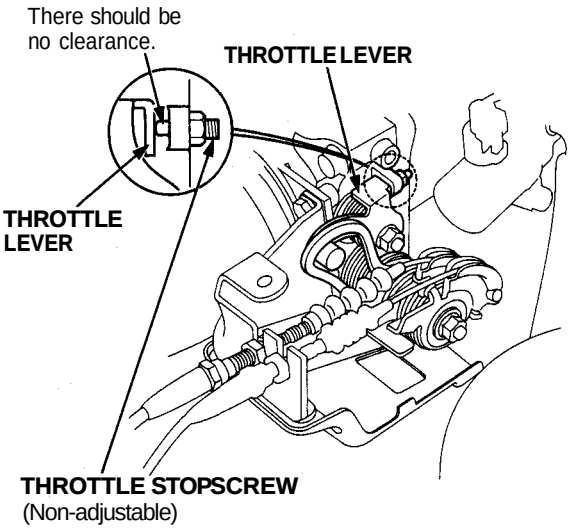
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.

   - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.

5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.

   - If there are any abnormalities in the above steps, check for.

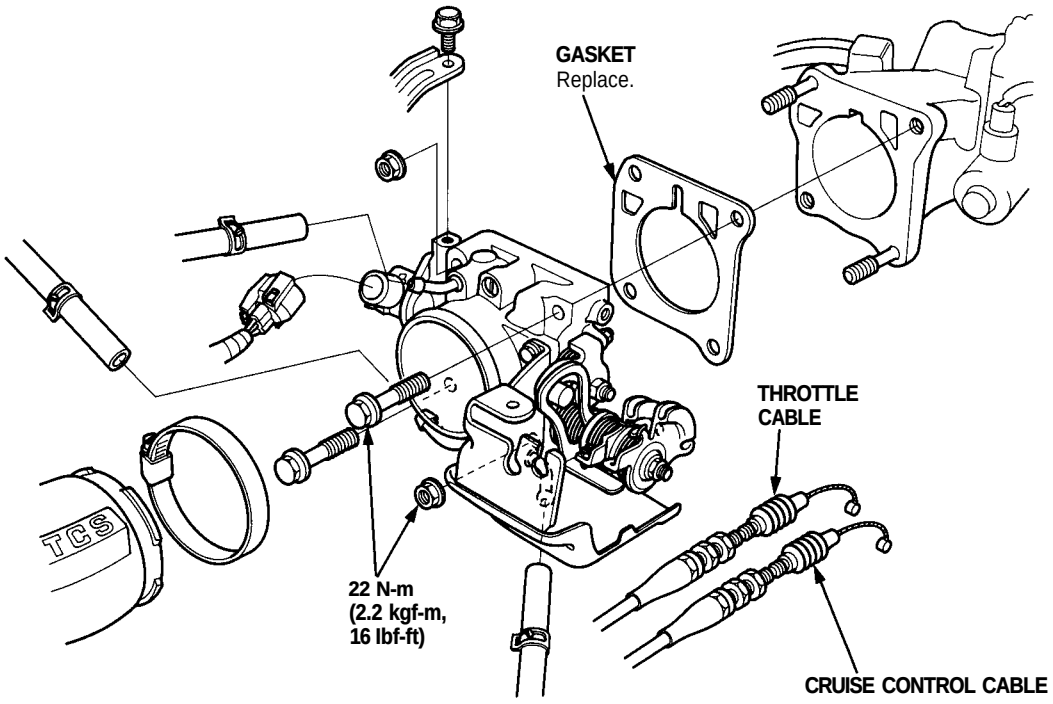
   — Excessive wear or play in the throttle valve shaft.
   — Sticky or binding throttle lever at full close position.
   — Clearance between throttle stop screw and throttle lever at full close position.



Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

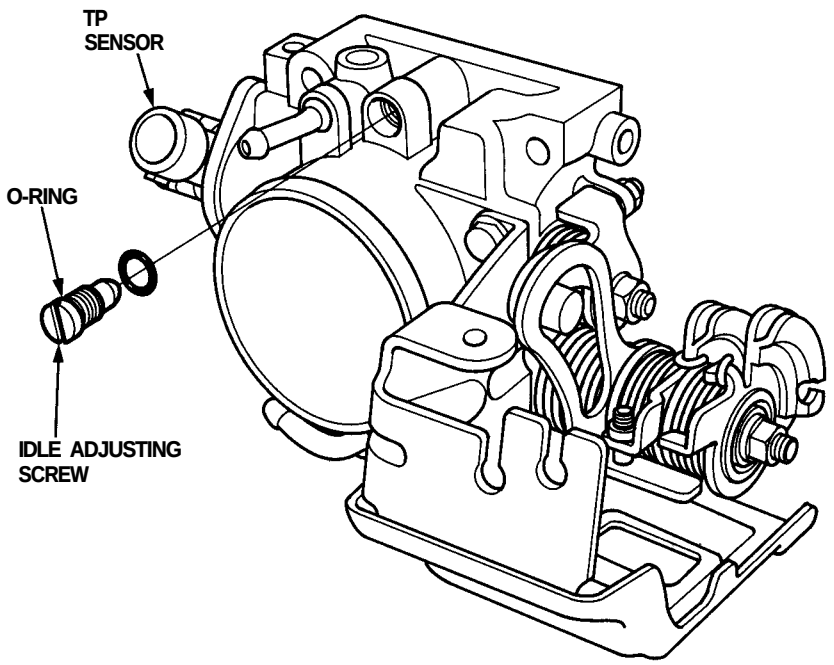
Disassembly

with TCS: Remove the TCS control valve (see section 19).



CAUTION:

- **The throttle stop screw is non-adjustable.**
- **After reassembly, adjust the throttle cable (see page 11-135) and the cruise control cable (see section 23).**



Intake Air System

Intake Air Bypass (IAB) Control System

Description

Satisfactory power performance is achieved by closing and opening the intake air bypass (IAB) control valves. High torque at low rpm is achieved when the valves are closed, whereas high power at high rpm is achieved when the valves are opened.

INTAKE AIR BYPASS (IAB) LOW CONTROL SOLENOID VALVE OFF

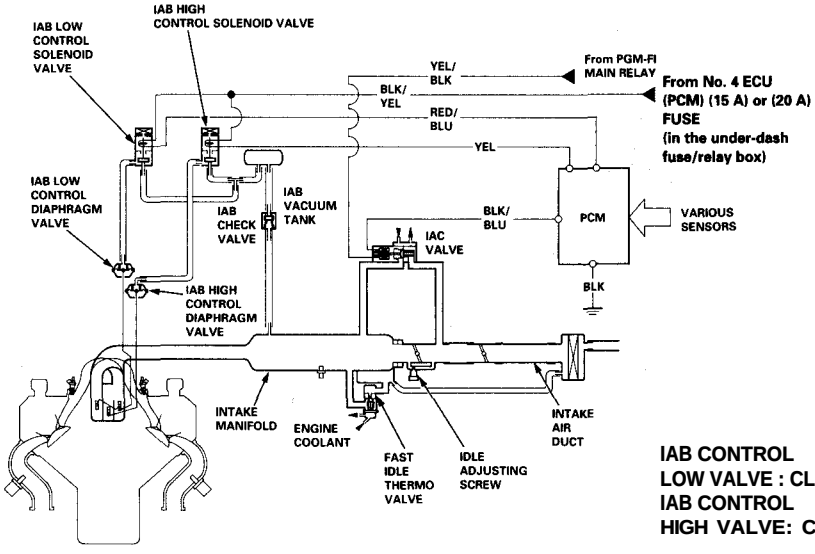
↑

ENGINE SPEED IS ABOVE 3,350 rpm

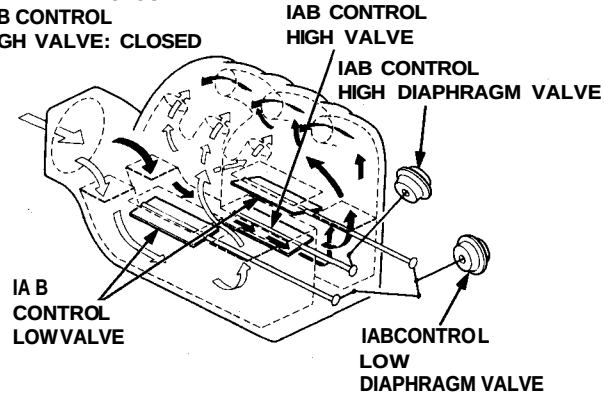
INTAKE AIR BYPASS (IAB) HIGH CONTROL SOLENOID VALVE OFF

↑

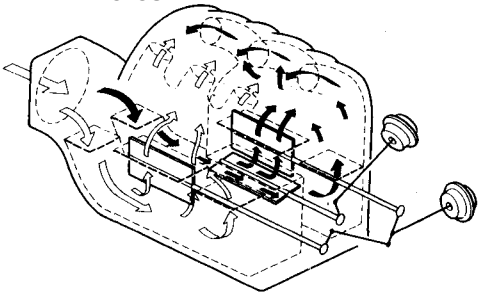
ENGINE SPEED IS ABOVE 3,950 rpm



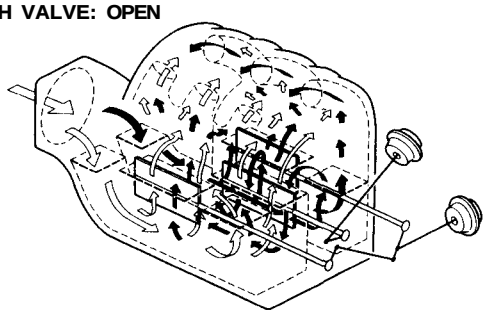
IAB CONTROL LOW VALVE : CLOSED
IAB CONTROL HIGH VALVE: CLOSED



IAB CONTROL LOW VALVE : OPEN
IAB CONTROL HIGH VALVE: CLOSED



IAB CONTROL LOW VALVE: OPEN
IAB CONTROL HIGH VALVE: OPEN



Troubleshooting Flowchart

Inspection of IAB Control System.

Check for vacuum at idle:
1. Start engine and allow it to idle.
2. Remove No. 2 vacuum hose from the IAB low control diaphragm valve and connect vacuum gauge to the hose.

Is there vacuum?

NO

Check for vacuum at IAB vacuum tank:
Disconnect the No. 4 vacuum hose on IAB low control solenoid valve and connect a vacuum gauge to the hose.

Is there vacuum?

NO

Repair the blockage or vacuum leak between the IAB vacuum tank and the intake manifold.

YES

Check for an open in the wire (IABCS1 line):
1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the IAB control solenoid valve assy.
3. Start engine and allow it to idle.
4. Measure voltage between 4P connector terminal No. 2 and No. 4.

Is there battery voltage?

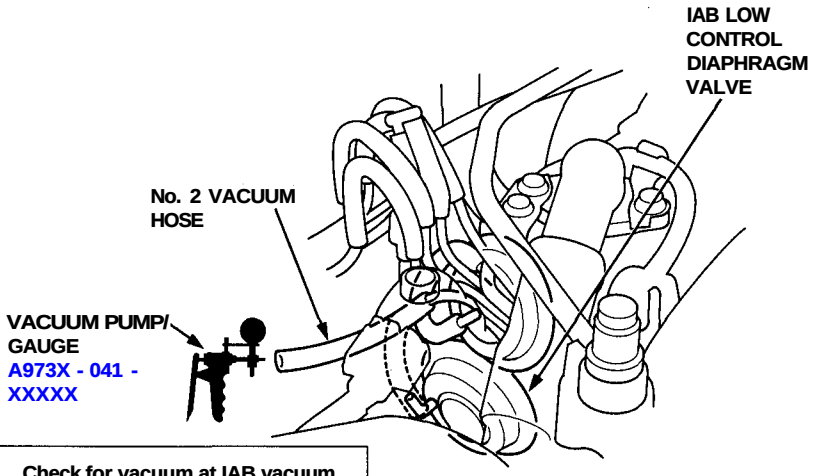
YES

Replace the IAB low control solenoid valve.

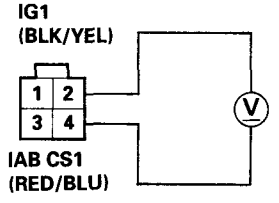
NO

Check for an open in the wire (IG1 line):
Measure voltage between 4P connector terminal No. 2 and body ground.

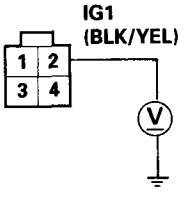
YES



IAB CONTROL SOLENOID VALVE ASSY. 4P CONNECTOR (C203)



Wire side of female terminals



(cont'd)

A

(To page 11-140)

B

(To page 11-140)

Intake Air System

Intake Air Bypass (IAB) Control System (cont'd)

(From page 11-139)

A

Check for vacuum at idle:
Remove No. 8 vacuum hose from the IAB high control diaphragm valve and connect a vacuum gauge to the hose.

Is there vacuum?

NO

Check for vacuum at IAB vacuum tank:
Disconnect the No. 4 vacuum hose on IAB low control solenoid valve and connect a vacuum gauge to the hose.

YES

(To page 11-141)

(From page 11-139)

B

Is there battery voltage?

NO

Repair open in wire between the 4P connector and No. 4 ECU (PCM) (15 A) fuse in the under-dash fuse/relay box.

YES

PCM CONNECTOR A (26P)

1	2	3	4	5	6	7	8		10	11	12	13
14	15	16		18	19	20	21	22	23	24	25	26

IAB CONTROL SOLENOID VALVE ASSY. 4P CONNECTOR (C203)

IAB CS1 (RED/BLU)

1	2
3	4

Wire side of female terminals

Check for an open in the wire (IABCS1 line):
1. Turn the ignition switch OFF.
2. Check for continuity between PCM connector terminal A20 and 4P connector terminal No. 4.

Is there continuity?

NO

Repair open in wire between PCM (A20) and the 4P connector.

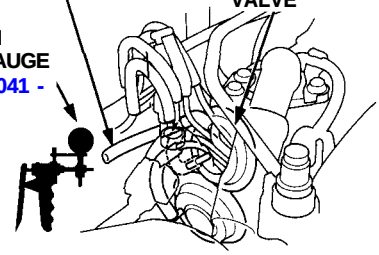
YES

Substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.

No. 8 VACUUM HOSE

IAB HIGH CONTROL DIAPHRAGM VALVE

VACUUM PUMP/GAUGE A973X - 041 - XXXXX



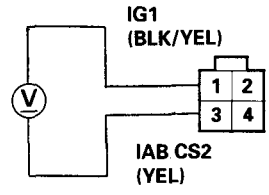
Is there vacuum?

NO

Repair the blockage or vacuum leak between the IAB vacuum tank and the intake manifold.

YES

Check for an open in the wire (IABCS2 line):
1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the IAB control solenoid valve assy.
3. Start engine and allow it to idle.
4. Measure voltage between 4P connector terminal No. 1 and No. 3.



Wire side of female terminals

B

(To page 11-141)

(From page 11-140)

A

Check for vacuum at 3,400 rpm:
1. Raise engine speed to 3,400 rpm.
2. Check for vacuum at No. 2 vacuum hose.

Is there vacuum?

YES

Check the IAB Low Control Solenoid Valve:
Disconnect the 4P connector from the IAB control solenoid valve assembly.

Is there vacuum?

YES

Replace the IAB low control solenoid valve.

NO

A

(To page 11-142)

NO

(From page 11-140)

B

Is there battery voltage?

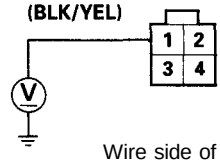
YES

Replace the IAB high control solenoid valve.

NO

Check for an open in the wire (IG1 line):
Measure voltage between 4P connector terminal No. 1 and body ground.

IAB CONTROL SOLENOID VALVE ASSY. 4P CONNECTOR (C203)
IG1 (BLK/YEL)



Wire side of female terminals

Is there battery voltage?

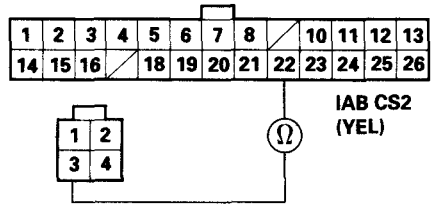
NO

Repair open in wire between the 4P connector and No. 4 ECU (PCM) (15 A) or (20A) fuse in the under-dash fuse/relay box.

YES

PCM CONNECTOR A (26P)

Check for an open in the wire (IABCS2 line):
1. Turn the ignition switch OFF.
2. Check for continuity between PCM connector terminal A22 and 4P connector terminal No. 3.



Is there continuity?

NO

Repair open in wire between PCM (A22) and the 4P connector.

YES

Substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.

B

(To page 11-142)

(cont'd)

Intake Air System

Intake Air Bypass (IAB) Control System (cont'd)

(From page 11-141)

A

Check for vacuum at 4,000 rpm:
1. Raise engine speed to 4,000 rpm.
2. Check for vacuum at No. 8 vacuum hose.

Is there vacuum?

YES

Check the IAB high Control Solenoid Valve:
Disconnect the 4P connector from the IAB control solenoid valve assembly.

Is there vacuum?

YES

Replace the IAB high control solenoid valve.

NO

Check for a short in the wire (IABCS2 line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (26P) form the PCM.
3. Check for continuity between PCM connector terminal A22 and body ground.

Is there continuity to ground?

YES

Repair short to ground at wire between PCM (A22) and the 4P connector.

NO

Substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.

NO

IAB control system is OK.

(From page 11-141)

B

Check for a short in the wire (IABCS1 line):
1. Turn the ignition switch OFF.
2. Disconnect the PCM connector A (26P) from the PCM.
3. Check for continuity between PCM connector terminal A20 and body ground.

Is there continuity?

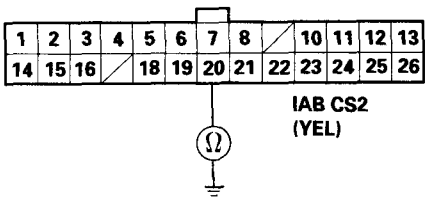
YES

Repair short to ground at wire between PCM (A20) and the 4P connector.

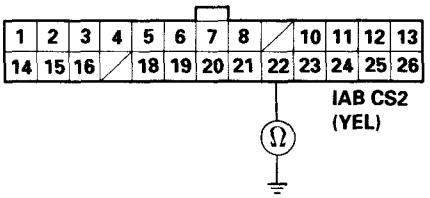
NO

Substitute a known-good PCM and recheck. If symptom goes away, replace the original PCM.

PCM CONNECTOR A (26P)



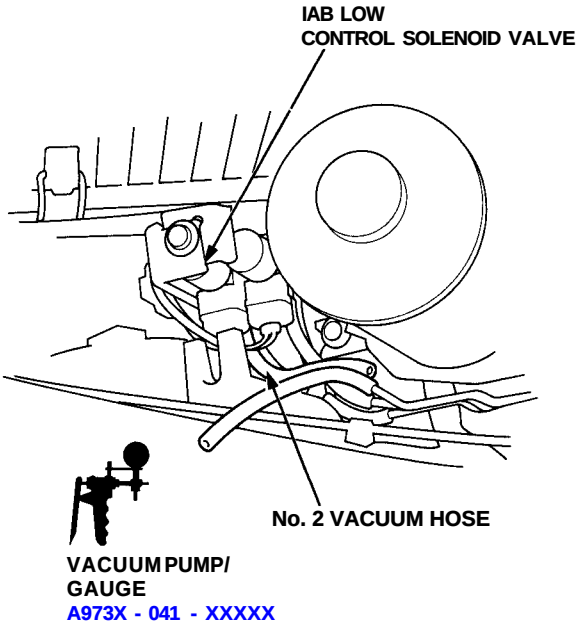
Wire side of female terminals



Testing

Intake Air Bypass (IAB) Low Control Valve

1. Disconnect the No. 2 vacuum hose from the vacuum hose manifold, and attach a vacuum pump to the vacuum hose manifold.

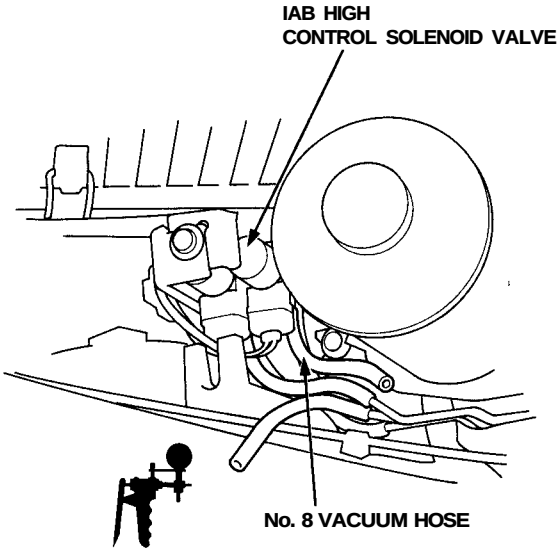


2. Apply vacuum and verify that the IAB control diaphragm valve holds vacuum and that as the vacuum is applied and released the IAB control diaphragm valve rod moves in and out.

   - If the IAB control diaphragm valve does not hold vacuum or the IAB control diaphragm valve rod does not move in and out, replace the IAB control valve and retest.

Intake Air Bypass (IAB) High Control Valve

1. Disconnect the No. 8 vacuum hose from the vacuum hose manifold, and attach a vacuum pump to the vacuum hose manifold.



2. Apply vacuum and verify that the IAB control diaphragm valve holds vacuum and that as the vacuum is applied and released the IAB control diaphragm valve rod moves in and out.

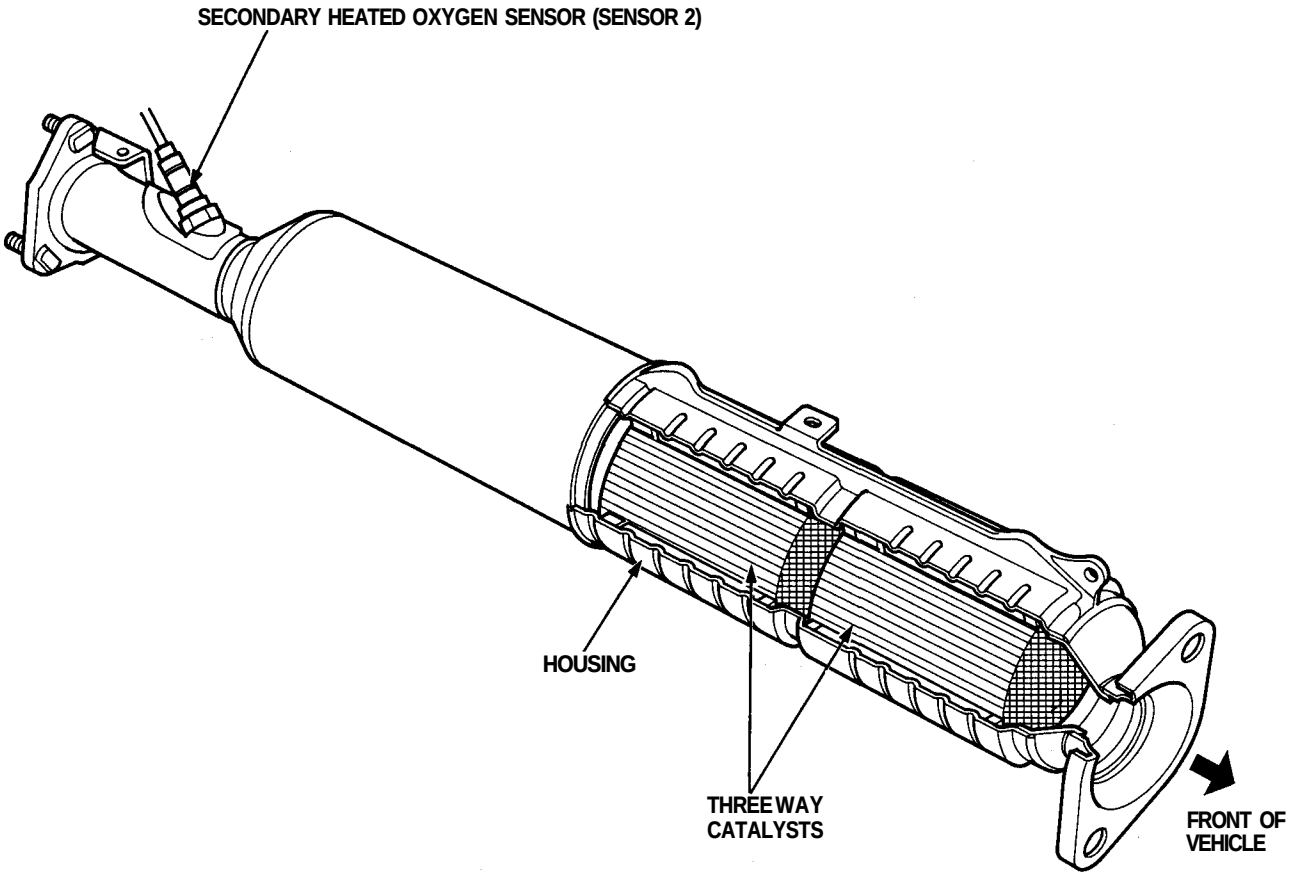
   - If the IAB control diaphragm valve does not hold vacuum or the IAB control diaphragm valve rod does not move in and out, replace the IAB control valve and retest.

Emission Control System

Three Way Catalytic Converter (TWC)

Description

The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.



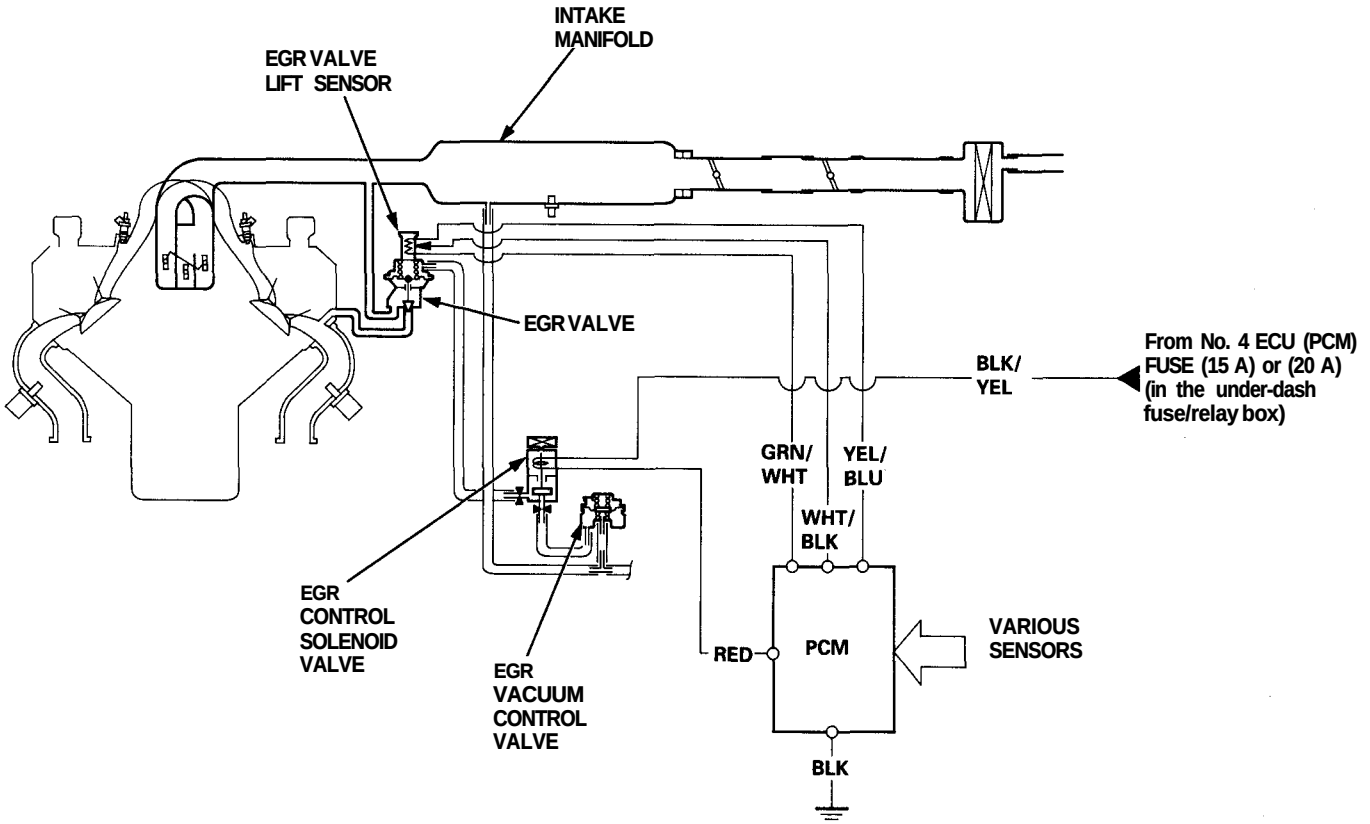
Emission Control System

Exhaust Gas Recirculation (EGR) System

Description

The EGR system is designed to reduce oxides of nitrogen emissions (NOx) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, EGR vacuum control valve, EGR control solenoid valve, PCM and various sensors.

The PCM contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the PCM. The PCM then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the PCM cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.

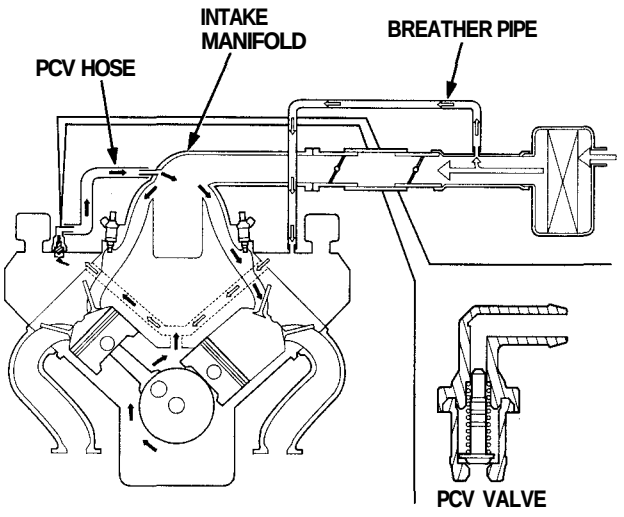


Emission Control System

Positive Crankcase Ventilation (PCV) System

Description

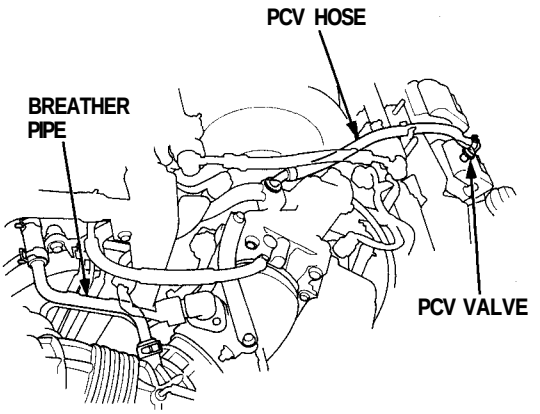
The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.



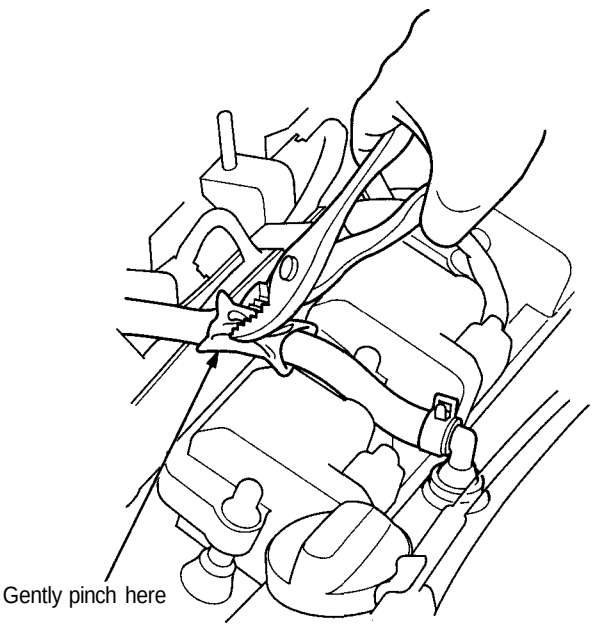
⬅: BLOW-BY VAPOR
⇦: FRESH AIR

Inspection

1. Check the PCV hoses and connections for leaks and clogging.



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between the PCV valve and intake manifold is lightly pinched with your fingers or pliers.



- If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

Evaporative Emission (EVAP) Controls

Description

The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Evaporative Emission (EVAP) Control Canister

An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

B. Vapor Purge Control System

EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control solenoid valve.

'96 model:

EVAP PURGE CONTROL SOLENOID VALVE OFF AFTER STARTING ENGINE

↑

ENGINE COOLANT TEMPERATURE ABOVE 158°F (70°C)

'97 - 98 models:

EVAP PURGE CONTROL SOLENOID VALVE DUTY CONTROLLED AFTER STARTING ENGINE

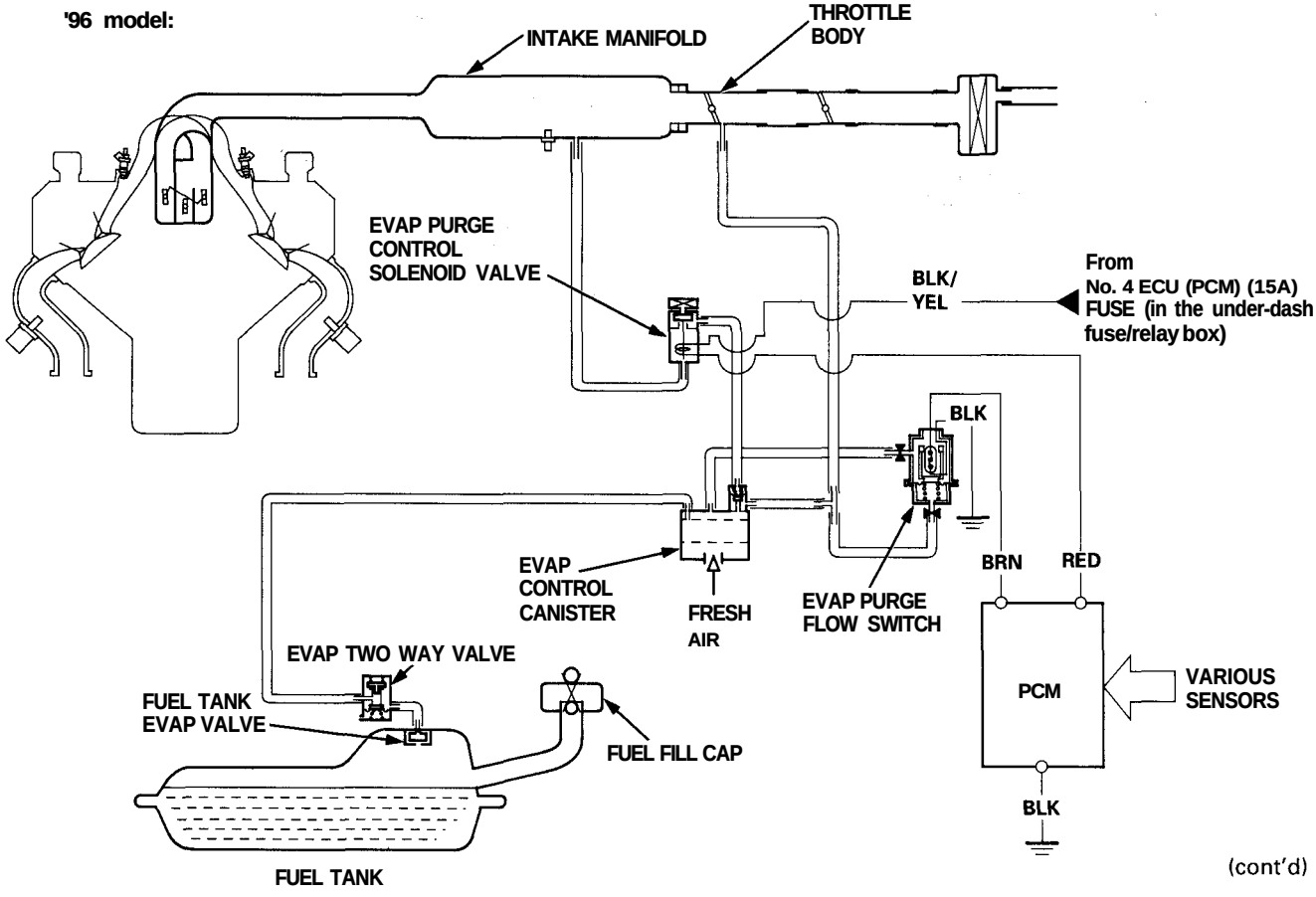
↑

ENGINE COOLANT TEMPERATURE ABOVE 99°F (37°C)

C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.

'96 model:

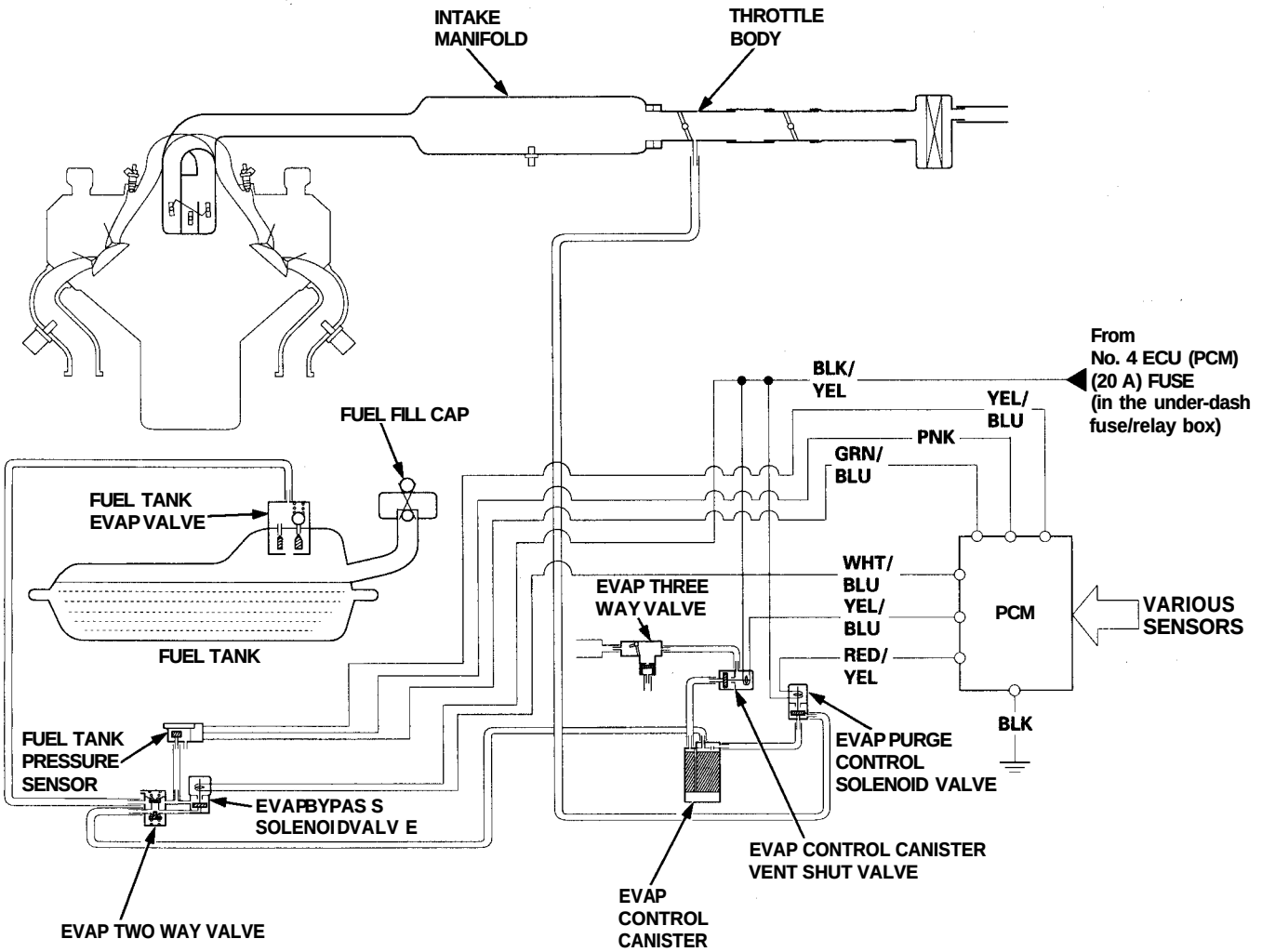


(cont'd)

Emission Control System

Evaporative Emission (EVAP) Controls (cont'd)

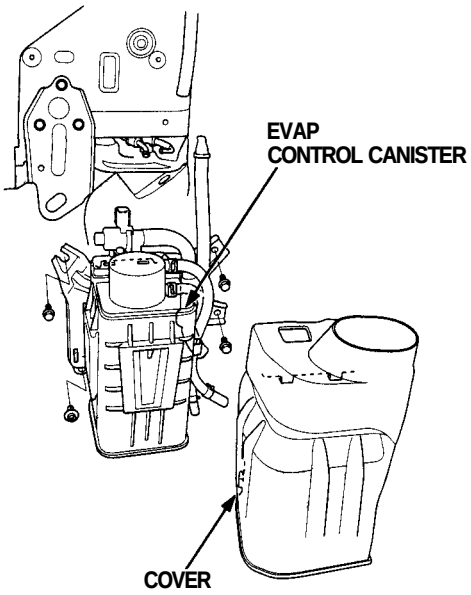
'97 - 98 models:



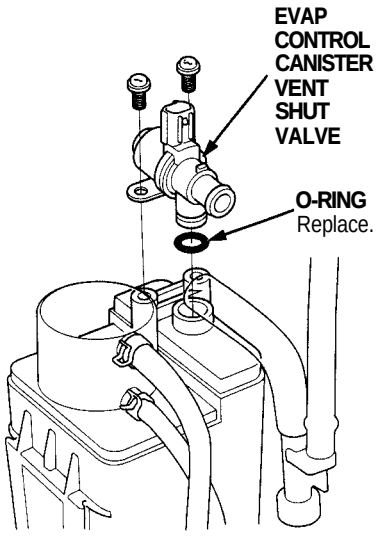
Evaporative Emission (EVAP) Control Canister and EVAP Control Canister Vent Shut Valve Replacement

1. Remove the front bumper (see section 20).

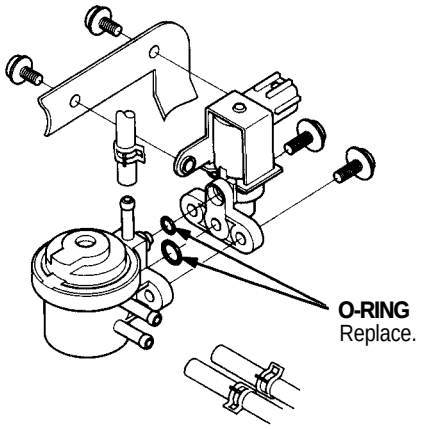
2. Remove the EVAP control canister.



3. Remove the EVAP control canister vent shut valve.



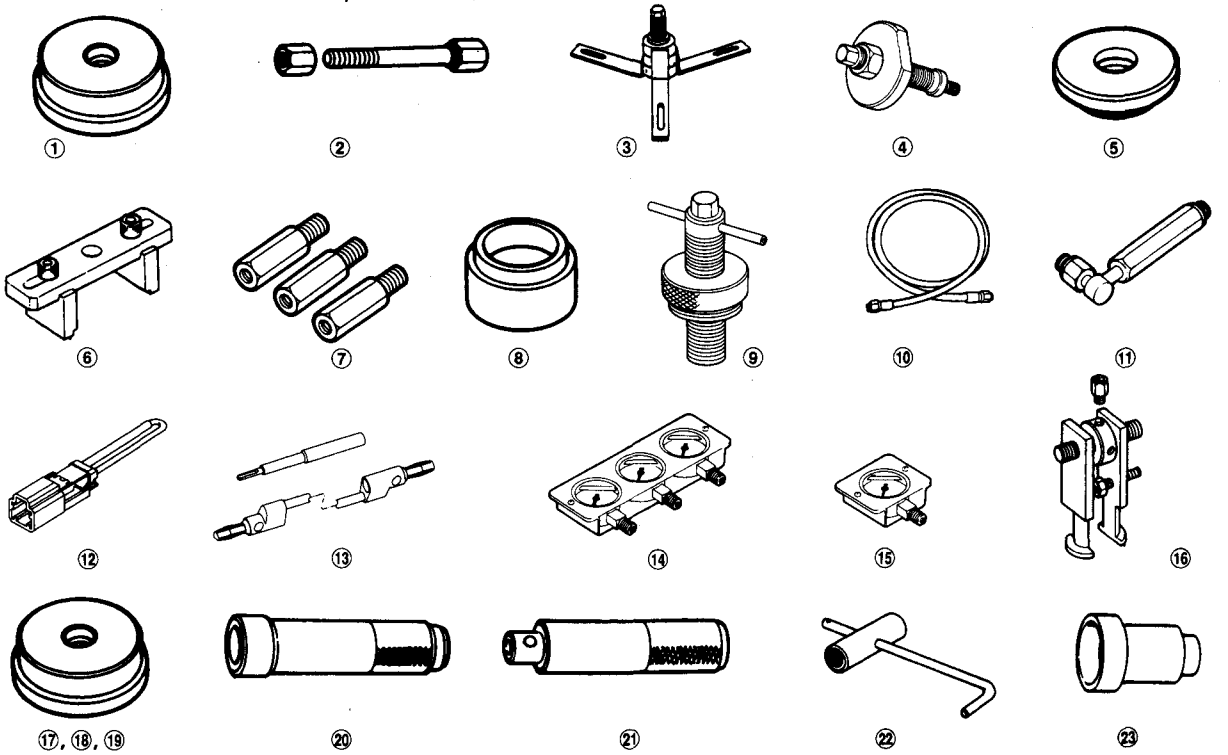
Evaporative Emission (EVAP) Two Way Valve and EVAP Bypass Solenoid Valve Replacement



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD – SD40101	Bearing Driver Attachment	1	14-176, 14-194
②	07GAE – PG40200 or 07GAE – PG4020A	Clutch Spring Compressor Bolt Assembly	1	14-185, 14-188
③	07HAC – PK4010A	Housing Puller	1	14-143
④	07LAC – PW50101	Extension Shaft Puller	1	14-128
⑤	07LAD – SM40100	Seal Driver Attachment	1	14-197
*⑥	07LAE – PX40100	Clutch Spring Compressor Attachment	2	14-185, 14-188
⑦	07MAC – PY40100	Housing Puller Extension Bolts	3	14-143
⑧	07MAD – PR90100	Attachment, 45 x 55 mm I.D.	1	14-168, 14-169, 14-192
⑨	07MAF – PY40101	Extension Shaft Installer	1	14-213
⑩	07MAJ – PY4011A	A/T Pressure Hose, 2210 mm	4	14-114, 14-118
⑪	07MAJ – PY40120	A/T Pressure Hose, Adapter	4	14-114, 14-118
⑫	07PAZ – 0010100	SCS Service Connector	1	14-65
⑬	07SAZ – 001000A	Backprobe Set	2	14-66, 14-108
⑭	07406 – 0020400	A/T Oil Pressure Gauge Set w/panel	1	14-114, 14-118
⑮	07406 – 0070300	A/T Low Pressure Gauge w/panel	1	14-114, 14-118
**⑯	07736 – A01000B or 07736 – A01000A	Adjustable Bearing Puller, 25 – 40 mm	1	14-198, 14-199
⑰	07746 – 0010400	Attachment, 52 x 55 mm	1	14-176, 14-191
⑱	07746 – 0010500	Attachment, 62 x 68 mm	1	14-198, 14-199
⑲	07746 – 0010600	Attachment, 72 x 75 mm	1	14-193, 14-197, 14-198
⑳	07746 – 0030100	Driver I.D. 40 mm	1	14-207
㉑	07749 – 0010000	Driver	1	14-191, 14-193, 14-194, 14-197, 14-198, 14-199
㉒	07924 – PJ4010A	Mainshaft Holder	1	14-141, 14-208
㉓	07947 – 6340500	Driver Attachment	1	14-198

*: 07HAE – PL50101 may be used to substitute one of these tools.
**: Must be used with commercially available 3/8" – 16 slide hammer.



Description

The automatic transmission is a combination of a 3-element torque converter and a dual-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine, and stator, assembled in a single unit. They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the drive plate is a ring gear which meshes with the starter pinion when the engine is being started.
The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has two parallel shafts: the mainshaft and the countershaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the 1st, 4th and 2nd clutches and gears for 4th, 1st, 2nd and reverse (3rd gear is integral with the mainshaft). The countershaft includes the 3rd, 1st-hold and reverse clutches, and gears for 3rd, 4th, 1st, 2nd, reverse and parking. The secondary drive gear is integrated with the countershaft. The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide [1], [2], [D3], [D4] and [R] positions.

Electronic Control

The electronic control system consists of a Powertrain Control Module (PCM), sensors, a linear solenoid and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The PCM is located below the dashboard, under the front lower panel on the passenger's side.

Hydraulic Control

The lower valve body assembly includes the main valve body, the secondary valve body, the throttle valve body, the linear solenoid, the shift control solenoid valves and the ATF passage body. They are bolted on the lower part of the transmission housing. The regulator valve body, the ATF pump body, and the accumulator body are bolted to the torque converter housing.

The main valve body on '96 model contains the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the 4-3 kick-down valve and the Clutch Pressure Control (CPC) valve. The main valve body on '97 model contains the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the 4-3 kick-down valve and the main orifice control valve. The secondary valve body on '96 model contains the 3-4 orifice control valve, the 4-3 shift timing valve, the modulator valve and the accumulator pistons.The secondary valve body on '97 model contains the 3-4 orifice control valve, the 4-3 shift timing valve, the line pressure control valve, the modulator valve and the accumulator pistons. The throttle valve body includes the throttle valve which is bolted onto the secondary valve body. The linear solenoid is joined to the throttle valve body. The regulator valve body contains the regulator valve, the lock-up shift valve and the cooler relief valve. Fluid from the regulator passes through the manual valve to the various control valves. The ATF pump body contains the lock-up timing valve, the lock-up control valve and the relief valve. The torque converter check valve is located in the torque converter housing under the ATF pump body. The accumulator body contains the accumulator pistons. The reverse accumulator and the 1st-hold accumulator pistons are assembled in the rear cover.
The 1st, 1st-hold, 2nd and reverse clutches receive fluid from their respective feed pipes, and the 3rd and 4th clutches receive fluid from the internal hydraulic circuit.

Shift Control Mechanism

Input from various sensors located throughout the vehicle determines which shift control solenoid valve the PCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging the clutch and its corresponding gear.

Lock-up Mechanism

In [D4] position, in 2nd, 3rd, and 4th, and [D3] position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the PCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve. When lock-up control solenoid valves A and B activate, modulator pressure changes. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the PCM.

(cont'd)

Description

(cont'd)

Gear Selection

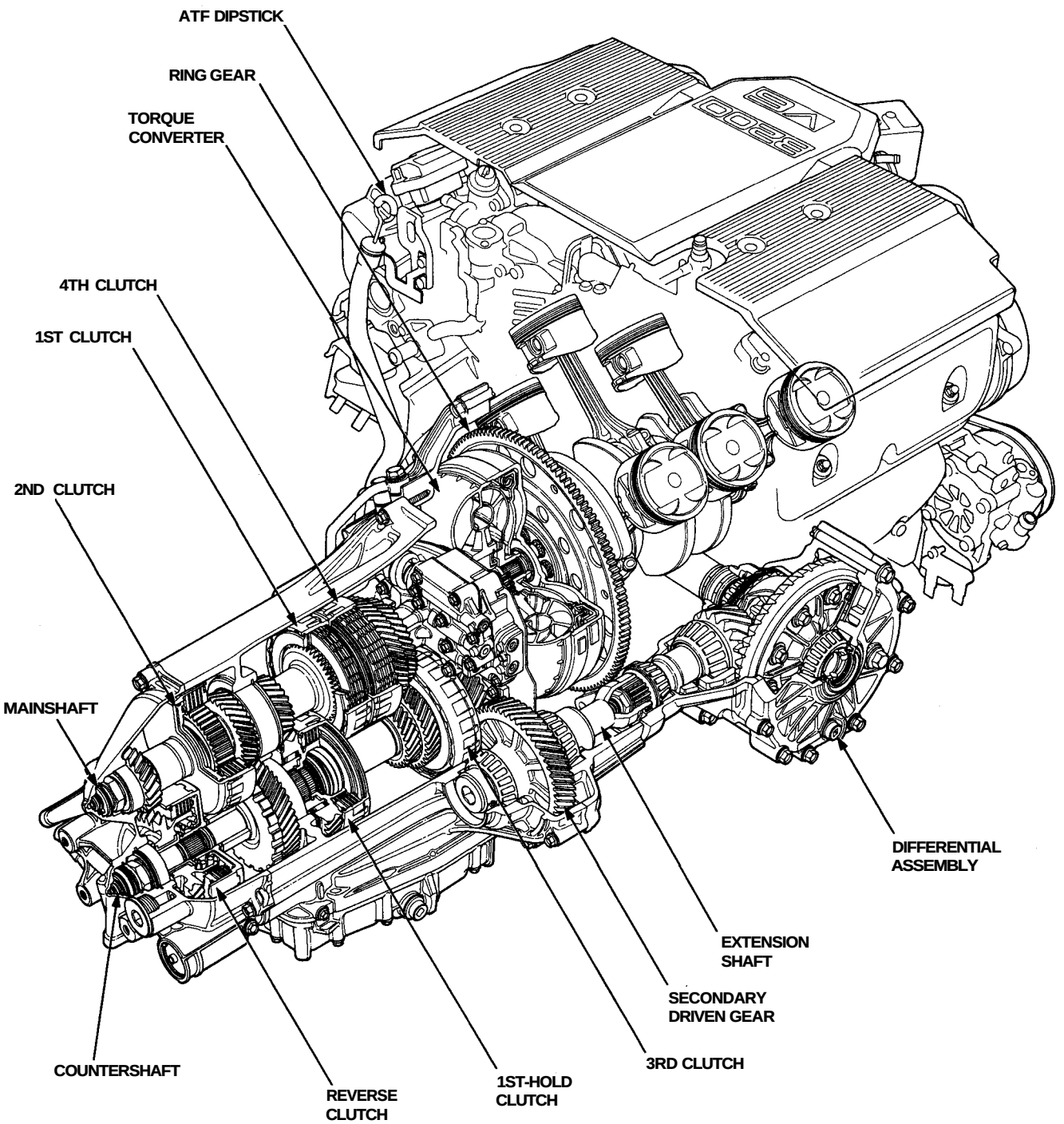
The shift lever has seven positions: [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th gear ranges. [D3] 1st through 3rd gear ranges. [2] 2nd gear and [1] 1st gear.

Position	Description
[P] PARK	Front wheels locked; parking brake pawl engaged with parking gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse clutch engaged.
[N] NEUTRAL	All clutches released.
[D4] DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in [D4] position in 2nd, 3rd and 4th gear.
[D3] DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop. The lock-up mechanism comes into operation in 3rd speed.
[2] SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.
[1] FIRST	For engine braking; stays in 1st gear, does not shift up.

Starting is possible only in [P] and [N] positions through the use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator

The A/T gear position indicator in the instrument panel shows which gear has been selected without having to look down at the console.



NOTE: The illustration shows '96 model; '97 - '98 models are similar.

Description

Clutches

The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When the hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear.
Likewise, when the hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each. This allows the gear to spin independently of its shaft, transmitting no power.

1st Clutch
The 1st clutch, engages/disengages 1st gear, and is located at the middle of the mainshaft. The 1st clutch is joined back-to-back to the 4th clutch. The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold, [1] position or [2] position, and is located at the middle of the countershaft. The 1st-hold clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

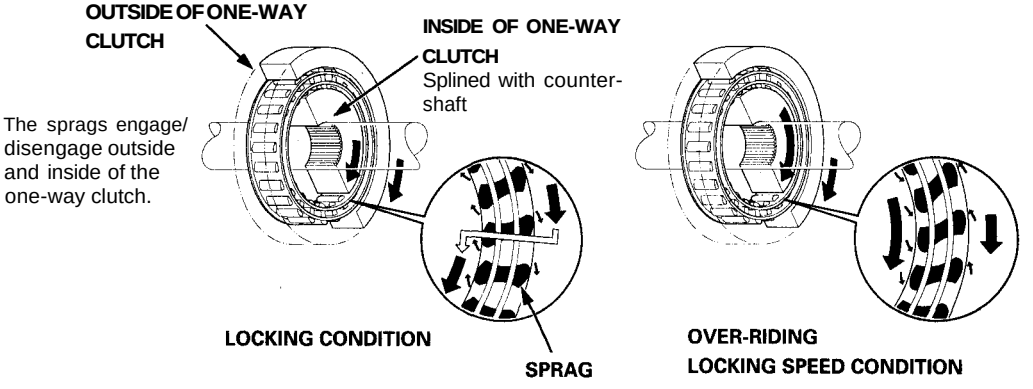
2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located on the rear end of the mainshaft. The 2nd clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

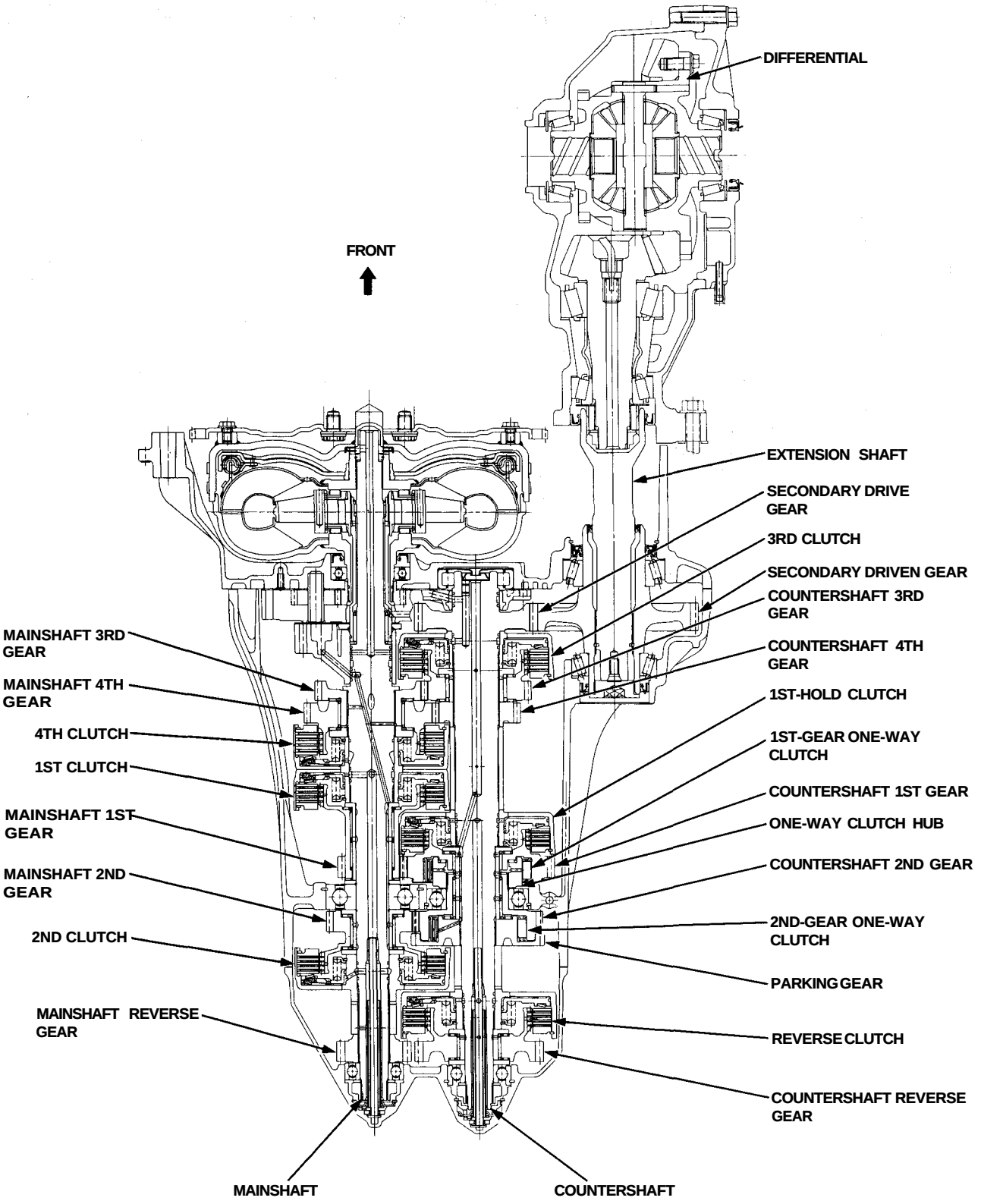
3rd Clutch
The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft, opposite the rear cover. The 3rd clutch is supplied hydraulic pressure by a circuit connected to the internal hydraulic circuit.

4th Clutch
The 4th clutch engages/disengages 4th gear, and is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 1st clutch. The 4th clutch is supplied hydraulic pressure by a circuit connected to the internal hydraulic circuit.

Reverse Clutch
The reverse clutch engages/disengages reverse gear, and is located on the rear end of the countershaft. The reverse clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

One-way Clutch
This transmission has two one-way clutches: the 1st gear one-way clutch and the 2nd gear one-way clutch. The 1st gear one-way clutch is positioned between the countershaft 1st gear and the one-way clutch hub, with the one-way clutch hub splined to the countershaft 2nd gear. The countershaft 1st gear provides the outer race surface, and the one-way clutch hub provides the inner race surface. The 2nd gear one-way clutch is positioned between the countershaft 2nd gear and the parking gear, with the parking gear splined to the countershaft. The countershaft 2nd gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutches lock up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear. The 2nd gear one-way clutch locks up when power is transmitted from the mainshaft 2nd gear to the countershaft 2nd gear.
The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear positions in the [D3] or [D4] position. However, the 1st gear one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the [D3] or [D4] position. This is because the increased rotational speed of the gears on the countershaft over-ride the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch freewheels with the 1st clutch still engaged.





NOTE: The illustration shows '96 model; '97 - '98 models are similar.

Description

Power Flow

POSITION \ PART		TORQUE CONVERTER	1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH GEAR 4TH CLUTCH	REVERSE GEAR REVERSE CLUTCH	PARKING GEAR
P		○	×	×	×	×	×	×	○
R		○	×	×	×	×	×	○	×
N		○	×	×	×	×	×	×	×
D4	1ST	○	×	○*3	×	×	×	×	×
	2ND	○	×	○*1	○*3	×	×	×	×
	3RD	○	×	○*1	○*2	○	×	×	×
	4TH	○	×	○*1	○*2	×	○	×	×
D3	1ST	○	×	○*3	×	×	×	×	×
	2ND	○	×	○*1	○*3	×	×	×	×
	3RD	○	×	○*1	○*2	○	×	×	×
2		○	○	×	○	×	×	×	×
1		○	○	○	×	×	×	×	×

○: Operates, ×: Doesn't operate.

*1: Although the 1st clutch engages, driving power is not transmitted as the 1st gear one-way clutch slips.

*2: Although the 1st and 2nd clutches engage, driving power is not transmitted as the one-way clutches slip.

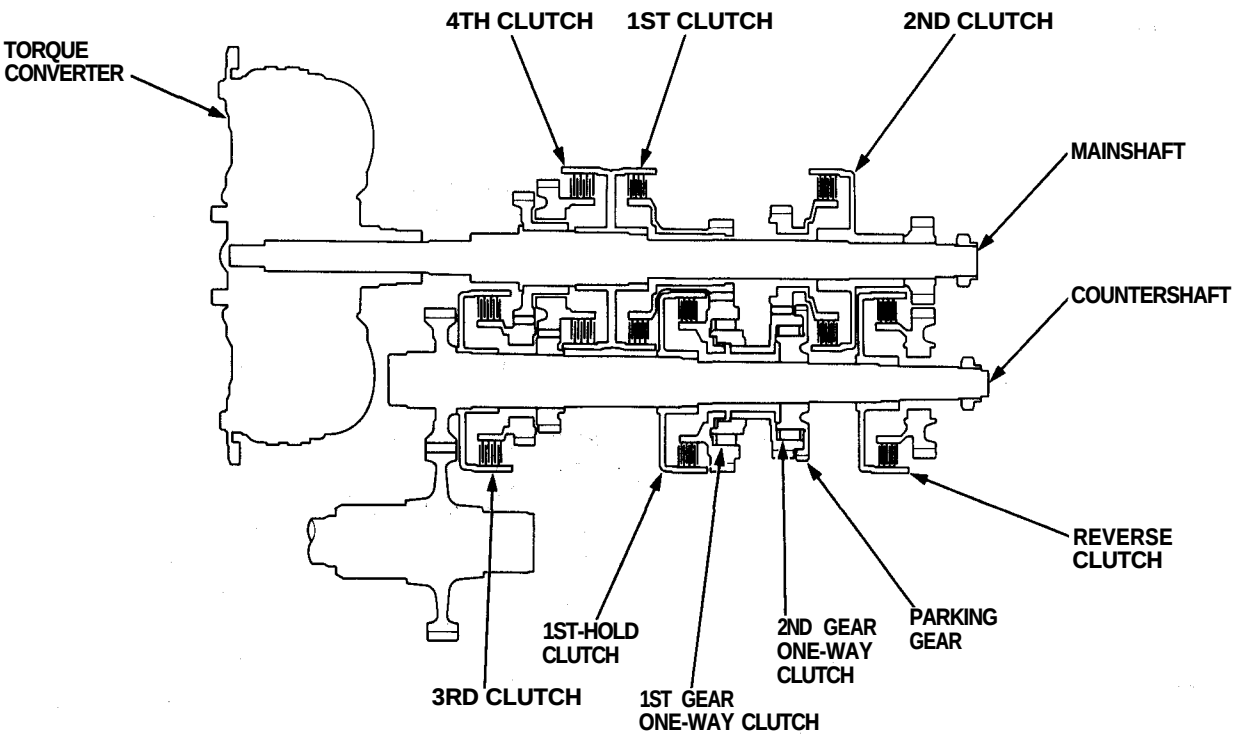
*3: The one-way clutch engages when accelerating, and slips when decelerating.

N Position

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.

P Position

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft is locked by the parking brake pawl interlocking the parking gear.



(cont'd)

Description

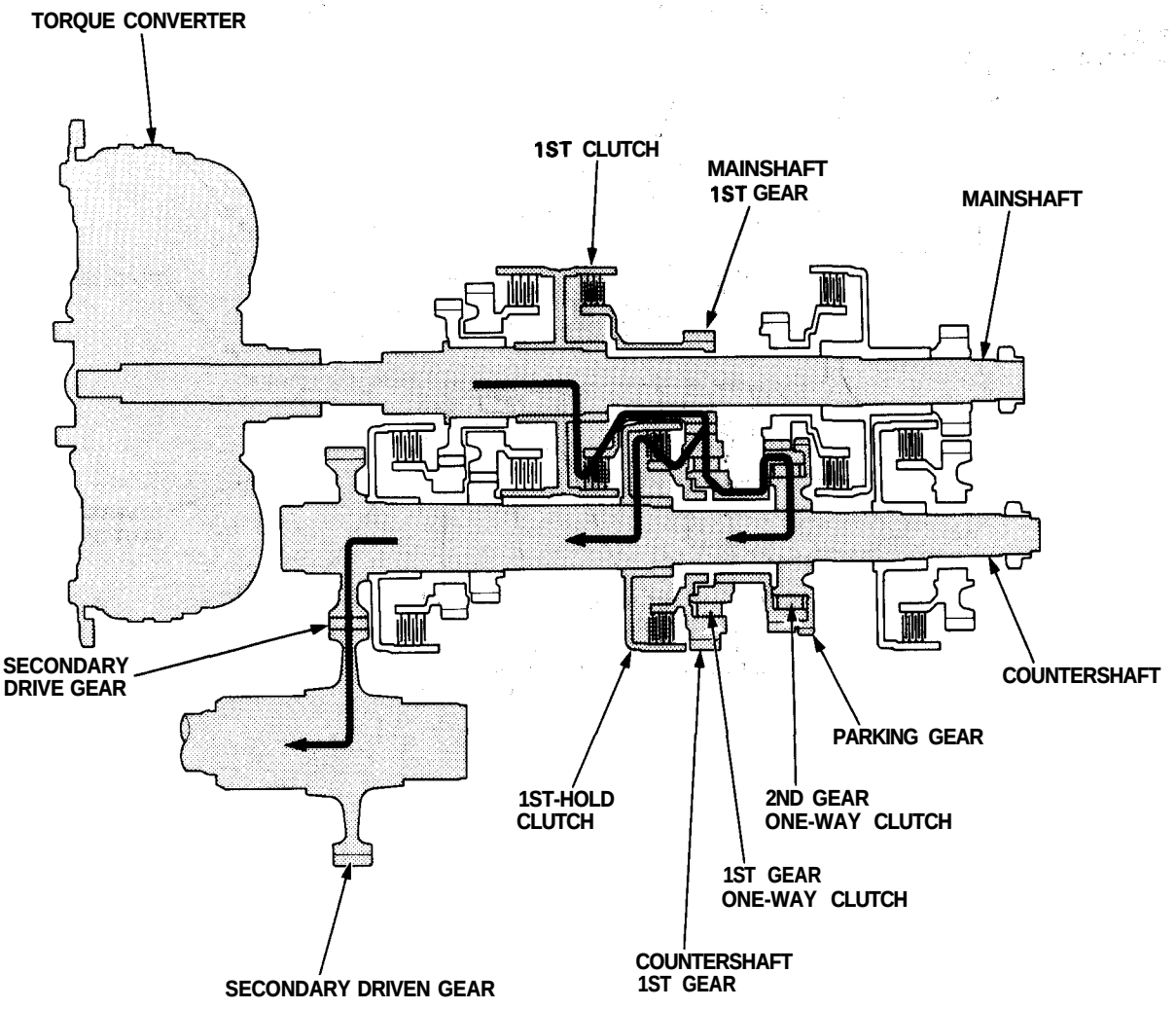
Power Flow (cont'd)

[1] Position

In [1] position, hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch.

The power flow when accelerating is as follows:

1. The hydraulic pressure is applied to the 1st clutch on the mainshaft, and power is transmitted via the 1st clutch to the mainshaft 1st gear.
2. The hydraulic pressure is also applied to the 1st-hold clutch on the countershaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the 1st gear one-way clutch, the 2nd gear one-way clutch, and the 1st-hold clutch. The one-way clutches are used to drive the countershaft, and the 1st-hold clutch drives the countershaft.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.



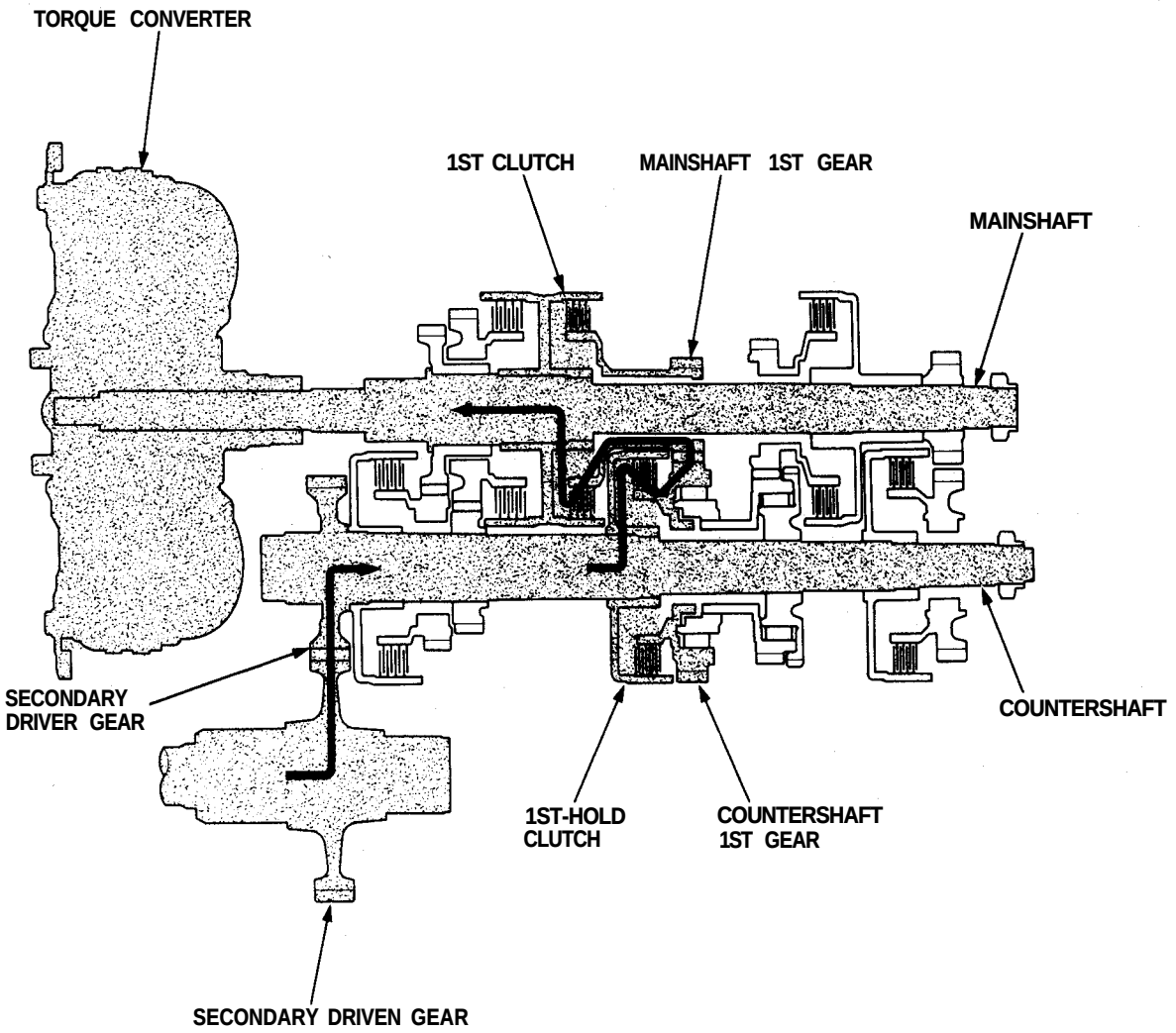
1 Position

The power flow when decelerating is as follows:

1. Rolling resistance from the road surface goes through the front wheels to the secondary drive gear, then to the countershaft 1st gear via the 1st-hold clutch which is applied during deceleration.

2. The 1st gear one-way clutch disengages at this time because the application of torque is reversed.

3. The counterforce conveyed to the countershaft 1st gear turns the mainshaft 1st gear. At this time, since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear.



(cont'd)

Description

Power Flow (cont'd)

2 Position

2 Position is provided to drive only in 2nd gear.

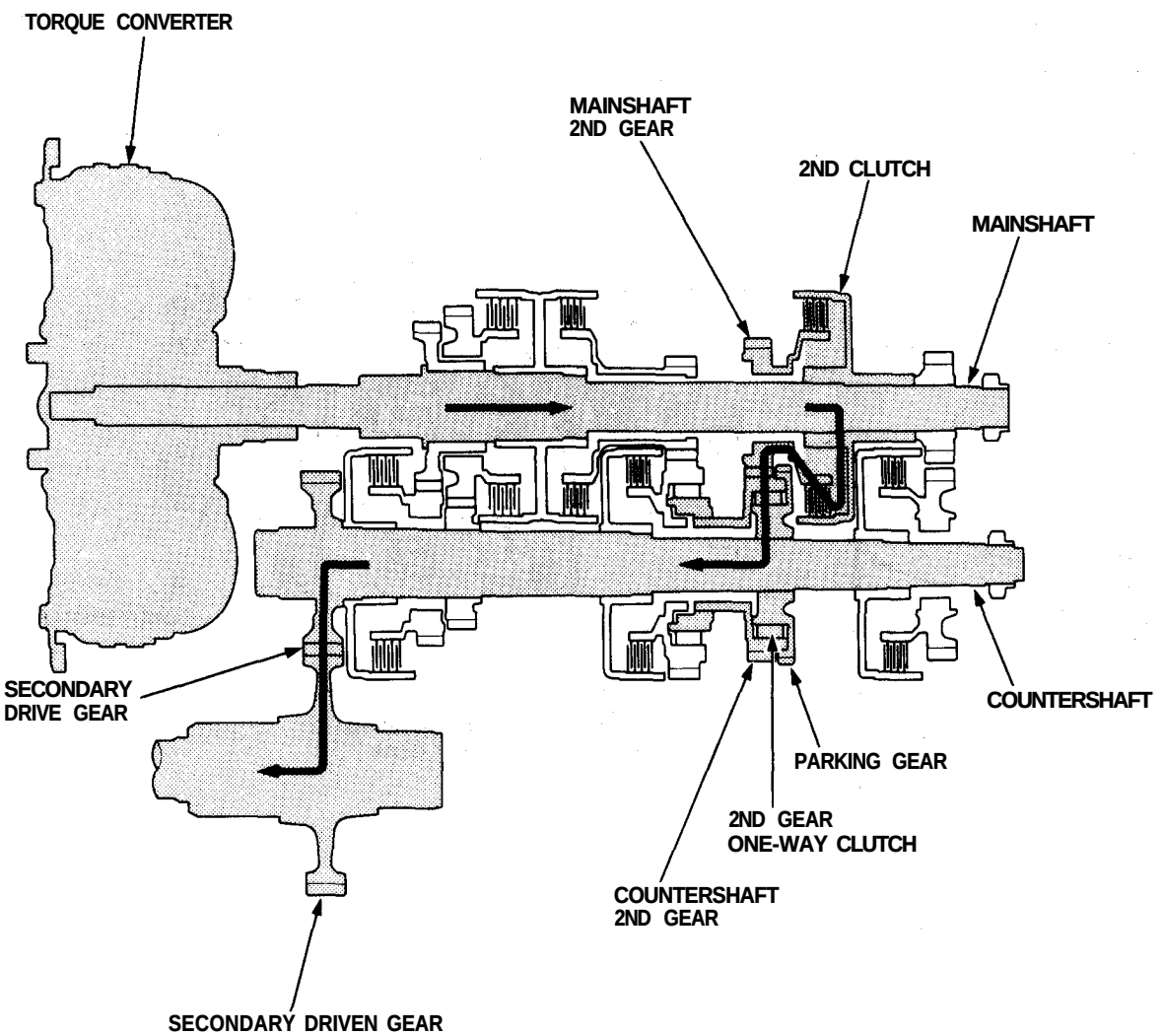
In 2 position, hydraulic pressure is applied to the 2nd clutch and to the 1st-hold clutch.

The power flow when accelerating is as follows:

1. The hydraulic pressure is applied to the 2nd clutch on the mainshaft, and power is transmitted via the 2nd clutch to the mainshaft 2nd gear.

2. Power transmitted to the mainshaft 2nd gear is conveyed via the countershaft 2nd gear to the 2nd gear one-way clutch on the inside of the countershaft 2nd gear. The 2nd gear one-way clutch is used to drive the parking gear on the countershaft.

3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.
Hydraulic pressure is applied to the 1st-hold clutch, but the countershaft is rotated by the 2nd gear one-way clutch.



2 Position

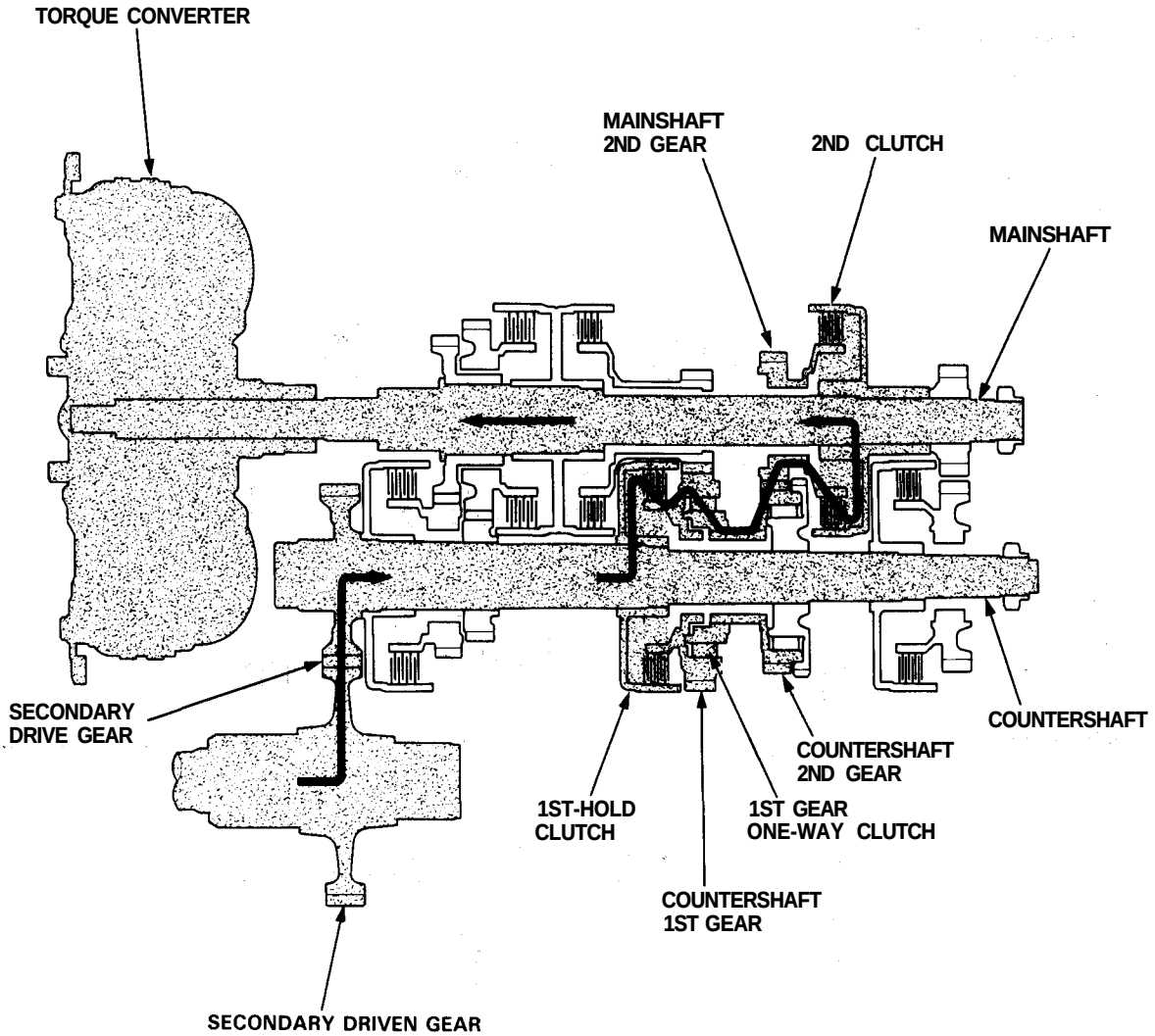
The power flow when decelerating is as follows:

1. Rolling resistance from the road surface goes through the front wheels to the secondary drive gear, then to the countershaft 1st gear via the 1st-hold clutch which is applied during deceleration.

2. Power transmitted to the countershaft 1st gear is conveyed via the 1st gear one-way clutch on the inside of the countershaft 1st gear to the countershaft 2nd gear. The 1st gear one-way clutch is used to drive the countershaft 2nd gear.

3. The 2nd gear one-way clutch disengages at this time because the application of torque is reversed.

4. The counter-force conveyed to the countershaft 1st gear turns the mainshaft 2nd gear. At this time, since hydraulic pressure is applied to the 2nd clutch, counterforce is transmitted to the mainshaft. As a result, engine braking can be obtained with 2nd gear.



(cont'd)

Description

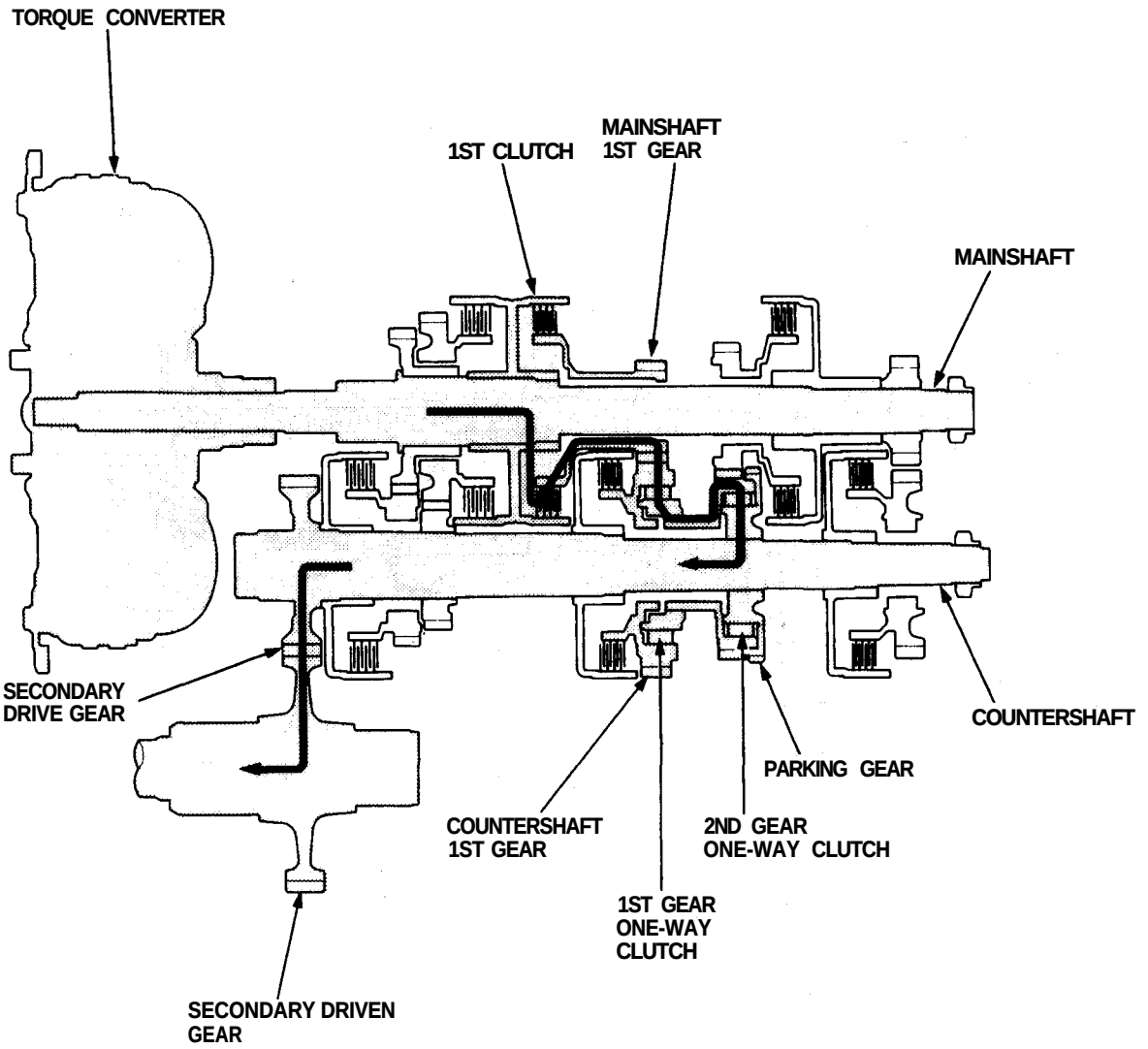
Power Flow (cont'd)

In D4 or D3 position, the optimum gear is automatically selected from 1st, 2nd, 3rd, and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

D4 or D3 Position, 1st gear

1. The hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
2. Power is transmitted to the countershaft 1st gear, which drives the countershaft via the one-way clutches.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

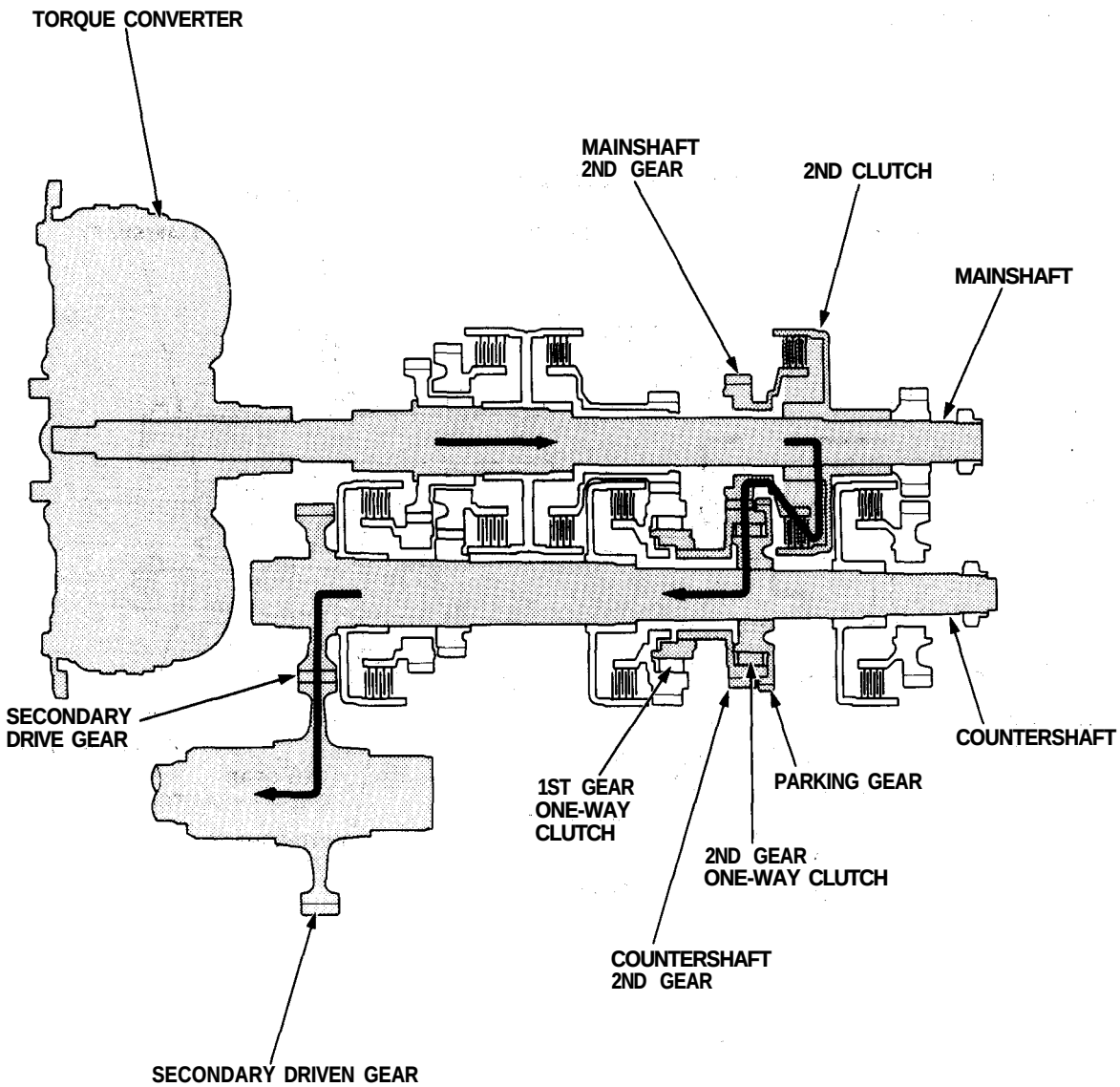
NOTE: In D4 or D3 position, hydraulic pressure is not applied to the 1st-hold clutch.



D4 or D3 Position, 2nd gear

1. The hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
2. Power is transmitted to the countershaft 2nd gear, which drives the countershaft via the 2nd gear one-way clutch.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 or D3 position, 2nd gear, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the 1st gear one-way clutch.



(cont'd)

Description

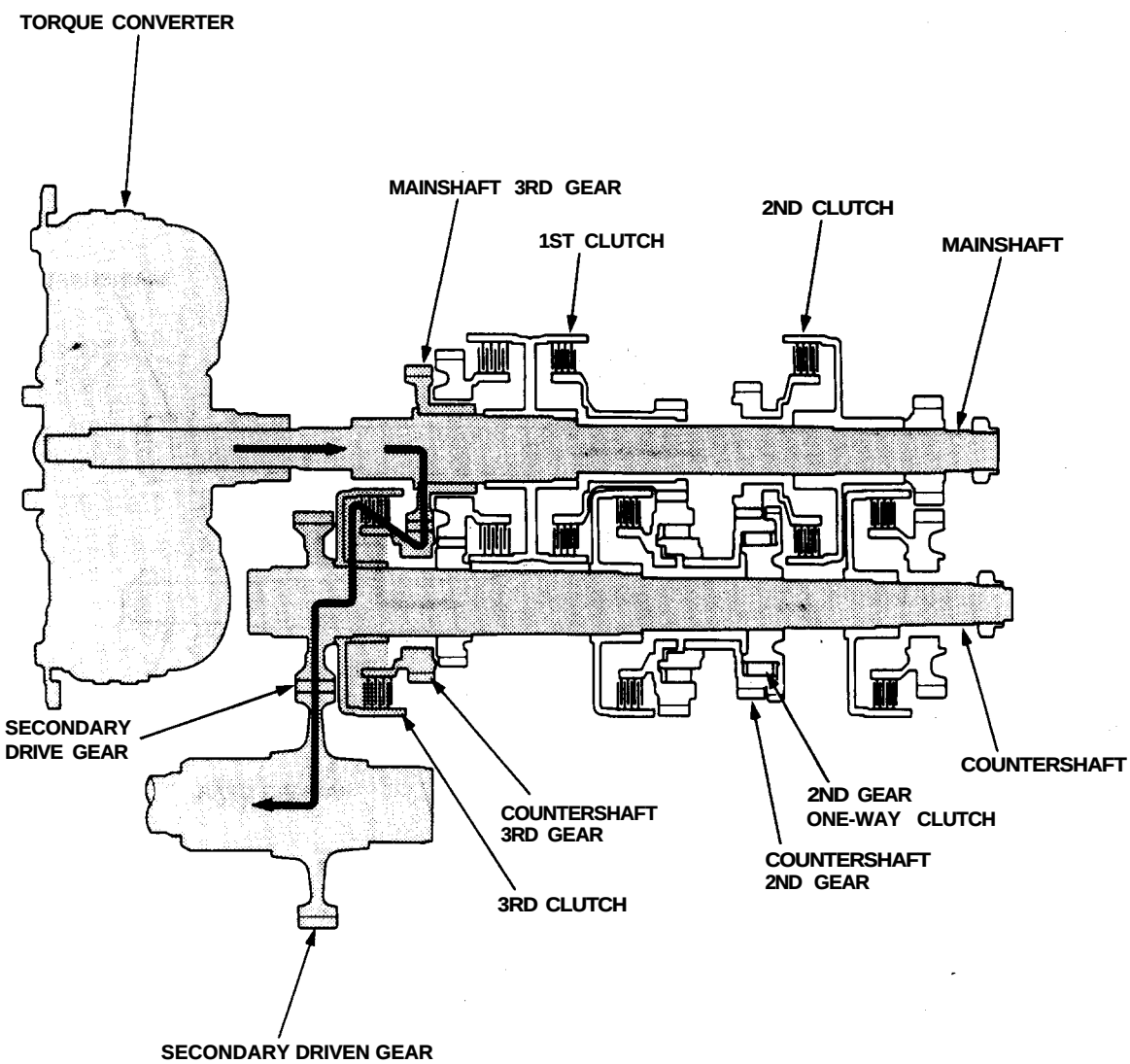
Power Flow (cont'd)

D4 or D3 Position, 3rd gear

1. The hydraulic pressure is applied to the 3rd clutch. Power from mainshaft 3rd gear is transmitted to the countershaft 3rd gear.

2. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

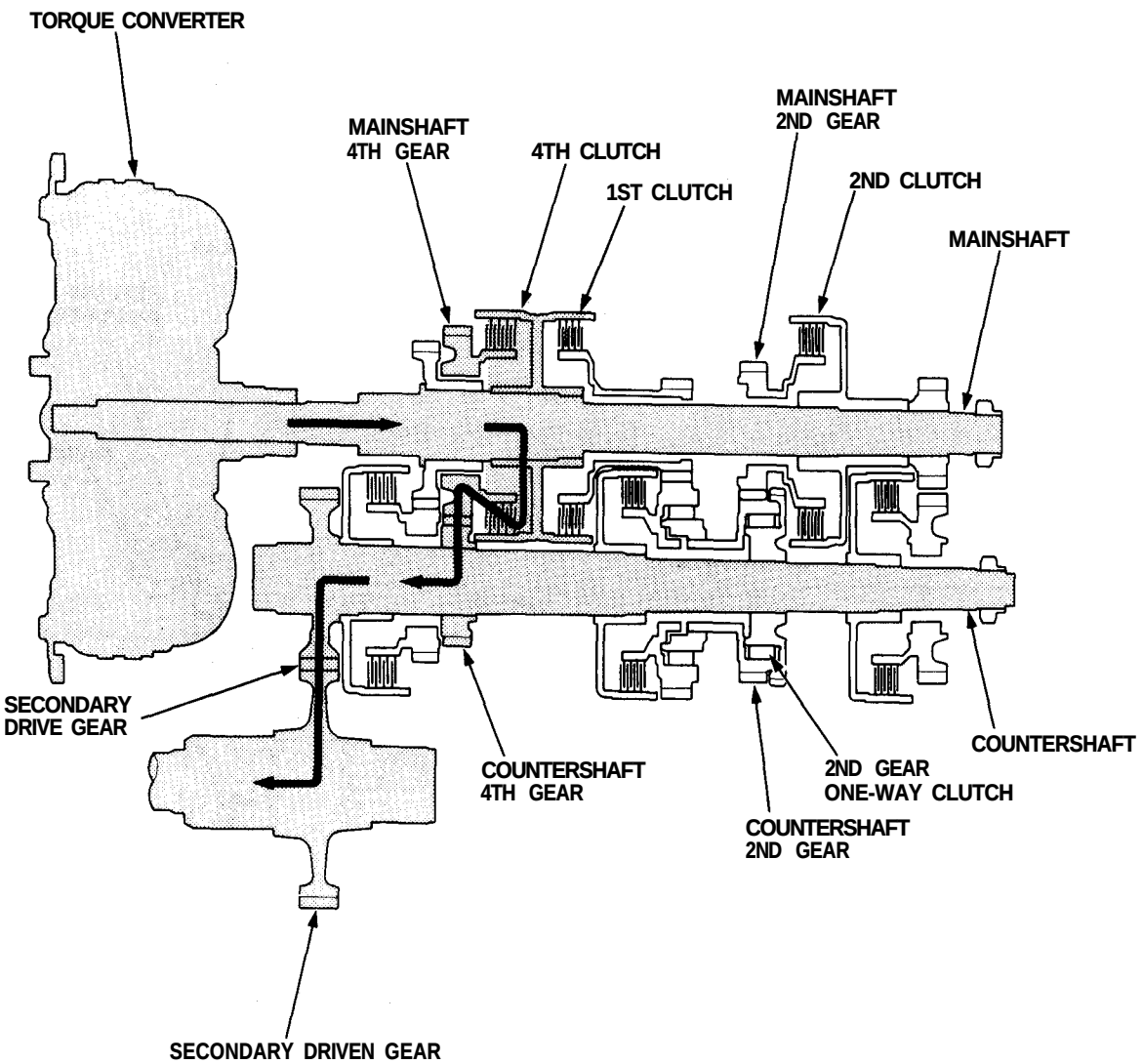
NOTE: In D4 or D3 position, 3rd gear, hydraulic pressure is also applied to the 1st clutch and to the 2nd clutch, but since the rotation speed of 3rd gear exceeds that of 2nd gear, power from 2nd gear is cut off at the 2nd gear one-way clutch.



D4 Position, 4th gear

1. The hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
2. Power is transmitted to the countershaft 4th gear, which drives the countershaft.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 position, 4th gear, hydraulic pressure is also applied to the 1st clutch and to the 2nd clutch, but since the rotation speed of 4th gear exceeds that of 2nd gear, power from 2nd gear is cut off at the 2nd gear one-way clutch.



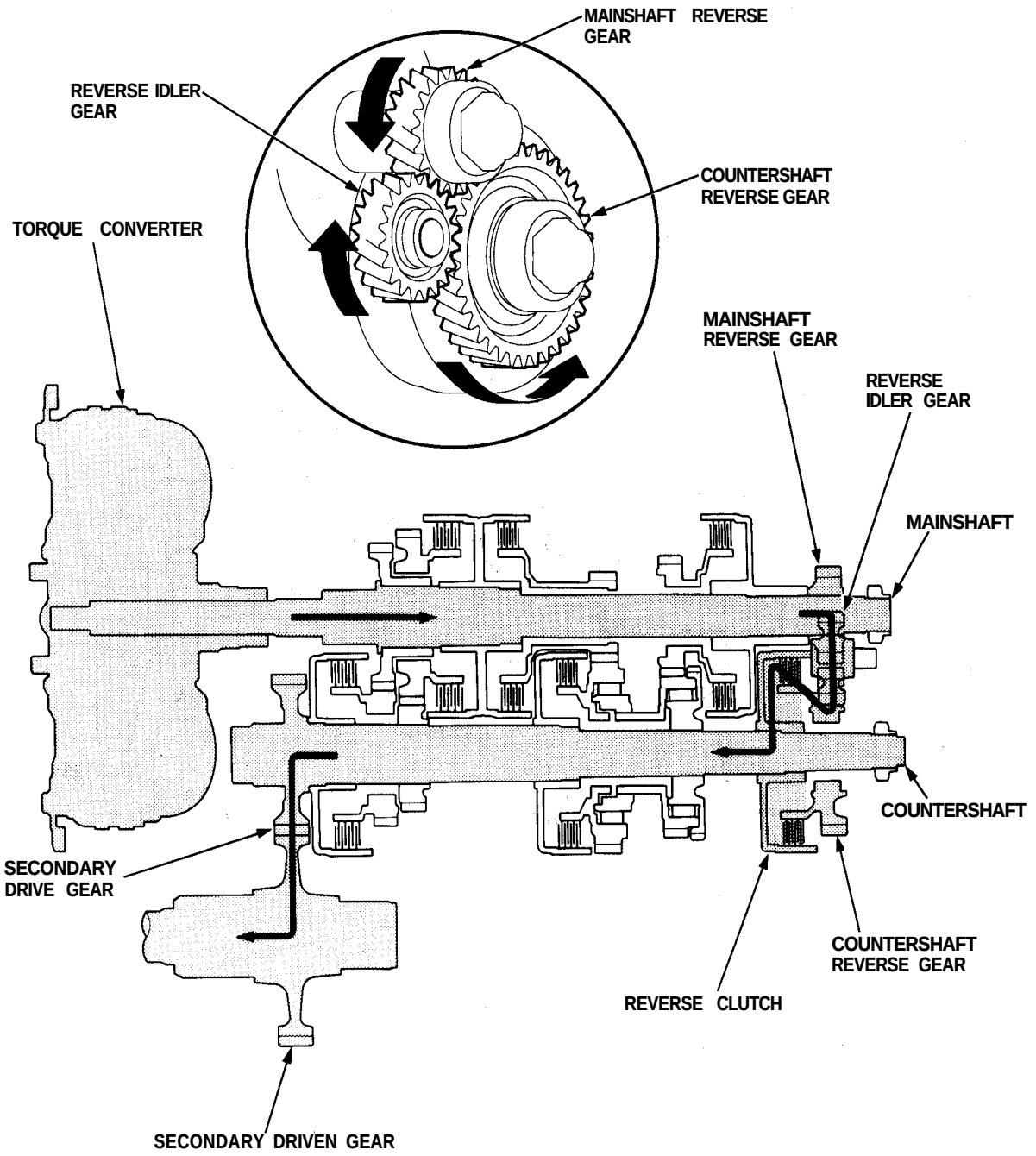
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Description

Power Flow (cont'd)

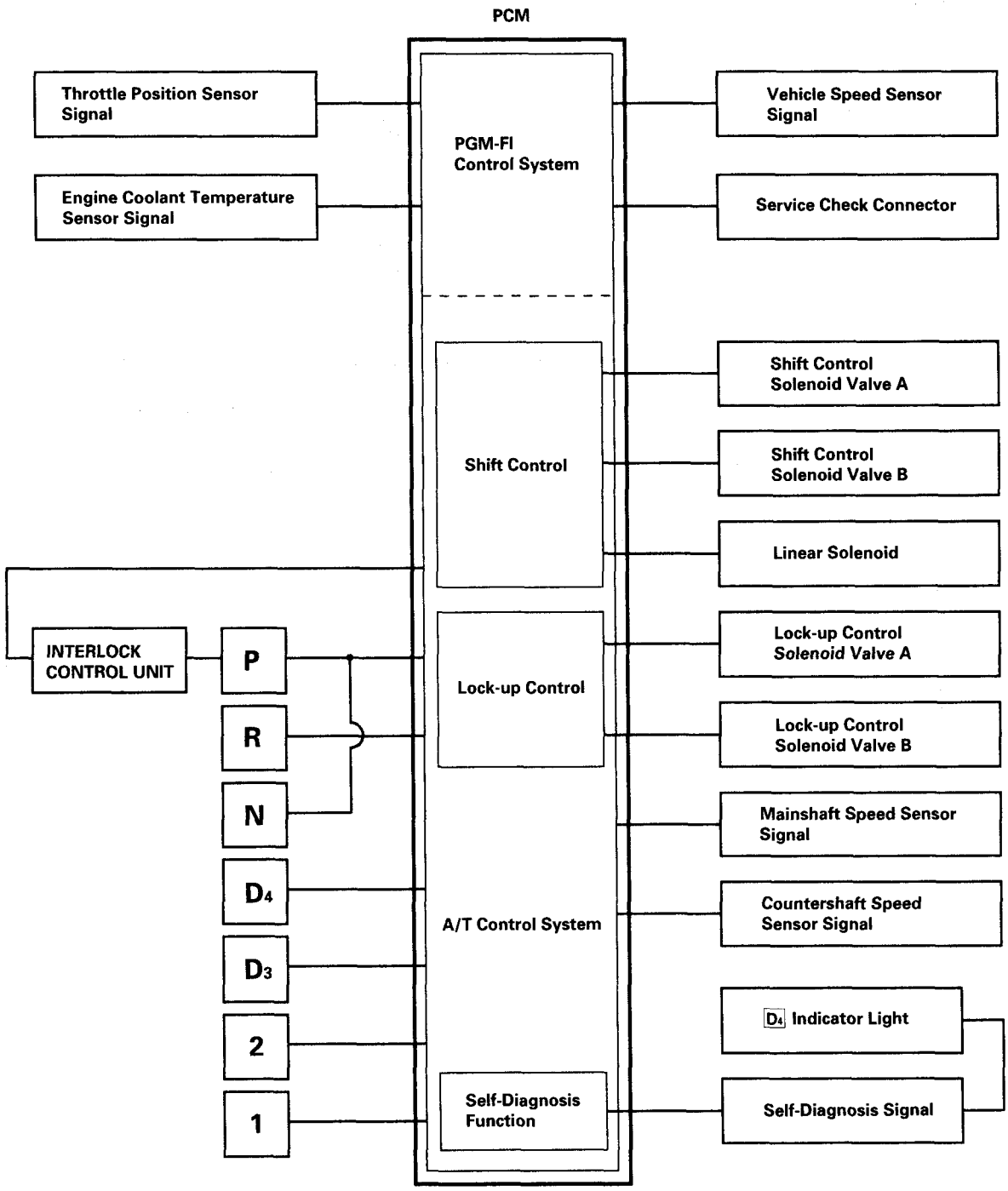
R Position

1. The hydraulic pressure is applied to the reverse clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.
2. The rotation direction of the countershaft reverse gear is changed via the reverse idler gear in the rear cover.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.



Electronic Control System

The electronic control system consists of a Powertrain Control Module (PCM), sensors, a linear solenoid and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The PCM is located below the dashboard, under the front lower panel on the passenger's side.



(cont'd)

Description

Electronic Control System (cont'd)

Shift Control

The PCM instantaneously determines which gear should be selected by various signals sent from sensors, and it actuates the shift control solenoid valves A and B to control shifting. Also, a Grade Logic Control System has been adopted to control shifting in D4 position while the vehicle is ascending or descending a slope, or reducing speed.

Shift control solenoid valve / Position (gear)		A	B
D3, D4	(1st)	OFF	ON
	(2nd)	ON	ON
	(3rd)	ON	OFF
D4	(4th)	OFF	OFF
2	(2nd)	ON	ON
1	(1st)	OFF	ON
R	(Reverse)	ON	OFF

Lock-up Control

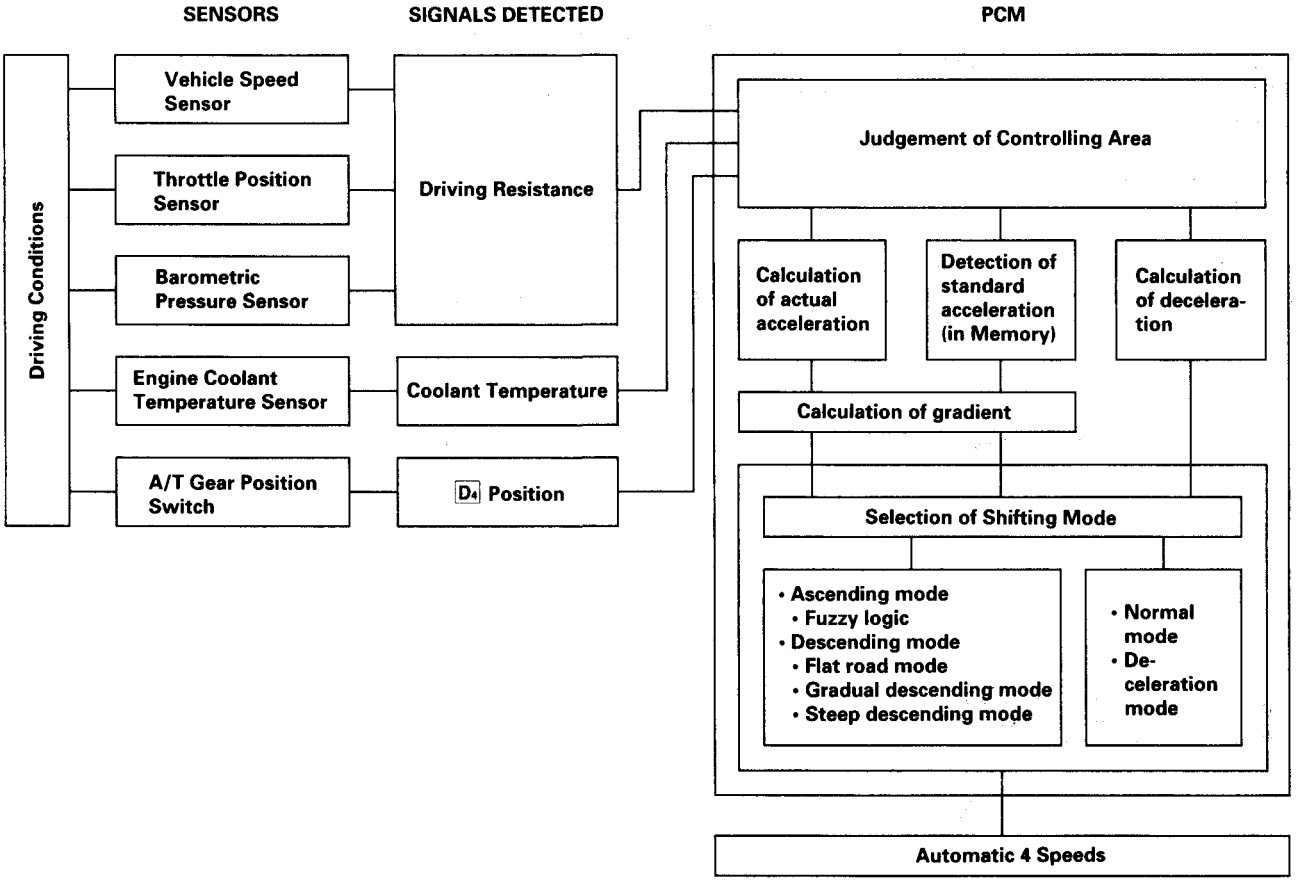
From sensor input signals, the PCM determines whether to turn the lock-up ON or OFF, and activates lock-up control solenoid valve A and/or B accordingly.

The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

Lock-up control solenoid valve / Lock-up condition	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ↔ ON

Grade Logic Control System

How it works:
The PCM compares actual driving conditions with driving conditions memorized in the PCM, based on the input from the vehicle speed sensor, throttle position sensor, engine coolant temperature sensor, barometric pressure sensor, brake switch signal and shift lever position signal, to control shifting while a vehicle is ascending or descending a slope, or reducing speed.



(cont'd)

Description

Electronic Control System (cont'd)

Ascending Control

When the PCM determines that the vehicle is climbing a hill in D4 position, the system extends the engagement area of 3rd gear to prevent the transmission from frequently shifting between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed.

NOTE:
- Shift schedules between 3rd and 4th gear stored in the PCM enable the PCM's fuzzy logic to automatically select the most suitable gear according to the magnitude of a gradient.
- Fuzzy logic is a form of artificial intelligence that lets computers respond to changing conditions much like a human mind would.

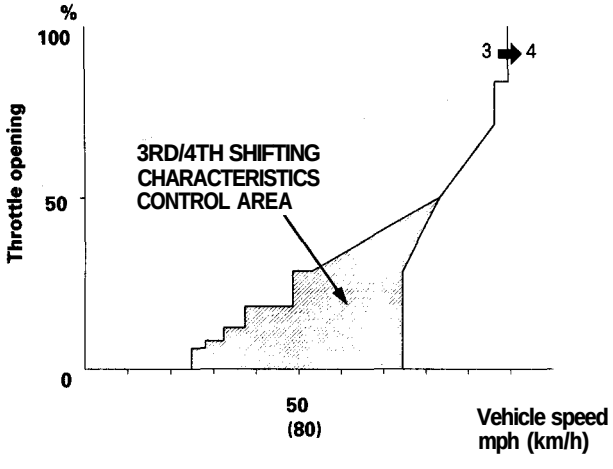
Descending Control

When the PCM determines that the vehicle is going down a hill in D4 position, the shift-up speed from 3rd to 4th gear when the throttle is closed becomes faster than the set speed for flat road driving to widen the 3rd gear driving area. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending.

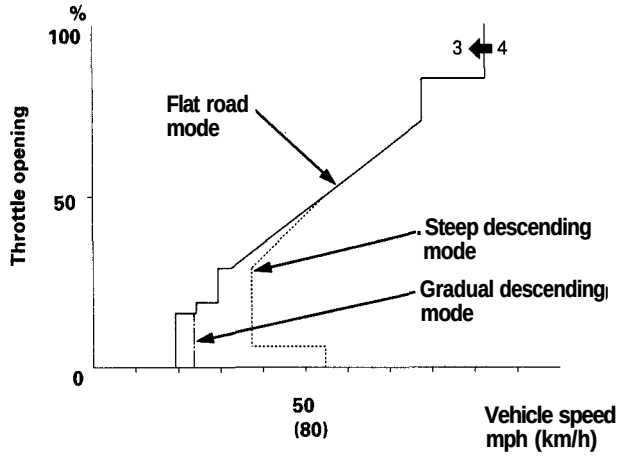
There are two descending modes with different 3rd gear driving areas according to the magnitude of a gradient stored in the PCM.

When the vehicle is in 4th gear, and you are decelerating on a gradual hill, or when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to 4th gear.

ASCENDING MODE



DESCENDING MODE



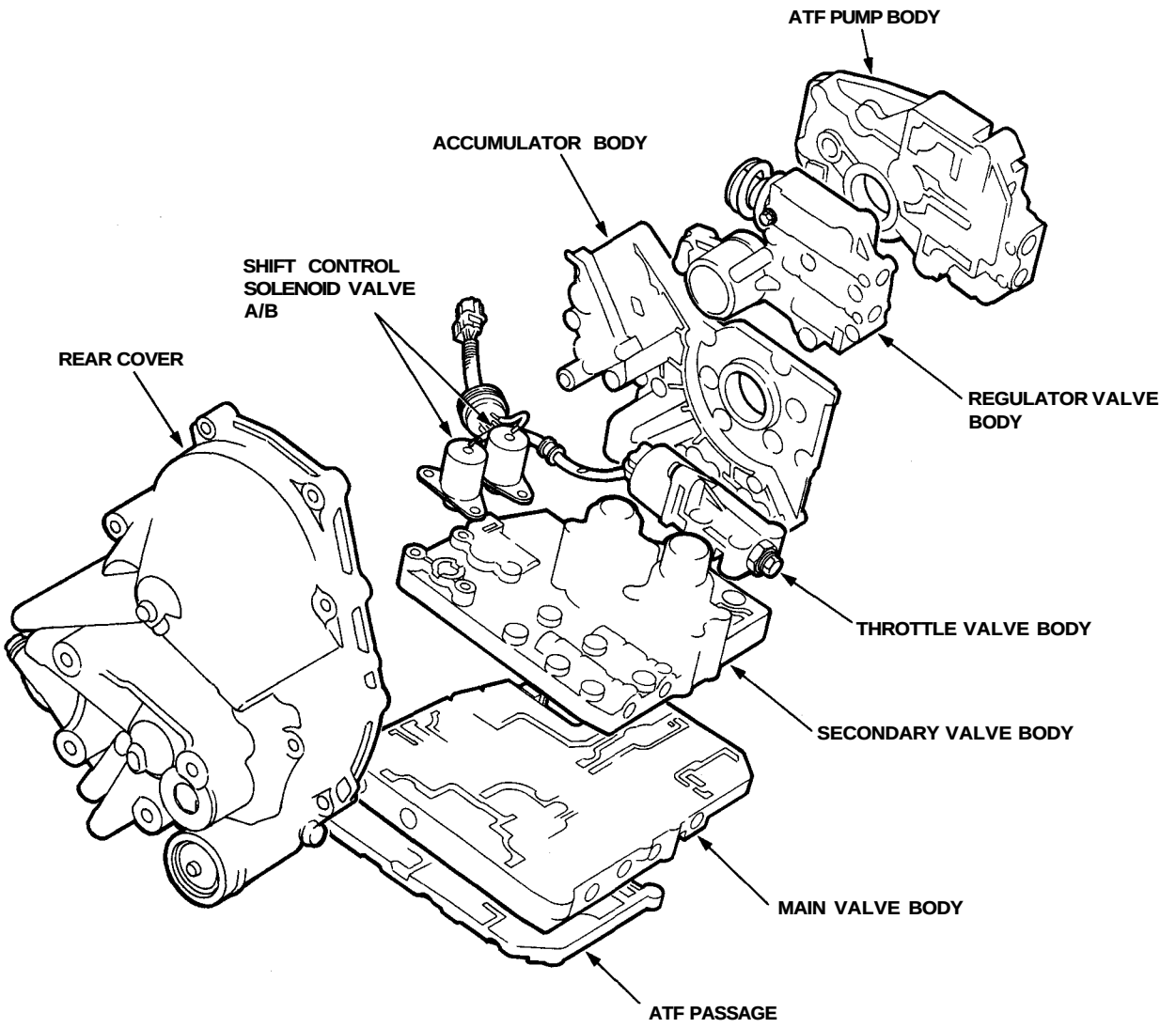
Deceleration Control

When the vehicle goes around a corner, and needs to decelerate first and then accelerate, the PCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 30 mph (48 km/h), the PCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.

Description

Hydraulic Control

The hydraulic control system is controlled by the ATF pump, valves, and accumulators in the valve bodies. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine.
Fluid from the ATF pump flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each of the clutches.
The valve body includes the main valve body, the secondary valve body, the ATF pump body, the regulator valve body, the throttle valve body, and the accumulator body. The throttle valve body is joined with the linear solenoid.
The shift control solenoid valves A and B are bolted to the secondary valve body. The lock-up control solenoid valve assembly is bolted to the outside of the torque converter housing.



NOTE: The illustration shows '96 model; '97 - '98 models are similar.

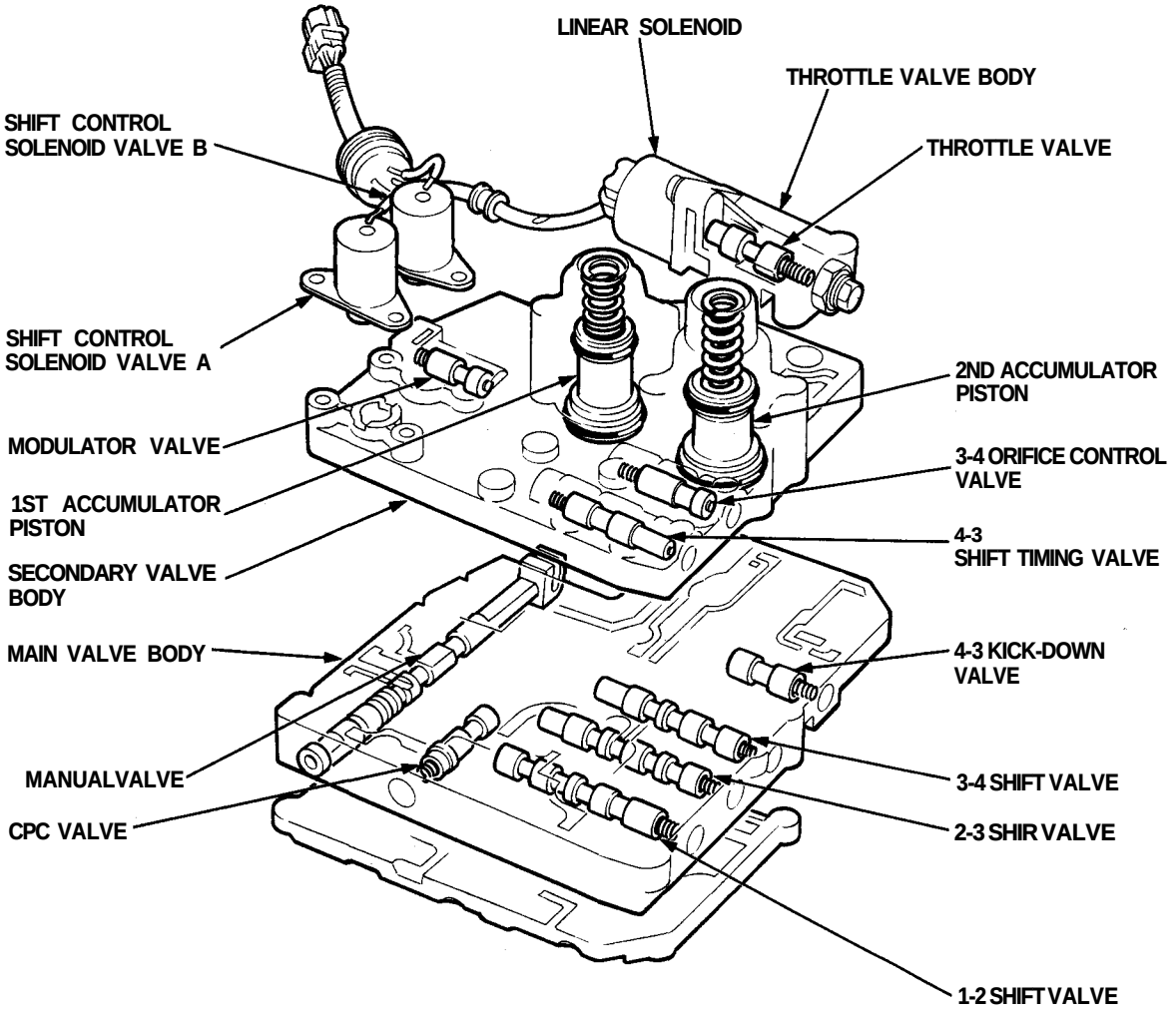
Hydraulic Control/Lower Valve Body Assembly — '96 Model

The lower valve body assembly is located on the bottom of the transmission housing. The lower valve body assembly consists of the main valve body, the secondary valve body, and the ATF passage.

Main Valve Body
The main valve body houses the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the 4-3 kick-down valve, and the Clutch Pressure Control (CPC) valve.
The primary functions of the main valve body are to switch fluid pressure on and off, and to control the hydraulic pressure going to the hydraulic control system.

Secondary Valve Body
The secondary valve body is located on the main valve body. The secondary valve body houses the modulator valve, the 3-4 orifice control valve, the 4-3 shift timing valve, the 1st accumulator piston, and the 2nd accumulator piston. The shift control solenoid valves A and B are bolted to the secondary valve body.

Throttle Valve Body/Linear Solenoid
The throttle valve body is joined with the linear solenoid, which is controlled by the PCM. The throttle valve body/linear solenoid assembly is located on the secondary valve body. The throttle valve body houses the throttle valve.



(cont'd)

Description

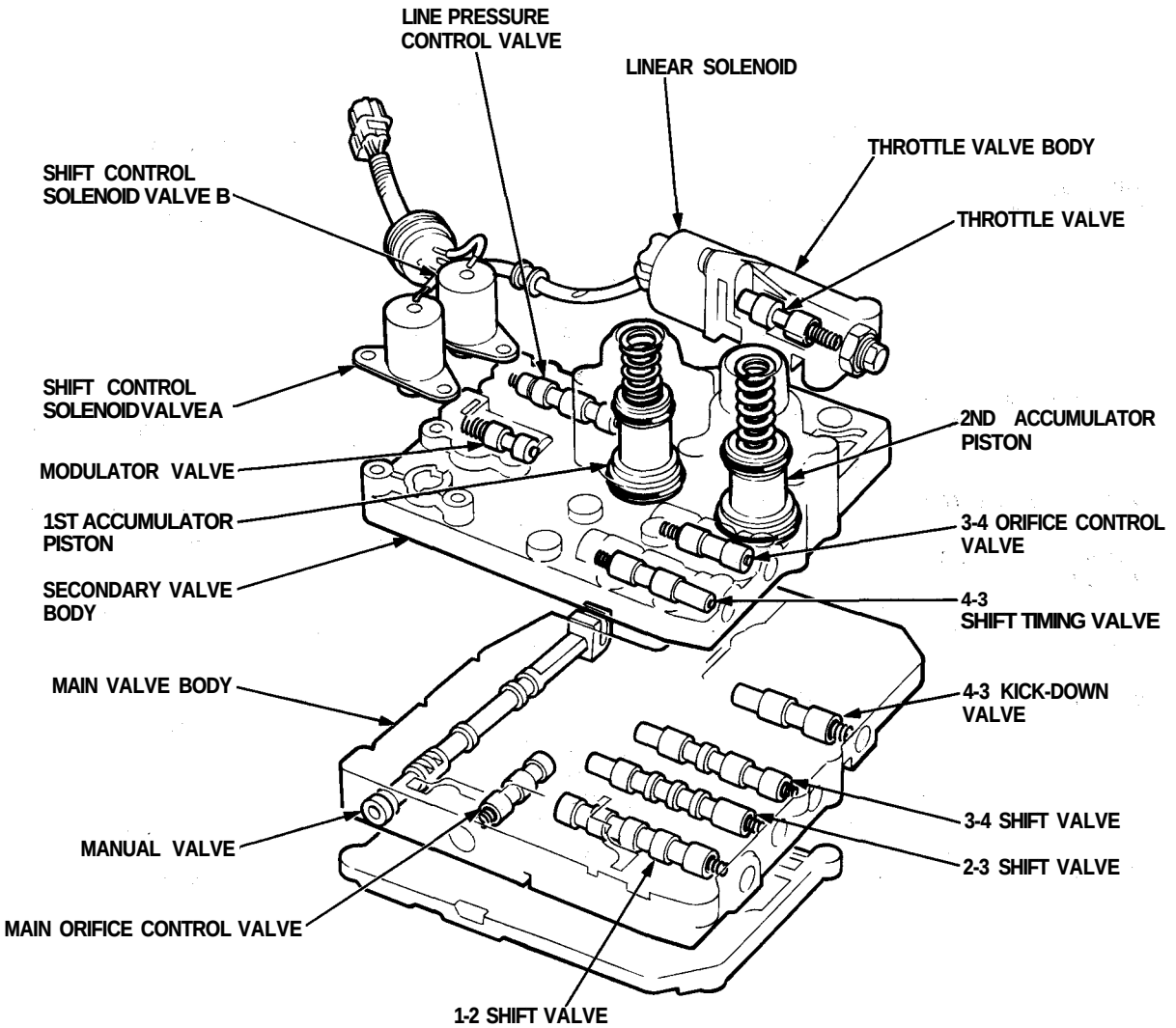
Hydraulic Control (cont'd)/Lower Valve Body Assembly — '97 - '98 Models

The lower valve body assembly is located on the bottom of the transmission housing. The lower valve body assembly consists of the main valve body, the secondary valve body, and the ATF passage.

Main Valve Body
The main valve body houses the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the 4-3 kick-down valve, and the main orifice control valve. The primary functions of the main valve body are to switch fluid pressure on and off, and to control the hydraulic pressure going to the hydraulic control system.

Secondary Valve Body
The secondary valve body is located on the main valve body. The secondary valve body houses the line pressure control valve, the modulator valve, the 3-4 orifice control valve, the 4-3 shift timing valve, the 1st accumulator piston, and the 2nd accumulator piston. The shift control solenoid valves A and B are bolted to the secondary valve body.

Throttle Valve Body/Linear Solenoid
The throttle valve body is joined with the linear solenoid, which is controlled by the PCM. The throttle valve body/linear solenoid assembly is located on the secondary valve body. The throttle valve body houses the throttle valve.



Hydraulic Control

ATF Pump Body

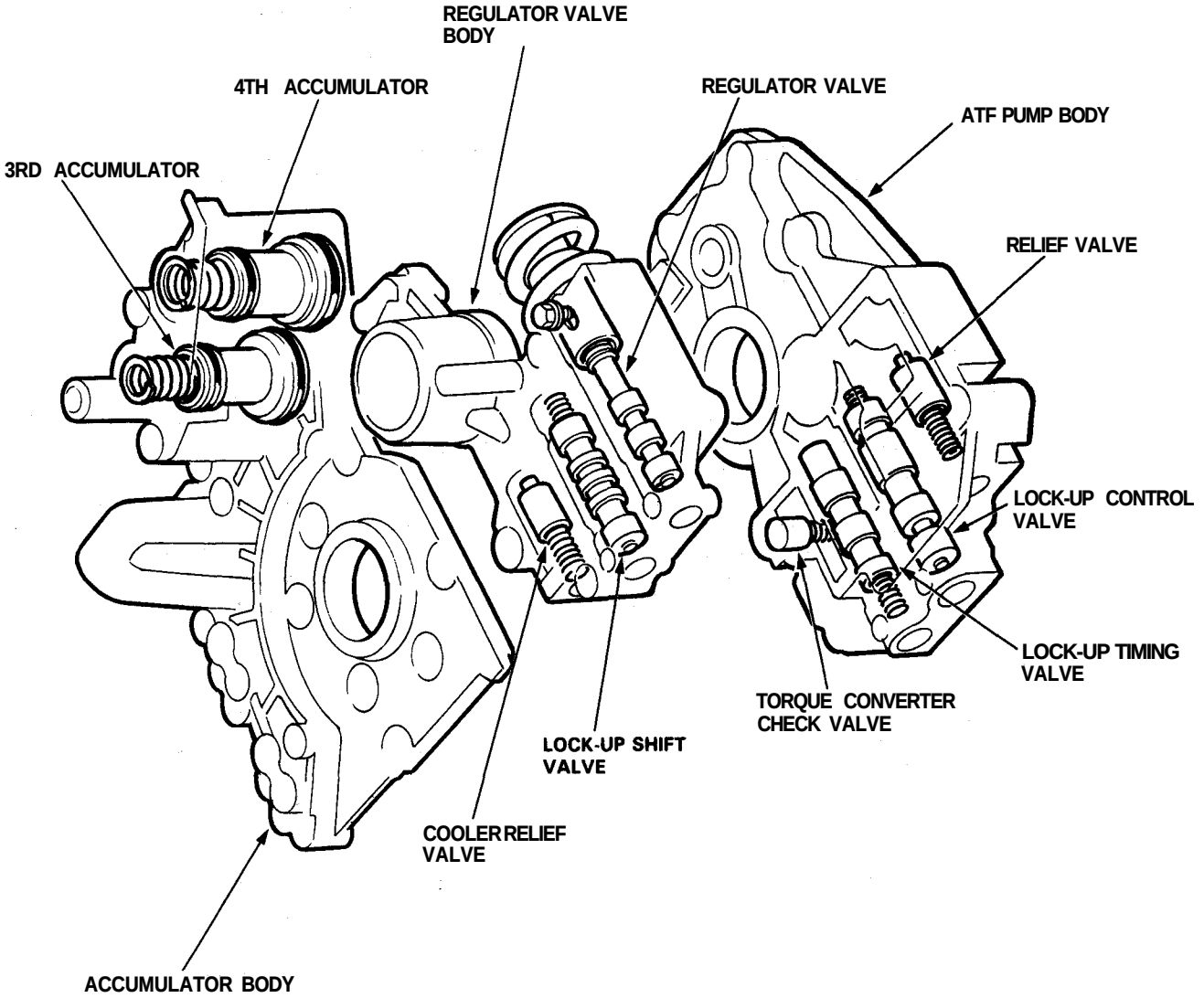
The ATF pump body is located on the torque converter housing. The ATF pump body consists of the ATF pump gears, the relief valve, the lock-up control valve, the lock-up timing valve, and the torque converter check valve. The torque converter check valve is located between the ATF pump body and the torque converter housing.

Accumulator Body

The accumulator body is located on the torque converter housing next to the ATF pump body. The accumulator body houses the 3rd accumulator piston and the 4th accumulator piston.

Regulator Valve Body

The regulator valve body is located on the ATF pump body. The regulator valve body consists of the regulator valve, the cooler relief valve, and the lock-up shift valve.



NOTE: The illustration shows '96 model; '97 - '98 models are similar.

(cont'd)

Description

Hydraulic Control (cont'd)

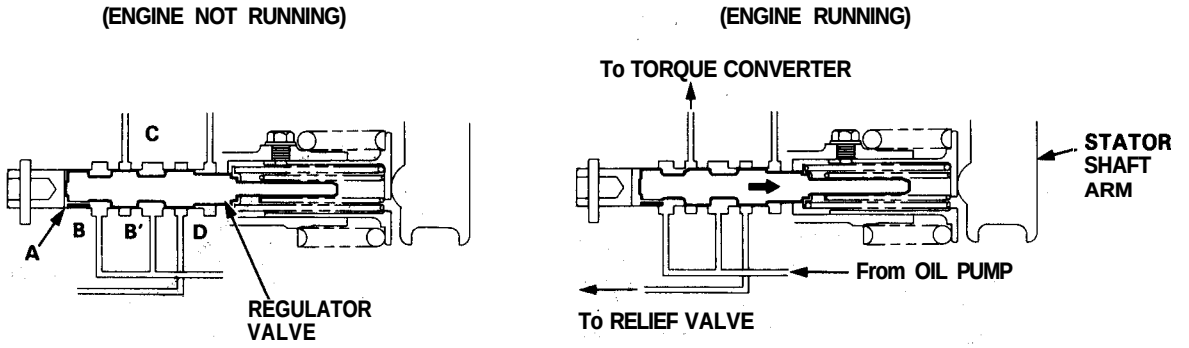
Regulator Valve — '96 Model

The regulator valve maintains a constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter.

The fluid from the ATF pump flows through B and B'. The regulator valve has a valve orifice. The fluid entering from B flows through the orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the right side, and this movement of the regulator valve uncovers the fluid port to the torque converter and the relief valve. The fluid flows out to the torque converter, and the relief valve and regulator valve moves to the left side.

According to the level of the hydraulic pressure through B, the position of the regulator valve changes and the amount of the fluid from B' through D and C also changes. This operation is continued, maintaining the line pressure.

NOTE: When used, "left" or "right" indicates direction on the illustration below.

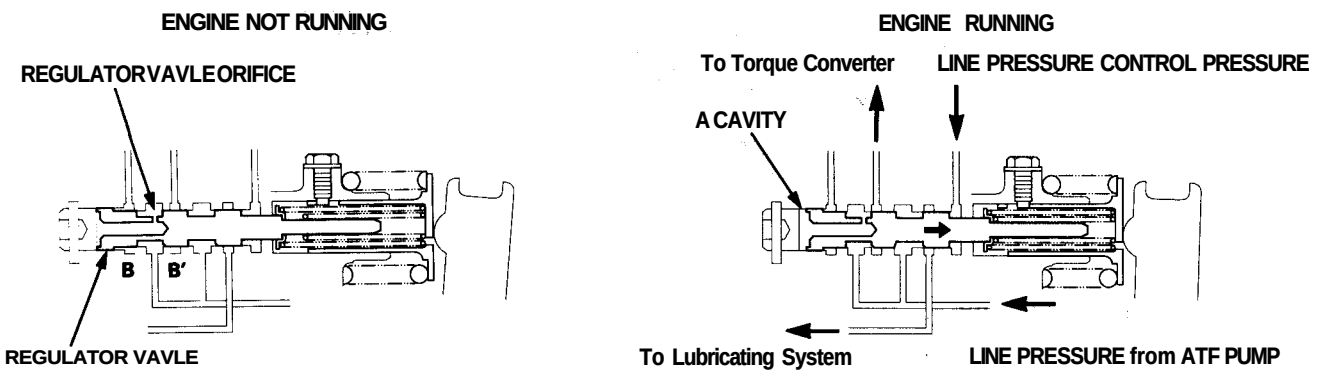


Regulator Valve — '97 - '98 Models

The regulator valve regulates line pressure, and also supplies fluid to the lubricating system and torque converter. To regulate line pressure, the regulator valve passes fluid from the ATF pump thorough the lubricating system and the torque converter. The regulator Valve receives line pressure control pressure.

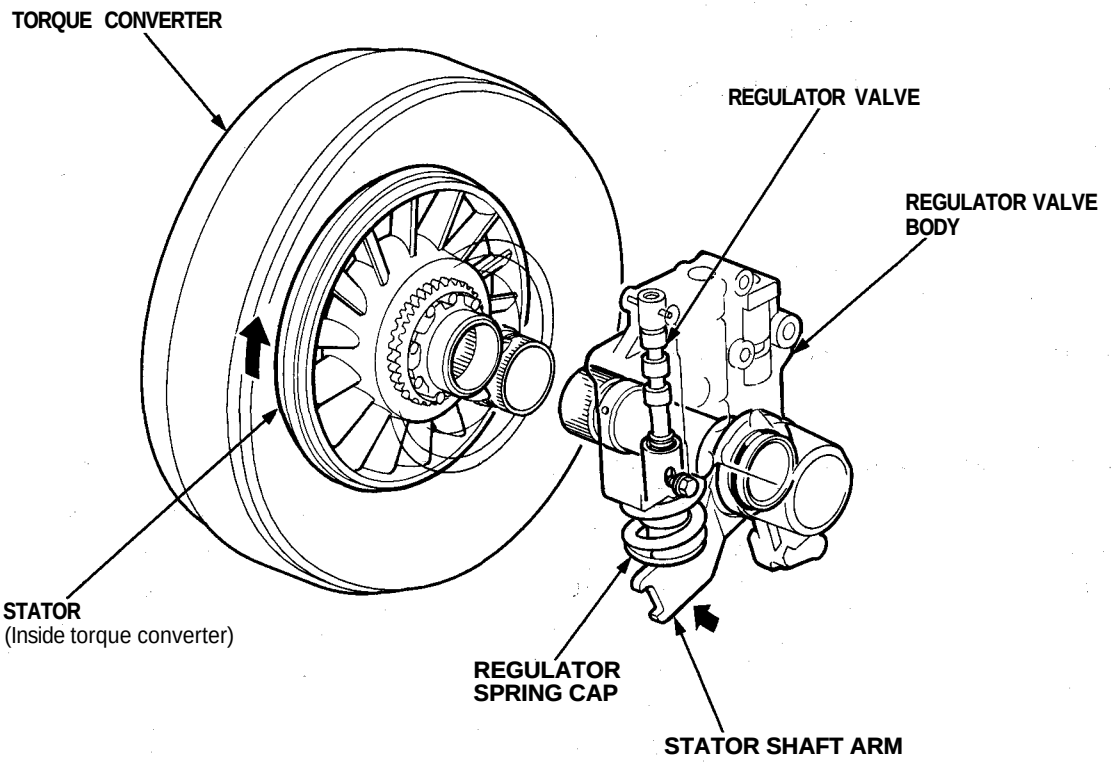
Fluid from the ATF pump flows through B and B'. Fluid entering from B flows through the regulator valve orifice to the A cavity. This pressure of the A Cavity pushes the regulator valve to the right side. The line pressure control pressure flows to the right side of the regulator valve, and pushes the regulator valve to the left side. As a result, the regulator valve stays at a certain position to regulate line pressure. The line pressure control pressure increases according to the throttle opening (throttle B pressure), while line pressure increases according to line pressure control pressure.

NOTE: When used, "left" or "right" indicates direction on the illustration below.



Stator Reaction Hydraulic Pressure Control

Hydraulic pressure increase from torque is performed by the regulator valve using stator torque reaction. The stator shaft is splined with the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the direction of the arrow in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the line pressure which is regulated by the regulator valve. The line pressure reaches its maximum when the stator torque reaction reaches its maximum.



Description

Hydraulic Flow — '96 Model

General Chart of Hydraulic Pressure

ATF Pump → Regulator Valve → Line Pressure → Modulator Pressure
Line Pressure → Throttle B Pressure
Line Pressure → Clutch Pressure
Regulator Valve → Torque Converter Pressure
Regulator Valve → Lubrication Pressure

Distribution of Hydraulic Pressure

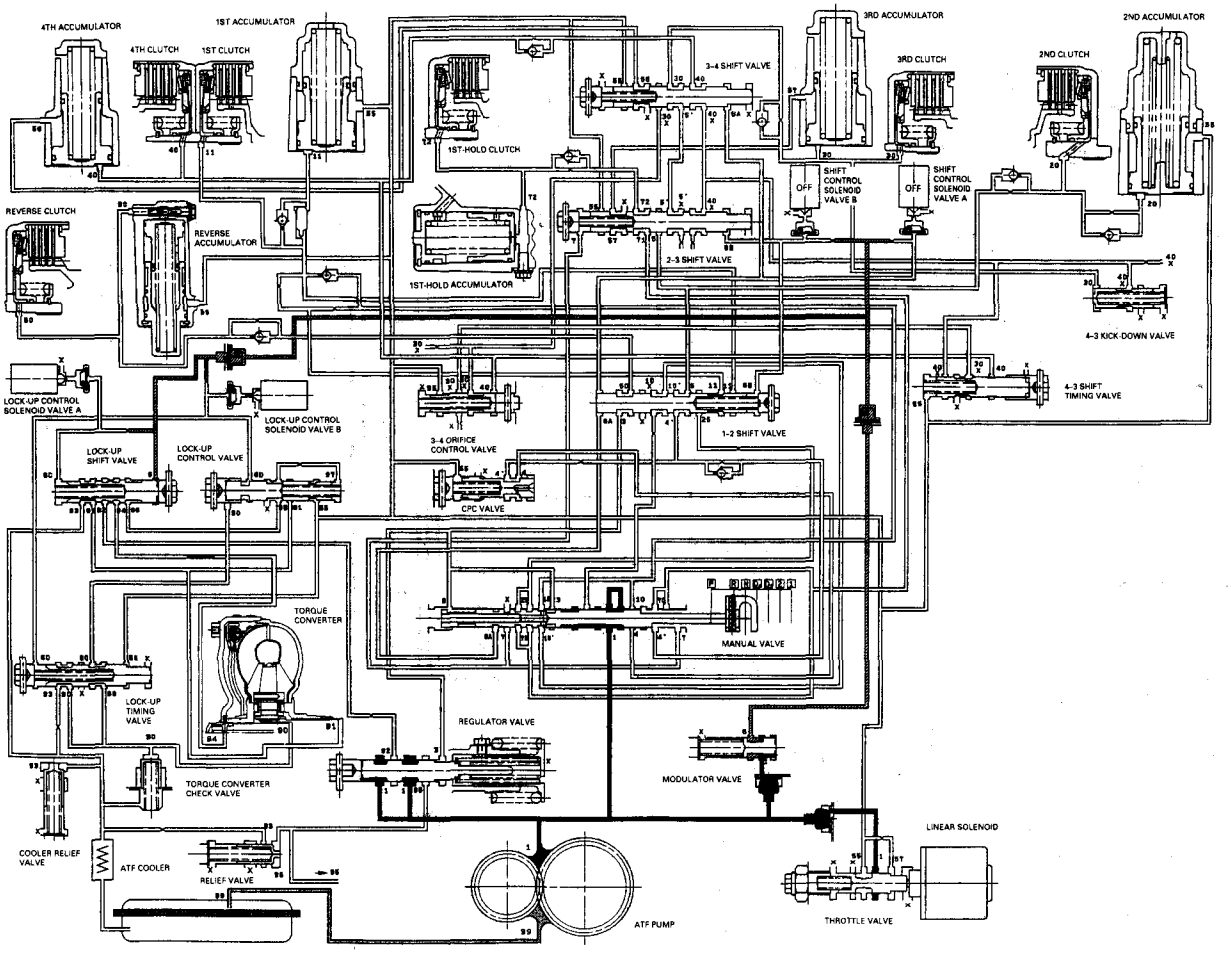
- Regulator Valve → Torque Converter Pressure
  Regulator Valve → Lubrication Pressure
  Regulator Valve → To Regulate Line Pressure
- Manual Valve → To Select Line Pressure → Clutch Pressure
- Modulator Valve → Modulator Pressure → Shift Control Solenoid Valves
  Modulator Pressure → Lock-up Control Solenoid Valves
- 1-2 Shift Valve → Clutch Pressure
- 2-3 Shift Valve → Clutch Pressure
- 3-4 Shift Valve → Clutch Pressure
- Throttle Valve → Throttle B Pressure

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	7	LINE	71	1ST-HOLD CLUTCH
2	LINE	10	1ST CLUTCH	72	1ST-HOLD CLUTCH
3	LINE	10'	1ST CLUTCH	90	TORQUE CONVERTER
4	LINE	11	1ST CLUTCH	91	TORQUE CONVERTER
4'	LINE	20	2ND CLUTCH	92	TORQUE CONVERTER
4"	LINE	25	LINE	93	ATF COOLER
5	LINE	30	3RD CLUTCH	94	TORQUE CONVERTER
5'	LINE	40	4TH CLUTCH	95	LUBRICATION
6	LINE	50	REVERSE CLUTCH	96	TORQUE CONVERTER
6A	MODULATOR	55	THROTTLE B	99	SUCTION
6B	MODULATOR	56	THROTTLE B	X	EXHAUST
6C	MODULATOR	57	THROTTLE B		
6D	MODULATE (DUTY CONTROL)	70	1ST-HOLD CLUTCH		

N Position

As the engine turns, the ATF pump also starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF flowing from the ATF pump becomes the line pressure (1). The line pressure (1) is regulated by the regulator valve. The torque converter inlet pressure (92) enters (94) of the torque converter through the lock-up shift valve and discharges into (90).
The torque converter check valve prevents the torque converter pressure from rising.
Under this condition, the hydraulic pressure is not applied to the clutches as the manual valve stops line pressure (1).

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow — '96 Model (cont'd)

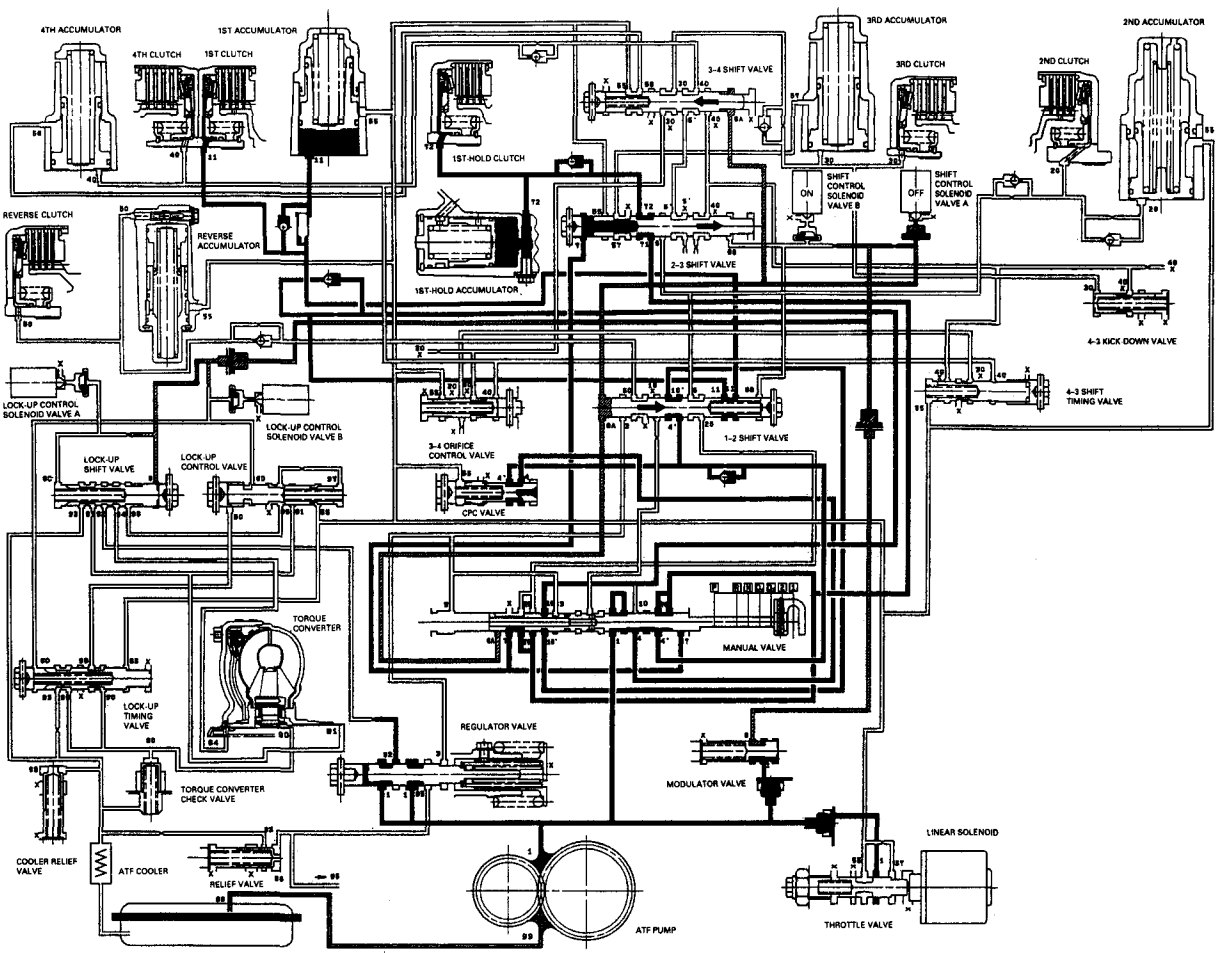
1 Position

Line pressure (1) flows to the manual valve, the modulator valve, and the throttle valve. Line pressure (1) becomes modulator pressure (6) at the modulator valve, and line pressure (4) and (4'), and 1st-hold clutch pressure (70) at the manual valve.
Modulator pressure (6) flows to the left end of the 1-2 shift valve and to the right end of the 3-4 shift valve because shift control solenoid valve A is turned OFF and B is turned ON by the PCM, 1-2 shift valve is moved to the right side, and 3-4 shift valve is moved to the left side. The 1st-hold clutch pressure (70) becomes line pressure (7) at the manual valve, then goes to the 2-3 shift valve. The 2-3 shift valve remains in the right side.
Line pressure (4) becomes 1st clutch pressure (11). The 1st clutch pressure (11) is applied to the 1st clutch, and the 1st clutch is engaged.
Fluid flows by way of:

- Line Pressure (4) → CPC Valve - Line Pressure (4') → 1-2 Shift Valve - 1st Clutch Pressure (10') → Manual Valve - 1st Clutch Pressure (10) → Orifice- 1st Clutch Pressure (11) → 1-2 Shift Valve-1st Clutch Pressure (11) → 1st Clutch

Line pressure (1) also becomes 1st-hold clutch pressure (70), and it flows to the 1st-hold clutch and the 1st-hold accumulator via the 2-3 shift valve.
Power is transmitted only during deceleration through the 1st-hold clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



2 Position

Line pressure (1) flows to the manual valve, the modulator valve, and the throttle valve. Line pressure (1) becomes modulator pressure (6) at the modulator valve, and line pressure (4) and (4'), and 1st-hold clutch pressure (70) at the manual valve.

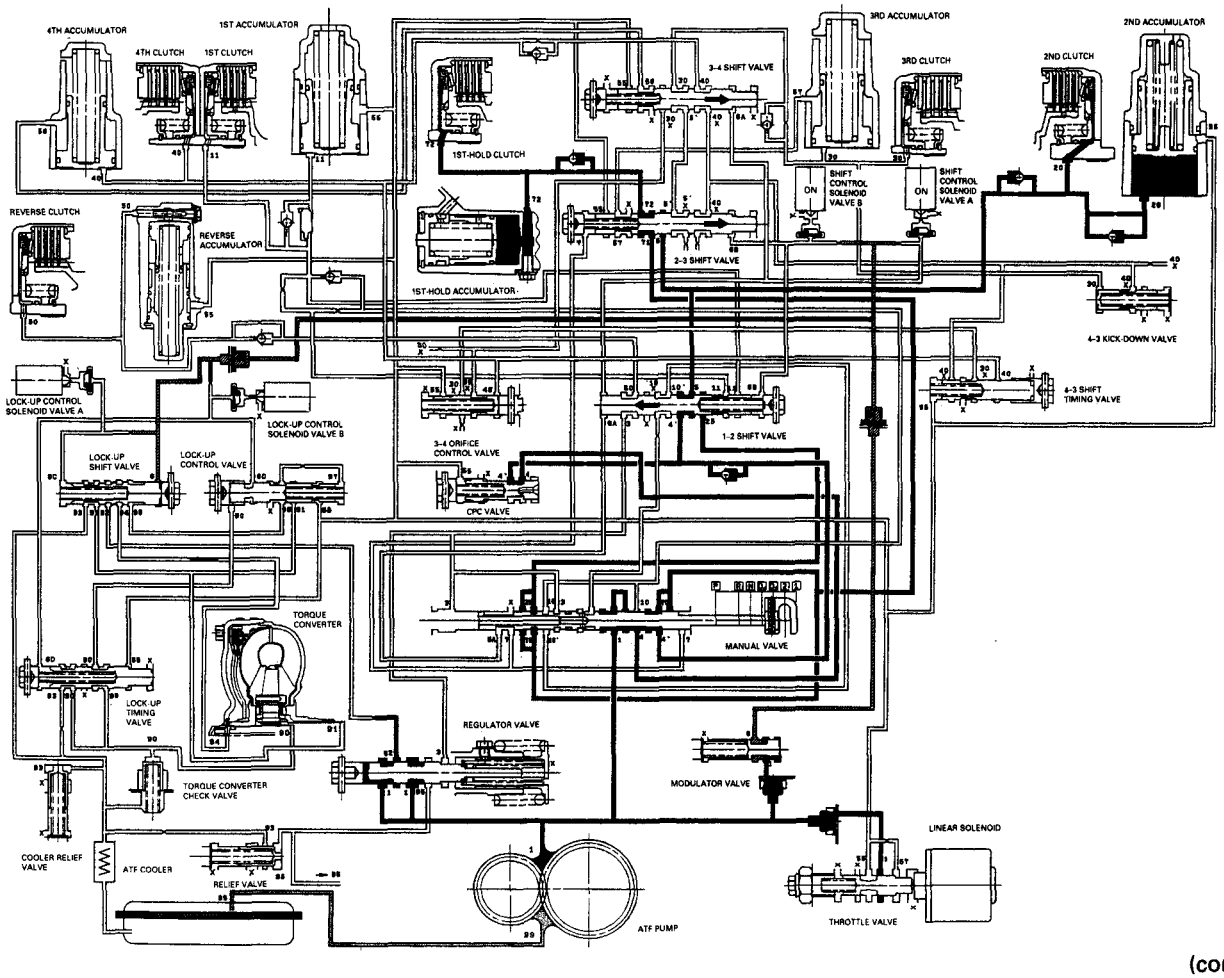
Modulator pressure (6) does not flow to each shift valve because shift control solenoid valves A and B are turned ON by the PCM.

Line pressure (4) becomes line pressure (4') at the CPC valve, and line pressure (4') becomes line pressure (5) at the 1-2 shift valve. The line pressure (5) changes into the 2nd clutch pressure (20) at the orifice. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.

Line pressure (4) also become 1st-hold clutch pressure (70). Ist-hold clutch pressure (70) is applied to the 1st-hold clutch via the 2-3 shift valve.

Power is transmitted only during deceleration through the 1st-hold clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow — '96 Model (cont'd)

[D3] or [D4] Position

1. 1st Gear

The flow of fluid through the torque converter circuit is the same as in [N] position.

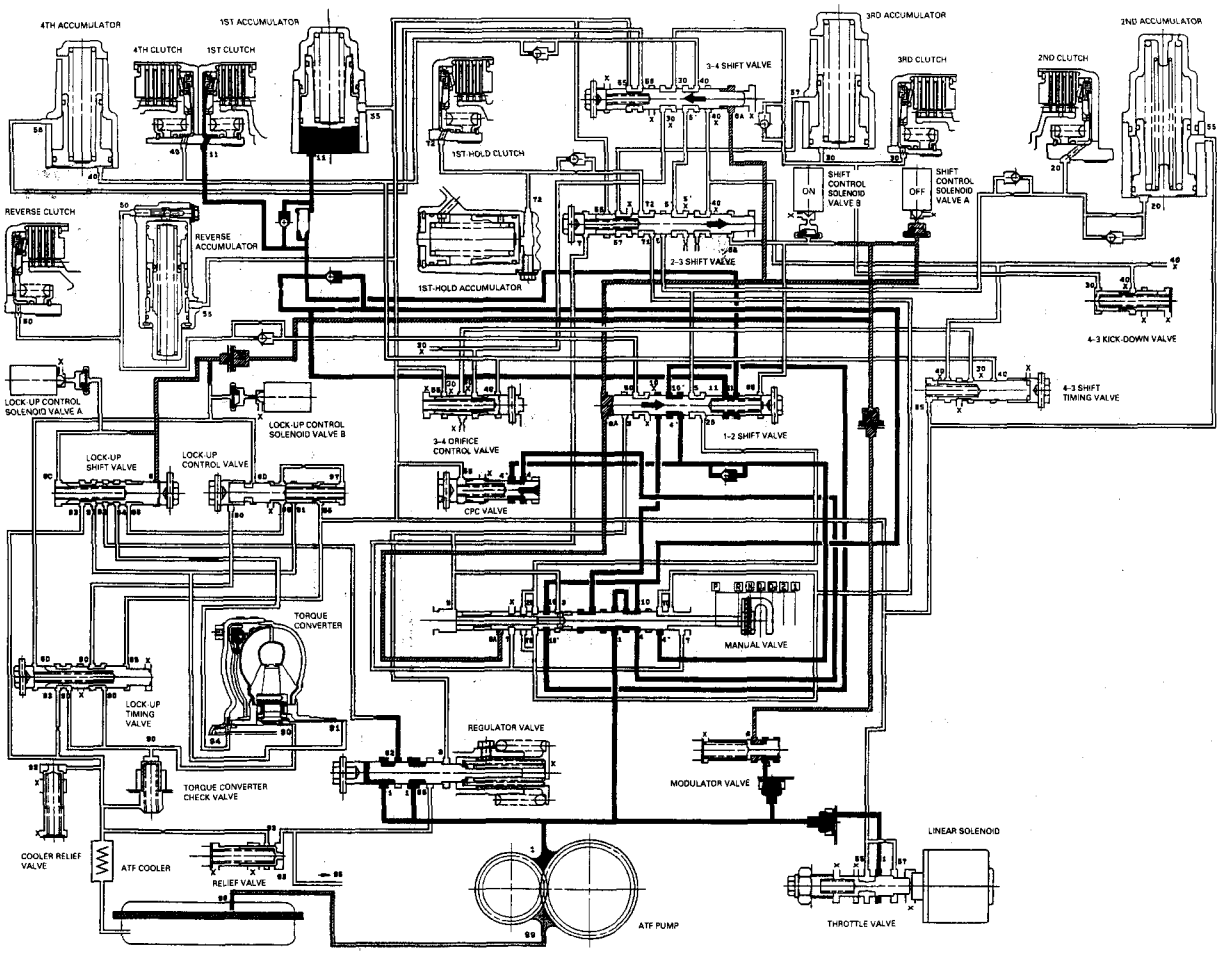
Line pressure (1) flows to the manual valve, the modulator valve, and the throttle valve. Line pressure (1) becomes modulator pressure (6) at the modulator valve, and line pressure (4) at the manual valve.

Modulator pressure (6) flows to the left end of the 1-2 shift valve and right end of the 3-4 shift valve because shift control solenoid valve A is turned OFF and B is turned ON by the PCM, 1-2 shift valve is moved to the right side, and the 3-4 shift valve is moved to the left side.

Line pressure (1) also becomes 1st clutch pressure (10). The 1st clutch pressure (10) is applied to the 1st clutch and 1st accumulator, causing the vehicle to move as engine power is transmitted.

In [D3] or [D4] position at 1st speed, the 1st-hold clutch pressure is not applied to the 1st-hold clutch because the manual valve covers the port to leading to the 1st-hold clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



2. 2nd Gear

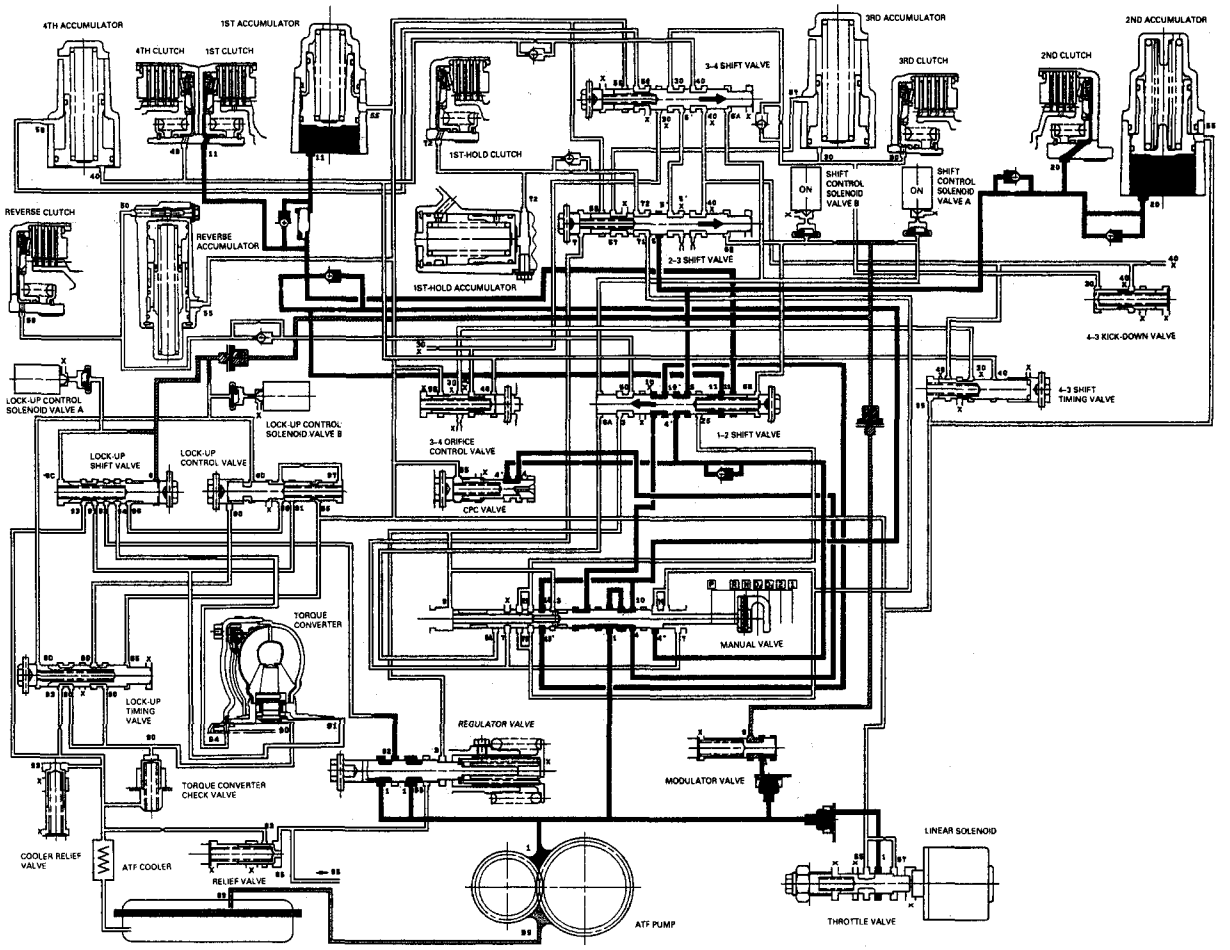
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned ON by means of the PCM. Shift control solenoid valve B remains ON. Modulator pressure (6A) in the left end of the 1-2 shift valve is released by turning shift control solenoid valve A ON. The 1-2 shift valve is moved to the left side and uncovers the port to allow line pressure (5) to the 2nd clutch. Line pressure (5) becomes 2nd clutch pressure (20) at the orifice. 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.

Fluid flows by way of;

- Line Pressure (4) → CPC Valve - Line Pressure (4') → 1-2 Shift Valve - Line Pressure (5) → Orifice - 2nd Clutch Pressure (20) → 2nd Clutch

Hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow — '96 Model (cont'd)

D3 or D4 Position

3. 3rd Gear

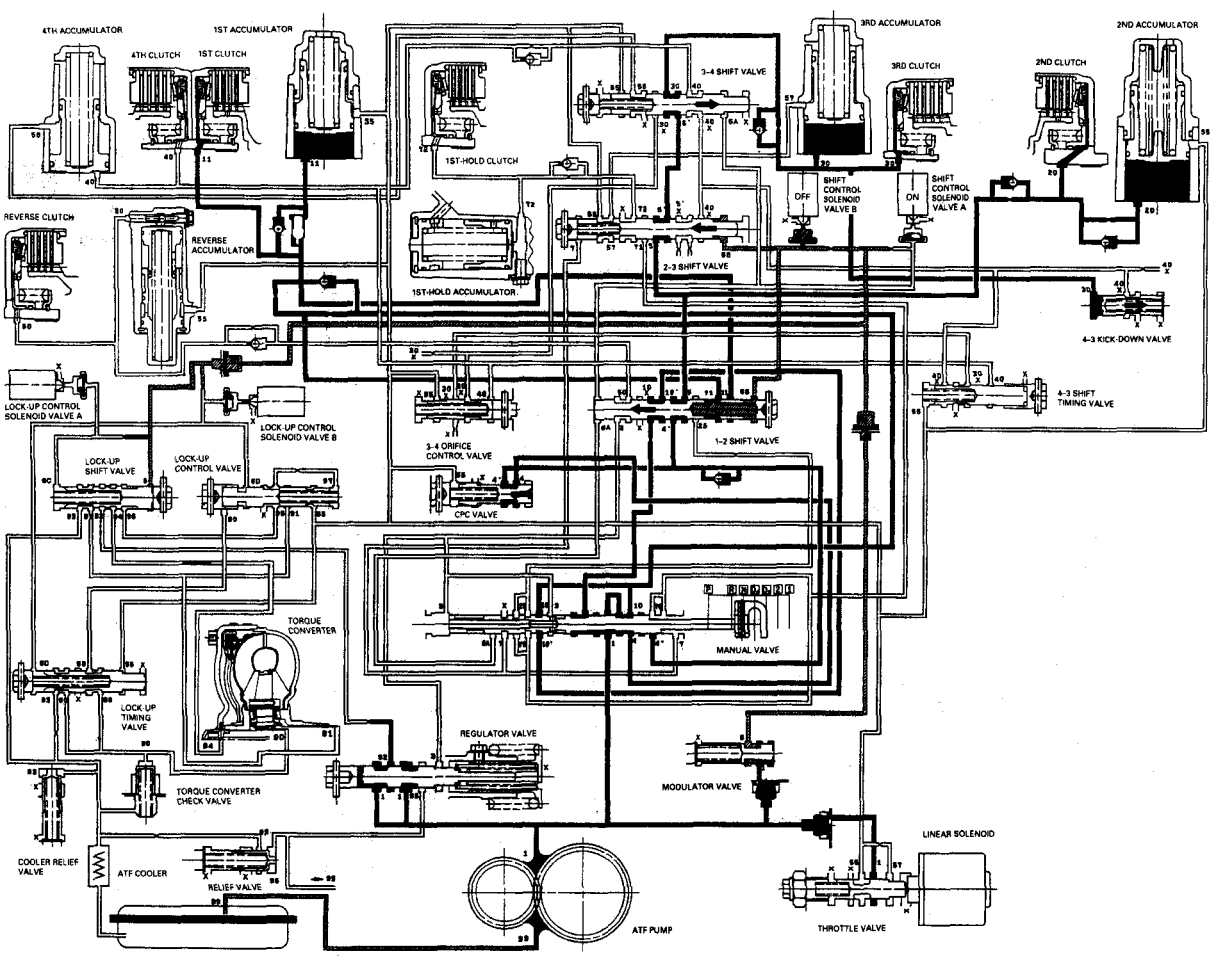
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve B is turned OFF by the PCM. Shift control solenoid valve A remains ON. Modulator pressure (6B) flows to the right ends of the 1-2 shift valve and the 2-3 shift valve. The 2-3 shift valve is moved to the left side by modulator pressure (6B). The 2-3 shift valve uncovers the port to allow line pressure (5) to the 3-4 shift valve as this valve is moved to the left side. Line pressure (5') becomes the 3rd clutch pressure. The 3rd clutch pressure (30) is applied to the 3rd clutch, and the 3rd clutch is engaged.

Fluid flows by way of:

- Line Pressure (4) → CPC Valve - Line Pressure (4') → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve - Line Pressure (5') → 3-4 Shift Valve - 3rd Clutch Pressure (30) → 3rd Clutch

Hydraulic pressure also flows to the 1st clutch and 2nd clutch. However, no power is transmitted because of the one-way clutches.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



D4 Position

4. 4th Gear

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned OFF by the PCM. Shift control solenoid valve B remains OFF. Modulator pressure (6A) flows to the right end of the 3-4 shift valve and the left end of the 1-2 shift valve. Modulator pressure (6A) in the left end of the 1-2 shift valve equals modulator pressure (6B) in the right end of the 1-2 shift valve, so the 1-2 shift valve remains in the left side by valve spring tension.

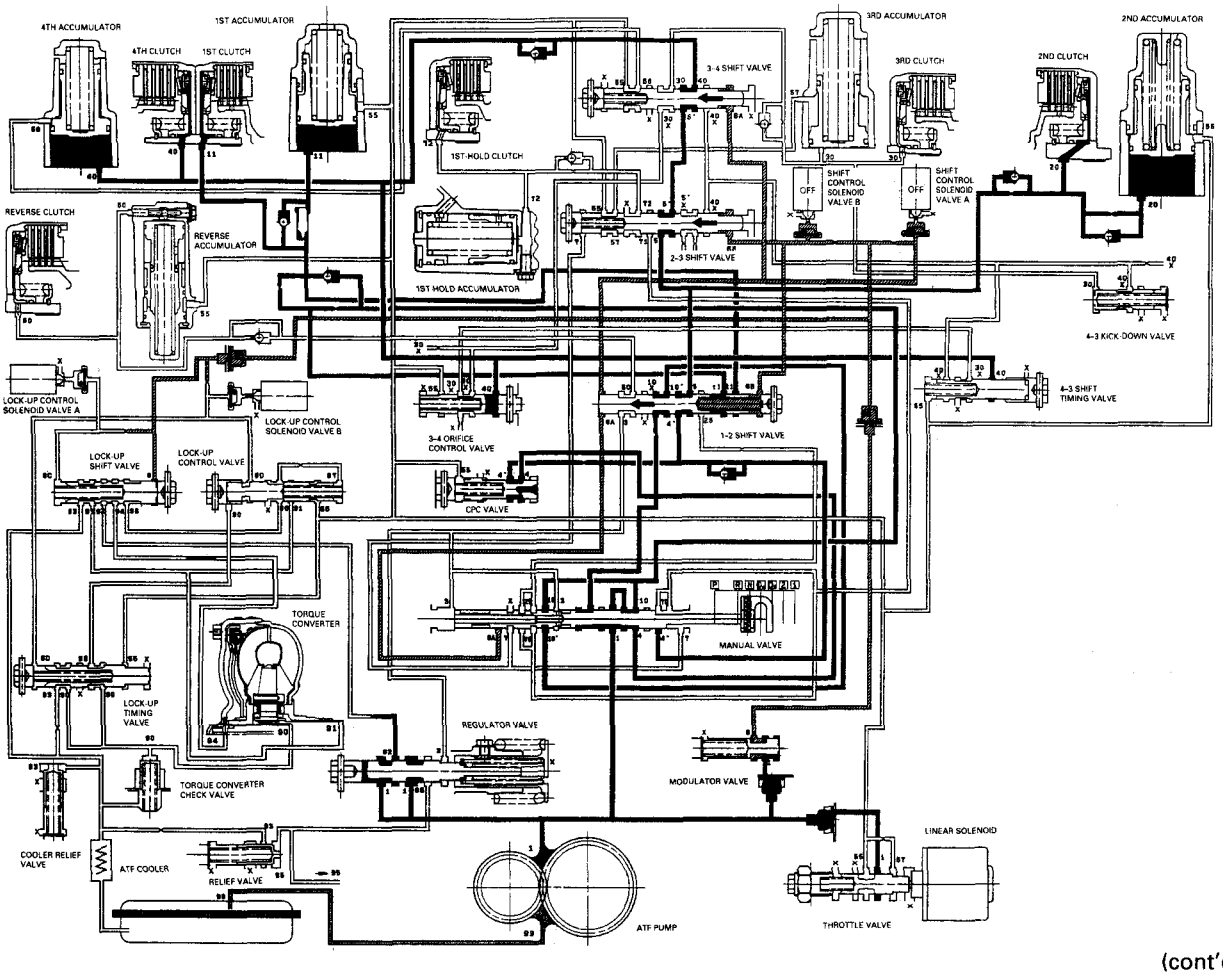
The 3-4 shift valve is moved to the left side by modulator pressure (6B). The 3-4 shift valve covers the port leading to the 3rd clutch and uncovers to the 4th clutch as this valve is moved to the left side. Line pressure (5') from the 2-3 shift valve becomes 4th clutch pressure (40). The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Fluid flows by way of:

- Line Pressure (4) → CPC valve - Line Pressure (4') → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift valve - Line Pressure (5') → 3-4 Shift Valve - 4th Clutch Pressure (40) → 4th Clutch

Hydraulic pressure also flows to the 1st clutch and 2nd clutch. However, no power is transmitted because of the one-way clutches.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

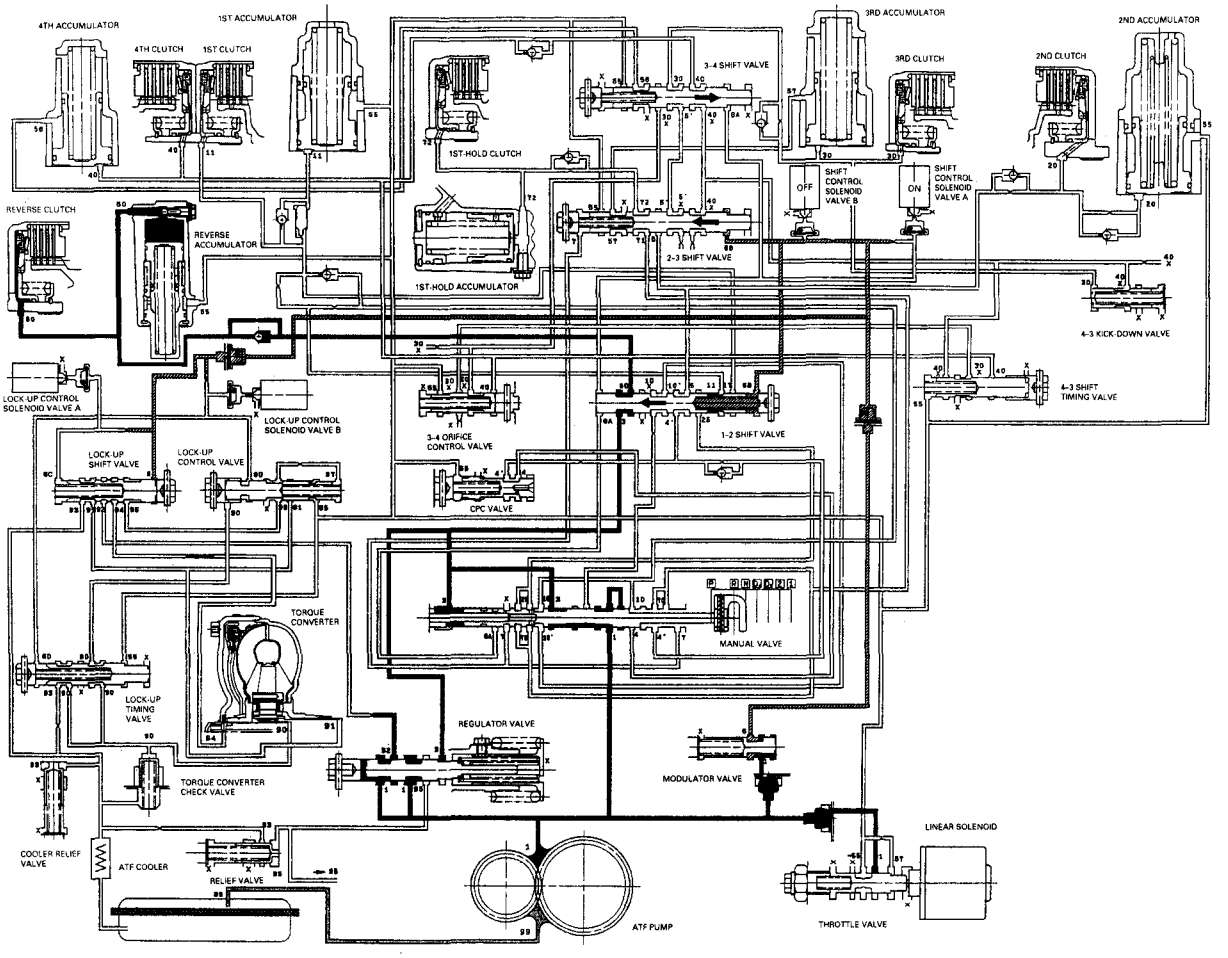
Hydraulic Flow — '96 Model (cont'd)

[R] Position

The flow of fluid through the torque converter circuit is the same as in [N] position.
Line pressure (1) becomes modulator pressure (6) at the modulator valve, and line pressure (3) at the manual valve.
Modulator pressure (6) flows to the right ends of the 1-2 shift valve and 2-3 shift valve because shift control solenoid valve A is turned ON and B is turned OFF by the PCM, and those valves are moved to the left side.
Line pressure (3) flows to the 1-2 shift valve, and it becomes reverse clutch pressure (50). Reverse clutch pressure (50) is applied to the reverse clutch, and the reverse clutch is engaged.

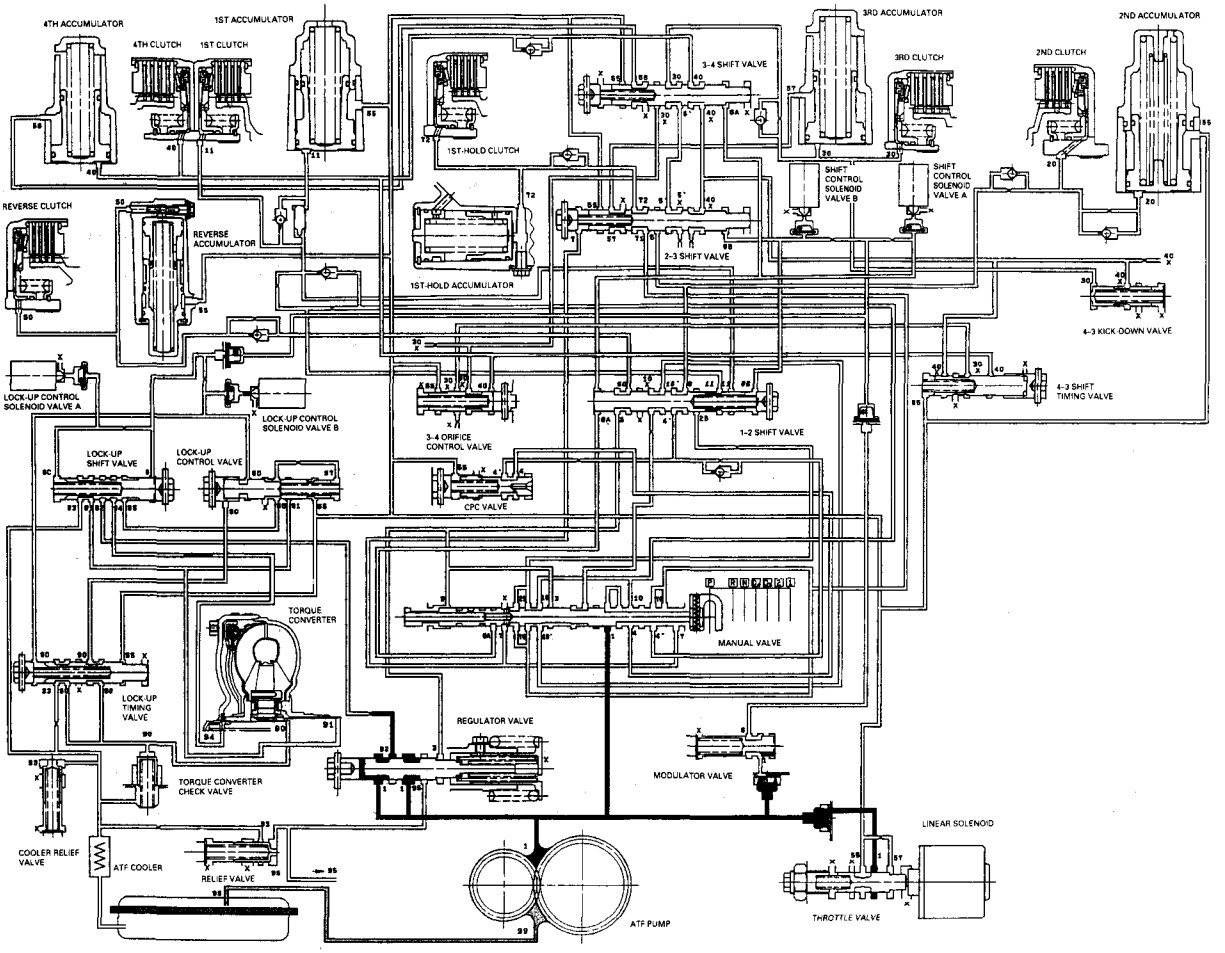
Reverse Inhibitor Control
When the [R] position is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the PCM outputs the 1st signal to shift control solenoid valves A and B; shift control solenoid valve A is turned OFF, shift control solenoid valve B is turned ON. The 1-2 shift valve is moved to the right side and covers the port to stop line pressure (3) to the reverse clutch. Line pressure (3) is not applied to the reverse clutch, and reverse clutch pressure (50) is not applied to the reverse clutch, as a result, power is not transmitted in the reverse direction.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



P Position

The flow of fluid through the torque converter circuit is the same as in N position.
Line pressure (1) is intercepted by the manual valve. Hydraulic pressure is not supplied to the clutches, and power is not transmitted.



Description

Lock-up System

Lock-up Clutch

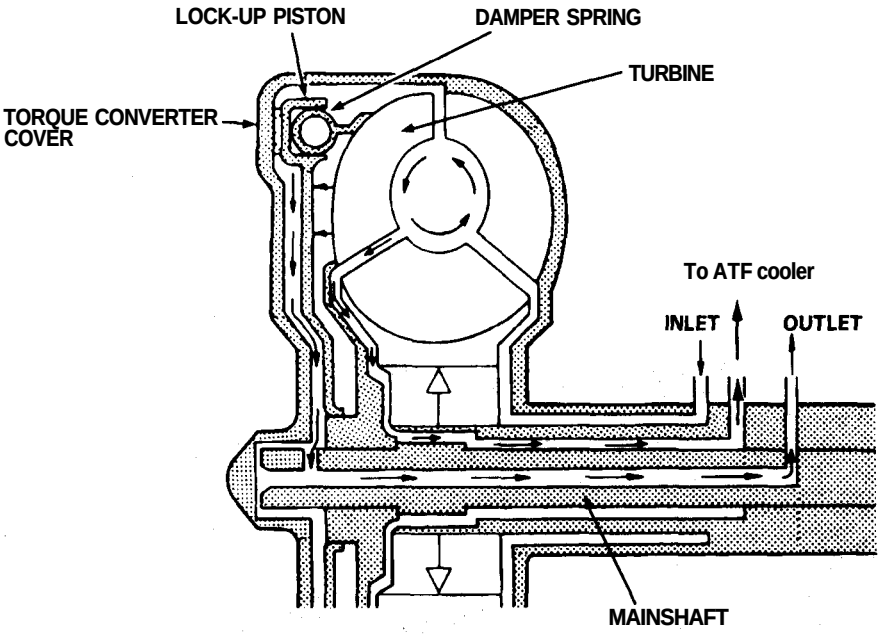
1. Operation (clutch on)

With the lock-up clutch on, the fluid in the chamber between the torque converter cover and lock-up piston is drained off, and the converter fluid exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. The effect is to bypass the converter, thereby placing the vehicle in direct drive.

Power flow

The power flows by way of:

Engine
↓
Drive plate
↓
Torque converter cover
↓
Lock-up piston
↓
Damper spring
↓
Turbine
↓
Mainshaft

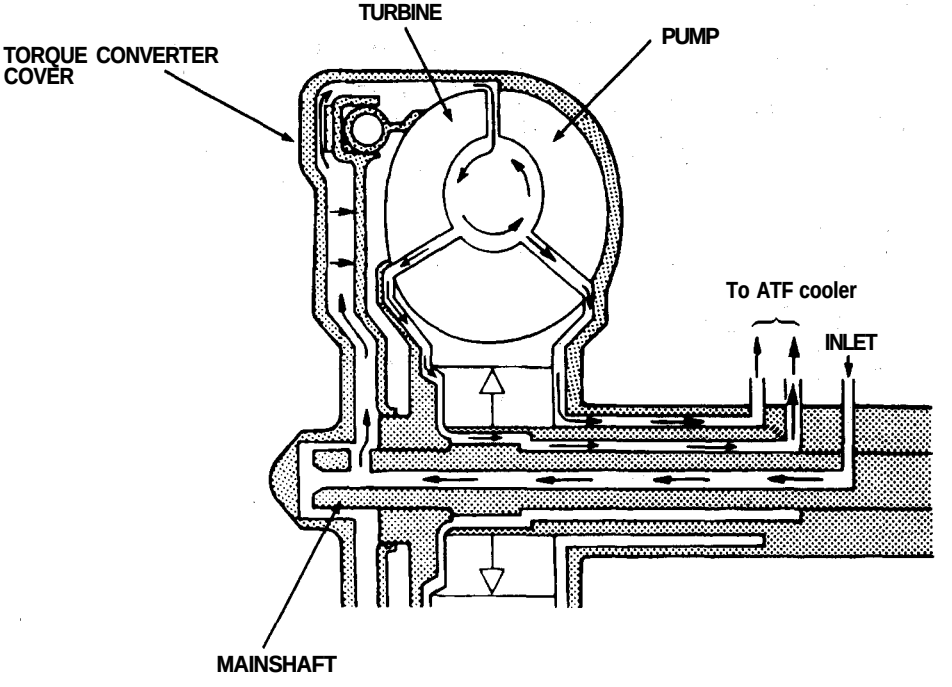


2. Operation (clutch off)

With the lock-up clutch off, the fluid flows in the reverse of CLUTCH ON. As a result, the lock-up piston moves away from the converter cover, and the torque converter lock-up is released.

Power flow

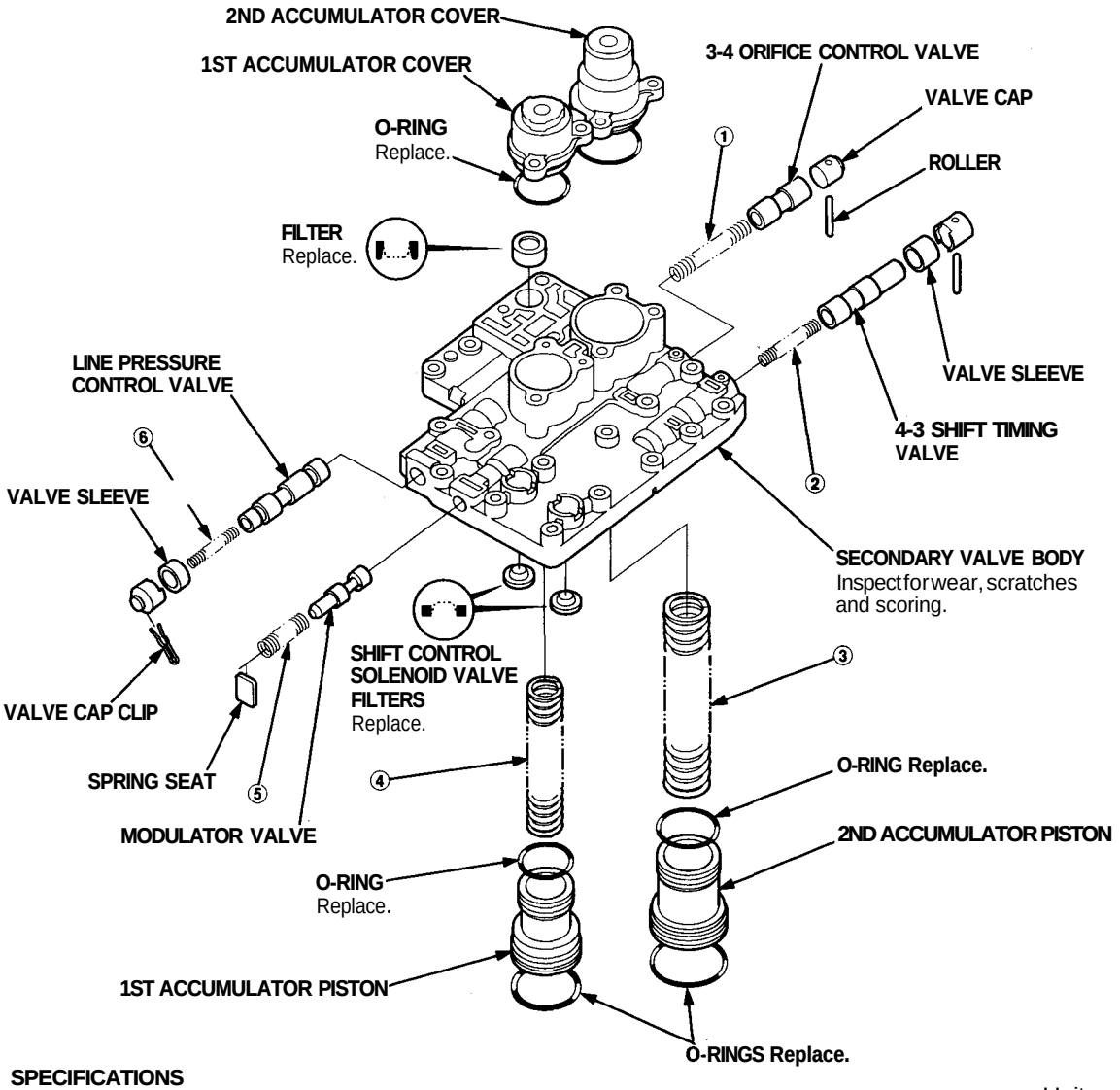
Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft



Secondary Valve Body — '97 - '98 Models

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-4 orifice control valve spring	1.1 (0.043)	7.1 (0.280)	47.7(1.878)	22.9
②	4-3 shift timing valve spring	0.7 (0.028)	7.1 (0.280)	35.0(1.378)	20.4
③	2nd accumulator spring A	3.2(0.126)	23.7 (0.933)	92.8 (3.654)	11.8
④	1st accumulator spring	2.7 (0.106)	18.0(0.709)	83.3 (3.280)	14.4
⑤	Modulator valve spring	1.2(0.047)	7.0 (0.276)*	27.6(1.087)	7.7
⑥	Line pressure control valve spring	0.8(0.031)	6.1 (0.240)	24.1 (0.949)	14.6

*: Inside Diameter

Description

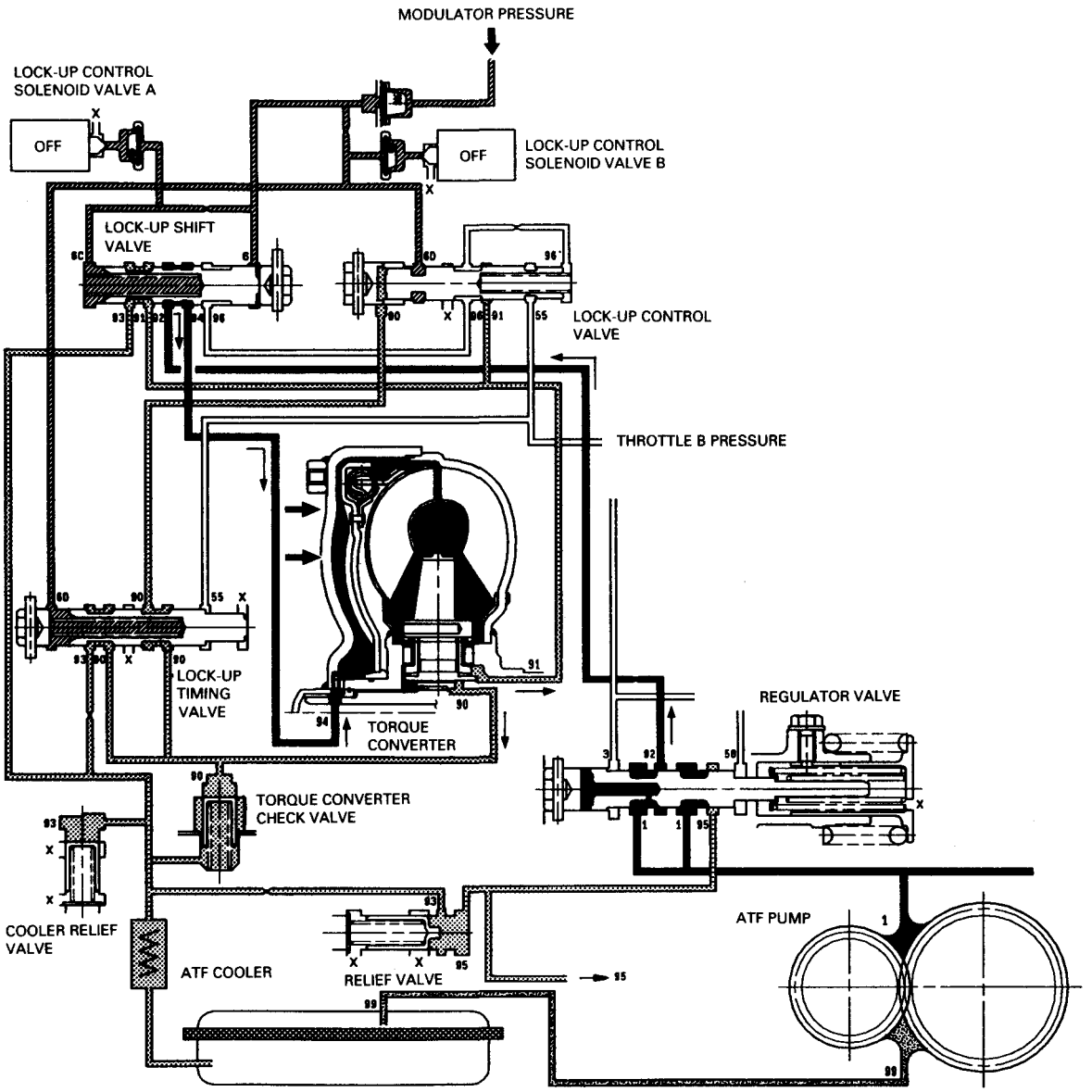
Lock-up System (cont'd)

No Lock-up

The pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Under this condition, the pressures working on both ends of the lock-up shift valve are equal, and the shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the pump will flow through the left side of the lock-up clutch to the torque converter; that is, the lock-up clutch is in OFF condition.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows '97 - '98 models; '96 model is similar.



Partial Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: OFF

The PCM switches the solenoid valve A on to release modulator pressure in the left cavity of the lock-up shift valve. Modulator pressure in the right cavity of the lock-up shift valve overcomes spring force, and the lock-up shift valve is moved to the left side.

Line pressure is then separated into the two passages to the torque converter:

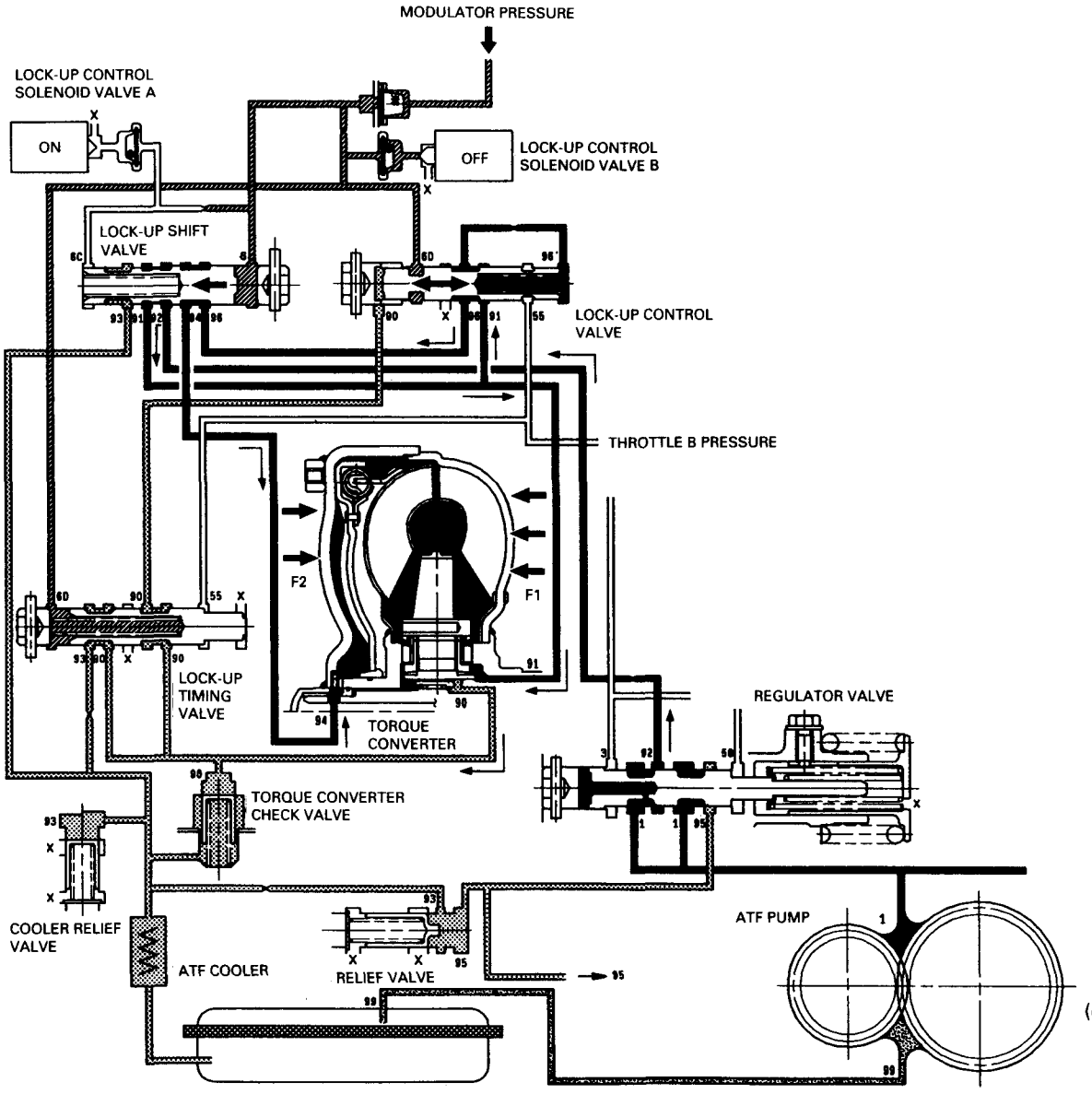
Torque Converter Inner Pressure: enters into right side to engage lock-up clutch

Torque Converter Back Pressure: enters into left side to disengage lock-up clutch

Back pressure (F2) is regulated by the lock-up control valve, whereas the position of the lock-up timing valve is determined by the throttle B pressure, tension of the valve spring, and pressure regulated by the modulator valve. Also the position of the lock-up control valve is determined the back pressure of the lock-up control valve and torque converter pressure regulated by the check valve. With the lock-up control solenoid valve B kept off, modulator pressure is maintained in the left side of the lock-up control valve; the lock-up control valve is moved slightly to the right side. This slight movement of the lock-up control valve causes back pressure to be lowered slightly, resulting in partial lock-up.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows '97 - '98 models; '96 model is similar.



(cont'd)

Description

Lock-up System (cont'd)

Half Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON

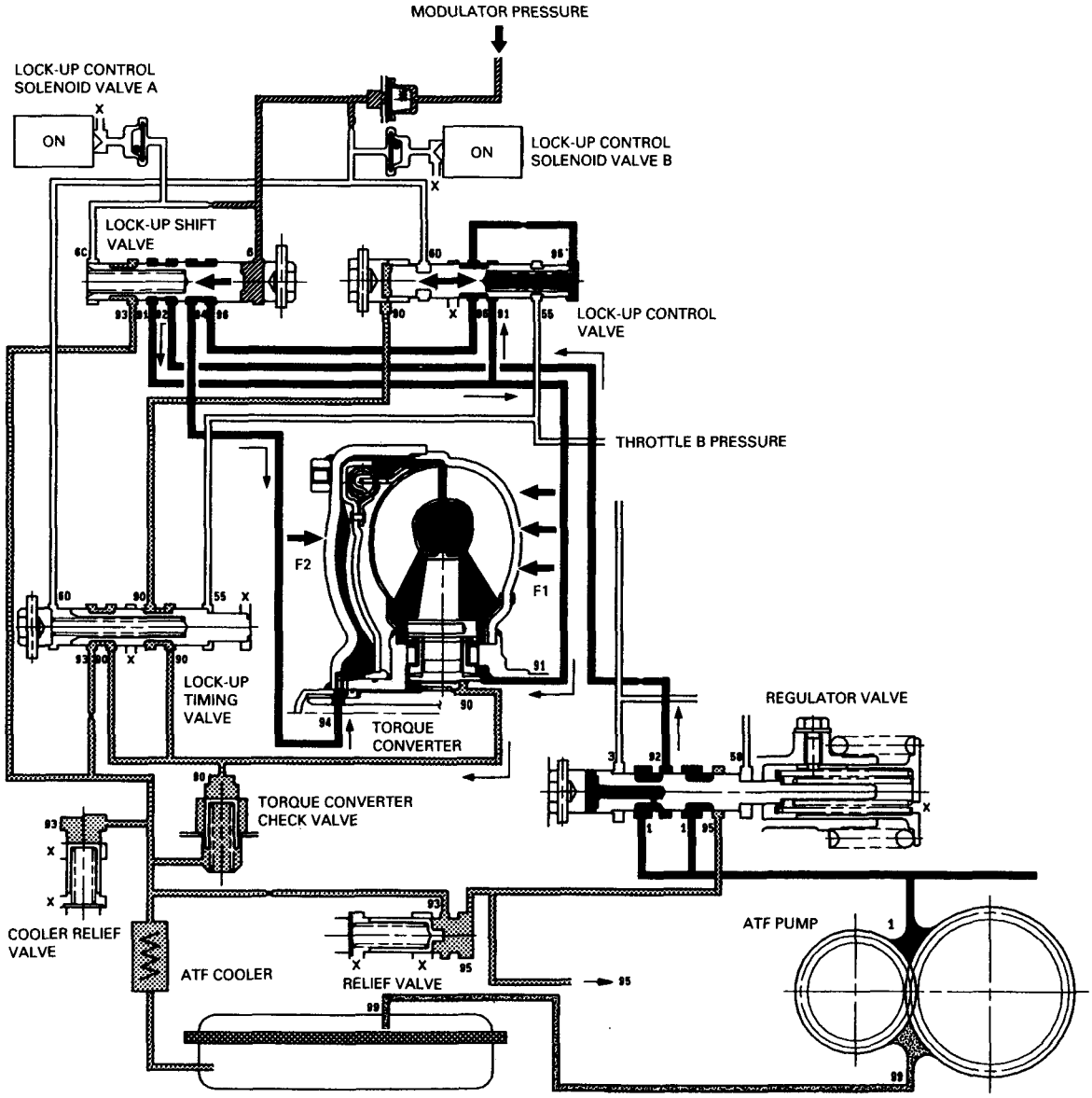
Modulator pressure is released by the solenoid valve B, causing modulator pressure in the left side of the lock-up control valve to lower.

Also, modulator pressure in the left cavity of the lock-up timing valve is low. However, throttle B pressure is still low at this time, so the lock-up timing valve is kept on the right side by the spring force.

With the lock-up control solenoid valve B turned on, the lock-up control valve is moved somewhat to the left side, causing back pressure (F2) to lower. This allows a greater amount of fluid (F1) to work on the lock-up clutch to engage it. Back pressure (F2), which still exists, prevents the clutch from engaging fully.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows '97 - '98 models; '96 model is similar.



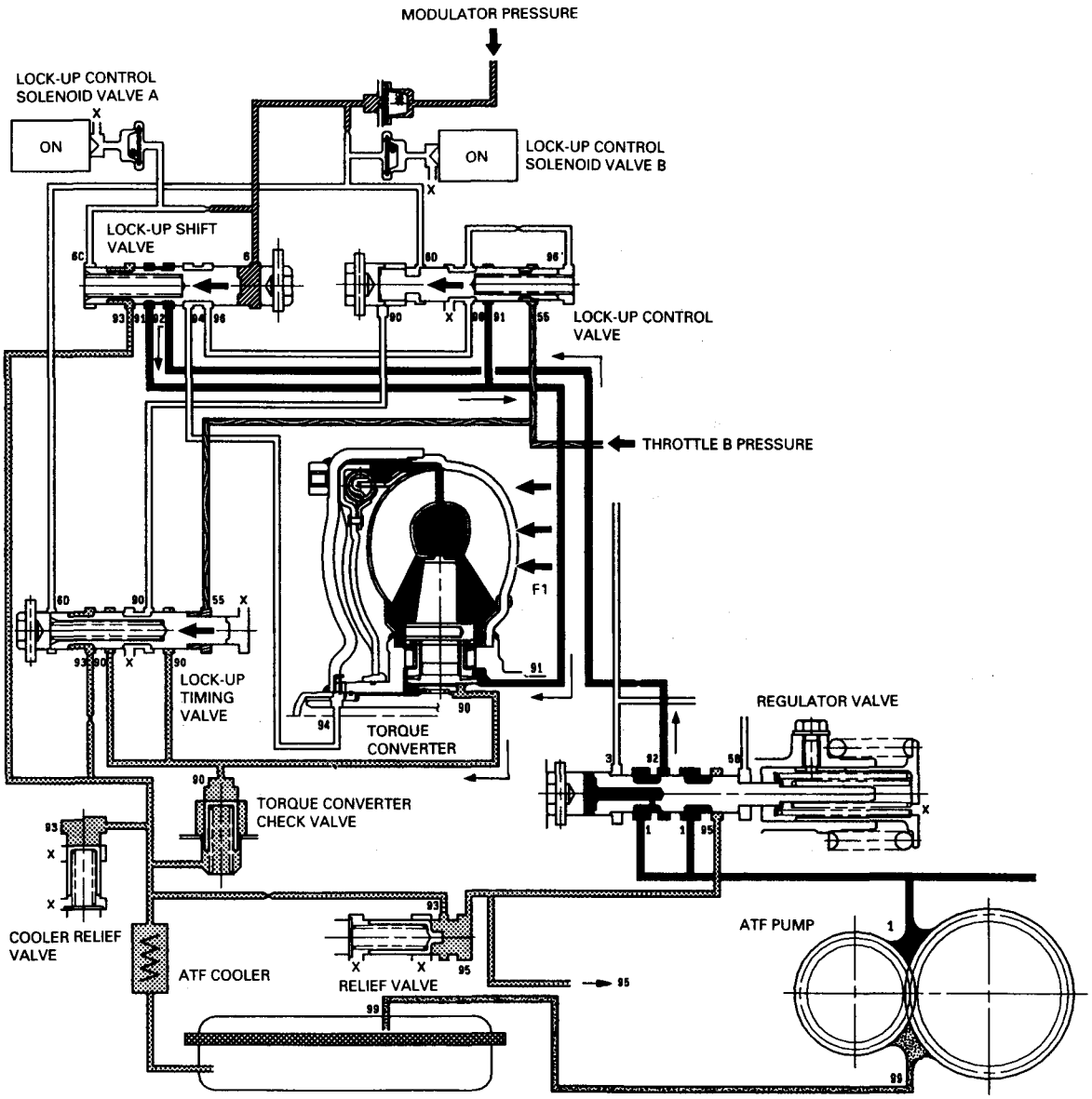
Full Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON

When the vehicle speed further increases, throttle B pressure is increased in accordance with the throttle opening. Throttle B pressure (55) flows to the right side of the lock-up timing valve and the lock-up control valve, and they are moved to the left side. The lock-up timing valve covers the port leading the torque converter pressure (90) from the torque converter to the lock-up control valve. The lock-up control valve uncovers the port to leak torque converter pressure (94) and (96). As this takes place, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows '97- '98 models; '96 model is similar.



(cont'd)

Description

Lock-up System (cont'd)

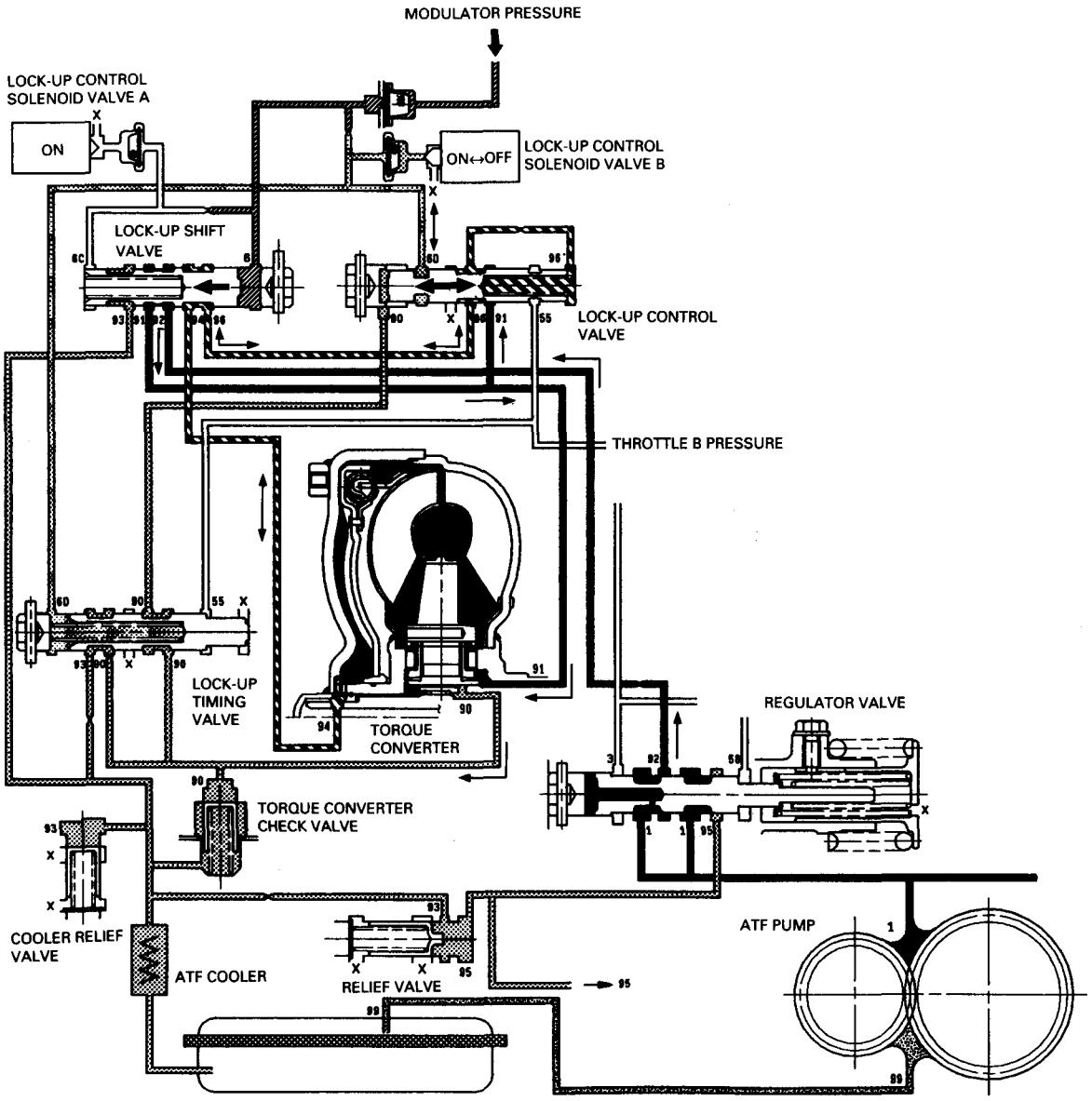
Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty Operation (ON↔OFF)

The PCM switches solenoid valve B on and off rapidly under certain conditions. The slight lock-up and half lock-up regions are maintained to lock the torque converter properly.

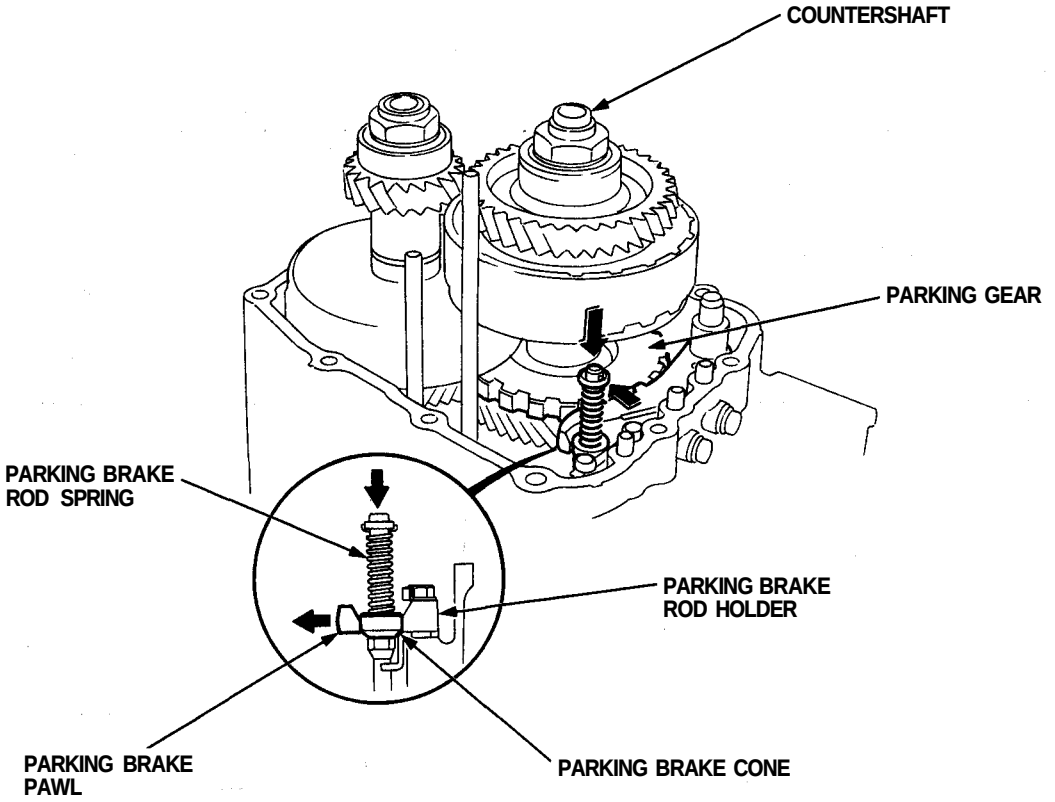
NOTE:

- When used, "left" or "right" indicates direction on the hydraulic circuit.
- The hydraulic circuit shows '97 - '98 models; '96 model is similar.



Parking Brake Mechanism

The parking brake mechanism locks the transmission by engaging the parking brake pawl with the parking gear which is splined to the countershaft.
Shifting to [P] position causes the parking brake cone (installed at the end of the parking brake rod) to press the parking brake pawl onto the parking gear. Even if the end of the parking brake pawl rides on top of the parking gear teeth. slight movement of the countershaft will cause the parking brake pawl and the parking gear to mesh with each other completely because the parking brake cone receives tension from the parking brake rod spring. The parking brake pawl receives the tension (which acts to separate the parking brake pawl from the parking gear) from the parking pawl spring.

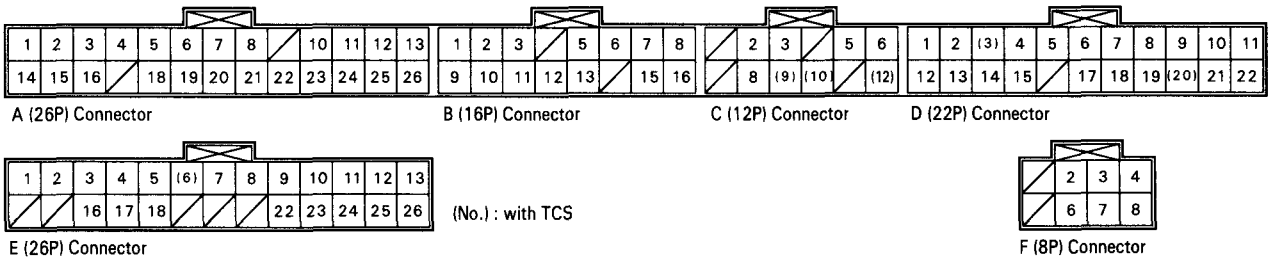


PCM Terminal Voltage/Measuring Conditions

A/T Control System

The PCM terminal voltage and measuring conditions are shown for the connector terminals that are related to the A/T control system. The other PCM terminal voltage and measuring conditions are described in section 11.

PCM Terminal Locations



PCM CONNECTOR A (26P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A1 to A11	-see section 11 -		
A12	PG1	Ground	
A13	IGP1	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
A14 to A24	- see section 11-		
A25	PG2	Ground	
A26	LG1	Ground	

PCM CONNECTOR B (16P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
B1	IGP2	Power supply system	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
B2 to B8	- see section 11 -		
B9	LG2	Ground	
B10 to B12	- see section 11 -		
B13	VSS	Vehicle Speed Sensor (VSS) signal Input	With ignition switch ON (II) and rotating front wheels: 0V - 5V cycle
B14 to B16	- see section 11-		

PCM CONNECTOR C (12P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
C1 to C4	-see section 11 -		
C5	SCS	Service check signal	With ignition switch ON (II) and service check connector open: 5 V With ignition switch ON (II) and service check connector connected with special tool: 0 V
C6 to C12	- see section 11-		

PCM CONNECTOR D (22P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
D1	VBU	Back-up power system	Always battery voltage
D2 to D5	- see section 11 -		
D6	TPS	Throttle Position (TP) sensor signal input	With ignition switch ON (II) and throttle fully open: About 4.8 V With ignition switch ON (II) and throttle fully closed: About 0.1 V
D7	ECT	Engine Coolant Temperature (ECT) sensor signal input	With ignition switch ON (II) and depending on engine coolant temperature: About 0.1 V - 4.8 V
D8 to D20	- see section 11 -		
D21	VCC2	Sensors power supply circuit	With ignition switch ON (II): About 5 V
D22	SG2	Sensors ground	

PCM CONNECTOR E (26P)

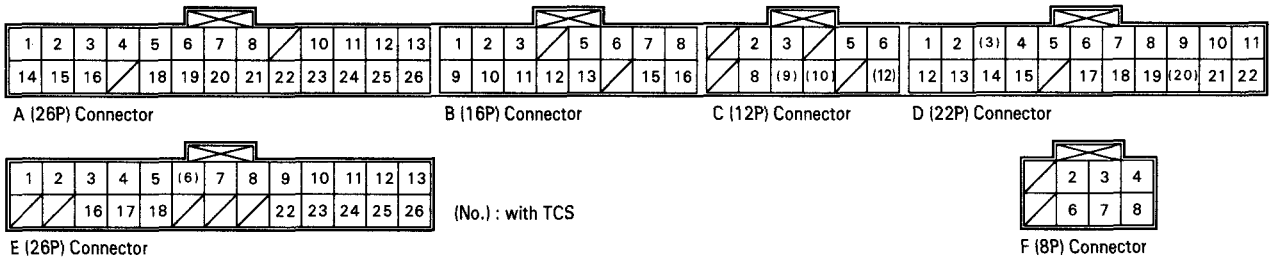
Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
E1	VBSOL	Power supply circuit for shift and lock-up control solenoid valves	With ignition switch ON (II): Battery voltage With ignition switch OFF: 0 V
E2	STOP SW	Brake switch signal input	With ignition switch ON (II) and brake pedal depressed: Battery voltage With ignition switch ON (II) and brake pedal released: 0 V
E3	LS+	Linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsing signal
E4	NM	Mainshaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When engine is stopped: 0 V
E5	NC	Countershaft speed sensor signal input	Depending on vehicle speed: Pulsing signal When vehicle is stopped: 0 V
E6	TCSFT	A/T gear position signal for traction control output	With ignition switch ON (II): Pulsing signal
E7	ATPR	A/T gear position switch R position signal input	In R position: 0 V In other than R position: Battery voltage
E8	ATPD4	A/T gear position switch D4 position signal input	In D4 position: 0 V In other than D4 position: Battery voltage
E9	ATPD3	A/T gear position switch D3 position signal input	In D3 position: 0 V In other than D3 position: Battery voltage
E10	ATP2	A/T gear position switch 2 position signal input	In 2 position: 0 V In other than 2 position: Battery voltage
E11	ATP1	A/T gear position switch 1 position signal input	In 1 position: 0 V In other than 1 position: Battery voltage
E12	SHA	Shift control solenoid valve A control	In 2 position, in 2nd and 3rd gear in D3, D4 position: Battery voltage In 1 position, in 1st gear in D3, D4 position, in 4th gear in D4 position: 0 V

(cont'd)

PCM Terminal Voltage/Measuring Conditions

A/T Control System (cont'd)

PCM Terminal Locations



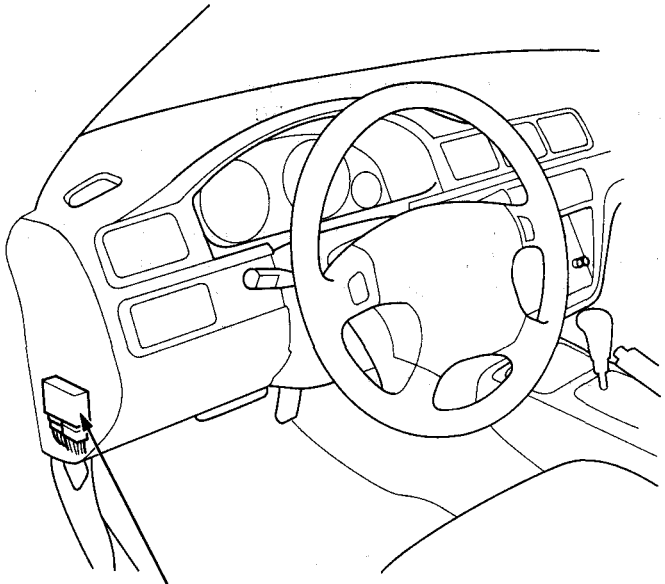
PCM CONNECTOR E (26P) (cont'd)

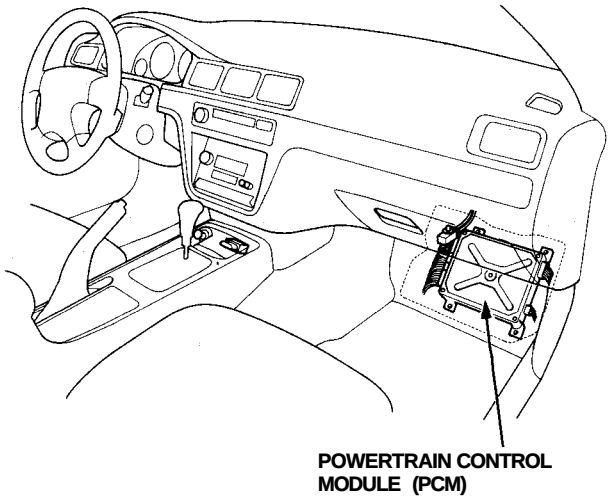
Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
E13	LCA	Lock-up control solenoid valve A control	When lock-up is ON: Battery voltage With no lock-up: 0 V
EH	———	Not used	
E15	———	Not used	
E16	LS-	Linear solenoid power supply negative electrode	With ignition switch ON (II): Pulsing signal
E17	NMSG	Mainshaft speed sensor ground	Always: 0 V
E18	NCSG	Countershaft speed sensor ground	Always: 0 V
E19	———	Not used	
E20	———	Not used	
E21	———	Not used	
E22	ILU	Interlock control	When ignition switch is ON (II), brake pedal depressed and accelerator pedal released: Battery voltage
E23	D4IND	A/T gear position switch [D4] position signal output	When ignition switch is first turned ON (II): Battery voltage for two seconds In [D4] position: 5V or more In other than [D4] position: 0 V
E24	ATPPN	A/T gear position switch [P] and [N] position signals output	In [P] and [N] positions: 5 V or more In other than [P] and [N] positions: 0 V
E25	SHB	Shift control solenoid valve B control	In [1], [2] position, in 1st and 2nd gear in [D3], [D4] position: Battery voltage In 3rd gear in [D3], [D4] position, in 4th gear in [D4] position: 0 V
E26	LCB	Lock-up control solenoid valve B control	During half and full lock-up and during deceleration: Pulsing 0 V and battery voltage During no lock-up: 0 V

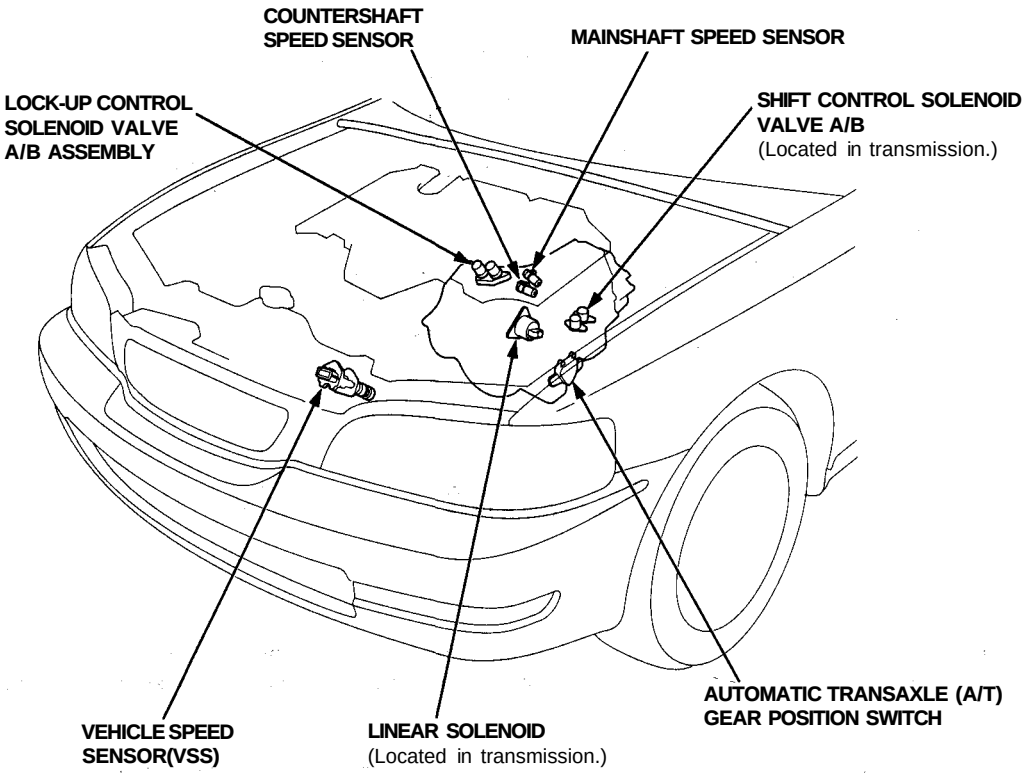
PCM CONNECTOR F (8P)

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
F1 to F8	- see section 11-		

Component Locations







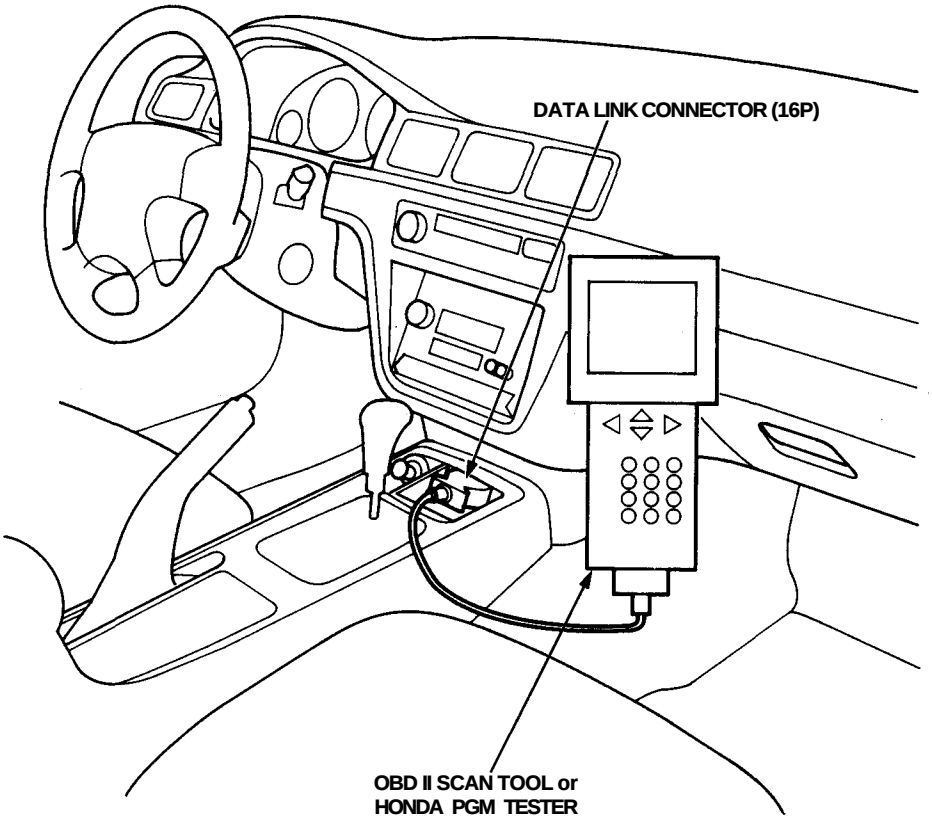
Troubleshooting Procedures

**Checking the Diagnostic Trouble Code (DTC)
with an OBD II Scan tool or Honda PGM Tester**

When the PCM senses an abnormality in the input or output systems, the D4 indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located behind the ashtray) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON (II).

When the D4 indicator light has been reported on, connect the OBD II Scan Tool conforming to SAE J1978 or Honda PGM Tester to the DLC (16P) behind the ashtray. Turn the ignition switch on (II), and observe the DTC on the screen of the OBD II Scan Tool or Honda PGM Tester. After determining the DTC, refer to the electrical system Symptom-to-Component Chart on page 14-68 and 14-69.

NOTE: See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instructions.



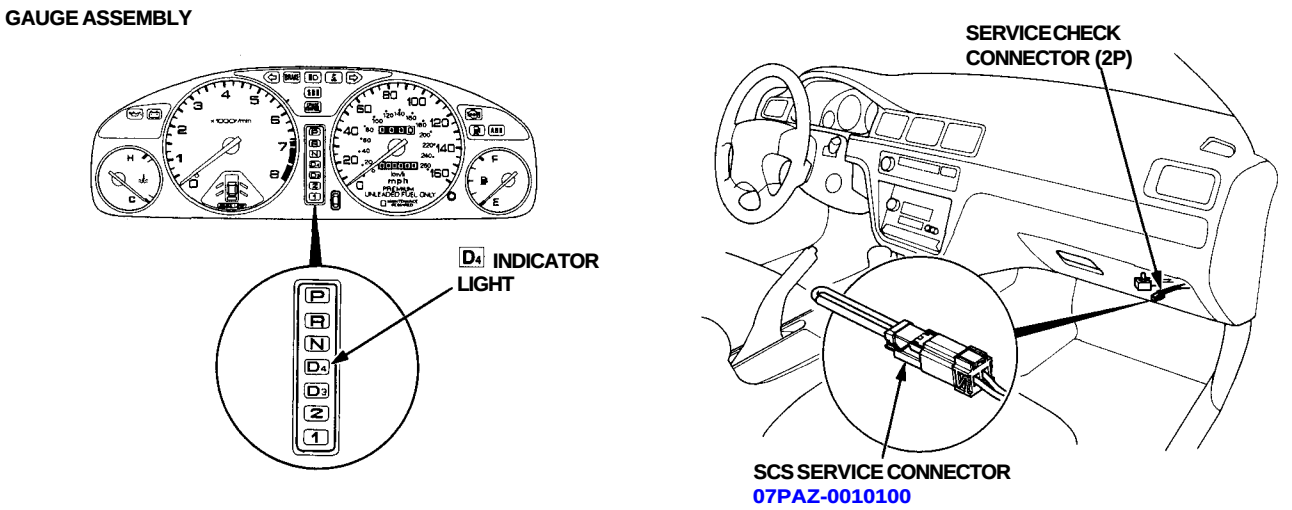
Some PGM-FI problems will also make the D4 indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP, RADIO fuse (10 A) in the under-hood fuse/relay box for more than 10 seconds to reset the PCM memory, then retest.

NOTE: Disconnecting the BACK UP, RADIO fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

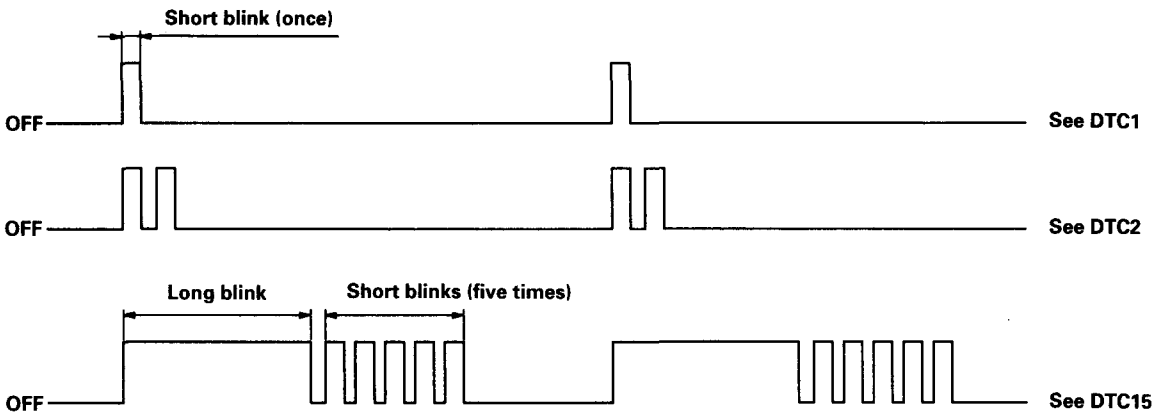
Checking the Diagnostic Trouble Code (DTC)
with the Service Check Connector and Special Tool

When the PCM senses an abnormality in the input or output systems, the D4 indicator light in the gauge assembly will blink. When the Service Check Connector (located under the dash on the passenger side) is connected with the special tool as shown, the D4 indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned on (II).

When the D4 indicator light has been reported on, connect the Service Check Connector with the special tool. Then turn the ignition switch on (II) and observe the D4 indicator light.



Codes 1 through 9 are indicated by individual short blinks. Codes 10 and above are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to Component Chart on pages 14-68 and 14-69.



Some PGM-FI problems will also make the D4 indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP, RADIO fuse (10 A) in the under-hood fuse/relay box for more than 10 seconds to reset the PCM memory, then retest.

NOTE: Disconnecting the BACK UP, RADIO fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

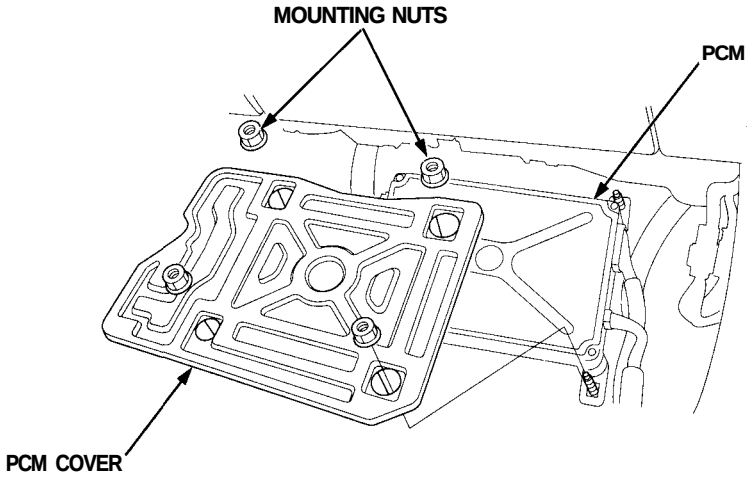
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Troubleshooting Procedures

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SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

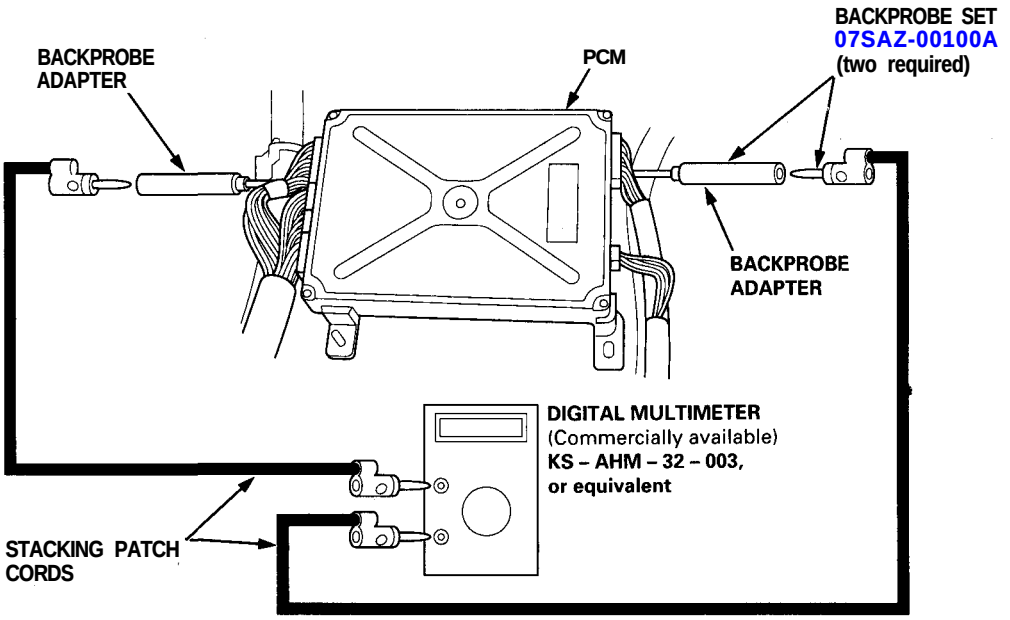
1. Remove the heater lower cover on the passenger's side (see section 20).
2. Pull the carpet back to expose the PCM cover.
3. Remove the PCM cover mounting nuts, then turn the PCM over.



4. Inspect the circuit on the PCM according to the troubleshooting flowchart with the special tools and a digital multimeter as shown.

How to use the Backprobe Set

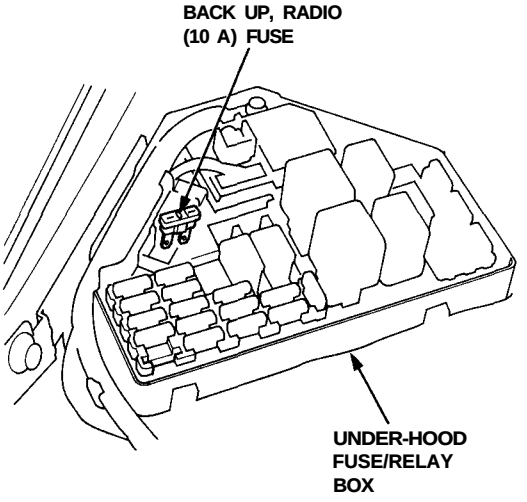
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.



PCM Reset Procedure

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Turn the ignition switch OFF.
3. Remove the BACK UP, RADIO fuse (10 A) from the under-hood fuse/relay box for 10 seconds to reset the PCM.

   NOTE: The PCM memory can also be cleared by using the OBD II Scan Tool or Honda PGM Tester.



Final Procedure

NOTE: This procedure must be done after any troubleshooting.

1. Turn the ignition switch OFF.
2. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector (16P), or remove the special tool from the Service Check Connector.
3. Reset the PCM.
4. Turn the ignition switch ON (II).
5. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Symptom-to-Component Chart

Electrical System

Diagnostic Trouble Code (DTC)*	D4 Indicator Light	Symptom	Possible Cause	Refer to Page
P1753 (1)	Blinks	• Lock-up clutch does not engage. • Lock-up clutch does not disengage.	• Disconnected lock-up control solenoid valve A connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A • Open in VB SOL line	14-70
P1758 (2)	Blinks	• Lock-up clutch does not engage.	• Disconnected lock-up control solenoid valve B connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B • Open in VB SOL line	14-72
P1791 (4)	Blinks	• Lock-up clutch does not engage.	• Disconnected vehicle speed sensor (VSS) connector • Short or open in VSS wire • Faulty VSS	14-74
P1705 (5)	Blinks	• Fails to shift other than 2nd - 4th gears. • Lock-up clutch does not engage.	• Short in A/T gear position switch wire • Faulty A/T gear position switch	14-75
P1706 (6)	OFF	• Fails to shift other than 2nd - 3rd - 4th gears. • Lock-up clutch does not engage.	• Disconnected A/T gear position switch connector • Open in A/T gear position switch wire • Faulty A/T gear position switch	14-78
P0753 (7)	Blinks	• Fails to shift (between 1st - 4th or 2nd - 3rd gear only). • Fails to shift (stuck in 4th gear).	• Disconnected shift control solenoid valve A connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A • Open in VB SOL line	14-80
P0758 (8)	Blinks	• Fails to shift (stuck in 1st or 4th gears).	• Disconnected shift control solenoid valve B connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B • Open in VB SOL line	14-82
P0720 (9)	Blinks	• Lock-up clutch does not engage.	• Disconnected countershaft speed sensor connector • Short or open in countershaft speed sensor wire • Faulty countershaft speed sensor	14-84
P0715 (15)	'96, '97 models OFF '98 model Blinks	• Transmission jerks hard when shifting. • Lock-up clutch dose not engage.	• Disconnected mainshaft speed sensor connector • Short or open in mainshaft speed sensor wire • Faulty mainshaft speed sensor	14-86
P1768 (16)	Blinks	• Transmission jerks hard when shifting. • Lock-up clutch does not engage. • Fails to shift (stuck in 4th gear).	• Disconnected linear solenoid connector • Short or open in linear solenoid wire • Faulty linear solenoid • Open in VB SOL line	14-88

(DTC)*: The DTCs in parentheses are the codes of the D4 indicator light indicates when the service check connector is connected to the special tool (SCS service connector).

Diagnostic Trouble Code (DTC)*	D4 Indicator Light	Symptom	Possible Cause	Refer to Page
P0740 (40)	OFF	• Lock-up clutch does not engage.	• Faulty lock-up control system	14-89
P0730 (41)	OFF	• Fails to shift (between 1st - 2nd, 2nd - 4th or 2nd - 3rd gears only). • Fails to shift (stuck in 1st or 4th gears).	• Faulty shift control system	14-90

(DTC)*: The DTCs in parentheses are the codes of the D4 indicator light indicates when the service check connector is connected to the special tool (SCS service connector).

If the self-diagnostic D4 indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
D4 indicator light does not come on for two seconds after ignition switch is first turned on (II).	———	14-91
D4 indicator light is on constantly (not blinking) whenever the ignition switch is on (II).	———	14-93
Shift lever cannot be moved from P position with the brake pedal depressed.	Check brake switch signal.	14-94

NOTE: Sometimes the D4 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously. If so, repair the PGM-FI system according to the DTC, then reset the memory by removing the BACK UP, RADIO fuse in the under-dash fuse/relay box for more than 10 seconds. Drive the vehicle for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.

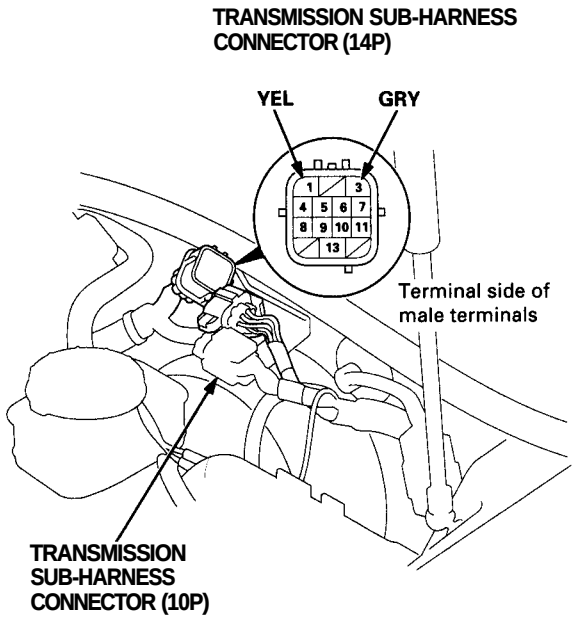
Lock-up Control Solenoid Valve A/B

Test

1. Disconnect the transmission sub-harness connector (14P).

2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the transmission sub-harness connector and body ground, and between the No. 3 terminal (solenoid valve B) and body ground.

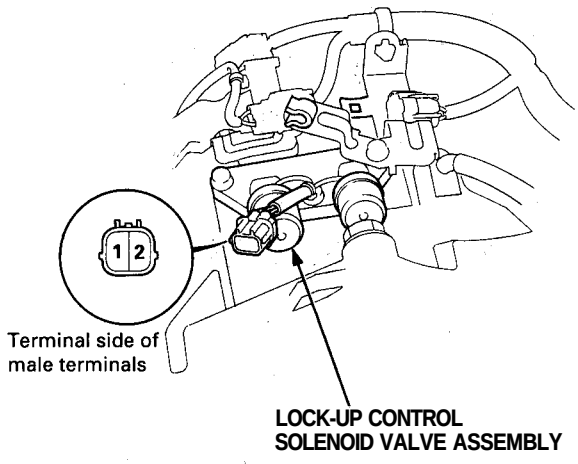
   STANDARD: 12 - 25 Ω



3. If the resistance is out of specification, disconnect the 2P connector from the lock-up control solenoid valve A/B.

4. Measure the resistance between the No. 2 terminal (solenoid valve A) of the lock-up control solenoid connector and body ground, and between the No. 1 terminal (solenoid valve B) and body ground.

   STANDARD: 12 - 25 Ω



- If the resistance is OK, replace the transmission sub-harness.
- Replace the lock-up control solenoid valve assembly if the resistance is out of specification.

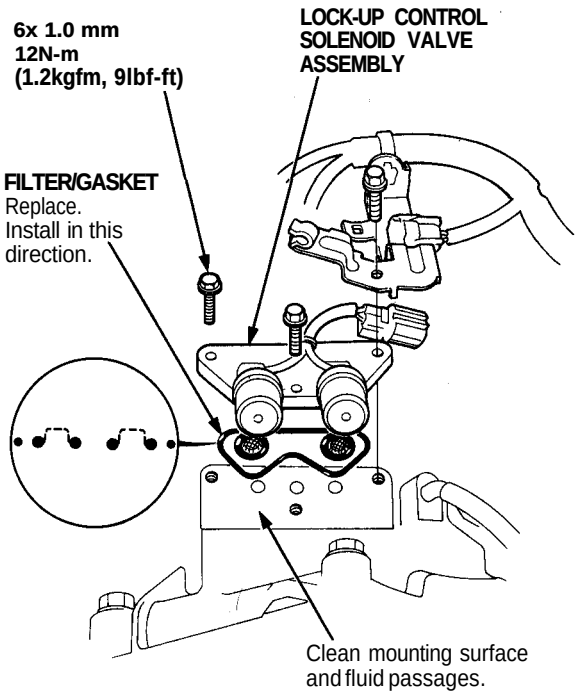
5. If the resistance is within the standard, connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve assembly if no clicking sound is heard.

Lock-up Control Solenoid Valve A/B

Replacement

NOTE: Lock-up control solenoid valve A and B must be replaced as an assembly.

1. Remove the mounting bolts and lock-up control solenoid valve assembly.



2. Clean the mounting surface and fluid passages of the lock-up control solenoid valve assembly, and install a new lock-up control solenoid valve A/B with a new filter/gasket.

   NOTE: Install the filter/gasket in the direction shown.

3. Check the connector for rust, dirt or oil, then reconnect it securely.

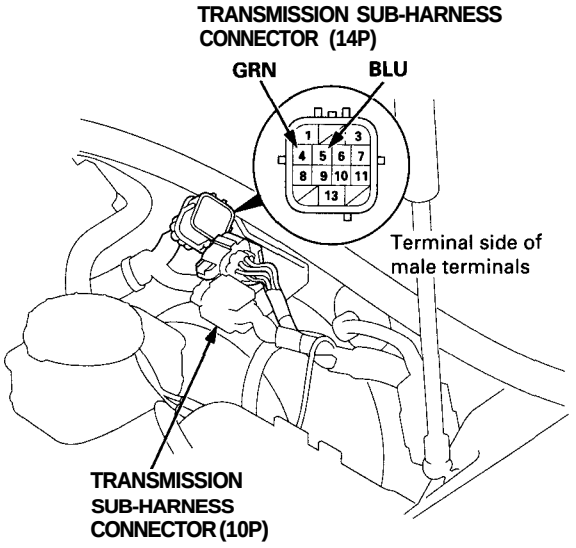
Shift Control Solenoid

Test

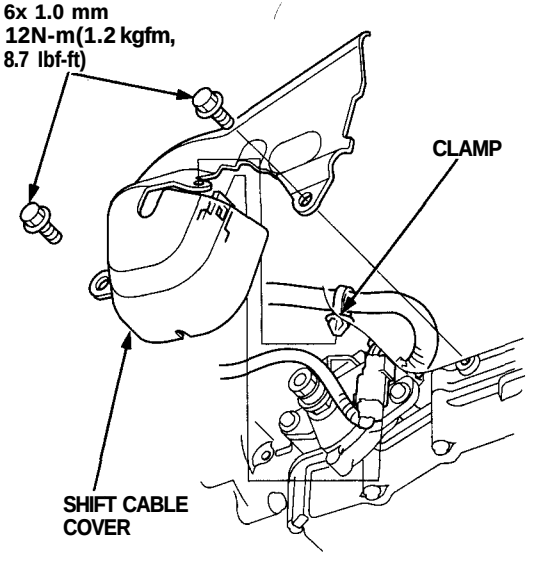
1. Disconnect the transmission sub-harness connector (14P).

2. Measure the resistance between the No. 4 terminal of the transmission sub-harness connector and body ground, and between the No. 5 terminal and body ground.

STANDARD: 12-25 Ω

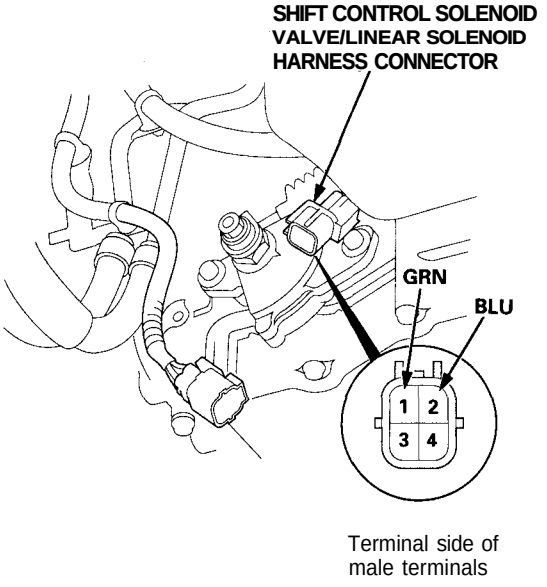


3. If the resistance is out of specification, remove the shift cable cover, and disconnect the shift control solenoid valve/linear solenoid harness connector.



4. Measure the resistance between the No. 1 terminal of the shift control solenoid valve/linear solenoid harness connector and body ground, and between the No. 2 terminal and body ground.

STANDARD: 12-25 Ω



- Replace the transmission sub-harness if the resistance is within specification.
- Replace the shift control solenoid valve assembly if the resistance is out of specification.

5. If the resistance is within the standard, connect the No. 2 terminal of the shift control solenoid valve/linear solenoid harness connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 1 terminal to the battery positive terminal. A clicking sound should be heard. If no clicking sound is heard, replace the shift control solenoid valve assembly.

NOTE: If solenoid valve replacement is required, see the following headings:

- Lower Valve Body
  Removal/Installation 14-121
  Disassembly/Reassembly
  '96 Model 14-122
  '97 -'98 Models 14-123
- Shift Control Solenoid Valve A/B
  Test 14-125
  Replacement 14-125

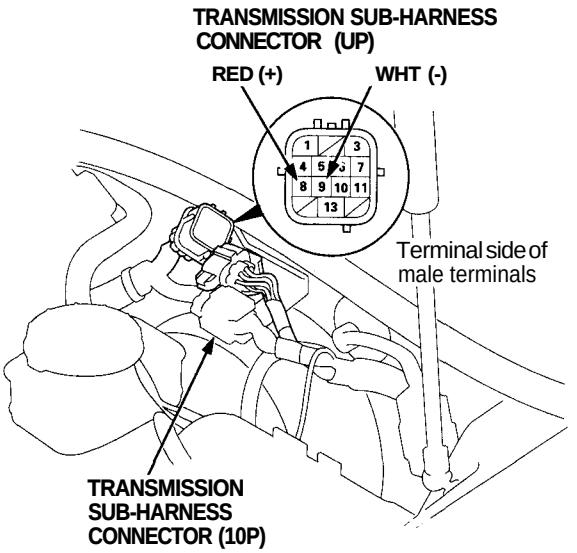
Linear Solenoid

Test

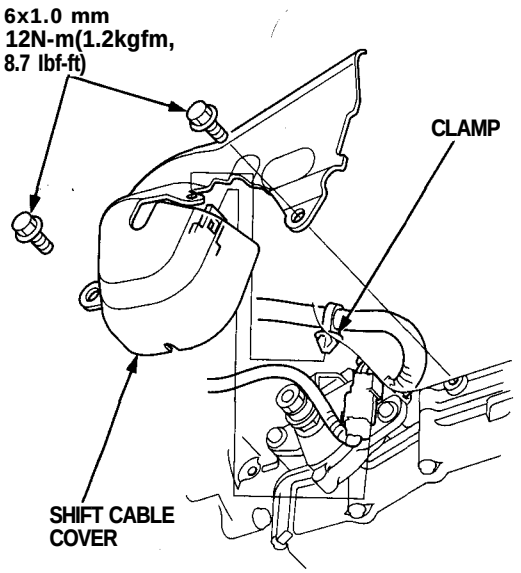
1. Disconnect the transmission sub-harness connector (HP).

2. Measure the resistance between the No. 8 and No. 9 terminals of the transmission sub-harness connector.

STANDARD: 4.8 - 5.6 Ω (at 70°F, 20°C)

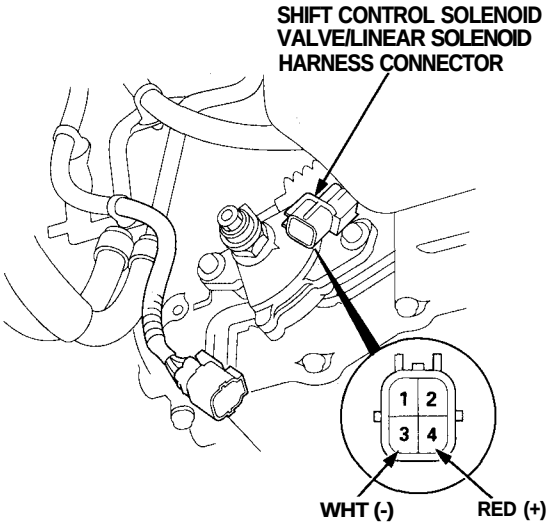


3. If the resistance is out of specification, remove the shift cable cover, and disconnect the shift control solenoid vatve/linear solenoid harness connector.



4. Measure the resistance between the No. 3 and No. 4 terminals of the shift control solenoid valve/linear solenoid harness connector.

STANDARD: 4.8 - 5.6 Ω (at 70°F, 20°C)



- Replace the transmission sub-harness if the resistance is within specification.
- Replace the linear solenoid if the resistance is out of specification.

5. If the resistance is within the standard, connect the No. 4 terminal of the shift control solenoid valve/linear solenoid harness connector to the battery positive terminal, and connect the No. 3 terminal to the battery negative terminal. A clicking sound should be heard. If no clicking sound is heard, replace the linear solenoid,

NOTE: If the linear solenoid replacement is required, see the following headings:

- Lower Valve Body
  Removal/Installation 14-121
  Disassembly/Reassembly
  '96 Model 14-122
  '97 -'98 Models 14-123
- Throttle Valve Body/Linear Solenoid
  Replacement 14-124

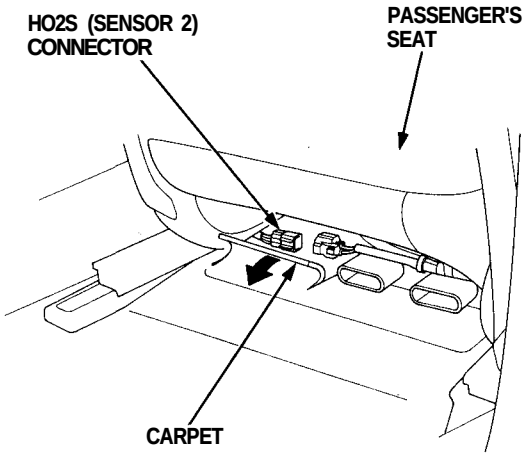
Mainshaft/Countershaft Speed Sensors

Replacement

⚠ WARNING Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).

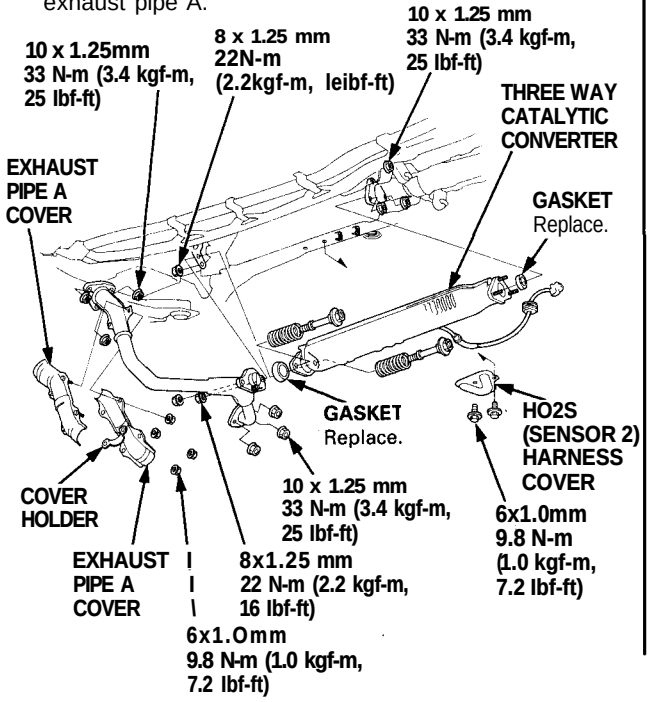
1. Pull the carpet back to expose the secondary heated oxygen sensor (HO2S sensor 2) connector. Disconnect the connector, then push it out to the outside.

   NOTE: The H02S (sensor 2) connector is located under the passenger's seat.

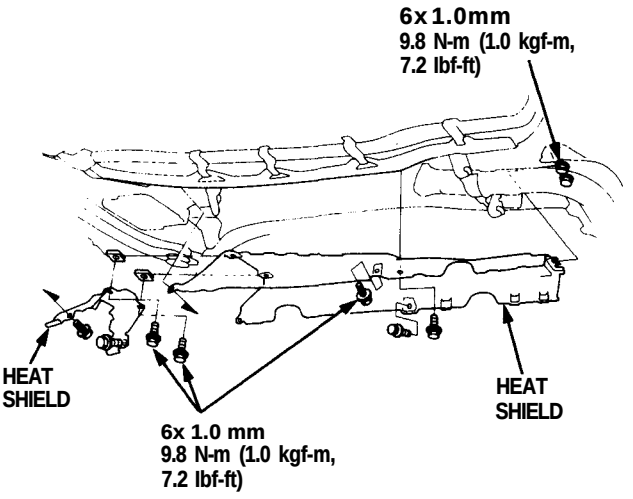


2. Remove the HO2S (sensor 2) harness cover, then remove the three way catalytic converter.

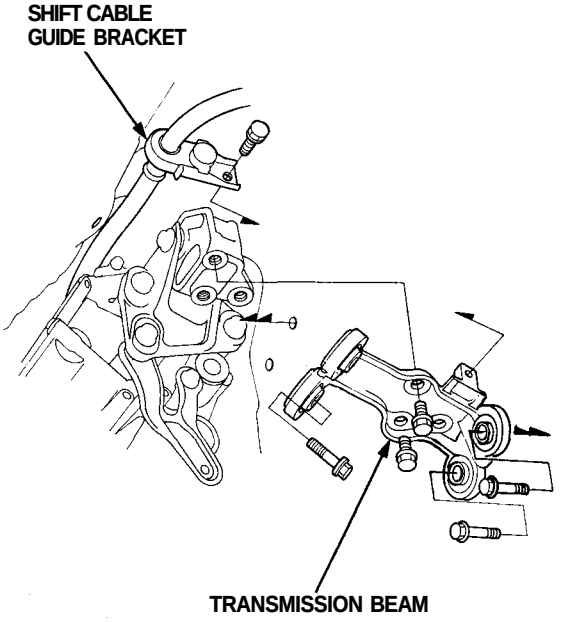
3. Remove the exhaust pipe A cover, then remove the exhaust pipe A.



4. Remove the heat shields.



5. Remove the bolt securing the shift cable guide bracket, then remove the transmission beam.

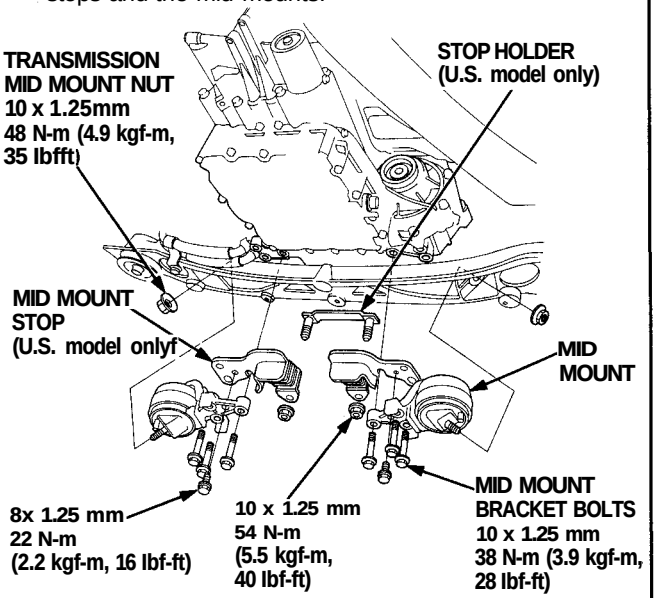


(cont'd)

Mainshaft/Countershaft Speed Sensors

Replacement (cont'd)

6. Place a jack under the transmission, and raise the transmission just enough to take the weight off of the mounts, then remove the stop holder, the mid mount stops and the mid mounts.

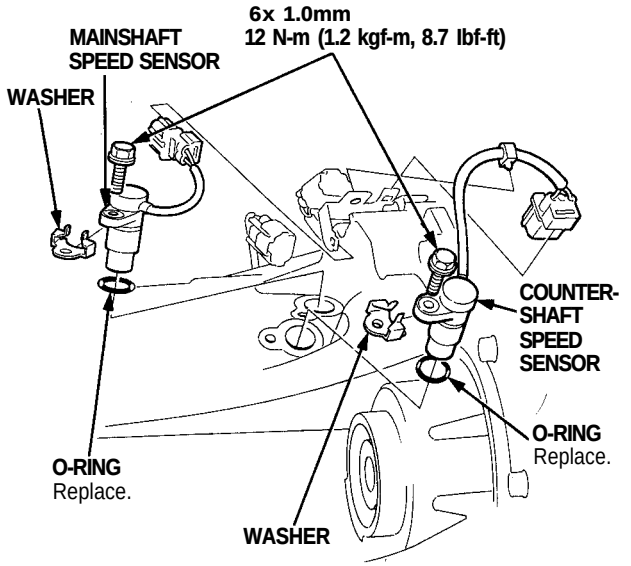


7. Lower the transmission with a jack.

8. Remove the 6 mm bolt from the transmission housing, and remove the mainshaft and countershaft speedsensors.

9. Replace the O-rings with new ones before reassembling the mainshaft and countershaft speed sensors.

10. Install the washers on the mainshaft and countershaft speed sensors, then install them on the transmission housing.

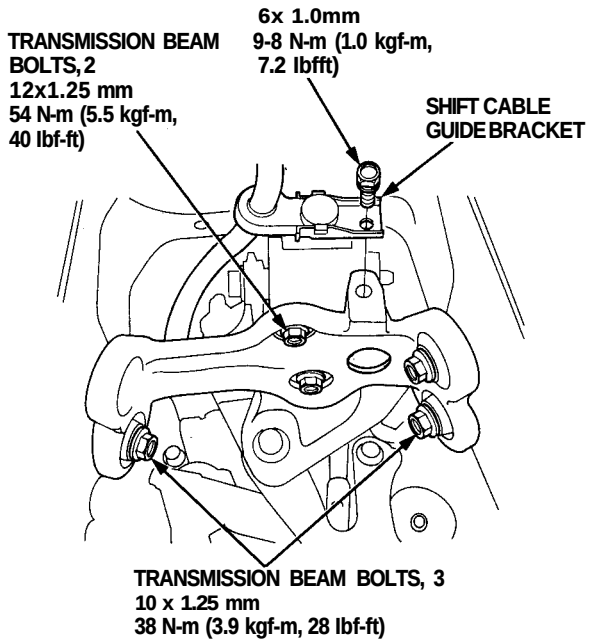


11. Raise the transmission with a jack, then install the mid mounts. Tighten the mid mount bracket bolts, then tighten the mid mount nuts.

12. Install the transmission beam on the rear transmission mount bracket/mount, then tighten the three bolts loosely.

13. Tighten the three transmission beam bolts, then tighten the two transmission beam bolts to the specified torque.

14. Install the shift cable guide bracket on the transmission beam.



15. Install the heat shields.

16. Install the exhaust pipe A and the three way catalytic converter, then install the exhaust pipe A cover.

17. Push the H02S (sensor 2) connector into the vehicle, then secure with the harness grommet.

18. Install the H02S (sensor 2) harness cover.

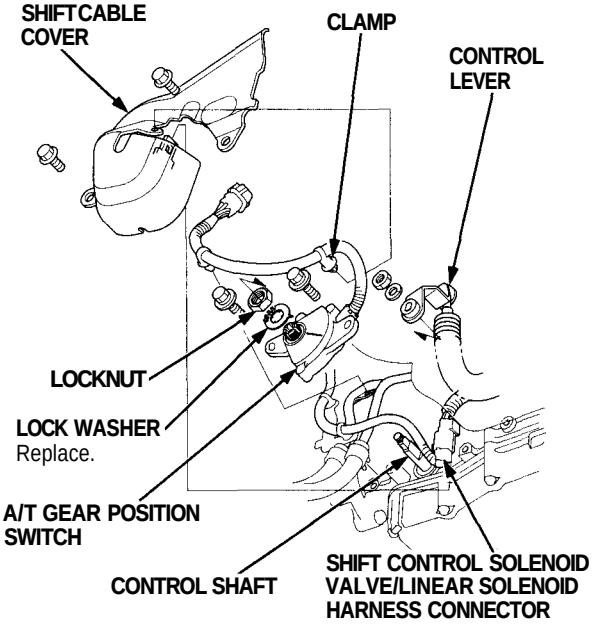
19. Connect the HO2S (sensor 2) connector.

A/T Gear Position Switch

Replacement

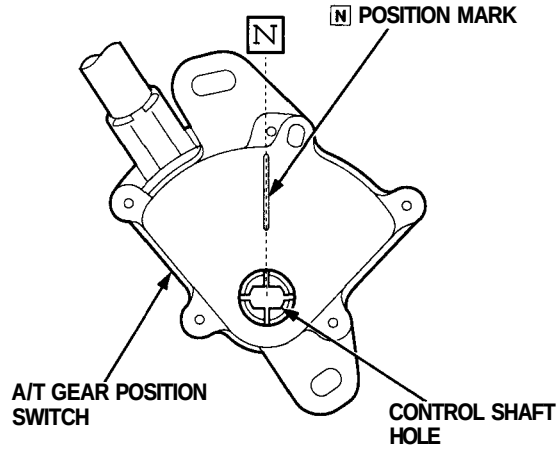
⚠ WARNING Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift the transmission to the [N] position.
4. Remove the shift cable cover mounting bolts.

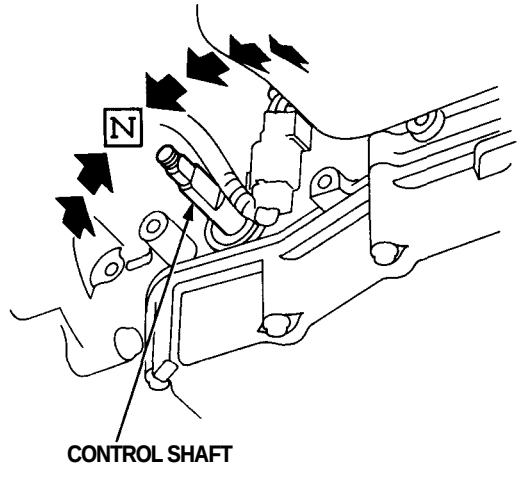


5. Remove the A/T gear position switch harness clamp and the shift control solenoid valve/linear solenoid harness connector from the shift cable cover.
6. Remove the shift cable cover from the transmission housing.
7. Remove the control lever.
8. Remove the locknut and lock washer.
9. Disconnect the A/T gear position switch harness connector and harness clamp, then remove the A/T gear position switch from the control shaft.
10. Set a new A/T gear position switch to the [N] position as shown.

    NOTE: The A/T gear position switch clicks in the [N] position.



11. Set the control shaft to the [N] position.

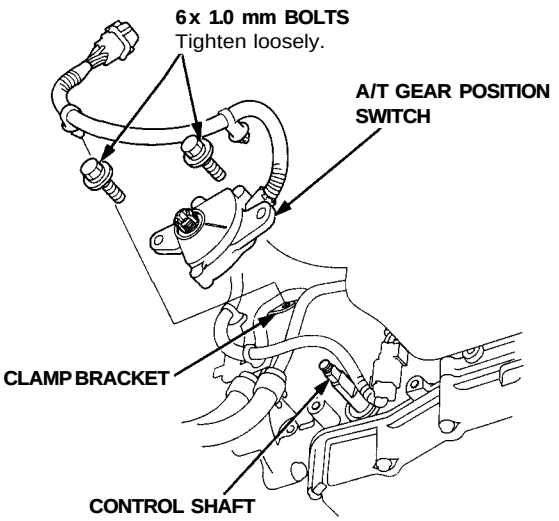


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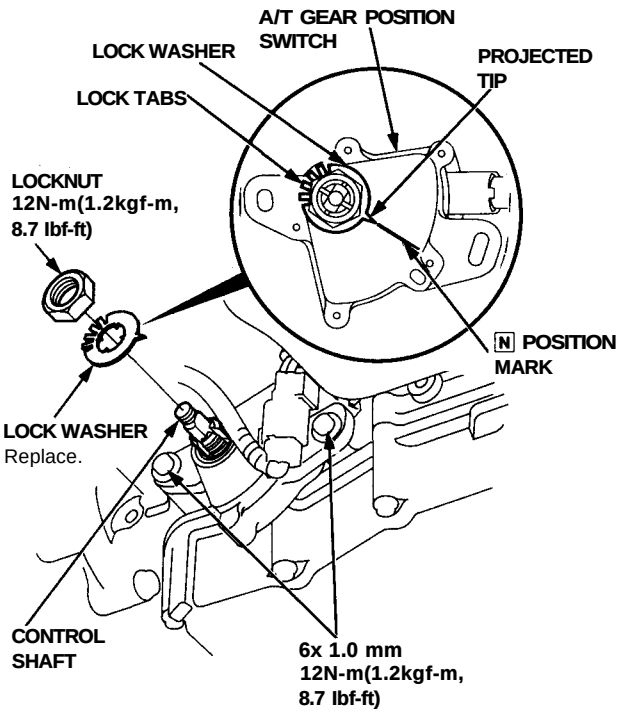
A/T Gear Position Switch

Replacement (cont'd)

12. Install the A/T gear position switch on the control shaft, and tighten the bolts loosely.



13. Install a new lock washer on the A/T gear position switch by aligning its projected tip with the N position mark on the A/T gear position switch as shown.

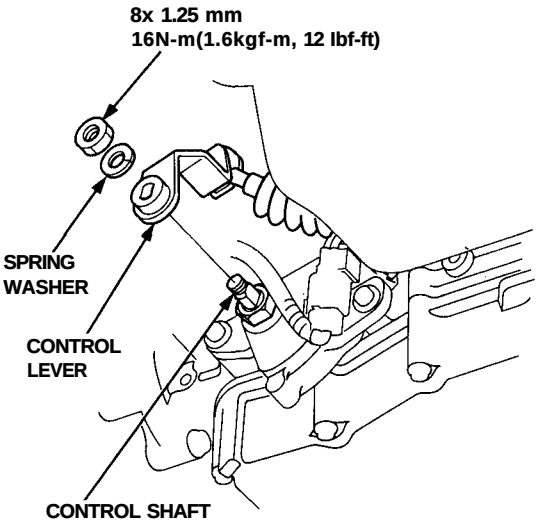


14. Tighten the locknut while holding the control shaft, then bend the lock tabs against the locknut.

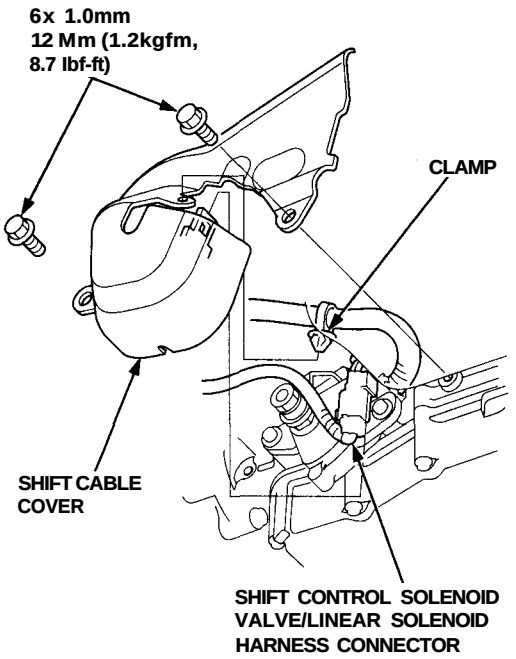
15. Tighten the 6 mm bolts to the specified torque.

16. Install the control lever.

CAUTION: Take care not to bend the shift cable.



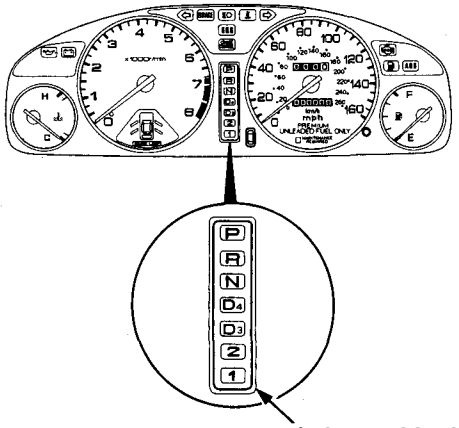
17. Connect the A/T gear position switch connector, and clamp the harness on the clamp bracket.



18. Install the shift cable cover, and install the shift control solenoid valve/linear solenoid harness connector and the A/T gear position switch harness clamp on the shift cable cover, then tighten the bolts.

19. Turn the ignition switch ON (II). Move the shift lever through all gears, and check the A/T gear position switch synchronization with the A/T gear position indicator.

GAUGE ASSEMBLY



A/T GEAR POSITION INDICATOR

20. If the A/T gear position switch is not synchronized with the A/T gear position indicator, loosen the bolts securing the A/T gear position switch and adjust the A/T gear position switch installation.

21. Start the engine. Move the shift lever through all gears, and verify the following:

- The shift lever cannot be moved to the [R] position from the [N] position without pushing the shift lever.
- The engine will not start in any gear, only in the [N] or [P] position.
- The back-up lights come on when the shift lever is in the [R] position.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1,2,3,4,5,6,7,37,42	K, L, R, S
Vehicle moves in 2, but not in D3, D4, or 1 position.	5, 8, 9, 59, 60, 61 ('96)	C, M, 0
Vehicle moves in D3, D4, 1 R but not in 2 position.	5, 10, 11,60	C, L
Vehicle moves in D3, D4, 2 1 but not in R position.	5,12,58	C, L, Q
Vehicle moves in D3 D4 2 but not in 1 position.	5, 9, 59	C, L, M
Vehicle moves in N position.	9,11,13,31,32,34,35,36	C, D
Excessive idle vibration	2, 33, 37, 48, 49	B, K, L
Poor acceleration; flares on starting off in D3 position		
Stall rpm high in D4 D3 2 1 position	1, 2, 3, 5, 42, 45	K, L, R
Stall rpm high in D4, D3, 1 position	5, 7, 9, 59	C, D
Stall rpm high in 2 position	5,11,60	C, D
Stall rpm high in R position	58	N
Stall rpm low	14, 33, 48, 49	R
No shift	41,51,52	G, L
Fails to shift in D3 position; from 1st to 3rd gear	19	
Fails to shift in D4 position; from 1st to 4th gear	19,20	
Erratic upshifting		V
1-2 upshift, 2-3 upshift, 3-4 upshift	45,64	
1-2 upshift	51	
2-3 upshift	52	
3-4 upshift	51	
Harsh upshift (1-2)	11, 16, 17, 18, 21, 27, 59, 60, 61C97 - '98), 62C97 - '98), 63, 64	C, D, E, V
Harsh upshift (2-3)	16, 17, 19, 22, 31, 60, 61C97 - '98), 62C97 - '98), 63,64	C, D, E, H, L, V
Harsh upshift (3-4)	16, 17, 20, 22, 23, 28, 29, 30, 32, 61C97 - '98), 62C97 - '98), 63, 64	C, D, E, I, L, V
Harsh downshift (2-1)	9, 27, 28, 59	O
Harsh downshift (3-2)	19, 22, 29, 39	C, D, E, H
Harsh downshift (4-3)	16, 17, 20, 22, 23, 24, 30, 40, 56, 61('97 - '98), 62C97 - '98), 63, 64	C, D, E, I
Flares on 3-4 upshift	16, 17, 20, 22, 23, 25, 28, 30, 32, 61('97 - '98), 62C97 - '98)	E, L, N, V
Excessive shock on 2-3 upshift	16, 17, 22, 39, 46, 61C97 - '98), 62C97 - '98), 64	E, L, N
Excessive shock on 3-4 upshift	16, 17, 22, 23, 28, 29, 40, 46, 61 ('97 - '98), 62C97 - '98), 64	E, L, N
Late shift from N position to D4 or D3 positions	3, 9, 26	M
Late shift from N position to R position	3, 18, 58	Q
Noise from transmission in all shift lever positions	2, 4, 7, 41	K, L, Q
Vehicle does not accelerate more than 31 mph (50 km/h).	14	
Shift^ver does not operate smoothly.	5,43	P
Fails to shift; stuck in 4th gear	17,51,52	
Transmission will not shift into parking gear in P position.	5, 15,43	P
Stall rpm high; all clutch pressures are in specification.	45	D, K, O
Lock-up clutch does not disengage.	16, 17, 47, 48, 49, 50, 53, 54, 64	E, L, V
Lock-up clutch does not operate smoothly.	16, 17, 45, 47, 48, 49, 50, 53, 54, 64	L
Lock-up clutch does not engage.	16, 17, 45, 47, 48, 49, 50, 53, 54, 63, 64	E, L, V
No engine braking in 1 position	7, 9, 51, 57	C, D
No engine braking in 2 position	7, 11,51,57,59	C, D
Vibration in all positions	37	
Position indicator light does not come on	5, 43, 55	

PROBABLE CAUSE			
1	Low ATF	41	Torque converter housing or transmission housing ball bearing worn/damaged
2	ATF pump worn or binding	42	ATF strainer clogged
3	Regulator valve stuck or spring worn	43	Joint in shift cable and transmission or body worn
4	Mainshaft worn/damaged	44	Modulator valve stuck
5	Shift cable broken/out of adjustment	45	Torque converter check valve stuck
6	Secondary drive gear, secondary driven gear, extension shaft worn/damaged	46	Foreign material in separator plate orifice
7	Countershaft worn/damaged	47	Lock-up timing valve stuck
8	1st gears worn/damaged (2 gears)	48	Lock-up shift valve stuck
9	1st clutch defective	49	Lock-up piston defective
10	2nd gears worn/damaged (2 gears)	50	Lock-up control valve stuck
11	2nd clutch defective	51	Shift control solenoid valve A defective
12	Reverse gears worn/damaged (2 gears)	52	Shift control solenoid valve B defective
13	Excessive ATF	53	Lock-up control solenoid valve A defective
14	Torque converter one-way clutch defective	54	Lock-up control solenoid valve B defective
15	Parking mechanism defective	55	A/T gear position switch defective
16	Throttle valve stuck	56	4-3 kick-down valve stuck
17	Linear solenoid defective	57	1st-hold clutch defective
18	1-2 shift valve stuck	58	Reverse clutch defective
19	2-3 shift valve stuck	59	1st gear one-way clutch worn/damaged
20	3-4 shift valve stuck	60	2nd gear one-way clutch worn/damaged
21	2nd accumulator defective	61C96)	CPC valve defective
22	3rd accumulator defective	61 ('97 -'98)	Line pressure control valve defective
23	4th accumulator defective	62C97 - '98)	Main orifice control valve defective
24	4-3 shift timing valve stuck	63	Mainshaft speed sensor defective
25	Foreign material in main orifice	64	Countershaft speed sensor defective
26	Foreign material in 1st orifice		
27	Foreign material in 2nd orifice		
28	3-4 orifice control valve stuck		
29	Foreign material in 3rd orifice		
30	Foreign material in 4th orifice		
31	3rd clutch defective		
32	4th clutch defective		
33	Engine output low		
34	Needle bearing worn/damaged		
35	Thrust washer worn/damaged		
36	Clutch clearance incorrect		
37	Drive plate defective or transmission misas-sembly		
38	2nd check ball stuck		
39	3rd check ball stuck		
40	4th check ball stuck		

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Vehicle creeps in [N] position.	R1,R2	
Vehicle does not move in [D3] or [D4] position.	R4	
Transmission locks up in [R] position.	R1	
Excessive drag in transmission.	R6	K, R
Excessive vibration, rpm related.	R7	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1	Improper clutch clearance.
R2	Improper gear clearance.
R4	One-way (sprag) clutch installed upside down.
R6	ATF pump binding.
R7	Torque converter not fully seated in ATF pump.
R8	Main seal improperly installed.
R9	Springs improperly installed.
R10	Valves improperly installed.
R11	Check valve balls not installed.

NOTES	
A	Flush the ATF cooler and cooler line (see flushing procedure in the '95 - '98 Acura 2.5TL Service Manual, 61SW504).
B	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C	If the large clutch piston 0-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valve for free movement.
E	If throttle valve is stuck, inspect the clutches for wear.
G	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H	If the 4-3 shift timing valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the CPC valve is stuck closed, the transmission will not shift out of 1st gear.
K	Improper alignment of ATF pump body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeak.
L	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump. If the pump is OK and no cause for the contamination is found, replace the torque converter.
M	If the 1st clutch feedpipe guide in the rear cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the rear cover as it is dented. The O-ring under the guide is probably worn.
N	Replace the mainshaft if the bushings for the 1st and 2nd feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 2nd feedpipe is damaged or out of round, replace the rear cover.
O	A worn or damaged one-way (sprag) clutch is mostly a result of shifting the transmission in D3 or D4 position while the wheels rotate in reverse, such as rocking the vehicle in snow.
P	Inspect the frame for collision damage.
Q	Inspect the reverse clutch for damage or wear. Inspect bottom of 3rd clutch for swirl marks. Replace reverse clutch if worn or damaged. If transmission makes clicking, grinding or whirring noise, also replace mainshaft reverse gear, reverse idler gear, and countershaft reverse gear. If bottom of 3rd clutch has swirl marks, and transmission makes gear noise, replace the countershaft.
R	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the ATF pump body. This will result is ATF pump seizure if not detected. Use the proper tools.
S	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.
T	Harsh downshifts when coasting to a stop with zero throttle may be caused by the linear solenoid not working.
V	Adjusting the throttle valve body, throttle valve, and linear solenoid is essential for proper operation of the transmission. Not only does it affect the shift quality if misadjusted, but also the lock-up clutch operation.

Road Test

NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

1. Apply parking brake and block the wheels. Start the engine, then shift to D4 position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.

2. Repeat same test in D3 position.

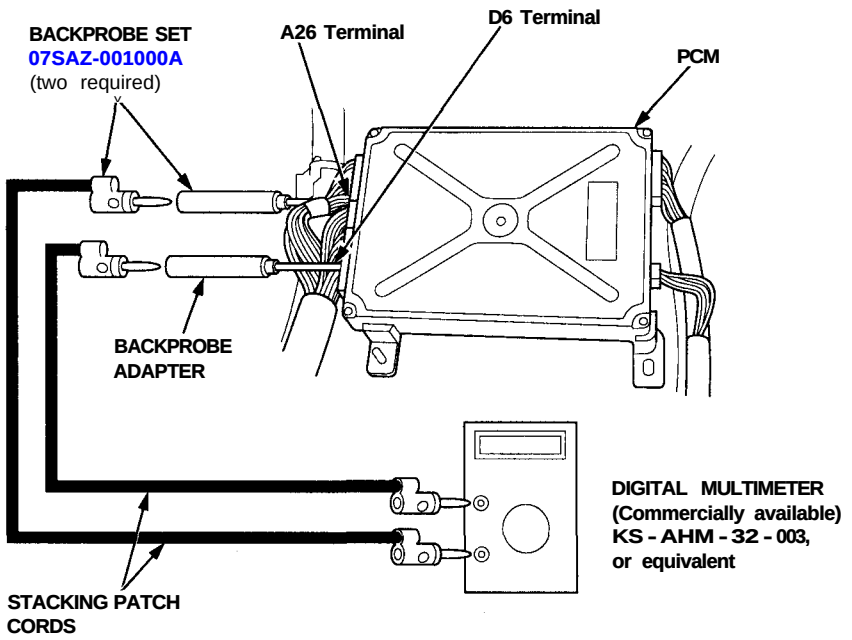
3. Test drive the vehicle on the flat road in D4 position. Check that the shift points occur at the approximate speeds shown on the next page. Also check for abnormal noise and clutch slippage.

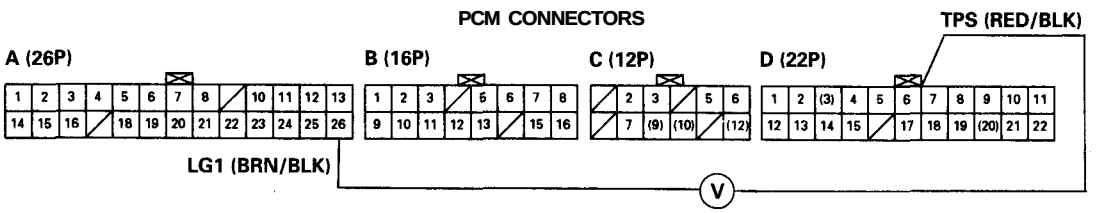
   NOTE: Throttle position sensor voltage represents the throttle opening.

   -1. Remove the PCM cover to expose the PCM for road testing; refer to page 14-66 and 14-67.
   -2. Set the digital multimeter to check voltage between D6 (+) terminal and A26 (-) terminal of the PCM for the throttle position sensor.

   NOTE: Refer to page 14-66; How to use the Backprobe Set.

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.





D4 and D3 Positions

'96 Model

- **Upshift**

Throttle Position	Unit	1st→2nd	2nd→3rd	3rd→4th (D4 Position)	Lock-up ON (D4 Position)	Lock-up ON (D3 Position)
Throttle position sensor voltage: 0.702 – 0.798 V	mph	9.5 – 12.5	19 – 22.5	26 – 30.5	19.5 – 23	60.5 – 64
	km/h	15 – 20	31 – 36	42 – 49	31 – 37	97 – 103
Throttle position sensor voltage: 2.167 – 2.333 V	mph	24 – 28	48 – 53.5	72.5 – 78.5	90 – 96	83.5 – 89.5
	km/h	39 – 45	77 – 86	117 – 126	145 – 154	134 – 144
Full throttle position	mph	39 – 44.5	69 – 77.5	98 – 109	100 – 111	94 – 105
	km/h	63 – 72	111 – 125	158 – 175	161 – 179	151 – 169

- **Downshift**

Throttle Position	Unit	Lock-up OFF (D4 Position)	Lock-up OFF (D3 Position)	4th→3rd (D4 Position)	3rd→2nd	2nd→1st (3rd→1st)
Throttle position sensor voltage: 0.702 – 0.798 V	mph	17 – 20.5	57.5 – 61	17.5 – 21	———	5.5 – 9
	km/h	27 – 33	93 – 98	28 – 34	———	9 – 14
Throttle position sensor voltage: 2.167 – 2.333 V	mph	71 – 76.5	76 – 81.5	———	———	———
	km/h	114 – 123	122 – 131	———	———	———
Full throttle position	mph	95.5 – 106	92 – 102.5	90.5 – 101	57.5 – 64.5	26 – 31.5
	km/h	154 – 171	148 – 165	146 – 163	93 – 104	42 – 51

'97 - '98 Models

- **Upshift**

Throttle Position	Unit	1st→2nd	2nd→3rd	3rd→4th (D4 Position)	Lock-up ON (D4 Position)	Lock-up ON (D3 Position)
Throttle position sensor voltage: 0.702 – 0.798 V	mph	9.5 – 12.5	19 – 22.5	26 – 30.5	19.5 – 23	60.5 – 64
	km/h	15 – 20	31 – 36	42 – 49	31 – 37	97 – 103
Throttle position sensor voltage: 2.167 – 2.333 V	mph	24 – 28	48 – 53.5	72.5 – 78.5	90 – 96	83.5 – 89.5
	km/h	39 – 45	77 – 86	117 – 126	145 – 154	134 – 144
Full throttle position	mph	41 – 44.5	72.5 – 77.5	99 – 109	101 – 111	———
	km/h	66 – 72	117 – 125	159 – 175	163 – 179	———

- **Downshift**

Throttle Position	Unit	Lock-up OFF (D4 Position)	Lock-up OFF (D3 Position)	4th→3rd (D4 Position)	3rd→2nd	2nd→1st (3rd→1st)
Throttle position sensor voltage: 0.702 – 0.798 V	mph	17 – 20.5	57.5 – 61	17.5 – 21	———	5.5 – 9
	km/h	27 – 33	93 – 98	28 – 34	———	9 – 14
Throttle position sensor voltage: 2.167 – 2.333 V	mph	71 – 76.5	76 – 81.5	———	———	———
	km/h	114 – 123	122 – 131	———	———	———
Full throttle position	mph	97.5 – 106	———	90.5 – 101	57.5 – 64.5	26 – 31.5
	km/h	157 – 171	———	146 – 163	93 – 104	42 – 51

NOTE:

- Lock-up ON: Lock-up control solenoid valve B turns on.
- Lock-up OFF: Lock-up control solenoid valve B turns off.

(cont'd)

Road Test

(cont'd)

4. Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from [D4] position to [2] position. The vehicle should immediately begin slowing down from engine braking.

   CAUTION: Do not shift from [D4] or [D3] position to [2] or [1] position at speeds over 63 mph (100 km/h); you may damage the transmission.

5. Check for abnormal noise and clutch slippage in the following positions.

   [1] (1st Gear) Position
   a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage,
   b. Upshifts should not occur with the shift lever in this position.

   [2] (2nd Gear) Position
   a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage,
   b. Upshifts and downshifts should not occur with the shift lever in this position.

   [R] (Reverse) Position
   Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

6. Test in [P] (Parking) Position
   Park the vehicle on slope (approx. 16°), apply the parking brake, and shift into [P] position. Release the brake; the vehicle should not move.

Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Engage the parking brake, and block the front wheels.
2. Connect a tachometer to the engine, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into [2] position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow two minutes for cooling, then repeat the test in D4, 1, and R positions.

NOTE:
- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in D4, 2, 1, and R positions.

Stall Speed RPM:
Specification: 2,000 rpm
Service Limit: 1,850 - 2,150 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in D4, 2, 1 and R positions	• Low fluid level or ATF pump output • Clogged ATF strainer • Pressure regulator valve stuck closed • Slipping clutch
Stall rpm high in 1 position	• Slippage of 1st clutch, 1st-hold clutch or 1st gear one-way clutch
Stall rpm high in 2 position	• Slippage of 2nd clutch, 1st-hold clutch or 2nd gear one-way clutch
Stall rpm high in D4 position	• Slippage of 1st clutch, 2nd clutch, 1st gear one-way clutch or 2nd gear one-way clutch
Stall rpm high in R position	• Slippage of reverse clutch
Stall rpm low in D4, 2, 1, and R positions	• Engine output low • Torque converter one-way clutch slipping

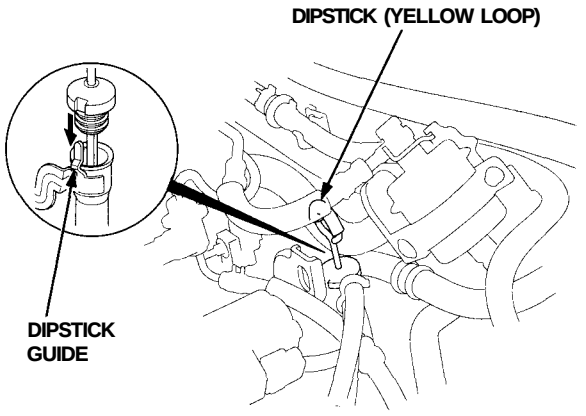
Fluid Level

Checking/Changing

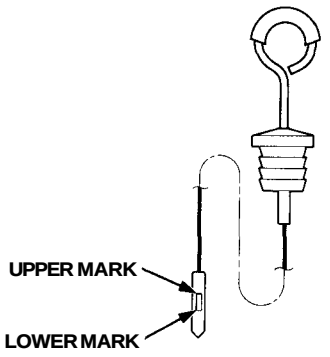
Checking

NOTE: Check the fluid level with the engine at normal operating temperature (the radiator fan comes on).

1. Park the vehicle on level ground. Turn off the engine.
2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.



3. Insert the dipstick into the transmission. Make sure the notch in the rubber cap fits in the dipstick guide, and push the dipstick in all the way.
4. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.

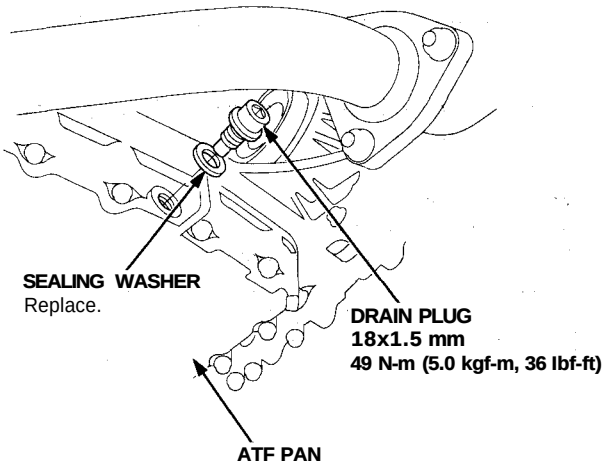


5. If the level is below the lower mark, pour the recommended fluid* into the dipstick tube to bring it to the upper mark.
6. Insert the dipstick back in the transmission. Make sure the notch fits in the dipstick guide, and the dipstick is down all the way.

Changing

1. Bring the transmission up to normal operating temperature (the radiator fan comes on) by driving the vehicle. Park the vehicle on level ground, turn the engine off, and remove drain plug.

   NOTE: If a cooler flusher is to be used, see flushing procedure in the '95 - '98 Acura 2.5TL Service Manual, 61SW504.



2. Reinstall the drain plug with a new washer, then refill the transmission with the recommended fluid* to the upper mark on the dipstick.

   Automatic Transmission Fluid Capacity:
   '96 Model:
   3.3 ((3.5 US qt, 2.9 Imp. qt.) at change
   8.7 £ (9.2 US qt., 7.7 Imp. qt.) after overhaul

   '97 - '98 Models:
   3.0 *i* (3.2 US qt., 2.6 Imp. qt.) at change
   8.6 £ (9.1 US qt., 7.6 Imp. qt.) after overhaul

   Recommended Automatic Transmission Fluid: Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*

   * Always use Genuine Honda Premium Fomula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift qualify.

Pressure Testing — '96 Model

⚠ WARNING

- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks and safety stands are placed properly (see section 1).**

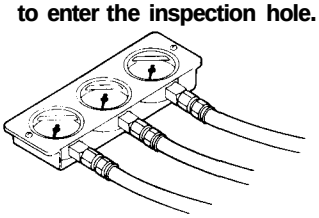
CAUTION:

- **Before testing, be sure the transmission fluid is filled to the proper level.**
- **Warm up the engine before testing.**

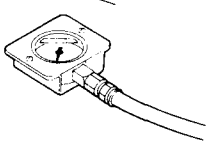
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Allow the front wheels to rotate freely.
4. Warm up the engine (the radiator fan comes on), then stop and connect a tachometer.
5. Connect the special tool to each inspection hole.

   TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

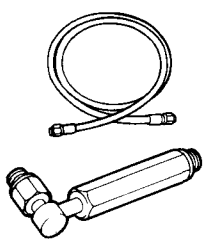
   CAUTION: Connect the oil pressure gauge securely, be sure not to allow dust and other foreign particles to enter the inspection hole.



A/T OIL PRESSURE GAUGE SET W/PANEL
07406 - 0020400



A/T LOW PRESSURE GAUGE W/PANEL
07406 - 0070300



A/T PRESSURE HOSE, 2210 mm
07MAJ-PY4011A
(4 Required)

A/T PRESSURE HOSE ADAPTER
07MAJ - PY40120
(4 Required)

NOTE: The A/T Oil Pressure Gauge Set (07406-0020003) or A/T Low Pressure Gauge (07406-0070000) may also be used.

6. Measure the respective pressure as follows.
   - Line Pressure
   - Clutch Pressure
   - Clutch Low/High Pressure
   - Throttle B Pressure
7. Disconnect the special tool after testing.
8. Install the sealing bolt with a new sealing washer in the inspection hole, and tighten to the specified torque.

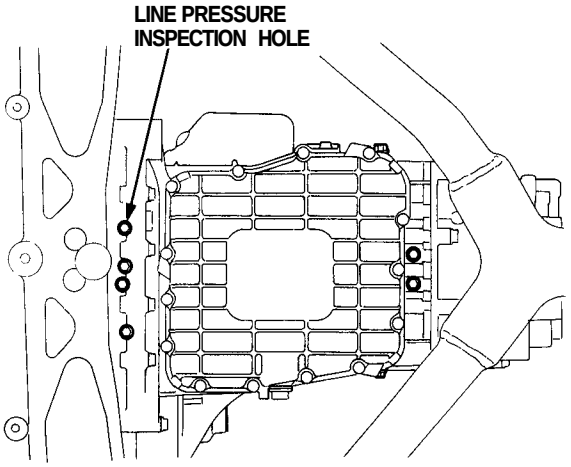
   TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

   NOTE: Do not reuse old sealing washers; always replace washers.

- **Line Pressure Measurement**

1. Start the engine, and run it at 2,000 rpm.
2. Shift to [N] or [P] position.
3. Measure line pressure.

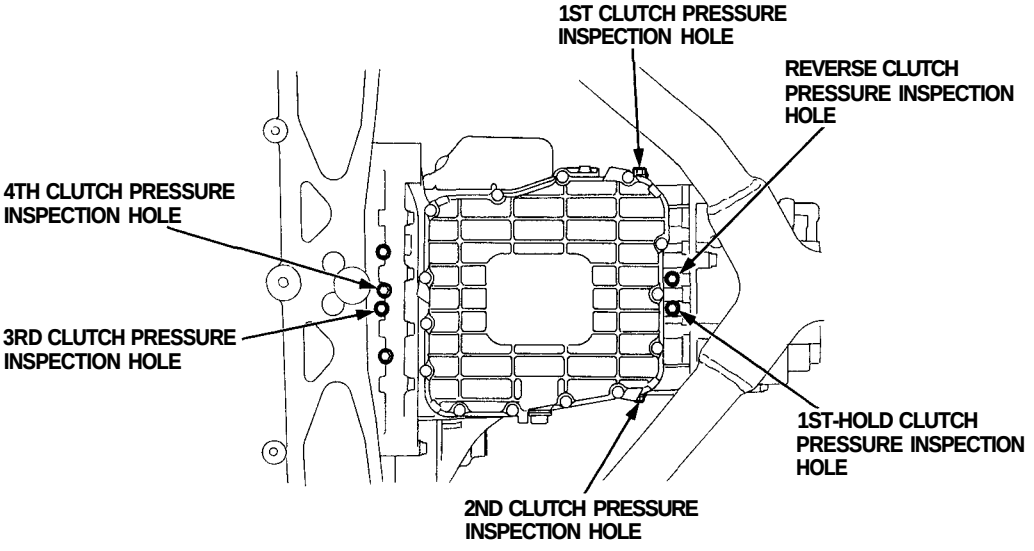
   NOTE: Higher pressure may be indicated if measurements are made in shift lever positions other than [N] or [P] position.



- **Clutch Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

1. Start the engine, and run it at 2,000 rpm.
2. Shift to each shift lever position indicated by the table below.
3. Measure each clutch pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	780-840kPa (8.0 - 8.6 kgf/cm^2, 110-120psi)	740 kPa (7.5 kgf/cm^2, 110 psi)
1st clutch	1, D4 or D3	No or low 1st pressure	1st Clutch		
1st-hold clutch	1 or 2	No or low 1st-hold pressure	1st-hold Clutch		
2nd clutch	2	No or low 2nd pressure	2nd Clutch		
2nd clutch	D4	No or low 2nd pressure	2nd Clutch	390 kPa (4.0 kgf/cm^2, 57 psi) Fully closed throttle | 840 kPa (8.6 kgf/cm^2, 120 psi) More than 1/4 throttle	370 kPa (3.8 kgf/crn^2, 54 psi) Fully closed throttle | 740 kPa (7.5 kgf/crn^2, 110 psi) More thari 1/4 throttle
3rd clutch		No or low 3rd pressure	3rd Clutch		
4th clutch		No or low 4th pressure	4th Clutch		
Reverse clutch	R	No or low Reverse pressure	Reverse Clutch	1,170- 1,250 kPa (11.9 -12.7 kgf/cm^2, 169-181 psi)	1,130kPa (11.5 kgf/cm^2, 164 psi)

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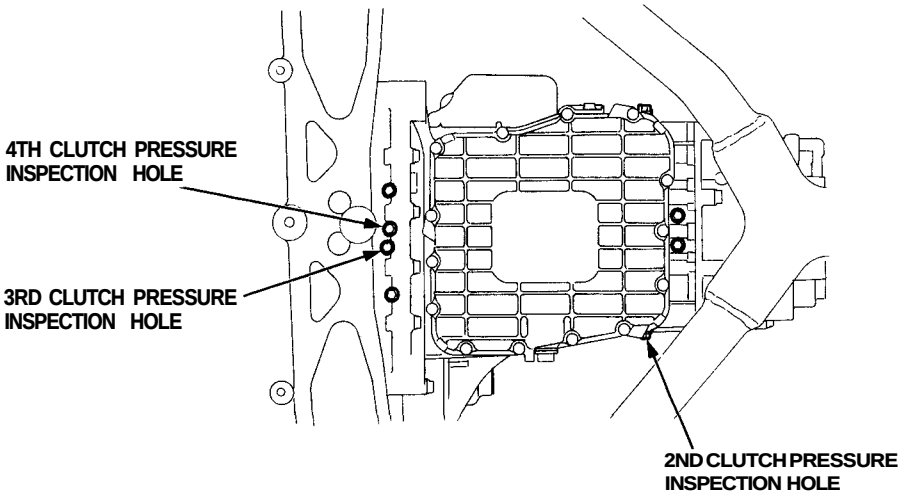
Pressure Testing — '96 Model

(cont'd)

- **Clutch Low/High Pressure Measurement**

⚠ WARNING While testing, be careful of the ratating front wheels.

1. Start the engine, and let it idle.
2. Shift to D4 position.
3. Slowly depress the accelerator pedal to increase engine rpm until pressure is indicated on the pressure gauge. Then release the accelerator pedal, allowing the engine return to an idle, and measure the pressure reading.
4. With the engine idling, depress the accelerator pedal approximately 1/2 of its possible travel, and increase the engine rpm until pressure is indicated on the gauge. Then measure the highest pressure reading obtained.
5. Repeat steps 3 and 4 for each clutch pressure being inspected.

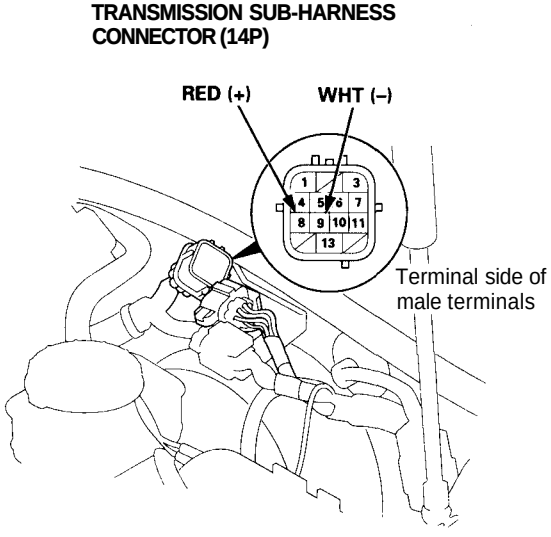


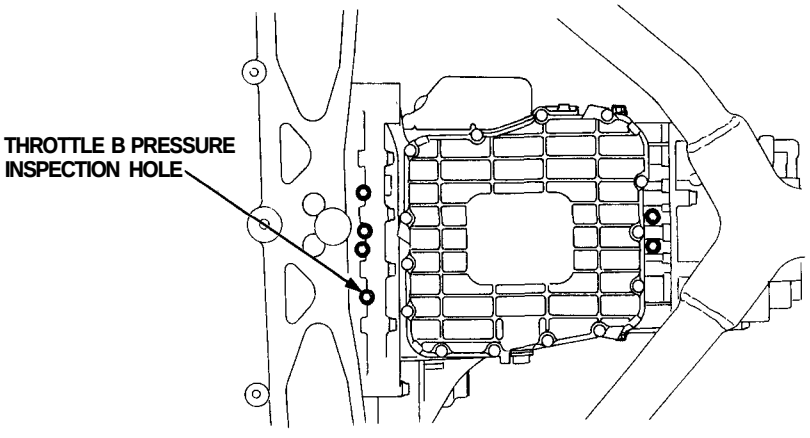
PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D4	No or low 2nd pressure	2nd Clutch	390-840kPa (4.0 - 8.6 kgf/cm^2, 57-120psi) varies with throttle opening	370 kPa (3.8 kgf/cm^2, 54 psi) with accelerator pedal released 740 kPa (7.5 kgf/cm^2, 110 psi) with more than 1/4 throttle
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		

- **Throttle B Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

1. Disconnect the transmission sub-harness connector (14P).
2. Start the engine, and run it at 1,000 rpm.
3. Measure fully-opened throttle B pressure.
4. Connect battery voltage to the linear solenoid terminals of the transmission sub-harness connector as shown.
5. Measure fully-closed throttle B pressure.





PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	D4	Pressure too high	Throttle Valve Body/Linear Solenoid Assembly	0-15 kPa (0-0.15 kgf/cm^2, 0-2 psi) Fully closed throttle	———
		No or low pressure		580-630 kPa (5.9 - 6.4 kgf/cm^2, 84-91 psi) Fully opened throttle	540 kPa (5.5 kgf/cm^2, 78 psi) Fully opened throttle

Pressure Testing — '97 - '98 Models

⚠ WARNING

- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks and safety stands are placed properly (see section 1).**

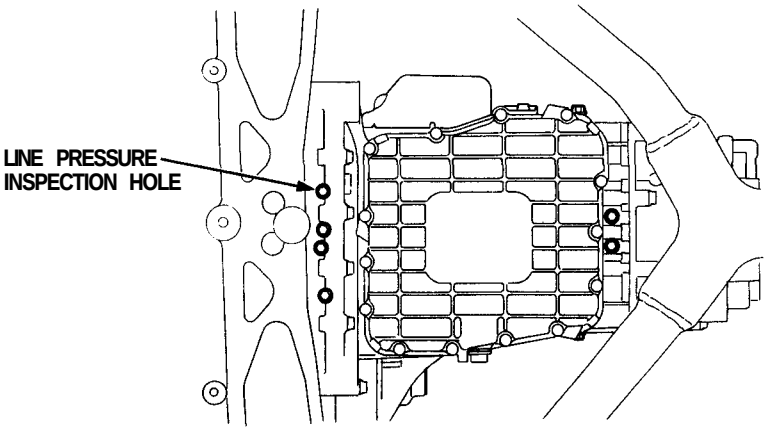
CAUTION:

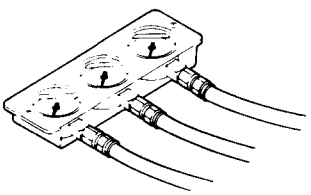
- **Before testing, be sure the transmission fluid is filled to the proper level.**
- **Warm up the engine before testing.**

1. Raise the front of the vehicle, and support it with safety stands.
2. Set the parking brake, and block rear wheels securely.
3. Allow the front wheels to rotate freely.
4. Warm up the engine (the radiator fan comes on), then stop and connect a tachometer.
5. Connect the special tool to line pressure inspection hole.

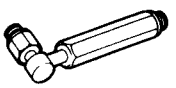
TORQUE: 18 N-m (1.8 kgfm, 13 lbfft)

CAUTION: Connect the oil pressure gauge securely, be sure not to allow dust and other foreign particles to enter the inspection hole.

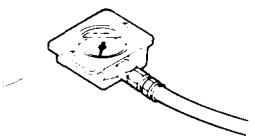




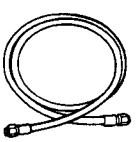
A/T OIL PRESSURE GAUGE SET W/PANEL
07406-0020400



A/T PRESSURE HOSE ADAPTER
07MAJ-PY40120
(4 Required)



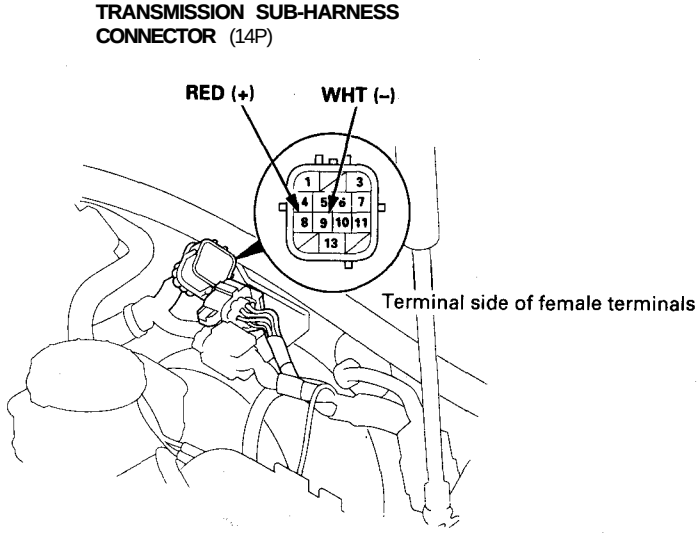
A/T LOW PRESSURE GAUGE W/PANEL
07406-0070300



A/T PRESSURE HOSE, 2210 mm
07MAJ-PY4011A
(4 Required)

NOTE: The A/T Oil Pressure Gauge Set (07406 - 0020003) or A/T Low Pressure Gauge (07406 - 0070000) may also be used.

6. Disconnect the transmission sub-harness connector (14P).
7. Start the engine, and run it at 2,000 rpm.



8. Shift to the [HI or [P] position, and measure line pressure at fully-opened throttle.
9. Connect battery voltage to the linear solenoid terminals of the transmission sub-harness connector as shown.
10. Measure line pressure at fully-closed throttle.
    If line pressure is out of specification, check and repair the probable cause in the table below.

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, ATF pump, pressure regulator. torque converter check valve	520 kPa (5.3 kgf/cm^2, 75 psi) Fully closed throttle | 910 kPa (9.3 kgf/cm^2, 130 psi) Fully opened throttle	500 kPa (5.1 kgf/cm^2, 73 psi) Fully closed throttle | 790 kPa (8.1 kgf/cm^2, 120 psi) Fully opened throttle

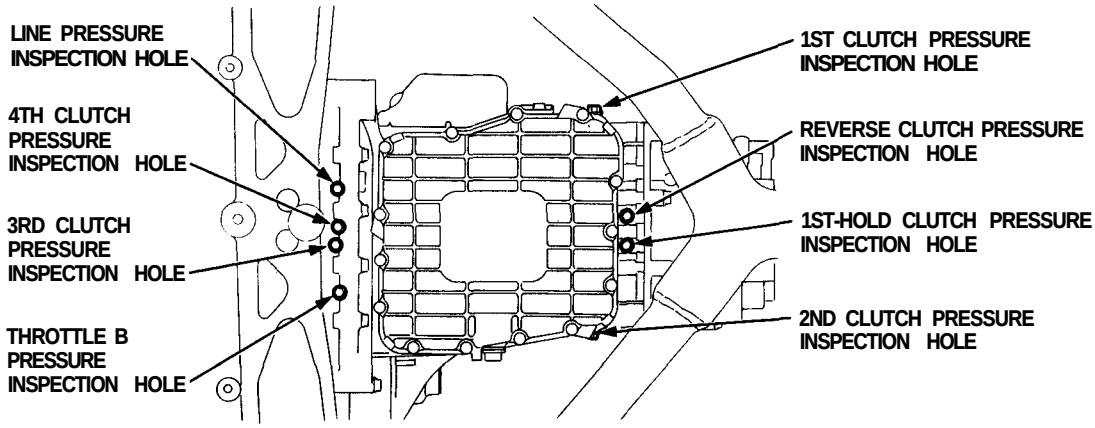
11. Stop the engine, and connect the transmission sub-harness connector (14P).
12. Disconnect the special tool from line pressure inspection hole, and connect the special tool to each inspection hole.
13. Start the engine, and run it at 2,000 rpm.

(cont'd)

Pressure Testing — '97 - '98 Models

(cont'd)

14. Shift to the respective shift lever position, and measure each clutch pressure.



15. Disconnect the transmission sub-harness connector (14P), then measure throttle B pressure with the throttle fully opened.

16. Connect battery voltage to the linear solenoid terminals of the transmission sub-harness connector as shown.

17. Measure throttle B pressure at fully-closed throttle.

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st clutch	1, D4 or D3	No or low 1st pressure	1st clutch	530-590kPa (5.4 - 6.0 kgf/cm^2, 77-85 psi) Fully closed throttle	510 kPa (5.2 kgf/cm^2, 74 psi) Fully closed throttle
1st-hold clutch	1 or 2	No or low 1st-hold pressure	1st-hold clutch		
2nd clutch	2	No or low 2nd pressure	2nd clutch		
3rd clutch	D3	No or low 3rd pressure	3rd clutch		
4th clutch	D4	No or low 4th pressure	4th clutch		
Reverse clutch	R	No or low reverse pressure	Reverse clutch	760-850kPa (7.7 - 8.7 kgf/cm^2, 110- 120 psi) Fully closed throttle	740 kPa (7.5 kgf/cm^2, 110 psi) Fully closed throttle
Throttle B	D4	Pressure too high	Throttle valve body/linear solenoid assembly	0-15kPa (0-0.15 kgf/cm$_2$, 0-2 psi) Fully closed throttle	—
		No or low pressure		550-590kPa (5.6 - 6.0 kgf/cm^2, 80-85 psi) Fully opened throttle	510 kPa (5.2 kgf/cm^2, 74 psi) Fully opened throttle

18. Install the sealing bolt with a new sealing washer in the inspection hole, and tighten the bolt to the specified torque.

TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

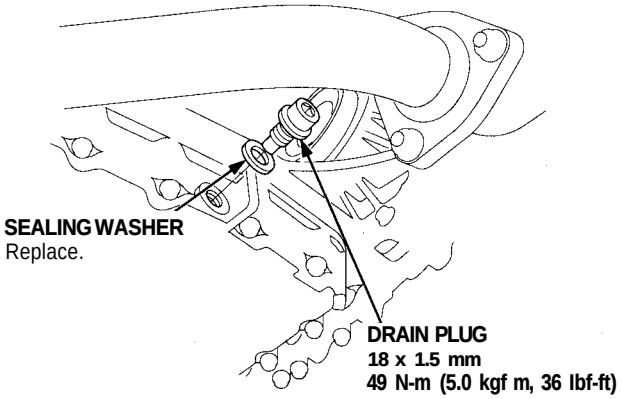
NOTE: Do not reuse old sealing washer.

Lower Valve Body Assembly

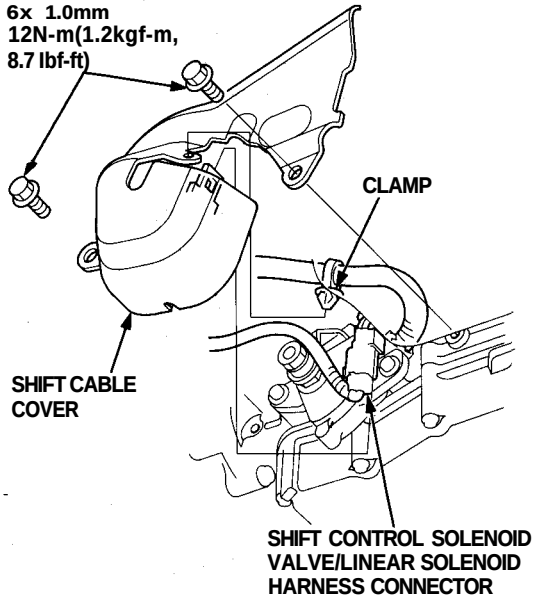
Removal/Installation

⚠ WARNING Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).

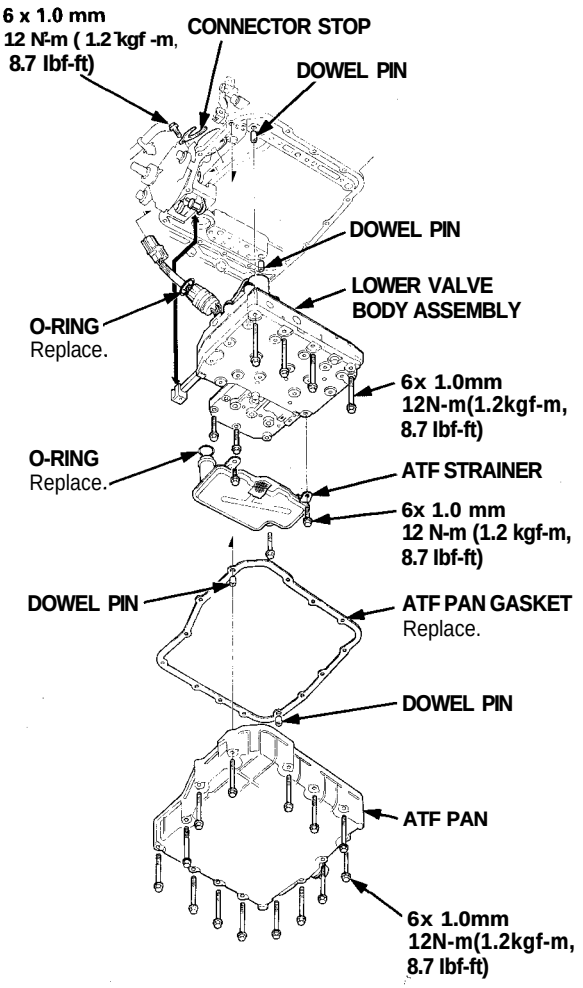
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift the transmission to the [P] position.
4. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



5. Remove the shift cable cover mounting bolts, then remove the A/T gear position switch harness clamp and the shift control solenoid/linear solenoid harness connector from the shift cable cover.



6. Remove the shift cable cover from the transmission housing.
7. Disconnect the shift control solenoid/linear solenoid harness connector.
8. Remove the shift control solenoid/linear solenoid harness connector stop.



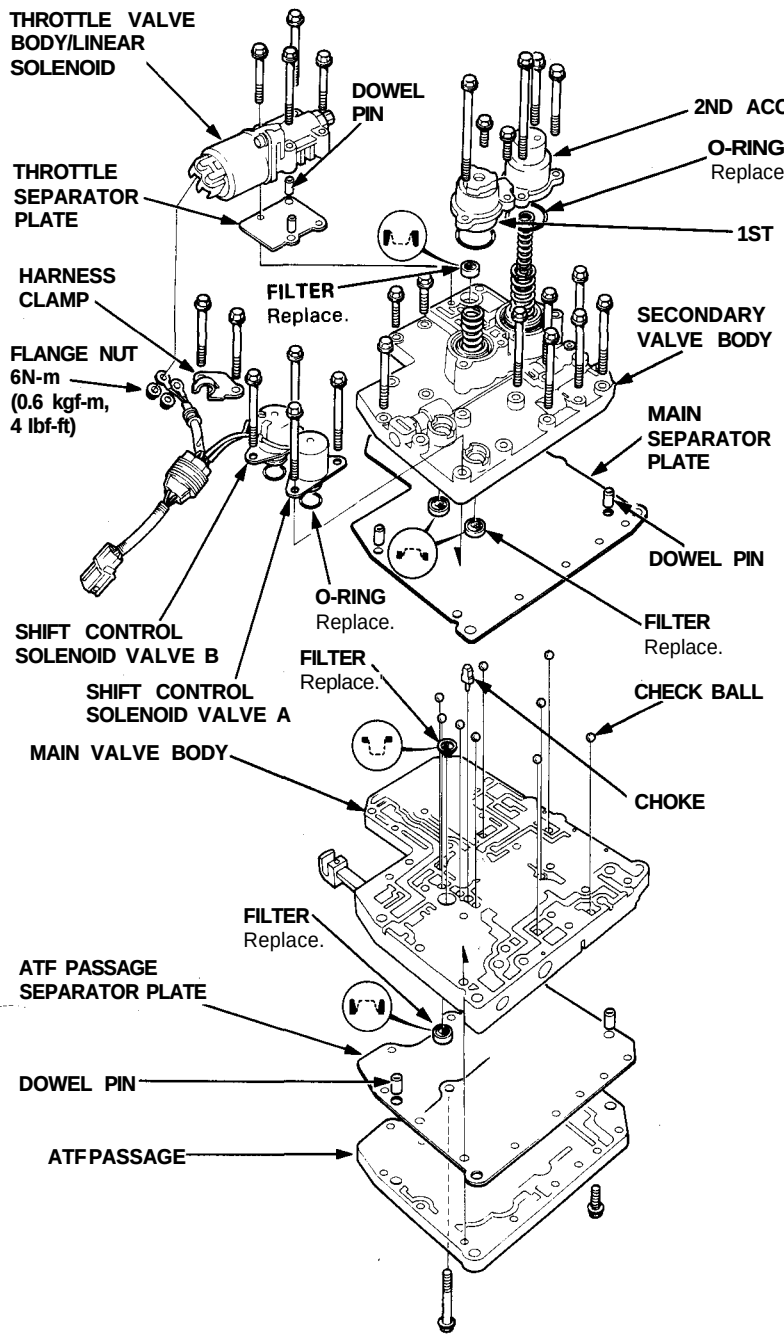
9. Remove the ATF pan (14 bolts).
10. Remove the ATF strainer (three bolts).
11. Remove the lower valve body assembly (six bolts) while pushing the connector out of the transmission housing.
12. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.
13. Replace the ATF strainer if it is clogged or damaged.
    NOTE: The ATF strainer can be reused if it is not clogged.
14. Install the lower valve body assembly in the reverse order of removal.

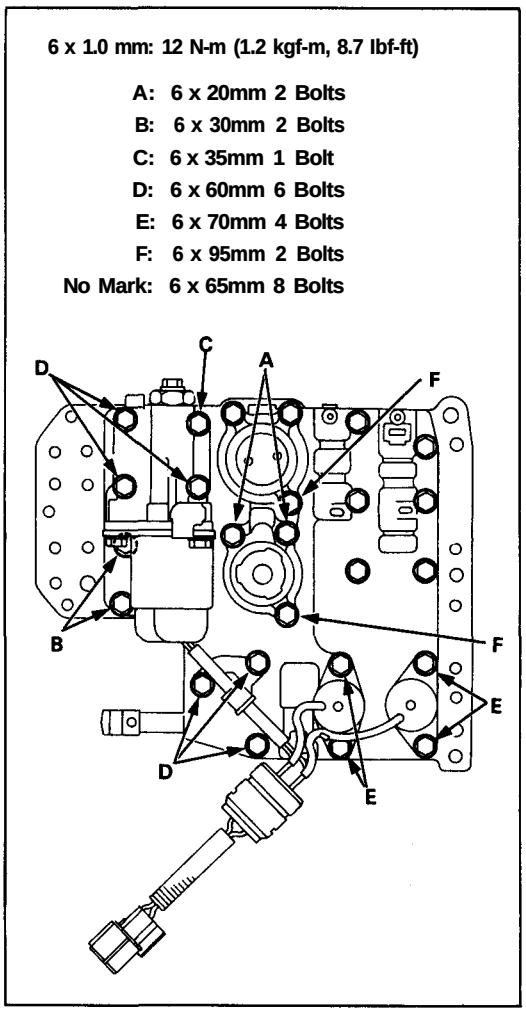
Lower Valve Body Assembly — '96 Model

Disassembly/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Do not let the check balls fall out of the main valve body when removing the main valve body.
- Coat all parts with ATF before reassembly.
- Replace the O-rings and filters.
- Install the filters in the direction shown.
- Refer to page 14-153 when installing the check balls on the main valve body.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





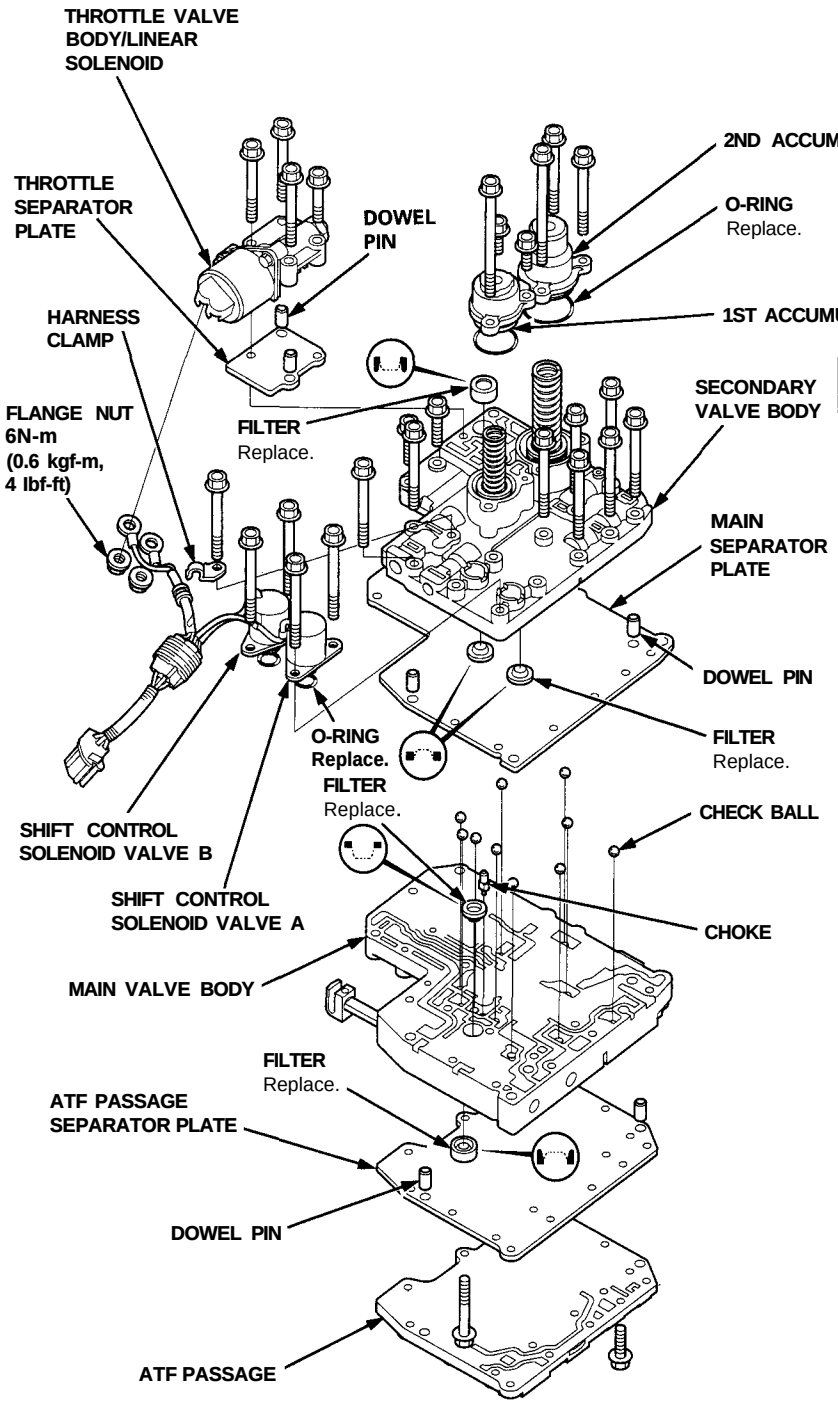
Lower Valve Body Assembly — '97 - '98 Models

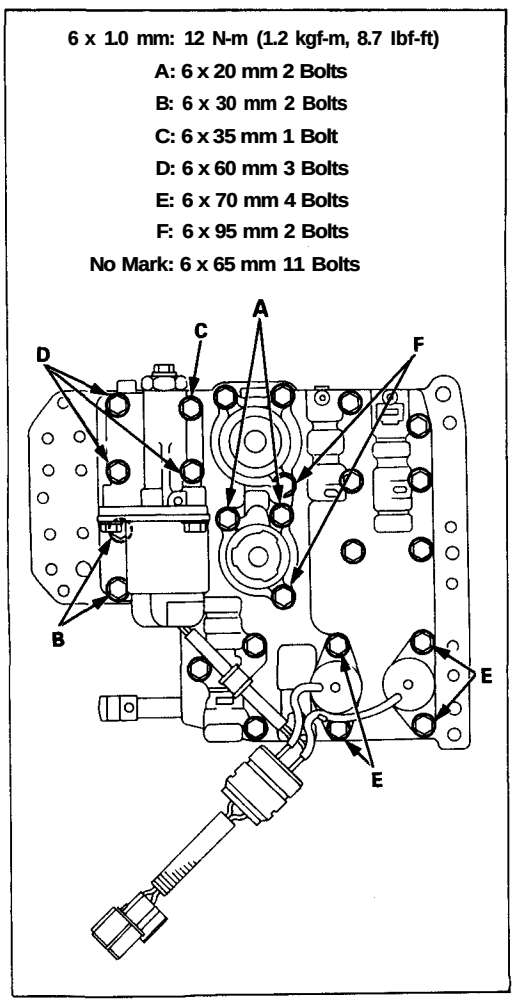
Disassembly/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Do not let the check balls fall out of the main valve body when removing the main valve body.
- Coat all parts with ATF before reassembly.
- Replace the 0-rings and filters.
- Install the filters in the direction shown.
- Refer to page 14-155 when installing the check balls on the main valve body.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.

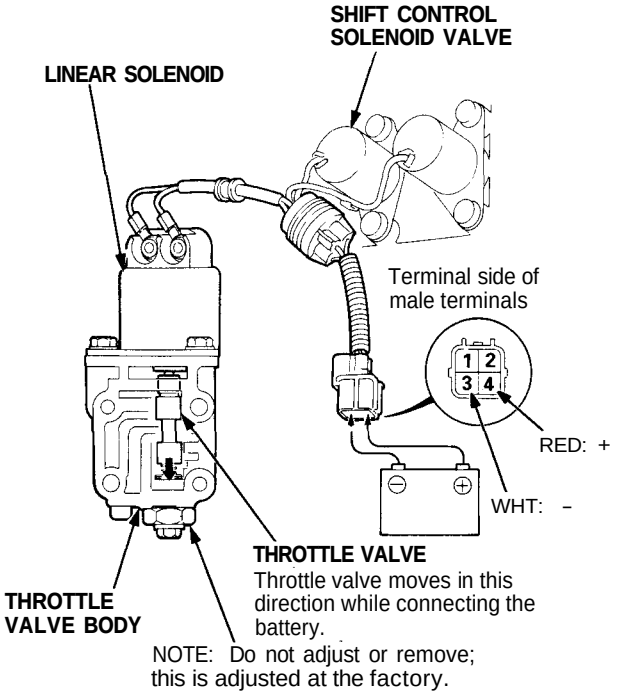




Throttle Valve Body/Linear Solenoid Assembly

Test

1. Connect the No. 4 (RED: +) terminal of the shift control solenoid valve/linear solenoid harness connector to the battery positive terminal and the No. 3 (WHT: -) terminal to the battery negative terminal. Check that the throttle valve moves.



2. Disconnect the battery terminals and check that the throttle valve is released.

3. Repeat the above steps 1 and 2.

   NOTE: You can see the movement of the throttle valve through the fluid passage in the attaching surface of the throttle valve body.

4. If the throttle valve binds, or moves sluggishly, or the linear solenoid does not operate, replace the throttle valve body/linear solenoid as an assembly.

5. If the linear solenoid does not operate, disconnect the linear solenoid harness from the linear solenoid assembly. Connect the battery terminals directly to the linear solenoid.

6. If the linear solenoid operates after connecting the battery, and the throttle valve movement is OK, replace the shift control solenoid valve assembly.

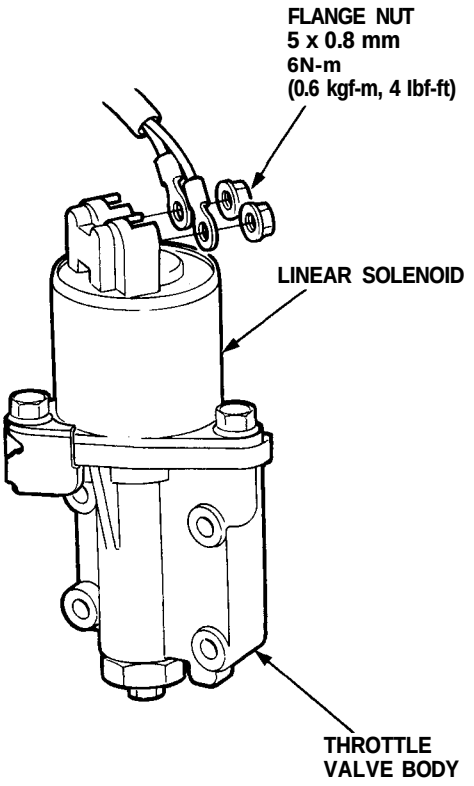
Replacement

NOTE: Throttle valve body/linear solenoid must be replaced as an assembly.

1. Check the throttle valve body passages for dust or dirt, and replace as an assembly, if necessary.

2. Clean the mounting surface and fluid passages of the throttle valve body.

3. Assemble the throttle valve body/linear solenoid to the secondary valve body.

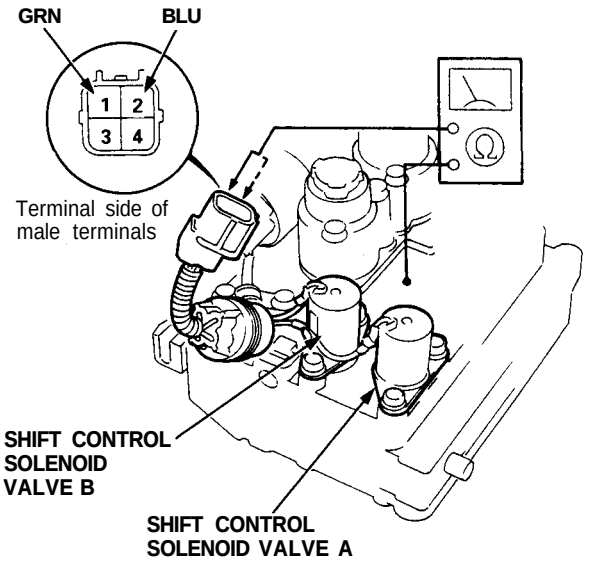


Shift Control Solenoid Valve A/B

Test

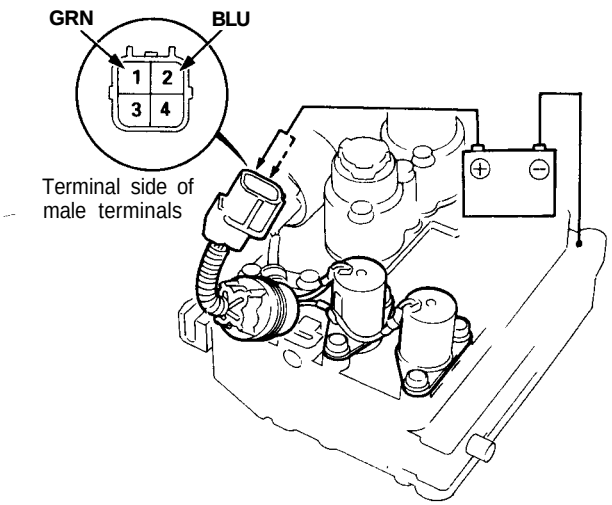
1. Measure the resistance between the No. 2 terminal of the shift control solenoid valve/linear solenoid harness connector and body ground, and between the No. 1 terminal and body ground.

   STANDARD: 12 - 25 Ω



2. Replace the shift control solenoid valve assembly if the resistance is out of specification.

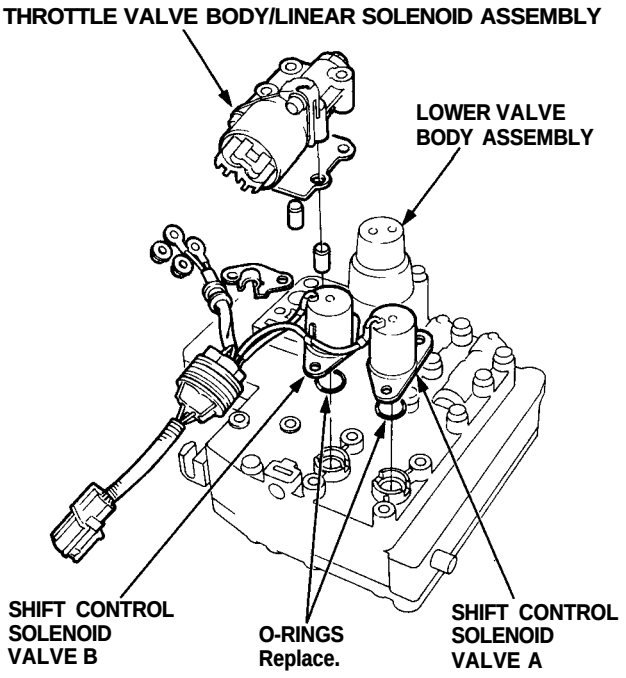
3. If the resistance is within the standard, connect the No. 2 terminal of the shift control solenoid valve/linear solenoid harness connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 1 terminal to the battery positive terminal. A clicking sound should be heard. Replace the shift control solenoid valve assembly if no clicking sound is heard.



Replacement

NOTE: Shift control solenoid valve A and B must be replaced as an assembly.

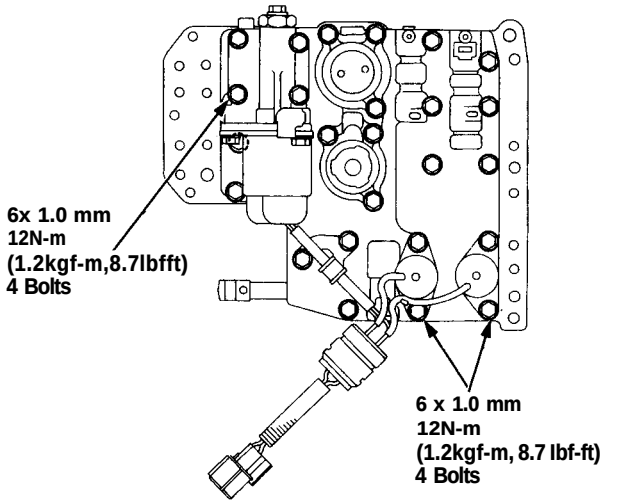
1. Remove the shift control solenoid valve A, B and linear solenoid/throttle valve body from the lower valve body assembly.



2. Disconnect the linear solenoid terminals.

3. Clean the mounting surfaces and fluid passages.

4. Connect the linear solenoid terminal, then install the shift control solenoid valve A, B and linear solenoid/ throttle valve body on the lower valve body.



Transmission

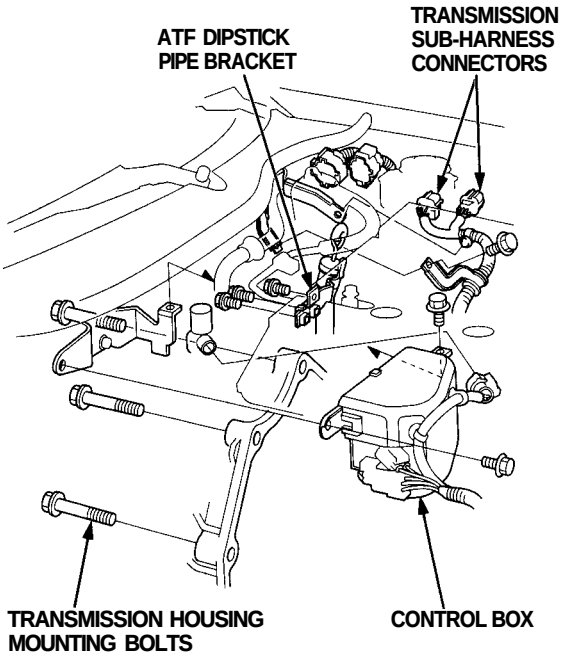
Removal

⚠ WARNING Make sure lifts are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).

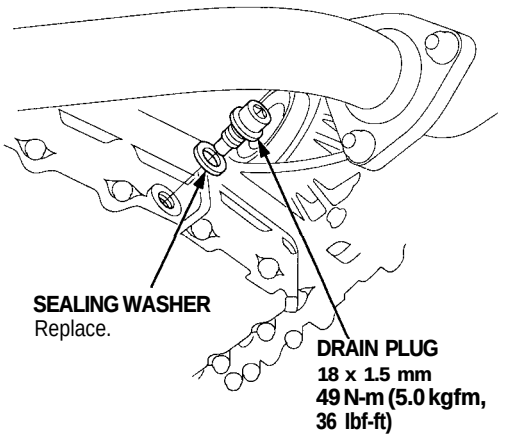
CAUTION: Use fender cover to avoid damaging painted surfaces.

1. Before you disconnect power, make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative (-) terminal from the battery, then remove the positive (+) terminal.
3. Shift the transmission into the [P] position.
4. Remove the control box.

   CAUTION: Do not remove the vacuum tubes from the control box.

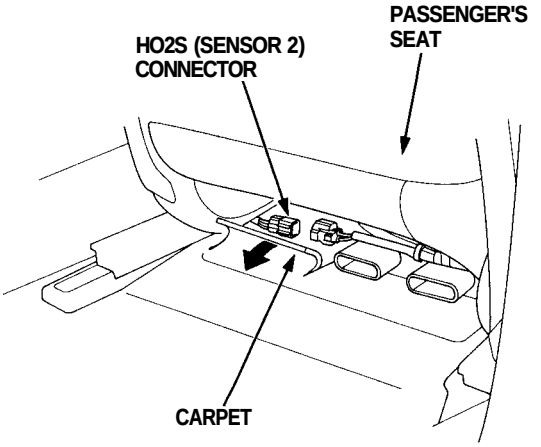


5. Disconnect the transmission sub-harness connectors, and remove the transmission sub-harness clamp.
6. Remove the three bolts securing the ATF dipstick pipe bracket.
7. Remove the transmission housing mounting bolts.
8. Drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.

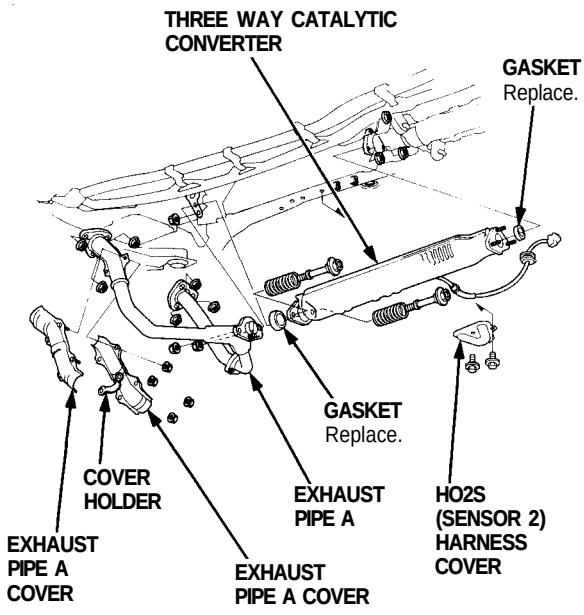


9. Pull the carpet back to expose the secondary heated oxygen sensor (H02S sensor 2) connector, then disconnect the connector, and push it out from inside of the vehicle.

   NOTE: The H02S (sensor 2) connector is located under the passenger's seat.

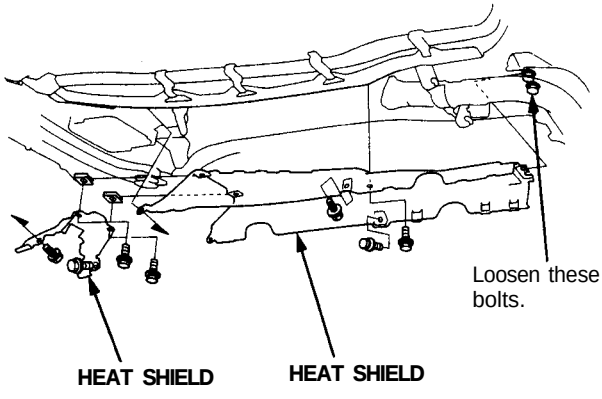


10. Remove the HO2S (sensor 2) harness cover, then remove the three way catalytic converter.



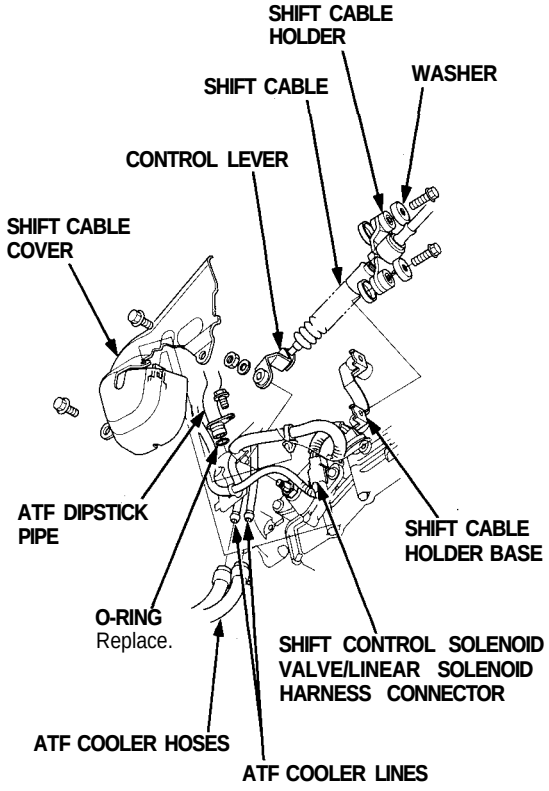
11. Remove the exhaust pipe A cover, then remove the exhaust pipe A.

12. Remove the heat shields.



13. Remove the ATF cooler hoses at the ATF cooler lines. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the ATF cooler lines and hoses.

NOTE: Check for any signs of leakage at the hoses joints.



14. Remove the shift cable cover mounting bolts, then remove the A/T gear position switch harness clamp and the shift control solenoid valve/linear solenoid harness connector from the shift cable cover.

15. Remove the shift cable cover from the transmission housing.

16. Remove the shift cable holder with shift cable from the shift cable holder base.

17. Remove the control lever from the control shaft.

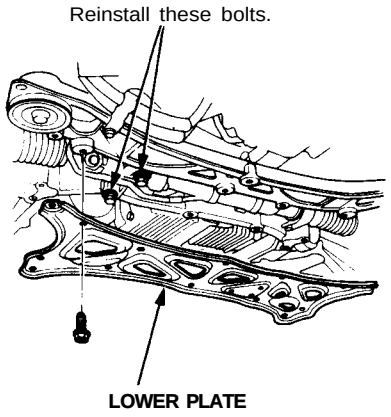
18. Remove the ATF dipstick pipe from the torque converter housing.

(cont'd)

Transmission

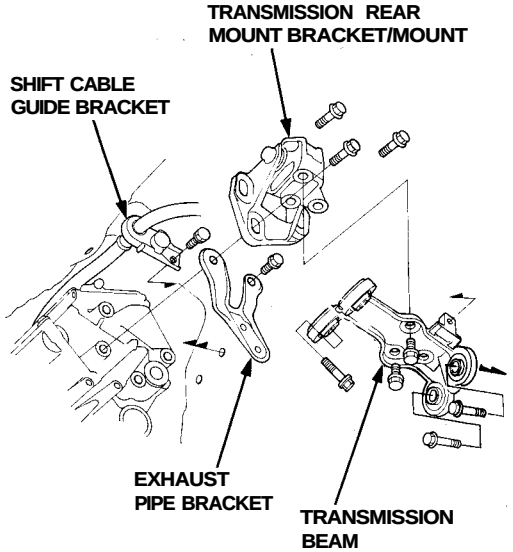
Removal (cont'd)

19. Remove the lower plate, and reinstall the steering gearbox mounting bolts as shown.



20. Remove the shift cable guide bracket from the transmission beam.

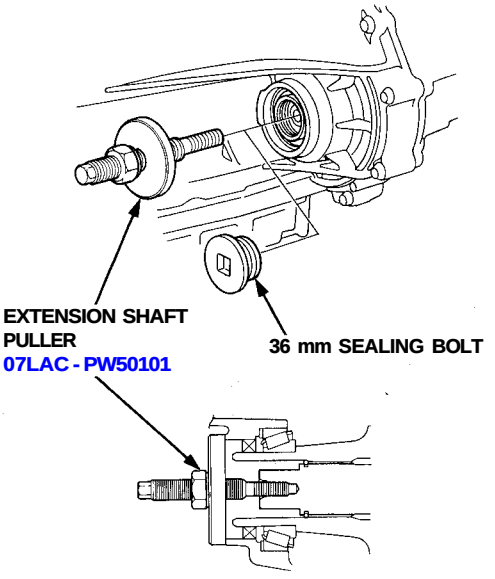
CAUTION: Take care not to bend the shift cable.



21. Remove the transmission beam, rear transmission mount bracket/mount and exhaust pipe bracket.

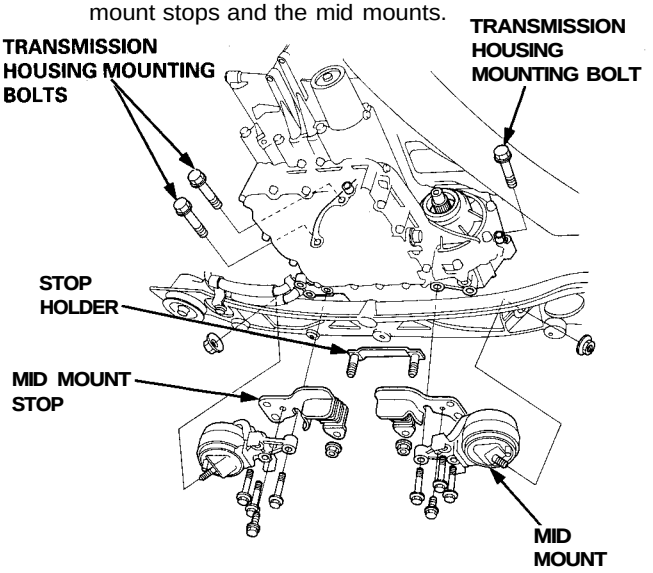
22. Make sure that the transmission in into [P] the position, then remove the 36 mm sealing bolt from the secondary driven gear shaft.

NOTE: If the transmission is in any position other than [P] , shift into [P] position by rotating the control shaft.



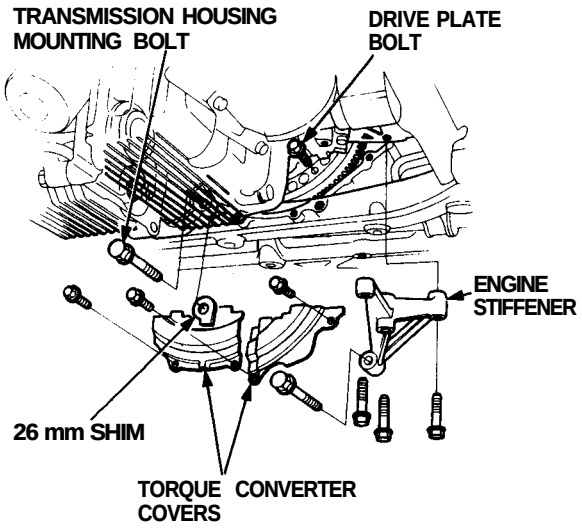
23. Remove the extension shaft from the differential using the special tool as shown.

24. Place a jack under the transmission, and raise the transmission just enough to take weight off of the mounts, then remove the stop holder, the mid mount stops and the mid mounts.



25. Remove the transmission housing mounting bolts.

26. Remove the engine stiffener.



27. Remove the torque converter covers.

28. Remove the six drive plate bolts one at a time while rotating the crankshaft pulley.

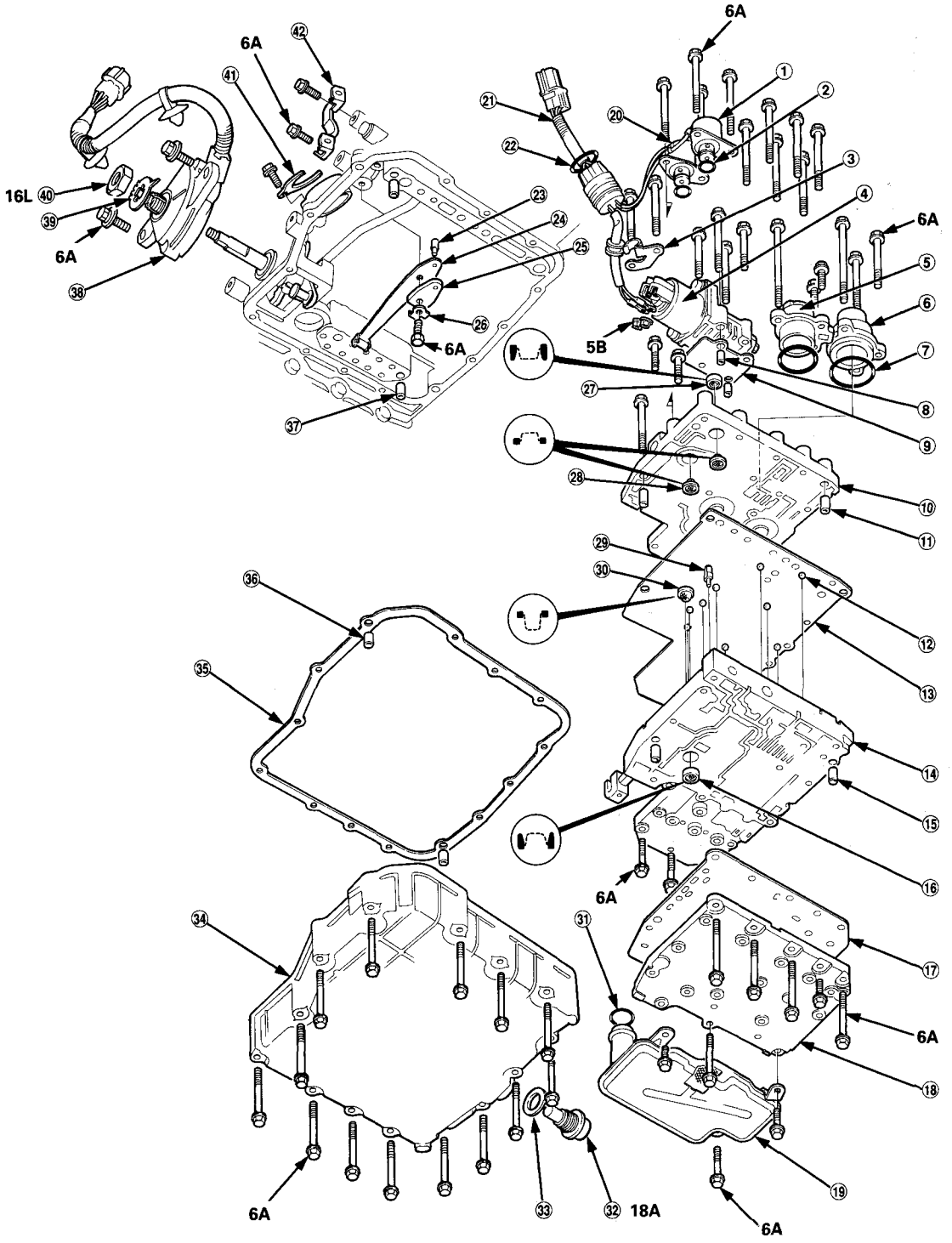
    NOTE: If necessary, remove the spark plugs while removing the drive plate bolts.

29. Remove the transmission housing mounting bolts.

30. Pull the transmission away from the engine until it clears the dowel pins, then lower it on the transmission jack.

Illustrated Index

Transmission Housing/Lower Valve Body



① **SHIFT CONTROL SOLENOID VALVE A**
② **O-RING** Replace.
③ **HARNESS CLAMP**
④ **LINEAR SOLENOID/THROTTLE VALVE BODY ASSEMBLY**
⑤ **1ST ACCUMULATOR COVER**
⑥ **2ND ACCUMULATOR COVER**
⑦ **O-RING** Replace.
⑧ **DOWEL PINS**
⑨ **THROTTLE SEPARATOR PLATE**
⑩ **SECONDARY VALVE BODY**
⑪ **DOWEL PINS**
⑫ **CHECK BALLS**
⑬ **MAIN SEPARATOR PLATE**
⑭ **MAIN VALVE BODY**
⑮ **DOWEL PINS**
⑯ **FILTER** Replace.
⑰ **ATF PASSAGE SEPARATOR PLATE**
⑱ **ATF PASSAGE**
⑲ **ATF STRAINER**
⑳ **SHIFT CONTROL SOLENOID VALVE B**
㉑ **SHIFT CONTROL SOLENOID VALVE/LINEAR SOLENOID HARNESS**
㉒ **O-RING** Replace.
㉓ **DETENT SPRING PIN**
㉔ **DETENT SPRING**
㉕ **DETENT SPRING PLATE**
㉖ **LOCK WASHER** Replace.
㉗ **FILTER** Replace.
㉘ **FILTERS** Replace.
㉙ **CHOKE**
㉚ **FILTER** Replace.
㉛ O-RING Replace.
㉜ **DRAIN PLUG, 18x1.5 mm**
㉝ **SEALING WASHER** Replace.
㉞ **ATF PAN**
㉟ **ATF PAN GASKET** Replace.
㊱ **DOWEL PINS**
㊲ **DOWEL PINS**
㊳ **A/T GEAR POSITION SWITCH**
㊴ **LOCK WASHER** Replace.
㊵ **LOCKNUT**
㊶ **HARNESS CONNECTOR STOP**
㊷ **SHIFT CABLE HOLDER BASE**

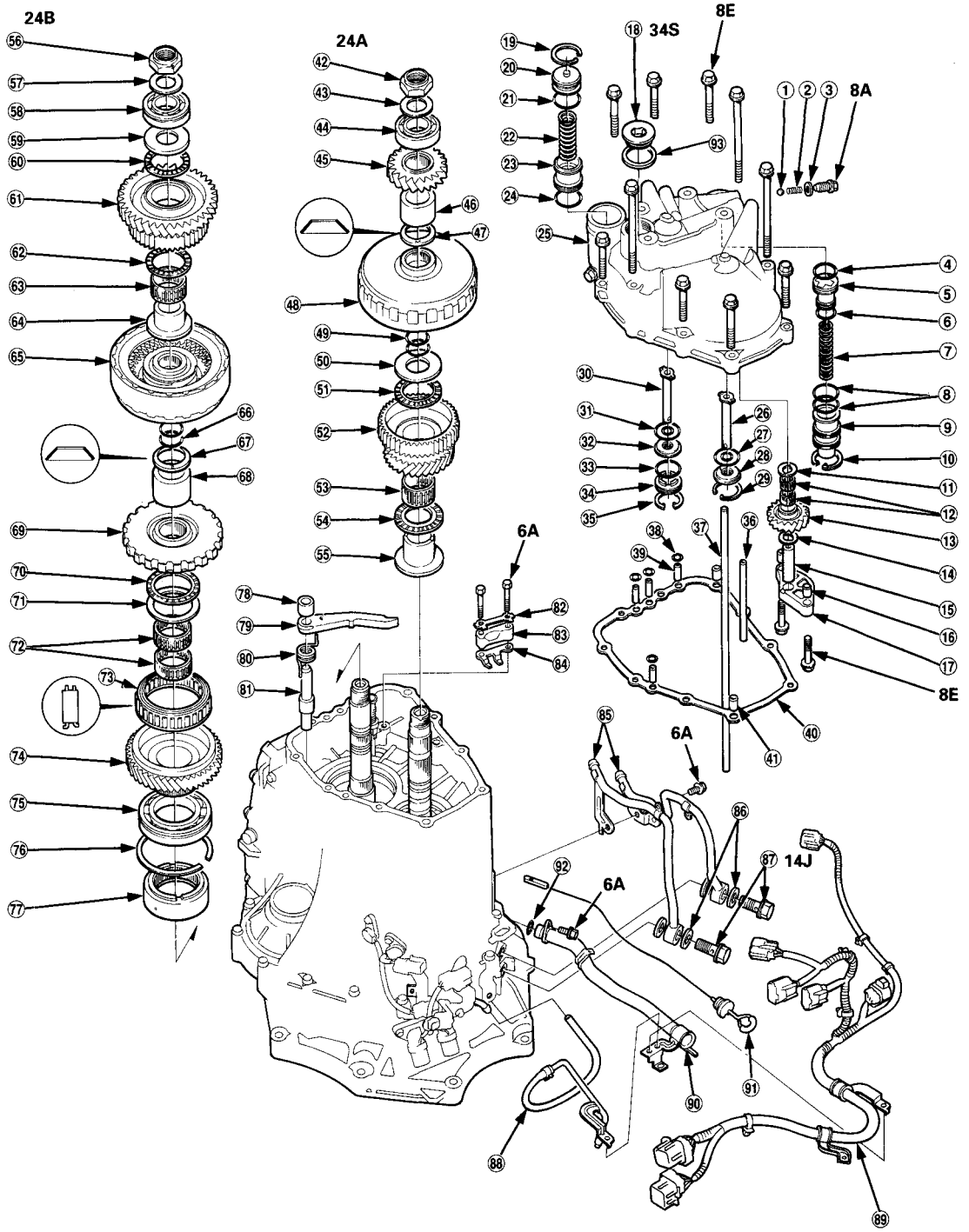
TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
5B	6 N-m (0.6 kgf-m, 4 lbf-ft)	5 x 0.8 mm	
6A	12 N-m (1.2 kgf-m, 8.7 lbf-ft)	6x 1.0 mm	
16L	12 N-m (1.2 kgf-m, 8.7 lbf-ft)	16x 1.5 mm	A/T gear position switch locknut
ISA	49 N-m (5.0 kgf-m, 36 lbf-ft)	18 x 1.5 mm	Drain plug

Illustrated Index

Rear Cover

NOTE:
- The illustration shows '96 model; '97 - '98 models are similar.
- Parts ① and ② are used on '96 models only; '97 - '98 models do not have these parts.
- Parts ⑨③ is used on '96 models with the transmission No. M5HA- 1021049 and above, and on '97-'98 models; '96 models with the transmission No. M5HA - 1000001 to M5HA - 1021048 do not use this part.



① **STEEL BALL {'96 model)**
② **ONE-WAY BALL SPRING ('96 model)**
③ **SEALING WASHER** Replace.
④ **O-RING** Replace.
⑤ **REVERSE ACCUMULATOR PISTON**
⑥ **O-RING** Replace.
⑦ **REVERSE ACCUMULATOR SPRING**
⑧ **O-RINGS** Replace.
⑨ **REVERSE ACCUMULATOR SLEEVE**
⑩ **SNAP RING**
⑪ **THRUST WASHER, 14 x 30 mm**
⑫ **NEEDLE BEARINGS**
⑬ **REVERSE IDLER GEAR**
⑭ **THRUST WASHER, 14 x 25 mm**
⑮ **REVERSE IDLER GEAR SHAFT**
⑯ **DOWEL PIN**
⑰ **REVERSE IDLER GEAR SHAFT HOLDER**
⑱ **SEALING BOLT, 34 x 1.25 mm**
⑲ **SNAP RING**
⑳ **1ST-HOLD ACCUMULATOR SLEEVE**
㉑ **O-RING** Replace.
㉒ **1ST-HOLD ACCUMULATOR SPRING**
㉓ **1ST-HOLD ACCUMULATOR PISTON**
㉔ **O-RING** Replace.
㉕ **REAR COVER**
㉖ **2ND CLUTCH FEED PIPE**
㉗ **O-RINGS** Replace.
㉘ **FEED PIPE GUIDE**
㉙ **SNAP RING**
㉚ **REVERSE CLUTCH FEED PIPE**
㉛ **O-RINGS** Replace.
㉜ **FEED PIPE GUIDE**
㉝ O-RING Replace.
㉞ **ATF FEED GUIDE**
㉟ **SNAP RING**
㊱ **ATF FEED PIPE**
㊲ **ATF FEED PIPE**
㊳ **O-RING** Replace.
㊴ **ATF FEED PIPE**
㊵ **REAR COVER GASKET** Replace.
㊶ **DOWEL PINS**
㊷ **MAINSHAFT LOCKNUT, 24 x 1.25 mm** Replace.
㊸ **WASHER, 24 mm**
㊹ **BALL BEARING**
㊺ **MAINSHAFT REVERSE GEAR**
㊻ **MAINSHAFT REVERSE GEAR DISTANCE COLLAR**
㊼ **CONICAL SPRING WASHER, 28 mm** Replace.
㊽ **2ND CLUTCH ASSEMBLY**
㊾ **O-RING Replace.**
㊿ **THRUST WASHER, 29 mm**
(51) **THRUST NEEDLE BEARING**
(52) **MAINSHAFT 2ND GEAR**
(53) **NEEDLE BEARING**
(54) **THRUST NEEDLE BEARING**
(55) **MAINSHAFT 2ND GEAR COLLAR**
(56) **COUNTERSHAFT LOCKNUT, 24 x 1.25 mm** Replace.
(57) **WASHER, 24 mm**
(58) **BALL BEARING**
(59) **THRUST WASHER, 25 mm**
(60) **THRUST NEEDLE BEARING**
(61) **COUNTERSHAFT REVERSE GEAR**
(62) **THRUST NEEDLE BEARING**
(63) **NEEDLE BEARING**
(64) **COUNTERSHAFT REVERSE GEAR COLLAR**
(65) **REVERSE CLUTCH ASSEMBLY**
(66) **O-RINGS Replace.**
(67) **CONICAL SPRING WASHER, 29 mm** Replace.
(68) **REVERSE CLUTCH DISTANCE COLLAR**
(69) **PARKING GEAR**
(70) **THRUST NEEDLE BEARING**
(71) **THRUST WASHER, 45.5 x 60 mm Selective part**
(72) **NEEDLE BEARINGS**
(73) **2ND GEAR ONE-WAY CLUTCH**
(74) **COUNTERSHAFT 2ND GEAR**
(75) **BALL BEARING**
(76) **SNAP RING**
(77) **ONE-WAY CLUTCH HUB**
(78) **PARKING BRAKE PAWL SHAFT SLEEVE**
(79) **PARKING BRAKE PAWL**
(80) **PARKING BRAKE PAWL SPRING**
(81) **PARKING BRAKE PAWL SHAFT**
(82) **LOCK PLATE Replace.**
(83) **PARKING BRAKE ROD HOLDER**
(84) **PARKING BRAKE ROD GUIDE**
(85) **ATF COOLER LINES**
(86) **SEALING WASHERS Replace.**
(87) **JOINT BOLTS**
(88) **BREATHER PIPE**
(89) **TRANSMISSION SUB-HARNESS**
(90) **ATF DIPSTICK PIPE**
(91) **ATF DIPSTICK**
(92) **O-RING Replace.**
(93) **WASHER**

TORQUE SPECIFICATIONS

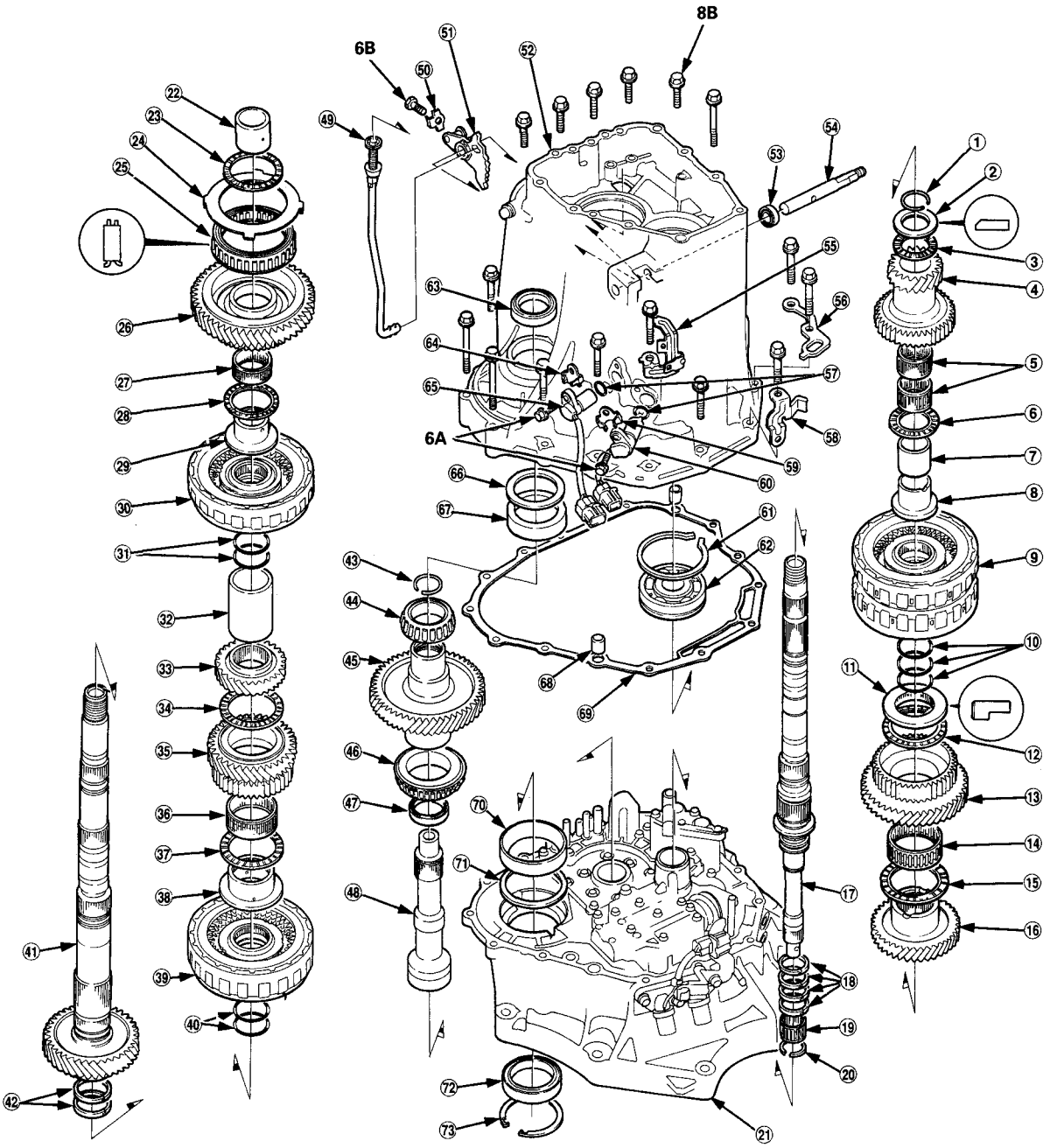
Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N-m (1.2kgf-m, 8.7 lbf-ft)	6x 1.0 mm	
8A	18 N-m (1.8 kgf-m, 13 lbf-ft)	8 x 1.25 mm	
8E	26 N-m (2.7 kgf-m, 20 lbf-ft)	8 x 1.25 mm	
14J	39 N-m (4.0 kgf-m, 29 lbf-ft)	14 x 1.5 mm	Joint bolt
24A	127 N-m (13.0 kgf-m, 94 lbf-ft)	24 x 1.25 mm	Mainshaft locknut
24B	127 N-m (13.0 kgf-m, 94 lbf-ft)	24 x 1.25 mm	Countershaft locknut: Left-hand threads
34S	78 N-m (8.0 kgf-m, 58 lbf-ft)	34 x 1.25 mm	Sealing bolt: '96 models with transmission No. M5HA- 1000001 to M5HA- 1021048
	98 N-m (10.0 kgf-m, 72.3 lbf-ft)	34 x 1.25 mm	Sealing bolt: '96 models with transmission No. M5HA - 1021049 and above, and '97 - '98 models (transmission No. M5HA-2000001 -)

Illustrated Index

Transmission Housing

NOTE:

- The illustration shows '96 model; '97 - '98 models are similar.
- Parts ⑦① and ⑦③ are used on '96 models with the transmission No. M5HA - 1000001 to M5HA - 1014322; '96 models with the transmission No. M5HA - 1014323 and above, and '97 - '98 models do not use these parts.



① **SNAP RING**
② **THRUST WASHER**
③ **THRUST NEEDLE BEARING**
④ **MAINSHAFT 1ST GEAR**
⑤ **NEEDLE BEARINGS**
⑥ **THRUST NEEDLE BEARING**
⑦ **MAINSHAFT 1ST GEAR DISTANCE COLLAR**
⑧ **MAINSHAFT 1ST GEAR COLLAR**
⑨ **1ST/4TH CLUTCH ASSEMBLY**
⑩ **O-RINGS** Replace.
⑪ **THRUST WASHER, 43 x 74 mm** Selective part
⑫ **THRUST NEEDLE BEARING**
⑬ **MAINSHAFT 4TH GEAR**
⑭ **NEEDLE BEARING**
⑮ **THRUST NEEDLE BEARING**
⑯ **MAINSHAFT 3RD GEAR**
⑰ **MAINSHAFT**
⑱ **SEALING RINGS, 37 mm**
⑲ **NEEDLE BEARING**
⑳ **SET RING**
㉑ **TORQUE CONVERTER HOUSING**
㉒ **COUNTERSHAFT 2ND GEAR COLLAR**
㉓ **THRUST NEEDLE BEARING**
㉔ **SET PLATE**
㉕ **1ST GEAR ONE-WAY CLUTCH**
㉖ **COUNTERSHAFT 1ST GEAR**
㉗ **NEEDLE BEARING**
㉘ **THRUST NEEDLE BEARING**
㉙ **COUNTERSHAFT 1ST GEAR COLLAR**
㉚ **1ST-HOLD CLUTCH ASSEMBLY**
㉛ **O-RINGS** Replace.
㉜ **1ST-HOLD CLUTCH DISTANCE COLLAR** Selective part
㉝ **COUNTERSHAFT 4TH GEAR**
㉞ **THRUST NEEDLE BEARING**
㉟ **COUNTERSHAFT 3RD GEAR**
㊱ **NEEDLE BEARING**
㊲ **THRUST NEEDLE BEARING**
㊳ **COUNTERSHAFT 3RD GEAR COLLAR**
㊴ **3RD CLUTCH ASSEMBLY**
㊵ **O-RINGS** Replace.
㊶ **COUNTERSHAFT**
㊷ **SEALING RINGS, 42 mm**
㊸ **SET RING** Replace.
㊹ **TAPERED ROLLER BEARING**
㊺ **SECONDARY DRIVEN GEAR SHAFT**
㊻ **TAPERED ROLLER BEARING**
㊼ **SECONDARY DRIVEN GEAR SHAFT OIL SEAL** Replace.
㊽ **EXTENSION SHAFT**
㊾ **PARKING BRAKE ROD**
㊿ **LOCK WASHER** Replace.
(51) **DETENT LEVER**
(52) **TRANSMISSION HOUSING**
(53) **TRANSMISSION HOUSING OIL SEAL** Replace.
(54) **CONTROL SHAFT**
(55) **SPEED SENSOR CONNECTOR BRACKET**
(56) **TRANSMISSION HANGER**
(57) **O-RINGS** Replace.
(58) **HARNESS CLAMP BRACKET**
(59) **MAINSHAFT SPEED SENSOR WASHER**
(60) **MAINSHAFT SPEED SENSOR**
(61) **SNAP RING**
(62) **MAINSHAFT TRANSMISSION HOUSING BEARING**
(63) **TRANSMISSION HOUSING OIL SEAL** Replace.
(64) **COUNTERSHAFT SPEED SENSOR WASHER**
(65) **COUNTERSHAFT SPEED SENSOR**
(66) **THRUST SHIM, 75 mm** Selective part
(67) **TAPERED ROLLER BEARING OUTER RACE**
(68) **DOWEL PINS**
(69) **TRANSMISSION HOUSING GASKET** Replace.
(70) **TAPERED ROLLER BEARING OUTER RACE**
(71) **THRUST WASHER, 90 mm**
(72) **TORQUE CONVERTER HOUSING OIL SEAL Replace.**
(73) **SNAP RING**

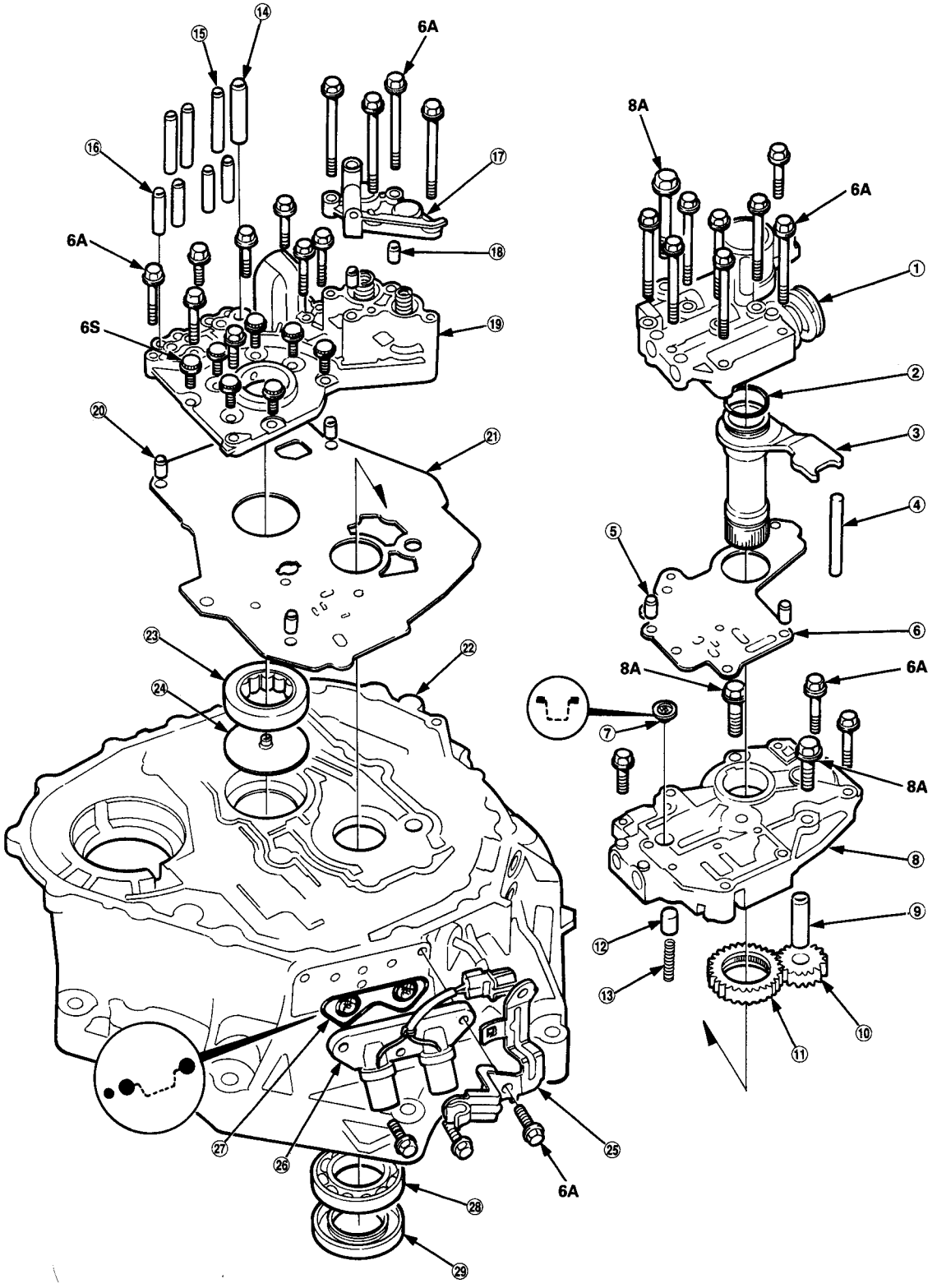
TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12N-m(1.2kgf-m, 8.7 lbf-ft)	6x 1.0 mm	
6B	14N-m(1.4kgf-m, 10 lbf-ft)	6 x 1.0 mm	
8B	33 N-m (3.4 kgf-m, 25 lbf-ft)	8 x 1.25 mm	

Illustrated Index

Torque Converter Housing/Valve Body

NOTE: The illustration shows '96 model; '97 - '98 models are similar.



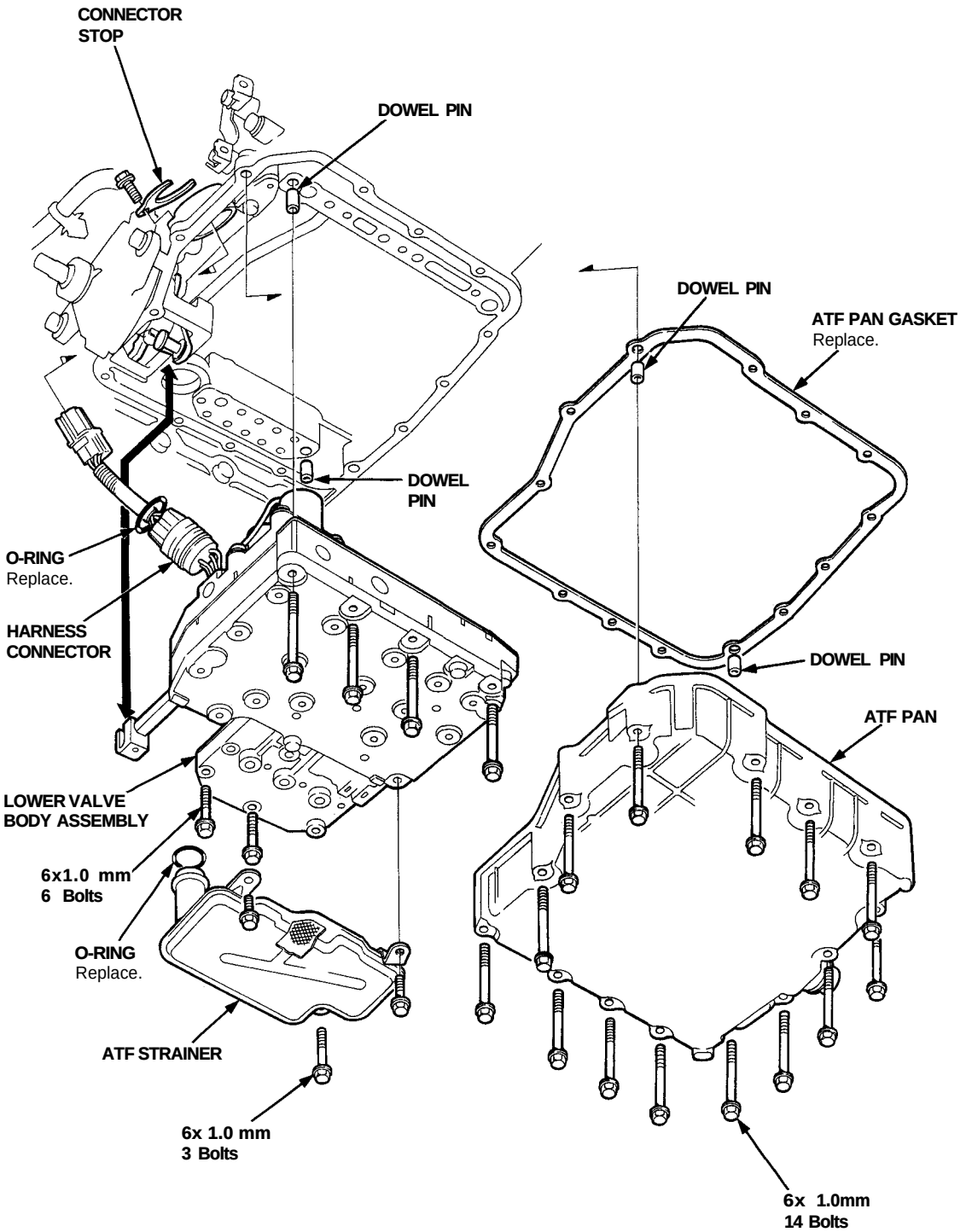
① **REGULATOR VALVE BODY**
② **O-RING** Replace.
③ **STATOR SHAFT**
④ **STOP SHAFT**
⑤ **DOWEL PINS**
⑥ **REGULATOR SEPARATOR PLATE**
⑦ **FILTER** Replace.
⑧ **ATF PUMP BODY**
⑨ **ATF PUMP DRIVEN GEAR SHAFT**
⑩ **ATF PUMP DRIVEN GEAR**
⑪ **ATF PUMP DRIVE GEAR**
⑫ **TORQUE CONVERTER CHECK VALVE**
⑬ **TORQUE CONVERTER CHECK VALVE SPRING**
⑭ **ATF FEED PIPE, 10 x 60 mm**
⑮ **ATF FEED PIPE, 8 x 57.5 mm**
⑯ **ATF FEED PIPES, 8 x 40 mm**
⑰ **ACCUMULATOR COVER**
⑱ **DOWEL PINS**
⑲ **ACCUMULATOR BODY**
⑳ **DOWEL PINS**
㉑ **TORQUE CONVERTER HOUSING SEPARATOR PLATE**
㉒ **TORQUE CONVERTER HOUSING**
㉓ **TORQUE CONVERTER HOUSING COUNTERSHAFT BEARING**
㉔ **ATF GUIDE PLATE**
㉕ **LOCK-UP CONTROL SOLENOID VALVE CONNECTOR BRACKET**
㉖ **LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY**
㉗ **LOCK-UP CONTROL SOLENOID FILTER/GASKET** Replace.
㉘ **TORQUE CONVERTER HOUSING MAINSHAFT BEARING**
㉙ **MAINSHAFT OIL SEAL** Replace.

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12N-m(1.2kgf-m, 8.7 lbf-ft)	6x 1.0 mm	
6S	12N-m(1.2kgf-m, 8.7 lbf-ft)	6x 1.0 mm	Special Bolt
8A	18N-m(1.8kgf-m, 13 lbf-ft)	8x 1.25 mm	

Transmission Housing/Lower Valve Body Assembly

Removal



NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the lower valve body assembly, replace the following:
  -O-rings
  -ATF pan gasket

CAUTION: Do not turn over the transmission before removing the ATF pan.

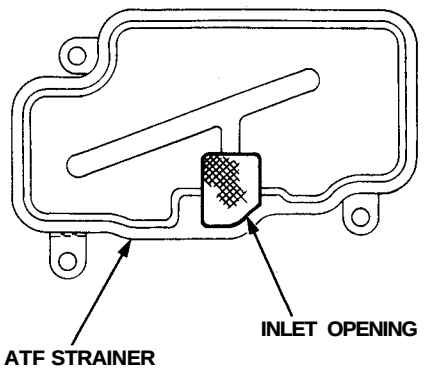
1. Remove the shift control solenoid/linear solenoid harness connector stop.

2. Remove the ATF pan (14 bolts).

3. Remove the ATF strainer (three bolts).

4. Remove the lower valve body assembly (six bolts) while pushing the connector out of the transmission housing.

5. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.



6. Replace the ATF strainer if it is clogged or damaged.

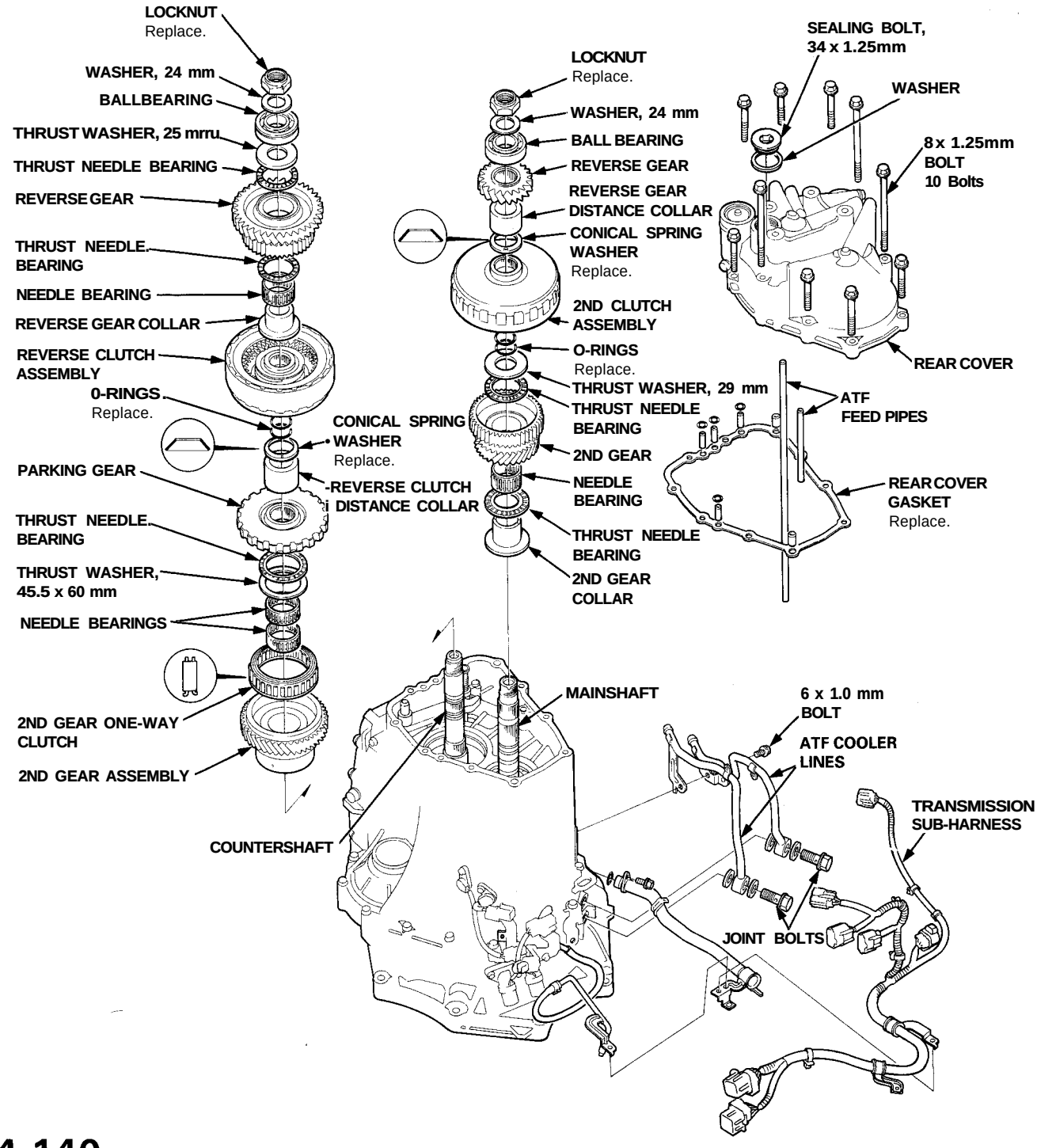
   NOTE: The ATF strainer can be reused if it is not clogged.

Rear Cover

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the rear cover, replace the following:
  -0-rings
  - Mainshaft and countershaft locknuts
  -Conical spring washers
  -Rear cover gasket
- The washer on the rear cover is used on '96 models with the transmission No. M5HA-1021049 and above, and on '97 -'98 models; '96 models with the transmission No. M5HA-1000001 to M5HA-1021048 do not use this part.

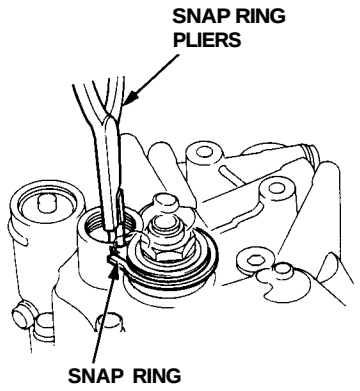


1. Remove the one bolt securing the ATF cooler lines to the transmission housing and the joint bolts, then remove the ATF cooler lines.

2. Remove the 34 x 1.25 mm sealing bolt and the washer from the rear cover, and the ten bolts securing the rear cover.

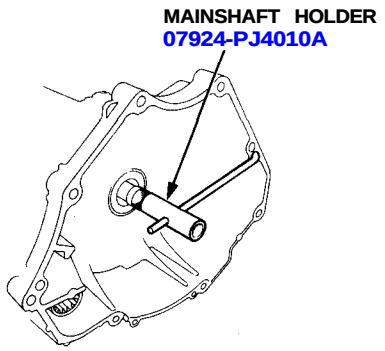
   NOTE: The washer on the rear cover is used on '96 models with the transmission No. M5HA - 1021049 and above, and on '97 - '98 models; '96 models with the transmission No. M5HA - 1000001 to M5HA - 1021048 do not use this part.

3. Using snap ring pliers, expand the snap ring on the countershaft ball bearing and remove the rear cover.



4. Remove the two ATF feed pipes from the transmission housing.

5. Slip the special tool onto the mainshaft.

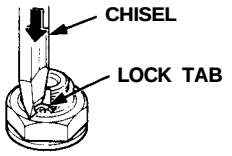


6. Engage the parking brake pawl with the parking gear.

7. Cut the lock tabs of each shaft locknut using a chisel as shown, then remove the locknuts from each shaft.

   CAUTION: Keep all of the chiseled particles out of the transmission.

   NOTE:
   - Countershaft locknut has left-hand threads.
   - Always wear safety glasses.



8. Remove the special tool from the mainshaft after removing the locknuts.

9. Remove the 24 mm washer, ball bearing, reverse gear, reverse gear distance collar and conical spring washer from the mainshaft.

10. Remove the 24 mm washer, ball bearing, 25 mm thrust washer, thrust needle bearing, reverse gear, thrust needle bearing, needle bearing, reverse gear collar, reverse clutch assembfy, conical spring washer and reverse clutch distance collar from the countershaft.

11. Remove the 2nd clutch assembly from the mainshaft.

12. Remove the parking brake pawl shaft sleeve, pawl, spring, and shaft from the housing.

13. Remove the parking gear from the countershaft, and the 29 mm thrust washer, thrust needle bearing and 2nd gear from the mainshaft together.

14. Remove the thrust needle bearing, 45.5 x 60 mm thrust washer, needle bearings, 2nd gear one-way clutch and 2nd gear assembly from the countershaft.

15. Remove the needle bearing, thrust needle bearing and 2nd gear collar from the mainshaft.

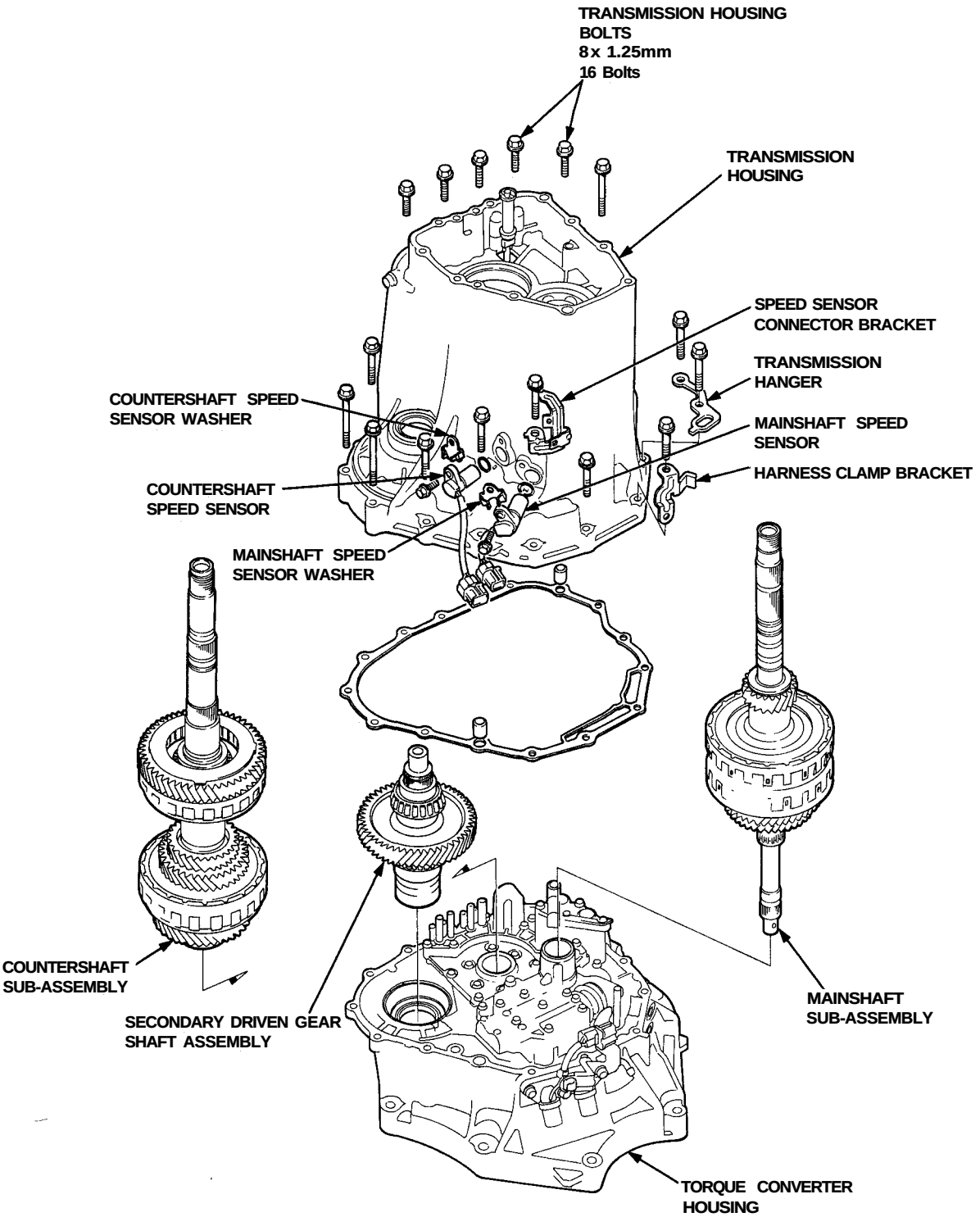
16. Disconnect the connectors from the transmission sub-harness.

Transmission Housing

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  - O-rings
  - Transmission housing gasket

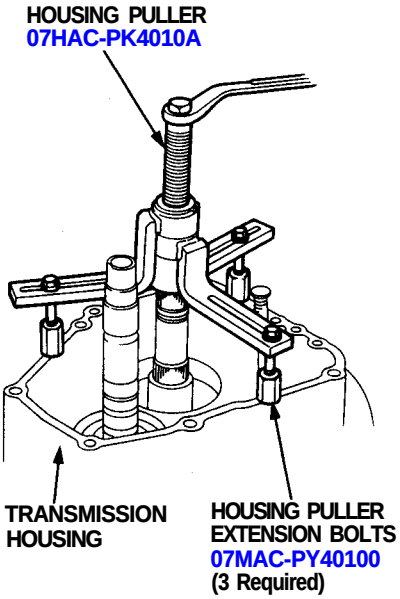


1. Remove the mainshaft and countershaft speed sensors from the transmission housing.

2. Remove the sixteen bolts securing the transmission housing with the transmission hanger, harness clamp bracket and speed sensor connector bracket.

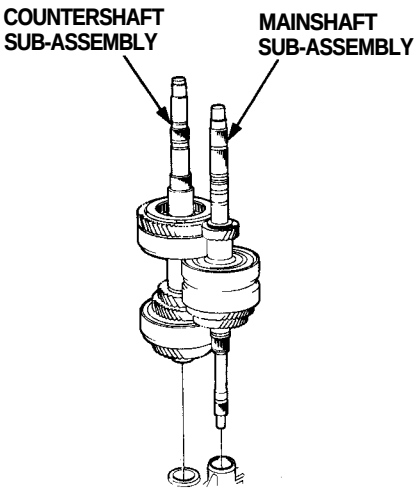
3. Install the special tools on the transmission housing, then remove the transmission housing as shown.

CAUTION: Make sure that the mainshaft and countershaft speed sensors have been removed from the transmission housing before removing the transmission housing from the torque converter housing.



4. Remove the mainshaft sub-assembly and countershaft sub-assembly together.

NOTE: When removing the shafts, take care to prevent damage to the regulator valve body.



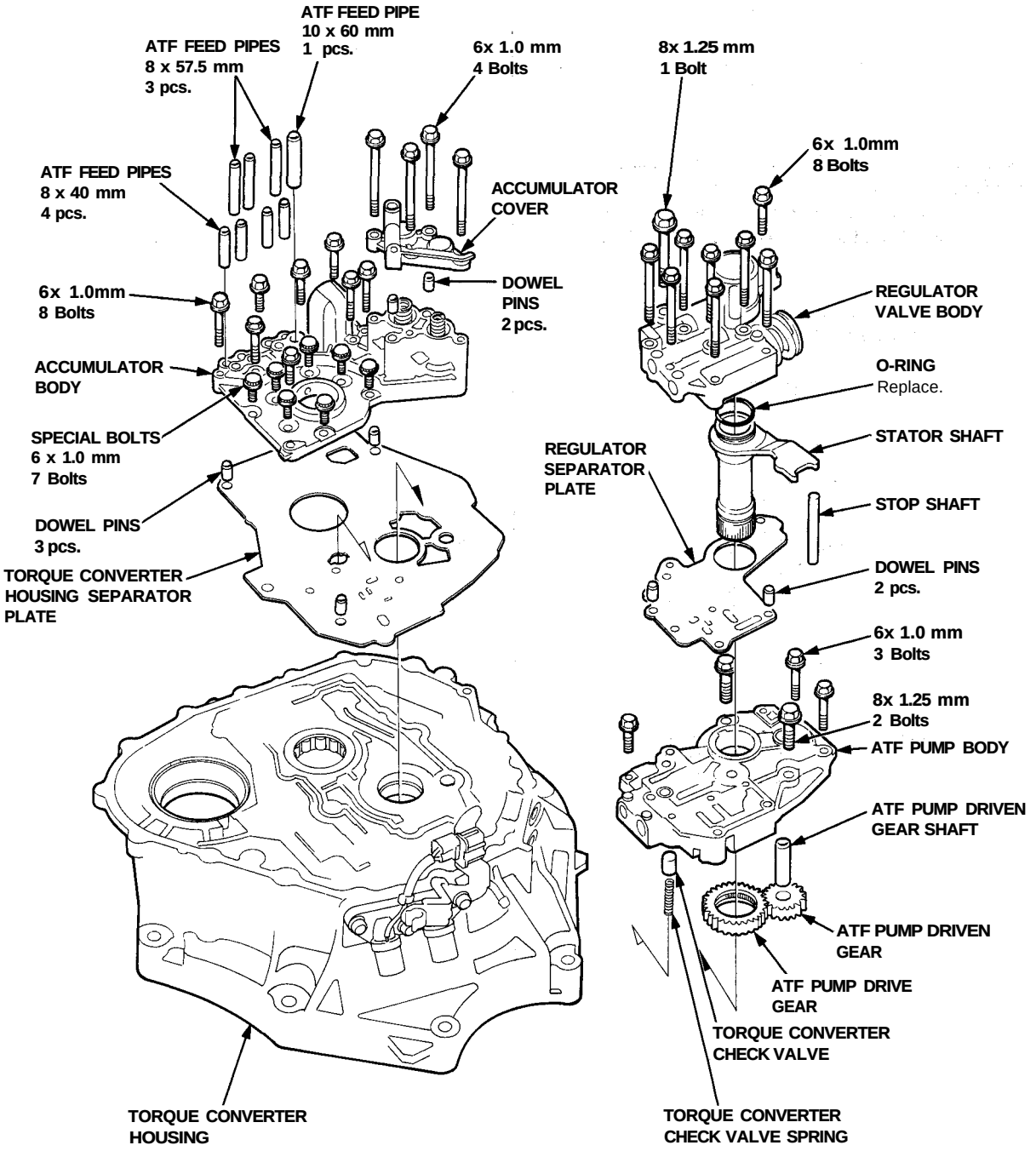
5. Remove the secondary driven gear shaft assembly.

Torque Converter Housing/Valve Body

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve body from the torque converter housing, replace the O-ring.



1. Remove the eight 6 mm bolts and one 8 mm bolt securing the regulator valve body, then remove the regulator valve body.

2. Remove the stator shaft, stop shaft, and the regulator separator plate.

3. Remove the three 6 mm bolts and two 8 mm bolts securing the ATF pump body, then remove the ATF pump body.

4. Remove the ATF pump driven gear shaft, ATF pump gears, torque converter check valve, and spring.

5. Remove the four bolts securing the accumulator cover, then remove the accumulator cover.

   NOTE: The accumulator cover is spring loaded. To prevent stripping the threads in the torque converter housing, press down on the accumulator cover while unscrewing the bolts in a crisscross pattern.

6. Remove the eight ATF feed pipes from the accumulator body.

7. Remove the eight 6 mm bolts and seven 6 mm special bolts securing the accumulator body, then remove the accumulator body.

8. Remove the torque converter housing separator plate with three dowel pins.

Valve Body

Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.

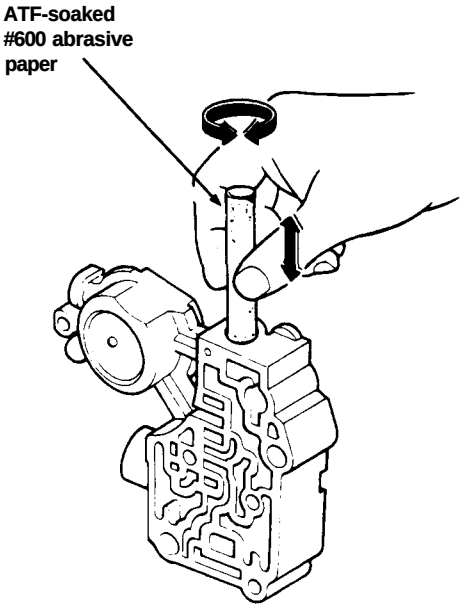
2. Carefully tap the valve body so the sticking valve drops out of its bore.

   CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.

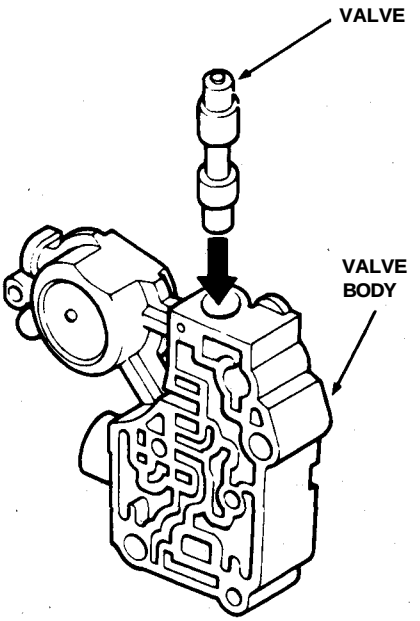
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

   CAUTION: The valve body is aluminum and doesn't require much polishing to remove any burrs.



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry with compressed air.

6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest. If the valve still sticks, replace the valve body.



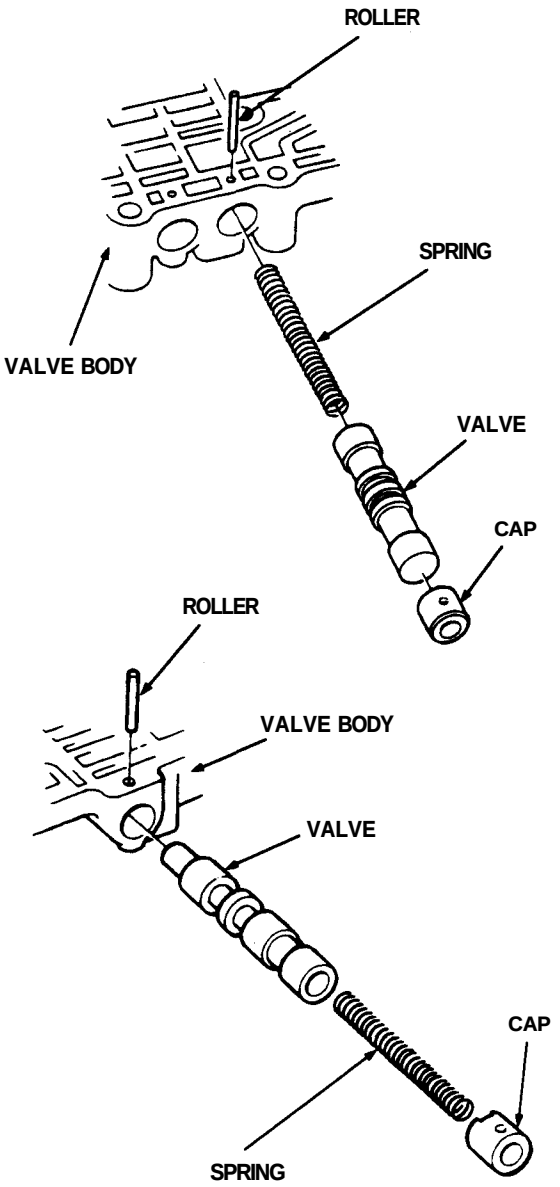
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

Valve

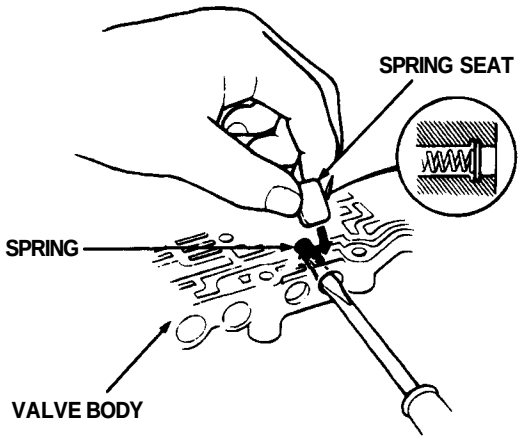
Assembly

NOTE: Coat all parts with ATF before assembly.

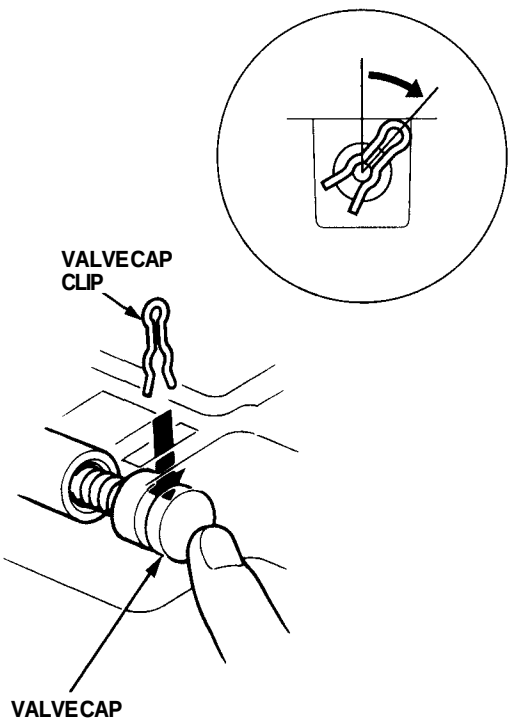
- Install the valve, valve spring and cap in the valve body, and secure with the roller.



- Set the spring in the valve, then install them in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Install the valve, valve spring and cap in the valve body, then secure with the valve cap clip. Rotate the valve cap clip until it stops against the valve body wall.



Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

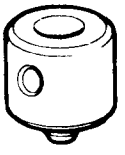
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and a hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.

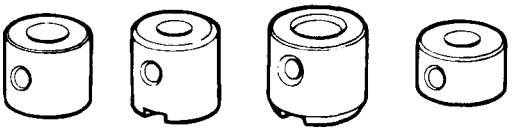
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



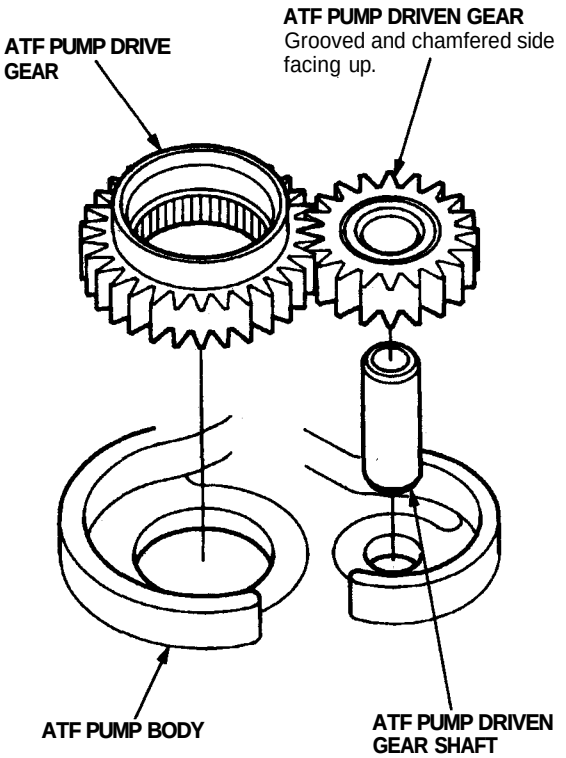
TOWARD INSIDE OF VALVE BODY

ATF Pump

Inspection

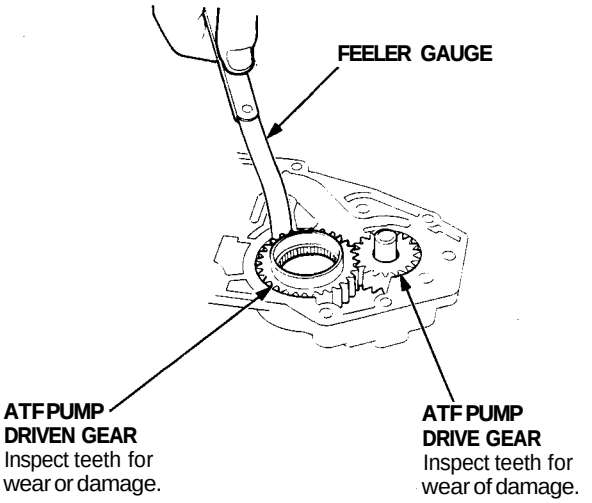
1. Install the ATF pump gears and ATF pump driven gear shaft in the ATF pump body.

NOTE:
- Lubricate all parts with ATF during inspecting.
- Install the ATF pump driven gear with its grooved and chamfered side facing up as shown.



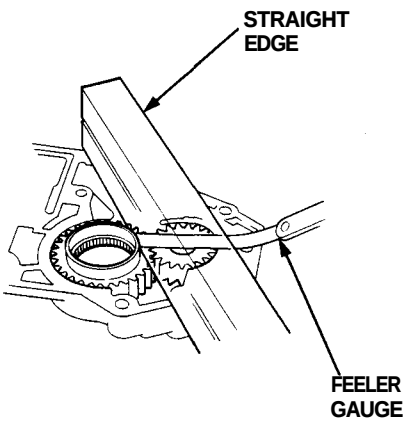
2. Measure the side clearance of the ATF pump drive and driven gears.

ATF Pump Gears Side (Radial) Clearance:
Standard (New):
ATF Pump Drive Gear
0.210 - 0.265 mm (0.0083 - 0.0104 in)
ATF Pump Driven Gear
0.070 - 0.125 mm (0.0028 - 0.0049 in)



3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body, with a straight edge and a feeler gauge.

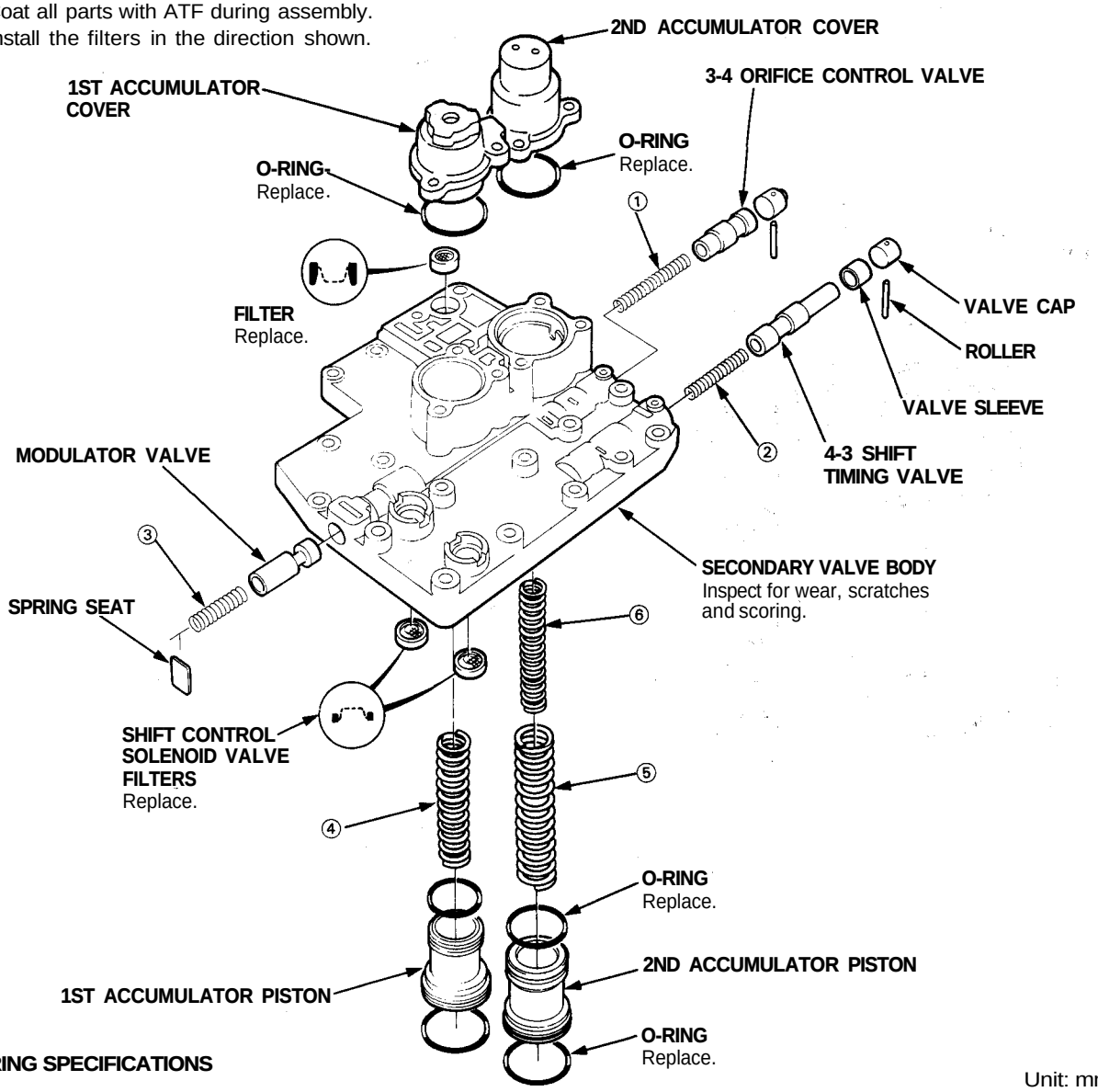
ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:
Standard (New): 0.03 - 0.05 mm (0.001 - 0.002 in)
Service Limit: 0.07 mm (0.003 in)



Secondary Valve Body — '96 Model

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.



SPRING SPECIFICATIONS

Unit: mm (in)

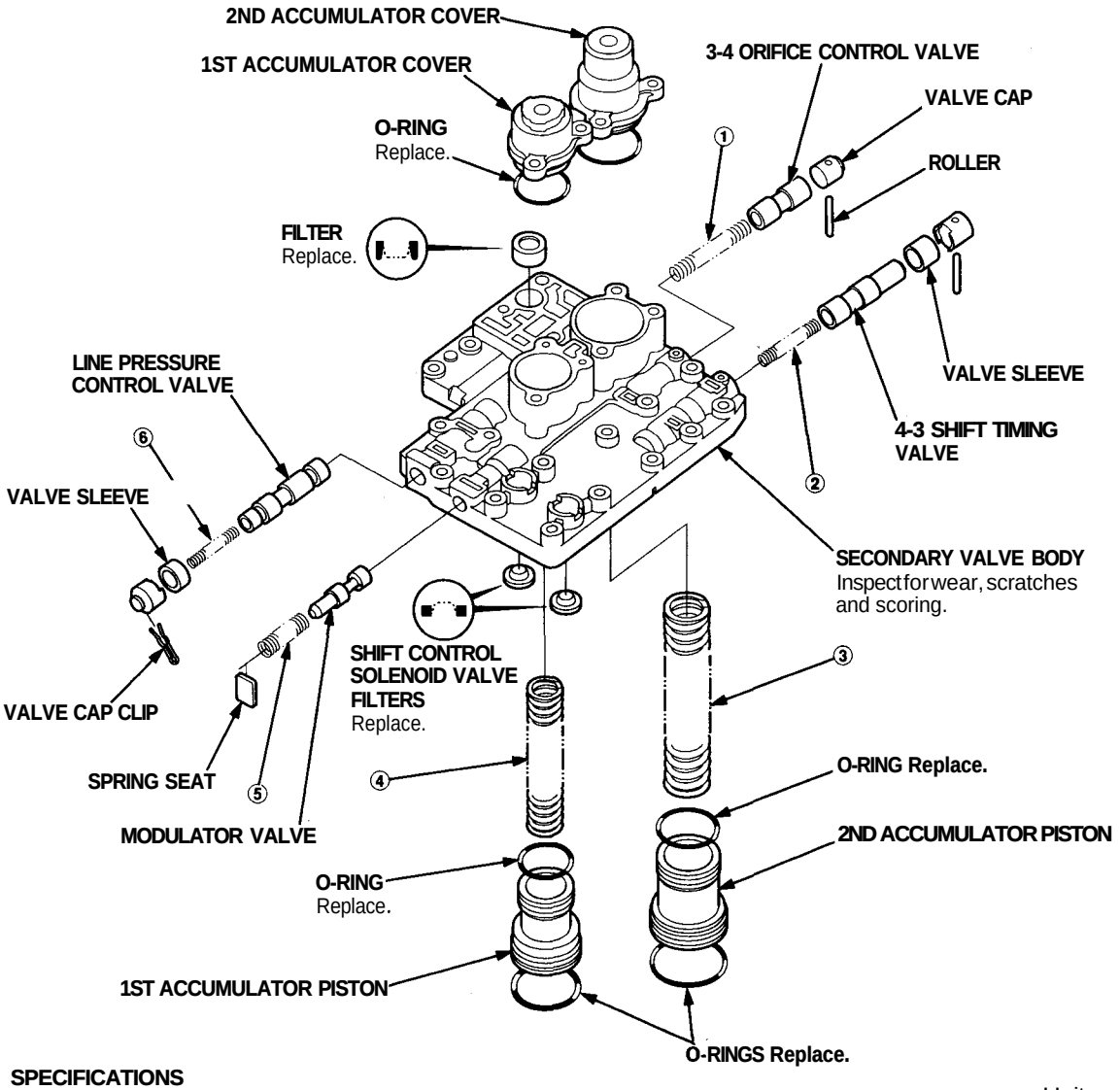
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-4 orifice control valve spring	1.0(0.039)	6.6(0.260)	49.6(1.953)	26.8
②	4-3 shift timing valve spring	0.7(0.028)	7.1(0.280)	35.0(1.378)	20.4
③	Modulator valve spring	1.5(0.059)	9.4 (0.370)	30.6(1.205)	9.9
		1.4(0.055)	9.4 (0.370)	33.0(1.299)	10.5
④	1st accumulator spring	2.9(0.114)	18.0(0.709)	75.5 (2.972)	11.5
⑤	2nd accumulator spring A	3.6(0.142)	22.0 (0.866)	96.7 (3.807)	13.0
⑥	2nd accumulator spring B	2.0 (0.079)	6.6 (0.260)*	80.0(3.150)	19.6

*: inside Diameter

Secondary Valve Body — '97 - '98 Models

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3-4 orifice control valve spring	1.1 (0.043)	7.1 (0.280)	47.7(1.878)	22.9
②	4-3 shift timing valve spring	0.7 (0.028)	7.1 (0.280)	35.0(1.378)	20.4
③	2nd accumulator spring A	3.2(0.126)	23.7 (0.933)	92.8 (3.654)	11.8
④	1st accumulator spring	2.7 (0.106)	18.0(0.709)	83.3 (3.280)	14.4
⑤	Modulator valve spring	1.2(0.047)	7.0 (0.276)*	27.6(1.087)	7.7
⑥	Line pressure control valve spring	0.8(0.031)	6.1 (0.240)	24.1 (0.949)	14.6

*: Inside Diameter

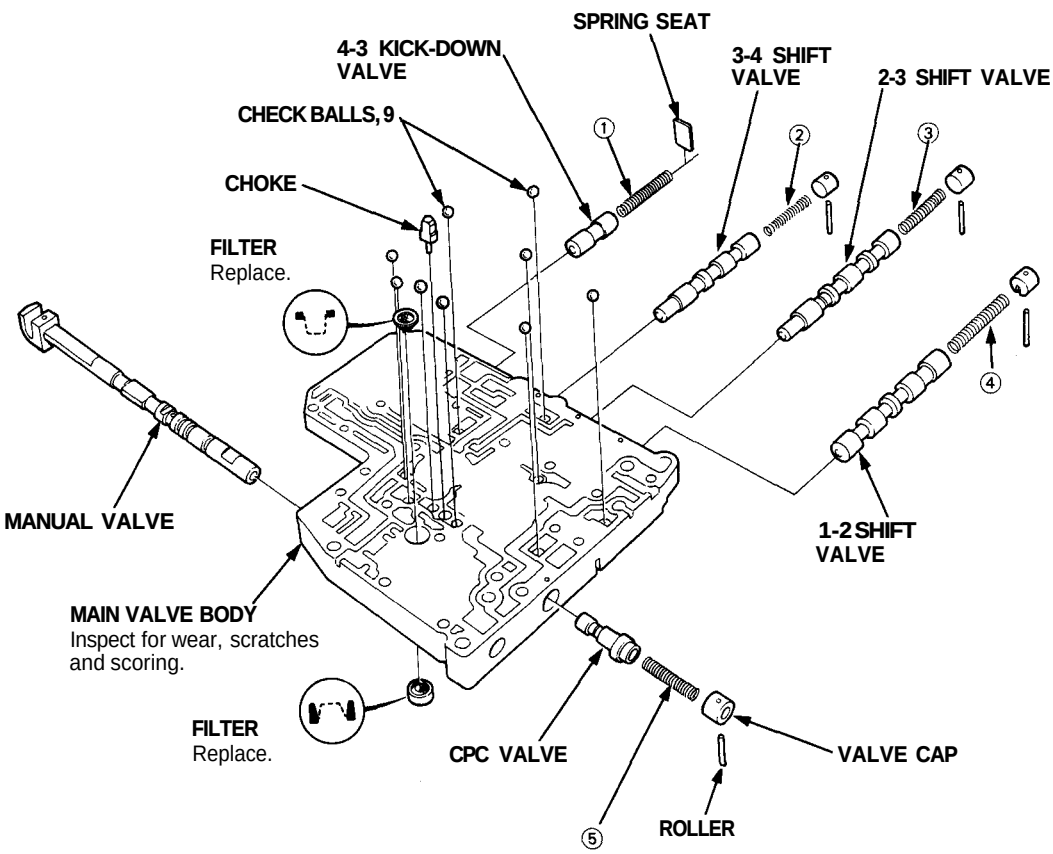
Main Valve Body — '96 Model

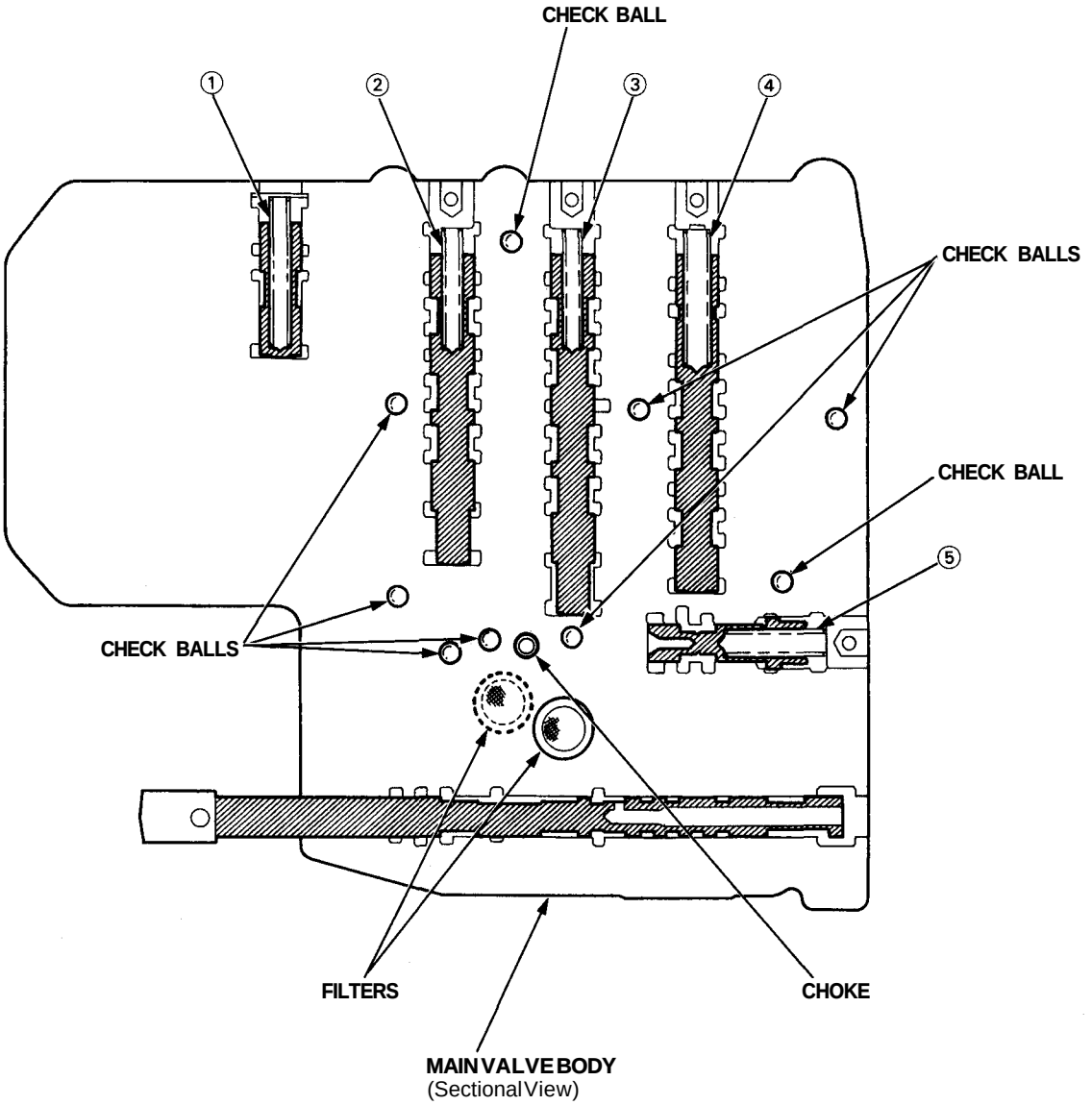
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly !n solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4-3 kick-down valve spring	1.1 (0.043)	7.1 (0.280)	51.3(2.020)	22.5
②	3-4 shift valve spring	0.8(0.031)	6.6 (0.260)	42.1 (1.657)	22.0
③	2-3 shift valve spring	0.8(0.031)	6.6 (0.260)	42.1 (1.657)	22.0
④	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	55.5(2.185)	24.0
⑤	CPC valve spring	1.0(0.039)	6.8 (0.268)	34.3(1.350)	14.2

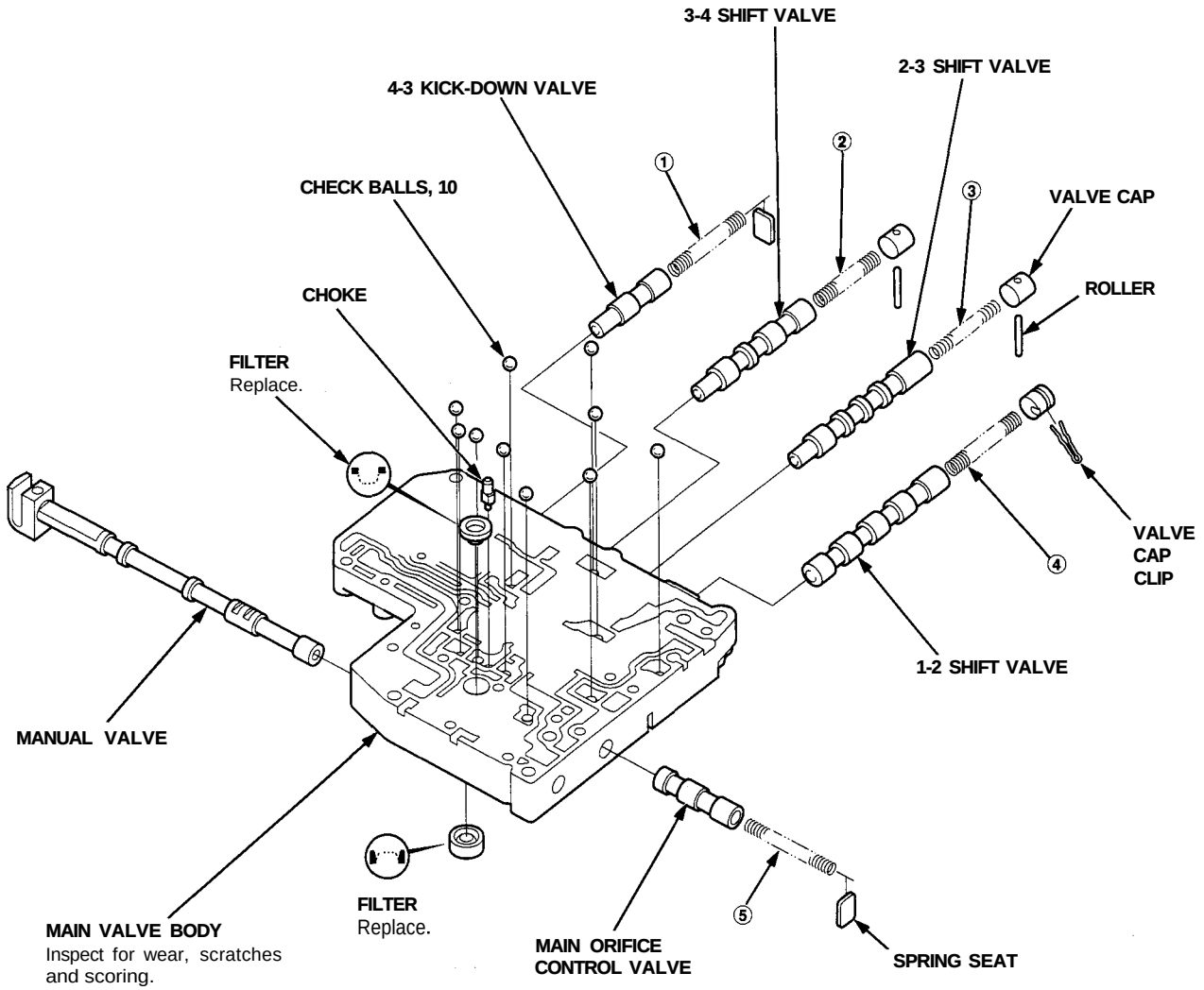
Main Valve Body — '97 - '98 Models

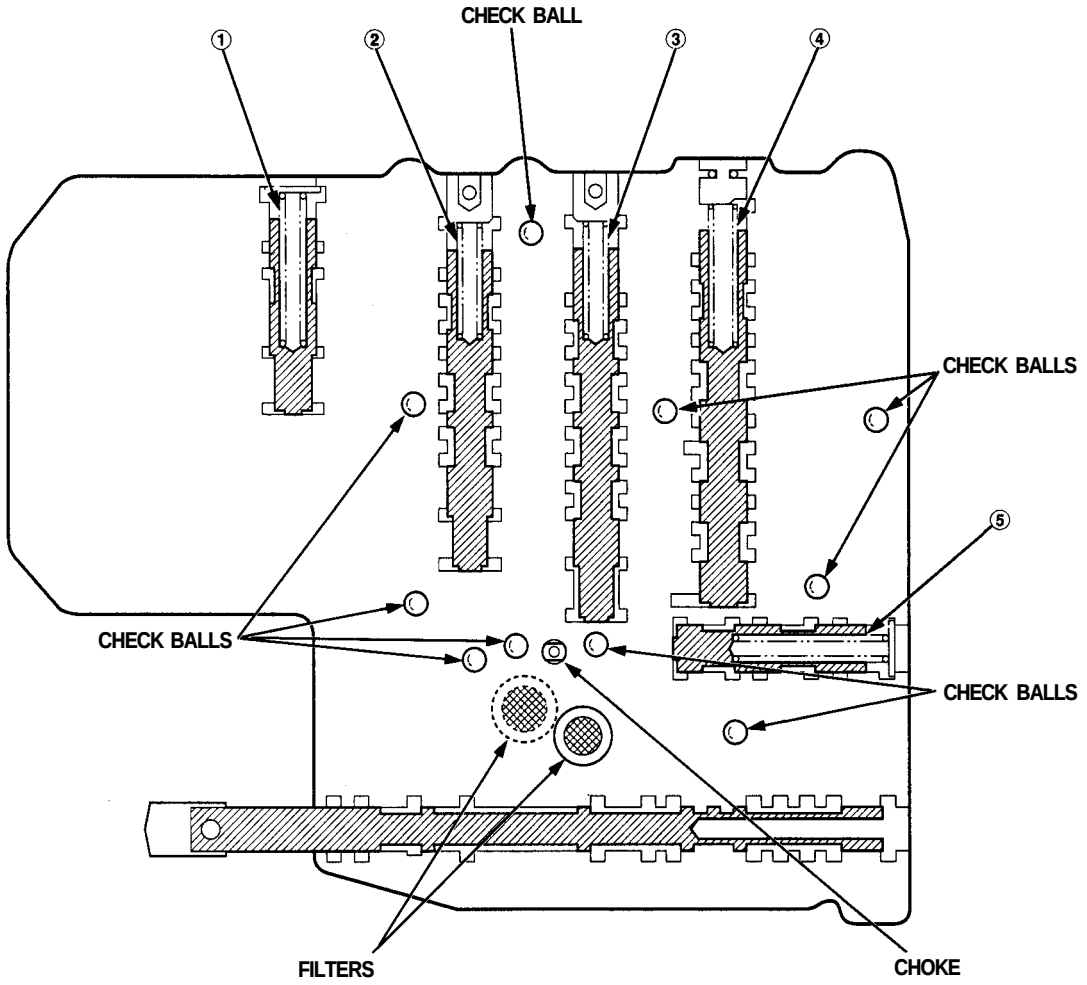
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4-3 kick-down valve spring	1.1 (0.043)	7.1 (0.280)	44.6(1.756)	22.5
②	3-4 shift valve spring	0.8 (0.031)	6.6 (0.260)	42.1 (1.657)	22.0
③	2-3 shift valve spring	0.8(0.031)	6.6 (0.260)	42.1 (1.657)	22.0
④	1-2 shift valve spring	0.9 (0.035)	7.6 (0.299)	55.5 (2.185)	24.0
⑤	Main orifice control valve spring	1.0(0.039)	6.6 (0.260)	42.0(1.654)	21.6

Regulator Valve Body — '96 Model

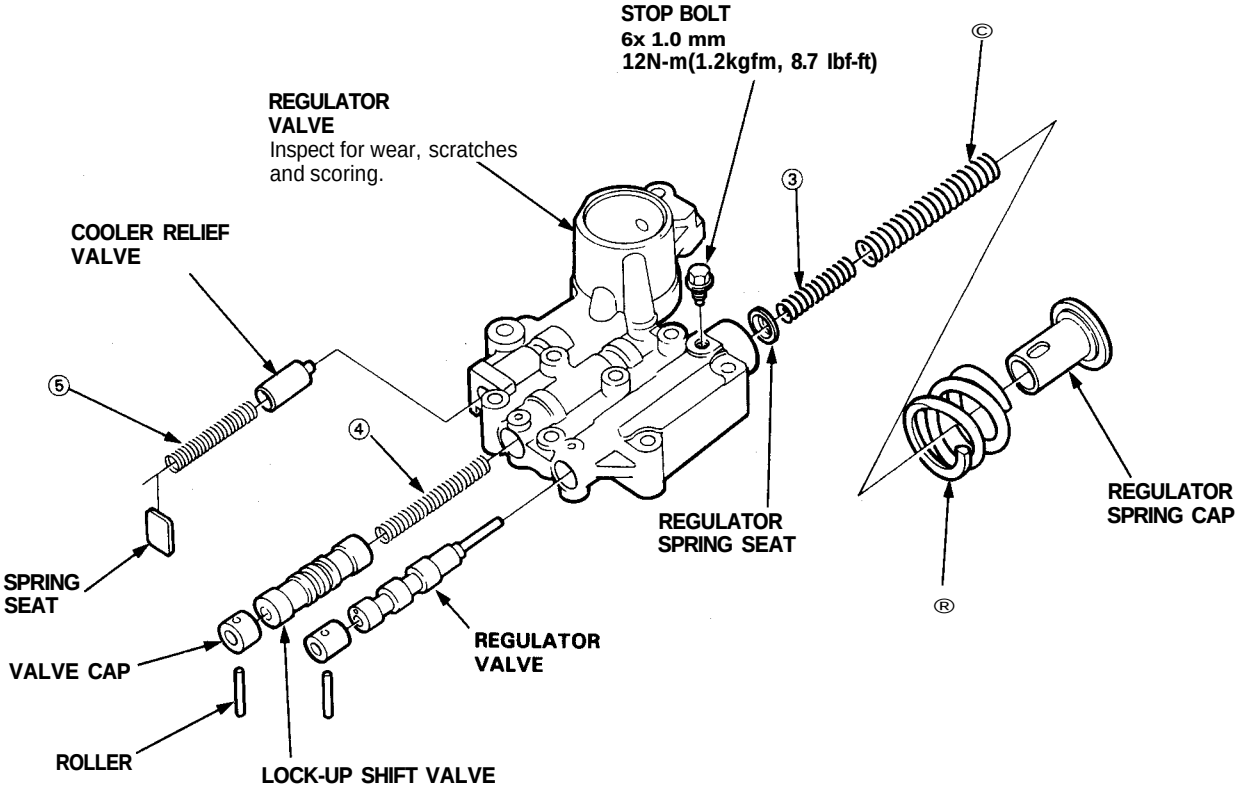
Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.

1. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.

2. Reassembly is the reverse of the disassembly procedure.

NOTE:
- Coat all parts with ATF during assembly.
- Align the hole in the regulator spring cap with the hole in the valve body, press the spring cap into the body and tighten the stop bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Stator reaction spring	6.5 (0.256)	26.4(1.039)*	30.3(1.193)	1.9
②	Regulator valve spring A	1.8(0.071)	14.7 (0.579)	86.5 (3.406)	16.5
③	Regulator valve spring B	1.7(0.067)	6.0 (0.236)*	43.0(1.693)	13.5
④	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
⑤	Cooler relief valve spring	1.1 (0.043)	8.4(0.331)	46.8(1.843)	17.0

*: Inside Diameter

Regulator Valve Body — '97 - '98 Models

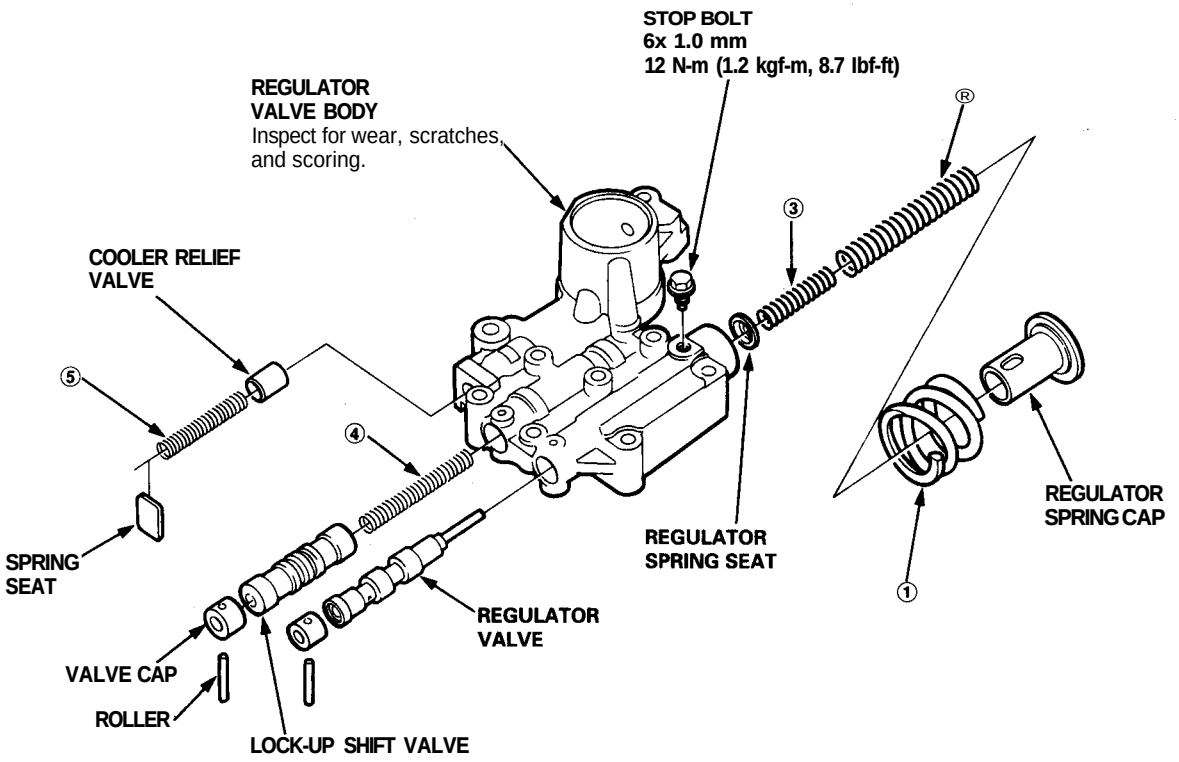
Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fall to slide freely, see Valve Body Repair on page 14-146.

1. Hold the regulator spring cap in place while removing the stop bolt. The regulator spring cap is spring loaded. Once the stop bolt is removed, release the spring cap slowly so it does not pop out.

2. Reassembly is the reverse of the disassembly procedure.

   NOTE:
   - Coat all parts with ATF during assembly.
   - Align the hole in the regulator spring cap with the hole in the valve body, press the spring cap into the body and tighten the stop bolt.



SPRING SPECIFICATIONS

Unit: mm (in)

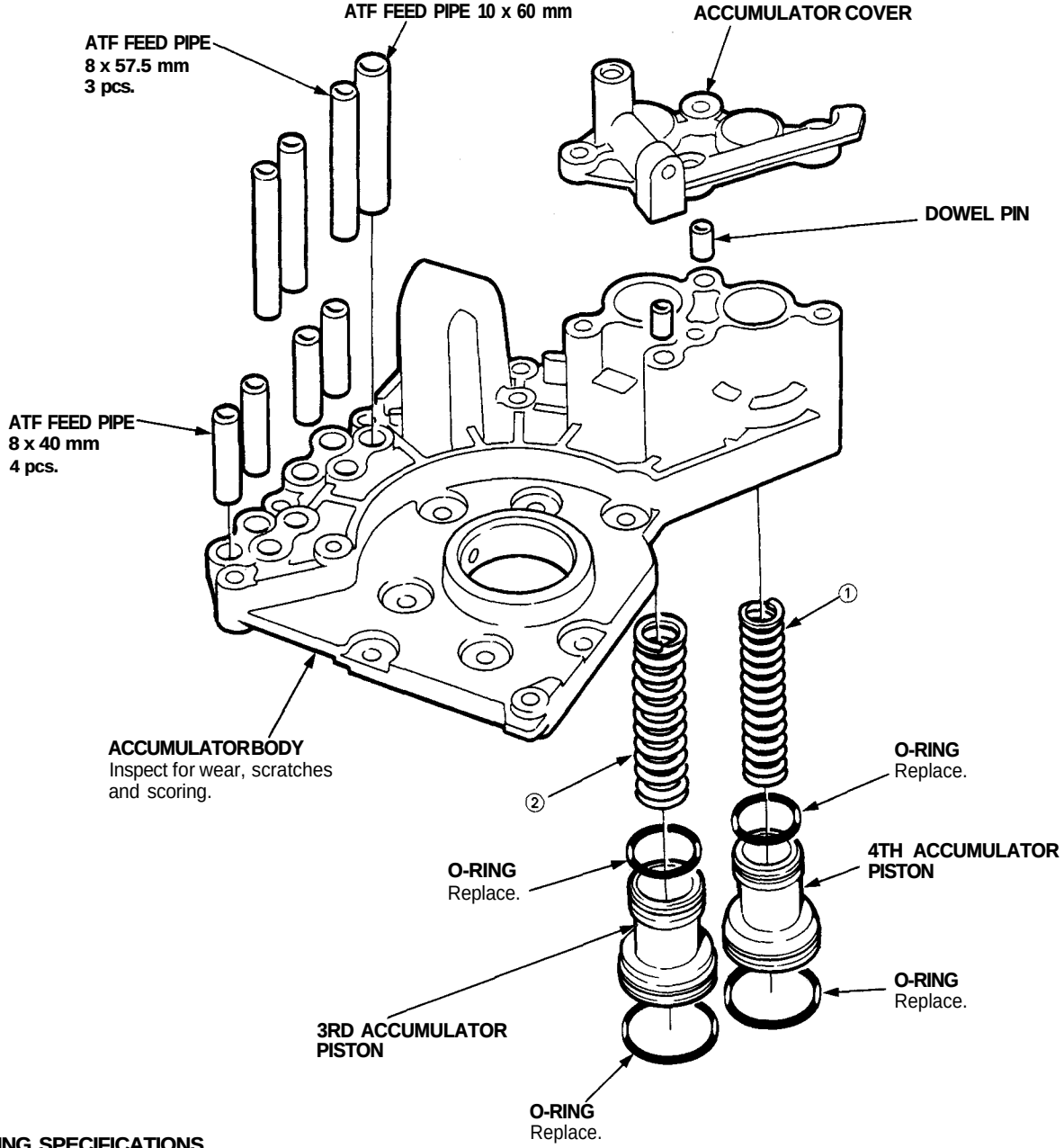
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Stator reaction spring	5.5(0.217)	26.4(1.039)*	30.3(1.193)	2.1
②	Regulator valve spring A	1.8(0.071)	14.7(0.579)	81.9(3.224)	16.5
③	Regulator valve spring B	1.7(0.067)	6.0 (0.236)*	43.0(1.693)	7.2
④	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
⑤	Cooler relief valve spring .	1.0(0.039)	8.4(0.331)	33.8(1.331)	10.8

*: Inside Diameter

Accumulator Body — '96 Model

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

Unit: mm (in)

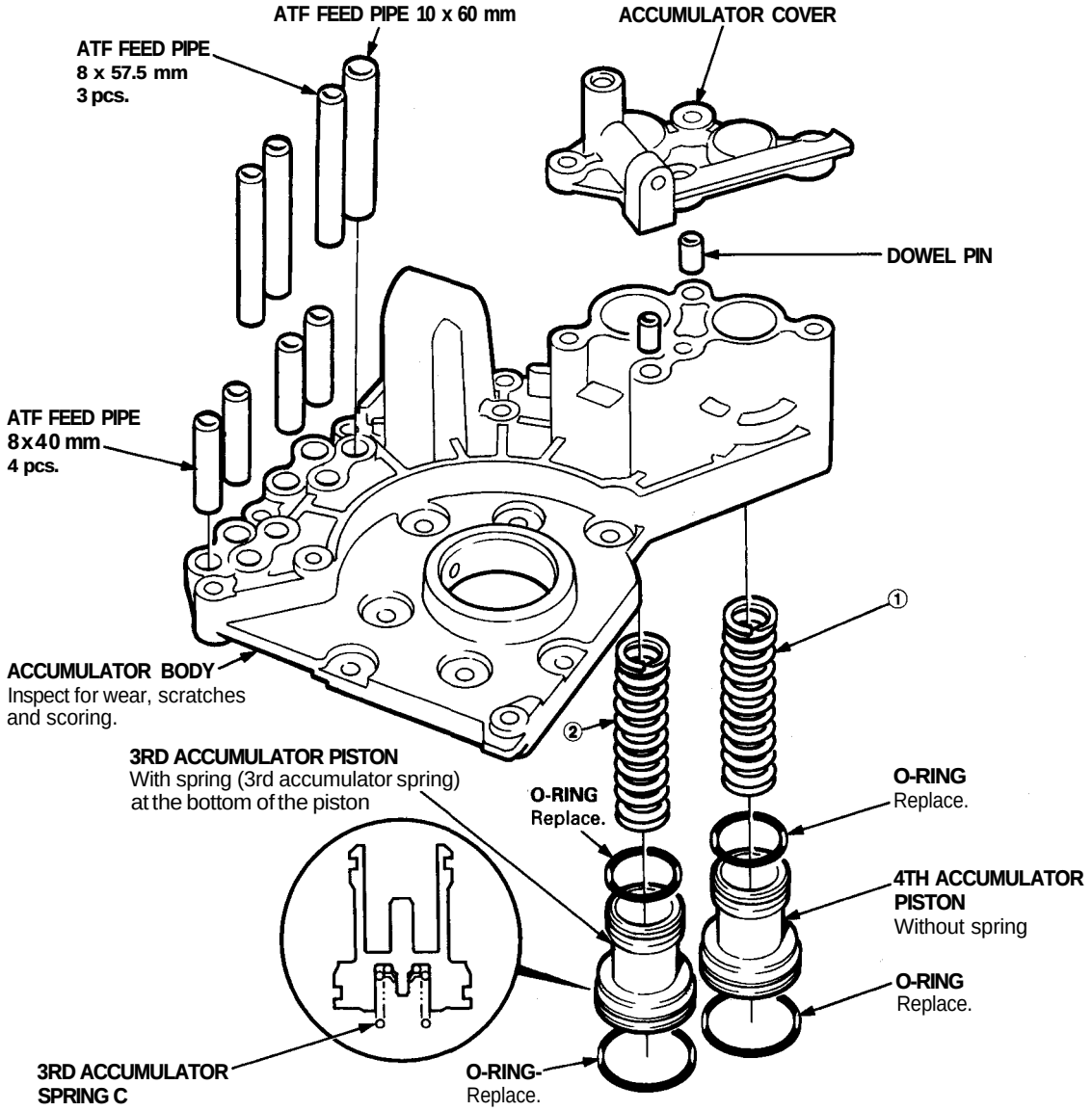
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4th accumulator spring	2.8(0.110)	16.5(0.650)	80.8(3.181)	14.6
②	3rd accumulator spring	3.2(0.126)	19.0 (0.748)	78.4(3.087)	11.1

Accumulator Body — '97-'98 Models

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Coat all parts with ATF during assembly.
- The 3rd accumulator and the 4th accumulator use the same size piston. The 3rd accumulator piston has the spring (3rd accumulator spring C) at its bottom.



SPRING SPECIFICATIONS

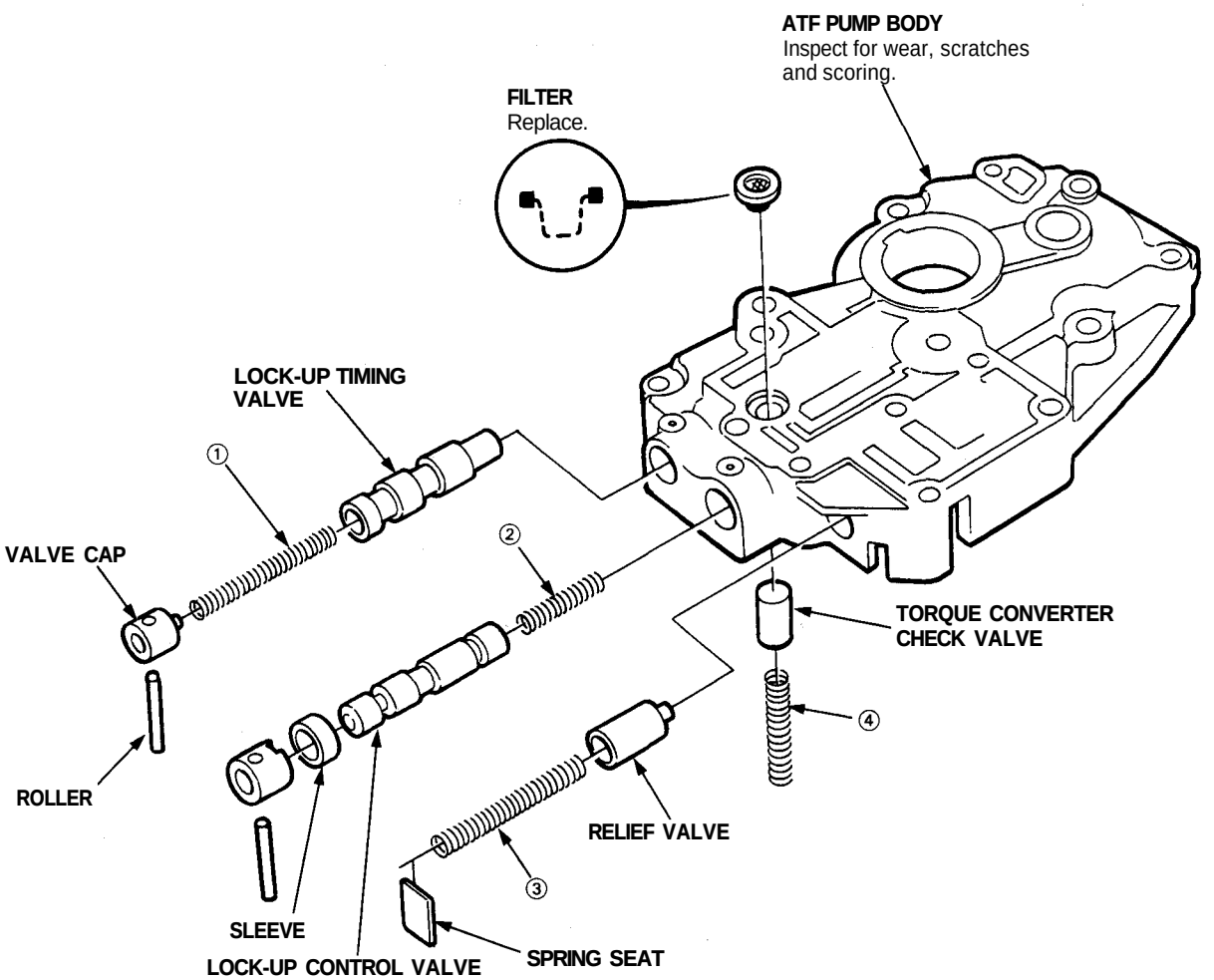
Unit: mm (in)

No.	Spring		Standard (New)			
			Wire Dia.	O.D.	Free Length	No. of Coils
①	4th accumulator spring	'97 model	3.0(0.118)	19.6(0.772)	67.6(2.661)	10.0
		'98 model	3.3 (0.130)	19.6 (0.772)	77.3 (3.043)	11.7
②	3rd accumulator spring A		3.0(0.118)	19.6 (0.772)	72.5 (2.854)	10.8

ATF Pump Body — '96 Model

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filter in the direction shown.



SPRING SPECIFICATIONS

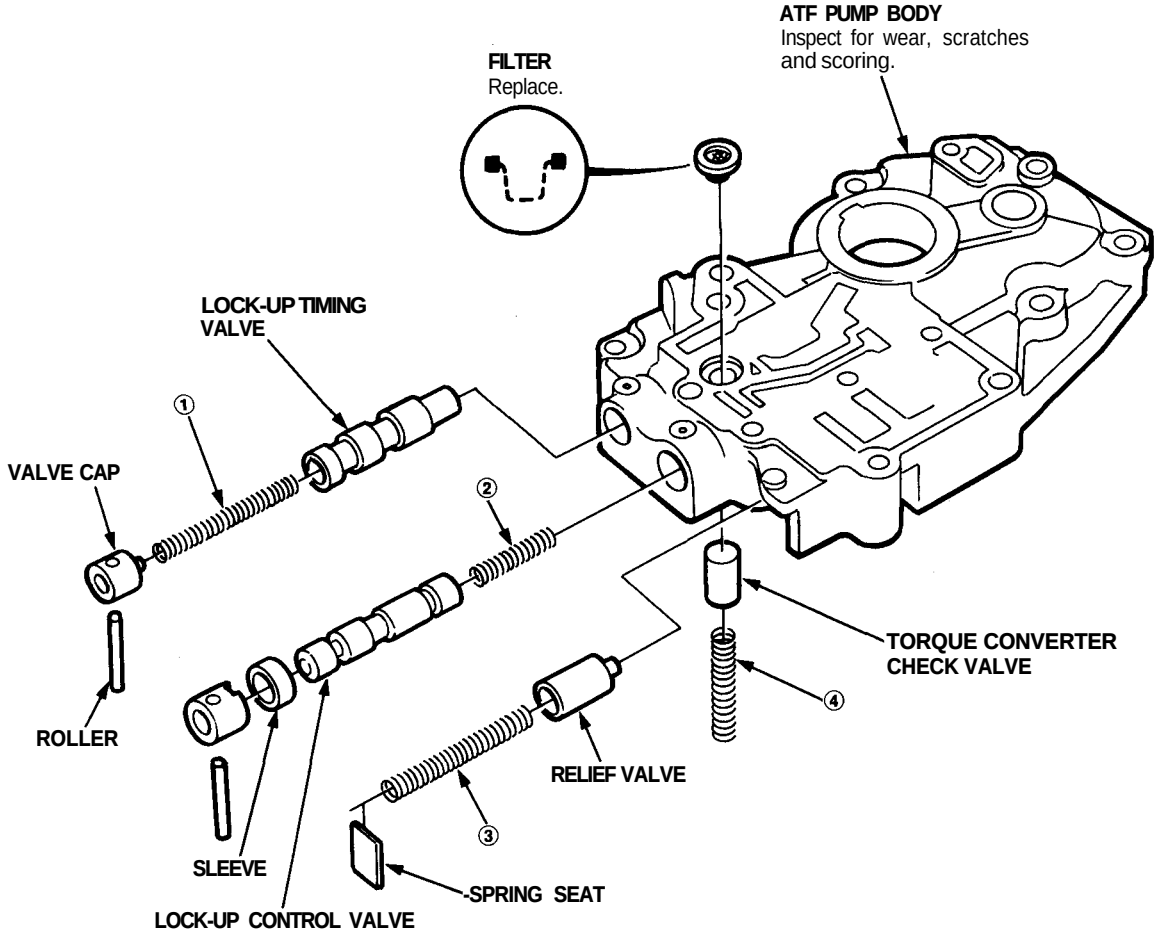
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up timing valve spring	0.8(0.031)	6.6 (0.260)	61.2(2.409)	38.5
②	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	36.3(1.429)	14.1
		0.7 (0.028)	6.6 (0.260)	37.5(1.476)	24.6
		0.7 (0.028)	6.6 (0.260)	38.5(1.516)	24.6
③	Relief valve spring	0.9 (0.035)	8.4(0.331)	56.5 (2.224)	22.4
④	Torque converter check valve spring	1.1 (0.043)	8.4(0.331)	41.8(1.646)	15.7

ATF Pump Body — '97 - '98 Models

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-146.
- Coat all parts with ATF during assembly.
- Install the filter in the direction shown.



SPRING SPECIFICATIONS

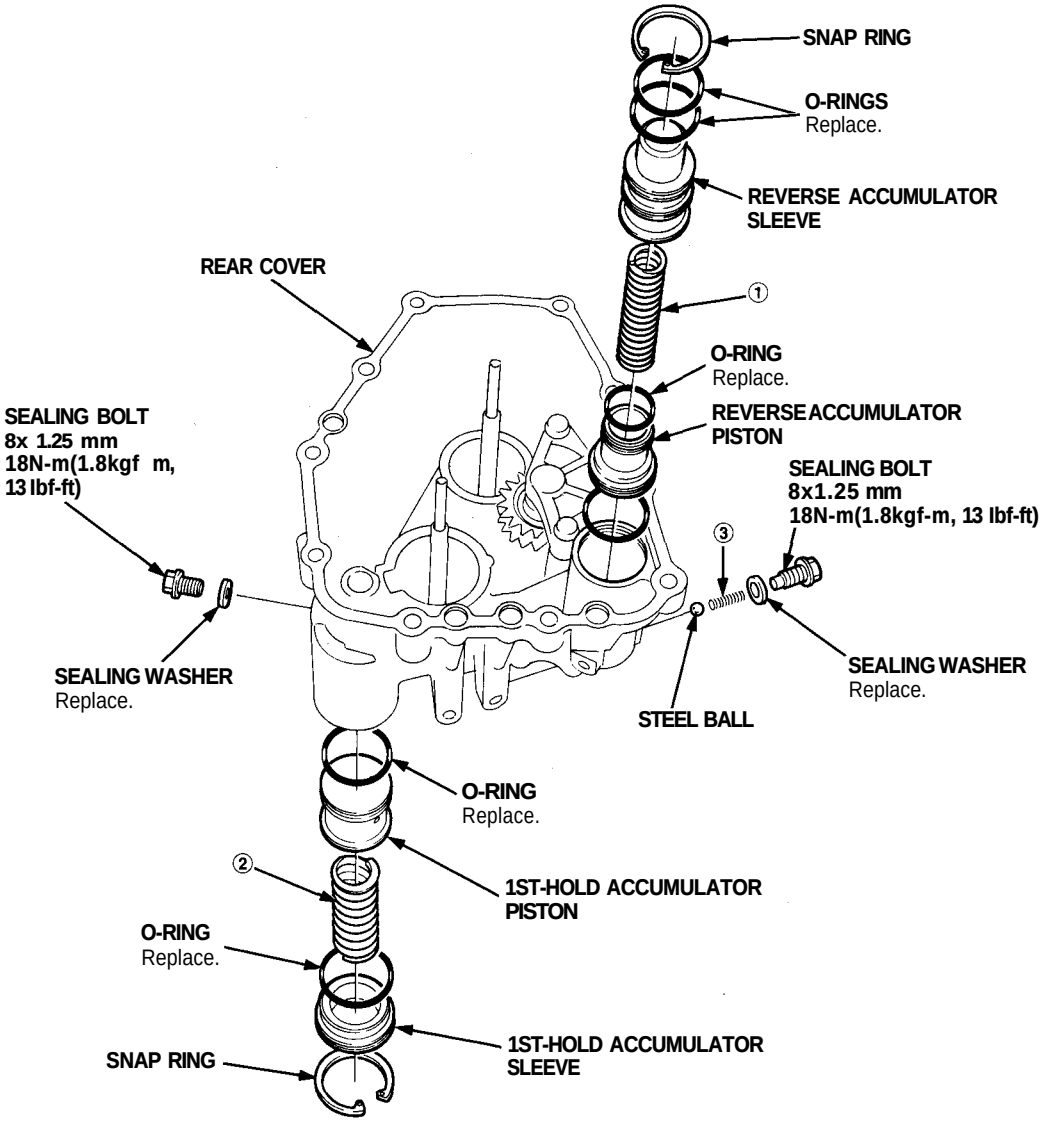
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up timing valve spring	0.8(0.031)	6.6 (0.260)	61.2 (2.409)	38.5
②	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.6(1.520)	17.6
		0.7 (0.028)	6.6 (0.260)	39.3(1.547)	17.6
		0.7 (0.028)	6.6 (0.260)	40.0(1.575)	17.6
③	Relief valve spring	0.9 (0.035)	8.4(0.331)	56.5 (2.224)	22.4
④	Torque converter check valve spring	1.2(0.047)	8.4(0.331)	35.7 (1.406)	14.5

Reverse Accumulator/1st-hold Accumulator — '96 Model

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the O-rings.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

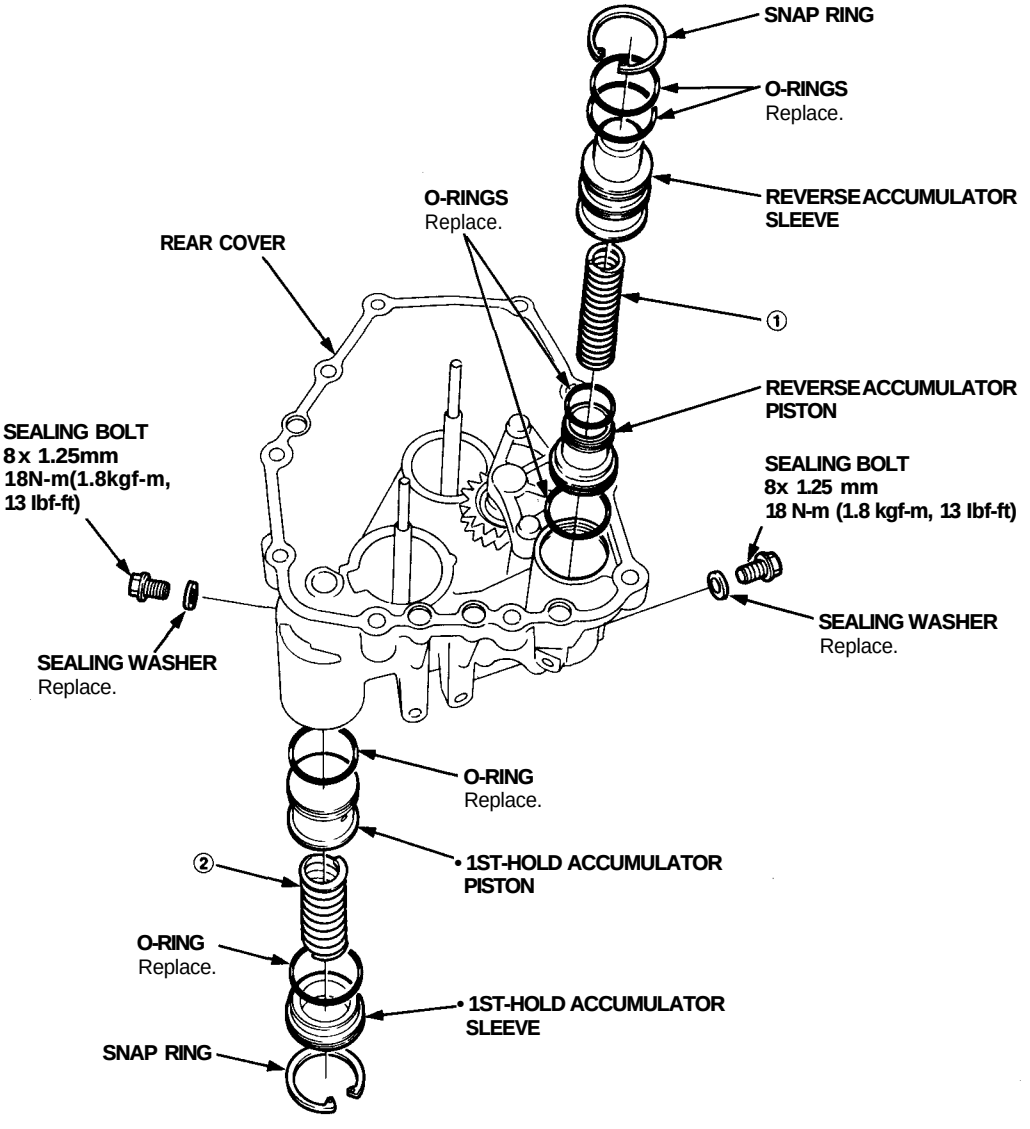
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Reverse accumulator spring	3.5(0.138)	18.6(0.732)	115.5(4.547)	19.0
②	1st-hold accumulator spring	4.0(0.157)	25.0 (0.984)	68.4 (2.693)	7.2
③	One-way ball spring	0.29(0.011)	4.0 (0.157)	14.0(0.551)	13.0

Reverse Accumulator/1 st-hold Accumulator — '97 - '98 Models

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the O-rings.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Reverse accumulator spring	3.1 (0.122)	18.6(0.732)	118.4(4.661)	21.2
②	1st-hold accumulator spring	4.0(0.157)	25.0 (0.984)	68.4 (2.693)	7.2

Accumulator Piston

Removal

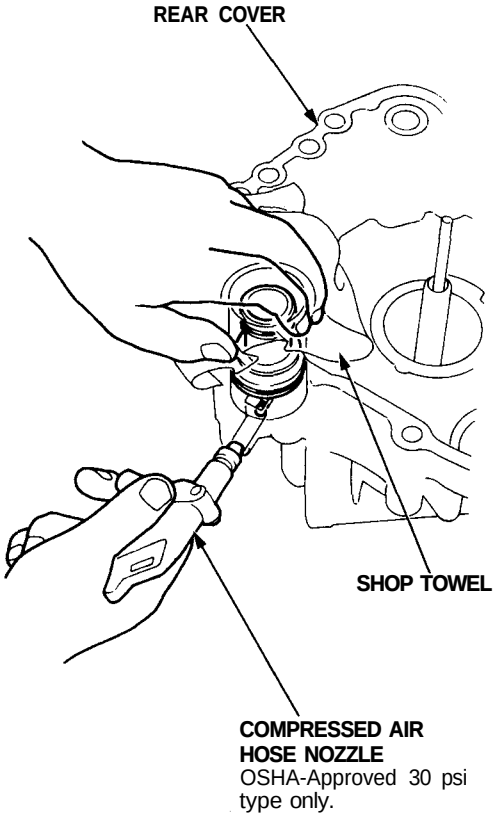
1. Remove the snap ring.
2. Remove the accumulator sleeve and spring.
3. Remove the sealing bolt.
4. Remove the one-way ball spring ('96 model).

   NOTE: Do not remove the steel ball.

5. Wrap a shop towel around the accumulator piston, and apply air pressure to the fluid passage to remove the piston.

⚠ WARNING

- **Do not place your fingers in front of piston.**
- **Do not use high air pressure; use an OSHA approved 30 PSI nozzle.**

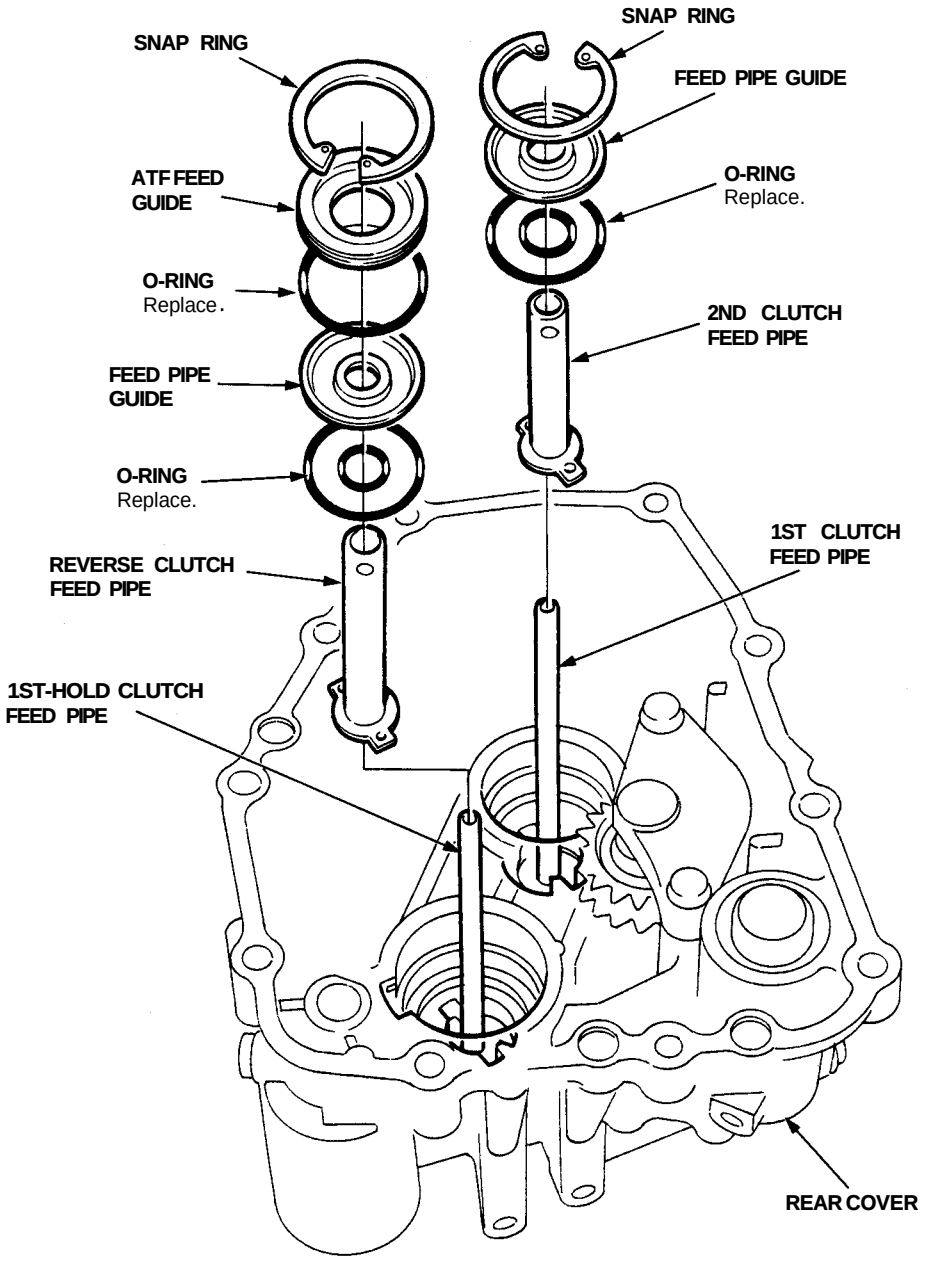


Rear Cover/Clutch Feed Pipes

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace the O-rings.
- Coat all parts with ATF during assembly.

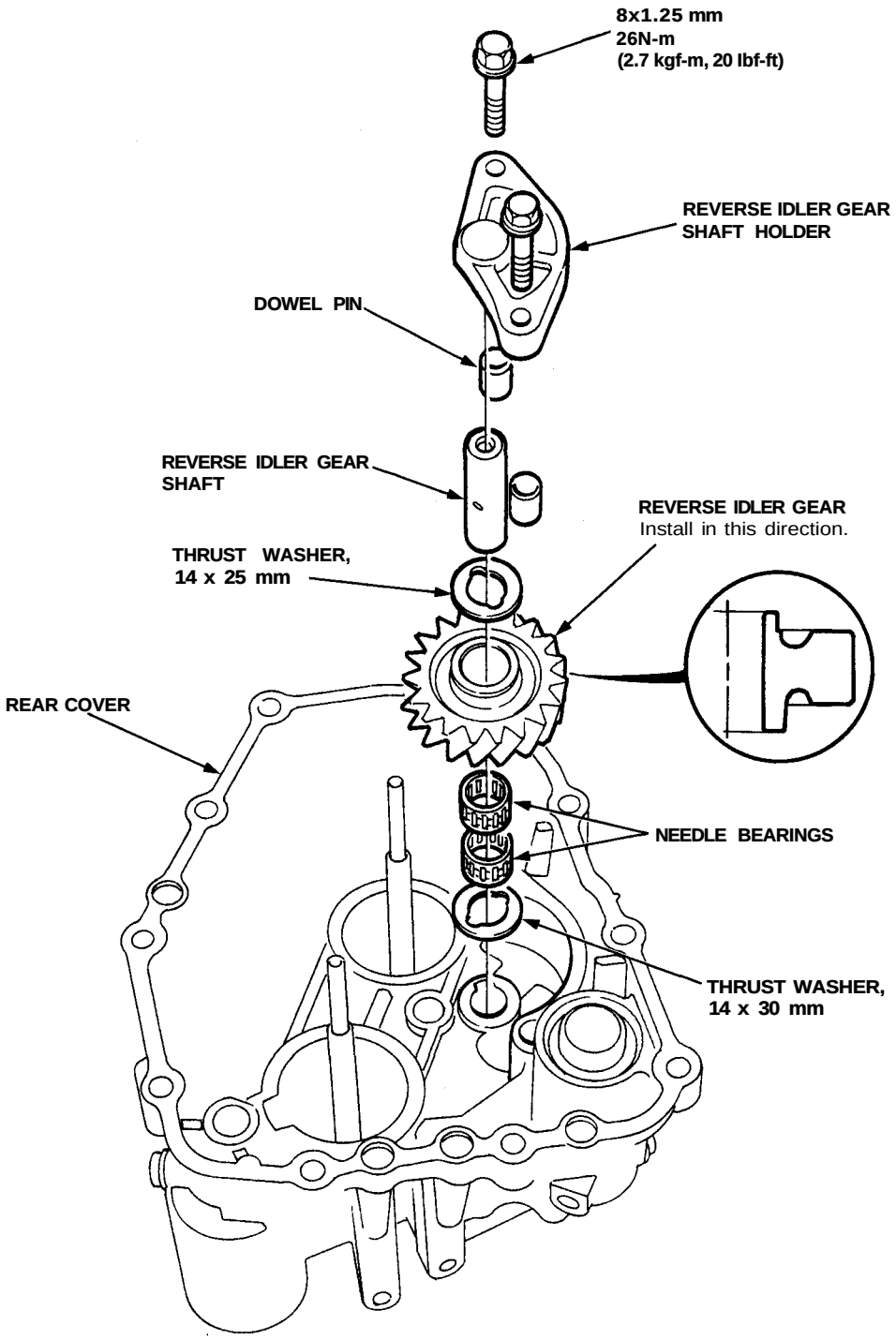


Rear Cover/Reverse Idler Gear

Disassembly/Inspection/Reassembly

NOTE:

- Inspect the needle bearings for galling and rough movement.
- Coat all parts with ATF before reassembly.

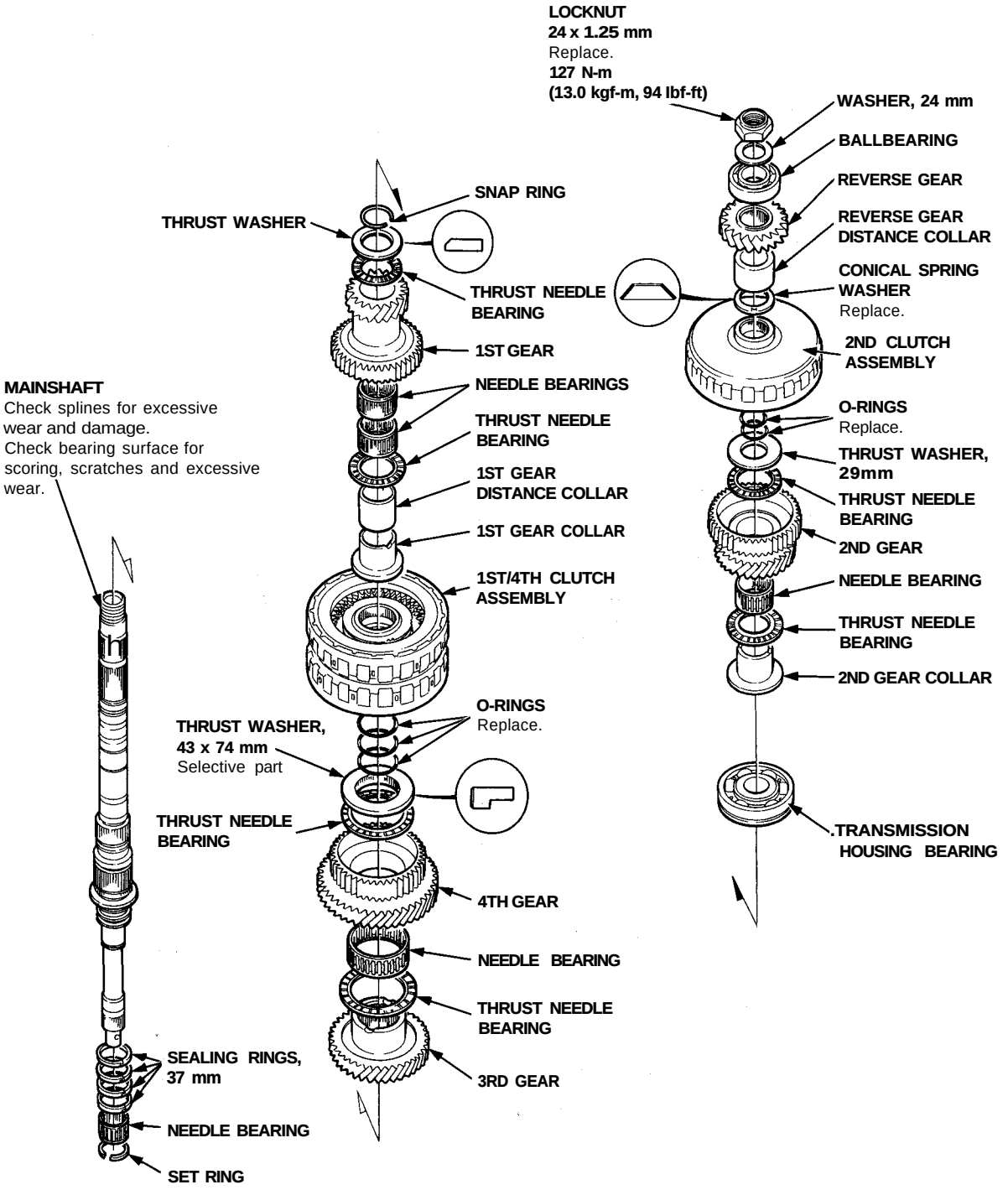


Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

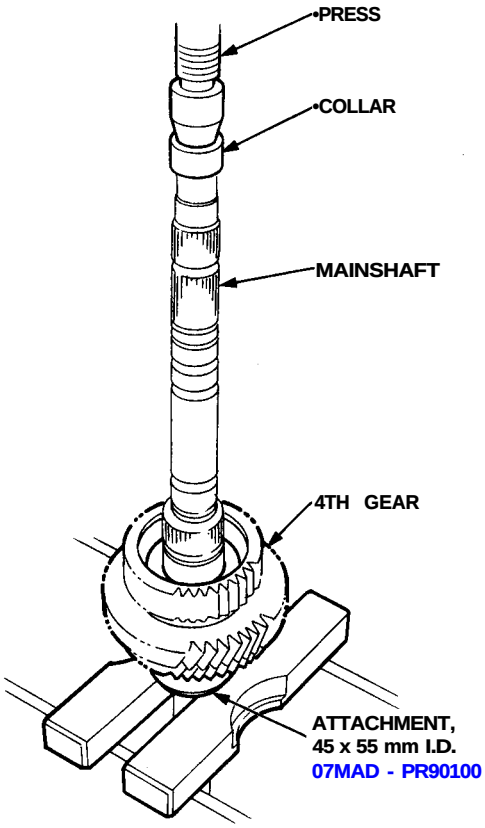
- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the 0-rings.

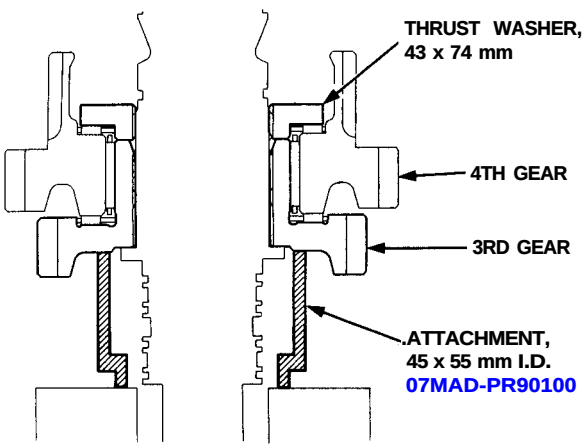


Mainshaft

Mainshaft 3rd Gear Removal

1. Remove mainshaft 3rd gear, 4th gear, and thrust washer (43 x 74 mm) from the mainshaft using the special tool and a press as shown.





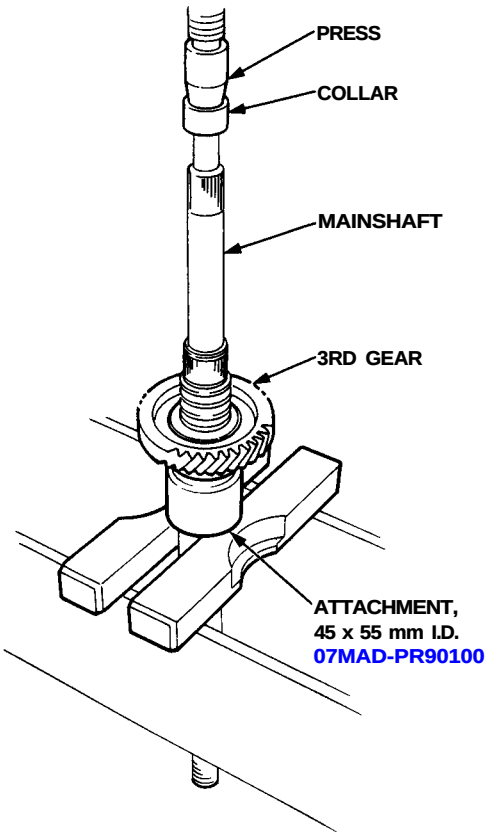
Mainshaft

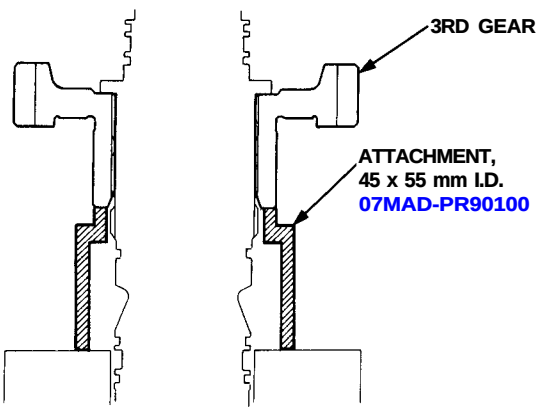
Inspection

NOTE:

- Inspect the 43 x 74 mm thrust washer when disassembling the mainshaft assembly or replacing mainshaft 3rd gear and/or 1st/4th clutch assembly.
- Lubricate all parts with ATF during assembly.

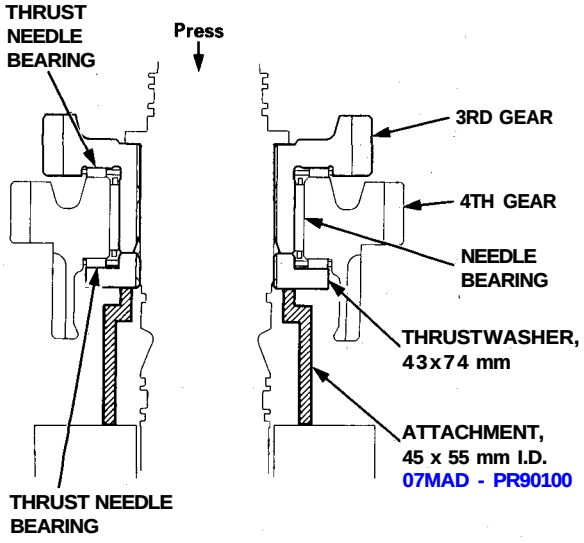
1. Install mainshaft 3rd gear on the mainshaft using the special tool and a press as shown.



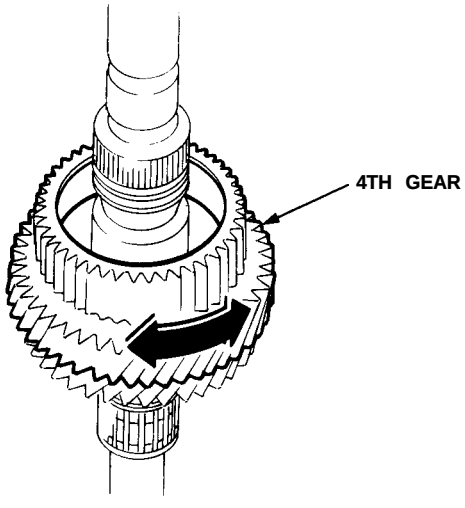


2. Assemble the thrust needle bearing, needle bearing, and 4th gear, and install the 43 x 74 mm thrust washer using the special tool and a press as shown.

   NOTE: Replace the 43 x 74 mm thrust washer, if it can be installed by pressing with your hand.



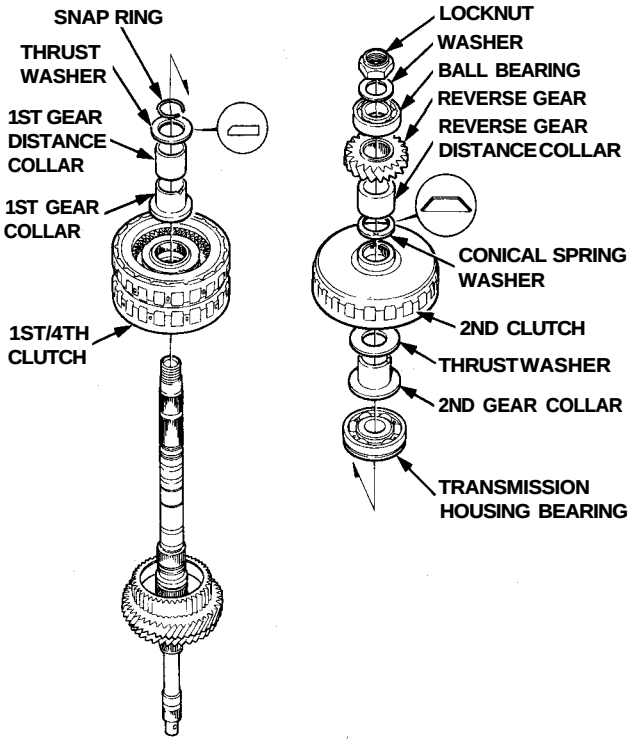
3. Spin mainshaft 4th gear by hand to check for clearance. The clearance is normal if it turns freely without binding.



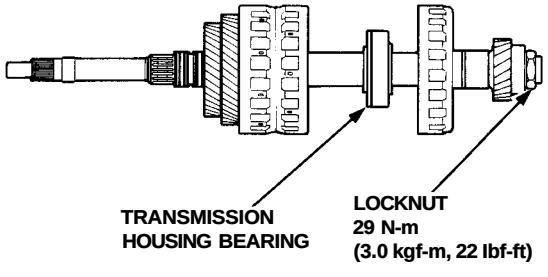
4. Remove the mainshaft bearing from the transmission housing (see page 14-199).

5. Assemble the parts below on the mainshaft.

   NOTE: Do not assemble the 0-rings and mainshaft 1st gear.



6. Torque the mainshaft locknut to 29 N-m (3.0 kgf-m, 22 lbft).



7. Move the 1st/4th clutch assembly to check the axial clearances.

(cont'd)

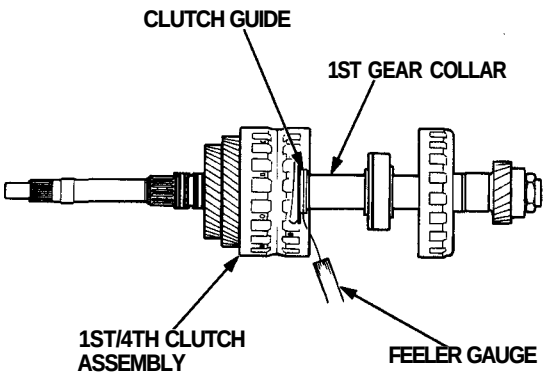
Mainshaft

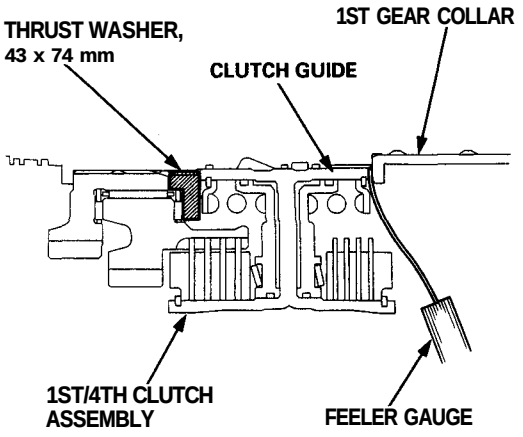
Inspection (cont'd)

8. Measure the clearance between the 1st/4th clutch guide and 1st gear collar with a feeler gauge.

   STANDARD: 0 - 0.08 mm (0 - 0.003 in)

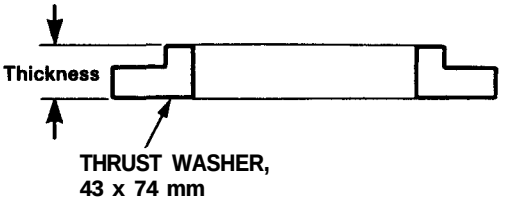
   NOTE: Take measurements in at least three places, and use the average as the actual clearance.





9. If the clearance is out of tolerance, remove the 43 x 74 mm thrust washer, and measure the thickness.

   NOTE: If the 0.08 mm (0.003 in) feeler gauge can be inserted, perform this step.



10. Select and install a new 43 x 74 mm thrust washer, then recheck.

THRUST WASHER, 43 x 74 mm

No.	Part Number	Thickness
1	90431 - PY4 - 000	9.70 mm (0.382 in)
2	90432 - PY4 - 000	9.75 mm (0.384 in)
3	90433 - PY4 - 000	9.80 mm (0.386 in)
4	90434 - PY4 - 000	9.85 mm (0.388 in)
5	90435 - PY4 - 000	9.90 mm (0.390 in)
6	90436 - PY4 - 000	9.95 mm (0.392 in)
7	90437 - PY4 - 000	10.00 mm (0.394 in)

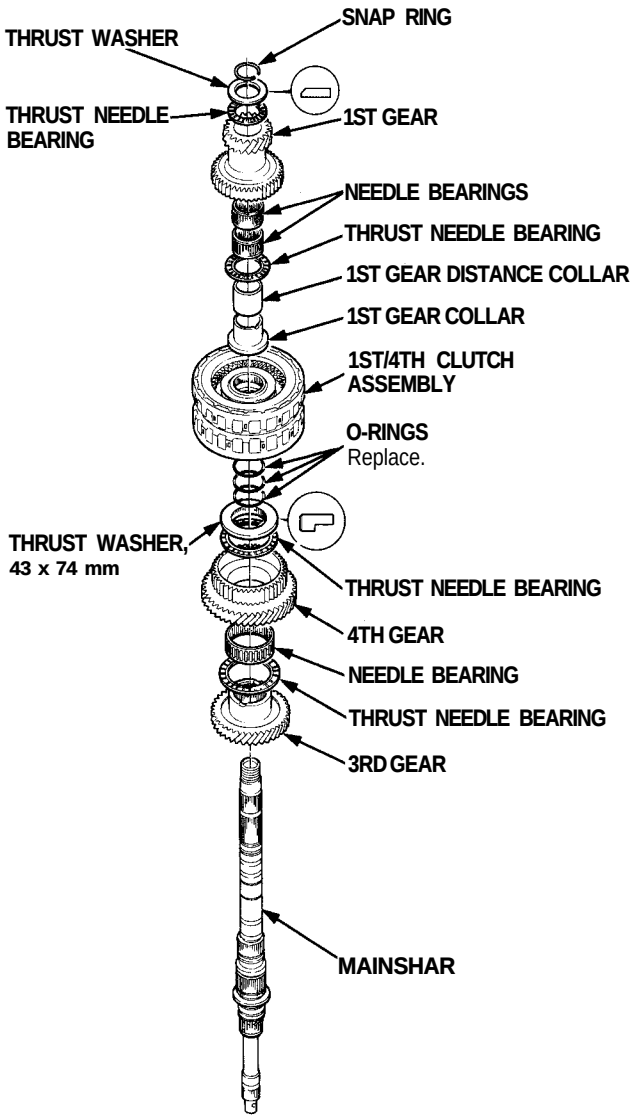
11. After replacing the 43 x 74 mm thrust washer, make sure that the clearance is within the tolerance.

Sealing Rings

Sub-assembly

NOTE:
- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Assemble the mainshaft sub-assembly when assembling the transmission.
- Refer to page 14-168 and 14-169, when installing 3rd gear, 4th gear and the 43 x 74 mm thrust washer.

1. Assemble the parts below on the mainshaft.

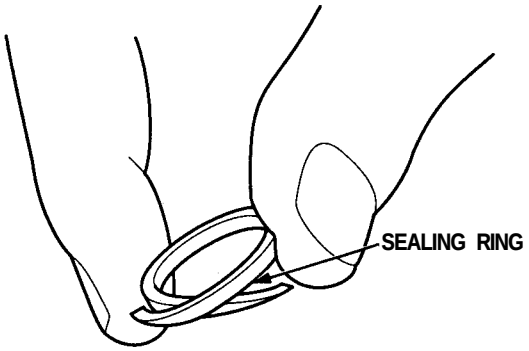


Replacement

The sealing rings (37 mm and 42 mm) are synthetic resin with chamfered ends. Check conditions of the sealing rings. Replace the sealing rings only if worn, distorted or damaged.

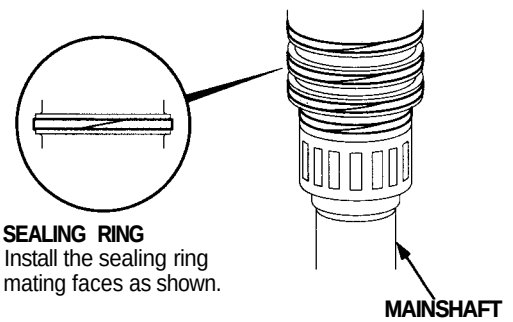
NOTE: Apply all parts with ATF during assembly.

1. Squeeze the sealing ring together slightly before installing for better fit.



2. Install new sealing rings on the mainshaft.

3. After installing the sealing rings verify the following:
   - The sealing rings are fully seated in the groove.
   - The sealing rings are not twisted.
   - The chamfered ends of the sealing ring are properly joined.

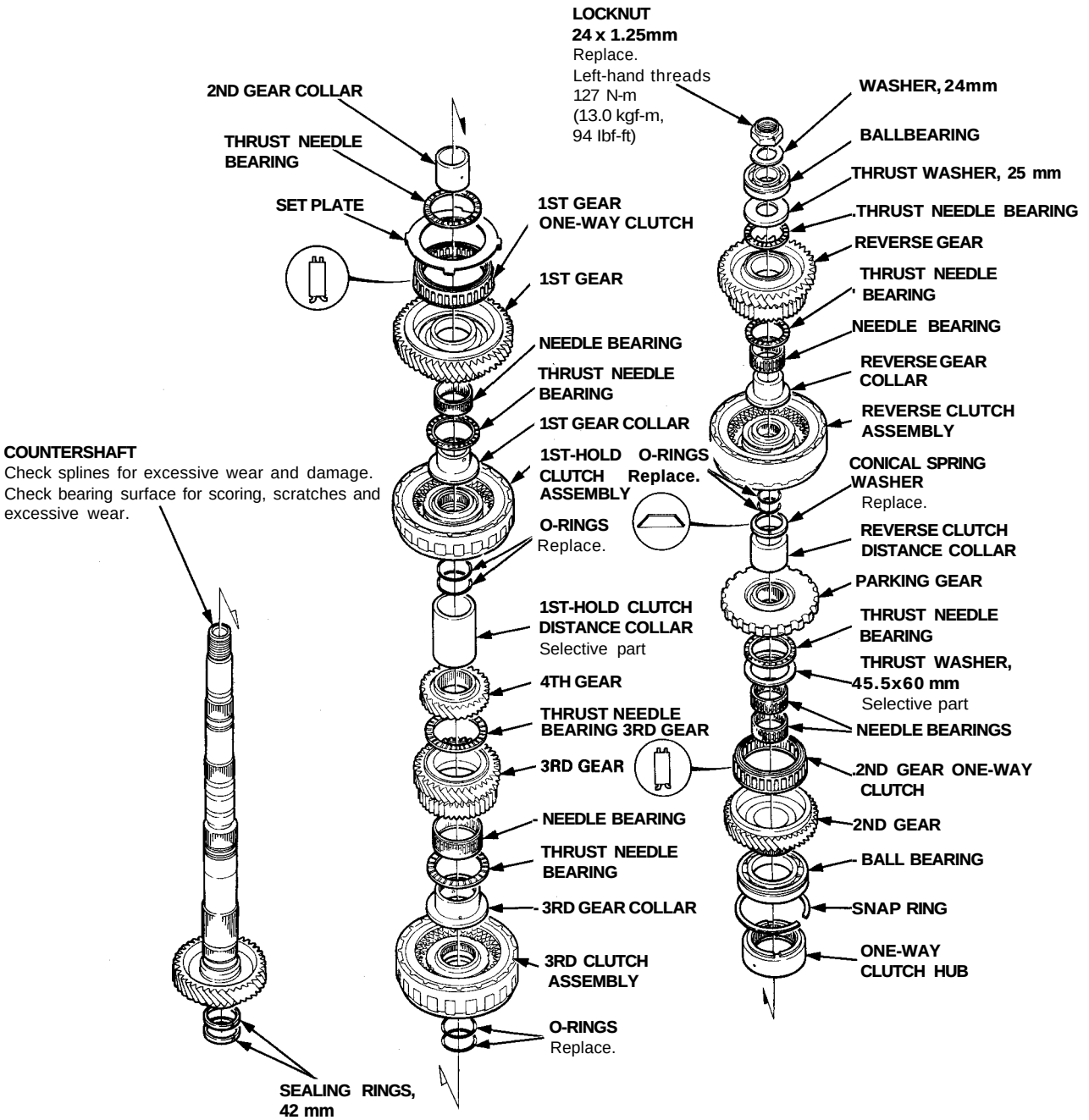


Countershaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Locknut has left-hand threads.



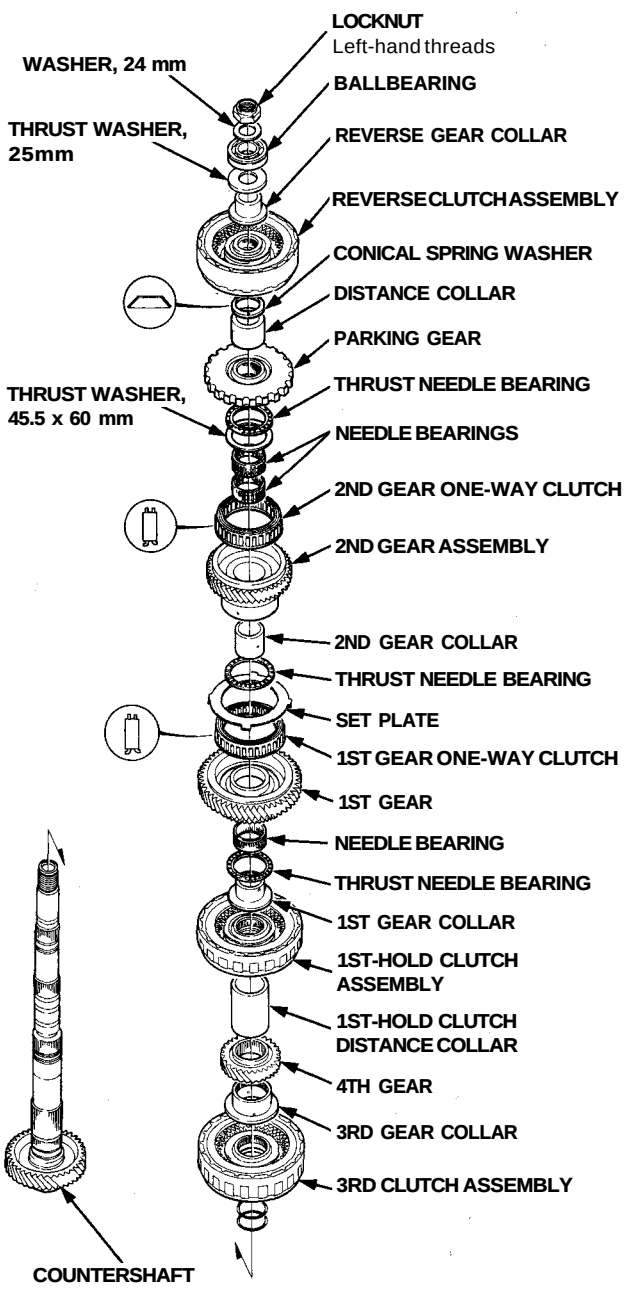
Inspection

Clearance Measurements

NOTE: Lubricate all parts with ATF during assembly.

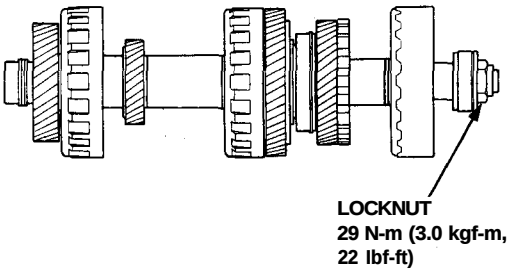
1. Assemble the parts below on the countershaft.

   NOTE: Do not install the O-rings during inspection.



2. Torque the countershaft locknut to 29 N-m (3.0 kgf-m, 22 lbf-ft).

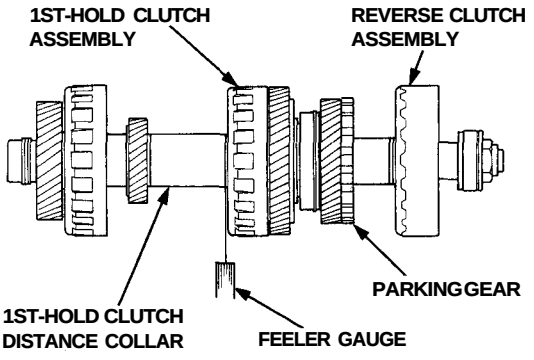
   NOTE: Countershaft locknut has left-hand threads.

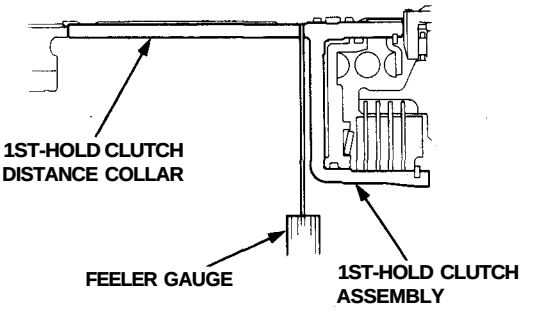


3. Hold the 1st-hold clutch assembly against the parking gear. Measure the clearance between the 1st-hold clutch distance collar and the 1st-hold clutch with a feeler gauge.

   NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0 - 0.08 mm (0 - 0.003 in)





(cont'd)

Countershaft

Inspection (cont'd)

4. If the clearance is out of tolerance, remove the 1st-hold clutch distance collar and measure its length.

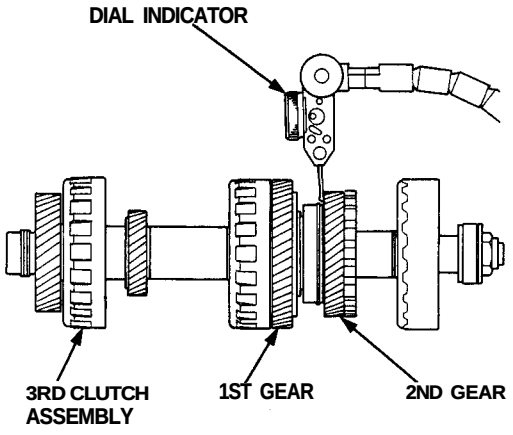
5. Select and install a new 1st-hold clutch distance collar, then recheck.

1ST-HOLD CLUTCH DISTANCE COLLAR

No.	Part Number	Thickness
1	90451 -PY4- 010	72.00 mm (2.835 in)
2	90452 -PY4- 010	72.05 mm (2.837 in)
3	90453 -PY4- 010	72.10 mm (2.839 in)
4	90454 -PY4- 010	72.15 mm (2.841 in)
5	90455 -PY4- 010	72.20 mm (2.843 in)
6	90456 -PY4- 010	72.25 mm (2.844 in)
7	90457 -PY4- 010	72.30 mm (2.846 in)
8	90458 -PY4- 010	72.35 mm (2.848 in)
9	90459 -PY4- 010	72.40 mm (2.850 in)
10	90460 -PY4- 010	72.45 mm (2.852 in)
11	90461 -PY4- 010	72.50 mm (2.854 in)

6. After replacing the 1st-hold clutch distance collar, make sure that the clearance is within tolerance.

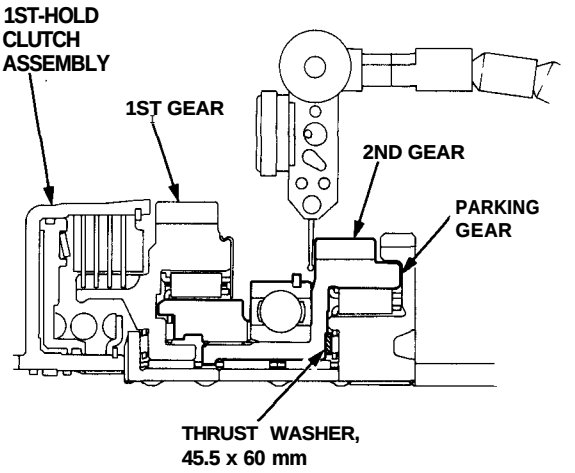
7. Attach a dial indicator to the side of the 2nd gear.



8. Measure 2nd gear axial clearance while pushing the 1st gear towards the reverse clutch assembly.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.05 - 0.13 mm (0.002 - 0.005 in)



9. If the clearance is out of tolerance, remove the 45.5 x 60 mm thrust washer, and measure its thickness.

10. Select and install a new 45.5 x 60 mm thrust washer, then recheck.

THRUST WASHER, 45.5 x 60 mm

No.	Part Number	Thickness
1	90411-P5D-000	1.30 mm (0.051 in)
2	90412-P5D-000	1.35 mm (0.053 in)
3	90413-P5D-000	1.40 mm (0.055 in)
4	90414-P5D-000	1.45 mm (0.057 in)
5	90415-P5D-000	1.50 mm (0.059 in)
6	90416-P5D-000	1.55 mm (0.061 in)
7	90417-P5D-000	1.60 mm (0.063 in)
8	90418-P5D-000	1.65 mm (0.065 in)
9	90419-P5D-000	1.70 mm (0.067 in)
10	90420 - P5D - 000	1.75 mm (0.069 in)
11	90421-P5D-000	1.80 mm (0.071 in)
12	90422 - P5D - 000	1.85 mm (0.073 in)
13	90423 - PSD - 000	1.90 mm (0.075 in)

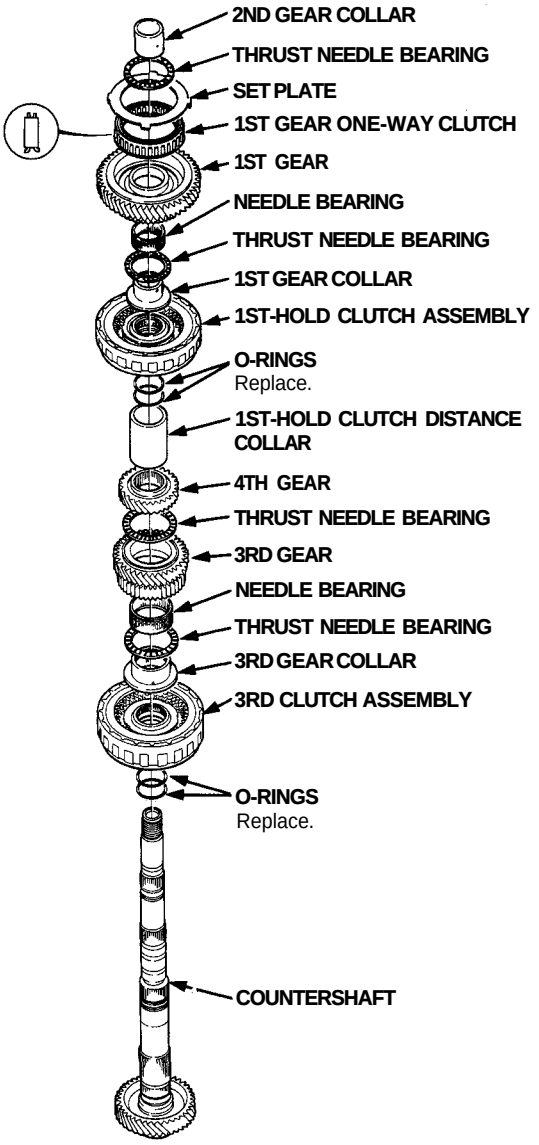
11. After replacing the 45.5 x 60 mm thrust washer, make sure that the clearance is within tolerance.

Sub-assembly

NOTE:

- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Assemble the countershaft sub-assembly when assembling the transmission.

1. Assemble the parts below on the countershaft.

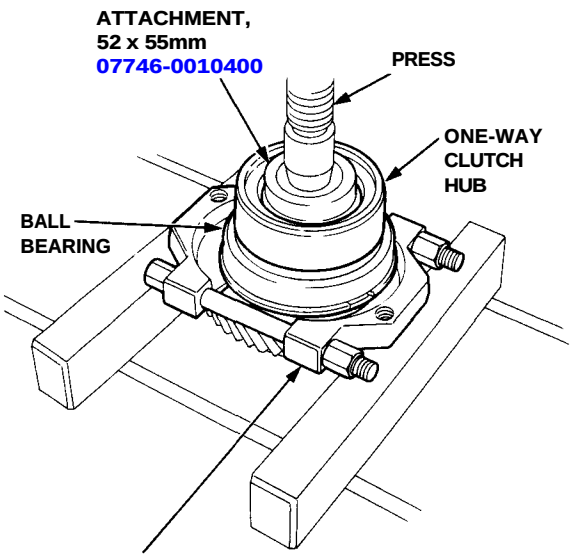


Countershaft 2nd Gear Assembly

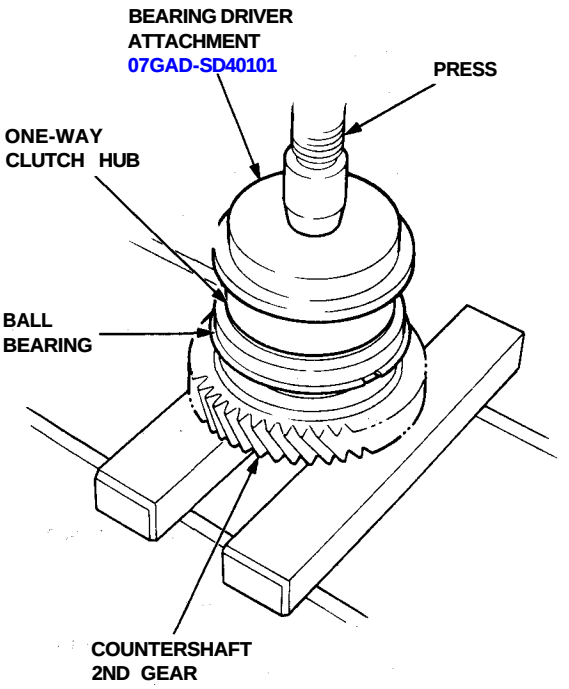
Ball Bearing Replacement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the one-way clutch hub and ball bearing from the countershaft 2nd gear using the special tool and a press as shown.



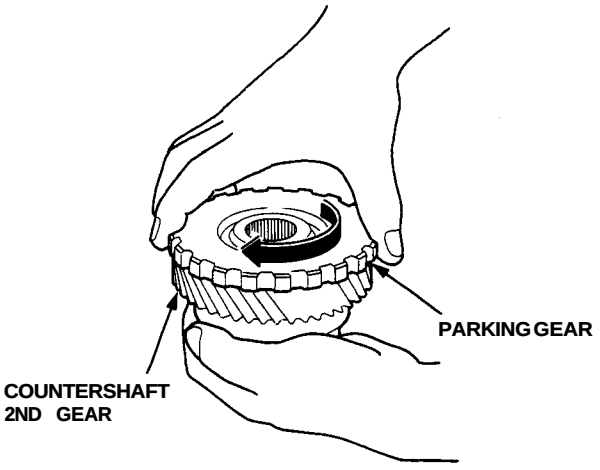
2. Install a new ball bearing and the one-way clutch hub on the countershaft 2nd gear using the special tool and a press as shown.



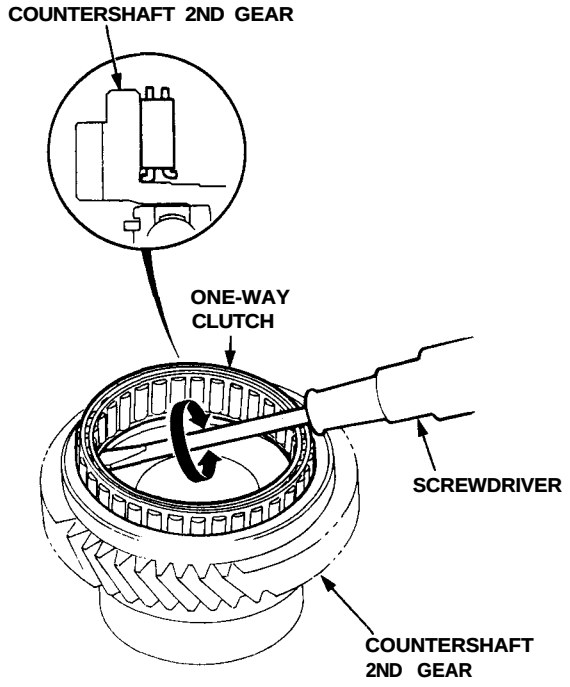
2nd Gear One-way Clutch

Disassembly/Inspection/Reassembly

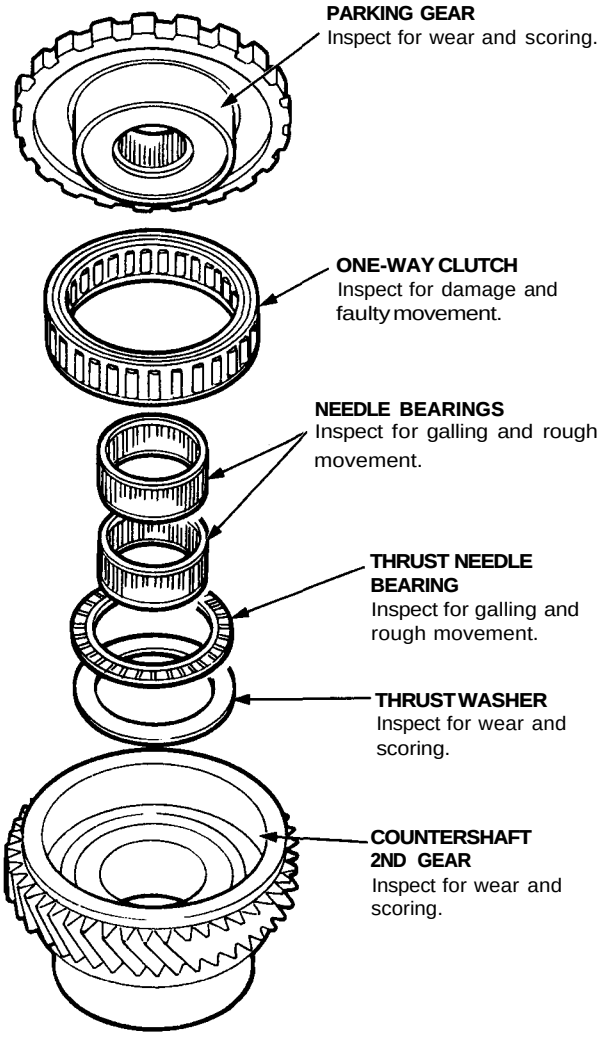
1. Separate countershaft 2nd gear from the parking gear by turning the parking gear in the direction shown.



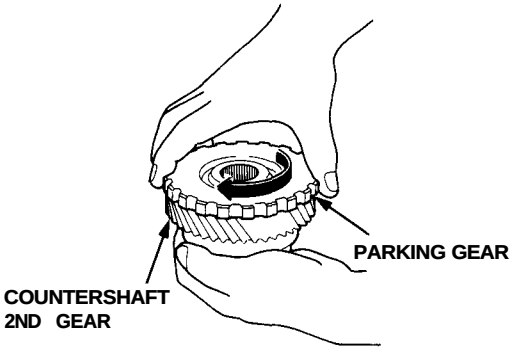
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:



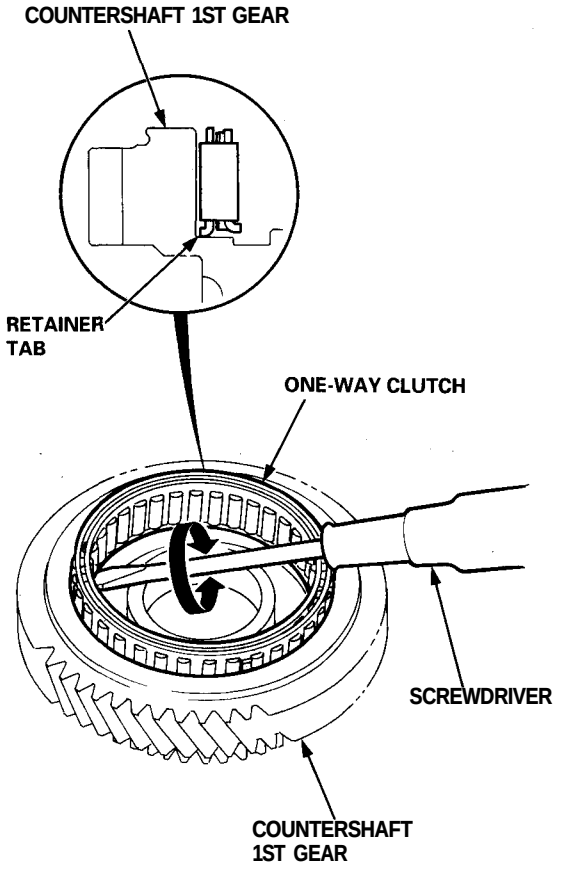
4. After the parts are assembled, hold countershaft 2nd gear and turn the parking gear in the direction shown to be sure it turns freely. Also make sure the parking gear does not turn in the opposite direction.



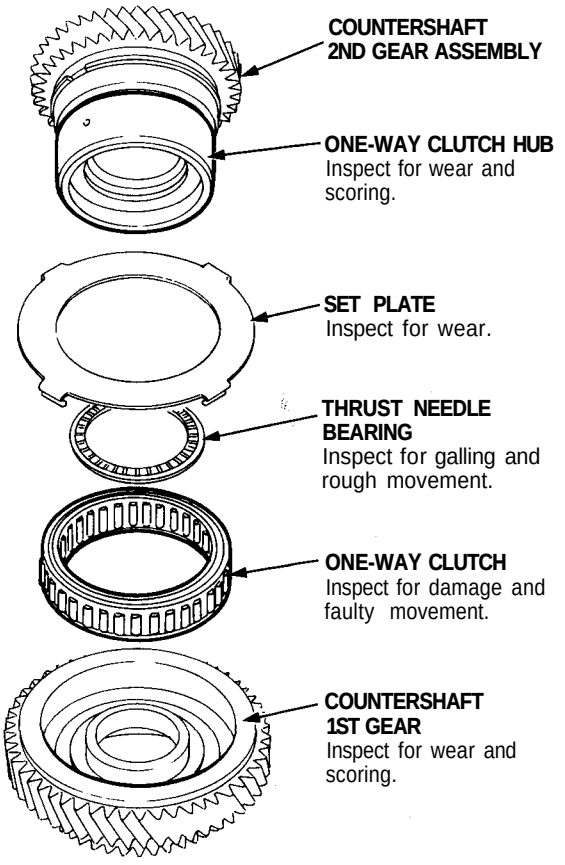
1st Gear One-way Clutch

Disassembly/Inspection/Reassembly

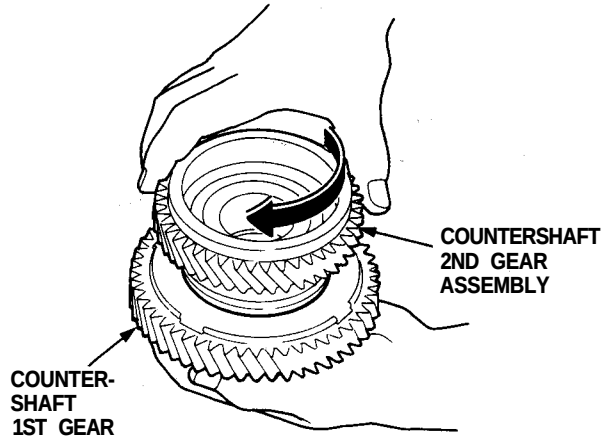
1. Remove the set plate from countershaft 1st gear.
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:



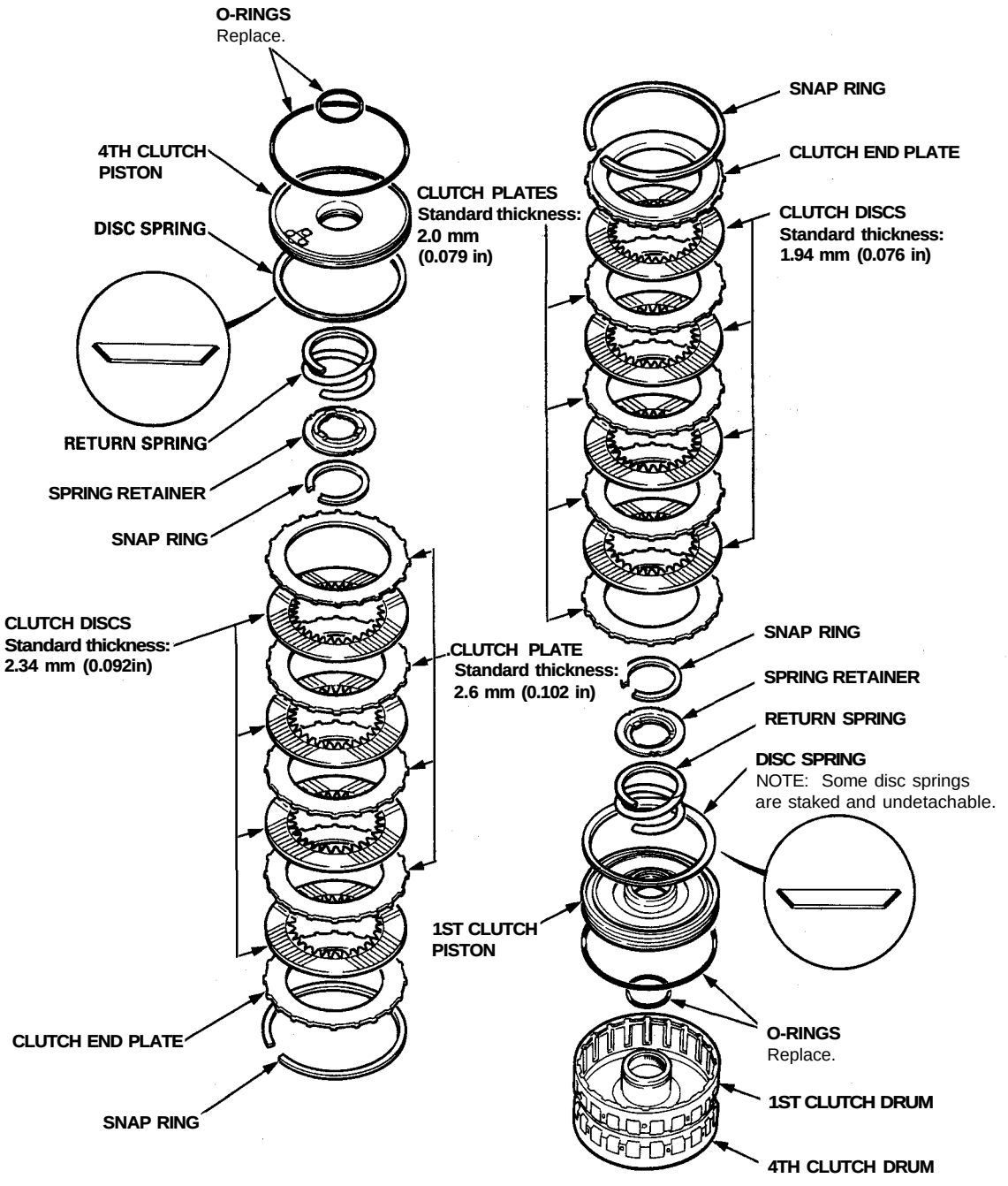
4. Assemble the one-way clutch, thrust needle bearing and set plate on the countershaft 1st gear.
5. Hold countershaft 1st gear, and turn the countershaft 2nd gear assembly in the direction shown to be sure it turns freely. Also make sure the countershaft 2nd gear assembly does not turn in the opposite direction.



Clutch

Illustrated Index — '96 Model

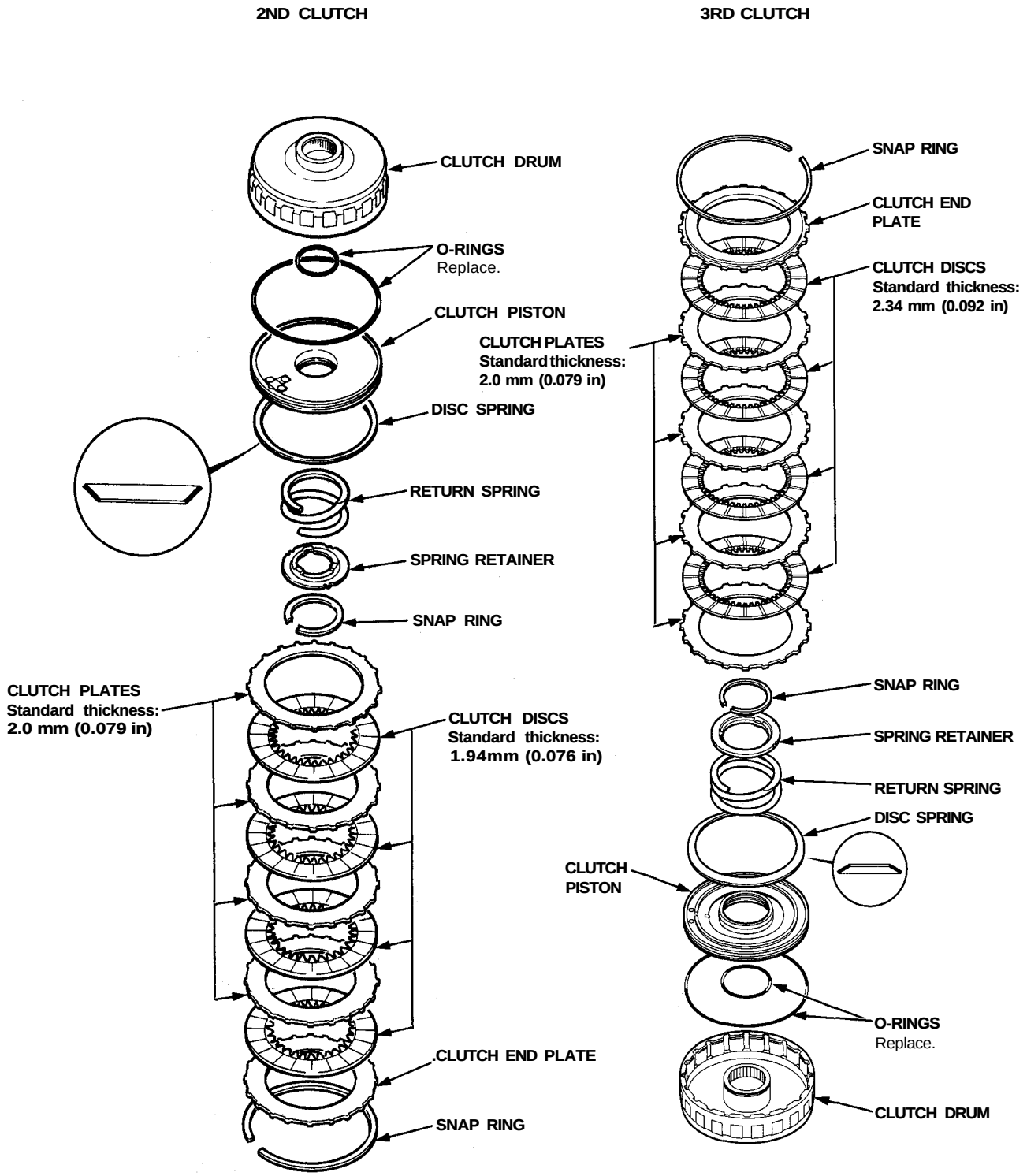
1ST/4TH CLUTCH



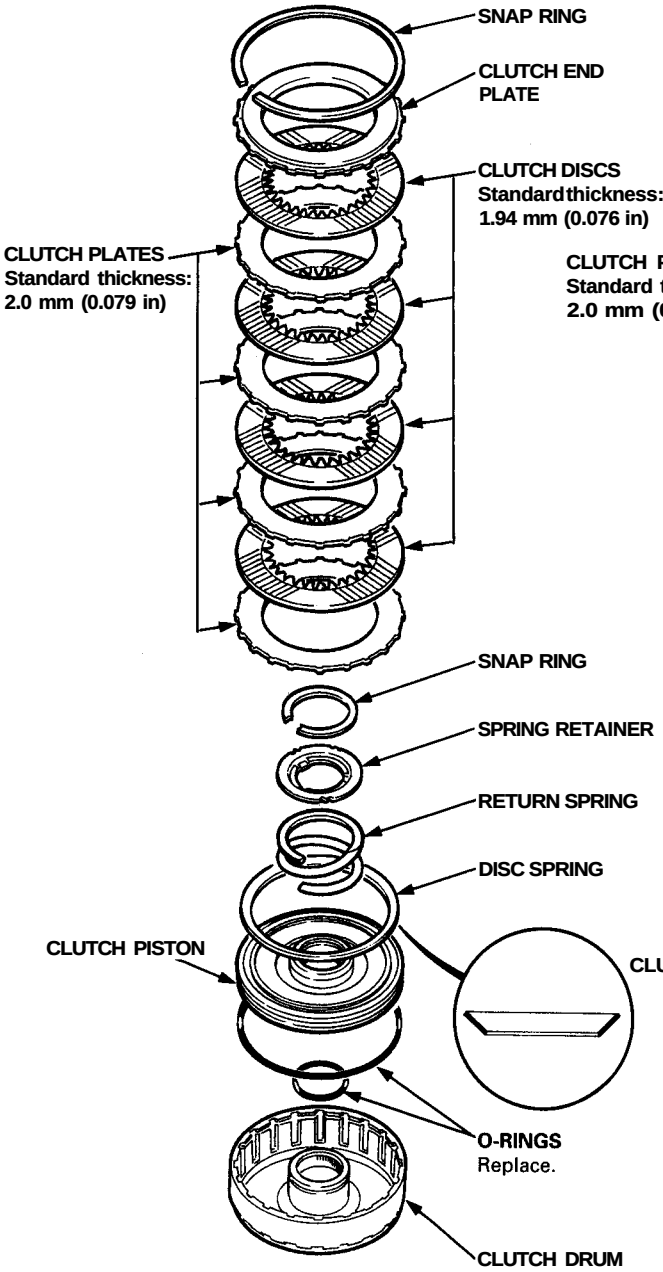
(cont'd)

Clutch

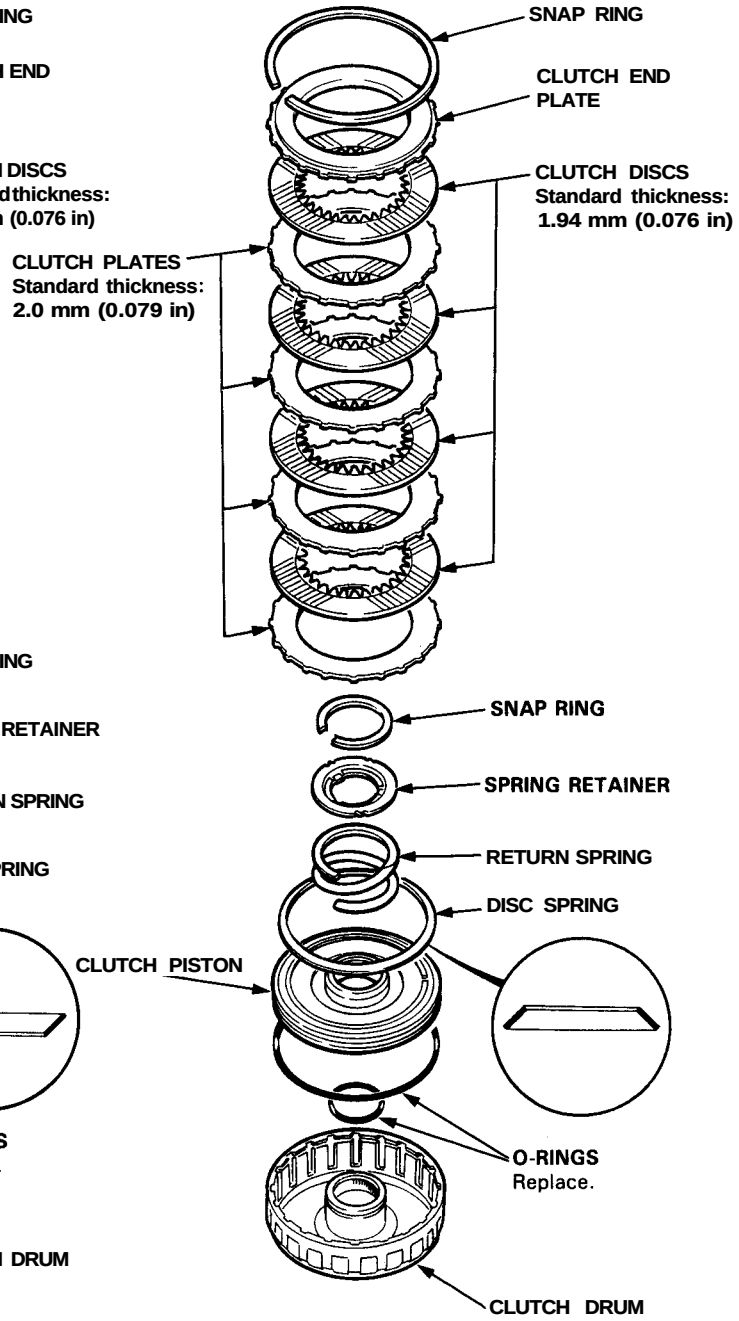
Illustrated Index — '96 Model (cont'd)



REVERSE CLUTCH

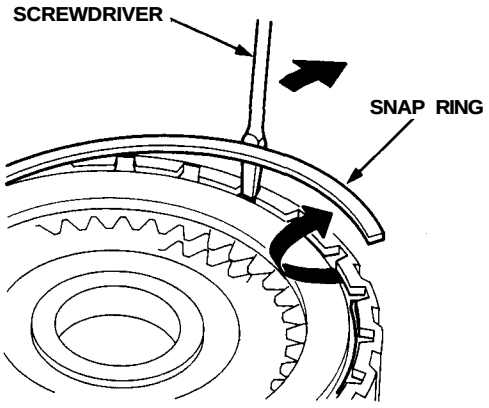


1ST-HOLD CLUTCH

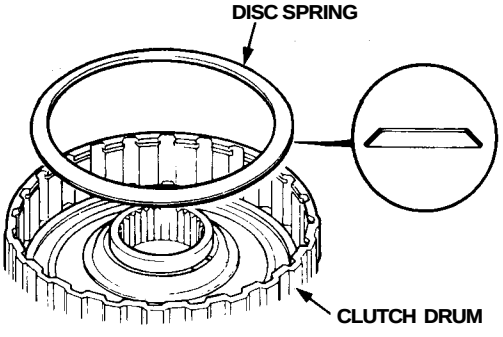


Disassembly

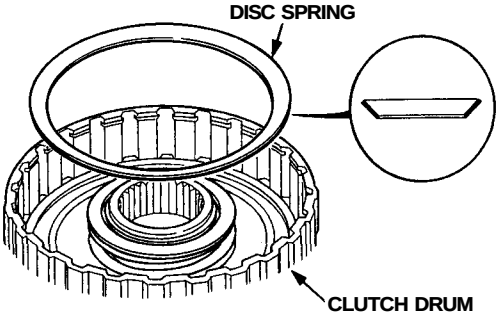
1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.



2. Remove the disc spring, if it is not staked.
NOTE: The 3rd and 4th clutches on '97 model do not have disc spring.
'96 MODEL: 2ND, 3RD, 4TH and 1ST-HOLD CLUTCHES
'97 - '98 MODELS: 1ST-HOLD CLUTCH

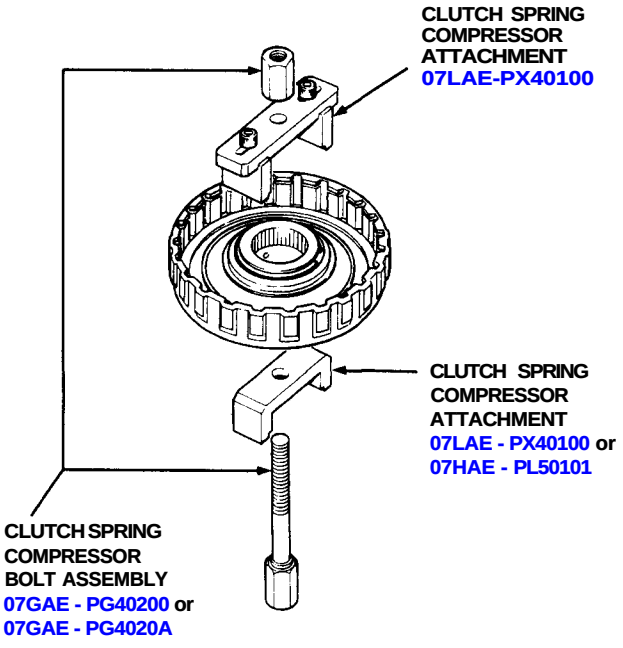


'96 MODEL: REVERSE and 1ST CLUTCHES
'97 - '98 MODELS: 1ST, 2ND and REVERSE CLUTCHES

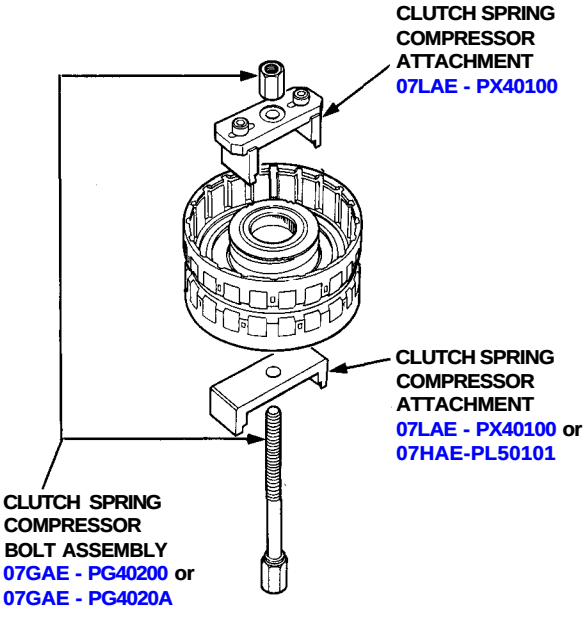


3. Install the special tools as shown.

NOTE: For 2nd, 3rd, 1st-hold and reverse clutches.



NOTE: For 1st and 4th clutches.

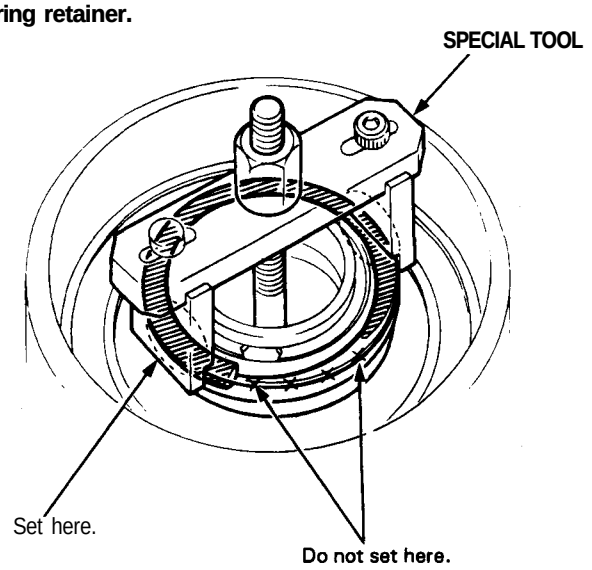


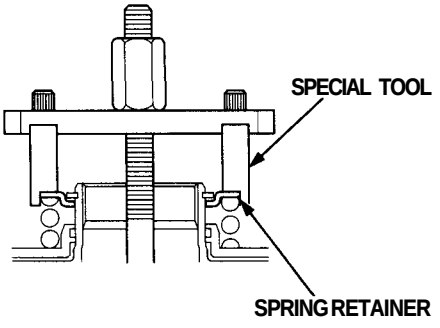
(cont'd)

Clutch

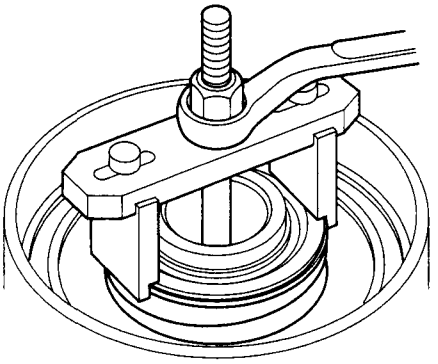
Disassembly (cont'd)

CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

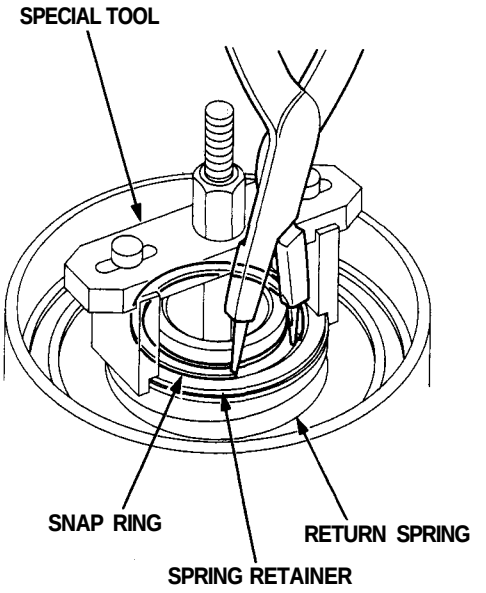




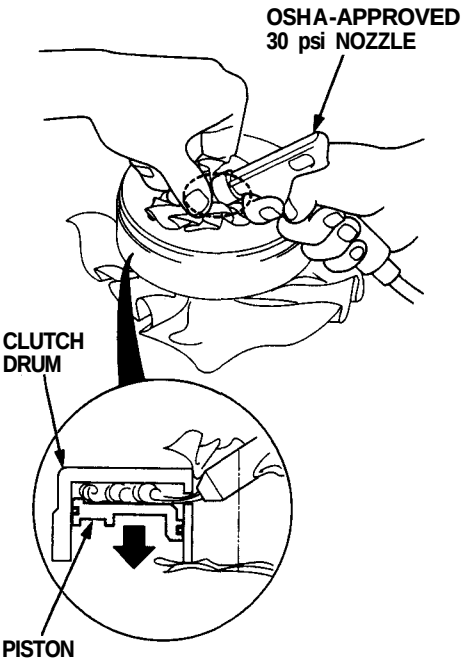
4. Compress the return spring with the special tool.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



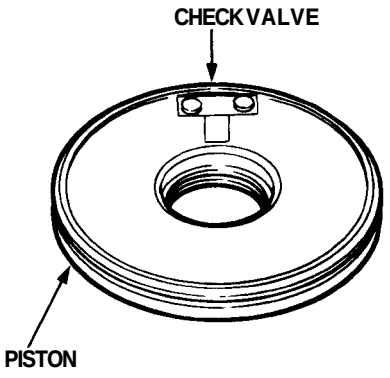
6. Wrap a shop rag around the clutch drum, and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.



Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

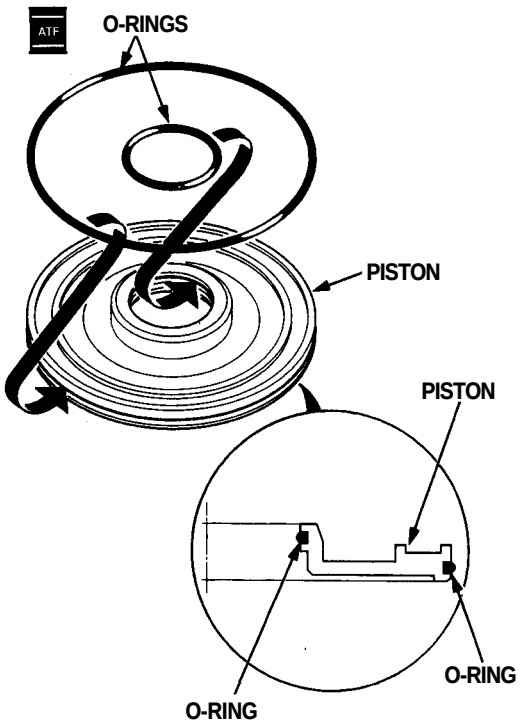
1. Inspect the check valve; if it's loose, replace the piston.



2. Be sure that the 1st clutch piston disc spring is securely staked,

   NOTE: Some of the 1st clutch disc springs are not staked. If the disc spring is not staked, install it in step 10.

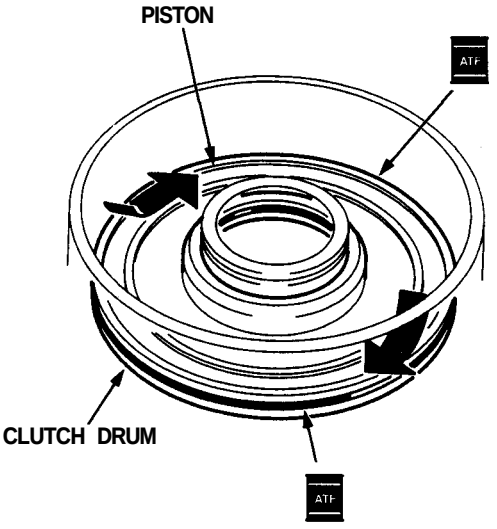
3. Install new O-rings on the piston.



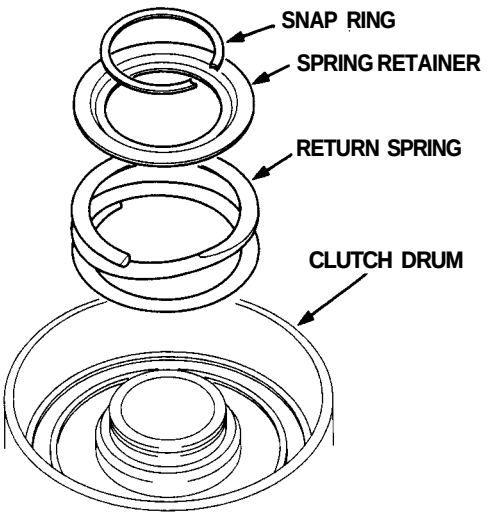
4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

   NOTE: Lubricate the piston O-ring with ATF before installing.

   CAUTION: Do not pinch the O-ring by installing the piston with too much force.



5. Install the return spring and spring retainer, and position the snap ring on the retainer.



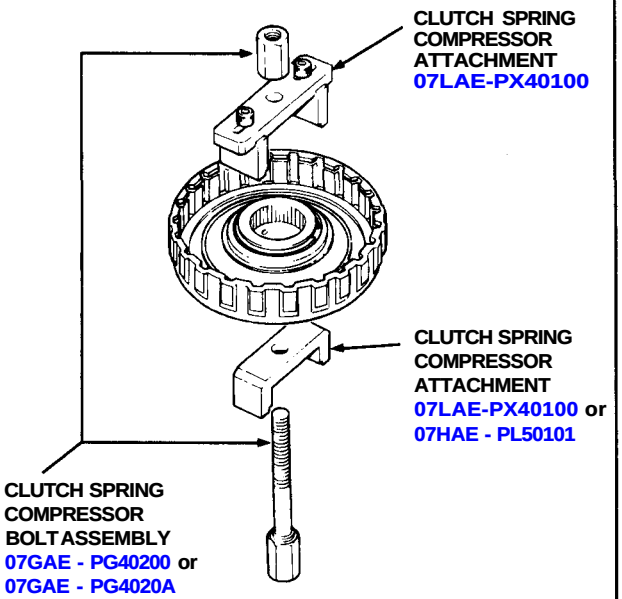
(cont'd)

Clutch

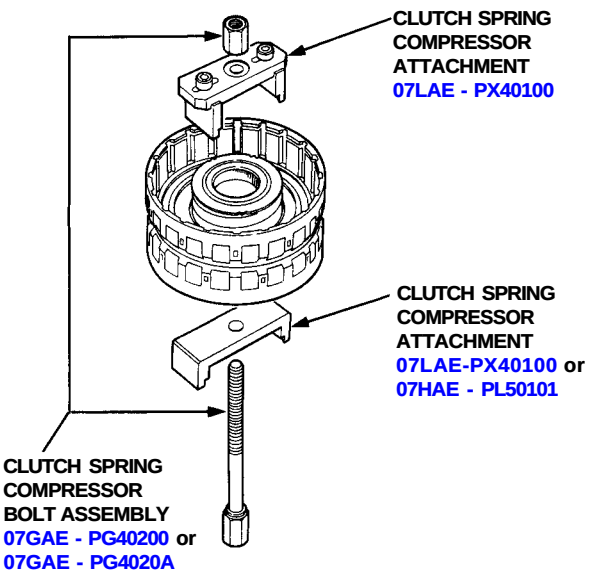
Reassembly (cont'd)

6. Install the special tools as shown.

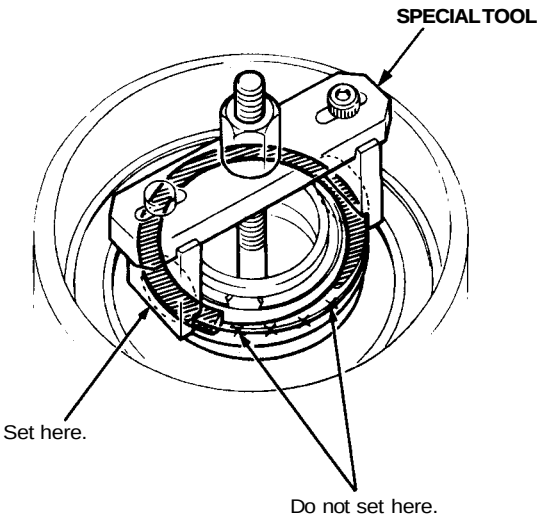
NOTE: For 2nd, 3rd, 1st-hold and reverse clutches

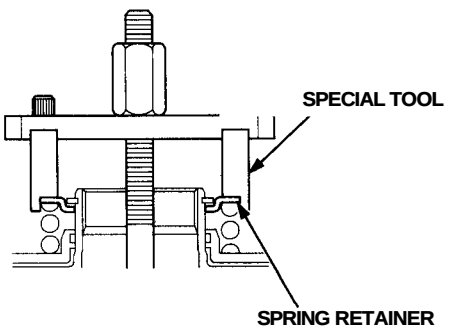


NOTE: For Island 4th clutches

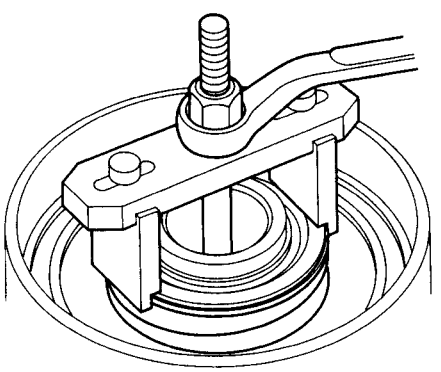


CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

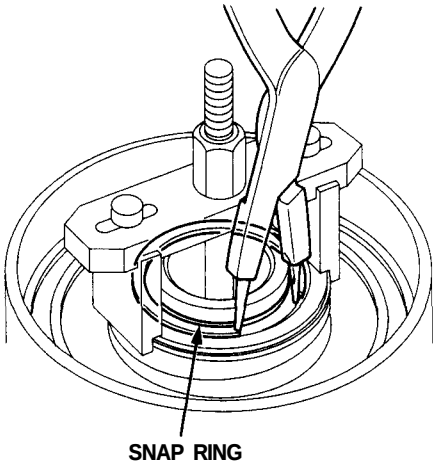




7. Compress the return spring with the special tool.

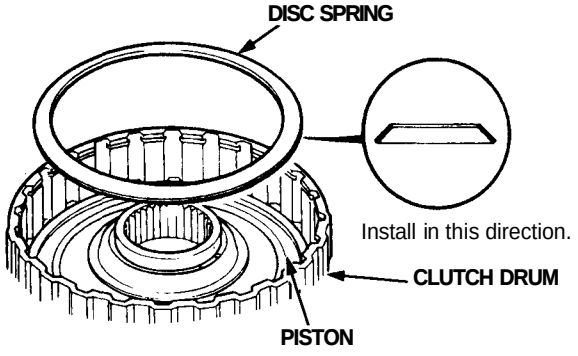


8. Install the snap ring.

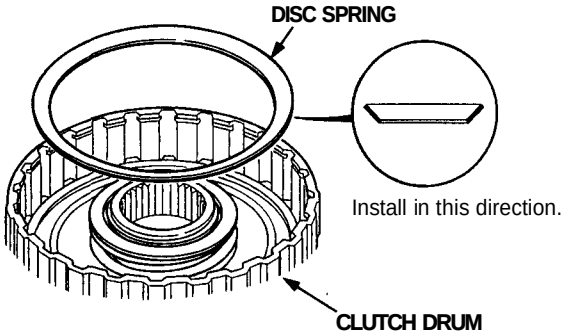


9. Remove the special tools.

10. Install the disc spring in the direction shown.
NOTE: The 3rd and 4th Clutches on '97 model do not the disc springs.
'96 MODEL: 2ND, 3RD, 4TH and 1ST-HOLD CLUTCHES
'97 - '98 MODELS: 1ST-HOLD CLUTCH



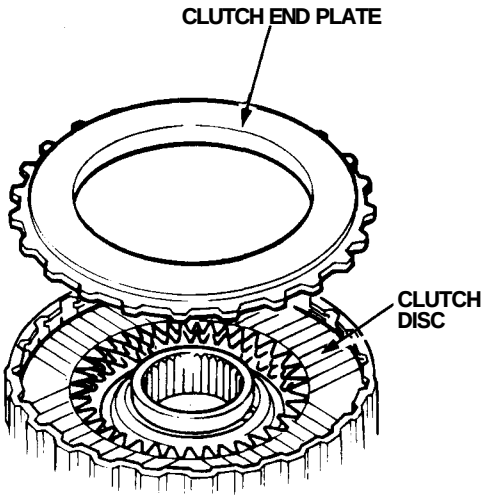
'96 MODEL: REVERSE and 1ST CLUTCHES
NOTE: Install the 1st clutch disc spring if it was removed from the 1st clutch piston.
'97 - '98 MODELS: 1ST, 2ND and REVERSE CLUTCHES



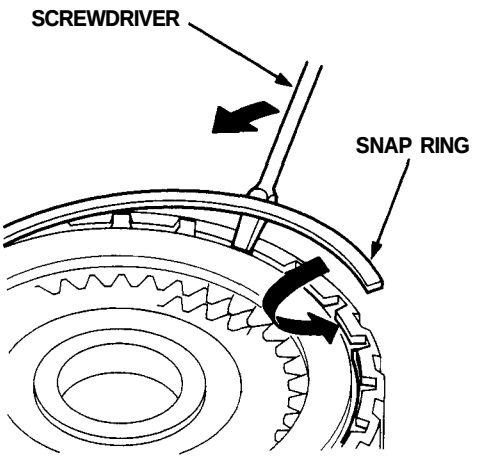
11. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

12. Starting with a clutch plate, alternately install the clutch plates and clutch discs. Install the clutch end plate with the flat side toward the disc.

NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt and other foreign matter.



13. Install the snap ring.



(cont'd)

Clutch

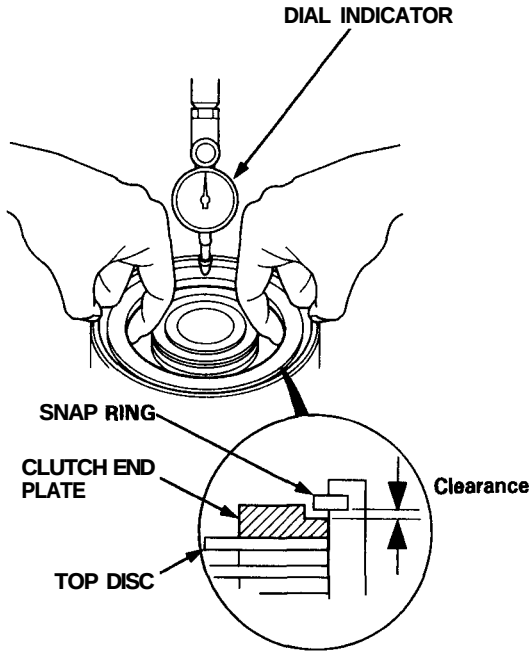
Reassembly (cont'd)

14. Measure the clearance between the clutch end plate and top disc with a dial indicator.
Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

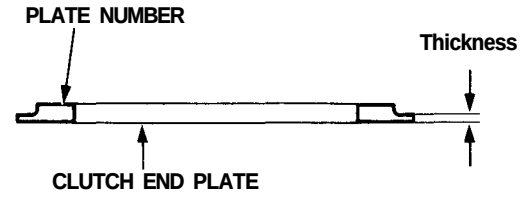
Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 -0.85 mm (0.026 - 0.033 in)
2nd	0.60 -0.80 mm (0.024 -0.031 in)
3rd	0.60 -0.80 mm (0.024 -0.031 in)
4th	0.50 -0.70 mm (0.020 - 0.028 in)
1st-hold	0.70 -0.90 mm (0.028 - 0.035 in)
Reverse	0.75 -0.95 mm (0.030 - 0.037 in)



15. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.



1ST, 2ND, 3RD and 4TH CLUTCH END PLATES

Plate No.	Part Number	Thickness
1	22551 – PY4 – 003	2.1 mm (0.083 in)
2	22552 - PY4 - 003	2.2 mm (0.087 in)
3	22553 - PY4 - 003	2.3 mm (0.091 in)
4	22554 - PY4 - 003	2.4 mm (0.094 in)
5	22555 - PY4 - 003	2.5 mm (0.098 in)
6	22556 - PY4 - 003	2.6 mm (0.102 in)
7	22557 - PY4 - 003	2.7 mm (0.106 in)
8	22558 - PY4 - 003	2.8mm (0.1 10 in)
9	22559 - PY4 - 003	2.9 mm (0.1 14 in)

1ST-HOLD CLUTCH END PLATES

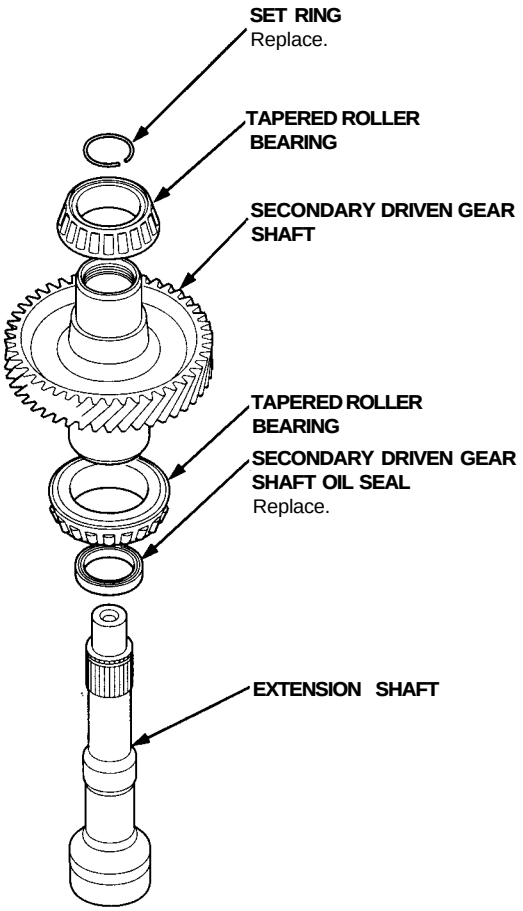
Plate No.	Part Number	Thickness
L1	22351 - PY4 - 003	2.1 mm (0.083 in)
L2	22352 - PY4 - 003	2.2 mm (0.087 in)
L3	22353 - PY4 - 003	2.3 mm (0.091 in)
L4	22354 - PY4 - 003	2.4 mm (0.094 in)
L5	22355 - PY4 - 003	2.5 mm (0.098 in)
L6	22356 - PY4 - 003	2.6 mm (0.102 in)
L7	22357 - PY4 - 003	2.7 mm (0.106 in)
L8	22358 - PY4 - 003	2.8 mm (0.110 in)
L9	22359 - PY4 - 003	2.9 mm (0.114 in)

REVERSE CLUTCH END PLATES

Plate No.	Part Number	Thickness
R1	22451 - PY4 - 003	4.1 mm (0.161 in)
R2	22452 - PY4 - 003	4.2 mm (0.165 in)
R3	22453 - PY4 - 003	4.3 mm (0.169 in)
R4	22454 - PY4 - 003	4.4 mm (0.173 in)
R5	22455 - PY4 - 003	4.5 mm (0.177 in)
R6	22456 - PY4 - 003	4.6 mm (0.181 in)
R7	22457 - PY4 - 003	4.7 mm (0.185 in)
R8	22458 - PY4 - 003	4.8 mm (0.189 in)
R9	22459 - PY4 - 003	4.9 mm (0.193 in)

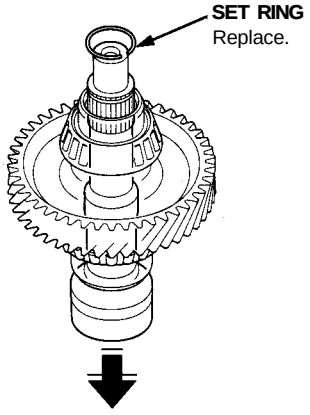
Secondary Driven Gear Shaft

Components



Disassembly

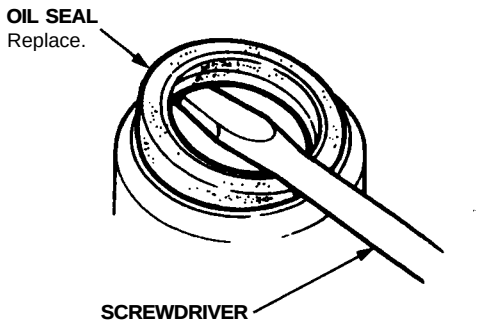
1. Remove the set ring.



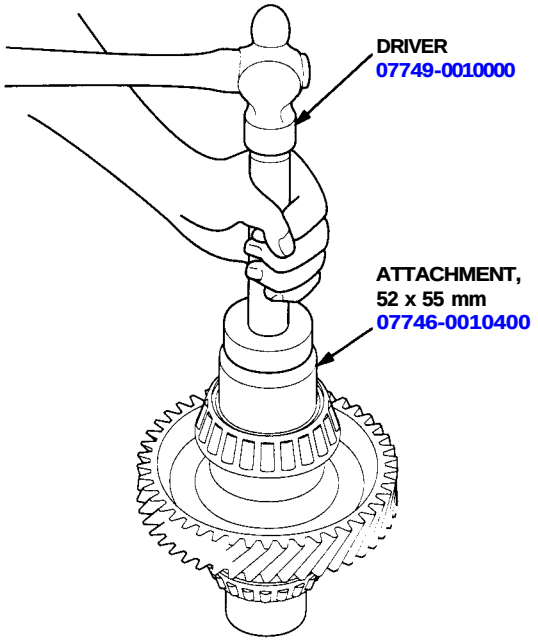
2. Remove the extension shaft from the secondary driven gear shaft.

Oil Seal Replacement

1. Remove the oil seal from the secondary driven gear shaft.



2. Drive the oil seal into the secondary driven gear shaft using the special tools as shown.

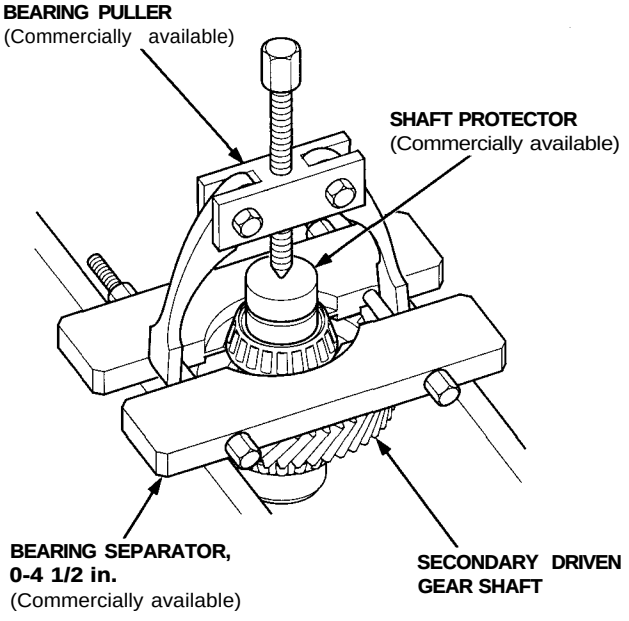


Secondary Driven Gear Shaft

Tapered Roller Bearing Replacement

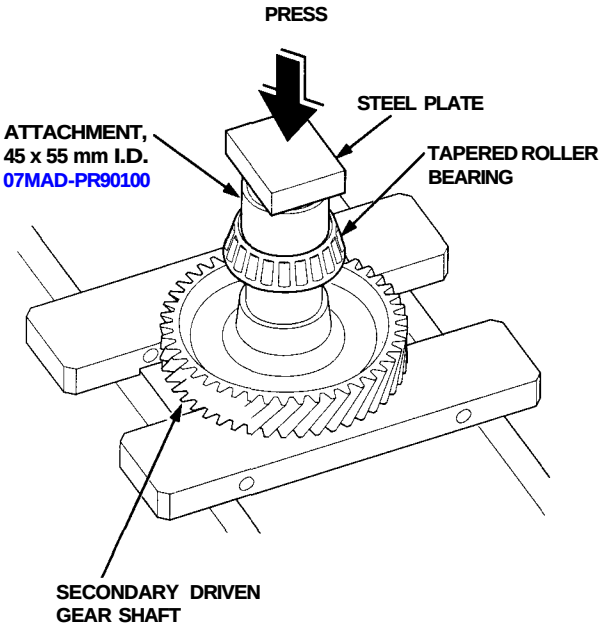
NOTE:
- The bearing and outer race should be replaced as a set.
- If the bearing is replaced, inspect and adjust the bearing preload (see page 14-194).

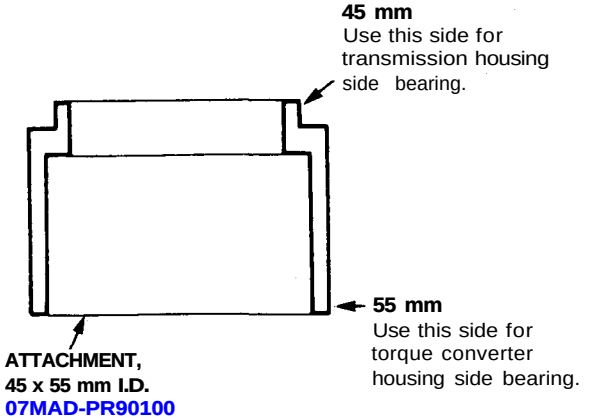
1. Remove the tapered roller bearings from the secondary driven gear shaft using a bearing puller and separator as shown.



2. Install the bearings using the special tool and a press as shown.

NOTE: Press the bearings in squarely until they bottom.



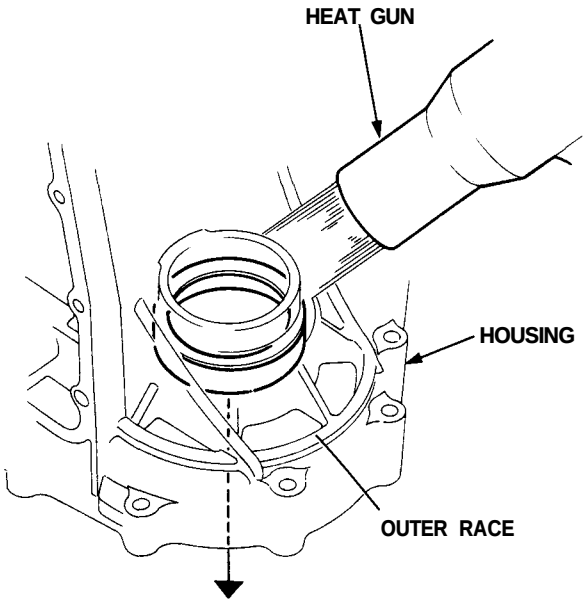


Tapered Roller Bearing Outer Race Replacement

NOTE:
- Replace the bearing with a new one whenever the outer race is replaced.
- Adjust preload after replacing the bearing and outer race.
- Coat all parts with ATF during installation.
- The illustration shows '96 model; '97 - '98 models is similar.

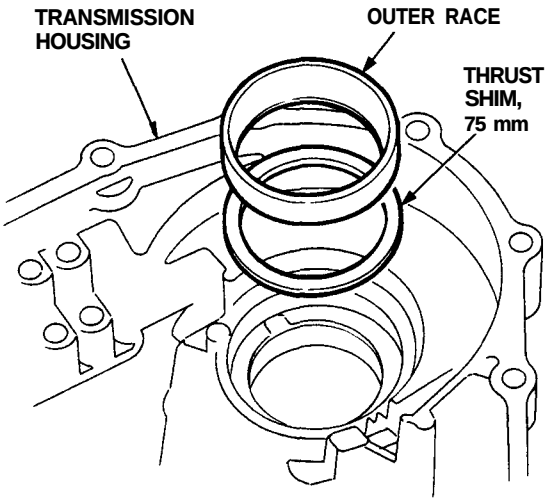
1. Remove the bearing outer race from the transmission housing and torque converter housing by heating the housing to about 212°F (100°C).

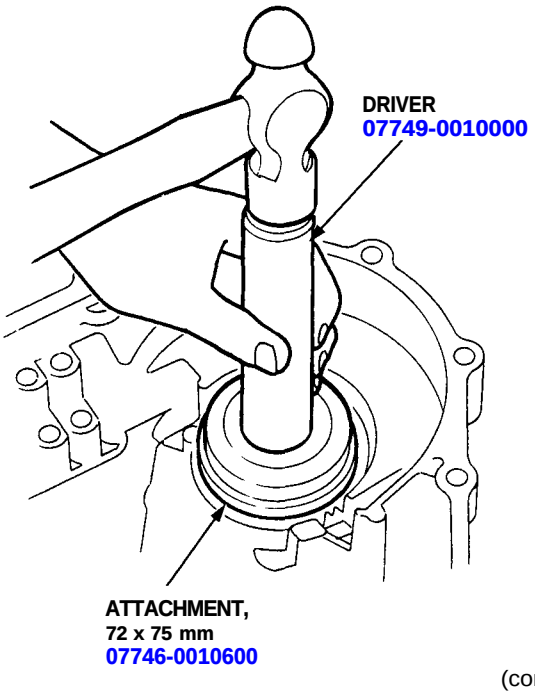
   CAUTION: Do not heat the housing in excess of 212°F (100°C).



2. Install the thrust shim and outer race in the transmission housing using the special tools as shown.

   NOTE:
   - Install the outer race squarely in the transmission housing.
   - Check that there is no clearance between the outer race, thrust washer and transmission housing.





(cont'd)

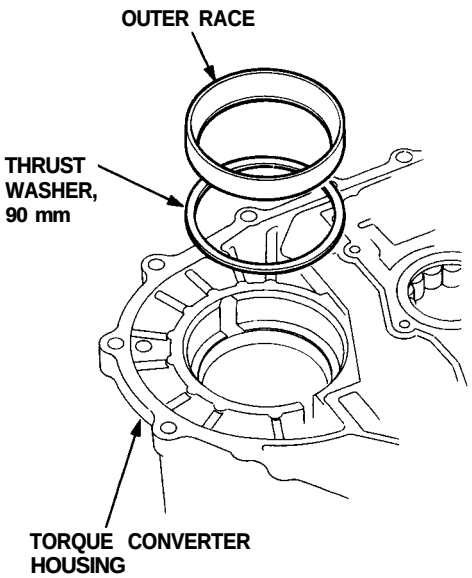
Secondary Driven Gear Shaft

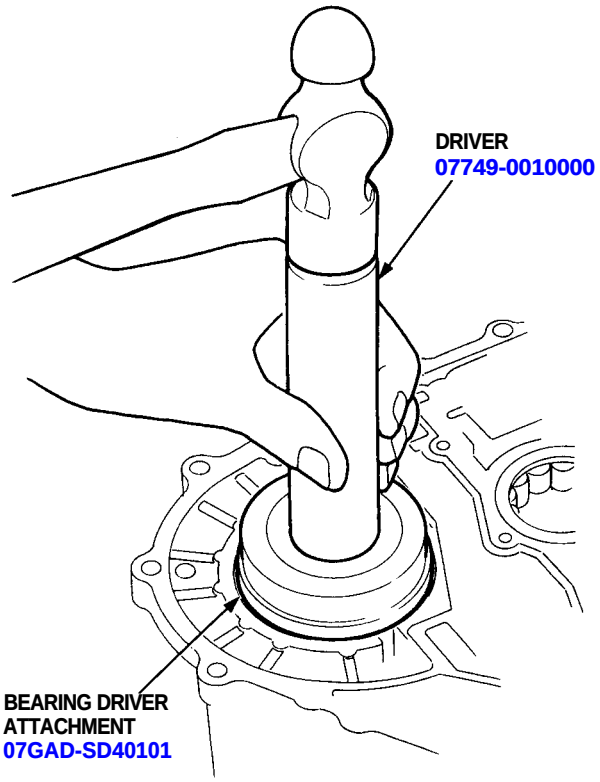
Tapered Roller Bearing Outer Race Replacement (cont'd)

3. Install the 90 mm thrust washer and outer race in the torque converter housing using the special tools as shown.

NOTE:

- The 90 mm thrust washer is used on '96 models with the transmission No. M5HA-1000001 to M5HA - 1014322; '96 models with the transmission No. M5HA-1014323 and above, and '97-'98 models do not use this part.
- Install the outer race squarely in the torque converter housing.
- Check that there is no clearance between the outer race, thrust washer, and torque converter housing.





Tapered Roller Bearing Preload Adjustment

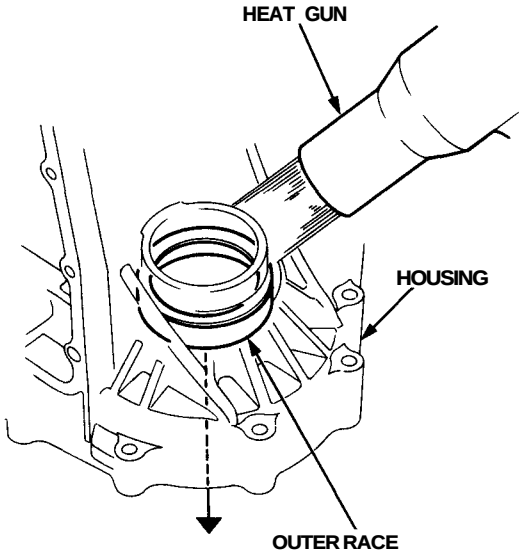
NOTE:
- If the transmission housing, torque converter housing, secondary driven gear shaft, tapered roller bearing, outer race, thrust shim, or thrust washer were replaced, the bearing preload must be adjusted.
- The illustration shows '97 - '98 models; '96 model is similar.
- The 90 mm thrust washer is used on '96 models with the transmission No. M5HA - 1000001 to M5HA - 1014322; '96 models with the transmission No. M5HA - 1014323 and above, and '97 - '98 models do not use this part.

1. Remove the oil seals from both housings.

2. Remove the bearing outer race and thrust shim from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.

   CAUTION:
   - **Do not heat the housing in excess of 212°F (100°C).**
   - **Replace the tapered roller bearing when the outer race is to be removed.**

   NOTE: Let the transmission housing cool to room temperature before adjusting the bearing preload.



3. Select the 1.98 mm (0.078 in) thrust shim from the middle of the table below.

THRUST SHIM, 75 mm

No.	Part Number	Thickness mm (in)
A	23941-P5D-000	1.56 (0.061)
B	23942-P5D-000	1.59 (0.063)
C	23943-P5D-000	1.62 (0.064)
D	23944-PSD-000	1.65 (0.065)
E	23945-PSD-000	1.68 (0.066)
F	23946-P5D-000	1.71 (0.067)
G	23947-P5D-000	1.74 (0.069)
H	23948-P5D-000	1.77 (0.07)
I	23949-PSD-000	1.80 (0.071)
J	23950-P5D-000	1.83 (0.072)
K	23951-P5D-000	1.86 (0.073)
L	23952-PSD-000	1.89 (0.074)
M	23953-P5D-000	1.92 (0.076)
N	23954-PSD-000	1.95 (0.077)
O	23955-P5D-000	1.98 (0.078)
P	23956-PSD-000	2.01 (0.079)
Q	23957-PSD-000	2.04 (0.080)
R	23958-PSD-000	2.07 (0.081)
S	23959-PSD-000	2.10 (0.08)
T	23960-P5D-000	2.13 (0.08)
U	23961-PSD-000	2.16 (0.085)
V	23962-P5D-000	2.19 (0.086)
W	23963-P5D-000	2.22 (0.087)
X	23964-PSD-000	2.25 (0.089)
Y	23965-PSD-000	2.28 (0.090)
Z	23966-PSD-000	2.31 (0.091)
AA	23967-P5D-000	2.34 (0.092)
AB	23968-P5D-000	2.37 (0.093)
AC	23969-PSD-000	2.40 (0.094)
AD	23970-PSD-000	2.43 (0.096)

4. After installing the thrust shim, install the outer race in the transmission housing using the special tools (see page 14-193).

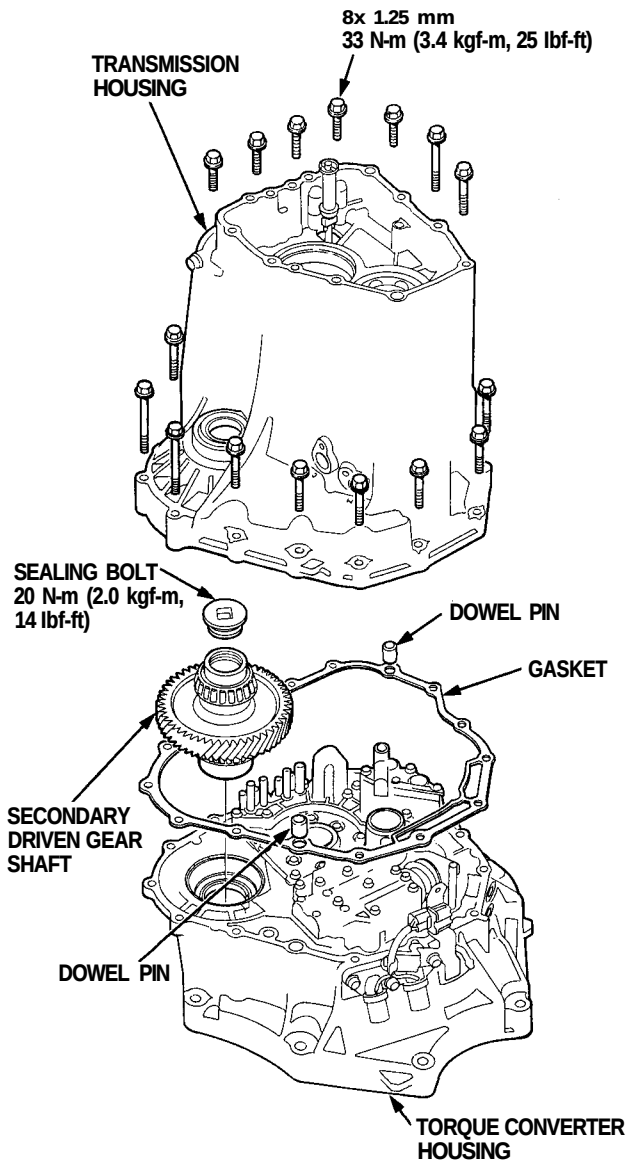
   NOTE:
   - Install the outer race squarely in the transmission housing.
   - Check that there is no clearance between the outer race, shim, and transmission housing.

(cont'd)

Secondary Driven Gear Shaft

Tapered Roller Bearing Preload Adjustment (cont'd)

5. Install the sealing bolt to the secondary driven gear shaft, and torque it to 20 N-m (2.0 kgf-m, 14 lbf-ft).



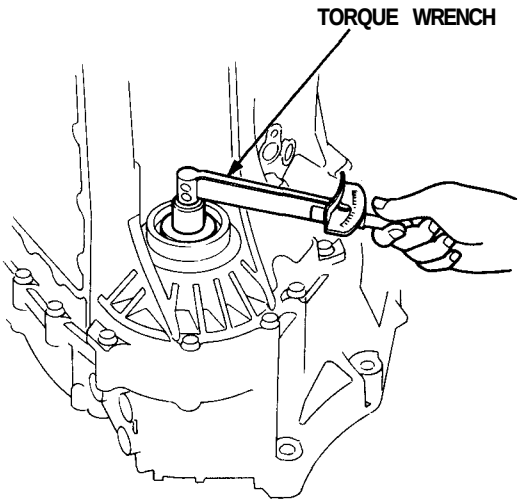
6. With the mainshaft and countershaft removed, install the secondary driven gear shaft, and torque the transmission housing.

   NOTE: Install the gasket when checking starting torque.

7. Rotate the secondary driven gear shaft in both directions to seat the bearing.

8. Measure the starting torque of the secondary driven gear shaft with a torque wrench.

   STANDARD: 3.4-4.4 N-m (35 - 45 kgf-cm, 30 - 39 lbf-in)



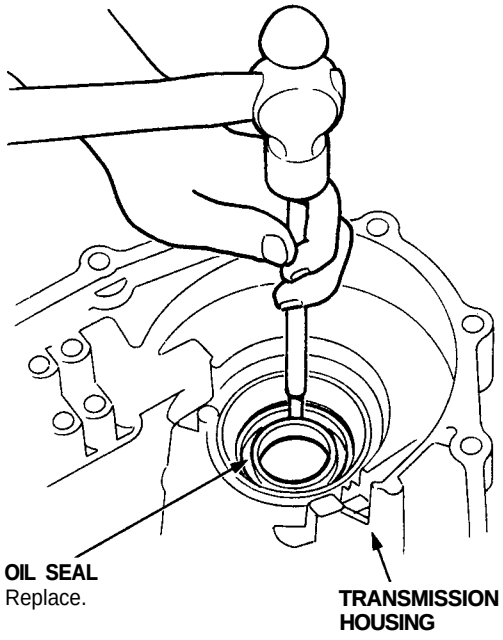
NOTE:

- Measure the starting torque at normal room temperature in both directions.
- Changing the shim to the next size will increase or decrease starting torque about 0.3-0.4 N-m (3-4kgf-cm,3-4lbf-in).
- To increase the starting torque, increase the thickness of the shim. To decrease the starting torque, decrease the thickness of the shim.

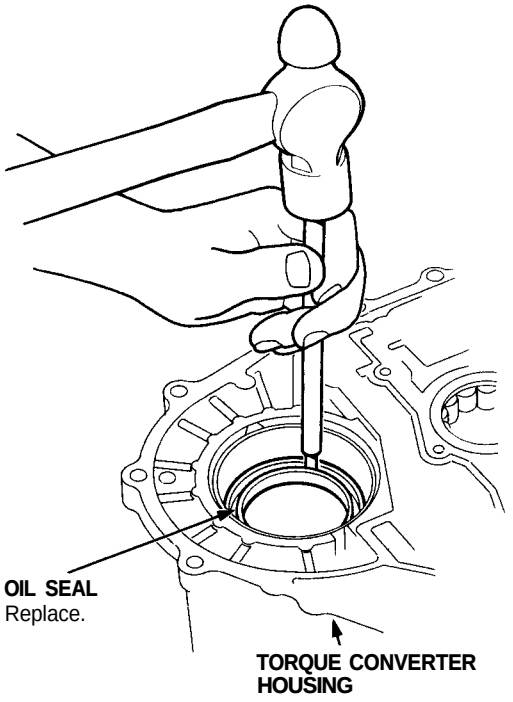
Oil Seals

Removal

1. Remove the oil seal from the transmission housing.

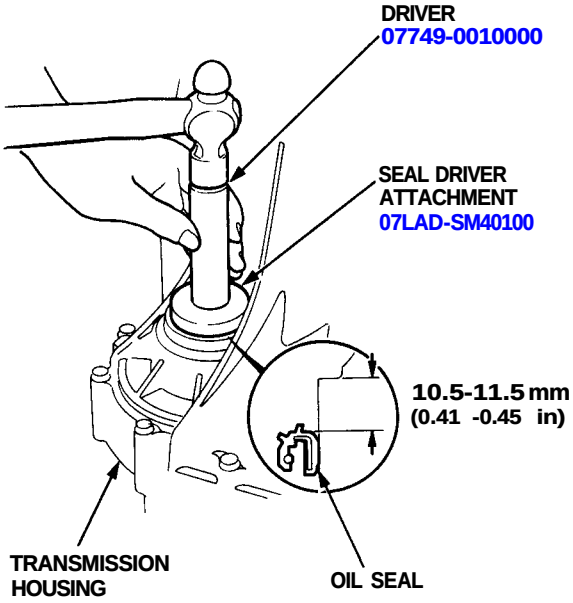


2. Remove the oil seal from the torque converter housing.



Installation

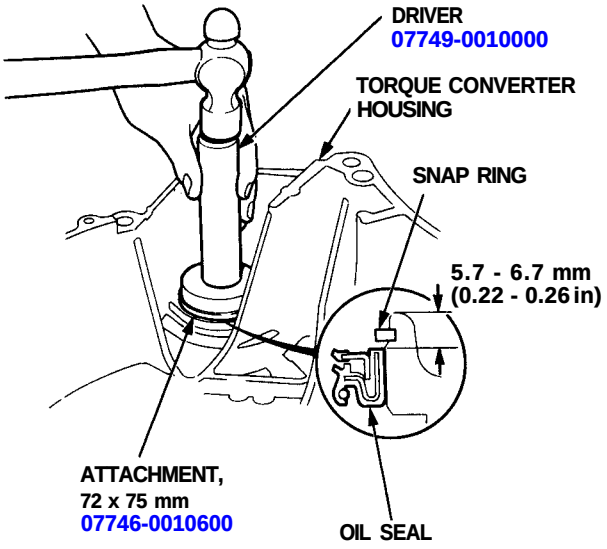
1. Install the oil seal in the transmission housing using the special tool as shown.



2. Install the oil seal into the torque converter housing using the special tools as shown.

3. Install the snap ring in the torque converter housing ('96 model).

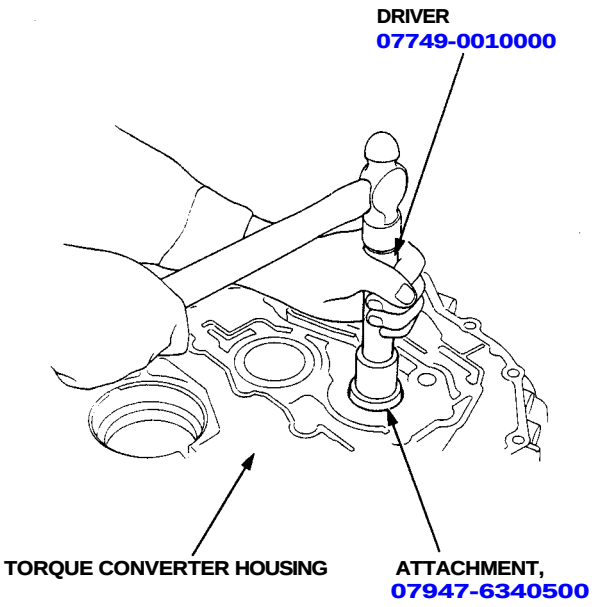
NOTE: The snap ring is used on '96 models with the transmission No. M5HA - 1000001 to M5HA - 1014322; '96 models with the transmission No. M5HA - 1014323 and above, and '97 - '98 models do not use this part.



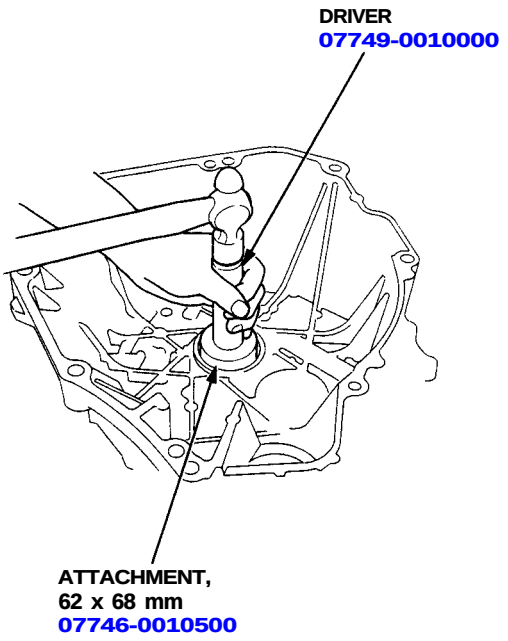
Torque Converter Housing Bearings

Mainshaft Bearing/Oil Seal Replacement

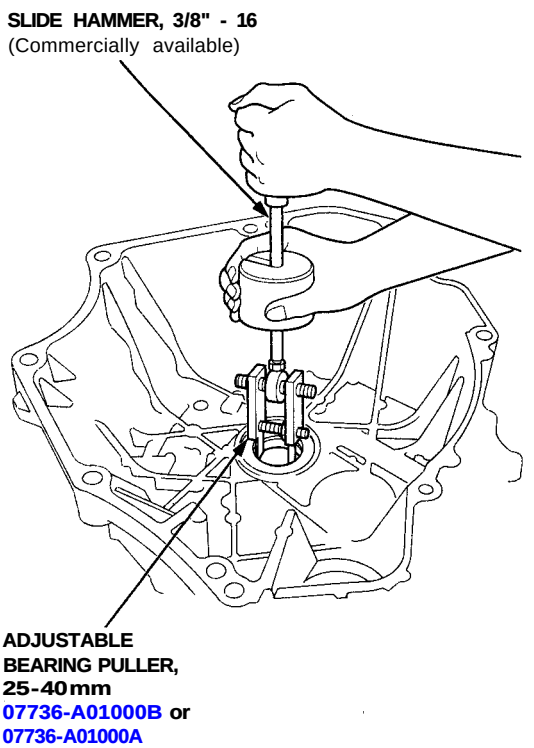
1. Drive out or pull up the mainshaft bearing and oil seal using the special tools as shown.

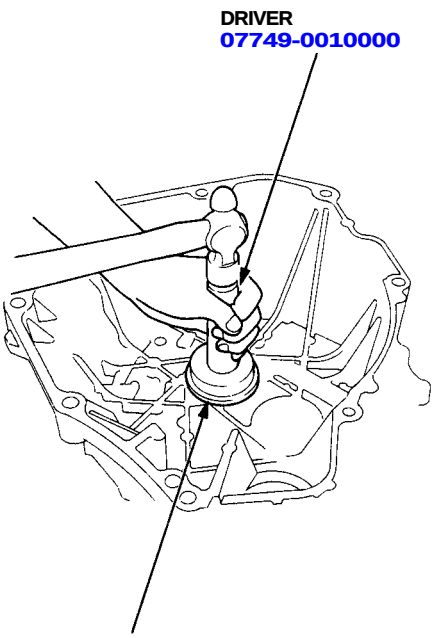


2. Drive in the new mainshaft bearing until it bottoms in the housing using the special tools as shown.



3. Install the new oil seal flush with the housing using the special tools as shown.

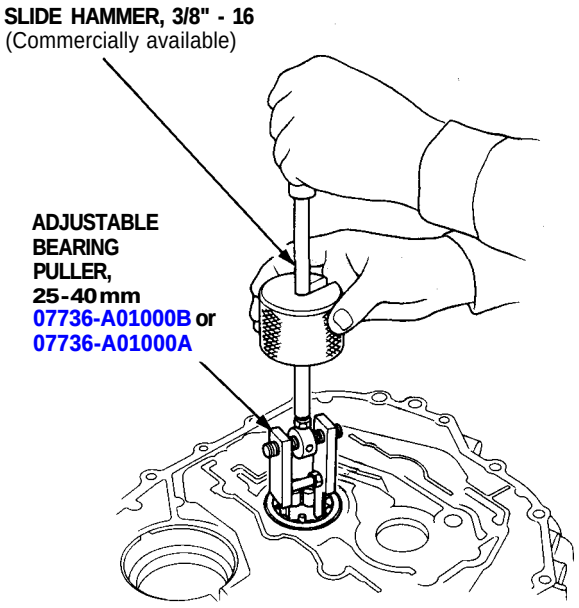




Transmission Housing Mainshaft Bearing

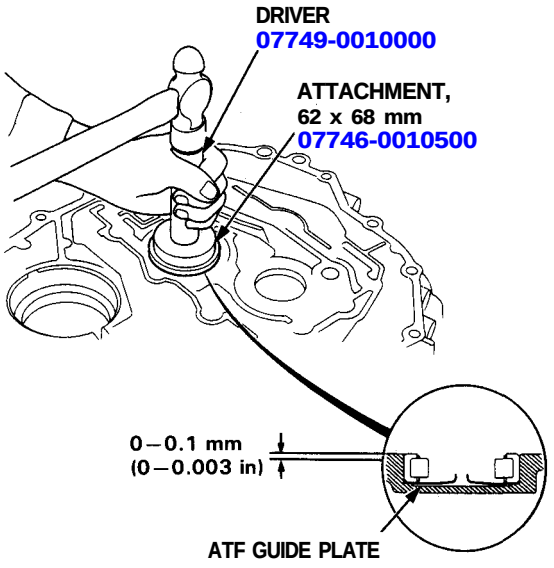
Countershaft Bearing Replacement

1. Remove the countershaft roller bearing using the special tool as shown.



2. Install the ATF guide plate.

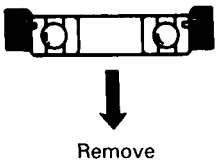
3. Drive the new bearing into the housing using the special tools as shown.

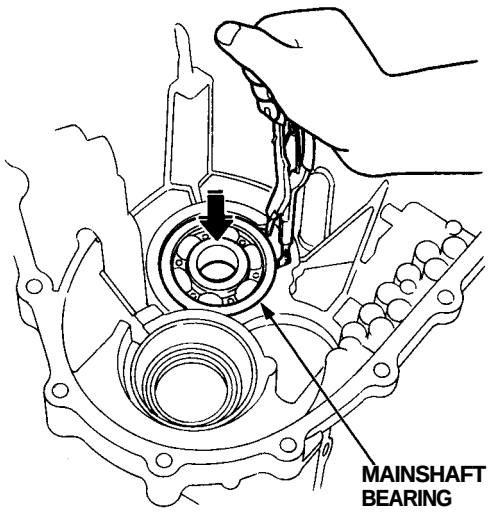


Replacement

1. To remove the mainshaft bearing from the transmission housing, expand the snap ring with the snap ring pliers, then push the bearing out.

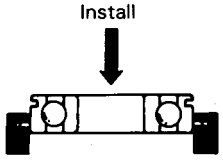
NOTE: Do not remove the snap ring unless it's necessary to clean the groove in the housing.





2. Expand the snap ring with the snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.

NOTE: Install with groove side of the bearing facing inside the transmission housing.

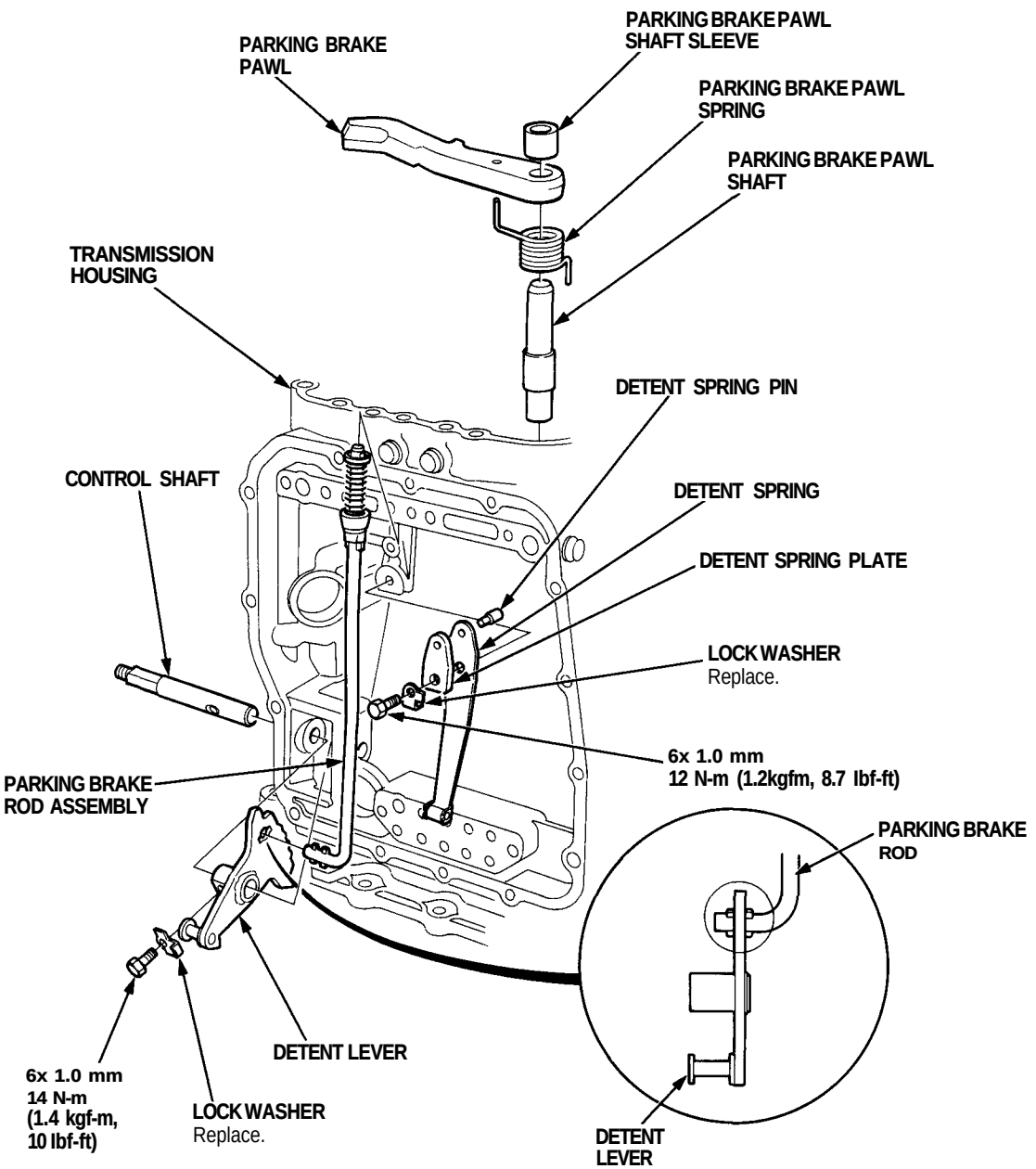


Parking Brake Mechanism

Disassembly/Inspection/Reassembly

1. Remove the parking brake pawl shaft sleeve, parking brake pawl and parking brake pawl spring.
2. Remove the A/T gear position switch (see page 14-201).
3. Remove the bolt securing the detent lever to the control shaft, then remove the control shaft.
4. Remove the detent lever and parking brake rod assembly from the transmission housing.
5. Assemble the parking brake mechanism in the reverse order of disassembly.

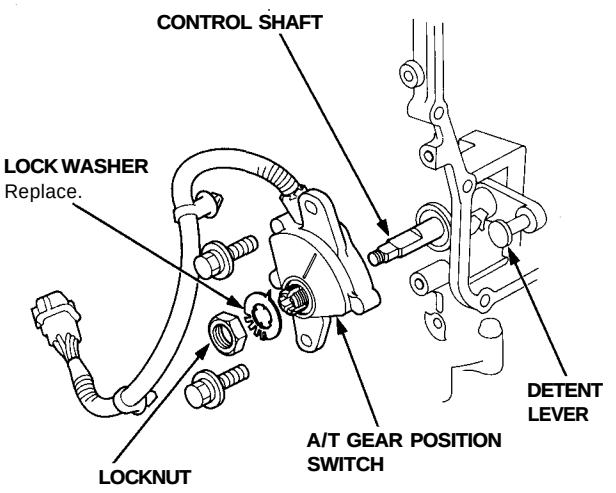
   NOTE: See page 14-201 and 14-202 when installing the A/T gear position switch.



A/T Gear Position Switch

Removal

1. Shift the detent lever to the [P] position.



2. Pry the locktabs on the lock washer, then remove the locknut and lock washer.

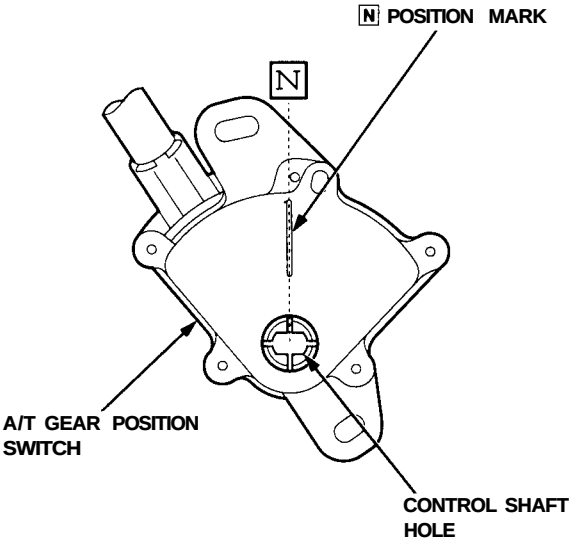
3. Remove the bolts securing the A/T gear position switch, then remove the A/T gear position switch.

A/T Gear Position Switch

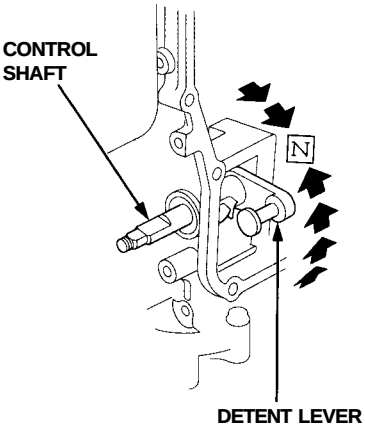
Installation

1. Set the A/T gear position switch to the [N] position as shown.

   NOTE: The A/T gear position switch clicks in the [N] position.



2. Shift the detent lever to the [N] position.

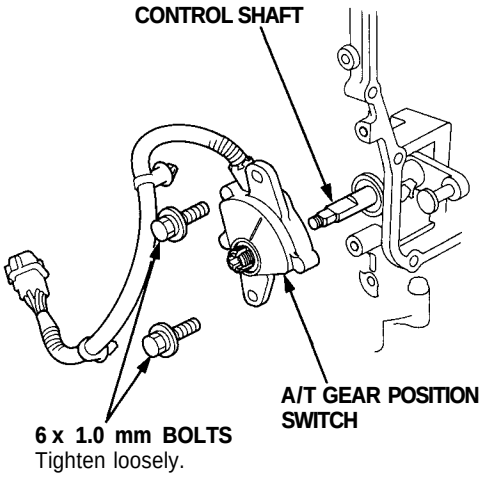


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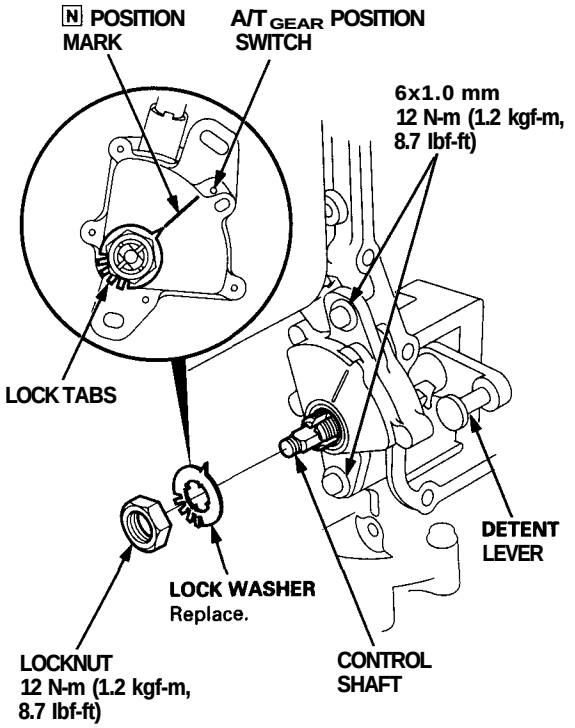
A/T Gear Position Switch

Installation (cont'd)

3. Install the A/T gear position switch on the control shaft, then install the bolts loosely.



4. Install a new lock washer on the A/T gear position switch by aligning its projected tip with the [N] position mark on the A/T gear position switch as shown.



5. Tighten the locknut while holding the detent lever in the [N] position, then bend the lock tabs against the locknut.

6. Tighten the 6 mm bolts to the specified torque.

Transmission

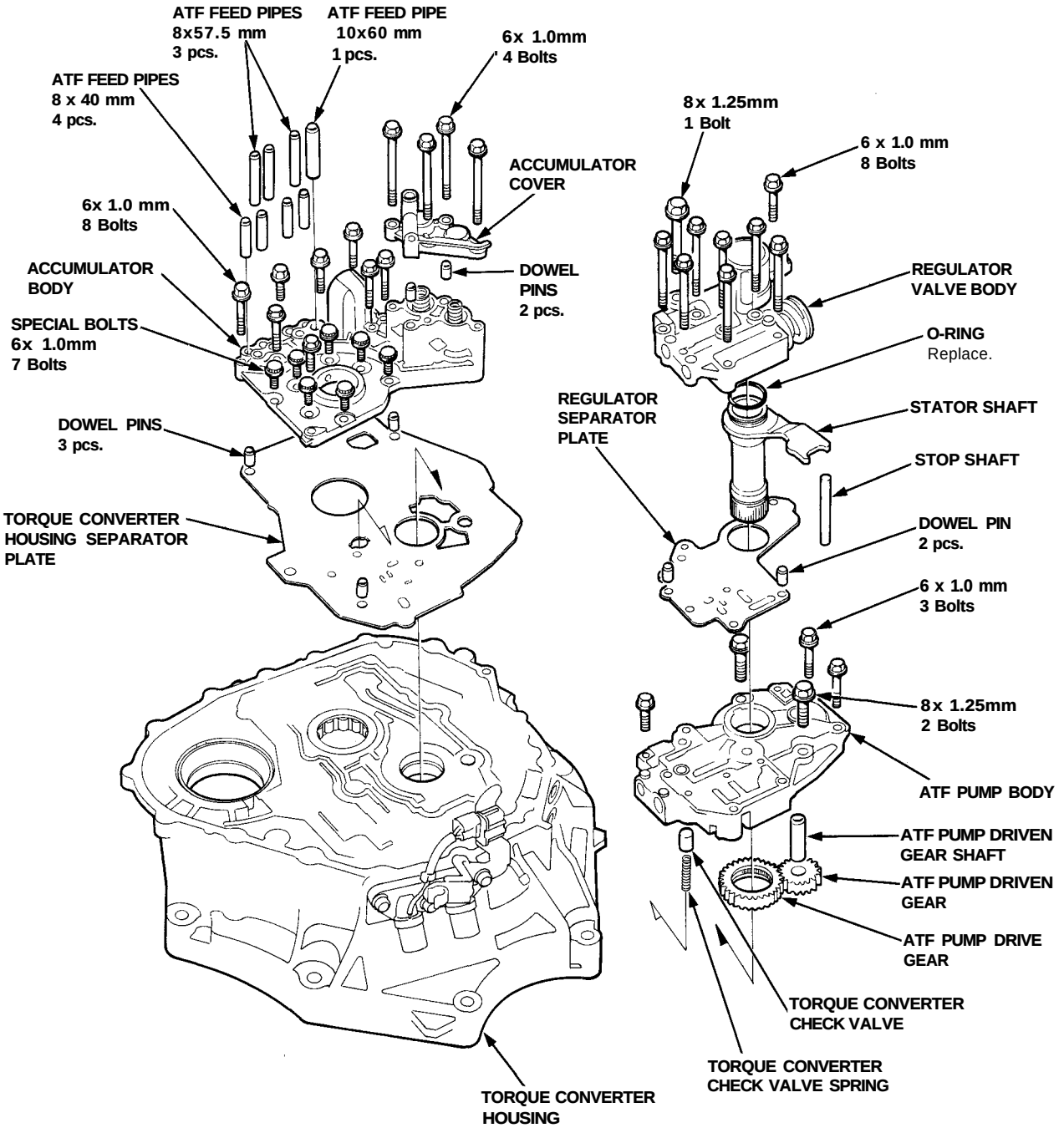
Reassembly

NOTE:

- Coat all parts with ATF.
- Replace the following parts:
  - O-rings
  - Lock washers
  - Gaskets
  - Mainshaft and countershaft locknuts and conical disc springs
  - Sealing washers

TORQUE:

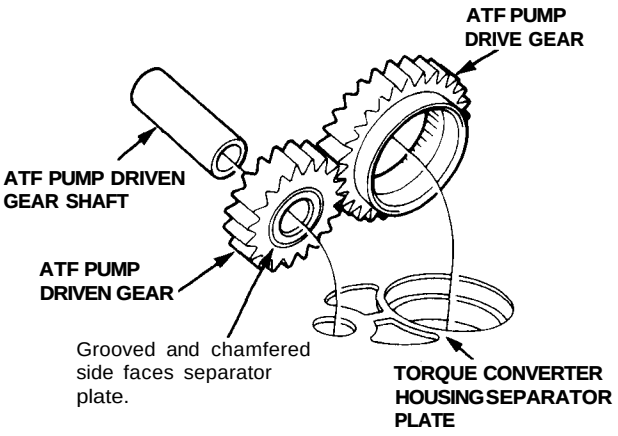
- **6 x 1.0 mm Bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)**
- **8 x 1.25 mm Bolts: 18 N-m (1.8 kgf-m, 13 lbf-ft)**



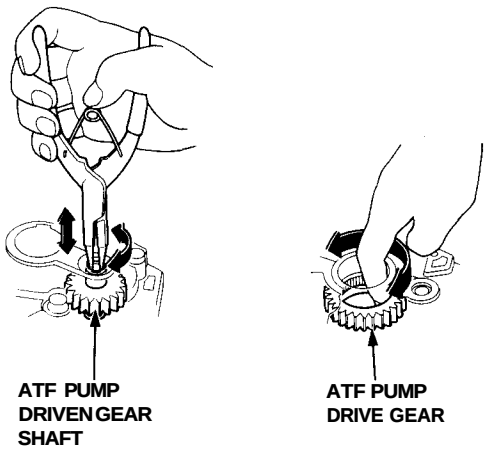
1. Install the torque converter housing separator plate and three dowel pins on the torque converter housing.

2. Install the ATF pump drive gear, ATF pump driven gear, ATF driven gear shaft, torque converter check valve, and spring on the torque converter housing.

   NOTE: Install the ATF pump driven gear with its grooved and chamfered side facing down.



3. Loosely install the ATF pump body with two 8 mm bolts and three 6 mm bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.



4. Install the accumulator body (eight bolts and seven special bolts).

5. Install the two dowel pins on the accumulator body, then install the accumulator cover while pressing it down (four bolts).

6. Tighten the bolts on the ATF pump body to the specified torque. Make sure the ATF drive gear and the ATF driven gear shaft move smoothly.

7. If the ATF pump drive gear and ATF driven gear shaft do not move freely, loosen the bolts on the ATF pump body, and remove the accumulator cover and accumulator body.

8. Realign the ATF pump driven gear shaft, reinstall the accumulator body and the accumulator cover, then retighten the bolts on the ATF pump body to the specified torque. Recheck the ATF drive gear and the ATF driven gear shaft movement.

   CAUTION: Failure to align the ATF pump driven gear shaft correctly will result in seized ATF pump gears or a ATF pump driven gear shaft.

9. Install the regulator separator plate and two dowel pins on the ATF pump body.

10. Install the stator shaft with a new O-ring and stop shaft.

11. Install the regulator valve body (eight 6 mm bolts and one 8 mm bolt).

12. Install the ATF feed pipes on the accumulator body.

13. Install the parking brake rod assembly with the detent lever on the control shaft, and install the detent spring on the transmission housing, if necessary (see page 14-200).

14. Assemble the mainshaft sub-assembly (see page 14-171).

15. Assemble the countershaft sub-assembly (see page 14-175).

16. Install the secondary driven gear shaft in the torque converter housing.

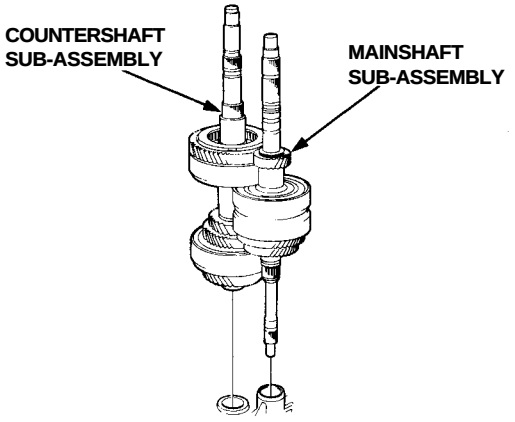
(cont'd)

Transmission

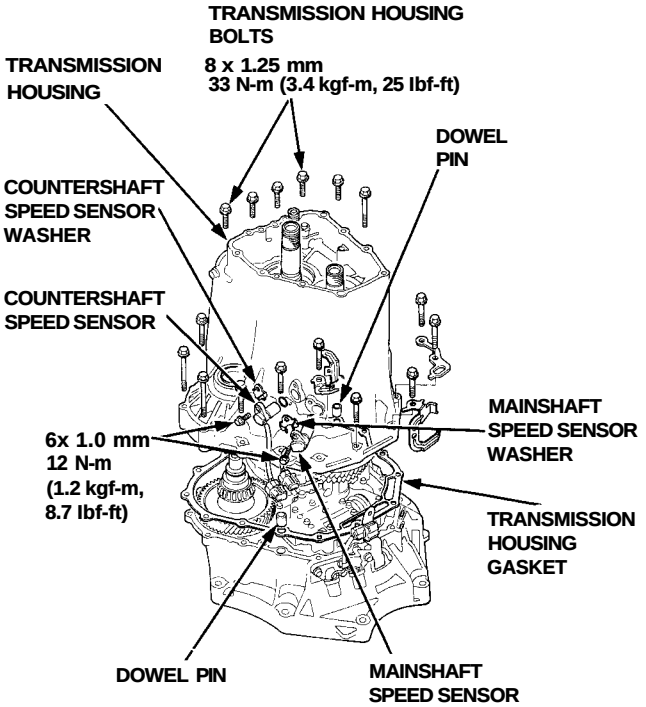
Reassembly (cont'd)

17. Install the mainshaft sub-assembly and the countershaft sub-assembly together in the torque converter housing.

    NOTE: Take care to prevent damage to the regulator valve body, when installing the shafts.



18. Install the two dowel pins and a new gasket on the torque converter housing.

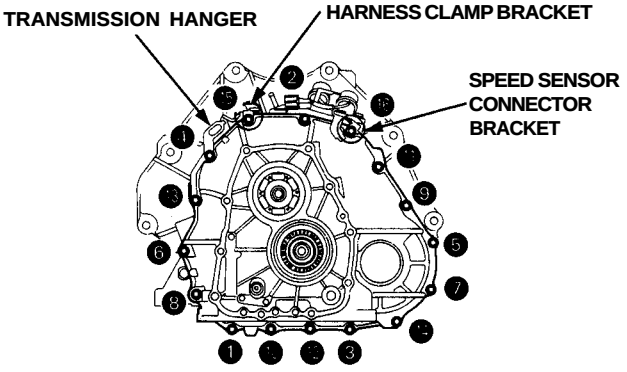


19. Place the transmission housing on the torque converter housing.

    CAUTION: Make sure that the mainshaft and countershaft speed sensors are not installed on the transmission housing before installing the transmission housing on the torque converter housing.

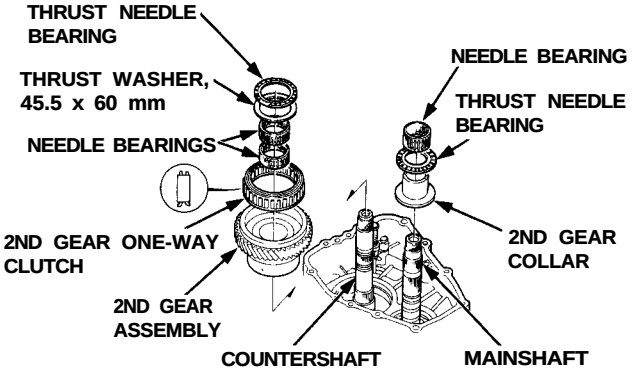
20. Install the transmission housing mounting bolts with the transmission hanger, harness clamp bracket, and speed sensor connector bracket, then tighten them in two or more steps in the sequence shown.

    TORQUE: 33 N-m (3.4 kgf-m, 25 lbf-ft)



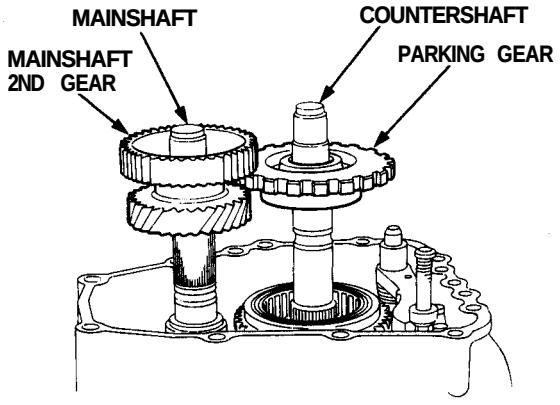
21. Install the mainshaft and countershaft speed sensors with the washers on the transmission housing.

22. Install the countershaft 2nd gear assembly, 2nd gear one-way clutch, needle bearings, thrust washer, and thrust needle bearing on the countershaft.

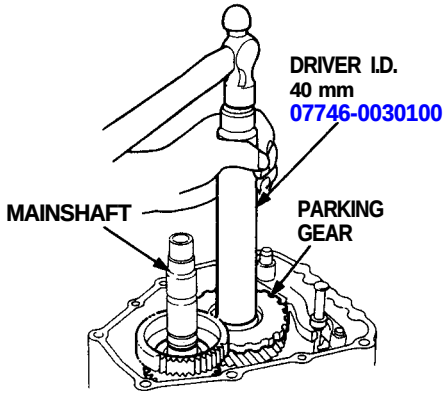


23. Install the 2nd gear collar, thrust needle bearing, and needle bearing on the mainshaft.

24. Combine the mainshaft 2nd gear with the parking gear, then install them on their respective shafts.

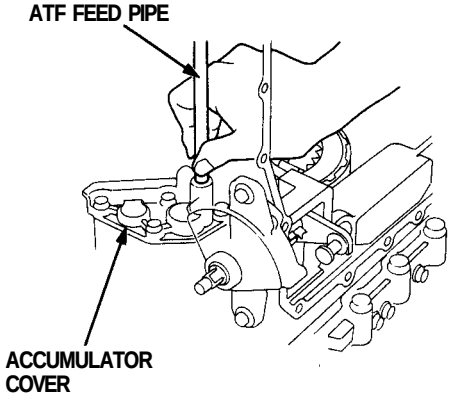


25. Tap the parking gear very lightly to install in the 2nd gear one-way clutch, using the special tool as shown.



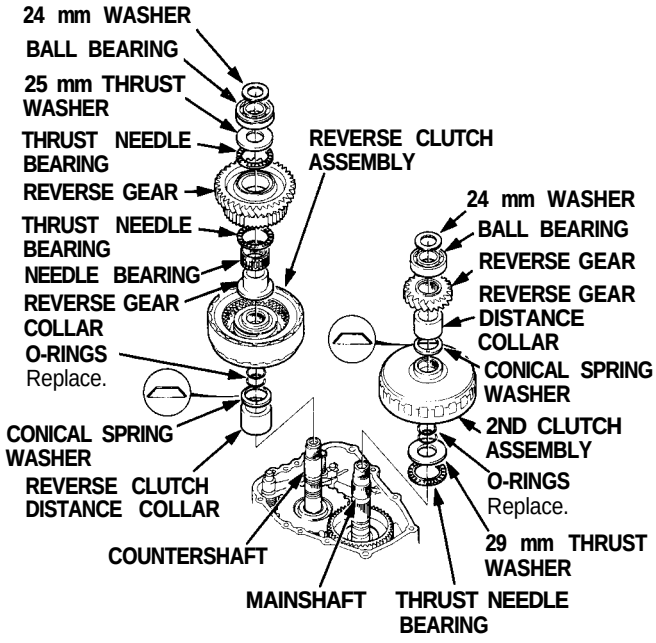
26. Install the parking brake pawl shaft, spring, pawl, and sleeve in the transmission housing (see page 14-200).

27. Install the ATF feed pipe in the accumulator cover.



28. Install the reverse clutch distance collar and a new countershaft conical spring washer on the countershaft.

NOTE: Install the conical spring washers in the direction shown.



29. Install the thrust needle bearing and 29 mm thrust washer on the mainshaft.

30. Install new O-rings on the countershaft and mainshaft.

NOTE: Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.

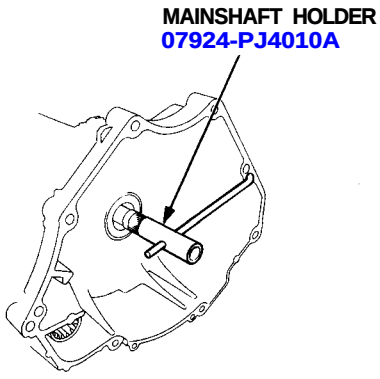
31. Install the 2nd clutch assembly on the mainshaft, then install the reverse clutch assembly, reverse gear collar, needle bearing, thrust needle bearing, reverse gear, thrust needle bearing, 25 mm thrust washer and ball bearing on the countershaft.

32. Install a new mainshaft conical spring washer, reverse gear distance collar, reverse gear and ball bearing on the mainshaft.

Transmission

Reassembly (cont'd)

33. Install the special tool onto the mainshaft as shown.



34. Engage the parking brake pawl with the parking gear by moving the detent lever to the P position.

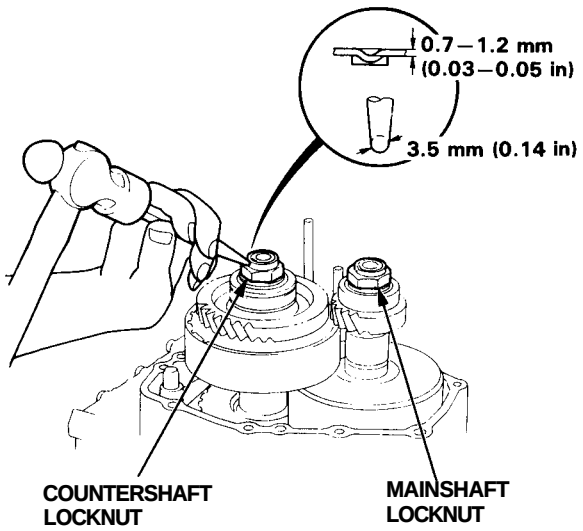
35. Coat the 24 mm washers with ATF, then install them and new locknuts on each shaft.

36. Tighten the locknuts to the specified torque using a torque wrench.

TORQUE: 127 N-m (13.0 kgf-m, 94 lbf-ft)

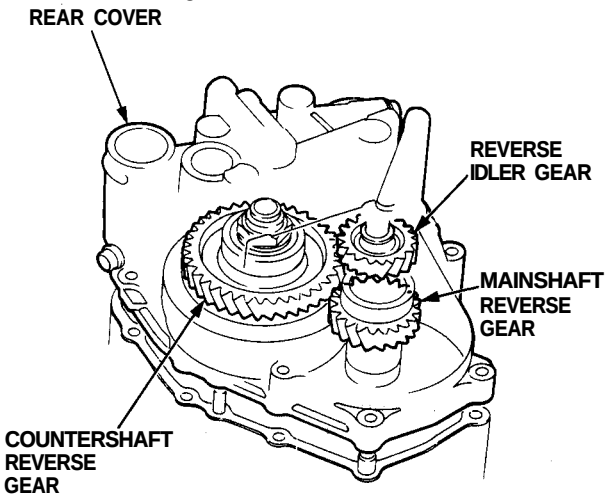
NOTE: Countershaft locknut has left-hand threads.

37. Stake each locknut into its shaft, using a 3.5 mm (0.14 in) punch as shown.



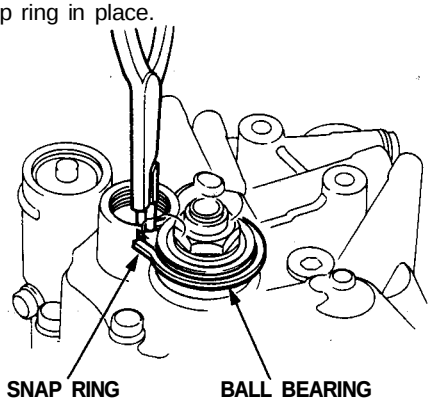
38. Install two dowel pins, four ATF feed pipes with new O-rings, and a new rear cover gasket on the transmission housing.

39. Install the rear cover and engage the reverse gears while rotating the mainshaft.



40. Push the rear cover with expanding the snap ring with the snap ring pliers until the ring snaps in place around the bearing.

NOTE: Make sure the snap ring fits in place around the bearing. If not, raise the countershaft to fit the snap ring in place.



41. Tighten the bolts on the rear cover (ten bolts).

TORQUE: 26 N-m (2.7 kgf-m, 20 lbf-ft)

42. Apply liquid gasket (P/N 08718 - 0001) to the sealing bolt threads, and install the washer and the sealing bolt on the rear cover.

NOTE: The washer on the rear cover is used on '96 models with the transmission No. M5HA - 1021049 and above, and on '97 - '98 models; '96 models with the transmission No. M5HA - 1000001 to M5HA - 1021048 do not have this part.

TORQUE:

78 N-m (8.0 kgf-m, 58 lbf-ft): '96 models with transmission No. M5HA - 1000001 to M5HA - 1021048

98 N-m (10.0 kgf-m, 72.3 lbf-ft): '96 models with transmission No. M5HA - 1021049 and above, and '97 - '98 models (transmission No. M5HA - 2000001 -)

43. Assemble the lower valve body assembly ('96 model: see page 14-122; '97 model: see page 14-123).

44. Pass the shift control solenoid valve/linear solenoid harness through the transmission housing, and put the manual valve and the detent lever together. Then install the lower valve body assembly (six bolts) with two dowel pins in the transmission housing.

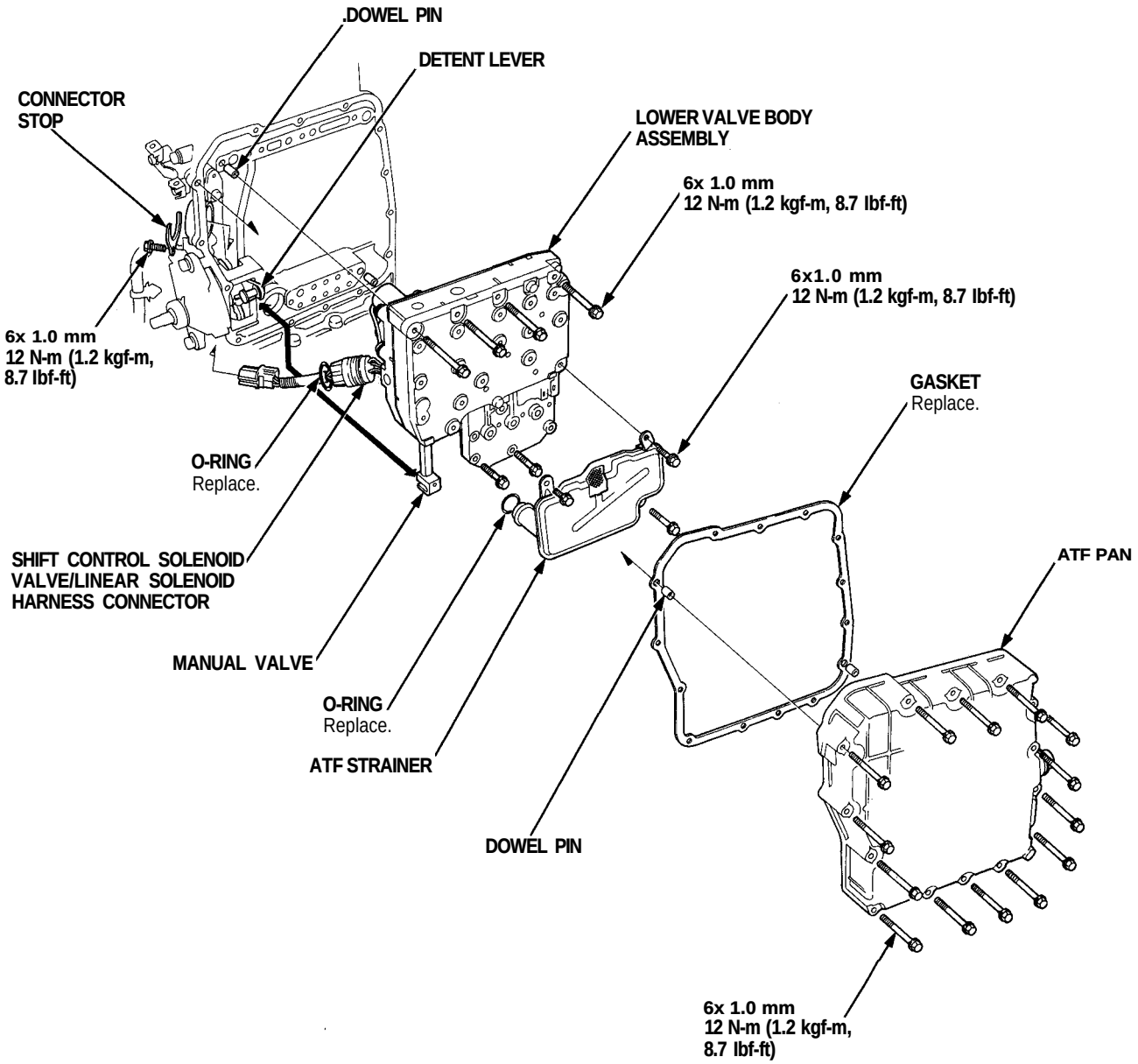
45. Install the ATF strainer (three bolts).

46. Position the connector stop on the shift control solenoid valve/linear solenoid harness connector groove, then tighten the bolt.

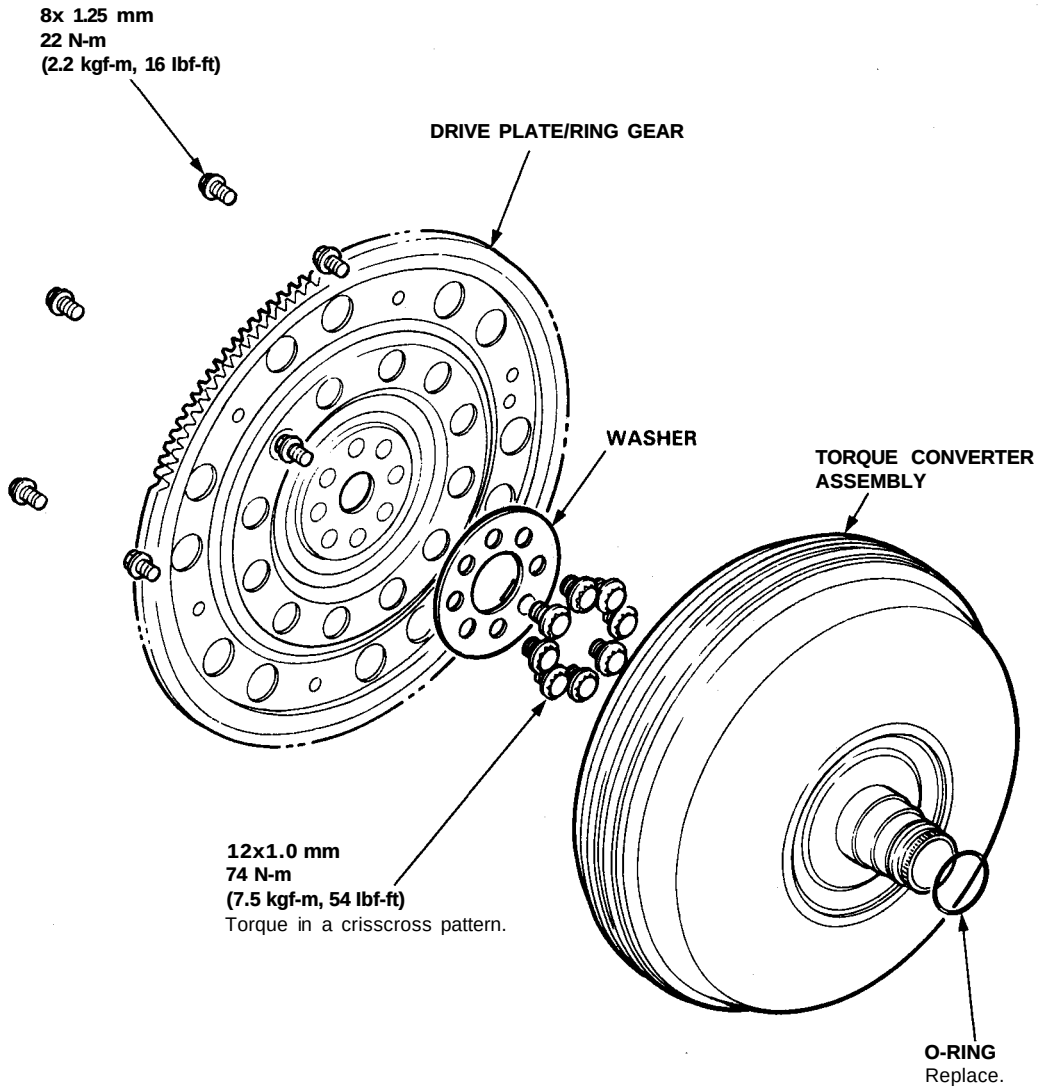
47. Install the ATF pan with two dowel pins and a new gasket (fourteen bolts).

48. Install the ATF cooler lines with new sealing washers, then tighten the joint bolts.

49. Connect the transmission sub-harness connector to speed sensor connectors and solenoid connectors.



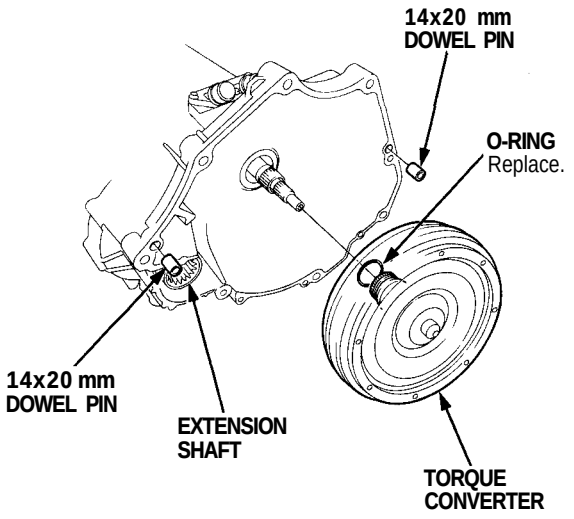
Torque Converter/Drive Plate/Ring Gear



Installation

1. Flush the ATF cooler (see flushing procedure in the '95 - '98 Acura 2.5TL Service Manual, 61SW504).

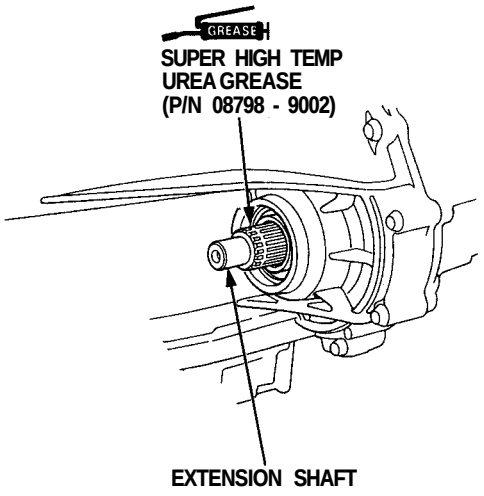
2. Install the torque converter securely with a new O-ring on the mainshaft, and install two 14 x 20 mm dowel pins in the torque converter housing.



3. Clean the extension shaft opening on the differential side.

   NOTE: Keep all of the particles out of the extension shaft opening.

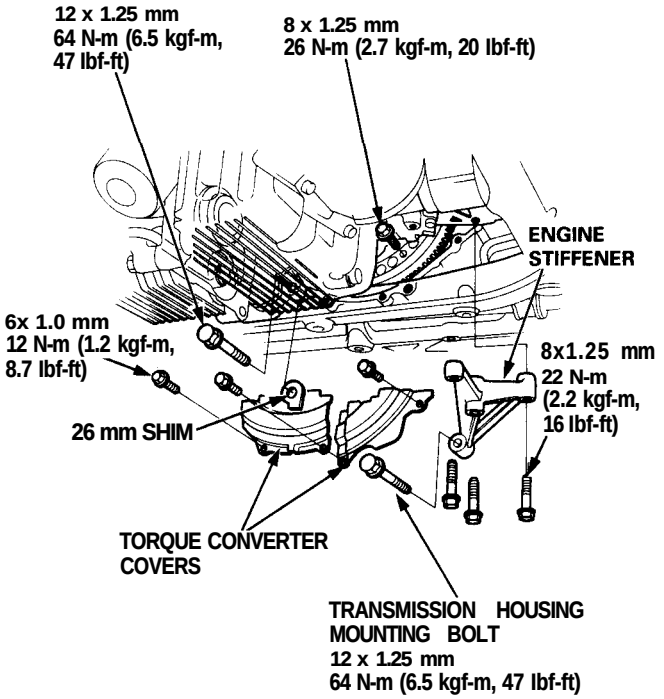
4. Set the extension shaft, and apply Super High Temp Urea Grease (P/N 08798 - 9002) to the shaft splines.



5. Place the transmission on a jack, and raise it to engine level.

6. Attach the transmission to the engine, then install the transmission housing mounting bolt with the 26 mm shim.

   NOTE: Do not install the transmission housing bolt on the engine stiffener side.



7. Attach the torque converter to the drive plate with six bolts and torque:
   Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern. After tightening the last bolt, check that the crankshaft rotates freely.

8. Install the torque converter covers.

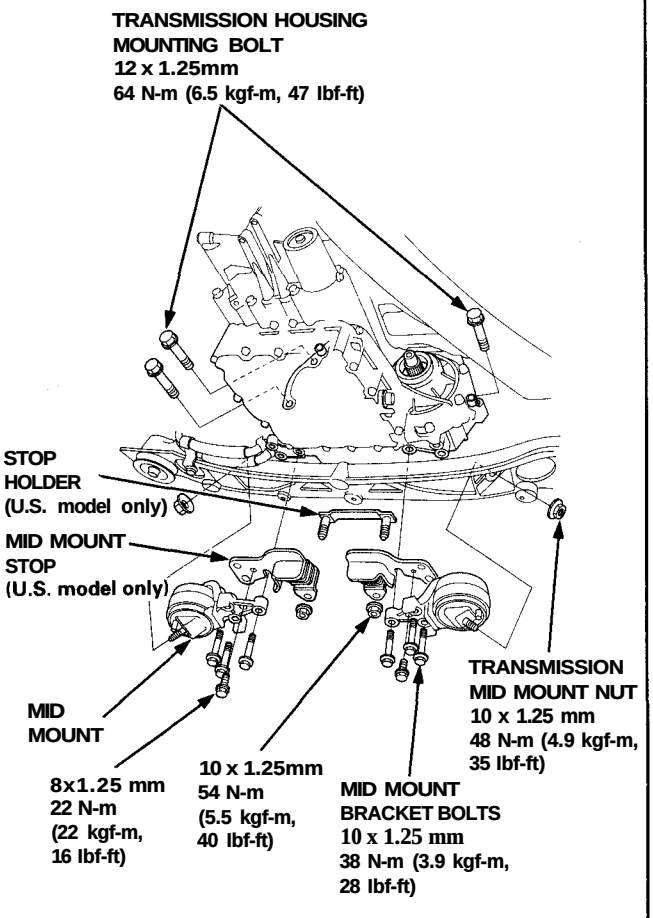
9. Install the engine stiffener. Tighten the engine stiffener 8 mm bolts loosely, and tighten the transmission housing mounting bolt to the specified torque, then tighten the 8 mm bolts to the specified torque.

(cont'd)

Transmission

Installation (cont'd)

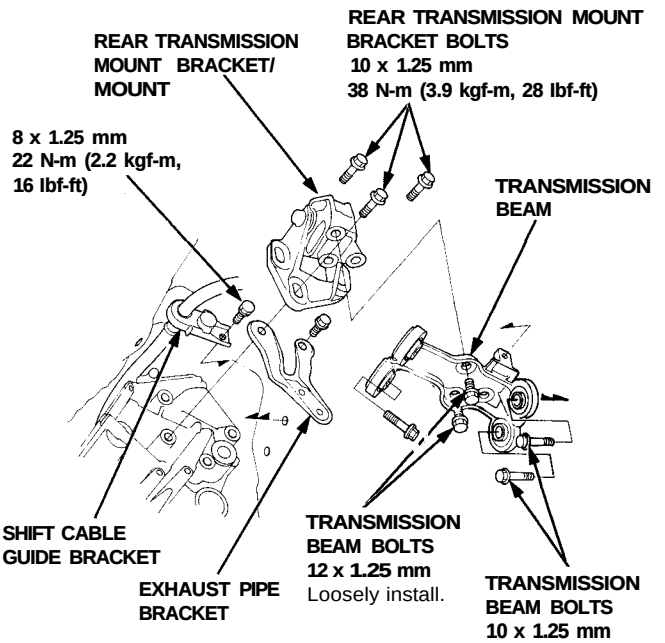
10. Install the transmission housing mounting bolts from the transmission side.



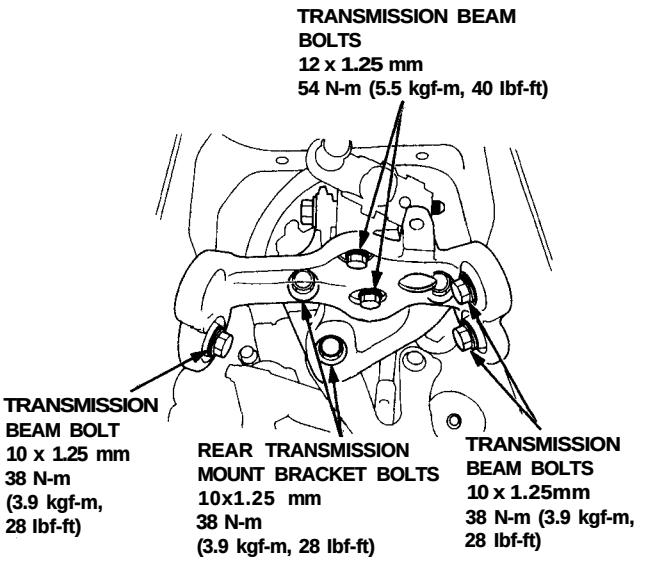
11. Install the mid mounts, mid mount stops and stop holder, then tighten the mid mount bracket bolts, the mid mount stop bolts, the stop holder nuts and the mid mount nuts.

12. Remove the transmission jack from the transmission.

13. Install the transmission beam to the rear transmission mount bracket/mount. Tighten the two bolts loosely, then install them with the exhaust pipe bracket on the rear cover and body.



14. Tighten the transmission beam bolts (three bolts).

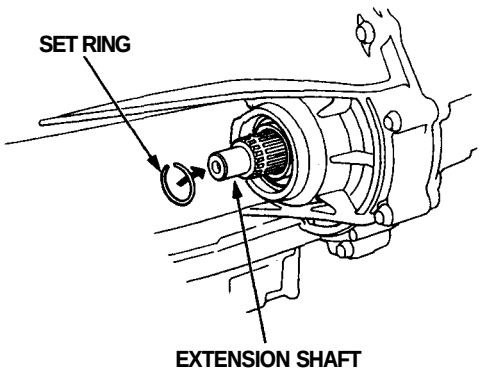


15. Tighten the rear transmission mount bracket bolts (three bolts).

16. Tighten the transmission beam bolts (two bolts) installed loosely in step 13.

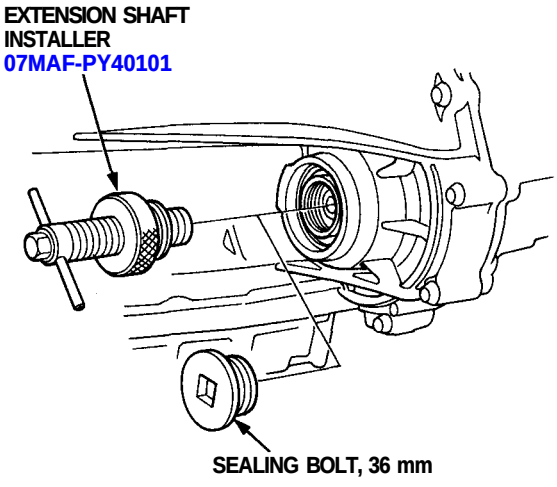
17. Install the shift cable guide bracket on the transmission beam.

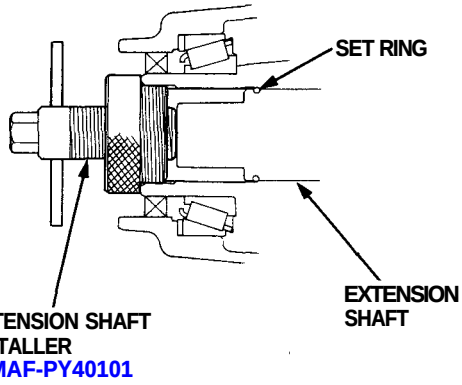
18. Install a new set ring in the extension shaft groove.



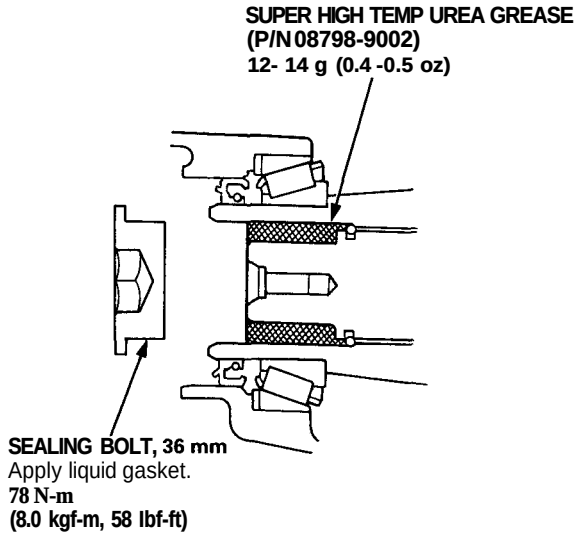
19. install the extension shaft using the special tool as shown.

NOTE: Push the extension shaft in the secondary driven gear shaft until the extension shaft stops.





20. Fill the opening between the secondary drive gear shaft and the extension shaft with High Temp Urea Grease {P/N 08798 - 90002), as shown.

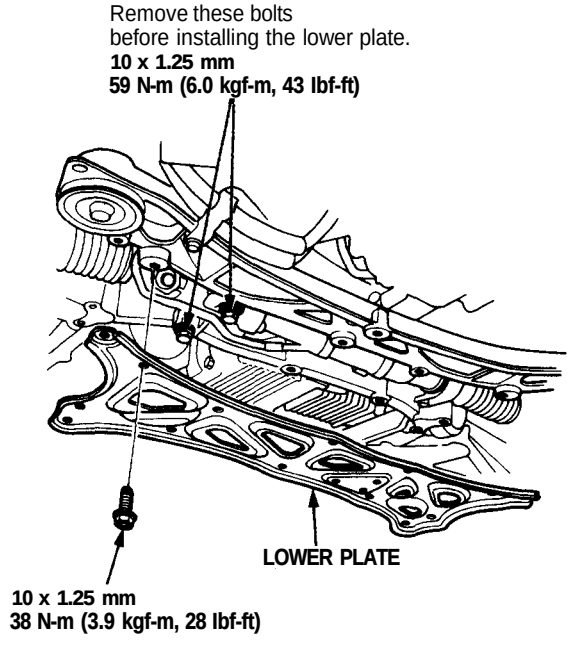


21. Apply liquid gasket (P/N 08718-0001) to the 36 mm sealing bolt threads.

22. Shift the transmission to the [P] position by rotating the control shaft.

23. Install the 36 mm sealing bolt.

24. Remove the steering gearbox mounting bolts, then install the lower plate.



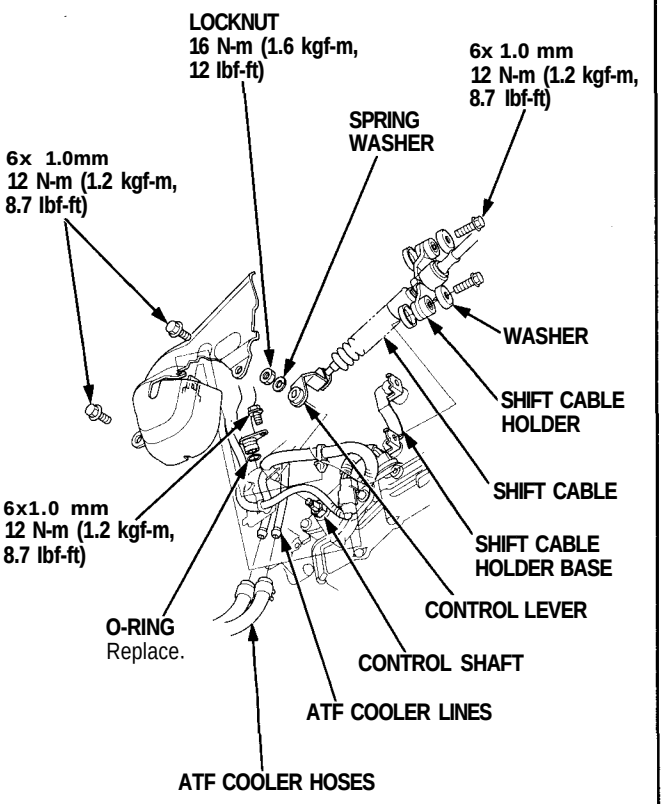
(cont'd)

Transmission

Installation (cont'd)

25. Install the control lever on the control shaft.

CAUTION: Take care not to bend the shift cable.



26. Install the shift cable holder on the shift cable holder base.

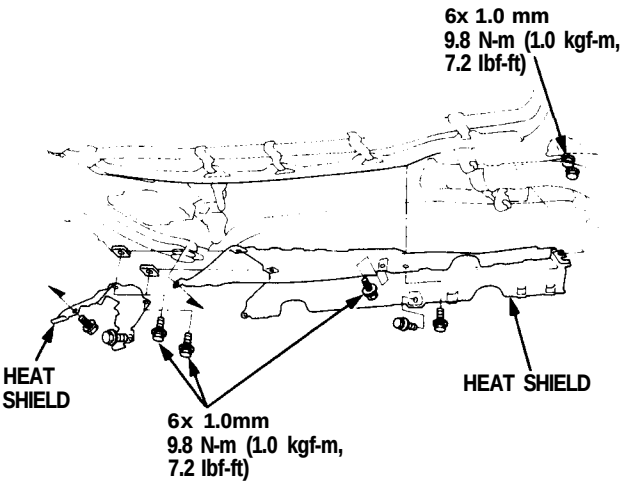
27. Install the shift cable cover, and install the shift control solenoid valve/linear solenoid harness connector and the A/T gear position switch harness clamp on the shift cable cover, then tighten the bolts.

28. Connect the ATF cooler hoses to the ATF cooler lines (see page 14-216).

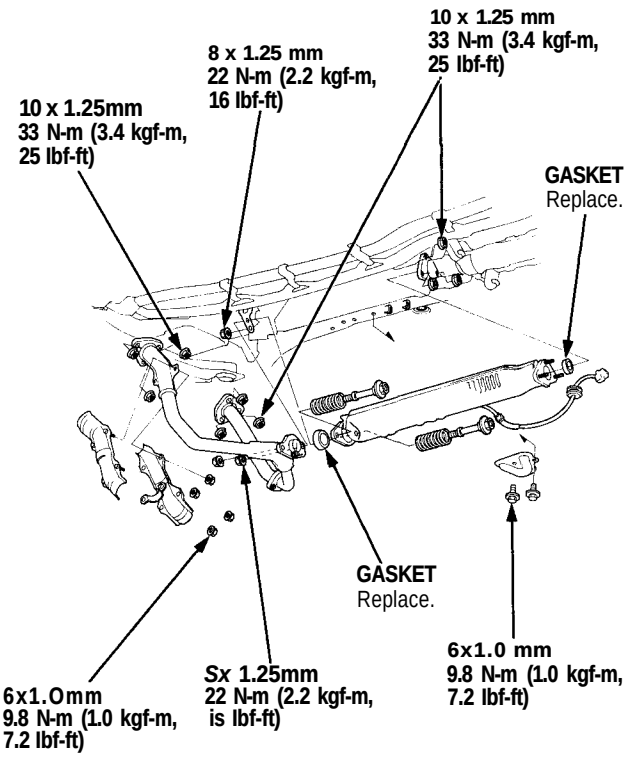
29. Install the ATF dipstick pipe with a new O-ring on the torque converter housing.

30. Clamp the transmission sub-harness on the clamp brackets.

31. Install the heat shields.



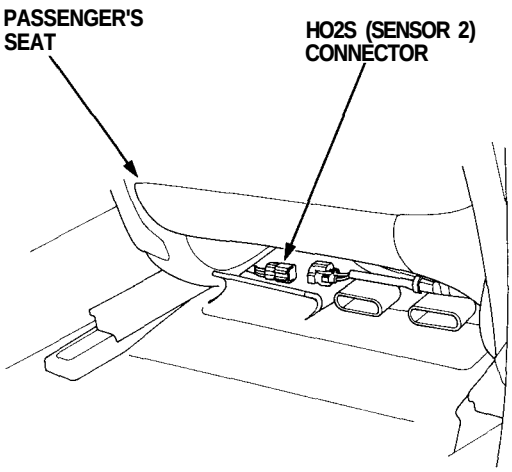
32. Install the exhaust pipe A and the three way catalytic converter, then install the exhaust pipe A cover.



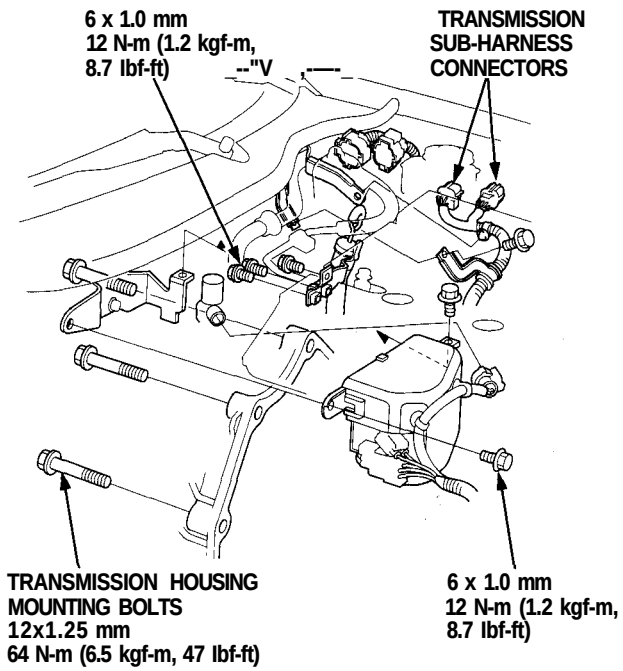
33. Push the H02S (sensor 2) connector into the vehicle, then secure it with the harness grommet.

34. Install the H02S (sensor 2) harness cover.

35. Connect the HO2S (sensor 2) connector.



36. Install the transmission housing mounting bolts.



37. Install the ATF dipstick pipe bracket bolts.

38. Connect the transmission sub-harness connectors.

39. Install the control box.

40. Refill the transmission with ATF (see page 14-112).

41. Connect the battery positive (+) and negative (-) cables to the battery terminals.

42. Set the parking brake. Start the engine, and shift the transmission through all gears three times. Check the shift lever operation and the A/T gear position indicator operation.

43. Let the engine reach normal operating temperature (the radiator fan comes on) with the transmission in the [N] or [P] position, then turn it off and check ATF level.

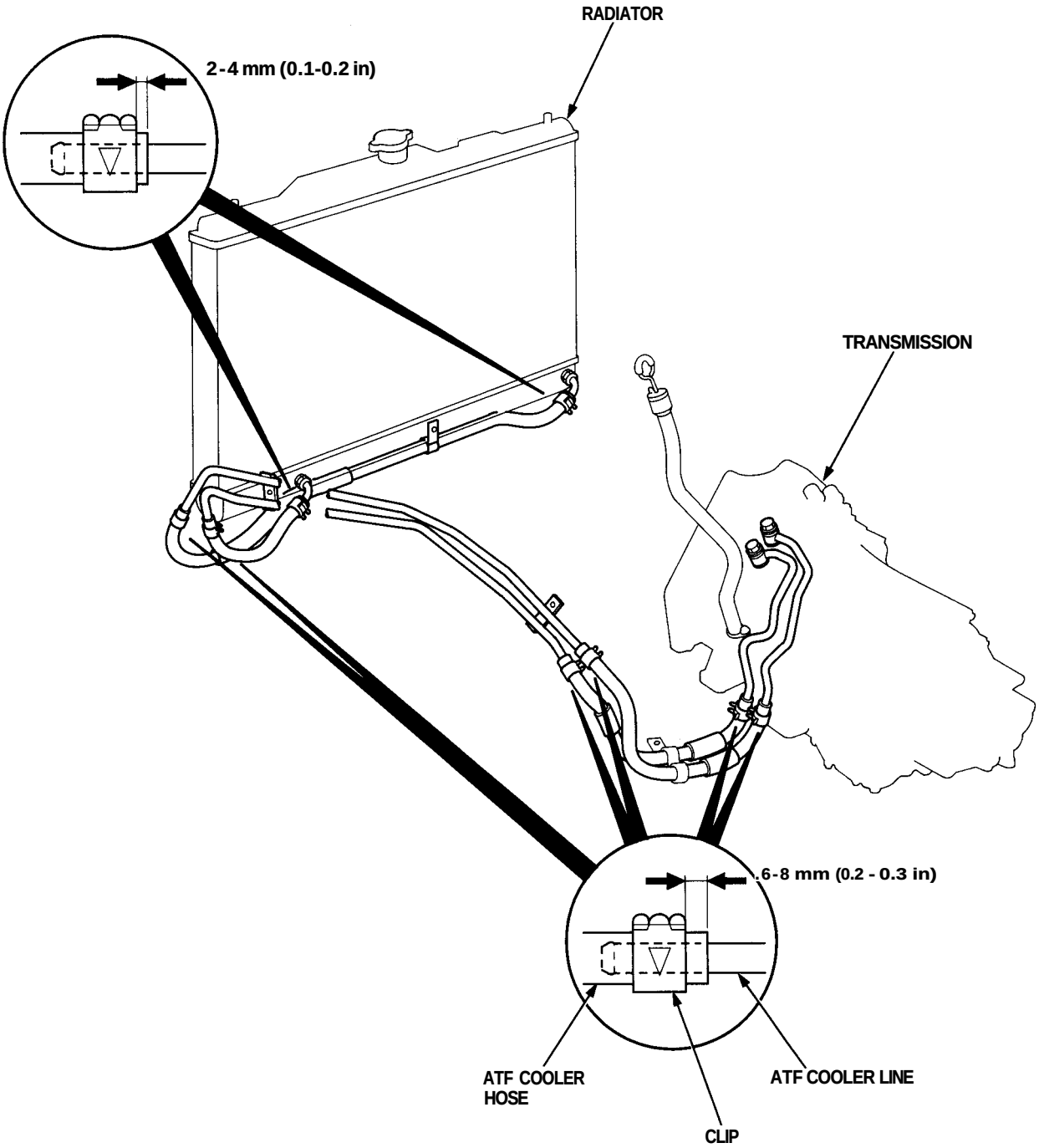
44. Road test as described on pages 14-108 thru 14-110.

45. Enter the anti-theft radio code for the radio, then enter the customer's radio station presets.

ATF Cooler Hoses

Connection

1. Connect the ATF cooler hoses to the ATF cooler lines, and secure them with the clips as shown.



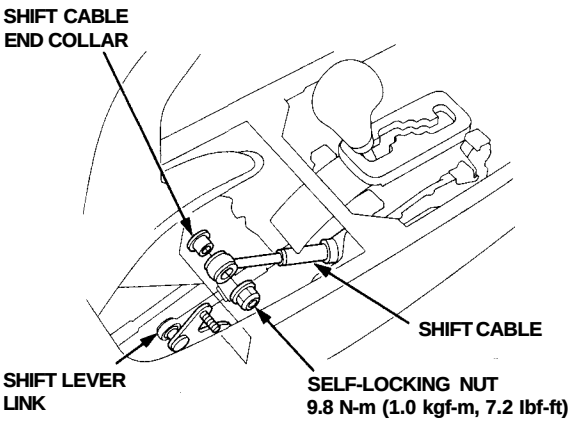
Shift Cable

Replacement

⚠ WARNING

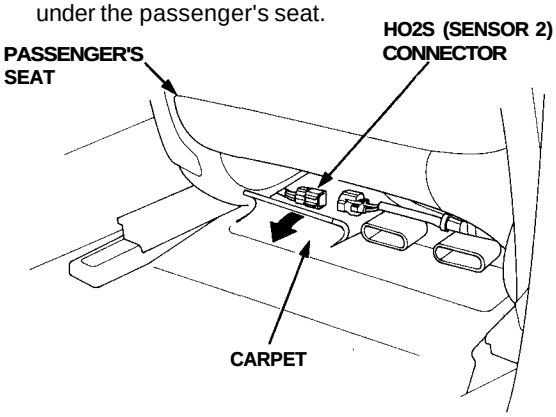
- **Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).**
- **Apply parking brake, and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.**

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set parking brake, and block both rear wheels securely.
3. Shift the transmission into the N position.
4. Remove the center console (see section 20).
5. Shift the transmission into the 1 position.
6. Remove the self-locking nut and shift cable end collar, then remove the shift cable from the shift lever link.

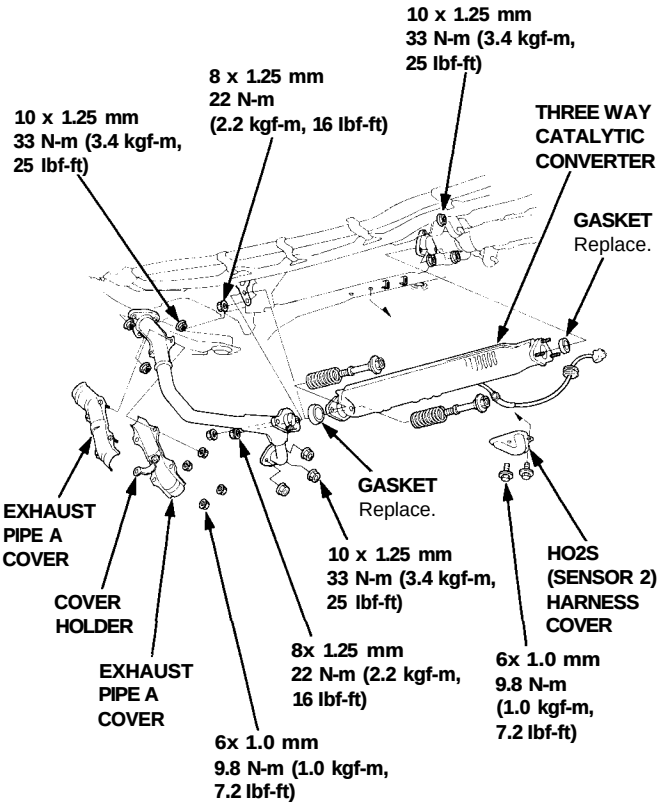


7. Pull the carpet back to expose the HO2S (sensor 2) connector. Disconnect the connector, then push it to outside.

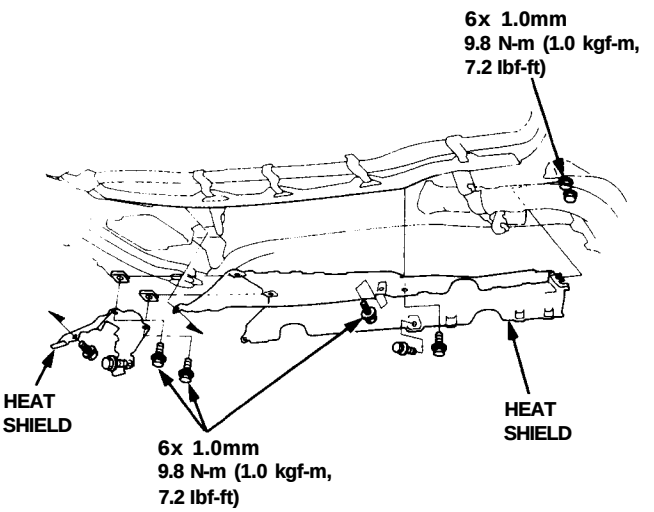
NOTE: The H02S (sensor 2) connector is located under the passenger's seat.



8. Remove the H02S (sensor 2) harness cover, then remove the three way catalytic converter.



9. Remove the exhaust pipe A cover, then remove the exhaust pipe A.
10. Remove the heat shields.

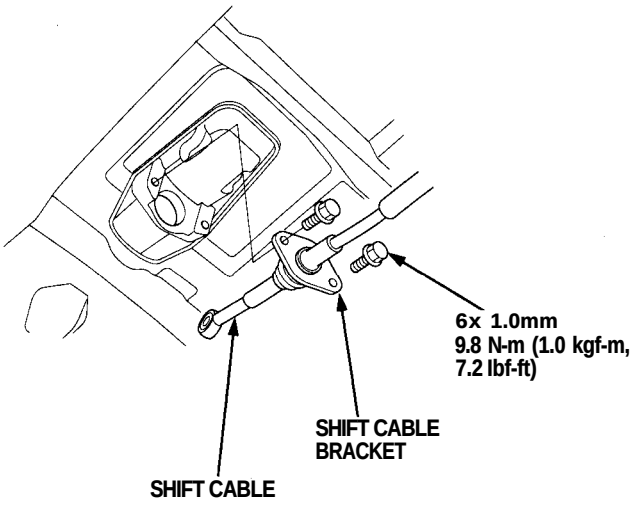


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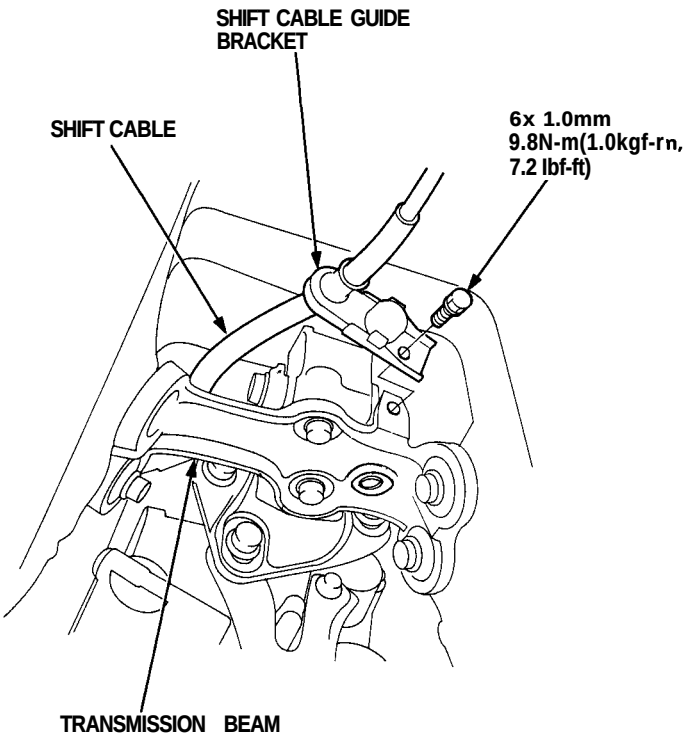
Shift Cable

Replacement (cont'd)

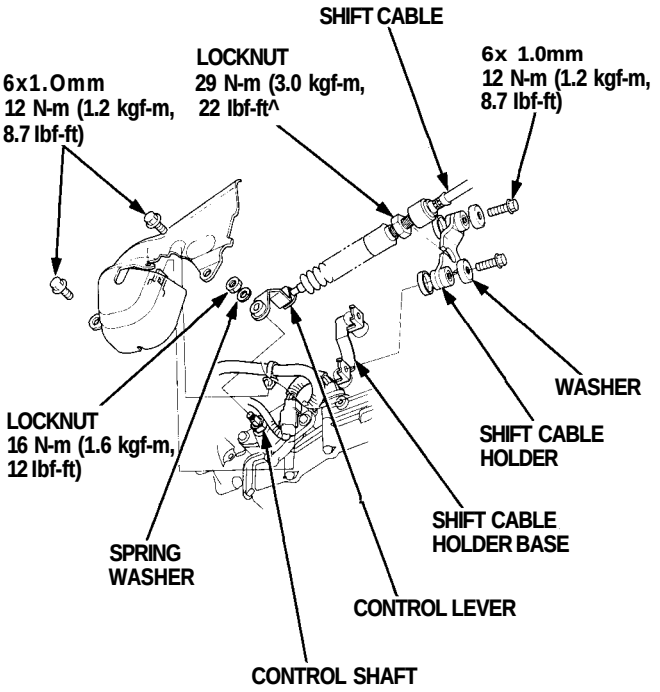
11. Remove the shift cable bracket.



12. Remove the shift cable guide bracket.



13. Remove the shift cable cover mounting bolts.



14. Remove the A/T gear position switch harness clamp and the shift control solenoid valve/linear solenoid harness connector from the shift cable cover.

15. Remove the shift cable cover from the transmission housing.

16. Remove the shift cable holder with the shift cable from the shift cable holder base.

17. Remove the control lever from the control shaft, then remove the shift cable.

18. Remove the shift cable holder from the shift cable, then replace it with a new one.

19. Install the shift cable in the reverse order of removal.

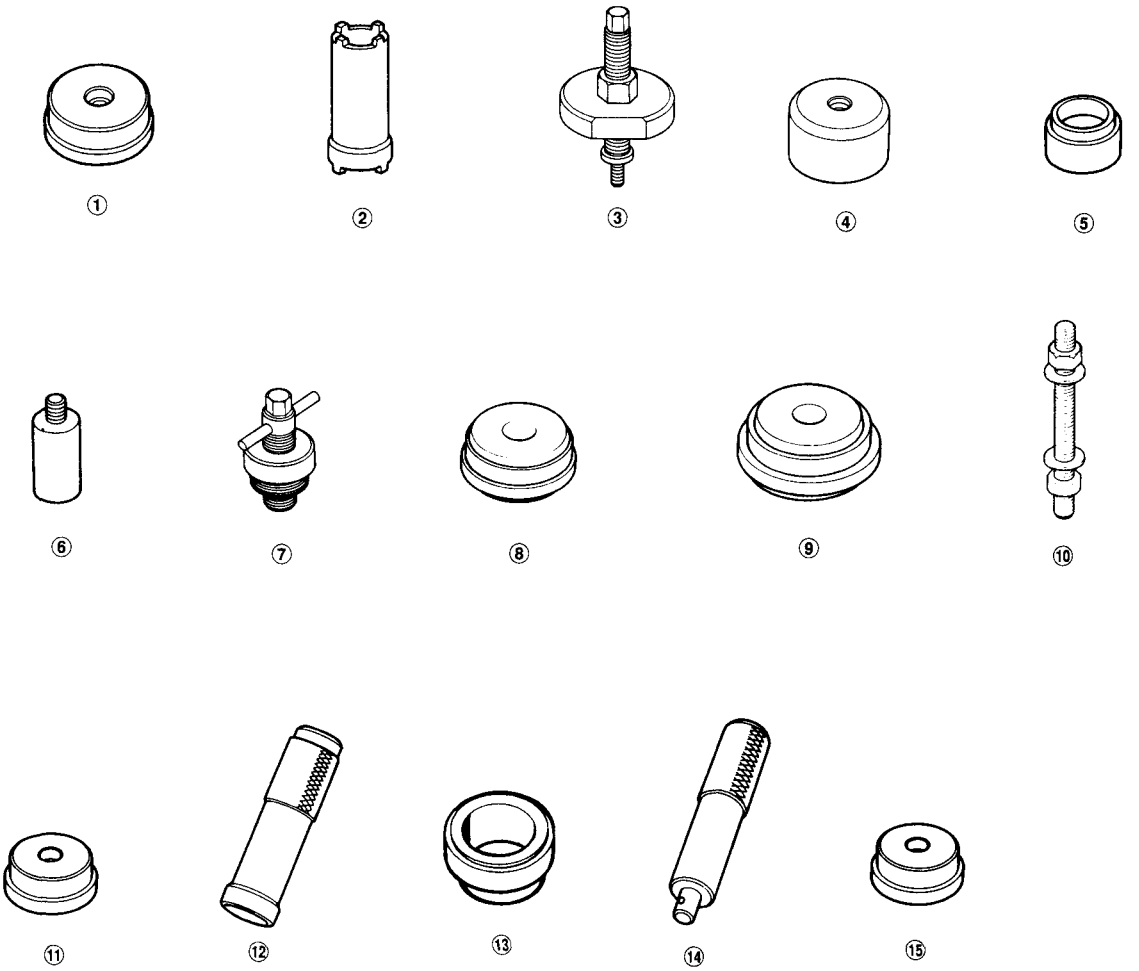
CAUTION: Take care not to bend the shift cable when installing it.

20. Check the shift lever operation after installation.

21. If shift lever adjustment is required, remove the center console (see section 20), and adjust the link adjuster (see link adjustment procedures in the '95 - '98 Acura 2.5TL Service Manual, 61SW504).

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD-SD40101	Bearing Driver Attachment	1	15-15, 15-16
②	07HAA-SF10100	Locknut Wrench, 36 x 41 mm	1	15-8,15-9,15-17,15-19,15-20
③	07LAC-PW50100 or 07LAC-PW50101	Extension Shaft Puller	1	15-5
④	07LAD-PW50500	Pinion Cover Driver Attachment	1	15-19
⑤	07MAD-PR90100	Attachment, 45 x 55 mm I.D.	1	15-13
⑥	07MAD-PR90200	Pilot, 32 x 50 mm	1	15-21
⑦	07MAF-PY40100 or 07MAF-PY40101	Extension Shaft Installer	1	15-25
⑧	07MAF-SP0011A	Tapered Bearing Race Installer A	1	15-15
⑨	07MAF-SP0012A	Tapered Bearing Race Installer B	1	15-15
⑩	07MAF-SP0013A	Installer Shaft	1	15-15
⑪	07746-0010100	Attachment, 32 x 35 mm	1	15-12,15-13
⑫	07746-0030100	Driver, 40 mm I.D.	1	15-14,15-16,15-18
⑬	07746-0030400	Attachment, 35 mm	1	15-14
⑭	07749-0010000	Driver	1	15-15,15-16,15-19,15-21
⑮	07965-SA00600	Driver Attachment	1	15-21



Differential

Troubleshooting

NOTE: Most problems in the unit are to be diagnosed by identifying noises from the gears or bearings.
Care should be taken during diagnosis not to confuse differential noises with those from other drivetrain components.

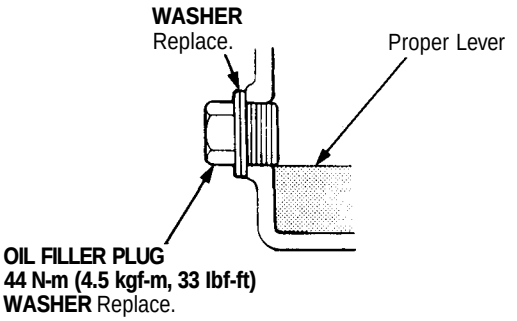
[Noise symptoms will be most prominent]

Symptom	Probable Cause	Remedy
Consistent noise during cruising	• Lack of oil • Foreign matter stuck in gears, etc. • Improper tooth contact between ring gear and drive pinion • Worn or damaged side bearing • Deformed ring gear or differential carrier	• Replenish oil • Clean and inspect • Adjust or replace • Replace any damaged or faulty parts
Gear noises while accelerating	• Lack of oil • Foreign matter stuck in gears, etc. • Improper drive pinion preload • Chipped or damaged gears	• Replenish oil • Clean and inspect • Adjust • Replace
Gear noises while coasting or accelerating	• Improper drive pinion preload • Damaged or chipped gears	Adjust or replace
Bearing noises while accelerating or coasting/deceleration	Cracked or damaged drive pinion bearing or side bearing	Replace
Abnormal noises when rounding a curve	• Worn (excessive play) or damaged side bearing • Damaged side gear, pinion, or pinion shaft	Replace
Abnormal noises during acceleration or when first driving away from a stop	• Excessive backlash between ring gear and drive pinion • Improper ring gear or drive pinion preload • Excessive pinion backlash • Worn differential splines • Loose companion flange nuts and other fasteners	• Adjust • Adjust or replace • Recheck torque or replace
Oil leak	• Oil level too high • Clogged breather hole • Loose case cover or inadequate sealing • Worn or damaged oil seal	• Lower to proper level • Clean or replace • Recheck torque or apply sealant • Replace
Overheating	• Lack of oil • Insufficient ring gear-to-pinion backlash • Excessive ring gear or drive pinion preload	• Replenish • Adjust • Adjust or replace

Differential Oil

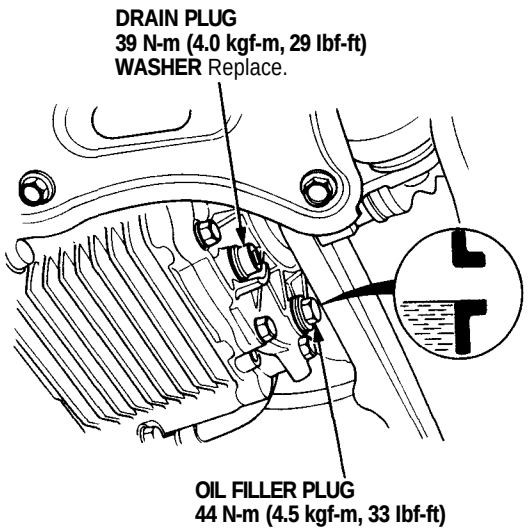
NOTE: Check the differential oil with engine OFF, and the vehicle on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



2. The oil level must be up to the fill hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.

3. If the differential oil is dirty, remove the drain plug, and drain the oil.



4. Reinstall the drain plug with a new washer, and refill the differential oil to the proper level.

NOTE:
- The drain plug washer should be replaced at every oil change.
- Clean the drain plug before reinstalling.

5. Reinstall the oil filler plug with a new washer.

Oil Capacity
1.05 ℓ (1.11 US qt, 0.92 Imp qt) at oil change
1.10 ℓ (1.16 US qt, 0.97 Imp qt) at overhaul

Recommended oil:
Hypoid gear oil
API Classification GL4 or GL5
viscosity:
SAE 90 above 0°F (-18°C)
SAE 80 W - 90 below 0°F (-18°C)

Differential Assembly

Removal

⚠ WARNING

- **Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct positions on the engine.**
- **Apply parking brake and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.**

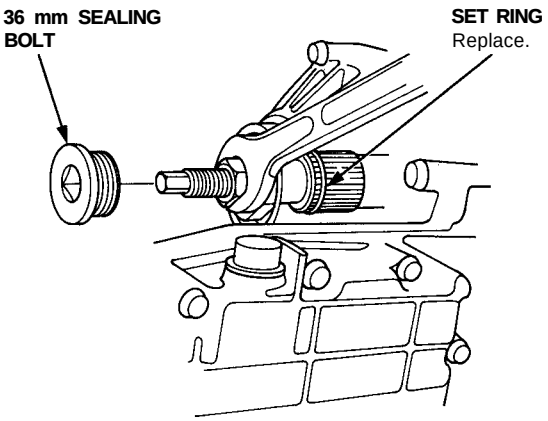
CAUTION: Use fender covers to avoid damaging painted surfaces.

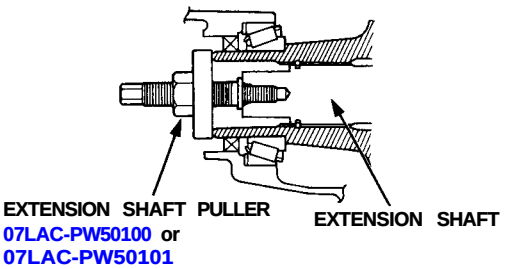
1. Remove the drain plug, and drain the differential oil (see page 15-4).

2. Remove the driveshafts and intermediate shaft (see section 16).

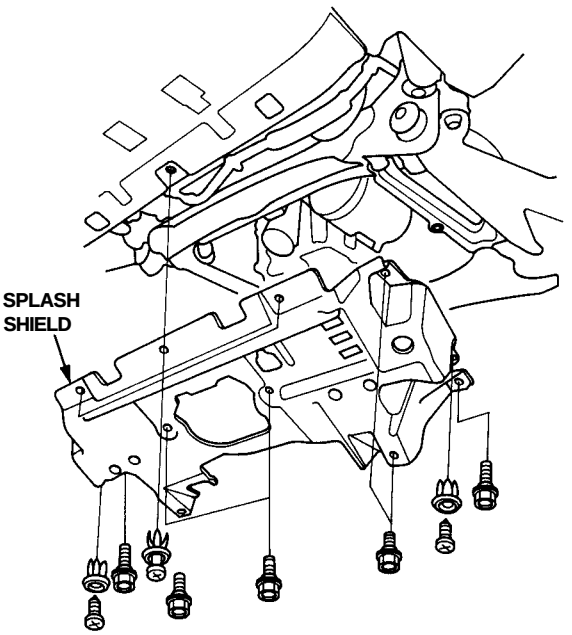
3. Remove the 36 mm sealing bolt, then disconnect the extension shaft from the differential using the special tool.

   NOTE: Shift the transmission into the [P] position to lock the secondary gear.

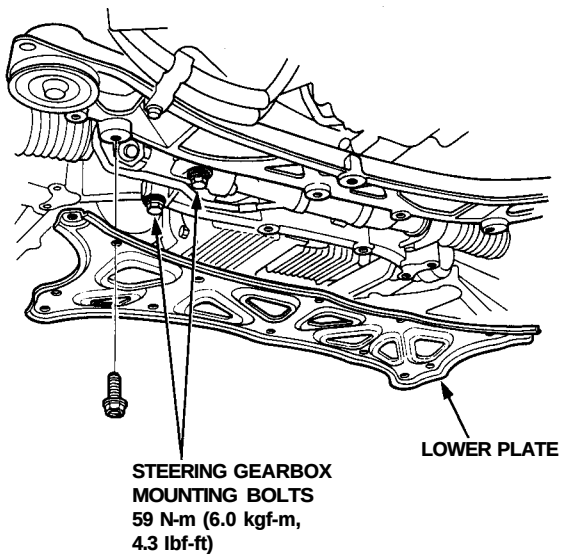




4. Remove the splash shield.



5. Remove the lower plate, then reinstall the steering gearbox mounting bolts.

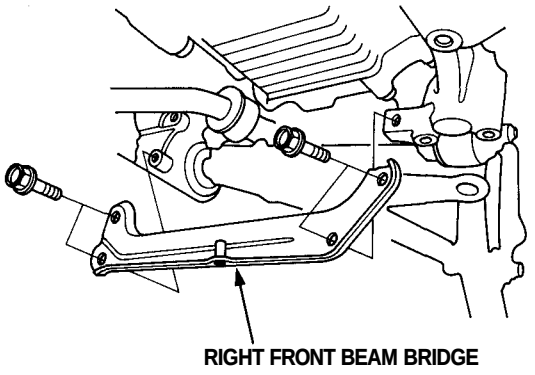


(cont'd)

Differential Assembly

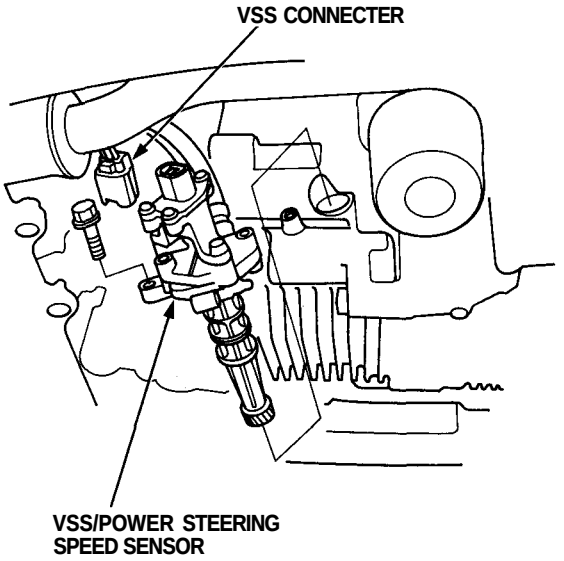
Removal (cont'd)

6. Remove the right front beam bridge.

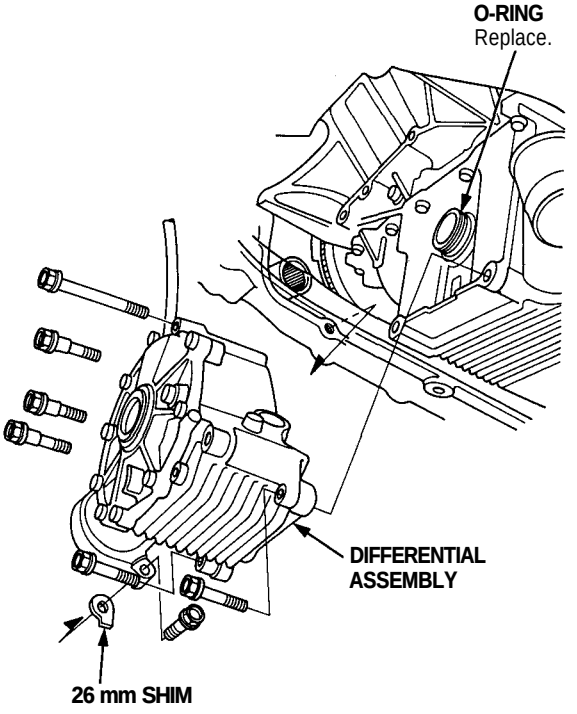


7. Disconnect the vehicle speed sensor (VSS) connecter, then remove the VSS/power steering speed sensor.

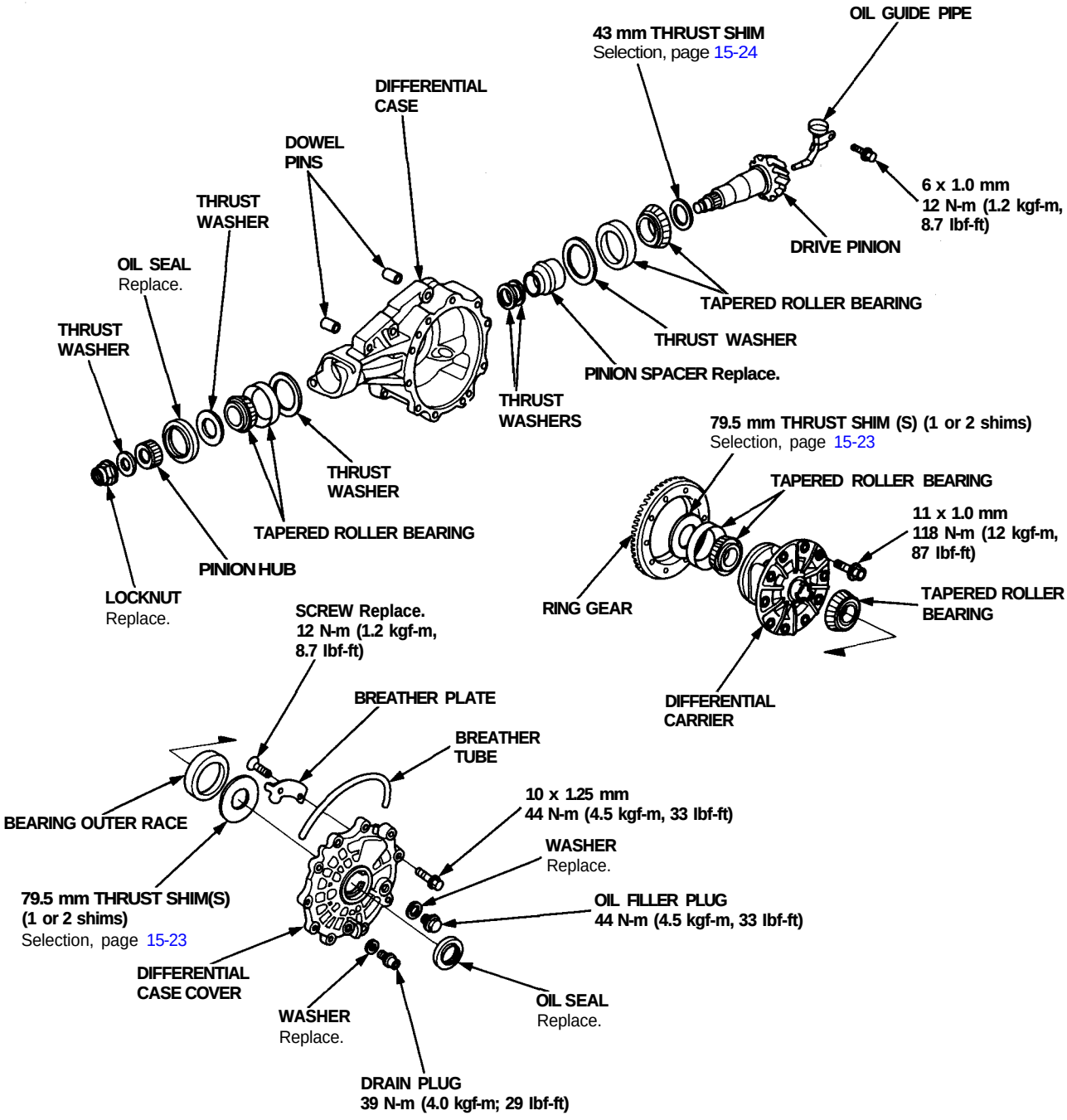
NOTE: Do riot disconnect the hoses.



8. Remove the mounting bolts and 26 mm shim, then remove the differential assembly.



Illustrated Index



Differential Assembly

Inspection

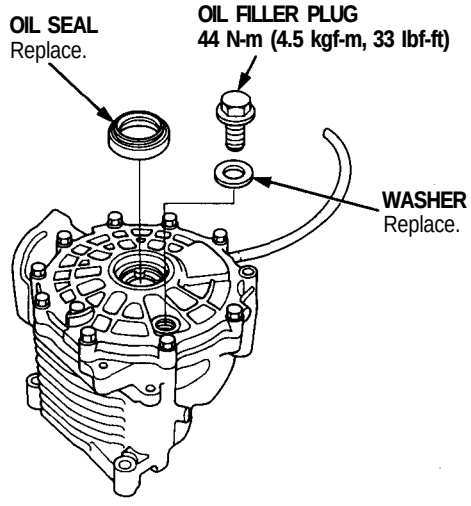
To establish a starting point before disassembly, inspect the following:

- Ring gear backlash
- Total bearing preload
- Gear tooth contact

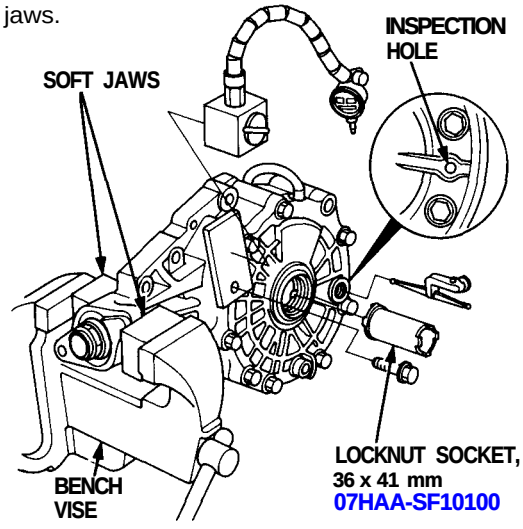
NOTE:
- Be sure the differential is at room temperature before inspecting.
- Record the results of the preliminary inspections. This information will be helpful during reassembly.

Ring gear backlash

1. Remove the oil filler plug and the oil seal.



2. Secure the differential assembly in a vise with soft jaws.

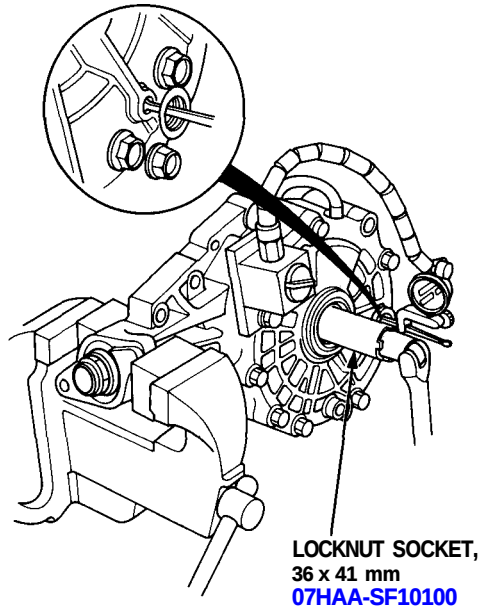


3. Align the differential gear inspection hole with the oil filler plug hole.

4. Measure the backlash of the ring gear on the differential carrier using the special tools as shown. After measuring, remove the dial gauge and turn the differential carrier one full turn, then remeasure the backlash.

Standard: 0.06 - 0.14 mm (0.002 - 0.006 in)

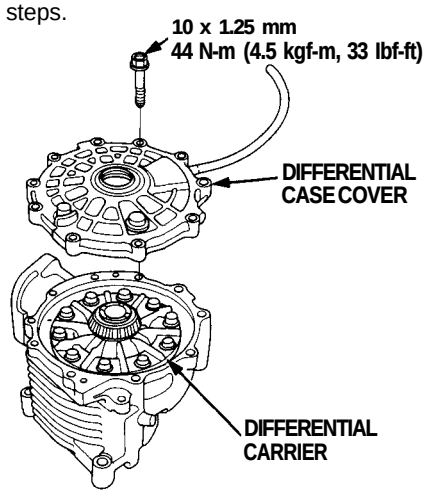
The difference between the two measurements taken must not exceed 0.06 mm (0.002 in).



Total bearing preload

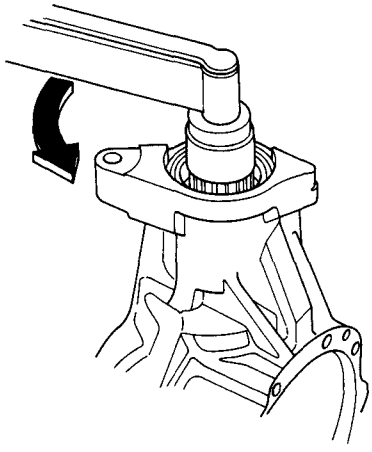
5. Remove the differential case cover and the differential carrier.

NOTE: Loosen the bolts in a crisscross pattern, in several steps.



6. Use a dial-type torque wrench on the drive pinion to measure the drive pinion bearing preload (Tp).

Standard: 1.42 - 1.91 N-m
(14.5 - 19.5 kgf-cm, 12.6 - 16.9 lbf-in)



7. Reinstall the differential carrier and the differential case cover, then measure the total bearing preload. The total bearing preload should exceed the drive pinion bearing preload (Tp) by:

Standard:
0.94 - 1.07 N-m (9.6 - 10.9 kgf-cm, 8.33 - 9.46 lbf-in)

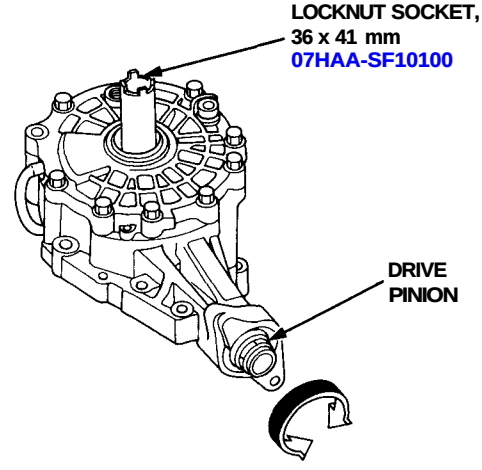
Example:
Total bearing preload (from step 7)
-Tp (from step 6)
= 0.94 - 1.07 N-m (9.6 - 10.9 kgf-cm, 8.33 - 9.46 lbf-m)

Gear tooth contact

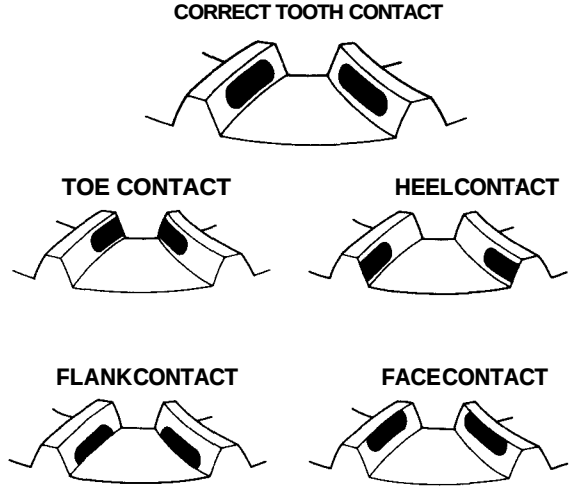
8. Remove the differential case cover and differential carrier. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

9. Reinstall the differential carrier and the differential case cover, then torque the bolts in a crisscross pattern in several steps.

10. Install the special tool as shown, then rotate the drive pinion in both directions so that the ring gear rotate one full turn in both directions. During this operation resistance should be applied to the ring gear.



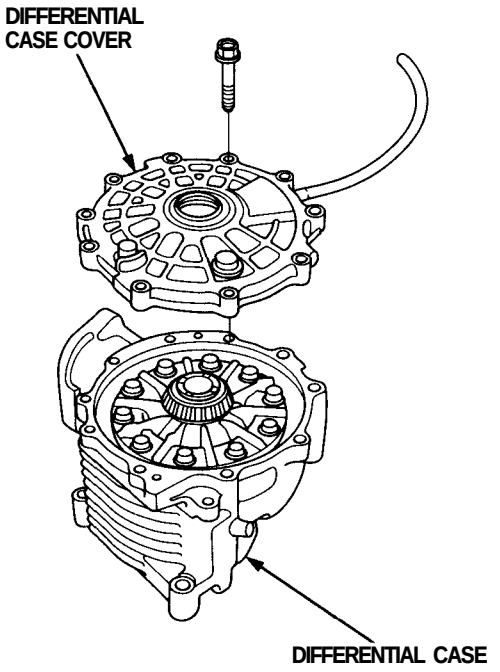
11. Remove the differential case cover and the differential carrier, then check the tooth contact pattern.



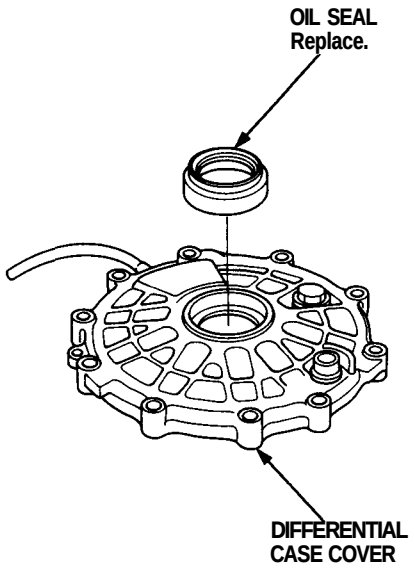
Differential Assembly

Disassembly

1. Remove the bolts in a crisscross pattern, in several steps, then remove the differential case cover.

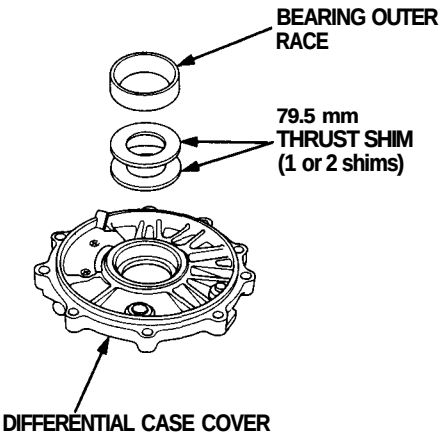


2. Remove the oil seal from the differential case cover.

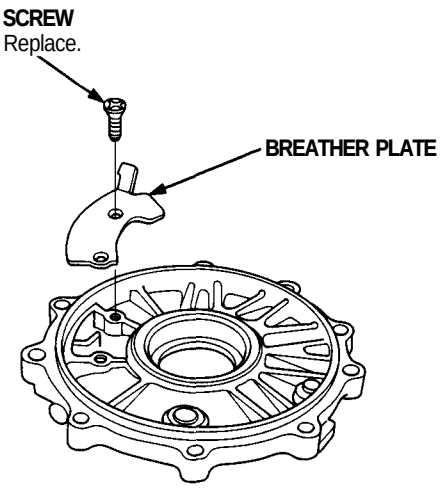


3. Remove the bearing outer race and the 79.5 mm thrust shim(s) from the differential case cover by heating the differential case cover to about 212°F (100°C).

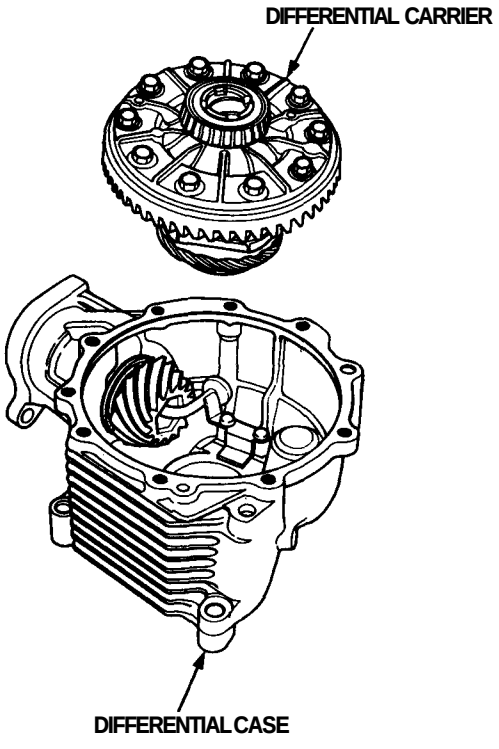
NOTE:
- Do not heat the differential case cover in excess of 212°F (100°C).
- If the bearing outer race was removed by heating, allow the differential case cover to cool to room temperature.
- Replace the tapered roller bearing with a new one whenever the bearing outer race is replaced.



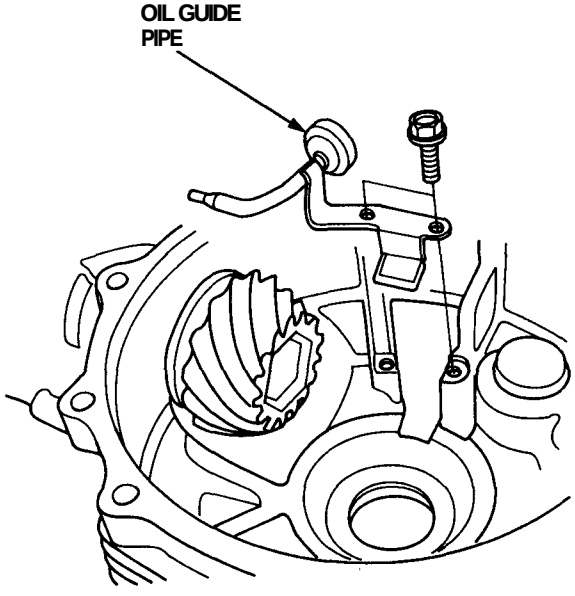
4. Remove the breather plate.



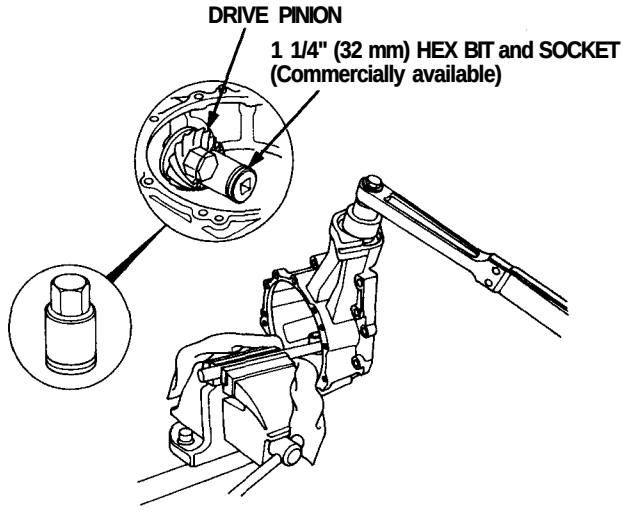
5. Remove the differential carrier from the differential case.



6. Remove the oil guide pipe.

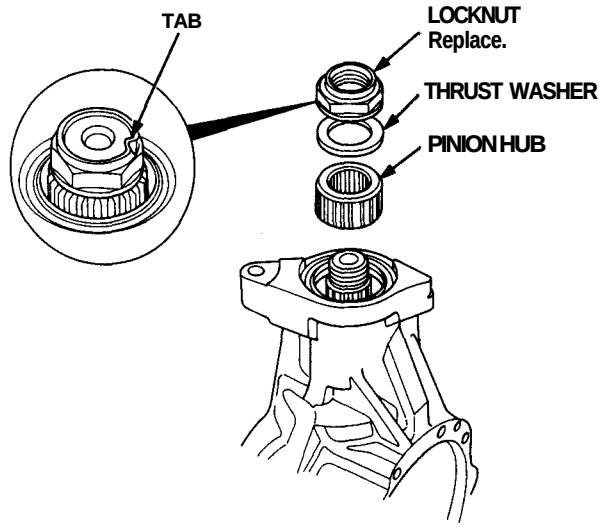


7. Hold the drive pinion with a 1 1/4" (32 mm) hex bit and socket as shown.



8. Raise the locknut tab from the groove of the drive pinion, and remove the locknut, thrust washer and pinion hub.

NOTE: Be sure the tab of the locknut is completely clear of the groove or damage to the threads can occur.

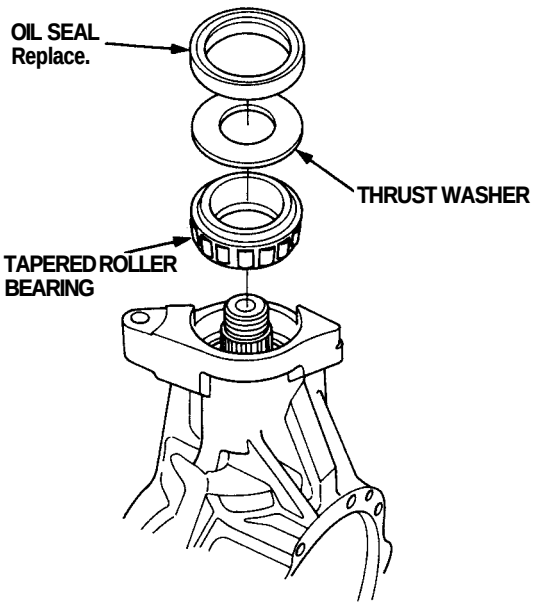


(cont'd)

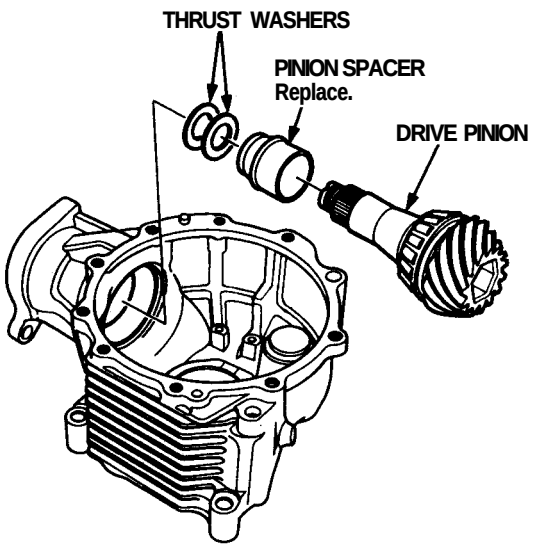
Differential Assembly

Disassembly(cont'd)

9. Remove the oil seal, then remove the thrust washer. Use a plastic hammer to carefully tap the drive pinion out of the tapered roller bearing, then remove the bearing.

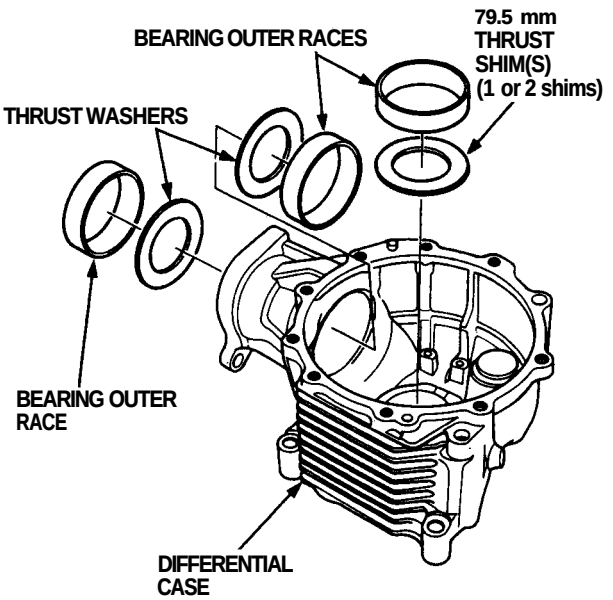


10. Remove the drive pinion, pinion spacer and thrust washers.

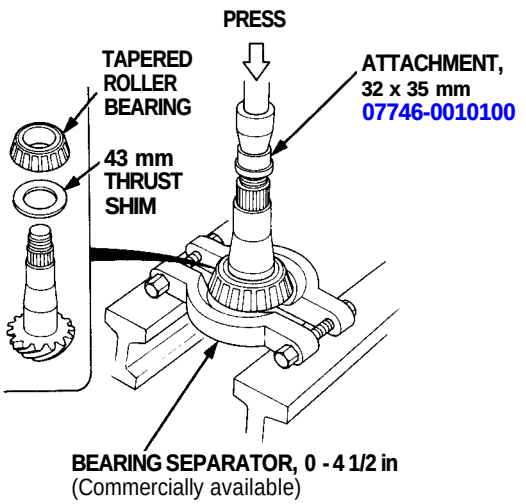


11. Remove the bearing outer races, thrust washers and 79.5 mm thrust shims from the differential case by heating the differential case to about 212°F (100°C).

NOTE:
- Do not heat the differential case in excess of 212°F (100°C).
- If the bearing outer race was removed by heating, allow the differential case to cool to room temperature.
- Replace the tapered roller bearing with a new one whenever the bearing outer race is replaced.



12. Remove the tapered roller bearing and 43 mm thrust shim using a press as shown.

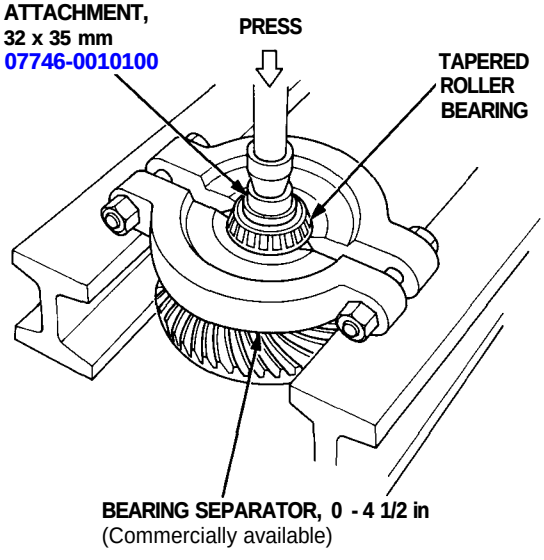


Differential Carrier

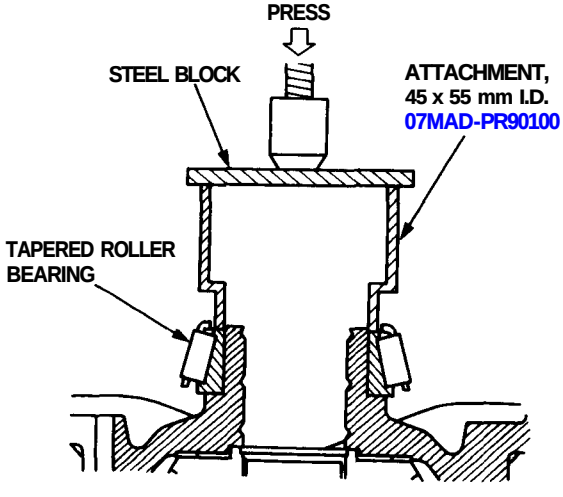
Tapered Roller Bearing Replacement

1. Remove the tapered roller bearings using the bearing separator and a press as shown.

   NOTE: Support the differential carrier with your hand so it dose not fall and hit the ground when pressed clear.



2. Install the both tapered roller bearings using the special tool and a press as shown.



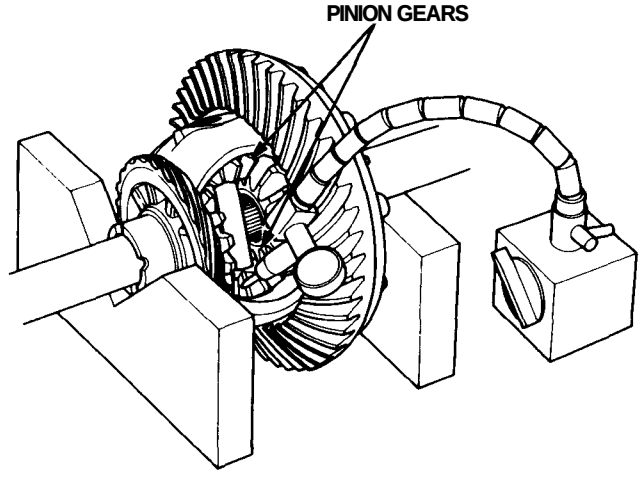
Backlash Inspection

1. Remove the tapered roller bearings (see previous column).

2. Install the left driveshaft and the intermediate shaft in the side gears.

3. Measure the backlash of both pinion gears.

   Standard: 0.05 - 0.15 mm (0.002 - 0.006 in)
   Service Limit: 0.30 mm (0.012 in)

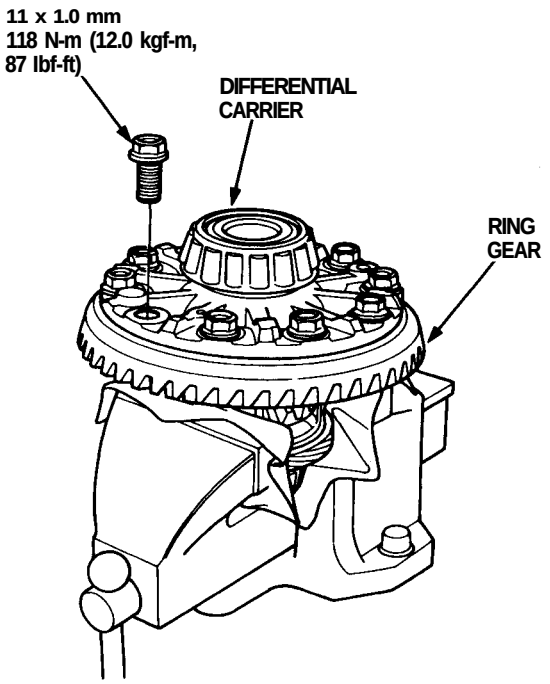


If the backlash exceeds the service limit, replace the differential carrier.

Differential Carrier

Ring Gear Replacement

1. Remove the bolts in a crisscross pattern, in several steps, and remove the ring gear.

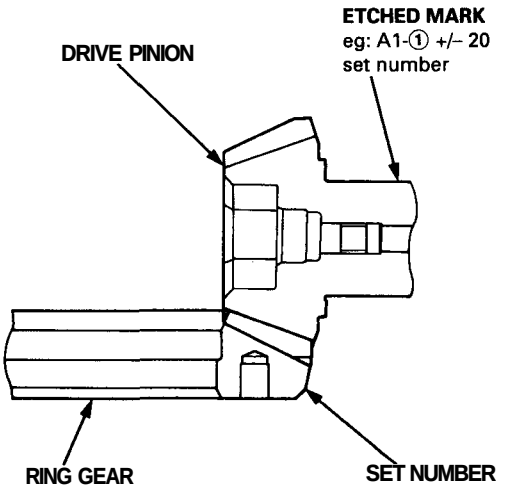


2. Install the ring gear by tightening the bolts in a crisscross pattern, in several steps. If the bolts are difficult to tighten, make sure that the ring gear is going onto the differential carrier correctly.

Differential Assembly

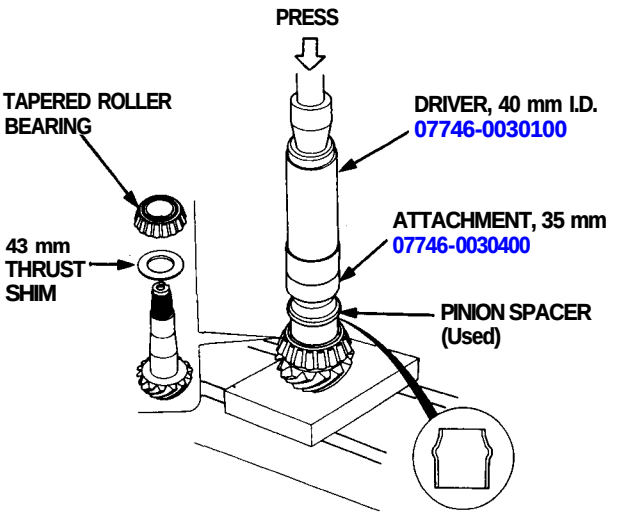
Reassembly

NOTE:
- If replacement is required, always replace the drive pinion and ring gear as a set.
- If the drive pinion and ring gear are replaced, check the height adjustment (see page 15-22).
- If replacement of one of the tapered roller bearings in the drive pinion and in the differential carrier is required, use the same make bearings and replace both bearings at once.

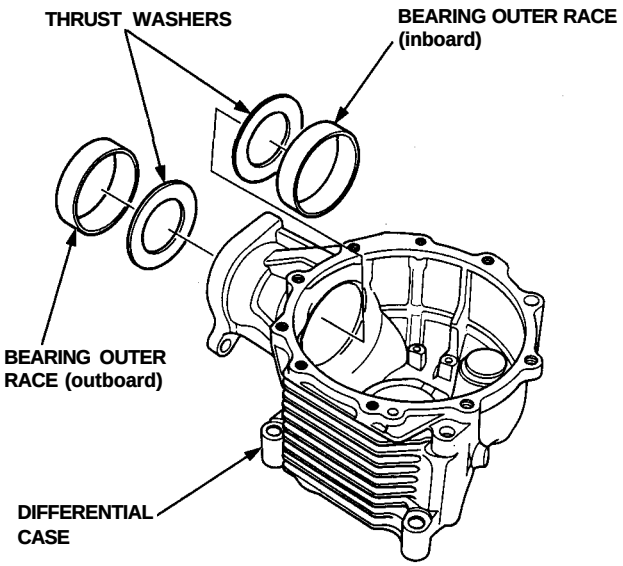


1. Install the 43 mm thrust shim and tapered roller bearing using the special tools and a press as shown.

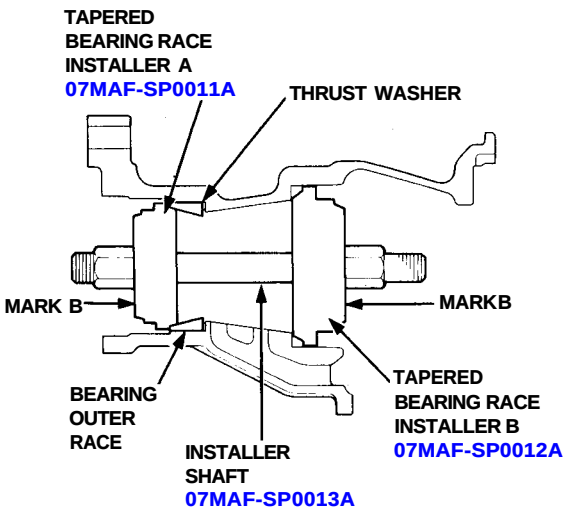
   NOTE: Use a used pinion spacer with the special tool for bearing installation, and then discard the used pinion spacer.



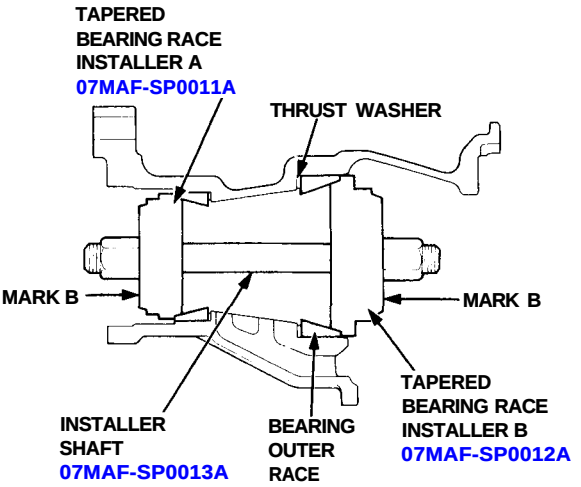
2. Check the differential case bearing surface areas for burrs, and remove as needed. Position the inboard thrust washer into the differential case. Using the sides of the special tools stamped "A", install the outboard bearing outer race as shown. Repeat for the inboard bearing outer race.



a. First install the outboard bearing outer race.

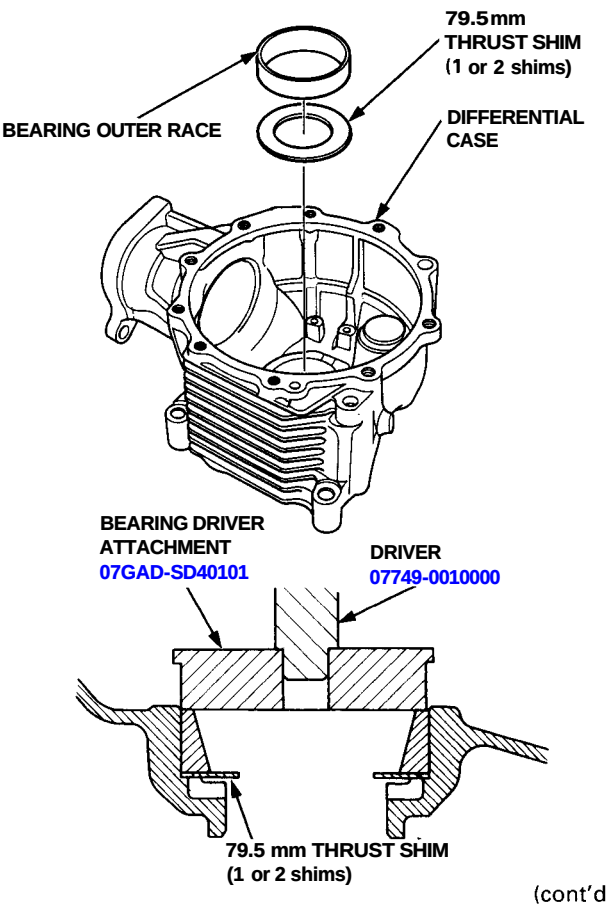


b. Next install the inboard bearing outer race.



3. Install the 79.5 mm thrust shim(s) and bearing outer race using the special tools as shown.

NOTE: Install the 79.5 mm thrust shim(s) that was removed.



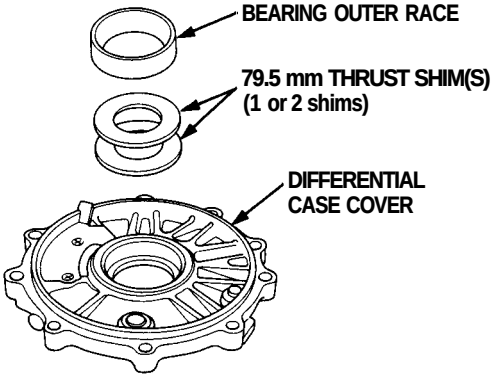
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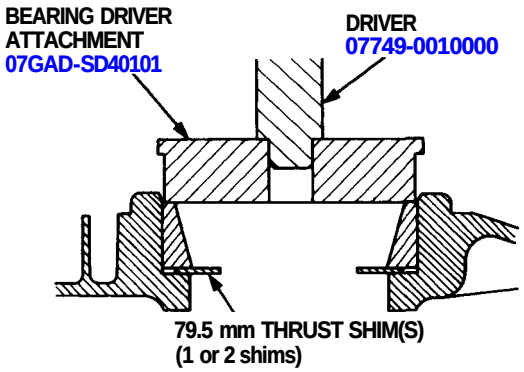
Differential Assembly

Reassembly (cont'd)

4. Install the 79.5 mm thrust shim(s) and bearing outer race using the special tools as shown.

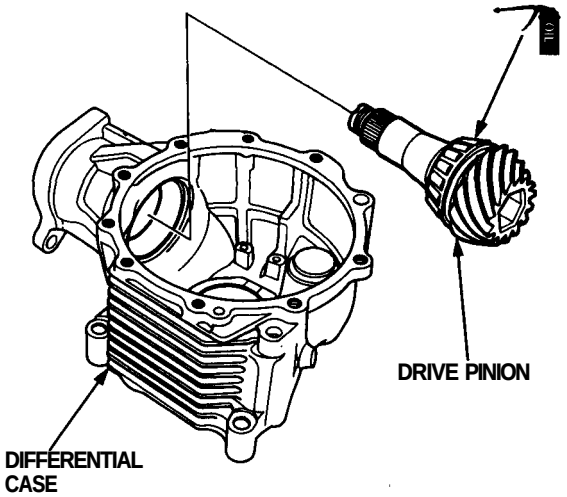
   NOTE: Install the 79.5 mm thrust shim(s) that was removed.



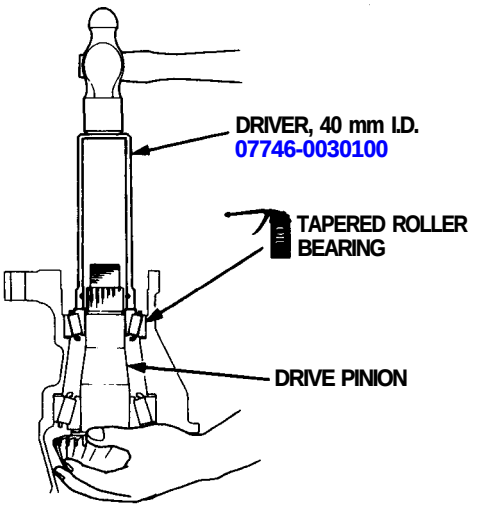


5. Apply lubricant to the tapered roller bearing, then install the drive pinion into the differential case as shown.

   NOTE: Do not install the pinion spacer and thrust washers at this time.

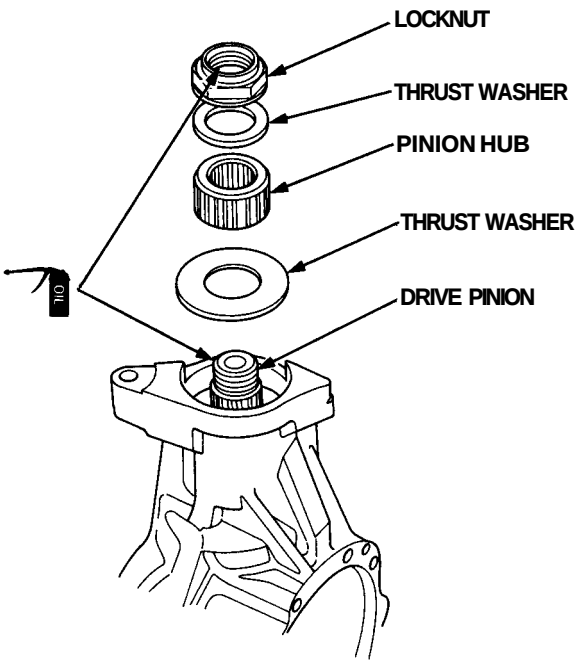


6. Apply lubricant to the tapered roller bearing, then install it using the special tool while holding the drive pinion as shown.



7. Install the large thrust washer, pinion hub, small thrust washer, and a new locknut.

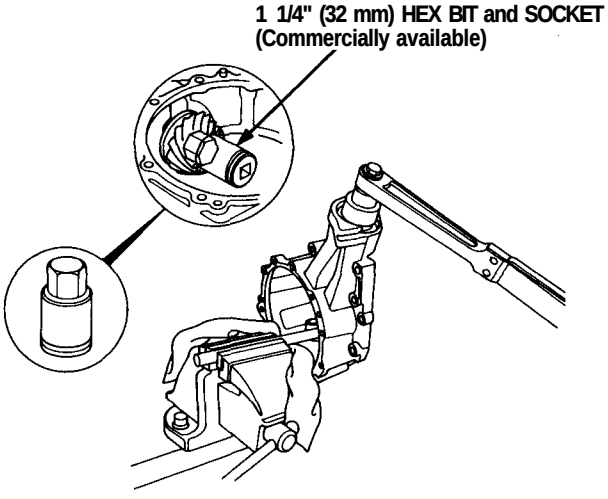
   NOTE: Lubricate the locknut and drive pinion threads with gear oil.



8. Hold the drive pinion with a 1 1/4" (32 mm) hex bit and socket as shown, then carefully tighten the pinion locknut until there is no play in the pinion shaft.

Torque: 20 N-m (2.0 kgf-m, 14 lbf-ft)

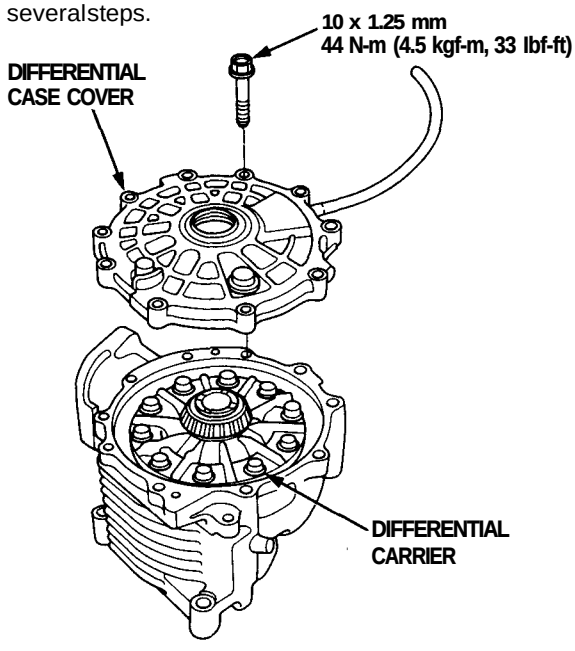
CAUTION: To avoid damaging the tapered roller bearing, do not overtighten the locknut.



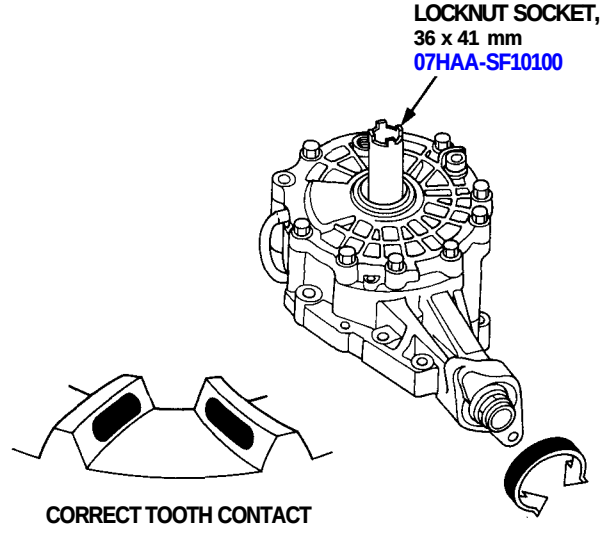
9. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

10. Apply lubricant to the tapered roller bearings, install the differential carrier into the differential case, then install the differential case cover.

11. Install the bolts and tighten in a crisscross pattern in severalsteps.

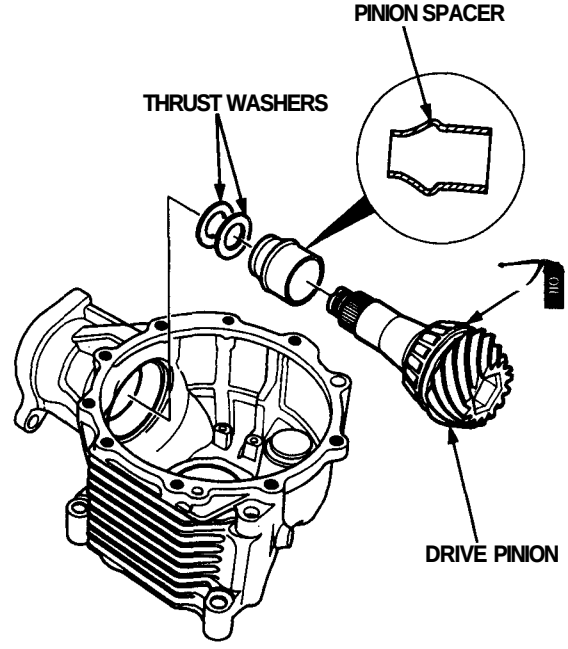


12. Install the special tool as shown, then rotate the drive pinion in both directions so that the ring gear rotate one full turn in both directions. During this operation resistance should be applied to the ring gear.



13. Remove the differential case cover, and check the tooth contact pattern (heel and toe). Adjust the ring gear tooth contact as needed (see page 15-23).

14. After adjusting the ring gear tooth contact, remove the drive pinion, then install a new pinion spacer and thrust washers on the drive pinion.

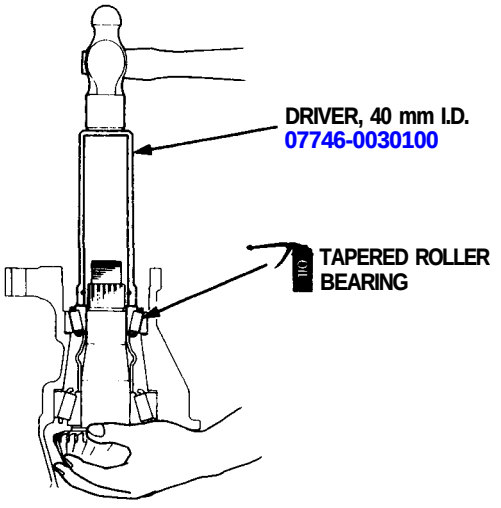


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Differential Assembly

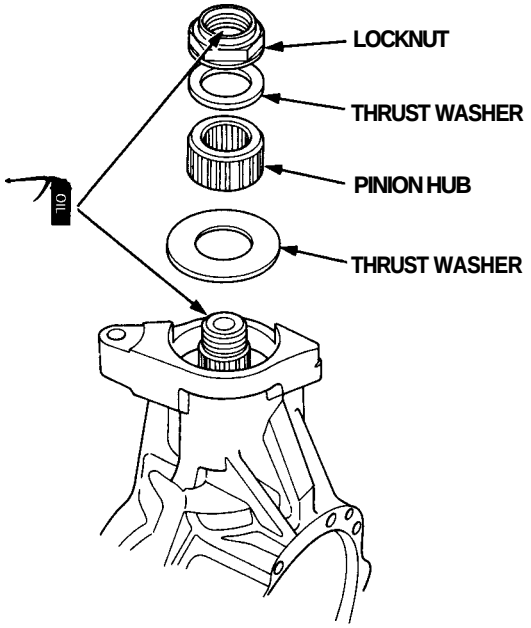
Reassembly (cont'd)

15. Apply lubricant to the tapered roller bearing, then install it using the special tool while holding the drive pinion as shown.

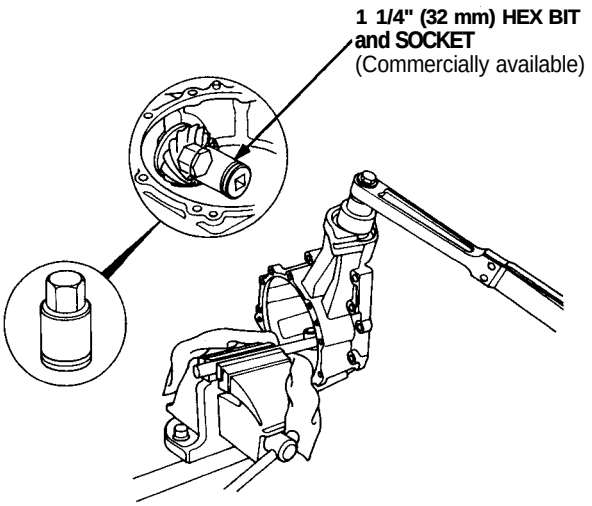


16. Install the large thrust washer, pinion hub, small thrust washer and locknut.

NOTE: Lubricate the locknut and drive pinion threads with gear oil.



17. Hold the drive pinion with a 1 1/4" (32 mm) hex bit and socket as shown.



18. Tighten the locknut to 216 N-m (22 kgf-m, 159 lbf-ft), and measure the tapered roller bearing preload (Tp).

NOTE: Rotate the drive pinion several times to assure proper tapered roller bearing contact.

Standard:
New Bearing: 1.82 - 2.49 N-m (18.6 - 25.4 kgf-cm, 16.1 - 22.0 lbf-in)
Reused Bearing: 1.42 - 1.91 N-m (14.5 -19.5 kgf-cm, 12.6 - 16.9 lbf-in)

- If the tapered roller bearing preload exceeds the standard, replace the pinion spacer.
- If the tapered roller bearing preload is less than the standard, adjust by tightening the locknut a little at a time, but keep the torque within 216 - 313 N-m (22 - 32 kgf-m, 159 - 231 lbf-ft). If this not possible, replace the pinion spacer.

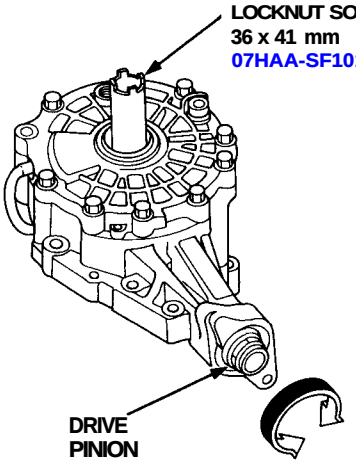
19. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

20. Install the differential carrier into the differential case, and reinstall the differential case cover.

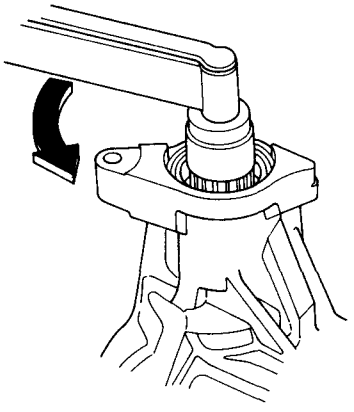
21. Install the bolts and tighten in a crisscross pattern in several steps.

Torque: 44 N-m (4.5 kgf-m, 33 lbf-ft)

22. Install the special tool as shown. Rotate the drive pinion in both directions so that the ring gear rotate one full turn in both directions. During this operation resistance should be applied to the ring gear.



23. Remove the special tool, and use a dial-type torque wrench on the drive pinion to check total bearing preload. The total bearing preload should exceed the drive pinion bearing preload by the amount shown in the next column.



NOTE: Rotate the drive pinion several times to ensure proper bearing contact.

Standard:

New differential carrier tapered roller bearing:
Total bearing preload (from step 23)
-Tp (from step 18)
= 1.04 -1.26 N-m (10.6 -12.8 kgfcm, 9.2 -11.1 lbfin)

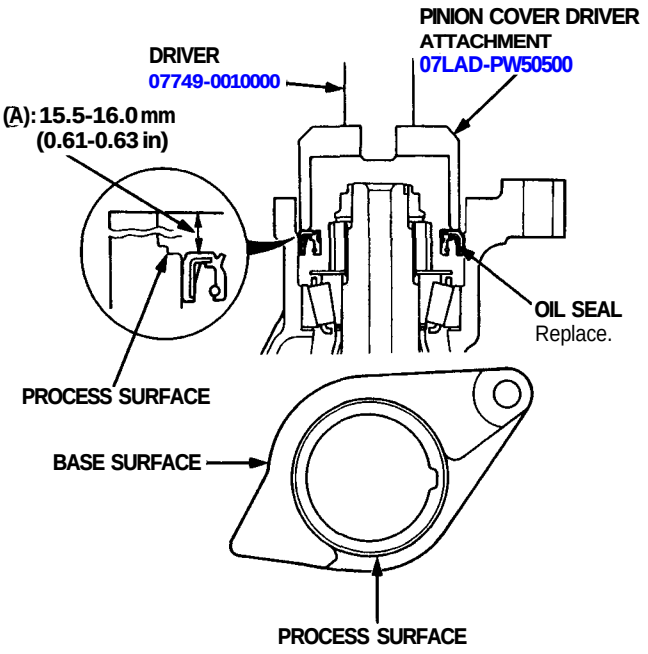
Reused differential carrier tapered roller bearing:
Total bearing preload (from step 23)
- Tp (from step 18)
= 0.94 - 1.07 N-m (9.6 - 10.9 kgfcm, 8.33 - 9.46 lbfin)

If the total bearing preload is not within the standard, correct it by increasing or decreasing the preload on the carrier bearings as needed. If there is too much preload, decrease the shim thickness equal amounts on both sides. If there is not enough preload, increase the shim thickness equal amounts on both sides.

NOTE: Be sure the same amount of shim thickness is added or subtracted from both sides, so that the backlash and tooth contact pattern are not affected.

24. Install the oil seal using the special tools as shown.

NOTE: Make sure that distance Ⓐ is correct.

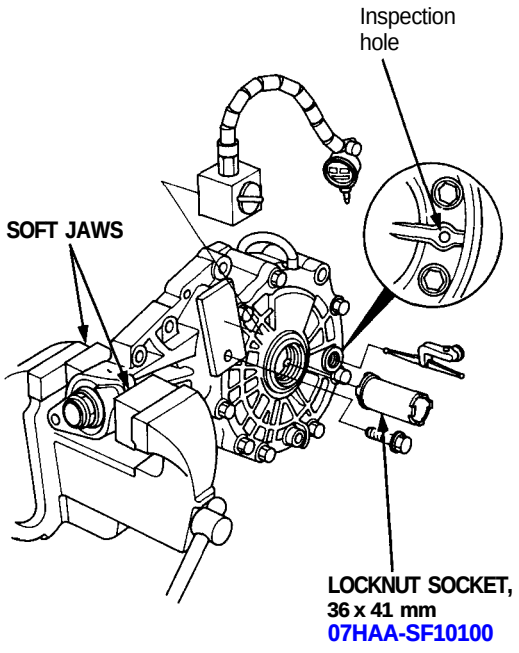


(cont'd)

Differential Assembly

Reassembly (cont'd)

25. Hold the differential assembly using a bench vise with soft jaws as shown.

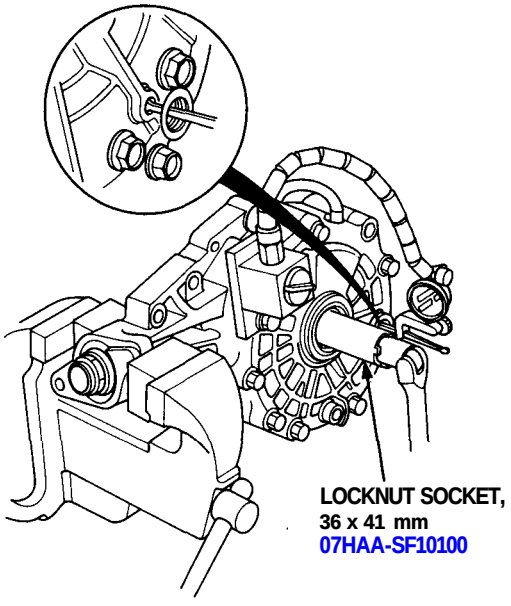


26. Align a backlash inspection hole with the oil filler plug hole, and install the special tools as shown.

27. Measure backlash on the differential carrier using the special tools as shown. After measuring, remove the dial gauge and turn the differential carrier one full turn, then remeasure the backlash.

Standard: 0.06 - 0.14 mm (0.002 - 0.006 in)

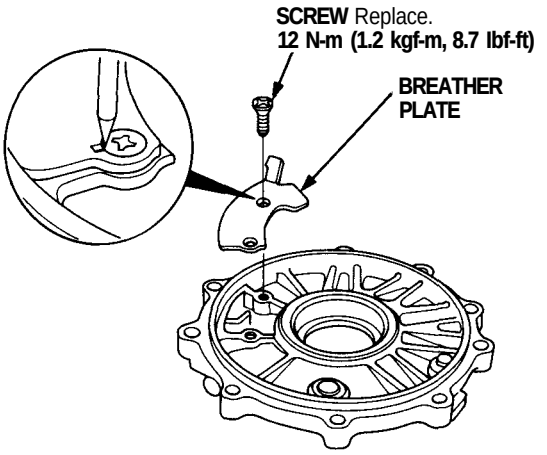
The difference between the two measurements taken must not exceed 0.06 mm (0.002 in).



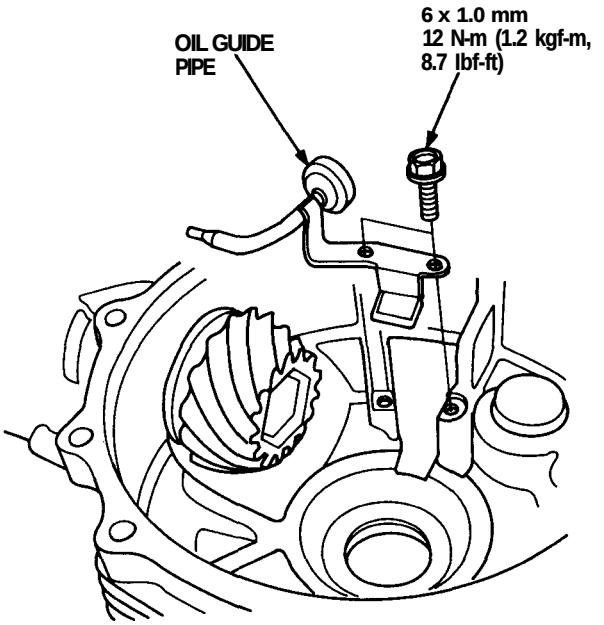
28. If the backlash is less than the standard, adjust the ring gear backlash (see page 15-23).

29. Remove the differential case cover, and check the tooth contact pattern (face and flank). If the tooth contact is not correct, adjust ring gear contact (see page 15-23).

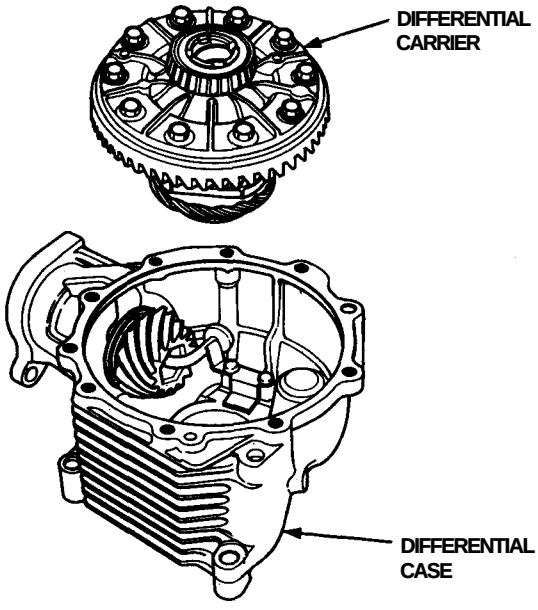
30. After all adjustments are made, install the breather plate and stake the screw heads in the groove as shown.



31. Remove the differential carrier, then install the oil guide pipe.

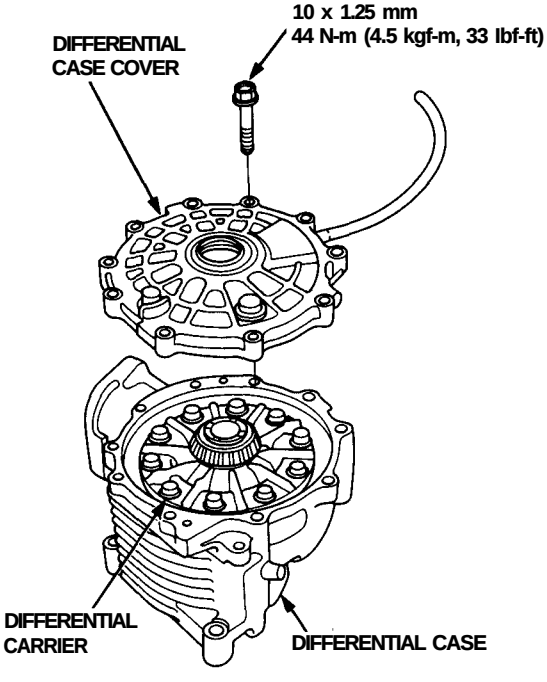


32. Install the differential carrier in the differential case.

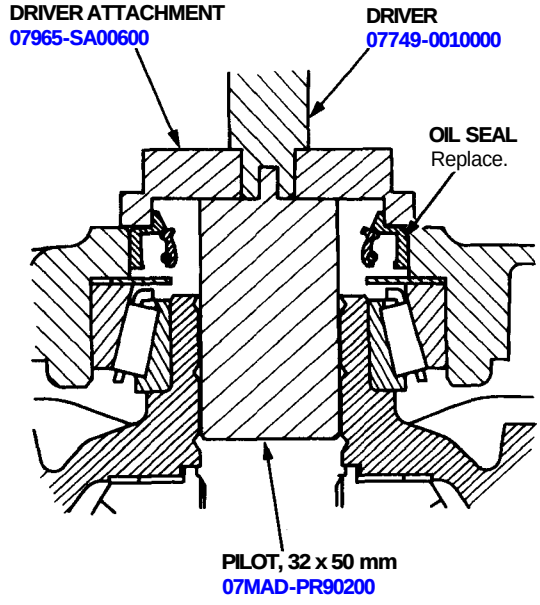


33. Install the differential case cover, and tighten the bolts in a crisscross pattern in several steps.

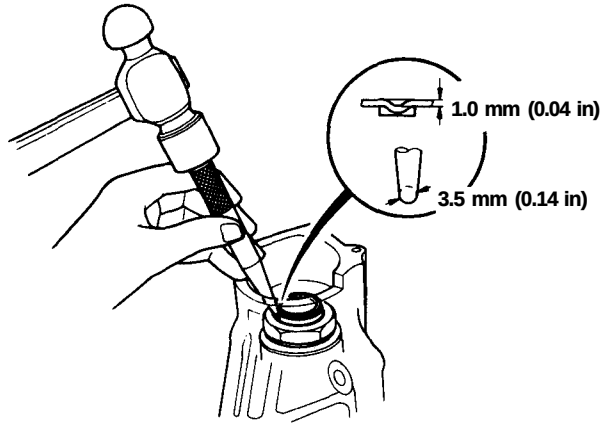
NOTE:
- Use liquid gasket (P/N 08718 - 0001).
- Remove any dirt and oil from the sealing surface.
- If 20 minutes have passed after applying liquid gasket, reapply it, assemble the housings, and allow it to cure at least 20 minutes after assembly before filling differential with oil.



34. Install the oil seal using the special tools as shown.



35. Stake the locknut tab into the groove.



Drive Pinion

Height Adjustment

NOTE: If the drive pinion and ring gear are replaced (always as a set), the height has to be adjusted.

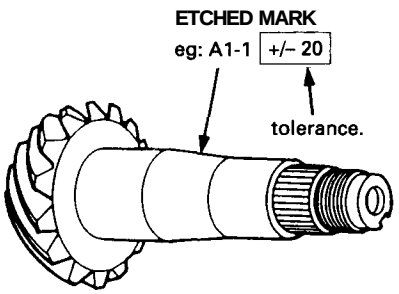
Select the proper shim as follows:
First, calculate the difference in size between the old shim and the new pinion.

The last one of the numbers (see ill.) on each pinion is the plus (+) or minus (-) tolerance in thousands of a millimeter. So, a pinion with +20 is 0.02 mm larger and a pinion with - 20 is 0.02 mm smaller.

1. If the number on the old pinion is a plus (+), add it to the old shim thickness. If it is a minus (-), subtract it from the old shim thickness.

2. If the number on the new pinion is a plus (+), subtract it from the number you got in step 1. If it is a minus (-), add it to the step 1 number.

3. Select the shim that is closest (but not more than) the final number you got from steps 1 and 2.



Example 1:
Old shim: 2.00 mm thickness
Old pinion: +20 (0.02 mm)
New pinion: -10 (-0.01 mm)

2.00 + 0.02 + 0.01 = 2.03
Select the 2.03 mm (0.0799 in) new shim.

Example 2:
Old shim: 1.70 mm thickness
Old pinion: -10 (-0.01 mm)
New pinion: -20 (-0.02 mm)

1.70-0.01 + 0.02 = 1.71
Select the 1.70 mm (0.0669 in) new shim.

43 mm THRUST SHIM

	Part Number	Thickness
A	41410 – P5D or PY4 – 000	1.64 mm (0.0646 in)
B	41411 – P5D or PY4 – 000	1.67 mm (0.0657 in)
C	41412 – P5D or PY4 – 000	1.70 mm (0.0669 in)
D	41413 – P5D or PY4 – 000	1.73 mm (0.0681 in)
E	41414 – P5D or PY4 – 000	1.76 mm (0.0693 in)
F	41415 – P5D or PY4 – 000	1.79 mm (0.0705 in)
G	41416 – P5D or PY4 – 000	1.82 mm (0.0717 in)
H	41417 – P5D or PY4 – 000	1.85 mm (0.0728 in)
I	41418 – P5D or PY4 – 000	1.88 mm (0.0740 in)
J	41419 – P5D or PY4 – 000	1.91 mm (0.0752 in)
K	41420 – P5D or PY4 – 000	1.94 mm (0.0764 in)
L	41421 – P5D or PY4 – 000	1.97 mm (0.0776 in)
M	41422 – P5D or PY4 – 000	2.00 mm (0.0787 in)
N	41423 – P5D or PY4 – 000	2.03 mm (0.0799 in)
O	41424 – P5D or PY4 – 000	2.06 mm (0.0811 in)
P	41425 – P5D or PY4 – 000	2.09 mm (0.0823 in)
Q	41426 – P5D or PY4 – 000	2.12 mm (0.0835 in)
R	41427 – P5D or PY4 – 000	2.15 mm (0.0846 in)
S	41428 – P5D or PY4 – 000	2.18 mm (0.0858 in)
T	41429 – P5D or PY4 – 000	2.21 mm (0.0870 in)
U	41430 – P5D or PY4 – 000	2.24 mm (0.0882 in)
V	41431 – P5D or PY4 – 000	2.27 mm (0.0894 in)

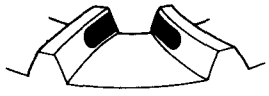
Ring Gear Tooth Contact

Adjustment

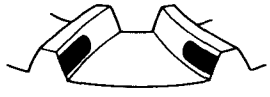
1) Correct Tooth Contact



2) Toe Contact
   - Use a thinner drive pinion shim (43 mm thrust shim) to move the drive pinion away from the ring gear.




3) Heel Contact
   - Use a thicker drive pinion shim (43 mm thrust shim) to move the drive pinion toward the ring gear.




4) Flank Contact
   - To move the ring gear away from the drive pinion, use a thicker side bearing shim (79.5 mm thrust shim) on the drive pinion side and a thinner one on the ring gear side.

   NOTE: Recheck backlash after replacing the side bearing shims. If out of specification, adjust as described under Toe Contact.



5) Face Contact
   - To move the ring gear toward the drive pinion, use a thinner side bearing shim (79.5 mm thrust shim) on the drive pinion side and a thicker one on the ring gear side.

   NOTE: Recheck backlash after replacing the side bearing shims. If out of specification, adjust as described under Heel Contact.



Ring Gear Backlash

Adjustment

1. If the backlash exceeds the standard, correct by decreasing the shim thickness on one side and increasing the thickness of the other shim the same amount.

   NOTE:
   - The total thickness of both shims must still equal the total thickness of the original shims.
   - If there is too much backlash, move the ring gear toward the drive pinion. If there is not enough backlash, move the ring gear away from the drive pinion.

2. After adjustment, recheck backlash (see page 15-8).

Standard: 0.06 - 0.14 mm (0.002 - 0.006 in)

79.5 mm THRUST SHIM

	Part Number	Thickness
AA	41460 – P5D or PY4 – 000	0.66 mm (0.0260 in)
AB	41461 – P5D or PY4 – 000	1.17 mm (0.0461 in)
AC	41462 – P5D or PY4 – 000	1.20 mm (0.0472 in)
AD	41463 – P5D or PY4 – 000	1.23 mm (0.0484 in)
AE	41464 – P5D or PY4 – 000	1.26 mm (0.0496 in)
AF	41465 – P5D or PY4 – 000	1.29 mm (0.0508 in)
AG	41466 – P5D or PY4 – 000	1.32 mm (0.0520 in)
AH	41467 – P5D or PY4 – 000	1.35 mm (0.0531 in)
AI	41468 – P5D or PY4 – 000	1.38 mm (0.0543 in)
AJ	41469 – P5D or PY4 – 000	1.41 mm (0.0555 in)
AK	41470 – P5D or PY4 – 000	1.44 mm (0.0567 in)
AL	41471 – P5D or PY4 – 000	1.47 mm (0.0579 in)
AM	41472 – P5D or PY4 – 000	1.50 mm (0.0591 in)
AN	41473 – P5D or PY4 – 000	1.53 mm (0.0602 in)
AO	41474 – P5D or PY4 – 000	1.56 mm (0.0614 in)
AP	41475 – P5D or PY4 – 000	1.59 mm (0.0626 in)
AQ	41476 – P5D or PY4 – 000	1.62 mm (0.0638 in)
AR	41477 – P5D or PY4 – 000	1.65 mm (0.0650 in)
AS	41478 – P5D or PY4 – 000	1.68 mm (0.0661 in)
AT	41479 – P5D or PY4 – 000	1.71 mm (0.0673 in)
AU	41480 – P5D or PY4 – 000	1.74 mm (0.0685 in)
AV	41481 – P5D or PY4 – 000	1.77 mm (0.0697 in)
AW	41482 – P5D or PY4 – 000	1.80 mm (0.0709 in)
AX	41483 – P5D or PY4 – 000	1.83 mm (0.0720 in)

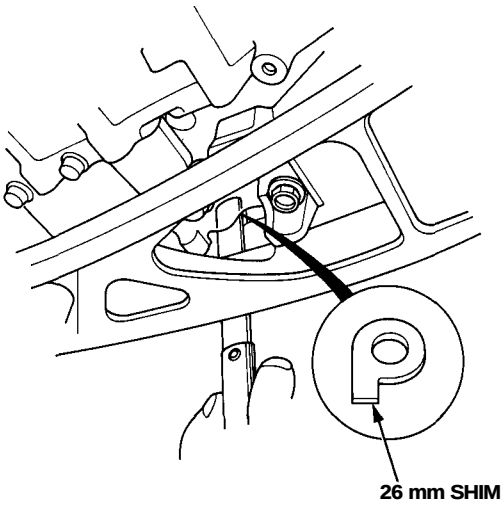
Differential Assembly

Installation

NOTE: If the differential case is replaced, the 26 mm shim must be adjusted.

a. Install the differential assembly.

b. Measure the clearance between the differential case and the torque converter housing.

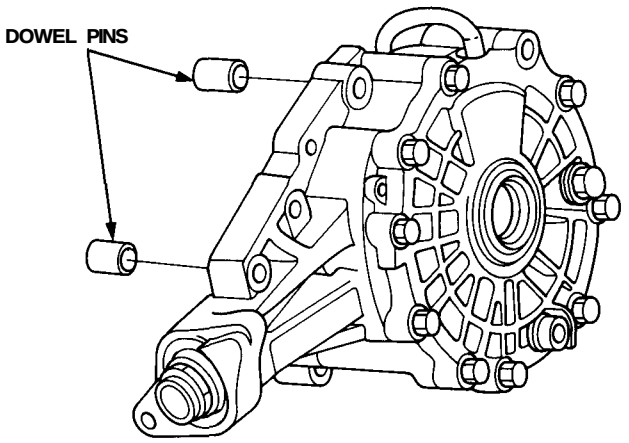


c. Select the 26 mm shim from the following table.

26 mm SHIM

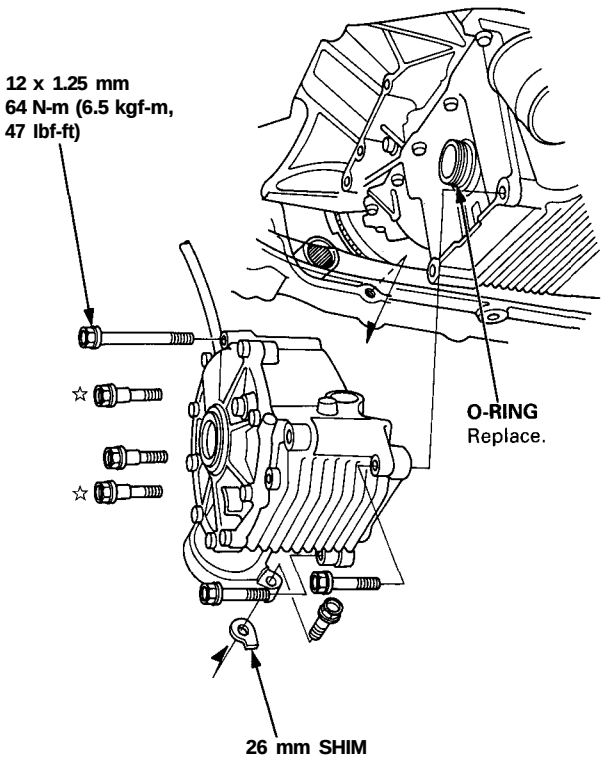
	Part Number	Thickness	Measurement Value
A	41432 – PY4 – 000	1.9 mm (0.0748 in)	1.99 – 1.9 mm
B	41433 – PY4 – 000	2.0 mm (0.0787 in)	2.09 – 2.0 mm
C	41434 – PY4 – 000	2.1 mm (0.0827 in)	2.19 – 2.1 mm
D	41435 – PY4 – 000	2.2 mm (0.0866 in)	2.29 – 2.2 mm
E	41436 – PY4 – 000	2.3 mm (0.0906 in)	2.39 – 2.3 mm
F	41437 – PY4 – 000	2.4 mm (0.0945 in)	2.49 – 2.4 mm
G	41438 – PY4 – 000	2.5 mm (0.0984 in)	2.59 – 2.5 mm
H	41439 – PY4 – 000	2.6 mm (0.1024 in)	2.69 – 2.6 mm
I	41440 – PY4 – 000	2.7 mm (0.1063 in)	2.79 – 2.7 mm
J	41441 – PY4 – 000	2.8 mm (0.1102 in)	2.89 – 2.8 mm
K	41442 – PY4 – 000	2.9 mm (0.1142 in)	2.99 – 2.9 mm
L	41443 – PY4 – 000	3.0 mm (0.1181 in)	3.09 – 3.0 mm

1. Install the two dowel pins on the differential assembly.

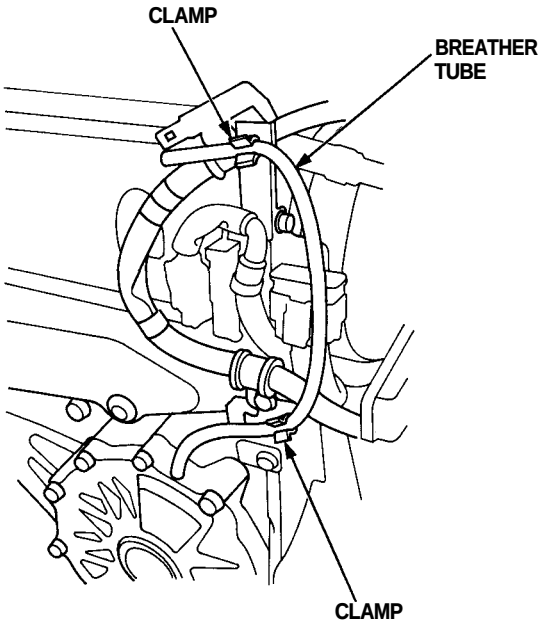


2. Attach the differential assembly to the engine, then tighten the two mounting bolts (marked with ☆ in this figure) loosely.

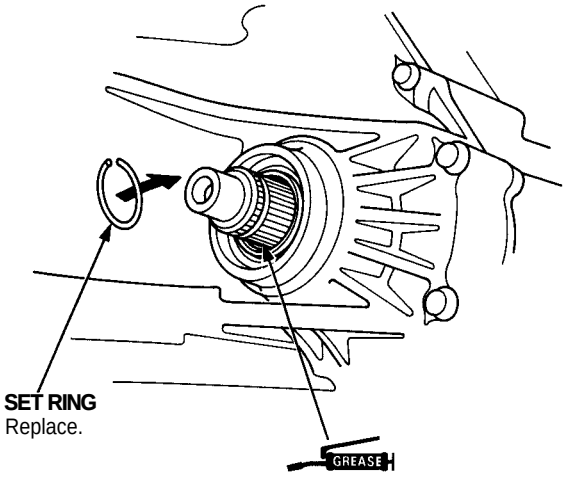
3. Install the 26 mm shim, then tighten the mounting bolts to the specified torque.



4. Install the breather tube as shown.

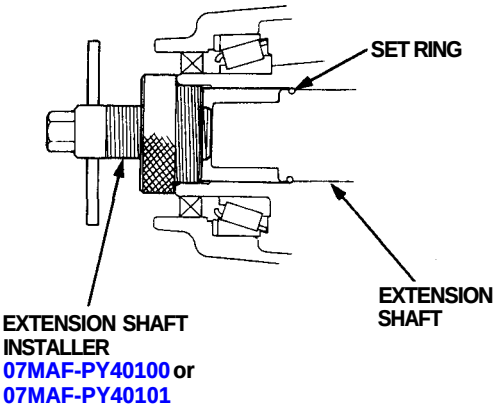


5. Apply Super High Temp Urea Grease (P/N 08798 - 9002) to the splines of the extension shaft, then install the new set ring.



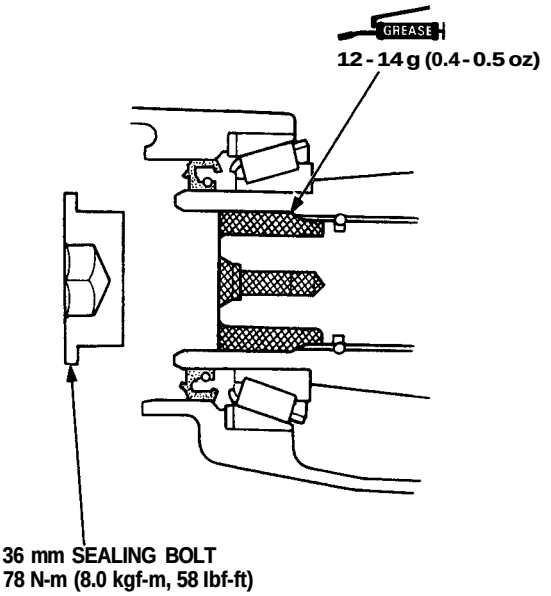
6. Install the extension shaft using the special tool as shown.

NOTE: Push the extension shaft in the secondary driven gear shaft until the extension shaft stops.



7. Fill the secondary gear with Super High Temp Urea Grease (P/N 08798 - 9002), then install the 36 mm sealing bolt.

NOTE:
- Shift the transmission into the [P] position to lock the secondary gear.
- Apply liquid gasket (P/N 08718 - 0001) to the 36 mm sealing bolt threads.

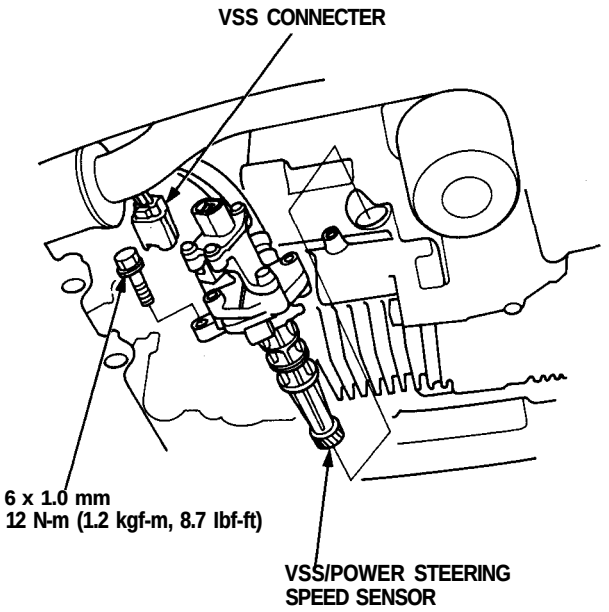


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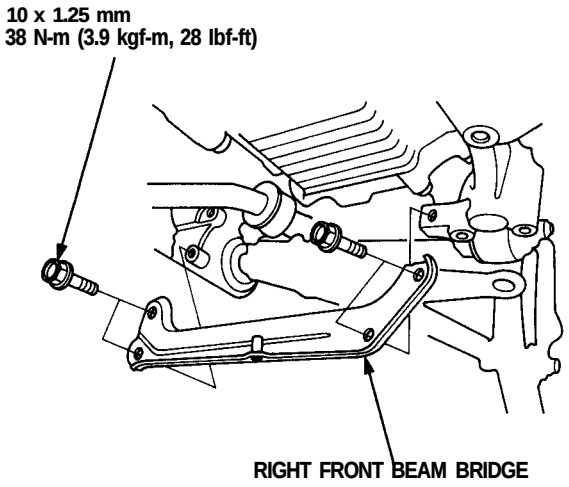
Differential Assembly

Installation (cont'd)

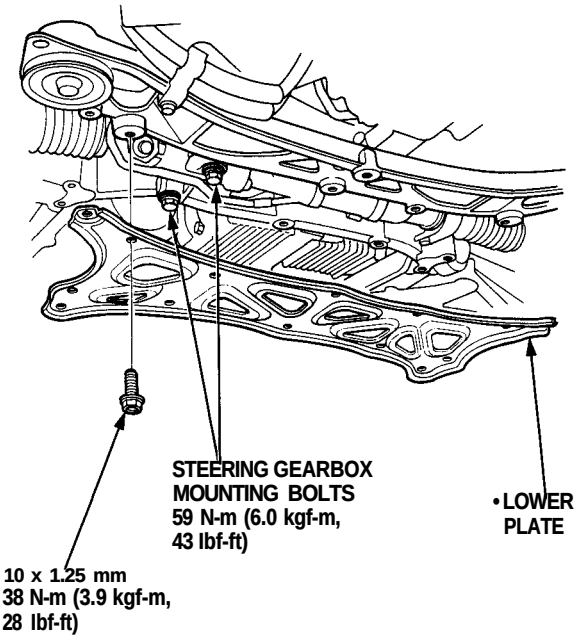
8. Install the vehicle speed sensor (VSS)/power steering speed sensor, then connect the VSS connecter.



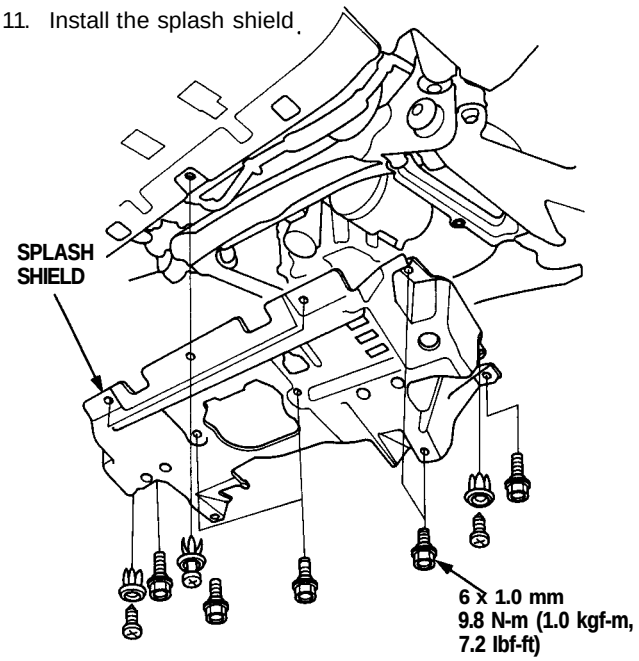
9. Install the right front beam bridge.



10. Remove the steering gearbox mounting bolts, then install the lower plate and the steering gearbox mounting bolts.



11. Install the splash shield.



12. Install the driveshafts and the intermediate shaft (see section 16).

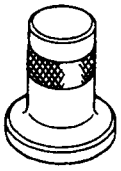
13. Refill the differential with oil (see page 15-4).

14. Check the front wheel alignment (see section 18).

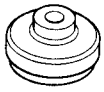
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD-PH70201 or 07GAD-PH70200	Oil Seal Driver	1	16-7
②	07MAD-SP00100	Driver Attachment	1	16-8
③	07746-0010300	Attachment, 42 x 47 mm	1	16-5
④	07746-0010400	Attachment, 52 x 55 mm	1	16-7
⑤	07746-0030100	Driver, 40 mm I.D.	1	16-7
⑥	07749-0010000	Driver	1	16-5, 16-7, 16-8

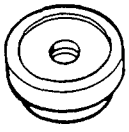
NOTE: Refer to page 16-2 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



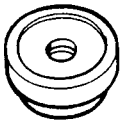
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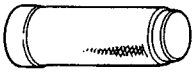
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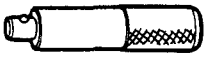
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④



⑤

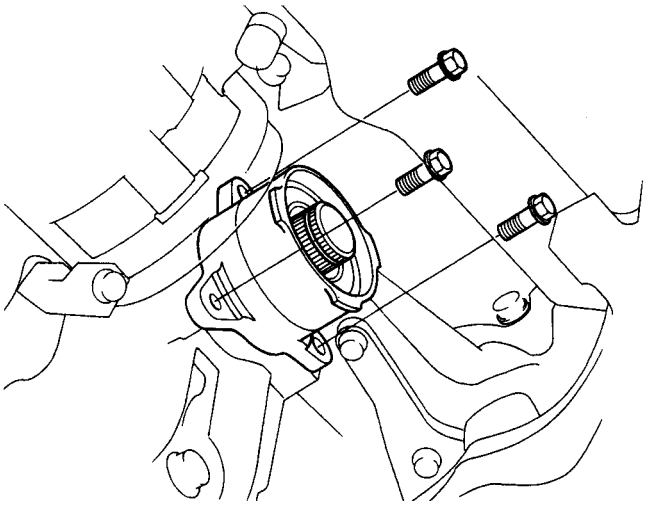


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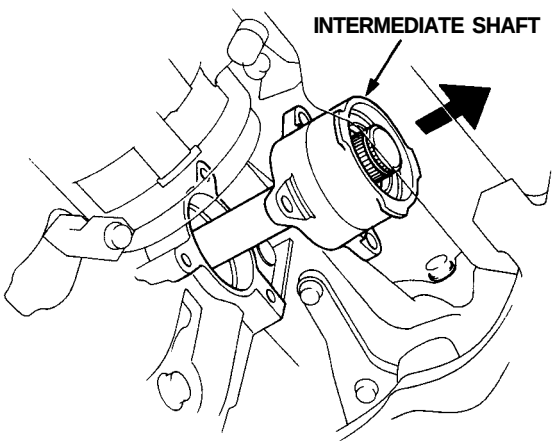
Intermediate Shaft

Removal/Installation

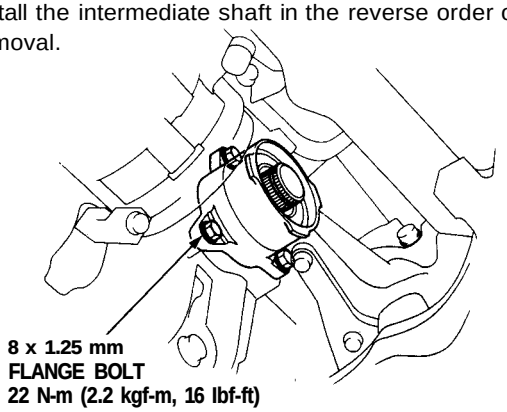
1. Drain the oil from the differential (see section 15).
2. Remove the left driveshaft assembly (refer to section 16 in the '95 - '98 Acura 2.5TL Service Manual, P/N 61SW504).
3. Remove the three bolts.



4. Remove the intermediate shaft assembly from the oil pan.



5. Install the intermediate shaft in the reverse order of removal.

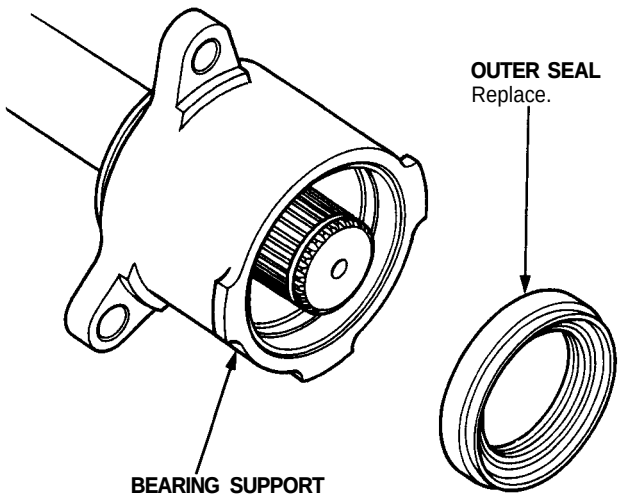


Intermediate Shaft

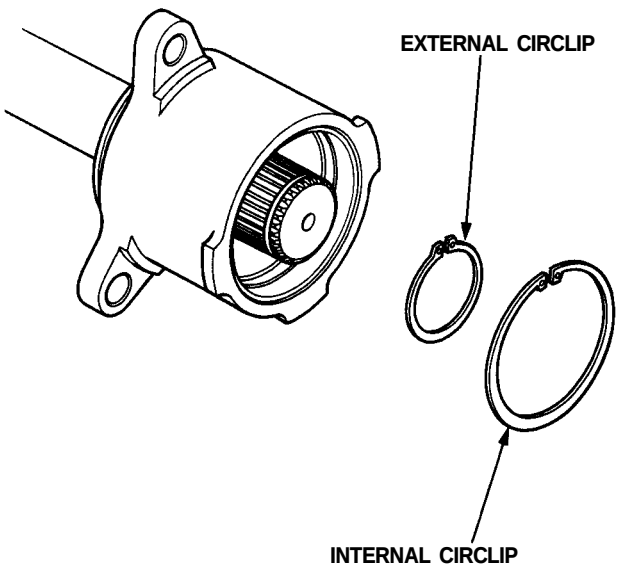
Disassembly

CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

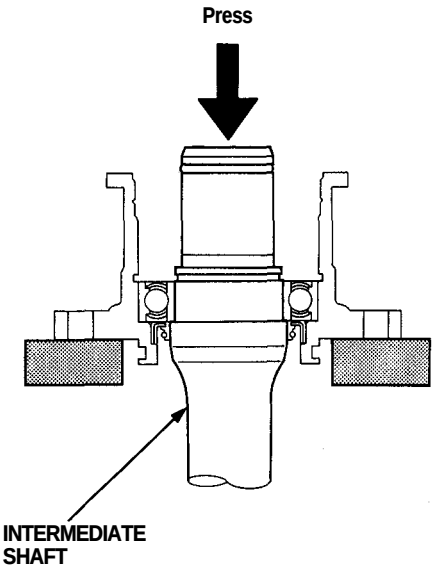
1. Remove the intermediate shaft outer seal from the bearing support.



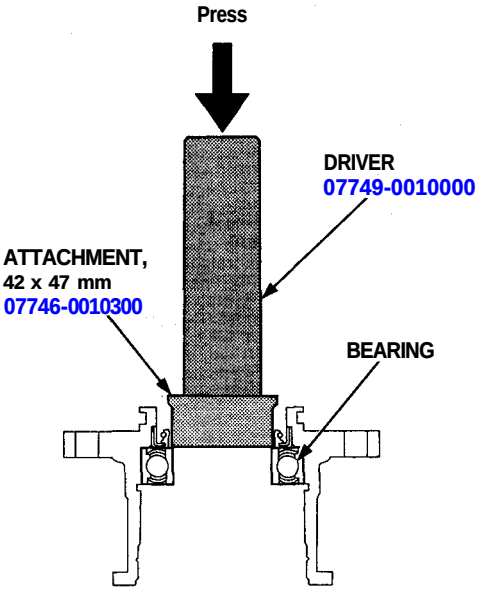
2. Remove the external circlip and the internal circlip.



3. Press the intermediate shaft out of the shaft bearing using a press.

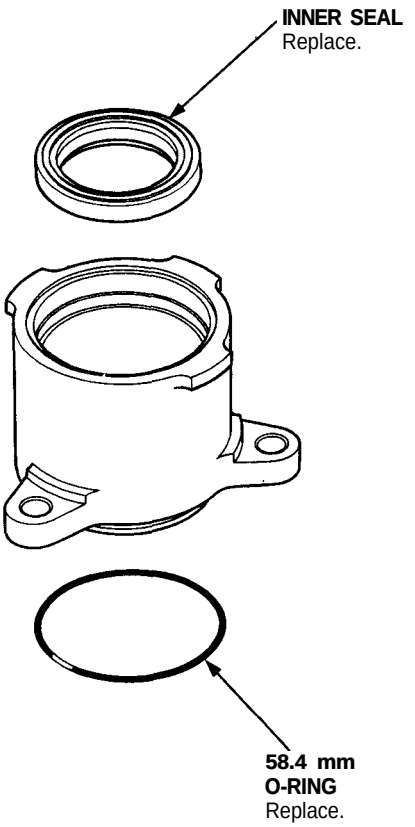


4. Press the intermediate shaft bearing out of the bearing support using the special tools and a press.



5. Remove the intermediate shaft inner seal from the bearing support.

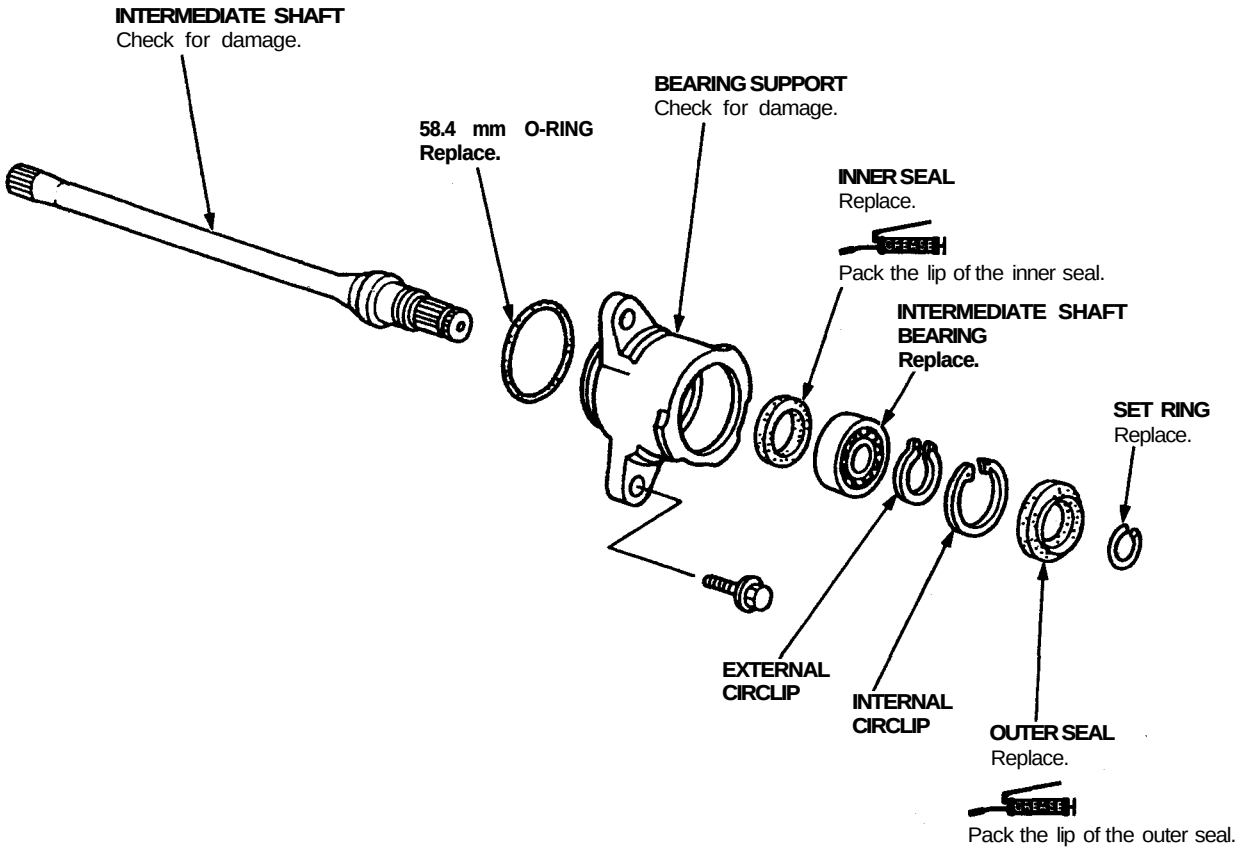
6. Remove the 58.4 mm O-ring.



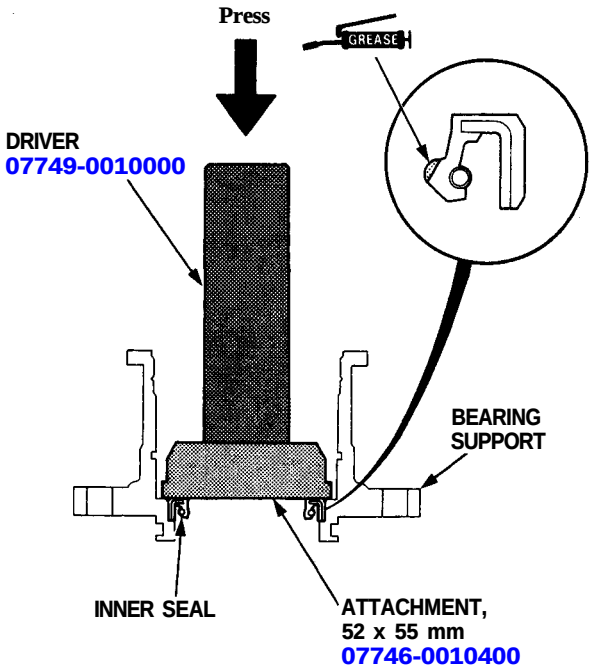
Intermediate Shaft

Reassembly

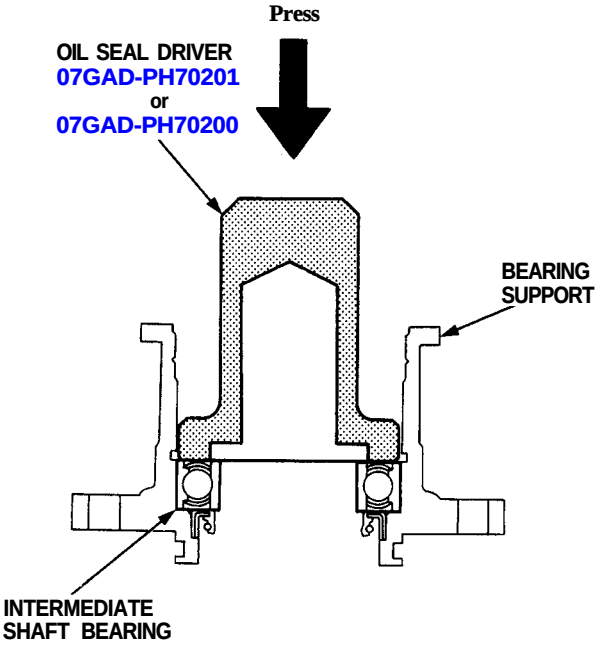
CAUTION:
- **The bearing support is made of aluminum. Be careful not to damage it when servicing.**
- **Do not damage the lip on inner and outer seals during installation.**



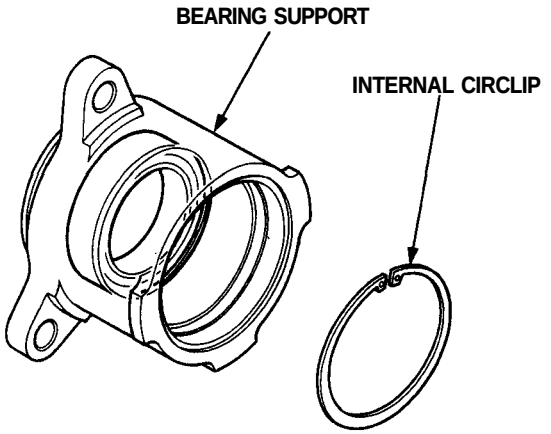
1. Press the intermediate shaft inner seal into the bearing support using the special tools and a press.



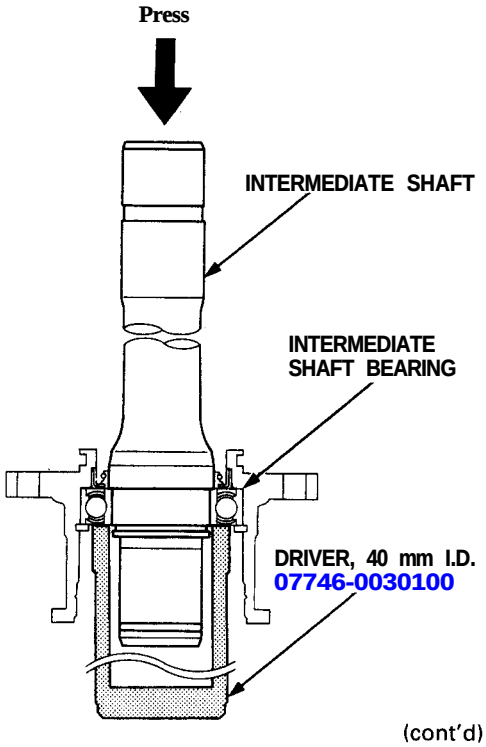
2. Press the intermediate shaft bearing into the bearing support using the special tool and a press.



3. Seat the internal circlip in the groove of the bearing support.



4. Press the intermediate shaft into the shaft bearing using the special tool and a press.

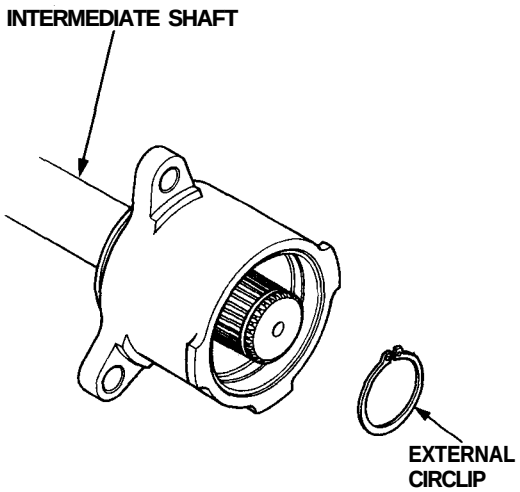


(cont'd)

Intermediate Shaft

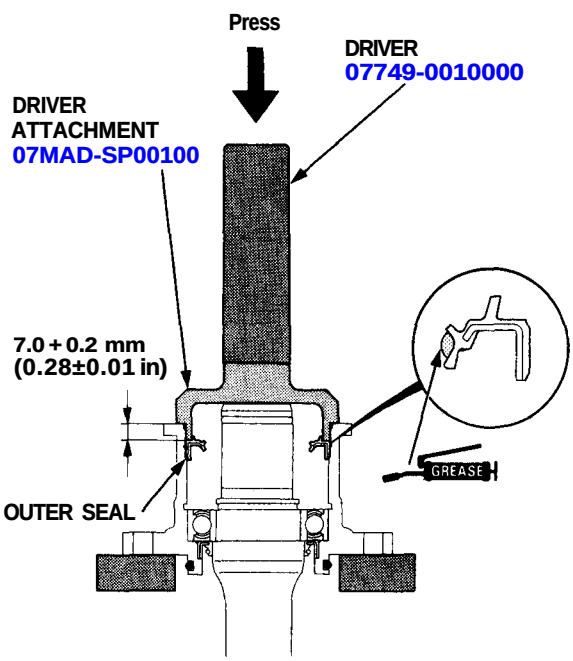
Reassembly (cont'd)

5. Seat the external circlip in the groove of the intermediate shaft.



6. Press the outer seal into the bearing support using the special tools and a press.

   NOTE: Drive in the outer seal until it is 7.0 mm (0.28 in) from the end of the bearing support.

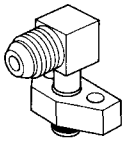


Special Tools

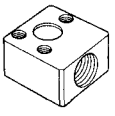
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAK-SE00112	P/S Joint Adapter (Pump)	1	17-5
②	07GAK-SE00120	P/S Joint Adapter (Hose)	1	17-5
③	*07JGG-001010A	Belt Tension Gauge	1	17-4
④	07LAG-SM40100 or 07LAG-SM4010A	Piston Seal Ring Guide	1	17-16
⑤	07LAG - SM40200 or 07LAG - SM4020A	Piston Seal Ring Sizing Tool	1	17-16
⑥	07MAC - SL00200	Ball Joint Remover, 28 mm	1	17-9
⑦	07NAD - SR3020A	Cylinder End Seal Remover Attachment	1	17-12
⑧	07TAF-SZ50100	Cylinder End Seal Remover Attachment	1	17-13
⑨	07406-0010001	P/S Pressure Gauge	1	17-5
⑩	07725 - 0030000	Universal Holder	1	17-4
⑪	07746-0010100	Attachment, 32 x 35 mm	1	17-16
⑫	07749-0010000	Driver	1	17-16
⑬	07965 - SA50500	Front Hub Dis/Assembly Tool	1	17-25
⑭	07974 - SA50700	Ball Joint Boot Clip Guide	1	17-24

*: Included in the Belt Tension Gauge set, 07TGG - 001000A.

NOTE: Refer to page 17-2 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



①



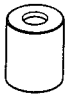
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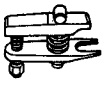
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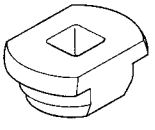
⑤ ⑬



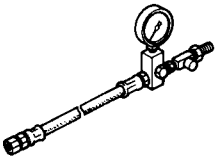
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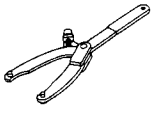
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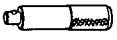
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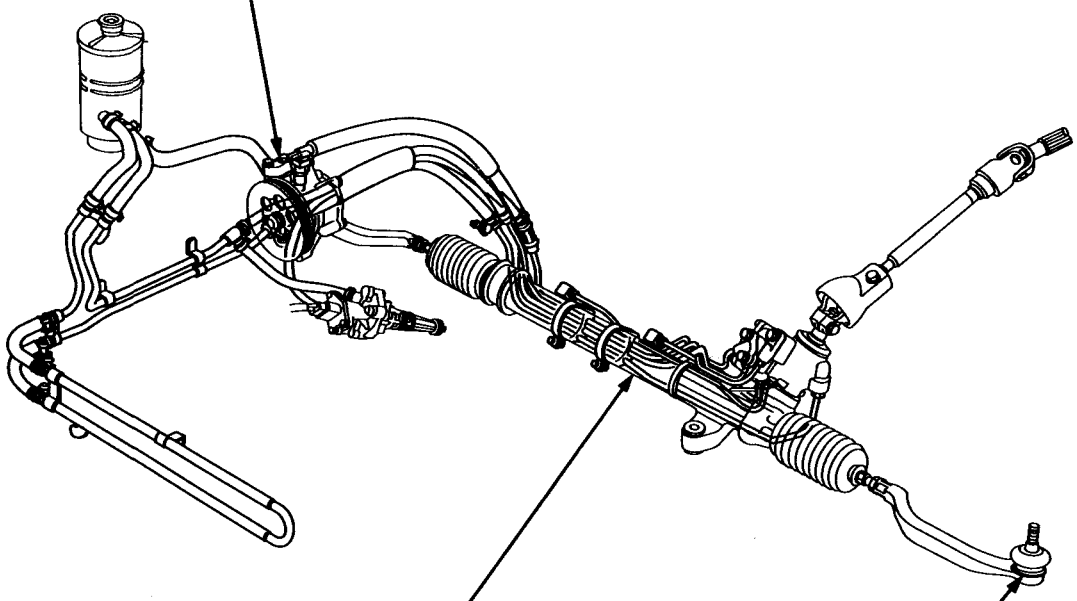


⑭

Component Locations

Index

NOTE: Refer to page 17-3 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



POWER STEERING PUMP
Pump Belt Inspection, page 17-4
Pump Belt Adjustment, page 17-4
Pump Pressure Check, page 17-5
Removal/Installation, page 17-8
Disassembly/Reassembly
(Pulley removal/Installation), page 17-8

STEERING GEARBOX
Rack Guide Adjustment, page 17-5
Removal, page 17-9
Disassembly, page 17-11
Reassembly, page 17-15
Installation, page 17-22

TIE-ROD END BALL JOINT
Ball Joint Boot Replacement page 17-24

Inspection and Adjustment

Pump Belt

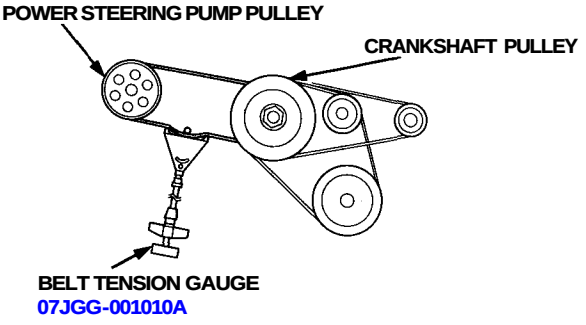
NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Inspection

Attach the special tool to the belt, and measure the tension of the belt.

Tension:
Used Belt: 340 - 540 N (35 - 55 kgf, 77 - 120 lbf)
New Belt: 690 - 880 N (70 - 90 kgf, 154-200 lbf)

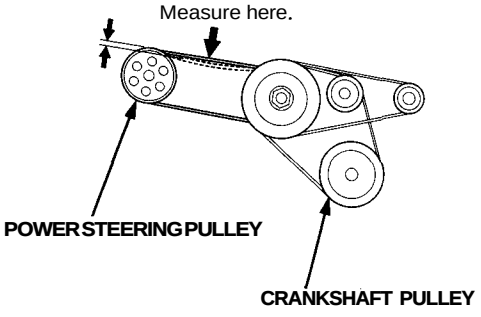
NOTE:
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.



Inspect the pump belt for cracks or any damage.
Replace the belt with a new one if necessary.

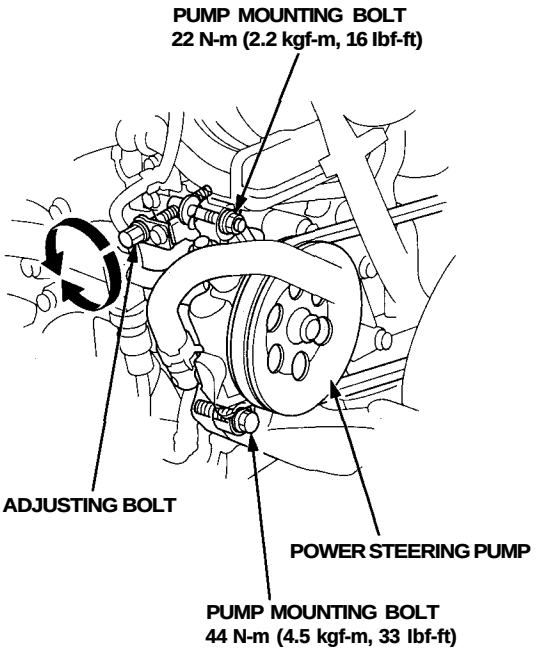
Measurement without Belt Tension Gauge:
Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:
Used Belt: 11.0 - 13.5 mm (0.43 - 0.53 in)
New Belt: 8.0 - 9.5 mm (0.31 - 0.37 in)



Adjustment

1. Remove the air cleaner (ACL).
2. Loosen the power steering pump mounting nut and bolt.
3. Turn the adjusting bolt to get the proper belt tension, then retighten the nut and bolt.
4. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.

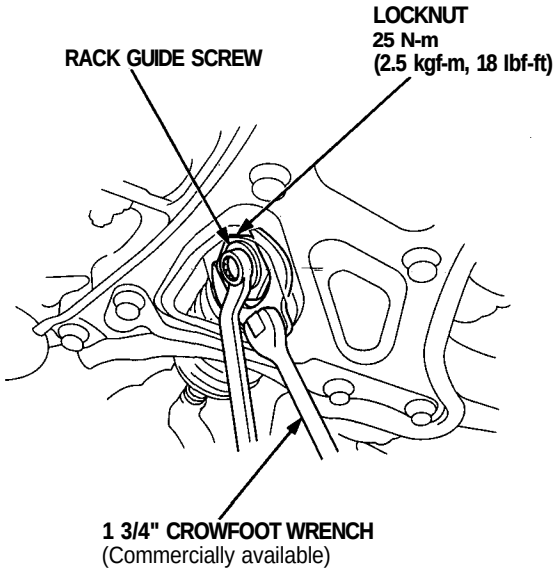


5. Install the air cleaner (ACL).

Rack Guide Adjustment

NOTE: Perform rack guide adjustment with the wheels in the straight ahead position.

1. Loosen the rack guide screw locknut with the special tool, then loosen the rack guide screw.



2. Tighten the rack guide screw to 25 N-m (2.5 kgf-m, 18 lbf-ft), then loosen it.

3. Retighten the rack guide screw to 3.9 N-m (0.4 kgf-m, 2.9 lbf-ft), then back it off to the specified angle.

   Specified Return Angle: 20 ± 5°

4. Tighten the locknut while holding the rack guide screw.

5. Check for tight or loose steering through the complete turning travel.

6. Perform the following inspections (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504):
   - Steering operation.
   - Power assist with vehicle parked.

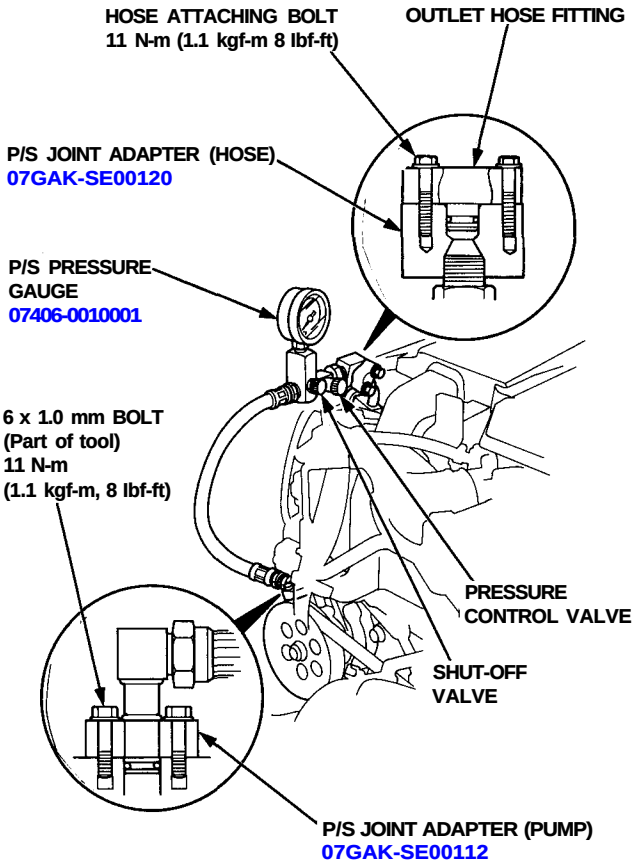
Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

CAUTION: Carefully disconnect the high pressure hose so the power steering fluid does not leak on the frame and other parts.

1. Remove the air cleaner (ACL).
2. Disconnect the outlet hose from the pump outlet fitting, and install the P/S joint adapter (pump) on the pump outlet.



3. Connect the hose P/S adapter (hose) to the power steering pressure gauge, then connect the outlet hose to the adapter.
4. Connect the power steering pressure gauge to the P/S joint adapter (pump).
5. Open the shut-off valve full.
6. Open the pressure control valve fully.

(cont'd)

Inspection and Adjustment

Pump Pressure Check (cont'd)

7. Start the engine and let it idle.

8. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.

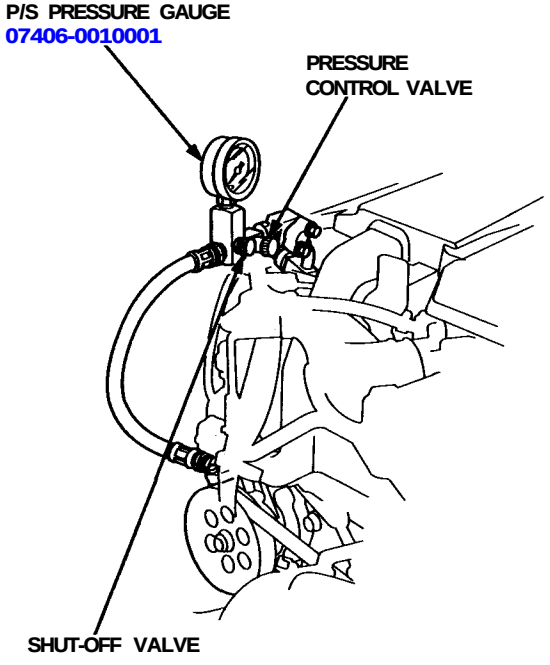
9. Measure steady-state fluid pressure while idling. If the pump is in good condition, the gauge should read less than 1500 kPa (15 kgf/cm^2, 213 psi).
   If it reads high, check the outlet hose or valve body unit (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504, for General Troubleshooting).

10. Close the pressure control valve, then close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

11. Immediately open the pressure control valve fully.

    CAUTION: Do not keep the pressure control valve closed more than 5 seconds or the pump could be damaged by over-heating.

    If the pump is in good condition, the gauge should read at least 7,800 - 8,800 kPa (80-90 kgf/cm^2, 1,138 - 1,280 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



Power Steering Hoses and Pipes

Replacement

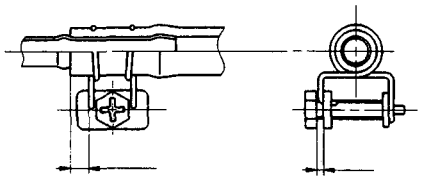
NOTE:

- Slide each hose over the corresponding pipe up to the stop on the pipe. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Add the power steering fluid to the specified level on the reservoir and check for leaks (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504).

CAUTION: Check all clamps for deterioration and deformation; replace the clamps with new ones if necessary.

ADJUSTABLE HOSE CLAMP:

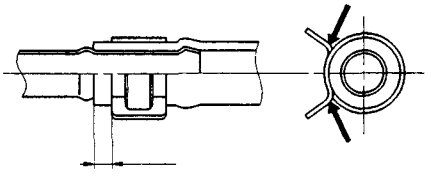
Slide the hose over the pipe until it contacts the stop.



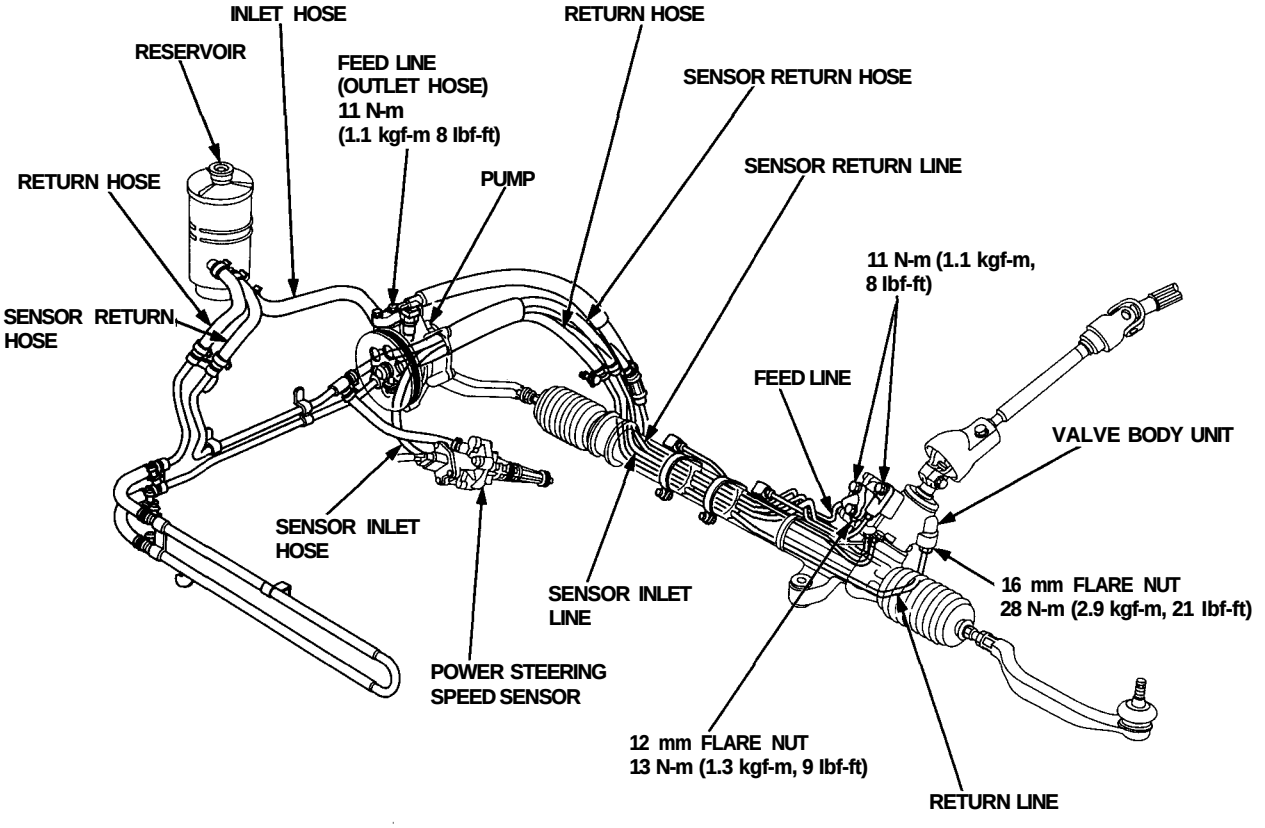
2.5-5.5mm (0.01-0.22 in) **2.0-4.0mm (0.08-0.16 in)**

HOSE CLAMP:

Slide the hose over the pipe until it contacts the stop.



2.5-5.5mm (0.01-0.22 in)

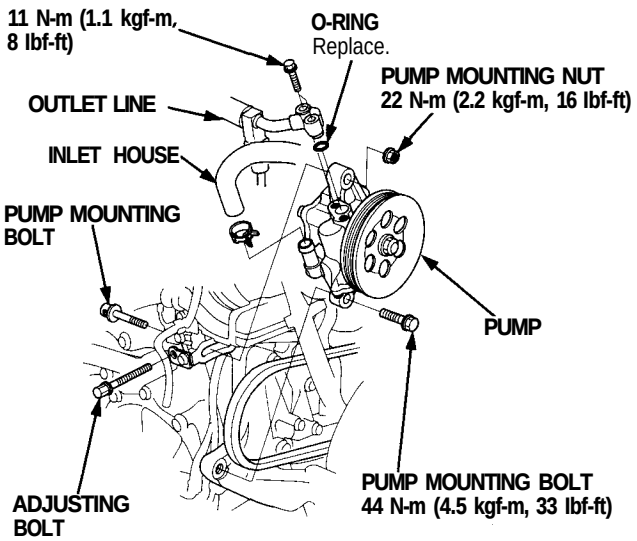


Power Steering Pump

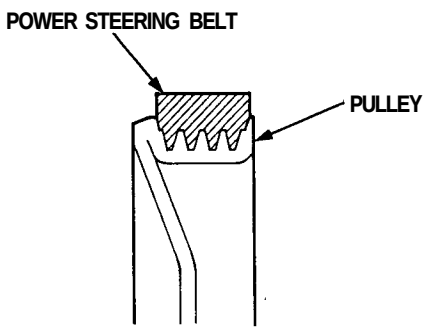
Removal/Installation

NOTE: Before disconnecting the hoses from the pump, place a suitable container under the vehicle.

1. Remove the air cleaner (ACL).
2. Remove the belt by loosening the pump adjusting bolt, mounting bolts.
3. Disconnect the inlet hose and the outlet line from the pump them, plug.
   NOTE: Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.
4. Remove the pump mounting bolts, then remove the pump.
   NOTE:
   - Do not turn the steering wheel with the pump removed.
   - Wrap the opening of the pump with a piece of tape to prevent foreign material form entering the pump.



5. Install the pump in the reverse order of removal.
   CAUTION:
   - **Make sure that the power steering belt is positioned properly on the pulley.**
   - **Do not get power steering fluid or grease on the power steering belt or pulley faces. Clean off any fluid or grease before installation.**



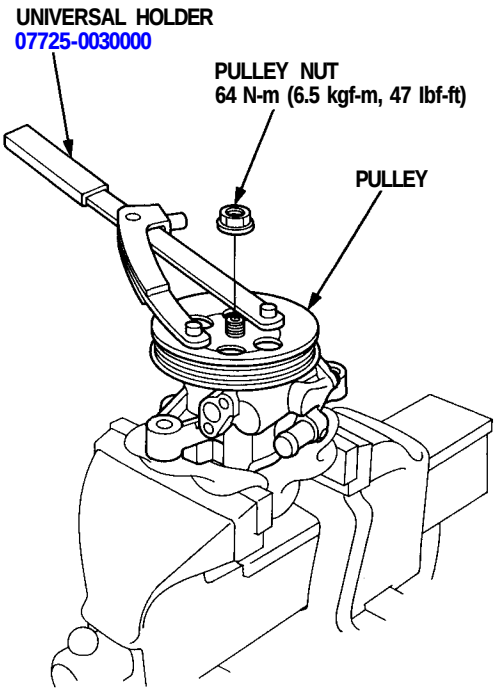
Disassembly/Installation

Pulley Removal/Installation

1. Drain the fluid from the pump.

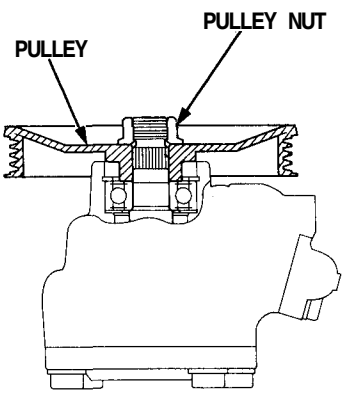
2. Hold the steering pump in a vise with soft jaws, hold the pulley with the special tool, and remove the pulley nut and pulley.

   CAUTION: Be careful not to damage the pump housing with the jaws of the vise.



3. Install the pulley in the reverse of removal.

   NOTE: Install the pump pulley as shown, then install the pulley nut.

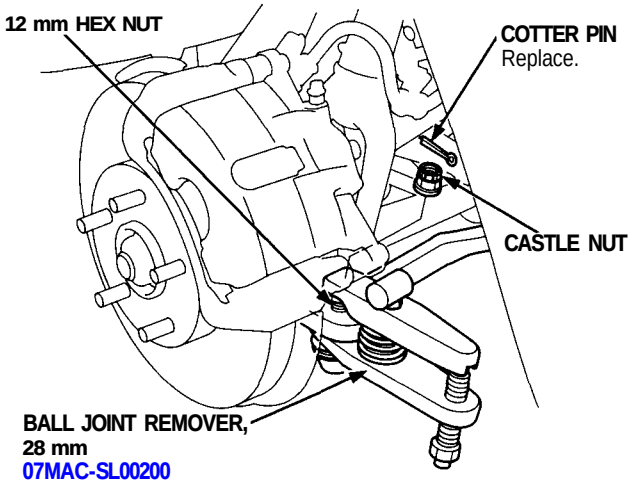


Steering Gearbox

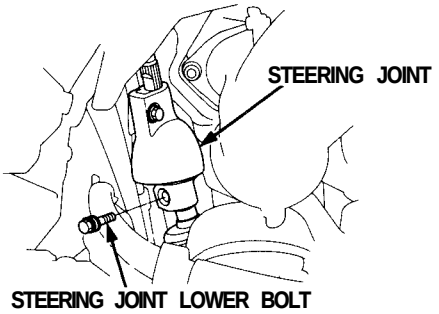
Removal

NOTE: Use solvent and a brush to wash off any oil and dirt from the valve body unit, its lines, and the end of the gearbox. Blow dry with compressed air.

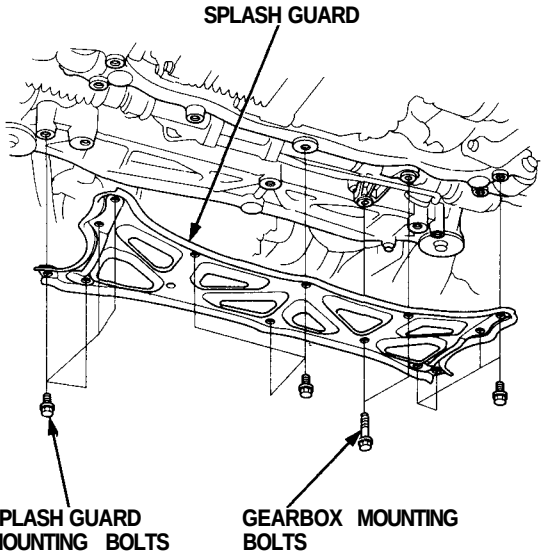
1. Drain the power steering fluid (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504).
2. Raise the front of vehicle, and support it on safety stands in the proper locations.
3. Remove the front wheels.
4. Remove the driver's airbag assembly and steering wheel (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504):
5. Remove the cotter pin from the castle nut, and remove the nut.
6. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.
   NOTE: Remove the ball joint using the Ball Joint Remover, 28 mm (07MAC - SL00200). Refer to page 18-8 for how to use the ball joint remover.
7. Separate the tie-rod ball joint and knuckle using the special tool.
   CAUTION: Avoid damaging the ball joint boot.



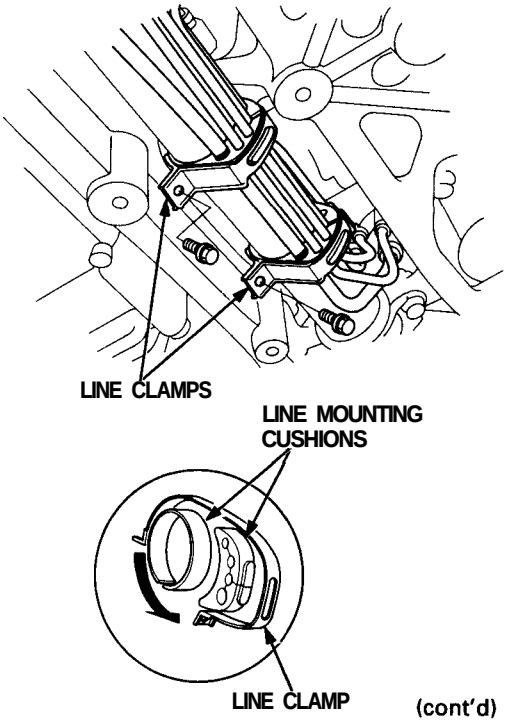
8. From the engine compartment, remove the steering joint lower bolt, and move the joint toward the column.



9. Remove the splash guard.
   NOTE: Some splash guard mounting bolts are also used as gearbox mounting bolts. The gearbox will tilt to the side when these bolts are removed.



10. Remove the line clamps and line mounting cushions from the gearbox.



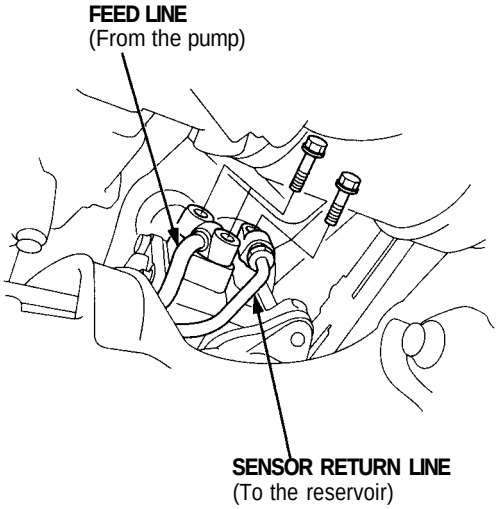
(cont'd)

Steering Gearbox

Removal (cont'd)

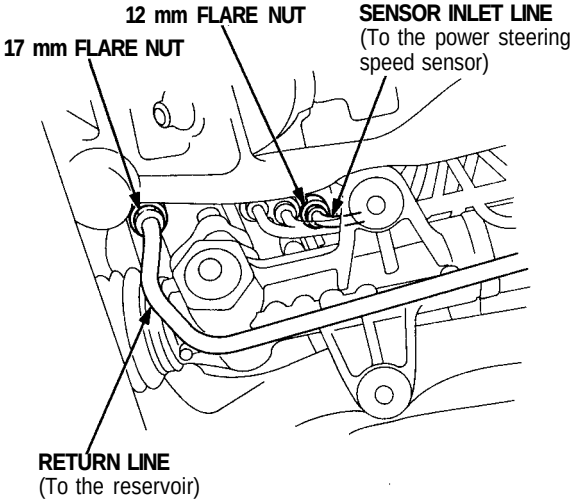
11. Disconnect the two lines (feed line and sensor return line) from the valve body unit upper side.

CAUTION: After disconnecting the pipes, plug or seal the line fittings with a piece of tape or equivalent to prevent foreign materials from the entering the valve body unit:



12. Disconnect the two lines (sensor inlet line and return line) from the valve body unit lower side.

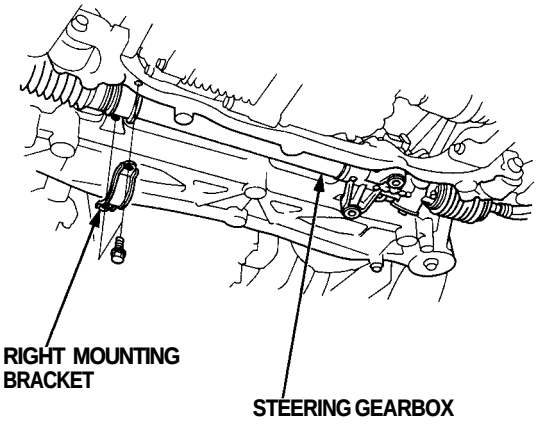
NOTE: It is not necessary to loosen cylinder lines A and B between the valve body unit and the cylinder, (see page 17-11)



13. Remove the right mounting bracket and steering gearbox.

NOTE: Before removing the gearbox, place a jack stand under the gearbox.

CAUTION: Be careful not to bend or damage cylinder lines A and B when removing the steering gearbox.



Disassembly

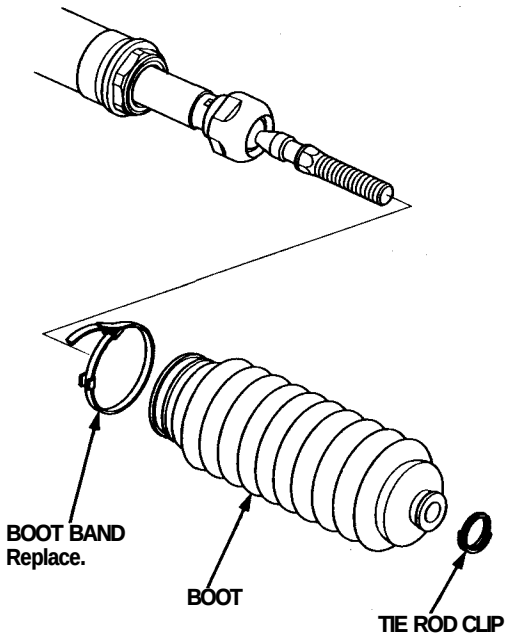
Steering Rack Disassembly

NOTE:
- **Before disassembling the gearbox, wash it off with solvent and a brush.**
- **Do not dip seals and O-rings in solvent.**

1. **Remove the steering gearbox (see page 17-9).**

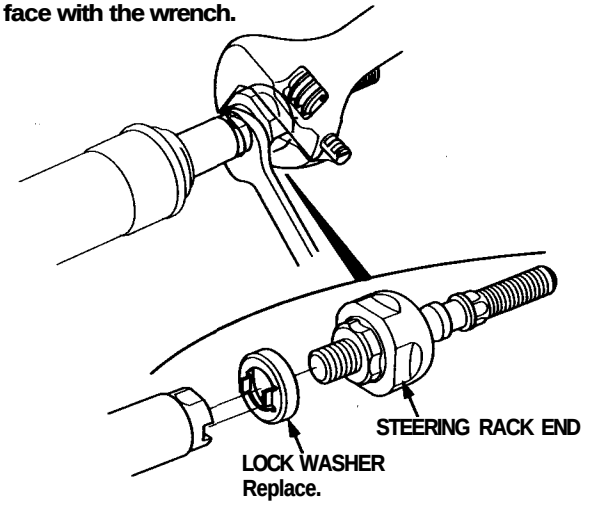
2. **Remove the tie-rod end and locknut.**

3. **Remove the boot bands and tie-rod clips. Pull the boots away from the ends of the gearbox.**



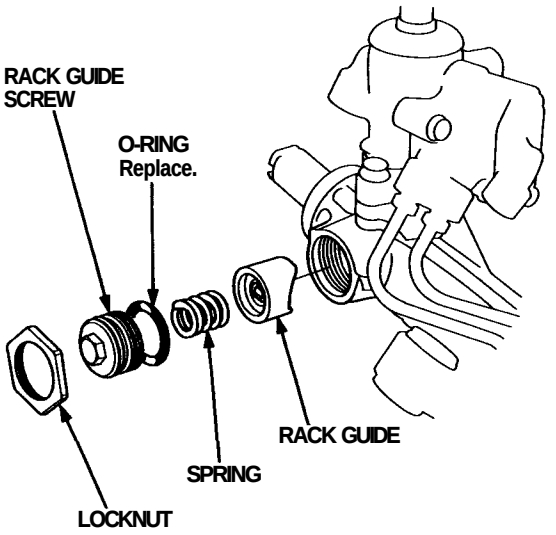
4. **Hold the steering rack with a wrench, and unscrew the rack end with another.**

   CAUTION: Be careful not to damage the rack surface with the wrench.

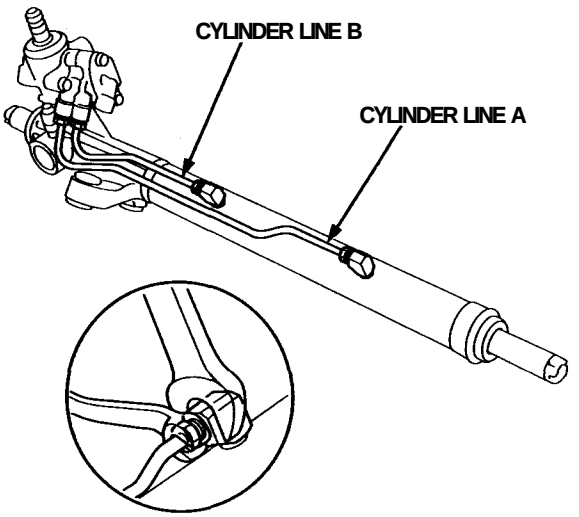


5. **Loosen the locknut and remove the rack guide screw.**

6. **Remove the spring and rack guide from the gearbox housing.**



7. **Remove cylinder lines A and B from the gearbox.**



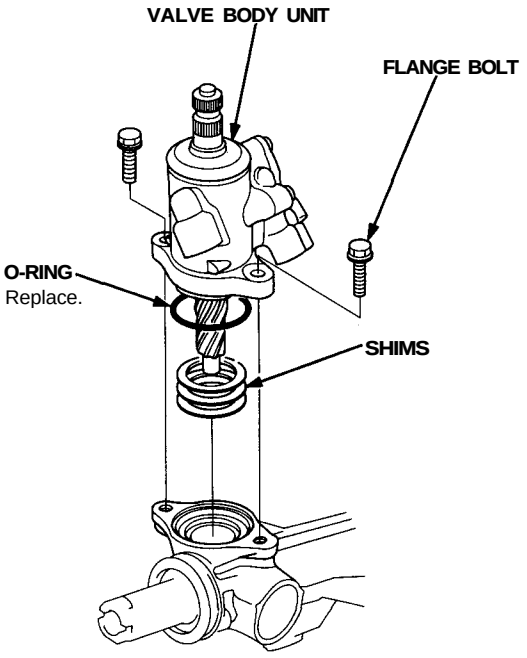
8. **Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.**

(cont'd)

Steering Gearbox

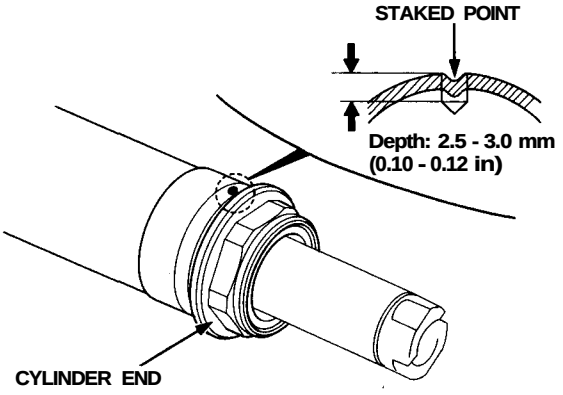
Disassembly (cont'd)

9. Remove the two flange bolts, then remove the valve body unit from the gearbox (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504).



10. Drill a 3 mm (0.12 in) diameter hole approximately 2.5 - 3.0 mm (0.10 - 0.12 in) in depth in the staked-point on the cylinder.

NOTE:
- Do not allow metal shavings to enter the cylinder housing.
- After removing the cylinder end, remove any burrs at the stake point.

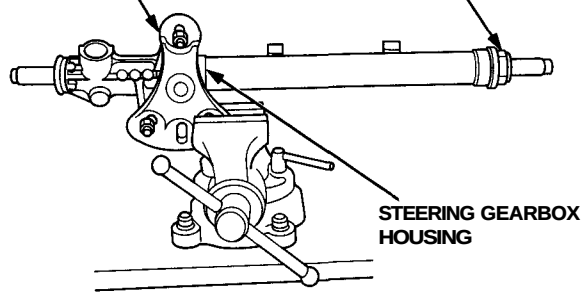


11. Install the special tool to the steering gearbox housing. Clamp the tool in a vise with soft jaws as shown, then loosen and remove the cylinder end.

CAUTION: Do not clamp the cylinder housing.

PULLER YOKE:
(Commercially available)
Snap-On® T/N CJ123-1
OTC® T/N 7372
or equivalent

CYLINDER END
Check the rubber stop in the cylinder end for damage or deterioration. If the rubber stop is damaged, replace the cylinder end.



12. Set the steering gearbox in a pressbox so the gearbox housing points upward.

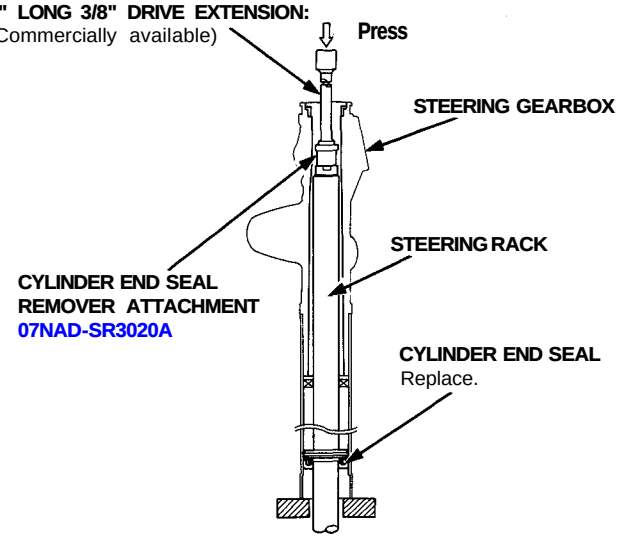
13. Insert a 6" long, 3/8" drive extension into the special tool.

14. Press the cylinder end seal and steering rack out of the gearbox.

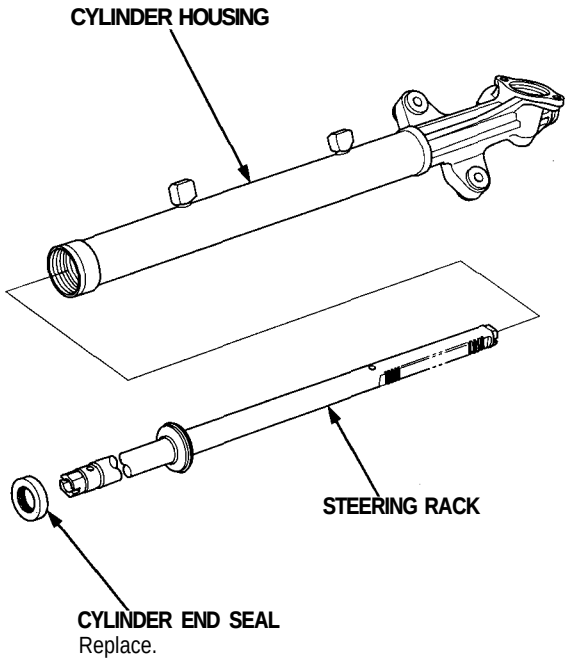
NOTE: Hold the steering rack to keep it from falling when pressed clear.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with the tool.

6" LONG 3/8" DRIVE EXTENSION:
(Commercially available)

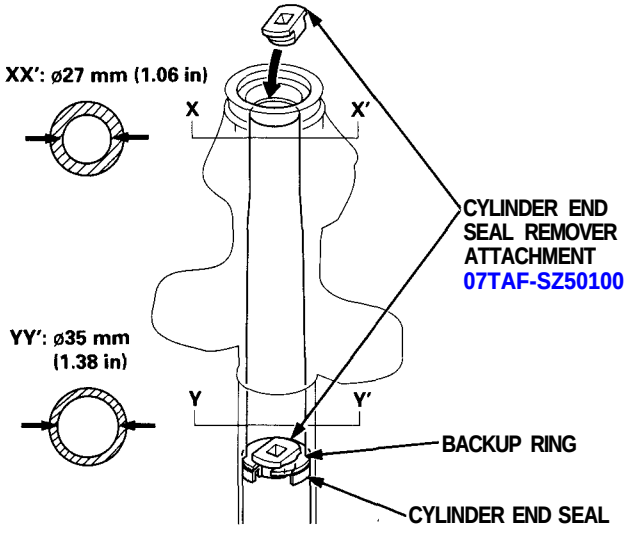


15. Remove the cylinder end seal from the steering rack.



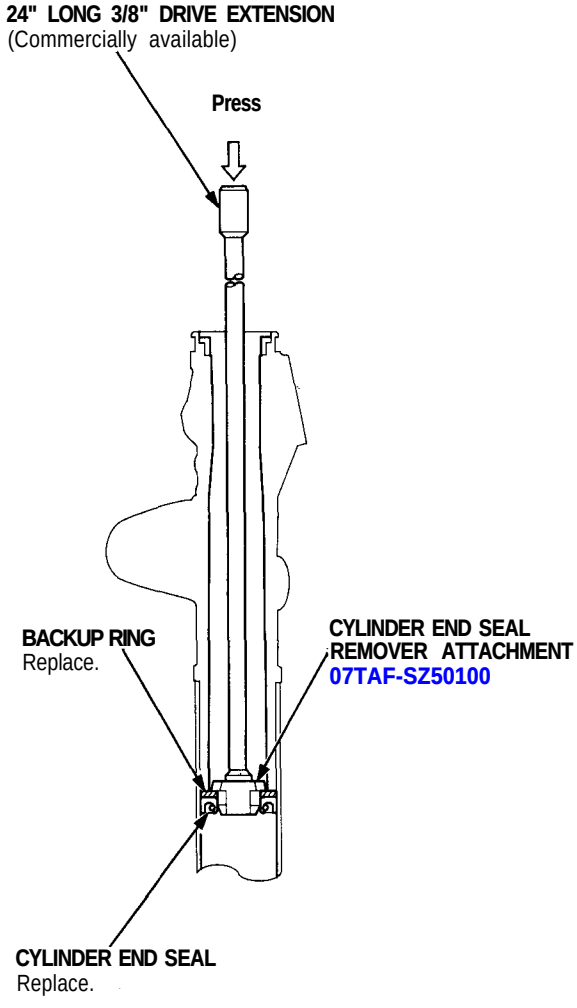
16. Turn the special tool so it will fit through the end of the gearbox housing, then position special tool on the backup ring as shown below.

NOTE: Make sure that the special tool is securely positioned on the backup ring edges.



17. Insert a 24" long 3/8" drive extension into the cylinder and the special tool from the gearbox side.

CAUTION: Be careful not to damage the inside surface of the housing with the tools.



18. Set the steering gearbox in a press, then press out the cylinder end seal and backup ring from the gearbox.

CAUTION:

- **Keep the tool straight to avoid damaging the cylinder wall. Check the tool angle, and correct it if necessary, when removing the cylinder end seal.**
- **Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the tool. It will break the backup ring, and the cylinder end seal will remain in the gearbox.**

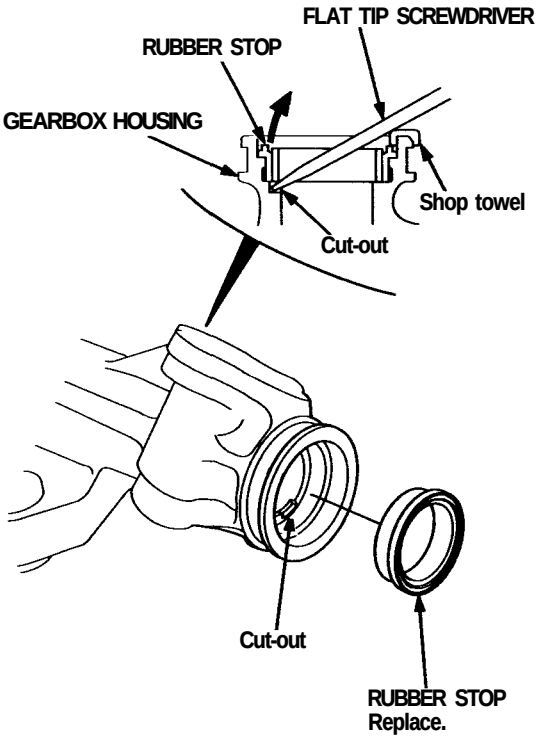
(cont'd)

Steering Gearbox

Disassembly (cont'd)

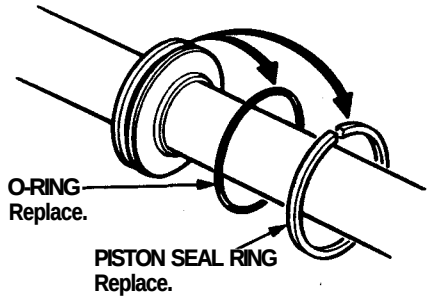
19. Check the rubber stop for damage or deterioration if OK, go on step 20; if not, replace the rubber stop, step as shown below:
Remove the rubber stop by prying it out of the gearbox housing with a flat tip screwdriver.

CAUTION: Protect the pry point on the gearbox housing with shop towel.



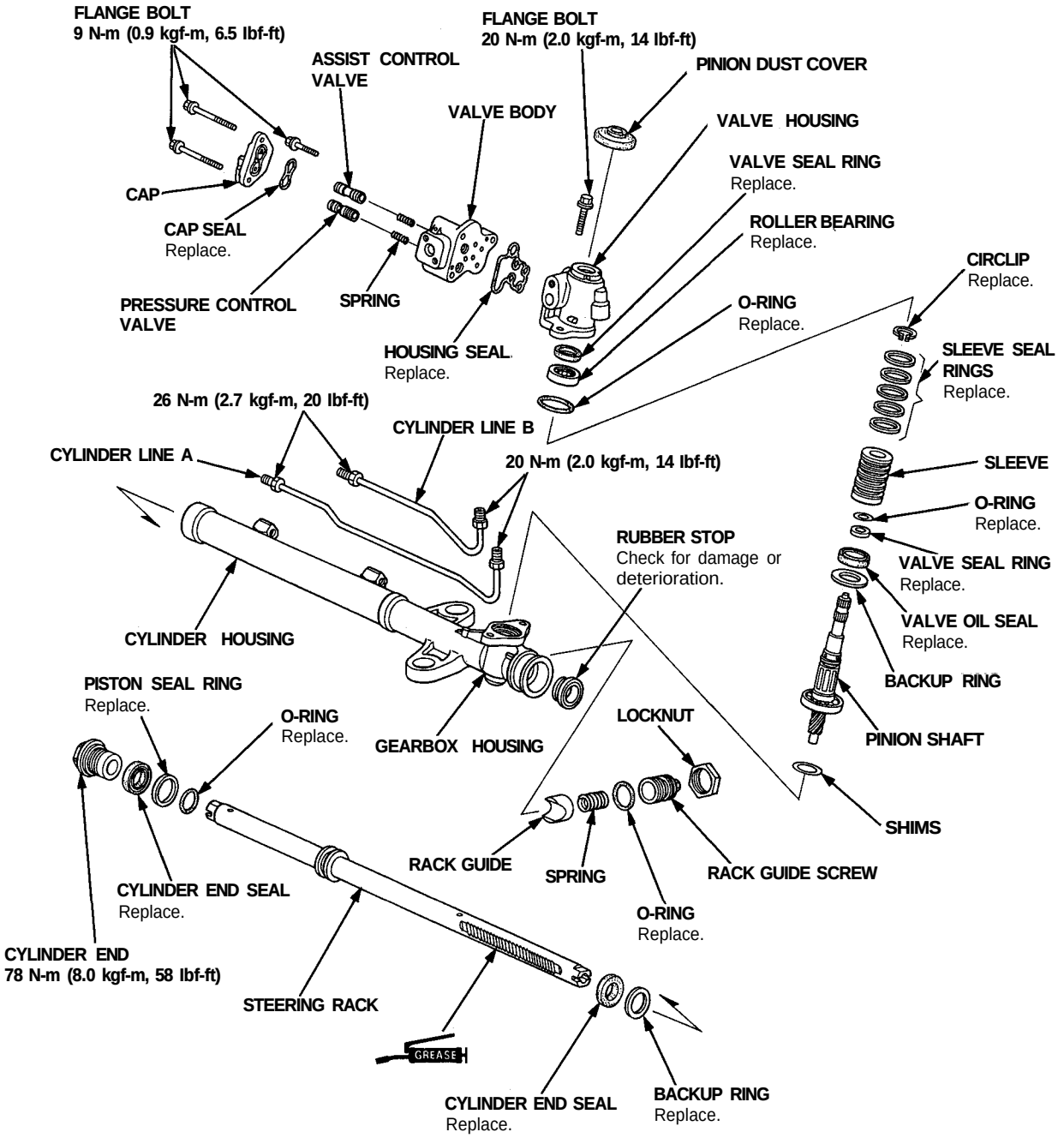
20. Carefully pry the piston seal ring and O-ring off the rack piston.

CAUTION: Be careful not to damage the inside of seal ring groove and piston edges when removing the seal ring.



Reassembly

NOTE:
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply the recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Use the appropriate special tools where necessary.



(cont'd)

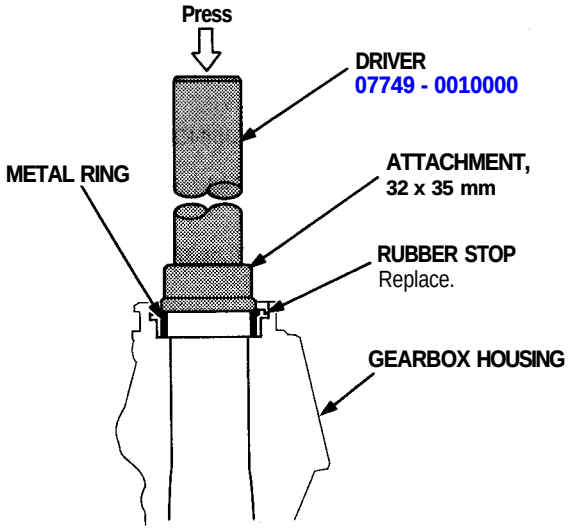
Steering Gearbox

Reassembly (cont'd)

Steering Rack Installation

1. If removed the rubber stop; position the new rubber stop in the gearbox housing, then press it in using a hydraulic press and the special tools as shown.

   NOTE: Make sure that the special tool presses against the metal portion of the rubber stop.

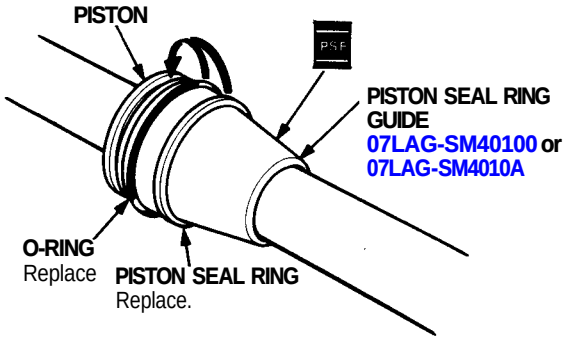


2. Coat the piston seal ring guide with power steering fluid, and slide it onto the rack, big end first.

3. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

   NOTE:
   - Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
   - Replace piston's O-ring and seal ring as a set.

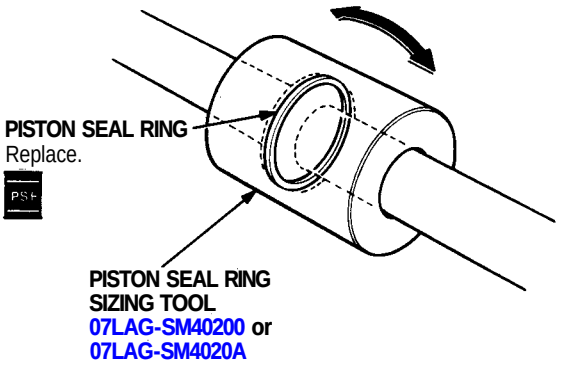
4. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.



5. Coat the piston seal ring and the inside of the special tool with power steering fluid.

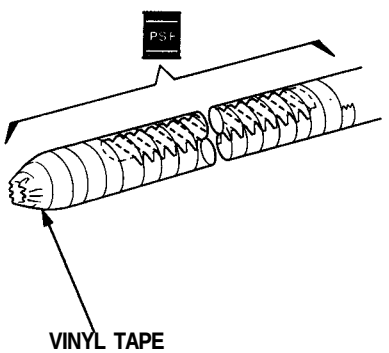
6. Carefully slide the tool onto the rack and over the piston seal ring.

7. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.



8. Wrap vinyl tape around the rack teeth and rack end edges, and coat the surface of the tape with the power steering fluid.

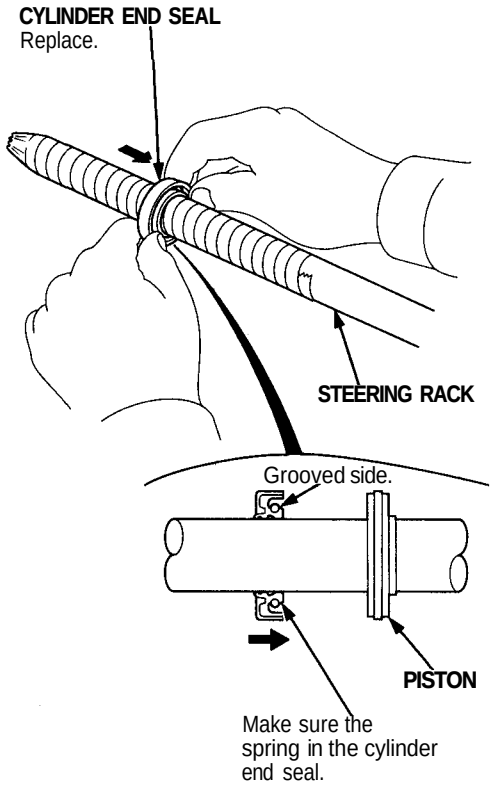
   NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



9. Coat the inside surface of the new cylinder end seal with power steering fluid.

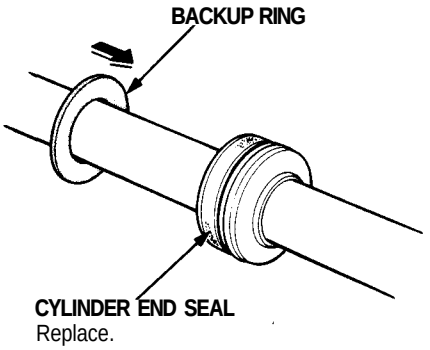
10. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges or teeth of the steering rack.



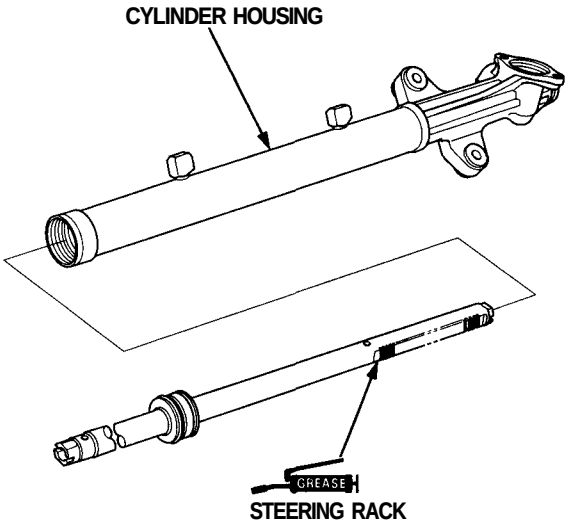
11. Remove the vinyl tape from the steering rack. Remove any residue of tape adhesive.

12. Install the new backup ring on the steering rack, then place the cylinder end seal to piston.

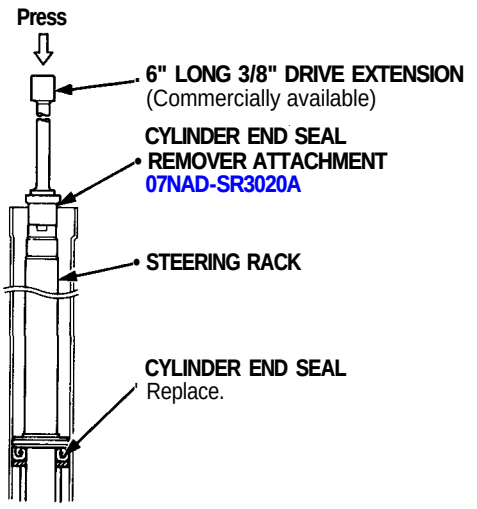


13. Grease the steering rack teeth, then insert the steering rack into the cylinder housing.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with the rack edges.



14. Insert 6" long 3/8" drive extension and the special tool into the steering rack as shown.



15. Install the cylinder end seal into the bottom of the cylinder by pressing on the tool with a press as shown.

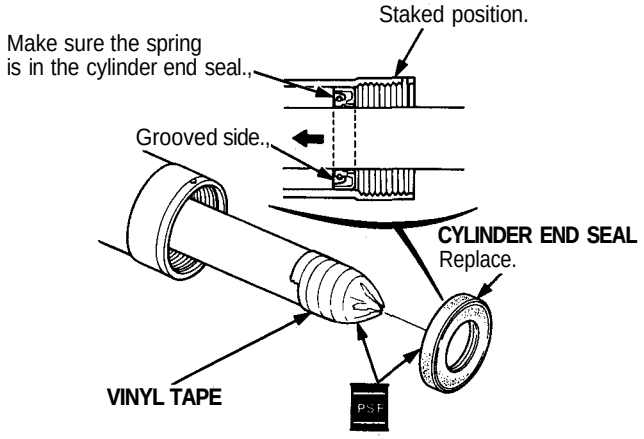
CAUTION: Do not push on the tool with excessive force as it may damage the cylinder end seal.

(cont'd)

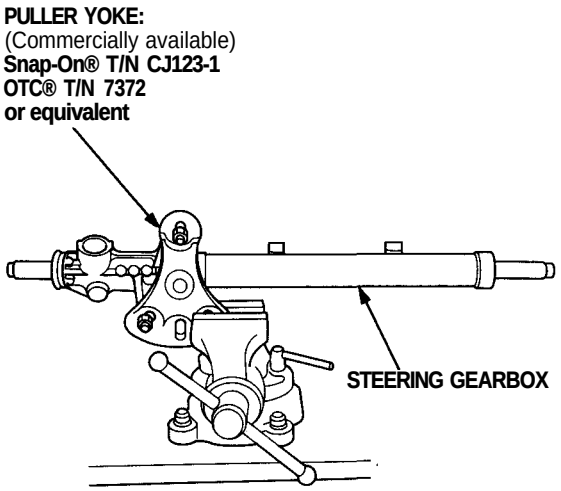
Steering Gearbox

Reassembly (cont'd)

16. Wrap vinyl tape around the rack end edges, and coat the surface of the tape with the power steering fluid.
    NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.
17. Coat the inside surface of the new cylinder end seal with power steering fluid.
18. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.
    CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges of the steering rack.



19. Remove the vinyl tape from the steering rack, then push in the cylinder end seal with your finger.
    NOTE:
    - Remove any residue of tape adhesive.
    - Take care not to damage the cylinder end seal with the threads and burrs at the staked position of the gearbox.
20. Install special to the steering gearbox, then clamp the tool in a vise with soft jaws as shown.
    CAUTION: Do not clamp the cylinder housing.

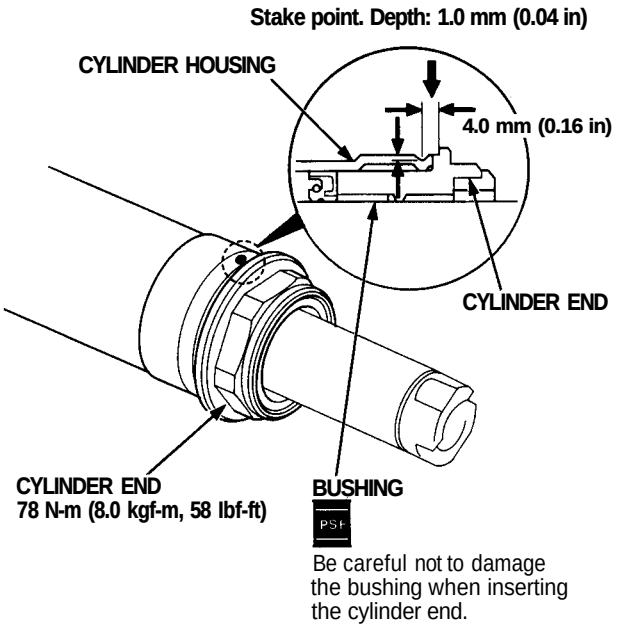


21. Coat the inside surface of the cylinder end with power steering fluid, then install the cylinder end by screwing it into the cylinder housing.

22. Remove the puller yoke from the steering gearbox.

23. After tightening the cylinder end, stake the point of the cylinder housing shown below.

    NOTE: Stake the cylinder in the position opposite from where the stake was removed during disassembly.



24. Select the 44 mm shim(s).

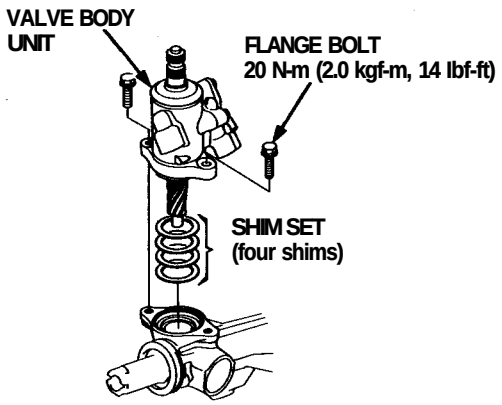
NOTE: Only reinstall the original 44 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones.
If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:

a. Set the four 44 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm.
Shim set: four 44 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

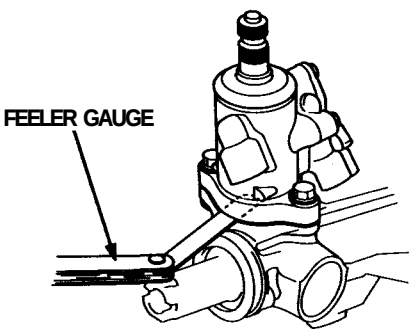
CAUTION: The four 44 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification.

b. Install the valve body unit on the gearbox, and tighten the flange bolts to the specified torque.



c. Measure the clearance between the gearbox and valve body unit using a feeler gauge as shown.

NOTE: Measure the clearance at the point midway between the two mounting bolts.



d. Determine the required thickness of the 44 mm shims by subtracting the clearance obtained in the step - 3 from the total thickness of the four shims.
(Total thickness of the 4 shims) - (Clearance) = Required thickness of the shims

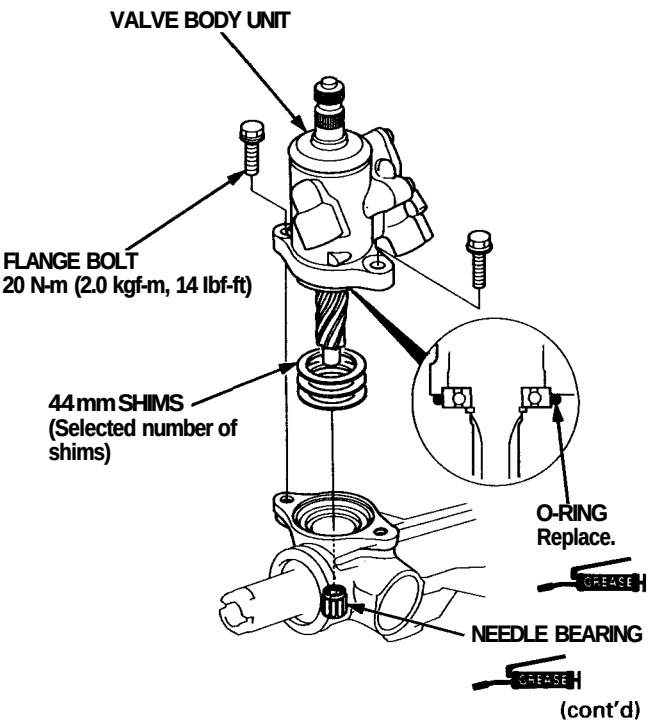
NOTE: Select the shims so that the total thickness is close to, but less than the required thickness.

Example:
Measurement is 0.28 mm (0.011 in):
0.07 - 0.28 = 0.42 mm (0.028 - 0.011 = 0.017 in)

The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

25. Set the selected 44 mm shims on the bearing surface of the gearbox housing.
26. Coat the new O-ring with grease, and carefully fit it on the valve housing.
27. Apply grease to the needle bearing in the gearbox housing.
28. Install the valve body unit on the gearbox housing by engaging the gears.
NOTE: Note the valve body unit installation position (direction of line connection).
29. Tighten the flange bolts to the specified torque.

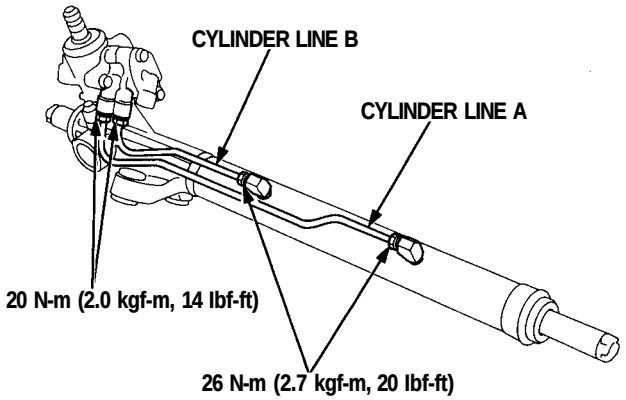


(cont'd)

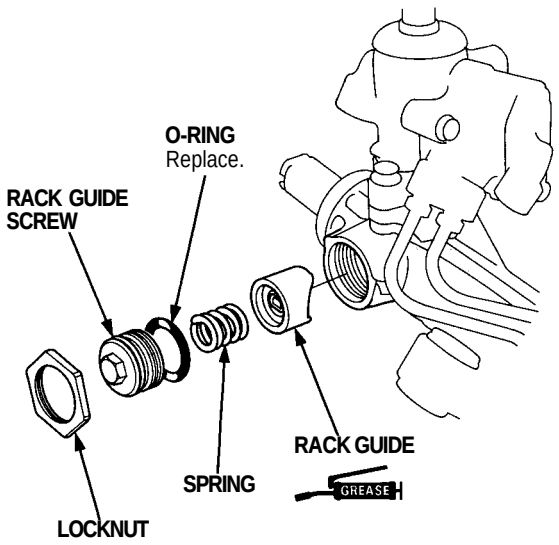
Steering Gearbox

Reassembly (cont'd)

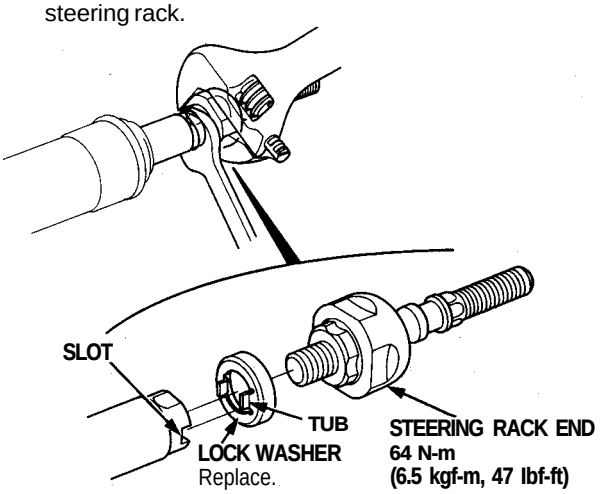
30. Install cylinder lines A and B.
    NOTE:
    - Clean the joints of cylinder lines A and B thoroughly. The joints must be free of foreign material.
    - Install cylinder lines A and B by lighting the flare nuts by hand first, then tighten the flare nuts to the specified torque.



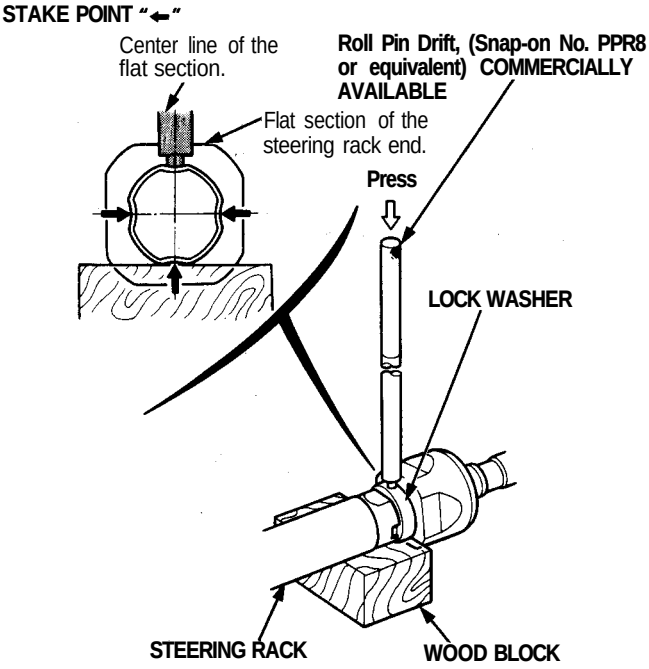
31. Grease the sliding surface of the rack guide, and install it onto the gearbox housing.
32. Apply a thin coat of grease to the new O-ring, and install it on the rack guide screw.
33. Install the spring, rack guide screw and locknut on the gearbox housing.
34. Adjust the rack guide screw (see page 17-5).
    NOTE: After adjusting, check that the rack moves smoothly by sliding the rack right and left.



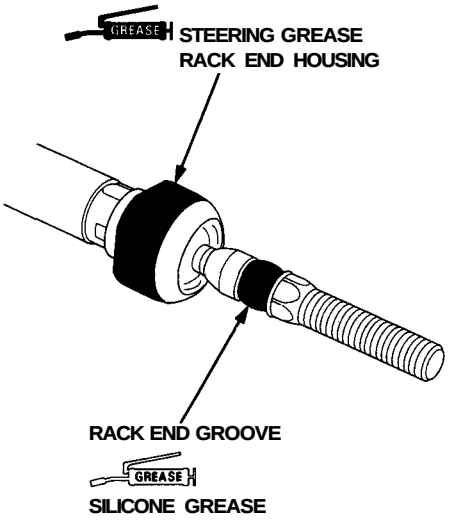
35. Install the new lock washer in the groove in the steering rack.



36. Screw each rack end into the rack.
37. Hold the steering rack with a wrench, and tighten the rack end with another.
    CAUTION: Be careful not to damage the rack surface with the wrench.
38. After tightening the rack, end, stake the four section of lock washer with the tool and a hydraulic press.
    NOTE:
    - Place the wood block on the press table, then set the lock washer section of the rack end on the wood block securely.
    - Be sure the tool is aligned with the flat sections of the steering rack end before pressing.
    - Stake the lock washer in the center of the flat section of the steering rack end.



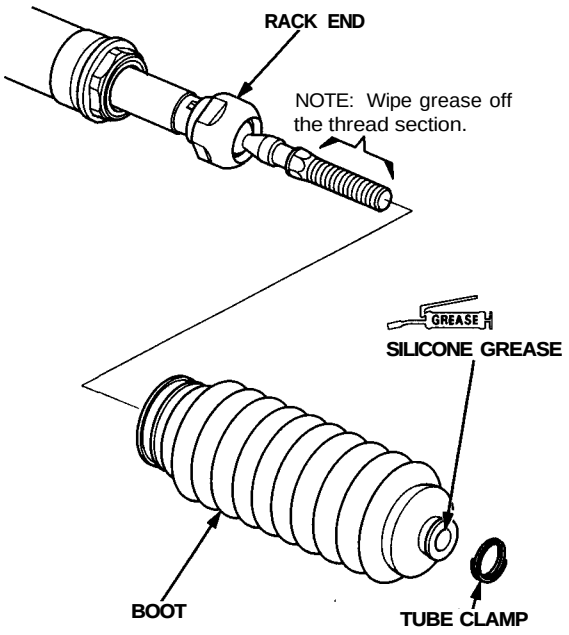
39. Apply steering grease to the circumference of the rack end housing.



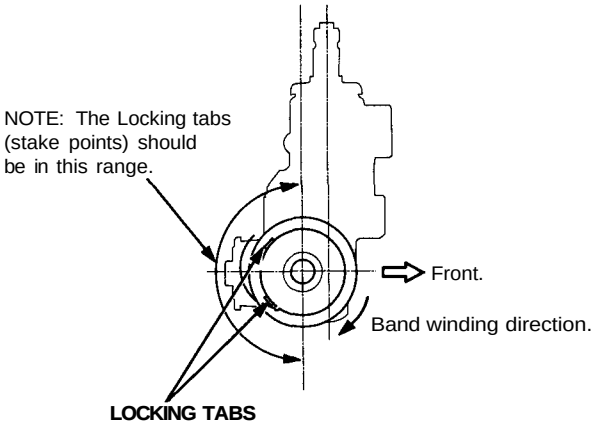
40. Apply a light coat of silicone grease to the boot grooves on the rack ends.

41. Install the boots in the rack end with the tube clamps.

NOTE: Install the boots with the rack in the straight ahead position (right and left tie-rods are equal in length).



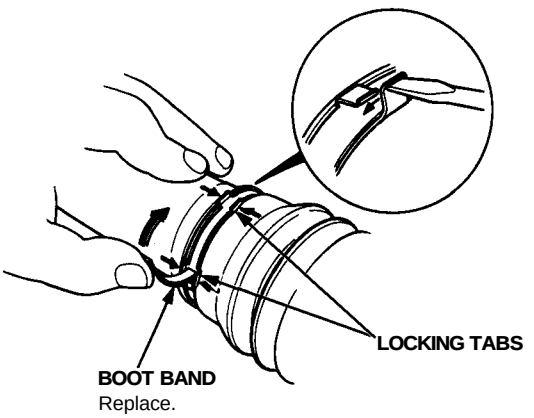
42. Install the new boot bands on the boots as shown.



43. Bend both sets of locking tabs.

44. Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Stake the band locking tabs firmly.



45. Slide the rack right and left to be certain that the boots are not deformed or twisted.

46. Loosely install the tie-rod locknuts and tie-rod ends on the rack ends.

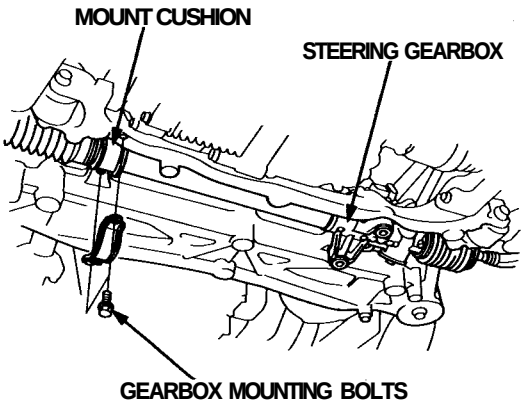
Steering Gearbox

Installation

CAUTION: Be careful not to bend or damage cylinder lines A and B or the four fluid lines when installing the gearbox.

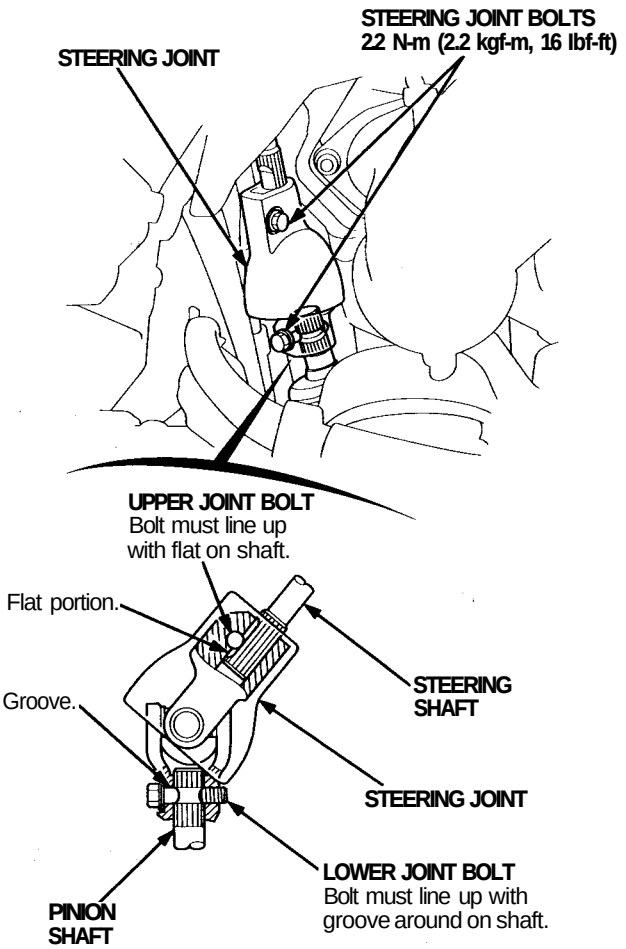
1. **Install the mount cushion on the right side.**

2. **Loosely install the mounting bracket on the cushion with the two gearbox mounting bolts.**



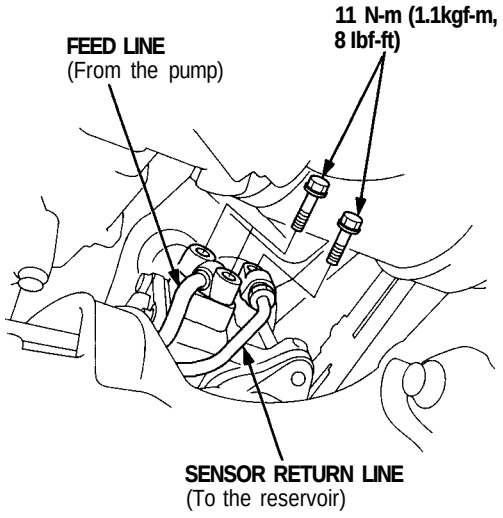
3. **Center the steering rack within its stroke.**

4. **Install the steering joint, and reconnect the steering shaft and pinion shaft.**
   NOTE: Make sure the steering joint is connected as follows:
   a. **Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat on the shaft), and loosely install the upper joint bolt,**
   b. **Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and loosely install the lower joint bolt.**
      Be sure that the lower joint bolt is securely in the groove in the pinion shaft,
   c. **Pull on the steering joint to make sure that the steering joint is fully seated. Then tighten the joint bolts.**

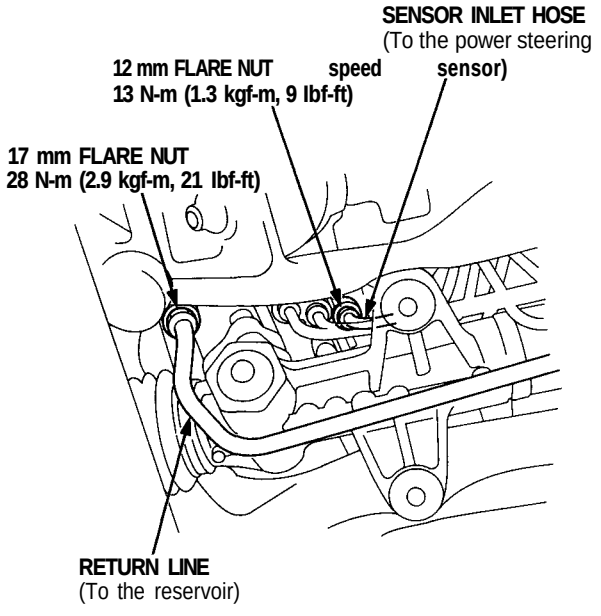


5. **Center the cable reel by first rotating it clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the arrow mark on the label points straight up.**
   Reinstall the steering wheel (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504):

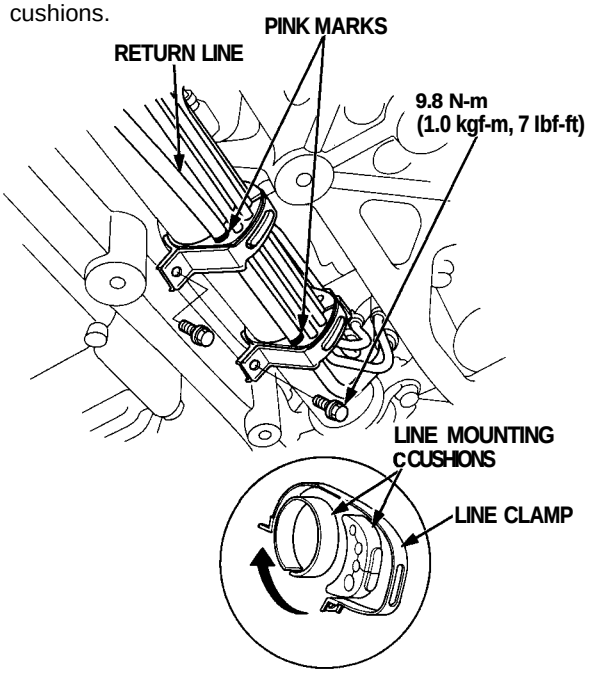
6. Reconnect the two lines (feed line and sensor line) to the upper side of the valve body unit.



7. Reconnect the two lines (sensor inlet line and return line) to the lower side of the valve body unit.

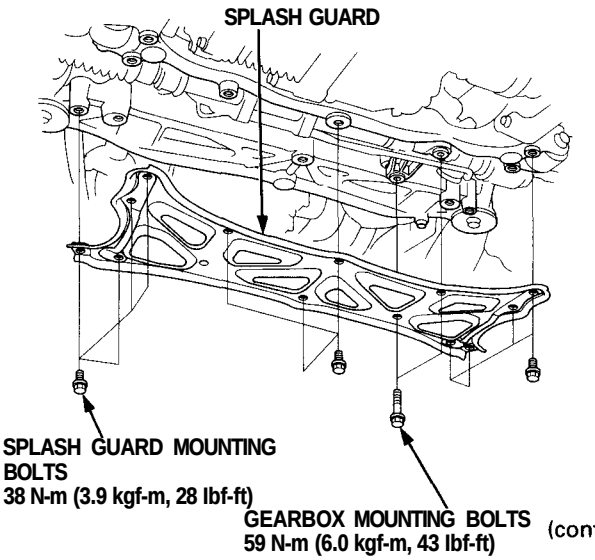


8. Install the line mounting cushions by aligning the pink marks on the return line (large diameter line).
   NOTE: After installing the pipe mounting cushions, make sure that there is no interference between the lines and rear beam.
9. Install the two line clamps on the line mounting cushions.



NOTE: Make sure that there is no interference between the fluid lines, the rear beam or any other parts.

10. Tighten the two gearbox mounting bolts on the right side that were loosely installed in step 2.
11. Install the splash guard with the two gearbox mounting bolts on the left side.
12. Tighten the splash guard attaching bolts.
    NOTE: Install the bolts loosely first, then tighten

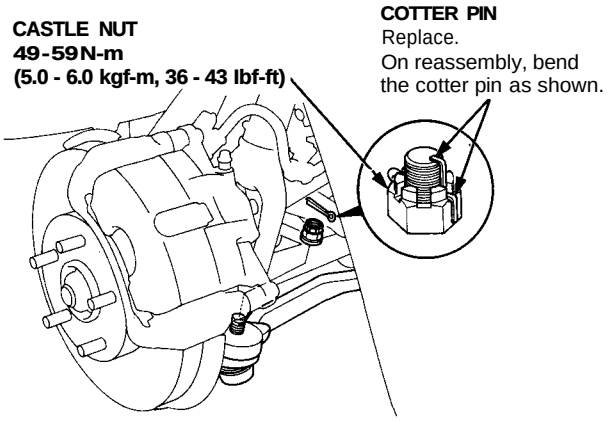


(cont'd)

Steering Gearbox

Installation (cont'd)

13. Reconnect the tie-rod ends to the steering knuckles, tighten the castle nut to the specified torque, and install new cotter pins.
NOTE: Before connecting the tie-rod ends, check the ball joint pin tapered section and threads section for grease contamination, and wipe it if necessary.
CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



14. Install the front wheels.

15. Fill the system with power steering fluid, and bleed air from the system (refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504).

16. After installation, perform the following checks.

- Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid. Check the gearbox for leaks.
- Adjust the front toe (see section 18).
- Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods, if necessary.

NOTE: Turn the right and left tie-rods equally.

Ball Joint Boot Replacement

'95 - 97 models:

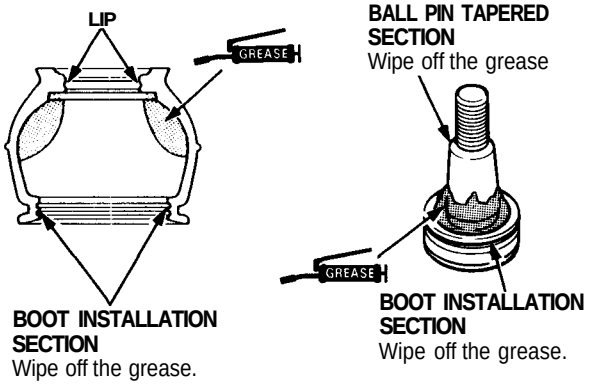
1. Remove the boot set ring and the boot.

   CAUTION: Do not contaminate the boot installation section with grease.

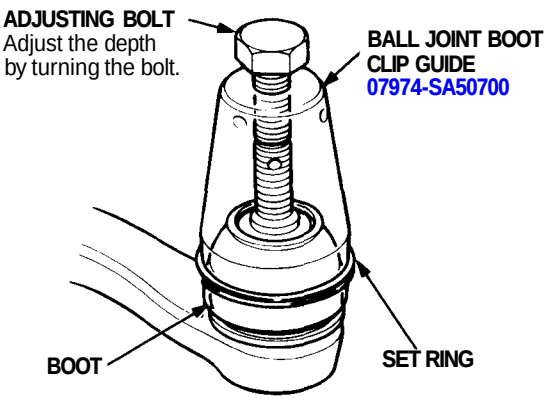
2. Pack the interior of the boot and lip with grease.

3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the boot in the groove of the boot installation section securely, then bleed air.



5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot.
   Slide the set ring over the tool and into position .

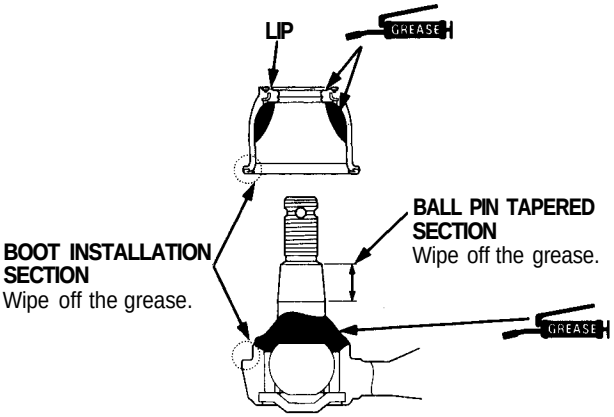
   CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

'98 model:

CAUTION: Do not contaminate the boot installation section with grease.

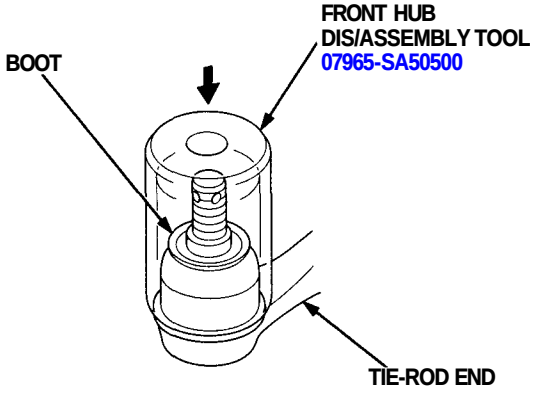
1. Remove the boot from the tie-rod end, and wipe the old grease off the ball pin.
2. Pack the lower area of the ball pin with fresh grease.
3. Pack the interior of the new boot and lip with fresh grease.

   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the new boot using the special tool as shown below.

   NOTE: The boot must not have a gap at the boot installation sections.



CAUTION: After installing the boot, check the ball pin tapered section for grease contamination, and wipe it if necessary.

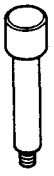
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF - SD40700	Hub Dis/Assembly Base	2	18-10
②	07GAF-SE00100	Hub Dis/Assembly Tool	1	18-10
③	07MAC-SL00100	Ball Joint Remover, 32 mm	1	18-9
④	07MAC - SL00200	Ball Joint Remover, 28 mm	1	18-8, 18-9
⑤	07746-0010300	Attachment, 42 x 47 mm	1	18-11
⑥	07746-0010600	Attachment, 72 x 75 mm	1	18-10, 18-11
⑦	07GAD-SD40101	Driver Attachment, 78 x 90 mm	1	18-11
⑧	07965-SD90100	Support Base	1	18-11
⑨	07965 - 6920201	Support Base	1	18-11

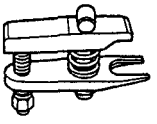
NOTE: Refer to page 18-2 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



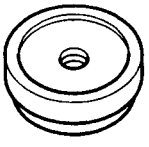
①



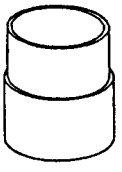
②



③ ④



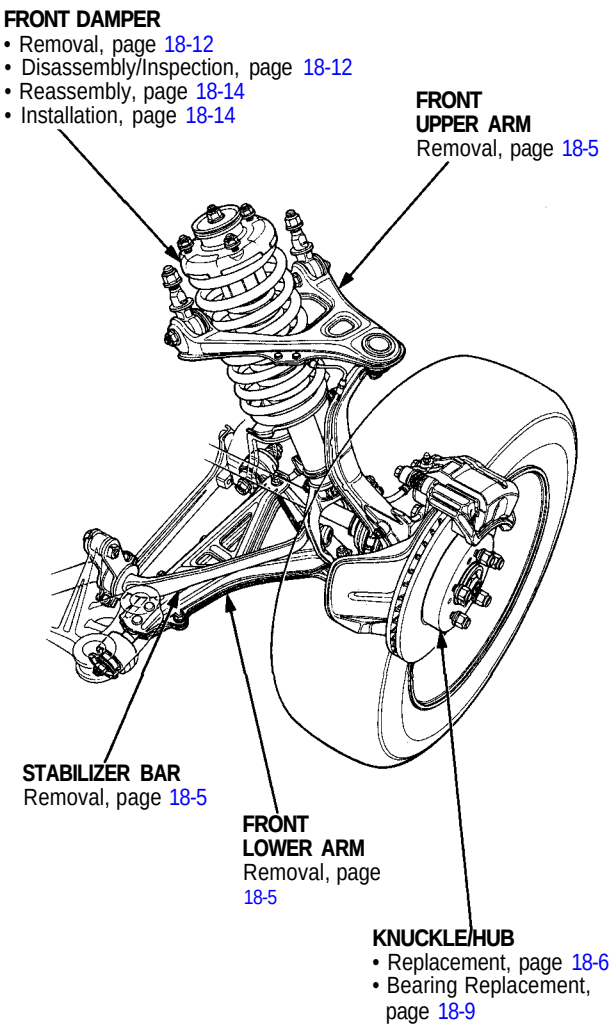
⑤ ⑥ ⑦



⑧ ⑨

Index

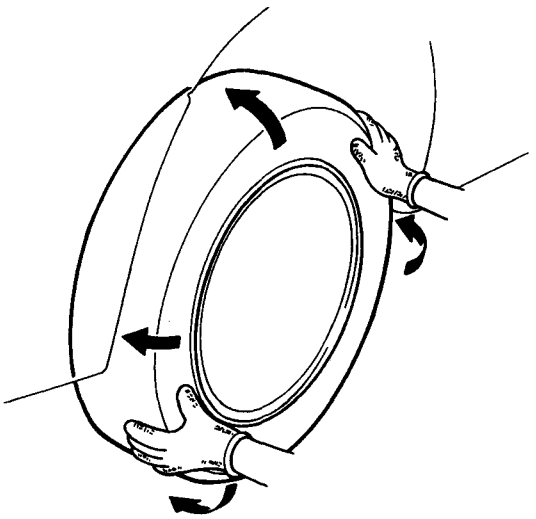
Front Suspension:



Caster

NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold a wheel with your hands, and move it up and down and right and left to check for wobbling.)



Inspection

NOTE: Use commercially available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Check the steering wheel angle; if significantly off center, it may be necessary to remove the steering wheel and reposition it on the splines. Turn the steering wheel to the straight ahead position.

2. Check the caster angle.

   Caster angle: 3 40'± 1°

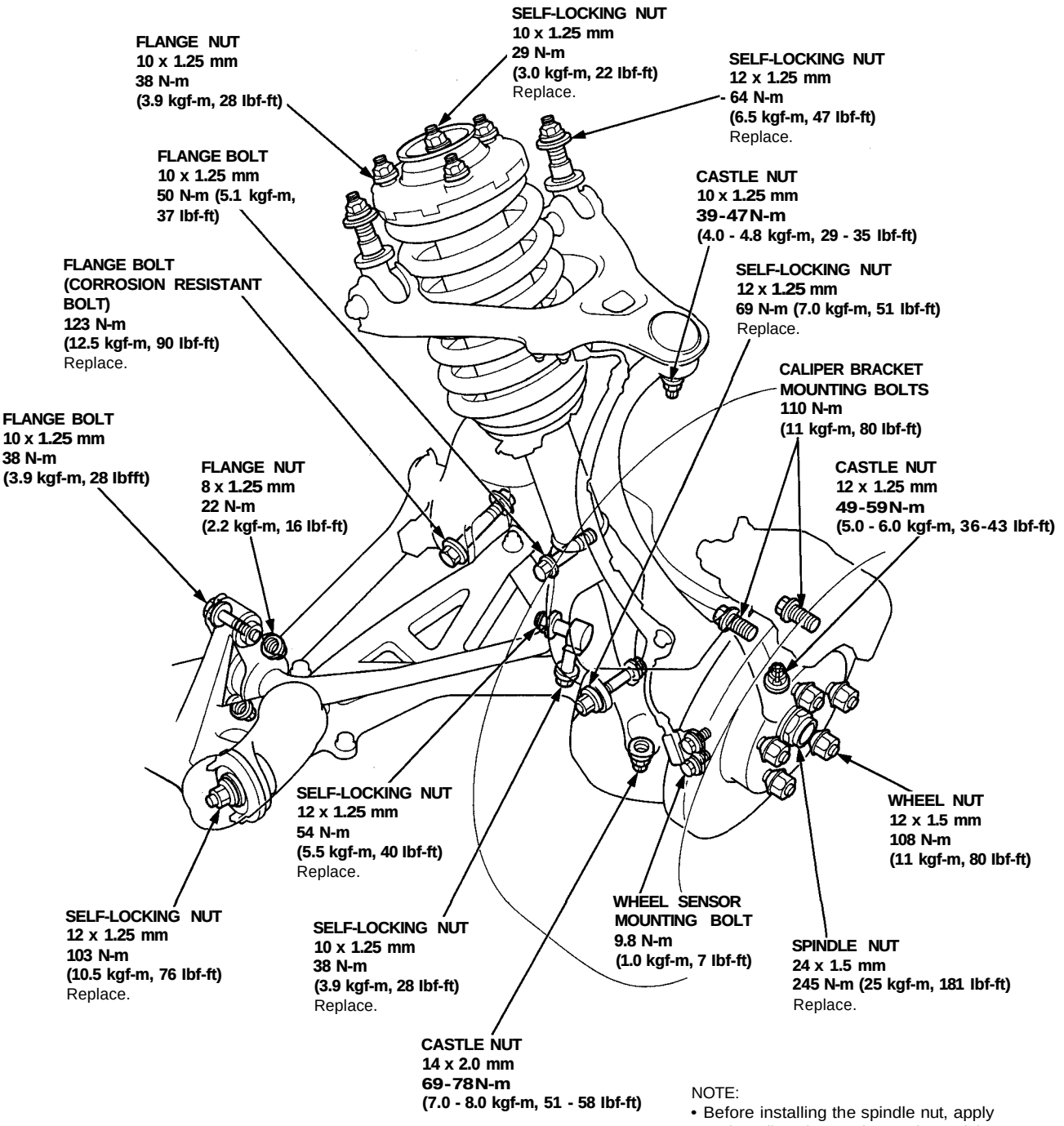
3. If out of specification, check for damaged suspension components.

Torque Specifications

CAUTION:

- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

NOTE: Wipe off the grease before tightening the nut at the ball joint.



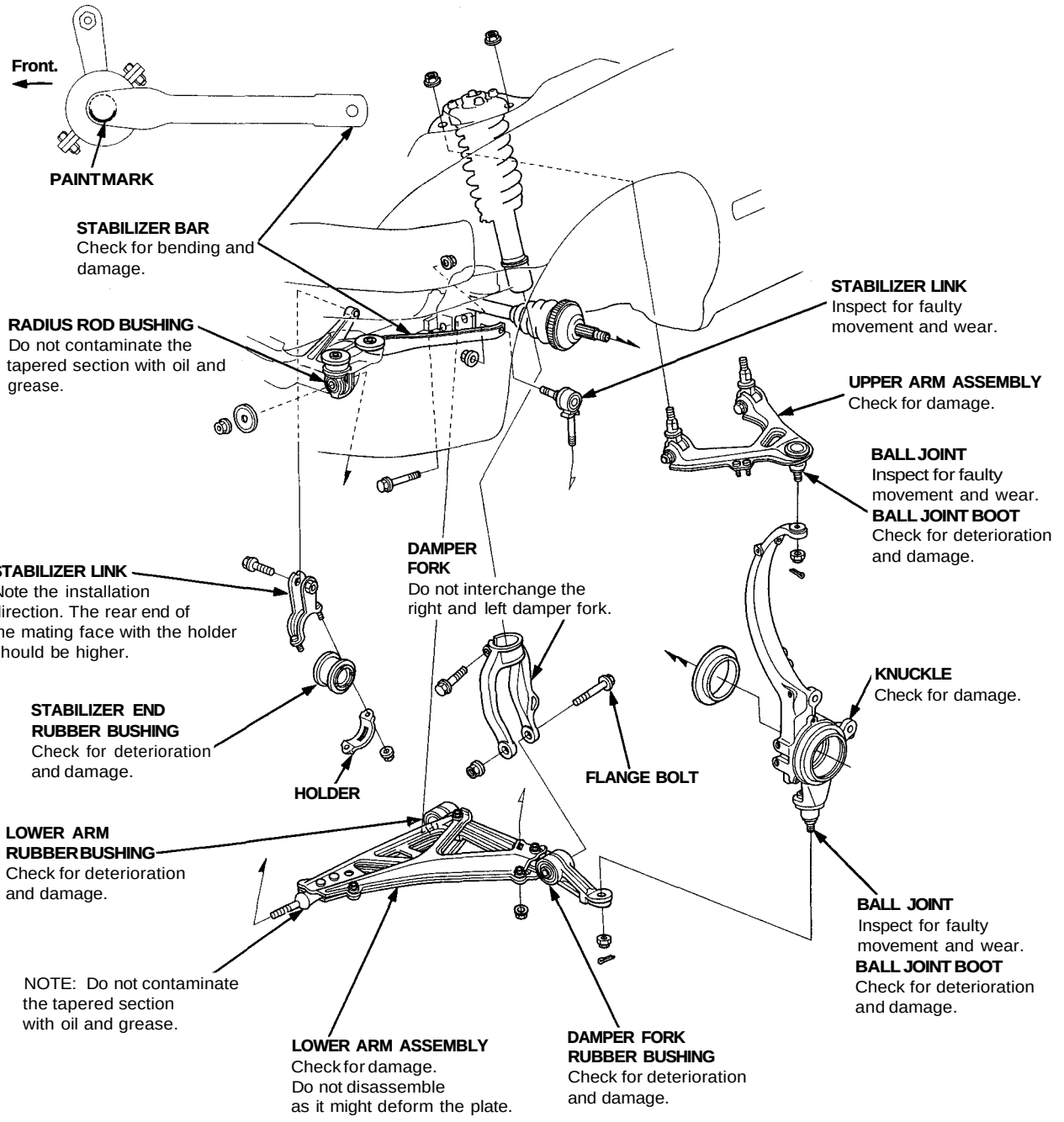
NOTE:

- Before installing the spindle nut, apply engine oil to the seating surface of the nut.
- After tightening, use a drift to stake the spindle nut shoulder against the spindle.

Illustrated Index

NOTE:

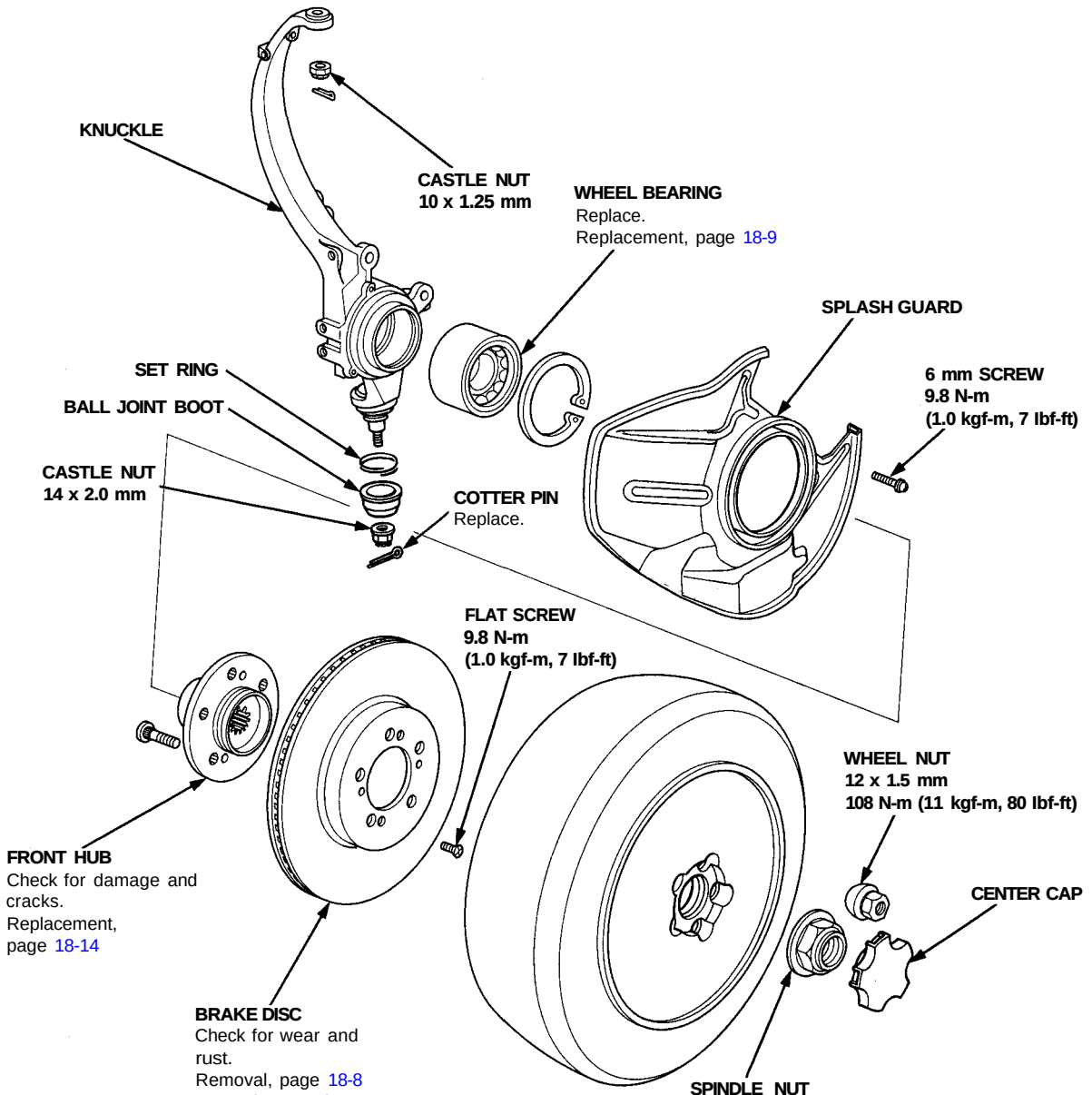
- Wipe off the grease before tightening the nut at the ball joint.
- Torque specifications, see page 18-4. The right and left stabilizer springs are symmetrical. Install with the paint mark facing down.
- The right and left damper forks are not symmetrical. The left damper fork is marked with "Z5L" while the right damper fork is marked with "Z5R". Do not interchange them.
- The right and left upper arms are not symmetrical. The left upper arm is marked with "LP" while the right arm is marked with "RP". Do not interchange them.



Front Suspension

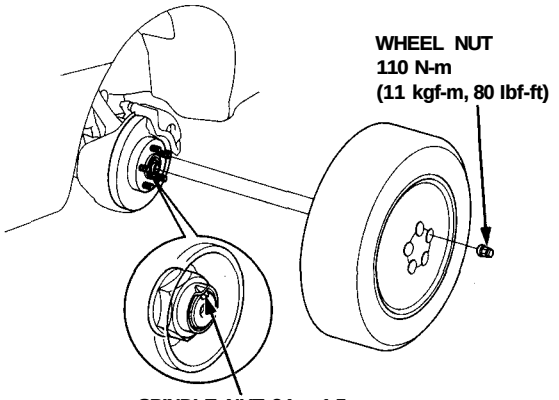
Knuckle/Hub Illustrated Index

NOTE:
- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage aluminum wheels.
- Before installing the wheel, clean the mating surface of the brake disc and inside of the wheel.



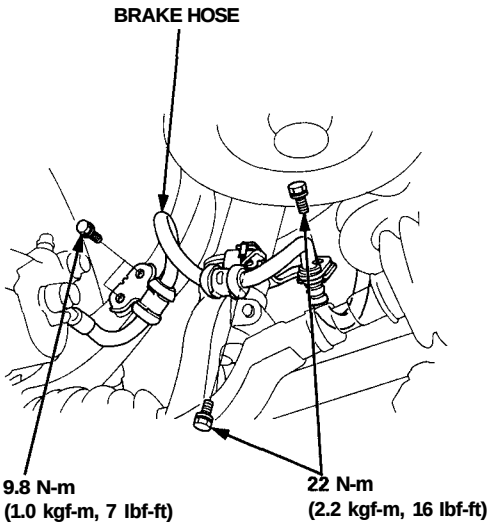
Knuckle Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheel.
4. Raise the locking tab on the spindle nut, then remove the nut.



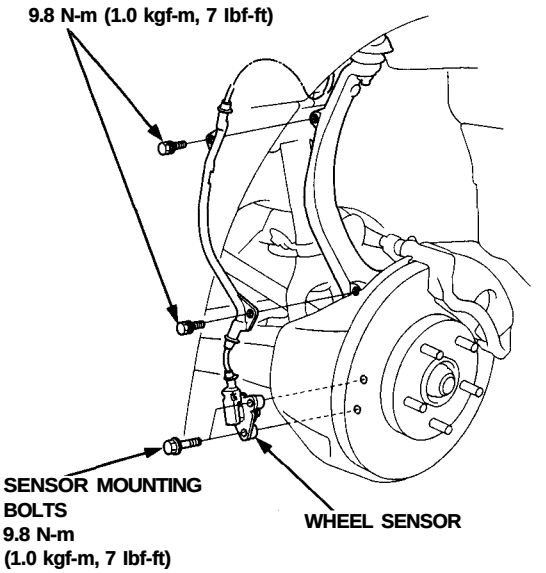
SPINDLE NUT 24 x 1.5 mm
245 N-m
(25 kgf-m, 181 lbf-ft)
Replace.
NOTE:
- Before installing the spindle nut, apply engine oil to the seating surface of the nut.
- After tightening, use a drift to stake spindle shoulder against the spindle.

5. Remove the brake hose mounting bolts.



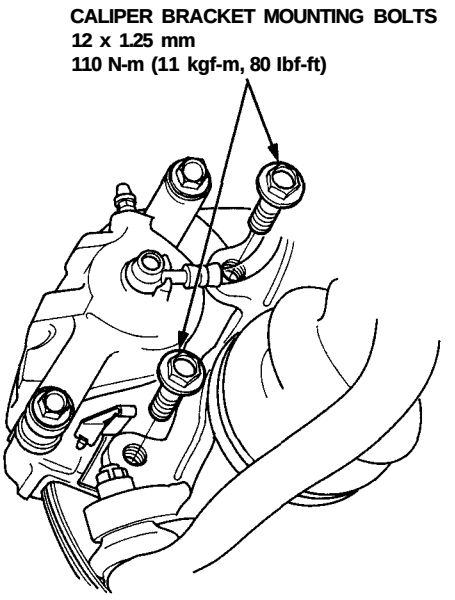
6. Remove the wheel sensor from the knuckle.

NOTE: Do not disconnect the wheel sensor connector.



7. Remove the caliper bracket mounting bolts, and hang the caliper assembly to one side.

CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the under-carriage.



(cont'd)

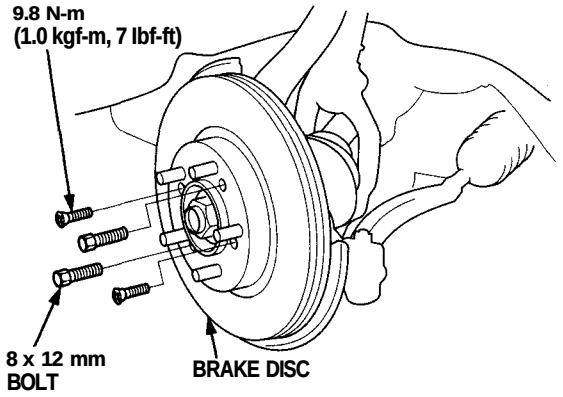
Front Suspension

Knuckle/Hub Replacement (cont'd)

8. Remove the 6 mm brake disc retaining screws.

9. Screw two 8 x 12 mm bolts into the disc to push it away from the hub.

   NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.



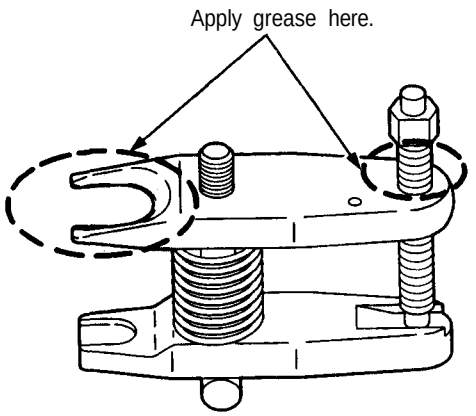
CAUTION: Be careful not to damage the ball joint boot.

10. Clean any dirt or grease off the ball joint.

11. Remove the cotter pin from the ball joint castle nut, and remove the nut.

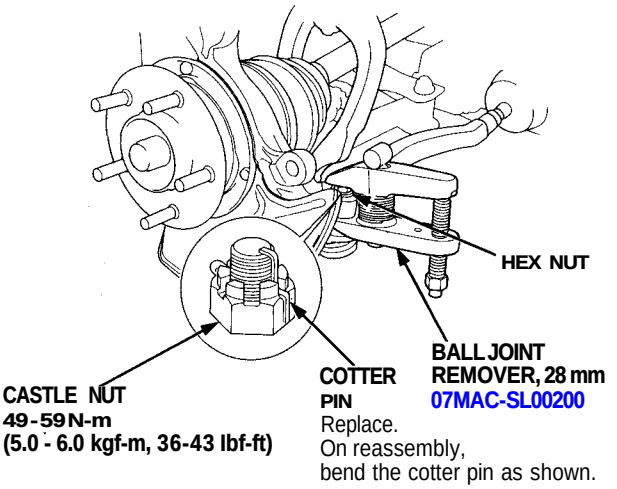
12. Install a 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.

13. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

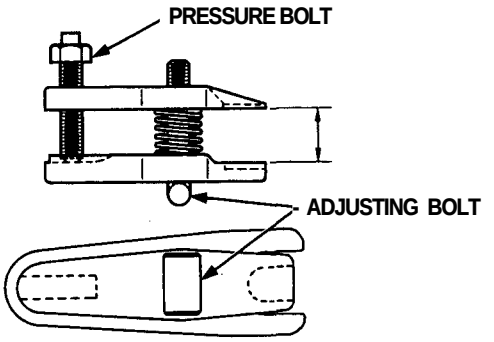


14. Install the special tool as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot. Adjust the jaw spacing by turning the pressure bolt.

   NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



15. Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt, and recheck the jaws to make sure they are still parallel.



NOTE: After making the adjustment to the adjusting bolt, be sure the head of the adjusting bolt is in this position to the allow the jaw to pivot.

16. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

   ⚠ WARNING Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

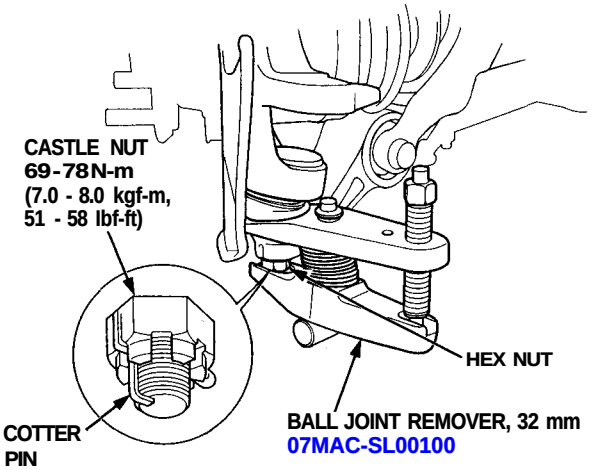
17. Remove the tool, then remove the nut from the end of the ball joint, and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot, and replace it if damaged.

18. Remove the cotter pin and lower arm ball joint nut.

19. Install a 14 mm hex nut on the ball joint. Be sure that the 14 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

20. Use the special tool as shown on page 18-8 to separate the ball joint and lower arm.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

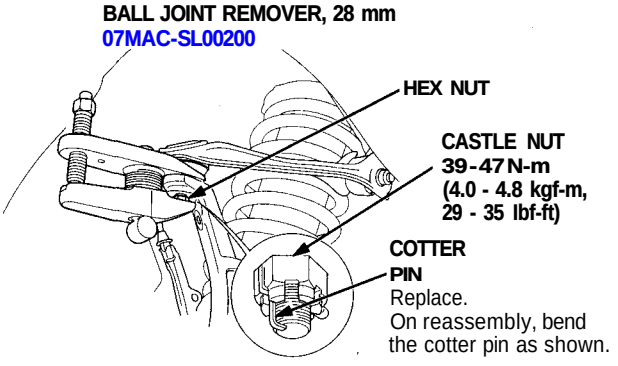


21. Remove the cotter pin and the upper ball joint nut.

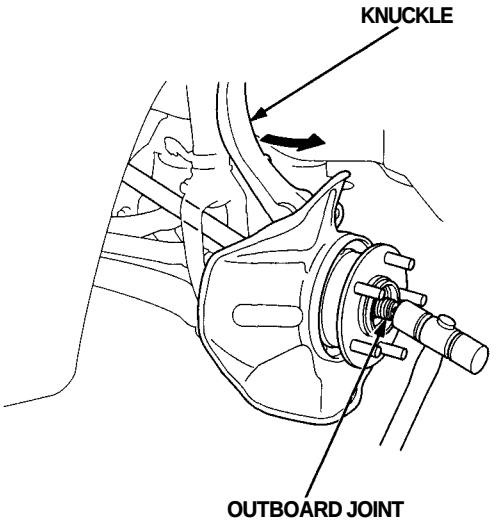
22. Install a 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

23. Use the special tool as shown on page 18-8 to separate the ball joint and knuckle.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



24. Pull the knuckle outward, and remove the driveshaft outboard joint from the knuckle by tapping the driveshaft end with a plastic hammer, then remove the knuckle.



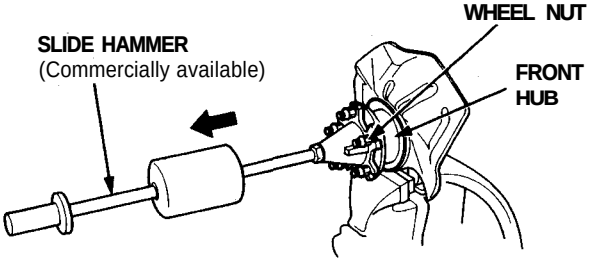
Wheel Bearing Replacement

NOTE: Replace the bearing with a new one after removal.

25. Carefully clamp the caliper bracket mount section of the knuckle in a vise with soft jaws.

26. Separate the hub from the knuckle using a commercially available hub puller.

CAUTION:
- **Hold the knuckle securely so it does not slip out of the vise from the impact.**
- **Take care not to distort the splash guard.**

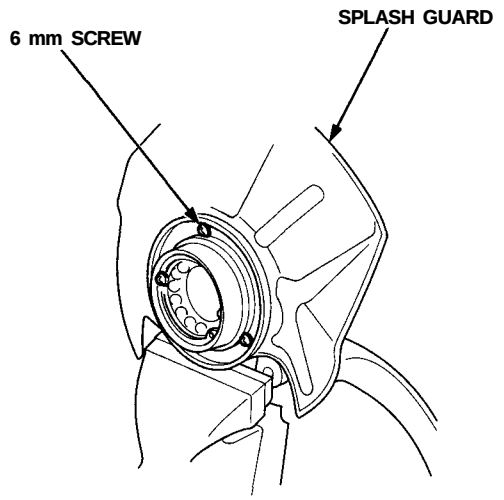


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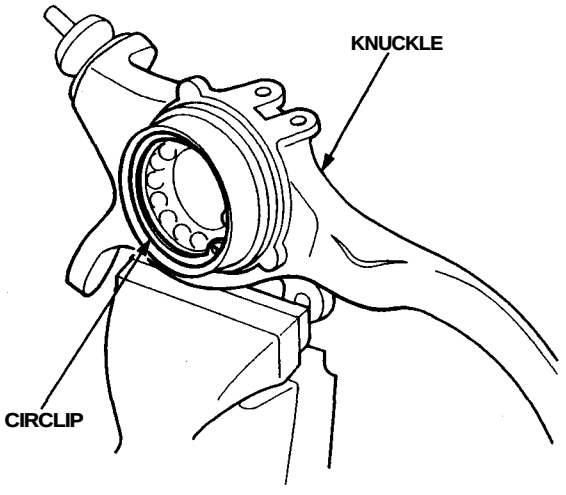
Front Suspension

Knuckle/Hub Replacement (cont'd)

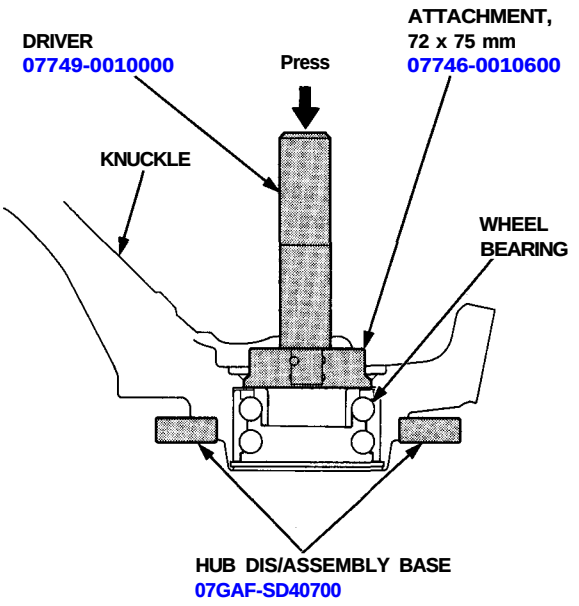
27. Remove the splash guard.



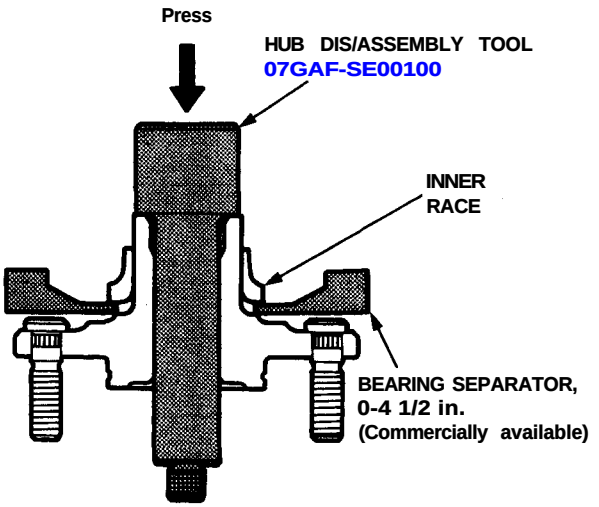
28. Remove the circlip from the knuckle.



29. Press the wheel bearing out of the knuckle using the special tools and a press.

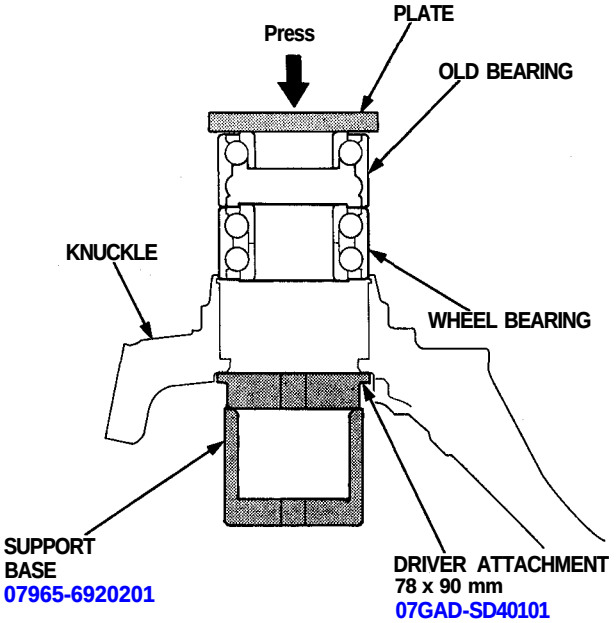


30. Remove the outboard bearing inner race from the hub using the special tools and a commercially available bearing separator.

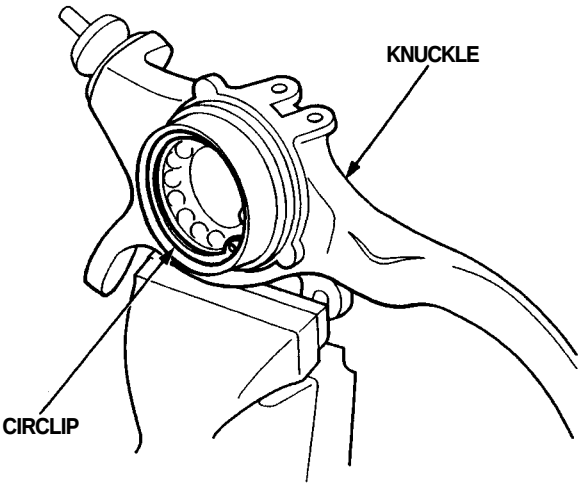


NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

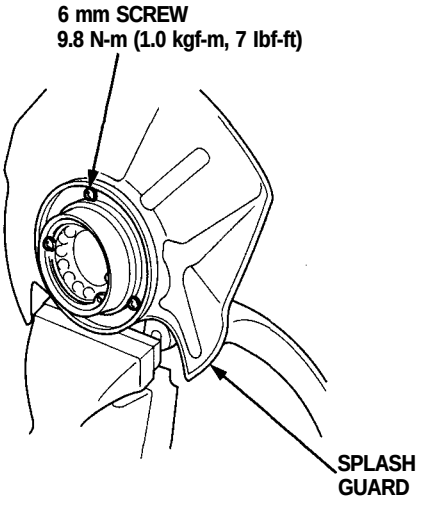
31. Press a new wheel bearing into the knuckle using the old bearing, plate and a press.



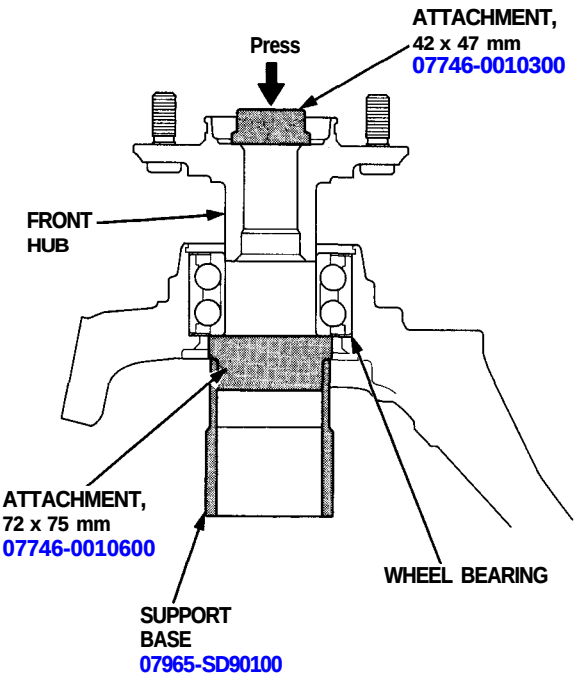
32. Install the circlip securely in the knuckle groove.



33. Install the splash guard and tighten the screws.



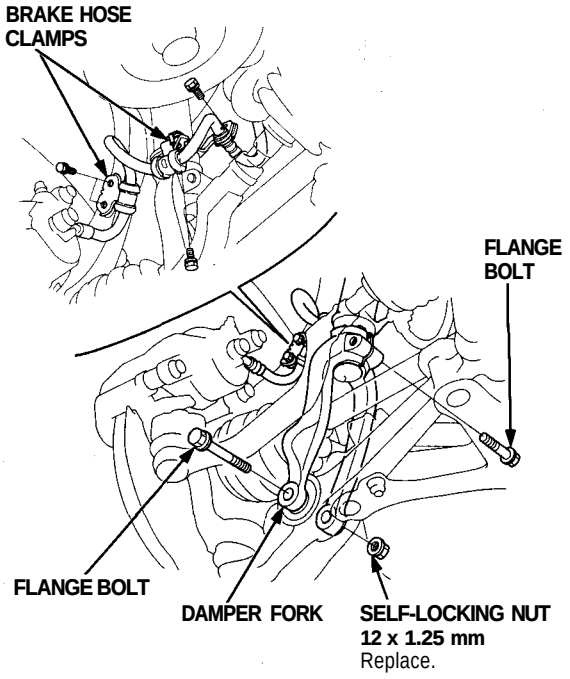
34. Place the front hub in the special tool fixture, then set the knuckle in position, and apply downward pressure using the special tools and a press.



Front Damper

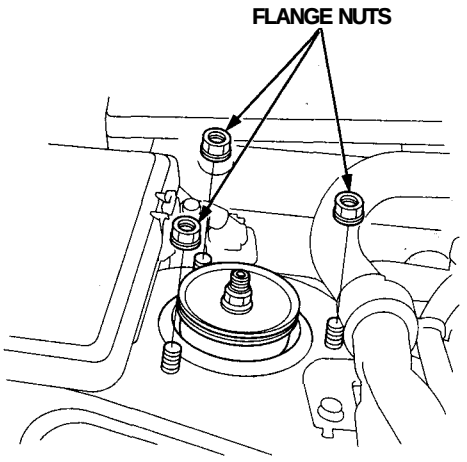
Removal

1. Remove the brake hose clamps from the damper.
2. Remove the flange bolt.
3. Remove the flange bolt and self-locking nut, then remove the damper fork.



4. Remove the damper by removing the three flange nuts.

NOTE: Mark the right and left dampers or store them separately. Do not confuse them on installation.

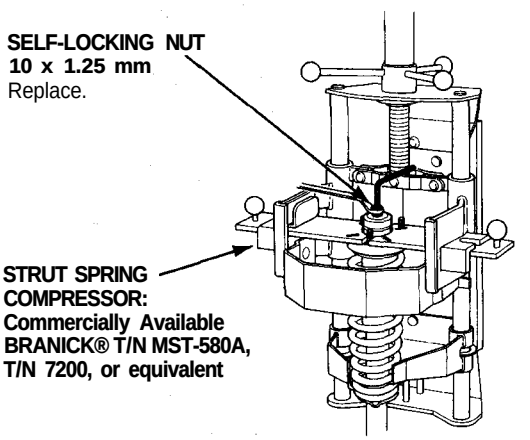


Disassembly/Inspection

Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

CAUTION: Do not compress the spring more than necessary to remove the nut.

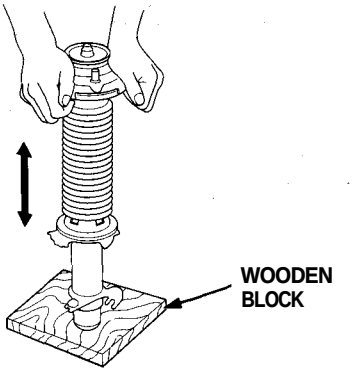


2. Remove the damper from the spring compressor, then disassemble the damper as shown on the next page.

Inspection

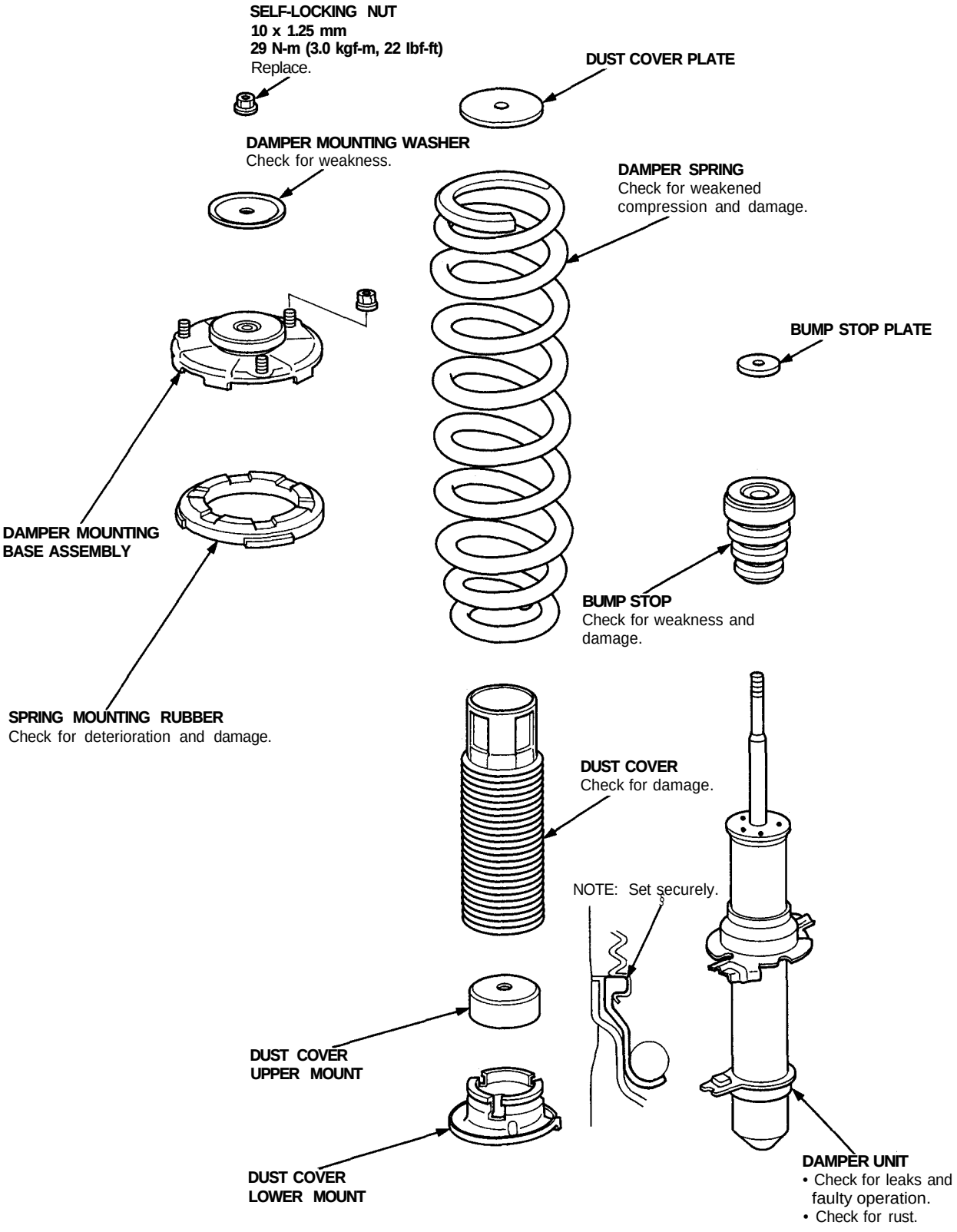
1. Reassemble all parts, except the spring.
2. Push on the damper as shown.
3. Check for smooth operation through a full stroke, both compression and extension.

NOTE: The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking and the damper should be replaced.



4. Check for oil leaks, abnormal noises or binding during these tests.

Inspection



NOTE: Mark the right and left dampers or store them separately. Do not confuse them on installation.

Front Damper

Reassembly

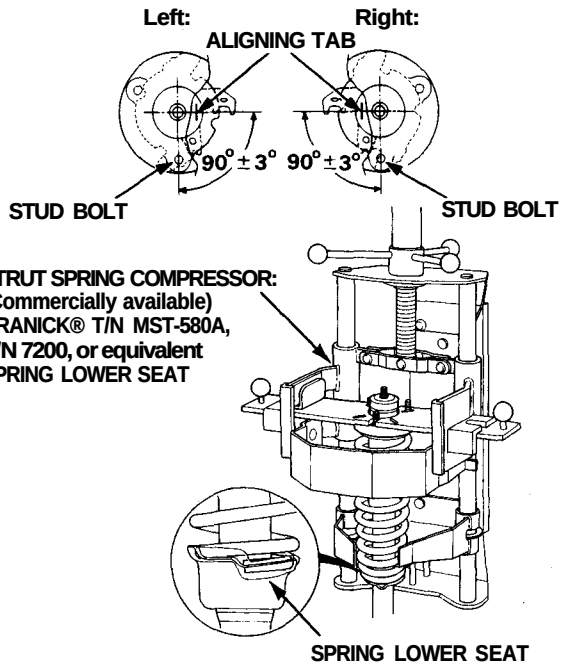
1. Install the damper unit on a spring compressor.

   NOTE: Follow the manufacturer's instructions.

2. Assemble the damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

   NOTE: Align the bottom of damper spring and spring lower seat as shown.

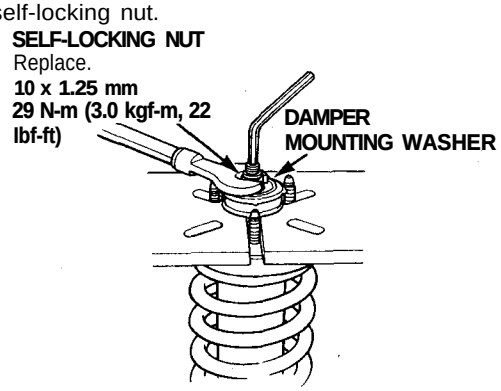
3. Position the damper mounting base on the damper unit as shown.



4. Compress the damper spring with the spring compressor.

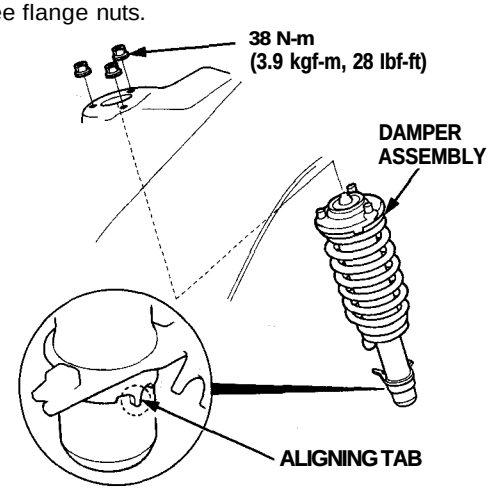
5. Install the damper mounting washer, then loosely install a new self-locking nut.

6. Hold the damper shaft with a hex wrench, and tighten the self-locking nut.



Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the three flange nuts.



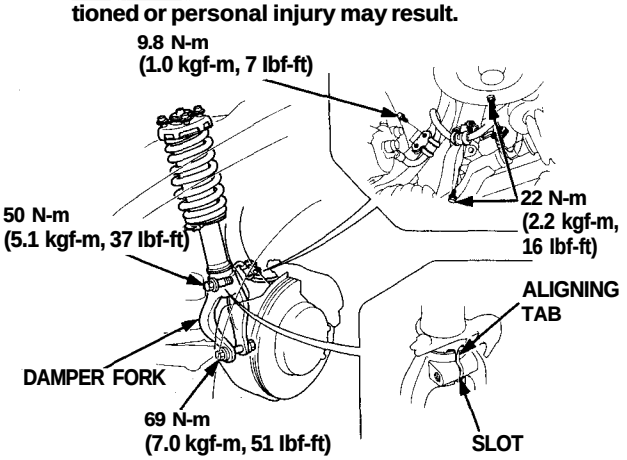
2. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.

3. Hand-tighten the bolts and nuts.

4. Raise the knuckle with a floor jack until the car just lifts off the safety stand.

   NOTE: The bolts and nuts should be tightened with the vehicle's weight on the damper.

⚠ WARNING The floor jack must be securely positioned or personal injury may result.



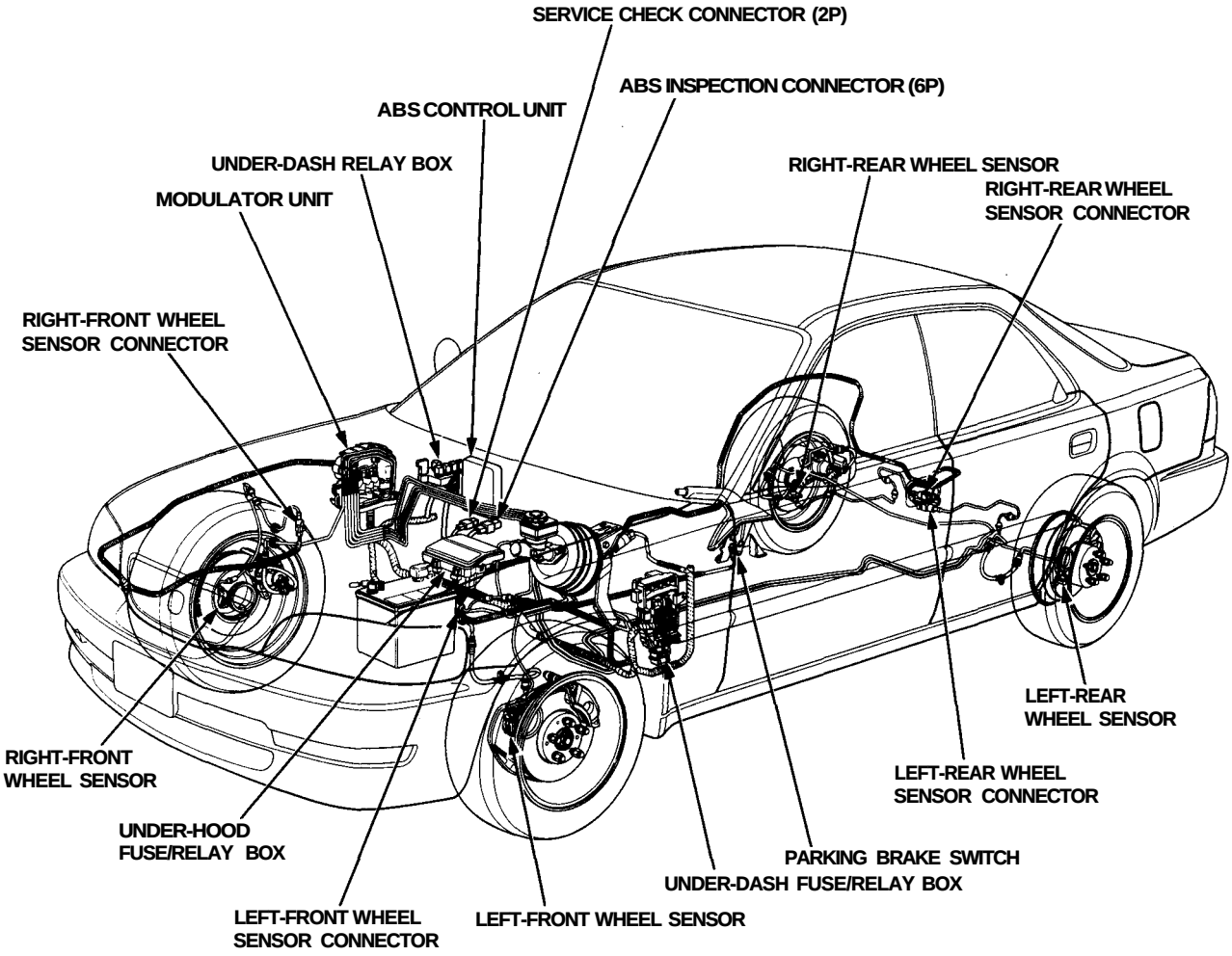
5. Tighten the flange bolt.

6. Tighten the flange bolt with a new self-locking nut.

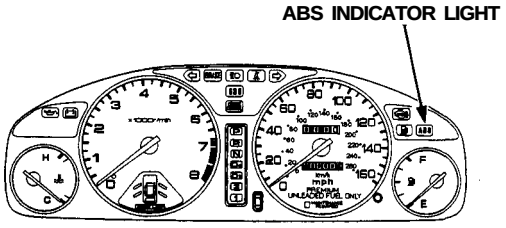
7. Tighten the damper to the frame with the flange nuts.

8. Install the brake hose clamps.

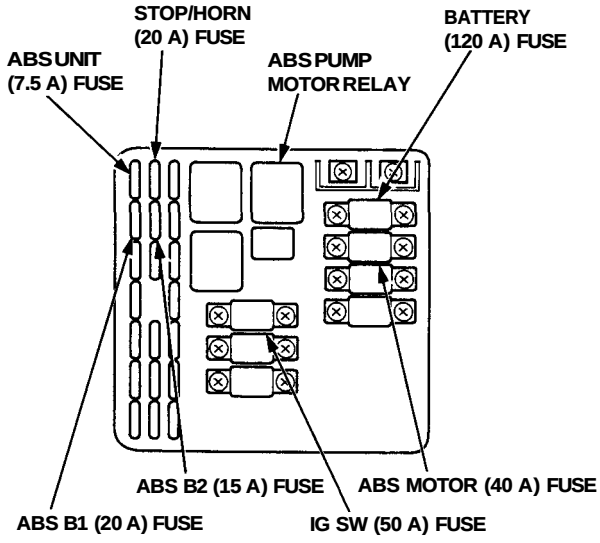
Component Locations



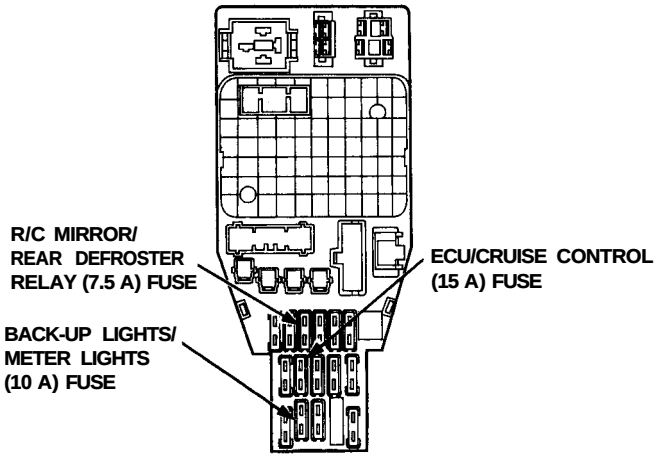
GAUGE ASSEMBLY



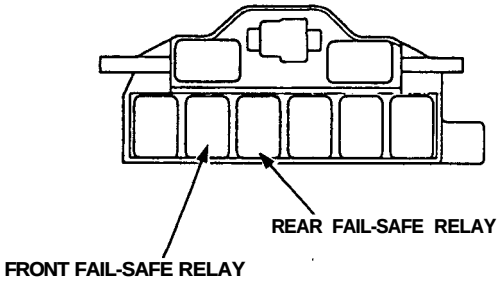
UNDER-HOOD FUSE/RELAY BOX



UNDER-DASH FUSE/RELAY BOX

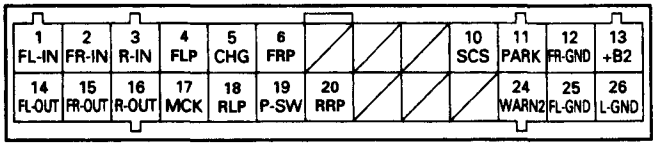


UNDER-DASH RELAY BOX



ABS Control Unit Terminal Arrangement

26P CONNECTOR



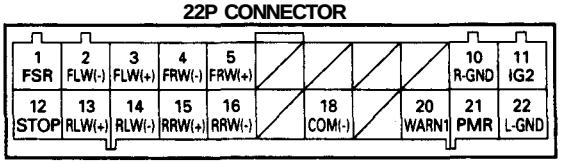
TERMINAL SIDE OF MALE TERMINALS

26P CONNECTOR

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	RED/BLU	FL-IN (Front-left inlet solenoid valve)	Drives left-front inlet solenoid valve.	Engine: ON → Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON (II)) → 0 V
2	RED/BLK	FR-IN (Front-right inlet solenoid valve)	Drives right-front inlet solenoid valve.	
3	RED/WHT	R-IN (Rear inlet solenoid valve)	Drives rear inlet solenoid valve.	
4	GRN/BLU	FLP (Front-left pulse)	Send the signal from left-front wheel sensor to TCS control unit.	When the wheel is turned: 5 V ↔ 0 V
5	WHT/BLU	CHG (Charge)	Detects engine operation. (Activates ABS control unit with engine ON.)	Engine running: 12 V Engine stopped: 0 V
6	GRN/BLK	FRP (Front-right pulse)	Send the signal from right-front wheel sensor to TCS control unit.	When the wheel is turned: 5 V ↔ 0 V
10	ORN	SCS (Service check signal)	Detects service check connector signal (diagnostic trouble code indication).	Connected: 0 V Disconnected: 5 V
11	GRN/RED	PARK (Parking brake)	Detects parking brake switch signal. (ABS indicator light is turned on when driving with signal ON.)	ON: 0 V OFF: 12 V
12	BLK	FR-GND (Front-right solenoid valve ground)	Ground for the right-front inlet and outlet solenoid valves.	
13	WHT/BLK	+B2 (+B2 power source)	• Power source for ABS control unit control circuit. • Power source for diagnostic trouble code memory.	12 V at all times
14	YEL/BLU	FL-OUT (Front-left outlet solenoid)	Drives left-front outlet solenoid valve.	Engine: ON → Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON (II)) → 0 V
15	YEL/BLK	FR-OUT (Front-right outlet solenoid valve)	Drives right-front outlet solenoid valve.	
16	YEL/WHT	R-OUT (Rear outlet solenoid valve)	Drives rear outlet solenoid valve.	
17	GRN	MCK (Motor check)	Detects pump motor drive signal. (ABS indicator light is turned on if there is open or short circuit.)	Motor → ON: 12 V OFF: 0 V (Open): 12 V
18	LT BLU	RLP (Rear-left pulse)	Send the signal from left-rear wheel sensor to TCS control unit.	When the wheel is turned: 5 V ↔ 0 V
19	YEL	P-SW (Pressure switch)	Detects pressure switch signal. (Switch turns ON at approx. 22,000 kPa, 220 kgf/cm², 3,100 psi and pump motor is stopped.)	ON: 0 V OFF: 12 V
20	GRN/YEL	RRP (Rear-right pulse)	Send the signal from right-rear wheel sensor to TCS control unit.	When the wheel is turned: 5 V ↔ 0 V
24	BLU/RED	WARN 2 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V
25	BLK	FL-GND (Front-left solenoid valve ground)	Ground for the left-front inlet and outlet solenoid valves.	
26	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.	

22P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

22P CONNECTOR

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal	
1	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay. (Fail-safe relay is turned OFF to shut off the power source to the solenoid when problem occurs.)	ON: 12 V OFF: 0 V	
2	BRN	FLW (–) (Front-left wheel sensor, negative)	Detects left-front wheel speed. (Ground level)	No. 2 – 3 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVp-p or above on oscilloscope
3	GRN/BLU	FLW (+) (Front-left wheel sensor, positive)	Detects left-front wheel speed.		
4	GRN	FRW (–) (Front-right wheel sensor, negative)	Detects right-front wheel speed. (Ground level)	No. 4 – 5 terminals	
5	GRN/BLK	FRW (+) (Front-right wheel sensor, positive)	Detects right-front wheel speed.		
10	BLK	R-GND (Rear solenoid valve ground)	Ground for rear inlet and outlet solenoid valves.		
11	YEL/BLK	IG2 (IG2 power source)	Detects ignition switch IG2 signal. (When IG2 is input, +B2 power source is switched to the power source for the ABS control unit (Vcc). Also IG2 monitors P-SW and MCK lines, and drives fail-safe relay.)	ON: 12 V OFF: 0 V	
12	GRN/WHT	STOP (Foot brake)	Detects brake switch signal. (Prevents unnecessary ABS operation when the brake pedal is not depressed)	ON: 12 V OFF: 0 V	
13	LT BLU	RLW (+) (Rear-left wheel sensor, positive)	Detects left-rear wheel speed. (Ground level)	No. 13 – 14 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVp-p or above on oscilloscope
14	GRY	RLW (–) (Rear-left wheel sensor, negative)	Detects left-rear wheel speed. (Ground level)		
15	GRN/YEL	RRW (+) (Rear-right wheel sensor, positive)	Detects right-rear wheel speed.	No. 15 – 16 terminals	
16	BLU/YEL	RRW (–) (Rear-right wheel sensor, negative)	Detects right-rear wheel speed. (Ground level)		
18	BLK/WHT	COM (–) (Common negative)	Ground for ALB checker when it is connected.		
20	BLU/RED	WARN 1 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V	
21	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay. (Pump motor relay is turned ON to drive the pump motor when P-SW OFF signal is detected.)	ON: 0 V OFF: 12 V	
22	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.		

Troubleshooting Precautions

ABS Indicator Light:

The ABS indicator light comes on for three seconds and then goes off when the control unit detects no problem during the initial diagnosis right after the engine starts. However, the ABS indicator light can stay on for up to 40 seconds when the control unit starts to check for pump overrun, etc. during the initial diagnosis. The ABS indicator light comes on, and the ABS control unit memorizes the diagnostic trouble code (DTC) under certain conditions.

- The parking brake is applied for more than 30 seconds while the vehicle is being driven. (DTC 2-1)
- The transmission downshifted excessively. (DTC 4-1, 4-2)
- The vehicle loses traction, and the front wheels spin for more than one minute when starting from a stuck condition on a muddy, snowy, or sandy road. (DTC 4-8)
- Tire adhesion is lost due to excessive cornering speed. (DTC 5, 5-4, 5-8)
- The vehicle is driven on an extremely rough road. (DTC 8-1)
- The vehicle is interfered by strong radio waves (noise), for example, illegal radio, etc. (DTC 8-2)

NOTE: If there is any trouble in the system, the ABS indicator light comes on during driving.

Diagnostic Trouble Code (DTC):

- When the control unit detects a problem and the ABS indicator light comes on, the control unit memorizes the DTC.
- The control unit has three memory registers. When a problem occurs, the control unit stores the DTC in the first memory register. If another problem occurs, or the same problem occurs again, the control unit moves the first DTC to the next memory register, and stores the second DTC in the first register. If there's a third problem occurrence, the two existing DTCs are moved up one register, and the third DTC is stored in the first register. If problems continue to occur, the oldest problem is moved out of the last register and lost, and the most recent problem is stored in the first register. When the same problem occurs three times, the same DTC is stored in all memory registers. (Refer to the Symptom-to-System Chart for diagnostic period.)
- The most recent DTC is indicated first, and the oldest DTC is indicated last.
- The DTCs are erased from the control unit when the ABS control unit +B2 power supply or connector is disconnected.
- The control unit's memory can be erased by disconnecting the ABS B2 fuse for more than three seconds.

Self-diagnosis:

- There are three self-diagnosises described below.
  ① Initial diagnosis: Performed right after the engine starts until the ABS indicator light goes off.
  ② Regular diagnosis: Continuously performed (under some conditions) after the ABS indicator light goes off until the engine stops.
  ③ Individual part/system diagnosis: Diagnosis about a specific part/system under its operating conditions.
- The CPU (central processing unit) controls the following when it detects a problem during self-diagnosis:
  ① Turns the ABS indicator light ON.
  ② Turns the front and rear fail-safe relays off.
  ③ Stops the ABS control.
  ④ Stops the ABS pump. (The pump may work under some conditions.)
  ⑤ After the DTC is stored in the control unit, the CPU stops self-diagnosis.

Kickback and Pump Operation:

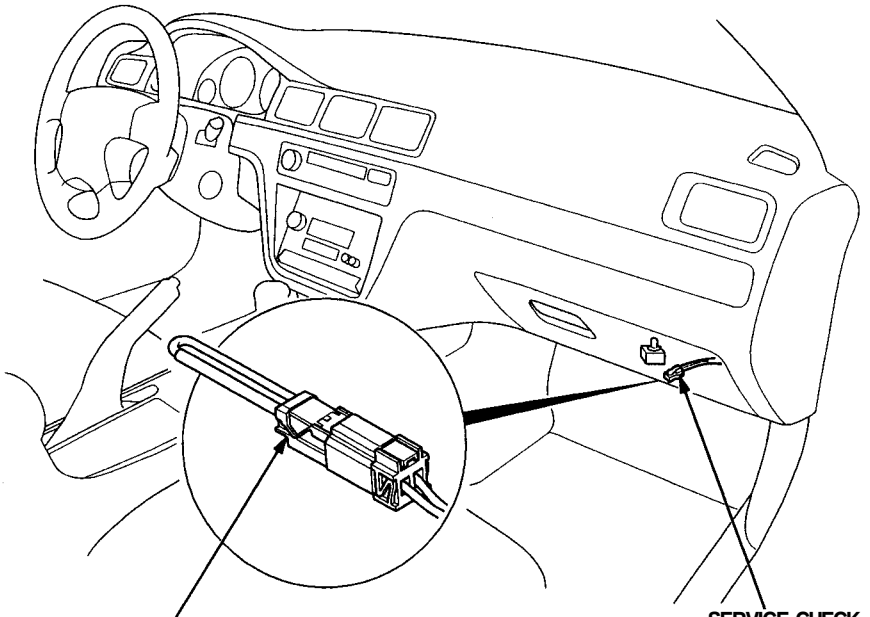
- When the engine is started, the ABS control unit begins the initial diagnosis and operates the solenoid valve one time. The kickback may be felt when the brake pedal is depressed.
- When the ABS control unit detects the pressure switch OFF signal during the initial diagnosis, it operates the pump motor, and performs the pump motor over-run diagnosis and pump motor diagnosis. Therefore, there are two cases where the pump motor operates or does not operate after the engine is started.
- Normally, after the initial diagnosis, the pump motor operates based on the pressure switch signal, regardless of the vehicle speed.

Troubleshooting:

- When two or three DTCs are stored in the control unit, perform troubleshooting for the DTC that appears first.
- When a customer's reported problem cannot be verified on the car, ask the customer about the conditions when the ABS indicator light came ON, and test-drive the car under those conditions, if possible. When the ABS indicator light does not come ON during the test, check for loose terminals and check by shaking the harnesses and connectors while following the flowchart.
- The connector terminal numbers are viewed from the wire side for the female terminals, and from the terminal side for the male terminals.
- After the repair is completed, test-drive the car and check that the ABS indicator light does not come ON again during the test. (Refer to the Symptom-to-System Chart for diagnostic period.)

Diagnostic Trouble Code (DTC) Indication

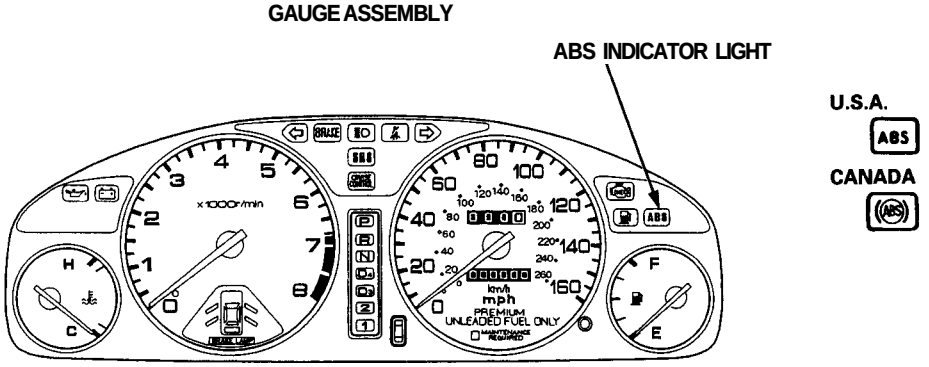
1. Connect the SCS service connector to the service check connector under the glove box.



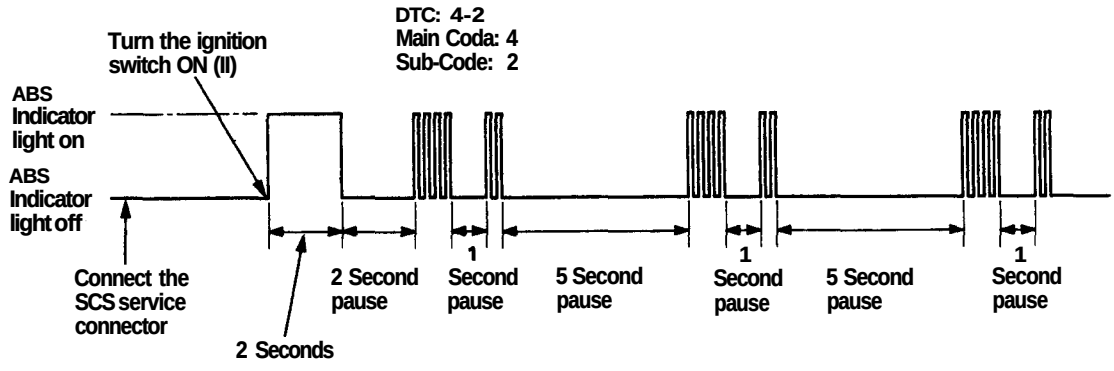
2. Turn the ignition switch ON (II), but do not start the engine.

3. Record the blinking frequency of the ABS indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).

NOTE: Check the DTC carefully and record it. The memory of the DTC is erased if the connector is disconnected from the ABS control unit.



DTC Indication Pattern (When the ABS control unit detected a problem three times.):



- Turn the ignition switch ON (II). The ABS indicator light comes on for two seconds to check the bulb.
- The ABS control unit indicates the DTC three times.
- If you miscount the blinking frequency or if you recheck the blinking frequency, turn the ignition switch OFF then turn it ON (II) to cycle the ABS indicator light again.

4. Remove the SCS service connector.

   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.

5. Remove the ABS B2 (15 A) fuse in the under-hood fuse/relay box for at least three seconds to erase the ABS control unit's memory.

Diagnostic Troubleshooting Code (DTC)

Symptom-to-System Chart

DTC MAIN CODE	DTC SUB-CODE	DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD: INITIAL DIAGNOSIS	DIAGNOSTIC PERIOD: INDIVIDUAL DIAGNOSIS	DIAGNOSTIC PERIOD: REGULAR DIAGNOSIS	PROBLEM LOCATION	PROBABLE CAUSE	PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
——		ABS indicator light does not come on when ignition switch is turned ON III)					• Blown BACK-UP LIGHTS/METER LIGHTS (10 A) fuse • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and ABS indicator light • Blown ABS indicator light bulb • Open circuit between the ABS indicator light and ABS control unit • Open circuit between the ABS control unit and body ground • Poor body ground • Faulty ABS control unit			19-16
		ABS indicator light does not go off after engine is started (No DTC)					• Blown R/C MIRROR/REAR DEFROSTER RELAY (7.5 A) fuse • Open circuit between the under-dash fuse/relay box and ABS control unit. • Open circuit between the battery and under-hood fuse/relay box • Blown ABS B2 (15 A) fuse • Open circuit inside the under-hood fuse/relay box • Open circuit between the under-hood fuse/relay box and ABS control unit • Faulty alternator • Open circuit between the alternator and ABS control unit • Short to body ground in the WARN circuit between the ABS indicator light and ABS control unit • Faulty ABS control unit			19-18
	—	ABS pump motor over-run	O	O			• Air mixed in the ABS brake fluid. • Pressure switch stuck OFF • Open circuit between the pressure switch and ABS control unit • Open circuit in the P-SW circuit between the pressure switch and body ground, or a poor ground • Drop in pump discharge volume • Leaking outlet valve • Leaking relief valve • ABS brake fluid leakage • Faulty ABS control unit	• The ABS indicator light is turned on when the pump motor relay ON signal is detected for more than 40 seconds while the ABS is not functioning.		19-21
①	②	Pump motor	O		O		• Open circuit or short to body ground between the R/C MIRROR/REAR DEFROSTER RELAY (7.5 A) fuse and under-hood fuse/relay box • Open circuit or short to body ground in the PMR circuit inside the under-hood fuse/relay box • Faulty pump motor relay • Open circuit or short to body ground in the PMR circuit between the under-hood fuse/relay box and ABS control unit • Open circuit between the battery and under-hood fuse/relay box • Blown ABS MOTOR (40 A) fuse • Blown ABS UNIT (7.5 A) fuse • Open circuit or short to body ground in the motor drive circuit and MCK circuit inside the under-hood fuse/relay box • Open circuit or short to body ground in the MCK circuit between the under-hood fuse/relay box and ABS control unit • Open circuit or short to body ground between the under-hood fuse/relay box and pump motor • Faulty pump motor • Open circuit between the pump motor and body ground or poor ground • Faulty ABS control unit	• Intermittent interruption in the MCK circuit • Intermittent interruption in the pump motor relay drive circuit • Intermittent interruption in the pump motor drive circuit	• The ABS indicator light is turned on when battery voltage is detected at the MCK terminal while the pump motor relay OFF signal is detected. • The ABS indicator light is turned on when the 0 V is detected at the MCK terminal while the pump motor relay ON signal is detected.	19-23
	③	High-pressure leakage			O		• Leaking outlet valve • Leaking relief valve • Poor contact in pressure switch circuit	• Intermittent interruption in the pressure switch • Intermittent interruption in the pressure switch circuit	• The ABS indicator light is turned on when the frequent ON/OFF cycle of the pressure switch signal is detected while the engine is running. The count is erased when the ABS functions.	19-29
	④	Pressure switch	O				• Short to body ground between the ABS control unit and pressure switch • Pressure switch stuck ON • Faulty ABS control unit		• The ABS indicator light is turned on when the pressure switch ON signal is always detected at every initial diagnosis. The count is erased when the ABS control unit detects the pressure switch OFF signal.	19-31
	⑧	High-pressure system	O				• Accumulator gas leakage • Changed relief valve set pressure • Rear outlet solenoid valve late to close • Changed pressure switch set pressure	• The ABS indicator light may not come on in normal climate when it comes on in very cold climate.	• This diagnosis is performed when the pressure switch is OFF at the initial diagnosis. The pump motor is operated to turn the pressure switch ON, then the solenoid valve is momentarily activated. The ABS indicator light is turned on if the pressure switch signal changes from ON to OFF.	19-32
②	①	Parking brake			O		• Low fluid level in the master cylinder reservoir • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and brake system light • Blown brake system light bulb • Open circuit or short to body ground between the brake system light and ABS control unit • Parking brake switch stuck ON • Short to body ground between the brake system light and parking brake switch • Brake fluid level switch stuck ON • Short to body ground between the brake system light and brake fluid level switch • Faulty ABS control unit	• Driving with the parking brake applied—(No problem)	• The ABS indicator light is turned on when the parking brake ON signal is detected for more than 30 seconds while driving.	19-33

(cont'd)

Diagnostic Troubleshooting Code (DTC)

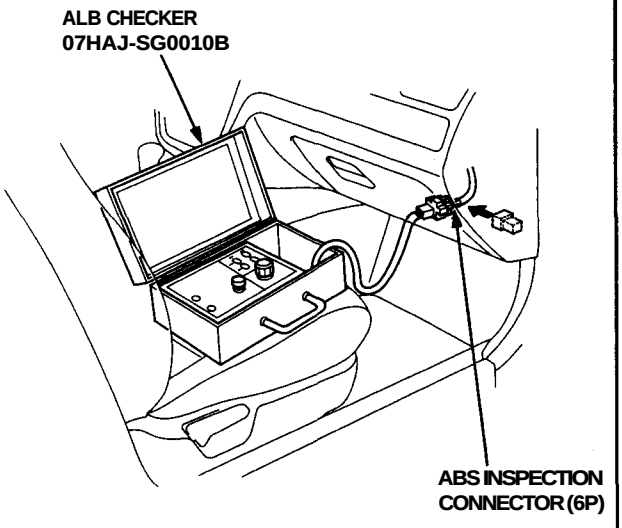
Symptom-to-System Chart (cont'd)

DIAGNOSTIC TROUBLE CODE (DTC) MAIN CODE	DIAGNOSTIC TROUBLE CODE (DTC) SUB-CODE	DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD: INITIAL DIAGNOSIS	DIAGNOSTIC PERIOD: INDIVIDUAL DIAGNOSIS	DIAGNOSTIC PERIOD: REGULAR DIAGNOSIS	PROBLEM LOCATION	PROBABLE CAUSE	PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
③	①	Pulser			○	Right-front	• Chipped pulser gear • Improperly installed wheel sensor	• Intermittent interruption in the wheel sensor	• The ABS indicator light is turned on when the wheel sensor signal is periodically missing during driving.	19-37
	②					Left-front				
	④					Right-rear				
	⑧					Left-rear				
	⑫	Different diameter tire			○		• Different diameter tire installed	• (No problem)	• The ABS indicator light may be turned on while driving when one, two or three different diameter tires are installed. This diagnosis is not performed when the parking brake switch is ON.	19-37
④	①	Wheel sensor		○	○	Right-front	• Open circuit, internal short or short to body ground in the wheel sensor • Open circuit or short to body ground in the positive (+) wire between the wheel sensor and ABS control unit • Open circuit or short to body ground in the negative (-) wire between the wheel sensor and ABS control unit • **Positive (+) wire shorted to the negative (−) wire between the wheel sensor and ABS control unit** • Loose connector or poor contact of terminals • Improper wheel sensor air gap • Faulty ABS control unit • Missing pulser • Modulator does not decrease pressure properly	• Intermittent interruption in the wheel sensor • Wheel spin of both front wheels (only for DTC 4-8) — (No problem) • The transmission downshifted excessively (only for DTC 4-1 and 4-2) -(No problem)	• The ABS indicator light is turned on when the wheel sensor signal is missing at speeds of 6 mph (10 km/h) or more. This diagnosis is not performed when the parking brake switch is ON.	19-38
	②					Left-front				
	④					Right-rear				
	⑧					Left-rear				
⑤	—	Rear wheel lock			○	Right/ Left	• Open circuit, internal short or short to body ground in the wheel sensor system • Rear brake drag • Modulator does not decrease pressure properly • Faulty ABS control unit	• Intermittent interruption in the wheel sensor • Wheel spin by operating the parking brake while the parking brake switch is stuck OFF • Car spun-out—(No problem)	• The ABS indicator light is turned on when either or both rear wheels lock and the wheel sensor signal is missing during driving. This diagnosis is not performed when the parking brake switch is ON.	19-41
	④					Right				
	⑧					Left				
⑥	—	Fail-safe relay	○			Front/ rear	• Short to power in the relay drive circuit between the fail-safe relay and ABS control unit • Faulty relay drive transistor (ON) in the ABS control unit • Fail-safe relay stuck ON • Short to power in the solenoid drive circuits between the fail-safe relay and ABS control unit		• The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal before the fail-safe relays are turned on at the initial diagnosis.	19-42
	①					Front				19-44
	④					Rear				19-47
⑦	①	Solenoid	○		○	Right-front	• Fail-safe relay stuck OFF • Open circuit in the solenoid drive circuit between the under-hood fuse/relay box and ABS control unit • Short to body ground in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (ON) in the ABS control unit • Short to power in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (OFF) in the ABS control unit • Short to power in the drive circuit inside the solenoid • Short to the outlet circuit in the inlet circuit between the solenoid and ABS control unit	• Intermittent interruption in the solenoid valve drive circuit • Intermittent interruption in the solenoid valve ground circuit • Intermittent interruption in the fail-safe relay circuit	• Each solenoid valve is momentarily activated at the initial diagnosis and when the car starts off. The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal. • The ABS indicator light is turned on when 0V is detected at the solenoid terminal while the solenoid OFF signal is detected at the regular diagnosis.	19-49
	②					Left-front				19-53
	④					Rear				19-59
⑧	①	ABS function			○		• Wheel sensor signal disappears at speeds of 6 mph (10 km/h) or less • Faulty ABS control unit	• Intermittent interruption in the wheel sensor • Rough road driving — (No problem)	• The ABS indicator light is turned on when the ABS functions continuously.	19-66
	②	CPU comparison	○		○		• Faulty ABS control unit	• (No problem)	• The ABS indicator light is turned on when there is a difference between the CPU data.	19-67
	④	IC [Integrated Circuit]	○		○		• Faulty ABS control unit	• (No problem)	• The ABS indicator light is turned on when there is a abnormality in the IC at the regular diagnosis.	19-67

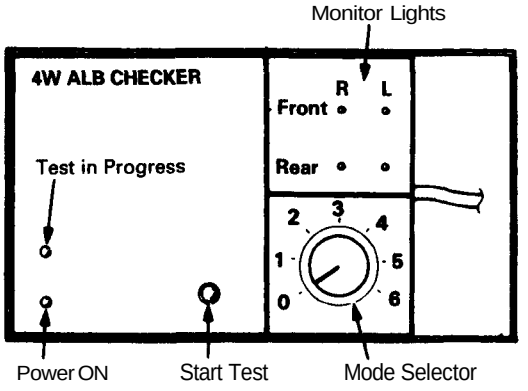
ABS Function Test

1. Raise the car off the ground, and support it with safety stands.
2. Check that there is no brake drag.
3. Turn the ignition switch ON (II), and confirm that the ABS indicator light comes on.
   - If the ABS indicator light does not come on, follow the troubleshooting on page 19-16.
4. **Honda PGM Tester:** Connect the PGM Tester as described in the PGM Tester Anti-Lock Brake System (ABS) Vehicle System Supplement. Follow the tester's prompts instead of steps 5 through 11 of this procedure.

   ALB Checker: With the ignition switch OFF, disconnect the ABS inspection connector (6P) from the connector cover located under the glove box, and connect it to the ALB checker. Continue with steps 5 through 11 of this procedure.



5. Shift the transmission to [P] position.
6. Start the engine and release the parking brake.
7. Turn the Mode Selector switch to "1".



8. Push the Start Test switch.
   The ABS indicator light should not come on while the Test in Progress light is on.
   - If the ABS indicator light comes on, confirm the DTC and perform the appropriate troubleshooting for the code.

   NOTE: Do not turn the Mode Selector switch when the Test in Progress light is on. Damage to the ALB checker can result.
9. Turn the Mode Selector switch to "2".
10. Depress the brake pedal firmly, and push the Start Test switch. The ABS indicator light should not come on while the Test in Progress light is on. There should be kickback on the brake pedal.

    Have the assistant check that the wheel controlled by the ABS can be rotated by hand when there is kickback on the brake pedal.
    - If the ABS indicator light comes on, confirm the DTC and perform the appropriate troubleshooting for the code.
    - If the ABS indicator light does not come on and the wheel controlled by the ABS cannot be rotated, check the connection of the modulator wire harness connectors. If the connections are OK, replace the modulator unit.

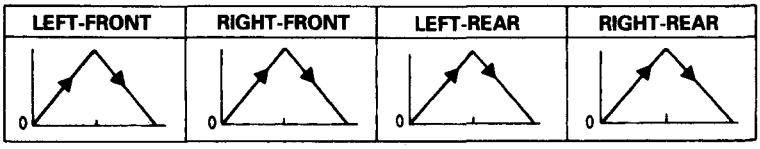
    NOTE: The kickback should occur approximately 20 seconds after the Start Test switch is pushed.
    The ABS can be checked with a brake tester, too, by checking the brake torque fluctuation of the wheel controlled by the ABS.
11. Turn the Mode Selector switch to "3", "4" and "5". Perform step 10 for each of the test mode positions.

Operation Sequence Simulated by Modes of ALB Checker

NOTE: The wheel sensors and sensor wire harnesses are not checked by the ALB checker.

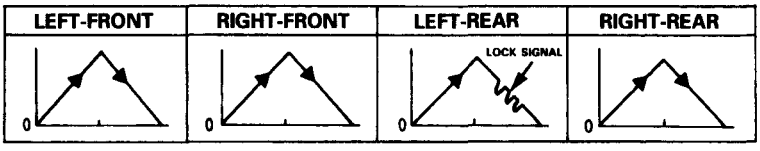
Mode 1: Sends the simulated driving signal O mph (O km/h) → 113 mph (180 km/h) → O mph (O km/h) of each wheel to the ABS control unit to check the system under the normal driving. There should be no kickback.

SIMULATED DRIVING SIGNAL



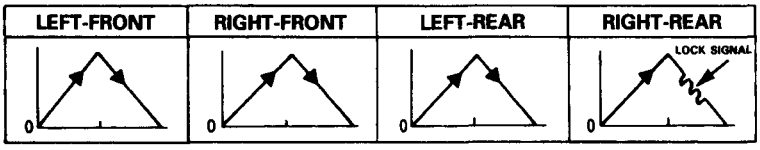
Mode 2: Sends the driving signal of each wheel, then sends the lock signal of the left-rear wheel to the ABS control unit to check the system under left-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



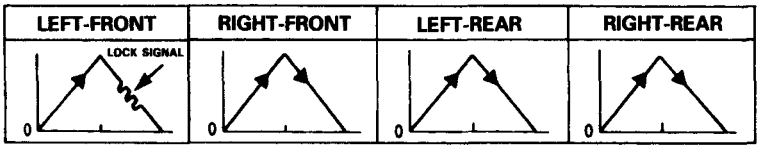
Mode 3: Sends the driving signal of each wheel, then sends the lock signal of the right-rear wheel to the ABS control unit to check the system under right-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



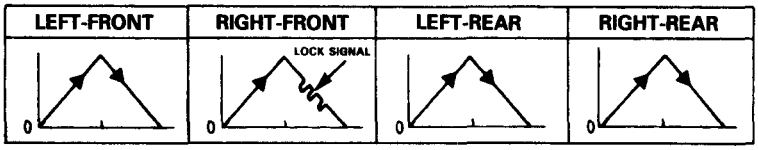
Mode 4: Sends the driving signal of each wheel, then sends the lock signal of the left-front wheel to the ABS control unit to check the system under left-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Mode 5: Sends the driving signal of each wheel, then sends the lock signal of the right-front wheel to the ABS control unit to check the system under right-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Inspection Points

If the ABS indicator light comes on and the system stops during the inspection, confirm the DTC and perform the appropriate troubleshooting for the code.

If there is no kickback in modes 2 through 5, and the ABS indicator light does not come on, the following items are probable causes:

- Pressure switch stuck ON
- Clogged or stuck solenoid outlet valve
- Modulator wire harness connectors improperly connected

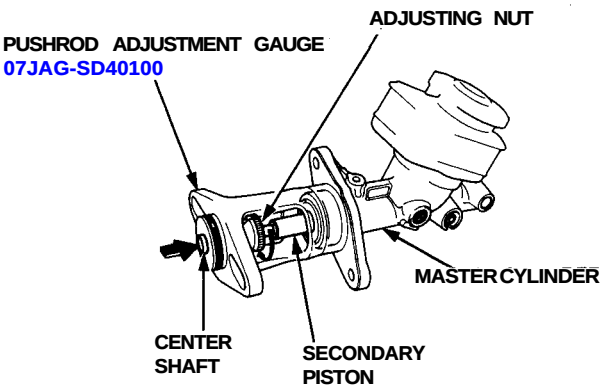
Master Cylinder

Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.

   NOTE: '96 model is shown.



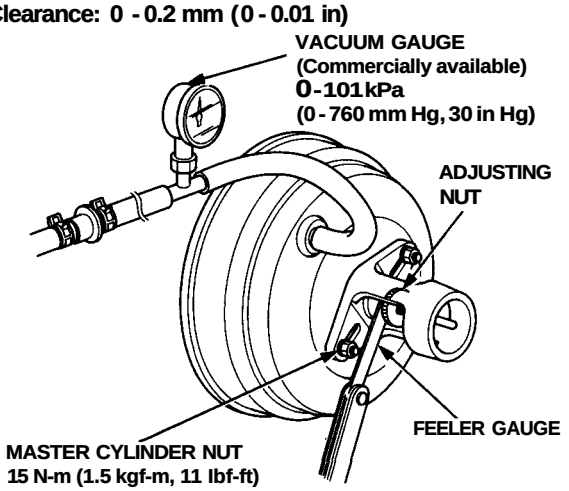
2. Without disturbing the center shaft's position, install the special tool upside down on the booster.

3. Install the master cylinder nuts and tighten to the specified torque.

4. Connect the booster in-line with a vacuum gauge O - 101 kPa (0-760 mmHg, 30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in Hg) vacuum.

5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

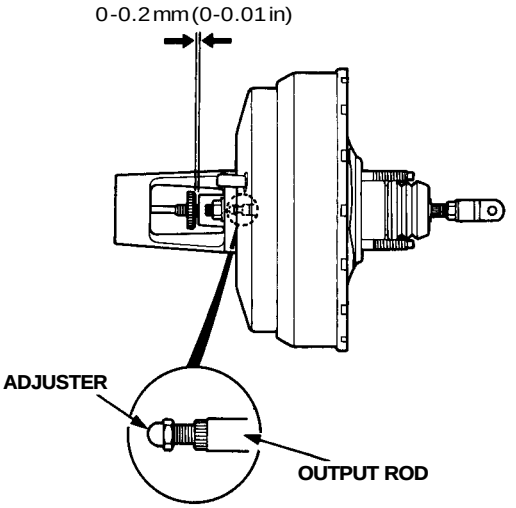
   Clearance: 0 - 0.2 mm (0 - 0.01 in)



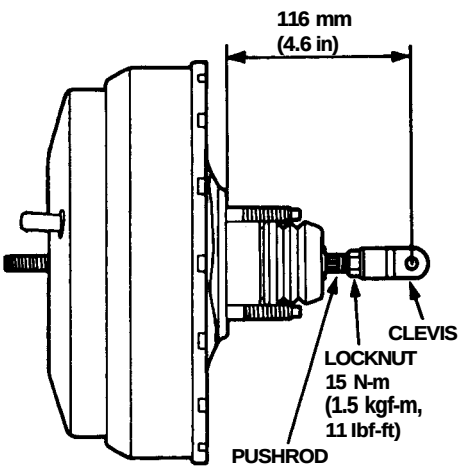
   NOTE: If the clearance between the gauge body and adjusting nut is 0.2 mm (0.01 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.2 mm (0.01 in) or more. Therefore, it must be adjusted and rechecked.

6. If the clearance is incorrect, remove the special tool and adjust the clearance by turning the adjuster in or out while holding the output rod.

   NOTE: Adjust the clearance while the specified vacuum is applied to the booster.

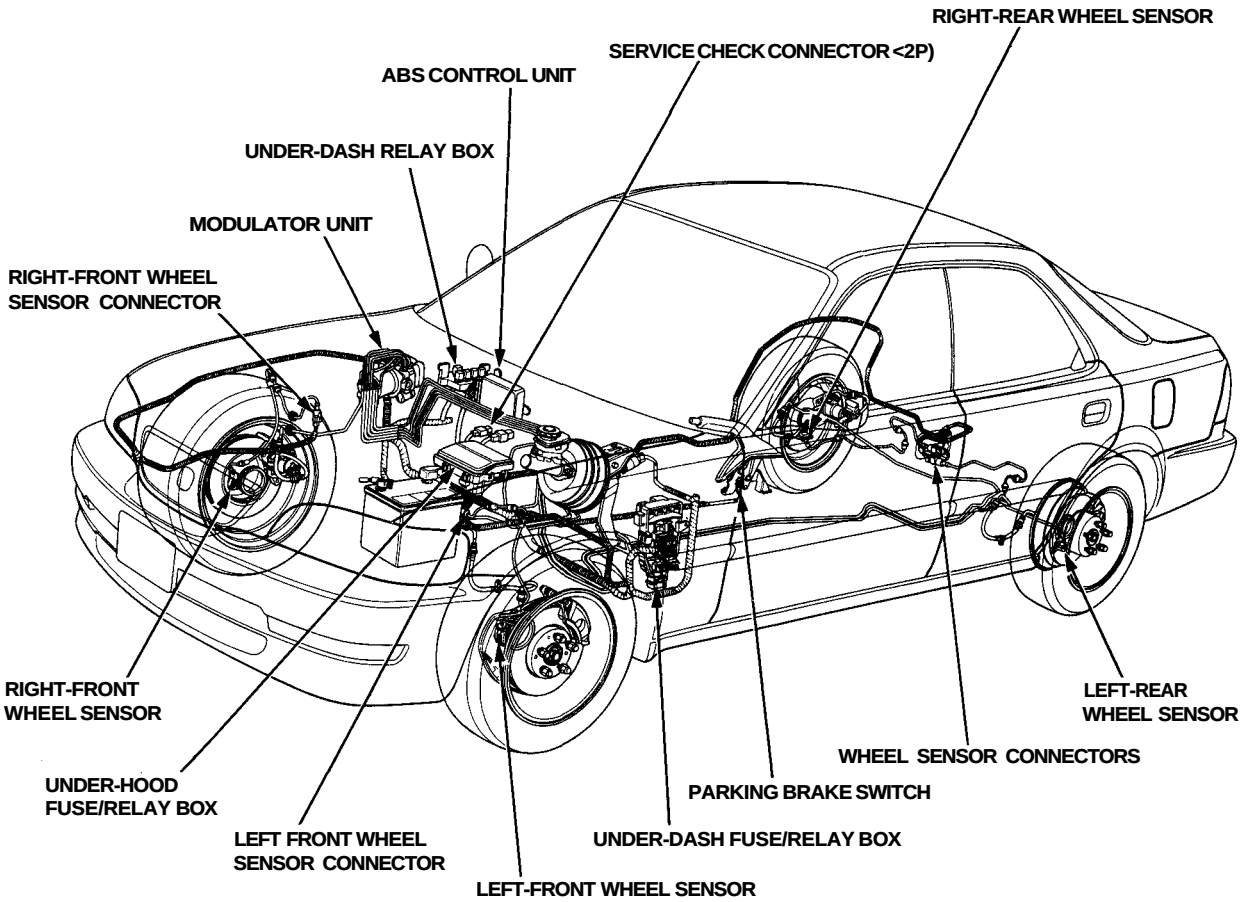


7. Adjust the pushrod length as shown if the booster is removed.

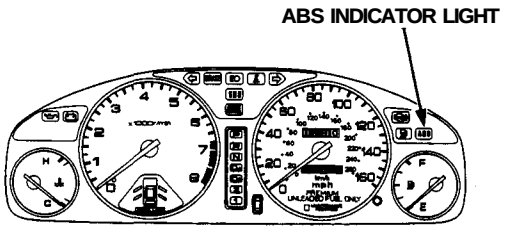


8. Install the master cylinder (refer to the '95 - 98 Acura 2.5 TL Service Manual, P/N 61SW504).

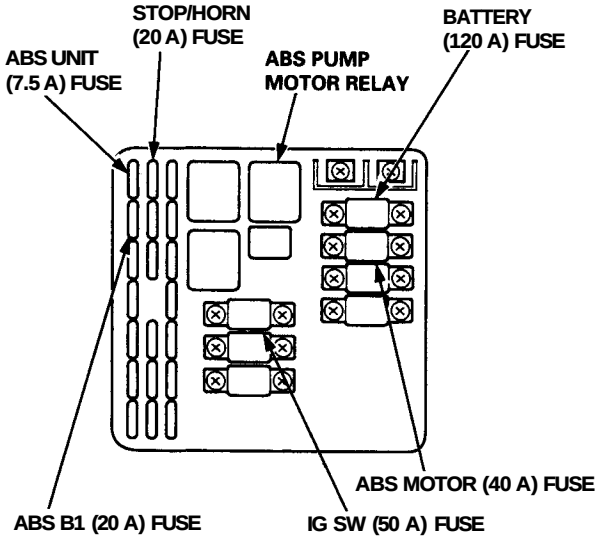
Component Locations



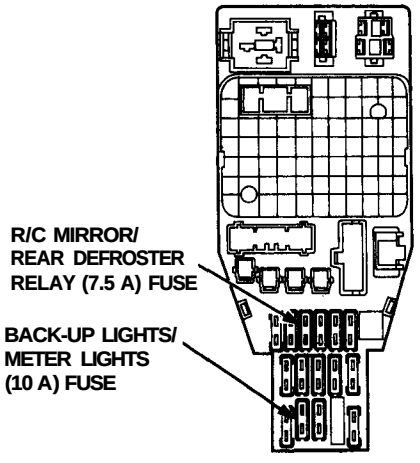
GAUGE ASSEMBLY



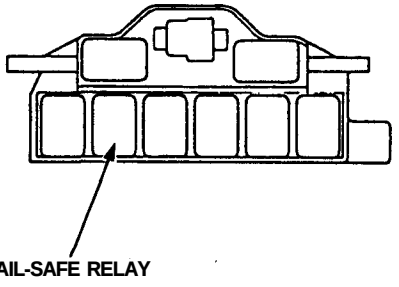
UNDER-HOOD FUSE/RELAY BOX



UNDER-DASH FUSE/RELAY BOX

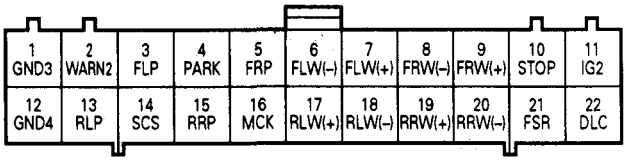


UNDER-DASH RELAY BOX



ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

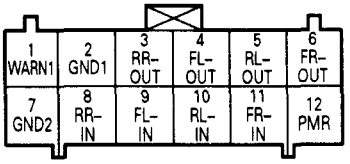
Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
1	BLK	GND3 (Ground 3)	Ground	1-GND	——		Below 0.3 V
2	BLU/RED	WARN2 (Warning 2)	Drives ABS indicator light (Turns the indicator light drive transistor to OFF, then turns off the indicator light)	2-GND	ABS indicator light	ON	Below 1.0 V
						OFF	VB
3	GRN/BLU	FLP (Front-left pulse)	Outputs left-front wheel sensor signal	3-GND	Turns wheel slowly		5 V ↔ 0 V
4	GRN/RED	PARK (Parking)	Detects parking brake switch signal	4-GND	Parking brake	Pulled	Below 0.3 V
						Released	VB
5	GRN/BLK	FRP (Front-right pulse)	Outputs right-front wheel sensor signal	5-GND	Turns wheel slowly		5 V ↔ 0 V
6	BRN	FLW (–) (Front-left wheel negative)	Detects left-front wheel sensor signal	6-7	Wheel: Turns slowly		AC: 0.053 V or above (Reference) Oscilloscope: 0.15 Vp-p or above
7	GRN/BLU	FLW (+) (Front-left wheel positive)					
8	GRN	FRW (–) (Front-right wheel negative)	Detects right-front wheel sensor signal	8-9			
9	GRN/BLK	FRW (+) (Front-right wheel positive)			Wheel: Stops		0.25 – 1.15 V
10	GRN/WHT	STOP	Detects brake switch signal	10-GND	Brake pedal	Depressed	VB
						Released	Below 0.3 V
11	YEL/BLK	IG2 (Ignition 2)	Power source for activating the system	11-GND	Ignition Switch	ON (II)	VB
						Start (III)	Below 0.3 V

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
12	BLK	GND4 (Ground 4)	Ground	12-GND	——		Below 0.3 V
13	LT BLU	RLP (Rear-left pulse)	Outputs left-rear wheel sensor signal	13-GND	Turns wheel slowly		5 V ↔ 0 V
14	ORN	SCS (Service check signal)	Detects service check connector signal (DTC indication or DTC erasure)	14-GND	SCS service connector	Connected	Below 0.3 V
						Disconnected	Approx. 5 V
15	GRN/YEL	RRP (Rear-right pulse)	Outputs right-rear wheel sensor signal	15-GND	Turns wheel slowly		5 V ↔ 0 V
16	GRN	MCK (Motor check)	Detects pump motor drive signal	16-GND	Pump motor	ON	VB
						OFF	Below 0.3 V
17	LT BLU	RLW (+) (Rear-left wheel positive)	Detects left-rear wheel sensor signal	17-18	Wheel: Turns slowly		AC: 0.053 V or above (Reference) Oscilloscope: 0.15 Vp-p or above
18	GRY	RLW (–) (Rear-left wheel negative)					
19	GRN/YEL	RRW (+) (Rear-right wheel positive)	Detects right-rear wheel sensor signal	19-20			
20	BLU/YEL	RRW (–) (Rear-right wheel negative)			Wheel: Stops		0.25 – 1.15 V
21	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay (Fail-safe relay is turned OFF to shut off the power source to the solenoid and pump motor relay when problem occurs.)	21-GND	ABS indicator light	ON	Below 0.3 V
						OFF	VB
22	LT BLU	DLC (Data link connector)	Communicates with Honda PGM Tester	22-GND	——		——

ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
1	BLU/RED	WARN1 (Warning 1)	Drives ABS indicator light (Turns the indicator light drive transistor to OFF, then turns off the indicator light)	1-GND	ABS indicator light	ON	Below 1.0 V
						OFF	VB
2	BLK	GND1 (Ground 1)	Ground	2-GND			Below 0.3 V
3	YEL/WHT	RR-OUT (Rear-right outlet)	Drives right-rear outlet solenoid valve	3-GND	ABS indicator light	OFF	VB
4	YEL/BLU	FL-OUT (Front-left outlet)	Drives left-front outlet solenoid valve	4-GND			
5	BLK/ORN	RL-OUT (Rear-left outlet)	Drives left-rear outlet solenoid valve	5-GND		ON	Below 0.3 V
6	YEL/BLK	FR-OUT (Front-right outlet)	Drives right-front outlet solenoid valve	6-GND			
7	BLK	GND2 (Ground 2)	Ground	7-GND			Below 0.3 V
8	RED/WHT	RR-IN (Rear-right inlet)	Drives right-rear inlet solenoid valve	8-GND	ABS indicator light	OFF	VB
9	RED/BLU	FL-IN (Front-left inlet)	Drives left-front inlet solenoid valve	9-GND			
10	YEL	RL-IN (Rear-left inlet)	Drives left-rear inlet solenoid valve	10-GND		ON	Below 0.3 V
11	RED/BLK	FR-IN (Front-right inlet)	Drives right-front inlet solenoid valve	11-GND			
12	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay	12-GND	ABS indicator light	OFF (Pump motor) ON	Below 0.3 V
						OFF (Pump motor) OFF	VB
						ON	Below 0.3 V

Troubleshooting Precautions

ABS Indicator Light

1. If the system is OK, the ABS indicator light goes off two seconds after turning the ignition switch ON (II) without starting the engine. After starting the engine, the ABS indicator light comes on again and goes off after two seconds. This occurs because the ABS control unit is activated by the IG2 power source.

2. The ABS indicator light comes on when the ABS control unit detects a problem in the system. However, even though the system is normal, the ABS indicator light comes on, too, under the following conditions. To determine the actual cause of problem, question the customer about the problem, talking the following conditions into consideration.
   - Only drive wheels rotate
   - One wheel stuck of drive wheels
   - Vehicle spin
   - ABS operate condition continue for long time
   - Signal disturbance

3. When a problem is detected and the ABS indicator light comes on, there are cases when the indicator light stays on until the ignition switch is turned OFF, and cases when the indicator light goes off automatically when the system returns normal. For the DTC 61 and 62, the indicator light goes off automatically when the system returns normal. For all other codes, the indicator light stays on until the ignition switch is turned OFF.

4. For DTCs 12, 14, 16, 18, 21, 22, 23, 24, 51, 52 and 53, the indicator light goes off when the vehicle is driven again and the signals are OK after the ignition switch is turned from OFF to ON (II). However, if the DTC is erased, the CPU is reset and the indicator light goes off right after the engine is started if the signals are OK.

Diagnostic Trouble Code (DTC)

1. The DTC is not memorized if the CPU cannot be activated or the CPU fails and the indicator light comes on.

2. The memory can hold any number of DTCs. However, when the same DTC is detected more than once, the later one is written over the old one. Therefore, when the same problem is detected repeatedly, it is memorized as one DTC.

3. The DTCs are indicated in the order of ascending number, not in the order they occur.

4. The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs cannot be canceled by disconnecting the battery. Perform the specified procedures to erase the DTCs.

Self-diagnosis

1. The self-diagnosis can be classified into two categories.
   - Initial diagnosis: Performed right after the engine starts and until the ABS indicator light goes off.
   - Regular diagnosis: Performed right after the initial diagnosis until the ignition switch is turned OFF.

2. When a problem is detected by self-diagnosis, the system
   - Turns the ABS indicator light ON
   - Memorizes the DTC
   - Turns the fail-safe relay OFF
   - Stops ABS control

Troubleshooting Precautions

Kickback

1. The motor operates when the ABS is functioning, and fluid in the reservoir is forced out to the master cylinder causing kickback at the brake pedal.

Pump Motor

1. The pump motor operates when the ABS is functioning.

2. The ABS control unit checks the pump motor operation during initial diagnosis and vehicle starts. You may hear the faint operation sound at this time, but it is normal.

Brake Fluid Replacement/Air Bleeding

1. Brake fluid replacement and air bleeding procedures are the same as vehicles without ABS. To case bleeding, start with the front wheels.

Troubleshooting

1. The troubleshooting flowcharts procedures assume that the cause of the problem is still present and the ABS indicator light is still on. Following the flowchart when the ABS indicator light does not come on can result in incorrect judgment.

2. Question the customer about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting.
   Find out when the ABS indicator light came on, such as during initial diagnosis, during ABS control, after ABS control, when the vehicle started, when vehicle speed was at 19 mph (30 km/h), when the problem continued for a few seconds or a few minutes, etc.

3. When the ABS indicator light does not come on during the test-drive, but the troubleshooting is performed based on the DTC, check for the loose connectors, poor contact of terminals, etc, before troubleshooting.

4. After troubleshooting, erase the DTC and test-drive the vehicle. Be sure that the ABS indicator light does not come on.

5. The connector illustrations show the female connectors with a single outline and the male connectors with a double outline.

Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication (SCS Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) under the glove box.
2. Turn the ignition switch ON (II) without brake pedal depressed.

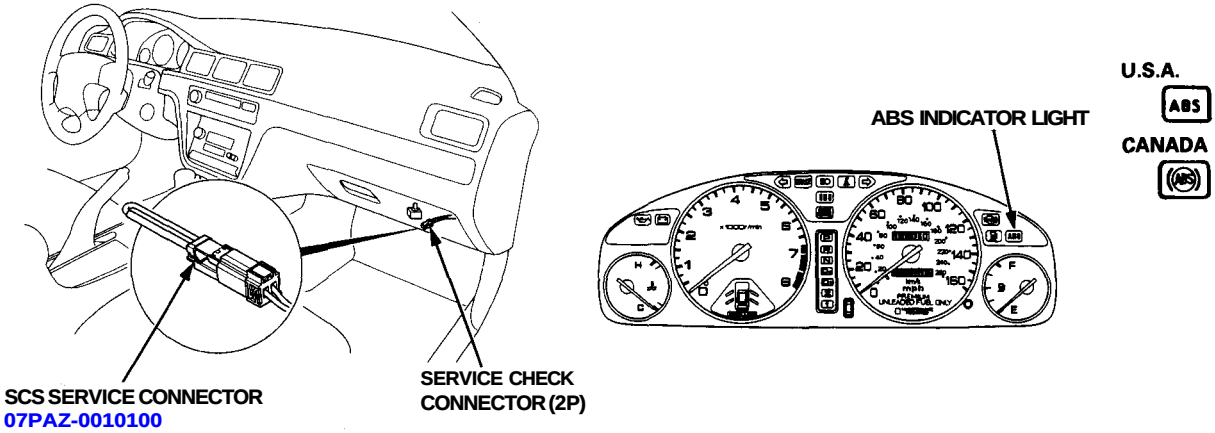
   NOTE: If the brake pedal is depressed when turning the ignition switch ON (II), the system shifts to MES mode.
3. The blinking frequency indicates the DTC.

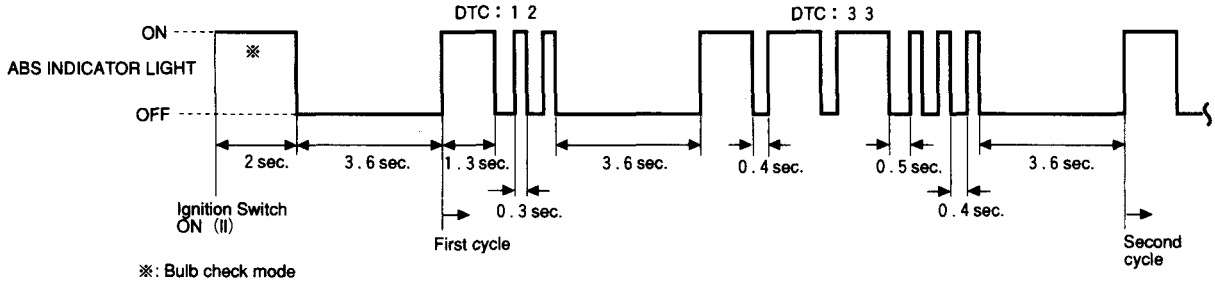
   NOTE: If the DTC is not memorized, the ABS indicator light goes off for 3.6 seconds and then stays on.
4. Turn the ignition switch OFF, and remove the SCS service connector.

   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.

Conditions for DTC indication

- The vehicle is at 10 km/h or less.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is released.





- When ignition switch is turned ON (II), the ABS indicator light comes on for two seconds to check the bulb. Do not count this as a DTC.

Diagnostic Trouble Code (DTC)

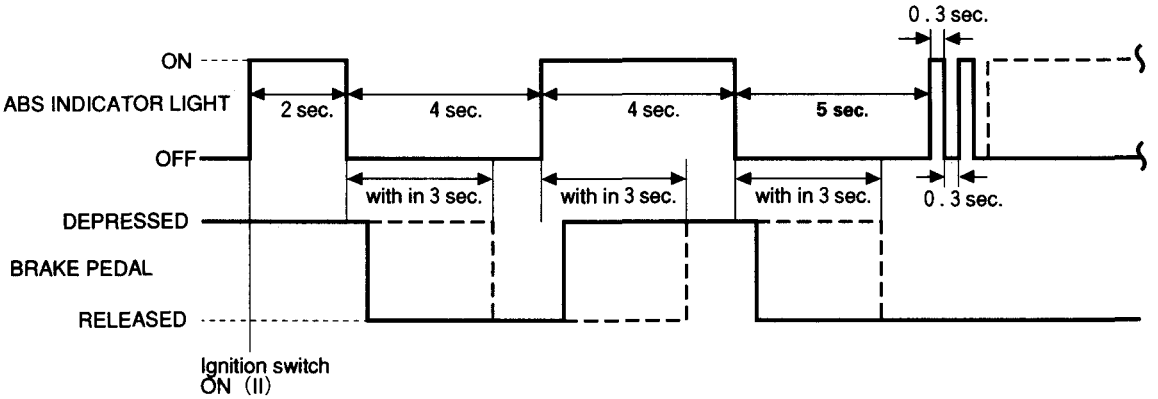
DTC Erasure (MES Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) under the glove box.
2. Depress the brake pedal.
3. Turn the ignition switch ON (II) while keeping the brake pedal depressed.
4. After the ABS indicator light goes off, release the brake pedal.
5. After the indicator light comes on, depress the brake pedal again.
6. After the indicator light goes off, release the brake pedal again.
7. After few seconds, the indicator light blinks twice and the DTC is erased. If the indicator light does not blink twice, repeat steps 1 through 6. If the indicator light stays ON after the indicator light blinks twice, check the DTC because a problem was detected during initial diagnosis before shifting to MES mode.
8. Turn the ignition switch OFF, and remove the SCS service connector.

Conditions for DTC erasure

- Vehicle speed is at 6 mph (10 km/h) or less.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is depressed before the ignition switch is turned ON (II).



Troubleshooting Index

NOTE: This operation can also be done with the Honda PGM Tester.

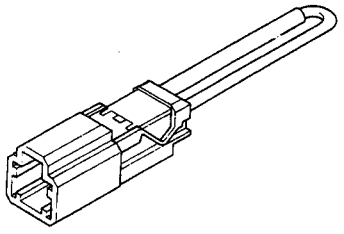
DTC	ABS INDICATOR LIGHT	DIAGNOSIS/SYMPTOM	DETECTION TIMING		PROBLEM LOCATION	REFER TO PAGE
			INITIAL DIAGNOSIS	REGULAR DIAGNOSIS		
No DTC	OFF	ABS indicator light does not come on when ignition switch is turned ON (II).				19-84
	ON	ABS indicator light does not go off after engine is started (No DTC).				19-86
11	ON	Wheel sensor (open/short to body ground/short to power)	○	○	FR	19-87
13					FL	
15					RR	
17					RL	
12	ON*1	Wheel sensor (electrical noise/intermittent interruption)		○	FR	19-88
14					FL	
16					RR	
18					RL	
21	ON*1	Pulser		○	FR	19-89
22					FL	
23					RR	
24					RL	
31	ON	Solenoid (short to body ground/short to wire)	○	○	FR-IN	19-90
32					FR-OUT	
33					FL-IN	
34					FL-OUT	
35					RR-IN	
36					RR-OUT	
37					RL-IN	
38					RL-OUT	
41	ON	Wheel lock		○	FR	19-93
42					FL	
43					RR	
44					RL	
51	ON	Motor lock		○		19-94
52	ON	Motor stuck OFF		○		19-95
53	ON	Motor stuck ON	○	○		19-98
54	ON	Fail-safe relay	○	○		19-100
61	ON*2	Ignition voltage		○		19-102
62						
71	ON	Different diameter tire		○		19-103
81	ON	CPU	○	○		19-103

*1: When the problem is detected and ABS indicator light comes on, the indicator light will stay on until the ignition switch is turned from OFF to ON (II), and the control unit confirms that the system is OK when the vehicle starts.

*2: When voltage returns normal, the ABS indicator light goes off.

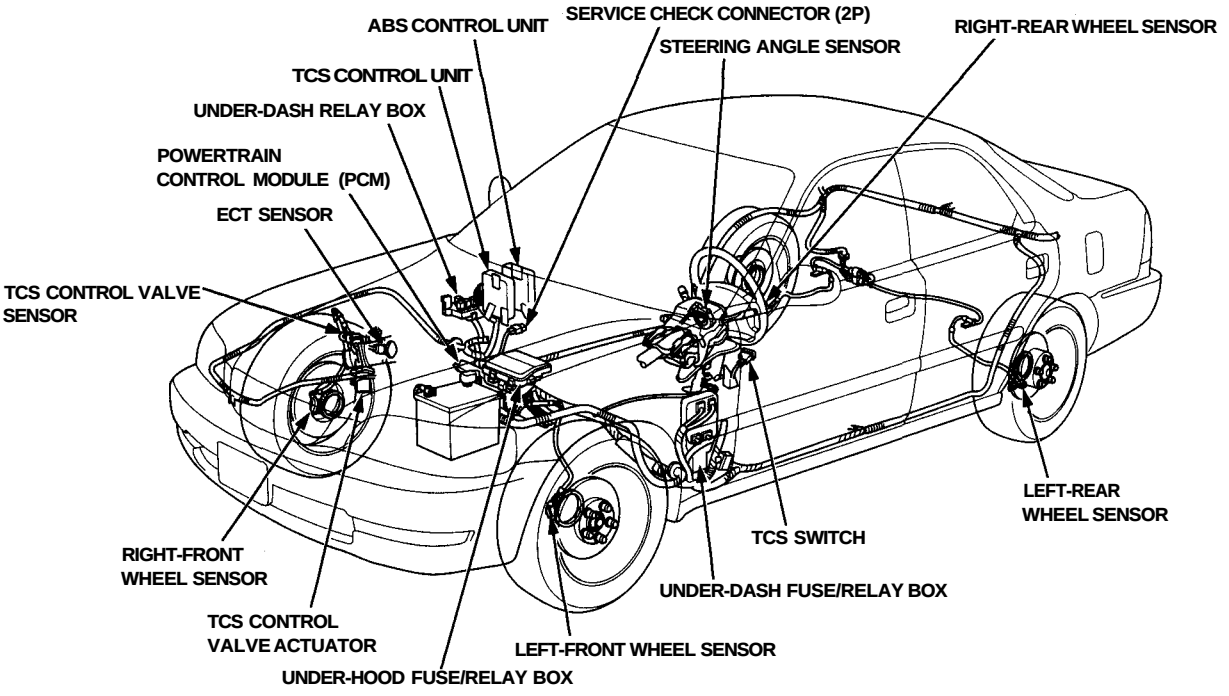
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ-0010100	SCS Service Connector	1	19-117, 19-81, 19-10

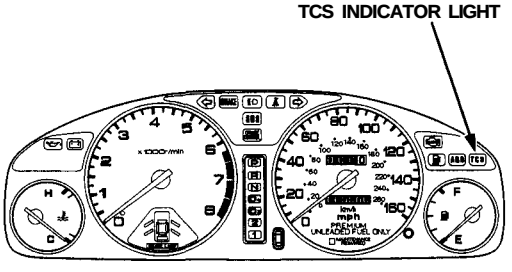


①

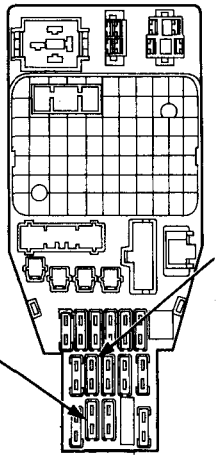
Component Locations



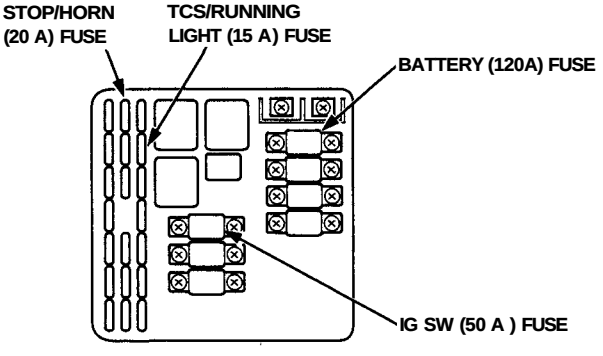
GAUGE ASSEMBLY



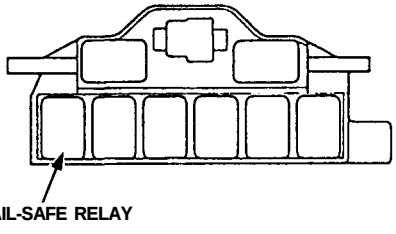
UNDER-DASH FUSE/RELAY BOX



UNDER-HOOD FUSE/RELAY BOX



UNDER-DASH RELAY BOX



System Description

Outline

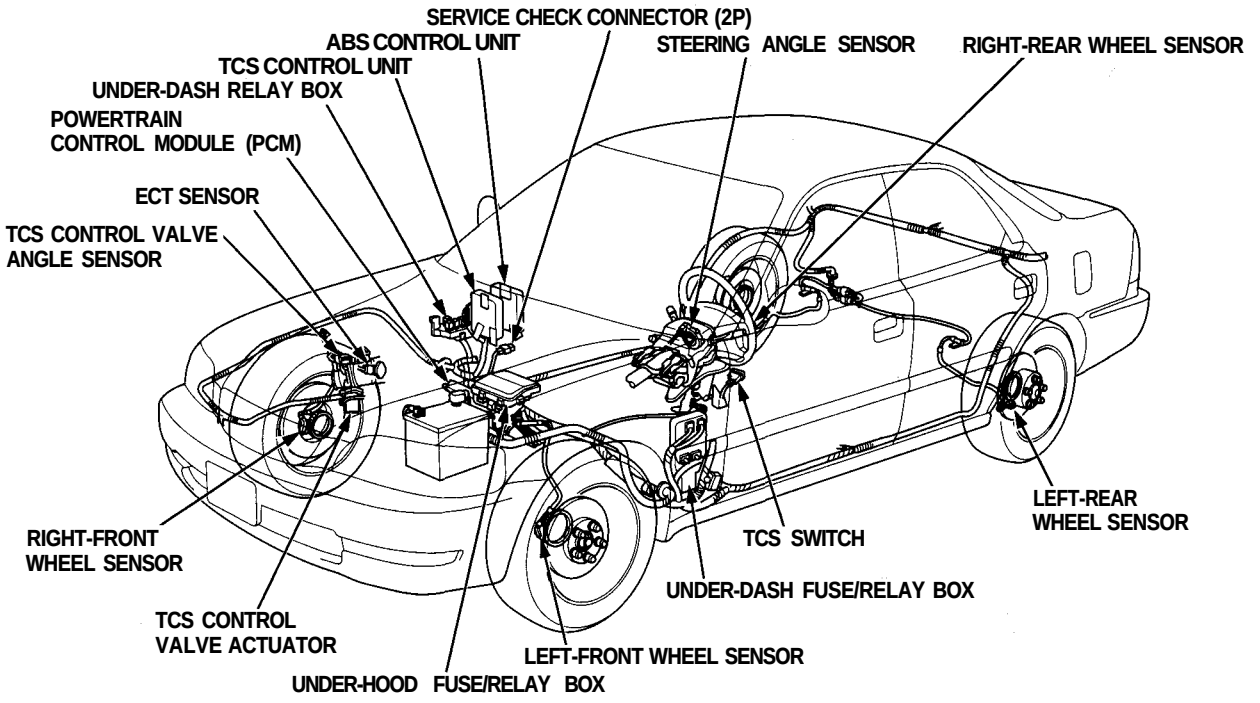
Role of System

The traction control is a variable system designed to enhance traction during acceleration and cornering. It does so by determining the optimum amount of wheel spin for any given driving situation, then suppressing surplus engine power accordingly.

Construction and Function

The TCS control unit gets signals about the vehicle's speed, direction, and road conditions from sensors at the wheels and the steering column. Based on these signals, the control unit will determine the optimum amount of wheel spin. Because the system is variable, the control unit may determine, depending on the driving conditions, that some wheel spin is beneficial (thus enhancing straight-line acceleration), or that no wheel spin is beneficial (thus enhancing cornering). For any given driving situation, the control unit will determine the amount of wheel spin best suited to the driver's needs and, if necessary, will then signal the TCS control valve actuator and Powertrain Control Module (PCM) to reduce engine power.

The system is automatically "ready" whenever the engine is started, but can be manually canceled with the TCS switch. However, once activated, the system cannot be canceled until it is once again in the ready state.



Components:

- Wheel sensors: The TCS "shares" the wheel sensors with the ABS. The wheel sensors transmit wheel speed signals to the TCS through the ABS control unit.
- Steering angle sensor: The steering angle sensor signals the TCS control unit about the amount of steering angle.
- TCS control valve sensor: The TCS control valve sensor signals the TCS control unit about the amount of TCS control valve angle.
- TCS control valve actuator: The actuator gets signals from the TCS control unit and closes the TCS control valve accordingly.
- TCS control unit: The TCS control unit detects the driving condition signals from the sensors and, if necessary, signals the Powertrain Control Module (PCM).

Construction and Function

TCS Control unit

Driving Control

When the drive wheel speed exceeds the vehicle speed by *a* given amount, the TCS control unit judges that the drive wheels are slipping, and it outputs the traction control signal to reduce engine power.

Handling Control

Based on signals about right and left driven wheel rotational speeds, the control unit calculates the vehicle's "yaw" rate (the turn rate of the vehicle's body). Based on signals from the steering angle sensor, the control unit also calculates the yaw rate expected by the driver. If the difference between actual and expected yaw rates is substantial — that is, if the direction of the vehicle's body will exceed the driver's expected line — the control unit signals the TCS control valve actuator and PCM, thus reducing engine power and maintaining the expected line.

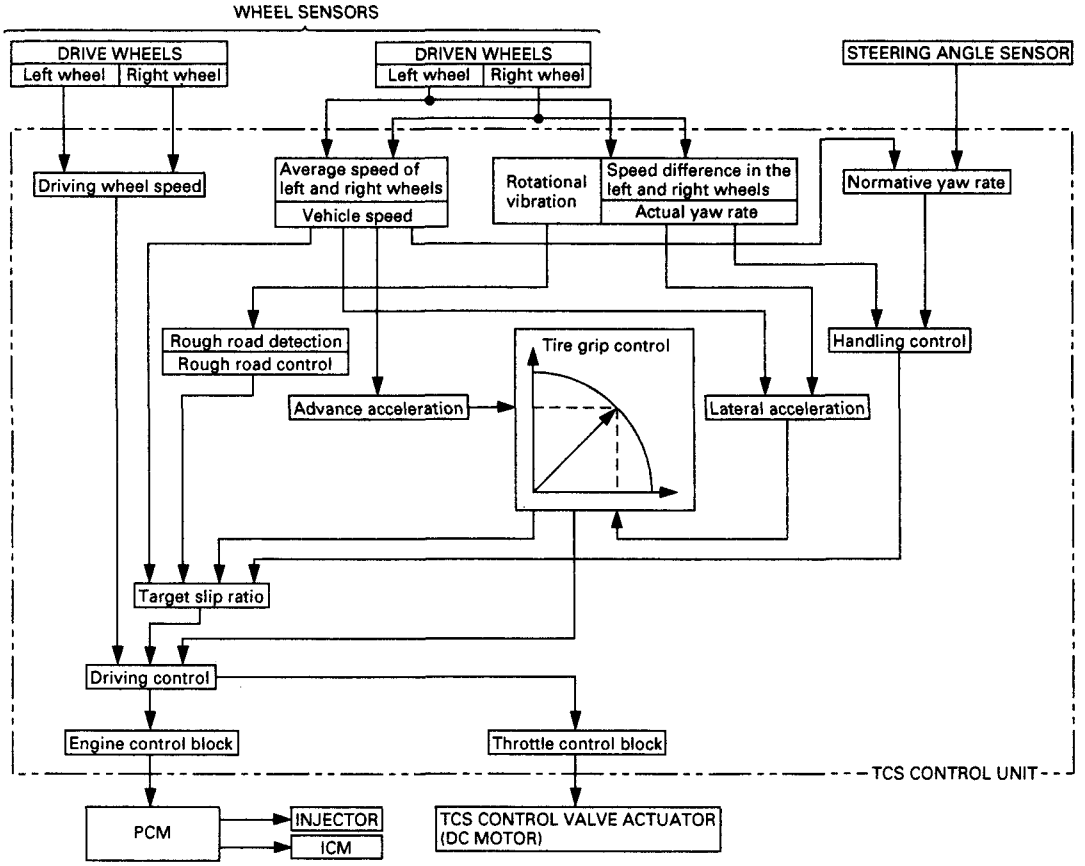
Rough Road Control

Based on signals from the wheel sensors, the control unit detects a rough road based on frequency of wheel rotational vibration. The control unit then signals the TCS control valve actuator and PCM to relax engine power, thus improving acceleration efficiency.

Grip Control

Based on signals about wheel speed and yaw rate, the control unit determines the efficiency of the grip of the tires on the road and signals the TCS control valve actuator and PCM to relax engine power, if necessary, thus improving grip.

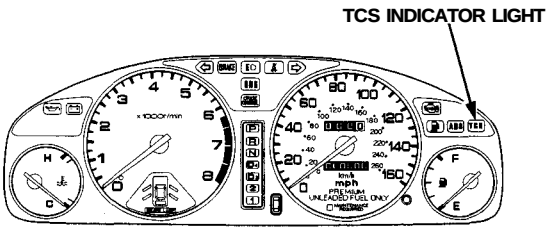
Main Control Block



System Description

Fail-Safe Function

If the control unit detects an abnormality, it shuts the traction control system off and causes the TCS indicator light to come on. However if the abnormality is detected while the TCS is activated, the control unit first establishes the appropriate wheel spin velocity, then shuts the system down, thus preventing excessive wheel spin.

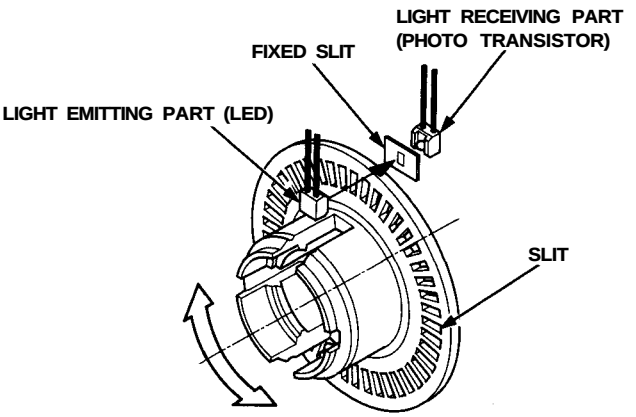


Self-Diagnosis Function

If the control unit detects an abnormality, it records a Diagnostic Trouble Code (DTC) which can be used to diagnose the problem. The DTC is shown at the TCS indicator light when the Service Check connector terminals are connected with the SCS service connector.

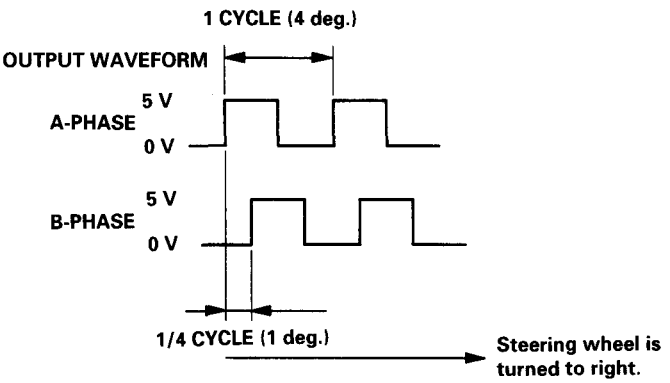
Steering Angle Detection

Steering angle is detected by the steering angle sensor. The disc with the slits of the regular pattern is provided between the facing parts of the light emitting part (LED), and the light receiving part (photo transistor). As the disc rotates, it passes and shuts off the light from the LED. The light which passed through a slit is converted into the electric current by the photo transistor, and the waveform of this electric current is shaped by the comparator to output the disc rotation as the rectangular signal.



The analysis performance of the system is improved by providing the fixed slit in front of the LED, and thereby identifying the brightness and darkness of the light which is received at the photo transistor clear.

The output signal is the 2-phase output (A-phase and B-phase), and the steering wheel turning angle and the turning direction are calculated by the TCS control unit.



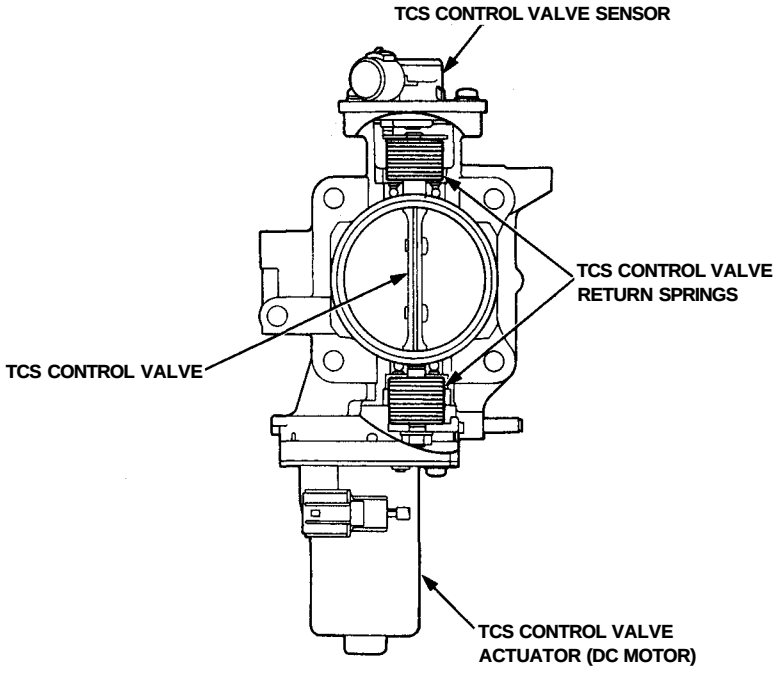
Vehicle Speed Detection

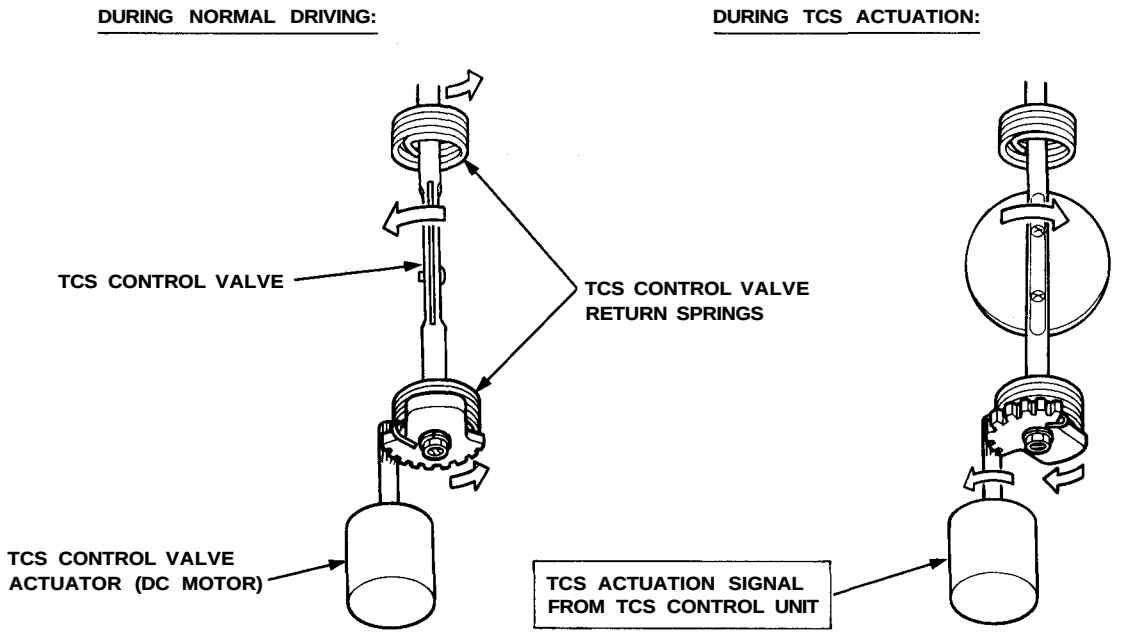
Wheel rotation speed is detected by the wheel sensors, located at each wheel. The signals are sent to the control unit, which compares each wheel's speed and determines whether traction control is required.

Engine Output Control

When the TCS is activated, the TCS control unit signals the TCS control valve actuator and PCM. The actuator is linked to the TCS control valve which is normally returned to fully open position by the two return springs.

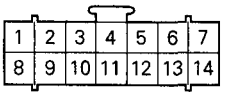
Although the throttle valve is still within the driver's control, the engine output is relaxed by the TCS control valve and PCM to achieve optimum traction.





TCS Control Unit Terminal Arrangement

TCS CONTROL UNIT HP CONNECTOR

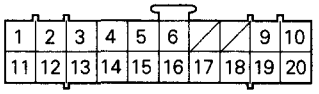


WIRE SIDE OF FEMALE TERMINALS

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Voltage		
				Measurement terminals	Conditions (Ignition Switch ON (II))	Output voltage
1	GRN/BLK	FRP (Front right pulse)	Detects right-front wheel sensor signal.	1-GND	Rotate the right-front wheel.	0 V ↔ 5 V
2	GRY/BLK	WARN1 (Warning 1)	Drives TCS indicator light (The indicator light comes on by the self-bias).	2-GND	Indicator light ON	Approx. 2 V
					Indicator light OFF	VB
3	GRN/BLU	FLP (Front left pulse)	Detects left-front wheel sensor signal.	3-GND	Rotate the left-front wheel.	0 V ↔ 5 V
4	BRN/BLK	LG1 (Logic ground1)	Ground for the logic circuit.	4-GND		Below 0.3 V
5	GRN/YEL	RRP (Rear right pulse)	Detects right-rear wheel sensor signal.	5-GND	Rotate the right-rear wheel.	0 V ↔ 5 V
6	BLU/GRN	θ TCV (θ traction control valve)	Detects TCS control valve sensor signal.	6-GND	TCS control valve is full close.	Approx. 0.5 V ≀ Approx. 4.5 V
					TCS control valve is full open.	
7	LT BLU	RLP (Rear left pulse)	Detects left-rear wheel sensor signal.	7-GND	Rotate the right-rear wheel.	0 V ↔ 5 V
8	LT GRN/BLK	TC-INH (Traction control inhibit)	FI → TCS, TCS operation permission signal.	8-GND	Permission (normal)	Approx. 2.5 V (5 V. Duty 50)
					Inhibition (the coolant temperature is 0°C or below)	Approx. 5 V
					Failure (TCS and/or PCM is failure)	Approx. 0 V
9	GRY	STR-B (Steering B)	Detects steering angle sensor signal B.	9-GND	Rotate the steering wheel.	5 V ↔ 0 V
10	LT BLU	TC-STB (Traction control standby)	TCS → FI, TCS operation start signal	10-GND	TCS is functioning.	0 V
					TCS is not functioning.	Approx. 5 V
11	WHT/BLK	TC-SW (Traction control switch)	Detects TCS switch signal.	11-GND	Push the TCS switch.	VB
					Release the TCS switch.	0 V
12	BLU	VREF (Voltage reference)	Reference voltage for the sensors of the PGM-FI system.	12-GND		Approx. 5 V
13	WHT	STR-A (Steering A)	Detects steering angle sensor signal A.	13-GND	Rotate the steering wheel.	5 V ↔ 0 V
14	RED/BLK	TPS (Throttle position sensor)	Detects throttle position sensor signal.	14-GND	Throttle valve is fully closed.	Approx. 0.5 V ≀ Approx. 4.5 V
					Throttle valve is fully open.	

TCS CONTROL UNIT 20P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Voltage		
				Measurement terminals	Conditions (Ignition Switch ON (II))	Output voltage
1	BLK/YEL	IG1 (Ignition 1)	Detects ignition switch IG1 signal.	1-GND		VB
2	GRN/RED	PARK (Parking)	Detects parking brake switch signal.	2-GND	Pull the parking brake lever up.	Below 0.6 V
					Release the parking brake lever.	VB
3	ORN	SCS (Service check signal)	Detects service check connector signal (Diagnostic trouble code indication).	3-GND	SCS service connector connected.	0 V
					SCS service connector disconnected.	5 V
4	BLU	STR-GND (Steering ground)	Ground for the steering angle sensor.	4-GND		Below 0.3 V
5	BLU/RED	AT-SHIFT (AT shift)	Detects A/T shift position signal.	5-GND	Shift the transmission to [P] position, then start the engine.	Approx. 4 V (5 V ↔ 0 V)
6	RED/BLK	FSR (Fail safe relay)	Drives fail-safe relay.	6-GND		VB
					Start the engine.	0 V
9	BLK	PMG (Power motor Ground)	Power ground for the TCS control valve actuator motor.	9-GND		Below 0.3 V
10	BRN/WHT	VPM (Voltage power motor)	Power source for the TCS control valve actuator motor.	10-GND		0 V
					Start the engine.	VB
11	GRN/WHT	STOP (Stop)	Detects brake switch signal.	11-GND	Brake pedal depressed.	VB
					Brake pedal released.	0 V
12	BLU	NEP (Engine speed pulse)	Detects engine speed signal.	12-GND	Engine idling	Approx. 6 V (12 V ↔ 0 V)
13	ORN/RED	BARO (Barometric)	Detects barometric sensor signal.	13-GND		Approx. 3 V
14	GRY/GRN	TC-FC (Traction control fuel cut)	TCS → FI, Fuel cut (torque down) signal	14-GND	TCS is functioning. (maximum fuel cut)	Approx. 1.5 V ≀ Approx. 4.5 V (5 V, PWM)
					TCS is not functioning.	
15	BRN/BLK	LG2 (Logic ground 2)	Ground for the logic circuit.	15-GND		Below 0.3 V
16	WHT/GRN	STR-VCC (Steering power supply)	Power source for the steering angle sensor.	16-GND		Approx. 5 V
17	GRY/BLK	WARN2 (Warning 2)	Drives TCS indicator light (The indicator light comes on by the self-bias).	17-GND	Indicator light ON	Approx. 2 V
					Indicator light OFF	VB
18	BLK	SH-MOT (Shield motor)	Shield for the TCS control valve actuator motor.	——	——	——
19	BLU/BLK	MOT + (Motor +)	Drives TCS control valve actuator motor.	19-20	TCS is functioning.	VB
					TCS is not functioning.	0 V
20	BLU/YEL	MOT – (Motor –)	Drives TCS control valve actuator motor.	20-19	TCS is functioning.	VB
					TCS is not functioning.	0 V

Troubleshooting Precautions

1. In any of these cases, the TCS indicator light may come on or stay on even the TCS system is normal.
   - The coolant temperature is 32°F (0°C) or below.
   - The parking brake is applied for more than 30 seconds while the vehicle is being driven.
   - The tire pressure is not at the specified pressure.
   - The wheel sensor signal is interrupted during driving at the speed of 6 mph (10 km/h) or above due to, for example, the vehicle spinning.
   - The MAP sensor, coolant temperature sensor, ICM or the atmospheric pressure sensor system of the PGM-FI system is faulty.

2. TCS does not function when the TCS indicator light is ON.

3. When both the TCS indicator light and the MIL are ON, troubleshoot the PGM-FI system first.

4. When both the TCS indicator light and the ABS indicator light are ON, troubleshoot the ABS first.

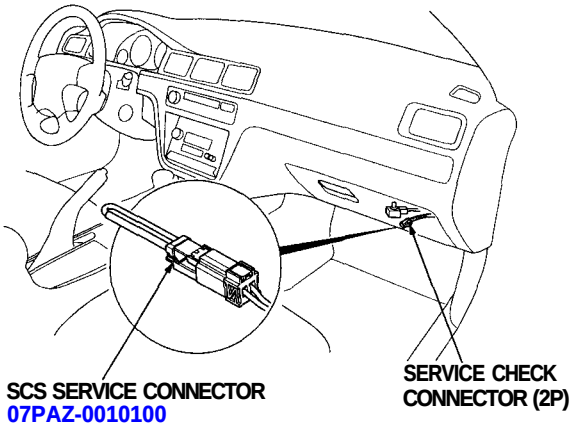
5. The DTC 4-9 (ABS down) is memorized when the ABS control unit cannot output the wheel speed signal due to, for example, a missing or blown ABS B2 (15 A) fuse. If you fail to erase the DTC of the TCS after troubleshooting the ABS, the DTC remains in the TCS control unit memory. Therefore, be sure to test-drive the vehicle and check the TCS indicator light before starting the troubleshooting the TCS.

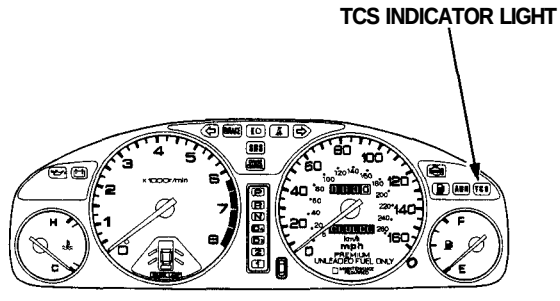
Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication

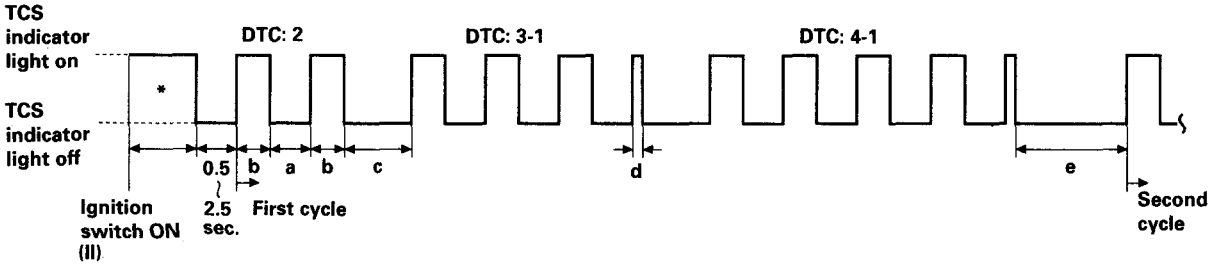
1. Connect the SCS service connector to the service check connector under the glove box.
2. Turn the ignition switch ON (II), but do not start the engine.
3. Record the blinking frequency of the TCS indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).
4. Turn the ignition switch off, and remove the SCS service connector.

   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.
5. Perform the DTC erasure.





DTC Indication Pattern



*: Bulb check mode
a: 1.2 sec.
b: 1 sec.
c: 2 sec.
d: 0.3 sec.
e: 3.3 sec.

- Turn the ignition switch ON (II). The TCS indicator light comes on to check the bulb. Do not count it as a DTC.
- The TCS control unit can memorize up to three DTCs.
- A new DTC is not memorized again when the TCS control unit has already memorized the same DTC.
- The TCS control unit indicates the DTC repeatedly at intervals of 3.3 seconds.
- If you miscount the blinking frequency or if you recheck the blinking frequency, turn the ignition switch OFF then turn it ON (II) to cycle the TCS indicator light again.

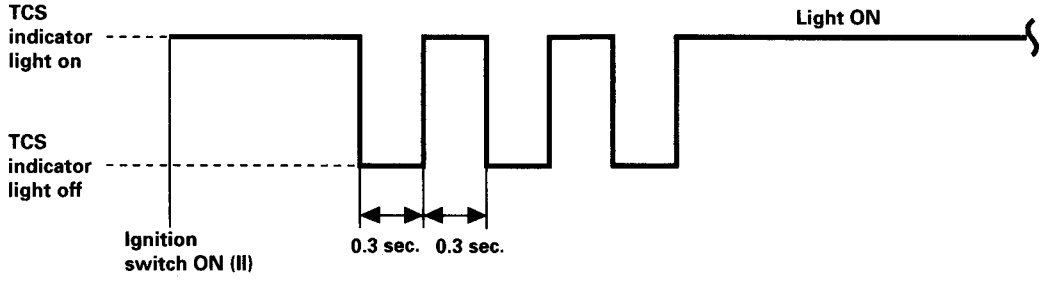
Diagnostic Trouble Code (DTC)

DTC Erasure

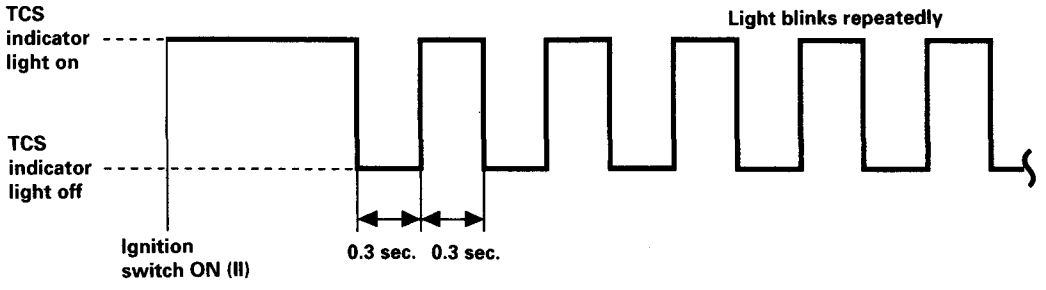
1. Pull the parking brake lever up.
2. Push and hold the TCS switch, then turn the ignition switch ON (II).
3. Hold the TCS switch pushed for four seconds (do not release the TCS switch), then release the TCS switch for less than six seconds.
4. After three seconds, the TCS indicator light go off three times, then turn it on. It means that the DTC is erased.

NOTE:
- Follow these steps exactly. If you connect the SCS service connector and/or release the parking brake lever during these steps, the DTC will not be erased.
- If the TCS indicator light blinks repeatedly, replace the TCS control unit.

Standard Indication Pattern



Abnormal Indication Pattern



Troubleshooting Guide

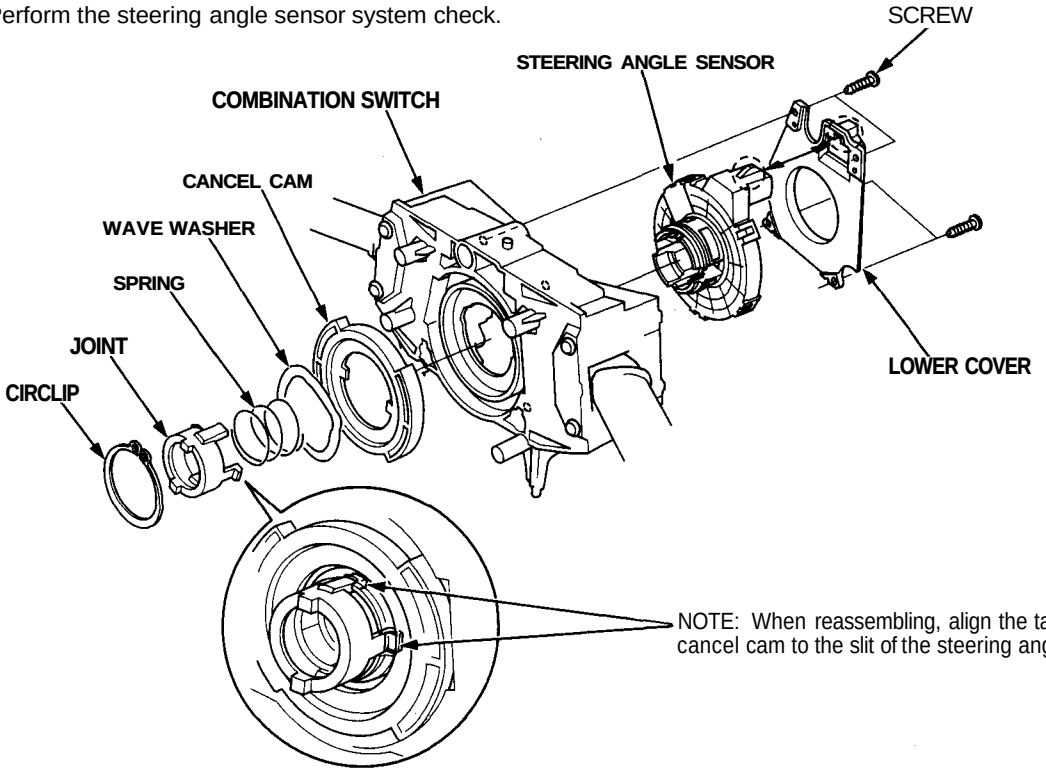
Diagnostic Trouble Code (DTC)	System Indicated	Related components												Refer to page
		BACK-UP LIGHTS (10 A) fuse	ECU (15 A) fuse	TCS (15 A) fuse	Parking brake switch	Steering angle sensor	TCS control valve sensor	TCS control valve actuator	Fail-safe relay	Powertrain Control Module (PCM)	ABS control unit	Wire harness	TCS control unit	
—	TCS indicator light does not come on when ignition switch is turned ON (II)	○										○	○	19-120
—	TCS indicator light does not go off after engine is started		○									○	○	19-122
2	Parking brake				○							○	○	19-123
2-1	Steering angle sensor					○						○	○	19-126
3-1	TCS inhibition (TC-INH signal / PGM-FI DTC: 35 / PGM-FI DTC: 36)									○		○	○	19-129
3-2	Engine speed signal (NEP)									○		○	○	19-134
3-4	Reference voltage signal (VREF)									○		○	○	19-135
3-5	Barometric pressure signal (BARO)									○		○	○	19-136
3-6	Throttle position sensor signal (TPS)									○		○	○	19-137
3-7	TCS control valve sensor signal (θ TCV)						○			○		○	○	19-138
4-1	Right-front wheel sensor signal (FRP)													
4-2	Left-front wheel sensor signal (FLP)										○	○	○	19-140
4-4	Right-rear wheel sensor signal (RRP)													
4-8	Left-rear wheel sensor signal (RLP)													
4-9	ABS down										○	○	○	19-142
5-1	Fail-safe relay stuck on								○			○	○	19-143
5-2	Ignition switch signal (IG1)													19-144
5-3														
5-4	TCS control valve actuator: Initial motor operation													
5-5	TCS control valve actuator: Motor operation (1)													
5-6	TCS control valve actuator: Motor operation (2)													
5-7	TCS control valve actuator: Over limit motor current			○				○	○			○	○	19-145
5-8	TCS control valve actuator: FET is full duty													
5-9	TCS control valve actuator: Under limit motor current													
5-10	TCS control valve actuator: FET stuck on													
6-1	A/T shift position signal (AT-SHIFT)									○		○	○	19-148

Electronic Components

Steering Angle Sensor Replacement

CAUTION: Do not damage or drop the steering angle sensor as it is sensitive.

1. Remove the combination switch (refer to section 17 in the '95 - '98 Acura 2.5TL service manual, P/N 61SW504).
2. Remove the circlip and screw, then remove the steering angle sensor from the combination switch.
3. Installation is in the reverse order of removal.
   CAUTION: Do not apply any grease or oil to the steering angle sensor.
4. Perform the steering angle sensor system check.



Steering Angle Sensor System Check

1. Start the engine.
2. Push the TCS switch three times within three seconds.
   NOTE: Always maintain the same number of rotations.
3. Slowly turn the steering wheel from clockwise more than 1.5 turns.
   NOTE:
   - Start checking after the steering wheel moves at least 1.5 turns.
   - Turn the steering wheel slowly, no faster than one turn in four seconds.
4. Push the TCS switch twice within three seconds.
   NOTE: Always maintain the same number of rotations.
5. Slowly turn the steering wheel counterclockwise, and check the number of times the TCS indicator light flashes after the wheel has moved approximately one turn.
   NOTE:
   - Start counting after the steering wheel moves one turn.
   - Turn the steering wheel slowly, no faster than one turn in four seconds.

   Standard number of times the TCS indicator light flashes: 2 times ('96 model)
   : 4 times ('97 model)

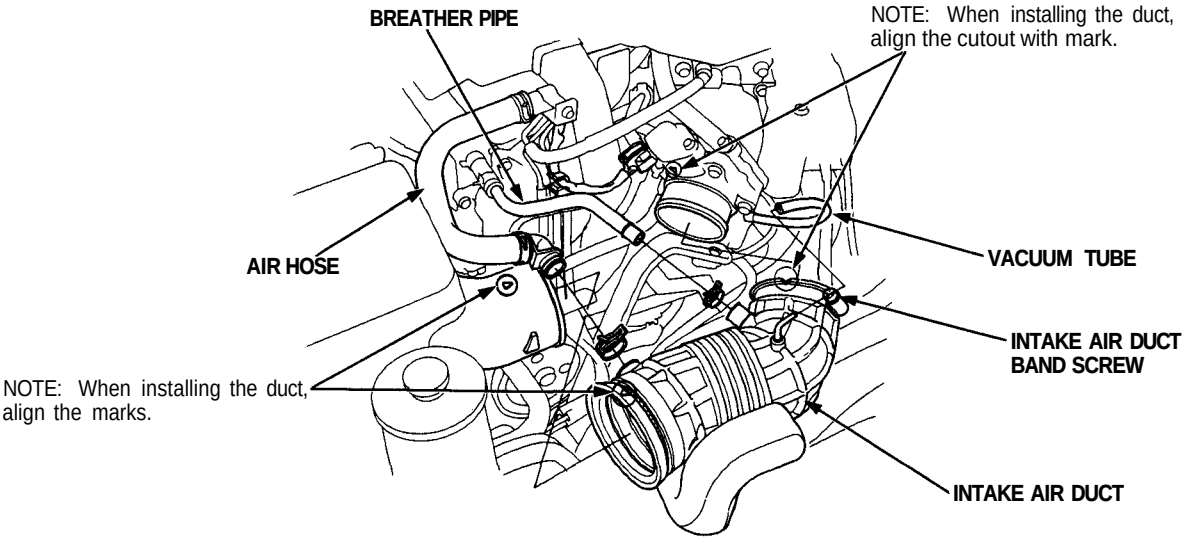
6. If there is an abnormality, check the troubleshooting flowchart (see page 19-126).

Electronic Components

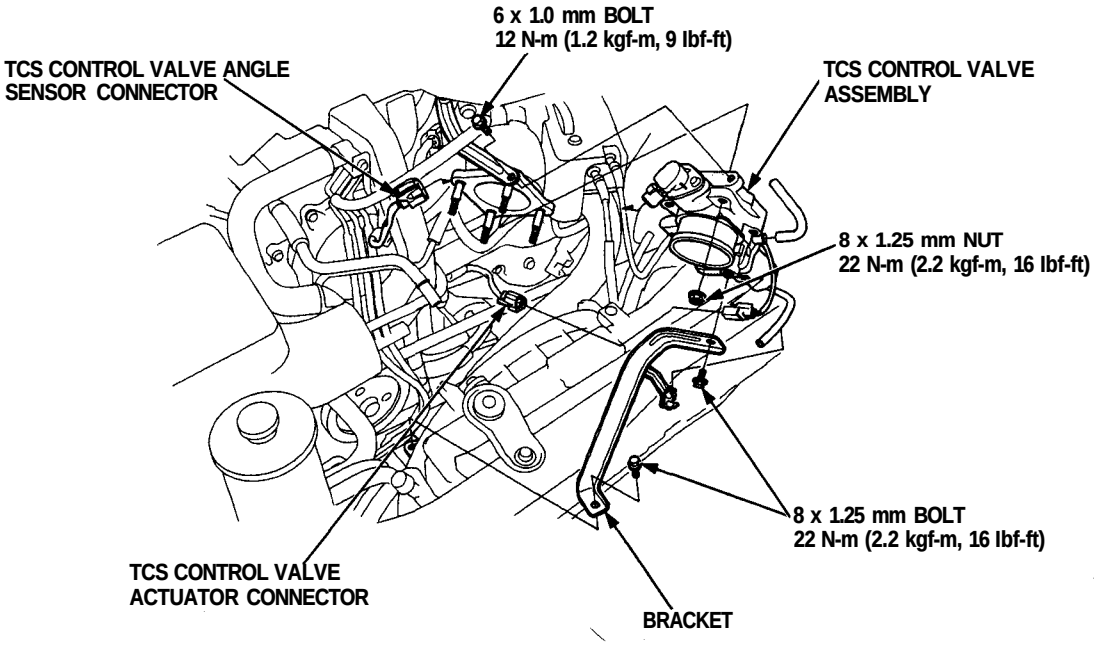
TCS Control Valve Assembly Replacement

CAUTION: Be careful not to damage the TCS control valve when handling the TCS control valve assembly.

1. Disconnect the vacuum tube, breather pipe and air hose from the intake air duct.
2. Loosen the intake air duct band screws, then remove the intake air duct.



3. Disconnect the TCS control valve angle sensor connector and actuator connector.
4. Remove the TCS control valve assembly and bracket.
5. Install the TCS control valve assembly in the reverse order of removal.

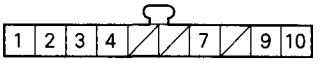


TCS Switch Inspection

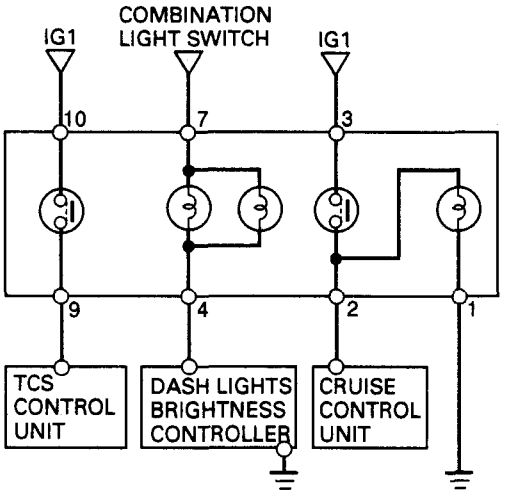
1. Remove the TCS switch.
2. Check for continuity between terminals No. 9 and No. 10.

There should be continuity when the switch is pushed, and there should be no continuity when the switch is released.

TCS SWITCH CONNECTOR

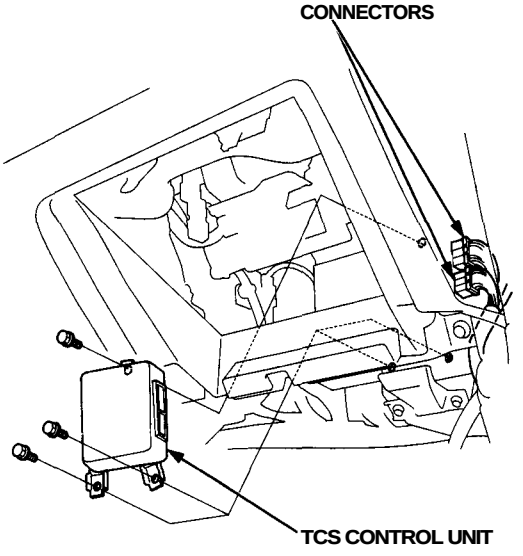


WIRE SIDE OF FEMALE TERMINALS



TCS Control Unit Replacement

1. Remove the glove box (refer to section 20 in the '95 - '98 Acura 2.5TL service manual, P/N 61SW504).
2. Remove the ABS control unit (refer to page 19-121 or 19-163 in the '95 - '98 Acura 2.5TL service manual, P/N 61SW504).
3. Disconnect the TCS control unit connectors.
4. Remove the TCS control unit.



5. Install the TCS control unit in the reverse order of removal.

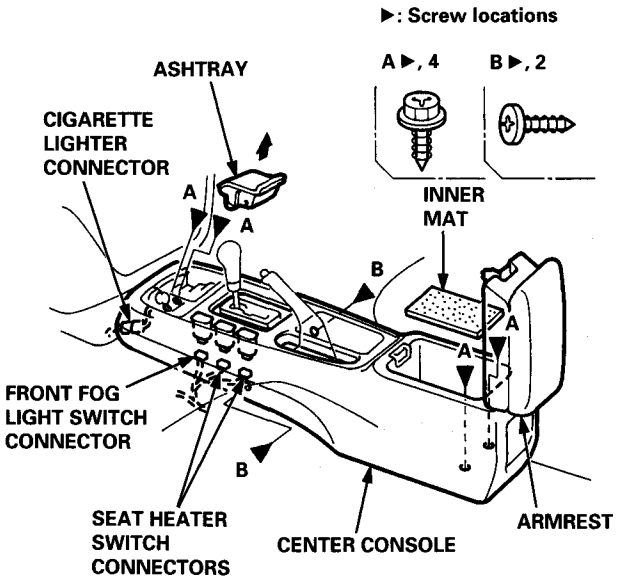
Center Console

Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the center console, front seat and related parts.

1. Slide the front seats backward fully.
2. Remove the A/T gear position indicator trim, and disconnect the indicator light.
3. Open the armrest, then remove the inner mat and remove the ashtray.



4. Remove the screws, then remove the center console. Disconnect the cigarette lighter connector, front fog light switch connector and seat heater switch connectors.
5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the wire harnesses are not pinched.
- Make sure the connectors are connected properly.

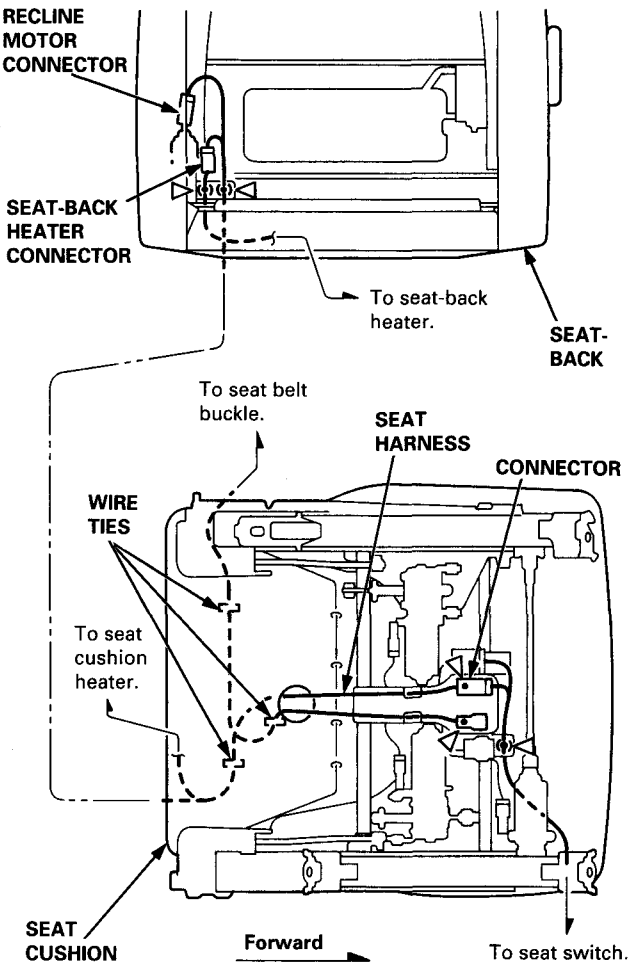
Front Seat

Seat Harness Wiring Locations (With Seat Heater)

NOTE: Replace the seat cover, seat heater and wire harness as an assembly.

8-way power adjustable:

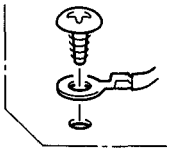
▷: Clip locations, 5

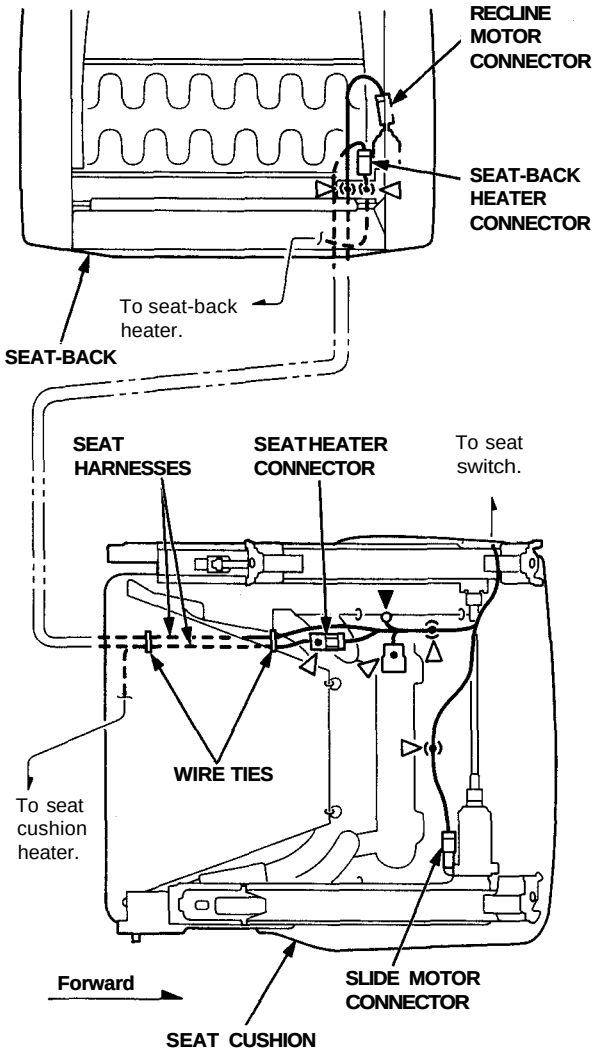


4-way power adjustable:

▷: **Clip locations, 6**

▶: **Screw location**



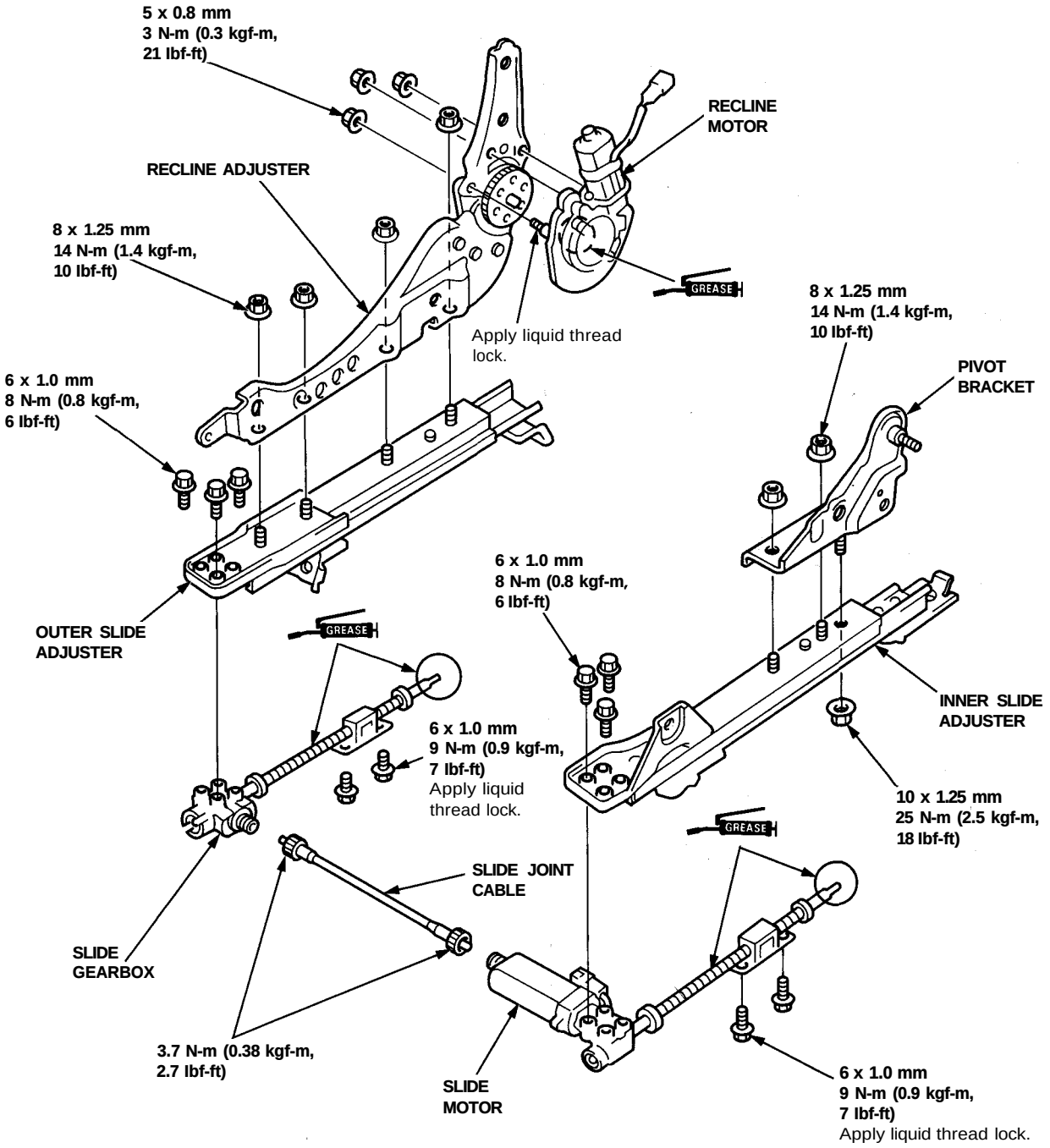


Front Seat

Seat Linkage (4-way Power Adjustable) Replacement

The slide joint cable, recline motor, slide motor and slide gearbox replacement procedures are the same as the 8-way power adjustable seat.

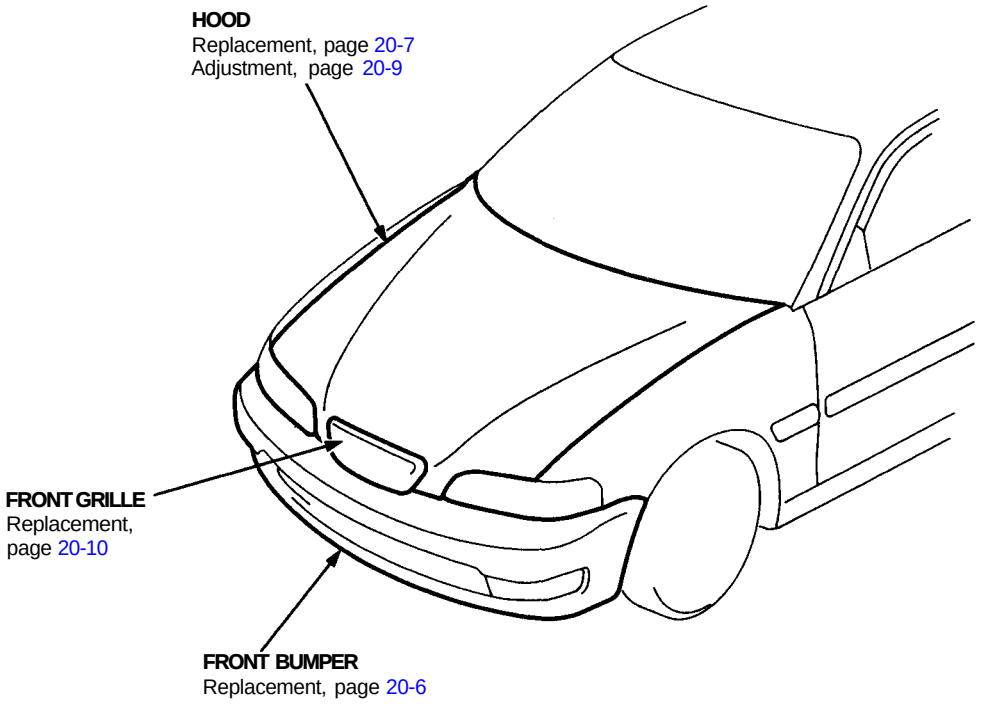
NOTE:
- Grease the slide lead screws and gear portion of the recline motor.
- Check the slide motor, slide gearbox and recline motor operations.

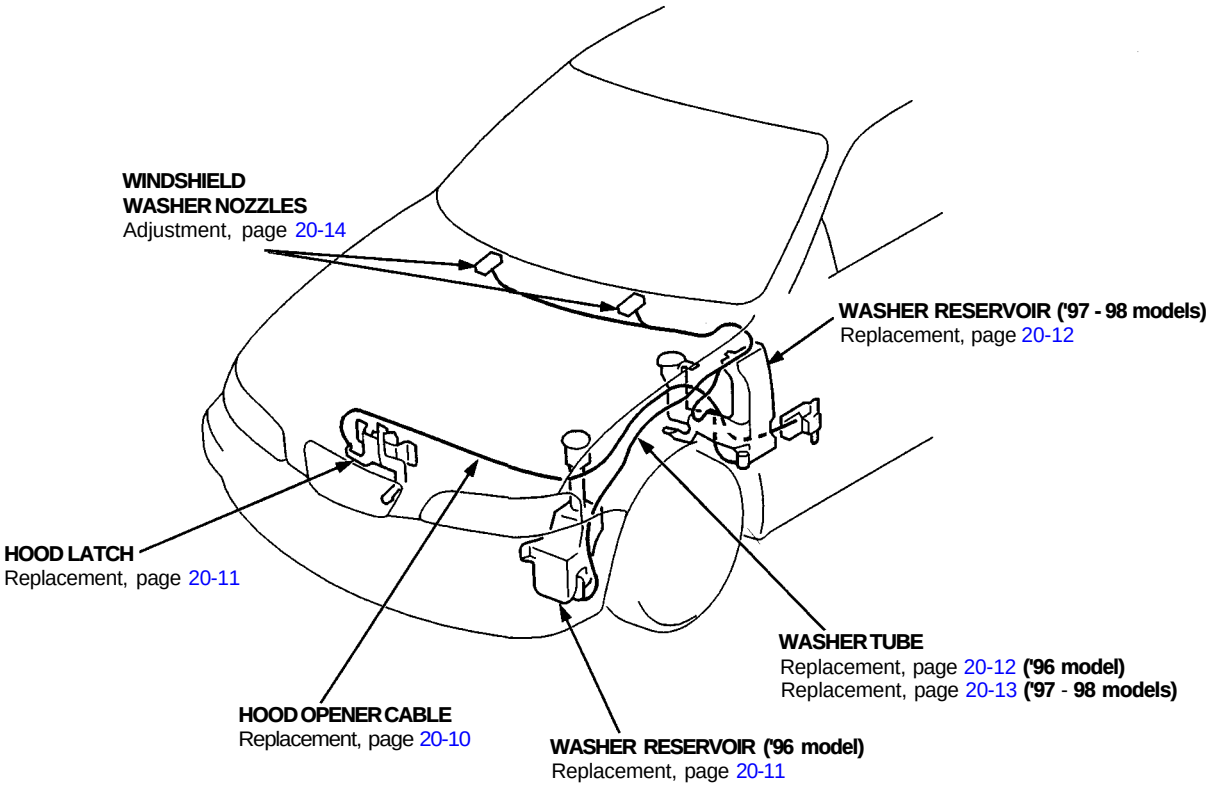


Exterior/Opener Cable/Washer

Component Location Index

NOTE: Refer to page 20-94 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.





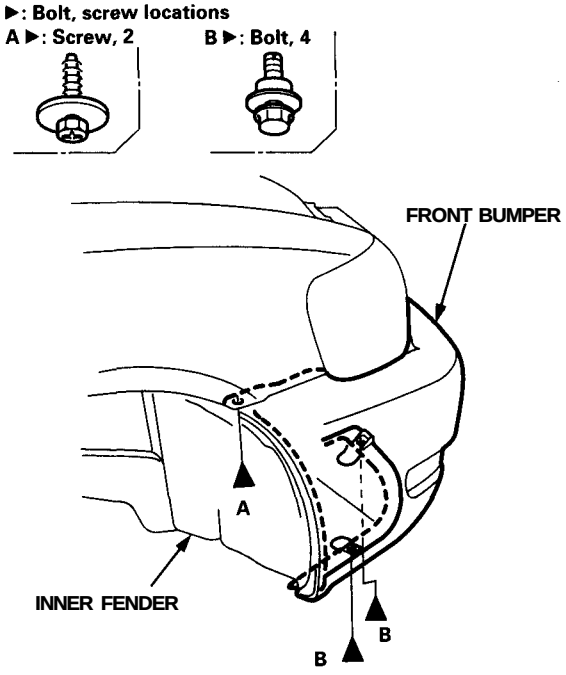
Front Bumper

Replacement

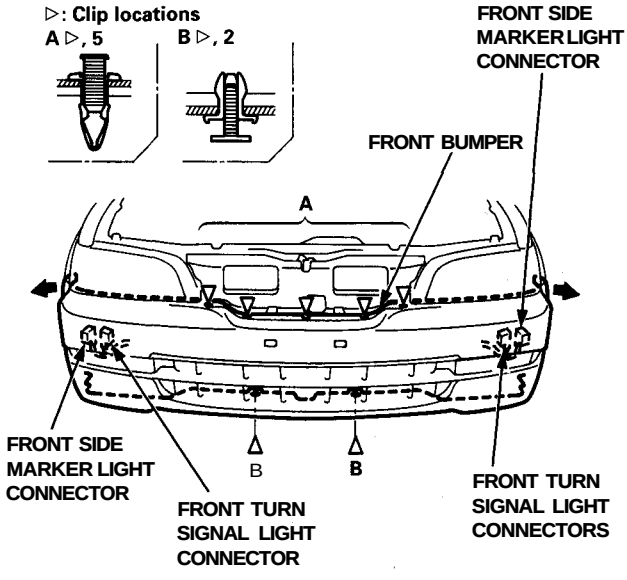
CAUTION: Wear gloves to remove and install the front bumper.

NOTE:
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front bumper and body.
- Open the hood.

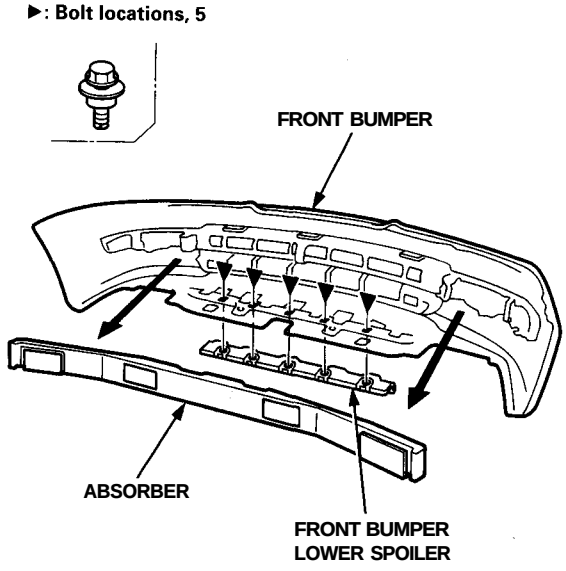
1. Remove the bolts and screw from each side.



2. Remove the clips. Remove the front bumper, then disconnect the connectors.

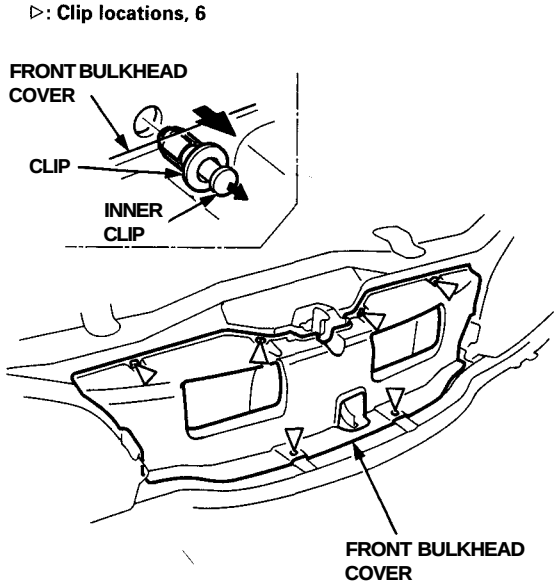


3. Remove the absorber and front bumper lower spoiler from the front bumper.

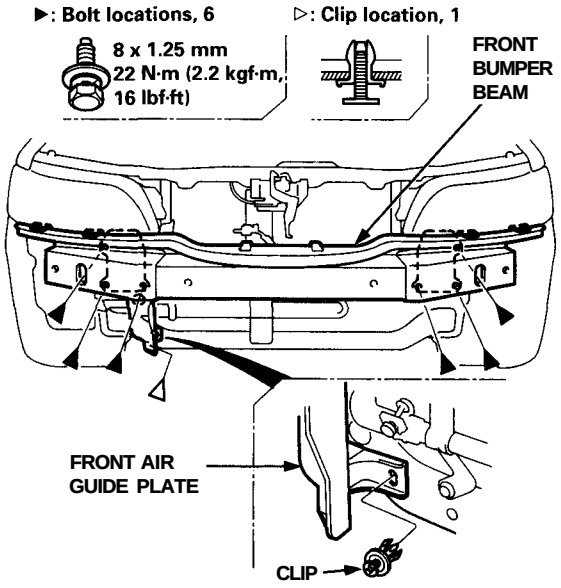


4. Remove the front bulkhead cover.

NOTE: After pulling the inner clips out, remove the front bulkhead cover with the clips.



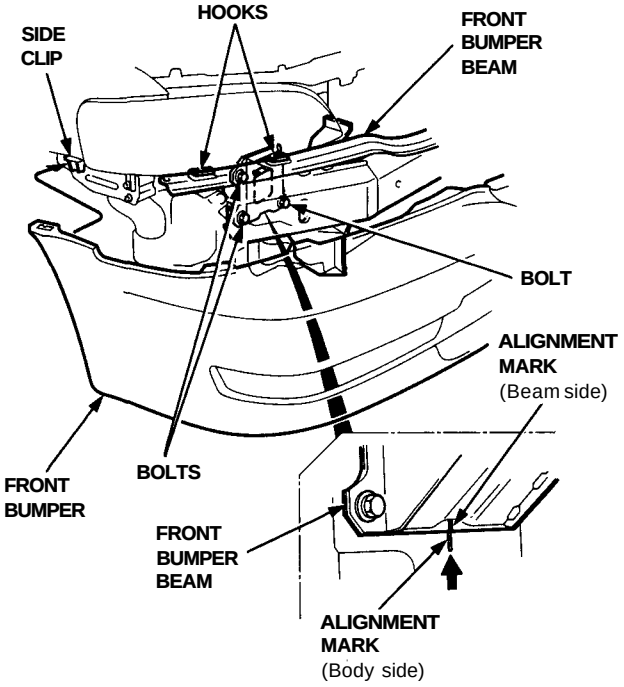
5. Remove the front bumper beam.



6. Installation is the reverse of the removal procedure.

NOTE:

- When installing the front bumper beam, align it with both alignment marks on the body, then tighten the bolts.
- Align the front bumper with the front fender and headlight properly.



(cont'd)

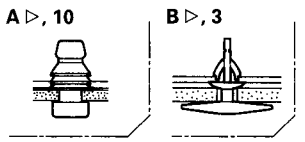
Hood

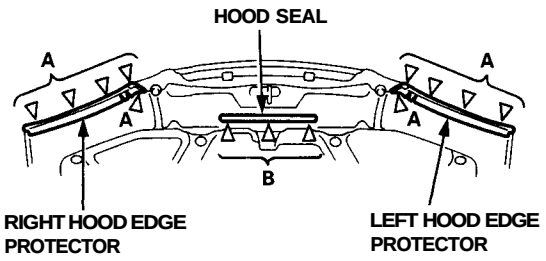
Replacement

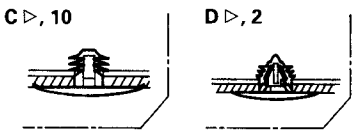
NOTE:
- An assistant is helpful when removing the hood.
- Take care not to damage the hood and body.
- When removing the clips, use a clip remover.
- Open the hood.

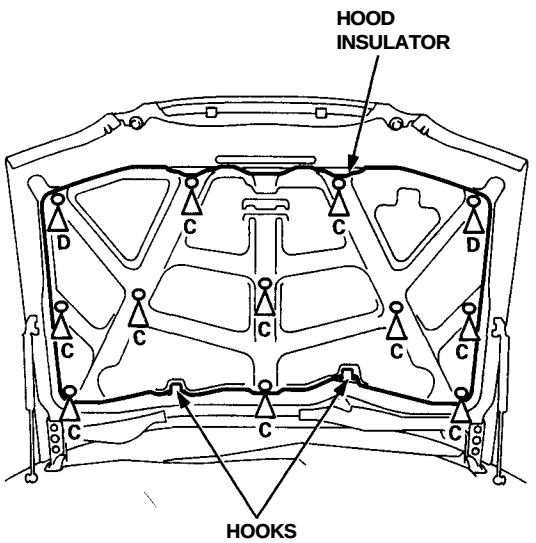
1. If necessary, remove the hood edge protector, hood seal and hood insulator.

▷ : Clip locations









(cont'd)

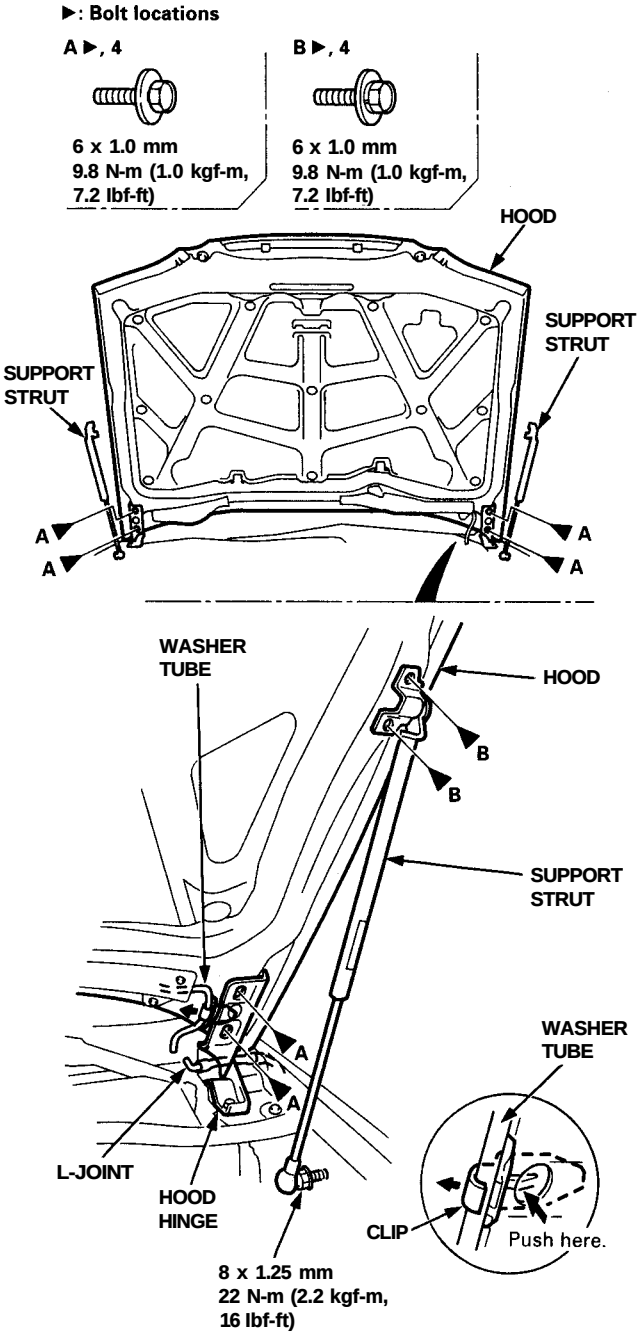
Hood

Replacement (cont'd)

2. Disconnect the washer tube at the L-joint, and detach the clip from the hood hinge.

3. Remove the support strut and bolts on each side while holding the hood, then remove the hood.

   NOTE: If necessary, remove the support strut.



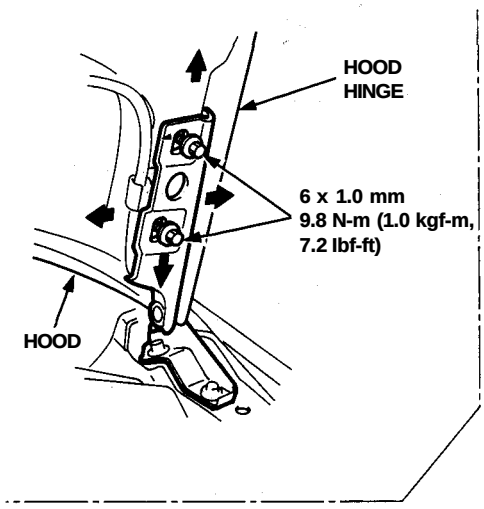
4. Installation is the reverse of the removal procedure.

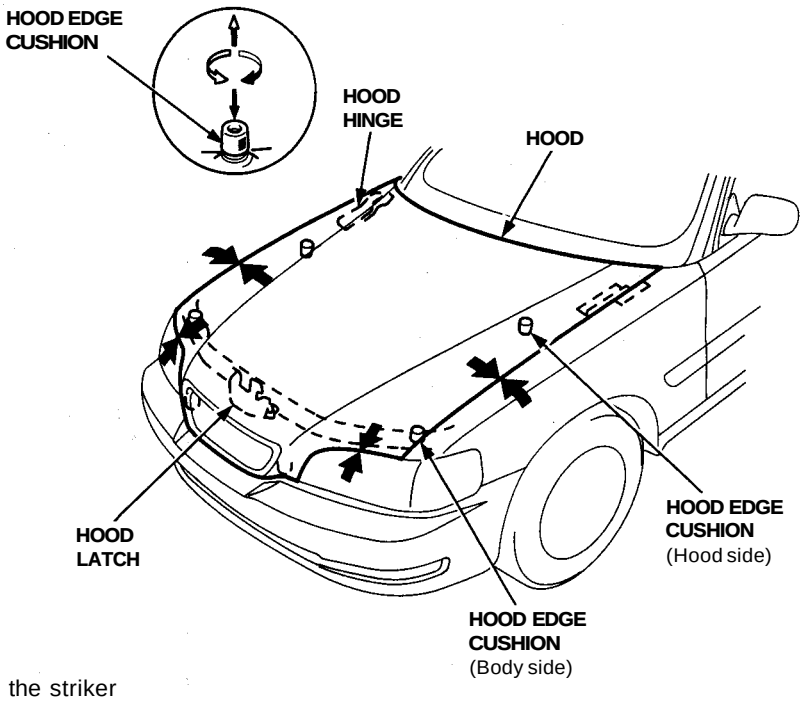
   NOTE:
   - If necessary, replace any damaged clips.
   - Make sure the hood opens properly and locks securely.
   - Adjust the hood alignment.
   - Adjust the aim of the windshield washer nozzles (see page 20-14).

Adjustment

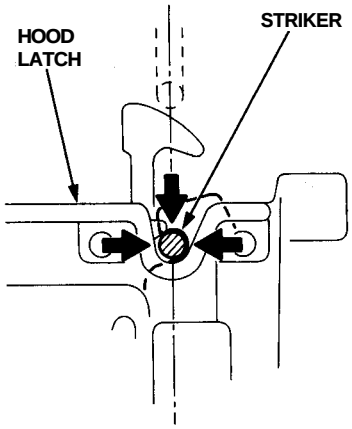
NOTE: Before adjusting the hood, remove the support strut on each side from the hood, and loosen each hood mounting bolt slightly.

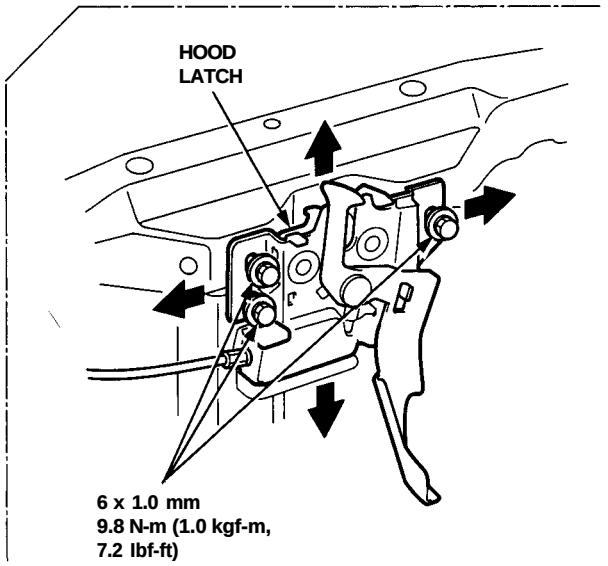
1. Adjust the hood right and left, as well as fore and aft, by using the elongated holes on the hood hinge.
2. Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.
3. Adjust the hood latch to obtain the proper height at the forward edge.
4. After adjustment, tighten each bolt securely.





NOTE: Move the hood latch right or left until the striker is centered in the hood latch as shown.



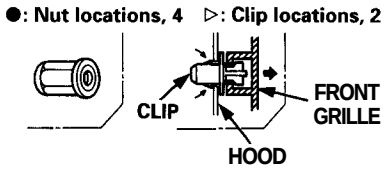


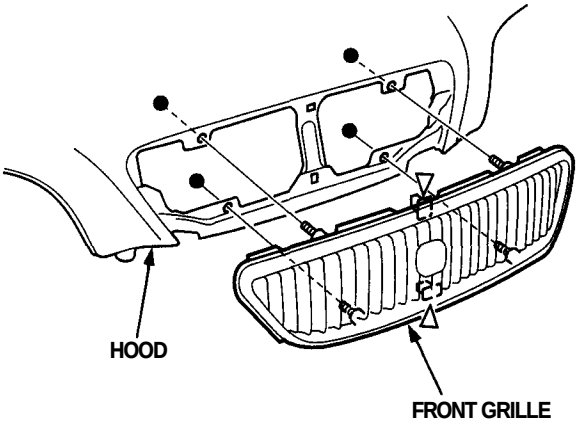
Front Grille

Replacement

NOTE: Take care not to scratch the hood.

1. Open the hood, then remove the nuts.
2. Detach the clips, then remove the front grille.





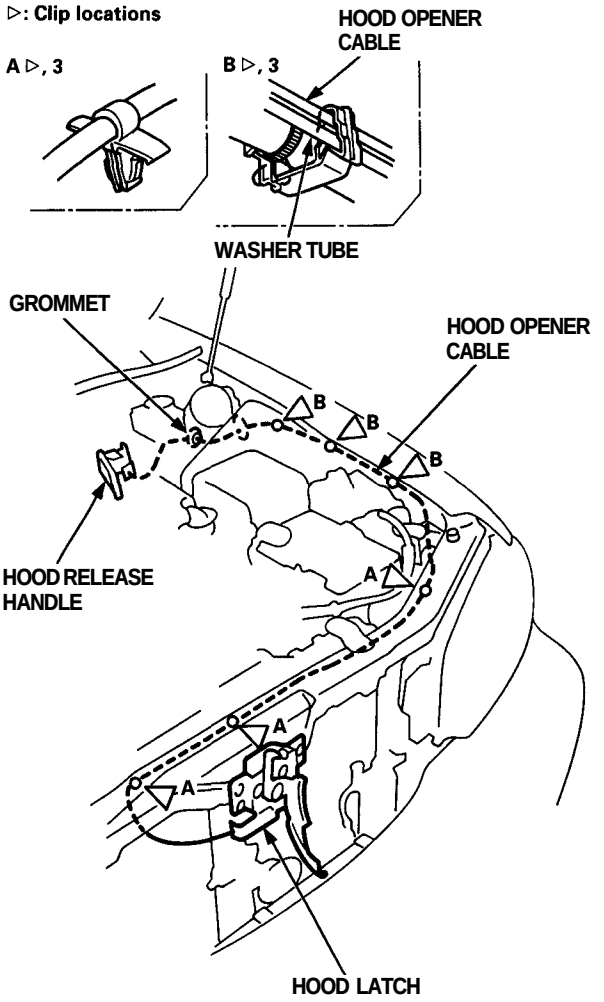
3. If necessary, disassemble the front grille.
4. Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Hood Opener Cable

Replacement

NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the hood opener cable.
- Open the hood, and remove the front bulkhead cover (see page 20-6).
- Remove the inner fender.



Installation is the reverse of the removal procedure.

NOTE:
- Make sure the hood opener cable is routed and connected properly.
- Make sure the hood opens properly.

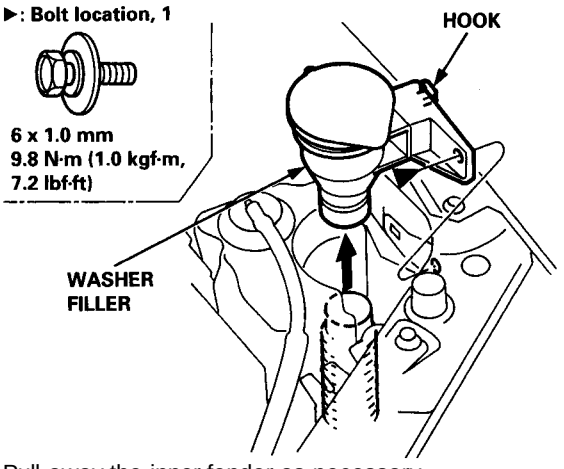
Washer Reservoir

Replacement

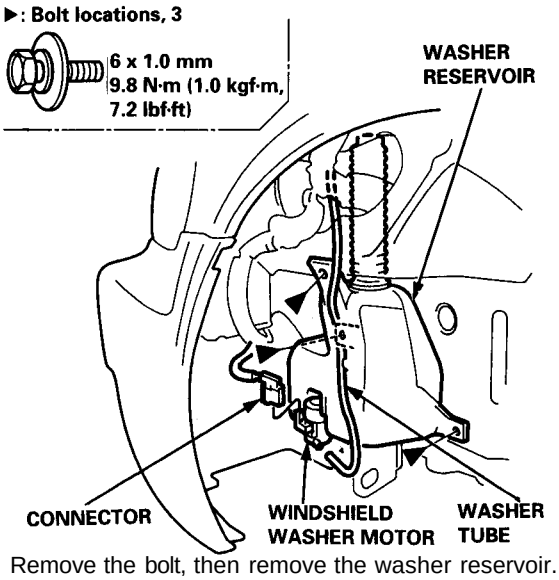
CAUTION: Wear gloves to remove and install the washer reservoir.

'96 model:

1. Open the hood.
2. Remove the bolt, then pull out the washer filler.



3. Pull away the inner fender as necessary.
4. Disconnect the washer tube and windshield washer motor connector.



5. Remove the bolt, then remove the washer reservoir.
6. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the windshield washer motor connector and washer tube are connected properly.
- Check the windshield washer motor operation.

(cont'd)

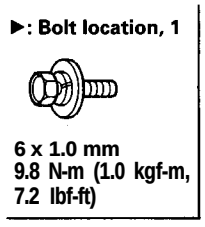
Washer Reservoir

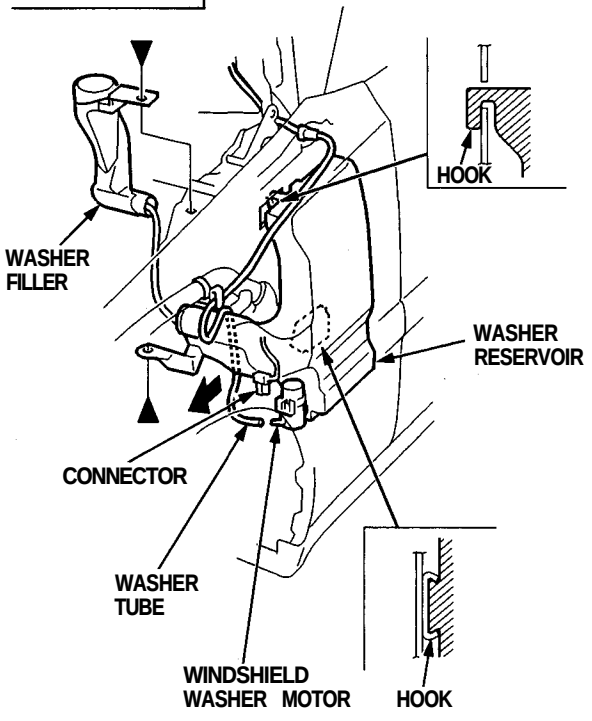
Replacement (cont'd)

CAUTION: Wear gloves to remove and install the washer reservoir.

'97 - 98 models:

1. Open the hood.
2. Remove the bolt, then pull out the washer filler.





3. Pull away the inner fender as necessary.
4. Disconnect the washer tube and windshield washer motor connector.
5. Remove the bolt, then remove the washer reservoir by sliding it forward.
6. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the windshield washer motor connector and washer tube are connected properly.
- Check the windshield washer motor operation.

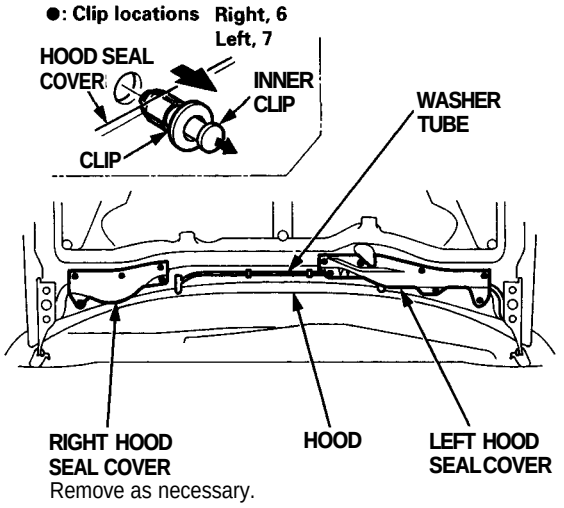
Washer Tube

Replacement

'96 model:

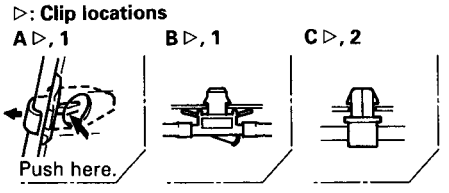
1. Open the hood.
2. Remove the left hood seal cover from the hood.

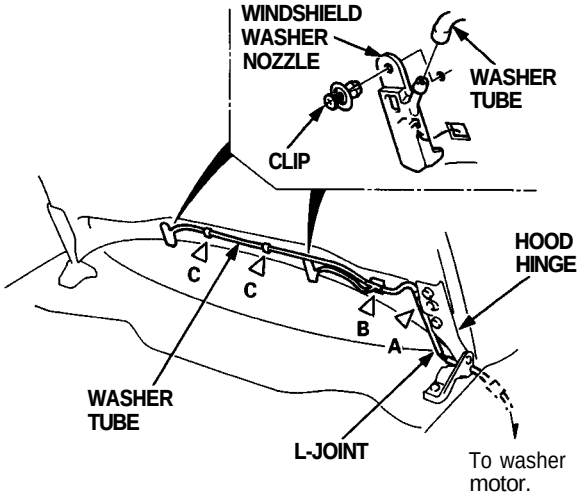
   NOTE: After pulling the inner clips out, remove the hood seal cover with the clips.



Remove as necessary.

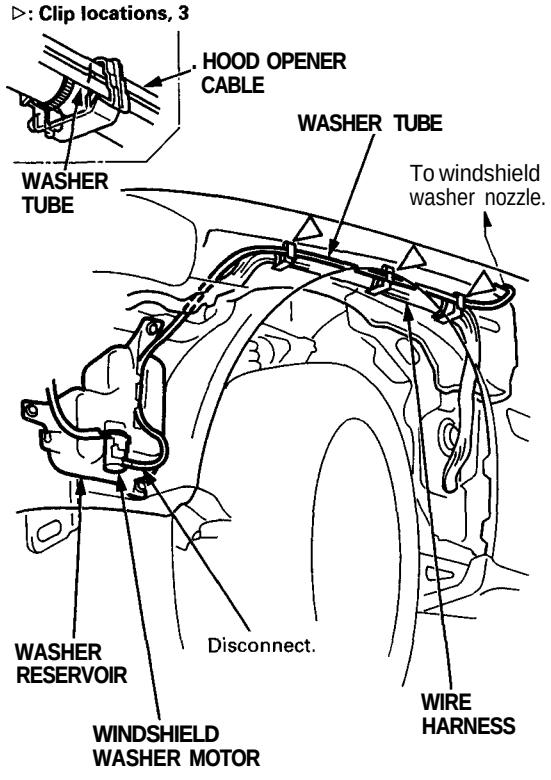
3. Detach the clips, and remove both windshield washer nozzles. Disconnect the washer tube at the L-joint, then remove the washer tube from the hood.





4. Remove the inner fender.

5. Disconnect the washer tube from the washer motor. Detach the washer tube from the clip, then remove the washer tube.

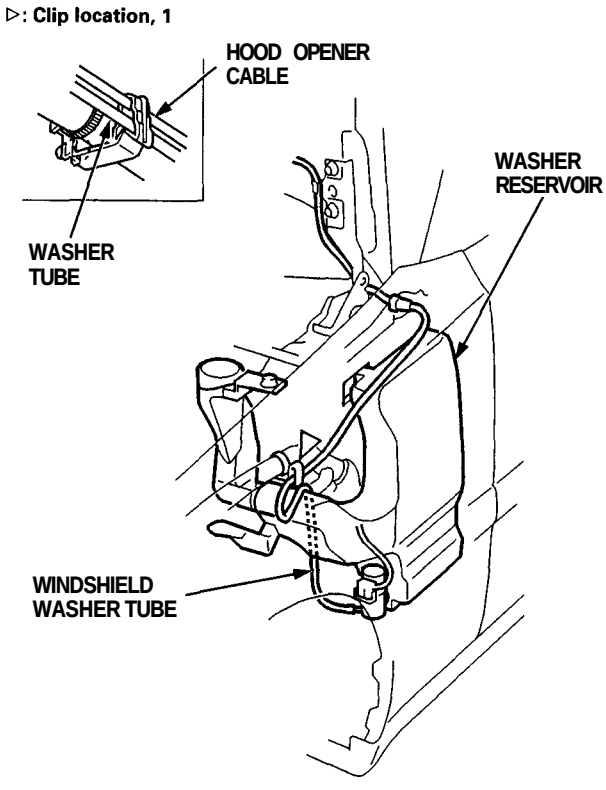


6. Installation is the reverse of the removal procedure.

NOTE:
- Take care not to pinch the washer tube.
- If necessary, replace any damaged clips.
- After installing, adjust the aim of the windshield washer nozzles.

'97 - 98 models:

Remove the left inner fender.



Installation is the reverse of the removal procedure.

NOTE:
- Take care not to pinch the washer tube.
- If necessary, replace any damaged clips.

Washer Nozzles

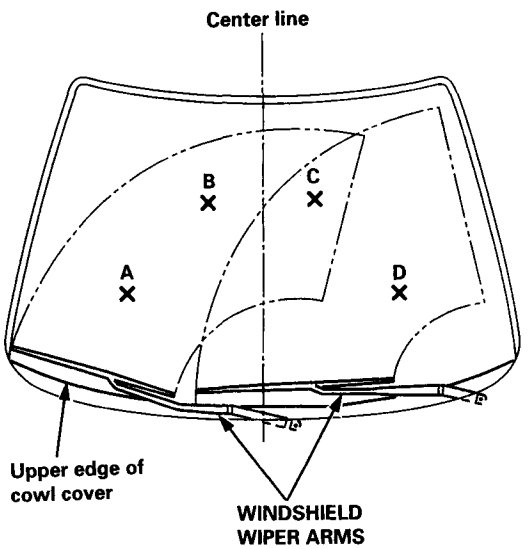
Adjustment

By inserting a tack and moving it as necessary, adjust the washer nozzles so that they aim at positions A, B, C, and D shown in the illustration.

NOTE: The fluid jets should hit within a 50 mm (2.0 in) radius around each of points A, B, C, and D.

Distance / Nozzle aim	from center line	from upper edge of air scoop
A	375 mm (14.8 in)	366 mm (14.4 in)
B	216 mm (8.50 in)	529 mm (20.8 in)
C	216 mm (8.50 in)	529 mm (20.8 in)
D	375 mm (14.8 in)	366 mm (14.4 in)

View from front to rear



Emblems

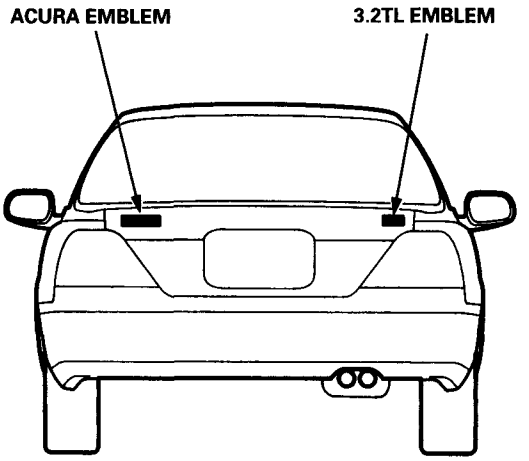
Installation

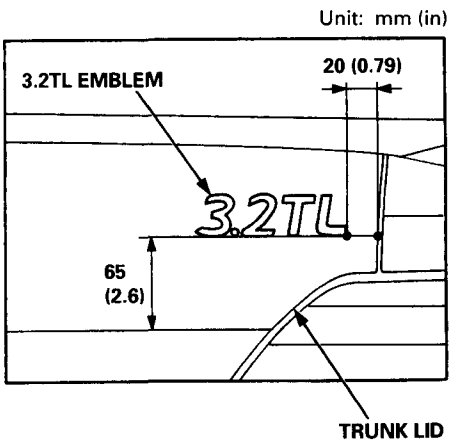
Apply the emblems where shown.

NOTE:
- Before applying, clean the trunk lid surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.

NOTE: Refer to page 20-120 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.

Attachment Points (Reference):

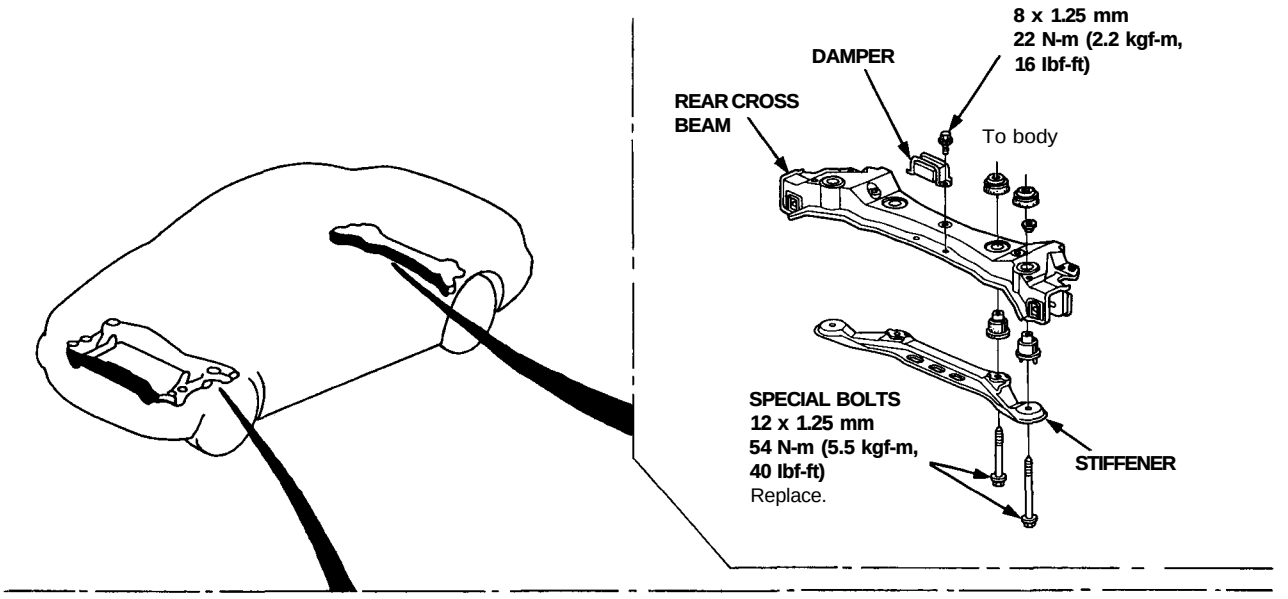


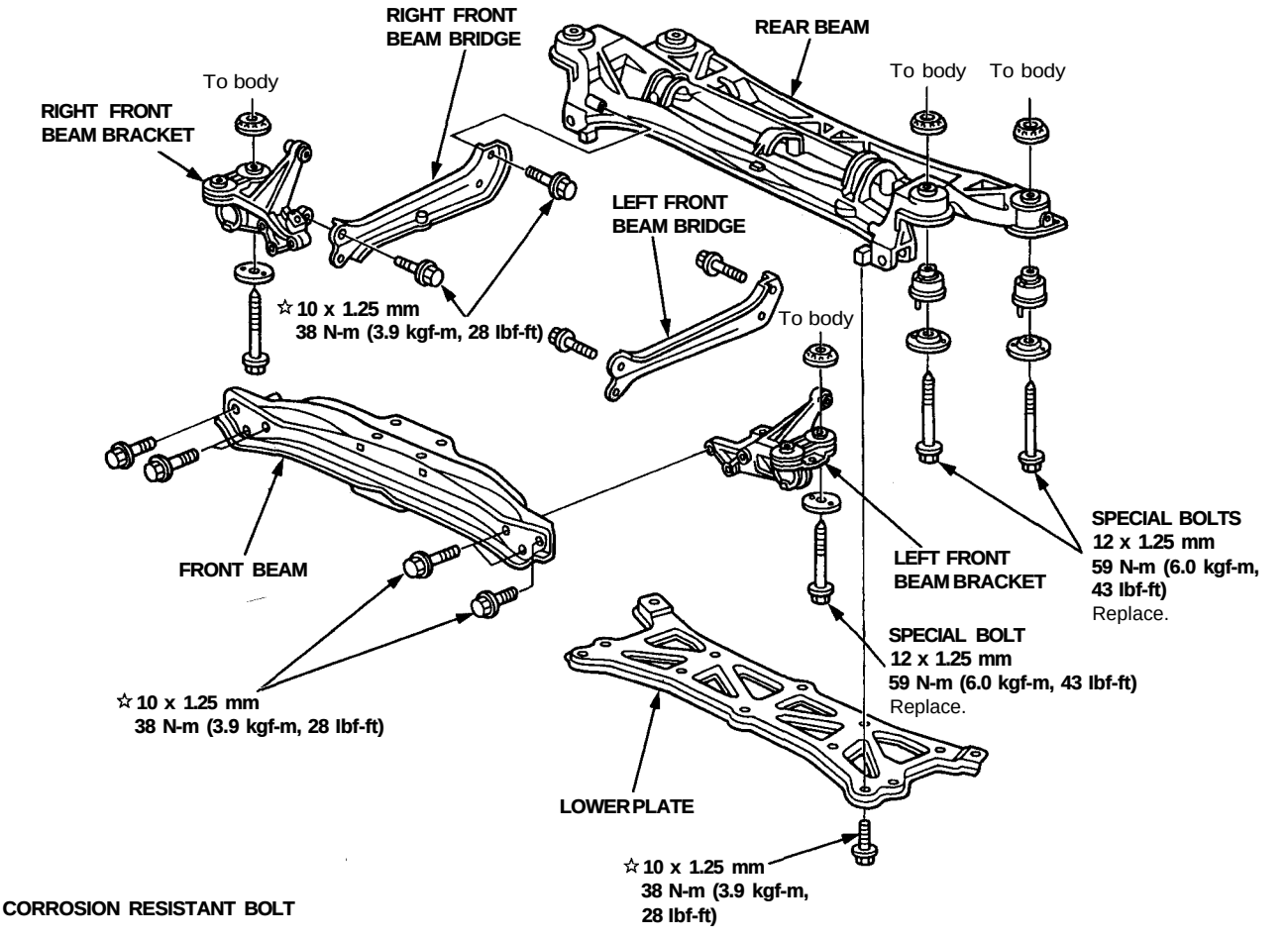


Sub-frame

Sub-frame Torque Sequence:

CAUTION: After loosening the sub-frame mounting bolts, be sure to replace them with new ones.

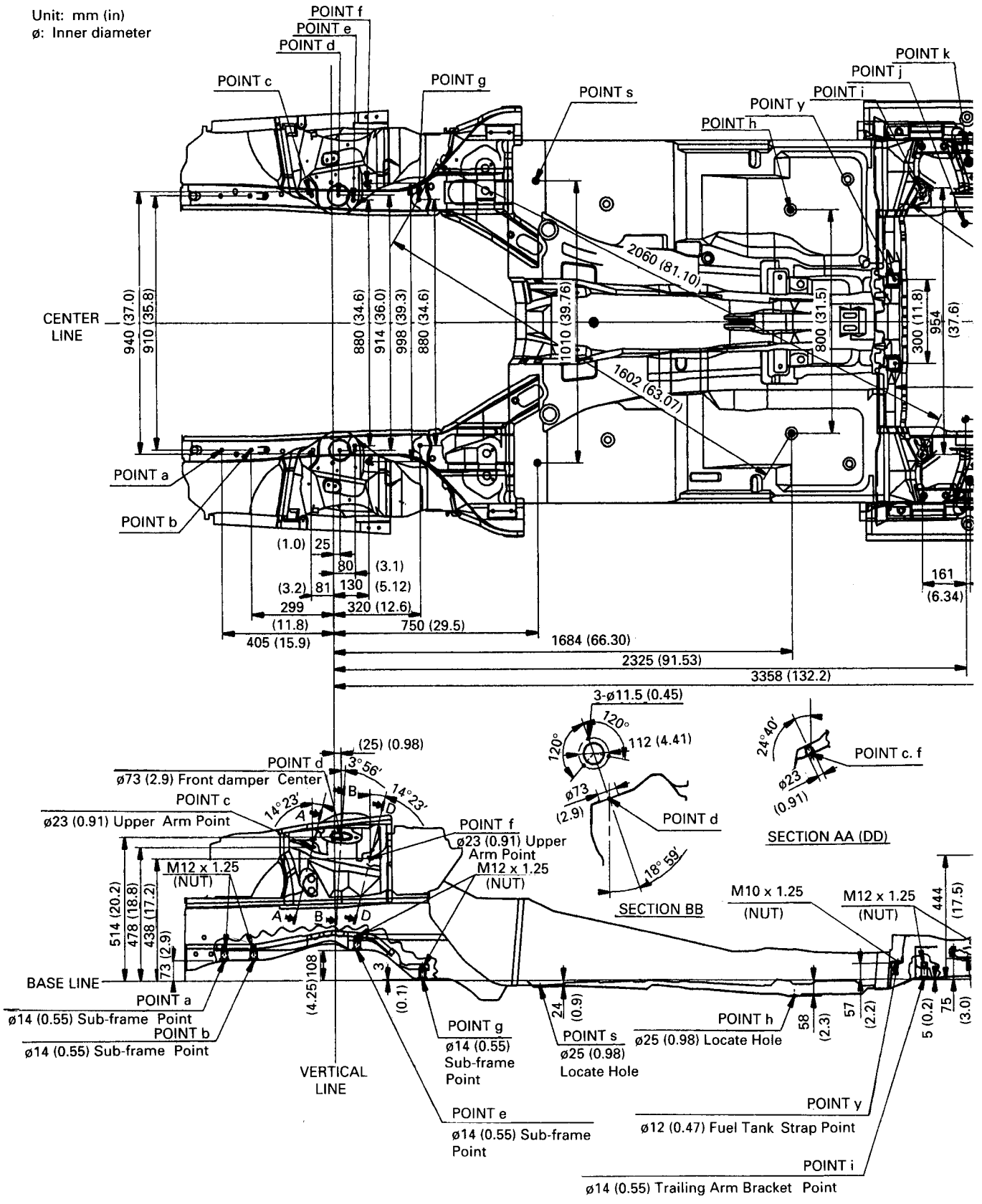




☆ CORROSION RESISTANT BOLT

Frame Repair Chart

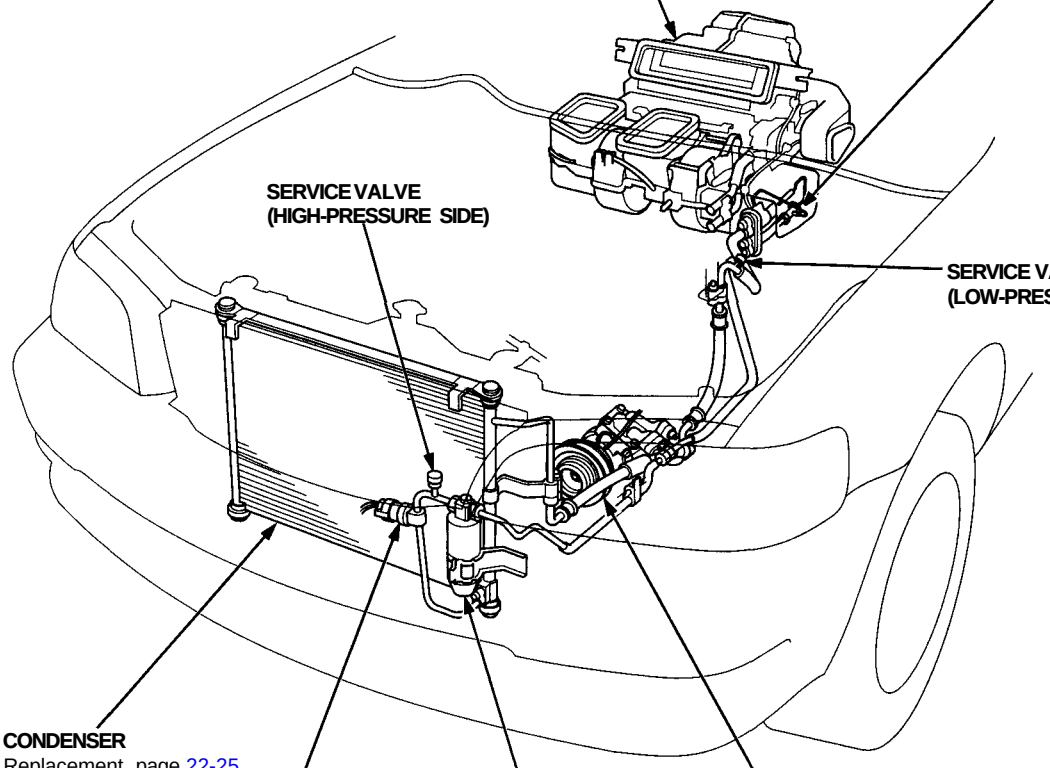
NOTE: The dimensions of the rear floor area are the same as 2.5TL (see page 20-123).



Illustrated Index

HEATER/EVAPORATOR/BLOWER UNIT
HEATER UNIT
Replacement, page 22-63
Heater Core Replacement, page 22-65
EVAPORATOR
Replacement, page 22-58
Overhaul, page 22-60
BLOWER UNIT
Replacement, page 22-61
Overhaul, page 22-62

EXPANSION VALVE
Replacement, page 22-63



SERVICE VALVE (HIGH-PRESSURE SIDE)

SERVICE VALVE (LOW-PRESSURE SIDE)

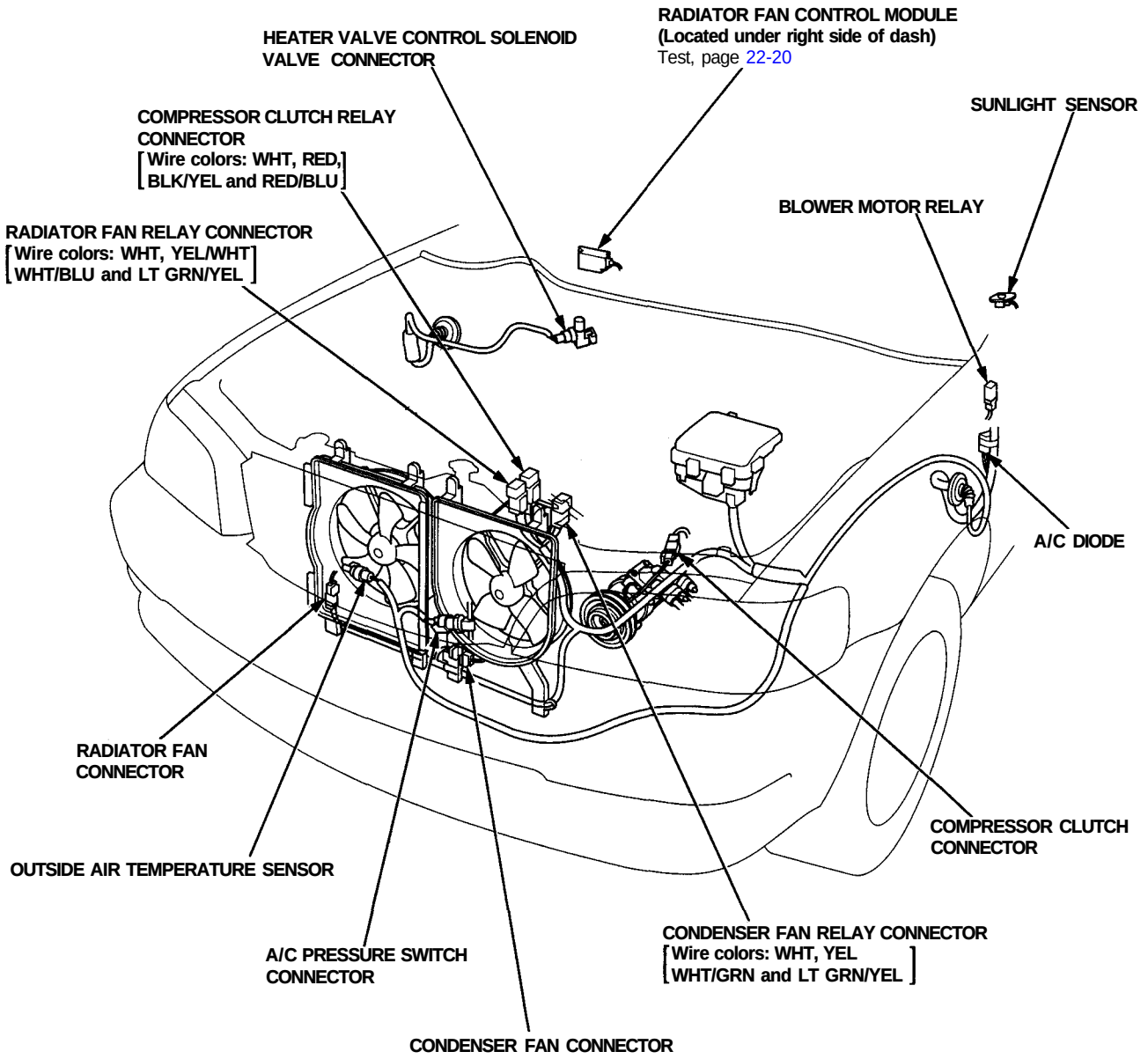
CONDENSER
Replacement, page 22-25

RECEIVER/DRYER

A/C PRESSURE SWITCH
When the refrigerant pressure is below 200 kPa (2.0 kgf/cm^2, 28 psi) due to refrigerant leakage or above 3,200 kPa (32 kgf/cm^2, 455 psi) due to refrigerant blockage, the A/C pressure switch opens the circuit to the A/C switch and stops the air conditioning to protect the compressor.

COMPRESSOR
Replacement, page 22-22
Clutch Inspection, page 22-75
Clutch Overhaul, page 22-76
Relief Valve Replacement, page 22-77

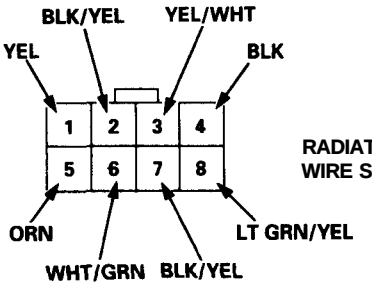
Wiring/Connector Locations



Troubleshooting

Radiator Fan Control Module Input Tests

NOTE: Perform the following tests with the radiator fan control module 8P connector connected, the ignition switch ON (II), and the A/C switch OFF. If you find the cause of a problem, correct it before you continue.



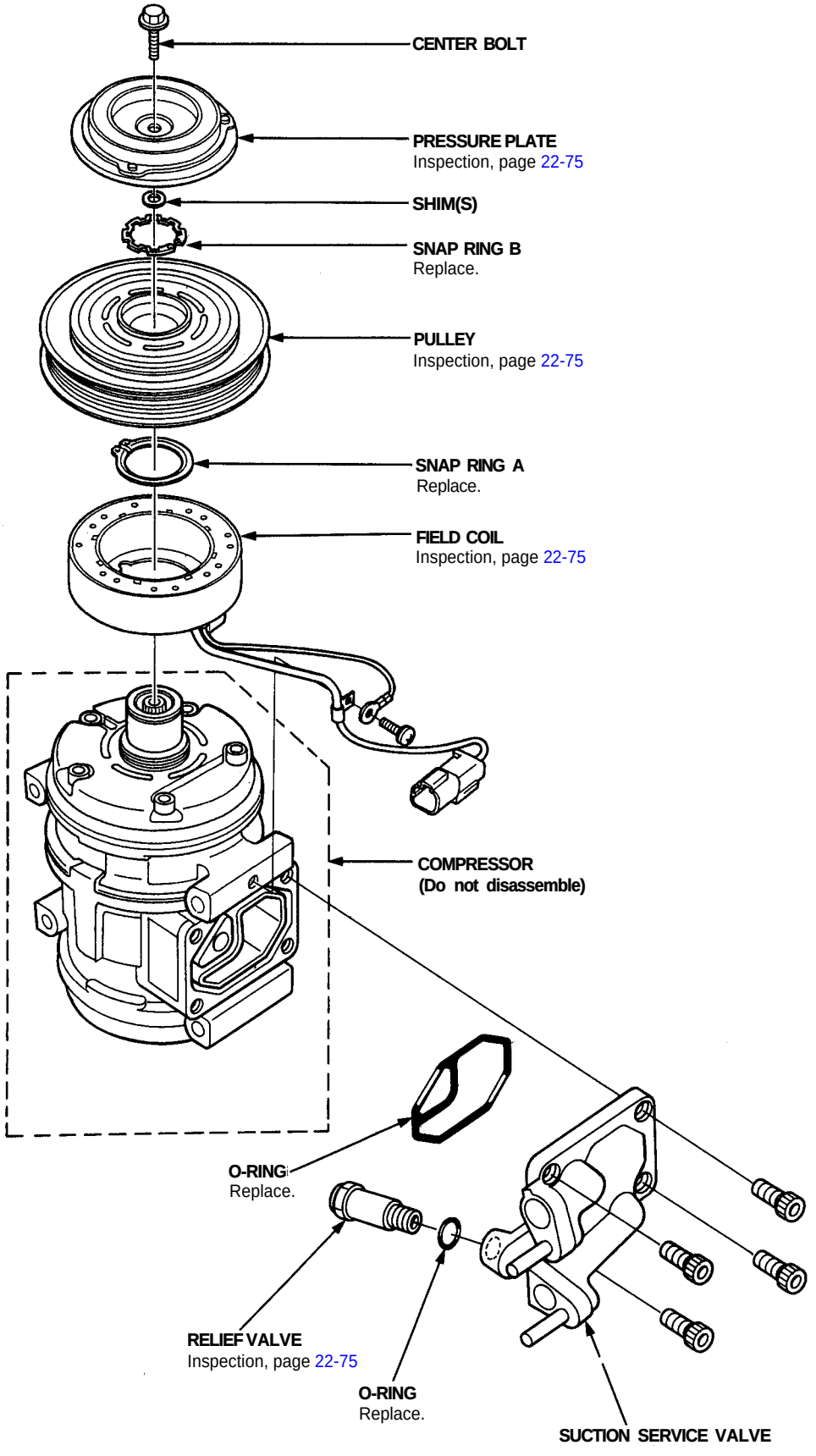
RADIATOR FAN CONTROL MODULE 8P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

Terminal No.	Wire color	Test condition	Desired results	Corrective action if desired results are not obtained
4	BLK	Check for voltage to body ground.	There should be less than one volt.	Repair open to body ground.
6	WHT/GRN	Check for battery voltage:	There should be battery voltage.	Check No. 56 (10 A) fuse in the under-hood fuse/relay box; if OK, repair open in the WHT/GRN wire.
7	BLK/YEL	Check for battery voltage: Ignition switch - ON (II)		Check No. 4* fuse in the under-dash fuse/relay box; if OK, repair open in the BLK/YEL wire.
2	BLK/YEL	Check for battery voltage: Ignition switch - ON (II)		Check No. 7 (7.5 A) fuse in the under-dash fuse/relay box; if OK, repair open in the BLK/YEL wire.
3	YEL/WHT	Check for battery voltage: Ignition switch - ON (II)		Replace the radiator fan control module. Before you connect the new radiator fan control module, disconnect both fan relays. Check for continuity between the YEL/WHT (or YEL) wire and ground, using the 20 kΩ scale on your ohmmeter. There should be no continuity. If there is continuity, the new radiator fan control module will be damaged when you connect it.
1	YEL	Check for battery voltage: Ignition switch - ON (II)		
8	LT GRN/YEL	Connect to body ground: Ignition switch - ON (II)	Condenser fan and radiator fan should come on.	Check for an open in the LT GRN/YEL wire between the radiator fan control module and the condenser fan relay or the radiator fan relay. If OK, check for an open in the YEL/WHT wire between the radiator fan control module and the radiator fan relay, or the YEL wire between the radiator fan control module and the condenser fan relay. If OK, test the condenser fan relay or the radiator fan relay.
5	ORN	Check for voltage.	Approx. 11 V (engine oil temperature below 198°F [92°C])	Faulty engine oil temperature switch, short to body ground, or faulty radiator fan control module.

*No. 4 (15 A):'96 model
No. 4 (20 A): '97 and '98 models

Compressor

Illustrated Index



Compressor

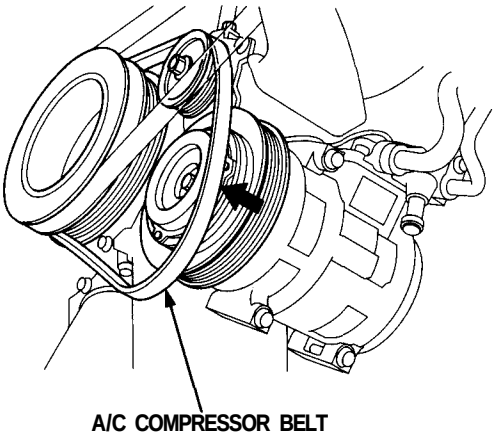
Replacement

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioner work for a few minutes, then shut the engine off.

2. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
   Disconnect the negative cable from the battery.

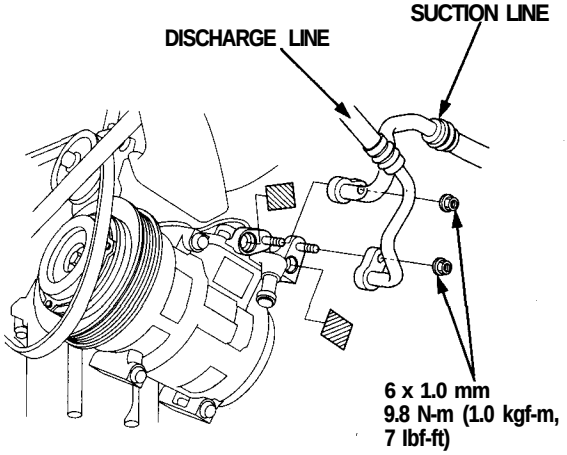
3. Recover the refrigerant with a Recovery/Recycling/Charging System.

4. Loosen the A/C compressor belt (see page 22-24).

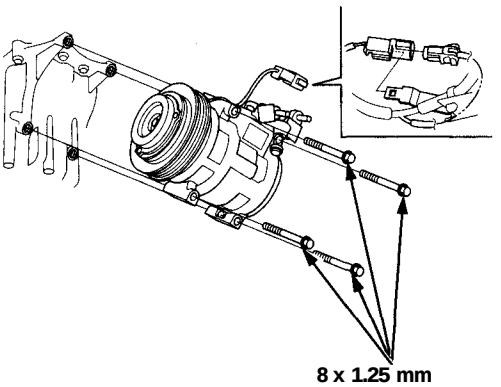


5. Remove the nuts, then disconnect the suction line and the discharge line from the compressor.

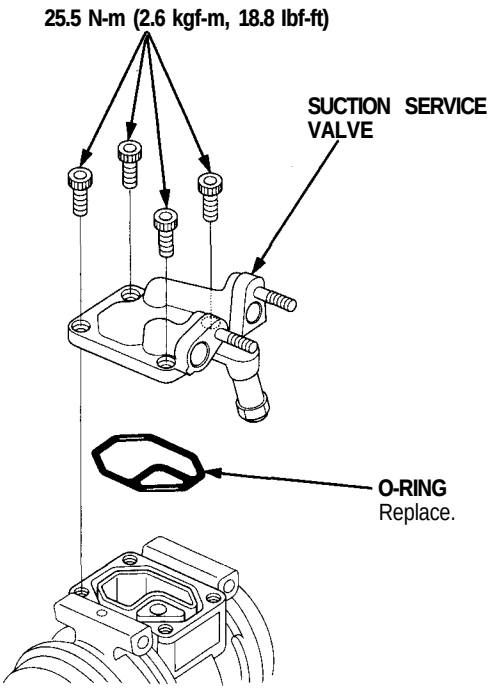
   NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



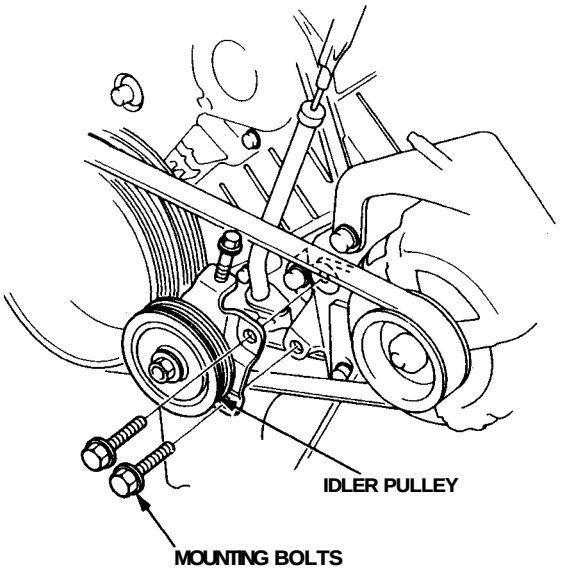
6. Remove the four mounting bolts and the compressor.



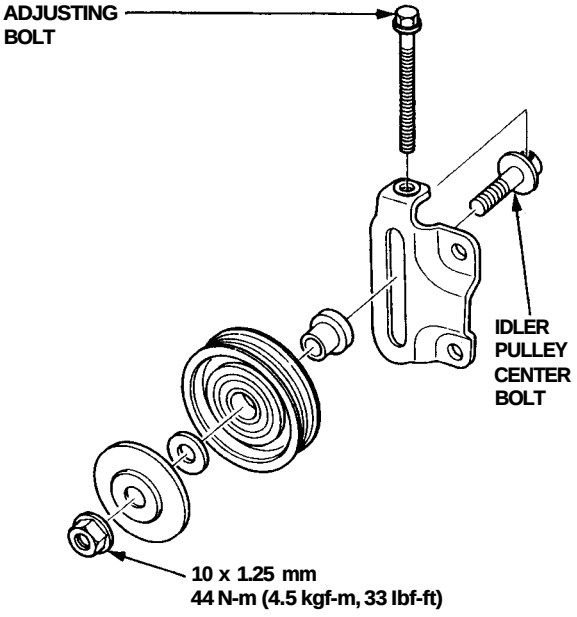
7. Remove the four bolts and the suction service valve from the compressor.



8. If necessary, remove the idler pulley.



9. Check the idler pulley bearing for play and drag. Replace it with a new one if it's noisy or has excessive play or drag.



10. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 140 mℓ (4 1/3 fl-oz, 4.9 Imp-oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.
  NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Use refrigerant oil (ND-OIL 8) for R-134a DENSO piston type compressors only.
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Be careful not to damage the radiator fins when installing the condenser fan shroud and the compressor.
- Adjust the A/C compressor belt (see page 22-24).
- Charge the system (see page 22-30), and test its performance (see page 22-28).
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

A/C Compressor Belt

Adjustment

Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the A/C compressor and the crankshaft pulley.

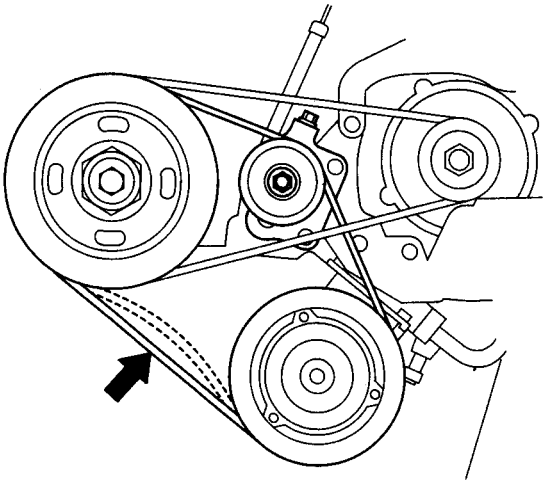
   A/C Compressor Belt
   Used Belt: 8.0 - 9.5 mm (0.31 - 0.37 in)
   New Belt: 5.0 - 6.0 mm (0.20 - 0.24 in)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the center nut of the idler pulley.

3. Turn the adjusting bolt to get proper belt tension, then retighten the center nut.

4. Recheck the deflection of the A/C compressor belt.



Tension Gauge Method

1. Attach the special tool to the A/C compressor belt as shown below, and measure the tension of the belt.

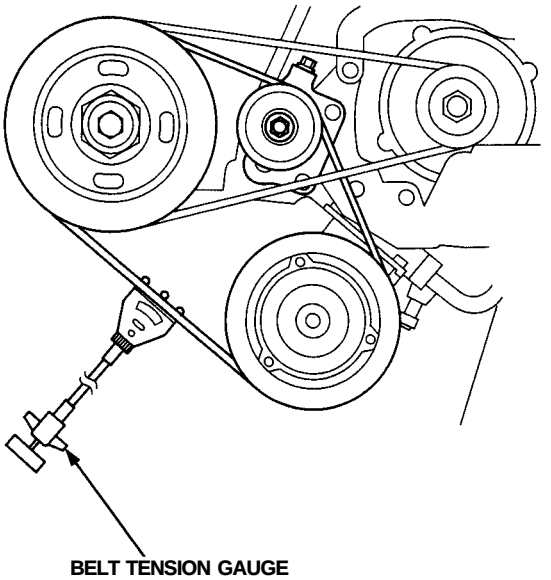
   A/C Compressor Belt
   Used Belt: 390-590 N
   (40 -60 kgf, 88 -130 lbf)
   New Belt: 830 - 1,030 N
   (85-105 kgf, 190-230 lbf)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - Follow the manufacturer's instructions for the belt tension gauge.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the center nut of the idler pulley.

3. Turn the adjusting bolt to get proper belt tension, then retighten the center nut.

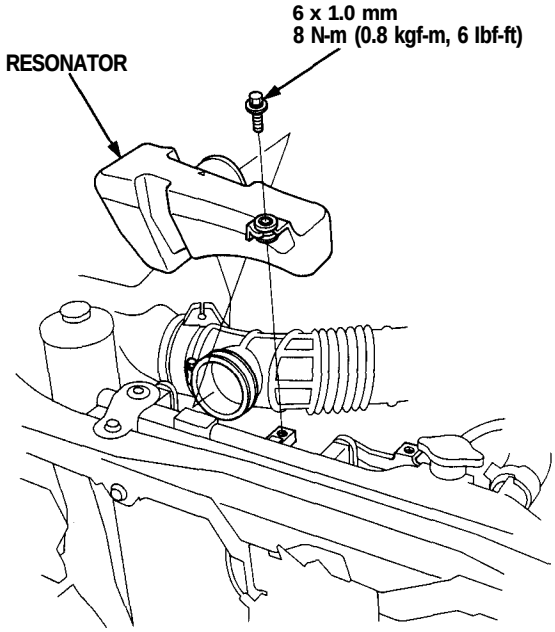
4. Recheck the tension of the A/C compressor belt.



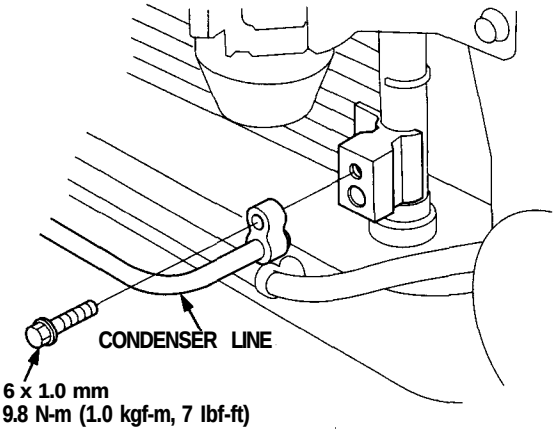
Condenser

Replacement

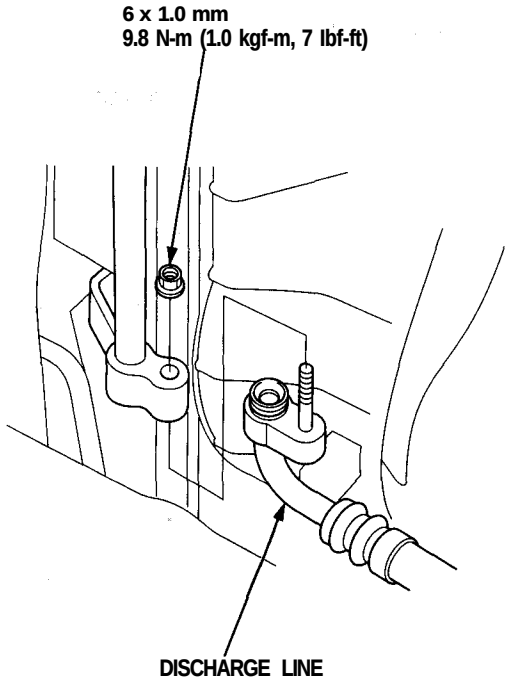
1. Recover the refrigerant with a Recovery/Recycling/ Charging System.
2. Remove the battery and the battery base (see section 5).
3. Remove the bulkhead cover (see section 20).
4. Remove the resonator.



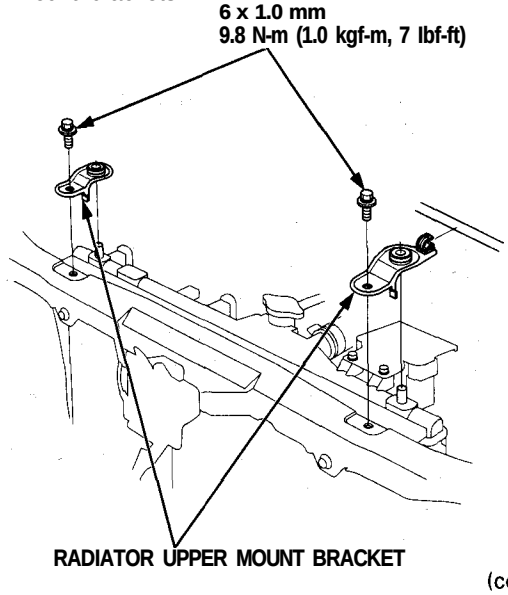
5. Remove the bolt, and disconnect the condenser line from the condenser.



6. Remove the nut, and disconnect the discharge line from the condenser.



7. Remove the two bolts, and the two radiator upper mount brackets.



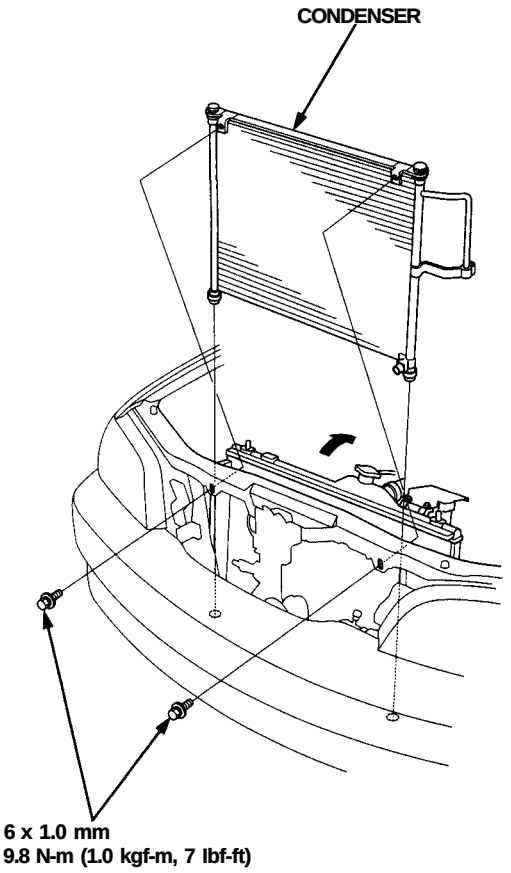
(cont'd)

Condenser

Replacement (cont'd)

8. Remove the two mounting bolts, and lift out the condenser as shown.

   NOTE: Do not damage the radiator and condenser fins when removing the condenser.



9. Install in the reverse order of removal. Make note of the following items.

   - If you're installing a new condenser, add refrigerant oil (ND-OIL 8) (see page 22-27).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (ND-OIL 8) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Do not damage the radiator and condenser fins when installing the condenser.
   - Be sure to install the condenser mount cushions securely into the holes.
   - Charge the system (see page 22-30), and test its performance (see page 22-28).

A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil*, which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioner system or your servicing equipment will result.

*DENSO ND-OIL 8:

- P/N 38897 - PR7 - A01AH: 120 mℓ (4 fl-oz, 4.2 Imp-oz)
- P/N 38899 - PR7 - A01: 40 mℓ (1 1/3 fl-oz, 1.4 Imp-oz)

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove R-134a from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in tire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

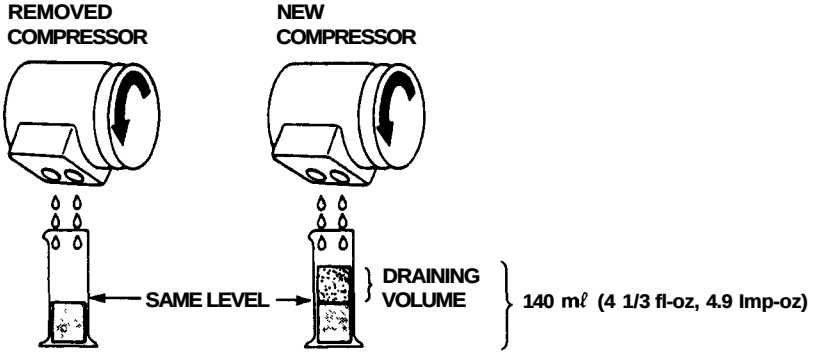
1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, use a R-134a refrigerant Recovery/Recycling/Charging System; don't release refrigerant into the atmosphere.
6. Add refrigerant oil after replacing the following parts:

NOTE:

- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

Condenser ..... 25 mℓ (5/6 fl-oz, 0.9 Imp-oz)
Evaporator ..... 50 mℓ (1 2/3 fl-oz, 1.8 Imp-oz)
Line or hose ..... 20 mℓ (2/3 fl-oz, 0.7 Imp-oz)
Receiver/Dryer ..... 15 mℓ (1/2 fl-oz, 0.5 Imp-oz)
Leakage repair ..... 25 mℓ (5/6 fl-oz, 0.9 Imp-oz)
Compressor ..... For compressor replacement, subtract the volume of oil drained from the removed compressor from 140 mℓ (4 1/3 fl-oz, 4.9 Imp-oz), and drain the calculated volume of oil from the new compressor: 140 mℓ (4 1/3 fl-oz, 4.9 Imp-oz) — Volume of removed compressor = Volume to drain from new compressor.

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 mℓ (1 2/3 fl-oz, 1.8 Imp-oz) from the new compressor.



A/C System Service

Performance Test

The performance test will help determine if the air conditioner system is operating within specifications.

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

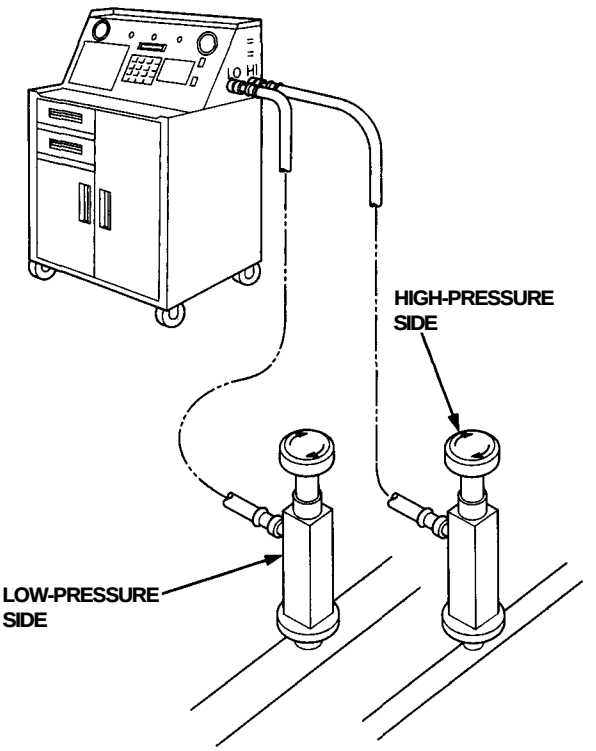
1. Connect a R-134a refrigerant Recover/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

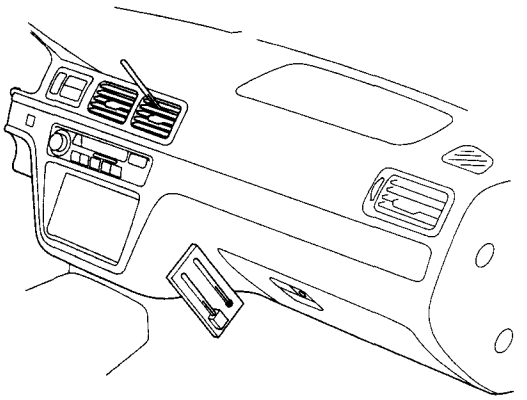
2. Insert a thermometer in the center vent outlet. Determine the relative humidity and air temperature.

3. Test conditions:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control dial on MAX COOL, the mode control switch on VENT and the recirculation control switch on RECIRCULATE.
   - Turn the A/C switch on, and the fan switch on MAX.
   - Run the engine at 1,500 rpm.
   - No driver or passengers in vehicle

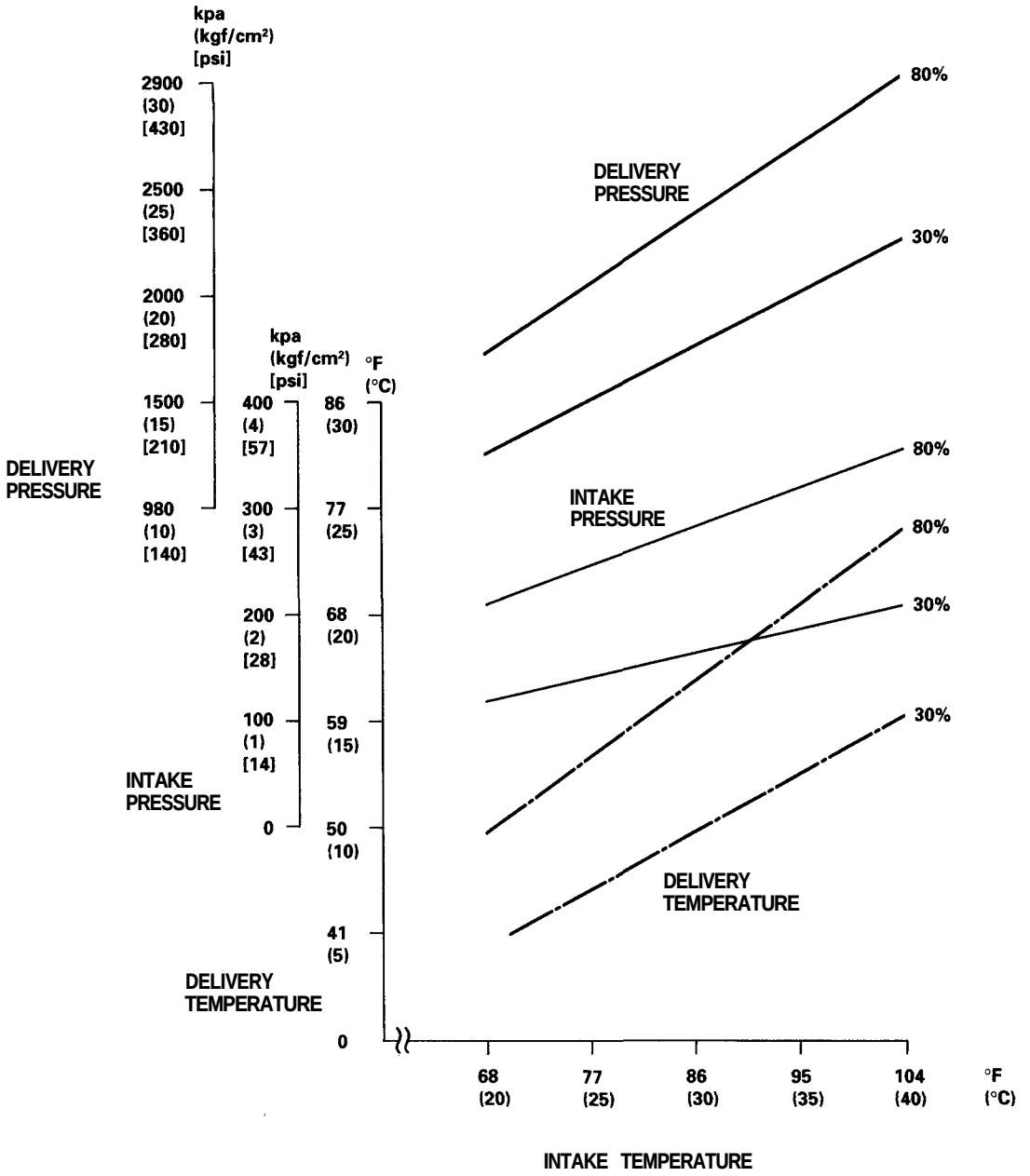
4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

Recovery/Recycling/Charging System





5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level (10% above and 10% below the humidity level).
   - From each point, draw a horizontal line across the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



A/C System Service

Charging

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

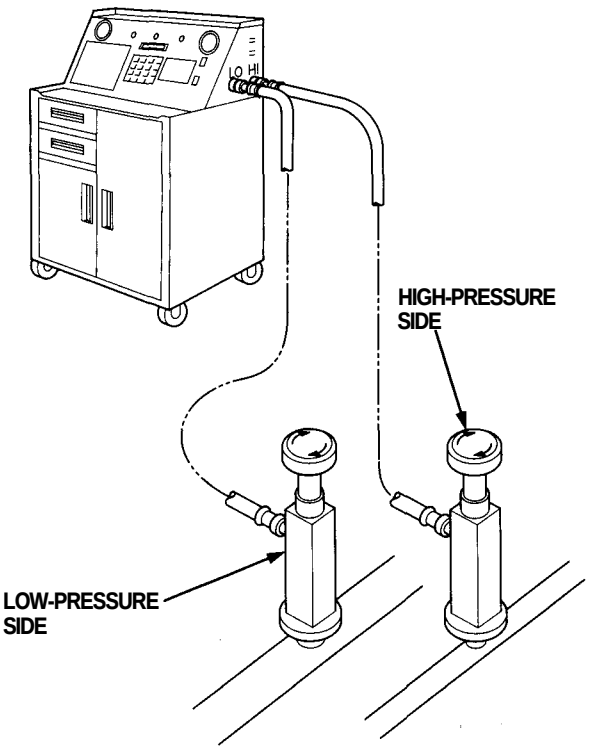
If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Refrigerant capacity: 750^{+0}_{-50} g ($26.5^{+0}_{-1.8}$ oz)

CAUTION: Do not overcharge the system; the compressor will be damaged.

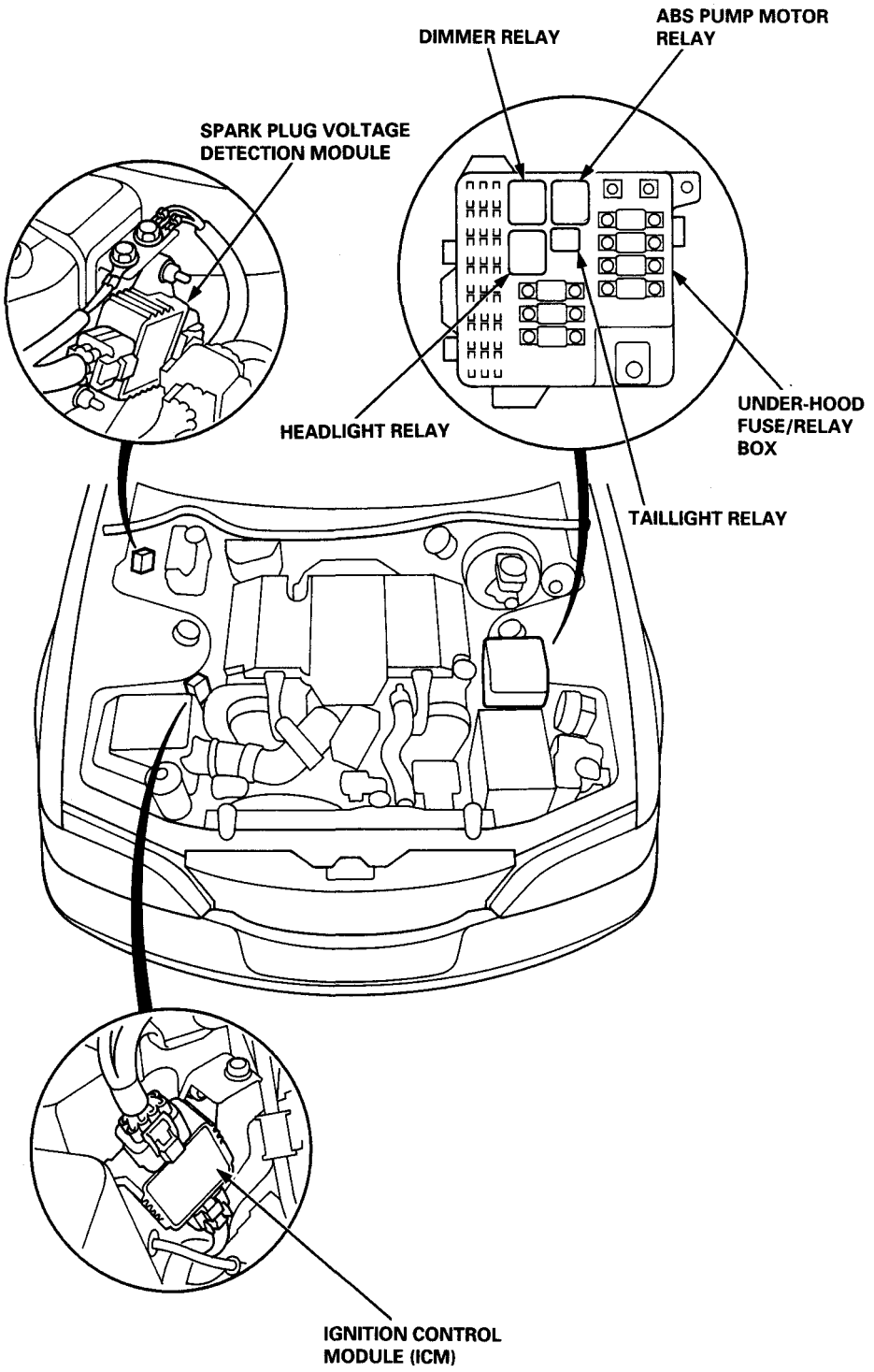
Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

Recovery/Recycling/Charging System



Relay and Control Unit Locations

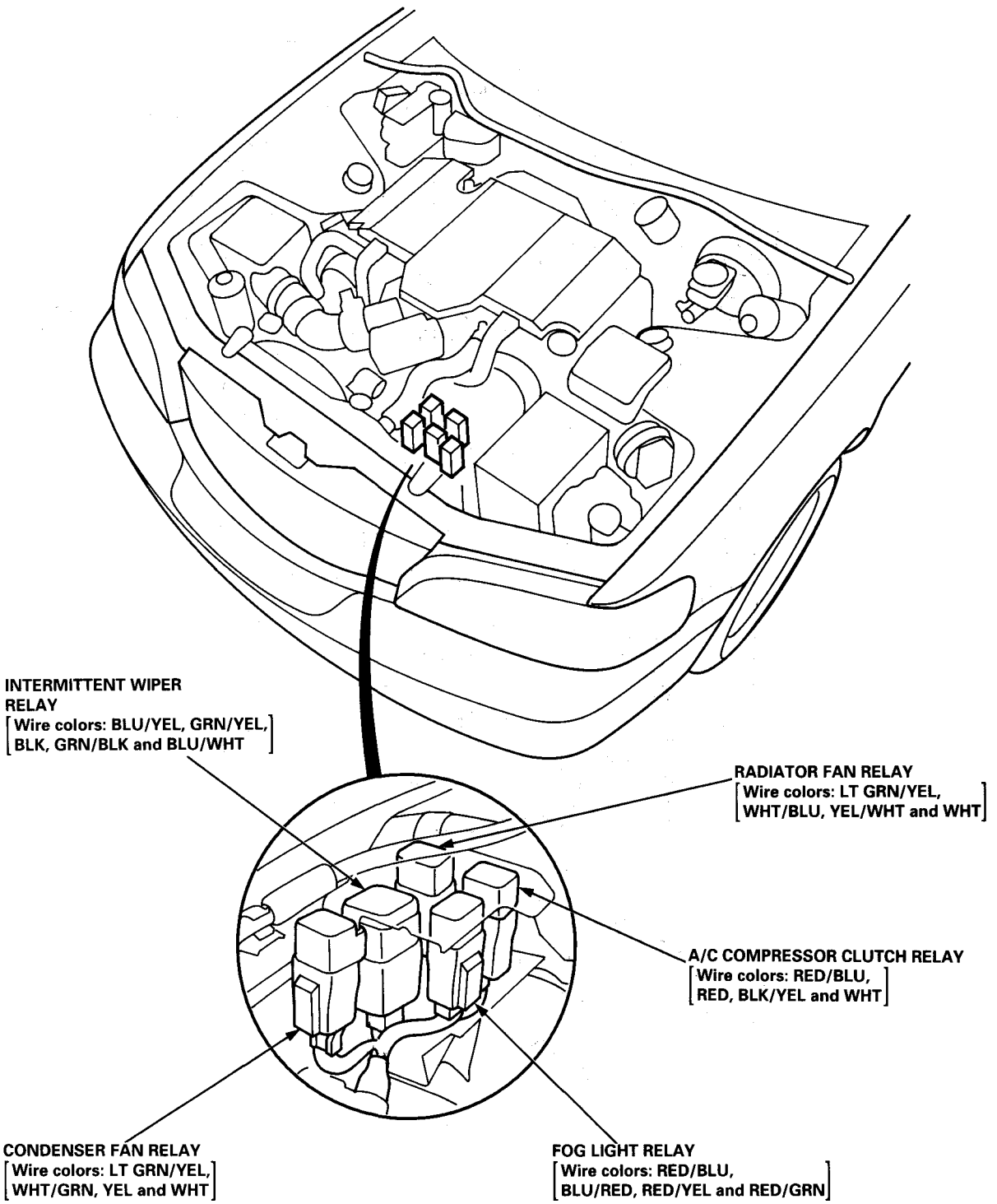
Engine Compartment



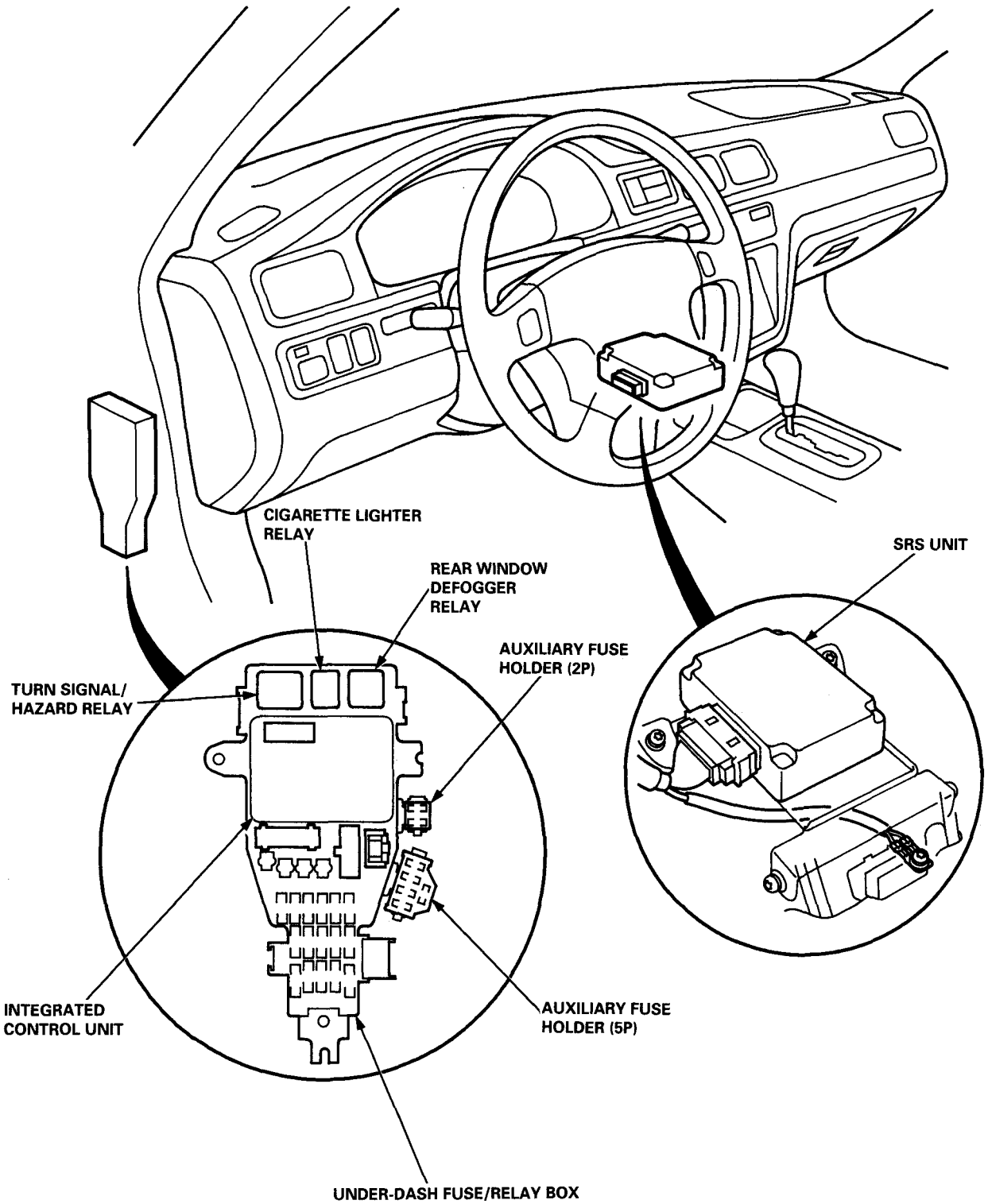
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Relay and Control Unit Locations

Engine Compartment (cont'd)



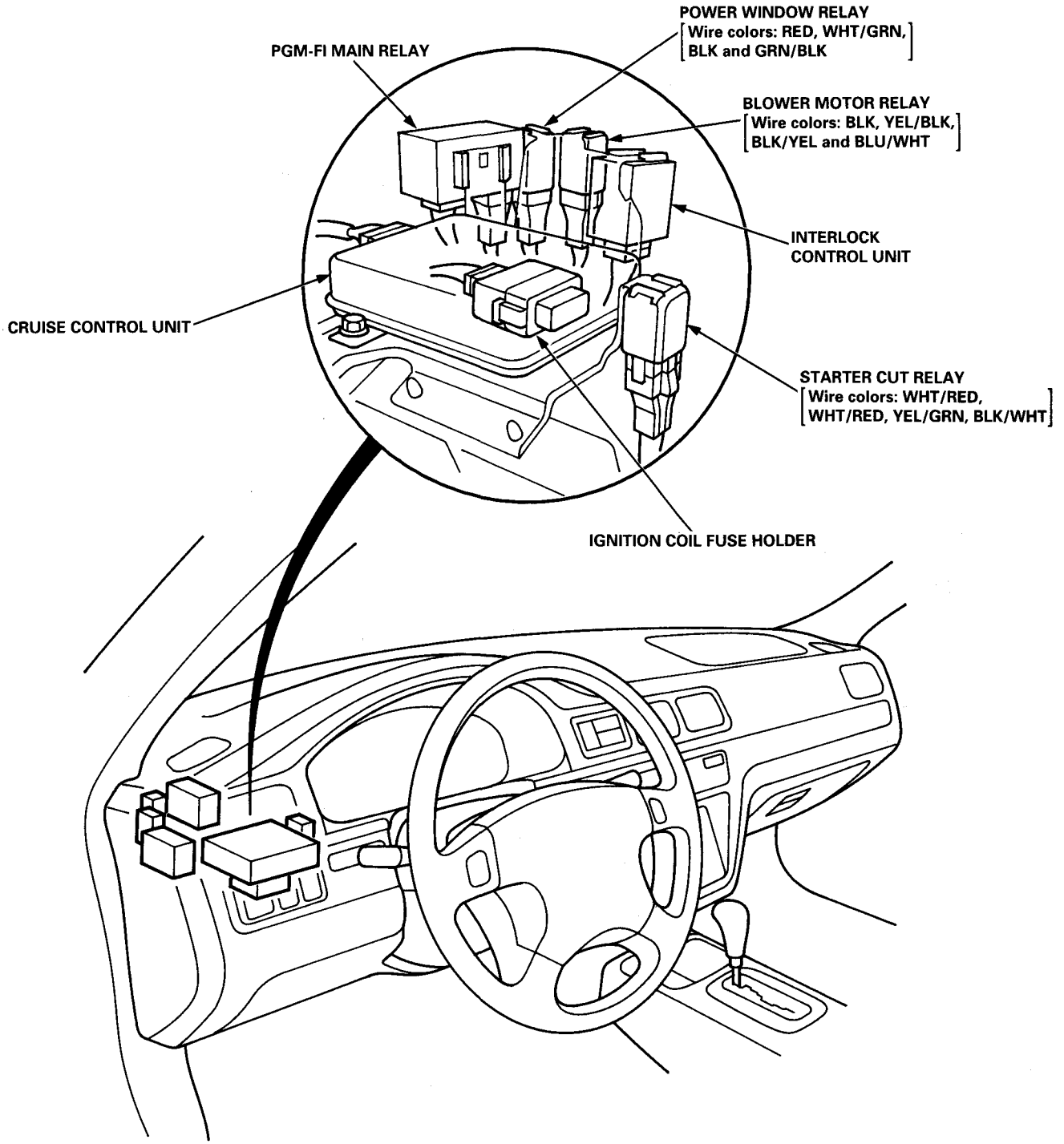
Dashboard

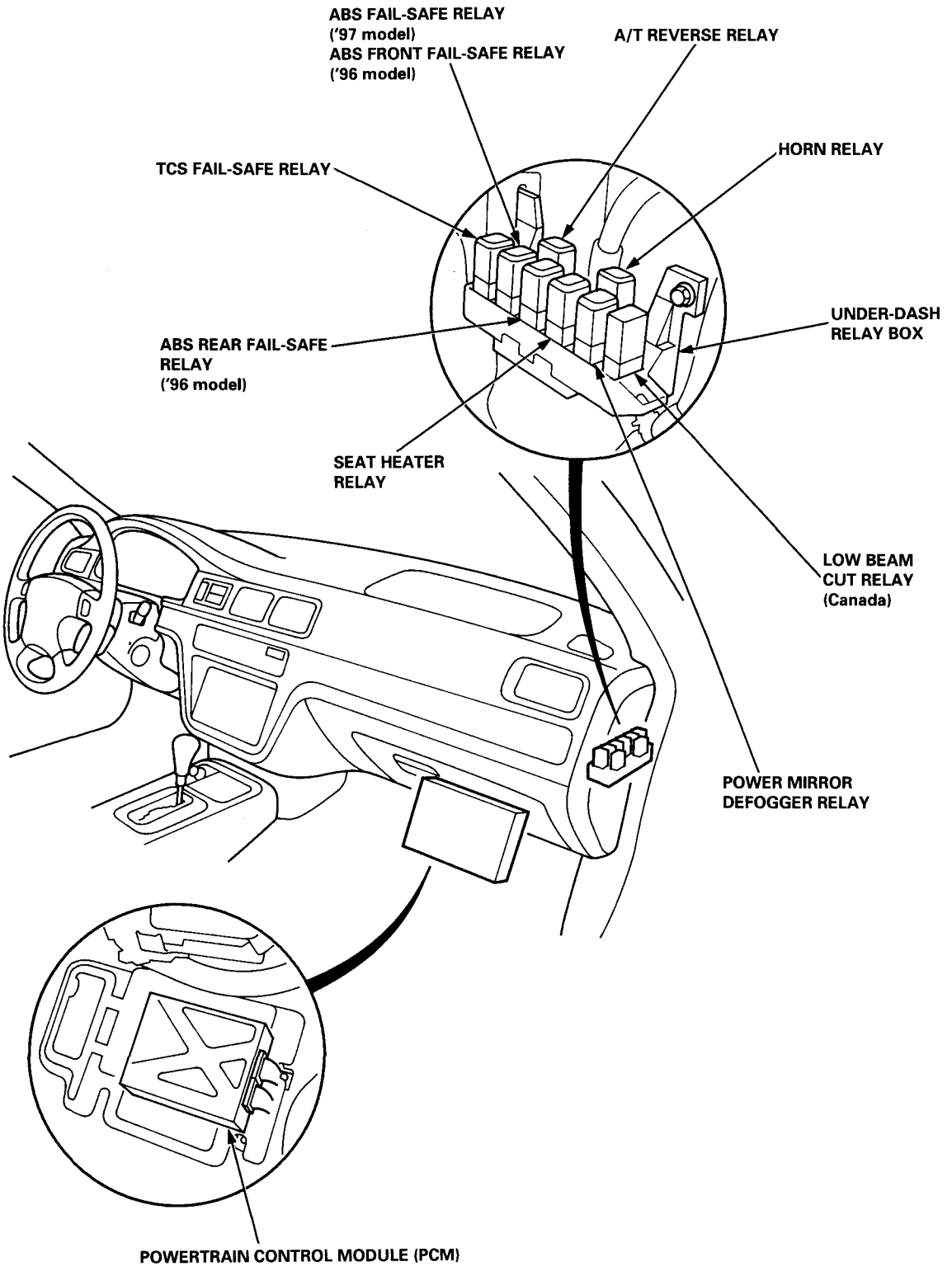


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Relay and Control Unit Locations

Dashboard (cont'd)

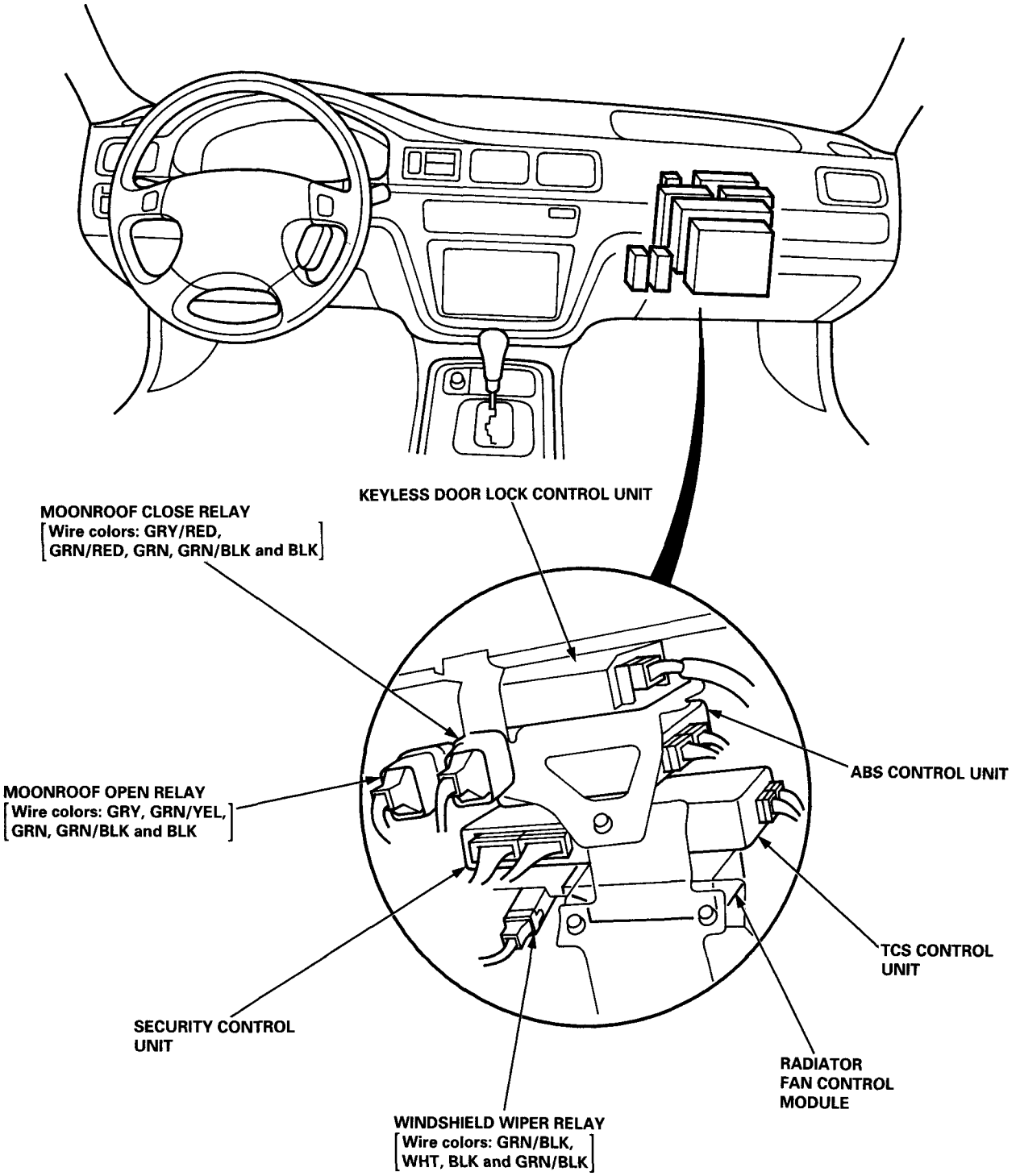



ABS FAIL-SAFE RELAY
('97 model)
ABS FRONT FAIL-SAFE RELAY
('96 model)
A/T REVERSE RELAY
HORN RELAY
TCS FAIL-SAFE RELAY
UNDER-DASH
RELAY BOX
ABS REAR FAIL-SAFE
RELAY
('96 model)
SEAT HEATER
RELAY
LOW BEAM
CUT RELAY
(Canada)
POWER MIRROR
DEFOGGER RELAY
POWERTRAIN CONTROL MODULE (PCM)

(cont'd)

Relay and Control Unit Locations

Dashboard (cont'd)



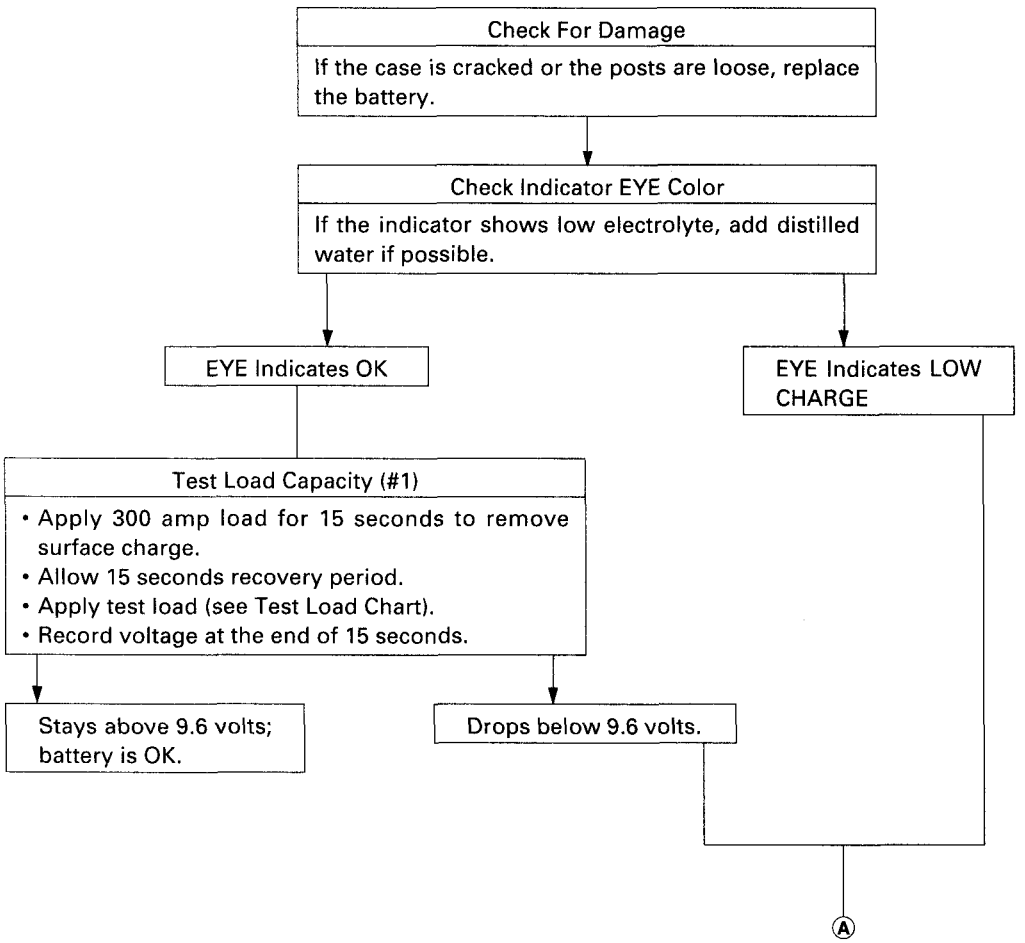
Battery

Test

⚠ WARNING

- **Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.**
  - **— If electrolyte gets on your skin or clothes, rinse it off with water immediately.**
  - **— If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.**
- **A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.**
- **Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.**

Use either a JCI or Bear ARBST tester, and follow the manufacturer's procedures. If you don't have one of these computerized testers, follow this conventional test procedure:
To get accurate results, the temperature of the electrolyte must be between 70°F (21°C) and 100°F (38°C).



Ⓐ

Charge on High Setting (40 amps)

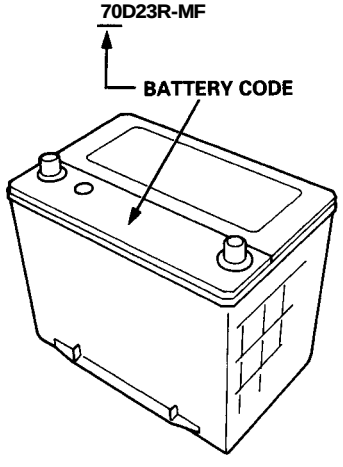
Charge until EYE shows charge is OK; plus an additional 30 minutes to assure full charge.
NOTE: If the battery charge is very low, it may be necessary to bypass the charger's polarity protection circuitry.
If the EYE does not show charge is OK within three hours, the battery is no-good; replace it. Write down how long the battery was charged.

Test Load Capacity (#2)

- Apply 300 amp load for 15 seconds to remove surface charge.
- Allow 15 seconds recovery period.
- Apply test load (see Test Load Chart).
- Record voltage at the end of 15 seconds.

Stays above 9.6 volts; battery is OK.

Drops below 9.6 volts; battery is no-good.



TEST LOAD CHART		
Use the test load or 1/2 the cold cranking amps (CCA) printed on the label on the top of the battery. If neither is indicated, use the information below:		
BATTERY CODE	COLD CRANKING AMPS (CCA)	LOAD (amps)
70	440	220

PowerRelays

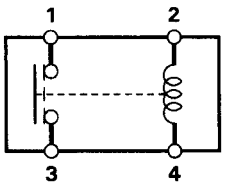
RelayTest

NOTE: Refer to page 23-62 in the '95 - 96 Acura 2.5TL Service Manual, P/N 61SW500, for the items not shown in this sub-section.

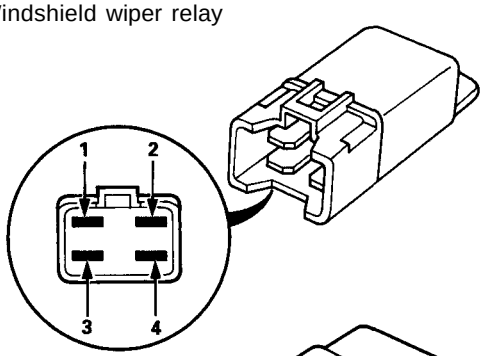
Normally-open type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
   - There should be no continuity between the No. 1 and No. 3 terminals when power is disconnected.

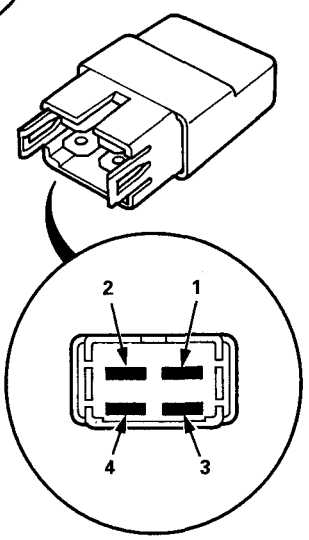
Terminal / Power (No. 2 – No. 4)	1	3
Disconnected		
Connected	○	○



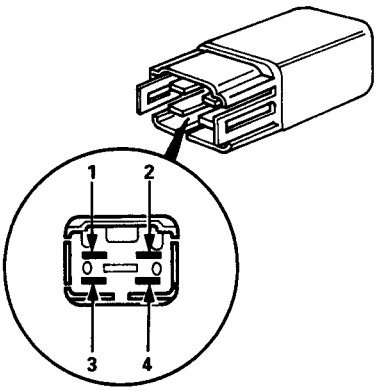
- Power window relay
- Blower motor relay
- Windshield wiper relay



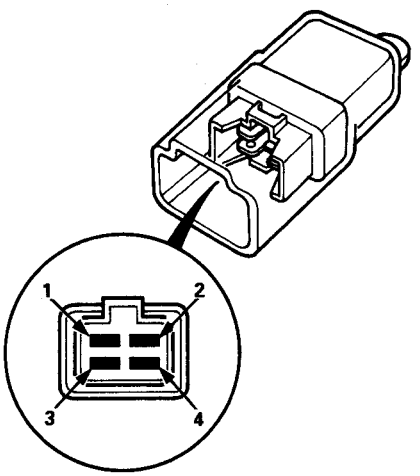
- Taillight relay



- A/T reverse relay
- Seat heater relay
- TCS fail-safe relay



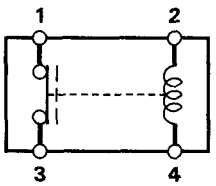
- Fog light relay



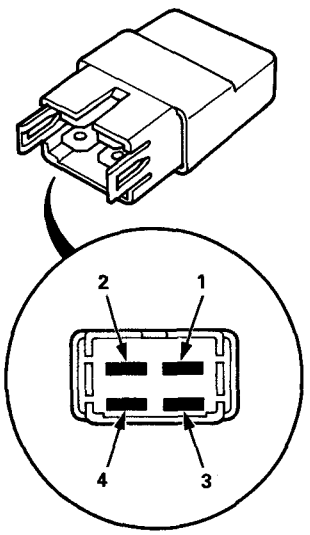
Normally-closed Type:

1. Check for continuity between the terminals.
   - There should be no continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
   - There should be continuity between the No. 1 and No. 3 terminals when power is disconnected.

Terminal / Power (No.2 – No.4)	1	3
Connected		
Disconnected	○	○

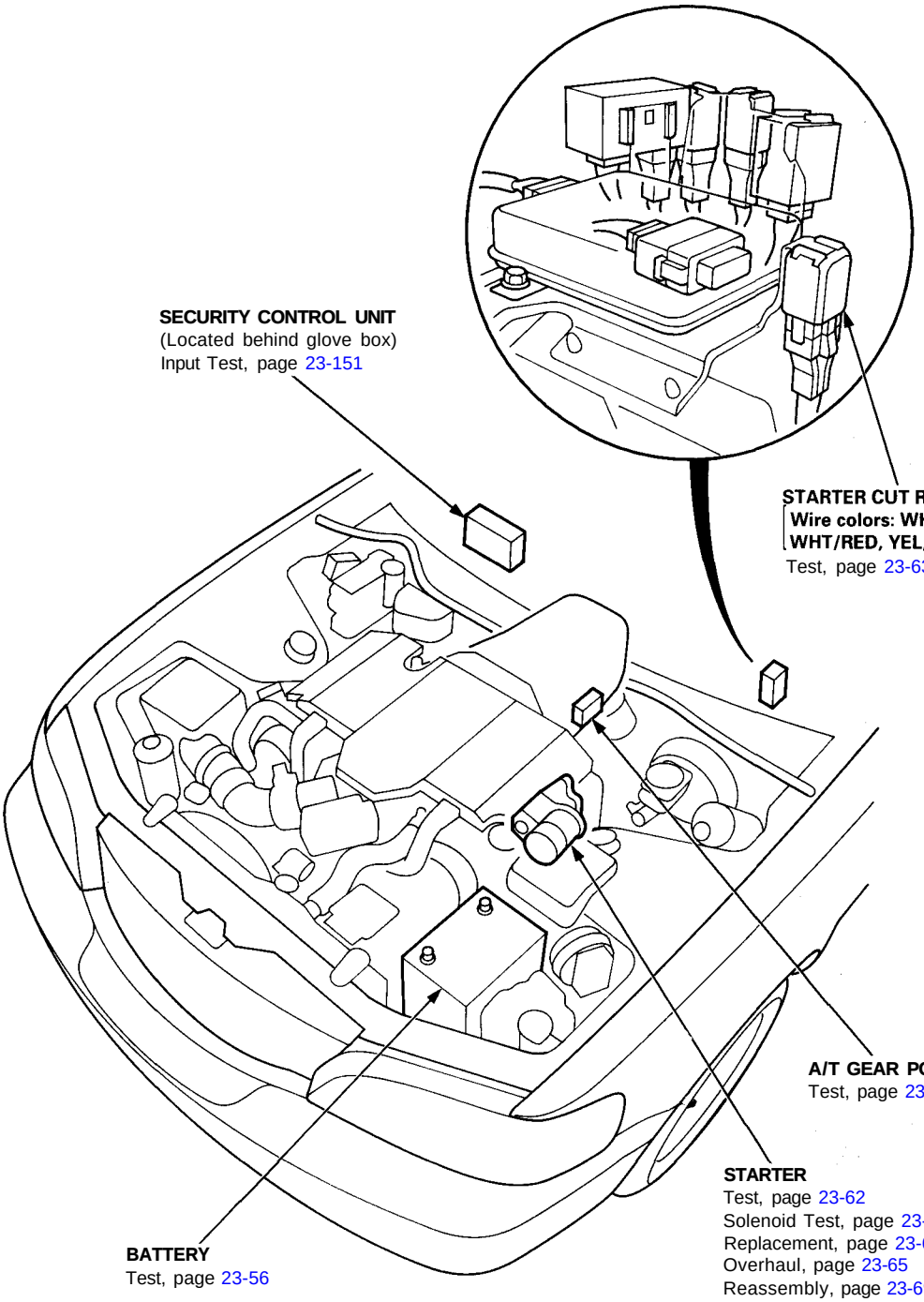


- Low beam cut relay (Canada)



Starting System

Component Location Index



Starting System

Starter Test

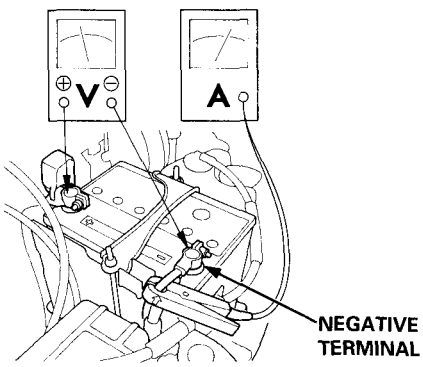
NOTE: The air temperature must be between 59 and 100°F (15 and 38°C) before testing.

Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

Alternate Procedure:

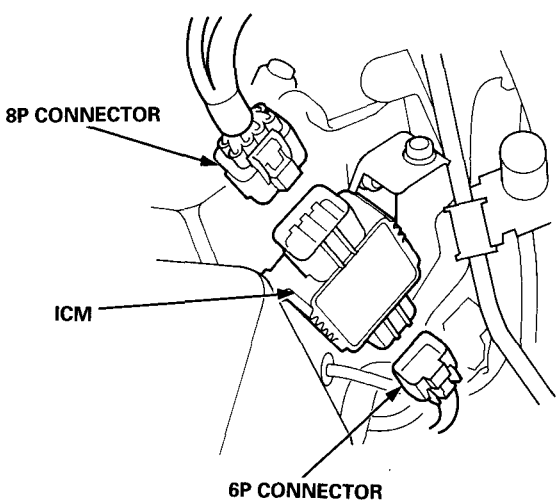
- Use following equipment:
  - — Ammeter, 0-400 A
  - — Voltmeter, 0-20 V (accurate within 0.1 volt)
  - — Tachometer, 0-1,200 rpm
- Hook up a voltmeter and ammeter as shown.



NOTE: After this test, or any subsequent repair, reset the PCM to clear any codes (see section 11).

Check the Starter Engagement

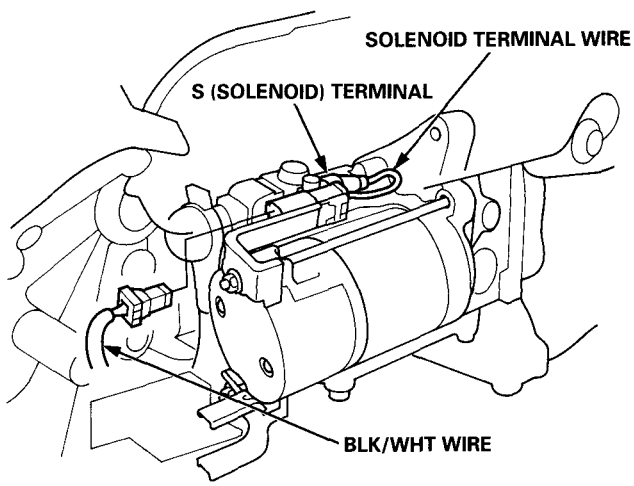
1. Disconnect the 8P and 6P connector from the ICM.



2. With the shift lever in P or N, turn the ignition switch to START (III).
   - The starter should crank the engine. If the starter does not crank the engine, go to step 3.
   - If it cranks the engine erratically or too slowly, go to "Check for Wear and Damage" on the next page.

3. Check the battery, battery positive cable, ground, starter cut relay, security control unit, and the wire connections for looseness and corrosion. Test again. If the starter still does not crank the engine, go to step 4.

4. Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter. Make sure the shift lever is in P or N, then connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.



   - If the starter still does not crank the engine, remove it, and diagnose its internal problem.
   - If the starter cranks the engine, go to step 5 and continue the test.

5. Check the ignition switch.

6. Check the starter cut relay.

7. Check the A/T gear position switch (see page 23-109).

8. Check the security control unit.

9. Check for an open in the WHT/RED wire between the ignition switch and starter cut relay, and check for an open in the BLK/WHT wire between the starter cut relay and starter.

Check for Wear and Damage
The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it, and inspect the starter drive gear and torque converter ring gear for damage.

- Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. If the clutch is damaged, replace the clutch assembly.

Check Cranking Voltage and Current Draw
Cranking voltage should be no less than 8.0 volts.
Current draw should be no more than 450 amperes.

If cranking voltage is too low, or current draw too high, check for:
- Dead or low battery
- Open circuit in starter armature commutator segments
- Starter armature dragging
- Shorted armature winding
- Excessive drag in engine

Check Cranking rpm
Engine speed during cranking should be above 100 rpm.

If speed is too low, check for:
- Loose battery or starter terminals
- Excessively worn starter brushes
- Open circuit in commutator segments
- Dirty or damaged helical spline or drive gear
- Defective drive gear overrunning clutch

Check Starter Disengagement
With the shift lever in P or N, turn the ignition switch to "START (III)", and release to "ON (II)". The starter drive gear should disengage from the flywheel ring gear when you release the key.

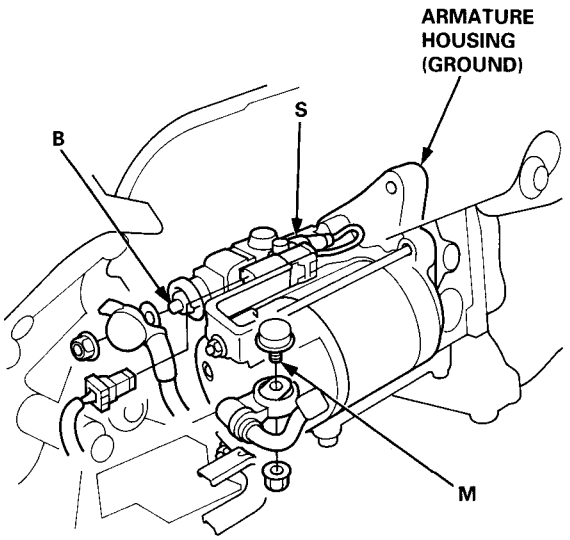
If the drive gear hangs upon the flywheel ring gear, check for:
- Solenoid plunger and switch malfunction
- Dirty drive gear assembly or damaged overrunning clutch

Starter Solenoid Test

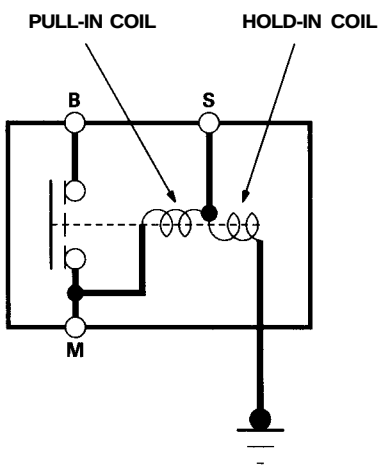
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable.

3. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.



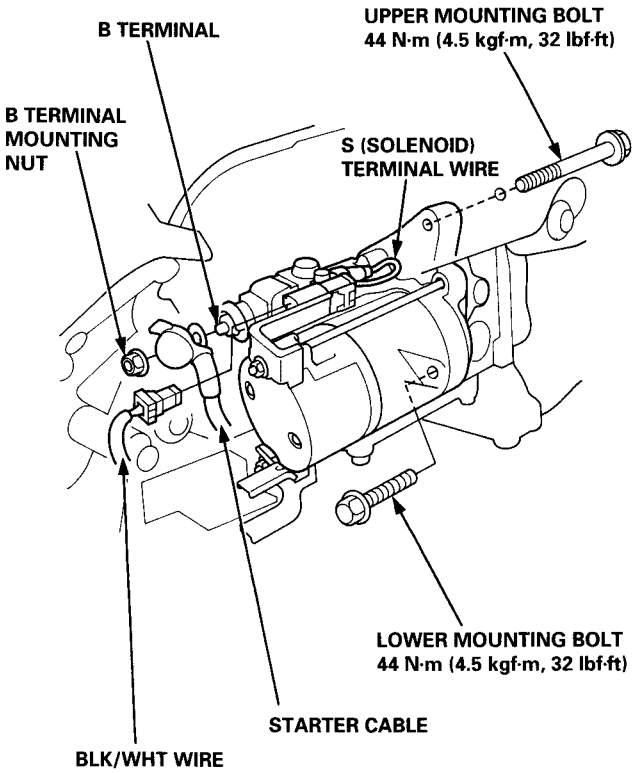
4. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.



Starting System

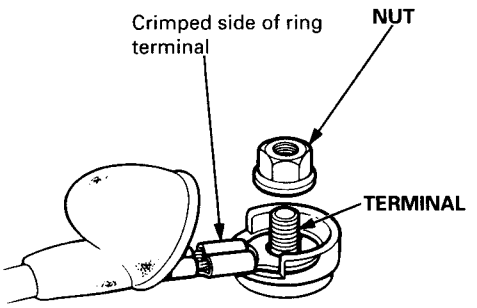
Starter Replacement

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Remove the left drive shaft.
4. Remove the exhaust pipe A.
5. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S (SOLENOID) terminal wire.



6. Remove the two bolts holding the starter, then remove the starter.
7. Install in the reverse order of removal.

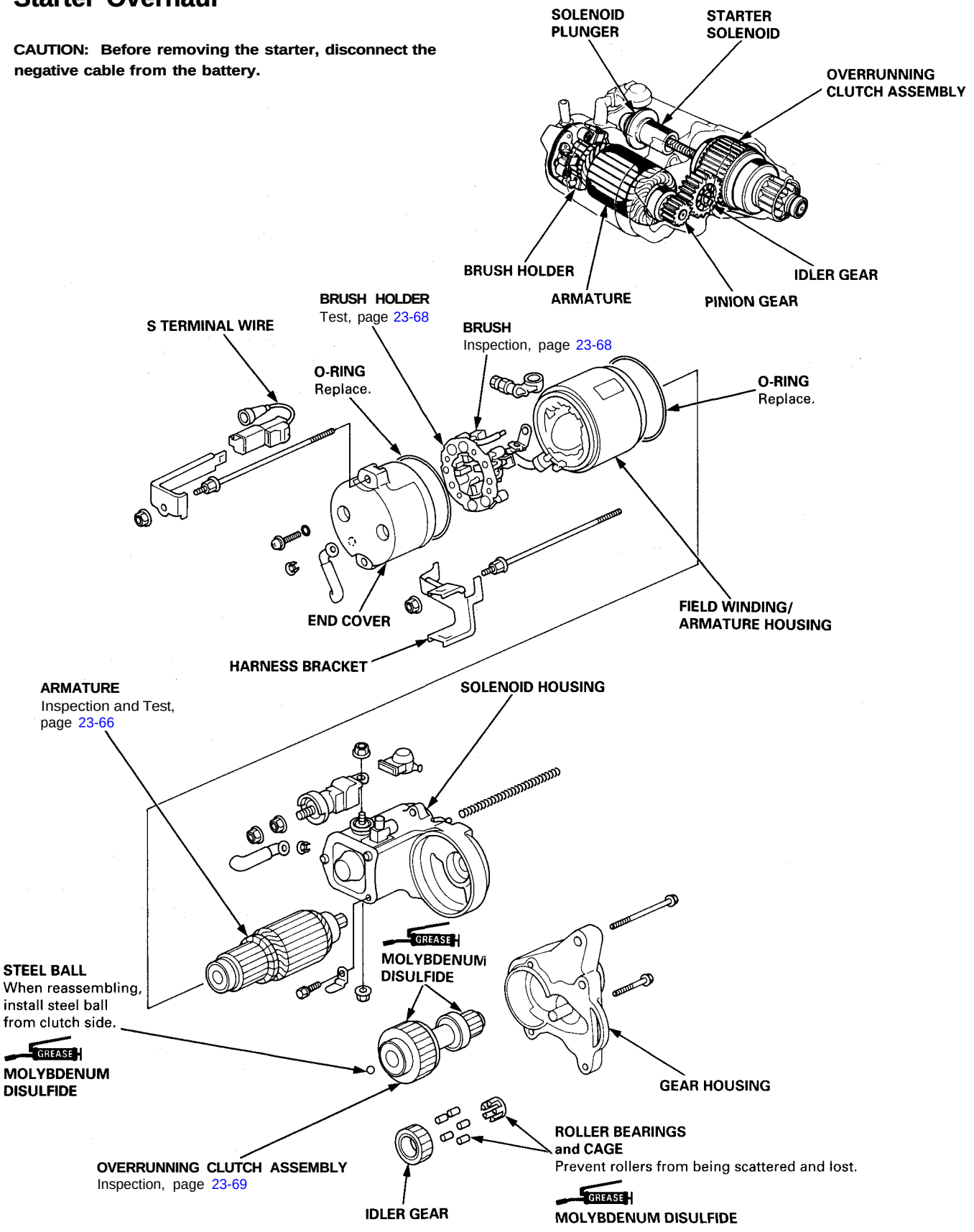
   NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



8. Connect the battery positive cable and negative cable to the battery.
9. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Starter Overhaul

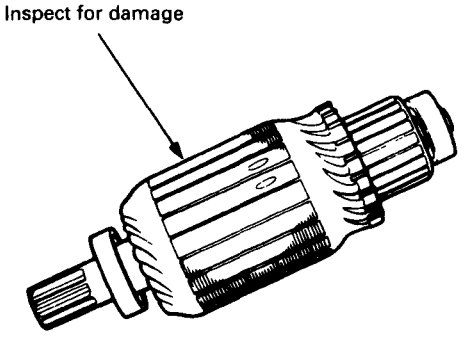
CAUTION: Before removing the starter, disconnect the negative cable from the battery.



Starting System

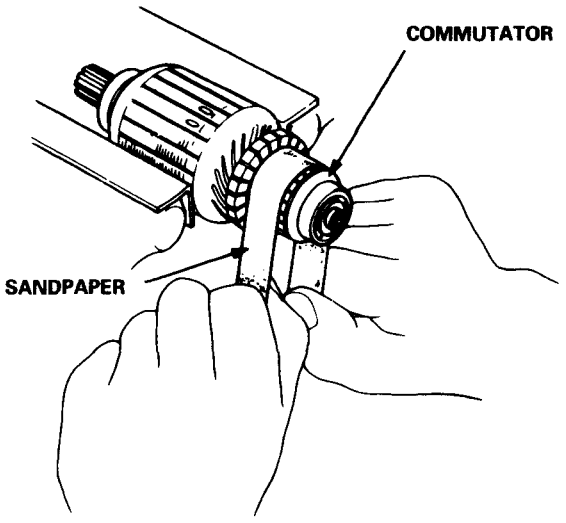
Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the permanent magnet. If there is wear or damage, replace the armature.



2. Check commutator surface and diameter.

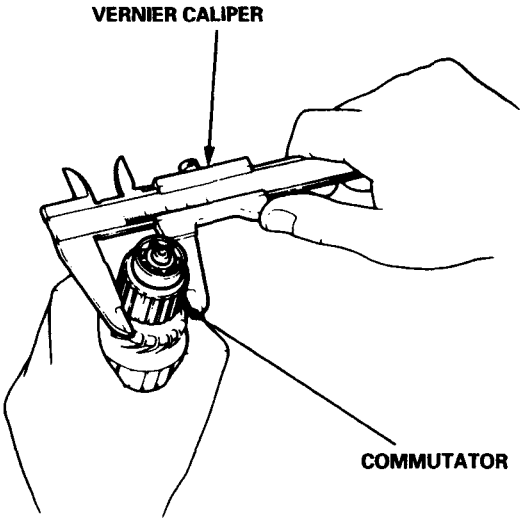
   - If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper.



   - If commutator diameter is below the service limit, replace the armature.

Commutator Diameter

Standard (NEW)	Service Limit
34.9 – 35.0 mm (1.374 – 1.378 in)	34.0 mm (1.338 in)

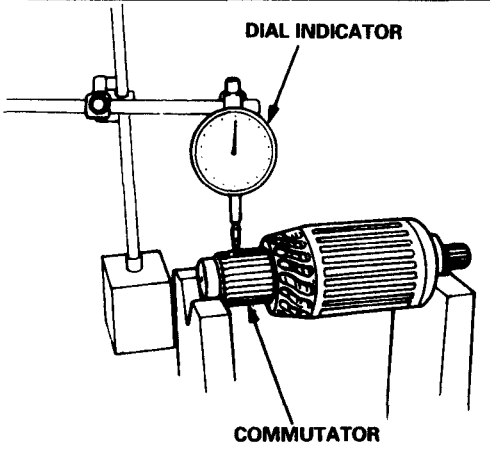


3. Measure the commutator runout.

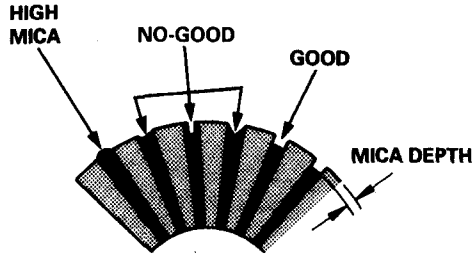
   - If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
   - If the commutator runout is not within the service limit, replace the armature.

Commutator Runout

Standard (NEW)	Service Limit
0 – 0.02 mm (0 – 0.0008 in)	0.05 mm (0.002 in)



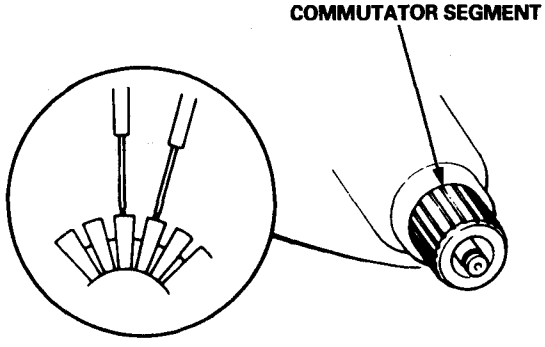
4. Check for mica depth. If necessary, undercut the mica with a hacksaw blade to achieve proper depth. If the service limit cannot be maintained, replace the armature.



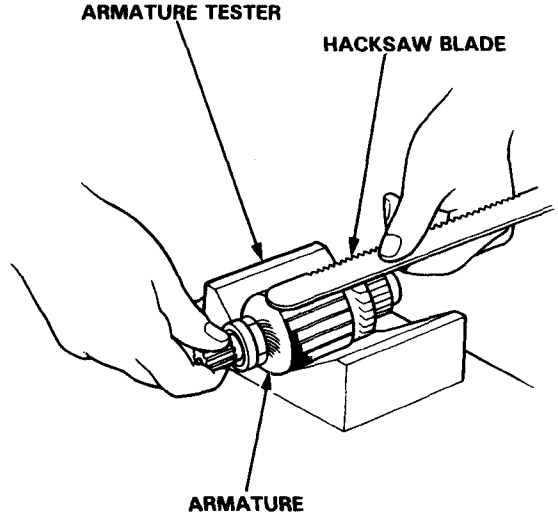
Commutator Mica Depth

Standard (NEW)	Service Limit
0.55 – 0.85 mm (0.022 – 0.034 in)	0.20 mm (0.008 in)

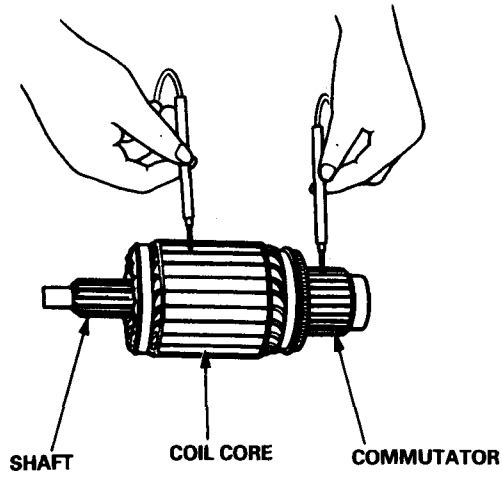
5. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.



6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core. If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.



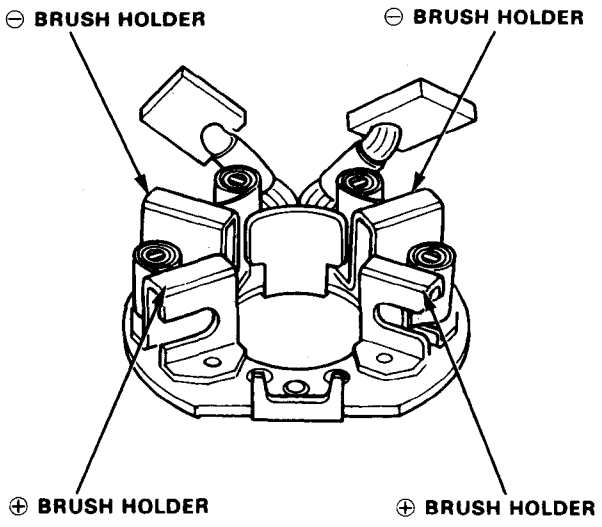
7. Check with an ohmmeter that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



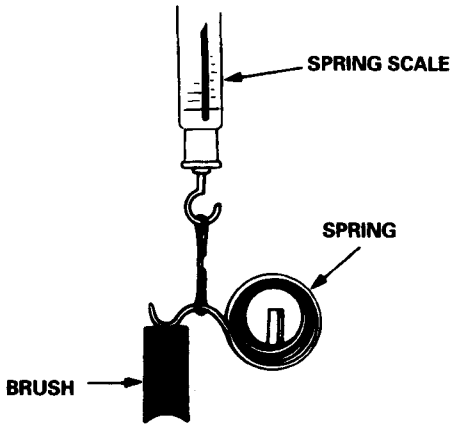
Starting System

Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders. If there is continuity, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.



Spring Tension

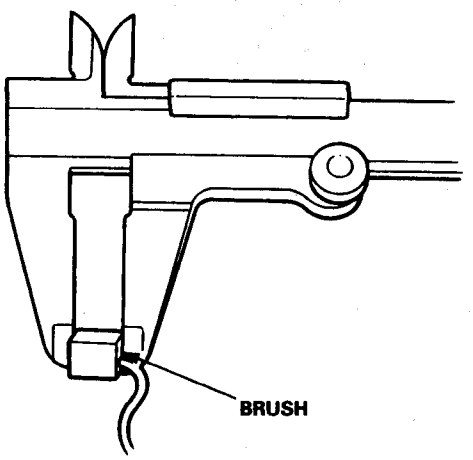
22 – 28 N (2.2 – 2.8 kgf, 4.9 – 6.2 lbf)

Starter Brush Inspection

Measure the brush length. If it is not within the service limit, replace the brush holder assembly.

Brush Length

Standard (NEW)	Service Limit
15.0 – 15.5 mm (0.59 – 0.61 in)	9.0 mm (0.35 in)

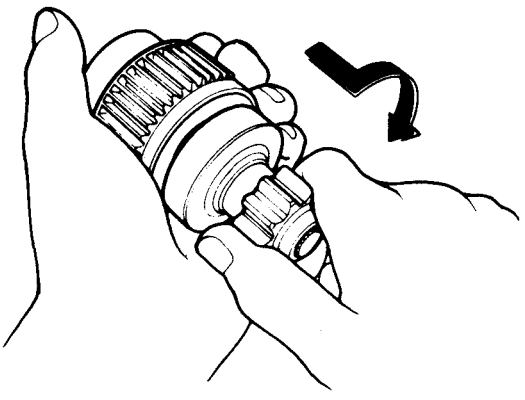


NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.

2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.



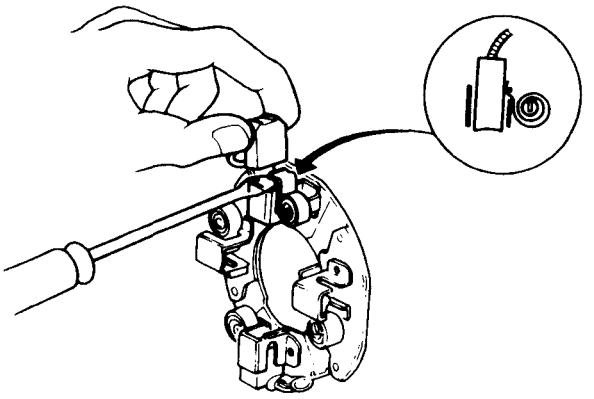
3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

4. Check the condition of the torque converter ring gear if the starter drive gear teeth are damaged.

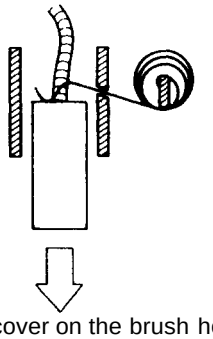
Starter Reassembly

NOTE: Use the illustration on page 23-65 as reference for reassembly.

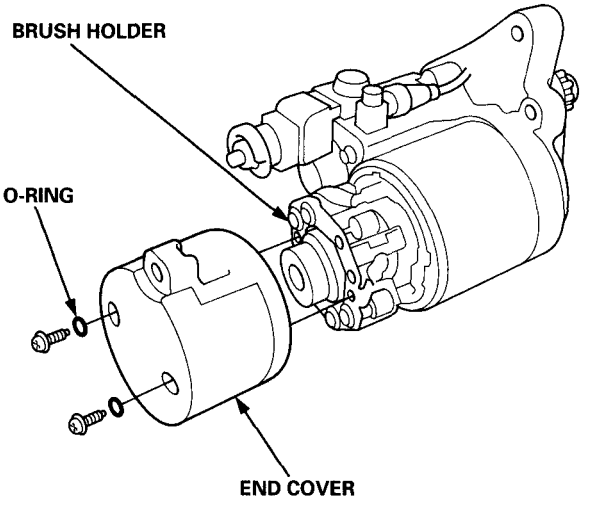
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3. Install the end cover on the brush holder.



Starting System

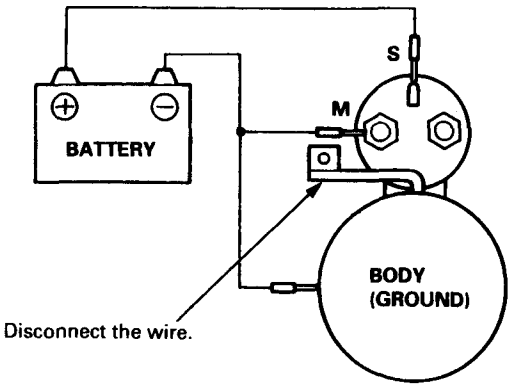
Performance Test

NOTE: Before starting the following checks, disconnect the wire from terminal M, and make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the car).

Pull-in Coil Test:

Connect the battery as shown. If the starter pinion pops out, it is working properly.

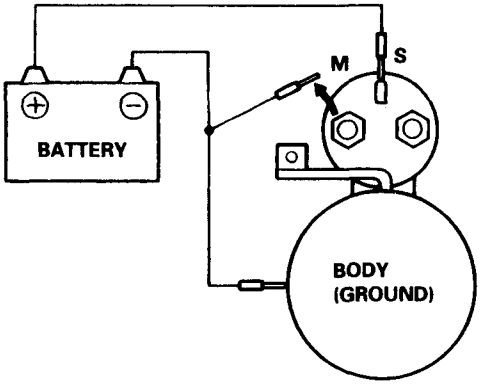
CAUTION: Do not leave the battery connected for more than 10 seconds.



Hold-in Coil Test:

Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly.

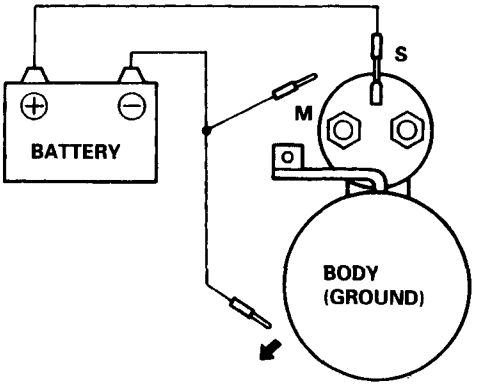
CAUTION: Do not leave the battery connected for more than 10 seconds.



Retracting Test:

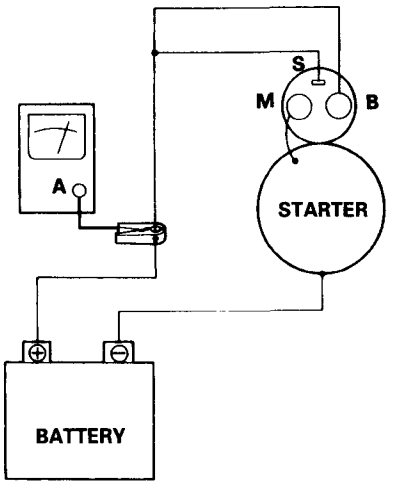
Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly.

CAUTION: Do not leave the battery connected for more than 10 seconds.



Starter No-load Test:

1. Clamp the starter firmly in a vise.
2. Connect the starter to the battery as shown in the diagram below, and confirm that the motor starts and keeps rotating.



3. If the electric current and motor speed meet the specifications when the battery voltage is at 11.5 V, the starter is working properly.

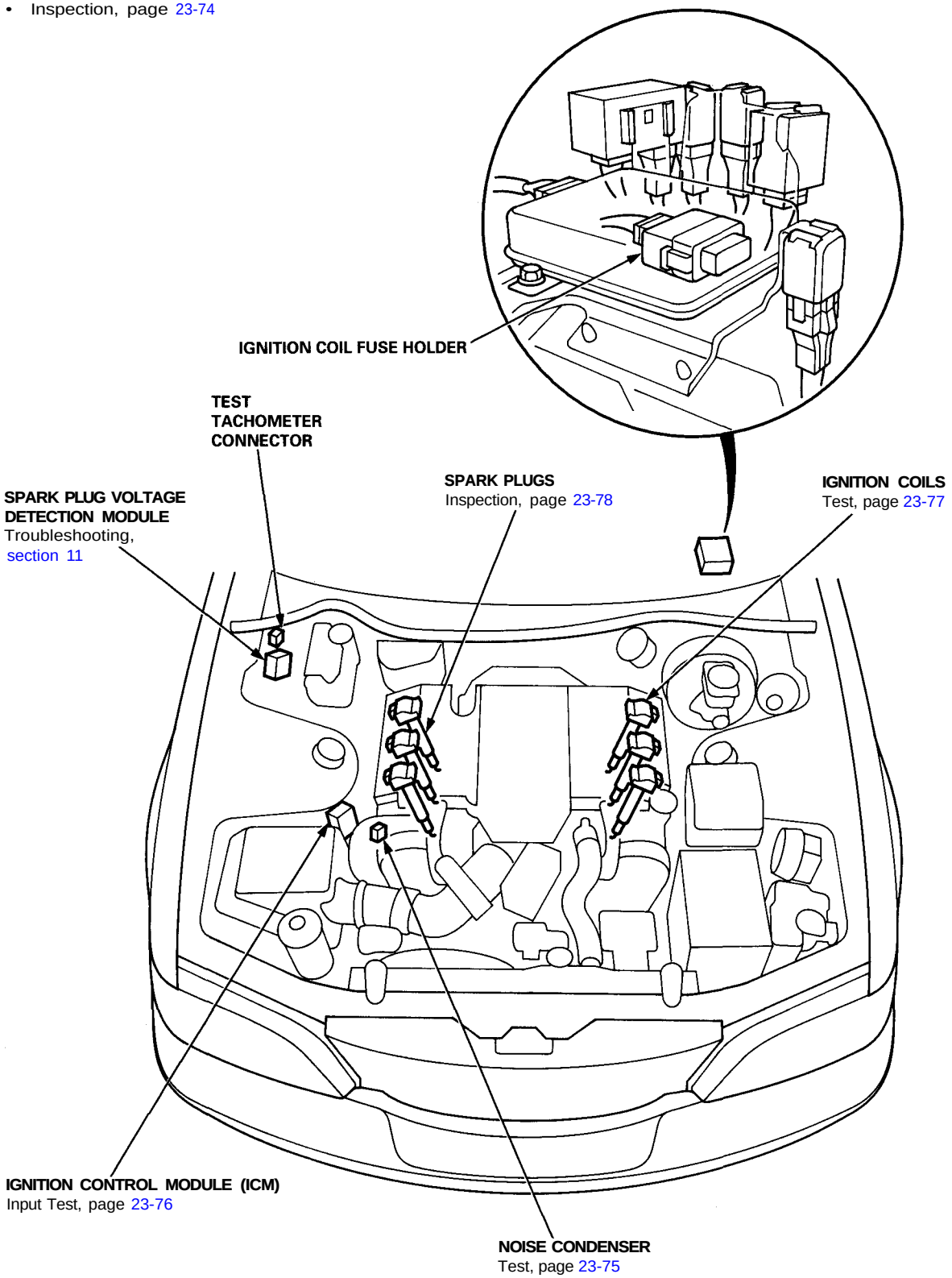
Specifications:

• 100 A or less current draw • 2,500 rpm or more rpm

Ignition System

Component Location Index

IGNITION TIMING CONTROL SYSTEM
- Description, page 23-72
- Inspection, page 23-74

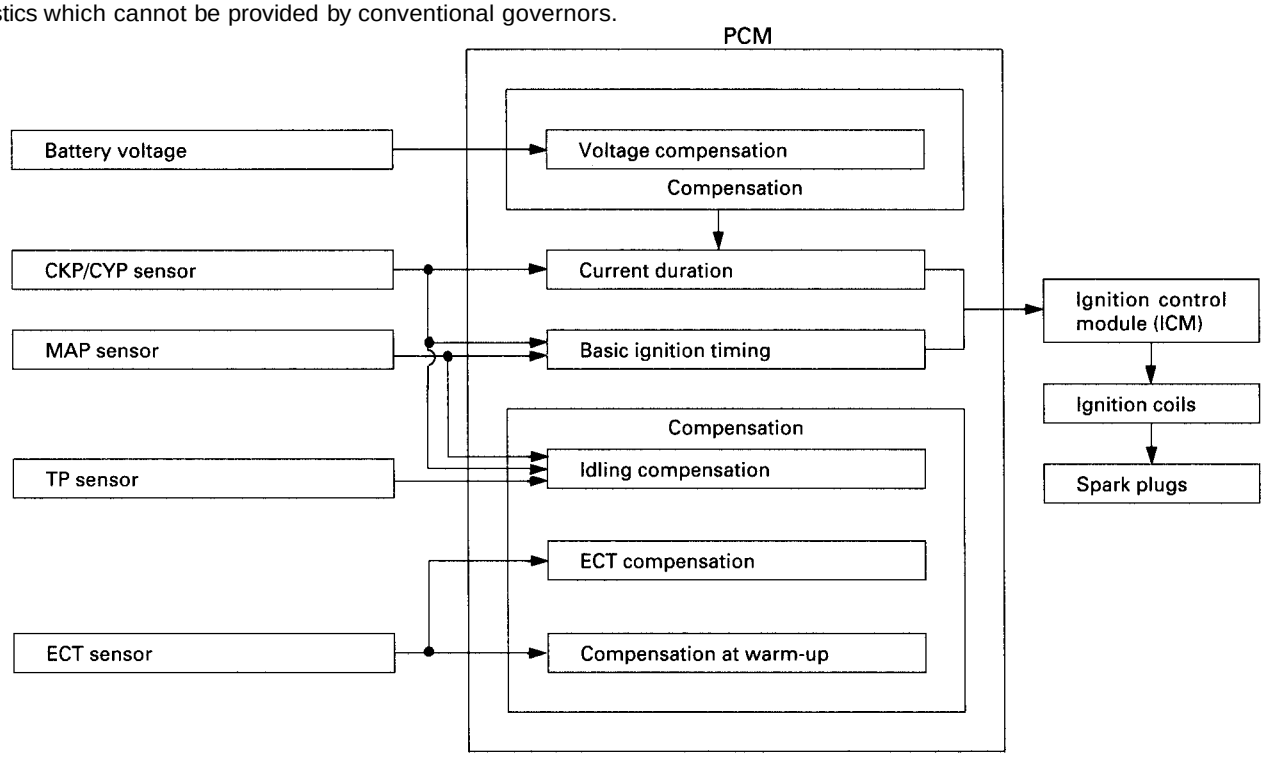


Ignition System

Description

Ignition Timing Control

The programmed ignition system on this engine provides optimum control of ignition timing. A microcomputer determines the timing based on information about engine speed and intake manifold vacuum, which is transmitted by signals from the CKP/CYP sensor, throttle position (TP) sensor, engine coolant temperature (ECT) sensor, and MAP sensor. This system, which is not dependent on a governor or vacuum diaphragm, is capable of providing ignition advance characteristics which cannot be provided by conventional governors.



Basic Control

The PCM has stored within it the basic ignition timing for operating conditions based upon engine speed and intake manifold vacuum. With the compensating signals from sensors, the system determines optimum ignition timing and duration for ambient conditions and sends voltage pulses to the ICM.

Compensation of ignition timing:

Compensation Item	Related Sensor and Information	Description
Idling	CKP/CYP sensor MAP sensor	Ignition timing is controlled to the target speed with compensation according to the idle speed.
Compensation at warm-up	ECT sensor	Timing is adjusted in accordance with warm-up conditions to bring about a good balance between operating performance and exhaust gas level.
ECT compensation	ECT sensor	Compensation for timing at low and high engine coolant temperatures.

Control at Start

Ignition timing is fixed at 5° BTDC for cranking. The cranking is detected by the CKP sensor (cranking rpm) and starter signal.

Misfiring Detection

As part of the OBD II misfiring detection system, each of the ignition coil has a built-in spark plug voltage sensor. This sensor detects the long duration high voltage which occurs in case of unfavorable combustion or misfiring. (For details, see section 11).

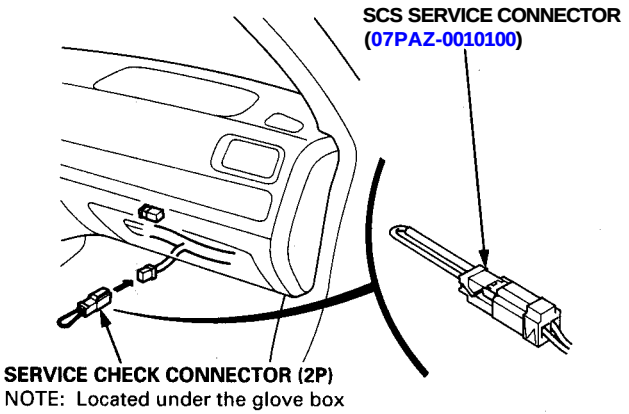
Ignition System

Ignition Timing Inspection

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

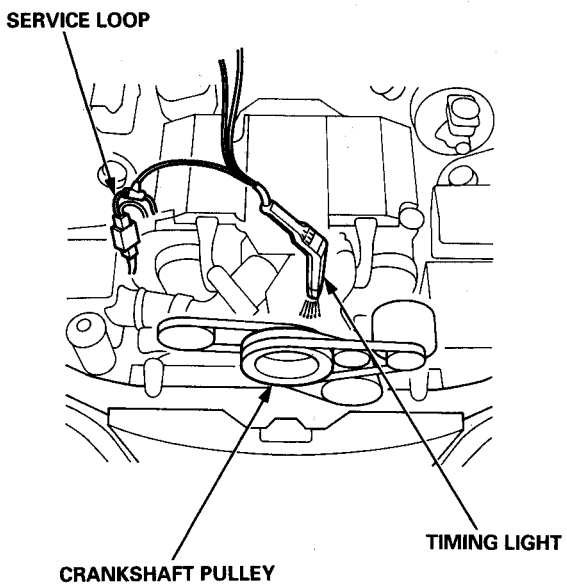
1. Start the engine. Hold the engine at 3,000 rpm with no load (shift lever in N or P position) until the radiator fan comes on, then let it idle.

2. Pull out the service check connector located under the glove box. Connect the GRN/BLU and ORN wire terminals with the special tool.



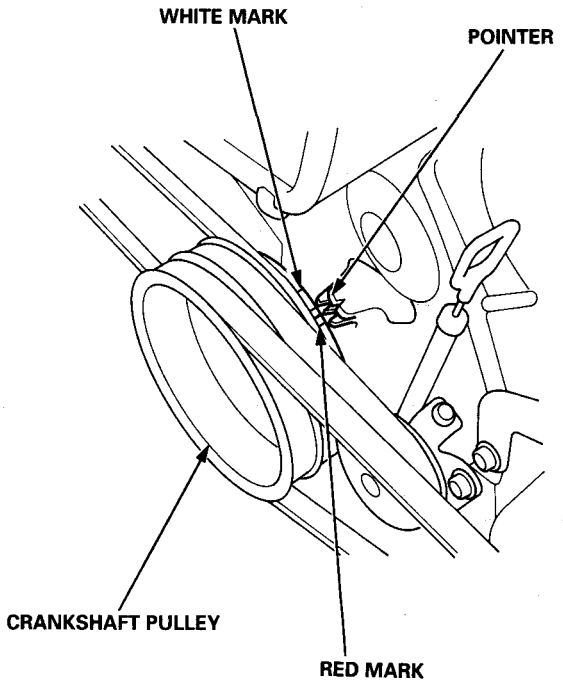
3. Check the idle speed (see page 23-75).

4. Connect a timing light to the service loop; while the engine idles, point the light toward the pointer on the timing belt cover.



5. Inspect ignition timing at idle speed.

Ignition Timing:
15 ± 2 BTDC (RED) at 640 + 50 rpm with shift lever in N or P position and electrical systems turned off.



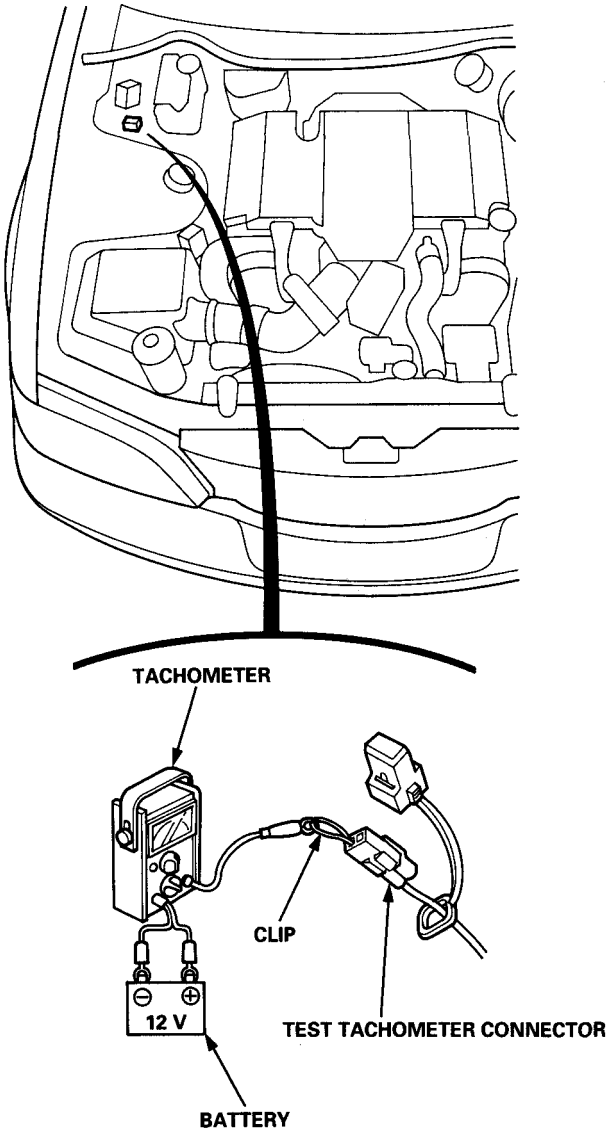
6. If the ignition timing is incorrect, replace the PCM (there is no way to adjust ignition timing).

7. Disconnect the special tool from the service check connector.

Idle Speed Check

1. Start the engine. Hold the engine at 3,000 rpm with no load (shift lever in N or P) until the radiator fan comes on, then let it idle.

2. Connect a tachometer to the test tachometer connector.



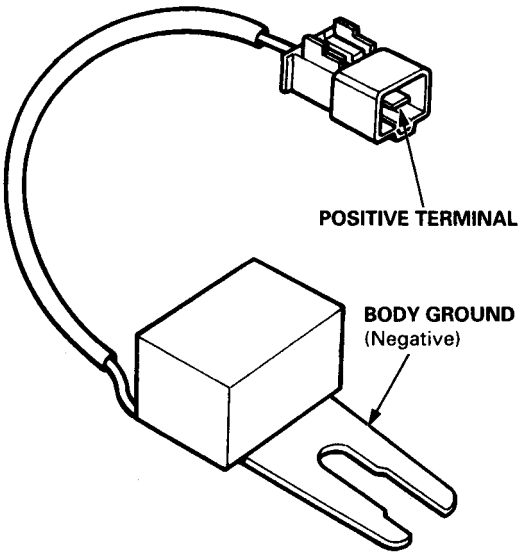
Idle speed: 640 ± 50 rpm with shift lever in position N or P and electrical systems turned off.

3. Adjust the idle speed if necessary (see section 11).

Noise Condenser Capacity Test

1. Use a commercially available condenser tester. Connect the condenser tester probes and measure the condenser capacity.

Condenser capacity: 0.47 ± 0.09 microfarads (μF)



NOTE: The noise condenser is intended to reduce ignition noise. However, condenser failure may cause the engine to stop running.

2. If not within the specifications, replace the noise condenser.

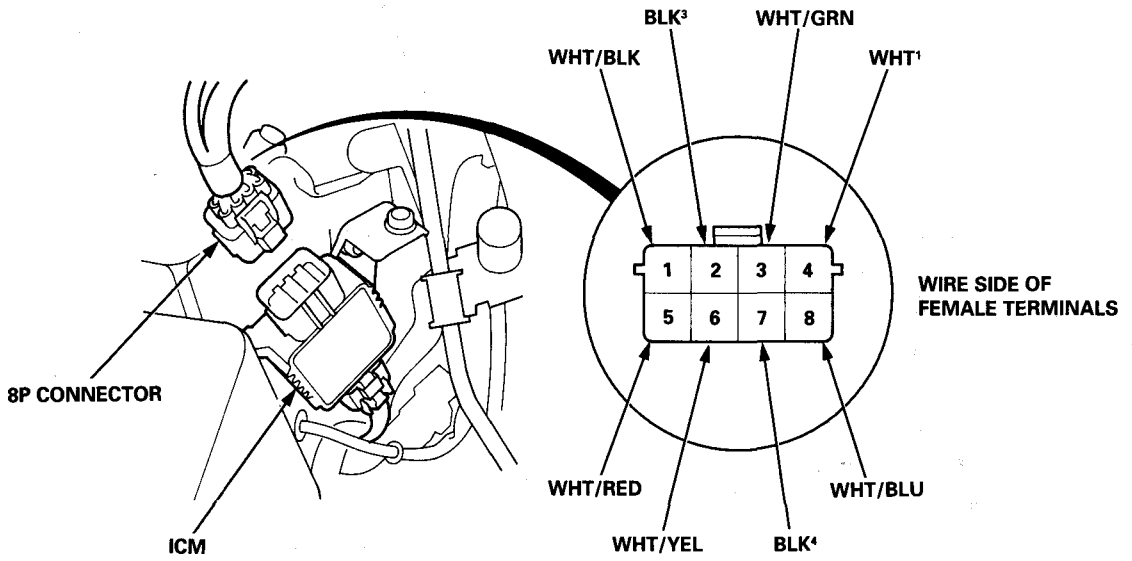
Ignition System

Ignition Control Module (ICM) Input Test

NOTE: See section 11 if the malfunction indicator lamp (MIL) blinks. Disconnect the 8P connector from the ignition control module (ICM). Inspect the connector and socket terminals to be sure they are all making good contact.

- If any terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
- If the terminals look OK, make the following input tests at the connector.

  — If a test indicates a problem, find and correct the cause, then recheck the system.
  — If all the input test prove OK, the ICM must be faulty; replace it.



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
2	BLK³	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G102) • An open in the wire
7	BLK⁴			
4	WHT¹	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown 30 A fuse in the ignition coil fuse holder • Faulty ignition coil • An open in the wire
3	WHT/GRN			
1	WHT/BLK			
8	WHT/BLU			
6	WHT/YEL			
5	WHT/RED			

Ignition Coil Test

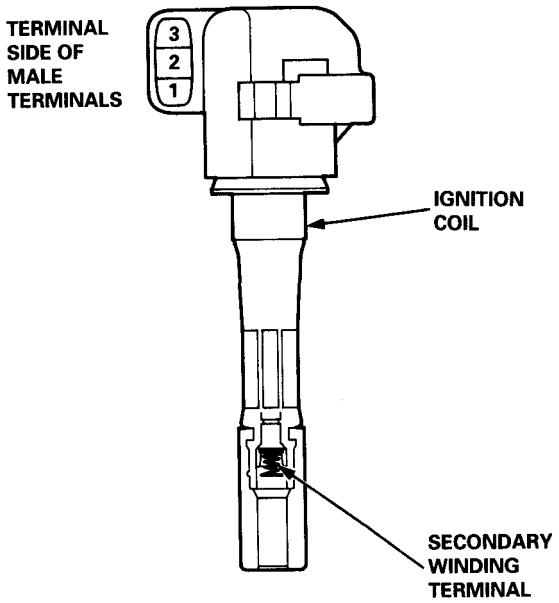
1. With the ignition switch OFF.

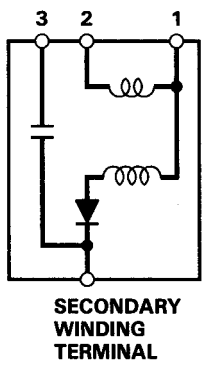
2. Remove the engine cover, then remove the ignition coil.

3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specification.
   NOTE: Resistance will vary with the coil temperature; specification is at 77°F (25°C).

   Primary Winding Resistance
   (between the No. 1 and No. 2 terminals)
   0.9-1.1 ohms

   - If the resistance is not within specification, replace the coil.
   - If the resistance is OK, but other troubleshooting doesn't reveal the cause of the problem, substitute a known-good ignition coil and check engine operation again.
     If the engine then runs OK, replace the original coil.

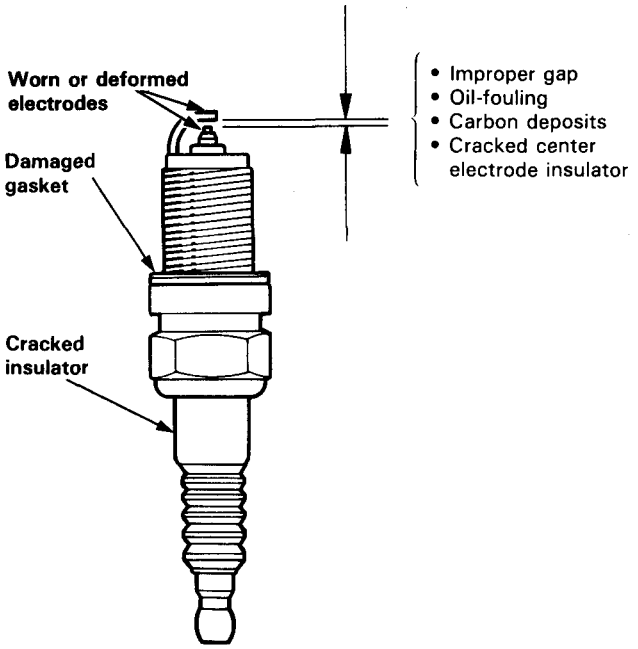




Ignition System

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



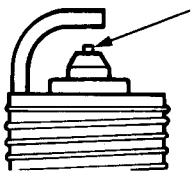
Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

Fouled plug may be caused by:
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too high
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

2. Do not adjust the gap of platinum tip plugs; replace the spark plug if the gap is out of specification or if the center electrode is rounded.

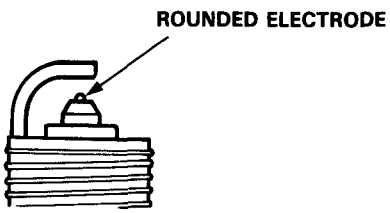
Electrode Gap:

Standard	1.1 $^{+0}_{-0.1}$ mm (0.043 $^{+0}_{-0.004}$ in)
Service Limit	1.3 mm (0.051 in)



Platinum tip plug: Do not adjust the gap; replace the spark plug if the gap is out of specification or if the center electrode is rounded.

3. Replace the plug at the specified interval, or if the center electrode is rounded as shown below:



NOTE: Use only the spark plugs listed below.

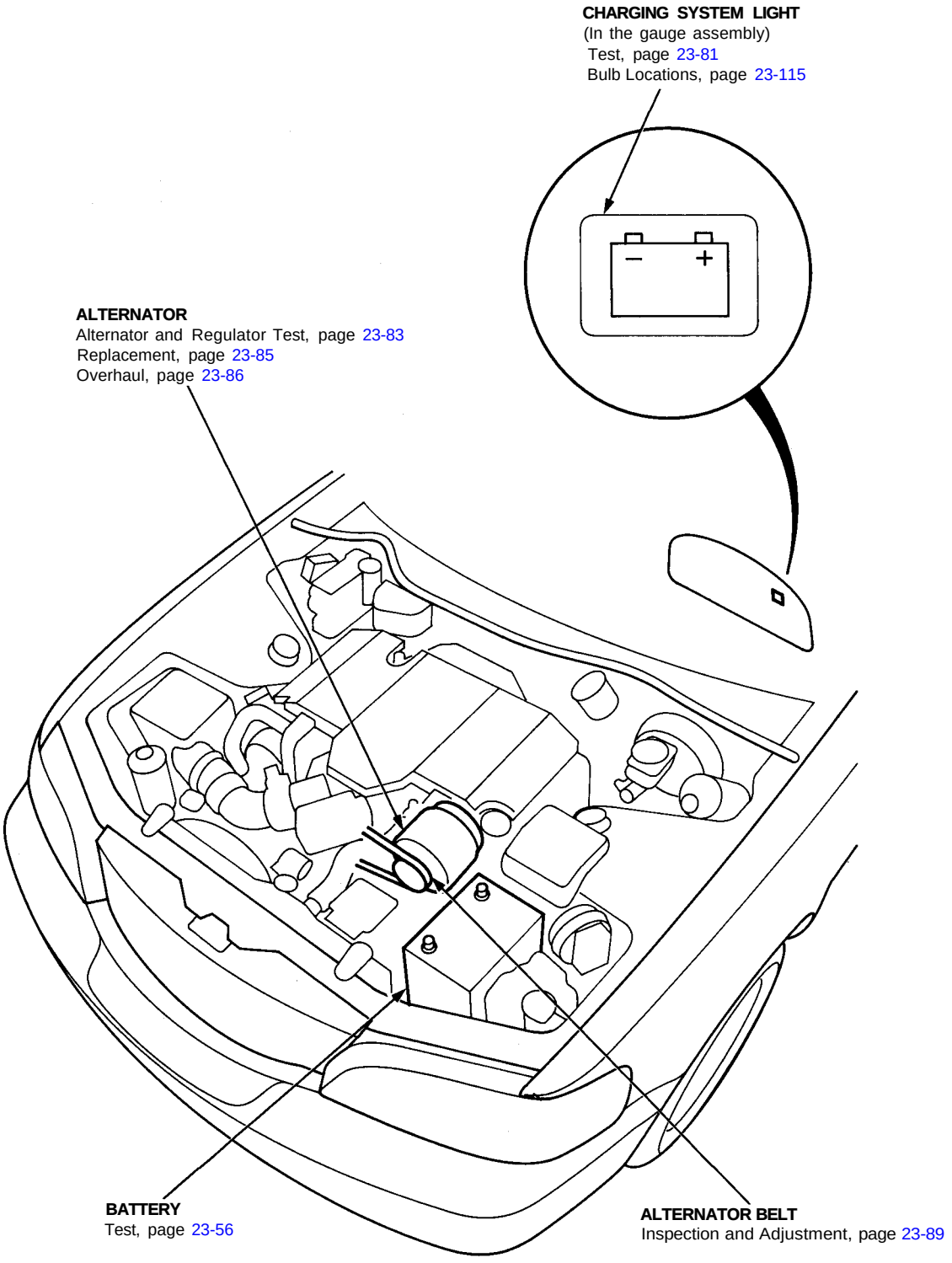
Spark Plugs

PFR5L-11 (NGK)
PK16PR-L11 (DENSO)

4. Apply a small quantity of anti-seize compound to the plug threads, and screw the plugs into the cylinder head finger-tight. Then torque them to 18 N-m (1.8 kgf-m, 13 lbf-ft).

Charging System

Component Location Index



Charging System

Troubleshooting

If the charging system light does not come on or does not go off, or the battery is dead or low, test the following items in the order listed below:

1. Battery (see page 23-56)
2. Charging System Light
3. Voltage Check
4. Alternator/Regulator

Check the No. 4 (15 A)*1 or (20 A)*2 fuse in the under-dash fuse/relay box.

*1: '96 model
*2: '97 – 98 models

Is the fuse OK?
- NO → **Replace the fuse.**
- YES →

Check for an open in the L circuit:
1. Disconnect the 4P connector from the alternator.
2. Ground the No. 4 terminal of the 4P connector.
3. Turn the ignition switch ON (II).

Does the charging system light come on?
- NO → **Check for a blown charging system light bulb. If the bulb is OK, repair the open in the WHT/BLU wire.**
- YES →

4. Disconnect the No. 4 terminal of the 4P connector from the ground.

Does the charging system light go off?
- YES → (1) (To page 23-82)
- NO →

Check for a short to body ground in the L circuit:
1. Turn the ignition switch OFF.
2. Disconnect the ABS control unit (C447) and integrated control unit (C401), as applicable.
3. Turn the ignition switch ON (II).

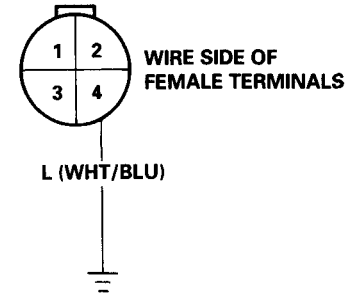
Does the charging system light stay off?
- NO → **Turn the ignition switch OFF, and repair the short to ground in the WHT/BLU wire.**
- YES →

Check for short in control unit(s):
1. Turn the ignition switch OFF.
2. Reconnect the ABS control unit connector.
3. Turn the ignition switch ON (II), and check the charging system light.

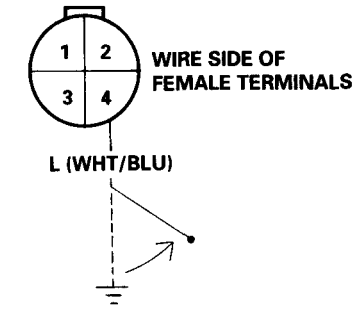
Did the light stay off when you turned on the ignition switch after connecting ABS control unit connector?
- NO → **Substitute a known-good integrated control unit, and recheck.**
- YES →

Substitute a known-good ABS control unit, and recheck.

ALTERNATOR 4P CONNECTOR



ALTERNATOR 4P CONNECTOR



(cont'd)

Charging System

Troubleshooting (cont'd)

(From page 23-81)

1

Check for an open in the IG circuit: Measure the voltage at the No. 3 terminal of the 4P connector.

Is there battery voltage?

NO → **Turn the ignition switch OFF, and repair the open circuit in the BLK/YEL wire.**

YES

Check the Alternator/Regulator:
1. Turn the ignition switch OFF.
2. Connect the 4P connector to the alternator.
3. Turn the ignition switch ON (II).

Does the charging system light come on?

NO → **Check the alternator/regulator (see page 23-83).**

YES

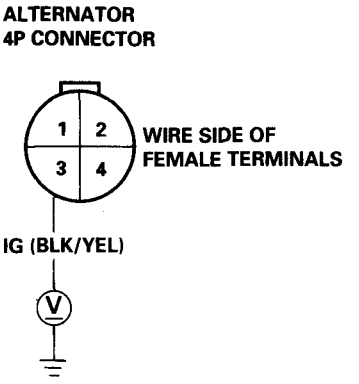
4. Start the engine.

Does the charging system light go off?

NO → **Check the alternator/regulator (see page 23-83).**

YES

The charging system light circuit is OK.



NOTE: Be sure the battery is sufficiently charged (see page 23-56).

Alternator/Regulator Test-1:
1. Connect the Sun VAT-40 (or equivalent tester), and turn the selector switch to position 1 (starting).
2. Shift to P or N position, and start the engine. Hold the engine at 3,000 rpm with no load until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage over 15.1 V?

YES → **Replace the voltage regulator.**

NO

Alternator/Regulator Test-2:
1. Release the accelerator pedal, and let the engine idle.
2. Make sure all accessories are turned off. Turn the selector switch to position 2 (charging).
3. Remove the inductive pick-up, and zero the ammeter.
4. Place the inductive pick-up over the B terminal wire of the alternator so that the arrow points away from the alternator.
5. Raise the engine speed to 2,000 rpm, and hold it there.

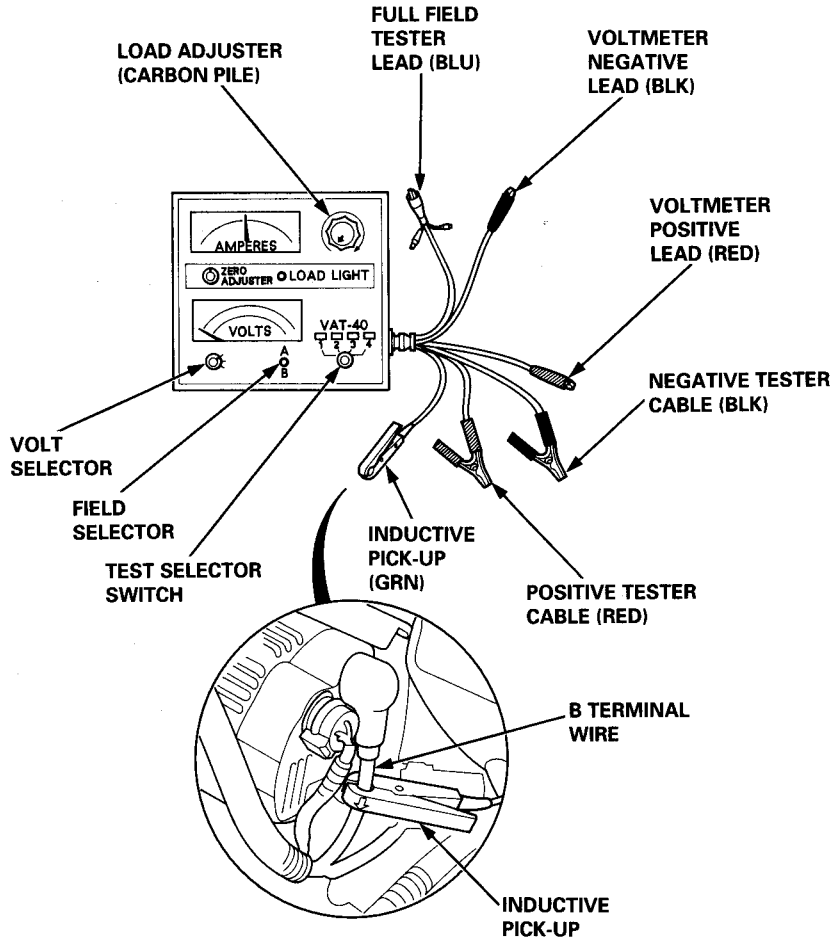
Is the voltage less than 13.5 V?

YES → **Test and repair the alternator components.**

NO

Alternator/Regulator Test-3:
Apply a load with the VAT-40 until the battery voltage drops to between 12 – 13.5 V.

2



(To page 23-84)

(cont'd)

Charging System

Troubleshooting (cont'd)

(From page 23-83)

(2)

Is the amperage 75 A or more?

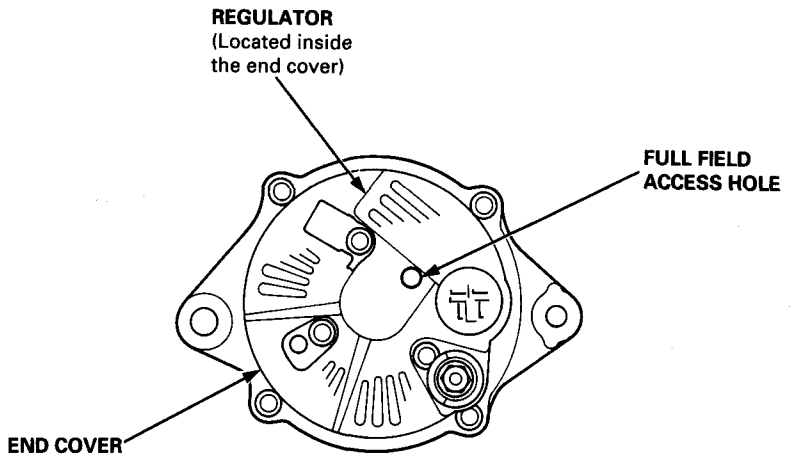
YES → **The charging system is OK.**

NO

Alternator/Regulator Test-4:
With the engine speed still at 2,000 rpm, full-field the alternator.

CAUTION: The voltage will rise quickly when the alternator is full-fielded. Do not allow the voltage to exceed 18 V; it may damage the electrical system.

NOTE: Attach a probe to the VAT-40 full field test lead, and insert the probe into the full field access hole at the back of the alternator. Switch the field selector to the "A (Ground)" position momentarily, and check the amperage reading.

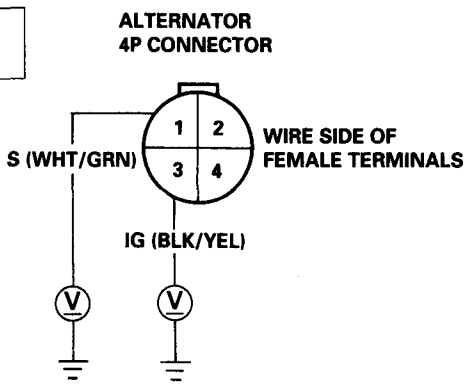


Is the alternator output 75 A or more?

NO → **Test and repair the alternator components.**

YES

BLK/YEL Wire Test:
1. Turn the ignition switch OFF, then turn it on (II) again.
2. Disconnect the 4P connector from the alternator.
3. Measure voltage between body ground and alternator 4P connector terminals No. 1 and No. 3 individually.



Is there battery voltage?

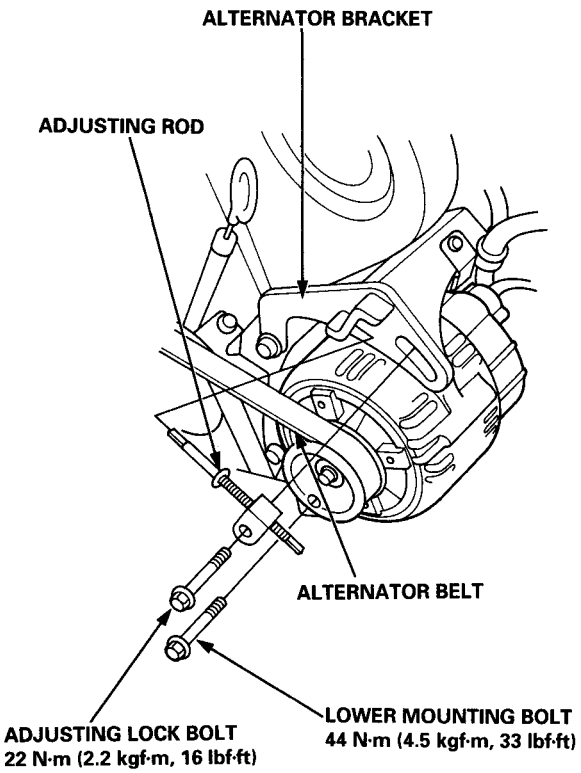
NO → **Repair the open in the wire.**

YES

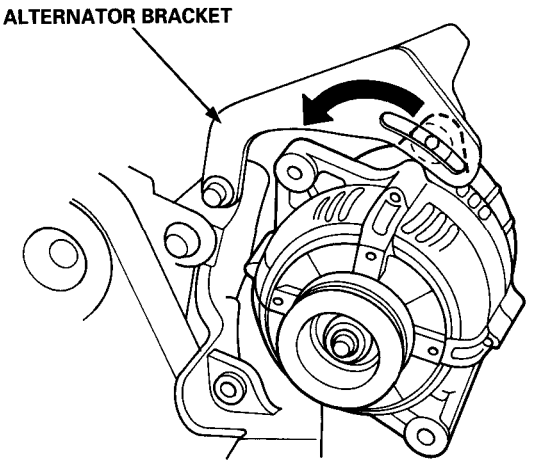
Replace the voltage regulator.

Alternator Replacement

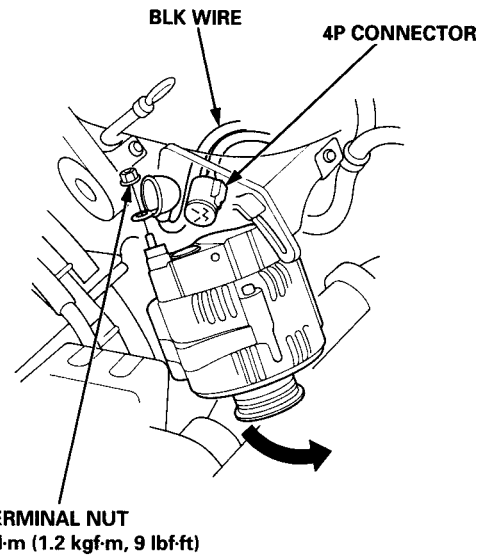
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Remove the lower mounting bolt, adjusting lock bolt and adjusting rod, then remove the belt from the pulley.



4. As shown in the illustration, rotate the alternator 90 degrees counterclockwise and pull it out toward you.



5. Disconnect the 4P connector and the harness clip bracket, then remove the terminal nut and the BLK wire from the B terminal. Take out the alternator.



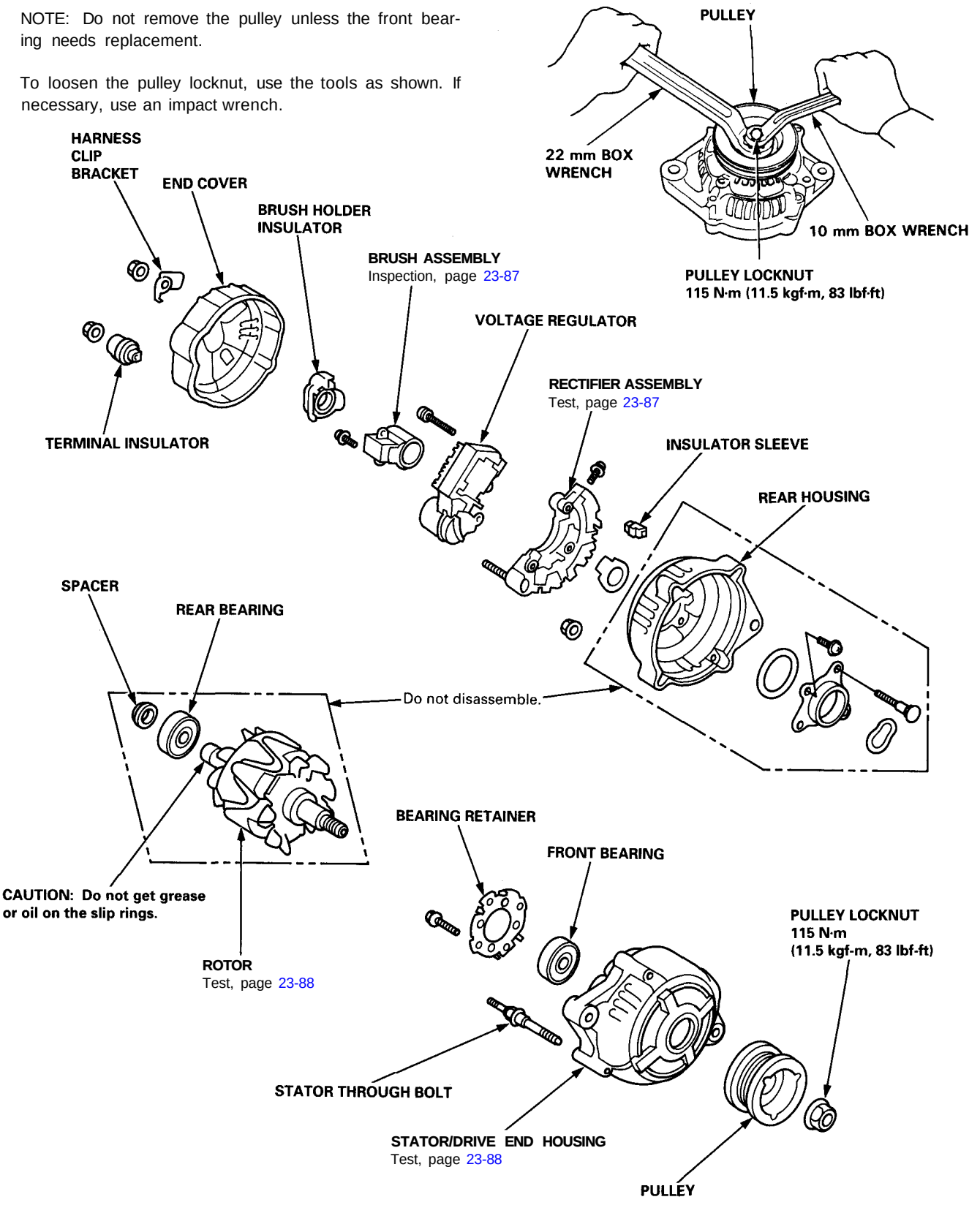
6. Install in the reverse order of removal.
7. Adjust the alternator belt tension (see page 23-89).
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Charging System

Alternator Overhaul

NOTE: Do not remove the pulley unless the front bearing needs replacement.

To loosen the pulley locknut, use the tools as shown. If necessary, use an impact wrench.



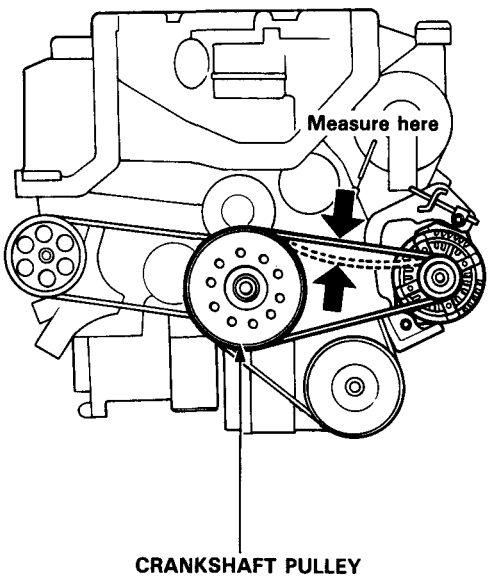
Alternator Belt Inspection and Adjustment

Deflection method:

Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and crankshaft pulley.

Deflection: 9.0 - 11.5 mm (0.35 - 0.45 in)

NOTE: On a brand-new belt (one that has been run for less than five minutes), the deflection should be 5.5 - 7.0 mm (0.22 - 0.28 in) when first measured. If the belt is worn or damaged, replace it.

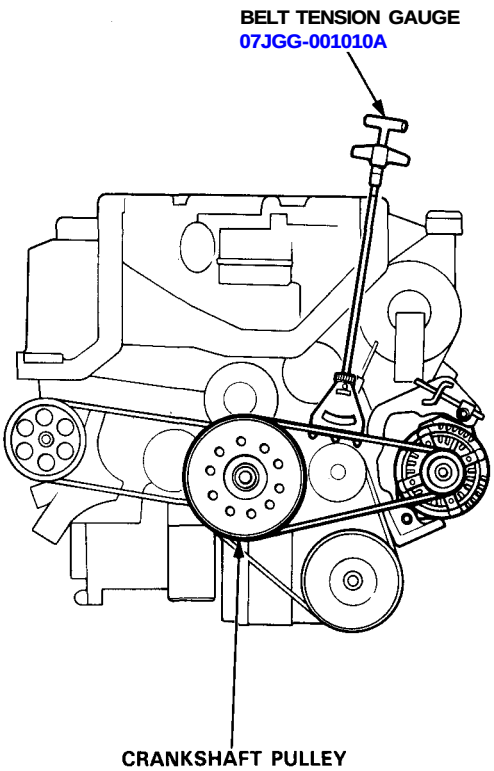


Belt tension gauge method:

Attach the belt tension gauge to the belt and measure the tension. Follow the gauge manufacturer's instructions.

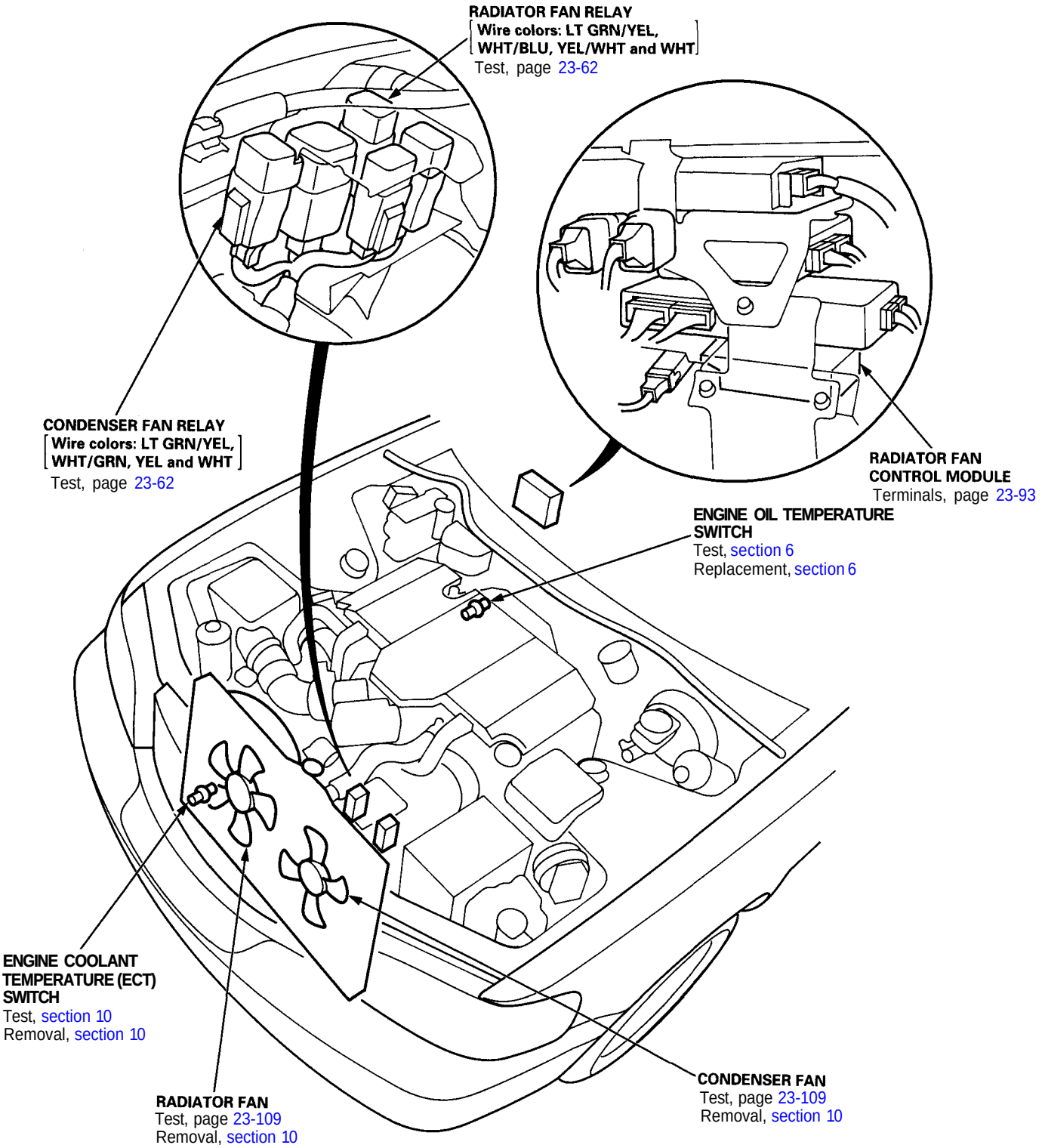
Tension: 390 - 590 N (40-60 kgf, 88-132 lbf)

NOTE: On a brand-new belt, (one that has been run for less than five minutes), the tension should be 785 - 980 N (80 - 100 kgf, 176 - 220 lbf) when first measured. If the belt is worn or damaged, replace it.



Fan Controls

Component Location Index



Radiator Fan Control:

When the engine oil temperature is above approximately 198°F (92°C) after the engine has stopped, the radiator fan will run for about 15 minutes. The engine coolant temperature (ECT) switch is in the thermostat housing. The engine oil temperature switch is located on the valve cover. The radiator fan control module is located behind the glove box.

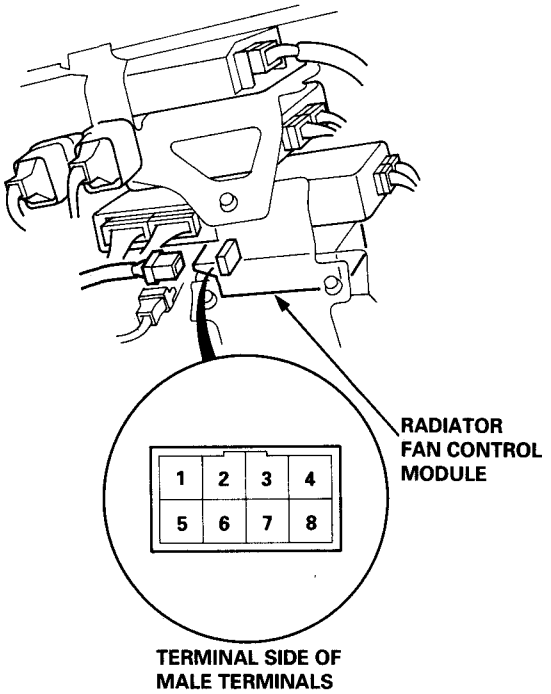
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

*1: '96 model
*2: '97 – 98 models

Symptom \ Item to be inspected		Blown No. 47 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 50 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 56 (10 A) fuse (In the under-hood fuse/relay box)	Blown No. 4 (15 A)*1 or (20 A)*2 fuse (In the under-dash fuse/relay box)	Blown No. 7 (7.5 A) fuse (In the under-dash fuse/relay box)	Radiator fan or condenser fan relay	Radiator fan or condenser fan motor	Engine coolant temperature (ECT) switch	Engine oil temperature switch	Faulty radiator fan control module	A/C system	Poor ground	Open circuit, loose or disconnected terminals
Only one fan runs (with engine running and A/C ON).		1					2	3					G301	WHT[1], WHT[2], WHT/GRN, WHT/BLU, YEL/WHT, YEL[1] or LT GRN/YEL
Fans do not run.	Under all conditions					1					2		G101 G203 G301 G401 G404	BLK/YEL[2], BLK/YEL[1] or LT GRN/YEL
	A/C ON					2					3	1		LT GRN/YEL
Radiator fan control module fails to function properly.				1	2	3				4	5		G101 G203 G401 G404	WHT/GRN, BLK/YEL[1], ORN or WHT[2]

Radiator Fan Control Module Terminals



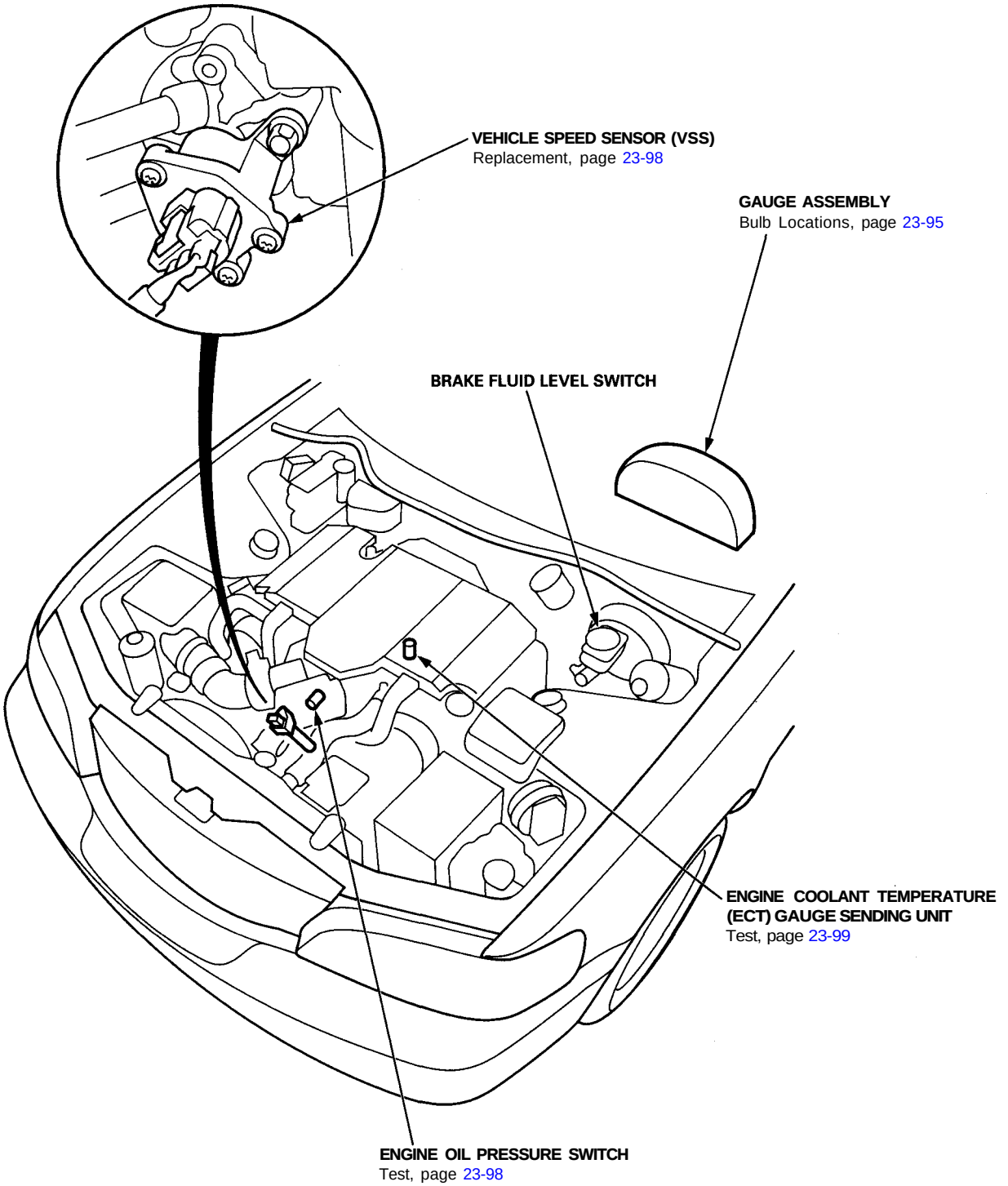
NOTE: See section 22 for the input test.

Terminal	Wire	Connects to
1	YEL[1]	Condenser fan relay (Coil ⊕)
2	BLK/YEL[2]	Power supply [For radiator fan and condenser fan relays via radiator fan control module with ignition switch ON (II)]
3	YEL/WHT	Radiator fan relay (Coil ⊕)
4	BLK	Ground (G203, G401, G404)
5	ORN	Engine oil temperature switch
6	WHT/GRN	Power supply (For radiator fan control module with ignition switch OFF)
7	BLK/YEL[1]	IG1 (Control module reset signal)
8	LT GRN/YEL	Radiator fan and condenser fan relays (Coil ⊖)

Gauge Assembly

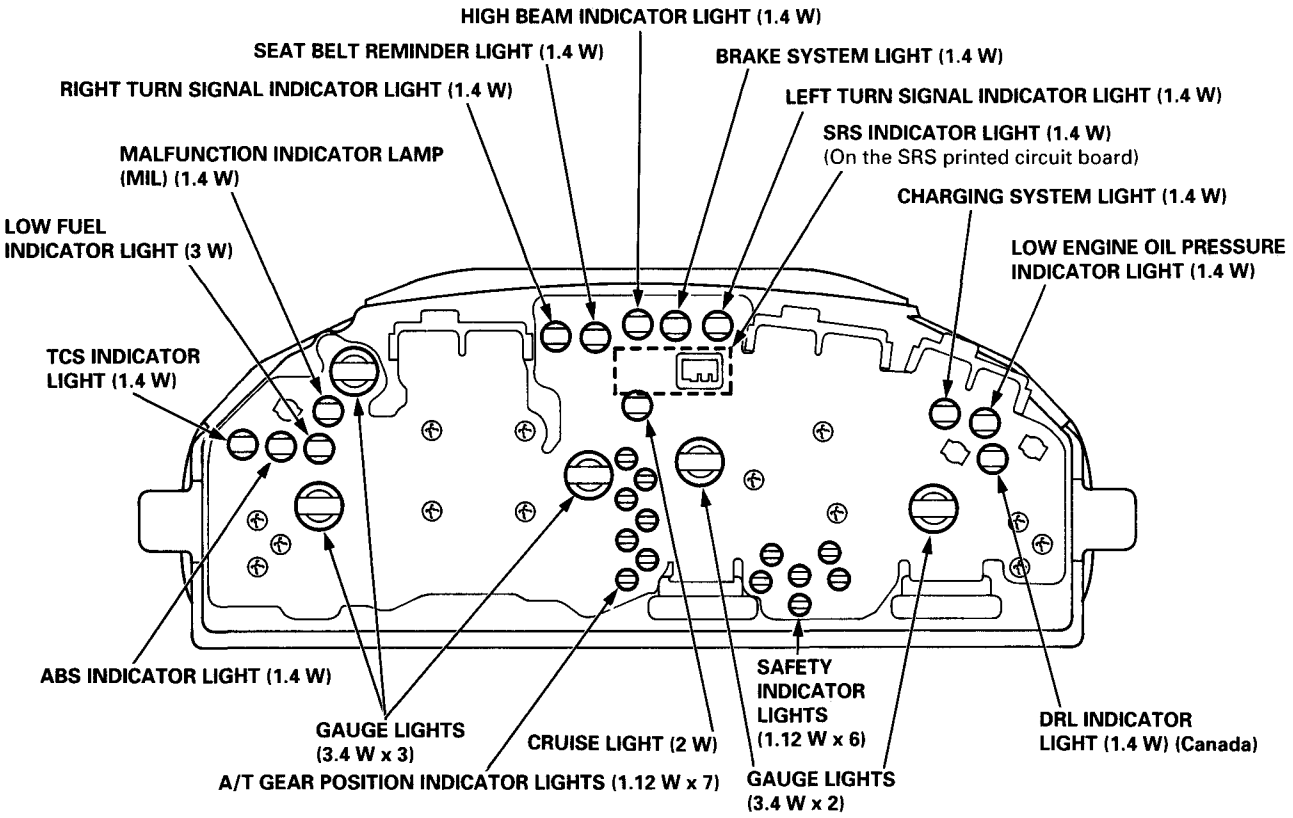
Component Location Index

NOTE: Refer to page 23-110 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



Bulb Locations

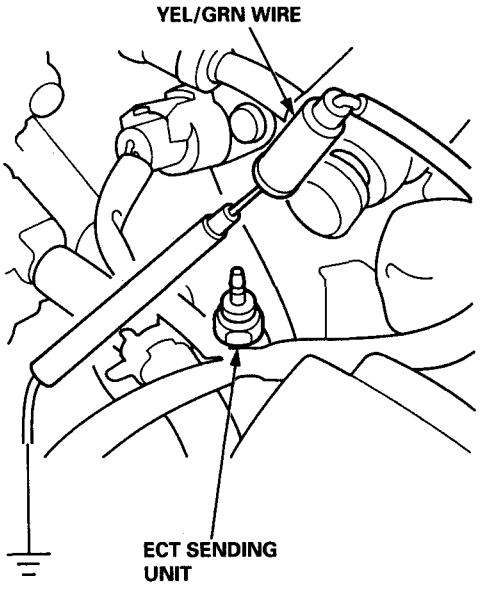
NOTE: Refer to page 23-115 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



Engine Coolant Temperature (ECT) Gauge

Gauge Test

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Remove the engine cover.
3. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the ECT sending unit, and ground it with a jumper wire.



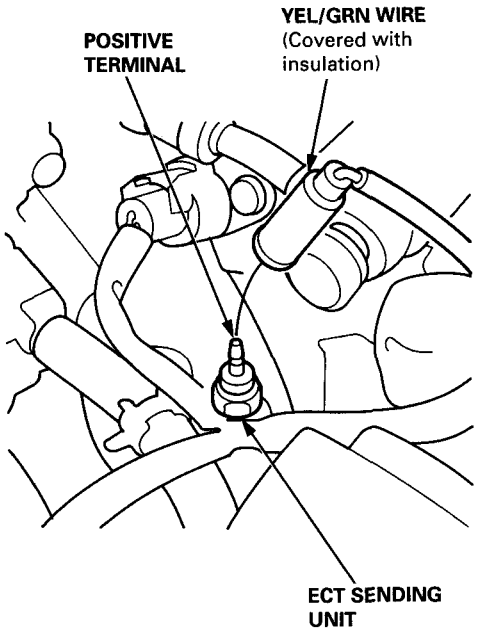
4. Turn the ignition switch ON (II). Check that the pointer of the ECT gauge starts moving toward the "H" mark.

CAUTION: Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.

- If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire. If the wires are OK, replace the ECT gauge.
- If the ECT gauge works, test the ECT sending unit.

ECT Sending Unit Test

1. Remove the engine cover.
2. Disconnect the YEL/GRN wire from the ECT sending unit.

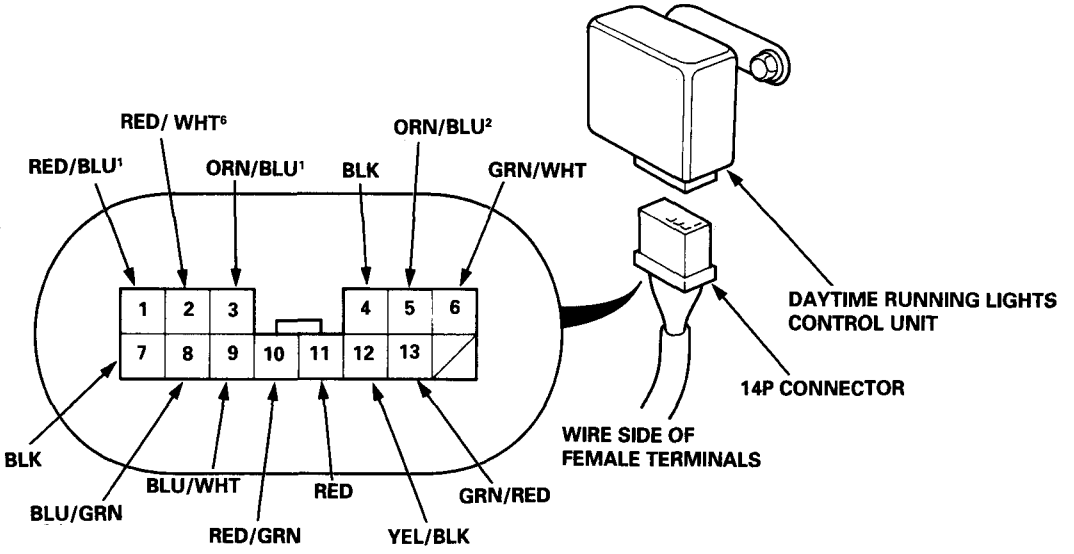


3. Using an ohmmeter, measure the change in resistance between the positive terminal and the engine (ground) with the engine cold and with the engine at operating temperature.

Temperature	133°F (56°C)	185°F (85°C) – 212°F (100°C)
Resistance (Ω)	137	46 – 30

4. If the obtained readings are substantially different from the specifications above, inspect the coolant level and the cooling system. If the cooling system is OK, replace the sending unit.

Daytime Running Lights Control Unit Input Test (Canada)

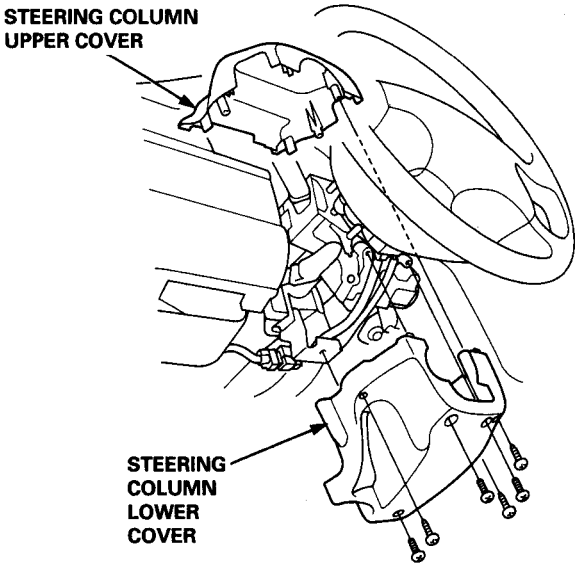


Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1 11	RED/BLU RED	Combination light switch ON (≡D)	Connect to ground: The headlights and high beam indicator light should come on.	• Blown No. 45, No. 46 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty headlight relay • Faulty low beam cut relay • Blown headlight bulb (High beam) • Blown high beam indicator light • An open in the wire
2	RED/WHT⁶	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 43 (15 A) fuse in the under-hood fuse/relay box • An open in the wire
3 5	ORN/BLU¹ ORN/BLU²	Passing switch ON	Check for continuity to ground: There should be continuity.	• Faulty combination light switch • Faulty headlight relay • Faulty dimmer relay • An open in the wire
4 7	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G203, G401, G404) • An open in the wire
6	GRN/WHT	Parking brake lever up	Check for continuity to ground: There should be continuity.	• Faulty parking brake switch • An open in the wire
8	BLU/GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Faulty headlight relay • An open in the wire
9	BLU/WHT	Ignition switch ON (II)	Connect to ground: The DRL indicator light should come on.	• Faulty DRL indicator light • Blown No. 1 (10 A) fuse in the under-hood fuse/relay box • An open in the wire
10	RED/GRN	Combination light switch ON (≡D)	Check for voltage to ground: There should be battery voltage.	• Blown No. 45 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty headlight relay • An open in the wire
12	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 10 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
13	GRN/RED	Brake fluid reservoir float in down position	Check for continuity to ground: There should be continuity.	• Faulty brake fluid level switch • An open in the wire

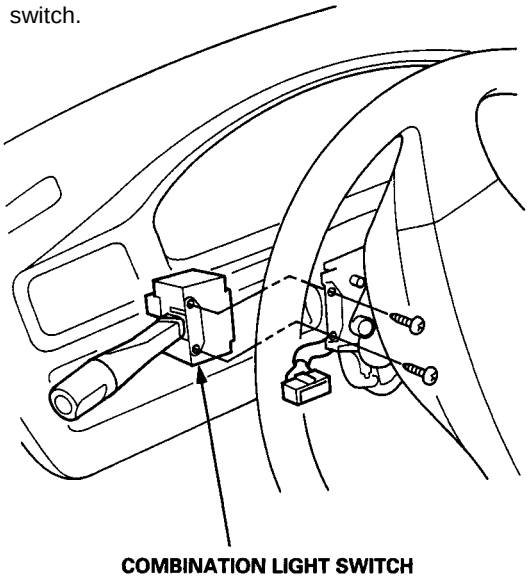
Combination Light Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster.
2. Remove the steering column covers.



3. Disconnect the connector from the combination light switch, then remove the two screws and the switch.

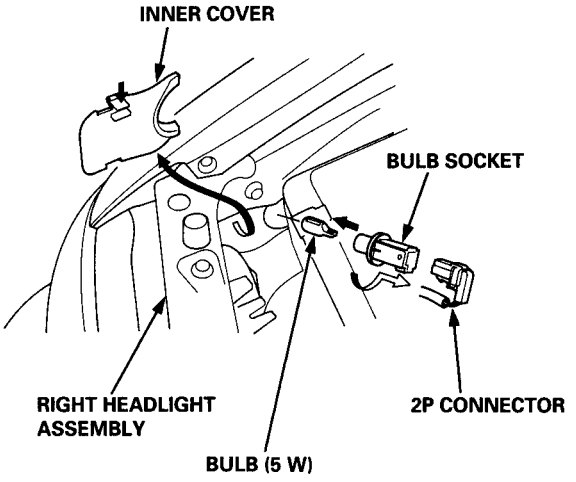


4. Install the combination light switch in the reverse order of removal.

NOTE: On TCS cars, check the position of the TCS 3P connector harness (see section 17).

Bulb Replacement

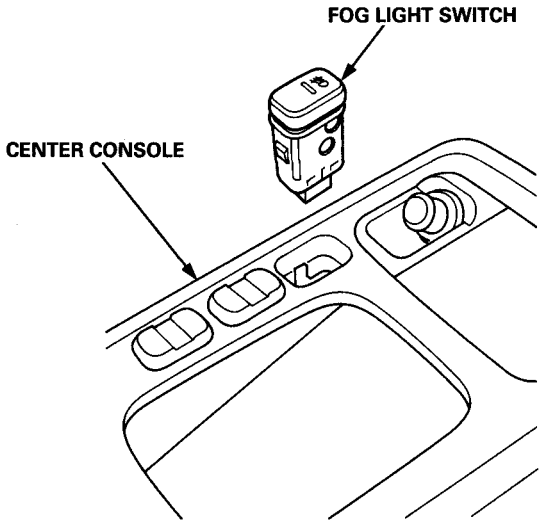
1. Remove the inner cover (Right front parking light), or pull out the coolant reservoir and washer filler neck (Left front parking light).
2. Disconnect the 2P connector from the light.
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



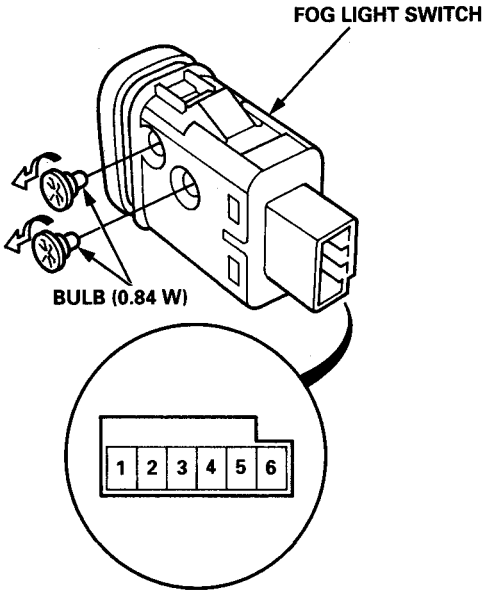
Fog Light

Switch Test/Replacement (With TCS)

1. Remove the center console.
2. Remove the fog light switch from the center console.

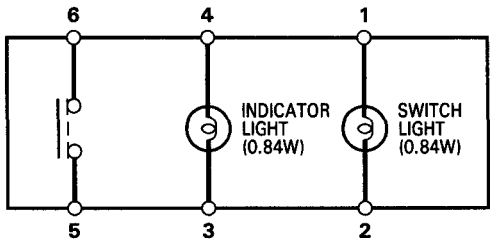


3. Check for continuity between the terminals in each switch position according to the table.



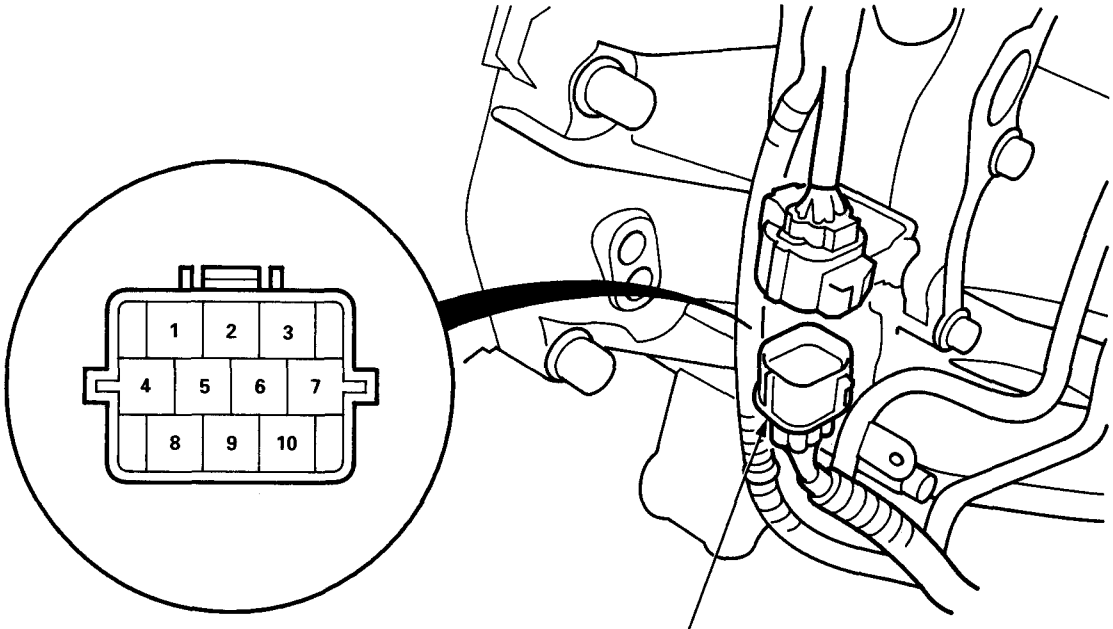
TERMINAL SIDE OF MALE TERMINALS

Terminal / Position	1		2	3		4	5	6
OFF	○	⊙	○	○	⊙	○		
ON	○	⊙	○	○	⊙	○	○	○



A/T Gear Position Switch Test

1. Raise the car, and remove the transmission splash shield (see section 14).
2. Disconnect the 10P connector from the A/T gear position switch.
3. Check for continuity between the terminals in each switch position according to the table.
   - Move the shift lever back and forth without pushing the shift lever at each switch position, and check for continuity within the range of free play of the shift lever.
   - If there is no continuity within the range of free play, adjust the position of the A/T gear position switch (see section 14).



A/T Gear Position Switch — **Neutral Position Switch**

Position \ Terminal	1	2	3	4	5	6	7	8	9	8	10
1							○	○			
2						○		○	○		
D3					○			○	○		
D4				○				○	○		
N			○					○		○	○
R		○						○			
P	○							○		○	○

Back-up Lights

Test

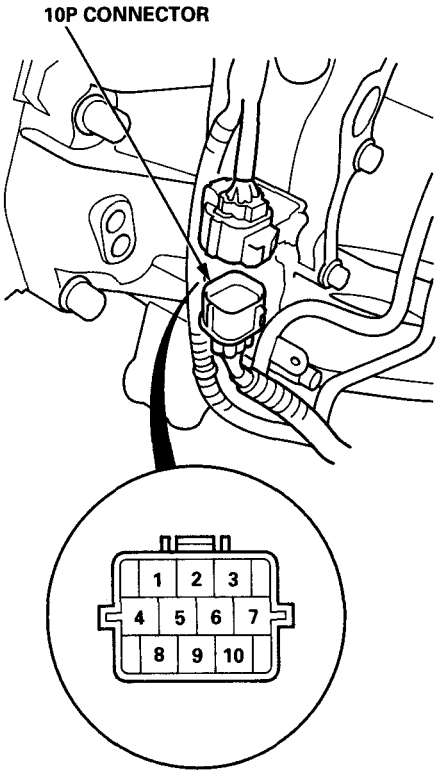
NOTE: Before testing, check the No. 1 (10 A) fuse in the under-dash fuse/relay box.

1. Check whether the back-up lights go on by turning the ignition switch ON (II) and shifting the shift lever to R.

   - If the back-up lights do not go on, check for:
     — blown bulb.
     — faulty A/T reverse relay,
     — poor ground (G301, G502).
     — an open in the wire.
   - If the back-up lights go on, go to step 2.

2. With the shift lever in position R, turn the ignition switch OFF.

3. Disconnect the 10P connector from the A/T gear position switch.



TERMINAL SIDE OF MALE TERMINALS

4. Check for continuity between the No. 2 and No. 8 terminals with the shift lever in position R.

   - If there is continuity, go to step 5.
   - If there is no continuity, replace the A/T gear position switch (see section 14).

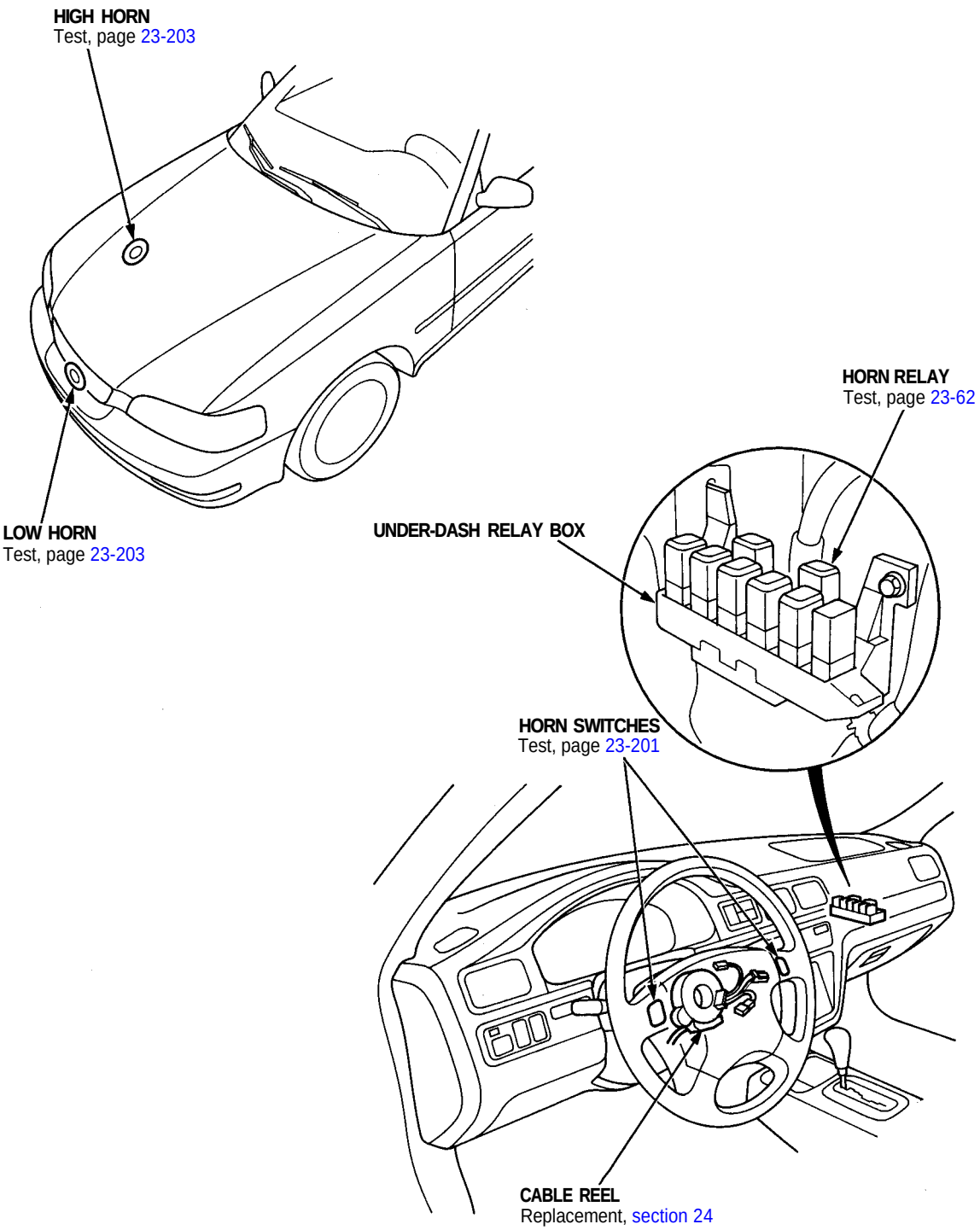
5. Move the shift lever back and forth at the R position, and check for continuity between the No. 2 and No. 8 terminals within the range of free play of the shift lever.

   - If there is no continuity, adjust the A/T gear position switch (see section 14).

Horns

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



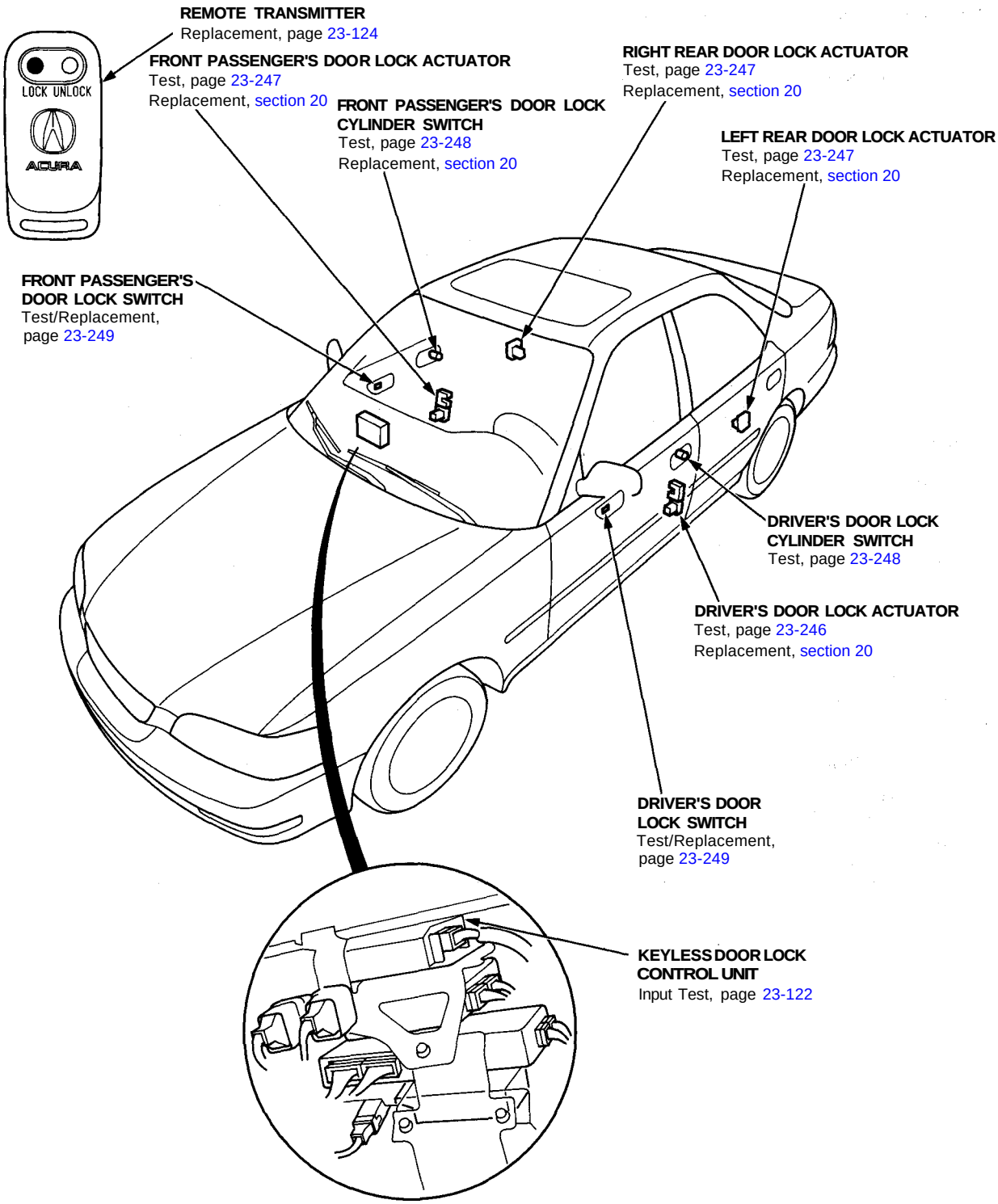
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 31 (120 A) fuse (In the under-hood fuse/relay box)	Blown No. 36 (40 A) fuse (In the under-hood fuse/relay box)	Blown No. 57 (15 A) fuse (In the under-hood fuse/relay box)	Power window relay	In the auxiliary fuse holder (5P)				Power window master switch	Passenger's switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Power window master switch input	Door switches	Key-off timer circuit (In the integrated control unit)	Poor ground	Open circuit in the wires, loose or disconnected terminals
						Blown No. 14 (20 A) fuse	Blown No. 15 (20 A) fuse	Blown No. 17 (20 A) fuse	Blown No. 16 (20 A) fuse											
All windows do not work.		1	2	3	4													5	G405	RED, WHT/GRN, GRN/BLK
Driver's window does not work.						1						2			3	4			G405	WHT/YEL
Driver's window does not work in AUTO.										1			2			3				BLU
Passenger's windows do not work.	Front passenger's						1			2	3			4	5					BLU/BLK
	Left rear								1	2	3			4	5					GRN/BLK
	Right rear							1		2	3			4	5					YEL/BLK
All windows do not work within 10 minutes after the ignition switch is OFF (neither front door opened)				1													2	3		

Power Door Locks

Component Location Index



Description

This door lock system has been adopted to improve convenience and safety. If you insert the key is the driver's door key cylinder, turn it to the unlock position, and then pull it out immediately, ONLY the driver's door will unlock. However, if you keep the key in the unlock position for one second or more, ALL doors will unlock.

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 44 (20 A) fuse (In the under-hood fuse/relay box)	Door lock knob switch (In the driver's door lock actuator)	Control unit input	Passenger's door lock actuators	Disconnected or obstructed door lock rod/linkage	Driver's door lock key cylinder switch	Front passenger's door lock key cylinder switch	Driver's door lock switch	Passenger's door lock switch	Ignition key switch	Dead batteries in remote transmitter	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system does not work at all.		1		2									G403	WHT
Doors do not lock or unlock with driver's door lock switch.	All doors			2					1				G405	GRN/WHT, GRN/RED
	One or more doors		1		2									WHT/RED, RED, YEL/RED
Doors do not lock or unlock with front passenger's door lock switch.	All doors			2						1			G403	BLK/WHT[2] BLK/RED[2]
	One or more doors		1		2									WHT/RED, RED, YEL/RED
The power door lock system works properly, but the keyless entry system does not.				2							3	1		
Doors do not lock with driver's door lock knob switch.	All passenger's doors		1	3		2							G405	BLU/WHT[1]
	One or more passenger's doors				1									YEL/RED, WHT/RED
Doors do not lock or unlock with front passenger's door lock key cylinder switch.	All doors			3		2		1					G403	GRY[1] GRN/YEL
	One or more doors				1									YEL/RED, WHT/RED
Doors do not lock or unlock with driver's door lock key cylinder switch.	All doors			3		2	1							GRN/BLK[2] GRY[1]
	One or more doors		1		2									WHT/RED, RED, YEL/RED

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

NOTE:

- When the remote transmitter button is pressed the first time, only the driver's door will unlock. When the button is pressed the second time, all the doors will unlock.
- The doors will relock automatically after 20 seconds if a door is not opened, or the key is out of the ignition switch.
- The keyless entry system will not lock the doors when the key is in the ignition switch.

Power Door Locks

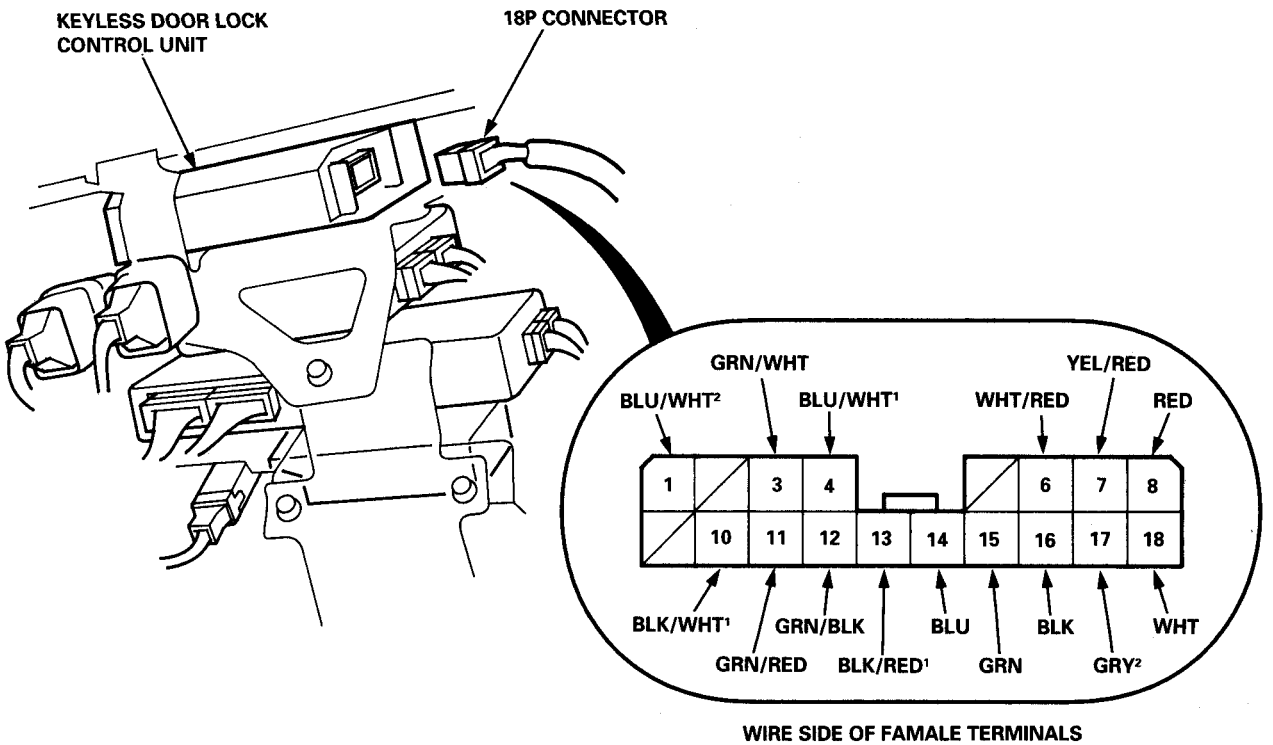
Control Unit Input Test

1. Remove the glove box (see section 20).

2. Disconnect the 18P connector from the control unit.

3. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
16	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G403) • An open in the wire
18	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 44 (20 A) fuse in the under-hood fuse/relay box. • An open in the wire
11	GRN/RED	Driver's door lock switch in UNLOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G405) • An open in the wire
3	GRN/WHT	Driver's door lock switch in LOCK		

Power Door Locks

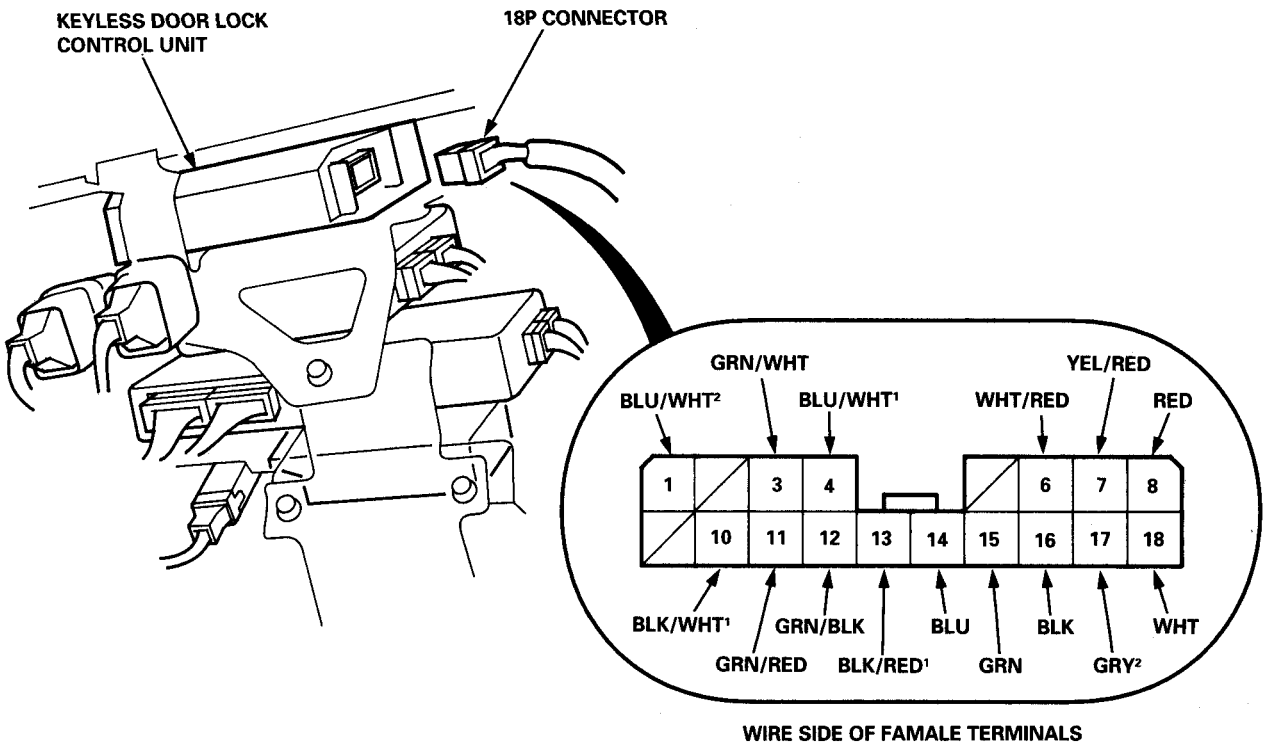
Control Unit Input Test

1. Remove the glove box (see section 20).

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   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
16	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G403) • An open in the wire
18	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 44 (20 A) fuse in the under-hood fuse/relay box. • An open in the wire
11	GRN/RED	Driver's door lock switch in UNLOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G405) • An open in the wire
3	GRN/WHT	Driver's door lock switch in LOCK		

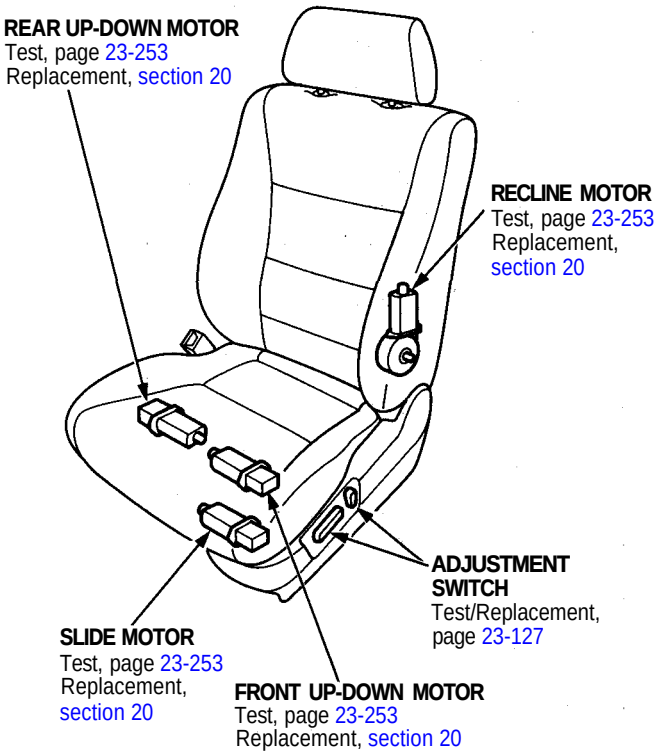
Remote Transmitter Replacement

Use the following procedure when replacing one or both remote transmitters:

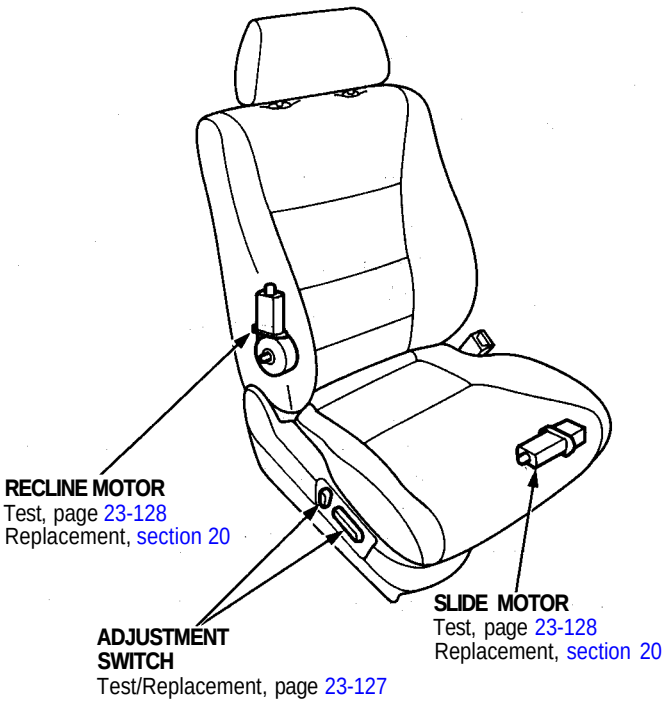
1. Open the driver's door.
2. Press and hold the driver's master door lock switch up in the UNLOCK position.
3. Quickly insert and remove the key from the ignition switch five times, then insert the key the sixth time, and leave it in the ignition switch.
   (This routine must be done within 10 seconds.)
   All the doors will lock and unlock to indicate that the control unit is in the program mode.
4. Press either button on the replacement transmitter. All the doors except the driver's door will lock and unlock to indicate that the control unit has accepted the transmitter into its memory. If either transmitter button is pressed again, all the doors will lock and unlock.
5. To program a second transmitter, press either button on that transmitter. The doors should lock and unlock as described in step 4.
6. Release the driver's master door lock switch.
7. To exit the program mode, close the driver's door or remove the key from the ignition switch.

Component Location Index

Driver's Power Seat:
(8-way adjustable)



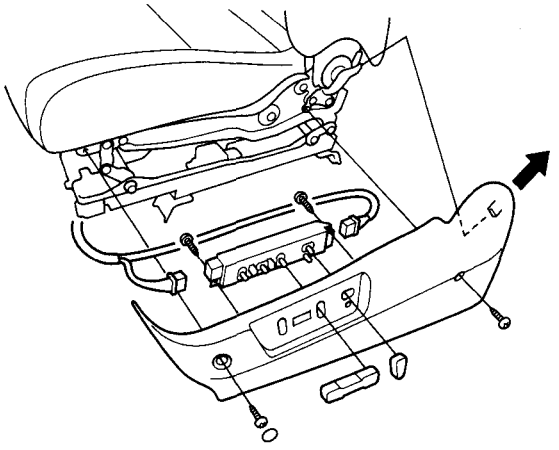
Front Passenger's Power Seat:
(4-way adjustable)



Switch Test/Replacement

1. Remove the adjustment switch cover from the driver's seat by removing the two screws, and pulling off the adjustment switch knobs.

   NOTE: The illustration shows the driver's power seat adjustment switch; the front passenger's power seat adjustment switch is symmetrical.



2. Disconnect the 8P connectors from the adjustment switch, then remove the switch from the cover by removing its two mounting screws.

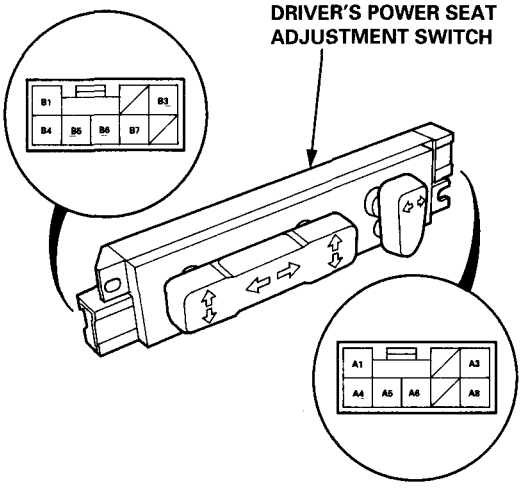
3. Check for continuity between the terminals in each switch position according to the table.

Driver's Adjustment Switch:

Position \ Terminal		A1	A3	A4	A5	A6	A8	B1	B3	B4	B5	B6	B7
SLIDE SWITCH	FORWARD							○	○	○			○
	BACKWARD							○	○	○			○
RECLINE SWITCH	FORWARD			○		○	○						
	BACKWARD			○	○		○						
FRONT UP-DOWN SWITCH	UP									○	○	○	
	DOWN									○	○	○	○
REAR UP-DOWN SWITCH	UP	○	○	○			○						
	DOWN	○	○	○			○						

TERMINAL SIDE OF MALE TERMINALS

DRIVER'S POWER SEAT ADJUSTMENT SWITCH



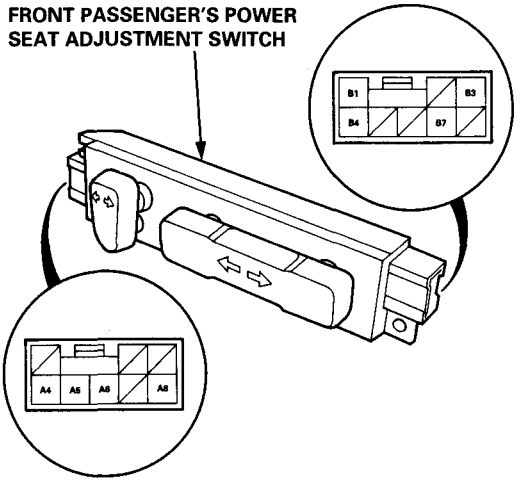
TERMINAL SIDE OF MALE TERMINALS

Front Passenger's Adjustment Switch:

Position \ Terinal		A4	A5	A6	B1	B3	B7	A8	B4
SLIDE SWITCH	FORWARD				○	○	○		○
	BACKWARD				○	○	○		○
RECLINE SWITCH	FORWARD	○	○	○				○	
	BACKWARD	○		○				○	

TERMINAL SIDE OF MALE TERMINALS

FRONT PASSENGER'S POWER SEAT ADJUSTMENT SWITCH



TERMINAL SIDE OF MALE TERMINALS

Power Seats

Motor Test

CAUTION: Be careful not to damage the seat, interior trim or body.

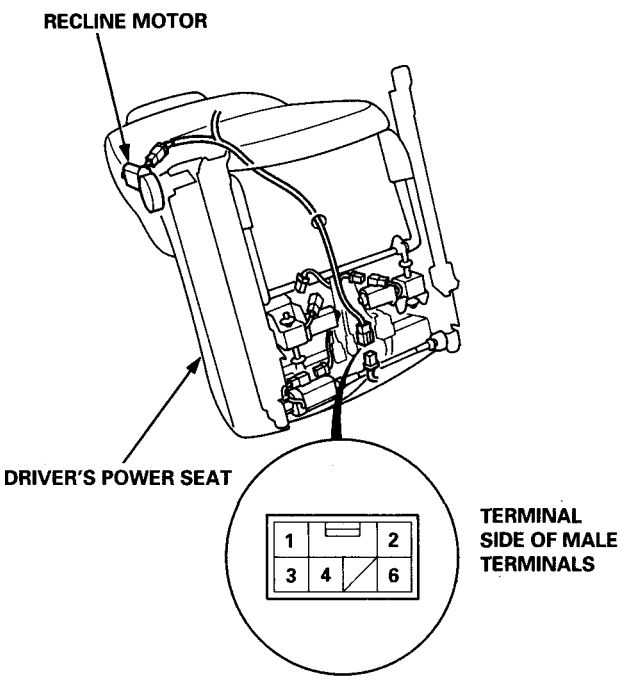
1. Remove the driver's seat (see section 20).
2. Disconnect the 2P connectors from the power seat motors.
3. Test the motors:

NOTE: Refer to page 23-253 in the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.

Driver's seat (With seat heater):

Position \ Terminal		1	2
RECLINE MOTOR	FOR-WARD	⊕	⊖
	BACK-WARD	⊖	⊕

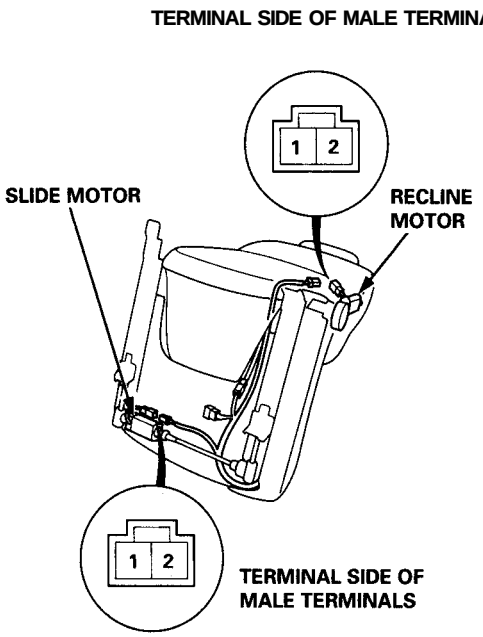
CAUTION: When a motor stops running, disconnect battery power immediately.



Front passenger's seat:

Position \ Terminal		1	2
SLIDE MOTOR	FOR-WARD	⊕	⊖
	BACK-WARD	⊖	⊕
RECLINE MOTOR	FOR-WARD	⊕	⊖
	BACK-WARD	⊖	⊕

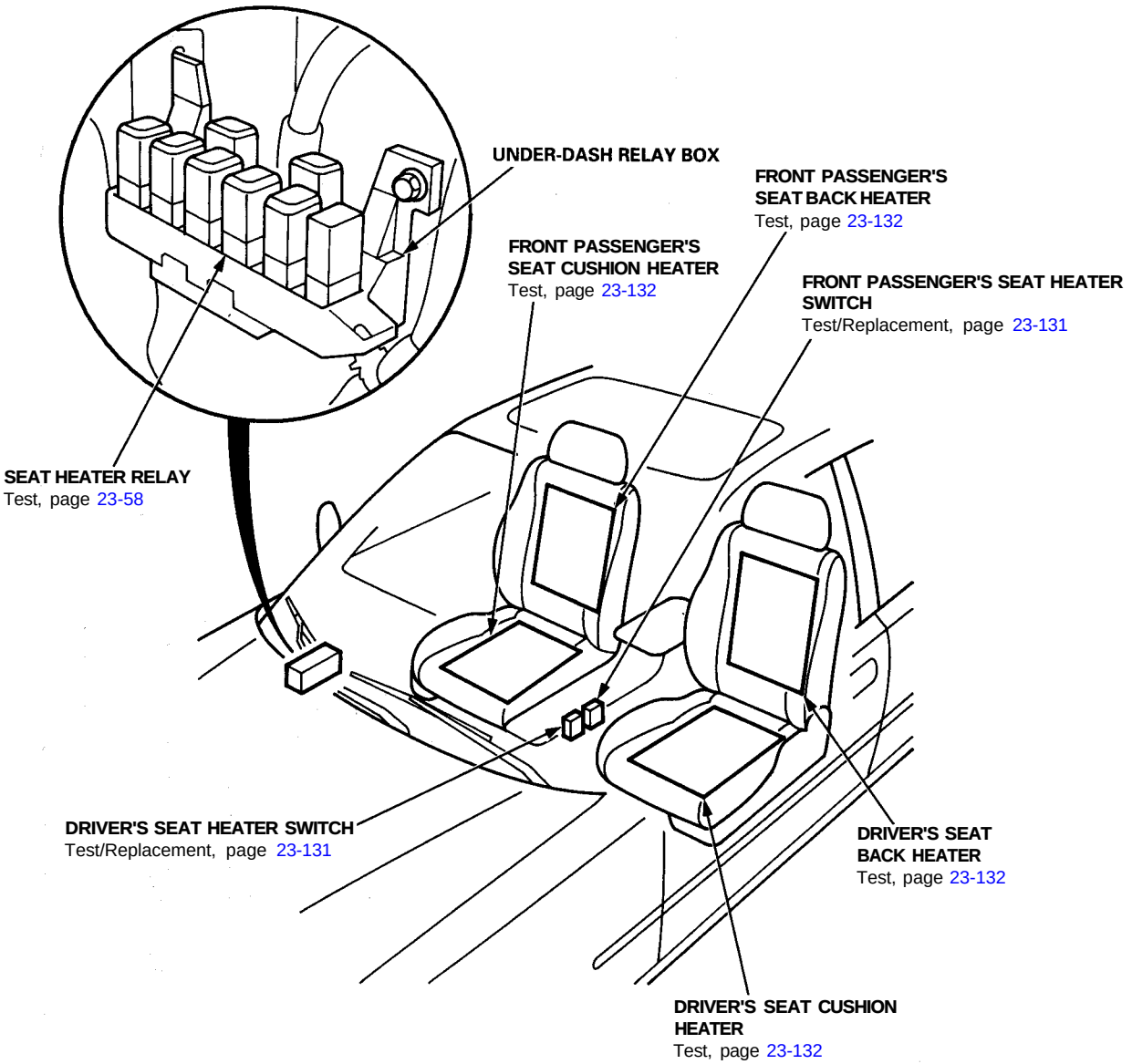
CAUTION: When a motor stops running, disconnect battery power immediately.



4. If the motor does not run or fails to run smoothly, replace it (see section 20).

Seat Heaters

Component Location Index



Description

Two heaters are provided in each front seat; one in the seat cushion and another in the seat back. In normal use, temperature is automatically controlled by the thermostat [OFF above 104°F (40°C)1 built into each seat cushion heater. Breaker [OFF 104°F (40°C)] cut off the circuit to prevent abnormal temperature rise.

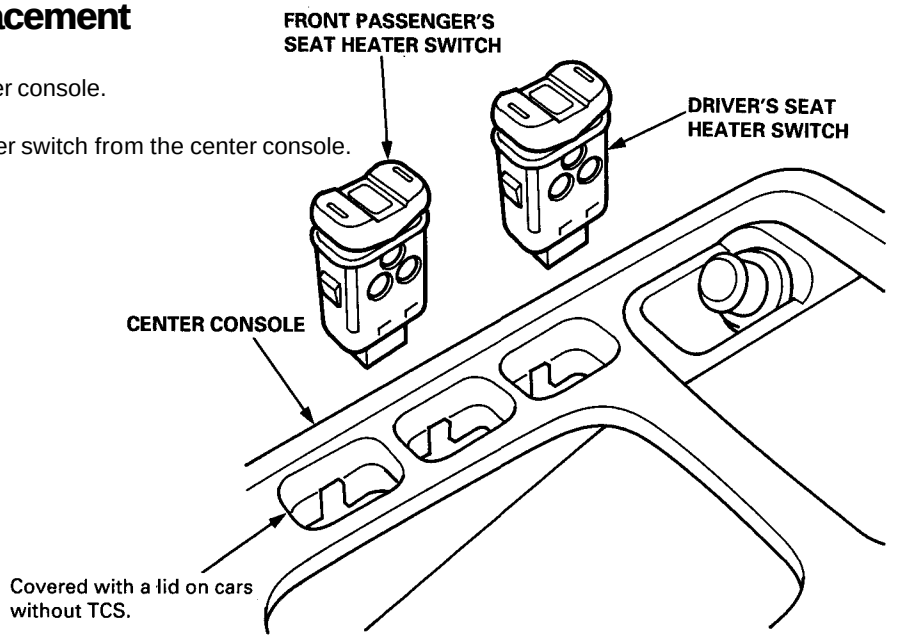
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 54 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 8 (7.5 A) fuse (In the under-dash fuse/relay box)	Blown indicator light bulb	Seat heater switch	Seat heater	Seat heater relay	Poor ground	Open circuit in wires, loose or disconnected terminals
Seat heaters work, but indicator light does not go on.				1					BLK
Seat heaters do not work and indicator light does not go on.		1			2		3	G203 G401 G403 G404 G501	YEL/BLK, RED/GRN, GRN/YEL[1]
Seat heaters do not work, but indicator light does on.	Driver's or front passenger's seat					1			WHT/BLK[1], WHT/BLK[2], WHT/BLU, GRN/YEL[2]
Seat cushion heater or seat back heater does not work, but indicator light goes on.						1			

Switch Replacement

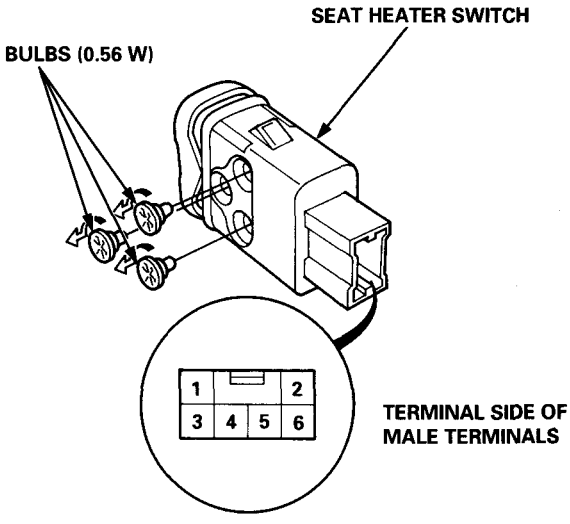
1. Remove the center console.
2. Remove the heater switch from the center console.



Seat Heaters

Switch Test

1. Remove the switch from the center console.



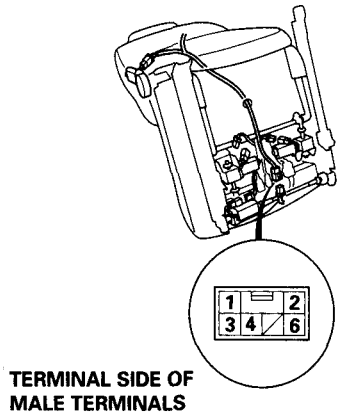
2. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		1		2	3		6	4	5
ON	HIGH	○	⊖	○	○	⊖	○	○	○
	LOW	○	⊖	○	○	⊖	○		○
OFF		○	⊖	○					

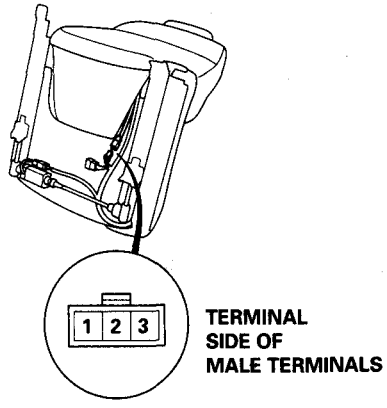
Heater Test

1. Disconnect the 6P (Driver's seat) or 3P (Front passenger's seat) connector as shown below.

Driver's seat:



Front passenger's seat:

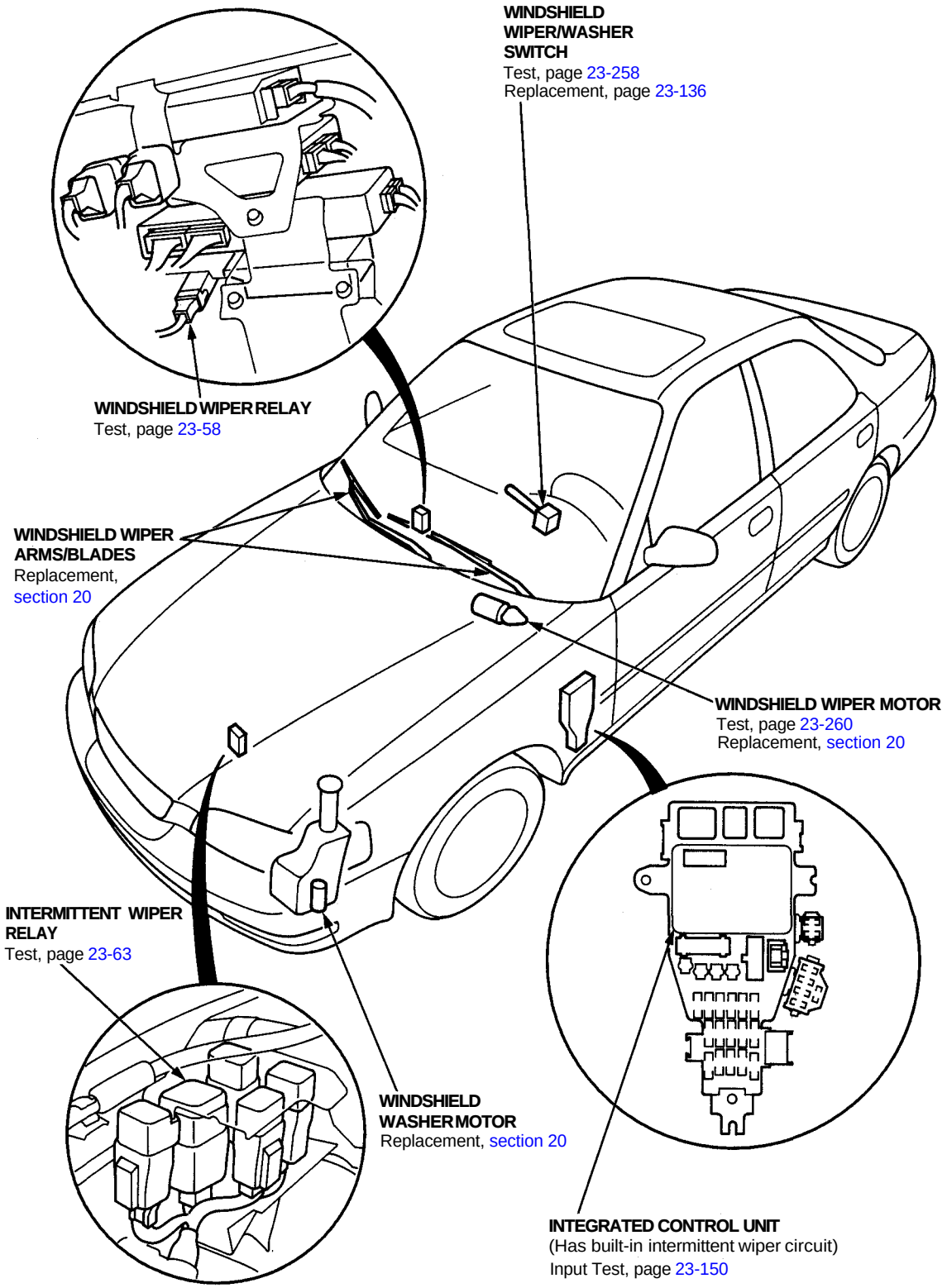


2. Check for continuity between the No. 3 and No. 4 (Driver's seat) or No. 2 (Front passenger's seat) terminals.
There should be continuity.

Wiper/Washer

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

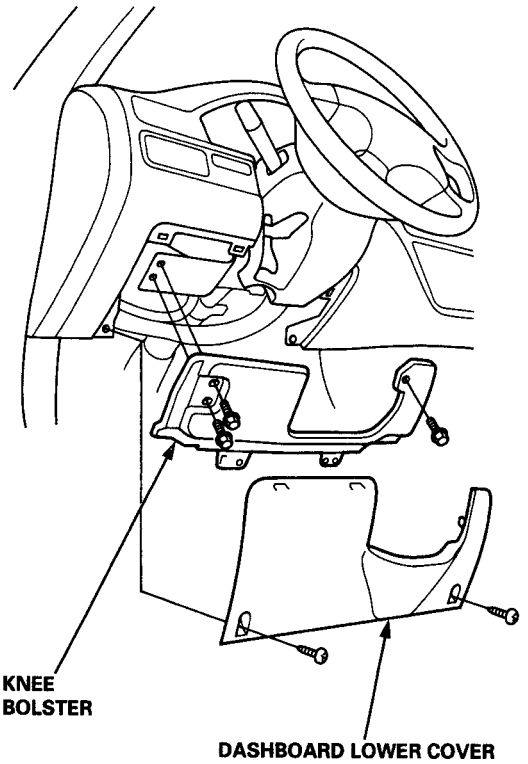
Symptom \ Item to be inspected		Blown No. 5 (7.5 A) fuse (In the under-dash fuse/relay box)	Blown No. 18 (30 A) fuse (In the auxiliary fuse holder 5P)	Windshield wiper relay	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	Intermittent wiper relay	Combined operation of wiper/washer (In the integrated control unit)	Not enough washer fluid in reservoir	Disconnected or blocked washer hose or clogged outlet	Disconnected wiper linkage	Poor ground	Open circuit, loose or disconnected terminals
Wipers do not work.	In all positions	1	2	3	5		2							4		GRN/BLK or WHT
	In INT				1		3			2					G405	GRN or BLU/WHT
	In LO or HI				1		2									BLU/YEL[1] or BLU
	In MIST					1	2									BLU/YEL[1]
Blades do not return to park position when wipers are turned OFF.					2		1									BLU/WHT
Erratic intermittent cycle or wipers do not work in INT.										1	2				G301	GRN/BLK, GRN, BLU/WHT or BLU/YEL[2]
Little or no washer fluid is pumped.								4	3			1	2		G301	BLK/YEL
Wipers and washer do not work at the same time.											1					BLK/YEL

Wiper/Washer

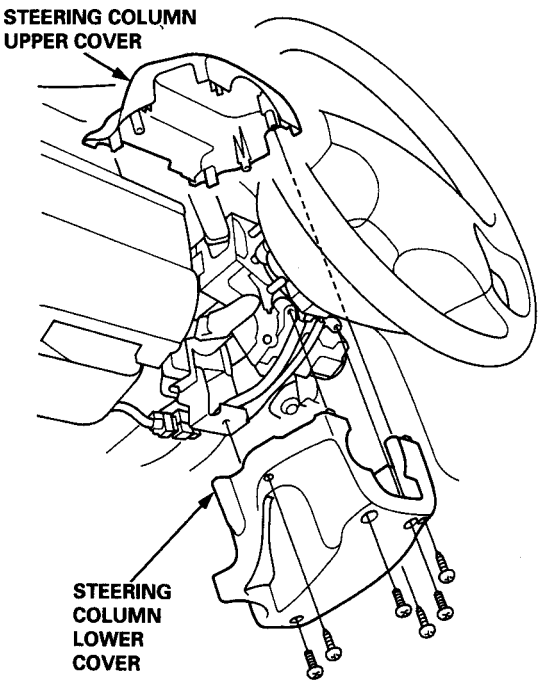
Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

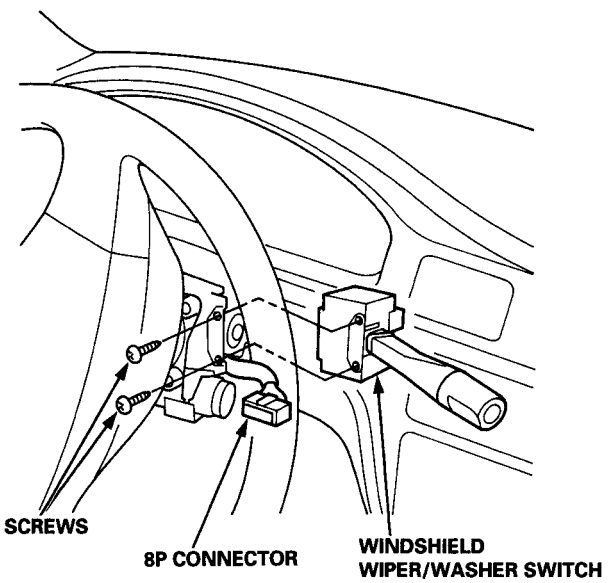
1. Remove the dashboard lower cover and knee bolster.



2. Remove the steering column covers.



3. Remove the two screws and the switch.



4. Install in the reverse order of removal.

NOTE: On TCS cars, check the position of the TCS 3P connector harness (see section 17).

Troubleshooting

NOTE:
- The numbers in the table show the troubleshooting sequence.
- Before troubleshooting,
  - — Check the No. 1 (10 A) and the No. 4 (15 A)*1 or (20 A)*2 fuses in the under-dash fuse/relay box, and the No. 31 (120 A), No. 35 (50 A), and the No. 30 (20 A) fuses in the under-hood fuse/relay box.
  - — Check that the horns sound.
  - — Check the tachometer to see if it works properly.

*1: '96 model
*2: '97 – 98 models

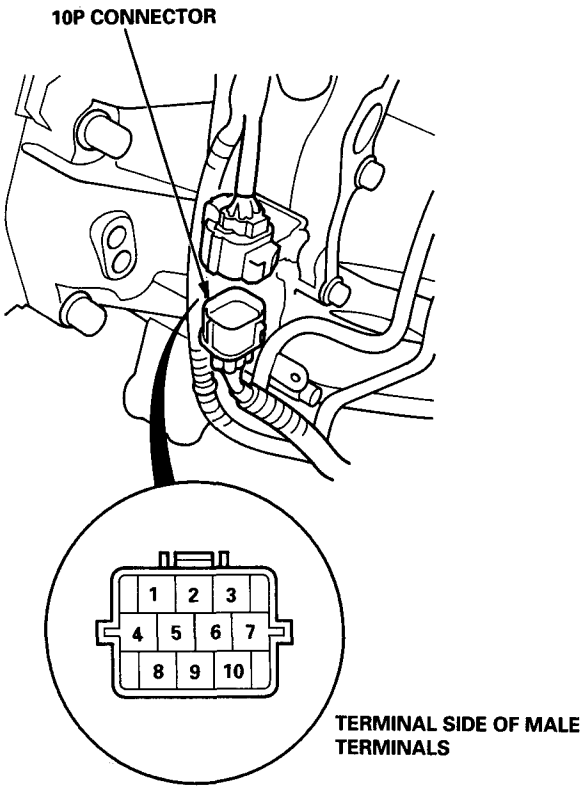
Symptom \ Item to be inspected	Main switch	SET/RESUME/CANCEL switch	Brake switch and mounting	A/T gear position switch	Vehicle speed sensor (VSS)	Dimming circuit in gauges	Actuator and cable deflection	Control unit	Poor ground	Open circuit in wires, loose or disconnected terminals
Cruise control cannot be set.	2	3	4	5				1	G203 G401 G404	BLU/RED, LT GRN/RED, BLK/YEL, LT GRN, GRY, ORN, BRN, BRN/BLK, BRN/WHT or PNK
Cruise control can be set, but indicator light does not go on.						2		1	G203 G401 G404	YEL or BLU/BLK
Cruise speed is noticeably higher or lower than what was set.					1		2	3		
Excessive overshooting and/or undershooting when trying to set speed.					2		1	3		
Steady speed not held, even on a flat road with cruise control set.					1		2	3		
Car does not decelerate or accelerate accordingly when SET or RESUME button is pushed.		1						2		LT GRN/BLK LT GRN/RED
Set speed not cancelled when shift lever is moved to [N].				1				2		
Set speed not cancelled when brake pedal is pushed.			1					2		
Set speed not cancelled when main switch is pushed OFF.	1							2		
Set speed not resumed when RESUME button is pushed (with main switch on, but set speed temporarily cancelled).		1						2		LT GRN/BLK LT GRN/RED

Cruise Control

A/T Gear Position Switch Test

1. Disconnect the 10P connector from the A/T gear position switch.
2. Check for continuity between the terminals in each position according to the table and confirm that there is continuity only in positions 2, D3, and D4.

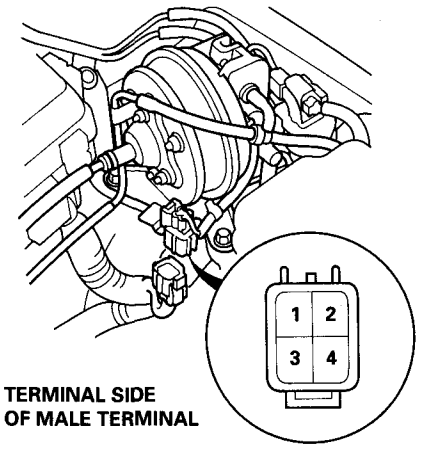
Position \ Terminal	8	9
1		
2	○——	——○
D3	○——	——○
D4	○——	——○
N		
R		
P		



3. If necessary, replace the A/T gear position switch.

Actuator Solenoid Test

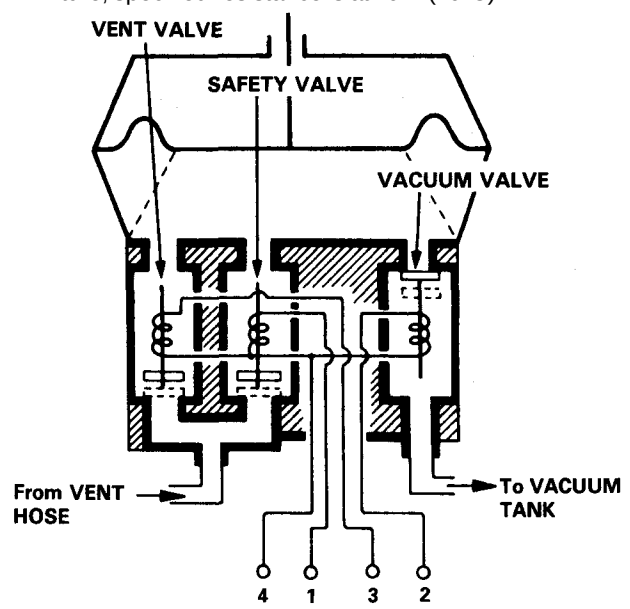
1. Disconnect the 4P connector from the actuator.



2. Check for resistance between the terminals according to the table.

Resistance (Ω) \ Terminal	1	2	3	4
VENT SOLENOID 40 – 60Ω			○——	——○
VACUUM SOLENOID 30 – 50Ω		○——		——○
SAFETY SOLENOID 40 – 60Ω	○——			——○

NOTE: Resistance will vary slightly with temperature; specified resistance is at 70°F (20°C).

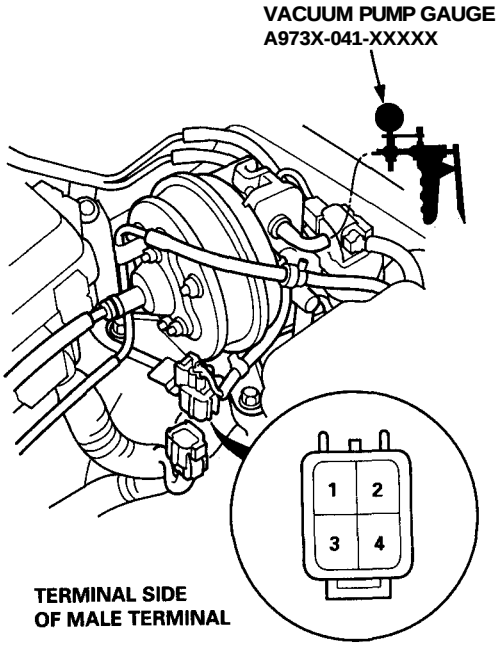


Actuator Test

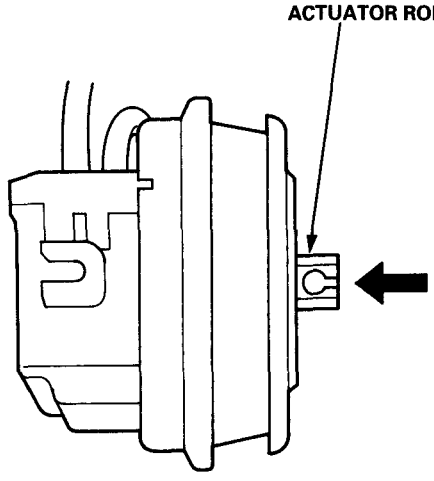
1. Disconnect the actuator cable from the actuator rod, and disconnect the 4P connector.

2. Connect battery power to the No. 4 terminal and ground to the No. 1, No. 2, and No. 3 terminals.

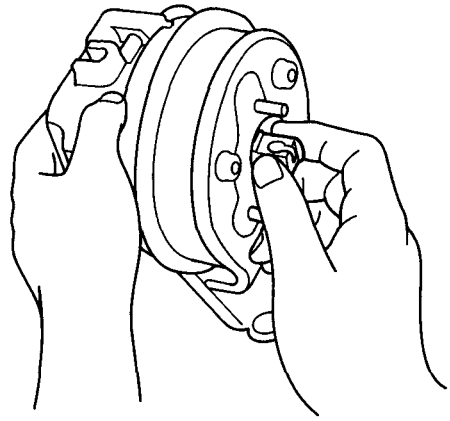
3. Connect a vacuum pump to the check valve. Then apply vacuum to the actuator.



4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.



5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it out. If you can, it is defective.



6. Disconnect ground from the No. 3 terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.

7. Repeat steps 2 through 5, and disconnect ground from the No. 1 terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.

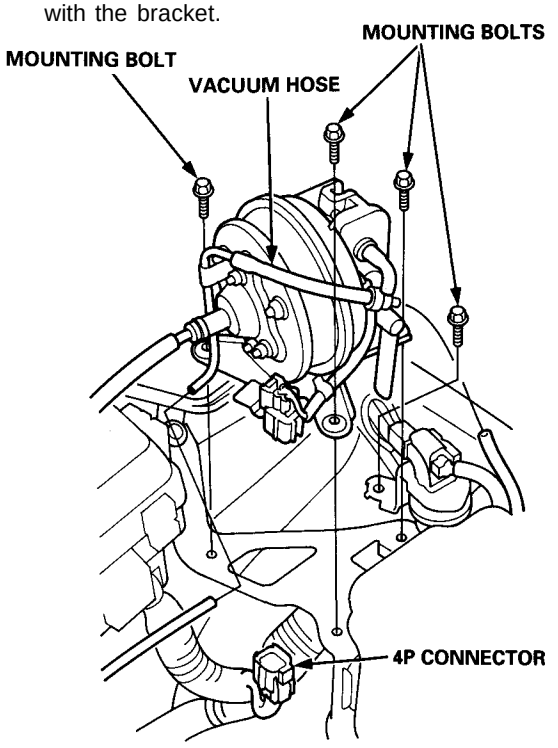
8. If you replace the solenoid valve assembly, be sure to use new O-rings on each solenoid.

Cruise Control

Actuator/Cable Replacement

1. Disconnect the 4P connector from the actuator.

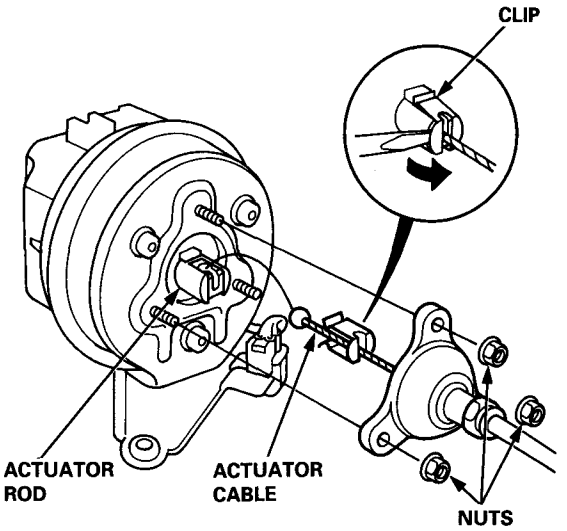
2. Remove the four mounting bolts and the actuator with the bracket.



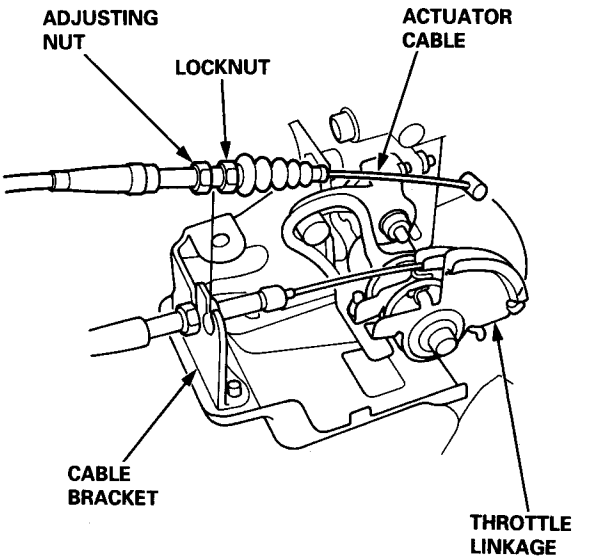
3. Remove the vacuum hose.

4. Remove the three nuts.

5. Disconnect the actuator cable from the actuator rod by releasing the clip from the rod with a screwdriver as shown.

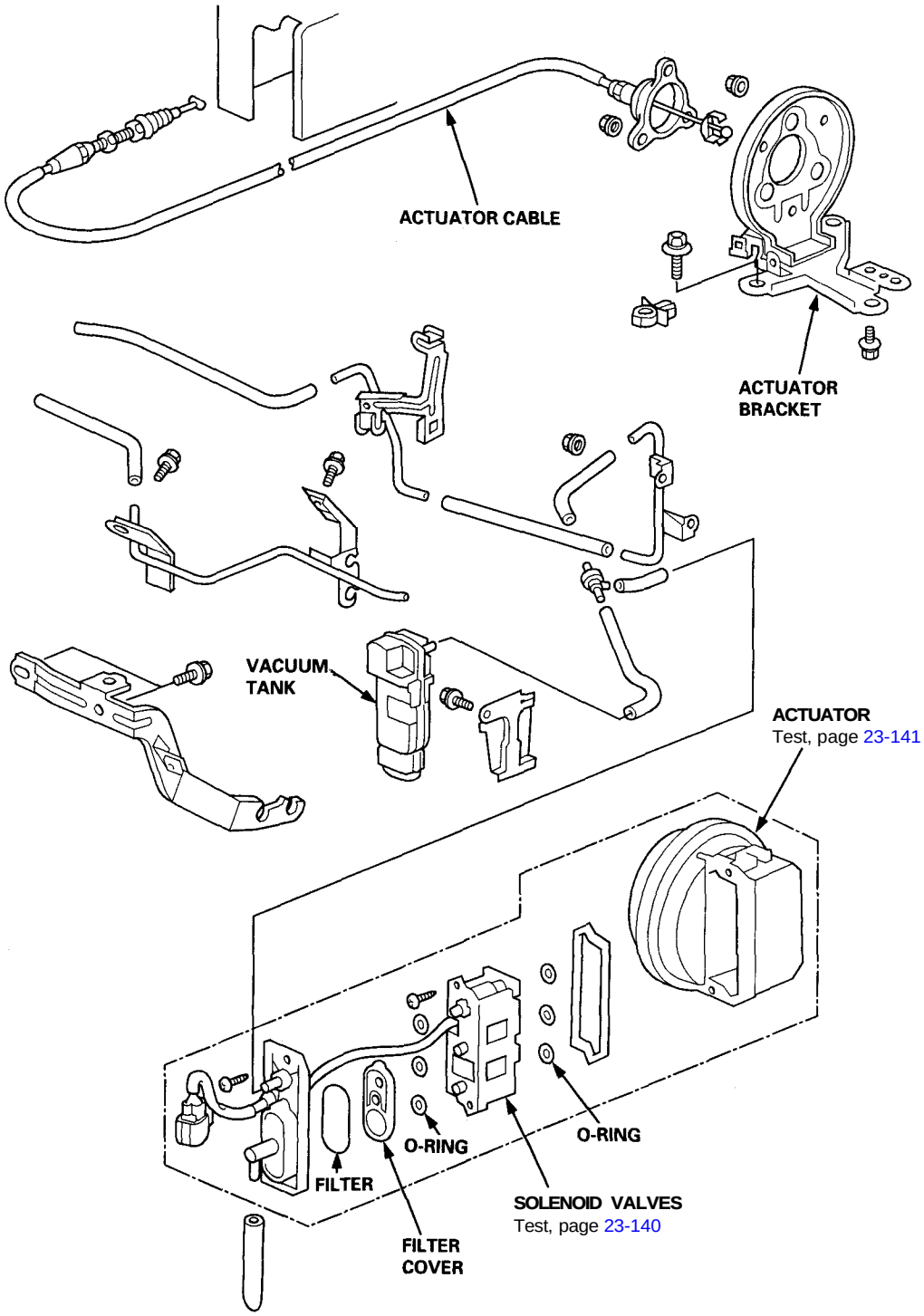


6. Loosen the locknut, then disconnect the actuator cable from the throttle linkage.



7. Install in the reverse order of removal, and adjust free play at the throttle linkage after connecting the actuator cable.

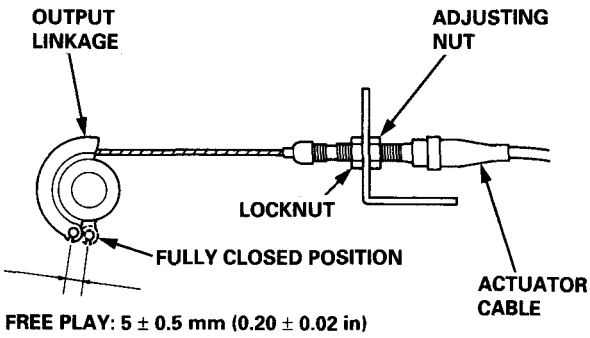
Actuator Disassembly



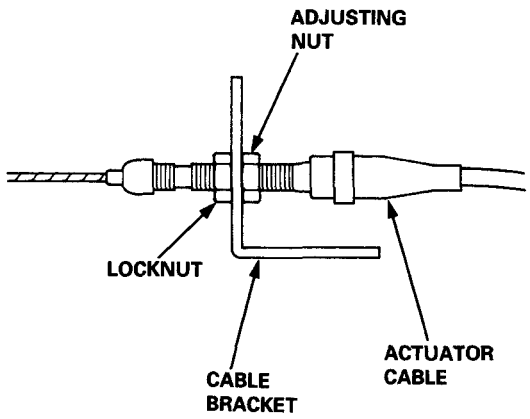
Cruise Control

Actuator Cable Adjustment

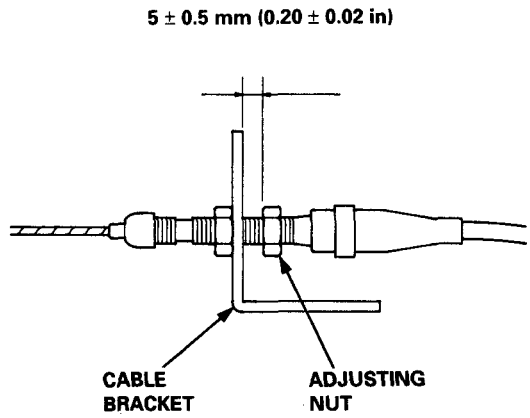
1. Check that the actuator cable moves smoothly with no binding or sticking.
2. Start the engine. Hold the engine at 3,000 rpm with no load (N or P position) until the radiator fan comes on, then let it idle.
3. Measure the amount of movement of the output linkage until the engine speed starts to increase. At first, the output linkage should be located at the fully closed position. Free play should be 5 ± 0.5 mm (0.20 ± 0.02 in).



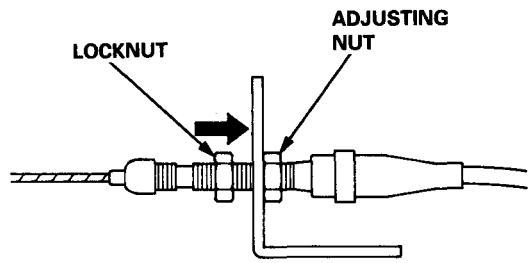
4. If the free play is not within specs, move the cable to the point where the engine speed starts to increase, and tighten the locknut and adjusting nut.



5. Turn the adjusting nut until it is 5 ± 0.5 mm (0.20 ± 0.02 in) away from the bracket.



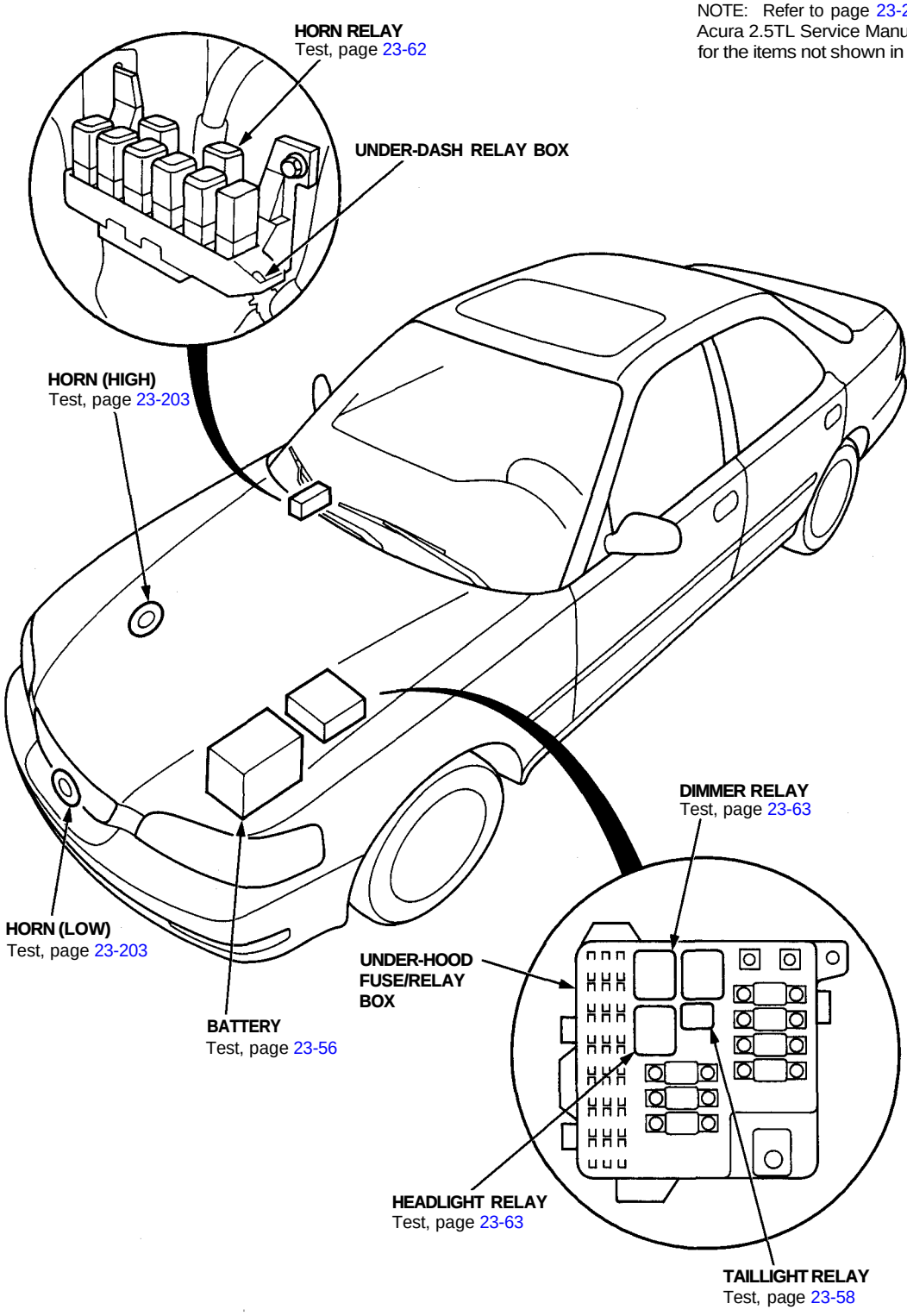
6. Pull the cable so that the adjusting nut touches the bracket, and tighten the locknut.



Security Alarm System

Component Location Index

NOTE: Refer to page 23-274 of the '95-98 Acura 2.5TL Service Manual, P/N 61SW504, for the items not shown in this sub-section.



Security Alarm System

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 39 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 4 (15 A)*1 or (20 A)*2 fuse (In the under-dash fuse/relay box)	Faulty indicator light (LED)	Horn circuit	Starting system	A/T gear position switch	Lighting system	Door lock cylinder	Ignition key switch	Security trunk lock cylinder switch	Security trunk latch switch	Hood switch	Door switch	Security control unit input	Poor ground	Open circuit in wires, loose or disconnected terminals
Security alarm can't be set (and indicator light does not flash).		1	2	3						4						G203 G401 G404	WHT/YEL, BLK/YEL, GRN[1] or BLU/WHT[1]
Starting system does not operate.						1	2								3		BLK/GRN, YEL/GRN or GRY[2]
Security alarm can be set, but alarm does not operate when the trunk, hood or either door is unlocked without the key.	Horn alarm	1			2										3	G301	WHT/YEL, BLU/RED, or WHT/BLU
	Headlight alarm							1							2		BLU/GRN[2] or RED/WHT
	Both alarms														1		
Alarm not cancelled when the door is opened with the key.									1						2	G403 G405	BLK/RED, GRN/YEL[2], GRN/BLK, or BLU/YEL
Alarm not cancelled when the key is inserted in the ignition switch.			1							2					3	G203 G401 G404	BLK/YEL or BLU/WHT
Alarm not cancelled when the trunk lid is opened with the key.											1	2			3	G501	GRN/ORN or BLU/GRN
Alarm does not operate when the hood is opened.													1		2	G301	YEL/RED
Alarm does not operate when the door is opened.														1	2		GRN/YEL[1], GRN/WHT, GRN/BLU or GRN/RED

*1: '96 model
*2: '97 – 98 models

Control Unit Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

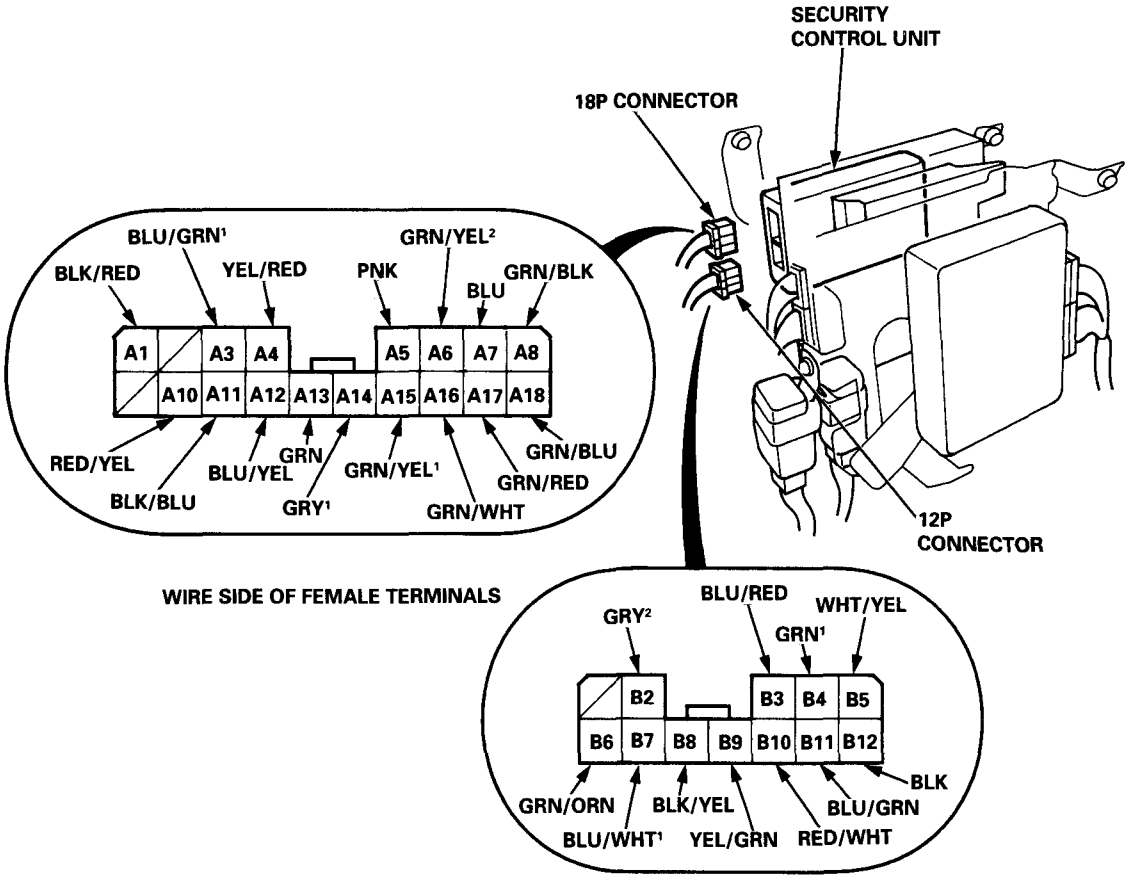
1. Remove the glove box (see section 20).

2. Disconnect the 12P and 18P connectors from the security control unit.

3. Inspect the connector and socket terminals to be sure they are all making good contact.

   If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   If the terminals look OK, make the following input tests at the connector terminals.
   — If any test indicates a problem, find and correct the cause, then recheck the system.
   — If all the input tests prove OK, the control unit must be faulty; replace it.

   NOTE: For the other input tests not included in the table below, refer to the '95 - 98 Acura 2.5TL Service Manual, P/N 61SW504.

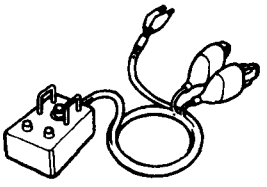


Trml	Wire	Test condition	Test: desired result	Possible cause if result is not obtained
A13	GRN	Remove the ignition key. Close the all door, hood and trunk lid. All door lock knob in lock.	Connect the GRN terminal to ground: security indicator should start flashing. While the security indicator is flashing, connect the BLU terminal to ground: security indicator should go off.	• Faulty keyless door lock control unit • An open in the wire
A7	BLU			

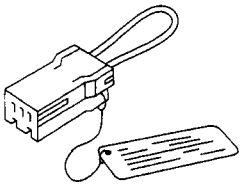
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①*1	07HAZ - SG00400	Deployment Tool	1	24-50
②	07MAZ-SP0020A	SRS Service Connector	1	24-29
③*1	07PAZ-0010100	SCS Service Connector	1	24-14
④	07SAZ - SW50200	SRS Service Connector	1	24-22
⑤	07TAZ - SZ50200	SRS Service Connector (2 Ω)	1	24-21
⑥*2	07TAZ-001020A	Backprobe Adapter, 17 mm	2	24-39

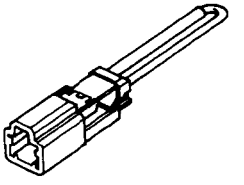
*1: Included in SRS Tool Set 07MAZ - SM5000B
*2: Use with the stacking patch cords from T/N 07SAZ-001000A, Backprobe Set.



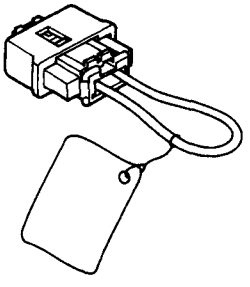
①



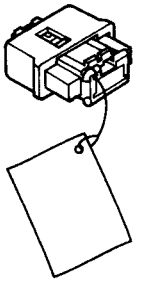
②



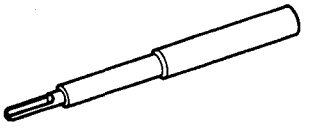
③



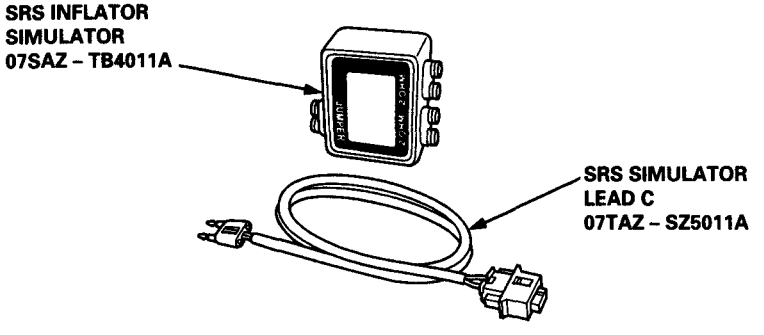
④



⑤



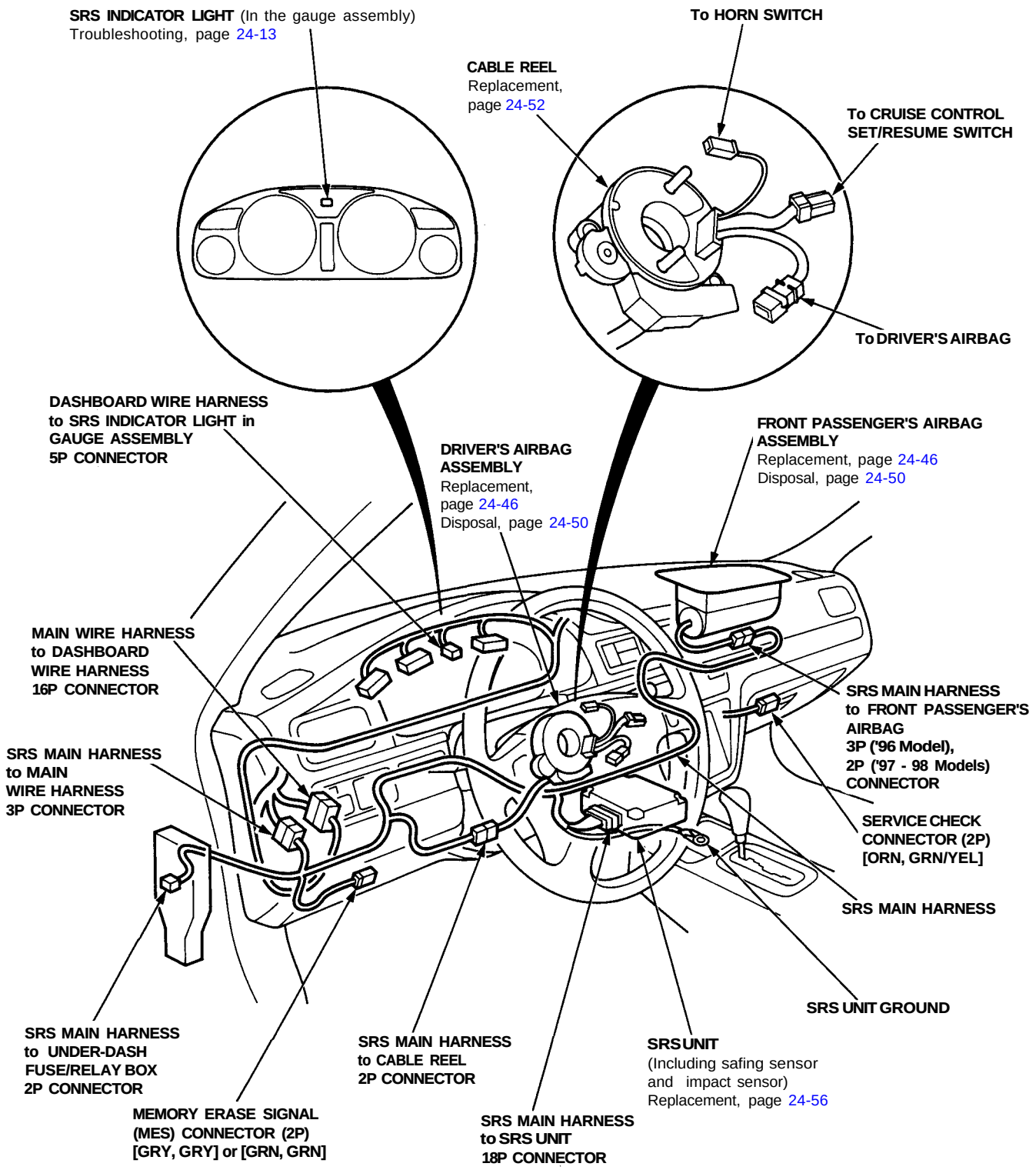
⑥



NOTE: The SRS Service Connector, T/N 07SAZ - SW50200, and the SRS Service Connector (2 Ω), T/N 07TAZ - SZ50200, are not available. Instead, use the SRS Inflator Simulator, T/N 07SAZ-TB4011A, and the SRS Simulator Lead C, T/N 07TAZ - SZ5011A. When the SRS Service Connector, T/N 07SAZ - SW50200, is called for, connect the lead to the Simulator's "Jumper" jack. When the SRS Service Connector (2 Ω), T/N 07TAZ - SZ50200, is called for, connect the lead to one of the simulator's "2 Ω" jacks.

Component/Wiring Locations

Index

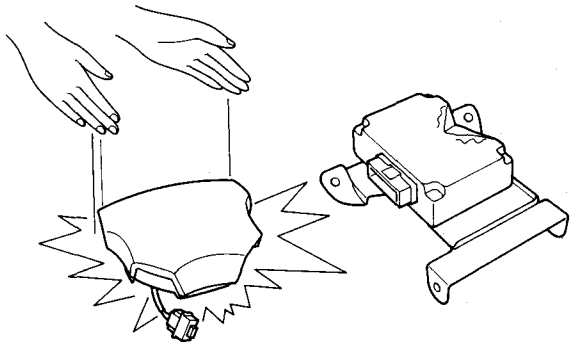


Precautions/Procedures

General Precautions

- Carefully inspect any SRS part before you install it. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:

  — Airbag assemblies
  — Cable reel
  — SRS unit



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.

- Do not install used SRS parts from another vehicle. When making SRS repairs, use only new parts.

- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery, and wait at least three minutes before beginning work.

- Replacement of the combination light and wiper/washer switches and cruise control switch can be done without removing the steering wheel:

  — For combination light and wiper/washer switch replacement, see section 23.
  — For cruise control set/resume switch replacement, see section 23.

- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injury.

- Whenever the airbag has been activated, replace the SRS unit.

- The original radio has a coded theft protection circuit. Be sure to get the customer's code number before disconnecting the battery cables.

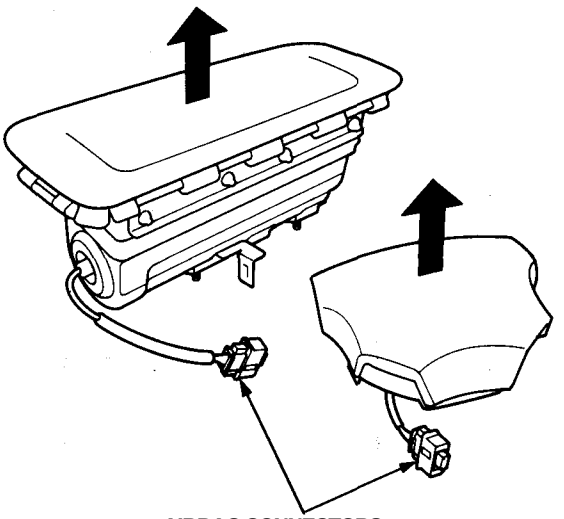
Airbag Handling and Storage

Do not try to disassemble the airbag assembly. It has no serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.

For temporary storage of the airbag assembly during service, please observe the following precautions:

- Store the removed airbag assembly with the pad surface up. On a '96 model, make sure you connect the short connector (RED) to the passenger's airbag connector. The driver's airbag connector on a '96 model and both airbag connectors on a '97 - 98 models have built-in short contacts (see page 24-10).

⚠ WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.



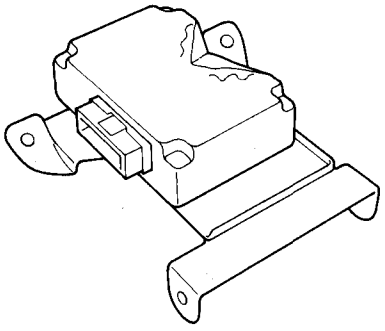
AIRBAG CONNECTORS
(with built-in short contact)

- Store the removed airbag assembly on a secure flat surface away from any high heat source (exceeding 212°F/100°C) and free of any oil, grease, detergent or water.

CAUTION: Improper handling or storage can internally damage the airbag assembly, making it inoperative. If you suspect the airbag assembly has been damaged, install a new unit, and refer to the Deployment/Disposal Procedures for disposing of the damaged airbag.

SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding, or spraying equipment.
- Disconnect the airbag connectors before disconnecting SRS harness connectors (see page 24-11). On a '96 model, connect the short connector to the front passenger's airbag connector.
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 104°F/40°C) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it away from dust.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbags could accidentally deploy and cause damage or injury.

Inspection After Deployment

After a collision in which the airbags were deployed, replace the SRS unit, and inspect the following:

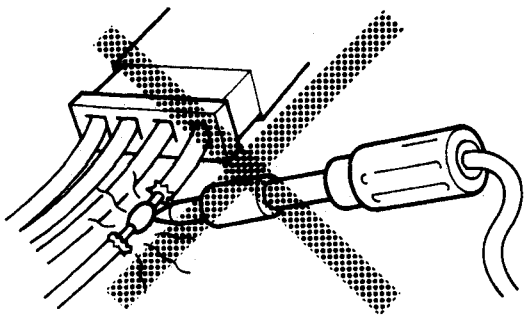
1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the vehicle is completely repaired, turn the ignition switch on. If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.

Precautions/Procedures

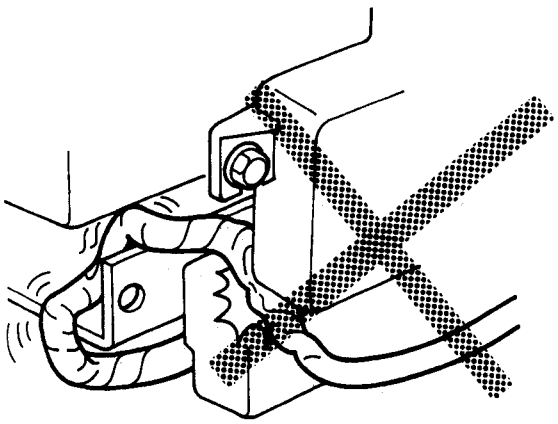
Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring.

  NOTE: SRS wiring can be identified by special yellow outer covering.



- Be sure to install the harness wires so that they are not pinched or interfering with other parts.

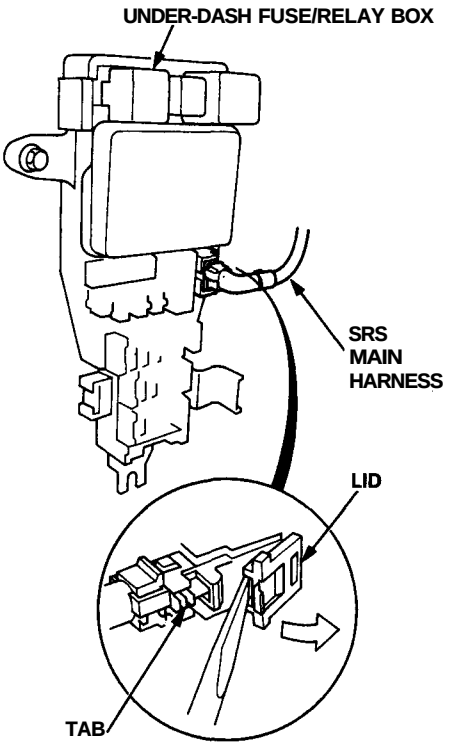


- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

Disconnecting the SRS Connector at the Under-dash Fuse/Relay Box:

CAUTION: Avoid breaking the connector; it's double-locked.

1. First lift the connector lid with a thin screwdriver, then press the connector tab down, and pull the connector out.



2. To reinstall the connector, push it into position until it clicks, then close its lid.

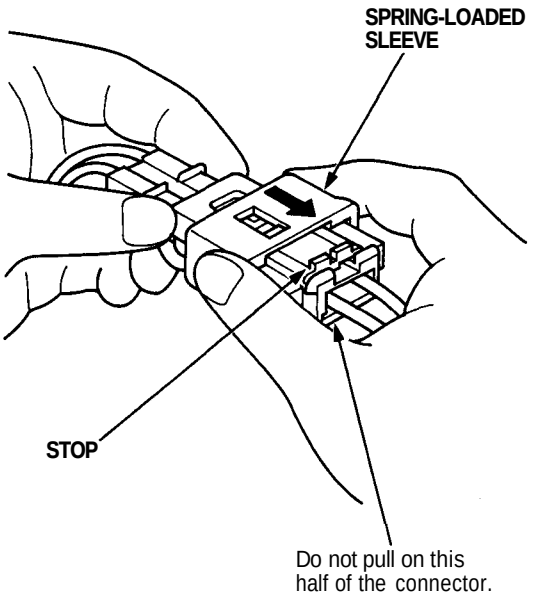
Spring-loaded Lock Connector

Some SRS system connectors have a spring-loaded lock.

Disconnecting

To release the lock, pull the spring-loaded sleeve toward the stop while holding the opposite half of the connector. Then pull the connector halves apart.

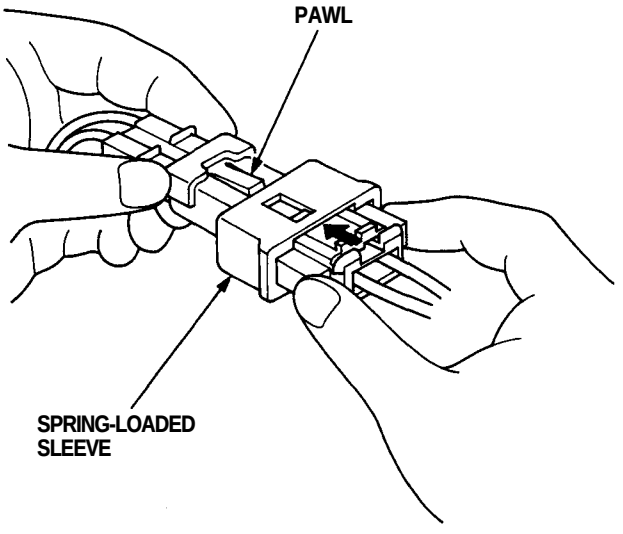
NOTE: Be sure to pull on the sleeve and not on the connector half itself.



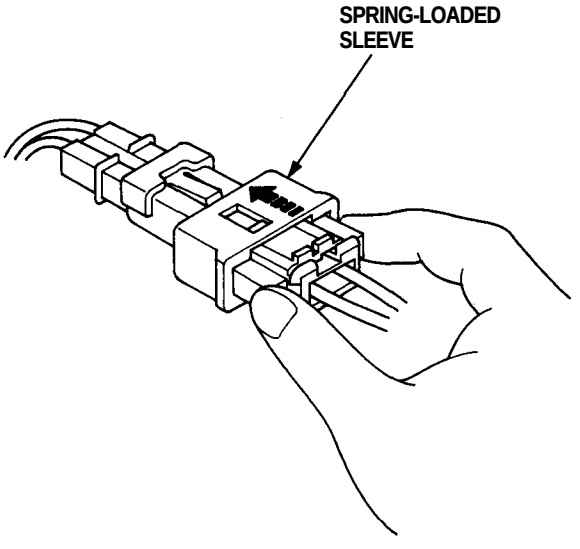
Connecting

1. Hold the pawl-side connector half, and press on the back of the sleeve-side connector half in the direction shown. As the two connector halves are pressed together, the sleeve is pushed back by the pawl.

   NOTE: Do not touch the sleeve.



2. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.

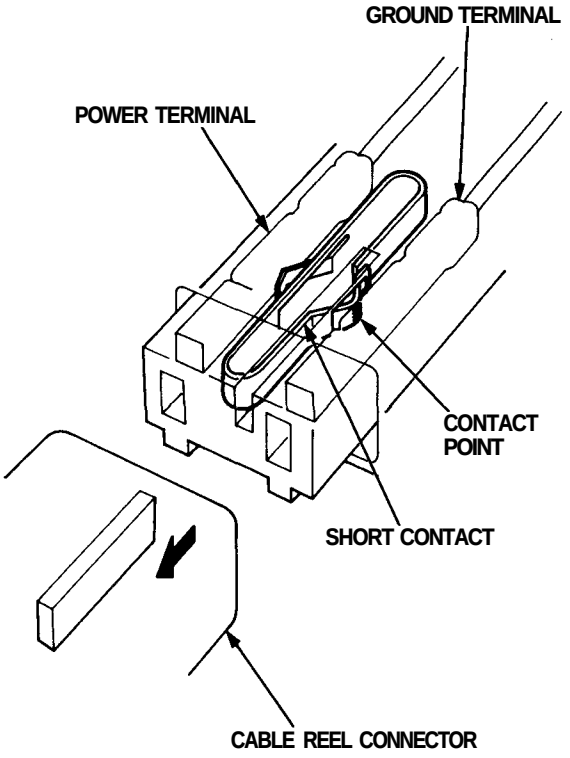


Precautions/Procedures

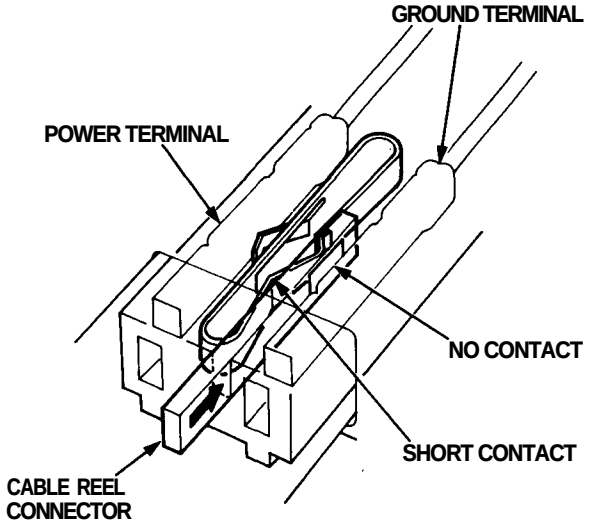
Spring-loaded Lock Connector with Built-in Short Contact

The driver's airbag ('96-98 models) and front passenger's airbag ('97-98 models) have a spring-loaded lock connector with a built-in short contact. When this connector is disconnected, the power terminal and the ground terminal in the airbag connector are automatically shorted.

Connector halves disconnected:

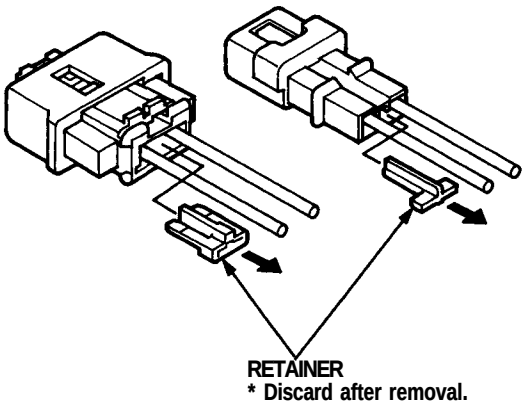


Connector halves connected:

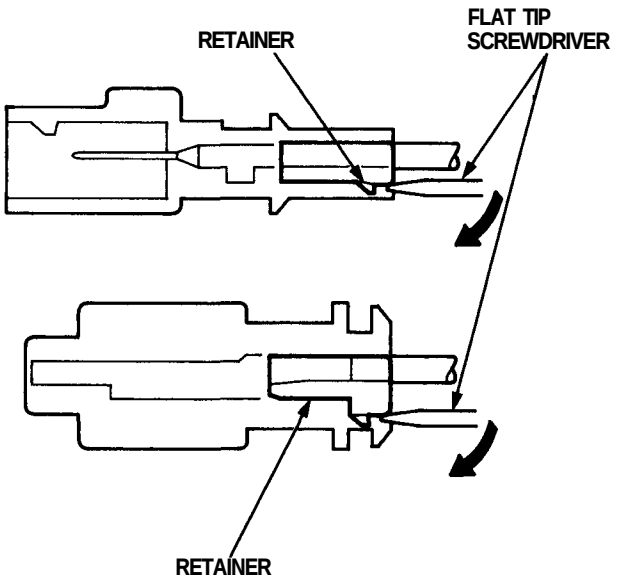


Backprobing Spring-loaded Lock Connectors

- When checking voltage or resistance on this type of connector the first time, it is necessary to remove the retainer to insert tester probes from the wire side. It is not necessary to reinstall the removed retainer; the terminals will stay locked in the connector housing.



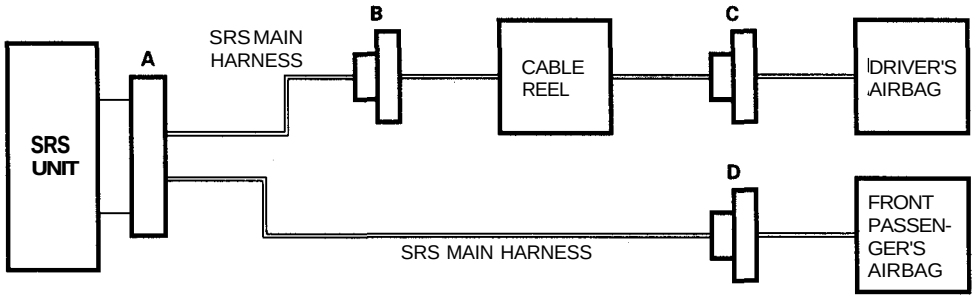
- To remove the retainer, insert a flat tip screwdriver between connector body and retainer, and carefully pry out the retainer. Take care not to break the connector.



Disconnecting the Airbag Connectors

⚠ WARNING To prevent accidental airbag deployment, turn the ignition switch OFF, disconnect the negative battery cable, and wait three minutes before disconnecting any SRS connectors.

- Before disconnecting the SRS main harness (A) from the SRS unit, disconnect both airbags (C, D).
- Before disconnecting the cable reel 2P connector (B), disconnect the driver's airbag 2P connector (C).

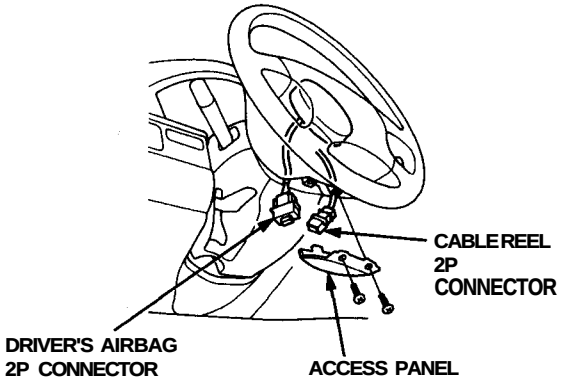


1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
3. Disconnect the airbag connector(s).

Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.

NOTE: When disconnected, the airbag connector is automatically shorted.

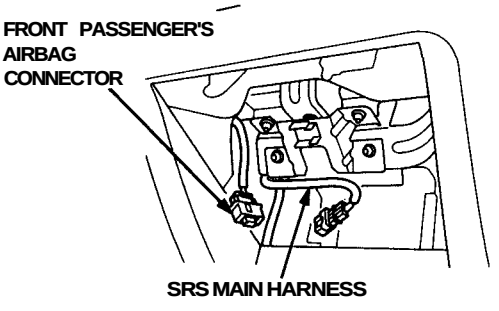


Front Passenger's Side:

- Remove the glove box.
- Disconnect the connector between the front passenger's airbag and SRS main harness.

NOTE:

- When disconnected, the airbag connector on '97 - 98 models is automatically shorted.
- On '96 model connect the short connector (RED) to the airbag connector.

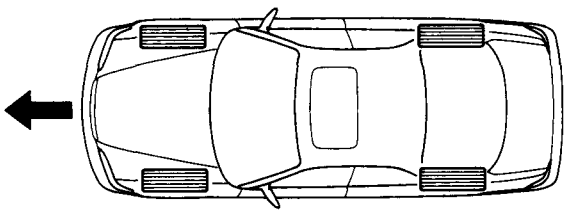


Precautions/Procedures

Steering-related Precautions

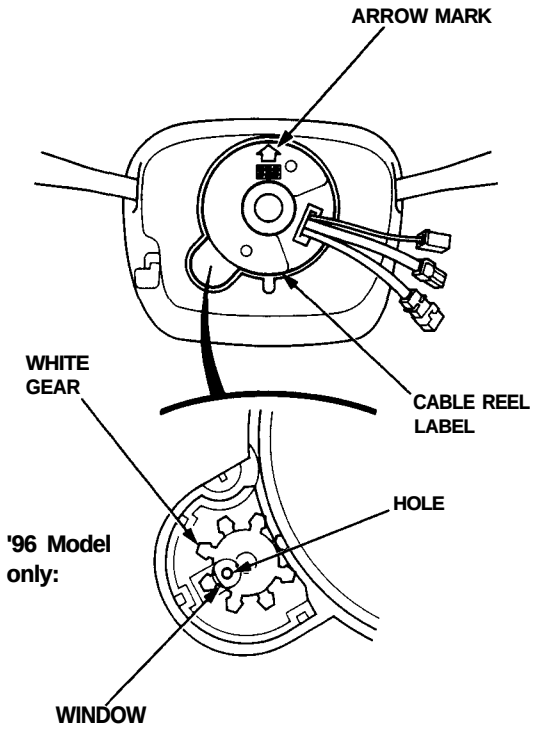
Steering Wheel and Cable Reel Alignment

NOTE: To avoid misalignment of the steering wheel on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



'96 Model: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the hole in the white gear lines up with the window on the cover and the arrow mark on the cable reel label points straight up.

'97 - 98 Models: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



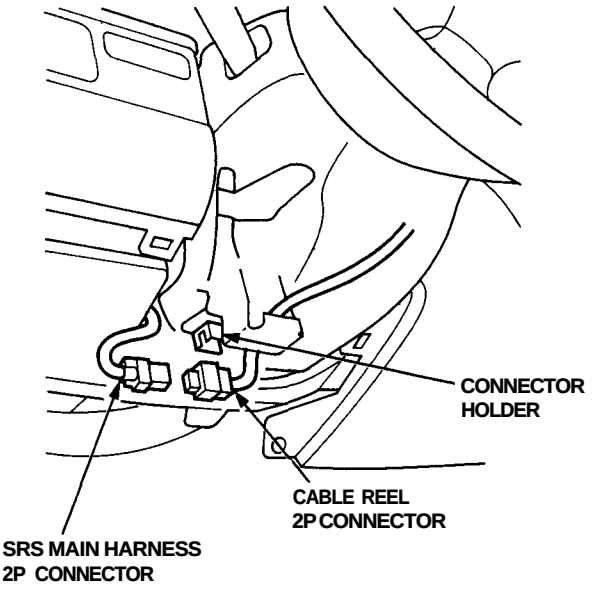
Steering Column Removal

CAUTION:

- **Before removing the steering column, first disconnect the connector between the cable reel and the SRS main harness.**
- **If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to 0-LOCK position, or remove the key from the ignition so that the steering wheel will not turn.**

NOTE:

- When the airbag assembly and cable reel are disconnected, and the battery is reconnected and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will come on. In such a case, make sure to confirm the DTC, then clear the SRS unit memory.
- For disconnecting the spring-loaded lock type connector, refer to page 24-9.



Do not replace the original steering wheel with any other design because it will make it impossible to properly install the airbag (use only genuine Honda replacement parts).

After reassembly, confirm the wheels are still turned straight ahead and that the steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

Troubleshooting

Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on.

NOTE: The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.

- When you connect the SCS service connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

Precautions

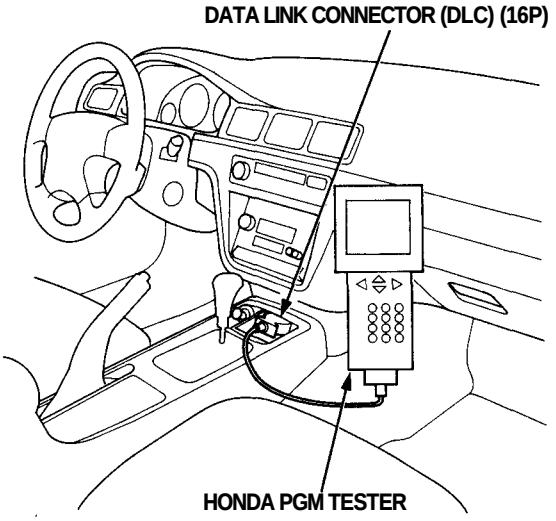
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury-
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the driver's airbag connector and the front passenger's airbag connector. (Connect the Short connector (RED) to the front passenger's airbag connector on a '96 model.)
- Make sure the battery is sufficiently charged (see section 23). If the battery is dead or low, measuring values won't be correct.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the test harness and the SCS service connectors.
  For backprobing spring-loaded lock type connectors, refer to page 24-11.

Troubleshooting

Reading the DTC

When the SRS indicator light is on, read the DTC using one of these methods:

A. Connect the Honda PGM Tester to the 16P Data Link Connector (DLC), and follow the tester's prompts. If the tester indicates no DTC, double-check by jumping the service check connector and watching the SRS indicator light (see page 24-14).



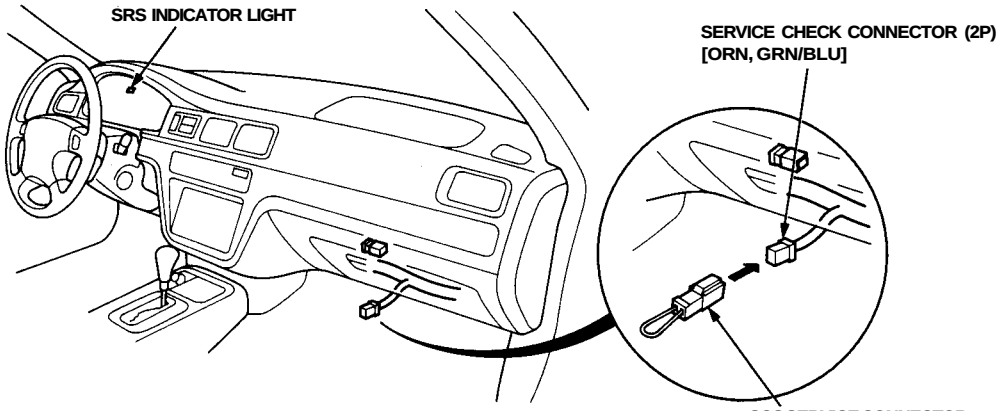
(cont'd)

Troubleshooting

Reading the DTC (cont'd)

B. The SRS indicator light can also indicate the DTC by the number of blinks when the SCS service connector is connected to the service check connector (2P).

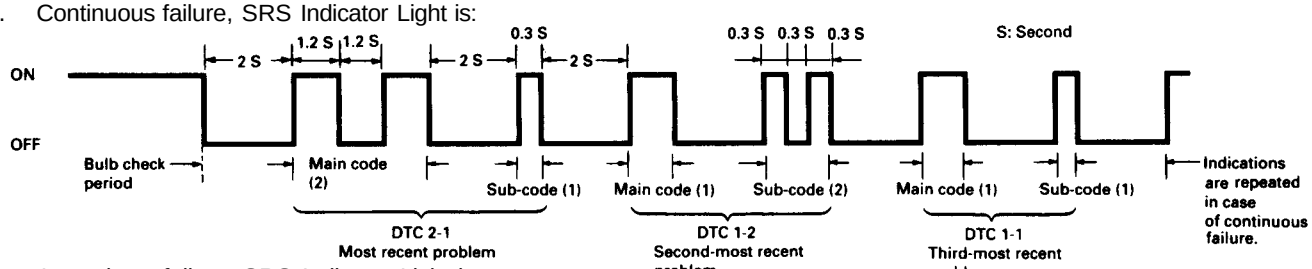
1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS service connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.



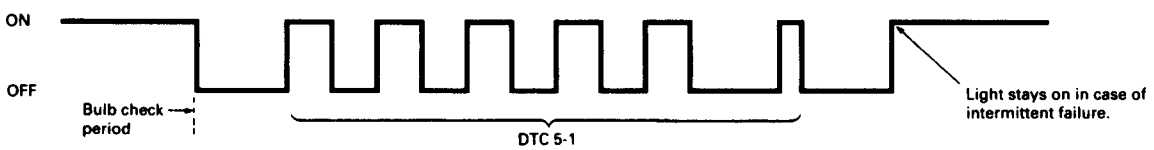
2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six seconds and goes off. Then it will indicate the DTC:
   — The DTC consists of a main code and a sub-code.
   — Including the most recent problem, up to three different malfunctions can be indicated.
   — In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
   — In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
   — If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
   — In case the system is normal (no DTC), the SRS indicator light will stay on (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS service connector from the service check connector (2P).

Examples of DTC Indications:

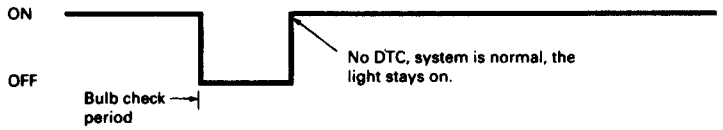
1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



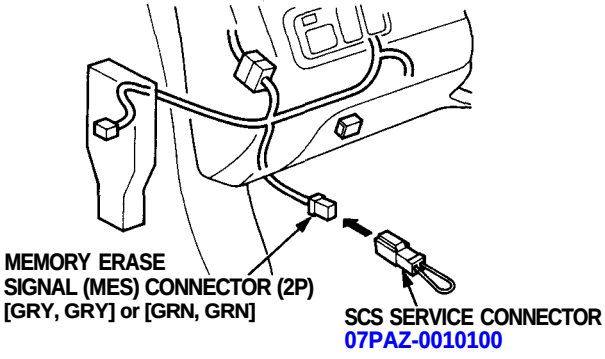
3. Normal (no failure), SRS Indicator Light is:



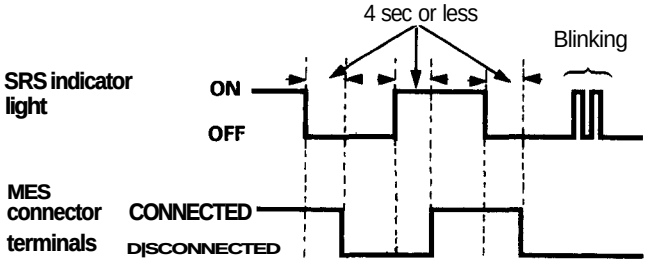
Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS vehicle System Supplement) or the following procedure.

1. Make sure the ignition switch is OFF.
2. Connect the SCS service connector to the MES connector (2P). Do not use a jumper wire.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS service connector from the MES connector (2P) within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS service connector to the MES connector (2P) within the four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS service connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.

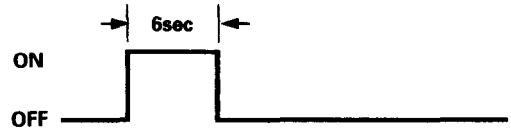


Troubleshooting Intermittent Failures

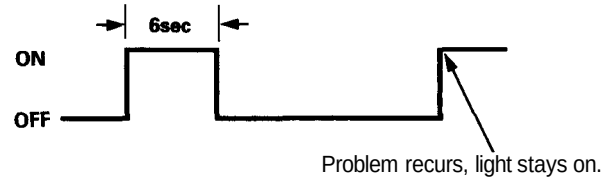
If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. The SRS indicator light comes on for about six seconds and goes off.



5. Shake the wire harness and the connector, take a test drive (quick acceleration, quick braking, cornering), and turn the steering wheel fully left and right, and hold it there for five to ten seconds to find the cause of the intermittent failure.
   If the problem recurs, the SRS indicator light will stay on.



6. If you can't duplicate the intermittent failure, the system is OK at this time.

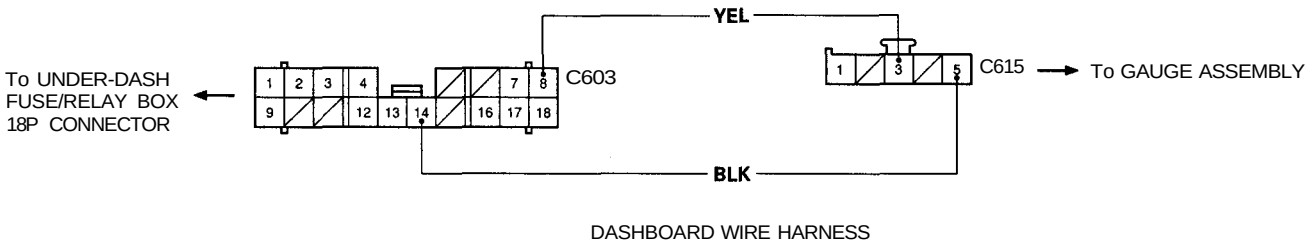
Troubleshooting

Diagnostic Trouble Code (DTC) Chart

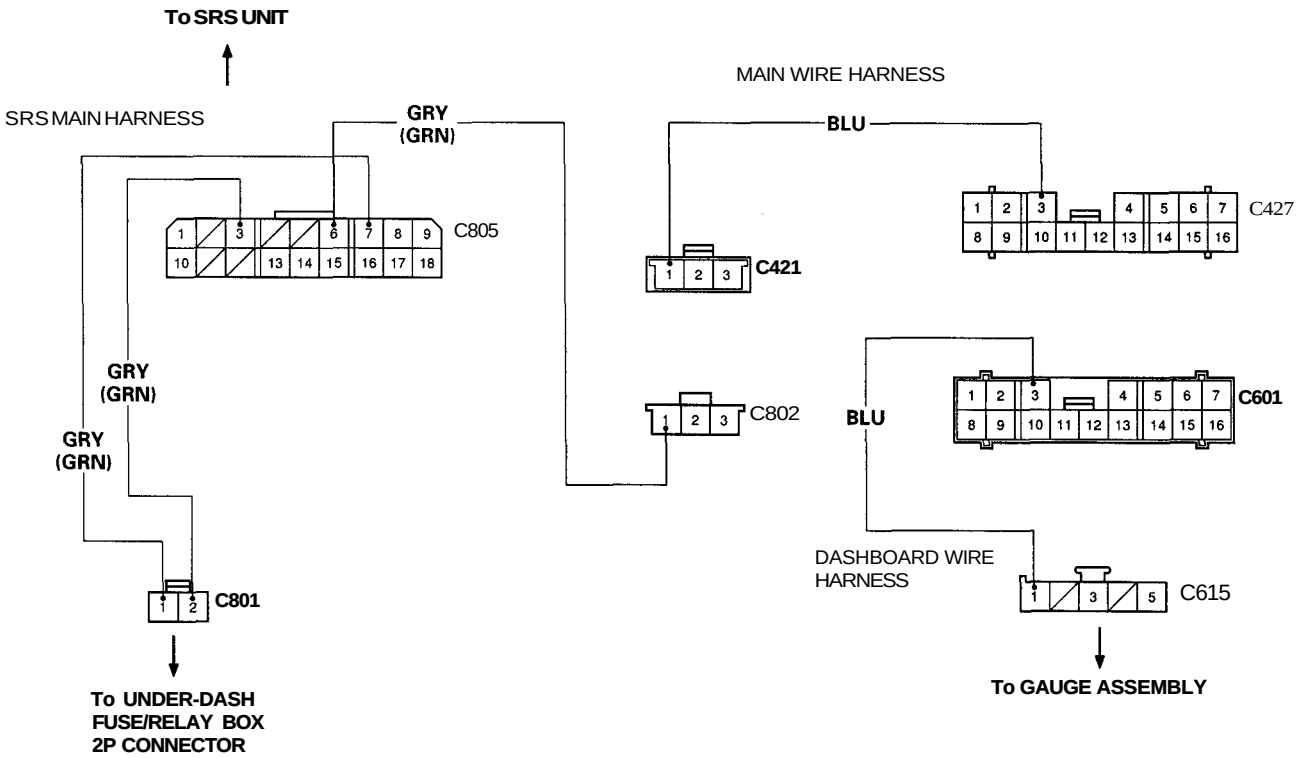
SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none	Faulty SRS indicator light circuit	Troubleshooting	24-18
comes on	1-1	Open in the driver's airbag inflator	Troubleshooting	24-21
	1-2	Increased resistance in the driver's airbag inflator		24-21
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-23
	1-4	Short to power in the driver's airbag inflator		24-25
	1-5	Short to ground in the driver's airbag inflator		24-27
	2-1	Open in the passenger's airbag inflator	Troubleshooting	'96: 24-29 '97-98: 24-30
	2-2	Increased resistance in the passenger's airbag inflator		
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance		'96: 24-31 '97-98: 24-32
	2-4	Short to power in the passenger's airbag inflator		'96: 24-33 '97-98: 24-35
	2-5	Short to ground in the passenger's airbag inflator		'96: 24-37 '97-98: 24-38
	5-1	Internal failure of the SRS unit	SRS unit replacement	24-56
	5-2			
	5-3			
	5-4			
	5-5			
	6-1	Internal failure of the SRS unit	SRS unit replacement	24-56
	6-2			
	6-3			
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-56
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-56
	8-2			
	8-3			
	8-4			
	8-5			
	8-6			
	9-1 or no code	Faulty SRS indicator circuit or internal failure of the SRS unit	Troubleshooting	24-39
	9-2	Faulty SRS power supply (VB line)		24-44
	10-1	SRS unit replacement code (SRS unit must not be used any longer)	SRS unit replacement	24-56

SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



C421 : MAIN WIRE HARNESS 3P CONNECTOR
C427 : MAIN WIRE HARNESS 16P CONNECTOR
C601 : DASHBOARD WIRE HARNESS 16P CONNECTOR
C603 : DASHBOARD WIRE HARNESS 18P CONNECTOR
C615 : DASHBOARD WIRE HARNESS 5P CONNECTOR
C801 : SRS MAIN HARNESS 2P CONNECTOR
C802 : SRS MAIN HARNESS 3P CONNECTOR
C805 : SRS MAIN HARNESS 18P CONNECTOR

Airbag

Replacement

After a collision in which the airbags were deployed, the airbag assemblies and the SRS unit must be replaced.

⚠ WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- **Always disconnect the airbag connectors when the SRS main harness is disconnected.**
- **'96 Model: Always keep the short connector (RED) on the passenger's airbag when the harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

NOTE:
- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
- Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

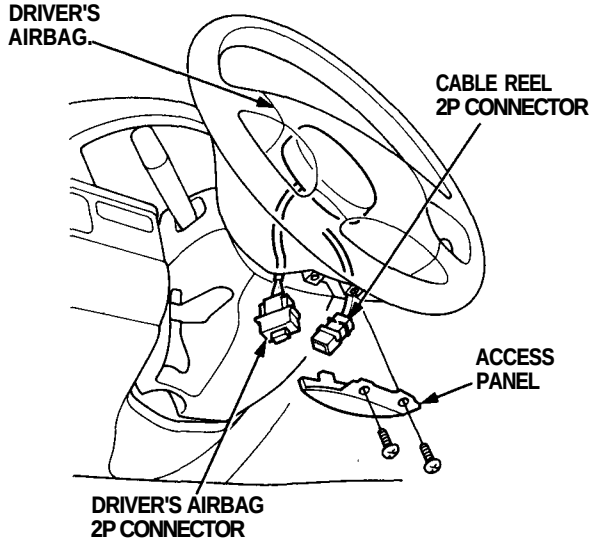
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

3. Disconnect the airbag connectors:

Driver's Side:

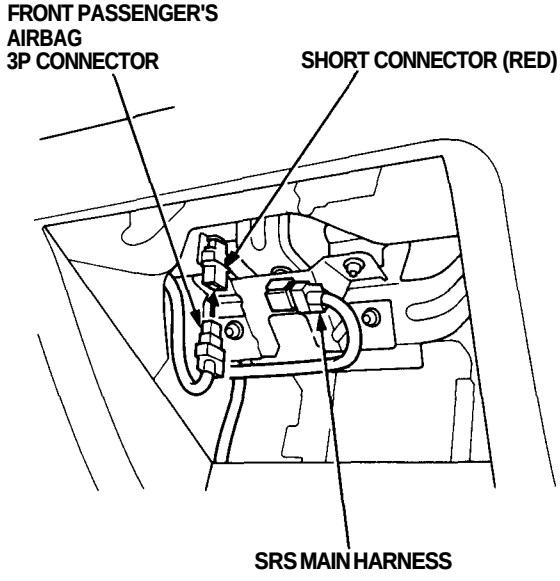
- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



Front Passenger's Side:

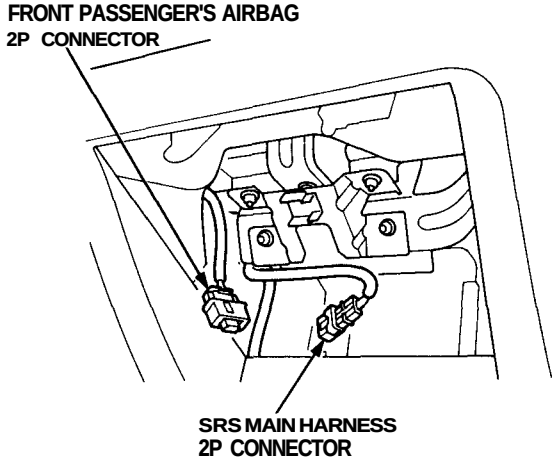
'96 Model:

- Remove the glove box, then remove the short connector (RED) from it's holder.
- Disconnect the 3P connector between the front passenger's airbag and SRS main harness, then connect the short connector (RED) to the airbag side of the connector.



'97 - 98 Models:

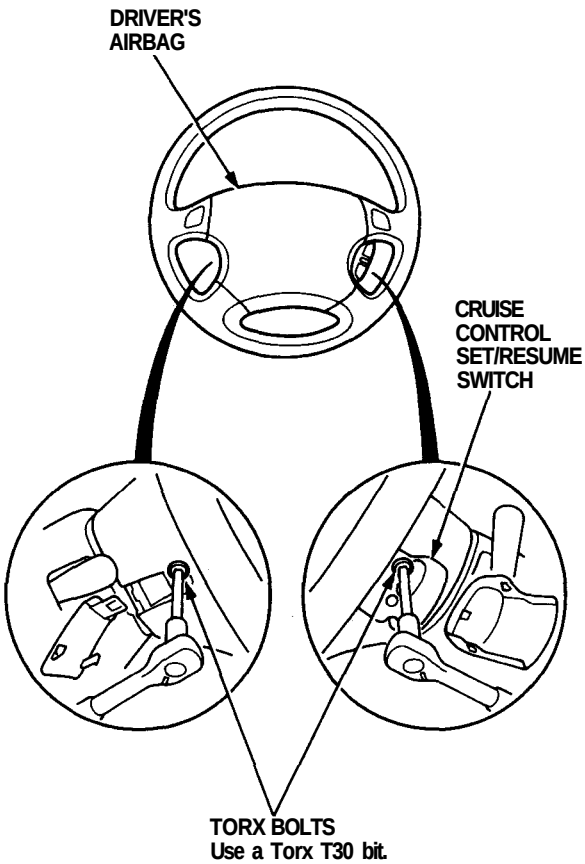
- Remove the glove box.
- Disconnect the 2P connector between the front passenger's airbag and SRS main harness.



4. Remove the airbags:

Driver's Side:

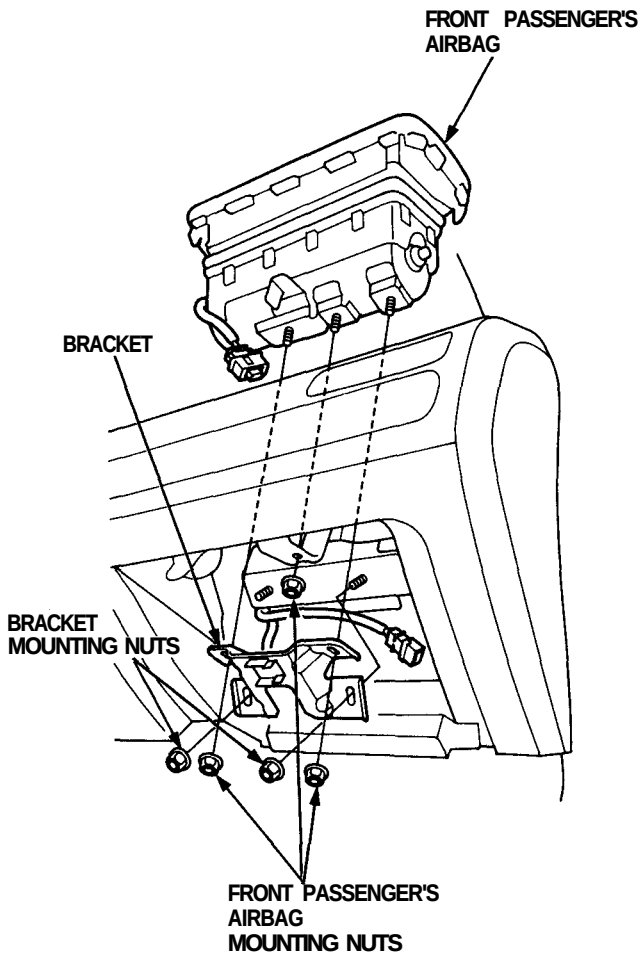
- Remove the two Torx bolts using a Torx T30 bit, then remove the driver's airbag.



Front Passenger's Side:

- Remove the four mounting nuts from the bracket.
- Remove the bracket and one mounting nut, then lift the front passenger's airbag out of the dashboard.

NOTE: The lid of the airbag has pawls on its side which attach it to the dashboard. To remove the airbag, cover the lid and dashboard with a cloth, and pry carefully with a flat tip screwdriver.



(cont'd)

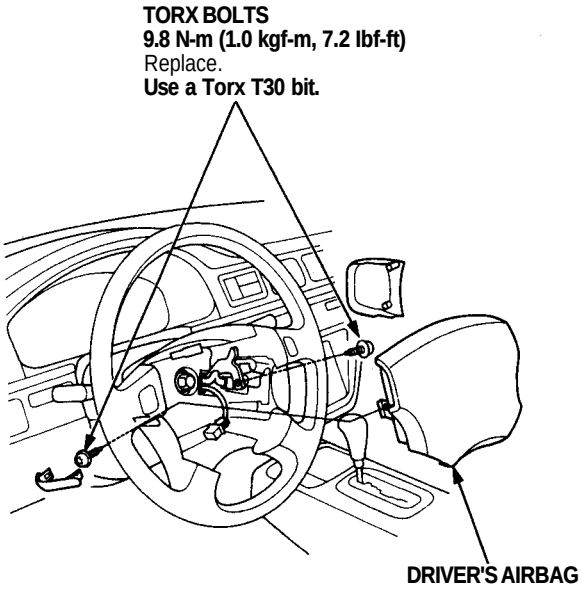
Airbag

Replacement (cont'd)

CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other parts.

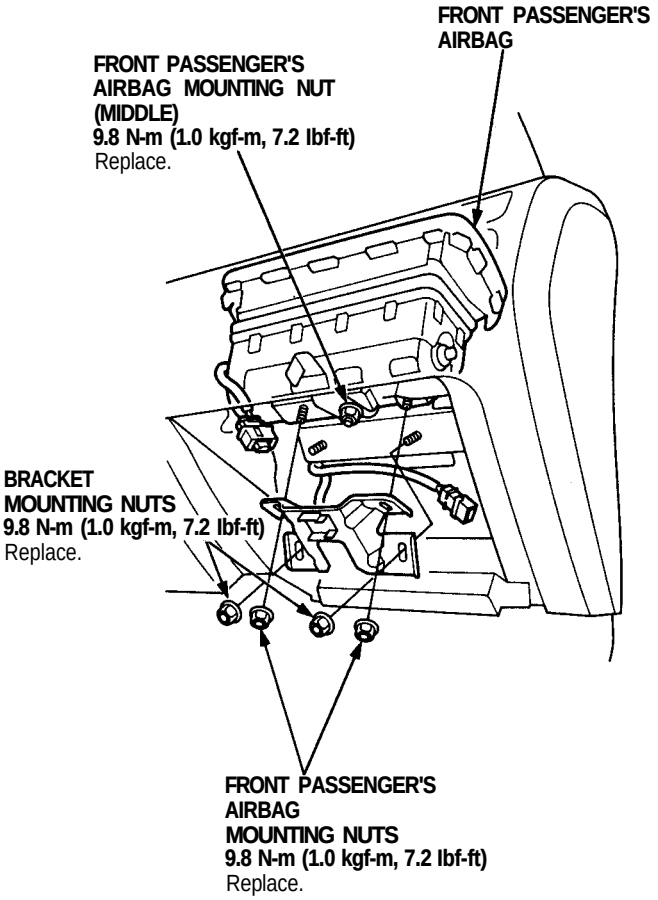
5. Install the new airbags:

Driver's Side: Place the driver's airbag in the steering wheel, and secure it with new Torx bolts.



Front Passenger's Side:

- Place the front passenger's airbag into the dashboard.
- Tighten the middle airbag mounting nut, then install the bracket and four mounting nuts.
- Tighten the two outer airbag mounting nuts first, then tighten the two bracket mounting nuts.

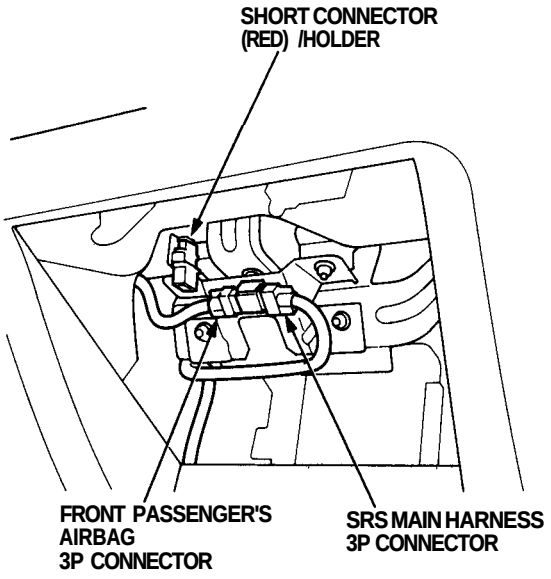


6. Reconnect the airbag connectors.

Front Passenger's Side:

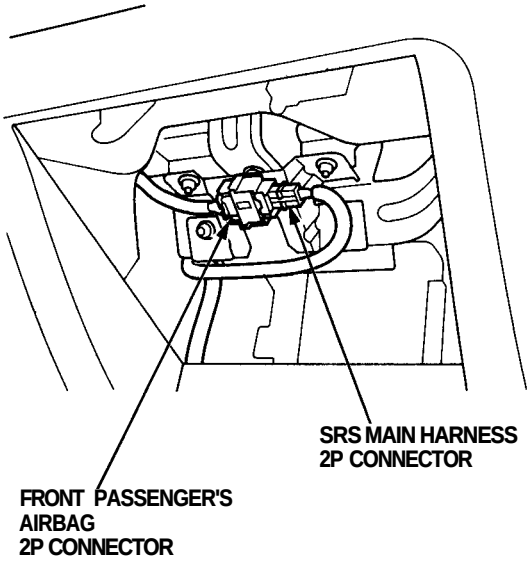
'96 Model:

- Attach the short connector (RED) to the connector holder, then reinstall the glove box.



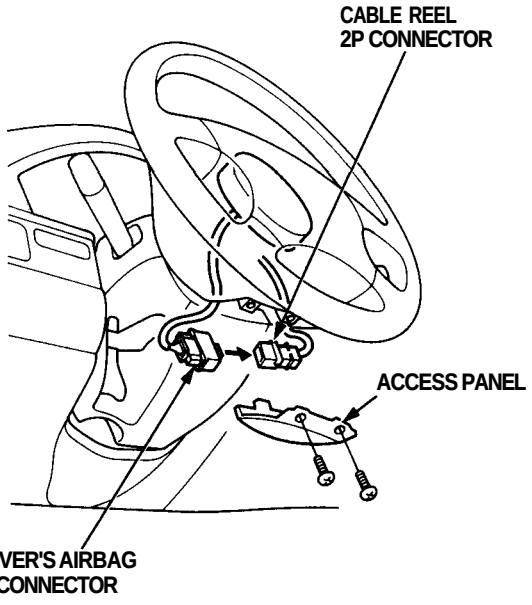
'97-98 Models:

- Attach the airbag connector to the connector holder, then install the glove box.



Driver's Side:

- Connect the driver's airbag 2P connector to the cable reel 2P connector, then install the access panel on the steering wheel.



7. Connect the battery positive cable, then connect the negative cable.

8. After installing the airbag, confirm proper system operation:

   - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
   - Make sure both horn buttons work.
   - Take a test-drive, and make sure the cruise control switches work.

9. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Airbag

Disposal

Before scrapping any airbags (including those in a whole vehicle to be scrapped), the airbags must be deployed. If the vehicle is still within the warranty period, before you deploy the airbags, the Acura District Technical Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), can they be scrapped. If the airbags appear intact (not deployed), treat them with extreme caution. Follow this procedure:

Deploying the Airbags: In-vehicle

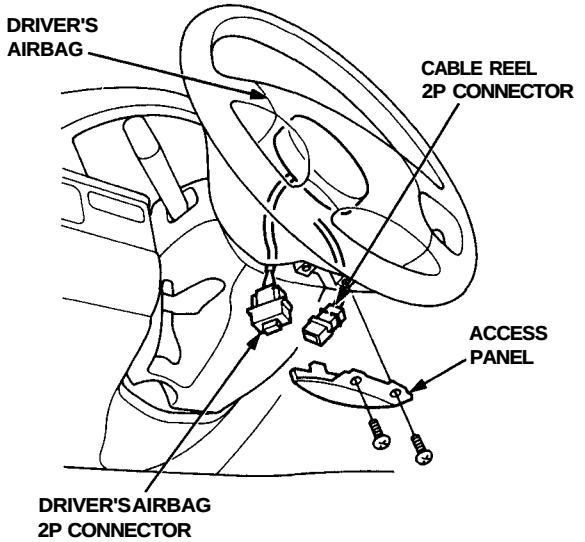
NOTE: If an SRS vehicle is to be entirely scrapped, its airbags should be deployed while still in the vehicle. The airbags should not be considered as salvageable parts and should never be installed in another vehicle.

⚠ WARNING Confirm that each airbag assembly is securely mounted; otherwise, severe personal injury could result from deployment.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Confirm that the special tool is functioning properly by following the check procedure on the label on the tool or the procedure on page 24-51.

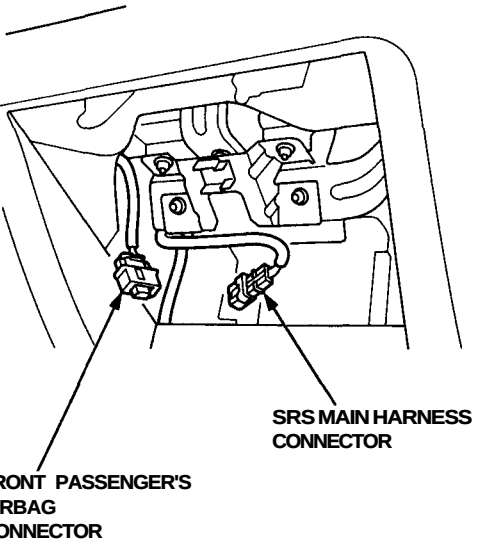
Driver's Airbag:

4. Remove the access panel, then disconnect the 2P connector between the driver's airbag and the cable reel.

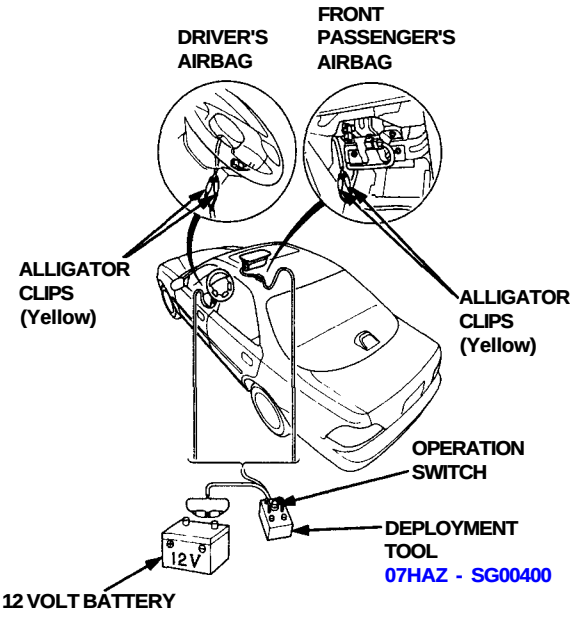


Front Passenger's Airbag:

5. Remove the glove box, then disconnect the 2P or 3P connector between the front passenger's airbag and SRS main harness.



6. Cut off the airbag connector, strip the ends of the airbag wires, and connect the special tool alligator clips to the airbag. Place the special tool approximately thirty feet (10 meters) away from the airbag.



7. Connect a 12 volt battery to the tool:

   - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. Go to Damaged Airbag Special Procedure.
   - If the red light on the tool comes on, the airbag is ready to be deployed.

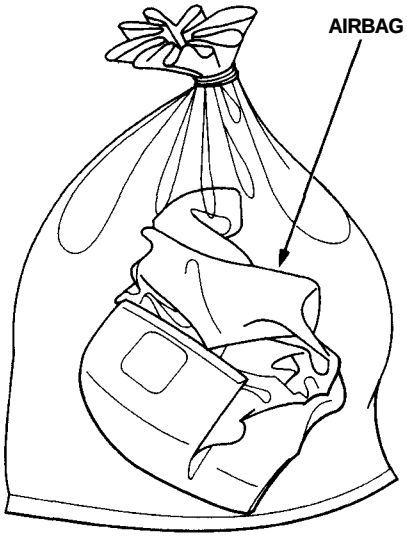
8. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible a loud noise and rapid inflation of the bag, followed by slow deflation).

   - If audible/visible deployment happens, and the green light on the tool comes on, continue with this procedure.
   - If the airbag doesn't deploy, yet the green light comes ON, its igniter is defective. Go to Damaged Airbag Special Procedure.
   - During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.

9. Dispose of the complete airbag. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

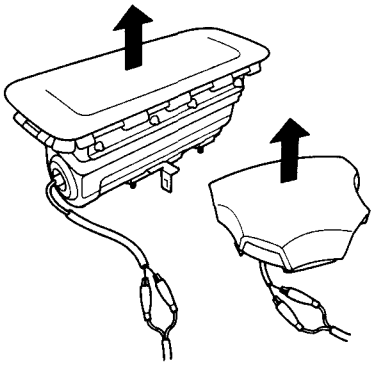
CAUTION:

- **Wear a face shield and gloves when handling a deployed airbag.**
- **Wash your hands and rinse them well with water after handling a deployed airbag.**



Deploying the Airbag: Out-of-vehicle

If an intact airbag has been removed from a scrapped vehicle, or has oeen found defective or damaged during transit, storage or service, it should be deployed as follows:



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool label.
2. Position the airbag face up, outdoors on flat ground at least thirty feet (10m) from any obstacles or people.
3. Follow steps 5, 6, 7, and 8 of the In-vehicle deployment procedure.

Damaged Airbag Special Procedure

⚠ WARNING If an airbag cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-47.
2. In all cases, make a short circuit by twisting together the two airbag inflator wires.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your Acura District Technical Manager for how and where to return it for disposal.

Deployment Tool: Check Procedure

1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. Disconnect the battery and the yellow clips.

Cable Reel

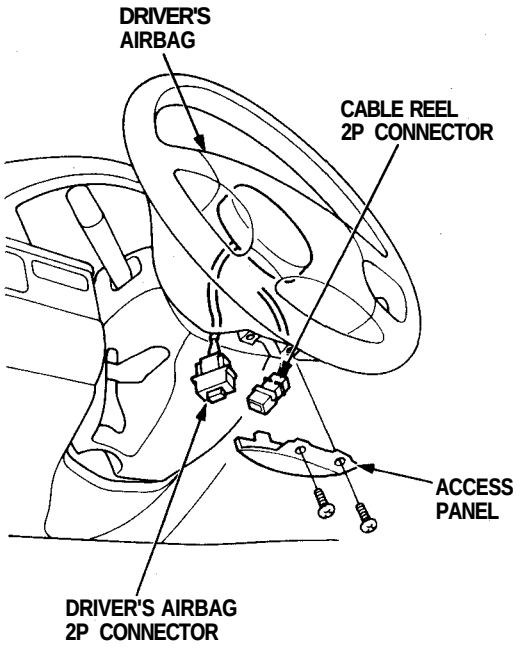
Replacement

⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

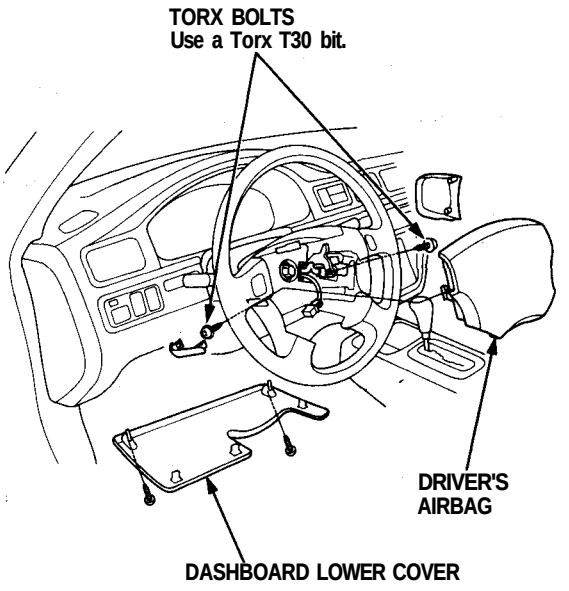
CAUTION:
- **Always disconnect the airbag connector when the SRS main harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

NOTE: Carefully inspect the airbag before installing it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

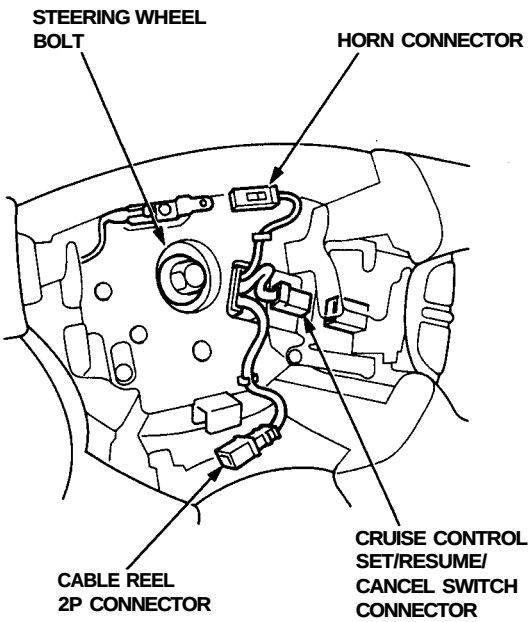
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
3. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



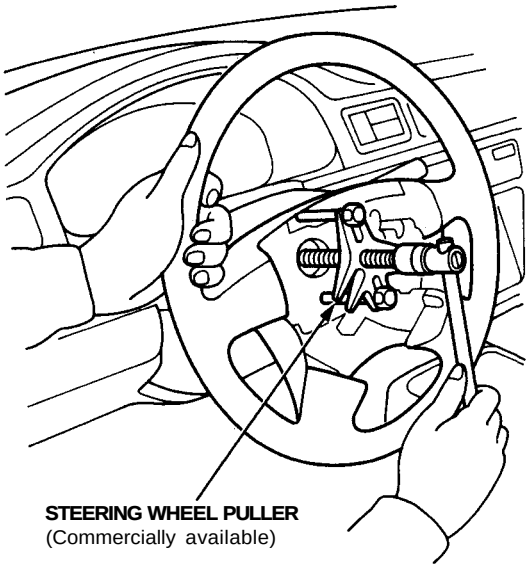
4. Make sure the wheels are aligned straight ahead.
5. Remove the dashboard lower cover.
6. Remove the driver's airbag assembly from the steering wheel (two T30 Torx bolts).



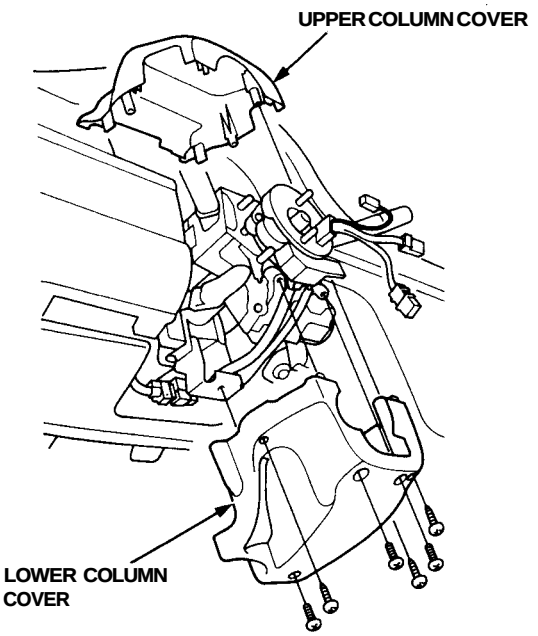
7. Disconnect the connectors from the horn and cruise control set/resume/cancel switches, then remove the steering wheel bolt.



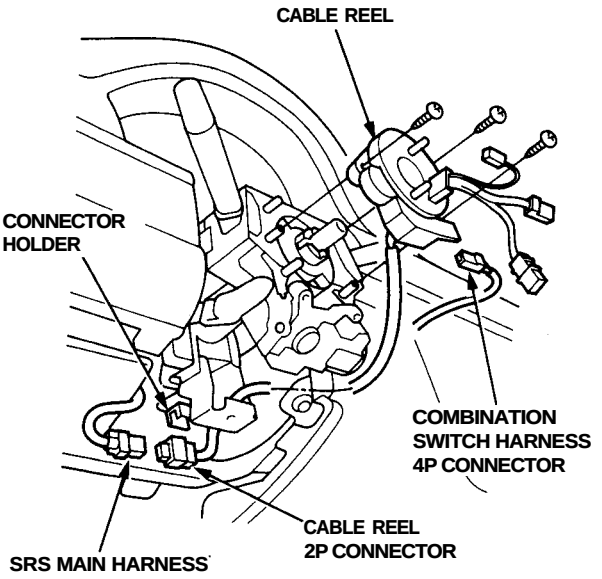
8. Remove the steering wheel with a steering wheel puller.



9. Remove the steering column covers.



10. Disconnect the 4P connector between the cable reel and combination switch harness, and the 2P connector between the cable reel and SRS main harness.



11. Remove the cable reel from the column.

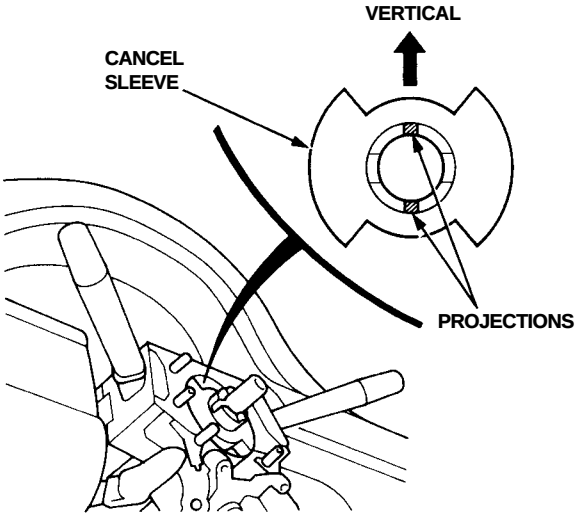
(cont'd)

Cable Reel

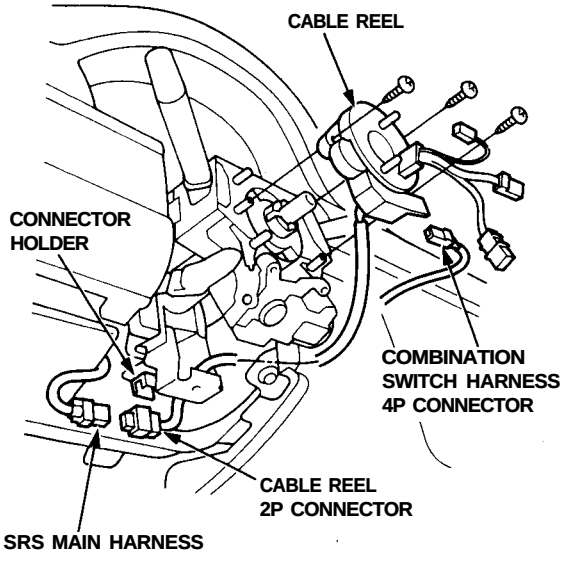
Replacement(cont'd)

NOTE:
- Before installing the steering wheel, the front wheels should be aligned straight ahead.
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.
- After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct (road test). If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

12. Set the cancel sleeve so that the projections are aligned as shown.



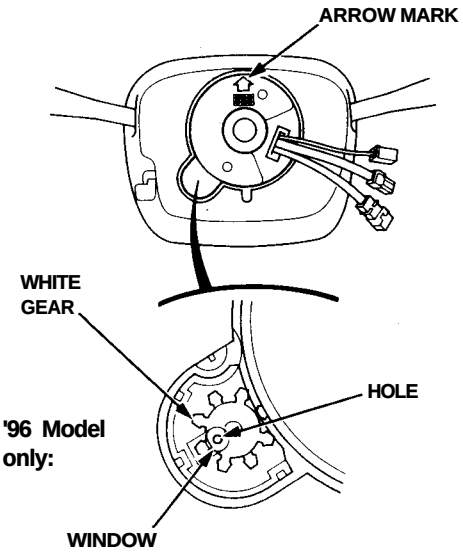
13. Carefully install the cable reel on the steering column shaft. Then connect the 4P connector to the cable reel, and connect the 2P connector to the SRS main harness.



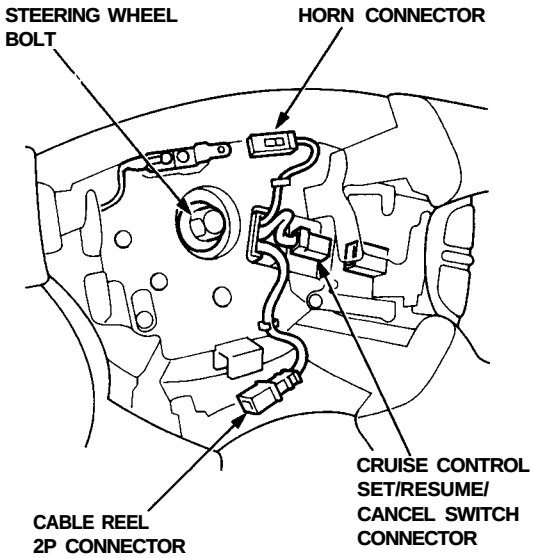
14. Install the steering column covers.

15. If necessary, center the cable reel. (New replacement cable reels come centered.) '97 - 98 Models: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.

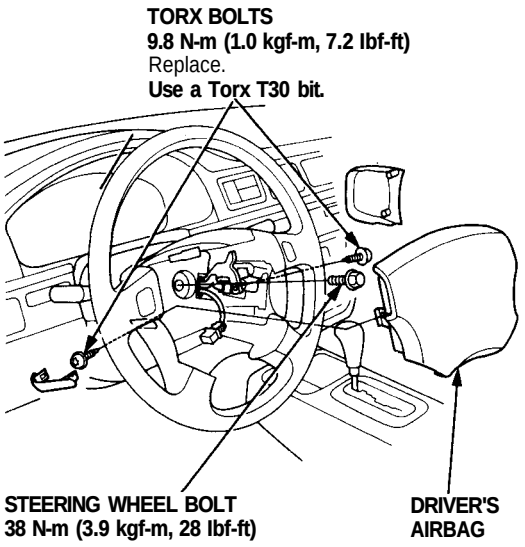
'96 Model: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the hole in the white gear lines up with the window on the cover and the arrow mark on the cable reel label points straight up.



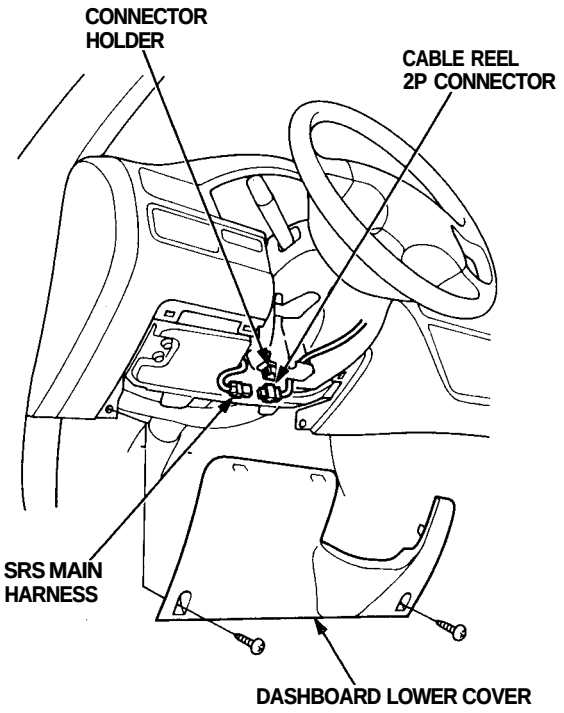
16. Install the steering wheel, then connect the horn connector and cruise control set/resume/cancel switch connector.



17. Tighten the steering wheel bolt to the specified torque. Then install the driver's airbag.



18. Attach the cable reel 2P connector to the connector holder. Then install the dashboard lower cover.



19. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

20. Reconnect the battery positive cable, then the negative cable.

21. After installing the cable reel, confirm proper system operation:

- Turn the ignition ON (II); the SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Make sure the headlight and wiper switches work.
- Go for a test drive, and make sure the cruise control switches work.

22. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

SRS Unit

Replacement

CAUTION:
- **During installation or replacement, do not bump (impact wrench, hammer etc.) the area near the SRS unit.**
- **Do not damage the SRS unit terminals or connectors.**
- **Do not disassemble the SRS unit; it has no serviceable parts.**
- **Store the SRS unit in a clean, dry area.**
- **Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**

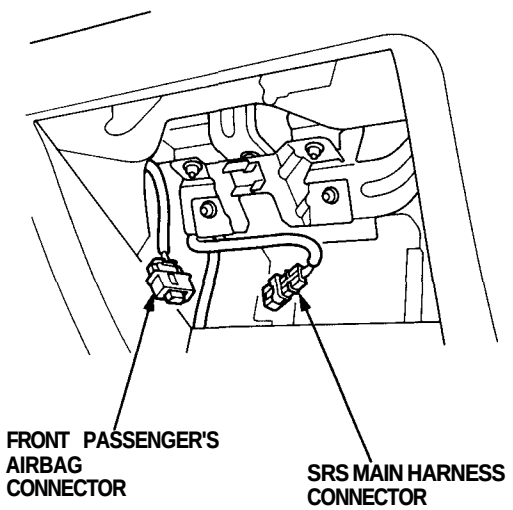
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

3. Disconnect the airbag connectors.

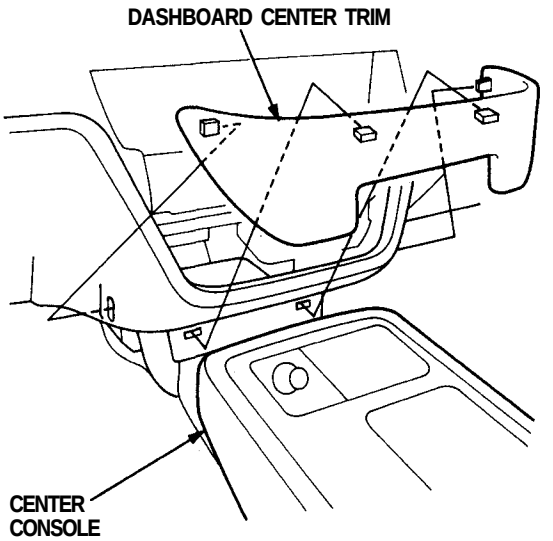
Driver's Side:
- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel (see page 24-11).

Front Passenger's Side:
- Remove the glove box.
- Disconnect the connector between the front passenger's airbag and SRS main harness. On a '96 model, connect the short connector to the front passenger's airbag connector.



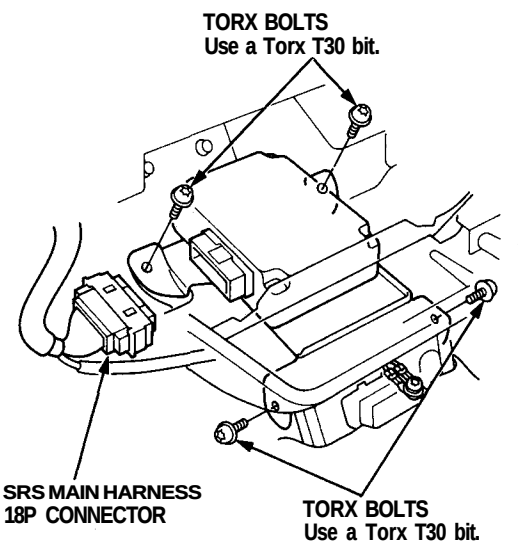
4. Remove the radio panel (see section 23).

5. Remove the center console and dashboard center trim.

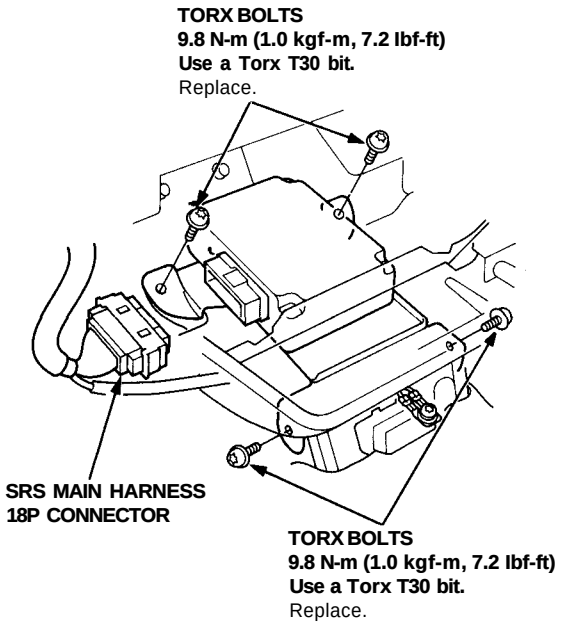


6. Disconnect the SRS main harness 18P connector from the SRS unit.

7. Remove the four Torx bolts from the SRS unit, then pull the SRS unit out of the dashboard.



8. Install the new SRS unit.



9. Connect the SRS main harness 18P connector to the SRS unit, then push it into position until it clicks.

10. Reinstall the radio panel bracket and radio panel assembly.

11. Reinstall the dashboard center trim and center console.

12. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

13. Reconnect the front passenger's airbag connector to the SRS main harness, then reinstall the glove box.

14. Reconnect the battery positive cable, then the negative cable.

15. After installing the SRS unit, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

16. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Main Menu

Engine

Engine Removal/Installation **5–1**
Cylinder Head/Valve Train **6–1**
Engine Block **7–1**
Engine Lubrication **8–1**
Intake Manifold/Exhaust System **9–1**
Cooling **10–1**

1995–98 TL Main Menu

General Info 

Specifications 

Maintenance 

Engine 

Cooling 

Fuel and Emissions
- 2.5L
- 3.2L



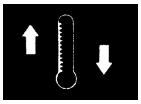
* Transaxle 

Steering 

Suspension 

* Brakes (Including ABS) 

* Body 

* Heating, Ventilation and Air Conditioning 

* Body Electrical 

* Engine Electrical 

* SRS
- 2.5L
- 3.2L



As sections w/ * include SRS components, special precautions are required when servicing.

Chassis and Paint Codes

U.S. 1995 Model

Vehicle Identification Number

JH4 UA2 6 4 * S C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
4: without moonroof
5: with moonroof (Premium Package)
Check Digit
Model Year
S: 1995
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 2000001

Transmission Type
Serial Number

Paint Code

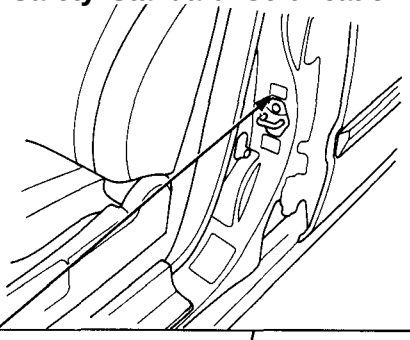
Paint Code	Color
R-91P	Garnet Red Pearl
G-79P	Bayern Green Pearl
NH-503P	Granada Black Pearl
NH-578	Taffeta White
YR-509P	Granite Silver Pearl
YR-506M	Arbere Taupe Metallic

Engine Number

G25A4 - 10 00001

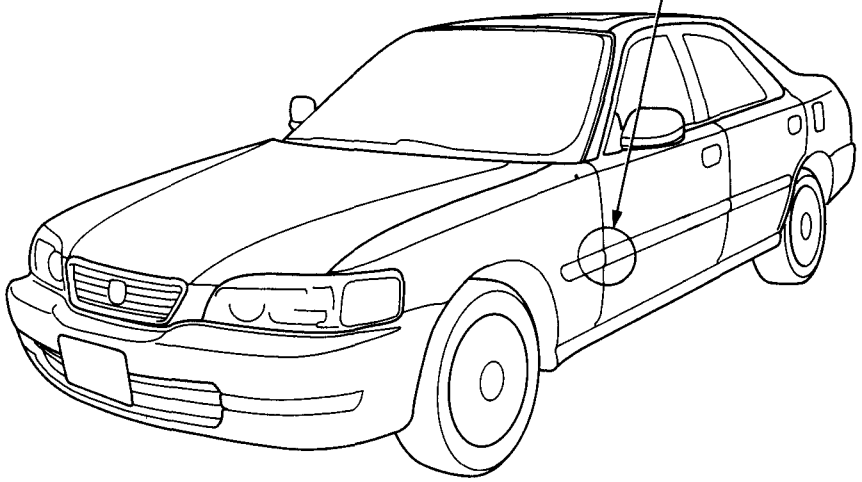
Engine Type
Emission Group
10: California
13: 49ST
Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



Paint Code

COLOR NH-503P



U.S. 1996 Model

Vehicle Identification Number

JH4 UA2 6 4 * T C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
4: without moonroof
5: with moonroof (Premium Package)
Check Digit
Model Year
T: 1996
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 3000001

Transmission Type
Serial Number

Paint Code

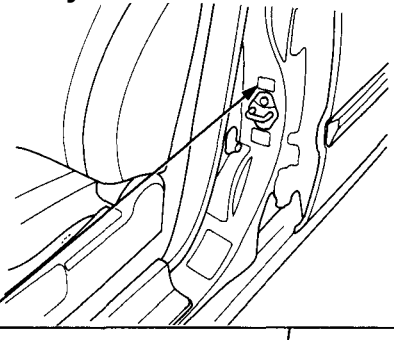
Paint Code	Color
R-91P	Garnet Red Pearl
G-79P	Bayern Green Pearl
NH-503P	Granada Black Pearl
NH-578	Taffeta White
YR-509P	Granite Silver Pearl
YR-506M	Arbere Taupe Metallic

Engine Number

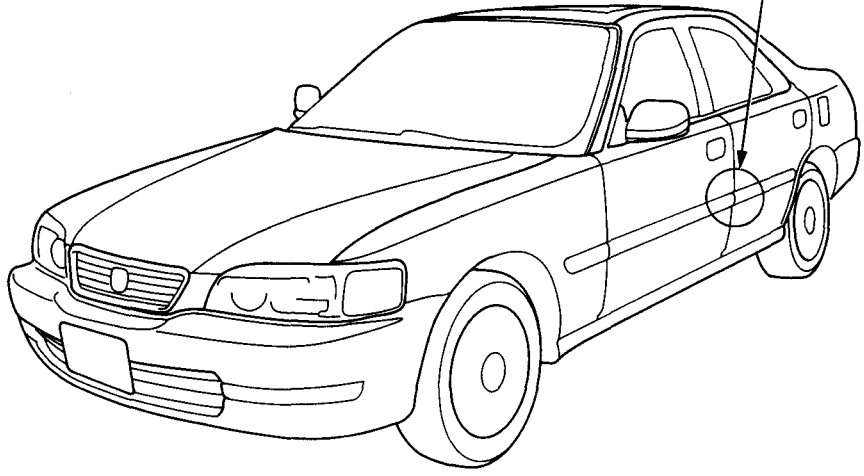
G25A4 - 20 00001

Engine Type
Emission Group
20: California
23: 49ST
Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



Paint Code
COLOR NH-503P



Chassis and Paint Codes

U.S. 1997 Model

Vehicle Identification Number

JH4 UA2 6 4 * V C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
4: without moonroof
5: with moonroof (Premium Package)
Check Digit
Model Year
V: 1997
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 4000001

Transmission Type
Serial Number

Paint Code

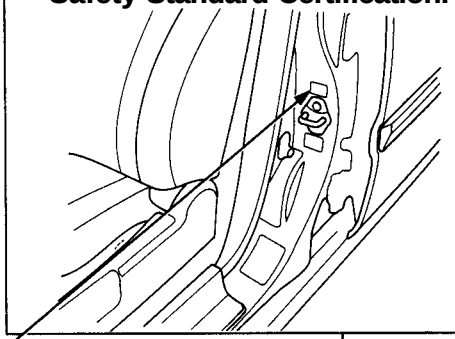
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Juniper Green Pearl
NH-578	Taffeta White
NH-592P	Flamenco Black Pearl
YR-506M	Desert Mist Metallic
YR-509P	Granite Silver Pearl

Engine Number

G25A4 - 33 00001

Engine Type
Emission Group
Serial Number

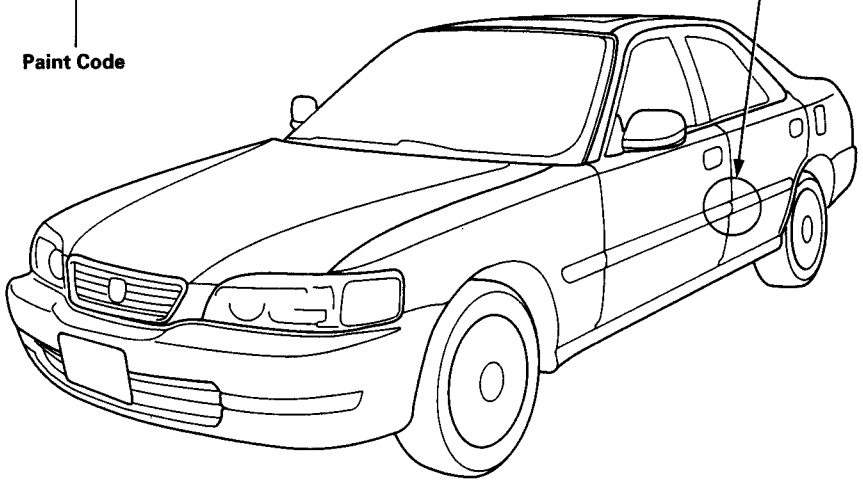
Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.



COLOR LABEL

INT. COLOR
TYPE F
EXT. COLOR
G-79P
KA SW5 A1 C

Paint Code



U.S. 1998 Model

Vehicle Identification Number

JH4 UA2 6 5 * W C 000001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle

Line, Body and Engine Type
UA2: 2.5TL/G25A4

Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic

Vehicle Grade (Series)
5: with moonroof (Premium Package)

Check Digit

Model Year
W: 1998

Factory Code
C: Saitama Factory in Japan (Sayama)

Serial Number

Transmission Number

M1WA - 5000001

Transmission Type

Serial Number

Paint Code

Paint Code	Color
B-68P	Pacific Blue Pearl
B-91M	Crystal Blue Metallic
G-79P	Juniper Green Pearl
NH-592P	Flamenco Black Pearl
NH-585P	Cayman White Pearl
YR-509P	Granite Silver Pearl

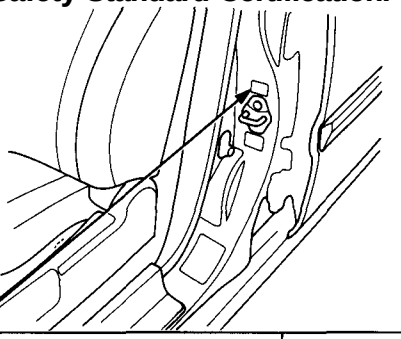
Engine Number

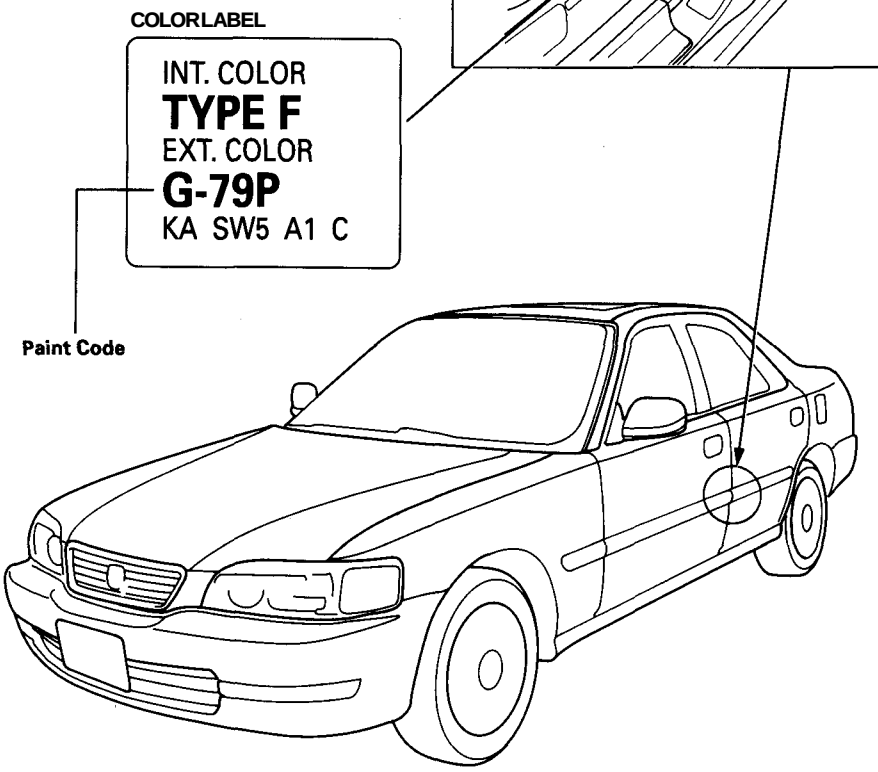
G25A4 - 4300001

Engine Type

Serial Number

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification.





Chassis and Paint Codes

Canada 1996 Model

Vehicle Identification Number

JH4 UA2 6 4 * T C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
T: 1996
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 3000001

Transmission Type
Serial Number

Paint Code

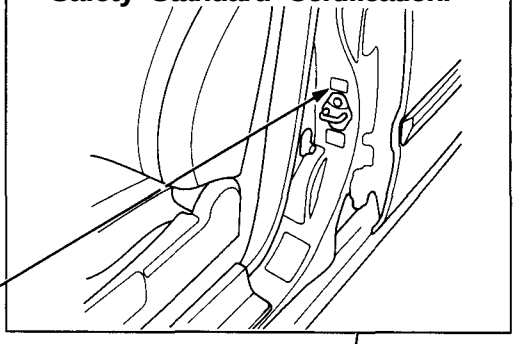
Paint Code	Color
R-91P	Garnet Red Pearl
G-79P	Bayern Green Pearl
NH-503P	Granada Black Pearl
NH-578	Taffeta White
YR-509P	Granite Silver Pearl
YR-506M	Arbere Taupe Metallic

Engine Number

G25A4 - 2800001

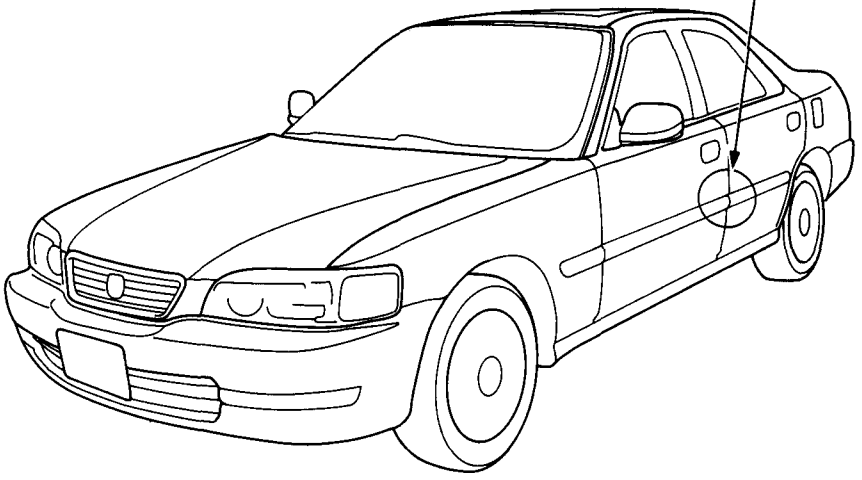
Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.



Paint Code

COLOR NH-503P



Canada 1997 Model

Vehicle Identification Number

JH4 UA2 6 4 * V C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
V: 1997
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 4000001

Transmission Type
Serial Number

Paint Code

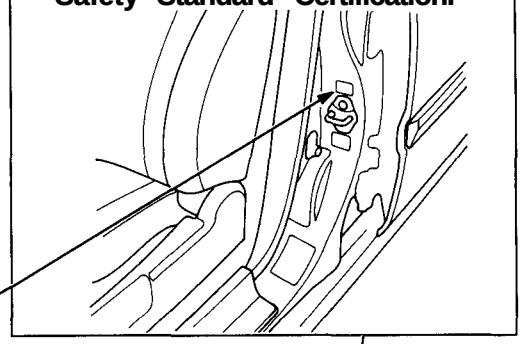
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Juniper Green Pearl
NH-578	Taffeta White
NH-592P	Flamenco Black Pearl
YR-506M	Desert Mist Metallic
YR-509P	Granite Silver Pearl

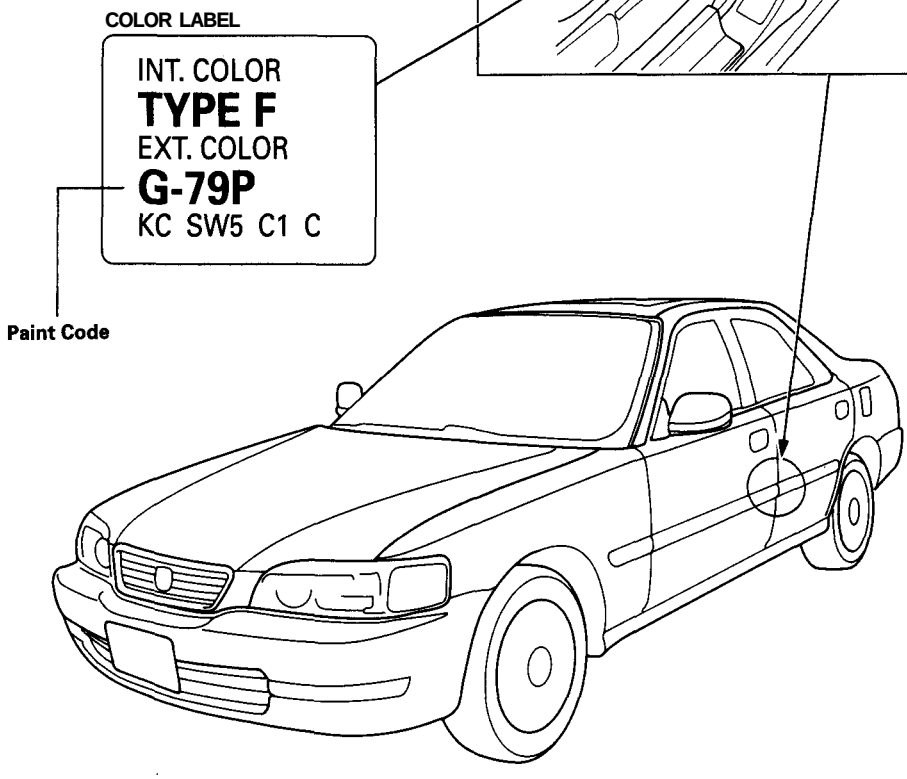
Engine Number

G25A4 - 3800001

Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.





Chassis and Paint Codes

Canada 1998 Model

Vehicle Identification Number

JH4 UA2 6 4 * W C 800001

Manufacturer, Make and Type of Vehicle
JH4: HONDA MOTOR CO., LTD. ACURA Passenger vehicle
Line, Body and Engine Type
UA2: 2.5TL/G25A4
Body Type and Transmission Type
6: 4-door sedan/4-speed Automatic
Vehicle Grade (Series)
Check Digit
Model Year
W: 1998
Factory Code
C: Saitama Factory in Japan (Sayama)
Serial Number

Transmission Number

M1WA - 5000001

Transmission Type
Serial Number

Paint Code

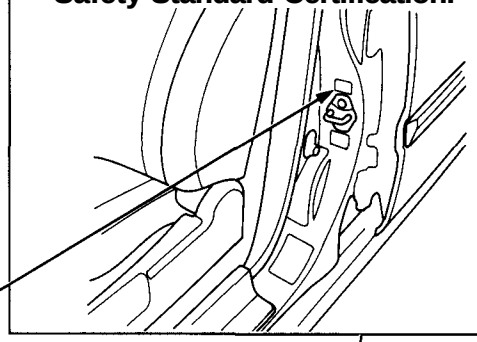
Paint Code	Color
B-68P	Pacific Blue Pearl
G-79P	Bayern Green Pearl
NH-592P	Starlight Black Pearl
YR-509P	Granite Silver Pearl

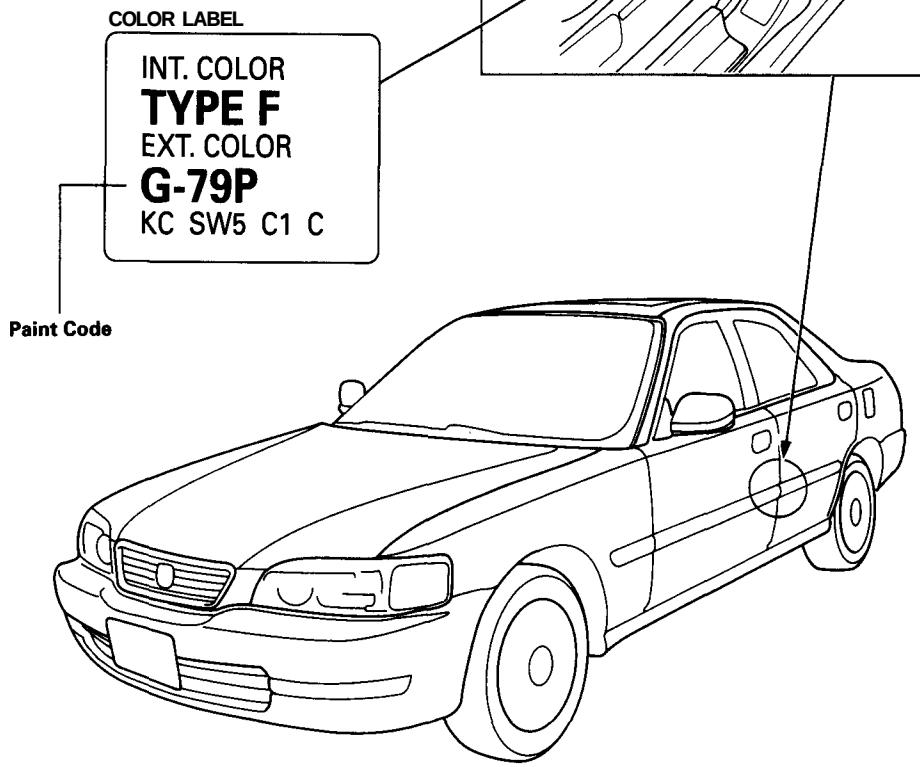
Engine Number

G25A4 - 4800001

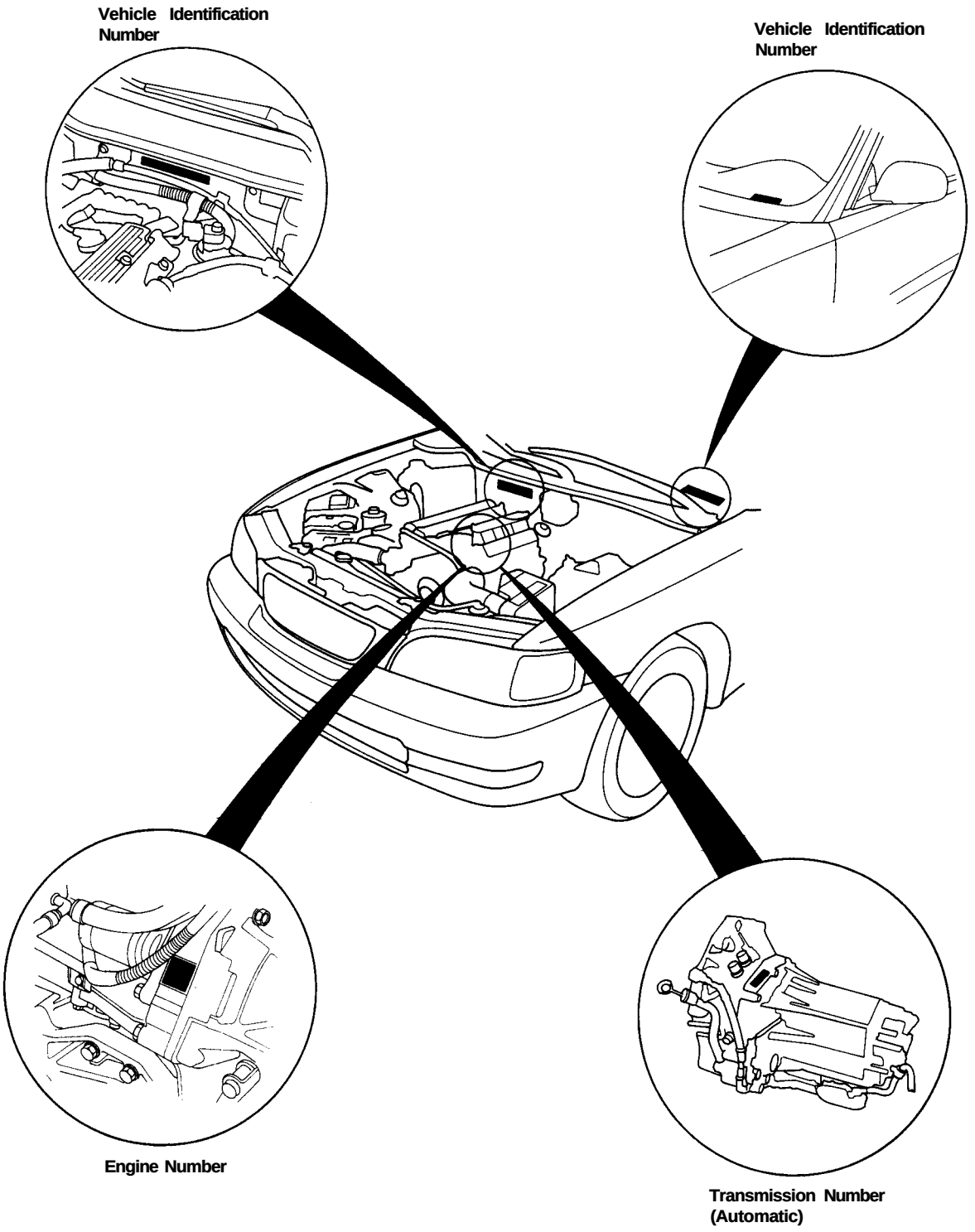
Engine Type
Serial Number

Vehicle Identification Number and Canadian Motor Vehicle Safety Standard Certification.

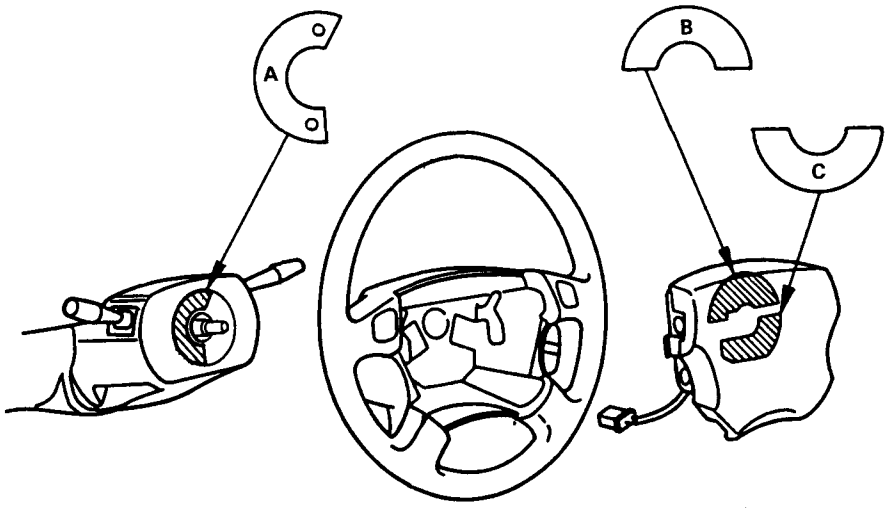




Identification Number Locations



Warning/Caution Label Locations



A: CABLE REEL CAUTION A

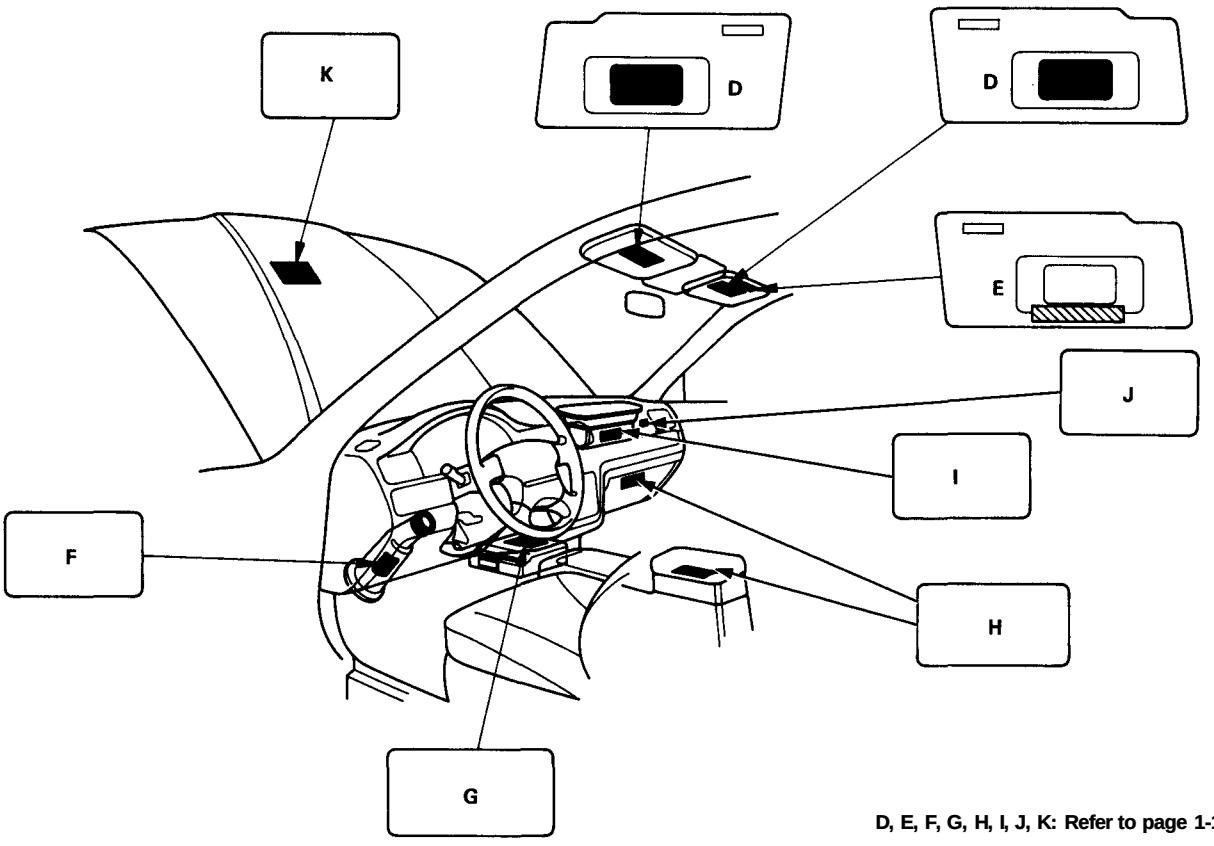
SRS
REFER TO SERVICE MANUAL FOR DETAILED INSTRUCTIONS.

B: DRIVER MODULE DANGER

DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD, OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100 C). FOR PROPER HANDLING, STORAGE, AND DISPOSAL PROCEDURES REFER TO SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

C: DRIVER MODULE WARNING

WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES. THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.



D, E, F, G, H, I, J, K: Refer to page 1-12

D: DRIVER INFORMATION (SUNVISOR)

U.S. model

CAUTION
TO AVOID SERIOUS INJURY:
- **FOR MAXIMUM SAFETY PROTECTION IN ALL TYPES OF CRASHES, YOU MUST ALWAYS WEAR YOUR SAFETY BELT.**
- **DO NOT INSTALL REARWARD FACING CHILD SEATS IN ANY FRONT PASSENGER SEAT POSITION.**
- **DO NOT SIT OR LEAN UNNECESSARILY CLOSE TO THE AIRBAG.**
- **DO NOT PLACE ANY OBJECTS OVER THE AIRBAG OR BETWEEN THE AIRBAG AND YOURSELF.**
- **SEE THE OWNER'S MANUAL FOR FURTHER INFORMATION AND EXPLANATIONS.**
- **THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.**
- **THE DATE OF INSTALLATION IS SHOWN OF THE DRIVER'S DOORJAMB.**

Canada model

SRS ALWAYS WEAR YOUR SEAT BELT
- **THIS CAR IS EQUIPPED WITH A DRIVER AIRBAG AND A FRONT SEAT PASSENGER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM (S.R.S.).**
- **IT IS DESIGNED TO SUPPLEMENT THE SEAT BELT.**
- **BEFORE DRIVING READ LABEL INSIDE THE GLOVE BOX.**

U.S. model (98 model)

WARNING
DEATH OR SERIOUS INJURY CAN OCCUR.
- **CHILDREN AGES 12 AND UNDER CAN BE KILLED BY THE AIRBAG.**
- **THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN.**
- **NEVER PUT A REAR-FACING CHILD SEAT IN THE FRONT.**
- **SIT AS FAR BACK AS POSSIBLE FROM THE AIRBAG.**
- **ALWAYS USE SEAT BELTS AND CHILD RESTRAINTS.**
- **THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.**
- **THE DATE OF INSTALLATION IS SHOWN ON THE DRIVER'S DOORJAMB.**

(cont'd)

Warning/Caution Label Locations

(cont'd)

D: DRIVER INFORMATION (SUNVISOR)
Canada model (98 model)

CAUTION
TO AVOID SERIOUS INJURY:
- FOR MAXIMUM SAFETY PROTECTION IN ALL TYPES OF CRASHES, YOU MUST ALWAYS WEAR YOUR SAFETY BELT.
- DO NOT INSTALL REARWARD FACING CHILD SEATS IN ANY FRONT PASSENGER SEAT POSITION.
- DO NOT SIT OR LEAN UNNECESSARILY CLOSE TO THE AIRBAG.
- DO NOT PLACE ANY OBJECTS OVER THE AIRBAG OR BETWEEN THE AIRBAG AND YOURSELF.
- SEE THE OWNER'S MANUAL FOR FURTHER INFORMATION AND EXPLANATIONS.
- THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED.
- THE DATE OF INSTALLATION IS SHOWN OF THE DRIVER'S DOORJAMB.

E: ASSISTANT INFORMATION
U.S. model

AIRBAG SEE OTHER SIDE.

U.S. model (98 model)

AIRBAG WARNING
FLIP VISOR OVER

F: STEERING COLUMN NOTICE

NOTICE
TO PREVENT SRS DAMAGE, REMOVE STEERING WHEEL BEFORE REMOVING STEERING SHAFT CONNECTING BOLT.

G: MONITOR NOTICE

NOTICE SRS
- NO SERVICEABLE PARTS INSIDE.
- REFER TO SERVICE MANUAL FOR DETAILED INSTRUCTIONS.

H: SRS CONSOLE/GLOVE BOX INFORMATION
Canada model (95 - 97 model)

AIRBAG INFORMATION
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
- THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED. THE DATE OF INSTALLATION IS SHOWN ON THE CERTIFICATION PLATE, LOCATED ON THE DRIVER'S DOORJAMB.
- DIAGNOSTIC CHECKS AND REPLACEMENT OF SRS COMPONENTS MUST BE DONE BY AN AUTHORIZED DEALER.
- SEE YOUR OWNER'S MANUAL FOR ADDITIONAL SRS INFORMATION.

I: FRONT SEAT PASSENGER AIRBAG MODULE DANGER

DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200 F (100°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING.
FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES. THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

J: PASSENGER AIRBAG CAUTION
U.S. model (98 model)

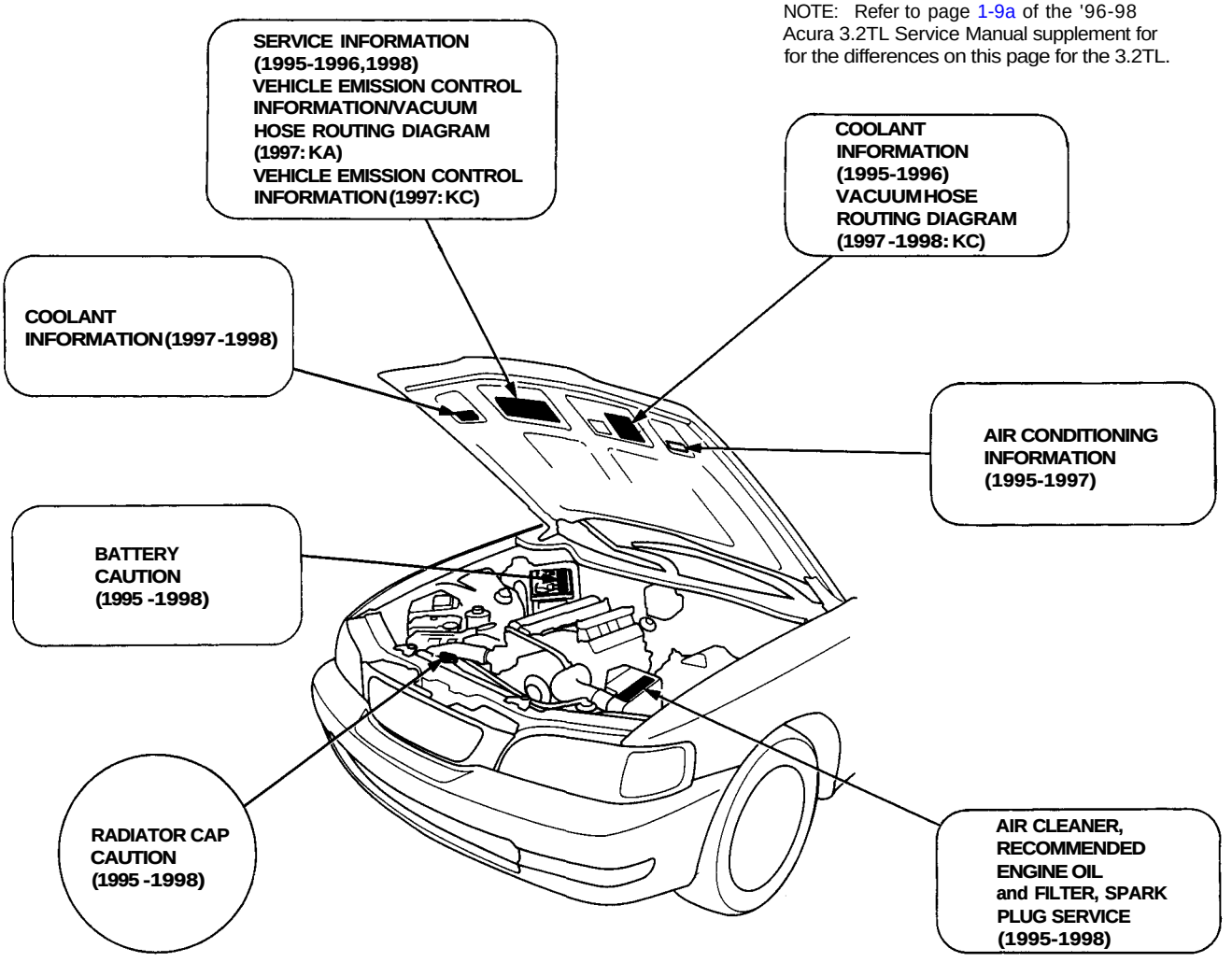
WARNING
CHILDREN CAN BE KILLED OR INJURED BY A PASSENGER AIRBAG.
THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN AGES 12 AND UNDER. MAKE SURE ALL CHILDREN USE SEAT BELTS OR CHILD SEATS.

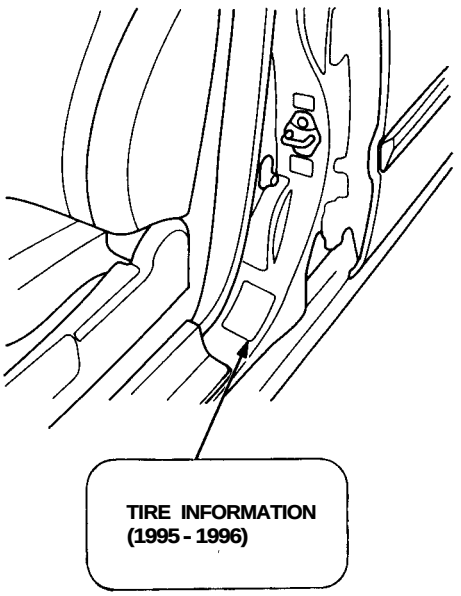
K: SRS WARNING (HOOD)

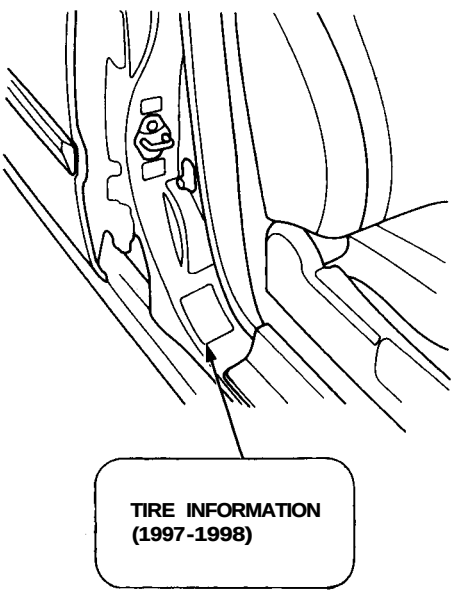
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
THIS VEHICLE IS EQUIPPED WITH DRIVER AND FRONT SEAT PASSENGER AIRBAGS.
ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
TAMPERING WITH, DISCONNECTING OR USING ELECTRICAL TEST EQUIPMENT ON THE SRS WIRING CAN MAKE THE SYSTEM INOPERATIVE OR CAUSE ACCIDENTAL FIRING OF THE INFLATOR.

WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT YOU. FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

NOTE: Refer to page 1-9a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences on this page for the 3.2TL.



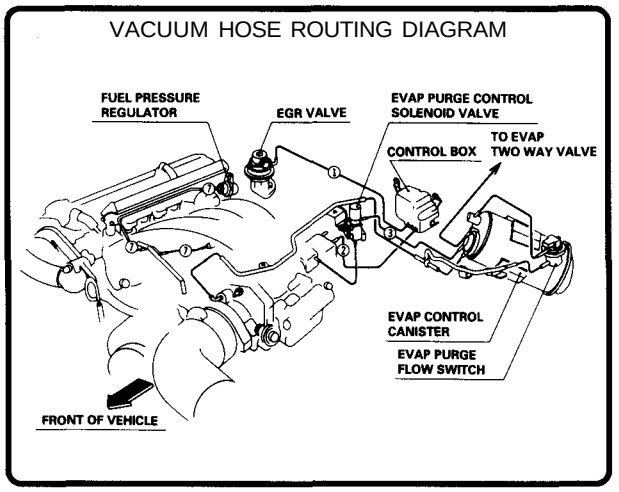


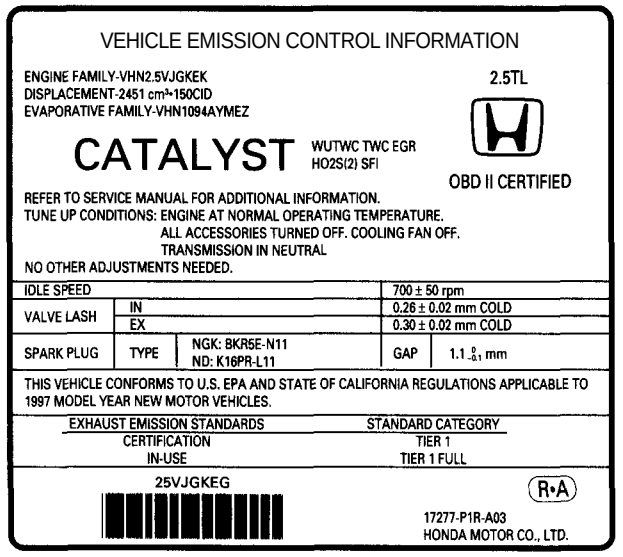


Under-hood Emissions Control Label

Emission Group Identification (1997 model)

Example:





50ST (50 States):
THIS VEHICLE CONFORMS TO THE U.S. EPA AND THE STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO THE U.S. EPA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):
THIS VEHICLE CONFORMS TO THE U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1997 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: V HN 2.5 V J G K E K

Model Year
- T: 1996
- V: 1997

Manufacturer
- HN: Honda

Displacement

Class
- V: Light Duty Vehicle/Passenger Car

Fuel System and Number of Valves
- J: Electronic Sequential Multiport Injection (three or more valves per cylinder)

Fuel Type
- G: Gasoline

Standard
- F: 49 or 50 States Tier 1
- K: 49 or 50 States Tier 1
- 1: California Tier 1
- 2: California TLEV
- 3: California LEV
- 4: California ULEV

Catalyst
- E, F, G, H: Three Way Catalyst

OBD
- K – T: OBD Equipped

Evaporative Family: V HN 1 094 A Y M E Z

Model Year
- T: 1996
- V: 1997

Manufacturer
- HN: Honda

Storage System
- 1: Canister

Canister Working Capacity (grams)

Canister Configuration
- A: Plastic Housing (Closed Bottom)
- B: Plastic Housing (Open Bottom)

Fuel System
- Y: Fuel Injection

Fuel Tank
- M: Metal

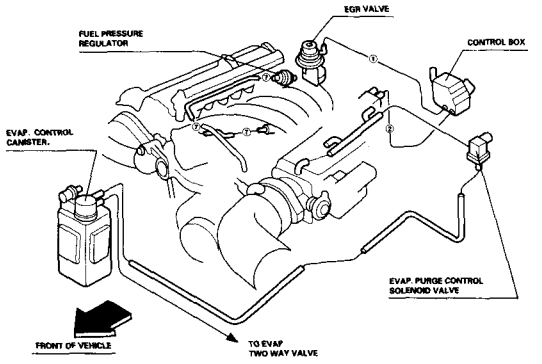
Standard
- A: Current Evap
- E: Enhanced Evap

Wild Card

Emission Group Identification (1998 model)

Example:

VACUUM HOSE ROUTING DIAGRAM



VEHICLE EMISSION CONTROL INFORMATION

ENGINE FAMILY-WHNXV02.5GA1
DISPLACEMENT-2.5L
EVAPORATIVE FAMILY-WHNXE0094AAZ
(§86.130-96 PROCEDURES)

CATALYST WUTWC TWC HO2S(2) EGR SFI

OBD II CERTIFIED

NO OTHER ADJUSTMENTS NEEDED.

VALVE LASH	IN		0.26 ± 0.02 mm	COLD
	EX		0.30 ± 0.02 mm	COLD
SPARK PLUG	TYPE	NGK: BKR5E-N11 ND: K16PR-L11	GAP	1,1 $^{0}_{-0.1}$ mm

THIS VEHICLE CONFORMS TO U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

2 5 V H G B B G

☆

P1R-A04 HONDA MOTOR CO., LTD. R•A

50ST (50 States):
THIS VEHICLE CONFORMS TO THE U.S. EPA AND THE STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

49ST (49 States/Federal):
THIS VEHICLE CONFORMS TO THE U.S. EPA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW MOTOR VEHICLES.

CAL (California):
THIS VEHICLE CONFORMS TO THE U.S. EPA AND STATE OF CALIFORNIA REGULATIONS APPLICABLE TO 1998 MODEL YEAR NEW PASSENGER CARS PROVIDED THAT THIS VEHICLE IS ONLY INTRODUCED INTO COMMERCE FOR SALE IN THE STATE OF CALIFORNIA.

Engine and Evaporative Families

Engine Family: W HNX V 02.5 GA1

Model Year
W: 1998
Manufacturer
HNX: Honda
Type
V: Light Duty Vehicle/Passenger Car
Displacement
Sequence Characters

Evaporative Family: W HNX E 0094 AAZ

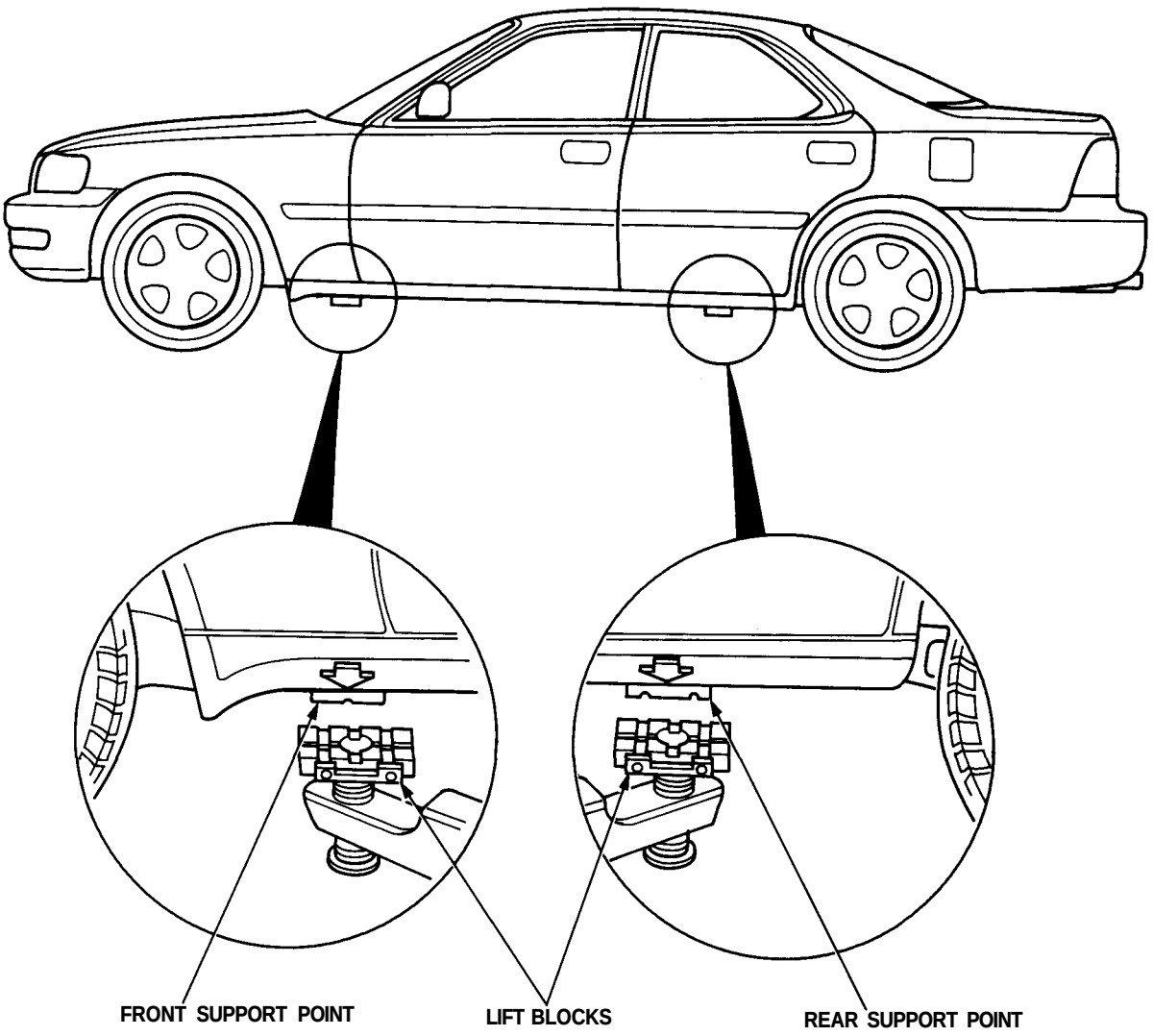
Model Year
W: 1998
Manufacturer
HNX: Honda
Type
E: EVAP
Canister Work Capacity (grams)
Sequence Characters

Lift and Support Points

Lift and Safety Stands

1. Place the lift blocks as shown.
2. Raise the hoist a few inches (centimeters), and rock the vehicle to be sure it is firmly supported.
3. Raise the hoist to full height, and inspect lift points for solid support.

NOTE: Use the same support points to support the vehicle on safety stands.



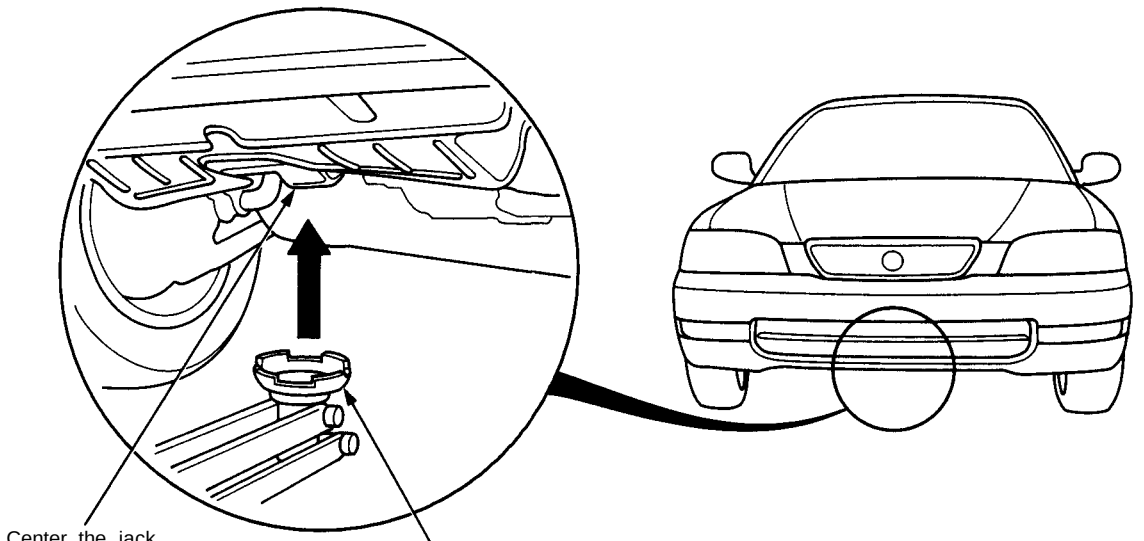
Floor Jack

1. Set the parking brake, and block the wheels that are not being lifted.
2. When lifting the rear of the vehicle, put the shift lever in [P] position.
3. Raise the vehicle high enough to insert the safety stands.
4. Adjust and place the safety stands so the vehicle will be approximately level, then lower the vehicle onto them.

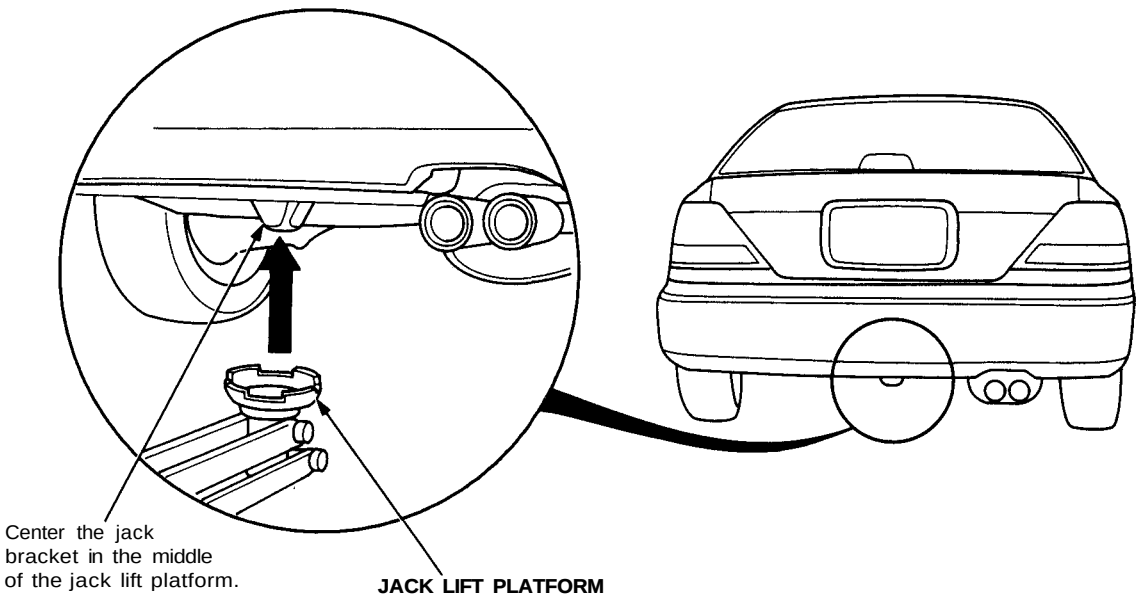
⚠ WARNING

- **Always use safety stands when working on or under any vehicle that is supported by only a jack.**
- **Never attempt to use a bumper jack for lifting or supporting the vehicle.**

Front



Rear



Towing

If the vehicle needs to be towed, call a professional towing service. Never tow the vehicle behind another vehicle with just a rope or chain. It is very dangerous.

Emergency Towing
There are three popular methods of towing a vehicle:

Flat-bed Equipment — The operator loads the vehicle on the back of a truck. This is the best way of transporting the vehicle.

Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two wheels remain on the ground.

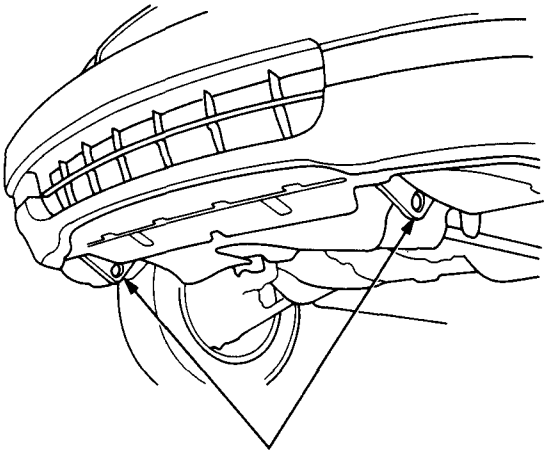
Sling-type Equipment — The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the vehicle off the ground. The vehicle's suspension and body can be seriously damaged if this method of towing is attempted.

If the vehicle cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the vehicle must be towed with the front wheels on the ground, do the following:

- Release the parking brake.
- Start the engine.
- Shift to D4 position, then N position.
- Turn off the engine.

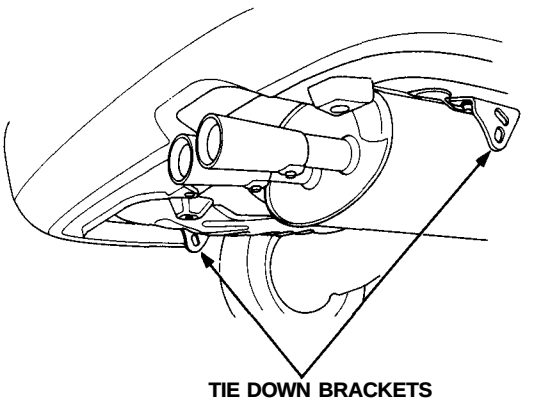
CAUTION:
- **Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine, the vehicle must be transported on a flat-bed.**
- **It is best to tow the vehicle no farther than 50 miles (80 km), and keep the speed below 35 mph (55 km/h).**
- **Trying to lift or tow the vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.**

Front:



TOWING HOOKS and TIE DOWN BRACKETS

Rear:



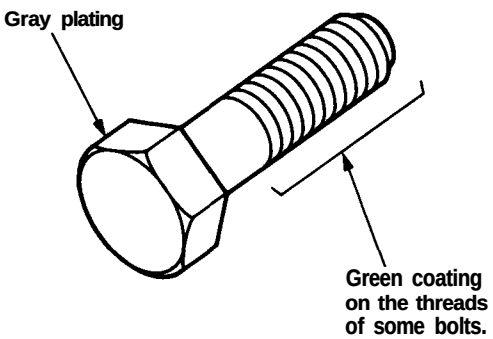
TIE DOWN BRACKETS

ServicePrecautions

Handling of Special Nuts and Bolts

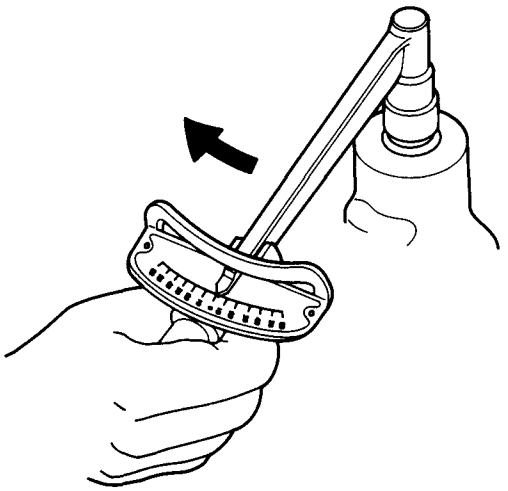
Because the front sub frame sections on this vehicle are constructed with aluminum alloys, use only the special "Dacro" type nuts and bolts recommended by Acura.

NOTE:
- Dacro finish can be identified by gray plating.
- Some Dacro finish bolts have a green coating on the thread section of the bolt for easier application. This type of bolt is called a "Torquer" bolt.
- Use of other types of nuts and bolts may cause electrolysis and corrosion which in turn could cause the bolt to loosen.



Gray plating: "Dacro" type
Gray plating + Green coating on the threads: "Torquer" type

1. When replacing nuts and bolts, use only the same type.
2. Tighten the nuts and bolts with a torque wrench to the specifications provided in this manual.
3. Clean all thread ridges with a non-wire-type bristle brush. Foreign matter in the threads may cause the bolt to loosen.
4. Sections on this vehicle requiring the use of Dacro nuts and bolts will be indicated by a (#) in this manual.



Standards and Service Limits

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm and wide open throttle kPa (kgf/cm², psi)	Nominal Minimum Maximum variation	 1,570 (16.0, 228) 930 (9.5, 135) 200 (2.0, 28)	
Cylinder head	Warpage Height		——— 99.95 – 100.05 (3.935 – 3.939)	0.05 (0.002) ———
Camshaft	End play Camshaft-to-holder oil clearance Total runout Cam lobe height	 IN EX	0.05 – 0.15 (0.002 – 0.006) 0.050 – 0.089 (0.0020 – 0.0035) 0.03 (0.001) max. 39.203 (1.5434) 38.875 (1.5305)	0.5 (0.02) 0.15 (0.006) 0.04 (0.002) ——— ———
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance	IN EX IN EX IN EX	0.24 – 0.28 (0.009 – 0.011) 0.28 – 0.32 (0.011 – 0.013) 5.475 – 5.485 (0.2156 – 0.2159) 5.450 – 5.460 (0.2146 – 0.2150) 0.020 – 0.045 (0.0008 – 0.0018) 0.05 – 0.08 (0.002 – 0.003)	——— ——— 5.445 (0.2144) 5.420 (0.2134) 0.075 (0.0030) 0.10 (0.004)
Valve seat	Width Stem installed height	 IN EX	1.25 – 1.55 (0.049 – 0.061) 48.745 – 49.215 (1.9191 – 1.9376) 51.315 – 51.785 (2.0203 – 2.0388)	2.0 (0.08) 49.465 (1.9474) 52.035 (2.0486)
Valve spring	Free length	IN EX 	52.13 (2.052)*1 52.12 (2.052)*2 56.10 (2.209)*1 56.08 (2.208)*2	——— ——— ——— ———
Valve guide	I.D. Installed height	IN EX IN EX	5.505 – 5.520 (0.2167 – 0.2173) 5.510 – 5.530 (0.2169 – 0.2177) 24.75 – 25.25 (0.974 – 0.994) 16.05 – 16.55 (0.632 – 0.652)	5.54 (0.2181) 5.55 (0.2185) ——— ———
Rocker arm	Arm-to-shaft clearance	IN EX	0.017 – 0.050 (0.0007 – 0.0020) 0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003) 0.08 (0.003)

*1: NIHON HATSUJO manufactured valve spring, *2: CHUO HATSUJO manufactured valve spring

Unit of length: mm (in)

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter	A or I	85.010 – 85.020 (3.3468 – 3.3472)	85.070 (3.3492)
		B or II	85.000 – 85.010 (3.3465 – 3.3468)	85.070 (3.3492)
	Bore taper		———	0.05 (0.002)
	Reboring limit		———	0.5 (0.02)
Piston	Skirt O.D.*	No letter (A)	84.980 – 84.990 (3.3457 – 3.3461)	84.970 (3.3453)
		B	84.970 – 84.980 (3.3453 – 3.3457)	84.960 (3.3449)
	Clearance in cylinder		0.010 – 0.040 (0.0004 – 0.0016)	0.05 (0.002)
	Groove width (For ring)	Top	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
		Second	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
		Oil	2.805 – 2.825 (0.1104 – 0.1112)	2.85 (0.112)
Piston ring	Ring-to-groove clearance	Top	0.045 – 0.070 (0.0018 – 0.0028)	0.14 (0.006)
		Second	0.030 – 0.055 (0.0012 – 0.022)	0.13 (0.005)
	Ring end gap	Top	0.20 – 0.30 (0.008 – 0.012)	0.50 (0.020)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil	0.20 – 0.70 (0.008 – 0.028)	0.80 (0.031)
Piston pin	O.D.		21.994 – 22.000 (0.8659 – 0.8661)	———
	Pin-to-piston clearance		0.012 – 0.024 (0.0005 – 0.0009)	———
Connecting rod	Pin-to-rod interference		0.013 – 0.032 (0.0005 – 0.0013)	———
	Small end bore diameter		21.968 – 21.981 (0.8649 – 0.8654)	———
	Large end bore diameter	Nominal	48.0 (1.89)	———
	End play installed on crankshaft		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Main journal diameter		54.976 – 55.000 (2.1644 – 2.1654)	———
	Rod journal diameter		44.976 – 45.000 (1.7707 – 1.7717)	———
	Taper		0.005 (0.0002) max.	0.010 (0.0004)
	Out-of-round		0.005 (0.0002) max.	0.010 (0.0004)
	End play		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Total runout		0.03 (0.001) max.	0.04 (0.002)
Bearings	Main bearing-to-journal oil clearance		0.018 – 0.048 (0.0007 – 0.0019)	0.053 (0.0021)
	Rod bearing-to-journal oil clearance		0.015 – 0.043 (0.0006 – 0.0017)	0.05 (0.002)

*: Measured at 21.0 mm (0.83 in) from bottom at skirt

Engine Lubrication — Section 8

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)		5.2 (5.5, 4.6) for engine overhaul 4.3 (4.5, 3.8) for oil change, including filter 4.0 (4.2, 3.5) for oil change, without filter	
Oil pump	Inner-to-outer rotor radial clearance		0.02 – 0.16 (0.001 – 0.006)	0.20 (0.008)
	Housing-to-outer rotor radial clearance		0.10 – 0.18 (0.004 – 0.007)	0.20 (0.008)
	Housing-to-rotor axial clearance		0.02 – 0.07 (0.001 – 0.003)	0.12 (0.005)
Relief valve	Pressure setting at oil temperature 176°F (80°C) kPa (kgf/cm², psi)	at idle	69 (0.7, 10) min.	
		at 3,000 rpm	340 (3.5, 50) min.	

Standards and Service Limits

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Engine coolant capacity ℓ (US qt, Imp qt) [including engine, heater, cooling line and reservoir] Reservoir capacity: 0.70 ℓ (0.74 US qt, 0.62 Imp qt)	7.0 (7.4, 6.2) for overhaul 5.2 (5.5, 4.6) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm², psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to open °F (°C) Primary Secondary Fully open °F (°C) Valve lift at fully open Primary Secondary	176 – 183 (80 – 84) 181 – 189 (83 – 87) 203 (95) 10.0 (0.39) min. 8.5 (0.33) min.
Radiator fan	Radiator fan switch A "ON" temperature °F (°C) Radiator fan switch A "OFF" temperature °F (°C) Radiator fan switch B "ON" temperature °F (°C) Radiator fan switch B "OFF" temperature °F (°C)	196 – 203 (91 – 95) Subtract 5 – 15 (3 – 8) from actual "ON" temperature. 201 – 212 (94 – 100) Subtract 7 – 16 (4 – 9) from actual "ON" temperature.

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)
Pressure	Pressure with regulator vacuum hose disconnected kPa (kgf/cm², psi)	290 – 340 (3.0 – 3.5, 43 – 50)
Fuel tank	Capacity ℓ (US gal, Imp gal)	65 (17.2, 14.3)
Engine	Fast idle rpm	1200 ± 200
	Idle speed rpm [with headlight and cooling fan off]	700 ± 50 (P or N position)
	Idle CO %	0.1 max.

Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)		7.2 (7.6, 6.3) for overhaul 2.7 (2.9, 2.4) for fluid change	
Hydraulic pressure kPa (kgf/cm², psi)	Line pressure at 2,000 rpm in N or P position		590 (6.0, 85) Fully closed throttle | 880 (9.0, 130) Fully opened throttle	540 (5.5, 78) Fully closed throttle | 830 (8.5, 120) Fully opened throttle
	1st clutch pressure at 2,000 rpm in 1 position			
	2nd clutch pressure at 2,000 rpm in D4 position			
	3rd clutch pressure at 2,000 rpm in D4 position			
	4th clutch pressure at 2,000 rpm in D4 position			
	2nd clutch pressure at 2,000 rpm in 2 position			
	1st and 1st-hold clutch pressure at 2,000 rpm in 1 position			
	Throttle B pressure	Throttle fully closed Throttle fully open	0 – 15 (0 – 0.15, 0 – 2) 580 (5.9, 84)	——— 560 – 600 (5.7 – 6.1, 81 – 87)
Stall speed rpm (Check with vehicle on level ground)			2,350	2,200 – 2,500
Clutch	Clutch initial clearance	1st-hold	0.80 – 1.00 (0.031 – 0.039)	———
		1st	0.65 – 0.85 (0.026 – 0.033)	———
		2nd, 3rd, 4th	0.55 – 0.75 (0.022 – 0.030)	———
	Clutch return spring free length	1st	33.2 (1.31)	31.2 (1.23)
		2nd, 3rd, 4th	33.9 (1.33)	31.9 (1.26)
		1st-hold	31.1 (1.22)	29.1 (1.15)
	Clutch disc thickness		1.88 – 2.00 (0.074 – 0.079)	Until grooves wear out
	Clutch plate thickness	1st, 3rd, 1st-hold	1.95 – 2.05 (0.077 – 0.081)	Discoloration
		2nd, 4th	2.25 – 2.35 (0.089 – 0.093)	Discoloration
	Clutch end plate thickness (1st)	Mark 1	2.05 – 2.10 (0.081 – 0.083)	Discoloration
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	↕
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	↕
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	↕
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	↕
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	↕
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	↕
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	↕
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	↕
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	↕
		Mark 11	3.05 – 3.10 (0.120 – 0.122)	↕
		Mark 12	3.15 – 3.20 (0.124 – 0.126)	↕
		Mark 13	3.25 – 3.30 (0.128 – 0.130)	↕
		Mark 14	3.35 – 3.40 (0.132 – 0.134)	Discoloration
	Clutch end plate thickness (2nd and 4th)	Mark 1	2.05 – 2.10 (0.081 – 0.083)	Discoloration
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	↕
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	↕
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	↕
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	↕
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	↕
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	↕
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	↕
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	Discoloration

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Clutch (cont'd)	Clutch end plate thickness (3rd)	Mark 4	2.35 – 2.40 (0.093 – 0.094)	Discoloration ↕ Discoloration
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	
		Mark 11	3.05 – 3.10 (0.120 – 0.122)	
		Mark 12	3.15 – 3.20 (0.124 – 0.126)	
		Mark 13	3.25 – 3.30 (0.128 – 0.130)	
	Clutch end plate thickness (1st-hold)	Mark 3	2.25 – 2.30 (0.089 – 0.091)	Discoloration ↕ Discoloration
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	
		Mark 10	2.95 – 3.00 (0.116 – 0.118)	
Valve body	Stator shaft needle bearing contact I.D.			
	Torque converter side		27.000 – 27.021 (1.0630 – 1.0638)	Wear or damage
	ATF pump side		29.000 – 29.013 (1.1417 – 1.1422)	———
	ATF pump gear thrust clearance		0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
	ATF pump gear-to-body clearance	Drive	0.210 – 0.265 (0.0083 – 0.0104)	———
		Driven	0.070 – 0.125 (0.0028 – 0.0049)	———
	ATF pump driven gear I.D.		14.016 – 14.034 (0.5518 – 0.5525)	Wear or damage
	ATF pump driven gear shaft O.D.		13.980 – 13.990 (0.5504 – 0.5508)	Wear or damage
Shifting device and parking brake control	Reverse shift fork finger thickness		5.90 – 6.00 (0.232 – 0.236)	5.40 (0.213)
	Parking brake pawl		———	Wear or other defect
	Parking gear		———	
Servo body	Shift fork shaft bore I.D.		14.000 – 14.010 (0.5512 – 0.5516)	———
	Shift fork shaft valve bore I.D.		37.000 – 37.039 (1.4567 – 1.4582)	37.045 (1.4585)
Regulator valve body	Sealing ring contact I.D.		35.000 – 35.025 (1.3780 – 1.3789)	35.050 (1.3799)
Stator shaft	Sealing ring contact I.D.		29.000 – 29.013 (1.1417 – 1.1422)	29.050 (1.1437)
Transmission	Thrust washer thickness			
	Mainshaft ball bearing Fr side		3.45 – 3.55 (0.136 – 0.140)	Wear or damage
	Mainshaft 1st gear Fr side		1.45 – 1.50 (0.057 – 0.059)	1.40 (0.055)
	Mainshaft 1st gear Rr side		2.43 – 2.50 (0.096 – 0.098)	Wear or damage
	Countershaft 1st gear Rr side		3.43 – 3.50 (0.135 – 0.138)	Wear or damage
	Mainshaft 4th gear collar length		47.50 – 47.55 (1.870 – 1.872)	———
	Mainshaft 1st gear collar length		35.50 – 35.55 (1.398 – 1.400)	———
	Mainshaft 1st gear collar flange thickness		3.25 – 3.40 (0.128 – 0.134)	Wear or damage
	Mainshaft 2nd gear thrust washer thickness		3.97 – 4.00 (0.156 – 0.157) 4.02 – 4.05 (0.158 – 0.159) 4.07 – 4.10 (0.160 – 0.161) 4.12 – 4.15 (0.162 – 0.163) 4.17 – 4.20 (0.164 – 0.165) 4.22 – 4.25 (0.166 – 1.167) 4.27 – 4.30 (0.168 – 1.169) 4.32 – 4.35 (0.170 – 0.171) 4.37 – 4.40 (0.172 – 0.173) 4.42 – 4.45 (0.174 – 0.175) 4.47 – 4.50 (0.176 – 0.177)	Wear or damage ↕ Wear or damage
	Mainshaft sealing ring 35 mm thickness		1.980 – 1.995 (0.0780 – 0.0785)	1.80 (0.071)
	Mainshaft sealing ring 29 mm thickness		1.980 – 1.995 (0.0780 – 0.0785)	1.80 (0.071)
	Mainshaft sealing ring groove width		2.025 – 2.060 (0.0797 – 0.0811)	2.08 (0.082)
	Countershaft 3rd gear distance collar length		24.05 – 24.10 (0.947 – 0.949)	———
	Countershaft 3rd gear distance collar flange thickness		4.35 – 4.50 (0.171 – 0.177)	Wear or damage
	Countershaft reverse gear collar length		14.0 – 14.05 (0.551 – 0.553)	———
	Countershaft reverse gear collar flange thickness		2.45 – 2.60 (0.096 – 0.102)	Wear or damage
	Countershaft 1st gear collar length		60.00 – 60.05 (2.362 – 2.364)	———

Unit of length: mm (in)

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Countershaft distance collar 35 mm length	65.625 – 65.675 (2.5837 – 2.5856)	———
		65.675 – 65.725 (2.5856 – 2.5876)	———
		65.725 – 65.775 (2.5876 – 2.5896)	———
		65.775 – 65.825 (2.5896 – 2.5915)	———
		65.825 – 65.875 (2.5915 – 2.5935)	———
		65.875 – 65.925 (2.5935 – 2.5955)	———
		65.925 – 65.975 (2.5955 – 2.5974)	———
		65.975 – 66.025 (2.5974 – 2.5994)	———
		66.025 – 66.075 (2.5994 – 2.6014)	———
		66.075 – 66.125 (2.6014 – 2.6033)	———
	Mainshaft feed pipe O.D.	11.47 – 11.48 (0.4516 – 0.4520)	11.45 (0.451)
	Mainshaft feed pipe O.D.	5.97 – 5.98 (0.2350 – 0.2354)	5.95 (0.234)
	Countershaft feed pipe O.D.	11.47 – 11.48 (0.4516 – 0.4520)	11.45 (0.451)
	Countershaft feed pipe O.D.	7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.313)
	Mainshaft bushing I.D.	11.500 – 11.518 (0.4528 – 0.4535)	11.530 (0.4539)
	Mainshaft bushing I.D.	6.018 – 6.030 (0.2369 – 0.2374)	6.045 (0.2380)
	Countershaft bushing I.D.	11.500 – 11.518 (0.4528 – 0.4535)	11.530 (0.4539)
	Countershaft bushing I.D.	8.000 – 8.015 (0.3150 – 0.3156)	8.030 (0.3161)
	Diameter of needle bearing contact area		
	On mainshaft of stator shaft	22.980 – 22.993 (0.9047 – 0.9052)	Wear or damage
	On mainshaft of 1st gear collar	32.975 – 32.991 (1.2982 – 1.2989)	↑
	On mainshaft of 4th gear collar	33.975 – 33.991 (1.3376 – 1.3382)	↑
	On mainshaft of 2nd gear	36.975 – 36.991 (1.4557 – 1.4563)	↑
	On countershaft (Front side)	38.505 – 38.515 (1.5159 – 1.5163)	↑
	On countershaft of 3rd gear distance collar	43.975 – 43.991 (1.7313 – 1.7319)	↑
	On countershaft of 1st gear collar	33.975 – 33.991 (1.3376 – 1.3382)	↑
	On countershaft of 4th gear	31.975 – 31.991 (1.2589 – 1.2595)	↑
	On countershaft of reverse gear collar	32.975 – 32.991 (1.2982 – 1.2989)	↑
	On reverse idler gear shaft	14.990 – 15.000 (0.5902 – 0.5906)	↑
	Reverse idler gear shaft holder I.D.	14.800 – 14.818 (0.5827 – 0.5834)	↑
	Diameter of one-way clutch contact area		↑
	Countershaft 1st gear I.D.	83.339 – 83.365 (3.2811 – 3.2821)	↑
	Parking gear O.D.	66.685 – 66.698 (2.6254 – 2.6259)	↑
	Selector hub O.D.	51.87 – 51.90 (2.042 – 2.043)	↑
	Inside diameter		↑
	Mainshaft 1st gear	37.000 – 37.016 (1.4567 – 1.4573)	↑
	Mainshaft 2nd gear	43.000 – 43.016 (1.6929 – 1.6935)	↑
	Mainshaft 4th gear	40.000 – 40.016 (1.5748 – 1.5754)	↑
	Countershaft 1st gear	40.000 – 40.016 (1.5748 – 1.5754)	↑
	Countershaft 3rd gear	49.000 – 49.016 (1.9291 – 1.9298)	↑
	Countershaft 4th gear	38.000 – 38.016 (1.4961 – 1.4967)	↑
	Countershaft reverse gear	39.000 – 39.016 (1.5354 – 1.5361)	↑
	Reverse idler gear	20.007 – 20.020 (0.7877 – 0.7882)	Wear or damage
	End play		
	Mainshaft 1st gear	0.08 – 0.24 (0.003 – 0.009)	———
	Mainshaft 2nd gear	0.07 – 0.15 (0.003 – 0.006)	———
	Mainshaft 4th gear	0.10 – 0.22 (0.004 – 0.009)	———
	Countershaft 1st gear	0.10 – 0.41 (0.004 – 0.016)	———
	Countershaft 3rd gear	0.05 – 0.17 (0.002 – 0.007)	———
	Countershaft 4th gear	0.07 – 0.15 (0.003 – 0.006)	———
	Countershaft reverse gear	0.10 – 0.25 (0.004 – 0.010)	———
	Reverse idler gear	0.05 – 0.28 (0.002 – 0.011)	———
Secondary gear shaft tapered roller bearing starting torque N·m (kgf·cm, lbf·in)		2.3 – 3.2 (23 – 33, 20 – 29)	———

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A	1.7 (0.067)	14.7 (0.579)	77.6 (3.055)	14.6
	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	7.5
	Stator reaction spring	5.5 (0.217)	37.4 (1.472)	30.3 (1.193)	2.1
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7
	Relief valve spring	0.9 (0.035)	8.4 (0.331)	38.1 (1.500)	13.0
	Cooler relief valve spring	1.0 (0.039)	8.4 (0.331)	39.1 (1.539)	15.1
	3-4 orifice control valve spring	0.7 (0.028)	6.6 (0.260)	34.8 (1.370)	22.0
	2-3 orifice control valve spring	0.7 (0.028)	6.6 (0.260)	33.8 (1.331)	11.7
	Throttle valve spring	1.0 (0.039)	7.6 (0.299)	28.3 (1.114)	12.1
	4th exhaust valve spring	0.6 (0.024)	5.6 (0.220)	49.1 (1.933)	21.0
	1-2 shift valve spring	0.9 (0.035)	8.6 (0.339)	40.4 (1.591)	14.5
	2-3 shift valve spring	0.9 (0.035)	9.6 (0.378)	43.0 (1.693)	12.1
	3-4 shift valve spring	0.9 (0.035)	9.6 (0.378)	43.0 (1.693)	12.1
	1st accumulator spring A	2.3 (0.091)	17.2 (0.677)	81.2 (3.197)	14.3
	1st accumulator spring B	2.3 (0.091)	9.6 (0.378)	48.0 (1.890)	12.2
	4th accumulator spring A	2.7 (0.106)	17.2 (0.677)	73.1 (2.878)	11.9
	4th accumulator spring B	1.9 (0.075)	9.0 (0.354)	49.0 (1.929)	15.1
	2nd accumulator spring	3.0 (0.118)	22.3 (0.878)	95.6 (3.764)	12.6
	1st-hold accumulator spring A	3.5 (0.138)	21.6 (0.850)	55.9 (2.201)	7.7
	3rd accumulator spring A	2.7 (0.106)	17.2 (0.677)	90.7 (3.571)	15.7
	3rd accumulator spring B	1.9 (0.075)	9.0 (0.354)	62.0 (2.441)	21.6
	1st-hold accumulator spring B	2.3 (0.091)	12.8 (0.504)	53.4 (2.102)	12.6
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	60.8 (2.394)	22.1
	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	52.1 (2.051)	20.8
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.0 (1.496)	14.1
	Modulator valve spring	1.2 (0.047)	9.4 (0.370)	27.6 (1.087)	7.7
	Main orifice control valve spring	0.7 (0.028)	6.1 (0.240)	35.1 (1.382)	22.4
	4th kick-down valve spring	1.0 (0.039)	7.6 (0.299)	48.2 (1.898)	22.2

Standards and Service Limits

Differential — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential oil	Capacity ℓ (US qt, Imp qt)	1.05 (1.11, 0.92) for overhaul 0.95 (1.00, 0.84) for oil change	
Differential carrier	Pinion shaft contact area I.D. Carrier-to-pinion shaft clearance Driveshaft or intermediate shaft contact area I.D. Carrier-to-driveshaft clearance Carrier-to-intermediate shaft clearance	18.000 – 18.018 (0.7087 – 0.7094) 0.013 – 0.047 (0.0005 – 0.0019) 28.025 – 28.045 (1.1033 – 1.1041) 0.045 – 0.086 (0.0018 – 0.0034) 0.108 – 0.144 (0.0043 – 0.0057)	——— 0.10 (0.004) ——— 0.12 (0.005) 0.18 (0.007)
Differential pinion gear	Backlash I.D. Pinion gear-to-pinion shaft clearance	0.05 – 0.15 (0.002 – 0.006) 18.042 – 18.066 (0.7103 – 0.7113) 0.055 – 0.095 (0.0022 – 0.0037)	0.30 (0.012) ——— 0.15 (0.006)
Drive pinion and ring gear	Backlash at inspection hole at gear circumference	0.04 – 0.10 (0.002 – 0.004) 0.06 – 0.14 (0.002 – 0.006)	Adjust with a shim
Drive pinion	Preload N·m (kgf·cm, lbf·in) New bearing Reused bearing	1.27 – 1.67 (13.0 – 17.0, 11 – 15) 0.64 – 1.03 (6.5 – 10.5, 5.6 – 9.1)	Adjust with a shim
Total bearing preload	Preload N·m (kgf·cm, lbf·in) Pinion and ring gear bearings are new Pinion and ring gear bearings are reused Ring gear bearing is new Pinion bearing is new	 Tp + 1.26 – 1.57 (12.8 – 16.0, 11.1 – 13.9) Tp + 0.89 – 1.13 (9.1 – 11.5, 7.90 – 9.98) Tp + 1.26 – 1.57 (12.8 – 16.0, 11.1 – 13.9) Tp + 0.89 – 1.13 (9.1 – 11.5, 7.90 – 9.98)	Adjust with a shim

Tp: Actual measurement of pinion preload.

Unit of length: mm (in)

Steering — Section 17

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Rotational play at steering wheel circumference		0 – 10 (0 – 0.4)
	Starting load at steering wheel circumference N (kgf, lbf)	Engine running	24 (2.4, 5.3) max.
Gearbox	Angle of rack-guide-screw loosened from locked position		20° ± 5°
Pump	Pump pressure with shut-off valve closed (oil temp./speed: 105°F (40°C) min./idle. Do not run for more than 5 seconds). kPa (kgf/cm², psi)		7,800 – 8,800 (80 – 90, 1,138 – 1,280)
Power steering fluid	Recommended fluid		Honda Power Steering Fluid-V or S
	Fluid capacity ℓ (US qt, Imp qt)	System	1.3 (1.4, 1.1)
		Reservoir	0.5 (0.5, 0.4)
Power steering pump belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		8.5 – 10.0 (0.33 – 0.39) with used belt 5.5 – 6.5 (0.22 – 0.26) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge		390 – 540 (40 – 55, 88 – 120) with used belt 740 – 880 (75 – 90, 170 – 200) with new belt

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

Suspension — Section 18

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber	Front	0°00′ ± 1°	———
		Rear	–0°30′ ± 1°	———
	Caster	Front	2°07′ ± 1°	———
	Total toe	Front	OUT 1.0 ± 2.0 (1/16 ± 1/16)	———
		Rear	IN 2.0 ± 2.0 (1/16 ± 1/16)	———
	Front wheel turning angle	Inward wheel	40°00′ ± 2°	———
		Outward wheel	33°18′ (Reference)	———
Wheel	Rim runout (Steel wheel)	Axial	0 – 1.0 (0 – 0.04)	2.0 (0.08)
		Radial	0 – 1.0 (0 – 0.04)	1.5 (0.06)
	Rim runout (Aluminum wheel)	Axial	0 – 0.7 (0 – 0.03)	2.0 (0.08)
		Radial	0 – 0.7 (0 – 0.03)	1.5 (0.06)
Wheel bearing	End play	Front	0 – 0.05 (0 – 0.002)	———
		Rear	0 – 0.05 (0 – 0.002)	———

Brakes — Section 19

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke at 196 N (20 kgf, 44 lbf) lever force		To be locked when pulled 7 – 11 notches	———
Foot brake pedal	Pedal height (with floor mat removed)		194 (6 5/8)	———
	Free play		1 – 5 (1/16 – 3/16)	———
Master cylinder	Piston-to-pushrod clearance		0 – 0.4 (0 – 0.02)	———
Disc brake	Disc thickness	Front	23.0 (0.91)	21.0 (0.83)
		Rear	9.0 (0.35)	7.5 (0.30)
	Disc runout	Front	———	0.10 (0.004)
		Rear	———	0.10 (0.004)
	Disc parallelism	Front and rear	———	0.015 (0.0006)
	Pad thickness	Front	11.0 (0.43)	1.6 (0.06)
		Rear	9.0 (0.35)	1.6 (0.06)

Standards and Service Limits

Air Conditioning — Section 22

	MEASUREMENT	STANDARD (NEW)
Air conditioning system	Lubricant type: ND-OIL8 (P/N 38897 – PR7 – A01AH or 38899 – PR7 – A01)	
	Lubricant capacity mℓ (fl oz, Imp oz) Condenser	25 (5/6, 0.9)
	Evaporator	50 (1 2/3, 1.8)
	Line or hose	20 (2/3, 0.7)
	Receiver	15 (1/2, 0.5)
Compressor (DENSO)	Lubricant type: ND-OIL8	
	Lubricant capacity mℓ (fl oz, Imp oz)	160 (5 1/3, 5.6)
	Field coil resistance at 68°F (20°C) Ω	3.4 – 3.8
	Pulley-to-pressure plate clearance	0.5 ± 0.15 (0.020 ± 0.006)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	9.0 – 11.0 (0.35 – 0.43) with used belt 5.0 – 6.5 (0.20 – 0.26) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge	390 – 540 (40 – 55, 88 – 120) with used belt 830 – 1,030 (85 – 105, 190 – 230) with new belt

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

Electrical — Section 23

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ignition coil	Rated voltage V	12	
	Primary winding resistance at 68°F (20°C) Ω	0.36 – 0.44	
	Secondary winding resistance at 68°F (20°C) kΩ	10.8 – 16.2	
Ignition wire	Resistance at 68°F (20°C) kΩ	25 max.	
	Firing order	1 – 2 – 4 – 5 – 3	
Spark plug	Type	See Section 23	
	Gap	1.1 $^{+0.8}_{-0.1}$(0.043 $^{+0.8}_{-0.004}$)	
Ignition timing	At idle °BTDC (Red)	15 ± 2	
Alternator belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	9.0 – 11.5 (0.35 – 0.45) with used belt 5.5 – 7.0 (0.22 – 0.28) with new belt	
	Belt tension N (kgf, lbf) Measured with belt tension gauge	390 – 540 (40 – 55, 88 – 121) with used belt 830 – 1030 (85 – 105, 187 – 231) with new belt	
Alternator (DENSO)		STANDARD (NEW)	SERVICE LIMIT
	Output 13.5 V at normal operating temperature A	100	———
	Brush length	10.5 (0.41)	1.5 (0.06)
Starter (MITSUBA 1.6 kW)	Type	Spur gear reduction, Permanent magnet	
	Commutator mica depth	0.4 – 0.5 (0.016 – 0.020)	0.15 (0.006)
	Commutator runout	0 – 0.02 (0 – 0.0008)	0.05 (0.002)
	Commutator O.D.	28.0 – 28.1 (1.102 – 1.106)	27.5 (1.083)
	Brush length	15.8 – 16.2 (0.62 – 0.64)	11.0 (0.43)
	Brush spring tension (new) N (kgf, lbf)	15.7 – 17.7 (1.60 – 1.80, 3.53 – 3.97)	———

* When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

Design Specifications

	ITEM		METRIC	ENGLISH	NOTES
Dimensions	Overall Length		4,865 mm	191.5 in	
	Overall Width		1,785 mm	70.3 in	
	Overall Height		1,405 mm	55.3 in	
	Wheelbase		2,840 mm	111.8 in	
	Track Front/Rear		1,520/1,510 mm	59.8/59.4 in	
	Ground Clearance		160 mm	6.3 in	
	Seating Capacity		Five		
Weight (USA)	Gross Vehicle Weight Rating (GVWR)		———	4,280 lbs	
Weight (CANADA)	Gross Vehicle Weight Rating (GVWR)		1,940 kg	———	
ENGINE	Type		Water-cooled, 4-stroke SOHC gasoline engine		
	Cylinder Arrangement		Inline 5-cylinder 35° slant mount		
	Bore and Stroke		85.0 x 86.4 mm	3.35 x 3.40 in	
	Displacement		2,451 cm^3 (cc)	149 cu-in	
	Compression Ratio		9.6		
	Valve Train		Belt driven, SOHC 4 valves per cylinder		
	Lubrication System		Forced and wet sump, trochoid pump		
	Fuel Required		Premium UNLEADED grade gasoline with 91 Pump Octane Number or higher		
STARTER	Make/Type		MITSUBA/Spur gear reduction, permanent magnet 1.6 kW		
	Normal Output		1.6 kW		
	Nominal Voltage		12 V		
	Hour Rating		30 seconds		
	Direction of Rotation		Counterclockwise as viewed from gear end		
	Weight		Approximate 3.6 kg	7.9 lbs	
CLUTCH	Clutch Type		Torque converter		
TRANSMISSION	Transmission		Electronically controlled 4-speed automatic, 1 reverse		
	Primary Reduction		Direct 1 : 1		
	Gear Ratio	1st	2.650		
		2nd	1.531		
		3rd	0.976		
		4th	0.654		
		Reverse	1.904		
	Secondary Reduction	Gear type	Single helical gear		
		Gear ratio	1.621		
DIFFERENTIAL	Final Reduction	Gear type	Hypoid spiral bevel gear		
		Gear ratio	2.764		

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Design Specifications

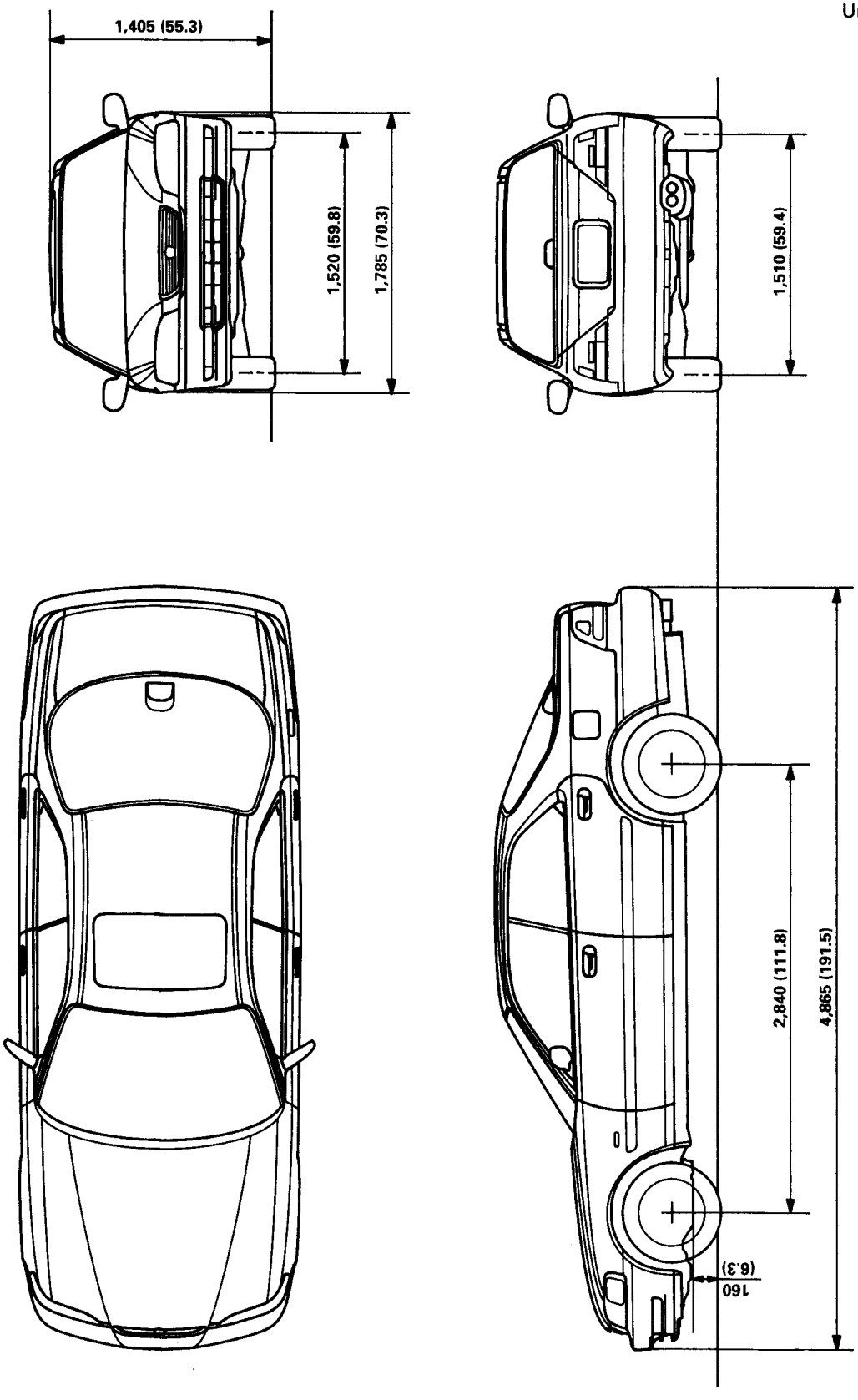
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	ITEM		METRIC	ENGLISH	NOTES
AIR CONDITIONING	Cooling Capacity		4,300 kcal/h	17,060 BTU/h	
	Compressor	Type/Manufacturer	Swash-plate/DENSO		
		No. of Cylinders	10		
		Capacity	177.7 mℓ/rev	10.84 cu-in/rev	
		Max. Speed	7,600 rpm		
		Lubricant Type	ND-OIL8		
		Lubricant Capacity	160 mℓ	5 1/3 fl oz, 5.6 Imp oz	
	Condenser	Type	Corrugated fin		
	Evaporator	Type	Corrugated fin		
	Blower	Type	Sirocco fan		
		Motor Input	200 W/12 V		
		Speed Control	Infinitely variable		
		Max. Capacity	530 m^3/h	18,700 cu-ft/h	
	Temperature Control		Air-mix type		
	Compressor Clutch	Type	Dry, single plate, poly-V-belt drive		
		Power Consumption	40 W max./12 V		
	Refrigerant	Type	HFC-134a (R-134a)		
		Quantity	750 $^{+0}_{-50}$ g	26.5 $^{+0}_{-1.8}$ oz	
STEERING SYSTEM	Type		Power assisted, rack and pinion		
	Overall Ratio		17.53		
	Turns, Lock-to-Lock		3.52		
	Steering Wheel Dia.		380 mm	15.0 in	
SUSPENSION	Type	Front	Independent double wishbone, coil spring with stabilizer		
		Rear	Independent double wishbone, coil spring with stabilizer		
	Shock Absorber	Front and Rear	Telescopic, hydraulic nitrogen gas-filled		

	ITEM		METRIC	ENGLISH	NOTES
WHEEL ALIGNMENT	Camber	Front	0°00′		
		Rear	−0°30′		
	Caster		2°07′		
	Toe	Front	Out 1.0 mm	Out 1/16 in	
		Rear	In 2.0 mm	In 1/16 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc		
		Rear	Power-assisted self-adjusting solid disc		
	Pad Surface Area:	Front	58.0 cm² x 2	8.99 sq-in x 2	
		Rear	27.9 cm² x 2	4.32 sq-in x 2	
	Parking Brake Kind and Type		Mechanical actuating, rear two wheel brakes		
TIRE	Size		205/60R15 91H T135/70 D15 (Spare tire)		
WASHER RESERVOIR	Capacity ℓ (US qt, Imp qt)		2.5 (2.6, 2.2) 4.5 (4.8, 4.0)		U.S.A. model Canada model
ELECTRICAL	Battery		12 V – 52 AH/5 HR		
	Starter		12 V – 1.6 kW		
	Alternator		12 V – 100 A		
	Fuses				
	In the Under-dash Fuse/Relay Box		7.5 A, 10 A, 15 A, 20 A, 30 A		
	In the Under-hood Fuse/Relay Box		10 A, 15 A, 20 A, 30 A, 40 A, 50 A, 100 A		
	In the Under-hood ABS Fuse/Relay Box		7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A		
	Headlights	High	12 V – 60 W		
		Low	12 V – 55 W		
	Front Turn Signal Lights		12 V – 21 W		
	Front Parking Lights		12 V – 5 W		
	Rear Turn Signal Lights		12 V – 21 W		
	Brake/Taillights		12 V – 21/5 W		
	Rear Side Marker Lights		12 V – 3 CP		
	Front Fog Lights		12 V – 55 W		
	High Mount Brake Light		12 V – 21 W		
	Front Side Marker Lights		12 V – 3 CP		
	Back-up Lights		12 V – 21 W		
	License Plate Light		12 V – 8 W		
	Ceiling Light		12 V – 8 W		
	Spot Light		12 V – 5 W		
	Trunk Lights		12 V – 5 W		
	Door Courtesy Lights		12 V – 3.4 W		
	Vanity mirror light		12 V – 2 W		
	Gauge Lights		12 V – 3.4 W, 1.4 W		
	Indicator Lights		12 V – 0.84 W, 1.12 W, 1.4 W, 2.0 W, 3.0 W		
	Warning Lights		12 V – 1.4 W		
	Illumination and Pilot Lights		12 V – 1.4 W, 1.12 W, 0.84 W 12 V – 0.56 W, LED		
	Heater Illumination Lights		12 V – 1.12 W		

Body Specifications

Unit: mm (in)

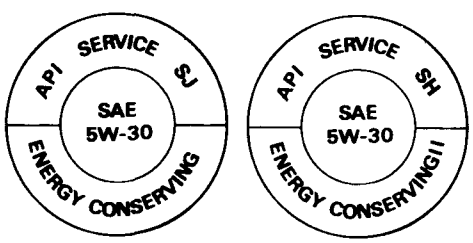


Lubrication Points

For the details of lubrication points and types of lubricants to be applied, refer to the illustrated index and various work procedures (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

No.	LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: Use SH "Energy Conserving II" or SJ "Energy Conserving" grade oil. The oil container may also display the API Certification mark shown below. Make sure it says "For Gasoline Engines." SAE Viscosity: See chart below.
2	Transmission	Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*1
3	Brake Line (Includes Anti-lock brake line)	Genuine Honda DOT3 Brake Fluid*2
4	Power steering gearbox	Steering grease P/N 08733 – B070E
5 6 7 8 9 10 11 12	Steering boots Throttle cable end Steering ball joints Shift lever (Automatic transmission) Pedal linkage Intermediate shaft Brake master cylinder pushrod Fuel fill lid	Multi-purpose grease
13 14 15 16	Trunk hinges and latch Door hinges upper and lower Door opening detents Hood hinges and hood latch	Honda White Lithium Grease
17	Brake pipe joint (Front and rear wheel house)	Rust preventives
18	Caliper Piston seal, Dust seal, Caliper pin, Piston	Silicone grease
19	Power steering system	Genuine Honda Power Steering Fluid-V or S*3
20	Differential	Hypoid gear Oil API GL4 or GL5 Viscosity: at above –18°C (0°F): SAE 90 at less than –18°C (0°F): SAE 80 W-90
21	A/C compressor	Compressor oil: DENSO: ND-OIL8 (P/N 38897 – PR7 – A01AH or 38899 – PR7 – A01) (For Refrigerant: HFC-134a (R-134a))

API SERVICE LABEL

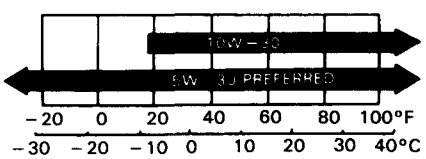


API CERTIFICATION MARK



Recommended Engine Oil

Engine oil viscosity for ambient temperature ranges

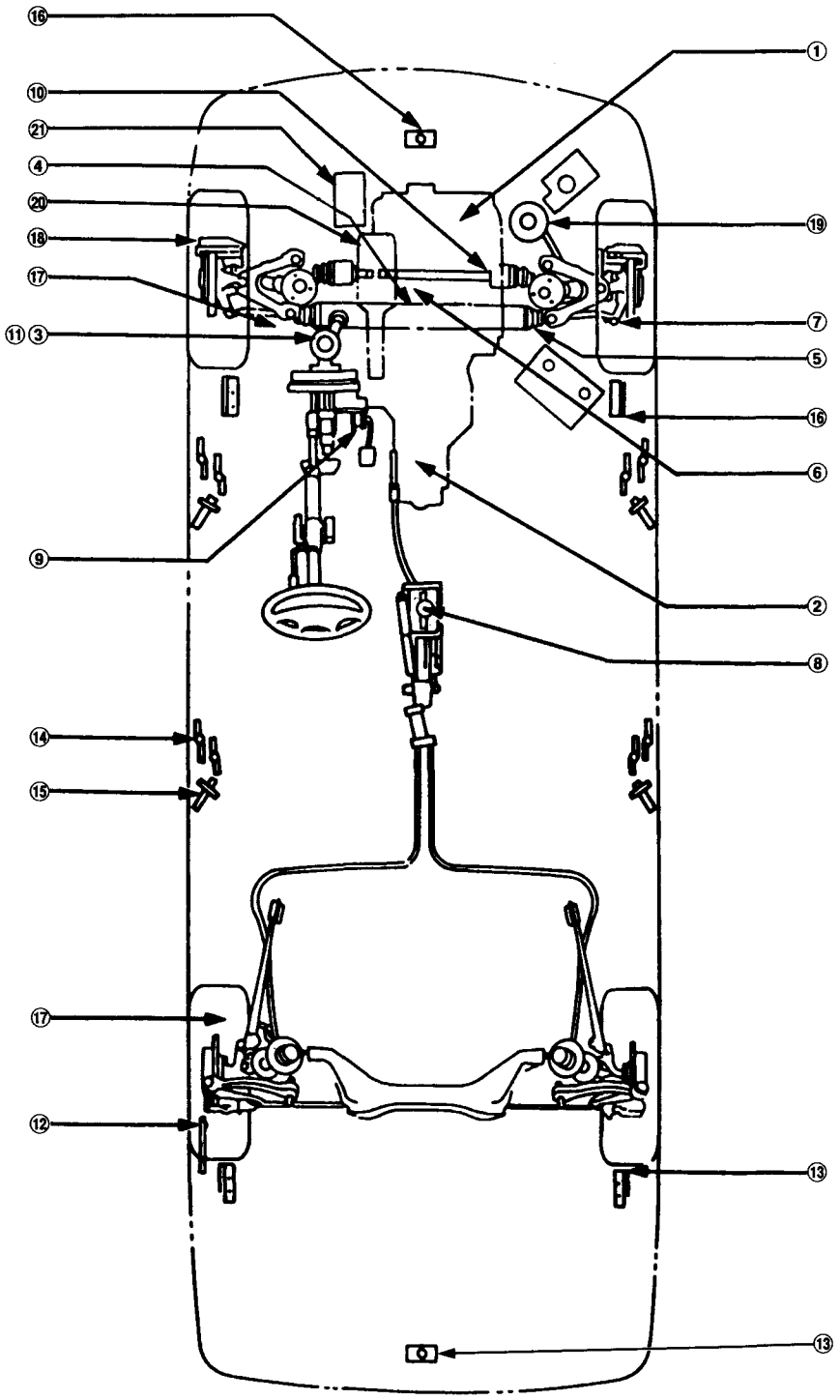


NOTE: The following information as marked *1, *2 and *3 on above chart details for 1997 model:

*1: Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

*2: Always use Genuine Honda DOT3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

*3: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increase wear and poor steering in cold weather.



NOTE: Lubricate all hinges, latches, and locks once a year.
In corrosive areas, more frequent lubrication is necessary.
We recommend Honda White Lithium Grease.

Follow the Normal Conditions Maintenance Schedule for 1995 and 1996 Models if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1995 and 1996 Models on pages 4-6 and 4-7 do not apply.

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Replace engine oil		Replace every 7,500 miles (12,000 km) or 6 months							Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4
Replace engine oil filter		●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop							Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●			11-136
Inspect valve clearance			●		●		●		Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in)	6-3
Replace spark plugs			●		●		●		NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Inspect distributor cap*, rotor*					●					23-86, 23-89
Replace timing belt* and inspect water pump							●			6-10, 10-10
Inspect and adjust drive belts			●		●		●		Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed*					●				700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●	Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●		2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid			●		●		●		Capacity for change: 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	• Check the brake pad and disc thickness. Check for damage and cracks. • Check the calipers for damage, leaks and tightness.	19-4, 19-8, 19-10, 19-12, 19-25
Replace brake fluid (Including ABS)			●		●		●		Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	Fully engaged: 7 to 11 notches.	19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)							The suggested rotation method is shown in the diagram of the Owner's Manual.	——

This schedule should be used for 1995 and 1996 **2.5TL** models; it supersedes the schedule shown in the 1995 2.5TL owner's manuals.

Service at the indicated distance or time — whichever comes first.	km x 1,000	24	48	72	96	120	144	168	NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Visually inspect the following items:									• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Brake hoses and lines										19-30
All fluid levels and condition of fluid									Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid.	10-5, 14-105, 15-4, 19-7
Tie-rod ends, steering gearbox, and boots									• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components										——
Driveshaft boots		●	●	●	●	●	●	●	Check boots and boot band for cracks. Check rack grease.	16-3
Cooling system hoses and connections									Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*									Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel pipes, hoses, and connections*									Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118
Inspect supplemental restraint system		10 years after production								——

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1996 Canada Model:

This Maintenance Schedule outlines the minimum required maintenance that you should perform to ensure the trouble-free operation of Canadian model. Due to regional and climactic differences, some additional servicing may be required.

This schedule should be used for 1995 and 1996 2.5TL models; it supersedes the schedule shown in the 1995 2.5TL owner's manuals.

Follow the Severe Conditions Maintenance Schedule for 1995 and 1996 Models if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-7):

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Replace engine oil and oil filter		Replace every 3,750 miles (6,000 km) or 3 months							Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop							Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○		11-136
Inspect valve clearance			●		●		●		Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in)	6-3
Replace spark plugs			●		●		●		NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Inspect distributor cap*, rotor*					●					23-86, 23-89
Replace timing belt*1 and inspect water pump		Replace every 60,000 miles (96,000 km)								6-10, 10-10
Inspect and adjust drive belts			●		●		●		Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed*					●				700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●	Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid		●	●	●	●	●	●	●	Capacity for change: 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		Inspect every 7,500 miles (12,000 km) or 6 months							• Check the brake pad and disc thickness. Check for damage and cracks. • Check the calipers for damage, leaks and tightness.	19-4, 19-8, 19-10 19-12, 19-25
Replace brake fluid (Including ABS)			●		●		●		Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)							The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).

This schedule should be used for 1995 and 1996 2.5TL models; it supersedes the schedule shown in the 1995 2.5TL owner's manuals.

Service at the indicated distance or time — whichever comes first.									NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168		
	miles x 1,000	15	30	45	60	75	90	105		
	months	12	24	36	48	60	72	84		
Visually inspect the following items:									• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	———
Tie-rod ends, steering gear box, and boots	Every 7,500 miles (12,000 km) or 6 months								• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components										———
Driveshaft boots									Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines										19-30
All fluid levels and condition of fluid									Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid.	10-5, 14-105, 15-4, 19-7
Cooling system hoses and connections		●	●	●	●	●	●	●	Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*									Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel pipes, hoses, and connections*									Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118
Inspect supplemental restraint system	10 years after production									———

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the vehicle is driven OCCASIONALLY under a "severe" conditions, you should follow the Normal Conditions Maintenance Schedule on pages 4-4 and 4-5.

This schedule should be used for 1995 and 1996 2.5TL models; it supersedes the schedule shown in the 1995 2.5TL owner's manuals.

Follow the Normal Conditions Maintenance Schedule for 1997 Model if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1997 Model on pages 4-10 and 4-11 do not apply.

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		Replace every 7,500 miles (12,000 km) or 6 months								Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-136
Inspect valve clearance			●		●		●		●	Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in) Measured when cold	6-3
Replace spark plugs			●		●		●		●	NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Replace timing belt and inspect water pump								●			6-10, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of following belts pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed								●		700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●		Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid					●		●		●	Capacity for change: 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 19-8, 19-10, 19-12, 19-25
Replace brake fluid (Including ABS)				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	196		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:										• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	———
Tie-rod ends, steering gearbox, and boots		●	●	●	●	●	●	●	●	• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components											———
Driveshaft boots										Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines											19-30
All fluid levels and condition of fluid										Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid and battery fluid.	10-5, 14-105, 15-4, 19-7
Cooling system hoses, and connections										Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel pipes, hoses, and connections*										Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118
Inspect supplemental restraint system		10 years after production									———

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1997 Canada Model: Follow the Severe Conditions Maintenance Schedule for 1997 Model on pages 4-10 and 4-11.

Follow the Severe Conditions Maintenance Schedule for 1997 Model if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-11

Service at the indicated distance or time — whichever comes first.	miles x 1,000	15	30	45	60	75	90	105	120	NOTE	SECTION and PAGE
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Replace every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○	●		11-136
Inspect valve clearance			●		●		●		●	Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in) Measured when cold	6-3
Replace spark plugs			●		●		●		●	NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Replace timing belt*1 and inspect water pump								●			6-10, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of the following belts, pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed								●		700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●		Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		●	2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid			●	●	●	●	●	●	●	Capacity for change; 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		Inspect every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 19-8, 19-10, 19-12, 19-25
Replace brake fluid (Including ABS)				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged: 7 to 11 notches.	19-6
Lubricate locks and hinges		●	●	●	●	●	●	●	●	Lubricate the door hinges and locks	4-2, 4-3
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:										• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Tie-rod ends, steering gear box, and boots		Every 7,500 miles (12,000 km) or 6 months								• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components											——
Driveshaft boots										Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines											19-30
All fluid levels and condition of fluid										Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid and battery fluid.	10-5, 14-105, 15-4, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*		●	●	●	●	●	●	●	●	Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel lines and connections*										Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118
Lights and controls										Check all lights functions and headlight position.	23-168
Vehicle underbody										Check the paint for damages, scratches, stone chipping and dents.	——
Inspect supplemental restraint system		10 years after production									——

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void the customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F (32°C)] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

NOTE: If the vehicle is driven OCCASIONALLY under a "severe" condition, you should follow the Normal Conditions Maintenance Schedule for 1997 Model on pages 4-8 and 4-9.

Follow the Normal Conditions Maintenance Schedule for 1998 Model if the severe driving conditions specified in the Severe Conditions Maintenance Schedule for 1998 Model on pages 4-14 and 4-15 do not apply.

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil		Every 7,500 miles (12,000 km) or 12 months								Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4
Replace engine oil filter		●	●	●	●	●	●	●	●		8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Replace air cleaner element			●		●		●		●		11-136
Inspect valve clearance			●		●		●		●	Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in) Measured when cold	6-3
Replace spark plugs			●		●		●		●	NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Replace timing belt and inspect water pump								●			6-10, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of the following belts, pressing with 98 N (10 kgf, 22 lbf) tension: *Alternator drive belt:* 9.0 – 11.5 *mm* (0.35 – 0.45 *in*) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed								●		700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●		Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid							●			2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid					●		●		●	Capacity for change: 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		●	●	●	●	●	●	●	●	• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 19-8, 19-10, 19-12, 19-25
Replace brake fluid				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged 7 to 11 notches.	19-6
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	———

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	196		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:										• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Tie-rod ends, steering gearbox, and boots										• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components											——
Driveshaft boots										Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines (Including ABS)											19-30
All fluid levels and condition of fluid		●	●	●	●	●	●	●	●	Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid and battery fluid.	10-5, 14-105, 15-4, 19-7
Cooling system hoses, and connections										Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*										Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel pipes, hoses, and connections*										Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

For 1998 Canada Model: Follow the Severe Conditions Maintenance Schedule for 1998 Model on pages 4-14 and 4-15.

Follow the Severe Conditions Maintenance Schedule for 1998 Model if the vehicle is driven MAINLY under one or more of the Severe Driving Conditions (page 4-15):

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Replace engine oil and oil filter		Every 3,750 miles (6,000 km) or 6 months								Capacity for change with filter: 4.3 ℓ (4.5 US qt, 3.8 Imp qt)	8-4, 8-5
Check engine oil and coolant		Check oil and coolant at each fuel stop								Check levels and check for leaks.	8-4, 10-5
Clean (○) or replace (●) air cleaner element Use normal schedule except in dusty conditions		○	●	○	●	○	●	○	●		11-136
Inspect valve clearance			●		●		●		●	Intake: 0.24 – 0.28 mm (0.009 – 0.011 in) Exhaust: 0.28 – 0.32 mm (0.011 – 0.013 in) Measured when cold	6-3
Replace spark plugs			●		●		●		●	NGK: BKR5E-N11 DENSO: K16PR-L11 Gap: 1.0 – 1.1 mm (0.039 – 0.043 in)	23-92
Replace timing belt*1 and inspect water pump								●			6-10, 10-10
Inspect and adjust drive belts			●		●		●		●	Check for cracks and damage. Check deflection and tension at center of the following belts, pressing with 98 N (10 kgf, 22 lbf) tension: Alternator drive belt: 9.0 – 11.5 mm (0.35 – 0.45 in) P/S pump belt: 8.5 – 10.0 mm (0.33 – 0.39 in) A/C compressor belt: 9.0 – 11.0 mm (0.35 – 0.43 in)	17-23, 22-78, 23-104
Inspect idle speed								●		700 ± 50 rpm (in N or P position)	11-117
Replace engine coolant				●		●		●		Capacity for change: 5.2 ℓ (5.5 US qt, 4.6 Imp qt) Check specific gravity for freezing point.	10-5
Replace transmission fluid			●		●		●		●	2.7 ℓ (2.9 US qt, 2.4 Imp qt) for change with Genuine HONDA Premium Formula ATF	14-105
Replace front differential fluid			●	●	●	●	●	●	●	Capacity for change; 0.95 ℓ (1.00 US qt, 0.84 Imp qt)	15-4
Inspect front and rear brakes		Every 7,500 miles (12,000 km) or 6 months								• Check the brake pad, disc thickness and free movement. • Check the calipers for leakage.	19-4, 19-8, 19-10, 19-12, 19-25
Replace brake fluid				●			●			Use Genuine Honda DOT3 brake fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-7
Check parking brake adjustment		●	●	●	●	●	●	●	●	Fully engaged: 7 to 11 notches.	19-6
Lubricate locks and hinges		●	●	●	●	●	●	●	●	Lubricate all hinges, latches and locks.	4-2, 4-3
Rotate tires (Check tire inflation and condition at least once per month)		Rotate tires every 7,500 miles (12,000 km)								The suggested rotation method is shown in the diagram of the Owner's Manual.	——

*1: Replace the timing belt at 60,000 miles (U.S.) 100,000 km (Canada) if the vehicle regularly is driven in one or more of these conditions:
- In very high temperatures (over 110°F, 43°C).
- In very low temperatures (under -20°F, -29°C).

Service at the indicated distance or time — whichever comes first.										NOTE	SECTION and PAGE
	miles x 1,000	15	30	45	60	75	90	105	120		
	km x 1,000	24	48	72	96	120	144	168	192		
	months	12	24	36	48	60	72	84	96		
Visually inspect the following items:										• Check for correct installation and position, check for cracks, deterioration, rust, and leaks. • Check tightness of screws, nuts, and joints. If necessary, retighten.	——
Tie-rod ends, steering gear box, and boots	Every 7,500 miles (12,000 km) or 6 months									• Check rack grease and steering linkage. • Check the boot for damage and leaking grease. • Check the fluid line for damage and leaks.	17-22
Suspension components											——
Driveshaft boots										Check boots and boot band for cracks. Check rack grease.	16-3
Brake hoses and lines (Including ABS)											19-30
All fluid levels and condition of fluid										Check levels and check for leaks. If necessary, add transmission fluid, engine coolant, brake fluid, windshield washer fluid and battery fluid.	10-5, 14-105, 15-4, 19-7
Cooling system hoses and connections										Check all hoses for damage, leaks and deterioration. Check all hose clamps. Retighten if necessary.	10-3
Exhaust system*		●	●	●	●	●	●	●	●	Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.	9-5
Fuel lines and connections*										Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.	11-118
Lights and controls										Check all lights functions and headlight position.	23-168
Vehicle underbody										Check the paint for damages, scratches, stone chipping and dents.	——

According to state and federal regulations, failure to perform maintenance on the items marked with an asterisk (*) will not void customer's emission warranties. However, Acura recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

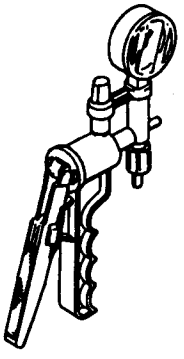
Severe Driving Conditions:

- Driving less than 5 miles (8 km) per trip or, in freezing temperatures, driving less than 10 miles (16 km) per trip.
- Driving in extremely hot [over 90°F **(32°C)**] conditions.
- Extensive idling or long periods of stop-and-go driving.
- Trailer towing, driving with a car-top carrier, or driving in mountainous conditions.
- Driving on muddy, dusty, or de-iced roads.

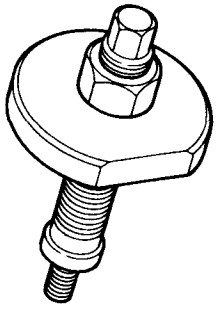
NOTE: If the vehicle is driven OCCASIONALLY under a "severe" **condition,** you should follow the Normal Conditions Maintenance Schedule for 1998 Model on pages 4-12 and 4-13.

Special Tools

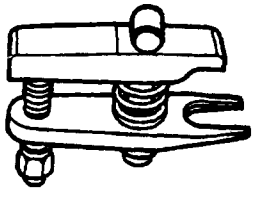
Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X - 041 - XXXXX	Vacuum Pump/Gauge, 0-30 in.Hg.	1	5-19, 5-20
②	07LAC-PW50101	Extension Shaft Puller	1	5-9
③	07MAC-SL00100	Ball Joint Remover, 32 mm	1	5-8



①



②



③

Engine Removal/Installation

Removal

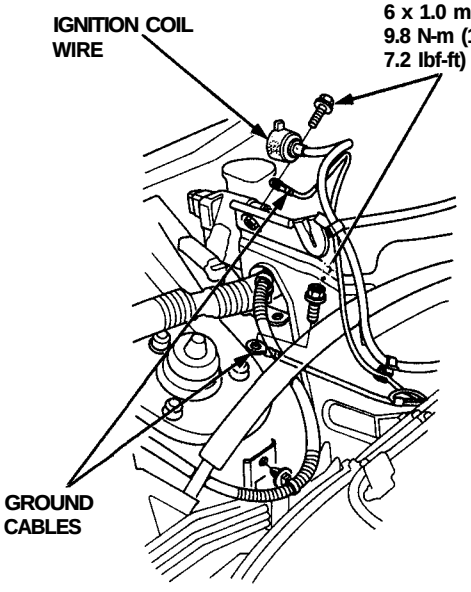
⚠ WARNING

- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine.**
- **Make sure the car will not roll off stands and fall while you are working under it.**

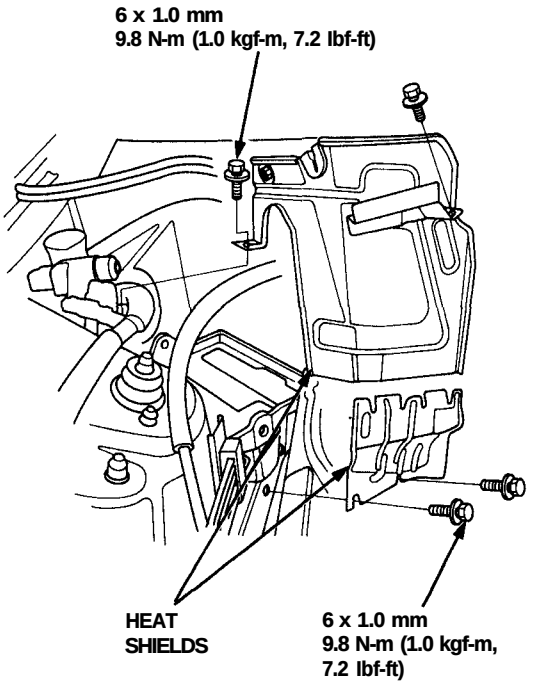
CAUTION:

- **Use fender covers to avoid damaging painted surface.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- **Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses or interfere with other parts.**

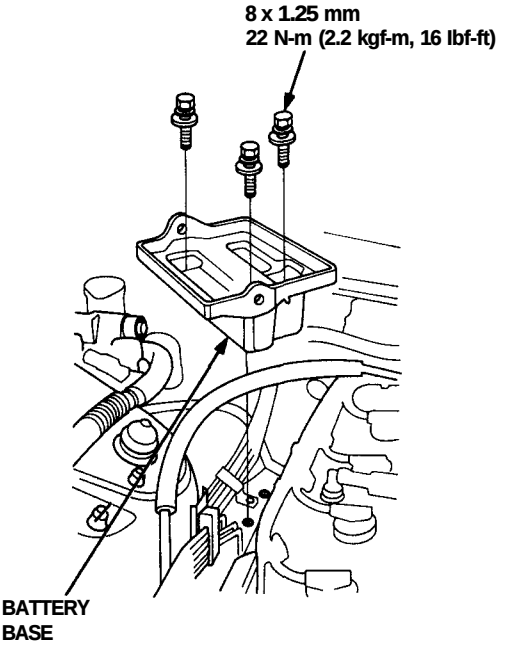
1. Secure the hood open as far as possible.
2. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
3. Disconnect the battery negative terminal first, then the positive terminal.
4. Remove the engine ground cables and ignition coil wire.



5. Remove the battery, then remove the heat shields.



6. Remove the battery base.

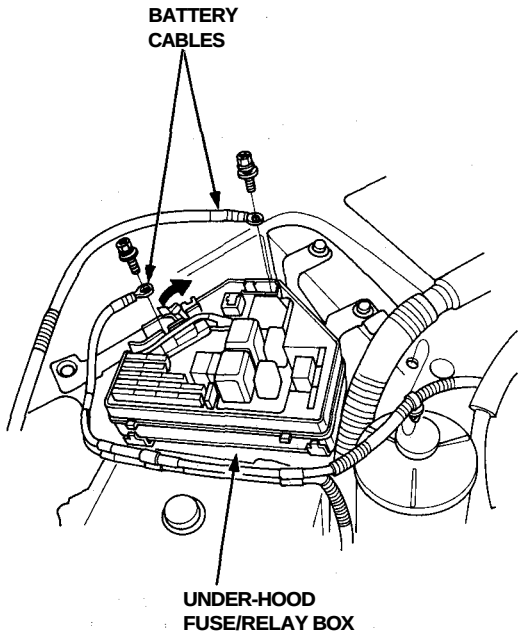


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Engine Removal/Installation

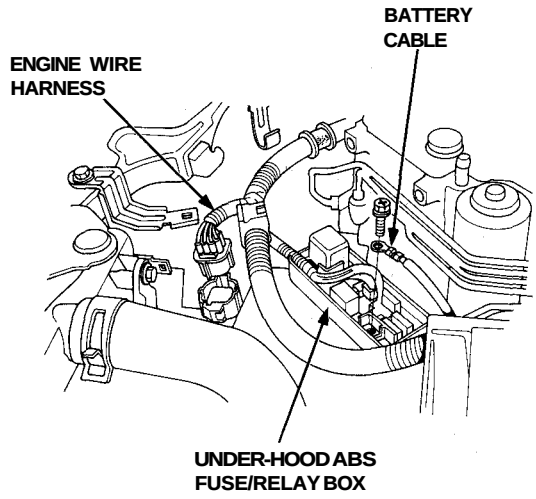
Removal (cont'd)

7. Remove the battery cables from the under-hood fuse/ relay box.

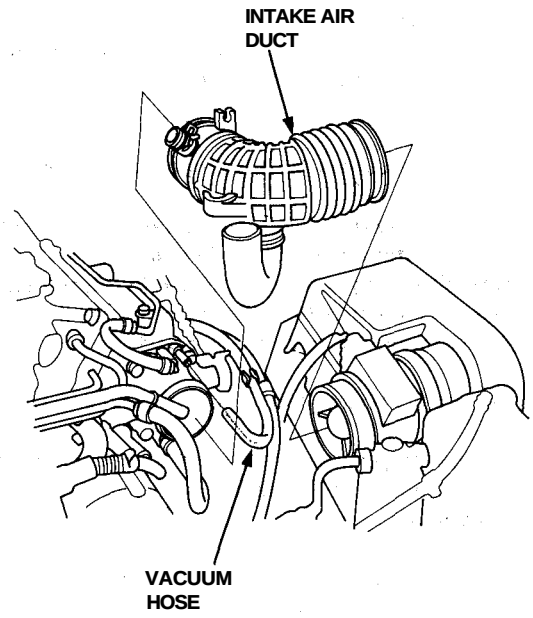


8. Disconnect the engine wire harness connector on the right (passenger's) side of the engine compartment.

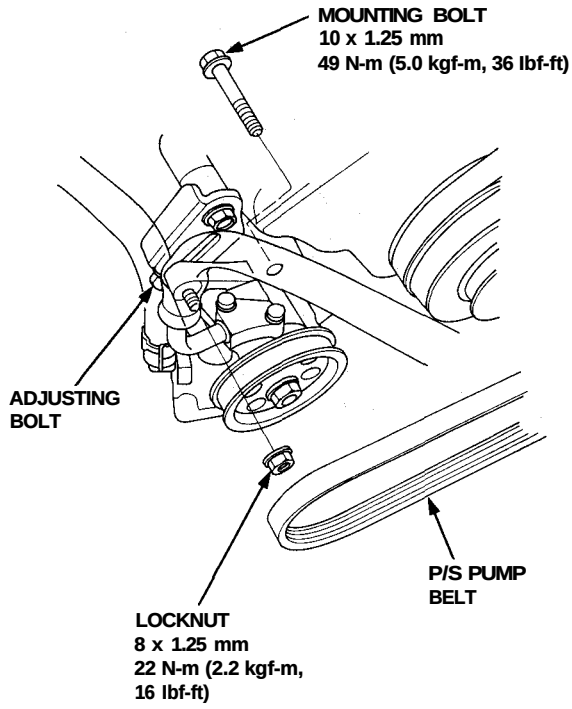
9. Remove the battery cable from the under-hood ABS fuse/relay box.



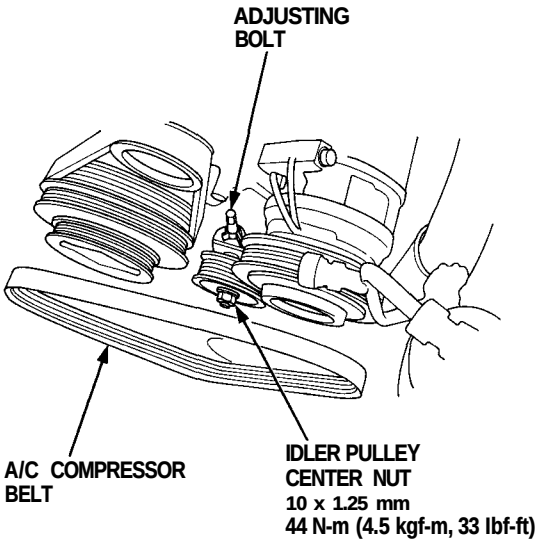
10. Remove the intake air duct and vacuum hose.



11. Remove the adjusting bolt, locknut and mounting bolt, then remove the power steering (P/S) pump belt and pump.

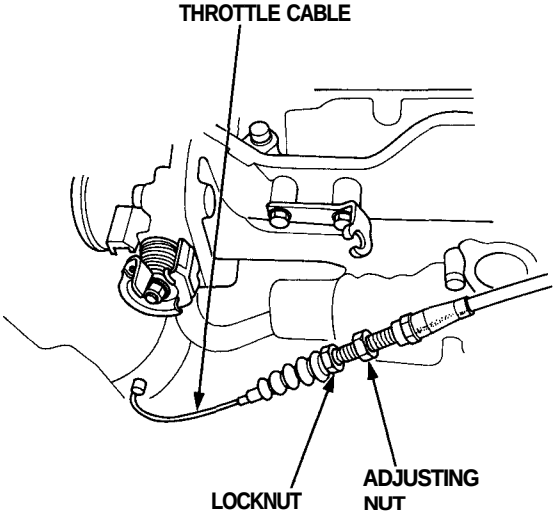


12. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C compressor belt.

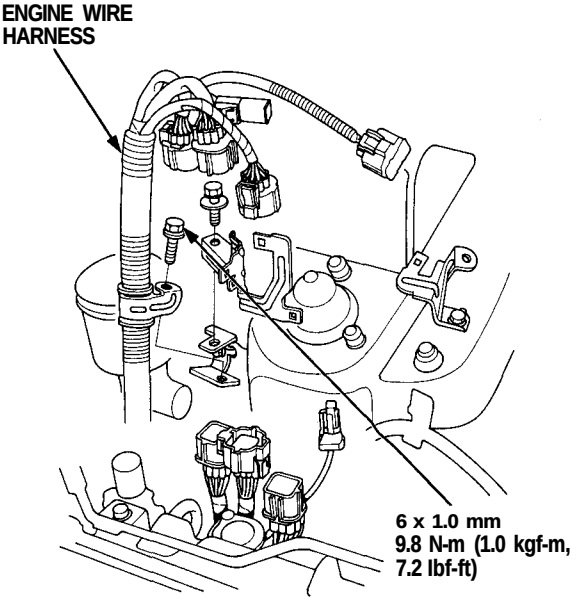


13. Remove the throttle cable by loosening the locknut, then slip the cable end out of the accelerator linkage.

NOTE:
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the throttle cable when installing (see section 11).

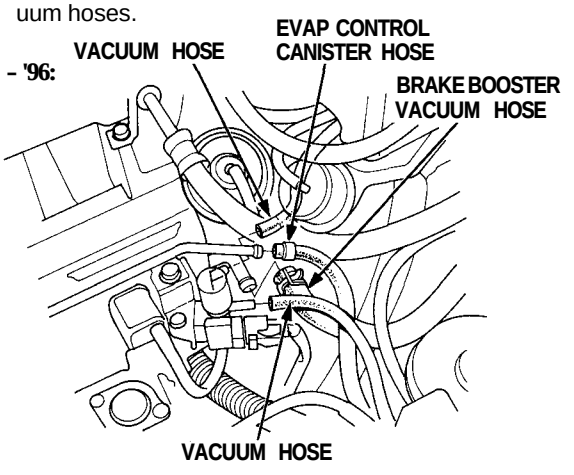


14. Disconnect the engine wire harness connectors on the left (driver's) side of the engine compartment.

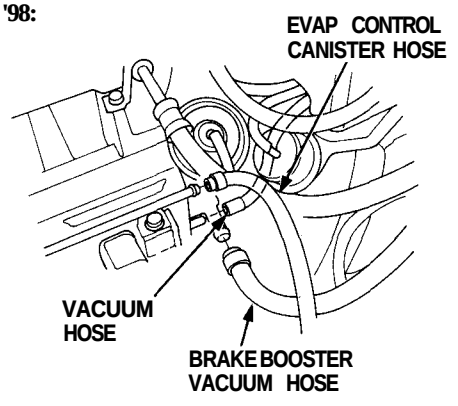


15. Remove the brake booster vacuum hose, evaporative emission (EVAP) control canister hose and vacuum hoses.

'95 - '96:



'97 - '98:



(cont'd)

Engine Removal/Installation

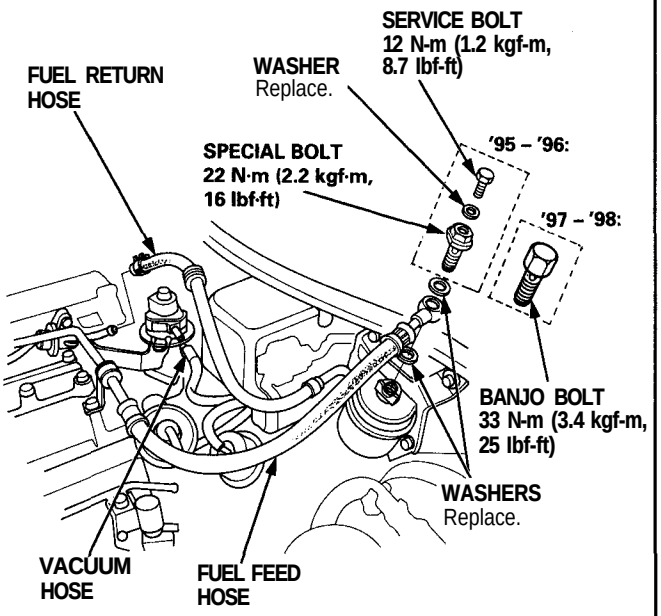
Removal (cont'd)

16. Relieve fuel pressure (see section 11).

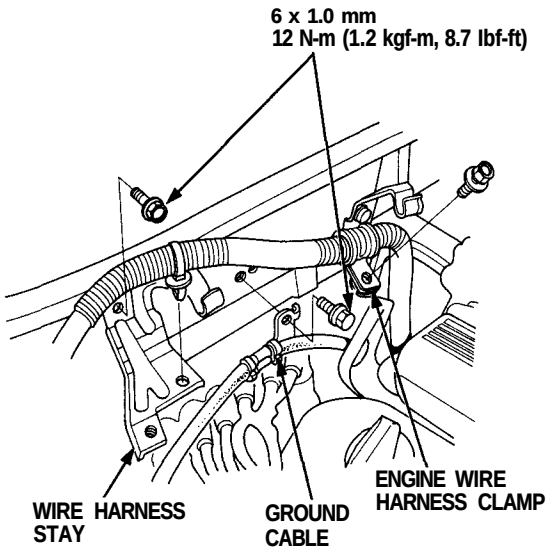
⚠ WARNING

Do not smoke while working on the fuel system. Keep open flame or sparks away from the work area. Drain fuel only into an approved container.

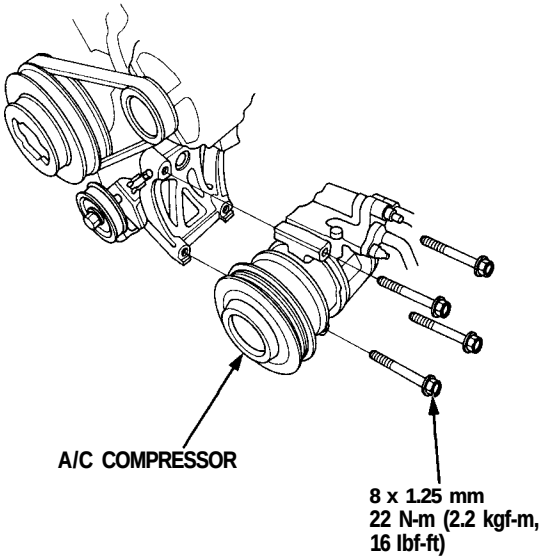
17. Remove the fuel feed hose, fuel return hose and vacuum hose.



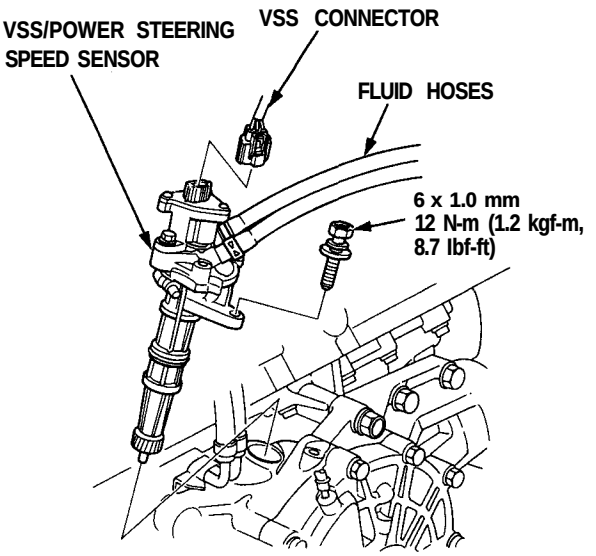
18. Remove the engine wire harness clamp, wire harness stay and ground cable.



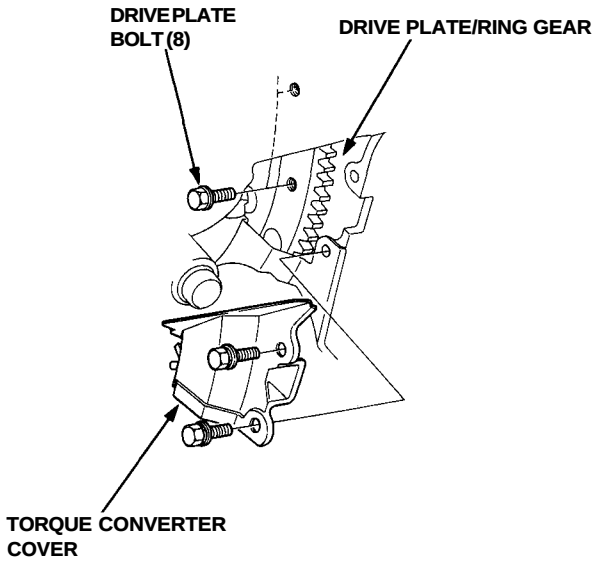
19. Remove the A/C compressor.
    - Do not disconnect the A/C hoses.



20. Remove the vehicle speed sensor (VSS)/power steering speed sensor. Do not disconnect the fluid hoses.

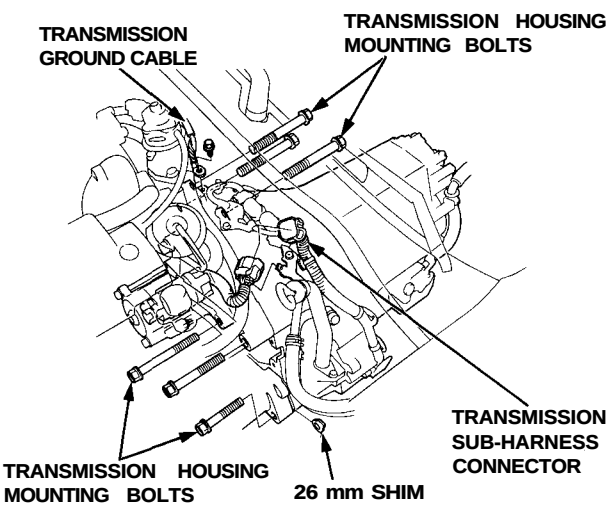


21. Remove the torque converter cover, then remove the drive plate bolts one at time while rotating the crankshaft pulley.



22. Remove the transmission housing mounting bolts and the 26 mm shim.

23. Remove the transmission sub-harness connector.

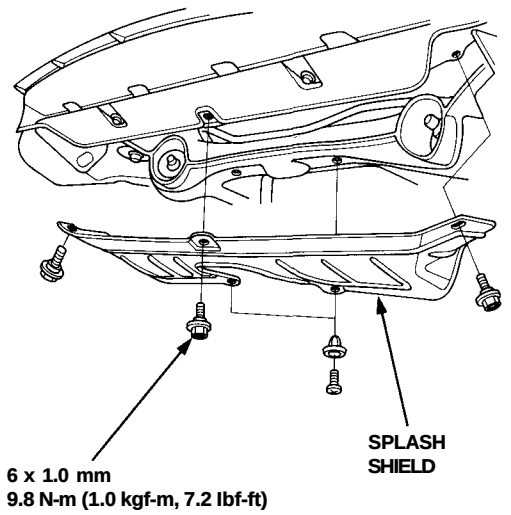


24. Remove the radiator cap.

⚠ WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.

25. Raise the hoist to full height.

26. Remove the front tires/wheels and splash shield.



27. Drain the engine coolant (see page 10-5). Loosen the radiator drain plug.

28. Drain the automatic transmission fluid (ATF). Reinstall the drain plug using a new washer.

29. Drain the differential oil. Reinstall the drain plug using a new washer.

30. Drain the engine oil. Reinstall the drain plug using a new washer.

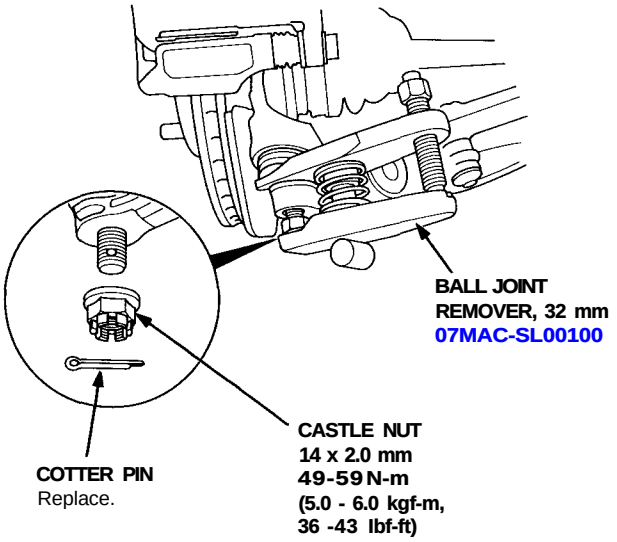
31. Remove the damper fork (see section 18).

(cont'd)

Engine Removal/Installation

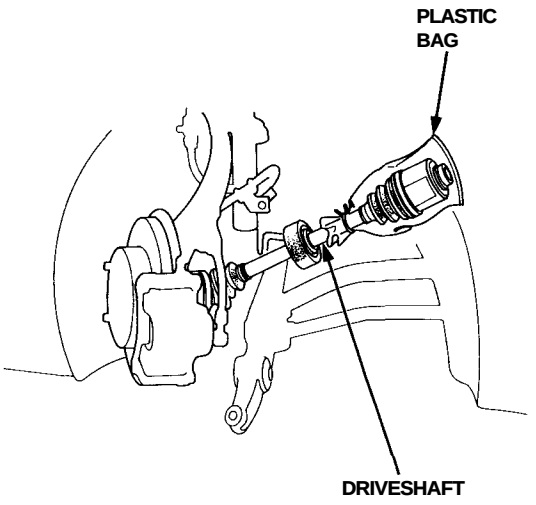
Removal (cont'd)

32. Disconnect the suspension lower arm ball joints with the special tool. Refer to section 18 for the proper procedure.

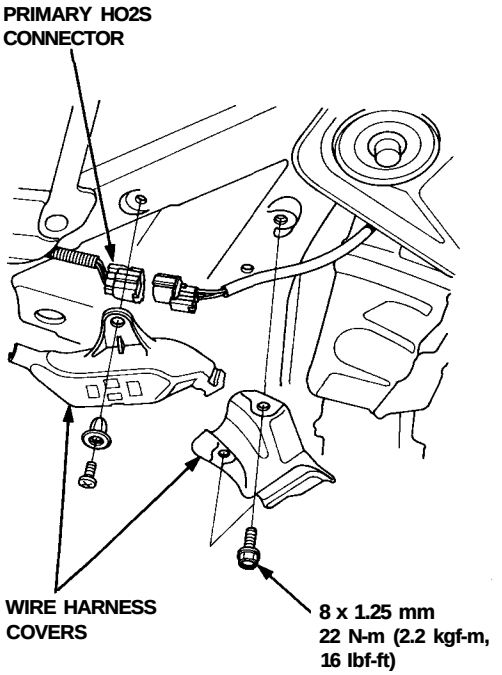


33. Remove the driveshafts (see section 16).

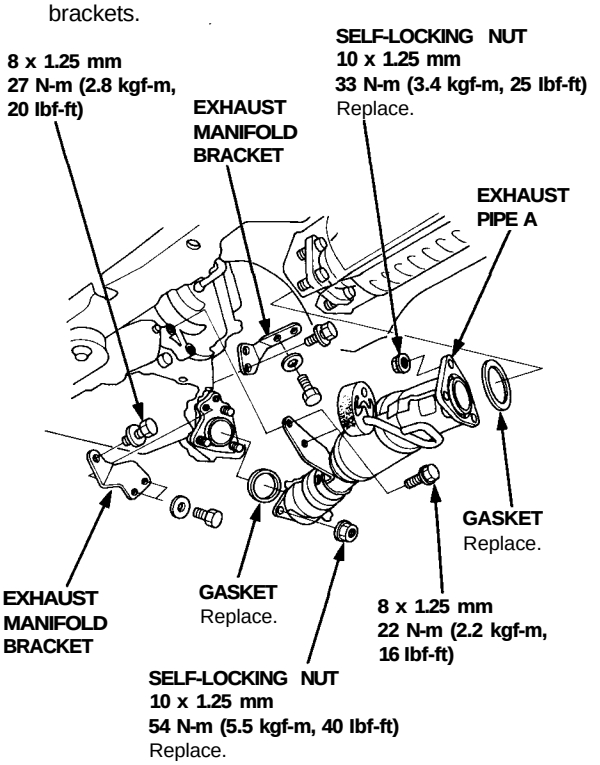
NOTE: Coat all precision-finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.



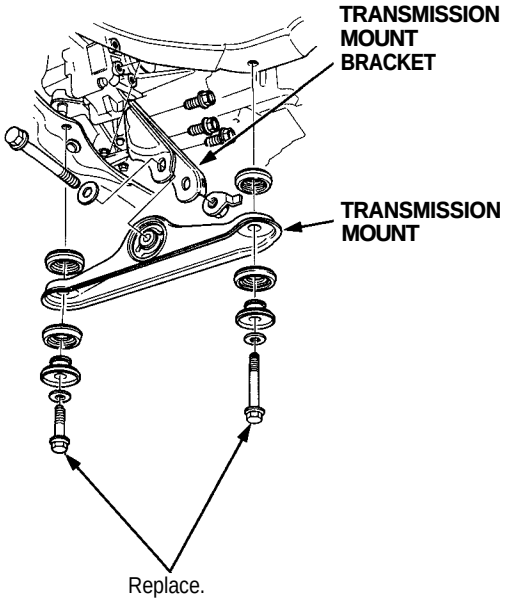
34. Remove the wire harness covers, then disconnect the primary heated oxygen sensor (HO2S) connector.



35. Remove exhaust pipe A and the exhaust manifold brackets.



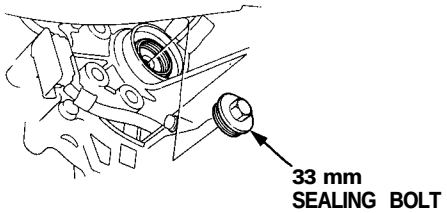
36. Remove the transmission mount and mount bracket.

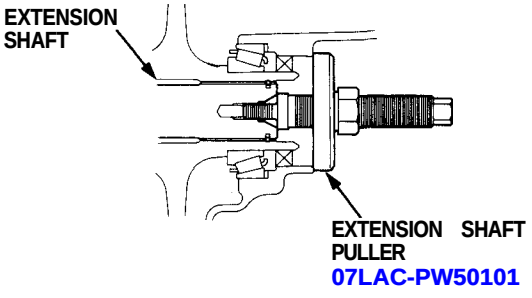


37. Shift the transmission to the P position.

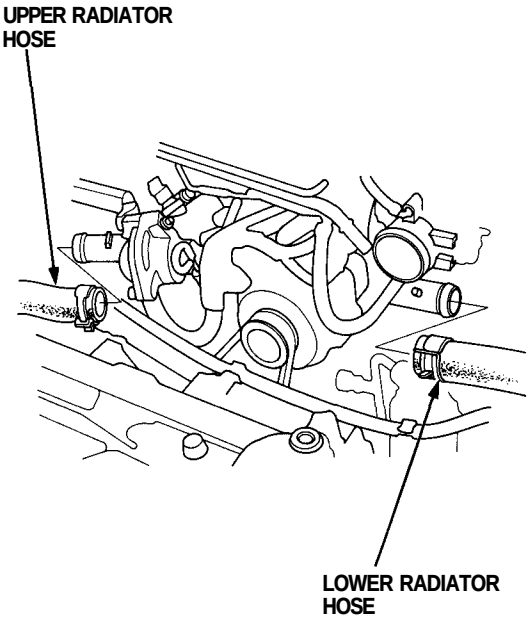
38. Remove the 33 mm sealing bolt.

39. Remove the extension shaft from the differential using the special tool as shown.



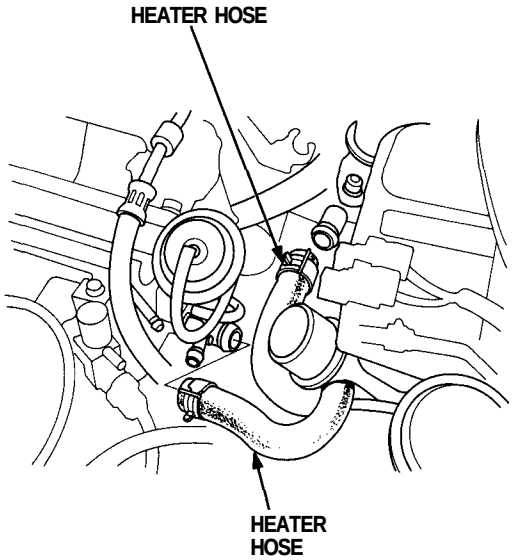


40. Lower the hoist, then remove the upper and lower radiatorhoses.



41. Remove the radiator assembly (see page 10-4).

42. Remove the heater hoses.

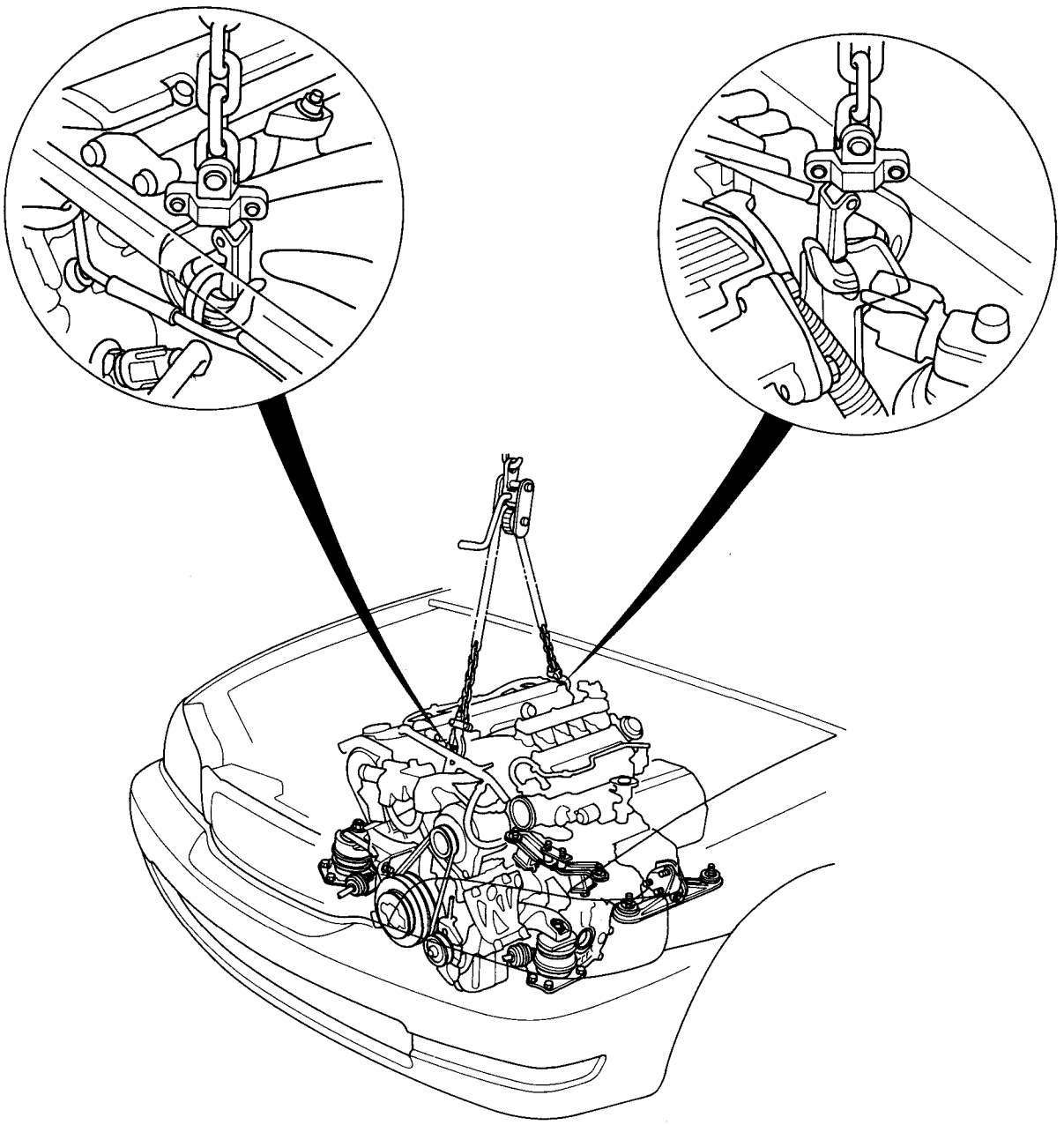


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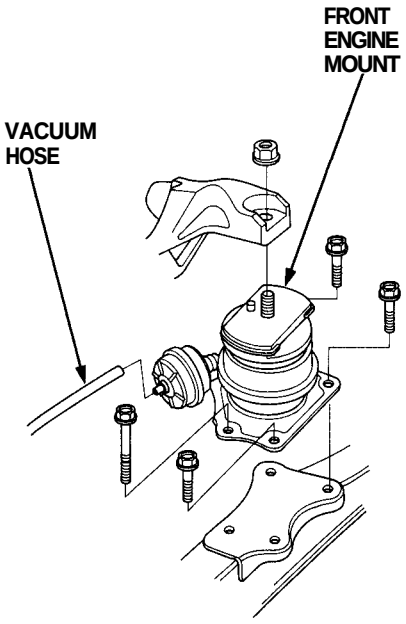
Engine Removal/Installation

Removal (cont'd)

43. Attach the chain hoist to the engine.

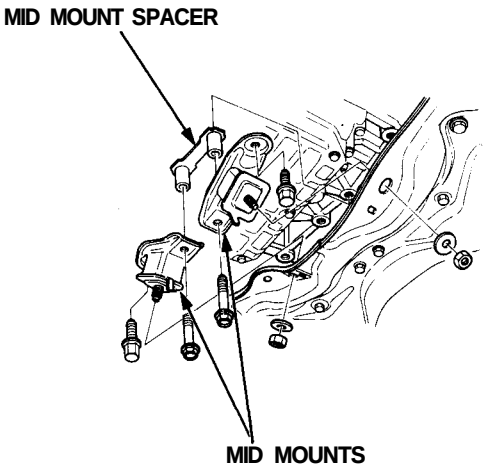


44. Disconnect the vacuum hoses, then remove the front engine mounts.

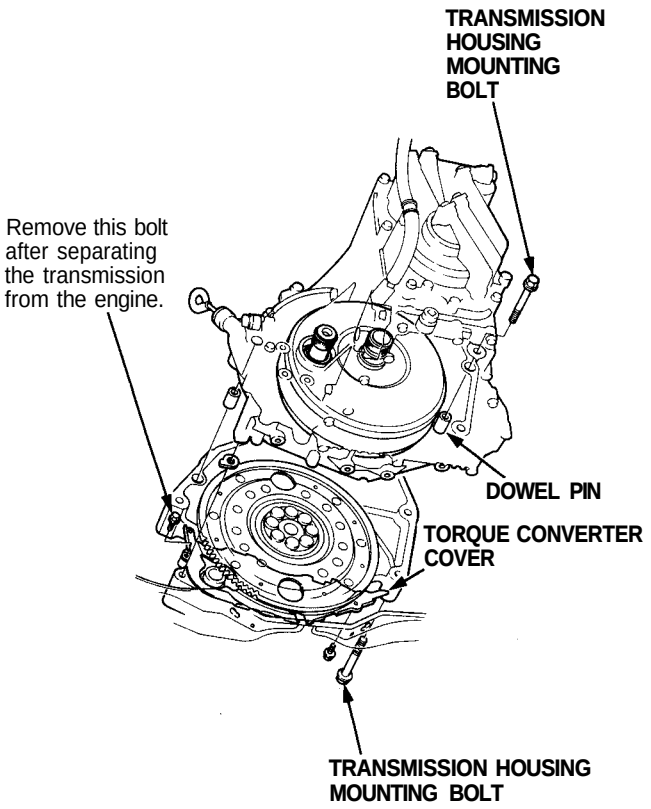


45. Slowly raise the hoist up a little.

46. Remove the mid mounts.



47. Remove the transmission housing mounting bolts and the torque converter cover, then separate the engine and the transmission.
Attach the transmission jack with a rubber pad or a wooden block to protect the transmission housing.



48. Reinstall the mid mounts to the transmission and retorque the mounting bolts.

49. Raise the chain hoist to remove all slack from the chain.

50. Check that the engine is completely free of vacuum hoses, fuel and coolant hoses and electrical wiring.

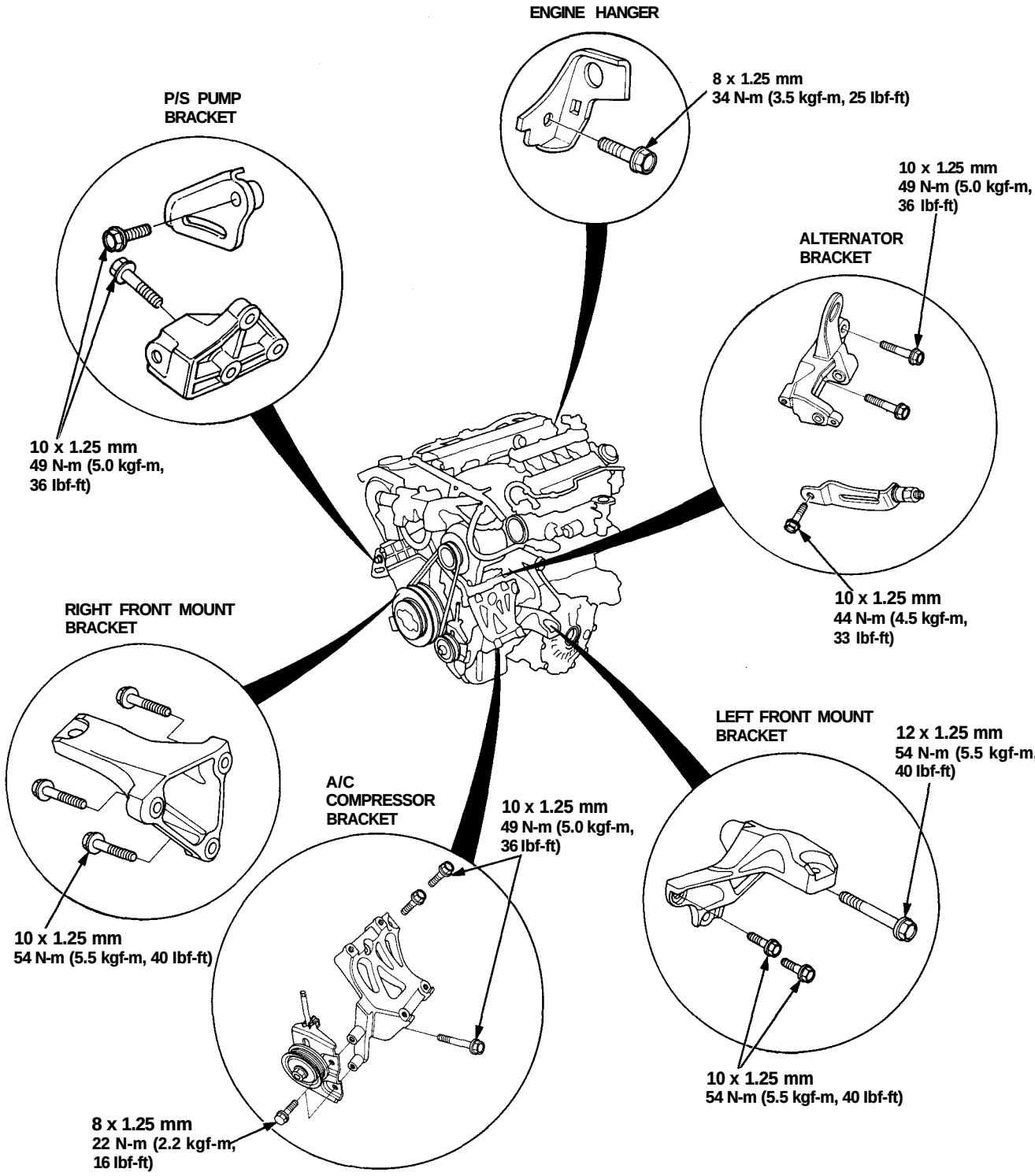
51. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine.

52. Raise the engine all the way up, and remove it from the vehicle.

Engine Removal/Installation

Installation

Bracket Bolts Torque Specifications:



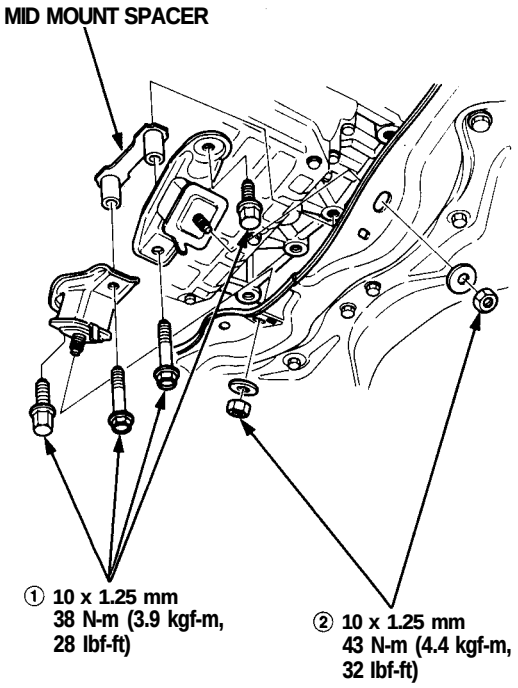
NOTE: When installing the A/C compressor bracket, tighten the bolts on the oil pan first, then those on the cylinder block.

Engine Installation:

Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

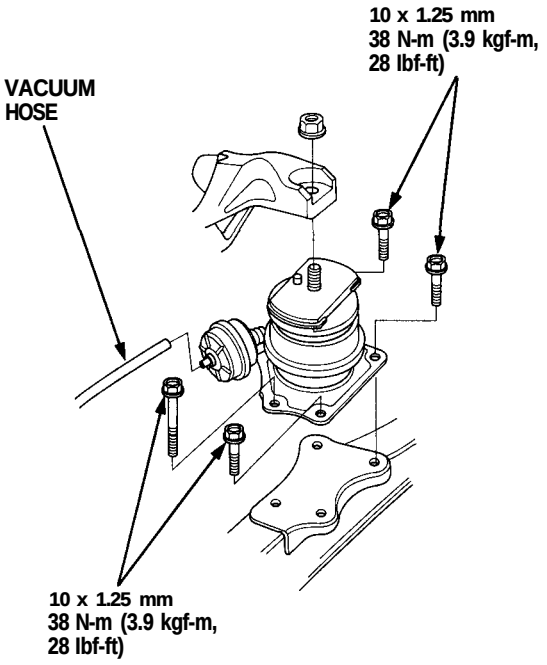
1. Remove the mid mounts, then tighten the transmission housing mounting bolts and torque converter cover (see section 14).

2. Install the mid mounts, then tighten the bolts and nuts in the numbered sequence as shown (① – ②) (see section 14).



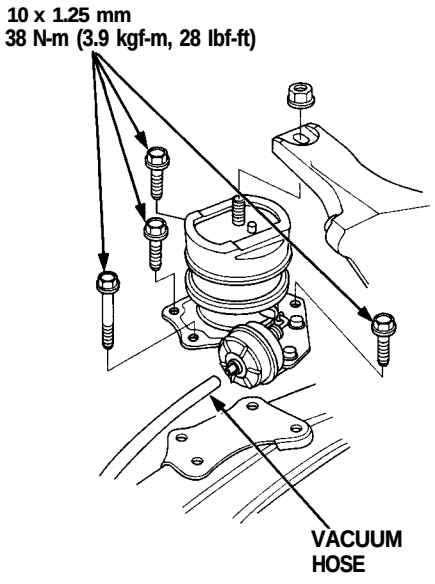
3. Install the left front engine mount and vacuum hose, then tighten the bolts.

NOTE: Do not tighten the nut.



4. Install the right front engine mount and vacuum hose, then tighten the bolts.

NOTE: Do not tighten the nut.

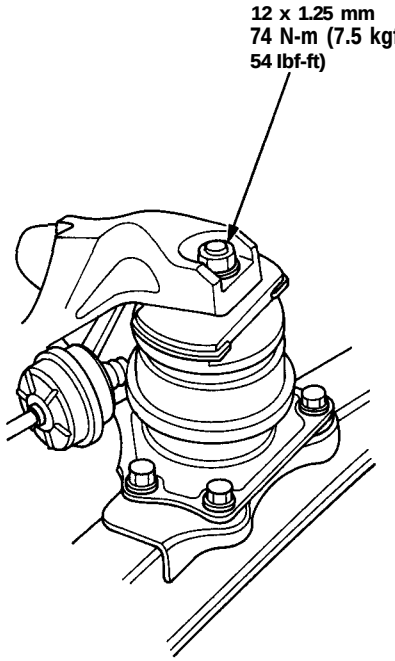


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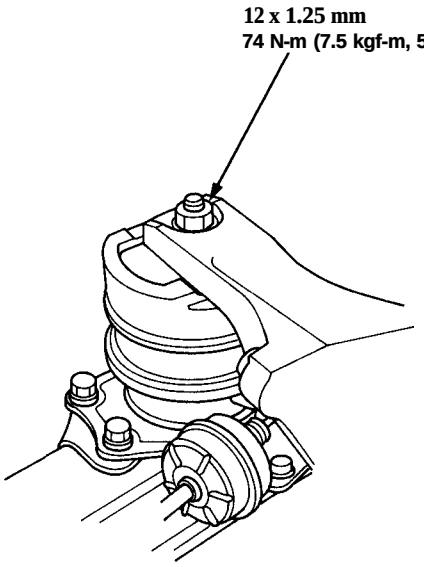
Engine Removal/Installation

Installation (cont'd)

5. Tighten the nut on the left front engine mount.

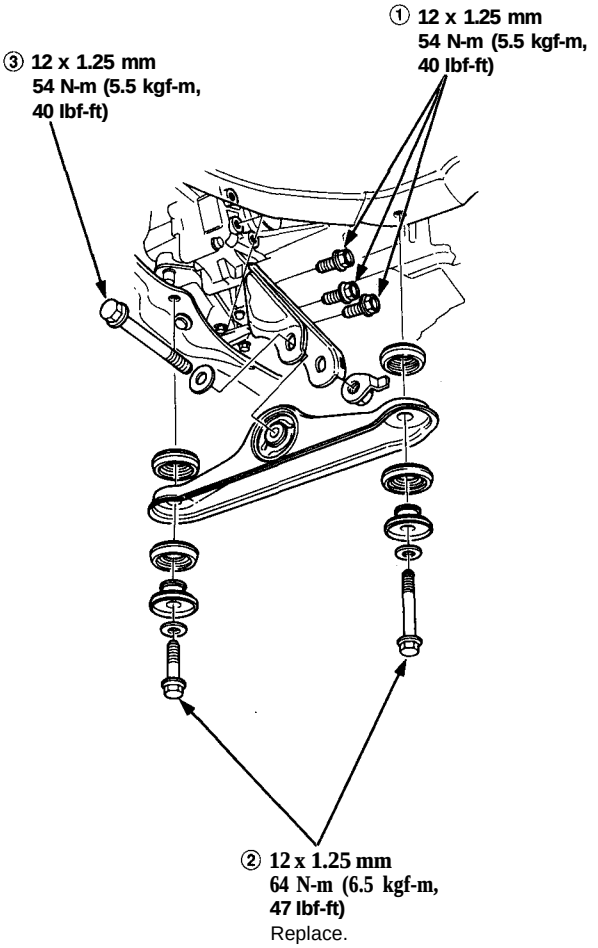


6. Tighten the nut on the right front engine mount.



7. Install the extension shaft (see section 14).

8. Install the transmission mount and mount bracket, then tighten the bolts in the numbered sequence as shown (① – ③).



- Check that the spring clip on the end of each driveshaft clicks into place.

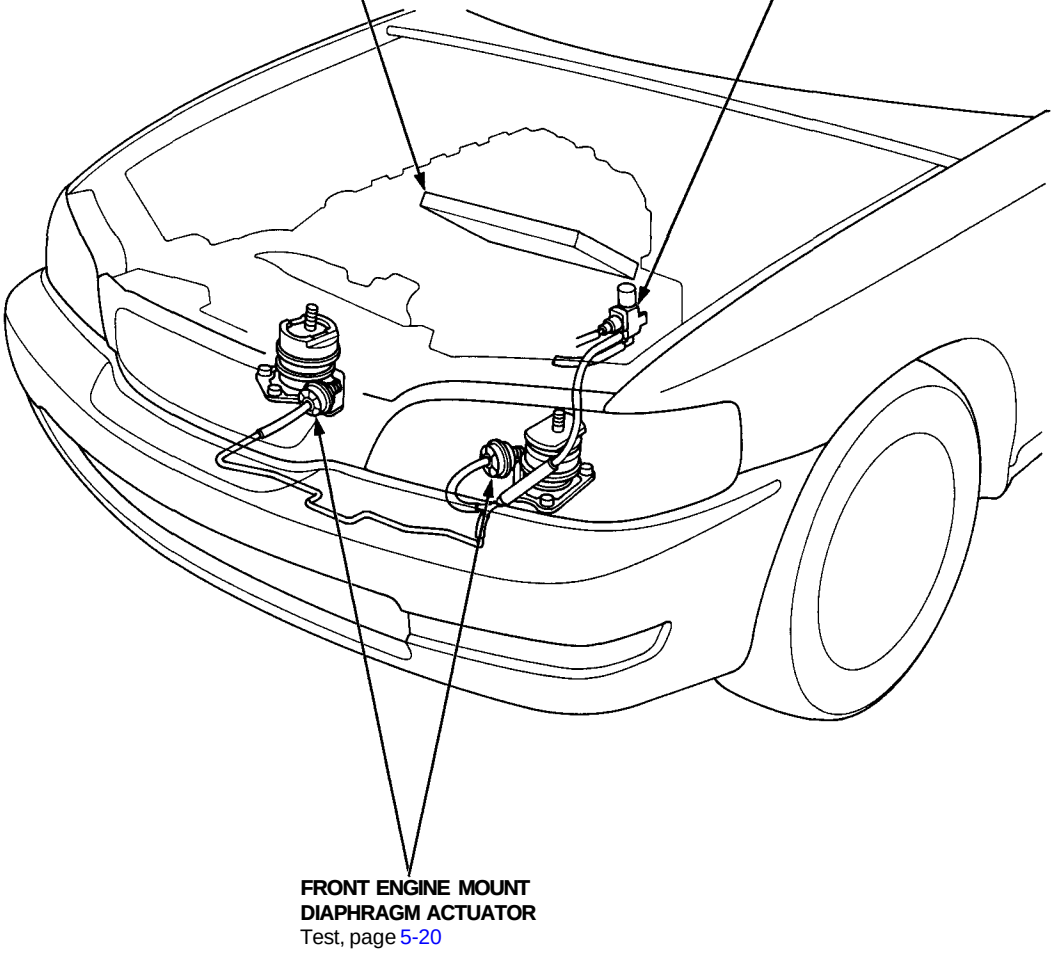
CAUTION: Use new spring clips.

- Refill the cooling system.
- Bleed air from the cooling system at the bleed bolt with the heater valve open (see page 10-5).
- Adjust the throttle cable (see section 11).
- Adjust the shift cable (see section 14).
- Adjust the tension of the following drive belts.
  Alternator belt (see section 23).
  P/S pump belt (see section 17).
  A/C compressor belt (see section 22).
- Clean the battery posts and cable terminals with sandpaper, assemble them, then apply grease to prevent corrosion.
- Inspect for fuel leakage (see section 11).
  - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes.
    Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.
- Refill the engine with engine oil (see page 8-4).
- Refill the transmission with ATF (see section 14).
- Refill the differential with differential oil (see section 15).

- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Engine Mount Control System

Component Location Index



Engine Mount Control System

Troubleshooting Flowchart

NOTE:
- Check the vacuum hoses and pipes for damage and proper connections.
- Refer to page 11-28 through 11-31 before troubleshooting.

— The engine vibrates excessively when idling.

Check Idle Speed:
Warm up engine to normal operating temperature (the cooling fan comes on).

Is the idle speed less than 800 rpm?
- NO → **Adjust the idle speed (see page 11-117).**
- YES

Check the Engine Mount Control System:
1. Fully depress the brake pedal.
2. With the transmission in gear, have an assistant connect and disconnect the 2P connector from the engine mount control solenoid valve.

Is there a noticeable change in idle smoothness when the 2P connector is connected and disconnected?
- YES → **Reconnect the 2P connector to the solenoid valve. The engine mount control system is OK.**
- NO

Test the Engine Mount Control Solenoid Valve Wire:
1. Shift to [N] or [P] position.
2. Disconnect the 2P connector from the engine mount control solenoid valve.
3. Measure voltage between the BLK/YEL wire and body ground.

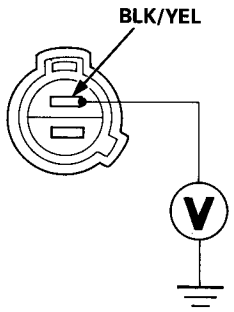
Is there battery voltage?
- NO → **Repair open in BLK/YEL wire between the 2P connector and the ECM fuse ('95 - '96: 15 A, '97 - '98:20 A).**
- YES

Test the Engine Mount Control Solenoid Valve Wire:
Measure voltage between the BLK/YEL wire and the GRN/WHT wire.

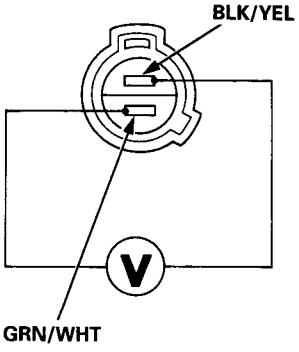
Is there battery voltage?
- NO → **— Repair open in GRN/WHT wire between ECM (A10) and the 2P connector.**
  — If the wire is OK, substitute a known-good ECM and recheck.
- YES

(To page 5-19)

ENGINE MOUNT CONTROL SOLENOID VALVE CONNECTOR



TERMINAL SIDE OF FEMALE TERMINALS



(From page 5-18)

Test the Engine Mount Control Solenoid Valve Wire:
1. Raise the engine speed above 1,000 rpm.
2. Measure voltage between the BLK/YEL wire and the GRN/WHT wire.

Is there battery voltage?

YES

- **Repair short to body ground in GRN/WHT wire between ECM (A10) and the 2P connector.**
- **If the wire is OK, substitute a known-good ECM and recheck.**

NO

Test the Engine Mount and Vacuum Hose:
1. Turn the ignition switch OFF, then disconnect the upper vacuum hose from the engine mount control solenoid valve, and connect a vacuum pump/gauge to the hose.
2. Start the engine, then apply vacuum for 20 seconds.

Does the engine mount hold vacuum?

NO

- **Replace the vacuum hose.**
- **Replace the engine mount.**

YES

Test the Engine Mount:
Release the vacuum, then apply vacuum again.

Is there a noticeable change in idle smoothness with and without vacuum applied?

NO

Replace the engine mount.

YES

Test the Engine Mount Control Solenoid Valve:
1. Turn the ignition switch OFF.
2. Disconnect the lower vacuum hose from the engine mount control solenoid valve, and connect a vacuum gauge to the hose.
3. Start the engine.

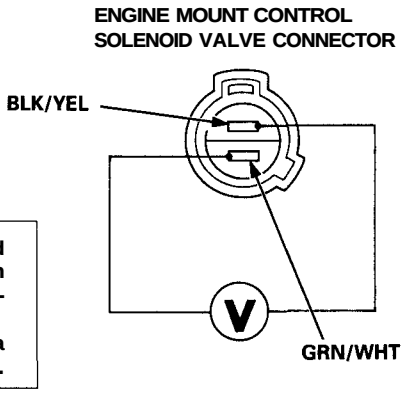
Is there manifold vacuum?

NO

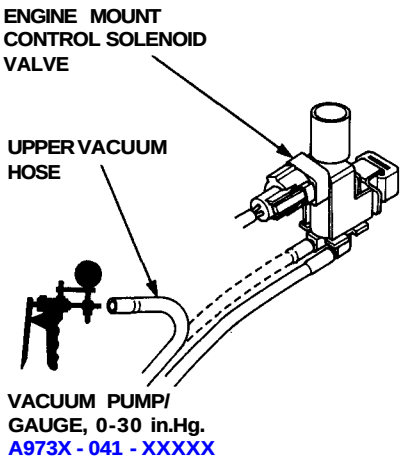
Repair as needed.

YES

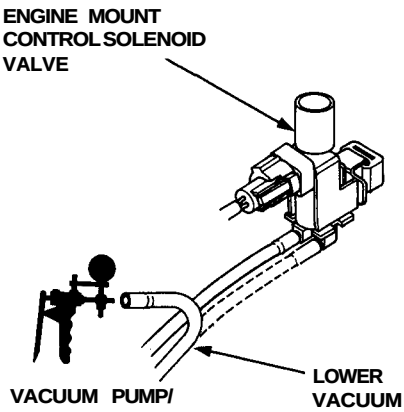
Replace the engine mount control solenoid valve.



TERMINAL SIDE OF FEMALE TERMINALS



VACUUM PUMP/ GAUGE, 0-30 in.Hg.
A973X - 041 - XXXXX



VACUUM PUMP/ GAUGE, 0-30 in.Hg.
A973X - 041 - XXXXX

Engine Mount Control System

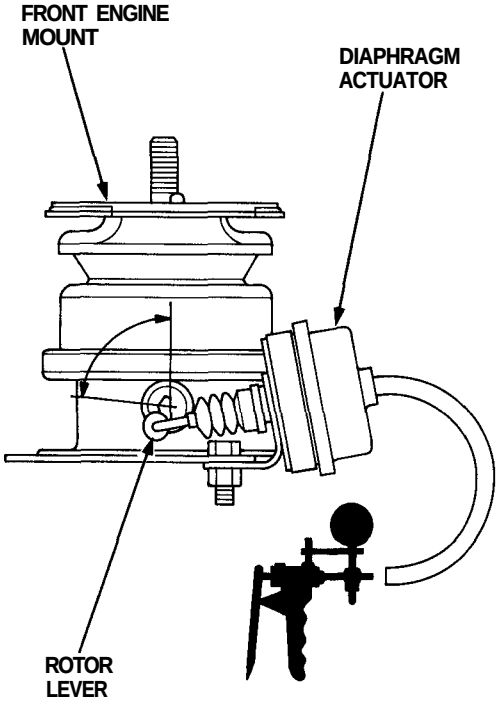
Diaphragm Actuator Test

1. Disconnect the vacuum hoses, then remove the front engine mounts (see page 5-11).

2. Clean and oil the diaphragm actuator rod, rotor lever, and lever linkage.

3. With a vacuum pump/gauge, apply vacuum of about 30.7 kPa (230 mmHg, 9.1 in.Hg), and check if the rotor lever turns 80 degrees.

   — Replace the front engine mount if the rotor lever does not operate.



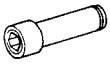
VACUUM PUMP/ GAUGE, 0-30 in.Hg.
A973X - 041 - XXXXX

Special Tools

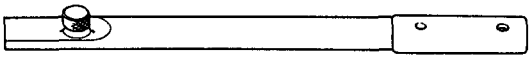
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAH-PJ7010B	Valve Guide Reamer, 5.5 mm	1	6-30
②	07JAA-001020A	Socket, 19 mm	1	6-7
③	07JAB-001020A	Holder Handle	1	6-7
④	07NAB-001040A	Holder Attachment, 50 mm	1	6-7
⑤	07742-0010100	Valve Guide Driver, 5.5 mm	1	6-29, 6-30
⑥	07757-PJ1010A	Valve Spring Compressor Attachment	1	6-25



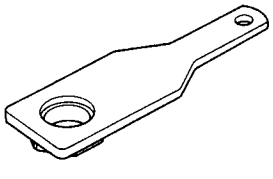
①



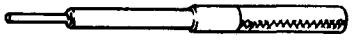
②



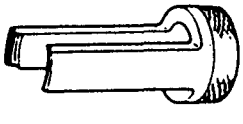
③



④



⑤



⑥

Valve Clearance

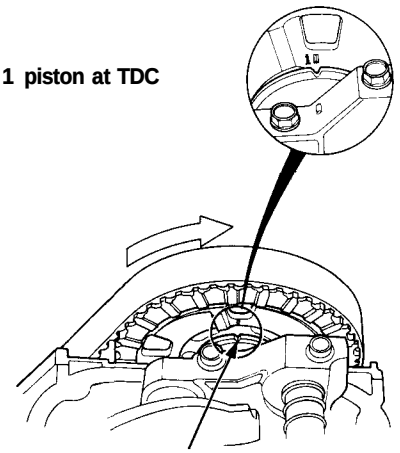
Adjustment

NOTE:
- Valves should be adjusted only when the cylinder head temperature is less than 100°F (38°C).
- After adjusting, retorque the crankshaft pulley bolt to 245 N-m (25.0 kgf-m, 181 lbf-ft).

1. Remove the cylinder head cover.

   NOTE: Refer to pages 6-35, 6-36 when installing the cylinder head cover.

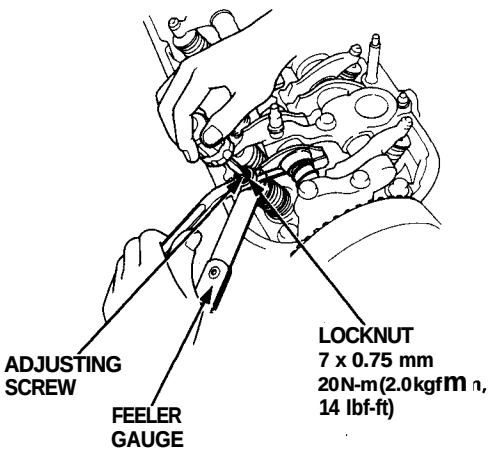
2. Align the No. 1 piston TDC mark with the TDC groove on the No. 1 camshaft holder as shown.



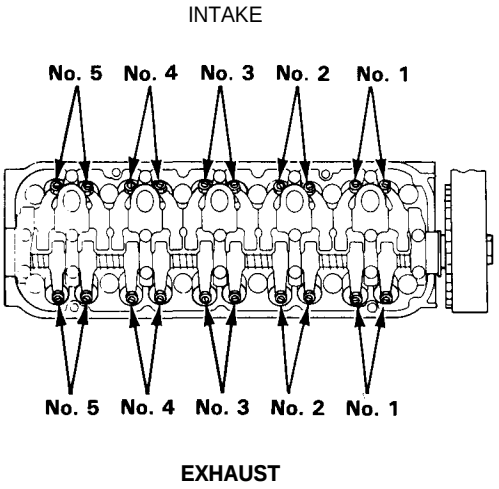
3. Adjust valves on No. 1 cylinder.

   Intake: 0.26 mm (0.010 in) ± 0.02 mm (0.0008 in)
   Exhaust: 0.30 mm (0.012 in) ±0.02 mm (0.0008 in)

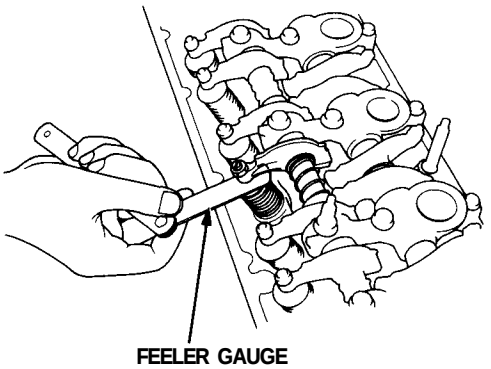
4. Loosen the locknut, and turn the adjusting screw until the feeler gauge slides back and forth with a slight amount of drag.



Adjusting screw location:



5. Tighten the locknut and check clearance again. Repeat the adjustment if necessary.

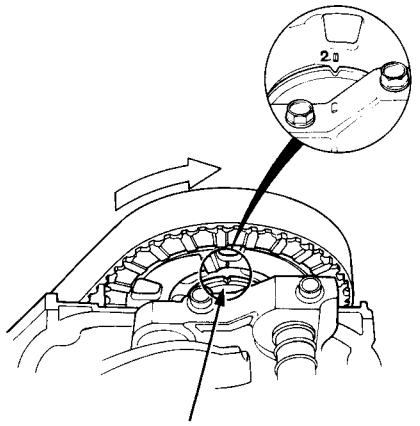


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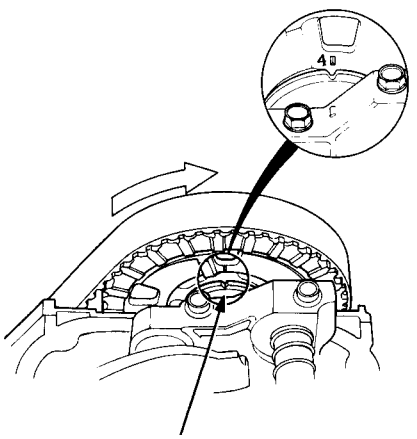
ValveClearance

Adjustment (cont'd)

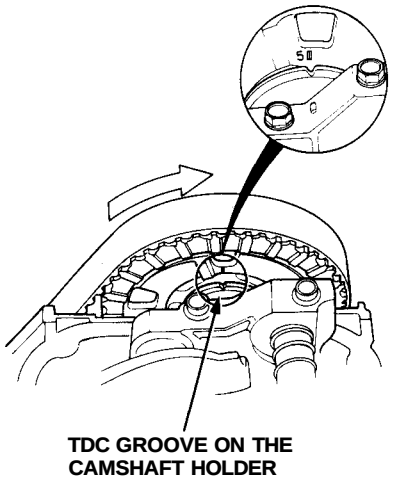
6. Rotate the crankshaft 144° counterclockwise (camshaft pulley turns 72°). Align the No. 2 piston TDC mark with the TDC groove on the No. 1 camshaft holder. Adjust the valves on No. 2 cylinder.



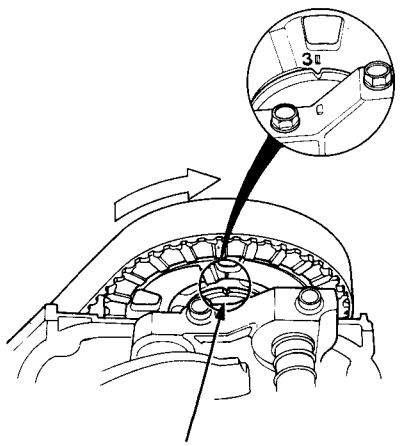
7. Rotate the crankshaft 144° counterclockwise (camshaft pulley turns 72°). Align the No. 4 piston TDC mark with the TDC groove on the No. 1 camshaft holder. Adjust the valves on No. 4 cylinder.



8. Rotate the crankshaft 144° counterclockwise (camshaft pulley turns 72°). Align the No. 5 piston TDC mark with the TDC groove on the No. 1 camshaft holder. Adjust the valves on No. 5 cylinder.



9. Rotate the crankshaft 144° counterclockwise (camshaft pulley turns 72°). Align the No. 3 piston TDC mark with the TDC groove on the No. 1 camshaft holder. Adjust the valves on No.3 cylinder.



Valve Seals

Replacement (Cylinder head removal not required)

NOTE: Cylinder head removal is not required in this procedure.

The procedure shown below applies when using the in-car valve spring compressor (Snap-on YA8845 with YA8845 - 2A 7/8" attachment).

⚠ WARNING Always wear approved eye protection when using the in-car valve spring compressor.

1. Turn the crankshaft so that the No. 1 piston is at top dead center (TDC).

2. Remove the cylinder head cover and the rocker arm assembly.

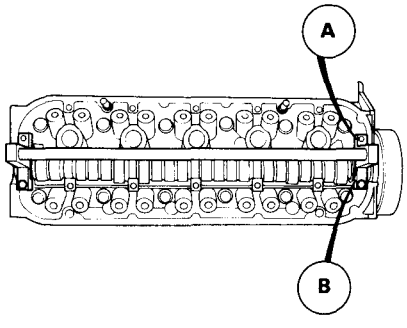
   NOTE:
   - Refer to page 6-20 for rocker arm assembly removal.
   - When removing or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
   - Refer to pages 6-35, 6-36 when installing cylinder head cover.

3. Remove the fuel injectors and the wire harness.

Intake Valve Seals:

4. Using the 8 mm bolts supplied with the tool, mount the two uprights to the cylinder head at the end camshaft holder locations. The uprights fit over the camshaft as shown.

5. Insert the cross shaft through the top holes of the uprights.

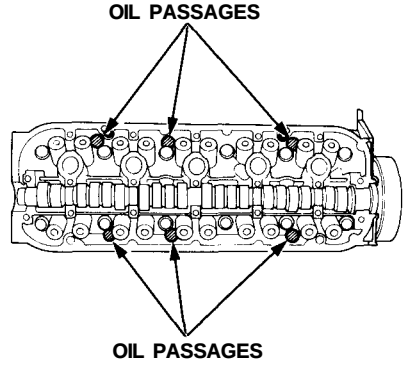


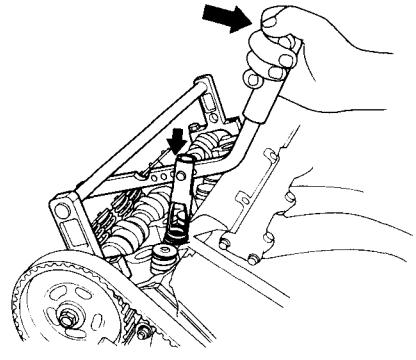
6. Select the 7/8 in diameter long compressor attachment and fasten the attachment to the No. 4 hole in the lever arm with the speed pin supplied.

7. Position the piston at TDC, and insert an air adaptor into the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing the springs and removing the valve keepers.

8. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the front position slot on the lever as shown.

   NOTE: Put shop towels over the oil passages to prevent the valve keepers from falling into the cylinder head.





9. Using a downward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.

(cont'd)

Valve Seals

Replacement (Cylinder head removal not required) (cont'd)

10. Remove the valve seals (see page 6-25).

11. Install the new valve seals (see page 6-31).

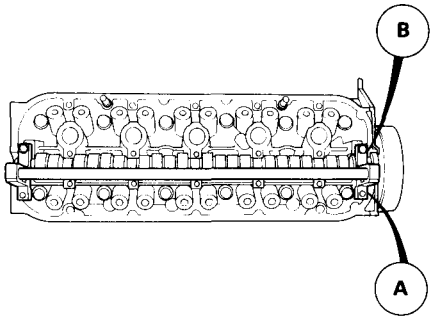
12. Install the springs, the retainers and the keepers in reverse order of removal.

13. Repeat steps 7 to 12 on the other cylinders.

Exhaust Valve Seals:

14. Using the 8 mm bolts supplied with the tool, mount the two uprights to the cylinder head at the end camshaft holder locations. The uprights fit over the camshaft as shown.

15. Insert the cross shaft through the top holes of the uprights.

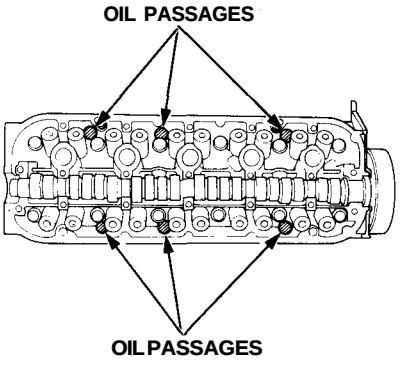


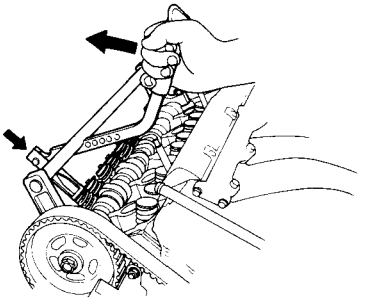
16. Select the 7/8 in diameter long compressor attachment, and fasten the attachment to the front hole in the lever arm with the speed pin supplied.

17. Position the piston at TDC, and insert an air adaptor onto the spark plug hole. Pump air into the cylinder to keep the valve closed while compressing the springs and removing the valve keepers.

18. Position the lever arm under the cross shaft so the lever is perpendicular to the shaft and the compressor attachment rests on top of the retainer for the spring being compressed. Use the rear position slot on the lever as shown.

NOTE: Put shop towels over the oil passages to prevent the valve keepers form falling into the cylinder head.





19. Using an upward motion on the lever arm, compress the valve spring and remove the keepers from the valve stem. Slowly release pressure on the spring.

20. Remove the valve seals (see page 6-25).

21. Install the new valve seals (see page 6-31).

22. Install the springs, the retainers and the keepers in reverse order of removal.

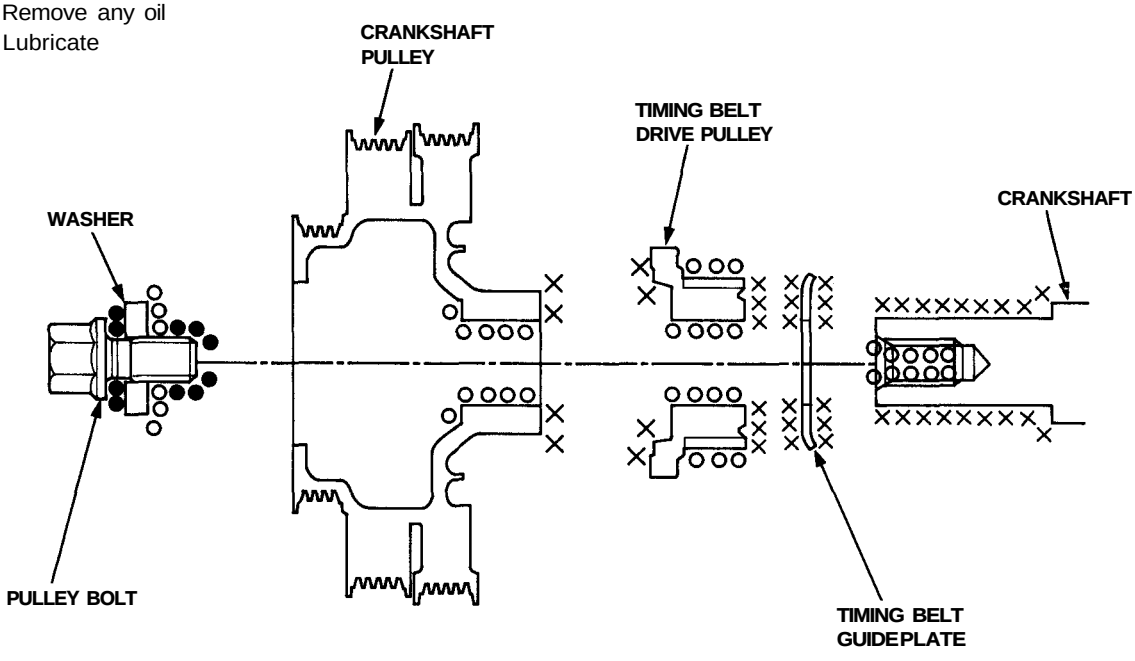
23. Repeat steps 17 to 21 on the other cylinders.

Crankshaft Pulley and Pulley Bolt

Replacement

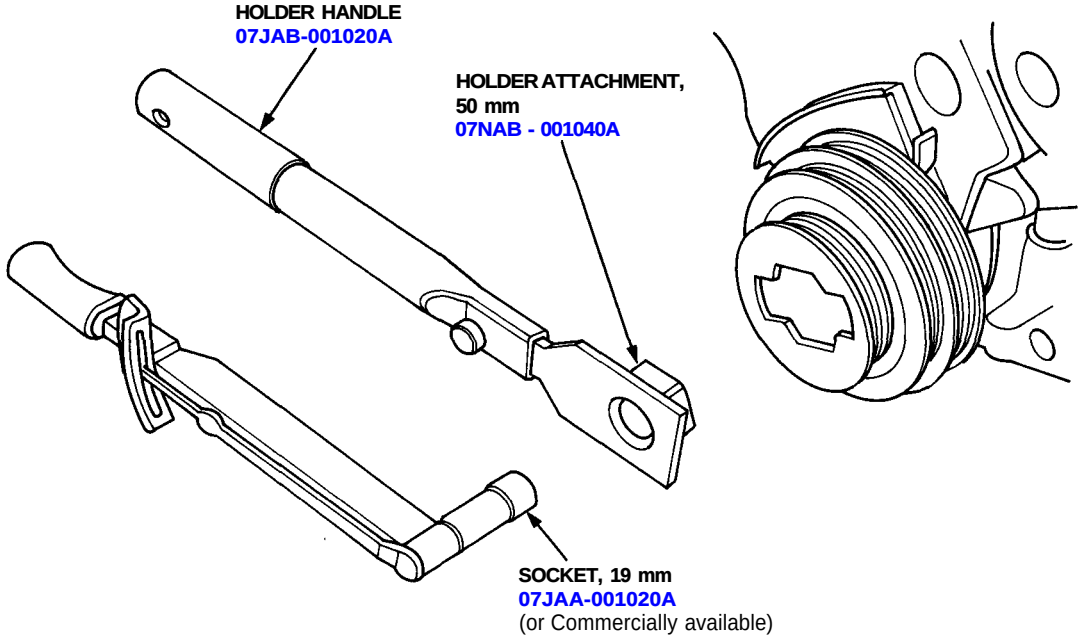
When installing and tightening the pulley, follow the procedure below.

Clean, remove any oil, and lubricate points shown below.
○ : Clean
× : Remove any oil
● : Lubricate



Crankshaft pulley bolt size and torque value:
16 x 1.5 mm
245 N-m (25.0 kgf-m, 181 lbf-ft)

NOTE:
- Do not use an impact wrench when installing.
- Align the thumbscrew in the holder handle with the hole in the holder attachment.

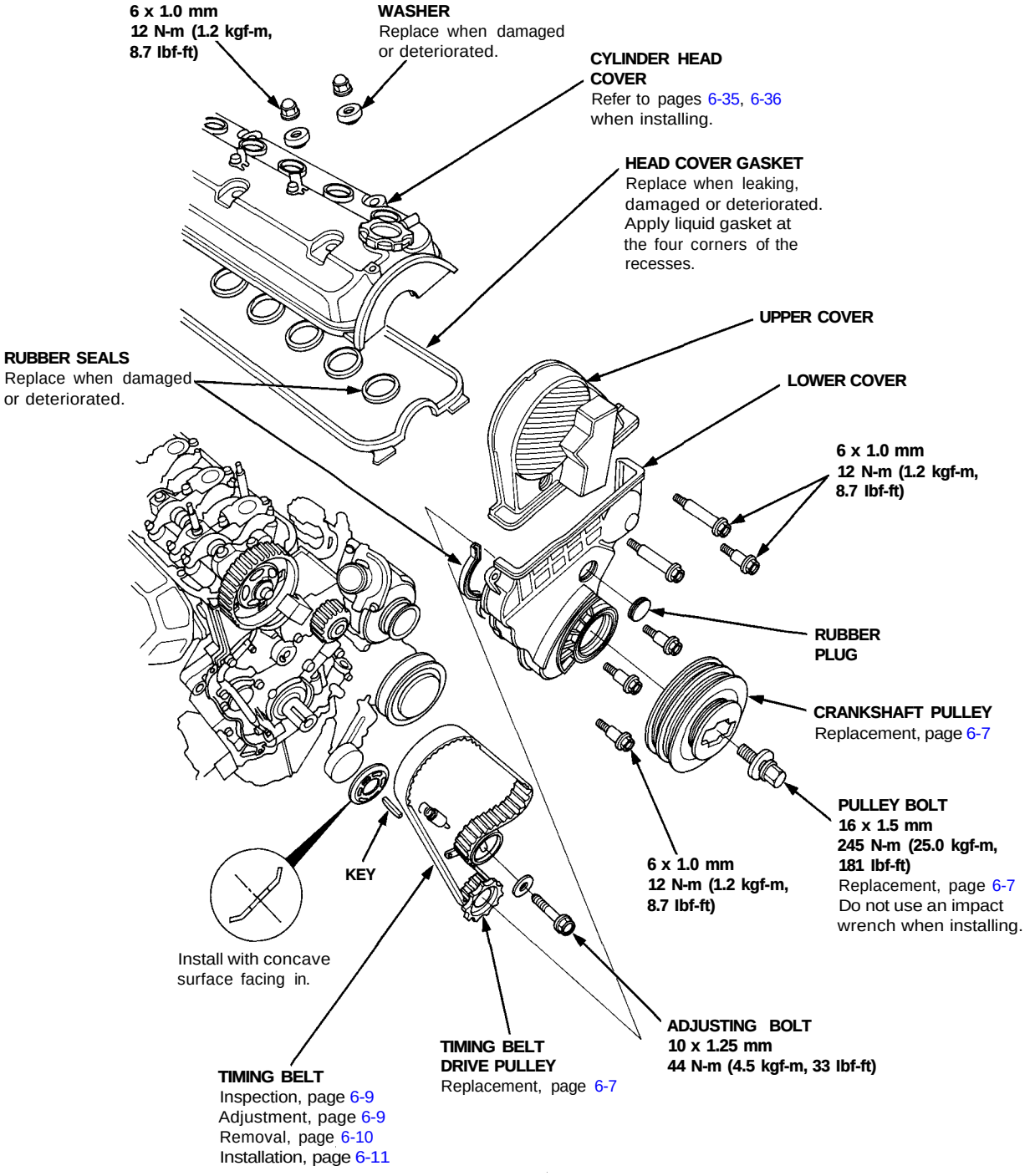


Timing Belt

Illustrated Index

NOTE:

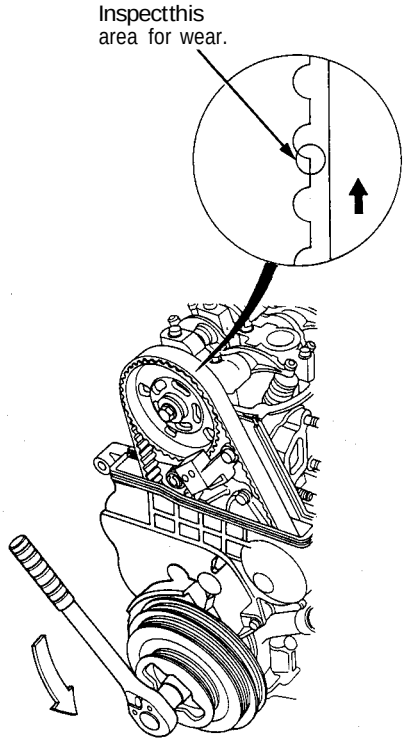
- Refer to page 6-11 for how to position the crankshaft and pulley before installing the belt.
- Mark the direction of rotation on the belt before removing.
- Do not use the upper cover and lower cover for storing removed items.
- Clean the upper cover and lower cover before installing.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.
- Refer to page 6-7 before installing the timing belt and timing balancer belt.



Inspection

1. Remove the cylinder head cover.
   - Refer to pages 6-35, 6-36 when installing.
2. Remove the upper cover (see page 6-8).
3. Inspect the timing belt for cracks and oil or coolant soaking.

   NOTE:
   - Replace the belt if oil or coolant soaked.
   - Remove any oil or solvent that gets on the belt.



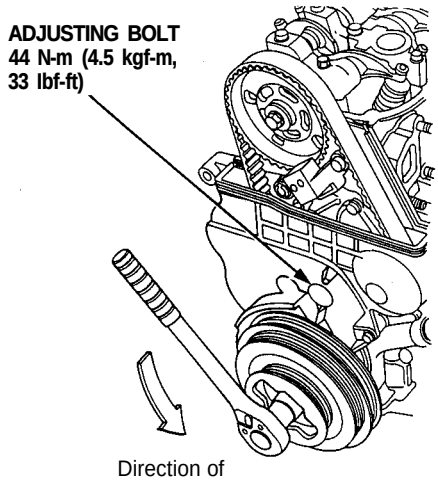
4. After inspecting, retorque the crankshaft pulley bolt to 245 N-m (25.0 kgf-m, 181 lbf-ft).

Tension Adjustment

CAUTION: Always adjust the timing belt tension with the engine cold.

NOTE:
- The tensioner is spring-loaded to apply tension to the belt automatically after making the following adjustment.
- Always rotate the crankshaft counterclockwise when viewed from the pulley side. Rotating it clockwise may result in improper adjustment of the belt tension.
- Inspect the timing belt before adjusting the belt tension.

1. Remove the cylinder head cover.
   - Refer to pages 6-35, 6-36 when installing.
2. Remove the upper cover (see page 6-8).
3. Rotate the crankshaft five or six revolutions to set the belt.
4. Set the No. 1 piston at TDC (see page 6-12).
5. Loosen the adjusting bolt 180°.



6. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley.
7. Tighten the adjusting bolt.
8. After inspecting, retorque the crankshaft pulley bolt to 245 N-m (25.0 kgf-m, 181 lbf-ft).

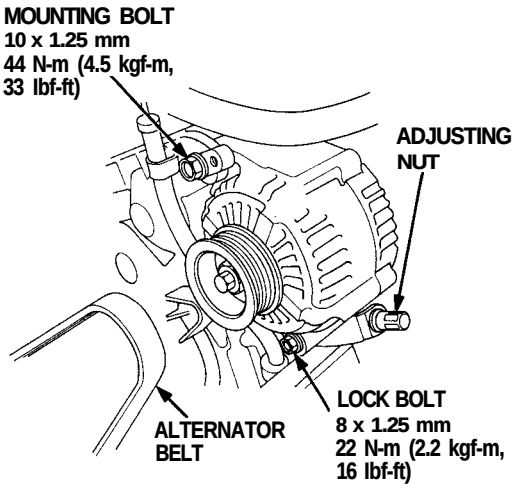
Tinning Belt

Removal

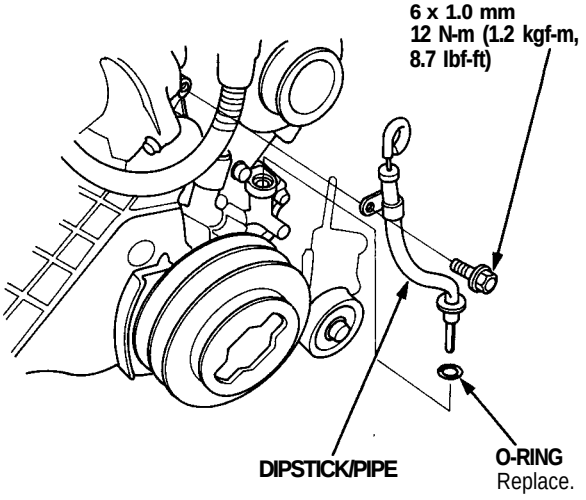
NOTE:

- Replace the timing belt at 105,000 miles (168,000 km) according to the maintenance schedule (normal conditions/severe conditions).
  If the vehicle regularly is driven in one or more of the following conditions, replace the timing belt at 60,000 miles (U.S.A.) 100,000 km (Canada).
  - In very high temperatures (over 110°F, 43°C).
  - In very low temperatures (under -20°F, -29°C).
- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-12).
- Inspect the water pump (see page 10-10).

1. Loosen the adjusting bolt, locknut and mounting bolt, then remove the power steering (P/S) pump belt (see page 5-4).
2. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C compressor belt (see page 5-5).
3. Loosen the adjusting nut, lock bolt and mounting bolt, then remove the alternator belt.

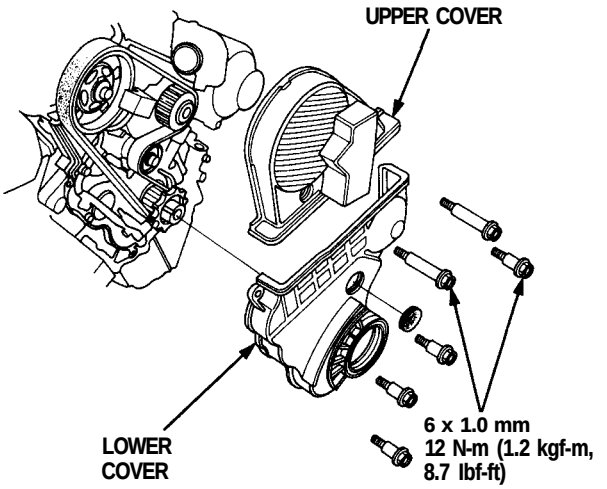


4. Remove the dipstick and pipe.

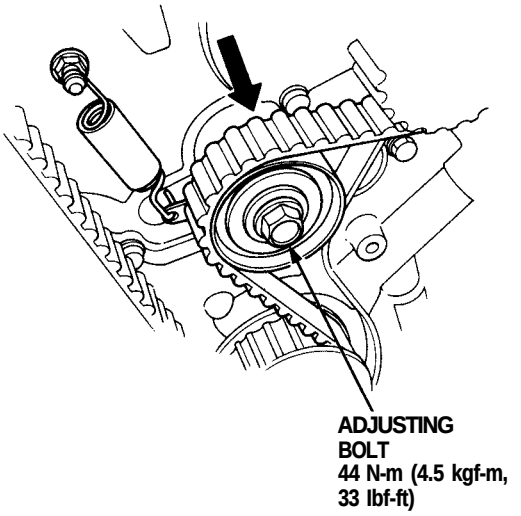


5. Remove the cylinder head cover.
   - Refer to pages 6-35, 6-36 when installing.
6. Remove the crankshaft pulley (see page 6-7).
7. Remove the upper cover and lower cover.

   NOTE: Do not use the upper and lower covers for storing removed items.



8. Loosen the adjusting bolt 180°. Push the tensioner to remove tension from the timing belt, then retighten the adjusting bolt.

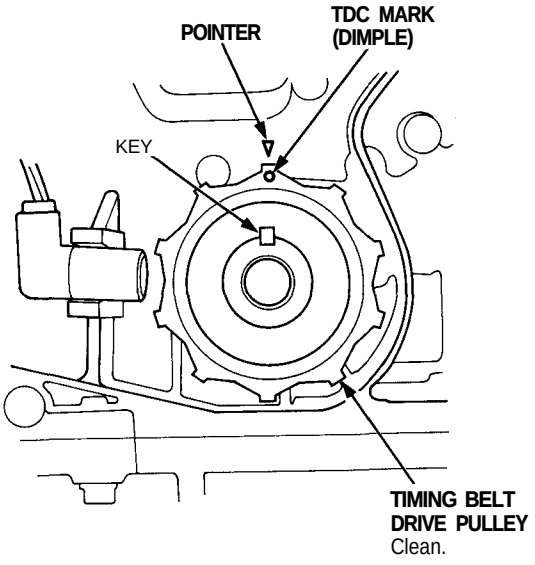


9. Remove the timing belt.

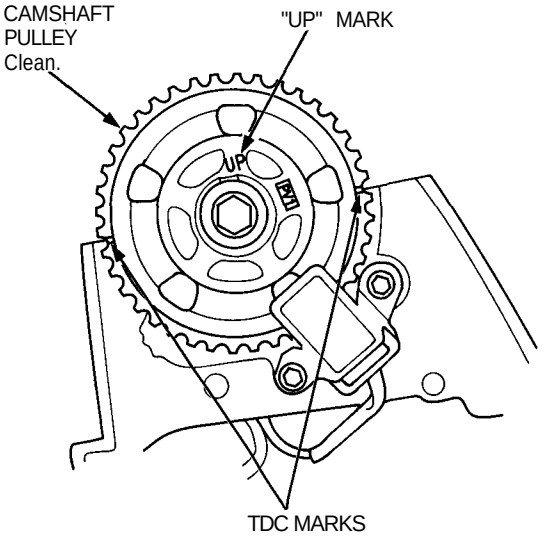
Installation

Install the timing belt in the reverse order of removal; Only key points are described here.

1. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the TDC mark on the tooth of the timing belt drive pulley with the V pointer on the oil pump.

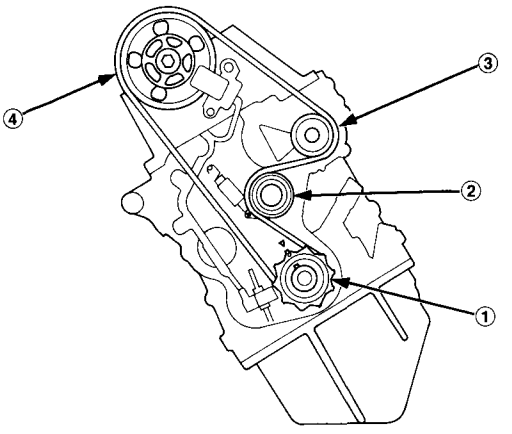


2. Set the camshaft pulley so that the No. 1 piston is at TDC. Align the TDC mark on the camshaft pulley to the pointer on the back cover.



3. Install the timing belt tightly in the sequence shown. ① Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Water pump pulley → ④ Camshaft pulley.

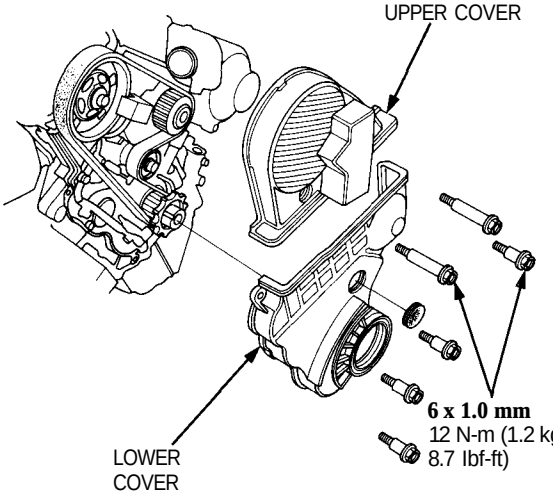
   NOTE: Make sure the timing belt drive pulley and camshaft pulley are at TDC.



4. Loosen and retighten the adjusting nut to tension the timing belt.

5. Install the lower cover and upper cover.

   NOTE: Clean the upper and lower covers before installation.



(cont'd)

Timing Belt

Installation (cont'd)

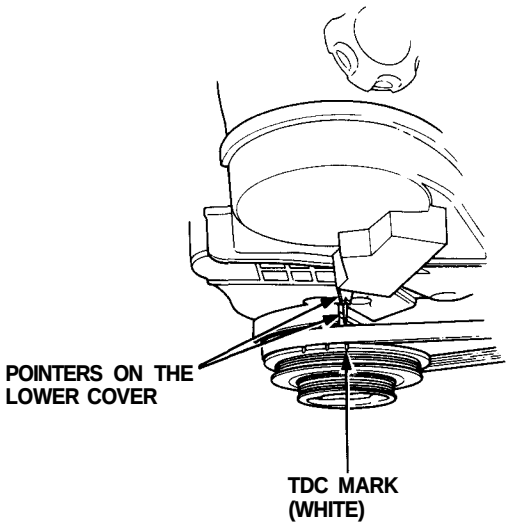
6. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-7).

7. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.

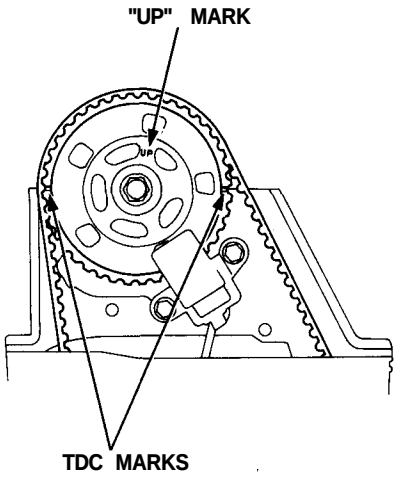
8. Adjust the timing belt tension (see page 6-9).

9. Check that the crankshaft pulley and camshaft pulley are both at TDC.

CRANKSHAFT PULLEY:



CAMSHAFT PULLEY:



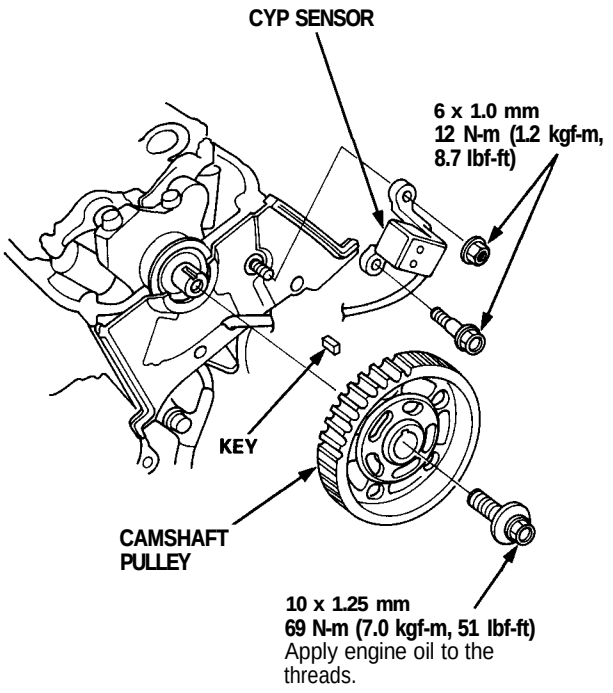
10. If the camshaft and crankshaft pulleys are not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-11, then reinstall the timing belt.

11. After installation, adjust the tension of each belt.
    - See section 23 for alternator belt tension adjustment.
    - See section 22 for A/C compressor belt tension adjustment.
    - See section 17 for P/S pump belt tension adjustment.

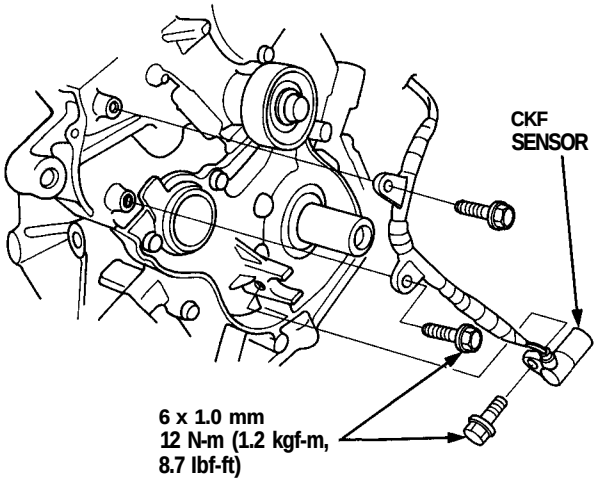
TDC/CKP/CYP/CKF Sensors

Replacement

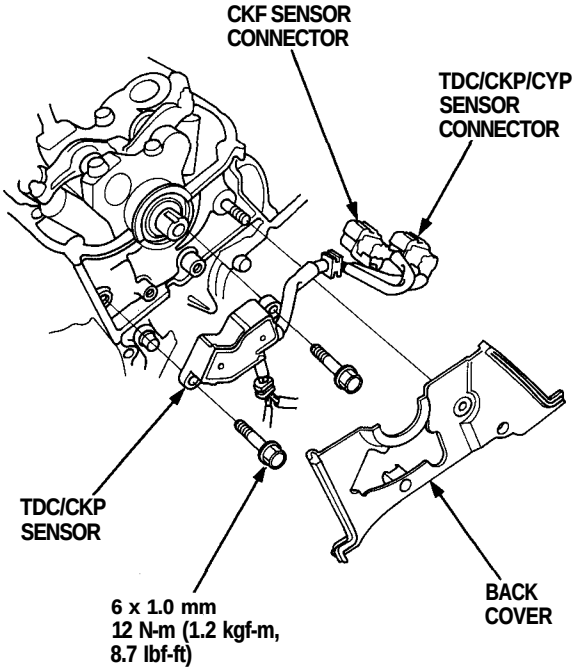
1. Set the No. 1 piston is at TDC (see page 6-12).
2. Remove the timing belt (see page 6-10).
3. Remove the CYP sensor, then remove the camshaft pulley.



4. Remove the crankshaft speed fluctuation (CKF) sensor.



5. Disconnect the TDC/CKP/CYP sensor connector and CKF sensor connector.
6. Remove the back cover, then remove the TDC/CKP sensor.



7. Install the TDC/CKP/CYP/CKF sensor in reverse order of removal.
   - Refer to page 6-11 when installing the timing belt.

Cylinder Head

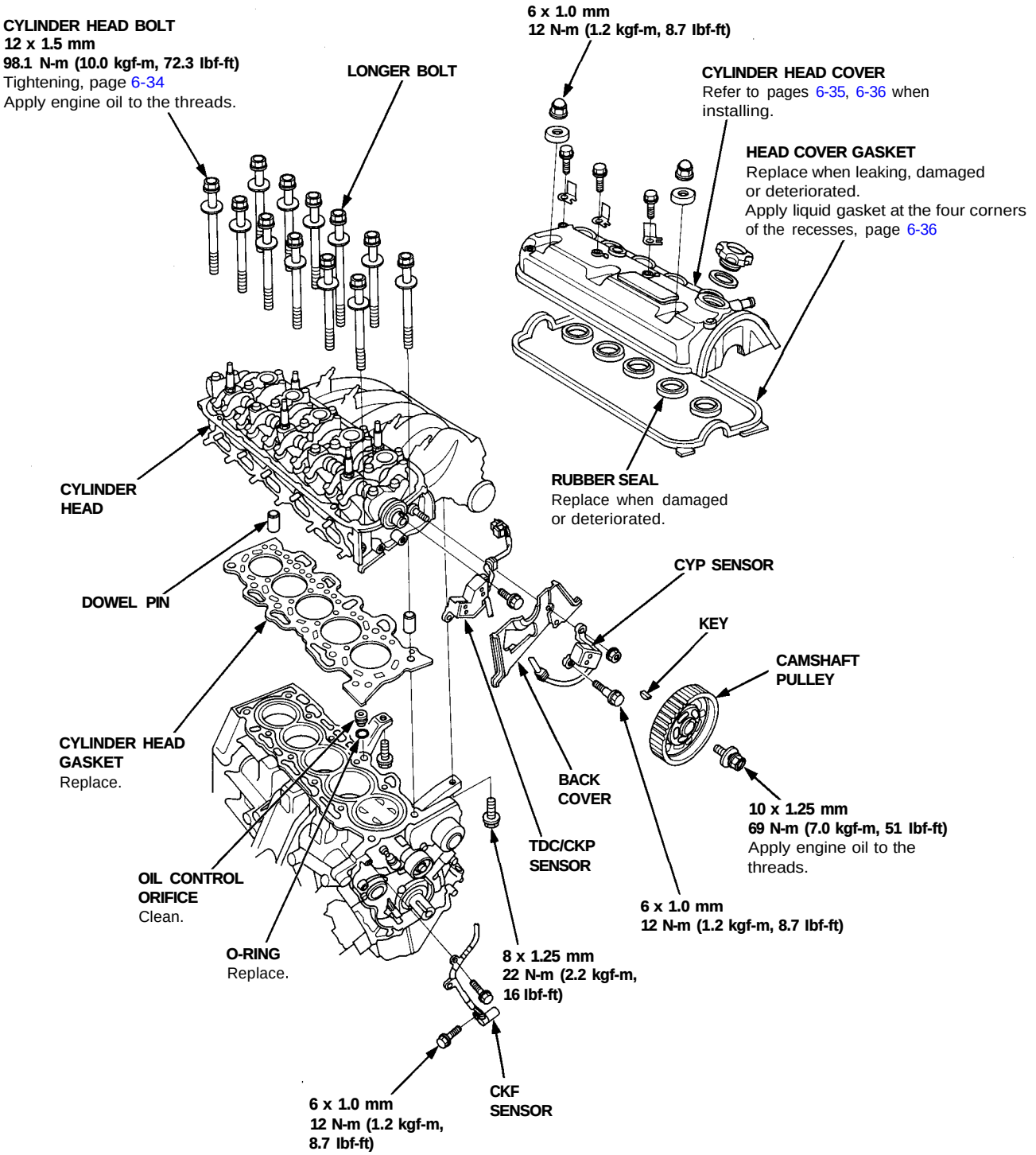
Illustrated Index

CAUTION:

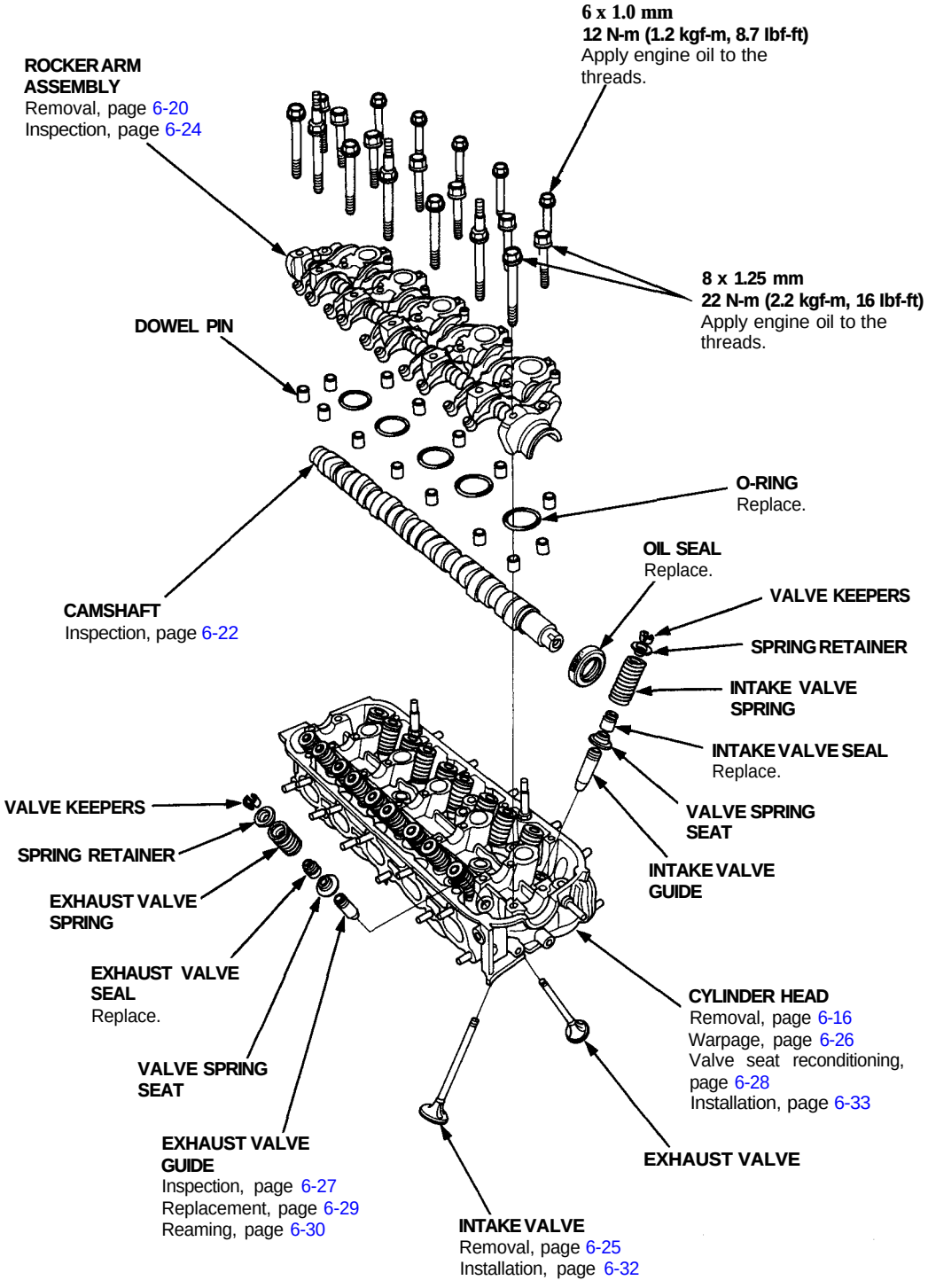
- **To avoid damage, wait until the engine coolant temperature drops below 100°F (38 C) before removing the cylinder head.**
- **When handling a metal gasket, take care not to fold it or damage the contact surface.**

NOTE:

- Use new O-rings and gaskets when reassembling.
- Clean the oil control orifice before installing.



Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact parts.



Cylinder Head

Removal

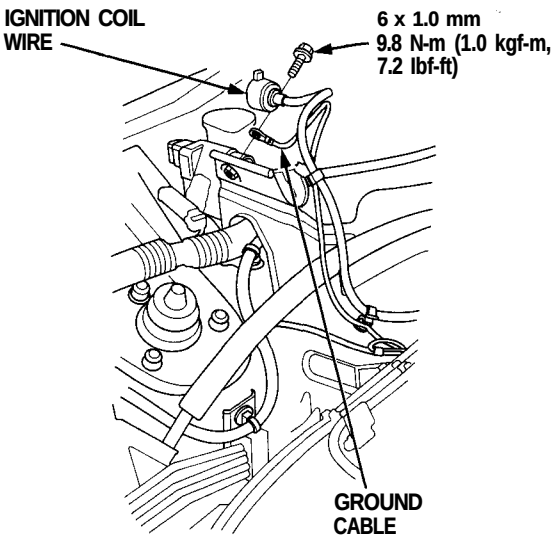
Engine removal is not required for this procedure.

⚠ WARNING Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct position on the engine.

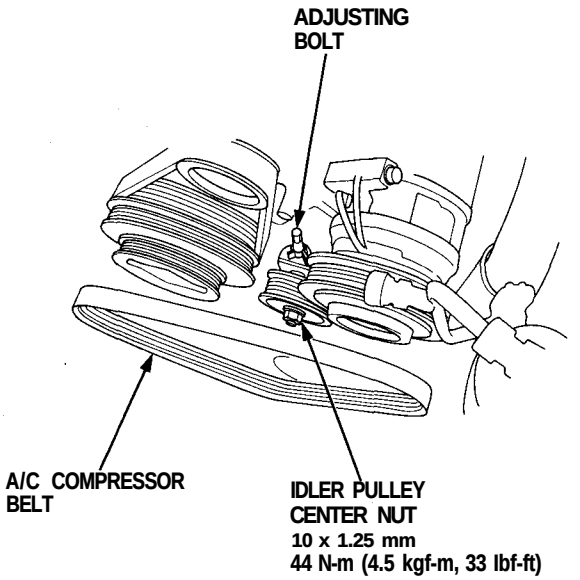
CAUTION:
- **Use fender covers to avoid damaging painted surfaces.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 100°F (38°C) before loosening the retaining bolts.**

NOTE:
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center (see page 6-12).

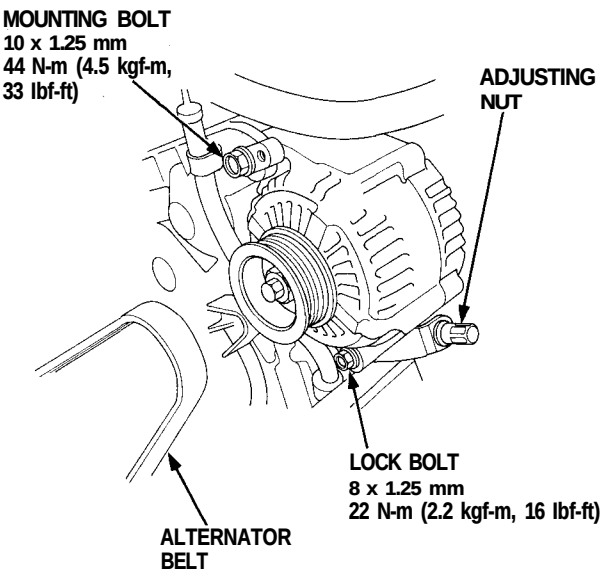
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the negative terminal from the battery.
3. Drain the engine coolant (see page 10-5). Remove the radiator cap to speed draining.
4. Remove the ground cable and ignition coil wire.



5. Remove the heat shields (see page 5-3).
6. Remove the intake air duct (see page 5-4).
7. Loosen the adjusting bolt, locknut and mounting bolt, then remove the power steering (P/S) pump belt (see page 5-4).
8. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C) compressor belt.



9. Loosen the adjusting bolt, lock bolt and mounting bolt, then remove the alternator belt.



10. Remove the throttle cable by loosening the locknut, then slip the cable end out of the accelerator linkage (see page 5-5).

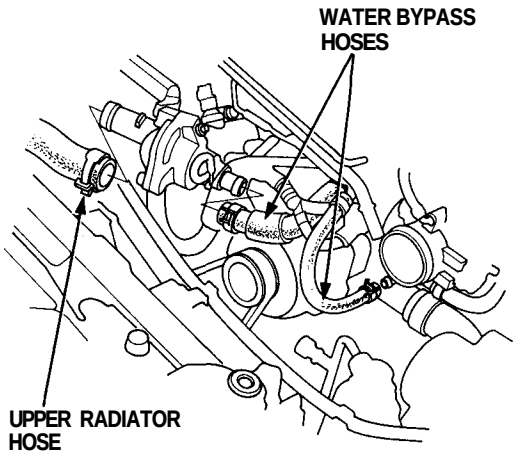
11. Remove the brake booster vacuum hose, evaporative emission (EVAP) control canister hose and vacuum hoses (see page 5-5).

12. Relieve fuel pressure (see section 11).

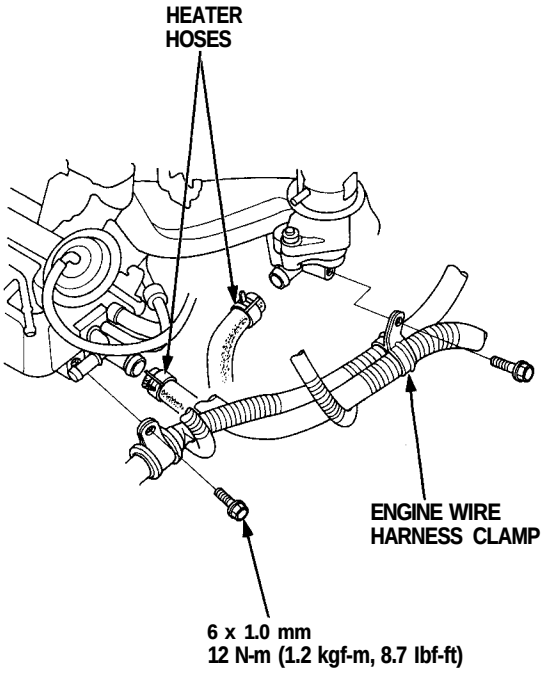
⚠ WARNING Do not smoke while working on the fuel system. Keep open flame or sparks away from the work area. Drain fuel only into an approved container.

13. Remove the fuel feed hose and fuel return hose (see page 5-6).

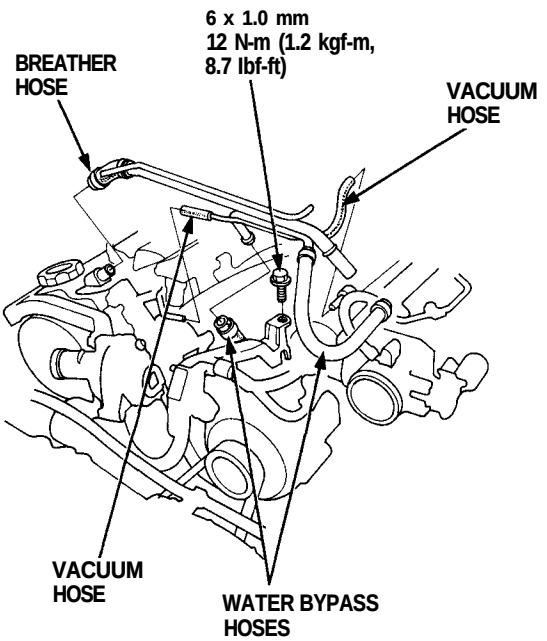
14. Remove the upper radiator hose and water bypass hoses.



15. Remove the heater hoses and wire harness clamps.



16. Remove the breather hose, vacuum hoses, water bypass hose and wire harness holder.

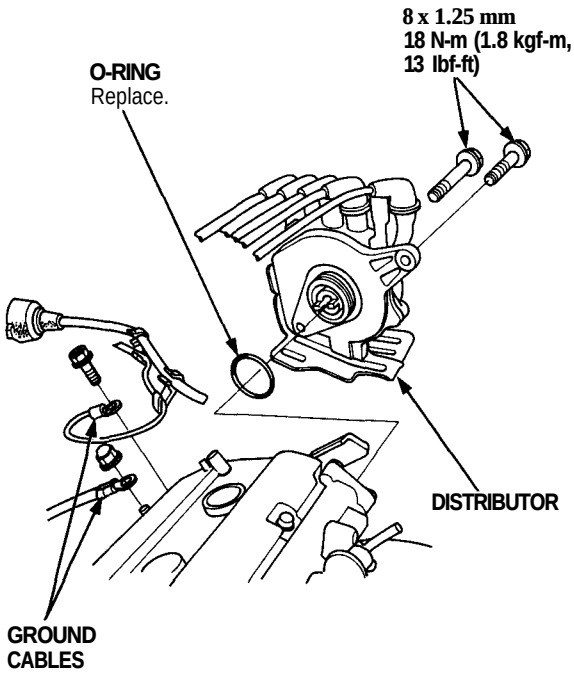


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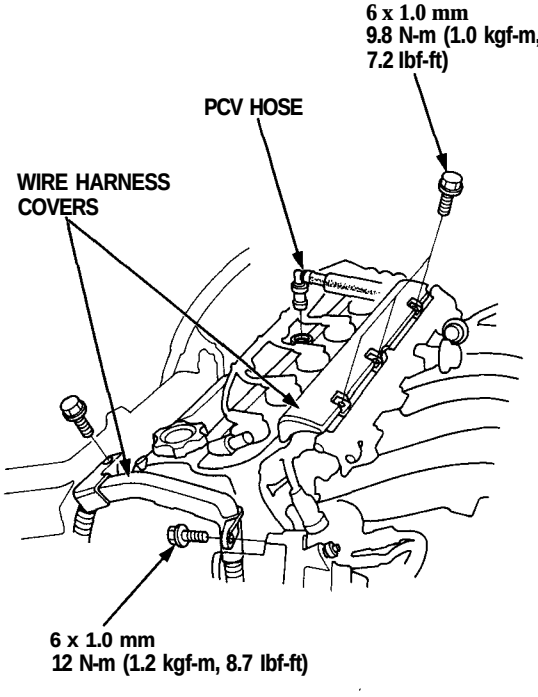
Cylinder Head

Removal (cont'd)

17. Remove the spark plug wires, distributor and ground cables from the cylinder head.

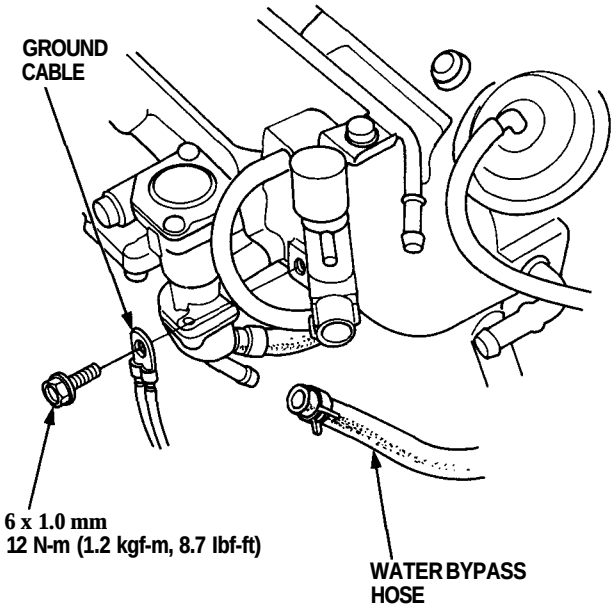


18. Remove the wire harness covers and positive crankcase ventilation (PCV) hose.

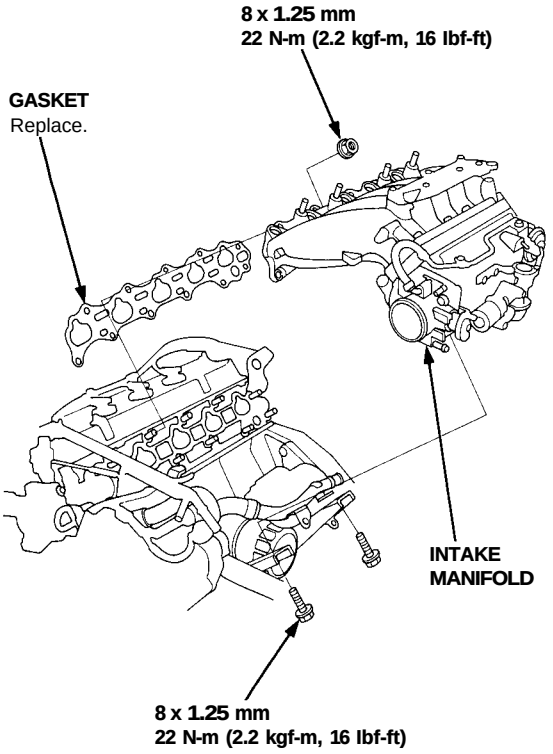


19. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.
    - Five injector connectors
    - TDC/CKP/CYP sensor connector
    - CKF sensor connector
    - Idle air control (IAC) valve connector
    - Engine coolant temperature (ECT) sensor connector
    - ECT gauge sending unit connector
    - ECT switch connector
    - Exhaust gas recirculation (EGR) valve lift sensor connector
    - Throttle position sensor connector
    - Intake air bypass (IAB) control solenoid valve connector
    - Evaporative emission (EVAP) purge control solenoid valve connector

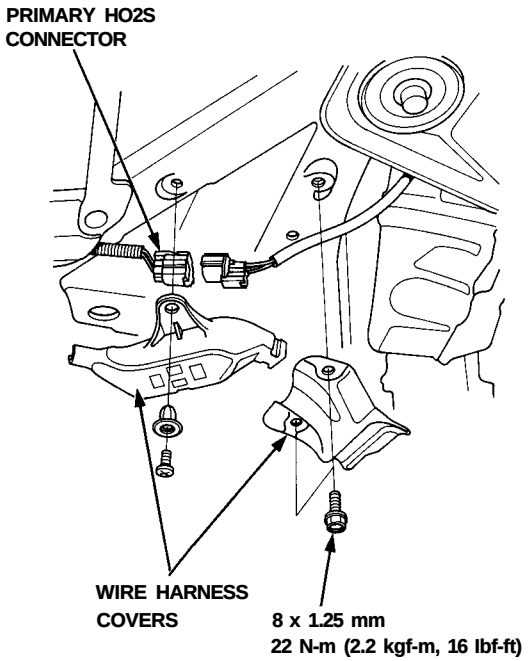
20. Remove the ground cable and water bypass hose.



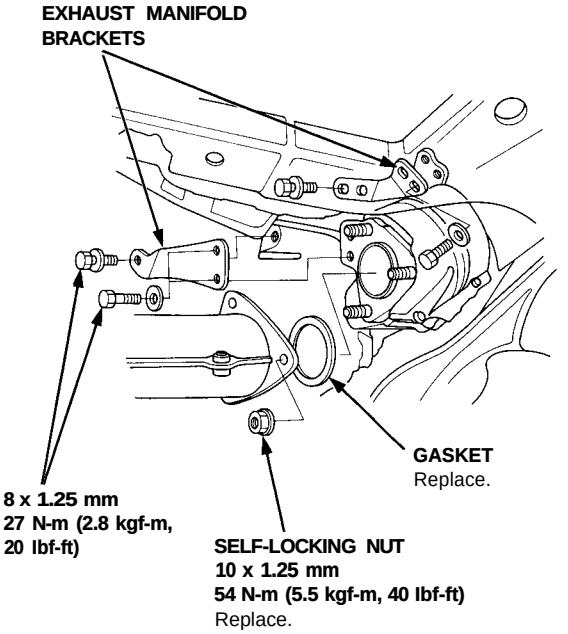
21. Remove the intake manifold.



22. Remove the wire harness covers, then disconnect the primary heated oxygen (HO2S) connector.

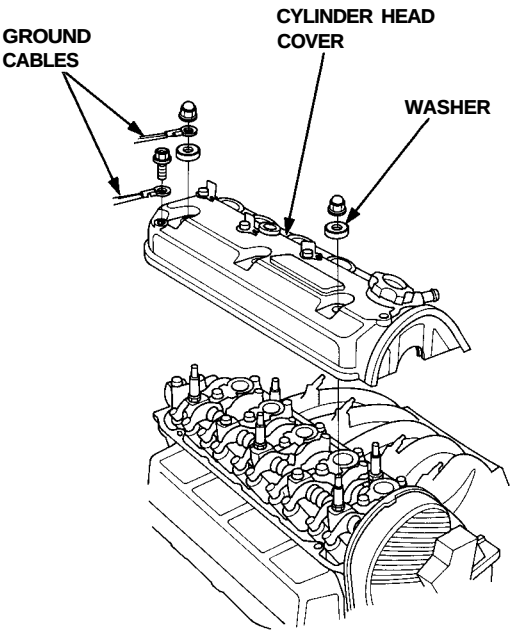


23. Remove the self-locking nut and exhaust manifold brackets.



24. Remove the exhaust manifold (see page 9-4).

25. Remove the ground cables and cylinder head cover.



(cont'd)

Cylinder Head

Removal (cont'd)

26. Remove the tinning belt (see page 6-10).

27. Remove the CYP sensor, then remove the camshaft pulley (see page 6-13).

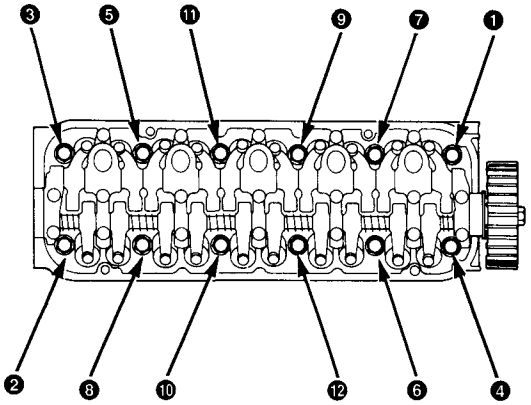
28. Remove the CKF sensor (see page 6-13).

29. Remove the back cover, then remove the TDC/CKP sensor (see page 6-13).

30. Remove the cylinder head bolts, then remove the cylinder head.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE:

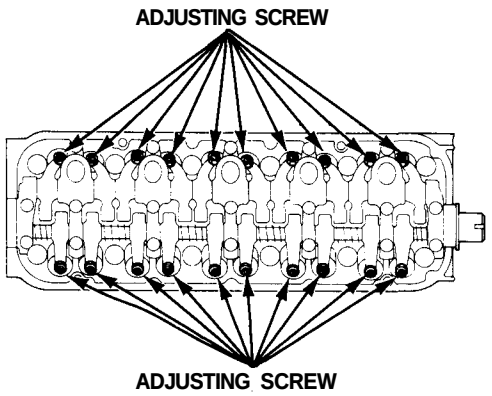


Rocker Arm Assembly

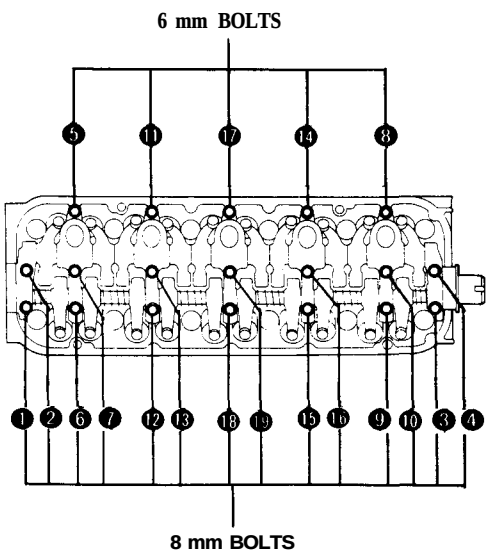
Removal

1. Loosen the adjusting screws, then remove the bolts and the rocker arm assembly.

NOTE:
- Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern, to prevent damaging the valves or rocker arm assembly.
- When removing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the camshaft holders, the springs and the rocker arms on the shafts.



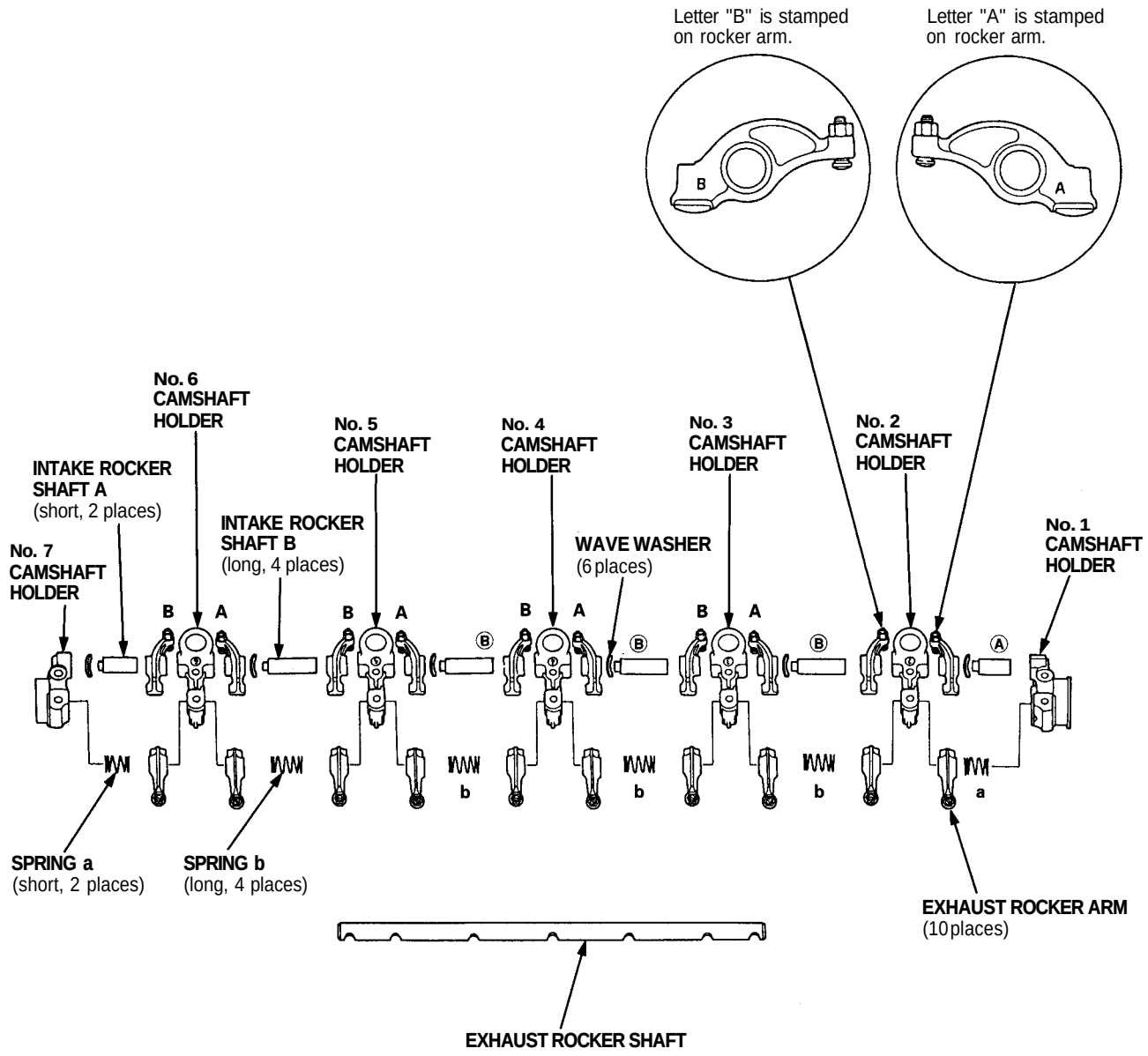
CAMSHAFT HOLDER BOLTS LOOSENING SEQUENCE:



Disassembly/Reassembly

NOTE:
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see page 6-24).
- Rocker arms must be installed in the same position if reused.
- When removing or installing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- When reassembling, fit the projection of the intake rocker shaft to the notch in the camshaft holder.

OIL Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact points.



Camshaft

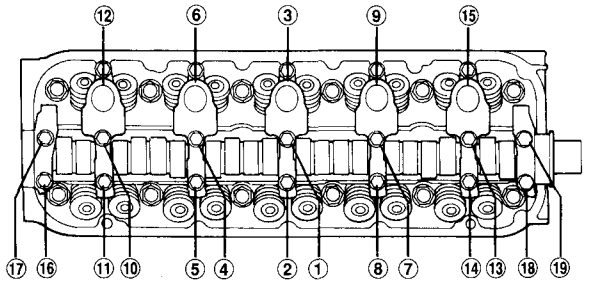
Inspection

NOTE:
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

   Specified torque:
   8 mm bolts: 22 N-m (2.2 kgf-m, 16 lbf-ft)
   Apply engine oil
   6 mm bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)
   Apply engine oil

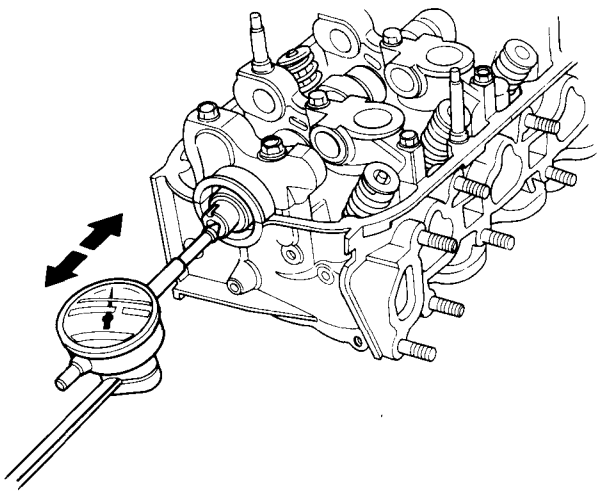
6 mm bolts: ③, ⑥, ⑨, ⑫, ⑮



2. Seat the camshaft by pushing it toward the distributor end of cylinder head.

3. Zero the dial indicator against the end of the distributor drive, then push the camshaft back and forth and read the end play.

   Camshaft End Play:
   Standard (New): 0.05 - 0.15 mm
   (0.002 - 0.006 in)
   Service Limit: 0.5 mm (0.02 in)



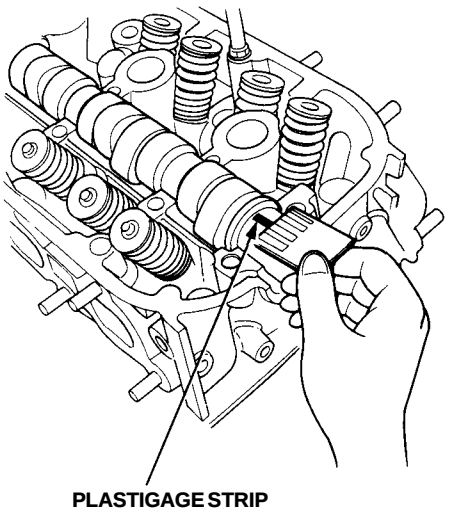
4. Remove the bolts, then remove the camshaft holders from the cylinder head.

   — Lift the camshaft out of the cylinder head, wipe it clean, then inspect the lift ramps. Replace the camshaft if lobes are pitted, scored, or excessively worn.
   — Clean the camshaft bearing surfaces in the cylinder head, then set the camshaft back in place.
   — Insert a plastigage strip across each journal.

5. Install the camshaft holders, then tighten the bolts to the specified torque shown in the left column of this page.

6. Remove the camshaft holders. Measure the widest portion of plastigage on each journal.

   Camshaft-to-Holder Oil Clearance:
   Standard (New): 0.050 - 0.089 mm
   (0.0020 - 0.0035 in)
   Service Limit: 0.15 mm (0.006 in)

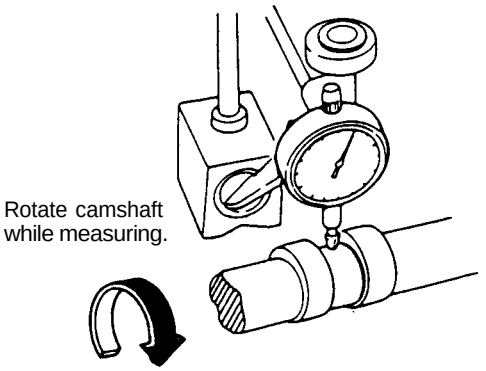


PLASTIGAGE STRIP

7. If the camshaft-to-holder oil clearance is out of tolerance:

   — And the camshaft has already been replaced, you must replace the cylinder head.
   — If the camshaft has not been replaced, first check the total runout with the camshaft supported on V-blocks.

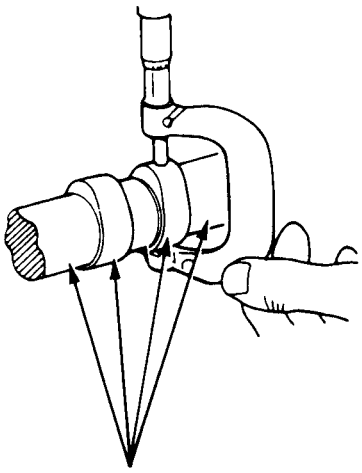
Camshaft Total Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)



   — If the total runout of the camshaft is within tolerance, replace the cylinder head.
   — If the total runout is out of tolerance, replace the camshaft and recheck. If the oil clearance is still out of tolerance, replace the cylinder head.

8. Check the cam lobe height wear.

Cam Lobe Height Standard (New):
INTAKE: 39.203 mm (1.5434 in)
EXHAUST: 38.875 mm (1.5305 in)

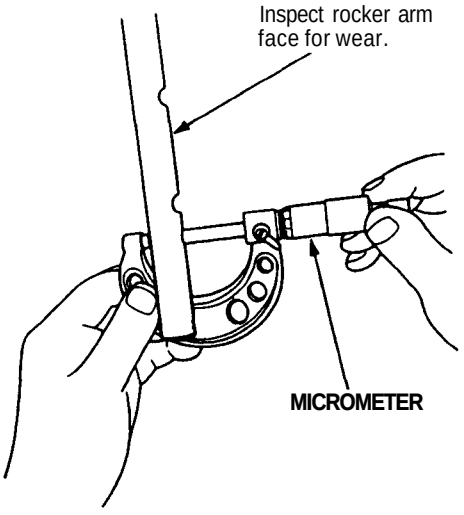

Check this area for wear.

Rocker Arms and Shafts

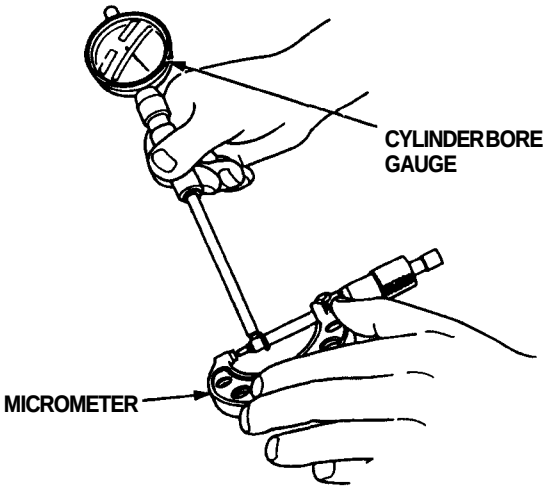
Clearance Inspection

Measure both the intake rocker shafts and the exhaust rocker shaft.

1. Measure diameter of shaft at first rocker location.

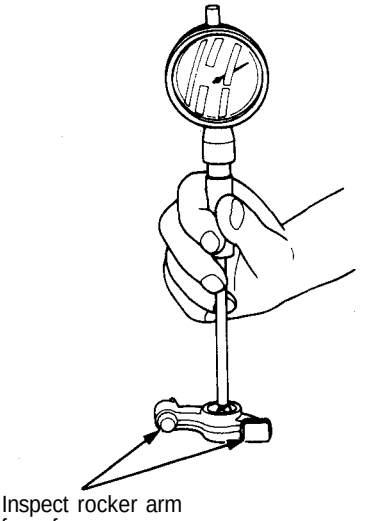


2. Zero gauge to shaft diameter.



3. Measure the inside diameter of the rocker arm, and check for out-of-round condition.

Rocker Arm-to-Shaft Clearance:
Standard (New):
Intake: 0.017-0.050 mm (0.0007 - 0.0020 in)
Exhaust: 0.018 - 0.054 mm (0.0007 - 0.0021 in)
Service Limit: 0.08 mm (0.003 in)



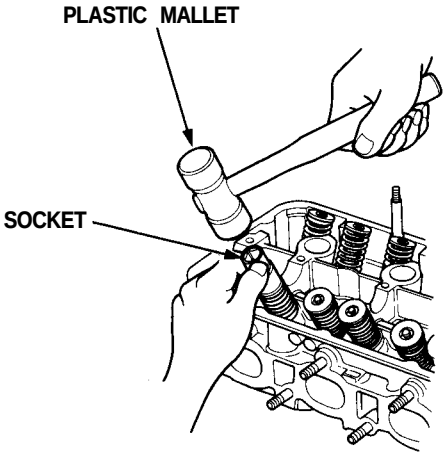
Repeat for all rockers.
— If over limit, replace rocker shaft and all overtolerance rocker arms.

Valves, Valve Springs and Valve Seals

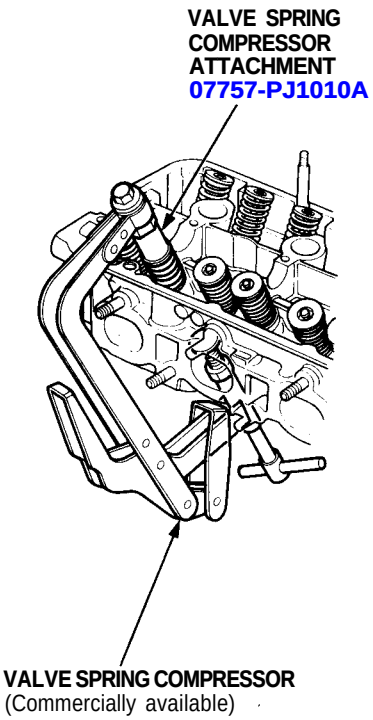
Removal

NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

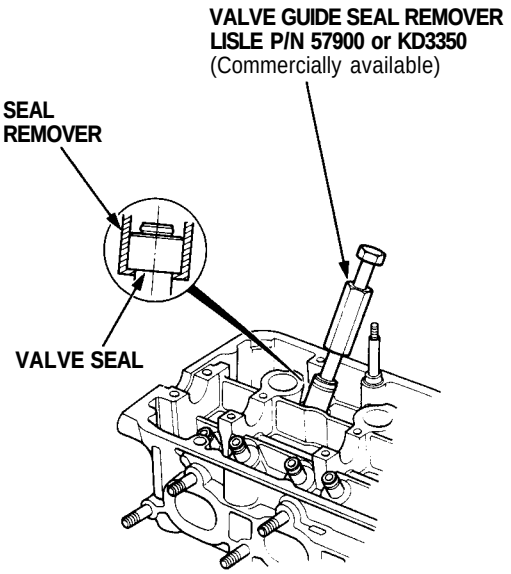
1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



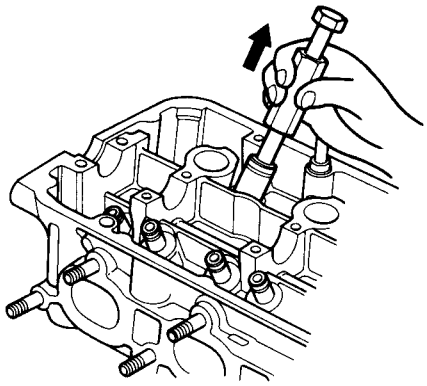
2. Install the valve spring compressor. Compress the spring and remove the valve keeper.



3. Install the special tool as shown.



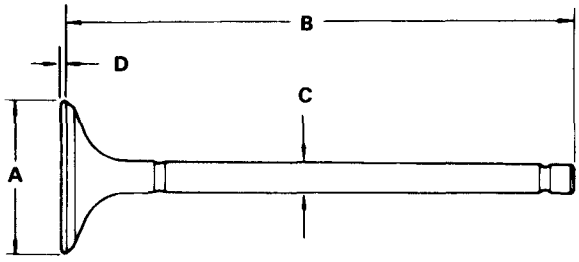
4. Remove the valve seal.



(cont'd)

Valves, Valve Springs and Valve Seals

Removal (cont'd)



Intake Valve Dimensions
A Standard (New): 33.9 - 34.1 mm (1.33-1.34 in)
B Standard (New): 110.88-111.18 mm (4.365 - 4.377 in)
C Standard (New): 5.475 - 5.485 mm (0.2156-0.2159 in)
C Service Limit: 5.445 mm (0.2144 in)
D Standard (New): 0.85 - 1.15 mm (0.033 - 0.045 in)
D Service Limit: 0.65 mm (0.026 in)

Exhaust Valve Dimensions
A Standard (New): 28.9 - 29.1 mm (1.14-1.15 in)
B Standard (New): 123.15 - 123.45 mm (4.848 - 4.860 in)
C Standard (New): 5.450 - 5.460 mm (0.2146-0.2150 in)
C Service Limit: 5.420 mm (0.2134 in)
D Standard (New): 1.55 - 1.85 mm (0.061 - 0.073 in)
D Service Limit: 1.35 mm (0.053 in)

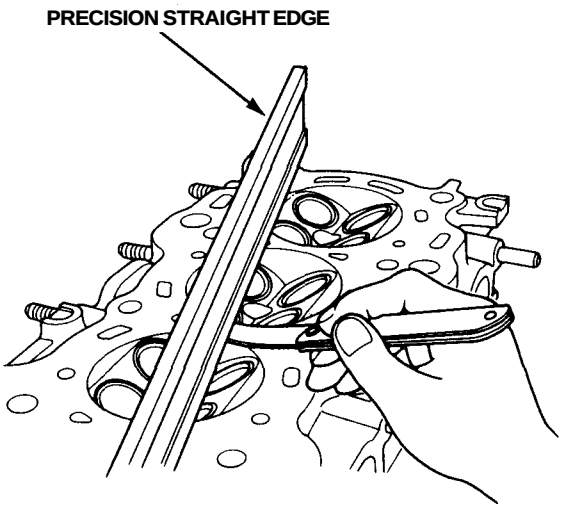
Cylinder Head

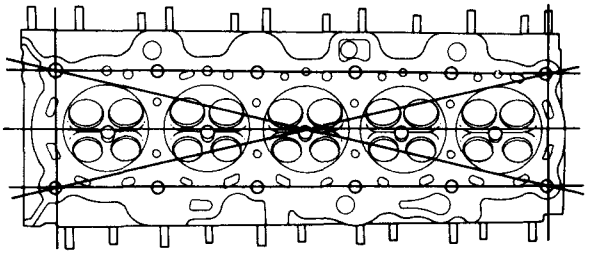
Warpage

NOTE: If the camshaft-to-holder oil clearance (see page 6-22) is not within specifications, the cylinder head cannot be resurfaced.

If the camshaft-to-holder oil clearance is within specifications, check the cylinder head for warpage.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface the cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 100 mm (3.94 in).





Measure along edges, and three ways across center.

Cylinder Head Height:
Standard (New): **99.95 - 100.05 mm (3.935 - 3.939 in)**

ValveGuides

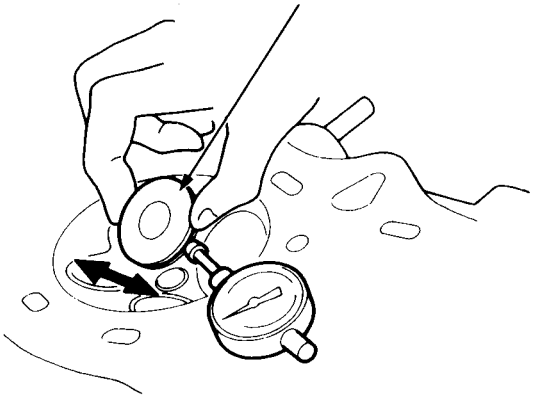
Valve Movement

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.04 - 0.09 mm
(0.002 - 0.004 in)
Service Limit: 0.15 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.10 - 0.16 mm
(0.004 - 0.006 in)
Service Limit: 0.20 mm (0.008 in)

Valve extended 10 mm out from seat.



- If measurement exceeds the service limit, recheck using a new valve.
- If measurement is now within the service limit, reassemble using a new valve.
- If measurement still exceeds limit, recheck using alternate method in the next column, then replace valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.020 - 0.045 mm
(0.0008-0.0018 in)
Service Limit: 0.075 mm (0.0030 in)

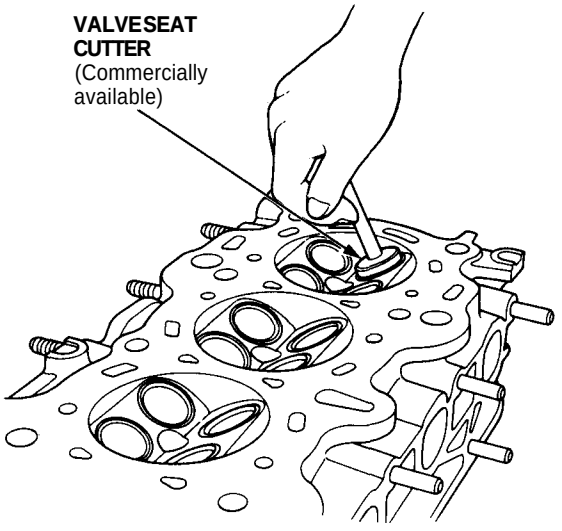
Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.05 - 0.08 mm
(0.002 - 0.003 in)
Service Limit: 0.10 mm (0.004 in)

Valve Seats

Reconditioning

1. Renew the valve seats in the cylinder head using a valve seat cutter.

   NOTE: If the guides are worn (see page 6-27), replace them (see page 6-29) before cutting the valve seats.

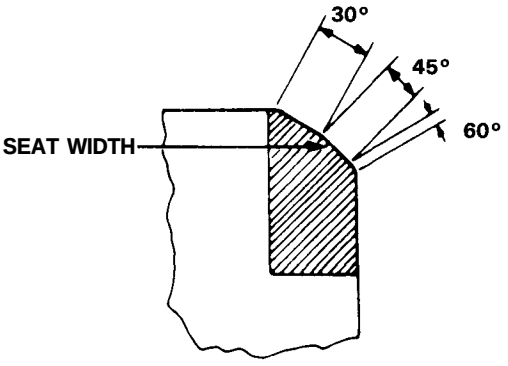


2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.

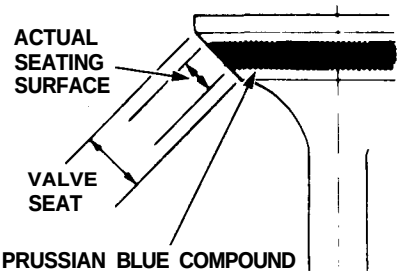
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check the width of the seat and adjust accordingly.

4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width:
Standard (New): 1.25 - 1.55 mm (0.049 - 0.061 in)
Service Limit: 2.00 mm (0.079 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.

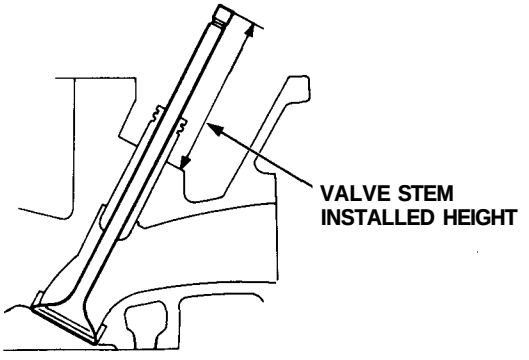


6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

   NOTE: The final cut should always be made with the 45° cutter.

7. Insert the intake and exhaust valves in the head and measure the valve stem installed height.

Valve Stem Installed Height:
Standard (New): Intake 48.745 - 49.215 mm (1.9191-1.9376 in)
Exhaust 51.315 - 51.785 mm (2.0203 - 2.0388 in)
Service Limit: Intake 49.465 mm (1.9474 in)
Exhaust 52.035 mm (2.0486 in)

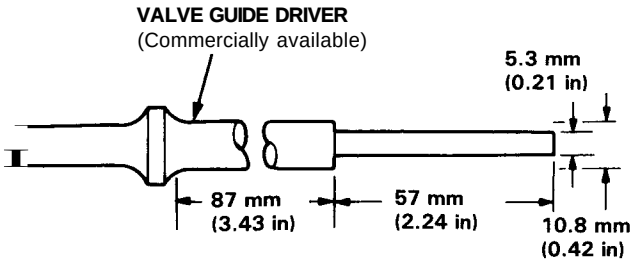


8. If the valve stem installed height is over the service limit, replace the valve and recheck. If its still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

Valve Guides

Replacement

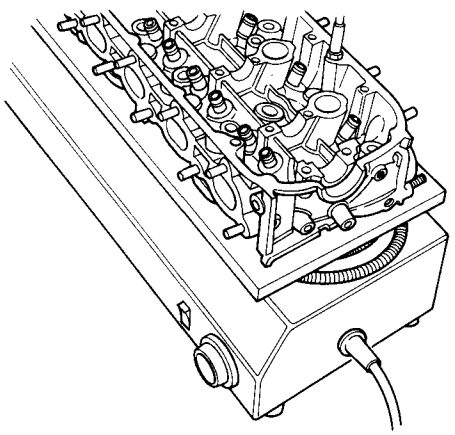
1. As illustrated below, use a commercially-available air-impact valve guide driver attachment modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



or
VALVE GUIDE DRIVER, 5.5 mm
07742-0010100

2. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.

3. Use a hot plate or oven to evenly heat the cylinder head to 300°F (150°C). Monitor the temperature with a cooking thermometer.

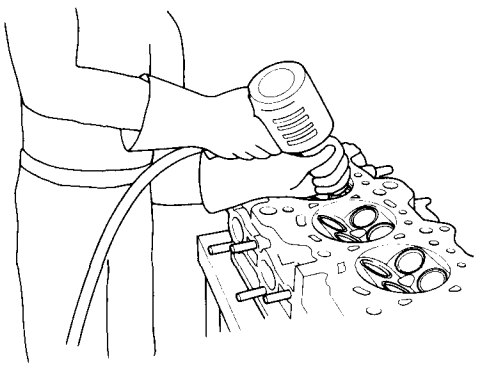


CAUTION:
- **Do not use a torch; it may warp the head.**
- **Do not get the head hotter than 300 F (150 C); excessive heat may loosen the valve seats.**
- **To avoid burns, use heavy gloves when handling the heated cylinder head.**

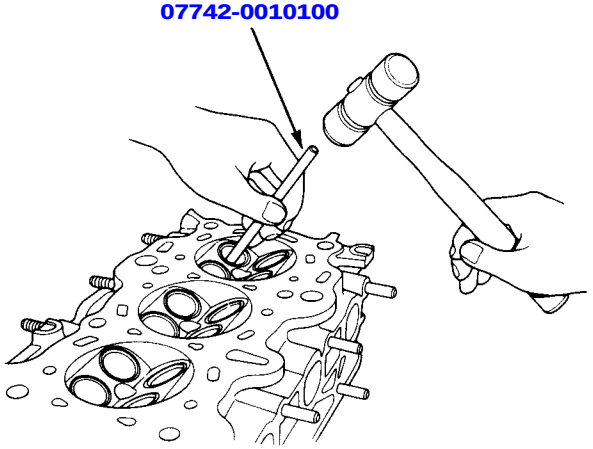
4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in) towards the combustion chamber. This will knock off some of the carbon and make removal easier.

CAUTION:
- **Always wear safety goggles or a face shield when driving valve guides.**
- **Hold the air hammer directly in line with the valve guide to prevent damaging the driver.**

5. Turn the head over, and drive the guide out toward the camshaft side of head.



VALVE GUIDE DRIVER,
5.5 mm
07742-0010100



If a valve guide still won't move, drill it out with a 8 mm (5/16 in) bit, then try again.

CAUTION: Drill guides only in extreme cases; you could damage the cylinder head if the guide breaks.

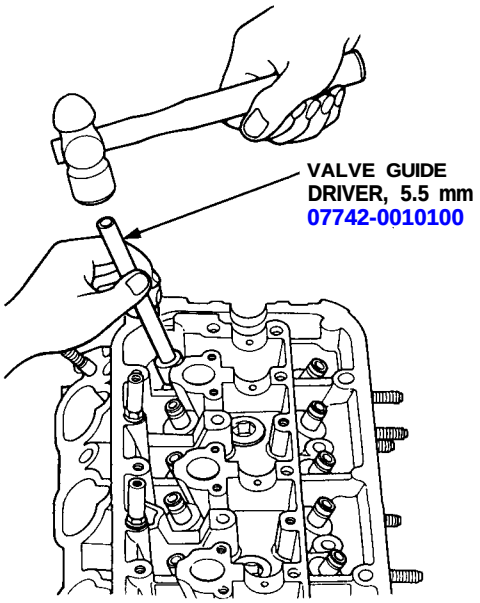
6. Remove the new guides from the freezer, one at a time, as you need them.

(cont'd)

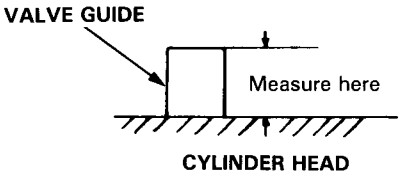
Valve Guides

Replacement (cont'd)

7. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide in to the specified installed height. If you have all 20 guides to do, you may have to reheat the head.



Valve Guide Installed Height:
Intake: 24.75 - 25.25 mm (0.974 - 0.994 in)
Exhaust: 16.05 - 16.55 mm (0.632 - 0.652 in)

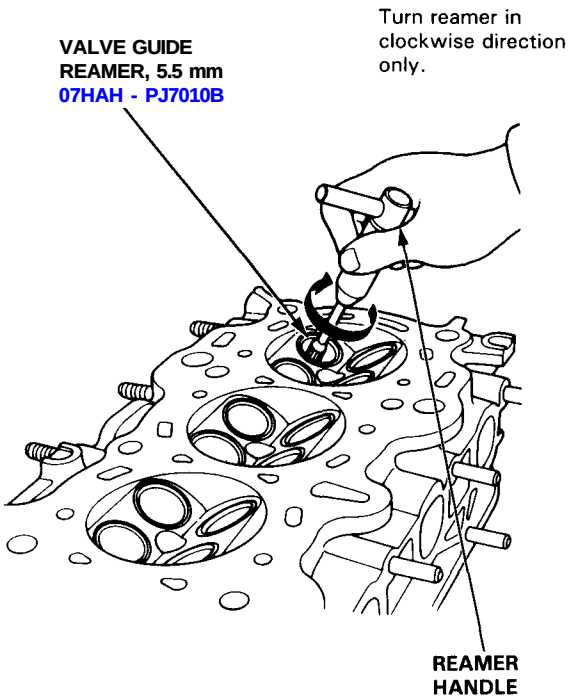


Valve Guides

Reaming

NOTE: For new valve guides only.

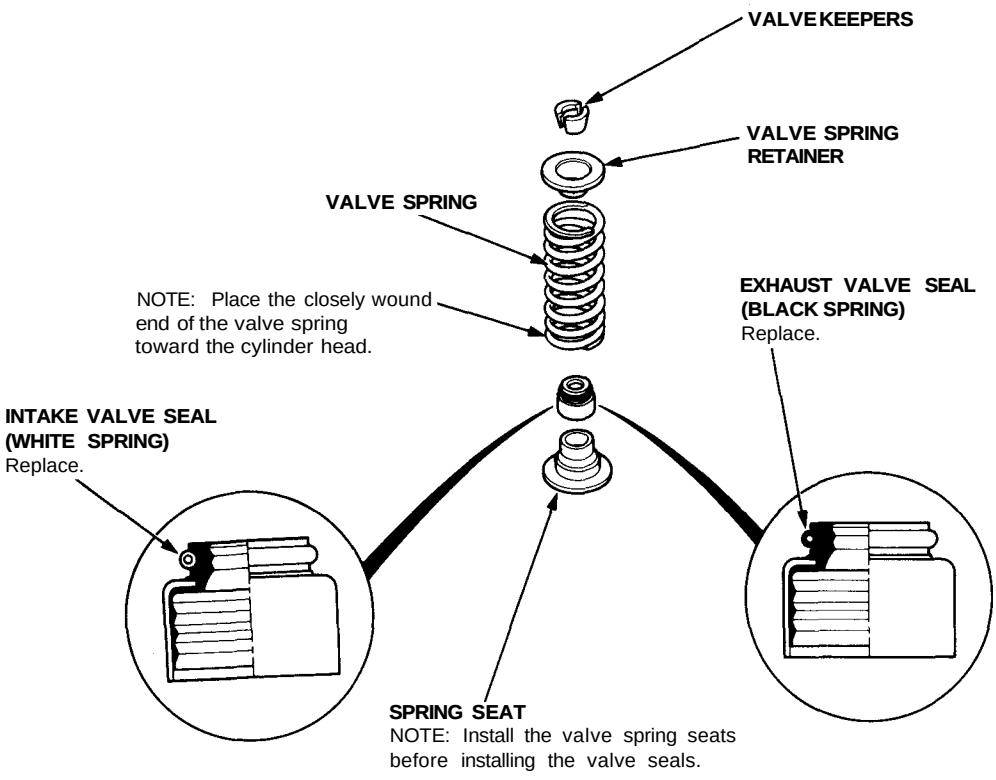
1. Coat both the reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check the clearance with a valve (see page 6-27).
   — Verify that the valve slides in the valve guide without exerting pressure.

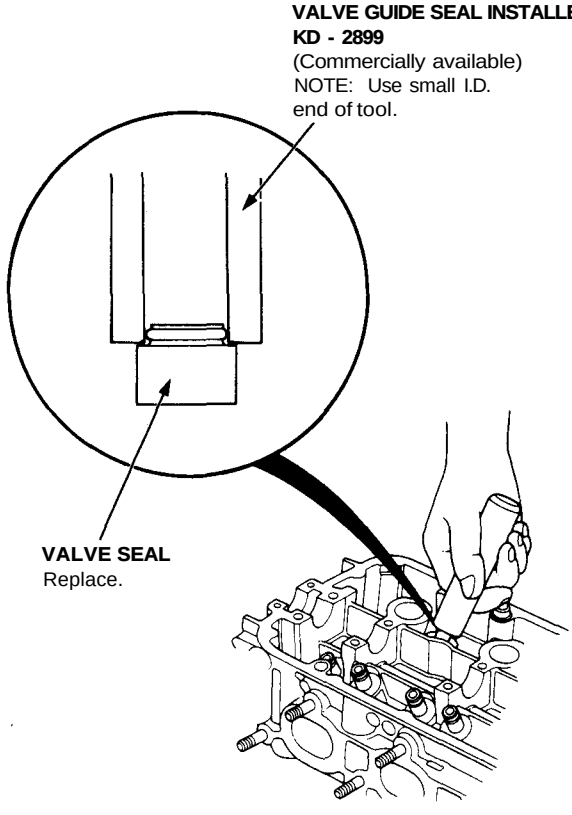


Valves, Valve Springs and Valve Seals

Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.





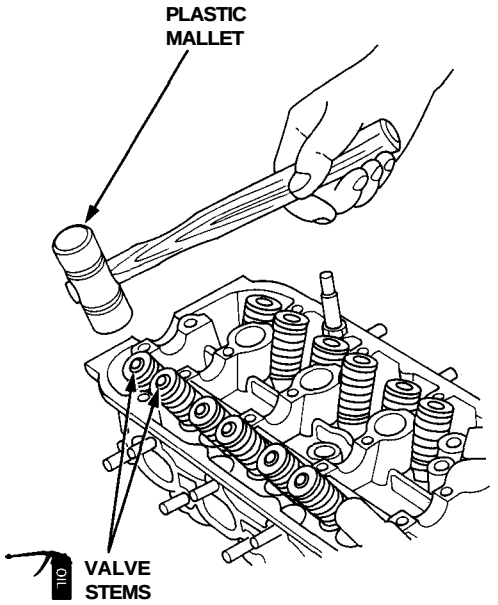
Valves, Valve Springs and Valve Seals

Valve Installation

When installing valves in the cylinder head, coat valve stems with oil before inserting into the valve guides, and make sure the valves move up and down smoothly.

After the valves, springs and keepers are assembled, lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of valve and valve keepers.

NOTE: Tap the valve stem only along its axis so you do not bend the stem.



Camshaft/Rocker Arms and Camshaft Seal

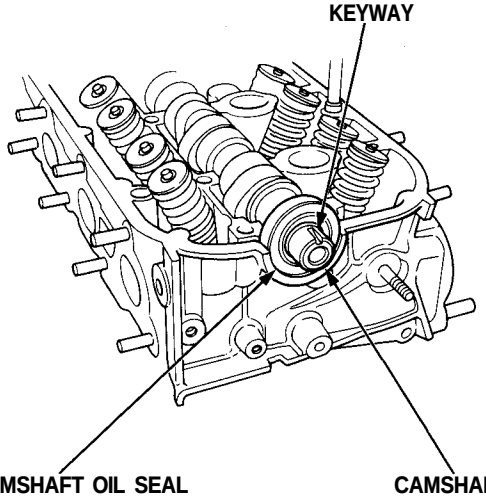
Installation

CAUTION:
- **Make sure that all rockers are in alignment with their valves when torquing the rocker assembly bolts.**
- **Valve locknuts should be loosened and adjusting screws backed off before installation.**
- **To prevent the rocker arm assembly from coming apart, leave the camshaft holder bolts in the holes.**

1. After wiping down the camshaft and journals in the cylinder head, lubricate both surfaces and install the camshaft.

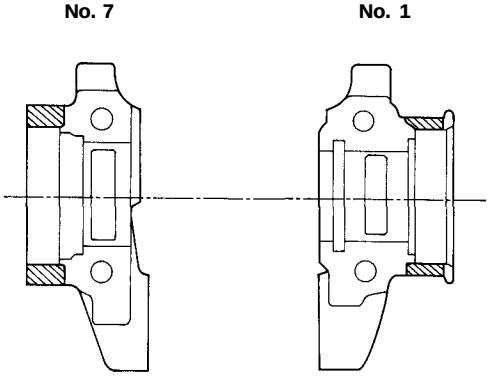
2. Install the camshaft seal with the open side (spring) facing in.

   OIL Lubricate the cam lobes after reassembly.



3. Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 7 camshaft holders.
   — Apply liquid gasket to the shaded areas.

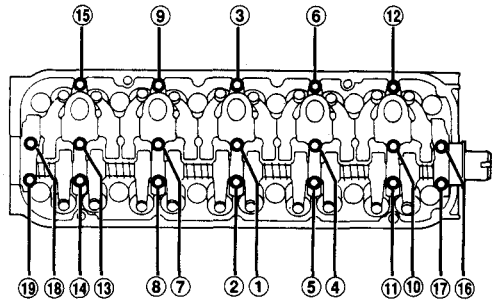
   NOTE: Be sure to wipe any liquid gasket off the surface of the No. 7 camshaft holder where the distributor is to be attached.



4. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

Specified torque:
8 mm bolts: 22 N-m (2.2 kgf-m, 16 lbf-ft)
Apply engine oil
6 mm bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)
Apply engine oil

6 mm bolts: ③, ⑥, ⑨, ⑫, ⑮



5. Torque the bolts in the sequence shown.

(cont'd)

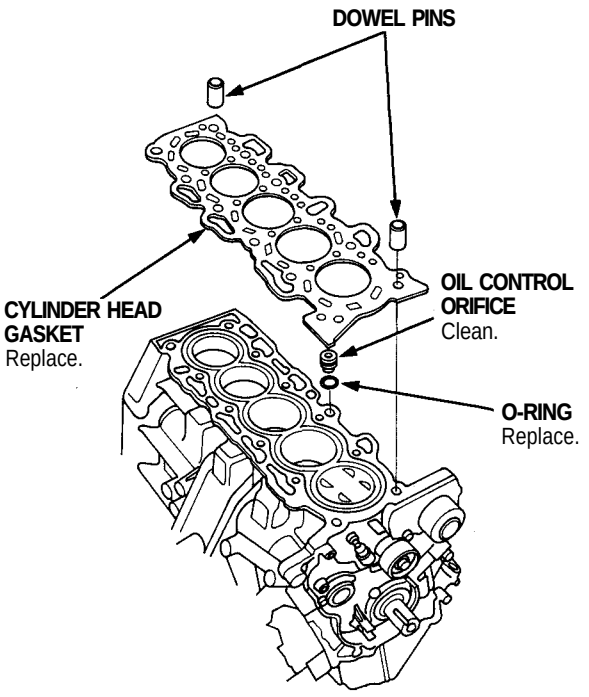
Installation

Install the cylinder head in the reverse order of removal:

NOTE:
- Always use a new cylinder head gasket.
- Cylinder head and cylinder block surface must be clean.
- Turn the camshaft so the keyway in facing up.
- Turn the crankshaft so the No. 1 piston is at TDC (see page 6-11).
- Clean the oil control orifice before installing.
- Do not use the upper cover and lower cover for storing removed item.
- Clean the upper cover and lower cover before installation.

1. Align the cylinder head dowel pins.

2. Install the oil control orifice and cylinder head gasket.



(cont'd)

Cylinder Head

Installation (cont'd)

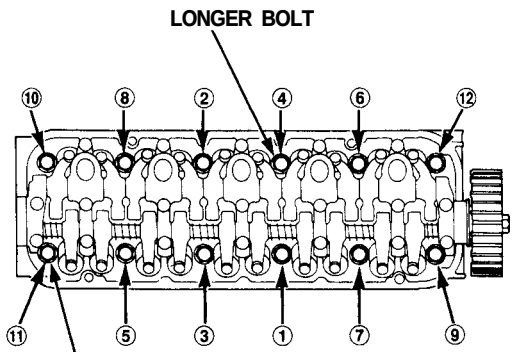
3. Turn the camshaft until its keyway is facing up (No. 1 piston TDC).

4. Torque the cylinder head bolts sequentially in three steps.

1st step torque: 39 N-m (4.0 kgf-m, 29 lbf-ft)
2nd step torque: 69 N-m (7.0 kgf-m, 51 lbf-ft)
3rd step torque: 98.1 N-m (10.0 kgf-m, 72.3 lbf-ft)

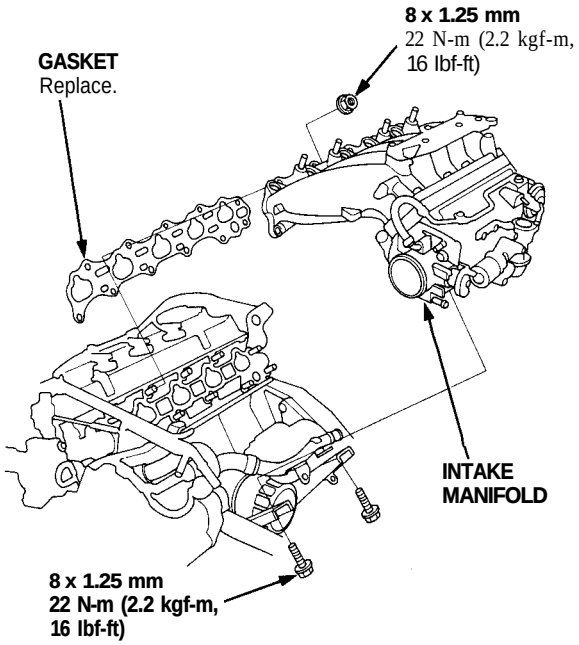
NOTE:
- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



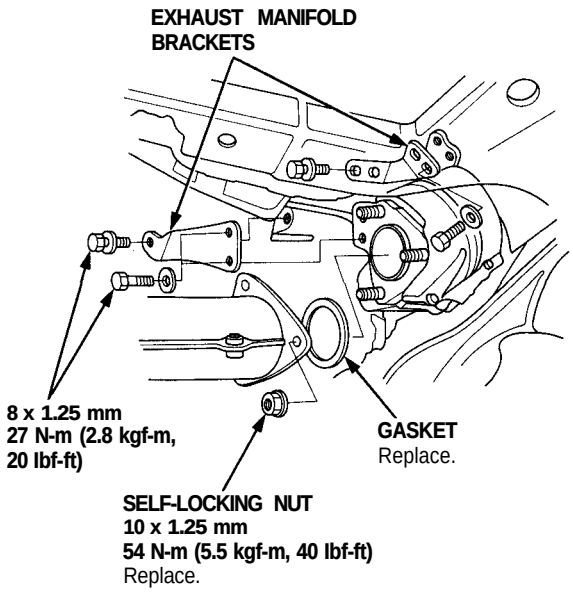
CYLINDER HEAD BOLT
12 x 1.5 mm
98.1 N-m (10.0 kgf-m, 72.3 lbf-ft)
Apply clean engine oil to the bolt threads and washer contact surfaces.

5. Install the intake manifold, and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nuts.
- Always use a new intake manifold gasket.

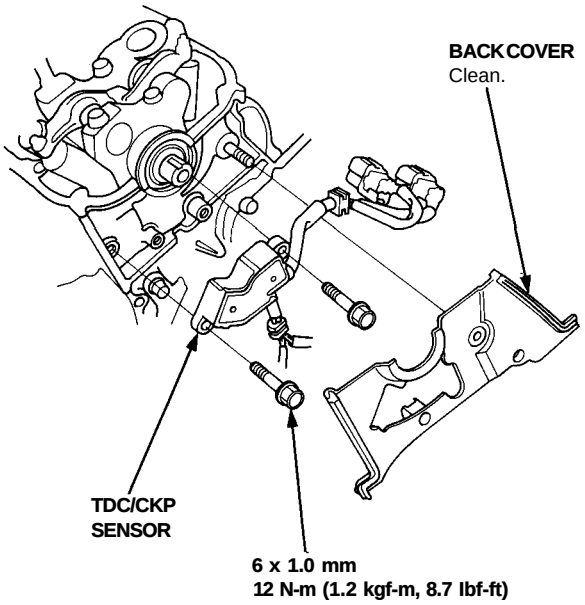


6. Install the exhaust manifold, and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nut (see page 9-4).
- Always use a new exhaust manifold gasket.

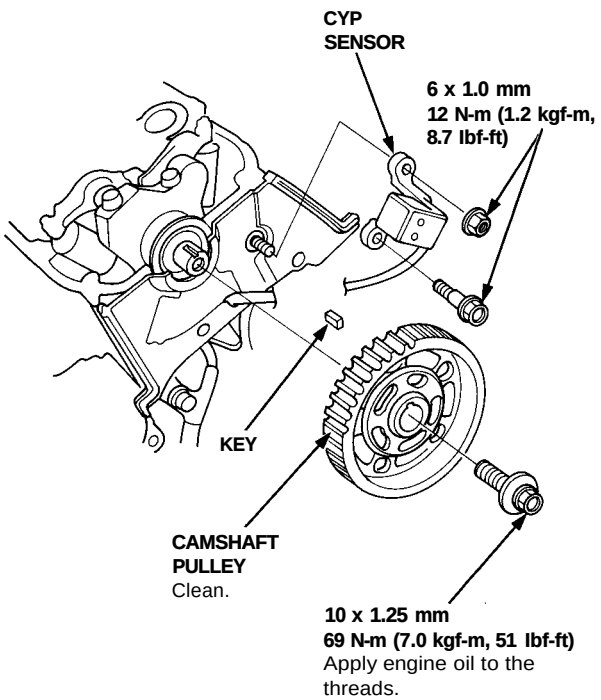
7. Install the exhaust manifold brackets, then tighten the self-locking nuts.



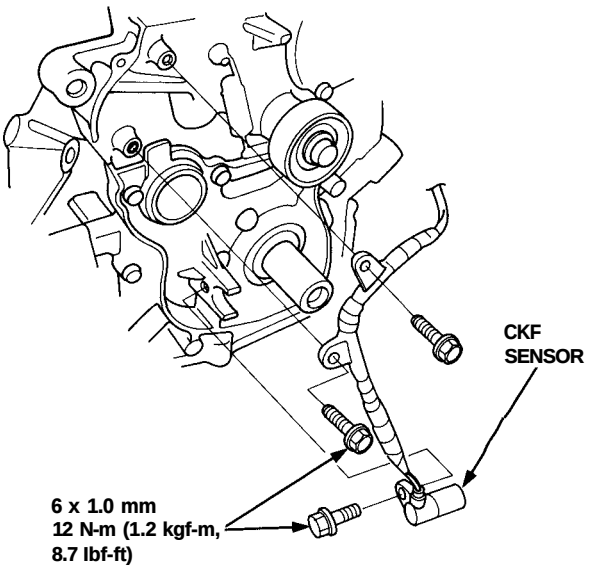
8. Install the TDC/CKP sensor, then install the back cover.



9. Install the camshaft pulley, then install the CYP sensor.



10. Install the CKF sensor.

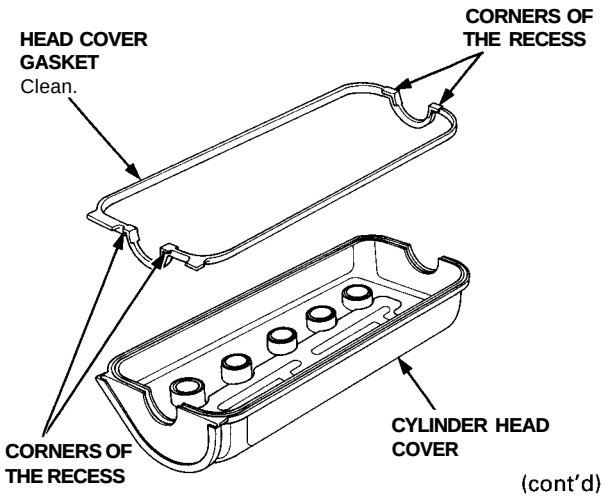


11. Install the timing belt (see page 6-11).

12. Adjust the valve clearance (see page 6-3).

13. Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

NOTE:
- Before installing the head cover gasket, thoroughly clean the seal and the groove.
- When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.

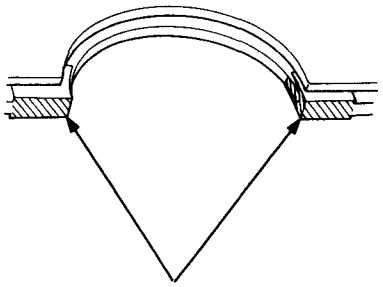


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Cylinder Head

Installation (cont'd)

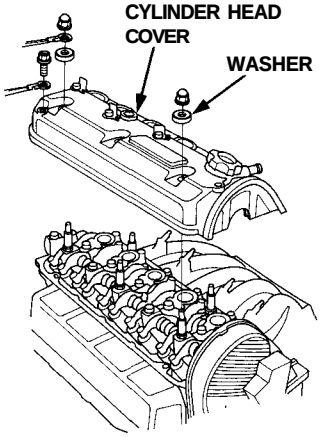
14. Apply liquid gasket to the head cover gasket at the four corners of the recesses.
    NOTE:
    - Use liquid gasket. Part No. 08718 - 0001 or 08718 - 0003.
    - Check that the mating surfaces are clean and dry before applying liquid gasket.
    - Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
    - After assembly, wait at least 30 minutes before filling the engine with oil.



Apply liquid gasket to the shaded areas.

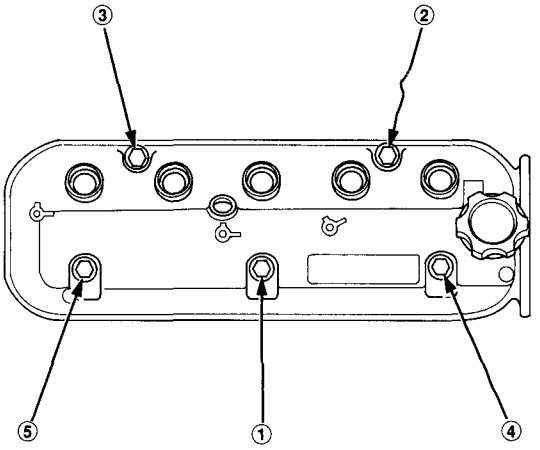
15. When installing the cylinder head cover, hold the head cover gasket in the groove by placing your fingers on the camshaft contacting surfaces (top of the semicircles).
    Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

    NOTE:
    - Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
    - Do not touch the parts where liquid gasket was applied.
    - Replace the washer when damaged or deteriorated.
    - Reconnect the grounds cables to the cylinder head cover.



16. Tighten the nuts in two or three steps. In the final step, torque all nuts, in sequence, to 12 N-m (1.2 kgf-m, 8.7 lbf-ft).

    NOTE:
    - Be sure to wipe any liquid gasket off the surface of the No. 7 camshaft holder where the distributor is to be attached.
    - After assembly, wait at least 30 minutes before filling the engine with oil.

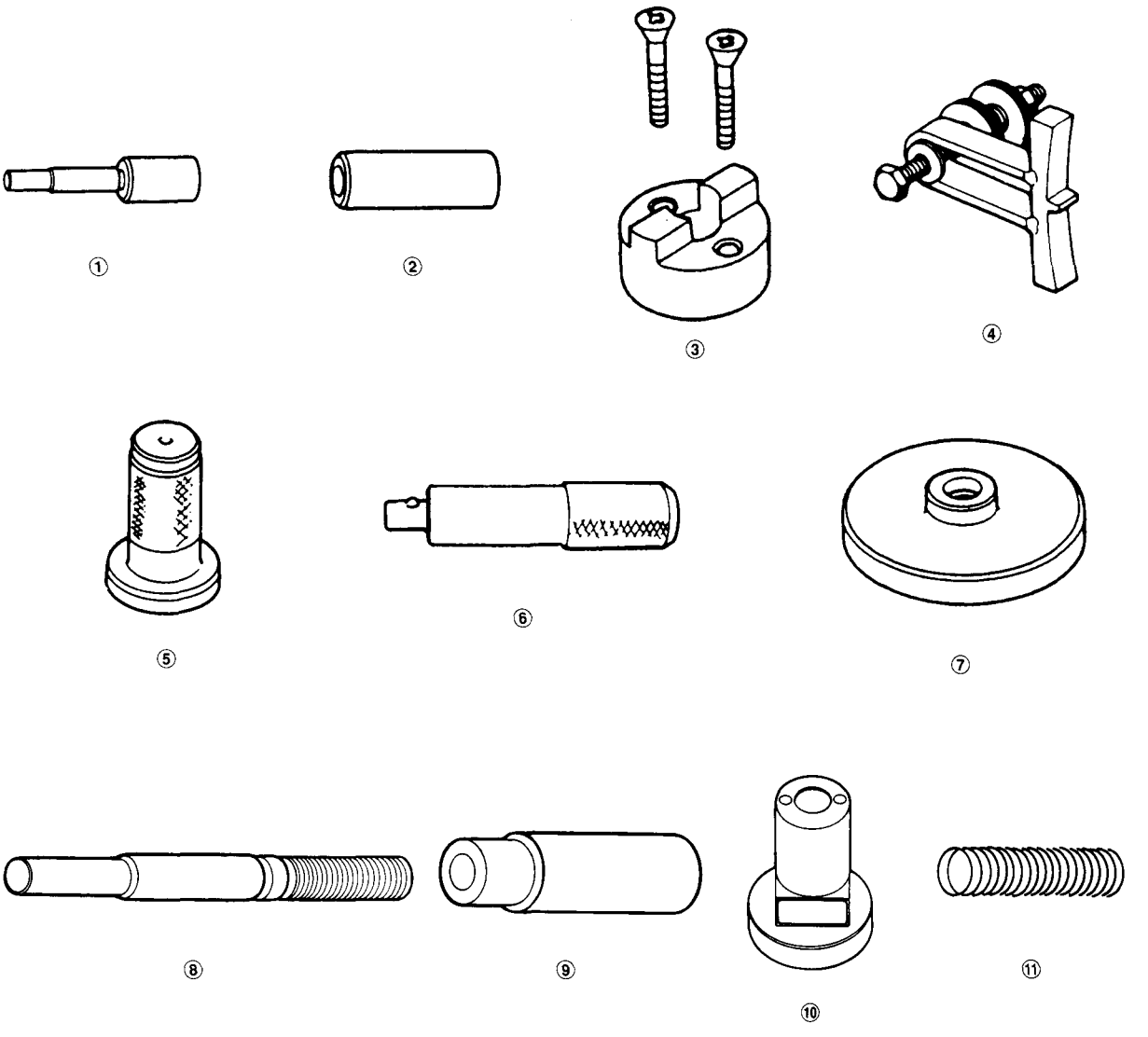


17. After installation, check that all tubes, hoses and connectors are installed correctly.

18. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

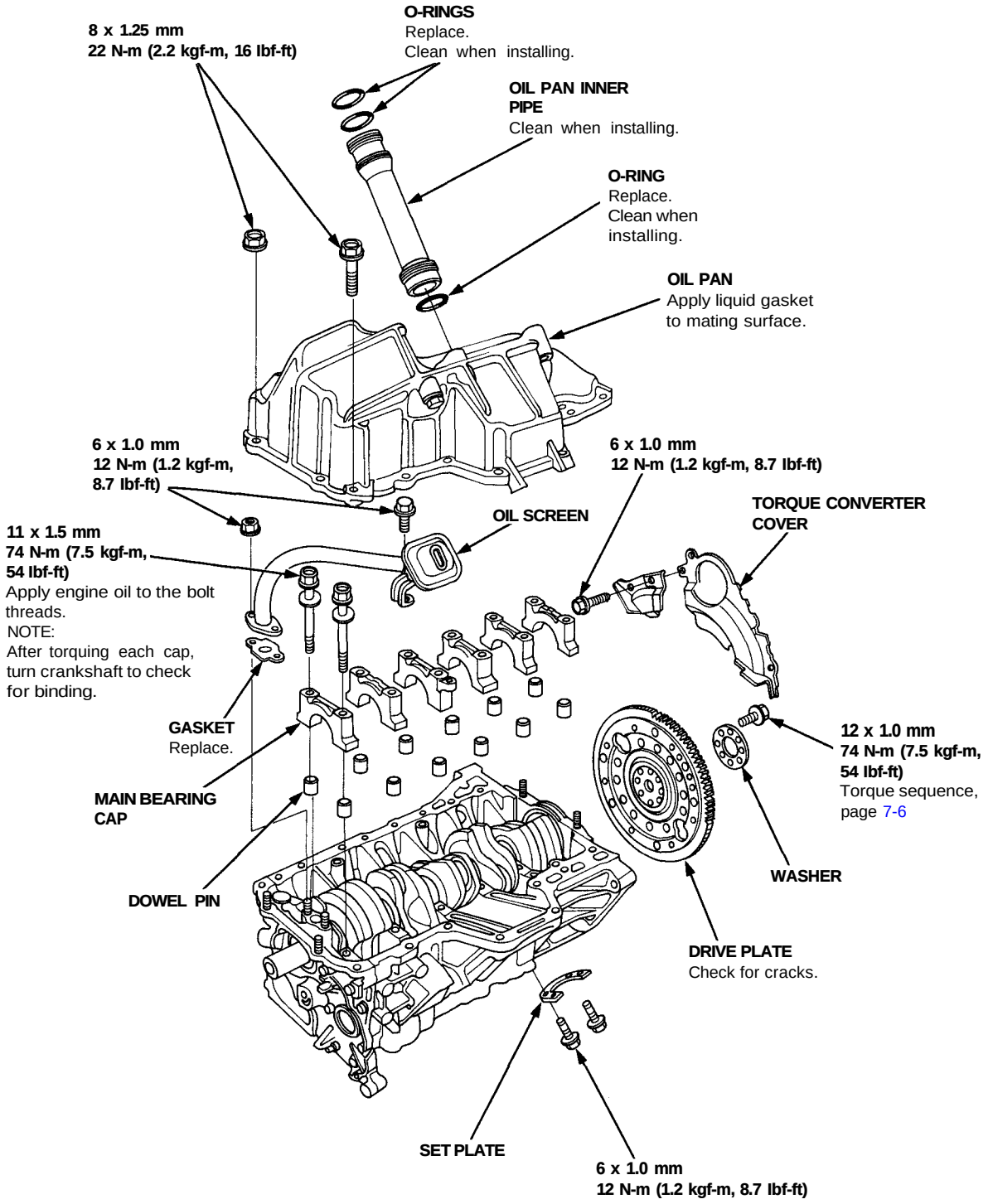
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF-PH60300	Piston Pin Base Insert	1	7-14, 7-16
②	07GAF-PH70100	Pilot Collar	1	7-14, 7-16
③	07HAF-PL20102	Piston Base Head	1	7-14, 7-16
④	07LAB-PV00100	Ring Gear Holder	1	7-6
⑤	07LAD-PT3010A	Seal Driver	1	7-22
⑥	07749-0010000	Driver	1	7-18, 7-22
⑦	07948-SB00101	Driver Attachment	1	7-18, 7-22
⑧	07973-PE00310	Piston Pin Driver Shaft	1	7-14, 7-16
⑨	07973-PE00320	Piston Pin Driver Head	1	7-14, 7-16
⑩	07973-6570500	Piston Base	1	7-14, 7-16
⑪	07973-6570600	Piston Base Spring	1	7-14, 7-16



Illustrated Index

OIL Lubricate all internal parts with engine oil during reassembly.



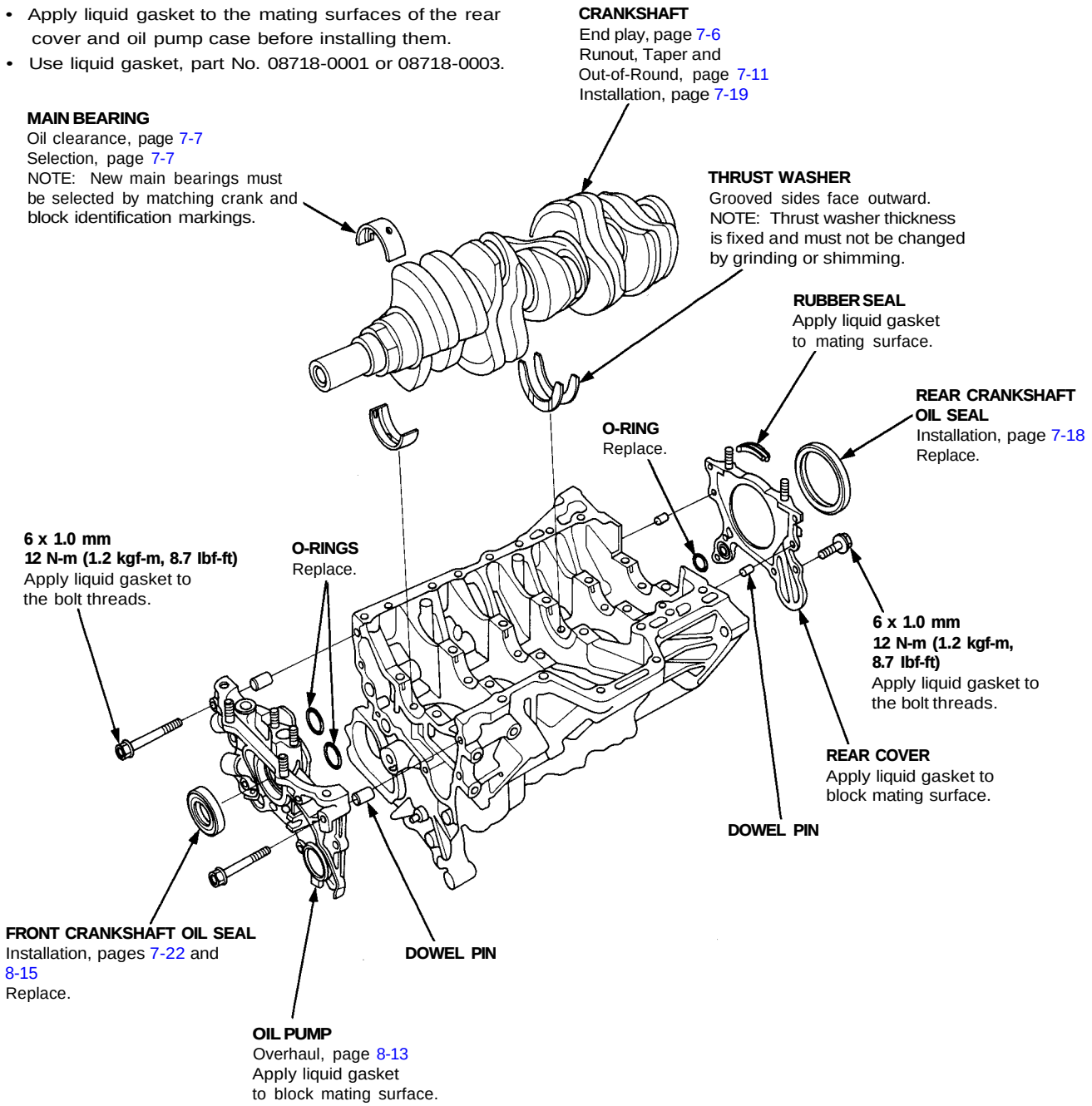
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Illustrated Index

(cont'd)

OIL Lubricate all internal parts with engine oil during reassembly.

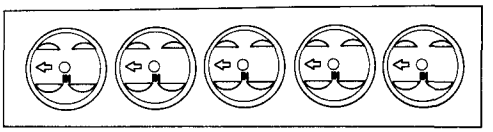
NOTE:
- Apply liquid gasket to the mating surfaces of the rear cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718-0001 or 08718-0003.



NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (see page 7-9).

PISTON INSTALLATION DIRECTION

EXHAUST



INTAKE

PISTON RINGS
Replacement, page 7-17
Measurement, pages 7-16, 7-17
Alignment, page 7-18

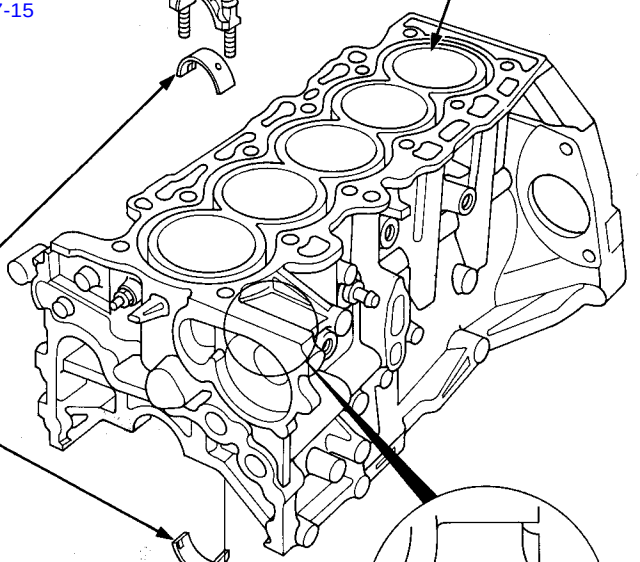
PISTON PIN
Removal, page 7-14
Installation, page 7-16
Inspection, page 7-15

PISTON
Removal, page 7-9
Measurement, page 7-12
NOTE: To maintain proper clearance, match the letter on the piston top with the letter for each cylinder stamped on the block.

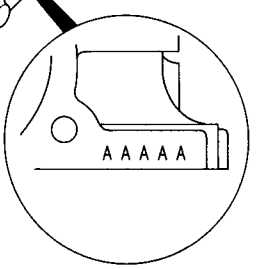
On the piston top	On the block
No letter	A or I
B	B or II

CYLINDER BLOCK
Cylinder bore inspection, page 7-12
Warpage inspection, page 7-13
Cylinder bore honing, page 7-13
Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-10

CONNECTING ROD
End play, page 7-6
Selection, page 7-14
Small end measurement, page 7-15



CONNECTING ROD BEARINGS
Clearance, page 7-8
Selection, page 7-9



CONNECTING ROD BEARING CAP
Installation, page 7-19
NOTE: Install cap so the bearing recess is on the same side as the recess in the rod.

CONNECTING ROD NUT
8 x 0.75 mm
32 N-m (3.3 kgf-m, 24 lbf-ft)
After torquing each bearing cap, rotate crankshaft to check for binding.

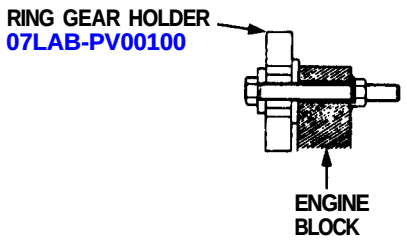
CYLINDER BORE SIZES
(A or I, B or II)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from left to right, No. 1 through No. 4 cylinders.

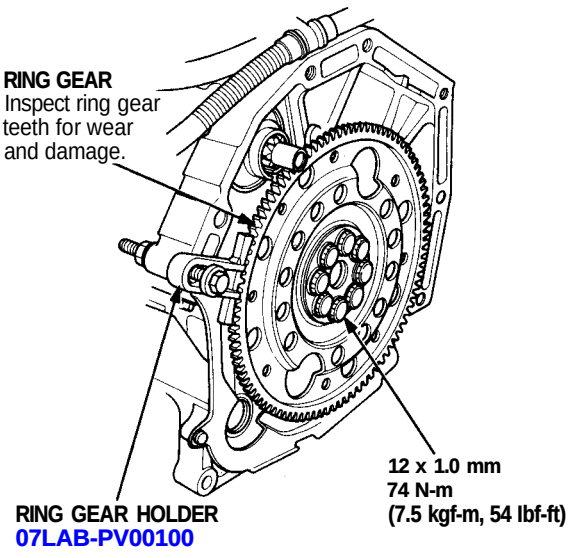
On the block	On the piston top
A or I	No letter
B or II	B

Drive Plate

Replacement

Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.

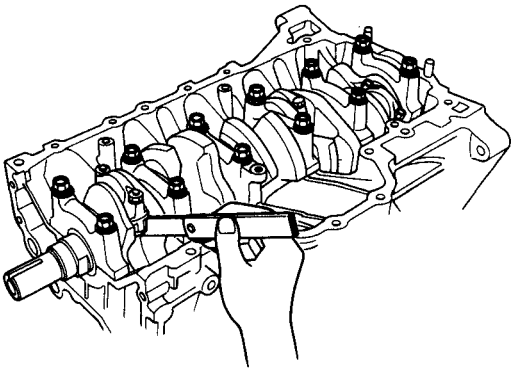




Connecting Rod and Crankshaft

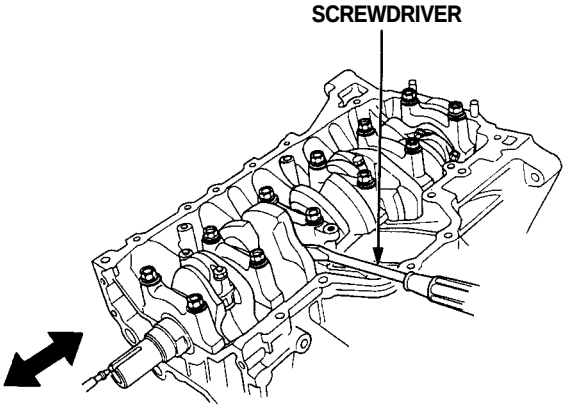
End Play

Connecting Rod End Play:
Standard (New): 0.15 - 0.30 mm (0.006 - 0.012 in)
Service Limit: 0.40 mm (0.016 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (see pages 7-9 and 7-19).

Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; dial reading should not exceed service limit.



Crankshaft End Play:
Standard (New): 0.10 - 0.35 mm (0.004-0.014 in)
Service Limit: 0.45 mm (0.018 in)

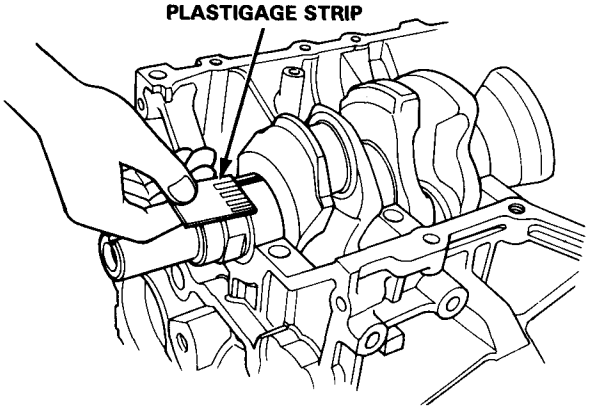
- If end play is excessive, inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming.
Thrust washers are installed with grooved side facing outward.

Main Bearings

Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.
   NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolt and give you an incorrect reading. For an accurate reading, support the crankshaft with a jack under the counterweights and check only one bearing at a time.
4. Reinstall the bearings and caps, then torque the bolts.
   1st step: 29 N-m (3.0 kgf-m, 22 lbf-ft)
   Final step: 74 N-m (7.5 kgf-m, 54 lbf-ft)
   NOTE: Do not rotate the crankshaft during inspection.
5. Remove the caps, and bearings again, and measure the widest part of the plastigage.
   Main Bearing-to-Journal Oil Clearance:
   Standard (New): 0.018 - 0.048 mm (0.0007 - 0.0019 in)
   Service Limit: 0.053 mm (0.0021 in)



6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. '95 and '96 only: Install a new, complete bearing with the same color (select the color as shown in the right column of this page), and recheck the clearance.
   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

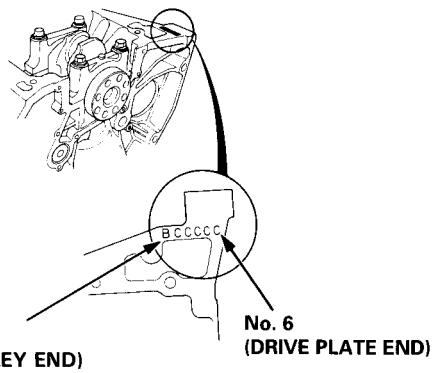
Main Bearings

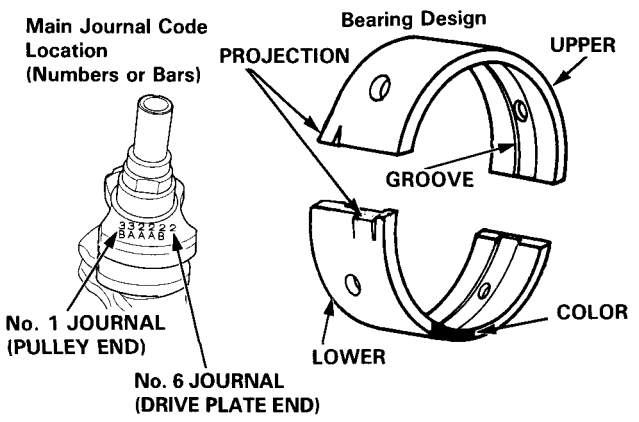
Selection

CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Crankshaft Bore Code Location

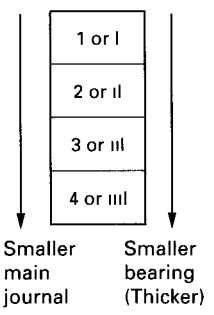
Numbers, letters, or bars have been stamped on the end of the cylinder block as a code for the size of each of the six main journal bores.
Use them, and the numbers or bars stamped on the crankshaft (codes for main journal size), to choose the correct bearings.





'95 – '96 models:

Bearing Identification
Color code is on the edge of the bearing.



Larger crank bore →

1 or A or I	2 or B or II	3 or C or III	4 or D or IIII

Smaller bearing (Thicker) →

Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

(cont'd)

Main Bearings

Selection (cont'd)

'97-'98 models:

Bearing Identification
Color code is on the edge of the bearing.

A or I	B or II	C or III	D or IIII

1 or I	Pink	Pink/ Yellow	Yellow	Yellow/ Green
2 or II	Pink/ Yellow	Yellow	Yellow/ Green	Green
3 or III	Yellow	Yellow/ Green	Green	Green/ Brown
4 or IIII	Yellow/ Green	Green	Green/ Brown	Brown
5 or IIIII	Green	Green/ Brown	Brown	Brown/ Black
6 or IIIIII	Green/ Brown	Brown	Brown/ Black	Black

Smaller main journal

Smaller bearing (Thicker)

'97 - '98 models:

NOTE: When using bearing halves of different color, it does not matter which color is used in the top or bottom.

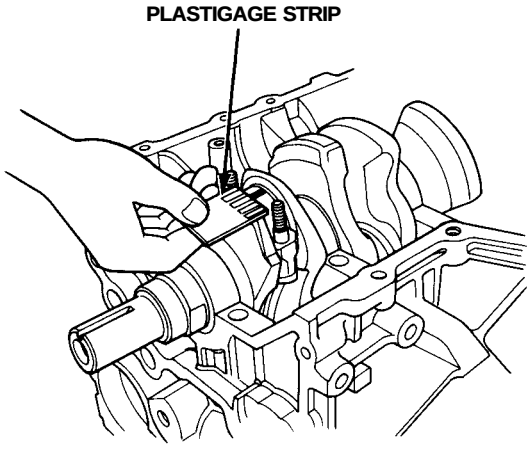
Connecting Rod Bearings

Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place the plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 32 N-m (3.3 kgf-m, 24 lbf-ft).

   NOTE: Do not rotate the crankshaft during inspection.
5. Remove the rod cap and bearing half, and measure the widest part of the plastigage.

   Connecting Rod Bearing-to-Journal Oil Clearance:
   Standard (New): 0.015 - 0.043 mm
   (0.0006 - 0.0017 in)
   Service Limit: 0.05 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown in the right column of this page), and recheck the clearance.

   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

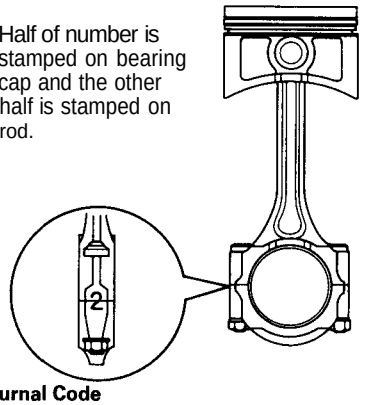
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

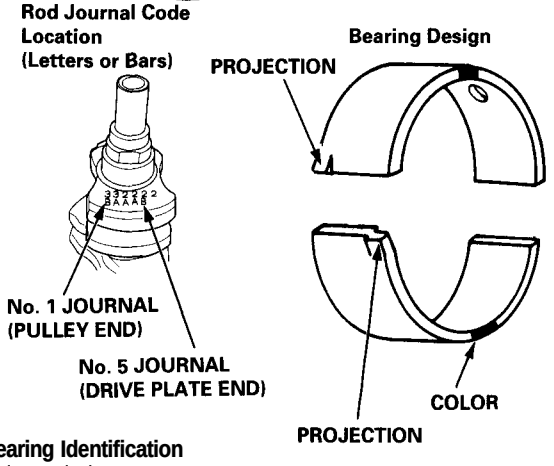
Selection

CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Code Location

Numbers or bars have been stamped on the side of each connecting rod as a code for the size of the big end. Use it, and the letters or bars stamped on the crank (codes for rod journal size), to choose the correct bearings.





Bearing Identification
Color code is on the edge of the bearing

Larger big end bore →

1 or I	2 or II	3 or III	4 or IIII

Smaller bearing (Thicker) →

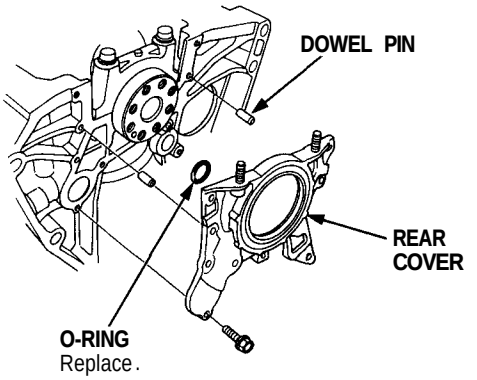
A or I	Red	Pink	Yellow	Green
B or II	Pink	Yellow	Green	Brown
C or III	Yellow	Green	Brown	Black
D or IIII	Green	Brown	Black	Blue

Smaller rod journal ↓

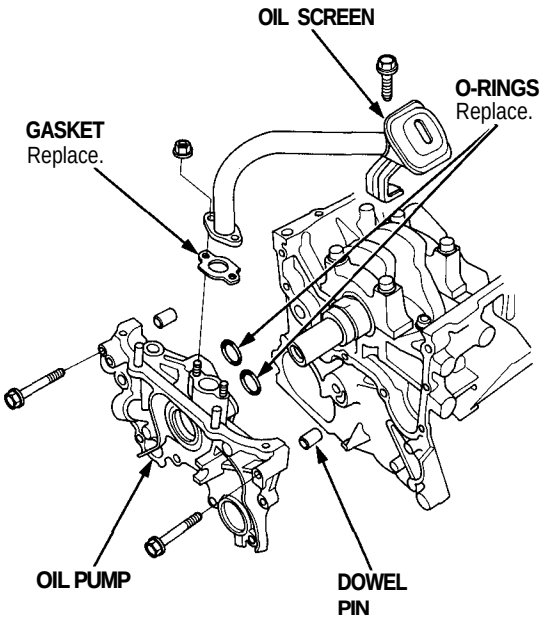
Smaller bearing (Thicker) ↓

Removal

1. Remove the set plate, then remove the oil pan inner pipe (see page 8-10).
2. Remove the oil pan assembly.
3. Remove the rear cover.



4. Remove the oil screen.
5. Remove the oil pump.



(cont'd)

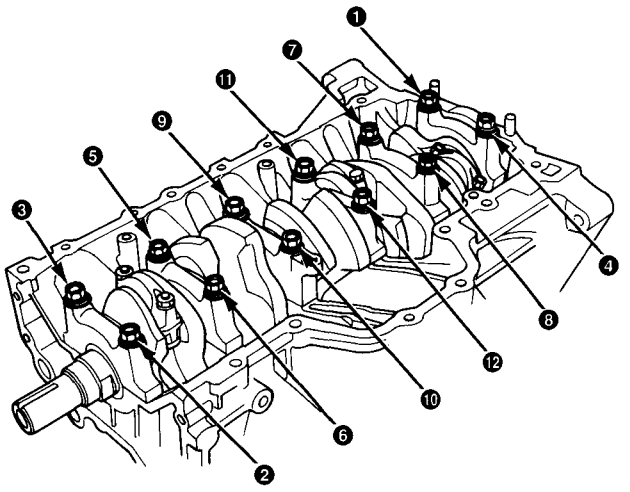
Pistons and Crankshaft

Removal (cont'd)

6. Remove the bolts and the bearing caps.

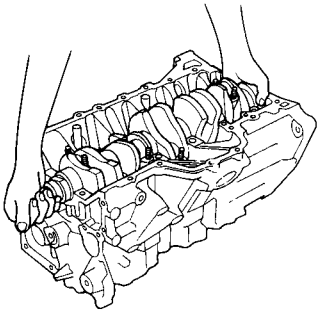
   CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

MAIN BEARING CAP BOLTS LOOSENING SEQUENCE



7. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.

8. Lift the crankshaft out of the engine, being careful not to damage journals.

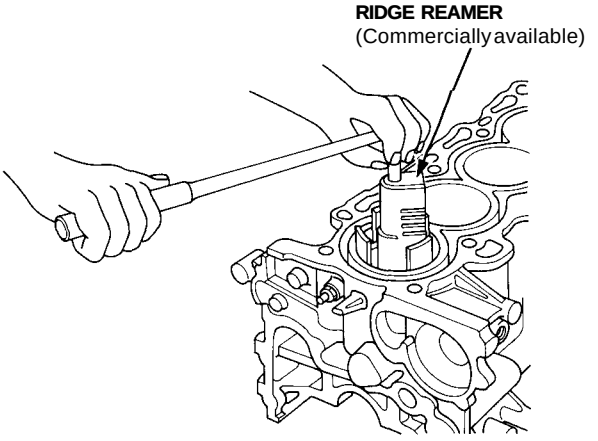


9. Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.

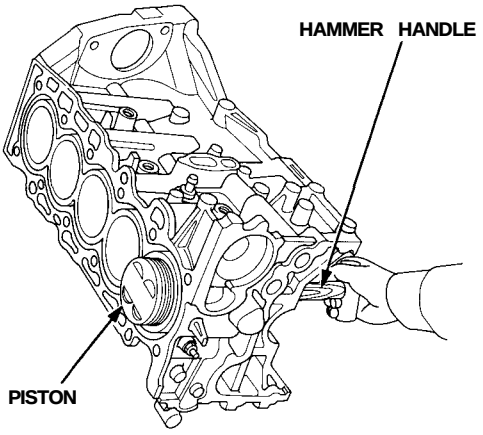
10. Reinstall the main caps and bearings on the engine in proper order.

11. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions.

    CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



12. Use the wooden handle of a hammer to drive the pistons out.



13. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.

14. Mark each piston/connecting rod assembly with its cylinder number to avoid mixup on reassembly.

    NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

Crankshaft

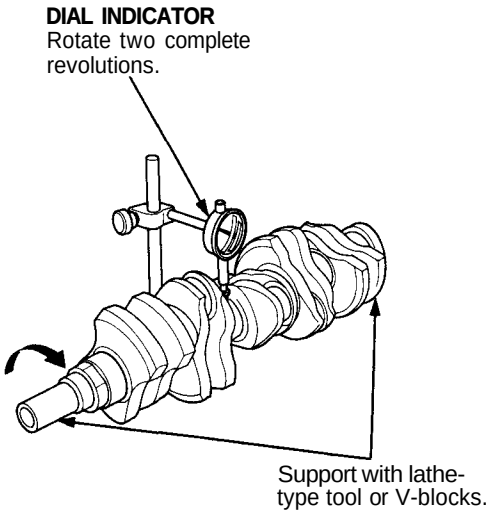
Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crankshaft is not bent.
- The difference between measurements on each journal must not be more than the service limit.

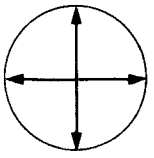
Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)

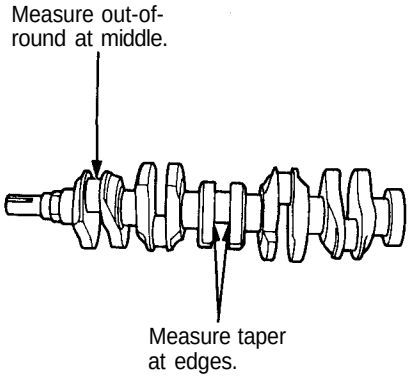


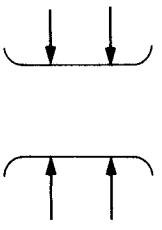
Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)







- Measure taper at edges of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.010 mm (0.0004 in)

Pistons

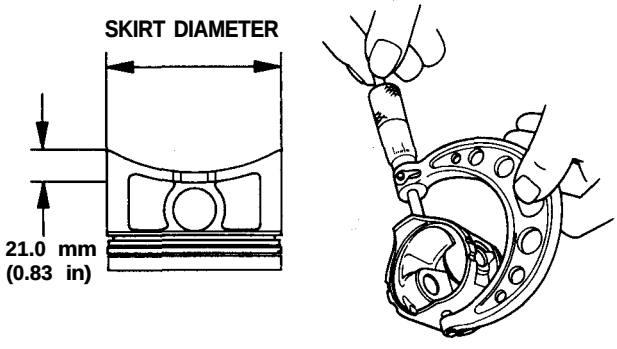
Inspection

1. Check the piston for distortion or cracks.
   NOTE: If the cylinder is bored, an oversized piston must be used.

2. Measure the piston diameter at a point 21.0 mm (0.83 in) from bottom of skirt
   NOTE: There are two standard-size pistons (No letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the cylinder block as cylinder bore sizes.

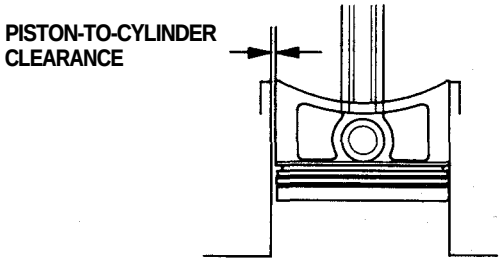
Piston Diameter

	Standard (New)	Service Limit
No Letter (A)	84.980 - 84.990 mm (3.3457-3.3461 in)	84.970 mm (3.3453 in)
B	84.970 - 84.980 mm (3.3453 -3.3457 in)	84.960 mm (3.3449 in)



3. Calculate the difference between the cylinder bore diameter shown in the right column and the piston diameter.

Piston-to-Block Clearance
Standard (New): 0.010 - 0.040 mm (0.0004-0.0016 in)
Service Limit: 0.05 mm (0.002 in)

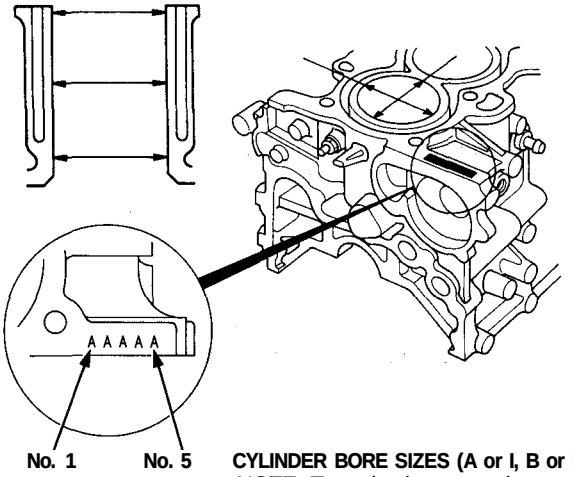


Oversize Piston Diameter
0.25: 85.230 - 85.240 mm (3.3555 - 3.3559 in)
0.50: 85.480 - 85.490 mm (3.3653 - 3.3657 in)

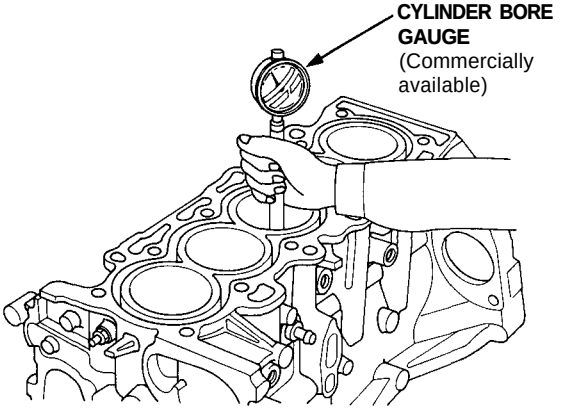
Cylinder Block

Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.



CYLINDER BORE SIZES (A or I, B or II)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons.



Cylinder Bore Size

	Standard (New)	Service Limit
A or I	85.010 -85.020 mm (3.3468 -3.3472 in)	85.070 mm (3.3492 in)
B or II	85.000 -85.010 mm (3.3465 -3.3468 in)	85.070 mm (3.3492 in)

Oversize
0.25: 85.250 - 85.270 mm (3.3563 - 3.3571 in)
0.50: 85.500 - 85.520 mm (3.3661 - 3.3669 in)

Bore Taper
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

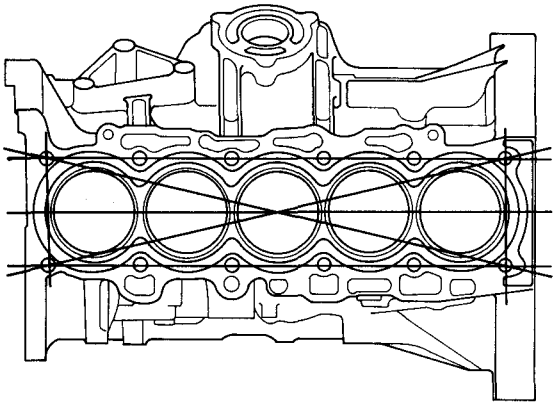
- If measurements in any cylinder are beyond oversize bore service limit, replace the cylinder block.
- If the block is to be rebored, refer to Piston Clearance Inspection (see page 7-11) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.5 mm (0.02 in)

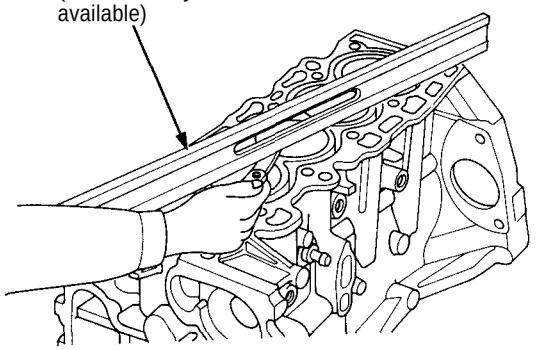
2. Check the top of the cylinder block for warpage. Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Cylinder Block Warpage:
Standard (New): 0.07 mm (0.003 in) max.
Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE
(Commercially available)

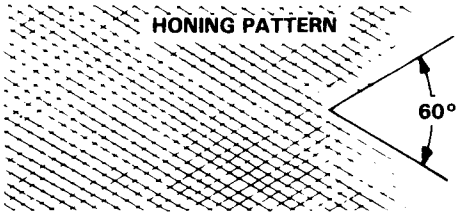


Bore Honing

1. Measure cylinder bores as shown on page 7-12. If the cylinder block is to be reused, hone the cylinders and remeasure the bores.

2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.

   NOTE:
   - Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
   - Do not use stones that are worn or broken.

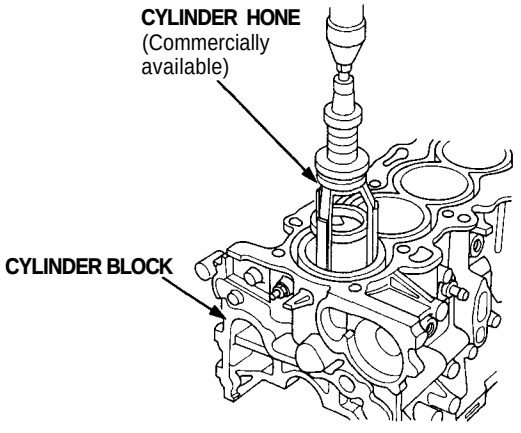


3. When honing is complete, thoroughly clean the cylinder block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

   NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in cylinder bores after honing to the service limit, rebore the cylinder block.

   NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.

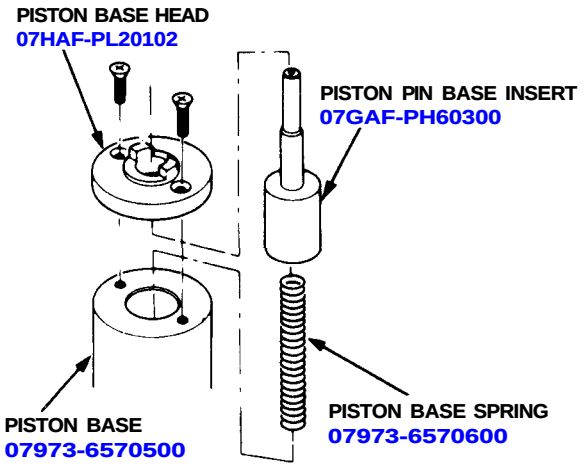


NOTE:
- After honing, clean the cylinder thoroughly with soapy water.
- Only a scored or scratched cylinder bore must be honed.

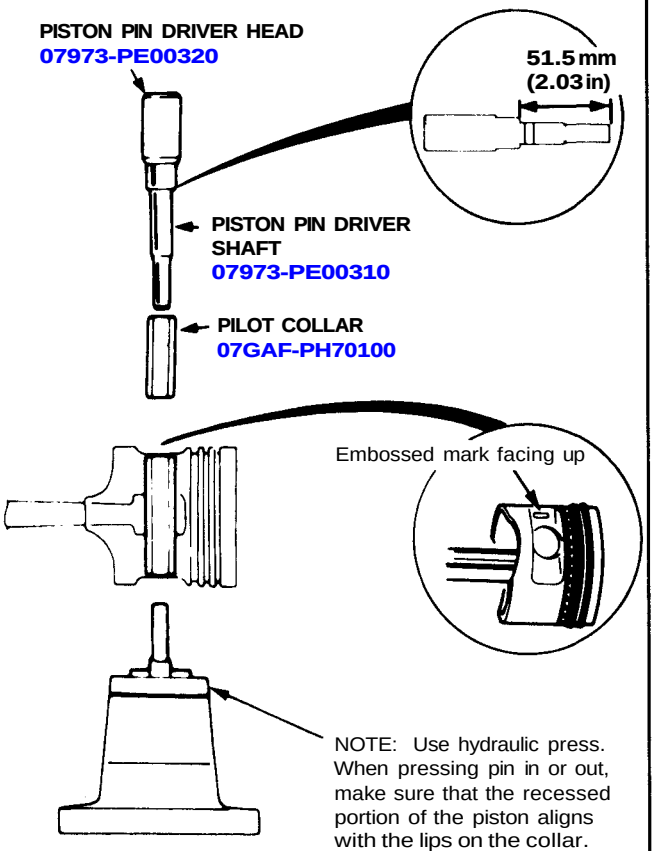
Piston Pins

Removal

1. Assemble the special tools as shown.



2. Assemble and adjust the length of the piston pin driver and shaft to 51.5 mm (2.03 in) as shown.



3. Place the piston on the piston base and press the pin out with the special tools a hydraulic press.

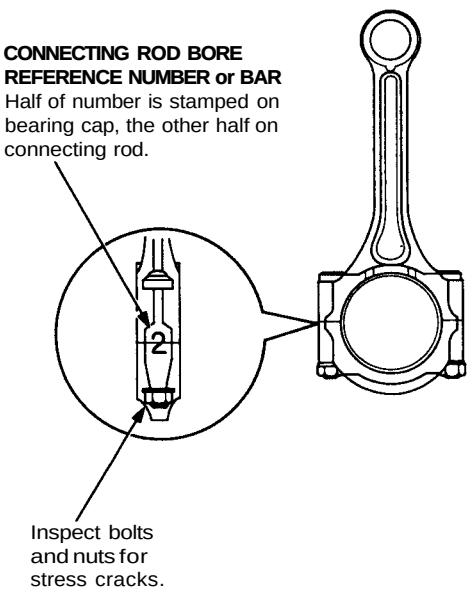
Connecting Rods

Selection

Each rod falls into one of four tolerance ranges (from O to 0.024 mm (0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore. It's then stamped with a number or bar (1, 2, 3, or 4/I, II, III, or mI) indicating the range.
You may find any combination of 1, 2, 3, or 4/I, II, III, or IIII in any engine.

Normal Bore Size: 48.0 mm (1.89 in)

NOTE:
- Reference numbers or bars are for big end bore size and do not indicate the position of rod in the engine.
- Inspect connecting rod for cracks and heat damage.



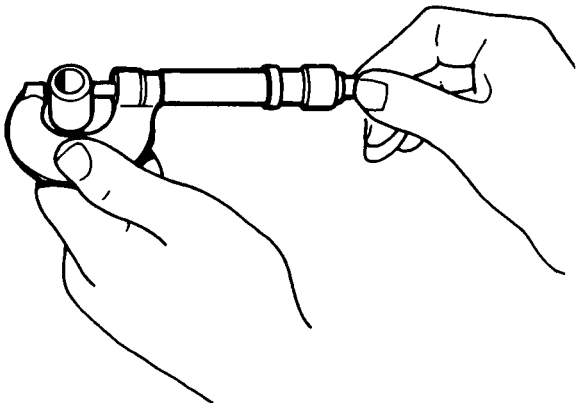
Piston Pins

Inspection

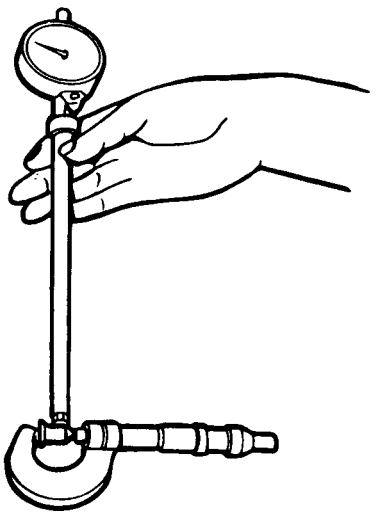
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): 21.994 - 22.000 mm
(0.8659 - 0.8661 in)
Oversize: 21.997 - 22.003 mm
(0.8660 - 0.8663 in)

NOTE: All replacement piston pins are oversize.



2. Zero the dial indicator to the piston pin diameter.

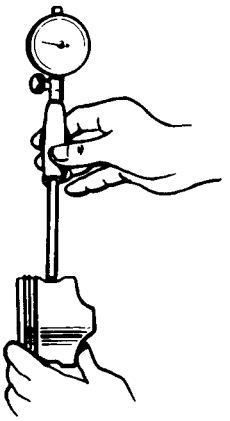


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

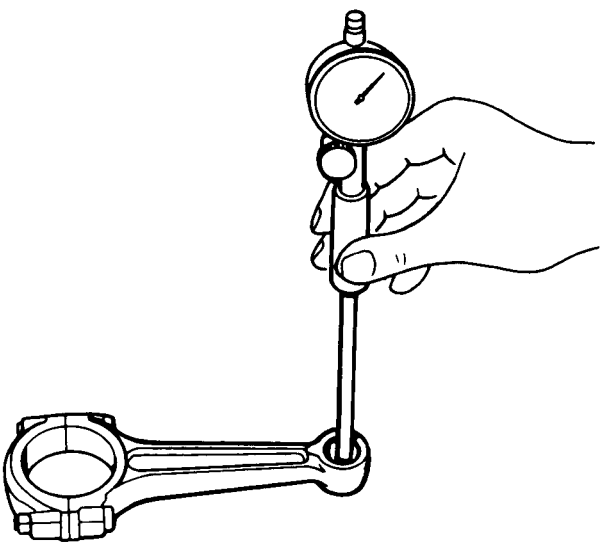
If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

Piston Pin-to-Piston Clearance:
Standard (New): 0.012 - 0.024 mm
(0.0005 - 0.0009 in)



4. Check the difference between the piston pin diameter and connecting rod small end diameter.

Piston Pin-to-Connecting Rod Interference:
Standard (New): 0.013 - 0.032 mm
(0.0005-0.0013 in)



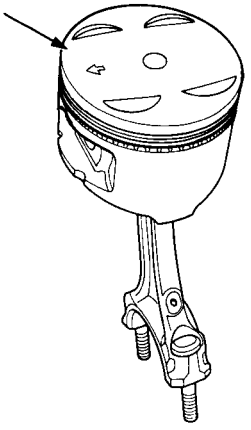
Piston Pins

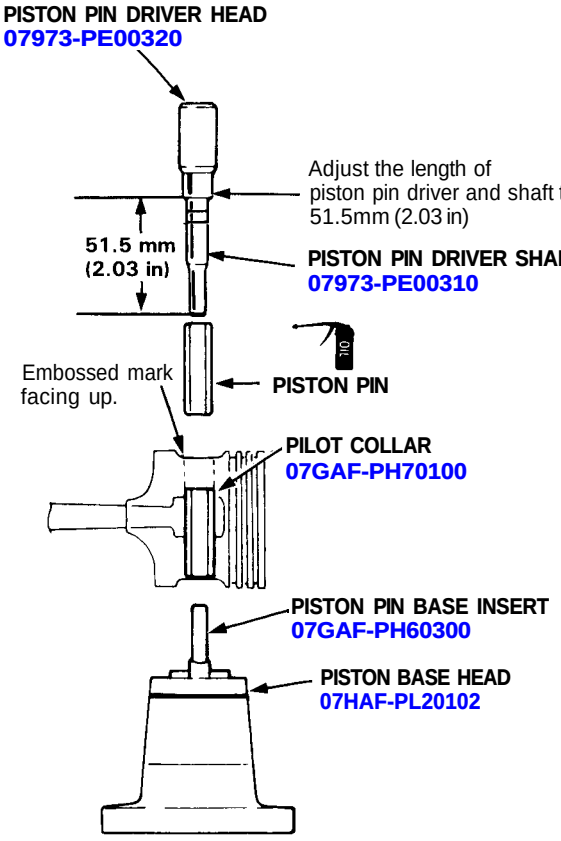
Installation

1. Use a hydraulic press for installation.

   • When pressing the pin in or out, be sure to position the recessed flat on the piston against the lugs on the base attachment.

The arrow must face the timing belt side of the engine and the connecting rod oil hole must face the left side of the engine.





Piston Rings

End Gap

1. Using a piston, push a new ring into the cylinder bore 15-20 mm (0.6 - 0.8 in) from the bottom.

2. Measure the piston ring end-gap with a feeler gauge:

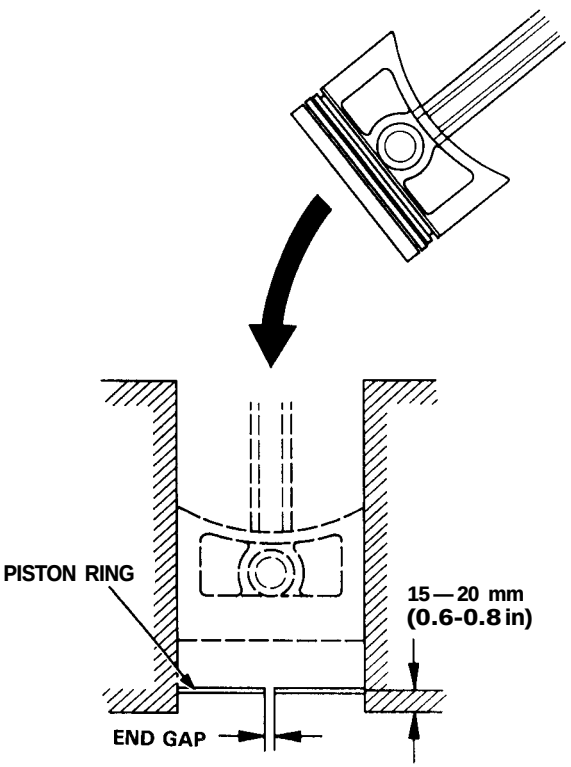
   • If the gap is too small, check to see if you have the proper rings for your engine.
   • If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-12. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:

Top Ring
Standard (New): 0.20 - 0.30 mm (0.008-0.012 in)
Service Limit: 0.50 mm (0.020 in)

Second Ring
Standard (New): 0.35 - 0.50 mm (0.014-0.020 in)
Service Limit: 0.65 mm (0.026 in)

Oil Ring
Standard (New): 0.20 - 0.70 mm (0.008 - 0.028 in)
Service Limit: 0.80 mm (0.031 in)



Replacement

1. Using a ring expander, remove the old piston rings.

2. Clean all ring grooves thoroughly.

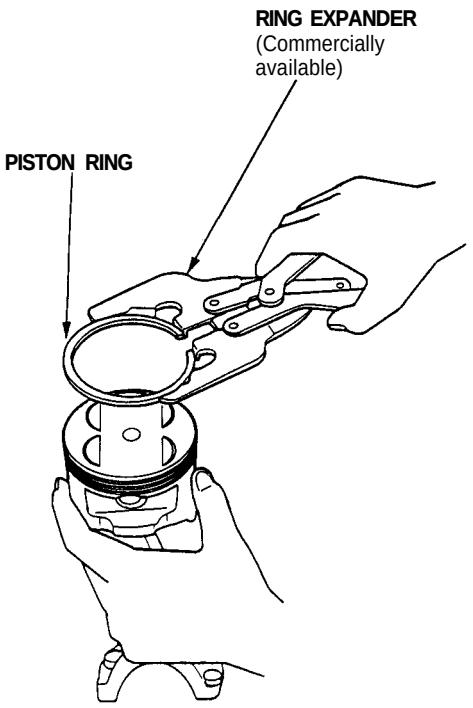
   NOTE:
   - Use a squared-off broken ring or ring groove cleaner with blade to clean piston grooves. File down blade if necessary.
   - Top and 2nd ring grooves are 1.2 mm (0.05 in) wide and oil ring groove is 2.8 mm (0.11 in) wide.

   CAUTION: Do not use a wire brush to clean the ring grooves. Do not use the cleaning tool to cut ring grooves deeper.

   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

3. Install new rings in the proper sequence and position (see page 7-18).

   NOTE: Do not reuse old piston rings.

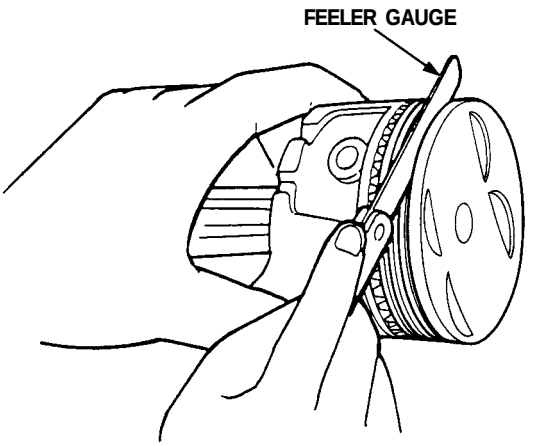


Ring-to-Groove Clearance

After installing a new set of rings, measure ring-to-groove clearance:

Top Ring Clearance
Standard (New): 0.045 - 0.070 mm (0.0018 - 0.0028 in)
Service Limit: 0.14 mm (0.006 in)

Second Ring Clearance
Standard (New): 0.030 - 0.055 mm (0.0012-0.0022 in)
Service Limit: 0.13 mm (0.005 in)



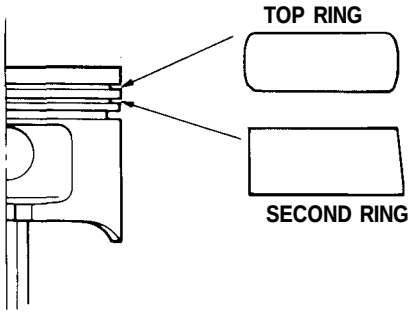
Piston Rings

Alignment

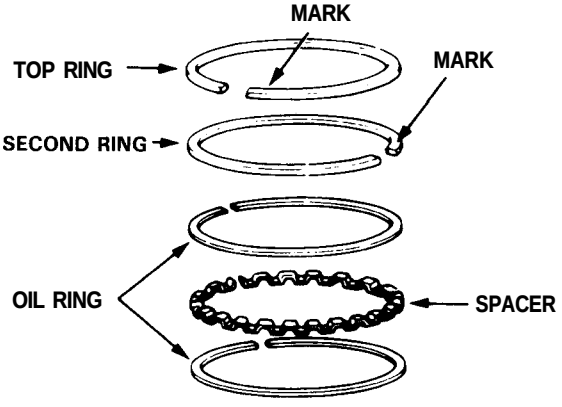
1. Install the rings using the ring expander shown on page 7-17.

   Identify top and second rings by the chamfer on the edge. Make sure they are in their proper grooves on piston.

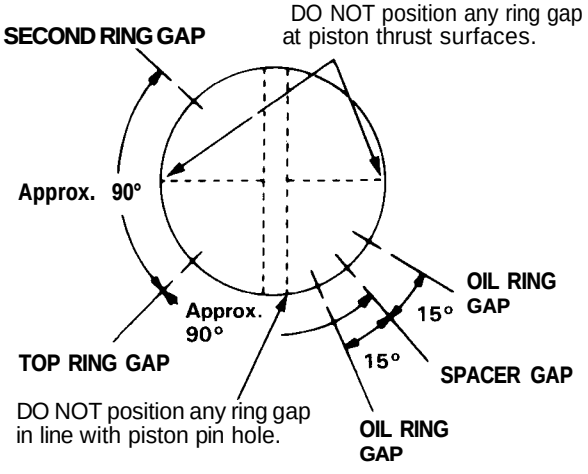
   NOTE: The manufacturing marks must be facing upward.



2. Rotate the rings in their grooves to make sure they do not bind.



3. Position the ring end gaps as shown:



Crankshaft Oil Seal

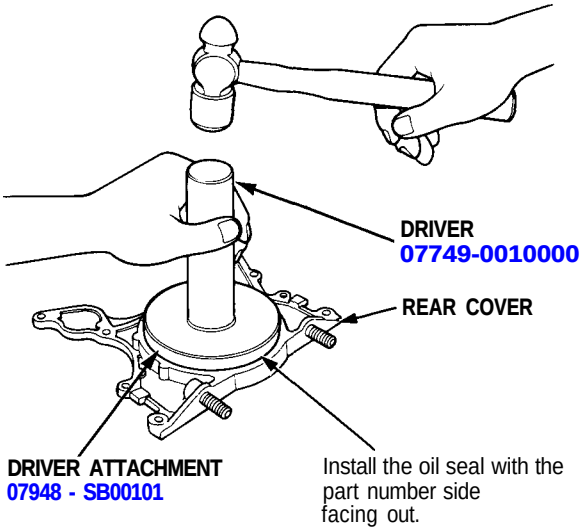
Installation



The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.

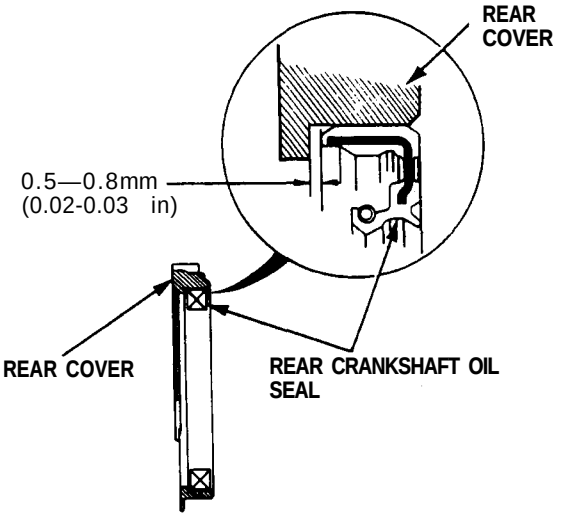
1. Drive the rear crankshaft oil seal into the rear cover using the special tools.

   NOTE: Drive the rear crankshaft oil seal in squarely.



2. Confirm clearance is equal all the way around with a feeler gauge.

   Clearance: 0.5 - 0.8 mm (0.02 - 0.03 in)



NOTE: Refer to pages 7-22 and 8-15 for installation of the front crankshaft oil seal.

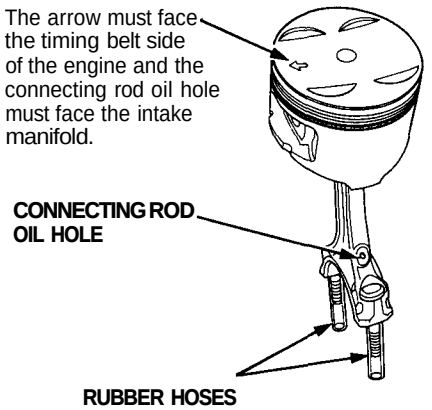
Pistons

Installation

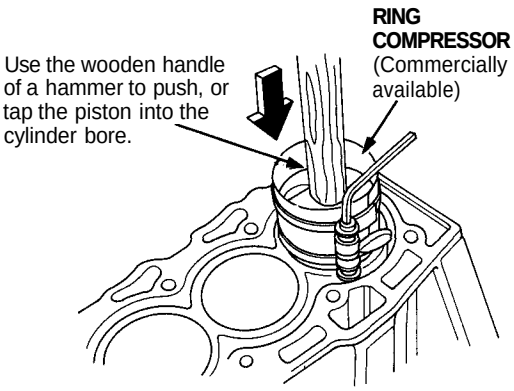
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

1. If the crankshaft is already installed:
   - Remove the connecting rod caps and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
   - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder and tap it in using the wooden handle of a hammer.
   - Stop tapping after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing piston into place.
   - Install the rod caps with bearings, and torque the nuts to 32 N-m (3.3 kgf-m, 24 lbf-ft)

2. If the crankshaft is not installed:
   - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and tap it in using the wooden handle of a hammer.
   - Position all pistons at top dead center.



NOTE: Maintain downward force on the ring compressor to prevent rings from expanding before entering the cylinder bore.



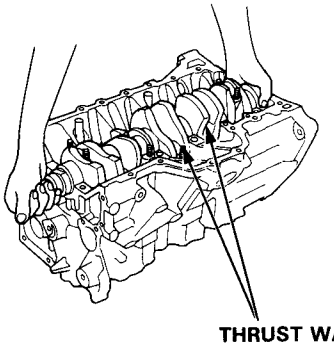
Installation

Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

1. Insert bearing halves in the cylinder block and connecting rods.

2. Install the thrust washers in the No. 4 journal. Oil the thrust washer surfaces.

3. Lower the crankshaft into the cylinder block, seating the rod journals into connecting rods No. 1, No. 2 and No. 5. Install the rod caps and nuts finger-tight.



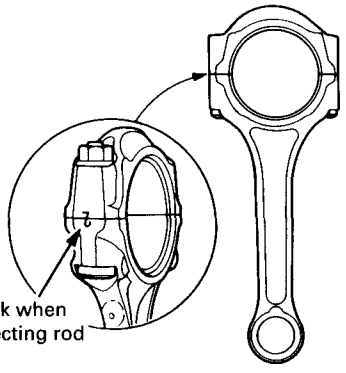
THRUST WASHERS
Grooved sides face outward.

4. Rotate the crankshaft clockwise, seat journals into connecting rods No. 3 and No. 4, and install the rod caps and nuts finger tight.

   NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

5. Check rod bearing clearance with plastigage (see page 7-8), then torque the capnuts.
   32 N-m (3.3 kgf-m, 24 lbf-ft)

   NOTE:
   - Reference numbers on connecting rod are for big-end bore tolerance and do not indicate the position of piston in the engine.
   - Coat the bolt threads with engine oil.



Line up the mark when installing connecting rod cap.

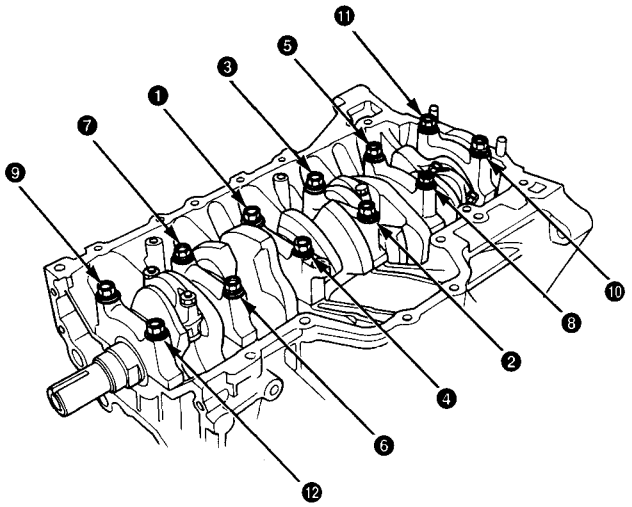
(cont'd)

Crankshaft

Installation (cont'd)

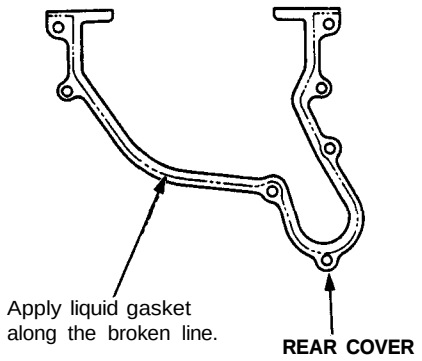
6. Install the main bearing caps.
Check clearance with plastigage (see page 7-7), then tighten the bearing cap bolts in two steps.
In the first step, torque all bolts in sequence to about 29 N-m (3.0 kgf-m, 22 lbf-ft); in the final step, torque in same sequence to 74 N-m (7.5 kgf-m, 54 lbf-ft).

NOTE: Coat the bolt threads with engine oil.

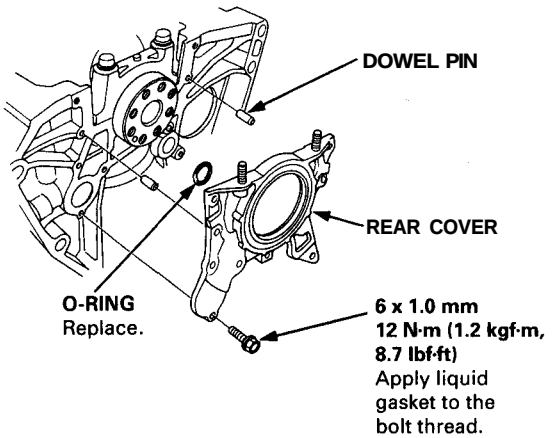


CAUTION: Whenever any crankshaft bearing or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

7. Apply liquid gasket to the cylinder block mating surface of the rear cover, then install it on the cylinder block.

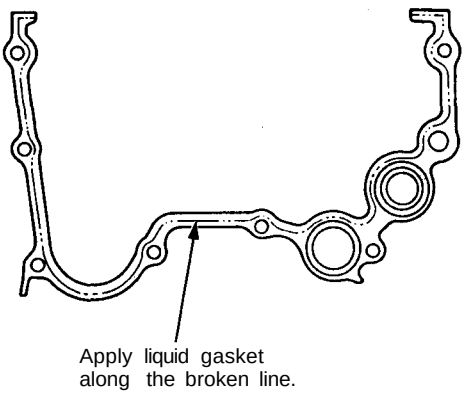


NOTE:
- Use liquid gasket, Part No. 08718-0001 or 08718 -0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent oil leakage, apply liquid gasket to the inner threads of the bolt holes.
- Do not apply liquid gasket to O-ring grooves.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.
- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use a new O-ring and apply oil when installing it.



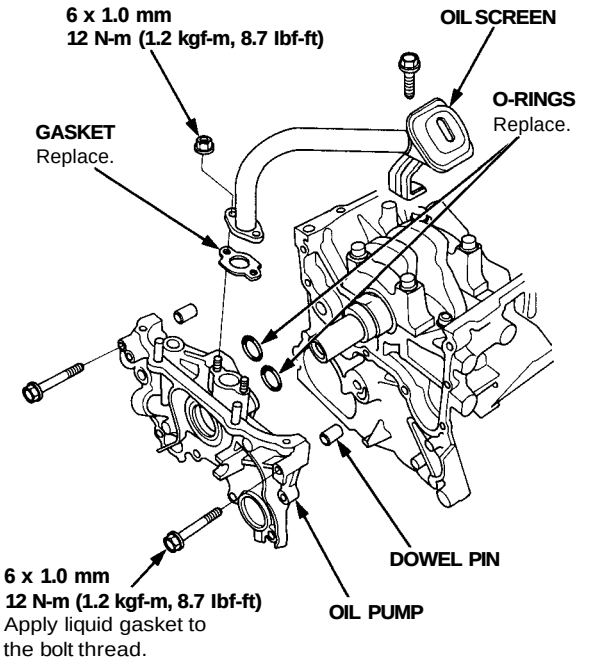
8. Apply liquid gasket to the cylinder block mating surface of the oil pump, then install it on the cylinder block.

NOTE: Do not apply liquid gasket to O-ring grooves.

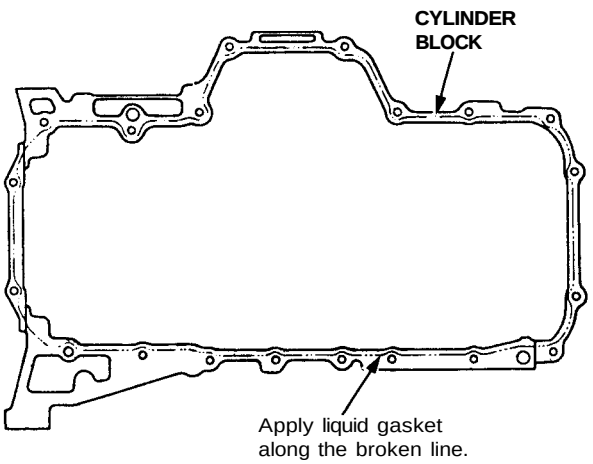


NOTE:
- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use new O-rings and apply oil when installing them.

9. Install the oil screen.



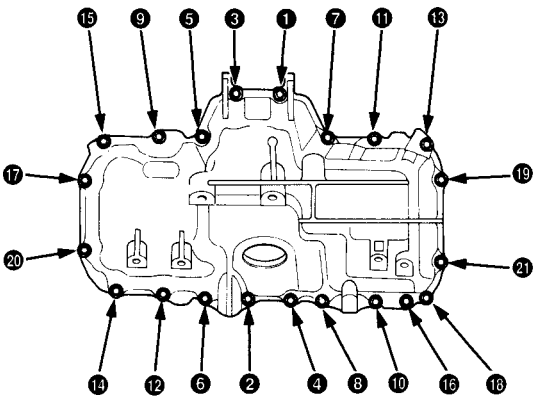
10. Apply liquid gasket to the cylinder block, then install the oil pan.



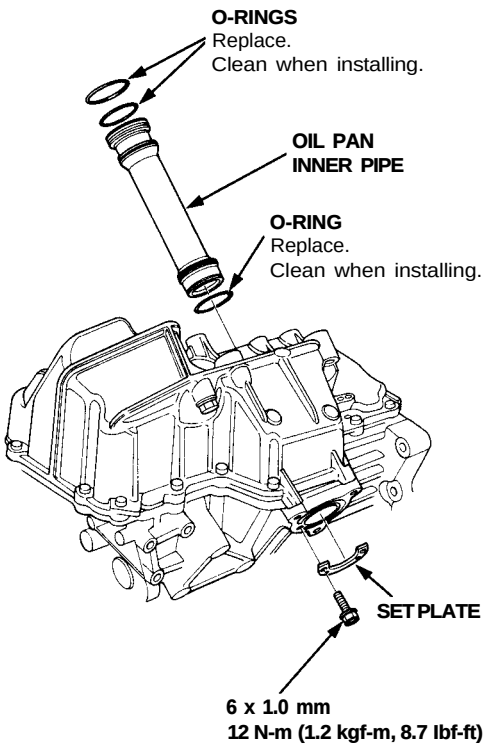
11. Torque the oil pan bolts and nuts as shown.

8 x 1.25 mm
22 N-m (2.2 kgf-m, 16 lbf-ft)

OIL PAN BOLT TORQUE SEQUENCE



12. Install the oil pan inner pipe, then install the set plate.

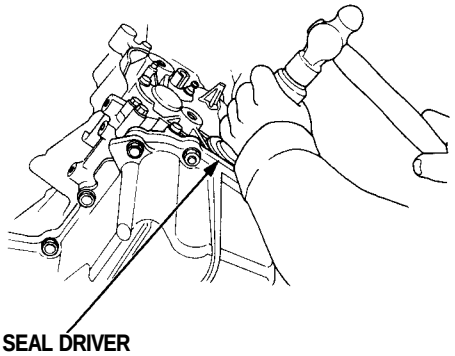


Crankshaft Oil Seals

Installation (Engine removal not required)

NOTE: The crankshaft oil seal housing surface should be dry.
Apply a light coat of grease to the crankshaft and to the lips of the seals.

1. Using the special tool, drive in the front crankshaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft, and check that the front crankshaft oil seal lip is not distorted.

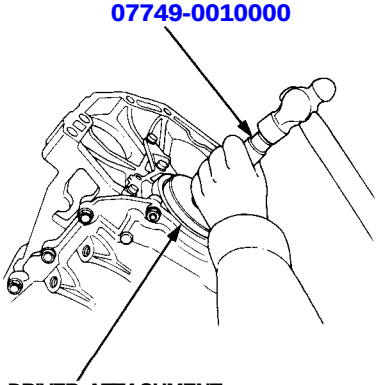


SEAL DRIVER
07LAD-PT3010A
Install the oil seal with the part number side facing out.

2. Measure the flywheel-end seal thickness and the oil seal housing depth. Using the special tool, drive the rear crankshaft oil seal into the rear cover to the point where the clearance between the bottom of the rear crankshaft oil seal and the rear cover is 0.5 - 0.8 mm (0.02 - 0.03 in) (see page 7-18).

NOTE: Align the hole in the driver attachment with the pin on the crankshaft.

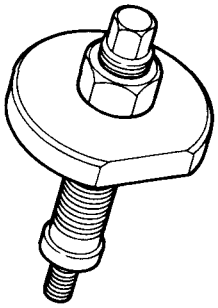
DRIVER
07749-0010000



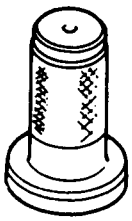
DRIVER ATTACHMENT
07948 -SB00101
Install the oil seal with the part number side facing out.

Special Tools

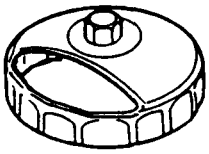
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAC-PW50101	Extension Shaft Puller	1	8-9
②	07LAD-PT3010A	Seal Driver	1	8-15
③	07912-6110001	Oil Filter Wrench	1	8-6



①



②

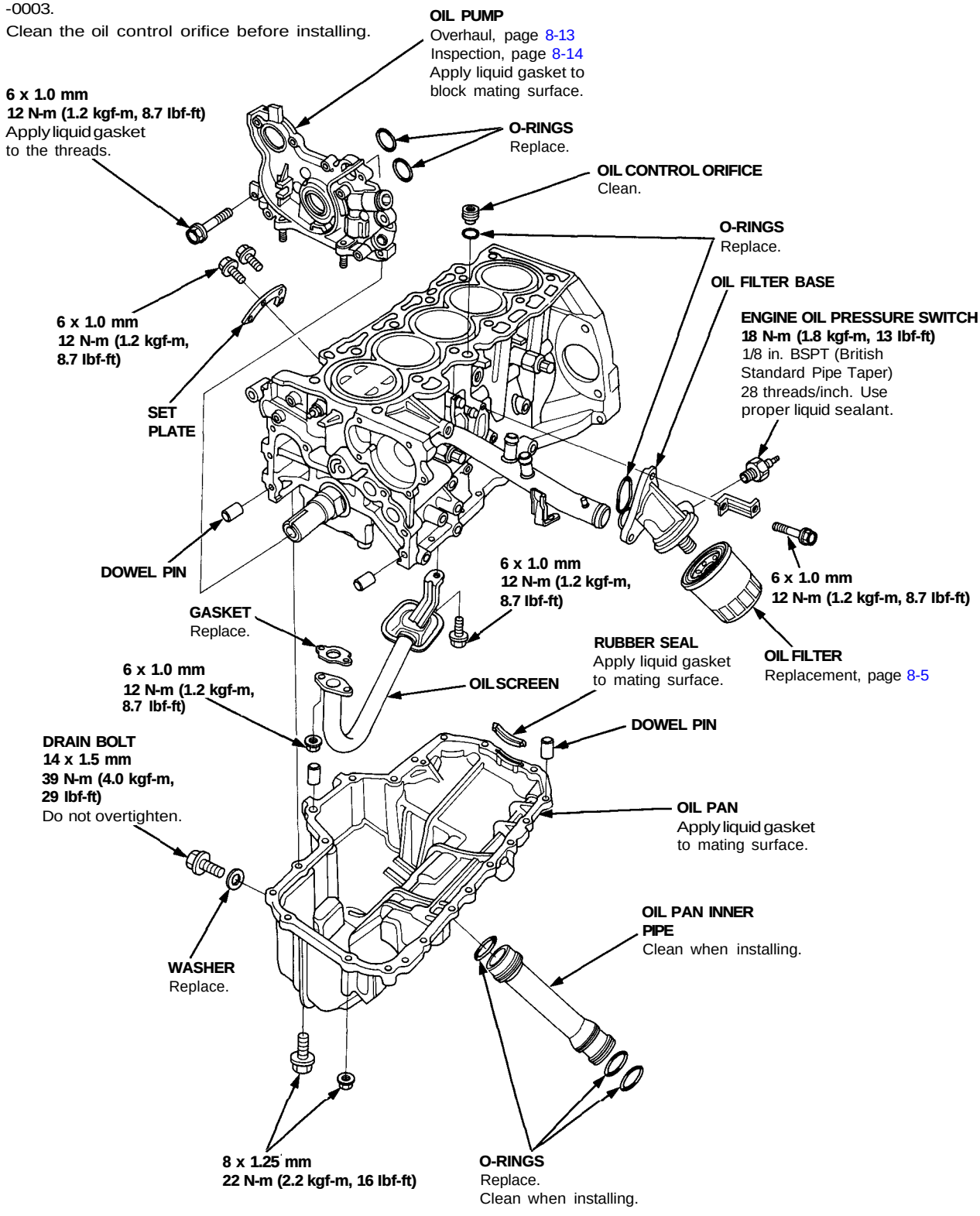


③

Illustrated Index

NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718-0001 or 08718 -0003.
- Clean the oil control orifice before installing.

CAUTION: Do not overtighten the drain bolt.



Engine Oil

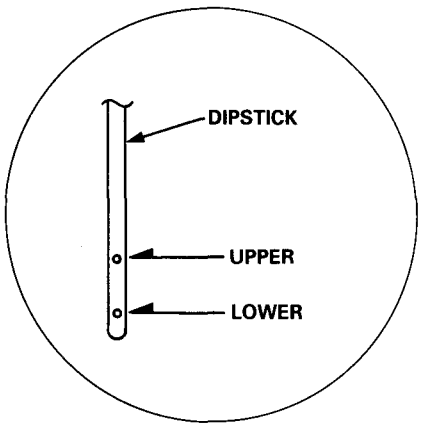
Inspection

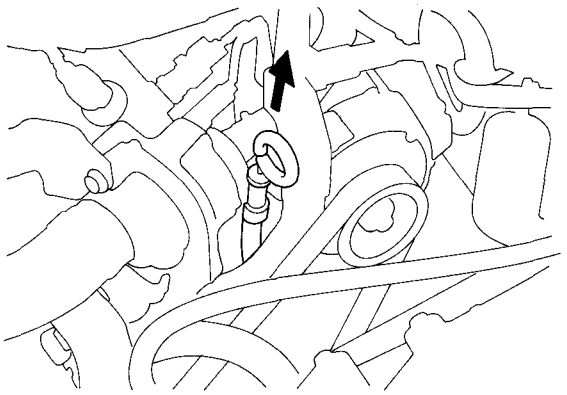
1. Check engine oil level with the engine off and the car parked on level ground.

2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.

3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

CAUTION: Insert the dipstick carefully to avoid bending it.



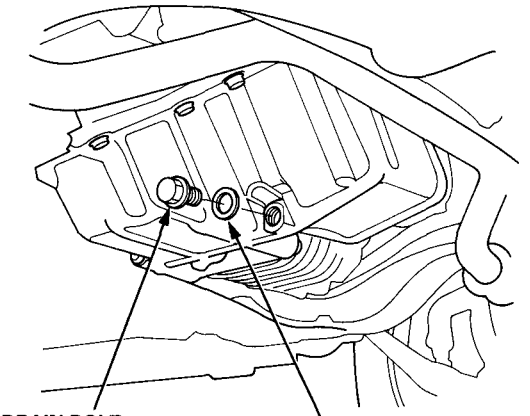


Engine Oil

Replacement

⚠ WARNING Be careful when loosening the drain bolt while the engine is hot. Burns can result because the oil temperature is very hot.

1. Warm up the engine.
2. Drain the engine oil.

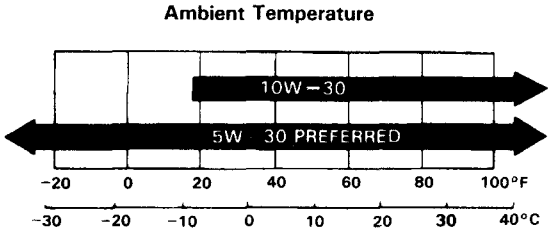


3. Reinstall the drain bolt with a new washer, and refill with the recommended oil.

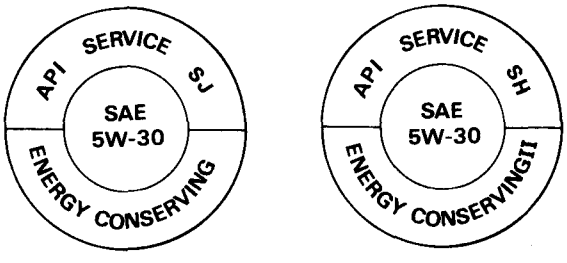
Requirement	API Service Grade: Use an "Energy Conserving" SJ grade oil or an "Energy Conserving II" SH grade oil, SAE 5W – 30 preferred. You can also use an oil that bears the API CERTIFICATION mark.
Capacity	4.0 ℓ (4.2 US qt, 3.5 Imp qt) at oil change. 4.3 ℓ (4.5 US qt, 3.8 Imp qt) at oil change including filter. 5.2 ℓ (5.5 US qt, 4.6 Imp qt) after engine overhaul.
Change interval	Every 7,500 miles (12,000 km) or 12 months (Normal condition). Every 3,750 miles (6,000 km) or 6 months (Severe condition).

NOTE: Under normal conditions, the oil filter should be replaced at every other oil change.
Under severe conditions, the oil filter should be replaced at each oil change.

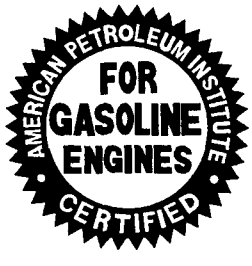
The numbers in the middle of the API Service label tell you the oil's SAE viscosity or weight. Select the oil for your car according to this chart:



An oil with a viscosity of 5W - 30 is preferred for improved fuel economy and year-round protection in the car. You may use a 10W - 30 oil if the climate in your area is limited to the temperature range shown on the chart.



API SERVICE LABEL



API CERTIFICATION MARK

4. Fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

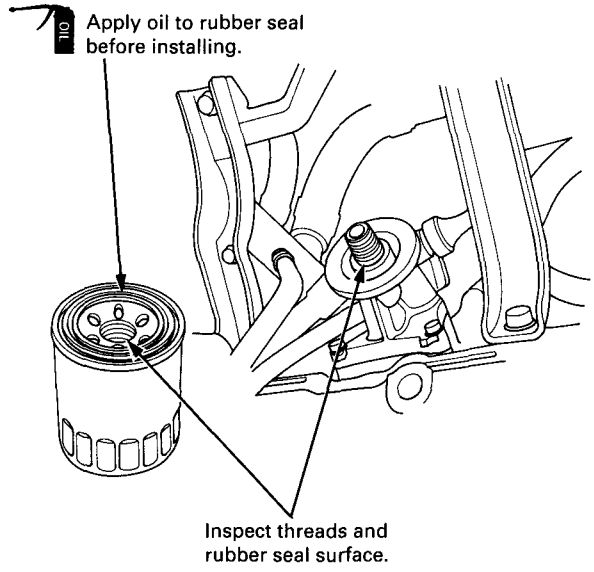
Oil Filter

Replacement

⚠ WARNING Be careful when loosening the oil filter while the engine is hot. Burns can result because the oil temperature is very high.

1. Remove the oil filter with the special oil filter wrench.
2. Inspect the threads and rubber seal on the new filter. Wipe off the seat on the engine block, then apply a light coat of oil to the filter rubber seal.

   NOTE: Use only filters with a built-in bypass system.



(cont'd)

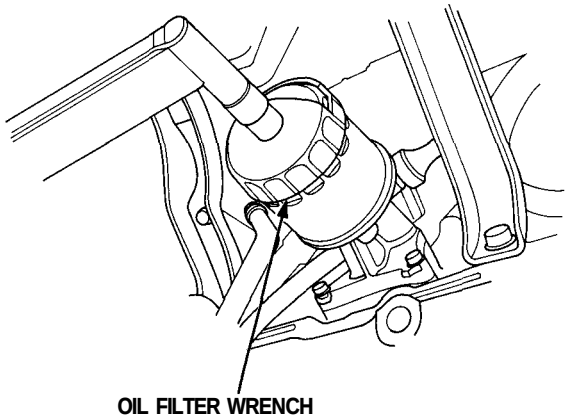
Oil Filter

Replacement (cont'd)

3. Install the oil filter by hand.

4. After the rubber seal seats, tighten the oil filter clockwise with the special tool.

Tighten: 7/8 turn clockwise.
Tightening torque: 22 N-m (2.2 kgf-m, 16 lbf-ft)

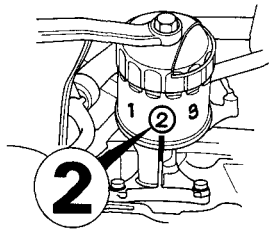


OIL FILTER WRENCH
07912-6110001

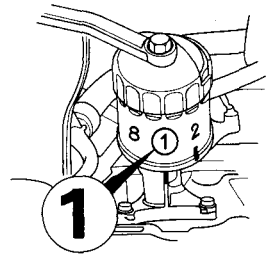
Use this procedure to tighten the filter if eight numbers (1 to 8) are printed on the surface of the filter.

1) Make a mark on the oil filter base under the number that shows at the bottom of the filter when the rubber seal is seated.

2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated.



Number after tightening.

Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

CAUTION: Using any procedure other than those shown could result in serious engine damage due to oil leakage.

5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

Oil Pressure

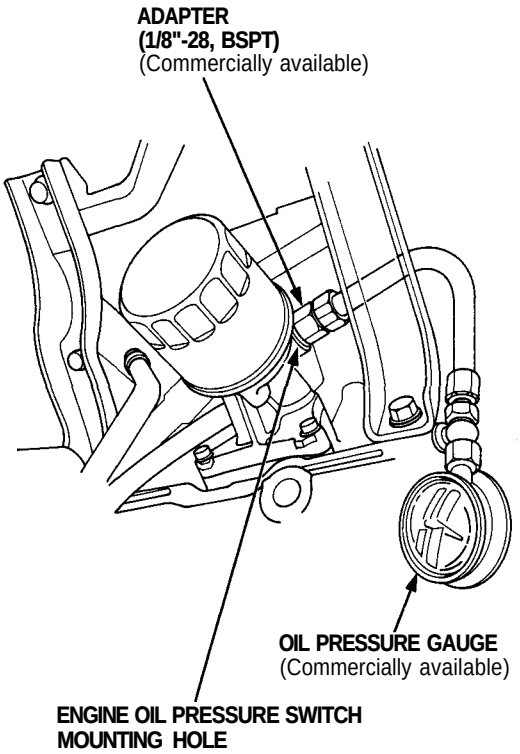
Testing

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Connect a tachometer.
2. Remove the engine oil pressure switch, and install an oil pressure gauge.
3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

Engine Oil Temperature: 176°F (80°C)
Engine Oil Pressure:
At Idle: 69 kPa (0.7 kgf/cm^2,10 psi) minimum
At 3,000 rpm: 340 kPa (3.5 kgf/cm^2, 50 psi) minimum

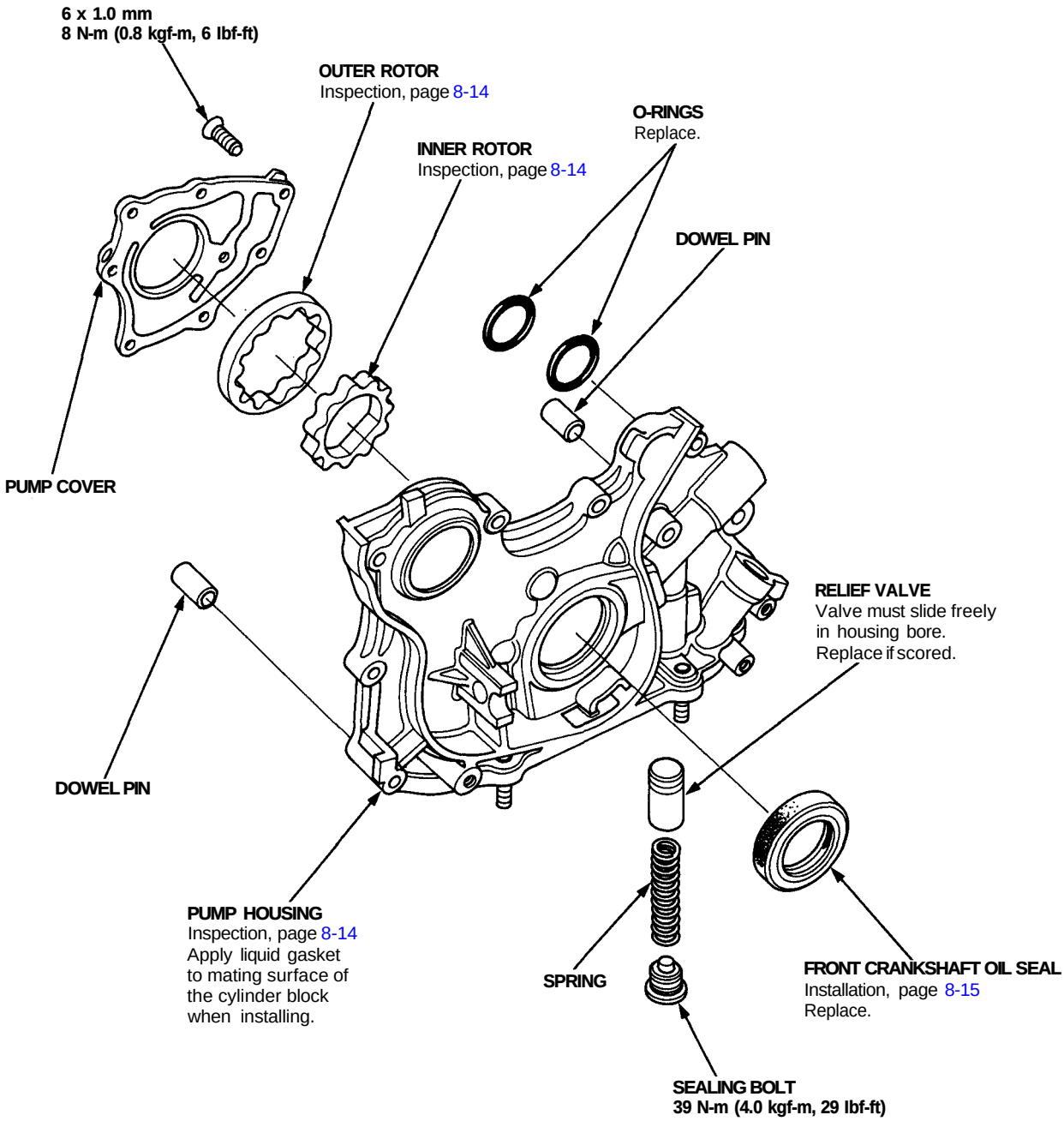
- If oil pressure is within specifications, replace the oil pressure switch and recheck.
- If oil pressure is NOT within specifications, inspect the oil pump (see page 8-14).



Oil Pump

Overhaul

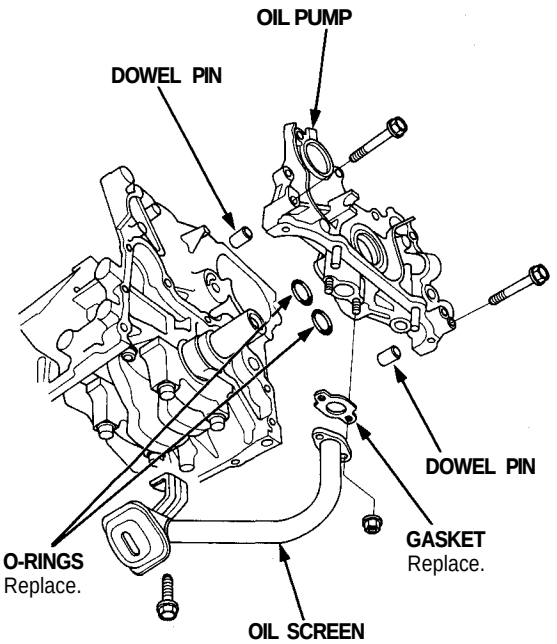
NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket. Part No. 08718-0001 or 08718-0003.
- The rotors must be installed in the same direction.
- After reassembly, check that the rotors move without binding.



Oil Pump

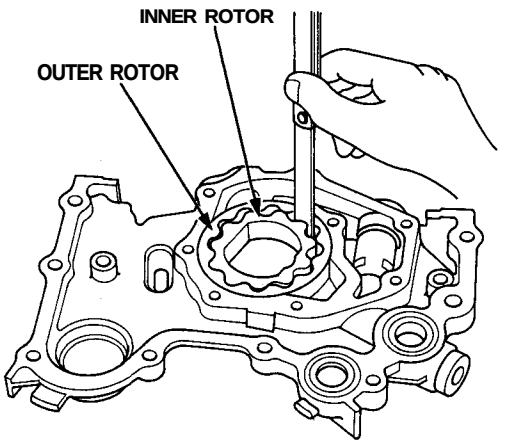
Removal/Inspection/Installation

1. Drain the engine oil and the differential oil.
2. Turn the crankshaft to TDC.
3. Remove the timing belt (see page 6-10).
4. Remove the oil pan (see page 8-8).
5. Remove the oil screen, then remove the oil pump.



6. Remove the screws from the pump housing, then separate the housing and cover.
7. Check the inner-to-outer rotor radial clearance on the pump rotor.

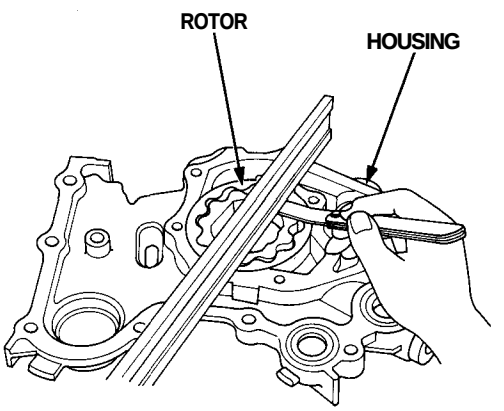
Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.02 - 0.16 mm (0.001 - 0.006 in)
Service Limit: 0.20 mm (0.008 in)



— If the inner-to-outer rotor clearance exceeds the service limit, replace the inner and outer rotors.

8. Check the housing-to-rotor axial clearance on the pump rotor.

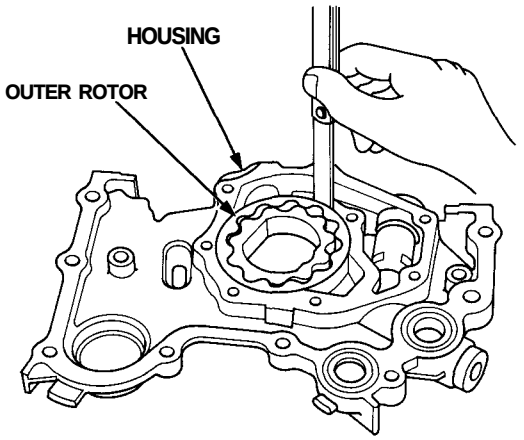
Housing-to-Rotor Axial Clearance
Standard (New): 0.02 - 0.07 mm (0.001 - 0.003 in)
Service Limit: 0.12 mm (0.005 in)



— If the housing-to-rotor axial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

9. Check the housing-to-outer rotor radial clearance.

Housing-to-Outer Rotor Radial Clearance
Standard (New): 0.10 - 0.18 mm (0.004 - 0.007 in)
Service Limit: 0.20 mm (0.008 in)



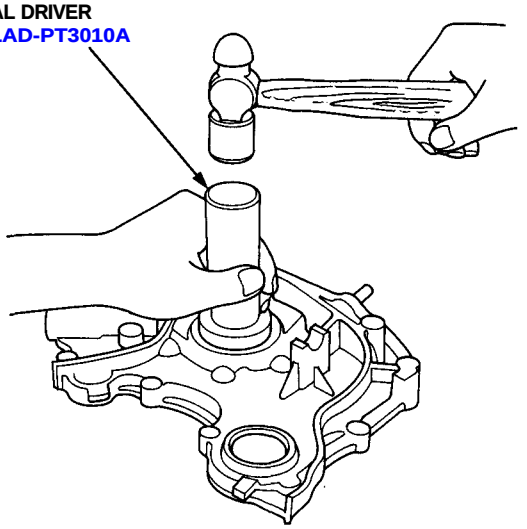
— If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

10. Inspect both rotors and pump housing for scoring or other damage. Replace parts if necessary.

11. Remove the old oil seal from the oil pump.

12. Using the special tool, gently tap in the new front crankshaft oil seal until the driver bottoms against the pump.

SEAL DRIVER
07LAD-PT3010A



13. Reassemble the oil pump, applying liquid thread lock to the pump housing screws.

14. Check that the oil pump turns freely.

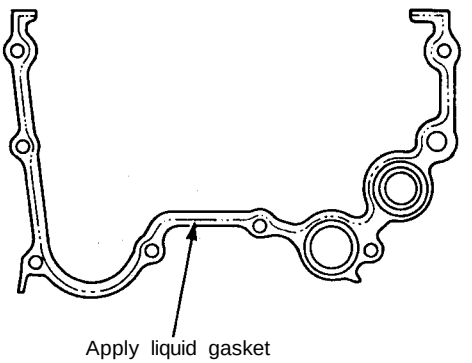
15. Apply a light coat of oil to the seal lip.

16. Install the two dowel pins and new O-ring on the cylinder block.

17. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE:
- Use liquid gasket, Part No. 08718 - 0001 or 08718 - 0003.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- Do not apply liquid gasket to the O-ring grooves.
- To prevent leakage, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

OIL PUMP HOUSING

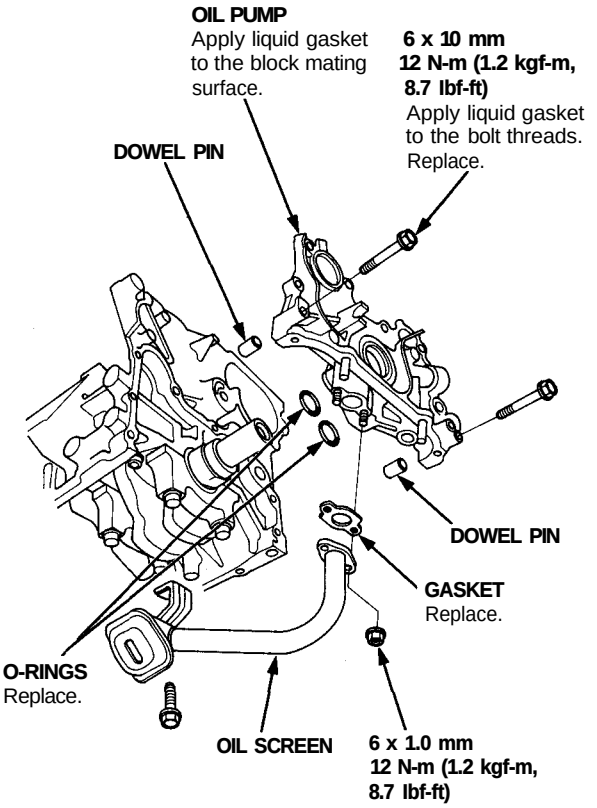


(cont'd)

Oil Pump

Removal/Inspection/Installation (cont'd)

18. Install the oil pump to the cylinder block.



19. Install the oil screen.

20. Install the oil pan (see page 8-11).

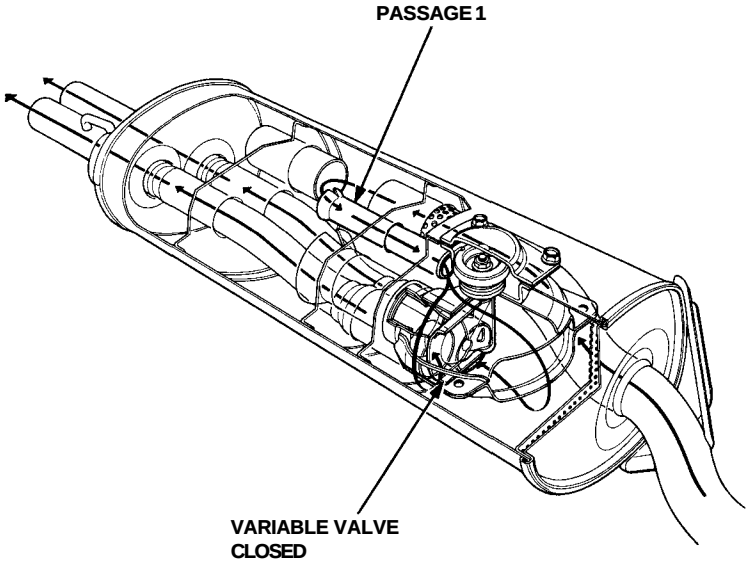
21. Install the timing belt (see page 6-11).

Muffler (With Variable Flow Rate Exhaust System)

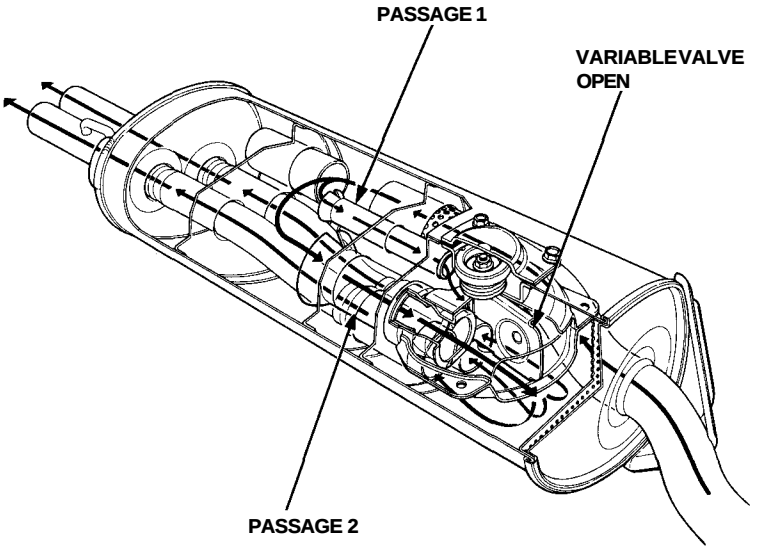
Description

By integrating a valve into the muffler, it was possible to reduce exhaust noise at low engine speeds and to improve engine performance at high engine speeds without enlarging muffler volume.
The variable flow rate exhaust system is a simple mechanism that uses no sensors, controllers or actuators. Opening and closing of the variable valve is controlled by exhaust gas pressure.

At low engine speeds:
Because of the low flow-rate of the exhaust gas, the valve will be closed; causing the gas to flow through passage 1. This causes higher exhaust gas backpressure, which dampens exhaust noise.



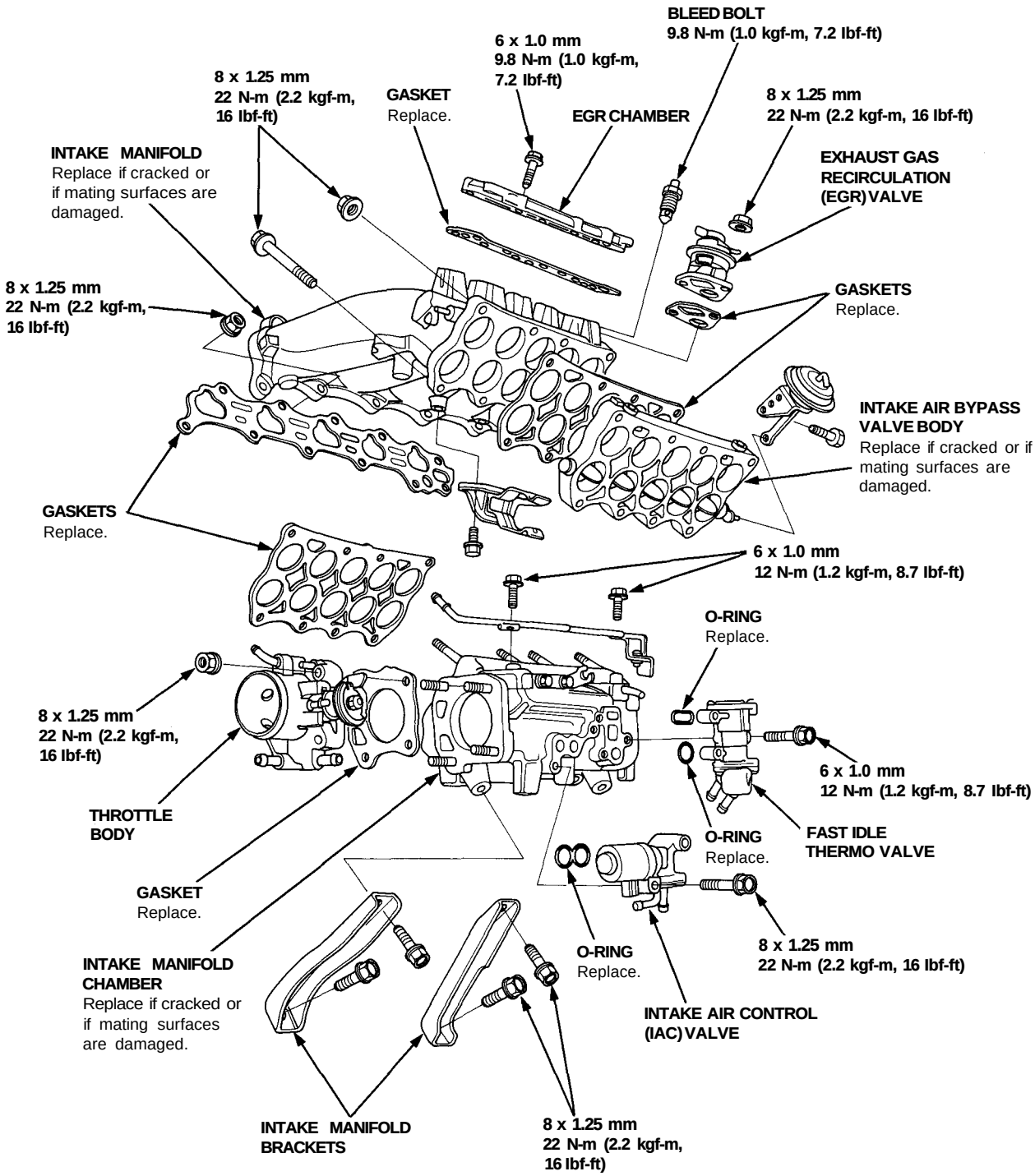
At high engine speeds:
The higher exhaust gas flow-rate causes the valve to open, allowing the gas to flow through passages 1 and 2. Exhaust gas backpressure is decreased, giving better engine performance.



Intake Manifold

Replacement

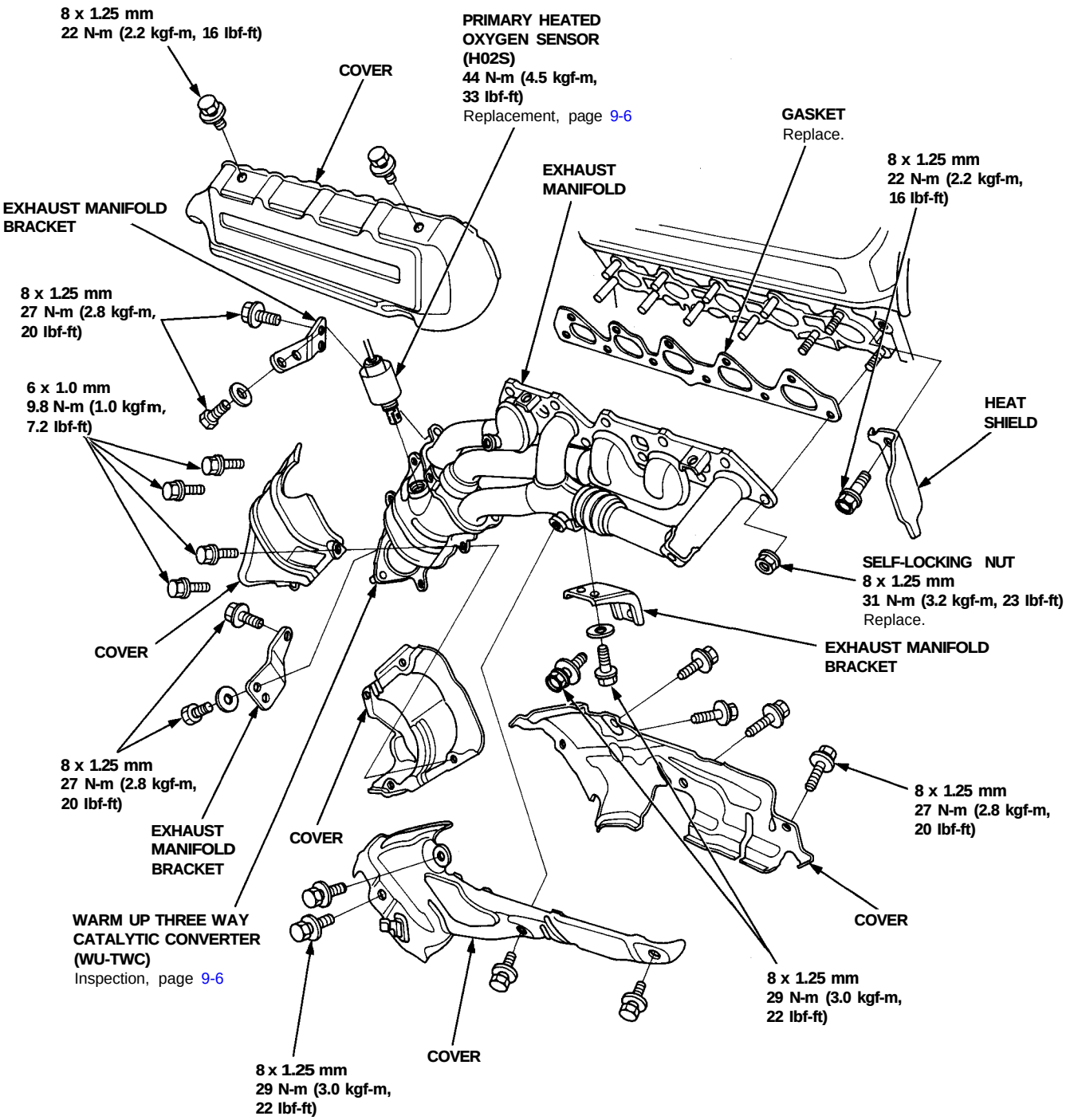
NOTE: Use new O-rings and gaskets when reassembling.



Exhaust Manifold

Replacement

NOTE: Use new gaskets and self-locking nuts when reassembling.

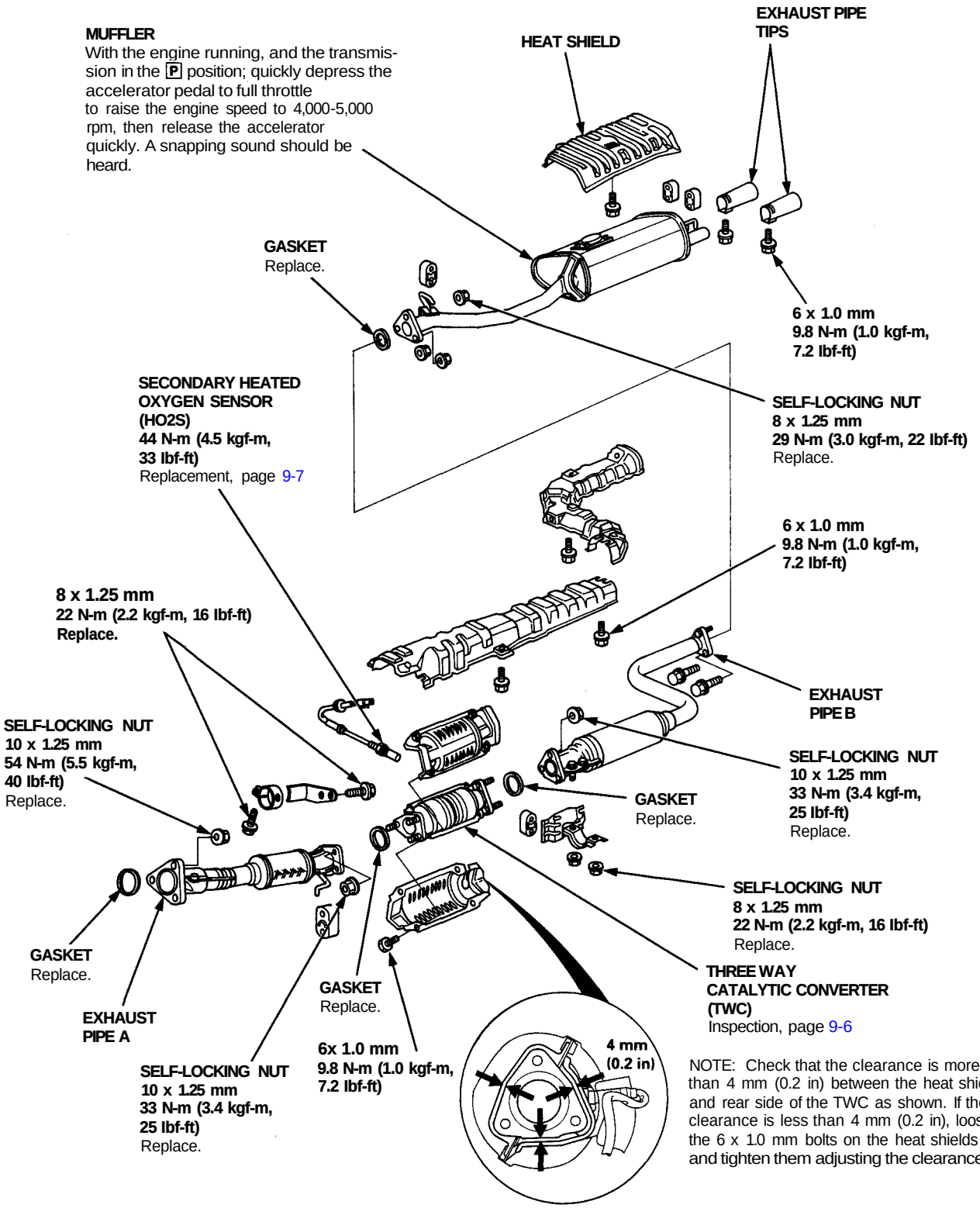


Exhaust Pipe and Muffler

Replacement

CAUTION: Do not let the secondary HO2S wire harness connect the heat shields. If the secondary HO2S wire harness connects the heat shield, keep the wire harness away from the heat shield by moving the wire harness clamp.

NOTE: Use new gaskets and self-locking nuts when reassembling.



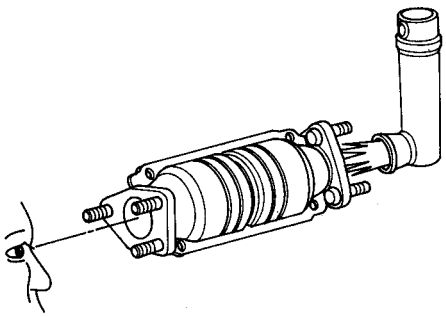
NOTE: Check that the clearance is more than 4 mm (0.2 in) between the heat shields and rear side of the TWC as shown. If the clearance is less than 4 mm (0.2 in), loosen the 6 x 1.0 mm bolts on the heat shields and tighten them adjusting the clearance.

TWC/WU-TWC

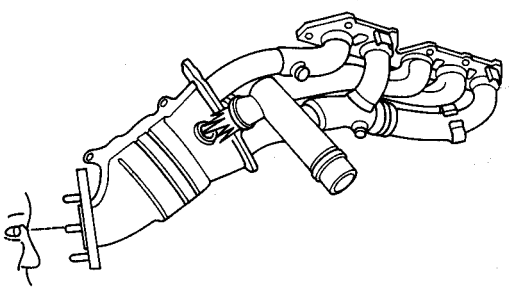
Inspection

1. Using a flashlight, make a visual check for plugging, melting or cracking of the catalyst.

TWC:



WU-TWC:

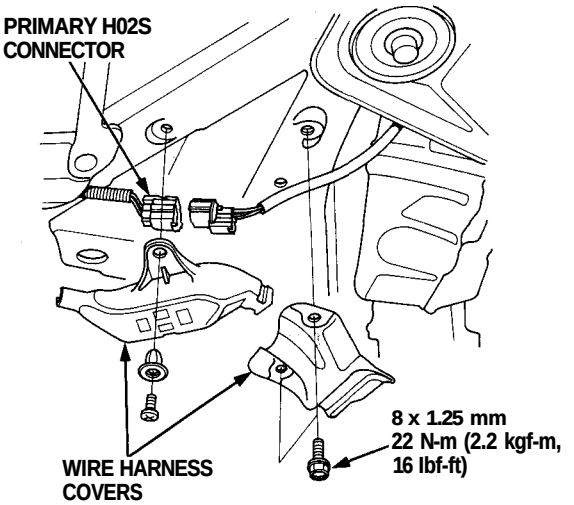


HO2S

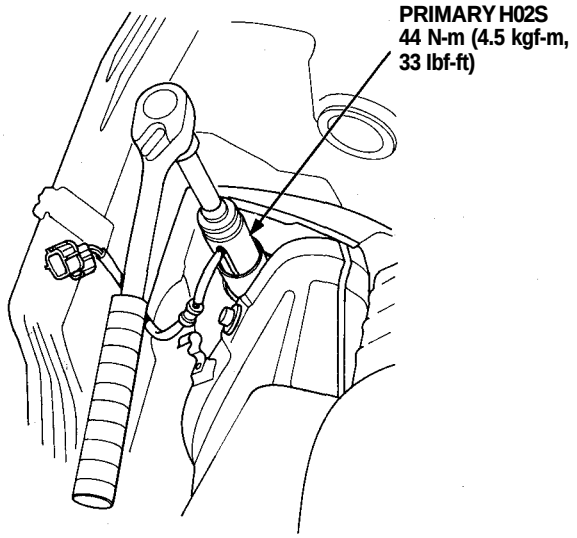
Replacement

Primary HO2S:

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Remove the battery, then remove the heat shields (see page 5-3).
4. Remove the wire harness covers, then disconnect the primary H02S connector.



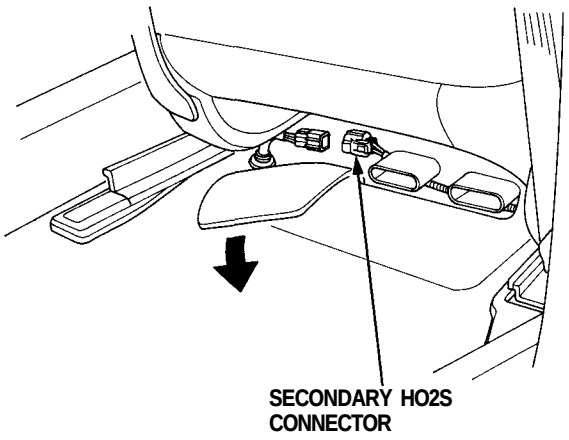
5. Remove the primary HO2S.



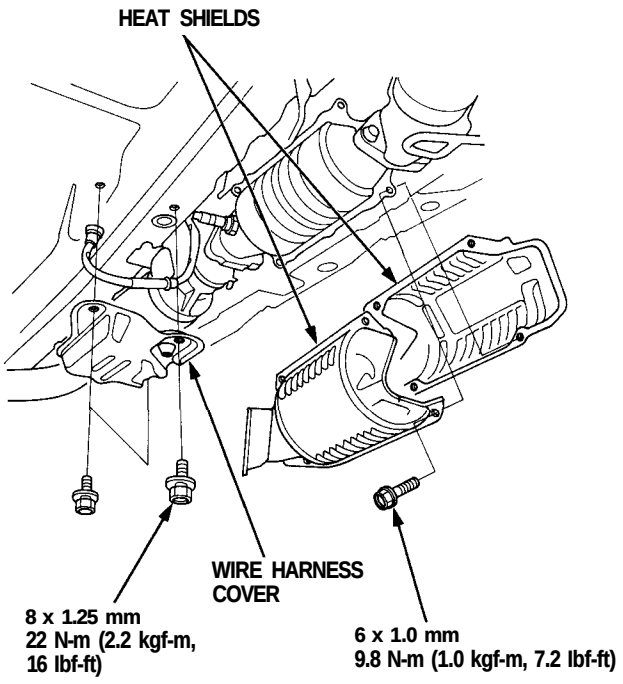
6. Install the primary HO2S in reverse order of removal.
7. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Secondary H02S:

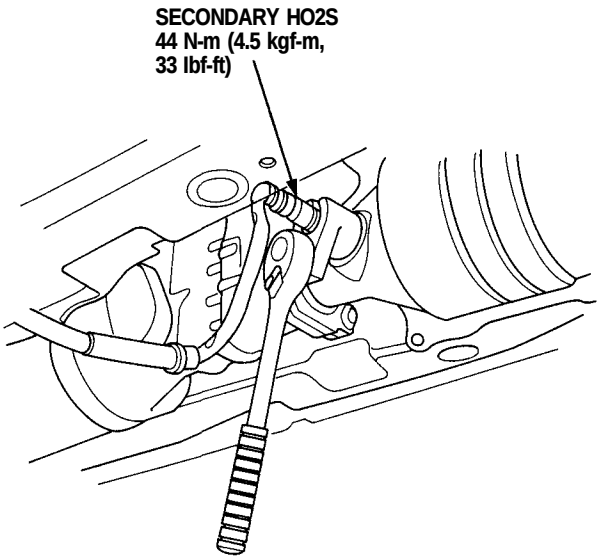
1. Move the front passenger's seat forward. Pull the carpet back to expose the secondary H02S connector.
2. Disconnect the secondary HO2S connector.



3. Remove the wire harness cover and heat shields.



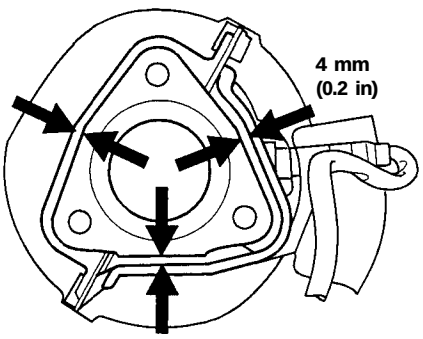
4. Remove the secondary H02S.



5. Install the secondary H02S in reverse order of removal.
   - Be sure to follow the instructions below when installing the secondary HO2S.

CAUTION: Do not let the secondary HO2S wire harness contact the heat shields. If the secondary HO2S wire harness contacts the heat shield, keep the wire harness away from the heat shield by moving the wire harness clamp.

NOTE: Check that the clearance is more than 4 mm (0.2 in) between the heat shields and rear side of the TWC as shown. If the clearance is less than 4 mm (0.2 in), loosen the 6 x 1.0 mm bolts on the heat shields and tighten them adjusting the clearance.



Radiator

Illustrated Index

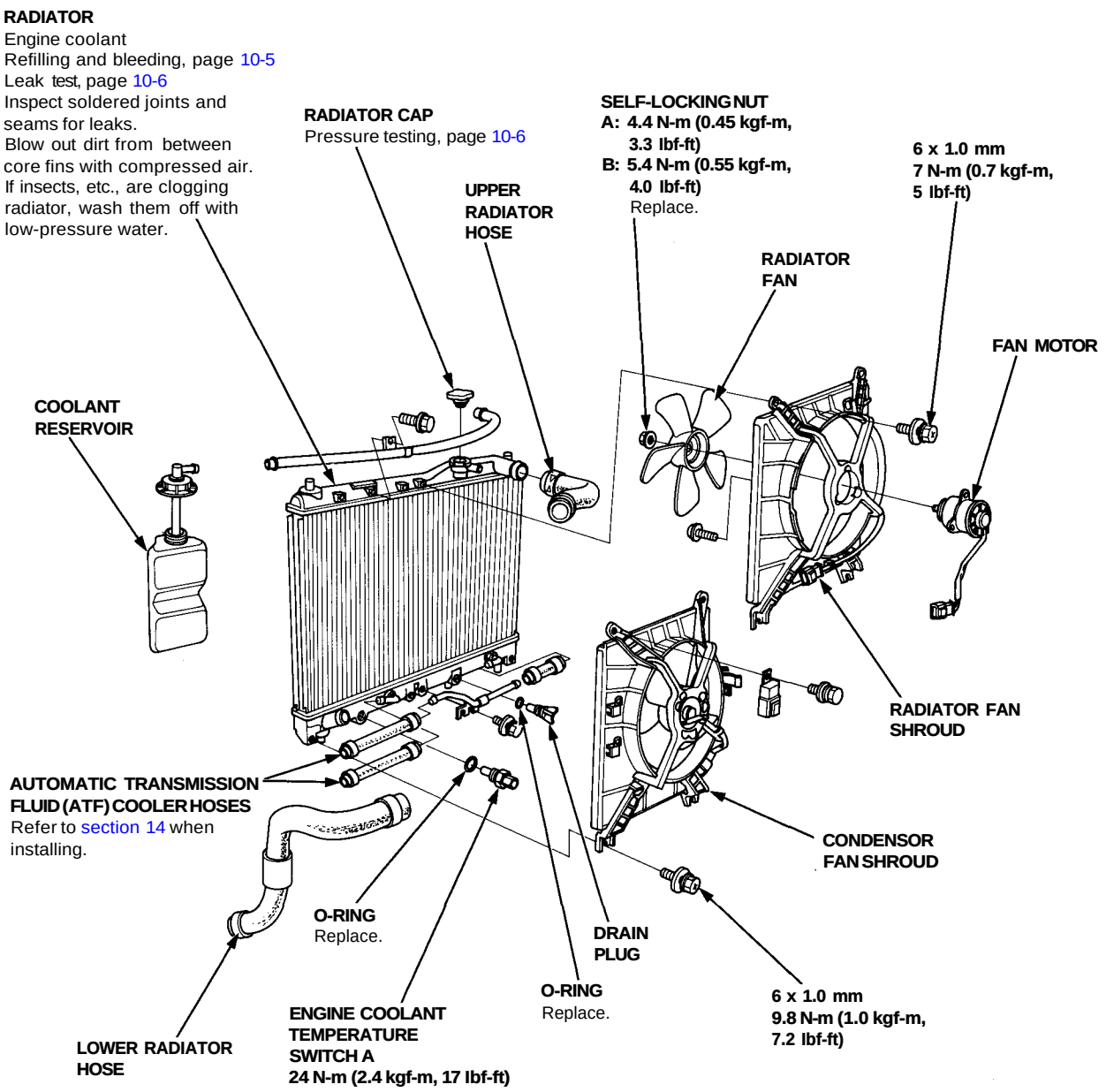
⚠ WARNING **System is under high pressure when the engine is hot. To avoid danger of releasing scalding coolant, remove cap only when the engine is cool.**

Total Cooling System Capacity (Including heater and reservoir)

7.0 ℓ (7.4 US qt, 6.2 Imp qt)
Reservoir capacity: 0.7 ℓ (0.7 US qt, 0.6 Imp qt)

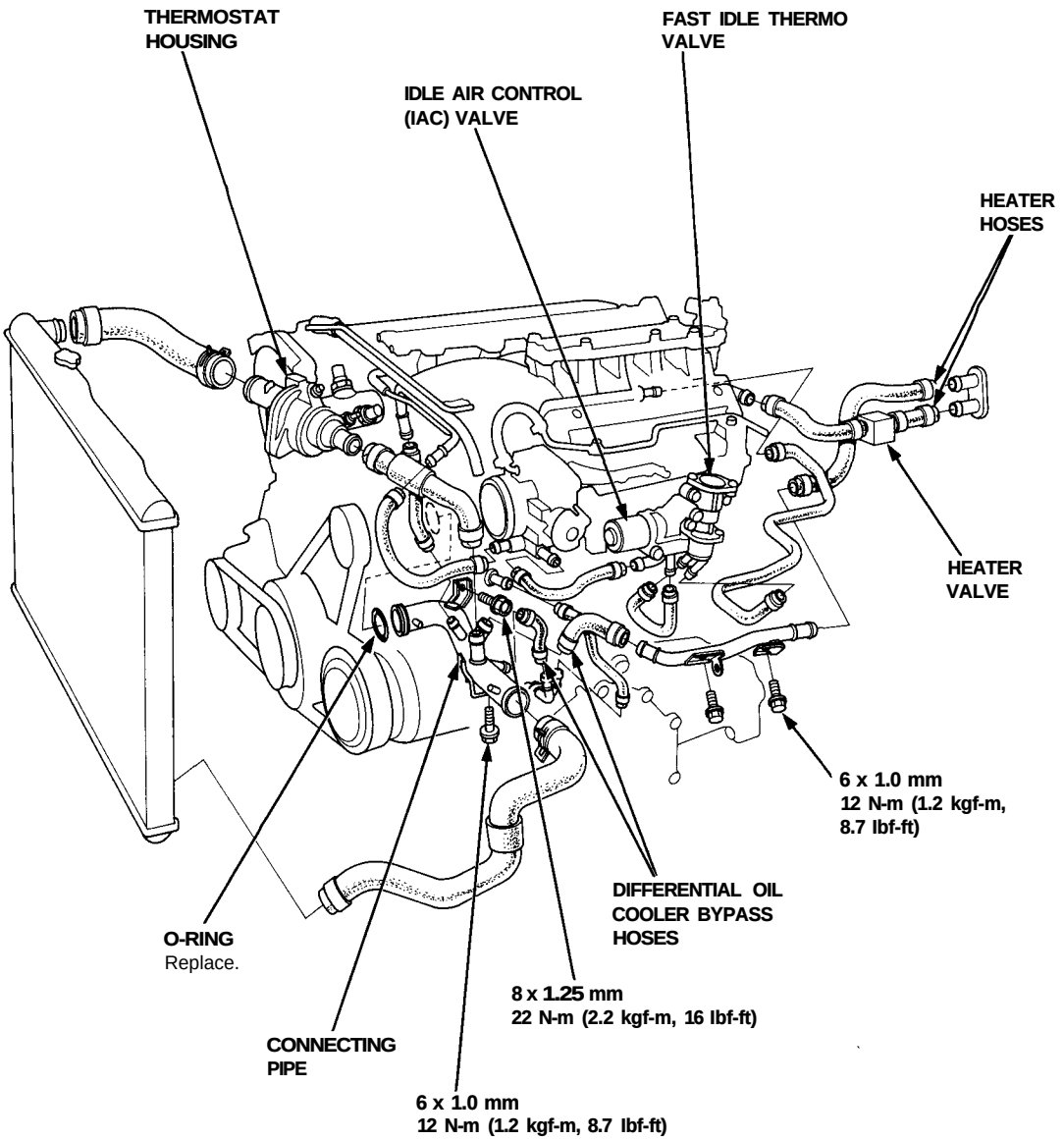
CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to spill coolant on the electrical parts or the painted portion. If any coolant spills, rinse it off immediately.

NOTE:
- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.



A: SHOWA ALUMINUM manufactured radiator.
B: DENSO manufactured radiator.

Engine Hose Connections:



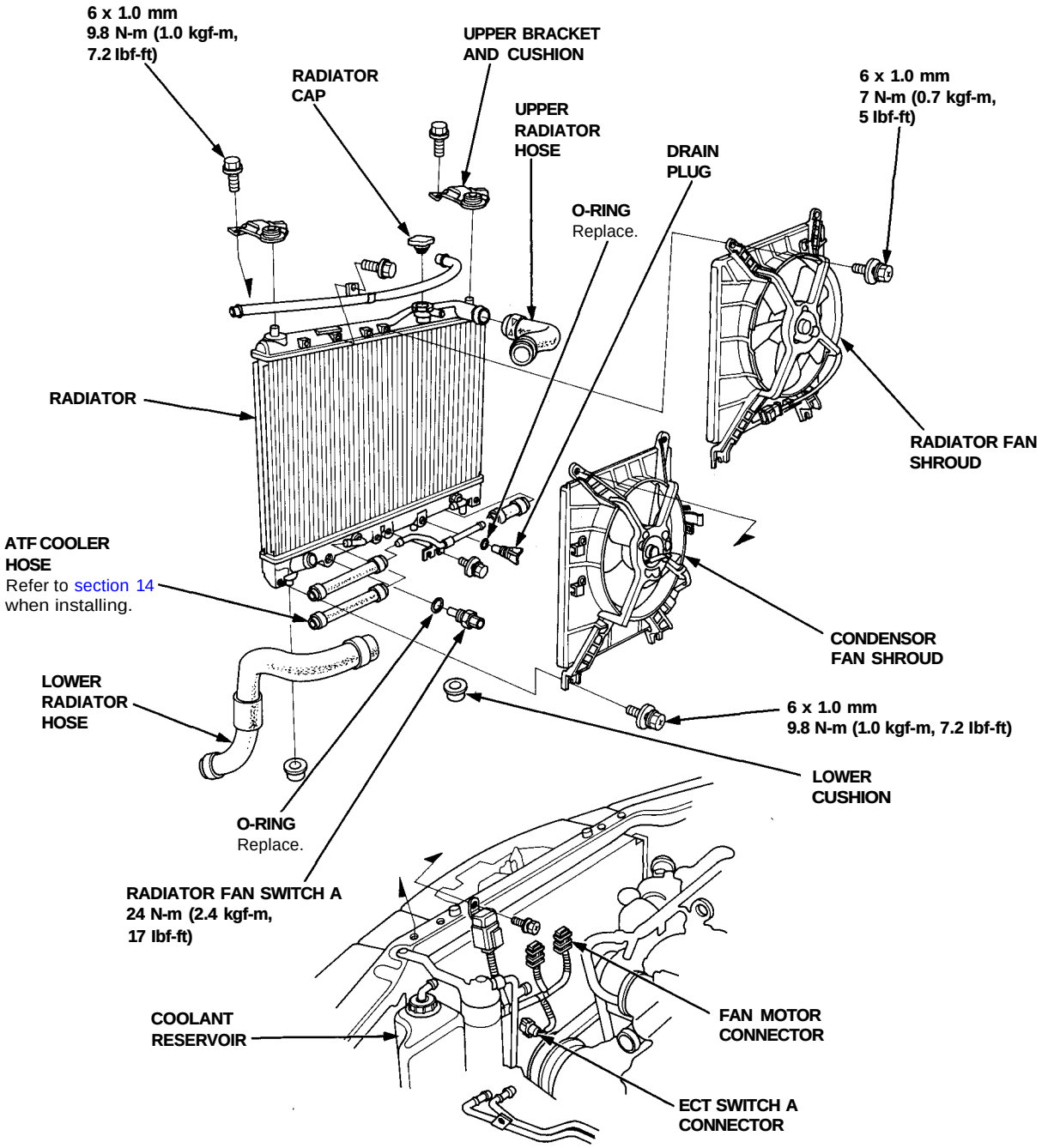
Radiator

Replacement

1. Drain engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connectors and ECT switch A connector.
4. Remove the radiator upper brackets, then pull up the radiator.
5. Remove the fan shroud assemblies and other parts from the radiator.

Install the radiator in the reverse order of removal:

NOTE:
- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.

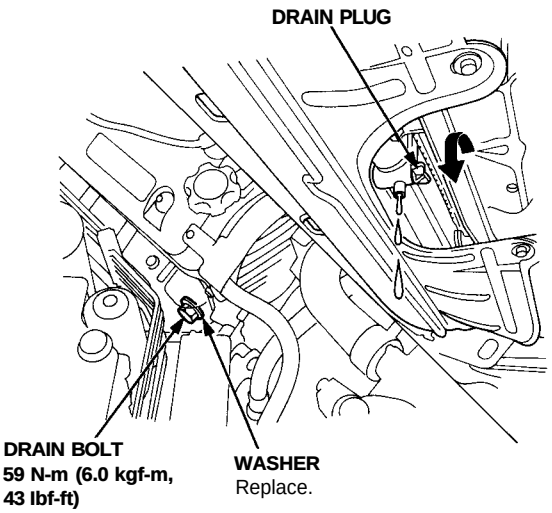


Engine Coolant Refilling and Bleeding

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

NOTE:
- Perform this procedure when the engine is cool.
- Before replacing the coolant, turn the ignition ON (II), slowly turn the climate control temperature knob to 90° and turn off the ignition. This will allow the coolant in the heater to drain out with the rest of the system.

1. When the radiator is cool, remove the radiator cap. Loosen the drain plug, and drain the coolant.
2. Remove the drain bolt from the right side of the cylinder block to drain the block.



3. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
4. Tighten the radiator drain plug securely.
5. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.
6. Mix the recommended antifreeze with an equal amount of water in a clean container.

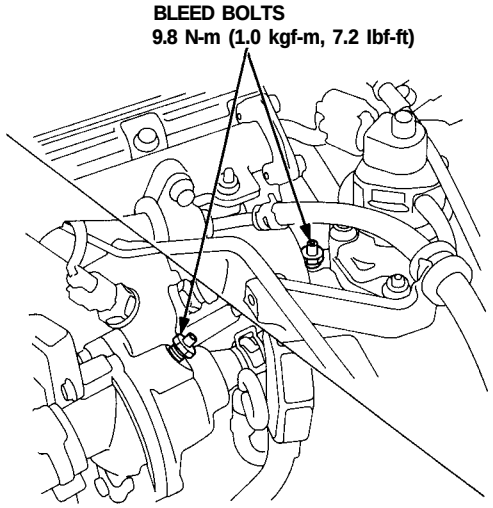
NOTE:
- Use only genuine Honda antifreeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

CAUTION:
- **Do not mix different brands of antifreeze/coolants.**
- **Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the coolant.**

Engine Coolant Refill Capacity [including reservoir (0.7 ℓ (0.7 US qt, 0.6 Imp qt))]:

5.2 ℓ (5.5 US qt, 4.6 Imp qt)

7. Loosen the air bleed bolts in the thermostat housing and intake manifold, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolts as soon as coolant starts to run out in a steady stream without bubbles.



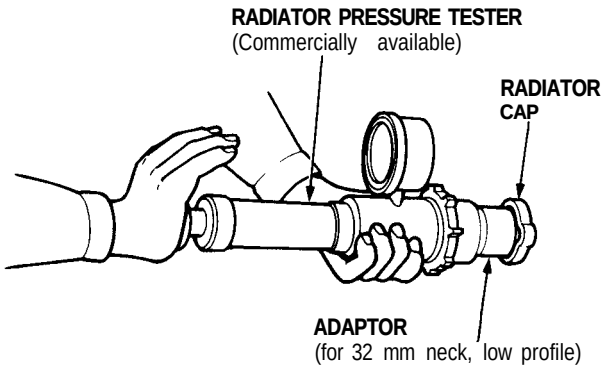
8. With the radiator cap off, start the engine and let it run until warmed up (radiator fan comes on at least twice). Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.

9. Put the radiator cap on tightly, then run the engine again and check for leaks.

Radiator

Cap Testing

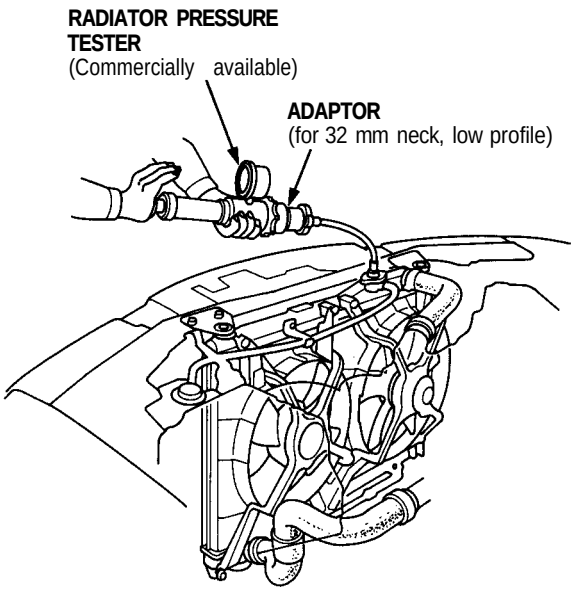
1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93 - 123 kPa (0.95 - 1.25 kgf/cm^2, 14-18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



Testing

1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 93-123 kPa (0.95 - 1.25 kgf/cm^2, 14 - 18 psi).
3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the radiator cap.

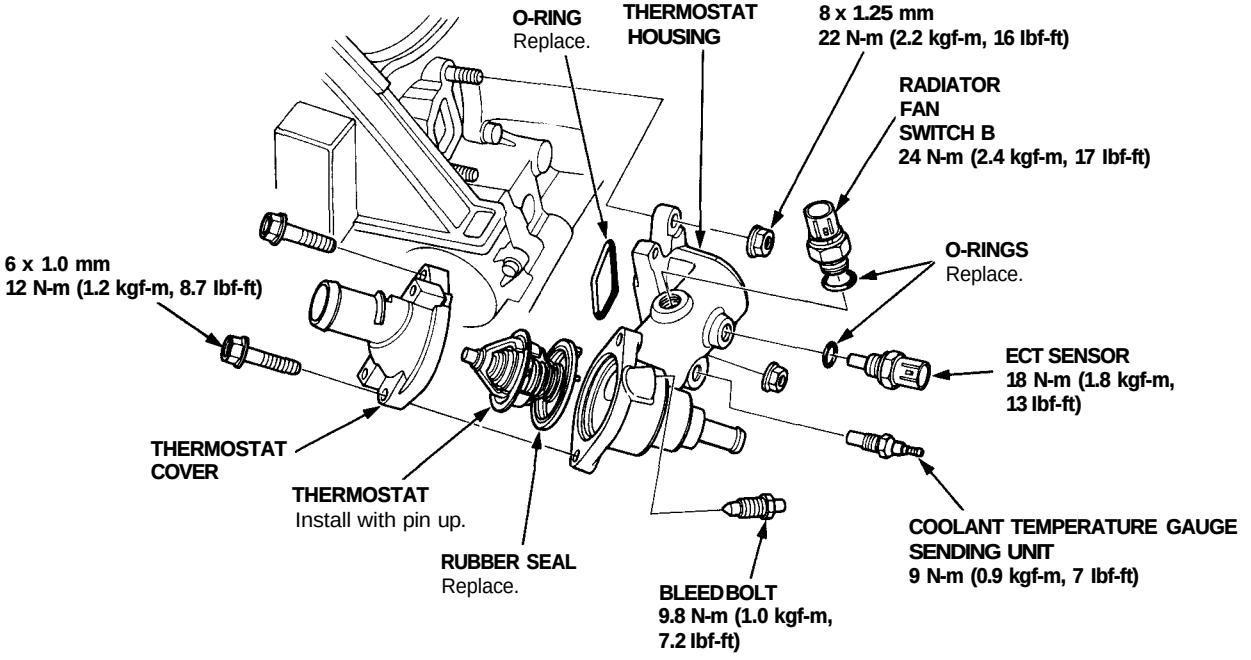
NOTE: Check for engine oil in the coolant and/or coolant in the engine oil.



Thermostat

Replacement

NOTE: Use new O-rings when reassembling.



Thermostat

Testing

Replace the thermostat if it is open at room temperature.

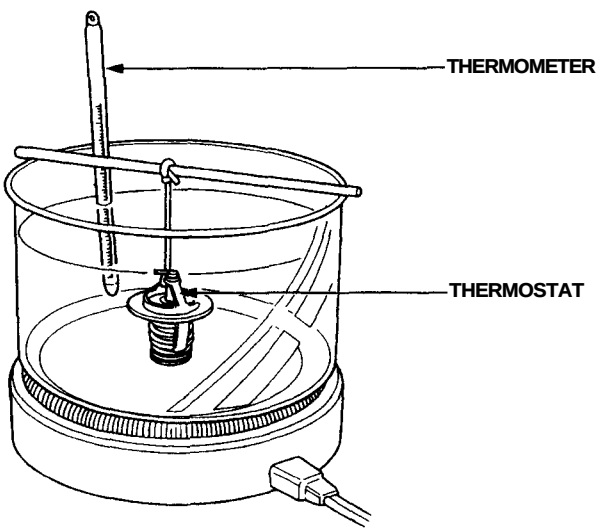
To test a closed thermostat:

1. Suspend the thermostat in a container of water as shown.
2. Heat the water, and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.

   CAUTION: Do not let the thermometer touch the bottom of the hot container.

3. Measure lift height of the thermostat when fully open.

STANDARD THERMOSTAT
Lift height:
Primary valve: 10.0 mm (0.39 in) min.
Secondary valve: 8.5 mm (0.33 in) min.
Starts opening:
Primary valve: 176-183°F (80-84°C)
Secondary valve: 181 - 189°F (83 - 87°C)
Fully open: 203°F (95°C)



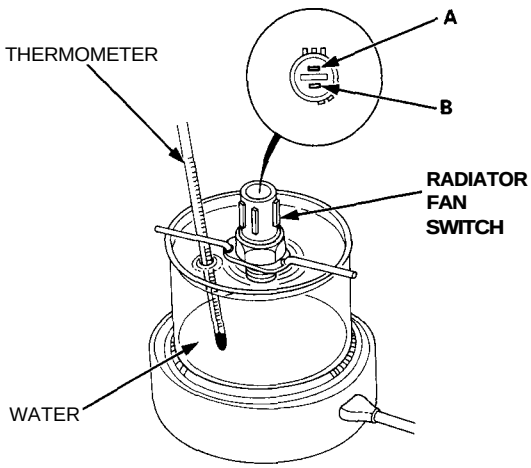
Radiator Fan Switches

Testing

⚠ WARNING Removing the radiator fan switch while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the switch.

NOTE: Bleed air from the cooling system after installing the radiator fan switch (see page 10-5).

1. Remove the radiator fan switch A from the radiator (see page 10-2) and radiator fan switch B from the thermostat housing (see page 10-9).
2. Suspend the switch in a container of water as shown.



3. Heat the water and check the temperature with a thermometer.

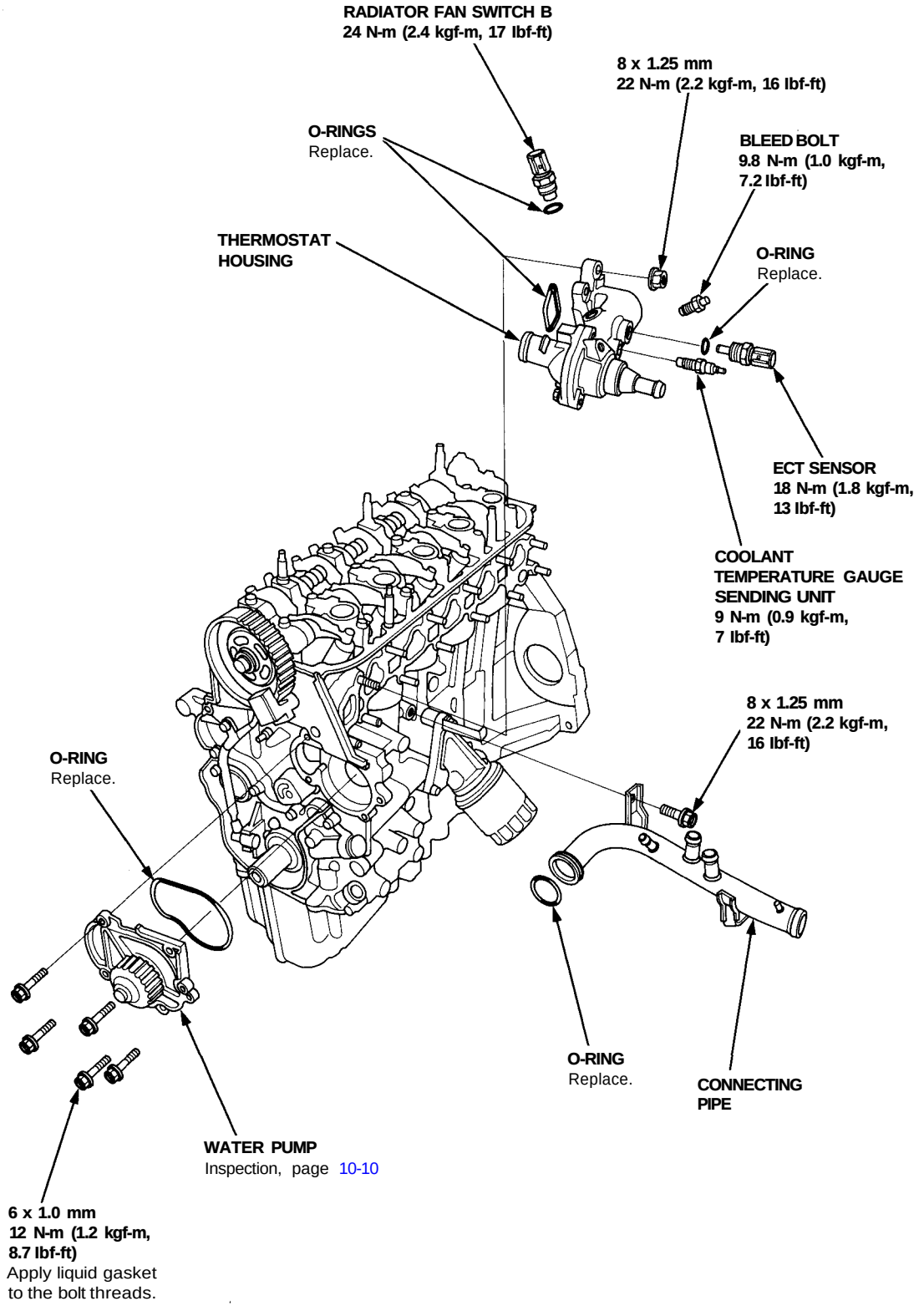
   CAUTION: Do not let the thermometer touch the bottom of the hot container.

4. Measure the resistance between the A and B terminals according to the table.

Operation		Temperature	Terminal A	Terminal B
SWITCH A	ON	196 – 203°F (91 – 95°C)	○——	——○
	OFF	5 – 15°F (3 – 8°C) lower than the temperature when it goes on		
SWITCH B	ON	201 – 212°F (94 – 100°C)	○——	——○
	OFF	7 – 16°F (4 – 9°C) lower than the temperature when it goes on		

Water Pump

Illustrated Index

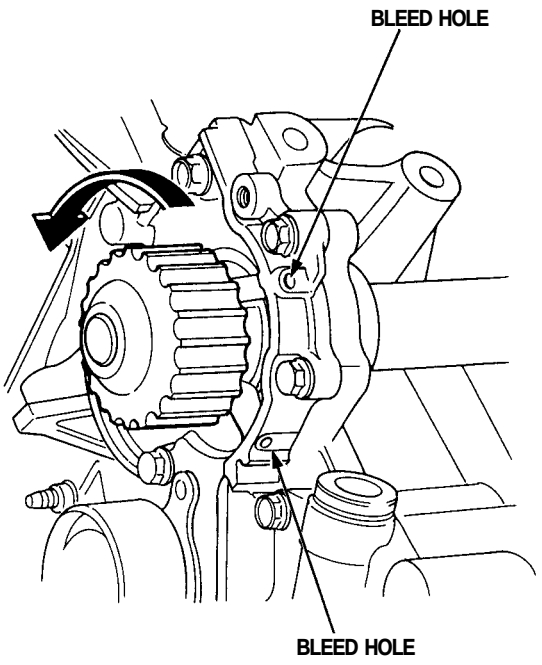


Water Pump

Inspection

1. Remove the timing belt (see page 6-10).
2. Turn the water pump pulley counterclockwise. Check that it turns freely.
3. Check for signs of seal leakage.

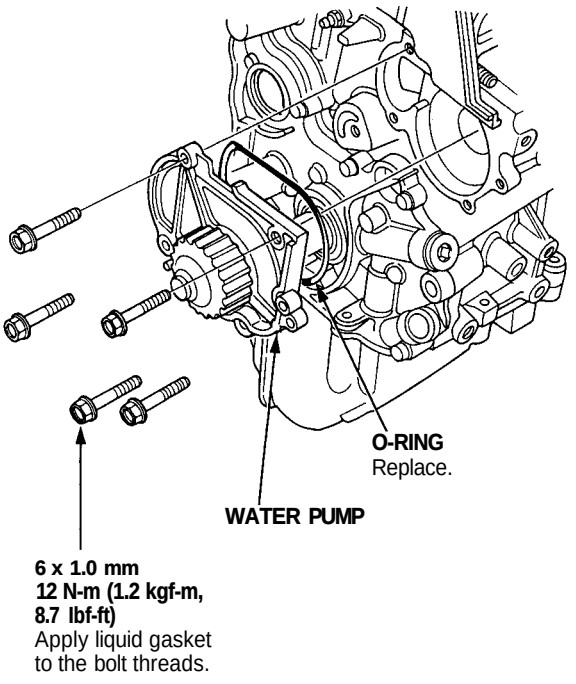
   NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see page 6-10).
2. Remove the water pump by removing five bolts.

   NOTE: Inspect, repair and clean the O-ring groove and mating surface with the cylinder block.

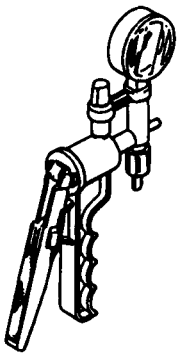


3. Install the water pump in the reverse order of removal.

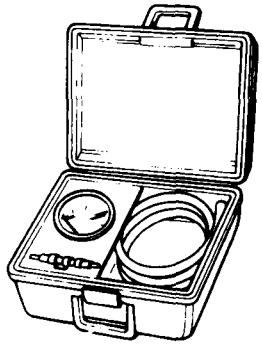
   NOTE:
   - Keep the O-ring in position when installing.
   - Clean the spilled engine coolant.

Special Tools

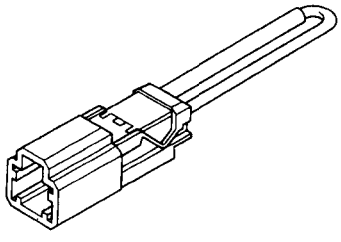
Ref. No.	Tool Number	Description	Qty	Page Reference
①	A973X - 041 - XXXXX	Vacuum Pump/Gauge, 0-30 in.Hg	1	11-138, 11-142, 11-149, 11-156, 11-157, 11-158, 11-159, 11-165, 11-171, 11-172
②	07JAZ-001000B	Vacuum/Pressure Gauge 0-4 in.Hg	1	11-171, 11-172
③	07PAZ-0010100	SCS Service Connector	1	11-32
④	07SAZ-001000A	Backprobe Set	2	11-34
⑤	07406 - 0040001	Fuel Pressure Gauge	1	11-125, 11-128



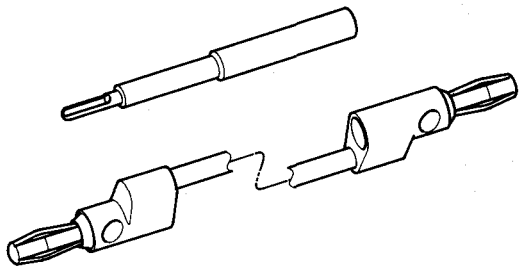
①



②



③



④

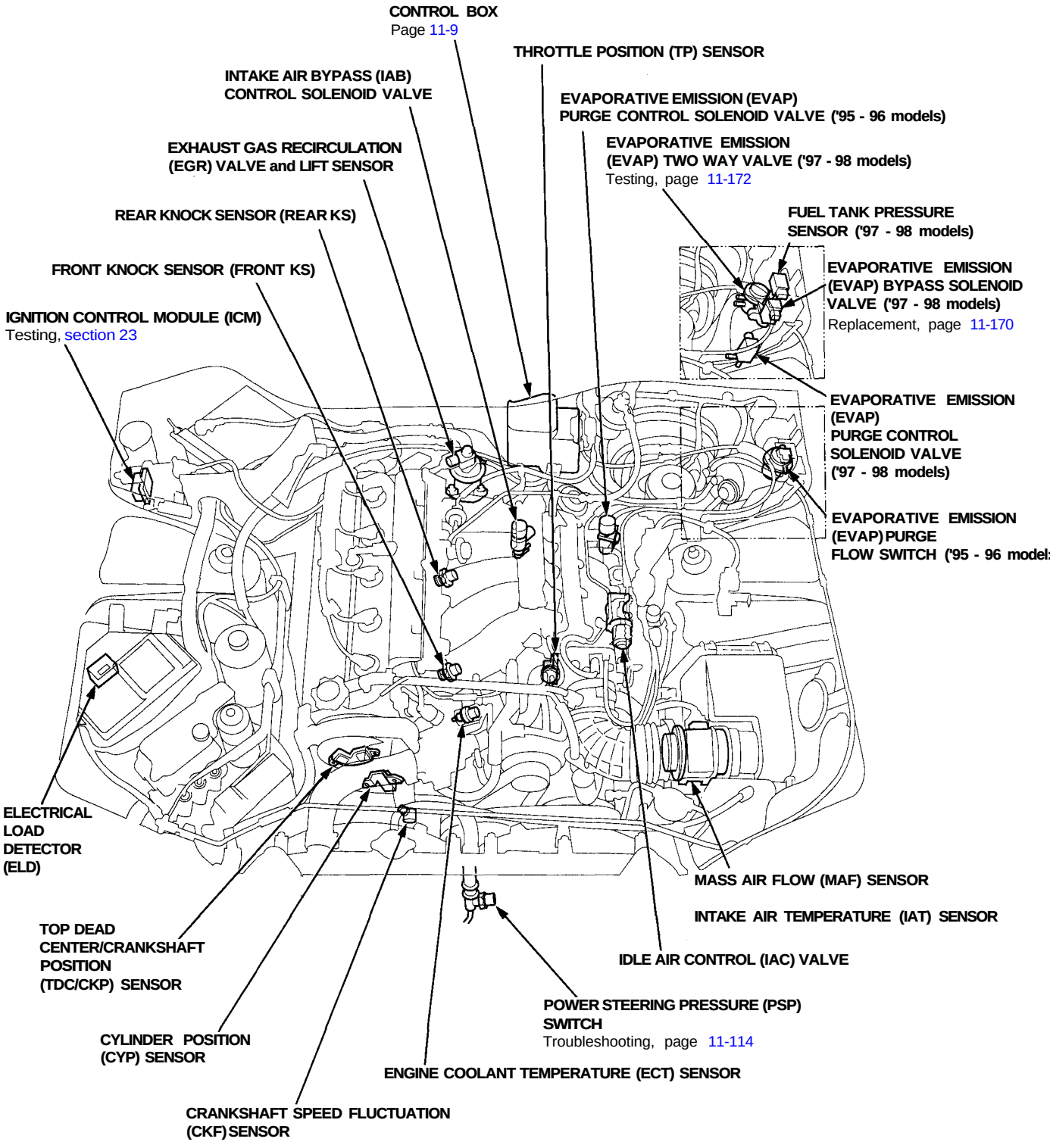


⑤

Component Locations

Index

For Troubleshooting of DTC related components, see chart on page 11-44.

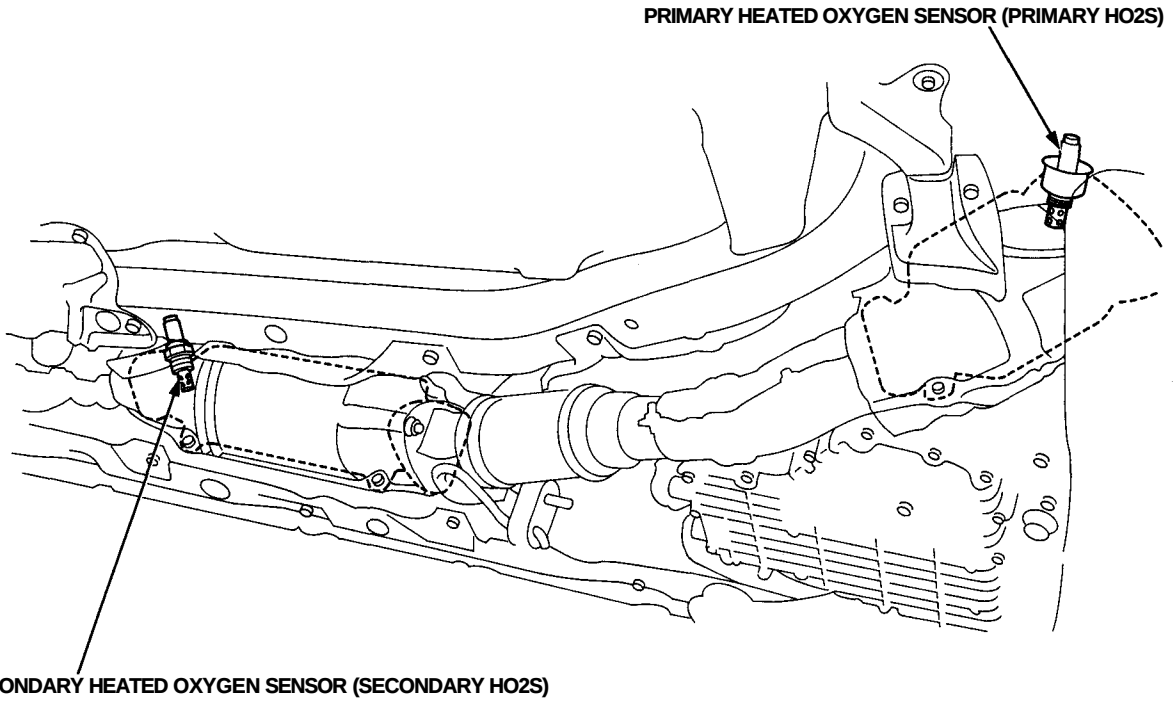


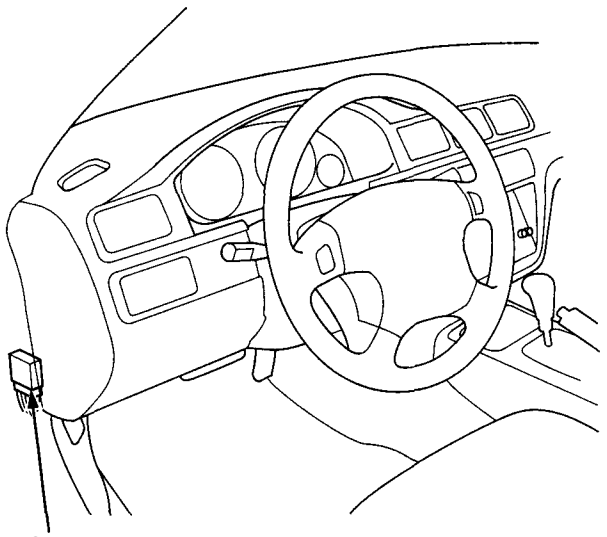
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Component Locations

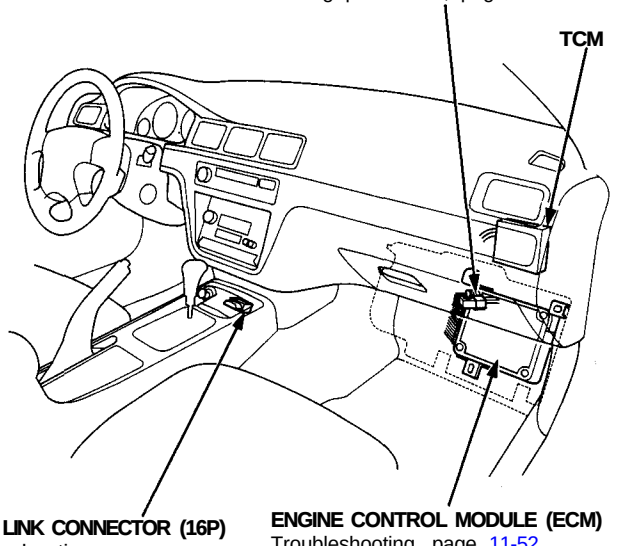
Index (cont'd)

For Troubleshooting of DTC related components, see chart on page 11-44.





PGM-FI MAIN RELAY
Relay Testing, page 11-131
Troubleshooting, page 11-132

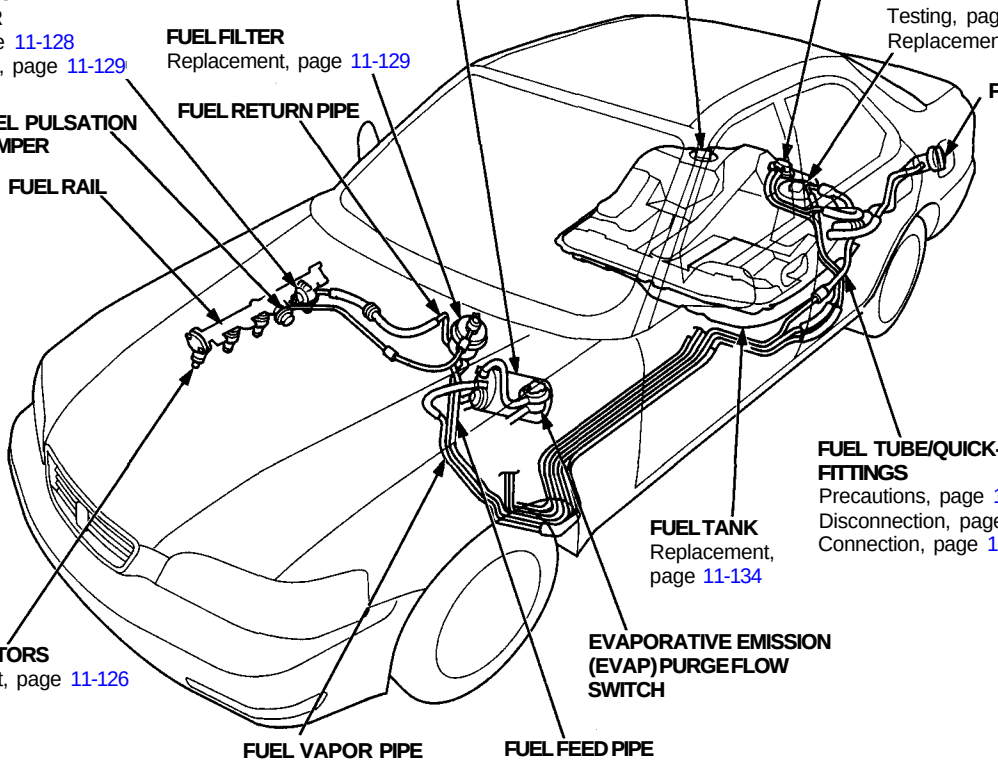


DATA LINK CONNECTOR (16P)
Troubleshooting procedures, page 11-32

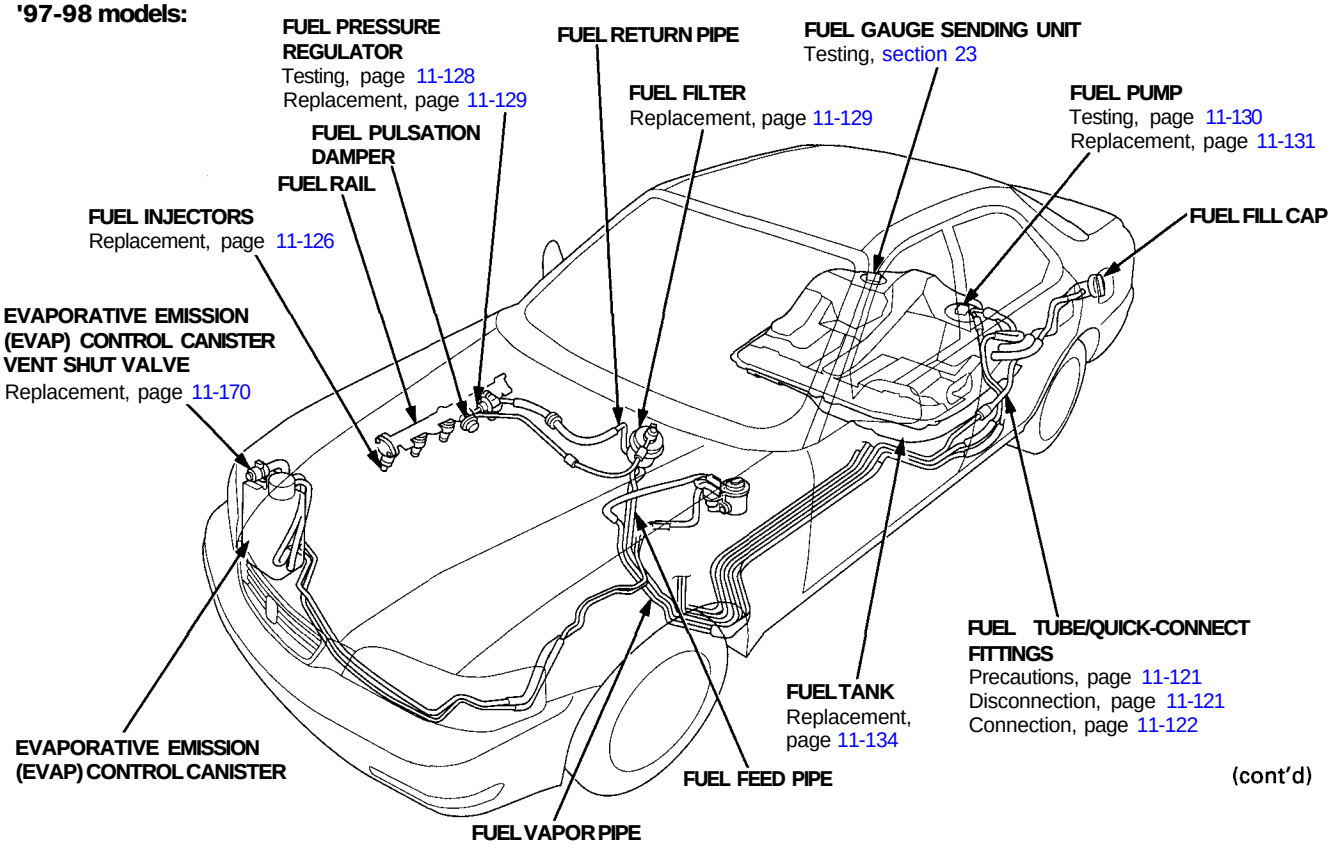
ENGINE CONTROL MODULE (ECM)
Troubleshooting, page 11-52

For Troubleshooting of DTC related components, see chart on page 11-44.

'95 - 96 models:



'97-98 models:

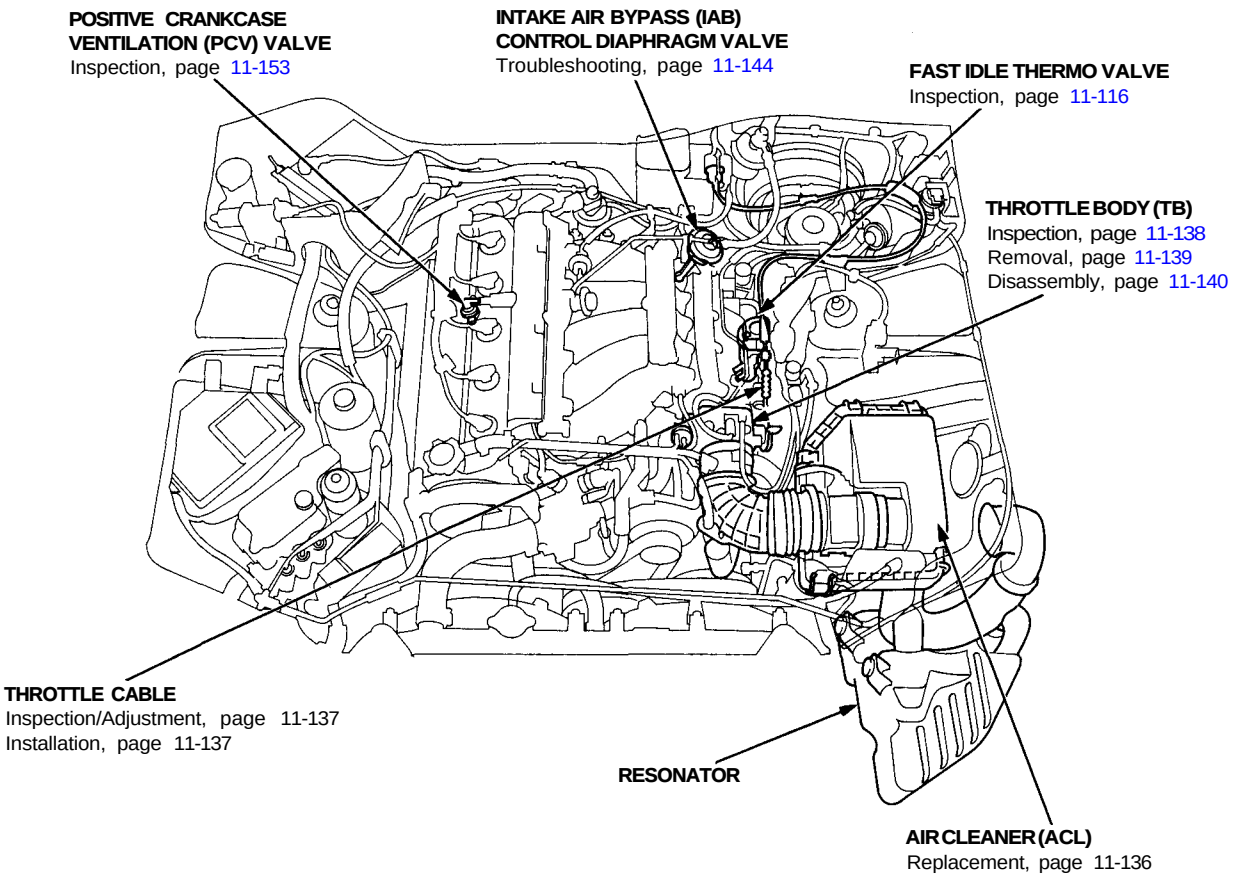


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Component Locations

Index (cont'd)

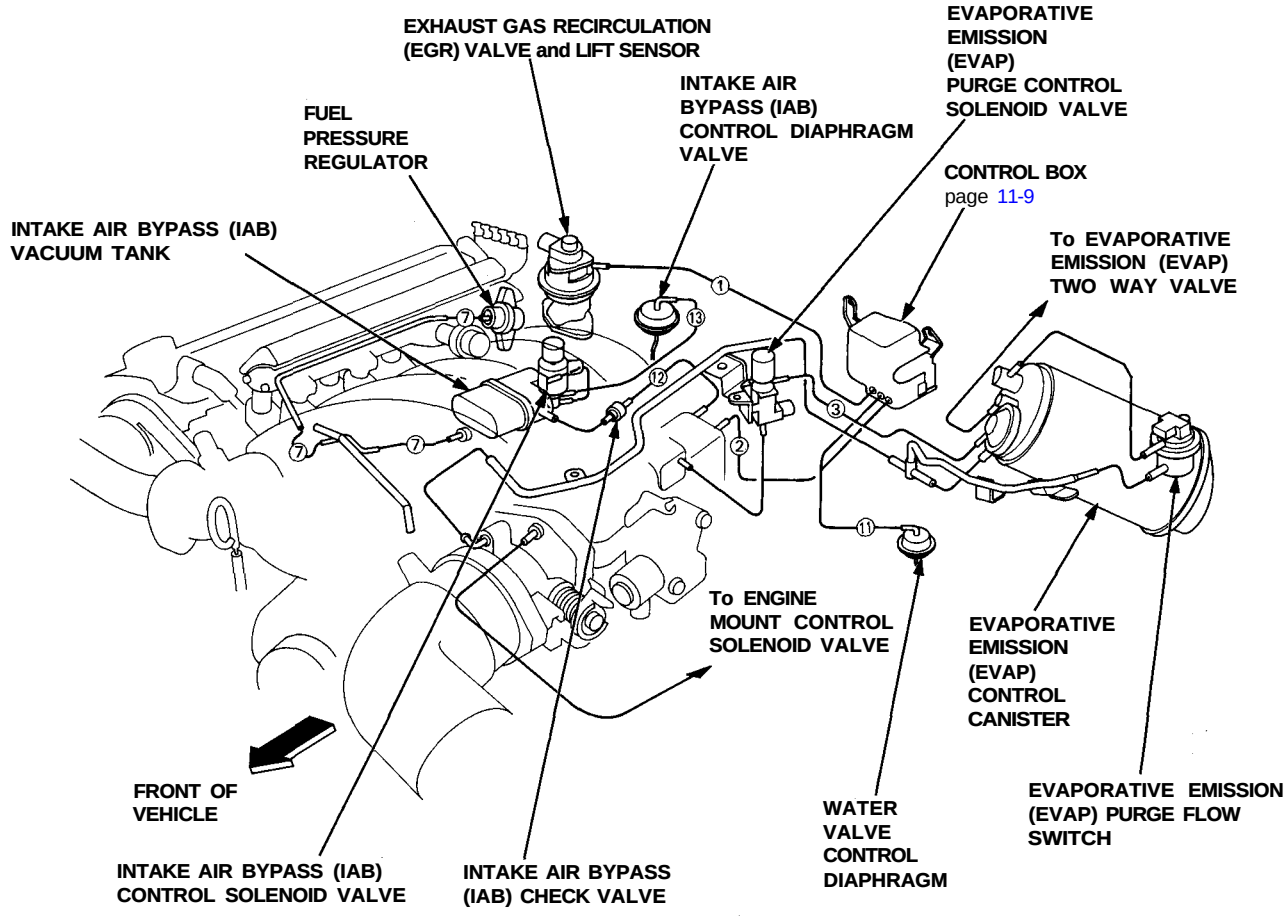
For Troubleshooting of DTC related components, see chart on page 11-44.



System Description

Vacuum Connections

'95 - 96 models:

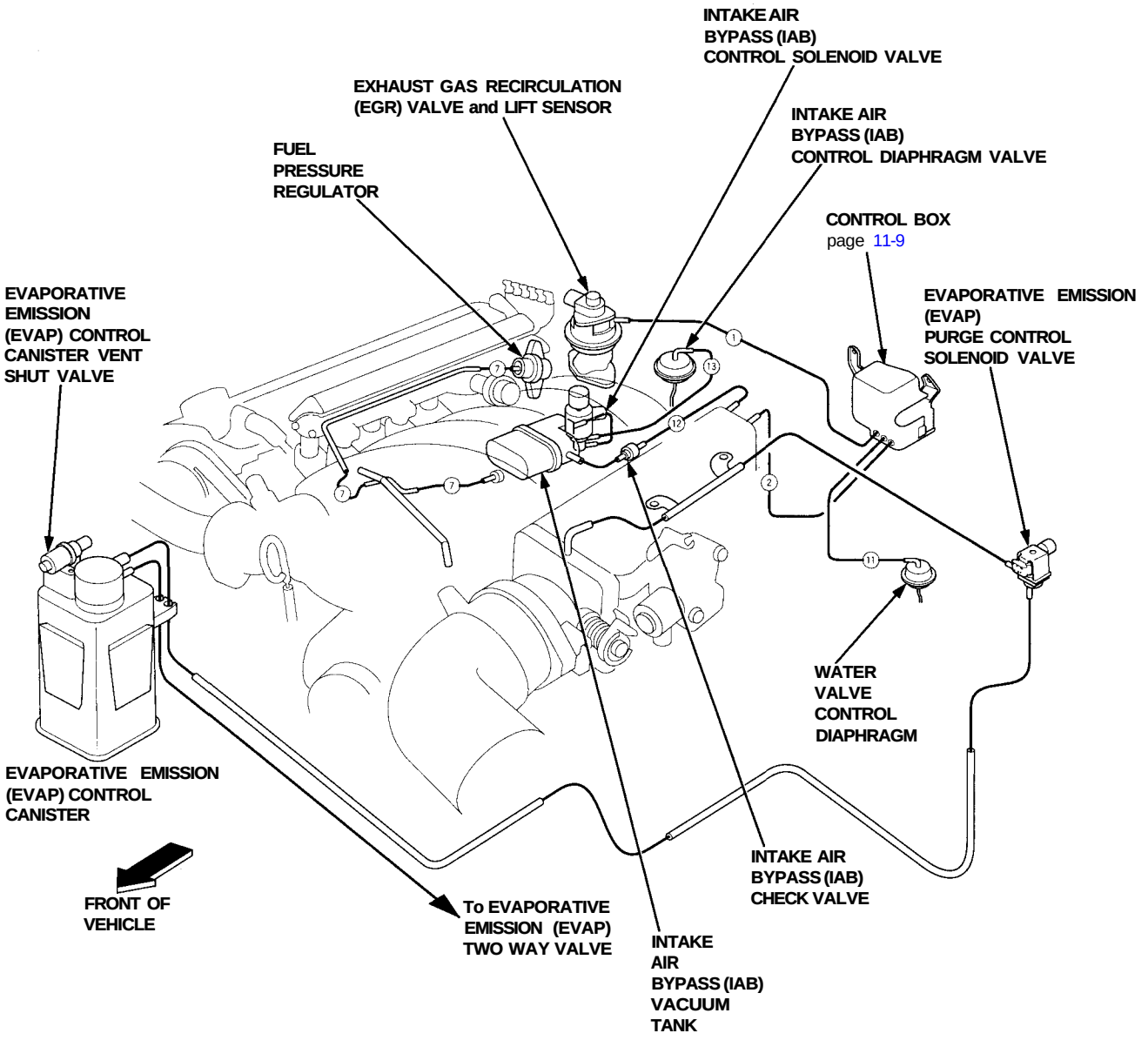


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System Description

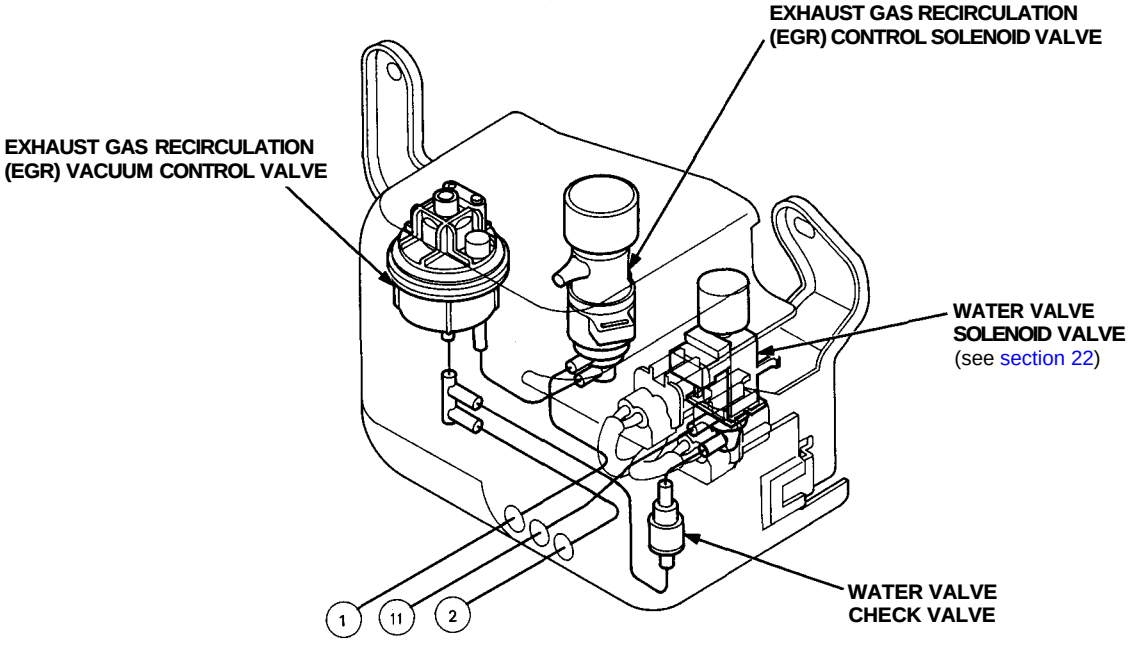
Vacuum Connections (cont'd)

'97 - 98 models:



CONTROL BOX

For Troubleshooting of DTC related components, see chart on page 11-44.

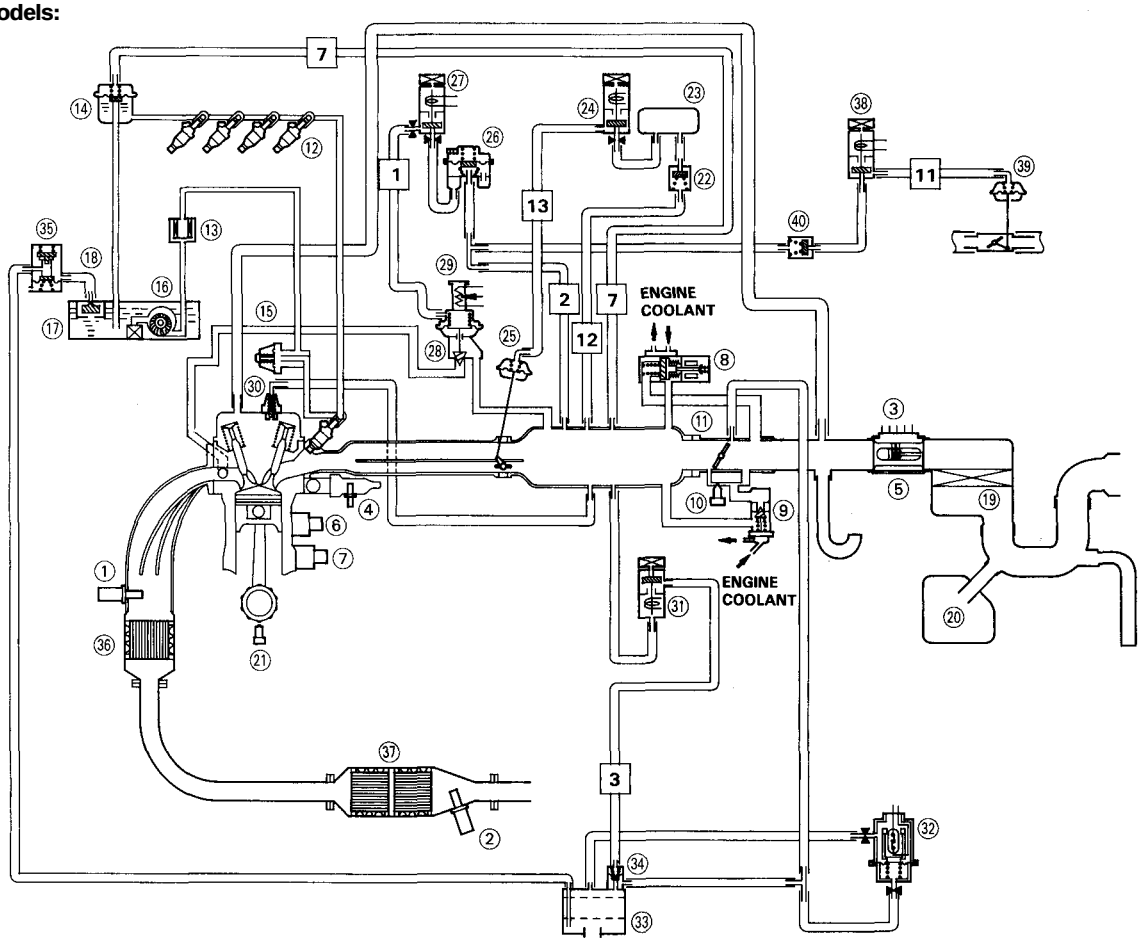


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System Description

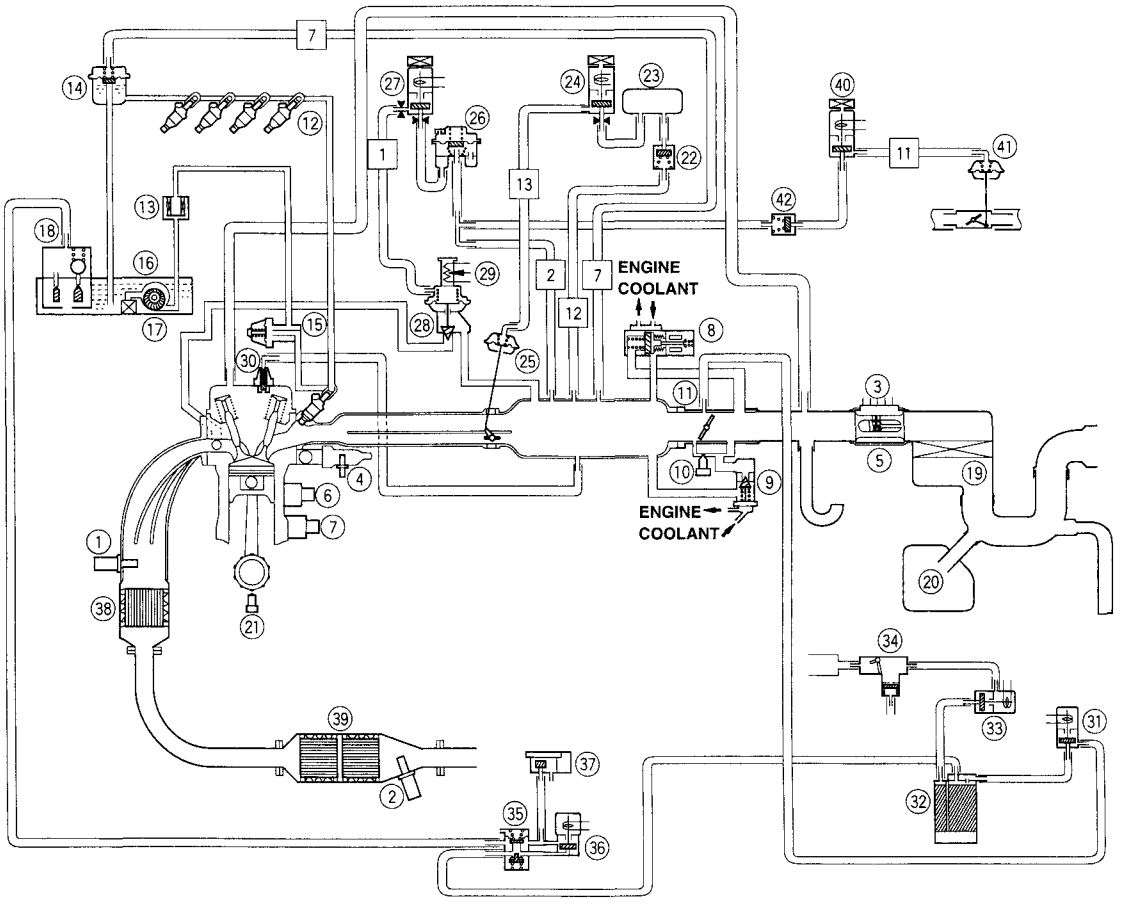
Vacuum Connections (cont'd)

'95 - 96 models:



① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO2S)
② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S)
③ MASS AIR FLOW (MAP) SENSOR
④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ FRONT KNOCK SENSOR (FKS)
⑦ REAR KNOCK SENSOR (RKS)
⑧ IDLE AIR CONTROL (IAC) VALVE
⑨ FAST IDLE THERMO VALVE
⑩ IDLE ADJUSTING SCREW
⑪ THROTTLE BODY (TB)
⑫ FUEL INJECTOR
⑬ FUEL FILTER
⑭ FUEL PRESSURE REGULATOR
⑮ FUEL PULSATION DAMPER
⑯ FUEL PUMP (FP)
⑰ FUEL TANK
⑱ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑲ AIR CLEANER
⑳ RESONATOR
㉑ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR
㉒ INTAKE AIR BYPASS (IAB) CHECK VALVE
㉓ INTAKE AIR BYPASS (IAB) VACUUM TANK
㉔ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE
㉕ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM
㉖ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉗ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉘ EXHAUST GAS RECIRCULATION (EGR) VALVE
㉙ EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR
㉚ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉛ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉜ EVAPORATIVE EMISSION (EVAP) PURGE FLOW SWITCH
㉝ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉞ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL DIAPHRAGM VALVE
㉟ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㊱ WARM UP THREE WAY CATALYTIC CONVERTER (WU TWC)
㊲ THREE WAY CATALYTIC CONVERTER (TWC)
㊳ WATER VALVE CONTROL SOLENOID VALVE
㊴ WATER VALVE CONTROL DIAPHRAGM
㊵ WATER VALVE CHECK VALVE

'97 - 98 models:

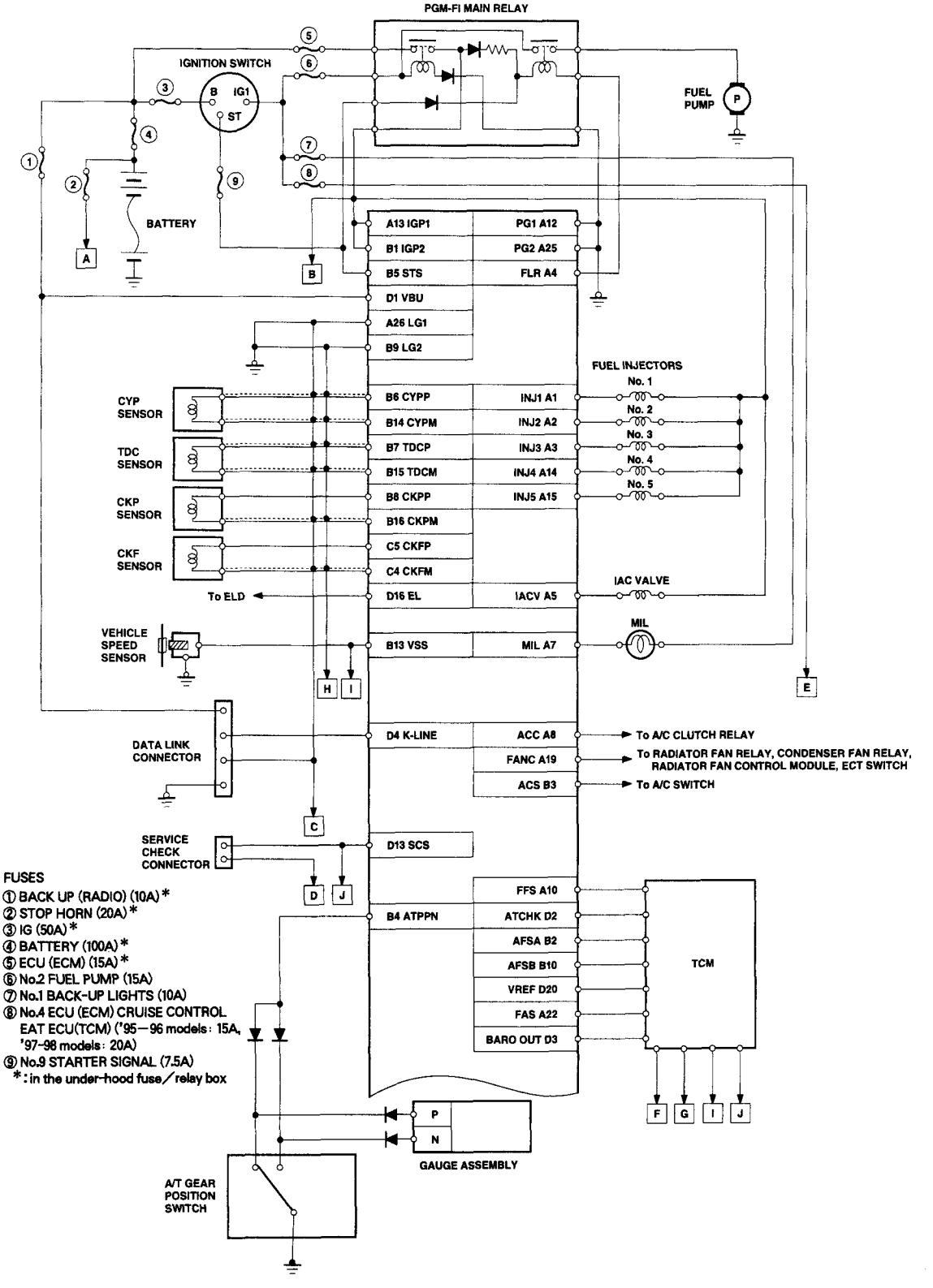


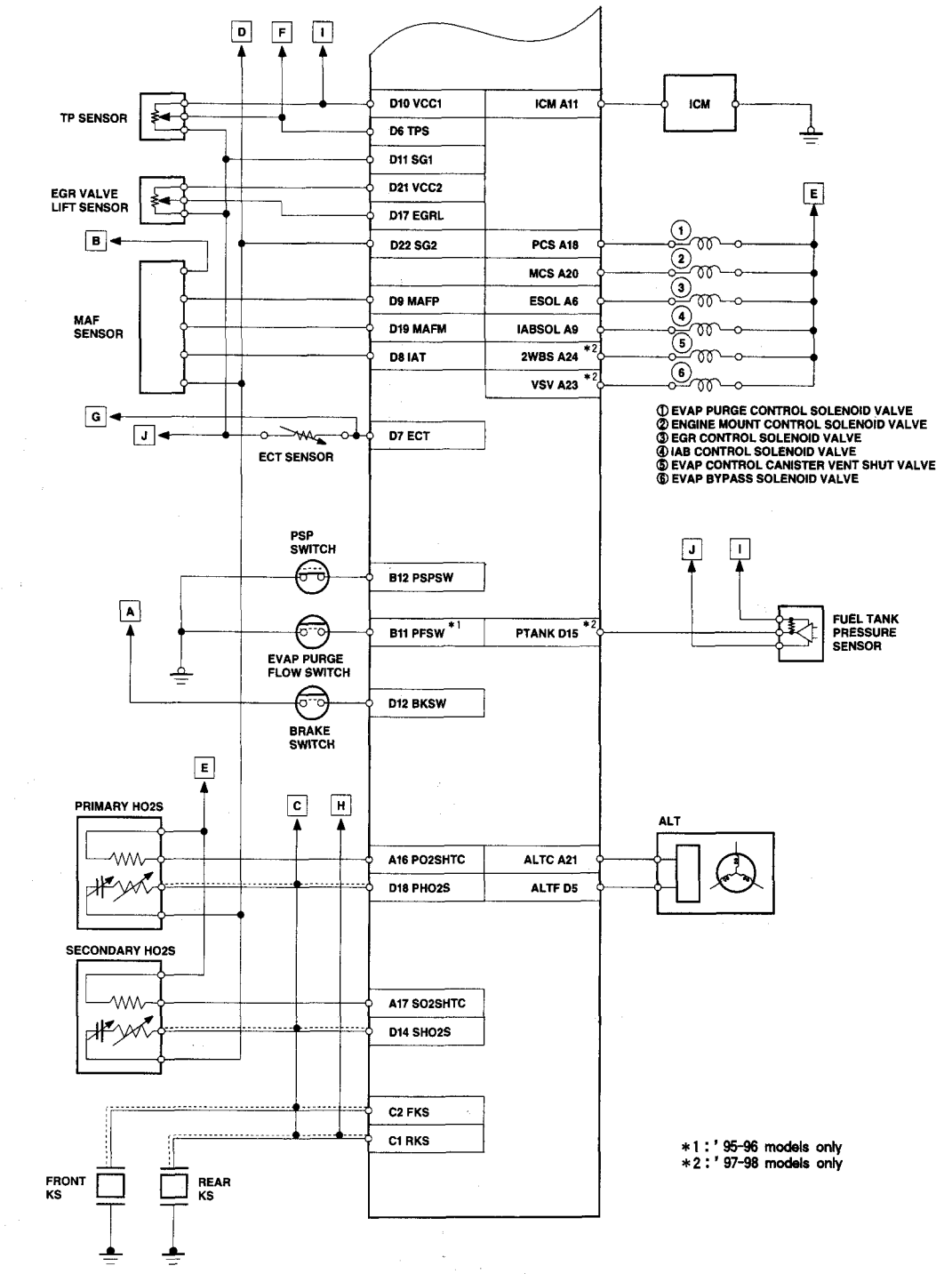
□: Vacuum hose No.

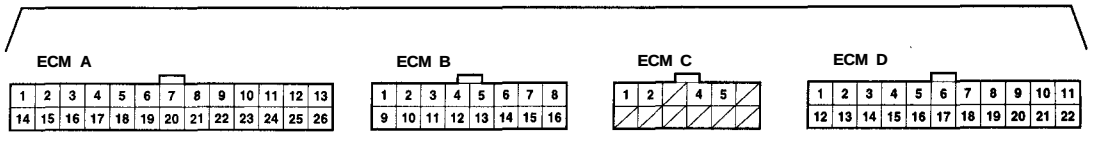
① PRIMARY HEATED OXYGEN SENSOR (PRIMARY HO2S)
② SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S)
③ MASS AIR FLOW (MAP) SENSOR
④ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
⑤ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑥ FRONT KNOCK SENSOR (FKS)
⑦ REAR KNOCK SENSOR (RKS)
⑧ IDLE AIR CONTROL (IAC) VALVE
⑨ FAST IDLE THERMO VALVE
⑩ IDLE ADJUSTING SCREW
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⑬ FUEL FILTER
⑭ FUEL PRESSURE REGULATOR
⑮ FUEL PULSATION DAMPER
⑯ FUEL PUMP (FP)
⑰ FUEL TANK
⑱ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑲ AIRCLEANER
⑳ RESONATOR
㉑ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR
㉒ INTAKE AIR BYPASS (IAB) CHECK VALVE
㉓ INTAKE AIR BYPASS (IAB) VACUUM TANK
㉔ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE
㉕ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM
㉖ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉗ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉘ EXHAUST GAS RECIRCULATION (EGR) VALVE
㉙ EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR
㉚ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉛ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉜ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉝ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER VENT SHUT VALVE
㉞ EVAPORATIVE EMISSION (EVAP) THREE WAY VALVE
㉟ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㊱ EVAPORATIVE EMISSION (EVAP) BYPASS SOLENOID VALVE
㊲ FUEL TANK PRESSURE SENSOR
㊳ WARM UP THREE WAY CATALYTIC CONVERTER (WU TWC)
㊴ THREE WAY CATALYTIC CONVERTER (TWC)
㊵ WATER VALVE CONTROL SOLENOID VALVE
㊶ WATER VALVE CONTROL DIAPHRAGM
㊷ WATER VALVE CHECK VALVE

System Description

Electrical Connections





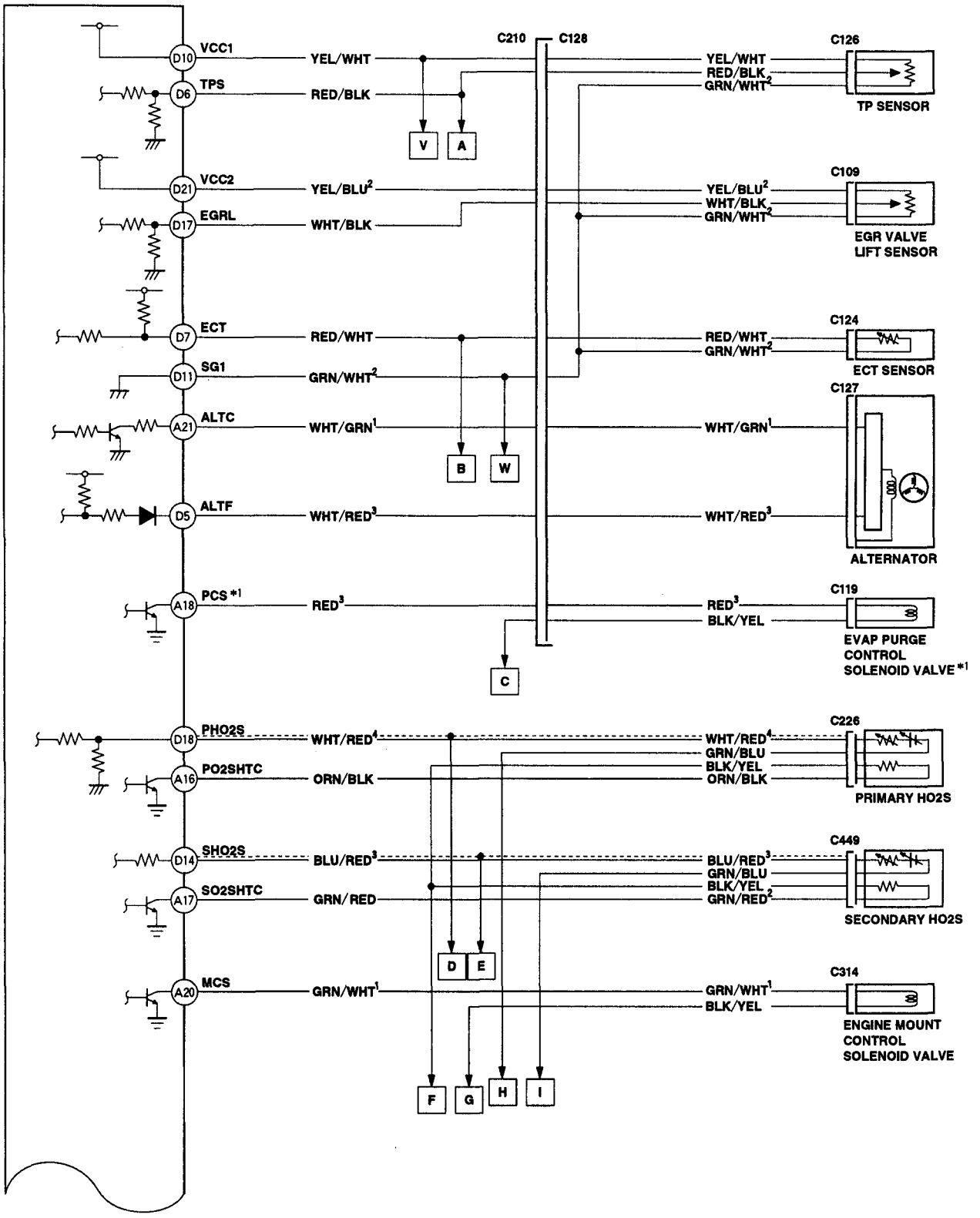


TERMINAL LOCATIONS

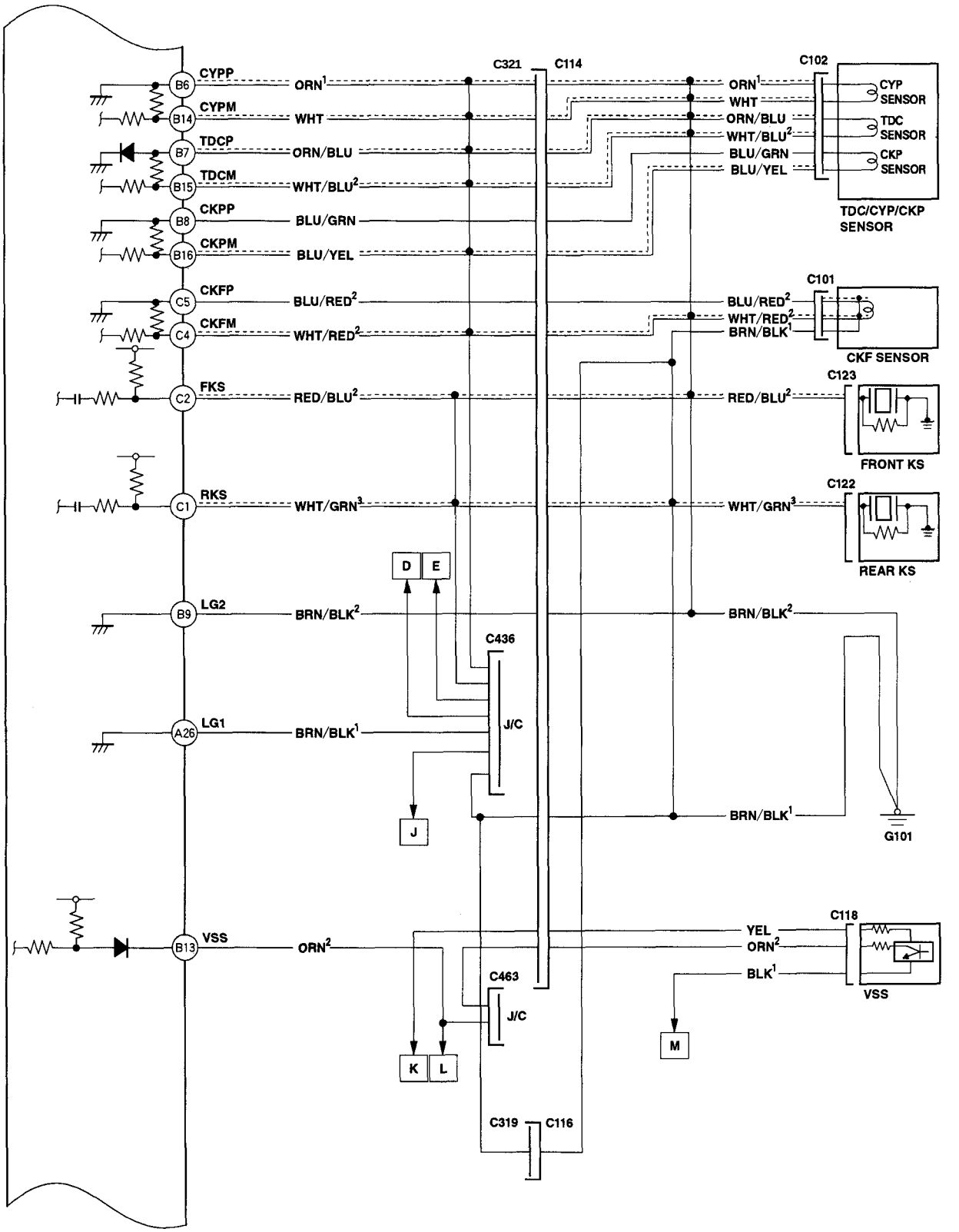
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System Description

Electrical Connections (cont'd)



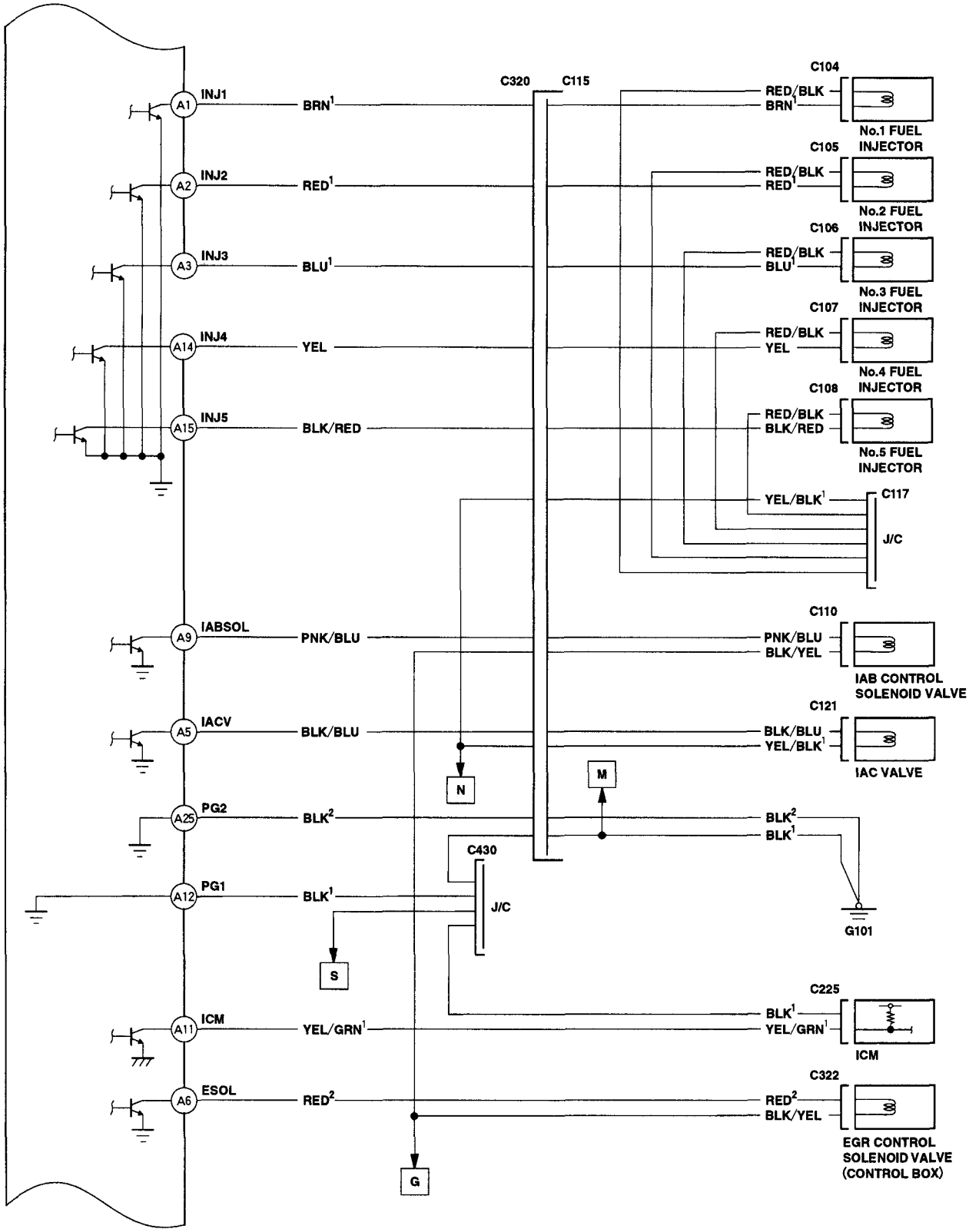
*1: '95-'96 models only

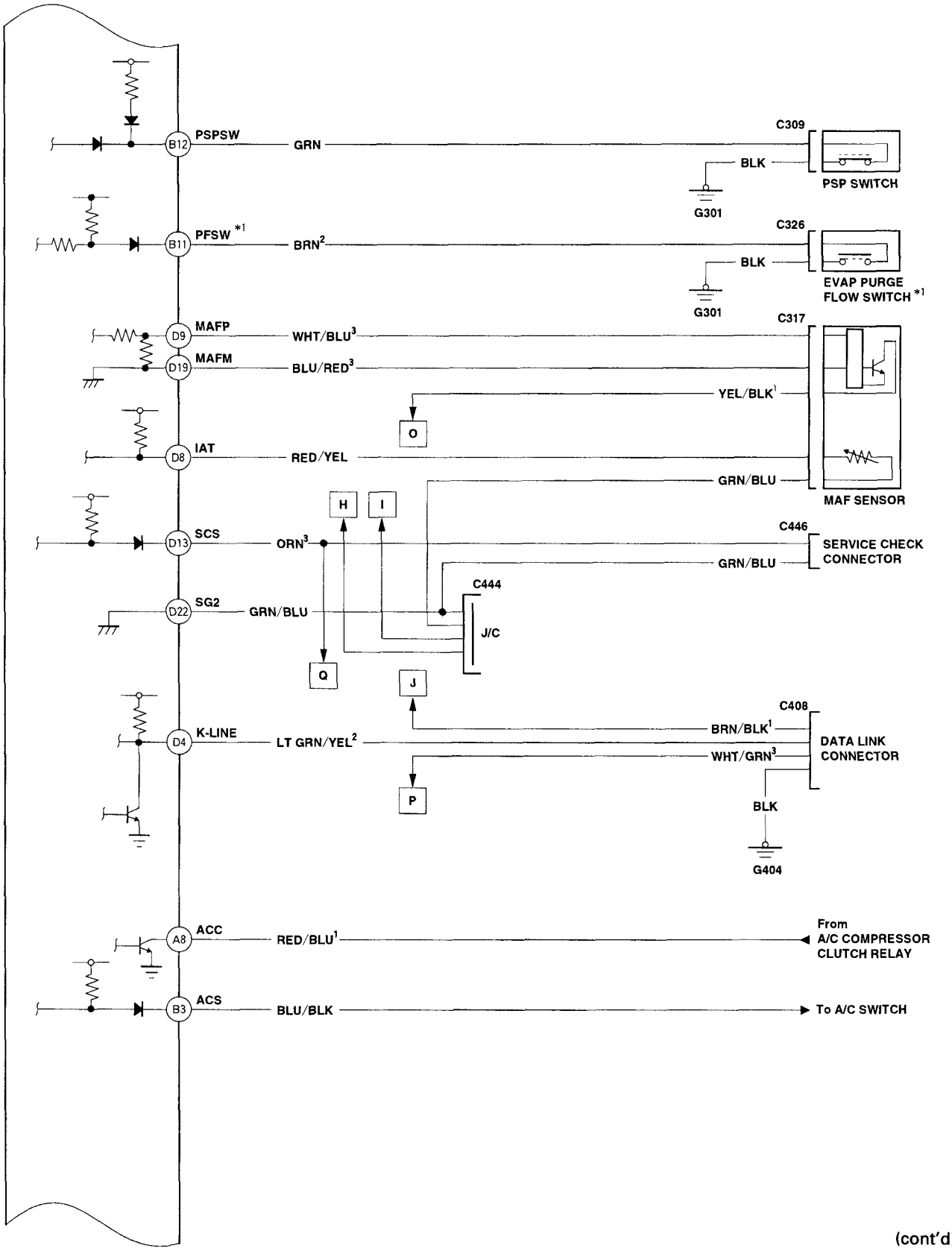

CYPP
B6
ORN[1]
CYPM
B14
WHT
TDCP
B7
ORN/BLU
TDCM
B15
WHT/BLU[2]
CKPP
B8
BLU/GRN
CKPM
B16
BLU/YEL
CKFP
C5
BLU/RED[2]
CKFM
C4
WHT/RED[2]
FKS
C2
RED/BLU[2]
RKS
C1
WHT/GRN[3]
LG2
B9
BRN/BLK[2]
LG1
A26
BRN/BLK[1]
VSS
B13
ORN[2]
C321
C114
C102
ORN[1]
WHT
ORN/BLU
WHT/BLU[2]
BLU/GRN
BLU/YEL
CYP SENSOR
TDC SENSOR
CKP SENSOR
TDC/CYP/CKP SENSOR
C101
BLU/RED[2]
WHT/RED[2]
BRN/BLK[1]
CKF SENSOR
C123
RED/BLU[2]
FRONT KS
C122
WHT/GRN[3]
REAR KS
D
E
C436
J/C
J
BRN/BLK[2]
BRN/BLK[1]
G101
C118
YEL
ORN[2]
BLK[1]
VSS
C463
J/C
K
L
M
C319
C116

(cont'd)

System Description

Electrical Connections (cont'd)



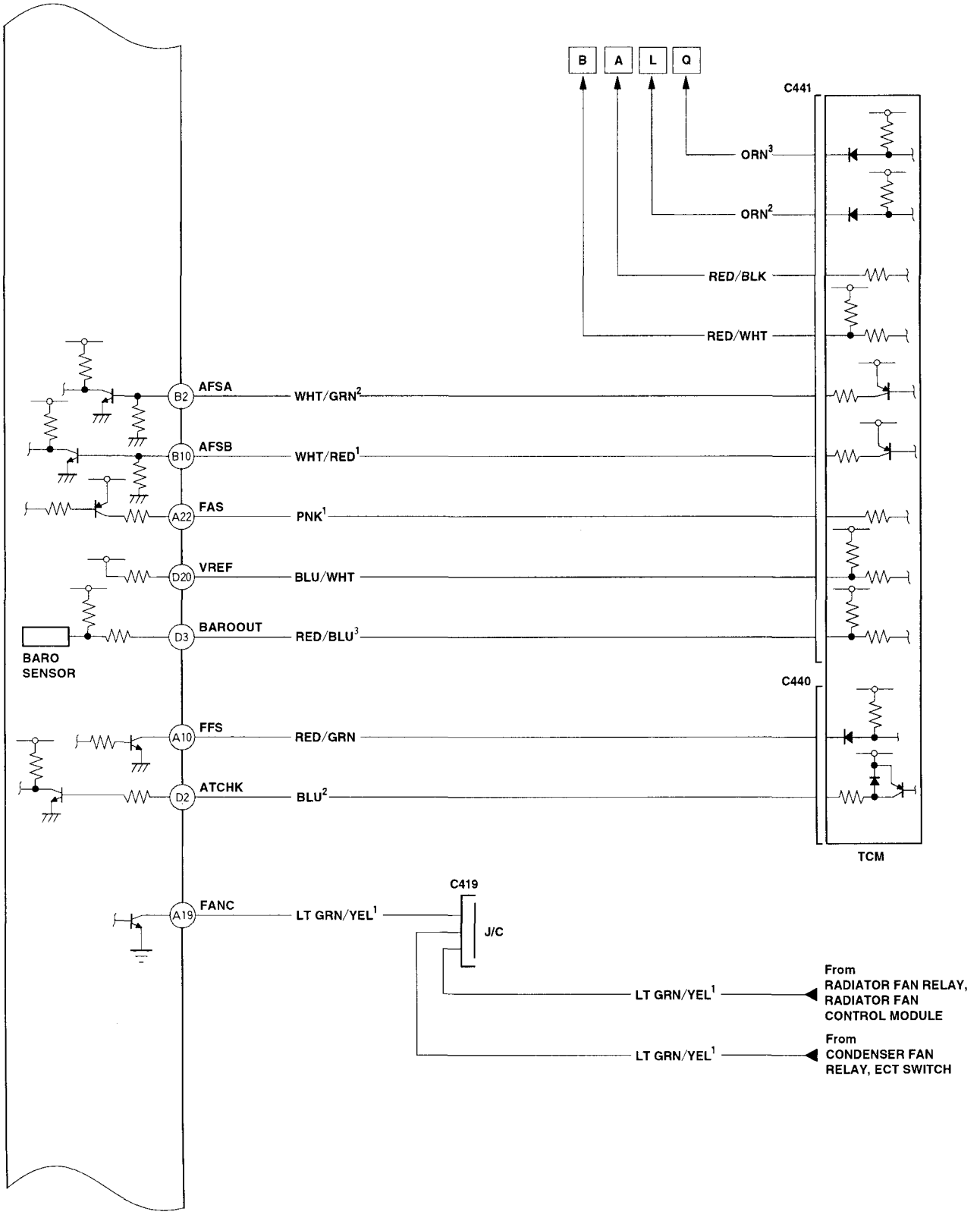


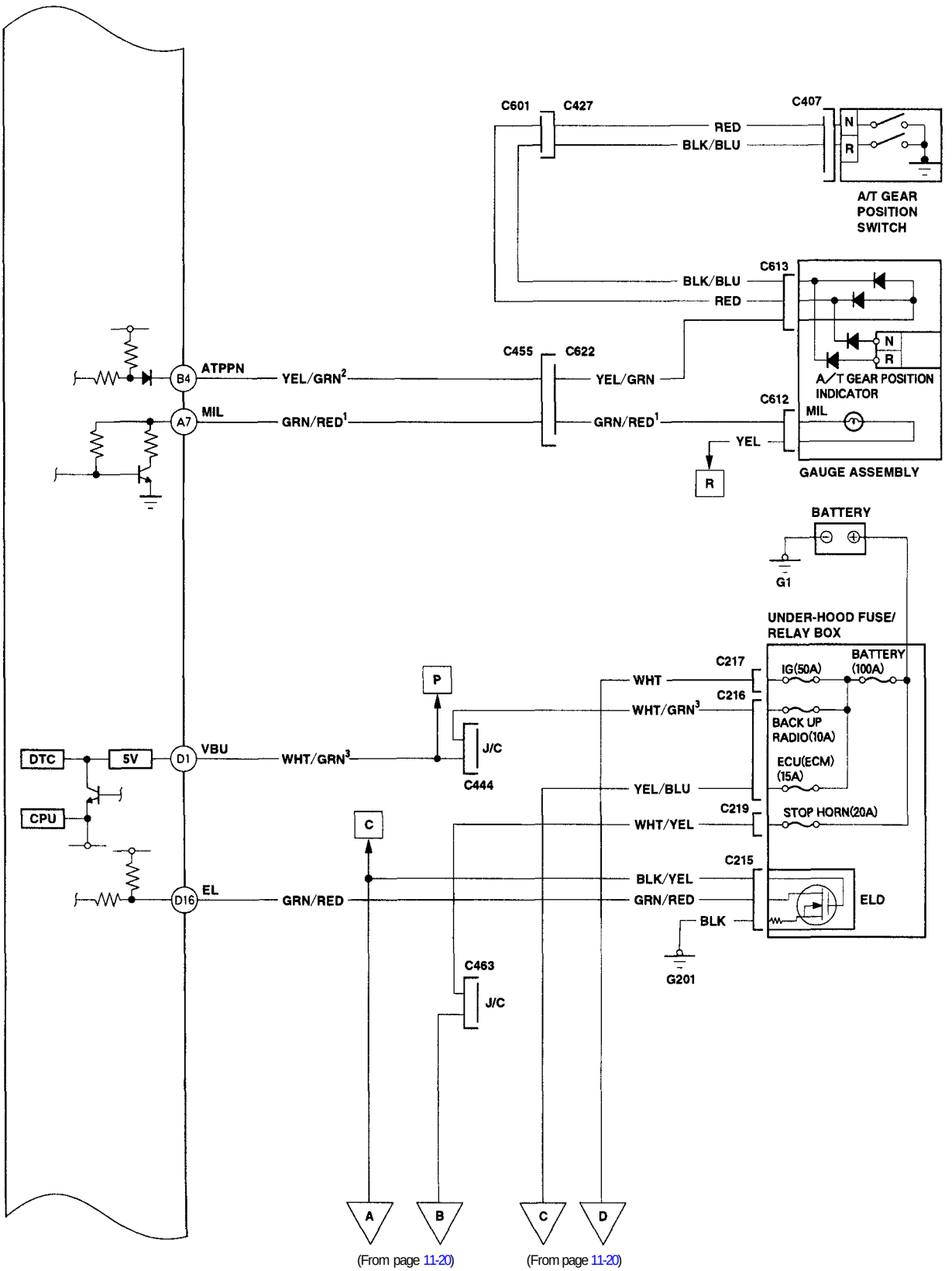
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*1 : '95-96 models only

System Description

Electrical Connections (cont'd)

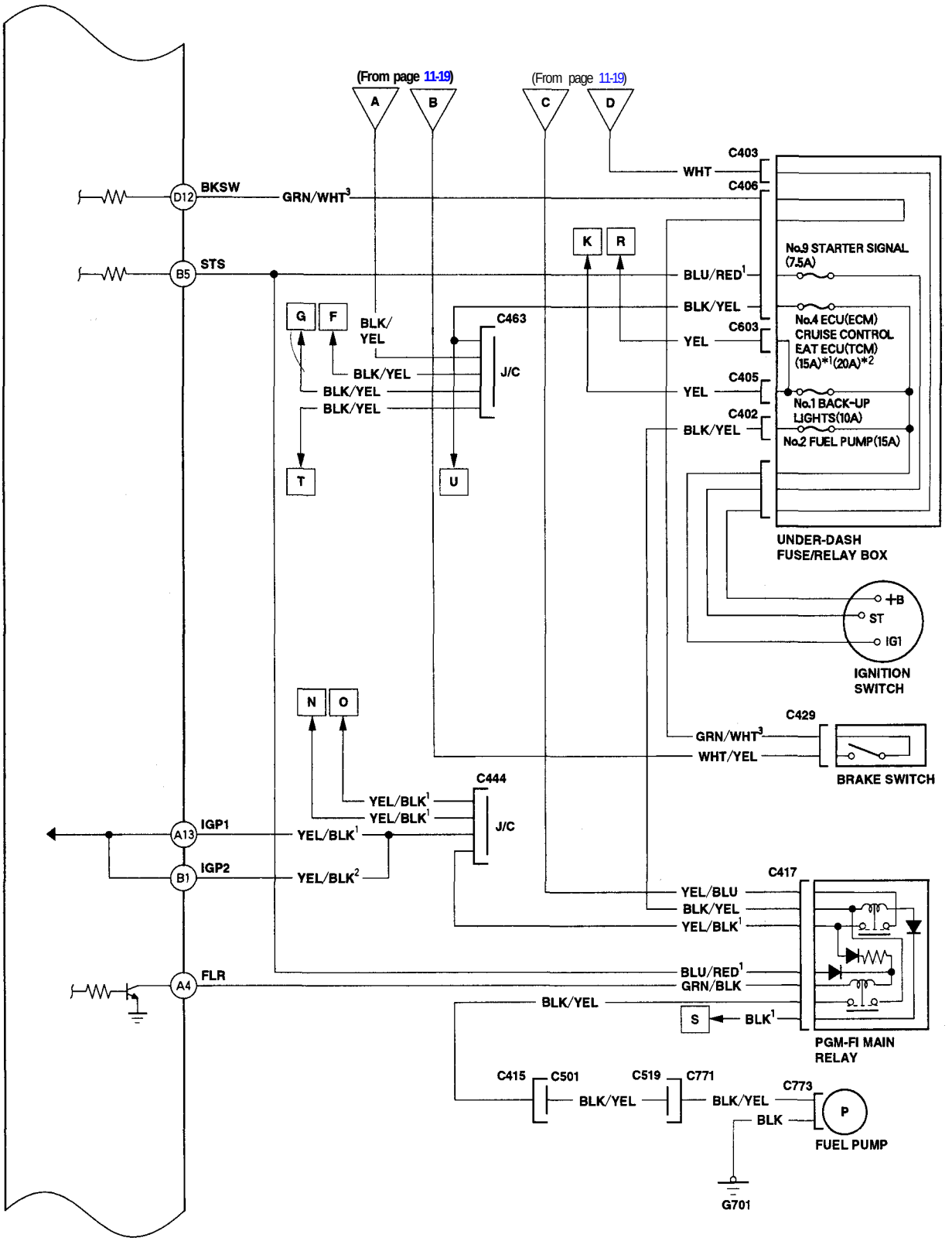



C601
C427
C407
RED
BLK/BLU
N
R
A/T GEAR POSITION SWITCH
C613
BLK/BLU
RED
N
R
A/T GEAR POSITION INDICATOR
C455
C622
C612
B4
ATPPN
YEL/GRN2
YEL/GRN
A7
MIL
GRN/RED1
GRN/RED1
MIL
YEL
R
GAUGE ASSEMBLY
BATTERY
G1
UNDER-HOOD FUSE/ RELAY BOX
C217
BATTERY (100A)
IG(50A)
WHT
C216
WHT/GRN3
BACK UP RADIO(10A)
ECU(ECM) (15A)
YEL/BLU
C219
STOP HORN(20A)
WHT/YEL
C215
BLK/YEL
GRN/RED
BLK
ELD
G201
P
J/C
C444
DTC
5V
D1
VBU
WHT/GRN3
CPU
C
D16
EL
GRN/RED
C463
J/C
A
B
C
D
(From page 11-20)
(From page 11-20)

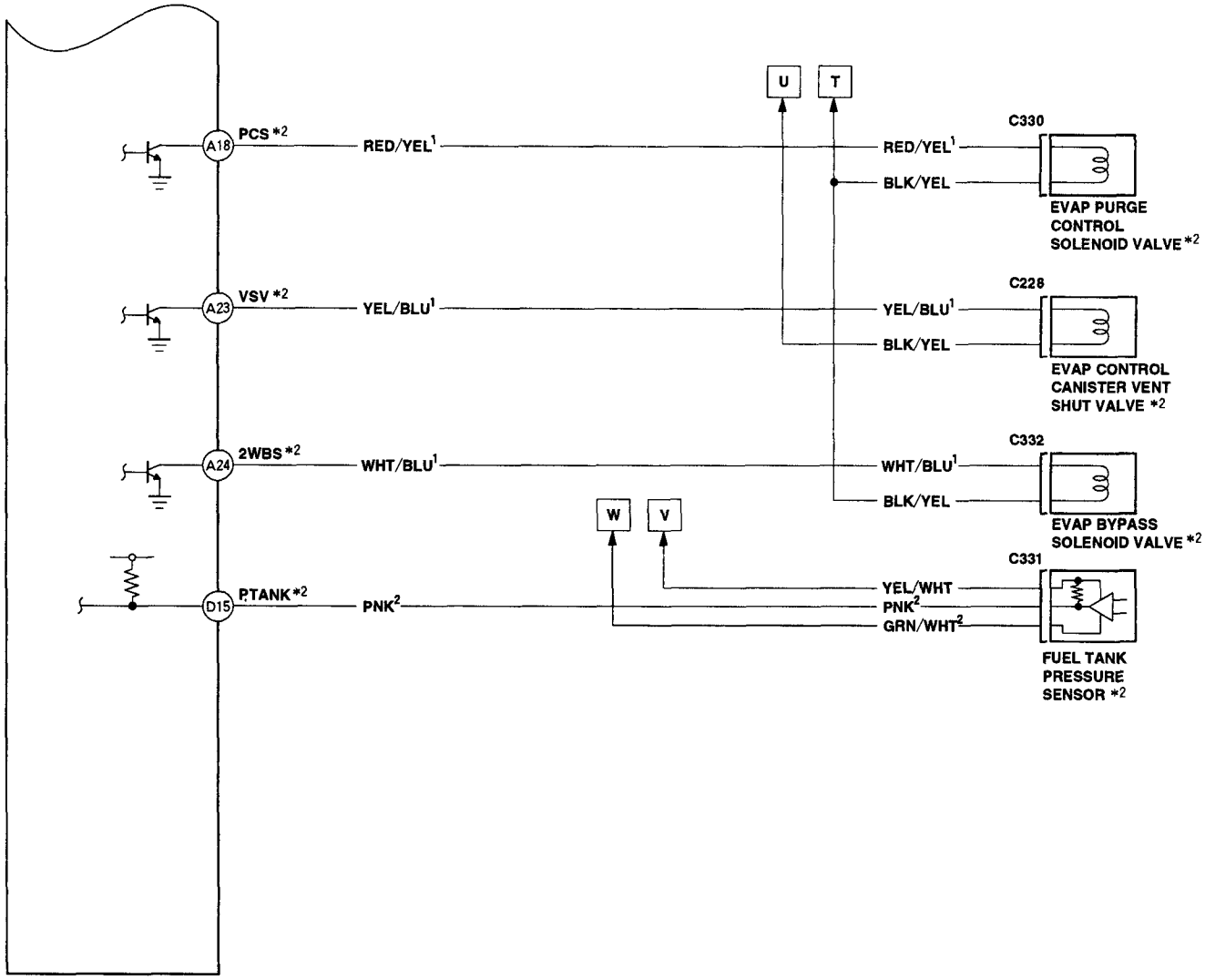
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System Description

Electrical Connections (cont'd)



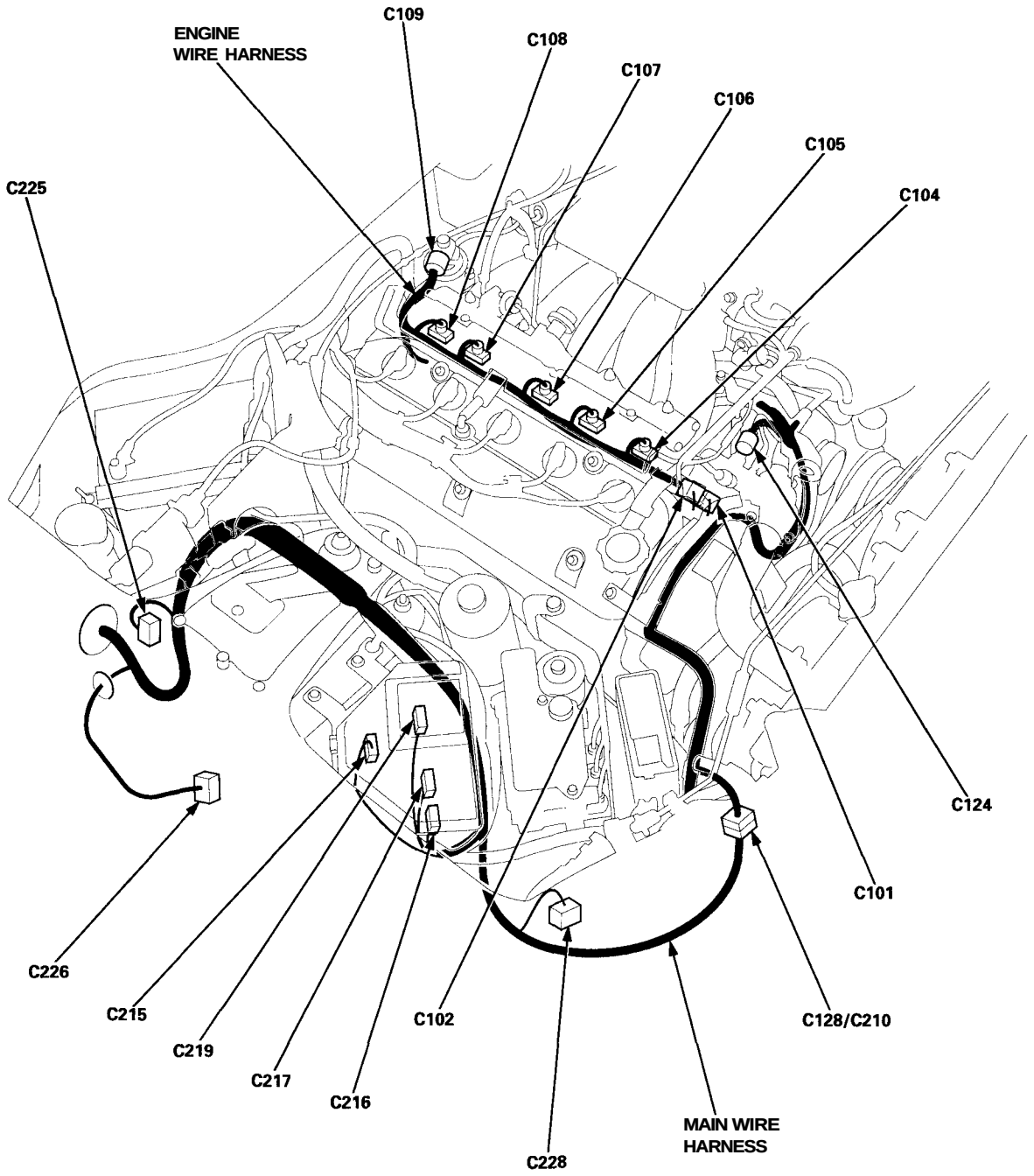
*1 : '95-96 models only
*2 : '97-98 models only



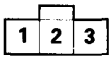
*2: '97-98 models only

System Description

System Connectors [Engine Compartment]

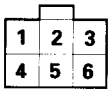


C101



①	WHT/RED[2]
②	BLU/RED[2]
③	BRN/BLK[1]

C102



①	WHT/BLU[2]
②	BLU/YEL
③	WHT
④	ORN/BLU
⑤	BLU/GRN
⑥	ORN[1]

C104



①	BRN[1]
②	RED/BLK

C105



①	RED[1]
②	RED/BLK

C106



①	BLU[1]
②	RED/BLK

C107



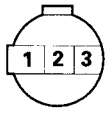
①	YEL
②	RED/BLK

C108



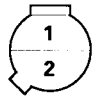
①	BLK/RED
②	RED/BLK

C109



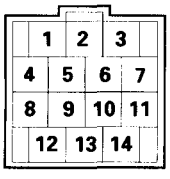
①	WHT/BLK
②	GRN/WHT[2]
③	YEL/BLU[2]

C124



①	GRN/WHT[2]
②	RED/WHT

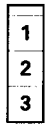
C128



①	WHT/BLK	⑧	RED/WHT
②	YEL/BLU[2]	⑨	YEL/WHT
③	RED[3*1]	⑩	WHT/BLU
4	YEL/RED	⑪	WHT/GRN[1]
5	YEL/GRN	⑫	RED/BLK
6	BLK/YEL	⑬	GRN/WHT[2]
⑦	WHT/RED[3]	⑭	BLK/YEL

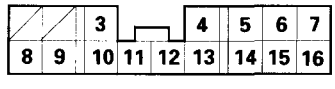
*1: '95 – 96 models

C215



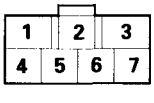
①	BLK
②	GRN/RED
③	BLK/YEL

C216



1	—	9	WHT/YEL
2	—	10	BLU/BLK
③	YEL/BLU	11	YEL/BLK
4	WHT/YEL	12	GRN/BLK
5	WHT/GRN	13	RED
6	WHT/BLU	14	WHT
⑦	WHT/GRN[3]	15	BLU/RED
8	RED/GRN	16	WHT

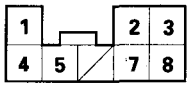
C217



①	WHT
2	BLU/WHT
3	YEL/GRN
4	RED/WHT
5	BLK
6	WHT/RED
7	GRN*

*: With moonroof

C219



①	WHT/YEL	6	—
2	RED/WHT	7	RED/WHT
3	RED/WHT	8	RED/BLU
4	RED/BLK	8	ORN/BLK*
5	RED/GRN		

*: Canada

C225



①	YEL/GRN[1]
2	GRN
3	BLK/YEL
④	BLK[1]

C226



①	WHT/RED[4]
②	GRN/BLU
③	BLK/YEL
④	ORN/BLK

C228



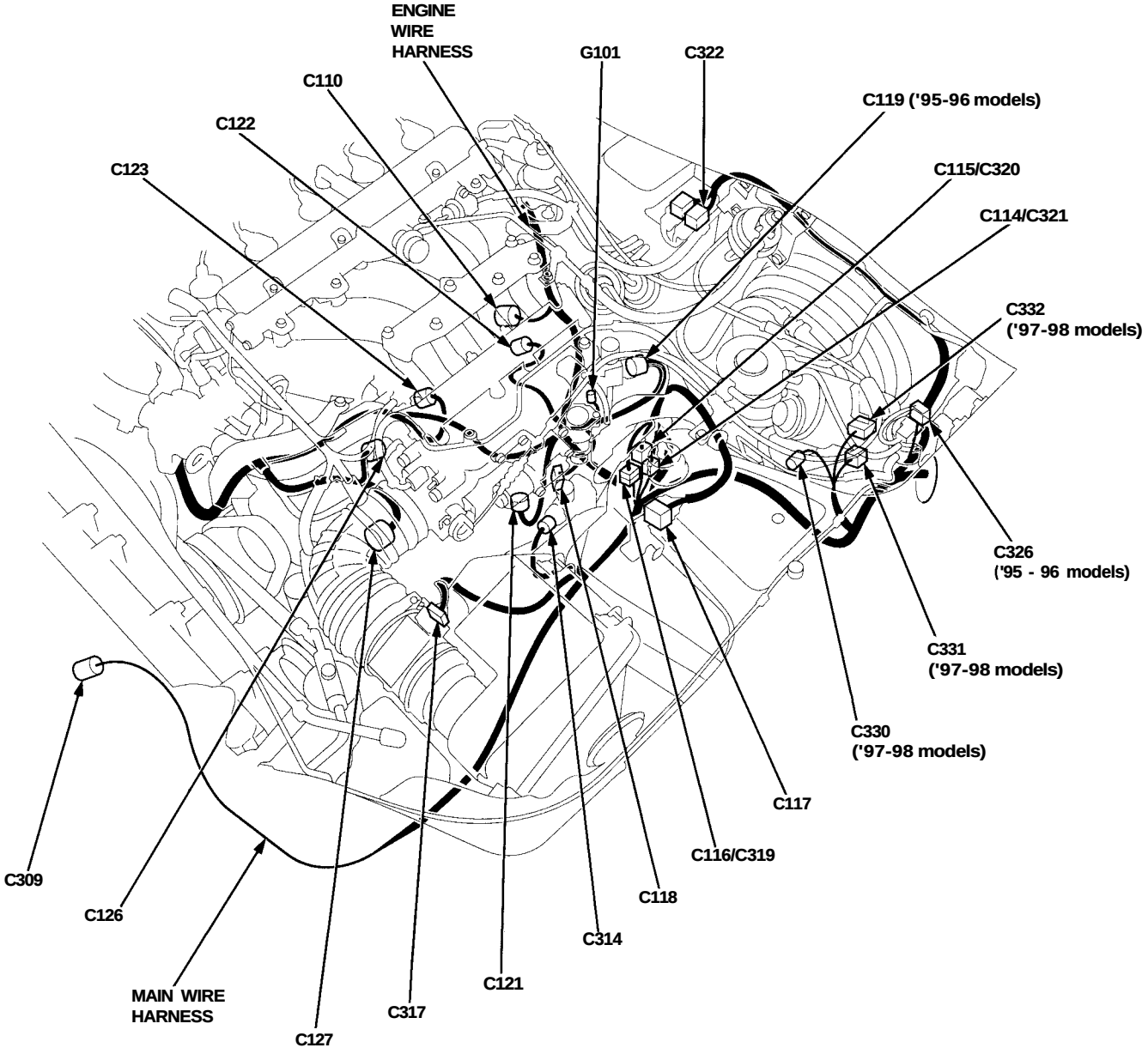
①	BLK/YEL
②	YEL/BLU[1]

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

(cont'd)

System Description

System Connectors [Engine Compartment] (cont'd)

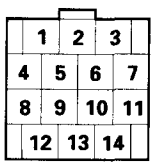


C110



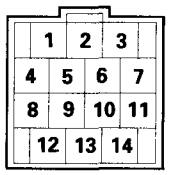
①	PNK/BLU
②	BLK/YEL

C114



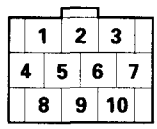
①	ORN[1]	⑧	BLU/YEL
②	WHT/BLU[2]	⑨	BRN/BLK[1]
③	ORN/BLU	⑩	WHT/GRN[3]
④	BLU/GRN	⑪	ORN[2]
⑤	WHT	⑫	BLU/RED[2]
⑥	BRN/BLK[2]	⑬	WHT/RED[2]
⑦	YEL	⑭	RED/BLU[2]

C115



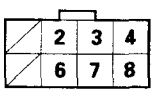
①	YEL/BLK[1]	8	WHT/GRN
②	BRN[1]	9	GRN/BLK
③	RED[1]	⑩	BLK[1]
④	PNK/BLU	⑪	BLK/RED
⑤	BLK/YEL	⑫	YEL/BLK[1]
⑥	BLU[1]	⑬	BLK/BLU
⑦	YEL	⑭	BLK[2]

C116



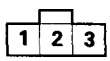
1	RED	6	YEL
2	GRN/WHT	7	ORN/BLU
3	BLU/YEL	8	BLU/YEL
④	BRN/BLK[1]	9	BLU/GRN
5	WHT	10	WHT/BLU

C117



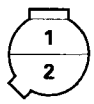
1	—	5	—
②	YEL/BLK[1]	⑥	RED/BLK
③	RED/BLK	⑦	RED/BLK
④	RED/BLK	⑧	RED/BLK

C118



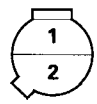
①	BLK[1]
②	YEL
③	ORN[2]

C119 ('95-96 models)



①	RED[3]
②	BLK/YEL

C121



①	BLK/BLU
②	YEL/BLK[1]

C122



①	WHT/GRN[3]

C123



①	RED/BLU[2]

C126



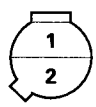
①	GRN/WHT[2]
②	RED/BLK
③	YEL/WHT

C127



1	BLK/YEL
②	WHT/GRN[1]
3	WHT/BLU
④	WHT/RED[3]

C309



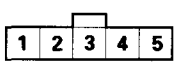
①	GRN
②	BLK

C314



①	BLK/YEL
②	GRN/WHT[1]

C317



①	BLU/RED[3]
②	GRN/BLU
③	RED/YEL[2]
④	WHT/BLU[2]
⑤	YEL/BLK[1]

C322



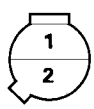
①	BLK/YEL
②	RED[2]

C326 ('95 - 96 models)



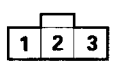
①	BRN[2]
②	BLK

C330 ('97 - 98 models)



①	RED/YEL[1]
②	BLK/YEL

C331 ('97 - 98 models)



①	YEL/WHT
②	PNK[2]
③	GRN/WHT[2]

C332 ('97-98 models)

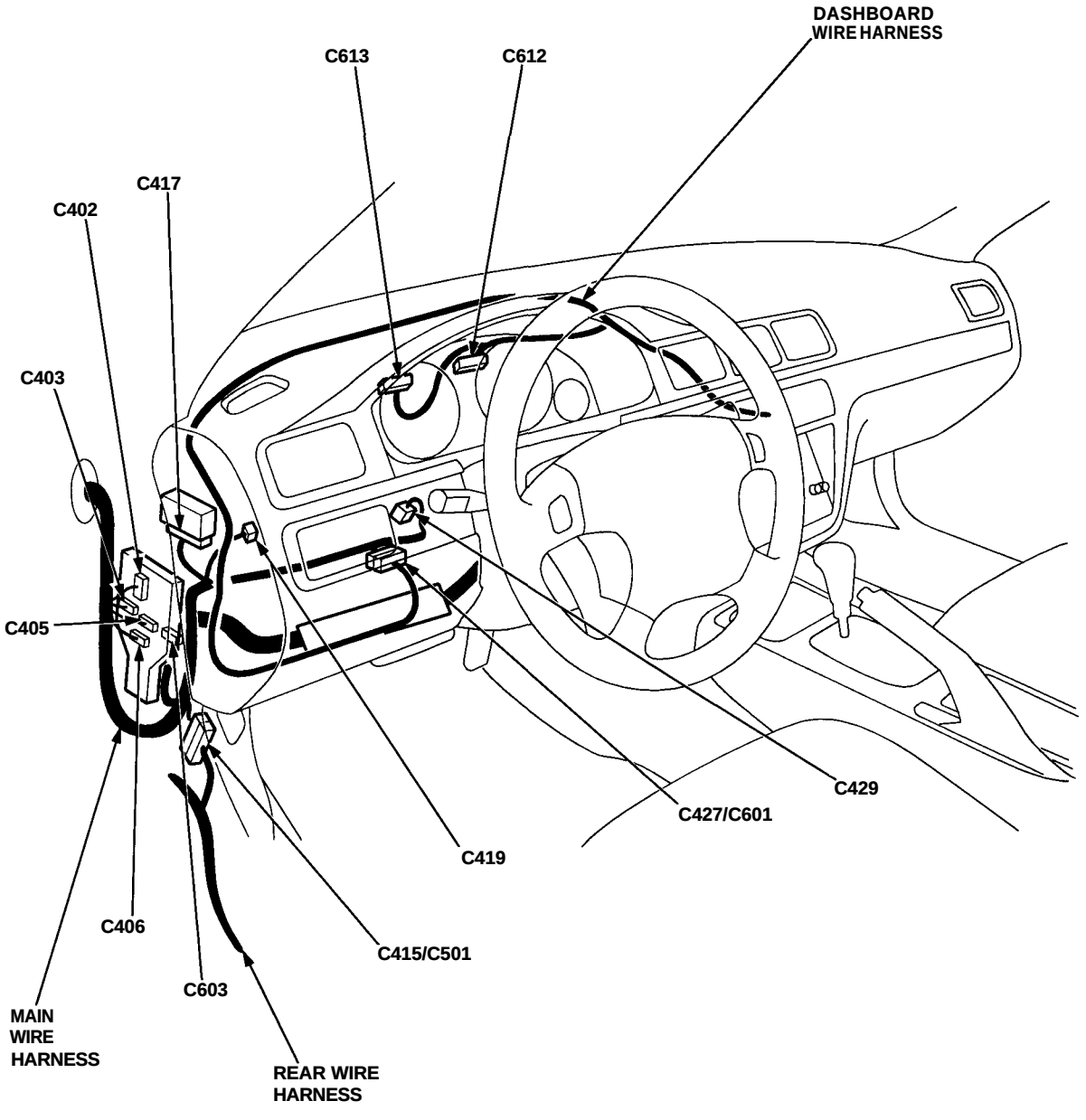


①	BLK/YEL
②	WHT/BLU[1]

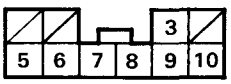
NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

System Description

System Connectors [Dash and Floor]

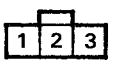


C402



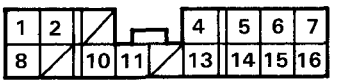
1	—	6	BLK
2	—	7	BLK
③	BLK/YEL	8	BLK
4	—	9	BLK
5	BLK/YEL	10	BLK

C403



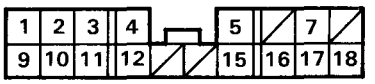
①	WHT
2	WHT/BLU
3	YEL/GRN

C405



1	RED/BLK	9	—
2	RED/BLK	10	BLU
3	—	11	BLU
4	BLU/WHT	12	—
5	GRN	13	BLK/YEL
6	BLK	14	GRN/RED
7	BLU/YEL	15	YEL
8	BLU	⑯	YEL

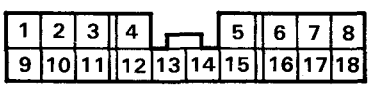
C406



①	GRN/WHT[3]	⑩	GRN/WHT[3]
2	GRN/WHT	11	YEL/BLK*
3	YEL/BLK	⑫	BLU/RED[1]
4	YEL/BLK	13	—
5	GRN/YEL	14	—
6	—	15	WHT/BLU
⑦	BLK/YEL	16	BLU/RED
8	—	17	GRN/BLU
9	GRN/WHT	18	BLK/YEL

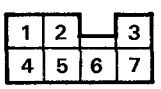
*: Canada

C415



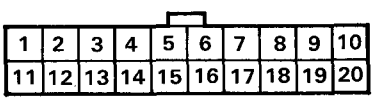
1	WHT/RED	10	GRY
2	BLU/YEL	11	LT BLU
3	GRN/YEL	12	GRN/YEL
4	GRN/BLK	13	GRN/BLU
5	YEL/RED	⑭	BLK/YEL
6	GRN/BLK	15	WHT/RED
7	GRN/YEL	16	GRN
8	RED/YEL	17	GRN/ORN
9	WHT/GRN	18	BLU/GRN

C417



①	GRN/BLK
②	BLU/RED[1]
③	BLK[1]
④	BLK/YEL
⑤	BLK/YEL
⑥	YEL/BLK[1]
⑦	YEL/BLU

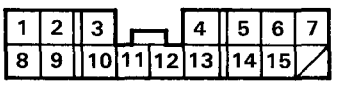
C419



1	ORN*	11	BLK/WHT
2	ORN*	12	BLK/WHT
3	GRN/YEL	13	BLK/RED
4	GRN/YEL	14	BLK/RED
5	YEL/RED	15	YEL/BLK
6	YEL/RED	16	YEL/BLK
7	YEL/RED	17	BLU/YEL
⑧	LT GRN/YEL[1]	18	BLU/YEL
⑨	LT GRN/YEL[1]	19	BLU/GRN
⑩	LT GRN/YEL[1]	20	BLU/GRN

*: Canada

C427



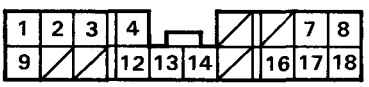
1	YEL/GRN	9	RED
2	BLK/YEL	10	BLU/WHT
3	BLU	⑪	BLK/BLU
4	BLU/GRN	12	GRN/RED
5	GRY/BLK	13	LT GRN
6	BLU/BLK	14	YEL/WHT
7	YEL/BLU	15	LT GRN
⑧	RED	16	—

C429



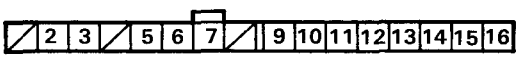
1	GRY
②	WHT/YEL
③	GRN/WHT[3]
4	LT GRN

C603



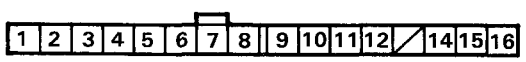
1	BLU/RED	10	—
2	BLU	11	RED/BLK
3	GRN/BLU	12	GRN/YEL
4	BLU/RED	13	YEL/GRN
5	—	14	BLK
6	—	15	—
7	GRN/BLU	16	BLK/YEL
⑧	YEL	17	GRN/RED
9	YEL/BLK	18	GRN/WHT

C612



1	—	⑨	YEL
2	RED	10	YEL/BLU
3	ORN	11	BRN
4	—	12	BLU
⑤	GRN/RED[1]	13	GRN
6	LT GRN/RED	14	BLK
7	BLU/RED	15	RED/BLK
8	—	16	BLU/RED

C613



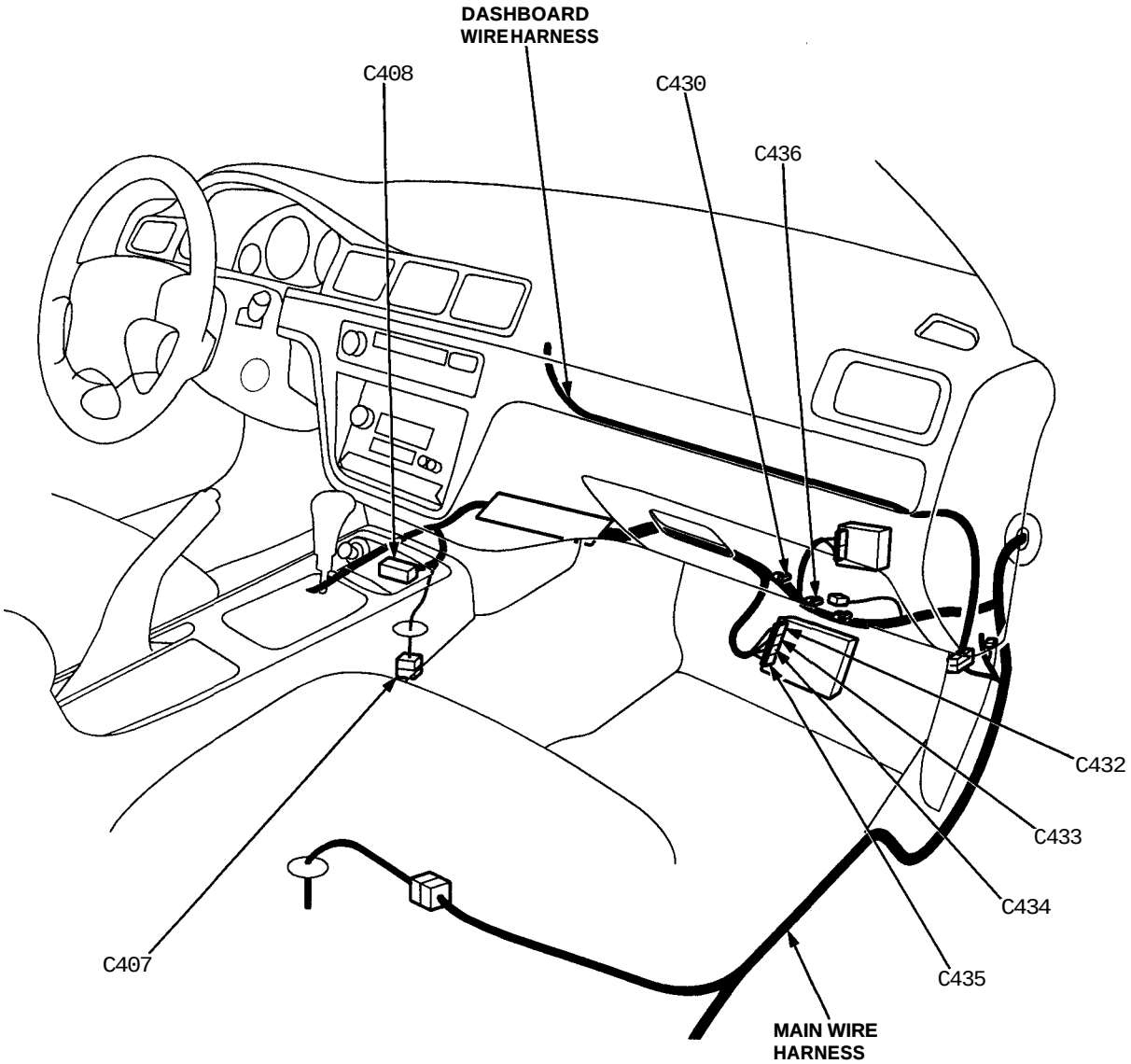
1	GRN/BLU	⑨	BLK/BLU
2	GRN/YEL	10	WHT
3	GRN/RED	⑪	RED
4	RED/BLU	12	BLU
5	RED/GRN	13	—
6	BLU/RED	14	GRN/BLK
7	BLU/BLK	15	ORN
⑧	YEL/GRN	16	GRN/WHT

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

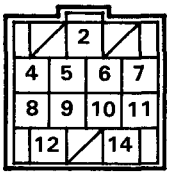
(cont'd)

System Description

System Connectors [Dash and Floor] (cont'd)

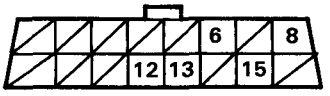


C407



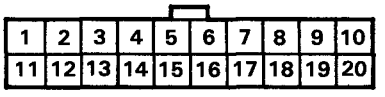
1	—	8	PNK
②	BLK/BLU	9	GRY
3	—	10	BRN
4	GRN	11	BLU
5	BLU/WHT	12	GRN/BLK
⑥	RED	13	—
7	WHT	14	YEL

C408



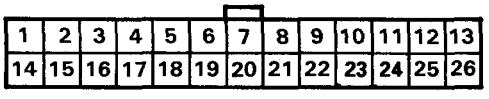
1	—	9	—
2	—	10	—
3	—	11	—
4	—	12	BLK
5	—	⑬	BRN/BLK[1]
6	LT BLU	14	—
7	—	⑮	LT GRN/YEL[2]
⑧	WHT/GRN[3]	16	—

C430



1	RED/GRN	⑪	BLK[1]
2	RED/GRN	⑫	BLK[1]
3	RED/GRN	⑬	BLK[1]
4	RED/GRN	⑭	BLK[1]
5	BLU/BLK	15	WHT/RED
6	BLU/BLK	16	WHT/RED
7	BLU/BLK	17	WHT/RED
8	YEL	18	GRY
9	YEL	19	GRY
10	YEL	20	GRY

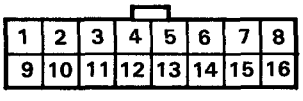
C432 ECM-A



①	BRN[1]	⑮	BLK/RED
②	RED[1]	⑯	ORN/BLK
③	BLU[1]	⑰	GRN/RED[2]
④	GRN/BLK	⑱	RED[3]*[1]
⑤	BLK/BLU	⑲	RED/YEL[1]*[2]
⑥	RED[2]	⑲	LT GRN/YEL[1]
⑦	GRN/RED[1]	⑳	GRN/WHT[1]
⑧	RED/BLU[1]	㉑	WHT/GRN[1]
⑨	PNK/BLU	㉒	PNK[1]
⑩	RED/GRN	㉓	YEL/BLU[1]*[2]
⑪	YEL/GRN[1]	㉔	WHT/BLU[1]*[2]
⑫	BLK[1]	㉕	BLK[2]
⑬	YEL/BLK[1]	㉖	BRN/BLK[1]
⑭	YEL		

*1:'95-96 models
*2:'97-98 models

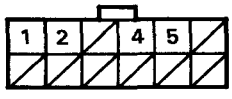
C433 ECM-B



①	YEL/BLK[2]	⑨	BRN/BLK[2]
②	WHT/GRN[2]	⑩	WHT/RED[1]
③	BLU/BLK	⑪	BRN[2]*[1]
④	YEL/GRN[2]	⑫	GRN
⑤	BLU/RED[1]	⑬	ORN[2]
⑥	ORN[1]	⑭	WHT
⑦	ORN/BLU	⑮	WHT/BLU[2]
⑧	BLU/GRN	⑯	BLU/YEL

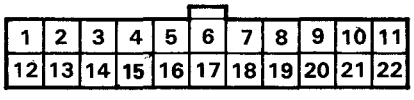
*1: '95 -96 models

C434 ECM-C



①	WHT/GRN[3]	7	—
②	RED/BLU[2]	8	—
3	—	9	—
④	WHT/RED[2]	10	—
⑤	BLU/RED[2]	11	—
6	—	12	—

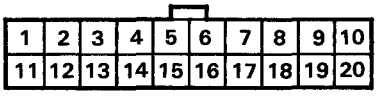
C435 ECM-D



①	WHT/GRN[3]	⑫	GRN/WHT[3]
②	BLU[2]	⑬	ORN[3]
③	RED/BLU[3]	⑭	BLU/RED[3]
④	LT GRN/YEL[2]	⑮	PNK[2]
⑤	WHT/RED[3]	⑯	GRN/RED
⑥	RED/BLK	⑰	WHT/BLK
⑦	RED/WHT	⑱	WHT/RED[4]
⑧	RED/YEL[2]	⑲	BLU/RED[3]
⑨	WHT/BLU[3]	⑳	BLU/WHT
⑩	YEL/WHT	㉑	YEL/BLU[2]
⑪	GRN/WHT[2]	㉒	GRN/BLU

*2: '97 - 98 models

C436



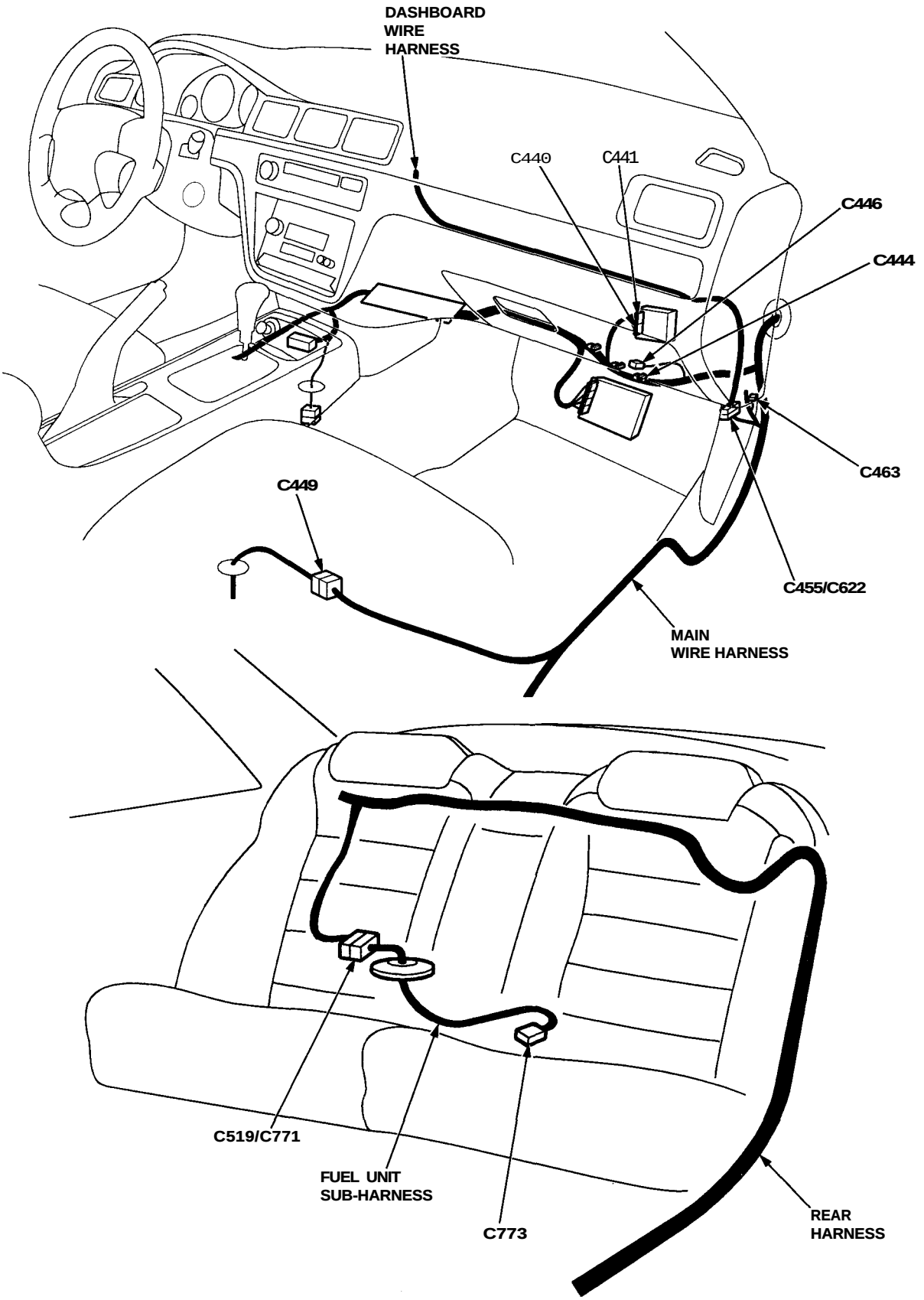
①	BRN/BLK[1]	11	RED/BLK
②	BRN/BLK[1]	12	RED/BLK
③	BRN/BLK[1]	13	RED/BLK
4	BRN/BLK	14	RED/BLK
5	BRN/BLK	15	RED/BLK
⑥	BRN/BLK[1]	16	RED/BLK
⑦	BRN/BLK[1]	17	WHT/BLU
⑧	BRN/BLK[1]	18	WHT/BLU
⑨	BRN/BLK[1]	19	WHT/BLU
10	BRN/BLK	20	WHT/BLU

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

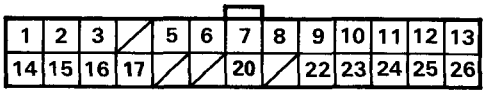
(cont'd)

System Description

System Connectors [Dash and Floor] (cont'd)

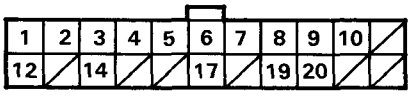


C440



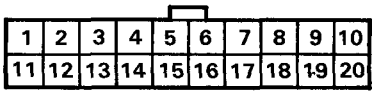
1	WHT	14	BLK[1]
2	GRN/WHT	15	GRN/BLK
3	BLU/YEL	16	YEL
4	—	17	GRN/BLK
5	BLU	18	—
6	BRN	19	—
7	BLU	⑳	BLU[2]
8	GRN	21	—
9	BLU/WHT	22	WHT/GRN
10	YEL/GRN	23	WHT/GRN
11	WHT	㉔	RED/GRN
12	BLK/YEL	25	BLK/YEL
13	BRN/BLK	26	BRN/BLK

C441



1	RED	12	GRN/WHT
②	RED/BLU[3]	13	—
③	RED/WHT	⑭	ORN[2]
④	RED/BLK	15	—
5	ORN	16	—
⑥	WHT/RED[1]	17	WHT/BLU
⑦	WHT/GRN[2]	18	—
8	BLU/YEL	⑲	PNK[1]
9	BLU/GRN	⑳	BLU/WHT
10	ORN/BLU	21	—
11	—	22	—

C444



①	GRN/BLU	⑪	YEL/BLK[1]
②	GRN/BLU	⑫	YEL/BLK[1]
③	GRN/BLU	⑬	YEL/BLK[1]
④	GRN/BLU	⑭	YEL/BLK[1]
⑤	WHT/GRN[3]	15	YEL/RED
6	WHT/GRN	16	YEL/RED
⑦	WHT/GRN[3]	17	YEL/RED
8	GRN/YEL	18	BLK/YEL
9	GRN/YEL	19	BLK/YEL
10	GRN/YEL	20	BLK/YEL

C446



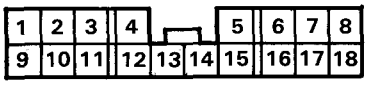
①	GRN/BLU
②	ORN[3]

C449



①	BLU/RED[3]
②	GRN/BLU
③	BLK/YEL
④	GRN/RED[2]

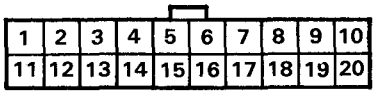
C455



1	BLU/RED	10	WHT/GRN
②	GRN/RED[1]	11	RED/GRN
3	ORN	12	BLK/GRN
4	RED/BLU	13	ORN/WHT
5	GRN	14	GRN/BLK
6	BLU	⑮	YEL/GRN[2]
7	BRN	16	YEL/RED
8	PNK	17	WHT
9	WHT/BLU	18	BLU/WHT*

*: Canada

C463



①	BLK/YEL	⑪	ORN[2]
②	BLK/YEL	⑫	ORN[2]
③	BLK/YEL	13	ORN[2]
④	BLK/YEL	14	WHT/BLU
⑤	BLK/YEL	15	WHT/BLU
6	BLK/YEL	16	WHT/BLU
7	GRN/RED	⑰	WHT/YEL
8	GRN/RED	⑱	WHT/YEL
9	GRN/RED	19	WHT/YEL
10	GRN/RED	20	WHT/YEL

C519



1	YEL/BLU
2	LT GRN/RED
③	BLK/YEL

C773



①	BLK
②	BLK/YEL

NOTE: • Different wires with the same color have been given a number suffix to distinguish them (for example, YEL/BLK[1] and YEL/BLK[2] are not the same).
○: Related to Fuel and Emissions System.
• — Connector with male terminals (double outline): View from terminal side
— Connector with female terminals (single outline): View from wire side

Troubleshooting

Troubleshooting Procedures

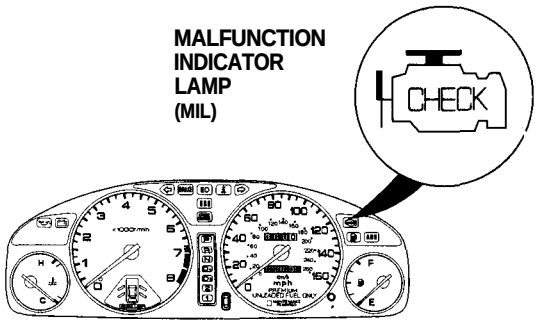
I. How To Begin Troubleshooting
When the Malfunction Indicator Lamp (MIL) has been reported on, or there is a driveability problem, use the appropriate procedure below to diagnose and repair the problem.

A. When the MIL has come on:

1. Connect the Honda PGM Tester or an OBD II scan tool to the 16P Data Link Connector (DLC) located on the center console behind the ashtray.

2. Turn the ignition switch ON (II).

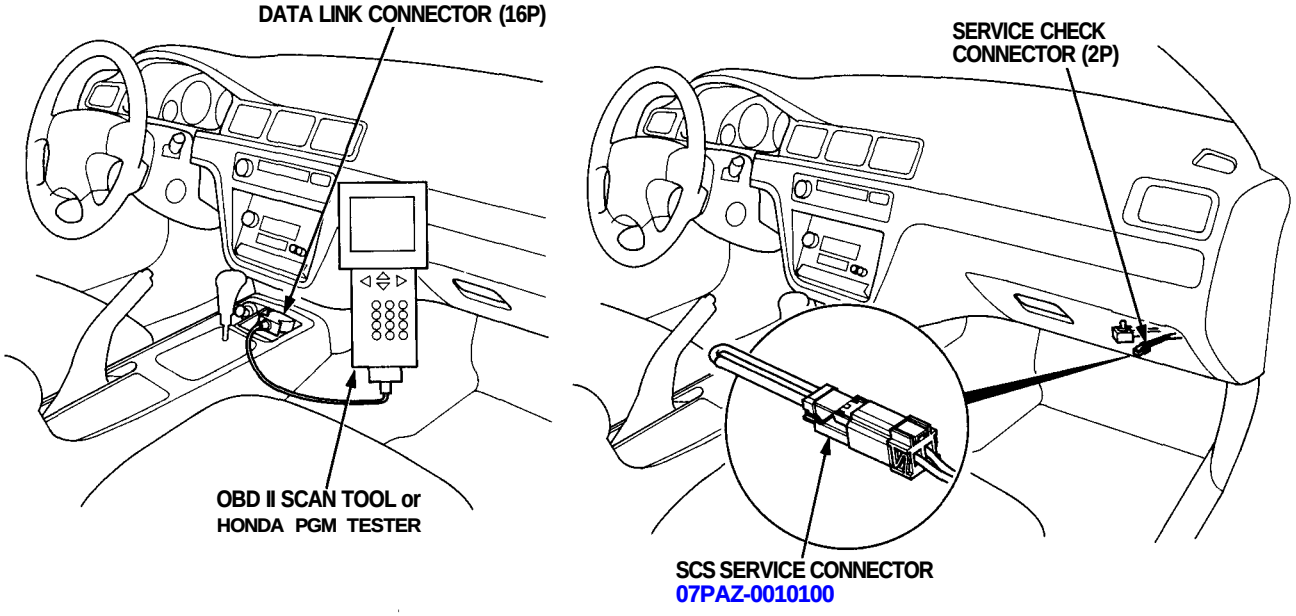
3. Check the DTC and note it. Also check and note the freeze frame data.
Refer to the Diagnostic Trouble Code Chart and begin troubleshooting.



NOTE:
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.
- The scan tool or tester can read the Diagnostic Trouble Codes (DTC), freeze frame data, current data, and other Engine Control Module (ECM) data.
- Freeze frame data indicates the engine conditions when the first malfunction, misfire or fuel trim malfunction was detected. It can be useful information when troubleshooting.

B. When the MIL has not come on, but there is a driveability problem, refer to the Symptom Chart on page 11-36.

C. DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.
Connect the SCS service connector to Service Check Connector as shown. (The 2P Service Check Connector is located under the dash on the passenger's side of the vehicle.) Turn the ignition switch ON (II).



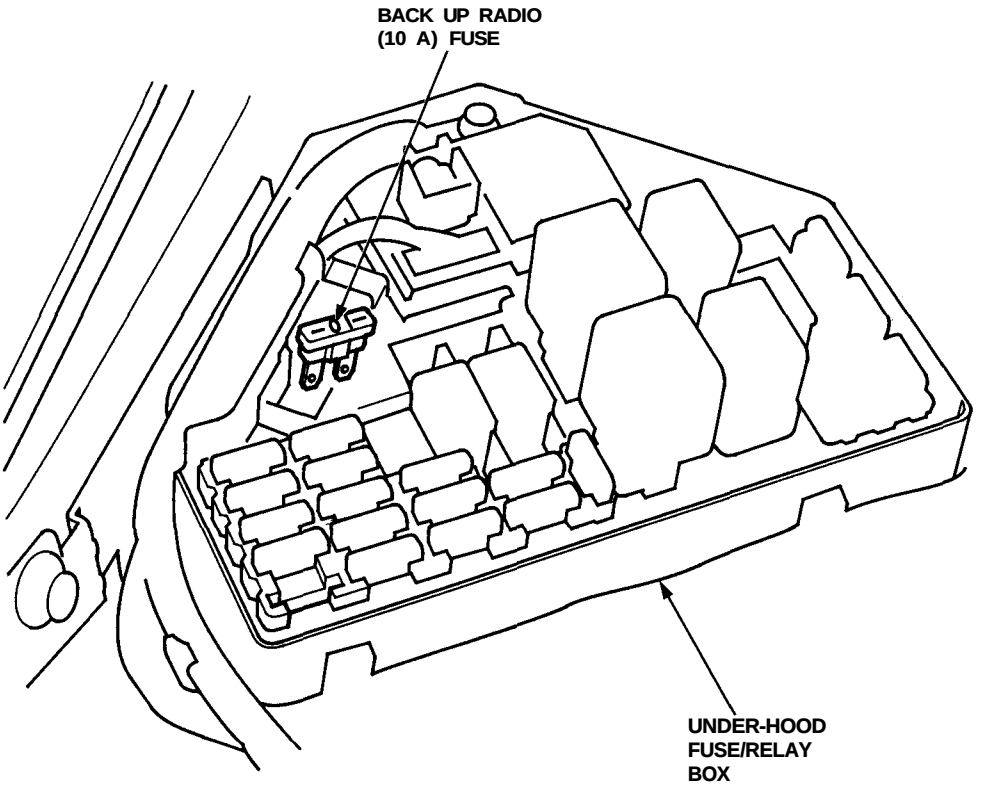
II. Engine Control Module (ECM) Reset Procedure

Either of the following actions will reset the ECM.

- Use the OBD II scan tool or Honda PGM Tester to clear the ECM's memory.

  NOTE: See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

- Turn the ignition switch OFF. Remove the BACK UP RADIO (10 A) fuse from the under-hood fuse/relay box for 10 seconds.



III. Final Procedure (this procedure must be done after any troubleshooting)

1. Remove the SCS Service Connector if it is connected.

   NOTE: If the SCS service connector is connected and there are no DTCs stored in the ECM, the MIL will stay on when the ignition switch is turned ON (II).

2. Do the ECM Reset Procedure.

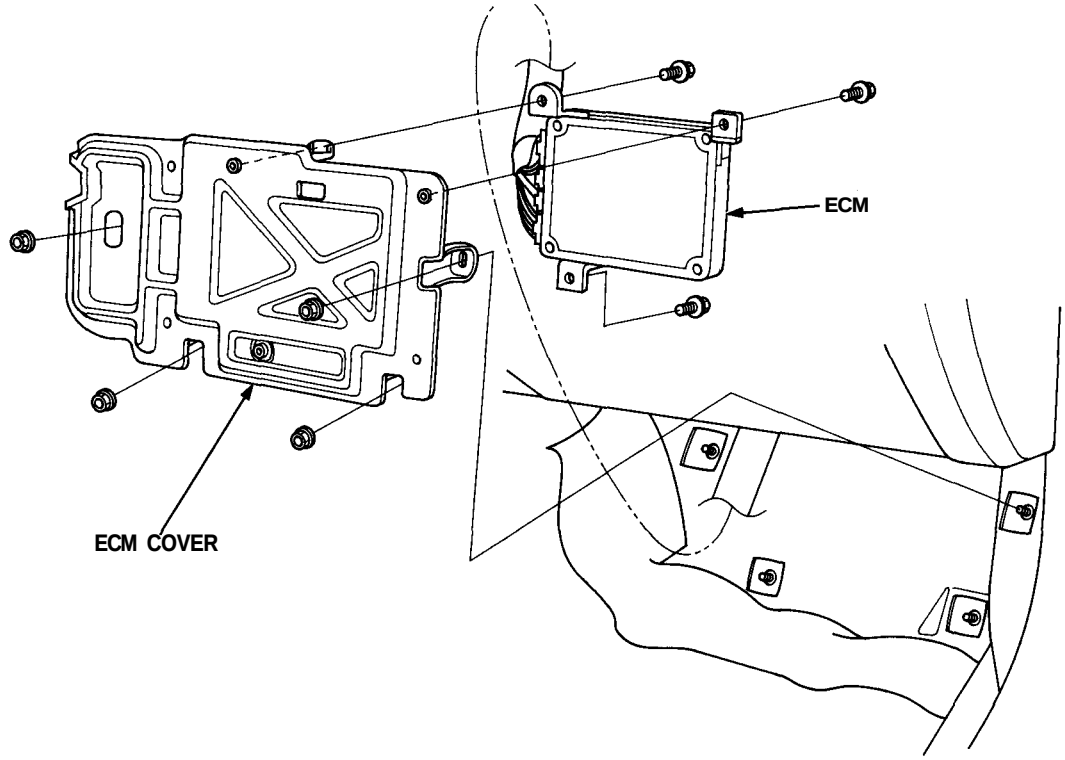
3. Turn the ignition switch OFF.

4. Disconnect the OBD II scan tool or Honda PGM Tester from the Data Link Connector (16P). (cont'd)

Troubleshooting

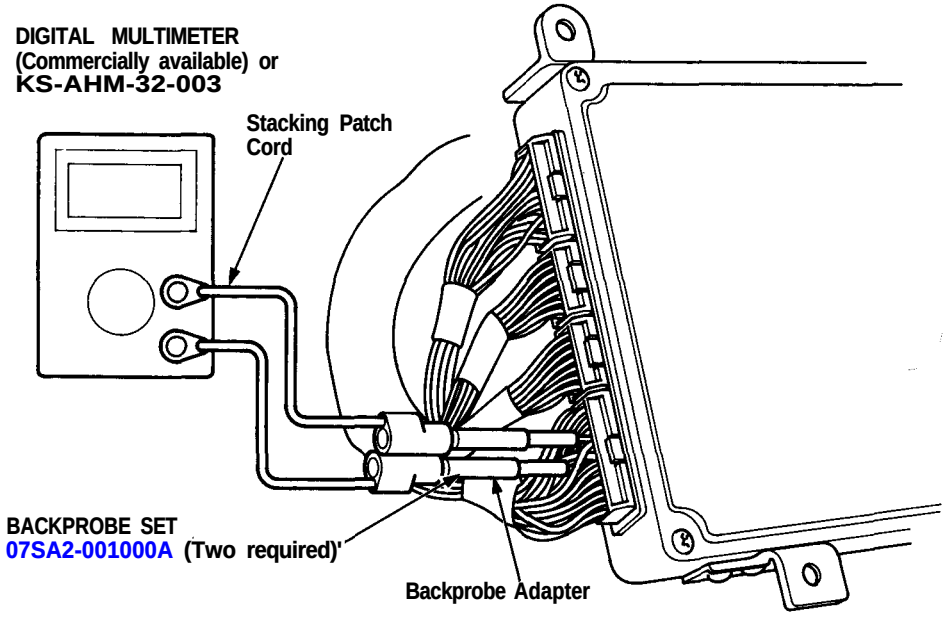
Troubleshooting Procedures (cont'd)

If the inspection for a particular code requires voltage or resistance checks at the ECM connectors, remove the right door sill molding. Pull the carpet back to expose the ECM. Unbolt the ECM cover, and connect the backprobe sets and a digital multimeter as described below. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.



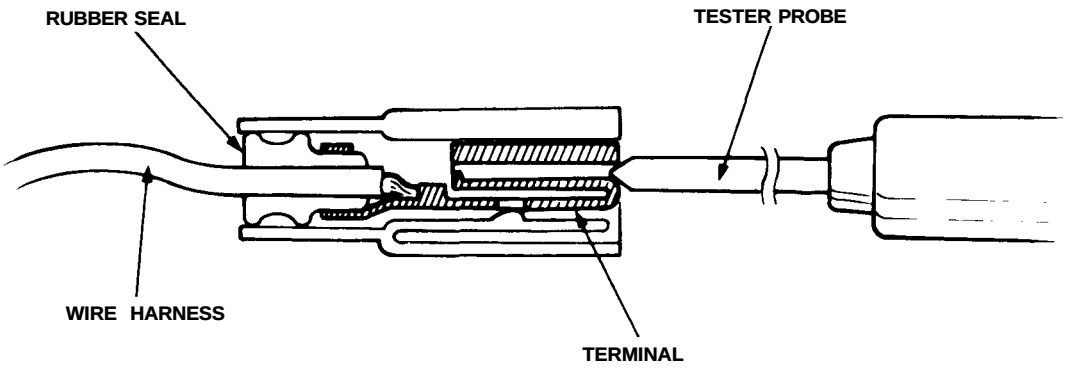
How to Use the Backprobe Sets

Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with terminal end of the wire.



CAUTION:

- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **Bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.**



(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

Symptom Chart

Listed below are symptoms and probable causes for problems that DO NOT cause the Malfunction Indicator Lamp (MIL) to come on. If the MIL was reported on, go to page 11-32.

Troubleshoot each probable cause in the order listed (from left to right) until the symptom is eliminated.

The probable cause and troubleshooting page reference can be found on next page.

SYMPTOM	PROBABLE CAUSE
Engine will not start	4, 2, 3, 5, 21, 15, 1
Hard starting	2, 4, 12, 17, 14, 20
Cold fast idle too low	7, 8, 9, 6, 17
Cold fast idle too high	7, 8, 9, 11, 10
Idle speed fluctuates	9, 7, 8, 11, 10
Misfire or rough running	Troubleshoot for misfire on pages 11-82, 11-85
Low power	2, 10, 11, 13, 18, 17, 19, 21
Engine stalls	2, 4, 12, 7, 21, 9, 5

Other Probable Causes for an engine that will not start:

— Compression
— Intake air leakage
— Engine locked up
— Timing belt
— Starting system
— Overheating
— Battery

Probable Cause List (For the DTC Chart, see page 11-44)

Probable Cause	Page	System
1	11-52, 11-53	Engine Control Module (ECM)
2	11-124	Fuel pressure
3	11-131	PGM-FI main relay
4	Section 23	Ignition system
5	See DTC chart	Crankshaft Position/Top Dead Center/Cylinder Position sensor circuit
6	See DTC chart	Intake Air Temperature (IAT) sensor circuit
7	See DTC chart	Idle Air Control Valve (IACV)
8	11-116	Fast idle thermo valve
9	11-117	Idle speed adjustment
10	11-138	Throttle body
11	11-137	Throttle cable
12	See DTC chart	Mass Air Flow (MAF) sensor
13	See DTC chart	Throttle Position (TP) sensor
14	See DTC chart	Barometric pressure (BARO) sensor
15	11-112	A/T gear position signal
16	11-111	Brake switch signal
17	11-136	Air Cleaner
18	11-142	Intake Air Bypass (IAB) control system and intake air pipe
19	See DTC chart	Three Way Catalytic Converter (TWC)
20	See DTC chart	Evaporative emission (EVAP) control
21	———	Contaminated fuel

(cont'd)

Troubleshooting

Troubleshooting Procedures (cont'd)

ECM Data

By connecting the OBD II scan tool or the Honda PGM Tester to the 16P data link connector (DLC), various data can be retrieved from the ECM. The items listed in the table below conform to the SAE recommended practice.
The Honda PGM Tester also reads data beyond that recommended by SAE.
Understanding this data will help to find the causes of intermittent failures or engine problems.

NOTE:

- The "operating values" given below are approximate values and may be different depending on the environment and the individual vehicle.
- Unless noted otherwise, "at idle speed" means idling with the engine completely warmed up, the transmission in position [P] or [N], and the A/C and all accessories turned off.

Data	Description	Operating Value	Freeze Data
Diagnostic Trouble Code (DTC)	If the ECM detects a problem, it will store it as a code consisting of one letter and four numbers. Depending on the problem, an SAE-defined code (P0xxx) or a Honda-defined code (P1xxx) will be output to the tester.	If no problem is detected, there is no output.	○
Engine Speed	The ECM computes engine speed from the signals sent from the Crankshaft Position sensor. This data is used for determining the time and amount of fuel injection.	Nearly the same as tachometer indication At idle speed: 700 ± 50 rpm	○
Vehicle Speed	The ECM converts pulse signals from the Vehicle Speed Sensor (VSS) into speed data.	Nearly the same as speedometer indication	○
Mass Air Flow (MAF)	The MAF sensor measures the volume of the air that flows into the engine, and sends voltage signals to the ECM.	At idle speed: 2.2 - 4.4 g/sec At 2,500 rpm with not load: 7.5- 13.0 g/sec	○
Engine Coolant Temperature (ECT)	The ECT sensor converts coolant temperature into voltage and signals the ECM. The sensor is a thermistor whose internal resistance changes with coolant temperature. The ECM uses the voltage signals from the ECT sensor to determine the amount of injected fuel.	With cold engine: Same as ambient temperature and IAT With engine warmed up: 90 - 96°C	○
Heated Oxygen Sensor (HO2S) (Primary) (Secondary)	The Heated Oxygen Sensor detects the oxygen content in the exhaust gas and sends voltage signals to the ECM. Based on these signals, the ECM controls the air/fuel ratio. When the oxygen content is high (that is, when the ratio is leaner than the stoichiometric ratio), the voltage signal is lower. When the oxygen content is low (that is, when the ratio is richer than the stoichiometric ratio), the voltage signal is higher.	0.0-1.25V At idle speed: about 0.1-0.9V	×

Data	Description	Operating Value	Freeze Data
HO2S Feedback Loop Status	Loop status is indicated as "open" or "closed". Closed: Based on the HO2S output, the ECM determines the air/fuel ratio and controls the amount of injected fuel. Open: Ignoring HO2S output, the ECM refers to signals from the TP, MAF, and ECT sensors to control the amount of injected fuel.	At idle speed: closed	○
Short Term Fuel Trim	The air/fuel ratio correction coefficient for correcting the amount of injected fuel when H02S feedback is in the closed loop status. When the signal from the H02S is weak, short term fuel trim gets higher, and the ECM increases the amount of injected fuel. The air/fuel ratio gradually gets richer, causing a higher HO2S output. Consequently, the short term fuel trim is lowered, and the ECM reduces the amount of injected fuel. This cycle keeps the air/fuel ratio close to the stoichiometric ratio when in closed loop status.	±20%	○
Long Term Fuel Trim	Long term fuel trim is computed from short term fuel trim and indicates changes occurring in the fuel supply system over a long period. If long term fuel trim is higher than 1.00, the amount of injected fuel must be increased. If it is lower than 1.00, the amount of injected fuel must be reduced.	±20%	○
Intake Air Temperature (IAT)	The IAT sensor converts intake air temperature into voltage and signals the ECM. When intake air temperature is low, the internal resistance of the sensor increases, and the voltage signal is higher.	With cold engine: Same as ambient temperature and ECT	○
Throttle Position	Based on the accelerator pedal position, the opening angle of the throttle valve is indicated.	At idle speed: approx. 10%	○
Ignition Timing	Ignition timing is the ignition advance angle set by the ECM. The ECM matches ignition timing to the driving conditions.	At idle speed: 15° ±2° BTDC with the SCS service connector connected.	×
Calculated Load Value (CLV)	CLV is the engine load calculated from the MAF data.	At idle speed: 14-27% At 2,500 rpm with no load: 13-26%	○

Troubleshooting

Troubleshooting Procedures (cont'd)

Symptom Chart

Listed below are symptoms and probable causes for problems that DO NOT cause the Malfunction Indicator Lamp (MIL) to come on. If the MIL was reported on, go to page 11-32.

Troubleshoot each probable cause in the order listed (from left to right) until the symptom is eliminated.

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Cold fast idle too high	7, 8, 9, 11, 10
Idle speed fluctuates	9, 7, 8, 11, 10
Misfire or rough running	Troubleshoot for misfire on pages 11-82, 11-85
Low power	2, 10, 11, 13, 18, 17, 19, 21
Engine stalls	2, 4, 12, 7, 21, 9, 5

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— Starting system
— Overheating
— Battery

Probable Cause List (For the DTC Chart, see page 11-44)

Probable Cause	Page	System
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2	11-124	Fuel pressure
3	11-131	PGM-FI main relay
4	Section 23	Ignition system
5	See DTC chart	Crankshaft Position/Top Dead Center/Cylinder Position sensor circuit
6	See DTC chart	Intake Air Temperature (IAT) sensor circuit
7	See DTC chart	Idle Air Control Valve (IACV)
8	11-116	Fast idle thermo valve
9	11-117	Idle speed adjustment
10	11-138	Throttle body
11	11-137	Throttle cable
12	See DTC chart	Mass Air Flow (MAF) sensor
13	See DTC chart	Throttle Position (TP) sensor
14	See DTC chart	Barometric pressure (BARO) sensor
15	11-112	A/T gear position signal
16	11-111	Brake switch signal
17	11-136	Air Cleaner
18	11-142	Intake Air Bypass (IAB) control system and intake air pipe
19	See DTC chart	Three Way Catalytic Converter (TWC)
20	See DTC chart	Evaporative emission (EVAP) control
21	———	Contaminated fuel

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart

DTC (MIL indication*)	Detection Item	Probable Cause	Page
P0101 (50)*1	Mass Air Flow Circuit Range/Performance Problem	• MAF sensor	11-56
P0102 (50)	Mass Air Flow Circuit Low Input	• Open or short in MAF sensor circuit • MAF sensor • ECM	11-57
P0103 (50)	Mass Air Flow Circuit High Input	• Open in MAF sensor circuit • MAF sensor • ECM	11-59
P0111 (10)*3	Intake Air Temperature Circuit Range/Performance Problem	• IAT sensor	11-62
P0112 (10)	Intake Air Temperature Circuit Low Input	• Short in IAT sensor circuit • IAT sensor • ECM	11-63
P0113 (10)	Intake Air Temperature Circuit High Input	• Open in IAT sensor circuit • IAT sensor • ECM	11-64
P0116 (86)	Engine Coolant Temperature Circuit Range/Performance Problem	• ECT sensor • Cooling system	11-65
P0117 (6)	Engine Coolant Temperature Circuit Low Input	• Short in ECT sensor circuit • ECT sensor • ECM	11-66
P0118 (6)	Engine Coolant Temperature Circuit High Input	• Open in ECT sensor circuit • ECT sensor • ECM	11-67
P0122 (7)	Throttle Position Circuit Low Input	• Open or short in TP sensor circuit • TP sensor • ECM • TCM	11-68
P0123 (7)	Throttle Position Circuit High Input	• Open in TP sensor circuit • TP sensor • ECM	11-70
P0130 (1)	Primary Heated Oxygen Sensor Circuit Malfunction	• Open or short in primary HO2S circuit • ECM	11-73
P0133 (61)	Primary Heated Oxygen Sensor Slow Response	• Primary HO2S • Exhaust system	11-75
P0135 (41)	Primary Heated Oxygen Sensor Heater Circuit Malfunction	• Open or short in primary HO2S heater circuit • ECM	11-77

*: These DTCs will be indicated by the blinking of the Malfunction Indicator Lamp (MIL) with the SCS service connector connected.
*1:'95-96 models
*3: '95-97 models

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0139 (63)	Secondary Heated Oxygen Sensor Slow Response	• Secondary HO2S • Open or short in secondary HO2S circuit • ECM	11-76
P0141 (65)	Secondary Heated Oxygen Sensor Heater Circuit Malfunction	• Open or short in secondary HO2S heater circuit • ECM	11-77
P0171 (45)	System Too Lean	• Fuel supply system • Primary HO2S • MAF sensor • Contaminated fuel • Valve clearance • Intake leakage • Exhaust leakage	11-80
P0172 (45)	System Too Rich	• Fuel supply system • Primary HO2S • MAF sensor • Contaminated fuel • Valve clearance	11-80
P0300 (76)	Random Misfire Detected	• Ignition system • Fuel supply system • MAF sensor • EGR system • IAC valve • Contaminated fuel • Lack of fuel	11-85
P0301 (71) P0302 (72) P0303 (73) P0304 (74) P0305 (75)	— Cylinder 1 — Cylinder 2 — Cylinder 3 — Cylinder 4 — Cylinder 5 Misfire Detected	• Fuel injector • Fuel injector circuit • Ignition system • Low compression • Valve clearance	11-82
P0327 (23)	Front Knock Sensor Circuit Low Input	• Front knock sensor • Front knock sensor circuit • ECM	11-86
P0328 (23)	Front Knock Sensor Circuit High Input	• Front knock sensor • Front knock sensor circuit • ECM	11-87
P0332 (53)	Rear Knock Sensor Circuit Low Input	• Rear knock sensor • Rear knock sensor circuit • ECM	11-86
P0333 (53)	Rear Knock Sensor Circuit High Input	• Rear knock sensor • Rear knock sensor circuit • ECM	11-87

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P0335 (4)	Crankshaft Position Sensor Circuit Low Input	• Crankshaft Position Sensor • Crankshaft Position Sensor circuit • ECM	11-88
P0336 (4)	Crankshaft Position Sensor Range/Performance	• Crankshaft Position Sensor • Timing belt skipped teeth	11-88
P0401 (80)	Exhaust Gas Recirculation Insufficient Flow Detected	• EGR valve • EGR line	11-148
P0420 (67)	Catalyst System Efficiency Below Threshold	• Three Way Catalytic converter • Secondary HO2S	11-146
P0440 (90)*2	Evaporative Emission Control System Leak Detected	• Vacuum connection • Fuel tank • Fuel tank pressure sensor • Fuel fill cap • EVAP bypass solenoid valve • EVAP two way valve • EVAP control canister vent shut valve • EVAP control canister • EVAP Purge control solenoid valve	11-165
P0441 (92)*1	Evaporative Emission Control System Incorrect Purge Flow	• EVAP Purge Control Solenoid valve • EVAP Purge Control Solenoid Valve circuit • EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Throttle Body (purge port) • Tubing • ECM	11-156
P0452 (91)*2	Evaporative Emission Control System Pressure Sensor (Fuel Tank Pressure Sensor) Circuit Low Input	• Open or short in Fuel Pressure Sensor circuit • Fuel Tank Pressure Sensor • ECM	11-161
P0453 (91)*2	Evaporative Emission Control System Pressure Sensor (Fuel Tank Pressure Sensor) Circuit High Input	• Open in Fuel Tank Pressure Sensor circuit • Fuel Tank Pressure Sensor • ECM	11-163
P0500 (17)	Vehicle Speed Sensor Circuit Low Input	• Vehicle Speed Sensor • Vehicle Speed Sensor circuit • ECM	11-90
P0505 (14)	Idle Control System Malfunction	• IAC valve • Fast idle thermo valve • Throttle Body	11-103
P0700 P0715 P0720 P0725 P0730 (70) P0740 P0753 P0758	Automatic Transaxle	—	Section 14

*1: '95 -96 models
*2:'97-98 models

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1102 (50)*2	Mass Air Flow Lower Than Expected	• MAF sensor	11-60
P1103 (50)*2	Mass Air Flow Higher Than Expected	• MAF sensor	11-61
P1106 (13)*2	Barometric Pressure Circuit Range/Performance Problem	• ECM (Baro sensor)	11-91
P1107 (13)	Barometric Pressure Circuit Low Input	• ECM (Baro sensor) • TCM • ECM to TCM harness	11-92
P1108 (13)	Barometric Pressure Circuit High Input	• ECM (Baro sensor)	11-92
P1121 (7)*2	Throttle Position Lower Than Expected	• TP sensor	11-71
P1122 (7)*2	Throttle Position Higher Than Expected	• TP sensor	11-72
P1297 (20)	Electrical Load Detector Circuit Low Input	• Electrical Load Detector • Electrical Load Detector circuit • ECM	11-93
P1298 (20)	Electrical Load Detector Circuit High Input	• Electrical Load Detector • Electrical Load Detector circuit • ECM	11-94
P1336 (54)	Crankshaft Speed Fluctuation Sensor Intermittent Interruption	• CKF sensor	11-95
P1337 (54)	Crankshaft Speed Fluctuation Sensor No Signal	• CKF sensor • CKF sensor circuit • ECM	11-95
P1359 (8)	Crankshaft Position/Top Dead Center Sensor Connector Disconnection	• CKP/TDC sensor circuit	11-97
P1361 (8)	Top Dead Center Sensor Intermittent Interruption	• TDC sensor	11-88
P1362 (8)	Top Dead Center Sensor No Signal	• TDC sensor • TDC sensor circuit • ECM	11-88

*2: '97 - 98 models

(cont'd)

Troubleshooting

Diagnostic Trouble Code (DTC) Chart (cont'd)

DTC (MIL indication)	Detection Item	Probable Cause	Page
P1381 (9)	Cylinder Position Sensor Intermittent Interruption	• CYP sensor	11-88
P1382 (9)	Cylinder Position Sensor No Signal	• CYP sensor • CYP sensor circuit • ECM	11-88
P1459 (92)*1	Evaporative Emission Purge Flow Switch Malfunction	• EVAP Purge Flow Switch • EVAP Purge Flow Switch circuit • Tubing • ECM	11-158
P1491 (12)	EGR Valve Lift Insufficient Detected	• EGR valve (with lift sensor) • EGR valve lift sensor circuit • EGR control solenoid valve • EGR control solenoid valve circuit • EGR vacuum line • ECM	11-149
P1498 (12)	EGR Valve Lift Sensor High Voltage	• EGR valve (with lift sensor) • EGR valve lift sensor circuit • ECM	11-152
P1508 (14)	Idle Air Control Valve Circuit Failure	• IAC valve • IAC valve circuit • ECM	11-105
P1660 (70)	A/T FI Data Line Failure	• A/T FI Data Line • TCM • ECM	11-98
P1681 (30)	A/T FI Signal A Low Input	• AFSA Line • TCM • ECM	11-100
P1682 (30)	A/T FI Signal A High Input	• AFSA Line • TCM • ECM	11-100
P1686 (31)	A/T FI Signal B Low Input	• AFSB Line • TCM • ECM	11-100
P1687 (31)	A/T FI Signal B High Input	• AFSB Line • TCM • ECM	11-100
P1705 P1706 P1753 P1758 P1768 (70) P1786 P1787 P1790 P1791 P1792 P1794	Automatic Transaxle	——	Section 14

*1: '95 -96 models

How to Read Flowcharts

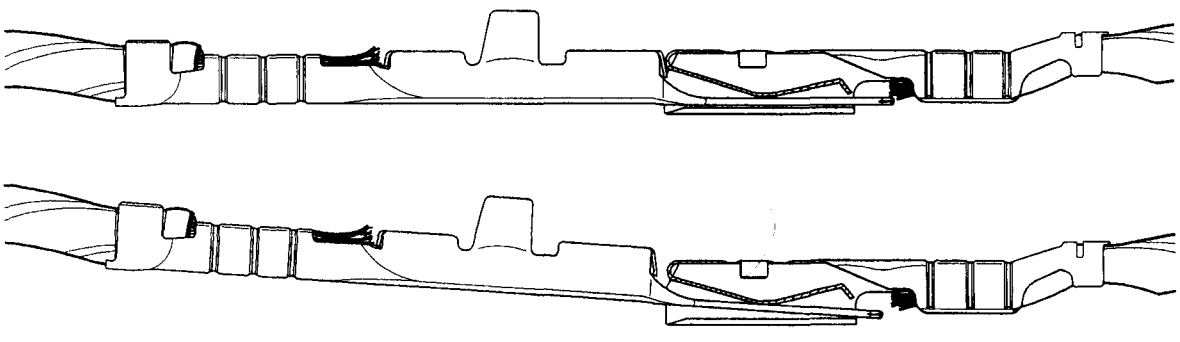
A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: If you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START (bold type)	Describes the conditions or situation to start a troubleshooting flowchart.
ACTION	Asks you to do something; perform a test, set up a condition etc.
DECISION	Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK at this time. If the Malfunction Indicator Lamp (MIL) on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting (see illustration below).
- Most of the troubleshooting flowcharts have you reset the Engine Control Module (ECM) and try to duplicate the Diagnostic Trouble Code (DTC). If the problem is intermittent and you can't duplicate the code, do not continue though the flowchart. To do so will only result in confusion and, possibly, a needlessly replaced ECM.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECM's), this can sometimes mean something works, but not the way it's supposed to.

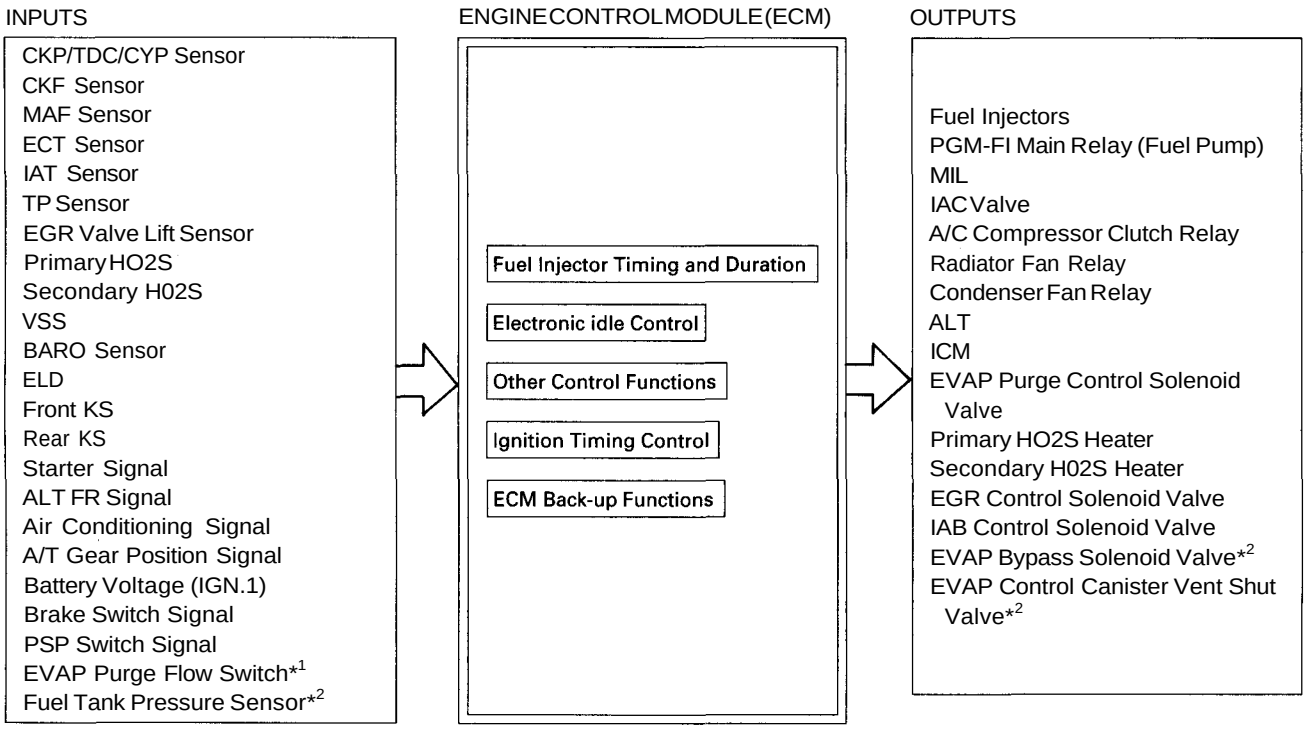
TIGHT



LOOSE

PGM-FI System

System Description



*1: '95-96 models
*2: '97 - 98 models

PGM-FI System

The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel injector Timing and Duration

The ECM contains memories for the basic discharge durations at various engine speeds and manifold air flow rates. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the transmission is in gear, the brake pedal is depressed, the P/S load is high, or the alternator is charging, the ECM controls current to the IAC Valve to maintain the correct idle speed.

Ignition Timing Control

- The ECM contains memories for basic ignition timing at various engine speeds and manifold air flow rates. Ignition timing is also adjusted for engine coolant temperature.
- A knock control system is also used. When detonation is detected by a knock sensor (KS), the ignition timing is retarded.

Other Control Functions

1. Starting Control
   When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.
2. Fuel Pump Control
   - When the ignition switch is initially turned on, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
   - When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.
3. Fuel Cut-off Control
   - During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 1,250 rpm.
   - Fuel cut-off action also takes place when engine speed exceeds 7,100 rpm, regardless of the position of the throttle valve, to protect the engine from over-revving.



4. A/C Compressor Clutch Relay
When the ECM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.

5. Evaporative Emission (EVAP) Purge Control Solenoid Valve
When the engine coolant temperature is below 167°F (75°C) ('97 - 98 models: 158°F (70°C), the ECM controls the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister diaphragm.

6. Intake Air Bypass (IAB) Control Solenoid Valve
When the engine speed is below 4,800 rpm, the IAB control solenoid valve is activated by a signal from the ECM, intake air flows through the smaller chamber, then high torque is delivered. At speeds higher than 4,800 rpm, the solenoid valve is deactivated by the ECM, and intake air flows through the larger chamber in order to reduce the resistance in airflow.

7. Exhaust Gas Recirculation (EGR) Control Solenoid Valve
When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECM controls the EGR control solenoid valve which supplies regulated vacuum to the EGR valve.

8. Alternator Control
The system controls the voltage generated at the alternator in accordance with the electrical load and driving mode, which reduces the engine load to improve the fuel economy.

ECM Fail-safe/Back-up Functions

1. Fail-safe Function
When an abnormality occurs in a signal from a sensor, the ECM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.

2. Back-up Function
When an abnormality occurs in the ECM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.

3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]
When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the DTC in erasable memory. When the ignition is initially turned on, the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.

4. Two Trip Detection Method ('95 - 96 models)
To prevent false indications, the Two Trip Detection Method is used for the MAF sensor, H02S, fuel metering-related, idle control system, ECT sensor, and EGR system self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the ECM informs the driver by lighting the MIL.
However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

5. Two (or Three) Driving Cycle Detection Method ('95 - 96 models)
A "Driving Cycle" consists of starting the engine, beginning closed loop operation, and stopping the engine. If misfiring that increases emissions or EVAP control system malfunction is detected in two consecutive driving cycles, or TWC deterioration is detected in three consecutive driving cycles, the ECM turns the MIL on.
However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

6. Two Driving Cycle Detection Method ('97 - 98 models)
To prevent false indications, the "two driving cycle detection method" is used for the H02S, fuel metering-related, idle control system, ECT sensor, EGR system, TWC and EVAP control system and other self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after switch is turned OFF and ON (II) again, the ECM informs the driver by turning on the MIL.

PGM-FI System

Engine Control Module (ECM)

The Malfunction Indicator Lamp (MIL) never comes on (even for two seconds) after ignition is turned on.

NOTE: If this symptom is intermittent, check for a loose fuse No. 1 (BACK UP LIGHTS, METER LIGHTS, 10 A) in the under-dash fuse/relay box, a poor connection at ECM terminal A7, or an intermittent open in the GRN/RED wire between the ECM (A7) and the gauge assembly.

Turn the ignition switch ON (II).

Is the low oil pressure light on?

NO

- **Repair short in the wire between NO. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse and gauge assembly.**
- **Replace No. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse.**

YES

Try to start the engine.

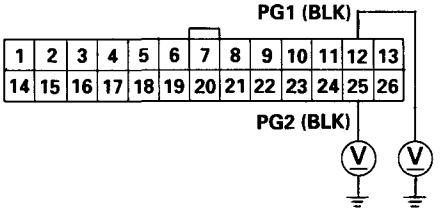
Does the engine start?

NO

YES

Check for an open in the wires (PG1, PG2 lines):
1. Turn the ignition switch ON (II).
2. Measure voltage between body ground and ECM connector terminals A12 and A25 individually.

ECM CONNECTOR A (26P)



Wire side of female terminals

Check for an open in the wire or bulb (MIL line):
1. Turn the ignition switch OFF.
2. Connect the ECM connector terminal A7 to body ground with a jumper wire.
3. Turn the ignition switch ON (II).

Is there less than 1.0 V?

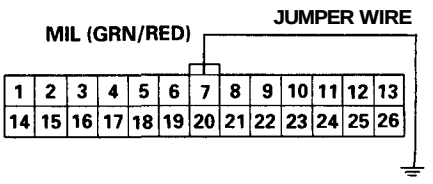
NO

Repair open in the wire(s) between ECM and G101 (located at left side of engine) that had more than 1.0 V.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

ECM CONNECTOR A (26P)



Wire side of female terminals

Is the MIL on?

NO

- **Repair open in the wires between ECM (A7) and gauge assembly.**
- **Replace the MIL bulb.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Check the Diagnostic Trouble Code (DTC):
1. Connect a scan tool or Honda PGM Tester.
2. Turn the ignition switch ON (II).
3. Read the DTC with the scan tool or Honda PGM Tester.

Are any DTC(s) indicated?

YES → **Go to Diagnostic Trouble Code (DTC) chart (see page 11-44).**

NO

Try to start the engine.

Does the engine start?

NO → A

(To page 11-54)

YES

Check for a short in the wire (SCS line):
1. Stop the engine and turn the ignition switch ON (II).
2. Measure voltage between ECM connector terminals D13 and D22.

Is there battery voltage?

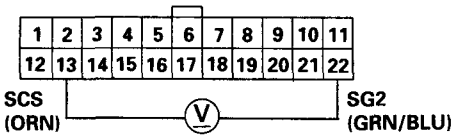
NO → **Repair short to body ground in the wire between ECM (D13) and service check connector.**

YES

(To page 11-54)

NOTE:
- When there is no Diagnostic Trouble Code (DTC) stored, the MIL will stay on if the SCS service connector is connected and the ignition switch is on.
- If this symptom is intermittent, check for:
  - — A loose ECU (ECM) (15 A) fuse in the under-hood fuse/relay box
  - — A loose No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box
  - — An intermittent short in the wire between the ECM (D13) and the service check connector
  - — An intermittent open in the wire between the ECM (D22) and the service check connector
  - — An intermittent short in the wire between the ECM (A7) and the gauge assembly
  - — An intermittent short in the wire between the ECM (D10), the TP sensor and the fuel tank pressure sensor ('97 - 98 models)
  - — An intermittent short in the wire between the ECM (D21) and the EGR valve lift sensor
- See the OBD II scan tool or Honda PGM Tester user's manuals for specific operating instructions.

ECM CONNECTOR D (22P)



Wire side of female terminals

(cont'd)

PGM-FI System

Engine Control Module (ECM) (cont'd)

(From page 11-53)

Check for a short in the wire (MIL line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector A (26P).
3. Turn the ignition switch ON (II).

Is the MIL ON?

YES → **Repair short to body ground in the wire between the ECM (A7) and MIL.**

NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(From page 11-53)

A

Inspect ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO → **— Repair short in the wire between ECU (ECM) (15 A) fuse and PGM-FI main relay.**
— Replace ECU (ECM) (15 A) fuse.

YES

Inspect No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO → **— Repair short in the wire between No. 2 FUEL PUMP (15 A) fuse and PGM-FI main relay.**
— Replace No. 2 FUEL PUMP (15A) fuse.

YES

Check for a short in a sensor:
1. Turn the ignition switch ON.
2. Disconnect the 3P connector of each sensor one at time:
   - TP sensor
   - EGR valve lift sensor
   - Fuel tank pressure sensor ('97-98 models)

(To page 11-55)

(From page 11-54)

Does the MIL go off momentarily?

YES → **Replace the sensor that caused the light to go out.**

NO

Check for a short in the wires (VCC1, VCC2 lines):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector D (22P).
3. Check for continuity between body ground and ECM connector terminals D10 and D21 individually.

Is there continuity?

YES →
- **Repair short to body ground in the wire between ECM (D10), TP sensor and fuel tank pressure sensor ('97 model).**
- **Repair short to body ground in the wire between ECM (D21) and EGR valve lift sensor.**

NO

Check for an open in the wires (IGP1, IGP2 lines):
1. Disconnect the junction connector, MAF sensor and IAC valve connectors.
2. Turn the ignition switch ON (II).
3. Measure voltage between body ground and ECM connector terminals A13 and B1 individually.

Is there battery voltage?

NO →
- **Repair open in the wire(s) between ECM (A13, B1) and PGM-FI main relay.**
- **Check for poor connections or loose wires at the PGM-FI main relay.**

YES

Check for an open in the wires (LG1, LG2 lines):
1. Reconnect all sensor connectors.
2. Reconnect the ECM connector D (22P).
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and ECM connector terminals A26 and B9 individually.

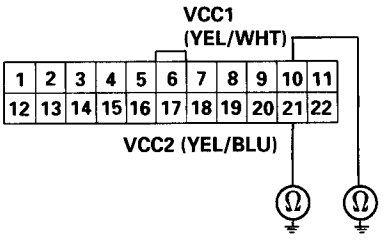
Is there less than 1.0 V?

NO → **Repair open in the wire(s) between ECM (A26, B9) and G101 that had more than 1.0 V.**

YES

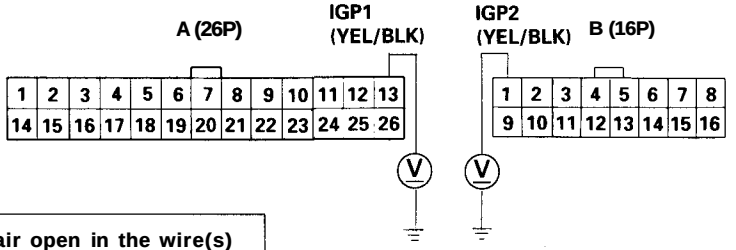
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

ECM CONNECTOR D (22P)



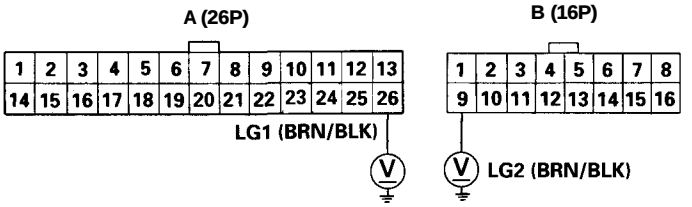
Wire side of female terminals

ECM CONNECTORS



Wire side of female terminals

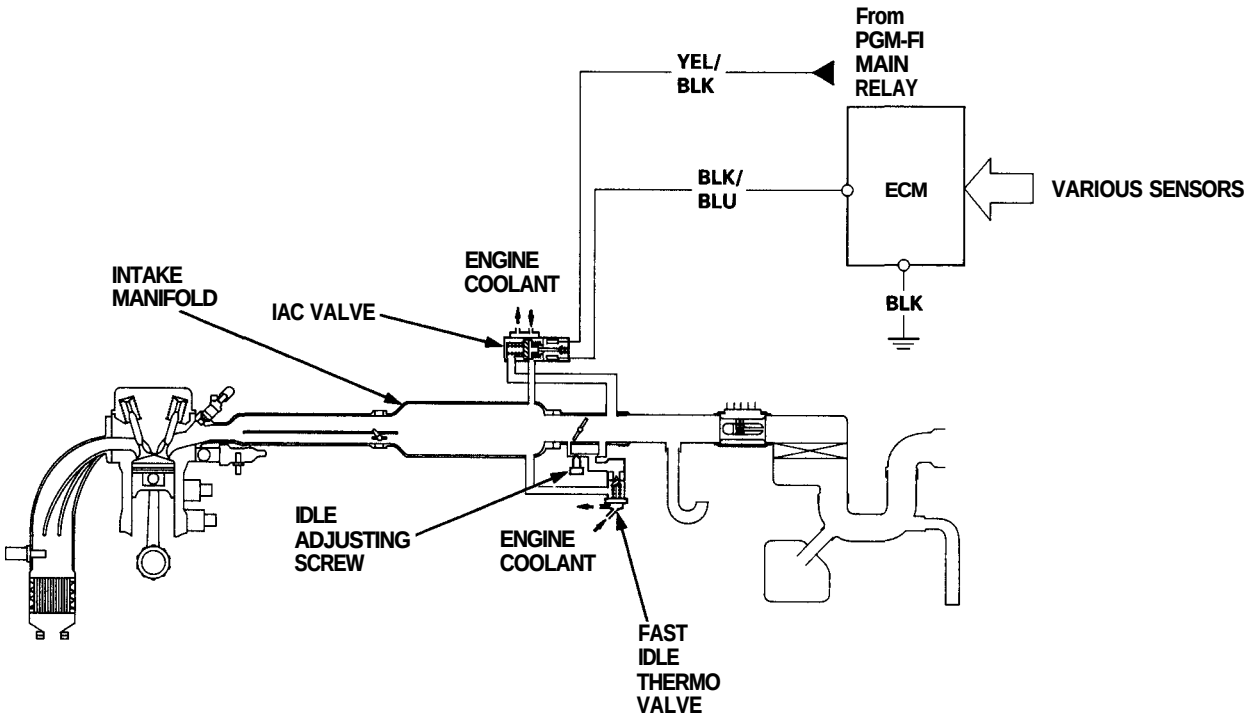
ECM CONNECTORS



Idle Control System

System Description

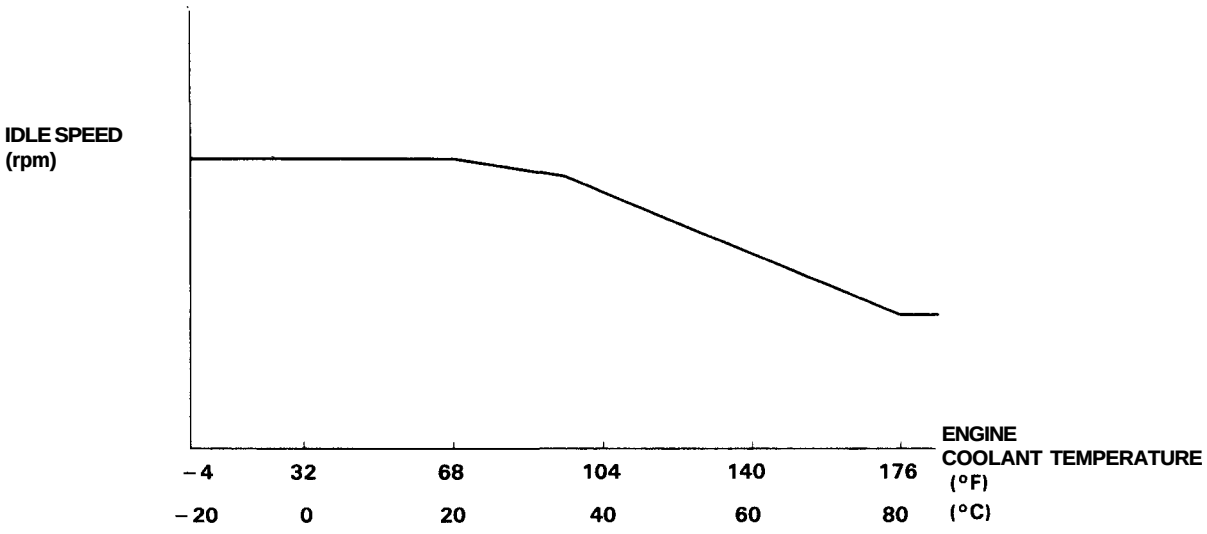
The idle speed of the engine is controlled by the Idle Air Control (IAC) Valve.
The valve changes the amount of air bypassing into the intake manifold in response to electric current controlled by the ECM. When the IAC Valve is activated, the valve opens to maintain the proper idle speed.



Idle Control System

1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150-300 rpm.

2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.



3. When the idle speed is out of specification and the scan tool does not indicate Diagnostic Trouble Code (DTC) P0505 or P1508, check the following items:
   - Adjust the idle speed (see page 11-117)
   - Starter switch signal (see page 11-107)
   - Air conditioning signal (see page 11-108)
   - ALT FR signal (see page 11-110)
   - Brake switch signal (see page 11-111)
   - A/T gear position signal (see page 11-112)
   - PSP switch signal (see page 11-114)
   - Fast idle thermo valve (see page 11-116)
   - Hoses and connections
   - IAC valve and its mounting O-rings

4. If the above items are normal, substitute a known-good IAC valve and readjust the idle speed (see page 11-117).

   If the idle speed still cannot be adjusted to specification (and the scan tool does not indicate DTC P0505 or P1508) after IAC valve replacement, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.

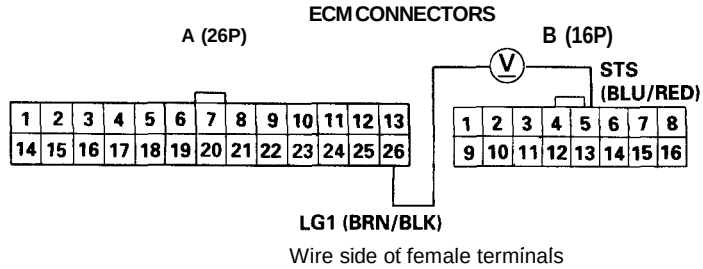
Starter Switch Signal

This signals the ECM when the engine is cranking.

Inspection of Starter Switch Signal.

NOTE: Transmission in [N] or [P] position.

Check for an open or short in the wire (STS line):
Measure voltage between ECM connector terminals B5 and A26 on the ECM connectors with the ignition switch in the start position (III).



Is there battery voltage?

NO → Inspect the No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

YES → **Starter switch signal is OK.**

Is the fuse OK?

NO → **— Repair short in the wire between the ECM (B5) and the No. 9 STARTER SIGNAL (7.5 A) fuse or the PGM-FI main relay.**
— Replace the No. 9 STARTER SIGNAL (7.5 A) fuse.

YES → **Repair open in the wire between the ECM (B5) and the No. 9 STARTER SIGNAL (7.5 A) fuse.**

Idle Control System

Air Conditioning Signal

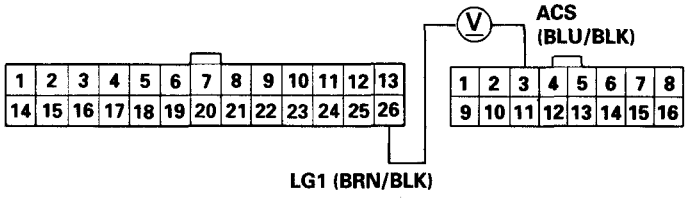
This signals the ECM when there is a demand for cooling from the air conditioning system.

Inspection of Air Conditioning Signal.

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the A/C pressure switch connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals B3 and A26.

ECM CONNECTORS

A (26P) B (16P)



Wire side of female terminals

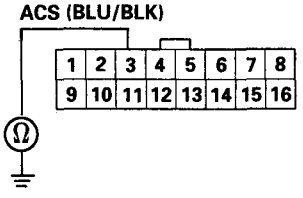
Is there battery voltage?

NO

YES

Check for a short in the wire (ACS line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector B (16P).
3. Check for continuity between body ground and ECM connector terminal B3.

ECM CONNECTOR B (16P)



Wire side of female terminals

Is there continuity?

YES

Repair short in the wire between the ECM (B3) and the A/C pressure switch.

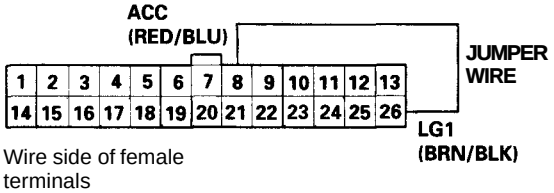
NO

— **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**
— **See the air conditioner inspection (see section 22).**

Check for an open in the wire (ACC line):
1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch connector.
3. Turn the ignition switch ON (II).
4. Momentarily connect ECM connector terminals A8 and A26 with a jumper wire several times.

(To page 11-109)

ECM CONNECTOR A (26P)



Wire side of female terminals

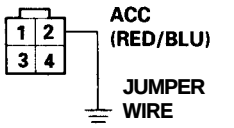
(From page 11-108)

Is there a clicking noise from the A/C compressor clutch?

NO

Check for an open in the wire (ACC line):
Momentarily connect the A/C clutch relay connector terminal No. 2 to body ground with a jumper wire several times.

A/C CLUTCH RELAY CONNECTOR (C328)



Wire side of female terminals

YES

Is there a clicking noise from the A/C compressor clutch?

NO

See air conditioner inspection (see section 22).

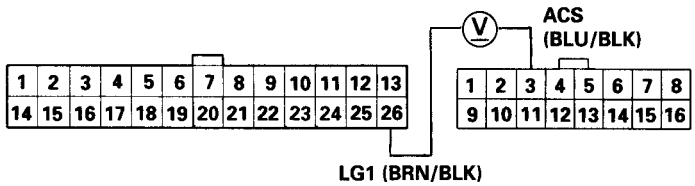
YES

Repair open in the wire between the ECM (A8) and the A/C clutch relay.

Check the A/C operation:
1. Start the engine.
2. Turn the blower switch ON.
3. Turn the A/C switch ON.

ECM CONNECTORS

A (26P) **B (16P)**



Wire side of female terminals

Does the A/C operate?

NO

Check for an open in the wire (ACC line):
Measure voltage between ECM connector terminals A26 and B3.

YES

Air conditioning signal is OK.

Is voltage less than 1.0 V?

NO

Repair open in the wire between the ECM (B3) and the A/C switch.

YES

- **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**
- **See the air conditioner inspection (see section 22).**

Idle Control System

Alternator (ALT) FR Signal

This signals the ECM when the Alternator (ALT) is charging.

Inspection of ALT FR Signal.

Check for a short in the wire (ALT F line):
1. Disconnect the GRN 4P connector from the ALT.
2. Turn the ignition switch ON (II).
3. Measure voltage between ECM connector terminals D5 and A26.

Is there approx. 5 V?

NO

Check for a short in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect the ECM connector D (22P).
4. Check for continuity between body ground and ECM connector terminal D5.

Is there continuity?

YES

Repair short in the wire between the ECM (D5) and the ALT.

NO

Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

YES

Check the operation of the ALT:
1. Turn the ignition switch OFF.
2. Reconnect the ALT GRN 4P connector to the ALT.
3. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in [N] or [P] position) until the radiator fan comes on, then let it idle.
4. Measure voltage between ECM connector terminals D5 and A26.

Does the voltage decrease when headlights and rear defogger are turned on?

YES

ALT FR signal is OK.

NO

Check for an open in the wire (ALT F line):
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable from the battery.
3. Disconnect the ECM connector D (22P).
4. Disconnect the GRN 4P connector from the ALT.
5. Connect the ALT 4P connector terminal No. 4 to body ground with a jumper wire.
6. Check for continuity between body ground and ECM connector terminal D5.

Is there continuity?

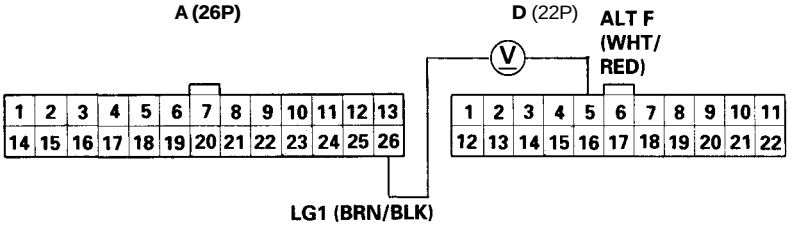
NO

Repair open wire between the ECM (D5) and the ALT.

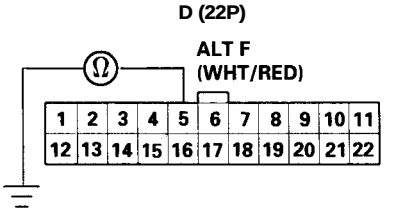
YES

See the ALT inspection (see section 23).

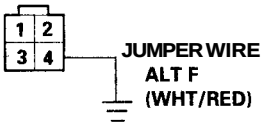
ECM CONNECTORS



Wire side of female terminals

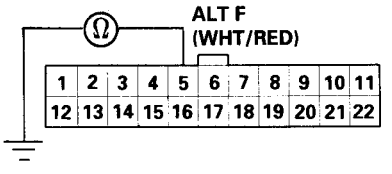


ALT GRN 4P CONNECTOR (C127)



Wire side of female terminals

ECM CONNECTOR D (22P)



Wire side of female terminals

Brake Switch Signal

This signals the ECM when the brake pedal is depressed.

Inspection of Brake Switch Signal.

Are the brake lights on without depressing the brake pedal?

YES → **Inspect the brake switch (see section 19).**

NO

Depress the brake pedal.

Do the brake lights come on?

NO → Inspect the STOP HORN (20 A) fuse in the under-hood fuse/ relay box.

YES

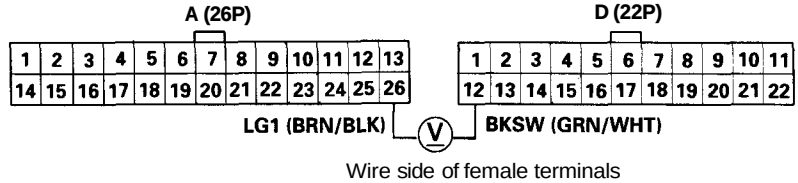
Is the fuse OK?

NO → **— Repair short in the wire between the brake switch and the STOP HORN (20 A) fuse.**
— Replace the STOP HORN (20 A) fuse.

YES → **— Repair open in the wire between the brake switch and the STOP HORN (20 A) fuse.**
— Inspect the brake switch (see section 19).

Check for an open in the wire (BKSW line):
1. Depress the brake pedal.
2. Measure voltage between ECM connector terminals D12 and A26 with the brake pedal depressed.

ECM CONNECTORS



Wire side of female terminals

Is there battery voltage?

NO → **Repair open in the wire between the ECM (D12) and the brake switch.**

YES

Brake switch signal is OK.

Idle Control System

Automatic Transaxle (A/T) Gear Position Signal

This signals the ECM when the transmission is in [N] or [P] position.

Inspection of A/T Gear Position Signal.

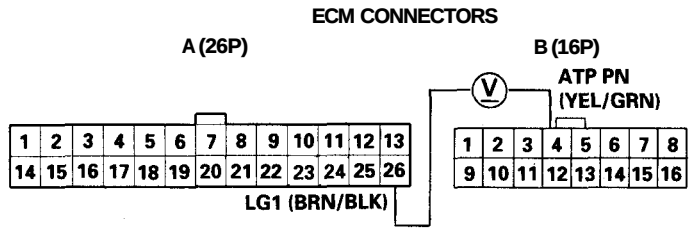
Check the operation of the A/T gear position switch:
1. Turn the ignition switch ON (II).
2. Observe the A/T shift position indicator and select each position separately.

Does the indicator light properly?

NO → **See the A/T gear position indicator inspection (see section 14).**

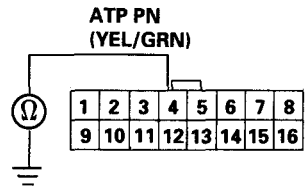
YES

Check for a short in the wire (ATP PN line):
1. Turn the ignition switch OFF.
2. Disconnect the 16P connector from the gauge assembly.
3. Disconnect the 26P connector from the TCM.
4. Turn the ignition switch ON (II).
5. Measure voltage between ECM connector terminals B4 and A26.



Is there approx. 5 V?

NO → **Check for a short in the wire (ATP PN line):**
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector B (16P).
3. Check for continuity between body ground and ECM connector terminal B4.



YES

Is there continuity?

YES → **Repair short in the wire between the ECM (B4) and the gauge assembly.**

NO

Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

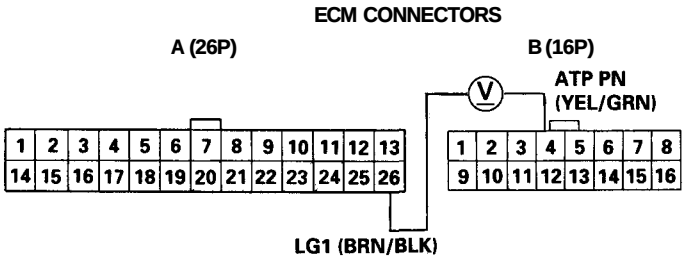
A

(To page 11-113)

(From page 11-112)

A

Check for an open in the wire (ATP PN line):
1. Turn the ignition switch OFF.
2. Reconnect the 16P connector to the gauge assembly.
3. Reconnect the 26P connector to the TCM.
4. Start the engine.
5. Measure voltage between ECM connector terminals B4 and A26 with the transmission in N position.



Wire side of female terminals

Is there less than 1.0 V?

NO

- **Repair open in the wire between the ECM (B4) and the gauge assembly.**
- **Repair open in RED wire between the gauge assembly and the A/T gear position switch.**

YES

Check for an open in the wire (ATP PN line):
Measure voltage between ECM connector terminals B4 and A26 with the transmission in P position.

Is there less than 1.0 V?

NO

Repair open in BLK/BLU wire between the gauge assembly and the A/T gear position switch.

YES

A/T gear position signal is OK.

Idle Control System

Power Steering Pressure (PSP) Switch Signal

This signals the ECM when the power steering load is high.

Inspection of PSP switch signal.

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch ON (II).
2. Measure voltage between ECM connector terminals B12 and A26.

Is there less than 1.0 V?

NO

Check for an open in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the PSP switch 2P connector.
3. Turn the ignition switch ON (II).
4. At the harness side, connect the PSP switch 2P connector terminals No. 1 and No. 2 with a jumper wire.
5. Measure voltage between ECM connector terminals B12 and A26.

Is there less than 1.0 V?

NO

— Repair open in the wire between the ECM (B12) and the PSP switch.
— Repair open in BLK wire between the PSP switch and G301.

YES

Replace the PSP switch.

YES

Check the operation of the PSP switch:
1. Start the engine
2. Turn steering wheel to full lock.
3. Measure voltage between ECM connector terminals B12 and A26.

Is there battery voltage?

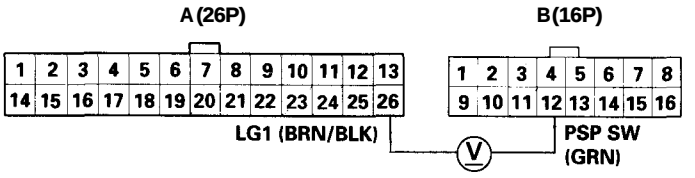
NO

YES

PSP switch signal is OK.

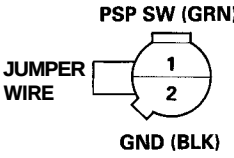
(To page 11-115)

ECM CONNECTORS



Wire side of female terminals

PSP SWITCH CONNECTOR (C309)

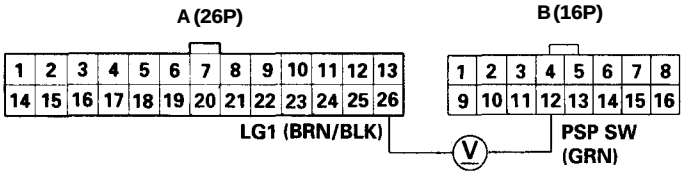


Wire side of female terminals

(From page 11-114)

Check for a short in the PSP switch:
1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the PSP switch.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals B12 and A26.

ECM CONNECTORS

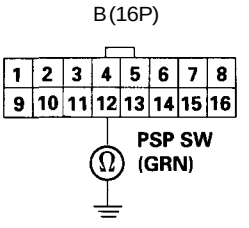


Wire side of female terminals

Is there battery voltage?

NO

Check for a short in the wire (PSP SW line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector B (16P).
3. Check for continuity between body ground and ECM connector terminal B12.



YES

Replace the PSP switch.

Is there continuity?

YES

Repair short in the wire between the ECM (B12) and the PSP switch.

NO

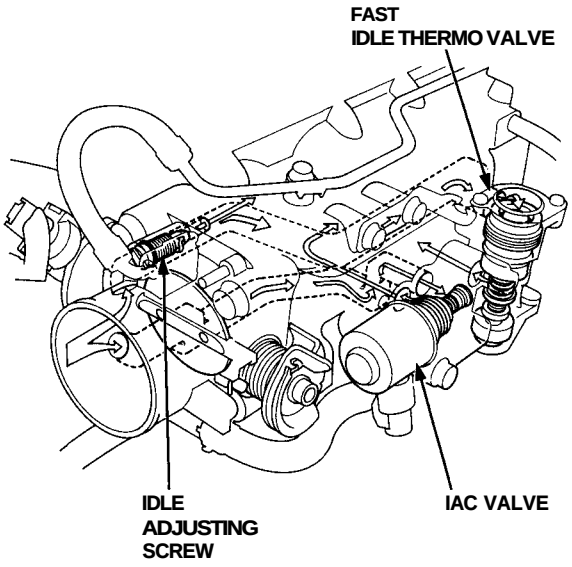
Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

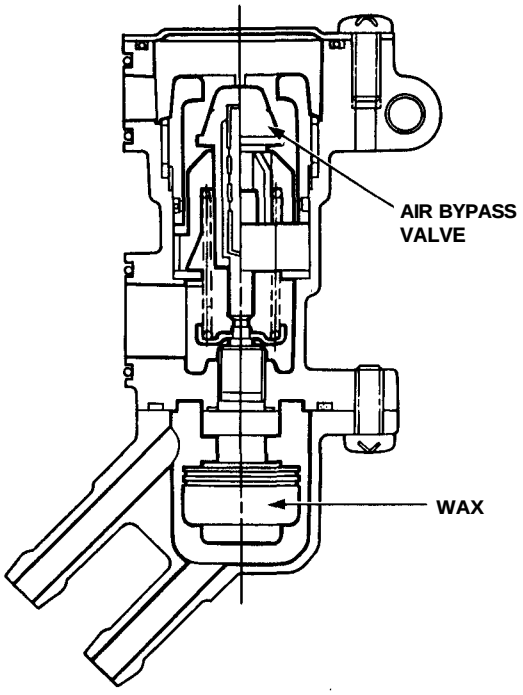
Idle Control System

Fast Idle Thermo Valve

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle thermo valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the intake manifold.

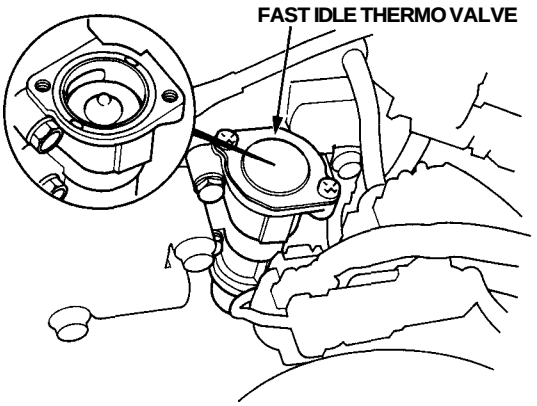




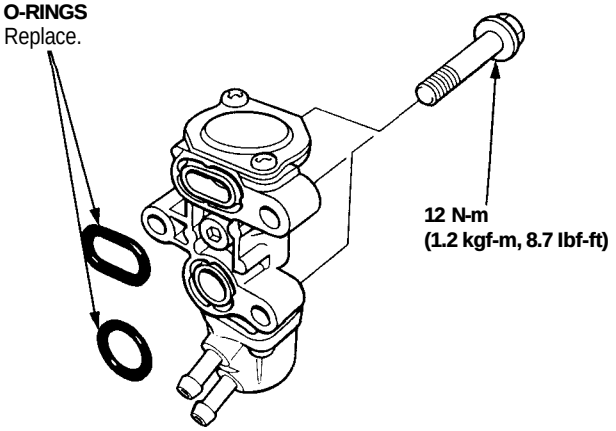
Inspection

NOTE: The fast idle thermo valve is factory adjusted; it should not be disassembled.

1. Remove the cover of the fast idle thermo valve.
2. Start the engine.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (engine coolant temperature below 86°F, 30°C) and idling.



If not, replace the fast idle thermo valve and retest.



4. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
5. Check that the valve is completely closed. If not, air suction can be felt in the valve seat area.
   If any suction is felt, the valve is leaking.
   Check engine coolant level and for air in the engine cooling system (see section 10).
   If OK, replace the fast idle thermo valve and recheck.

NOTE: If the cover of fast idle thermo valve was removed, do the ECM reset procedure.

Idle Speed Setting

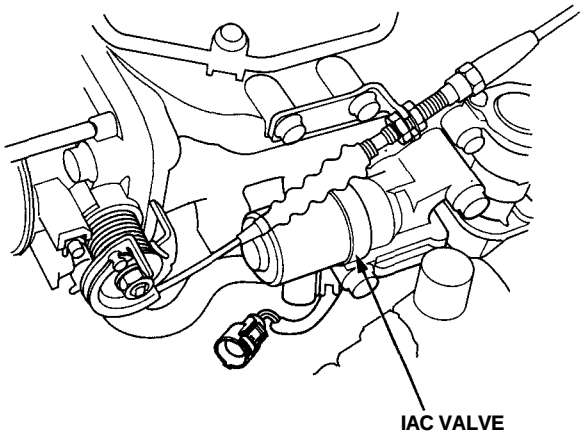
Inspection/Adjustment

NOTE:
- Before setting the idle speed, check the following items:
  — The MIL has not been reported on.
  — Ignition timing
  — Spark plugs
  — Air cleaner
  — PCV system
- (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in [N] or [P] position) until the radiator fan comes on, then let it idle.

2. Connect a tachometer.

3. Disconnect the IAC valve connector.



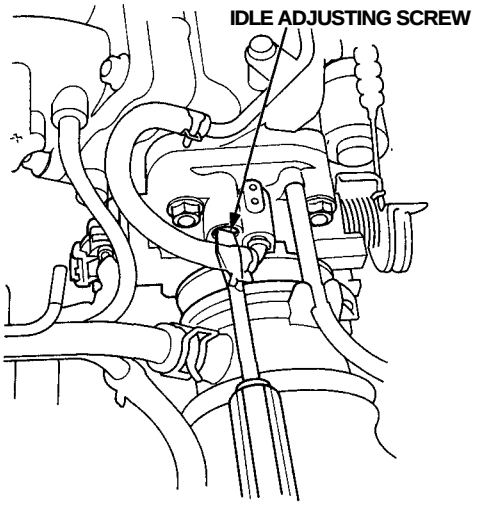
4. Start the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1,000, then slowly release the pedal until the engine idles.

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

Idle speed should be:
550 ± 50 rpm
(in [N] or [P] position)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.

NOTE: After adjusting the idle speed in this step, recheck the ignition timing (see section 23).
If it is out of spec, go back to step 4.



6. Turn the ignition switch OFF.

7. Reconnect the 2P connector on the IAC valve, then do the ECM reset procedure.

8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

Idle speed should be:
700 ± 50 rpm
(in [N] or [P] position)

9. Idle the engine for one minute with headlights (Low) ON and check the idle speed.

Idle speed should be:
770 ± 50 rpm
(in [N] or [P] position)

10. Turn the headlights off.
Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

Idle speed should be:
770 ± 50 rpm
(in [N] or [P] position)

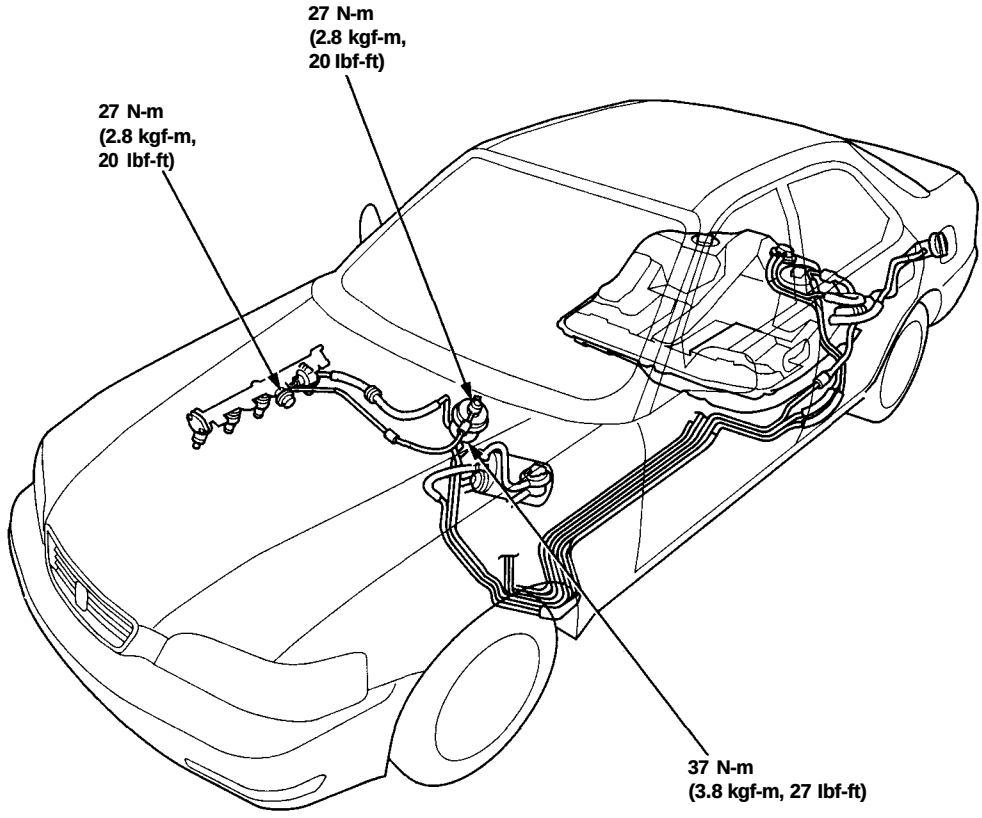
NOTE: If the idle speed is not within specification, see Symptom Chart on page 11-36.

Fuel Supply System

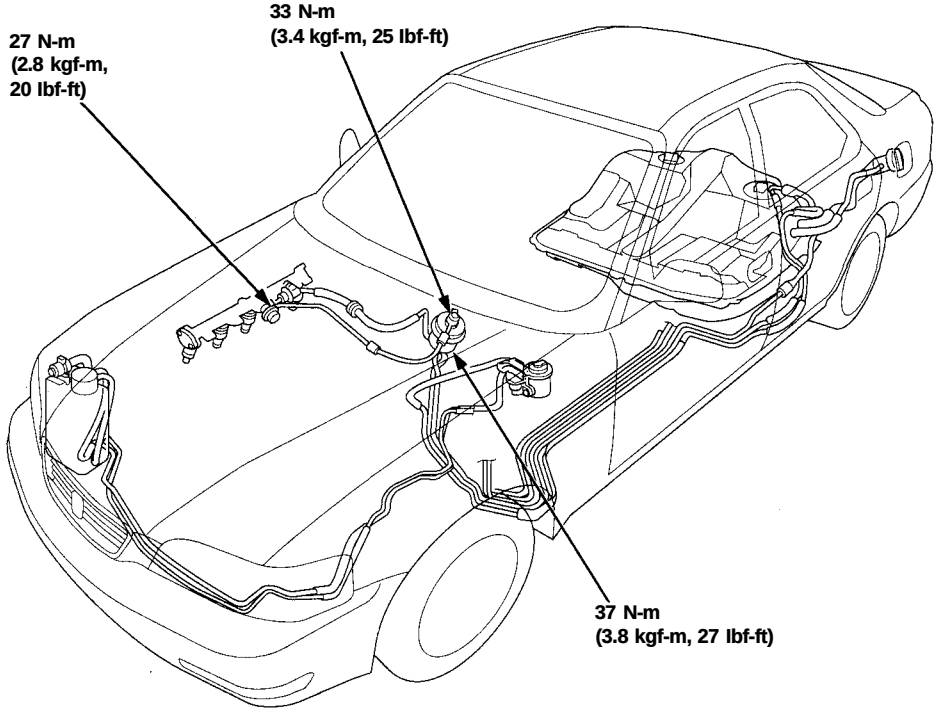
Fuel Lines

NOTE: Check all fuel system lines, hoses, and components for damage, leaks and deterioration, and replace if necessary.

'95 - 96 models:

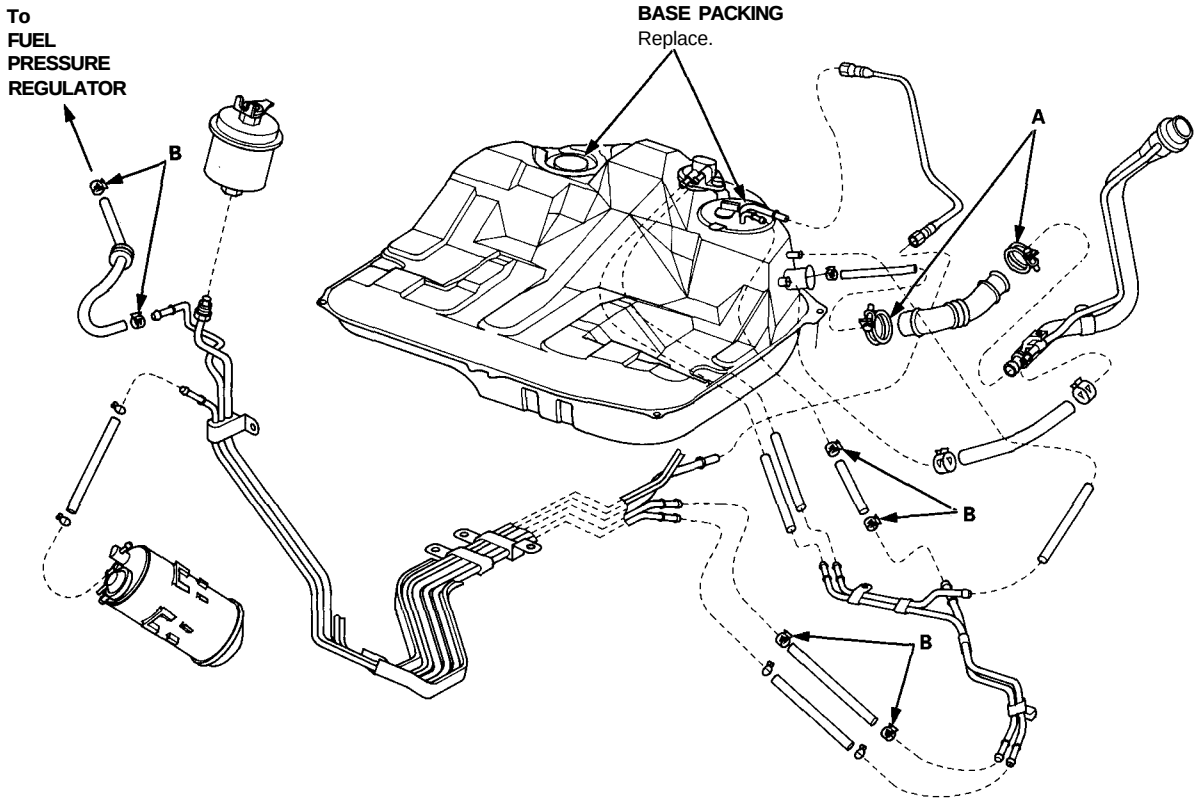


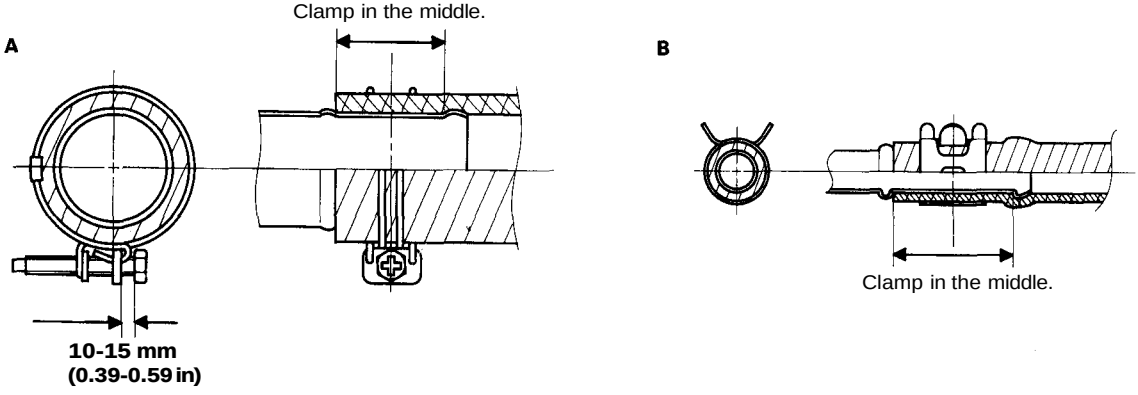
'97 - 98 models:



'95 - 96 models:

NOTE: Check all hose clamps and retighten if necessary.





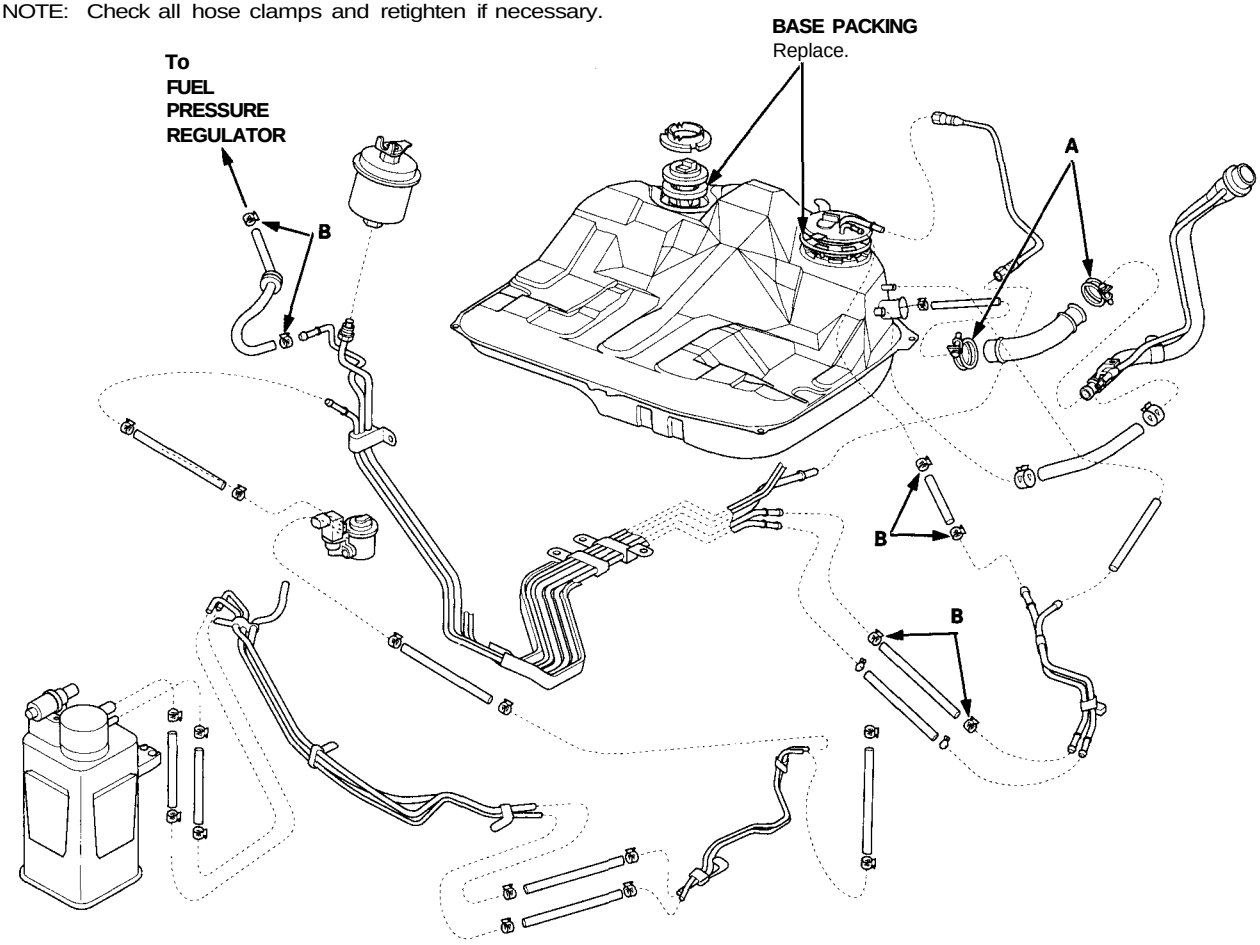
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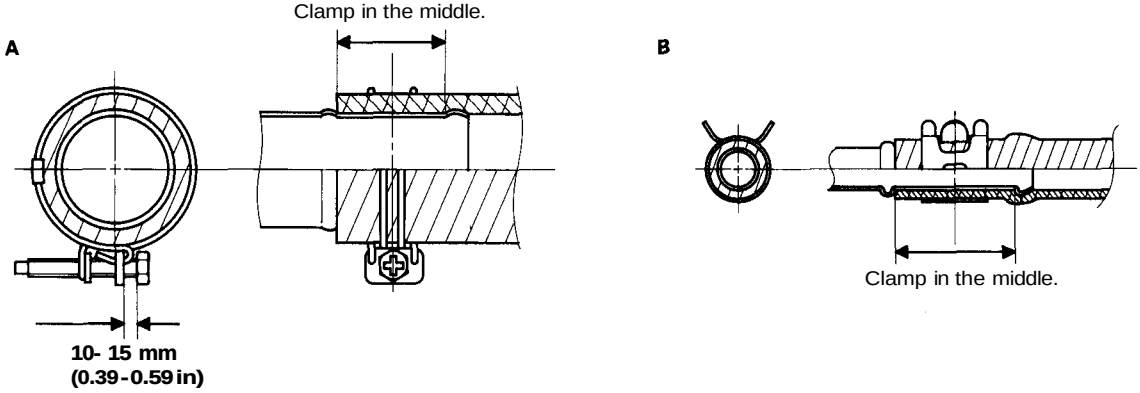
Fuel Supply System

Fuel Lines (cont'd)

'97 - 98 models:

NOTE: Check all hose clamps and retighten if necessary.





Fuel Tube/Quick-Connect Fittings

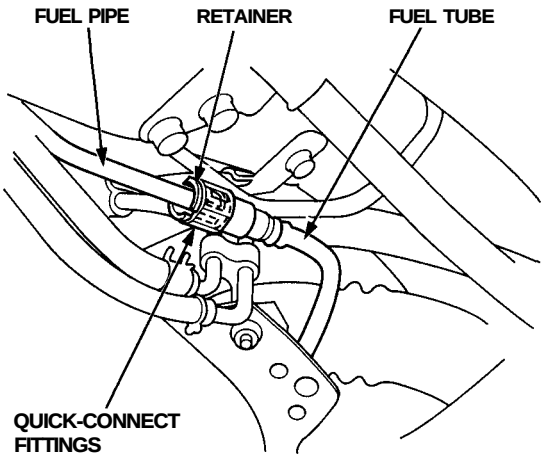
Precautions

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

The fuel tube/quick-connect fittings assembly connects the in-tank fuel pump with the fuel feed pipe. For removing or installing the fuel pump and fuel tank, it is necessary to disconnect or connect the quick-connect fittings. Pay attention to following:

- The fuel tube/quick-connect fittings assembly is not heat-resistant; be careful not to damage it during welding or other heat-generating procedures.
- The fuel tube/quick-connect fittings assembly is not acid-proof; do not touch it with a shop towel which was used for wiping battery electrolyte. Replace the fuel tube/quick-connect fittings assembly if it came into contact with electrolyte or something similar.
- When connecting or disconnecting the fuel tube/quick-connect fittings assembly, be careful not to bend or twist it excessively. Replace it if damaged.

A disconnected quick-connect fitting can be reconnected, but the retainer on the mating pipe cannot be reused once it has been removed from the pipe. Replace the retainer when
— Replacing the fuel pump.
— Replacing the fuel feed pipe.
— It has been removed from the pipe.
— It is damaged.

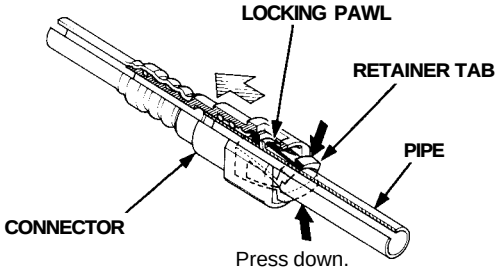


Disconnection

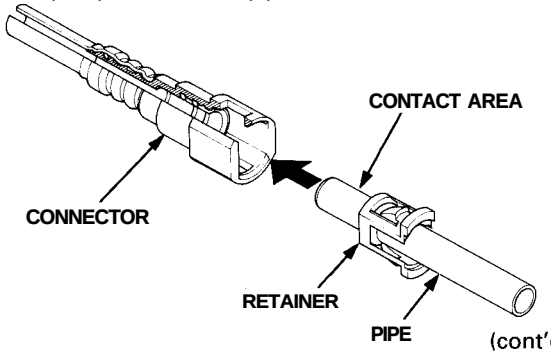
⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Disconnect the battery negative cable.
2. Remove the fuel fill cap, and relieve fuel pressure in the tank.
3. Relieve fuel pressure (see page 11-124).
4. Check the fuel quick-connect fittings for dirt, and clean if necessary.
5. Hold the connector with one hand and press down the retainer tabs with the other hand, then pull the connector off.

   NOTE:
   - Be careful not to damage the pipe or other parts. Do not use tools.
   - If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
   - Do not remove the retainer from the pipe; once removed, the retainer must be replaced with a new one.



6. Check the contact area of the pipe for dirt and damage.
   — If the surface is dirty, clean it.
   — If the surface is rusty or damaged, replace the fuel pump or fuel feed pipe.

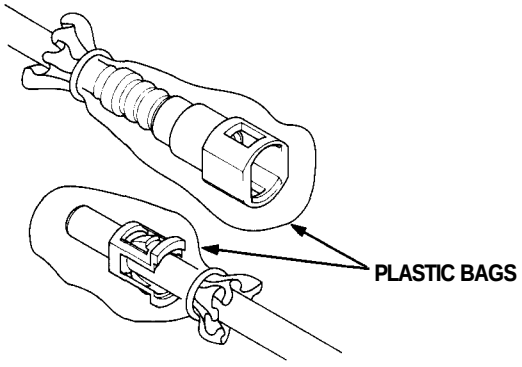


(cont'd)

Fuel Supply System

Fuel Tube/Quick-Connect Fittings (cont'd)

7. To prevent damage and keep out foreign matter, cover the disconnected connector and pipe end with plastic bags.

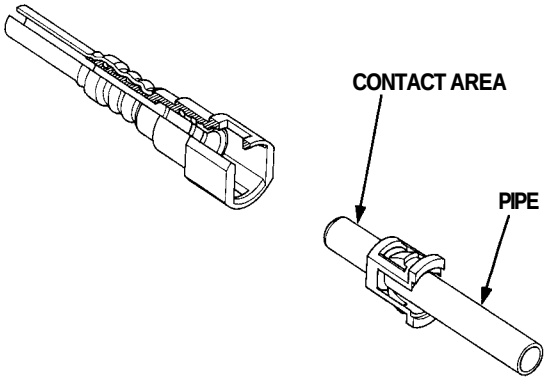


NOTE:
The retainer cannot be reused once it has been removed from the pipe.
Replace the retainer when
— replacing the fuel pump.
— replacing the fuel feed pipe.
— it has been removed from the pipe.
— it is damaged.

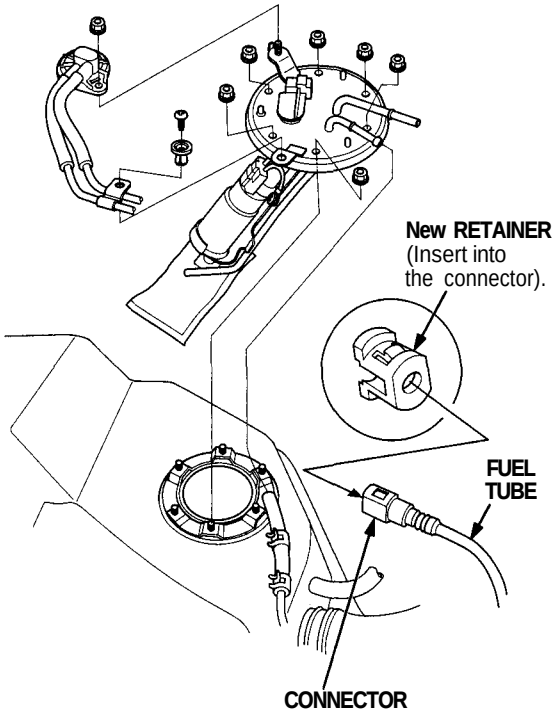
Connection

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

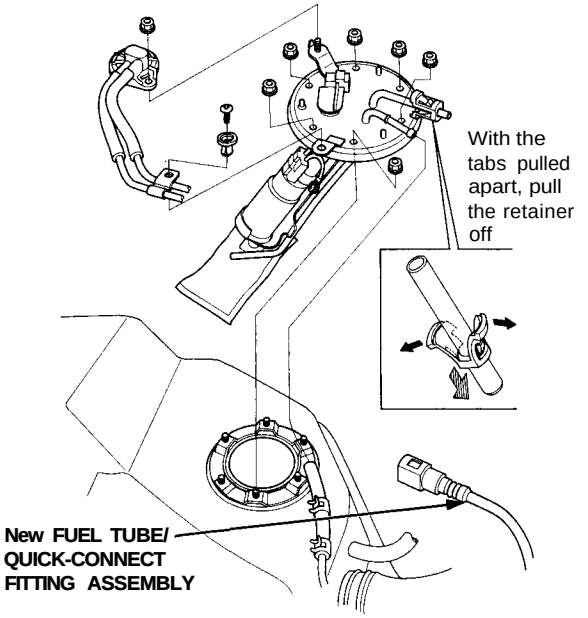
1. Check the pipe contact area for dirt and damage, and clean if necessary.



2. Insert a new retainer into the connector if the retainer is damaged, or after
— replacing the fuel pump.
— replacing the fuel feed pipe.
— removing the retainer from the pipe.



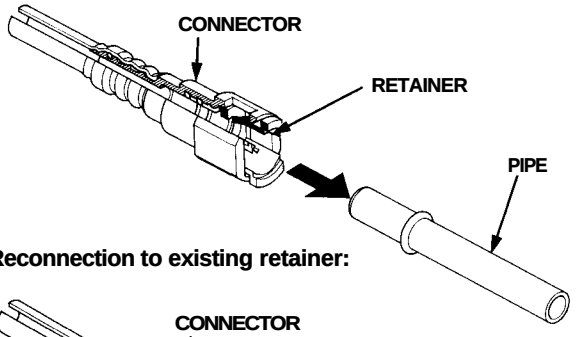
Before connecting a new fuel tube/quick-connect fitting assembly, remove the old retainer from the mating pipe.



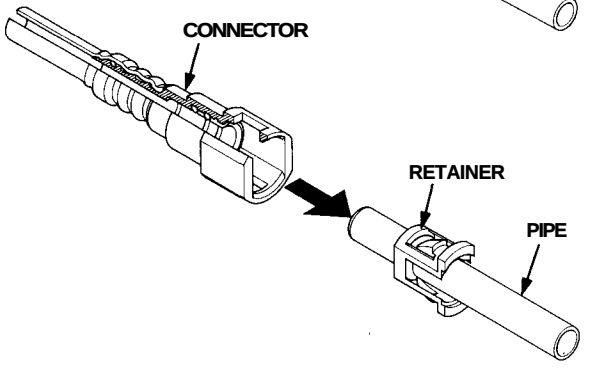
3. Align the quick-connect fittings with the pipe, and align the retainer locking pawls with the connector grooves. Then press the quick-connect fittings onto the pipe until both retainer pawls lock with a clicking sound.

   NOTE: If it is hard to connect, put a small amount of new engine oil on the pipe end.

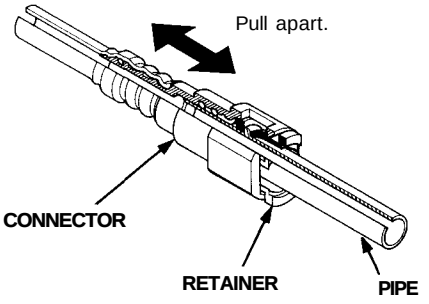
Connection with new retainer:



Reconnection to existing retainer:



4. Make sure the connection is secure and the pawls are firmly locked into place; check visually and by pulling the connector.



5. Reconnect the battery negative cable, and turn the ignition switch ON (II) the fuel pump will run for about two seconds, and fuel pressure will rise. Repeat two or three times, and check that there is no leakage in the fuel supply system.

Fuel Supply System

System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Supply System

Fuel Pressure

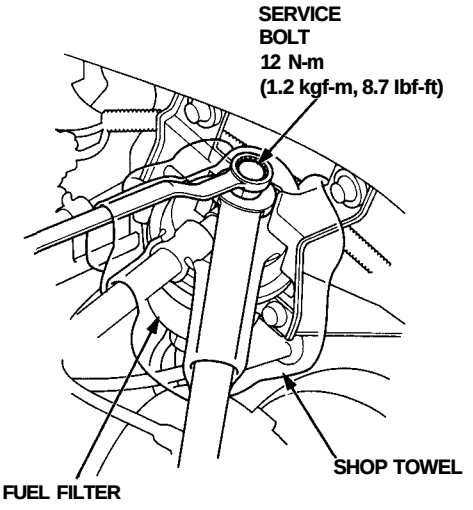
Relieving (models with service bolt)

Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt on top of the fuel filter.

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.**
- **Be sure to relieve fuel pressure while the ignition switch is off.**

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Remove the fuel fill cap.
4. Use a box end wrench on the 6 mm service bolt at the fuel filter while holding the special banjo bolt with another wrench.
5. Place a rag or shop towel over the 6 mm service bolt.
6. Slowly loosen the 6 mm service bolt one complete turn.



NOTE:

- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt whenever the service bolt is loosened.
- Replace all washers whenever the bolts are removed.

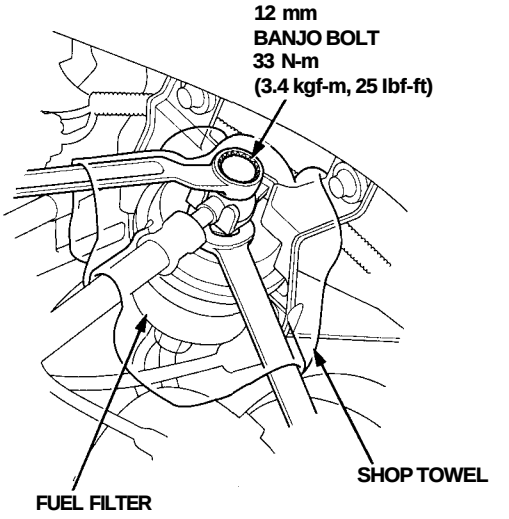
Relieving (models without service bolt)

Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 12 mm banjo bolt on top of the fuel filter.

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.**
- **Be sure to relieve fuel pressure while the ignition switch is off.**

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Remove the fuel fill cap.
4. Use a box end wrench on the 12 mm banjo bolt at the fuel filter while holding the fuel filter with another wrench.
5. Place a rag or shop towel over the 12 mm banjo bolt.
6. Slowly loosen the 12 mm banjo bolt one complete turn.

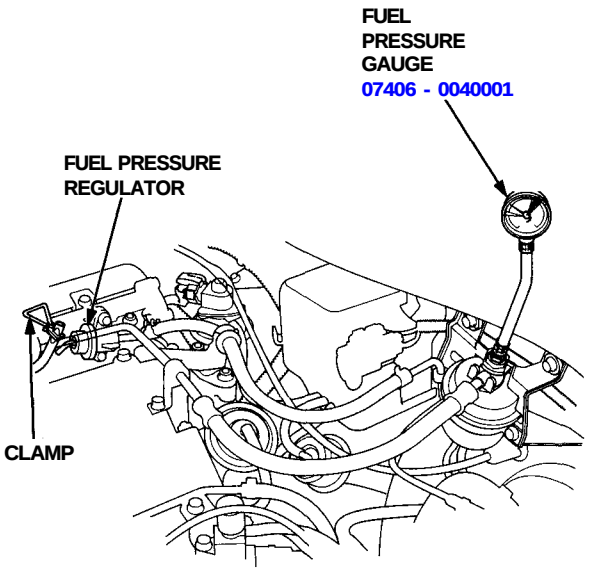


NOTE: Replace the washers whenever the 12 mm banjo bolt is loosened or removed.

Inspection (models with service bolt)

1. Relieve fuel pressure (see page 11-124).

2. Remove the service bolt on the fuel filter while holding the banjo bolt with another wrench. Attach the special tool.



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch ON (II), wait for two seconds, turn it off, then back on again and read the fuel pressure.

Pressure should be:
294 - 343 kPa (3.0 - 3.5 kgf/cm^2, 43-50 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

Pressure should be:
230 - 279 kPa (2.35 - 2.85 kgf/cm^2,33 - 41 psi)

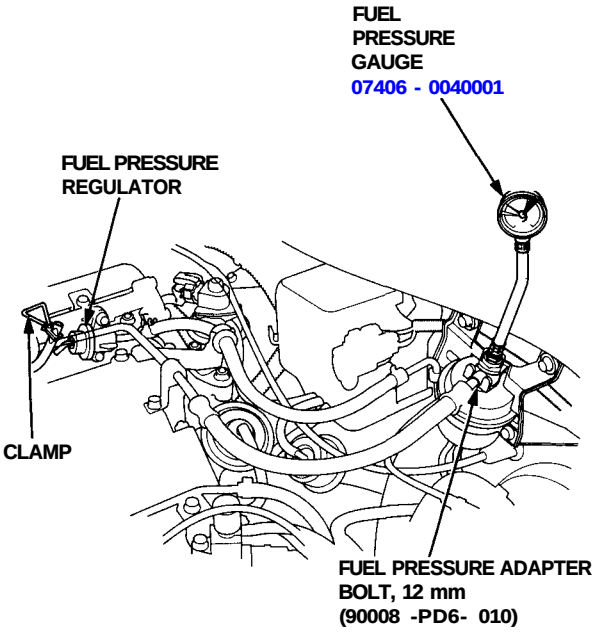
If the fuel pressure is not as specified, first check the fuel pump (see page 11-130). If the fuel pump is OK, check the following:

- If the fuel pressure is higher than specified, inspect for:
  — Pinched or clogged fuel return hose or line.
  — Faulty fuel pressure regulator (see page 11-128).
- If the fuel pressure is lower than specified, inspect for:
  — Clogged fuel filter.
  — Faulty fuel pressure regulator (see page 11-128).
  — Leakage in the fuel line.

Inspection (models without service bolt)

1. Relieve fuel pressure (see page 11-124).

2. Remove the 12 mm banjo bolt from the fuel filter while holding the fuel filter with another wrench. Attach the special tool.



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch ON (II), wait for two seconds, turn it off, then back on again and read the fuel pressure.

Pressure should be:
294 - 343 kPa (3.0 - 3.5 kgf/cm^2, 43 - 50 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

Pressure should be:
230 - 279 kPa (2.35 - 2.85 kgf/cm^2,33 - 41 psi)

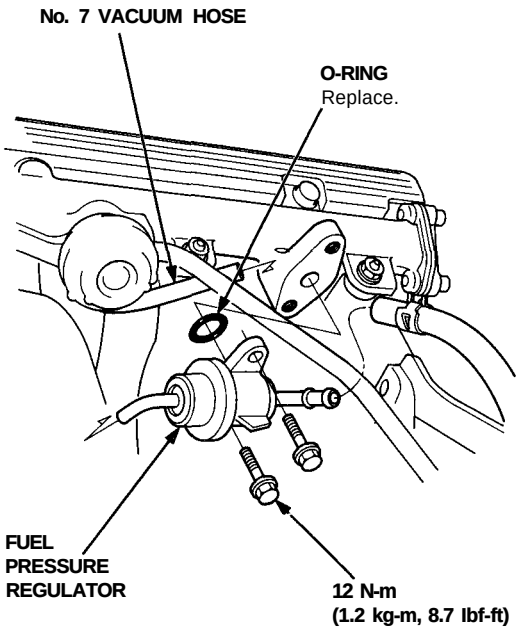
If the fuel pressure is not as specified, first check the fuel pump (see page 11-130). If the fuel pump is OK, check the following:

- If the fuel pressure is higher than specified, inspect for:
  — Pinched or clogged fuel return hose or line.
  — Faulty fuel pressure regulator (see page 11-128).
- If the fuel pressure is lower than specified, inspect for:
  — Clogged fuel filter.
  — Faulty fuel pressure regulator (see page 11-128).
  — Leakage in the fuel line.

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-124).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:
- Replace the O-ring.
- When assembling the fuel pressure regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

(cont'd)

Fuel Supply System

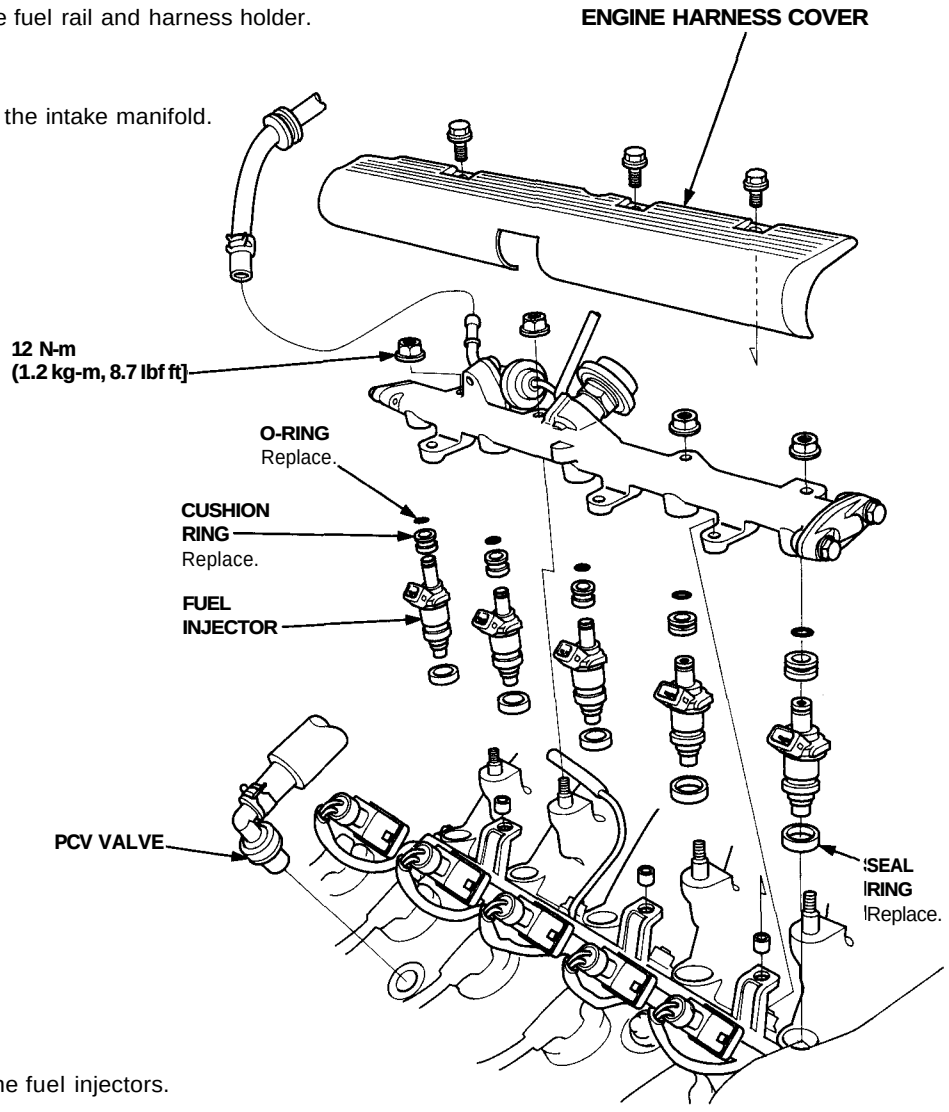
Fuel Injectors

Replacement

WARNING **Do not smoke when working on the fuel system. Keep open flames away from your work area.**

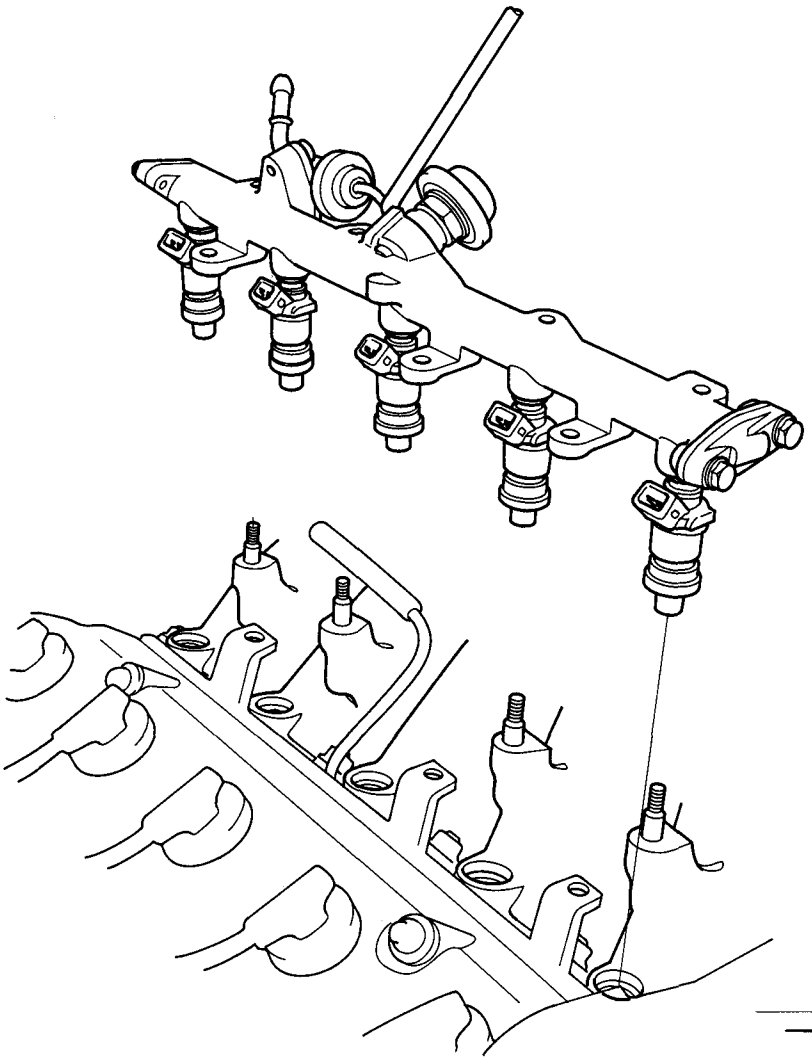
1. Relieve fuel pressure (see page 11-124).
2. Remove the engine harness cover.
3. Disconnect the connectors from the fuel injectors.
4. Disconnect the No. 7 vacuum hose and fuel return hose from the fuel pressure regulator.

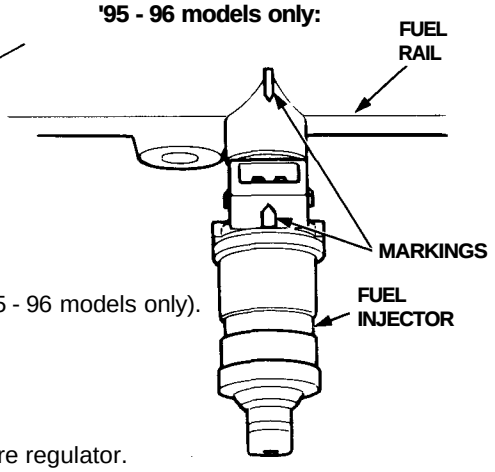
   NOTE: Place a rag or shop towel over the hoses before disconnecting them.
5. Disconnect the fuel hose from the fuel rail.
6. Remove the retainer nuts on the fuel rail and harness holder.
7. Disconnect the fuel rail.
8. Remove the fuel injectors from the intake manifold.



9. Slide new cushion rings onto the fuel injectors.
10. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
11. Insert the fuel injectors into the fuel rail first.
12. Coat new seal rings with clean engine oil, and press them into the intake manifold.

13. To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.





14. Align the center line on the connector with the mark on the fuel rail ('95 - 96 models only).
15. Install and tighten the retainer nuts.
16. Connect the fuel hose to the fuel rail with new washers.
17. Connect the No. 7 vacuum hose and fuel return hose to the fuel pressure regulator.
18. Install the connectors on the fuel injectors.
19. Install the engine harness cover.
20. Turn the ignition switch ON (II), but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

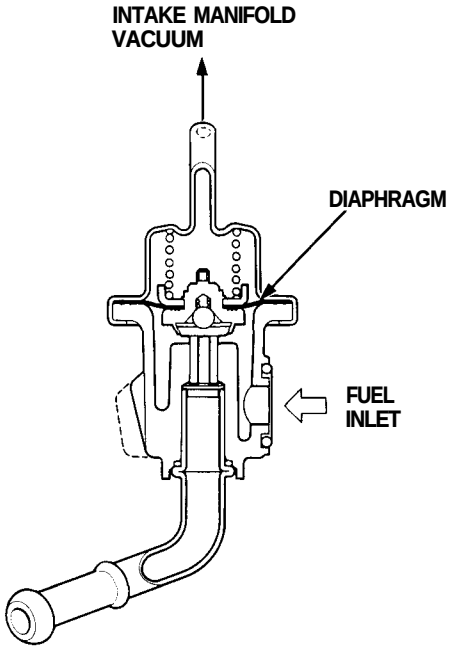
Fuel Supply System

Fuel Pressure Regulator

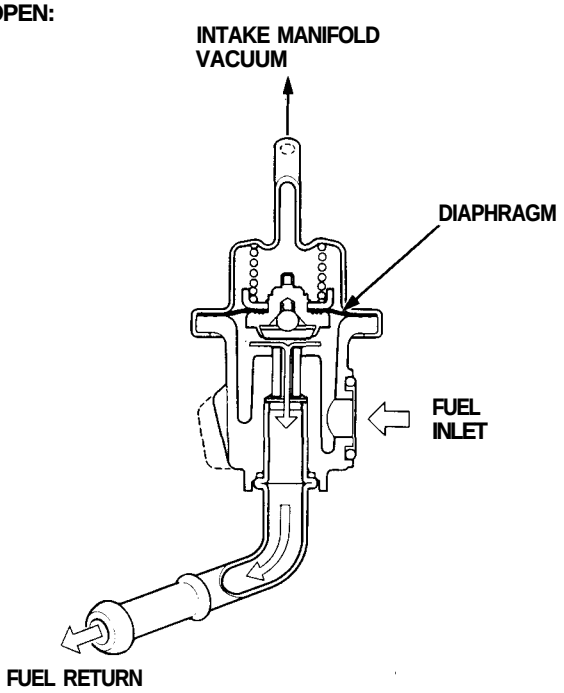
Description

The fuel pressure regulator maintains a constant fuel pressure to the fuel injectors. When the difference between the fuel pressure and manifold pressure exceeds 294 kPa (3.0 kgf/cm^2, 43 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSED:



OPEN:

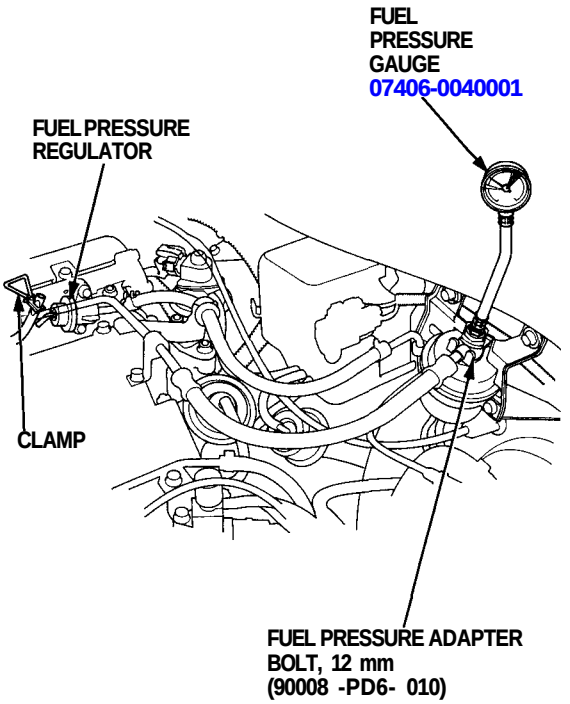


Testing

WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach the special tool to the service port (models with service bolt) or the fuel pressure adapter bolt, 12 mm, (90008 - PD6 - 010) (models without service bolt) on the fuel filter (see page 11-124).

   Pressure should be:
   294 - 343 kPa (3.0 - 3.5 kgf/cm^2, 43 - 50 psi)
   (with the fuel pressure regulator vacuum hose disconnected and pinched)



2. Reconnect the vacuum hose to the fuel pressure regulator.

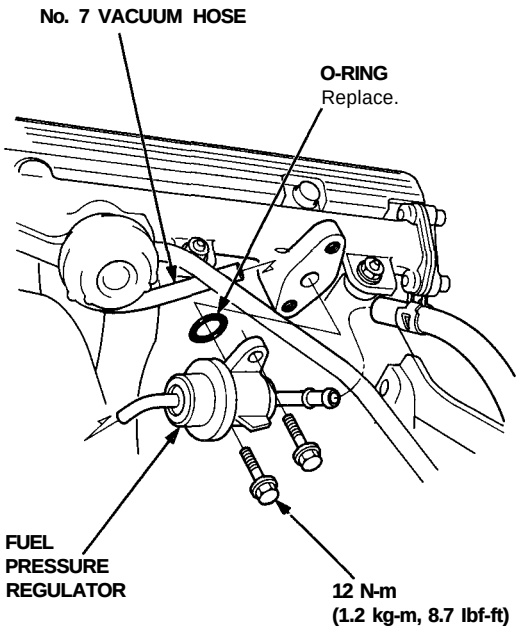
3. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.

   - If the fuel pressure did not rise, replace the fuel pressure regulator.

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-124).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:
- Replace the O-ring.
- When assembling the fuel pressure regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

(cont'd)

Fuel Filter

Replacement

⚠ WARNING

- **Do not smoke while working on fuel system. Keep open flame away from your work area.**
- **While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.**

The fuel filter should be replaced whenever the fuel pressure drops below the specified value [294 - 343 kPa, 3.0 - 3.5 kgf/cm^2, 43 - 50 psi with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

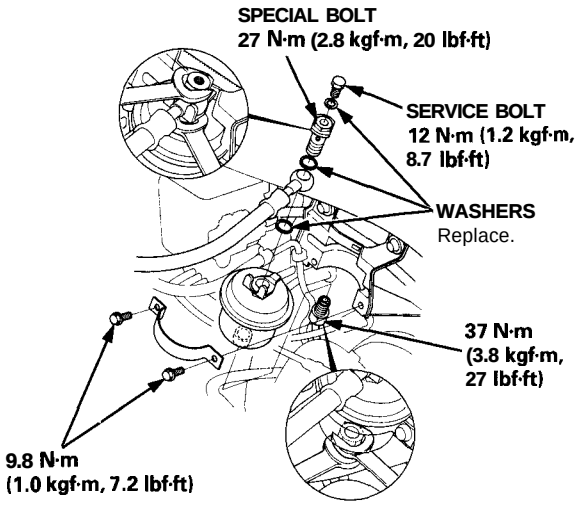
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Place a shop towel under and around the fuel filter.
4. Relieve fuel pressure (see page 11-124).
5. Remove the banjo bolt (models with service bolt) or 12 mm banjo bolt (models without service bolt) and the fuel feed pipe while supporting the fuel filter with another wrench, as shown.
6. Remove the fuel filter clamp and fuel filter.
7. Install the new fuel filter in the reverse order of removal, and note these items:
   - When assembling, use new washers as shown.
   - Clean the flared joint of high pressure hoses thoroughly before reconnecting them.
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

(cont'd)

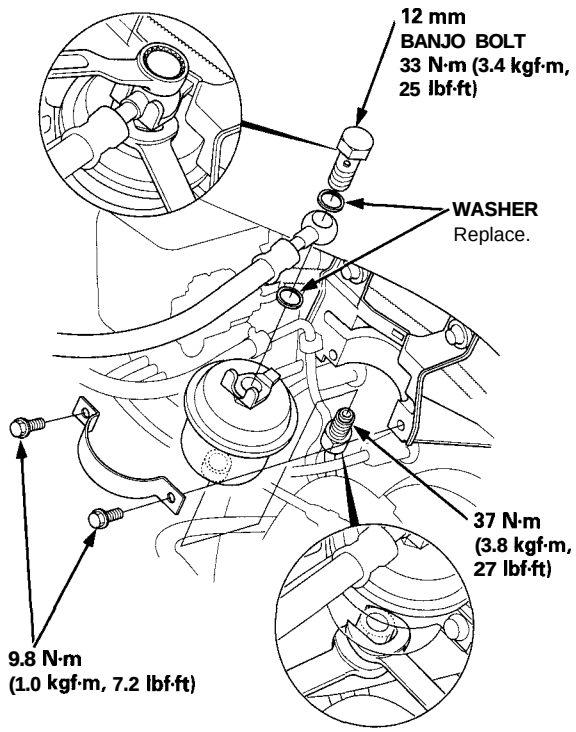
Fuel Supply System

Fuel Filter (cont'd)

Models with service bolt:



Models without service bolt:



Fuel Pump

Testing

⚠ WARNING Do not smoke during the test. Keep open flame away from your work area.

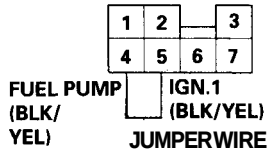
If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds when ignition switch is first turned ON (II). If the fuel pump does not make noise, check as follows:

1. Remove the trunk floor (see section 20).
2. Disconnect the 3P connector (C519).

CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Connect the PGM-FI main relay connector terminals No. 4 and No. 5 with a jumper wire.

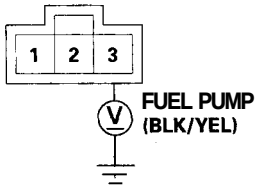
PGM-FI MAIN RELAY CONNECTOR (C417)



Wire side of female terminals

4. Check that battery voltage is available between the fuel unit sub-harness connector terminal No. 3 and body ground when the ignition switch is turned ON (II).

FUEL UNIT SUB-HARNESS CONNECTOR (C519)



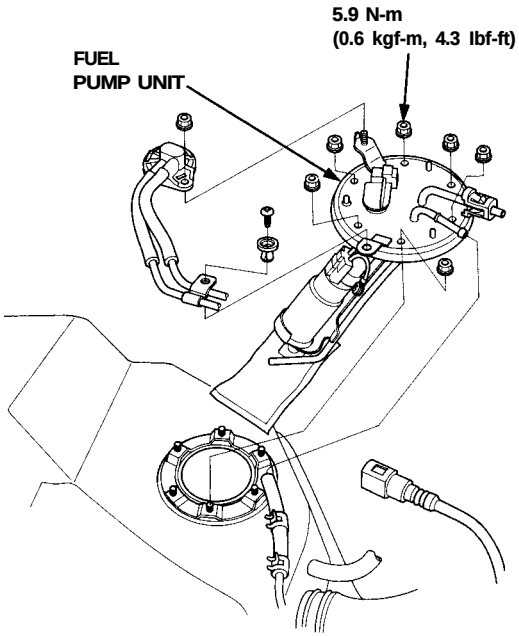
Terminal side of male terminal

- If battery voltage is available, check the fuel pump ground. If the ground is OK, replace the fuel pump.
- If there is no voltage, check the wire harness (see page 11-132).

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

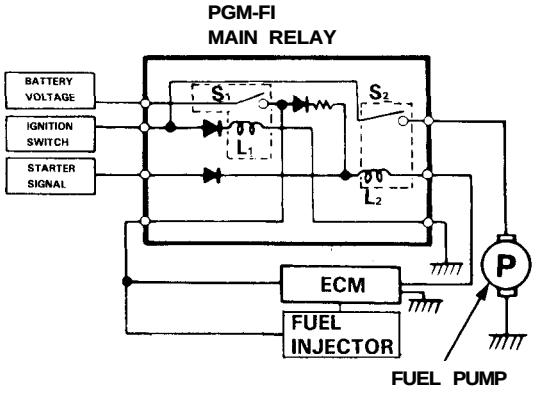
1. Remove the fuel tank (see page 11-134).
2. Remove the fuel pump mounting nuts.
3. Remove the fuel pump from the fuel tank.
4. Install parts in the reverse order of removal.



PGM-FI Main Relay

Description

The PGM-FI main relay actually contains two individual relays. This relay is located at the left side of the cowl. One relay is energized whenever the ignition is on which supplies the battery voltage to the ECM, power to the fuel injectors, and power for the second relay. The second relay is energized for two seconds when the ignition is switched on, and when the engine is running, to supply power to the fuel pump.



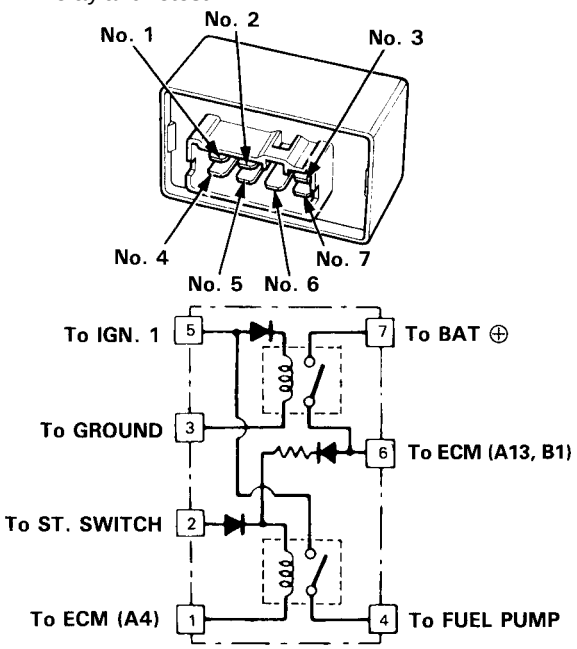
Relay Testing

NOTE: If the car starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.

2. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the PGM-FI main relay and retest.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No. 6 terminal of the PGM-FI main relay.

   - If there is continuity, go on to step 4.
   - If there is no continuity, replace the PGM-FI main relay and retest.

4. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

   - If there is continuity, the PGM-FI main relay is OK.
   - If there is no continuity, replace the PGM-FI main relay and retest.

(cont'd)

Fuel Supply System

PGM-FI Main Relay (cont'd)

Troubleshooting

— Engine will not start.
— Inspection of PGM-FI main relay and relay harness.

Check for an open in the wire (GND line):
1. Turn the ignition switch OFF.
2. Disconnect the PGM-FI main relay 7P connector.
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 3 and body ground.

Is there continuity?

NO → **Repair open in the wire between the PGM-FI main relay and G101.**

YES

Check for an open or short in the wire (BAT line):
Measure voltage between the PGM-FI main relay 7P connector terminal No. 7 and body ground.

Is there battery voltage?

NO → **— Replace the ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.**
— Repair open or short in the wire between the PGM-FI main relay and the ECU (ECM) (15 A) fuse.

YES

Check for an open or short in the wire (IG1 line):
1. Turn the ignition switch ON (II).
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 5 and body ground.

Is there battery voltage?

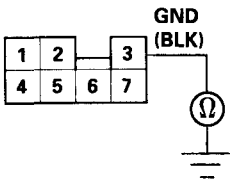
NO → **— Replace the No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.**
— Repair open or short in the wire between the PGM-FI main relay and the No. 2 FUEL PUMP (15 A) fuse.

YES

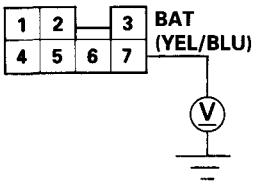
Check for an open or short in the wire (STS line):
1. Turn the ignition switch to the START (III) position.
NOTE: Transmission in [N] or [P] position.
2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 2 and body ground.

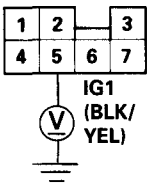
(To page 11-133)

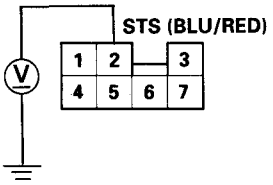
PGM-FI MAIN RELAY 7P CONNECTOR (C417)



Wire side of female terminals







(From page 11-132)

Is there battery voltage?

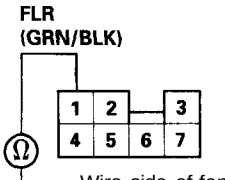
NO

- **Replace the No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.**
- **Repair open or short in the wire between the PGM-FI main relay and the No. 9 STARTER SIGNAL (7.5 A) fuse.**

YES

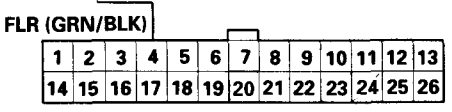
Check for an open in the wire (FLR line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector A (26P).
3. Check for continuity between the PGM-FI main relay 7P connector terminal NO. 1 and ECM connector terminal A4.

PGM-FI MAIN RELAY 7P CONNECTOR (C417)



Wire side of female terminals

ECM CONNECTOR A (26P)



Wire side of female terminals

Is there continuity?

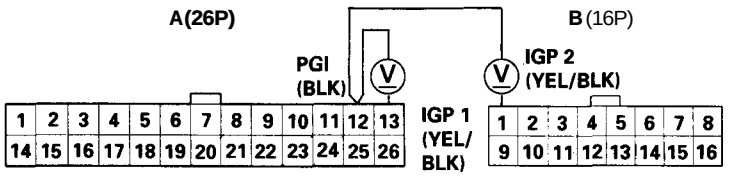
NO

Repair open in the wire between the ECM (A4) and the PGM-FI main relay.

YES

Check for an open in the wires (IGP1, IGP2 lines):
1. Reconnect the ECM connector A (26P).
2. Reconnect the PGM-FI main relay connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals A12 and A13, and between A12 and B1.

ECM CONNECTORS



Wire side of female terminals

Is there battery voltage?

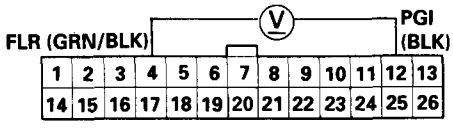
NO

- **Repair open in the wire between the ECM (A13, B1) and the PGM-FI main relay.**
- **Replace the PGM-FI main relay.**

YES

Check for an open in the ECM:
1. Turn the ignition switch OFF.
2. Measure voltage between ECM connector terminals A4 and A12 when the ignition switch is first turned ON (II) for two seconds.

ECM CONNECTOR A (26P)



Wire side of female terminals

Is there 1.0 V or less?

NO

Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

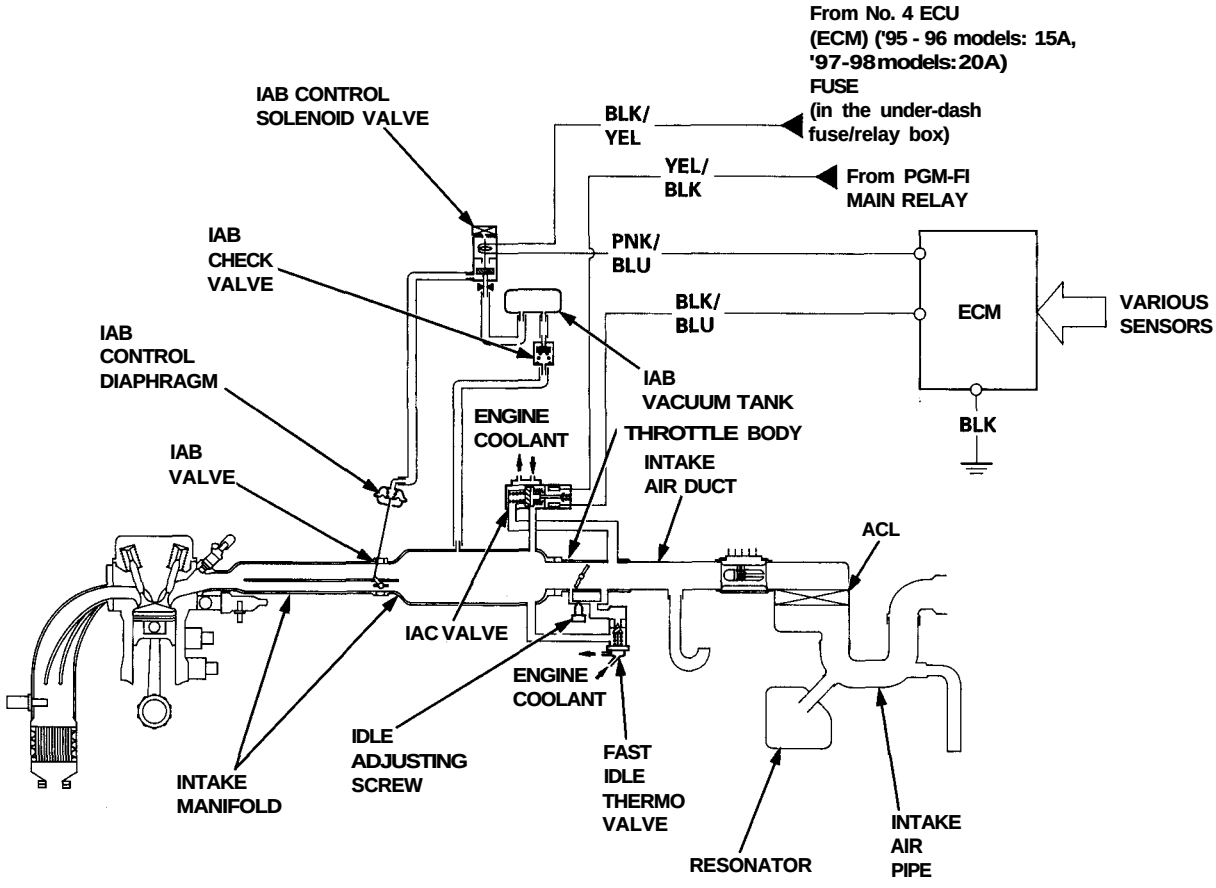
YES

Check the PGM-FI main relay (see page 11-131).

Intake Air System

System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct. Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve, and intake manifold.
A resonator in the intake air pipe provides additional silencing as air is drawn into the system.

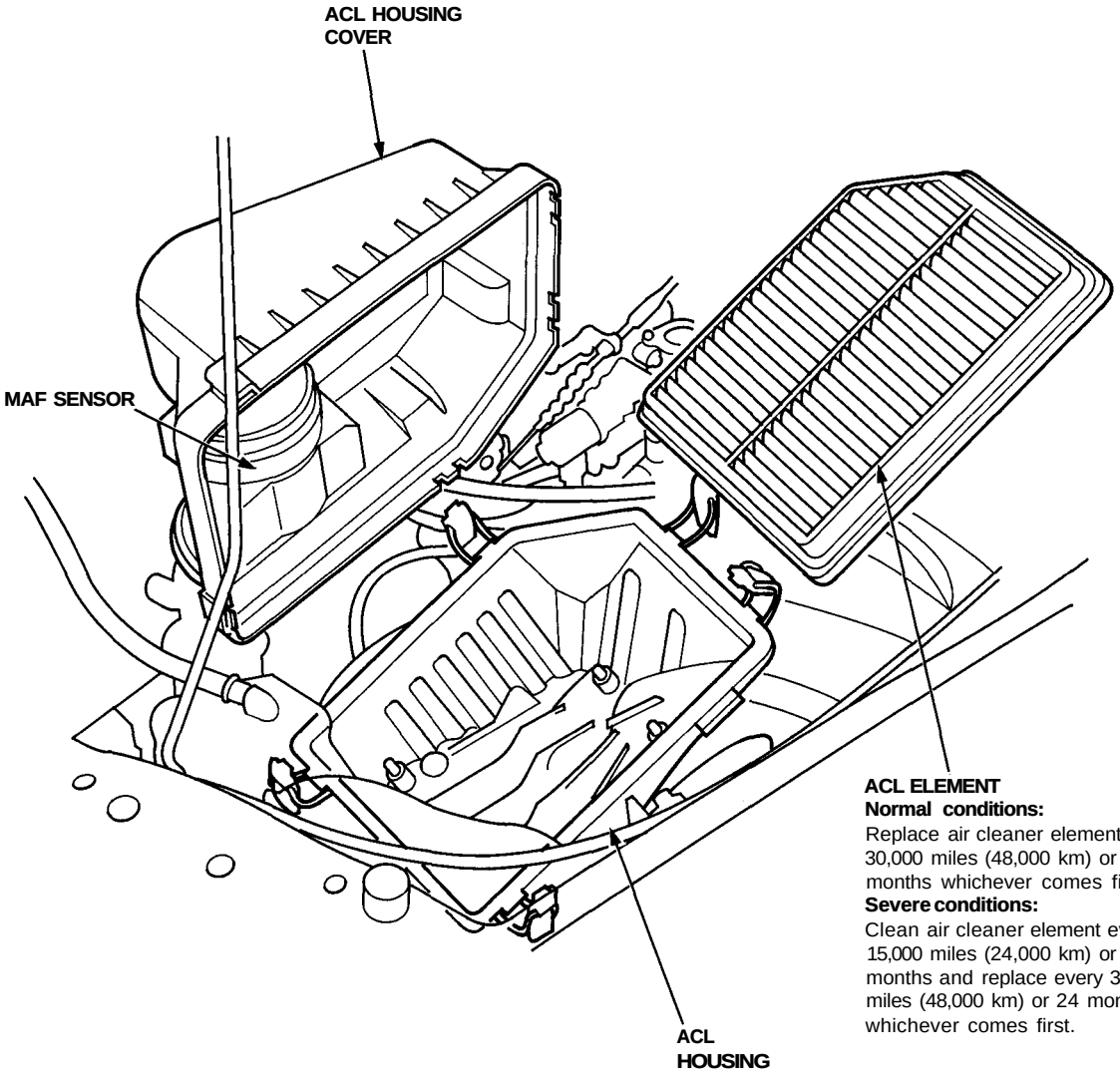


Intake Air System

Air Cleaner (ACL)

ACL Element Replacement

NOTE: When removing the ACL housing cover, do not disconnect the hose and MAF sensor connector.

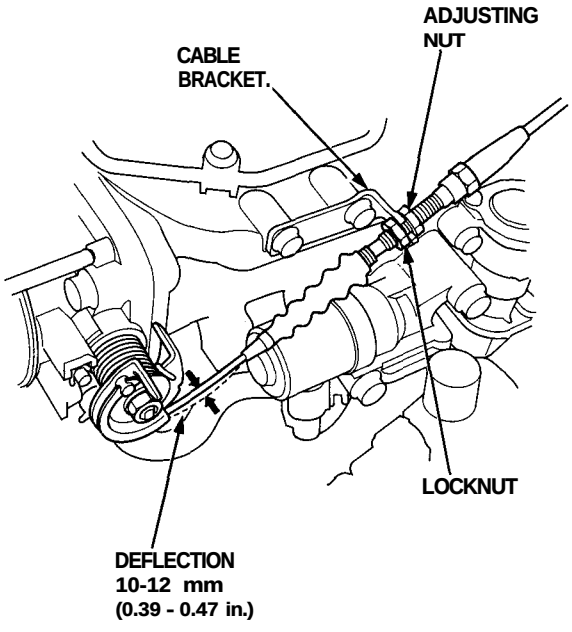


ACL ELEMENT
Normal conditions:
Replace air cleaner element every 30,000 miles (48,000 km) or 24 months whichever comes first.
Severe conditions:
Clean air cleaner element every 15,000 miles (24,000 km) or 12 months and replace every 30,000 miles (48,000 km) or 24 months whichever comes first.

Throttle Cable

Inspection/Adjustment

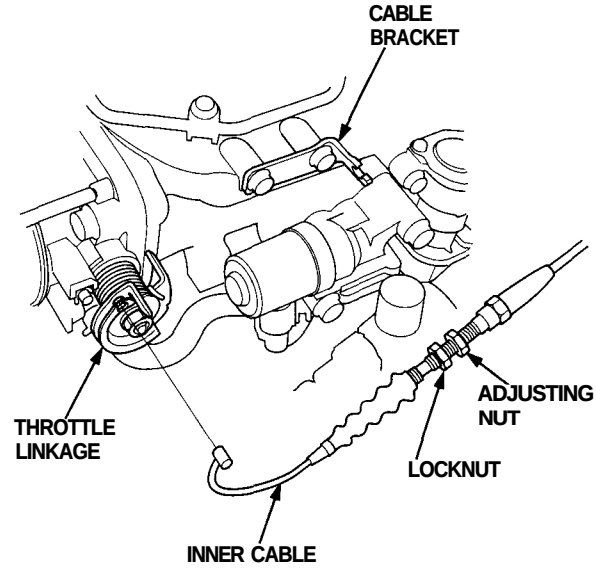
1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 - 12 mm (0.39 - 0.47 in.)



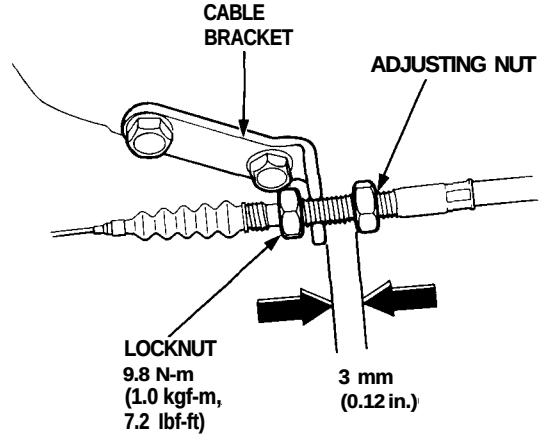
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.



2. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm (0.12 in.) away from the cable bracket.



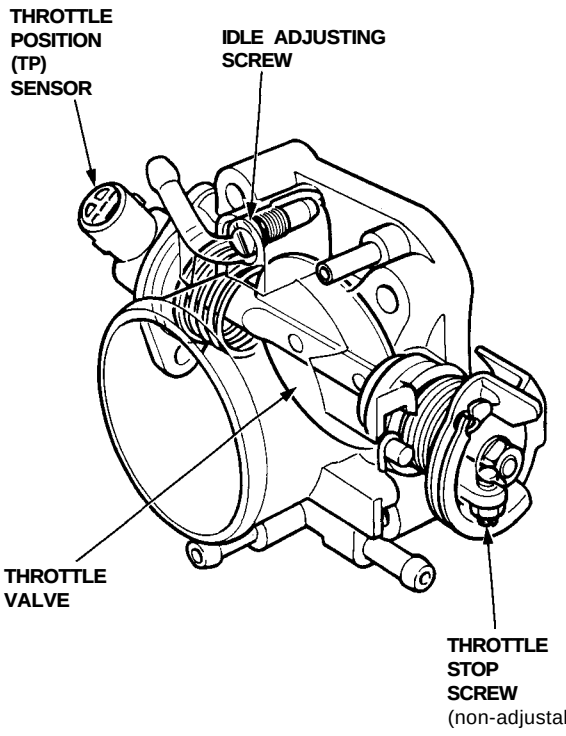
5. Tighten the locknut. The cable deflection should now be 10 - 12 mm (0.39 - 0.47 in.). If not, see inspection/adjustment.

Intake Air System

Throttle Body

Description

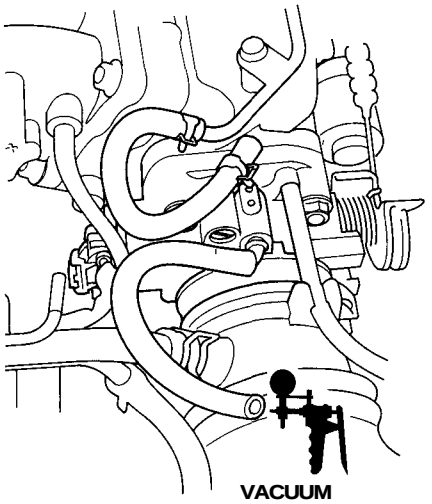
The throttle body is a single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw, which increases/decreases bypass air, and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body ('95 - '96 models only).



Inspection

1. Disconnect the vacuum hose from the top of the throttle body; connect a vacuum gauge to the throttle body.*

2. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.*



VACUUM PUMP/GAUGE, 0-30 in.Hg
A973X - 041 - XXXXX

3. Allow the engine to idle, and check that the gauge indicates no vacuum.*

   If there is vacuum, check the throttle cable (see page 11-137).

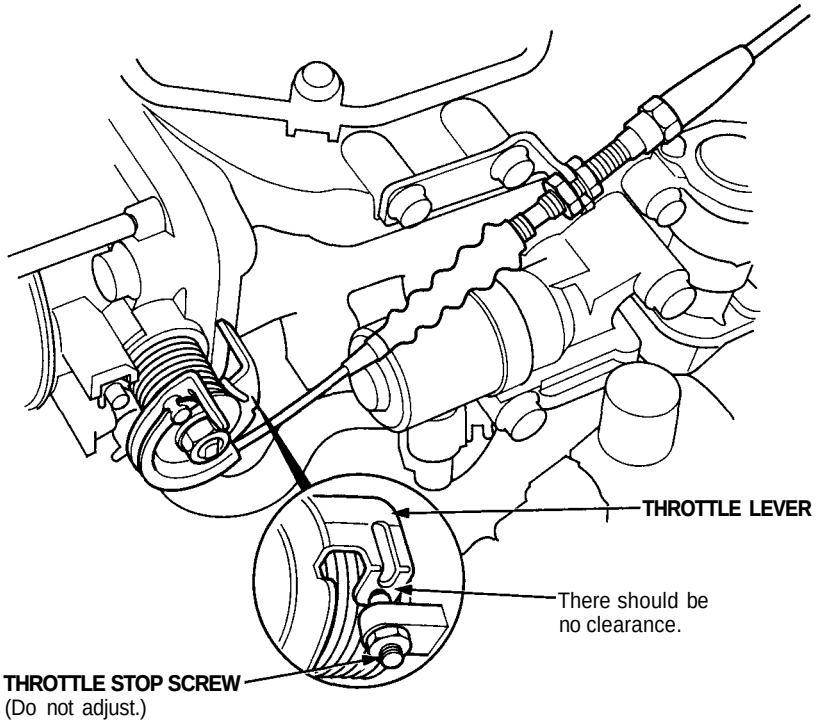
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.*

   If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.

5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.

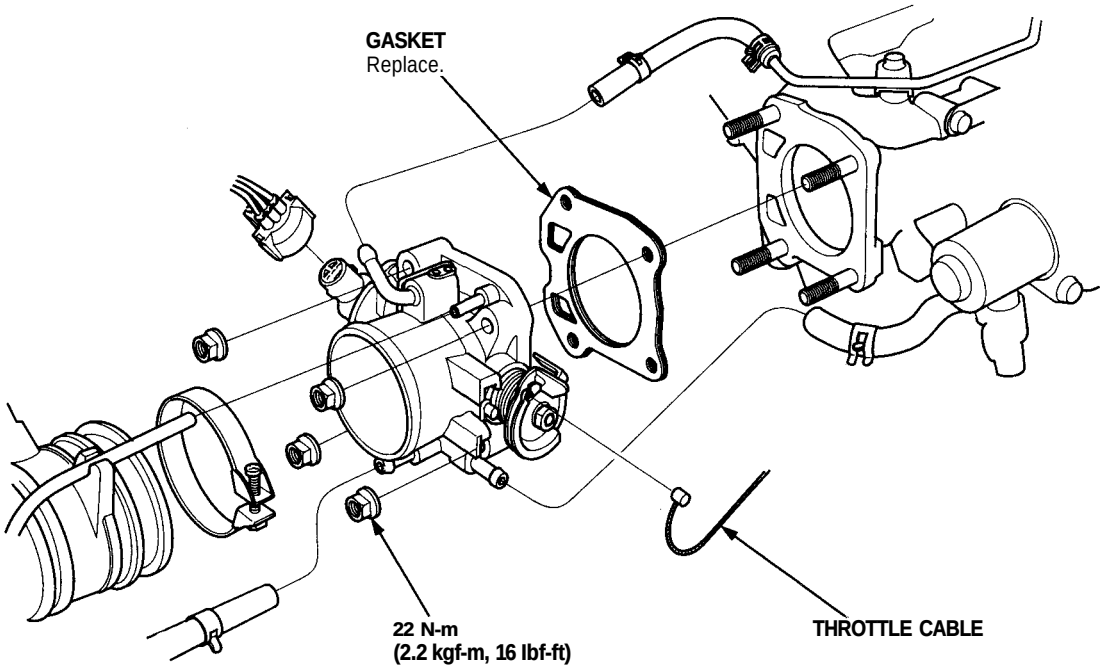
   If there are any abnormalities check for:
   - Excessive wear or play in the throttle valve shaft.
   - Sticky or binding throttle lever at the fully closed position.
   - Clearance between throttle stop screw and throttle lever at the fully closed position.

*: '95-96 models only



Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Removal



NOTE:

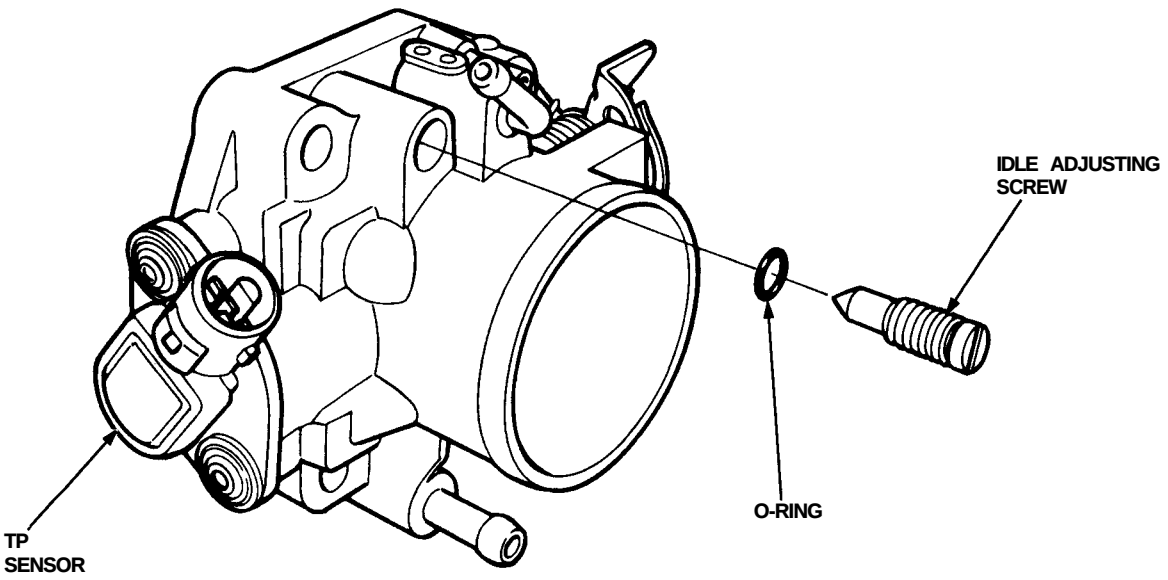
- The throttle stop screw in non-adjustable.
- After reassembly, adjust the throttle cable (see page 11-137).

(cont'd)

Intake Air System

Throttle Body (cont'd)

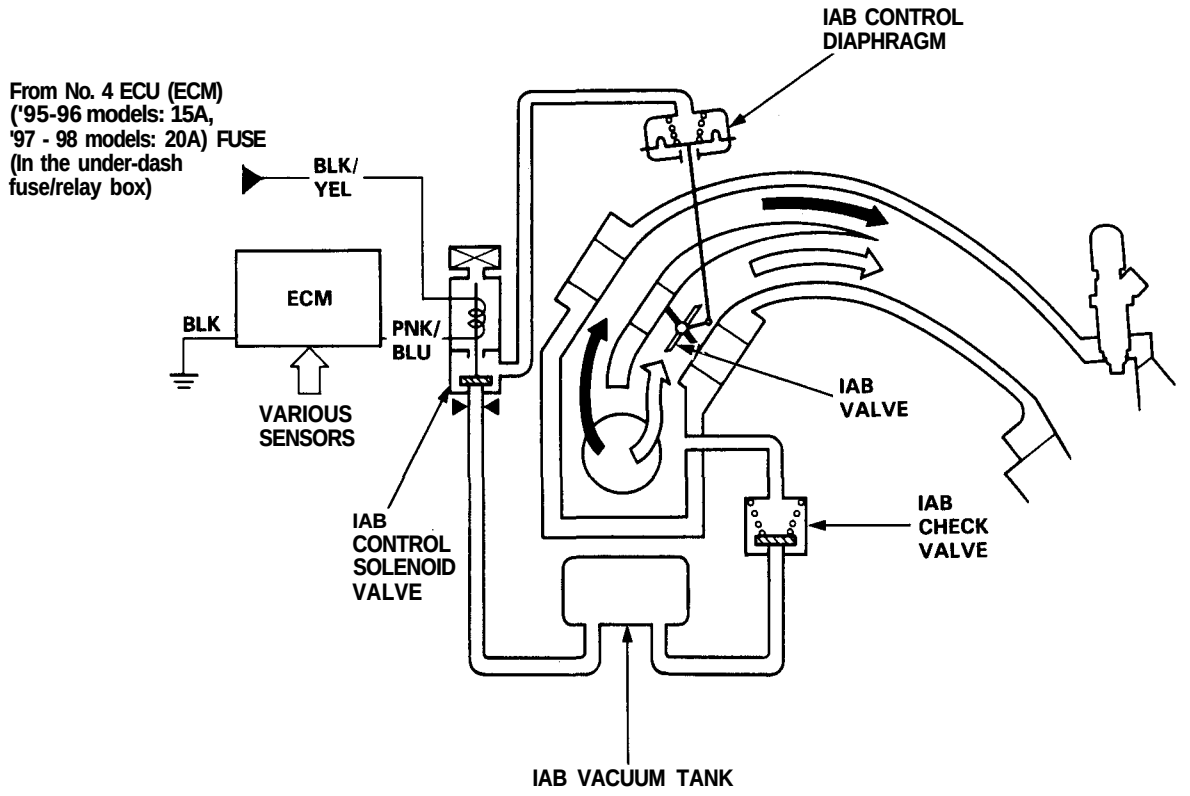
Disassembly



Intake Air Bypass (IAB) Control System

Description

Two air intake paths are provided in the intake manifold to allow the selection of the intake path most favorable for a given engine speed. Satisfactory power performance is achieved by closing and opening the intake Air Bypass (IAB) valves. High torque at low rpm is achieved when the IAB valves are closed, whereas high power at high rpm is achieved when the IAB valves are opened.



IAB CONTROL SOLENOID VALVE OFF

ENGINE RPM IS ABOVE 4,800 rpm

(cont'd)

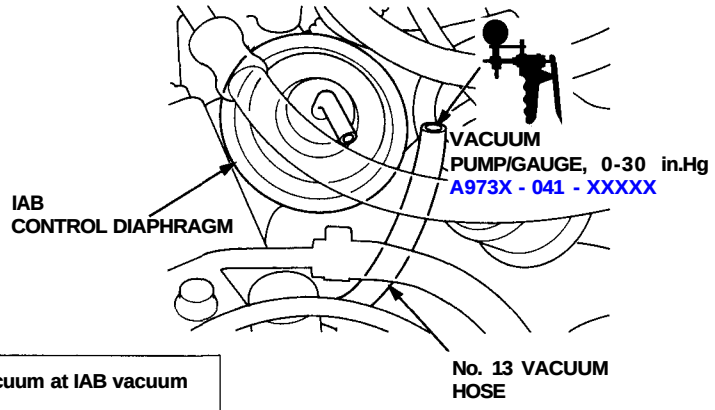
Intake Air System

Intake Air Bypass (IAB) Control System (cont'd)

Troubleshooting

Inspection of IAB Control System.

Check for vacuum at idle:
1. Start the engine and allow it to idle.
2. Remove the vacuum hose from the IAB control diaphragm and connect vacuum gauge to the hose.



Is there vacuum?

NO

Check for vacuum at IAB vacuum tank:
Remove No. 13 vacuum hose from the IAB vacuum tank, then check for vacuum at the IAB vacuum tank.

Is there vacuum?

NO

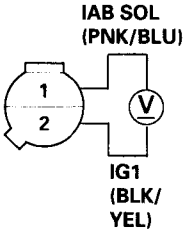
Repair the blockage or vacuum leak between the IAB vacuum tank and the intake manifold.

YES

YES

Check for an open in the wire (IAB SOL line):
1. Turn the ignition switch OFF.
2. Disconnect the IAB control solenoid valve connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between the IAB control solenoid valve 2P connector terminals No. 1 and No. 2.

IAB CONTROL SOLENOID VALVE CONNECTOR (C110)



Wire side of female terminals

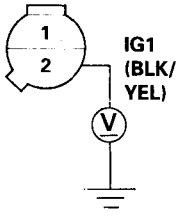
Is there battery voltage?

YES

Replace the IAB control solenoid valve.

NO

Check for an open in the wire (IG1 line):
Measure voltage between body ground and the IAB control solenoid valve 2P connector terminal No. 2.



A

(To page 11-143)

B

(To page 11-143)

(From page 11-142)

A

Check for vacuum at 5,000 rpm:
1. Raise engine speed to above 5,000 rpm.
2. Check for vacuum at the vacuum hose.

Is there vacuum?

YES

Disconnect the IAB control solenoid valve connector.

Is there vacuum?

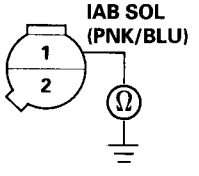
YES

Replace the IAB control solenoid valve.

NO

Check for a short in the wire (IAB SOL line):
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector A (26P).
3. Check for continuity between body ground and the IAB control solenoid valve 2P connector terminal No. 1.

IAB CONTROL SOLENOID VALVE CONNECTOR (C110)



Wire side of female terminals

Is there continuity?

YES

Repair short to ground at the wire between ECM (A9) and the IAB control solenoid valve connector.

NO

Substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.

IAB control system is OK.

(From page 11-142)

B

Is there battery voltage?

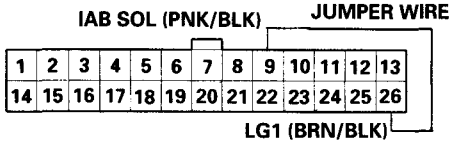
NO

Repair open in the wire between the IAB control solenoid valve connector and No. 4 ECU (ECM)('95 - 96 models: 15 A, '97 - 98 models: 20 A) fuse in the under-dash fuse/relay box.

YES

Check for an open in the wire (IAB SOL line):
Connect ECM connector terminals A9 and A26 with a jumper wire.

ECM CONNECTOR A (26P)



Wire side of female terminals

Does the solenoid valve click when the jumper is connected?

NO

Repair open in the wire between ECM (A9) and the IAB control solenoid valve connector.

YES

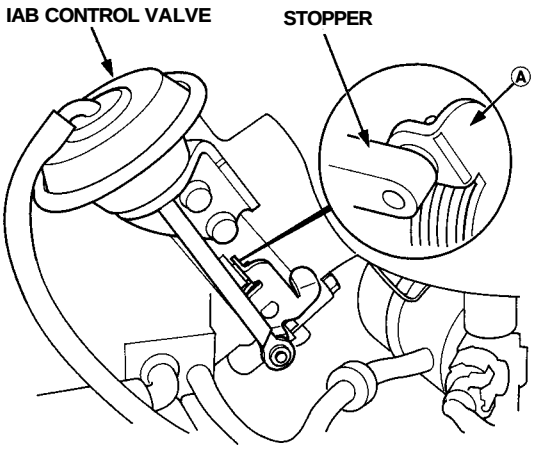
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(cont'd)

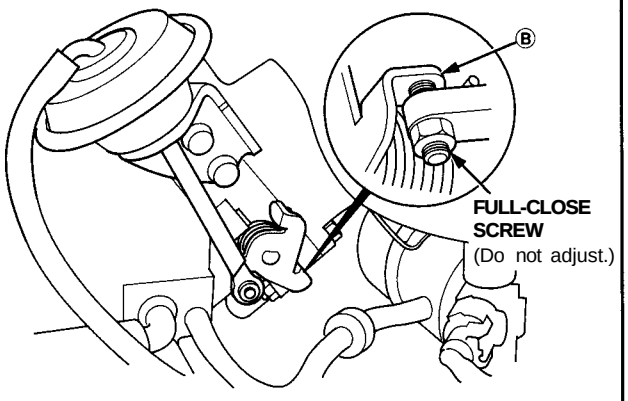
Intake Air Bypass (IAB) Control System (cont'd)

Intake Air Bypass (IAB) Control Valve Testing

1. Check the IAB control valve shaft for binding or sticking.
2. Check the IAB control valve for smooth movement.
3. Check that Ⓐ of the IAB control valve is in close contact with the stopper when the vacuum hose is disconnected from the IAB control diaphragm.



4. Check that Ⓑ of the IAB control valve is in close contact with the full-close screw when you apply 51 kPa (380 mmHg, 15 inHg) of vacuum to the IAB control diaphragm.



If any fault is found, clean the linkage and shafts with carburetor cleaner. If the problem still exists after cleaning, disassemble the intake manifold and check the IAB valve body assembly (see section 9).

System Description

The emission control system includes a Warm Up Three Way Catalytic Converter (WU TWC), a Three Way Catalytic Converter (TWC), Exhaust Gas Recirculation (EGR) system, Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system. The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

⚠ WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine. Hold the engine at 3,000 rpm with no load (transmission in N or P position) until the radiator fan comes on, then let it idle.
2. Connect a tachometer.
3. Check and adjust the idle speed, if necessary (see page 11-117).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

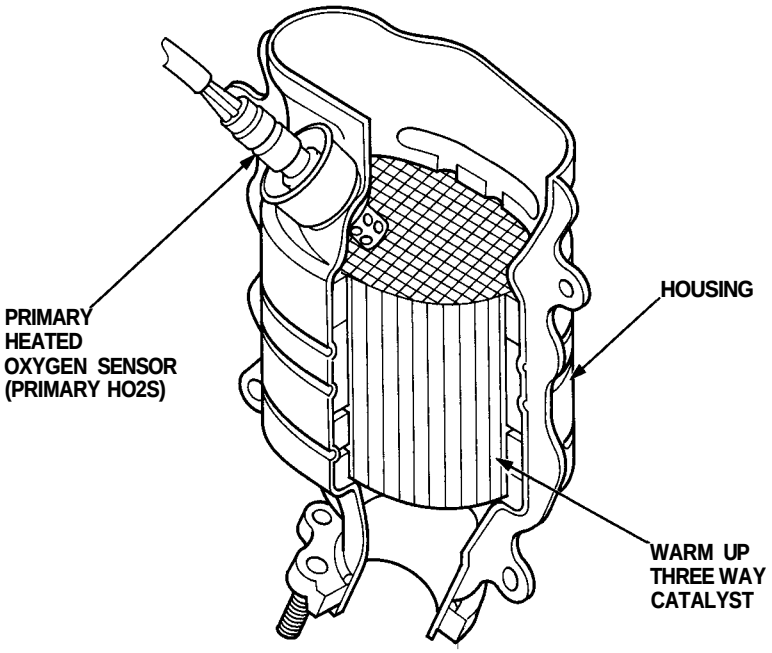
   NOTE: (Canada) Pull the parking brake lever up. Start the engine, then check that the headlights are off.

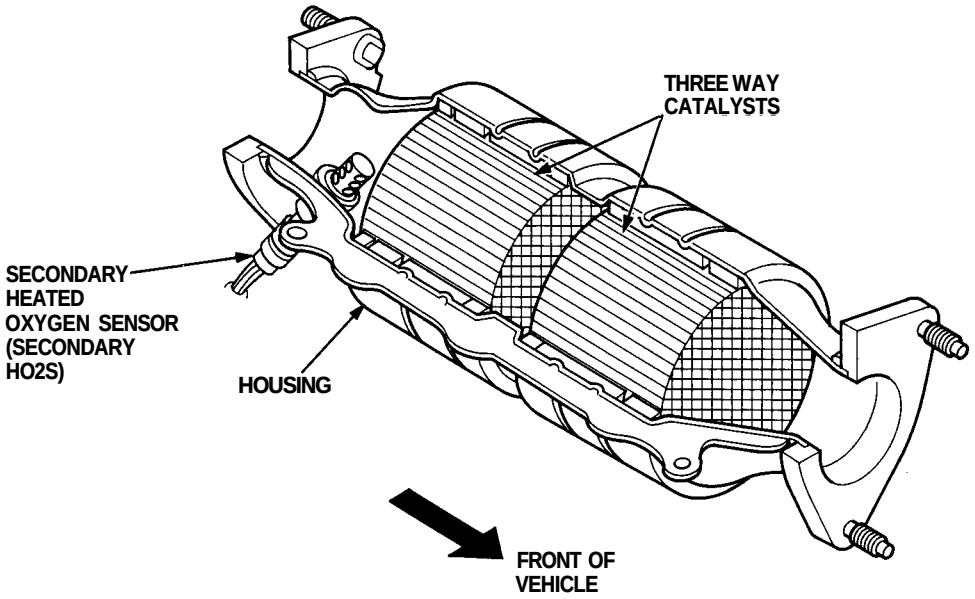
   CO meter should indicate 0.1% maximum.

Three Way Catalytic Converter (TWC)

Description

The Three Way Catalytic Converter (TWC) and Warm Up Three Way Catalytic Converter (WU TWC) are used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.





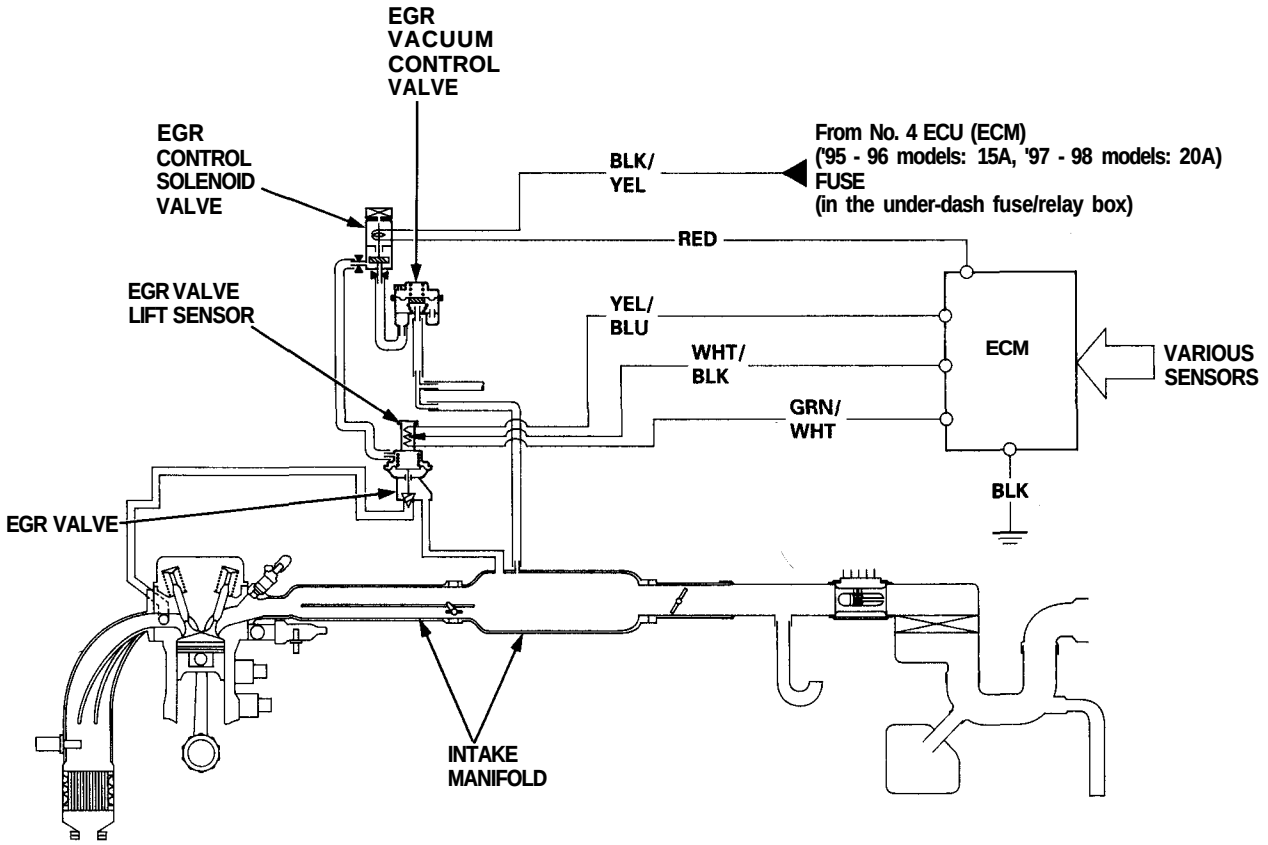
(cont'd)

Exhaust Gas Recirculation (EGR) System

Description

The EGR system is designed to reduce oxides of nitrogen emissions (NOx) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, EGR vacuum control valve, EGR control solenoid valve, ECM and various sensors.

The ECM contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECM. The ECM then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the ECM cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.

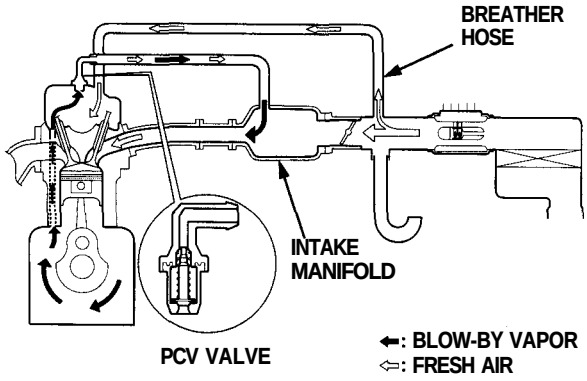


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Positive Crankcase Ventilation (PCV) System

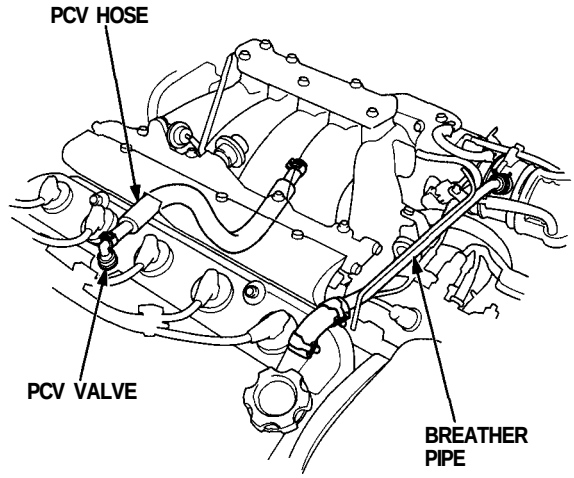
Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.

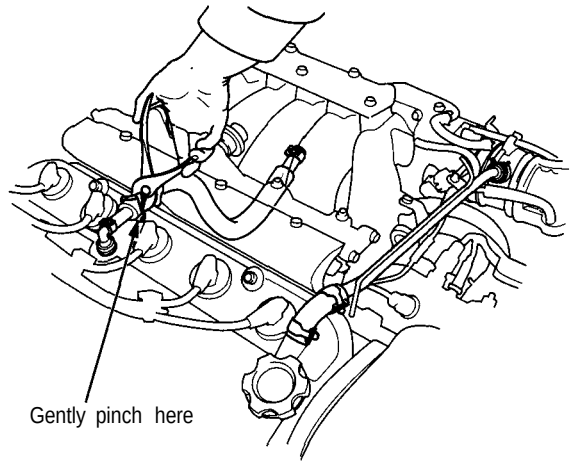


Inspection

1. Check the PCV hoses and connections for leaks and clogging.



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold in lightly pinched with your fingers or pliers.



If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

Emission Control System

Evaporative Emission (EVAP) Controls

Description

The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

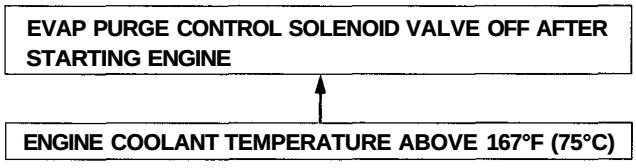
A. Evaporative Emission (EVAP) Control Canister

An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

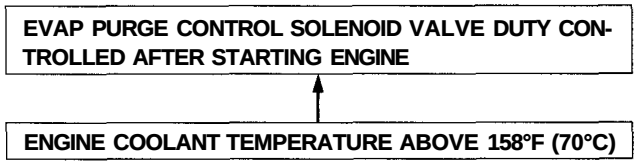
B. Vapor Purge Control System

EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control solenoid valve.

'95 - 96 models:



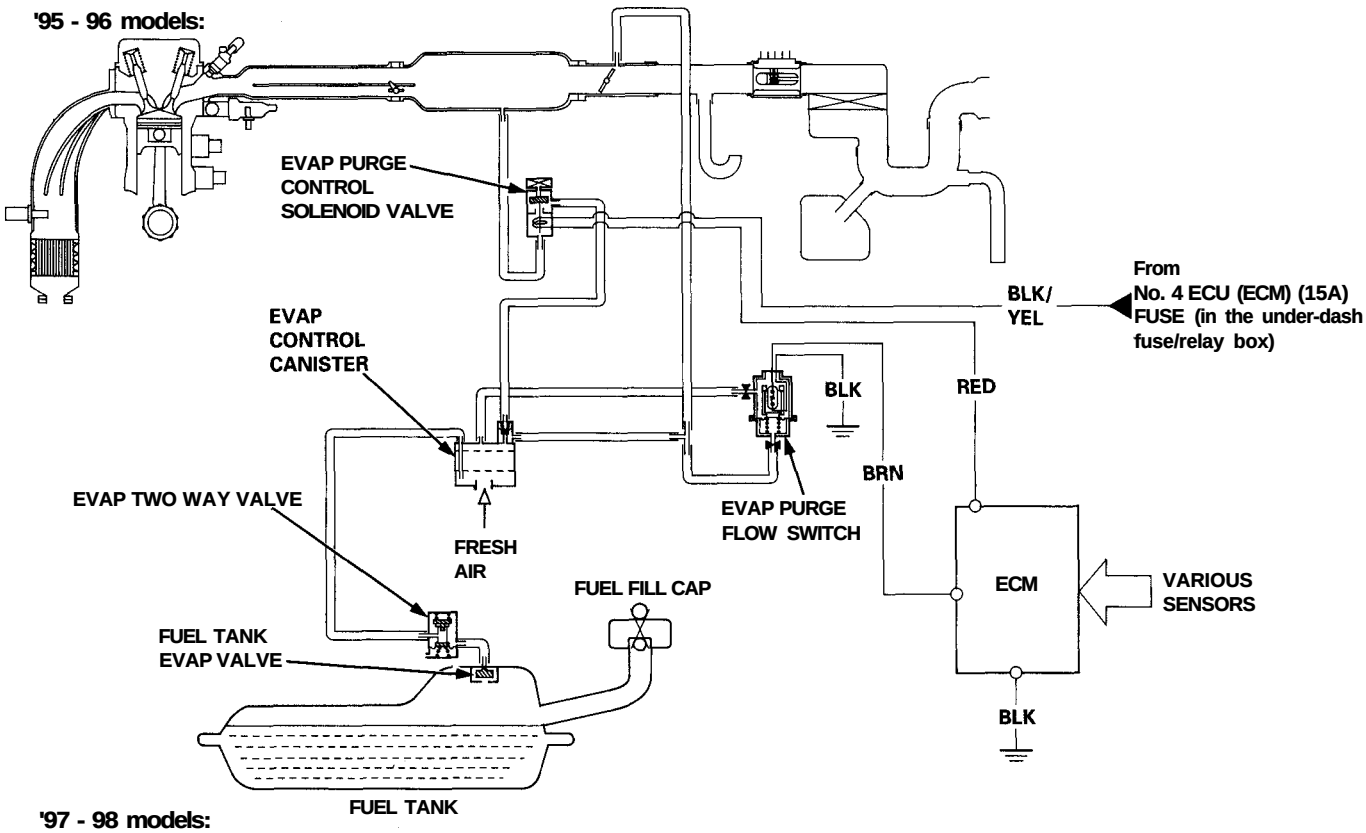
'97 - 98 models:



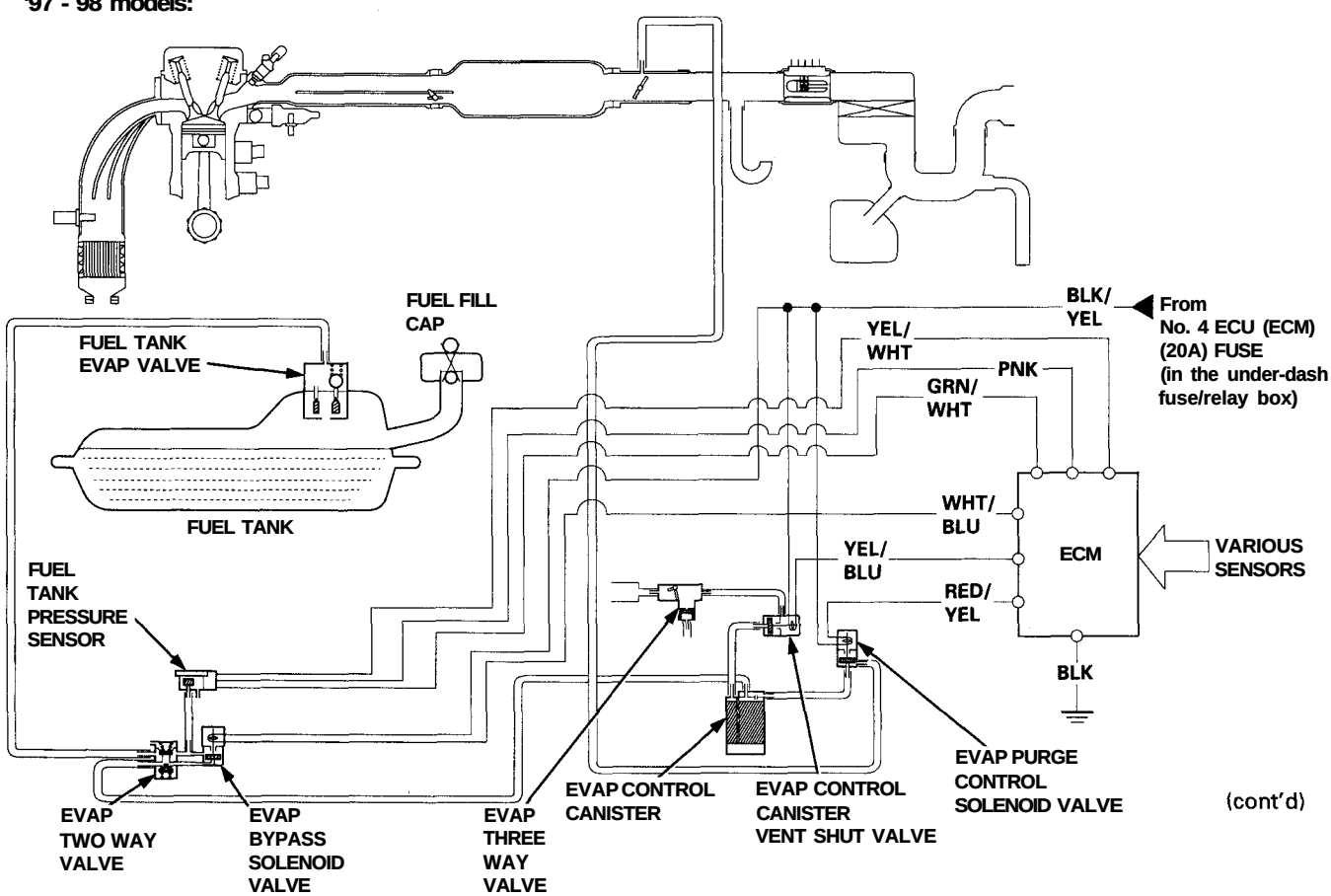
C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.

'95 - 96 models:



'97 - 98 models:



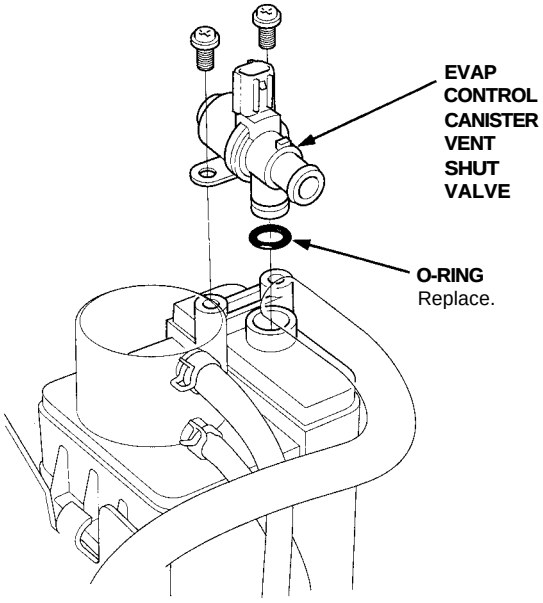
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Emission Control System

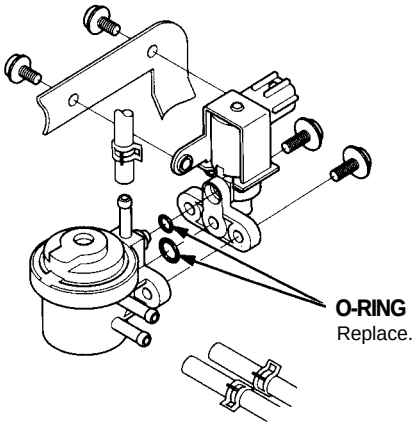
Evaporative Emission (EVAP) Controls (cont'd)

Evaporative Emission (EVAP) Control Canister and EVAP Control Canister Vent Shut Valve Replacement

1. Remove the front bumper (see section 20).
2. Disconnect the hoses from the EVAP control canister, and disconnect the 2P connector from the EVAP control canister vent shut valve.
3. Remove the EVAP control canister.
4. Remove the EVAP control canister vent shut valve.



Evaporative Emission (EVAP) Two Way Valve and EVAP Bypass Solenoid Valve Replacement

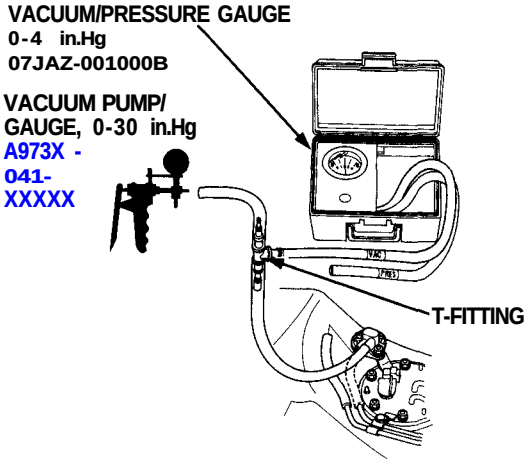


Evaporative Emission (EVAP) Two Way Valve Testing

'95 - 96 models:

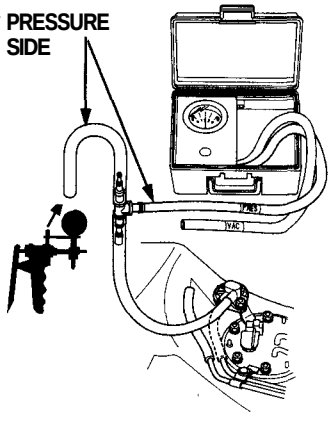
1. Remove the fuel fill cap.

2. Remove the vapor line from the EVAP two way valve on the fuel tank, and connect it to a T-fitting from vacuum gauge and vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge.
   The vacuum should stabilize momentarily at 0.7 - 2.0 kPa (5-15 mmHg, 0.2 - 0.6 in.Hg).
   If the vacuum stabilizes (valve opens) below 0.7 kPa (5 mmHg, 0.2 in.Hg) or above 2.0 kPa (15 mmHg, 0.6 in.Hg), install a new valve and retest.

4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.
   The pressure should stabilize at 1.3 - 4.7 kPa (10 - 35 mmHg, 0.4 - 1.4 in.Hg).
   - If the pressure momentarily stabilizes (valve opens) at 1.3 - 4.7 kPa (10 - 35 mmHg, 0.4 - 1.4 in.Hg), the valve is OK.
   - If the pressure stabilizes below 1.3 kPa (10 mmHg, 0.4 in.Hg) or above 4.7 kPa (35 mmHg, 1.4 in.Hg), install a new valve and retest.

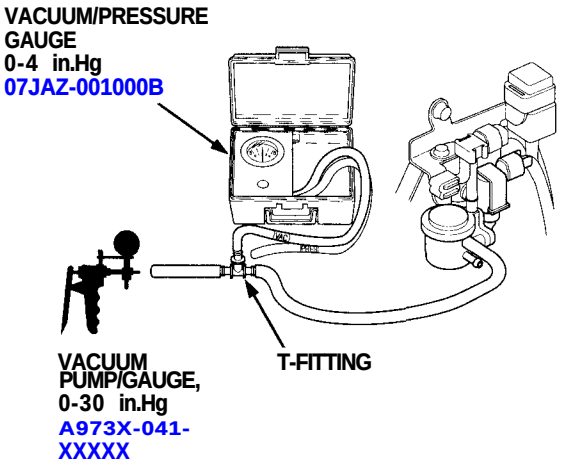
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Emission Control System

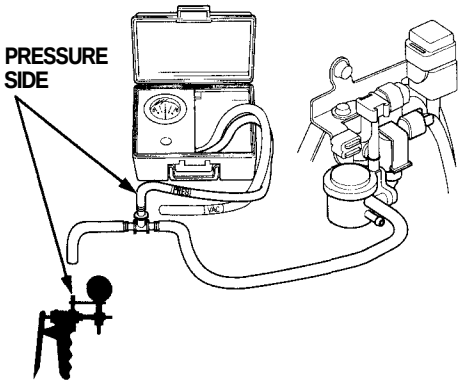
Evaporative Emission (EVAP) Controls (cont'd)

'97-98 models:

1. Remove the fuel fill cap.
2. Remove the vapor line from the EVAP two way valve (located at left side of engine compartment), and connect it to a T-fitting from a vacuum gauge and a vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge. The vacuum should stabilize momentarily at 0.8 - 2.1 kPa (6 - 16 mmHg, 0.2 - 0.6 in.Hg).
   If the vacuum stabilizes (valve opens) below 0.8 kPa (6 mmHg, 0.2 in.Hg) or above 2.1 kPa (16 mmHg, 0.6 in.Hg), install a new valve and retest.
4. Move the vacuum pump hose from the vacuum fitting to the pressure fitting, and move the vacuum gauge hose from the vacuum side to the pressure side as shown.

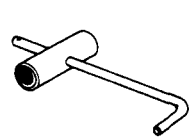


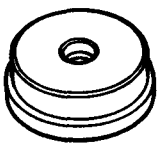
5. Slowly pressurize the vapor line while watching the gauge. The pressure should be stabilize momentarily above 1.0 kPa (8 mmHg, 0.3 in.Hg).
   - If the pressure momentarily stabilizes (valve opens) above 1.0 kPa (8 mmHg, 0.3 in.Hg), the valve is OK.
   - If the pressure stabilizes below 1.0 kPa (8 mmHg, 0.3 in.Hg), install a new valve and retest.

Special Tools

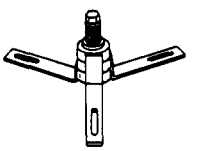
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAB-PF50100 or 07GAB-PF50101	Mainshaft Holder	1	14-131, 14-183
②	07GAD-SD40101	Bearing Driver Attachment	1	14-167
③	07GAE-PG40200	Clutch Spring Compressor Bolt Assembly	1	14-158, 14-161
④	07HAC-PK4010A	Housing Puller	1	14-133
⑤	07LAC-PW50101	Extension Shaft Puller	1	14-117
⑥	07LAD-PW50500	Pinion Cover Driver Attachment	1	14-170
⑦	07LAD-PW50601	Attachment, 40 x 50 mm, I.D.	1	14-166, 14-170
⑧	07LAE-PX40100	Clutch Spring Compressor Attachment	1	14-158, 14-161
⑨	07MAJ-PY4011A	A/T Pressure Hose, 2210 mm	4	14-106
⑩	07MAJ-PY40120	A/T Pressure Hose Adapter	4	14-106
⑪	07PAZ-0010100	SCS Service Connector	1	14-53
⑫	07SAZ-001000A	Backprobe Set	2	14-55, 14-102
⑬	07406-0020400	A/T Oil Pressure Gauge Set w/panel	1	14-106
⑭	07406-0070300	A/T Low Pressure Gauge w/panel	1	14-106
⑮*	07736-A01000A	Adjustable Bearing Puller, 25 - 40 mm	1	14-171, 14-172
⑯	07746-0010300	Attachment, 42 x 27 mm	1	14-165
⑰	07746-0010500	Attachment, 62 x 68 mm	1	14-171, 14-172
⑱	07746-0010600	Attachment, 72 x 75 mm	1	14-167, 14-171
⑲	07746-0030100	Driver 40 mm, I.D.	1	14-164
⑳	07749-0010000	Driver	1	14-165, 14-167, 14-170 14-171, 14-172
㉑	07947-6340500	Driver Attachment	1	14-171

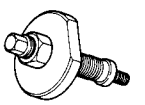
* Must be used with commercially available 3/8" - 16 slide hammer.

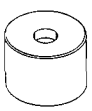

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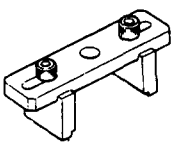

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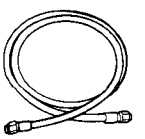

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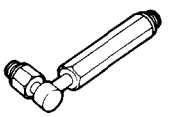

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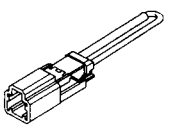

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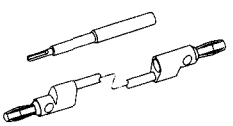

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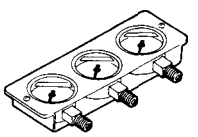

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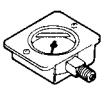

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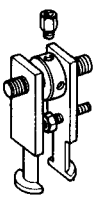

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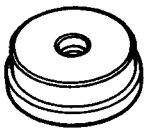

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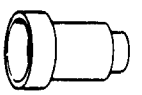

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Description

The automatic transmission is a combination of a 3-element torque converter and a dual-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator, assembled in a single unit.
They are connected to the engine crankshaft so they turn together as a unit as the engine turns.
Around the outside of the drive plate is a ring gear which meshes with the starter pinion when the engine is being started.
The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.
The transmission has two parallel shafts: the mainshaft and the countershaft. The mainshaft is in line with the engine crankshaft.
The mainshaft includes the 1st, 2nd and 4th clutches, and gears for 4th, 2nd, 1st and reverse (3rd gear is integral with the mainshaft, while the reverse gear is integral with 4th gear).
The countershaft includes the 3rd, and 1st-hold clutches, and gears for 3rd, 4th, 1st, 2nd, reverse, and parking. The secondary drive gear is integrated with the countershaft.
The gears on the mainshaft are in constant mesh with those on the countershaft.
When certain combinations of gears in the transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide [1], [2], [D3], [D4], and [R] positions.

Electronic Control

The electronic control system consists of the Transmission Control Module (TCM), sensors, a linear solenoid and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The TCM is located below the dashboard, behind the glove box on the passenger's side.

Hydraulic Control

The lower valve body assembly includes the main valve body, the servo body and the shift control solenoid valves. They are bolted on the lower part of the transmission housing.
Other valve bodies, the regulator valve body, the ATF pump body, the 2nd accumulator body, and the throttle valve body, are bolted to the torque converter housing.
The main valve body contains the manual valve, the 1 - 2 shift valve, the 2 - 3 shift valve, the 3 - 4 shift valve, the 4th kickdown valve, the 2 - 3 orifice control valve, the 3 - 4 orifice control valve, the 4th exhaust valve, the servo control valve, and the main orifice control valve.
The servo body contains the servo valve, 3rd and 4th accumulator pistons.
The regulator valve body contains the regulator valve, the lock-up shift valve, and the cooler relief valve.
Fluid from the regulator passes through the manual valve to the various control valves.
The throttle valve body includes the throttle valve which is bolted onto the 2nd accumulator body. The 2nd accumulator piston is assembled in the 2nd accumulator body.
The linear solenoid is joined with the throttle valve body.
The ATF pump body contains the modulator valve, the lock-up control valve, the lock-up timing valve, and the relief valve.
The torque converter check valve is located in the torque converter housing under the ATF pump body.
The 1st and 1st-hold accumulator pistons are assembled in the rear cover.
The clutches receive fluid from their respective feed pipes or internal hydraulic circuit.

Shift Control Mechanism

Input from various sensors located throughout the vehicle determines which shift control solenoid valve the TCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

Lock-up Mechanism

In [D4] position, in 2nd, 3rd and 4th, and in [D3] position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the TCM optimizes the timing of the lock-up mechanism. The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve. When lock-up control solenoid valves A and B activate, the modulator pressure changes. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the TCM.

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Description

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Gear Selection

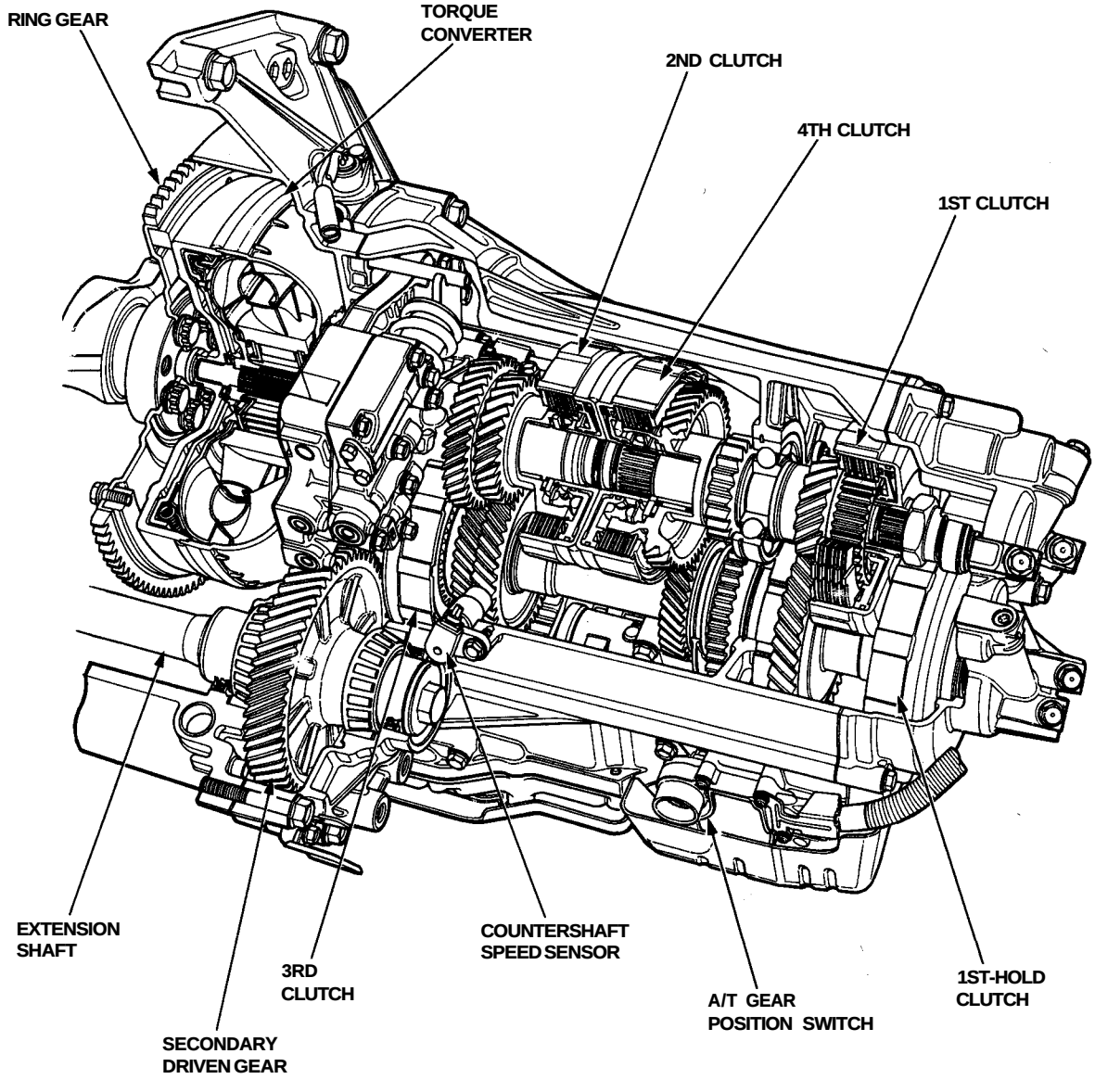
The shift lever has seven positions: [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th gear ranges, [D3] 1st through 3rd gear ranges, [2] 2nd gear and [1] 1st gear.

Position	Description
[P] PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.
[N] NEUTRAL	All clutches released.
[D4] DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshift through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in [D4] position in 2nd, 3rd and 4th gear.
[D3] DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop. The lock-up mechanism comes into operation in 3rd speed.
[2] SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.
[1] FIRST	For engine braking; stays in 1st gear, does not shift up.

Starting is possible only in [P] and [N] positions through the use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator

The A/T gear position indicator in the instrument panel shows which gear has been selected without having to look down at the console.


RING GEAR
TORQUE CONVERTER
2ND CLUTCH
4TH CLUTCH
1ST CLUTCH
EXTENSION SHAFT
SECONDARY DRIVEN GEAR
3RD CLUTCH
COUNTERSHAFT SPEED SENSOR
A/T GEAR POSITION SWITCH
1ST-HOLD CLUTCH

Description

Clutches

The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear.
Likewise, when the hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and the steel plates, and they are free to slide past each. This allows the gear to spin independently on its shaft, transmitting no power.

1st Clutch
The 1st clutch engages/disengages 1st gear, and is located at the end of the mainshaft, just behind the rear cover.
The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold or [1] position, and is located at the end of the countershaft, just behind the rear cover. The 1st-hold clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

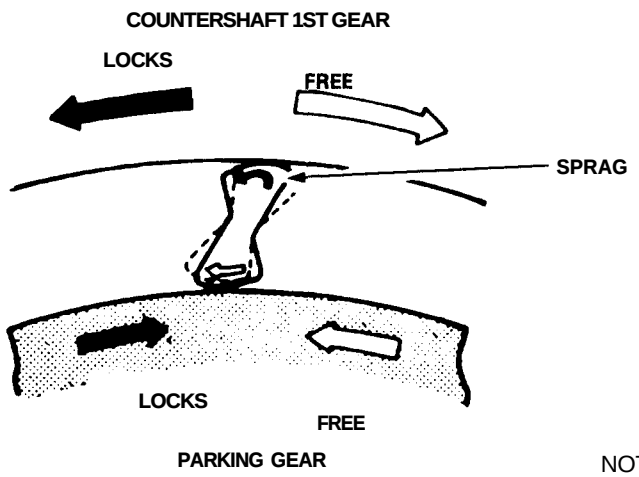
2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located at the center of the mainshaft. The 2nd clutch is joined back-to-back to the 4th clutch. The 2nd clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

3rd Clutch
The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft.
The 3rd clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

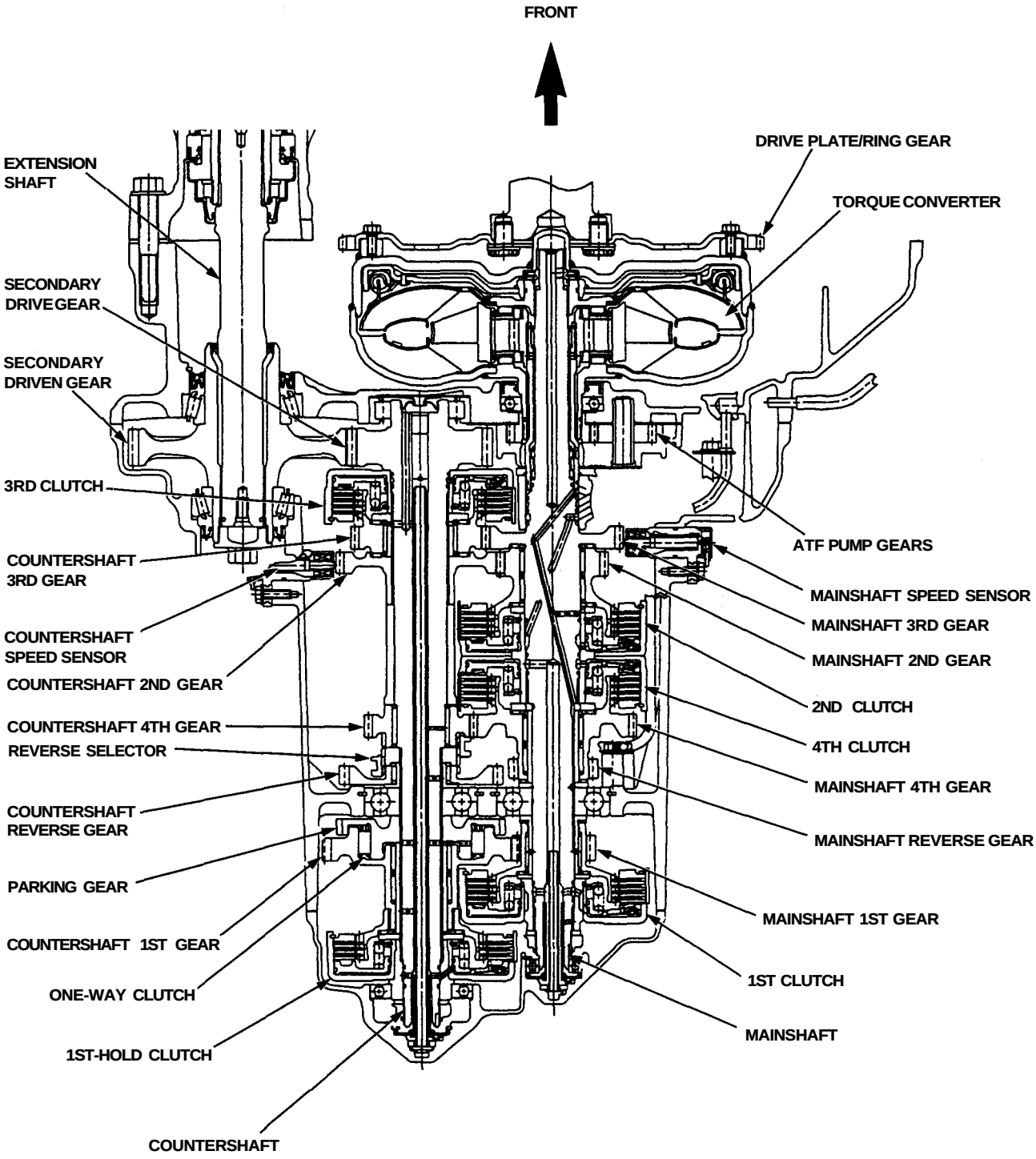
4th Clutch
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the center of the mainshaft. The 4th clutch is joined back-to-back to the 2nd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

One-way Clutch
The one-way clutch is positioned between the countershaft 1st gear and the parking gear, with the parking gear splined to the countershaft. The 1st gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear.
The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the [D4], [D3] or [2] position.

However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the [D4], [D3] or [2] position. This is because the increased rotational speed of the gears on the countershaft overrides the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch free-wheels with the 1st clutch still engaged.



NOTE: View from rear cover side.


FRONT
EXTENSION SHAFT
SECONDARY DRIVE GEAR
SECONDARY DRIVEN GEAR
3RD CLUTCH
COUNTERSHAFT 3RD GEAR
COUNTERSHAFT SPEED SENSOR
COUNTERSHAFT 2ND GEAR
COUNTERSHAFT 4TH GEAR
REVERSE SELECTOR
COUNTERSHAFT REVERSE GEAR
PARKING GEAR
COUNTERSHAFT 1ST GEAR
ONE-WAY CLUTCH
1ST-HOLD CLUTCH
COUNTERSHAFT
DRIVE PLATE/RING GEAR
TORQUE CONVERTER
ATF PUMP GEARS
MAINSHAFT SPEED SENSOR
MAINSHAFT 3RD GEAR
MAINSHAFT 2ND GEAR
2ND CLUTCH
4TH CLUTCH
MAINSHAFT 4TH GEAR
MAINSHAFT REVERSE GEAR
MAINSHAFT 1ST GEAR
1ST CLUTCH
MAINSHAFT

Description

Power Flow

POSITION \ PART		TORQUE CONVERTER	1ST GEAR 1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	1ST GEAR ONE-WAY CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH GEAR	4TH CLUTCH	REVERSE GEAR	PARKING GEAR
P		○	×	×	×	×	×	×	×	×	○
R		○	×	×	×	×	×	×	○	○	×
N		○	×	×	×	×	×	×	×	×	×
D4	1ST	○	×	○	*2○	×	×	×	×	×	×
	2ND	○	×	*1○	×	○	×	×	×	×	×
	3RD	○	×	*1○	×	×	○	×	×	×	×
	4TH	○	×	*1○	×	×	×	○	○	×	×
D3	1ST	○	×	○	*2○	×	×	×	×	×	×
	2ND	○	×	*1○	×	○	×	×	×	×	×
	3RD	○	×	*1○	×	×	○	×	×	×	×
2		○	×	*1○	×	○	×	×	×	×	×
1		○	○	○	○	×	×	×	×	×	×

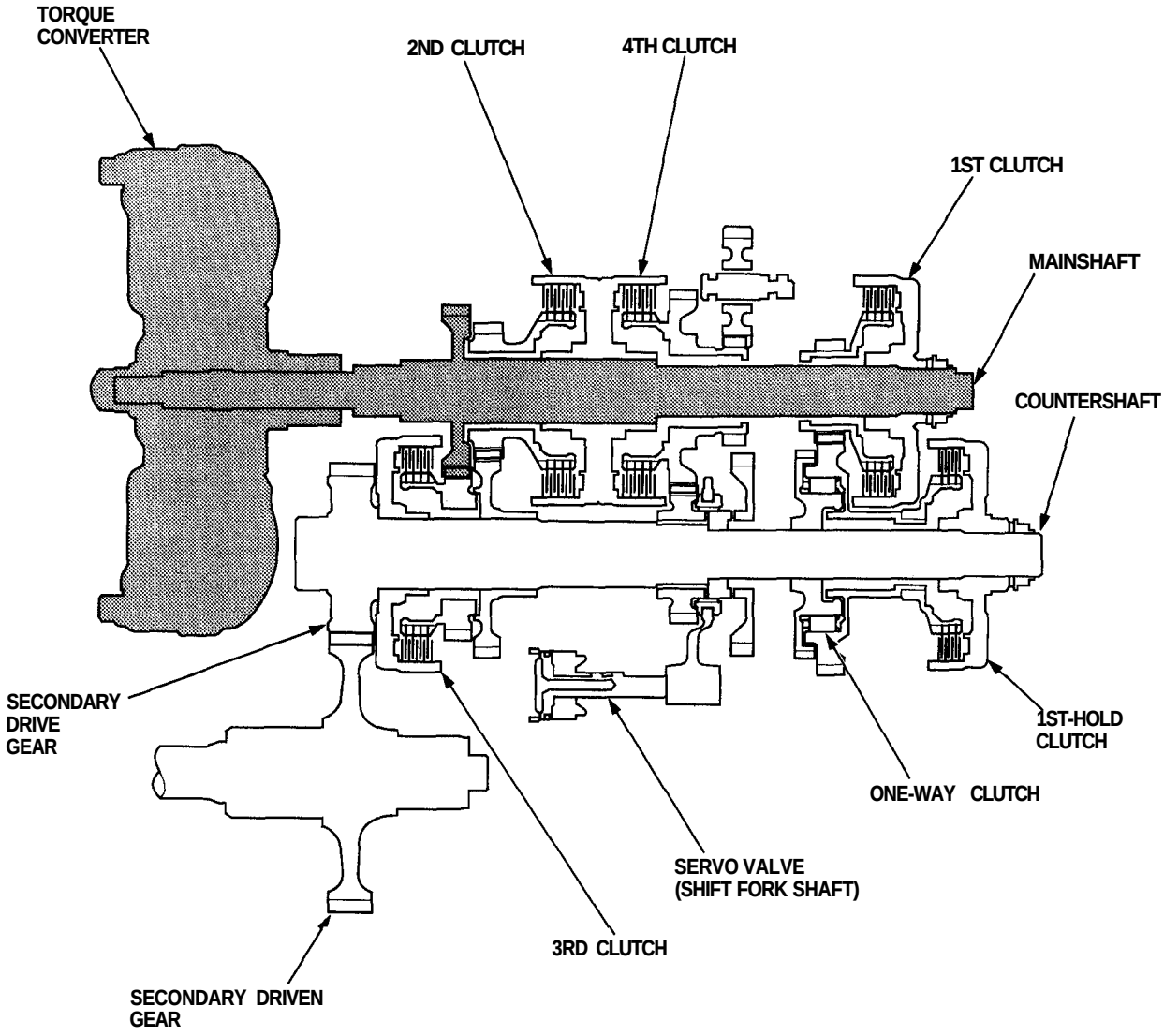
○: Operates, ×: Doesn't operate.

*1: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.

*2: The one-way clutch engages when accelerating, and slips when decelerating.

[N] Position
Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.

[P] Position
Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft is locked by the parking brake pawl interlocking the parking gear.



(cont'd)

Description

Power Flow (cont'd)

1 Position

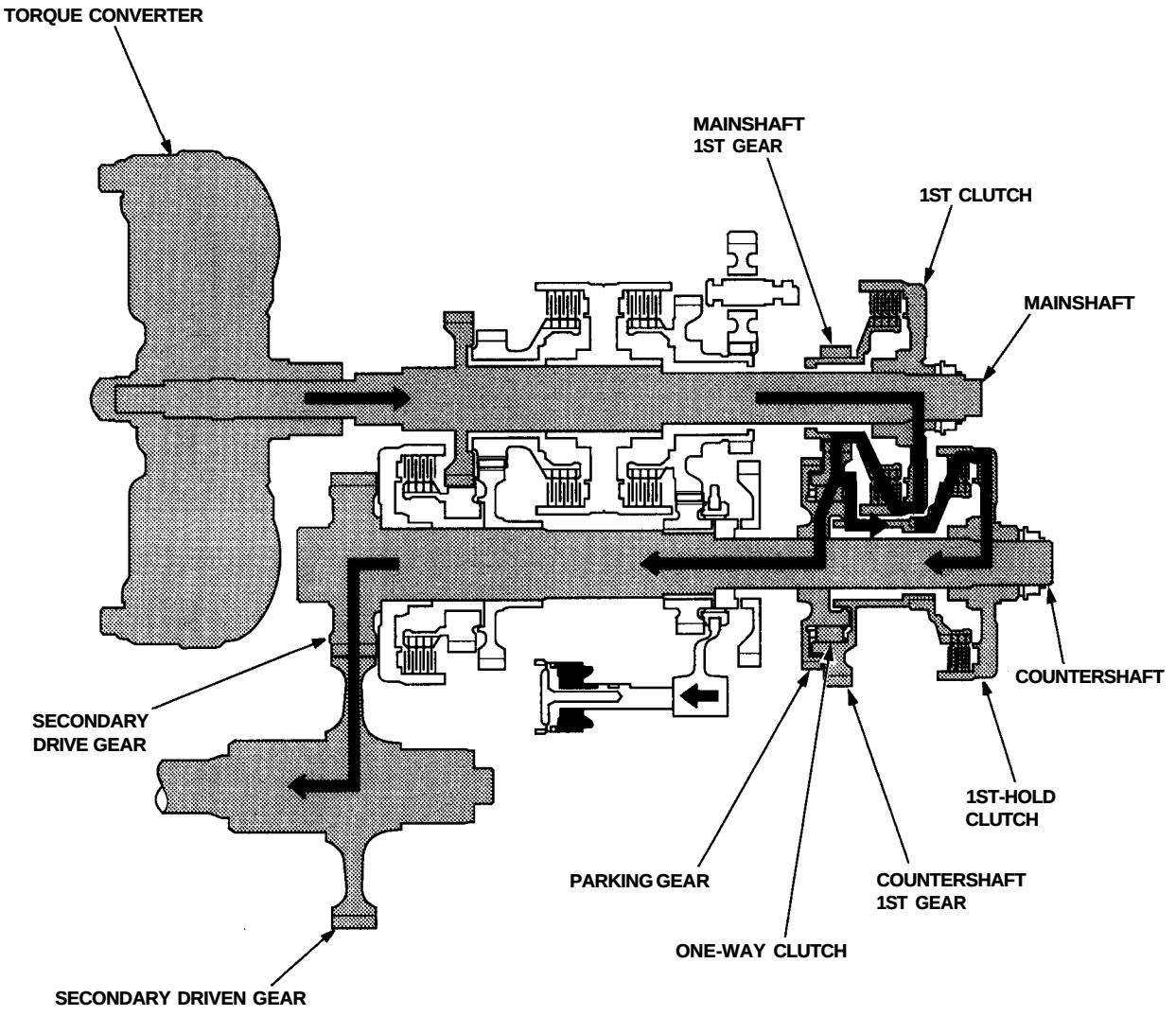
In 1 position, hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch.

The power flow when accelerating is as follows:

1. The hydraulic pressure is applied to the 1st clutch on the mainshaft, and power is transmitted via the 1st clutch to the mainshaft 1st gear.

2. Hydraulic pressure is also applied to the 1st-hold clutch on the countershaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch and the 1st-hold clutch. The one-way clutch is used to drive the countershaft, and the 1st-hold clutch drives the countershaft.

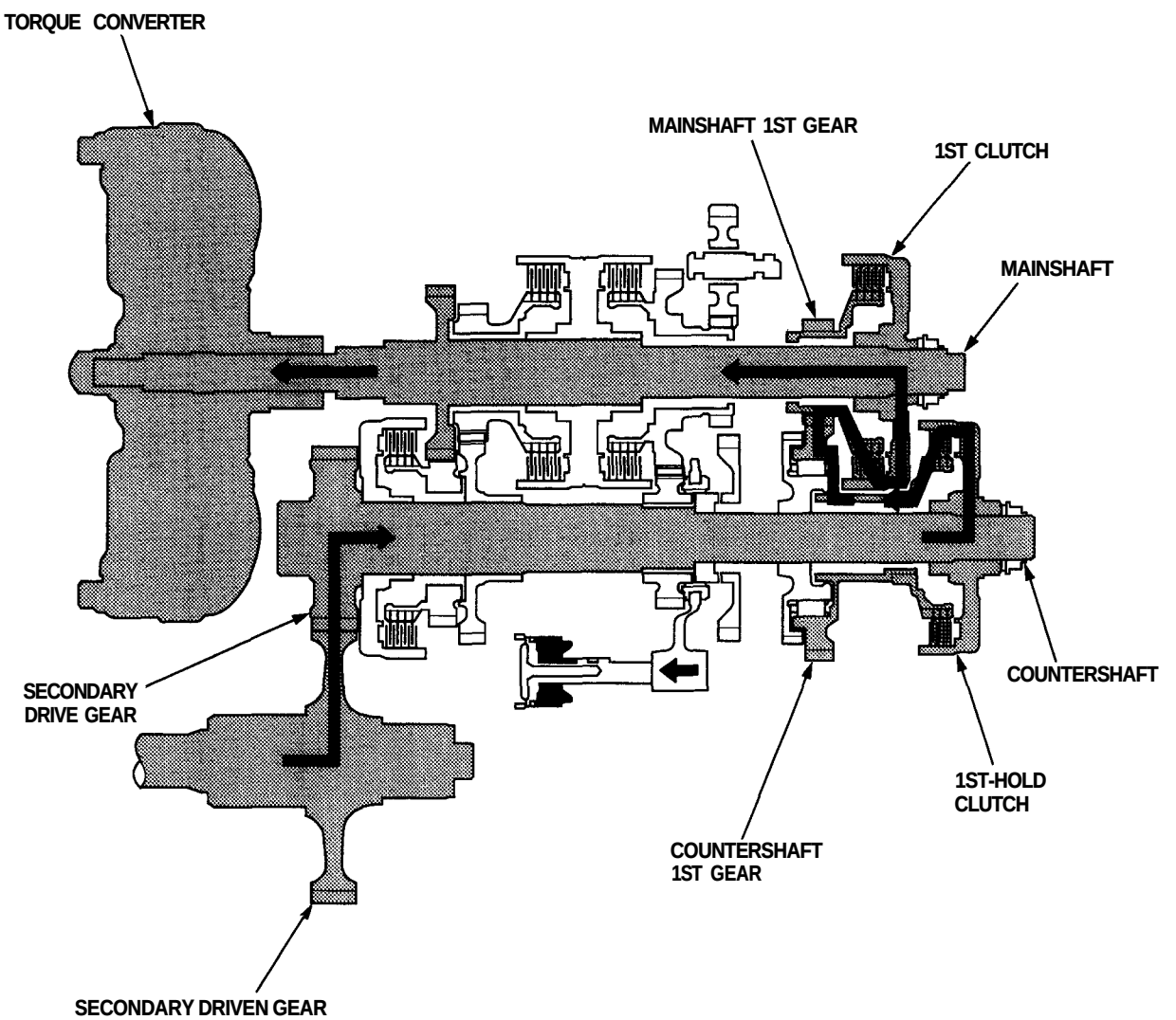
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.



1 Position

The power flow when decelerating is as follows:

1. Rolling resistance from the road surface goes through the front wheels to the secondary drive gear, then to the countershaft 1st gear via the 1st-hold clutch which is applied during deceleration.
2. The one-way clutch disengages at this time because the application of torque is reversed.
3. The counterforce conveyed to the countershaft 1st gear turns the mainshaft 1st gear. At this time, since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear.



(cont'd)

Description

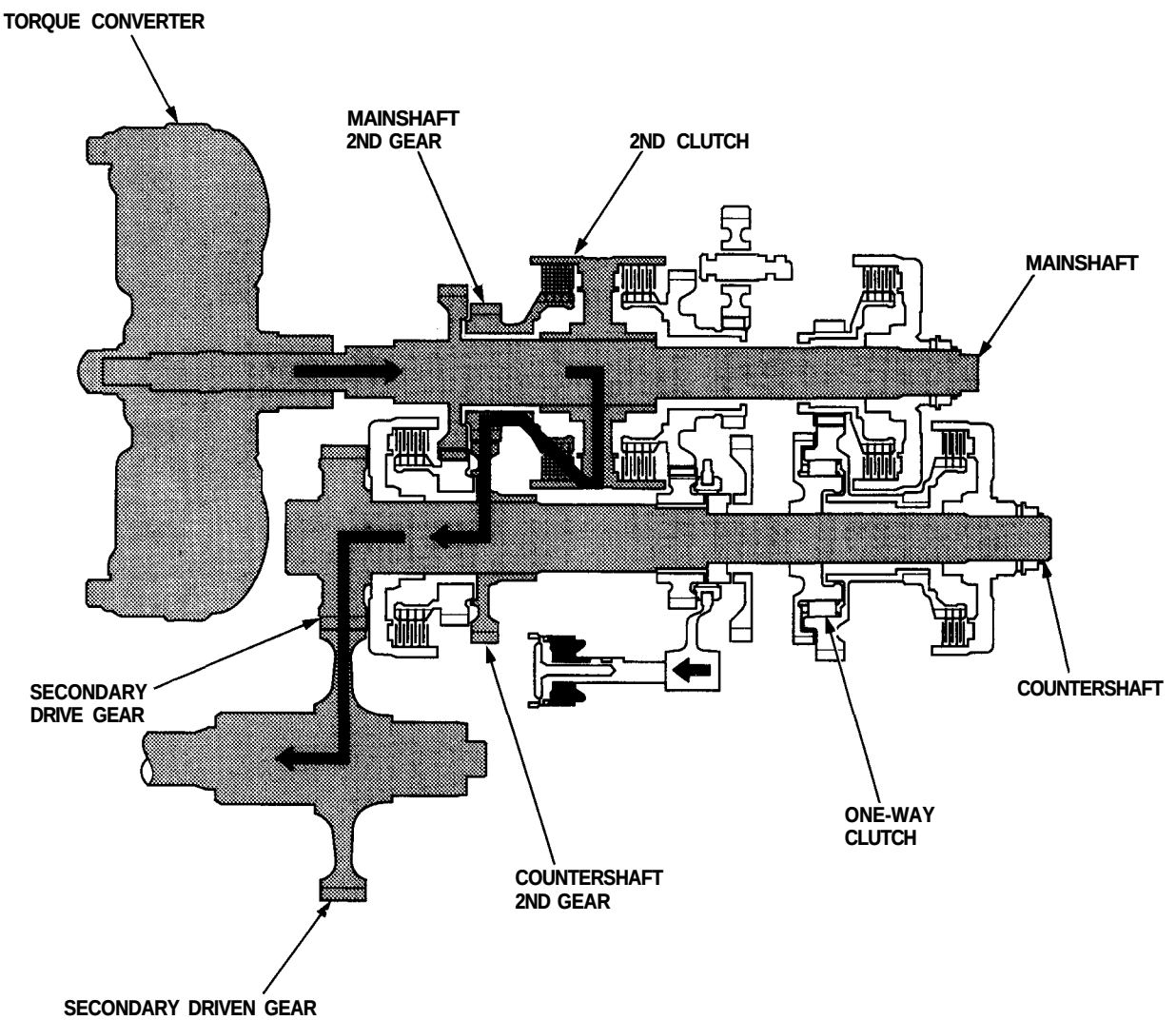
Power Flow (cont'd)

2 Position

2 Position is provided to drive only in 2nd gear.

1. Hydraulic pressure is applied to the 2nd clutch on the mainshaft, and power is transmitted via the 2nd clutch to the mainshaft 2nd gear.
2. Power transmitted to the mainshaft 2nd gear is conveyed via the countershaft 2nd gear, which drives the countershaft.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of the 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.

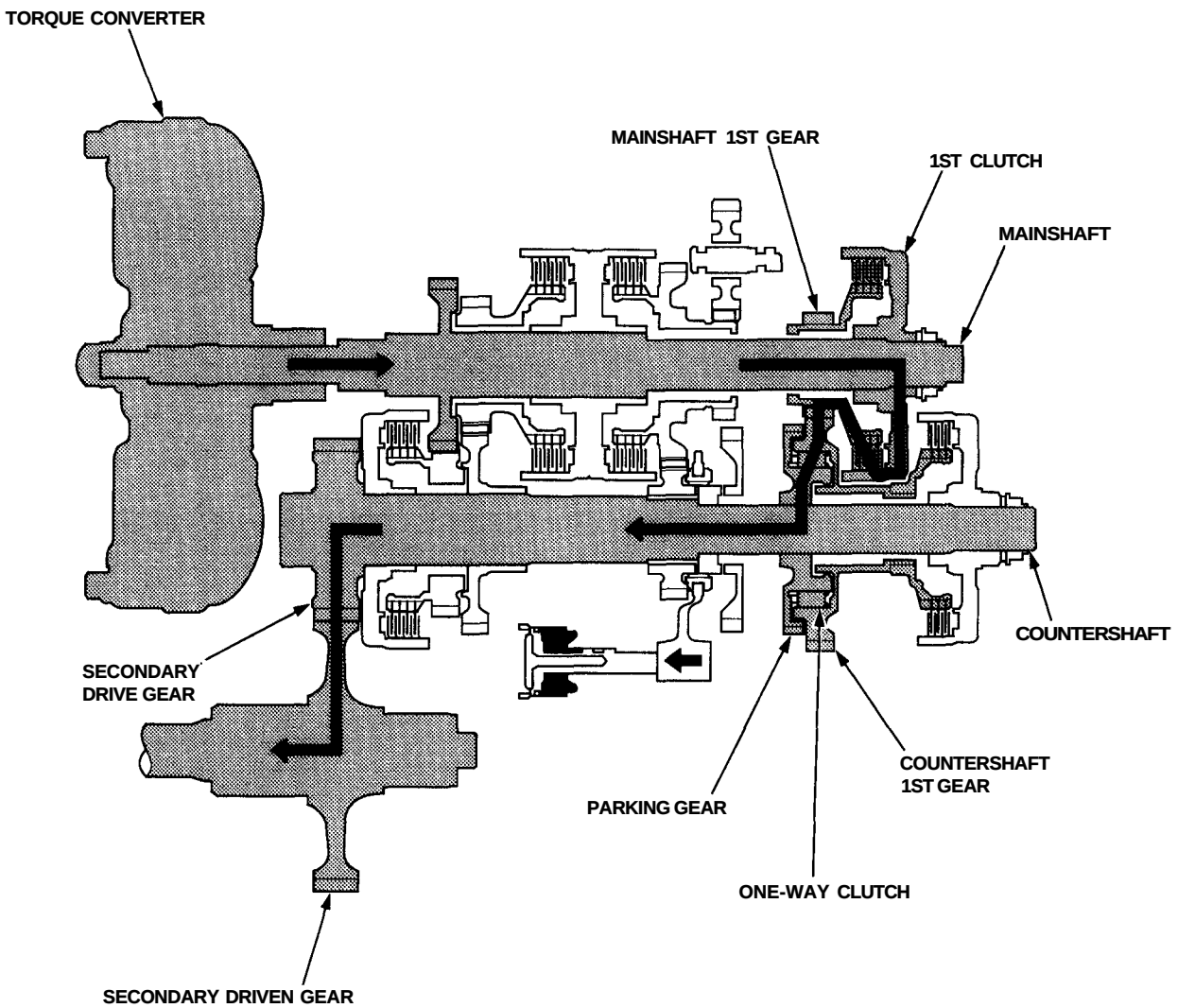


In D4 or D3 position, the optimum gear is automatically selected from 1st, 2nd, 3rd, and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

D4 or D3 Position, 1st gear

1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
2. Power is transmitted to the countershaft 1st gear, which drives the countershaft via the one-way clutch.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 or D3 position, hydraulic pressure is not applied to the 1st-hold clutch.



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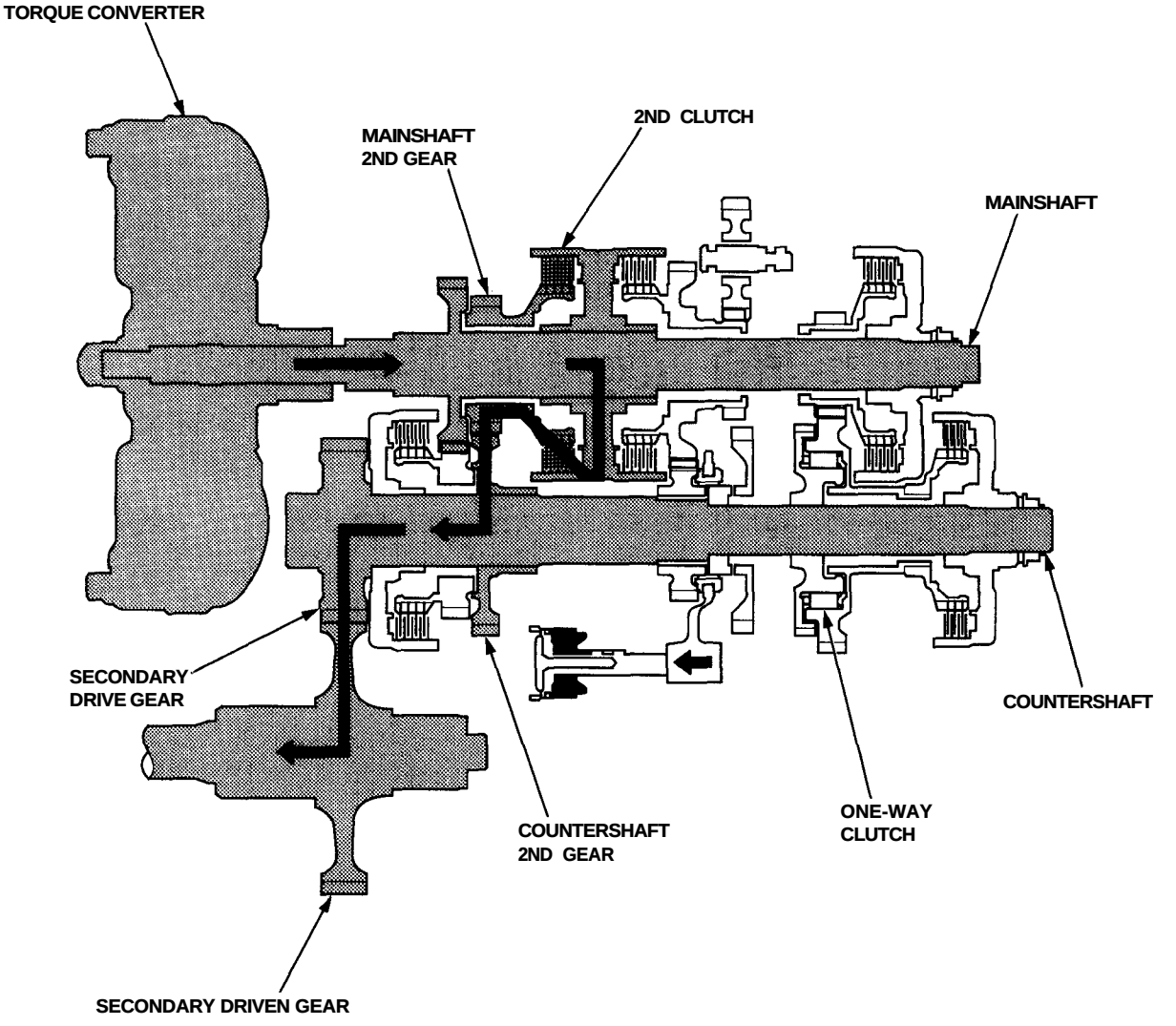
Description

Power Flow (cont'd)

D4 or D3 Position, 2nd gear

1. Hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
2. Power is transmitted to the countershaft 2nd gear, which drives the countershaft.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 or D3 position, 2nd gear, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.

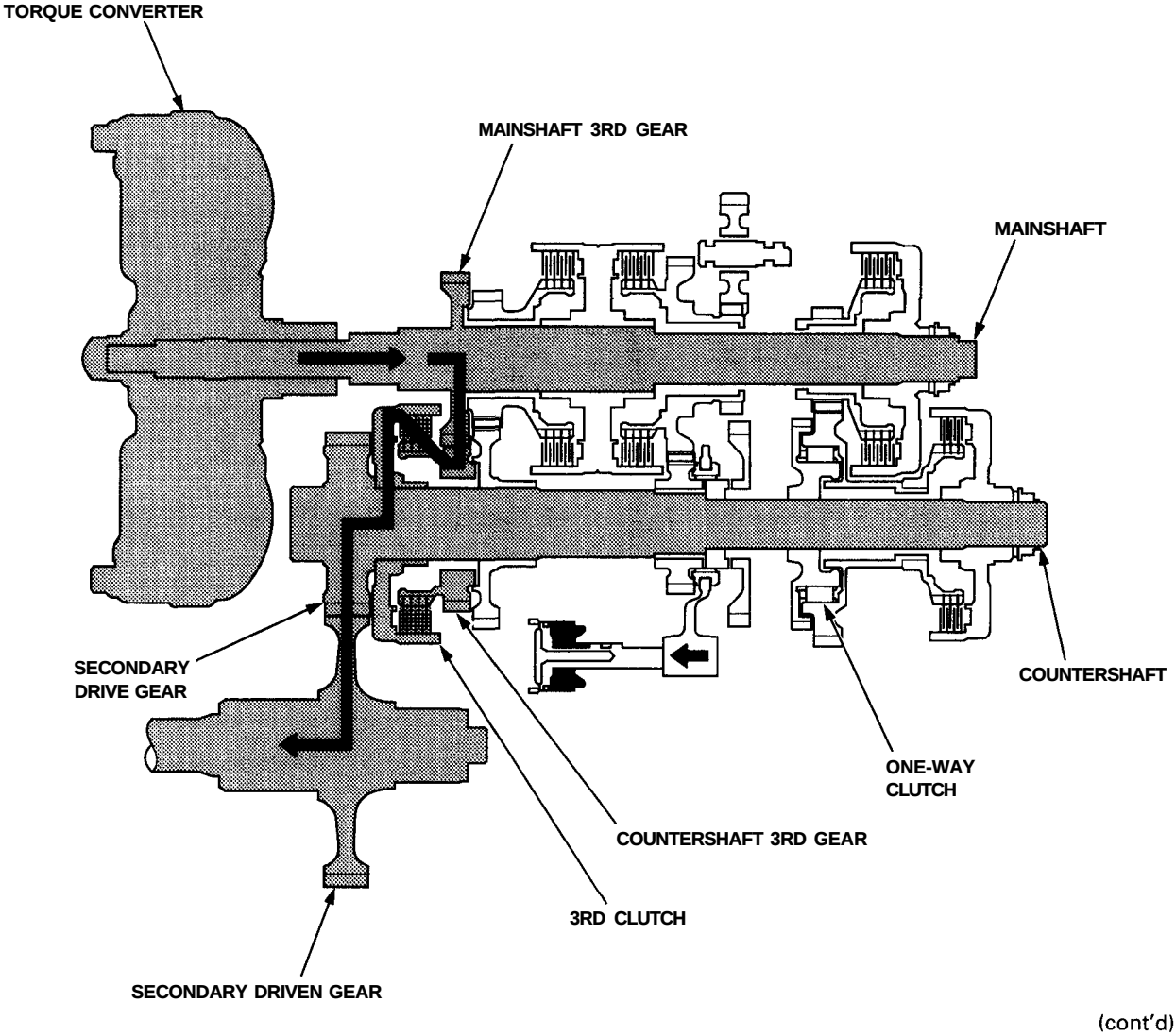


D4 or D3 Position, 3rd gear

1. Hydraulic pressure is applied to the 3rd clutch. Power from mainshaft 3rd gear is transmitted to the countershaft 3rd gear.

2. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 or D3 position, 3rd gear, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



(cont'd)

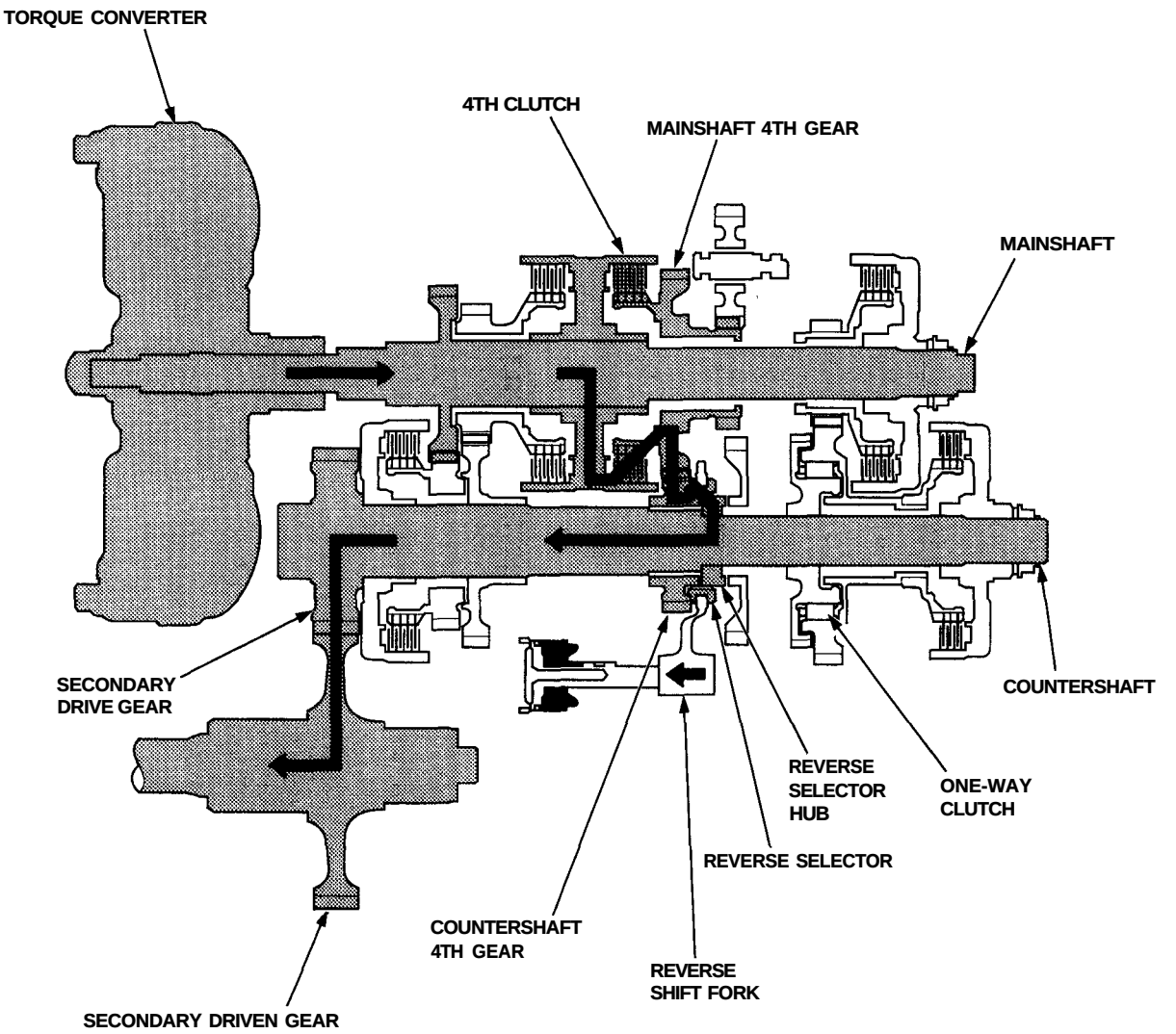
Description

Power Flow (cont'd)

D4 Position, 4th gear

1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
2. Power is transmitted to the countershaft 4th gear, which drives the countershaft.
3. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.

NOTE: In D4 position, 4th gear, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



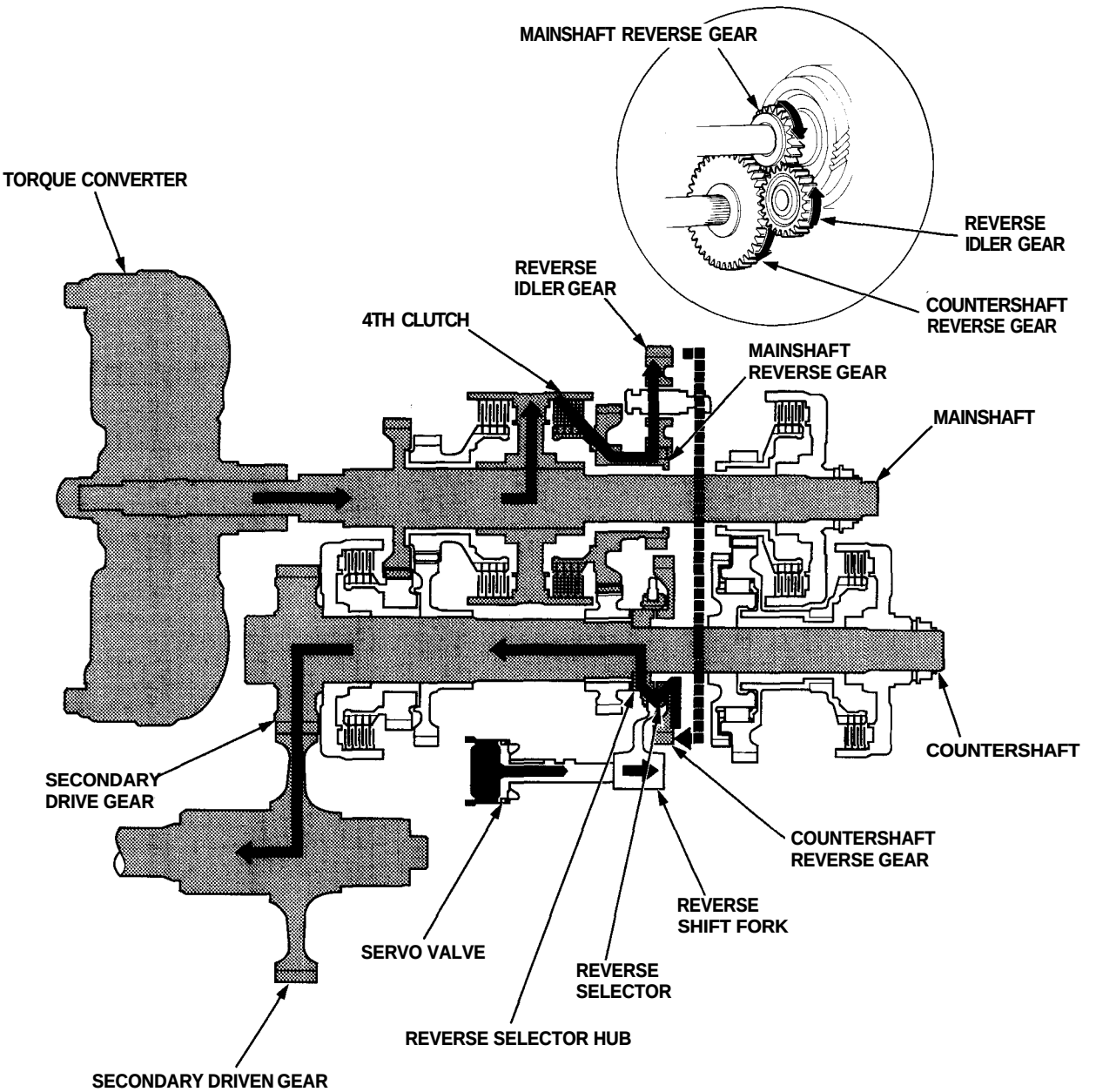
R Position

1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, reverse selector hub and the countershaft reverse gear.

2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.

3. The rotation direction of the countershaft reverse gear is changed via the reverse idler gear.

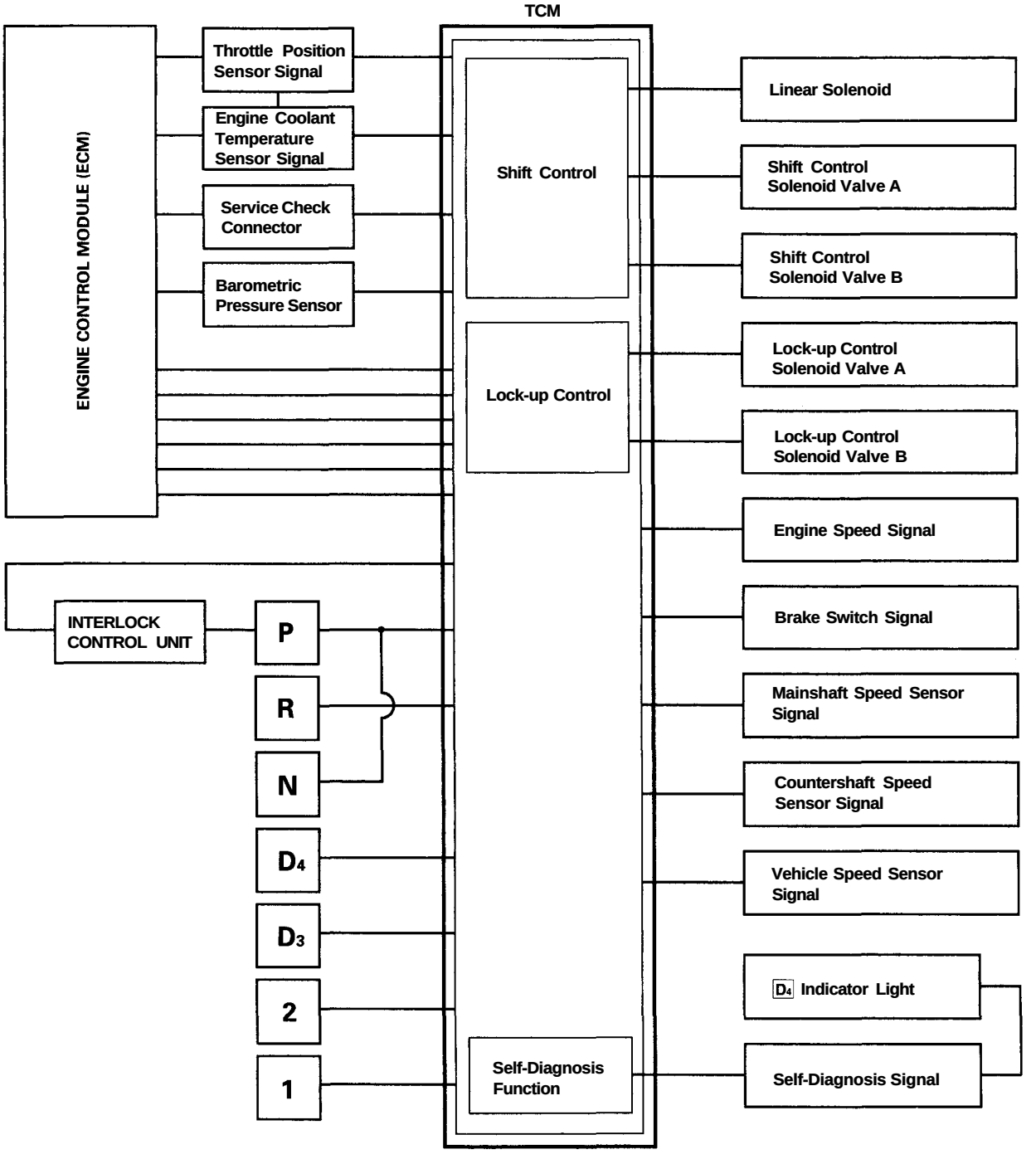
4. Power is transmitted to the secondary drive gear, which drives the secondary driven gear.



Description

Electronic Control System

The electronic control system consists of the Transmission Control Module (TCM), sensors, a linear solenoid, and four solenoid valves.
Shift and lock-up are electronically controlled for comfortable driving under all conditions.
The TCM is located below the dashboard, behind the glove box on the passenger's side.



Shift Control

The TCM instantaneously determines which gear should be selected by various signals sent from sensors, and actuates the shift control solenoid valves A and B control shifting. Also, a Grade Logic Control System has been adopted to control shifting in [D4] position while the vehicle is ascending or descending a slope, or reducing speed.

Position (gear) \ Shift control solenoid valve		A	B
[D3], [D4]	(1st)	OFF	ON
	(2nd)	ON	ON
	(3rd)	ON	OFF
[D4]	(4th)	OFF	OFF
[2]	(2nd)	ON	ON
[1]	(1st)	ON	OFF
[R]	(Reverse)	ON	OFF

Lock-up Control

From sensor input signals, the TCM determines whether to turn the lock-up ON or OFF, and activates lock-up control solenoid valve A and/or B accordingly.

The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

Lock-up condition \ Lock-up control solenoid valve	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ↔ ON

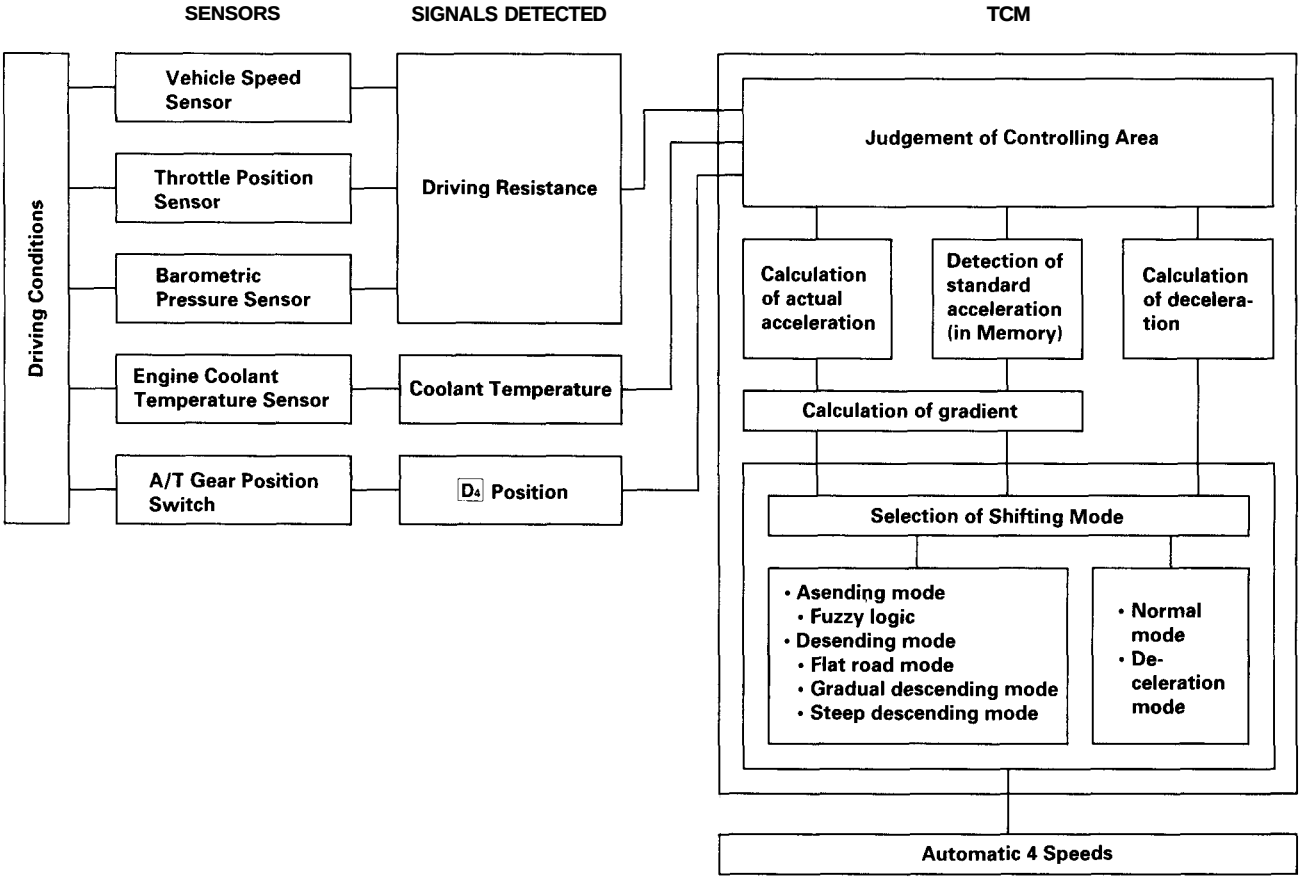
(cont'd)

Description

Electronic Control System (cont'd)

- **GRADE LOGIC CONTROL SYSTEM**

How it works:
The TCM compares actual driving conditions with driving conditions memorized in the TCM, based on the input from the vehicle speed sensor, throttle position sensor, engine coolant temperature sensor, barometric pressure sensor, brake switch signal and shift lever position signal, to control shifting while a vehicle is ascending or descending a slope, or reducing speed.



- **Ascending Control**

When the TCM determines that the vehicle is climbing a hill in D4 position, the system extends the engagement area of 3rd gear to prevent the transmission from frequently shifting between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed.

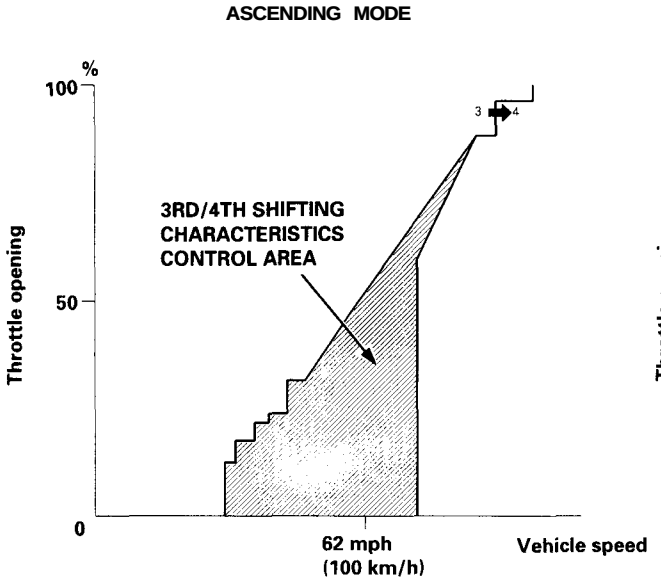
NOTE:
- Shift schedules between 3rd and 4th gear stored in the TCM enable the TCM's fuzzy logic to automatically select the most suitable gear according to the magnitude of a gradient.
- Fuzzy logic is a form of artificial intelligence that lets computers respond to changing conditions much like a human mind would.

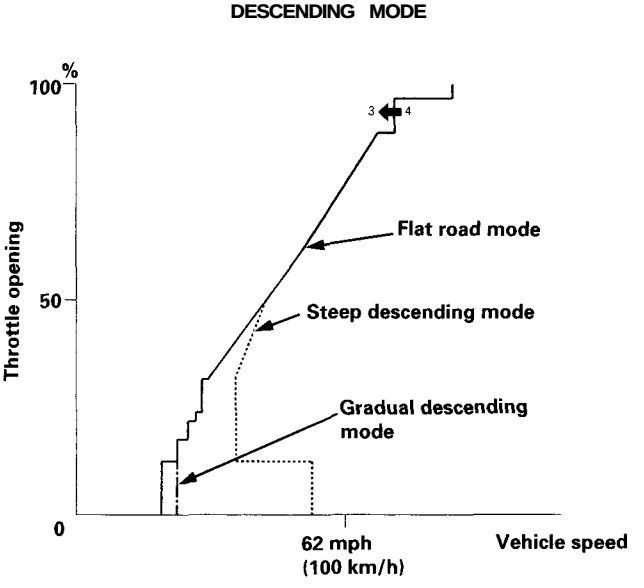
- **Descending Control**

When the TCM determines that the vehicle is going down a hill in D4 position, the shift-up speed from 3rd to 4th gear when the throttle is closed becomes faster than the set speed for flat road driving to widen the 3rd gear driving area.
This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending.

There are two ascending modes with different 3rd gear driving areas according to the magnitude of a gradient stored in the TCM.

When the vehicle is in 4th gear, and you are decelerating on a gradual hill, or when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to 4th gear.





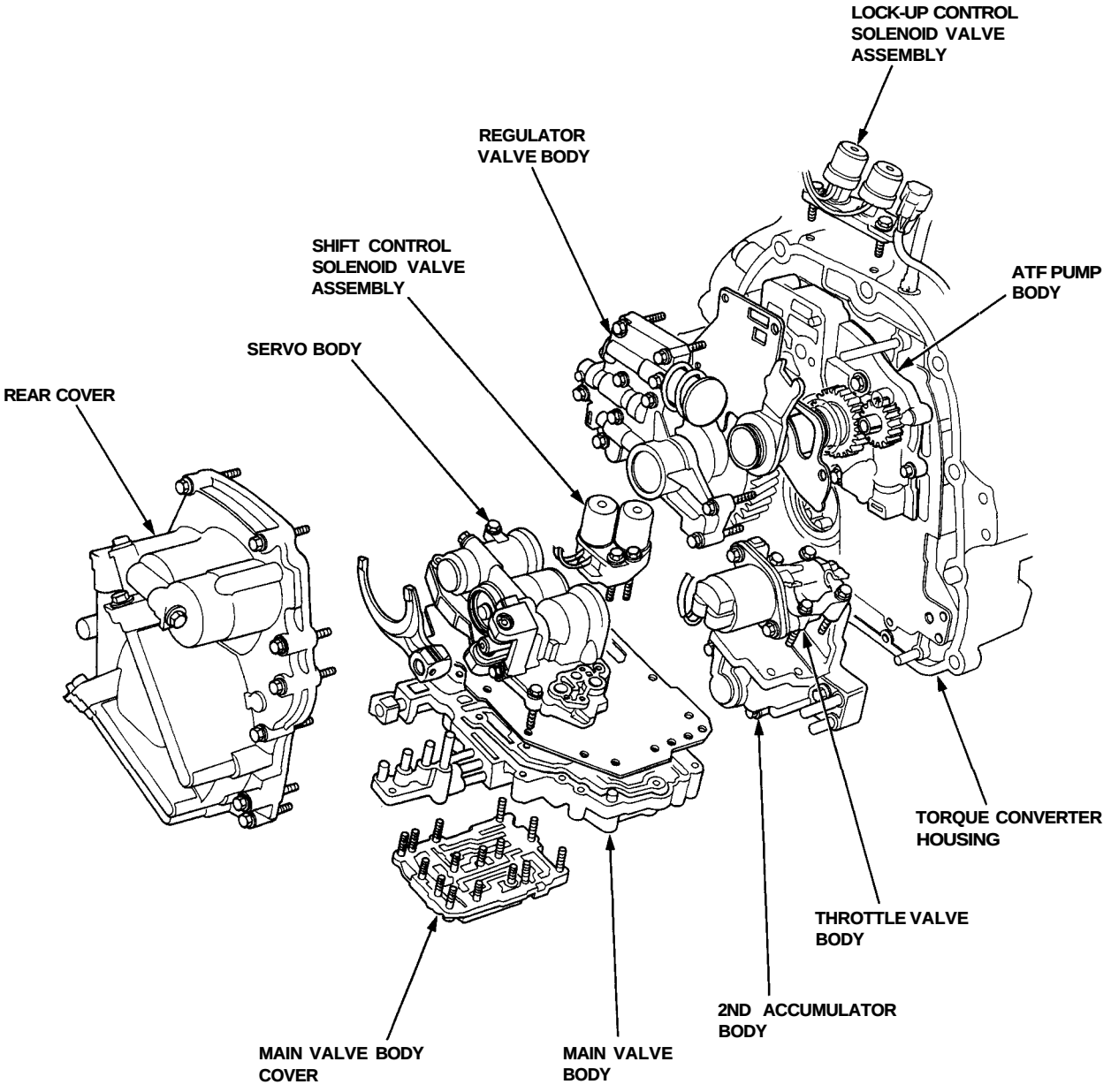
- **Deceleration Control**

When the vehicle goes around a corner, and needs to decelerate first and then accelerate, the TCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 30 mph (48 km/h), the TCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.

(cont'd)

Hydraulic Control

The hydraulic control system is controlled by the ATF pump, valves and accumulators in the valve bodies. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine.
Fluid from the ATF pump flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each of the clutches.
The valve body includes the main valve body, the servo body, the ATF pump body, the regulator valve body, the throttle valve body, and the 2nd accumulator body.
The throttle valve body is joined with the linear solenoid. The throttle valve body/linear solenoid assembly is bolted on the 2nd accumulator body.
The shift control solenoid valve assembly is bolted on the servo body. The lock-up control solenoid valve assembly is bolted on the outside of the torque converter housing.



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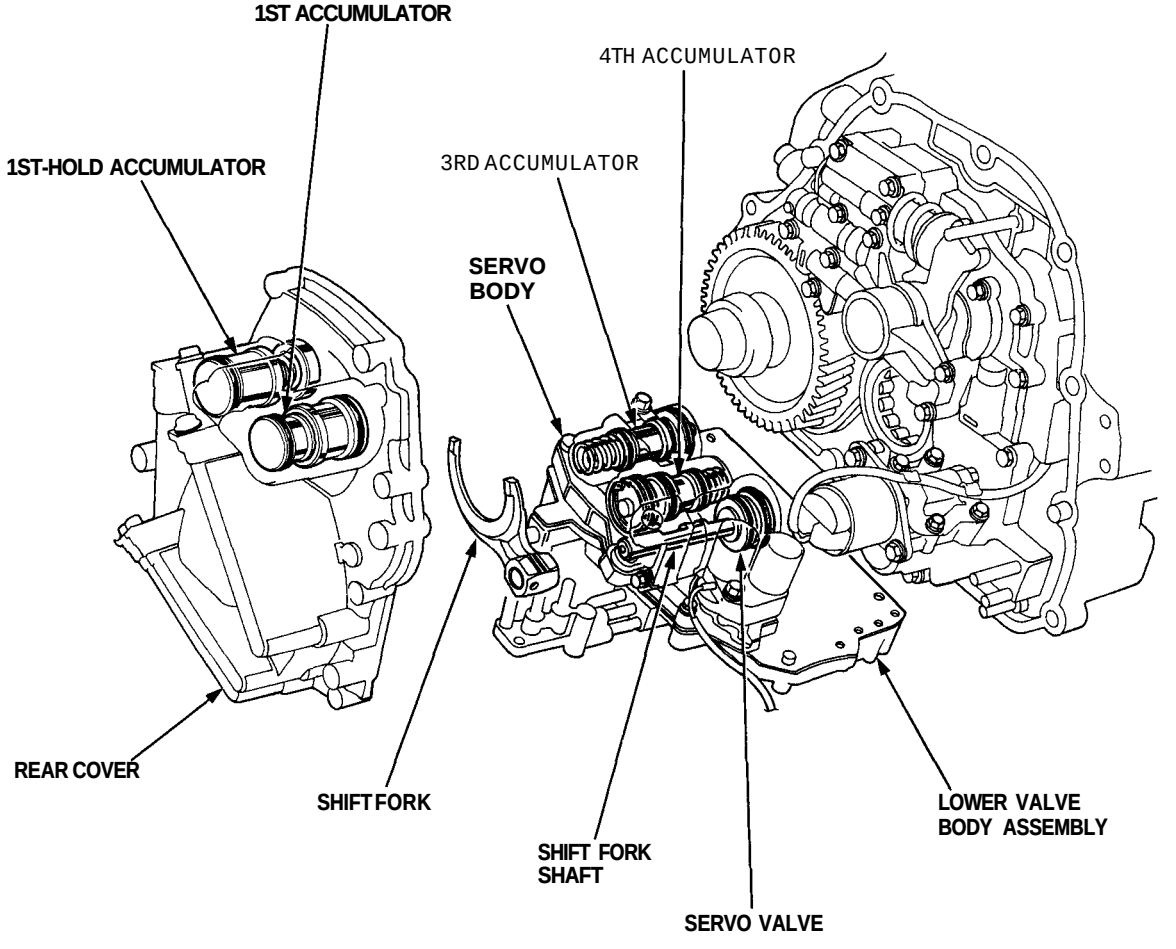
Description

Hydraulic Control (cont'd)

Rear Cover
The rear cover houses the 1st accumulator, the 1st-hold accumulator, and the ATF feed pipes.

Lower Valve Body Assembly
The lower valve body assembly is located on the bottom of the transmission. The lower valve body assembly consists of the main valve body, the servo body, shift control solenoid valves A/B and the ATF strainer.

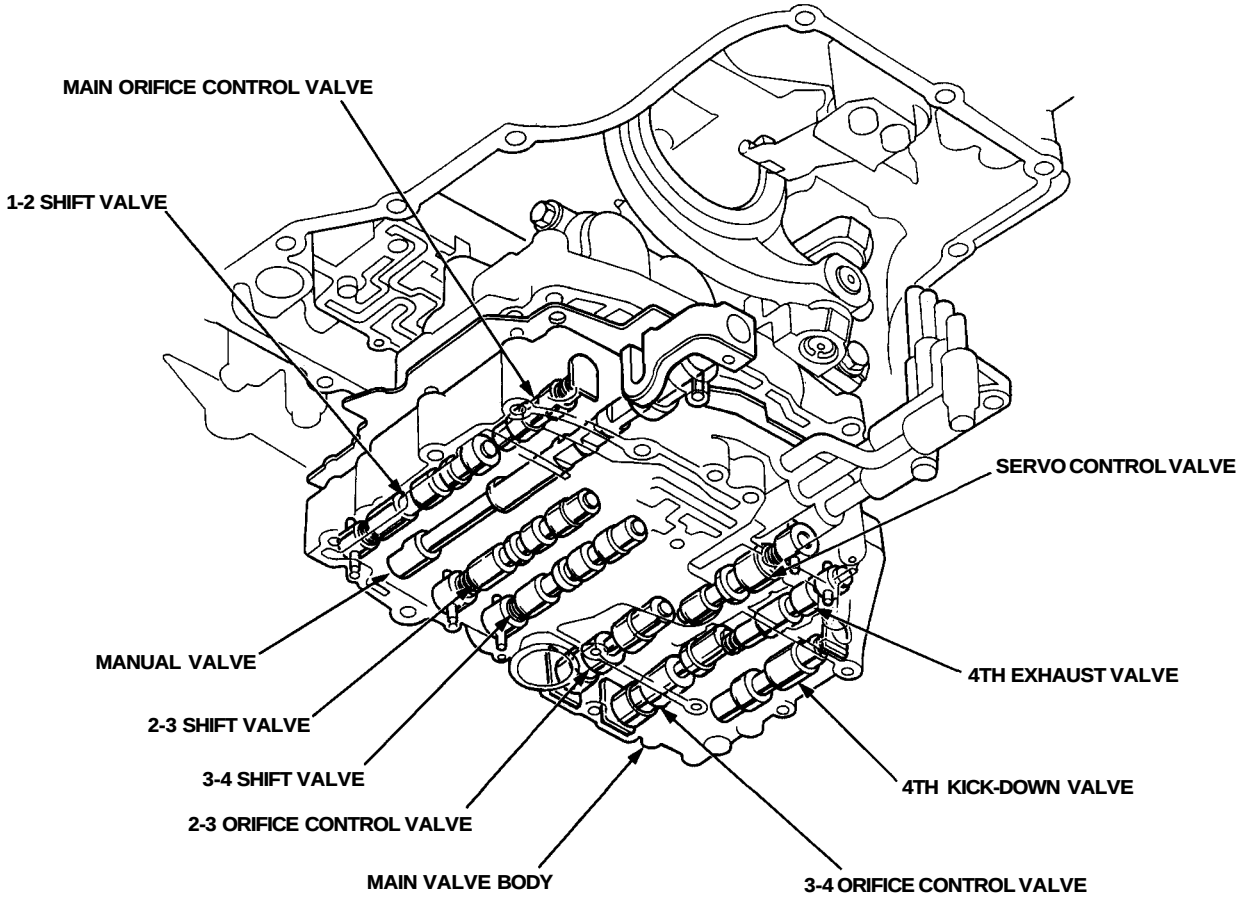
Servo Body
The servo body is located on the main valve body. The servo valve is integrated with the shift fork shaft, the 3rd accumulator and the 4th accumulator, which are all assembled in the servo body.
The shift fork installed on the end of the shift fork shaft operates the reverse selector.



Main Valve Body

The main valve body houses the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the main orifice control valve, the 2-3 orifice control valve, the 3-4 orifice control valve, the 4th kick-down valve, the 4th exhaust valve, and the servo control valve.

The primary functions of the main valve body are to switch fluid pressure on and off and to control the hydraulic pressure going to the hydraulic control system.



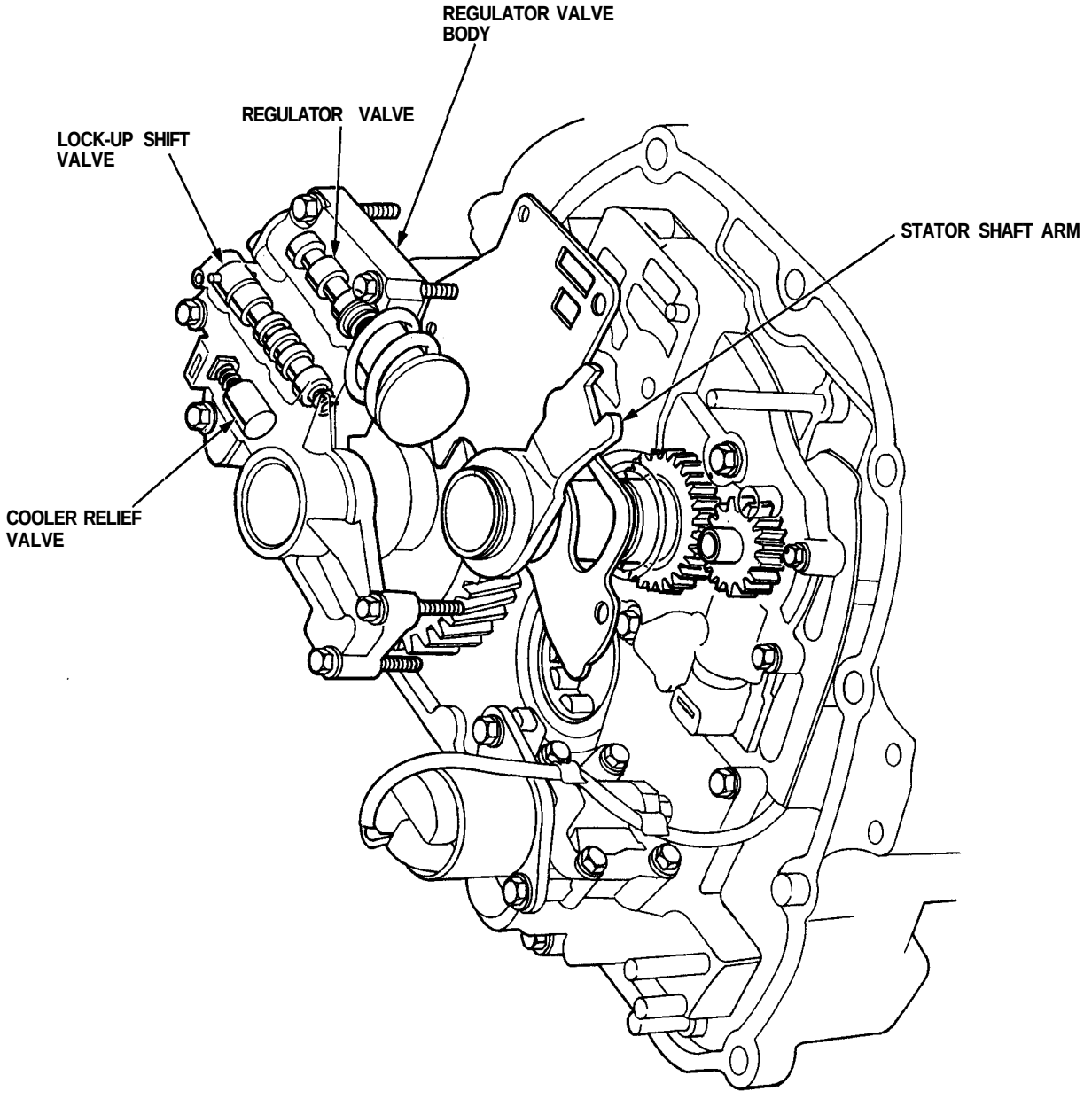
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Description

Hydraulic Control (cont'd)

Regulator Valve Body

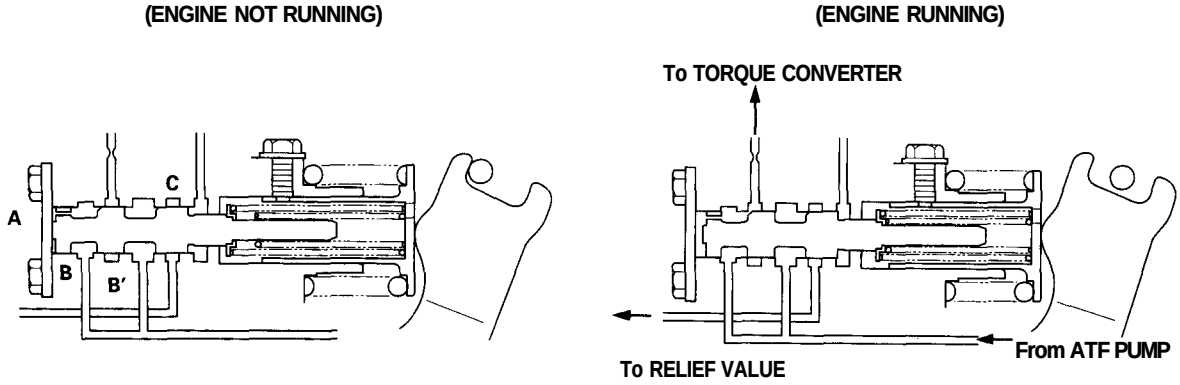
The regulator valve body is located on the ATF pump body. The regulator valve body consists of the regulator valve, the lock-up shift valve, and the cooler relief valve.



Regulator Valve

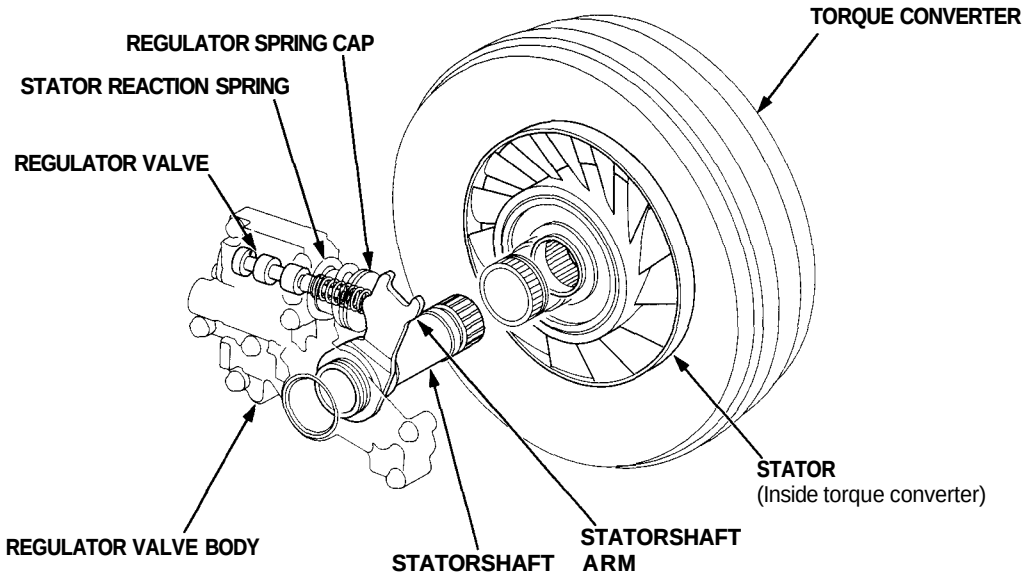
The regulator valve maintains a constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter.
The fluid from the ATF pump flows through B and B'. The regulator valve has a valve orifice. The fluid entering from B flows through the orifice to the A cavity. This pressure of the A cavity pushes the regulator valve to the right side, and this movement of the regulator valve uncovers the fluid port to the torque converter and the relief valve. The fluid flows out to the torque converter, and the relief valve and regulator valve moves to the left side.

According to the level of the hydraulic pressure through B, the position of the regulator valve changes and the amount of the fluid from B' through D and C also changes. This operation is continued, maintaining the line pressure.



Stator Reaction hydraulic Pressure Control

Hydraulic pressure increases according to the torque is performed by the regulator valve using the stator torque reaction. The stator shaft is splined with the stator in the torque converter, and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), the stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the → direction in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the line pressure which is regulated by the regulator valve. The line pressure reaches its maximum when the stator torque reaction reaches its maximum.



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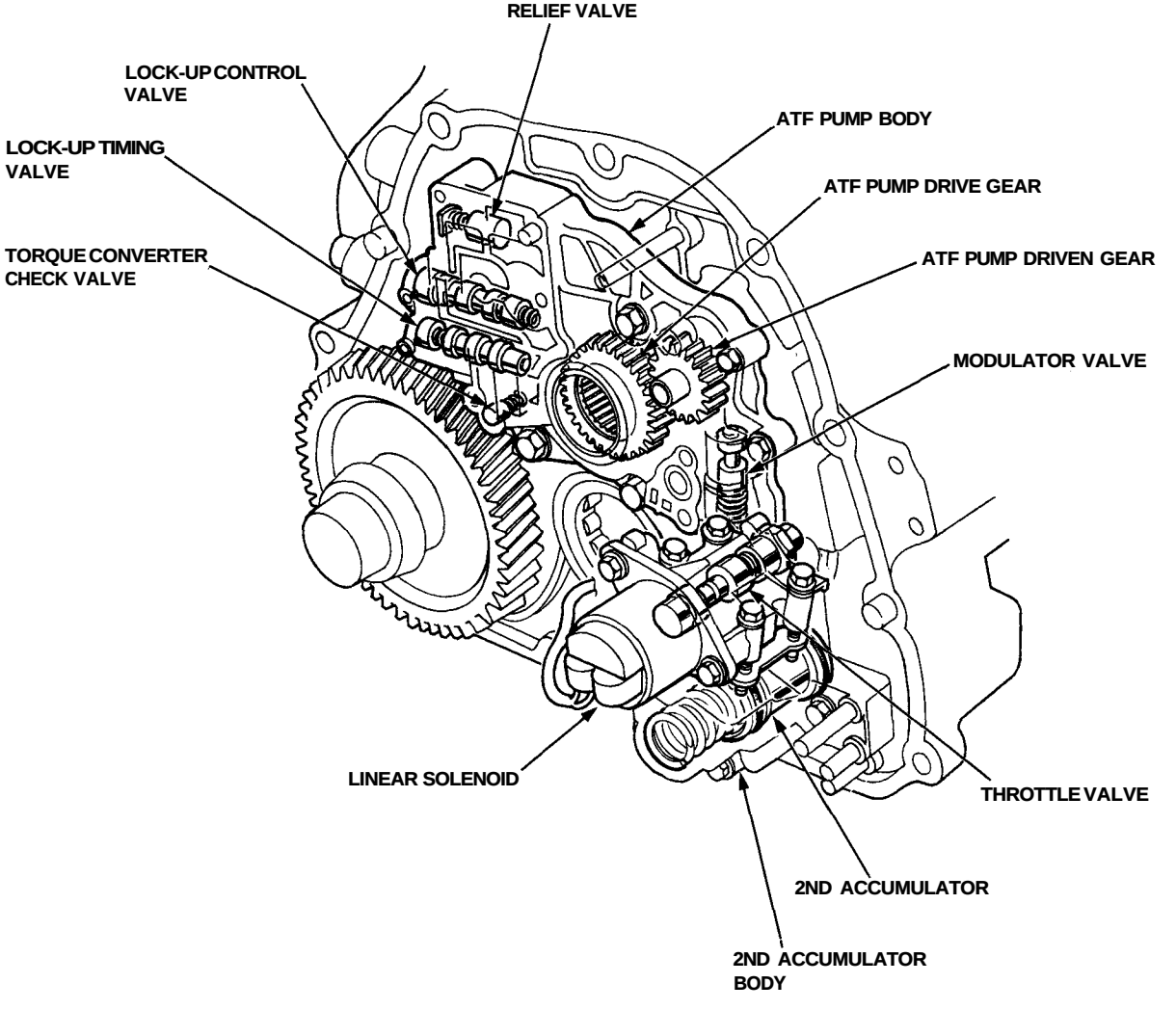
Description

Hydraulic Control (cont'd)

ATF Pump Body
The ATF pump body is located on the torque converter housing. The ATF pump body consists of the ATF pump gears, the lock-up control valve, the lock-up timing valve, the relief valve and the modulator valve. The torque converter check valve is located between the ATF pump body and the torque converter housing.

Throttle Valve Body/Linear Solenoid
The throttle valve body is joined with the linear solenoid which is controlled by the TCM. The throttle valve body/linear solenoid assembly is located on the 2nd accumulator body. The throttle valve body houses the throttle valve.

2nd Accumulator Body
The 2nd accumulator body is located on the torque converter housing beside the ATF pump body. It contains the 2nd accumulator.



Hydraulic Flow

General Chart of Hydraulic Pressure

- ATF Pump → Regulator Valve
  - Line Pressure
    - Modulator Pressure
    - Throttle B Pressure
    - Clutch Pressure
  - Torque Converter Pressure
  - Lubrication Pressure

Distribution of Hydraulic Pressure

- Regulator Valve
  - Torque Converter Pressure
  - Lubrication Pressure
  - To Regulate Line Pressure
- Manual Valve → To Select Line Pressure → Clutch Pressure
- Modulator Valve → Modulator Pressure
  - Shift Control Solenoid Valves
  - Lock-up Control Solenoid Valves
- 1-2 Shift Valve
- 2-3 Shift Valve
- 3-4 Shift Valve

  → Clutch Pressure
- Throttle Valve → Throttle B Pressure

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	9	LINE	55	THROTTLE B
2	LINE	10	1ST CLUTCH	56	THROTTLE B
3	LINE	15	1ST-HOLD CLUTCH	90	TORQUE CONVERTER
3′	LINE	16	1ST-HOLD CLUTCH	91	TORQUE CONVERTER
3″	LINE	18	LINE	92	TORQUE CONVERTER
4	LINE	20	2ND CLUTCH	93	ATF COOLER
4′	LINE	21	2ND CLUTCH	94	TORQUE CONVERTER
4″	LINE	22	2ND CLUTCH	95	LUBRICATION
5	LINE	25	LINE	96	TORQUE CONVERTER
6	MODULATE	30	3RD CLUTCH	99	SUCTION
6′	MODULATE	31	3RD CLUTCH	X	LEAK
6A	MODULATE	32	3RD CLUTCH		
6B	MODULATE	40	4TH CLUTCH		
6C	MODULATE	41	4TH CLUTCH		
6D	MODULATE (DUTY CONTROL)	42	4TH CLUTCH		

(cont'd)

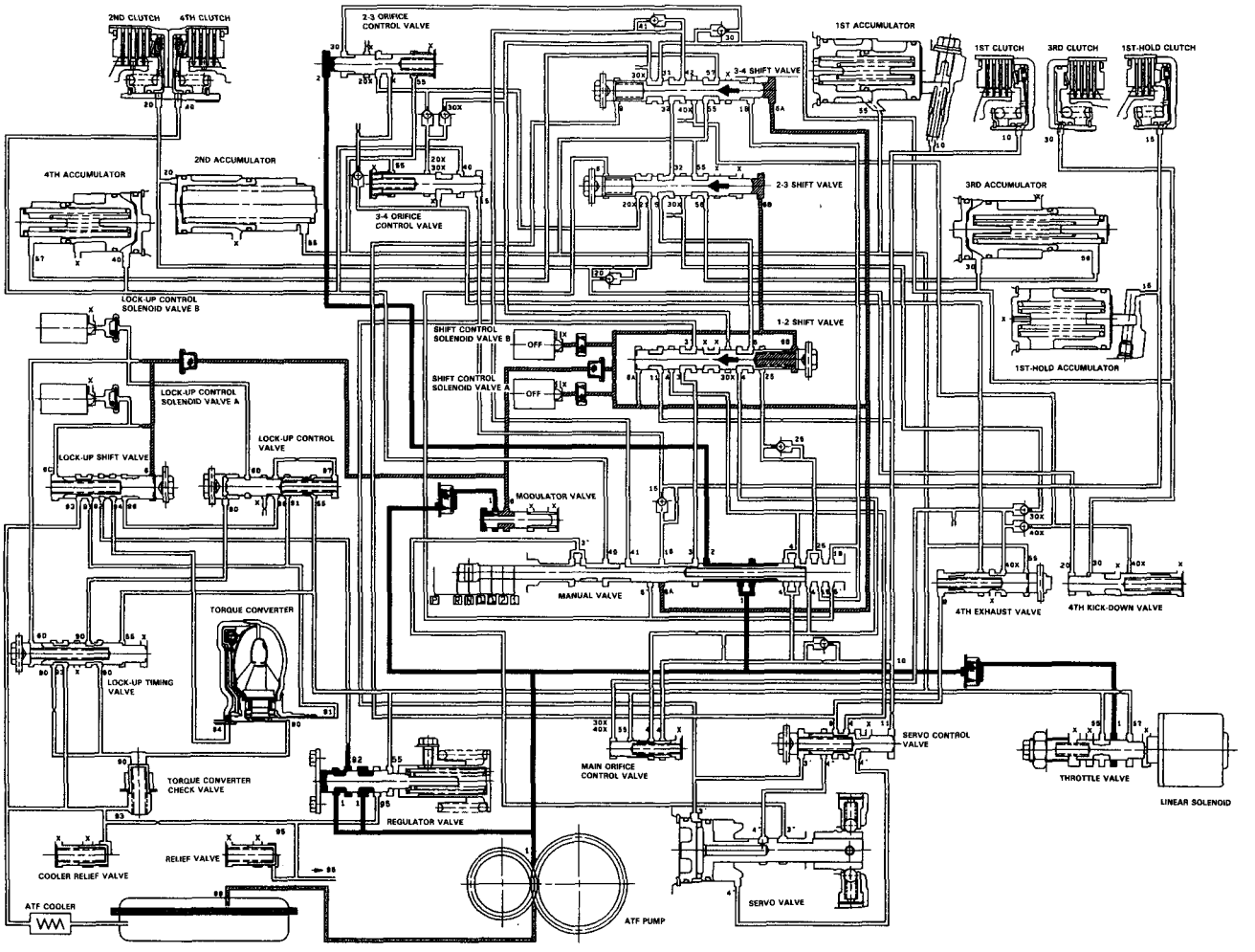
Description

Hydraulic Flow (cont'd)

N Position

As the engine turns, the ATF pump also starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF flowing from the ATF pump becomes the line pressure (1). The line pressure (1) is regulated by the regulator valve. The torque converter inlet pressure (92) enters (94) of the torque converter through the lock-up shift valve and discharges into (90).
The torque converter check valve prevents the torque converter pressure from rising.
Under this condition, the hydraulic pressure is not applied to the clutches as the manual valve stops line pressure (1).

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



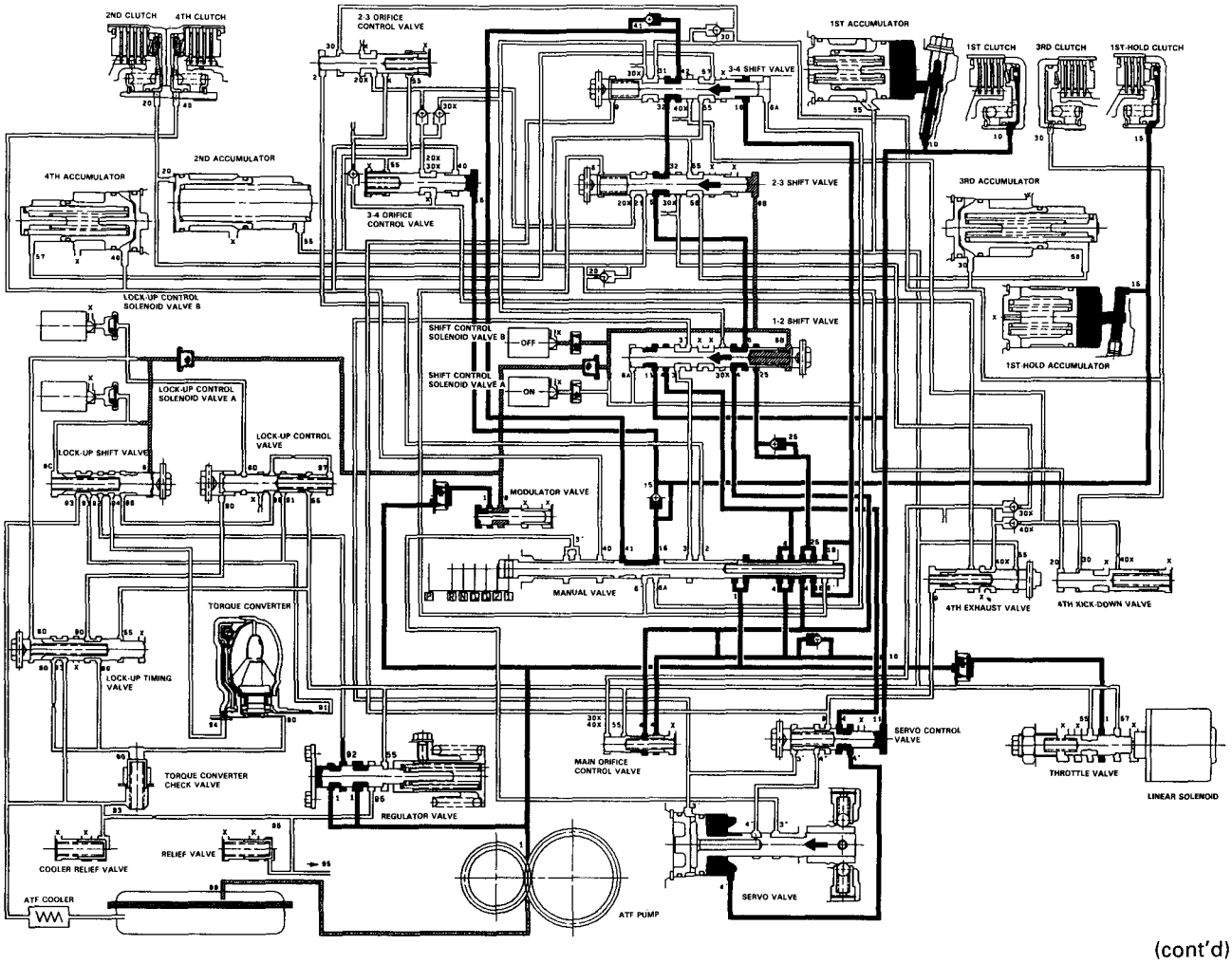
1 Position

The line pressure (1) flows to the manual valve, the modulator valve and the throttle valve. The line pressure (1) becomes to the modulator pressure (6) at the modulator valve, and remains line pressure (4), (18) and (25) at the manual valve.
The modulator pressure (6) flows to the right end of the 1-2 and 2-3 shift valves because shift control solenoid valve A is turned ON and B is turned OFF by the TCM, and those valves are moved to the left side. The line pressure (18) flows to the right end of the 3-4 shift valve, and the 3-4 shift valve is moved to the left side.
The line pressure (4) becomes the 1st clutch pressure (10). The 1st clutch pressure (10) is applied to the 1st clutch, and the 1st clutch is engaged.
The line pressure (4) also becomes the 1st-hold clutch pressure (15) and it flows to the 1st-hold clutch and the 1st-hold accumulator.
Fluid flows by way of:

- Line Pressure (4) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (32) → 3-4 Shift Valve - 4th Clutch Pressure (42) → Orifice - 4th Clutch Pressure (41) → Manual Valve - 1st-hold Clutch Pressure (16) → Orifice - 1st-hold Clutch Pressure (15) → 1st-hold Clutch.

Power is transmitted only during deceleration through the 1st-hold clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

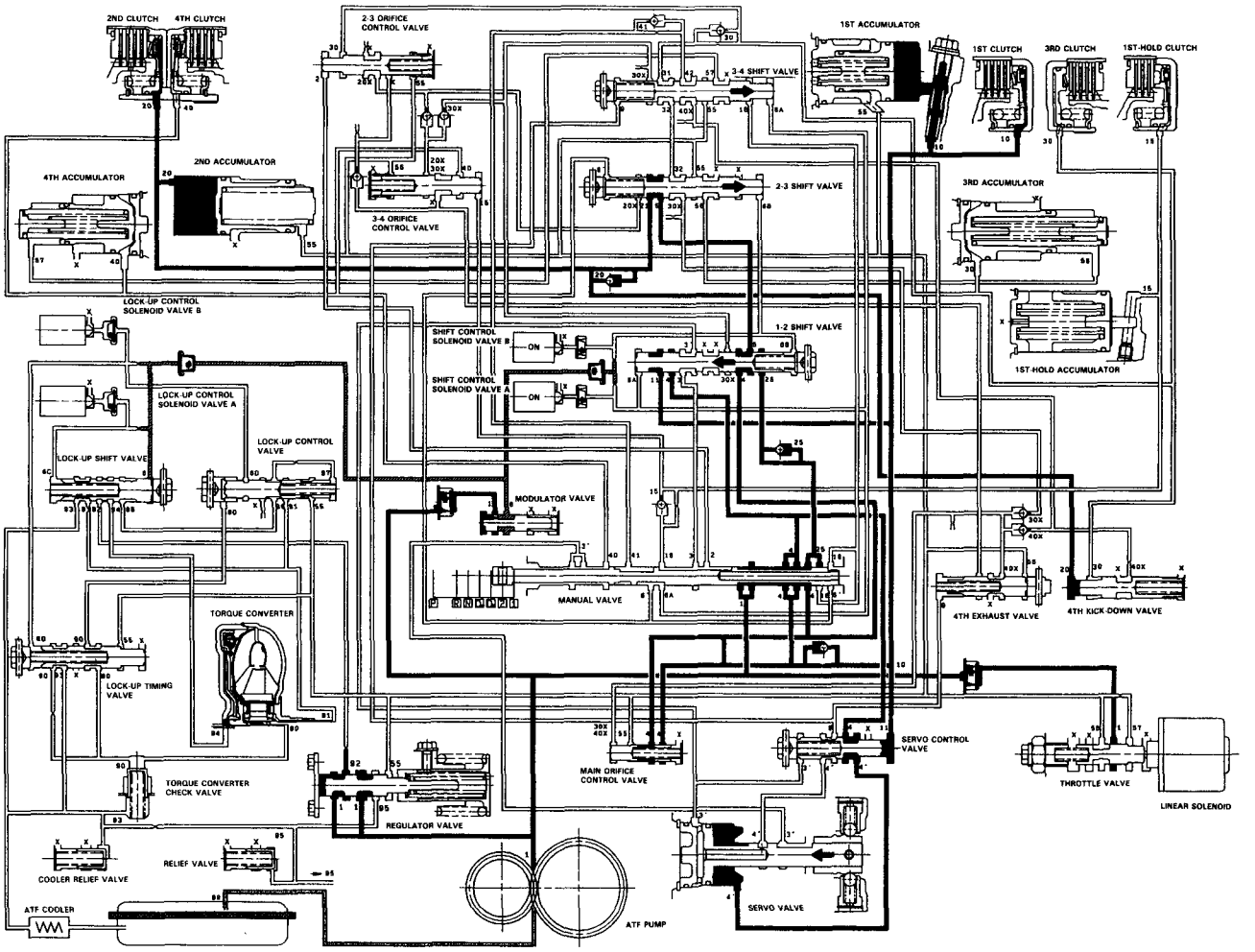
Description

Hydraulic Flow (cont'd)

2 Position

The line pressure (1) flows to the manual valve, the modulator valve and the throttle valve. The line pressure (1) becomes modulator pressure (6) at the modulator valve, and remains line pressure (4) and (25) at the manual valve.
The modulator pressure (6) does not flow to each shift valves because shift control solenoid valves A and B are turned ON by the TCM.
The line pressure (4) becomes the line pressure (5) at the 1-2 shift valve, and the line pressure (5) becomes the 2nd clutch pressure (21) at the 2-3 shift valve. The 2nd clutch pressure (21) changes the 2nd clutch pressure (20) at the orifice. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.
The line pressure (4) also becomes the 1st clutch pressure (10). The 1st clutch pressure (10) is applied to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



D3 or D4 Position

1. 1st Gear

The flow of fluid through the torque converter circuit is the same as in N position.

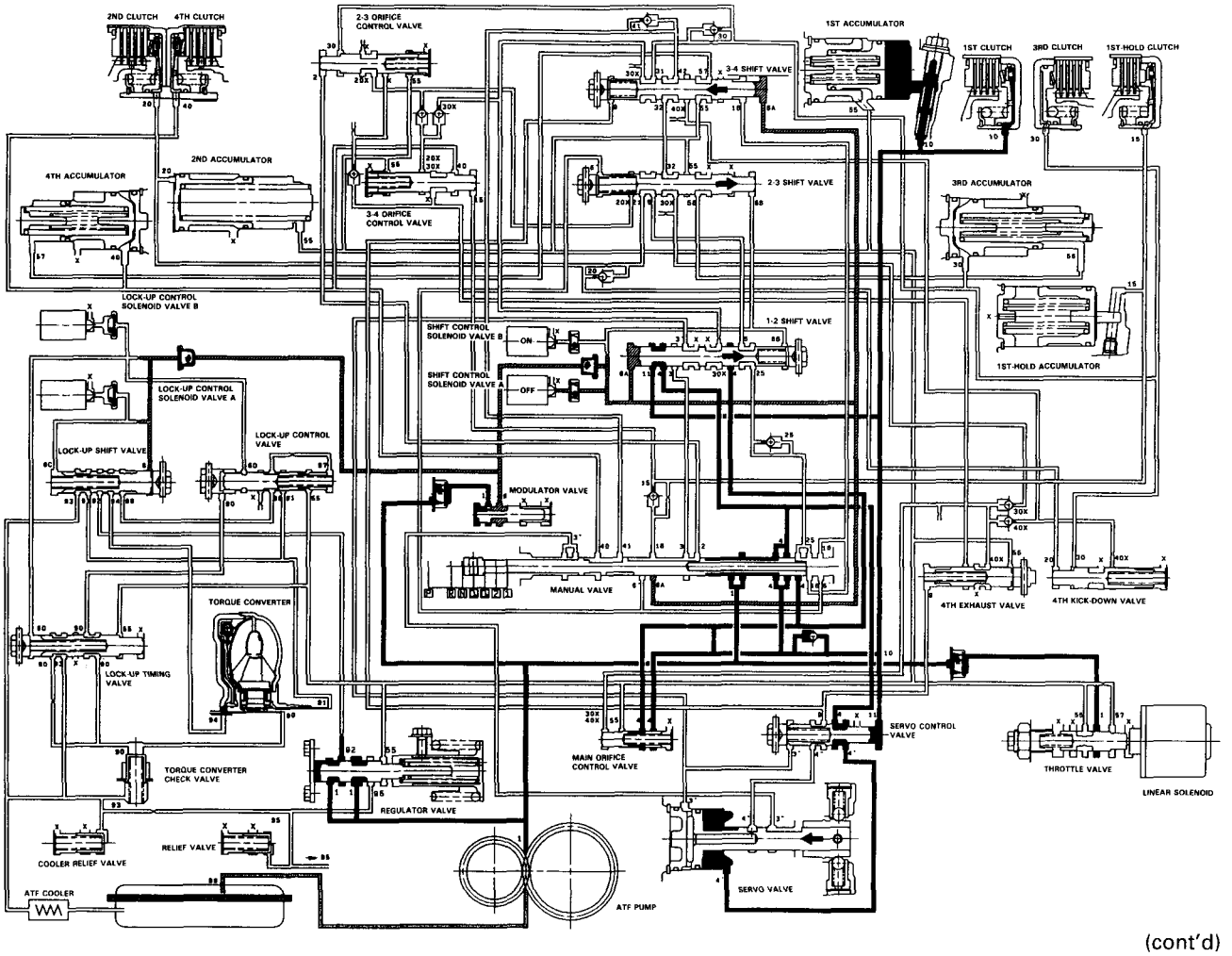
The line pressure (1) flows to the manual valve, the modulator valve and the throttle valve. The line pressure (1) becomes modulator pressure (6) at the modulator valve, and remains line pressure (4) at the manual valve.

The modulator pressure (6) flows to the left end of the 1-2 shift valve and right end of the 3-4 shift valve because shift control solenoid valve A is turned OFF and B is turned ON by the TCM. The 1-2 shift valve is moved to the right side, and the 3-4 shift valve is moved to the left side.

The line pressure (4) becomes the 1st clutch pressure (10). The 1st clutch pressure (10) is applied to the 1st clutch and 1st accumulator; consequently, the vehicle will move as the engine power is transmitted.

In D3 or D4 position at 1st gear, the 1st-hold clutch pressure is not applied to the 1st-hold clutch because the manual valve covers the port to leading to the 1st-hold clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow (cont'd)

D3 or D4 Position

2. 2nd Gear

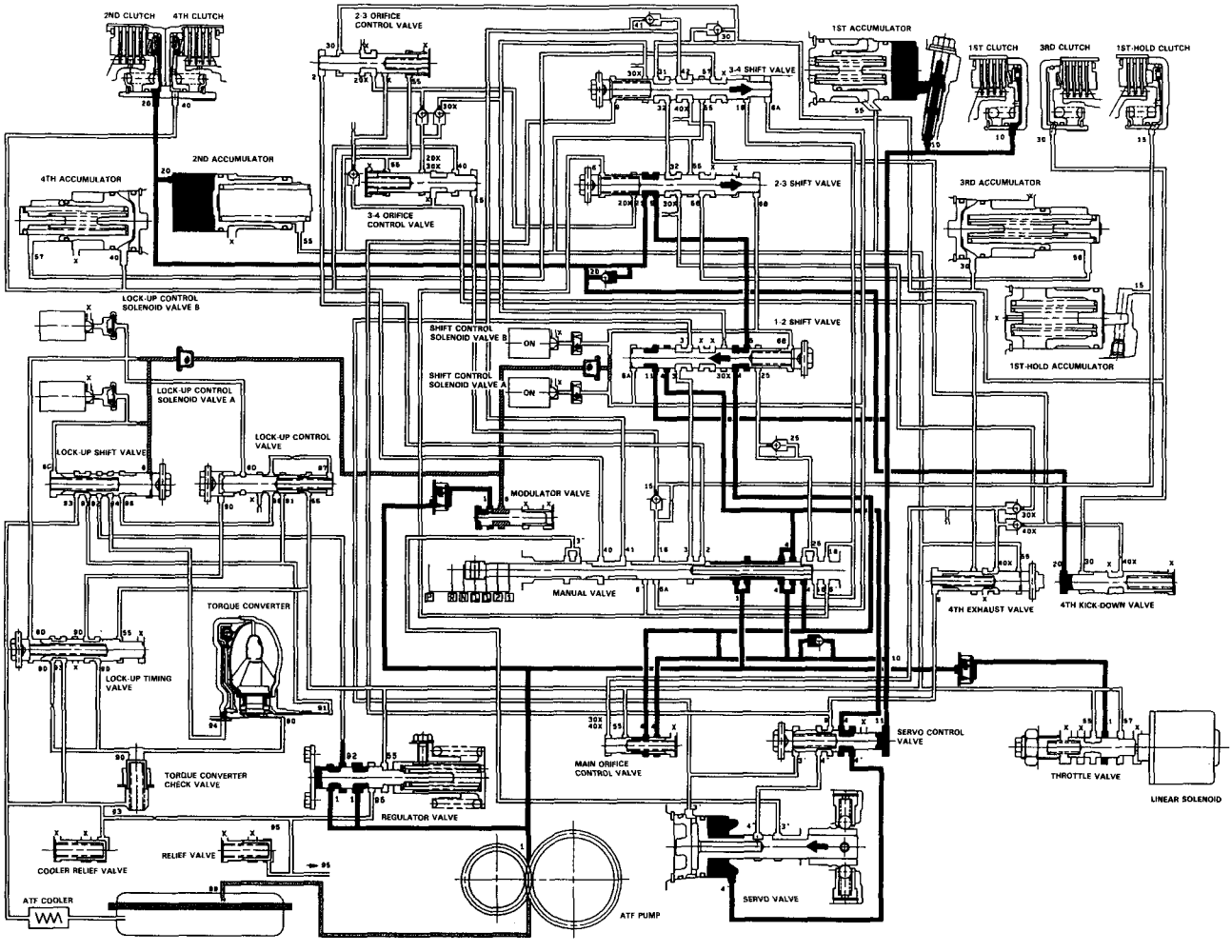
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned ON by means of the TCM. Shift control solenoid valve B remains ON. The modulator pressure (6A) in the left end of the 1-2 shift valve is released by turning shift control solenoid valve A ON. The 1-2 shift valve is moved to the left side and uncovers the port to allow line pressure (5) to the 2-3 shift valve. The line pressure (5) becomes the 2nd clutch pressure (21) at the 2-3 shift valve. The 2nd clutch pressure (20) is applied to the 2nd clutch, and the 2nd clutch is engaged.

Fluid flows by way of:

- Line pressure (4) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve - 2nd Clutch Pressure (21) → Orifice - 2nd Clutch Pressure (20) → 2nd Clutch

Hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



3. 3rd Gear

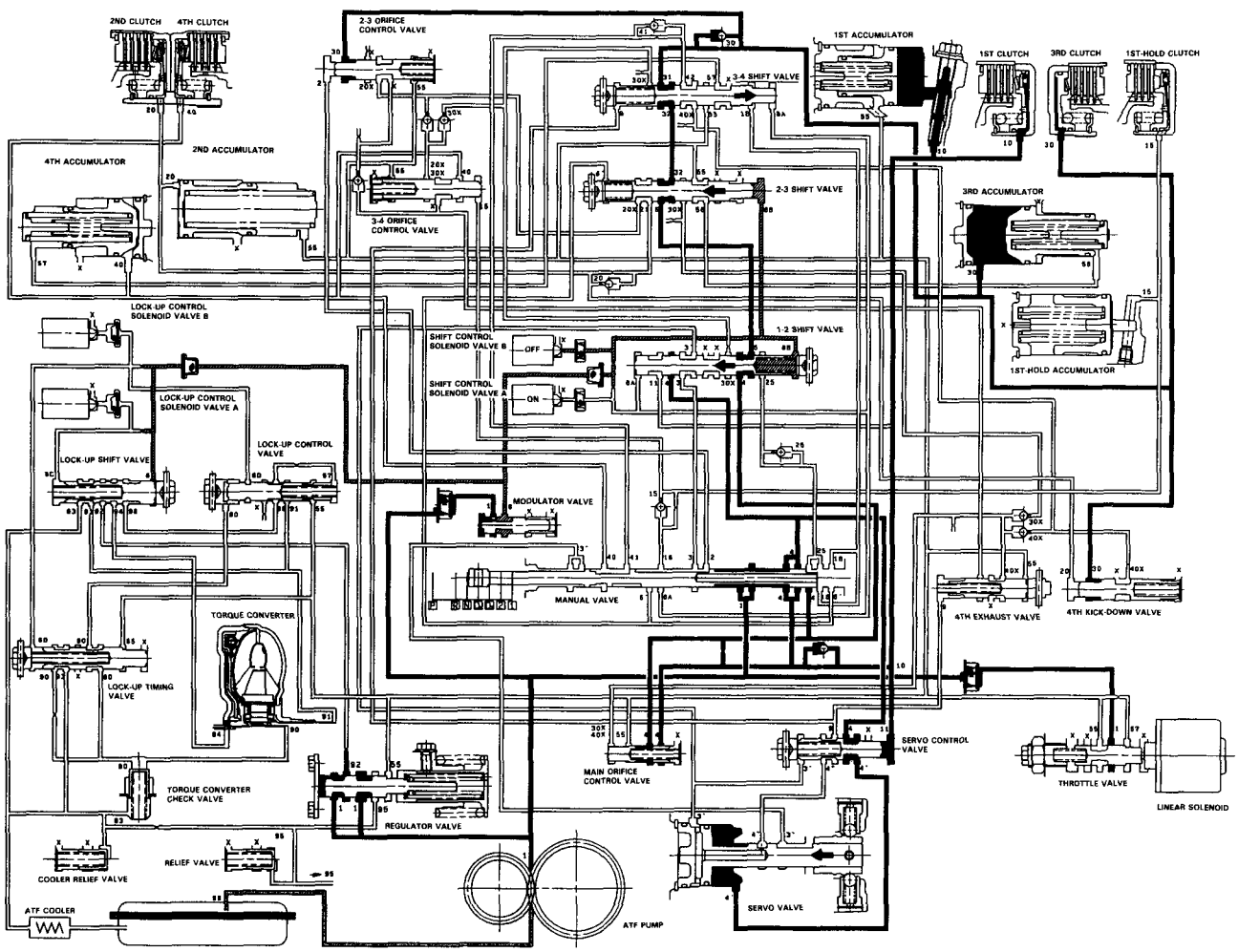
As the speed of the vehicle reaches the prescribed value, shift control solenoid valve B is turned OFF by means of the TCM. Shift control solenoid valve A remains ON. The modulator pressure (6B) flows to the right ends of the 1-2 shift valve and the 2-3 shift valve. The 2-3 shift valve is moved to the left side by the modulator pressure (6B). The 2-3 shift valve covers the port to stop line pressure (5) to the 2nd clutch and uncovers to the 3-4 shift valve as this valve is moved to the left side. The line pressure (5) becomes the 3rd clutch pressure. The 3rd clutch pressure (30) is applied to the 3rd clutch, and the 3rd clutch is engaged.

Fluid flows by way of:

-Line Pressure (4) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (32) → 3-4 Shift Valve - 3rd Clutch Pressure (31) → Orifice - 3rd Clutch Pressure (30) → 3rd Clutch

Hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

Description

Hydraulic Flow (cont'd)

D4 Position

4. 4th Gear

As the speed of the vehicle reaches the prescribed value, shift control solenoid valve A is turned OFF by means of the TCM. Shift control solenoid valve B remains OFF. The modulator pressure (6A) flows to the right end of the 3-4 shift valve and the left end of the 1-2 shift valve. The modulator pressure (6A) in the left end of the 1-2 shift valve equals the modulator pressure (6B) in the right end of the 1-2 shift valve, so the 1-2 shift valve remains at left side by the tension of the valve spring.

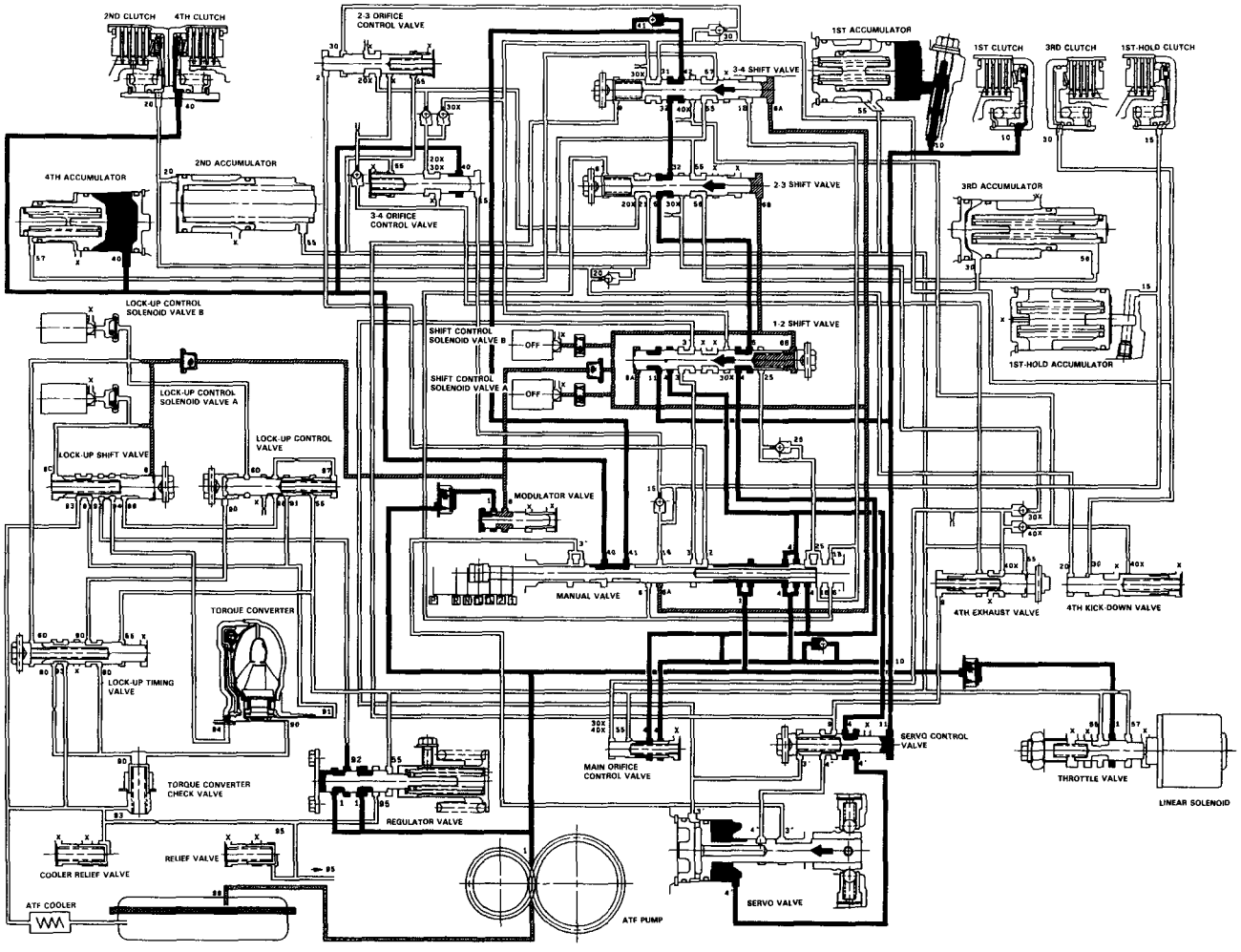
The 3-4 shift valve is moved to the left side by modulator pressure (6B). The 3-4 shift valve covers the port leading to the 3rd clutch and uncovers to the 4th clutch as this valve is moved to the left side. The 3rd clutch pressure (32) from the 2-3 shift valve becomes the 4th clutch pressure. The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Fluid flows by way of:

- Line Pressure (4) → 1-2 Shift Valve - Line Pressure (5) → 2-3 Shift Valve - 3rd Clutch Pressure (32) → 3-4 Shift Valve - 4th Clutch Pressure (42) → Orifice - 4th Clutch Pressure (41) → Manual Valve - 4th Clutch Pressure (40) → 4th clutch

Hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

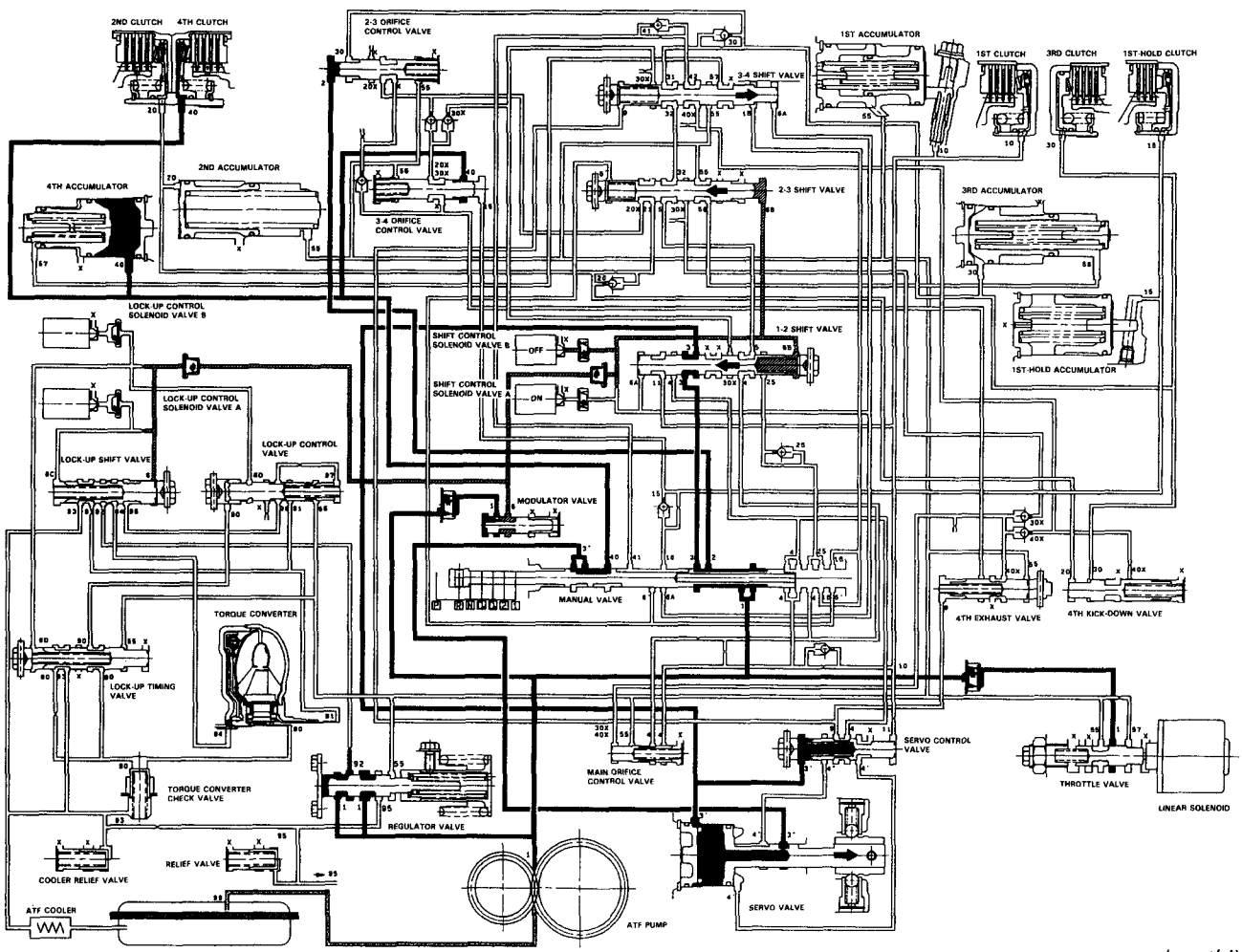


[R] Position

The flow of fluid through the torque converter circuit is the same as in [N] position.
The line pressure (1) becomes the line pressure (3) and flows to the 1-2 shift valve.The line pressure (3) becomes line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3'') to the manual valve. The line pressure (3') from the 1-2 shift valve flows through the servo valve to the manual valve and becomes to the 4th clutch pressure (40). The 4th clutch pressure (40) is applied to the 4th clutch, and the 4th clutch is engaged.

Reverse Inhibitor Control
When the [R] position is selected while the vehicle is moving forward at speeds over 6 mph (10 km/h), the TCM outputs the 1st signal to shift control solenoid valves A and B; shift control solenoid valve A is turned ON, shift control solenoid valve B is turned OFF. The 1-2 shift valve is moved to the right side and covers the port to stop line pressure (3') to the servo valve. The line pressure (3') is not applied to the servo valve, and the 4th clutch pressure (40) is not applied to the 4th clutch, as a result, power is not transmitted to the reverse direction.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

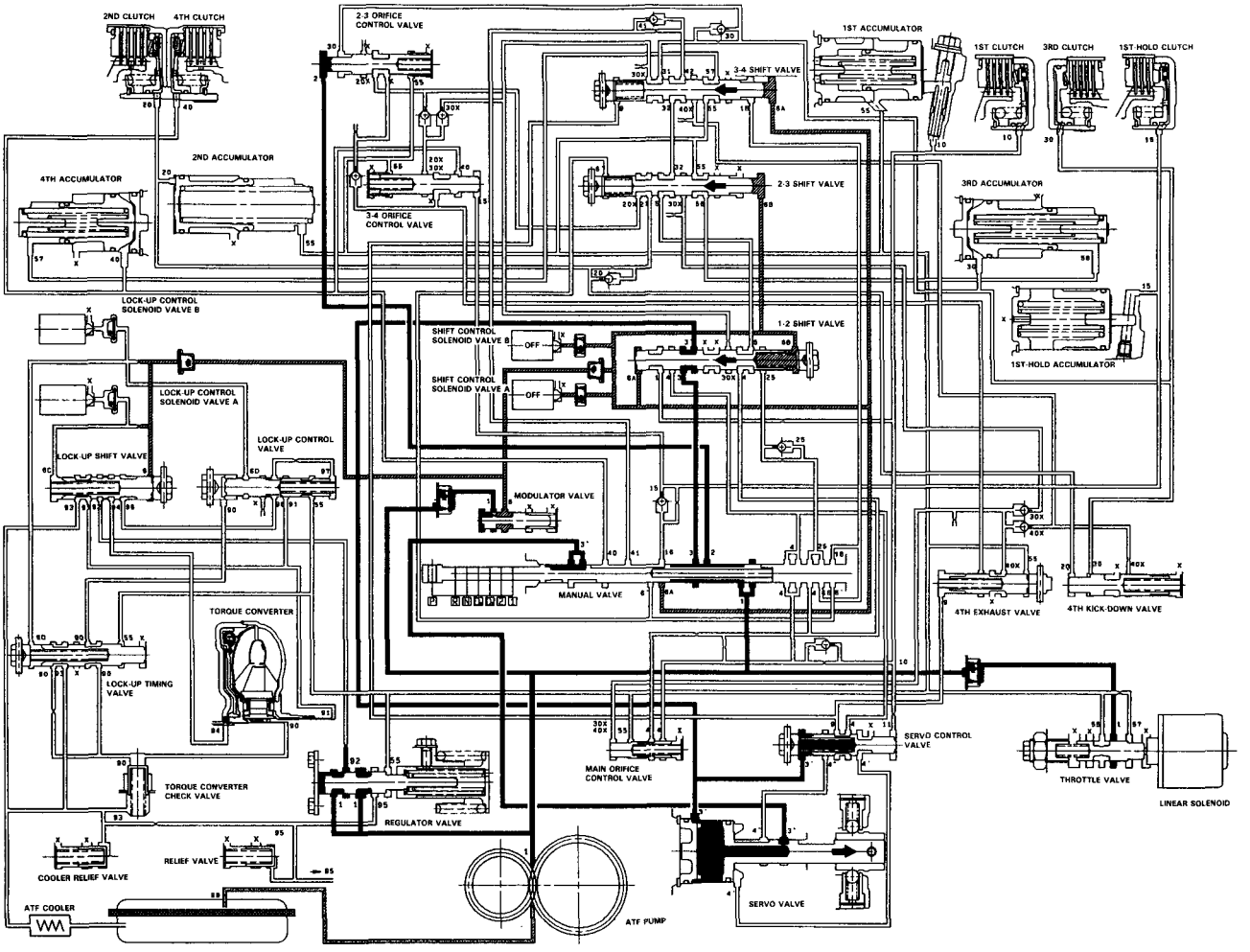
Description

Hydraulic Flow (cont'd)

B Position

The flow of fluid through the torque converter circuit is the same as in [N] position.
The line pressure (1) becomes the line pressure (3) and flows to the 1-2 shift valve. The line pressure (3) becomes line pressure (3') at the 1-2 shift valve and flows to the servo valve. The servo valve is moved to the right side (Reverse range position) and uncovers the port to allow line pressure (3") to the manual valve as in [R] position. The line pressure (3") from the servo valve is intercepted by the manual valve.
However, hydraulic pressure is not supplied to the clutches, and power is not transmitted.

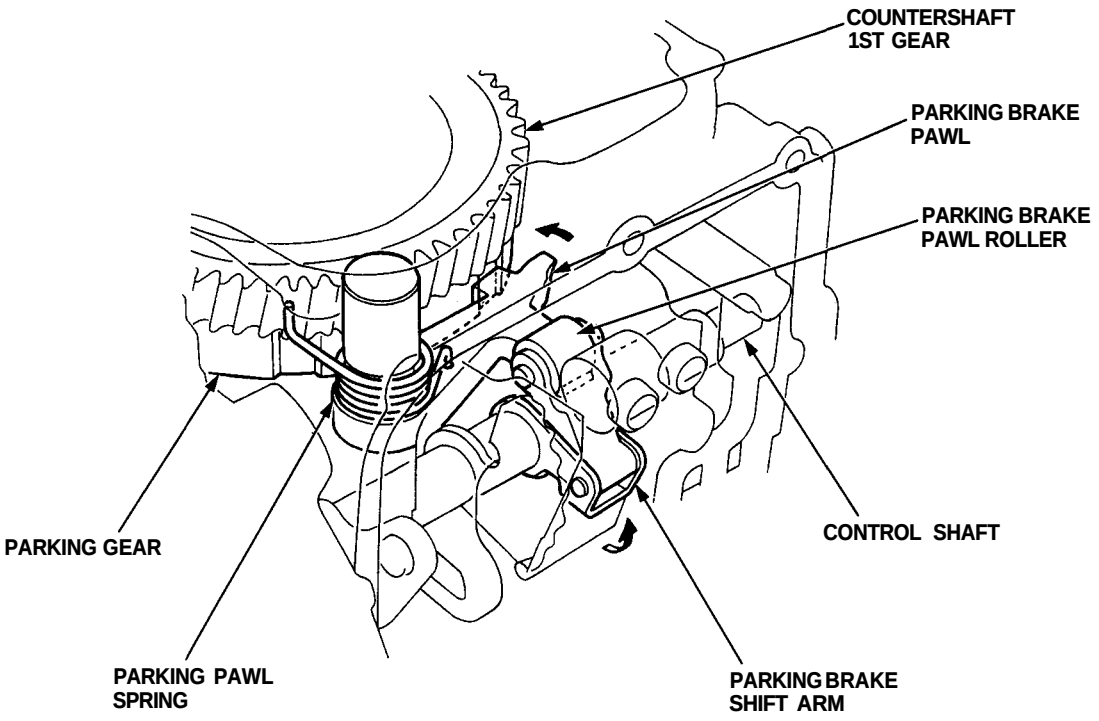
NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



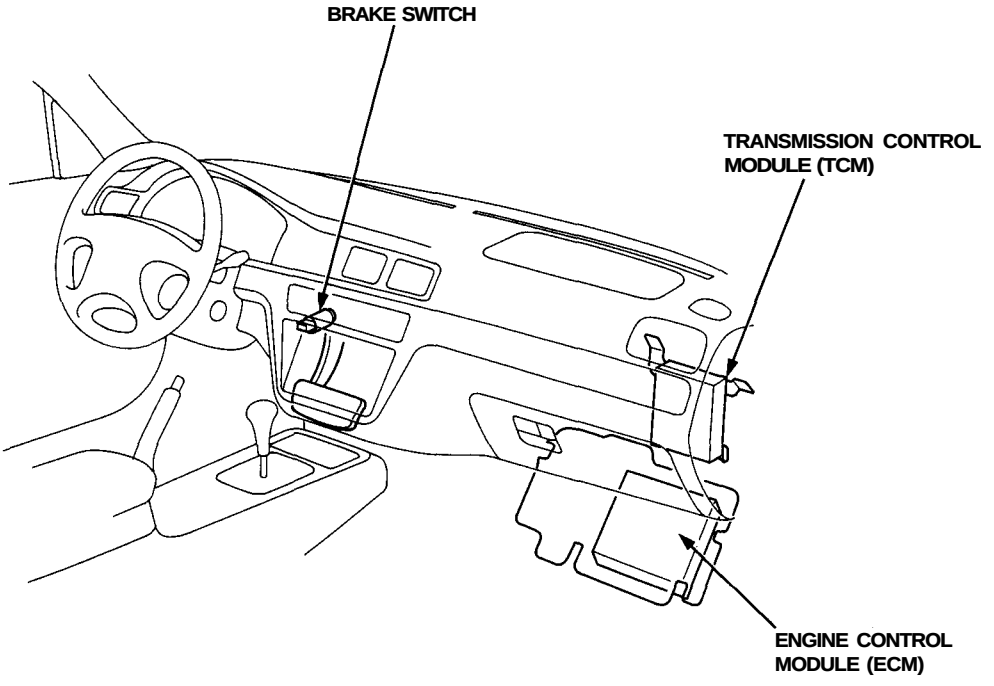
Description

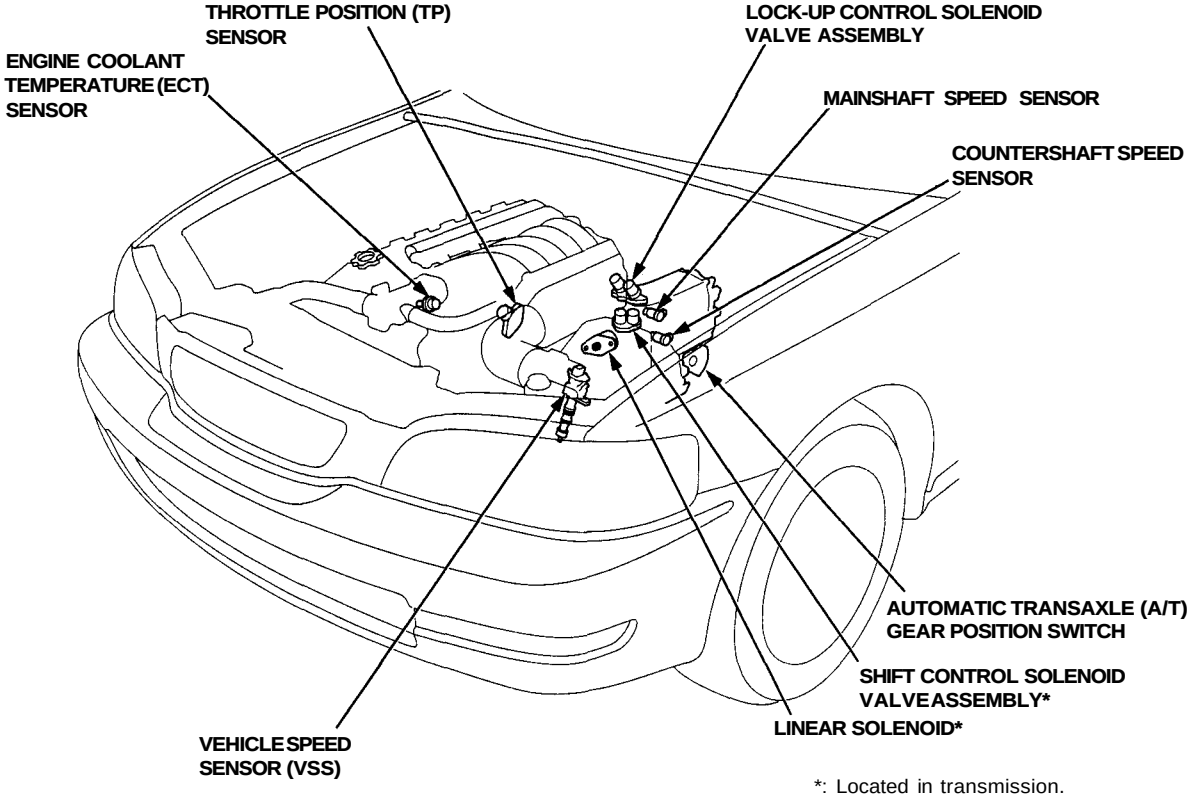
Parking Brake Mechanism

The parking brake mechanism locks the transmission by engaging the parking brake pawl into the parking gear which is splined to the countershaft.
Shifting to [P] position causes the parking brake pawl roller (installed at the end of the parking brake shift arm) to press the parking brake pawl onto the parking gear. Even if the end of the parking brake pawl rides on top of the parking gear teeth, slight movement of the countershaft will cause the parking brake pawl and the parking gear to mesh with each other completely, because the parking brake shift arm receives tension from the parking brake shift arm spring. The parking brake pawl receives the tension (which acts to separate the parking brake pawl from the parking gear) from the parking pawl spring.



Component Locations

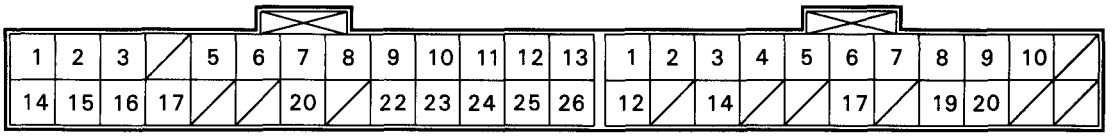




*: Located in transmission.

TCM Terminal Voltage/Measuring Conditions

TCM Terminal Locations



A (26P) Connector **B (22P) Connector**

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A1	LS-	Linear solenoid power supply negative electrode	With ignition switch ON (II): Pulsed signal
A2	SHB	Shift control solenoid valve B control	In [2] position, and in 1st and 2nd gear in [D3], [D4] position: Battery voltage In [1] and [R] position, and in 3rd gear in [D3], [D4] position, in 4th gear in [D4] position: 0 V
A3	SHA	Shift control solenoid valve A control	In [1], [2] and [R] position, and in 2nd and 3rd gear in [D3], [D4] position: Battery voltage In 1st gear in [D3], [D4] position, and in 4th gear in [D4] position: 0 V
A4	—	Not used	
A5	NE	Engine speed input	When engine is rotating: Pulsed signal
A6	ATP1	A/T gear position switch [1] position input	In [1] position: 0 V In other than [1] position: approx. 12 V
A7	ATP2	A/T gear position switch [2] position input	In [2] position: 0 V In other than [2] position: approx. 12 V
A8	ATP D3	A/T gear position switch [D3] position input	In [D3] position: 0 V In other than [D3] position: approx. 12 V
A9	ATP D4	A/T gear position switch [D4] position input	In [D4] position: 0 V In other than [D4] position: approx. 12 V
A10	ATP PN	A/T gear position switch [P] and [N] positions input	In [P] and [N] positions: 0 V In other than [P] and [N] position: approx. 12 V
A11	ATP R	A/T gear position switch [R] position input	In [R] position: 0 V In other than [R] position: approx. 12 V
A12	IG1	Power supply system	With ignition switch ON (II): approx. 12 V
A13	LG	Ground	
A14	PG	Ground	
A15	LCB	Lock-up control solenoid valve B control	During half and full lock-up: 12 V During deceleration: Pulsing signal During no lock-up: 0 V
A16	LCA	Lock-up control solenoid valve A control	When lock-up is ON: 12 V With no lock-up: 0 V
A17	D4 IND	D4 Indicator light control	When ignition switch is first turned ON (II): Battery voltage for two seconds In [D4] position: Battery voltage
A18	—	Not used	
A19	—	Not used	
A20	AT CHK	Upshift/downshift comparative signal output	With ignition switch ON (II): Pulsed signal
A21	—	Not used	
A22	ILU	Interlock control	When ignition switch is ON (II), brake pedal is depressed and without depressing accelerator pedal: 12 V
A23	VBU	Back-up power system	Always 12 V

Terminal Number	Signal	Description	Measuring Conditions/Terminal Voltage
A24	FFS	Upshift/downshift comparative signal output	With ignition switch ON (II): Pulsed signal
A25	IG1	Power supply system	With ignition switch ON (II): 12 V
A26	LG	Ground	
B1	LS+	Linear solenoid power supply positive electrode	With ignition switch ON (II): Pulsed signal
B2	BAROS S	Barometric pressure sensor signal input	With ignition switch ON (II) and depending on barometric pressure: Approx. 3 V
B3	ECT	Engine coolant temperature sensor signal input	With ignition switch ON (II) and depending on engine coolant temperature: Approx. 0.1 – 4.8 V
B4	TPS	Throttle angle sensor signal input	With ignition switch ON (II) and throttle fully open: 4.14 – 4.82 V With ignition switch ON (II) and throttle fully closed: 0.44 – 0.56 V
B5	VSS	Vehicle speed input	With ignition switch ON (II) and rotating front wheels: Pulsed signal
B6	AFSB	Upshift/downshift comparative signal output	With engine idling: 0 V At upshift or downshift: 5 V in an instant
B7	AFSA	Upshift/downshift comparative signal output	With engine idling: 0 V At upshift or downshift: 5 V in an instant
B8	NCSG	Countershaft speed pulser ground	Always: 0 V
B9	NC	Countershaft speed pulser input	Depending on vehicle speed: Pulsed signal When vehicle is stopped: 0 V
B10	NM	Mainshaft speed pulser input	Depending on vehicle speed: Pulsed signal When vehicle is stopped: 0 V
B11	——	Not used	
B12	STOP SW	Brake switch signal input	Brake pedal is depressed: 12 V Brake pedal released: 0 V
B13	——	Not used	
B14	SCS	Timing adjustment service check signal	With ignition switch ON (II) and service check connector is open: 5 V With ignition switch ON (II) and service check connector is connected with special tool: 0 V
B15	——	Not used	
B16	——	Not used	
B17	NMSG	Mainshaft speed pulser ground	Always: 0 V
B18	——	Not used	
B19	FAS	Shift acknowledge input	With engine idling: 5 V At upshift or downshift: 0 V in an instant
B20	VREF	+5 V reference	With ignition switch ON (II): Approx. 5 V
B21	——	Not used	
B22	——	Not used	

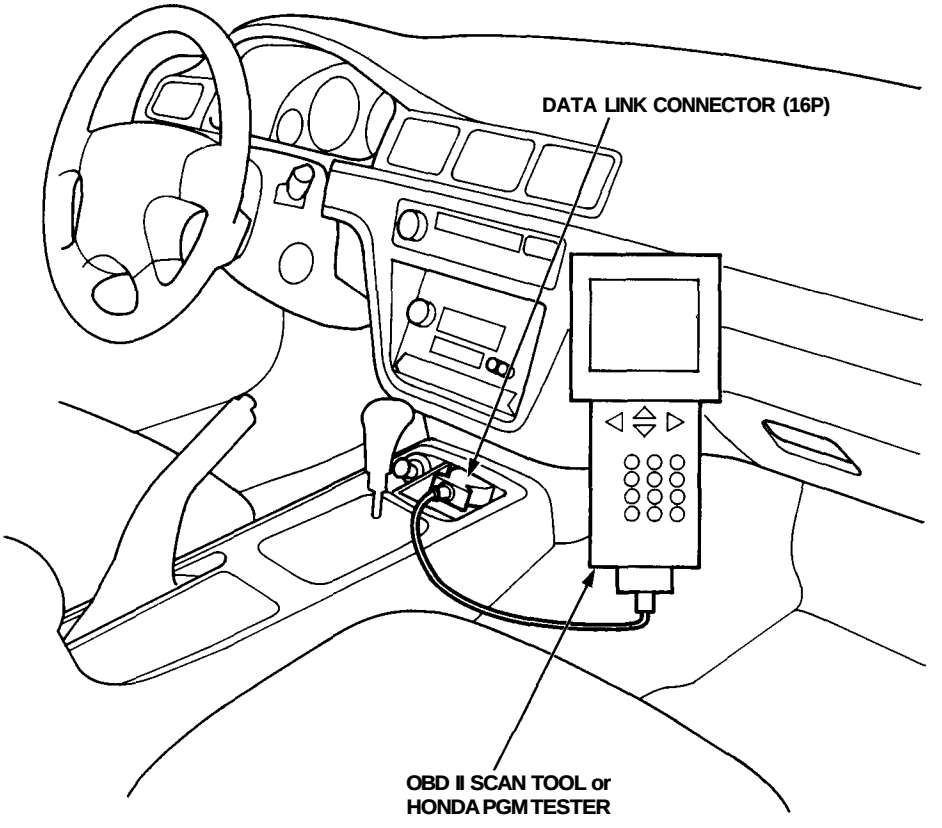
Troubleshooting Procedures

**Checking the Diagnostic Trouble Code (DTC)
with an OBD II Scan tool or Honda PGM Tester**

When the TCM senses an abnormality in the input or output systems, the D4 indicator light in the gauge assembly will blink. When the 16P Data Link Connector (DLC) (located behind the ashtray) is connected to the OBD II Scan Tool or Honda PGM Tester as shown, the scan tool or tester will indicate the Diagnostic Trouble Code (DTC) when the ignition switch is turned ON(II).

When the D4 indicator light has been reported on, connect the OBD II Scan Tool conforming to SAE J1978 or Honda PGM Tester to the DLC (16P) behind the ashtray. Turn the ignition switch on (II), and observe the DTC on the screen of the OBD II Scan Tool or Honda PGM Tester. After determining the DTC, refer to the electrical system Symptom-to-Component Chart on page 14-56 and 14-57.

NOTE: See the OBD II Scan Tool or Honda PGM Tester user's manual for specific instruction.



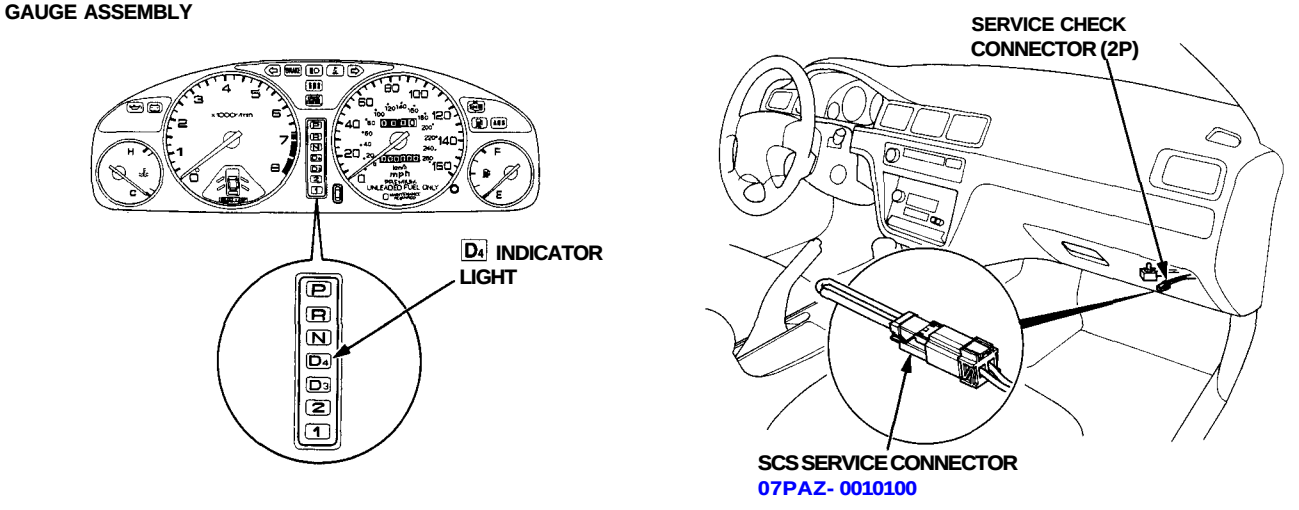
Some PGM-FI problems will also make the D4 indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP RADIO fuse (10 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM memory, then retest.

NOTE: Disconnecting the BACK UP RADIO fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

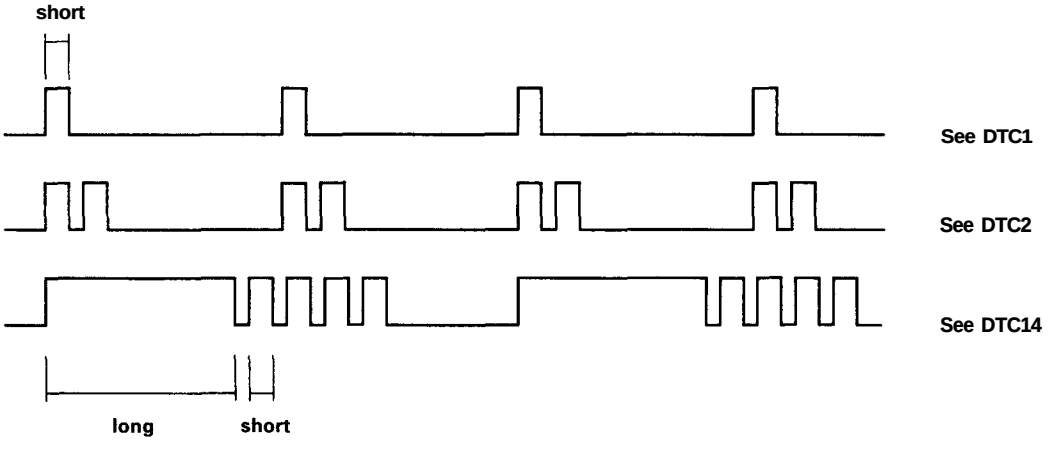
Checking the Diagnostic Trouble Code (DTC)
with the Service Check Connector and Special Tool

When the TCM senses an abnormality in the input or output systems, the D4 indicator light in the gauge assembly will blink. When the Service Check Connector (located under the dash on the passenger side) is connected with the special tool as shown, the D4 indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned on (II).

When the D4 indicator light has been reported on, connect the Service Check Connector with the special tool. Then turn on (II) the ignition switch and observe the D4 indicator light.



Codes 1 through 9 are indicated by individual short blinks, codes 10 through 18 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to Component Chart on pages 14-56 and 14-57.



Some PGM-FI problems will also make the D4 indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP RADIO fuse (10 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM memory, then recheck.

NOTE: Disconnecting the BACK UP RADIO fuse also cancels the radio anti-theft code, preset stations and the clock setting. Get the customer's code number, and make note of the radio presets before removing the fuse so you can reset them.

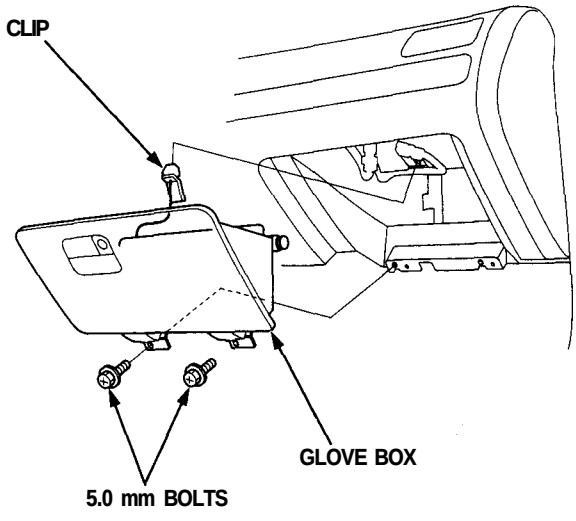
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Troubleshooting Procedures

(cont'd)

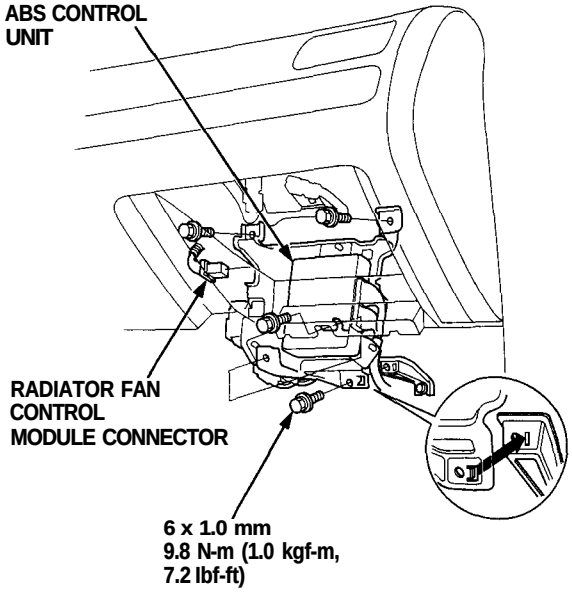
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the glove box from the dashboard.

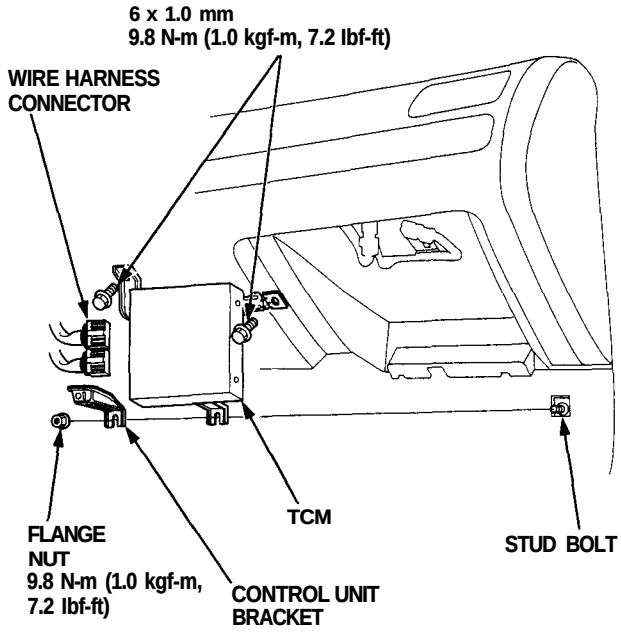


2. Remove the ABS control unit mounting bolts, and turn the ABS control unit over. Disconnect the radiator fan timer control unit connecter.

   NOTE: Do not disconnect the connectors from the ABS control unit.



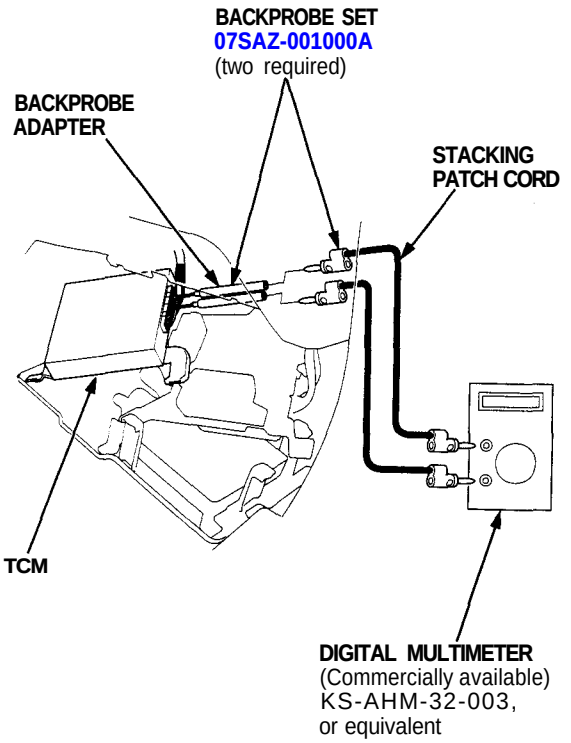
3. Remove the control unit bracket, then remove the TCM.



4. Inspect the circuit on the TCM according to the troubleshooting flowchart with the special tools and a digital multimeter as shown.

How to use the Backprobe Set

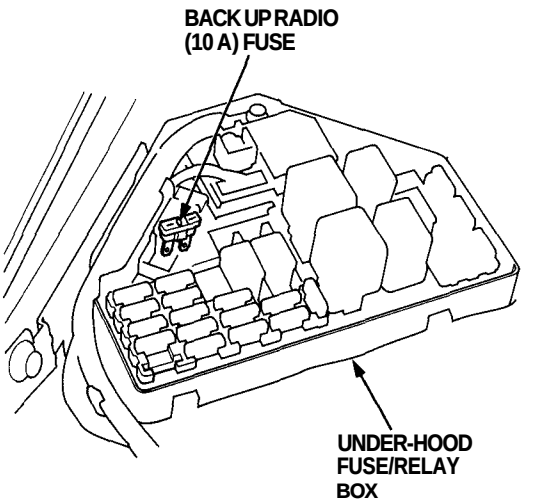
Connect the backprobe adapters to the stacking patch cords, and connect the cords to a multimeter. Using the wire insulation as a guide for the contoured tip of the backprobe adapter, gently slide the tip into the connector from the wire side until it comes in contact with the terminal end of the wire.



TCM Reset Procedure

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Turn the ignition switch OFF.
3. Remove the No. 39 BACK UP RADIO fuse (10 A) from the under-hood fuse/relay box for 10 seconds to reset the TCM.

   NOTE: The TCM memory cannot be cleared by using the OBD II Scan Tool or Honda PGM Tester; be sure to remove the BACK UP RADIO fuse to reset the TCM.



Final Procedure

NOTE: This procedure must be done after any troubleshooting.

1. Turn the ignition switch OFF.
2. Disconnect the OBD II Scan Tool or Honda PGM Tester from the Data Link Connector, or remove the special tool from the Service Check Connector.
3. Reset the TCM.
4. Turn the ignition switch ON (II).
5. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Symptom-to-Component Chart

Electrical System

Diagnostic Trouble Code (DTC)*	D4 Indicator Light	Symptom	Possible Cause	Refer to Page
P1753 (1)	Blinks	• Lock-up clutch does not engage. • Lock-up clutch does not disengage.	• Disconnected lock-up control solenoid valve A connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	14-58
P1758 (2)	Blinks	• Lock-up clutch does not engage.	• Disconnected lock-up control solenoid valve B connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	14-60
P1790 (3)	Blinks or OFF	• Lock-up clutch does not engage.	• Disconnected throttle position (TP) sensor connector • Short or open in TP sensor wire • Faulty TP sensor	14-62
P1791 (4)	Blinks	• Lock-up clutch does not engage.	• Disconnected vehicle speed sensor (VSS) connector • Short or open in VSS wire •Faulty VSS	14-63
P1705 (5)	Blinks	• Fails to shift other than 2nd - 4th gears. • Lock-up clutch does not engage.	• Short in A/T gear position switch wire • Faulty A/T gear position switch	14-64
P1706 (6)	OFF	• Fails to shift other than 2nd - 3rd - 4th gears. • Lock-up clutch does not engage.	• Disconnected A/T gear position switch connector • Open in A/T gear position switch wire • Faulty A/T gear position switch	14-66
P0753 (7)	Blinks	• Fails to shift (between 1st - 4th or 2nd - 3rd gear only). • Fails to shift (stuck in 4th gear).	• Disconnected shift control solenoid valve A connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	14-68
P0758 (8)	Blinks	• Fails to shift (stuck in 1st or 4th gears).	• Disconnected shift control solenoid valve B connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	14-70
P0720 (9)	Blinks	• Lock-up clutch does not engage.	• Disconnected countershaft speed sensor connector • Short or open in countershaft speed sensor wire • Faulty countershaft speed sensor	14-72
P1792 (10)	Blinks	• Lock-up clutch does not engage.	• Disconnected engine coolant temperature (ECT) sensor connector • Short or open in ECT sensor wire • Faulty ECT sensor	14-74
P0725 (11)	OFF	• Lock-up clutch does not engage.	• Disconnected ignition coil connector • Short or open in ignition coil wire • Faulty ignition coil	14-75

(DTC)*: The DTCs in parentheses are the codes of the D4 indicator light indicates when the service check connector is connected to the special tool (SCS service connector).

Diagnostic Trouble Code (DTC)*	D4 Indicator Light	Symptom	Possible Cause	Refer to Page
P1794 (13)	Blinks	• No specific symptom appears.	• Short or open in BAROS S (RED/BLU) wire between B2 terminal and ECM • Faulty barometric pressure (BARO) sensor NOTE: BARO sensor is built into ECM.	14-76
P1786 (14)	Blinks	• Transmission jerks hard when shifting.	• Short or open in FAS (PNK) wire between B19 terminal and ECM • Faulty ECM	14-77
P0715 (15)	'95, '96, '97 models OFF '98 model Blinks	• Transmission jerks hard when shifting. • Lock-up clutch does not engage.	• Disconnected mainshaft speed sensor connector • Short or open in mainshaft speed sensor wire • Faulty mainshaft speed sensor	14-79
P1768 (16)	Blinks	• Fails to shift (stuck in 4th gear). • Lock-up clutch does not engage.	• Disconnected linear solenoid connector • Short or open in linear solenoid wire • Faulty linear solenoid • Disconnected or loosed PG terminal	14-81
P1787 (18)	OFF	• Lock-up clutch does not have duty operation (ON ⇔ OFF)	• Short or open in FFS (RED/GRN) wire between A24 terminal and ECM • Faulty ECM • Faulty TCM	14-83
P0740 (none)	OFF	• Lock-up clutch does not engage.	• Faulty lock-up control system	14-84
P0730 (none)	OFF	• Fails to shift (between 1st -2nd, 1st - 2nd - 3rd, 1st - 2nd - 4th, 1st - 3rd - 4th, 2nd - 3rd - 4th gears only). • Fails to shift (stuck in 1st gear).	• Faulty shift control system	14-85

(DTC)*: The DTCs in parentheses are the codes of the D4 indicator light indicates when the service check connector is connected to the special tool (SCS service connector).

If the self-diagnostic D4 indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref. page
D4 indicator light does not come on for two seconds after ignition switch is first turned on (II).	———	14-86
D4 indicator light is on constantly (not blinking) whenever the ignition switch is on (II).	———	14-88
Shift lever cannot be moved from P position with the brake pedal depressed.	Check brake switch signal.	14-89

NOTE:

- If a customer describes the symptom for code P1790 (3), but the D4 indicator light is not blinking, P1706 (6) or P0725 (11), it will be necessary to recreate the symptom by test-driving, then recheck the DTC.
- Sometimes the D4 indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously. If so, repair the PGM-FI system according to the DTC, then reset the memory by removing the BACK UP RADIO fuse in the under-dash fuse/relay box for more than 10 seconds. Drive the vehicle for several minutes at a speed over 30 mph (50 km/h), then recheck the DTC.

Lock-up Control Solenoid Valve A/B

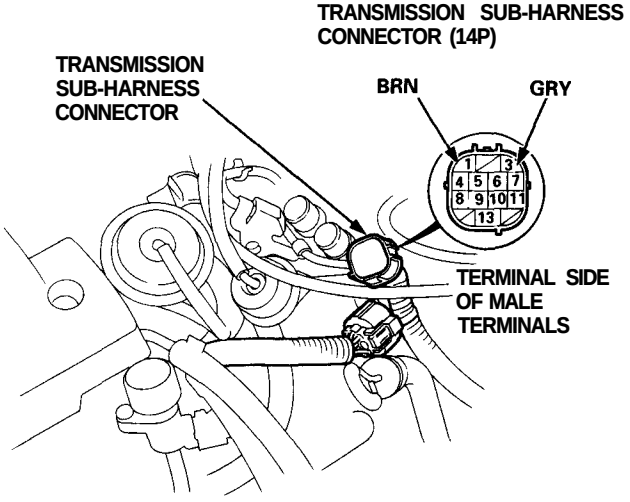
Test

NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the transmission sub-harness connector (14P).

2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the transmission sub-harness connector and body ground, and between the No. 3 terminal (solenoid valve B) and body ground.

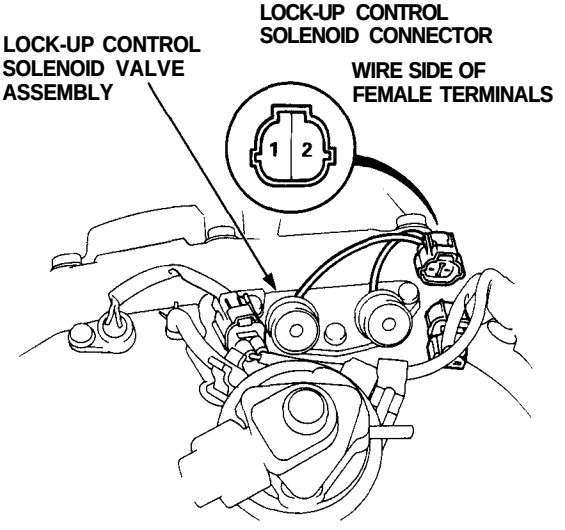
STANDARD: 12 - 25 Ω



3. If the resistance is out of specification, disconnect the 2P connector from the lock-up control solenoid valve A/B.

4. Measure the resistance between the No. 1 terminal (solenoid valve A) of the lock-up control solenoid connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

STANDARD: 12 - 25 Ω



5. If the resistance is OK, replace the transmission sub-harness.

6. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.

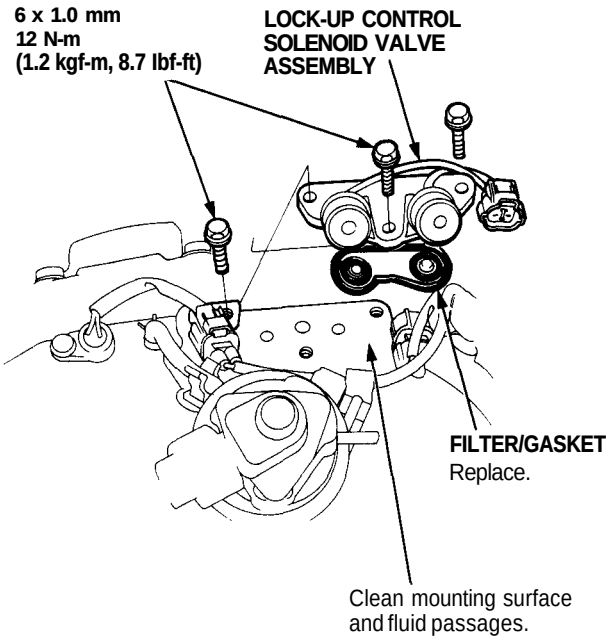
7. If the resistance is within the standard, connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve assembly if no clicking sound is heard.

Replacement

1. Remove the mounting bolts and lock-up control solenoid valve assembly.

   NOTE: Be sure to remove or replace the lock-up control solenoid valve A and B as an assembly.

2. Check the lock-up control solenoid valve fluid passages for dust or dirt, and replace as an assembly, if necessary.



3. Clean the mounting surface and fluid passages of the lock-up control solenoid valve assembly, and install a new lock-up control solenoid valve A/B with a new filter/gasket.

4. Check connector for rust, dirt or oil, and reconnect it securely.

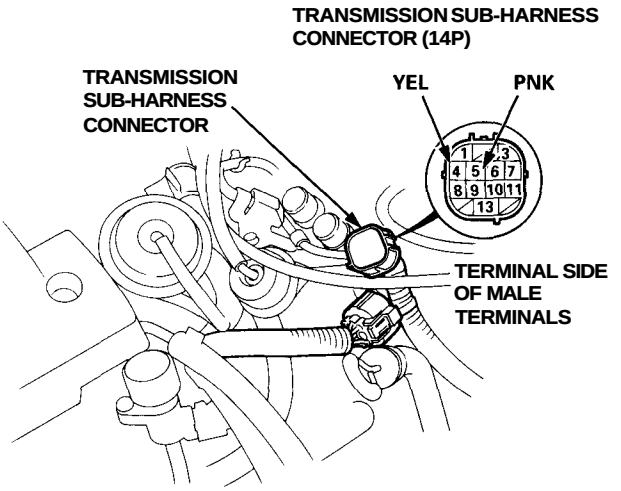
Shift Control Solenoid Valve

Test

1. Disconnect the transmission sub-harness connector (14P).

2. Measure the resistance between the No. 4 terminal of the transmission sub-harness and body ground, and between the No. 5 terminal and body ground.

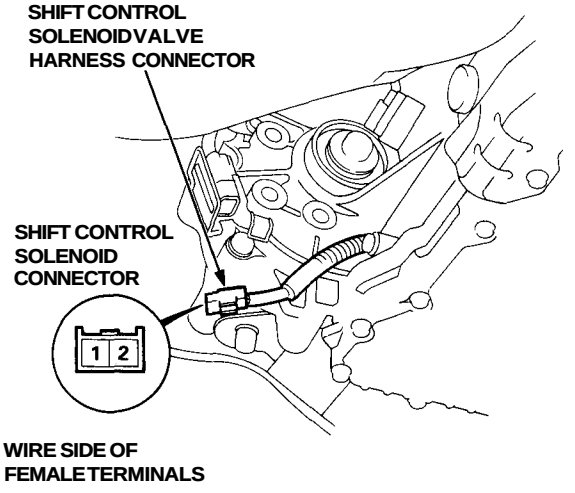
   STANDARD: 12 - 25 Ω



3. If the resistance is out of specification, disconnect the transmission sub-harness from the shift control solenoid valve harness.

4. Measure the resistance between the No. 2 terminal of the shift control solenoid valve harness and body ground, and between the No. 1 terminal and body ground.

   STANDARD: 12 - 25 Ω



5. Replace the transmission sub-harness if the resistance is within specification.

6. Replace the shift control solenoid valve assembly if the resistance is out of specification.

7. If the resistance is within the standard, connect the No. 2 terminal of the shift control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 1 terminal to the battery positive terminal. A clicking sound should be heard. Replace the shift control solenoid valve assembly if no clicking sound is heard.

   NOTE: If the solenoid valve replacement is required, see Shift Control Solenoid Valve Replacement (see page 14-113).

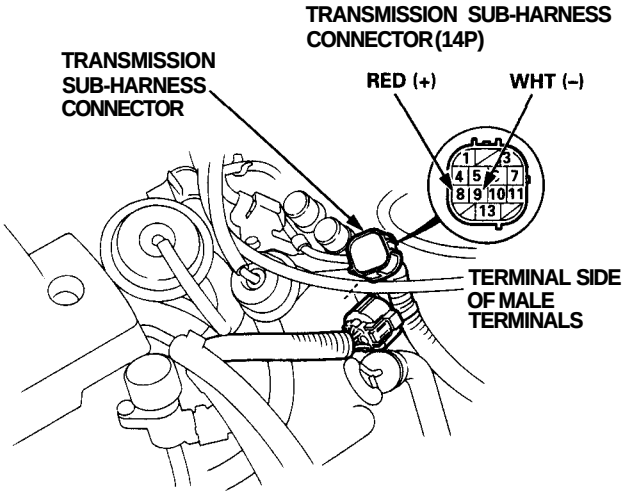
Linear Solenoid

Test

1. Disconnect the transmission sub-harness connector (HP).

2. Measure the resistance between the No. 8 and No. 9 terminals of the transmission sub-harness.

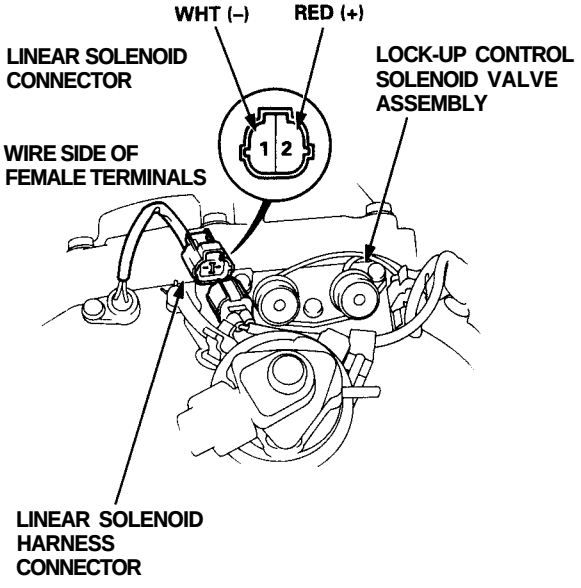
   STANDARD: 5.0 - 5.6 Ω (at 70°F, 20°C)



3. If the resistance is out of specification, disconnect the transmission sub-harness from the linear solenoid harness.

4. Measure the resistance between the No. 1 and No. 2 terminals of the linear solenoid harness.

   STANDARD: 5.0 - 5.6 Ω (at 70°F, 20°C)



5. Replace the transmission sub-harness if the resistance is within specification.

6. Replace the linear solenoid if the resistance is out of specification.

7. If the resistance is within the standard, connect the No. 2 terminal of the linear solenoid connector to the battery positive terminal and connect the No. 1 terminal to the battery negative terminal. A clicking sound should be heard. If no clicking sound is heard, replace the linear solenoid and throttle valve body as an assembly.

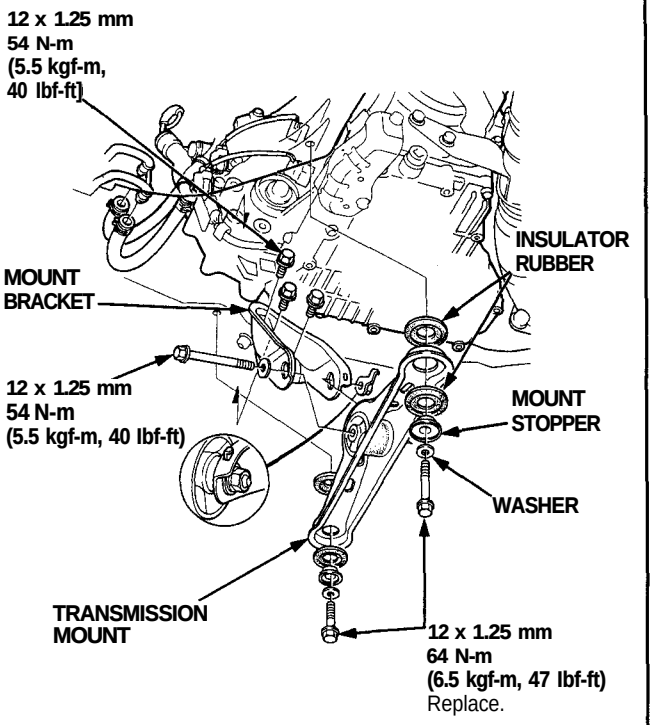
   NOTE: If the linear solenoid replacement is required, see Throttle Valve Body/Linear Solenoid Replacement (see page 14-147).

Mainshaft/Countershaft Speed Sensors

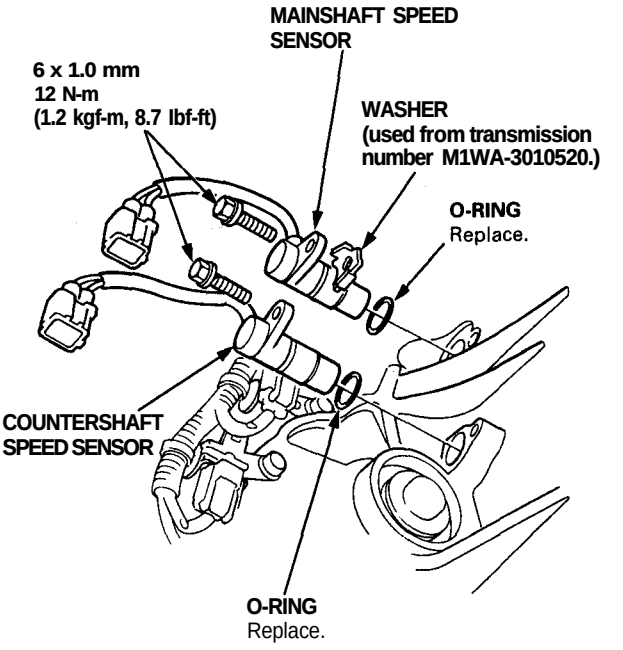
Replacement

⚠ WARNING Make sure lifts, jacks and safety stands are placed properly (see section 1).

1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Remove the transmission mount and mount bracket.



4. Disconnect the mainshaft or countershaft speed sensor connector.
5. Remove the 6 mm bolt from the transmission housing, and remove the mainshaft or countershaft speed sensor.
6. Replace the O-ring with a new one before reinstalling the mainshaft or countershaft speed sensor.

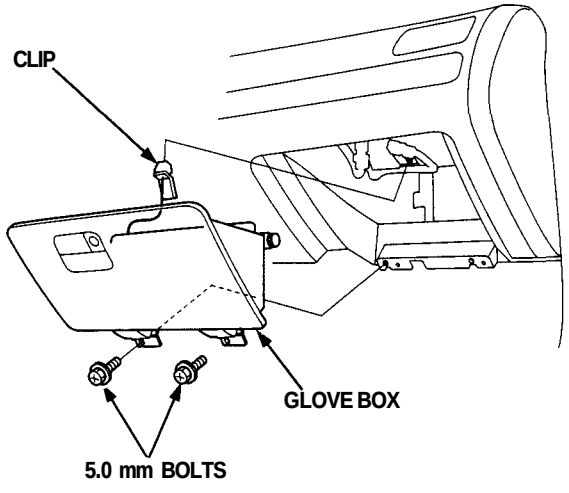


Transmission Control Module (TCM)

Replacement

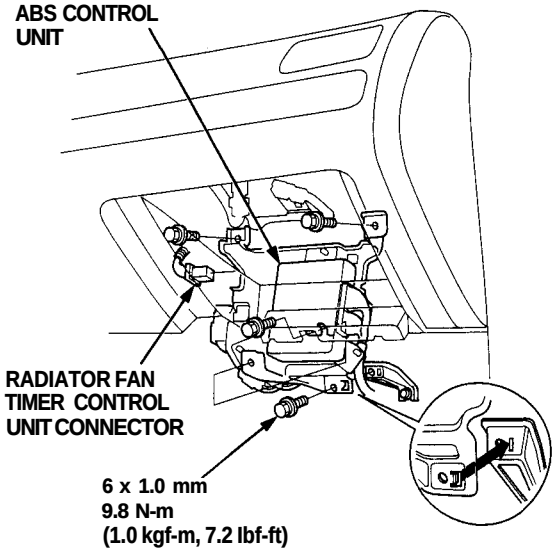
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the glove box from the dashboard.

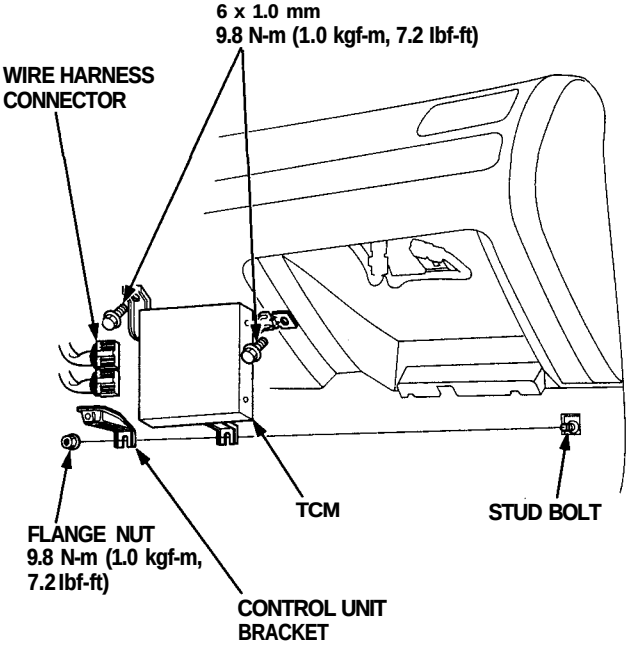


2. Remove the ABS control unit mounting bolts, and turn the ABS control unit over. Disconnect the radiator fan timer control unit connector.

   NOTE: Do not disconnect the connectors from the ABS control unit.



3. Remove the control unit bracket, then remove the TCM. Disconnect the connectors and replace the TCM.

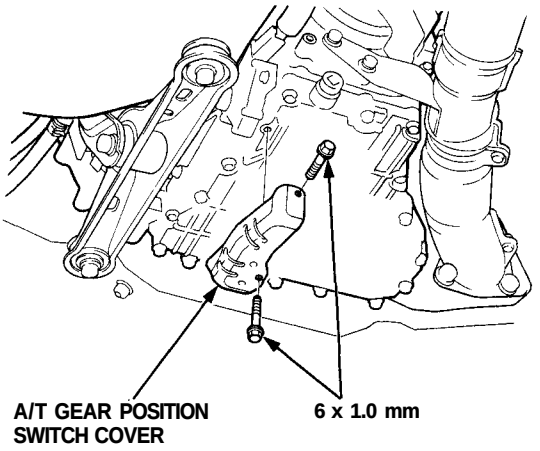


A/T Gear Position Switch

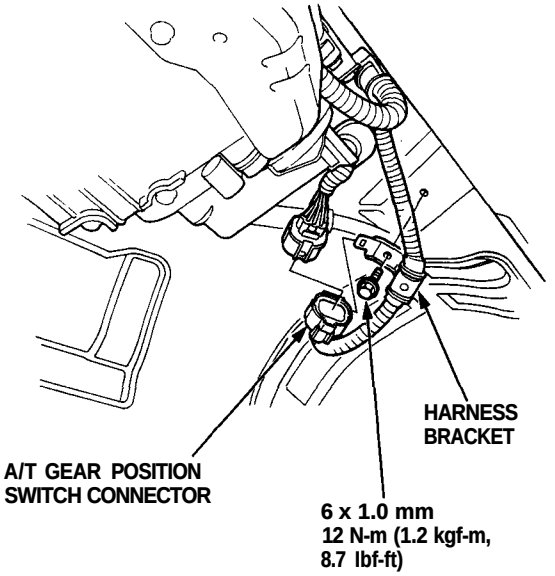
Replacement

⚠ WARNING Make sure lifts, jacks and safety stands are placed properly (see section 1).

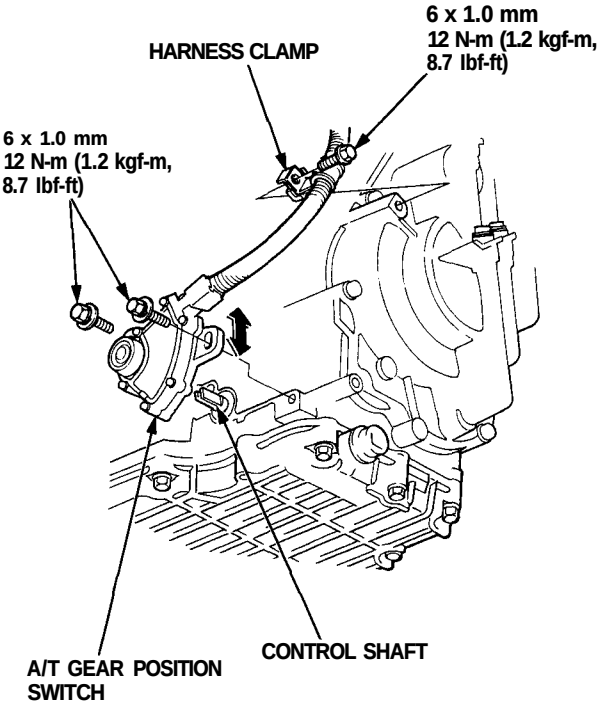
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Shift the transmission into the [N] position.
4. Remove the A/T gear position switch cover.



5. Disconnect the A/T gear position switch connector, then remove the harness bracket.

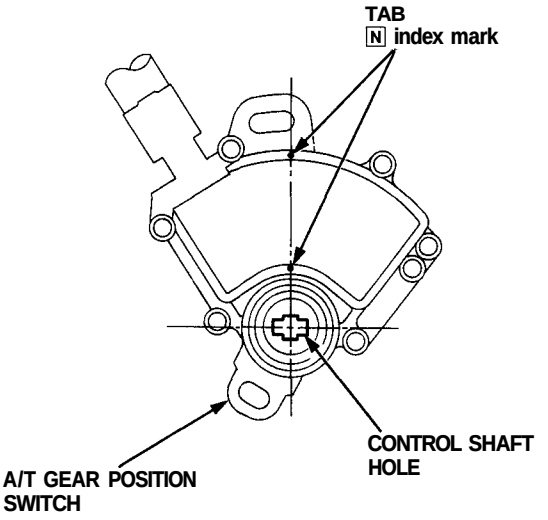


6. Remove the harness clamp from the rear side cover, then remove the A/T gear position switch from the control shaft.

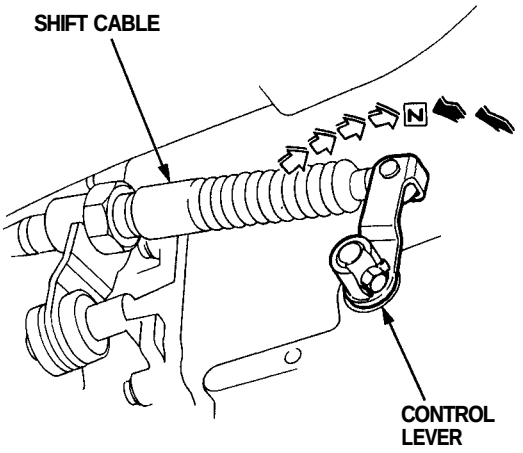


7. Set the A/T gear position switch to the [N] position as shown.

   NOTE: The A/T gear position switch clicks in the [N] position.



8. Set the control shaft to the [N] position, then install the A/T gear position switch on the control shaft and install the clamp on the rear cover.

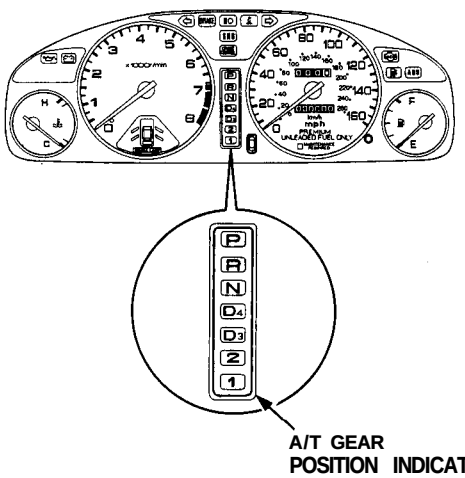


9. Connect the A/T gear position switch connector, then install the harness stay.

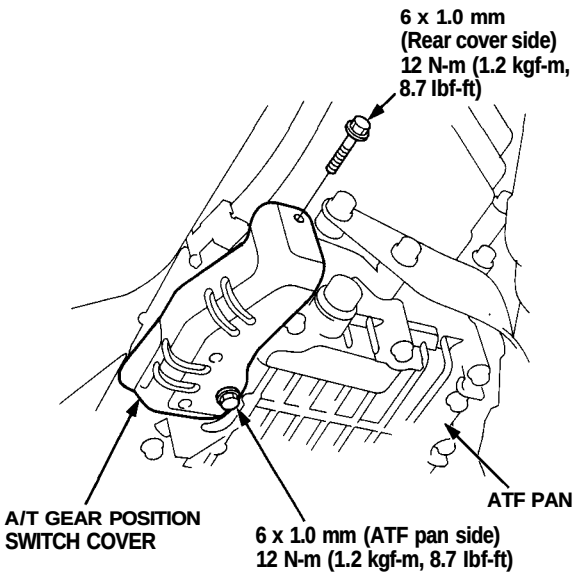
10. Turn the ignition switch ON (II). Move the shift lever through all gears, and check the A/T gear position switch synchronization with the A/T gear position indicator.

11. If the A/T gear position switch does not synchronize with the A/T gear position indicator, loosen the bolts securing the A/T gear position switch and adjust the A/T gear position switch installation.

GAUGE ASSEMBLY



12. Install the A/T gear position switch cover. Tighten the bolt on the ATF pan side loosely so that there is no clearance between the A/T gear position switch cover and the ATF pan. Then tighten the bolt on the rear cover side to the specified torque, and tighten the bolt on the ATF pan side to the specified torque.



13. Start the engine. Move the shift lever through all gears, and verify the following:

- The shift lever cannot be moved to the [R] position from the [N] position without pushing the shift lever.
- The engine will not start in any gear, only in the [N] or [P] position.
- The back-up lights come on when the shift lever is in the [R] position.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1, 2, 3, 5, 6, 7, 8, 38, 43	K, L, R, S
Vehicle moves in [2], but not in [D3], [D4], or [1] position.	6, 8, 9, 10, 65	C, M, O
Vehicle moves in [D3], [D4], [1], [R], but not in [2] position.	6, 11, 12, 22	C, L
Vehicle moves in [D3], [D4], [2], [1], but not in [R] position.	4, 6, 13, 33, 58	C, L, Q
Vehicle moves in [D3], [D4], [2], but not in [1] position.	6, 8	C, L, M
Vehicle moves in [N] position.	10, 12, 14, 32, 33, 35, 36, 37	C, D
Excessive idle vibration.	2, 34, 38, 49, 50	B, K, L
Poor acceleration; flares on starting off in [D4], [D3] position		
Stall rpm high in [D4], [D3], [2], [1] position.	1, 2, 3, 6, 43, 46	K, L, R
Stall rpm high in [D4], [D3], [1] position.	6, 8, 10	C, D
Stall rpm high in [2] position.	6, 12	C, D
Stall rpm high in [R] position.	33	N
Stall rpm low.	15, 34, 49, 50	R
No shift	45, 52, 53	G, L
Fails to shift in [D3] position; from 1st to 3rd gear	20	
Fails to shift in [D4] position; from 1st to 4th gear	20, 21	
Erratic upshifting.		V
1-2 upshift, 2-3 upshift, 3-4 upshift	67	
1-2 upshift	52	
2-3 upshift	53	
3-4 upshift	52	
Harsh upshift (1-2).	12, 17, 18, 22, 59, 66, 67	C, D, E, V
Harsh upshift (2-3).	17, 18, 22, 23, 25, 32, 59, 66, 67	C, D, E, H, L, V
Harsh upshift (3-4).	17, 18, 23, 24, 29, 33, 59, 61, 66, 67	C, D, E, I, L, V
Harsh downshift (2-1).	10, 17, 18, 22, 28, 39, 66, 67	O
Harsh downshift (3-2).	12, 17, 18, 22, 23, 29, 40, 59, 61, 66, 67	C, D, E, H
Harsh downshift (4-3).	17, 18, 23, 24, 31, 32, 41, 59, 61, 62, 66, 67	C, D, E, I
Flares on 2-3 upshift.	17, 18, 22, 23, 25, 26, 30, 32, 59	E, L, V
Flares on 3-4 upshift.	17, 18, 22, 24, 26, 29, 31, 33, 59	E, L, V, N
Excessive shock on 2-3 upshift.	17, 18, 22, 23, 25, 26, 32, 39, 47, 59, 67	E, L, N
Excessive shock on 3-4 upshift.	17, 18, 23, 24, 26, 29, 33, 40, 47, 65, 67	E, L, N
Late shift from [N] position to [D4] or [D3] position.	10, 27	M
Late shift from [N] position to [R] position.	4, 19, 33, 57	Q
Noise from transmission in all shift lever positions.	2, 42	K, L, Q
Vehicle does not accelerate more than 31 mph (50 km/h).	15	
Shift lever does not operate smoothly.	6, 44	P
Fails to shift; stuck in 4th gear.	18*, 52, 53	
Transmission will not shift into parking gear in [P] position.	6, 16, 44	P
Stall rpm high; all clutch pressures are in specification.	8, 10, 12, 46	D, K, O
Lock-up clutch does not disengage.	17, 18, 48, 49, 50, 51, 54, 55, 56, 57	E, L, V
Lock-up clutch does not operate smoothly.	17, 18, 46, 48, 49, 50, 51, 54, 55, 56, 67	L
Lock-up clutch does not engage.	17, 18, 46, 48, 49, 50, 51, 54, 55, 56, 66, 67	E, L, V
No engine braking in [1] position.	8, 10, 60, 63, 64	C, D, L
Vibration in all positions	38	
Position indicator light does not come on.	6, 44, 56	

*: '98 model only

PROBABLE CAUSE			
1	Low ATF.	41	4th check ball stuck.
2	ATF pump worn or binding.	42	Torque converter housing or transmission housing ball bearing worn/damaged.
3	Regulator valve stuck or spring worn.	43	ATF strainer clogged.
4	Servo valve stuck.	44	Joint in shift cable and transmission or body worn.
5	Mainshaft worn/damaged.	45	Modulator valve stuck.
6	Shift cable broken/out of adjustment.	46	Torque converter check valve stuck.
7	Secondary drive gear, secondary driven gear, extension shaft worn/damaged.	47	Foreign material in separator plate orifice.
8	One-way (sprag) clutch worn/damaged.	48	Lock-up timing valve stuck.
9	1st gears worn/damaged (2 gears).	49	Lock-up shift valve stuck.
10	1st clutch defective.	50	Lock-up piston defective.
11	2nd gears worn/damaged (2 gears).	51	Lock-up control valve stuck.
12	2nd clutch defective.	52	Shift control solenoid valve A defective.
13	Reverse gears worn/damaged (2 gears).	53	Shift control solenoid valve B defective.
14	Excessive ATF.	54	Lock-up control solenoid valve A defective.
15	Torque converter one-way clutch defective.	55	Lock-up control solenoid valve B defective.
16	Parking mechanism defective.	56	A/T gear position switch defective.
17	Throttle valve stuck.	57	Servo control valve stuck.
18	Linear solenoid defective.	58	Reverse idler gear worn/damaged.
19	1-2 shift valve stuck.	59	Main orifice control valve stuck.
20	2-3 shift valve stuck.	60	1st-hold clutch defective.
21	3-4 shift valve stuck.	61	4th exhaust valve stuck.
22	2nd accumulator defective.	62	4th kick-down valve stuck.
23	3rd accumulator defective.	63	1st-hold accumulator defective.
24	4th accumulator defective.	64	Foreign material in 1st-hold orifice.
25	2-3 orifice control valve stuck.	65	1st accumulator defective.
26	Foreign material in main orifice.	66	Mainshaft speed sensor defective.
27	Foreign material in 1st orifice.	67	Countershaft speed sensor defective.
28	Foreign material in 2nd orifice.		
29	3-4 orifice control valve stuck.		
30	Foreign material in 3rd orifice.		
31	Foreign material in 4th orifice.		
32	3rd clutch defective.		
33	4th clutch defective.		
34	Engine output low.		
35	Needle bearing worn/damaged.		
36	Thrust washer worn/damaged.		
37	Clutch clearance incorrect.		
38	Drive plate defective or transmission misassembly.		
39	2nd check ball stuck.		
40	3rd check ball stuck.		

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Vehicle creeps in [N] position.	R1, R2	
Vehicle does not move in [D3] or [D4] position.	R4	
Transmission locks up in [R] position.	R12	
Excessive drag in transmission.	R6	K, R
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R4.	One-way (sprag) clutch installed upside down.
R5.	Reverse selector hub installed upside down.
R6.	ATF pump binding.
R7.	Torque converter not fully seated in ATF pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Check valve balls not installed.
R12.	Shift fork bolt not installed.

NOTES	
A.	See flushing procedure, page 14-193 and 14-194.
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear, and check the orifice control valves and throttle valve for free movement.
E.	If the throttle valve is stuck inspect the clutches for wear.
G.	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
H.	If the 2-3 orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
K.	Improper alignment of ATF pump body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeak.
L.	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump. If OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feed pipe guide in the rear cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the rear cover as it is dented. The O-ring under the guide is probably worn.
N.	Replace the mainshaft if the bushings for the 1st and 4th feed pipe are loose or damaged. If the 1st feed pipe is damaged or out of round, replace it. If the 4th feed pipe is damaged or out of round, replace the rear cover.
O.	A worn or damaged sprag clutch is mostly a result of shifting the transmission in D3 or D4 position while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect for damage or wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Splines of extension shaft and secondary driven gear for wear. 5. Differential pinion shaft for wear under pinion gears. 6. Bottom of 3rd clutch for swirl marks. Replace items 1, 2, 3, 4 and 5 if worn or damaged. If transmission makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and countershaft 4th gear in addition to 1, 2, 3, 4 or 5. If extension shaft, secondary driven gear and/or differential pinion shaft are worn, overhaul extension shaft, secondary driven gear and/or differential assembly and replace ATF strainer and thoroughly clean transmission, flush torque converter, cooler and lines. If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and secondary driven gear shaft.
R.	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the ATF pump body. This will result in ATF pump seizure if not detected. Use proper tools.
S.	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by the linear solenoid not working.
U.	Check if servo valve cover is installed with snap ring. If they are not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal), affecting all forward gears.
V.	Adjusting the throttle valve body, throttle valve, and linear solenoid are essential for proper operation of the transmission. Not only does it affect the shift quality if misadjusted, but also the lock-up clutch operation.

RoadTest

NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

1. Apply parking brake and block the wheels. Start the engine, then shift to D4 position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.

2. Repeat same test in D3 position.

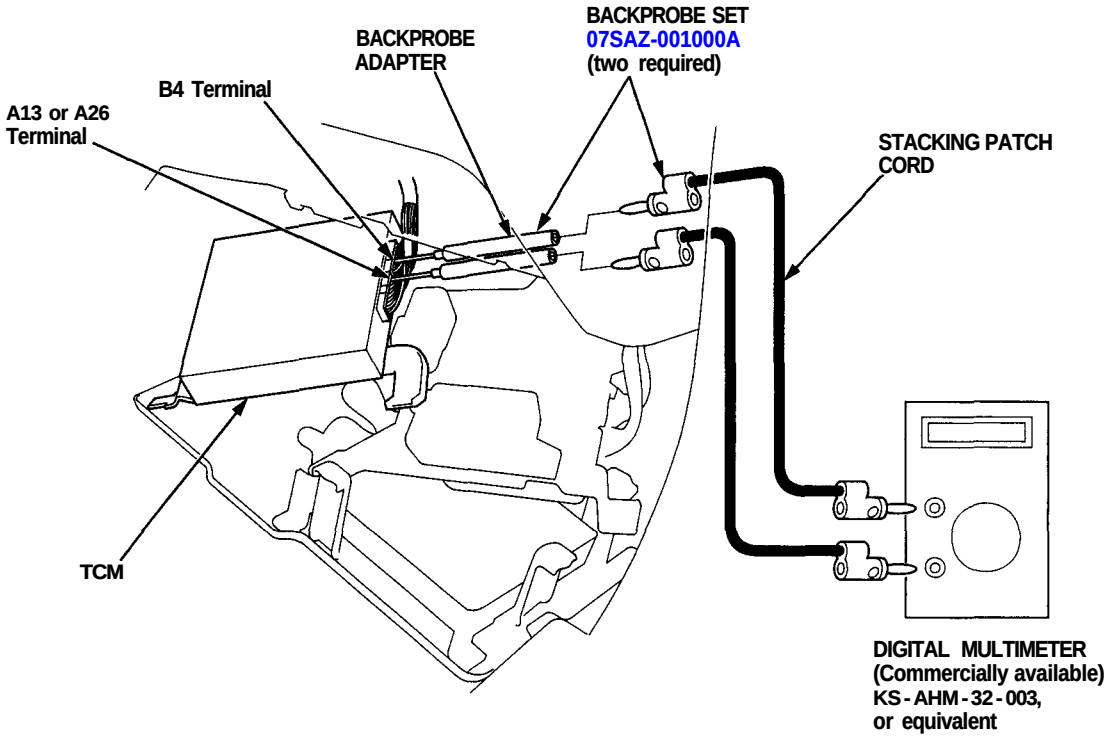
3. Shift to D4 position, and check that the shift points on a flat road occur at the approximate speeds shown on the next page. Also check for abnormal noise and clutch slippage.

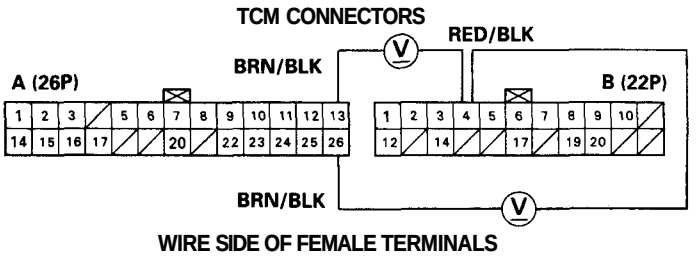
   NOTE: Throttle position sensor voltage represents the throttle opening.

   -1. Remove the TCM cover to expose the TCM for road testing; refer to page 14-54 and 14-55.
   -2. Set the digital multimeter to check voltage between B4 (+) terminal and A13 (-) or A26 (-) terminal of the TCM for the throttle position sensor.

   NOTE: Refer to page 14-55; How to use the Backprobe Set.

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.





D4 Position

- **Upshift**

		1st → 2nd	2nd → 3rd	3rd → 4th	Lock-up Clutch ON
Throttle position sensor voltage: 0.75 V	mph	10.0 – 13.0	17.5 – 21.0	28.0 – 32.5	20.5 – 24.0
	km/h	16.1 – 20.9	28.2 – 33.8	45.1 – 52.3	33.0 – 38.6
Throttle position sensor voltage: 2.25 V	mph	18.5 – 22.5	35.0 – 40.5	55.0 – 61.0	65.0 – 71.0
	km/h	29.8 – 36.2	56.3 – 65.2	88.5 – 98.2	105 – 114
Full throttle Throttle position sensor voltage: 4.5 V	mph	35.0 – 40.5	63.0 – 71.5	100.0 – 111.0	92.0 – 103.0
	km/h	56.3 – 65.2	101 – 115	160.9 – 178.6	148 – 165.8

- **Downshift**

		Lock-up Clutch OFF	4th → 3rd	3rd → 2nd	2nd → 1st
Throttle position sensor voltage: 0.75 V	mph	15.5 – 19.0	18.5 – 22.0	7.5 – 11.0	7.5 – 11.0
	km/h	24.9 – 30.6	29.8 – 35.4	12 – 17.7	12 – 17.7
Throttle position sensor voltage: 2.25 V	mph	48.0 – 54.0	———	———	———
	km/h	77.2 – 86.9	———	———	———
Full throttle Throttle position sensor voltage: 4.5 V	mph	90.0 – 101.0	86.0 – 96.5	53.0 – 60.0	26.0 – 31.5
	km/h	144 – 162.5	138 – 155	85.3 – 96.6	41.8 – 50.7

4. Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from D4 position to 2 position. The vehicle should immediately begin slowing down from engine braking.

   CAUTION: Do not shift from D4 or D3 position to 2 or 1 position at speeds over 63 mph (100 km/h); you may damage the transmission.

5. Check for abnormal noise and clutch slippage in the following positions.

   1 (1st Gear) Position
   a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage,
   b. Upshifts should not occur with the selector in this position.

   2 (2nd Gear) Position
   a. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage,
   b. Upshifts and downshifts should not occur with the selector in this position.

   R (Reverse) Position
   Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

6. Test in P (Parking) Position
   Park the vehicle on slope (approx. 16°), apply the parking brake, and shift into P position. Release the brake; the vehicle should not move.

Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Engage the parking brake and block the front wheels.
2. Connect a tachometer to the engine, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into [2] position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow two minutes for cooling, then repeat the test in [D4], [1], and [R] positions.

NOTE:
- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in [D4], [2], [1], and [R] positions.

Stall Speed RPM:
Specification: 2,350 rpm
Service Limit: 2,200 - 2,500 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D4], [2], [1] and [R] positions	• Low fluid level or ATF pump output • Clogged ATF strainer • Pressure regulator valve stuck closed • Slipping clutch
Stall rpm high in [R] position	• Slippage of 4th clutch
Stall rpm high in [2] and [D4] positions	• Slippage of 2nd clutch
Stall rpm high in [1] position	• Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm low in [D4], [2], [1], and [R] positions	• Engine output low • Torque converter one-way clutch slipping

Fluid Level

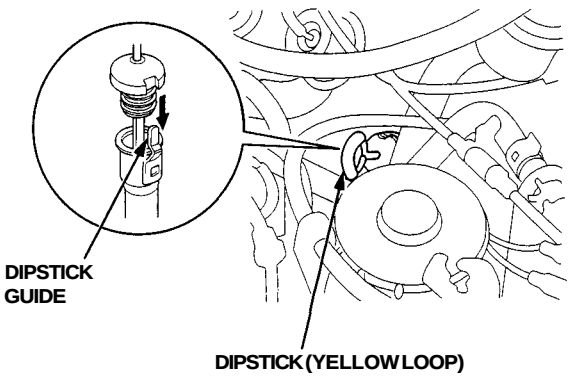
Checking/Changing

Checking

NOTE: Check the fluid level with the engine at normal operating temperature (the radiator fan comes on).

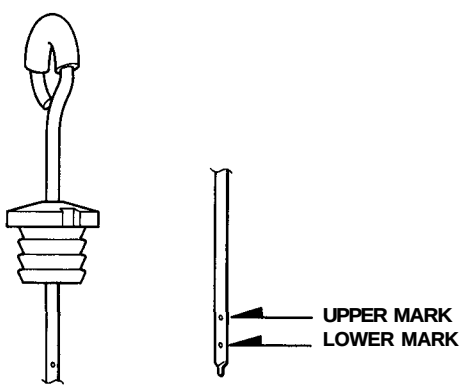
1. Park the vehicle on level ground. Turn off the engine.

2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.



3. Insert the dipstick into the transmission. Make sure the notch in the rubber cap fits in the dipstick guide and push the dipstick in all the way.

4. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.



5. It the level is below the lower mark, pour the recommended fluid* into the tube to bring it to the upper mark.

6. Insert the dipstick back in the transmission. Make sure the notch fits in the dipstick guide and the dipstick is down all the way.

Changing

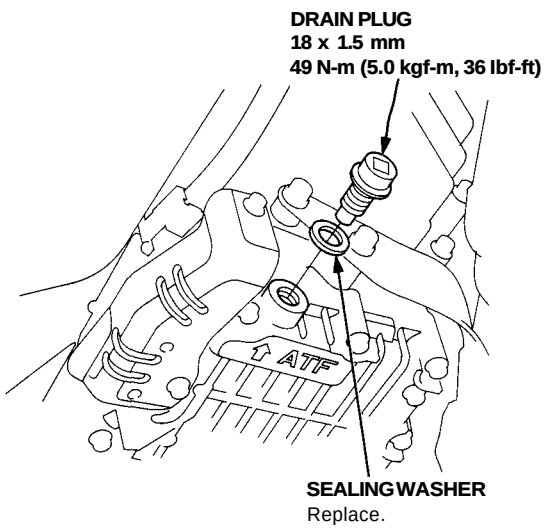
1. Bring the transmission up to normal operating temperature (the radiator fan comes on) by driving the vehicle. Park the vehicle on level ground, turn the engine off, and remove drain plug.

   NOTE: If a cooler flusher is to be used, see page 14-193 and 14-194.

2. Reinstall the drain plug with a new sealing washer, then refill the transmission with the recommended fluid* to the upper mark on the dipstick.

Automatic Transmission Fluid Capacity:
2.7 ℓ (2.9 US qt., 2.4 Imp qt.) at change
7.2 ℓ (7.6 US qt., 6.3 Imp qt.) at overhaul

Recommended Automatic Transmission Fluid:
Genuine Honda Premium Formula Automatic Transmission Fluid (ATF)*



* Always use Genuine Honda Premium Formula Automatic Transmission Fluid (ATF). Using a non-Honda ATF can affect shift quality.

Pressure Testing

⚠ WARNING

- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks and safety stands are placed properly (see section 1).**

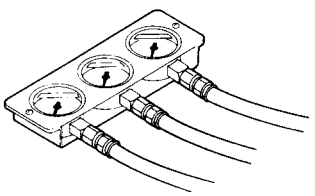
CAUTION:

- **Before testing, be sure the transmission fluid is filled to the proper level.**
- **Warm up the engine before testing.**

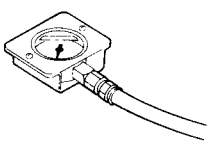
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set the parking brake, and block both rear wheels securely.
3. Allow the front wheels to rotate freely.
4. Warm up the engine (the radiator fan comes on), then stop and connect a tachometer.
5. Connect the special tool to each inspection hole.

   TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

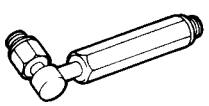
   CAUTION: Connect the oil pressure gauge securely, be sure not to allow dust and other foreign particles to enter the inspection hole.



A/T PRESSURE GAUGE SET W/PANEL
07406-0020400



A/T LOW PRESSURE GAUGE W/PANEL
07406 - 0070300



A/T PRESSURE HOSE, 2210 mm
07MAJ-PY4011A
(4 Required)

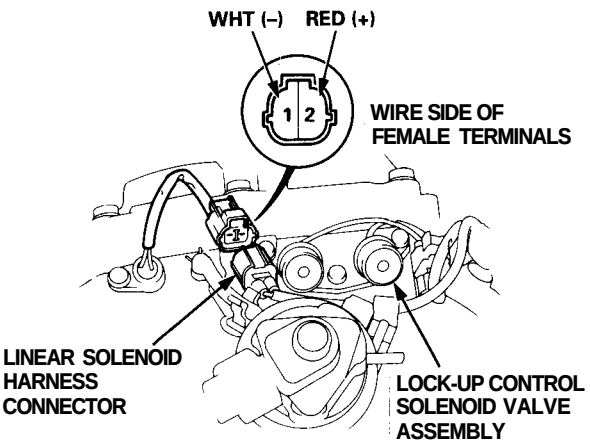
A/T PRESSURE HOSE ADAPTER
07MAJ - PY40120
(4 Required)

NOTE: Use the A/T Pressure Gauge Set (07406 - 0020003) or A/T Low Pressure Gauge (07406 - 0070000), and the A/T pressure gauge hoses and adapters shown above.

6. Disconnect the 2P connector from the linear solenoid connector.
7. Start the engine, and run it as follows:
   - At 2,000 rpm for line pressure and clutch pressure measurement.
   - At 2,000 rpm for throttle B pressure measurement.
8. Shift to the respective shift lever position as in the table, and measure each pressure at the fully-opened throttle condition according to the table.

   NOTE: While testing for line pressure measurement, higher pressure may be indicated if measurements are made in shift lever positions other than [N] or [P] position.
9. Connect battery voltage to the linear solenoid connector terminals.

LINEAR SOLENOID HARNESS CONNECTOR

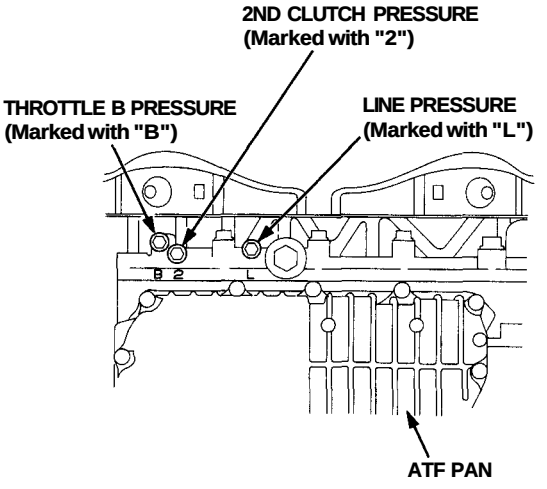


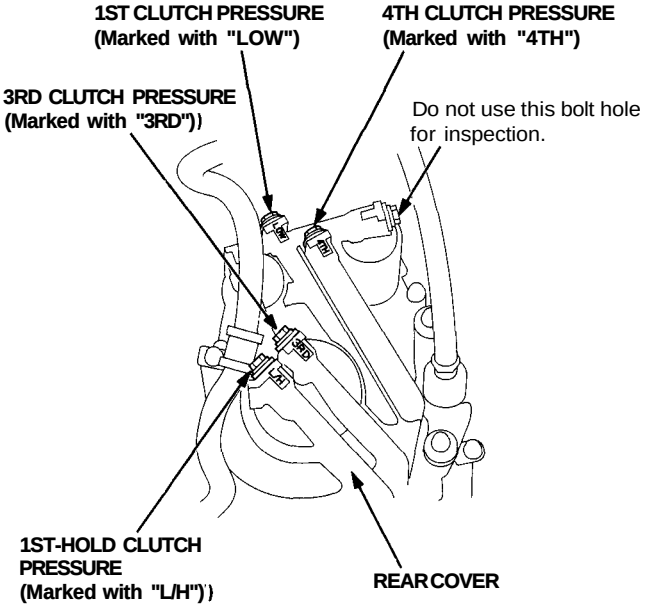
10. Shift to the respective shift lever position as in the table, and measure each pressure at the fully-closed throttle condition.
11. Disconnect the special tool, and connect the linear solenoid connector.
12. Install the sealing bolt with a new sealing washer in the inspection hole, and tighten to the specified torque.

    TORQUE: 18 N-m (1.8 kgf-m, 13 lbf-ft)

    NOTE: Do not reuse old sealing washers; always replace washers.

- **Locations of Pressure Inspection Holes**





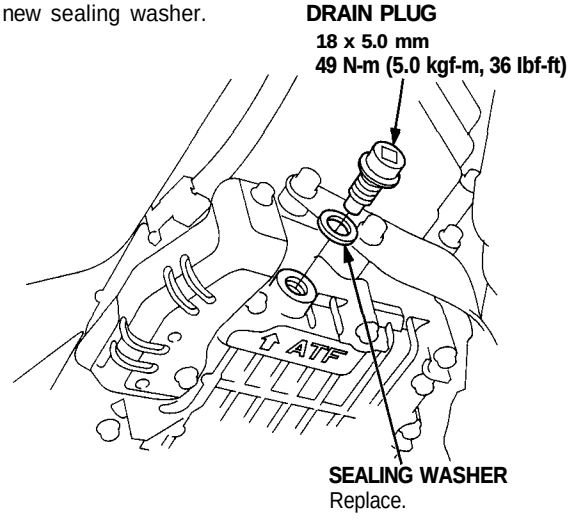
PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	590 kPa (6.0 kgf/cm², 85 psi) Fully closed throttle — 880 kPa (9.0 kgf/cm², 130 psi) Fully opened throttle	540 kPa (5.5 kgf/cm², 78 psi) Fully closed throttle — 830 kPa (8.5 kgf/cm², 120 psi) Fully opened throttle
1st clutch	1	No or low 1st pressure	1st Clutch		
1st-hold clutch	1	No or low 1st-hold pressure	1st-hold Clutch		
2nd clutch	2	No or low 2nd pressure	2nd Clutch		
2nd clutch	D4	No or low 2nd pressure	2nd Clutch		
3rd clutch	D4	No or low 3rd pressure	3rd Clutch		
4th clutch	D4	No or low 4th pressure	4th Clutch		
	R		Servo valve or 4th Clutch		
Throttle B	D4	Pressure too high	Linear Solenoid/ Throttle Valve Body Assembly	0 – 15 kPa (0 – 0.15 kgf/cm², 0 – 2 psi) Fully closed throttle	—
		No or low pressure		580 kPa (5.9 kgf/cm², 84 psi) Fully opened throttle	560 – 600 kPa (5.7 – 6.1 kgf/cm², 81 – 87 psi) Fully opened throttle

Lower Valve Body Assembly

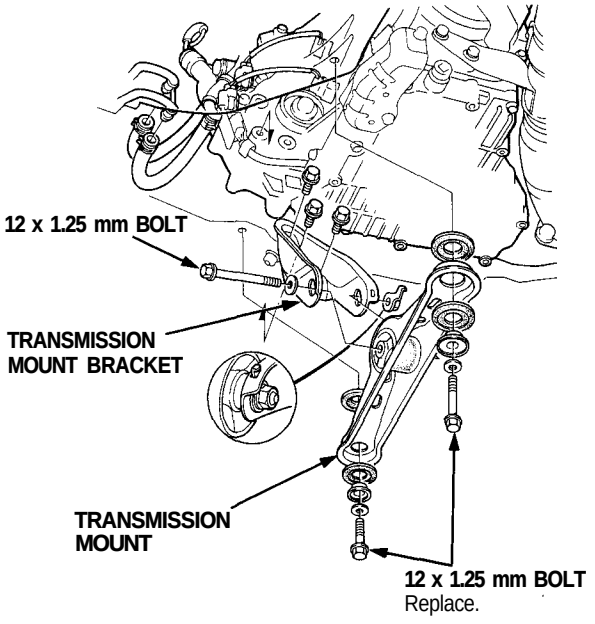
Removal

⚠ WARNING Make sure lifts, jacks and safety stands are placed properly (see section 1).

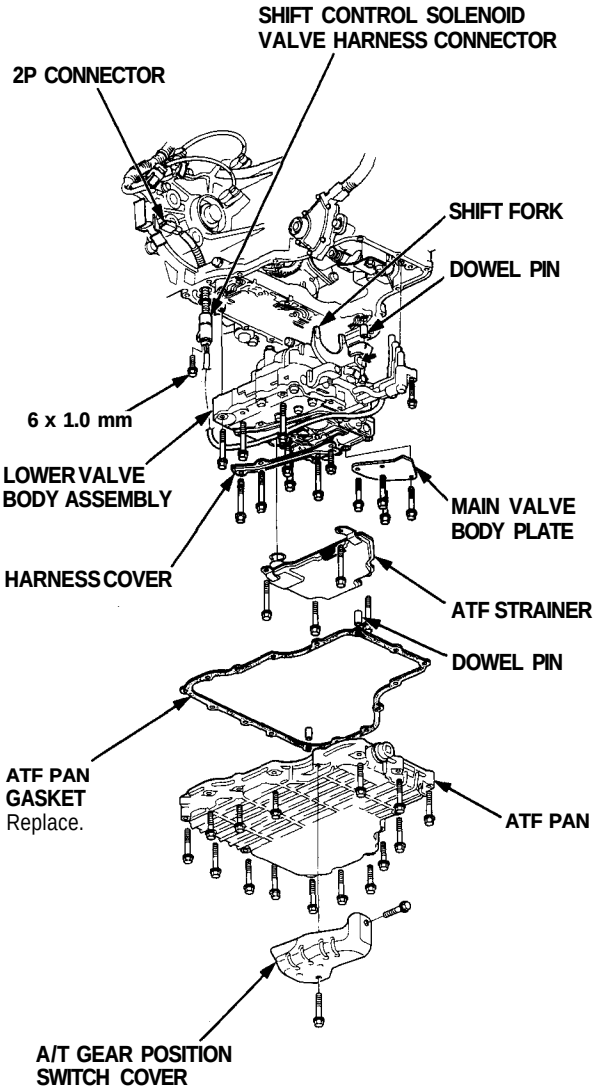
1. Raise the front of the vehicle, and support it with safety stands (see section 1).
2. Set parking brake, and block both rear wheels securely.
3. Shift the transmission into the [P] position.
4. Remove the drain plug and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



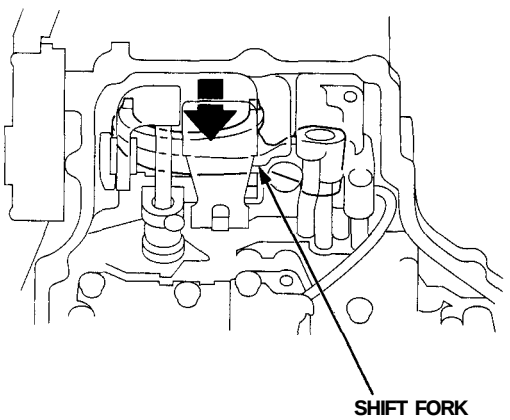
5. Remove the transmission mount and transmission mount bracket.



6. Remove the A/T gear position switch cover, then remove the ATF pan.
7. Remove the shift control solenoid valve connector (2P) from the connector holder, then disconnect it.
8. Remove the ATF strainer (four bolts).
9. Remove the main valve body plate (four bolts).
10. Remove the harness cover (four bolts).
11. Remove the one bolt securing the shift control solenoid valve harness connector, then remove the connector and pull the harness out through the transmission housing.



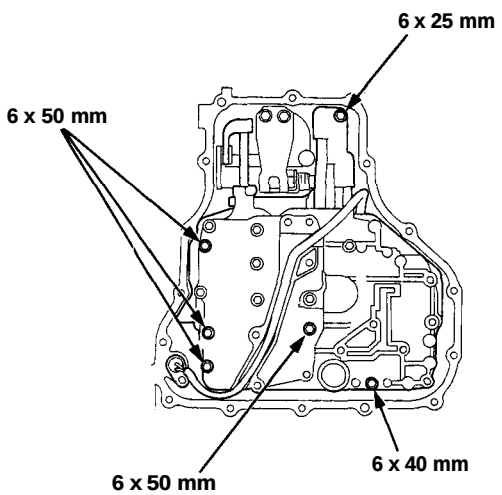
12. Move the shift fork toward the torque converter side as shown.



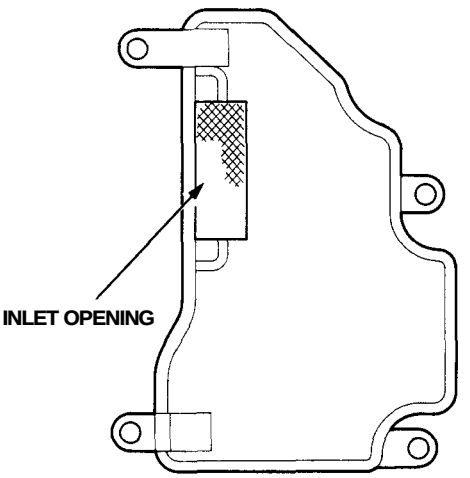
13. Make sure that the detent lever is in the [P] position.

NOTE: If the detent lever is not in the [P] position, the lower valve body assembly cannot be removed.

14. Remove the six bolts securing the lower valve body assembly as shown, then remove the lower valve body assembly.



15. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.



ATF STRAINER

16. Replace the ATF strainer if it is clogged or damaged.

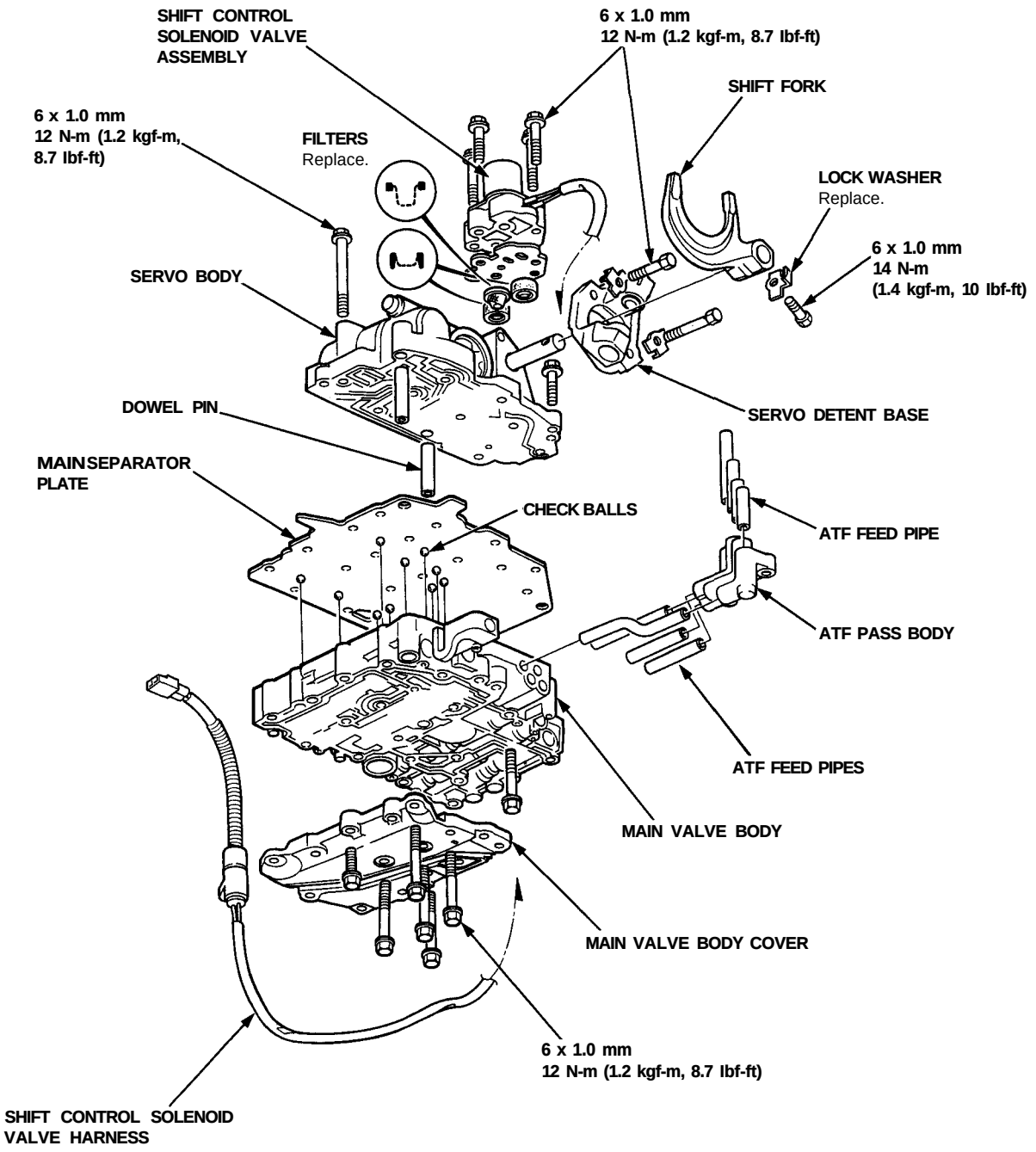
NOTE: The ATF strainer can be reused if it is not clogged.

Lower Valve Body Assembly

Disassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Do not let the check balls fall out of the main valve body when removing the main valve body.
- Replace the filters.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.



Shift Fork

Reassembly

NOTE:
- Coat all parts with ATF.
- Replace the filters.
- Install the filters in the direction shown.

1. Install the main separator plate and the two dowel pins on the main valve body.

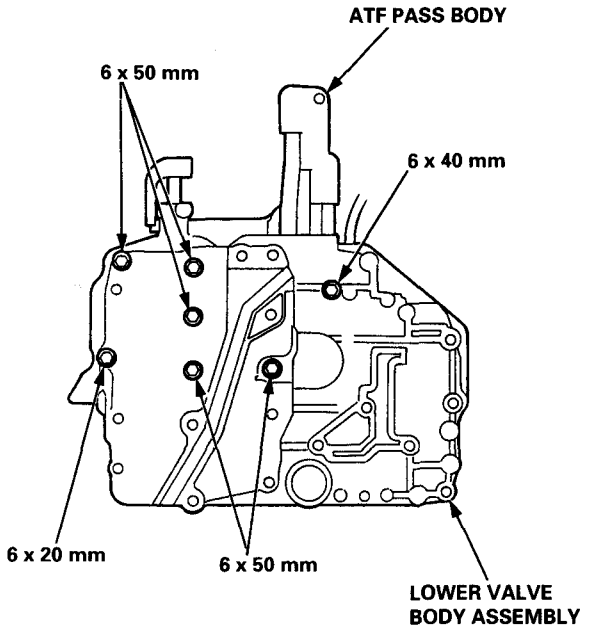
   NOTE: Refer to page 14-141, when installing the check balls on the main valve body.

2. Install the servo body on the main valve body (two bolts).

3. Install the main valve body cover on the main valve body (six bolts) as shown.

4. Install the one bolt on the main valve body as shown.

5. Install the ATF feed pipes and ATF pass body.



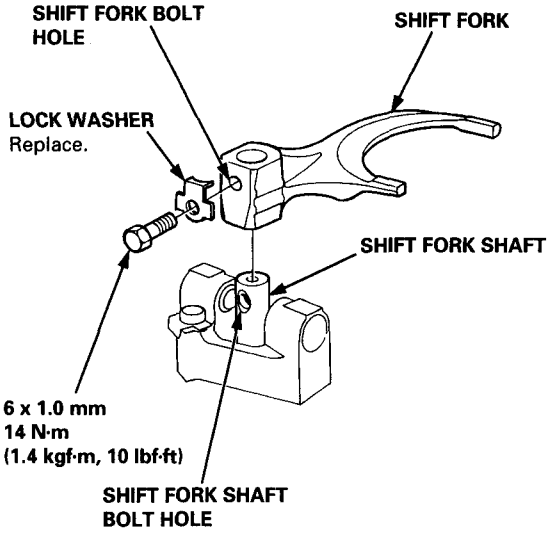
6 mm BOLTS TORQUE:
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

Installation

1. Turn the shift fork shaft so the large chamfered hole is facing the fork bolt hole.

2. Install the shift fork and the lock bolt with a new lock washer, and torque the bolt.

3. Bend the lock tab against the bolt head.



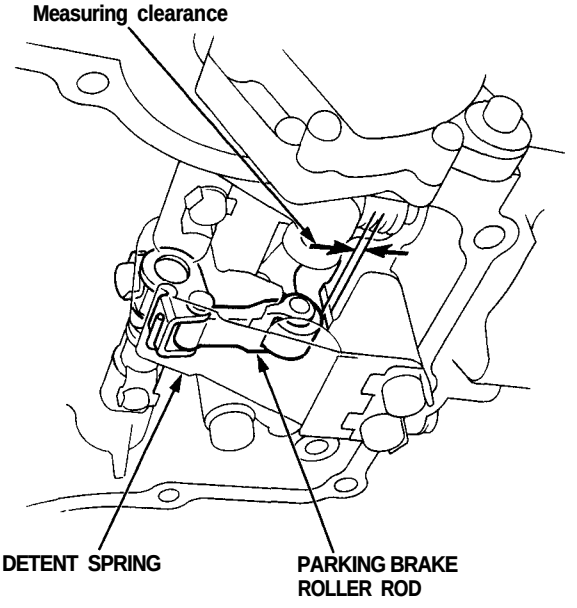
Parking Brake Roller Rod

Inspection

1. Shift to [P] position.
2. Measure the clearance between the transmission housing and the tip of the parking brake roller rod as shown.

   STANDARD: 3.8 - 4.3 mm (0.15 - 0.17 in)
3. If the clearance is out of tolerance, replace the parking brake roller rod.

   NOTE: If the parking brake roller rod replacement is required, see Control Shaft/Detent Spring Reassembly (see page 14-176).

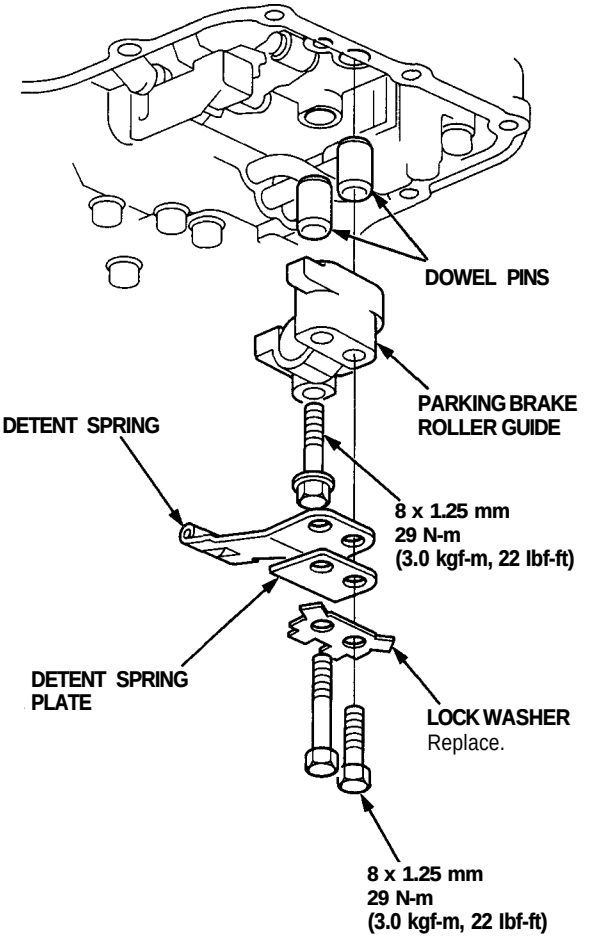


Detent Spring

Replacement

1. Shift to any gear other than the [P] position.

   CAUTION: Do not tighten the bolts when the detent lever is in the [P] position; the parking brake roller guide may be damaged.
2. Install the parking brake roller guide with two dowel pins, then torque the bolt.
3. Install a new detent spring, the detent spring plate and a new lock washer, then torque the bolts.
4. Bend the lock tab against the bolt heads.



Shift Control Solenoid Valve

Replacement

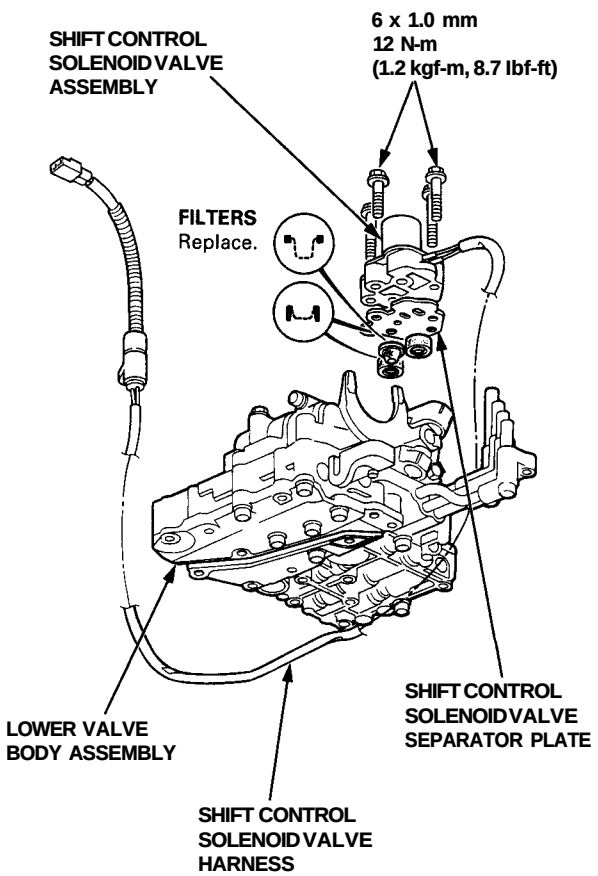
1. Remove the lower valve body assembly (see page 14-108).

2. Remove the shift control solenoid valve assembly from the servo body.

   NOTE: Be sure to remove or replace the shift control solenoid valves A and B as an assembly.

3. Check the shift control solenoid valve fluid passages for dust or dirt. If necessary, replace as an assembly.

4. Clean the mounting surface and fluid passages of the shift control solenoid valve assembly, and install a new shift control solenoid valve assembly and new filters.

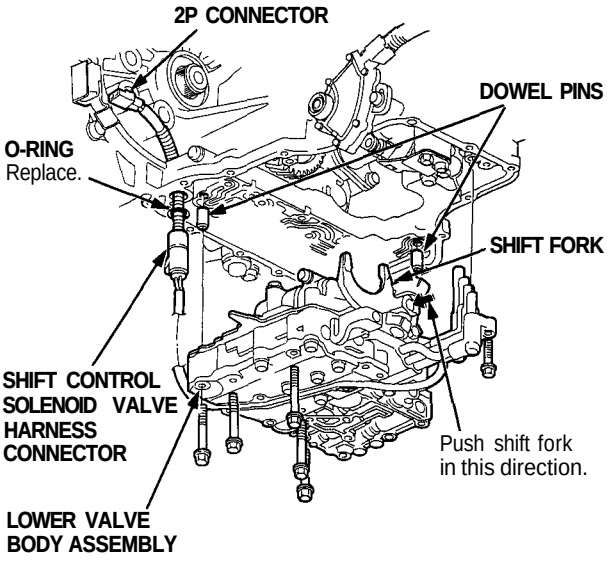


Lower Valve Body Assembly

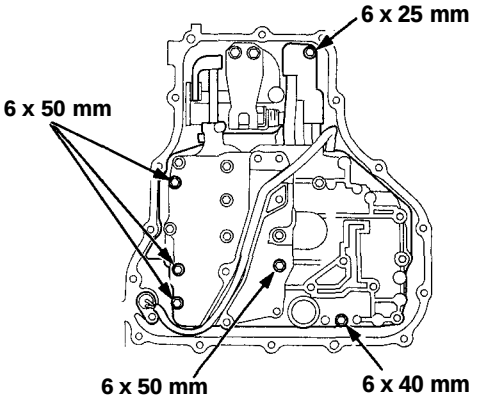
Installation

NOTE:
- Coat all parts with ATF.
- Replace the O-rings and ATF pan gasket.

1. Shift the transmission into the [P] position.
2. Assemble the lower valve body assembly (see page 14-110 and 14-111).
3. Install the two dowel pins on the lower valve body assembly.
4. Push the shift fork in the D range position.
5. Install the lower valve body putting the manual valve and the detent lever together, the reverse selector and the shift fork together, and joining the ATF feed pipes with the ATF feed pipe holes on the transmission housing.
6. Install the six bolts and torque as shown.

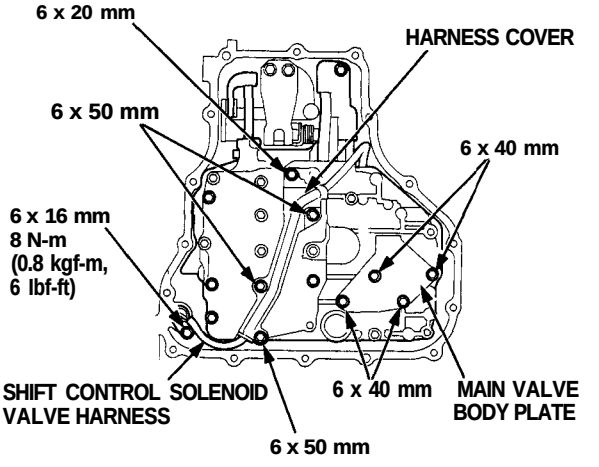


TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



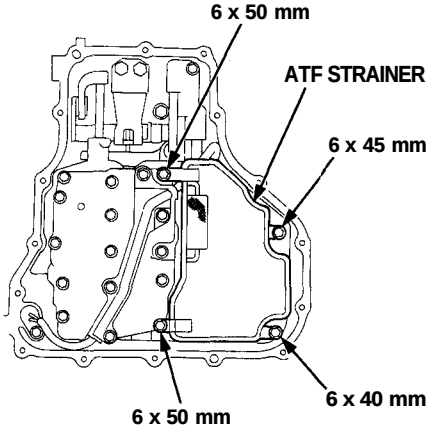
7. Install the main valve body plate (four bolts).
8. Pass the shift control solenoid valve harness through the transmission housing, and install the shift control solenoid valve harness connector (one bolt).
9. Install the harness cover (four bolts).
10. Lightly pull the shift control solenoid valve harness from the harness cover, then bring the shift control solenoid valve harness back. Make sure that the shift control solenoid valve harness is not pinched. If the shift control solenoid valve harness is pinched, loosen the four bolts securing the harness cover then retighten the bolts.

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



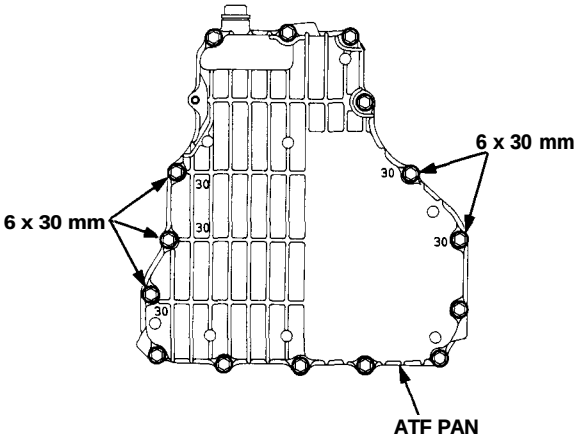
11. Install the ATF strainer with a new O-ring (four bolts).

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)

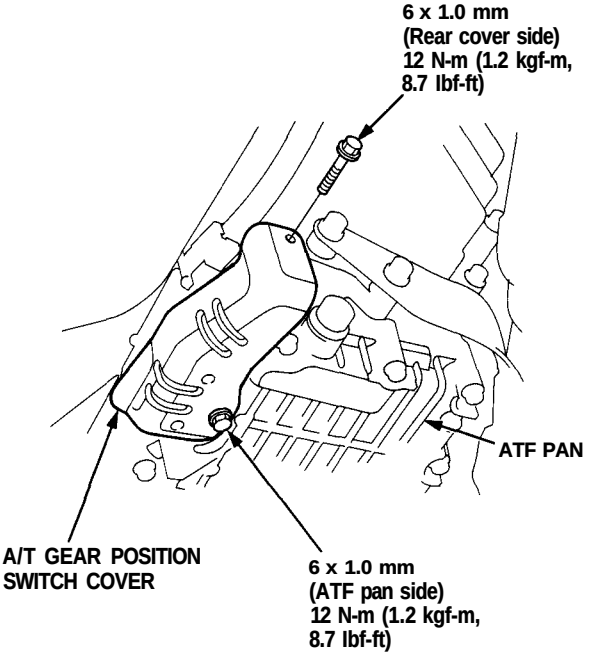


12. Install the ATF pan with two dowel pins and a new ATF pan gasket (fifteen bolts) as shown.
Make sure that the shift control solenoid valve harness is not pinched by the ATF pan.

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)

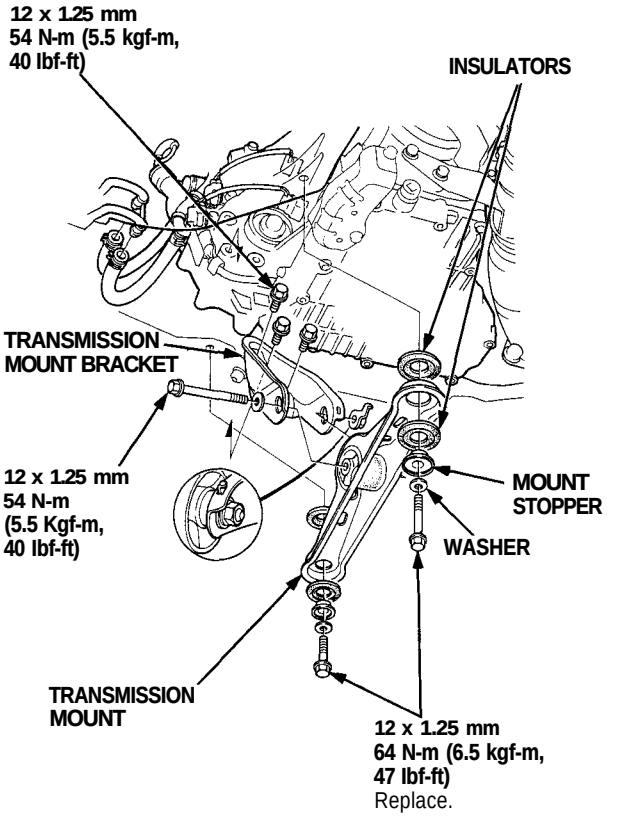


13. Install the A/T gear position switch cover. Tighten the bolt on the ATF pan side loosely so that there is no clearance between the A/T gear position switch cover and the ATF pan. Then tighten the bolt on the rear cover side to the specified torque, and tighten the bolt on the ATF pan side to the specified torque.



14. Connect the shift control solenoid valve connector.

15. Install the transmission mount bracket and transmission mount.



16. Refill the transmission with ATF (see page 14-105).

17. Start the engine, and shift the transmission through all gears three times. Check the shift lever operation and the A/T gear position indicator operation.

18. Let the engine reach operating temperature (the radiator fan comes on) with the transmission in the N or E position, then turn it off and check ATF level.

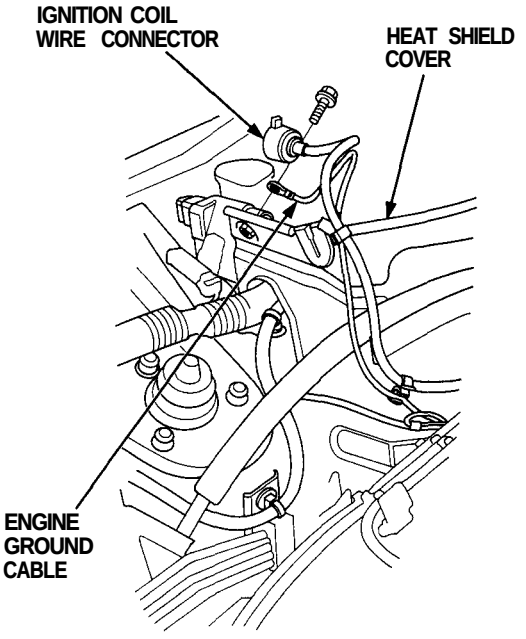
Transmission

Removal

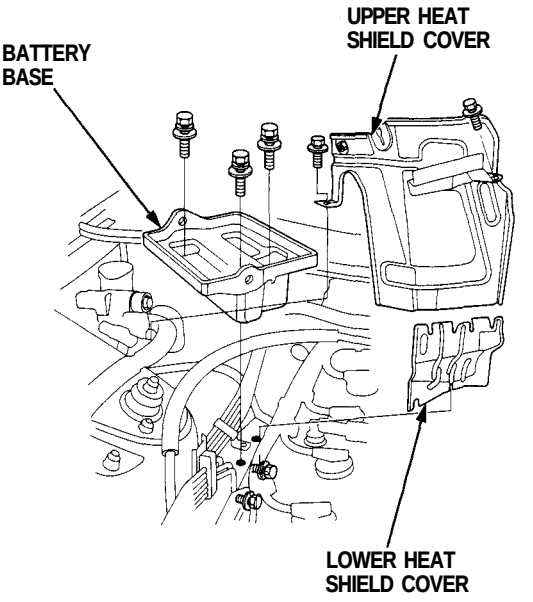
⚠ WARNING Make sure lifts are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Before disconnecting power, make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative (-) terminal from the battery, then remove the positive (+) terminal.
3. Remove the battery hold-down bracket and battery.
4. Disconnect the ignition coil wire connector, and remove it and the engine ground cable from the heat shield cover.

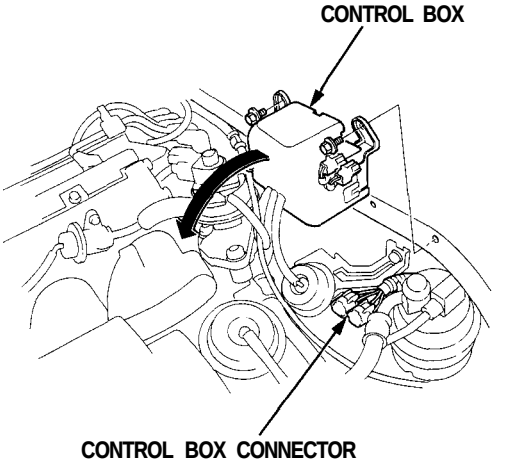


5. Remove the upper heat shield cover, then remove the battery base.
6. Loosen the lower heat shield cover bolts, then remove the lower heat shield cover.



7. Disconnect the connector from the control box, and remove the control box.

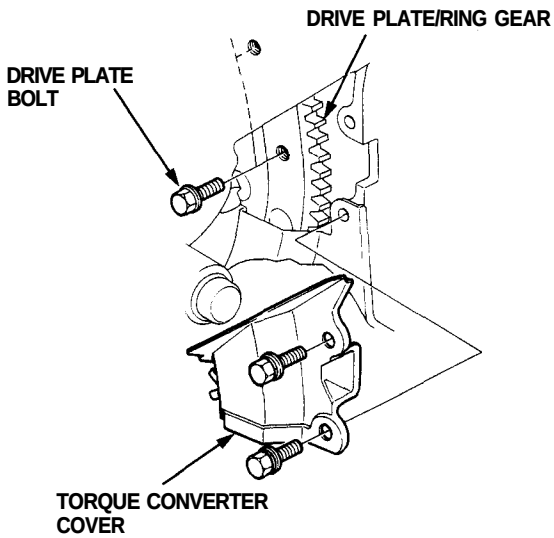
CAUTION: Do not disconnect the vacuum hoses from the control box.



8. Remove the torque converter cover.

9. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.

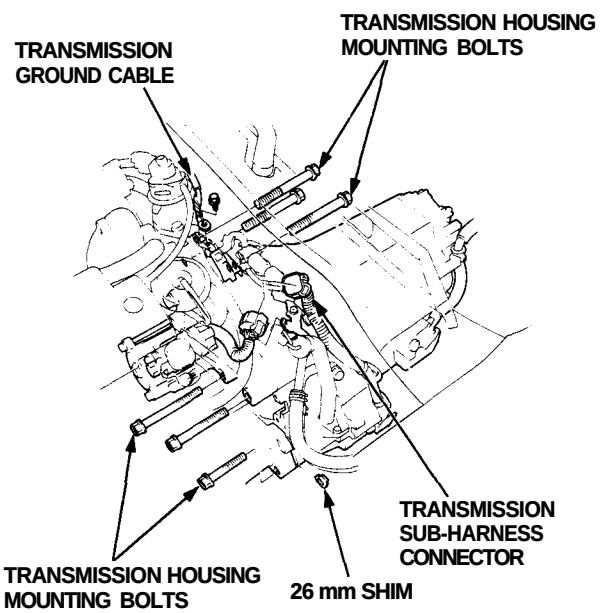
   NOTE: If necessary, remove the spark plugs while removing the drive plate bolts.



10. Remove the transmission sub-harness connector.

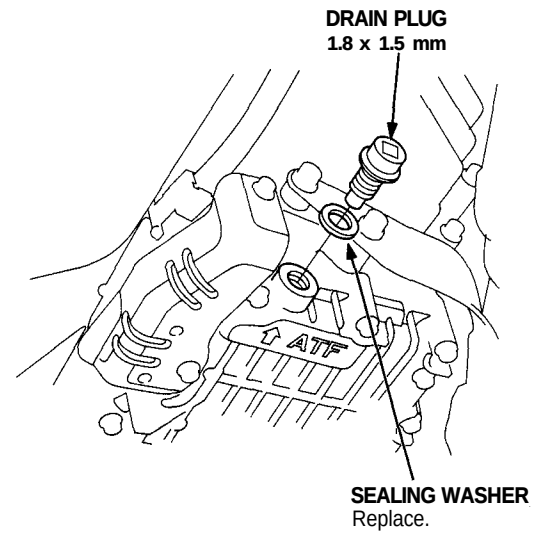
11. Remove the transmission ground cable.

12. Remove the transmission housing mounting bolts and the 26 mm shim.



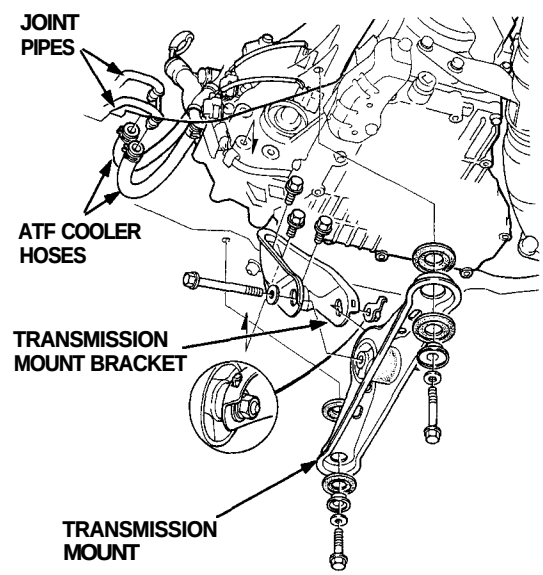
13. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.

TORQUE: 49 N-m (5.0 kgf-m, 36 lbf-ft)



14. Remove the transmission mount and mount bracket.

15. Remove the ATF cooler hoses at the joint pipes. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the joint pipes.



(cont'd)

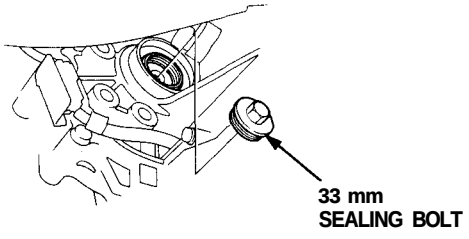
Transmission

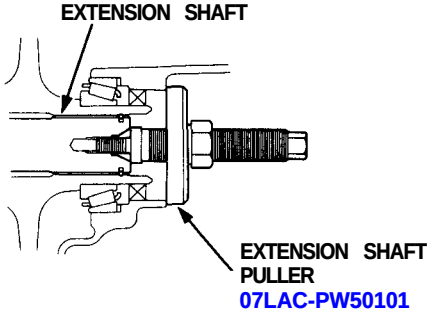
Removal (cont'd)

16. Shift the transmission into the [P] position.

17. Remove the 33 mm sealing bolt.

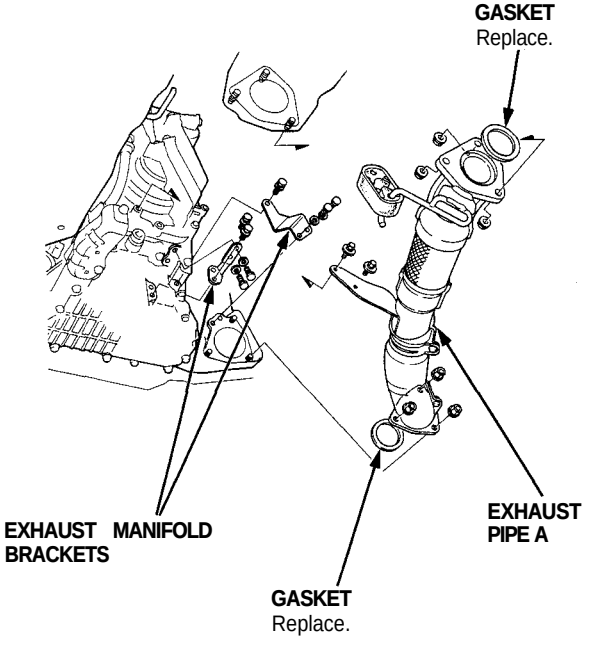
18. Remove the extension shaft from the differential using the special tool as shown.





19. Remove the two bolts from the exhaust pipe A stay.

20. Remove the exhaust pipe A and exhaust manifold brackets.

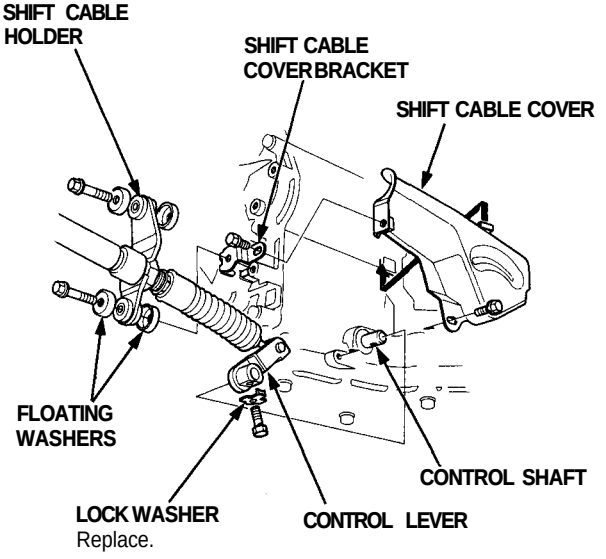


21. Remove the shift cable cover.

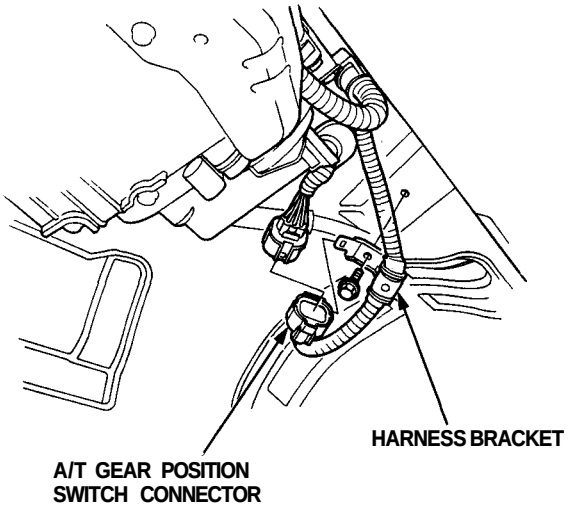
22. Remove the shift cable holder from the transmission rear cover.

23. Remove the control lever from the control shaft, then remove the shift cable.

CAUTION: Take care not to bend the shift cable.

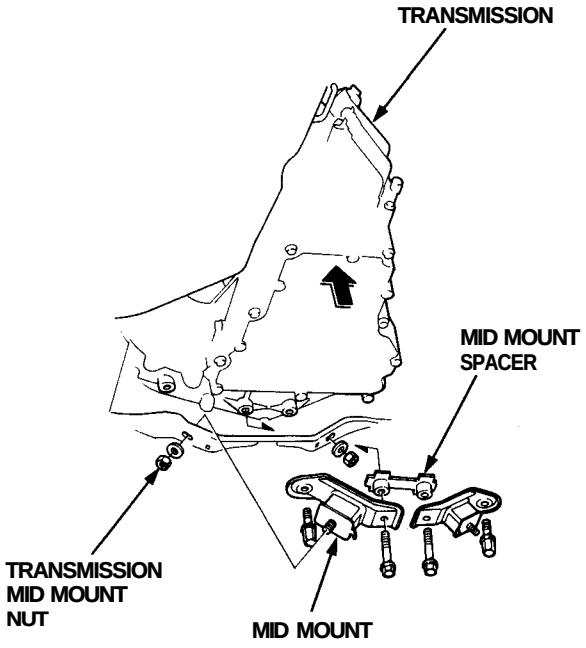


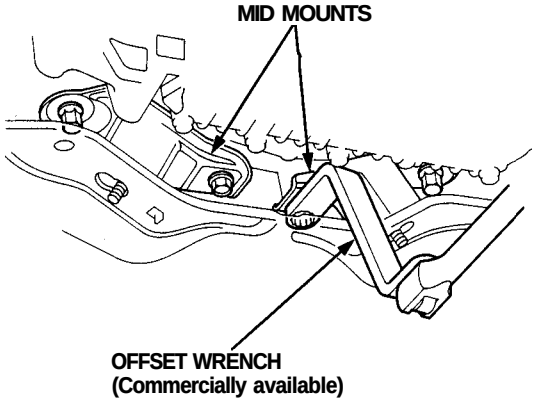
24. Disconnect the A/T gear position switch connector, then remove the harness bracket.



25. Remove the transmission mid mount nuts.

26. Place a jack under the transmission and raise the transmission just enough to take weight off of the mounts, then remove the mid mounts and mid mount spacer as shown.

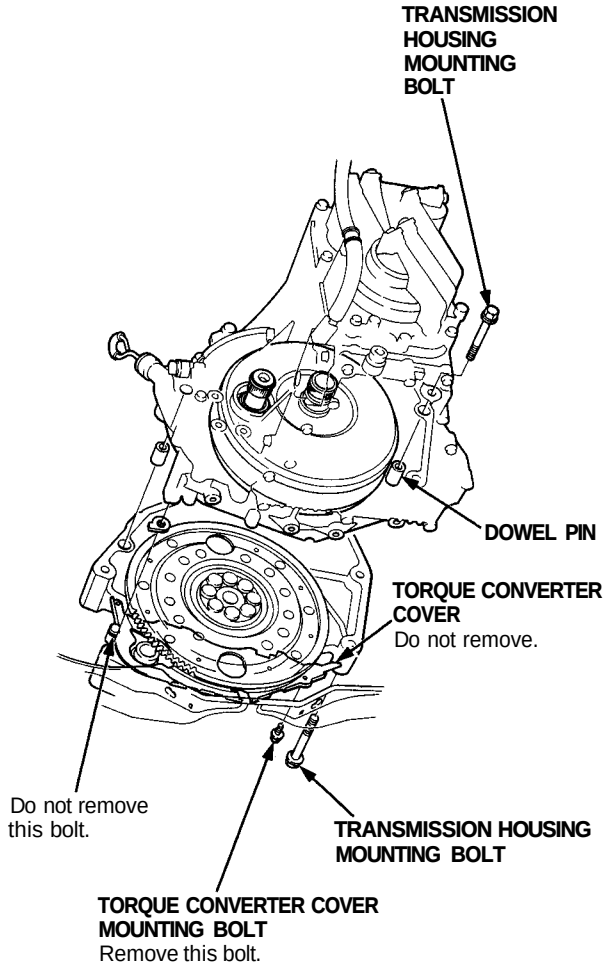




27. Remove the transmission housing mounting bolts.

28. Remove the torque converter cover mounting bolt on the torque converter housing side.

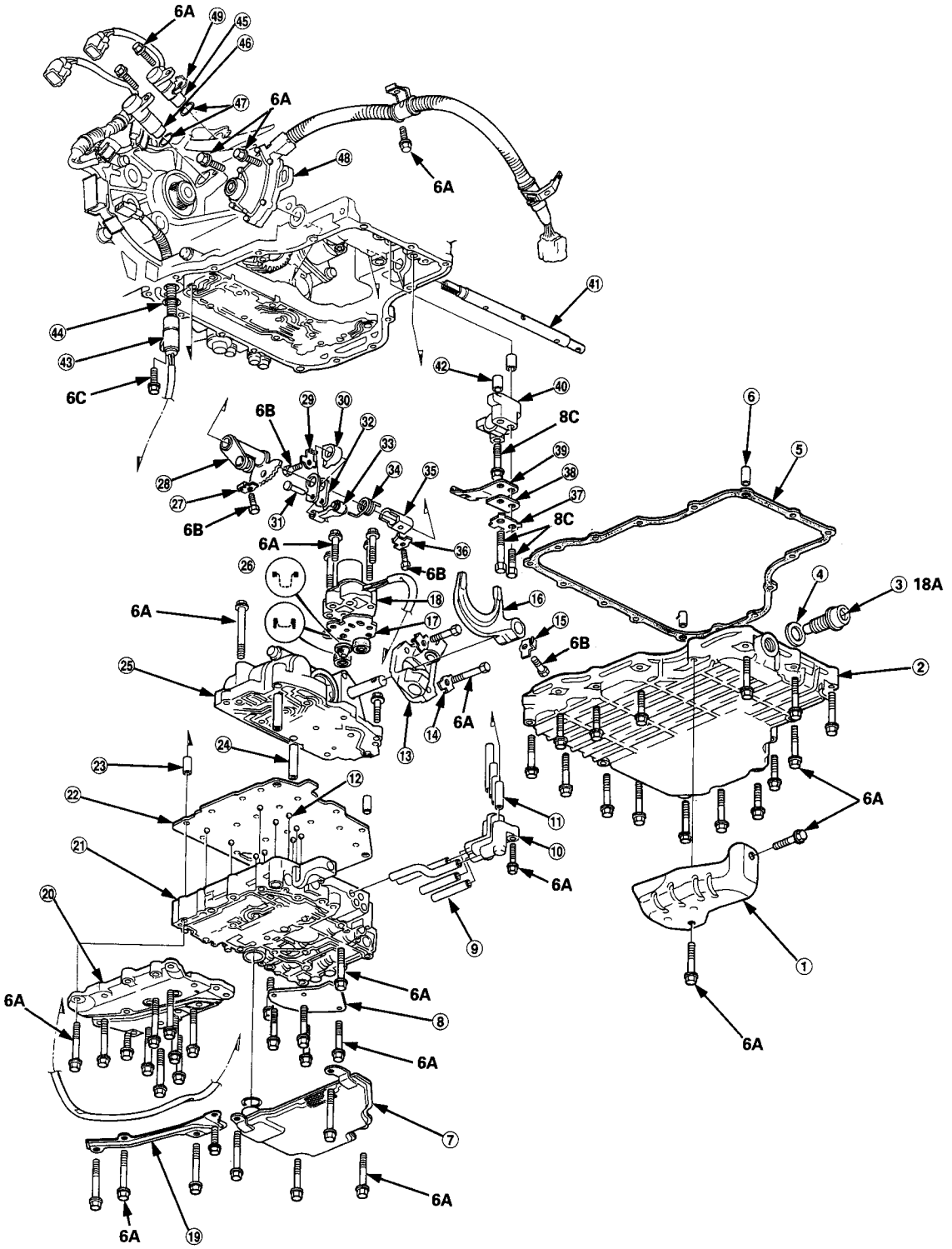
NOTE: Do not remove the torque converter cover mounting bolt on the differential carrier side and the torque converter cover.



29. Pull the transmission away from the engine until it clears the dowel pins, then lower it on the transmission jack.

Illustrated Index

Transmission Housing/Lower Valve Body



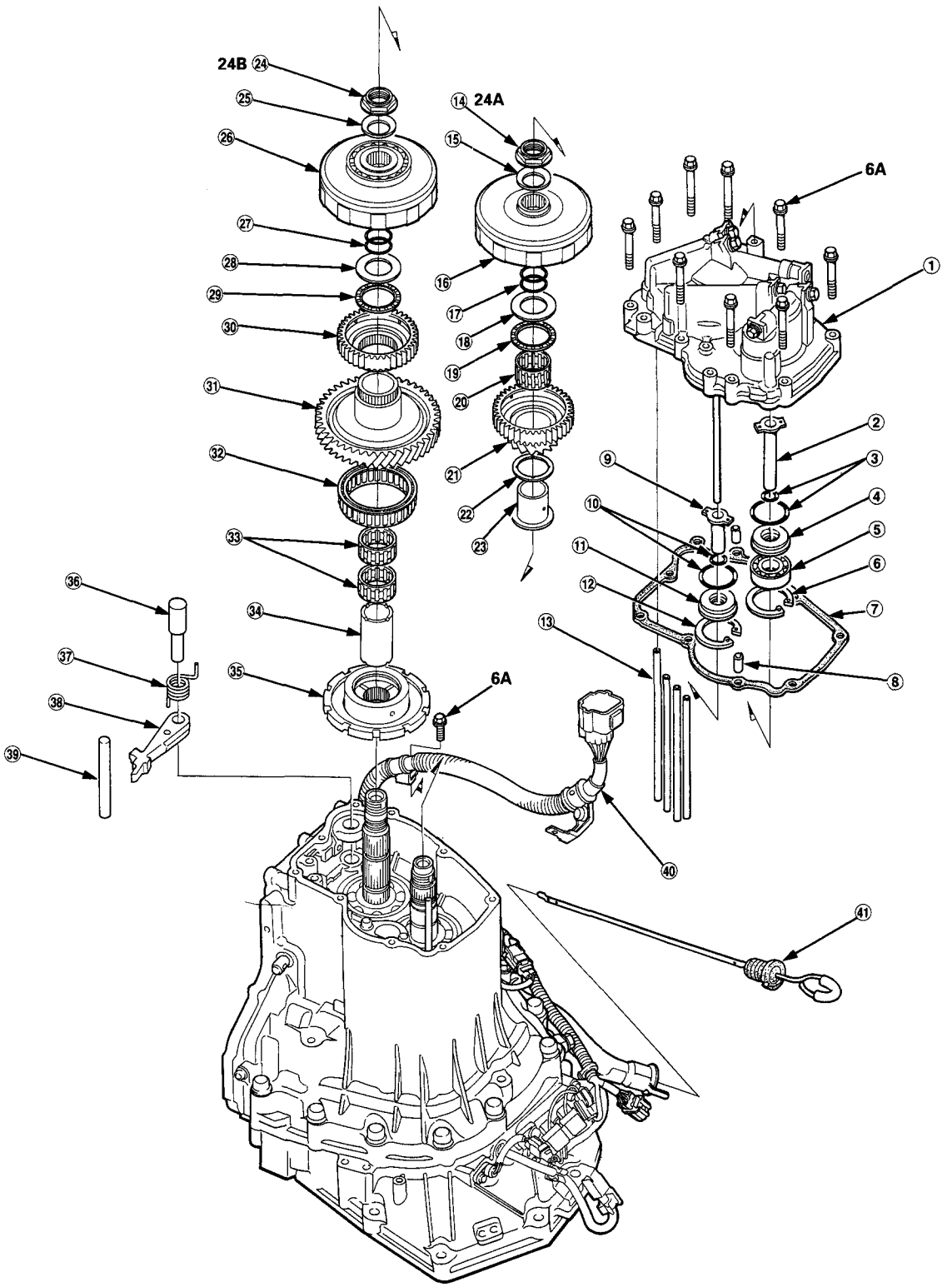
① **A/T GEAR POSITION SWITCH COVER**
② **TRANSMISSION ATF PAN**
③ **DRAIN PLUG**
④ **SEALING WASHER** Replace.
⑤ **ATF PAN GASKET** Replace.
⑥ **DOWEL PINS**
⑦ **ATF STRAINER**
⑧ **MAIN VALVE BODY PLATE**
⑨ **ATF FEED PIPES**
⑩ **ATF PASS BODY**
⑪ **ATF FEED PIPES**
⑫ **CHECK BALLS**
⑬ **SERVO DETENT BASE**
⑭ **LOCK WASHER** Replace.
⑮ **LOCK WASHER** Replace.
⑯ **SHIFT FORK**
⑰ **SHIFT CONTROL SOLENOID SEPARATOR PLATE**
⑱ **SHIFT CONTROL SOLENOID VALVE ASSEMBLY**
⑲ **SHIFT CONTROL SOLENOID VALVE HARNESS COVER**
⑳ **MAIN VALVE BODY COVER**
㉑ **MAIN VALVE BODY**
㉒ **MAIN SEPARATOR PLATE**
㉓ **DOWEL PINS**
㉔ **DOWEL PINS**
㉕ **SERVO BODY**
㉖ **FILTERS** Replace.
㉗ **LOCK WASHER** Replace.
㉘ **DETENT LEVER**
㉙ **LOCK WASHER** Replace.
㉚ **PARKING BRAKE STOPPER**
㉛ **SHIFT ARM ROLLER**
㉜ **PARKING BRAKE SHIFT ARM**
㉝ **PARKING BRAKE ROLLER ROD** Selective part
㉞ **PARKING BRAKE SHIFT ARM SPRING**
㉟ **CONTROL SHAFT COLLAR**
㊱ **LOCK WASHER** Replace.
㊲ **LOCK WASHER** Replace.
㊳ **DETENT SPRING PLATE**
㊴ **DETENT SPRING**
㊵ **PARKING BRAKE ROLLER GUIDE**
㊶ **CONTROL SHAFT**
㊷ **DOWEL PINS**
㊸ **SHIFT CONTROL SOLENOID VALVE HARNESS CONNECTOR**
㊹ **O-RING** Replace.
㊺ **MAINSHAFT SPEED SENSOR**
㊻ **COUNTERSHAFT SPEED SENSOR**
㊼ **O-RINGS** Replace.
㊽ **A/T GEAR POSITION SWITCH**
㊾ **WASHER (M1WA-2015787-)**

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
6C	8 N·m (0.8 kgf·m, 6 lbf·ft)	6 x 1.0 mm	
8C	29 N·m (3.0 kgf·m, 22 lbf·ft)	8 x 1.25 mm	
18A	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug

Illustrated Index

Rear Cover



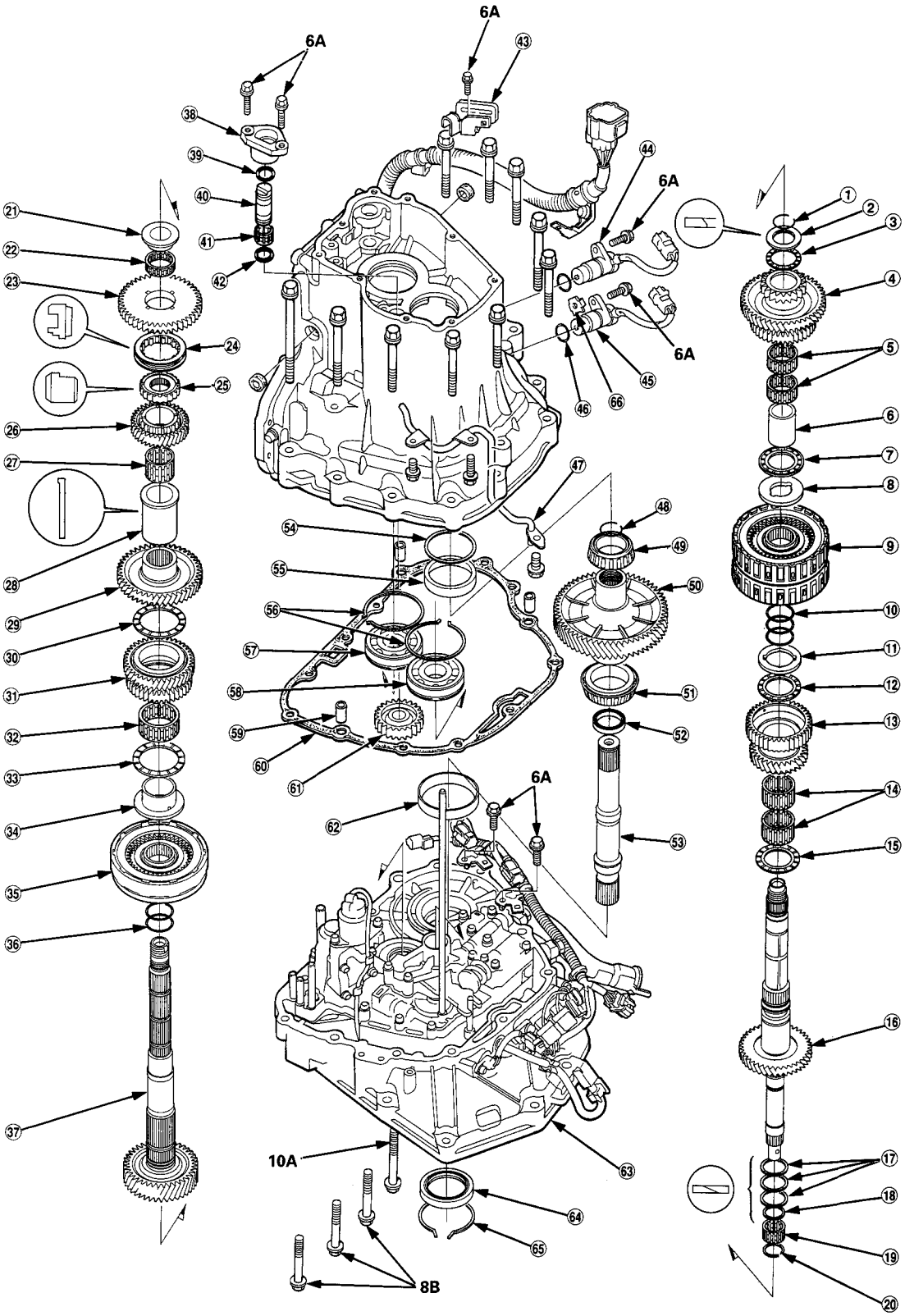
① **REAR COVER**
② **1ST CLUTCH FEED PIPE**
③ **O-RINGS** Replace.
④ **FEED PIPE GUIDE**
⑤ **BALL BEARING**
⑥ **SNAP RING**
⑦ **REAR COVER GASKET** Replace.
⑧ **DOWEL PIN**
⑨ **1ST-HOLD CLUTCH FEED PIPE**
⑩ **O-RINGS** Replace.
⑪ **FEED PIPE GUIDE**
⑫ **SNAP RING**
⑬ **ATF FEED PIPES**
⑭ **MAINSHAFT LOCKNUT,** 24 x 1.25 mm (Flange nut) Replace.
⑮ **CONICAL SPRING WASHER** Replace.
⑯ **1ST CLUTCH ASSEMBLY**
⑰ **O-RINGS** Replace.
⑱ **THRUST WASHER**
⑲ **THRUST NEEDLE BEARING**
⑳ **NEEDLE BEARING**
㉑ **MAINSHAFT 1ST GEAR**
㉒ **THRUST WASHER**
㉓ **MAINSHAFT 1ST GEAR COLLAR**
㉔ **COUNTERSHAFT LOCKNUT, 24 x 1.25 mm (Flange nut) Replace.**
㉕ **CONICAL SPRING WASHER** Replace.
㉖ **1ST-HOLD CLUTCH ASSEMBLY**
㉗ **O-RINGS** Replace.
㉘ **THRUST WASHER**
㉙ **THRUST NEEDLE BEARING**
㉚ **1ST-HOLD CLUTCH HUB**
㉛ **COUNTERSHAFT 1ST GEAR**
㉜ **ONE-WAY CLUTCH**
㉝ **NEEDLE BEARINGS**
㉞ **COUNTERSHAFT 1ST GEAR COLLAR**
㉟ **PARKING GEAR**
㊱ **PARKING BRAKE PAWL SHAFT**
㊲ **PARKING BRAKE PAWL SPRING**
㊳ **PARKING BRAKE PAWL**
㊴ **PARKING BRAKE PAWL STOPPER**
㊵ **A/T GEAR POSITION SWITCH HARNESS**
㊶ **ATF DIPSTICK**

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
24A	137 N·m (14.0 kgf·m, 101 lbf·ft)	24 x 1.25 mm	Mainshaft locknut: Left-hand threads
24B	137 N·m (14.0 kgf·m, 101 lbf·ft)	24 x 1.25 mm	Countershaft locknut

Illustrated Index

Transmission Housing



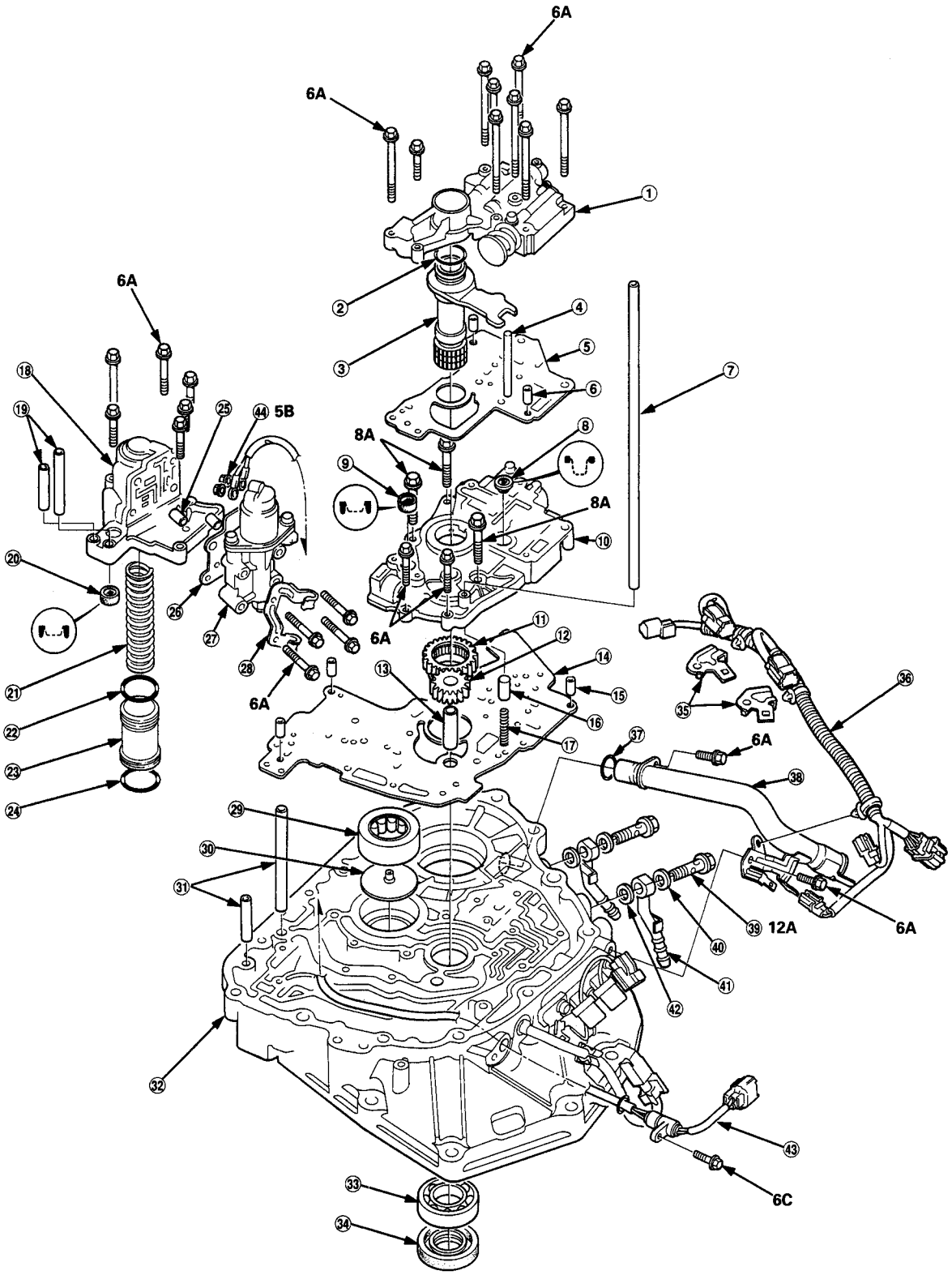
① **SNAP RING**
② **THRUST WASHER**
③ **THRUST NEEDLE BEARING**
④ **MAINSHAFT 4TH/REVERSE GEAR**
⑤ **NEEDLE BEARINGS**
⑥ **MAINSHAFT 4TH GEAR COLLAR**
⑦ **THRUST NEEDLE BEARING**
⑧ **THRUST WASHER**
⑨ **4TH/2ND CLUTCH ASSEMBLY**
⑩ **O-RINGS Replace.**
⑪ **2ND GEAR THRUST WASHER, 37.5 x 56 mm** Selective part
⑫ **THRUST NEEDLE BEARING**
⑬ **MAINSHAFT 2ND GEAR**
⑭ **NEEDLE BEARINGS**
⑮ **THRUST NEEDLE BEARING**
⑯ **MAINSHAFT**
⑰ **SEALING RINGS, 35 mm**
⑱ **SEALING RING, 29 mm**
⑲ **NEEDLE BEARING**
⑳ **SET RING**
㉑ **COUNTERSHAFT REVERSE GEAR COLLAR**
㉒ **NEEDLE BEARING**
㉓ **COUNTERSHAFT REVERSE GEAR**
㉔ **REVERSE SELECTOR**
㉕ **REVERSE SELECTOR HUB**
㉖ **COUNTERSHAFT 4TH GEAR**
㉗ **NEEDLE BEARING**
㉘ **DISTANCE COLLAR, 35 mm Selective part**
㉙ **COUNTERSHAFT 2ND GEAR**
㉚ **NEEDLE BEARING**
㉛ **COUNTERSHAFT 3RD GEAR**
㉜ **NEEDLE BEARING**
㉝ **THRUST NEEDLE BEARING**
㉞ **COUNTERSHAFT 3RD GEAR COLLAR**
㉟ **3RD CLUTCH ASSEMBLY**
㊱ **O-RINGS Replace.**
㊲ **COUNTERSHAFT**
㊳ **REVERSE IDLER GEAR SHAFT HOLDER**
㊴ **O-RING** Replace.
㊵ **REVERSE IDLER GEAR SHAFT**
㊶ **NEEDLE BEARING**
㊷ **O-RING Replace.**
㊸ **CONNECTOR HOLDER**
㊹ **COUNTERSHAFT SPEED SENSOR**
㊺ **MAINSHAFT SPEED SENSOR**
㊻ **O-RING** Replace.
㊼ **LUBRICATION PIPE**
㊽ **SET RING Replace.**
㊾ **TAPERED ROLLER BEARING**
㊿ **SECONDARY DRIVEN GEAR SHAFT**
(51) **TAPERED ROLLER BEARING**
(52) **SECONDARY DRIVEN GEAR SHAFT OIL SEAL** Replace.
(53) **EXTENSION SHAFT**
(54) **THRUST SHIM, 68 mm Selective part**
(55) **TAPERED ROLLER BEARING OUTER RACE**
(56) **SNAP RINGS**
(57) **TRANSMISSION HOUSING COUNTERSHAFT BEARING**
(58) **TRANSMISSION HOUSING MAINSHAFT BEARING**
(59) **DOWEL PIN**
(60) **TRANSMISSION HOUSING GASKET Replace.**
(61) **REVERSE IDLER GEAR**
(62) **TAPERED ROLLER BEARING OUTER RACE**
(63) **TORQUE CONVERTER HOUSING**
(64) **TORQUE CONVERTER HOUSING OIL SEAL Replace.**
(65) **SNAP RING**
(66) **WASHER (used from transmission number M1WA-3010520)**

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
8B	31 N·m (3.4 kgf·m, 25 lbf·ft)	8 x 1.25 mm	
10A	44 N·m (4.5 kgf·m, 33 lbf·ft)	10 x 1.25 mm	

Illustrated Index

Torque Converter Housing/Valve Body



① **REGULATOR VALVE BODY**
② **O-RING** Replace.
③ **STATOR SHAFT**
④ **STOPPER SHAFT**
⑤ **REGULATOR SEPARATOR PLATE**
⑥ **DOWEL PIN**
⑦ **ATF FEED PIPE**
⑧ **FILTER** Replace.
⑨ **FILTER** Replace.
⑩ **ATF PUMP BODY**
⑪ **ATF PUMP DRIVE GEAR**
⑫ **ATF PUMP DRIVEN GEAR**
⑬ **ATF PUMP DRIVEN GEAR SHAFT**
⑭ **ATF PUMP BODY SEPARATOR PLATE**
⑮ **DOWEL PIN**
⑯ **TORQUE CONVERTER CHECK VALVE**
⑰ **TORQUE CONVERTER CHECK VALVE SPRING**
⑱ **2ND ACCUMULATOR BODY**
⑲ **ATF FEED PIPES**
⑳ **FILTER** Replace.
㉑ **2ND ACCUMULATOR SPRING**
㉒ **O-RING** Replace.
㉓ **2ND ACCUMULATOR PISTON**
㉔ **O-RING** Replace.
㉕ **DOWEL PIN**
㉖ **THROTTLE VALVE BODY SEPARATOR PLATE**
㉗ **THROTTLE VALVE BODY/LINEAR SOLENOID ASSEMBLY**
㉘ **HARNESS CLAMP**
㉙ **TORQUE CONVERTER HOUSING COUNTERSHAFT ROLLER BEARING**
㉚ **ATF GUIDE PLATE**
㉛ **ATF FEED PIPES**
㉜ **TORQUE CONVERTER HOUSING**
㉝ **TORQUE CONVERTER HOUSING MAINSHAFT BALL BEARING**
㉞ **OIL SEAL** Replace.
㉟ **CONNECTOR BRACKETS**
㊱ **TRANSMISSION SUB-HARNESS**
㊲ **O-RING** Replace.
㊳ **ATF DIPSTICK PIPE**
㊴ **JOINT BOLT**
㊵ **SEALING WASHER** Replace.
㊶ **ATF COOLER PIPE**
㊷ **SEALING WASHER** Replace.
㊸ **LINEAR SOLENOID HARNESS**
㊹ **FLANGE NUT, 5 x 0.8 mm**

TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
5B	6 N·m (0.6 kgf·m, 4 lbf·ft)	5 x 0.8 mm	Flange nut
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6C	8 N·m (0.8 kgf·m, 6 lbf·ft)	6 x 1.0 mm	
8A	18 N·m (1.8 kgf·m, 13 lbf·ft)	8 x 1.25 mm	
12A	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Joint bolt

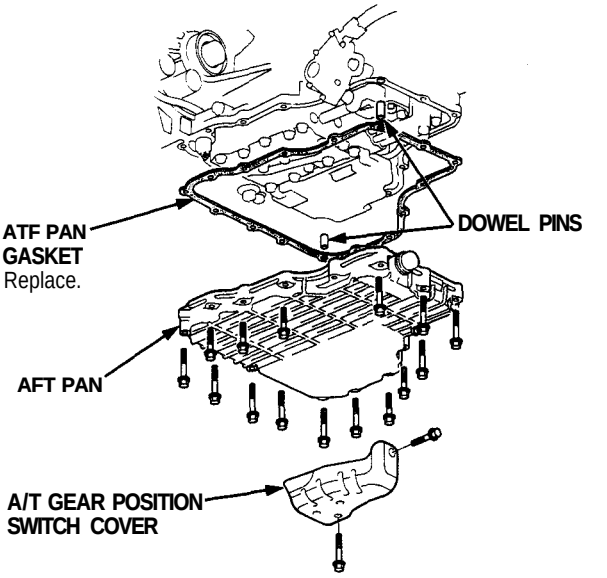
Transmission Housing/Lower Valve Body Assembly

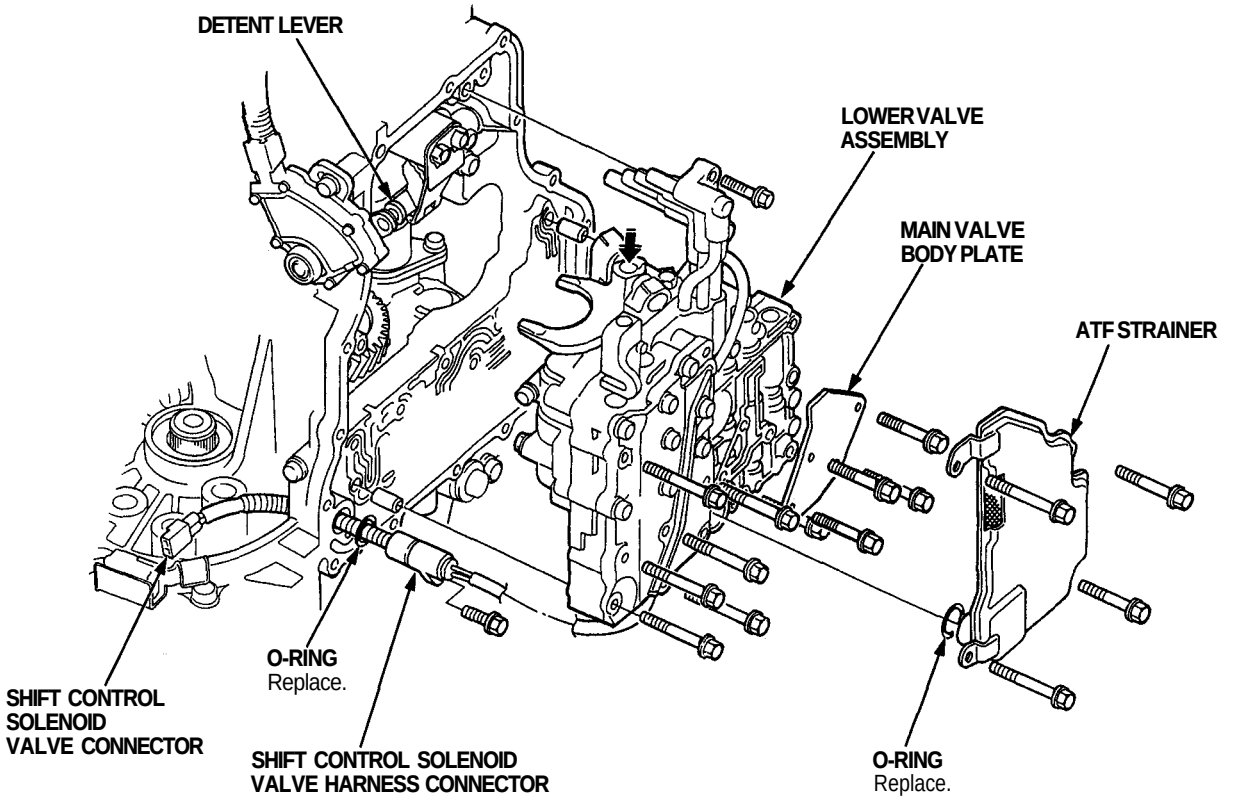
Removal

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the lower valve body, replace the following:
  - O-rings
  - ATF pan gasket

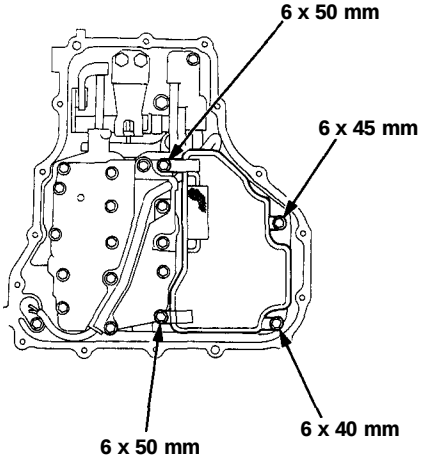
CAUTION: Do not turn over the transmission before removing the ATF pan.

1. Remove the shift control solenoid valve connector from the connector holder, then separate it.
2. Remove the A/T gear position switch cover, then remove the ATF pan.





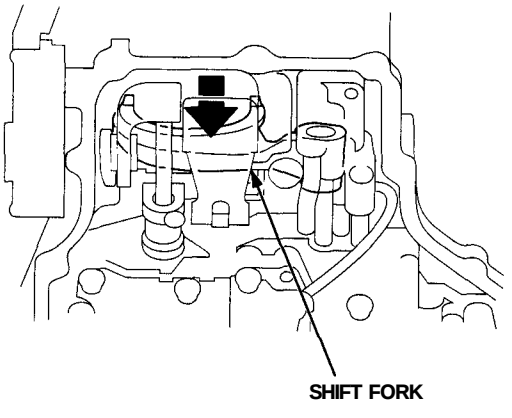
3. Remove the ATF strainer (four bolts).



4. Move the detent lever to the P position.

   NOTE: If the detent lever is not in the P position, the lower valve body assembly cannot be removed.

5. Move the shift fork toward the torque converter side as shown.



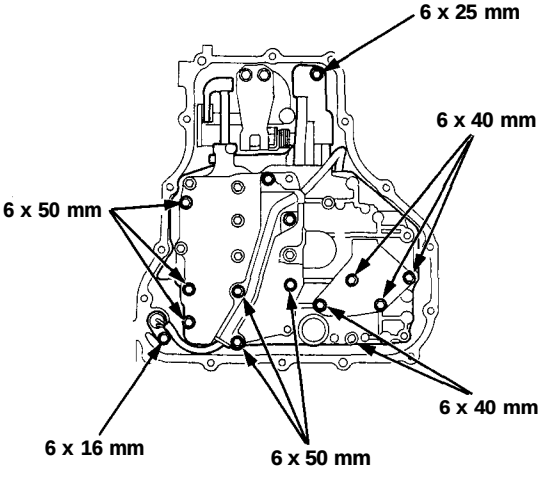
6. Remove the main valve body plate (four bolts).

7. Remove the harness cover (four bolts).

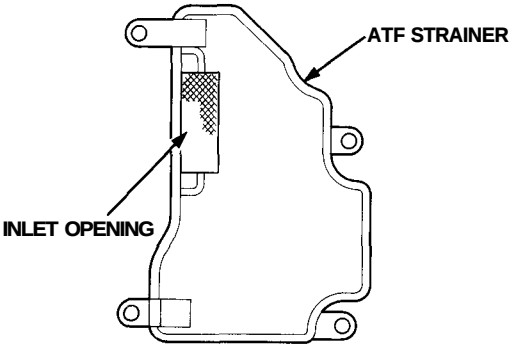
8. Remove the one bolt securing the shift control solenoid valve harness connector, then remove the connector and pull the harness out.

9. Remove the lower valve body assembly (six bolts).

   NOTE: Refer to page 14-110; Lower Valve Body Assembly Disassembly, when disassembling the lower valve body.



10. Clean the inlet opening of the ATF strainer thoroughly with compressed air, then check that it is in good condition, and the inlet opening is not clogged.



11. Replace the ATF strainer if it is clogged or damaged.

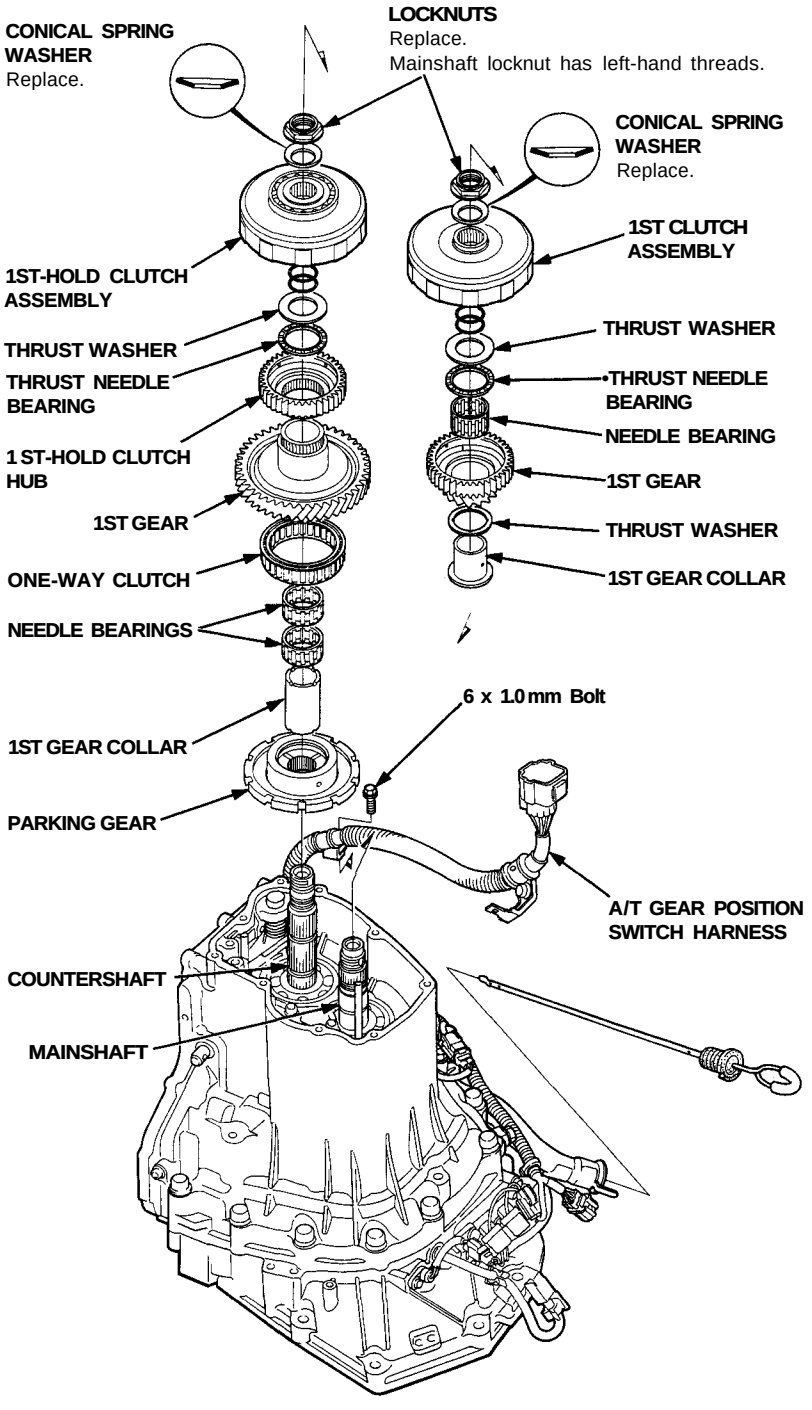
    NOTE: The ATF strainer can be reused if it is not clogged.

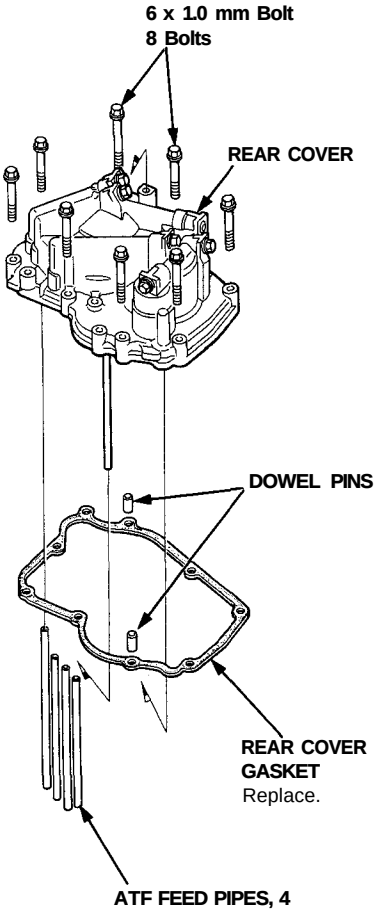
Rear Cover

Removal

NOTE:

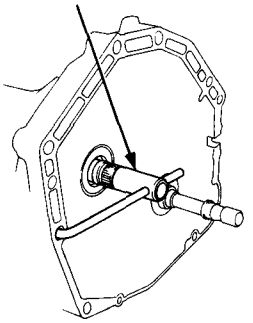
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the rear cover, replace the following:
  - O-rings
  - Mainshaft and countershaft locknuts
  - Conical spring washers





1. Remove the one bolt securing the A/T gear position switch harness clamp.
2. Remove the eight bolts securing the rear cover, then remove the rear cover.
3. Remove the four ATF feed pipes from the transmission housing.
4. Slip the special tool onto the mainshaft.

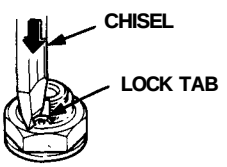
MAINSHAFT HOLDER
07GAB-PF50100 or
07GAB-PF50101



5. Engage the parking brake pawl with the parking gear.
6. Cut the lock tabs of each shaft locknut using a chisel as shown. Then remove the locknuts and conical spring washers from each shaft.

CAUTION: Keep all of the chiseled particles out of the transmission.

NOTE:
- Mainshaft locknut has left-hand threads.
- Always wear the safety glasses.



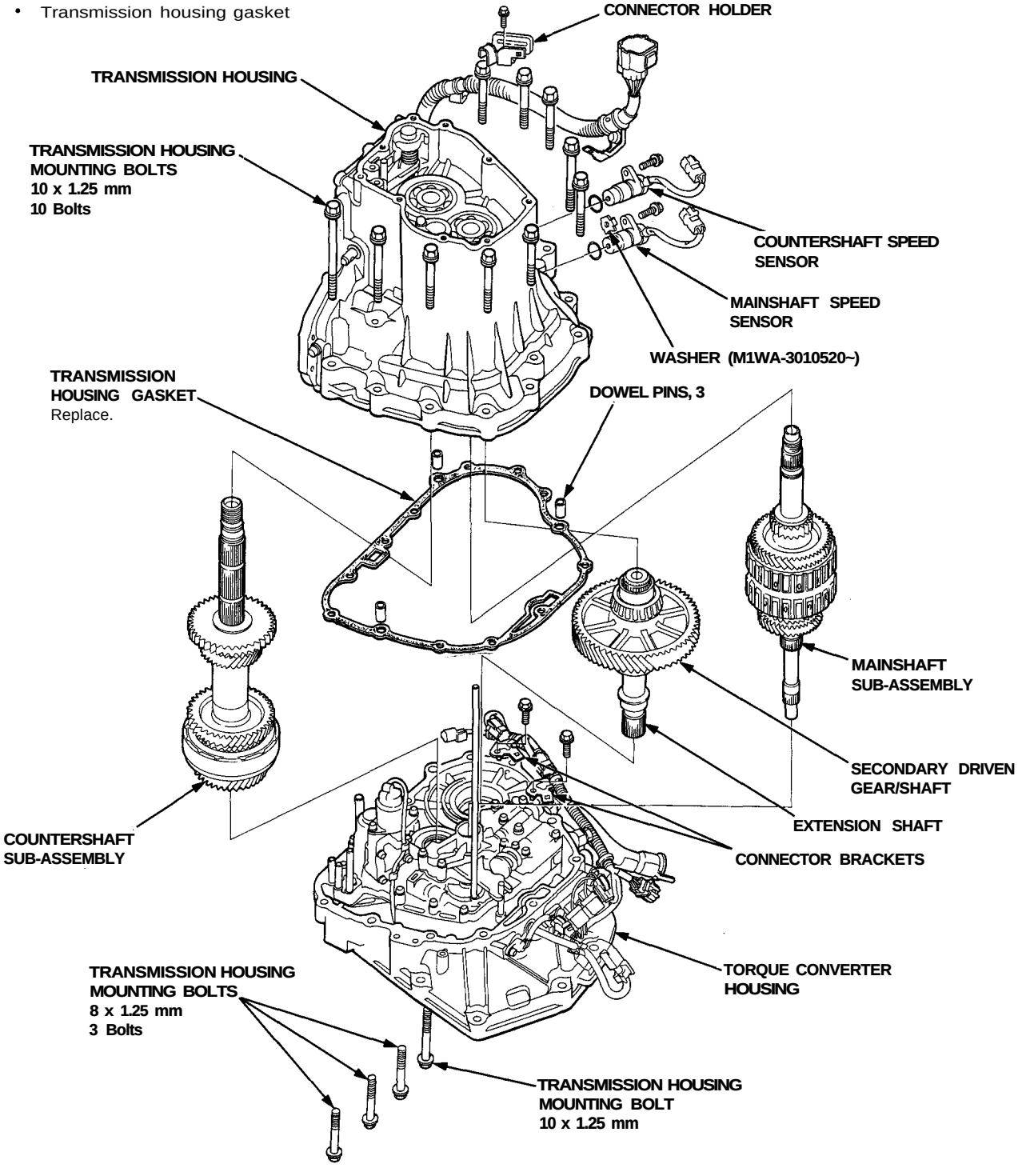
7. Remove the special tool from the mainshaft after removing the locknuts.
8. Remove the 1st-hold clutch assembly, thrust washer, thrust needle bearing and 1st-hold clutch hub from the countershaft.
9. Remove the 1st clutch assembly, thrust washer, thrust needle bearing and 1st gear from the mainshaft.
10. Remove the 1st gear, one-way clutch, needle bearings, 1st gear collar and parking gear from the countershaft.
11. Remove the thrust washer and 1st gear collar from the mainshaft.
12. Remove the parking brake pawl, shaft, spring, and stopper from the transmission housing.

Transmission Housing

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  - O-rings
  - Transmission housing gasket



1. Disconnect the mainshaft and countershaft speed sensor connectors.

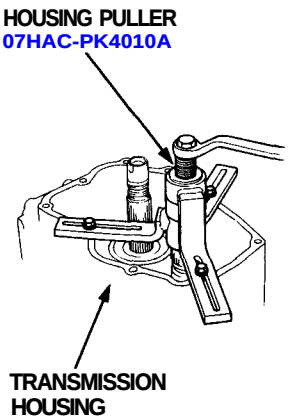
2. Remove the connector holder and connector brackets.

3. Remove the countershaft speed sensor and mainshaft speed sensor from the transmission housing.

4. Remove the ten bolts securing the transmission housing, then remove the 10 mm bolt and three 8 mm bolts securing the transmission housing to the torque converter housing side.

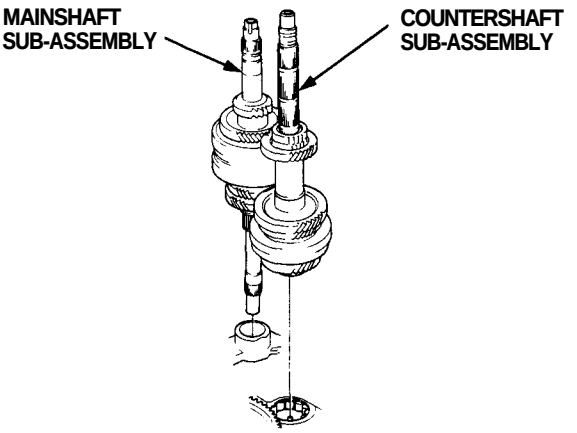
5. Install the special tool on the transmission housing, then remove the transmission housing as shown.

CAUTION: Make sure that the mainshaft and countershaft speed sensors have been removed from the transmission housing before removing the transmission housing from the torque converter housing.



6. Remove the mainshaft sub-assembly and countershaft sub-assembly together.

NOTE: When removing the shafts, take care to prevent damage to the regulator valve body.



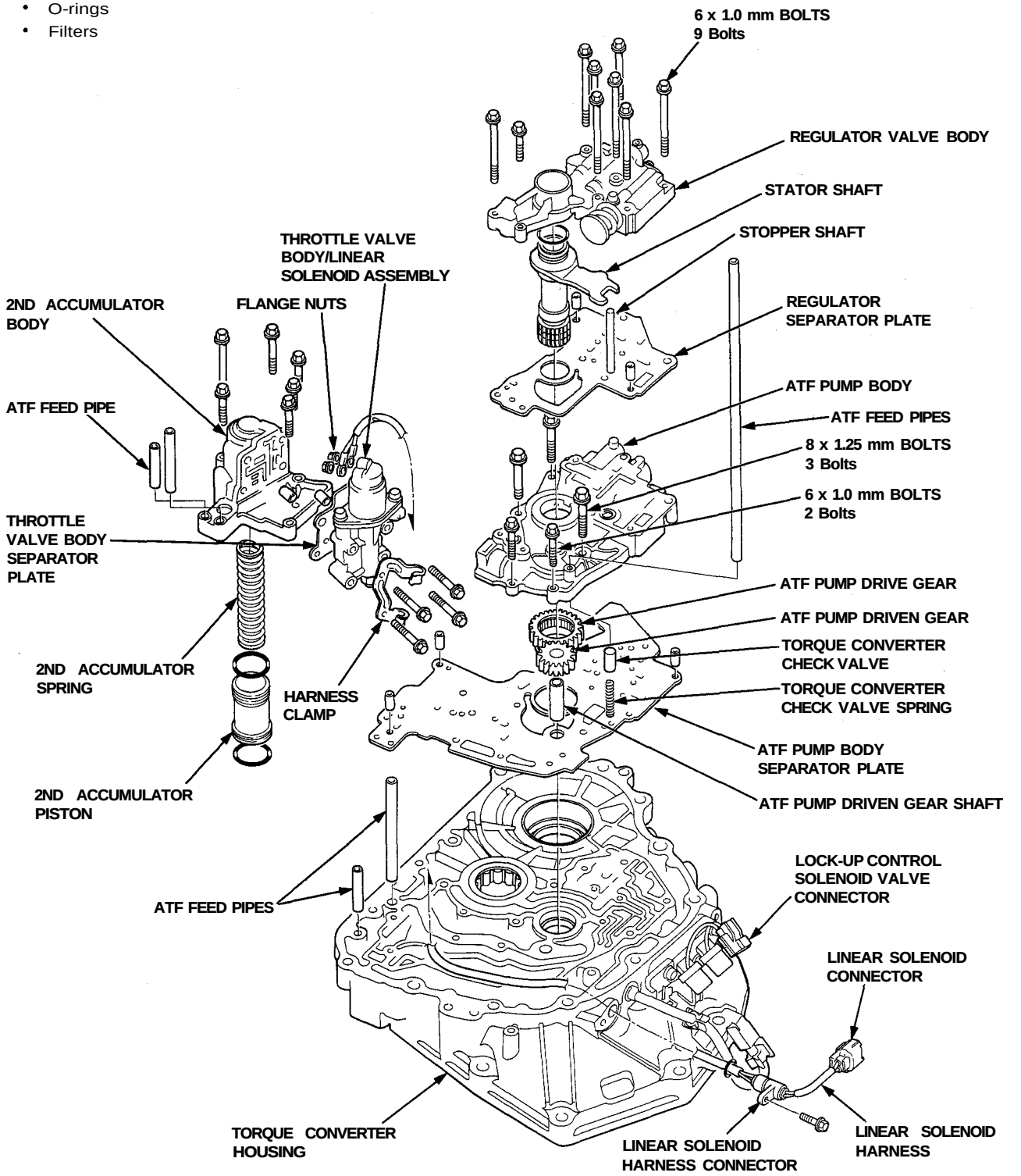
7. Remove the secondary driven gear shaft from the torque converter housing.

Torque Converter Housing/Valve Body

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve bodies, replace the following:
  - O-rings
  - Filters



1. Remove the ATF feed pipe from the ATF pump body and two ATF feed pipes from the torque converter housing.
2. Remove the two flange nuts securing the linear solenoid harness, then disconnect the harness from the linear solenoid and harness clamp.
3. Remove the regulator valve body (nine bolts).
4. Remove the stopper shaft and stator shaft.
5. Remove the regulator separator plate with two dowel pins.
6. Remove the six bolts securing the 2nd accumulator body, then remove the 2nd accumulator body and throttle valve body/linear solenoid as an assembly.
7. Remove the ATF pump body (five bolts).
8. Remove the ATF pump gears and ATF pump driven gear shaft.
9. Remove the torque converter check valve and spring.
10. Remove the ATF pump body separator plate with three dowel pins.
11. Remove the one bolt securing the linear solenoid harness connector, then remove the linear solenoid harness from the torque converter housing.
12. Disconnect the lock-up control solenoid valve connector, then remove the transmission sub-harness.

Valve Body

Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.

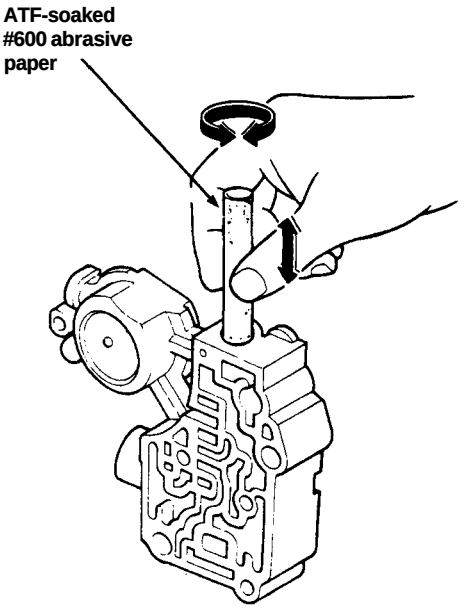
2. Carefully tap the valve body so the sticking valve drops out of its bore.

   CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.

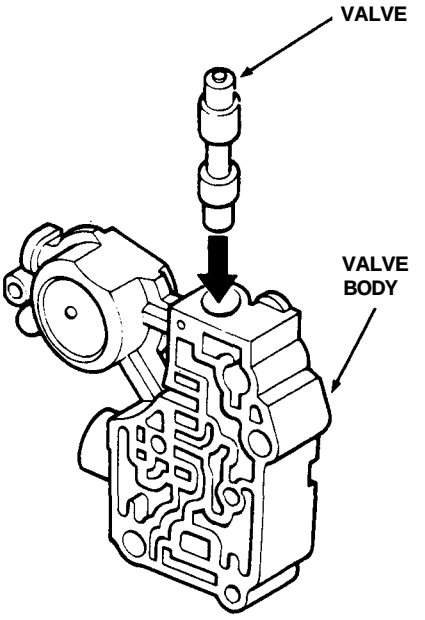
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

   CAUTION: The valve body is aluminum and doesn't require much polishing to remove any burrs.



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry with compressed air.

6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.



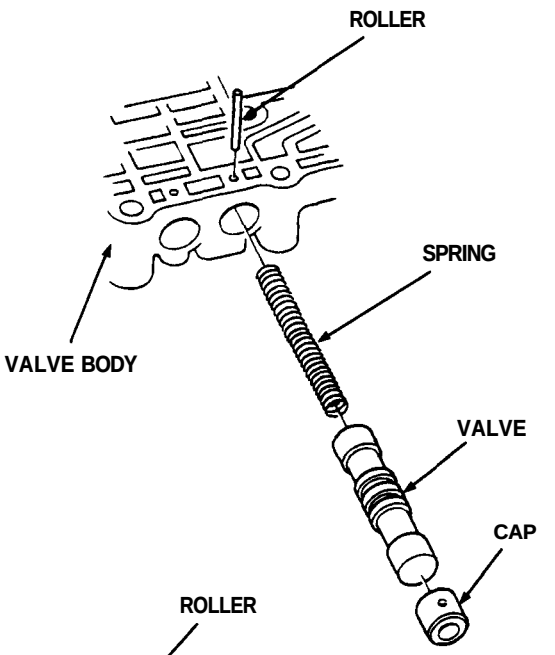
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

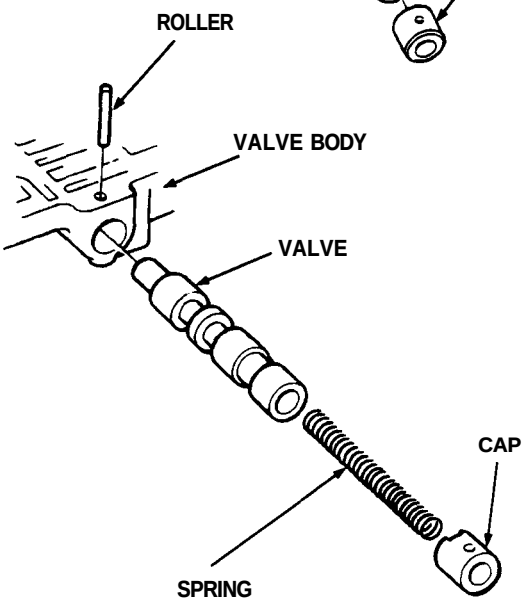
Valve

Assembly

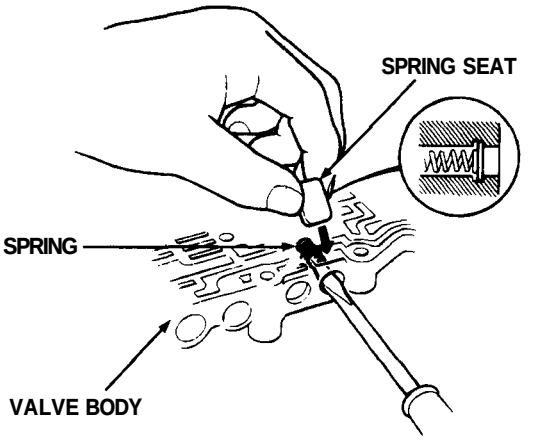
NOTE: Coat all parts with ATF before assembly.

- Install the valve, valve spring and cap in the valve body, and secure with the roller.

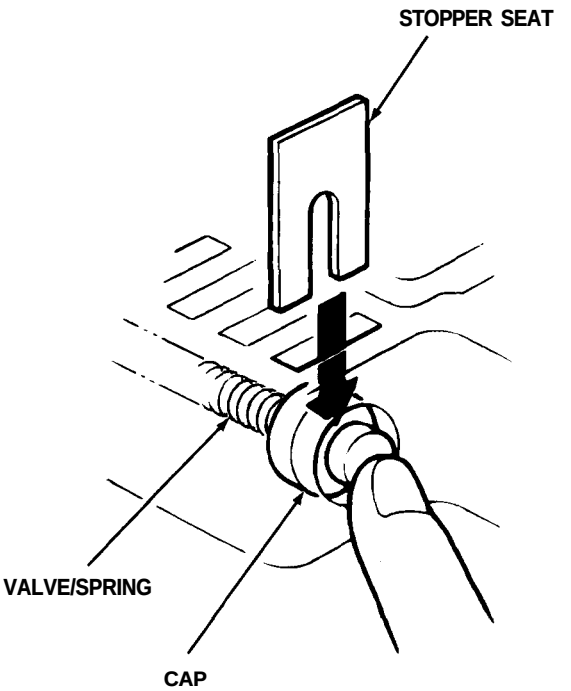




- Set the spring in the valve, then install them in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Install the valve, spring and cap in the valve body. Push the cap, then install the valve cap stopper.



Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

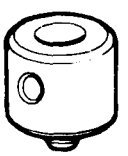
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and a hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.

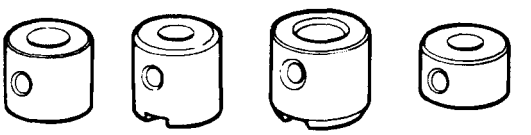
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



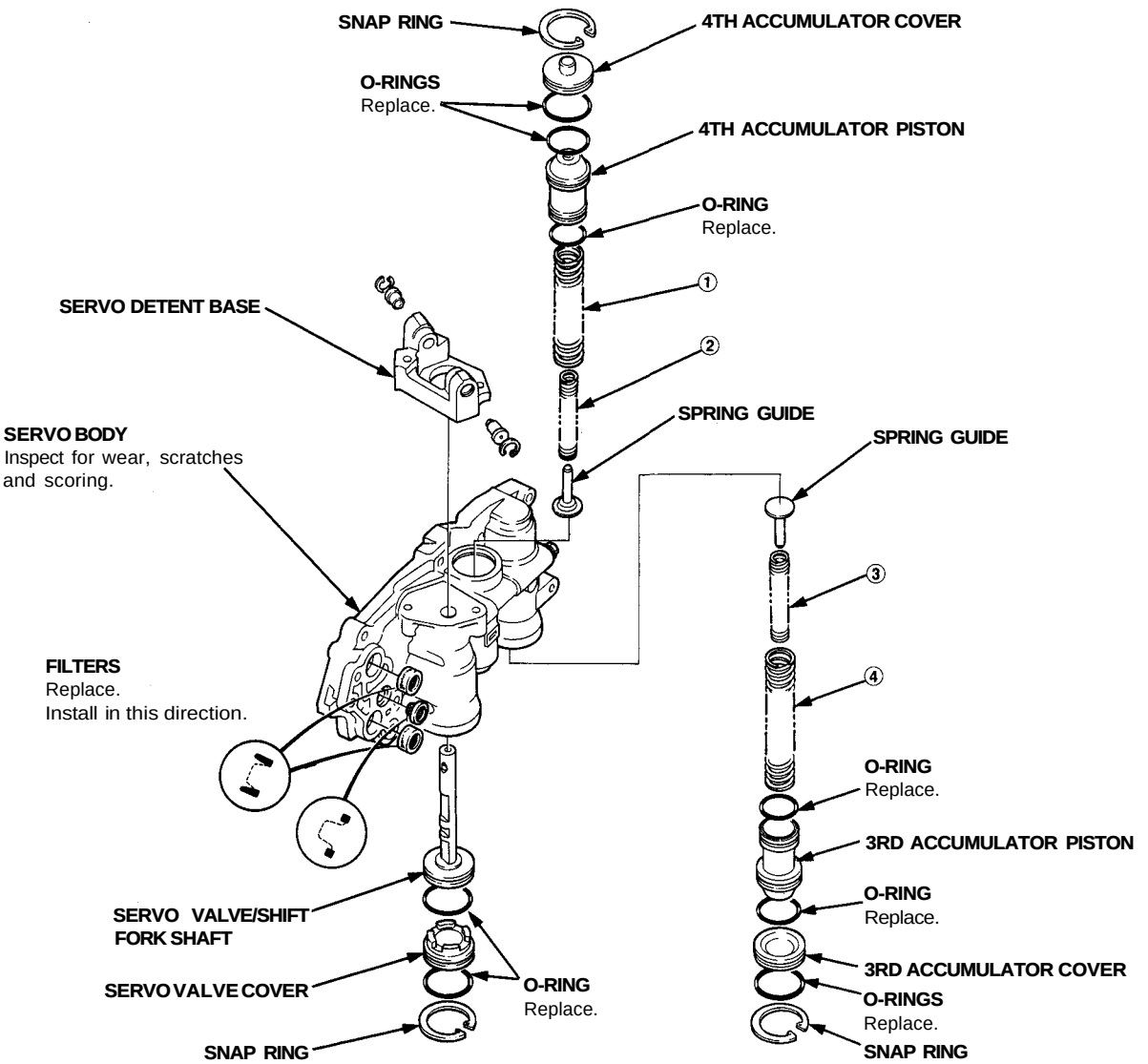
TOWARD INSIDE OF VALVE BODY

Servo Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the servo body as an assembly if any parts are worn or damaged.
- Replace the O-rings and filters.
- Install the filters in the direction shown.
- Coat all parts with ATF during assembly.



SPRING SPECIFICATIONS

Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4th accumulator spring A	2.7 (0.106)	17.2 (0.677)	73.1 (2.878)	11.9
②	4th accumulator spring B	1.9 (0.075)	9.0 (0.354)	49.0 (1.929)	15.1
③	3rd accumulator spring B	1.9 (0.075)	9.0 (0.354)	62.0 (2.441)	21.6
④	3rd accumulator spring A	2.7 (0.106)	17.2 (0.677)	90.7 (3.571)	15.7

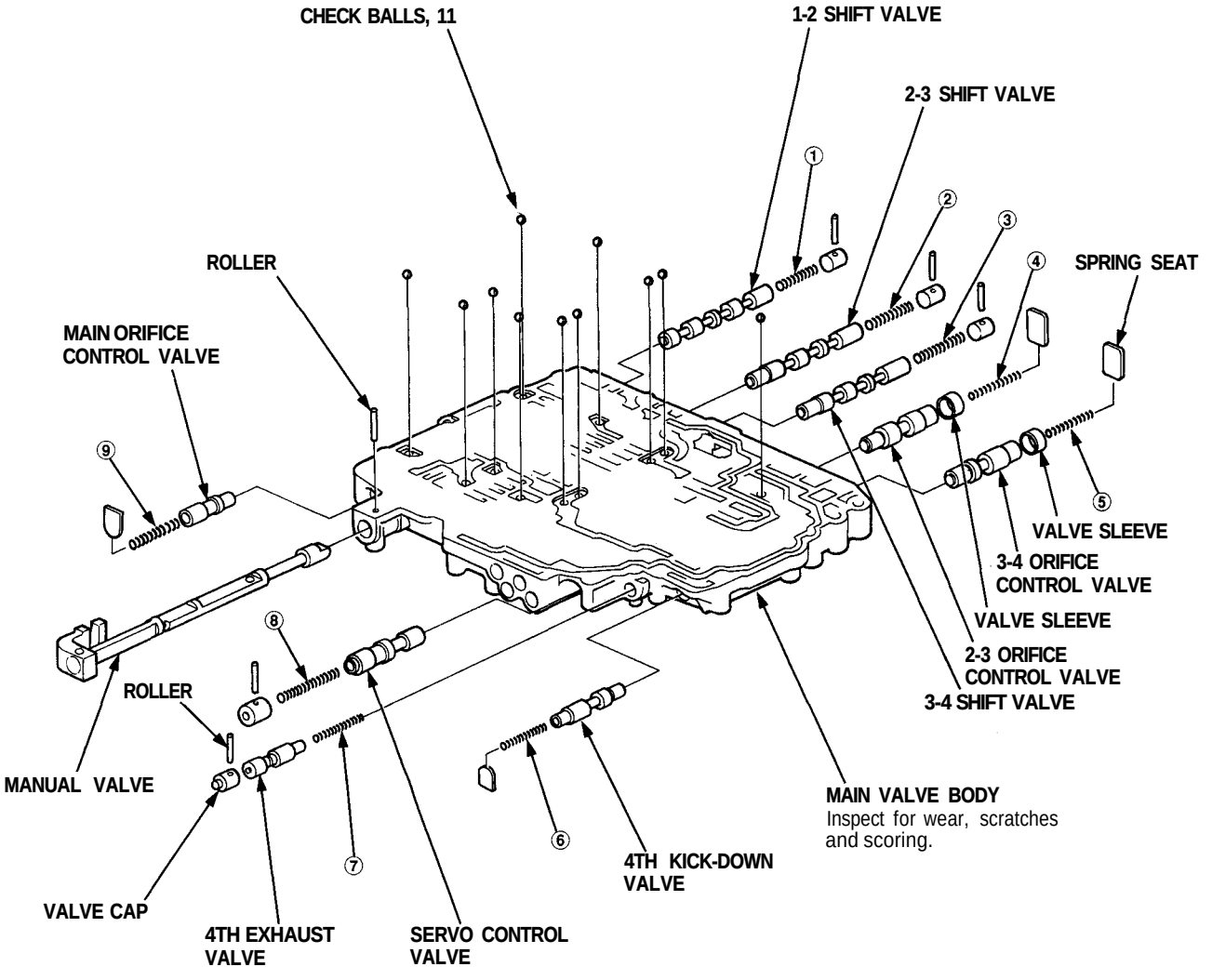
Main Valve Body

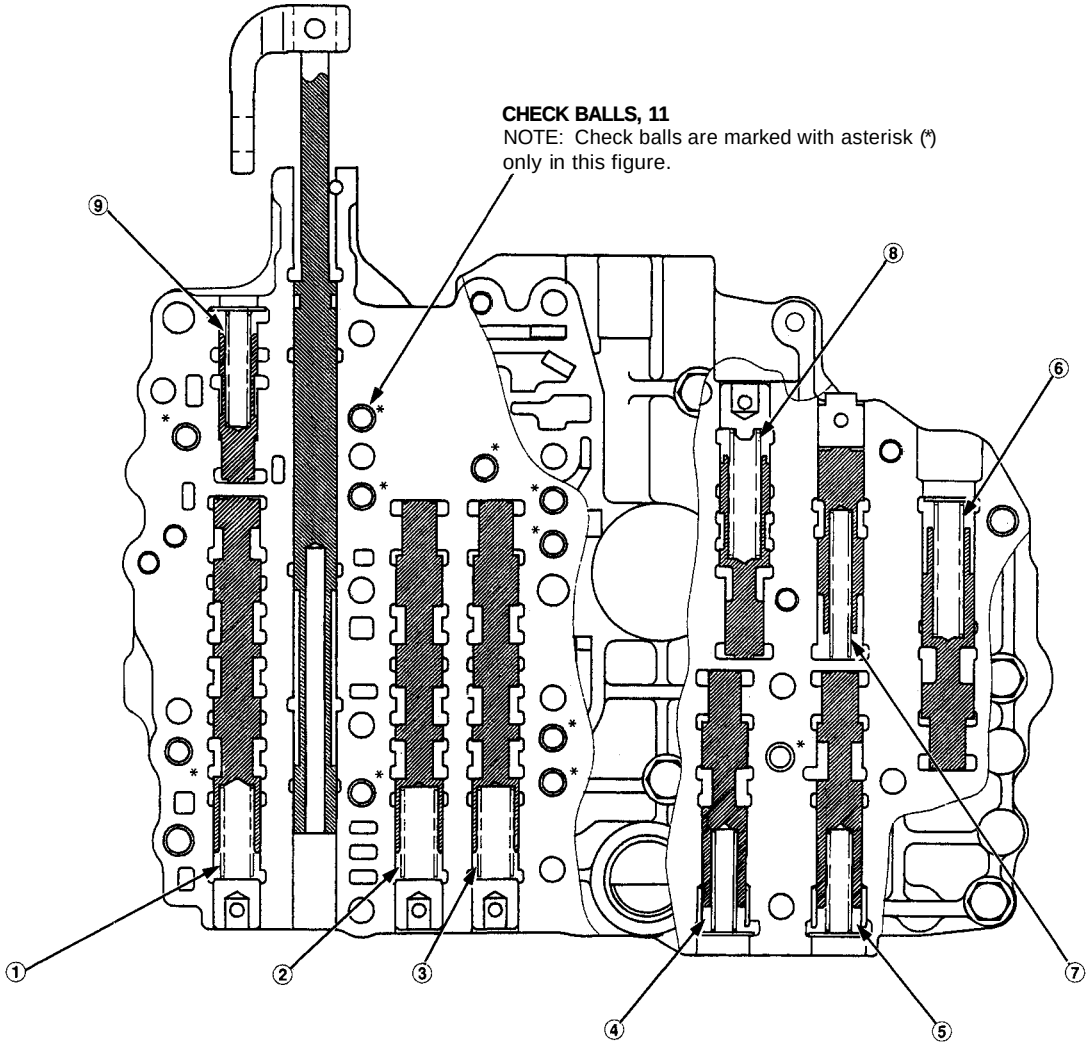
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-136.
- Coat all parts with ATF during assembly.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

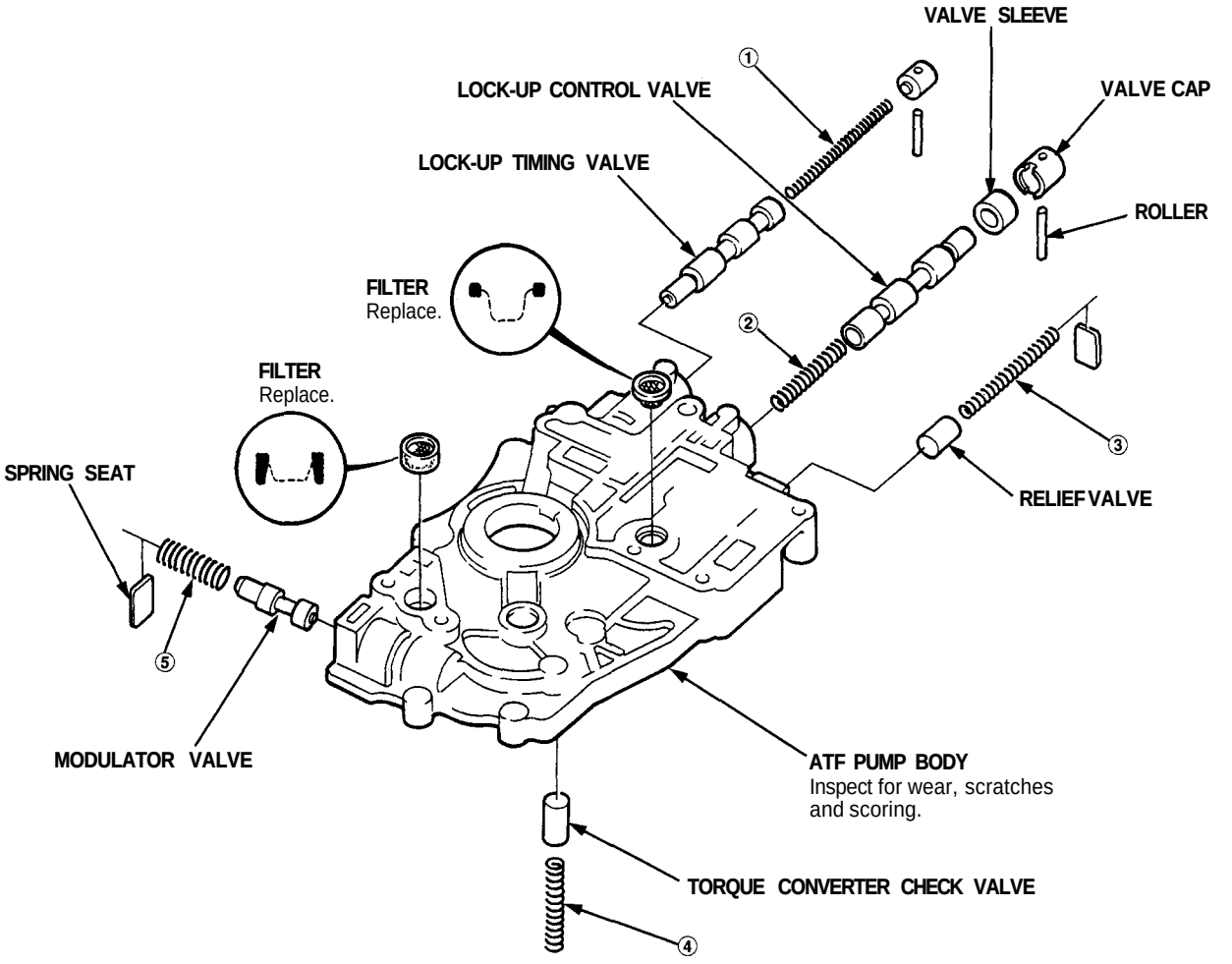
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1 – 2 shift valve spring	0.9 (0.035)	8.6 (0.339)	40.4 (1.591)	14.5
②	2 – 3 shift valve spring	0.9 (0.035)	9.6 (0.378)	43.0 (1.693)	12.1
③	3 – 4 shift valve spring	0.9 (0.035)	9.6 (0.378)	43.0 (1.639)	12.1
④	2 – 3 orifice control valve spring	0.7 (0.028)	6.6 (0.260)	33.8 (1.331)	11.7
⑤	3 – 4 orifice control valve spring	0.7 (0.028)	6.6 (0.260)	34.8 (1.370)	22.0
⑥	4th kick-down valve spring	1.0 (0.039)	7.6 (0.299)	48.2 (1.898)	22.2
⑦	4th exhaust valve spring	0.6 (0.024)	5.6 (0.220)	49.1 (1.933)	21.0
⑧	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	52.1 (2.051)	20.8
⑨	Main orifice control valve spring	0.7 (0.028)	6.1 (0.240)	35.1 (1.381)	22.4

ATF Pump Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-136.
- Coat all parts with ATF during assembly.
- Install the filters in the direction shown.



SPRING SPECIFICATIONS

Unit: mm (in)

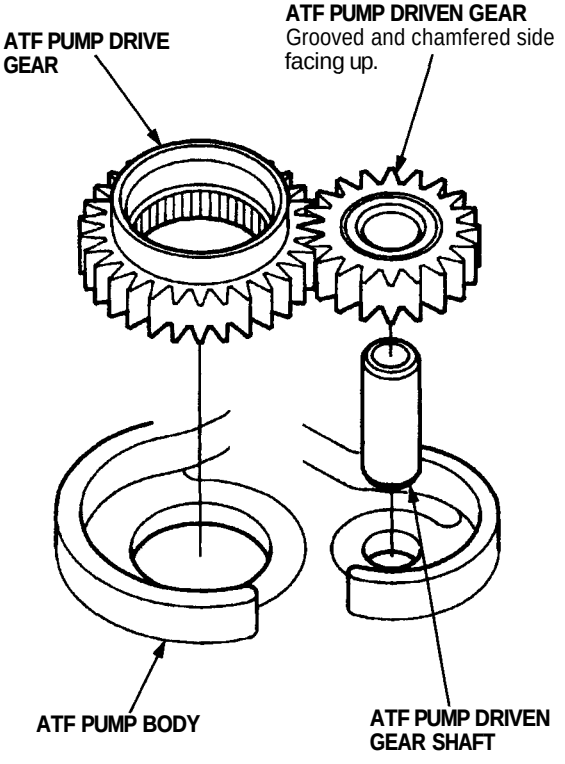
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	60.8 (2.394)	22.1
②	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	38.0 (1.496)	14.1
③	Relief valve spring	0.9 (0.035)	8.4 (0.331)	38.1 (1.500)	13.0
④	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7
⑤	Modulator valve spring	1.2 (0.047)	9.4 (0.370)	27.6 (1.087)	7.7

ATF Pump

Inspection

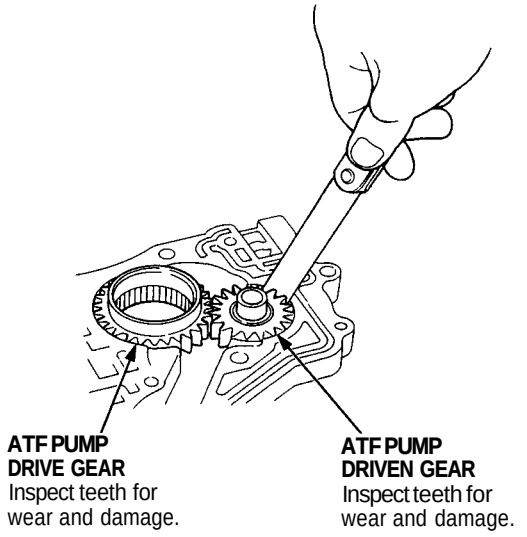
1. Install the ATF pump gears and ATF pump driven gear shaft in the ATF pump body.

NOTE:
- Lubricate all parts with ATF during inspecting.
- Install the ATF pump driven gear with its grooved and chamfered side facing up as shown.



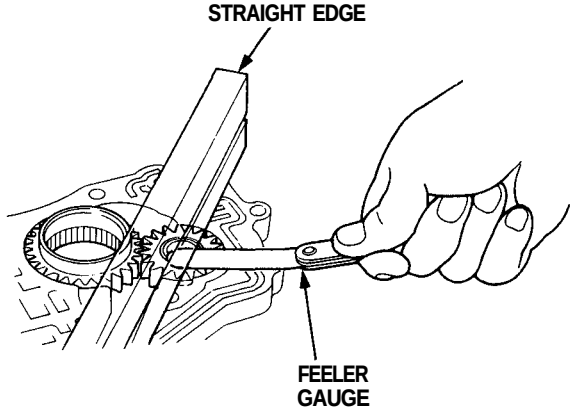
2. Measure the side clearance of the ATF pump drive and driven gears.

ATF Pump Gears Side (Radial) Clearance:
Standard (New):
ATF Pump Drive Gear
0.210 - 0.265 mm (0.0083 - 0.0104 in)
ATF Pump Driven Gear
0.070 - 0.125 mm (0.0028 - 0.0049 in)



3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body, with a straight edge and a feeler gauge.

ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:
Standard (New): 0.03 - 0.05 mm (0.001 - 0.002 in)
Service Limit: 0.07 mm (0.003 in)



Regulator Valve Body

Disassembly/Inspection/Reassembly

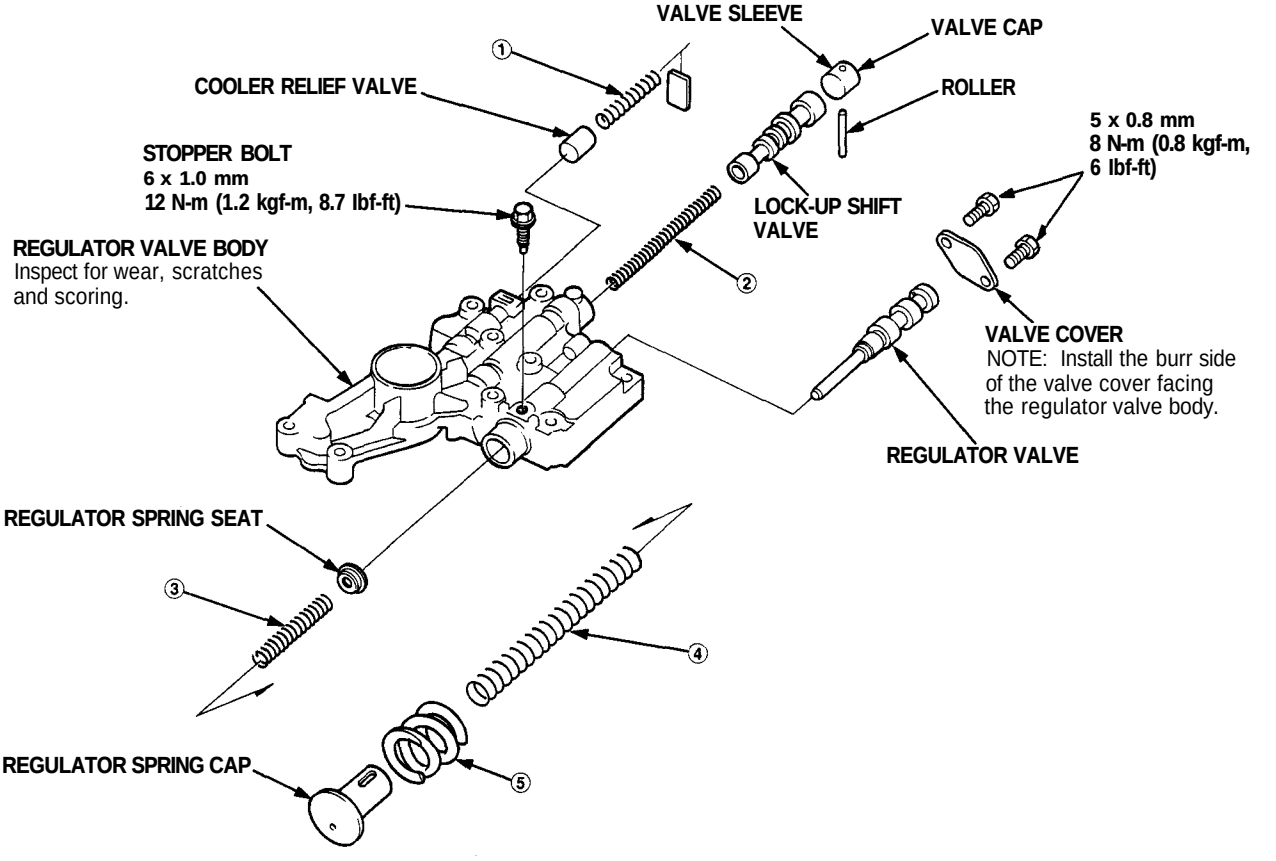
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-136.

1. Hold the regulator spring cap in place while removing the stopper bolt. Once the stopper bolt is removed, release the spring cap slowly.

   CAUTION: The regulator spring cap can pop out when the stopper bolt is removed.

2. Reassembly is the reverse of the disassembly procedure.

   NOTE:
   - Coat all parts with ATF during assembly.
   - Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stopper bolt.



SPRING SPECIFICATIONS

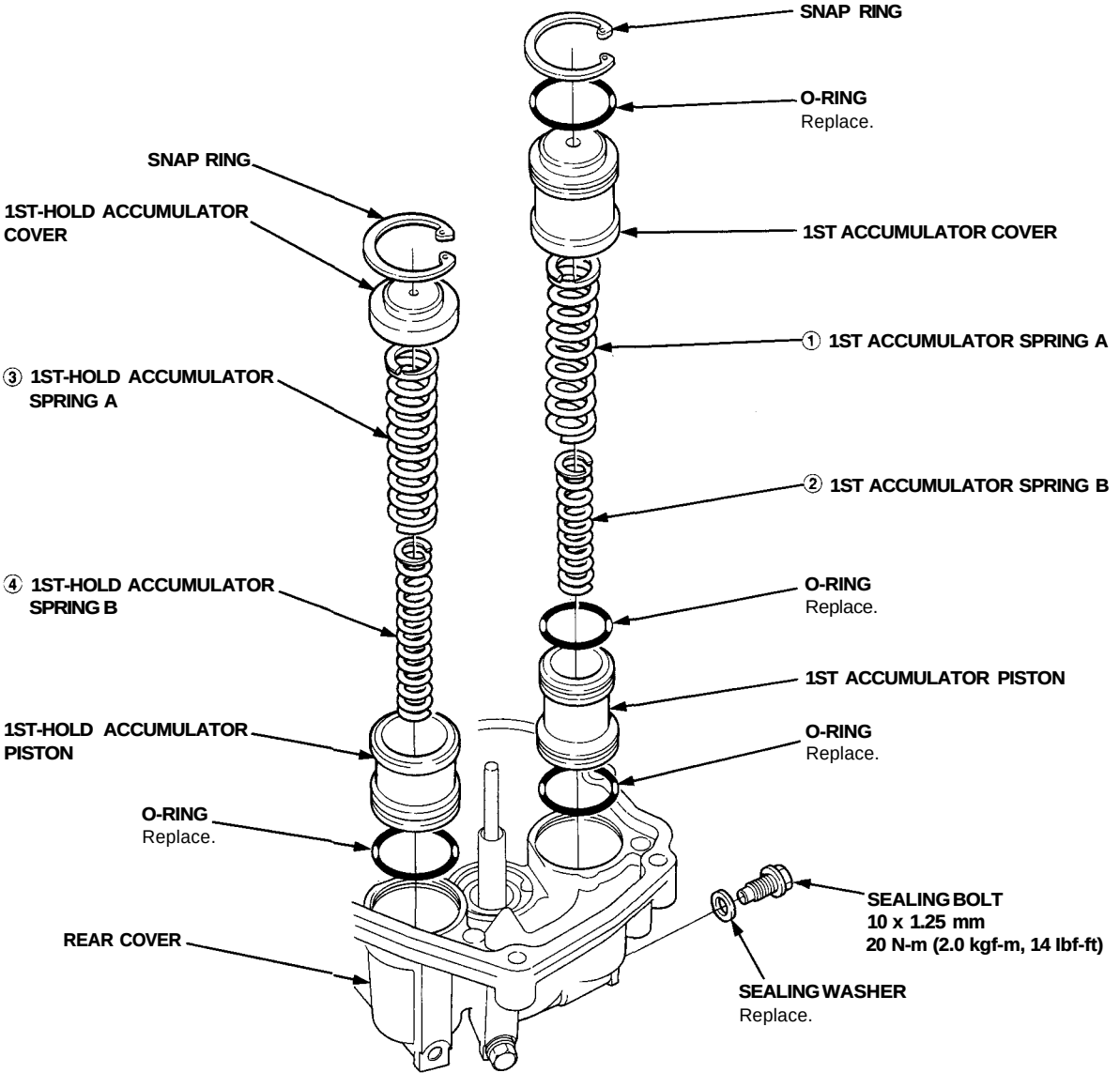
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Cooler relief valve spring	1.0 (0.039)	8.4 (0.331)	39.1 (1.539)	15.1
②	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
③	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	7.5
④	Regulator valve spring A	1.7 (0.067)	14.7 (0.579)	77.6 (3.055)	14.6
⑤	Stator reaction spring	5.5 (0.217)	37.4 (1.472)	30.3 (1.193)	2.1

1st Accumulator/1st-hold Accumulator

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Coat all parts with ATF during assembly.
- Replace the O-rings and sealing washer.



SPRING SPECIFICATIONS

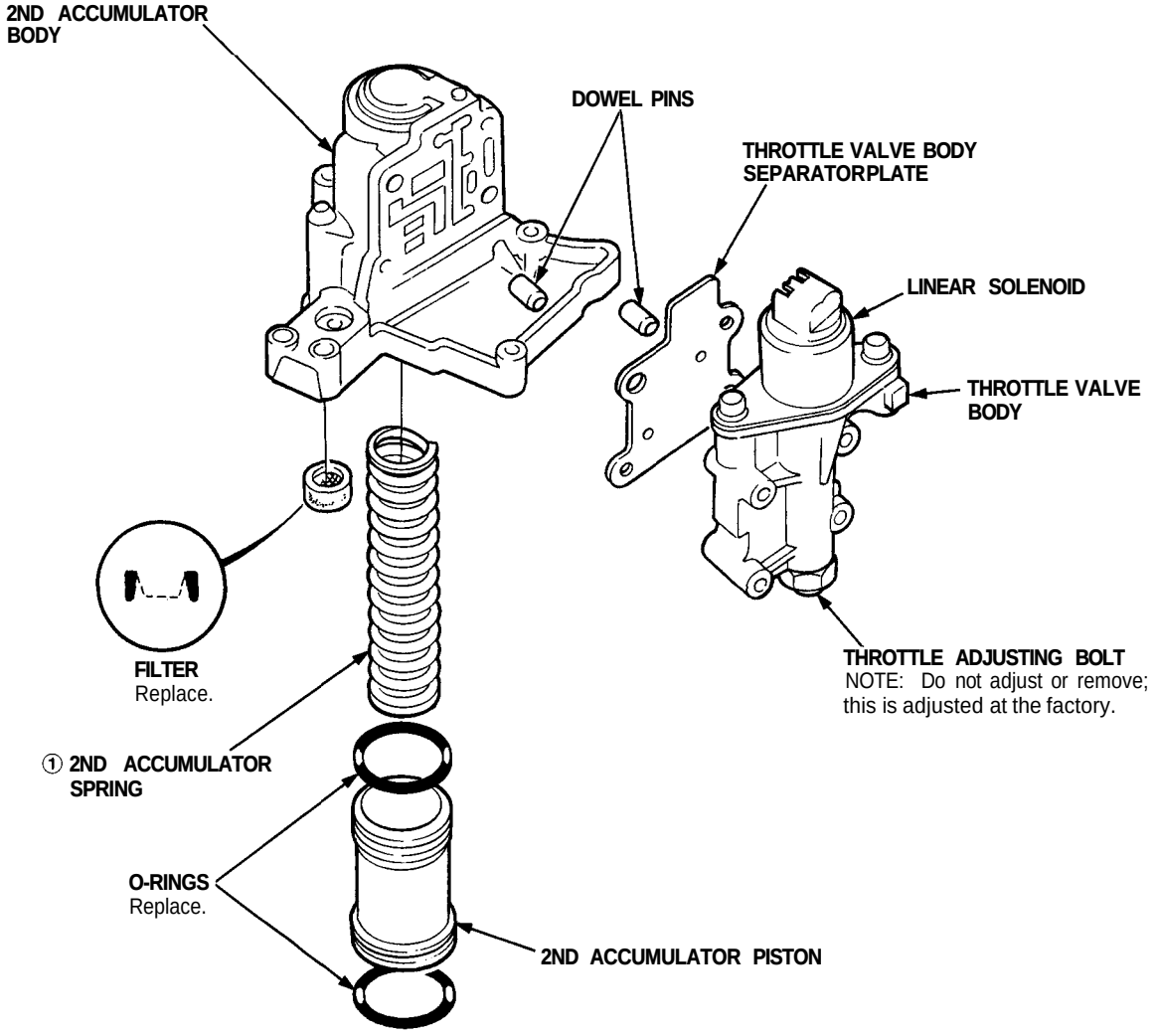
Unit: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring A	2.3 (0.091)	17.2 (0.677)	81.2 (3.197)	14.3
②	1st accumulator spring B	2.3 (0.091)	9.6 (0.378)	48.0 (1.890)	12.2
③	1st-hold accumulator spring A	3.5 (0.138)	21.6 (0.850)	55.9 (2.201)	7.7
④	1st-hold accumulator spring B	2.3 (0.091)	12.8 (0.504)	53.4 (2.102)	12.6

2nd Accumulator Body/Throttle Valve Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF during assembly.
- Replace the O-rings and filter.
- Install the filter in the direction shown.



SPRING SPECIFICATIONS

Unit: mm (in)

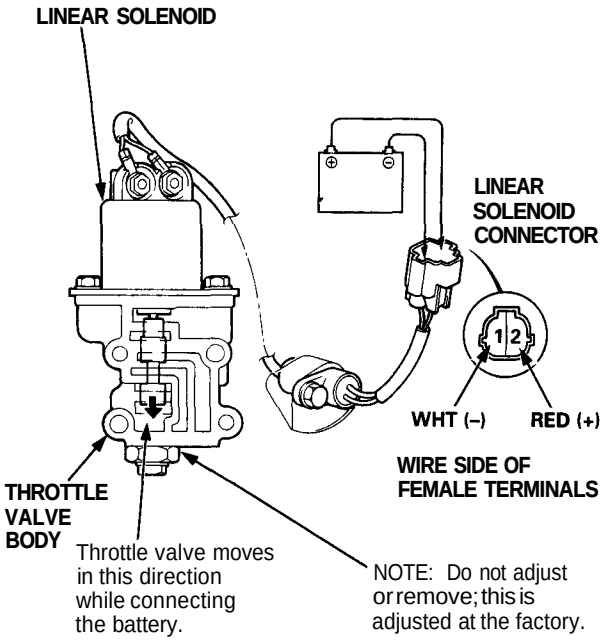
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	2nd accumulator spring	3.0 (0.118)	22.3 (0.878)	95.6 (3.764)	12.6

Throttle Valve Body/Linear Solenoid

Test

1. Connect the linear solenoid harness to the linear solenoid terminals.
2. Connect the No. 2 (RED: +) terminal of the linear solenoid connector to the positive battery terminal and the No. 1 (WHT: -) terminal to the negative battery terminal. Check that the throttle valve moves.
3. Repeat the above steps 1 and 2.

   NOTE: You can see the movement of the throttle valve through the fluid passage in the mounting surface of the throttle valve body.

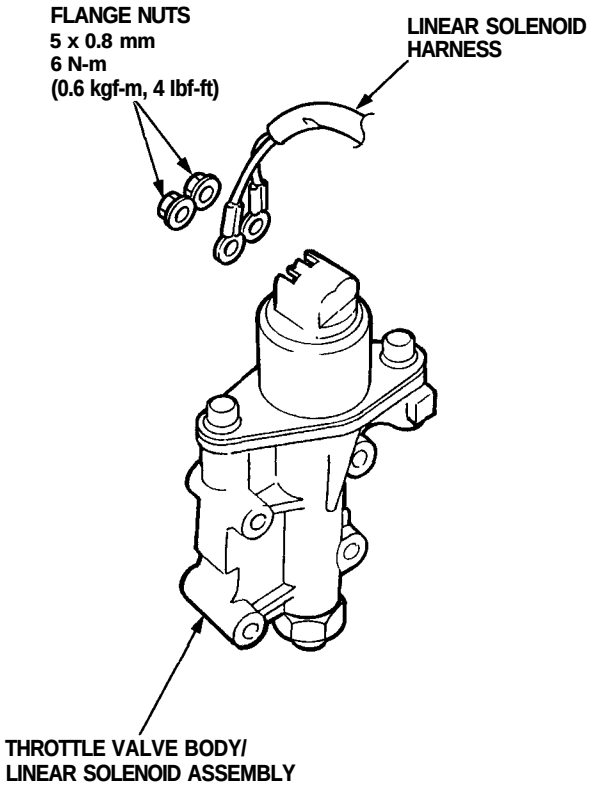


4. If the throttle valve binds, or moves sluggishly, or the linear solenoid does not operate, replace the throttle valve body/linear solenoid as an assembly.
5. If the linear solenoid does not operate, disconnect the linear solenoid harness from the linear solenoid assembly. Connect the battery directly to the linear solenoid.
6. If the linear solenoid operates after connecting the battery, and the throttle valve movement is OK, replace the linear solenoid harness.

Replacement

NOTE: Throttle valve body/linear solenoid must be replaced as an assembly.

1. Check the throttle valve body passages for dust or dirt, and replace as an assembly, if necessary.
2. Clean the mounting surface and fluid passages of the throttle valve body.
3. Assemble the throttle valve body/linear solenoid to the 2nd accumulator body.

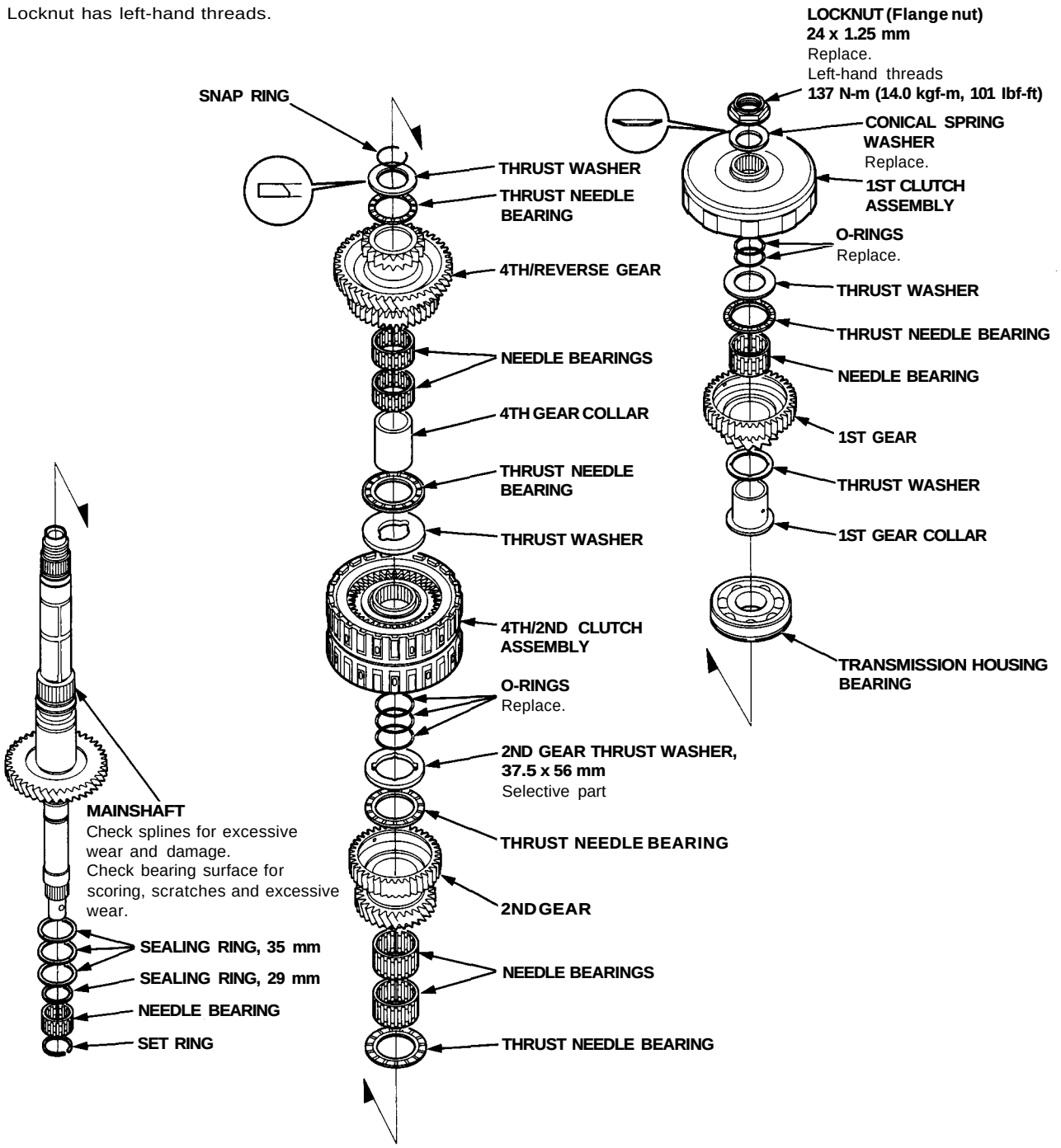


Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Locknut has left-hand threads.



Inspection

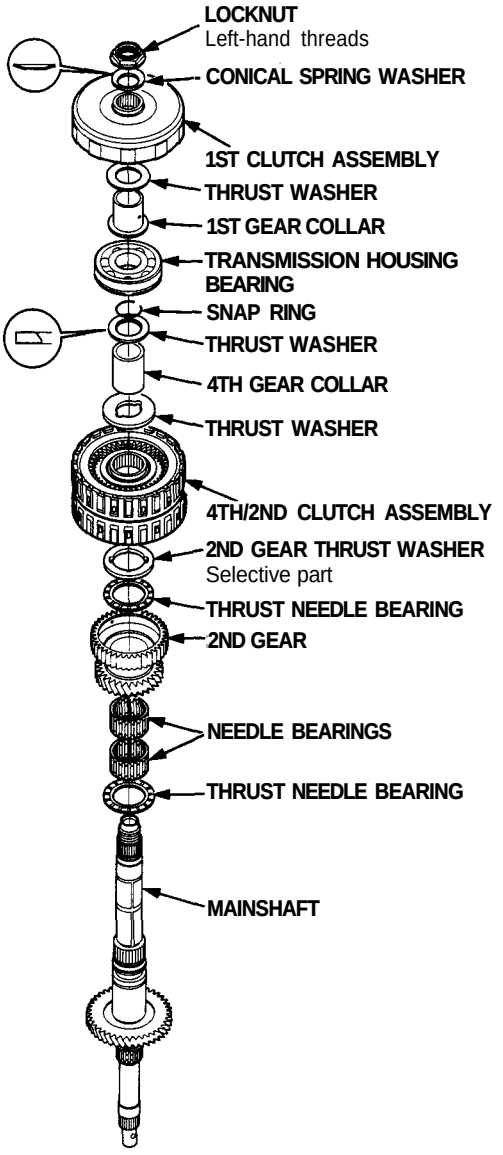
- Clearance Measurements

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the mainshaft bearing from the transmission housing (see page 14-172).

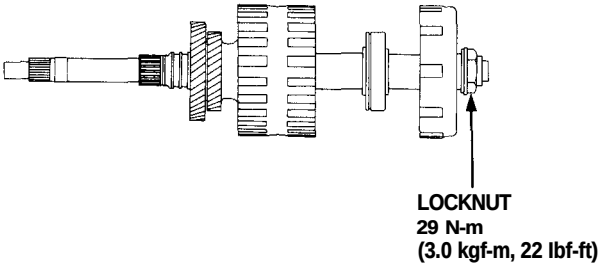
2. Assemble the parts below on the mainshaft.

NOTE: Do not install the O-rings during inspection.



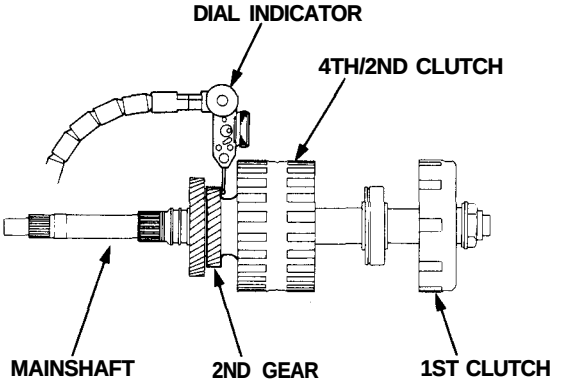
3. Torque the mainshaft locknut to 29 N-m (3.0 kgf-m, 22 lbf-ft).

NOTE: Mainshaft locknut has left-hand threads.



4. Move the 4th/2nd clutch assembly to check the axial clearances.

5. Attach the dial indicator to the mainshaft 2nd gear as shown.



(cont'd)

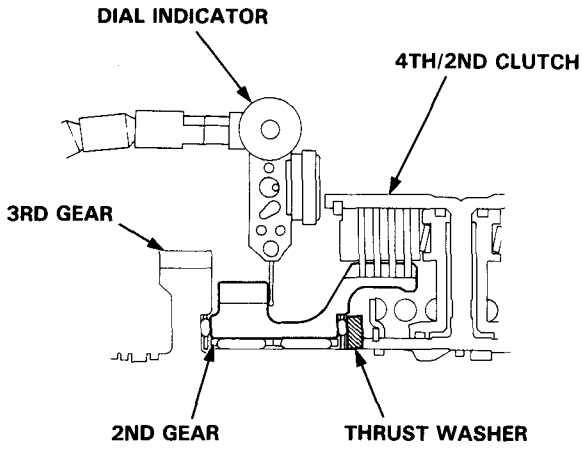
Mainshaft

Inspection (cont'd)

6. Measure the 2nd gear axial clearance while pushing the 4th/2nd clutch toward the 1st clutch.

   STANDARD: 0.07 - 0.15 mm (0.003 - 0.006 in)

   NOTE: Take measurements in at least three places, and use the average as the actual clearance.



7. If the clearance is out of tolerance, remove the 2nd gear thrust washer and measure its thickness.

8. Select and install a new 2nd gear thrust washer, then recheck.

   2ND GEAR THRUST WASHER, 37.5 x 56 mm

No.	Part Number	Thickness
1	90441-PW4-000	4.00 mm (0.157 in)
2	90442-PW4-000	4.05 mm (0.159 in)
3	90443-PW4-000	4.10 mm (0.161 in)
4	90444-PW4-000	4.15 mm (0.163 in)
5	90445-PW4-000	4.20 mm (0.165 in)
6	90446-PW4-000	4.25 mm (0.167 in)
7	90447-PW4-000	4.30 mm (0.169 in)
8	90448-PW4-000	4.35 mm (0.171 in)
9	90449-PW4-000	4.40 mm (0.173 in)
10	90450-PW4-000	4.45 mm (0.175 in)
11	90451-PW4-000	4.50 mm (0.177 in)

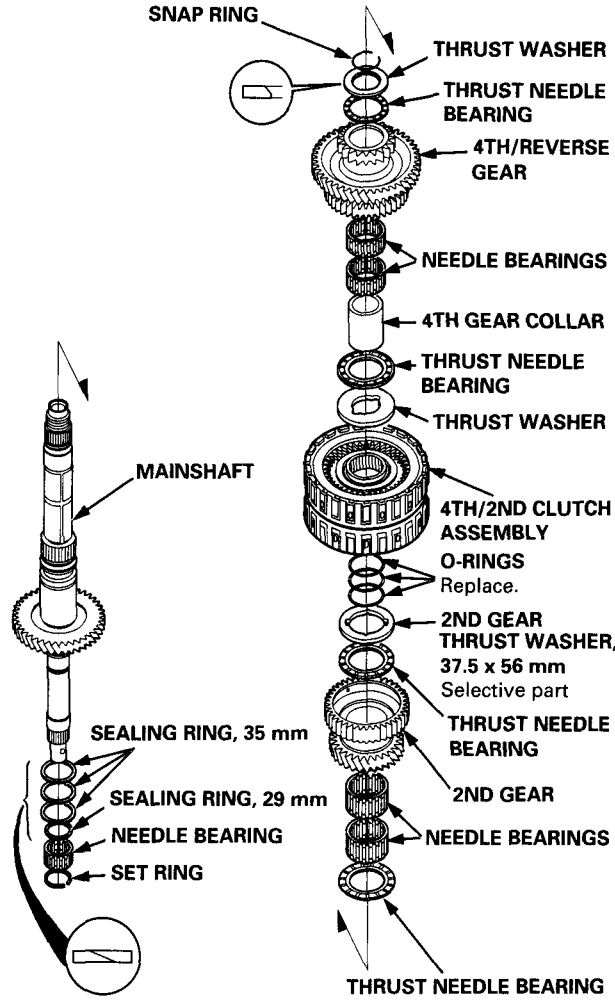
9. After replacing the 2nd gear thrust washer, make sure that the clearance is within tolerance.

Mainshaft

Sub-assembly

NOTE:
- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Assemble the mainshaft sub-assembly when assembling the transmission.

1. Assemble the parts below on the mainshaft.



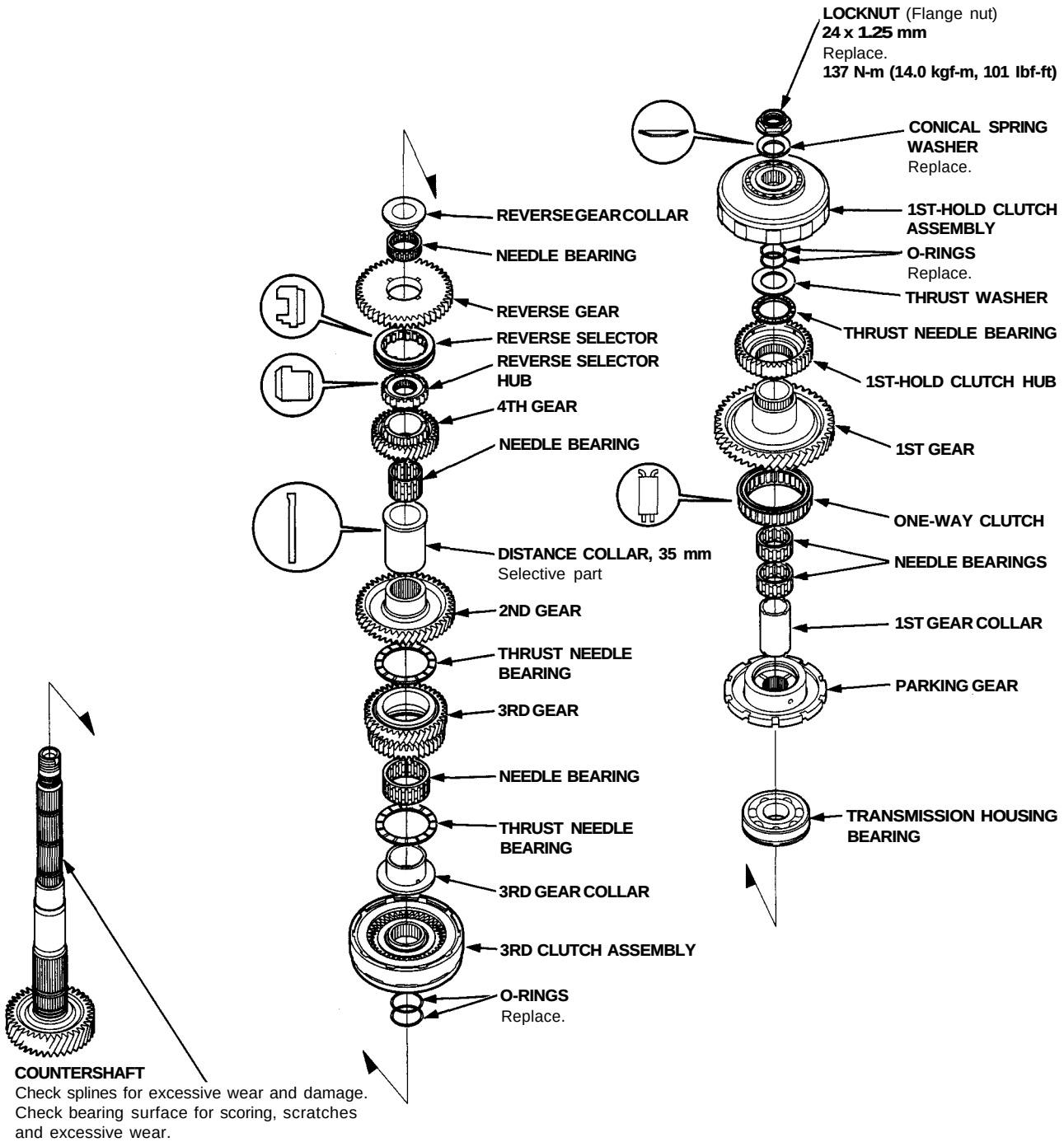
SEALING RING ('97, '98 models)
Install the sealing ring mating faces as shown.

Countershaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.



Countershaft

Inspection

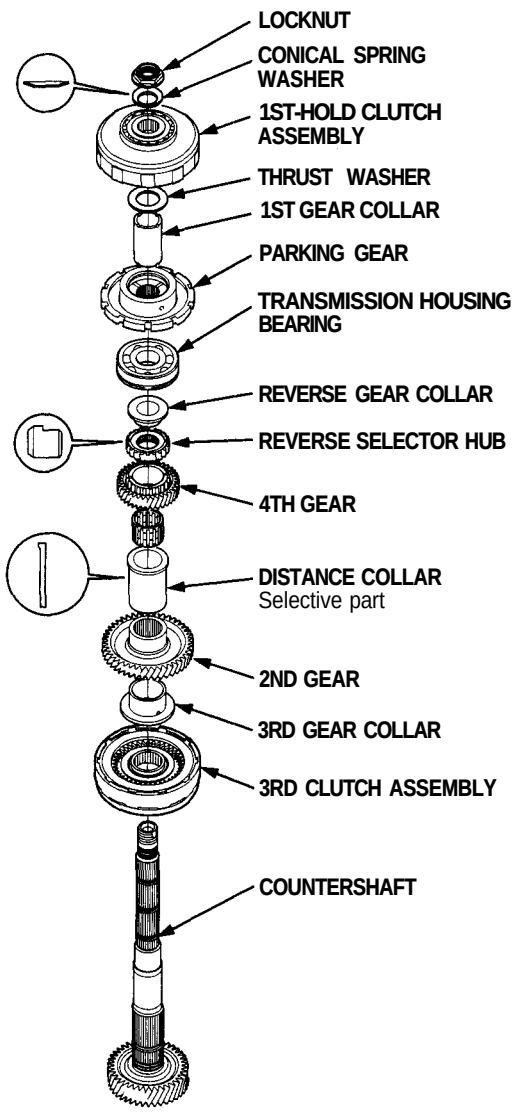
Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

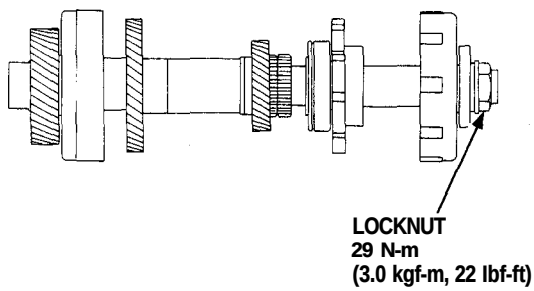
1. Remove the countershaft bearing from the transmission housing (see page 14-172).

2. Assemble the parts below on the countershaft.

   NOTE: Do not install the O-rings during inspection.



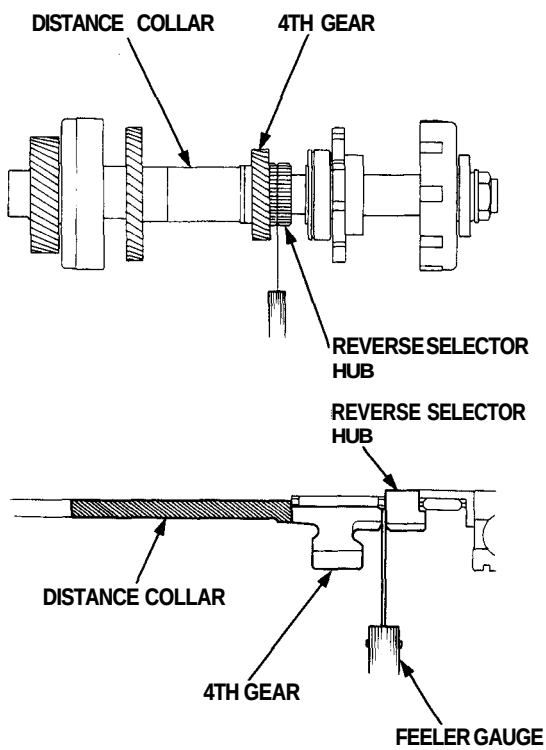
3. Torque the countershaft locknut to 29 N-m (3.0 kgf-m, 22 lbf-ft).



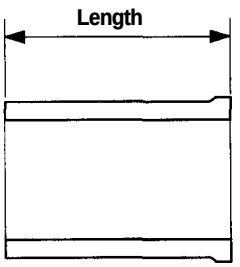
4. Hold the 4th gear against the distance collar. Measure the clearance between the 4th gear and the reverse selector hub with a feeler gauge.

   NOTE: Take measurements in at least three places, and use the average as the actual clearance.

   STANDARD: 0.07 - 0.15 mm (0.003 - 0.006 in)



5. If the clearance is out of tolerance, remove the distance collar and measure its length.



6. Select and install a new distance collar, then recheck.

DISTANCE COLLAR, 35mm

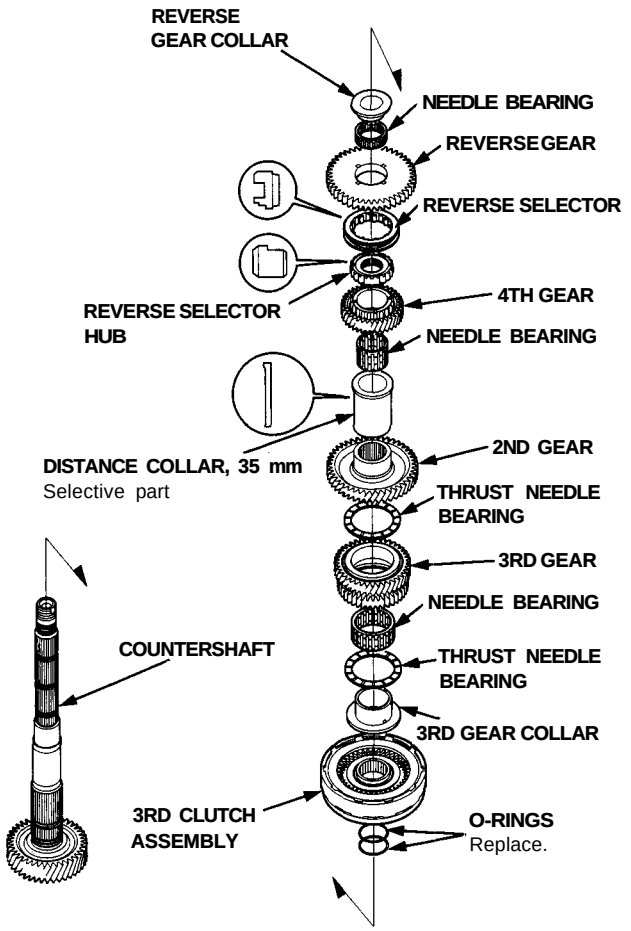
No.	Part Number	Thickness
1	90501 - PW7 - 000	65.65 mm (2.585 in)
2	90502 - PW7 - 000	65.70 mm (2.587 in)
3	90503 - PW7 - 000	65.75 mm (2.589 in)
4	90504 - PW7 - 000	65.80 mm (2.591 in)
5	90505 - PW7 - 000	65.85 mm (2.593 in)
6	90506 - PW7 - 000	65.90 mm (2.594 in)
7	90507 - PW7 - 000	65.95 mm (2.596 in)
8	90508 - PW7 - 000	66.00 mm (2.598 in)
9	90509 - PW7 - 000	66.05 mm (2.600 in)
10	90510-PW7-000	66.10 mm (2.602 in)

7. After replacing the distance collar, make sure that the clearance is within tolerance.

Sub-assembly

NOTE:
- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.
- Assemble the countershaft sub-assembly when assembling the transmission.

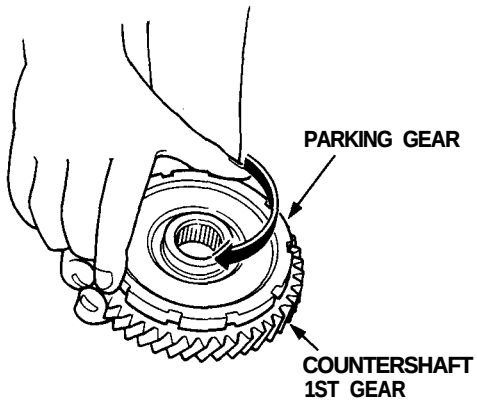
1. Assemble the parts below on the countershaft.



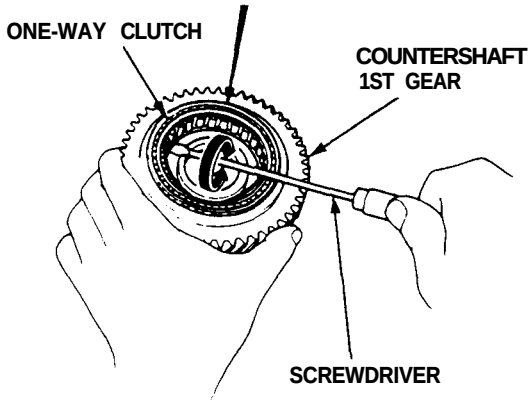
One-way Clutch

Disassembly/Inspection/Reassembly

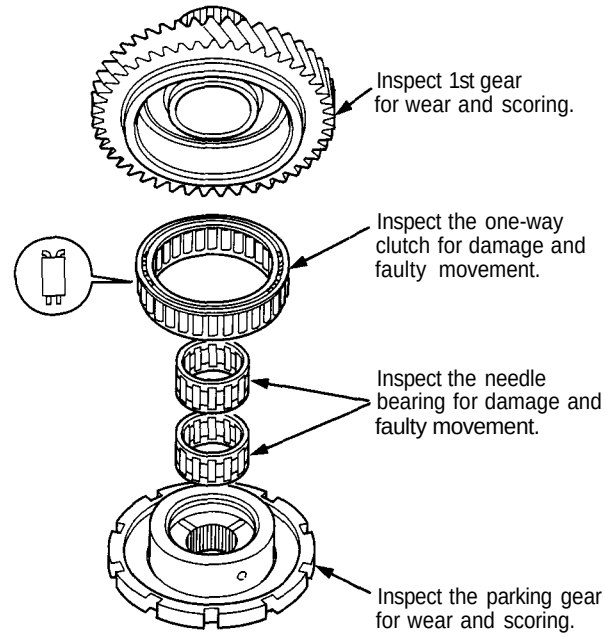
1. Separate countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



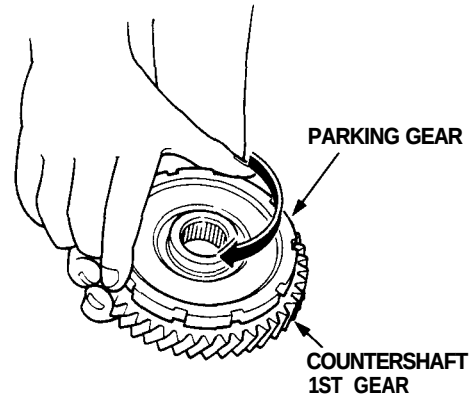
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:

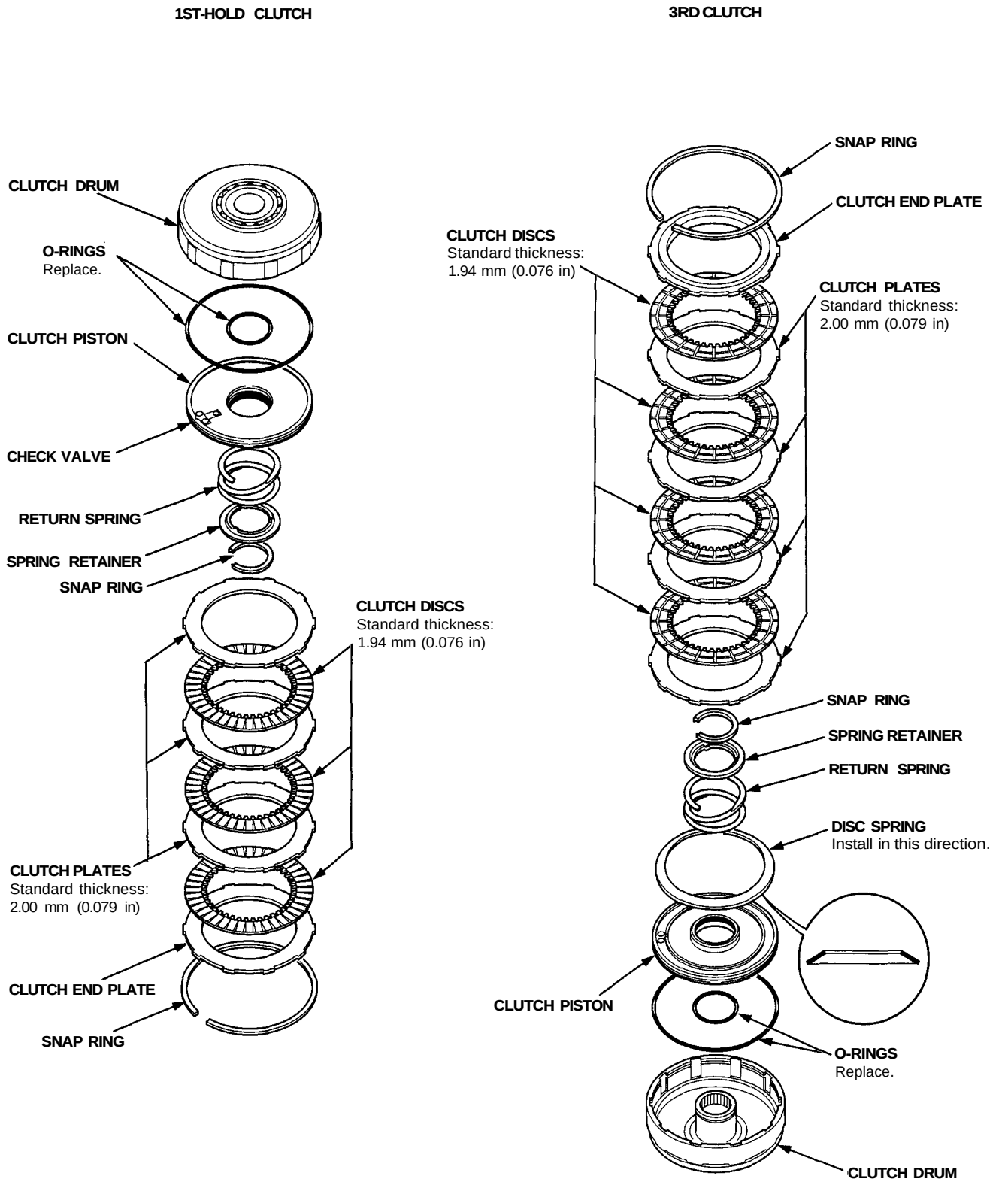


4. After the parts are assembled, hold countershaft 1st gear and turn the parking gear in the direction shown to be sure it turns freely. Also make sure the parking gear does not turn in the opposite direction.



Clutch

Illustrated Index

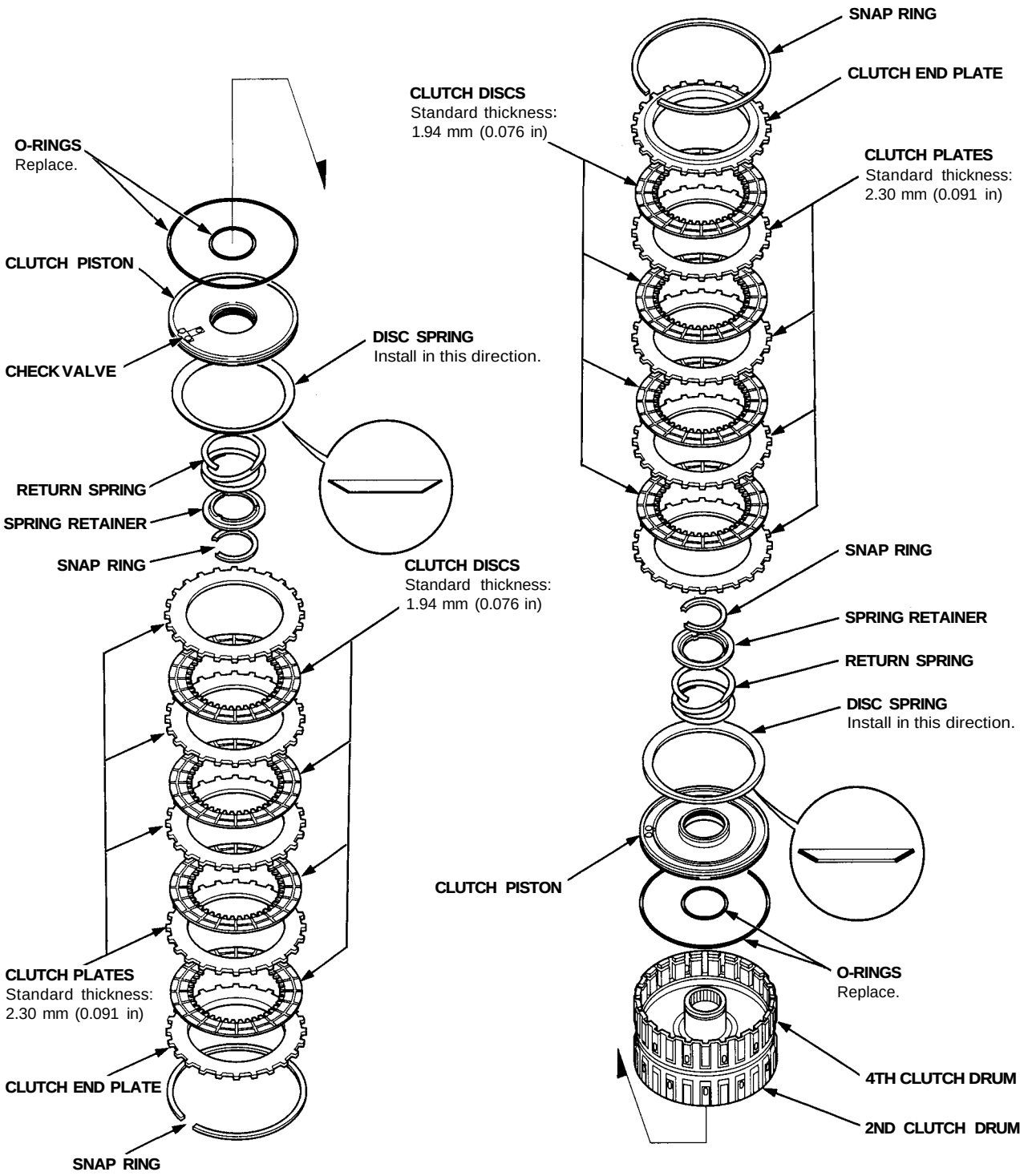


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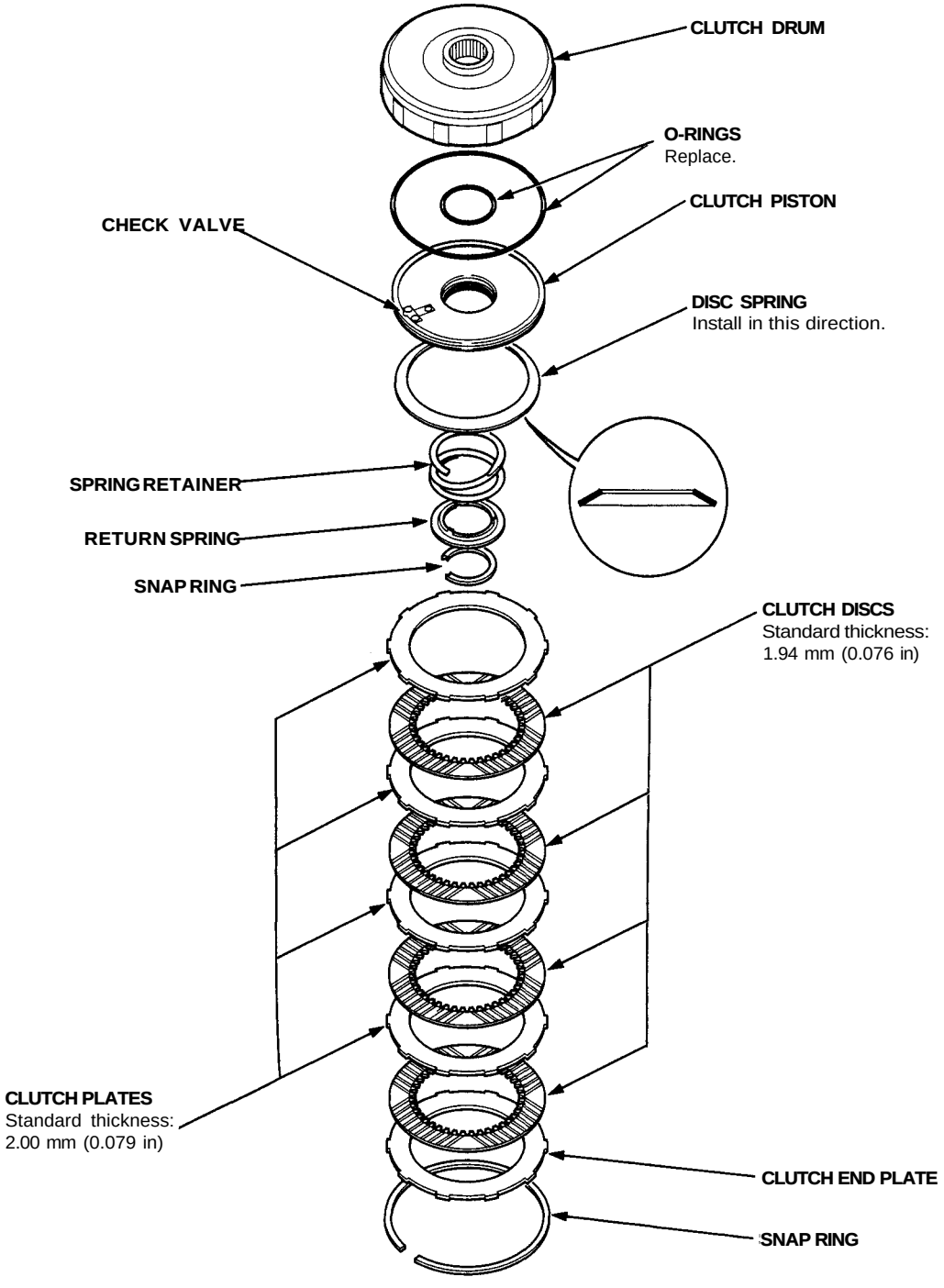
Clutch

Illustrated Index (cont'd)

4TH/2ND CLUTCH



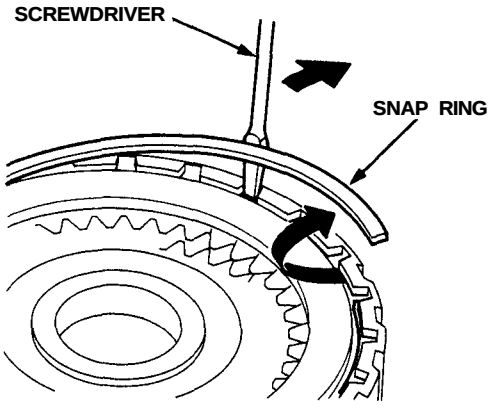
1ST CLUTCH


CLUTCH DRUM
O-RINGS
Replace.
CLUTCH PISTON
CHECK VALVE
DISC SPRING
Install in this direction.
SPRING RETAINER
RETURN SPRING
SNAP RING
CLUTCH DISCS
Standard thickness:
1.94 mm (0.076 in)
CLUTCH PLATES
Standard thickness:
2.00 mm (0.079 in)
CLUTCH END PLATE
SNAP RING

Clutch

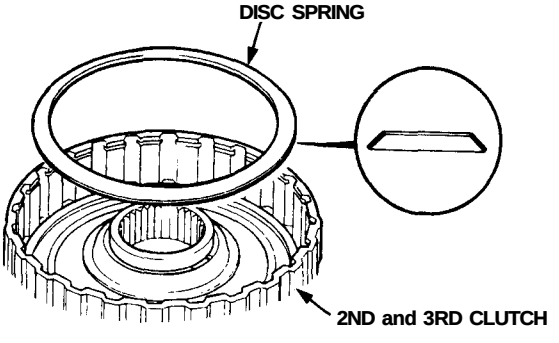
Disassembly

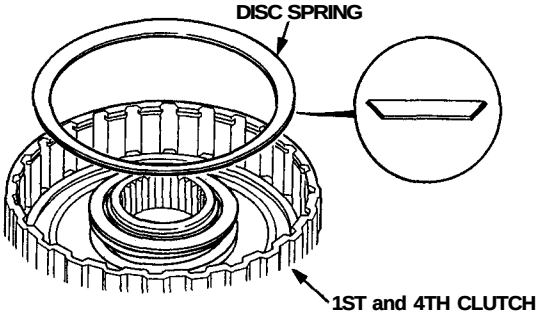
1. Remove the snap ring, then remove the clutch end plate, clutch discs, and plates.



2. Remove the disc springs.

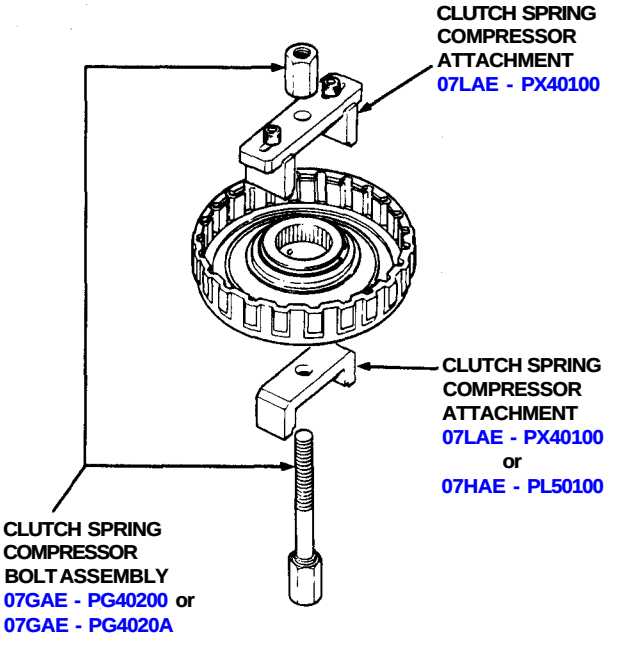
   NOTE: The 1st-hold clutch does not have a disc spring.



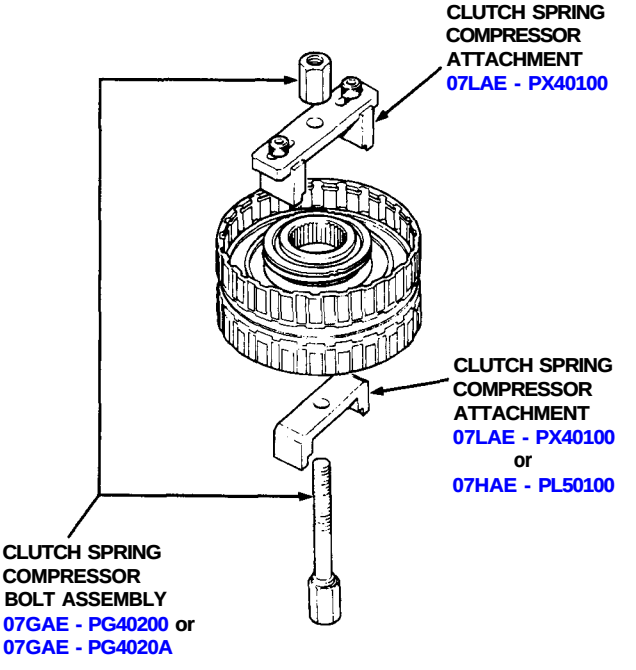


3. Install the special tools as shown.

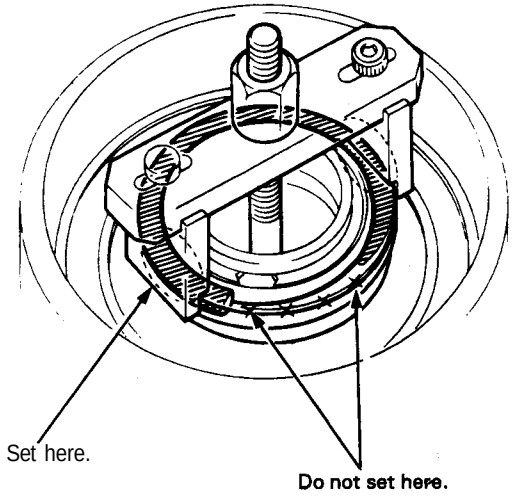
   NOTE: For 1st, 3rd, and 1st-hold clutches.

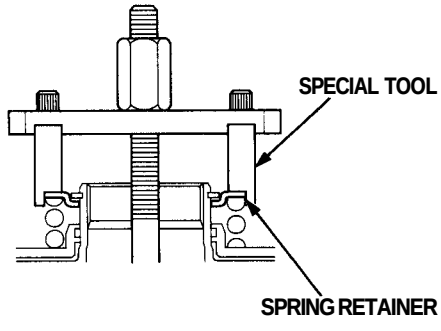


   NOTE: For 2nd and 4th clutches.

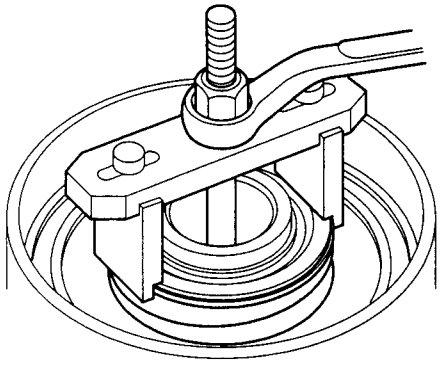


CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

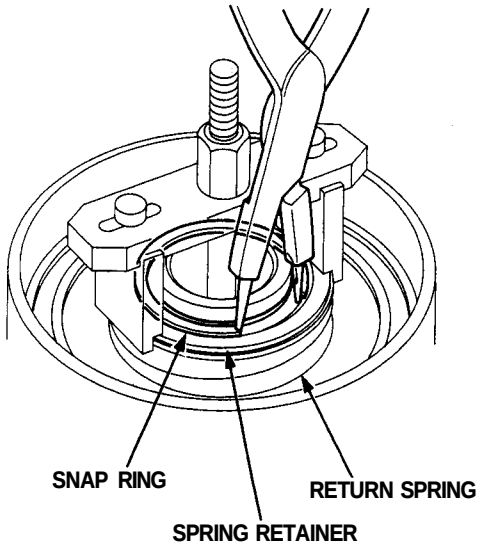




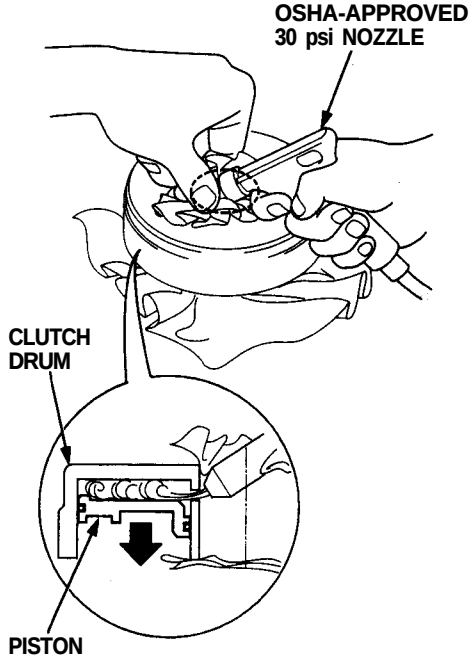
4. Compress the return spring.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



6. Wrap a shop rag around the clutch drum, and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.

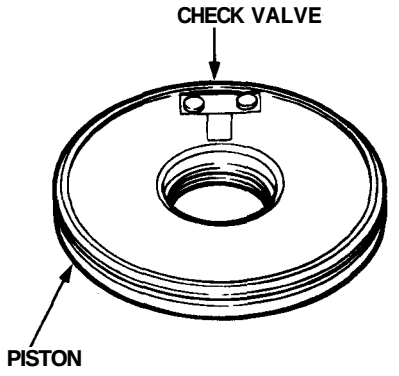


Clutch

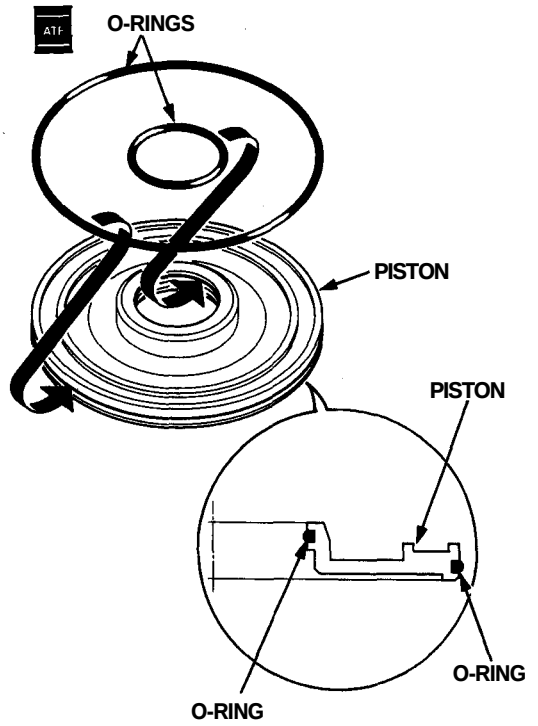
Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

1. Inspect the check valve; if it's loose, replace the piston.



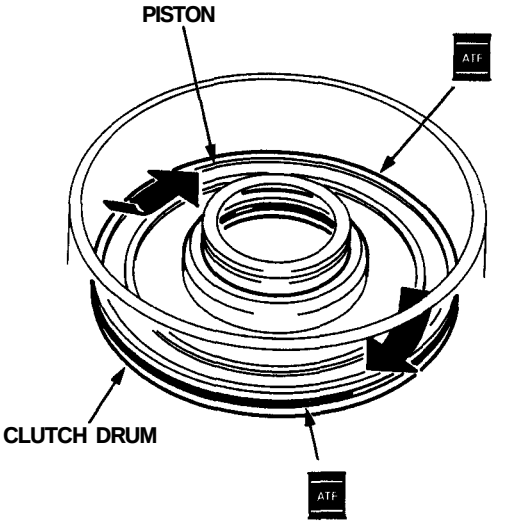
2. Install new O-rings on the piston.



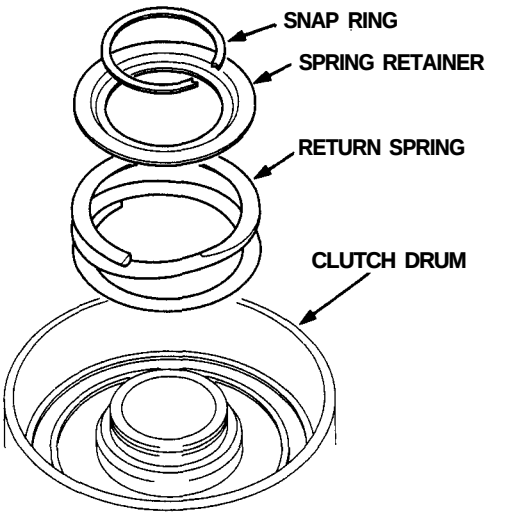
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch the O-ring by installing the piston with too much force.

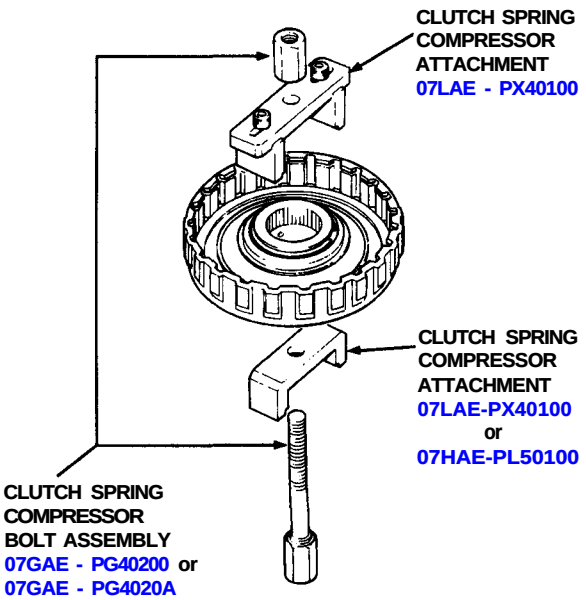


4. Install the return spring and spring retainer, and position the snap ring on the retainer.

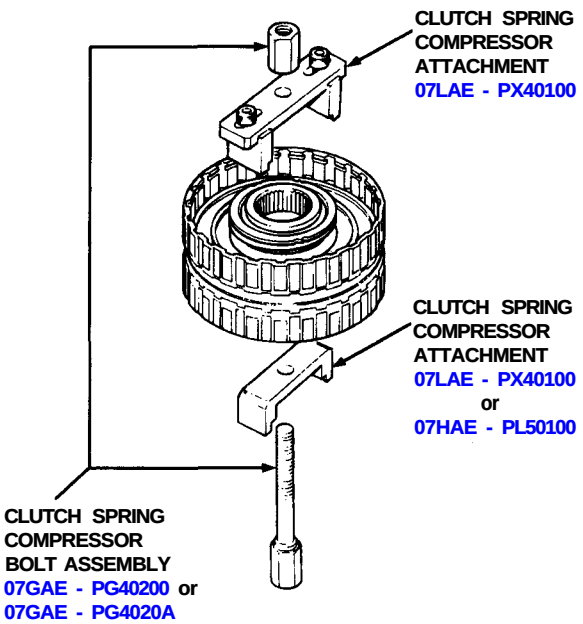


5. Install the special tools as shown.

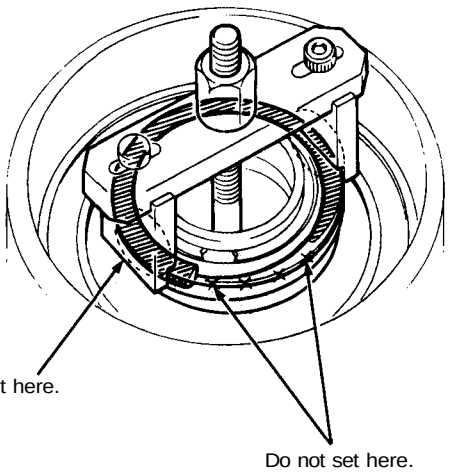
NOTE: For 1st, 3rd and 1st-hold clutches

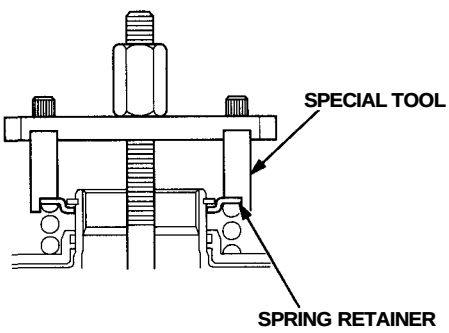


NOTE: For 2nd and 4th clutches

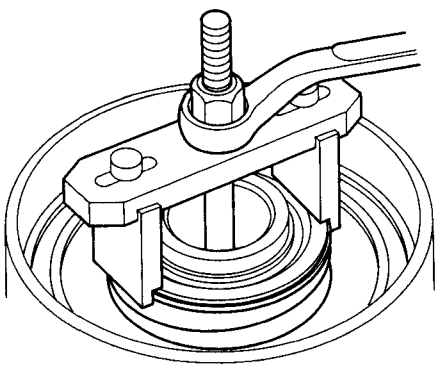


CAUTION: If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.





6. Compress the return spring.

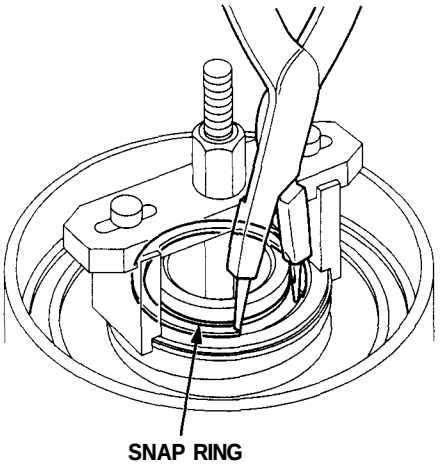


(cont'd)

Clutch

Reassembly (cont'd)

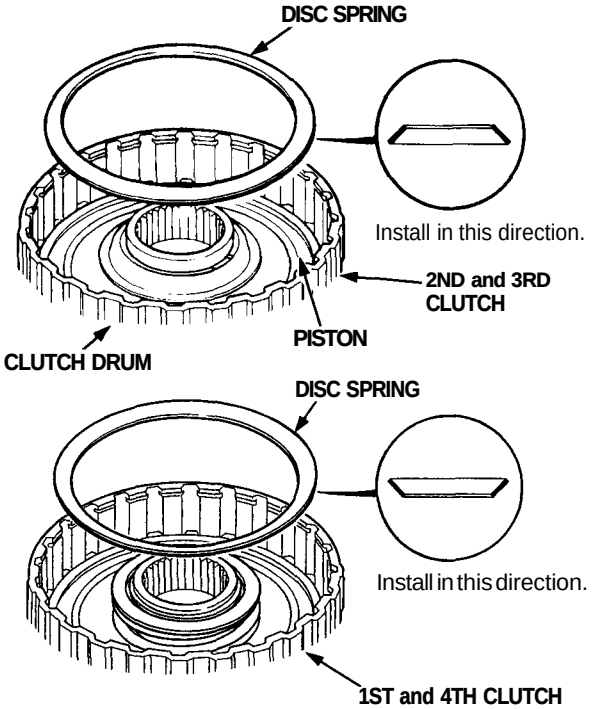
7. Install the snap ring.



8. Remove the special tools.

9. Install the disc spring.

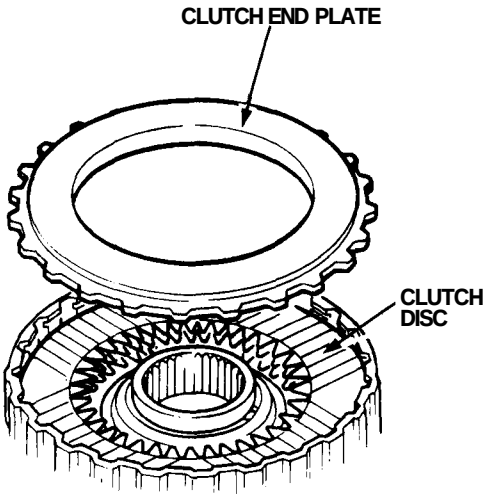
NOTE:
- Except 1st-hold clutch: the 1st-hold clutch does not have a disc spring.
- Install the disc spring in the direction shown.



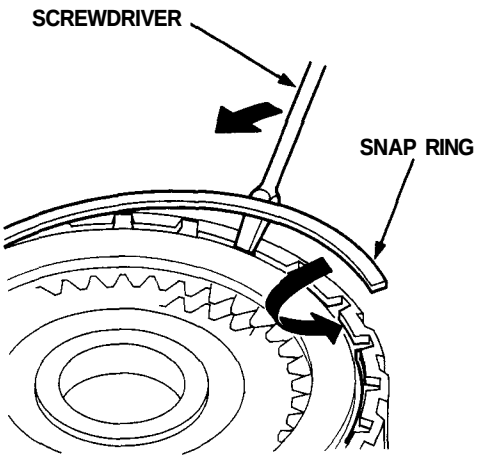
10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with the flat side toward the disc.

NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.



12. Install the snap ring.

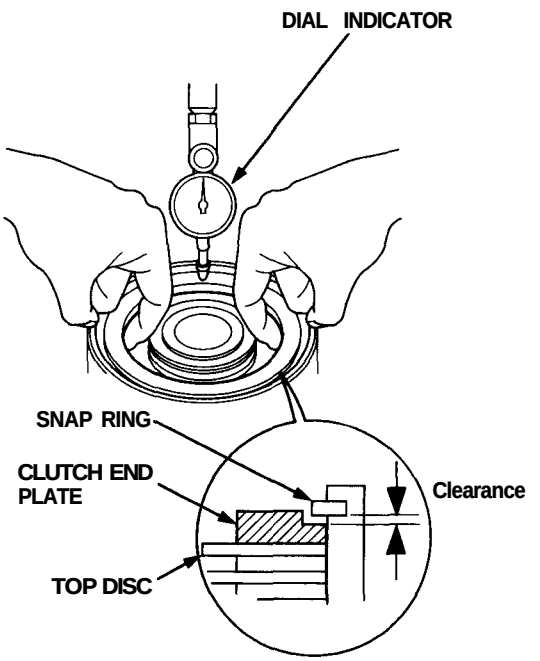


13. Measure the clearance between the clutch end plate and top disc with a dial indicator.
Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

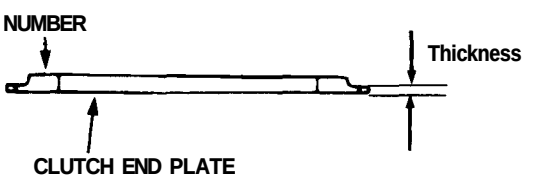
Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 - 0.85 mm (0.026 - 0.033 in)
2nd	0.55 - 0.75 mm (0.022 - 0.030 in)
3rd	0.55 - 0.75 mm (0.022 - 0.030 in)
4th	0.55 - 0.75 mm (0.022 - 0.030 in)
1st-hold	0.80 - 1.00 mm (0.031 - 0.039 in)



14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.



2ND and 4TH CLUTCH END PLATE

Plate No.	Part Number	Thickness mm (in)
1	22631 - PR9 - 003	2.1 (0.083)
2	22632 - PR9 - 003	2.2 (0.087)
3	22633 - PR9 - 003	2.3 (0.091)
4	22634 - PR9 - 003	2.4 (0.094)
5	22635 - PR9 - 003	2.5 (0.098)
6	22636 - PR9 - 003	2.6 (0.102)
7	22637 - PR9 - 003	2.7 (0.106)
8	22638 - PR9 - 003	2.8 (0.110)
9	22639 - PR9 - 003	2.9 (0.114)

1ST CLUTCH END PLATE

Plate No.	Part Number	Thickness mm (in)
1	22551 - PF4 - 000	2.1 (0.083)
2	22552 - PF4 - 000	2.2 (0.087)
3	22553 - PF4 - 000	2.3 (0.091)
4	22554 - PF4 - 000	2.4 (0.094)
5	22555 - PF4 - 000	2.5 (0.098)
6	22556 - PF4 - 000	2.6 (0.102)
7	22557 - PF4 - 000	2.7 (0.106)
8	22558 - PF4 - 000	2.8 (0.110)
9	22559 - PF4 - 000	2.9 (0.114)
10	22560 - PF4 - 000	3.0 (0.118)
11	22561 - PF4 - 000	3.1 (0.122)
12	22562 - PF4 - 000	3.2 (0.126)
13	22563 - PF4 - 000	3.3 (0.130)
14	22564 - PF4 - 000	3.4 (0.134)

3RD CLUTCH END PLATE

Plate No.	Part Number	Thickness mm (in)
4	22554 - PF4 - 000	2.4 (0.094)
5	22555 - PF4 - 000	2.5 (0.098)
6	22556 - PF4 - 000	2.6 (0.102)
7	22557 - PF4 - 000	2.7 (0.106)
8	22558 - PF4 - 000	2.8 (0.110)
9	22559 - PF4 - 000	2.9 (0.114)
10	22560 - PF4 - 000	3.0 (0.118)
11	22561 - PF4 - 000	3.1 (0.122)
12	22562 - PF4 - 000	3.2 (0.126)
13	22563 - PF4 - 000	3.3 (0.130)

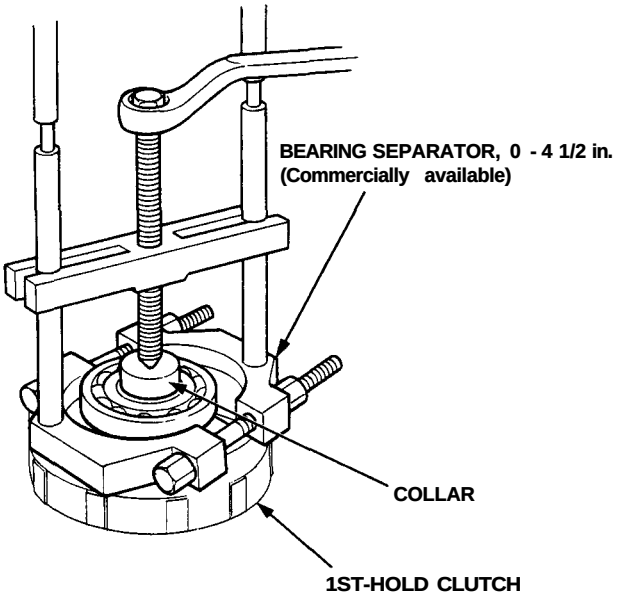
1ST-HOLD CLUTCH END PLATE

Plate No.	Part Number	Thickness mm (in)
3	22553 - PF4 - 000	2.3 (0.091)
4	22554 - PF4 - 000	2.4 (0.094)
5	22555 - PF4 - 000	2.5 (0.098)
6	22556 - PF4 - 000	2.6 (0.102)
7	22557 - PF4 - 000	2.7 (0.106)
8	22558 - PF4 - 000	2.8 (0.110)
9	22559 - PF4 - 000	2.9 (0.114)
10	22560 - PF4 - 000	3.0 (0.118)

1st-hold Clutch Bearing

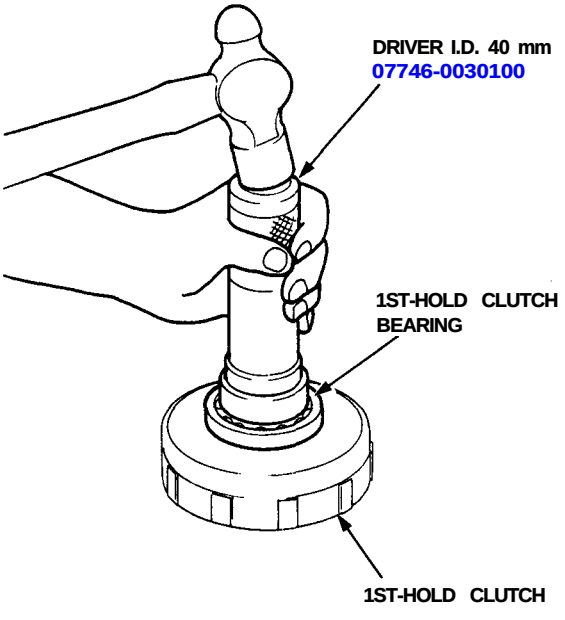
Replacement

1. Remove the 1st-hold clutch bearing using a bearing puller.



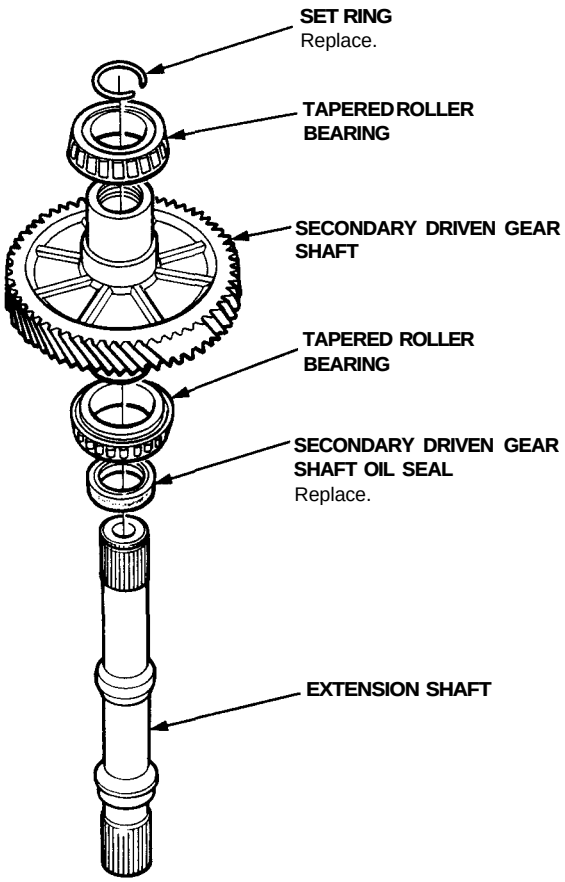
2. Install a new bearing using the special tool as shown.

   NOTE: Drive in the bearing until it fully bottoms.



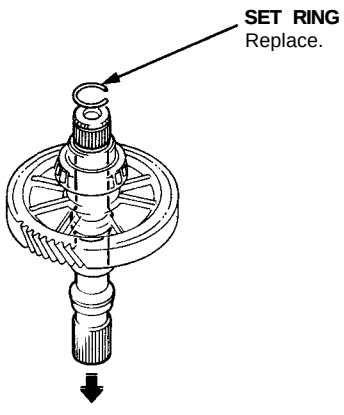
Secondary Driven Gear Shaft

Components



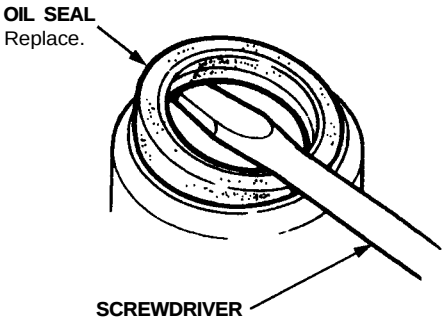
Disassembly

1. Remove the set ring.
2. Remove the extension shaft from the secondary driven gear shaft.

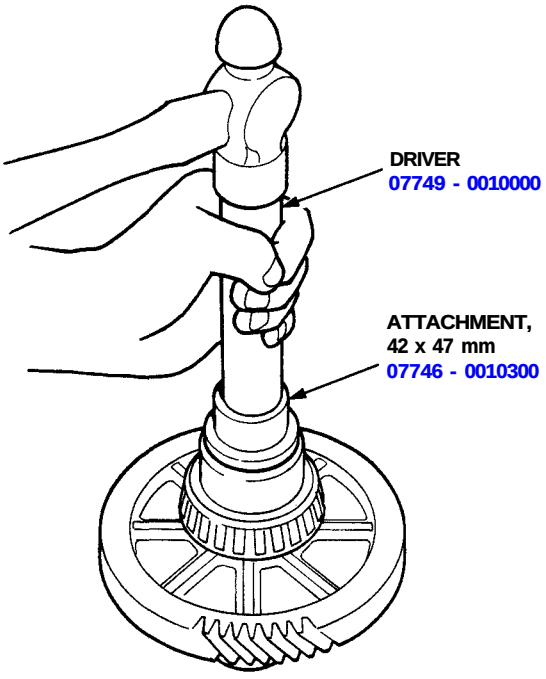


Oil Seal Replacement

1. Remove the oil seal from the secondary driven gear shaft.



2. Install the oil seal into the secondary driven gear shaft using the special tools as shown.

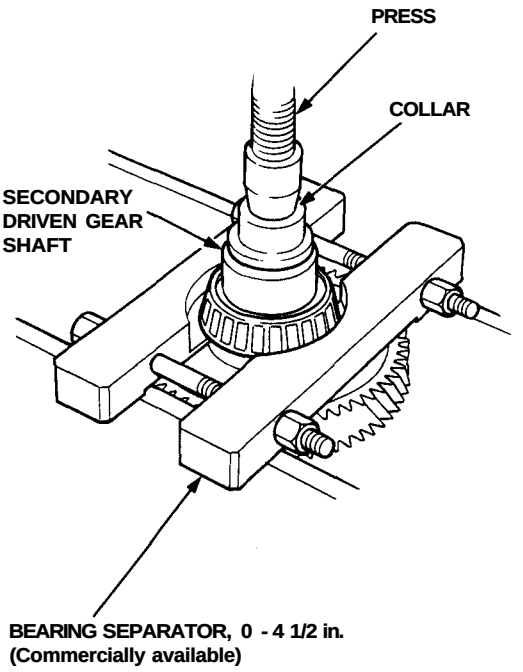


Secondary Driven Gear Shaft

Tapered Roller Bearing Replacement

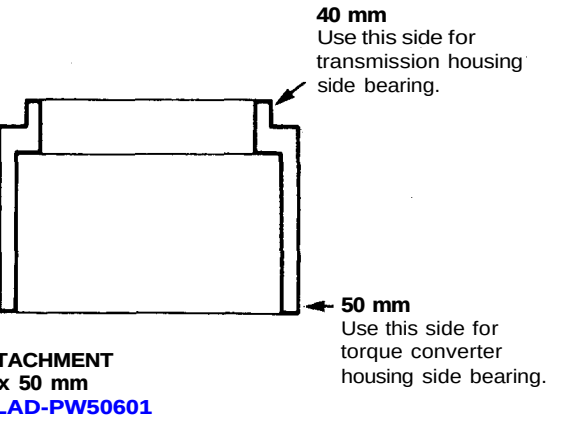
NOTE:
- The bearing and outer race should be replaced as a set.
- If the bearing is replaced, inspect and adjust the bearing preload (page 14-168).

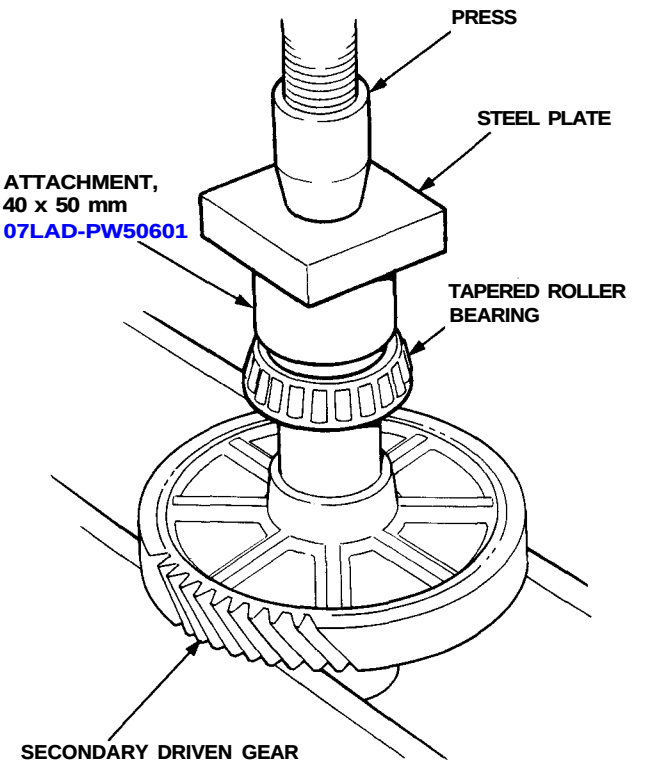
1. Remove the tapered roller bearings from the secondary driven gear shaft using a press.



2. Install the bearings using the special tool and a press as shown.

NOTE: Press the bearings in squarely until they bottom.



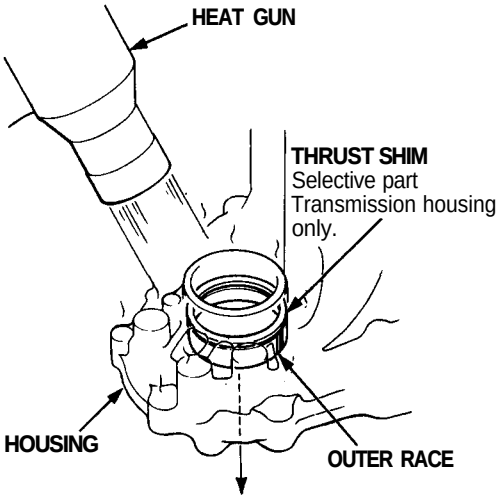


Tapered Roller Bearing Outer Race Replacement

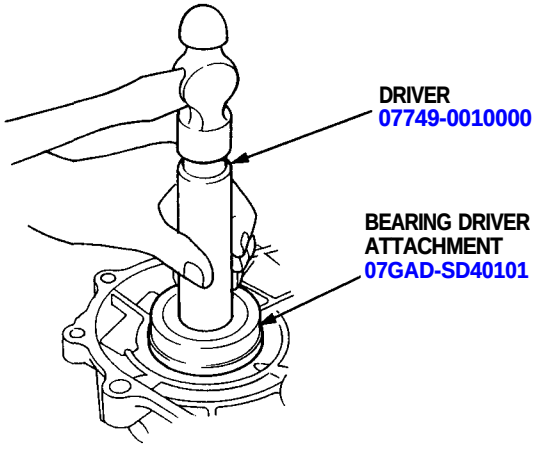
NOTE:
- Replace the bearing with a new one whenever the outer race is to be replaced.
- Do not use shim(s) on the torque converter housing side.
- Adjust preload after replacing the bearing and outer race.
- Coat all parts with ATF during installation.

1. Remove the bearing outer race from the transmission housing and torque converter housing by heating the housing to about 212°F (100°C).

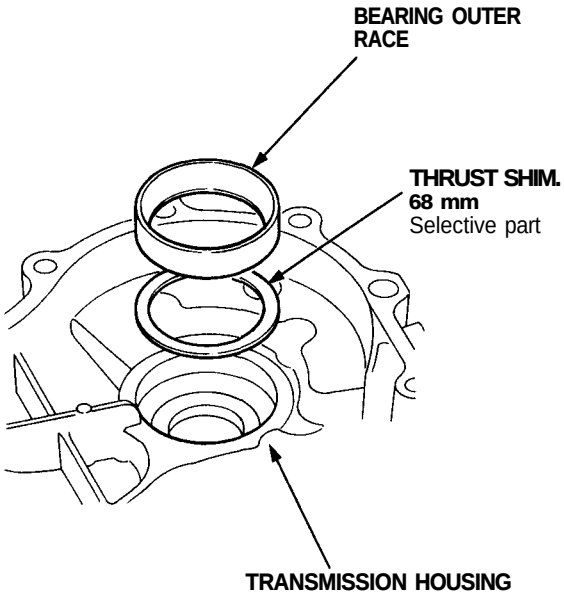
   CAUTION: Do not heat the housing in excess of 212°F (100°C).

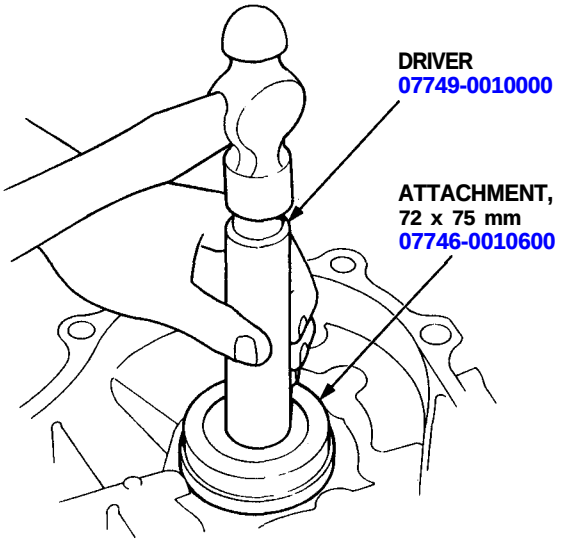


2. Install the outer race in the torque converter housing, using the special tools as shown.



3. Install the thrust shim and outer race in the transmission housing, using the special tools as shown.





Secondary Driven Gear Shaft

Tapered Roller Bearing Preload Adjustment

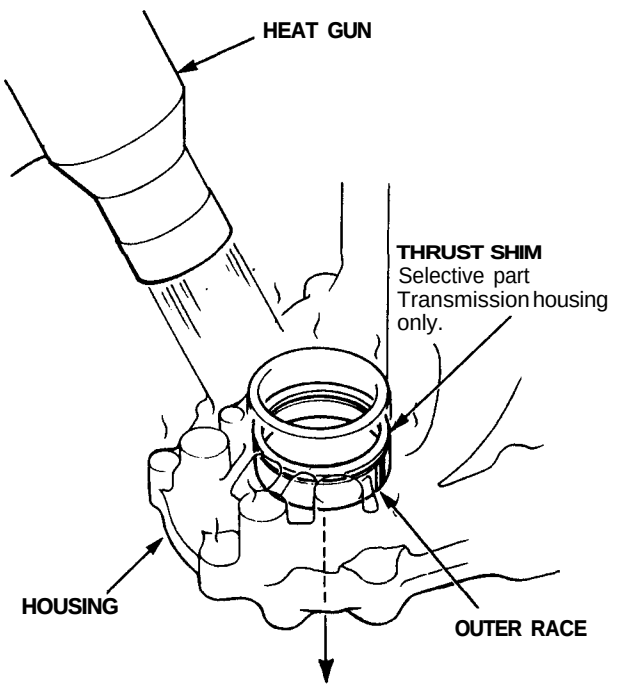
NOTE: If the transmission housing, torque converter housing, secondary driven gear shaft, tapered roller bearing, outer race or thrust shim were replaced, the bearing preload must be adjusted.

1. Remove the oil seals from both housing.

2. Remove the bearing outer race and thrust shim from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.

CAUTION:
- **Do not heat the housing in excess of 212°F (100°C).**
- **Replace the tapered roller bearing when the outer race is to be removed.**
- **Do not use a shim on the torque converter housing side.**

NOTE: Let the transmission housing cool to the room temperature before adjusting the bearing preload.



3. Select the 1.98 mm (0.078 in) thrust shim from the middle of the table below.

THRUST SHIM 68 mm

No.	Part Number	Thickness mm (in)
A	23941-PW5-000	1.56 (0.061)
B	23942 - PW5 - 000	1.59 (0.063)
C	23943 - PW5 - 000	1.62 (0.064)
D	23944 - PW5 - 000	1.65 (0.065)
E	23945 - PW5 - 000	1.68 (0.066)
F	23946 - PW5 - 000	1.71 (0.067)
G	23947 - PW5 - 000	1.74 (0.069)
H	23948 - PW5 - 000	1.77 (0.070)
I	23949 - PW5 - 000	1.80 (0.071)
J	23950 - PW5 - 000	1.83 (0.072)
K	23951 - PW5 - 000	1.86 (0.073)
L	23952 - PW5 - 000	1.89 (0.074)
M	23953 - PW5 - 000	1.92 (0.076)
N	23954 - PW5 - 000	1.95 (0.077)
O	23955 - PW5 - 000	1.98 (0.078)
P	23956 - PW5 - 000	2.01 (0.079)
Q	23957 - PW5 - 000	2.04 (0.080)
R	23958 - PW5 - 000	2.07 (0.081)
S	23959 - PW5 - 000	2.10 (0.083)
T	23960 - PW5 - 000	2.13 (0.084)
U	23961-PW5-000	2.16 (0.085)
V	23962 - PW5 - 000	2.19 (0.086)
W	23963 - PW5 - 000	2.22 (0.087)
X	23964 - PW5 - 000	2.25 (0.089)
Y	23965 - PW5 - 000	2.28 (0.090)
Z	23966 - PW5 - 000	2.31 (0.091)
AA	23967 - PW5 - 000	2.34 (0.092)
AB	23968 - PW5 - 000	2.37 (0.093)
AC	23969 - PW5 - 000	2.40 (0.094)
AD	23970 - PW5 - 000	2.43 (0.096)

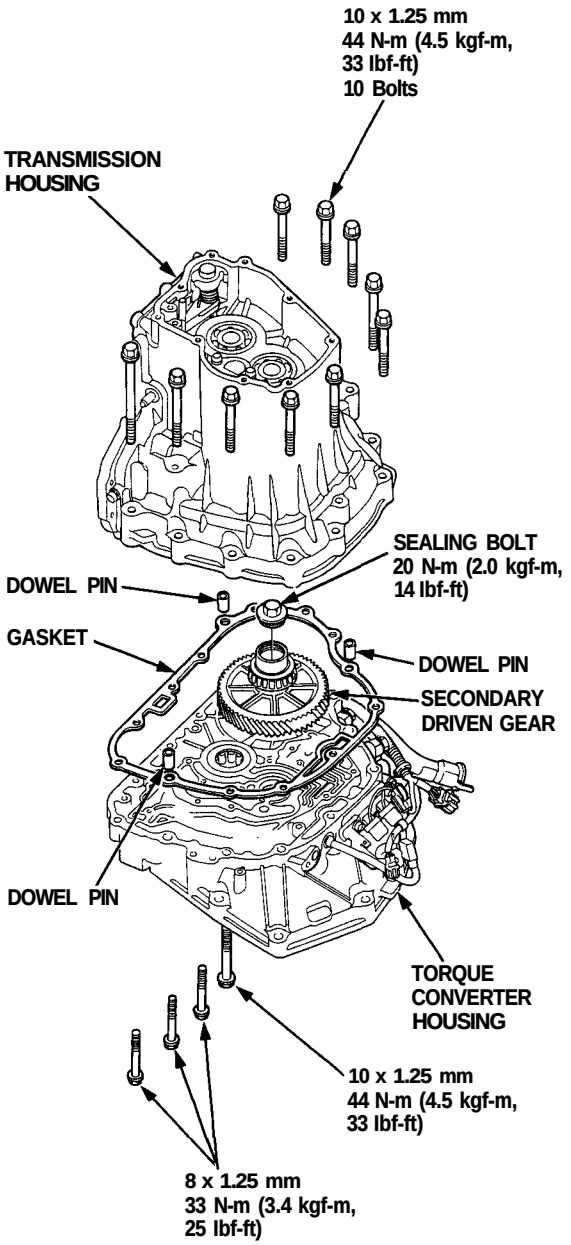
4. After installing the thrust shim, install the outer race in the transmission housing using the special tools (see page 14-167).

NOTE:
- Install the outer race squarely in the transmission housing.
- Check that there is no clearance between the outer race, shim and transmission housing.

5. Install the sealing bolt to the secondary driven gear shaft and torque it to 20 N-m (2.0 kgf-m, 14 lbf-ft).

6. With the mainshaft and countershaft removed, install the secondary driven gear shaft, and torque the transmission housing.

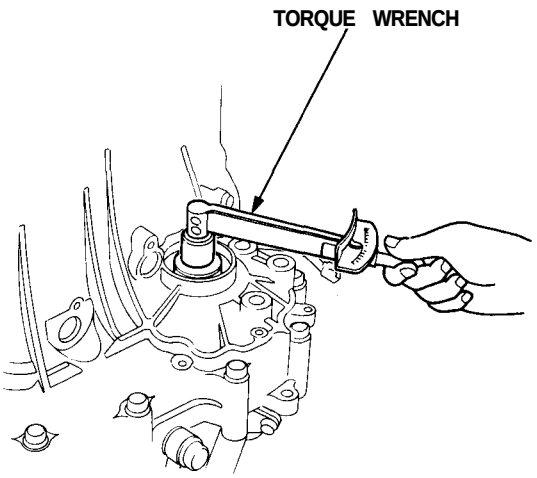
   NOTE: Install the gasket when checking starting torque.



7. Rotate the secondary driven gear shaft in both directions to seat the bearing.

8. Measure the starting torque of the secondary driven gear shaft with a torque wrench.

   STANDARD: 2.3 - 3.2 N-m
   (23 - 33 kgf-cm, 20 - 29 lbf-in)



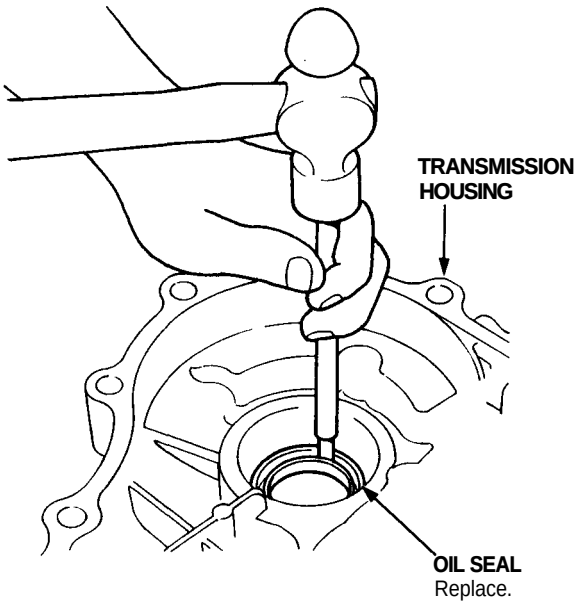
NOTE:

- Measure the starting torque at normal room temperature in both directions.
- Changing the shim to the next size will increase or decrease starting torque about 0.3 - 0.4 N-m (3 - 4 kgf-cm, 3-3 lbf-in).
- To increase the starting torque, increase the thickness of the shim. To decrease the starting torque, decrease the thickness of the shim.

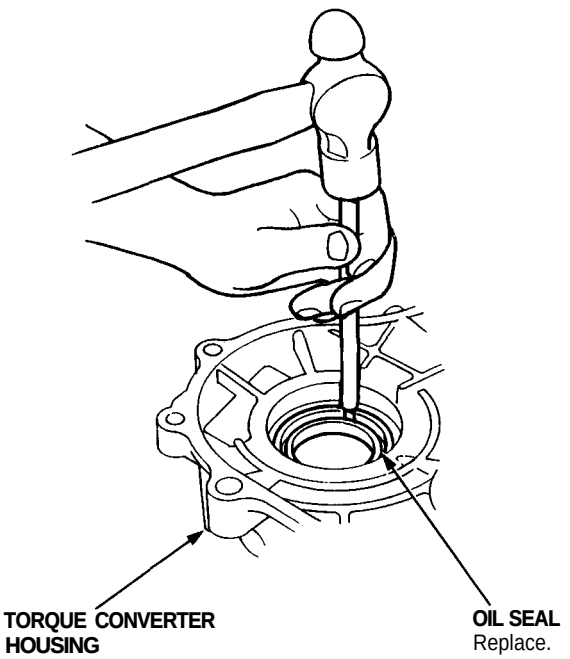
Oil Seals

Removal

1. Remove the oil seal from the transmission housing.

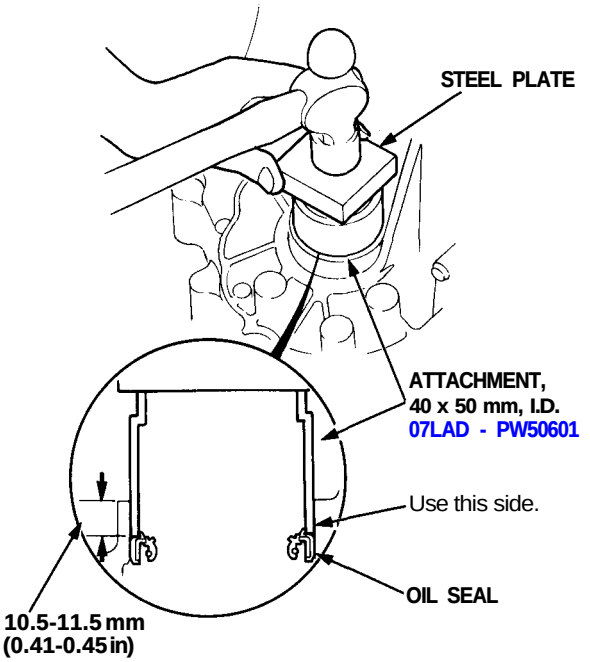


2. Remove the oil seal from the torque converter housing.



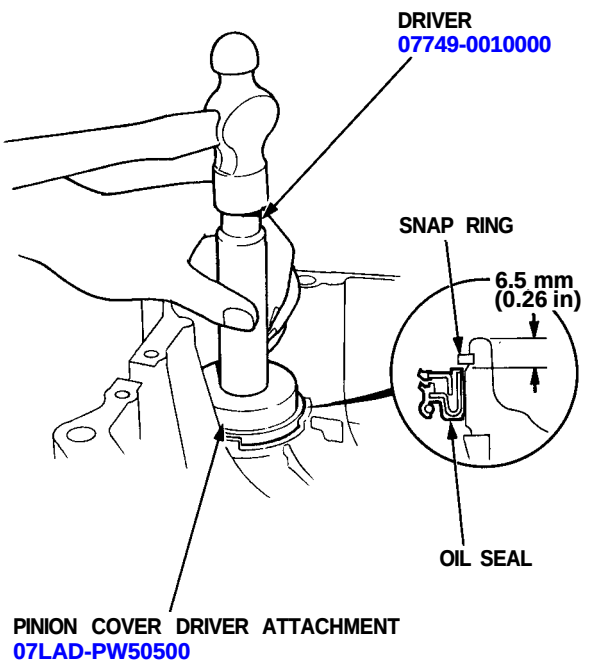
Installation

1. Install the oil seal in the transmission housing using the special tool as shown.



2. Drive the oil seal into the torque converter housing using the special tools as shown.

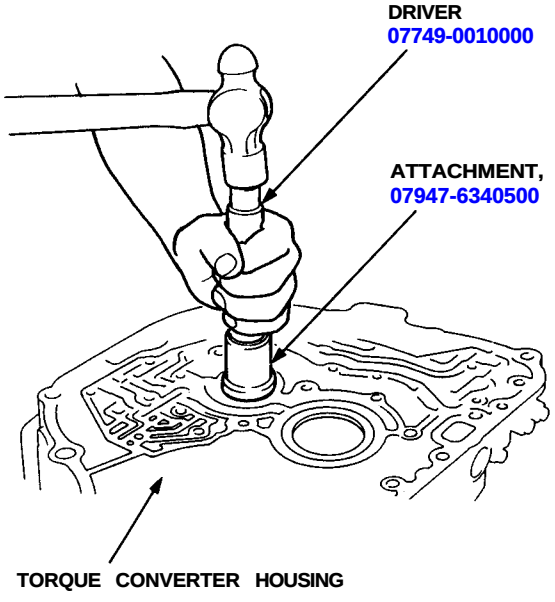
3. Install the snap ring in the torque converter housing.

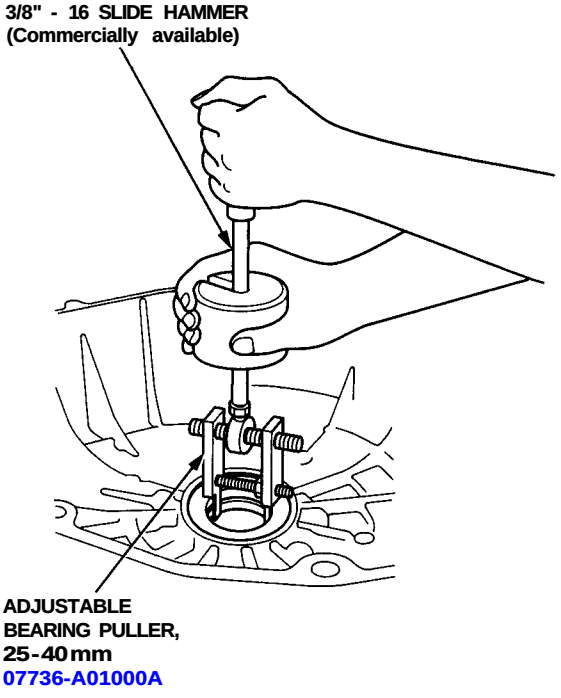


Torque Converter Housing Bearings

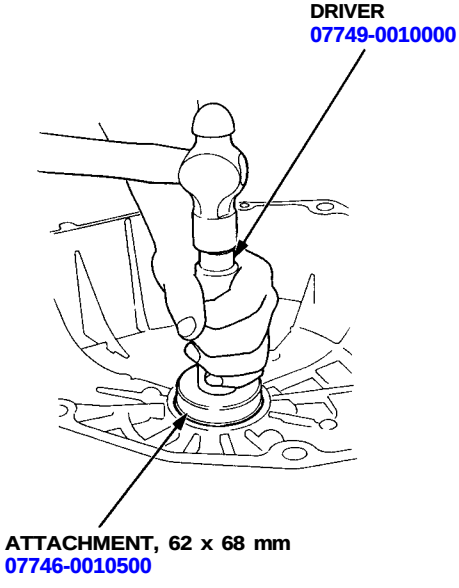
Mainshaft Bearing/Oil Seal Replacement

1. Drive out or pull up the mainshaft bearing and oil seal using the special tools as shown.

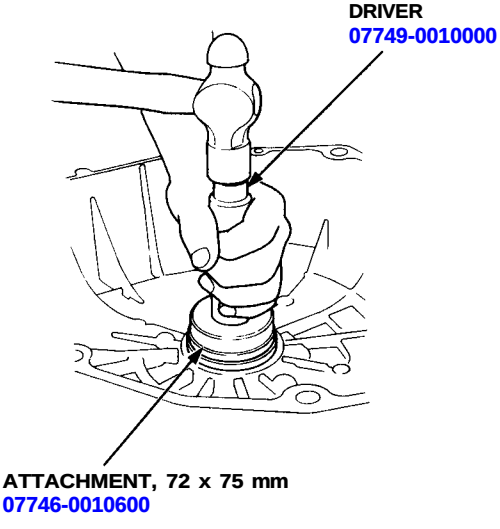




2. Drive in the new mainshaft bearing until it bottoms in the housing using the special tools as shown.



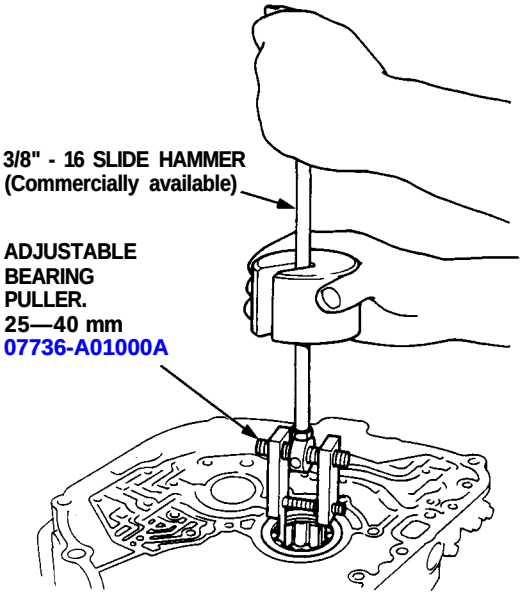
3. Install the new oil seal flush with the housing using the special tools as shown.



Torque Converter Housing Bearing

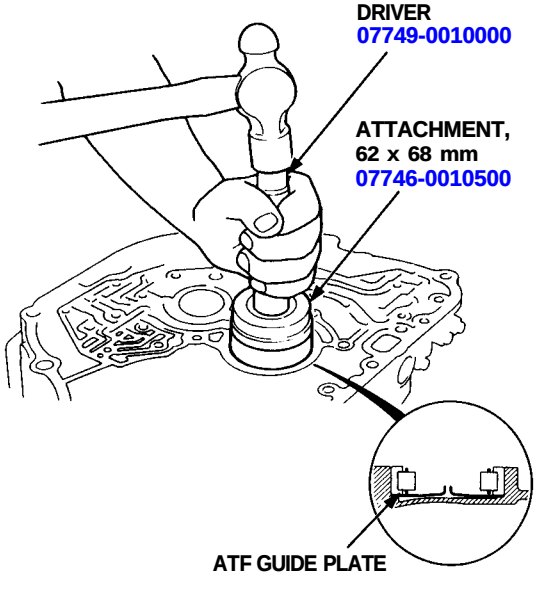
Countershaft Bearing Replacement

1. Remove the countershaft roller bearing using the special tool as shown.



2. Install the ATF guide plate.

3. Drive the new bearing into the housing using the special tools as shown.

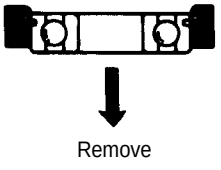


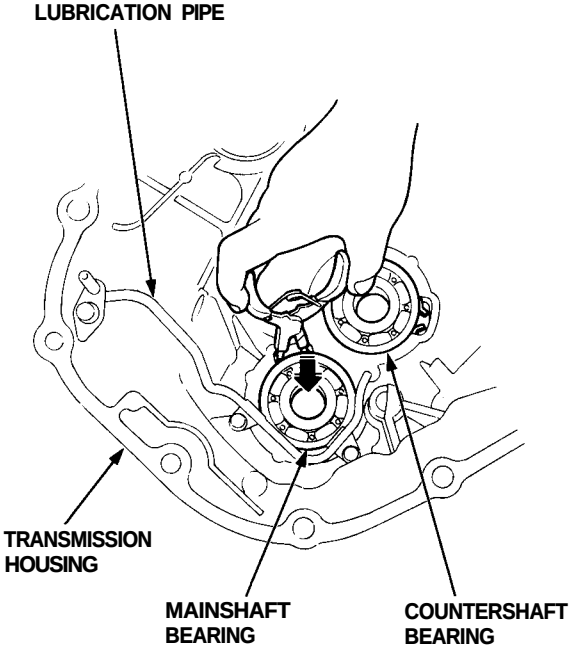
Transmission Housing Bearing

Replacement

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with the snap ring pliers, then push the bearing out.

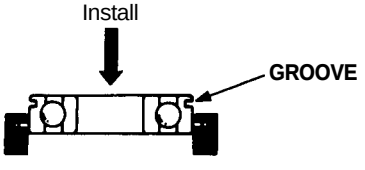
NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.





2. Expand each snap ring with the snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.

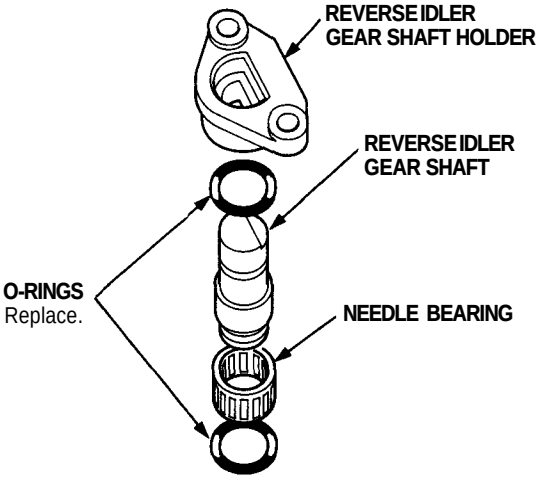
NOTE: Install with groove side of the bearing facing inside the transmission housing.



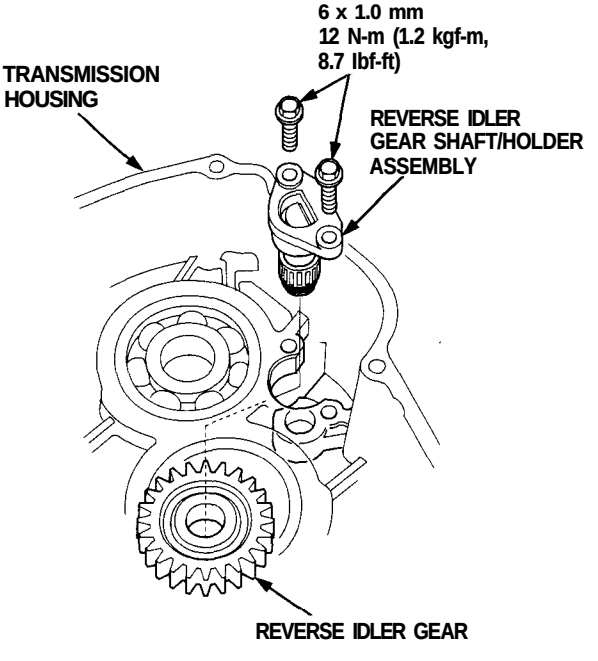
Reverse Idler Gear

Installation

1. Coat the reverse idler gear shaft, needle bearing and new O-rings with lithium grease lightly.
2. Assemble new O-rings and needle bearing on the reverse idler gear shaft.
3. Install the reverse idler gear shaft in the reverse idler gear shaft holder, aligning the D-shaped cutout of the shaft with the D-shaped area of the holder.



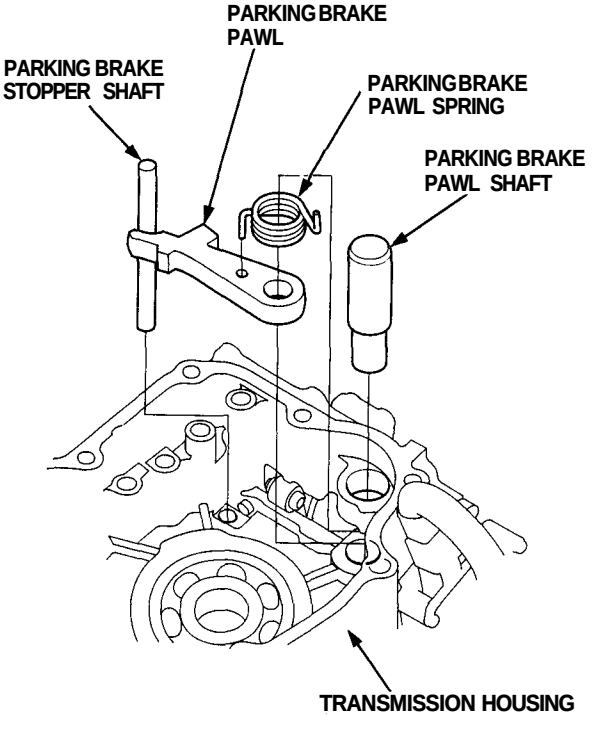
4. Install the reverse idler gear into the transmission housing.
5. Install the reverse idler gear shaft holder assembly in the transmission housing, then tighten the bolts.



Parking Brake Pawl

Installation

1. Install the hooked end of the parking brake pawl spring in the hole of the parking brake pawl.
2. Place them on the transmission housing aligning with shaft holes of the parking brake pawl and transmission housing.
3. Install the parking brake pawl shaft on the transmission housing.
4. Install the parking brake pawl stopper on the transmission housing.

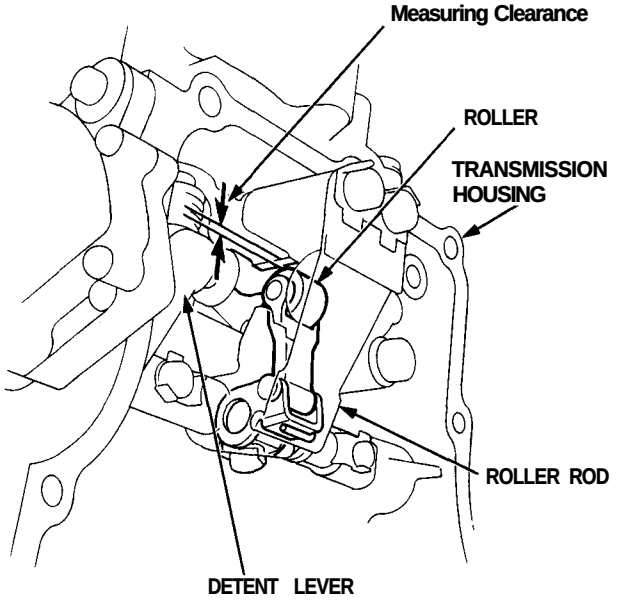


Parking Brake Roller Rod

Adjustment

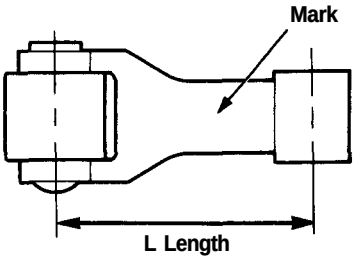
1. Move the detent lever to the [P] position.
2. Measure the clearance between the parking brake roller rod and the transmission housing as shown.

STANDARD: 3.8 - 4.3 mm (0.15 - 0.17 in)



3. If the clearance is out of tolerance, select and install a new parking brake roller rod.

PARKING BRAKE ROLLER ROD



PARKING BRAKE ROLLER ROD

Mark	Part Number	Length "L"
1 or None	24550 -PW4- 010	36.0 mm (1.417 in)
2	24560 -PW4- 010	35.6 mm (1.402 in)
0	24580 -PW4- 010	36.4 mm (1.433 in)
3	24590 - PW4 - 000	36.2 mm (1.425 in)

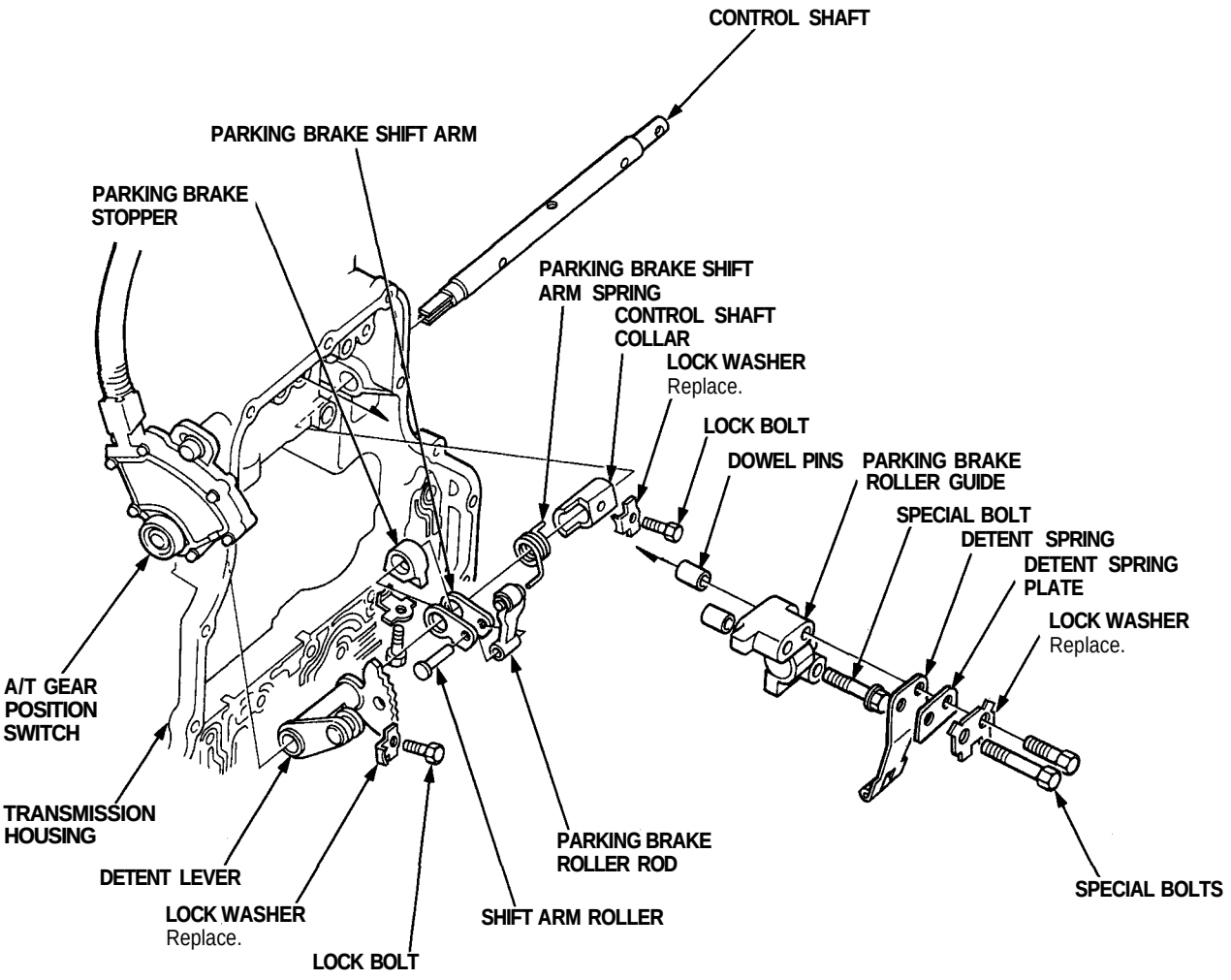
4. After replacing the parking brake roller rod, make sure that the clearance is within tolerance.

Control Shaft/Detent Spring

Disassembly

NOTE: It is necessary to disassemble the control shaft and/or detent spring when maintenance is required.

1. Remove the two special bolts, lock washer, detent spring plate and detent spring.
2. Remove the special bolt securing the parking brake roller guide, then remove the parking brake roller guide with two dowel pins from the transmission housing.
3. Remove the three lock bolts with lock washers from the control shaft.
4. Pull the control shaft out and remove the detent lever, shift arm roller, parking brake stopper, parking brake shift arm, parking brake roller rod, parking brake shift arm spring and control shaft collar.



Control Shaft/Detent Spring

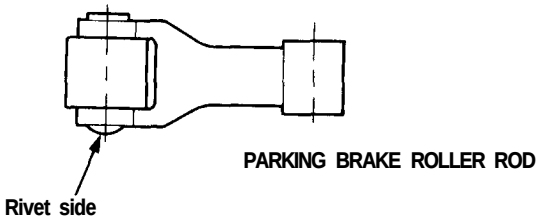
Reassembly

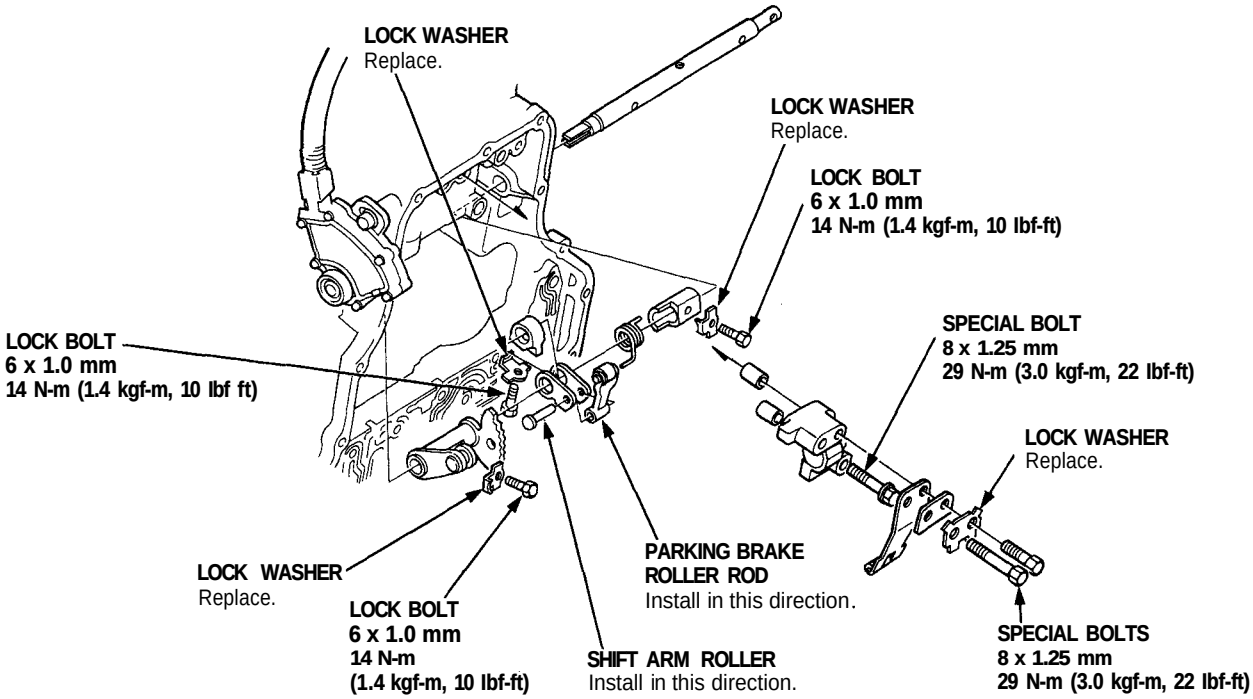
NOTE:
- Coat all parts with ATF.
- Replace the lock washers.

1. Insert the control shaft into the torque converter housing, then install the control shaft collar and parking brake shift arm spring on the control shaft.
2. Set the parking brake shift arm with the parking brake stopper, then insert the control shaft into the hole of the parking brake shift arm/parking brake stopper assembly.
3. Install the parking brake roller rod with the shift arm roller on the parking brake shift arm, then install the detent lever on the control shaft.

   CAUTION:
   Install the parking brake roller rod with the rivet facing the detent lever.
   Install the shift arm roller with its flange side facing the detent lever.
4. Align the cutout of the control shaft with the A/T gear position switch, then insert the control shaft in the A/T gear position switch.
5. Install the lock bolts with new lock washers on the control shaft, and tighten the bolts. Then bend the lock washers against the bolt head.
6. Move the detent lever to any gear other than the [P] position.

   CAUTION: If the detent lever is in the [P] position when installing the detent spring; you may damage the parking brake roller guide.
7. Install the parking brake roller guide on the transmission housing with the two dowel pins and the special bolt.
8. Install the detent spring, detent spring plate, lock washer and the two special bolts.
9. Tighten the bolts then bend the lock washer.





Transmission

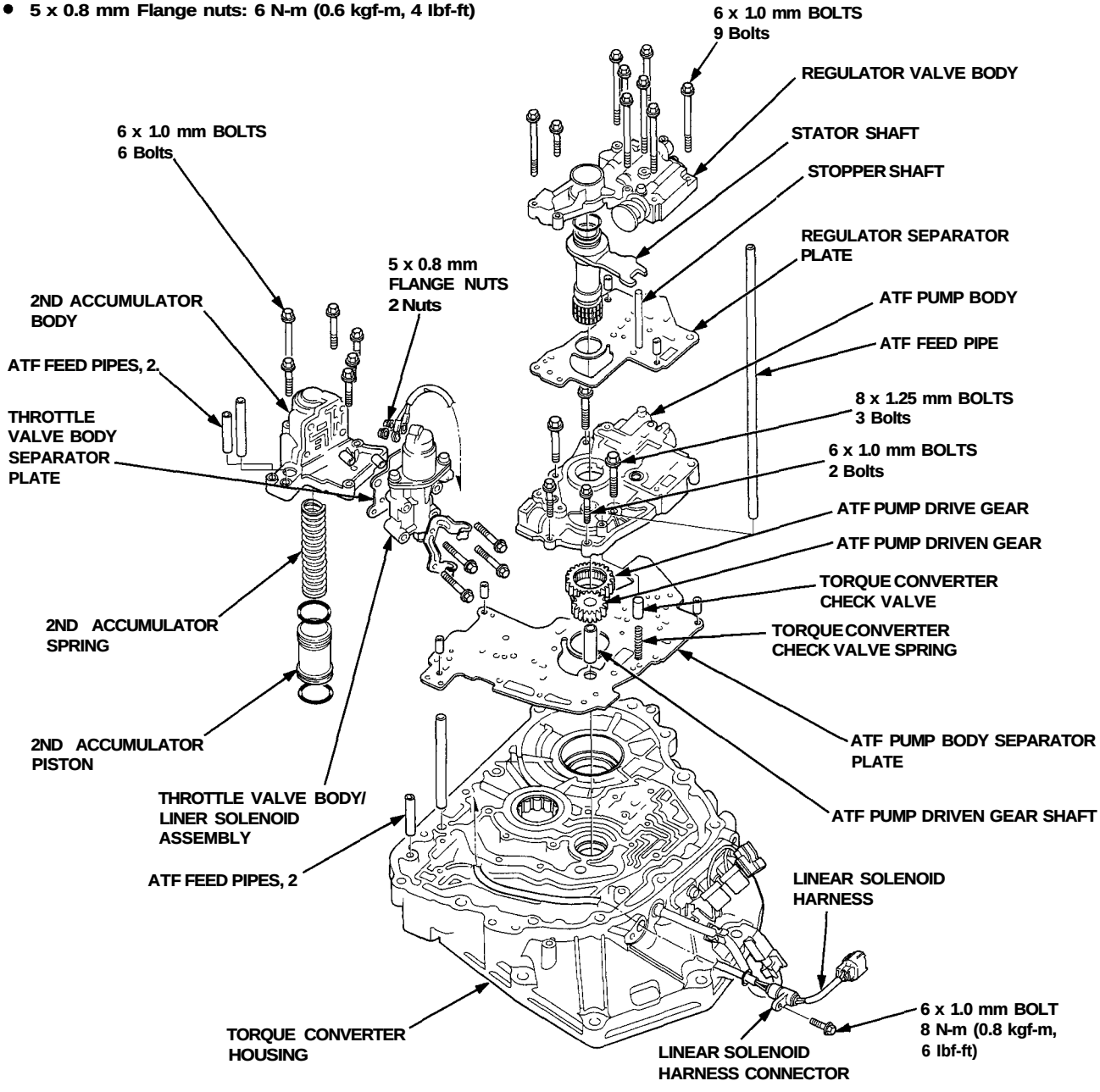
Reassembly

NOTE:

- Coat all parts with ATF.
- Replace the following parts:
  - O-rings
  - Lock washers
  - Gaskets
  - Mainshaft and countershaft locknuts and conical disc springs
  - Sealing washers

TORQUE:

- **6 x 1.0 mm Bolts: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)**
- **8 x 1.25 mm Bolts: 18 N-m (1.8 kgf-m, 13 lbf-ft)**
- **5 x 0.8 mm Flange nuts: 6 N-m (0.6 kgf-m, 4 lbf-ft)**



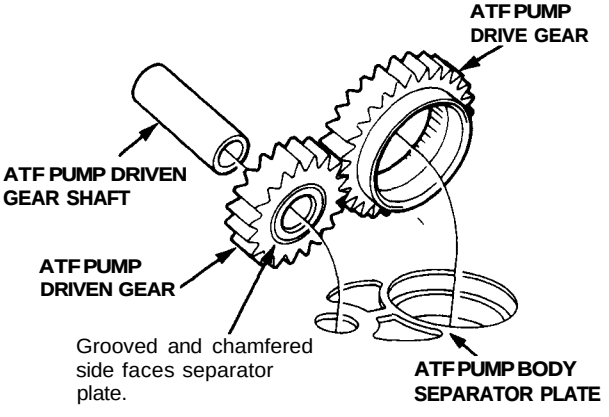
1. Install the linear solenoid harness and linear solenoid harness connector into the torque converter housing.

2. Install the ATF pump body separator plate and three dowel pins on the torque converter housing.

   CAUTION: Take care not to pinch the linear solenoid harness.

3. Install the ATF pump drive gear, ATF pump driven gear, ATF pump driven gear shaft, torque converter check valve, and spring on the torque converter housing.

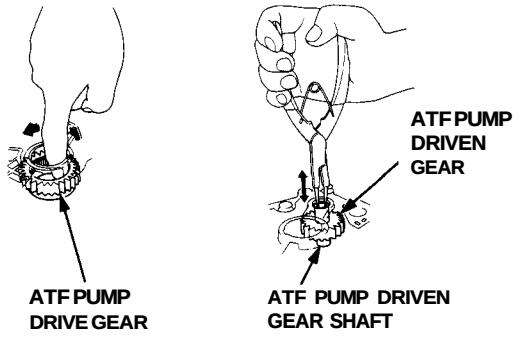
   NOTE: Install the ATF pump driven gear with its grooved and chamfered side facing down.



4. Install the ATF pump body with three 8 mm bolts and two 6 mm bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction, and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.

5. If the ATF pump drive gear and ATF pump driven gear shaft do not move freely, loosen the ATF pump body bolts, realign the ATF pump driven gear shaft, and then retighten to the specified torque.

   CAUTION: Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump driven gear or ATF pump driven gear shaft.



6. Install the throttle valve body/linear solenoid on the 2nd accumulator body with two dowel pins, throttle valve body separator plate, and harness clamp (four bolts).

7. Install the 2nd accumulator piston and 2nd accumulator spring in the 2nd accumulator body, then install the 2nd accumulator body on the torque converter housing (six bolts).

8. Install the regulator separator plate on the ATF pump body with two dowel pins.

9. Install the stator shaft with a new O-ring and stopper shaft.

10. Install the regulator valve body (nine bolts).

11. Connect the linear solenoid harness to the linear solenoid terminal, then tighten the two flange nuts to 6 N-m (0.6 kgf-m, 4 lbf-ft)

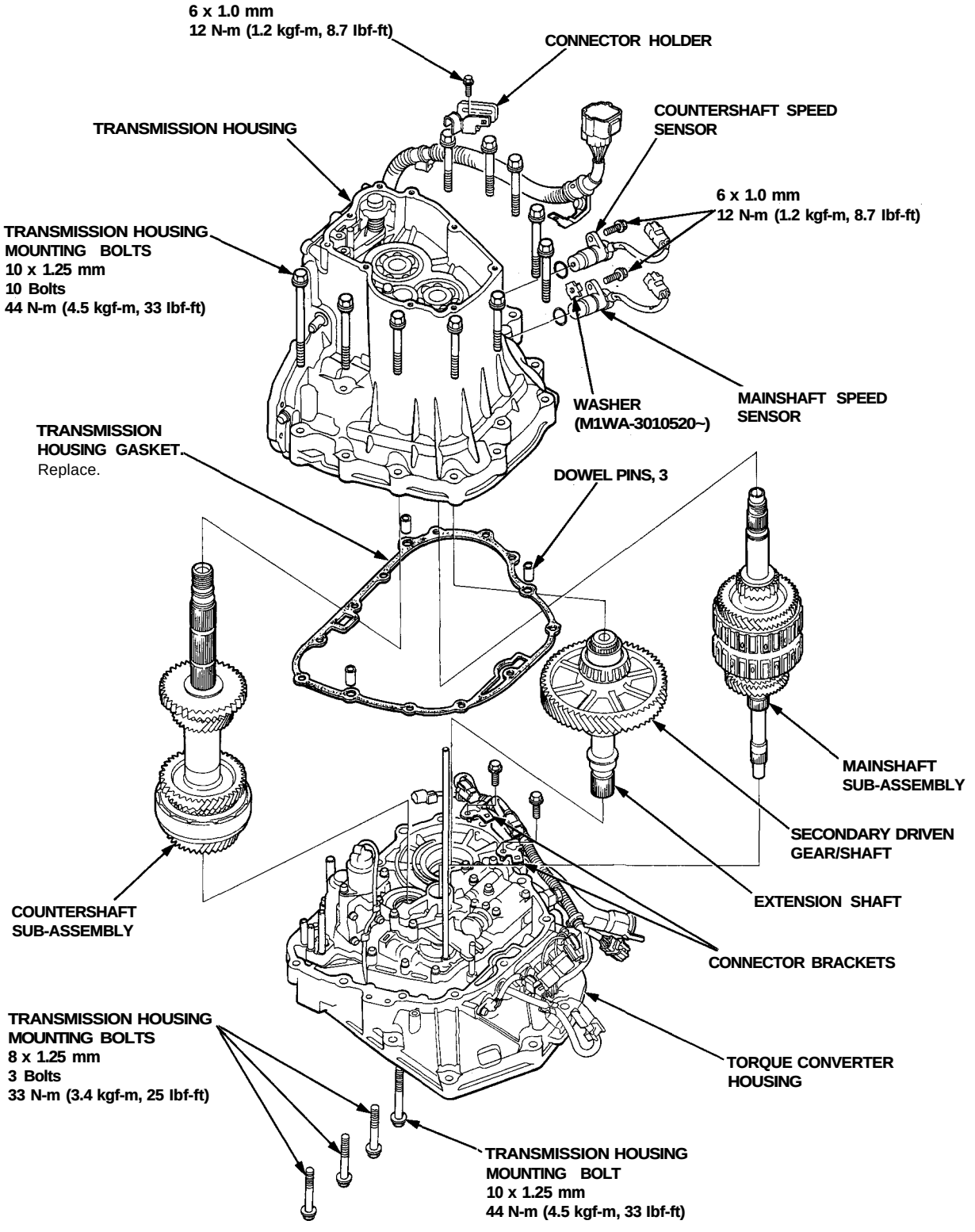
12. Tighten the linear solenoid harness connector bolt to 8 N-m (0.8 kgf-m, 6 lbf-ft)

13. Install the ATF feed pipe in the ATF pump body, the two ATF feed pipes in the torque converter housing, and the two ATF feed pipes in the 2nd accumulator body.

(cont'd)

Transmission

Reassembly (cont'd)



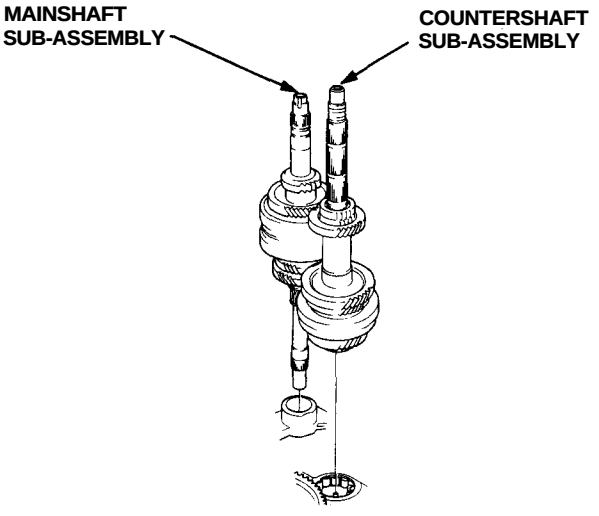
14. Install the reverse idler gear and reverse idler gear shaft assembly in the transmission housing (see page 14-173).

15. Assemble the mainshaft sub-assembly (see page 14-150).

16. Assemble the countershaft sub-assembly (see page 14-153).

17. Install the secondary driven gear shaft in the torque converter housing.

18. Install the mainshaft sub-assembly and the countershaft sub-assembly together in the torque converter housing.

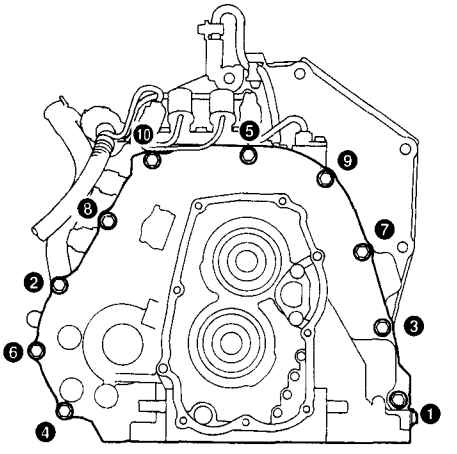


19. Install three dowel pins and a new gasket on the torque converter housing.

20. Place the transmission housing on the torque converter housing.

CAUTION: Make sure that the mainshaft and countershaft speed sensors are not installed on the transmission housing before installing the transmission housing on the torque converter housing.

21. Install the transmission housing mounting bolts, and torque them in two or more steps in the sequence shown.



22. Install the 10 mm bolt and three 8 mm bolts to the transmission housing from the torque converter housing side, and torque them.

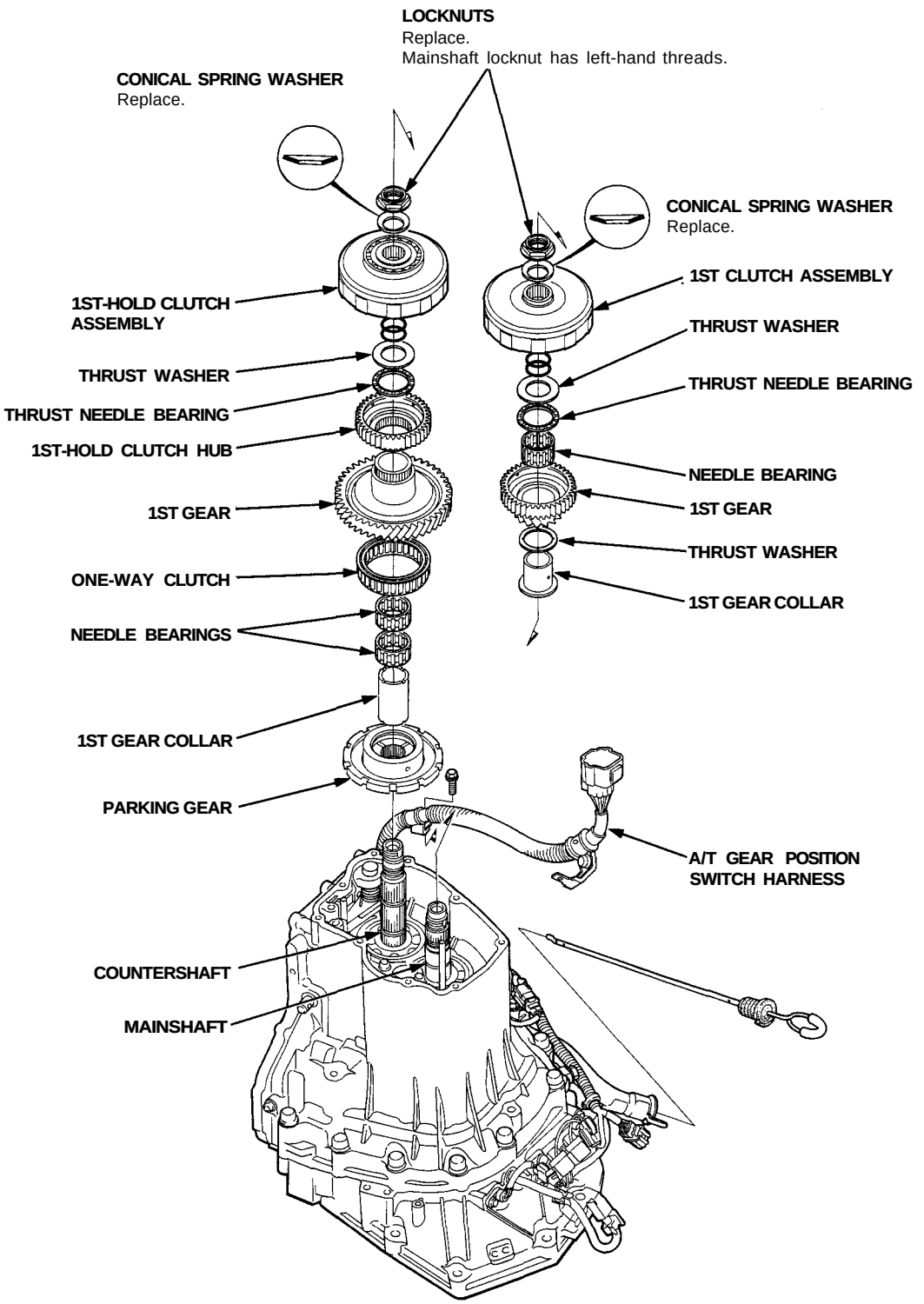
23. Install the mainshaft and countershaft speed sensors on the transmission housing.

24. Install the connector brackets and connector holder on the transmission housing.

(cont'd)

Transmission

Reassembly (cont'd)



25. Install the parking brake pawl, spring, pawl shaft and stopper shaft on the transmission housing (see page 14-173).

26. Shift to any gear other than the [P] position by turning the control shaft or the detent lever.

27. Install the parking gear, countershaft 1st gear collar and needle bearings on the countershaft.

28. Assemble the one-way clutch in the countershaft 1st gear, then install them on the countershaft.

29. Install the mainshaft 1st gear collar and the thrust washer on the mainshaft.

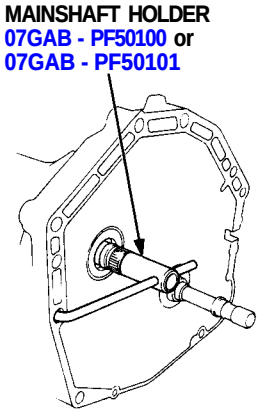
30. Install the O-ring on the mainshaft and countershaft.

    NOTE: Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.

31. Install the thrust washer, thrust needle bearing, needle bearing and mainshaft 1st gear in the 1st clutch assembly, then install them on the mainshaft.

32. Install the thrust washer, thrust needle bearing and 1st-hold clutch hub in the 1st clutch assembly, then install them on the countershaft.

33. Install the special tool onto the mainshaft as shown.



34. Engage the parking brake pawl with the parking gear by turning the detent lever to the E position.

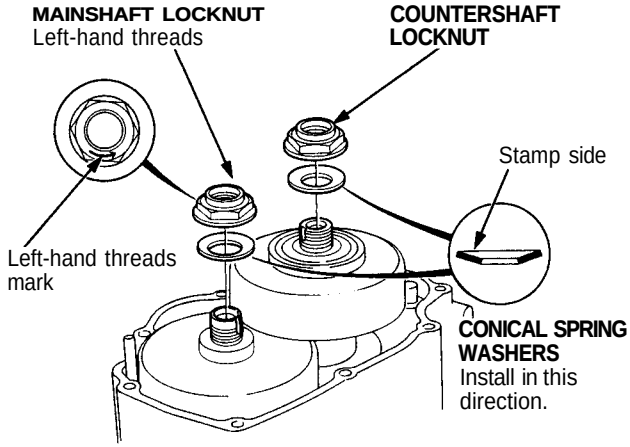
35. Coat new conical spring washers with ATF, then install them and new locknuts on each shaft.

    CAUTION: Install the conical spring washers in the direction shown.

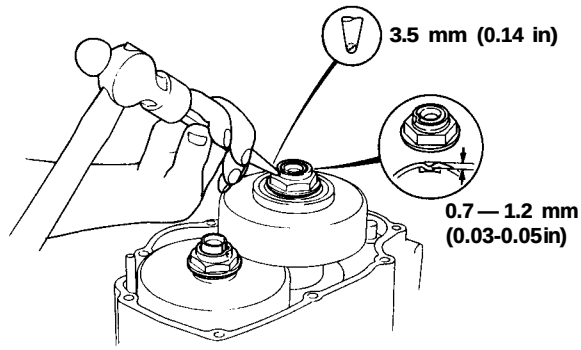
36. Tighten the locknuts to specified torque using a torque wrench.

    TORQUE: 137 N-m (14.0 kgf-m, 101 lbf-ft)

    NOTE: The mainshaft locknut has left-hand threads.



37. Stake each locknut into its shaft using a 3.5 mm (0.14 in) punch.



(cont'd)

Transmission

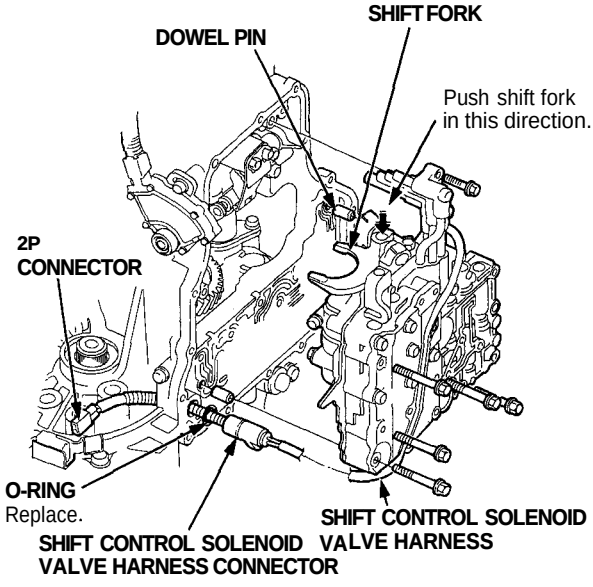
Reassembly (cont'd)

38. Assemble the lower valve body assembly (see page 14-110 and 14-111).

39. Install the two dowel pins on the lower valve body assembly.

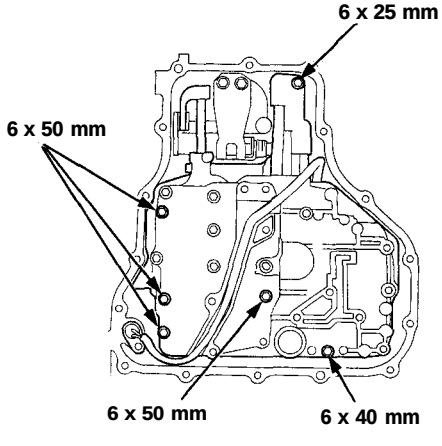
40. Push the shift fork toward the servo valve body.

41. Install the lower valve body assembly putting the manual valve and detent lever together, the reverse selector and the shift fork together, and joining the ATF feed pipes with the ATF feed pipe holes of the transmission housing.



42. Install the six bolts and torque as shown.

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



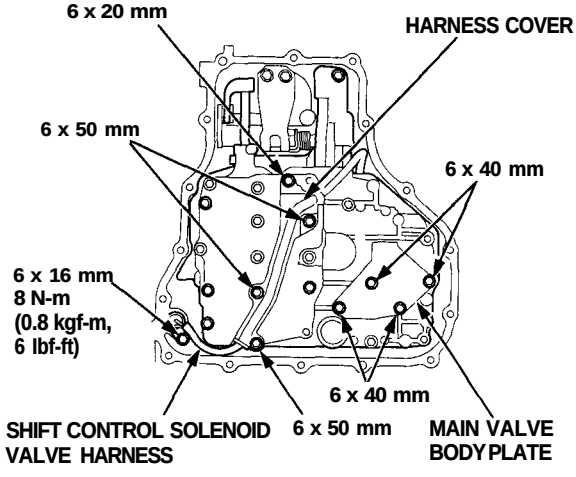
43. Install the main valve body plate (four bolts).

44. Pass the shift control solenoid valve harness through the transmission housing, then install the shift control solenoid valve harness connector (one bolt).

45. Install the harness cover (four bolts).

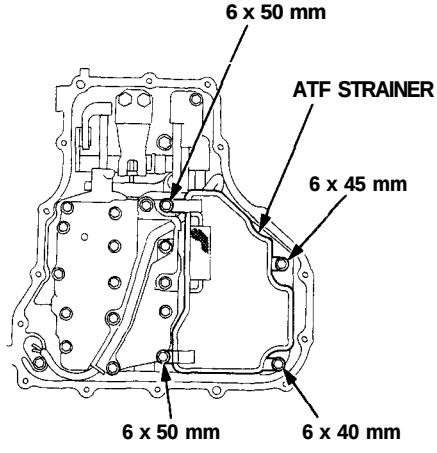
46. Lightly pull the shift control solenoid valve harness from the harness cover, then bring the shift control solenoid valve harness back. Make sure that the shift control solenoid valve harness is not pinched. If the shift control solenoid valve harness is pinched, loosen the four bolts securing the harness cover then retighten the bolts.

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



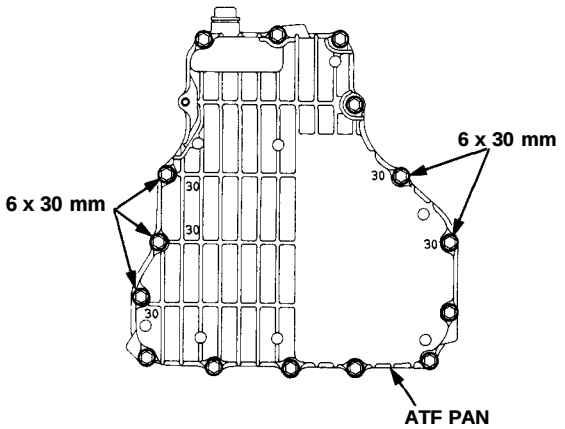
47. Install the ATF strainer with a new O-ring (four bolts).

TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



48. Install the ATF pan with two dowel pins and a new gasket (fifteen bolts) as shown. Make sure that the shift control solenoid valve harness is not pinched by the ATF pan.

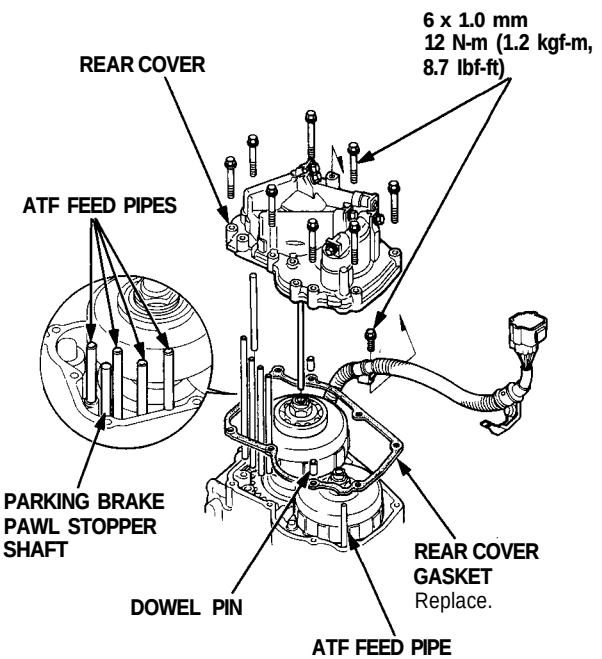
TORQUE: 12 N-m (1.2 kgf-m, 8.7 lbf-ft)



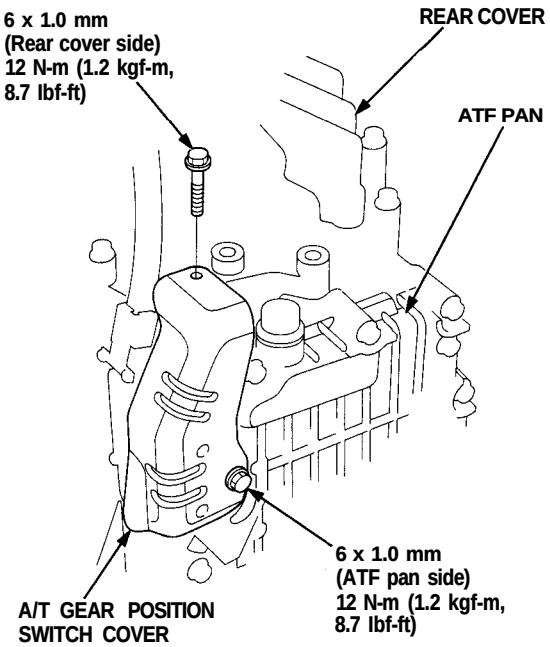
49. Install four ATF feed pipes in the transmission housing.

50. Install the rear cover with two dowel pins and a new gasket (eight bolts).

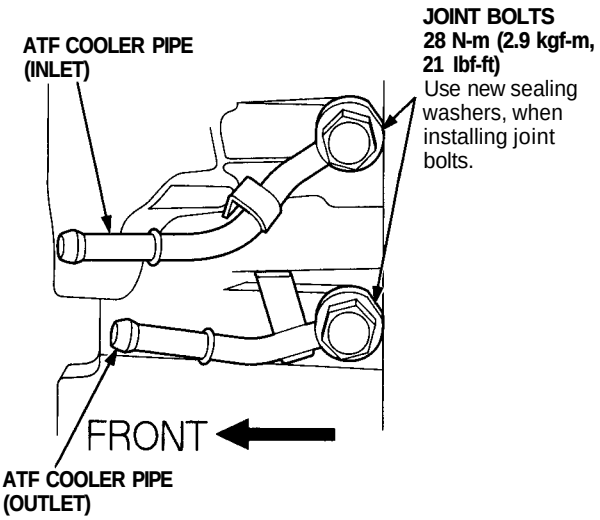
51. Install the A/T gear position switch harness clamp on the rear cover.



52. Install the A/T gear position switch cover. Tighten the bolt on the ATF pan side loosely so that there is no clearance between the A/T gear position switch cover and the ATF pan. Then tighten the bolt on the rear side cover side to the specified torque, and tighten the bolt on the ATF pan side to the specified torque.



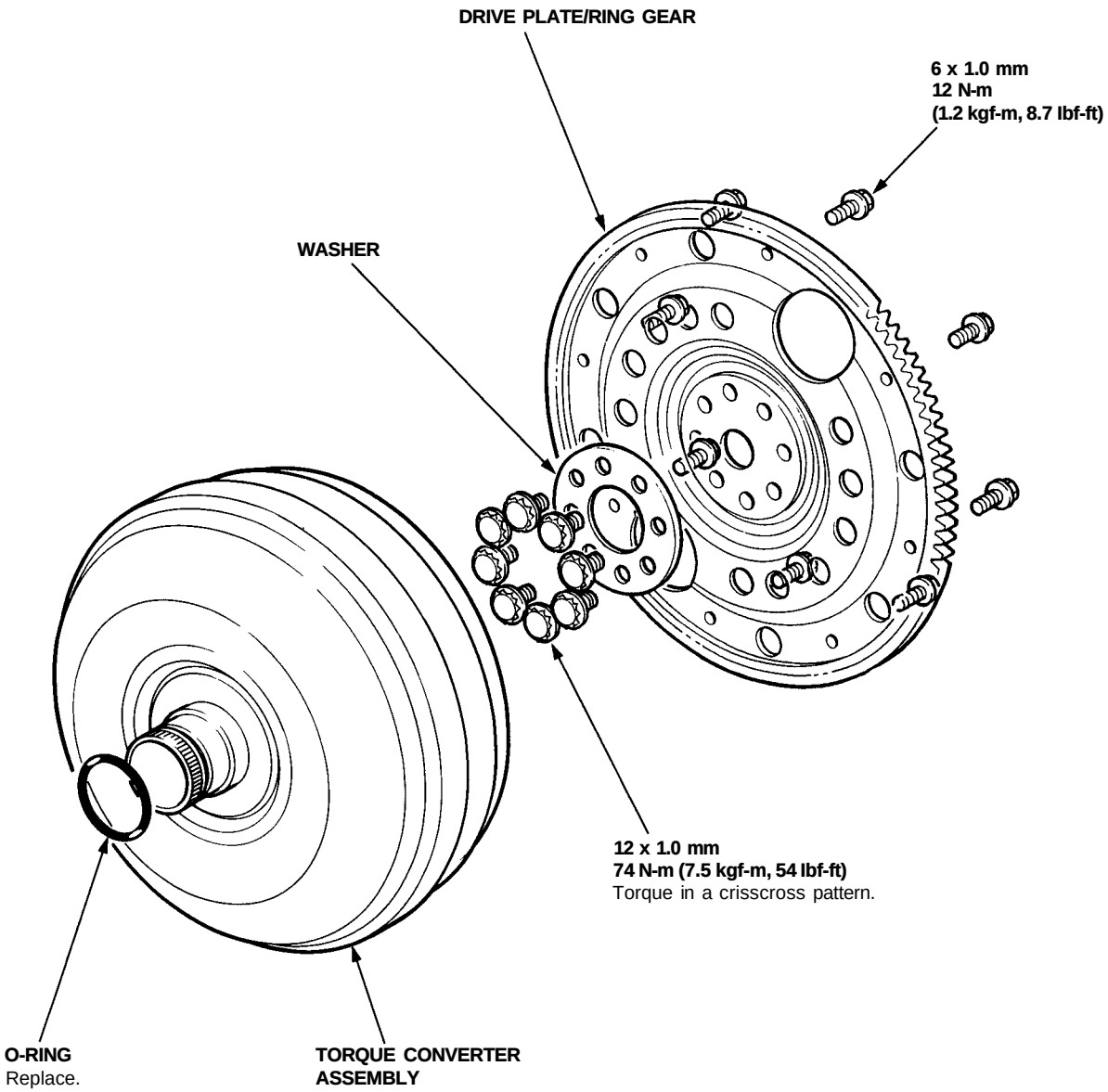
53. Install the ATF cooler pipes on the transmission housing, if necessary.



54. Install the ATF dipstick.

55. Connect the connectors, and install them on the connector brackets and connector holder.

Torque Converter/Drive Plate/Ring Gear

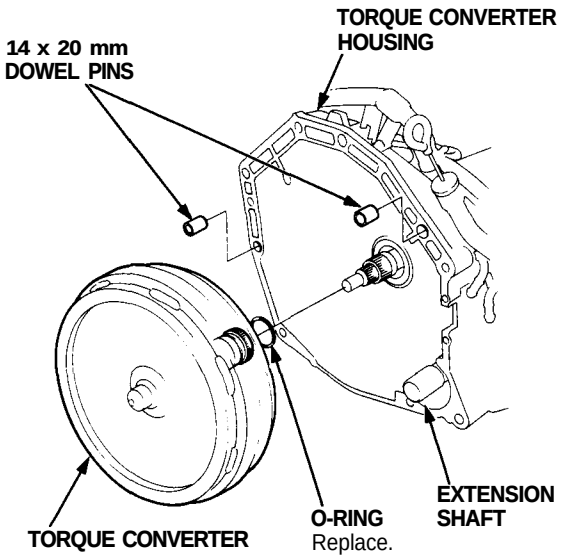


Transmission

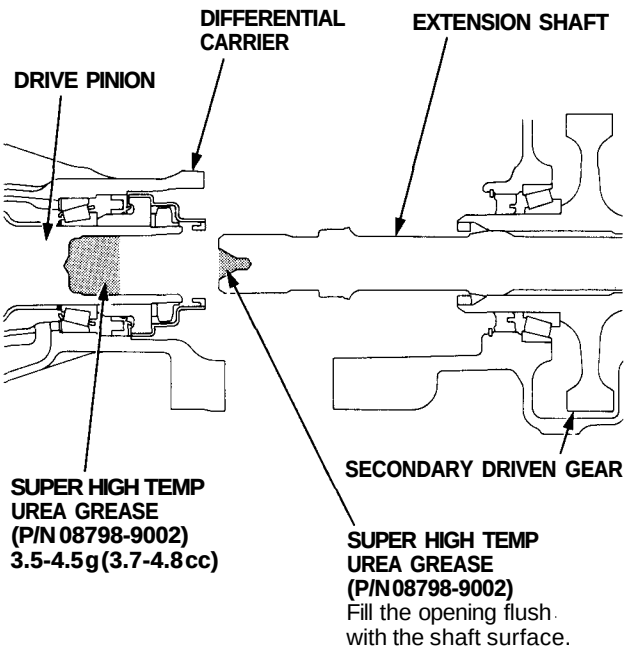
Installation

1. Flush the ATF cooler as described on pages 14-193 and 14-194.

2. Install the torque converter securely with a new O-ring on the mainshaft, and install two 14 x 20 mm dowel pins in the torque converter housing.



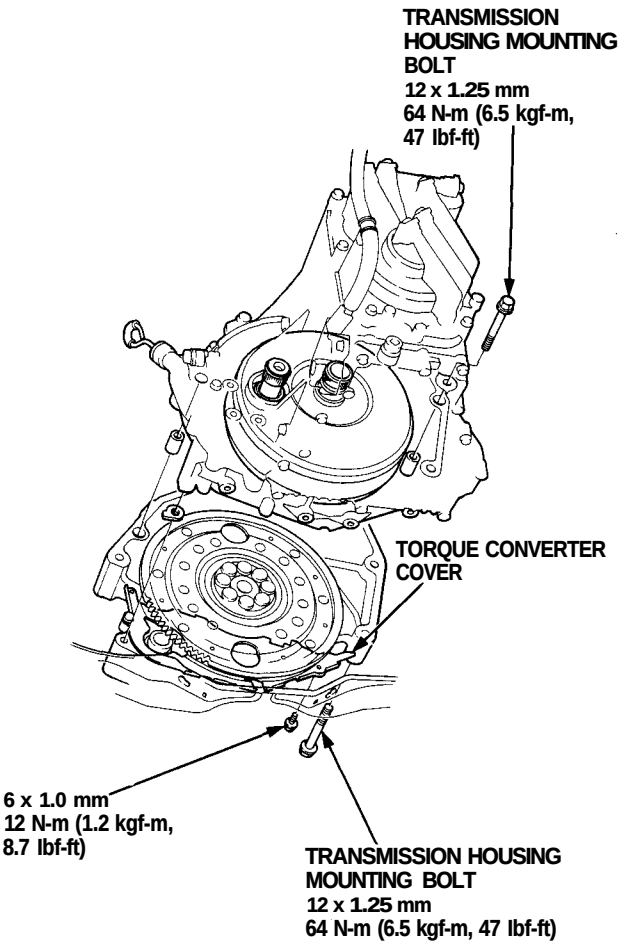
3. Set the extension shaft, apply Super High Temp Urea Grease (P/N 08798 - 9002) to the shaft splines.



4. Remove the used grease, then fill the opening of the drive pinion and extension shaft with Super High Temp Urea Grease (P/N 08798 - 9002), as shown.

5. Place the transmission on a jack, and raise to the engine assembly level.

6. Attach the transmission on the engine, then install the transmission housing mounting bolts.



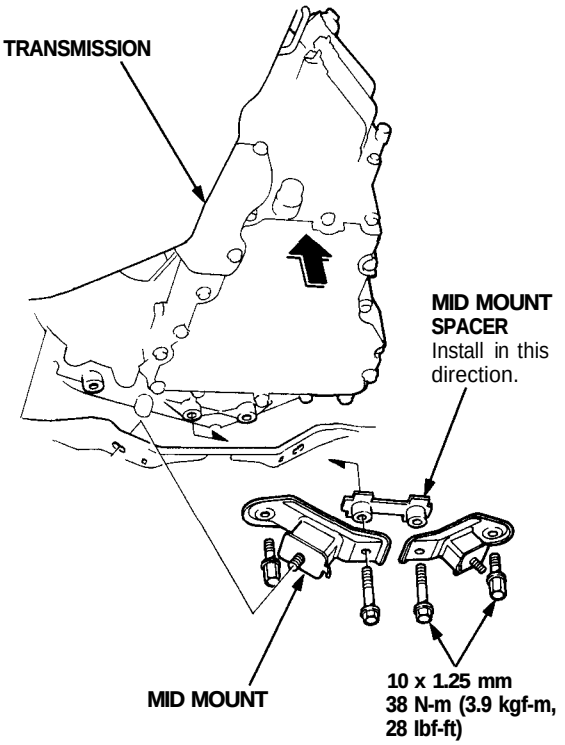
7. Install the torque converter cover mounting bolt on the torque converter housing side.

(cont'd)

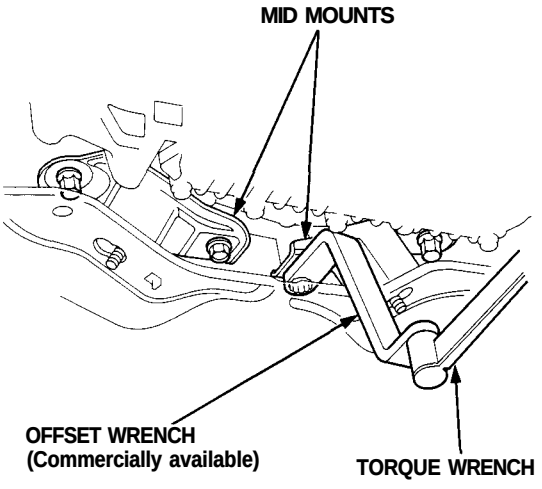
Transmission

Installation (cont'd)

8. Install the mid mount spacer and transmission mid mounts while raising the transmission with a jack.



9. Tighten the bolts using an offset wrench and a torque wrench as shown.

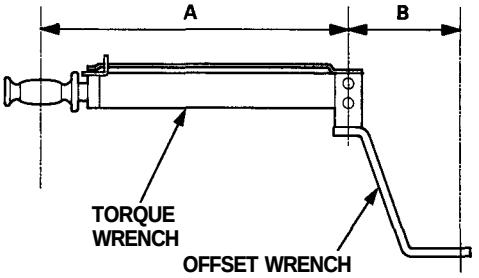


NOTE: When tightening the bolts using an offset wrench and a torque wrench, the tightening torque value differs from torque specification according to a torque wrench. Before tightening the bolts, calculate actual torque value by following formula.

FORMULA:

Actual Torque: T_2 N·m (kgf·m, lbf·ft)
Torque Specification: T_1 N·m (kgf·m, lbf·ft)
Effective Length of Torque Wrench: A (m)
Effective Length of Offset Wrench: B (m)

$$T_2 \text{ N·m (kgf·m, lbf·ft)} = \frac{T_1 \text{ N·m (kgf·m, lbf·ft)} \times A \text{ (m)}}{A \text{ (m)} + B \text{ (m)}}$$



Example:

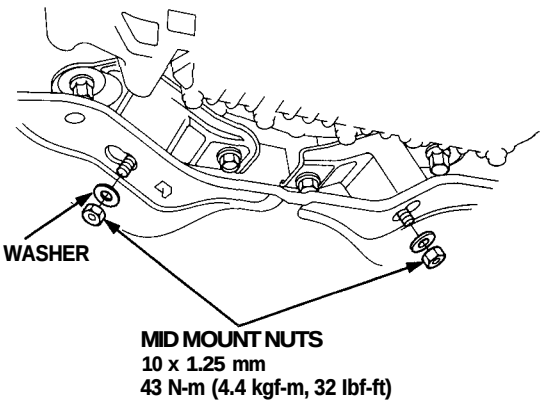
Torque Specification: 38 N-m (3.9 kgf-m, 28 lbf-ft)
Effective Length of Torque Wrench: 0.345 (m)
Effective Length of Offset Wrench: 0.13 (m)

T_2 N·m (kgf·m, lbf·ft)

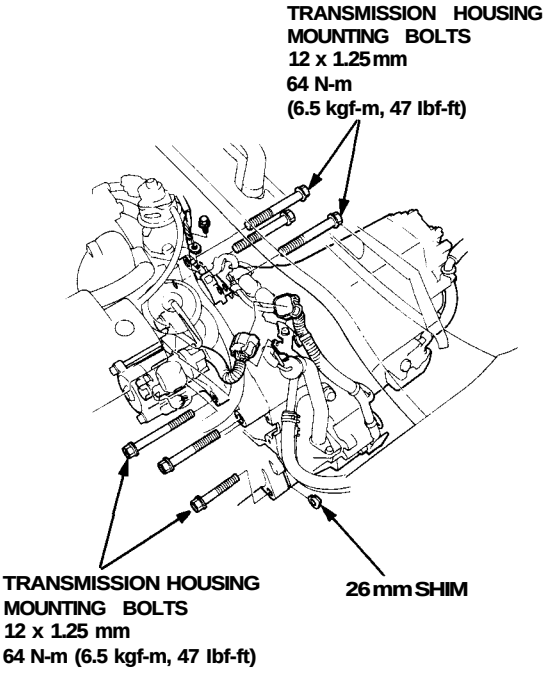
$$= \frac{38 \text{ N·m (3.8 kgf·m, 28 lbf·ft)}}{0.345 \text{ (m)} + 0.13 \text{ (m)}}$$

= 27 N·m (2.8 kgf·m, 20 lbf·ft)

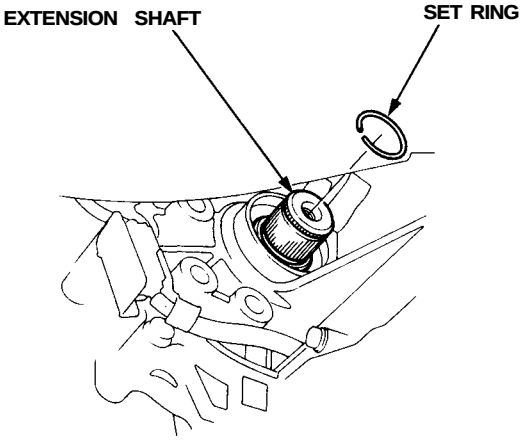
10. Install the mid mount nuts.



11. Install the transmission housing mounting bolts and 26 mm shim.

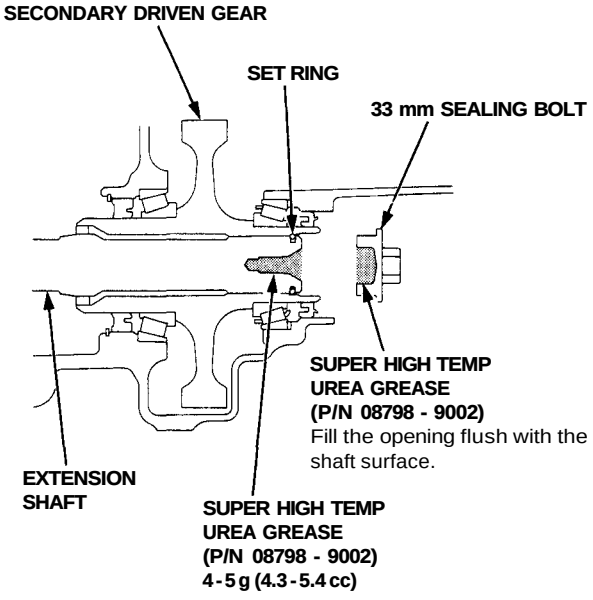


12. Install a new set ring on the extension shaft groove.



13. Install the extension shaft.

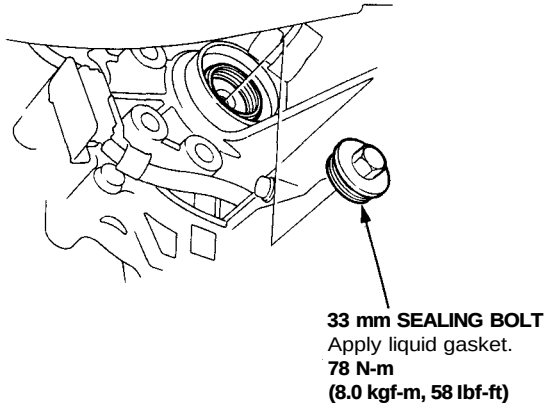
14. Fill the opening of the extension shaft and 33 mm sealing bolt with Super High Temp Urea Grease (P/N 08798-9002) as shown.



15. Apply liquid gasket (P/N 08718-0001) to the 33 mm sealing bolt threads.

16. Shift the transmission into the [P] position by rotating the control shaft.

17. Install the 33 mm sealing bolt.

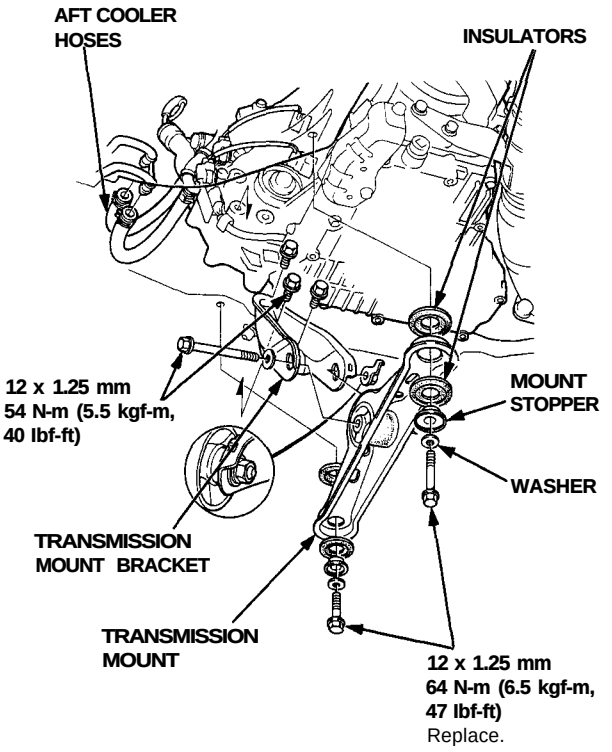


(cont'd)

Transmission

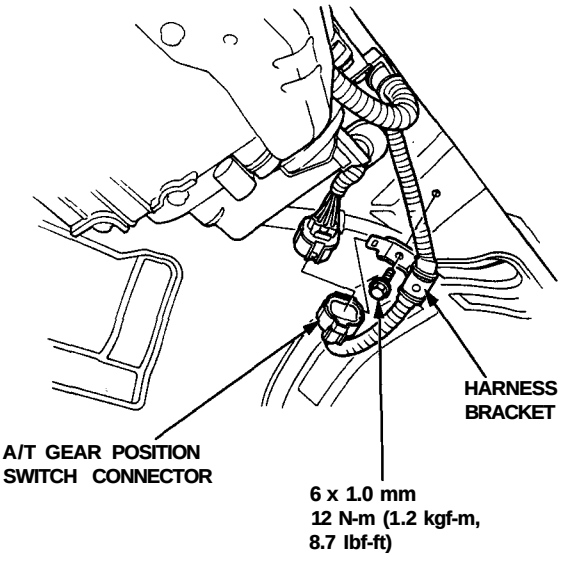
Installation (cont'd)

18. Connect the ATF cooler hoses to the joint pipes (see page 14-195).



19. Install the transmission mount bracket and transmission mount.

20. Install the A/T gear position switch harness bracket, then connect the A/T gear position switch connector.

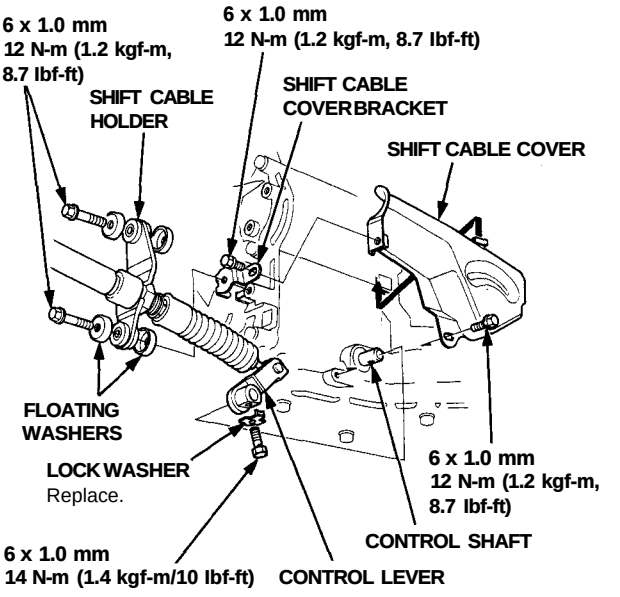


21. Install the shift cable holder on the transmission rear cover.

22. Install the control lever with a new lock washer to the control shaft.

CAUTION: Take care not to bend the shift cable.

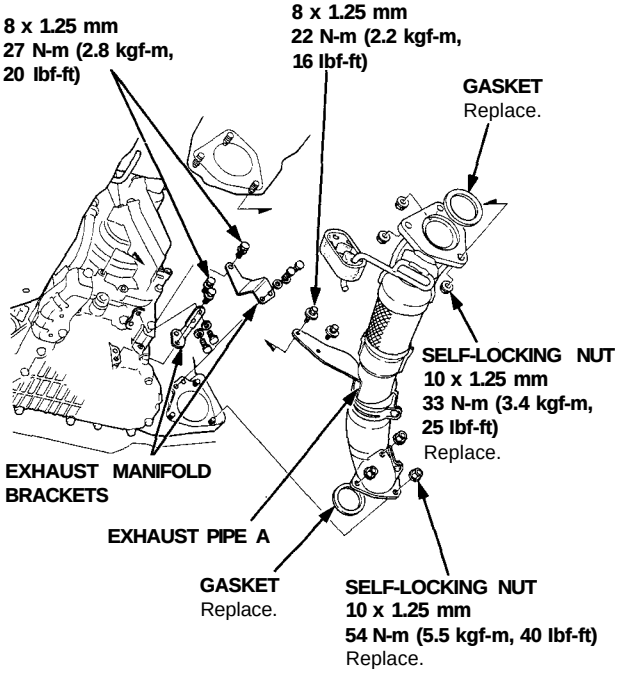
23. Install the shift cable cover.



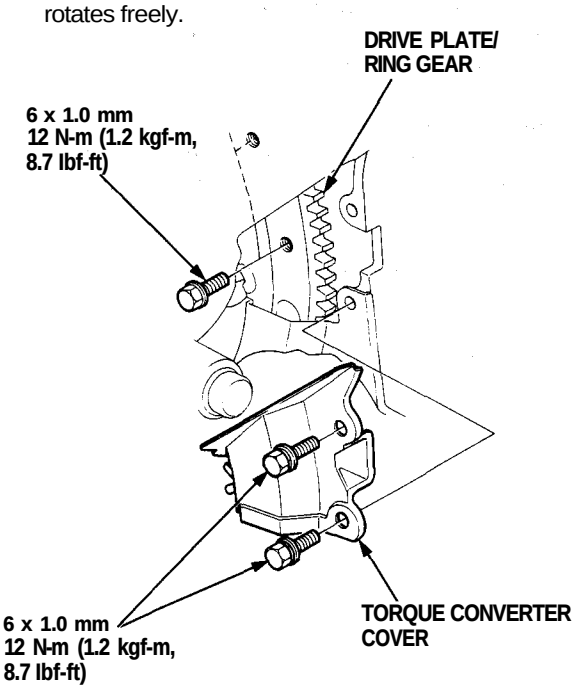
24. Install the exhaust manifold brackets.

25. Install exhaust pipe A.

26. Install the two exhaust pipe A bracket bolts to the transmission rear cover.

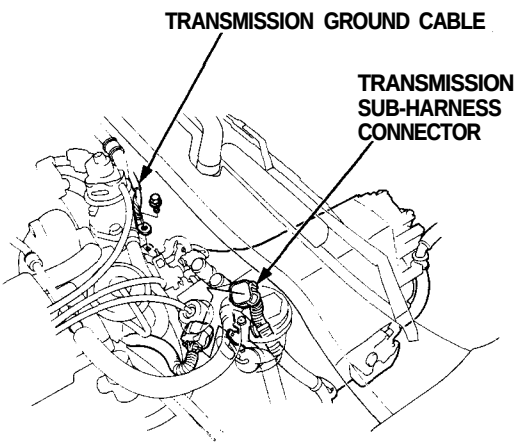


27. Attach the torque converter to the drive plate with eight bolts and torque:
Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern.
After tightening the last bolt, check that the crankshaft rotates freely.



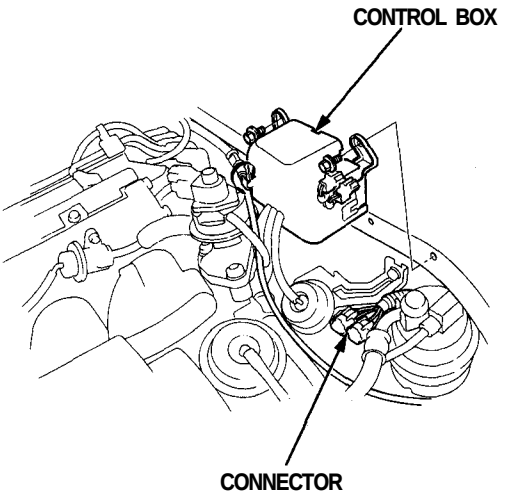
28. Install the torque converter cover.

29. Install the transmission ground cable.



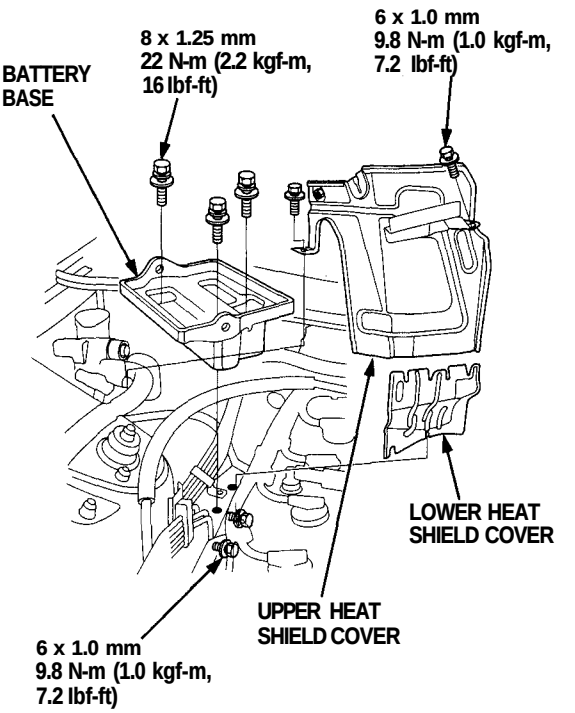
30. Connect the transmission sub-harness connector.

31. Install the control box, then connect the connector.



32. Install the lower heat shield cover.

33. Install the battery base and the upper heat shield.



(cont'd)

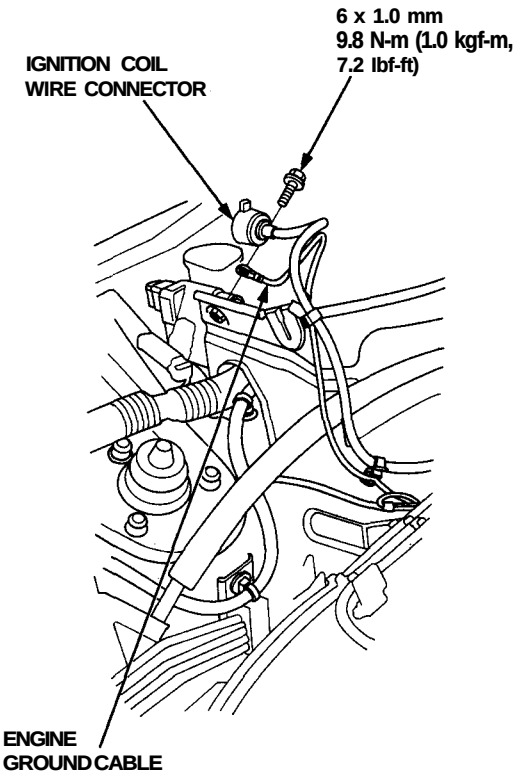
Transmission

Installation (cont'd)

34. Install the engine ground cable and ignition coil wire on the upper heat shield cover.

33. Connect the ignition coil wire connector.

36. Install the battery and battery hold-down bracket.



37. Refill the transmission with ATF (see page 14-105).

38. Connect the battery positive (+) and negative (-) cables to the battery terminals.

39. Set the parking brake. Start the engine, and shift the transmission through all gears three times.
Check the shift lever operation and the A/T gear position indicator operation.

40. Let the engine reach operating temperature (the cooling fan comes on) with the transmission in the [N] or [P] position, then turn it off and check ATF level.

41. Road test as described on pages 14-102 and 14-103.

42. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Cooler Flushing

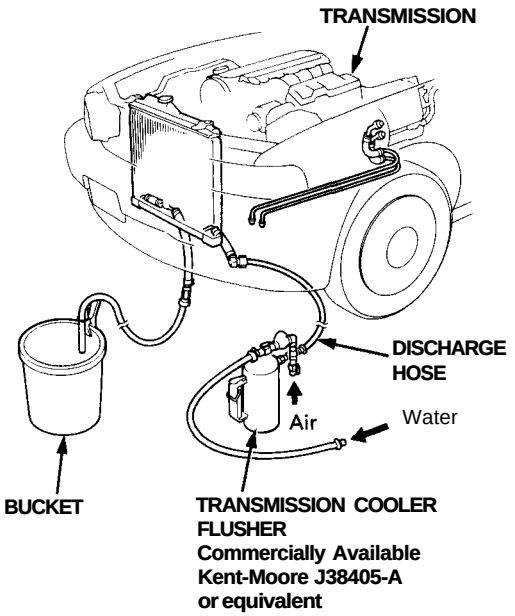
⚠ WARNING To prevent injury to face and eyes, always wear safety glasses or a face shield when using the transmission flusher.

NOTE: This procedure should be performed before reinstalling the transmission.

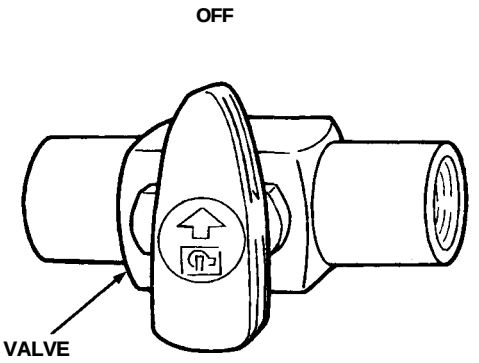
1. Check tool and hoses for wear or cracks before using. If wear or cracks are found, replace the hoses before using.
2. Using the measuring cup, fill the tank with 21 ounces (approximately 2/3 full) of biodegradable flushing fluid (J35944 - 20). Do not substitute with any other fluid. Follow the handling procedure on the fluid container.
3. Secure the flusher filler cap, and pressurize the tank with compressed air to between 550 - 829 kpa (5.6 - 8.45 kgf/cm^2, 80-120psi).

   NOTE: The air line should be equipped with a water trap to ensure a dry air system.
4. Hang the tool under the vehicle.
5. Attach the tank's discharge hose to the return line of the transmission cooler using a clamp.
6. Connect the drain hose to the inlet line on the transmission cooler using a clamp.

   IMPORTANT:
   Securely clamp the opposite end of the drain hose to a bucket or floor drain.



7. With the water and air valves off, attach the water and air supplies to the flusher. (Hot water if available.)



8. Turn on the flusher water valve so water will flow through the cooler for 10 seconds.

   NOTE: If water does not flow through the cooler, it is completely plugged, cannot be flushed, and must be replaced.
9. Depress the trigger to mix the flushing fluid into the water flow. Use the wire clip to hold the trigger down.
10. While flushing with the water and flushing fluid for 2 minutes, turn the air valve on for 5 seconds every 15-20 seconds to create a surging action.
    AIR PRESSURE: MAX 845 kpa (8.45 kgf/cm^2, 120 psi)
11. Turn the water valve off. Release the trigger, then reverse the hoses to the cooler so you can flush in the opposite direction. Repeat steps 8 through 10.
12. Release the trigger, and rinse the cooler with water only for one minute.
13. Turn the water valve off, and turn off the water supply.
14. Turn the air valve on to dry the system out with air for two full minutes or until no moisture is visible leaving the drain hose.

    CAUTION: Residual moisture in the cooler hoses, or lines can damage the transmission.
15. Remove the flusher from the cooler line. Attach the drain hose to a container.
16. Install the transmission, and leave the drain hose attached to the cooler line.

(cont'd)

Transmission

Cooler Flushing (cont'd)

17. Make sure the transmission is in the [P] position. Then fill it with ATF, and run the engine for 30 seconds or until approximately 0.95 ℓ (1.0 US qt., 0.8 Imp qt.) is discharged.

18. Remove the drain hose, and reconnect the cooler return hose to the transmission (see page 14-195).

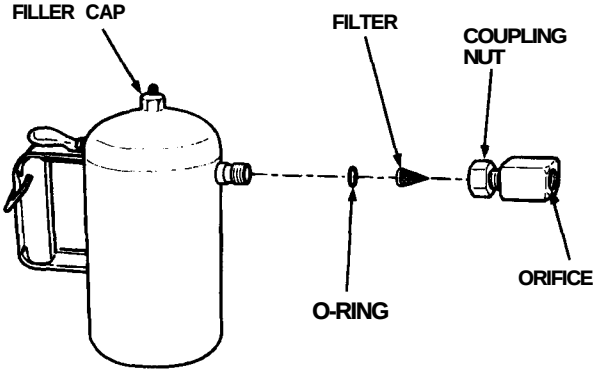
19. Refill the transmission with ATF to the proper level (see page 14-105).

TOOL MAINTENANCE

1. Empty and rinse after each use. Fill the can with water and pressurize the can. Flush the discharge line to ensure that the unit is clean.

2. If discharge liquid does not foam, the orifice may be blocked.

3. To clean, disconnect the plumbing from the tank at the large coupling nut.



4. Remove the in-line filter from the discharge side and clean if necessary.

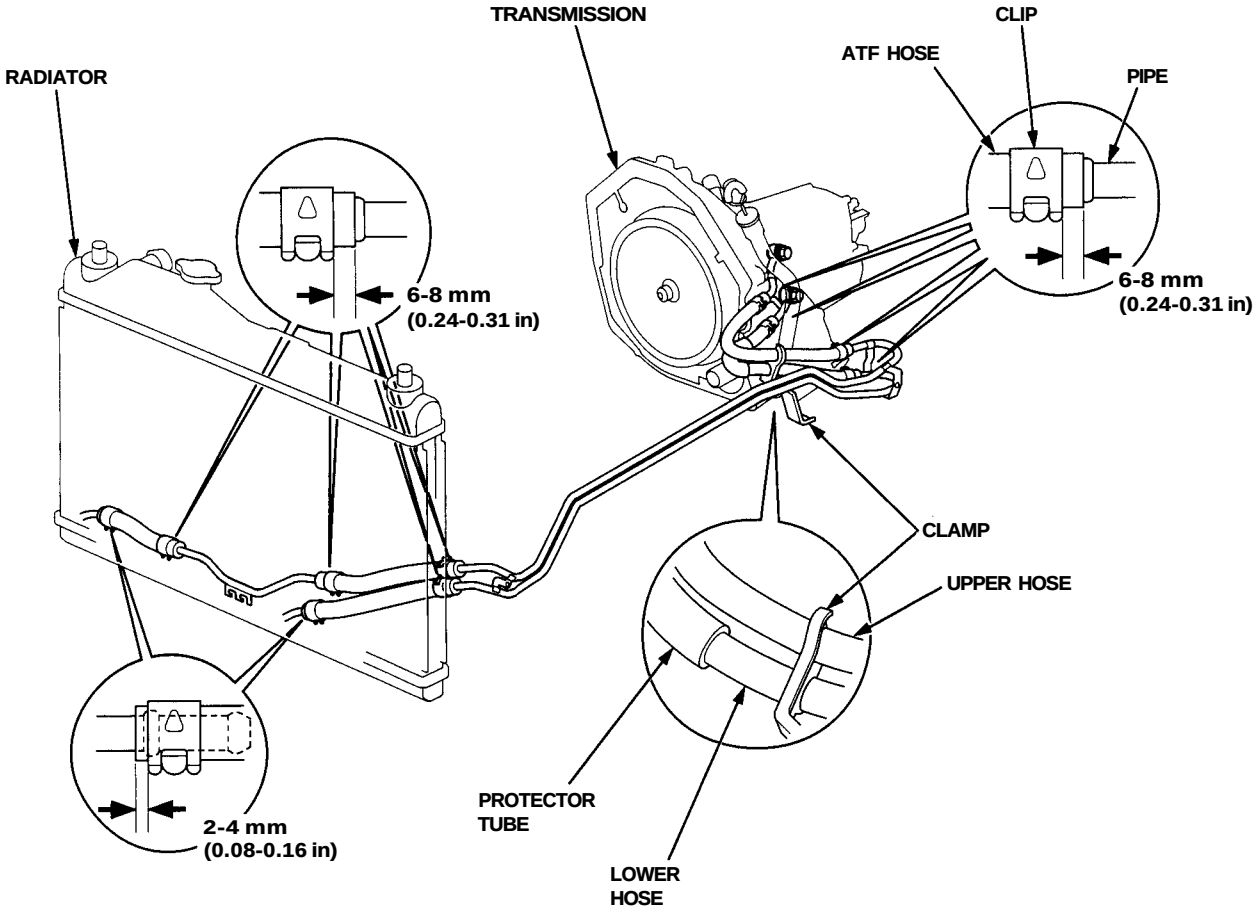
5. The fluid orifice is located behind the filter. Clean it with the pick stored in the bottom of the tank handle, or blow it clean with air. Securely reassemble all parts.

ATF Cooler Hoses

Connection

1. Connect the ATF hoses to the lines, and secure them with the clips as shown.
2. Install the lower hose on lower cutout of the clamp and install upper hose on upper part of the clamp.

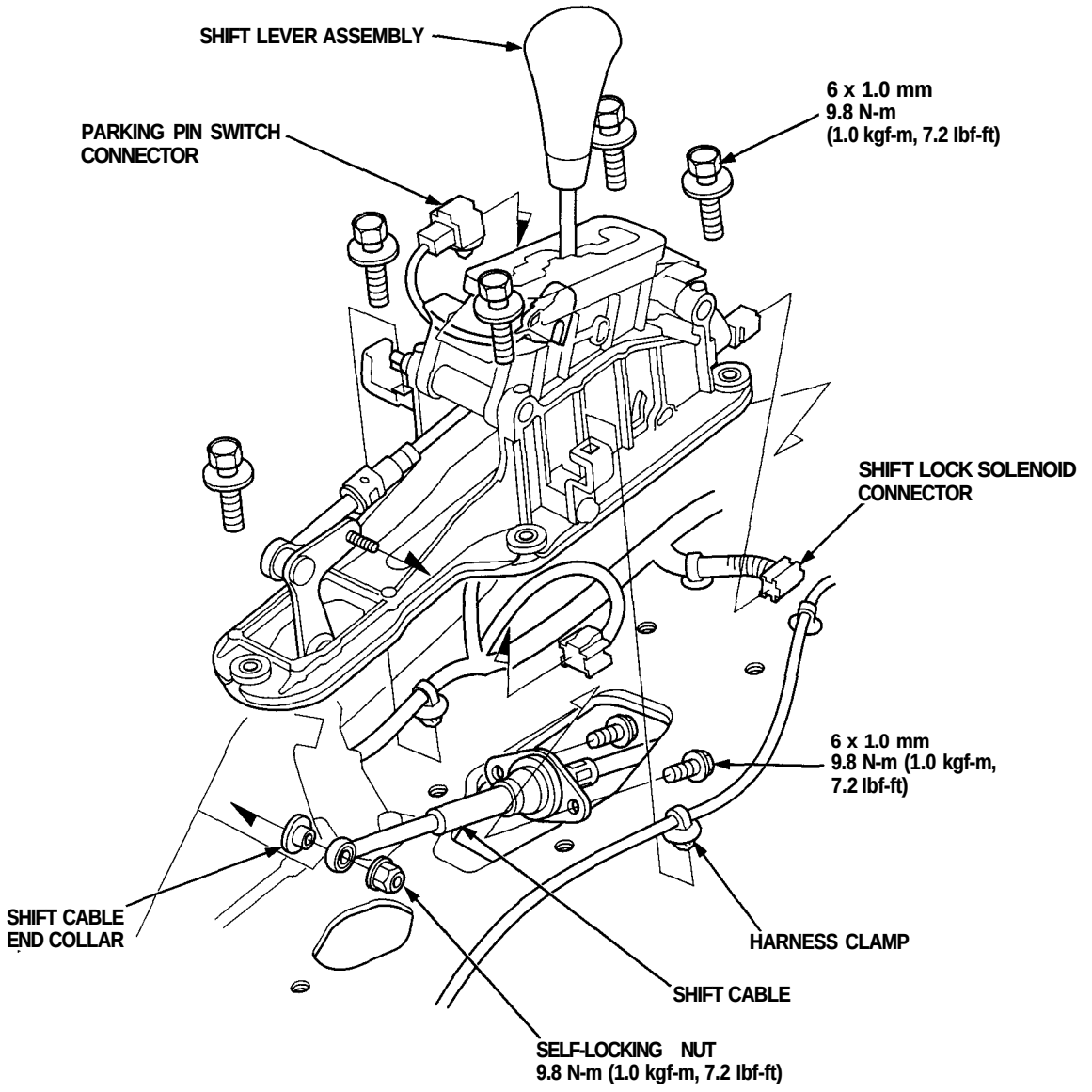
   NOTE: When replacing the lower hose on the transmission, install the short side from the protector tube to the transmission ATF cooler line.



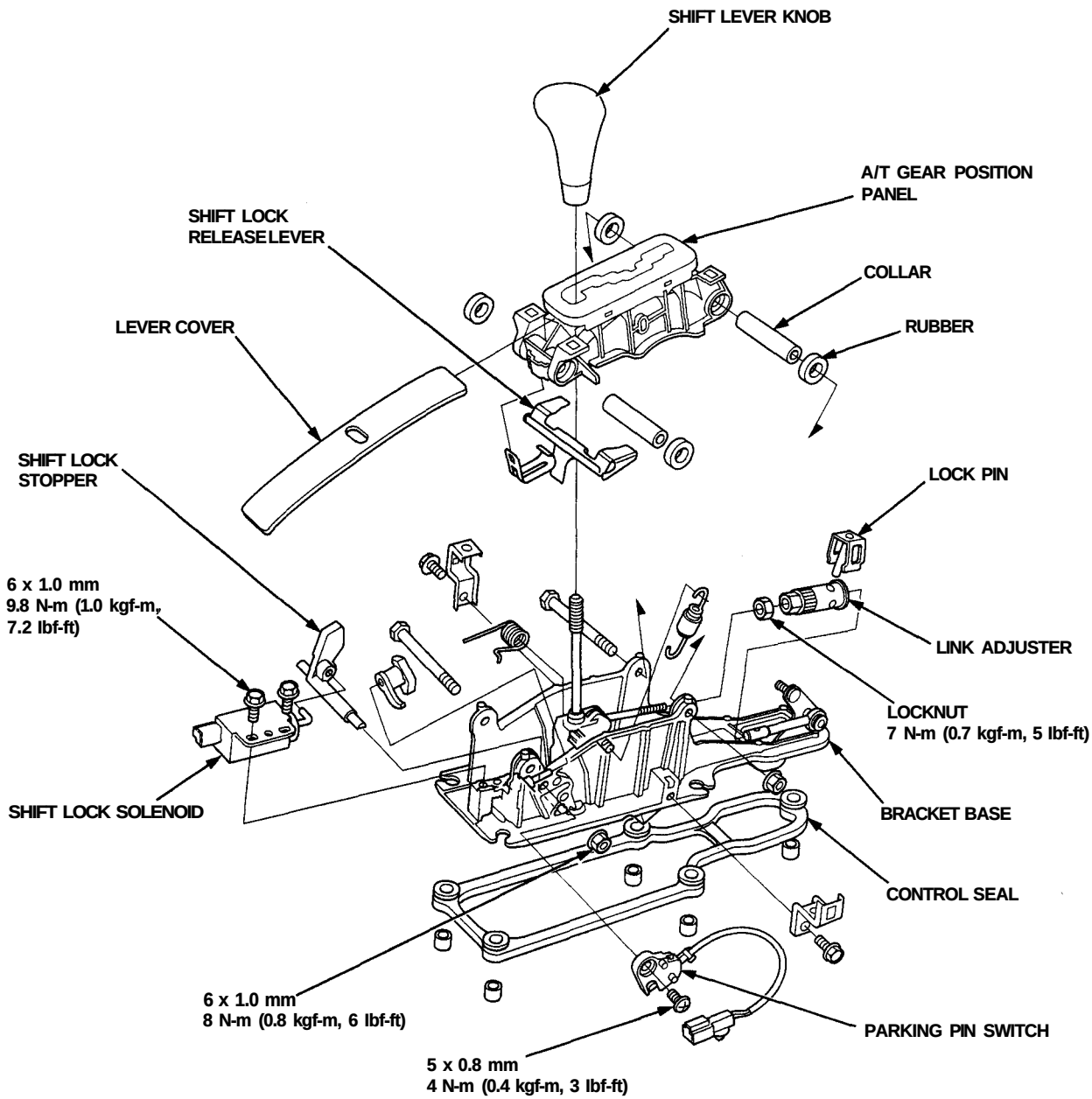
Shift Lever

Removal/Installation

1. Shift the transmission into the [N] position.
2. Remove the center console (see section 20).
3. Remove the harness clamps.
4. Disconnect the shift lock solenoid and parking pin switch connectors.
5. Shift the transmission into the [1] position.
6. Remove the self-locking nut and shift cable end collar, then remove the shift cable from the shift lever link.
7. Remove five shift lever mounting bolts.
8. Remove the shift cable bracket (two bolts) from the shift lever assembly, then remove the shift lever assembly.
9. Install the shift lever assembly in the reverse order of removal.



Disassembly



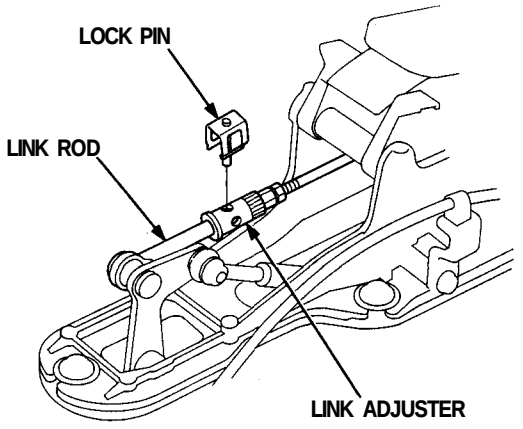
Shift Lever

Link Adjustment

⚠ WARNING

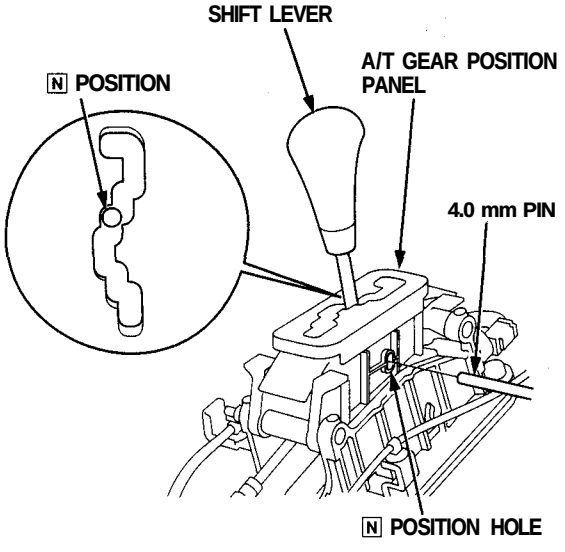
- **Make sure lifts, jacks and safety stands are placed properly (see section 1).**
- **Apply parking brake, and block rear wheels so vehicle will not roll off stands and fall on you while working under it.**

1. Shift the transmission into the [N] position.
2. Remove the center console (see section 20).
3. Remove the lock pin from the link adjuster.

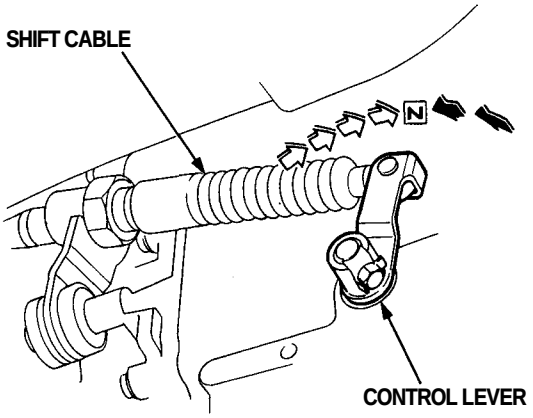


4. Insert a 4.0 mm (0.16 in) pin into the shift lever bracket through the [N] position cutout of the shift lever.

CAUTION: Be sure to use a 4.0 mm (0.16 in) pin.



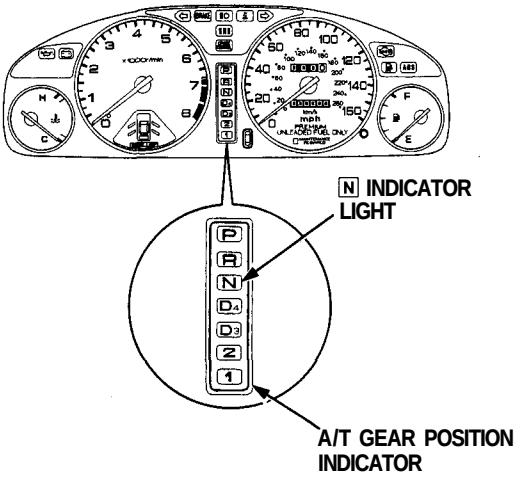
5. Verify that the shift position is in the [N] position on the transmission.



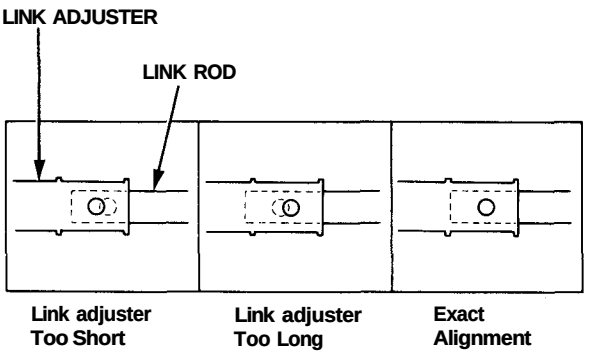
6. Turn the ignition switch ON (II), verify that the [N] indicator light comes on.

CAUTION: Do not start the engine.

GAUGE ASSEMBLY



7. Check that the hole in the link adjuster is perfectly aligned with the hole in the link rod.



NOTE: There are two holes in the link adjuster. They are positioned 90° apart to allow link adjustments in 1/4 turn increments.

8 If not perfectly aligned, loosen the locknut on the link adjuster, and adjust as required.

9. Tighten the locknut.

TORQUE: 7 N-m (0.7 kgf-m, 5 lbf-ft)

10. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the link rod is still out of adjustment and must be readjusted.

11. Make sure the lock pin is seated securely in the adjuster.

NOTE: Replace the lock pin if it does not snap over the link adjuster securely.

12. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the A/T gear position switch.

13. Start the engine, and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 14-98 thru 14-101.

14. Insert the ignition key into the key cylinder on the A/T gear position indicator panel, and verify that the shift lock lever is released.

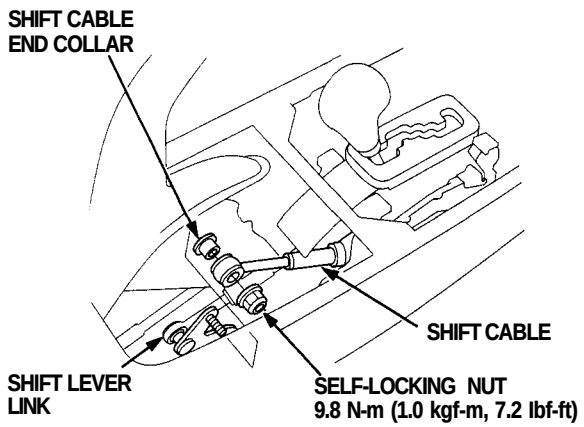
Shift Cable

Replacement

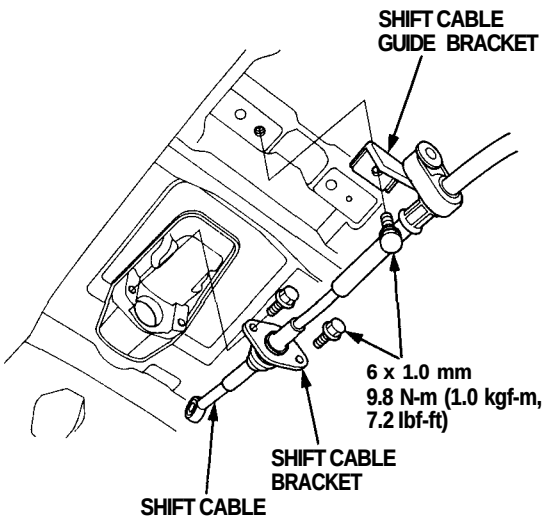
⚠ WARNING

- **Make sure the lifts, jacks and safety stands are placed properly (see section 1).**
- **Apply parking brake, and block rear wheels so the vehicle will not roll off stands and fall on you while working under it.**

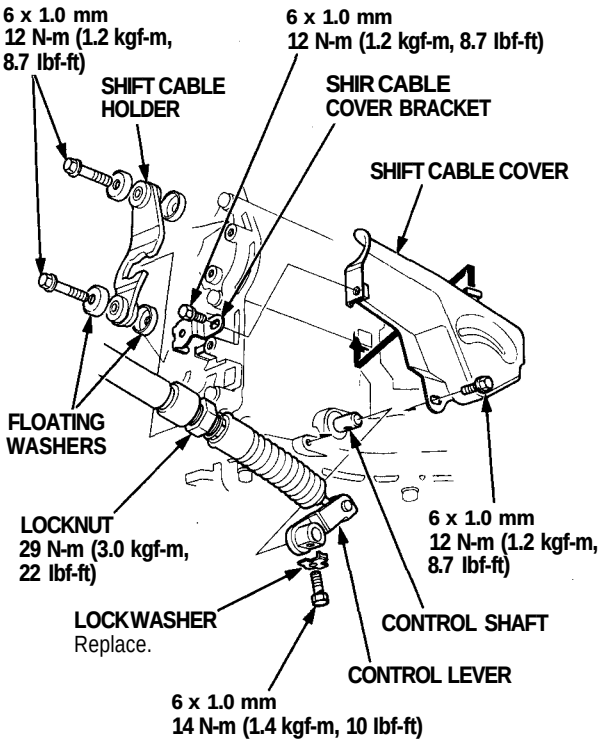
1. Shift the transmission into the N position.
2. Remove the center console panel (see section 20).
3. Shift the transmission into the 1 position.
4. Remove the self-locking nut and shift cable end collar, then remove the shift cable from the shift lever link.



5. Remove the exhaust pipe A/catalytic converter/ exhaust pipe B assembly (see section 9).
6. Remove the floor heat shield.
7. Remove the shift cable bracket and shift cable guide bracket.
   CAUTION: Take care not to bend the shift cable when removing or installing it.



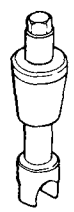
8. Remove the shift cable cover.
9. Remove the shift cable holder from the transmission rear cover.
10. Remove the control lever from the control shaft, then remove the shift cable.
11. Remove the shift cable holder from the shift cable.

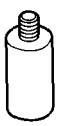


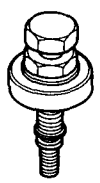
12. Install the shift cable in the reverse order of removal.
13. Check the shift lever operation.
14. If the shift lever adjustment is required, remove the center console and adjust the link adjuster (see page 14-198 and 14-199).

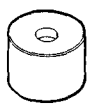
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAJ-PK40201	Preload Inspection Tool	1	15-9, 15-10, 15-19, 15-21, 15-22
②	07JAD-PH80400	Pilot, 28 x 30 mm	1	15-23
③	07LAC-PW50101	Extension Shaft Puller	1	15-6
④	07LAD-PW50500	Pinion Cover Driver Attachment	1	15-20, 15-24
⑤	07MAD-PR90100	Attachment, 45 x 55 mm, I.D.	1	15-14
⑥	07MAF-SP0011A	Tapered Bearing Race Installer A	1	15-16, 15-17
⑦	07MAF-SP0012A	Tapered Bearing Race Installer B	1	15-16, 15-17
⑧	07MAF-SP0013A	Installer Shaft	1	15-16, 15-17
⑨	07746-0010600	Attachment, 72 x 75 mm	1	15-17
⑩	07746-0030100	Driver, 40 mm, I.D.	1	15-16, 15-18, 15-20
⑪	07749-0010000	Driver	1	15-17, 15-20, 15-23, 15-24
⑫	07947-6110501	Driver Attachment	1	15-23

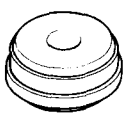

①

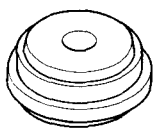

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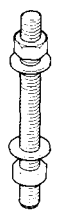

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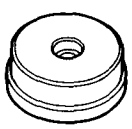

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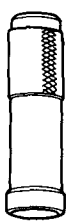

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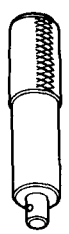

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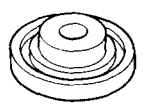

⑦


⑧


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⑩


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⑫

Differential

Troubleshooting

NOTE: Most problems in the unit are to be diagnosed by identifying noises from the gears or bearings.
Care should be taken during diagnosis not to confuse differential noises with those from other drivetrain components.

[Noise symptoms will be most prominent]

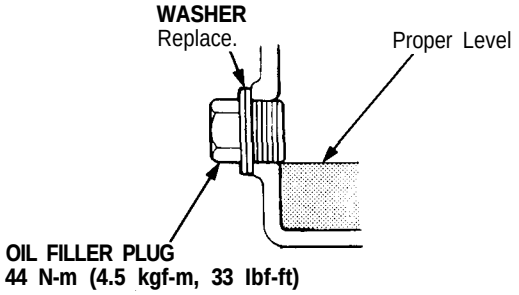
Symptom	Probable Cause	Remedy
Consistent noise during cruising	• Lack of oil • Foreign matter stuck in gears, etc. • Improper tooth contact between ring gear and drive pinion • Worn or damaged side bearing • Deformed ring gear or carrier	• Replenish oil • Clean and inspect • Adjust or replace • Replace any damaged or faulty parts
Gear noises while accelerating	• Lack of oil • Foreign matter stuck in gears, etc. • Improper drive pinion preload • Chipped or damaged gears	• Replenish oil • Clean and inspect • Adjust • Replace
Gear noises while coasting or accelerating	• Improper drive pinion preload • Damaged or chipped gears	Adjust or replace
Bearing noises while accelerating or coasting/deceleration	Cracked or damaged drive pinion bearing or side bearing	Replace
Abnormal noises when rounding a curve	• Worn (excessive play) or damaged side bearing • Damaged side gear, pinion, or pinion shaft	Replace
Abnormal noises during acceleration or when first driving away from a stop	• Excessive backlash between ring gear and drive pinion • Improper ring gear or drive pinion preload • Excessive pinion backlash • Worn differential splines • Loose companion flange nuts and other fasteners	• Adjust • Adjust or replace • Recheck torque or replace
Oil leak	• Oil level too high • Clogged breather hole • Loose case cover or inadequate sealing • Worn or damaged oil seal	• Lower to proper level • Clean or replace • Recheck torque or apply sealant • Replace
Overheating	• Lack of oil • Insufficient ring gear-to-pinion backlash • Excessive ring gear or drive pinion preload • Clogged or damaged oil cooler	• Replenish • Adjust • Adjust or replace • Replace
Coolant leak	Inadequate hose or clamp	Recheck torque or replace

Maintenance

Differential Oil

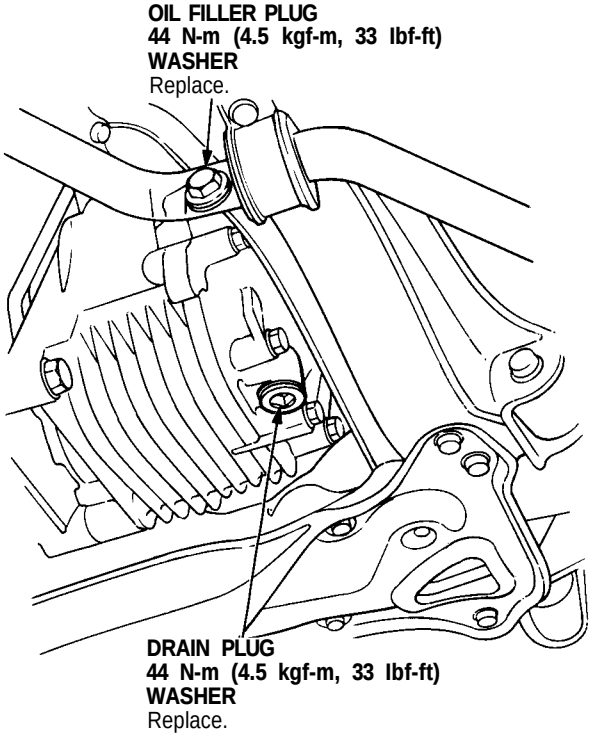
NOTE: Check the oil with engine OFF, and the vehicle on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



2. The oil level must be up to the fill hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.

3. If the differential oil is dirty, remove the drain plug, and drain the oil.



4. Reinstall the drain plug with a new washer, and refill the differential oil to the proper level.

NOTE:
- The drain plug washer should be replaced at every oil change.
- Clean the drain plug before reinstalling.

5. Reinstall the oil filler plug with a new washer.

Oil Capacity
0.95 ℓ (1.00 US qt, 0.84 Imp qt) at oil change
1.05 ℓ (1.11 US qt, 0.92 Imp qt) at overhaul

Recommended oil:
Hypoid gear oil
API Classification GL4 or GL5
viscosity:
SAE 90 above 0°F (-18°C)
SAE 80 W - 90 below 0°F (-18°C)

Differential Assembly

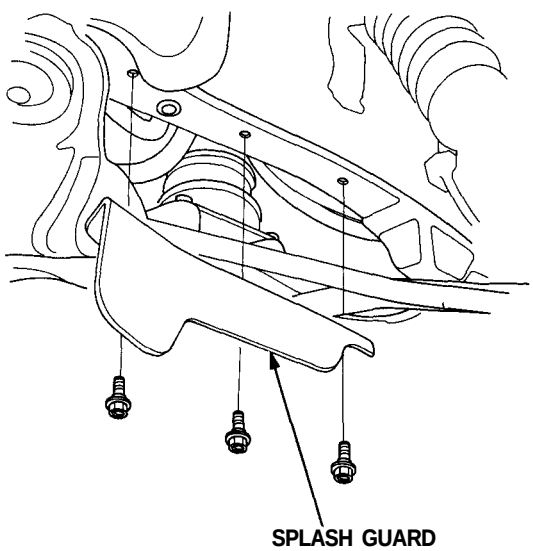
Removal

⚠ WARNING

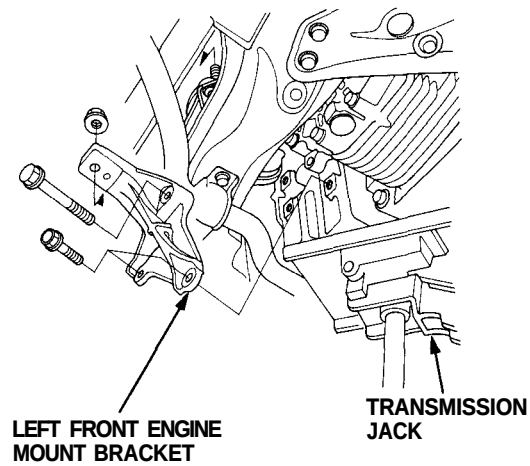
- **Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct positions on the engine.**
- **Apply parking brake and block rear wheels so vehicle will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

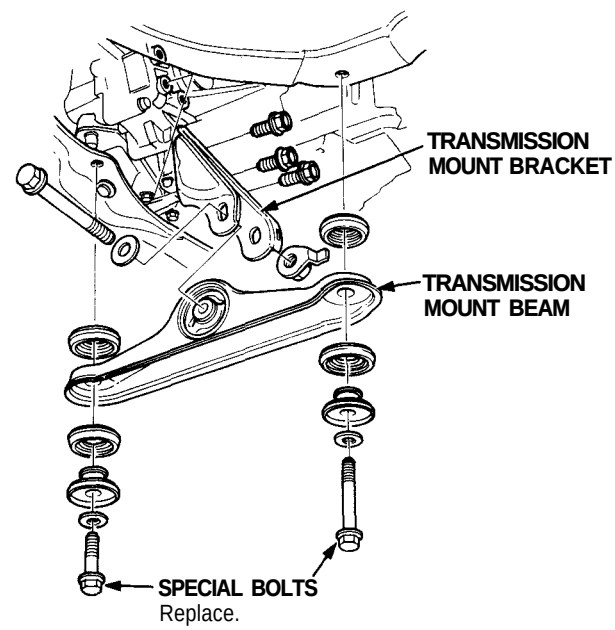
1. Before disconnecting power, make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative (-) and positive (+) cables from the battery.
3. Remove the air cleaner housing assembly.
4. Remove the drain plug, and drain the differential oil (see page 15-4).
5. Remove the driveshafts and intermediate shaft (see section 16).
6. Remove the splash guard.



7. Place the engine on a transmission jack, then lift the engine slightly to unload the mounts.
8. Remove the left front engine mount bracket.



9. Remove the transmission mount beam and transmission mount bracket.



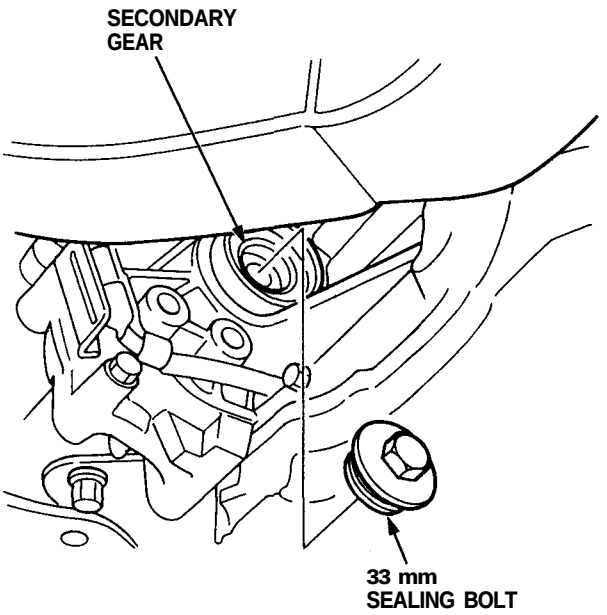
(cont'd)

Differential Assembly

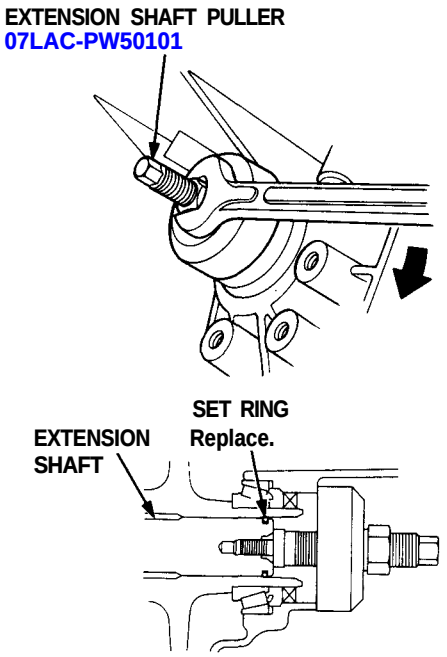
Removal (cont'd)

10. Remove the 33 mm sealing bolt.

    NOTE: Shift the transmission into the [P] position to lock the secondary gear.

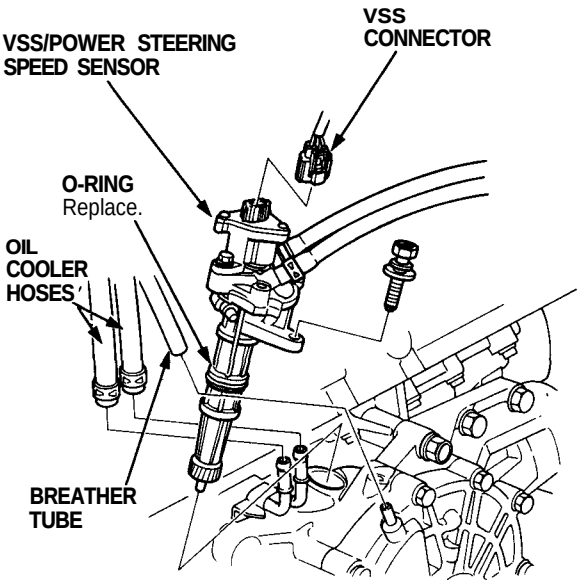


11. Disconnect the extension shaft from the differential using the special tool as shown.

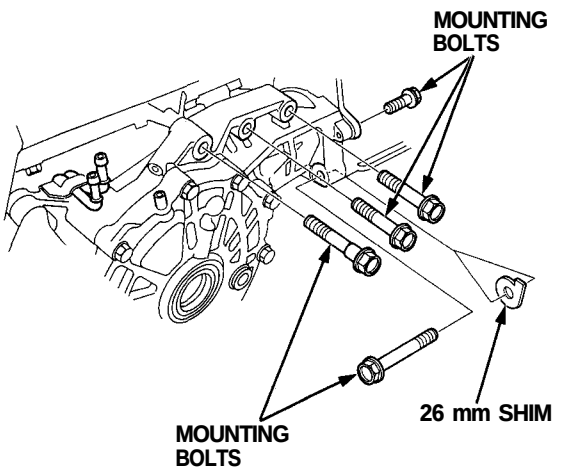


12. Disconnect the oil cooler hoses, breather tube and VSS connector, then remove the vehicle speed sensor (VSS)/power steering speed sensor.

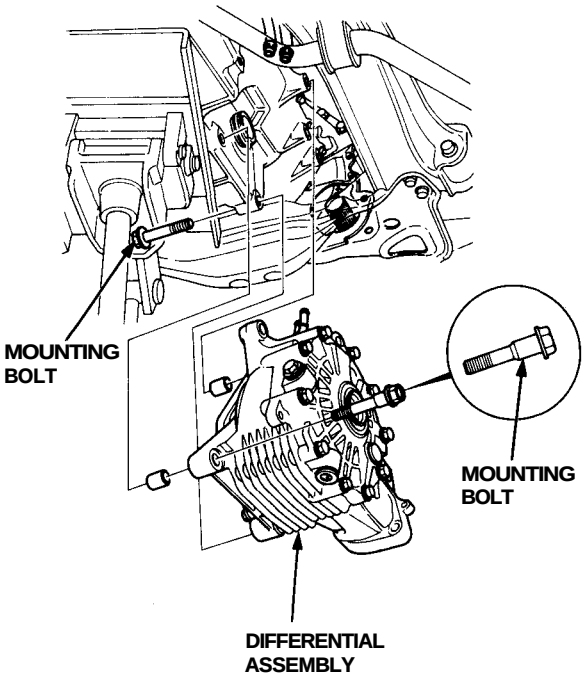
    NOTE:
    - Do not disconnect the hoses from the power steering speed sensor.
    - Do not let the engine coolant flow into the differential.



13. Remove the mounting bolts and the 26 mm shim.

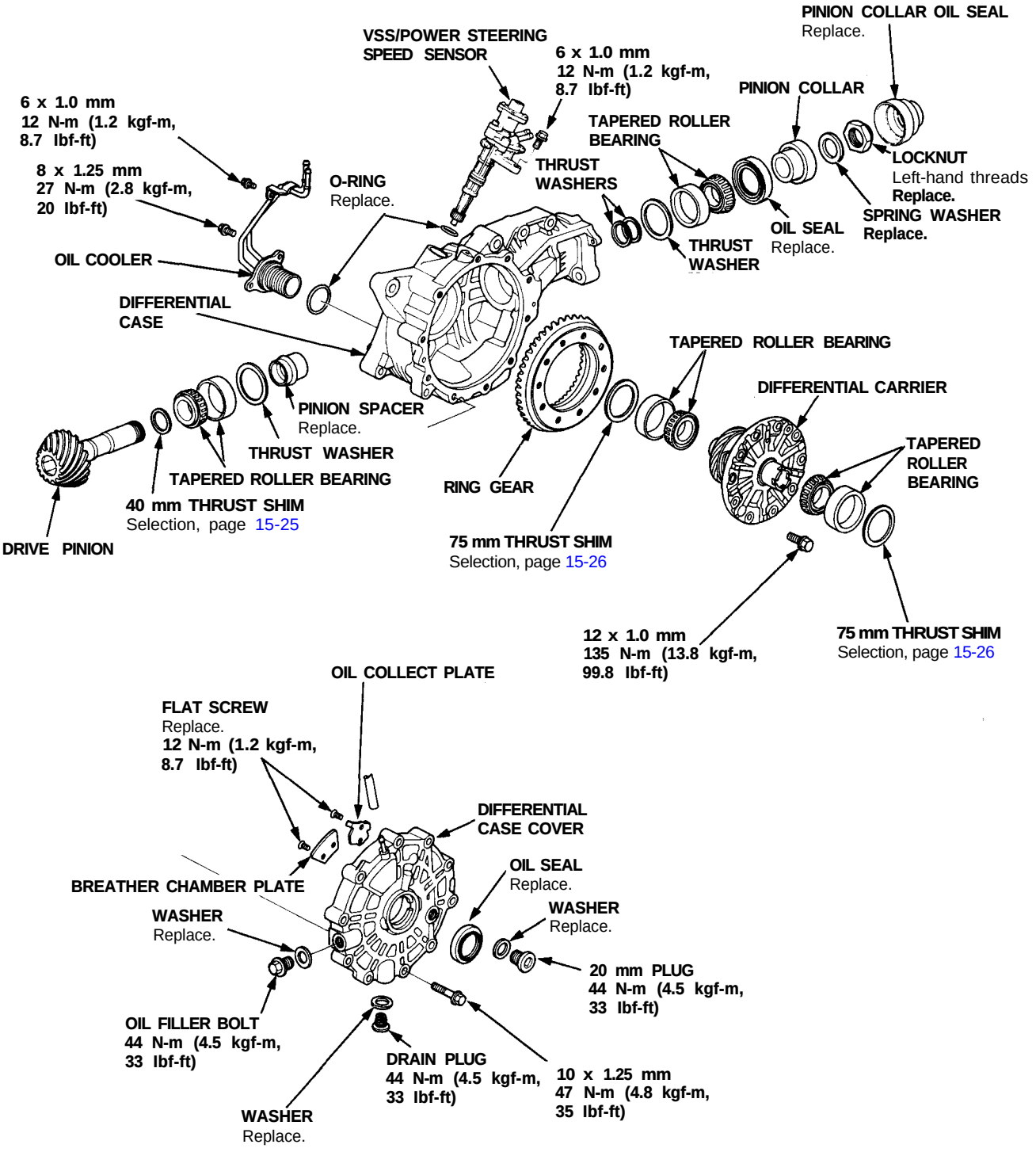


14. Remove the mounting bolts and the differential assembly.



Differential Assembly

Illustrated Index



Inspection

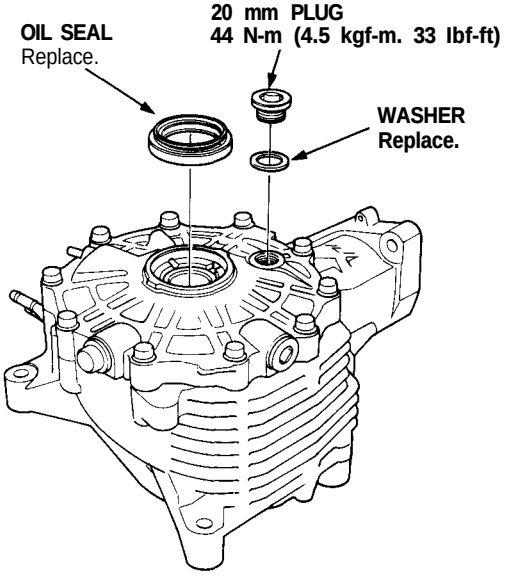
To establish a starting point before disassembly, it is necessary to inspect the following:

- Ring gear backlash
- Total bearing preload
- Gear tooth contact

NOTE:
- Be sure the differential is at room temperature before inspecting.
- Record the results of the preliminary inspections as this information will become helpful during reassembly.

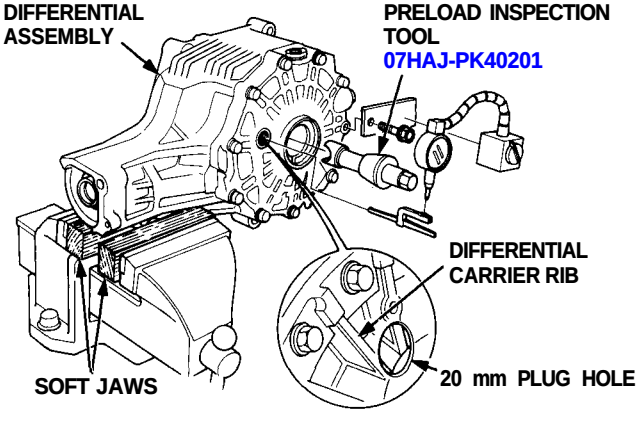
Ring gear backlash

1. Remove the 20 mm plug and the oil seal.



2. Secure the differential assembly in a vise using soft jaws.

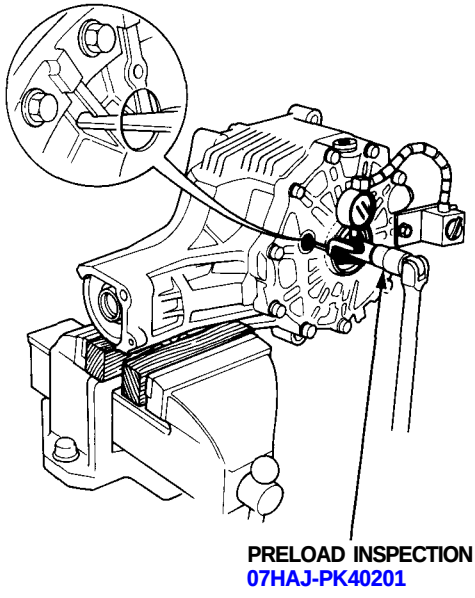
3. Align a differential carrier rib with the 20 mm plug hole, and install the special tools as shown.



4. Measure the backlash of the ring gear in 3-4 places on the differential carrier using the special tools as shown.

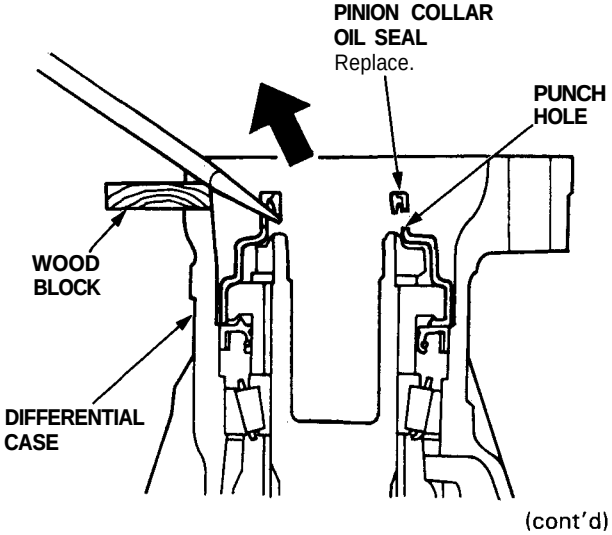
Standard: 0.04-0.10 mm (0.002-0.004 in)

The difference among the 3-4 measurements taken must not exceed 0.04 mm (0.002 in).



5. Remove the pinion collar oil seal by punching two holes in the seal 180° apart. Use the same pry point, and alternate between the two holes to lift the seal as shown.

NOTE: Use a wood block to protect the differential case.



(cont'd)

Differential Assembly

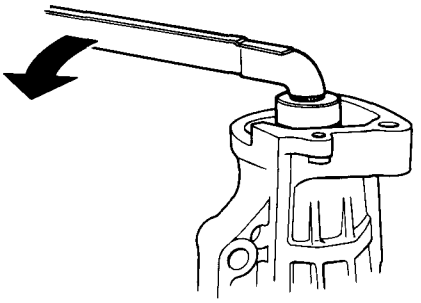
Inspection (cont'd)

Bearing preload

6. Remove the differential case cover and the differential carrier.

7. Use a dial-type torque wrench on the drive pinion to measure the drive pinion bearing preload.

Standard: 0.64-1.03 N-m
(6.5-10.5 kgf-cm, 5.6-9.1 lbf-in)



8. Reinstall the differential carrier and the differential case cover, then measure the total bearing preload.

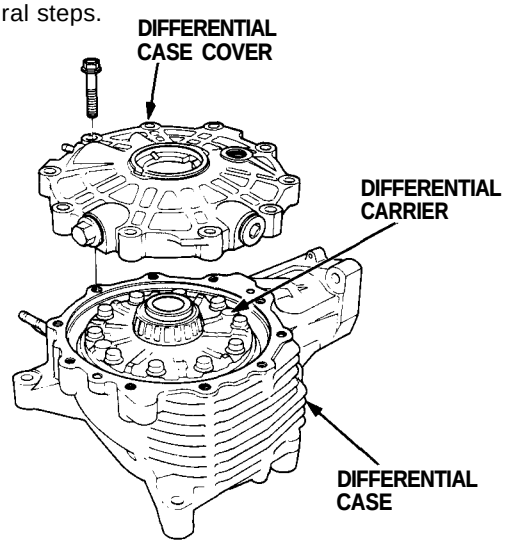
Standard: Tp* + 0.89-1.13 N-m
(9.1-11.5 kgf-cm, 7.90-9.98 lbf-in)

*: Drive pinion bearing preload in step 7.

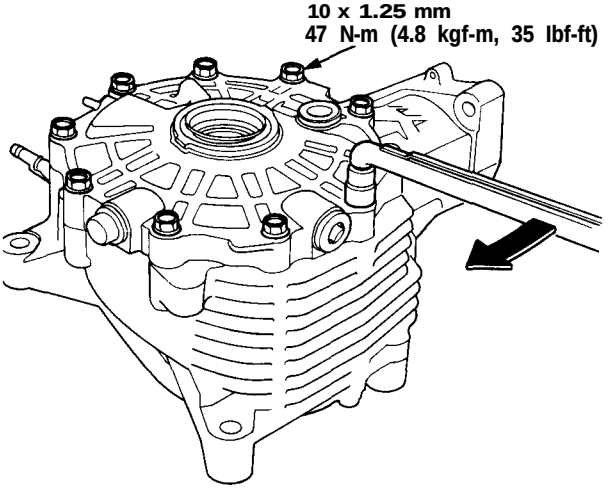
Gear tooth contact

9. Remove the differential case cover and differential carrier. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

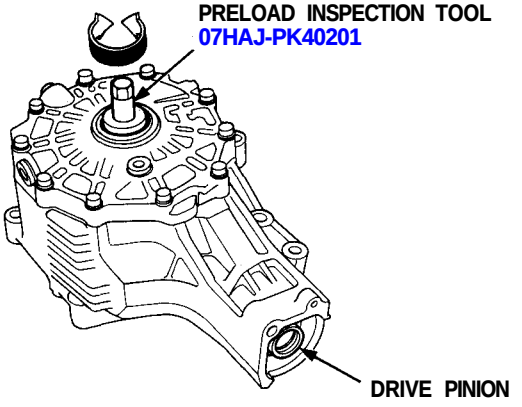
NOTE: Loosen the bolts in a crisscross pattern, in several steps.



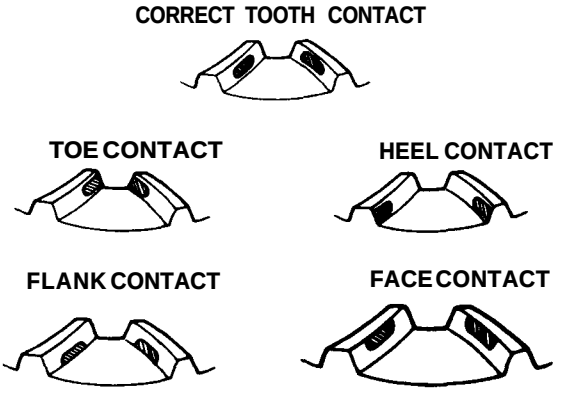
10. Reinstall the differential carrier and the differential case cover, then torque the bolts in a crisscross pattern, in several steps.



11. Install the special tool as shown. Rotate the ring gear one full turn in both directions while applying resistance to the drive pinion.

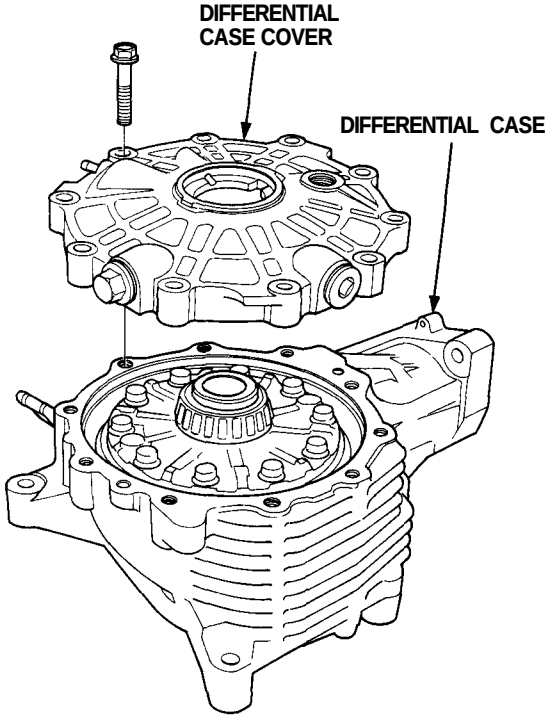


12. Remove the differential case cover and the differential carrier, then check the tooth contact pattern.

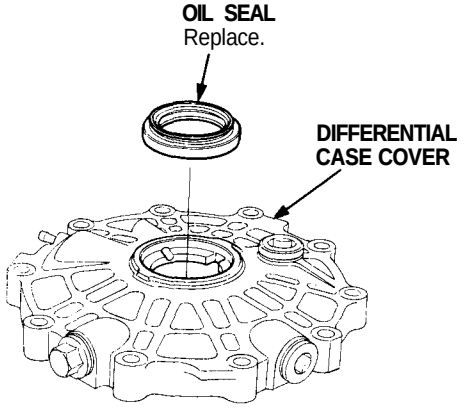


Disassembly

1. Remove the bolts in a crisscross pattern, in several steps, then remove the differential case cover.



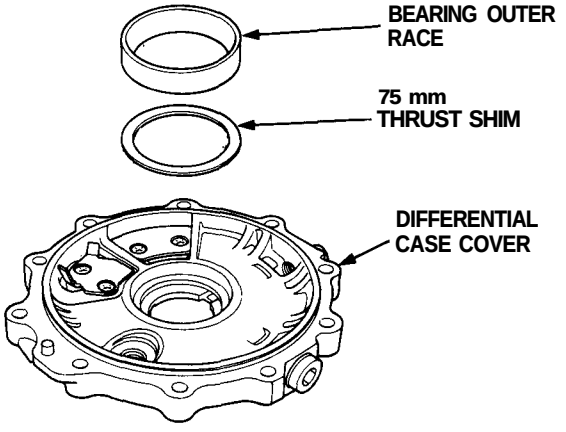
2. Remove the oil seal from the differential case cover.



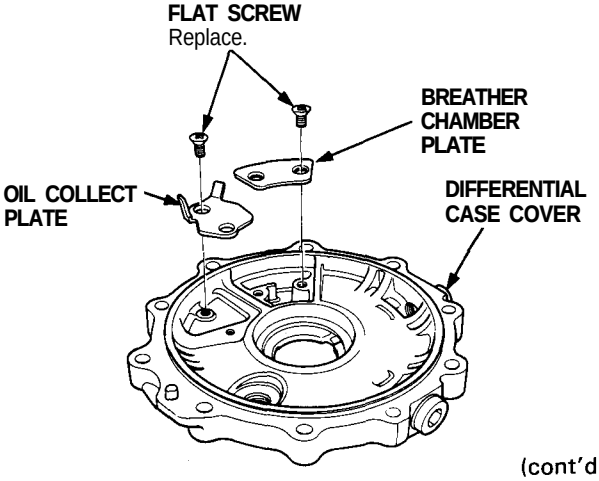
3. Remove the bearing outer race and the 75 mm thrust shim from the differential case cover by driving them out or by heating the differential case cover to about 212°F (100°C).

CAUTION: Do not reuse the 75 mm thrust shim if the bearing outer race was driven out.

NOTE:
- Do not heat the differential case cover in excess of 212°F (100°C).
- If the bearing outer race was removed by heating, allow the differential cover to cool to room temperature.
- Replace the tapered roller bearing with a new one whenever the bearing outer race is replaced.



4. Remove the breather chamber plate and the oil collect plate.

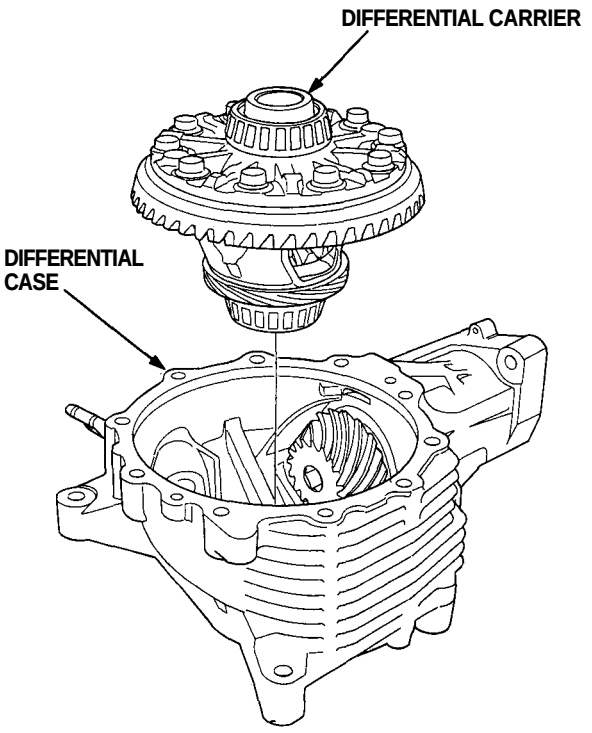


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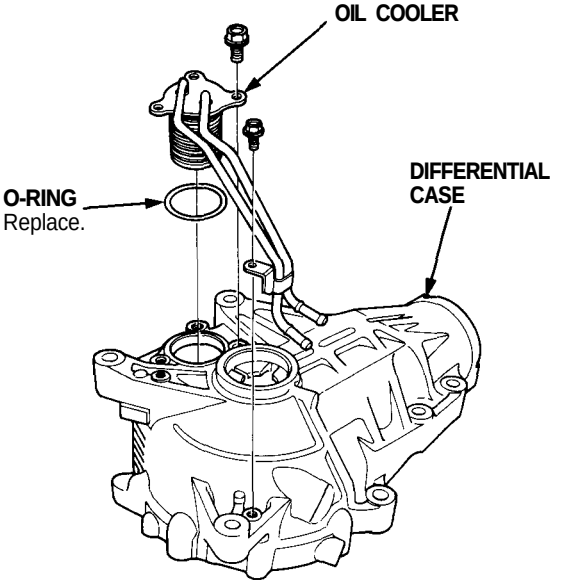
Differential Assembly

Disassembly (cont'd)

5. Remove the differential carrier from the differential case.

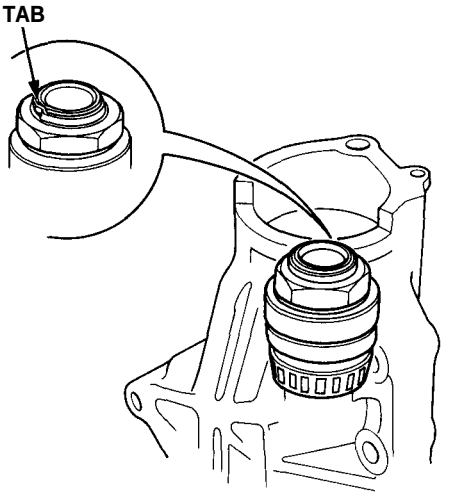


6. Remove the oil cooler.

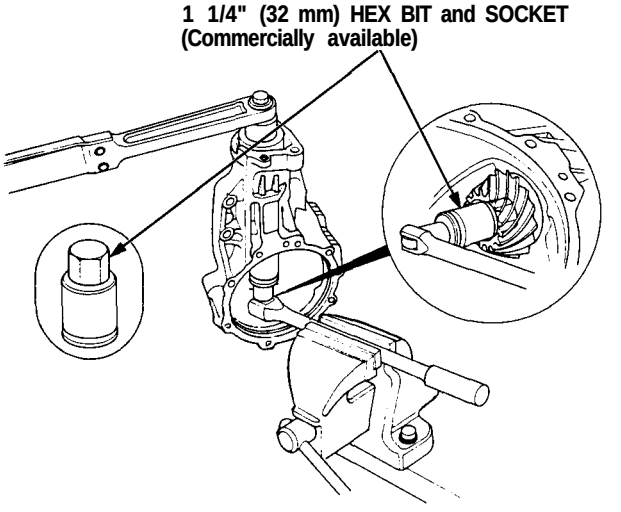


7. Raise the locknut tab from the groove of the drive pinion.

CAUTION: Make sure that the tab completely clears the groove to prevent damaging the drive pinion threads.

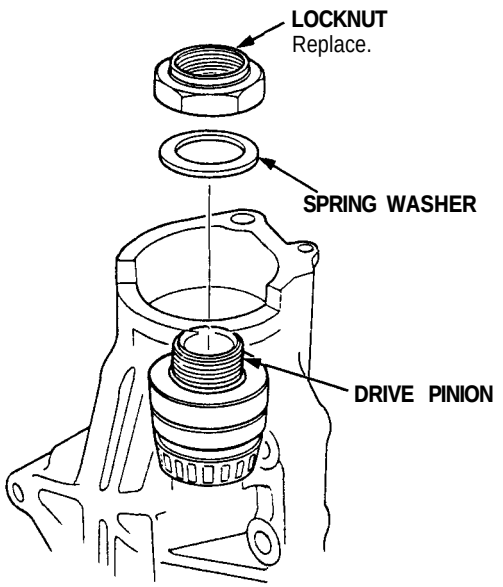


8. Hold the drive pinion using a 1 1/4" (32 mm) hex bit and socket as shown.

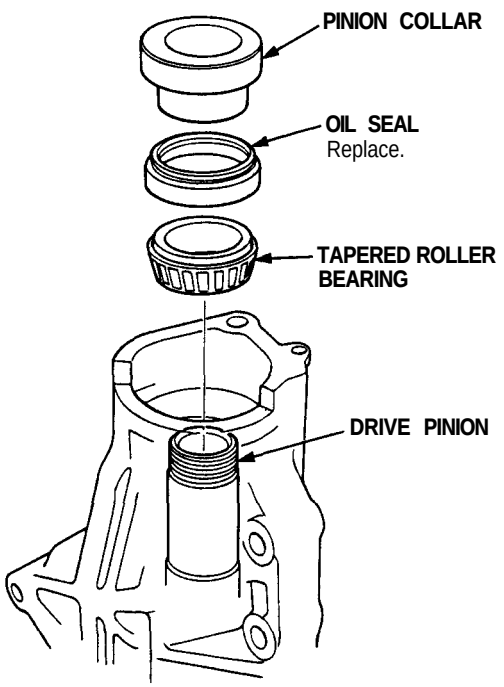


9. Remove the locknut and the spring washer from the drive pinion.

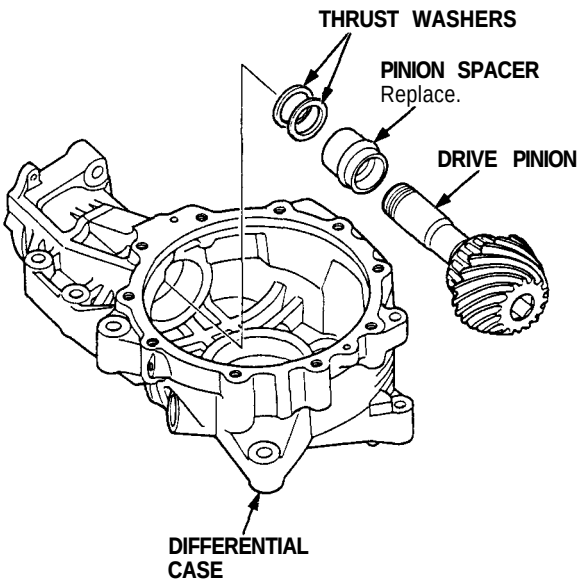
   NOTE: The locknut has left-hand threads.



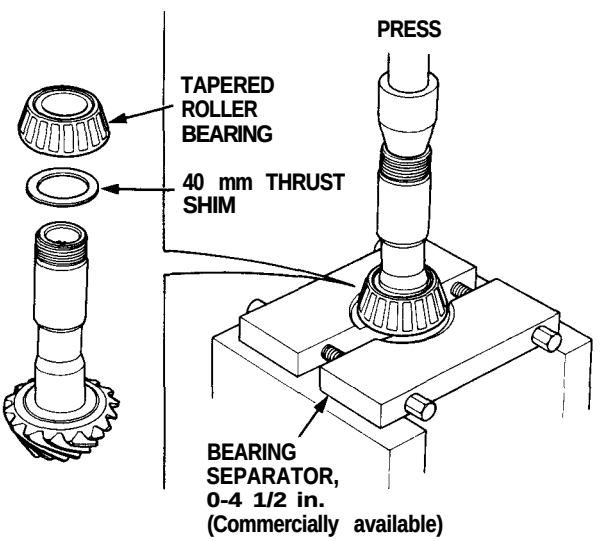
10. Remove the pinion collar and the oil seal, then tap the drive pinion through the tapered roller bearing.



11. Remove the drive pinion, the pinion spacer, and the thrust washers.



12. Remove the tapered roller bearing and 40 mm thrust shim using a press as shown.



(cont'd)

Differential Assembly

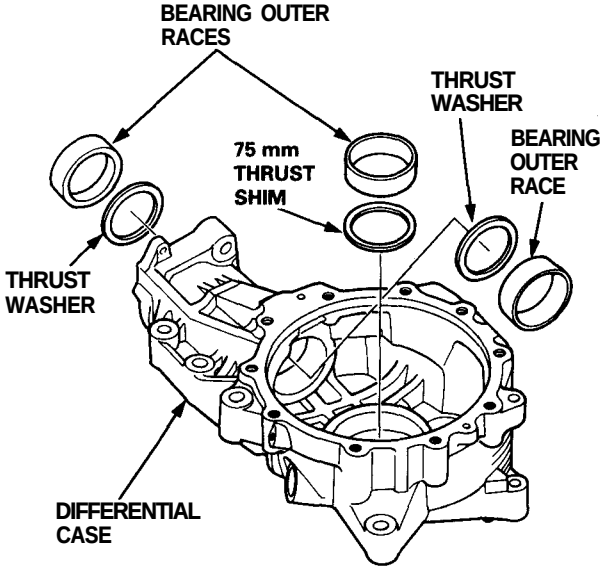
Disassembly(cont'd)

13. Remove the bearing outer races, 75 mm thrust shim, and thrust washers by driving them out from behind using the grooves provided or by heating the differential case to about 212°F (100°C).

NOTE: Use care when driving out the bearing outer races to prevent damage to the differential case.

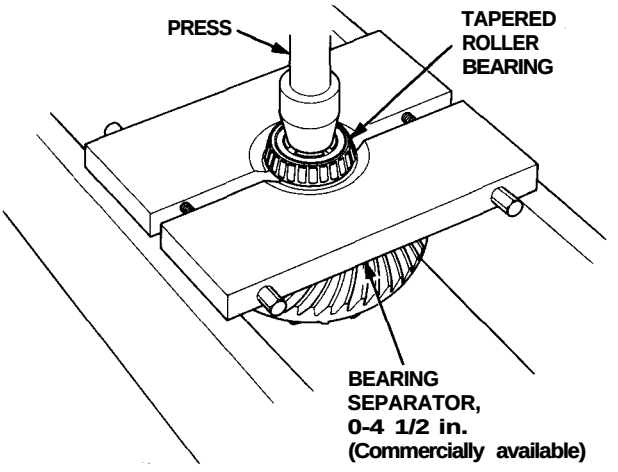
CAUTION: Do not reuse the 75 mm thrust shim and thrust washer if the bearing outer race was driven out.

NOTE:
- Do not heat the differential case in excess of 212°F (100°C).
- If the bearing outer race was removed by heating, allow the differential case to cool to room temperature.
- Replace the tapered roller bearing with a new one whenever the bearing outer race is replaced.

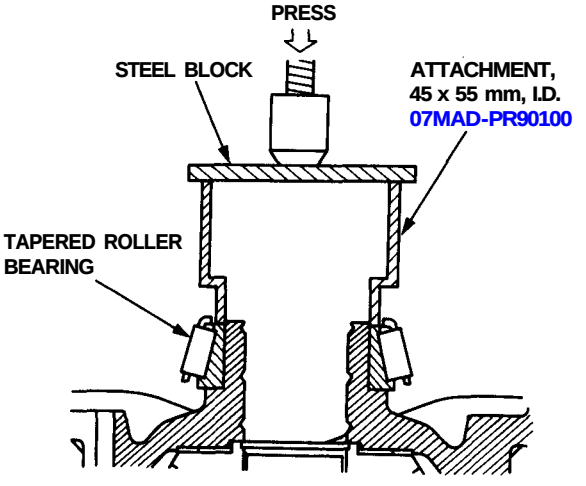


Tapered Roller Bearing Replacement

1. Remove the tapered roller bearings using a press as shown.



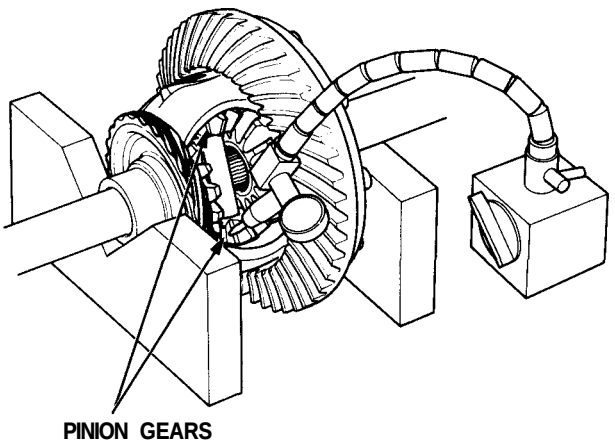
2. Install the tapered roller bearings using the special tools and a press as shown.



Backlash Inspection

1. Remove the tapered roller bearings (see page 15-14).
2. Install the left driveshaft and the intermediate shaft in the side gears.
3. Measure the backlash of both pinion gears.

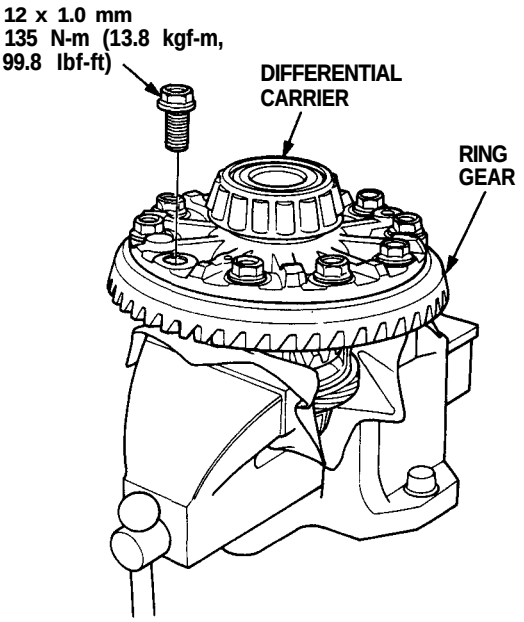
Standard: 0.05-0.15 mm (0.002-0.006 in)
Service Limit: 0.30 mm (0.012 in)



If the backlash exceeds the service limit, replace the differential carrier.

Ring Gear Replacement

1. Remove the bolts in a crisscross pattern, in several steps, and remove the ring gear.

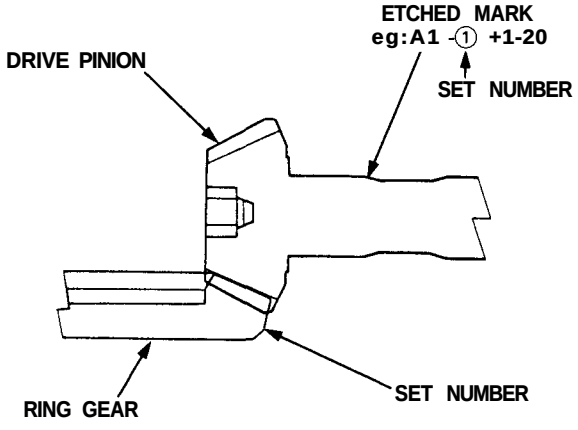


2. Install the ring gear by tightening the bolts in a criss-cross pattern, in several steps. If the bolts are difficult to tighten, make sure that the ring gear is going on to the differential carrier correctly.

Differential Assembly

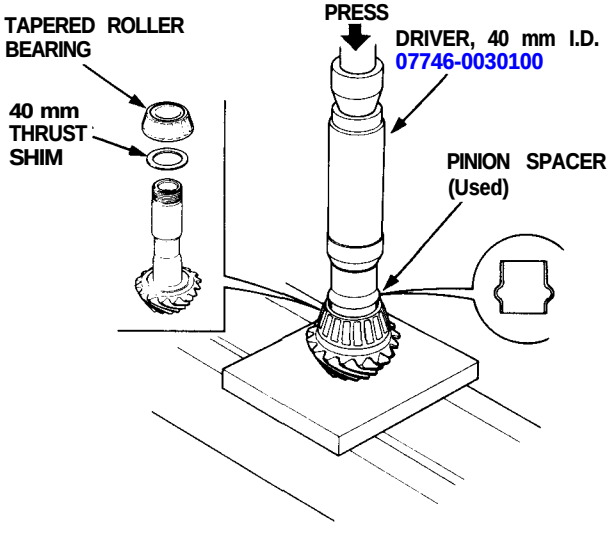
Reassembly

NOTE:
- If replacement is required, always replace the drive pinion and ring gear as a set.
- If the drive pinion and ring gear are replaced, check the height adjustment (see page 15-25).

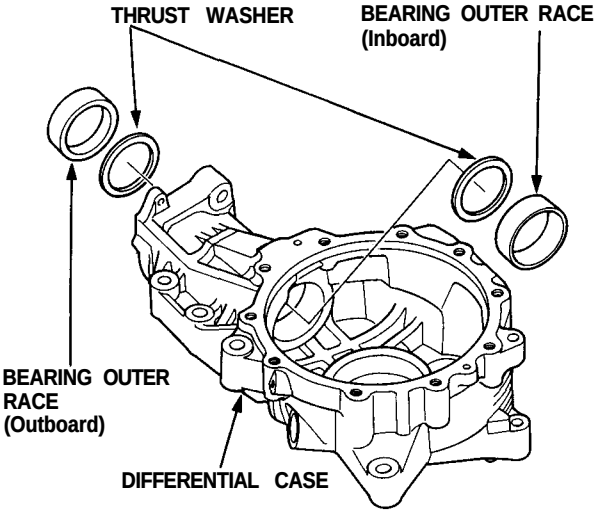


1. Install the 40 mm thrust shim and tapered roller bearing using the special tool and a press as shown.

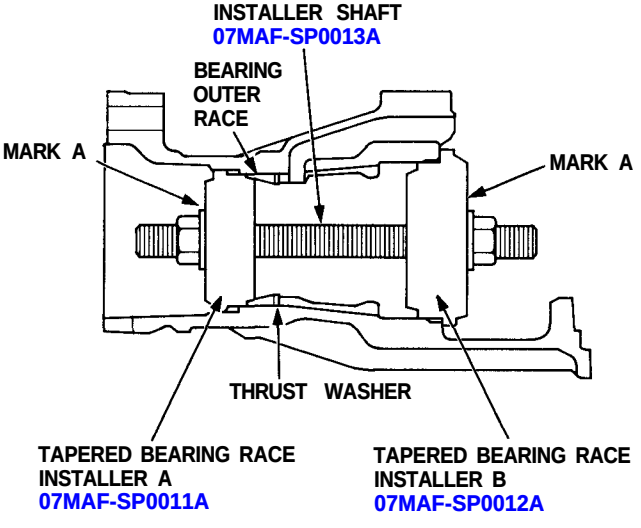
   NOTE: Use a used pinion spacer with the special tool for bearing installation, and then discard the used pinion spacer.



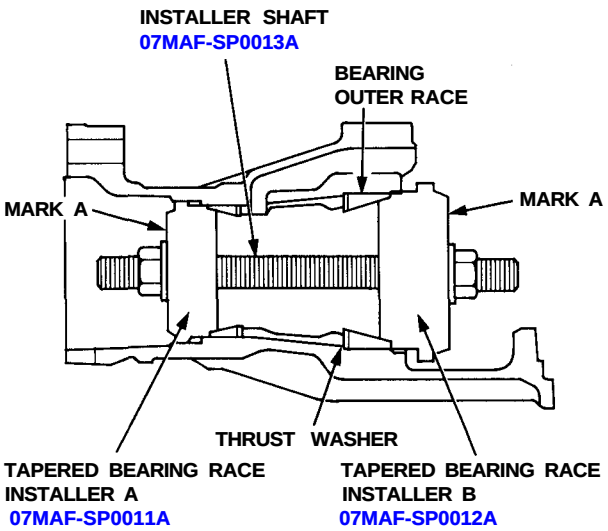
2. Check the differential case bearing surface areas for burrs, and remove as needed. Position the inboard thrust washer into the differential case. Using the sides of the special tools stamped "B", install the inboard bearing outer race as shown. Repeat for the outboard bearing outer race.



a. First install the outboard bearing outer race.

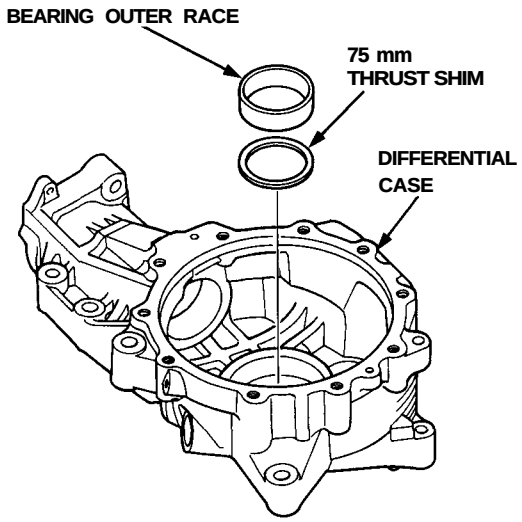


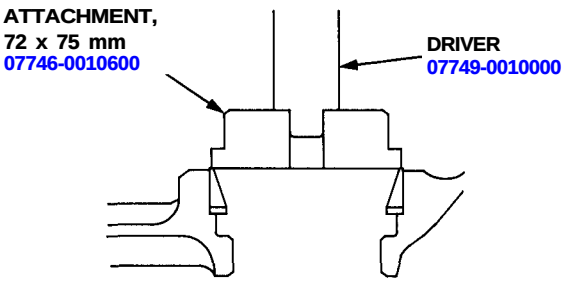
b. Next install the inboard bearing outer race.



3. Install the 75 mm thrust shim and bearing outer race using the special tools as shown.

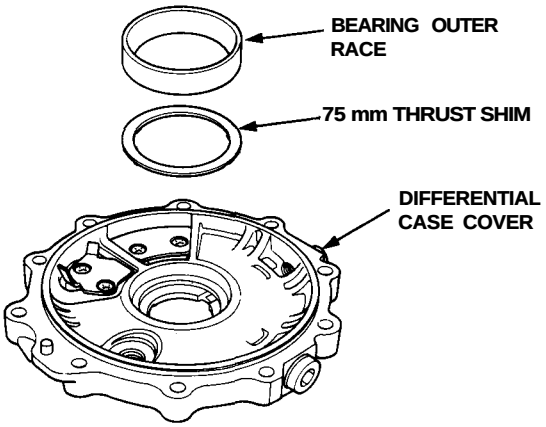
NOTE: Install the 75 mm thrust shim that was removed.

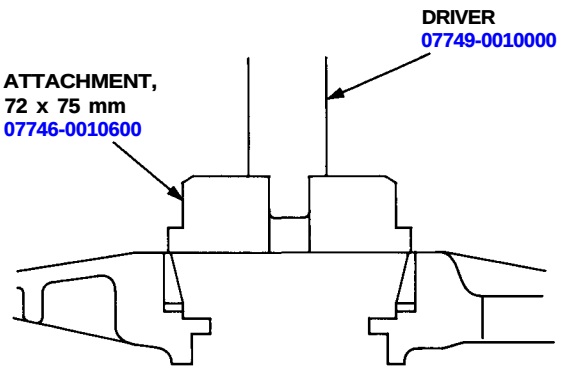




4. Install the 75 mm thrust shim and bearing outer race using the special tools as shown.

NOTE: Install the 75 mm thrust shim that was removed.





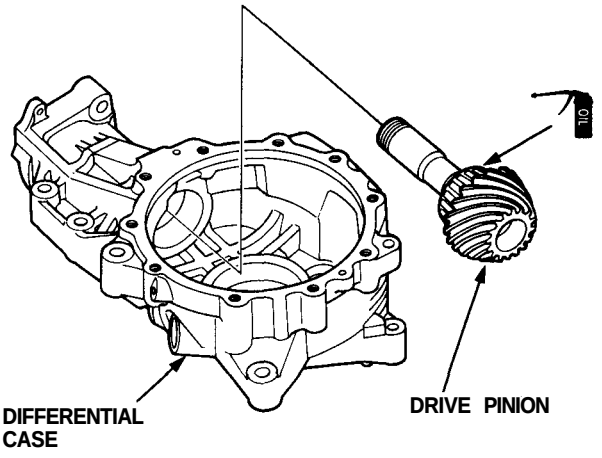
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Differential Assembly

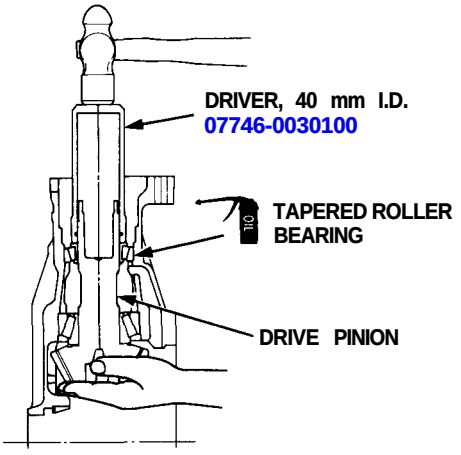
Reassembly (cont'd)

5. Apply lubricant to the tapered roller bearing, then install the drive pinion into the differential case as shown.

   NOTE: Do not install the pinion spacer and thrust washers at this time.

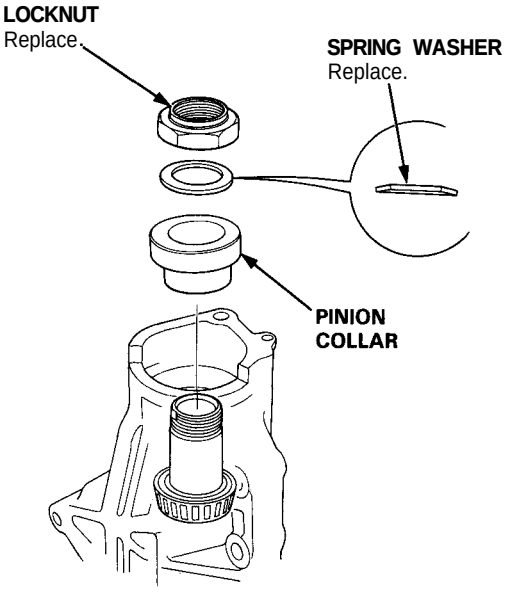


6. Apply lubricant to the tapered roller bearing, then install the tapered roller bearing using the special tool, and by holding the drive pinion as shown.



7. Install the pinion collar, spring washer and locknut.

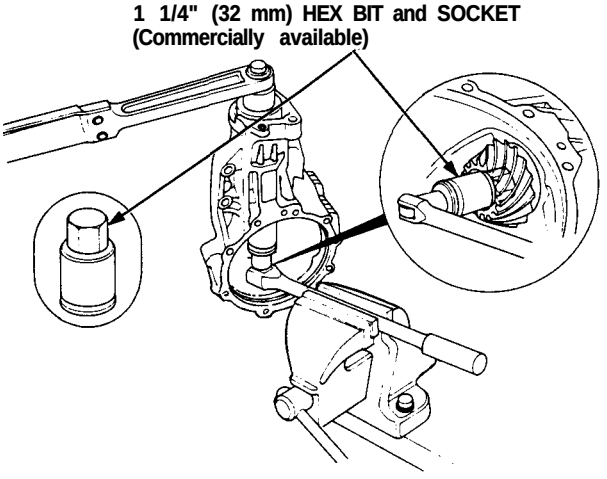
   NOTE:
   - The locknut has left-hand threads.
   - Apply a sufficient amount of lubricant (gear oil and molybdenum disulfide in a mixing ratio of 5 :1) to the locknut and the threaded part of the shaft.



8. Hold the drive pinion using a 1 1/4" (32 mm) hex bit and socket as shown, then carefully tighten the pinion locknut until there is no play in the drive pinion.

   Torque: 20 N-m (2.0 kgf-m, 14 lbf-ft)

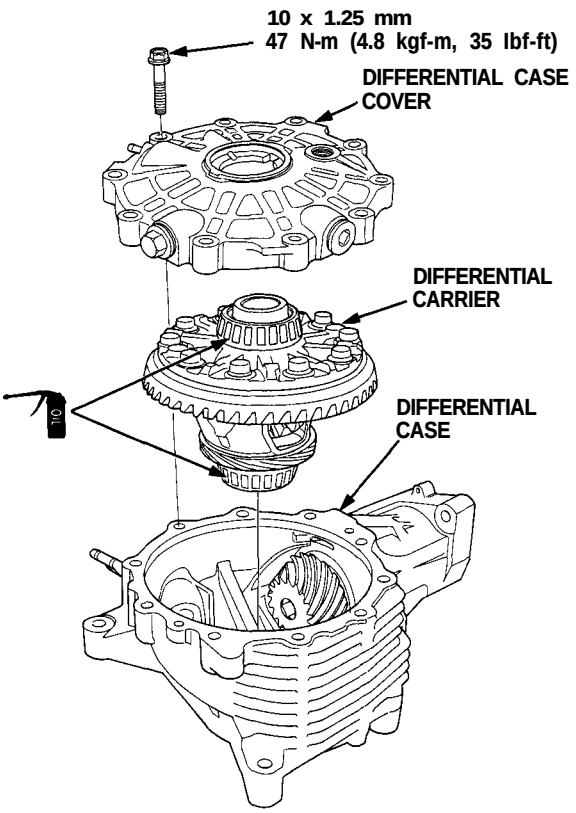
   CAUTION: To avoid damaging the tapered roller bearing, do not overtighten the locknut.



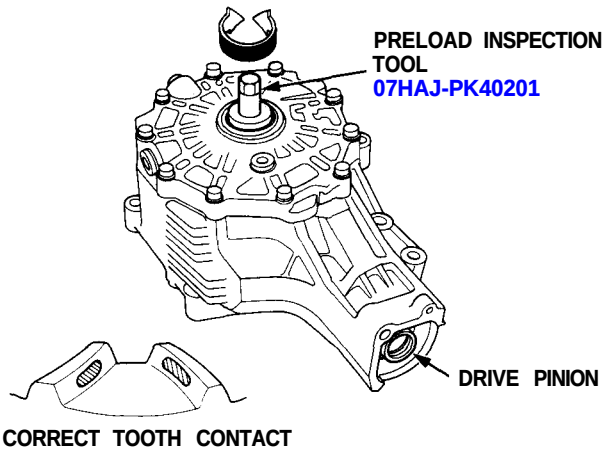
9. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

10. Apply lubricant to the tapered roller bearings, install the differential carrier into the differential case, then install the differential case cover.

11. Install the bolts and tighten in a crisscross pattern, in several steps.

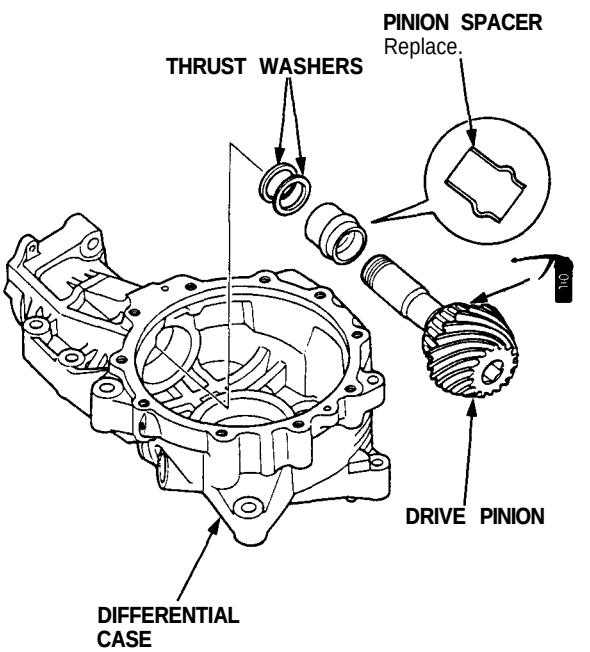


12. Install the special tool as shown. Rotate the ring gear one full turn in both directions while applying resistance to the drive pinion.



13. Remove the differential case cover, and check the tooth contact pattern (heel and toe). Adjust the ring gear tooth contact as needed (see page 15-26).

14. After adjusting the ring gear tooth contact, remove the drive pinion, then install a new pinion spacer and thrust washers on the drive pinion.

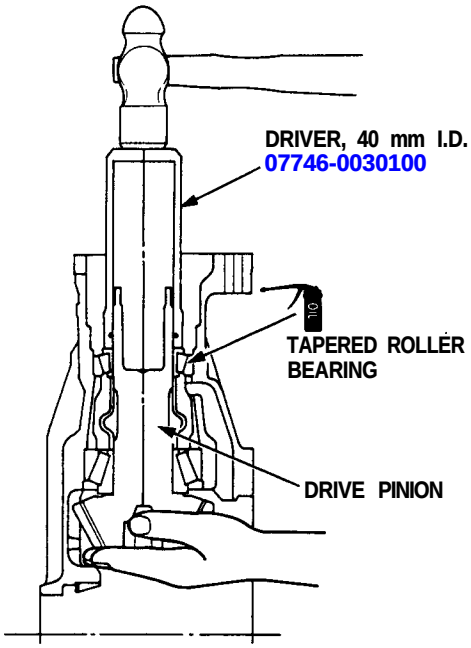


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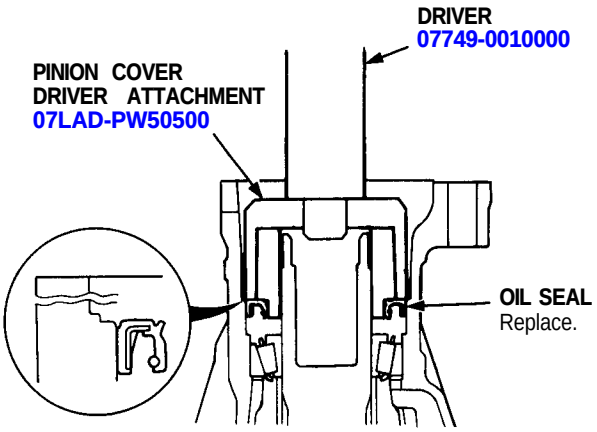
Differential Assembly

Reassembly (cont'd)

15. Apply lubricant to the tapered roller bearing, then install it using the special tool while holding the drive pinion as shown.

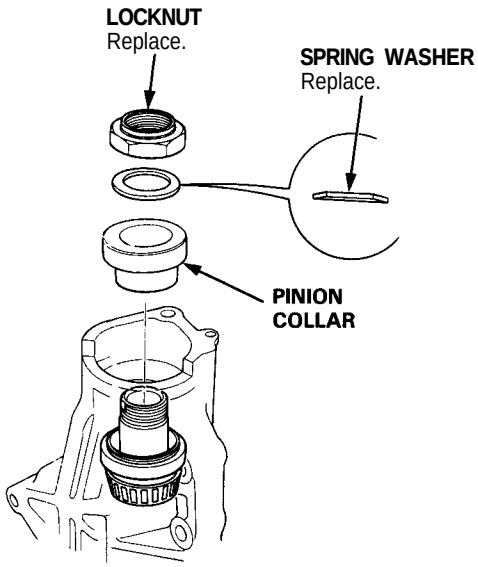


16. Install a new oil seal using the special tools as shown.

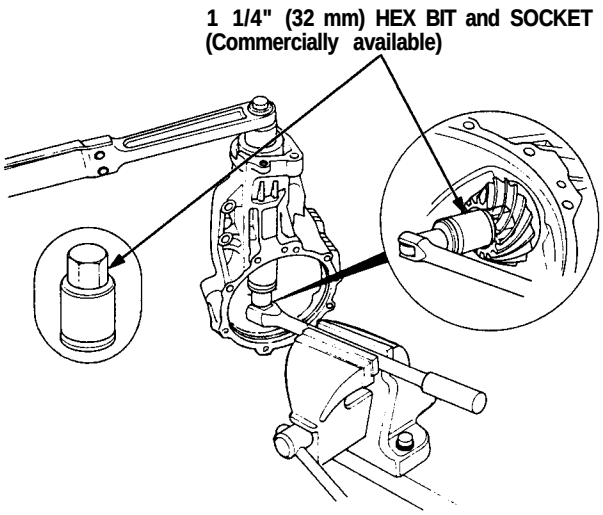


17. Install the pinion collar, spring washer and locknut.

NOTE:
- The locknut has left-hand threads.
- Apply a sufficient amount of lubricant (gear oil and molybdenum disulfide in a mixing ratio of 5 : 1) to the locknut and the threaded part of the shaft.



18. Hold the drive pinion using a 1 1/4" (32 mm) hex bit and socket as shown.

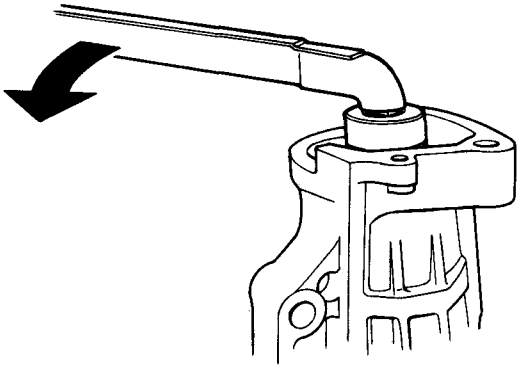


19. Tighten the locknut to 255 N-m (26 kgf-m, 188 lbf-ft), and measure the tapered roller bearing preload.

    NOTE: Rotate the drive pinion several times to ensure proper tapered roller bearing contact.

    Standard:

    New Bearing: 1.27 -1.67 N-m (13.0-17.0 kgf-cm, 11-15 lbf-in)
    Reused Bearing: 0.64-1.03 N-m (6.5-10.5 kgf-cm, 5.6-9.11 lbf-in)



    If the tapered roller bearing preload exceeds the standard, replace the pinion spacer.

    If the tapered roller bearing preload is less than the standard, adjust by tightening the locknut a little at a time, but keep the torque within 255—324 N-m (26-33 kgf-m, 188-239 lbf-ft). If this is not possible, replace the pinion spacer.

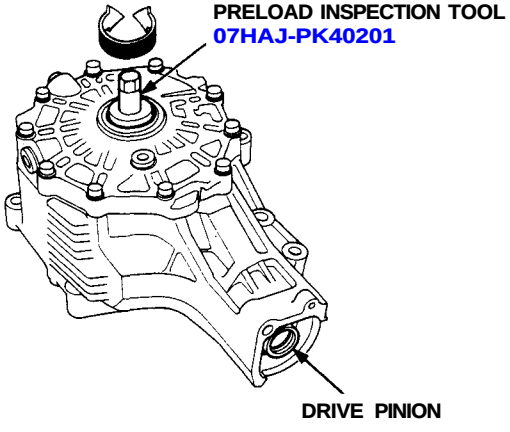
20. Clean and paint the ring gear teeth lightly and evenly with Prussian Blue (on both sides of each tooth).

21. Install the differential carrier into the differential case, and reinstall the differential case cover.

22. Install the bolts and tighten in a crisscross pattern in several steps.

    Torque: 47 N-m (4.8 kgf-m, 35 lbf-ft)

23. Install the special tool as shown. Rotate the ring gear one full turn in both directions while applying resistance to the drive pinion.



24. Remove the special tool, and use a dial-type torque wrench on the pinion shaft to check total bearing preload.

    NOTE: Rotate the drive pinion several times to ensure proper bearing contact.

    Standard:
    Pinion and ring gear bearings are new:
    Tp* + 1.26-1.57 N-m (12.8-16.0 kgf-cm, 11.1-13.9 lbf-in)
    Pinion and ring gear bearings are reused:
    Tp* + 0.89-1.13 N-m (9.1-11.5 kgf-cm, 7.90-9.98 lbf-in)
    Ring gear bearing is new:
    Tp* + 1.26-1.57 N-m (12.8-16.0 kgf-cm, 11.1-13.9 lbf-in)
    Pinion bearing is new:
    Tp* + 0.89-1.13 N-m (9.1-11.5 kgf-cm, 7.90-9.98 lbf-in)

    *: Drive pinion bearing preload measured in step 19.

    If the total preload is not within the standard, correct it by increasing or decreasing the preload on the carrier bearings as needed. If there is too much preload, decrease the shim thickness equal amounts on both sides. If there is not enough preload, increase the shim thickness equal amounts on both sides.

    NOTE: Be sure the same amount of shim thickness is added or subtracted from both sides, so that the backlash and tooth contact pattern are not affected.

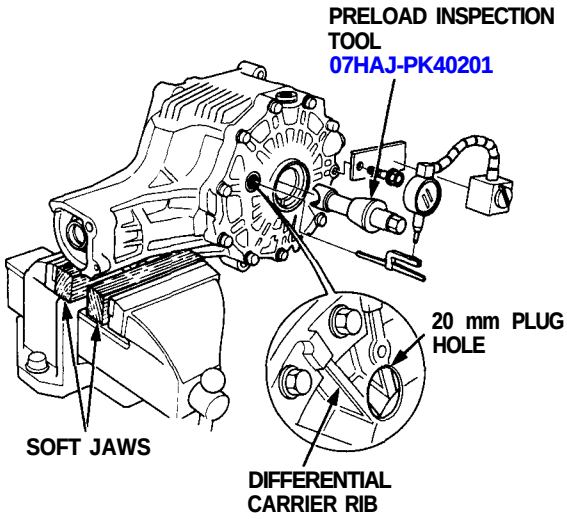
(cont'd)

Differential Assembly

Reassembly (cont'd)

25. Secure the differential assembly in a vise using soft jaws.

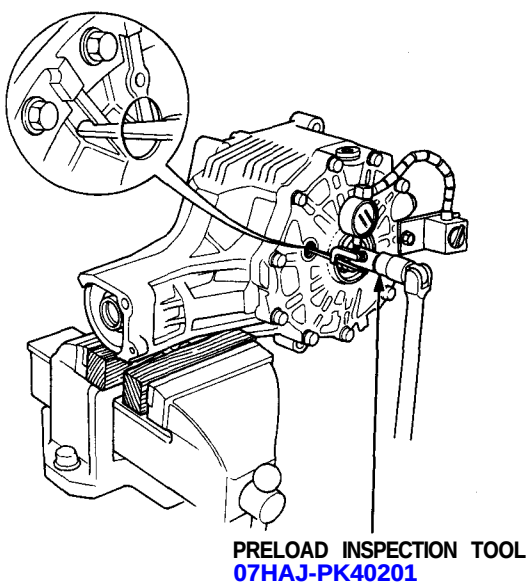
26. Align a differential carrier rib with the 20 mm plug hole, and install the special tools as shown.



27. Measure backlash in 3-4 places on the differential carrier using the special tools as shown.

Standard: 0.04-0.10 mm (0.002-0.004 in)

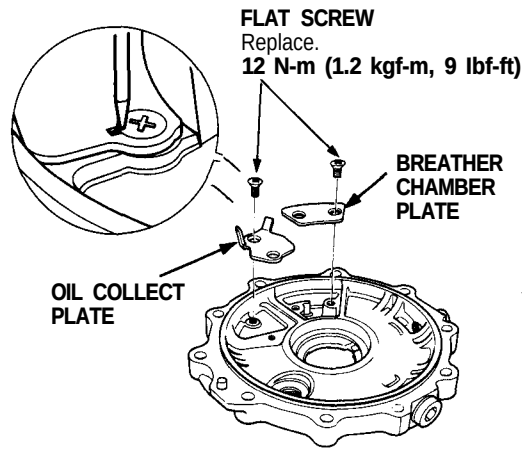
The difference among the 3-4 measurements taken must not exceed 0.04 mm (0.002 in).



28. If the backlash is less then the standard, adjust the ring gear backlash (see page 15-26).

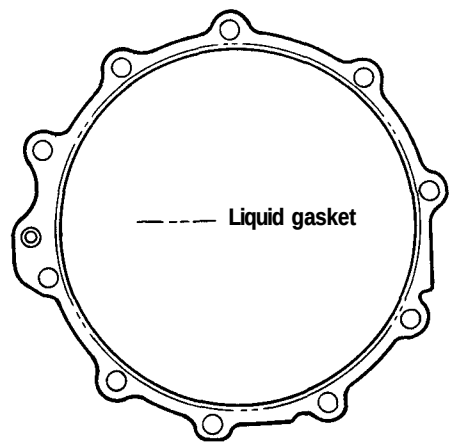
29. Remove the differential case cover, and check the tooth contact pattern (face and flank). If the tooth contact is not correct, adjust ring gear tooth contact (see page 15-26).

30. After all adjustments are made, install the oil collect plate and the breather chamber plate, then stake the screw heads in the groove as shown.



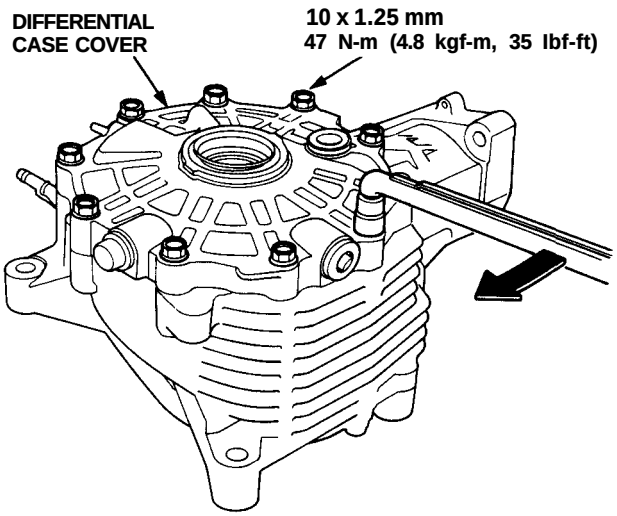
31. Apply liquid gasket to the mating surface of the differential case.

NOTE:
- Use liquid gasket (P/N 08718-0001).
- Remove the dirt and oil from the sealing surface.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings, and allow it to cure at least 20 minutes after assembly before filling the transmission with oil.

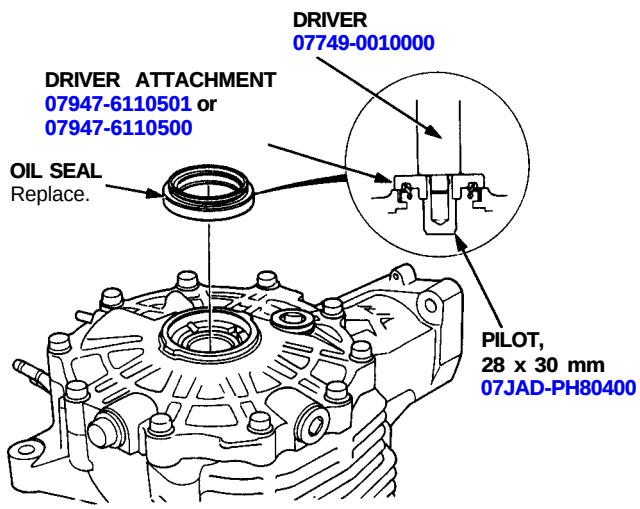


32. Install the differential case cover.

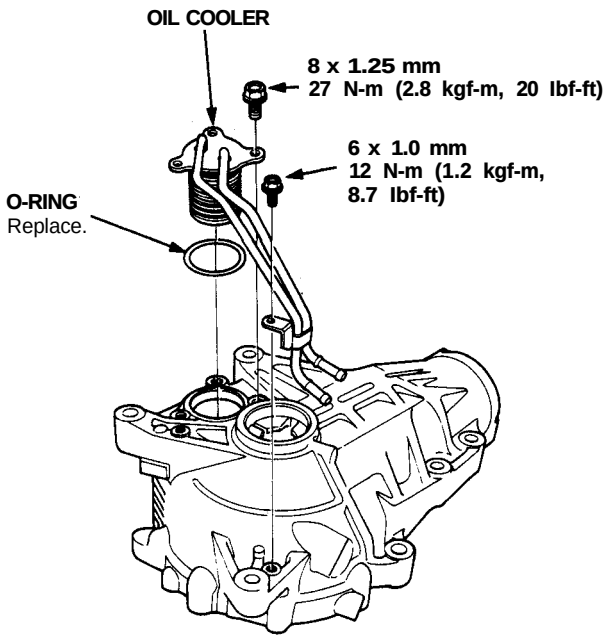
NOTE: Torque the bolts in a crisscross pattern, in several steps.



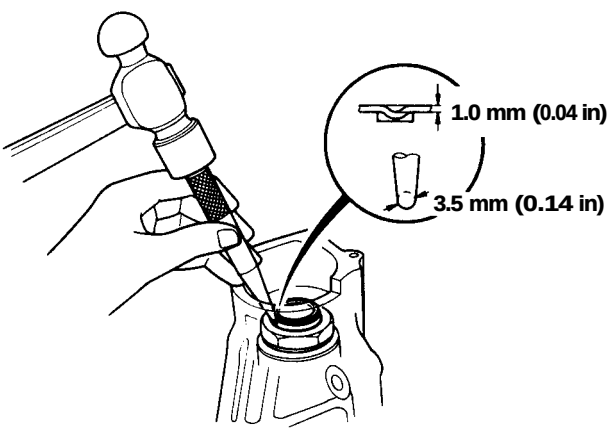
33. Install the oil seal using the special tools as shown.



34. Install the O-ring and the oil cooler.



35. Stake the locknut tab into the groove.

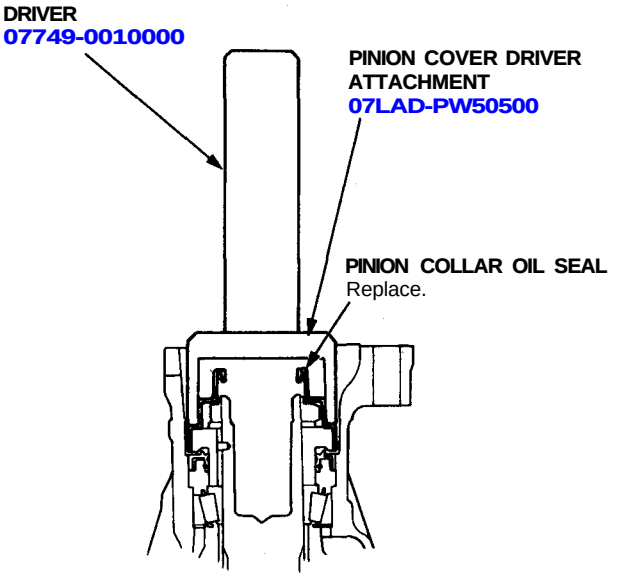


(cont'd)

Differential Assembly

Reassembly (cont'd)

36. Install the pinion collar oil seal using the special tools as shown.



Drive Pinion

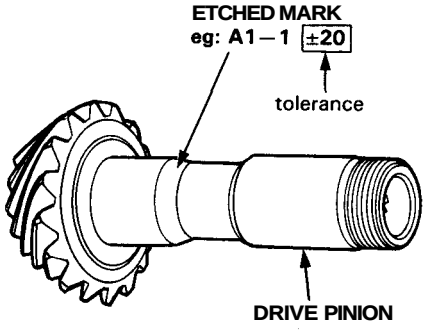
Height Adjustment

NOTE: If the drive pinion and ring gear are replaced (always as a set), the height has to be adjusted.

Select the proper 40 mm thrust shim as follows:

First, calculate the difference in size between the old shim and the new drive pinion. The last one of the numbers (see illustration.) on each drive pinion is the plus (+) or minus (-) tolerance in thousandths of a millimeter. So, a drive pinion with + 20 is 0.02 mm larger and a drive pinion with -20 is 0.02 mm smaller.

1. If the number on the old drive pinion is a plus (+), add it to the old shim thickness. If it is a minus (-), subtract it from the old shim thickness.
2. If the number on the new drive pinion is a plus (+), subtract it from the number you got in step 1. If it is a minus (-), add it to the step 1 number.
3. Select the shim that is closest (but not more than) the final number you got from steps 1 and 2.



Example 1:
Old shim: 1.30 mm thickness
Old pinion: +20 (0.02 mm)
New pinion: -20 (-0.02 mm)

1.30 + 0.02 + 0.02 = 1.34

Select the 1.33 mm (0.0524 in) new shim.

Example 2:
Old shim: 1.30 mm thickness
Old drive pinion: +20 (0.02 mm)
New drive pinion: +40 (0.04 mm)

1.30 + 0.02 - 0.04 = 1.28

Select the 1.27 mm (0.0500 in) new shim.

40 mm THRUST SHIM

	Part Number	Thickness
A	41381 -PW5-000	1.18 mm (0.0465 in)
B	41382-PW5-000	1.21 mm (0.0476 in)
C	41383-PW5-000	1.24 mm (0.0488 in)
D	41384-PW5-000	1.27 mm (0.0500 in)
E	41385-PW5-000	1.30 mm (0.0512 in)
F	41386-PW5-000	1.33 mm (0.0524 in)
G	41387-PW5-000	1.36 mm (0.0535 in)
H	41388-PW5-000	1.39 mm (0.0547 in)
I	41389-PW5-000	1.42 mm (0.0559 in)
J	41390-PW5-000	1.45 mm (0.0571 in)
K	41391 -PW5-000	1.48 mm (0.0583 in)
L	41392-PW5-000	1.51 mm (0.0594 in)
M	41393-PW5-000	1.54 mm (0.0606 in)
N	41394-PW5-000	1.57 mm (0.0618 in)
O	41395-PW5-000	1.60 mm (0.0630 in)
P	41396-PW5-000	1.63 mm (0.0642 in)

Ring Gear Tooth Contact

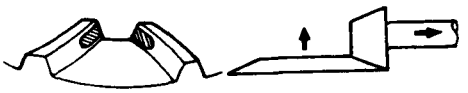
Adjustment

1) CORRECT TOOTH CONTACT



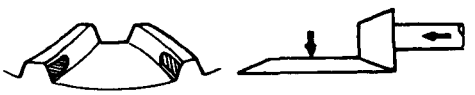
2) TOE CONTACT

- Use a thinner drive pinion shim (40 mm thrust shim) to move the drive pinion away from the ring gear.



3) HEEL CONTACT

- Use a thicker drive pinion shim (40 mm thrust shim) to move the drive pinion toward the ring gear.



4) FLANK CONTACT

- To move the ring gear away from the drive pinion, use a thicker side bearing shim (75 mm thrust shim) on the drive pinion side and a thinner one on the ring gear side.

NOTE: Recheck backlash after replacing the side bearing shims. If out of specification, adjust as described under TOE CONTACT.



5) FACE CONTACT

- To move the ring gear toward the drive pinion, use a thinner side bearing shim (75 mm thrust shim) on the drive pinion side and a thicker one on the ring gear side.

NOTE: Recheck backlash after replacing the side bearing shims. If out of specification, adjust as described under HEEL CONTACT.



Ring Gear Backlash

Adjustment

1. If the backlash exceeds the standard, correct by decreasing the shim thickness on one side and increasing the thickness of the other shim the same amount.

   NOTE:
   - The total thickness of both shims must still equal the total thickness of the original shims.
   - If there is too much backlash, move the ring gear toward the drive pinion. If there is not enough backlash, move the ring gear away from the drive pinion.

2. After adjustment, recheck backlash (see page, 15-22).

Standard: 0.04-0.10 mm (0.002-0.004 in)

75 mm THRUST SHIM

*: '95, '96 models only

	Part Number	Thickness
*A	41401-PW8-010	0.66 mm (0.0260 in)
B	41402 -PW8- 010	1.67 mm (0.0657 in)
C	41403 -PW8- 010	1.70 mm (0.0669 in)
D	41404-PW8-010	1.73 mm (0.0681 in)
E	41405-PW8-010	1.76 mm (0.0693 in)
F	41406 -PW8- 010	1.79 mm (0.0705 in)
G	41407-PW8-010	1.82 mm (0.0717 in)
H	41408-PW8-010	1.85 mm (0.0728 in)
I	41409 -PW8- 010	1.88 mm (0.0740 in)
J	41410-PW8-010	1.91 mm (0.0752 in)
K	41411-PW8-010	1.94 mm (0.0764 in)
L	41412-PW8-010	1.97 mm (0.0776 in)
M	41413-PW8-010	2.00 mm (0.0787 in)
N	41414-PW8-010	2.03 mm (0.0799 in)
O	41415-PW8-010	2.06 mm (0.0811 in)
P	41416-PW8-010	2.09 mm (0.0823 in)
Q	41417-PW8-010	2.12 mm (0.0835 in)
R	41418-PW8-010	2.15 mm (0.0846 in)
S	41419-PW8-010	2.18 mm (0.0858 in)
T	41420 -PW8- 010	2.21 mm (0.0870 in)
U	41421-PW8-010	2.24 mm (0.0882 in)
V	41422-PW8-010	2.27 mm (0.0894 in)
W	41423 -PW8- 010	2.30 mm (0.0906 in)
X	41424 -PW8- 010	2.33 mm (0.0917 in)
Y	41425-PW8-010	2.36 mm (0.0929 in)
Z	41426 -PW8- 010	2.39 mm (0.0941 in)

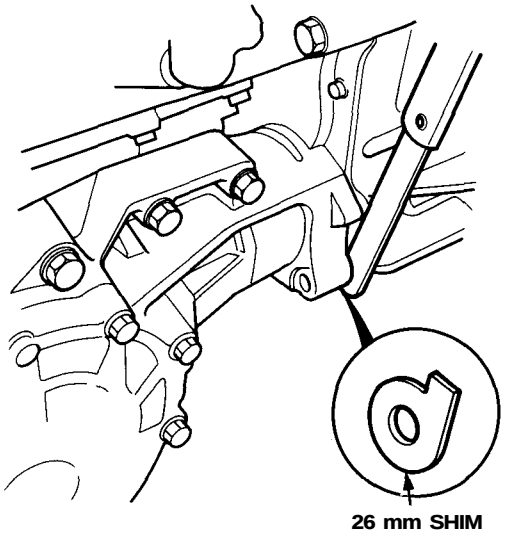
Differential Assembly

Installation

NOTE: If the differential case, torque converter housing, cylinder block and oil pan are replaced, the 26 mm shim must be adjusted.

a. Install the differential assembly.

b. Measure the clearance between the differential case and the torque converter housing.



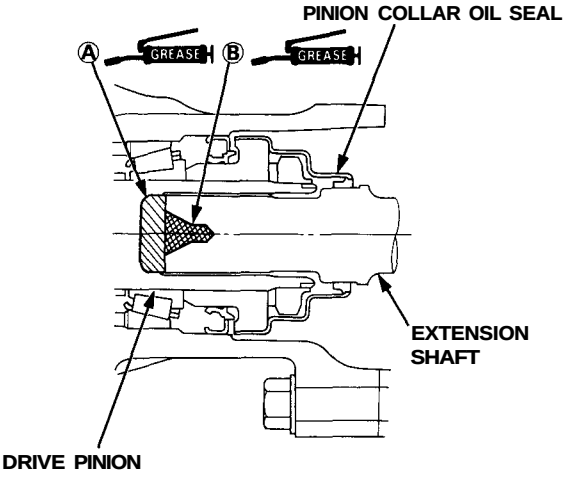
c. Select the 26 mm shim from the following table.

26 mm SHIM

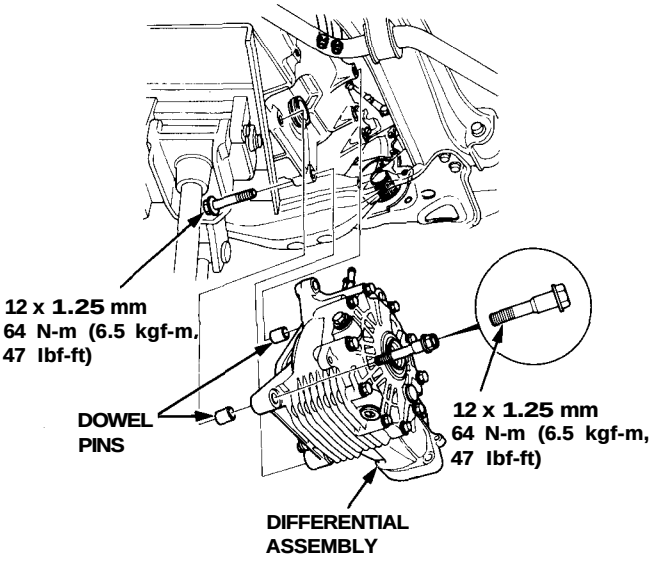
	Part Number	Thickness	Measurement Value
A	41432-PY4-000	1.9 mm (0.0748 in)	1.99—1.9 mm
B	41433-PY4-000	2.0 mm (0.0787 in)	2.09-2.0 mm
C	41434-PY4-000	2.1 mm (0.0827 in)	2.19-2.1 mm
D	41435-PY4-000	2.2 mm (0.0866 in)	2.29-2.2 mm
E	41436-PY4-000	2.3 mm (0.0906 in)	2.39-2.3 mm
F	41437-PY4-000	2.4 mm (0.0945 in)	2.49-2.4 mm
G	41438-PY4-000	2.5 mm (0.0984 in)	2.59-2.5 mm
H	41439-PY4-000	2.6 mm (0.1024 in)	2.69-2.6 mm
I	41440-PY4-000	2.7 mm (0.1063 in)	2.79-2.7 mm
J	41441-PY4-000	2.8 mm (0.1102 in)	2.89—2.8 mm
K	41442-PY4-000	2.9 mm (0.1142 in)	2.99—2.9 mm
L	41443-PY4-000	3.0 mm (0.1181 in)	3.09—3.0 mm

1. Fill the extension shaft and drive pinion with Super High Temp Urea Grease (P/N 08798-9002).

   Ⓐ: If the pinion collar oil seal is replaced: 19-20 g (0.67-0.71 oz)
   If the pinion collar oil seal is not replaced: 3.5-4.5 g (0.12-0.16 oz)
   Ⓑ: Fill the grease in until it is flush with extension shaft.



2. Install the dowel pins and the differential assembly.

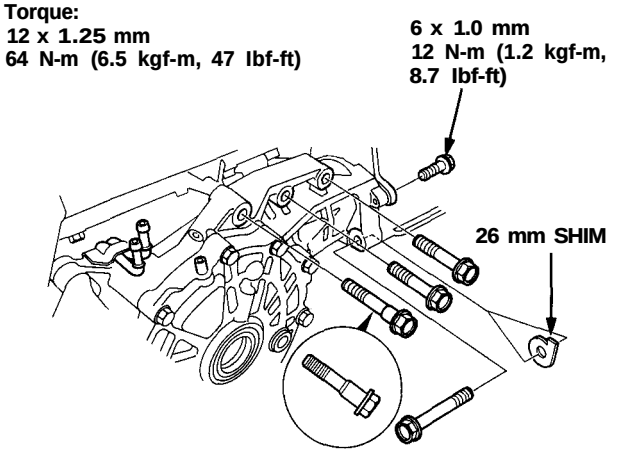


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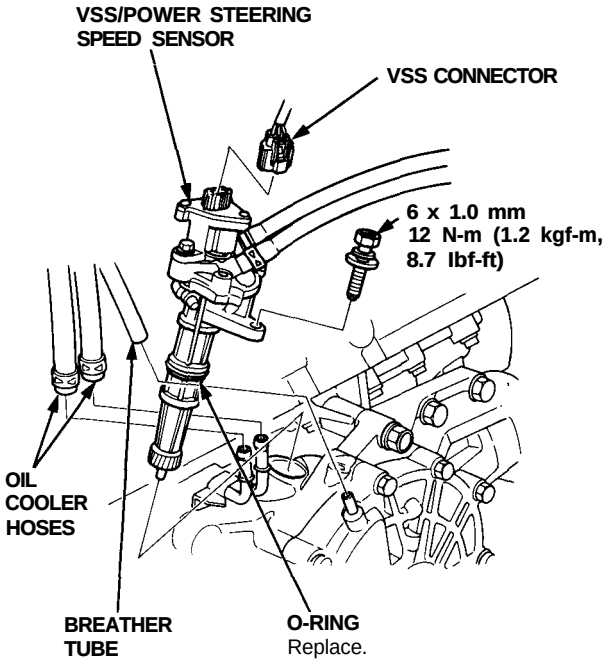
Differential Assembly

Installation (cont'd)

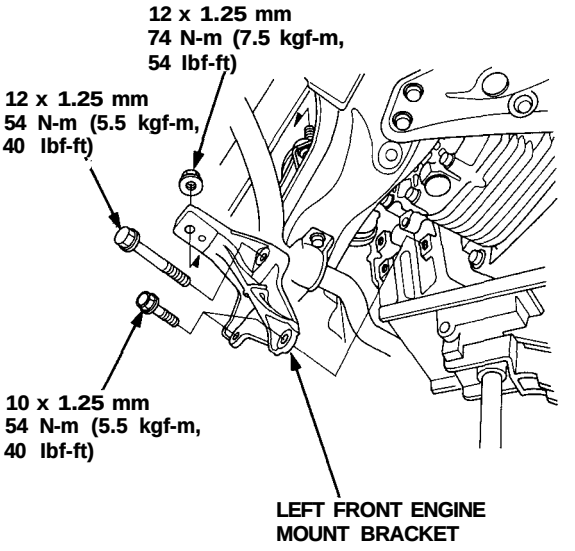
3. Install the mounting bolts and the 26 mm shim.



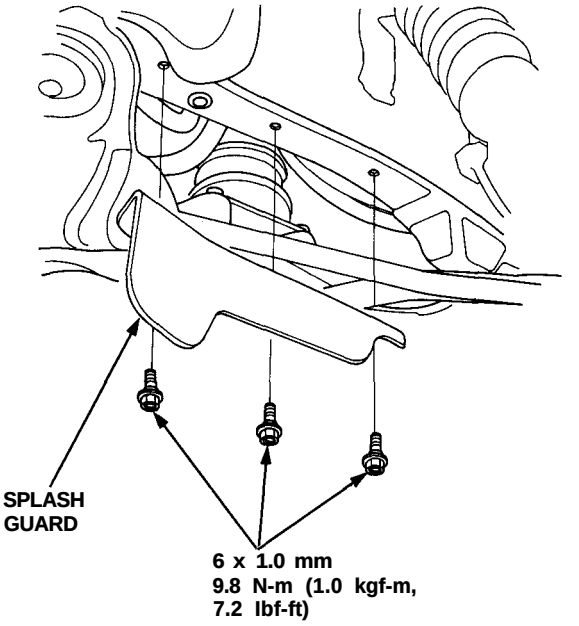
4. Install the vehicle speed sensor (VSS)/power steering speed sensor, then connect the oil cooler hoses and the breather tube.



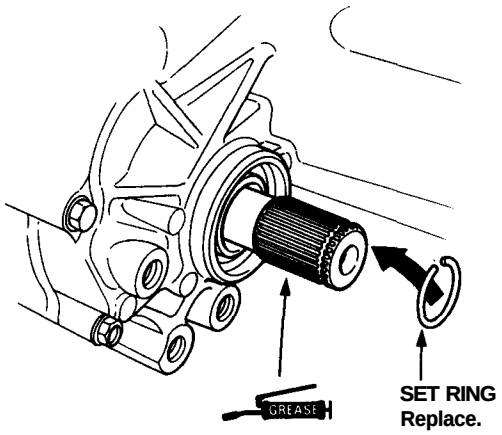
5. Install the left front engine mount bracket.



6. Install the splash guard.



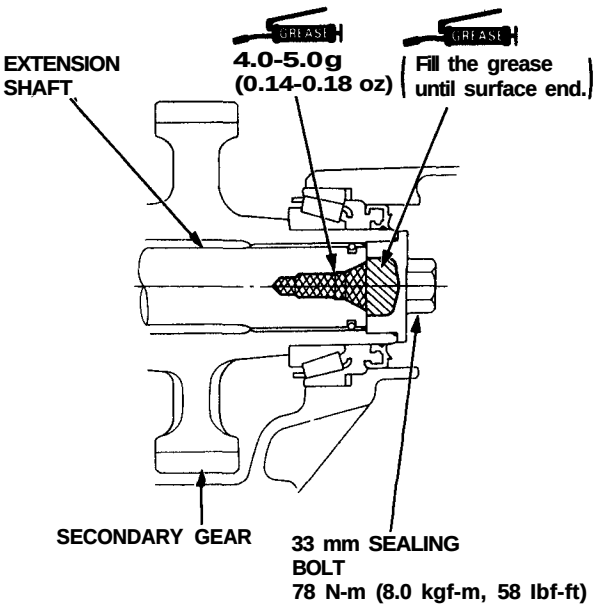
7. Install the set ring and the extension shaft, and apply Super High Temp Urea Grease (P/N 08798-9002) to the extension shaft spline.



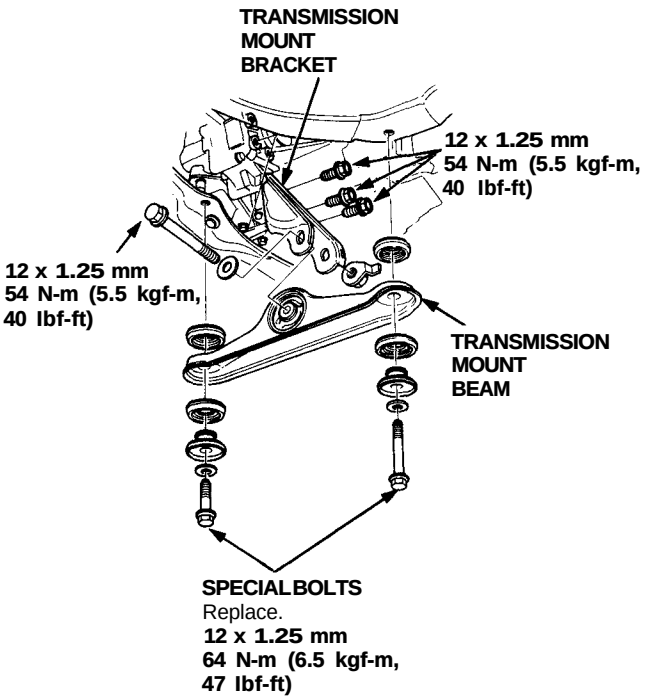
8. Fill the extension shaft and 33 mm sealing bolt with Super High Temp Urea Grease (P/N 08798—9002).

9. Install the 33 mm sealing bolt.

NOTE:
- Shift the transmission into the [P] position to lock the secondary gear.
- Apply liquid gasket (P/N 08718-0001) to the threads.



10. Install the transmission mount bracket and the transmission mount beam.



11. Install the driveshafts and the intermediate shaft (see section 16).

12. Refill the differential with oil (see page 15-4).

13. Refill the coolant (see section 10).

14. Install the air cleaner housing assembly.

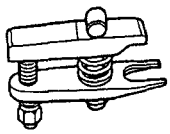
15. Connect the battery positive (+) and negative (-) cables to the battery.

16. Check the front wheel alignment (see section 18).

17. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07MAC-SL00100	Ball Joint Remover, 32 mm	1	16-4
②	07MAD-PR90100	Attachment, 45 x 55 mm I.D.	1	16-18
③	07746-0010300	Attachment, 42 x 47 mm	1	16-15
④	07746 - 0030400	Attachment, 35 mm I.D.	1	16-17
⑤	07749-0010000	Driver	1	16-15, 16-17
⑥	07947-SD90101	Seal Driver Attachment	1	16-17
⑦	07965-SD90200	Support Collar	1	16-17



①



②



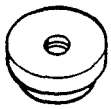
③



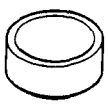
④



⑤



⑥



⑦

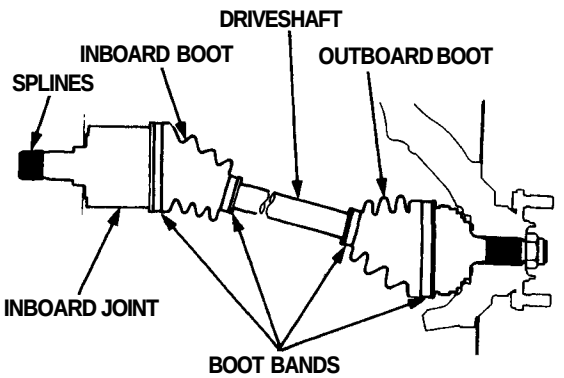
Driveshafts

Inspection

Driveshaft Boot
Check the boots on the driveshaft for cracks, damage, leaking grease and loose boot bands.
If any damage is found, replace the boot and boot bands.

Loose Splines
Turn the driveshaft by hand, and make sure the splines and joints are not excessively loose.
If damage is found, replace the joints if necessary.

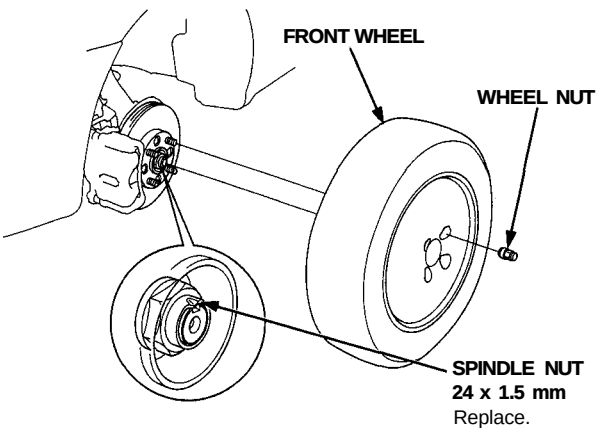
Twisted or Cracked
Make sure the driveshaft is not twisted or cracked.
Replace it if necessary.



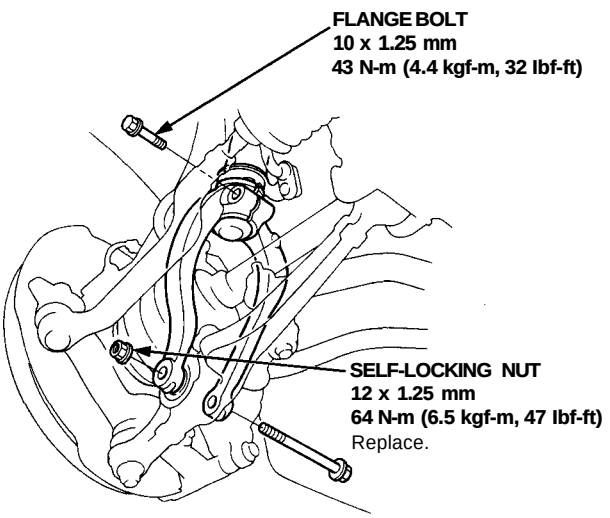
Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.
4. Drain the differential oil (see section 15).

   NOTE: It is not necessary to drain the differential oil when the right driveshaft is removed.
5. Raise the locking tab on the spindle nut, then remove the nut.



6. Remove the self-locking nut and flange bolt.
7. Remove the damper fork.



(cont'd)

Driveshafts

Removal (cont'd)

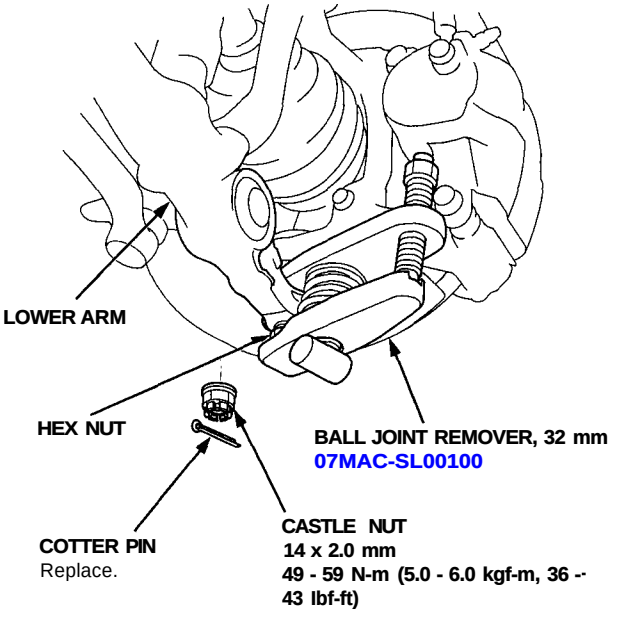
8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

9. Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

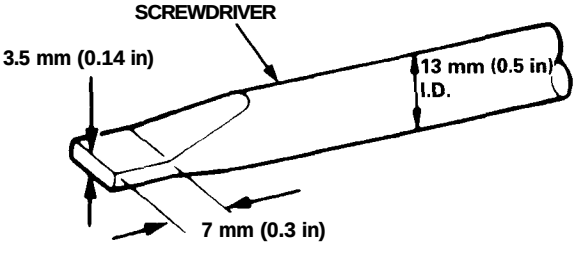
10. Use the ball joint remover, as shown on page 18-12, to separate the ball joint and lower arm.

CAUTION: Be careful not to damage the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



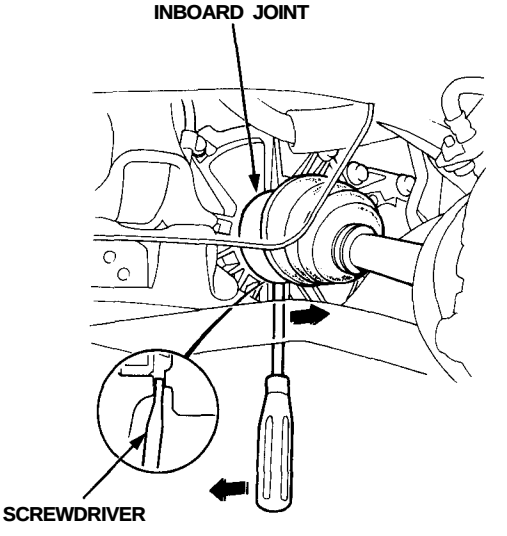
11. Pry the left driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove.



12. Pull on the inboard joint, and remove the left driveshaft from the differential case as an assembly.

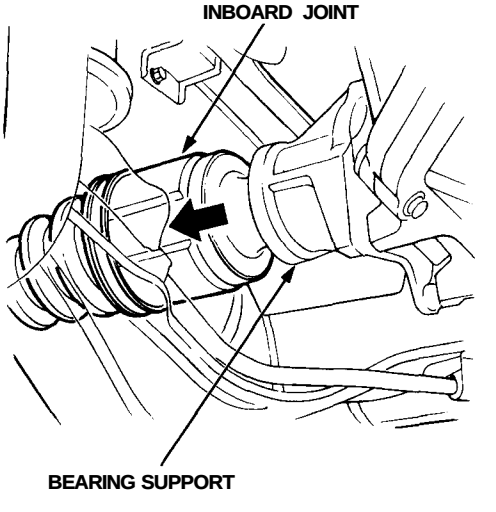
CAUTION:
- **Do not pull on the driveshaft, as the inboard joint may come apart.**
- **Use care when prying out the assembly, and pull it straight to avoid damaging the differential oil seal or the intermediate shaft outer seal.**

Left driveshaft:

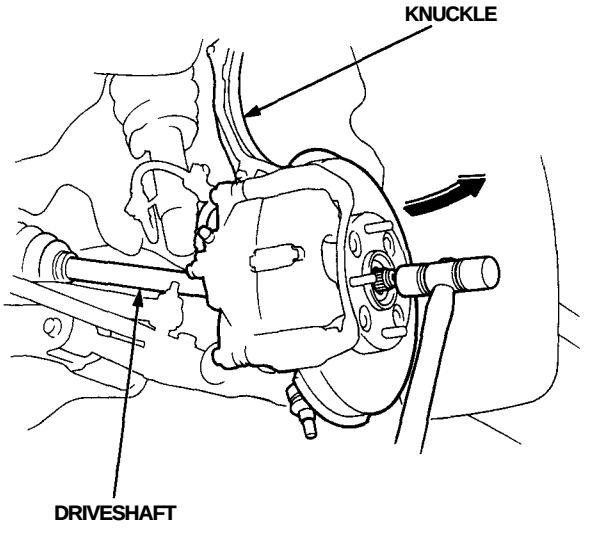


Right driveshaft:

Remove the right driveshaft from the bearing support by tapping the inboard joint of the driveshaft with a plastic hammer.



13. Pull the knuckle outward, then remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



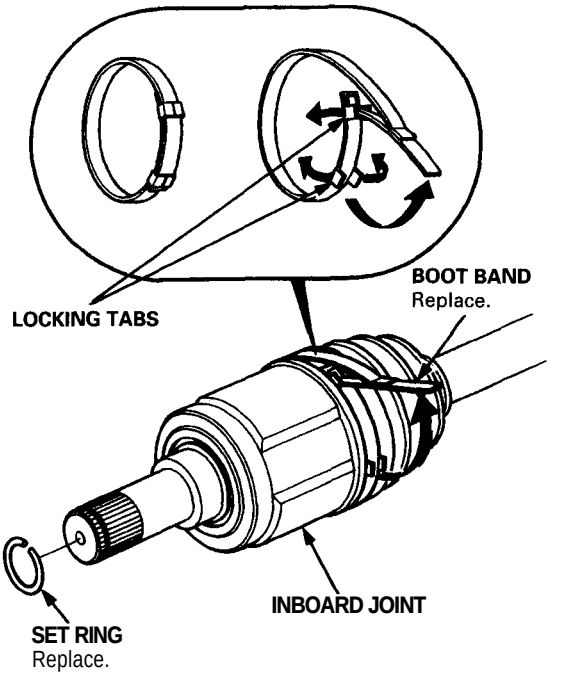
(cont'd)

Disassembly

1. Carefully clamp the driveshaft in a vise with soft jaws, then remove the set ring from the inboard joint.

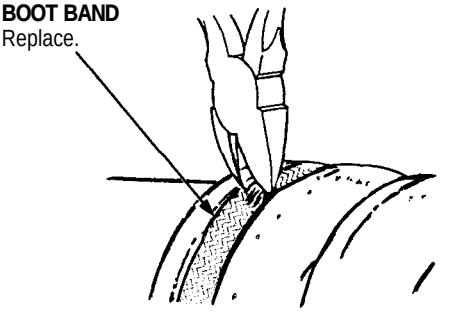
2. Remove the boot bands on the inboard joint and outboard joint.

   — If the boot band is a locking tabs type, pry up the locking tabs with a screwdriver and raise the end of the band.



   — If the boot band is the welded type, cut it off as shown.

CAUTION: Take care not to damage the boot.

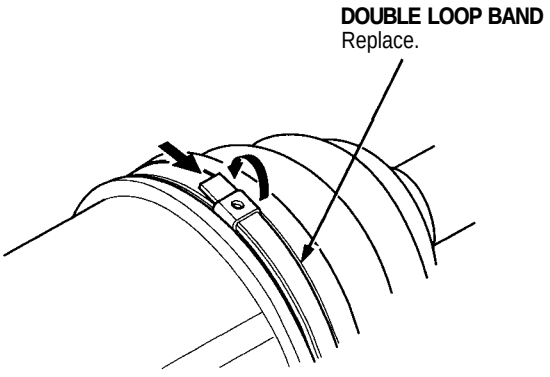


(cont'd)

Driveshafts

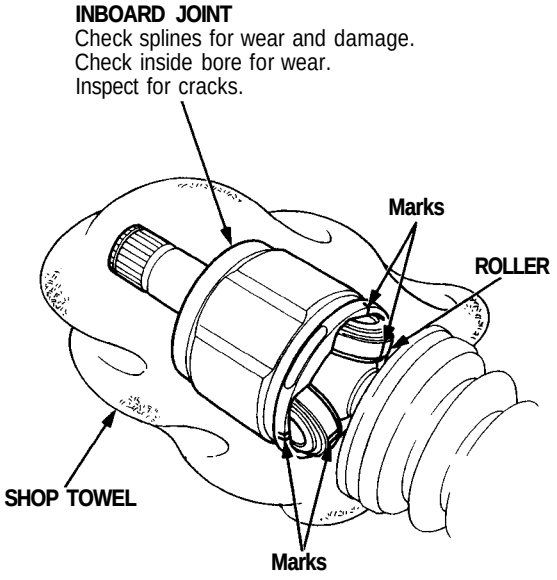
Disassembly (cont'd)

— If the boot band is a double loop band type, raise the band bend as shown.

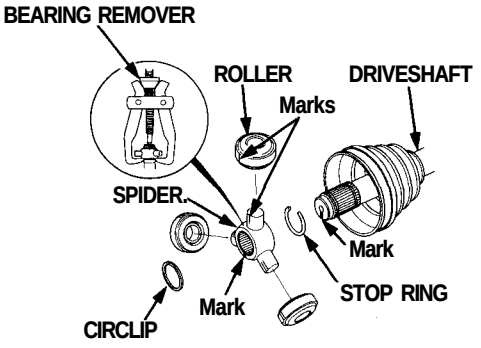


3. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel.

NOTE: Be careful not to drop the rollers when separating them from the inboard joint.



4. Mark the rollers and spider to identify the locations of rollers on the spider, then remove the rollers.



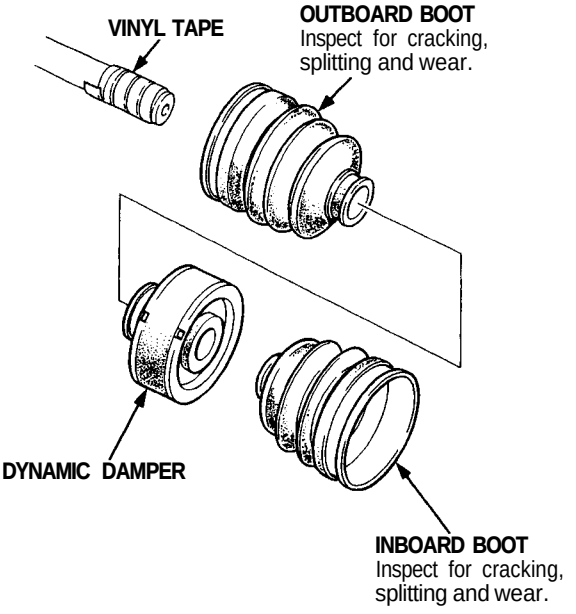
5. Remove the circlip.

6. Mark the spider and driveshaft to identify the position of the spider on the shaft.

7. Remove the spider using a commercially-available bearing remover.

8. Remove the stop ring.

9. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots and dynamic damper.



10. Remove the inboard boot.

CAUTION: Take care not to damage the boot.

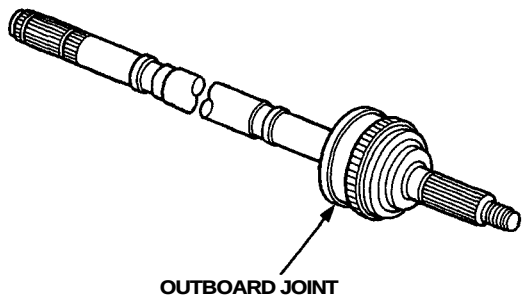
11. Remove the dynamic damper.

CAUTION: Take care not to damage the dynamic damper.

12. Remove the outboard boot, then remove the vinyl tape.

CAUTION: Take care not to damage the boot.

13. Inspect the outboard joint for faulty movement and wear. If any roughness or excess play is felt, replace the outboard joint.



14. Check the outboard ring for damage.

Driveshafts

Reassembly

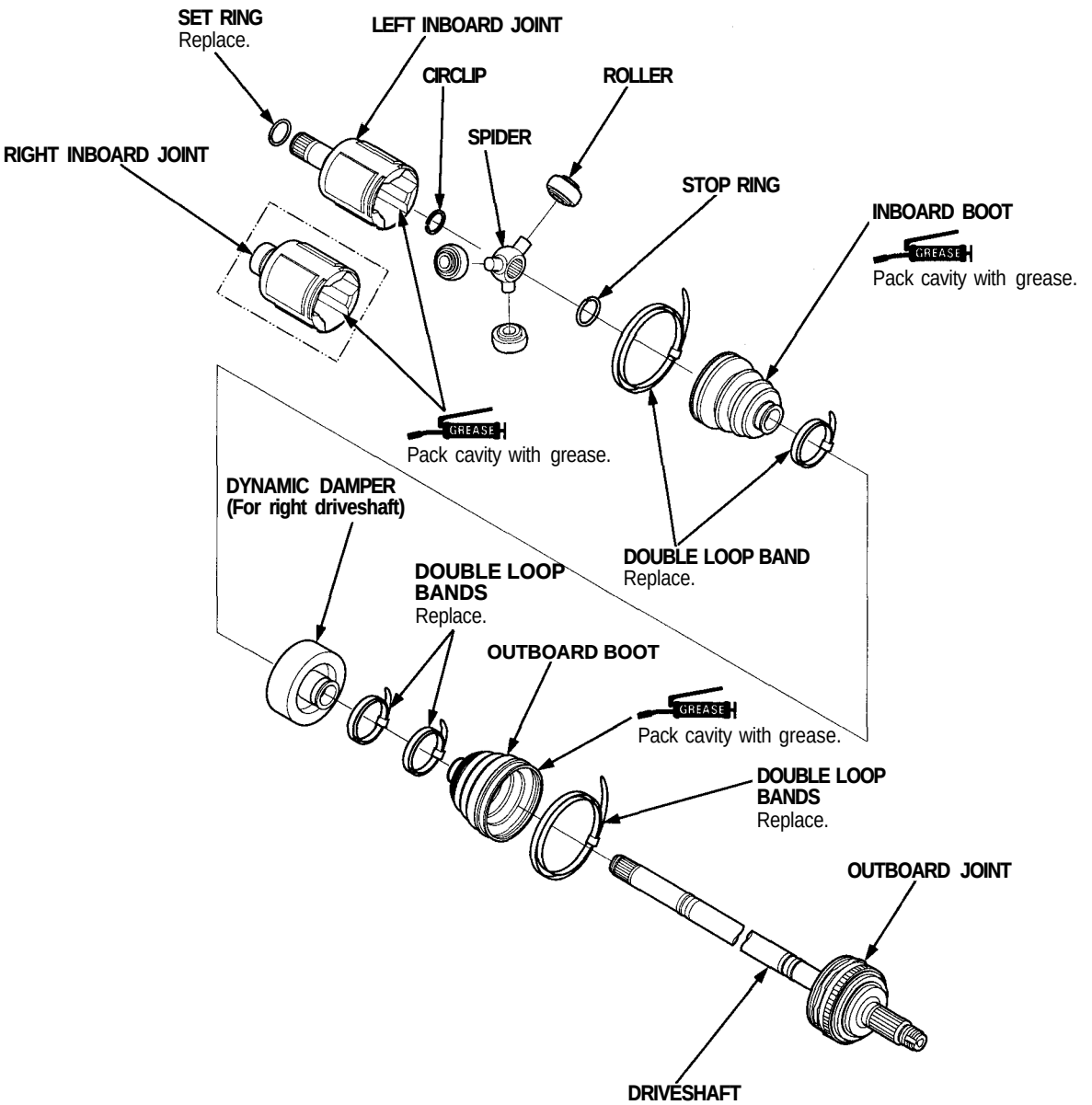
NOTE:

- Clean the disassembled parts with solvent, and dry them throughly with compressed air. Do not wash the rubber parts with solvent.
- GREASE : Thoroughly pack the inboard joint and both joint boots with the joint grease included in the new driveshaft set.

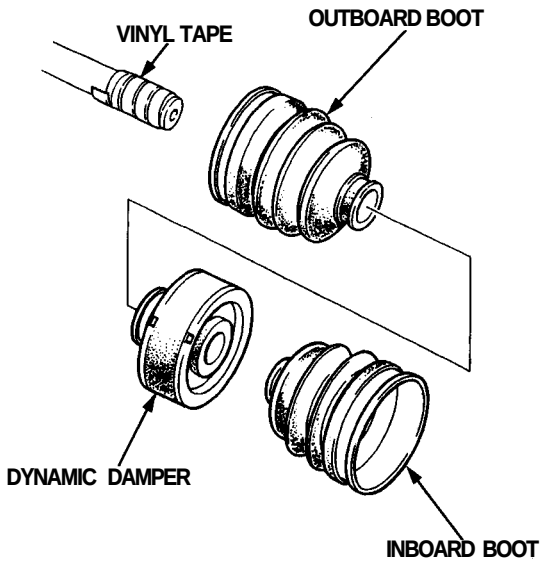
Grease quantity:

Inboard Joint	120 - 130 g (4.2- 4.6 oz)
Outboard Joint	130-140g (4.6-4.9oz)

NOTE: Refer to page 16-3a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences on this page for the 3.2TL.



1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.

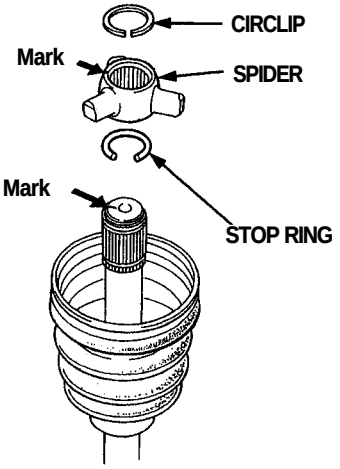


2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.

CAUTION: Take care not to damage the boots and dynamic damper.

3. Install the stopper ring into the driveshaft groove.

NOTE: Always rotate the stopper ring in its groove to be sure it is fully seated.



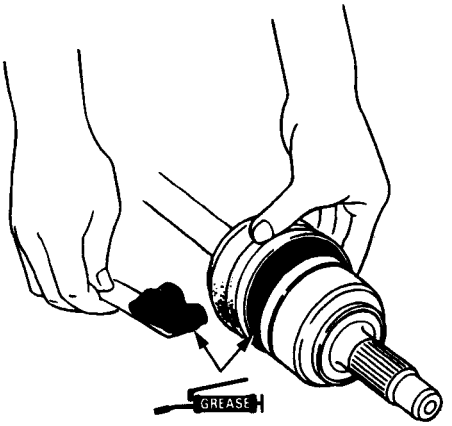
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.

5. Fit the circlip into the driveshaft groove.

NOTE: Always rotate the circlip in its groove to be sure it is fully seated.

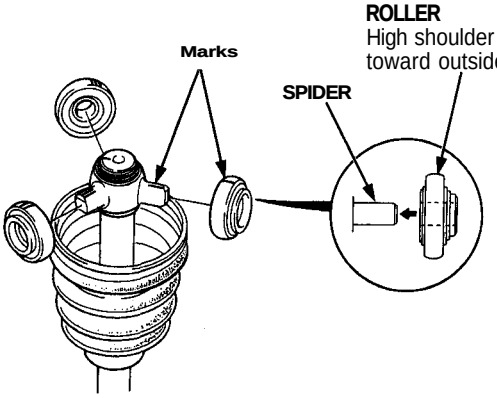
6. Pack the outboard joint with the joint grease included in the new driveshaft set.

Grease quantity: 130 - 140 g (4.6 - 4.9 oz)



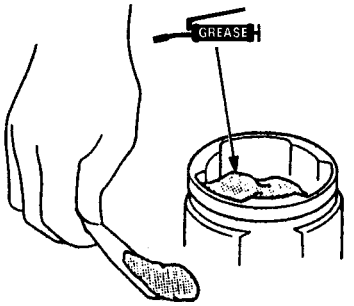
7. Fit the rollers to the spider with their high shoulders facing outward.

NOTE:
- Reinstall the rollers in their original positions on the spider by aligning the marks.
- Hold the driveshaft pointed up to prevent the rollers from falling off.



8. Pack the inboard joint with the joint grease included in the new driveshaft set.

Grease quantity: 120 - 130 g (4.2 - 4.6 oz)



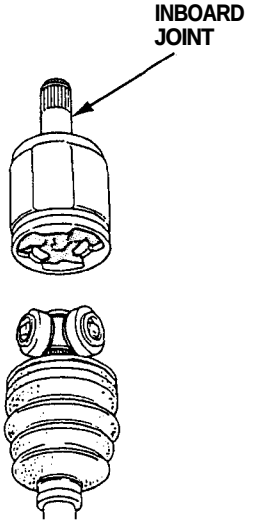
(cont'd)

Driveshaft

Reassembly (cont'd)

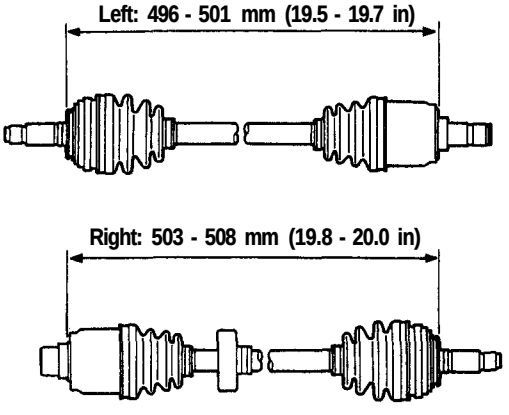
9. Fit the inboard joint onto the driveshaft.

   NOTE:
   - Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint and the rollers.
   - Hold the driveshaft so the inboard joint points up to prevent it from falling off.



10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

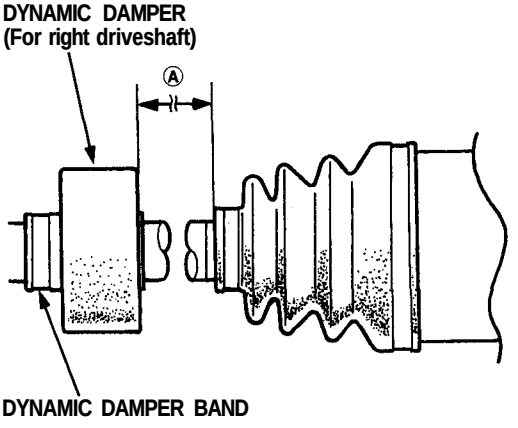
    NOTE: The ends of boots seat in the groove of the driveshaft and joint.



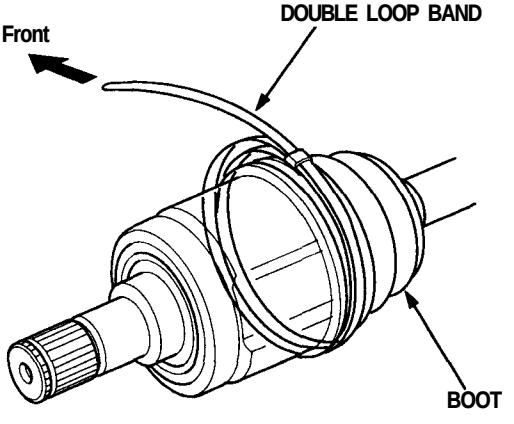
NOTE: Refer to page 16-3a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences on this page for the 3.2TL.

11. Position the dynamic damper as shown below.

    Ⓐ: 45 ± 2 mm **(1.8 ± 0.1 in)**

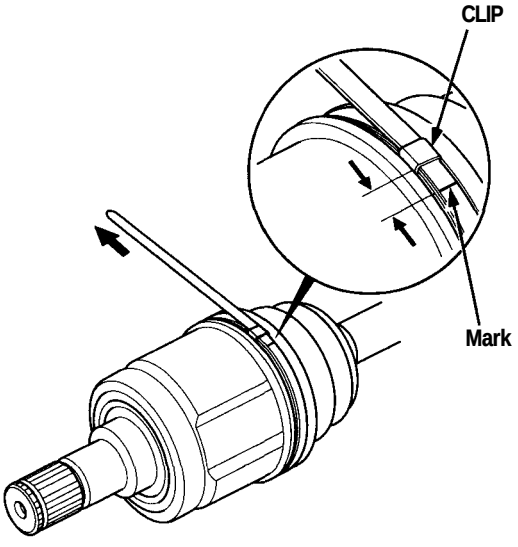


12. Set the double loop band onto the boot and dynamic damper with the band end toward to front of the vehicle.



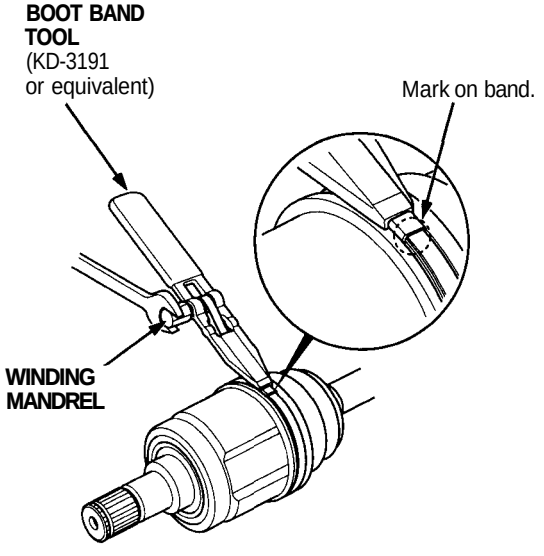
13. Pull up the slack in the band by hand.

14. Make a mark on the band 10 - 14 mm (0.4 - 0.6 in) from the clip.

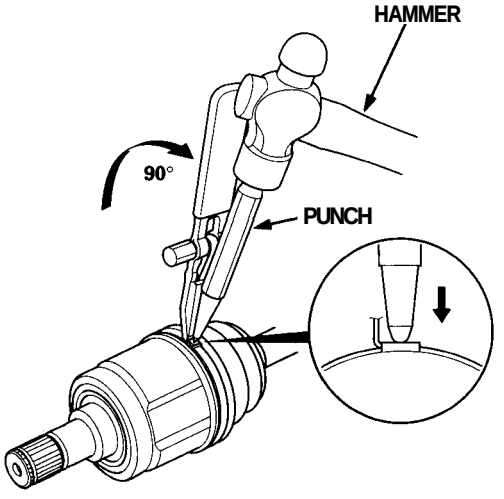


15. Thread the free end of the band through the nose section of the boot band tool and into the slot on the winding mandrel.

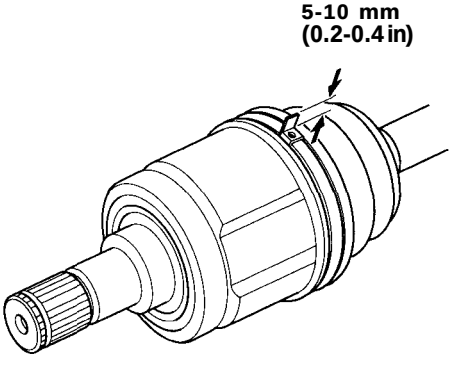
16. Place a wrench on the winding mandrel of the boot band tool, and tighten the band until the mark you made on the band meets the edge of the clip.



17. Raise up the boot band tool to bend the free end of the band 90 degrees, then center-punch the clip.



18. Unwind the boot band tool, and cut off the excess 5 - 10 mm (0.2 - 0.4 in) from the clip.

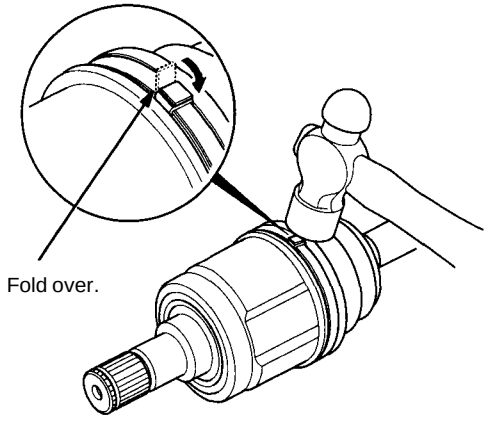


(cont'd)

Driveshaft

Reassembly (cont'd)

19. Secure the end of the boot band by tapping it down with a hammer.



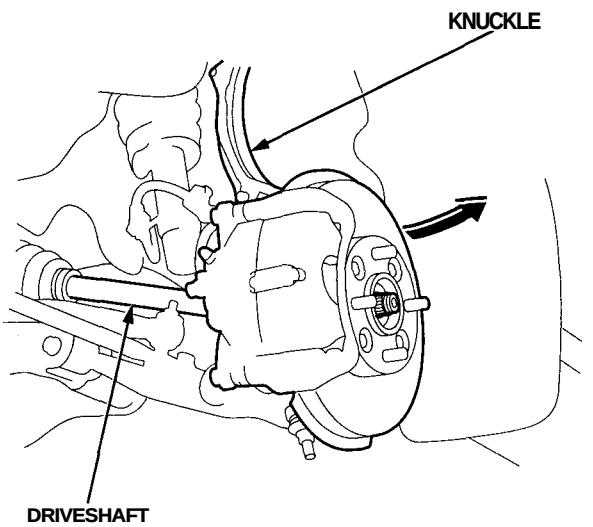
Note these items after reassembly:

- Make sure the band and clip does not interfere with anything and the band does not move.
- Remove any grease remaining on the surrounding surfaces.

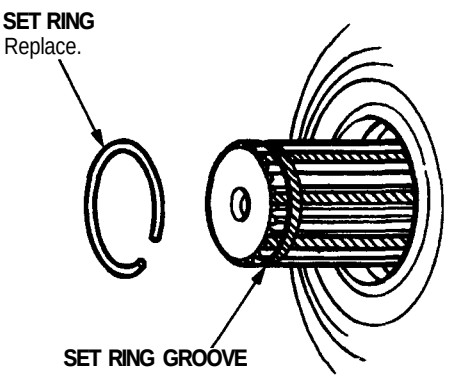
Driveshaft

Installation

1. Install the outboard joint into the knuckle.

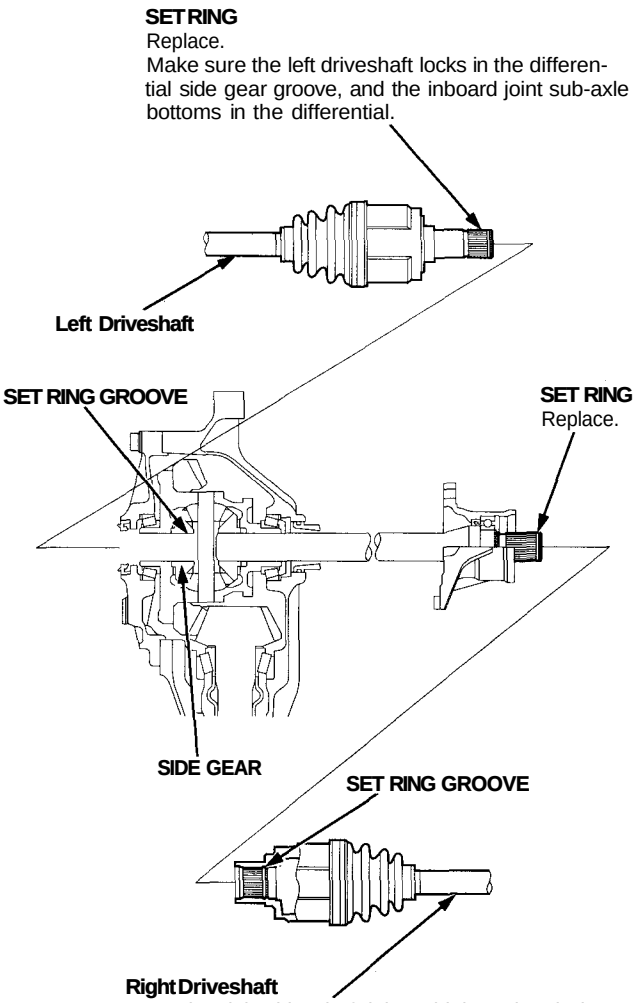


2. Apply 0.5 - 1.0 g (0.02 - 0.04 oz) of specified grease to the whole splined surface of the intermediate shaft. After applying grease, remove the grease from the splined grooves at intervals of 2 - 3 splines and from the set ring groove so air can bleed from the inboard joint.

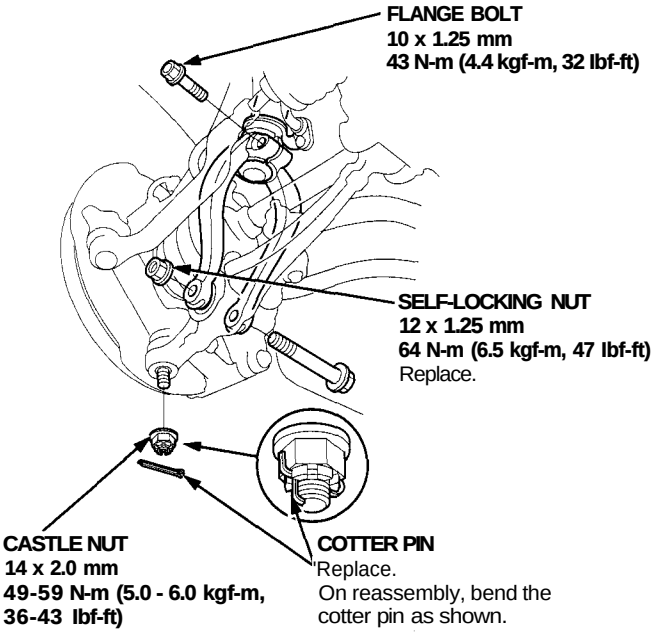


3. Install a new set ring onto the driveshaft or intermediate shaft groove.

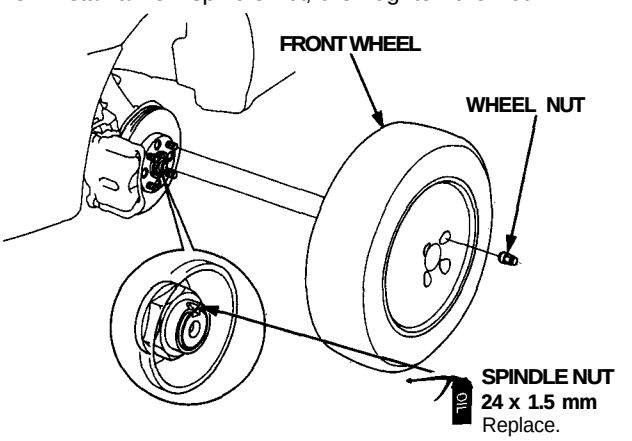
4. Install the inboard end of the driveshaft into the differential or the intermediate shaft.



5. Install the knuckle on the lower arm, then tighten the castle nut and install a new cotter pin.



6. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork (see section 18).
7. Loosely install the flange bolts and the new self-locking nut.
   NOTE: The bolts and nut should be tightened with the vehicle's weight on the damper.
8. Install a new spindle nut, then tighten the nut.



9. Install the front wheel with the wheel nuts.
   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and the wheel.
10. Tighten the flange bolts and the new self-locking nut with the vehicle's weight on the damper.
11. Refill the transmission with recommended fluid (see section 14).
12. Check the front wheel alignment and adjust if necessary (see section 18).

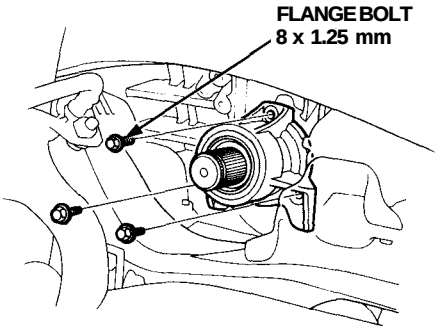
Intermediate Shaft

Removal/Installation

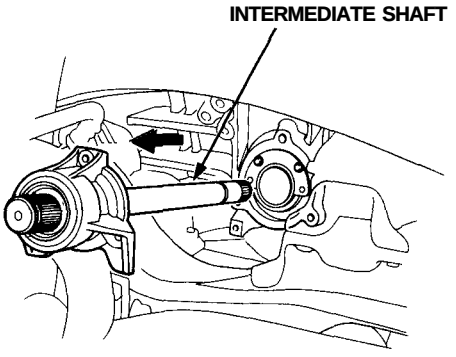
1. Drain the automatic transmission fluid (see section 14).

2. Remove the right driveshaft assembly (see page 16-3).

3. Remove the three flange bolts.



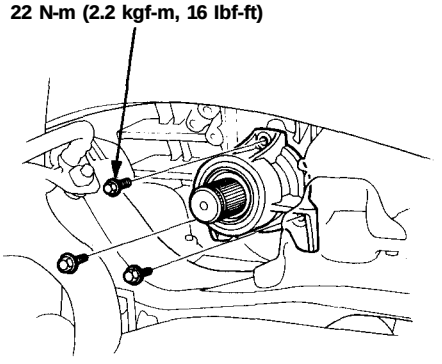
4. Remove the intermediate shaft assembly from the oil pan.



5. Install the intermediate shaft in the reverse order of removal.

CAUTION: When installing, make sure the O-ring is in place and not pinched.

NOTE: Apply sealant to the bolt threads, and tighten the bolts to the specified torque.

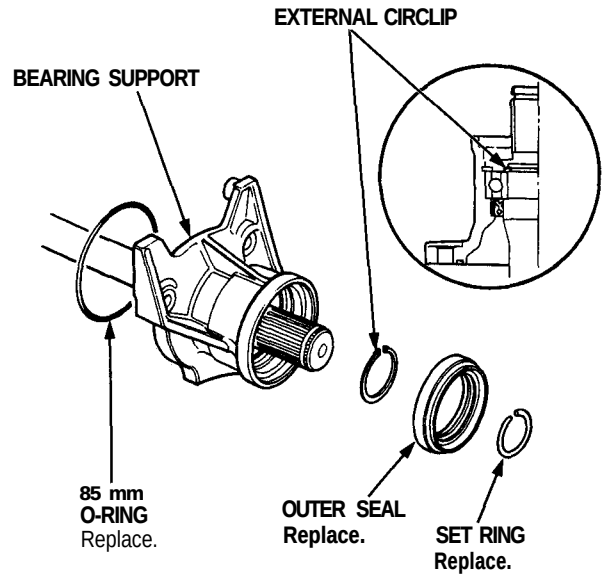


Intermediate Shaft

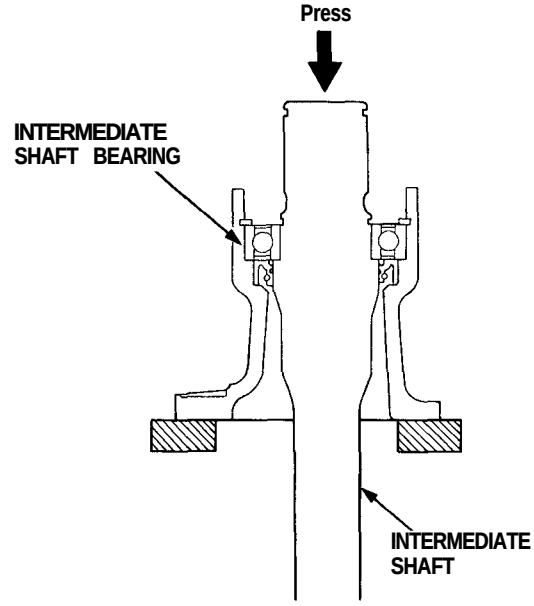
Disassembly

CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

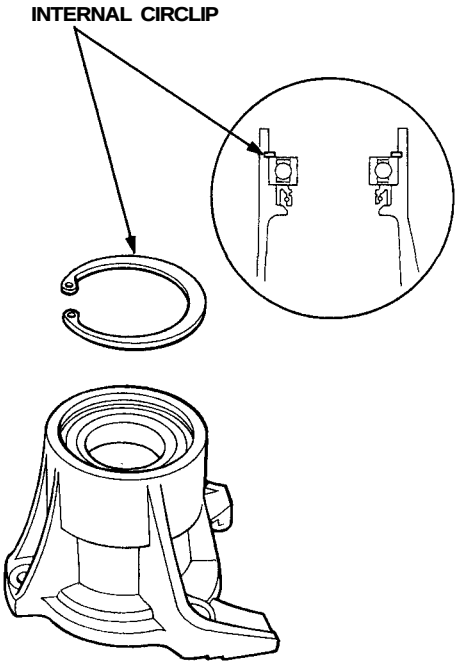
1. Remove the set ring.



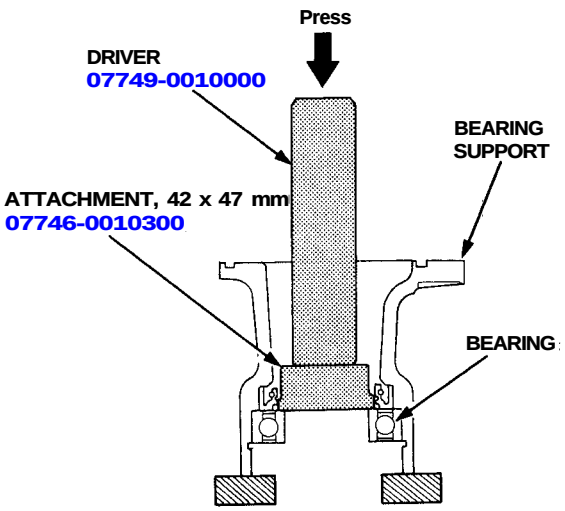
2. Remove the intermediate shaft outer seal from the bearing support.
3. Remove the external circlip and the O-ring.
4. Press the intermediate shaft out of the shaft bearing using the tools and a press as shown.



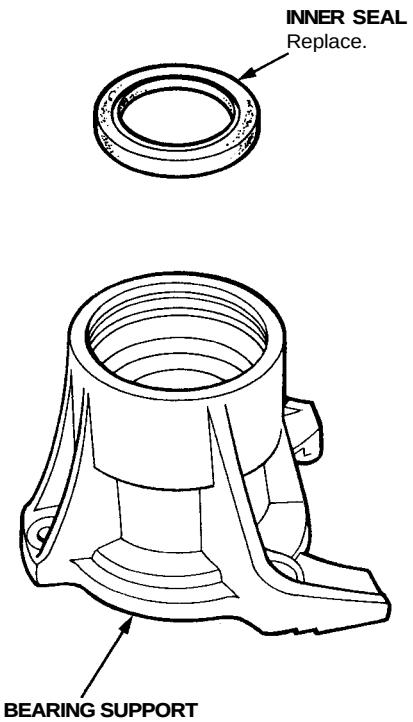
5. Remove the internal circlip.



6. Press the intermediate shaft bearing out of the bearing support using the special tools and a press.



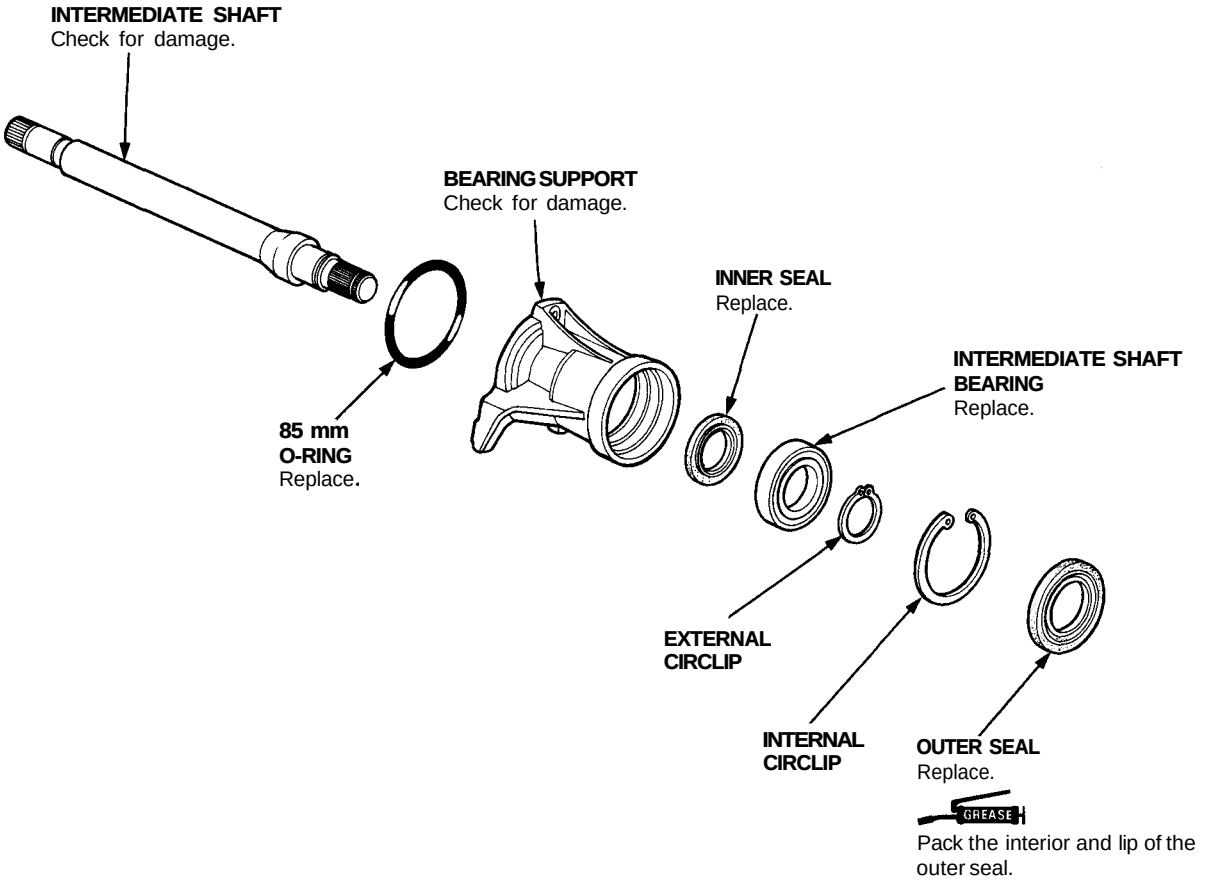
7. Remove the intermediate shaft inner seal from the bearing support.



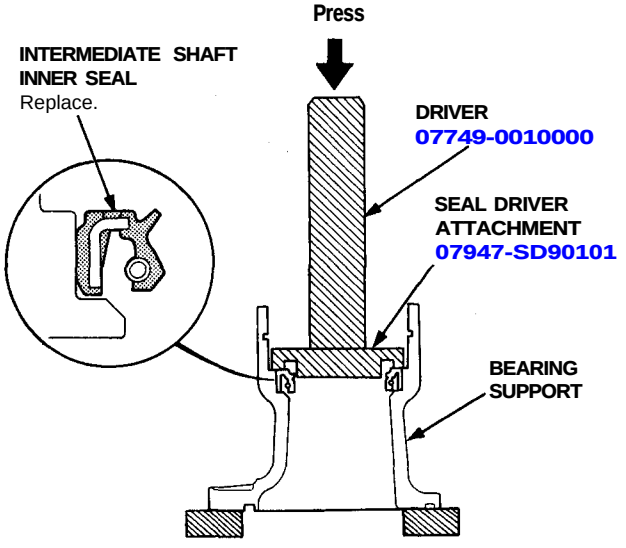
Intermediate Shaft

Reassembly

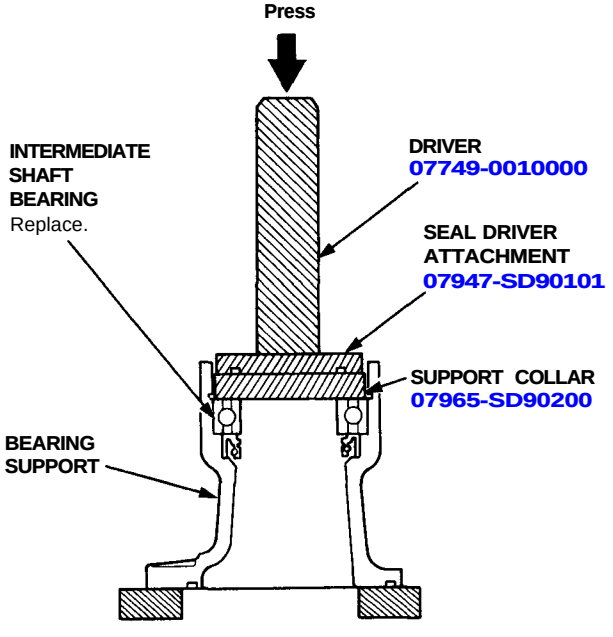
CAUTION:
- **The bearing support is made of aluminum. Be careful not to damage it when servicing.**
- **Do not damage the lip on inner and outer seals during installation.**



1. Press the intermediate shaft inner seal into the bearing support using the special tools and a press.

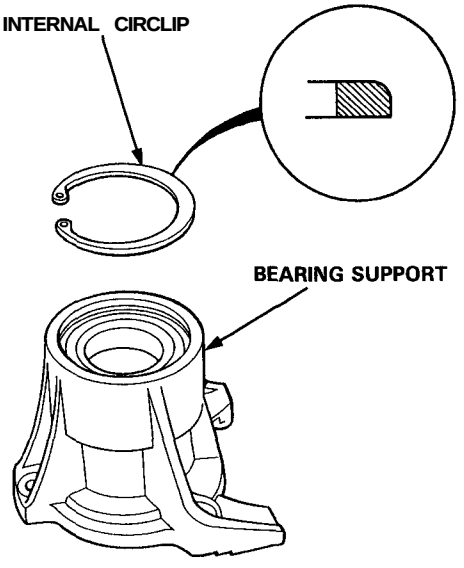


2. Press the intermediate shaft bearing into the bearing support using the special tools and a press.

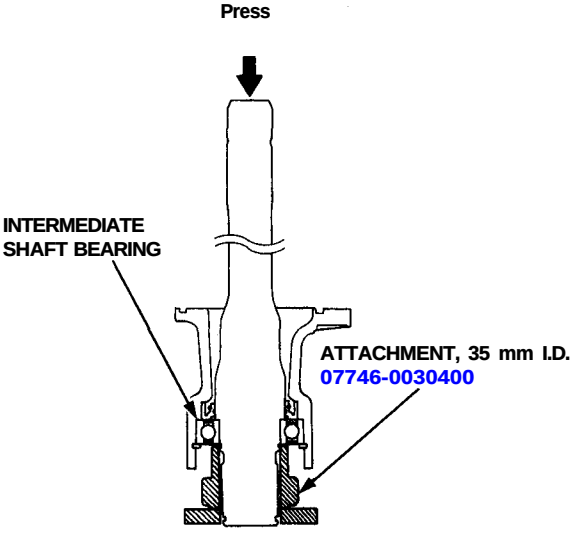


3. Seat the internal circlip in the groove of the bearing support.

CAUTION: Install the circlip with the radiused side facing out.



4. Press the intermediate shaft into the shaft bearing using the special tools and a press.



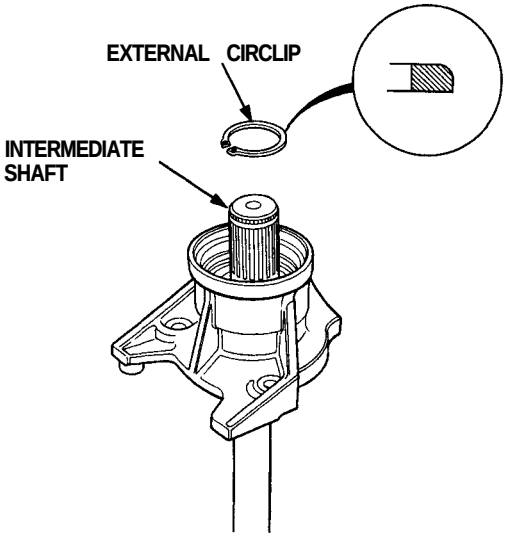
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Intermediate Shaft

Reassembly (cont'd)

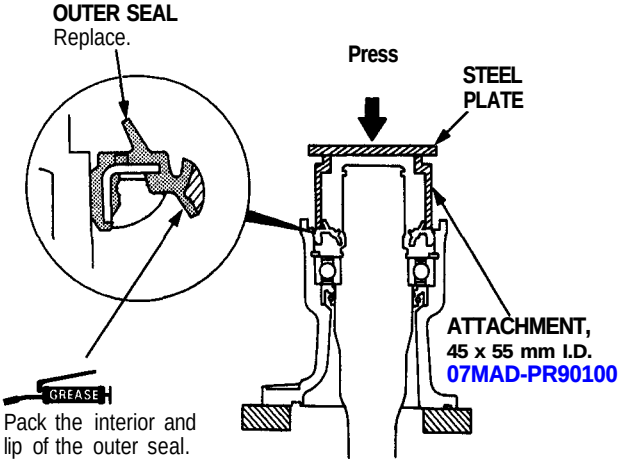
5. Seat the external circlip in the groove of the intermediate shaft.

   CAUTION: Install the circlip with the radiused side facing out.

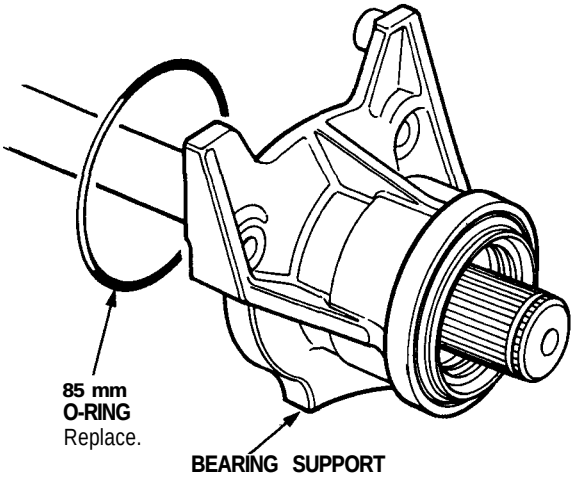


6. Press the outer seal into the bearing support using the special tools and a press.

   NOTE: Press the seal flush with the bearing support.



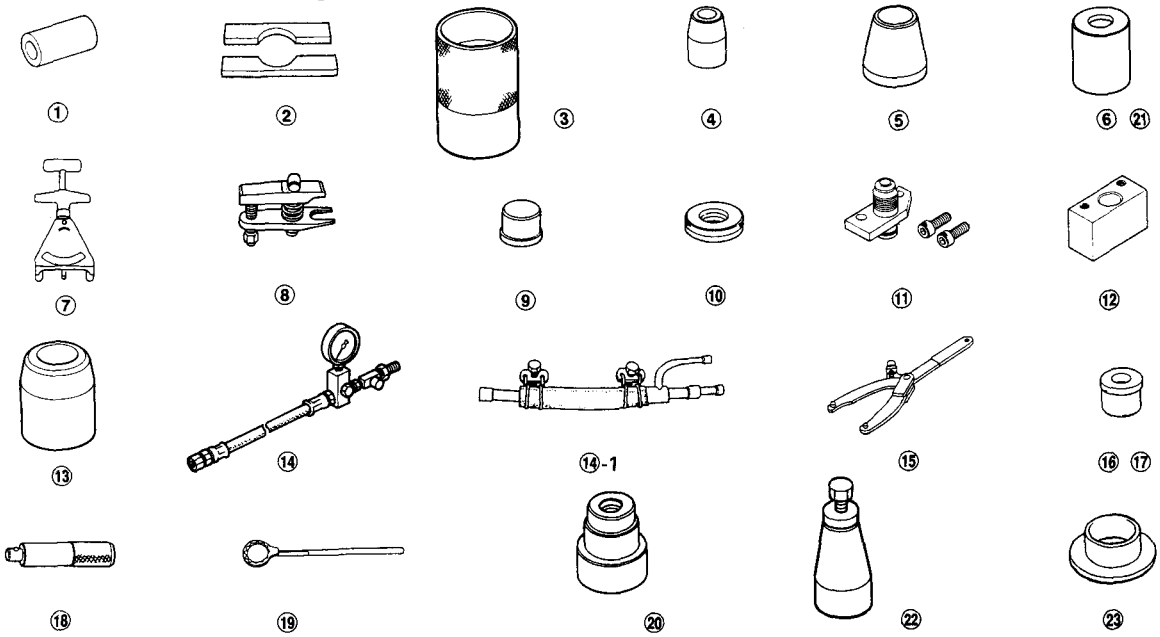
7. Seat the 85 mm O-ring in the groove of the bearing support.



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF-PH70100	Pilot Collar	1	17-54
②	07GAF - SD40700	Hub Dis/Assembly Base	1	17-41
③	07GAG - SD4020A or 07GAG - SD40200	Piston Seal Ring Sizing Tool	1	17-59
④	07GAG - SD40400 or 07GAG - SD4040A	Cylinder End Seal Guide	1	17-62
⑤	07HAG-SF10200or 07HAG-SF1010A	Piston Seal Ring Guide	1	17-60
⑥	07HAG-SF1020A	Piston Seal Ring Sizing Tool	1	17-60
⑦	*07JGG-001010A	Belt Tension Gauge	1	17-23
⑧	07MAC - SL00200	Ball Joint Remover, 28 mm	1	17-47
⑨	07NAD - SR30200 or 07NAD - SR3020A	Cylinder End Seal Remover Attachment	1	17-51
⑩	07NAG - SR30900 or 07 NAG - SR3090A	Piston Seal Ring Sizing Tool	1	17-58
⑪	07QAK-PV30110	P/S Joint Adapter (Pump)	1	17-25
⑫	07QAK-PV30120	P/S Joint Adapter (Hose)	1	17-25
⑬	07SAG-SW50100or 07SAG-SW5010A	Sleeve Seal Ring Guide	1	17-59
⑭	07406-0010001	P/S Pressure Gauge	1	17-25
⑭-1	07406-0010101	Bypass Tube Joint	1	17-21
⑮	07725 - 0030000	Universal Holder	1	17-37, 17-45
⑯	07746-0010100	Attachment, 32 x 35 mm	1	17-57, 17-58
⑰	07746-0010200	Attachment, 37 x 40 mm	1	17-43
⑱	07749-0010000	Driver	1	17-57
⑲	07916-SA50001	Locknut Wrench, 40 mm	1	17-24
⑳	07947 - 6340500	Driver Attachment	1	17-43
㉑	07965 - SA50500	Front Hub Dis/Assembly Tool	1	17-69
㉒	07974 - SA50800	Ball Joint Boot Clip Guide	1	17-69
㉓	07974 - 6890801 or 07974 - 689080A	Cylinder End Seal Slider	1	17-61

*: Included in the Belt Tension Gauge Set, 07TGG – 001000A.

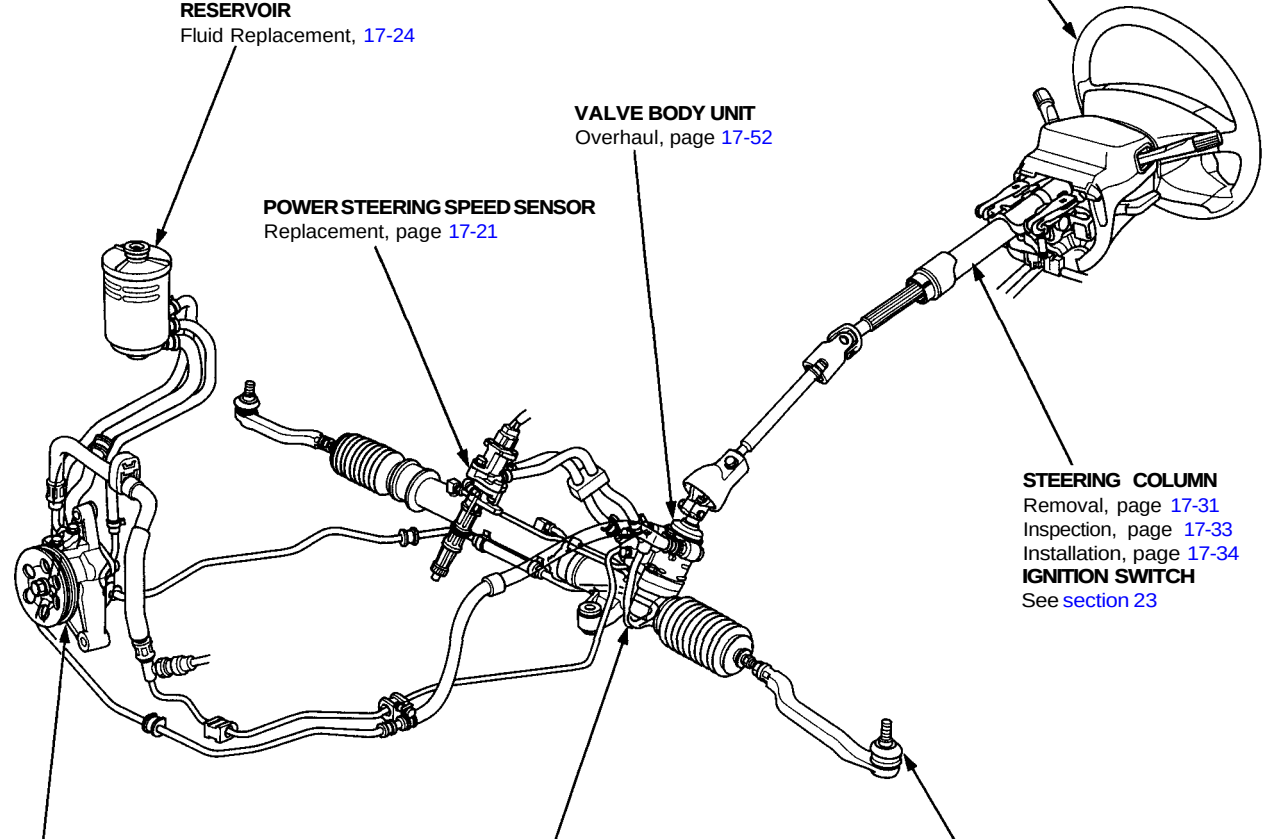


Component Locations

Index

NOTE:
- If an intact airbag assembly has been removed from a scrapped vehicle or has been found defective or damaged during transit, storage or service, it should be deployed (see section 24).
- Before removing the steering gearbox, remove the driver's airbag assembly and steering wheel.
- After installing the steering gearbox, check the wheel alignment and adjust if necessary.

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



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POWER STEERING SPEED SENSOR
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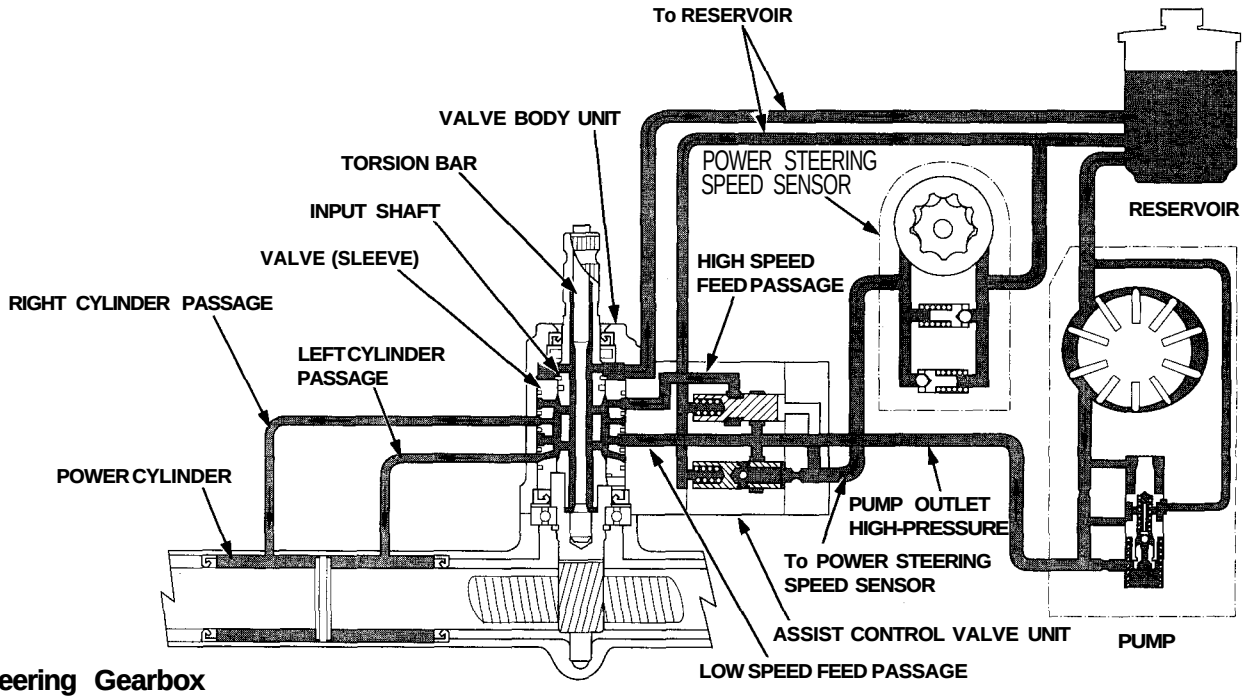
TIE-ROD END BALL JOINT
Ball Joint Boot Replacement, page 17-69

System Description

This power steering system is speed-sensitive. Its main components are a mechanical speed sensor, a rotary valve-type gearbox, and a constant volume, vane-type pump. The system regulates the power assist according to vehicle speed, road conditions, and driving style. The amount of power assist changes linearly from high assist, when driving at low speeds or parking, to low assist, when driving at high speeds.

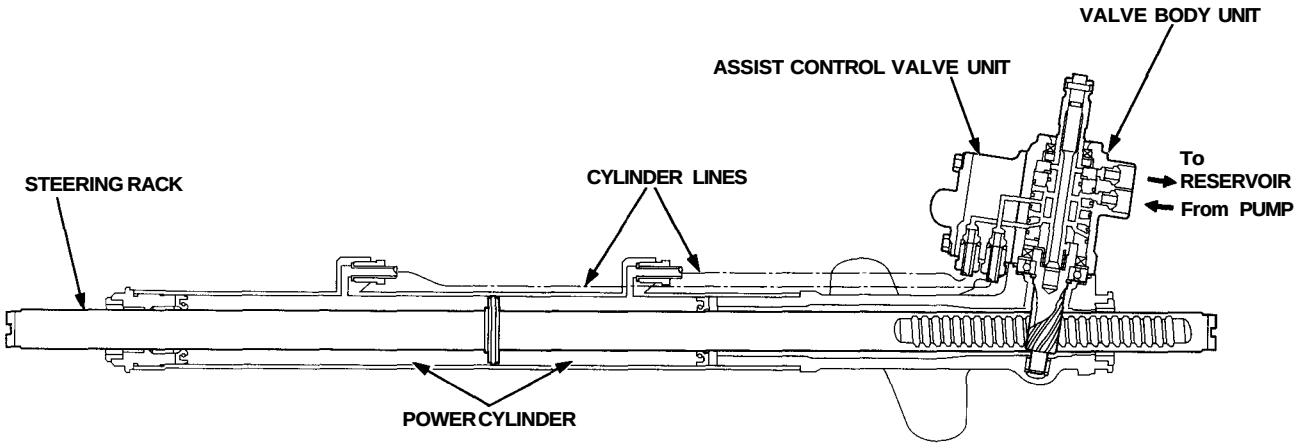
Fluid Flow Diagram

The fluid volume from the pump, which is driven by the crank pulley, is regulated by the flow control valve built into the pump. The regulated fluid is fed to the valve body unit located outside the pinion shaft of the steering gearbox. The fluid is regulated to the proper pressure by the valves in the valve body unit and by the power steering speed sensor before it flows to the power cylinder. The direction of the flow is determined by the rotary valve. The fluid then returns to the reservoir through the return passage and is fed to the pump again.



Steering Gearbox

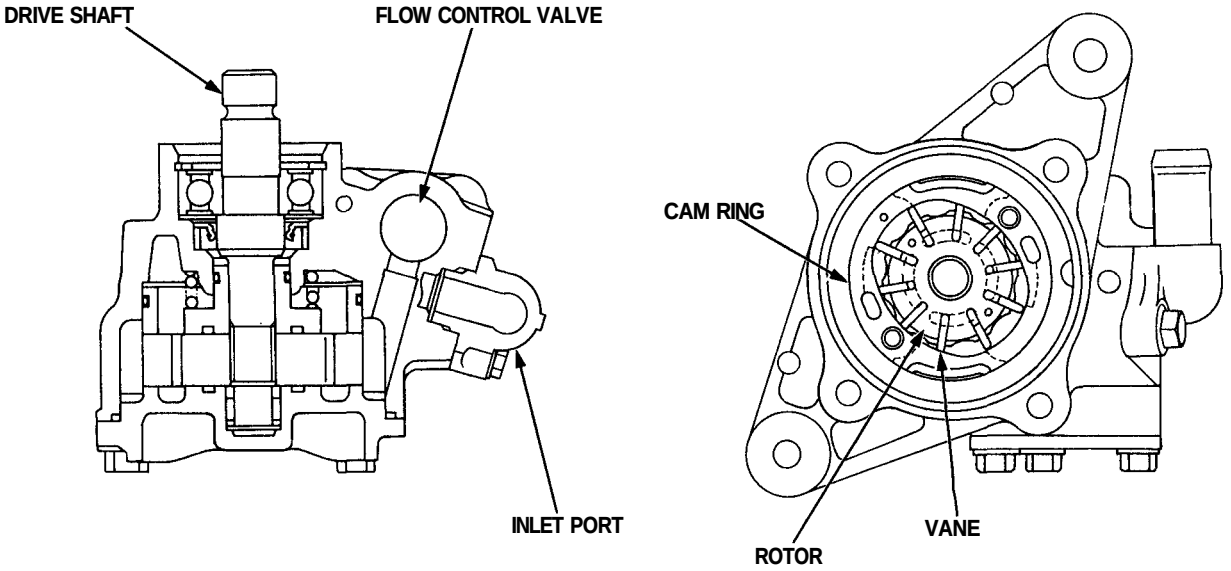
The steering gearbox is the rack-and-pinion type. The valve body unit consists of the valve body unit, where the fluid passage is regulated by the fluid pressure, and the assist control valve unit which regulates the fluid passage to the rotary valve according to vehicle speed.



Steering Pump

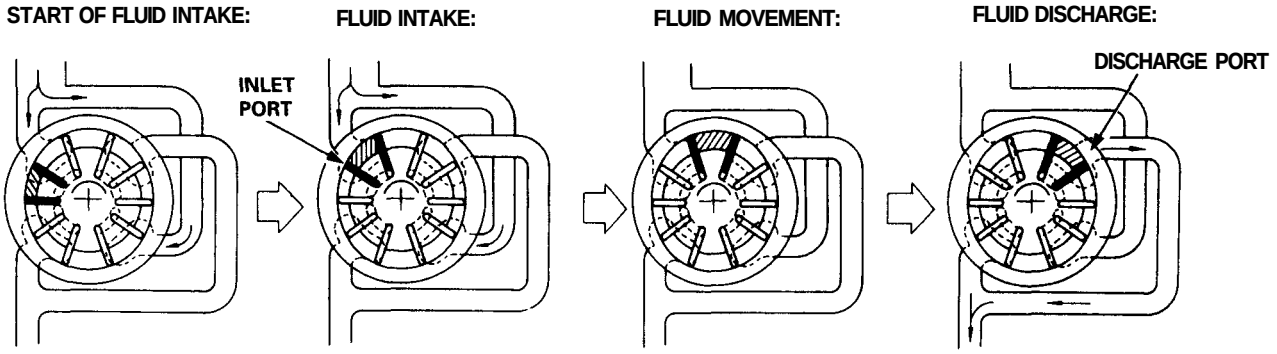
Construction

The pump is a vane-type incorporating a flow control valve (with an integrated relief valve) and is driven by a POLY-V-belt from the crank pulley. The pump features 10 vanes. Each vane performs two intake/discharge operations for every rotation of the rotor. This means that the hydraulic fluid pressure pulse becomes extremely small during discharge.



Operation

The belt-driven pulley rotates the rotor through the drive shaft. As the rotor rotates, the hydraulic pressure is applied to the vane chamber of the rotor and the vanes will rotate while being pushed onto the inner circumference of the cam ring. The inner circumference of the cam ring has an extended portion with respect to the center of the shaft, so the vanes move downward in the axial direction as the rotor rotates. As a result of this roller movement, the internal volume of the vane chamber will change, resulting in fluid intake and discharge.



The vanes are pushed onto the inner circumference of the cam ring.

The volume of the vane chamber increases so that fluid is sucked in.

The sucked-in fluid moves toward the discharge port.

As the vanes return to the their original position on the inner side, the volume of the vane chamber decreases so the fluid is discharged from the discharge port.

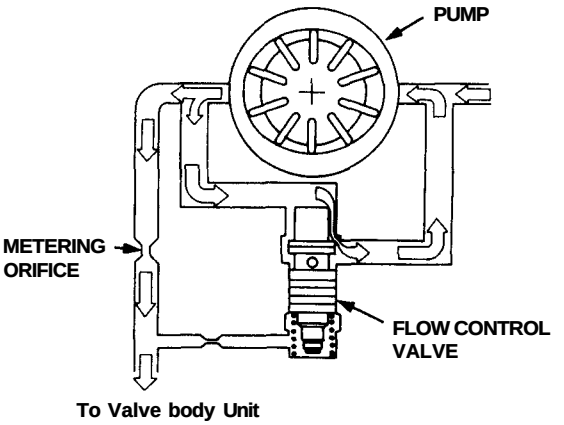
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System Description

Steering Pump (cont'd)

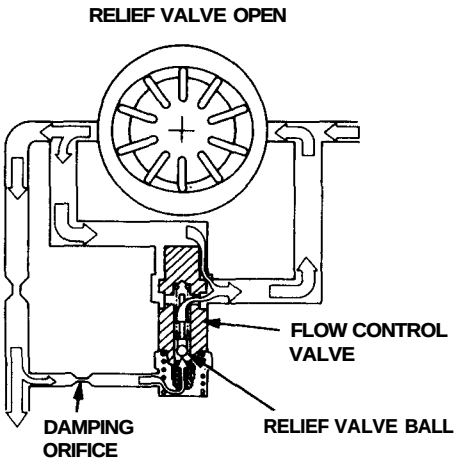
Flow Control

Fluid from the pump runs through a metering orifice to the valve body unit. This creates a pressure difference between the pump and valve body unit sides of the orifice. When pressure in the pump side is higher than the force of the spring holding the flow control valve closed, it pushes the valve down (open), and excess fluid returns to the pump inlet. The combined effect of the metering orifice and the flow control valve provides a relatively constant flow of fluid to the valve body unit.



Pressure Relief

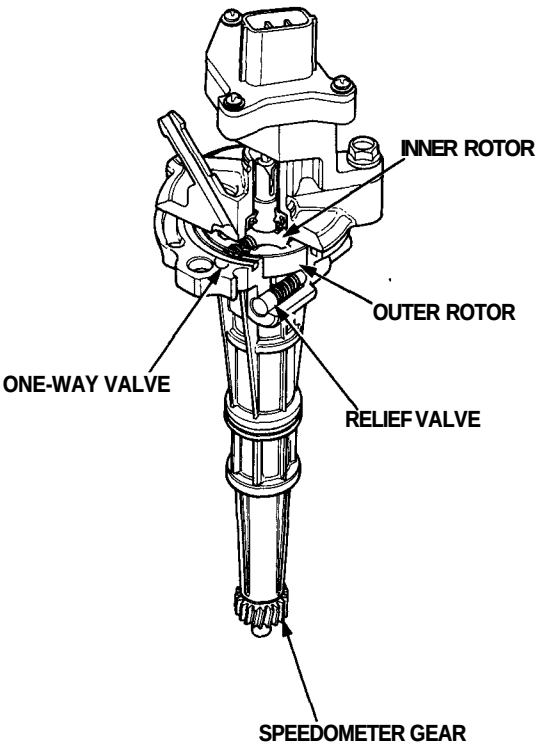
As pressure on the valve body unit side builds up, it pushes the relief valve ball (inside the flow control valve) up against its spring, and excess fluid returns to the pump inlet. As the pressure under the flow control valve drops, the relief valve ball is closed by its spring, and the flow control valve is forced down again, allowing excess fluid from the pump side to return to the inlet. This flow control valve-relief valve cylinder keeps pump output pressure between 7,000 - 8,000 kPa (70 - 80 kgf/cm^2, 995 - 1,138 psi).



System Description

Power Steering Speed Sensor

The power steering speed sensor is a trochoid-rotor, hydraulic pump combined with a relief valve and a one-way valve. It is driven by the speedometer gear shaft which in turn is driven by a helical gear on the differential.

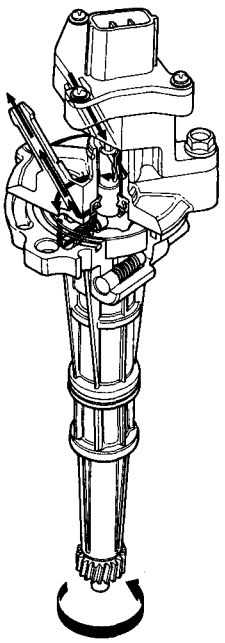


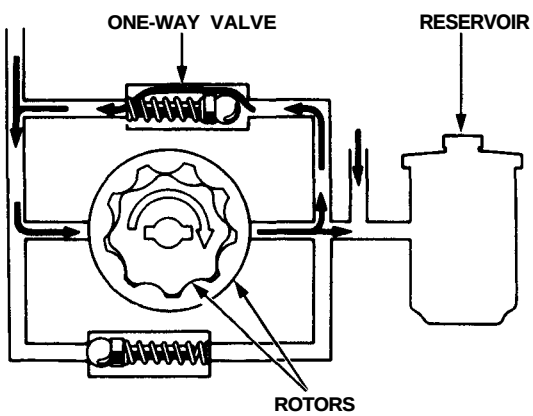
The power steering speed sensor turns only when the car is moving, controlling the assist control valve.

One-way Valve (In Power Steering Speed Sensor)

When the vehicle is moving at high speed, negative pressure develops at the sensor inlet because the power steering speed sensor is pumping faster than the fluid can be supplied. To compensate for this, the outlet and inlet ports are connected internally by a passage containing a one-way valve that lets output fluid recirculate to the inlet port to equalize pressure.

Driving at High Speed:

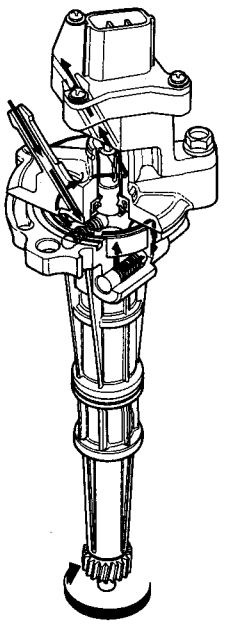


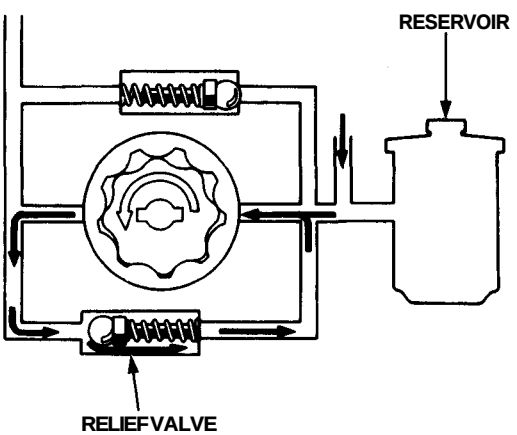


Relief Valve (In Power Steering Speed Sensor)

When the vehicle is moving in reverse, the power steering speed sensor also turns backward and pumps fluid in the opposite direction. To avoid building up pressure in the reaction chambers that would increase steering effort while driving in reverse, the inlet and outlet-ports are connected by a second internal passage containing a relief valve that allows the fluid to recirculate.

Driving in Reverse:



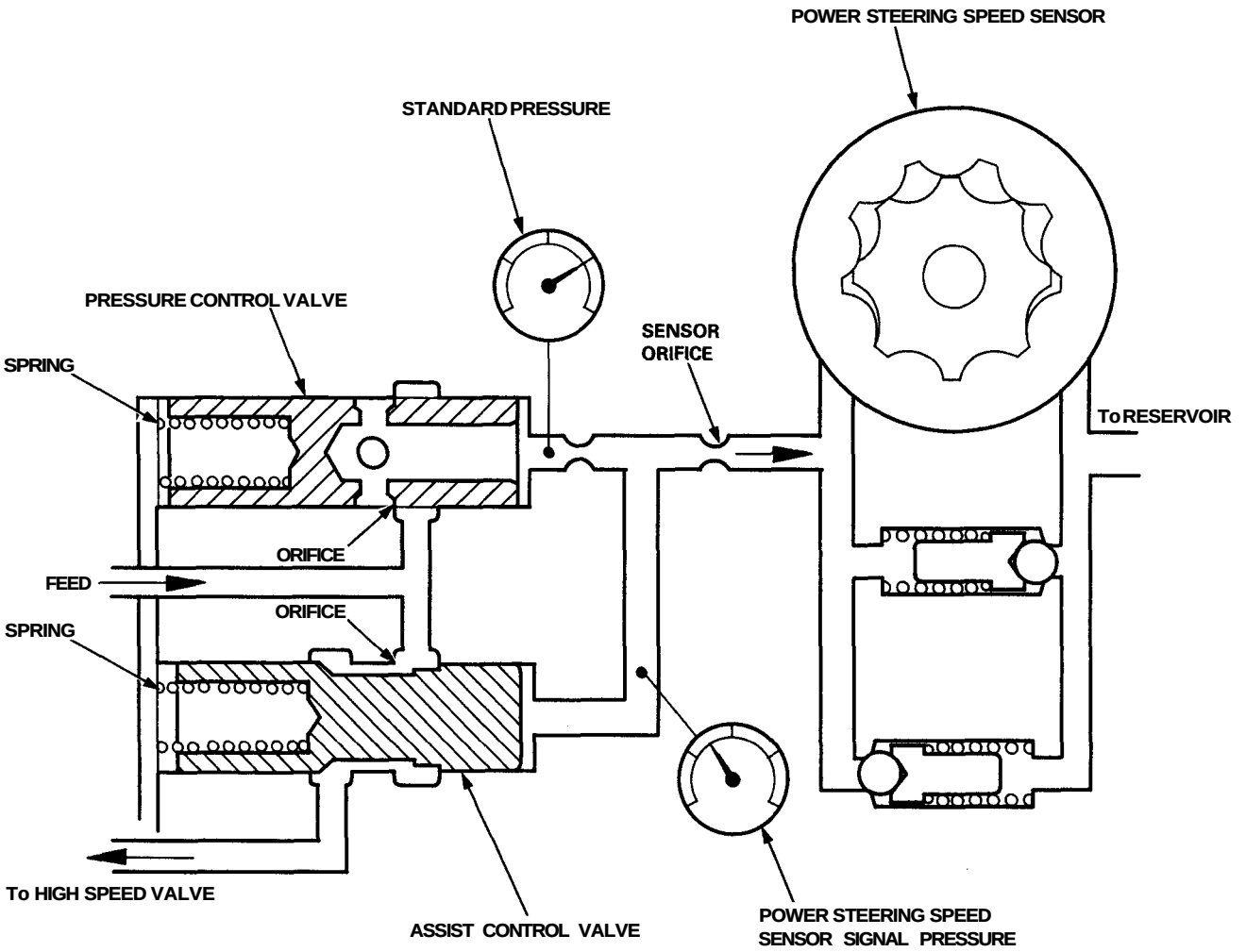


System Description

System Operation

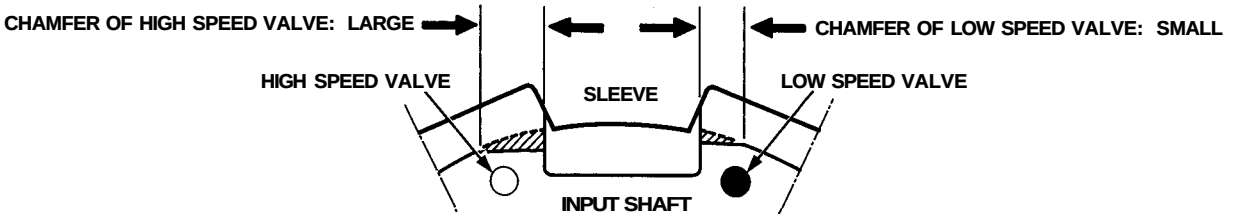
Assist Control Valve

The assist control valve unit consists of the assist control valve, which is controlled by the power steering speed sensor, and the pressure control valve. The pressure control valve and the assist control valve, located between the pump and the speed sensor, control the fluid passage to the rotary valve. The fluid pressure from the pump is reduced to a "standard pressure" by the pressure control valve, and this standard pressure is fed to the assist control valve. The standard pressure is drawn out by the rotation of the speed sensor, producing *a* pressure gap between the pressure control valve and the assist control valve when the standard pressure fluid passes the sensor orifice. This pressure gap, which changes with the fluid volume drawn (that is, it changes with vehicle speed), is referred to as the power steering speed sensor signal pressure. The assist control valve operates according to this speed sensor signal pressure to change the fluid passage to the high speed rotary valve.



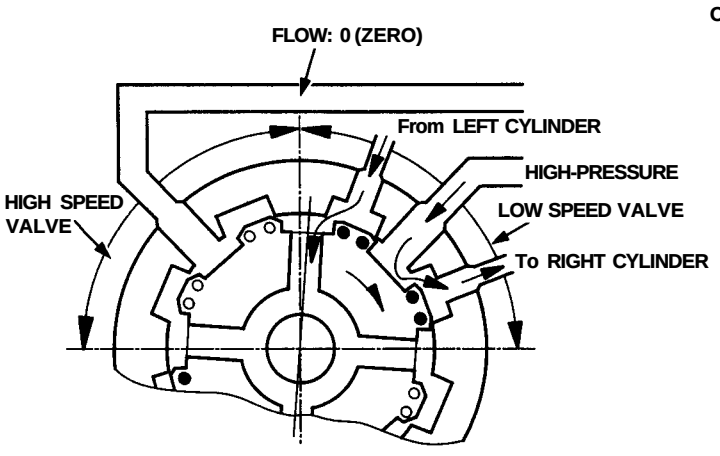
Valve Body Unit

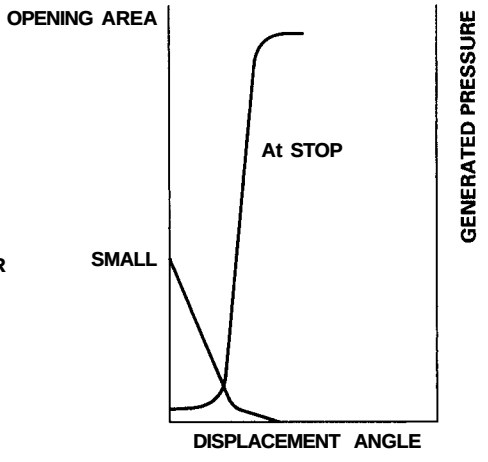
The rotary valve body unit has two valves, a low speed valve and a high speed valve, which can be identified by the chamfer width.



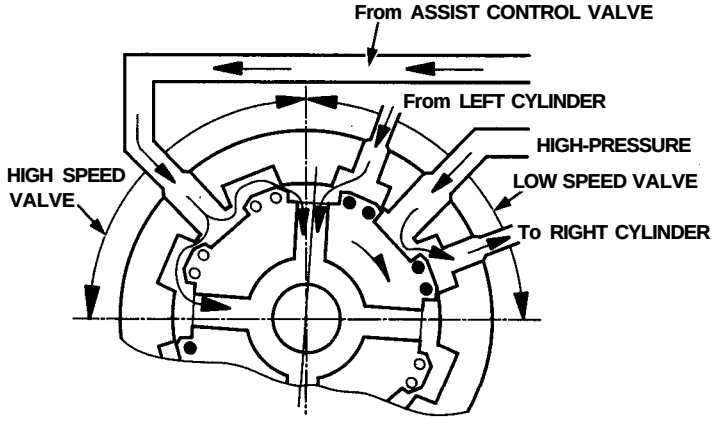
The opening area (the gap between the input shaft and the sleeve) of the two valves changes with the displacement angle (angle gap between the input shaft and the sleeve) produced during steering. In other words, the valve opening area changes according to the intensity of the road reaction (steering torque).

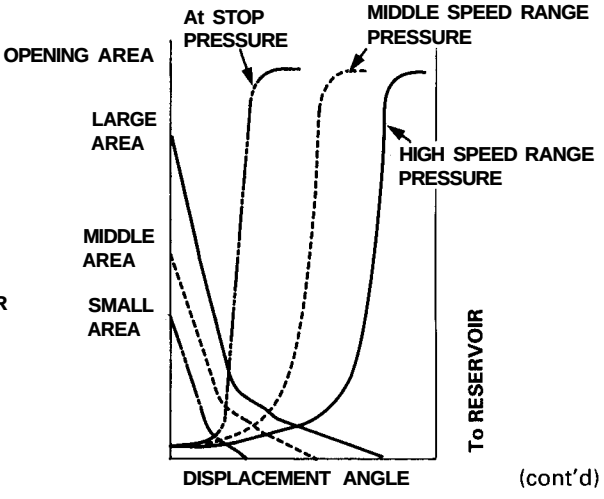
When the vehicle is stopped, the power steering speed sensor functions operate only the low speed valve.
Because the low speed valve has the small chamfer and thereby the small opening area, high fluid pressure can be fed to the power cylinder with the small displacement angle (small steering torque), resulting in light steering (high assist).





When driving the vehicle, the fluid is applied to the high speed valve, too, as the vehicle speed sensor functions. Because the high speed valve has a large chamfer and thereby the large opening area, the opening area of the two valves is compounded, even though the displacement angle is the same as when the vehicle is stopped.
Therefore, the fluid pressure is not generated unless the displacement angle is large (large steering torque), resulting in moderately heavy steering (medium assist).





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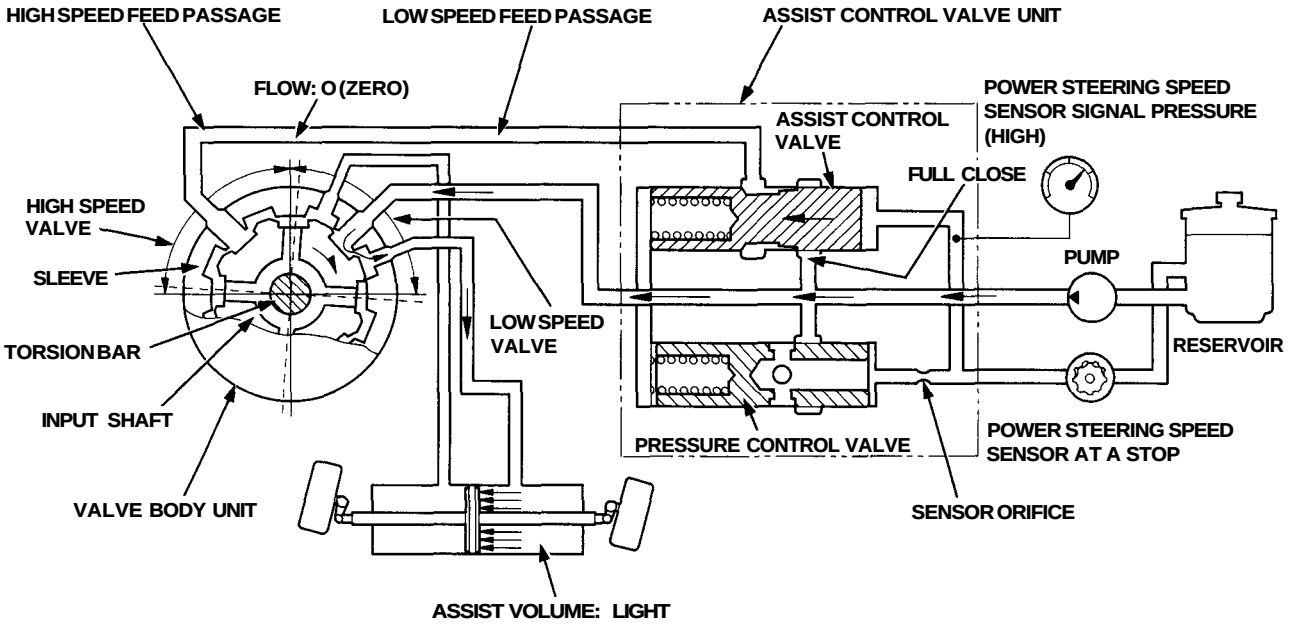
System Description

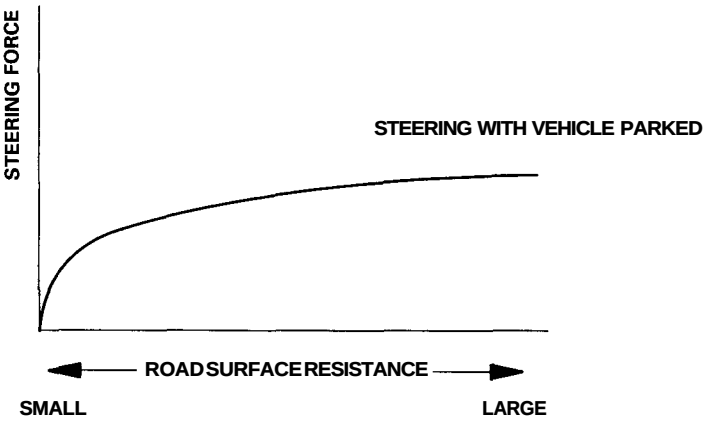
System Operation (cont'd)

Hydraulic Control at Each Speed Range

When stopped:

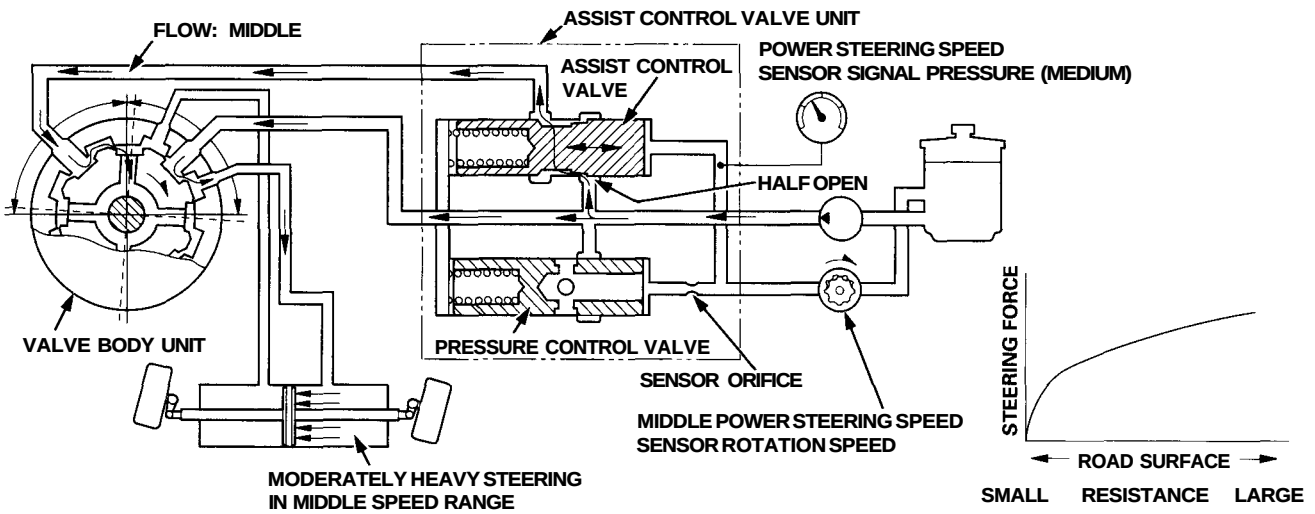
When the vehicle is stopped with the engine idling, the fluid flow is shut off because the power steering speed sensor rotor is not rotating. The standard pressure generated by the pressure control valve is applied to the assist control valve to move the valve to the left. When the assist control valve is in this position, the orifice valve is closed. Therefore, the fluid discharged from the pump is fed to the low speed valve of the valve body unit. Because the low speed valve has the small chamfer and thereby the small opening angle, the large hydraulic pressure (steering rack thrust) results in the smallest steering force (high assist).





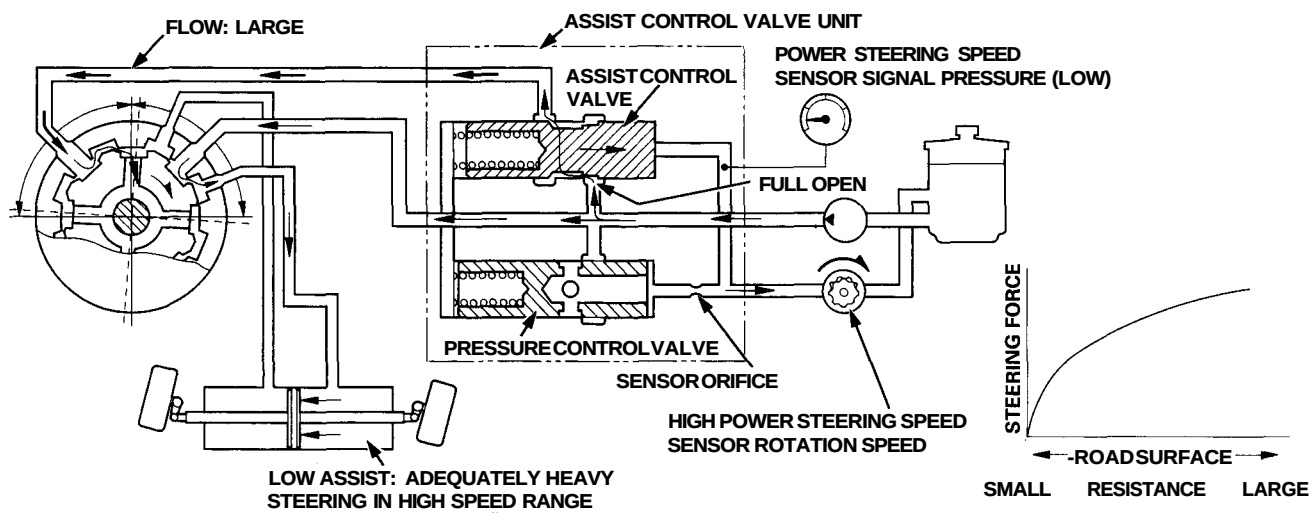
Middle speed range:

When the vehicle starts to move, the power steering speed sensor rotor starts to rotate as well, reducing the standard pressure and generating the power steering speed sensor signal pressure. The valve returns to the right point where the pressure of the power steering speed sensor signal equals the spring force of the assist control valve. When the assist control valve is in this position, the orifice of the valve slightly opens.
Therefore, the fluid pressure from the pump is applied to the high speed valve of the valve body unit. Because the high speed valve has a larger chamfer and the compound opening area with the low speed valve is larger than that when the vehicle is stopped, the fluid pressure (steering rack thrust) is not generated unless the displacement angle is large (large steering torque), resulting in moderately heavy steering (medium assist).



High speed range:

When the vehicle is driven at high speed, the power steering speed sensor rotor rotates at a high speed, greatly reducing the standard pressure. The pressure of the power steering speed sensor signal is at the lowest value, and the assist control valve is at the right end position.
When the assist control valve is in this position, the orifice of the valve opens fully. Therefore, the fluid pressure applied to the high speed valve is larger than when the engine speed is at the middle speed range. The compound opening area with the low speed valve is the largest this time, and the fluid pressure (steering rack thrust) is not generated unless the displacement angle is very large (low assist).



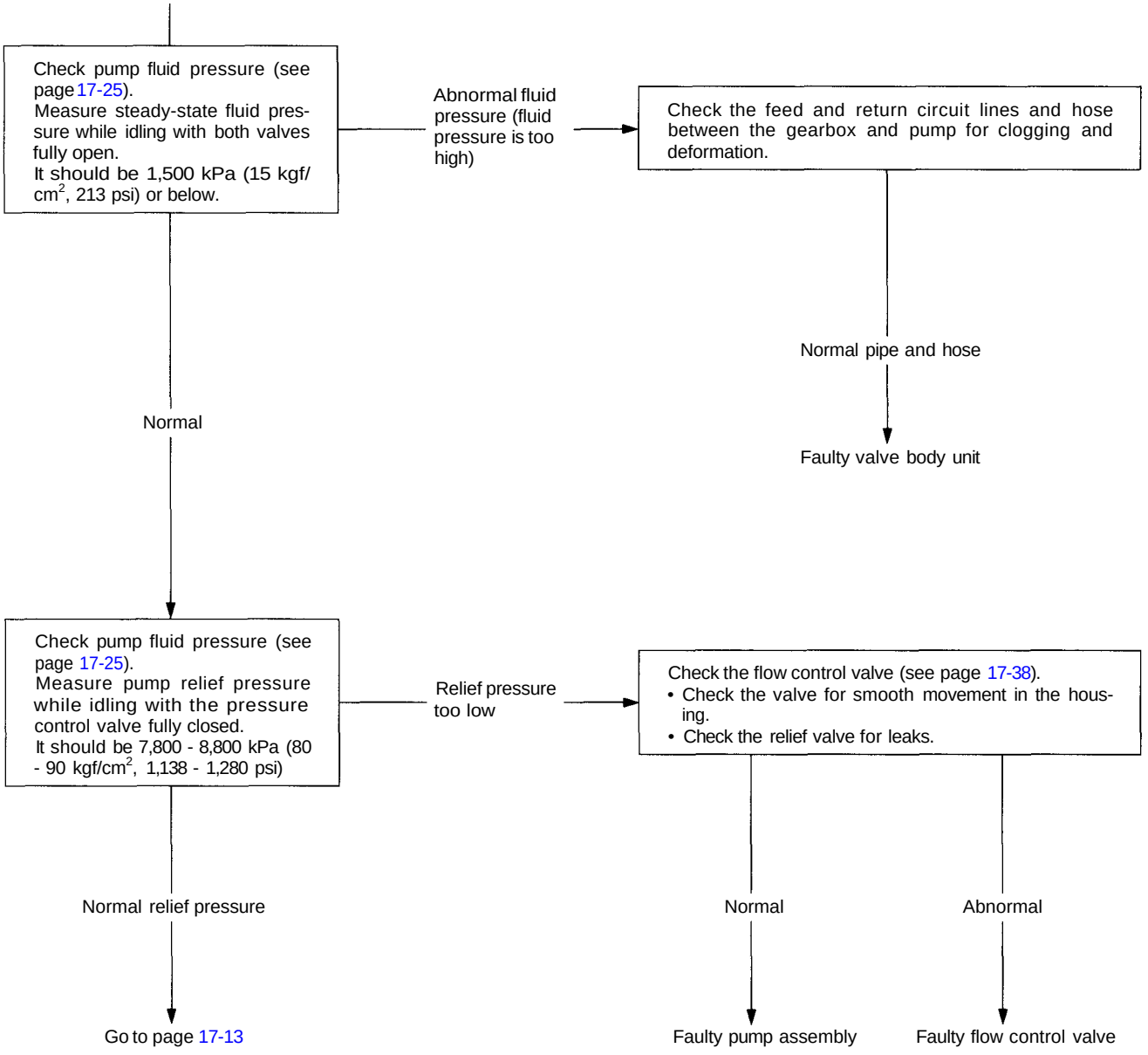
Troubleshooting

GeneralTroubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes, tire variety and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?

Hard Steering (Do power assist check, see page 17-20. If the figure is over 24 N (2.4 kgf, 5.3 lbf), follow the next steps)





From page 17-12

Check force required to turn the wheel (see page 17-20).
Start the engine and measure force required to turn the wheel to the right and left. Difference of the force required to turn the wheel to the right and to the left should be 2.9 N (0.3 kgf, 0.7 lbf) or below.

- Abnormal → Check cylinder pipes A and B for deformation.
  - Not deformed → Faulty valve body unit
  - Deformed → Faulty cylinder pipe
- Normal ↓

Measure the force required to turn the wheel with the power steering speed sensor hose plugged and the vehicle parked (see page 17-20).

- Abnormal →
  - • Steering effort below 24 N (2.4 kgf, 5.3 lbf). Connect the sensor hose as it is.
    If the steering effort is above 24 N (2.4 kgf, 5.3 lbf), replace the power steering speed sensor.
  - • Steering effort above 24 N (2.4 kgf, 5.3 lbf). Check the assist control valve for sticking or a clogged orifice; clean the valve as necessary (see page 17-55).

Assist control valve is normal ↓

Check the gearbox.
Remove the gearbox and measure the pinion torque.
The torque should be;
* 0.6 - 1.2 N-m (6 - 12 kgf-cm, 5.2 - 10 lbf-in) with the steering rack in the straight driving position.
* 1.3 N-m (13 kgf-cm, 11.3 lbf-in) with the steering rack in any other position.

- Normal → Check the parts other than the gearbox-related parts for proper rotation.
  - • Improper rotation of the steering column-related part(s)
  - • Faulty steering joint
  - • Faulty rack end/tie-rod end ball joints
  - • Interference in the steering system
- Abnormal ↓

Adjust the rack guide (see page 17-24), and recheck the pinion torque.

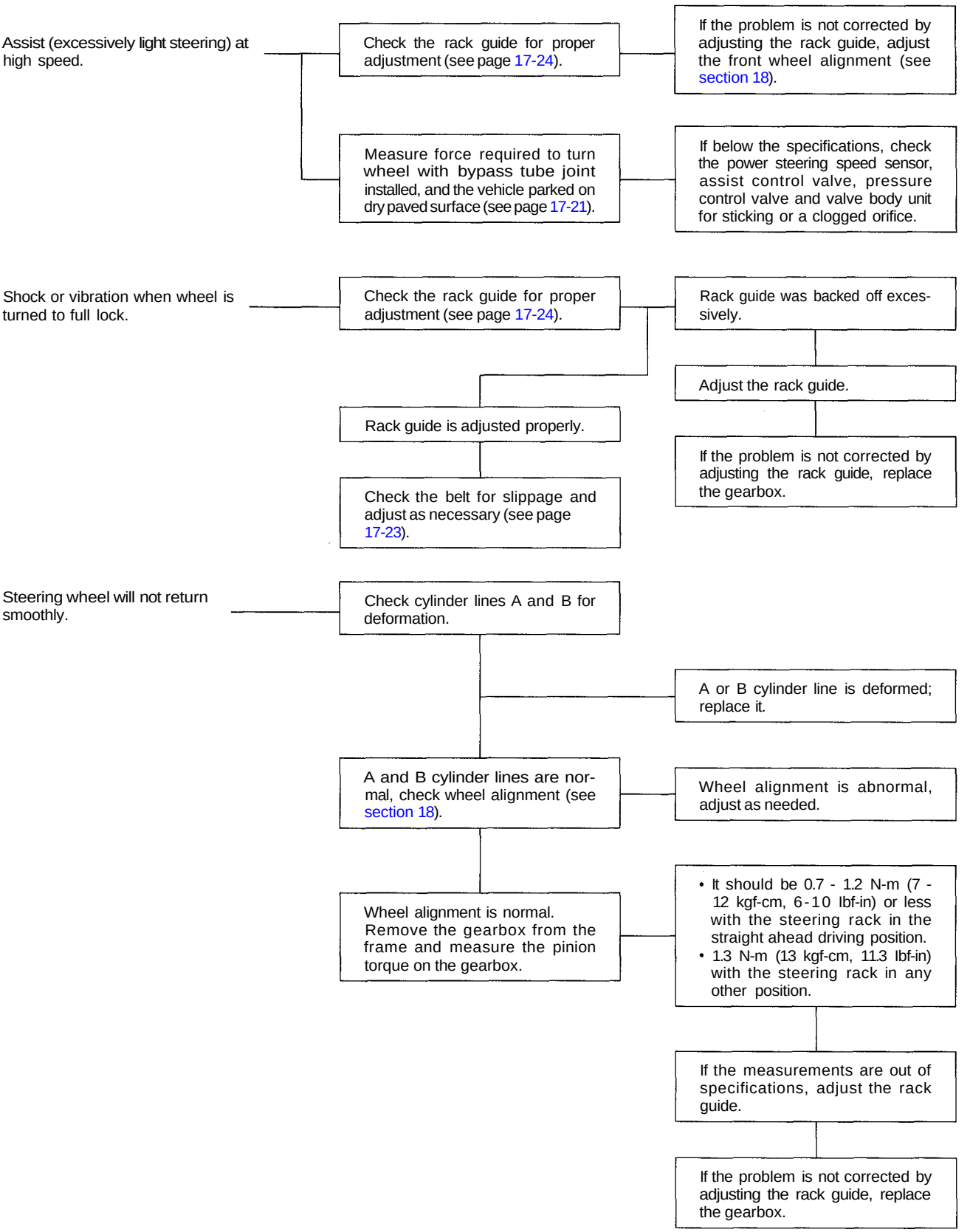
- Normal → Improperly adjusted rack guide
- Abnormal ↓

Faulty gearbox

(cont'd)

Troubleshooting

General Troubleshooting (cont'd)



Uneven or rough steering.

- Improperly adjusted rack guide.
  - Adjust rack guide (see page 17-24).
    - If the problem is not corrected by adjusting the rack guide, replace the gearbox.
- Belt slipping on pulley.
  - Adjust belt tension. Replace the belt, if necessary (see page 17-23).
- Idle speed low or erratic.
  - If the engine stalls when the wheel is turned while vehicle is stopped or moving at low speed, adjust idle speed (see section 11).
- Air in reservoir, or check power steering fluid level.
  - Check power steering fluid level. If level is excessively low, check for leaks in the system. Add fluid to the specified level.
    - If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the P/S pump housing mating surfaces and the pump shaft oil seal for suction leaks. Replace parts as necessary.

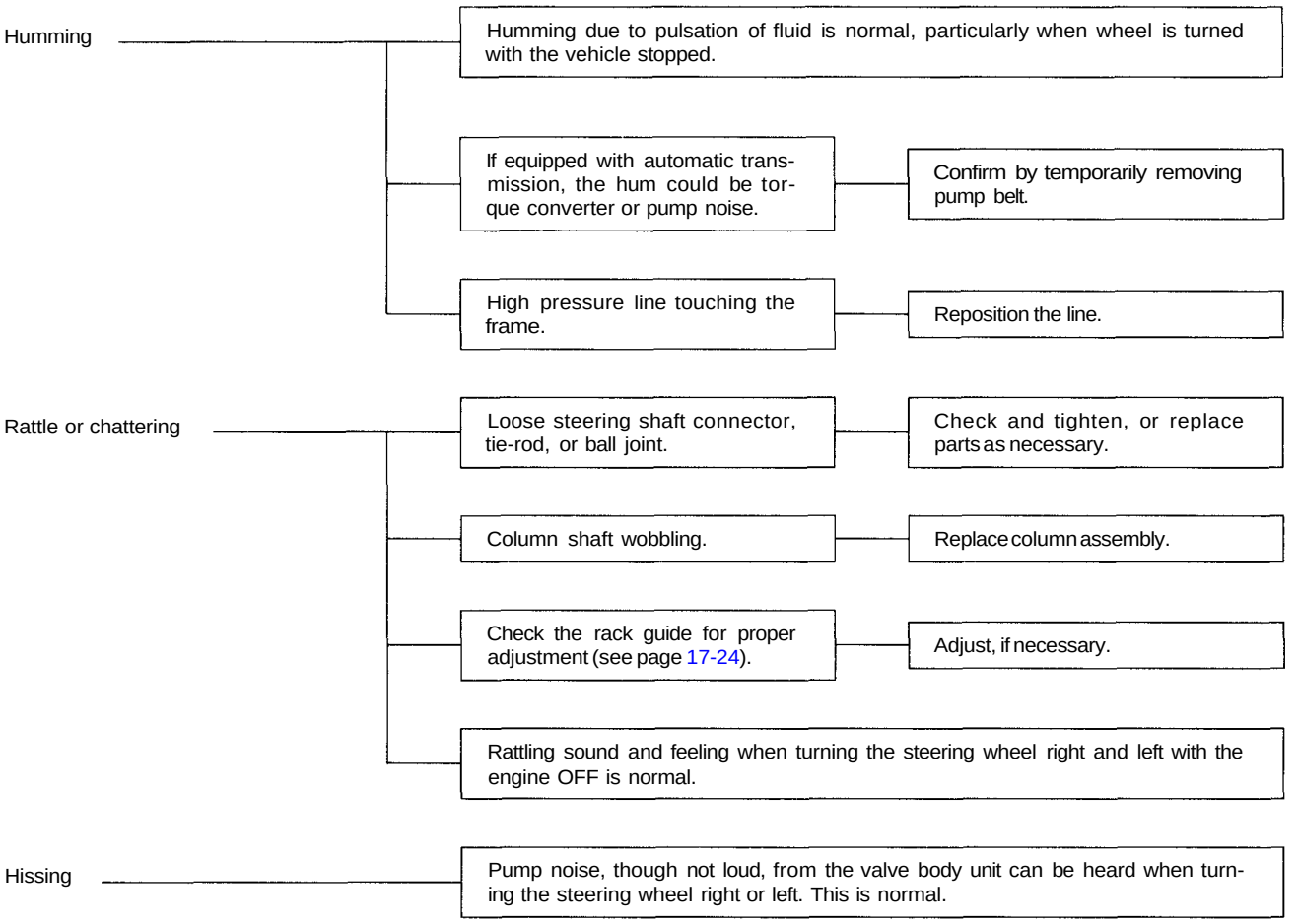
Steering wheel kicks back during wide turns.

- Pump belt slipping on pulley (pump stops momentarily).
  - Adjust belt tension (see page 17-23) or replace belt.
- Install the power steering pressure gauge. Close the pressure control valve fully and measure the pump pressure (see page 17-25).
  - Check if pump pressure is normal and the gauge needle travel is 500 kPa (5 kgf/cm^2, 71 psi) or less. Check the flow control valve if the needle travel exceeds 500 kPa (5 kgf/cm^2, 71 psi). If the flow control valve is normal, replace the pump as an assembly.

Troubleshooting

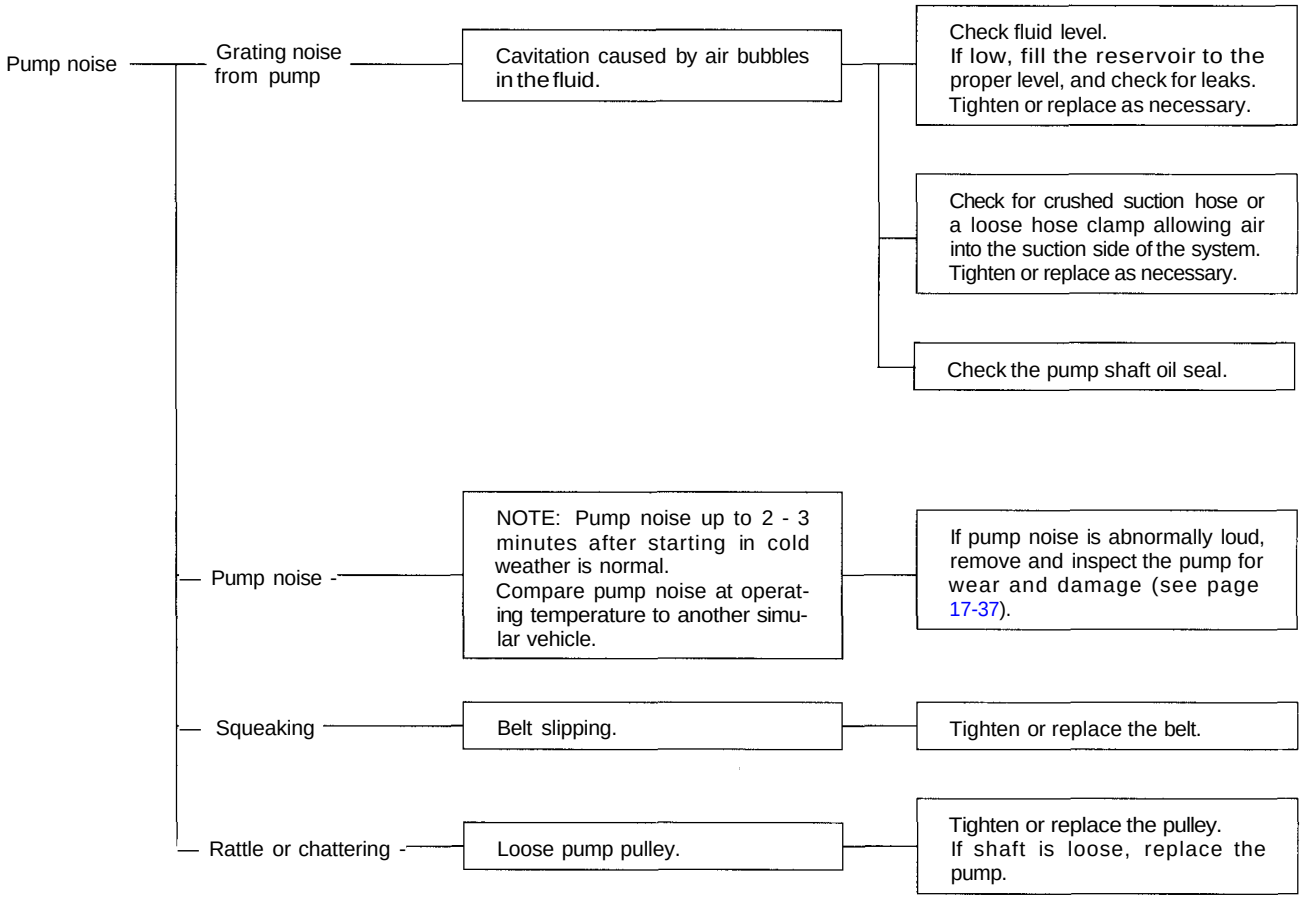
Noise and Vibration

NOTE: Pump noise in first 2-3 minutes after starting in cold weather is normal.



CAUTION: When inspecting, do not hold the steering wheel all the way to the right or the left.




Pump noise
Grating noise from pump
Cavitation caused by air bubbles in the fluid.
Check fluid level. If low, fill the reservoir to the proper level, and check for leaks. Tighten or replace as necessary.
Check for crushed suction hose or a loose hose clamp allowing air into the suction side of the system. Tighten or replace as necessary.
Check the pump shaft oil seal.
Pump noise
NOTE: Pump noise up to 2 - 3 minutes after starting in cold weather is normal. Compare pump noise at operating temperature to another simular vehicle.
If pump noise is abnormally loud, remove and inspect the pump for wear and damage (see page 17-37).
Squeaking
Belt slipping.
Tighten or replace the belt.
Rattle or chattering
Loose pump pulley.
Tighten or replace the pulley. If shaft is loose, replace the pump.

Troubleshooting

Fluid Leaks

- Check the gearbox assembly for oil leaks carefully. Oil can leak out of various points, depending on location of the faulty oil seals/seal rings. Check the following before removing the gearbox from the frame.

Steering gearbox	Leaking from the oil seal on the top of the valve housing.	Replace the valve oil seal from the valve housing.
	Leaking from cylinder end into left tie-rod boot.	Replace the valve oil seal from the pinion shaft.
		Replace the cylinder end seal on the gearbox housing side.
	Leaking from cylinder end into right tie-rod boot.	Replace the cylinder end seal on the cylinder end side.
	Leaking from the shaft upper end section or pin engagement section of the pinion shaft.	Replace the valve body unit.
	Leaking from the valve housing and valve body unit mating surface.	Tighten the attaching bolts, or replace the valve housing or valve body unit.
Power steering speed sensor	Leaking.	Replace the speed sensor.
Lines	Leaking from cylinder line A or B connections (at flare nut).	Tighten the connector. If it's still leaking, replace the line, cylinder or valve housing.
	Leaking caused by a damaged cylinder line A or B.	Replace cylinder pipe A or B.
	Leaking from feed line and sensor inlet line fitting on the valve body unit.	Tighten the attaching bolts. If it's still leaking, replace the line, joint fitting or valve housing.



Pump	Front seal leaking.	Replace front seal.
	Pump housing leaks at either end.	Replace housing O-rings. If the housing still leaks, replace the pump.
Reservoir	Leaking from around cap.	Reservoir overfilled. Pull off the hose and drain the reservoir to the proper level.
		Air leak in suction side of system (reservoir, inlet hose, front pump seal).
Pump outlet line (high pressure)	Leaking at the threaded fitting.	Tighten the fitting. If it's still leaking, replace the O-ring or high-pressure line.
	Leaking at the swagged joint.	Replace the high-pressure line.
Pump inlet line (low-pressure)	Leaking because of damage, deterioration, or improper assembly.	Replace or repair as necessary.

Inspection and Adjustment

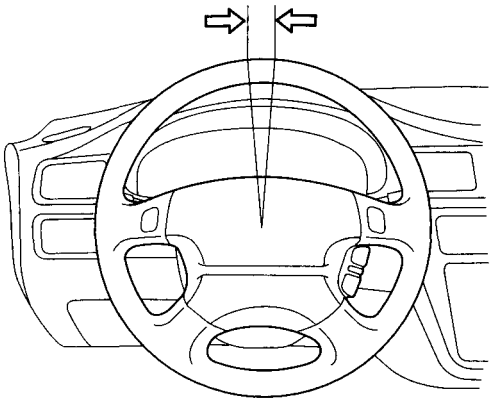
Steering Operation

Place the front wheels in the straight ahead position, and measure the distance the steering wheel can be turned without moving the front wheels.

ROTATIONAL PLAY: 0 - 10 mm (0 - 0.39 in)

If the play exceeds the service limit, perform rack guide adjustment (see page 17-24).
If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox as described on the next page.

ROTATIONAL PLAY

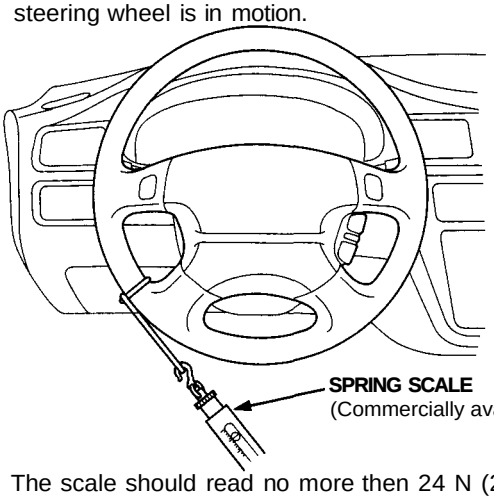


Power Assist Check with Vehicle Parked

1. Check the power steering fluid level (see page 17-24) and pump belt tension (see page 17-23).

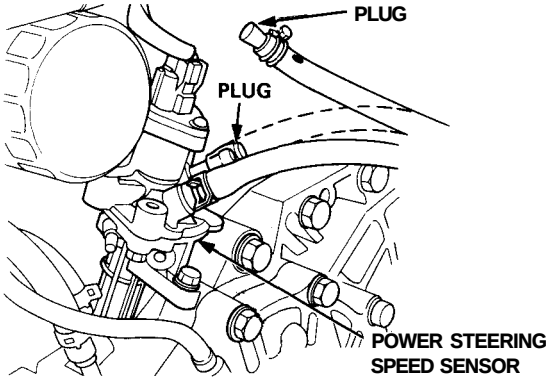
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.

3. Attach a spring scale to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown. Rotate the steering wheel more than 90 degree angle by pulling the spring scale. Read the figure on the spring scale while the steering wheel is in motion.



A. The scale should read no more then 24 N (2.4 kgf, 5.3 lbf).
If it reads more, go on to step 5.

5. Stop the engine. Disconnect the hose from the power steering speed sensor, and plug the hose and the sensor fitting as shown.



6. Start the engine, and let it idle.

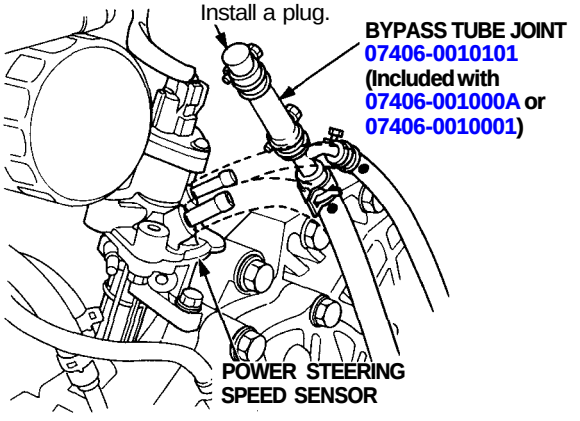
- If the reading is now 24 N (2.4 kgf, 5.3 lbf) or less, connect the sensor hose as it is. If the steering effort is above 24 N (2.4 kgf, 5.3 lbf), replace the power steering speed sensor (see page 17-25).
- If the reading is still more than 24 N (2.4 kgf, 5.3 lbf), check the gearbox and pump.

Assist Check at Road Speed

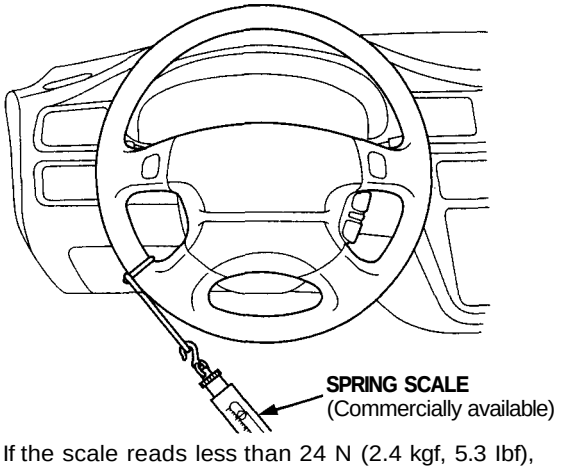
1. Check the power steering fluid level (see page 17-24), and check the pump belt tension (see page 17-23).

2. Start the engine, let it warm up to normal operating temperature, and turn the steering wheel lock-to-lock a few times to warm up the fluid.

3. Stop the engine. To simulate speeds above 62 mph (100 km/h), disconnect the hoses from the power steering speed sensor and connect them to the special tool. Plug the end of the special tool.



4. Attach the spring scale to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown. Rotate the steering wheel more than 90 degrees by pulling the spring scale. Read the figure on the spring scale while the steering wheel is in motion.

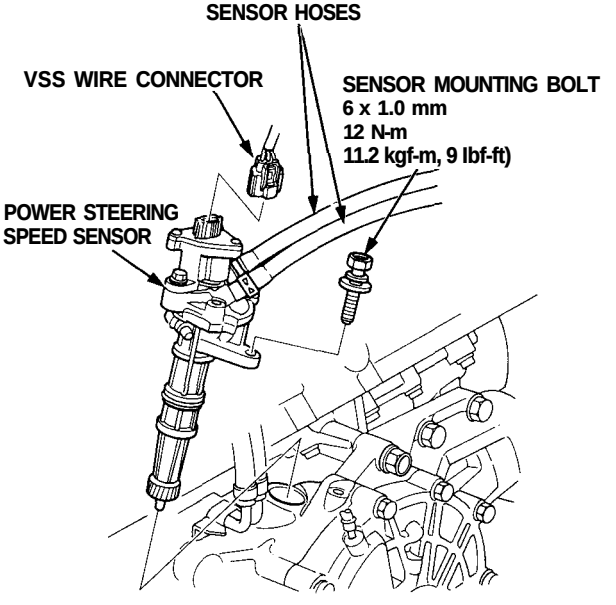


- If the scale reads less than 24 N (2.4 kgf, 5.3 lbf), the power steering speed sensor is OK and the problem is in the sensor feed line, the pump, the power steering speed sensor, or the valve body unit. See if the feed line is pinched or bent, then check the pump.

- See General Troubleshooting (see page 17-12).

Power Steering Speed Sensor Replacement

1. Disconnect the vehicle speed sensor (VSS) wire connector from the power steering speed sensor.



2. Remove the sensor mounting bolt, and remove the power steering speed sensor from the differential housing.

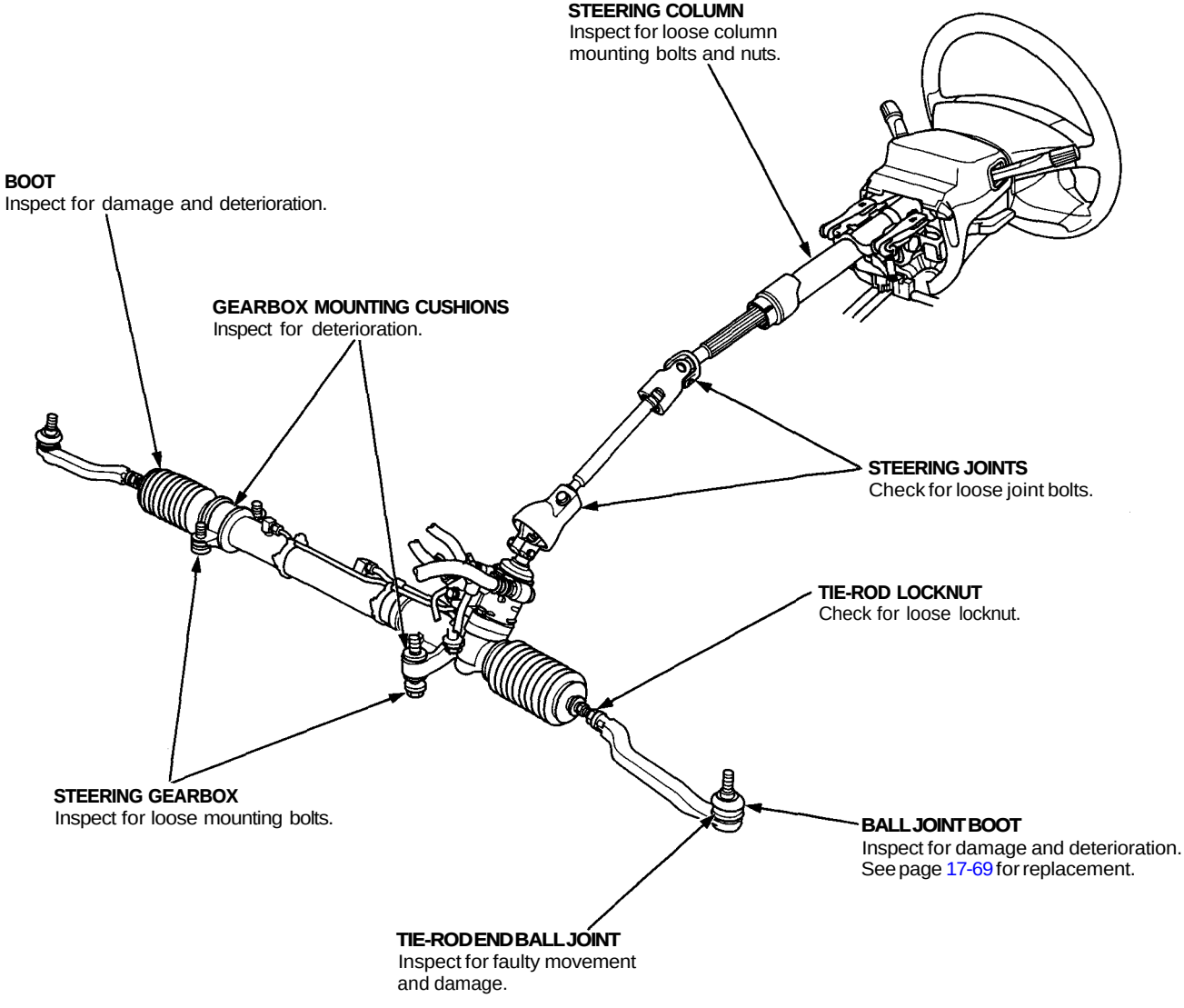
3. Disconnect the sensor hoses and plug the fittings.

4. After installing a new power steering speed sensor, turn the steering wheel lock-to-lock with the engine idling to bleed air from the system.

5. Check the reservoir, and add fluid if necessary.

Inspection and Adjustment

Steering Linkage and Gearbox



Pump Belt

NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

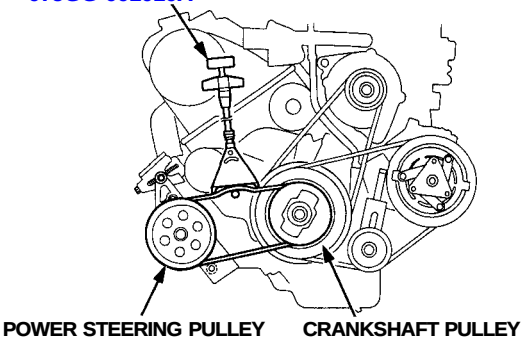
Inspection

Attach the special tool to the belt and measure the tension of the belt.

Tension:
Used Belt: 390 - 540 N (40 - 55 kgf, 88-120 lbf)
New Belt: 740 - 880 N (75 - 90 kgf, 170 - 200 lbf)

NOTE:
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.

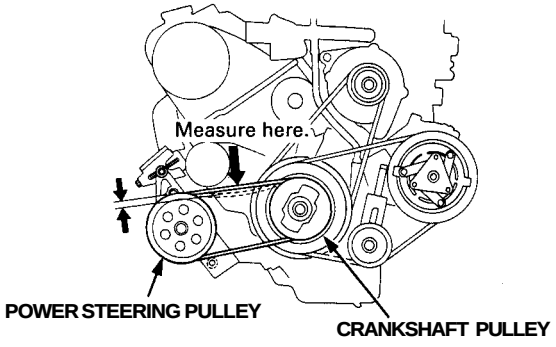
BELT TENSION GAUGE
07JGG-001010A



Inspect the pump belt for cracks or any damage. Replace the belt with a new one if necessary.

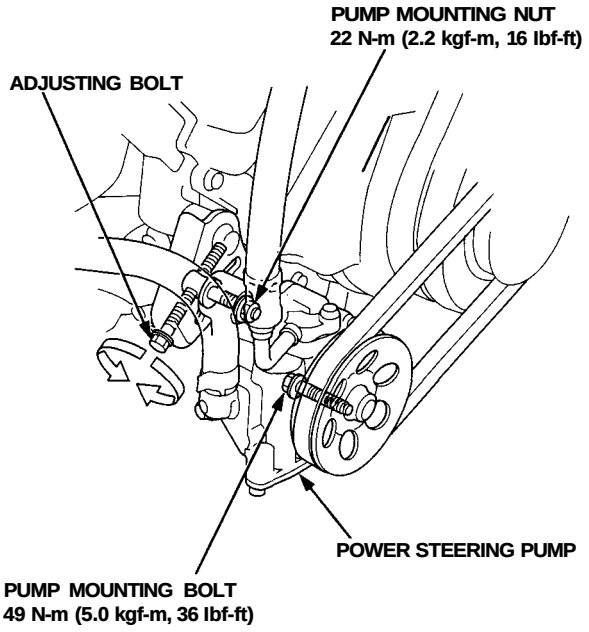
Measurement without Belt Tension Gauge:
Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:
Used Belt: 8.5 - 10.0 mm (0.33 - 0.39 in)
New Belt: 5.5 - 6.5 mm (0.22 - 0.26 in)



Adjustment

1. Loosen the power steering pump mounting nuts and bolt.
2. Turn the adjusting bolt to get the proper belt tension, then retighten the nuts and bolt.
3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.

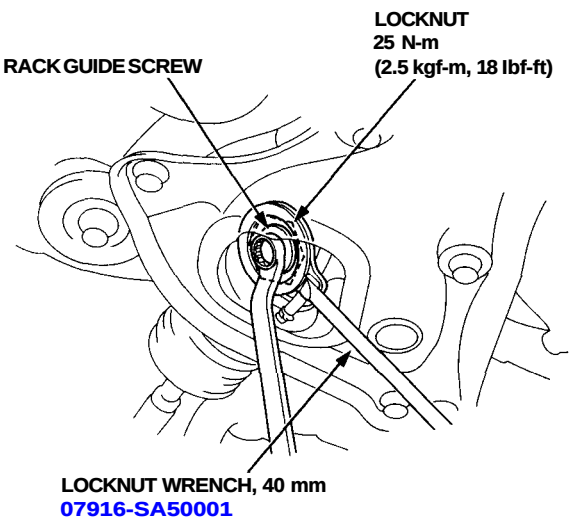


Inspection and Adjustment

Rack Guide Adjustment

NOTE: Perform rack guide adjustment with the wheels in the straight ahead position.

1. Loosen the rack guide screw locknut with the special tool, then loosen the rack guide screw.



2. Tighten the rack guide screw to 25 N-m (2.5 kgf-m, 18 lbf-ft), then loosen it.
3. Retighten the rack guide screw to 3.9 N-m (0.4 kgf-m, 2.9 lbf-ft), then back it off to specified angle.

   Specified Return Angle: 20 ± 5°

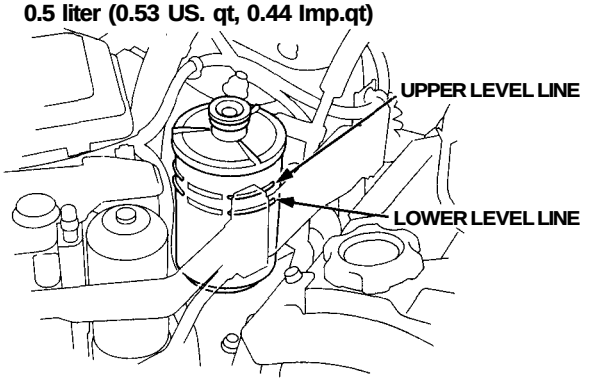
4. Tighten the locknut while holding the rack guide screw.
5. Check for tight or loose steering through the complete turning travel.
6. Perform following inspections:
   - Steering operation (see page 17-20).
   - Power assist with vehicle parked.

Fluid Replacement

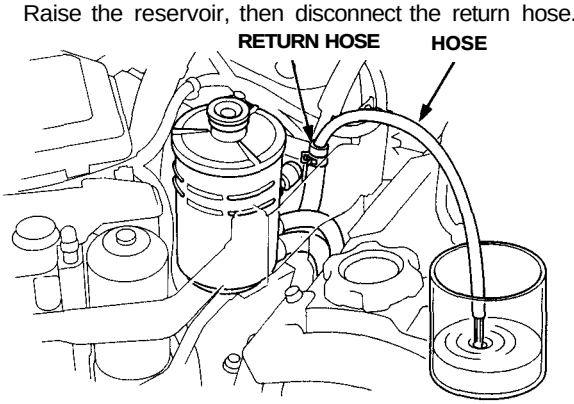
Check the reservoir at regular intervals, and add fluid as necessary.

CAUTION: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear and poor steering in cold weather.

SYSTEM CAPACITY:
1.3 liter (1.37 US. qt, 1.14 Imp.qt) at disassembly
RESERVOIR CAPACITY:
0.5 liter (0.53 US. qt, 0.44 Imp.qt)



1. Raise the reservoir, then disconnect the return hose.



2. Connect a hose of correct diameter to the disconnected return hose, and put the hose end in a suitable container.

   CAUTION: Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.

3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.
4. Reinstall the return hose on the reservoir.
5. Fill the reservoir to the upper level line.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary.

   CAUTION: Do not fill the reservoir beyond the upper level line.

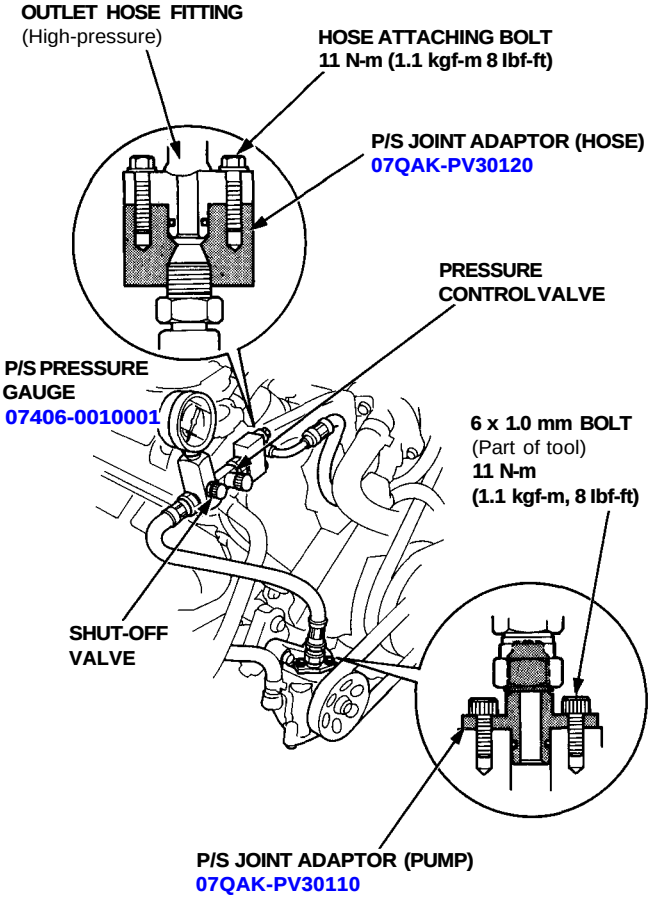
Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

CAUTION: Disconnect the high pressure hose with care so as not to spill the power steering fluid on the frame and other parts.

1. Disconnect the outlet hose (high-pressure) from the pump outlet fitting, then install the P/S joint adapter (pump) on the pump outlet.



2. Connect the P/S joint adapter (hose) to the power steering pressure gauge, then connect the outlet hose (high-pressure) to the adaptor.

3. Install the power steering pressure gauge to the P/S joint adaptor (pump).

4. Open the shut-off valve fully.

5. Open the pressure control valve fully.

6. Start the engine and let it idle.

7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.

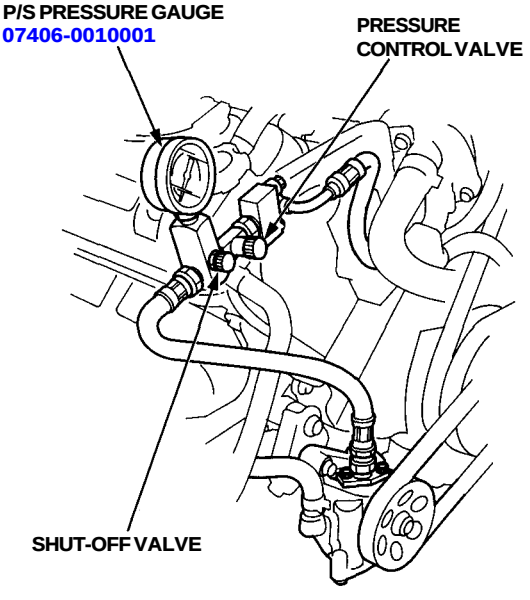
8. Measure steady-state fluid pressure while idling. If the pump is in good condition, the gauge should read less than 1500 kPa (15 kgf/cm^2, 213 psi).
If it reads high, check the feed line or valve body unit (see General Troubleshooting 17-12).

9. Close the pressure control valve, then close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

10. Immediately open the pressure control valve fully.

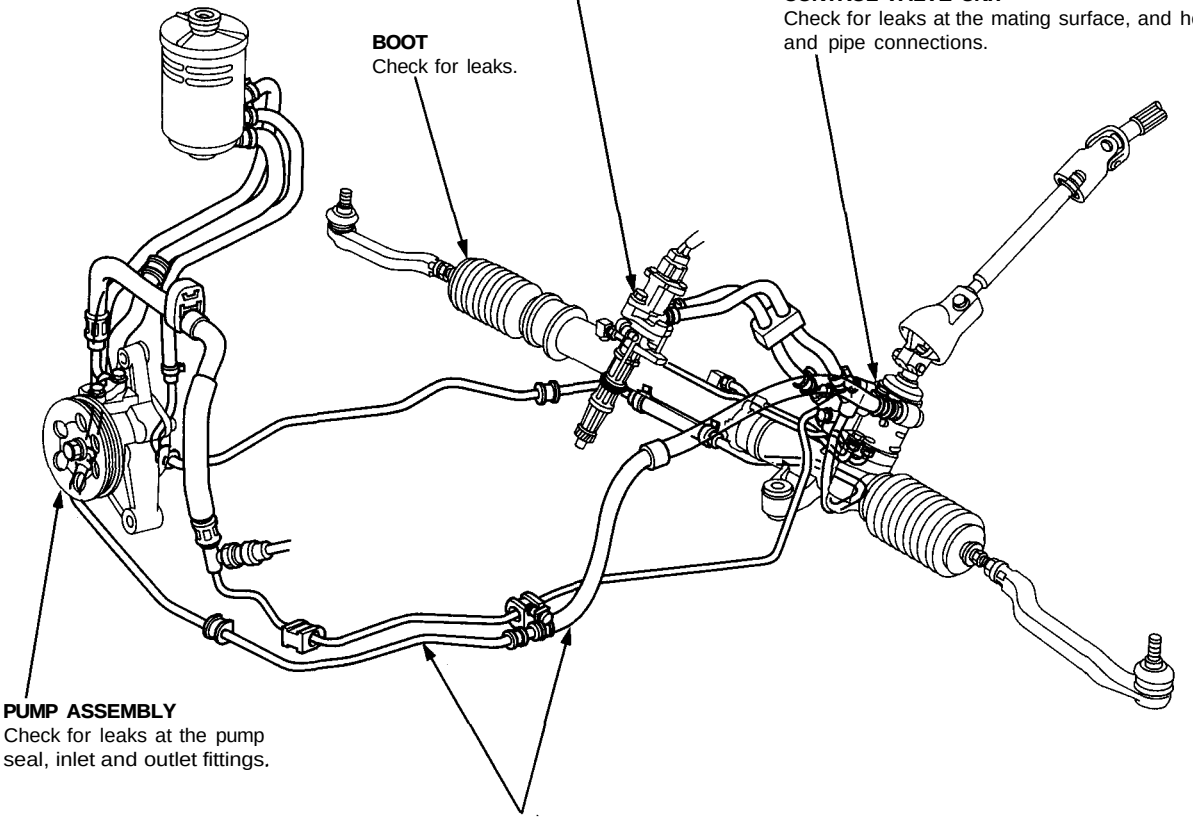
CAUTION: Do not keep the pressure control valve closed more then 5 seconds or the pump could be damaged by over-heating.

If the pump is in good condition, the gauge should read at least 7,800 - 8,800 kPa (80 - 90 kgf/cm^2, 1,138 - 1,280 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



Inspection and Adjustment

Fluid Leakage Inspection



Steering Wheel

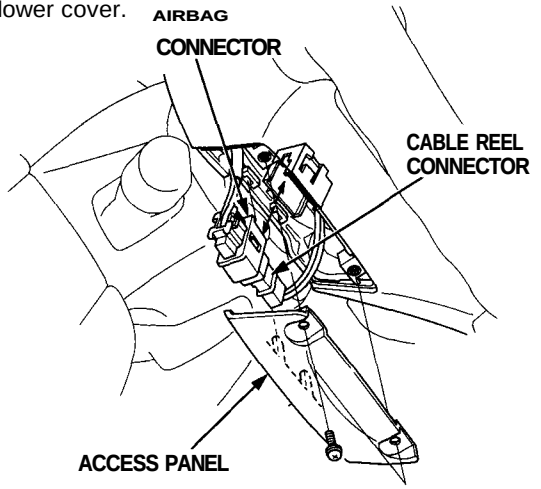
Removal

Airbag Removal

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

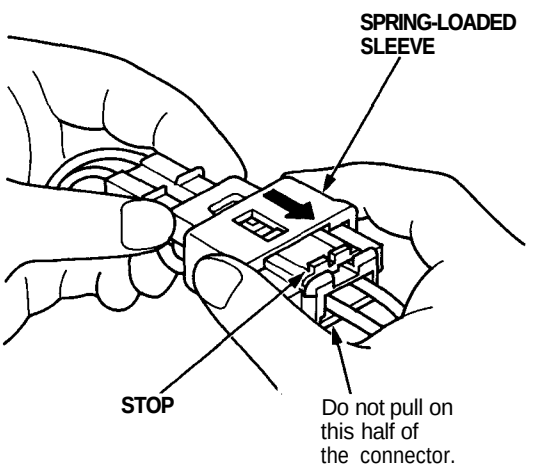
1. Disconnect the battery negative cable, then disconnect positive cable.

2. Remove the access panel from the steering wheel lower cover.



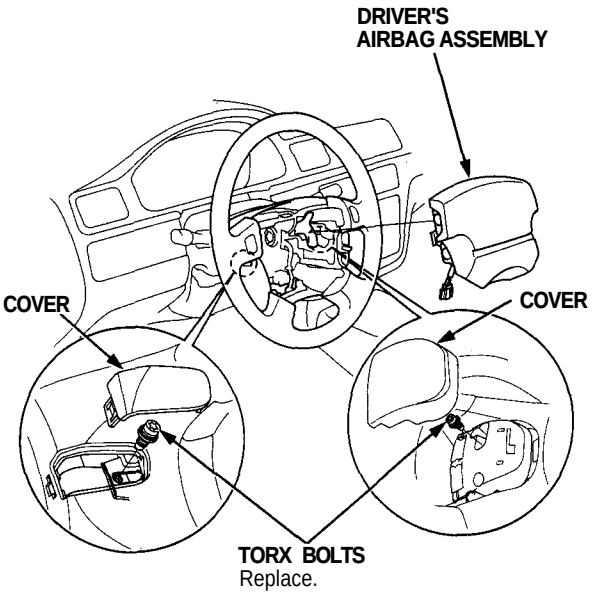
3. Disconnect the connector between the airbag and cable reel.

NOTE: Some SRS system connectors have *a* spring loaded lock.
To release the lock, pull the spring-loaded sleeve toward the stop. Then pull the connector halves apart.
Be sure to pull on the sleeve and not on the connector half itself.



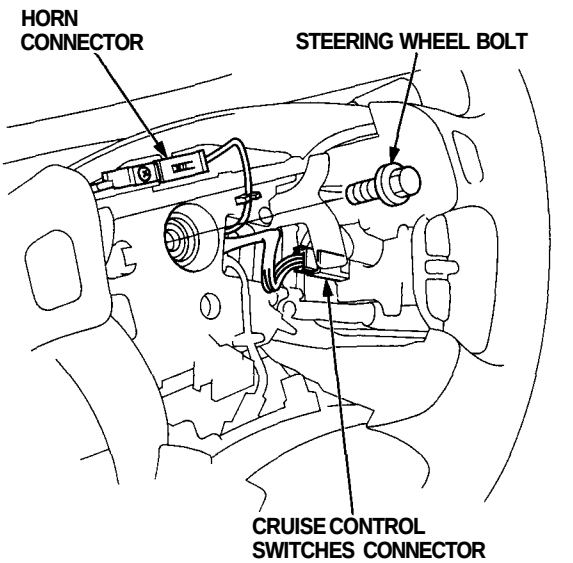
4. Remove the covers.

5. Remove the Torx T30 bit bolts, then remove the airbag assembly.



6. Disconnect the connectors from the horn and cruise control switches.

7. Remove the steering wheel bolt.



(cont'd)

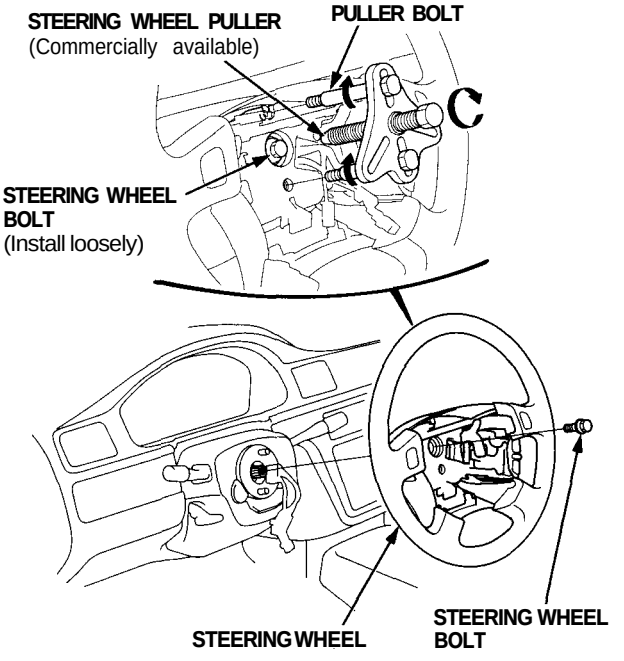
Steering Wheel

Removal (cont'd)

8. Loosely install the steering wheel bolt to the column shaft, then install a commercially-available steering wheel puller to the steering wheel to remove it.

9. Remove the steering wheel bolt and steering wheel from the column shaft.

CAUTION:
- **Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.**
- **If you thread the puller bolts into the wheel hub more than five threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.**



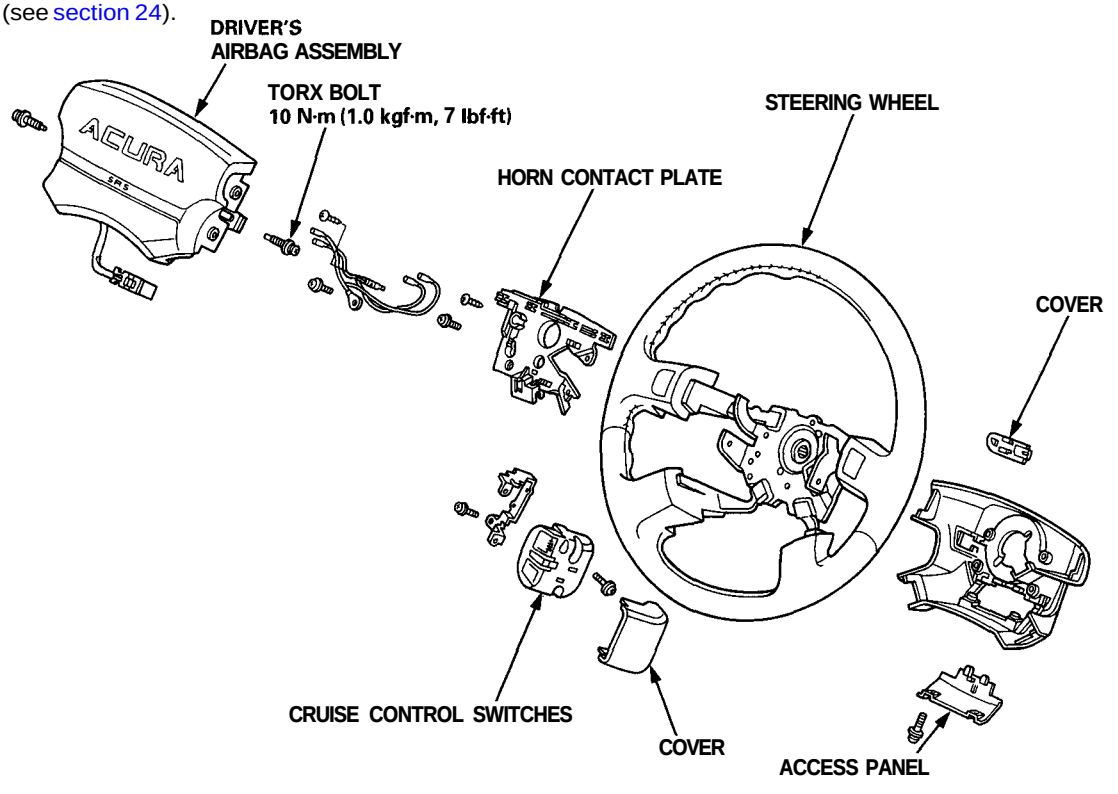
Steering Wheel

Disassembly/Reassembly

⚠ WARNING **Store a removed airbag assembly** with **the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.**

NOTE: If an intact airbag assembly has been removed from a scrapped vehicle, or has been found defective or damaged during transit, storage or service, it should be deployed (see section 24).

CAUTION:
- **Carefully inspect the airbag assembly before installing. Do not install an airbag assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**
- **Do not disassemble or tamper with the airbag assembly.**



Installation

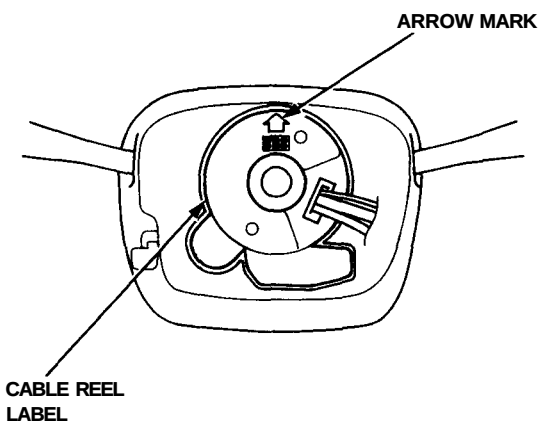
Airbag installation

CAUTION:

- **Before installing the steering wheel, align the front wheels straight ahead.**
- **Be sure to install the harness wires so that they are not pinched or interfering with other vehicle parts.**
- **Do not replace the original steering wheel with any other design, since it will make it impossible to properly install the airbag. (Only use genuine Honda replacement parts)**
- **After reassembly, confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie-rods, not by removing and repositioning the steering wheel.**

⚠ WARNING Confirm that the airbag assembly is securely attached to the steering wheel; otherwise, severe personal injury could result during airbag deployment.

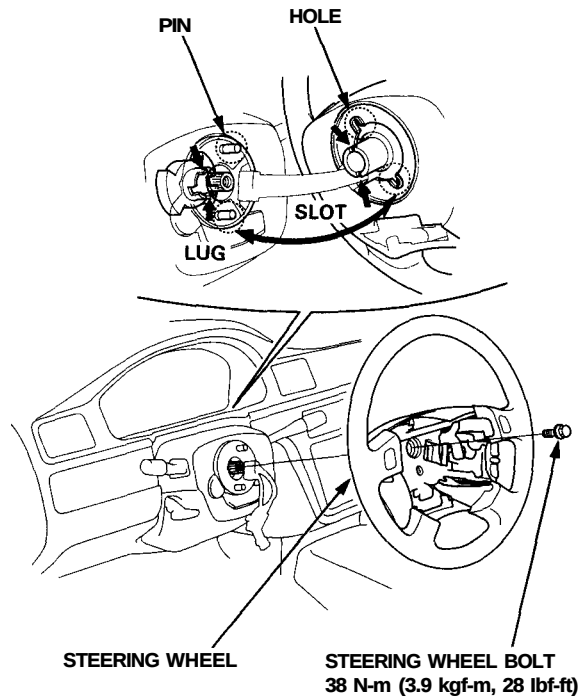
1. Before installing the steering wheel, center the cable reel. Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise approximately two turns.
   The arrow mark on the cable reel label should point straight up.



2. Install the steering wheel with the steering wheel bolt.

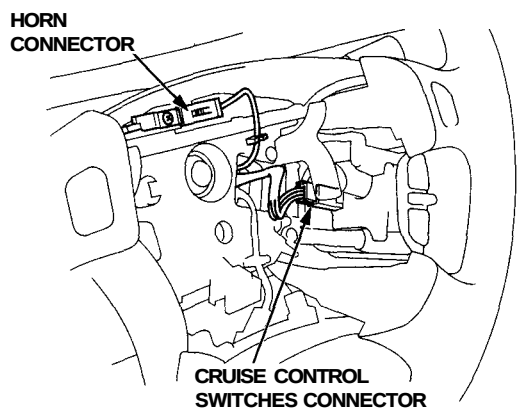
   NOTE: Be sure the steering wheel shaft engages the cable reel and canceling sleeve.

   CAUTION: Do not tap on the steering wheel or steering column shaft when installing the steering wheel.



3. Attach the cruise control switches connector to the steering wheel clip.

4. Connect the horn connector.

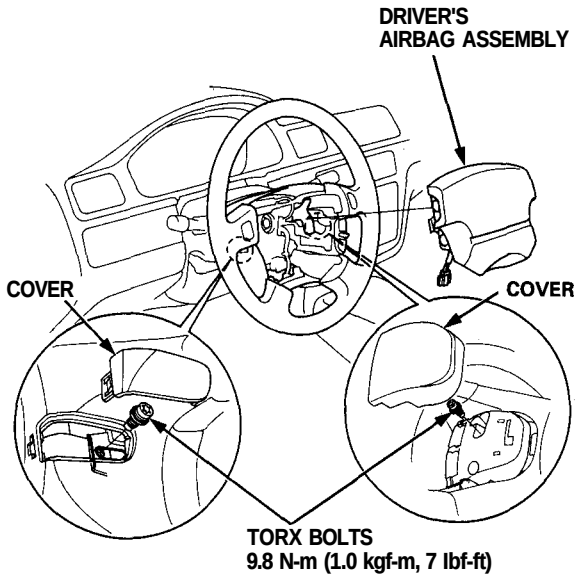


(cont'd)

Steering Wheel

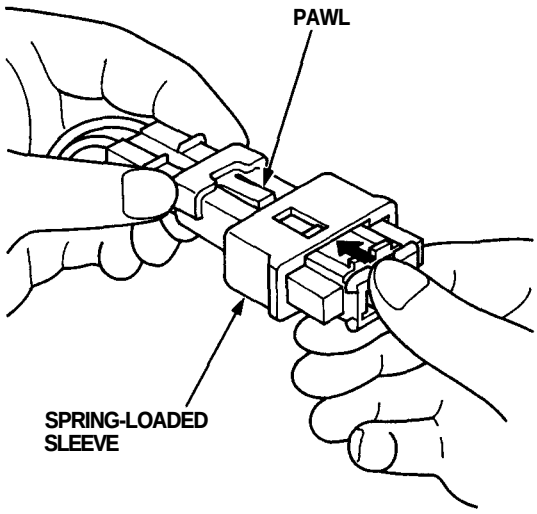
Installation (cont'd)

5. Install the driver's airbag assembly with new Torx bolts, and install the covers.

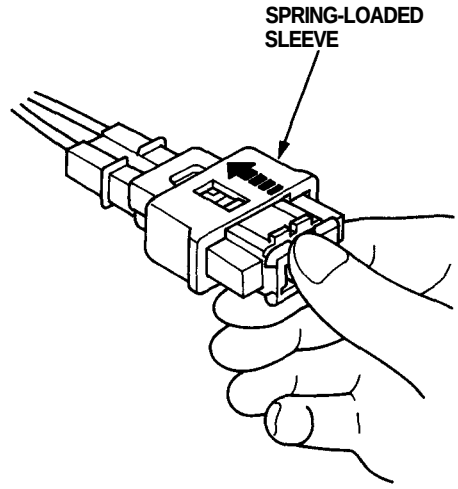


6. Hold the pawl side connector half, and press on the back of the sleeve-side connector half in the direction shown. As the two connector halves are pressed together, the sleeve is pushed back by the pawl.

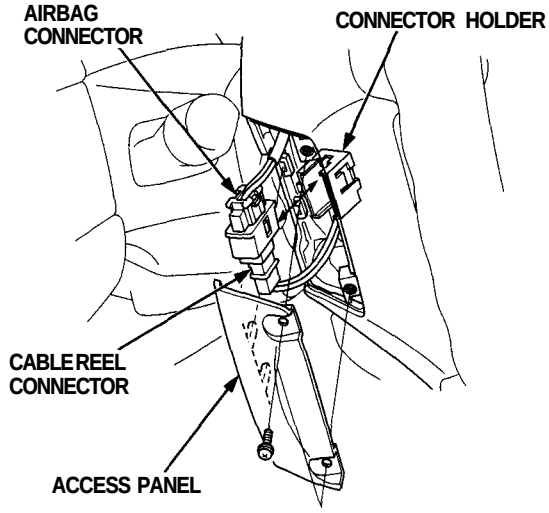
NOTE: Do not touch the sleeve.



7. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.



8. Attach the connector in the holder, then install the access panel on the steering wheel lower cover.



9. Connect the positive cable first, then the negative cable to the battery.

10. After installing the airbag assembly, confirm proper system operation:

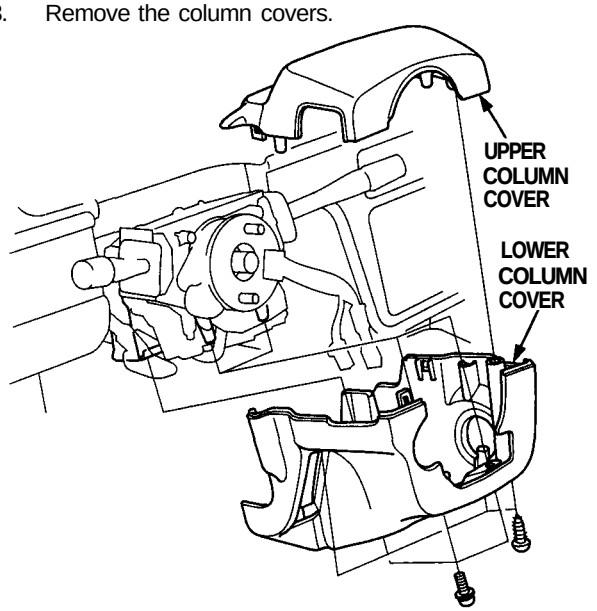
- Turn the ignition switch ON (II); the instrument panel SRS indicator light should come on for about six seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume/ cancel switches.

Steering Column

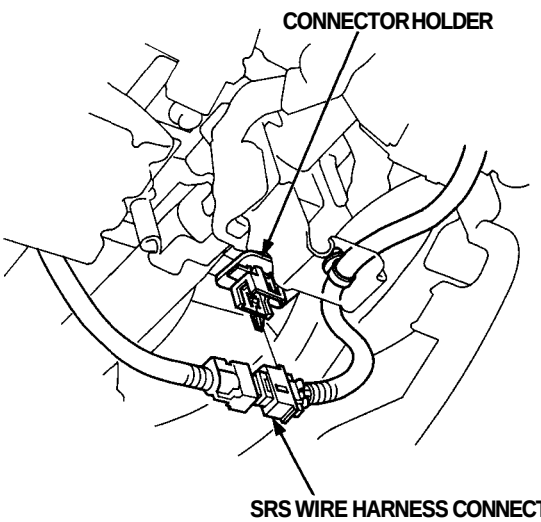
Removal

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

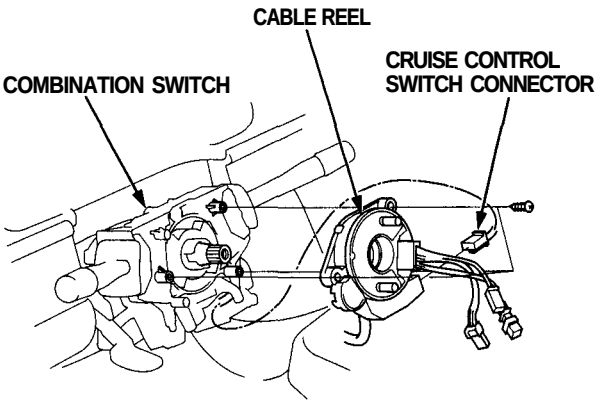
1. Remove the driver's airbag assembly and steering wheel (see page 17-27).
2. Remove the lower cover and driver's knee bolster (see section 20).
3. Remove the column covers.



4. Remove the SRS wire harness connector from the connector holder.
5. Disconnect the cable reel connector and SRS main wire harness connector (see page 17-27).

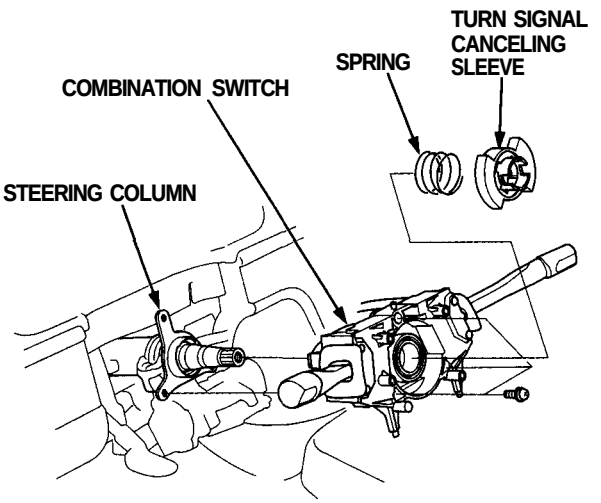


6. Disconnect the cruise control switch connector from the cable reel, and remove the cable reel from the combination switch.



7. Remove the turn signal canceling sleeve and spring.
8. Remove the combination switch from the steering column by disconnecting the connectors.

   NOTE: Refer to page 17-6a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences in this step for vehicles equipped with TCS.

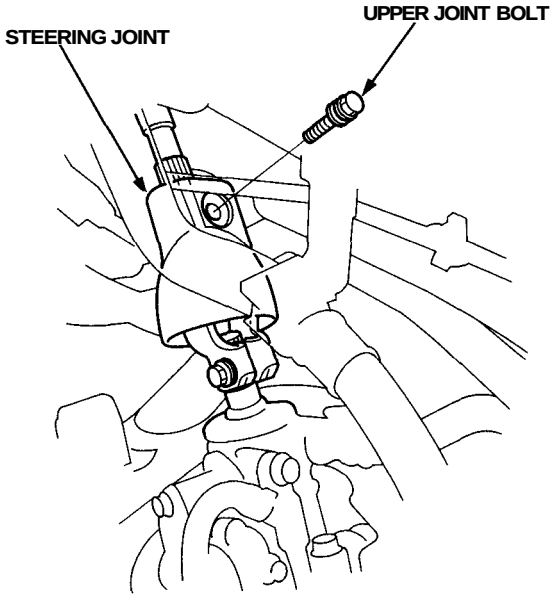


(cont'd)

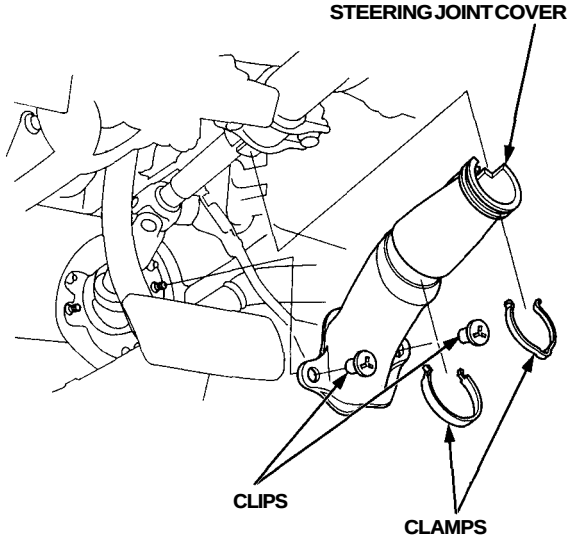
Steering Column

Removal (cont'd)

9. Remove the steering upper joint bolt from the engine compartment, then disconnect the steering joint by moving the joint toward the column.

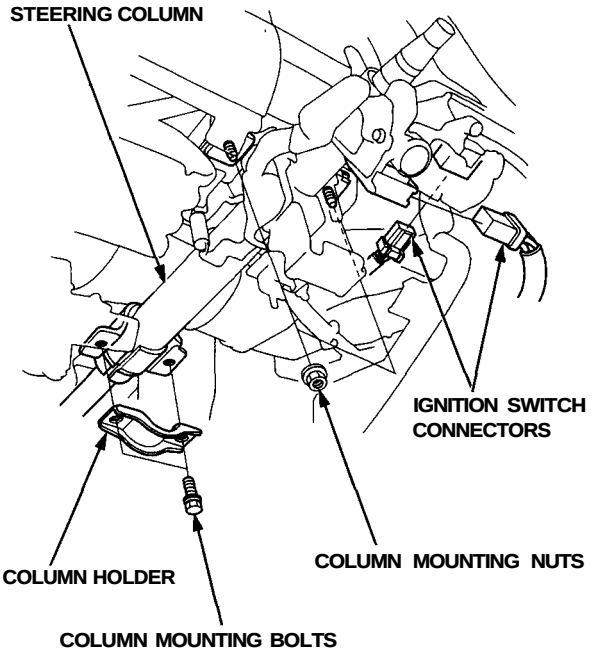


10. Remove the steering joint cover.



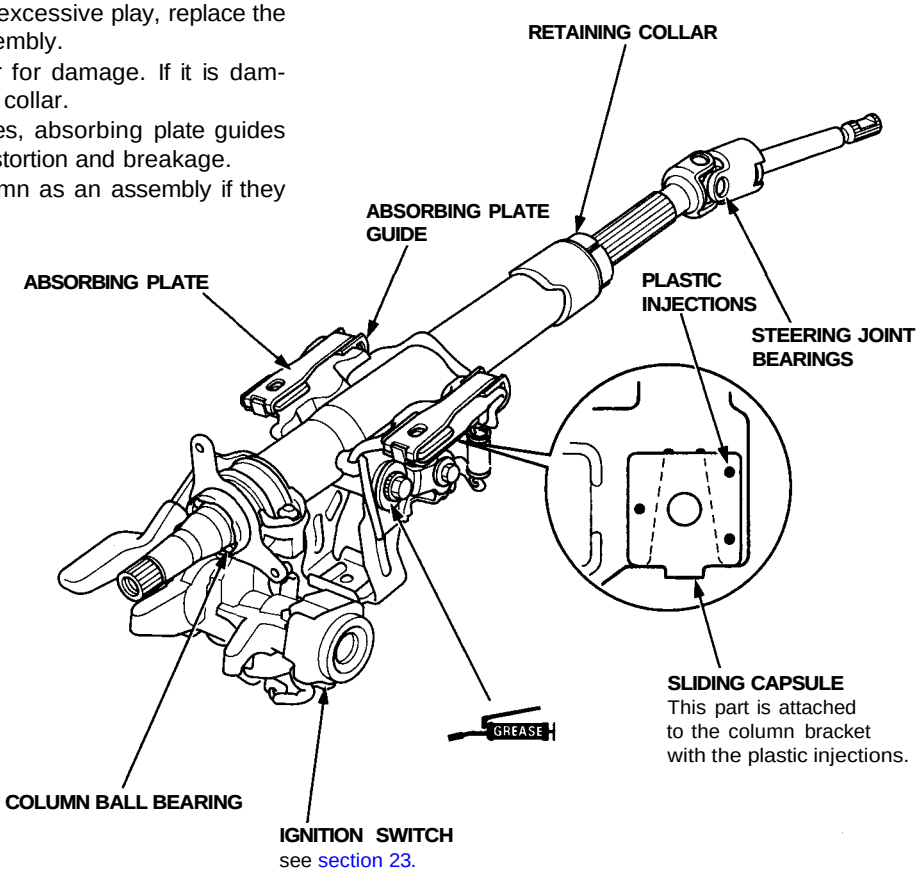
11. Disconnect the ignition switch connectors.

12. Remove the steering column by removing the mounting nuts and bolts.



Inspection

- Check the steering column ball bearing and the steering joint bearings for play and proper movement. If there is noise or if there is excessive play, replace the steering column as an assembly.
- Check the retaining collar for damage. If it is damaged, replace the retaining collar.
- Check the absorbing plates, absorbing plate guides and sliding capsules for distortion and breakage. Replace the steering column as an assembly if they are distorted or broken.



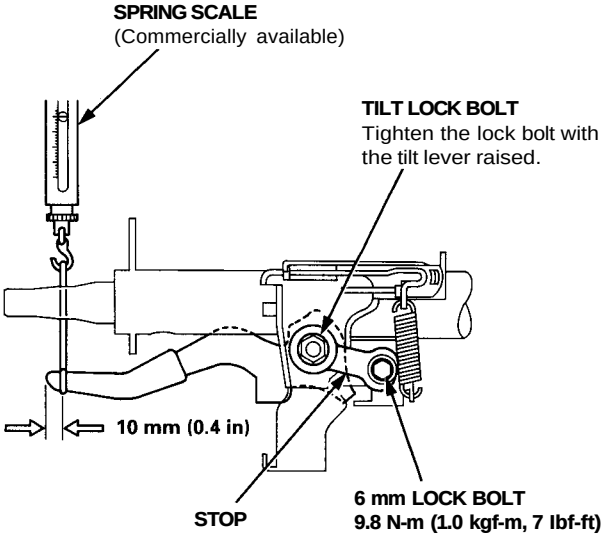
1. Move the tilt lever from the loose position to lock position 3 to 5 times; then measure the tilt lever preload 10 mm (0.4 in) from the end of the tilt lever.

   Preload: 70 - 90 N (7 - 9 kgf, 15-20 lbf)

2. If the measurement is out of the specification, adjust the preload using the following procedures.

   a. Loosen the tilt lever, and set the steering column in the neutral position.
   b. Remove the 6 mm lock bolt and remove the stop.
   c. Adjust the preload by turning the tilt lock bolt left or right.
   d. Pull up the tilt lever to the uppermost position and install the stop. Check the preload again. If the measurement is still out of specification, repeat the above procedures (a) through (c) to adjust.

   CAUTION: Be careful not to loosen the tilt lever when installing the stop or tightening the 6 mm lock bolt.



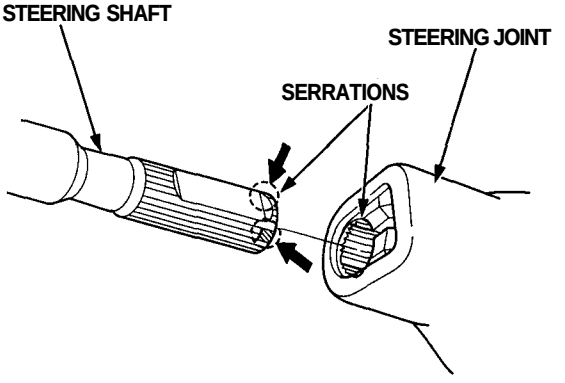
Steering Column

Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

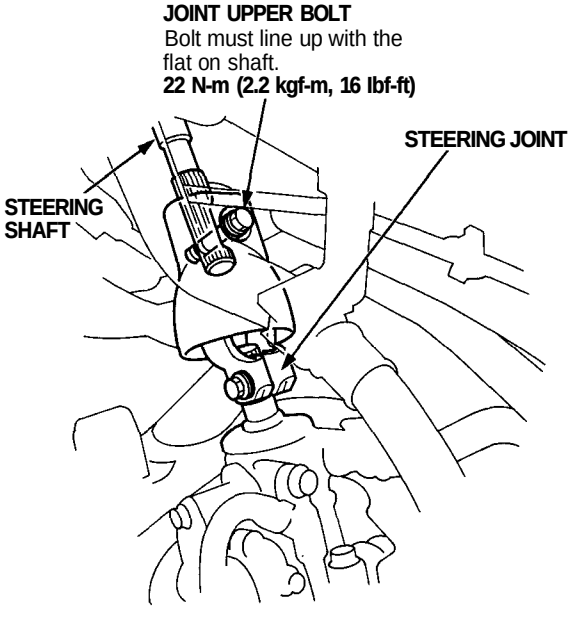
1. Coat the interior of the steering joint grommet with grease, then guide the steering shaft through the engine compartment bulkhead.

2. Insert the upper end of the steering joint onto the steering shaft by aligning the serrations.



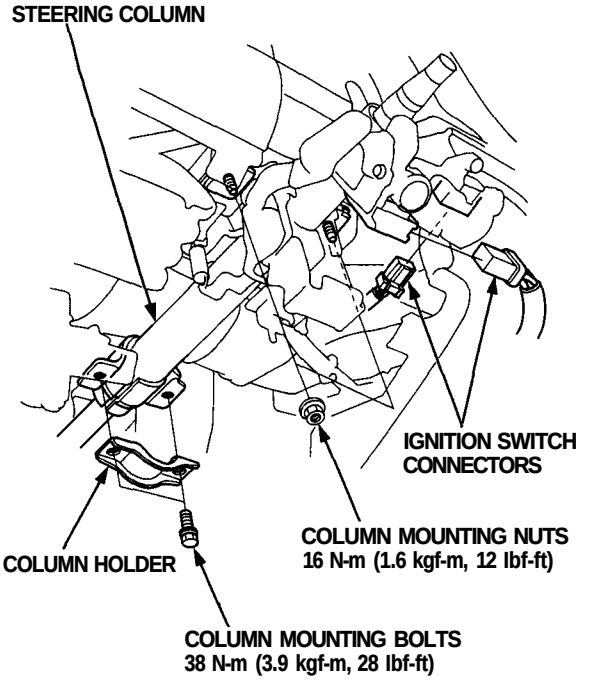
3. Align the bolt hole in the steering joint with the slot in the steering shaft. Then loosely install the joint upper bolt.

   NOTE: Before tightening the joint upper bolt, pull on the steering joint to make sure that the steering joint is fully seated.

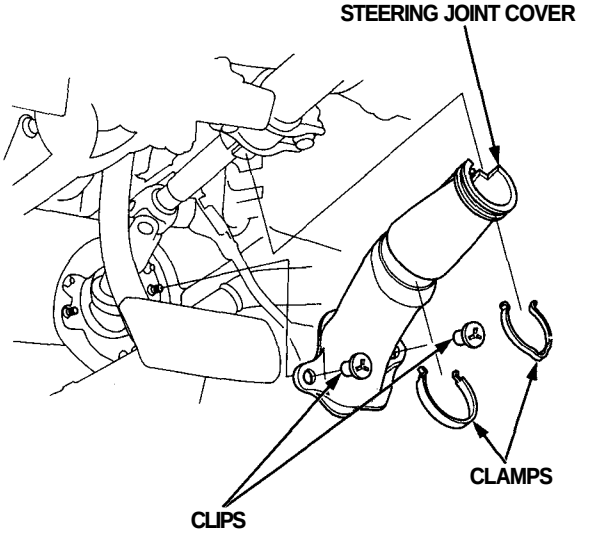


4. Install the steering column with the column mounting nuts and column holder. Then retighten the joint upper bolt.

   NOTE: Take care not to let the retaining collar fall out of position during installation.



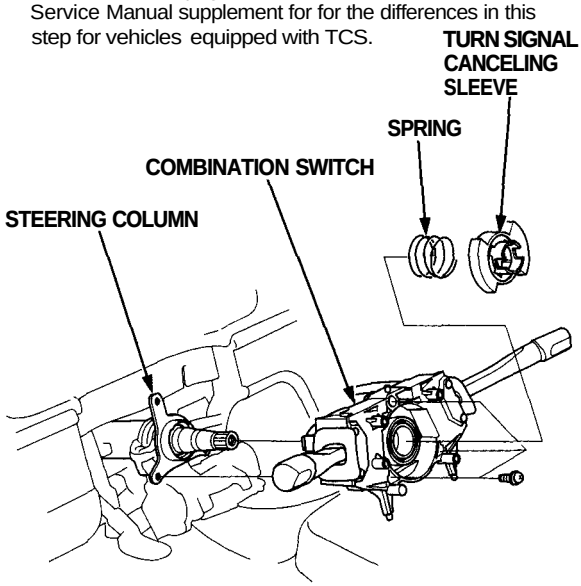
5. Install the steering joint cover with the clamps and clips.



6. Install the combination switch and connect the connectors. Be sure the wires are not caught or pinched by any parts when installing the combination switch.

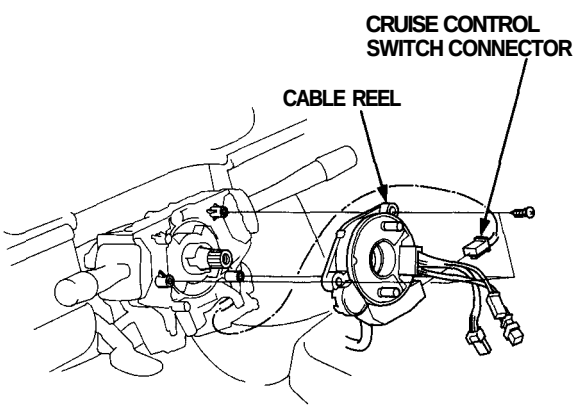
7. Carefully install the wire harness with the harness bands and clamps.

8. Install the spring and turn signal canceling sleeve onto the combination switch.
   NOTE: Refer to page 17-6a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences in this step for vehicles equipped with TCS.

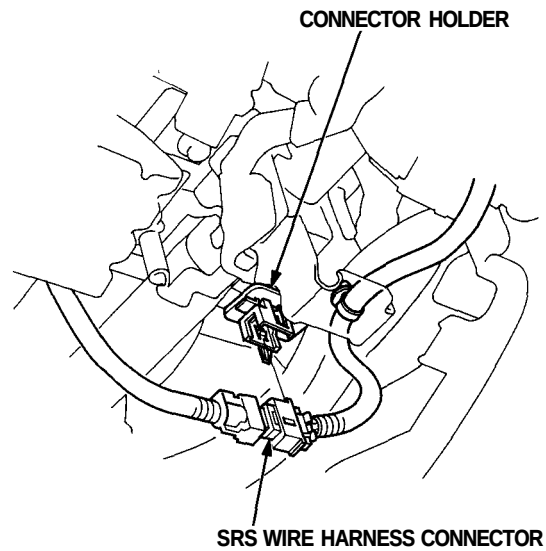


9. Install the cable reel, and connect the cruise control switch connector.

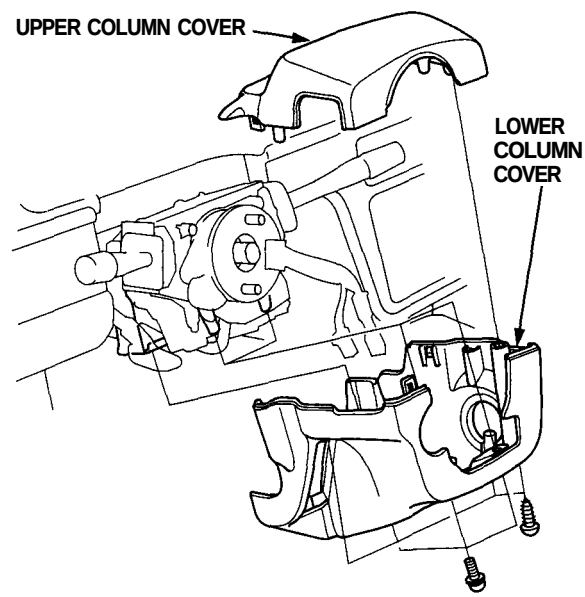
10. Connect the cable reel connector and SRS main wire harness connector (see page 17-30).



11. Install the SRS wire harness connector onto the connector holder.



12. Install the column covers.



13. Install the driver's knee bolster and lower cover (see section 20).

14. Install the steering wheel (see page 17-29).

Power Steering Hoses and Lines

Replacement

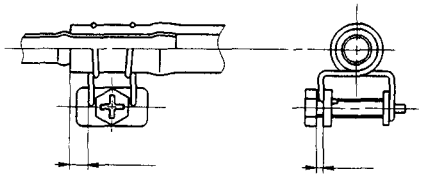
NOTE:

- Connect each hose to the corresponding line securely until it contacts the stop on the line. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Add the recommended power steering fluid to the specified level on the reservoir and check for leaks.

CAUTION: Check all clamps for deterioration and deformation; replace the clamps with new ones if necessary.

ADJUSTABLE HOSE CLAMP:

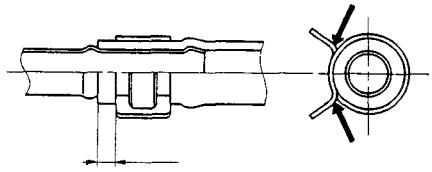
Slide the hose over the pipe until it contacts the stop.



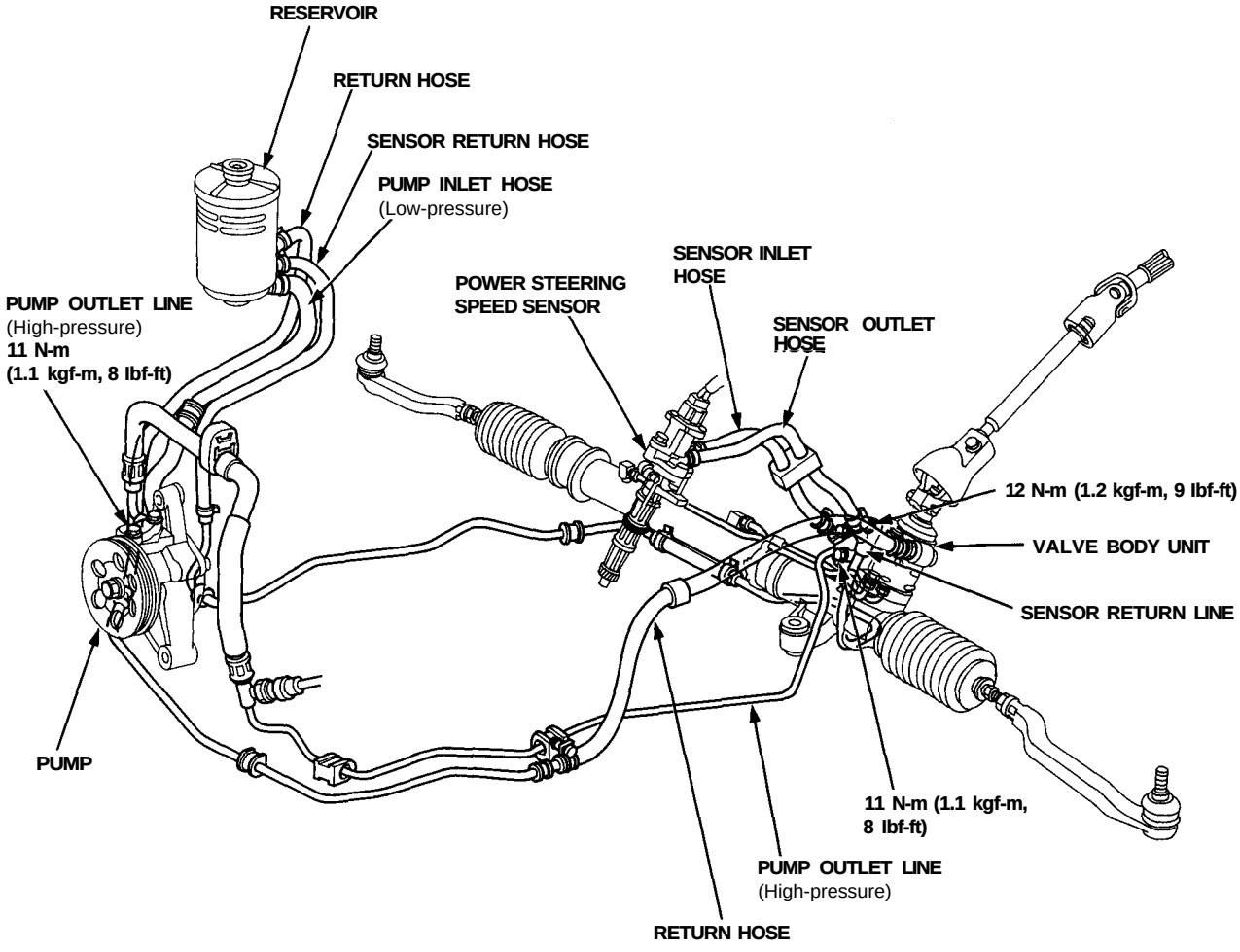
2.5-5.5 mm (0.01-0.22 in) **2.0-4.0 mm (0.08-0.16 in)**

HOSE CLAMP:

Slide the hose over the pipe until it contacts the stop.



2.5-5.5 mm (0.01-0.22 in)



Power Steering Pump

Removal

NOTE: Before disconnecting the hoses from the pump, place a suitable container under the vehicle.

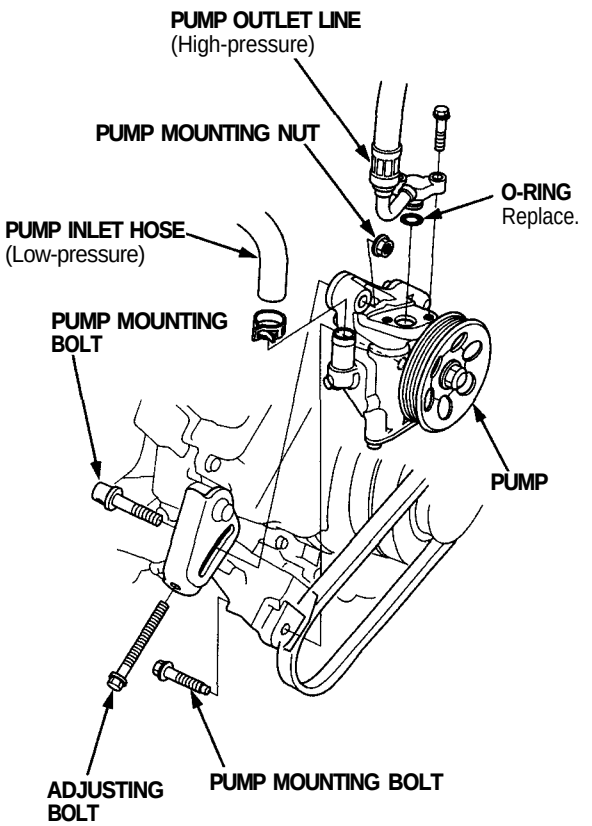
1. Remove the belt by loosening the pump adjusting bolt, mounting bolts and nuts.

2. Disconnect the inlet hose and the outlet line from the pump, and plug them.

   NOTE: Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.

3. Remove the pump mounting bolts, then remove the pump.

   NOTE:
   - Do not turn the steering wheel with the pump removed.
   - Wrap the opening of the pump with a piece of tape to prevent foreign material from entering the pump.



Power Steering Pump

Disassembly

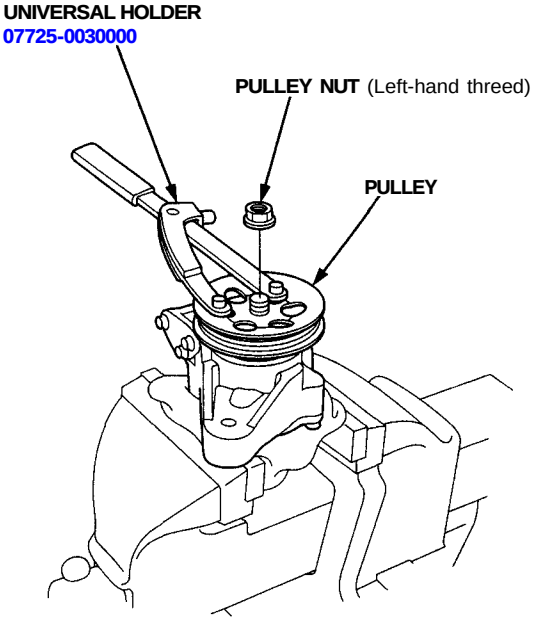
Pulley Removal

1. Drain the fluid from the pump.

2. Hold the steering pump in a vise with soft jaws, hold the pulley with the special tool, and remove the pulley nut and pulley.

CAUTION: Be careful not to damage the pump housing with the jaws of the vise.

NOTE: Pulley nut has left-hand threads.



(cont'd)

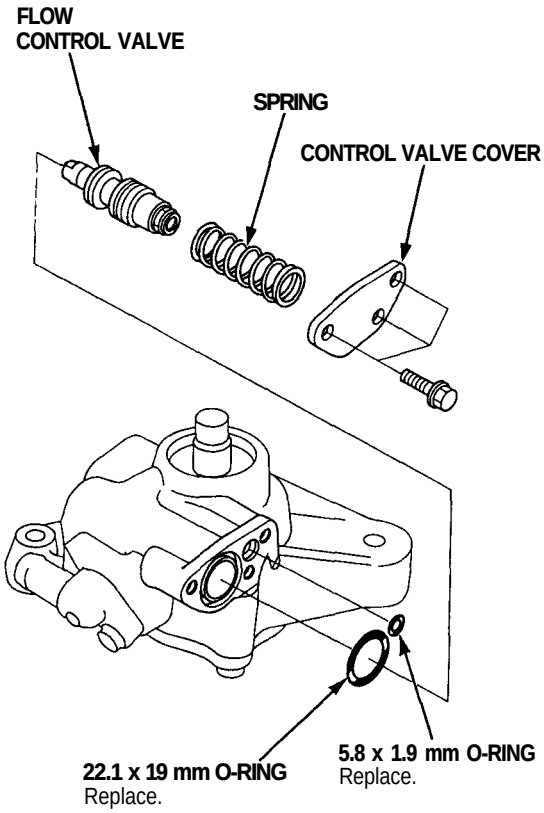
Power Steering Pump

Disassembly (cont'd)

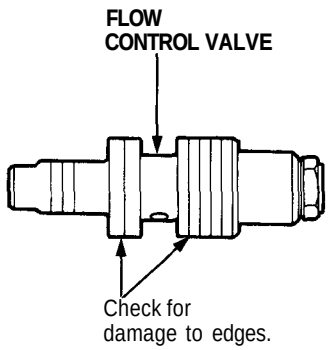
Flow Control Valve Removal/Inspection

1. Remove the control valve cover by removing the three flange bolts.

2. Remove the spring, flow control valve and O-rings.

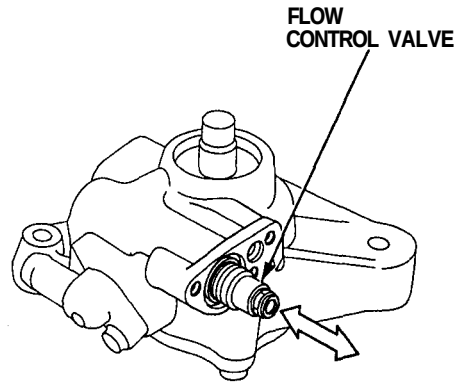


3. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.



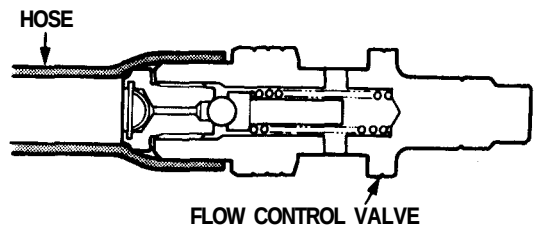
4. Inspect the bore for the flow control valve for scratches or wear.

5. Slip the valve back in the pump, and check that it moves in and out smoothly.

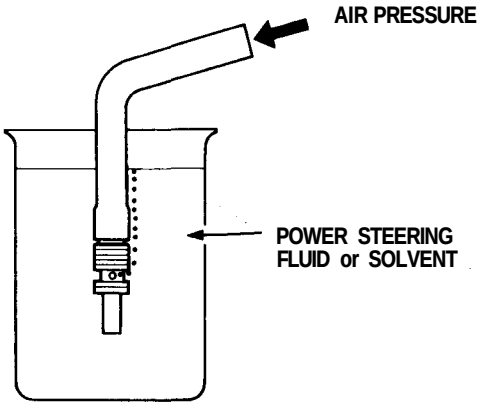


If OK, go to step 6; if not, replace the pump as an assembly. The flow control valve is not available separately.

6. Attach a hose to the end of the valve as shown.

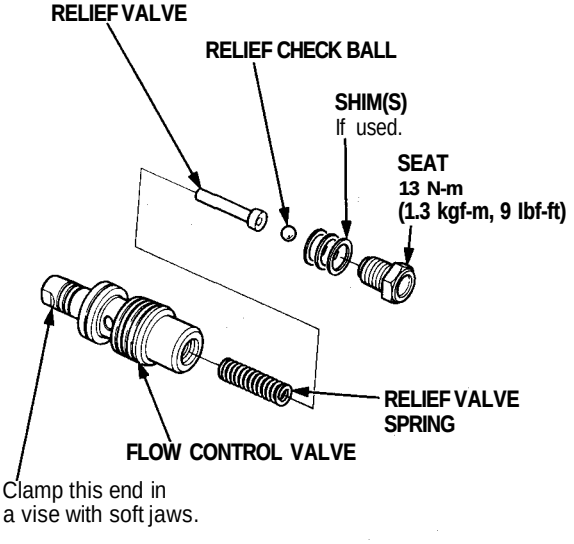


7. Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm^2, 14.2 psi), replace or repair it as follows.



8. Hold the bottom end of the valve with a open end wrench.

9. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.



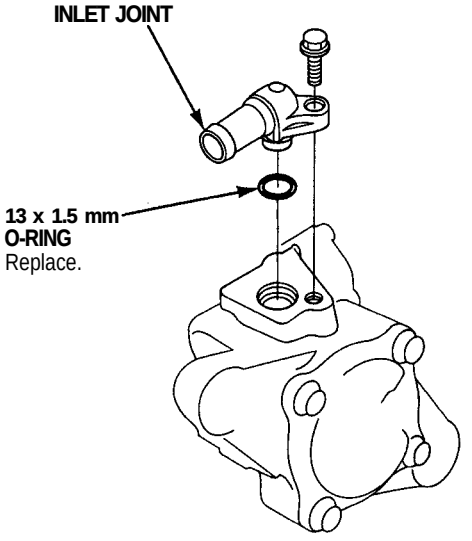
10. Clean all the parts in solvent, dry them off, then reassemble and retest the valve. If the flow control valve tests OK, reinstall it in the pump. If the flow control valve still leaks air, replace the pump as an assembly. The flow control valve is not available separately.

NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

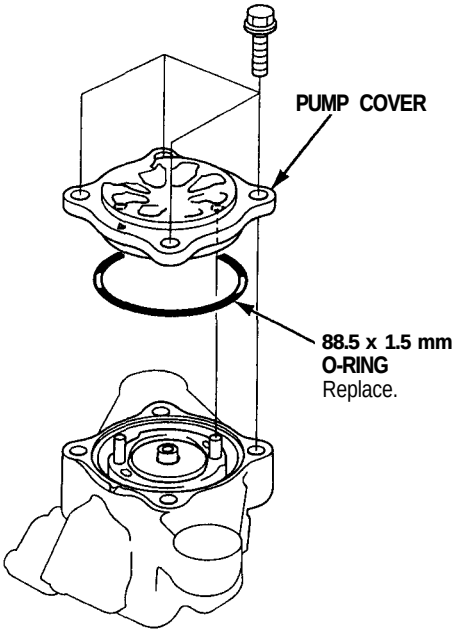
Pump Rotor Removal

CAUTION: The pump components are made of aluminum. Be careful not to damage them when servicing.

1. Remove the inlet joint and O-ring.



2. Remove the pump cover and O-ring.



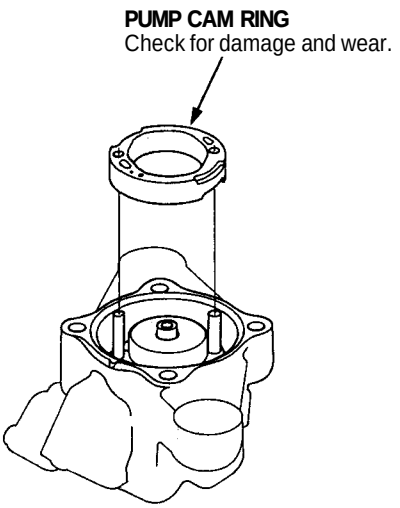
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Power Steering Pump

Disassembly (cont'd)

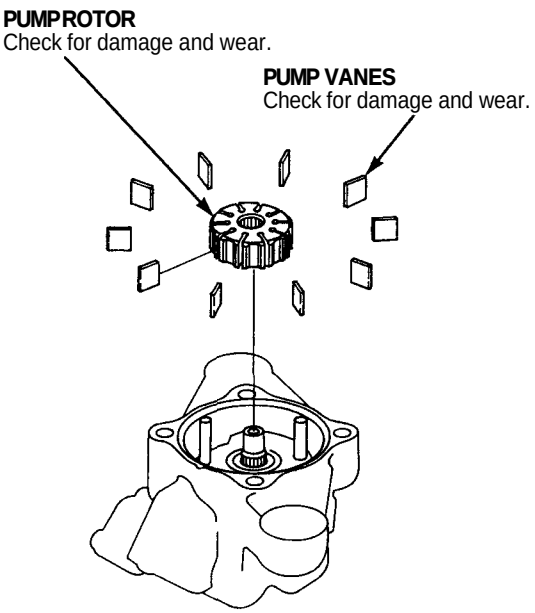
3. Remove the pump cam ring from the pump housing.

   NOTE: Replace the pump as an assembly if the cam ring must be replaced.



4. Remove the pump rotor and vanes.

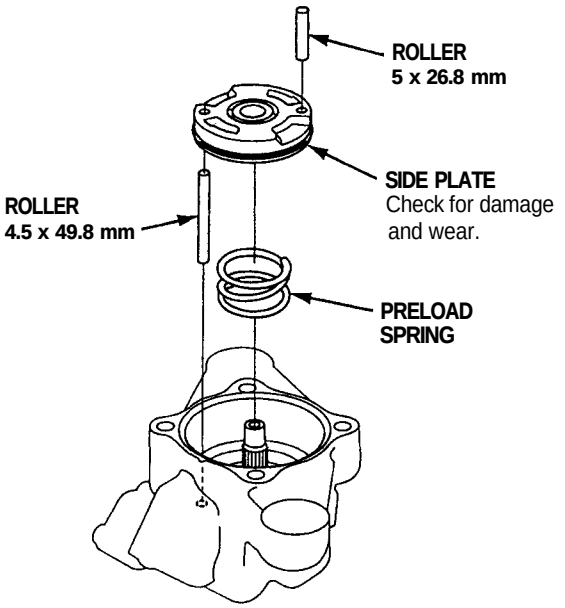
   NOTE: Replace the pump as an assembly if the pump rotor or vanes must be replaced.



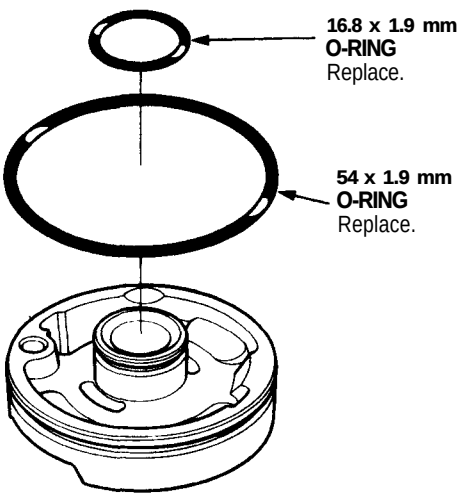
5. Remove the two rollers from the side plate.

6. Remove the side plate and preload spring.

   NOTE: Replace the pump as an assembly if the side plate must be replaced.



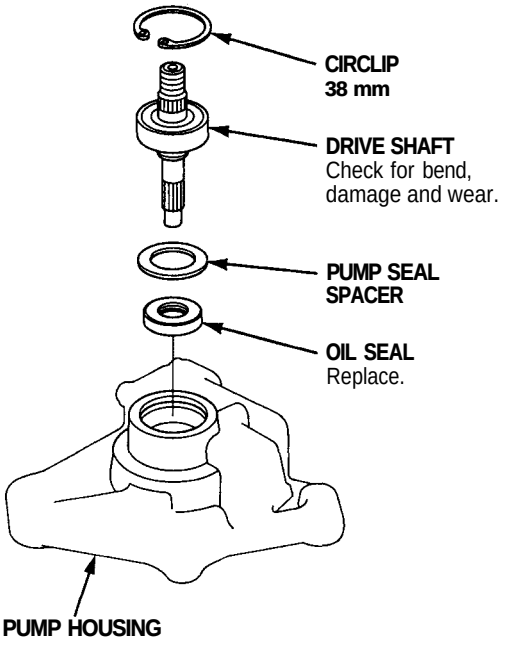
7. Remove the O-rings from the side plate.



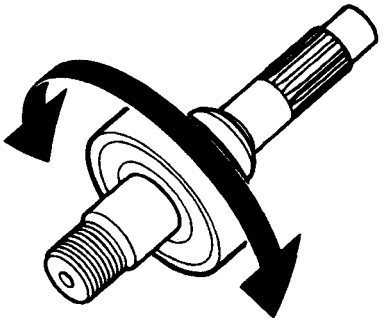
8. Remove the circlip, then remove the drive shaft assembly from the pump housing using a plastic hammer.

9. Remove the seal spacer and oil seal.

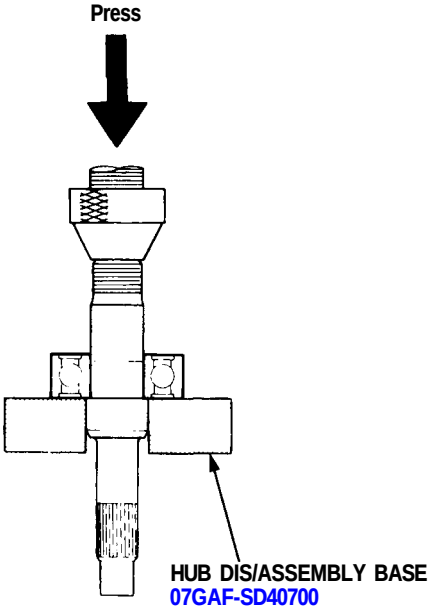
10. Inspect the pump housing for damage on the sealing surfaces.



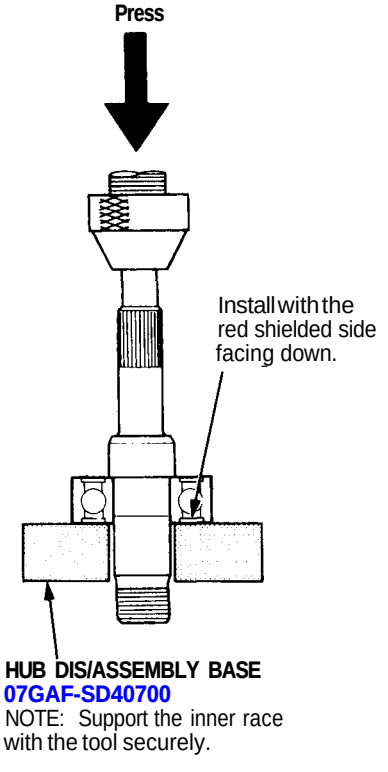
11. Inspect the bearing by rotating the outer race slowly. If any play or roughness is felt, replace the bearing.



12. Remove and discard the bearing using the special tool and a press.



13. Install the new bearing using the special tool and a press.

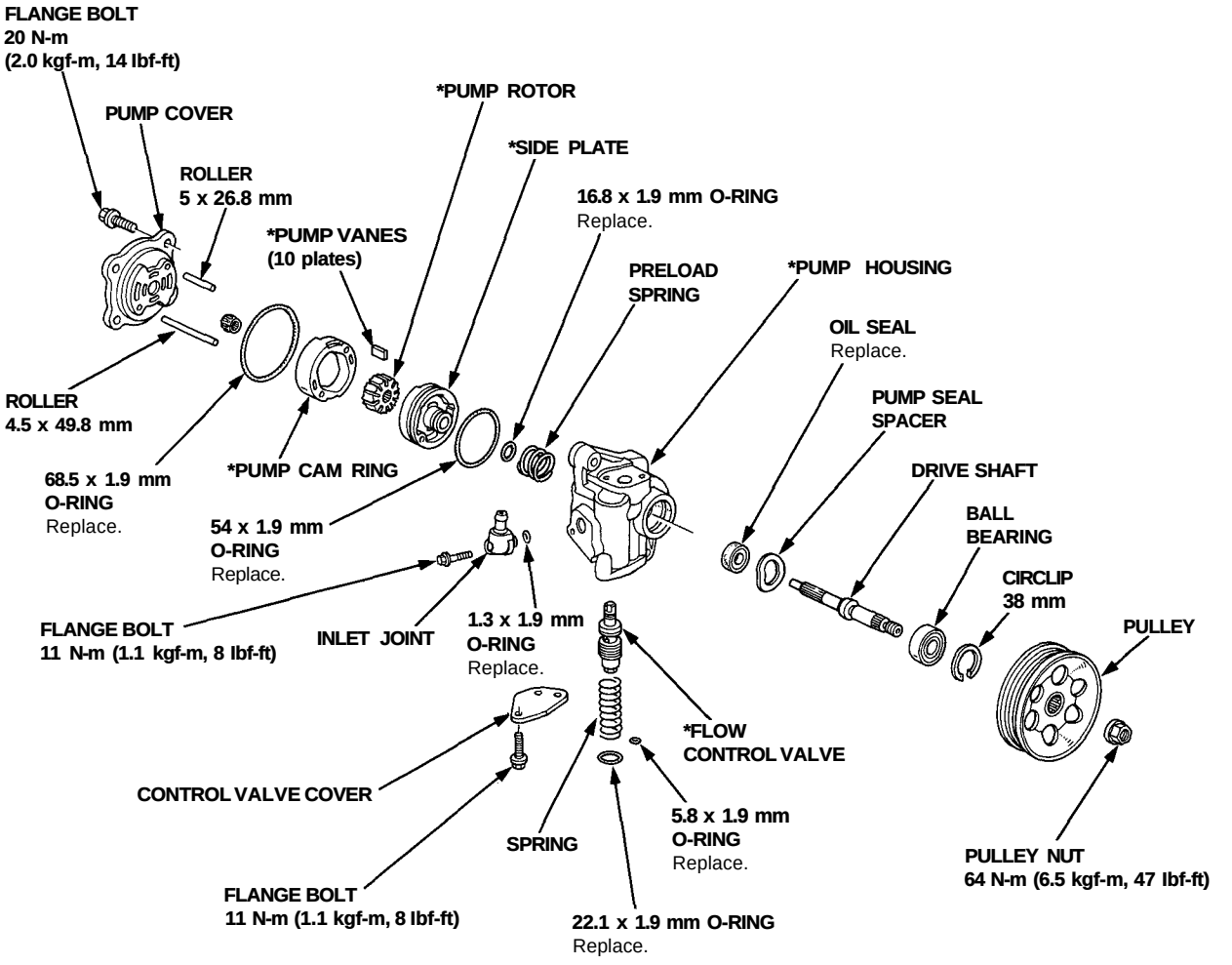


Power Steering Pump

Reassembly

CAUTION: The power steering components are made of aluminum. Avoid damaging the components during assembly.

NOTE:
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before reassembly.
- Apply recommended power steering fluid to the parts indicated in the reassembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Replace the pump as an assembly if the parts indicated with asterisk (*) are worn or damaged.

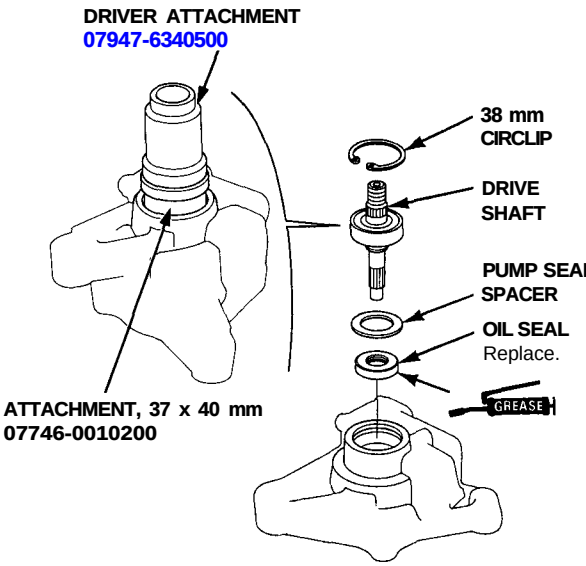


Pump Rotor Installation

1. Coat the lip of the new oil seal with steering grease.

2. Install the new oil seal in the pump housing by hand, then install the pump seal spacer.

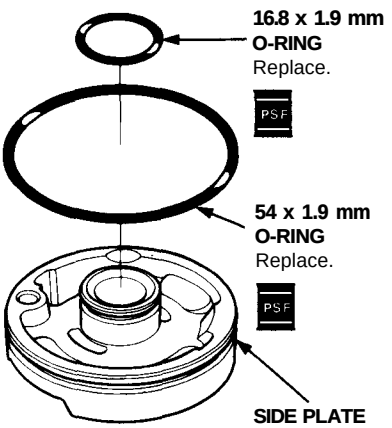
   NOTE: Insert the oil seal with its grooved side facing in.



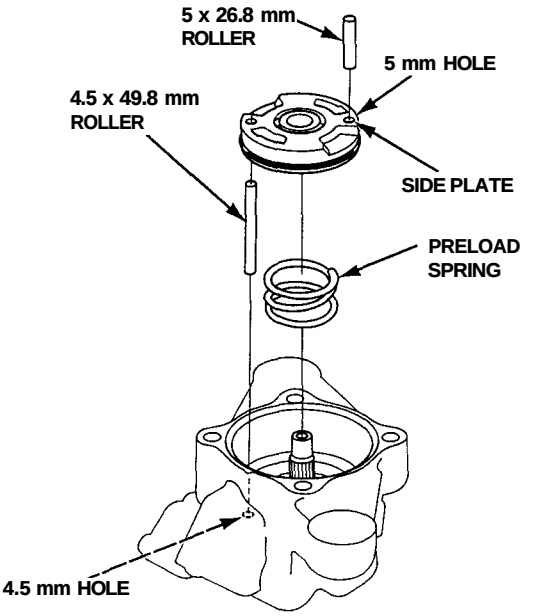
3. Install the pump drive shaft assembly with the special tool.

4. Install the 38 mm circlip with its radiused side facing out.

5. Coat the side plate grooves with the recommended power steering fluid, then position the 16.8 x 1.9 mm and 54 x 1.9 mm O-rings on the side plate.



6. Install the preload spring in the pump housing.



7. Set the 4.5 x 49.8 mm roller in the 4.5 mm hole in the pump housing.

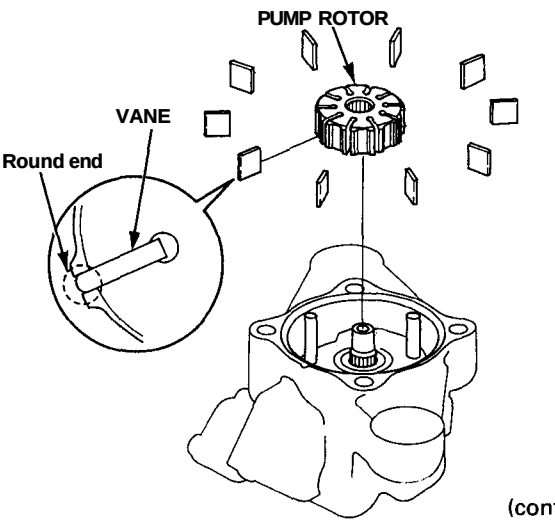
8. Set the side plate over the roller, then install it on the pump housing.

9. Set the 5 x 26.8 mm roller in the 5 mm hole in the side plate.

10. Assemble pump rotor to the drive shaft with the "°" mark on the rotor facing upward.

11. Set the 10 vanes in the grooves in the rotor.

    NOTE: Be sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.

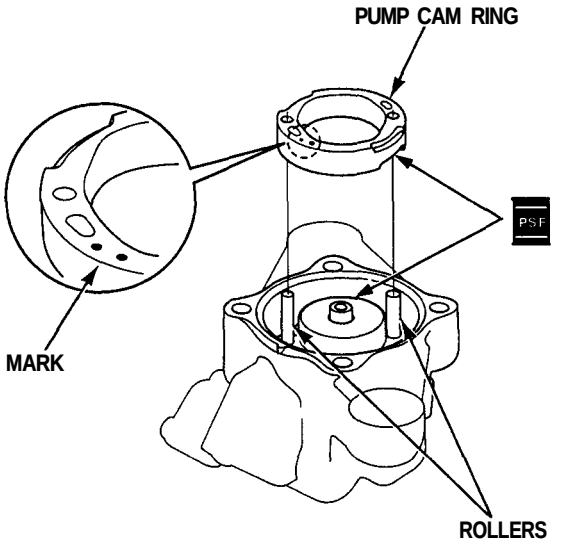


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Power Steering Pump

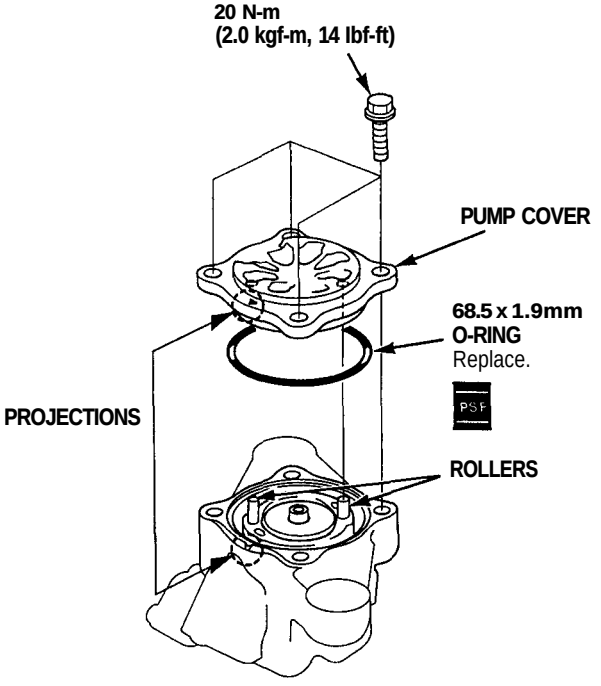
Reassembly (cont'd)

12. Set the pump cam ring over the two rollers with the "8" mark on the cam ring upward.



13. Apply clean power steering fluid to the vanes and cam ring.

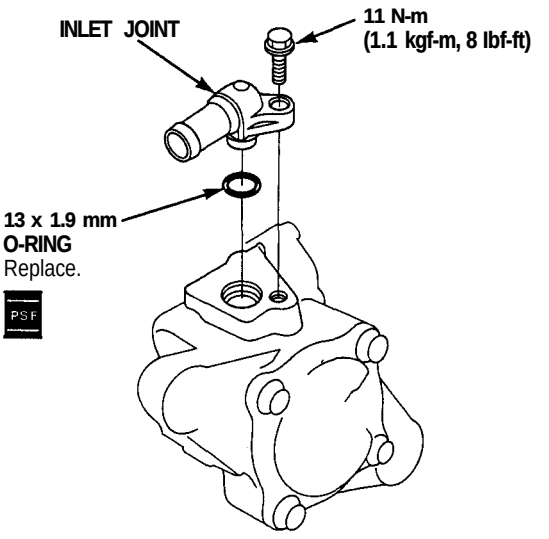
14. Install the 68.5 x 1.9 mm O-ring on the pump cover.



15. Align the roller set holes in the pump cover with the rollers.

16. Align the projection on the pump housing and the projection on the pump cover, then tighten the four bolts.

17. Set the 13 x 1.9 mm O-ring on the inlet joint.

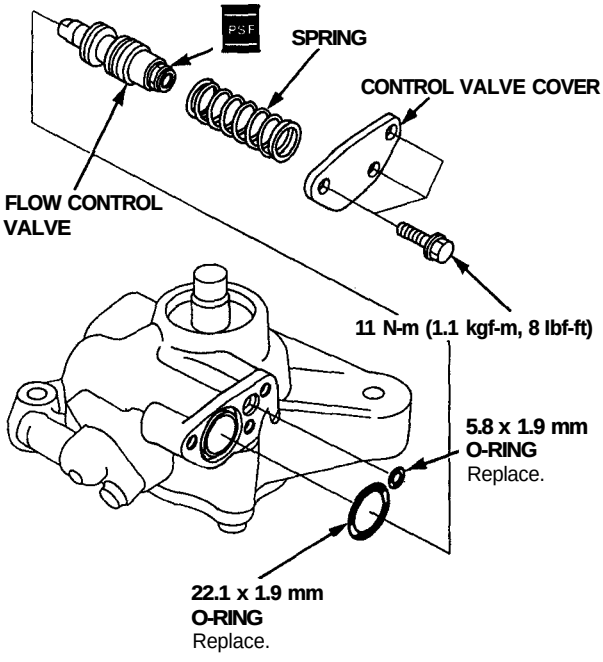


18. Install the inlet joint on the pump housing.

19. Rotate the pump drive shaft manually to make sure the pump drive shaft rotates smoothly.

Flow Control Valve Installation

1. Coat the new O-rings with clean power steering fluid, then install them in the housing grooves.



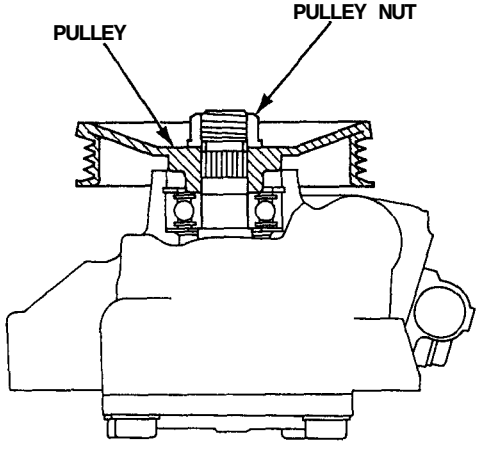
2. Coat the flow control valve with clean power steering fluid.
3. Install the flow control valve, spring and control valve cover on the pump housing.
4. Tighten the three control cover bolts.

Pulley Installation

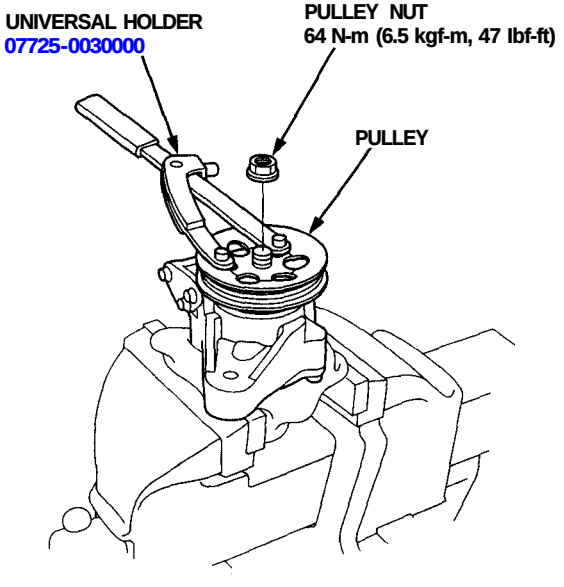
1. Hold the steering pump in a vise with soft jaws.

   CAUTION: Be careful not to damage the pump housing with the jaws of the vise.

2. Install the pump pulley as shown, then install the pulley nut.



3. Hold the pulley with the special tool, then tighten the pulley nut.



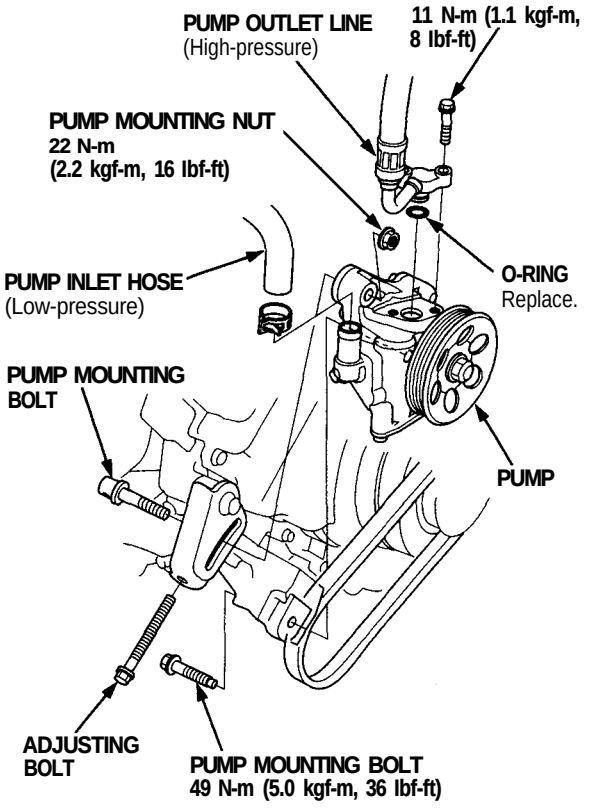
4. Check that the pump turns smoothly by turning the pulley.

Power Steering Pump

Installation

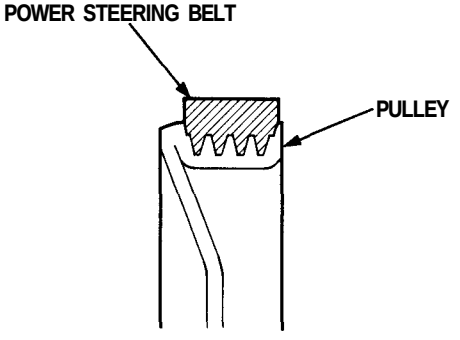
1. Connect the inlet hose and the outlet line. Tighten the pump fittings securely.

2. Loosely install the pump in the pump bracket with mounting bolts.



3. Install the pump belt.

CAUTION:
- **Make sure that the power steering belt is securely on the grooves of the pulleys.**
- **Do not get power steering fluid or grease on the power steering belt or pulley faces. Clean off any fluid or grease before installation.**



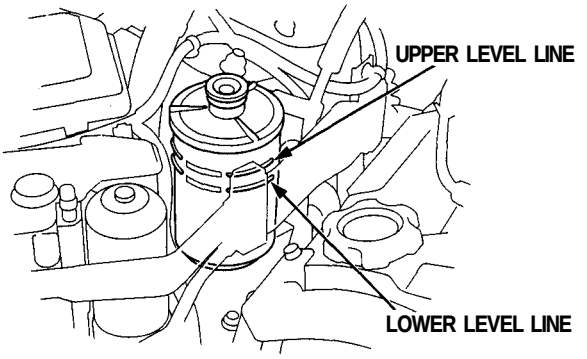
4. Adjust the pump belt (see page 17-23).

5. Fill the reservoir to the upper level line.

NOTE: Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.

CAUTION: Always use Genuine Honda Power Steering Fluid-V or S. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear and poor steering in cold weather.

SYSTEM CAPACITY:
1.3 liter (1.37 US.qt, 1.14 Imp.qt)
RESERVOIR CAPACITY:
0.5 liter (0.53 US.qt, 0.44 Imp.qt)



— Start the engine, let it run at idle, then turn the steering wheel lock-to-lock several times to bleed air from the system.

— Recheck the fluid level and add more if necessary.

CAUTION: Do not fill the reservoir beyond the upper level line.

Steering Gearbox

Removal

NOTE: Use solvent and a brush to wash off any oil and dirt from the valve body unit, its lines, and the end of the gearbox. Blow dry with compressed air.

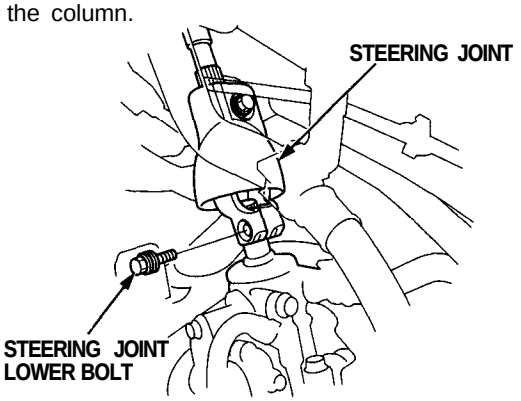
1. Drain the power steering fluid as described on page 17-24.

2. Raise the front of vehicle, and support it on safety stands in the proper locations, (see section 1)

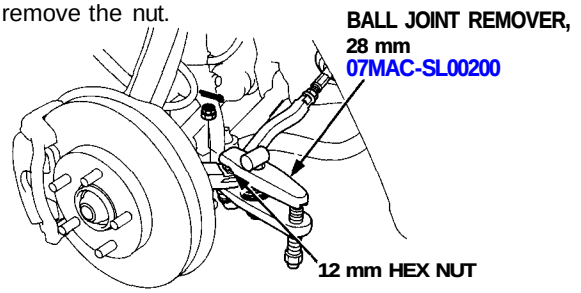
3. Remove the front wheels.

4. Remove the driver's airbag assembly and steering wheel (see page 17-27).

5. Remove the steering joint lower bolt from the engine compartment, and move the joint toward the column.



6. Remove the cotter pin from the castle nut, and remove the nut.



7. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the special tool.

   NOTE: Remove the ball joint using the Ball Joint Remover, 28 mm (07MAC-SL00200). Refer to page 18-12 for how to use the ball joint remover.

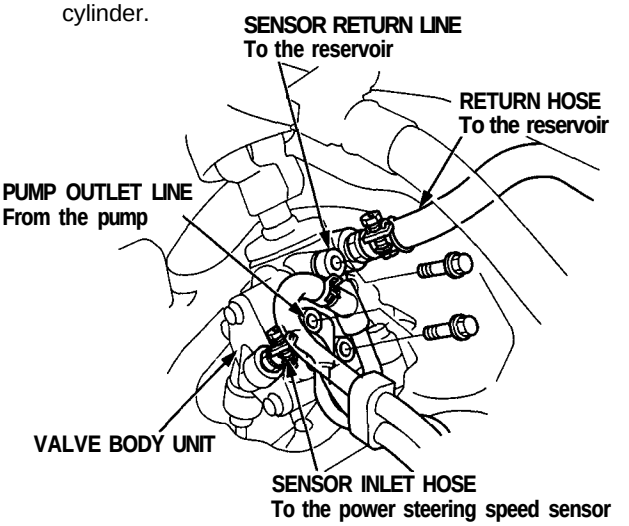
8. Separate the tie-rod ball joint and knuckle using the special tool.

   CAUTION: Avoid damaging the ball joint boot.

9. Disconnect the two lines and two hoses from the valve body unit on the steering gearbox.

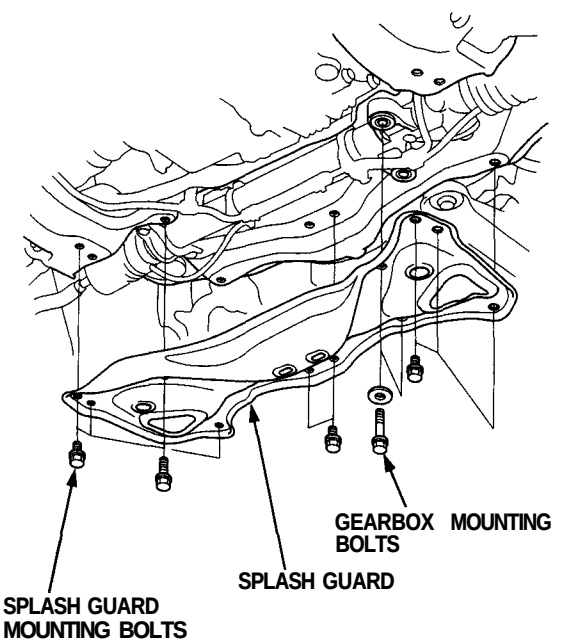
   CAUTION: After disconnecting the hose and line, plug or seal the hose and line with the piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

   NOTE: It is not necessary to loosen the cylinder lines A and B between the valve body unit and the cylinder.



10. Remove the splash guard.

    NOTE: Some splash guard mounting bolts are also used as gearbox mounting bolts. The gearbox will tilt to the side when these bolts are removed.

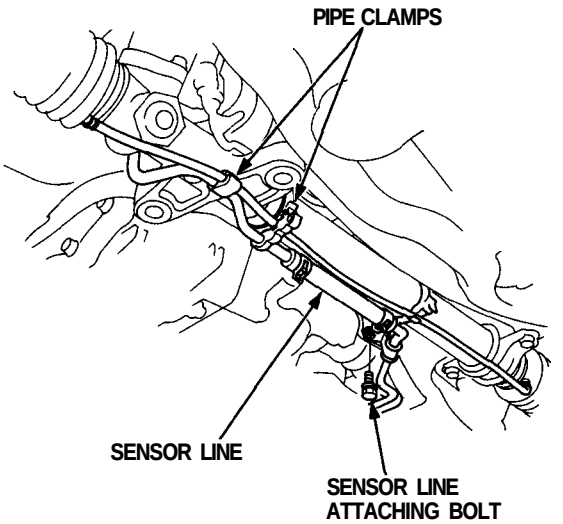


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Steering Gearbox

Removal (cont'd)

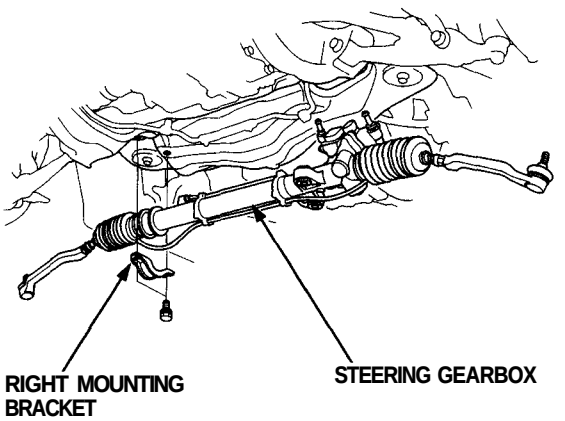
11. Unlock the pipe clamps, and remove the sensor line from the rear beam.



12. Remove the right mounting bracket and steering gearbox.

NOTE: Before removing the gearbox, place a jack stand under the gearbox.

CAUTION: Be careful not to bend or damage the cylinder lines A and B when removing the steering gearbox.



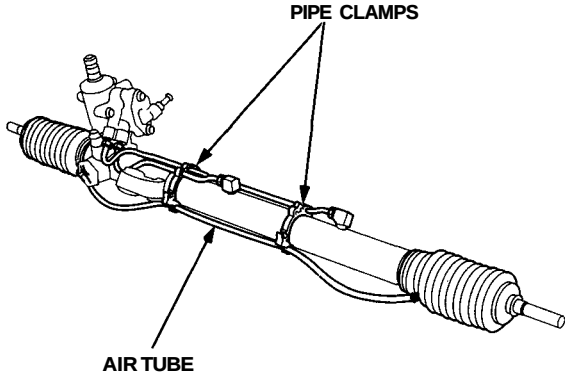
Disassembly

Steering Rack Disassembly

NOTE:
- Before disassembling the steering gearbox, wash it off with solvent and a brush.
- Do not dip seals and O-rings in solvent.

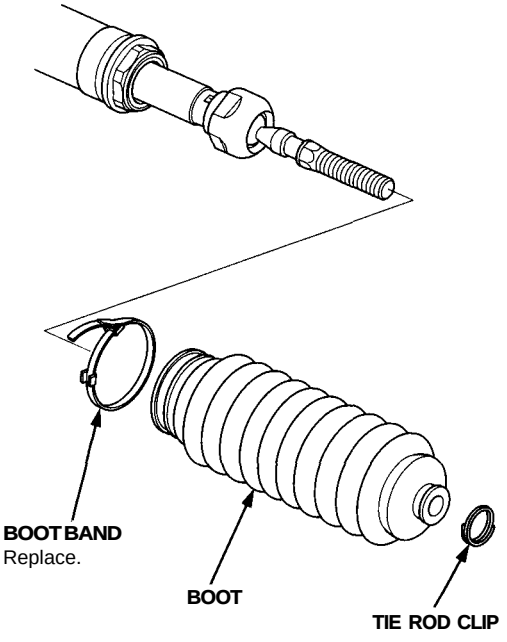
1. Remove the steering gearbox (see page 17-47).

2. Remove the air tube and pipe clamps.



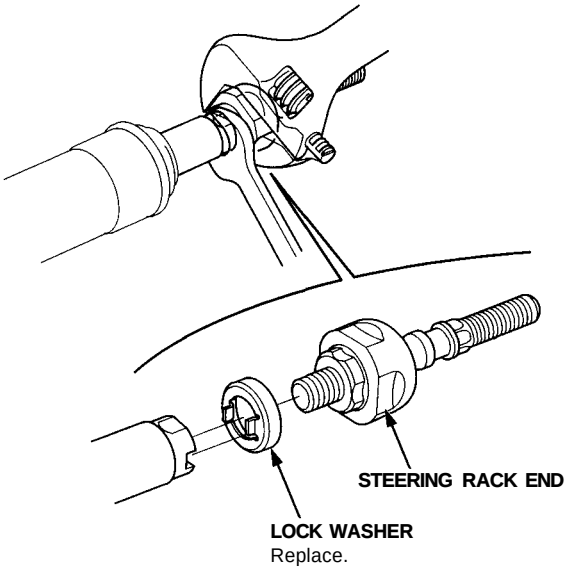
3. Remove the tie-rod end and locknut.

4. Remove the boot bands and tie-rod clips. Pull the boots away from the ends of the gearbox.



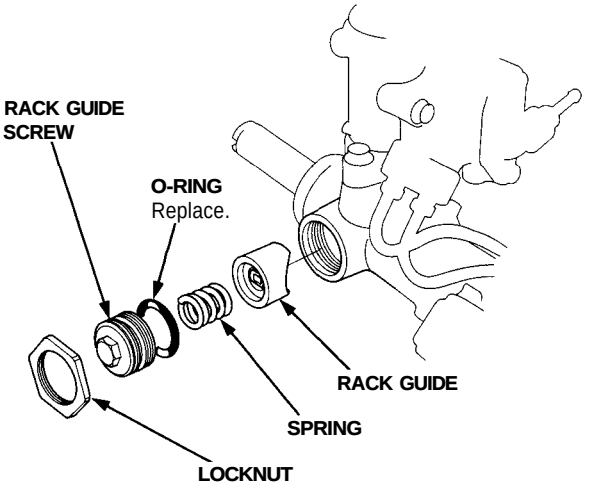
5. Hold the steering rack with a wrench, and unscrew the rack end with another.

CAUTION: Be careful not to damage the rack surface with the a wrench.



6. Loosen the locknut and remove the rack guide screw.

7. Remove the spring and rack guide from the gearbox housing.

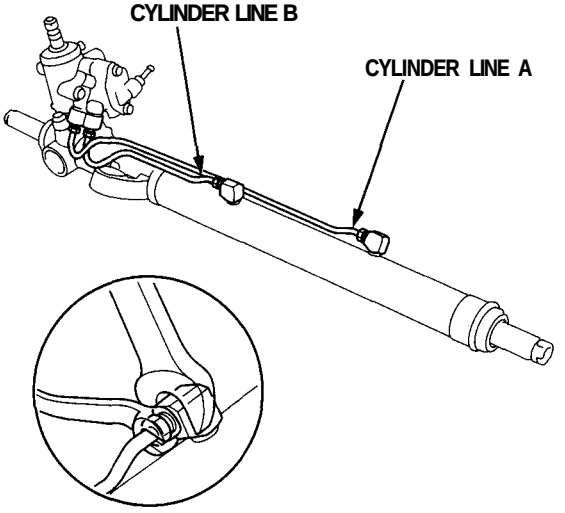


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Steering Gearbox

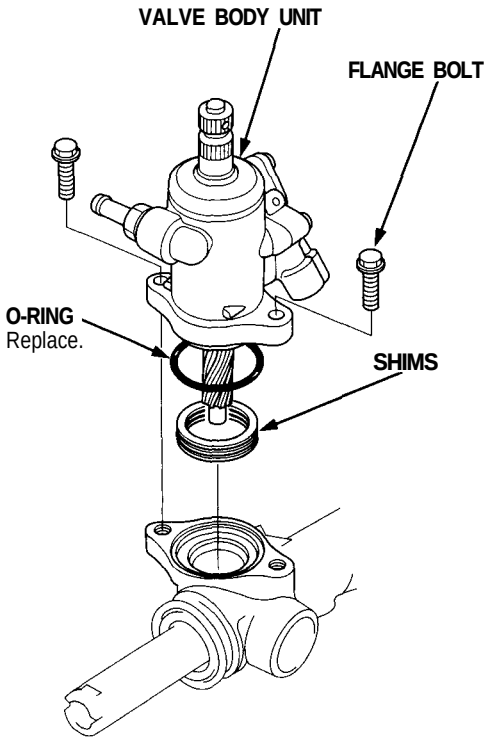
Disassembly (cont'd)

8. Remove the cylinder lines A and B from the gearbox.



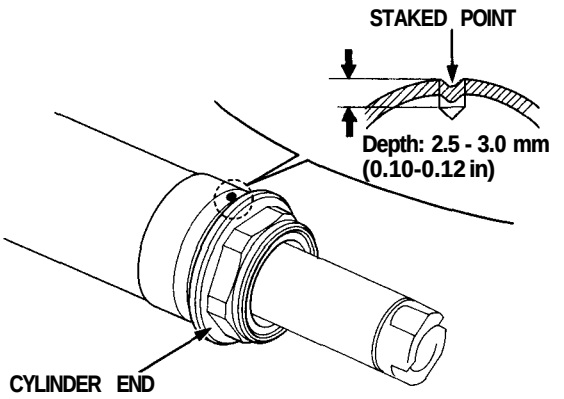
9. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.

10. Remove the two flange bolts, then remove the valve body unit from the gearbox. (See page 17-52 for valve body unit disassembly.)



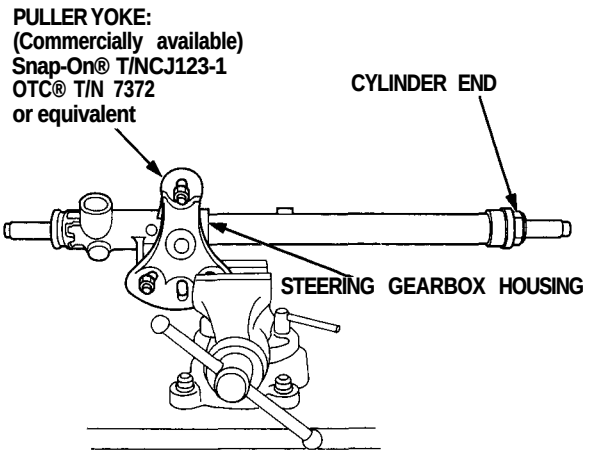
11. Drill a 3 mm (0.12 in) diameter hole approximately 2.5 - 3.0 mm (0.10 - 0.12 in) in depth in the staked-point on the cylinder.

NOTE:
- Do not allow metal shavings to enter the cylinder housing.
- After removing the cylinder end, remove any burrs at the stake point.



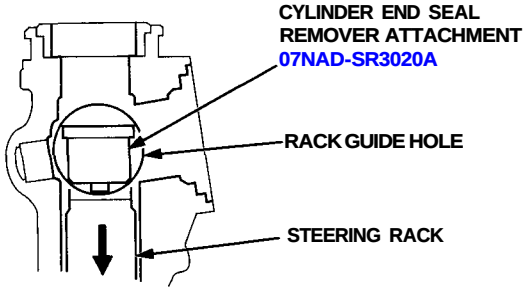
12. Install the special tool to the steering gearbox housing. Clamp the special tool in a vise with soft jaws as shown, then loosen and remove the cylinder end.

CAUTION: Do not clamp the cylinder housing.



13. Set the steering gearbox in a press so the gearbox housing points upward.

14. Pull the steering rack away from the gearbox housing, then insert the special tool into the rack guide hole as shown.

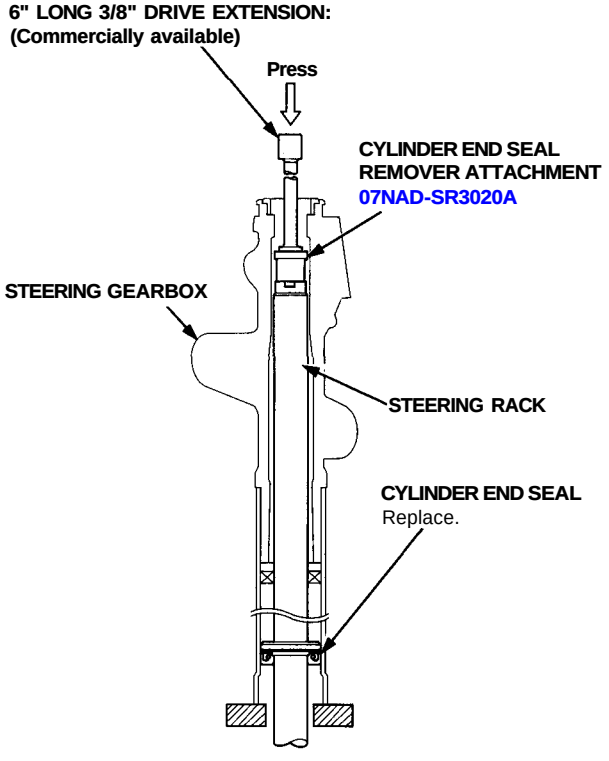


15. Insert a 6" long, 3/8" drive extension into the special tool.

16. Press the cylinder end seal and steering rack out of the gearbox.

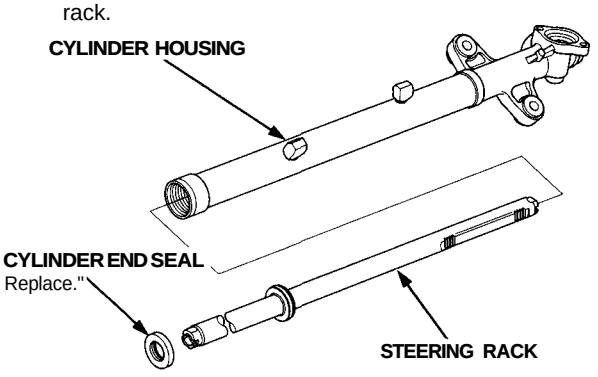
NOTE: Hold the steering rack to keep it from falling when pressed clear.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with the tools.



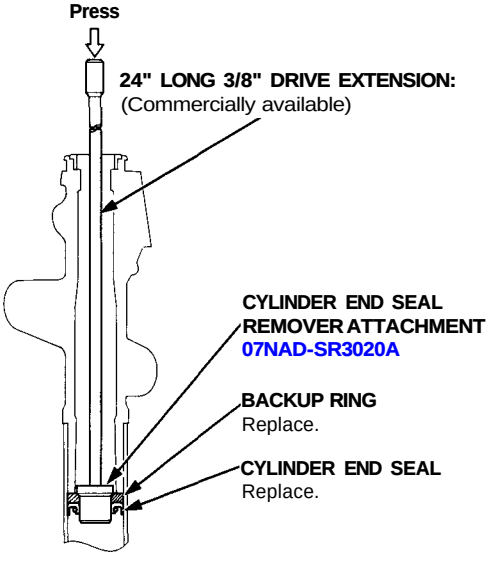
17. Remove the tools from the steering rack.

18. Remove the cylinder end seal from the steering rack.



19. Insert a 24" long, 3/8" drive extension and the special tool into the cylinder from the gearbox side.

CAUTION: Be careful not to damage the inside surface of the housing with the tools.



20. Set the steering gearbox in a press, then press out the cylinder end seal and backup ring from the gearbox.

CAUTION:

- **Keep the tool straight to avoid damaging the cylinder wall. Check the tool angle, and correct it if necessary, when removing the cylinder end seal.**
- **Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the tool. It will break the backup ring, and the cylinder end seal will remain in the gearbox.**

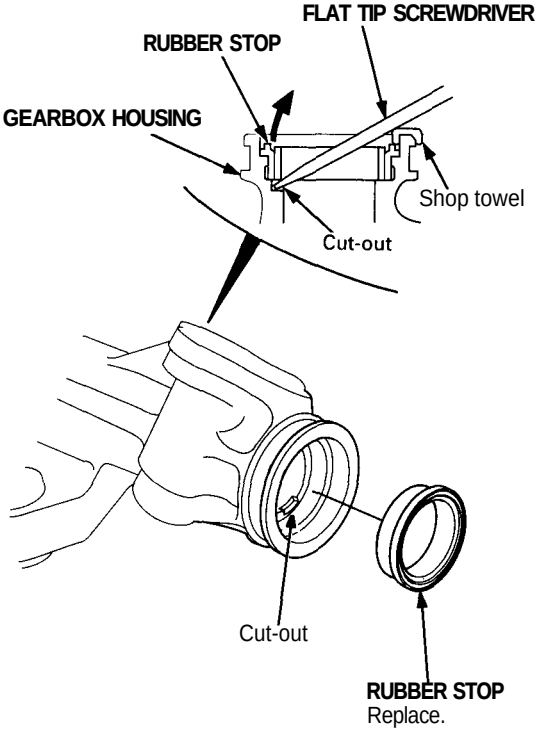
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Steering Gearbox

Disassembly (cont'd)

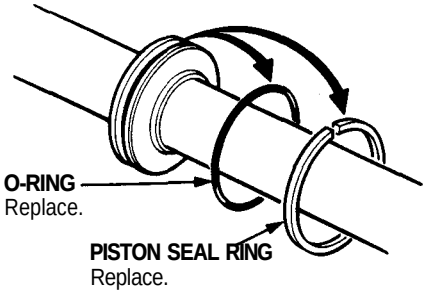
21. Check the rubber stop for damage or deterioration if OK, go on step 22; if not, replace the rubber stop, step as shown below:
Remove the rubber stop by prying it out of the gearbox housing with a flat tip screwdriver.

CAUTION: Protect the pry point on the gearbox housing with shop towel.



22. Carefully pry the piston seal ring and O-ring off the rack piston.

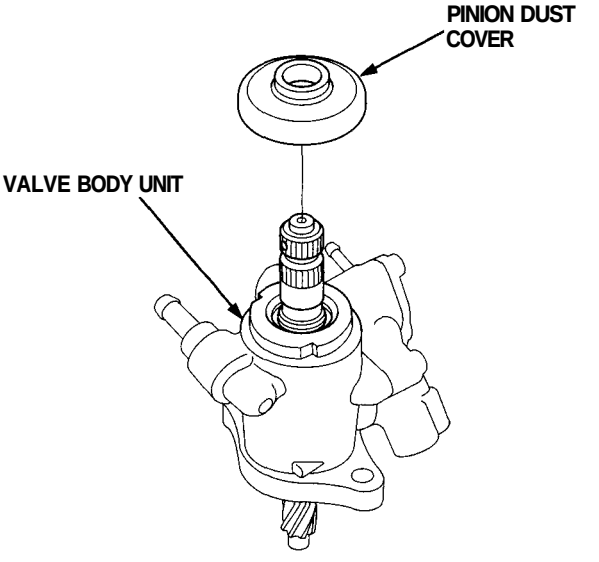
CAUTION: Be careful not to damage the inside of seal ring groove and piston edges when removing the seal ring.



Valve Body Unit Disassembly

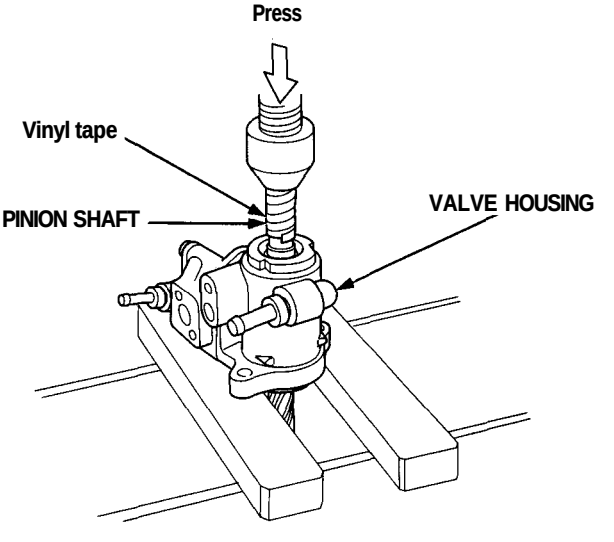
Valve body unit:

23. Remove the pinion dust cover.



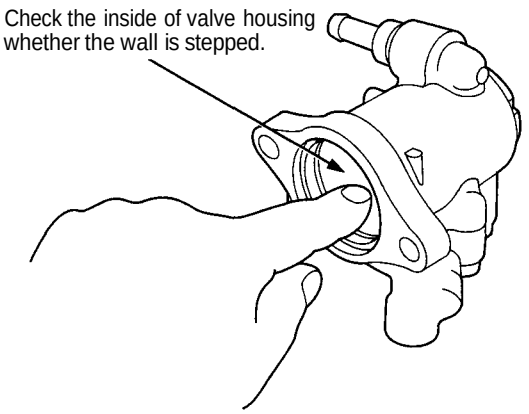
24. Before removing the valve housing, apply vinyl tape to splines of the pinion shaft.

25. Separate the valve housing from the pinion shaft/ valve using a press.



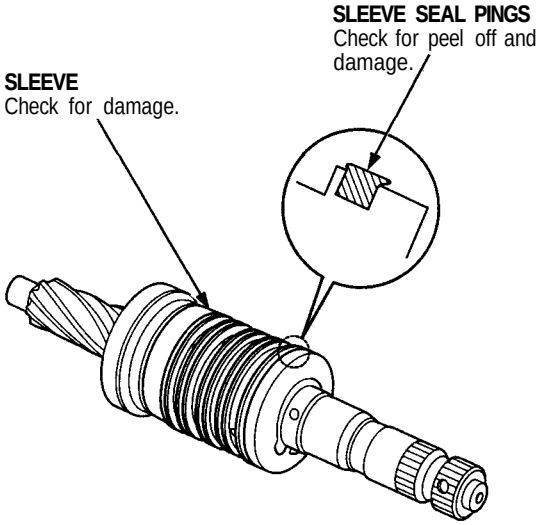
26. Check the inner wall of the valve housing where the seal ring slides with your finger. If there is a step in the wall, the valve housing is worn. Replace the valve housing.

    NOTE:
    - There may be the sliding marks from the seal ring on the wall of the valve housing. Replace the valve housing only if the wall is stepped.
    - When the valve housing is replaced, install new 32 mm shim(s) on the bearing surface of the housing to adjust the thickness.

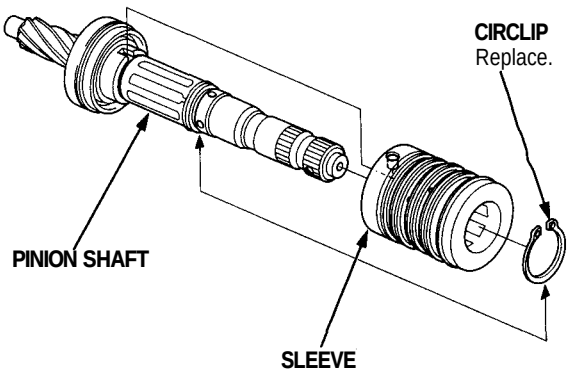


27. Check for wear, burrs and other damage to the edges of the grooves in the sleeve.

    NOTE: The pinion shaft and sleeve are a precision matched set. If either the pinion shaft or sleeve must be replaced, replace both parts as a set.

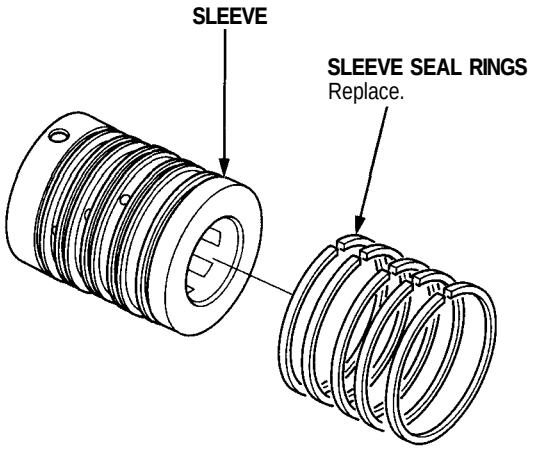


28. Remove the circlip and pinion shaft sleeve from the pinion shaft.



29. Using a cutter or an equivalent tool, cut and remove the four seal rings from the sleeve.

    CAUTION: Be careful not to damage the edges of the sleeve grooves and outer surface when removing the seal rings.



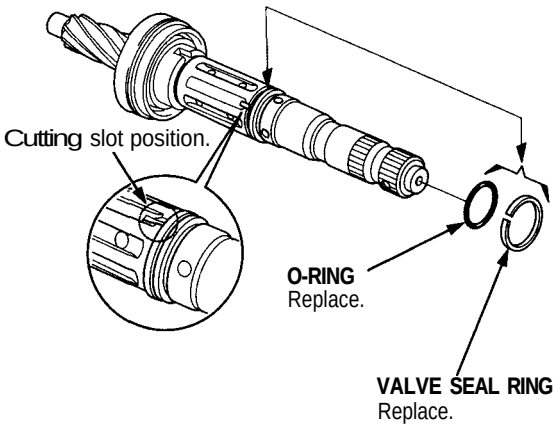
(cont'd)

Steering Gearbox

Disassembly (cont'd)

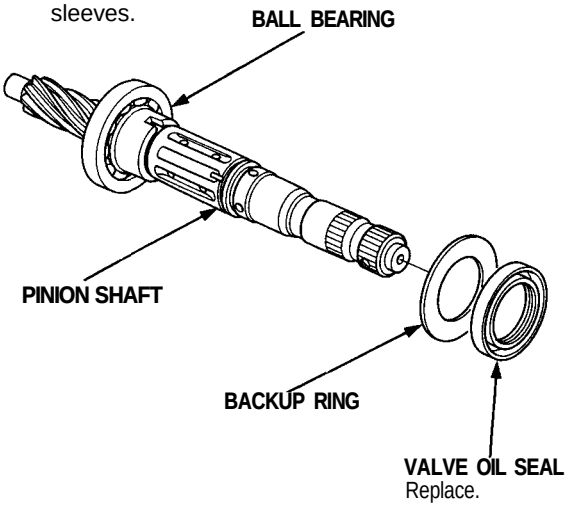
30. Using a cutter or an equivalent tool, cut the valve seal ring and O-ring at the groove the pinion shaft. Remove the valve seal ring and O-ring.

CAUTION: Be careful not to damage the edges of the pinion shaft groove and outer surface when removing the valve seal ring and O-ring.

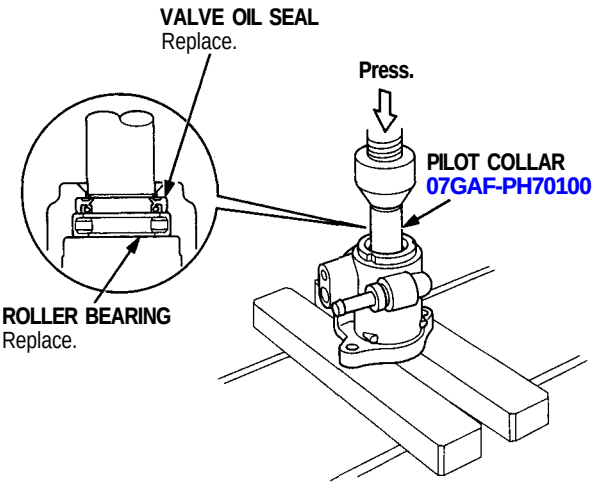


31. Remove the valve oil seal and backup ring from the pinion shaft.

NOTE:
- Inspect the ball bearing by rotating the outer race slowly. If there is any excessive play, replace the pinion shaft and sleeve as an assembly.
- The pinion shaft and sleeve are a precise fit; do not intermix old and new pinion shafts and sleeves.



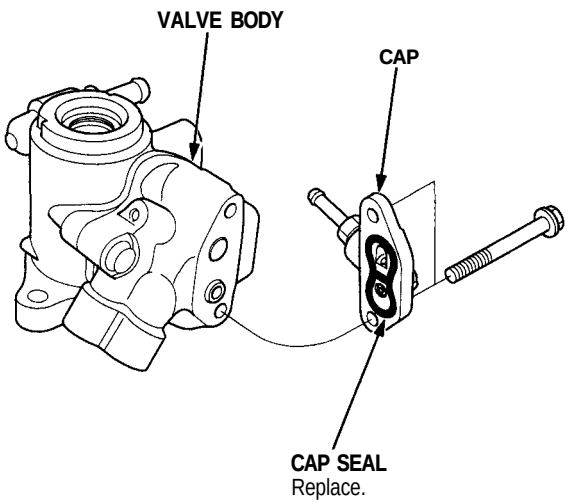
32. Press the valve oil seal and roller bearing out of the valve housing using a hydraulic press and the special tool shown below.



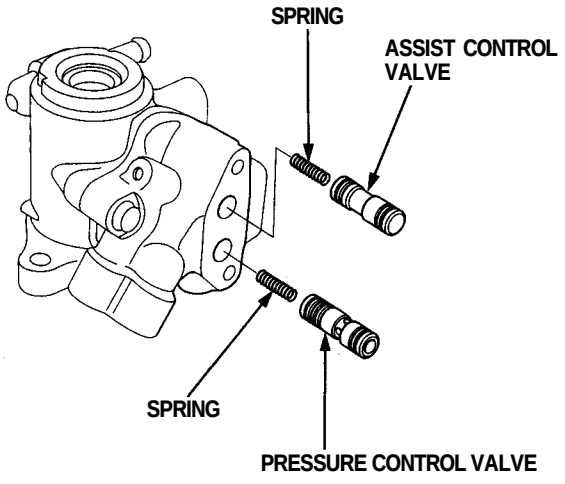
Assist control valve unit:

33. Remove the cap from the valve body.

34. Remove the cap seal from the cap.



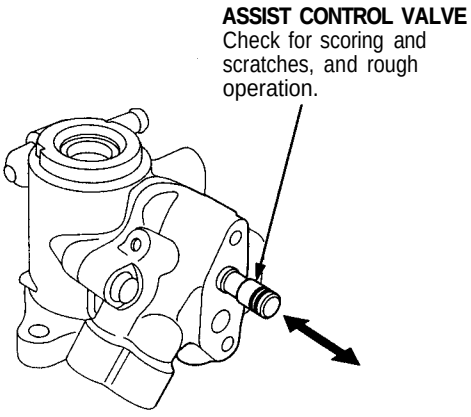
35. Remove the pressure control valve, assist control valve and springs from the valve body.



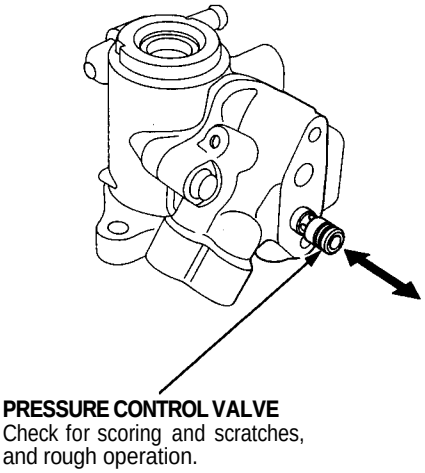
36. Check the two control valves.

NOTE: If the valves are damaged, replace the steering gearbox as an assembly.

Assist Control Valve:
- Inspect its surface for scoring and scratches.
- Slip it back into the valve body unit, and make sure it slides smoothly without drag or side play.

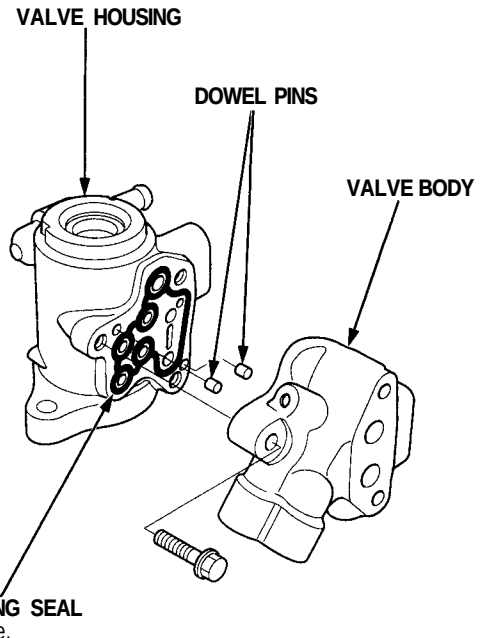


Pressure Control Valve:
- Inspect its surface for scoring and scratches.
- Slip it back into the valve body unit, and make sure it slides smoothly without drag or side play



37. Separate the valve body and valve housing.

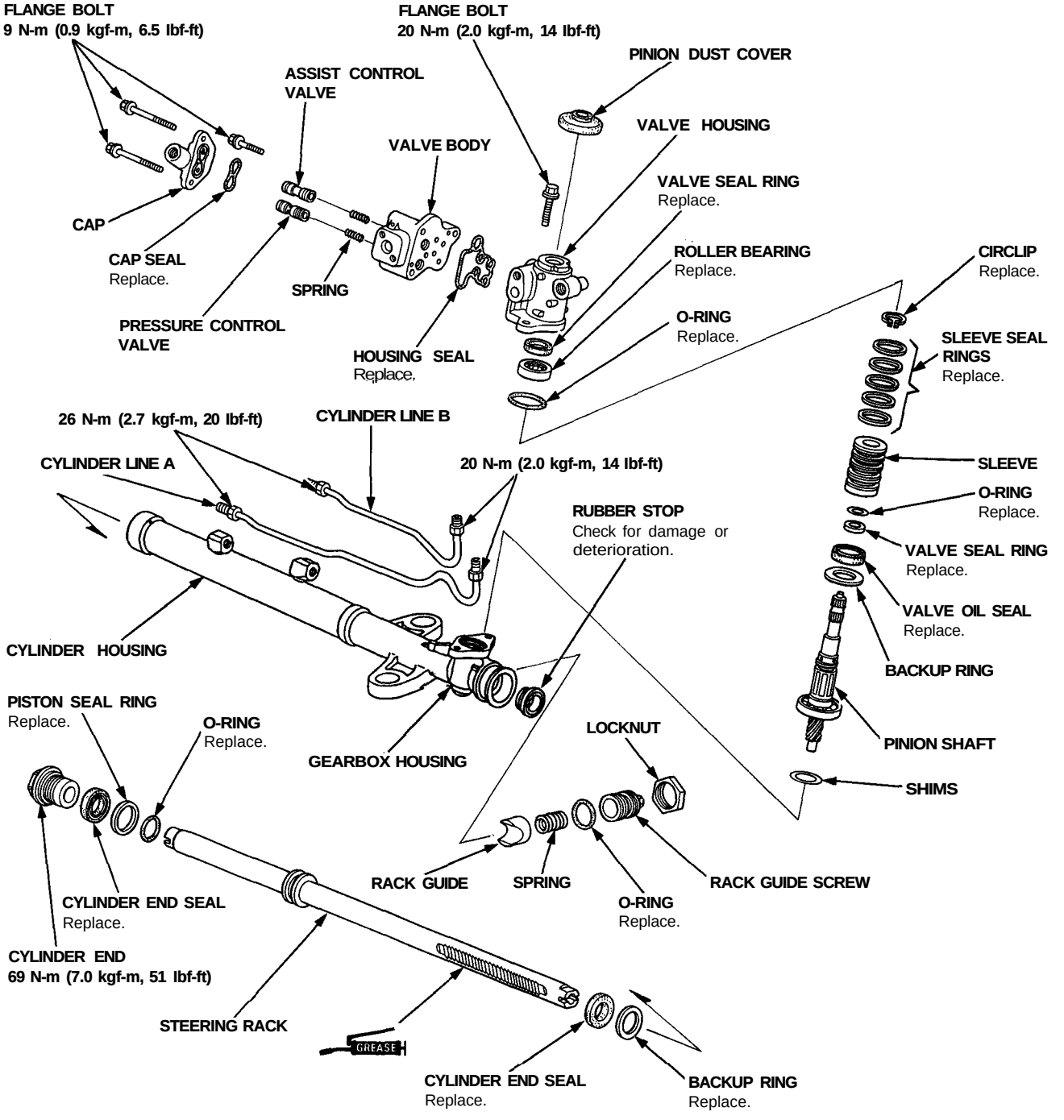
38. Remove the housing seal and dowel pins from the valve body unit.



Steering Gearbox

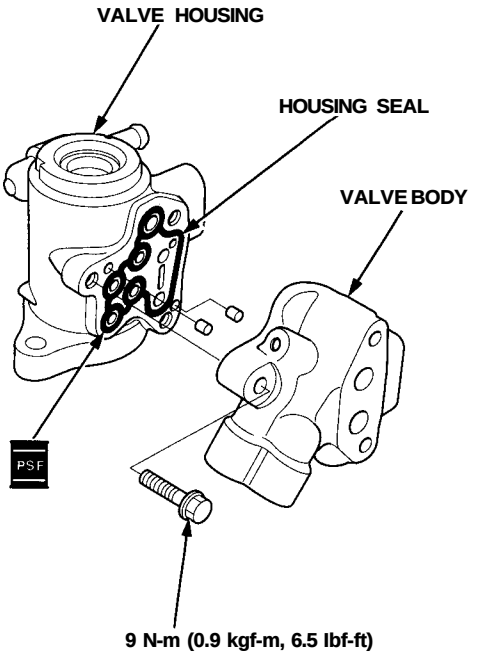
Reassembly

NOTE:
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply the recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Use the appropriate special tools where necessary.



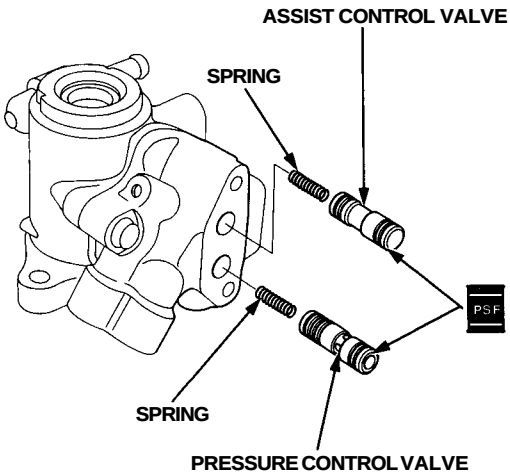
Valve Body Unit Reassembly
Assist control valve unit:

1. Coat the housing seal with power steering fluid, and install it in the groove of the valve housing. Then install the valve body.



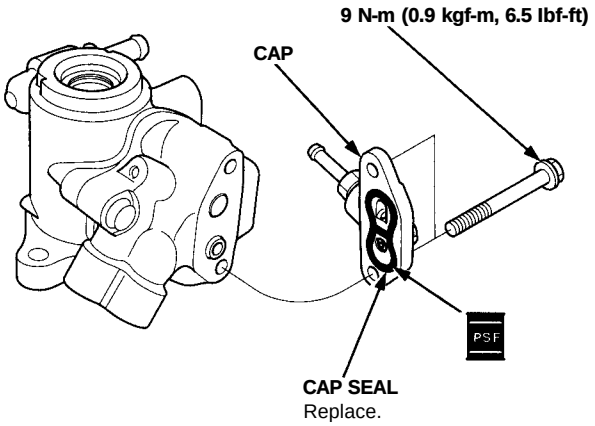
2. Install the valve springs.

3. Coat the pressure control valve and assist control valve with power steering fluid, then install them into the valve body.



4. Coat the cap seal with power steering fluid, and install the it in the groove of the cap.

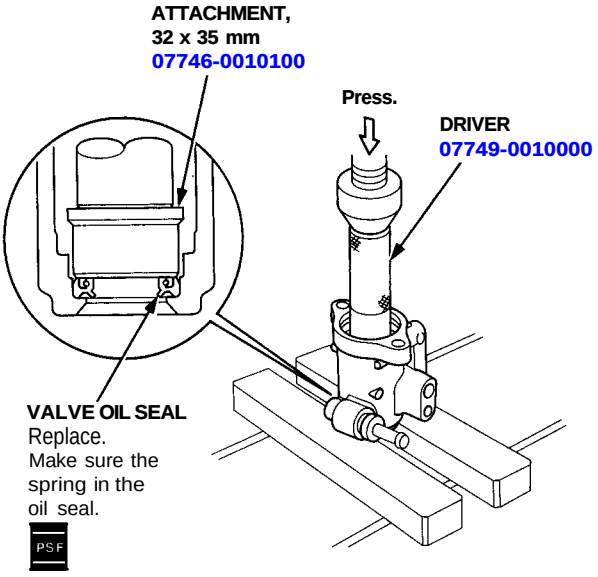
5. Install the cap on the valve body.



Valve body unit:

6. Apply power steering fluid to the seal ring lip of the valve oil seal, then install the seal in the valve housing using a hydraulic press and the special tools as shown.

CAUTION: Install the valve oil seal with its grooved side facing the tool.



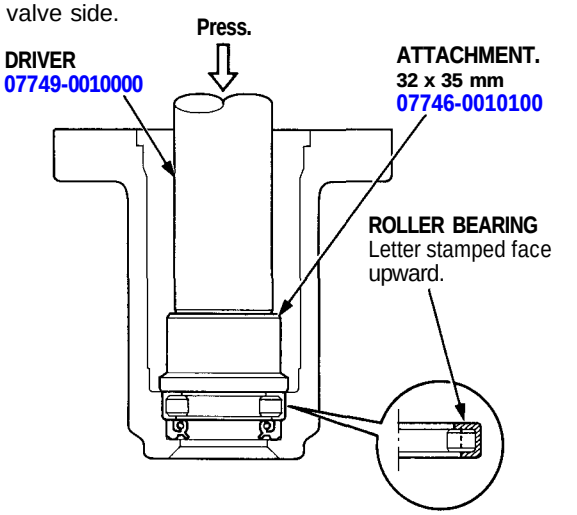
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Steering Gearbox

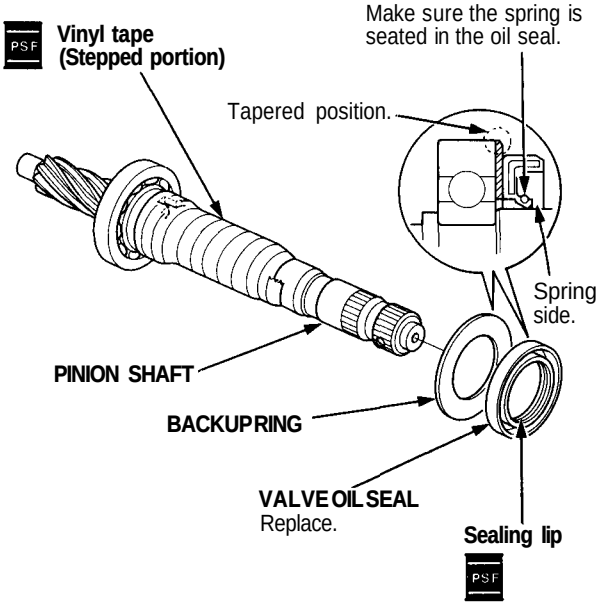
Reassembly (cont'd)

7. Press the new roller bearing into the valve housing using a hydraulic press and the special tools as shown.

   NOTE: Place the roller bearing on the valve housing with the stamped letter facing up towards the valve side.



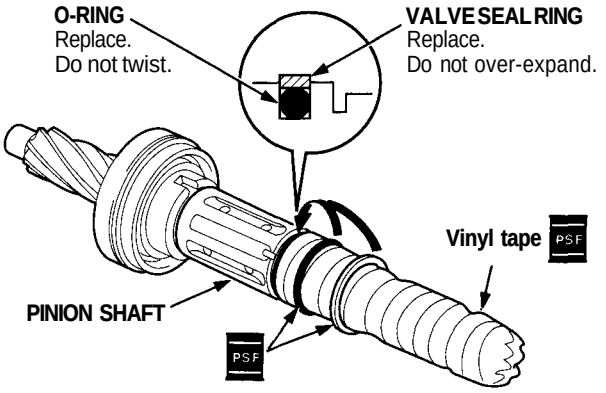
8. Apply vinyl tape to the stepped portion of the pinion shaft, and coat the surface of the vinyl tape with the power steering fluid.



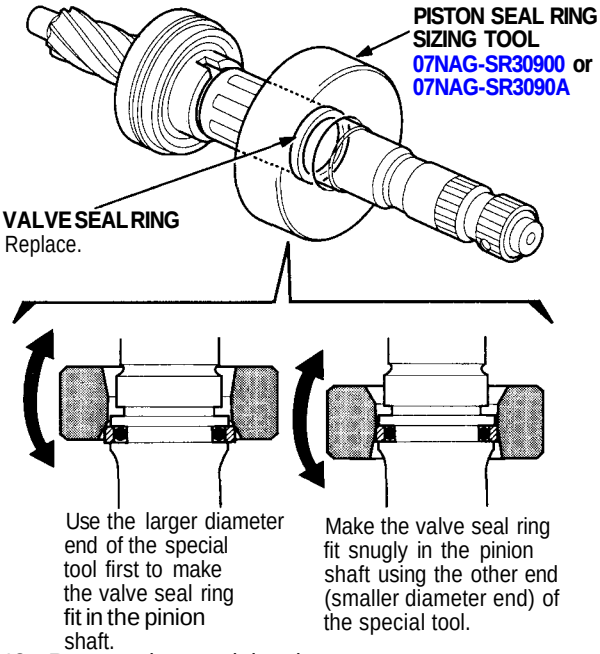
9. Install the backup ring with its tapered side as shown below.
10. Coat the inside surface of the new valve oil seal with power steering fluid.
11. Slide the valve oil seal over the pinion shaft, being careful not to damage the sealing lip.

CAUTION: Install the valve oil seal with the spring side facing opposite the bearing.

12. Apply vinyl tape to the spines and stepped portion of the shaft, and coat the surface of the vinyl tape with the power steering fluid.



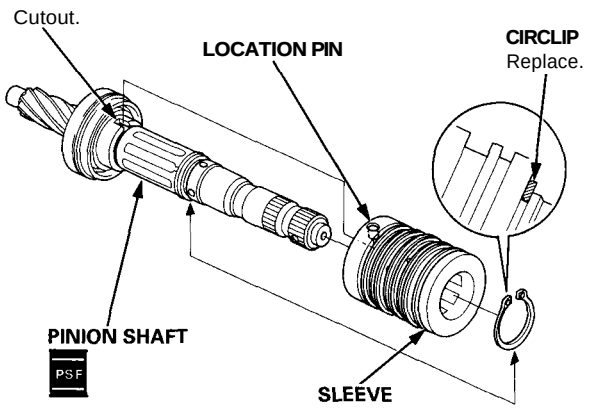
13. Fit the new O-ring in the groove of the pinion shaft. Then slide the new valve seal ring over the shaft and the groove in on the pinion shaft.
14. Remove the vinyl tape from the pinion shaft.
15. Apply power steering fluid to the surface of the valve seal ring that was installed on the pinion shaft.
16. Apply power steering fluid to the inside of the special tool. Set the larger diameter end of the special tool over the valve seal ring.
17. Move the special tool up and down several times to make the valve seal ring fit in the pinion shaft.



18. Remove the special tool.
19. Turn the special tool over, and set the smaller diameter end of the special tool over the valve seal ring. Move the special tool up and down several times to make the valve seal ring fit snugly in the pinion shaft.

20. Apply power steering fluid to the surface of the pinion shaft. Assemble the sleeve over the pinion shaft by aligning the locating pin on the inside of the sleeve with the cutout in the shaft. Then install the new circlip securely in the pinion shaft groove.

NOTE:
- Be careful not to damage the valve seal ring when inserting the sleeve.
- Install the circlip with its radiused side facing out.

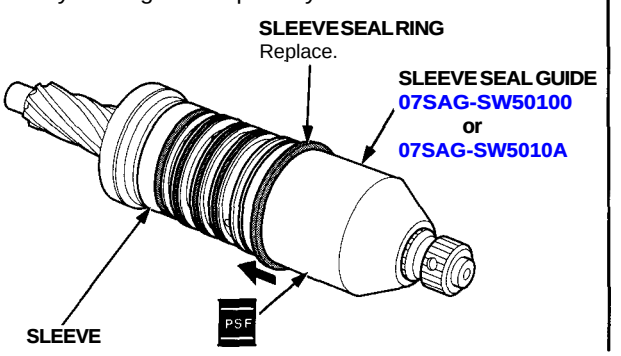


21. Apply power steering fluid to the surface of the special tool. Set the new seal rings over the special tool from the smaller diameter end of the tool, and expand the seal rings.

NOTE:
- Do not over-expand the seal ring. Install the resin seal rings with care so *as* not to damage them. After installation, be sure to contract the seal rings using the special tool (sizing tool).
- There are two types of sleeve seal rings: black and brown. Do not mix the different types of sleeve seal rings as they are not compatible.

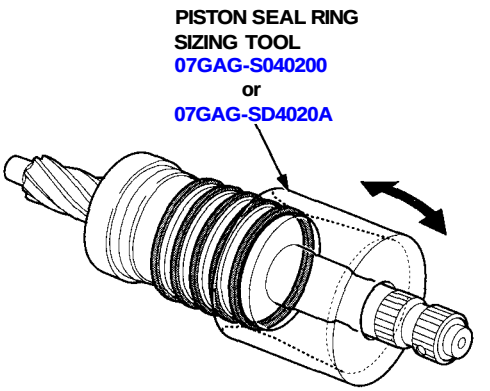
22. Set the special tool in the grooves in the sleeve, and set each ring in each groove securely.

NOTE: After installation, compress the seal rings with your fingers temporarily.



23. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the special tool.
24. Insert the sleeve into the special tool slowly.
25. Move the sleeve each direction several times to make the seal rings snugly fit in the sleeve.

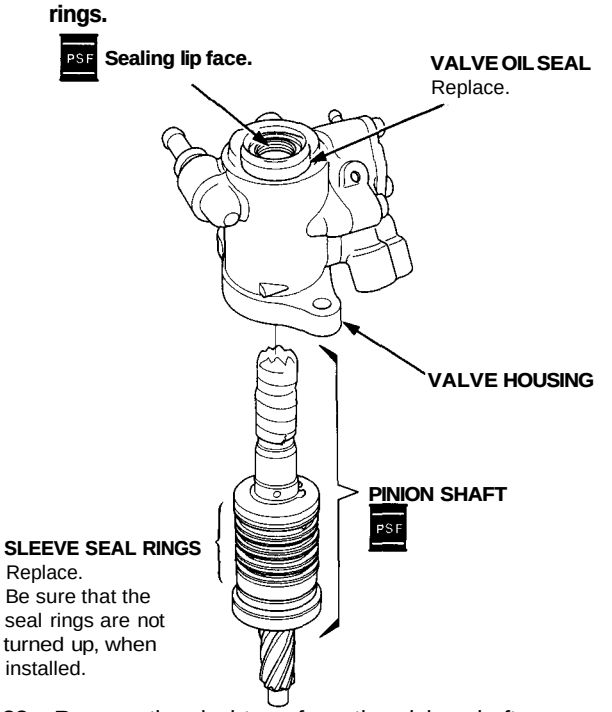
NOTE: Be sure that the seal rings are not turned up.



26. Apply vinyl tape to the pinion shaft, then coat the vinyl tape with power steering fluid.

27. Insert the pinion shaft into the valve housing.

CAUTION: Be careful not to damage the valve seal rings.



28. Remove the vinyl tape from the pinion shaft.

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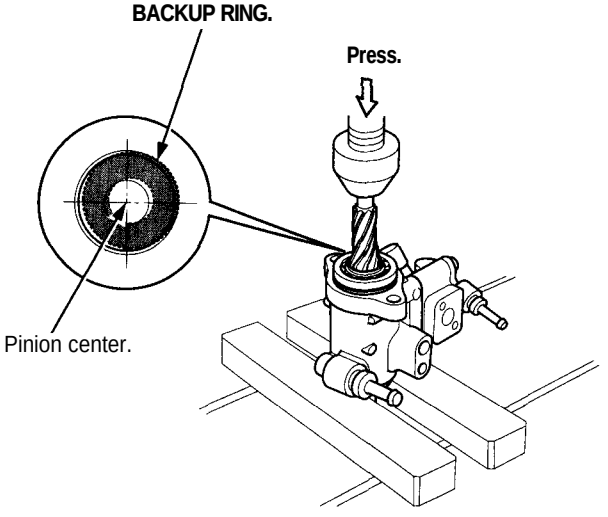
Steering Gearbox

Reassembly (cont'd)

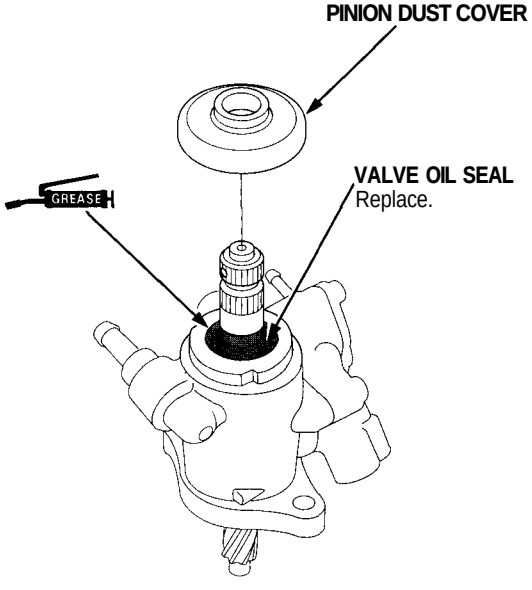
29. Press the pinion shaft/sleeve using a hydraulic press as shown.

    CAUTION: Before inserting the pinion shaft, be sure that the backup ring is centered with the pinion shaft bearing.

    NOTE: Check that the pinion shaft/sleeve turns smoothly by turning the pinion shaft.

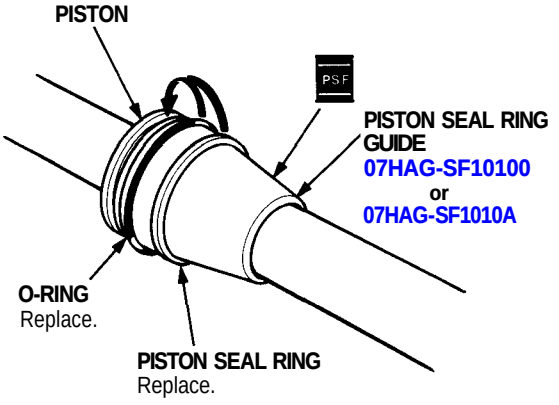


30. Apply steering grease on the valve oil seal, and install the pinion dust cover on the valve body unit.



Steering Rack Reassembly

31. Coat the piston seal ring guide with power steering fluid, and slide it onto the rack, big end first.



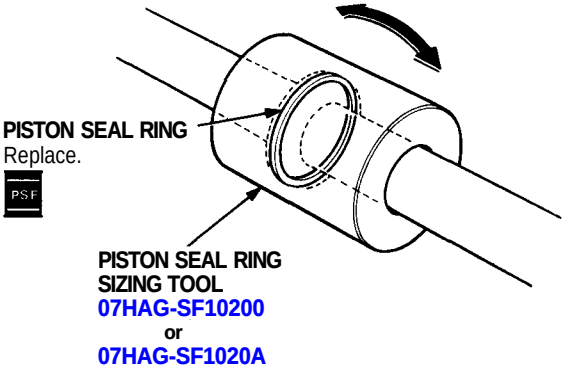
32. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

    NOTE:
    - Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
    - Replace piston's O-ring and seal ring as a set.

33. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.

34. Coat the piston seal ring and the inside of the special tool with power steering fluid.

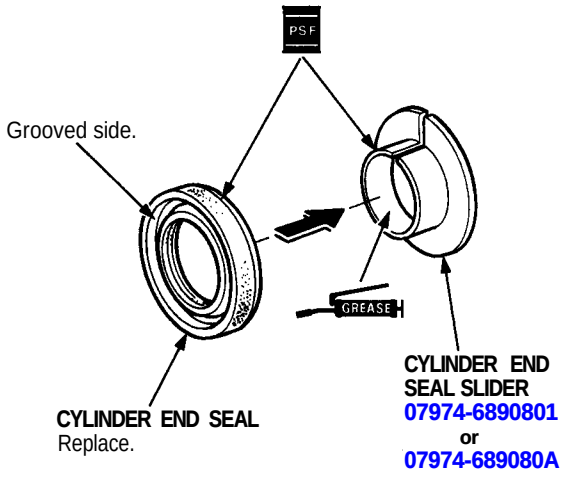
35. Carefully slide the tool onto the rack and over the piston seal ring.



36. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.

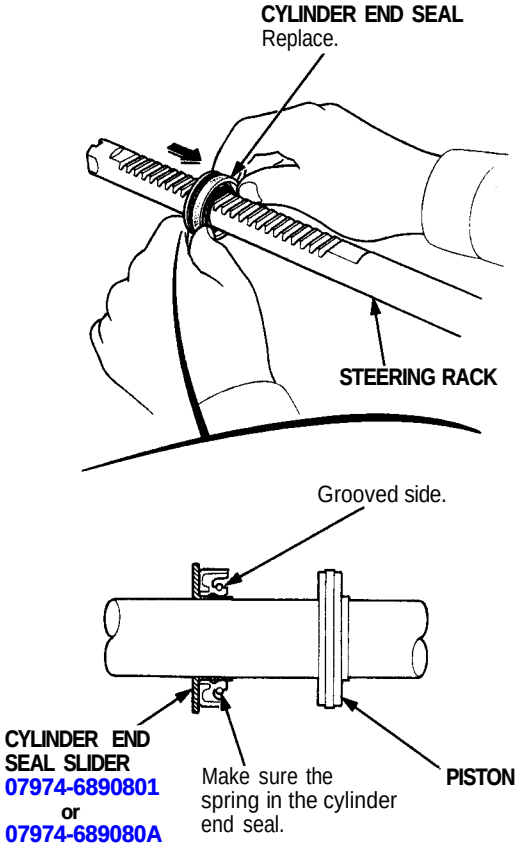
37. Coat the sliding surface of the special tool and new cylinder end seal with power steering fluid.

38. Place the seal on the special tool with its grooved side facing opposite the special tool.

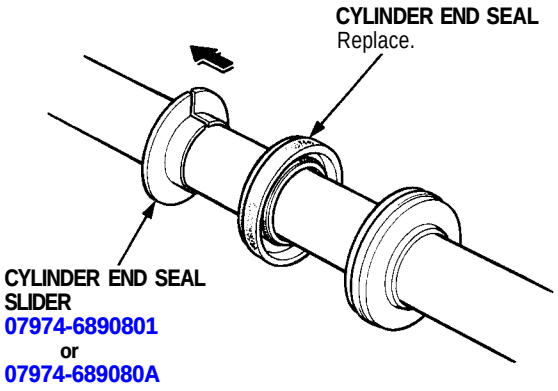


39. Apply a thin coat of grease to the inside of the special tool, and install it on the steering rack.

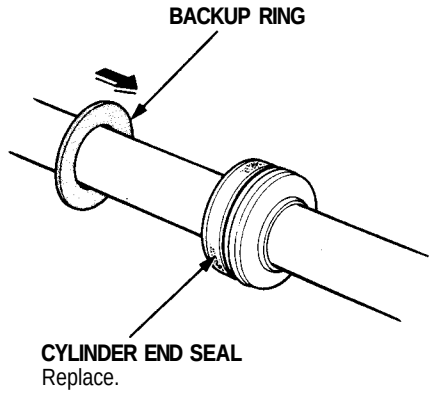
CAUTION: Make sure the rack teeth do not face the slot in the special tool.



40. Separate the cylinder end seal from the special tool, then remove the tool from the steering rack.

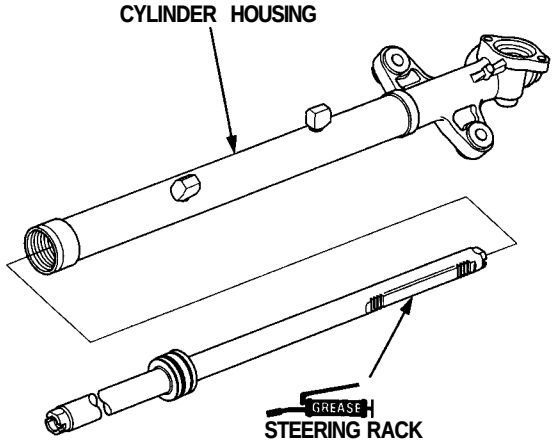


41. Install the new backup ring on the steering rack, then place the cylinder end seal to piston.



42. Grease the steering rack teeth, then insert the steering rack into the cylinder housing.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with the rack edges.



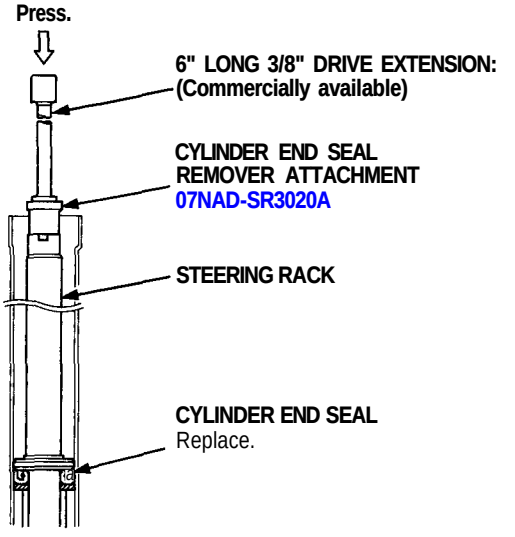
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Steering Gearbox

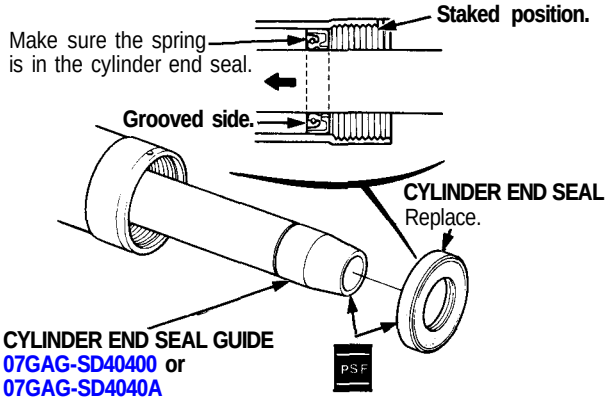
Reassembly (cont'd)

43. Insert 6" long 3/8" drive extension into the special tool and put them on the rack as shown.
44. Install the cylinder end seal into the bottom of the cylinder by pressing on the tools with a press as shown.

CAUTION: Do not push on the tools with excessive force as it may damage the cylinder end seal.

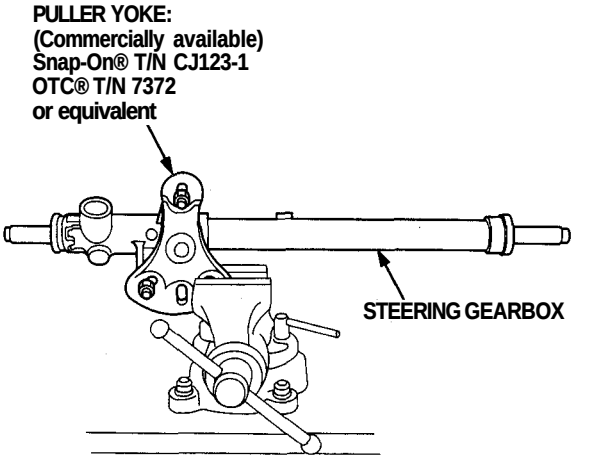


45. Remove the tools, and center the steering rack.
46. Install the special tool onto the end of the steering rack, then coat the special tool with power steering fluid.



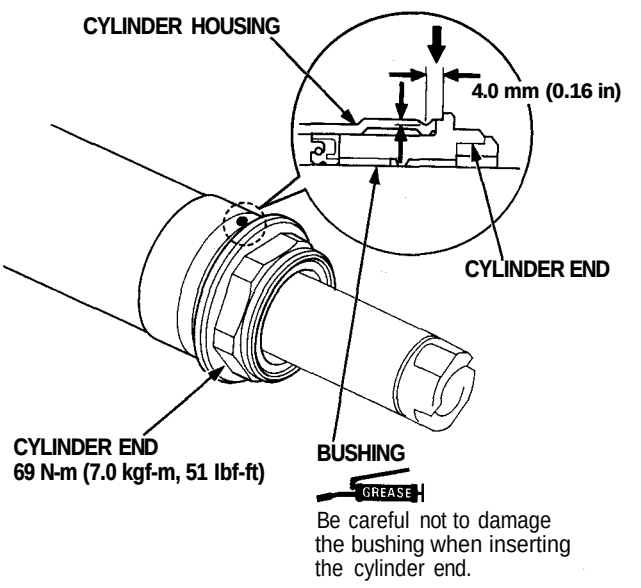
47. Coat the inside surface of the new cylinder end seal with power steering fluid.
48. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.
49. Remove the special tool, then push in the cylinder end seal with your finger.
    NOTE: Take care not to damage the cylinder end seal with the threads and burrs at the staked position of the gearbox.
50. Install a puller yoke to the steering gearbox, then clamp the puller yoke in a vise with soft jaws as shown.

CAUTION: Do not clamp the cylinder housing.



51. Grease the inside surface of the cylinder end, then install the cylinder end by screwing it into the cylinder housing.
52. Remove the puller yoke from the steering gearbox.
53. After tightening the cylinder end, stake the point of the cylinder housing shown below.

NOTE: Stake the cylinder in the position opposite from where the stake was removed during disassembly.



54. Select the 44 mm shim(s).

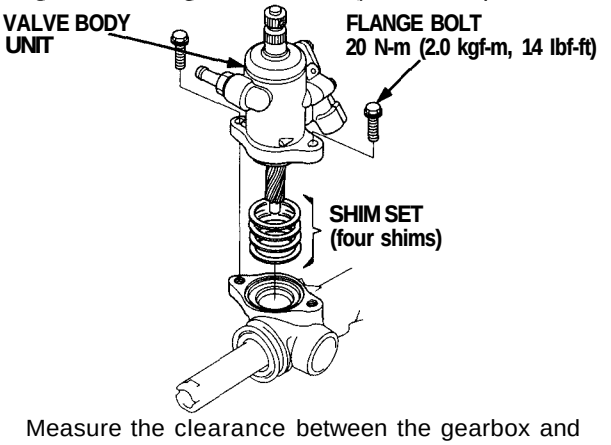
NOTE: Only reinstall the original 44 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones.
If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:

a. Set the four 44 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm.
Shim set: four 44 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

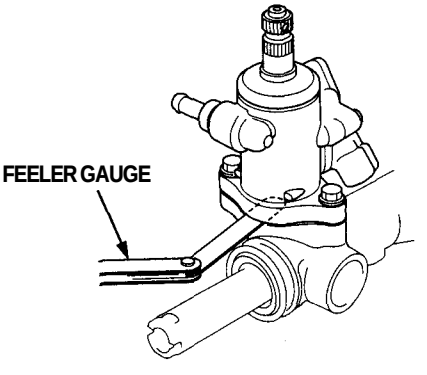
CAUTION: The four 44 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification.

b. Install the valve body unit on the gearbox, and tighten the flange bolts to the specified torque.



c. Measure the clearance between the gearbox and valve body unit using a feeler gauge as shown.

NOTE: Measure the clearance at the point midway between the two mounting bolts.



d. Determine the required thickness of the 44 mm shims by subtracting the clearance obtained in the step -3 from the total thickness of the four shims.
(Total thickness of the 4 shims) - (Clearance) = Required thickness of the shims

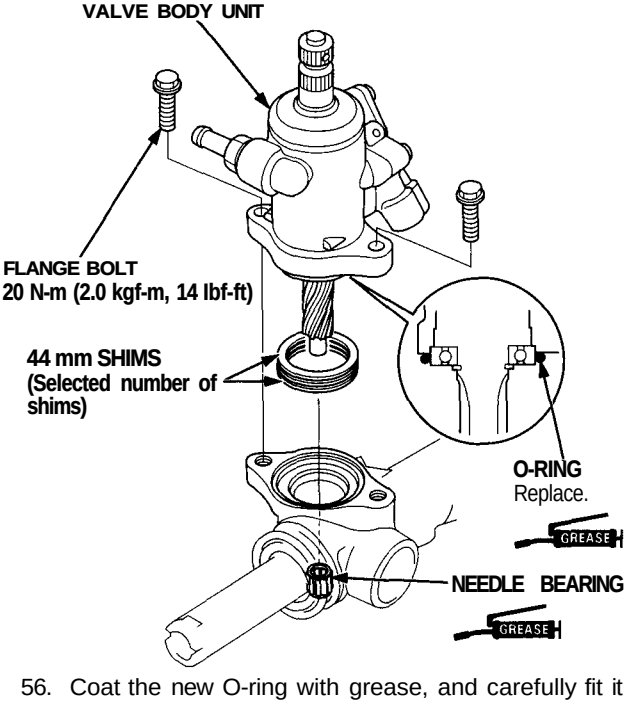
NOTE: Select the shims so that the total thickness is close to, but less than the required thickness.

Example:
Measurement is 0.28 mm (0.011 in):
0.70 - 0.28 = 0.42 mm (0.028 - 0.011 = 0.017 in)

The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

55. Set the selected 44 mm shims on the bearing surface of the gearbox housing.



56. Coat the new O-ring with grease, and carefully fit it on the valve housing.
57. Apply grease to the needle bearing in the gearbox housing.
58. Install the valve body unit on the gearbox housing by engaging the gears.

NOTE: Note the valve body unit installation position (direction of pipe connection).

59. Tighten the flange bolts to the specified torque.

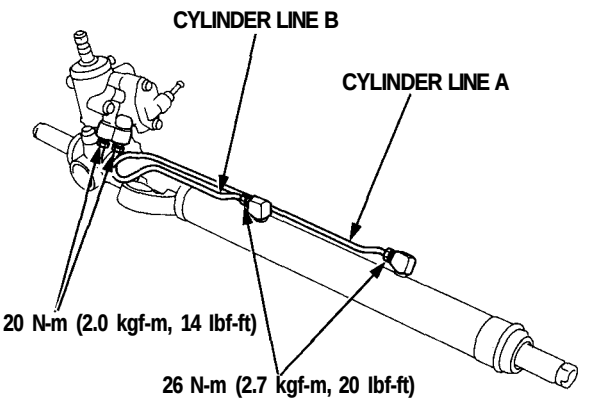
(cont'd)

Steering Gearbox

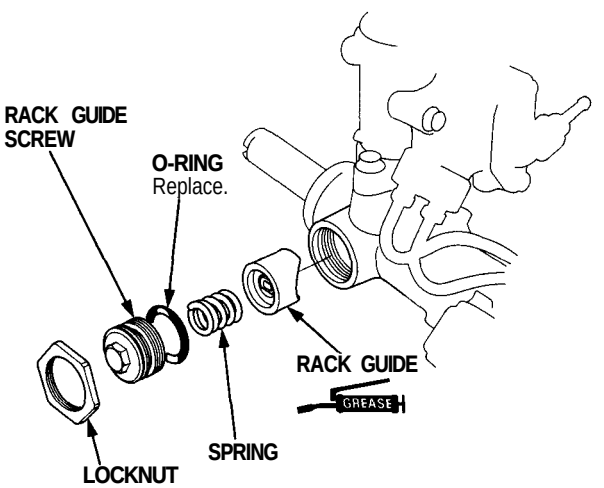
Reassembly (cont'd)

60. Install the cylinder lines A and B.

NOTE:
- Clean the joints of the cylinder lines A and B thoroughly. The joints must be free of foreign material.
- Install the cylinder lines A and B by tightening the flare nuts by hand first, then tighten the flare nuts to the specified torque.



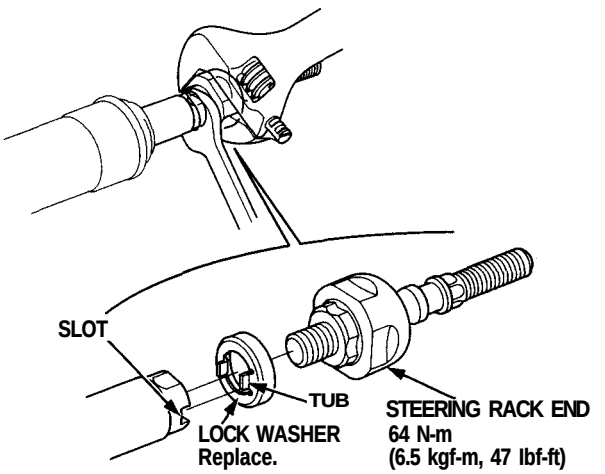
61. Grease the sliding surface of the rack guide, and install it onto the gearbox housing.



62. Apply a thin coat of grease to the new O-ring, and install it on the rack guide screw.
63. Install the spring, rack guide screw and locknut on the gearbox housing.
64. Adjust the rack guide screw (see page 17-24).

NOTE: After adjusting, check that the rack moves smoothly by sliding the rack right and left.

65. Install the new lock washer in the groove in the steering rack.



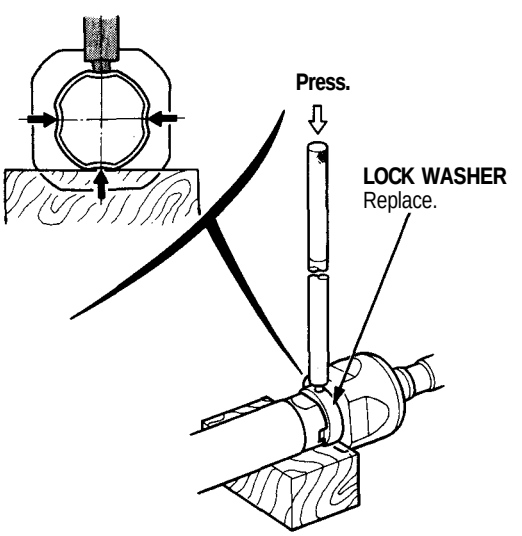
66. Screw each rack end into the rack.
67. Hold the steering rack with a wrench and tighten the rack end with another.

CAUTION: Be careful not to damage the rack surface with the a wrench.

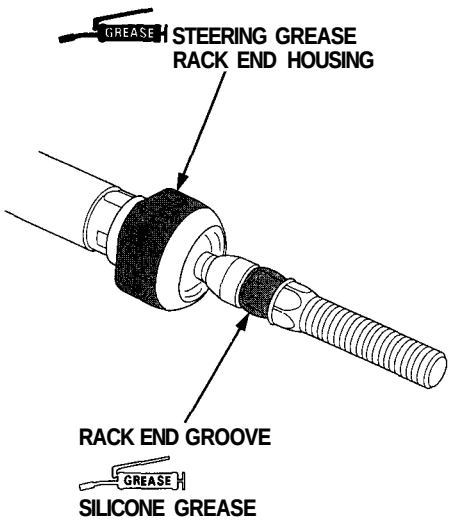
68. After tightening the rack end. Stake the four section of lock washer with the tool and hydraulic press.

NOTE:
- Place the wood block on the press table, then set the lock washer section of the rack end on the wood block securely.
- Be sure the tool is aligned with the flat sections of the steering rack end before pressing.
- Stake the lock washer in the center of the flat section of the steering rack end.

STAKE POINT "←"



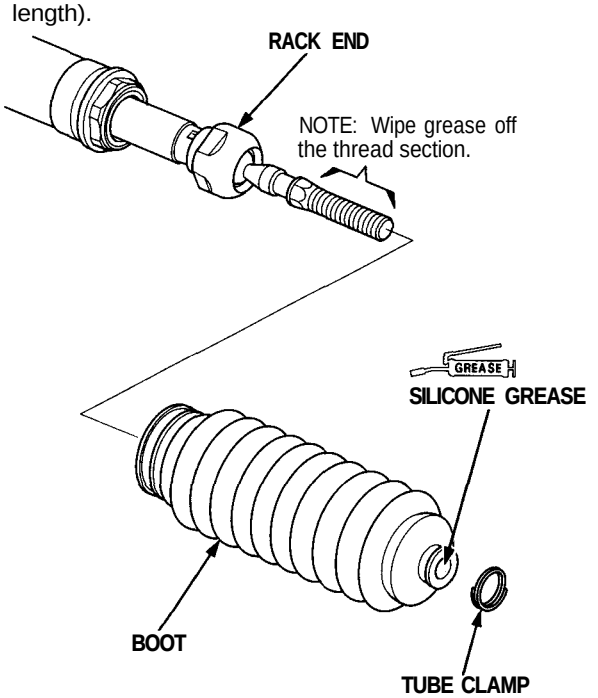
69. Apply steering grease to the circumference of the rack end housing.



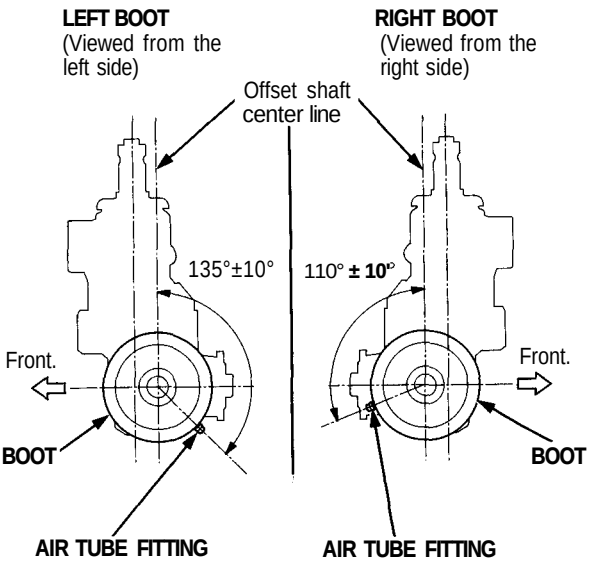
70. Apply a light coat of silicone grease to the boot grooves on the rack ends.

71. Install the boots in the rack end with the tube clamps.

NOTE: Install the boots with the rack, in the straight ahead position (right and left tie-rods are equal in length).

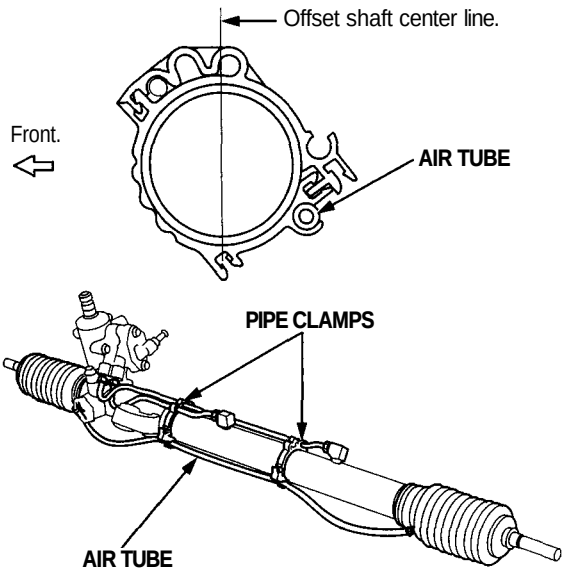


72. Adjust the air tube fitting position of the boots by turning it as shown below.



73. Install the two pipe clamps as shown below.

74. Connect the air tube between the right and left boot, and install it in the clips of the pipe clamps.



(cont'd)

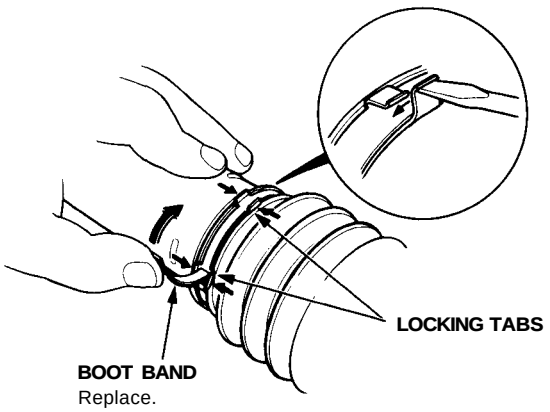
Steering Gearbox

Reassembly (cont'd)

75. Install the new boot bands on the boot, and bend both sets of locking tabs.

76. Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Stake the band locking tabs firmly.



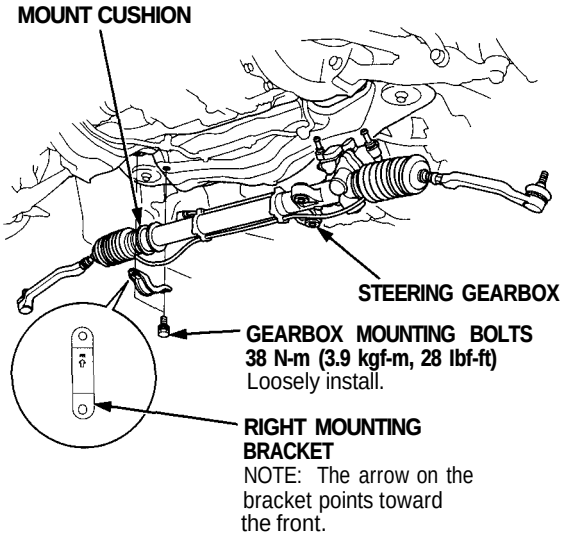
77. Slide the rack right and left to be certain that the boots are not deformed or twisted.

Steering Gearbox

Installation

CAUTION: Be careful not to bend or damage the cylinder line A and B when installing the gearbox.

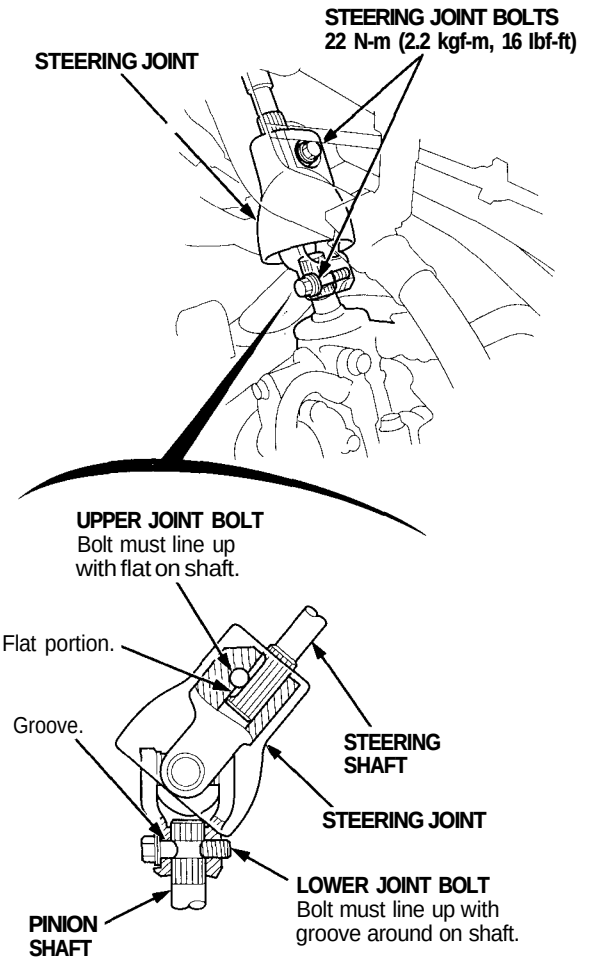
1. Install the mount cushion on the right side.
2. Loosely install the mounting bracket with the two gearbox mounting bolts on the cushion.



3. Center the steering rack within its stroke.

4. Install the steering joint, and reconnect the steering shaft and pinion shaft.

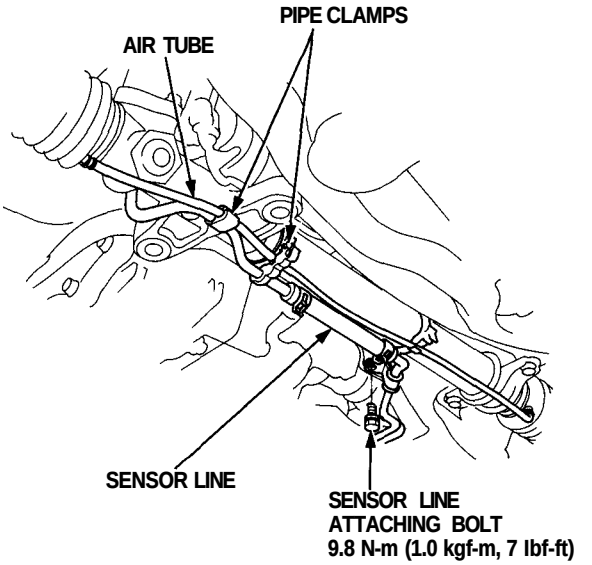
   NOTE: Make sure the steering joint is connected as follows:
   a. Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat on the shaft), and loosely install the upper joint bolt.
   b. Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and loosely install the lower joint bolt.
      Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
   c. Pull on the steering joint to make sure that the steering joint is fully seated. Then tighten the joint bolts.



5. Center the cable reel by first rotating it clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the arrow mark on the label points straight up.
   Reinstall the steering wheel (see page 17-29).

6. Install the sensor line on the rear beam.

7. Install the sensor line and air tube on the pipe clamps.

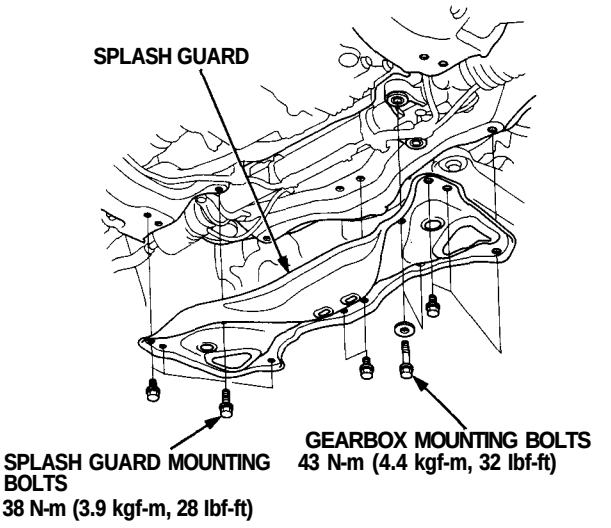


8. Tighten the two gearbox mounting bolts on the right side.

9. Install the splash guard with the two gearbox mounting bolts on the left side.

10. Tighten the splash guard attaching bolts.

    NOTE: Install the bolts loosely first, then tighten them securely.



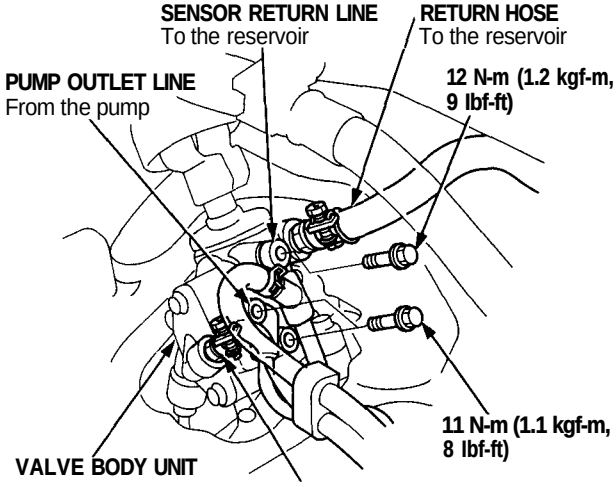
(cont'd)

Steering Gearbox

Installation (cont'd)

11. Reconnect the two lines and two hoses to the valve body unit.

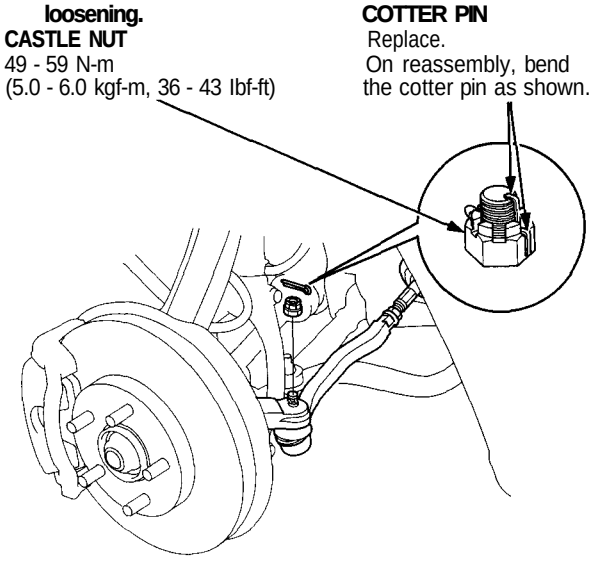
NOTE:
- Check the hose bands and clip for deformation and deterioration, and replace then if necessary.
- After installing the steering gearbox, make sure that there is no interference between the cylinder lines and rear beam.



12. Reconnect the tie-rod ends to the steering knuckles, tighten the castle nut to the specified torque, and install new cotter pins.

NOTE: Before connecting the tie-rod ends, check the ball joint pin tapered section and threads section for grease contamination, and wipe it if necessary.

CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



13. Install the front wheels.

14. Fill the system with power steering fluid and bleed air from the system (see page 17-24).

15. After installation, perform the following checks.

- Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid. Check the gearbox for leaks (see page 17-26).
- Adjust the front toe (see section 18).
- Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods, if necessary.

NOTE: Turn the right and left tie-rods equally.

Ball Joint Boot Replacement '95 - 97 models:

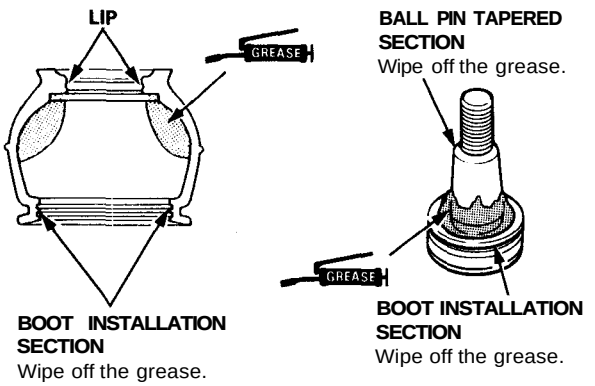
1. Remove the boot set ring and the boot.

   CAUTION: Do not contaminate the boot installation section with grease.

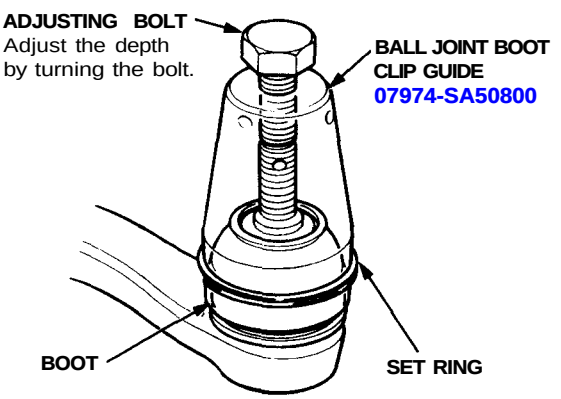
2. Pack the interior of the boot and lip with grease.

3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the boot in the groove of the boot installation section securely, then bleed air.



5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

   CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

'98 model:

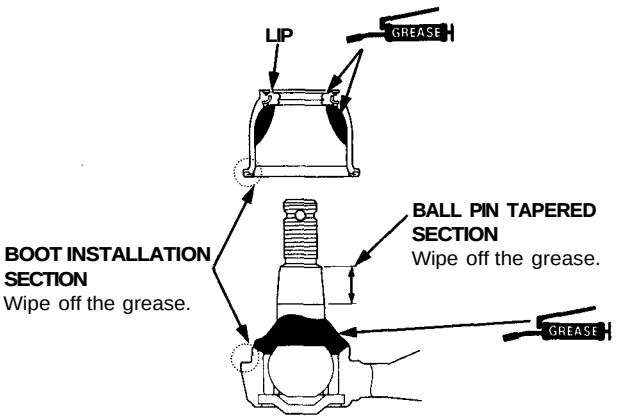
CAUTION: Do not contaminate the boot installation section with grease.

1. Remove the boot from the tie-rod end, and wipe the old grease off the ball pin.

2. Pack the lower area of the ball pin with fresh grease.

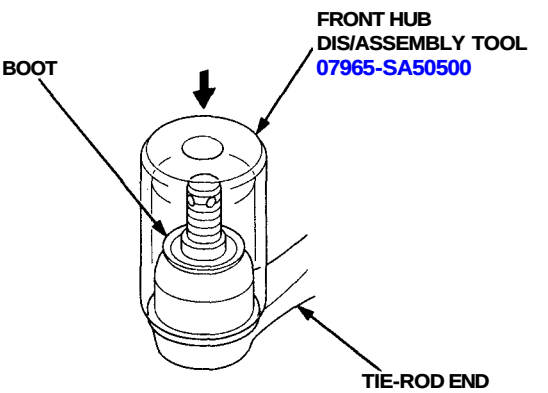
3. Pack the interior of the new boot and lip with fresh grease.

   CAUTION:
   - **Keep grease off the boot installation section and the tapered section if the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the new boot using the special tool as shown below.

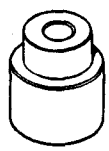
   NOTE: The boot must not be a gap at the boot installation sections.



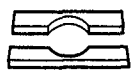
CAUTION: After installing the boot, check the ball pin tapered section for grease contamination, and wipe it if necessary.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAF - SD40330	Ball Joint Remover/Installer	1	18-17
②	07GAF - SD00700	Hub Dis/Assembly Base	2	18-14
③	07GAF-SE00100	Hub Dis/Assembly Tool	1	18-14
④	07GAG - SD40700	Ball Joint Boot Clip Guide	1	18-17, 18-18
⑤	07LAD-PT3010A	Seal Driver	1	18-15
⑥	07MAC-SL00100	Ball Joint Remover 32 mm	1	18-12
⑦	07MAC - SL00200	Ball Joint Remover, 28 mm	1	18-12, 18-13, 18-28
⑧	07965-SD90100	Support Base	1	18-15



①



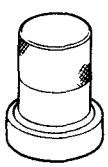
②



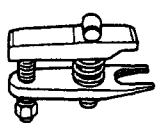
③



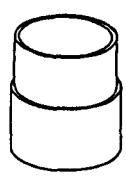
④



⑤



⑥ ⑦



⑧

Component Locations

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Wheel Alignment, page 18-5

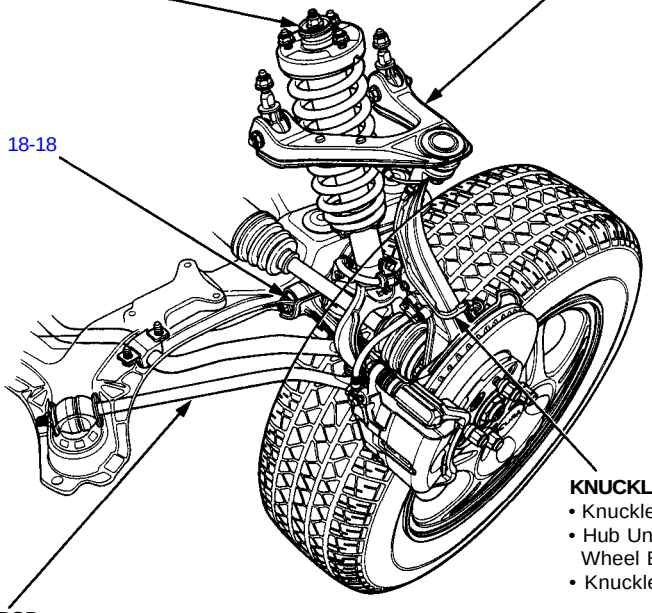
NOTE: Refer to page 18-3a of the '96-98 Acura 3.2TL Service Manual supplement for for the differences on this page for the 3.2TL.

Front Suspension

FRONT DAMPER
- Removal, page 18-20
- Disassembly/Inspection, page 18-20
- Reassembly, page 18-22
- Installation, page 18-23

UPPER ARM
- Removal/Inspection, page 18-18
- Installation, page 18-19

LOWER ARM
- Removal/Inspection, page 18-18
- Installation, page 18-19



KNUCKLE/HUB
- Knuckle Removal, page 18-11
- Hub Unit Removal and Wheel Bearing Replacement, page 18-13
- Knuckle Installation, page 18-16

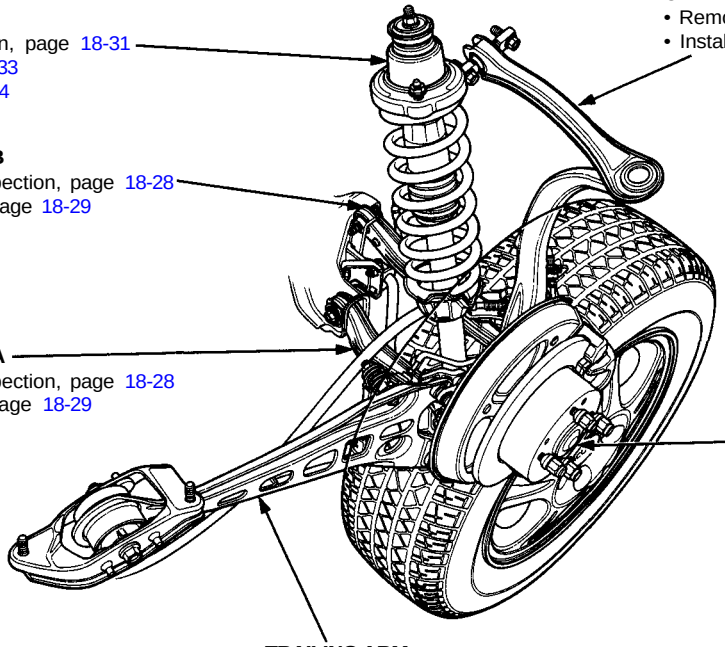
RADIUS ROD
- Removal/Inspection, page 18-18
- Installation, page 18-19

Rear Suspension

REAR DAMPER
- Removal, page 18-30
- Disassembly/Inspection, page 18-31
- Reassembly, page 18-33
- Installation, page 18-34

UPPER ARM
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- Installation, page 18-29

LOWER ARM B
- Removal/Inspection, page 18-28
- Installation, page 18-29



LOWER ARM A
- Removal/Inspection, page 18-28
- Installation, page 18-29

HUB BEARING UNIT
- Removal, page 18-26
- Installation, page 18-27

TRAILING ARM
- Removal/Inspection, page 18-28
- Installation, page 18-29

Description

Trailing Arm Bushing

Construction The trailing arm bushing is a hydraulic type. The low dynamic spring rate and high damping force of this type of bushing allow highly efficient damping of vibrations and shocks transmitted from the wheel.

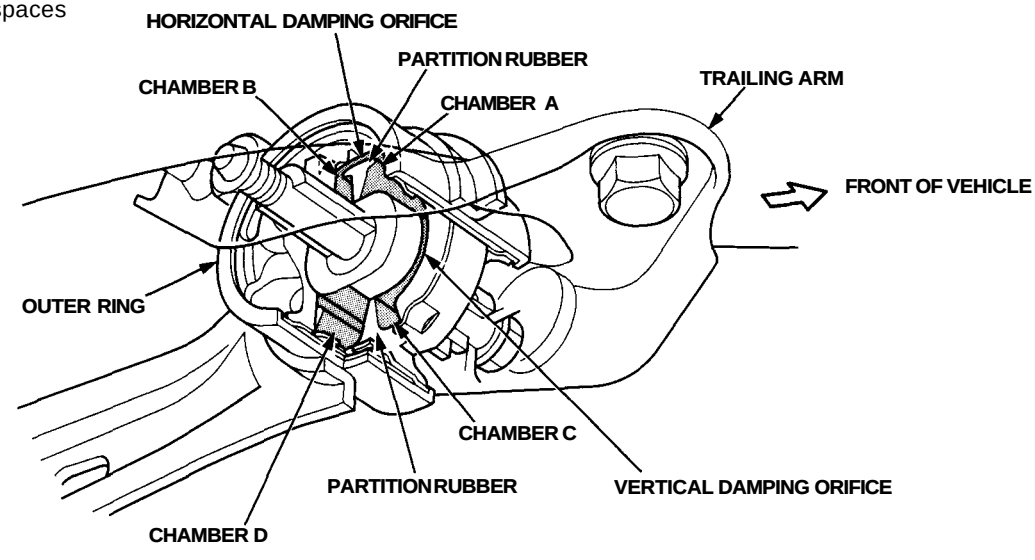
The interior of the bushing is separated into four hydraulic chambers connected by three orifices. One orifice is for horizontal damping, and the other two orifices are for vertical damping.

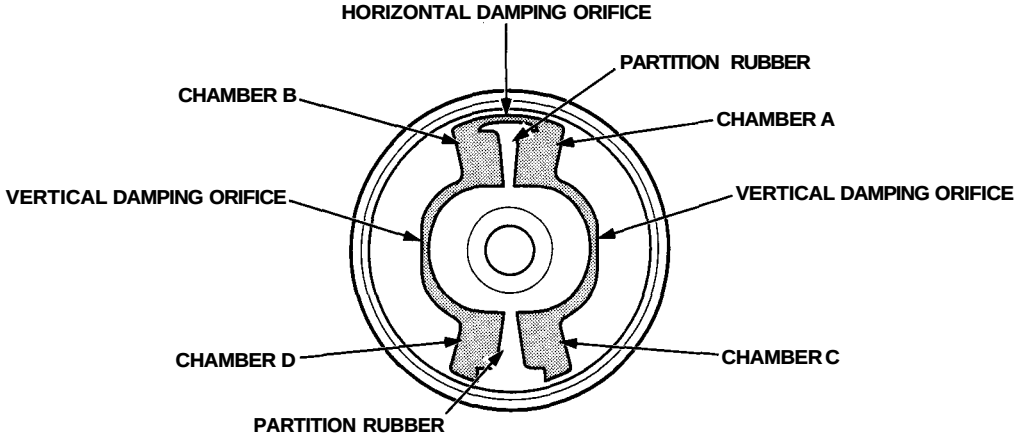
The horizontal damping orifice mainly serves to achieve high damping force. When a force directed toward the rear of the vehicle acts on the bushing, chambers A and C are compressed, while chambers B and D expand. Liquid flows from chambers A and C through the horizontal damping orifice into chambers B and D, damping the shock by means of the fluid's viscosity and resonance. When a force directed toward the front of the vehicle acts on the tire, the opposite chambers compress and expand.

The vertical damping orifices mainly serve to achieve a low dynamic spring rate. When a force directed upward acts on the bushing, chambers A and B are compressed, while chambers C and D expand. Liquid flows from chambers A and B through the vertical damping orifices into chambers C and D. When there is a downward-directed force, the opposite chambers compress and expand. This vertical flow causes resonance in the liquid, which limits the dynamic spring rate to a frequency range of 50 - 200 Hz, damping forces transmitted to the vehicle body.

The illustration shows the left trailing arm.

▨ : Liquid-filled spaces





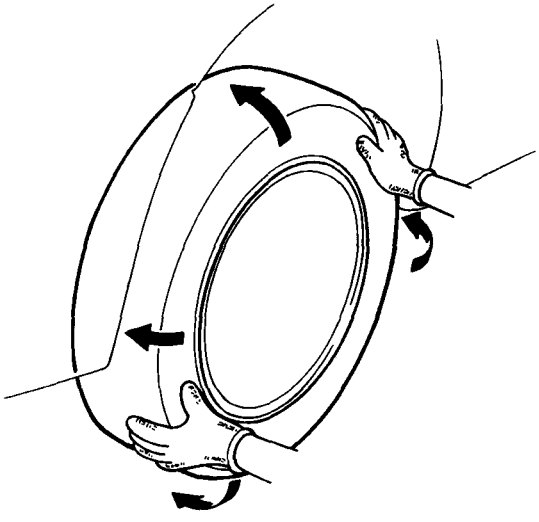
CROSS SECTION VIEW

Wheel Alignment

Caster

NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold the wheel with your hands, then move it up and down, and right and left to check for wobbling.)



Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Check the caster angle.

   Caster angle: 2°07' ± 1°

2. If out of specification, record the caster reading, then adjust the caster.

Adjustment

NOTE: Caster angle can be adjusted by increasing or decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

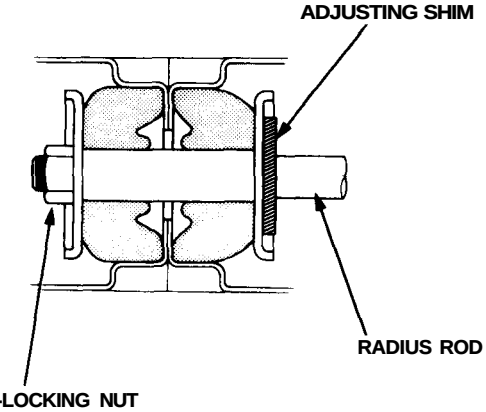
1. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).

2. Remove the self-locking nut on the end of the radius rod.

3. Remove the flange bolts at the radius rod on the lower arm, then remove the radius rod (see page 18-19).

4. Adjust the caster angle by increasing or decreasing the adjusting shims.

   NOTE:
   - Do not use more than two adjusting shims.
   - One adjusting shim changes the caster angle by 35' and the caster angle can be adjusted by 1°10' maximum.
   - One adjusting shim is 3.2 mm (0.13 in) in thickness.



SELF-LOCKING NUT
12 x 1.25 mm
54 N-m (5.5 kgf-m, 40 lbf-ft)
Replace.

5. After the adjustment, install the radius rod onto the lower arm, then tighten the flange bolts (see page 18-19).

6. Tighten the new self-locking nut to specified torque.

Wheel Alignment

Camber

Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle).
Follow the equipment manufacturer's instructions.

1. Check the camber angle.

   Camber angle:
   Front: 0°00'±1°
   Rear: -0°30'±1°

2. If out of specification, check for bent or damaged suspension components.

Front Toe Inspection/Adjustment

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle).
Follow the equipment manufacturer's instructions.

1. Check the tire pressure.

2. Center steering wheel spokes.

3. Check the toe with the wheels pointed straight ahead.

   Front toe: OUT 1.0 ± 2 mm (1/16 ± 1/16 in)

   — If adjustment is required, go on to step 4.

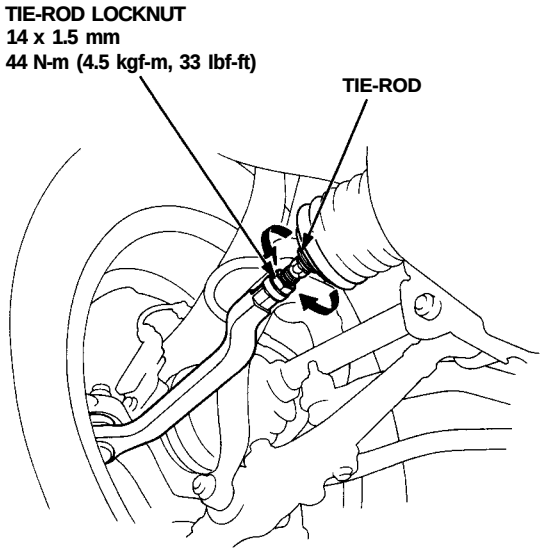
   — If no adjustment is required, remove alignment equipment.

4. Loosen the tie-rod locknuts, then turn both tie-rods in the same direction until the front wheels are in straight ahead position.

5. Turn both tie-rods equally until the toe reading on the turning radius gauge is correct.

6. After adjusting, tighten the tie-rod locknuts.

   NOTE: Reposition the tie-rod boot if it is twisted or displaced.



Rear Toe Inspection/Adjustment

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe and/or turning angle). Follow the equipment manufacturer's instructions.

1. Release parking brake.

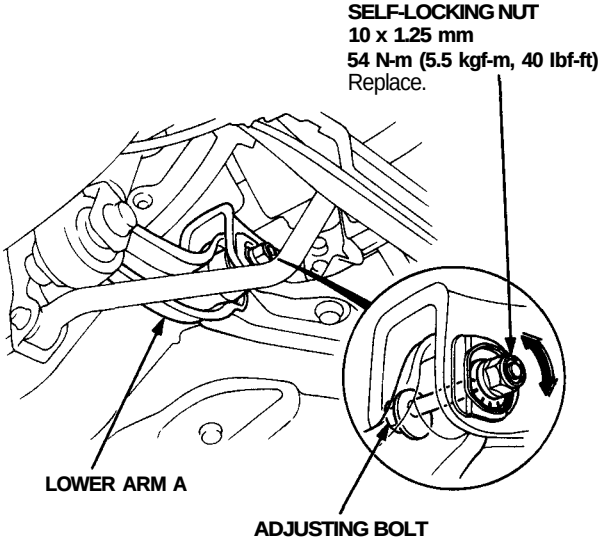
   NOTE:
   - Measure difference in toe measurements with the wheels pointed straight ahead.
   - If the parking brake is engaged, you may get an incorrect reading.

   Rear toe-in: 2 ± 2 mm (1/16 ± 1/16 in)

   — If adjustment is required, go to step 2.

   — If no adjustment is required, remove alignment equipment.

2. Hold the adjusting bolt on the rear lower arm A and loosen the self-locking nut.



3. Adjust the rear toe by turning the adjusting bolt until toe is correct.

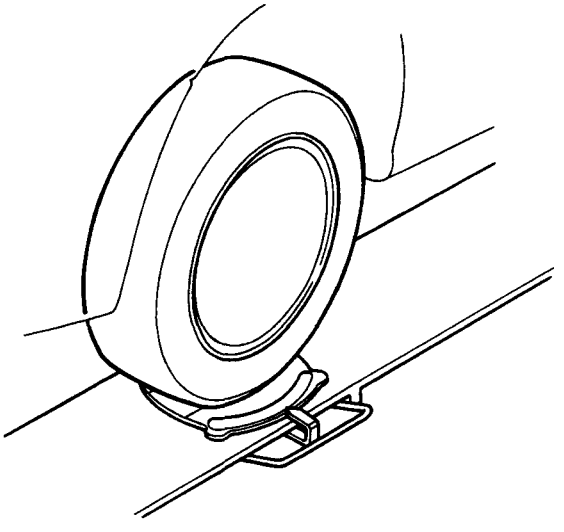
4. Install the self-locking nut, and tighten it while holding the adjusting bolt.

Turning Angle Inspection

NOTE: Use commercially-available computerized four wheel alignment equipment to measure wheel alignment (caster, camber, toe, and/or turning angle). Follow the equipment manufacturer's instructions.

1. Turn the wheel right and left while applying the brake, and measure the turning angle of both wheels.

   Turning angle:
   Inward wheel: 40°00' ± 2°
   Outward wheel: 33°18' (reference)



2. If the turning angle is not within the specifications, check for bent or damaged suspension components.

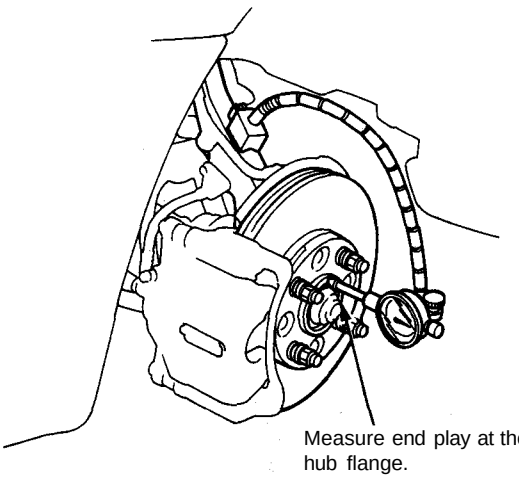
Wheel/Hub Inspection

Bearing End Play

1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc in or outward.

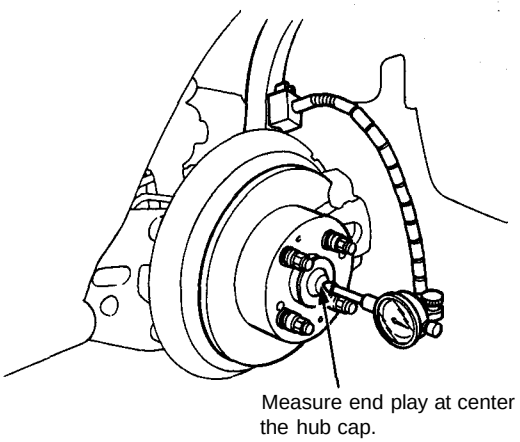
Front/Rear:
Standard: 0 - 0.05 mm (0 - 0.002 in)

Front



Measure end play at the hub flange.

Rear



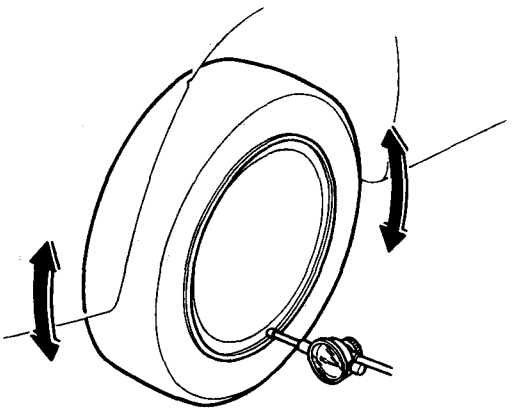
Measure end play at center of the hub cap.

5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

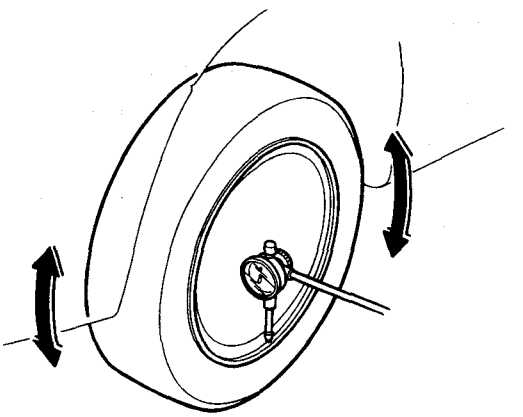
Wheel Runout

1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Check for bent or deformed wheels.
3. Attach the dial gauge as shown.
4. Measure the wheel runout by turning the wheel.

Front and Rear Wheel Axial Runout:
Standard:
Steel Wheel: 0 - 1.0 mm (0 - 0.04 in)
Aluminum Wheel: 0 - 0.7 mm (0 - 0.03 in)
Service Limit: 2.0 mm (0.08 in)



Front and Rear Wheel Radial Runout:
Standard:
Steel Wheel: 0 - 1.0 mm (0 - 0.04 in)
Aluminum Wheel: 0 - 0.7 mm (0 - 0.03 in)
Service Limit: 1.5 mm (0.06 in)



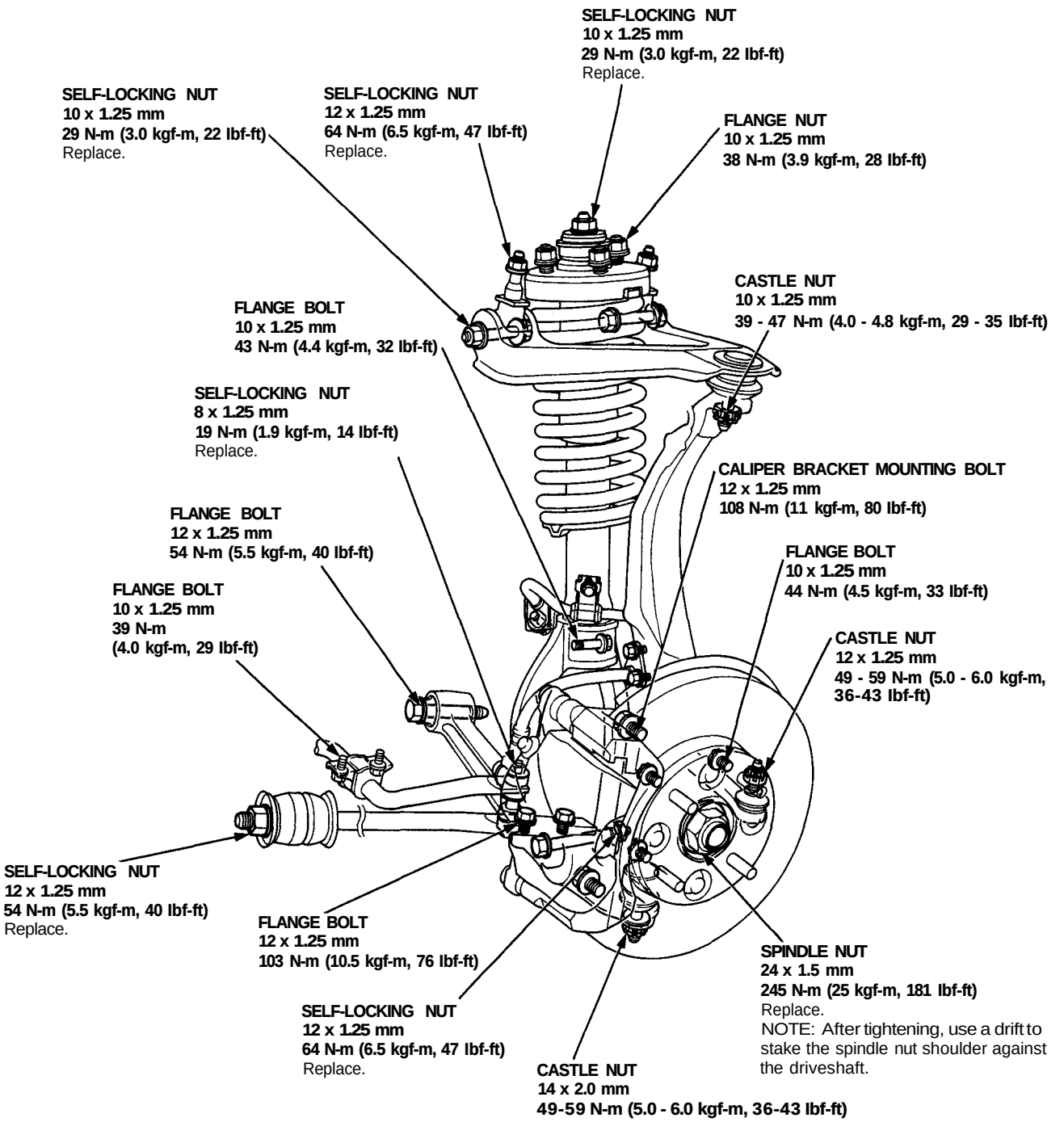
5. If the wheel runout is more than the service limit, replace the wheel.

Front Suspension

Torque Specifications

CAUTION:
- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

NOTE: Wipe off the grease before tightening the nut at the ball joint.

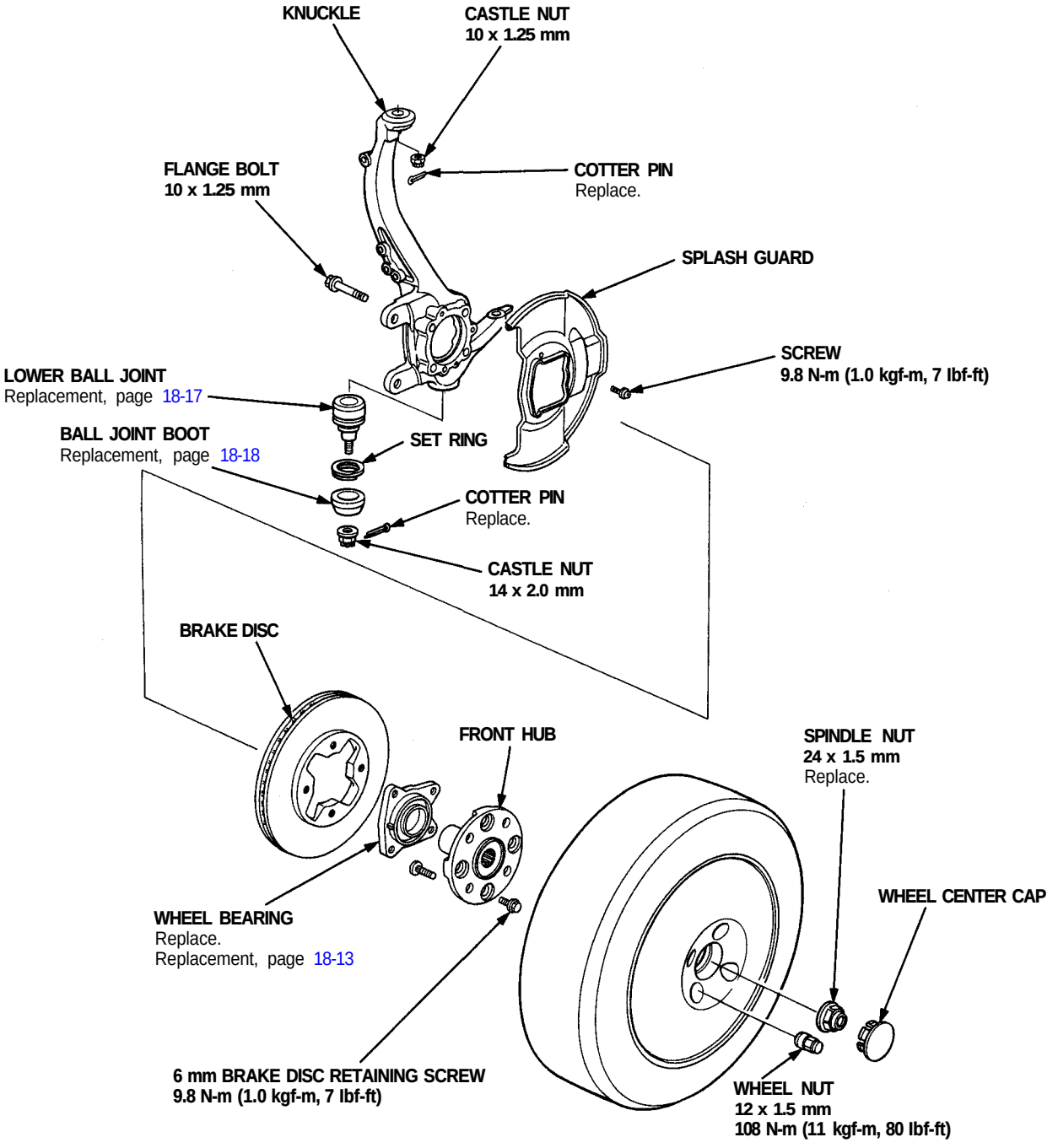


Front Suspension

Knuckle/Hub

Illustrated Index

NOTE:
- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



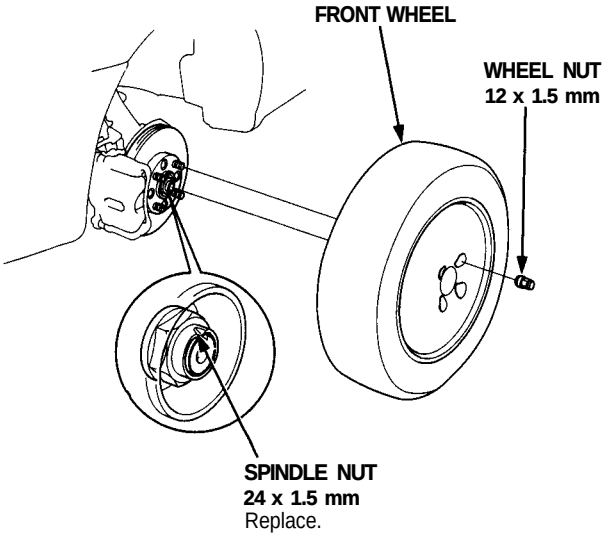
Knuckle Removal

1. Loosen the wheel nuts slightly.

2. Raise the front of vehicle, and support it with safety stands in the proper locations (see section 1).

3. Remove the wheel nuts and front wheel.

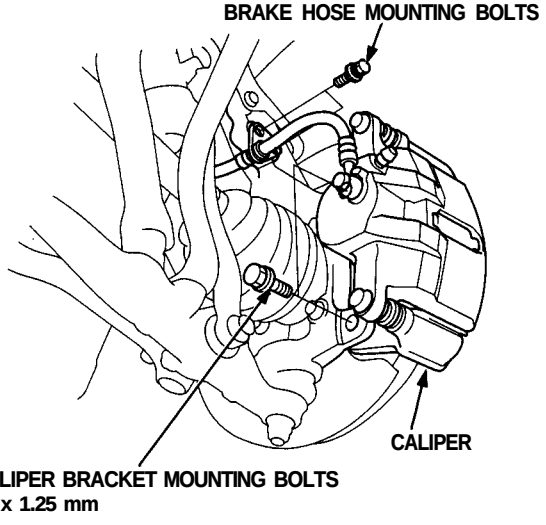
4. Raise the locking tab on the spindle nut, then remove the nut.



5. Remove the brake hose mounting bolts.

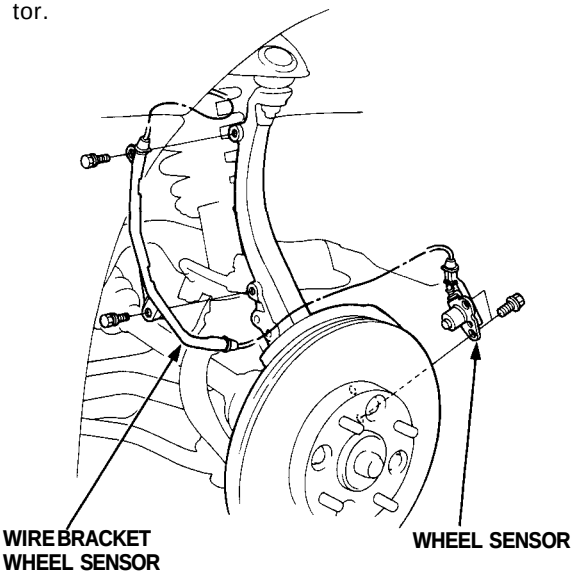
6. Remove the caliper bracket mounting bolts, and hang the caliper to one side.

CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.



7. Remove the wheel sensor wire bracket, then remove the wheel sensor from the knuckle.

NOTE: Do not disconnect the wheel sensor connector.



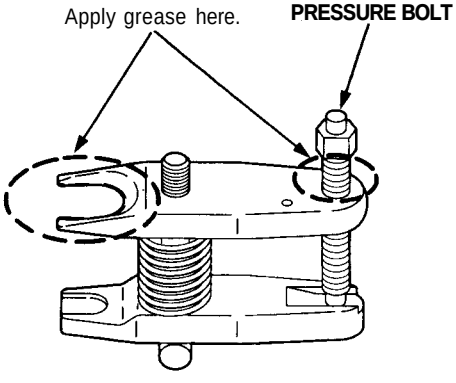
NOTE: Use ball joint removers to separate the ball joints from the suspension or tie-rod end.

CAUTION: Be careful not to damage the ball joint boot.

8. Clean any dirt or grease off the ball joint.

9. Remove the cotter pin from the tie-rod end ball joint castle nut, and remove the nut.

10. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.



(cont'd)

Front Suspension

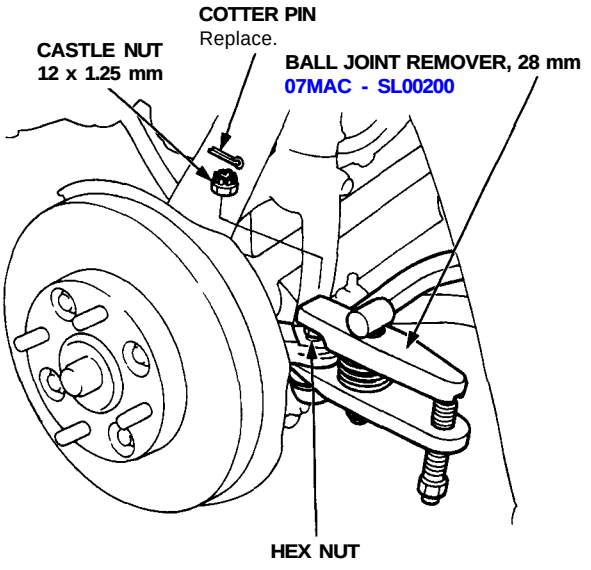
Knuckle/Hub (cont'd)

11. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.

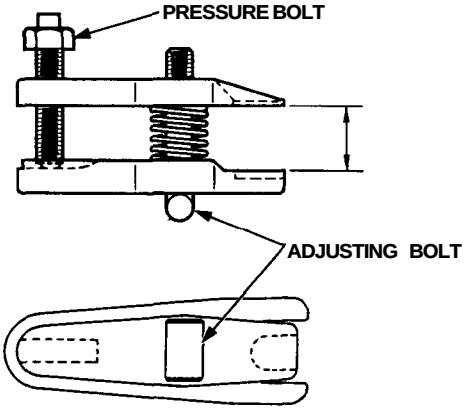
12. Use the special tool as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot.

13. Adjust the jaw spacing by turning the pressure bolt.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



14. Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt, and recheck the jaws to make sure they are still parallel.



    NOTE: After making the adjustment to the adjusting bolt, be sure the head of the adjusting bolt is in this position to the allow the jaw to pivot.

15. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

    ⚠ WARNING Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

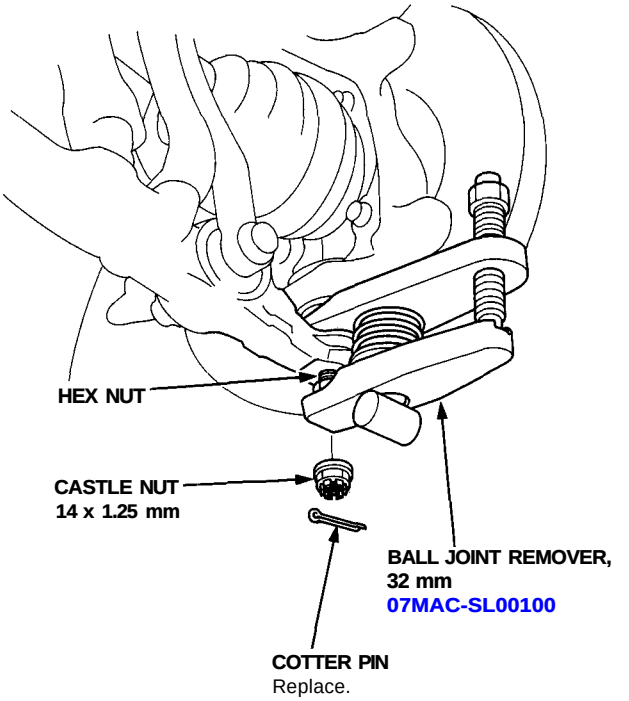
16. Remove the tool, then remove the nut from the end of the ball joint and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot and replace it if damaged.

17. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

18. Install a 14 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

19. Use the special tool as shown on page 18-11 to separate the lower ball joint and lower arm.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

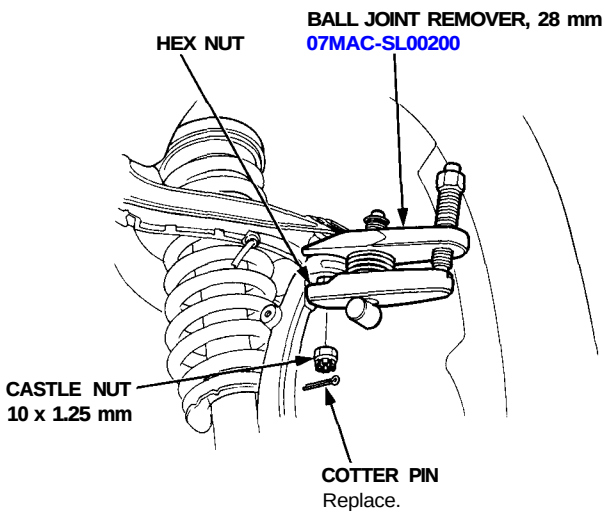


20. Remove the cotter pin from the upper ball joint castle nut, and remove the nut.

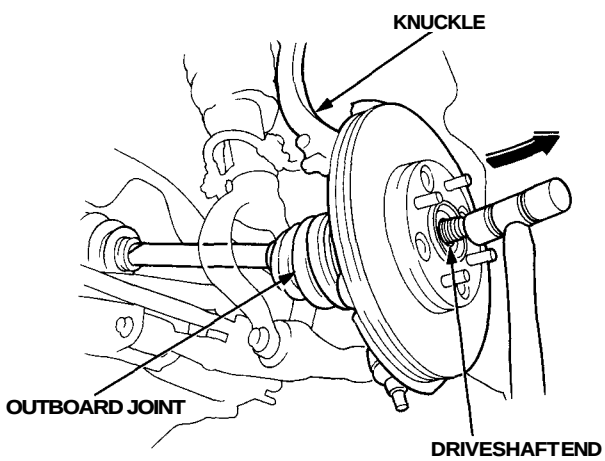
21. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

22. Use the special tool as shown on page 18-11 to separate the upper ball joint and knuckle.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



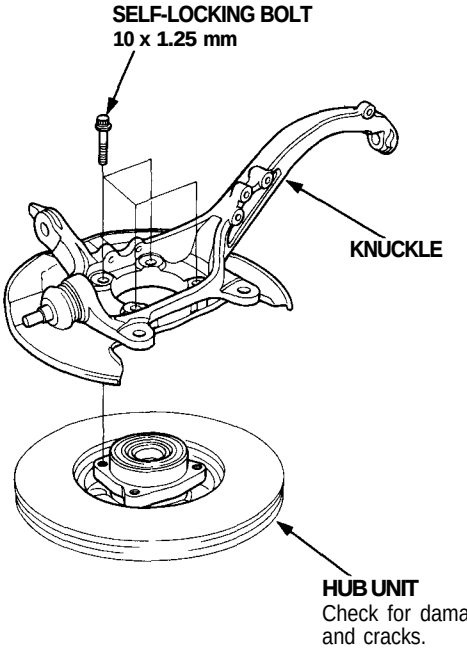
23. Pull the knuckle outward, and remove the driveshaft outboard joint from the knuckle by tapping the driveshaft end using a plastic hammer, then remove the knuckle.



(cont'd)

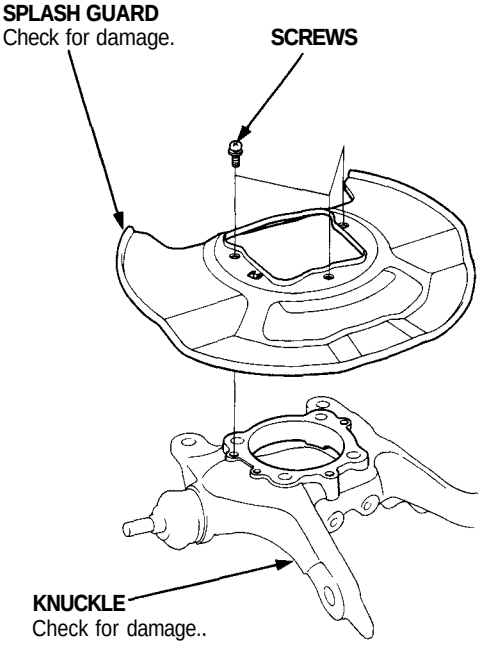
Hub Unit Removal and Wheel Bearing Replacement

1. Remove the knuckle from the hub unit.



2. Remove the splash guard from the knuckle.

NOTE: It is not necessary to remove the splash guard for hub unit or wheel bearing replacement.

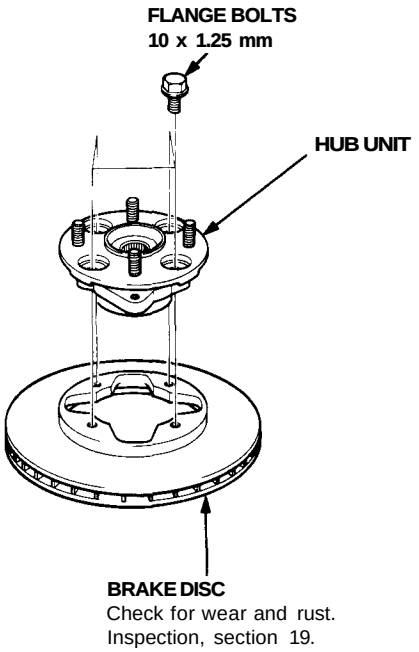


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Front Suspension

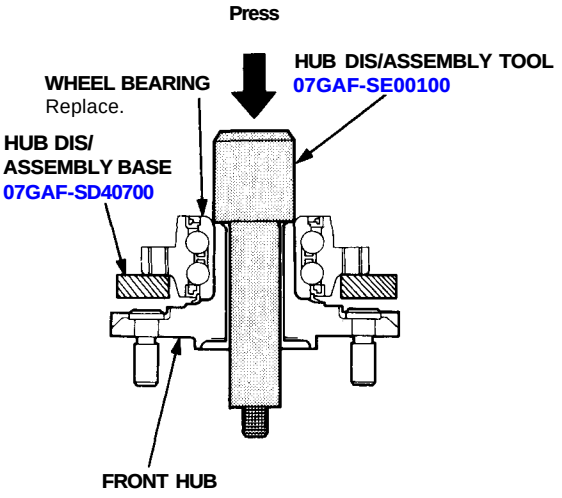
Knuckle/Hub (cont'd)

3. Remove the four flange bolts, then separate the hub unit from the brake disc.

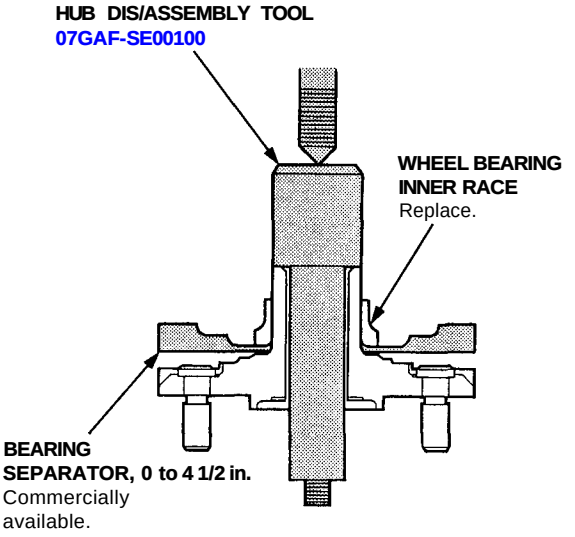


4. Separate the wheel bearing from the front hub using the special tools and a press as shown.

CAUTION: Hold onto the hub to keep it from falling when pressed clear.



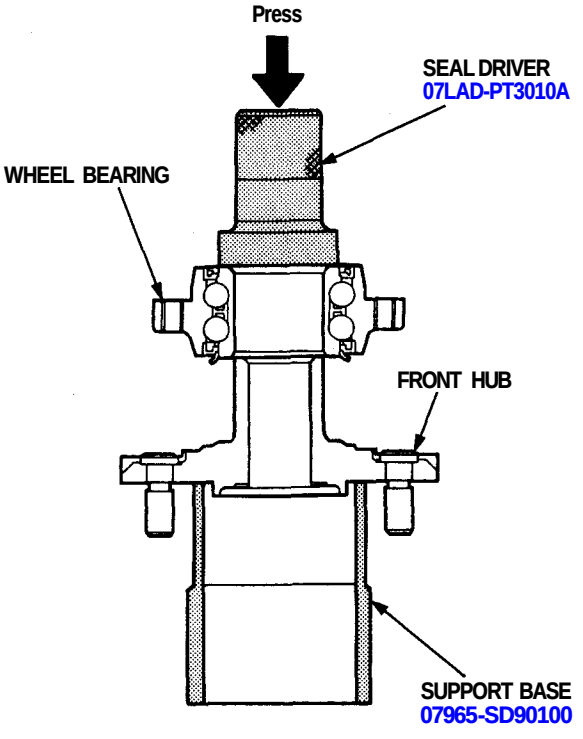
5. Press the wheel bearing inner race from the hub using the special tools and a commercially-available bearing separator as shown.



6. Replace the bearing with a new one after removal.

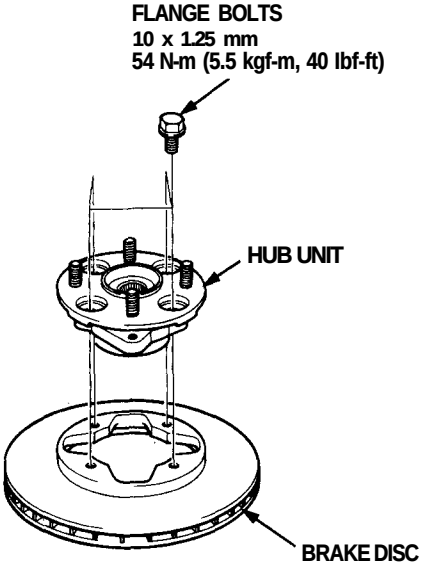
NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

7. Press a new wheel bearing into the hub using the special tools and a press as shown.



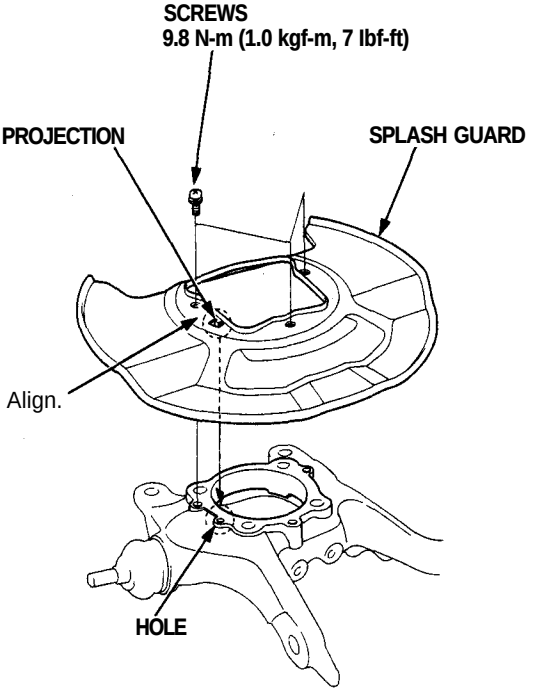
8. Install the hub unit on the brake disc, and tighten the flange bolts.

NOTE: Before installing the hub unit, clean the mating surfaces of the hub unit and brake disc.

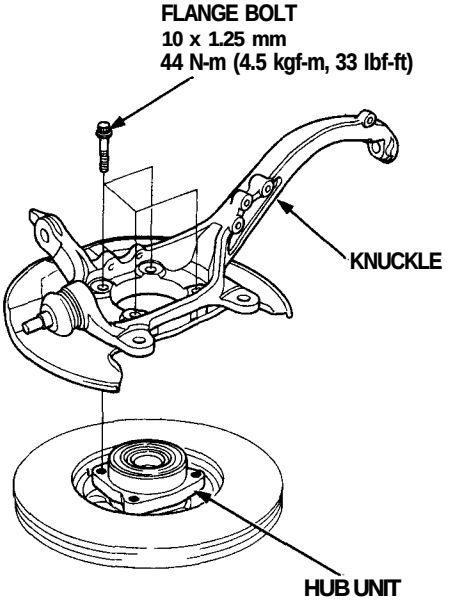


9. If necessary, install the splash guard and tighten the screws.

NOTE: Align the projection in the splash guard with the hole on the knuckle.



10. Install the knuckle on the hub unit, and tighten the flange bolts.



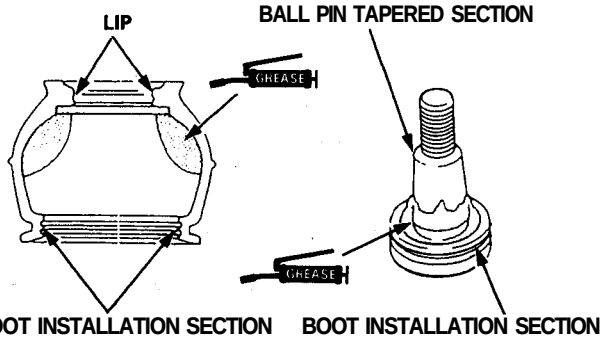
(cont'd)

Ball Joint Boot Replacement

1. Remove the set ring and the boot.

   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



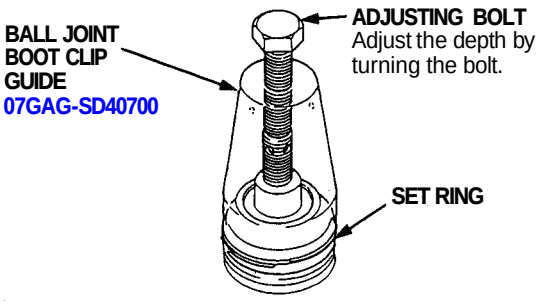
3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**

4. Install the boot in the groove of the boot installation section securely, then bleed air.

5. Install the upper and lower ball joint boot set rings using the special tools as follows:

   Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.



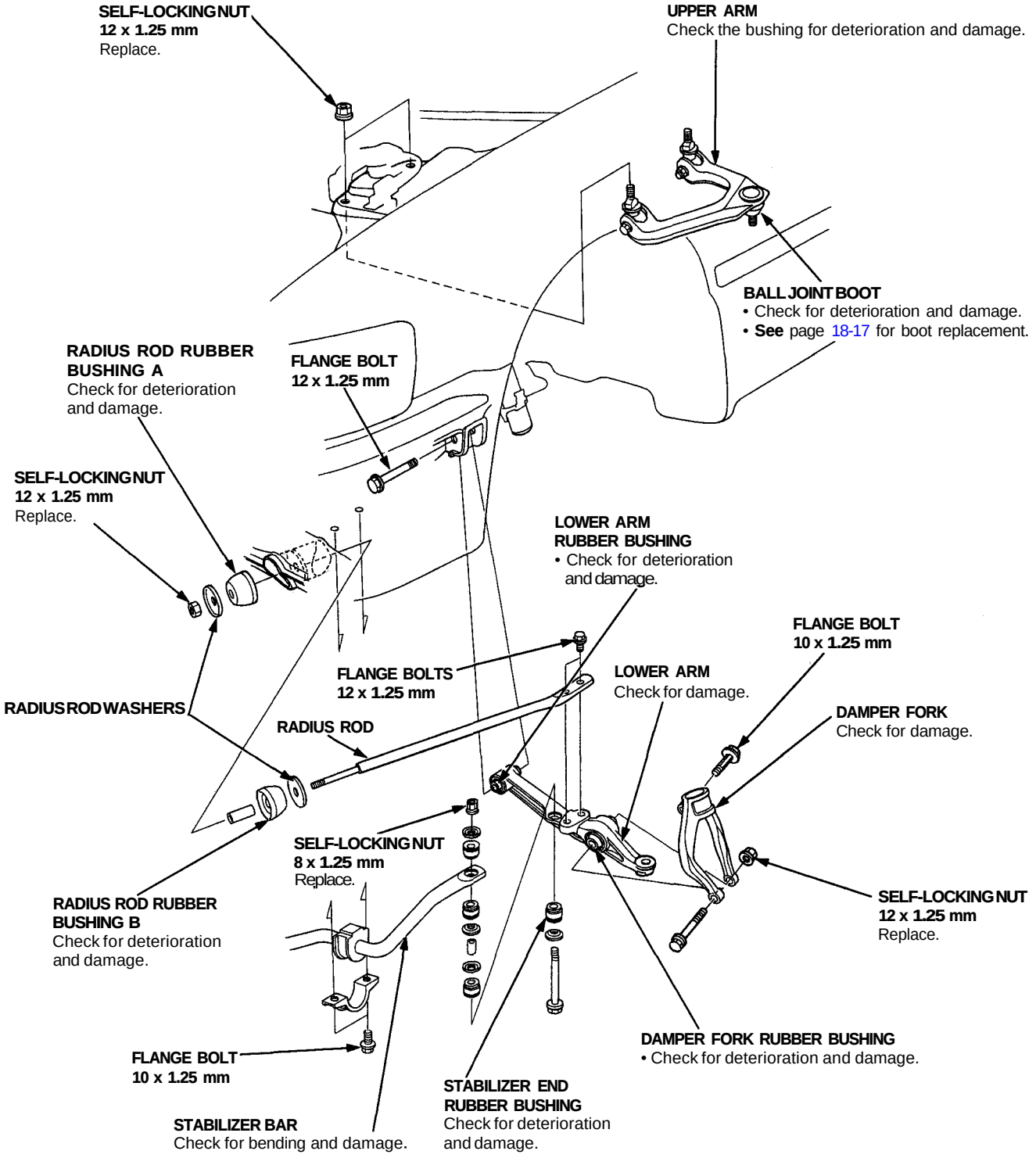
CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary-

Front Suspension

Suspension Arms

Removal/Inspection

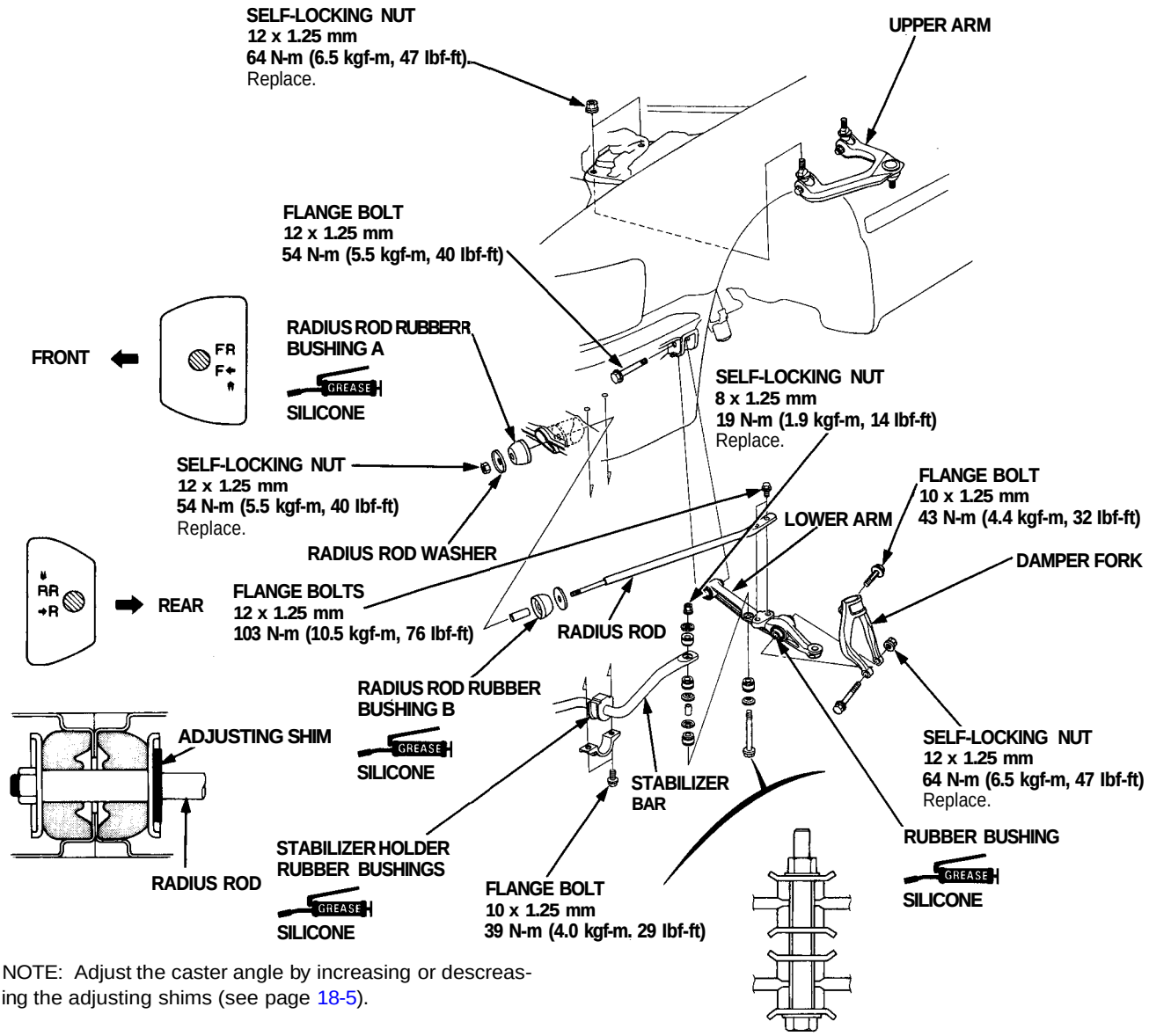
CAUTION: Replace the self-locking nuts after removal.



Installation

CAUTION: The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE:
- Wipe off the dirt, oil or grease from the threads before tightening the fasteners.
- The right and left damper forks are not interchangeable. The left damper fork is marked with "W5L" while the right damper fork is marked with "W5R".
- The right and left upper arms are not interchangeable. The left upper arm is marked with "L5J" while the right arm is marked with "R5J".
- The stabilizer bar is symmetrical. Install with the paint mark facing rear of the vehicle.
- After installing the suspension arm, check the front wheel alignment, and adjust if necessary (see page 18-5).



NOTE: Adjust the caster angle by increasing or descreasing the adjusting shims (see page 18-5).

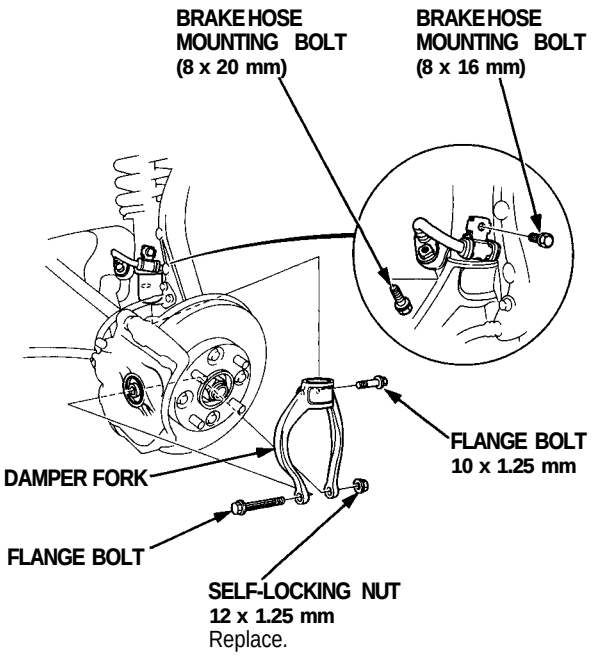
CAUTION: Do not interchange the radius rod rubber bushings.

Front Damper

Removal

1. Remove the front wheels (see page 18-10).

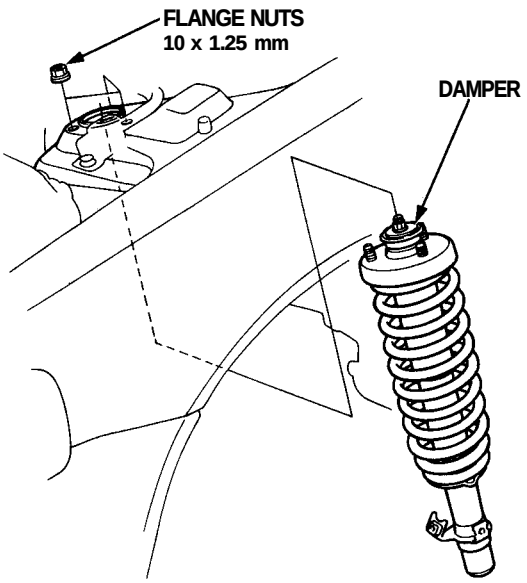
2. Remove the brake hose mounting bolts from the damper.



3. Remove the flange bolt.

4. Remove the flange bolt and self-locking nut, then remove the damper fork.

5. Remove the damper by removing the three flange nuts.

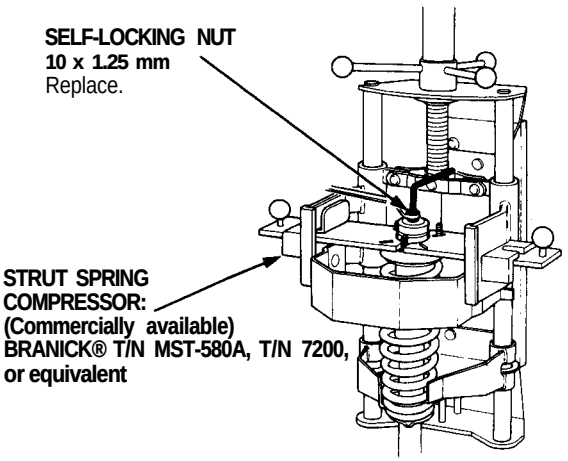


Disassembly/Inspection

Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

CAUTION: Do not compress the spring more than necessary to remove the nut.



2. Remove the spring compressor, then disassemble the damper as shown on the next page.

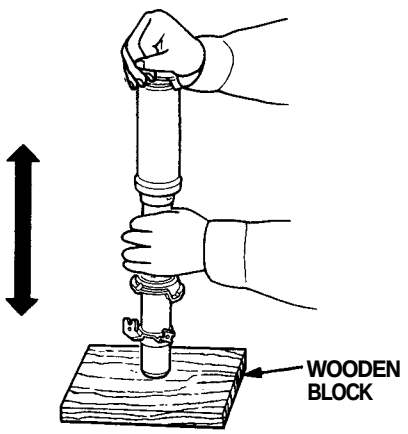
Inspection

1. Reassemble all parts, except the spring.

2. Push on the damper as shown.

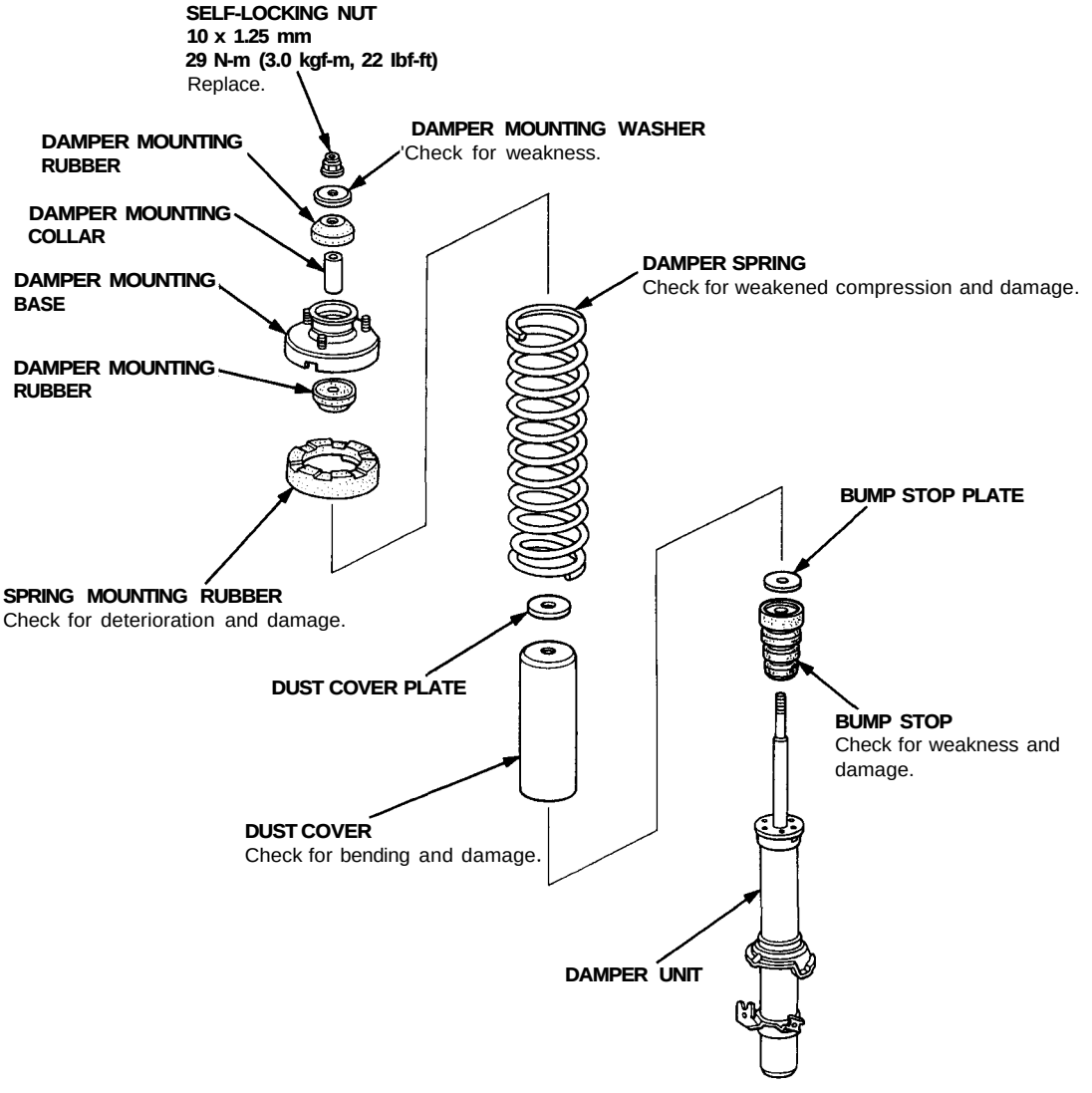
3. Check for smooth operation through a full stroke, both compression and extension.

NOTE: The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.



4. Check for oil leaks, abnormal noises or binding during these tests.

Inspection


SELF-LOCKING NUT
10 x 1.25 mm
29 N-m (3.0 kgf-m, 22 lbf-ft)
Replace.
DAMPER MOUNTING WASHER
Check for weakness.
DAMPER MOUNTING RUBBER
DAMPER MOUNTING COLLAR
DAMPER MOUNTING BASE
DAMPER MOUNTING RUBBER
DAMPER SPRING
Check for weakened compression and damage.
BUMP STOP PLATE
SPRING MOUNTING RUBBER
Check for deterioration and damage.
DUST COVER PLATE
BUMP STOP
Check for weakness and damage.
DUST COVER
Check for bending and damage.
DAMPER UNIT

Front Damper

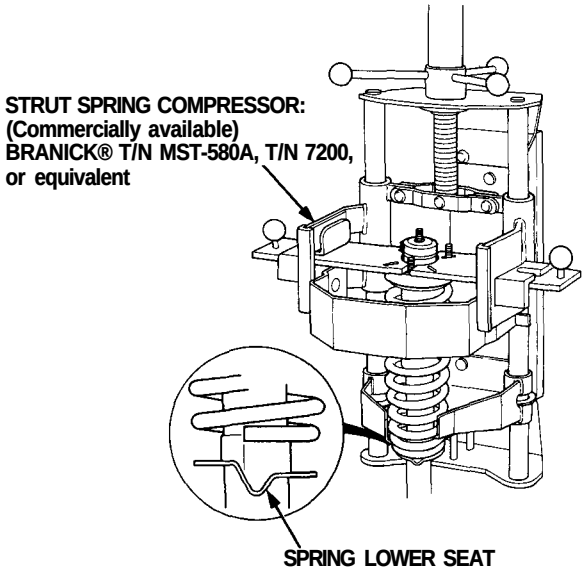
Reassembly

1. Install the damper unit on a spring compressor.

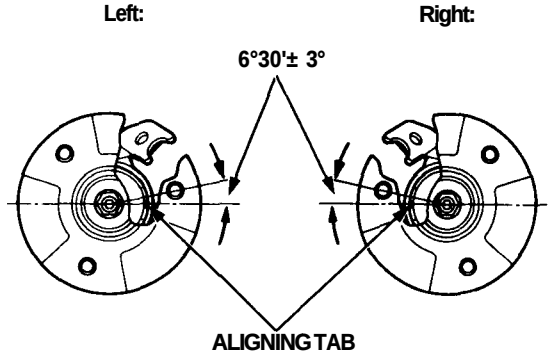
   NOTE: Follow the manufacturer's instructions.

2. Assemble the damper in reverse order of disassembly, except the damper mounting washer and self-locking nut.

   NOTE: Align the bottom of damper spring and spring lower seat as shown.



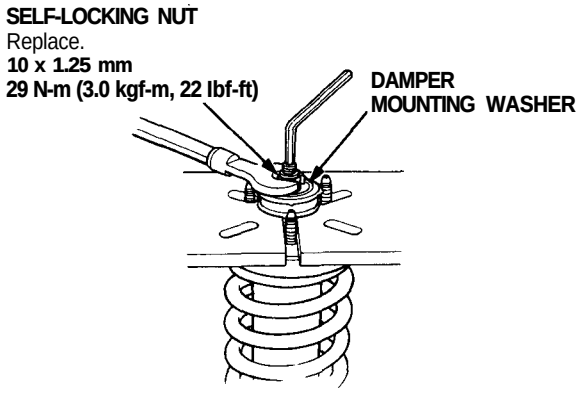
3. Position the damper mounting base on the damper unit as shown.



4. Compress the damper spring with the spring compressor.

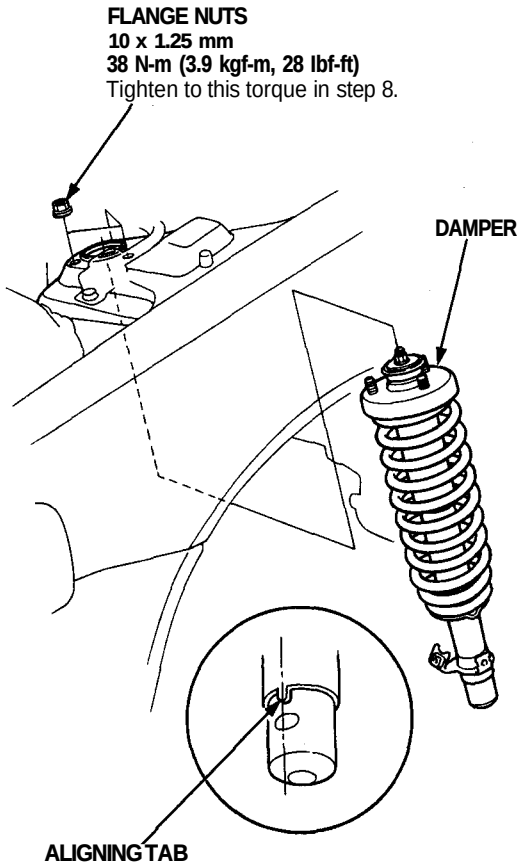
5. Install the damper mounting washer, then loosely install a new self-locking nut.

6. Hold the damper shaft with a hex wrench, and tighten the self-locking nut.



Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the three flange nuts.



2. Install the damper fork over the driveshaft and onto the lower arm. Install the front damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.

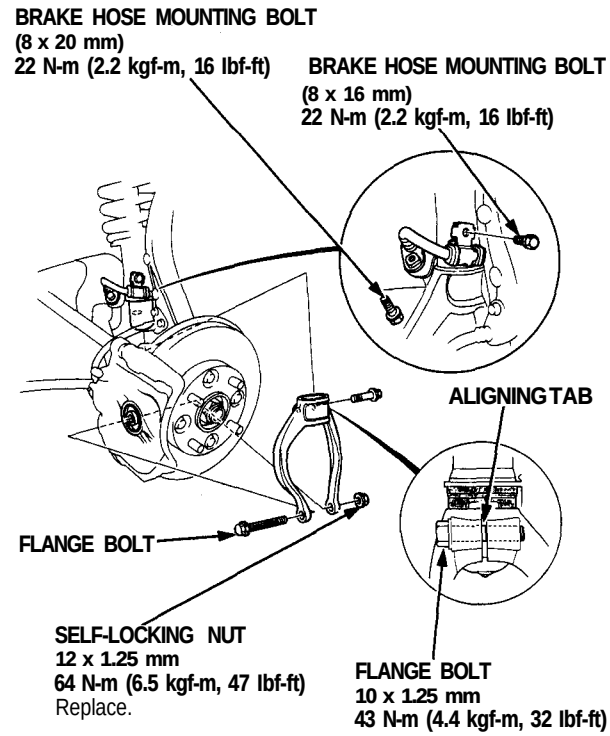
3. Loosely install the flange bolt into the damper fork.

4. Loosely install a new self-locking nut with the flange bolt.

5. Raise the knuckle with a floor jack until the vehicle just lifts off the safety stand.

⚠ WARNING The floor jack must be securely positioned or personal injury may result.

6. Tighten the flange bolt.



7. Tighten the self-locking nut.

8. Tighten the flange nuts on the top of the damper to the specified torque.

9. Install the brake hose mounts with the brake hose mounting bolts.

10. Install the front wheel (see page 18-16).

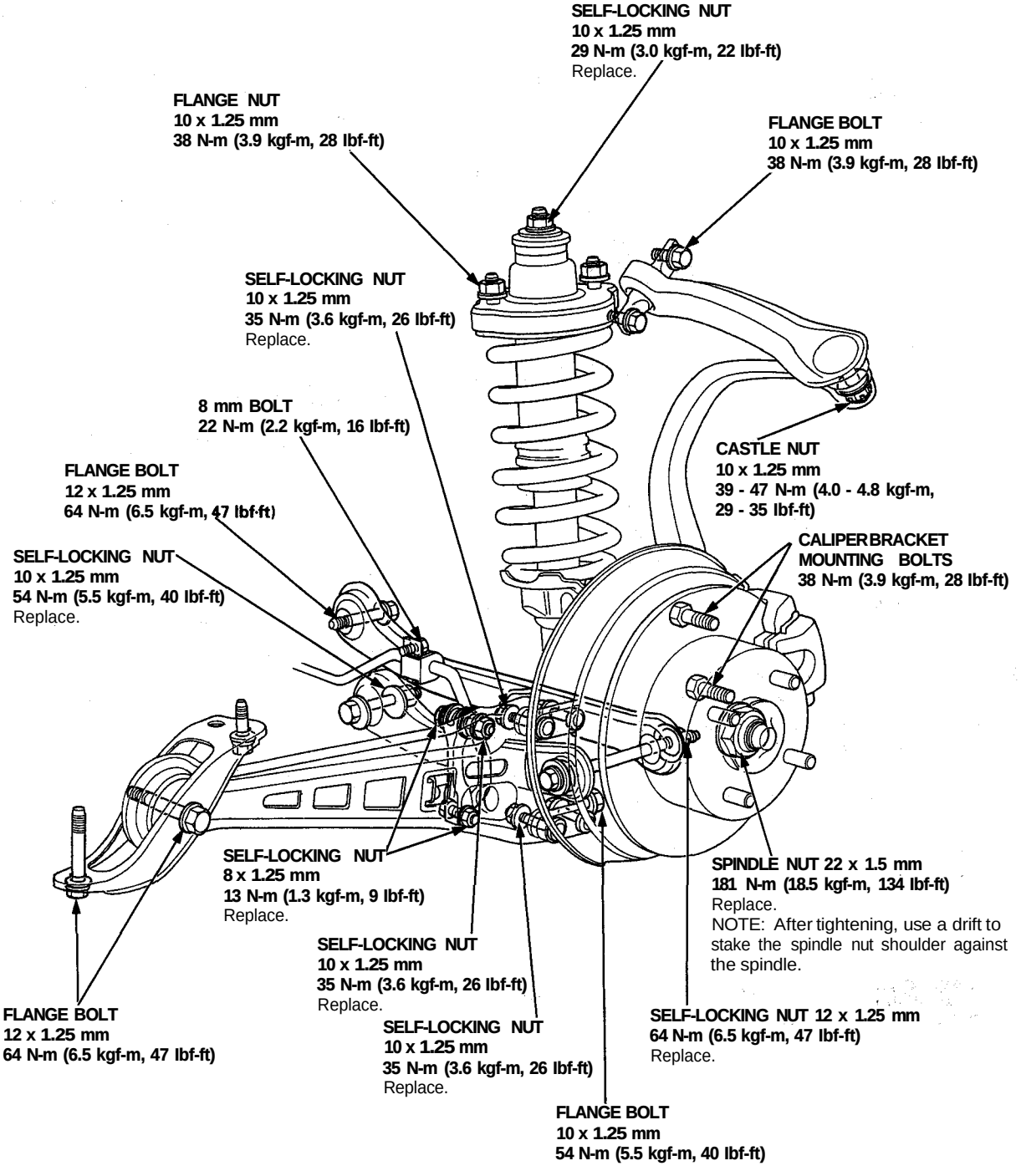
Rear Suspension

Torque Specifications

CAUTION:

- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

NOTE: Wipe off the grease before tightening the nut at the ball joint.

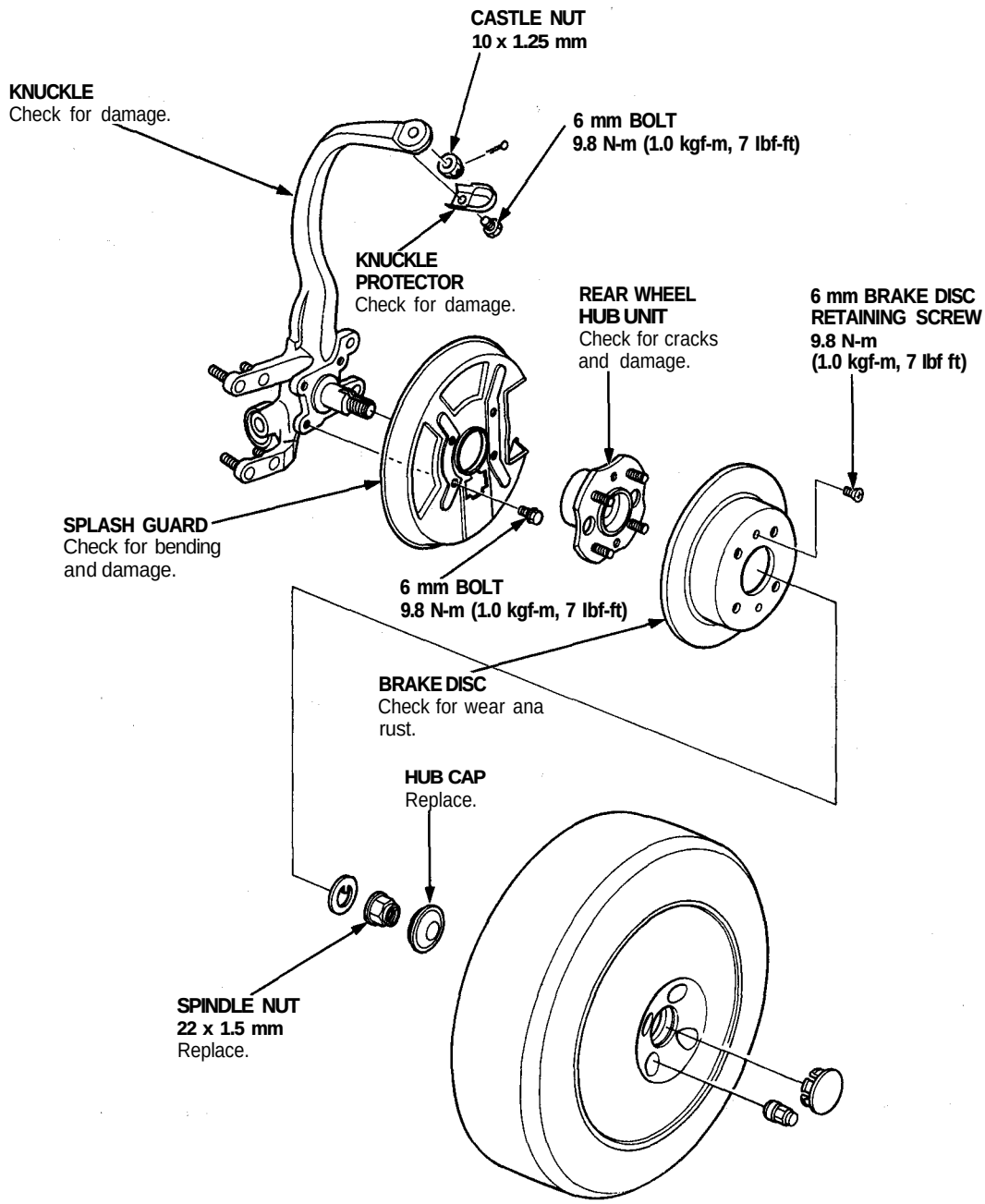


Hub Bearing Unit

Illustrated Index

NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc, clean the mating surfaces of the rear hub and inside of the brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



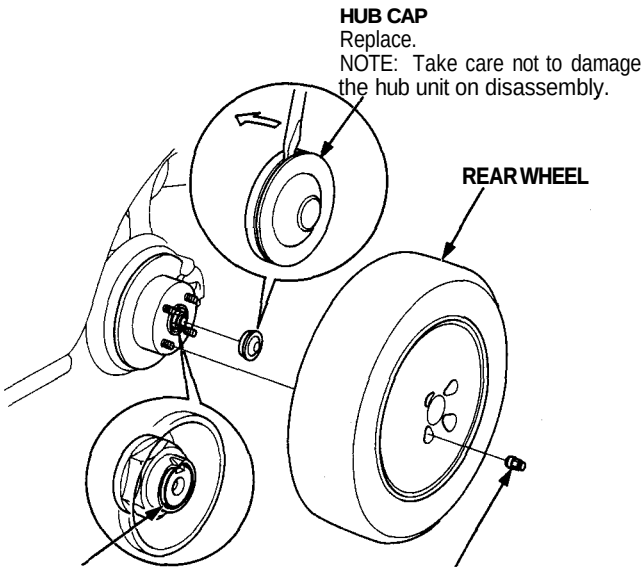
(cont'd)

Rear Suspension

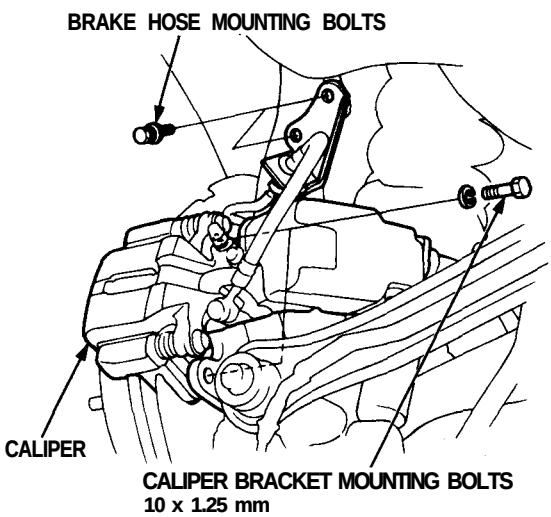
Hub Bearing Unit (cont'd)

Removal

1. Loosen the wheel nuts slightly.
2. Raise the rear of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and rear wheel.

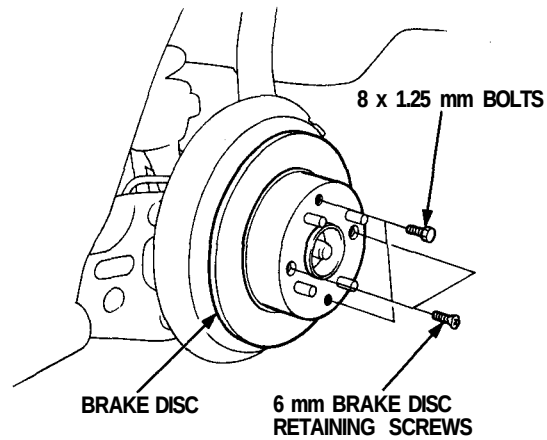


4. Pull the parking brake lever up.
5. Remove the hub cap.
6. Raise the locking tab on the spindle nut, then remove the nut.
7. Remove the brake hose mounting bolts.



8. Remove the caliper bracket mounting bolts and hang the caliper to one side.
   CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.

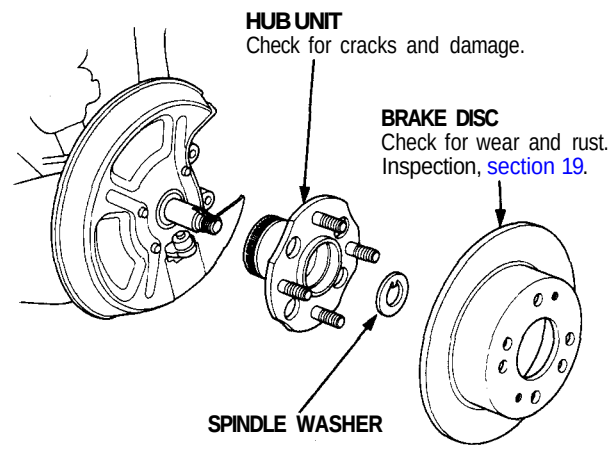
9. Remove the 6 mm brake disc retaining screws.



10. Screw two 8 x 1.25 mm bolts into the disc to push it away from the hub.

    NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.

11. Remove the brake disc.

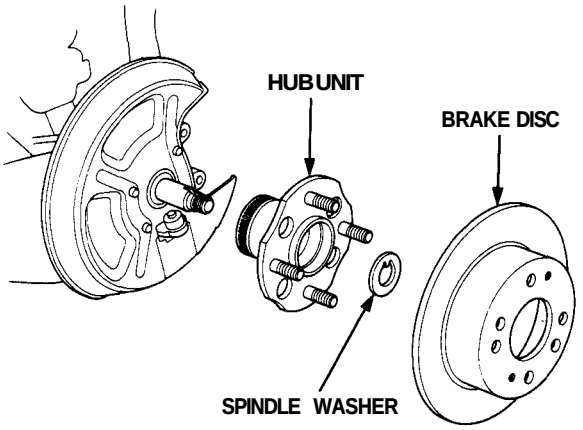


12. Remove the hub unit from the knuckle.

Installation

1. Install the hub unit, spindle washer and brake disc.

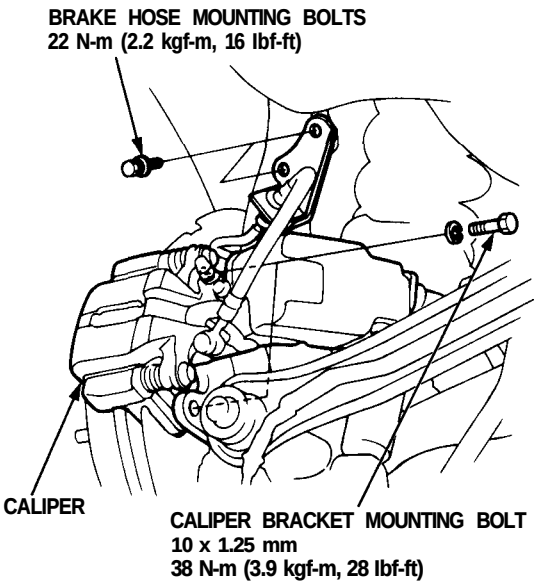
   NOTE:
   - Wash the bearing and spindle thoroughly in high flash point solvent before reassembly.
   - Before installing the brake disc, clean the mating surfaces of the rear hub and brake disc.



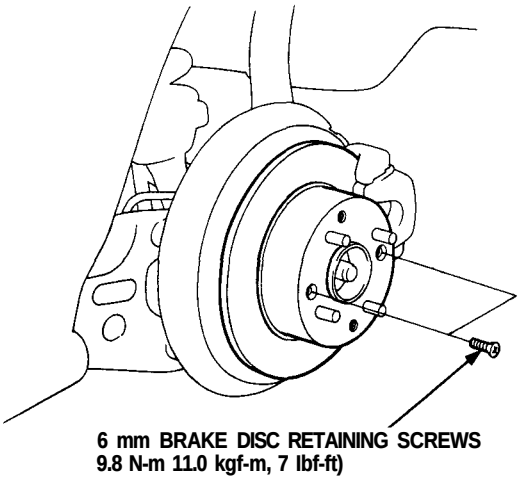
2. Install the brake caliper with the caliper bracket mounting bolts.

3. Install the brake hose with the brake hose mounting bolts.

   CAUTION: Be careful not to twist the hose more than necessary.



4. Tighten the 6 mm brake disc retaining screws.

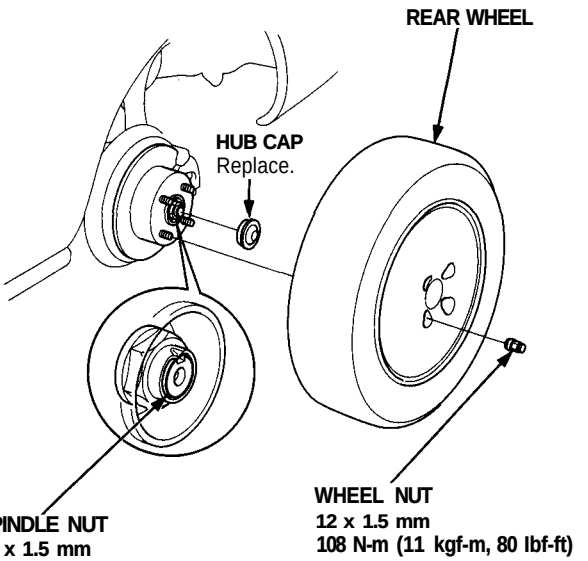


5. Install a new spindle nut, then tighten and stake the nut.

6. Install a new hub cap.

7. Install the rear wheel with the wheel nuts.

   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and wheel.

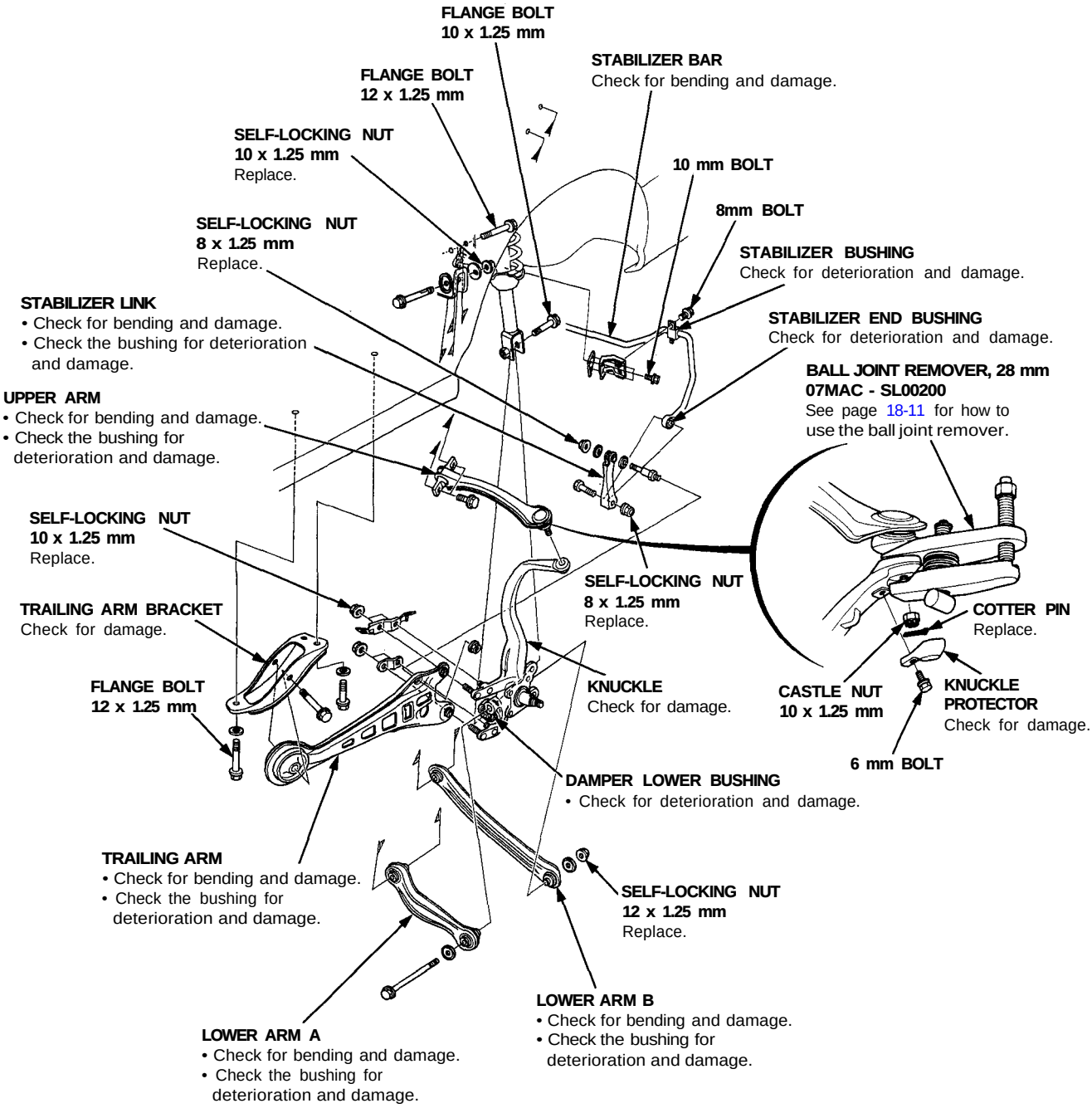


Rear Suspension

Suspension Arms

Removal/Inspection

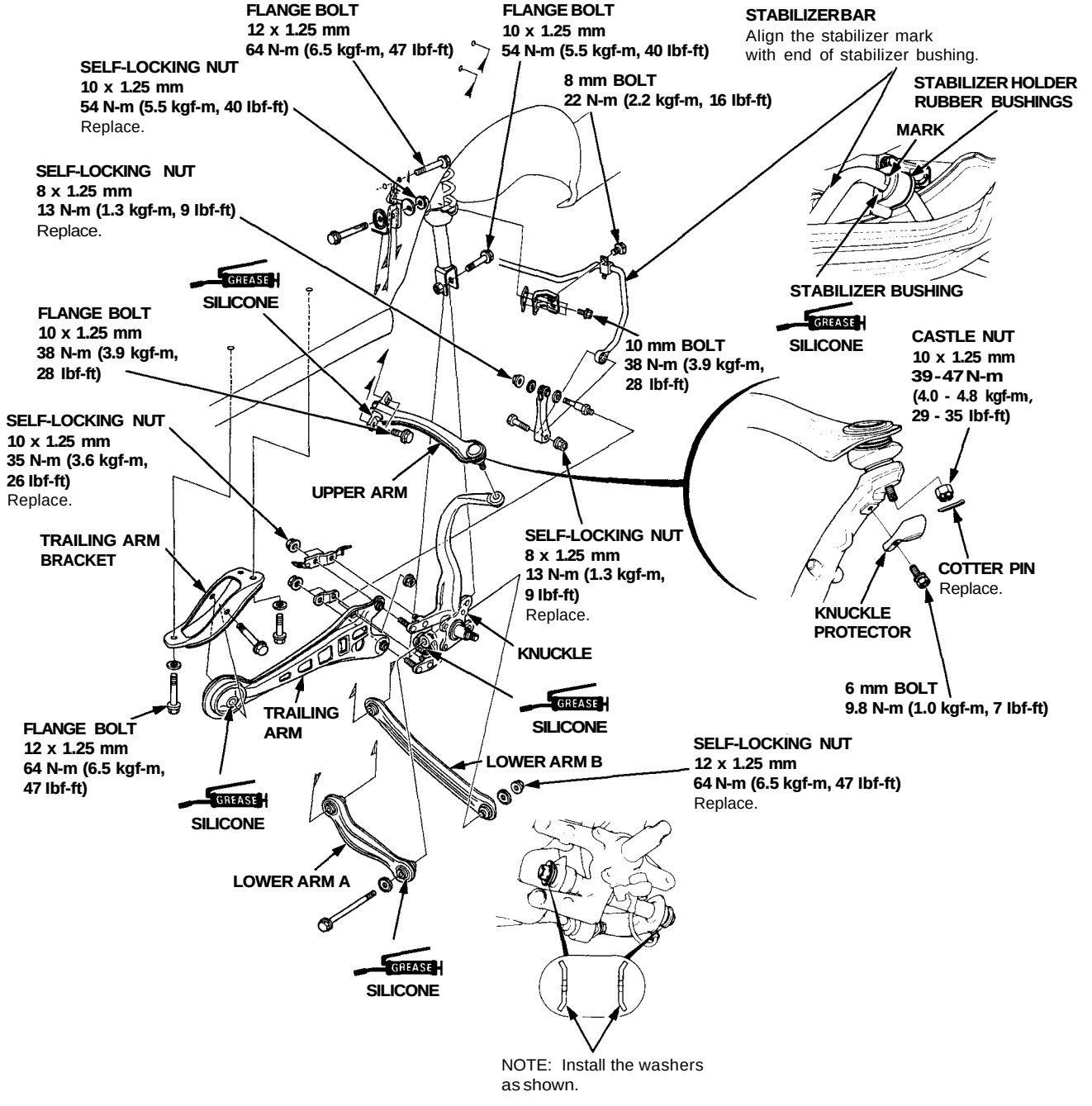
CAUTION:
- **Replace the self-locking nuts after removal.**
- **Be careful not to damage the ball joint boot.**



Installation

CAUTION:
- **Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

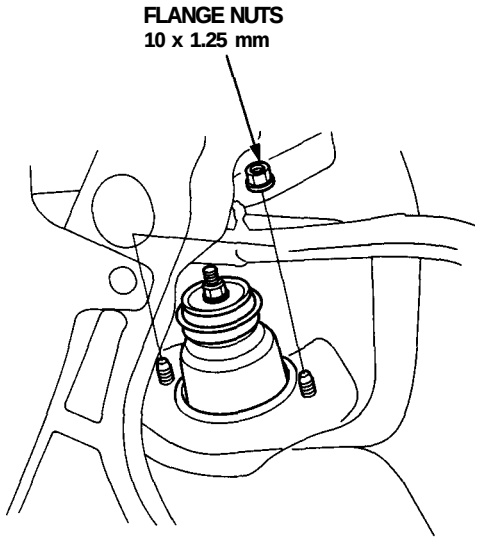
NOTE:
- Wipe off the oil, dirt or grease from the threads before tightening the fasteners.
- Make sure the toe adjuster cams on lower arm A are installed in the same direction.
- The right and left lower arm A are symmetrical. Install so the paint mark of "SM4⬆R UP⬆" and "SM4⬆L UP⬆" point to the front.
- "SM4⬆L UP⬆" is stamped on the left lower arm B and "SM4⬆R UP⬆" on the right lower arm B.
- The left upper arm is stamped with "L" while the right upper arm is stamped with "R".
- After installing the suspension arm, check the rear wheel alignment, and adjust if necessary (see page 18-5).



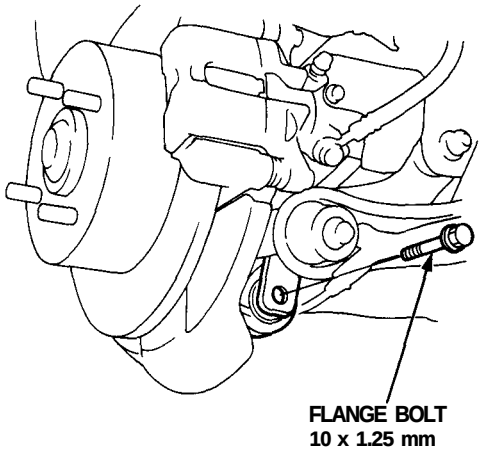
Rear Damper

Removal

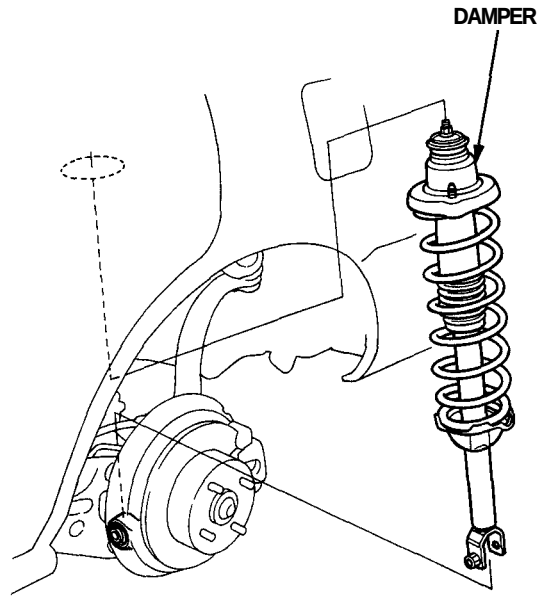
1. Remove the rear wheels (see page 18-26).
2. Remove the rear seat (see section 20).
3. Pull back the front of the quarter trim panel, and remove the two flange nuts.



4. Remove the flange bolt.



5. Lower the rear suspension and remove the damper.

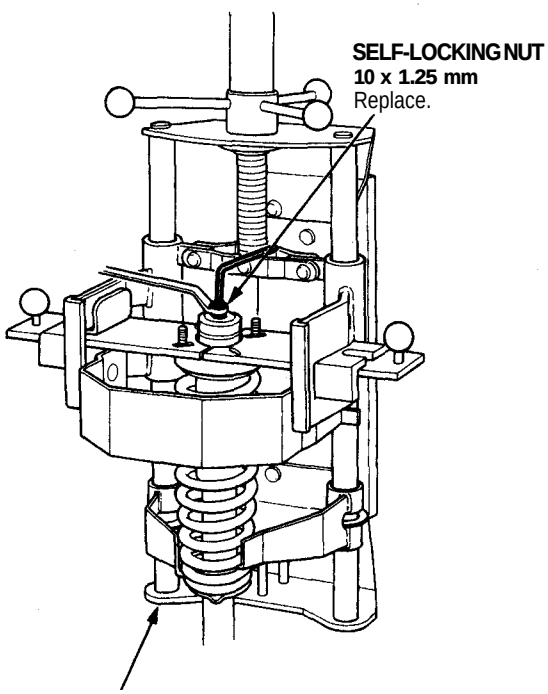


Disassembly/Inspection

Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

   CAUTION: Do not compress the spring more than necessary to remove the self-locking nut.

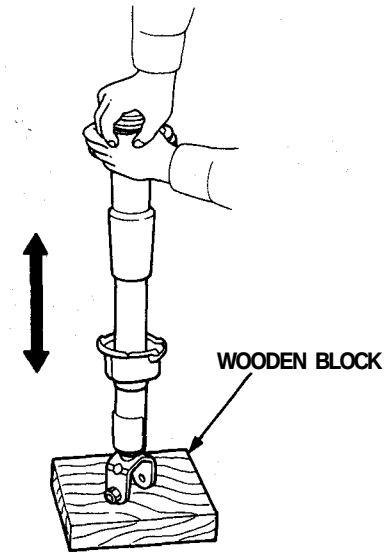


2. Remove the spring compressor, then disassemble the damper as shown on the next page.

Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper as shown.
3. Check for smooth operation through a full stroke, both compression and extension.

   NOTE: The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.

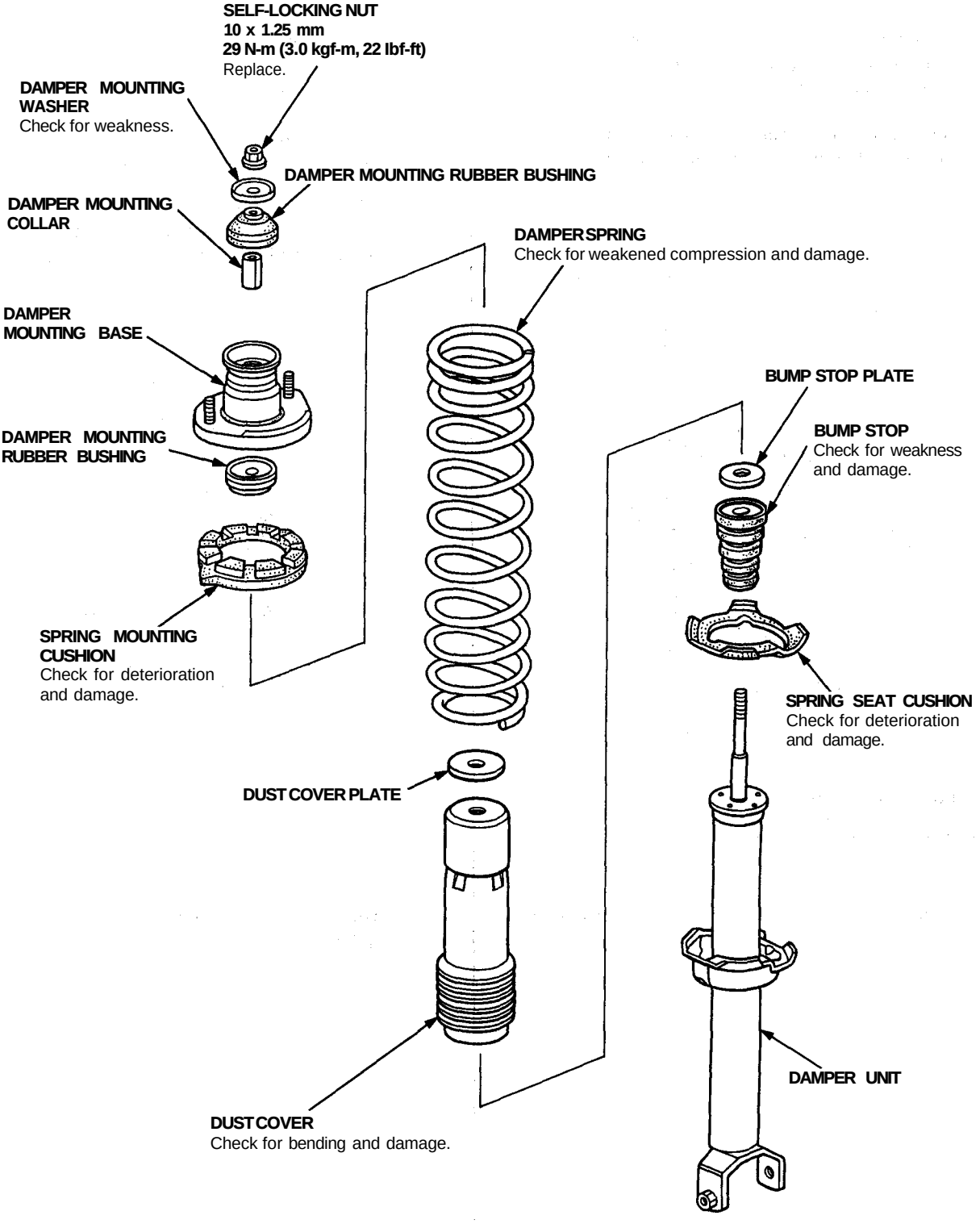


4. Check for oil leaks, abnormal noises or binding during these tests.

(cont'd)

Rear Damper

Disassembly/Inspection (cont'd)



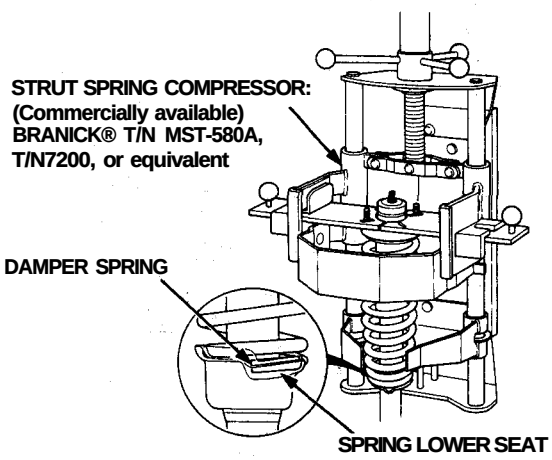
Reassembly

1. Install the damper unit on a spring compressor.

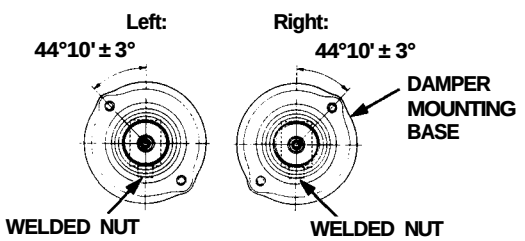
   NOTE: Follow the manufacturer's instructions.

2. Assemble the damper in reverse order of disassembly, except the damper mounting washer and self-locking nut.

   NOTE: Align the bottom of damper spring and spring lower seat as shown.



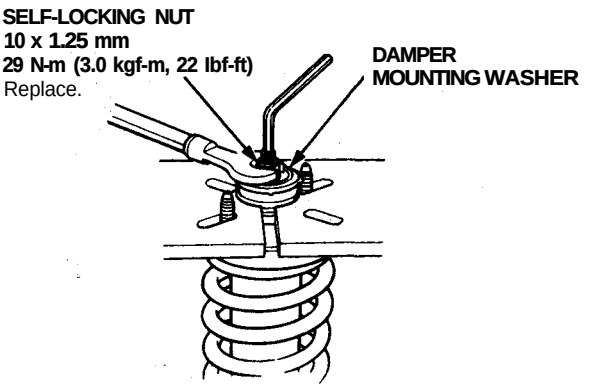
3. Position the damper mounting base on the damper unit as shown.



4. Compress the damper spring with the spring compressor.

5. Install the damper mounting washer, and loosely install a new self-locking nut.

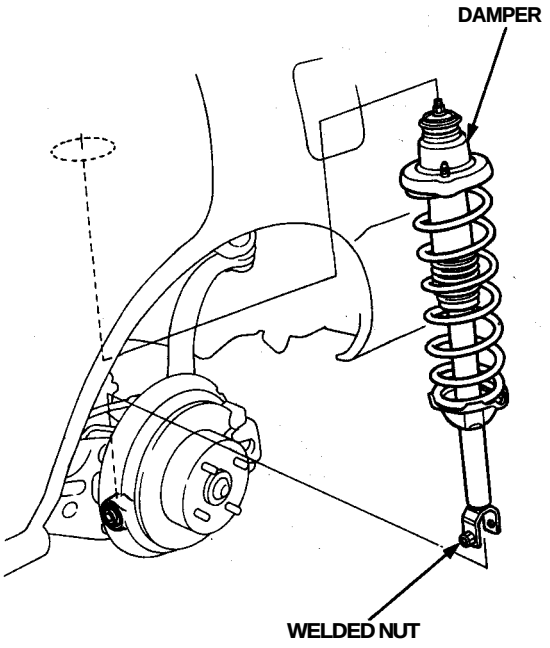
6. Hold the damper shaft with a hex wrench, and tighten the self-locking nut.



Rear Damper

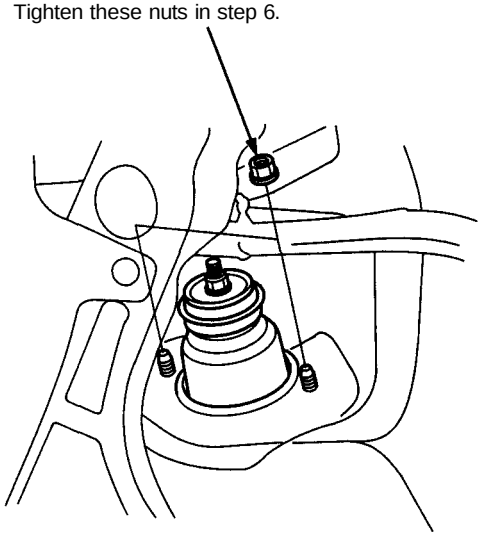
Installation

1. Lower the rear suspension, and position the damper with the welded nut pointed toward the front of the vehicle.



2. Loosely install the two flange nuts.

FLANGE NUTS
10 x 1.25 mm
38 N-m (3.9 kgf-m, 28 lbf-ft)
Tighten these nuts in step 6.

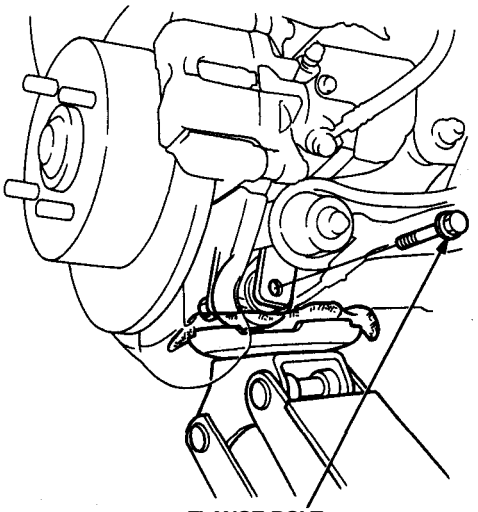


3. Loosely install the flange bolt.

4. Raise the rear suspension with a floor jack until the vehicle just lifts off the safety stand.

WARNING The floor jack must be securely positioned or personal injury may result.

5. Tighten the flange bolt.



FLANGE BOLT
10 x 1.25 mm
54 N-m (5.5 kgf-m, 40 lbf-ft)

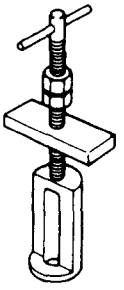
6. Tighten the two flange nuts on top of the damper to the specified torque.

7. Install the rear seat (see section 20).

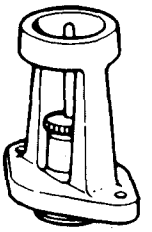
8. Install the rear wheels (see page 18-27).

Special Tools

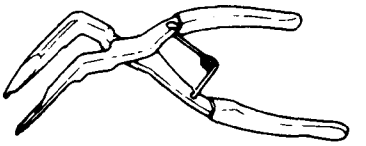
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAE-SG00100	Brake Spring Compressor	1	19-23, 19-27
②	07JAG-SD40100	Pushrod Adjustment Gauge	1	19-15, 19-70a
③	07914-SA50000	Snap Ring Pliers	1	19-23, 19-27



①



②

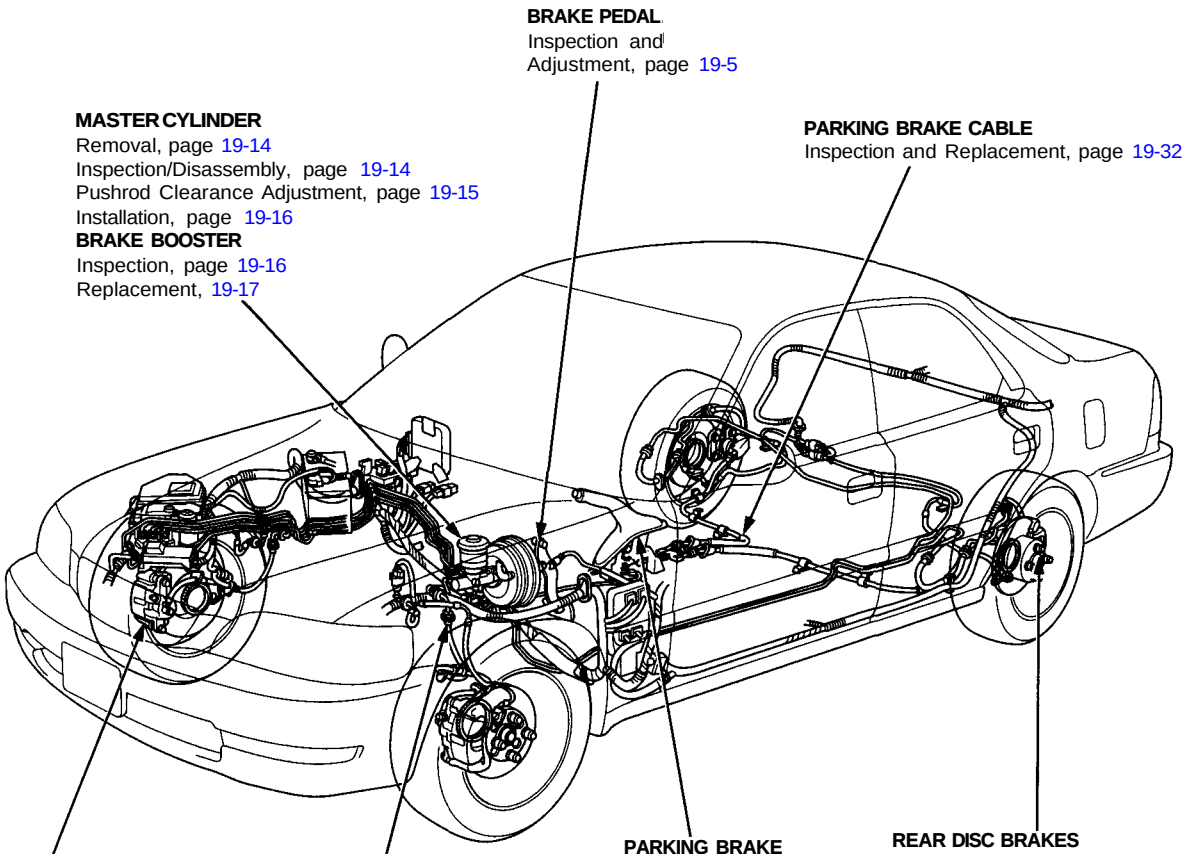


③

Component Locations

Index

⚠ WARNING The accumulator contains high-pressure nitrogen gas; do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



Inspection and Adjustment

Brake System Rubber Parts and Brake Booster

Ⓐ Brake Booster

Check brake operation by applying the brakes.
If the brakes do not work properly, check the brake booster. Replace the brake booster as an assembly if it does not work properly or if there are signs of leakage.

Ⓑ Piston Cup and Pressure Cup Inspection

- Check brake operation by applying the brakes.
  Visually check for damage or signs of fluid leakage.
  Replace the master cylinder as an assembly if the pedal does not work properly or if there is damage or signs of fluid leakage.

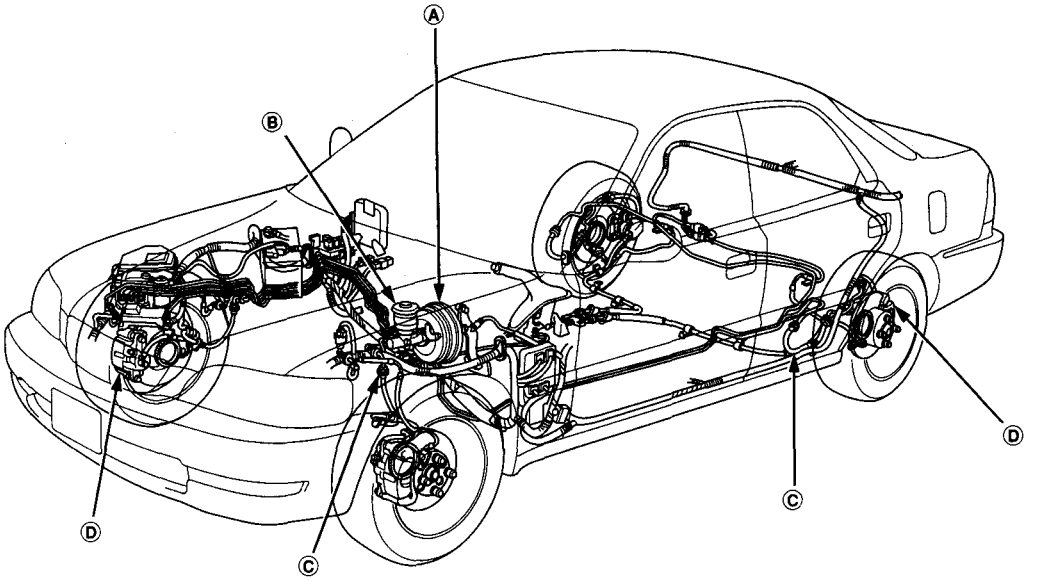
- Check for a difference in brake pedal stroke between quick and slow brake applications. Replace the master cylinder if there is a difference in pedal stroke.

Ⓒ Brake Hoses

Visually check for damage or signs of fluid leakage.
Replace the brake hose with a new one if it is damaged or leaking.

Ⓓ Caliper Piston Seal and Piston Boots

Check brake operation by applying the brakes.
Visually check for damage or signs of fluid leakage.
If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the brake caliper. Replace the boots and seals with new ones whenever the brake caliper is disassembled.



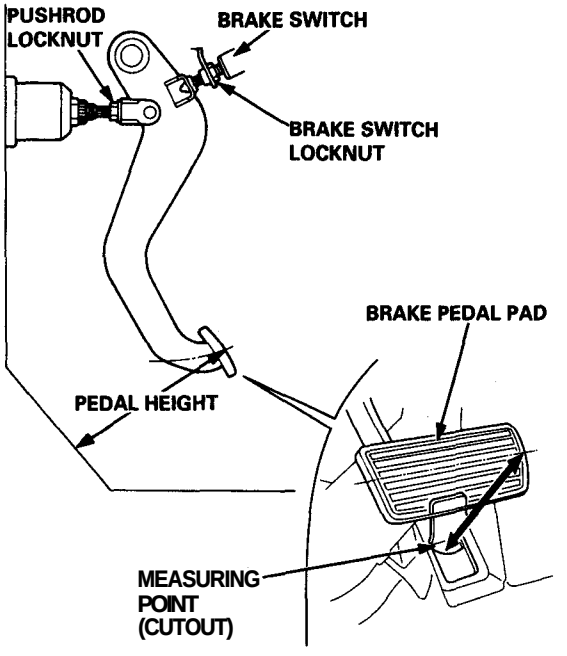
Inspection and Adjustment

Brake Pedal

Pedal Height

1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.

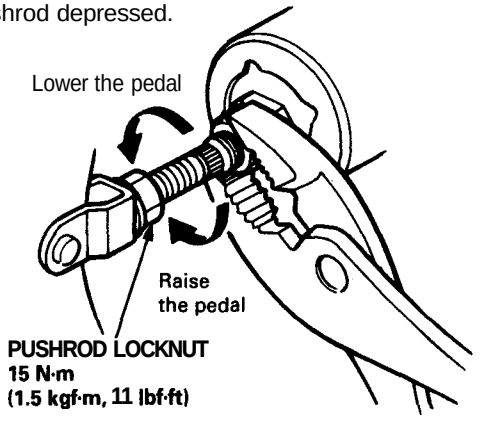
2. Turn up the carpet, and measure the pedal height from the right side center of the pedal pad.



Standard Pedal Height (with carpet removed): 194 mm (7 5/8 in)

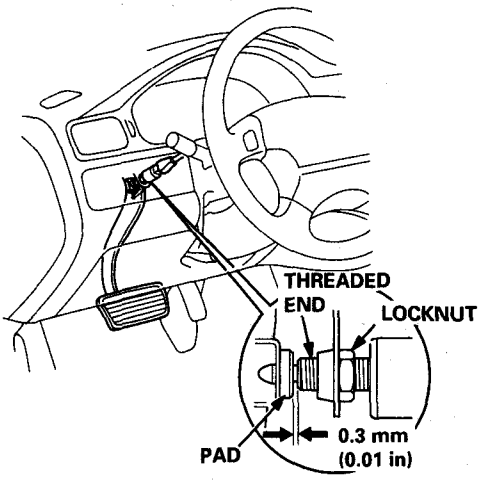
3. Loosen the pushrod locknut, and screw the push rod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly.

NOTE: Do not adjust the pedal height with the pushrod depressed.



4. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.01 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector.

CAUTION: Make sure that the brake lights go off when the pedal is released.



5. Check the brake pedal free play **as** described below.

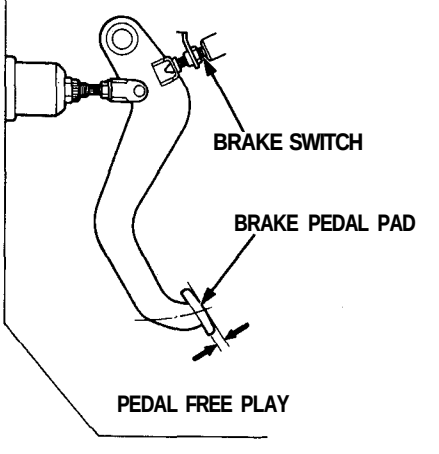
Pedal Free Play

1. With the engine off, inspect the play on the pedal pad by pushing the pedal by hand.

Free Play: 1 – 5 mm (1/16 – 3/16 in)

2. If the pedal free play is out of specification, adjust the brake switch.

CAUTION: If the pedal free play is insufficient, it may result in brake drag.



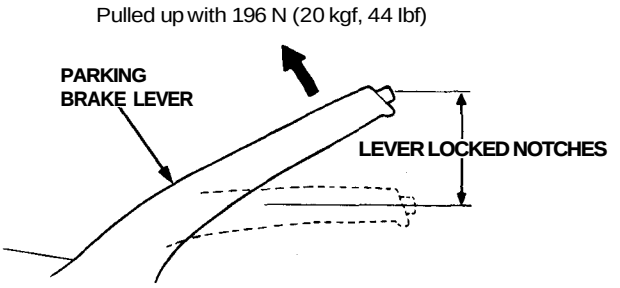
Inspection and Adjustment

Parking Brake

Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully apply the parking brake. The parking brake lever should be locked within the specified notches.

   Lever Locked Notches: 7-11



2. Adjust the parking brake if the lever notches are out of specification.

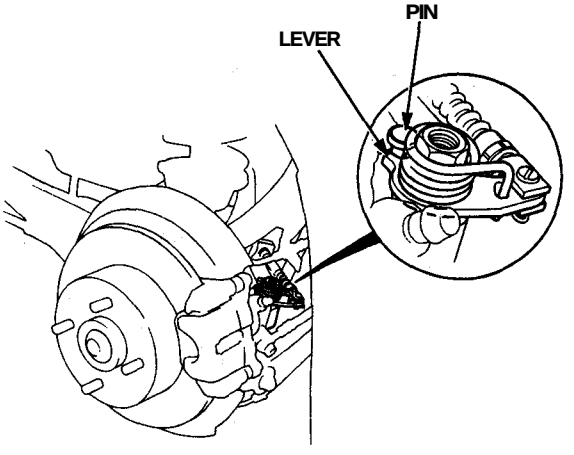
Adjustment

NOTE: After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine, and depress the brake pedal several times to set the self-adjusting brake before adjusting the parking brake.

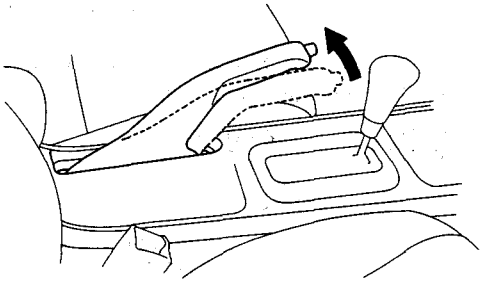
1. Raise the rear wheels off the ground, and support the vehicle on safety stands.

   ⚠ WARNING Block the front wheels before jacking up the rear of the vehicle.

2. Make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.

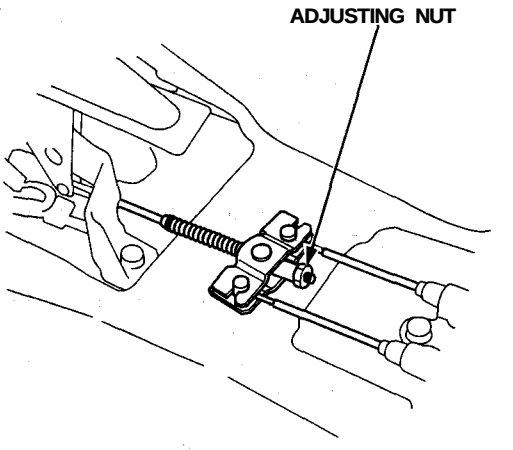


3. Pull the parking brake lever up one notch.



4. Remove the center console (see section 20).

5. Tighten the adjusting nut until the rear wheels drag slightly when turned.



6. Release the parking brake lever fully, and check that the rear wheels do not drag when turned. Readjust if necessary.

7. Make sure that the parking brakes are fully applied when the parking brake lever is pulled up fully.

8. Install the cap onto the parking brake cable end, and reinstall the center console.

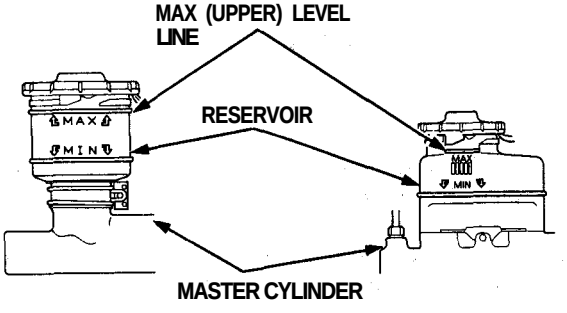
Bleeding

CAUTION:
- **Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not spill brake fluid on the vehicle, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

NOTE: The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of bleeding procedure, and checked after bleeding each brake caliper. Add fluid as required.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.

'95 - 96 models: **'97 - 98 models:**



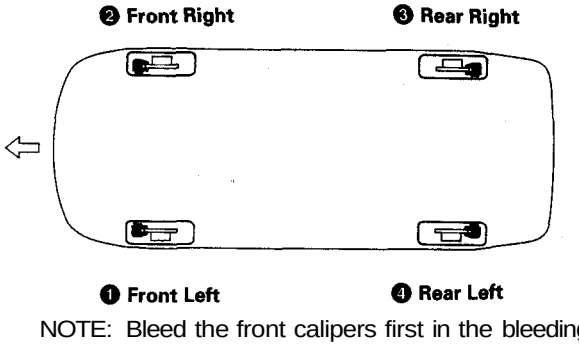
2. Have someone slowly pump the brake pedal several times, then apply steady pressure.

3. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

4. Repeat the procedure for each wheel in the sequence shown below, until air bubbles no longer appear in the fluid.

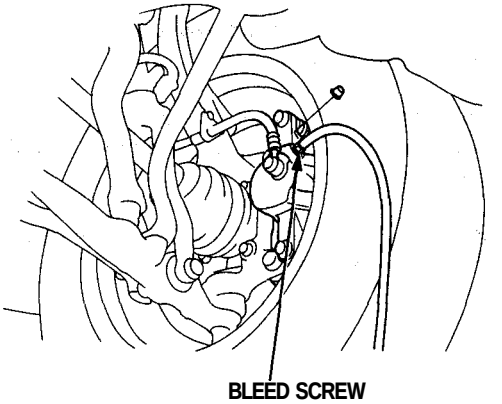
5. Refill the reservoir of master cylinder to the MAX (upper) level line.

BLEEDING SEQUENCE:

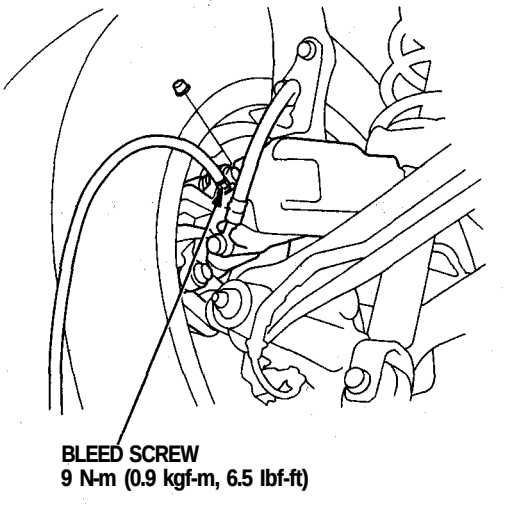


NOTE: Bleed the front calipers first in the bleeding procedure.

FRONT:



REAR:



Front Brake Pads

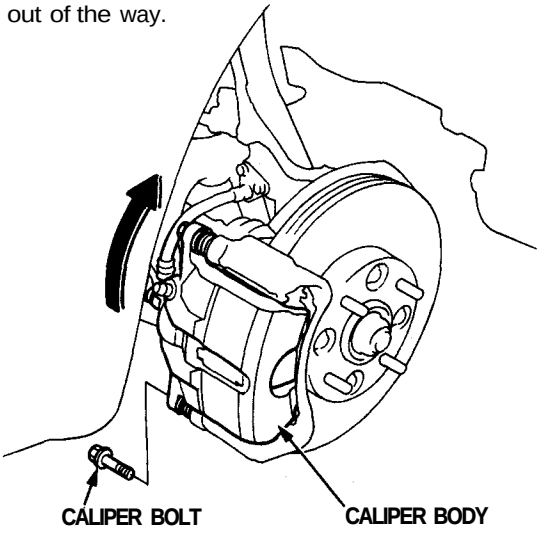
Inspection and Replacement

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**

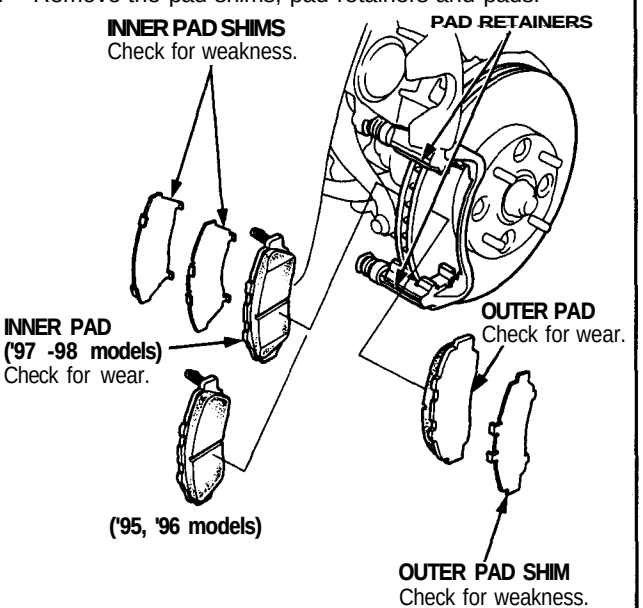
1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.

2. Remove the caliper bolt, and pivot the caliper up out of the way.



NOTE: Check the hoses and pin boots for damage and deterioration.

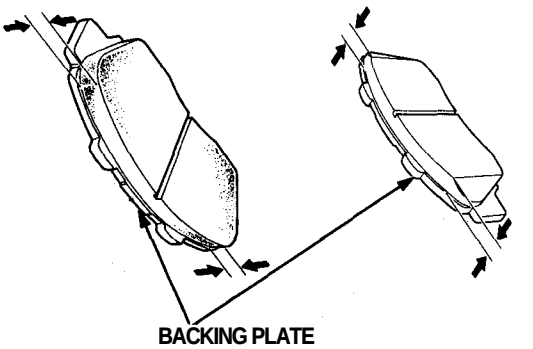
3. Remove the pad shims, pad retainers and pads.



4. Using vernier calipers, measure the thickness of each brake pad lining.

Brake Pad Thickness:
Standard: 10.5-11.5 mm (0.41-0.45 in)
Service Limit: 1.6 mm (0.06 in)

'95 - 96 models: **'97 - 98 models:**



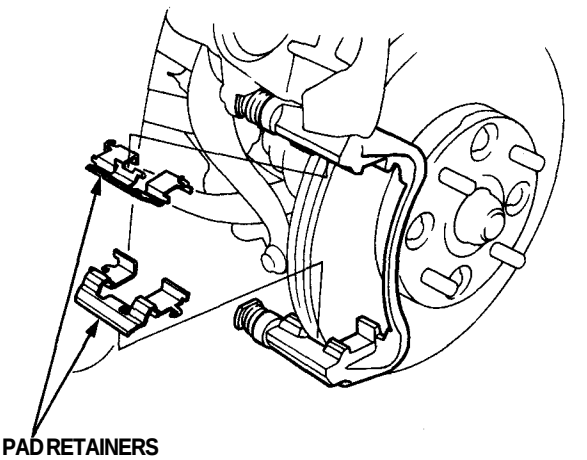
NOTE: Measurement does not include pad backing plate thickness.

5. If the brake pad thickness is less than service limit, replace the front pads as a set.

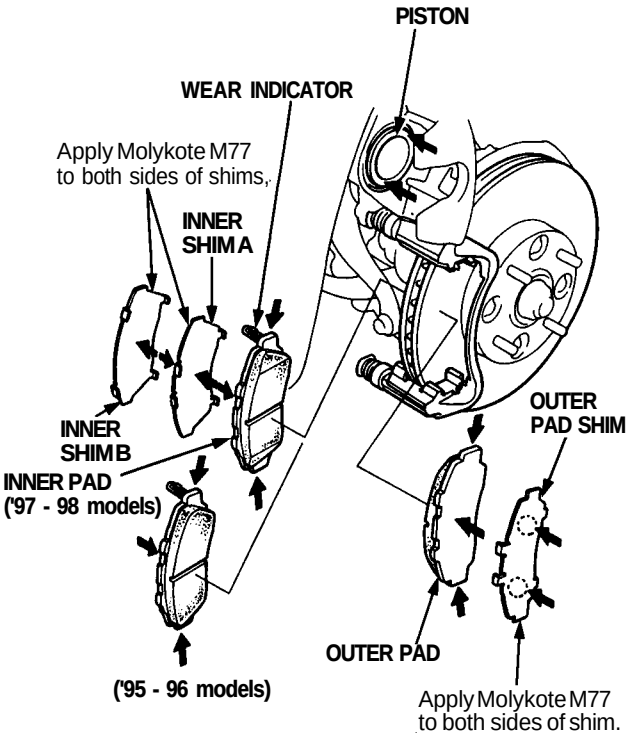
6. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.

7. Check the brake disc for damage and cracks.

8. Install the pad retainers.



9. Apply Molykote M77 grease to both sides of the pad shims and to the back of the pads. Wipe excess grease off the shim.



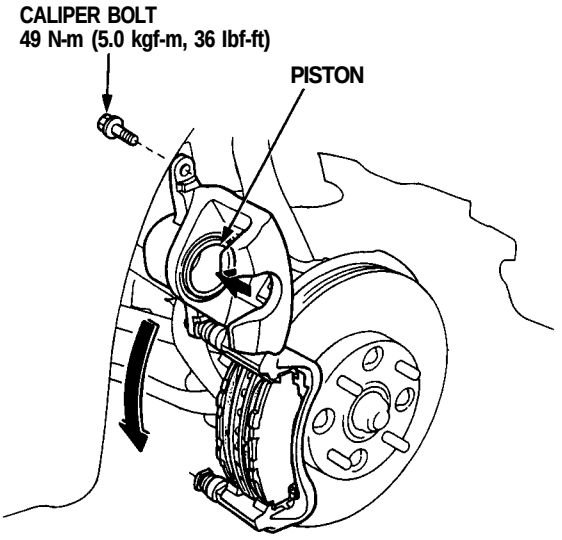
10. Install the brake pads and pad shims correctly.

⚠ WARNING

- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**
- **Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.**

NOTE: Install the pad with the wear indicator on the inside.

11. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.



12. Pivot the caliper down into position, then install the caliper bolt and tighten it.

CAUTION: Be careful not damage the pin boot when pivoting the caliper down.

13. Depress the brake pedal several times to make sure the brakes work, then test-drive.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

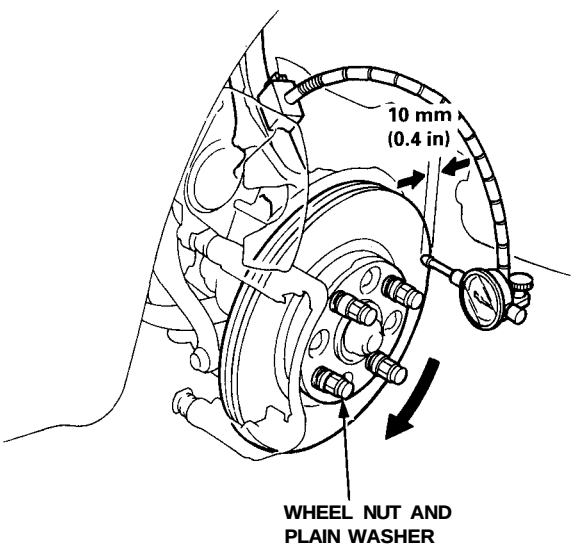
14. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

Front Brake Disc

Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-8).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:
Service Limit: 0.10 mm (0.004 in)



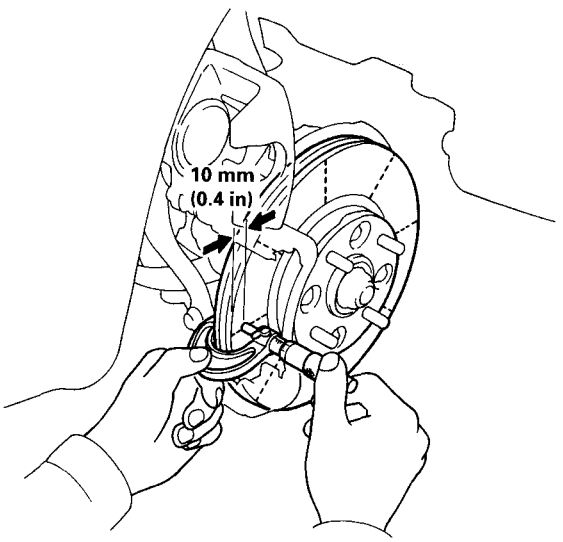
5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-way manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

Max. Refinish Limit: 21.0 mm (0.83 in)

NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in)

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-8).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 22.9 - 23.1 mm (0.90 - 0.91 in)
Max. Refinishing Limit: 21.0 mm (0.83 in)

NOTE: Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

NOTE: See section 18 for brake disc replacement.

Front Brake Caliper

Disassembly

⚠ WARNING

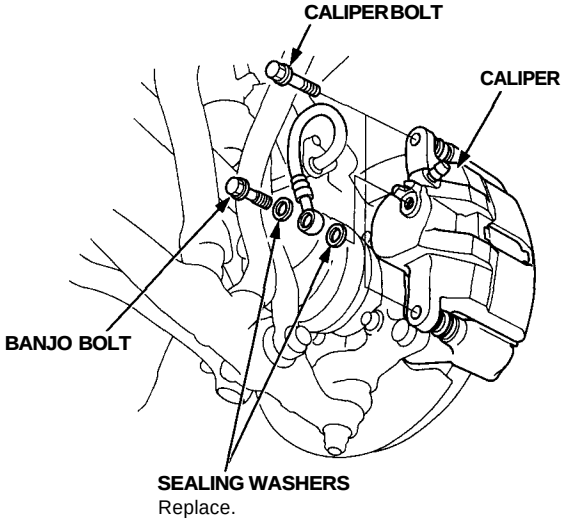
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**

CAUTION:

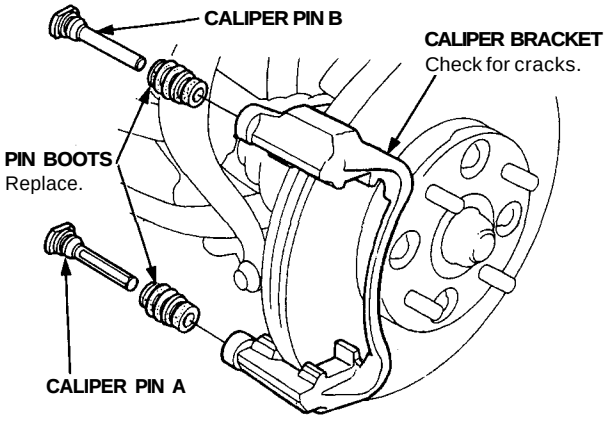
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the banjo bolt, and disconnect the brake hose from the caliper.

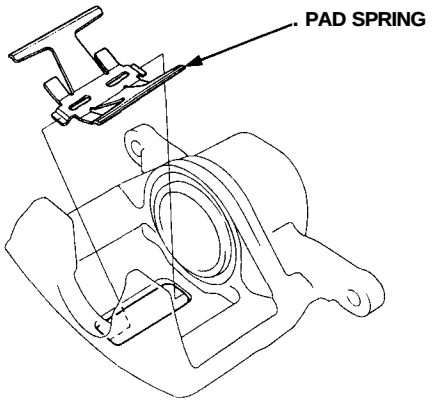
2. Remove the caliper bolts, then remove the caliper from the bracket.



3. Remove the caliper pins and pin boots from the caliper bracket.



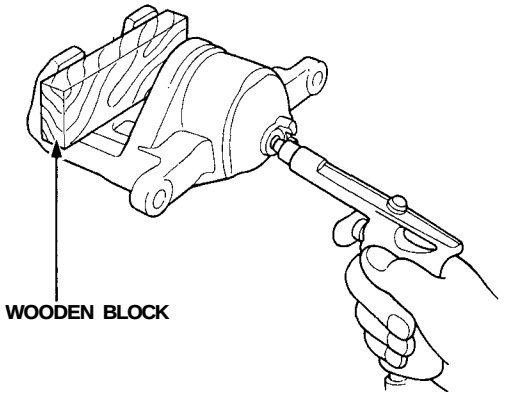
4. Remove the pad spring from the caliper.



5. If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag or wooden block as shown to cushion the piston when it is expelled. Use low pressure air in short spurts.

⚠ WARNING

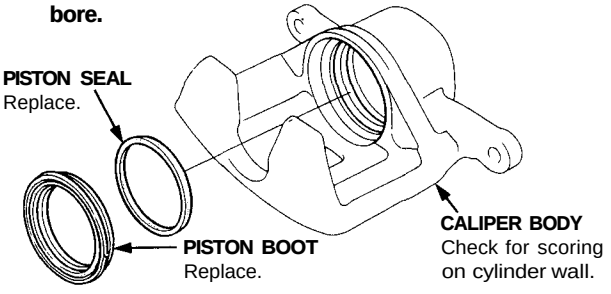
- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA approved 30 PSI nozzle.**



6. Remove the piston from the caliper, and check the piston for scoring.

7. Remove the piston boot and piston seal.

CAUTION: Take care not to damage the cylinder bore.



Front Brake Caliper

Reassembly

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**
- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**

CAUTION:

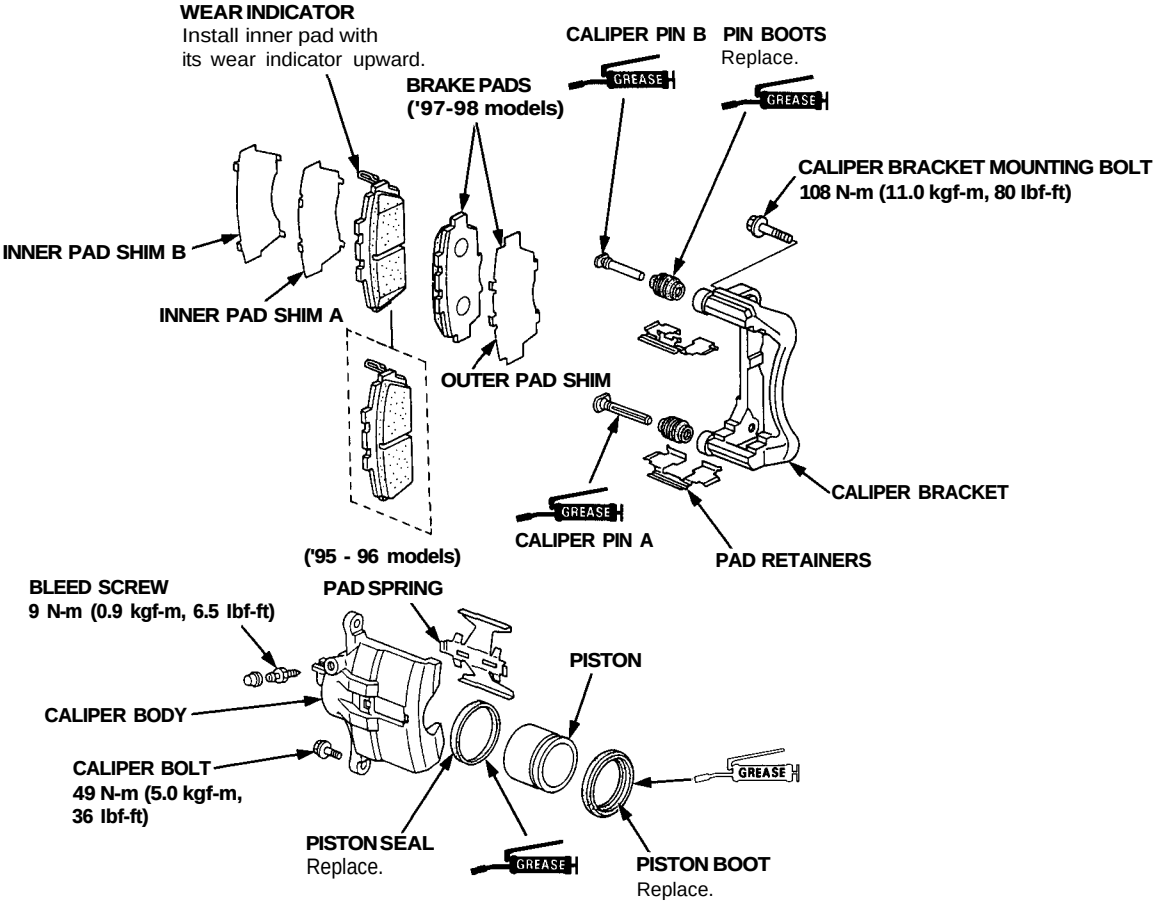
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.**

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

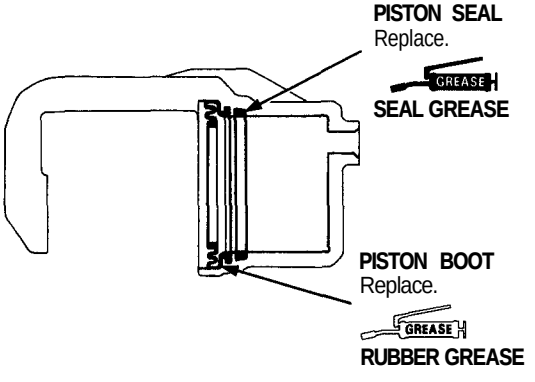
GREASE : Use recommended rubber grease in the caliper seal set.

GREASE : Use recommended seal grease in the caliper seal set.

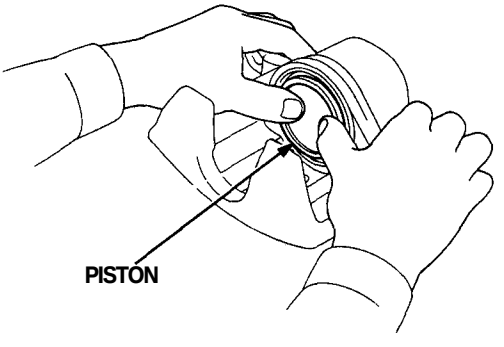


1. Clean the piston and caliper bore with brake fluid, and inspect for wear and damage.
2. Coat a new piston seal with the recommended seal grease in the caliper seal set, and install the seal in the cylinder groove.
3. Apply the recommended rubber grease in the caliper seal set to the sealing lips and inside of a new piston boot, and install it in the caliper.

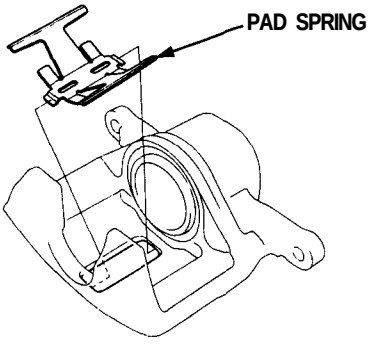
CAUTION: Be careful not to damage the caliper cylinder wall.



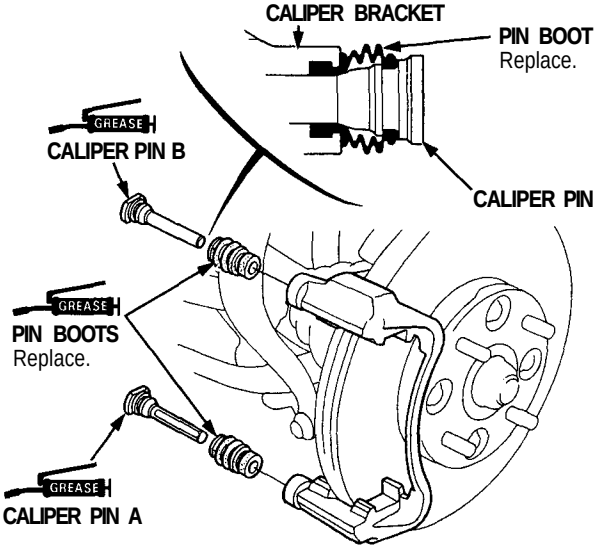
4. Lubricate the caliper and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



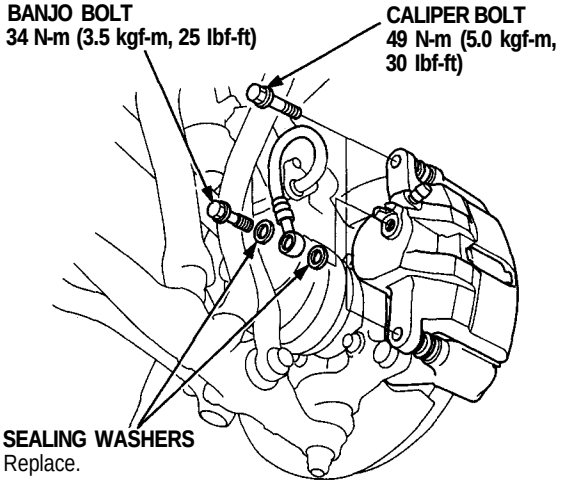
5. Install the pad spring on the caliper.



6. Apply the recommended seal grease in the caliper seal set to the sliding surface of the pins and the inside of the new pin boots.
7. Install the pin boots into the grooves in the caliper bracket properly.



8. Insert pin A and pin B into the caliper bracket.
9. Install the pin boots into the grooves in the pins properly.
10. Install the brake pads in their original positions (see page 19-8).
11. Push in the piston so that the caliper will fit over the pads, and install the caliper.
12. Tighten the caliper bolts.
13. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.



14. Fill the brake reservoir and bleed the brake system (see page 19-7).
15. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

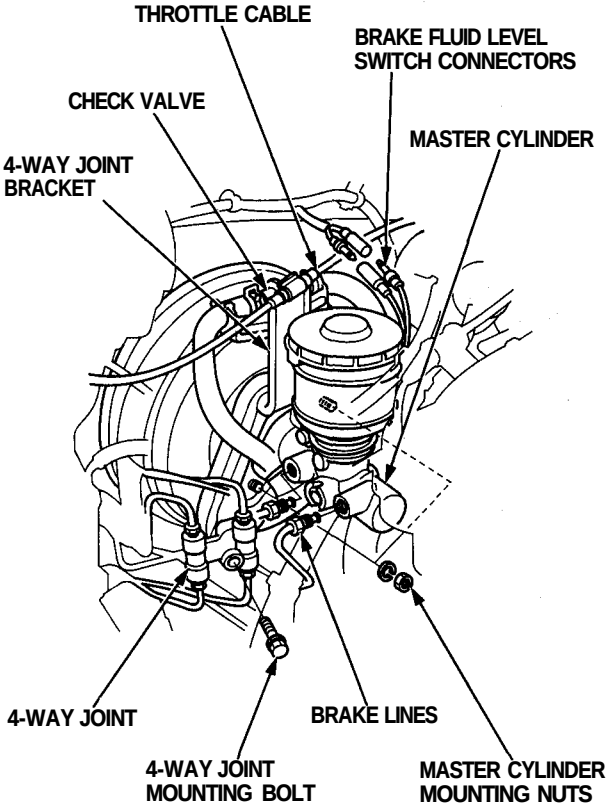
Master Cylinder

Removal

CAUTION:
- **Be careful not to bend or damage the brake lines when removing the master cylinder.**
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**

NOTE: '95 - 96 model is shown.

1. Disconnect the brake fluid level switch connectors.

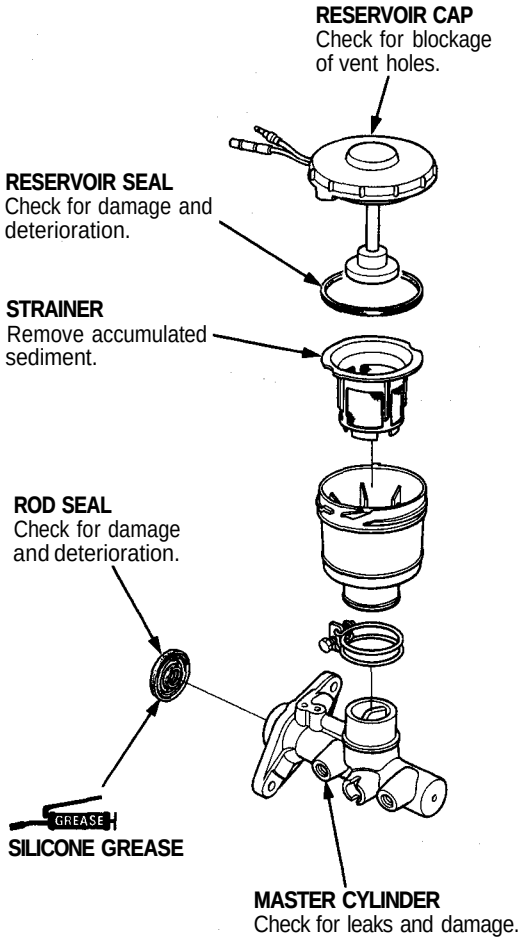


2. Remove the reservoir cap from the master cylinder.
3. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.
4. Remove the check valve and the throttle cable from the 4-way joint bracket.
5. Remove the 4-way joint mounting bolt.
6. Disconnect the brake lines from the master cylinder.
7. Remove the master cylinder mounting nuts, washers and 4-way joint bracket.
8. Remove the master cylinder from the brake booster.

Inspection/Disassembly

CAUTION:
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Do not try to disassemble the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**

NOTE: '95-96 model is shown.

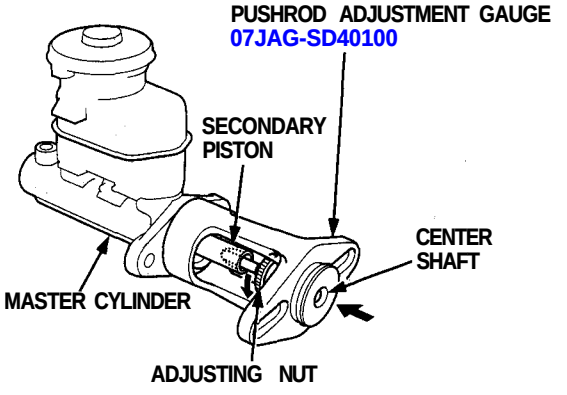


Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.

   NOTE: '97 - 98 models is shown.



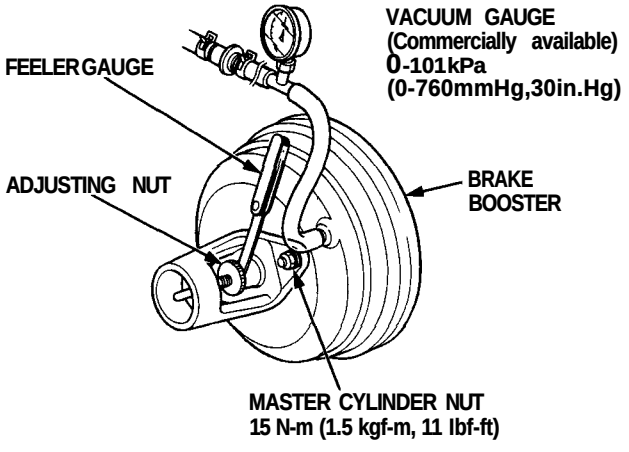
2. Without disturbing the center shaft's position, install the special tool upside down on the booster.

3. Install the master cylinder nuts and tighten to the specified torque.

4. Connect the booster in-line with a vacuum gauge 0 - 101 kPa (0 - 760 mmHg, 30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in Hg) vacuum.

5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

   Clearance: 0 - 0.4 mm (0 - 0.02 in)



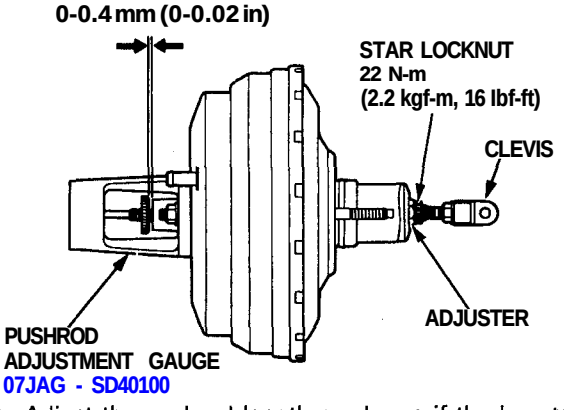
   NOTE: If the clearance between the gauge body and adjusting nut is 0.4 mm (0.02 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.02 in) or more. Therefore it must be adjusted and rechecked.

6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust.

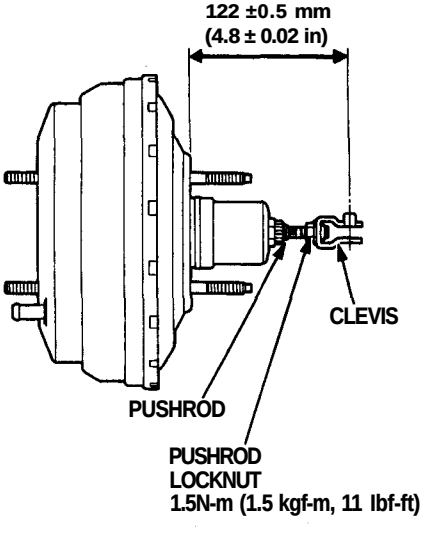
   NOTE:
   - Adjust the clearance while the specified vacuum is applied to the booster.
   - Hold the clevis while adjusting.

7. Tighten the star locknut securely.

8. Remove the special tool.



9. Adjust the pushrod length as shown if the booster is removed.



10. Install the master cylinder (see page 19-16).

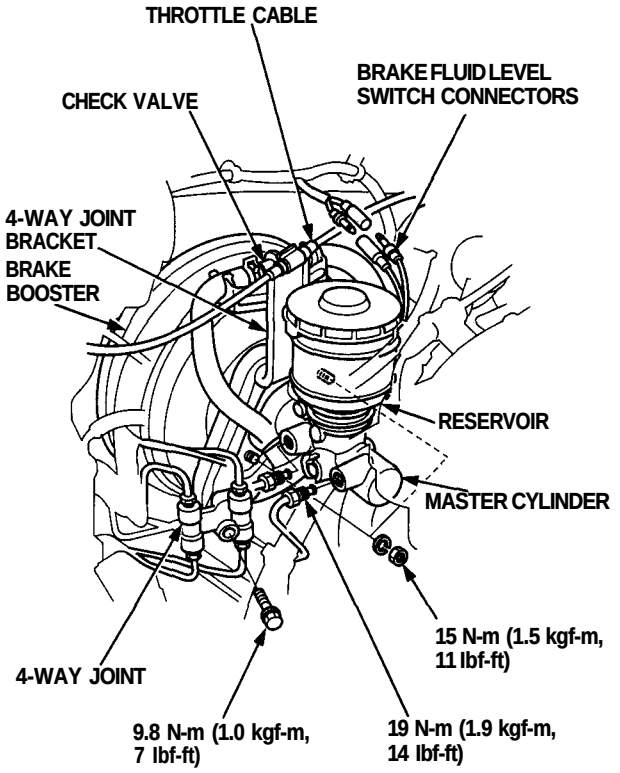
Master Cylinder

Installation

CAUTION:
- **When connecting the brake lines, make sure that there is no interference between the brake lines and other parts.**
- **Be careful not to bend or damage the brake lines when installing the master cylinder.**

NOTE: If replacing the master cylinder or brake booster, check and adjust the pushrod clearance before installing the master cylinder (see page 19-15).

1. Install the master cylinder and 4-way joint bracket with the mounting nuts and washers.
   NOTE: '95 - 96 model is shown.



2. Connect the brake lines to the master cylinder.

3. Install the 4-way joint, check valve and throttle cable to the 4-way joint bracket.

4. Fill the master cylinder reservoir, and bleed the brake system (see page 19-7).

5. Install the reservoir cap, and connect the brake fluid level switch connectors.

6. After installation, check the brake pedal height and brake pedal free play (see page 19-5) and adjust if necessary.

Brake Booster

Inspection

Functional Test

1. With the engine stopped, depress the brake pedal several times to deplete the vacuum reservoir, then depress the pedal hard and hold it for 15 seconds. If the pedal sinks, either the master cylinder is bypassing internally, or the brake system (master cylinder, lines, modulator, proportioning valve, or caliper) is leaking.

2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is operating normally. If the pedal height does not vary, the booster or check valve is faulty.

3. With the engine running, depress the brake pedal lightly. Apply just enough pressure to hold back automatic transmission creep. If the brake pedal sinks more than 25 mm (1.0 in.) in three minutes, the master cylinder is faulty. A slight change in pedal height when the A/C compressor cycles on and off if normal. (The A/C compressor load changes the vacuum available to the booster.)

Leak Test

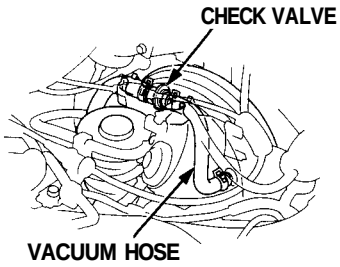
1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.

2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, the pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Booster Check Valve Test ('95, '96 models)

1. Disconnect the brake booster vacuum hose at the booster or at the booster side of the valve.

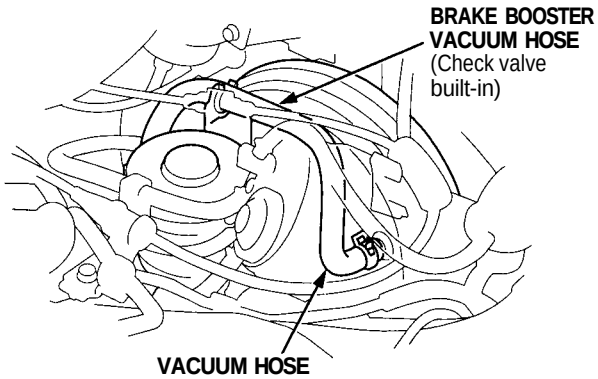
2. Start the engine and let it idle. There should be vacuum. If no vacuum is available, the check valve is not working properly. Replace the check valve and retest.



Booster Check Valve Test ('97 - 98 models)

1. Disconnect the brake booster vacuum hose at the booster.

2. Start the engine and let it idle. There should be vacuum. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve, and retest.

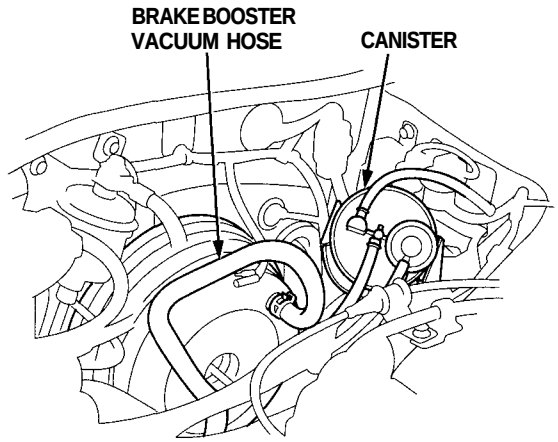


Replacement

1. Remove the master cylinder (see page 19-14).

2. Disconnect the brake booster vacuum hose.

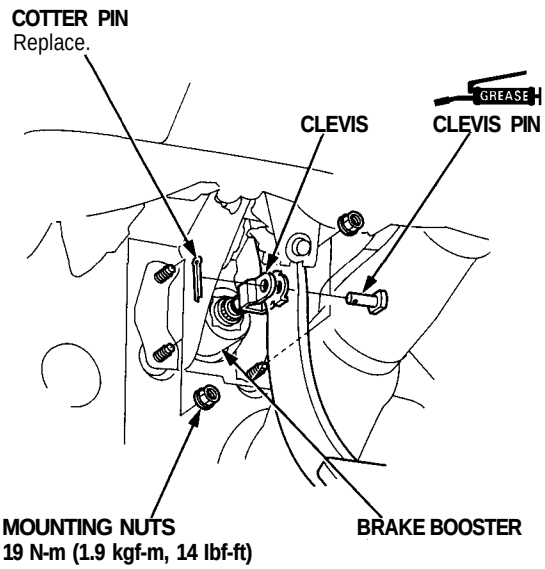
NOTE: '97 - 98 models is shown.



3. Remove the canister from the bracket, and move it aside. Do not disconnect the hoses from the canister.

4. Remove the cotter pin and clevis pin from the clevis.

CAUTION: Do not disconnect the clevis by removing it from the operating rod of the brake booster. If the clevis is loosened, adjust the pushrod length before installing the brake booster (see page 19-15).



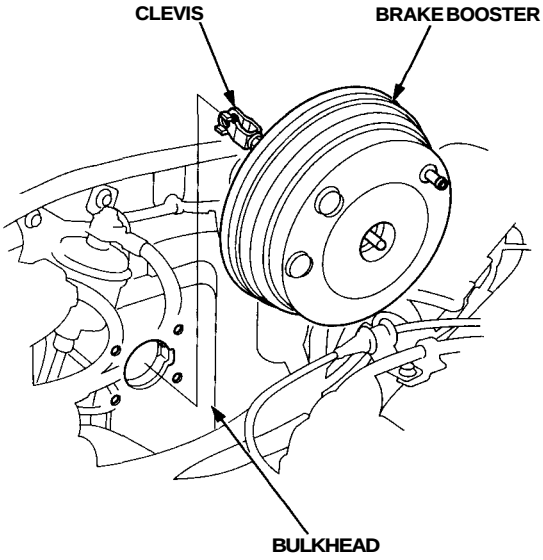
5. Remove the four booster mounting nuts. (cont'd)

Brake Booster

Replacement (cont'd)

6. Pull the brake booster forward until the clevis is clear of the bulkhead.

7. Remove the brake booster from the engine compartment.



8. Install the brake booster in the reverse order of removal.

9. Install the master cylinder (see page 19-16).

10. After installation, check the brake pedal height and brake pedal free play (see page 19-5) and adjust if necessary.

Rear Brake Pads

Inspection and Replacement

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**

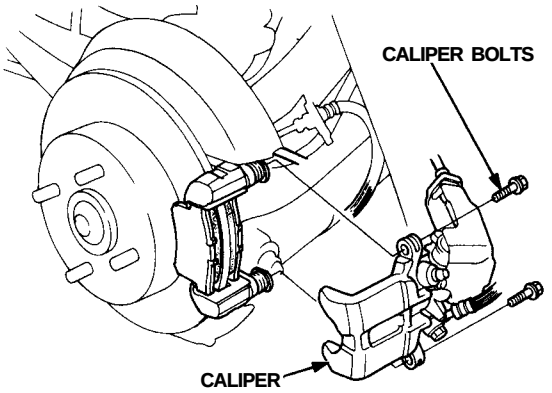
1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of vehicle on safety stands, then remove the rear wheels.

2. Release the parking brake.

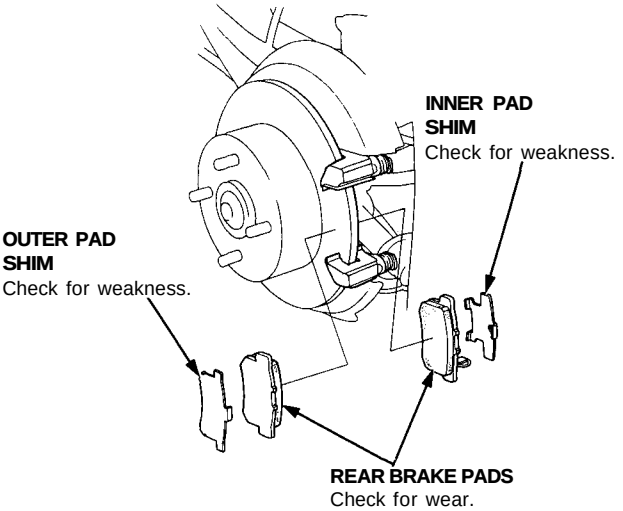
3. Remove the two caliper bolts and the caliper from the bracket.

CAUTION:

- **Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.**
- **Support the caliper with a piece of wire so that it does not hang from the brake hose.**

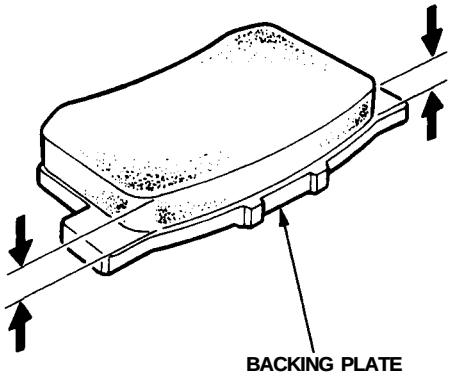


4. Remove the pad shims and brake pads.



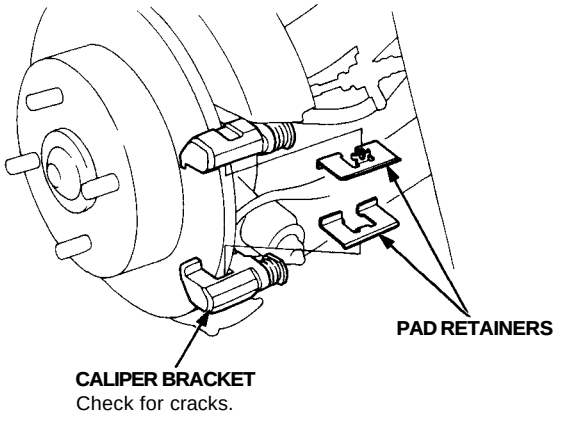
5. Using vernier calipers, measure the thickness of each brake pad lining.

Brake Pad Thickness:
Standard: 8.5 - 9.5 mm (0.33 - 0.37 in)
Service Limit: 1.6 mm (0.06 in)



NOTE: Measurement does not include pad backing plate thickness.

6. Remove the pad retainers.

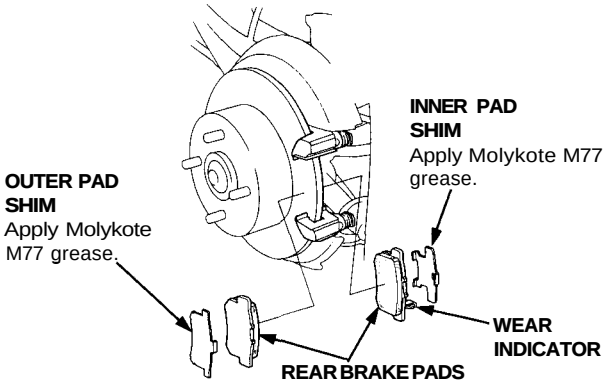


7. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.

8. Check the brake disc for damage and cracks.

9. Make sure that the pad retainers are installed in the correct positions.

10. Apply Molykote M77 grease to the pad side of the shims. Wipe excess grease off the shims.



11. Install the brake pads and pad shims on the caliper bracket.

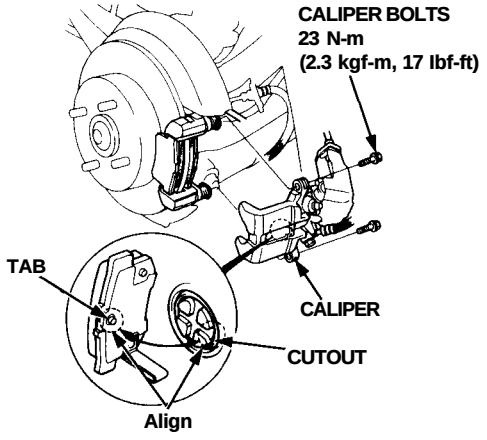
⚠ WARNING

- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**
- **Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.**

NOTE: Install the inner pad with its wear indicator facing downward.

12. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back.

CAUTION: Lubricate the boot with rubber grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.



13. Install the brake caliper.

14. Install and tighten the caliper bolts.

(cont'd)

Rear Brake Pads

Inspection and Replacement (cont'd)

15. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.

16. Depress the brake pedal several times to make sure the brakes work, then test-drive.

    NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

Rear Brake Disc

Disc Runout Inspection

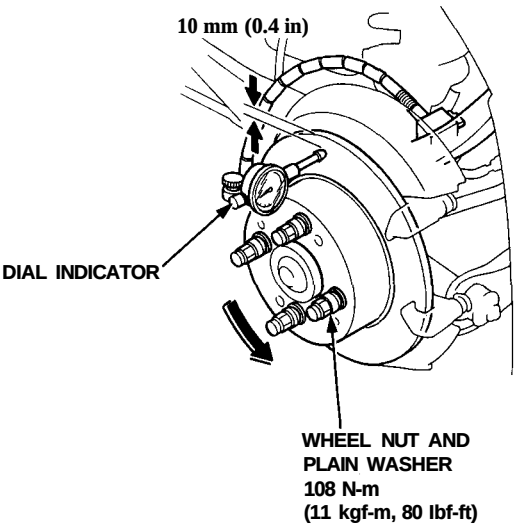
1. Loosen the rear wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the rear wheels.

2. Remove the brake pads (see page 19-18).

3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly and remove all rust.

4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)



5. If the disc is beyond the service limit, refinish the brake disc.

   Max. Refinishing Limit: 7.5 mm (0.30 in)

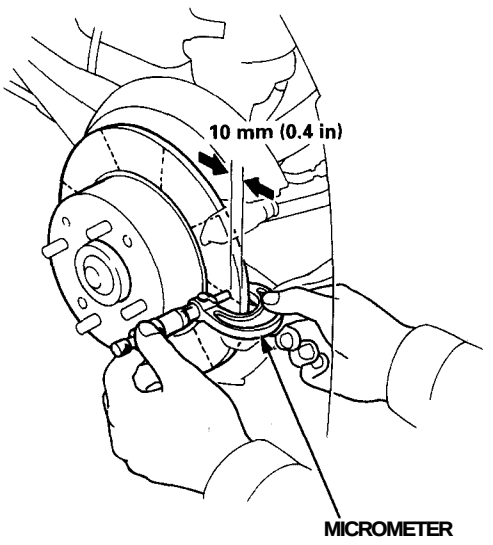
   NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Disc Thickness and Parallelism Inspection

1. Loosen the rear wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the rear wheels.

2. Remove the brake pads (see page 19-18).

3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 8.9 - 9.1 mm (0.350 - 0.358 in)
Max. Refinishing Limit: 7.5 mm (0.30 in)

NOTE: Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

NOTE: See page 18-27 for brake disc replacement.

(cont'd)

Rear Brake Caliper

Disassembly

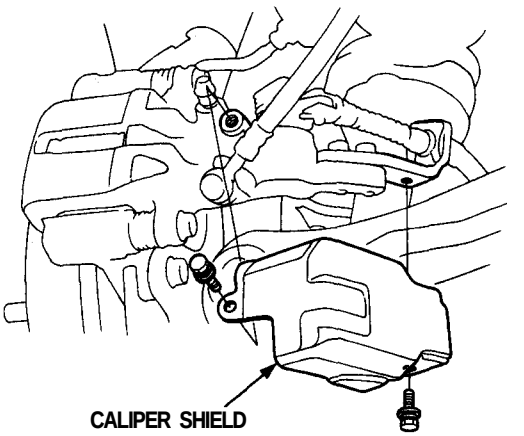
⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**

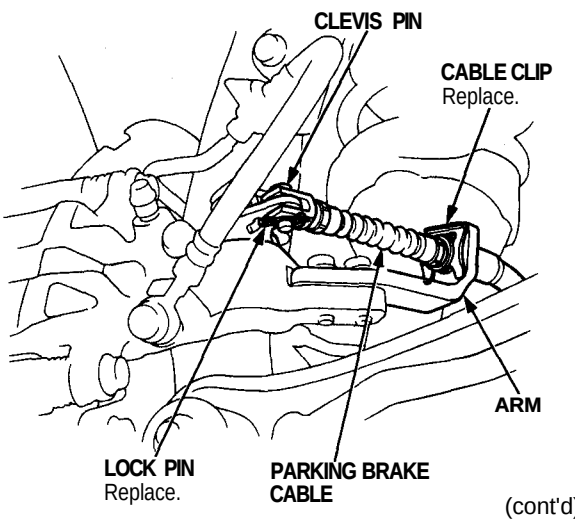
CAUTION:

- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the caliper shield.



2. Remove the lock pin and clevis pin. Remove the cable clip, and disconnect the cable from the arm.

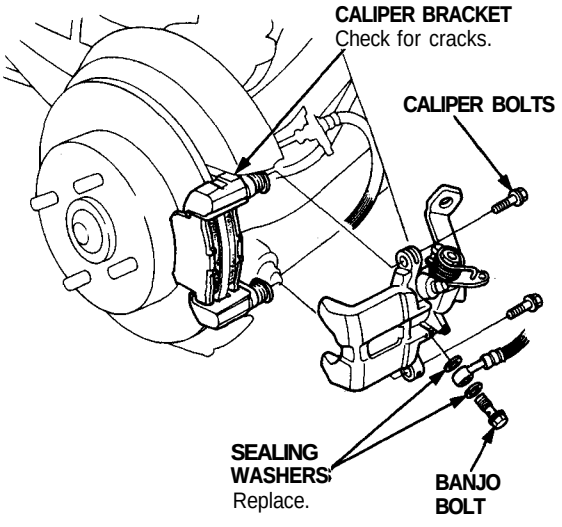


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Rear Brake Caliper

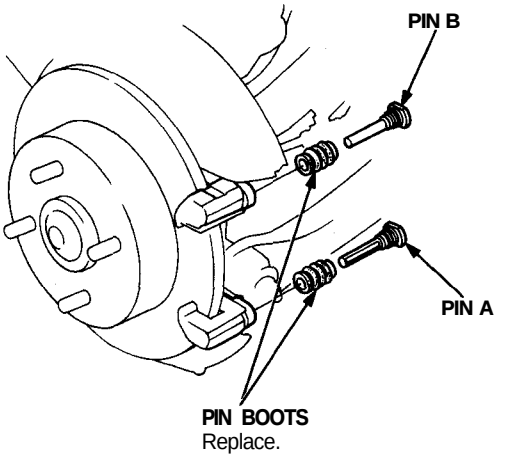
Disassembly (cont'd)

3. Remove the banjo bolt and two sealing washers.

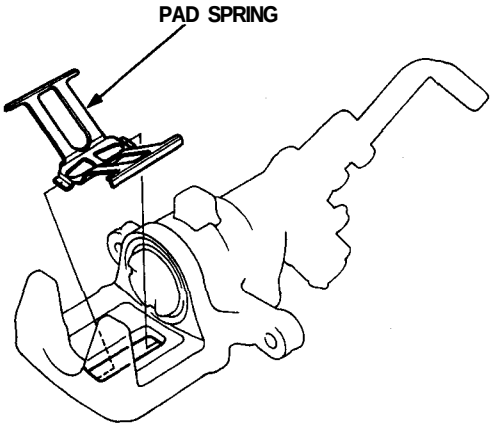


4. Remove the two caliper bolts and caliper body from the bracket.

5. Remove the pins and pin boots from the caliper bracket.

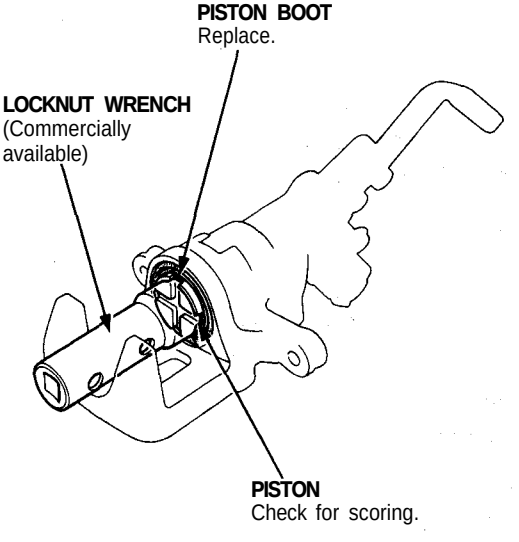


6. Remove the pad spring from the caliper body.



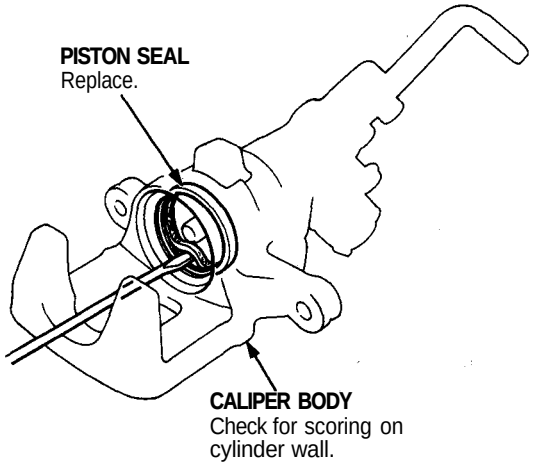
7. Remove the piston by rotating the piston counter-clockwise with the tool, and remove the piston boot.

CAUTION: Avoid damaging the piston.



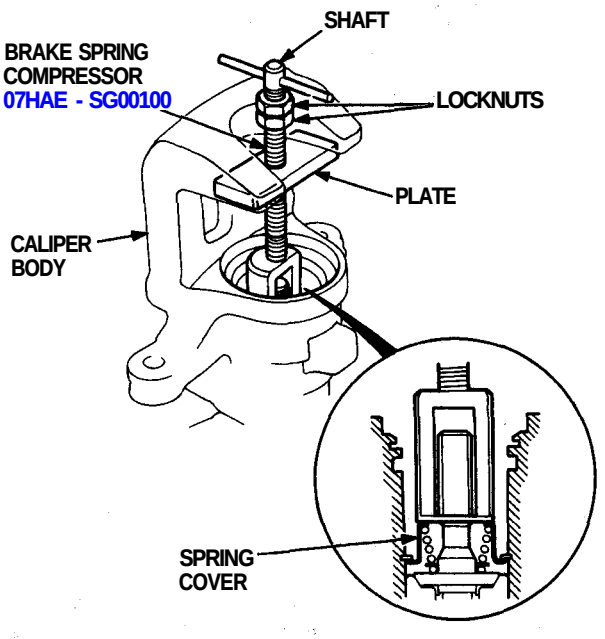
8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



9. Install the special tool between the caliper body and spring cover.

CAUTION: Be careful not to damage the inside of the caliper cylinder during caliper disassembly.

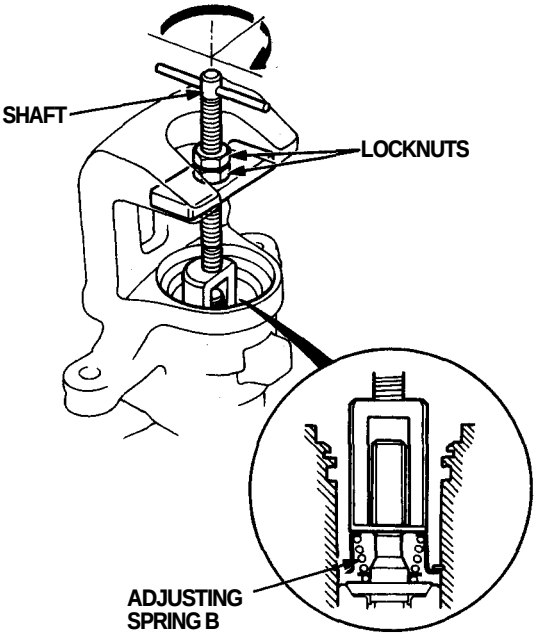


10. Position the locknuts as shown, then turn the shaft until the plate just contacts the caliper body.

NOTE: Do not compress the spring under the spring cover.

11. Turn the shaft clockwise 1/4 - 1/2 turn to compress adjusting spring B in the caliper body.

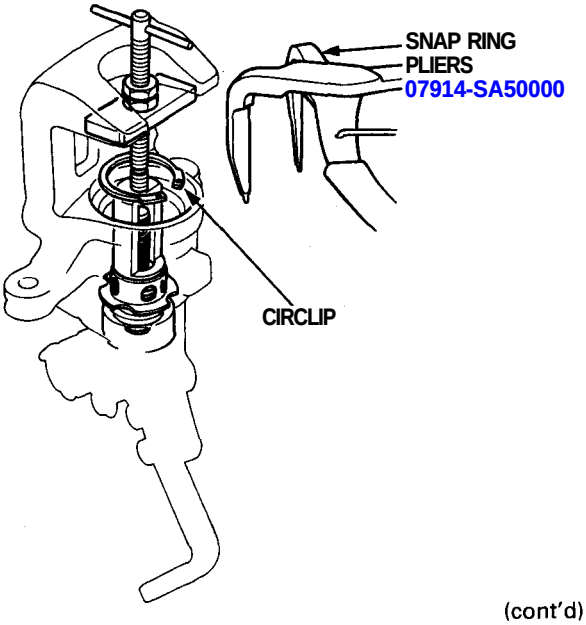
CAUTION: To prevent damage to the inner components, do not turn the shaft more than 1/2 turn.



12. Lower the locknuts fully and tighten them securely.

NOTE: Keep the locknuts in this position until you reinstall the circlip.

13. Remove the circlip with snap ring pliers.

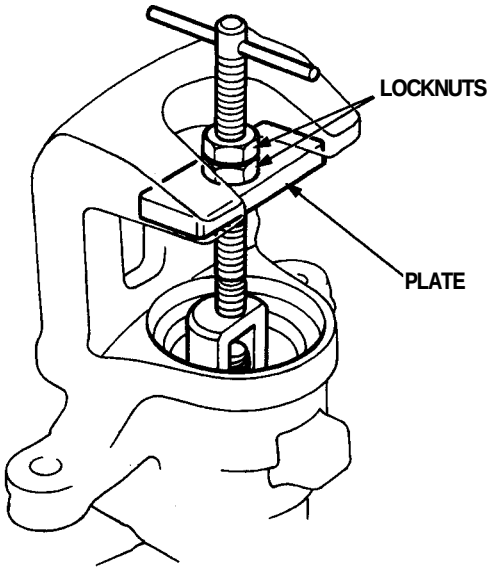


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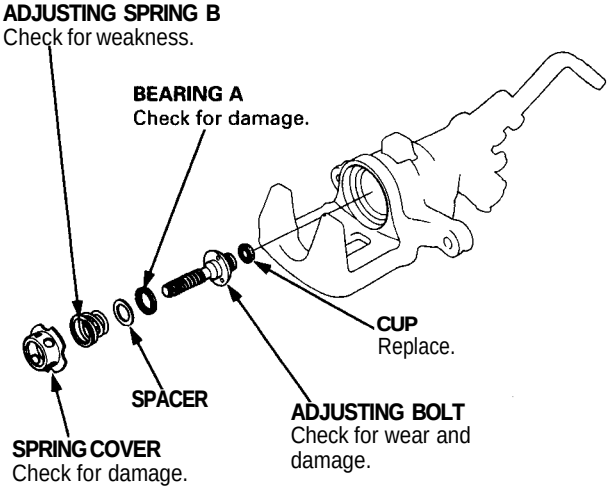
Rear Brake Caliper

Disassembly (cont'd)

14. Hold the plate with your fingers, and turn the shaft counterclockwise. Remove the special tool from the caliper.

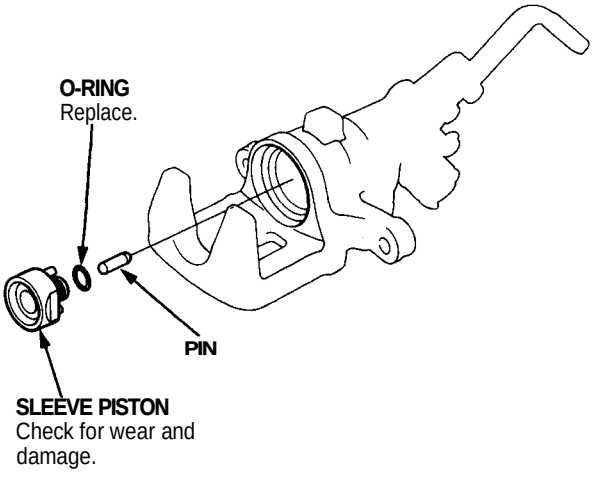


15. Remove the adjusting bolt.



16. Remove the spring cover, adjusting spring B, spacer, bearing A and cup from the adjusting bolt.

17. Remove the sleeve piston, and remove the pin from the cam in the caliper body.



18. Remove the return spring.



19. Remove the parking lever and cam as an assembly from the caliper body.

CAUTION: Do not loosen the parking nut with the cam installed in the caliper body. K the lever and shaft must be separated, hold the lever in a vise and loosen the parking nut.

20. Remove the cam boot.

Reassembly

⚠ WARNING

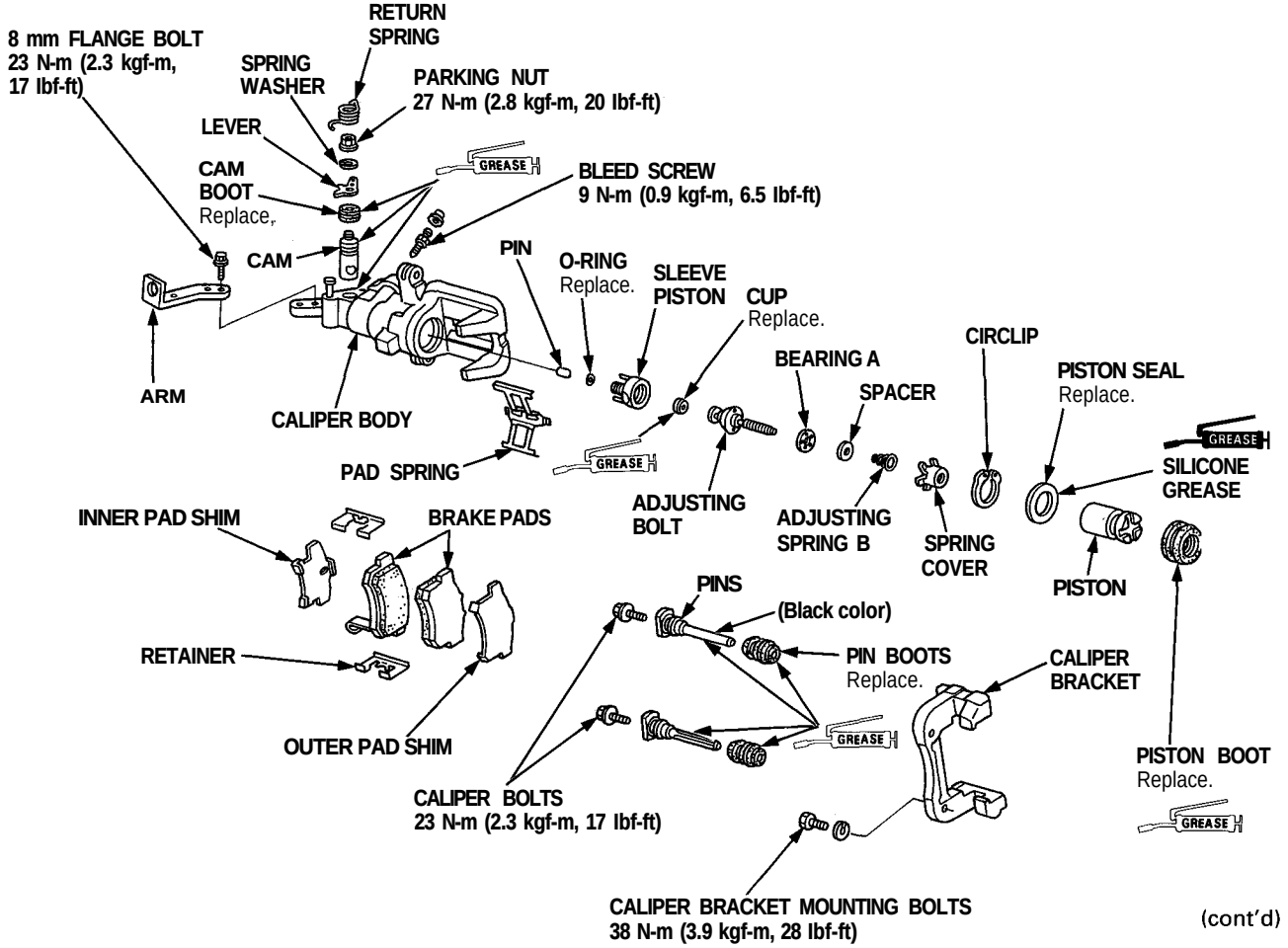
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**
- **When reusing the pads. Install them in their original positions to prevent loss of braking efficiency.**

CAUTION:

- **Do not spill brake fluid on the vehicle; It may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.**

NOTE:

- Coat piston, piston seal groove, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- GREASE : Use recommended silicone greases in the caliper seal set.
- GREASE : Use recommended rubber grease in the caliper seal set.



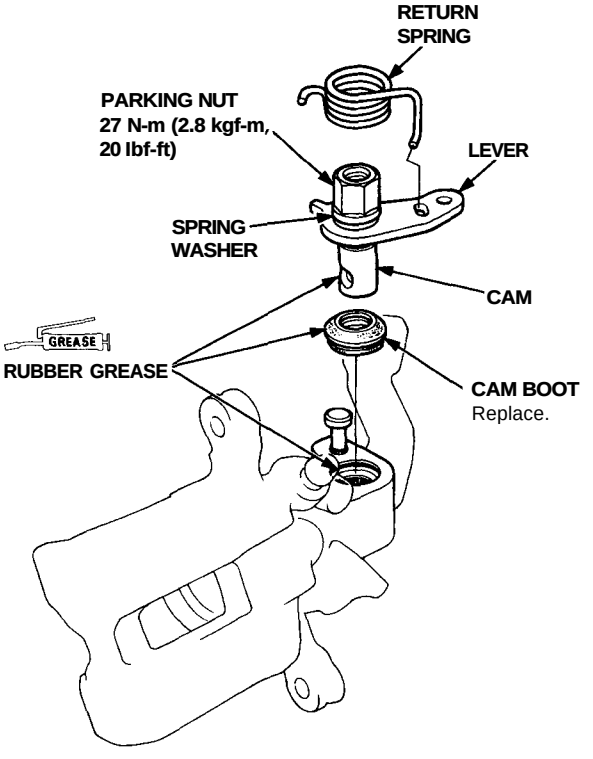
(cont'd)

Rear Brake Caliper

Reassembly (cont'd)

1. Pack all cavities of the needle bearing with the recommended rubber grease in the caliper seal set.

2. Coat a new cam boot with recommended rubber grease in the caliper seal set, and install it in the caliper body.



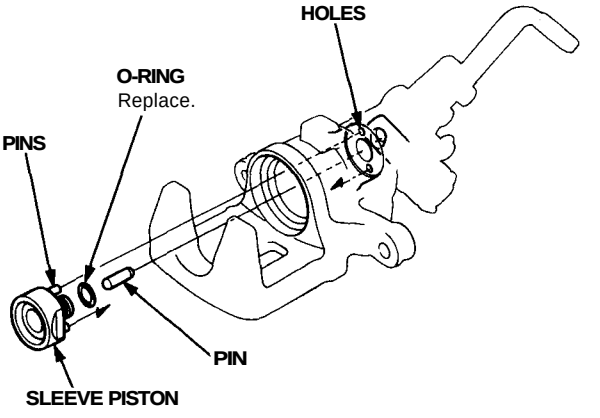
3. Apply recommended rubber grease in the caliper seal set to the pin contacting area of the cam, and install the cam and lever assembly into the caliper body.

4. Install the return spring.

CAUTION:

- **When the cam and lever were separated, be sure to assemble them before installing the cam in the caliper body. Install the lever and spring washer, apply locking agent to the threads, and tighten the parking nut while holding the lever with a vise.**
- **Avoid damaging the cam boot since it must be installed before the cam.**
- **When installing the cam, do not allow the cam boot lips to turn outside in.**

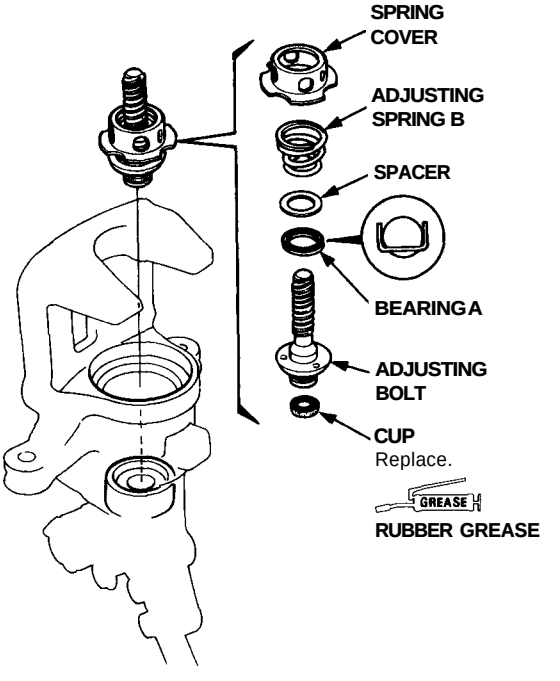
5. Install the pin in the cam.



6. Install a new O-ring on the sleeve piston.

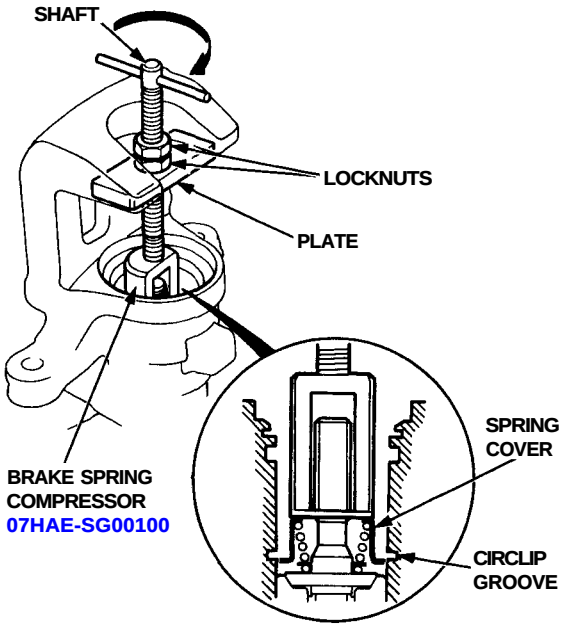
7. Install the sleeve piston so the hole in the bottom of the piston is aligned with the pin in the cam, and two pins on the piston are aligned with the holes in the caliper.

8. Coat a new cup with recommended rubber grease in the caliper seal set, and install it with its groove facing the bearing A side of the adjusting bolt.



9. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install them in the caliper cylinder.

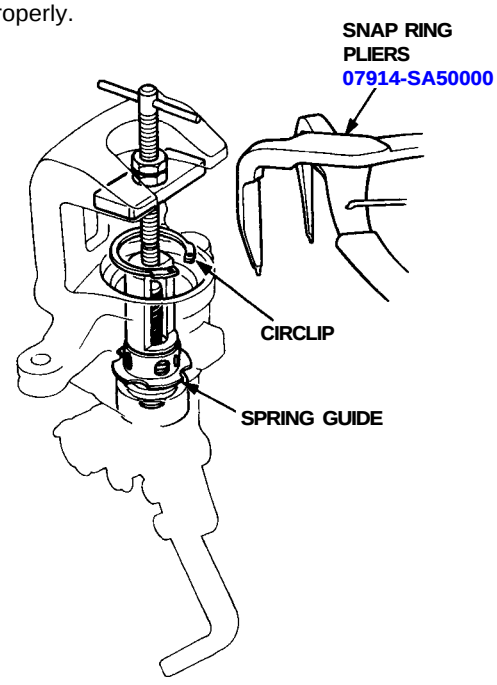
10. Install the special tool on the spring cover, and turn the shaft until the locknut contacts the plate.



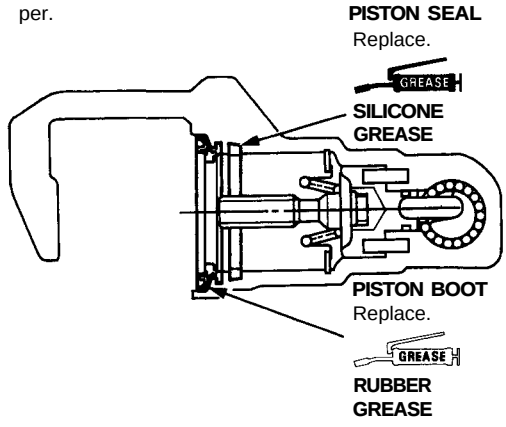
11. Check that the flared end of the spring cover is below the circlip groove.

12. Install the circlip in the groove, then remove the special tool.

NOTE: Check that the circlip is seated in the groove properly.



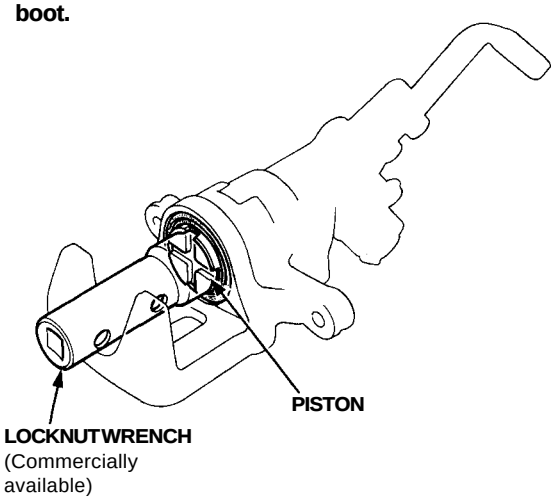
13. Coat a new piston seal with recommended silicone grease in the caliper seal set, and install it in the caliper.



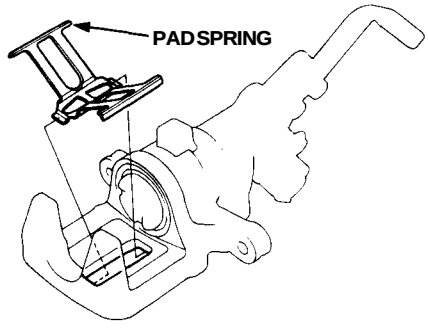
14. Apply recommended rubber grease in the caliper seal set to the sealing lips and inside of a new piston boot, and install it in the caliper.

15. Coat the outside of the piston with brake fluid, and install it on the adjusting bolt while rotating it clockwise with the tool.

CAUTION: Avoid damaging the piston and piston boot.



16. Install the pad spring on the caliper.



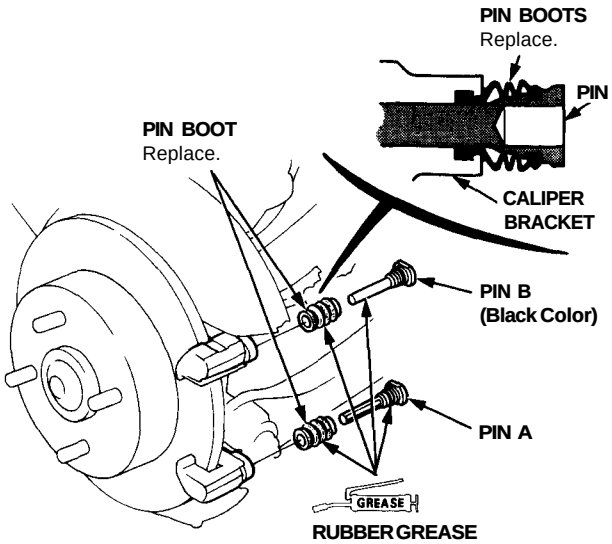
(cont'd)

Rear Brake Caliper

Reassembly (cont'd)

17. Apply the recommended rubber grease in the caliper seal set to the sliding surface of the pins and inside of the new pin boots.

18. Install the pin boots into the grooves in the caliper bracket properly.



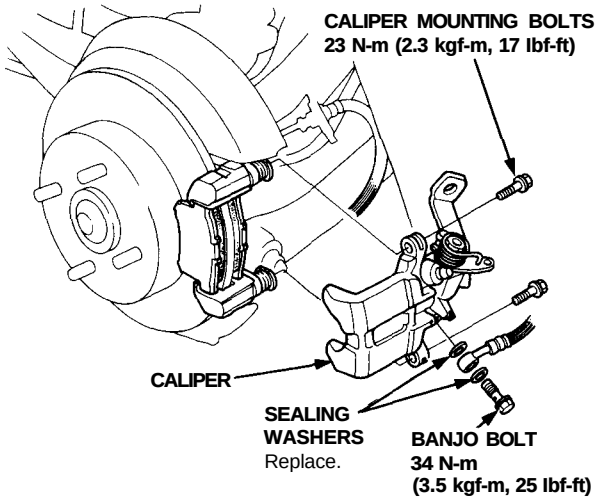
19. Insert pin A and pin B into the caliper bracket.

20. Install the pin boots into the grooves in the pins properly.

21. Install the brake pad retainers and brake pads (see page 19-18).

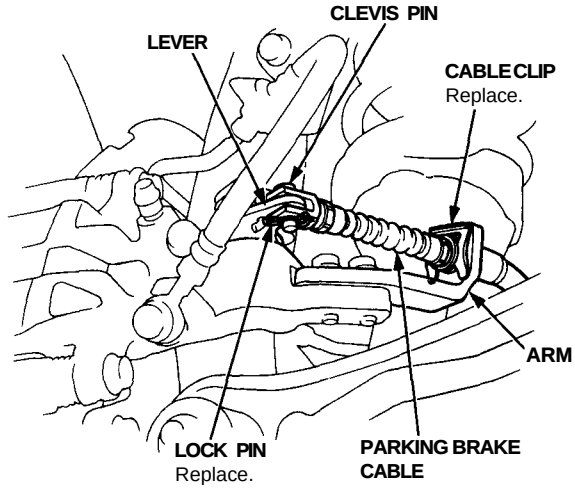
22. Align the cutout in the piston with the tab on the inner pad (see page 19-18).

23. Install the caliper on the caliper bracket, and tighten the caliper mounting bolts.

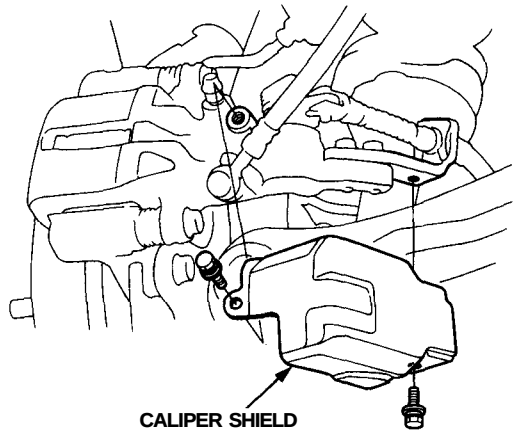


24. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.

25. Insert the cable through the arm, and connect the cable to the lever with the clevis pin and lock pin. Install the cable clip securely.



26. Install the caliper shield.



27. Fill the brake reservoir up, and bleed the brake system (see page 19-7).

28. Operate the brake pedal several times, then adjust the parking brake (see page 19-6).

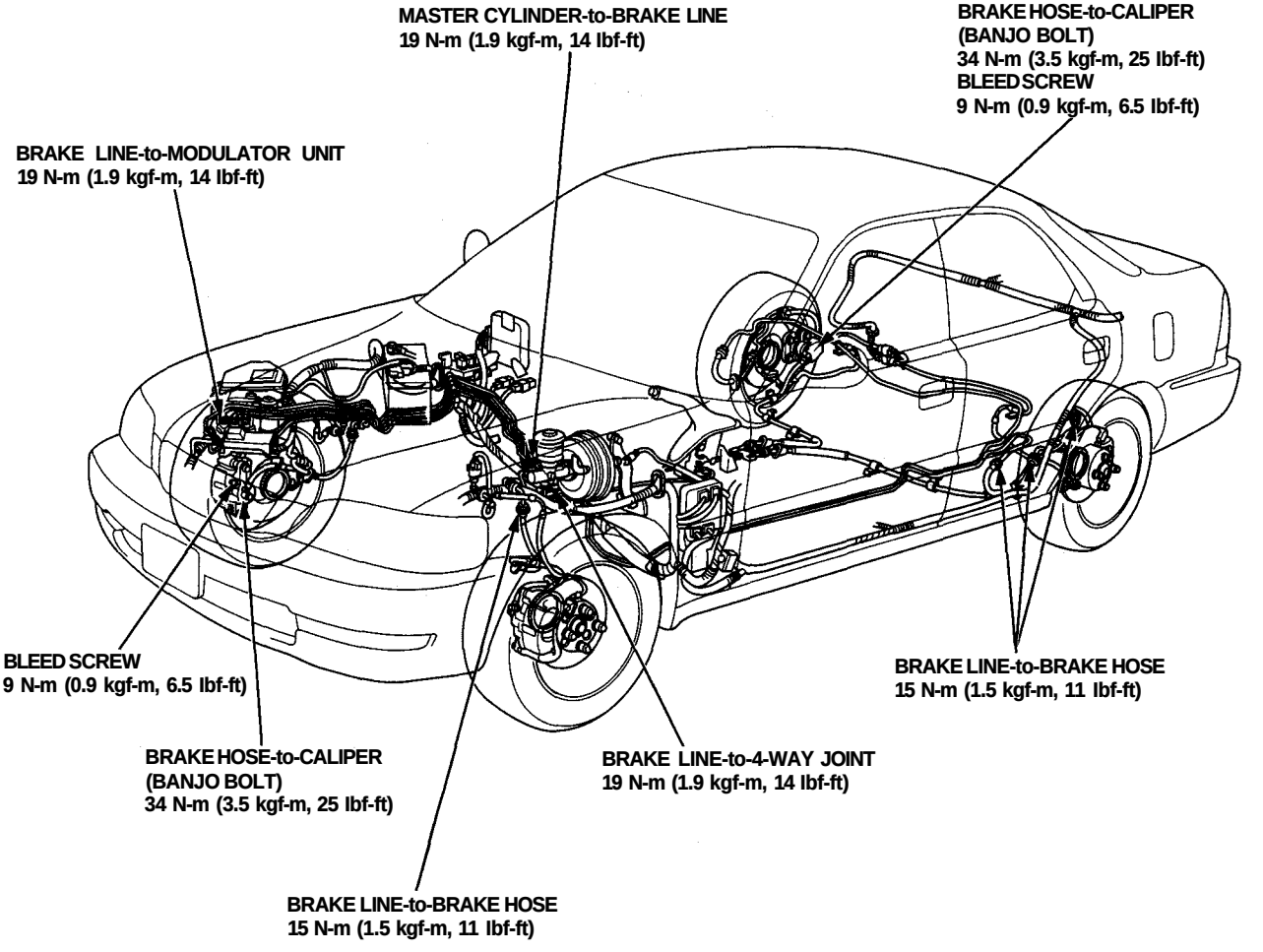
29. After installation, perform the following checks.
- Check for leaks at hose and line joints and connections, and retighten if necessary.
- Check the parking brake lever for operation, and adjust it if necessary.

Brake Hoses/Lines

Inspection ('95, '96 models)

1. Inspect the brake hoses for damage, deterioration, leaks, interference and twisting.
2. Check the brake lines for damage, rusting and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints and connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

CAUTION: Replace the brake hose clip whenever the brake hose is serviced.

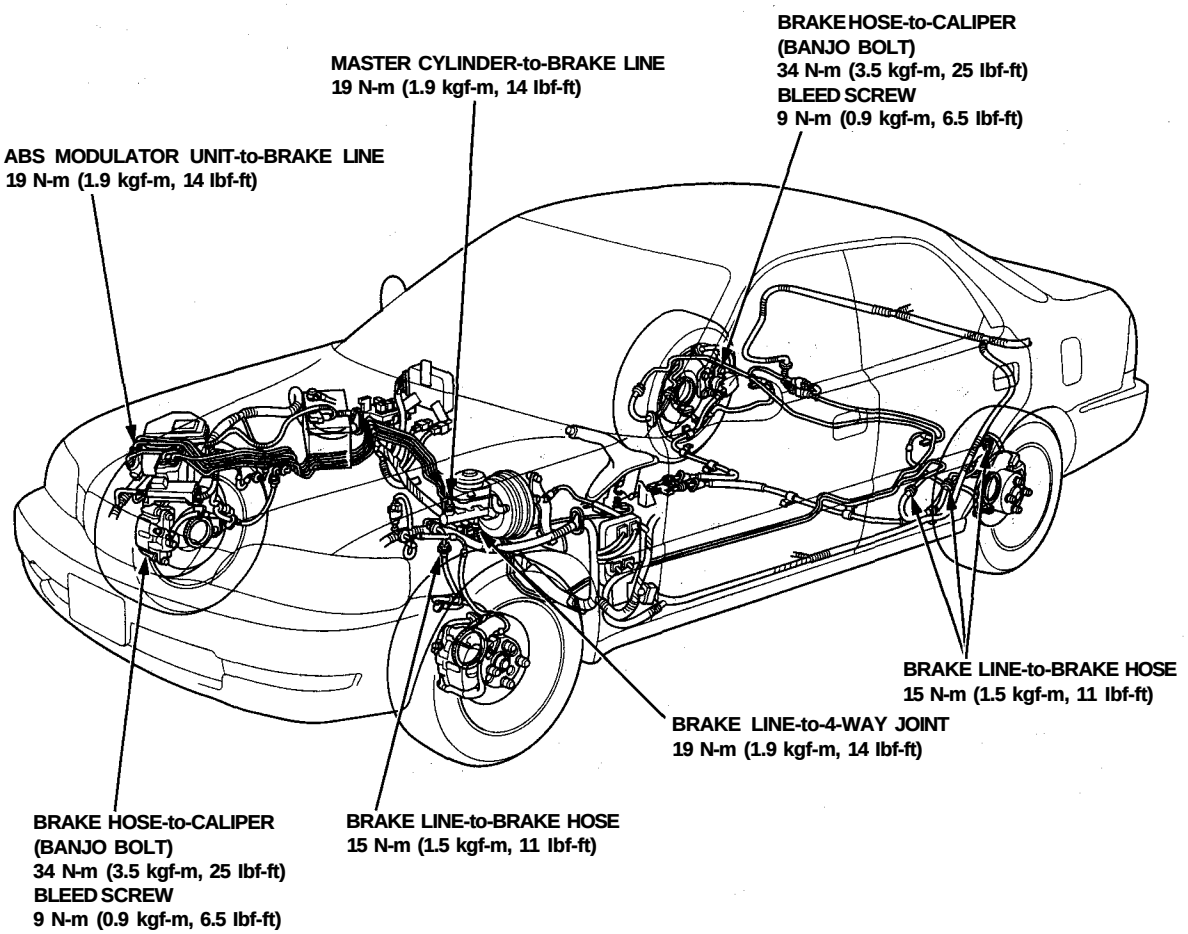


Brake Hoses/Lines

Inspection ('97 - '98 models)

1. Inspect the brake hoses for damage, deterioration, leaks, interference and twisting.
2. Check the brake lines for damage, rusting and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints and connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

CAUTION: Replace the brake hose clip whenever the brake hose is serviced.

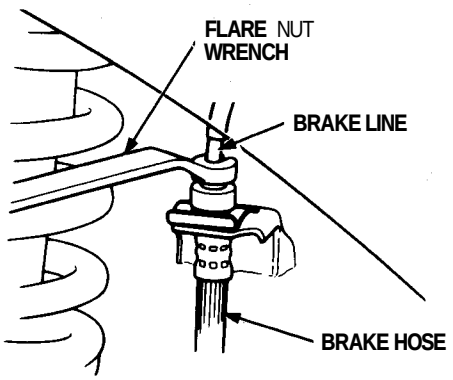


Hose Replacement

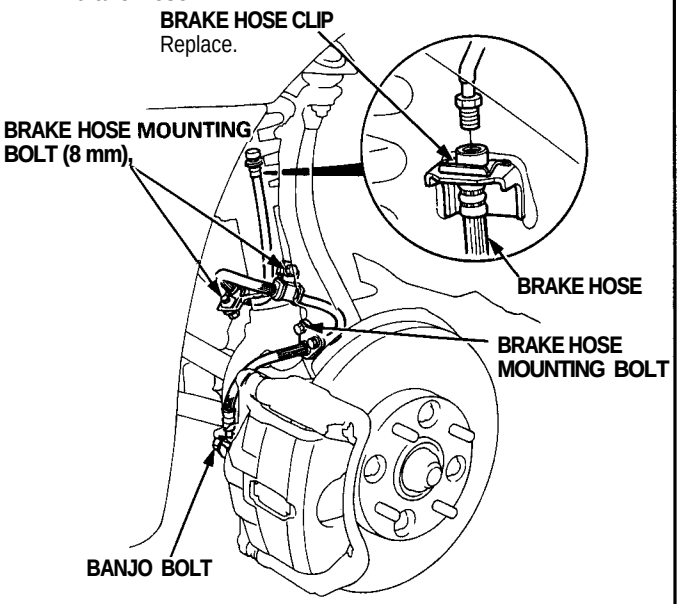
CAUTION:
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.

2. Disconnect the brake hose from the brake line using a 10 mm flare nut wrench.

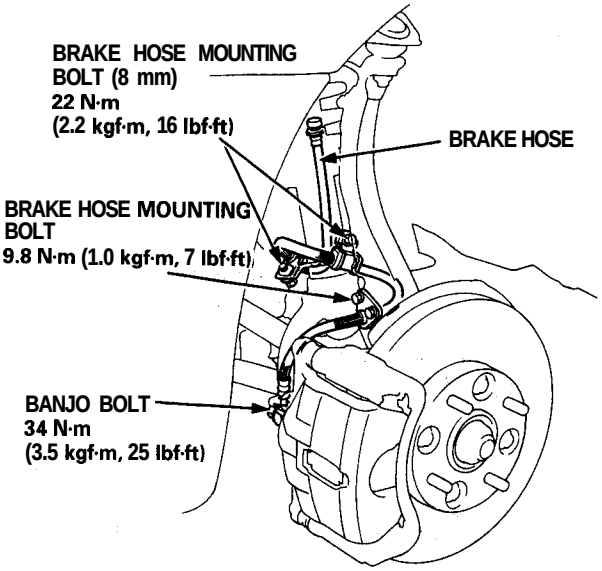


3. Remove and discard the brake hose clip from the brake hose.

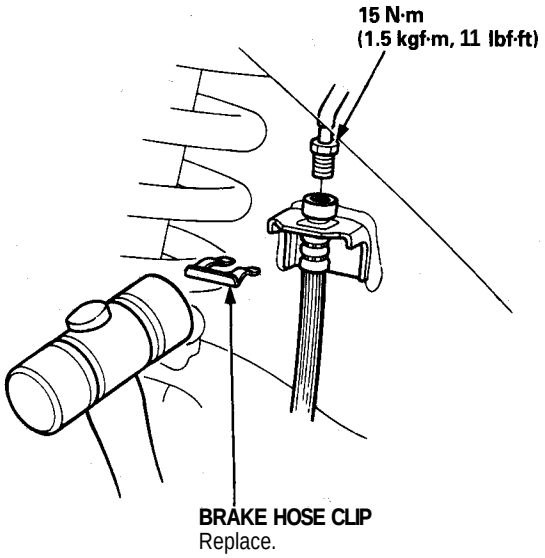


4. Remove the banjo bolt, and disconnect the brake hose from the caliper.

5. Install the brake hose on the knuckle and damper first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



6. Install a new brake hose clip on the brake hose.



7. Connect the brake line to the brake hose.

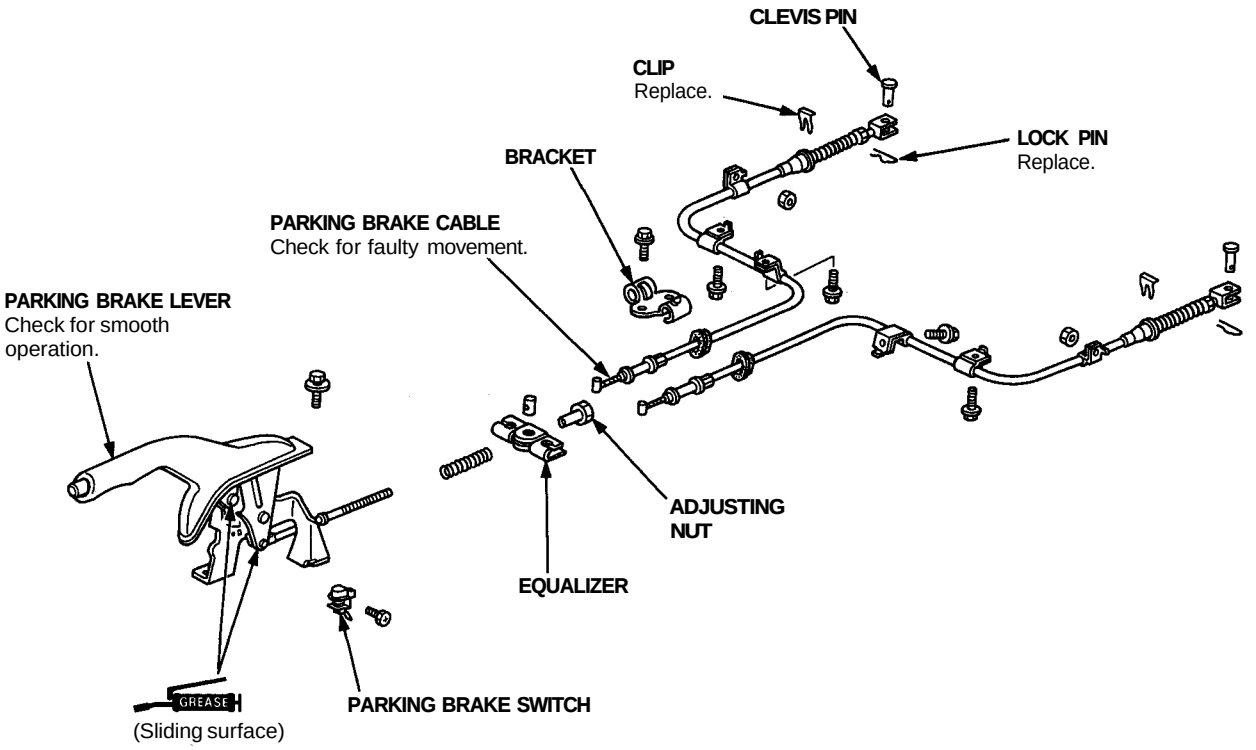
8. After installing the brake hose, bleed the brake system (see page 19-7).

9. Perform the following checks.
   - Check the brake hose and line joint for leaks, and tighten if necessary.
   - Check the brake hoses for interference or twisting.

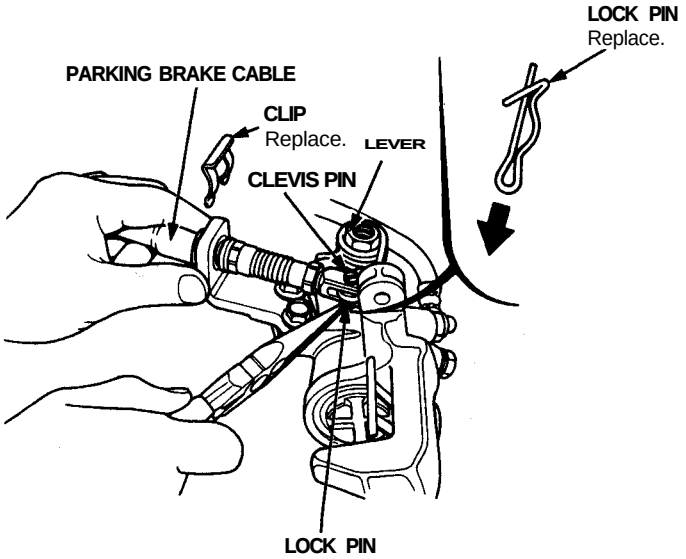
Parking Brake Cable

Inspection and Replacement

CAUTION: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.

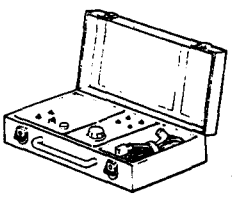


Disconnect the parking brake cable from the lever on the caliper by removing the lock pin and clevis pin, and remove the cable from the arm by removing the clip.

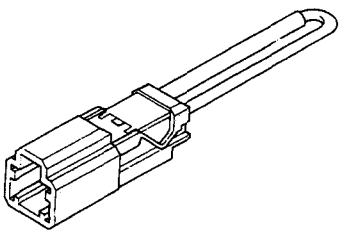


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAJ-SG0010Aor 07HAJ-SG0010B	ALB Checker	1	19-112
②	07PAZ-0010100	SCS Service Connector	1	19-54



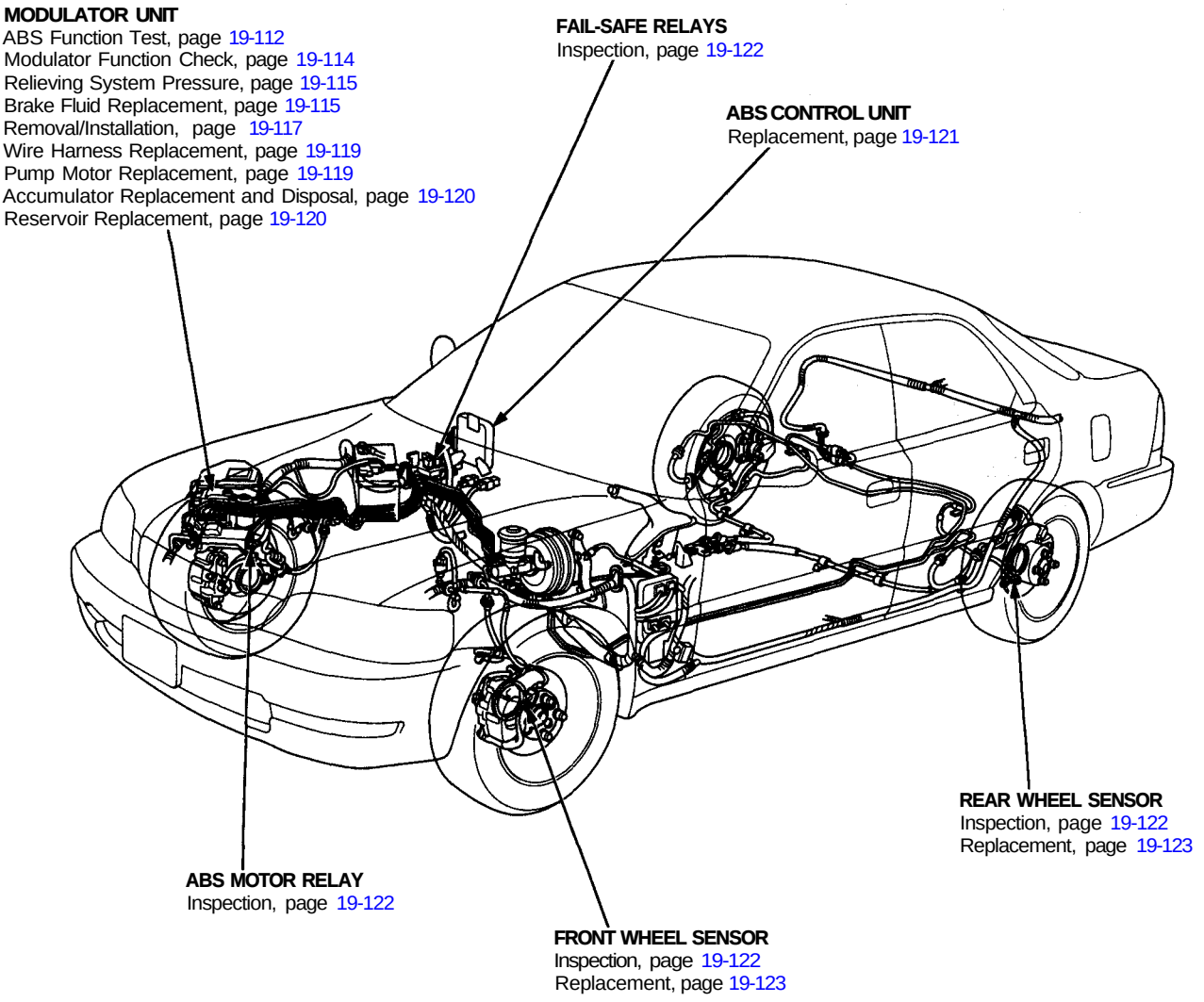
①



②

Illustrated Index

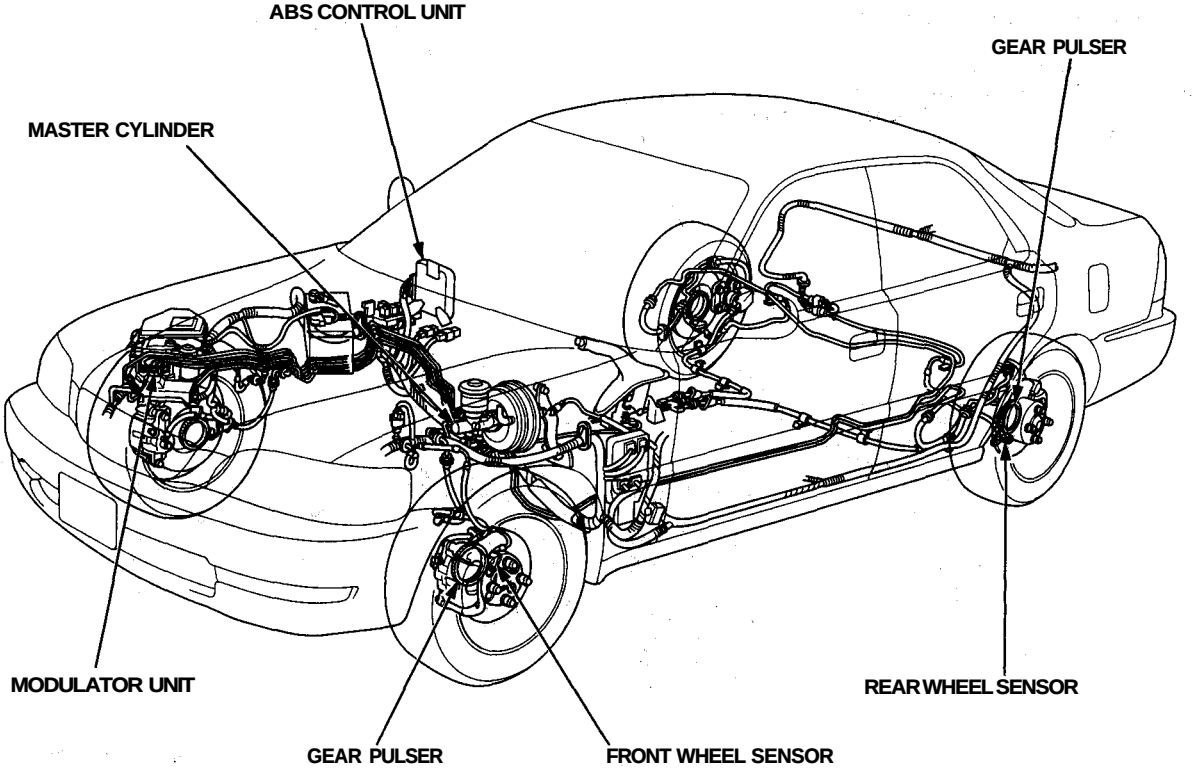
WARNING **The accumulator contains high-pressure nitrogen gas; do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode; severe personal injury may result.**



Anti-lock Brake System (ABS)

Features/Construction

In a conventional brake system, if the brake pedal is depressed very hard, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverability of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.
The Anti-lock Brake System (ABS) modulates the pressure of the brake fluid applied to each front caliper or both rear calipers, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to hard braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.
The ABS equipped on this car is compact, with its hydraulic control system incorporated into one modulator unit. It is a 3-channel anti-lock brake system that has individual control of the front wheels and common control ("select low") for the rear wheels. "Select low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines anti-lock brake system activation for both rear wheels.

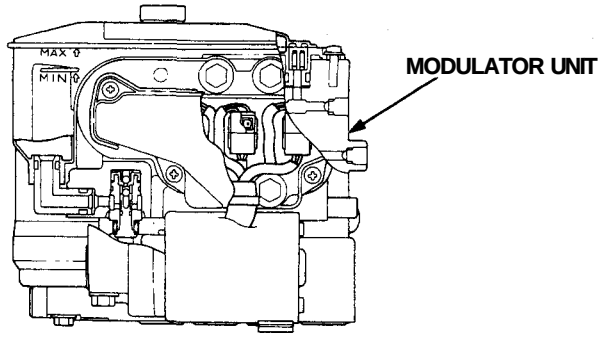


PART NAME	MAJOR FUNCTION
Gear pulser	Attached to the rotating part of the wheel and detects the wheel speed together with the wheel sensor.
Wheel sensor	Generates pulse signal corresponding to the revolution of the gear pulser.
ABS control unit	Controls the working of the anti-lock brake system by performing calculations based on the signals from the individual wheel sensors and the individual switches.
Modulator unit	• Adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the ABS control unit. • Pump, accumulator, solenoid valves, pressure switch and pistons are integrated in the modulator unit.
Motor Relay	Controls the ABS pump motor's power supply according to the signal from the ABS control unit.
Fail-safe relay	Cuts off the solenoid valve ground circuit when the fail-safe device is at work.

Modulator Unit:

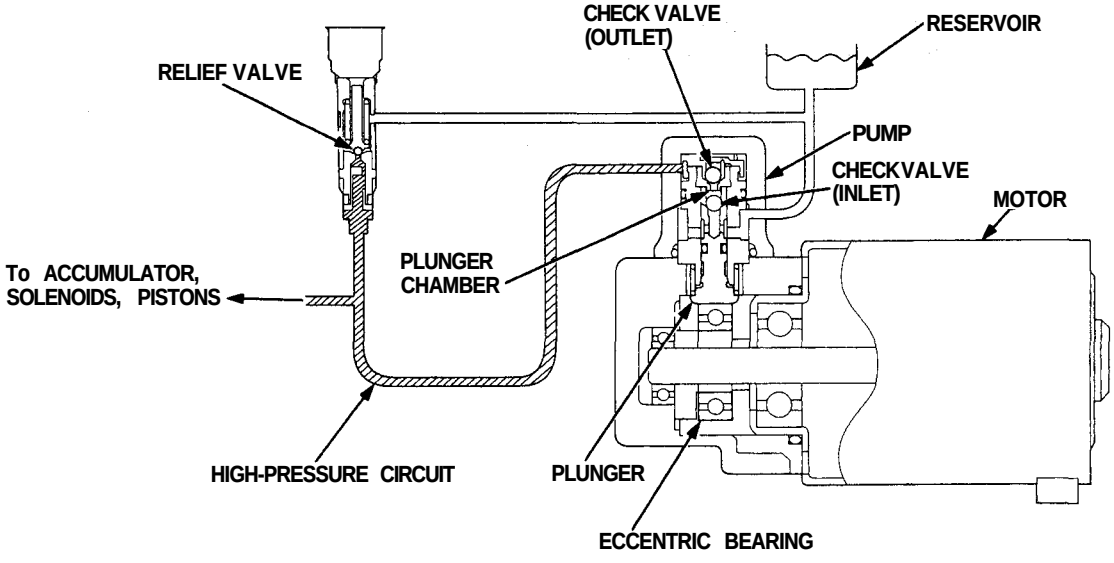
The modulator unit consists of the following sub-units. It adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the ABS control unit.

- ABS pump and motor: Supplies high-pressure brake fluid to control the ABS operation.
- Accumulator: Stores the high-pressure brake fluid.
- Pressure switch: Detects the pressure in the accumulator and transmits signals to the ABS control unit.
- Solenoid valves: Switches the ABS high-pressure passage according to the signals from the ABS control unit.
- Pistons and related parts: Receives the high-pressure brake fluid, and controls pressure to the calipers accordingly.



Motor and pump:

As the motor rotates, it drives the plunger-type ABS pump and raises the brake fluid pressure to approximately 25 MPa (250 kgf/cm^2, 3,600 psi). The eccentric bearing is attached to the motor shaft end; it contacts the plunger of the pump plunger. The motor shaft's rotational motion is transmitted to the reciprocating motion Of the pump plunger.
When the plunger is pushed, the brake fluid in the plunger chamber is pressurized and fed to the accumulator, solenoid, and piston, via the check valve. When the pressure in the accumulator exceeds 34 MPa (350 kgf/cm^2, 5,000 psi), the relief valve opens to release the excess brake fluid pressure to the reservoir, thereby protecting the system.



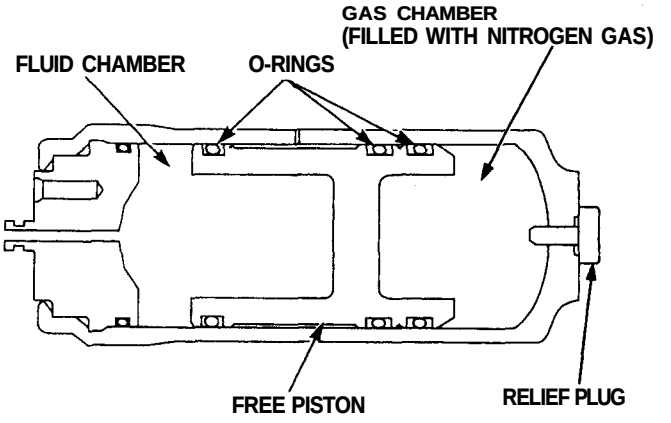
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Anti-lock Brake System (ABS)

Features/Construction (cont'd)

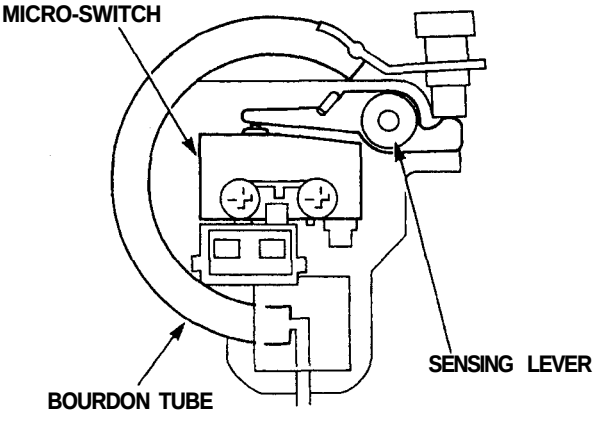
Accumulator:

The high-pressure brake fluid discharged from the pump is fed to the solenoids and pistons, but the passages to the solenoids and pistons are normally closed. Consequently, the high-pressure brake fluid accumulates in the accumulator.
The accumulator consists of two chambers separated by a free piston; that is, the fluid chamber where the brake fluid is accumulated, and the chamber filled with high-pressure nitrogen gas to maintain the fluid at a given pressure.
When the ABS operates, the constant high-pressure brake fluid in the accumulator is supplied to the piston.



Pressure switch:

The pressure switch monitors the pressure accumulation in the accumulator. When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outward, which in turn activates the micro-switch by the force of the spring attached to the sensing lever. When the pressure in the accumulator drops due to ABS operation, the Bourdon tube moves in the opposite direction, and the micro-switch is eventually turned off.
The ABS control unit detects the fluid pressure in the accumulator by the ON/OFF signals from the pressure switch.

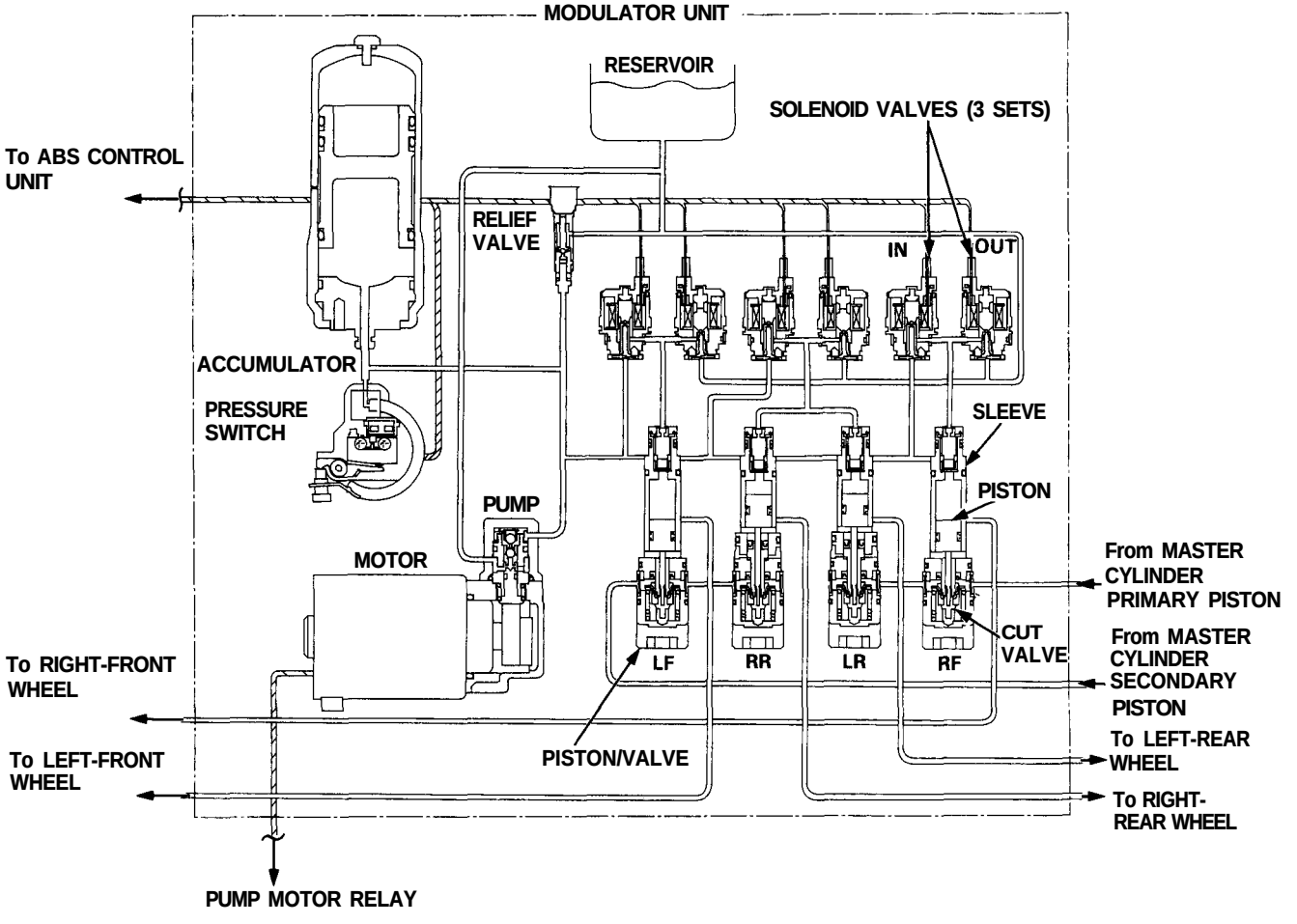


Piston/valve:

The piston/valve assembly consists of the piston, cut valve, and sleeve. There are four piston/valve assemblies in the modulator unit to control the brake fluid pressure to each caliper. The piston/valve assemblies for the rear brakes also serve as proportioning control valves to prevent the rear wheels from locking if the ABS malfunctions or when the ABS is not activated.

Solenoid valves:

The modulator unit opens and closes the inlet and outlet solenoid valves, and shifts the ABS high-pressure passage according to the signals from the ABS control unit. There are three solenoid valve assemblies, each containing an inlet and outlet valve, in the modulator unit; one for each front wheel, and one for both rear wheels. The inlet valves are normally open (open when the coil is not energized), while the outlet valves are normally closed.



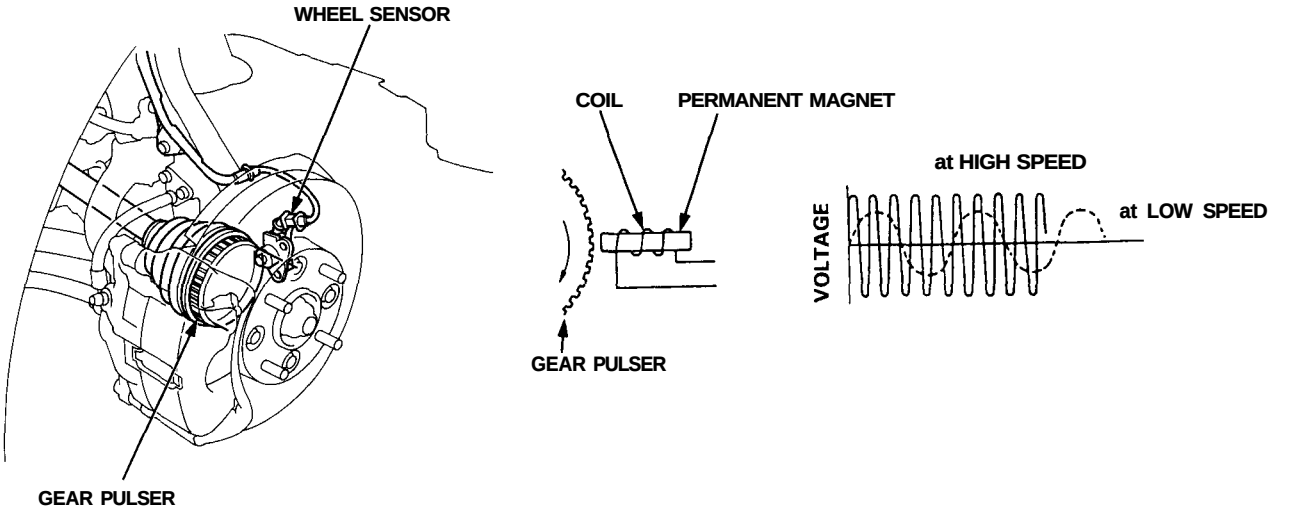
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Anti-lock Brake System (ABS)

Features/Construction (cont'd)

Wheel sensor:

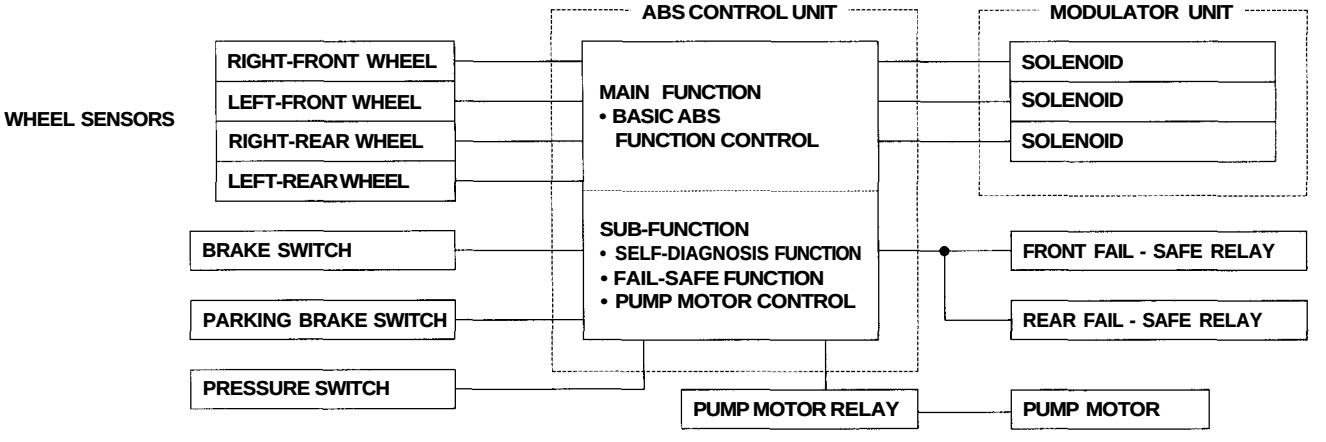
The wheel sensor is a contactless type that detects the rotating speed of a wheel. It consists of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel turn, the magnetic flux around the coil in the wheel sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are sent to the ABS control unit, and the ABS control unit identifies the wheel speed.



ABS control unit:

The ABS control unit consists of a main function, which controls the operation of the anti-lock brake system, and sub-function, which controls the pump motor and "self-diagnosis".
For safety, the main function consists of two systems, and the ABS control unit activates the solenoid valve only when the outputs of the two systems agree with each other.

- The main function section of the ABS control unit performs calculations on the basis of the signals from each wheel sensor, and controls the operation of the anti-lock brake system by activating the solenoid valves in the modulator unit for each front brake and for the two rear brakes. The ABS has individual control of the front wheels and common control ("Select low") for the rear wheels. "Select low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines the ABS activation for both rear wheels.
- The sub-function section has the fail-safe function that monitors the system operation by inputting the brake switch, parking brake switch and pressure switch signals, and stops the anti-lock brake system when it detects an abnormality in the system. It also has a self-diagnosis function and the pump motor control function.



Pump motor control:

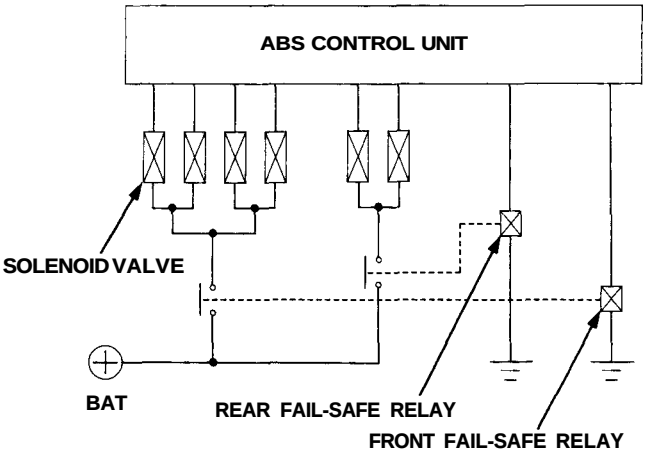
The ABS control unit monitors the brake fluid pressure in the accumulator by the pressure switch ON/OFF signals. The ABS control unit turns the pump on when the pressure in the accumulator drops, and stops the pump when the pressure rises to the specified value.
If the pressure does not reach the specified value after the motor has operated continuously for a specified period, the ABS control unit stops the motor and activates the ABS indicator light.

Self-diagnosis function:

The self-diagnosis function, provided in the sub-function of the ABS control unit, monitors the main system functions by constantly transmitting the data between the two Central Processing Units (CPUs). When an abnormality is detected, the ABS control unit turns the ABS indicator light on and stops the ABS, although the basic brake system continues to operate normally.
When the ABS control unit detects an abnormality with the ABS and turns the ABS indicator light on, the diagnostic trouble code (DTC), which shows the problem part or unit, is recorded in the control unit. The DTC can be read by the blinking frequency of the ABS indicator light.

Fail-safe function:

When an abnormality is detected in the ABS control system self-diagnosis, the solenoid operations are suspended by turning off the two fail-safe relays. This disconnects the ground circuits of all the solenoid valves to prevent ABS operation.
Under these conditions, the braking system functions just as an ordinary one.



Fail-safe relay:

The fail-safe relay's terminal side contact is normally open. When there is continuity at the relay coil, the fail-safe relay is closed, thereby connecting the ground circuit to the solenoid valve.

ABS indicator light:

The ABS control unit turns the ABS indicator light on when one or more of the following abnormalities are detected. This is only a partial list.

- When the operating time of the motor in the power unit exceeds the specified period.
- When vehicle running time exceeds 30 seconds without releasing the parking brake.
- When absence of speed signals from any of the four wheel sensor is detected.
- When the activation time of all solenoids exceeds a given time, or an open circuit is detected in the solenoid system.
- When solenoid output is not detected in the simulated ABS operation when the engine is started or the vehicle is driven.

To check the indicator light bulb, the light is activated when the ignition switch is first turned on. The light goes off after the engine is started if there is no abnormality in the system.

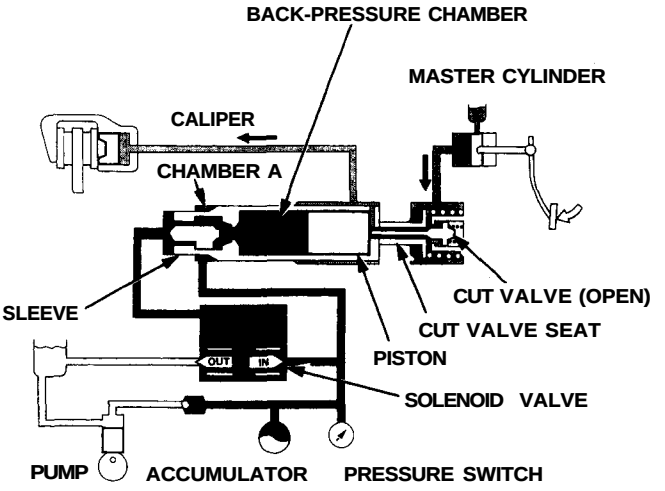
Anti-lockBrakeSystem(ABS)

Operation

The following description of ABS operation is for one of the front wheels. The ABS operation for the remaining wheels is the same.

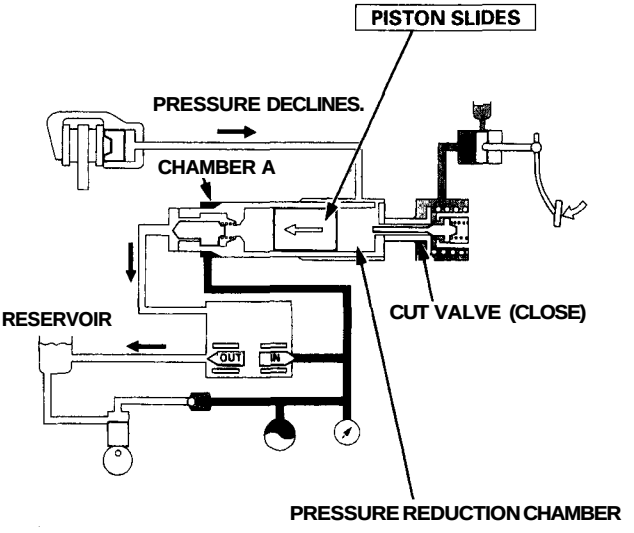
Ordinary braking function:

In ordinary brake operations when the ABS is not functioning, the solenoid outlet valve is closed and the inlet valve is open, the brake fluid pressure is transmitted to the back-pressure chamber between the sleeve and piston, and the cut valve is pushed by the piston. As the high-pressure is also transmitted to chamber A between the sleeve and cylinder, the sleeve pushes the cut valve seat toward the cut valve, too.
Under there conditions, the cut valve is kept open, and the hydraulic pressure from the master cylinder is transmitted to the caliper just like an ordinary brake system.

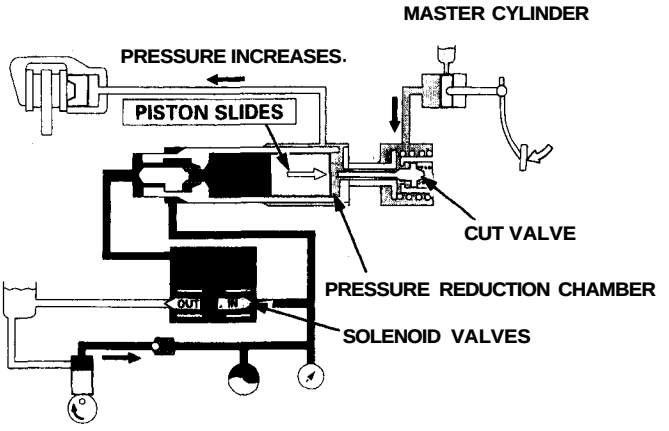


When ABS is functioning:

- Control by reducing caliper fluid pressure:
  When brake inputs (force exerted on brake pedal) are excessively large, and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the inlet valve and opening the outlet valve.
  As a result, high pressure in the back-pressure chamber is released to the reservoir, and the piston is pushed by the caliper fluid pressure toward the back-pressure chamber. However, the cut valve seat is kept in the pushed position because high pressure is transmitted to chamber A. As the piston moves, the cut valve moves and shuts the flow from the master cylinder to the caliper, the volume of the pressure reduction chamber connected to the caliper increases, and the fluid pressure in the caliper declines, relieving the braking force. The wheel speed is therefore restored, preventing the wheel from locking.

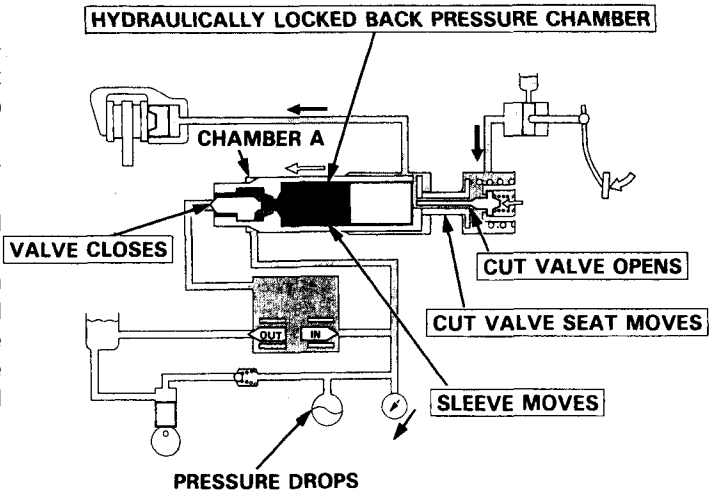


- Control by increasing caliper fluid pressure:
  When the ABS control unit senses that the caliper fluid pressure declined, and the wheel speed is restored, it signals the solenoid inlet valve to open and the solenoid outlet valve to close.
  As a result, the high-pressure brake fluid is transmitted to the back-pressure chamber, and the piston is pushed toward the pressure reduction chamber, increasing the caliper fluid pressure, and thereby the braking force again.
  When the master cylinder side's fluid pressure is low, the cut valve is slightly opened as the piston moves, and the caliper fluid pressure is transmitted to the master cylinder. The kickback is felt on the brake pedal this time. When the force depressing the brake pedal is relieved while the ABS is functioning, the cut valve is opened and the pressure in the pressure reduction chamber is returned to the master cylinder side. As a result, the caliper fluid pressure is relieved.



When high-pressure declines:

The ABS control unit monitors the pressure in the high-pressure passage by means of the pressure switch signals. The ABS control unit turns the ABS indicator light on, and stops the ABS when it detects an excessive drop in pressure in the high-pressure passage.
When the pressure declined due to leakage from the passage, for example, the pressure in chamber A declines, too, and the cut valve seat and sleeve return toward chamber A.
As a result, the valve at the sleeve end closes, which hydraulically locks the back-pressure chamber and blocks the piston movement. Because the cut valve opens as the cut valve seat moves, this connects the brake fluid passage between the master cylinder and caliper for ordinary brake operation.



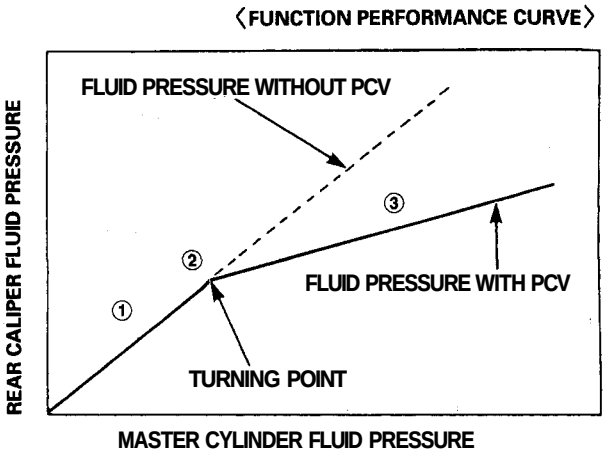
(cont'd)

Anti-lock Brake System (ABS)

Operation (cont'd)

Proportioning Control Valve Function:

The modulators for the rear brakes serve as proportioning control valves to prevent the rear wheels from locking if the ABS malfunctions or when the ABS is not activated. When this function is not provided, the hydraulic pressure from the master cylinder and the hydraulic pressure to the rear brake system are equal.
If the fluid pressure is transmitted to the rear brakes at the same rate as the front brakes, the rear wheels will lock first because the rear axle load becomes lighter when the brakes are applied.
To prevent the rear wheels from locking, the proportioning control valve function changes the distribution rate of the fluid pressure to the rear wheels when the pressure in the rear brake system exceeds the given value of the fluid pressure from the master cylinder. The fluid pressure point where the distribution rate changes is called the turning point.

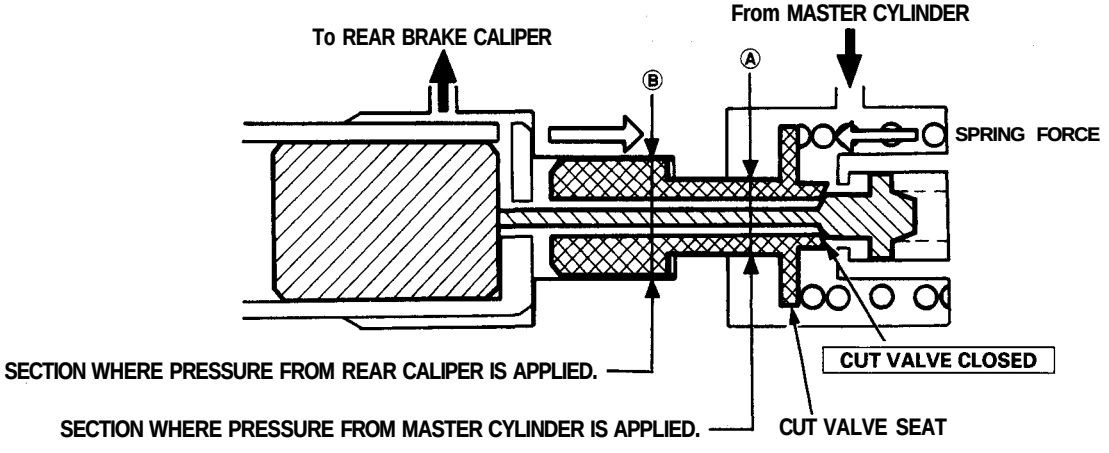


The cut valve seat in the rear brake system has a shoulder between sections A and B. Section A, where pressure from the master cylinder is applied, has a smaller diameter than section B, where pressure from the rear brake caliper is applied. This design provides the proportioning control valve function as follows.

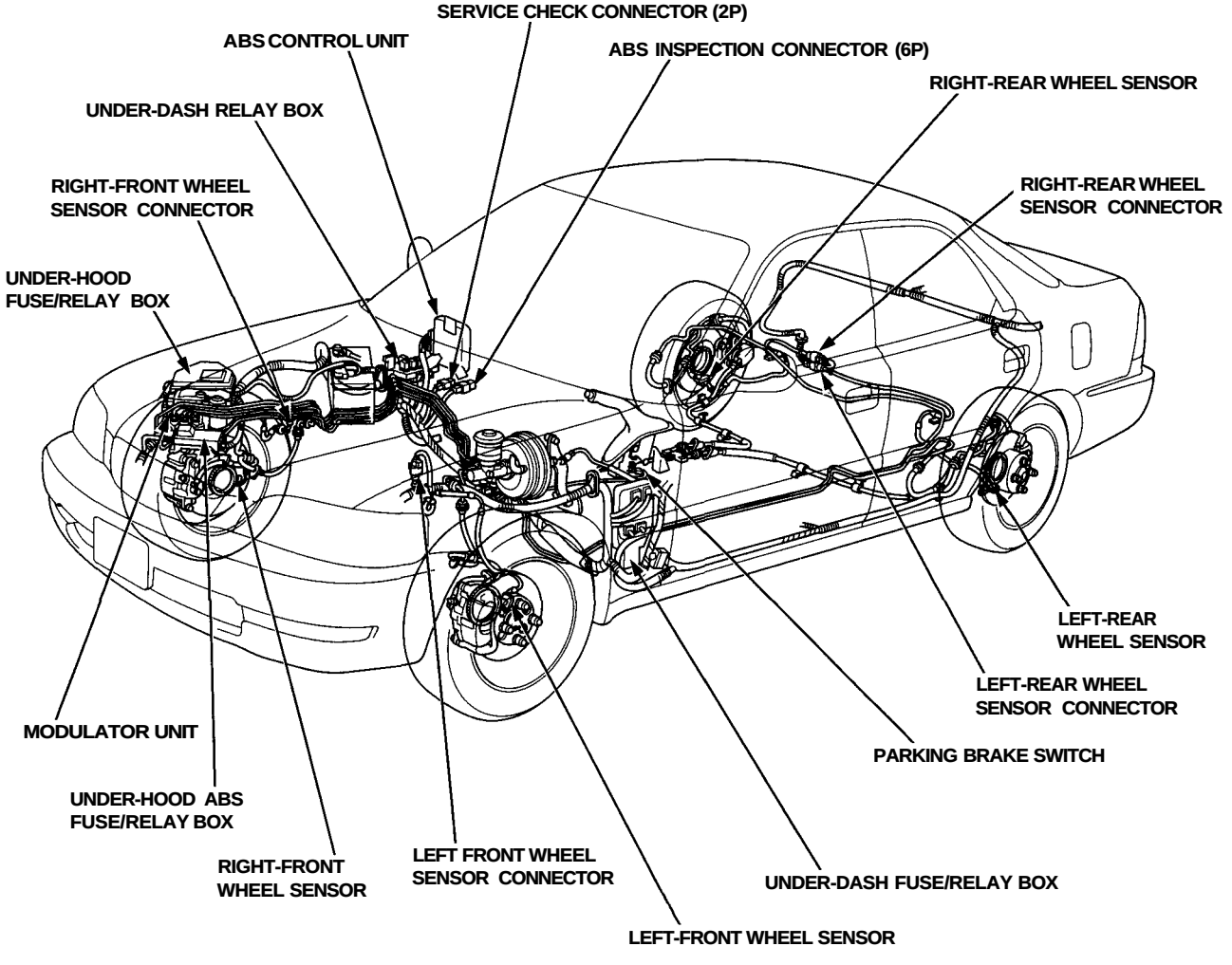
1. When the fluid pressure from the master cylinder is below the turning point, the cut valve seat is pushed by the spring force and the cut valve is open. Therefore, the fluid pressure from the master cylinder is transmitted to the rear brake caliper side. Under these conditions, fluid pressure from the master cylinder is equal to the pressure to the rear brake caliper, but because of the diameter difference between sections A and B, the force on the cut valve overcomes the spring force, moving the cut valve seat toward the cut valve slowly.

2. When the fluid pressure to the rear brake caliper reaches the turning point, the cut valve is closed by the cut valve seat, blocking the fluid passage between the master cylinder side and rear wheel cylinder side.

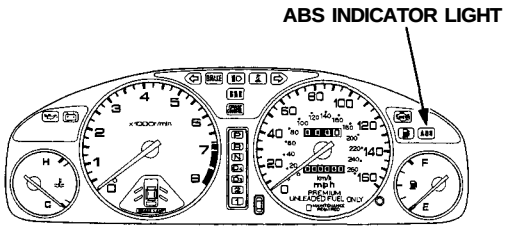
3. When the fluid from the master cylinder exceeds the turning point, the fluid pressure from the master cylinder rises, while the pressure to the rear brake caliper remains at the turning point value. As a result, the cut valve seat moves away from the cut valve and the cut valve opens. The passage between the master cylinder and caliper opens momentarily, but it is blocked again because the fluid pressure to the brake caliper rises, and the cut valve seat moves to close the cut valve. As described above, when the pressure in the master cylinder is above the turning point, the cut valve seat reduces the pressure in the rear brake caliper to the prescribed amount by repeating this process.



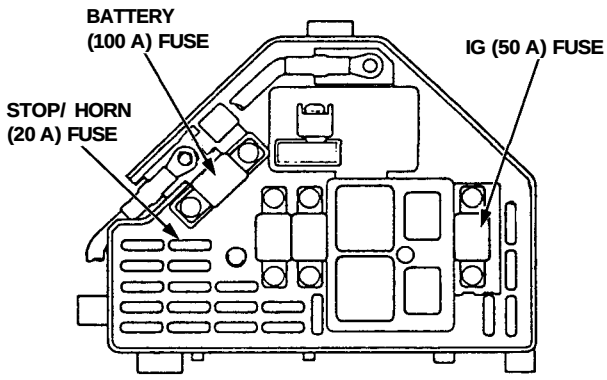
Component Locations



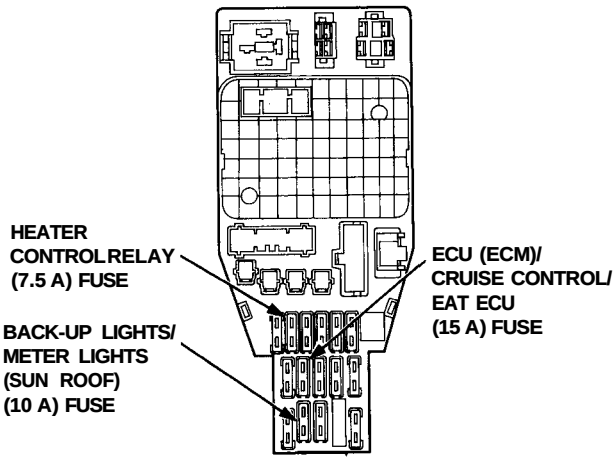
GAUGE ASSEMBLY



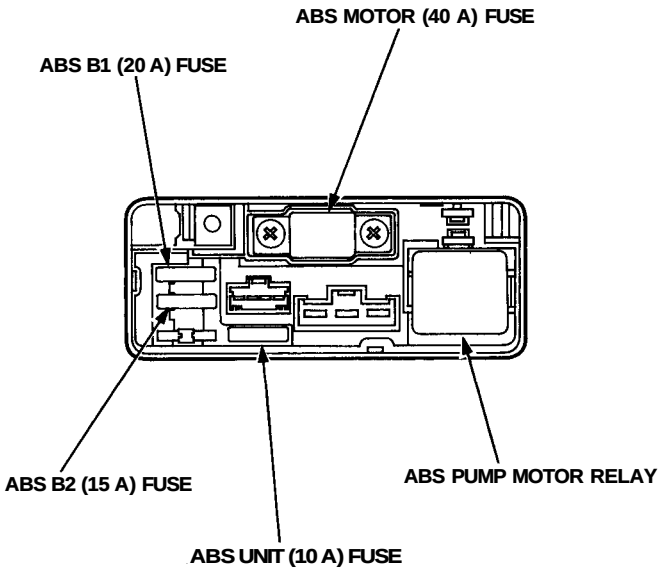
UNDER-HOOD FUSE/RELAY BOX



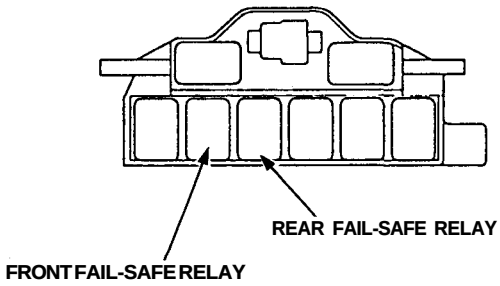
UNDER-DASH FUSE/RELAY BOX



UNDER-HOOD ABS FUSE/RELAY BOX

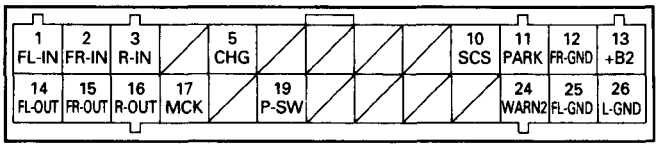


UNDER-DASH RELAY BOX



ABS Control Unit Terminal Arrangement

26P CONNECTOR



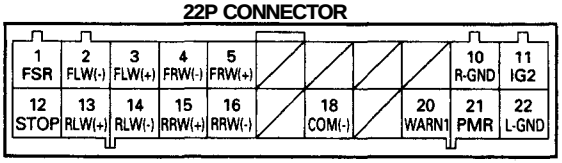
TERMINAL SIDE OF MALE TERMINALS

26P CONNECTOR

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	RED/BLU	FL-IN (Front-left inlet solenoid valve)	Drives left-front inlet solenoid valve.	Engine: ON → Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON (II)) → 0 V
2	RED/BLK	FR-IN (Front-right inlet solenoid valve)	Drives right-front inlet solenoid valve.	
3	RED/WHT	R-IN (Rear inlet solenoid valve)	Drives rear inlet solenoid valve.	
5	WHT/BLU	CHG (Charge)	Detects engine operation. (Activates ABS control unit with engine ON.)	Engine running: 12 V Engine stopped: 0 V
10	ORN	SCS (Service check signal)	Detects service check connector signal (diagnostic trouble code indication).	Connected: 0 V Disconnected: 5 V
11	GRN/RED	PARK (Parking brake)	Detects parking brake switch signal. (ABS indicator light is turned on when driving with signal ON.)	ON: 0 V OFF: 12 V
12	BLK	FR-GND (Front-right solenoid valve ground)	Ground for the right-front inlet and outlet solenoid valves.	
13	WHT/BLK	+B2 (+B2 power source)	• Power source for ABS control unit control circuit. • Power source for diagnostic trouble code memory.	12 V at all times
14	YEL/BLU	FL-OUT (Front-left outlet solenoid)	Drives left-front outlet solenoid valve.	Engine: ON → Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON (II)) → 0 V
15	YEL/BLK	FR-OUT (Front-right outlet solenoid valve)	Drives right-front outlet solenoid valve.	
16	YEL/WHT	R-OUT (Rear outlet solenoid valve)	Drives rear outlet solenoid valve.	
17	GRN	MCK (Motor check)	Detects pump motor drive signal. (ABS indicator light is turned on if there is open or short circuit.)	Motor → ON: 12 V OFF: 0 V (Open): 12 V
19	YEL	P-SW (Pressure switch)	Detects pressure switch signal. (Switch turns ON at approx. 22,000 kPa, 220 kgf/cm², 3,100 psi and pump motor is stopped.)	ON: 0 V OFF: 12 V
24	BLU/RED	WARN 2 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V
25	BLK	FL-GND (Front-left solenoid valve ground)	Ground for the left-front inlet and outlet solenoid valves.	
26	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.	

22P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

22P CONNECTOR

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal	
1	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay. (Fail-safe relay is turned OFF to shut off the power source to the solenoid when problem occurs.)	ON: 12 V OFF: 0 V	
2	BRN	FLW (–) (Front-left wheel sensor, negative)	Detects left-front wheel speed. (Ground level)	No. 2 – 3 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVp-p or above on oscilloscope
3	GRN/BLU	FLW (+) (Front-left wheel sensor, positive)	Detects left-front wheel speed.		
4	GRN	FRW (–) (Front-right wheel sensor, negative)	Detects right-front wheel speed. (Ground level)	No. 4 – 5 terminals	
5	GRN/BLK	FRW (+) (Front-right wheel sensor, positive)	Detects right-front wheel speed.		
10	BLK	R-GND (Rear solenoid valve ground)	Ground for rear inlet and outlet solenoid valves.		
11	BLK/YEL	IG2 (IG2 power source)	Detects ignition switch IG2 signal. (When IG2 is input, +B2 power source is switched to the power source for the ABS control unit (Vcc). Also IG2 monitors P-SW and MCK lines, and drives fail-safe relay.)	ON: 12 V OFF: 0 V	
12	GRN/WHT	STOP (Foot brake)	Detects brake switch signal. (Prevents unnecessary ABS operation when the brake pedal is not depressed)	ON: 12 V OFF: 0 V	
13	LT BLU	RLW (+) (Rear-left wheel sensor, positive)	Detects left-rear wheel speed. (Ground level)	No. 13 – 14 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVp-p or above on oscilloscope
14	GRY	RLW (–) (Rear-left wheel sensor, negative)	Detects left-rear wheel speed. (Ground level)		
15	GRN/YEL	RRW (+) (Rear-right wheel sensor, positive)	Detects right-rear wheel speed.	No. 15 – 16 terminals	
16	BLU/YEL	RRW (–) (Rear-right wheel sensor, negative)	Detects right-rear wheel speed. (Ground level)		
18	BLK/WHT	COM (–) (Common negative)	Ground for ALB checker when it is connected.		
20	BLU/RED	WARN 1 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V	
21	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay. (Pump motor relay is turned ON to drive the pump motor when P-SW OFF signal is detected.)	ON: 0 V OFF: 12 V	
22	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.		

Troubleshooting Precautions

ABS Indicator Light:

The ABS indicator light comes on for three seconds and then goes off when the control unit detects no problem during the initial diagnosis right after the engine starts. However, the ABS indicator light can stay on for up to 40 seconds when the control unit starts to check for pump overrun, etc. during the initial diagnosis. The ABS indicator light comes on, and the ABS control unit memorizes the diagnostic trouble code (DTC) under certain conditions.

- The parking brake is applied for more than 30 seconds while the vehicle is being driven. (DTC 2-1)
- The transmission downshifted excessively. (DTC 4-1, 4-2)
- The vehicle loses traction, and the front wheels spin for more than one minute when starting from a stuck condition on a muddy, snowy, or sandy road. (DTC 4-8)
- Tire adhesion is lost due to excessive cornering speed. (DTC 5, 5-4, 5-8)
- The vehicle is driven on an extremely rough road. (DTC 8-1)
- The vehicle is interfered by strong radio waves (noise), for example, illegal radio, etc. (DTC 8-2)

NOTE: If there is any trouble in the system, the ABS indicator light comes on during driving.

Diagnostic Trouble Code (DTC):

- When the control unit detects a problem and the ABS indicator light comes on, the control unit memorizes the DTC.
- The control unit has three memory registers. When a problem occurs, the control unit stores the DTC in the first memory register. If another problem occurs, or the same problem occurs again, the control unit moves the first DTC to the next memory register, and stores the second DTC in the first register. If there's a third problem occurrence, the two existing DTCs are moved up one register, and the third DTC is stored in the first register. If problems continue to occur, the oldest problem is moved out of the last register and lost, and the most recent problem is stored in the first register. When the same problem occurs three times, the same DTC is stored in all memory registers. (Refer to the Symptom-to-System Chart for diagnostic period.)
- The most recent DTC is indicated first, and the oldest DTC is indicated last.
- The DTCs are erased from the control unit when the ABS control unit +B2 power supply or connector is disconnected.
- The control unit's memory can be erased by disconnecting the ABS B2 fuse for more than three seconds.

Self-diagnosis:

- There are three self-diagnosises described below.
  ① Initial diagnosis: Performed right after the engine starts until the ABS indicator light goes off.
  ② Regular diagnosis: Continuously performed (under some conditions) after the ABS indicator light goes off until the engine stops.
  ③ Individual part/system diagnosis: Diagnosis about a specific part/system under its operating conditions.
- The CPU (central processing unit) controls the following when it detects a problem during self-diagnosis:
  ① Turns the ABS indicator light ON.
  ② Turns the front and rear fail-safe relays off.
  ③ Stops the ABS control.
  ④ Stops the ABS pump. (The pump may work under some conditions.)
  ⑤ After the DTC is stored in the control unit, the CPU stops self-diagnosis.

Kickback and Pump Operation:

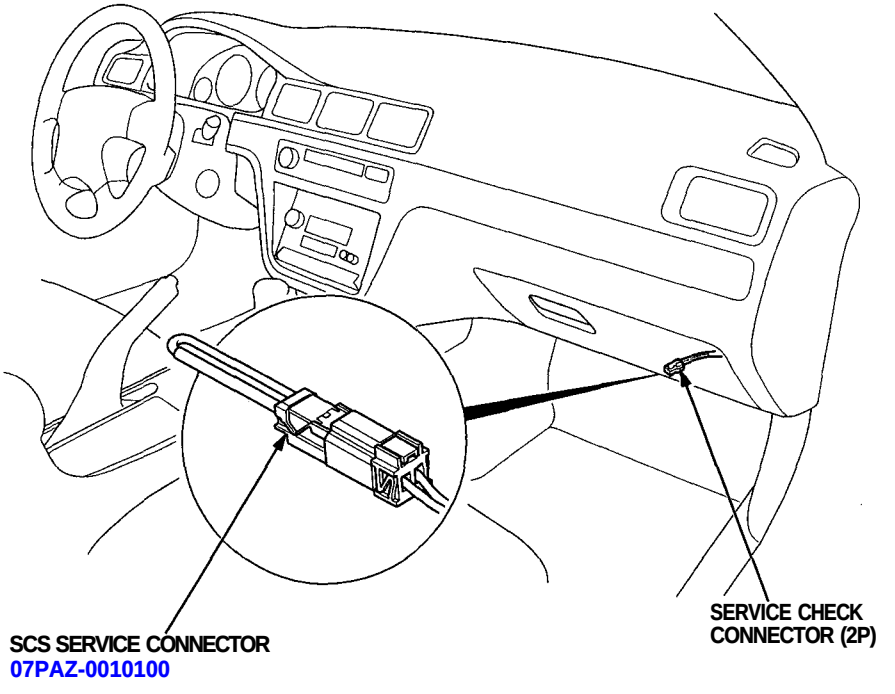
- When the engine is started, the ABS control unit begins the initial diagnosis and operates the solenoid valve one time. The kickback may be felt when the brake pedal is depressed.
- When the ABS control unit detects the pressure switch OFF signal during the initial diagnosis, it operates the pump motor, and performs the pump motor over-run diagnosis and pump motor diagnosis. Therefore, there are two cases where the pump motor operates or does not operate after the engine is started.
- Normally, after the initial diagnosis, the pump motor operates based on the pressure switch signal, regardless of the vehicle speed.

Troubleshooting:

- When two or three DTCs are stored in the control unit, perform troubleshooting for the DTC that appears first.
- When a customer's reported problem cannot be verified on the car, ask the customer about the conditions when the ABS indicator light came ON, and test-drive the car under those conditions, if possible. When the ABS indicator light does not come ON during the test, check for loose terminals and check by shaking the harnesses and connectors while following the flowchart.
- The connector terminal numbers are viewed from the wire side for the female terminals, and from the terminal side for the male terminals.
- After the repair is completed, test-drive the car and check that the ABS indicator light does not come ON again during the test. (Refer to the Symptom-to-System Chart for diagnostic period.)

Diagnostic Trouble Code (DTC) Indication

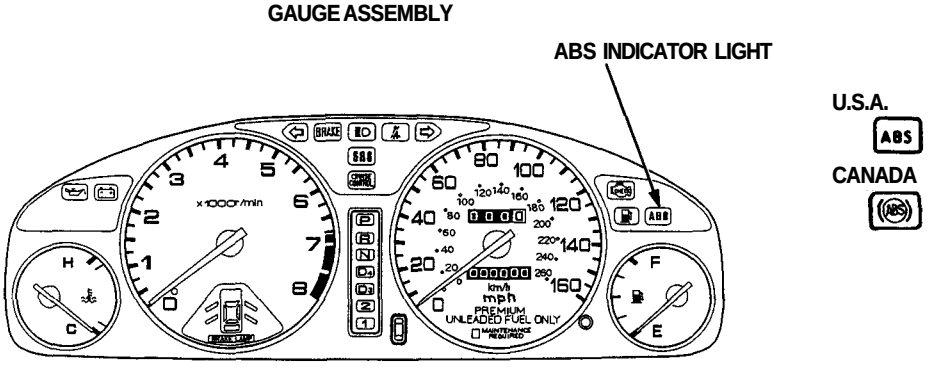
1. Connect the SCS service connector to the service check connector under the glove box.



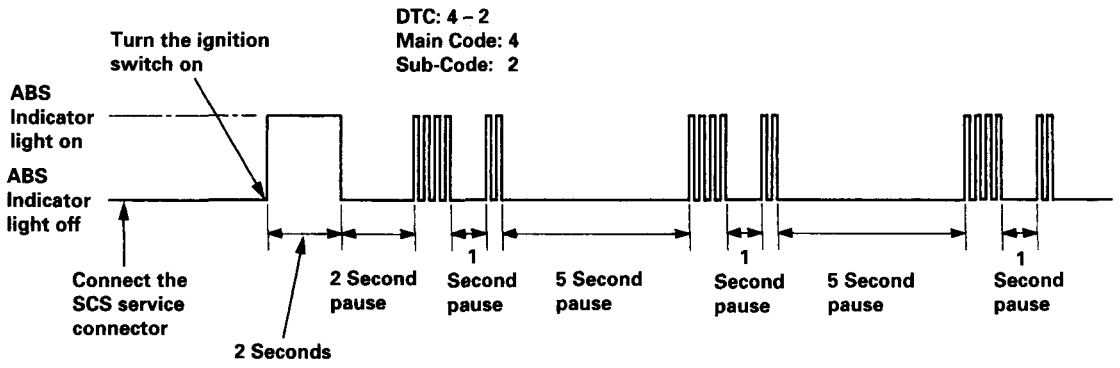
2. Turn the ignition switch ON (II), but do not start the engine.

3. Record the blinking frequency of the ABS indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).

NOTE: Check the DTC carefully and record it. The memory of the DTC is erased if the connector is disconnected from the ABS control unit.



DTC Indication Pattern (When the ABS control unit detected a problem three times.):



- Turn the ignition switch ON (II). The ABS indicator light comes on for two seconds to check the bulb.
- The ABS control unit indicates the DTC three times.
- If you miscount the blinking frequency or if you recheck the blinking frequency, turn the ignition switch OFF then turn it ON (II) to cycle the ABS indicator light again.

4. Remove the SCS service connector.

   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.

5. Remove the ABS B2 (15 A) fuse in the under-hood ABS fuse/relay box for at least three seconds to erase the ABS control unit's memory.

Diagnostic Troubleshooting Code (DTC)

Symptom-to-System Chart

DIAGNOSTIC TROUBLE CODE (DTC) MAIN CODE	DIAGNOSTIC TROUBLE CODE (DTC) SUB-CODE	DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD: INITIAL DIAGNOSIS	DIAGNOSTIC PERIOD: INDIVIDUAL DIAGNOSIS	DIAGNOSTIC PERIOD: REGULAR DIAGNOSIS	PROBLEM LOCATION	PROBABLE CAUSE	PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
—		ABS indicator light does not come on when ignition switch is turned ON (II)					• Blown BACK-UP LIGHTS/METER LIGHTS (SUN ROOF) (10 A) fuse • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (SUN ROOF) (10 A) fuse and ABS indicator light • Blown ABS indicator light bulb • Open circuit between the ABS indicator light and ABS control unit • Open circuit between the ABS control unit and body ground • Poor body ground • Faulty ABS control unit			19-60
		ABS indicator light does not go off after engine is started					• Blown HEATER CONTROL RELAY (7.5 A) fuse • Open circuit between the under-dash fuse/relay box and ABS control unit. • Open circuit between the battery and under-hood ABS fuse/relay box • Blown ABS B2 (15 A) fuse • Open circuit inside the under-hood ABS fuse/relay box • Open circuit between the under-hood ABS fuse/relay box and ABS control unit • Faulty alternator • Open circuit between the alternator and ABS control unit • Short to body ground in the WARN circuit between the ABS indicator light and ABS control unit • Faulty ABS control unit			19-62
	—	ABS pump motor over-run	○	○			• Air mixed in the ABS brake fluid. • Pressure switch stuck OFF • Open circuit between the pressure switch and ABS control unit • Open circuit in the P-SW circuit between the pressure switch and body ground, or a poor ground • Drop in pump discharge volume • Leaking outlet valve • Leaking relief valve • ABS brake fluid leakage • Faulty ABS control unit		• The ABS indicator light is turned on when the pump motor relay ON signal is detected for more than 40 seconds while the ABS is not functioning.	19-65
①	②	Pump motor	○		○		• Open circuit or short to body ground between the HEATER CONTROL RELAY (7.5 A) fuse and under-hood ABS fuse/relay box • Open circuit or short to body ground in the PMR circuit inside the under-hood ABS fuse/relay box • Faulty pump motor relay • Open circuit or short to body ground in the PMR circuit between the under-hood ABS fuse/relay box and ABS control unit • Open circuit between the battery and under-hood ABS fuse/relay box • Blown ABS MOTOR (40 A) fuse • Blown ABS UNIT (10 A) fuse • Open circuit or short to body ground in the motor drive circuit and MCK circuit inside the under-hood ABS fuse/relay box • Open circuit or short to body ground in the MCK circuit between the under-hood ABS fuse/relay box and ABS control unit • Open circuit or short to body ground between the under-hood ABS fuse/relay box and pump motor • Faulty pump motor • Open circuit between the pump motor and body ground or poor ground • Faulty ABS control unit	• Intermittent interruption in the MCK circuit • Intermittent interruption in the pump motor relay drive circuit • Intermittent interruption in the pump motor drive circuit	• The ABS indicator light is turned on when battery voltage is detected at the MCK terminal while the pump motor relay OFF signal is detected. • The ABS indicator light is turned on when the 0 V is detected at the MCK terminal while the pump motor relay ON signal is detected.	19-67
	③	High-pressure leakage			○		• Leaking outlet valve • Leaking relief valve • Poor contact in pressure switch circuit	• Intermittent interruption in the pressure switch • Intermittent interruption in the pressure switch circuit	• The ABS indicator light is turned on when the frequent ON/OFF cycle of the pressure switch signal is detected while the engine is running. The count is erased when the ABS functions.	19-73
	④	Pressure switch	○				• Short to body ground between the ABS control unit and pressure switch • Pressure switch stuck ON • Faulty ABS control unit		• The ABS indicator light is turned on when the pressure switch ON signal is always detected at every initial diagnosis. The count is erased when the ABS control unit detects the pressure switch OFF signal.	19-75
	⑧	High-pressure system	○				• Accumulator gas leakage • Changed relief valve set pressure • Rear outlet solenoid valve late to close • Changed pressure switch set pressure	• The ABS indicator light may not come on in normal climate when it comes on in very cold climate.	• This diagnosis is performed when the pressure switch is OFF at the initial diagnosis. The pump motor is operated to turn the pressure switch ON, then the solenoid valve is momentarily activated. The ABS indicator light is turned on if the pressure switch signal changes from ON to OFF.	19-76
②	①	Parking brake			○		• Low fluid level in the master cylinder reservoir • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (SUN ROOF) (10 A) fuse and brake system light • Blown brake system light bulb • Open circuit or short to body ground between the brake system light and ABS control unit • Parking brake switch stuck ON • Short to body ground between the brake system light and parking brake switch • Brake fluid level switch stuck ON • Short to body ground between the brake system light and brake fluid level switch • Faulty ABS control unit	• Driving with the parking brake applied—(No problem)	• The ABS indicator light is turned on when the parking brake ON signal is detected for more than 30 seconds while driving.	19-77

(cont'd)

Diagnostic Troubleshooting Code (DTC)

Symptom-to-System Chart (cont'd)

DTC MAIN CODE	DTC SUB-CODE	DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD: INITIAL DIAGNOSIS	DIAGNOSTIC PERIOD: INDIVIDUAL DIAGNOSIS	DIAGNOSTIC PERIOD: REGULAR DIAGNOSIS	PROBLEM LOCATION	PROBABLE CAUSE	PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
③	①	Pulser			○	Right-front	• Chipped pulser gear • Improperly installed wheel sensor	• Intermittent interruption in the wheel sensor	• The ABS indicator light is turned on when the wheel sensor signal is periodically missing during driving.	19-81
	②					Left-front				
	④					Right-rear				
	⑧					Left-rear				
	⑫	Different diameter tire			○		• Different diameter tire installed	• (No problem)	• The ABS indicator light may be turned on while driving when one, two or three different diameter tires are installed. This diagnosis is not performed when the parking brake switch is ON.	19-81
④	①	Wheel sensor		○	○	Right-front	• Open circuit, internal short or short to body ground in the wheel sensor • Open circuit or short to body ground in the positive (+) wire between the wheel sensor and ABS control unit • Open circuit or short to body ground in the negative (−) wire between the wheel sensor and ABS control unit • Positive (+) wire shorted to the negative (−) wire between the wheel sensor and ABS control unit • Loose connector or poor contact of terminals • Improper wheel sensor air gap • Faulty ABS control unit • Missing pulser • Modulator does not decrease pressure properly	• Intermittent interruption in the wheel sensor • Wheel spin of both front wheels (only for DTC 4-8)—(No problem) • The transmission downshifted excessively (only for DTC 4-1 and 4-2)—(No problem)	• The ABS indicator light is turned on when the wheel sensor signal is missing at speeds of 6 mph (10 km/h) or more. This diagnosis is not performed when the parking brake switch is ON.	19-82
	②					Left-front				
	④					Right-rear				
	⑧					Left-rear				
⑤	—	Rear wheel lock			○	Right/ Left	• Open circuit, internal short or short to body ground in the wheel sensor system • Rear brake drag • Modulator does not decrease pressure properly • Faulty ABS control unit	• Intermittent interruption in the wheel sensor • Wheel spin by operating the parking brake while the parking brake switch is stuck OFF • Car spun-out—(No problem)	• The ABS indicator light is turned on when either or both rear wheels lock and the wheel sensor signal is missing during driving. This diagnosis is not performed when the parking brake switch is ON.	19-85
	④					Right				
	⑧					Left				
⑥	—	Fail-safe relay	○			Front/ rear	• Short to power in the relay drive circuit between the fail-safe relay and ABS control unit • Faulty relay drive transistor (ON) in the ABS control unit • Fail-safe relay stuck ON • Short to power in the solenoid drive circuits between the fail-safe relay and ABS control unit		• The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal before the fail-safe relays are turned on at the initial diagnosis.	19-86
	①					Front				19-88
	④					Rear				19-91
⑦	①	Solenoid	○		○	Right-front	• Fail-safe relay stuck OFF • Open circuit in the solenoid drive circuit between the under-hood ABS fuse/relay box and ABS control unit • Short to body ground in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (ON) in the ABS control unit • Short to power in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (OFF) in the ABS control unit • Short to power in the drive circuit inside the solenoid • Short to the outlet circuit in the inlet circuit between the solenoid and ABS control unit	• Intermittent interruption in the solenoid valve drive circuit • Intermittent interruption in the solenoid valve ground circuit • Intermittent interruption in the fail-safe relay circuit	• Each solenoid valve is momentarily activated at the initial diagnosis and when the car starts off. The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal. • The ABS indicator light is turned on when 0V is detected at the solenoid terminal while the solenoid OFF signal is detected at the regular diagnosis.	19-93
	②					Left-front				19-97
	④					Rear				19-103
⑧	①	ABS function			○		• Wheel sensor signal disappears at speeds of 6 mph (10 km/h) or less • Faulty ABS control unit	• Intermittent interruption in the wheel sensor • Rough road driving—(No problem)	• The ABS indicator light is turned on when the ABS functions continuously.	19-110
	②	CPU comparison	○		○		• Faulty ABS control unit	• (No problem)	• The ABS indicator light is turned on when there is a difference between the CPU data.	19-111
	④	IC [Integrated Circuit]	○		○		• Faulty ABS control unit	• (No problem)	• The ABS indicator light is turned on when there is a abnormality in the IC at the regular diagnosis.	19-111

ABS Function Test

1. Raise the car off the ground, and support it with safety stands (see section 1).

2. Check that there is no brake drag.

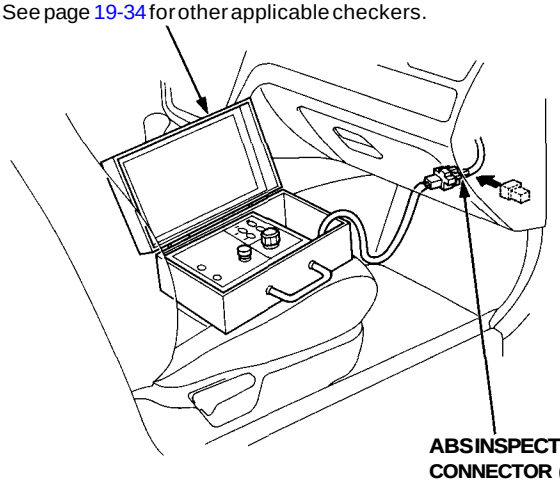
3. Turn the ignition switch ON (II), and confirm that the ABS indicator light comes on.

   - If the ABS indicator light does not come on, follow the troubleshooting on page 19-60.

4. **Honda PGM Tester:** Connect the PGM Tester as described in the PGM Tester Anti-Lock Brake System (ABS) Vehicle System Supplement. Follow the tester's prompts instead of steps 5 through 11 of this procedure.

   ALB Checker: With the ignition switch OFF, disconnect the ABS inspection connector (6P) from the connector cover located under the glove box, and connect it to the ALB checker. Continue with steps 5 through 11 of this procedure.

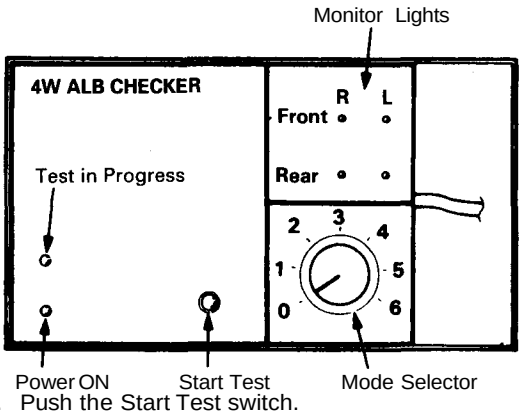
ALB CHECKER
07HAJ-SG0010B
See page 19-34 for other applicable checkers.



5. Shift the transmission to [P] position.

6. Start the engine and release the parking brake.

7. Turn the Mode Selector switch to "1".



8. Push the Start Test switch.
   The ABS indicator light should not come on while the Test in Progress light is on.

   - If the ABS indicator light comes on, confirm the DTC and perform the appropriate troubleshooting for the code.

   NOTE: Do not turn the Mode Selector switch when the Test in Progress light is on. Damage to the ALB checker can result.

9. Turn the Mode Selector switch to "2".

10. Depress the brake pedal firmly, and push the Start Test switch. The ABS indicator light should not come on while the Test in Progress light is on. There should be kickback on the brake pedal.

    Have the assistant check that the wheel controlled by the ABS can be rotated by hand when there is kickback on the brake pedal.

    - If the ABS indicator light comes on, confirm the DTC and perform the appropriate troubleshooting for the code.
    - If the ABS indicator light does not come on and the wheel controlled by the ABS cannot be rotated, check the connection of the modulator wire harness connectors. If the connections are OK, replace the modulator unit.

    NOTE: The kickback should occur approximately 20 seconds after the Start Test switch is pushed.
    The ABS can be checked with a brake tester, too, by checking the brake torque fluctuation of the wheel controlled by the ABS.

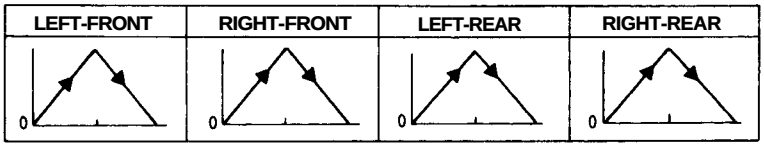
11. Turn the Mode Selector switch to "3", "4" and "5". Perform step 10 for each of the test mode positions.

Operation Sequence Simulated by Modes of ALB Checker

NOTE: The wheel sensors and sensor wire harnesses are not checked by the ALB checker.

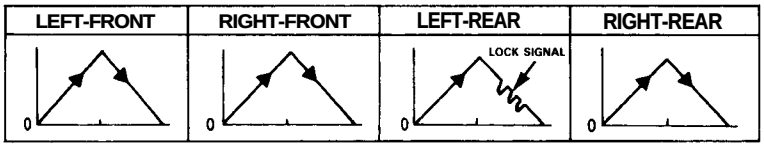
Mode 1: Sends the simulated driving signal O mph (O km/h) → 113 mph (180 km/h) → O mph (O km/h) of each wheel to the ABS control unit to check the system under the normal driving. There should be no kickback.

SIMULATED DRIVING SIGNAL



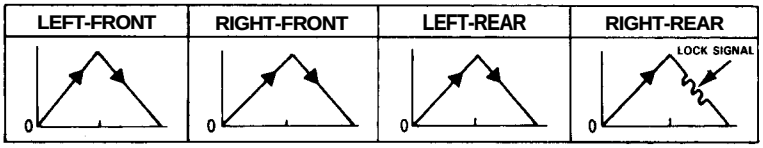
Mode 2: Sends the driving signal of each wheel, then sends the lock signal of the left-rear wheel to the ABS control unit to check the system under left-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



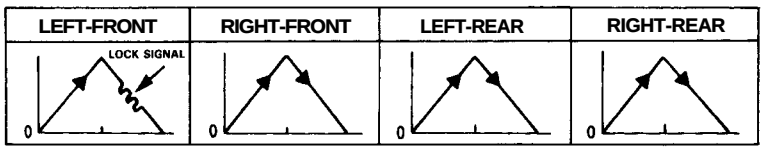
Mode 3: Sends the driving signal of each wheel, then sends the lock signal of the right-rear wheel to the ABS control unit to check the system under right-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



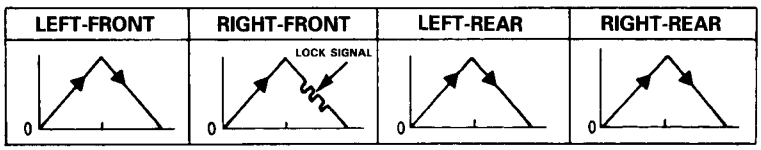
Mode 4: Sends the driving signal of each wheel, then sends the lock signal of the left-front wheel to the ABS control unit to check the system under left-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Mode 5: Sends the driving signal of each wheel, then sends the lock signal of the right-front wheel to the ABS control unit to check the system under right-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Inspection Points

If the ABS indicator light comes on and the system stops during the inspection, confirm the DTC and perform the appropriate troubleshooting for the code.

If there is no kickback in modes 2 through 5, and the ABS indicator light does not come on, the following items are probable causes:

- Pressure switch stuck ON
- Clogged or stuck solenoid outlet valve
- Modulator wire harness connectors improperly connected

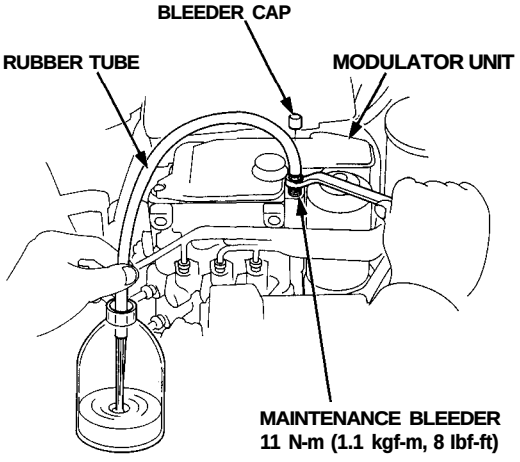
ABS Function Test

Modulator Function Check

NOTE: This inspection determines whether the basic brake system continues to operate normally when the modulator unit fluid pressure is low.

CAUTION:
- **This inspection is made by relieving the high-pressure fluid in the modulator unit and checking for brake operation. After inspection, be sure to add fresh brake fluid to the specified level of the reservoir, and start the engine to restore the ABS to its normal operating condition.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Do not reuse the drained brake fluid.**
- **Do not loosen the relief plug on the accumulator.**

1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.



2. Attach a wrench to the maintenance bleeder.

3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.

4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 turn to collect the brake fluid in the container.

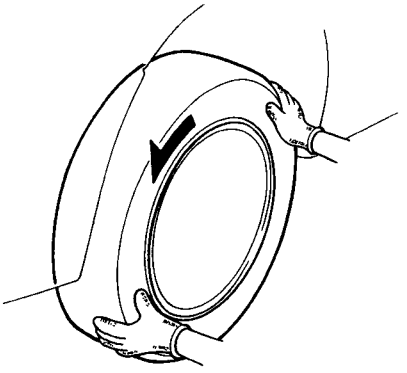
   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.

5. After the brake fluid stops flowing out, loosen the maintenance bleeder more to release the pressure completely.

6. Tighten the maintenance bleeder to the specified torque.

7. Raise the car off the ground, and support it with safety stands (see section 1).

8. Have an assistant depress the brake pedal firmly, and check that the wheels do not rotate.

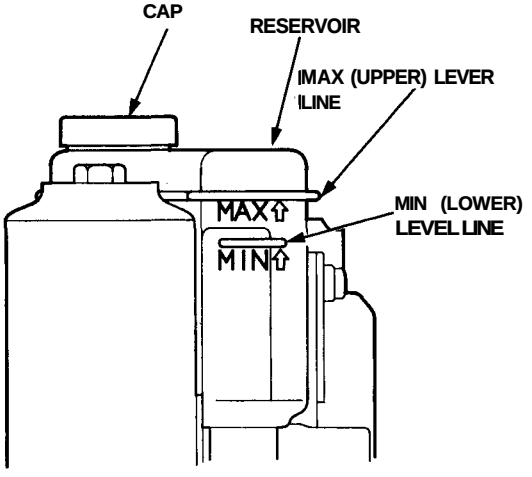


9. Remove the cap, and refill the reservoir to the MAX (upper) level with fresh brake fluid.

   NOTE: Pour the brake fluid slowly so that it does not foam, and wait for a few minutes.

10. Start the engine and let it idle for a minute. Stop the engine.

11. Check the brake fluid level in the reservoir. It should be below the MAX (upper) level line. Refill the reservoir with fresh brake fluid to the MAX level line again.



12. After inspection, start the engine and make sure that the ABS indicator light goes off.

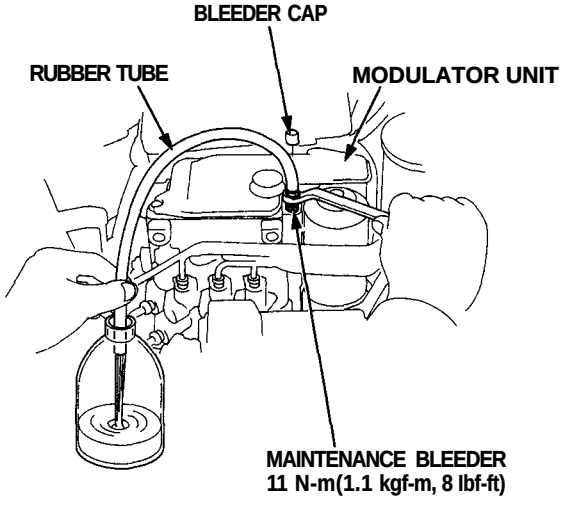
Modulator Unit

Relieving System Pressure

CAUTION:

- **Be sure to drain the high-pressure brake fluid completely before performing the modulator function check, disposing the modulator unit, accumulator and ABS pump motor replacement.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Do not reuse the drained brake fluid.**
- **Do not loosen the relief plug on the accumulator.**

1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.



2. Attach a wrench to the maintenance bleeder.

3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.

4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 turn to collect the brake fluid in the container.

   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.

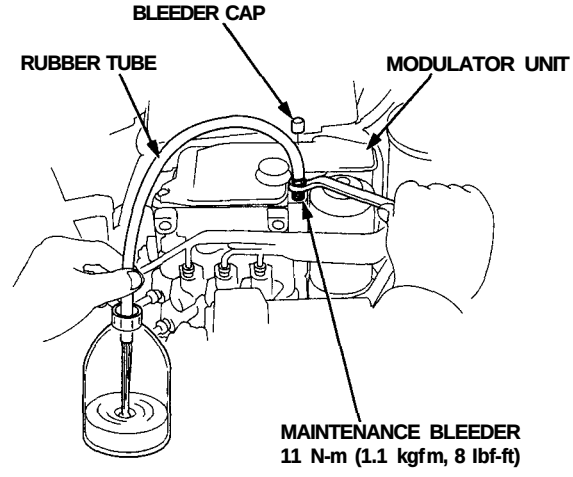
5. Tighten the maintenance bleeder to the specified torque.

Brake Fluid Replacement/Bleeding

CAUTION:
- **Do not loosen the relief plug on the accumulator.**

NOTE: Brake fluid replacement procedure explained in this section is for the brake fluid in the modulator unit (that is, the brake fluid in the high-pressure passage and in the reservoir). See page 19-7 for the brake fluid replacement procedures for the rest of the brake system.

1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.



2. Attach a wrench to the maintenance bleeder.

3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.

4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 to collect the brake fluid in the container.

   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.

5. Tighten the maintenance bleeder.

   NOTE: Do not remove the rubber tube and wrench yet.

(cont'd)

Modulator Unit

Brake Fluid Replacement/Bleeding (cont'd)

6. Start the engine and let it idle for a minute. Stop the engine.

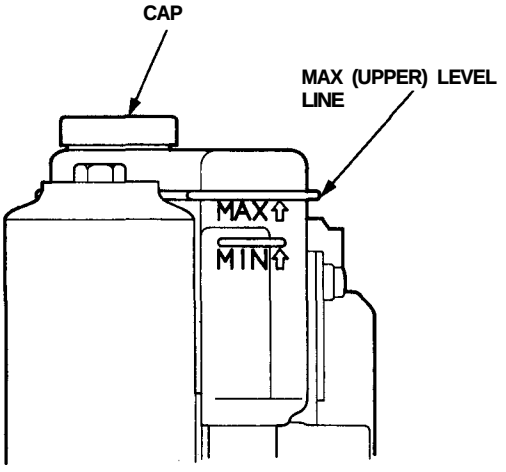
7. Check the brake fluid level in the reservoir. It should be below the MAX (upper) level line.

8. Repeat the steps 4 through 7 to drain the rest of the brake fluid from the modulator unit.

   NOTE: The modulator has a capacity of approximately 150 mℓ (5 fl-oz, 5.3 Imp-oz). Approximately 35 - 45 mℓ (1 1/6-1 1/2 fl-oz, 1.2-1.6 Imp-oz) of the fluid is drained at each try.

9. Remove the cap, and refill the reservoir to the MAX (upper) level with fresh brake fluid.

   NOTE: Pour the brake fluid slowly so that it does not foam, and wait for a few minutes.



10. Repeat steps 4 through 7 twice, and refill the reservoir to the MAX (upper) level with fresh brake fluid.

11. Tighten the maintenance bleeder to the specified torque.

12. After replacement, start the engine and make sure that the ABS indicator light goes off.

Bleeding:

NOTE: The ABS can also be bled by using the PGM Tester and the ABS Diagnostic Kit to run the ABS pump. Connect the tester and module A as described in the PGM Tester Anti-Lock Brake System (ABS) Vehicle System Supplement, then follow the tester's prompts instead of this procedure.

When the brake fluid is completely drained from the reservoir (air enters in the modulator unit) during brake fluid replacement, bleed the air from the modulator unit as follows.

1. Fill the reservoir to the MAX (upper) level with fresh brake fluid.

2. Connect the rubber tube to the bleeder on the modulator unit, and set the other end of the rubber tube in a container (see page 19-115).

3. Loosen the bleeder, and start the engine to activate the pump motor.

   NOTE: Take care not to spill the brake fluid from the container.

4. Tighten the bleeder when the fluid starts to flow out of the bleeder.

5. Stop the engine after the pump motor stops

   NOTE: If the ABS indicator light comes on and the pump motor stops, restart the engine and repeat steps 3 through 5 above.

Removal/Installation

Removal:

- When removing the modulator unit or after removing it, be careful not to turn it upside-down or lean if excessively.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Take care not to damage or deform the brake lines during removal and installation.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.
- Do not loosen the relief plug on the accumulator.

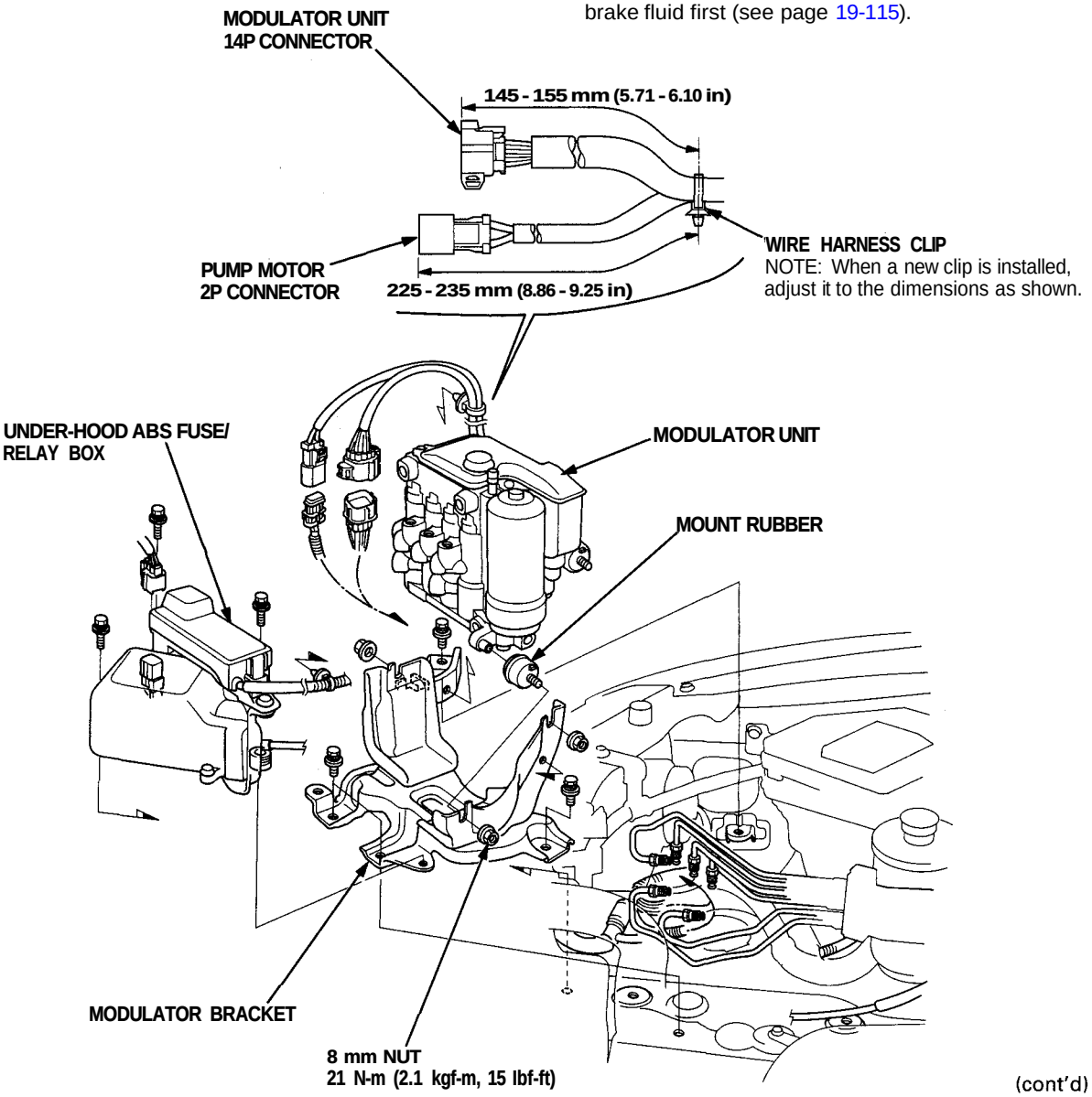
1. Disconnect the modulator unit 14P connector and pump motor 2P connector.

2. Remove the wire harness clip from the modulator bracket.

   NOTE: When a new harness clip is installed after a wire harness or modulator unit replacement, adjust the harness clip to the dimensions shown below.

3. Remove the three 8 mm nuts, and remove the modulator unit from the bracket.

   NOTE: When the pump motor, accumulator or the modulator unit is replaced, bleed the high-pressure brake fluid first (see page 19-115).



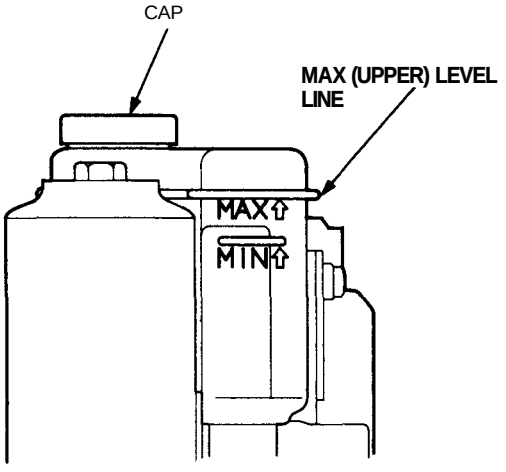
(cont'd)

Modulator Unit

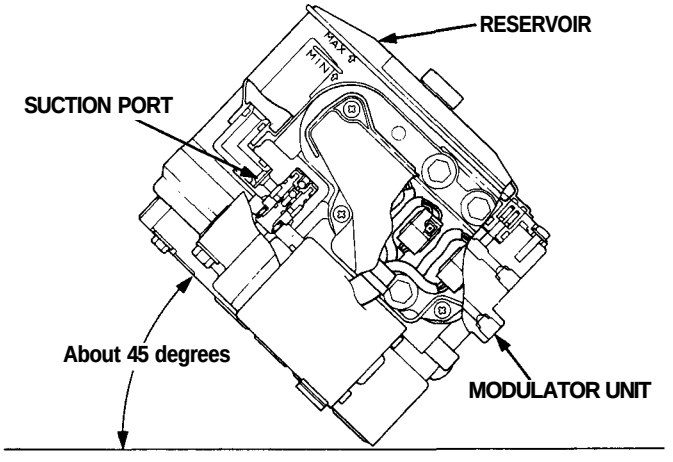
Removal/Installation (cont'd)

Installation:

1. Check whether the brake fluid level in the reservoir is at the MAX (upper) lever. If level is low, add fresh brake fluid to the MAX (upper) level.



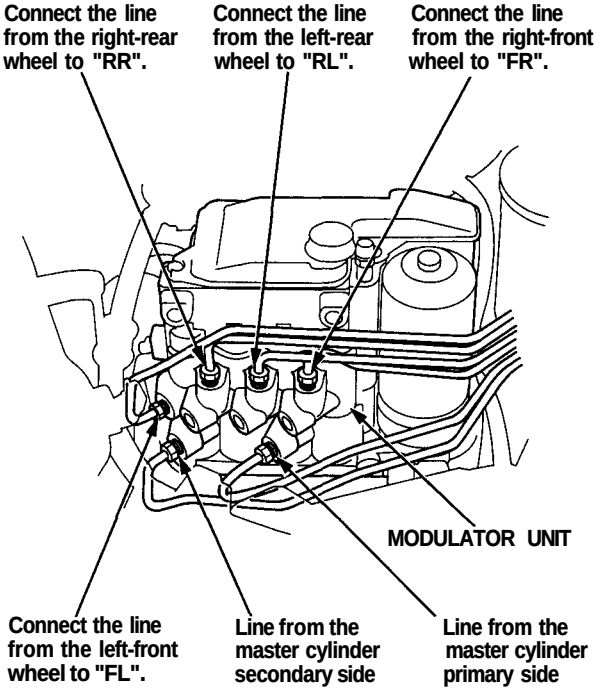
2. Before installing the modulator unit on the car, be sure to bleed the air from the suction port in the modulator unit by leaning the modulator unit to one side slowly (about 45 degrees) as shown.



CAUTION: When installing the modulator unit, be careful not to turn it upside-down or lean if excessively.

3. Install the modulator unit in the reverse order of removal.

   NOTE: Check the letters stamped on the modulator body, and connect the brake pipes properly.
   Tighten the flare nuts to 19 N-m (1.9 kgf-m, 14 lbf-ft).



4. Start the engine and let it idle for a minute.
   Check that:
   - ABS indicator light is off.
   - Brake fluid is not leaking from the brake pipe joints.

5. Stop the engine.

6. Check whether the brake fluid level in the reservoir is at the MAX (upper) level. If level is low, add fresh fluid until the reservoir is refilled to the MAX (upper) level.

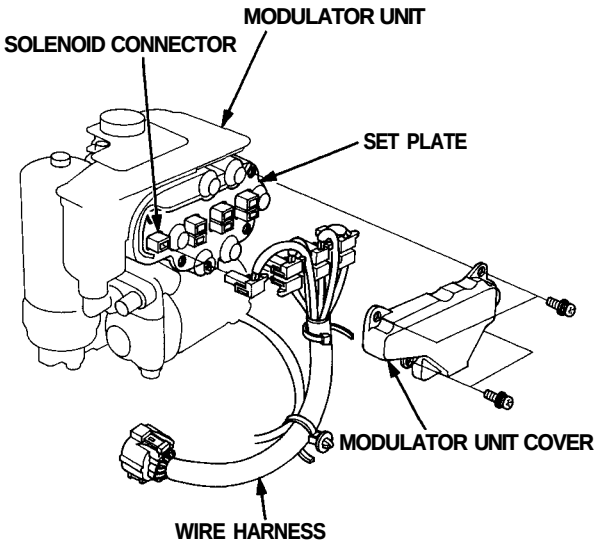
7. Bleed air from the brake system (see page 19-7).

8. Check the ABS function using the ALB checker (see page 19-112).

Wire Harness Replacement

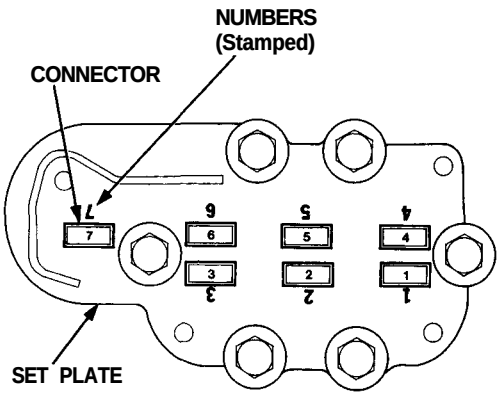
1. Remove the modulator unit from the car (see page 19-117).

2. Remove the modulator unit cover, and remove the wire harness.



3. Check the numbers stamped on the set plate, and connect each connector of the new wire harness to the set plate of the corresponding number.

   NOTE: Be sure that each connector is locked securely with the two locking tabs.



4. Install the modulator unit cover and modulator unit (see the previous page).

5. Check the ABS function using the ALB checker (see page 19-112).

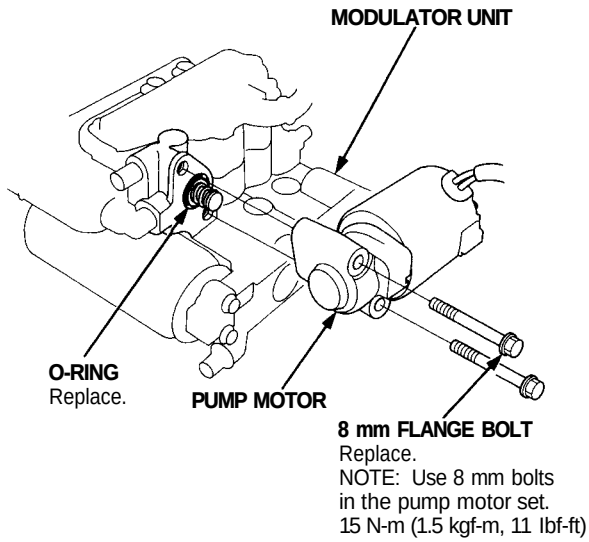
Pump Motor Replacement

⚠ WARNING The modulator unit contains high-pressure brake fluid. Be sure to bleed the high-pressure fluid from the modulator unit before removing the pump motor.

1. Bleed the high-pressure brake fluid from the modulator unit (see page 19-115).

2. Remove the modulator unit from the car (see page 19-117).

3. Remove the 8 mm flange bolts from the modulator unit, and remove the pump motor.



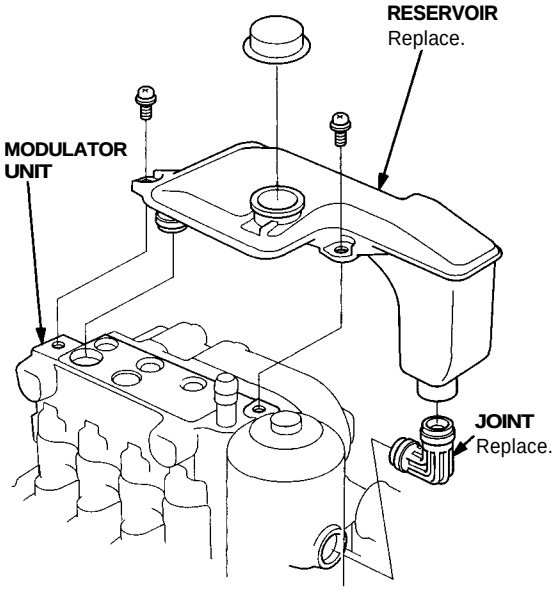
4. Install the pump motor in the reverse order of removal.

   NOTE:
   - After installing the modulator unit, add fresh brake fluid until the reservoir is refilled to the specified level, and bleed air from the system (see page 19-115).
   - Turn the ignition switch on (II); and check for the ABS indicator light operation.

Modulator Unit

Reservoir Replacement

1. Drain the brake fluid completely from the reservoir (see page 19-115 for the brake fluid replacement).
2. Remove the modulator unit from the car (see page 19-117).
3. Remove the reservoir from the modulator unit.



4. Install the reservoir in the reverse order of removal.
5. Fill the reservoir to the MAX (upper) level with fresh brake fluid.
6. Before installing the modulator unit on the car, be sure to bleed the air from the suction port in the modulator unit (see page 19-118).

   NOTE: After installing the modulator unit and bleeding the brakes, start the engine and make sure that the ABS indicator light goes off.

Modulator Unit

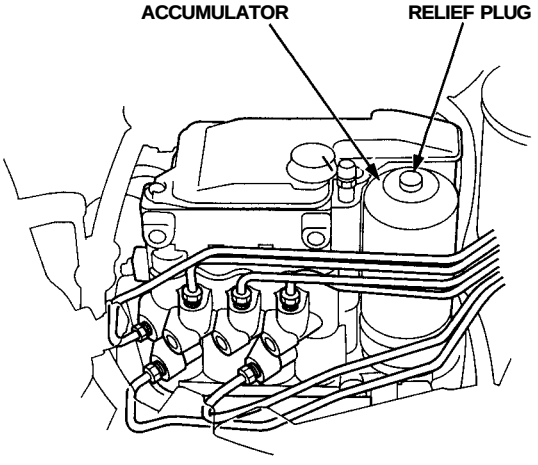
Accumulator Replacement and Disposal

⚠ WARNING

- **The modulator unit contains high-pressure brake fluid. Be sure to bleed the high-pressure fluid from the modulator unit before removing the accumulator.**
- **The accumulator contains high pressure nitrogen gas. Do not puncture, expose to flame, weld, drop or apply impact to the accumulator. The modulator unit may explode and severe personal injury may result.**

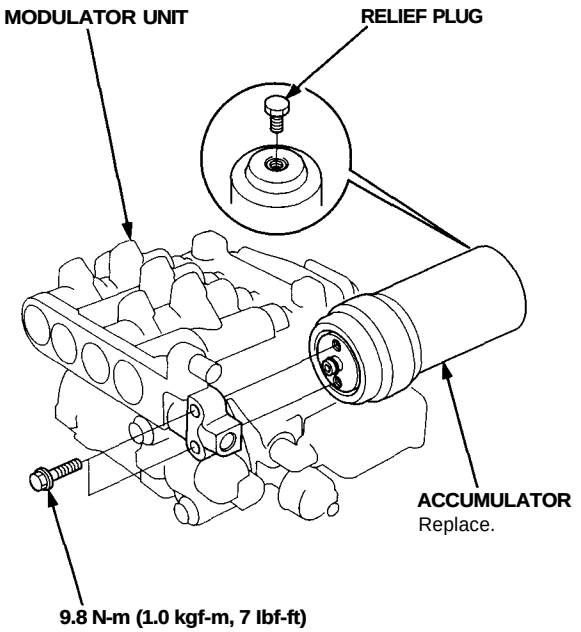
1. Bleed the high-pressure brake fluid from the modulator unit (see page 19-115).

2. Loosen the relief plug three and a half turns slowly, and wait for three minutes for all pressure to escape.



3. Remove the modulator unit from the car (see page 19-117).

4. Remove the accumulator from the modulator unit.



5. Remove the relief plug completely, and dispose of the accumulator.

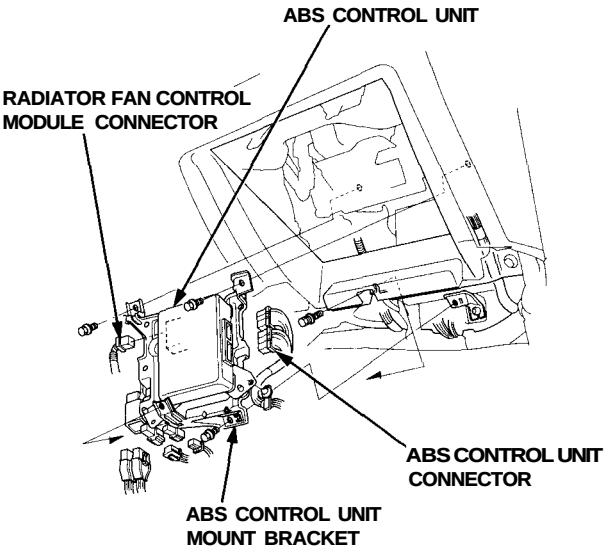
6. Install the new accumulator on the modulator unit.

7. Install the modulator unit (see page 19-118).

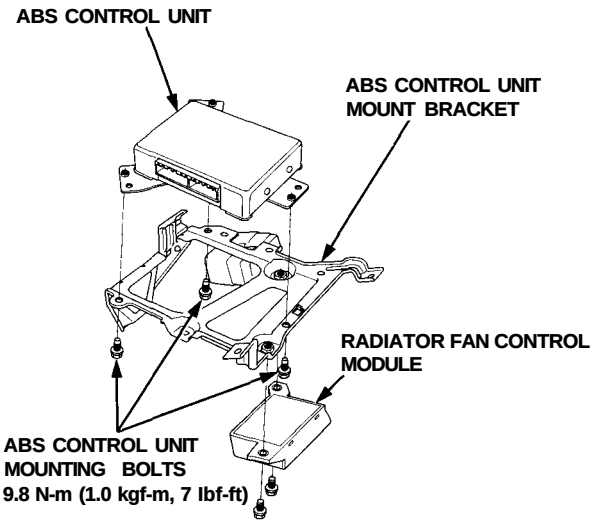
NOTE: After installing the modulator unit and bleeding the brakes, start the engine and make sure that the ABS indicator light goes off.

ABS Control Unit Replacement

1. Remove the glove box (see section 20).
2. Remove the four mounting bolts of the ABS control unit mount bracket.



3. Move the bracket forward, and disconnect the each connectors from the bracket.
4. Disconnect the ABS control unit connectors and radiator fan control module connector.
5. Move the bracket down to remove it from the car.
6. Remove the radiator fan control module and three ABS control unit mounting bolts.



7. Remove the ABS control unit from the bracket.
8. Install the ABS control unit in the reverse order of removal.

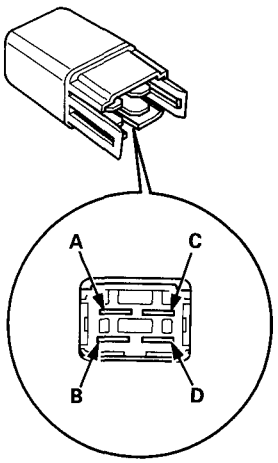
Relay Inspection

1. Remove the fail-safe relays and motor relay (location: see page 19-46).

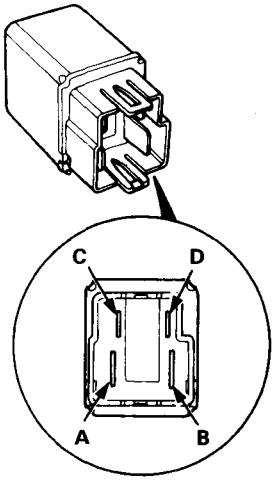
2. Check for continuity between the terminals C and D. There should be continuity.

3. Check for continuity between the terminals A and B. There should be continuity when the battery is connected between the terminals C and D. There should be no continuity when the battery is disconnected.

Fail-safe Relay:



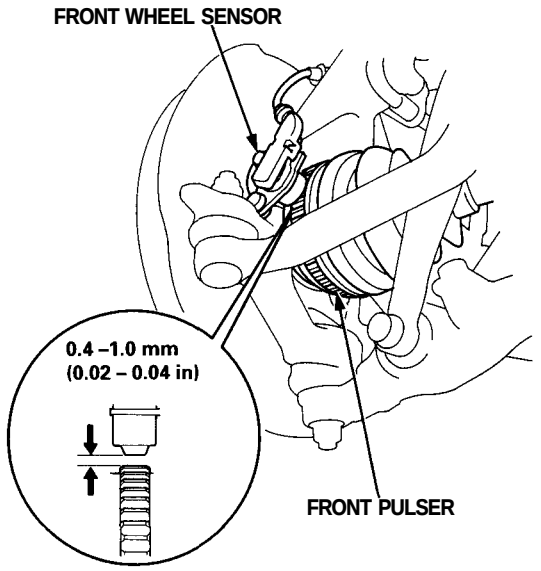
Motor Relay:



Inspection

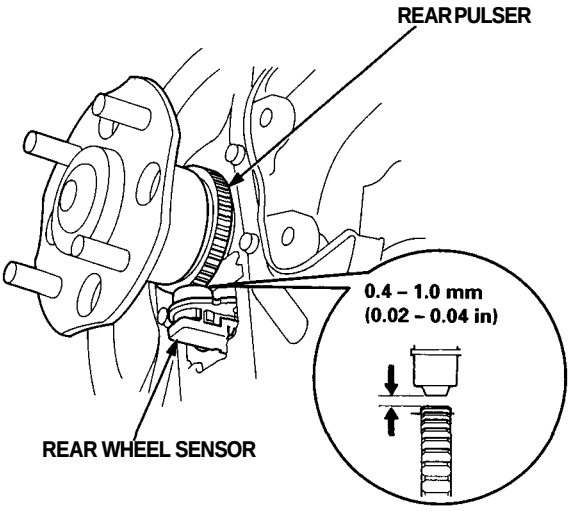
1. Check the front and rear pulser for chipped or damaged teeth.

Front:



Rear:

1. Check the rear pulser for chipped or damaged teeth.



2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the hub bearing unit by hand.

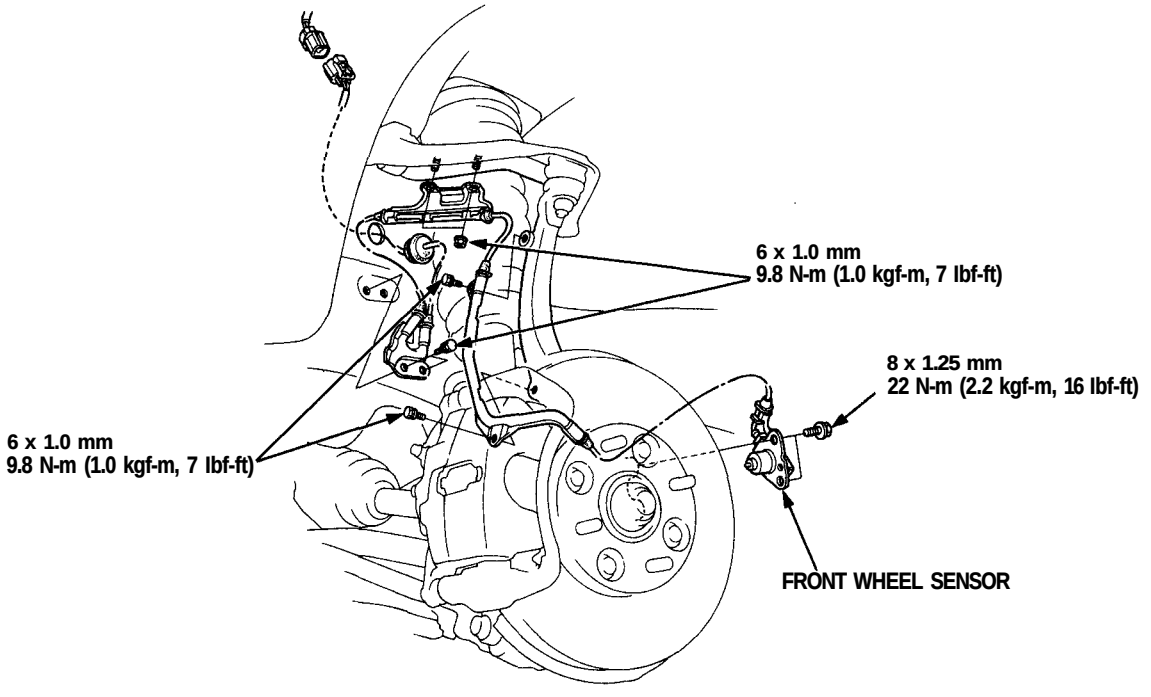
Standard: 0.4 - 1.0 mm (0.02 - 0.04 in)

NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted knuckle which should be replaced.

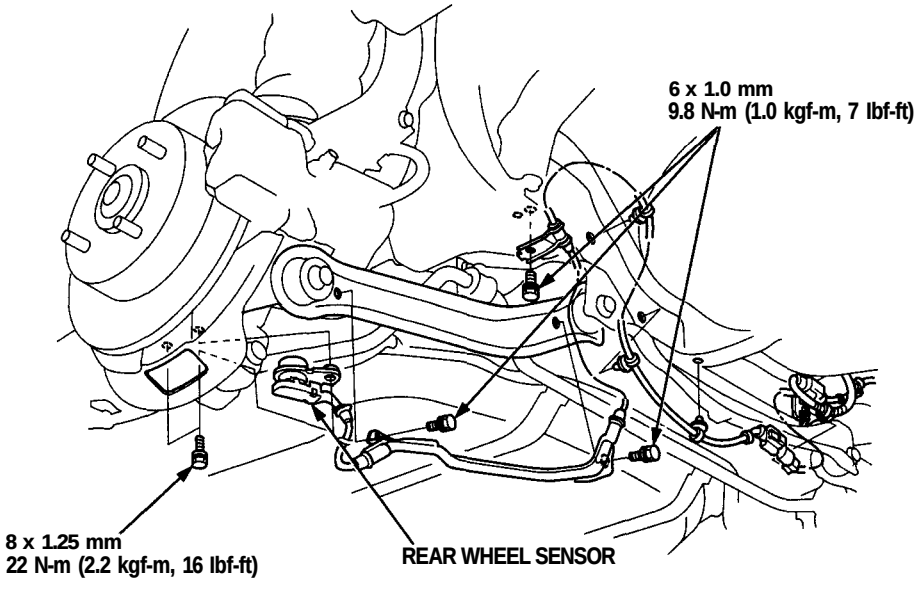
Wheel Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (see page 19-112).

Front:

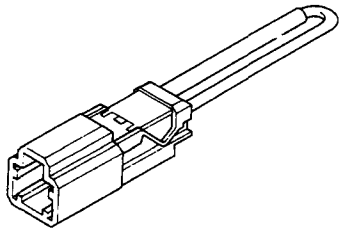


Rear:



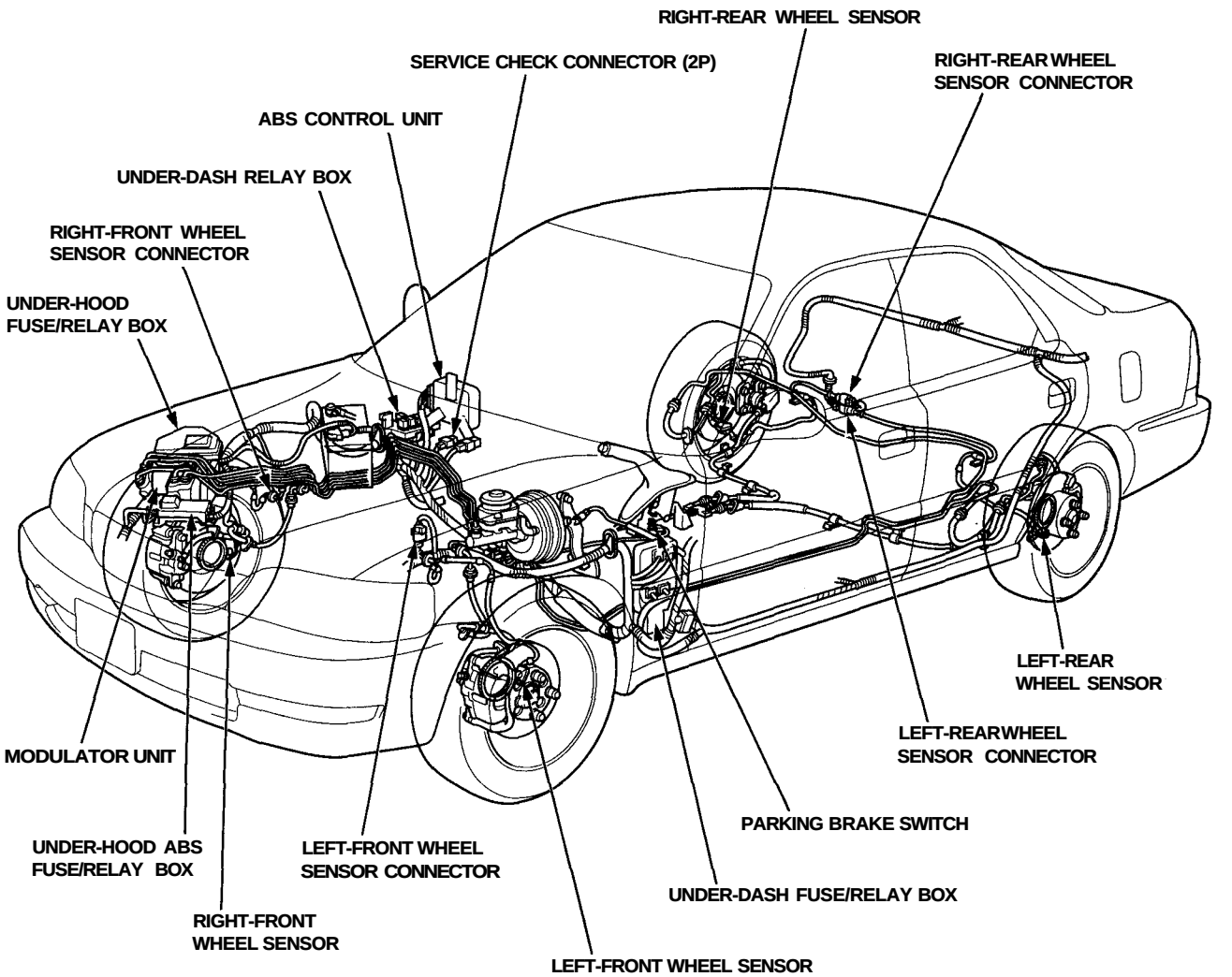
Special Tools

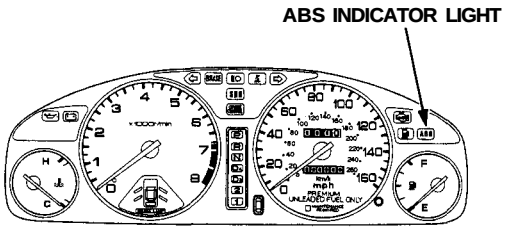
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ-0010100	SCS Service Connector	1	19-139

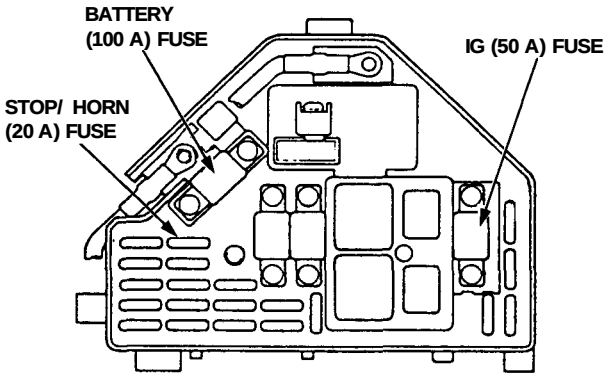


①

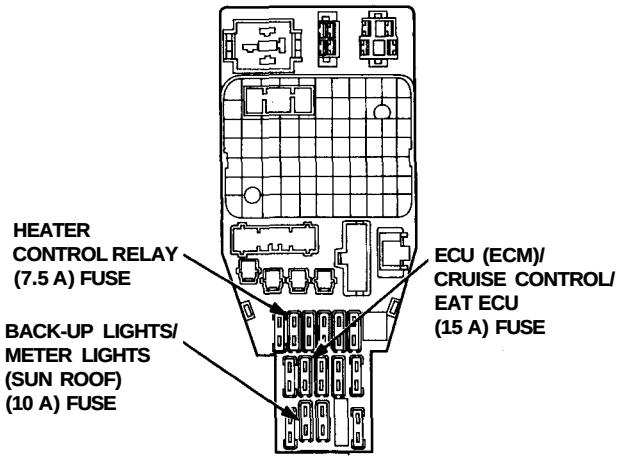
Component Locations



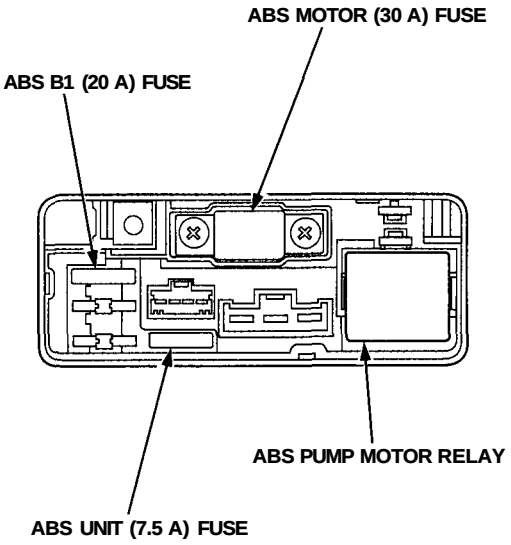




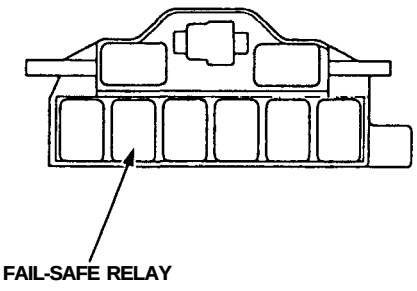
UNDER-DASH FUSE/RELAY BOX



UNDER-HOOD ABS FUSE/RELAY BOX



UNDER-DASH RELAY BOX

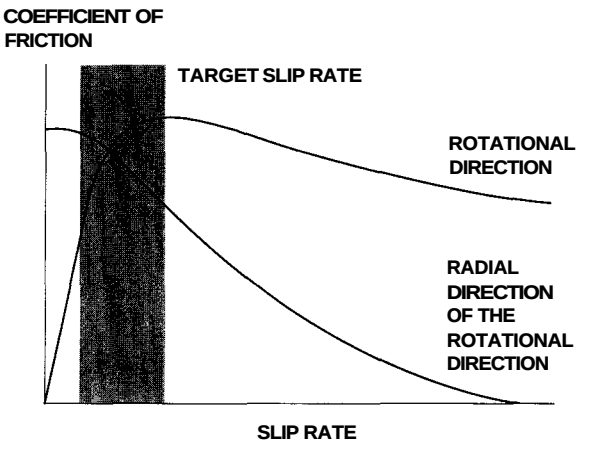


Anti-lock Brake System (ABS)

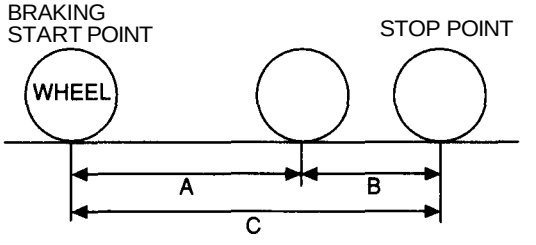
Features/Construction

When the brake pedal is depressed during driving, the wheels can lock before the vehicle comes to a stop. In such a case, the maneuverability of the vehicle is reduced if the front wheels are locked, and the stability of the vehicle is reduced if the rear wheels are locked, creating an extremely unstable condition. The ABS precisely controls the slip rate of the wheels to ensure the grip force of the tires, and it thereby ensures the maneuverability and stability of the vehicle.
Judging the vehicle speed, the ABS calculates the slip rate of the wheels based on the vehicle speed and the wheel speed, then it controls the brake fluid pressure to attain the target slip rate.

Grip Force of Tire and Road Surface

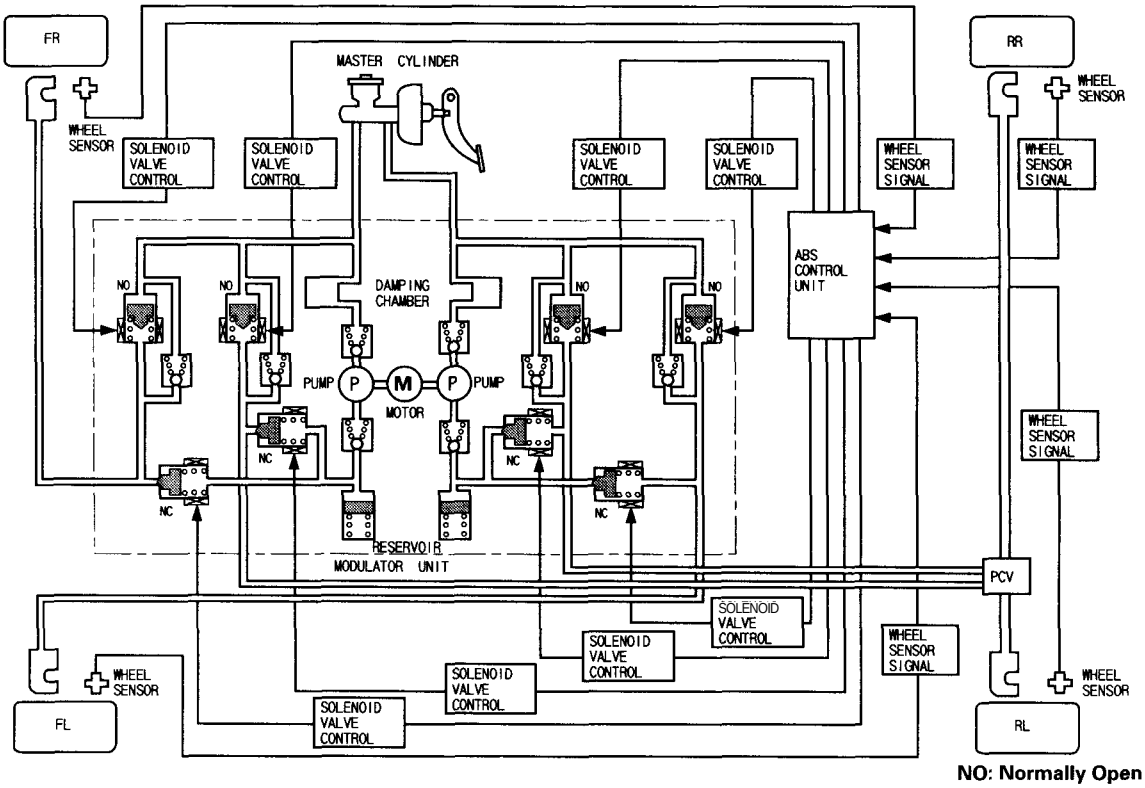


Slip Rate



A: Distance without slip
B: Slipped distance
C: Actual distance to stop

$$\text{SLIP RATE} = \frac{B}{C} = \frac{\text{VEHICLE SPEED} - \text{WHEEL SPEED}}{\text{VEHICLE SPEED}}$$



NO: Normally Open
NC: Normally Closed

Operation

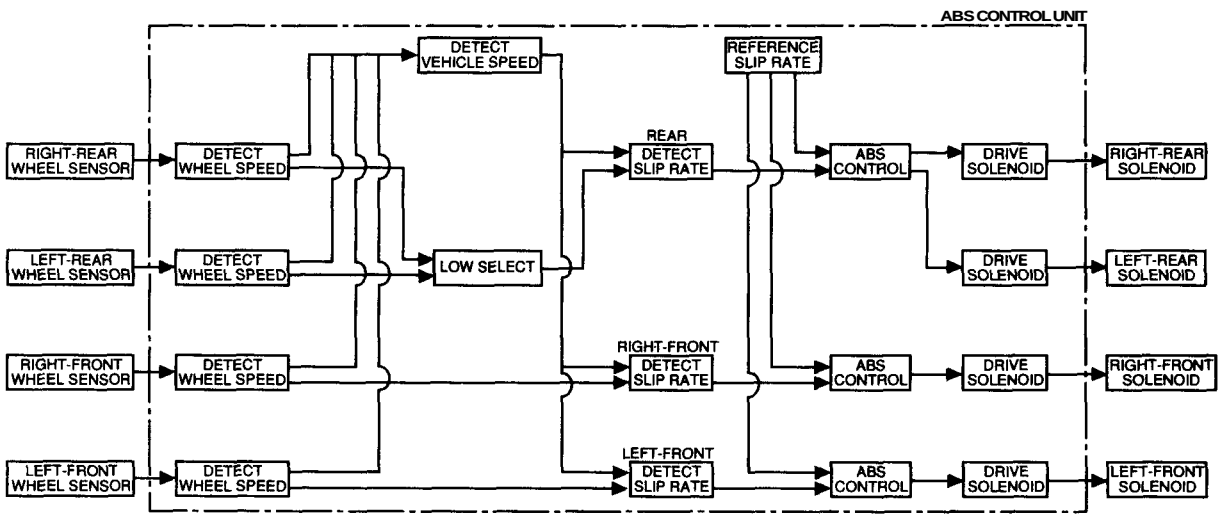
ABS Control Unit

Main Control

The ABS control unit detects the wheel speed based on the wheel sensor signal it received, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed during deceleration based on the rate of deceleration.

The ABS control unit calculates the slip rate of each wheel, and it transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

The pressure reduction control is a three-mode system, that is pressure reduction, pressure retaining and pressure intensifying modes.



Self-diagnosis Function

The ABS control unit is equipped with a main CPU and a sub CPU, and the CPUs check each other.

The CPUs check the circuit of the system.

The self-diagnosis can be classified into two categories.

①: Initial diagnosis

②: Regular diagnosis

On-board Diagnosis Function

The ABS control unit is connected to the data link connector.

The ABS system can be diagnosed with the Honda PGM Tester.

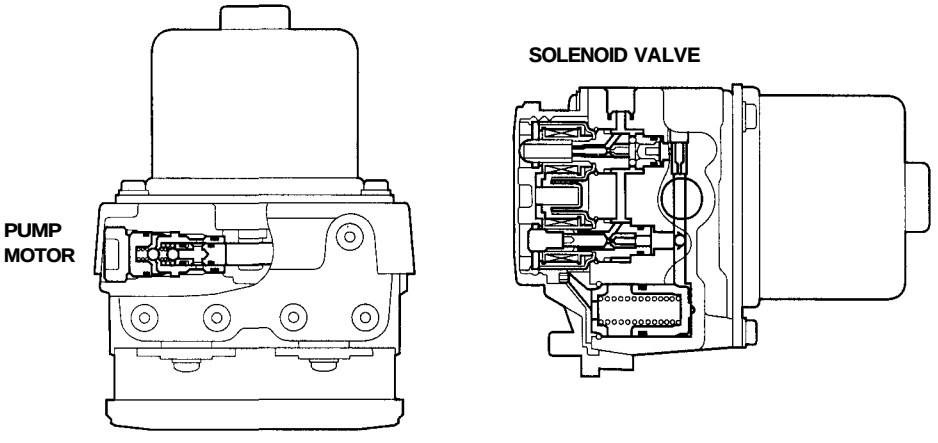
(cont'd)

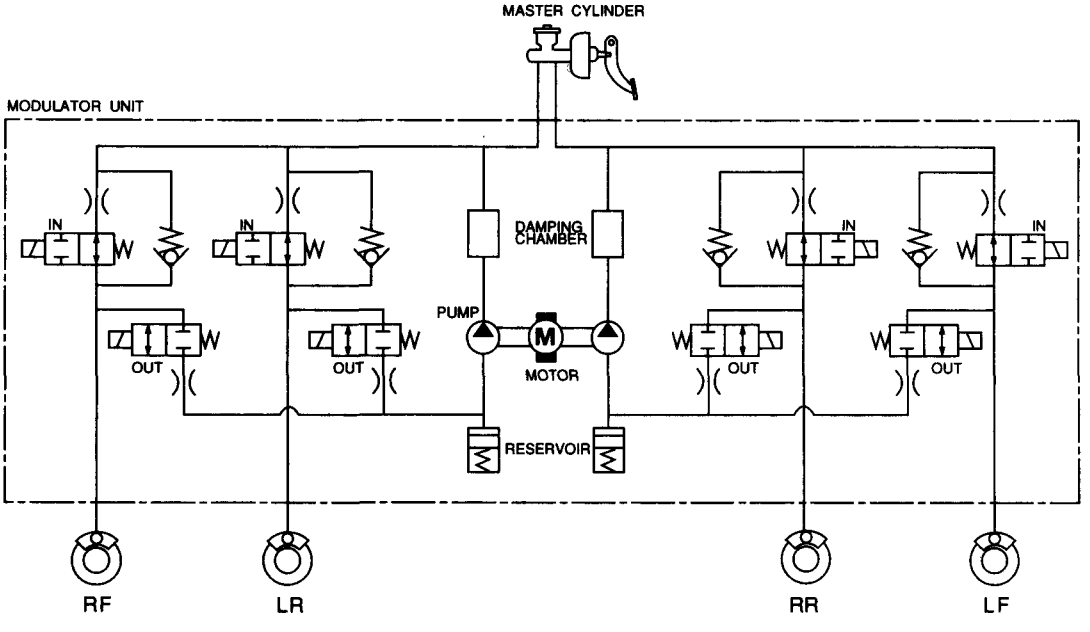
Anti-lock Brake System (ABS)

Operation (cont'd)

ABS Modulator

The ABS modulator consists of the inlet solenoid valve, outlet solenoid valve, reservoir, pump, pump motor and the damping chamber.
The modulator reduces the caliper fluid pressure directly. It is a circulating-type modulator because the brake fluid circulates through the caliper, reservoir and the master cylinder.
The hydraulic control has three modes: pressure reduction, pressure retaining and pressure intensifying.
The hydraulic circuit is the independent four channel-type, one channel for each wheel.

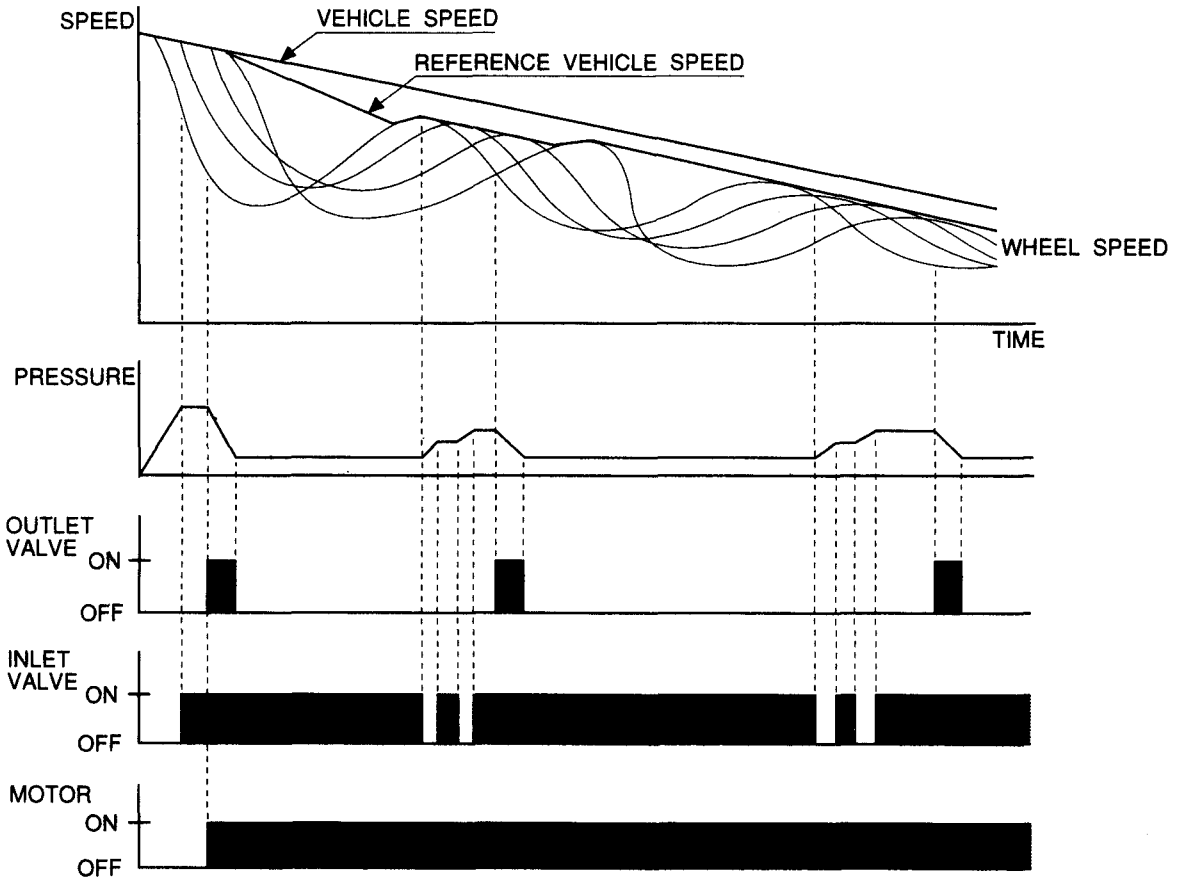




IN: INLET VALVE (NORMALLY OPEN)
OUT: OUTLET VALVE (NORMALLY CLOSED)

Pressure intensifying mode: Inlet valve open, outlet valve closed
Master cylinder fluid is pumped out to the caliper.
Pressure retaining mode: Inlet valve closed, outlet valve closed
Caliper fluid is retained by the inlet valve and outlet valve.
Pressure reduction mode: Inlet valve closed, outlet valve open
Caliper fluid flows through the outlet valve to the reservoir.
Motor operation mode: When starting the pressure reduction mode, the pump motor is ON.
When stopping ABS operation, the pump motor is OFF.
The reservoir fluid is pumped out by the pump, through the damping chamber, to the master cylinder.

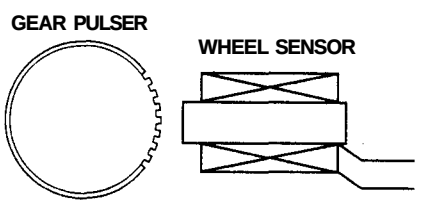
Wheel Speed and Modulator Control

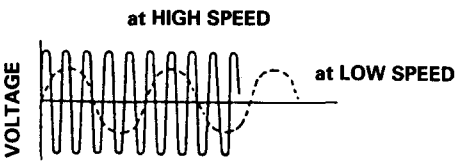


When the wheel speed drops sharply below the vehicle speed, the inlet valve closes to retain the caliper fluid pressure.
When the wheel speed drops further, the outlet valve opens momentarily to reduce the caliper fluid pressure. The pump motor starts at this time.
As the wheel speed is restored, the inlet valve opens momentarily to increase the caliper fluid pressure.

Wheel Sensor

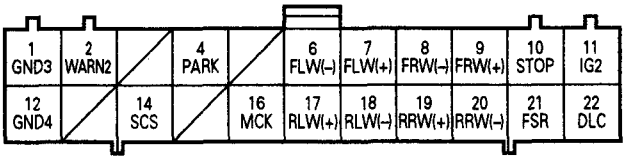
The wheel sensors are the magnetic contactless type.
As the gear pulser teeth rotate past the wheel sensor's magnetic coil, AC current is generated. The AC frequency changes in accordance with the wheel speed. The ABS control unit detects the wheel sensor signal frequency and thereby detects the wheel speed.
There are four wheel sensors, one for each wheel.
The gear pulser has 50 teeth.





ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

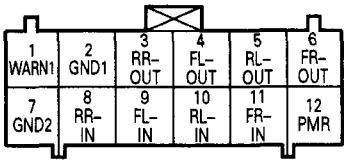
Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
1	BLK	GND3 (Ground 3)	Ground	1-GND			Below 0.3 V
2	BLU/RED	WARN2 (Warning 2)	Drives ABS indicator light (Turns the indicator light drive transistor to OFF, then turns off the indicator light)	2-GND	ABS indicator light	ON	Below 1.0 V
						OFF	VB
4	GRN/RED	PARK (Parking)	Detects parking brake switch signal	4-GND	Parking brake	Pulled	Below 0.3 V
						Released	VB
6	BRN	FLW (–) (Front-left wheel negative)	Detects left-front wheel sensor signal	6-7	Wheel	Turns slowly	AC: 0.053 V or above (Reference) Oscilloscope: 0.15 Vp-p or above
7	GRN/BLU	FLW (+) (Front-left wheel positive)					
8	GRN	FRW (–) (Front-right wheel negative)	Detects right-front wheel sensor signal	8-9			
9	GRN/BLK	FRW (–) (Front-right wheel positive)				Stops	0.25 – 1.15 V
10	GRN/WHT	STOP	Detects brake switch signal	10-GND	Brake pedal	Depressed	VB
						Released	Below 0.3 V
11	BLK/YEL	IG2 (Ignition 2)	Power source for activating the system	11-GND	Ignition switch	ON (II)	VB
						Start (II)	Below 0.3 V

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
12	BLK	GND4 (Ground 4)	Ground	12-GND			Below 0.3 V
14	ORN	SCS (Service check signal)	Detects service check connector signal (DTC indication or DTC erasure)	14-GND	SCS service connector	Connected	Below 0.3 V
						Disconnected	Approx. 5 V
16	GRN	MCK (Motor check)	Detects pump motor drive signal	16-GND	Pump motor	ON	VB
						OFF	Below 0.3 V
17	LT BLU	RLW (+) (Rear-left wheel positive)	Detects left-rear wheel sensor signal	17-18	Wheel	Turns slowly	AC: 0.053 V or above (Reference) 0scilloscope: 0.15 Vp-p or above
18	GRY	RLW (–) (Rear-left wheel negative)					
19	GRN/YEL	RRW (+) (Rear-right wheel positive)	Detects right-rear wheel sensor signal	19-20			
20	BLU/YEL	RRW (–) (Rear-right wheel negative)				Stops	0.25 – 1.15 V
21	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay (Fail-safe relay is turned OFF to shut off the power source to the solenoid and pump motor relay when problem occurs.)	21-GND	ABS indicator light	ON	Below 0.3 V
						OFF	VB
22	LT BLU	DLC (Data link connector)	Communicates with Honda PGM Tester	22-GND	——		——

ABS Control Unit Terminal Arrangement

ABS CONTROL UNIT 12P CONNECTOR



Wire side of female terminals

VB: Battery Voltage

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (II))		Voltage
1	BLU/RED	WARN1 (Warning 1)	Drives ABS indicator light (Turns the indicator light drive transistor to OFF, then turns off the indicator light)	1-GND	ABS indicator light	ON	Below 1.0 V
						OFF	VB
2	BLK	GND1 (Ground 1)	Ground	2-GND			Below 0.3 V
3	YEL/WHT	RR-OUT (Rear-right outlet)	Drives right-rear outlet solenoid valve	3-GND	ABS indicator light	OFF	VB
4	YEL/BLU	FL-OUT (Front-left outlet)	Drives left-front outlet solenoid valve	4-GND			
5	BLK/ORN	RL-OUT (Rear-left outlet)	Drives left-rear outlet solenoid valve	5-GND		ON	Below 0.3 V
6	YEL/BLK	FR-OUT (Front-right outlet)	Drives right-front outlet solenoid valve	6-GND			
7	BLK	GND2 (Ground 2)	Ground	7-GND			Below 0.3 V
8	RED/WHT	RR-IN (Rear-right inlet)	Drives right-rear inlet solenoid valve	8-GND	ABS indicator light	OFF	VB
9	RED/BLU	FL-IN (Front-left inlet)	Drives left-front inlet solenoid valve	9-GND			
10	YEL	RL-IN (Rear-left inlet)	Drives left-rear inlet solenoid valve	10-GND		ON	Below 0.3 V
11	RED/BLK	FR-IN (Front-right inlet)	Drives right-front inlet solenoid valve	11-GND			
12	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay	12-GND	ABS indicator light	OFF (Pump motor) ON	Below 0.3 V
						OFF (Pump motor) OFF	VB
						ON	Below 0.3 V

Troubleshooting Precautions

ABS Indicator Light

1. If the system is OK, the ABS indicator light goes off two seconds after turning the ignition switch ON (II) without starting the engine. After starting the engine, the ABS indicator light comes on again and goes off after two seconds. This occurs because the ABS control unit is activated by the IG2 power source.
2. The ABS indicator light comes on when the ABS control unit detects a problem in the system. However, even though the system is normal, the ABS indicator light comes on, too, under the following conditions. To determine the actual cause of problem, question the customer about the problem, talking the following conditions into consideration.
   - Only drive wheels rotate
   - One wheel stuck of drive wheels
   - Vehicle spin
   - ABS operate condition continue for long time
   - Signal disturbance
3. When a problem is detected and the ABS indicator light comes on, there are cases when the indicator light stays on until the ignition switch is turned OFF, and cases when the indicator light goes off automatically when the system returns normal. For the DTC 61 and 62, the indicator light goes off automatically when the system returns normal. For all other codes, the indicator light stays on until the ignition switch is turned OFF.
4. For DTCs 12, 14, 16, 18, 21, 22, 23, 24, 51, 52 and 53, the indicator light goes off when the vehicle is driven again and the signals are OK after the ignition switch is turned from OFF to ON (II). However, if the DTC is erased, the CPU is reset and the indicator light goes off right after the engine is started if the signals are OK.

Diagnostic Trouble Code (DTC)

1. The DTC is not memorized if the CPU cannot be activated or the CPU fails and the indicator light comes on.
2. The memory can hold any number of DTCs. However, when the same DTC is detected more than once, the later one is written over the old one. Therefore, when the same problem is detected repeatedly, it is memorized as one DTC.
3. The DTCs are indicated in the order of ascending number, not in the order they occur.
4. The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs cannot be canceled by disconnecting the battery. Perform the specified procedures to erase the DTCs.

Self-diagnosis

1. The self-diagnosis can be classified into two categories.
   - Initial diagnosis: Performed right after the engine starts and until the ABS indicator light goes off.
   - Regular diagnosis: Performed right after the initial diagnosis until the ignition switch is turned OFF.
2. When a problem is detected by self-diagnosis, the system
   - Turns the ABS indicator light ON
   - Memorizes the DTC
   - Turns the fail-safe relay OFF
   - Stops ABS control

Troubleshooting Precautions

Kickback

1. The motor operates when the ABS is functioning, and the fluid in the reservoir is forced out to the master cylinder causing kickback at the brake pedal.

Pump Motor

1. The pump motor operates when the ABS is functioning.

2. The ABS control unit checks the pump motor operation during initial diagnosis and vehicle starts. You may hear the faint operation sound at this time, but it is normal.

Brake Fluid Replacement/Air Bleeding

1. Brake fluid replacement and air bleeding procedures are the same as vehicles without ABS. To ease bleeding, start with the front wheels.

Troubleshooting

1. The troubleshooting flowcharts procedures assume that the cause of the problem is still present and the ABS indicator light is still on. Following the flowchart when the ABS indicator light does not come on can result in incorrect judgment.

2. Question the customer about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting.
   Find out when the ABS indicator light came on, such as during initial diagnosis, during ABS control, after ABS control, when the vehicle started, when vehicle speed was at 19 mph (30 km/h), when the problem continued for a few seconds or a few minutes, etc.

3. When the ABS indicator light does not come on during the test-drive, but the troubleshooting is performed based on the DTC, check for the loose connectors, poor contact of the terminals, etc, before troubleshooting.

4. After troubleshooting, erase the DTC and test-drive the vehicle. Be sure that the ABS indicator light does not come on.

5. The connector illustrations show the female connectors with a single outline and the male connectors with a double outline.

Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication (SCS Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) under the glove box.

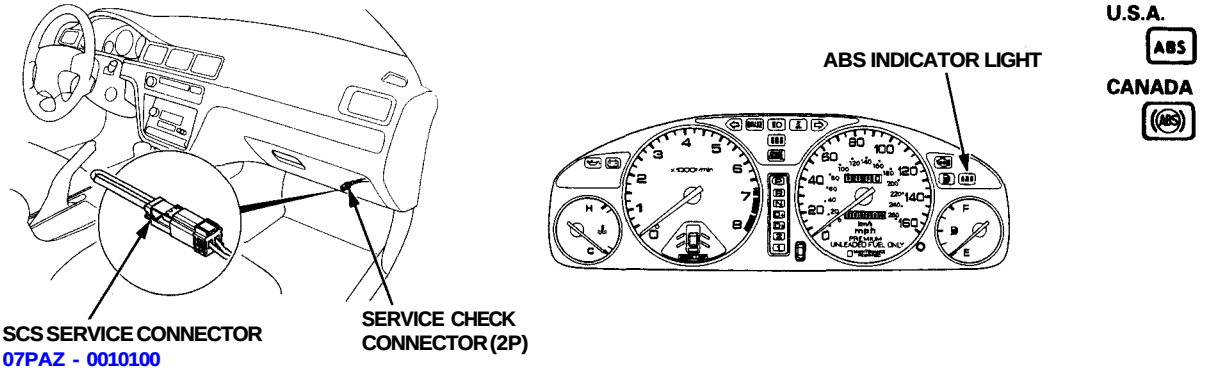
2. Turn the ignition switch ON (II) without brake pedal depressed.
   NOTE: If the brake pedal is depressed when turning the ignition switch ON (II), the system shifts to MES mode.

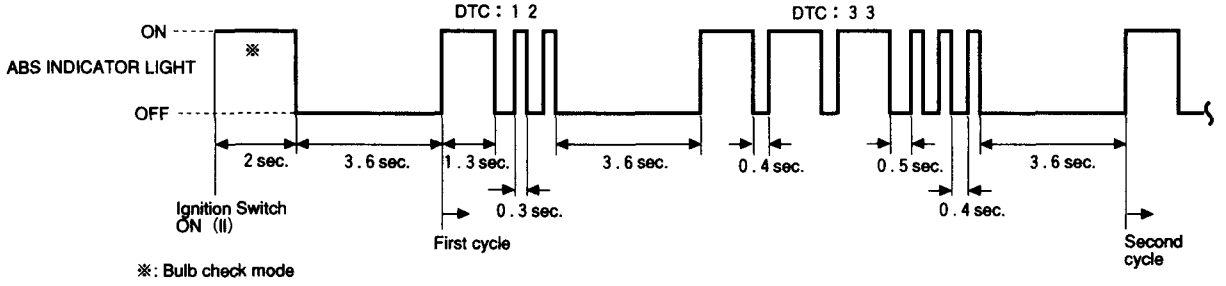
3. The blinking frequency indicates the DTC.
   NOTE: If the DTC is not memorized, the ABS indicator light goes off for 3.6 seconds and then stays on.

4. Turn the ignition switch OFF, and remove the SCS service connector.
   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.

Conditions for DTC indication

- Vehicle speed is at 6 mph (10 km/h) or less.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is released.





- When ignition switch is turned ON (II), the ABS indicator light comes on for two seconds to check the bulb. Do not count this as a DTC.

Diagnostic Trouble Code (DTC)

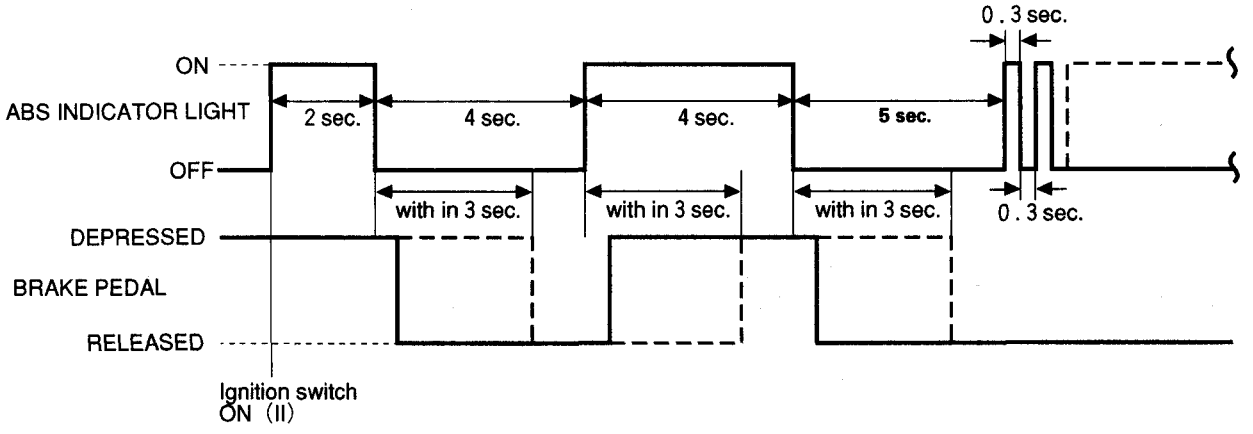
DTC Erasure (MES Mode)

NOTE: This operation can also be done with the Honda PGM Tester.

1. Connect the SCS service connector to the service check connector (2P) under the glove box.
2. Depress the brake pedal.
3. Turn the ignition switch ON (II) while keeping the brake pedal depressed.
4. After the ABS indicator light goes off, release the brake pedal.
5. After the indicator light comes on, depress the brake pedal again.
6. After the indicator light goes off, release the brake pedal again.
7. After few seconds, the indicator light blinks twice and the DTC is erased. If the indicator light does not blink twice, repeat steps 1 through 6. If the indicator light stays ON after the indicator light blinks twice, check the DTC because a problem was detected during initial diagnosis before shifting to MES mode.
8. Turn the ignition switch OFF, and remove the SCS service connector.

Conditions for DTC erasure

- 'Vehicle speed is at 6 mph (10 km/h) or less.
- 'The SCS service connector is connected before the ignition switch is turned ON (II).
- 'The brake pedal is depressed before the ignition switch is turned ON (II).



Troubleshooting Index

NOTE: This operation can also be done with the Honda PGM Tester.

DTC	ABS INDICATOR LIGHT	DIAGNOSIS/SYMPTOM	DETECTION TIMING		PROBLEM LOCATION	REFER TO PAGE
			INITIAL DIAGNOSIS	REGULAR DIAGNOSIS		
NO DTC	OFF	ABS indicator light does not come on when ignition switch is turned ON (II).				19-142
	ON	ABS indicator light does not go off after engine is started (No DTC).				19-144
11	ON	Wheel sensor (open/short to body ground/short to power)	○	○	FR	19-145
13					FL	
15					RR	
17					RL	
12	ON*1	Wheel sensor (electrical noise/intermittent interuption)		○	FR	19-146
14					FL	
16					RR	
18					RL	
21	ON*1	Pulser			FR	19-147
22					FL	
23					RR	
24					RL	
31	ON	Solenoid (short to body ground/short to wire)	○	○	FR-IN	19-148
32					FR-OUT	
33					FL-IN	
34					FL-OUT	
35					RR-IN	
36					RR-OUT	
37					RL-IN	
38					RL-OUT	
41	ON	Wheel lock			FR	19-151
42					FL	
43					RR	
44					RL	
51	ON*1	Motor lock		○		19-152
52	ON*1	Motor stuck OFF		○		19-153
53	ON*1	Motor stuck ON	○	○		19-156
54	ON	Fail-safe relay	○	○		19-158
61	ON*2	Ignition voltage		○		19-160
62						
71	ON	Different diameter tire				19-161
81	ON	CPU	○	○		19-161

*1: When the problem is detected and ABS Indicator light comes on, the indicator light will stay on until the ignition switch is turned from OFF to ON (II), and the control unit confirms that the system is OK when the vehicle starts.
*2: When voltage returns normal, the ABS indicator light goes off.

Modulator Unit

Removal/Installation

CAUTION:

- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Take care not to damage or deform the brake lines during removal and installation.**
- **To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.**

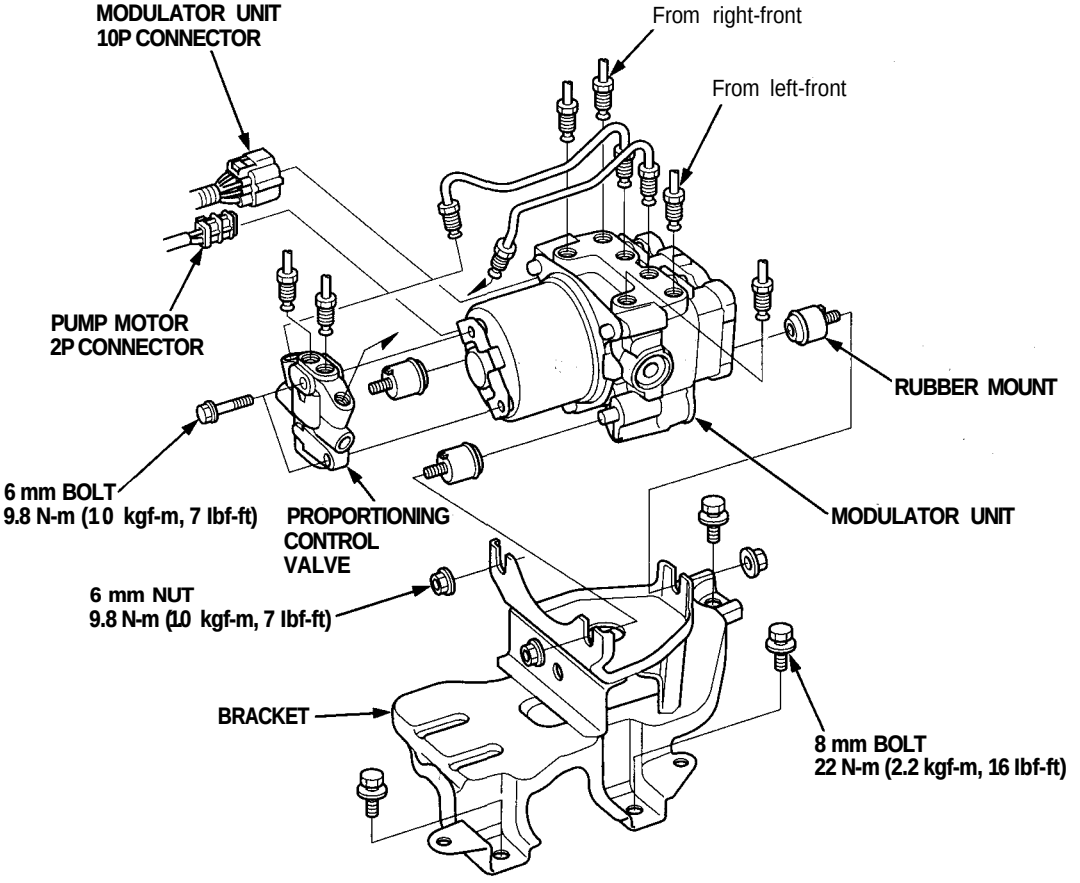
NOTE: Tighten the flare nuts to 15 N-m (1.5 kgf-m, 11 lbf-ft).

Removal

1. Disconnect the modulator unit 10P and pump motor 2P connectors.
2. Remove the proportioning control valve.
3. Disconnect the brake lines, then remove the modulator unit.

Installation

1. Install the modulator unit, then connect the brake lines.
2. Install the proportioning control valve.
3. Connect the modulator unit 10P and pump motor 2P connectors.
4. Bleed the brake system, starting with the front wheels.
5. Start the engine, and check that the ABS indicator light goes off.
6. Test-drive the vehicle, and check that the ABS indicator light does not come on.

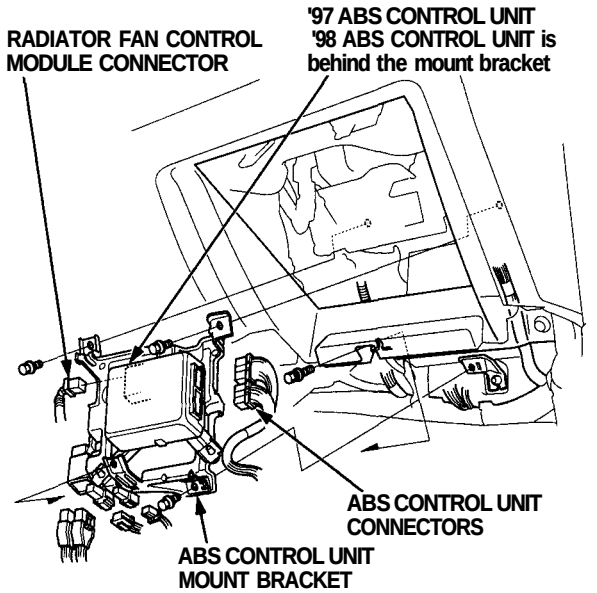


ABS Control Unit

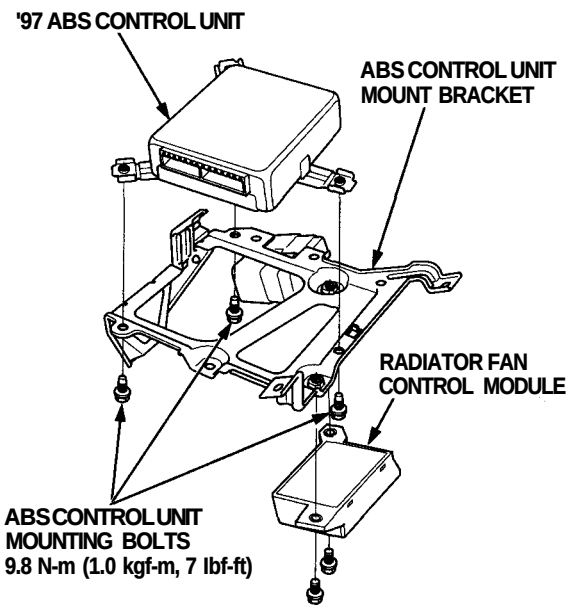
Pulsers/Wheel Sensors

Replacement

1. Remove the glove box (see section 20).
2. Remove the four mounting bolts of the ABS control unit mount bracket.



3. Move the bracket forward, and disconnect the each connectors from the bracket.
4. Disconnect the ABS control unit connectors and radiator fan control module connector.
5. Move the bracket down to remove it from the car.
6. Remove the radiator fan control module and three ABS control unit mounting bolts.



7. Remove the ABS control unit from the bracket.
8. Install the ABS control unit in the reverse order of removal.

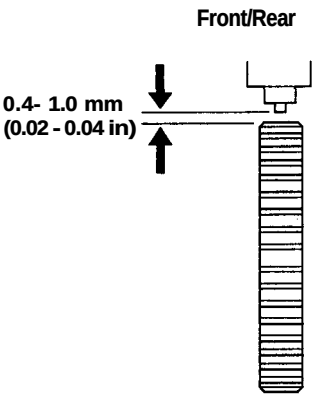
Inspection

1. Check the front and rear pulser for chipped or damaged teeth.

2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the pulser.

   Standard: 0.4 - 1.0 mm (0.02 - 0.04 in)

   NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted suspension arm which should be replaced.

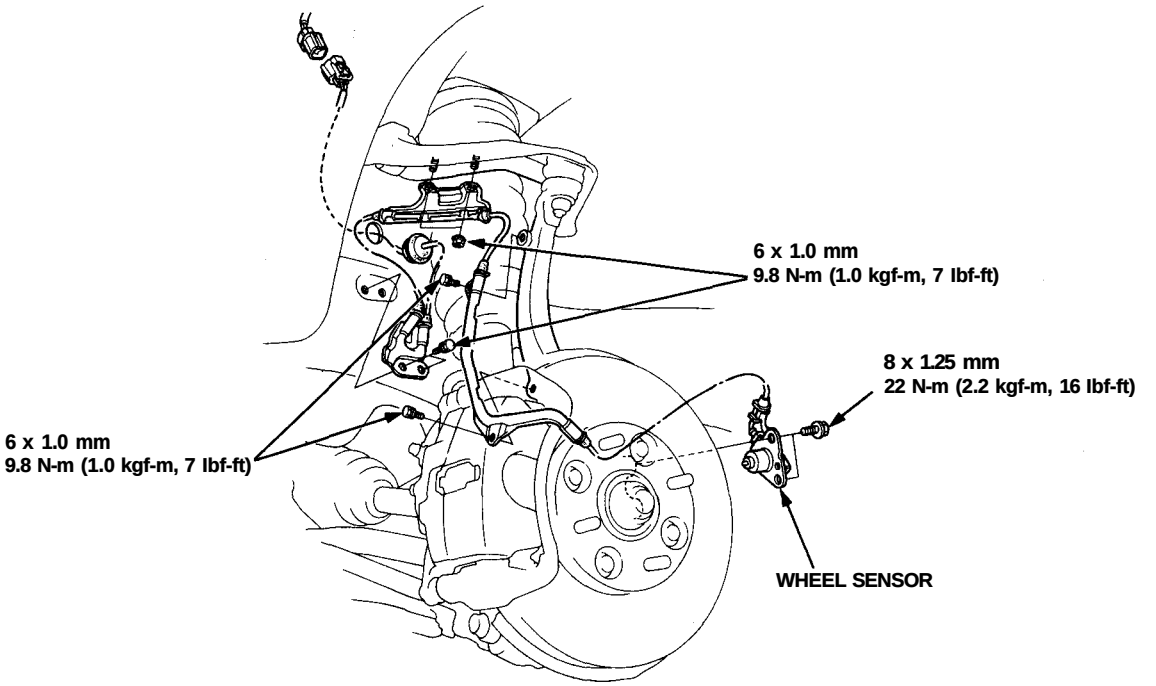


Pulsers/Wheel Sensor

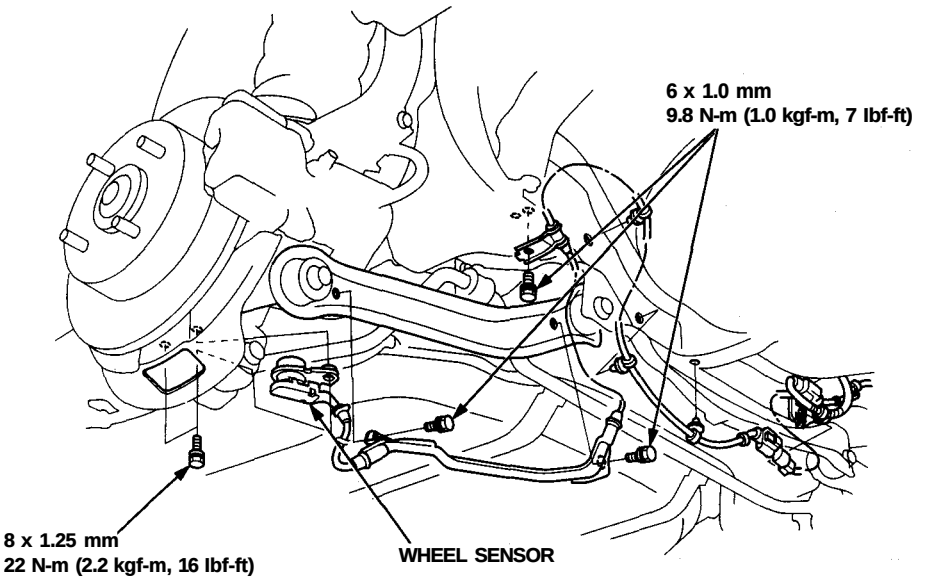
Wheel Sensor Replacement

NOTE: Be careful when installing the sensors to avoid twisting the wires.

Front

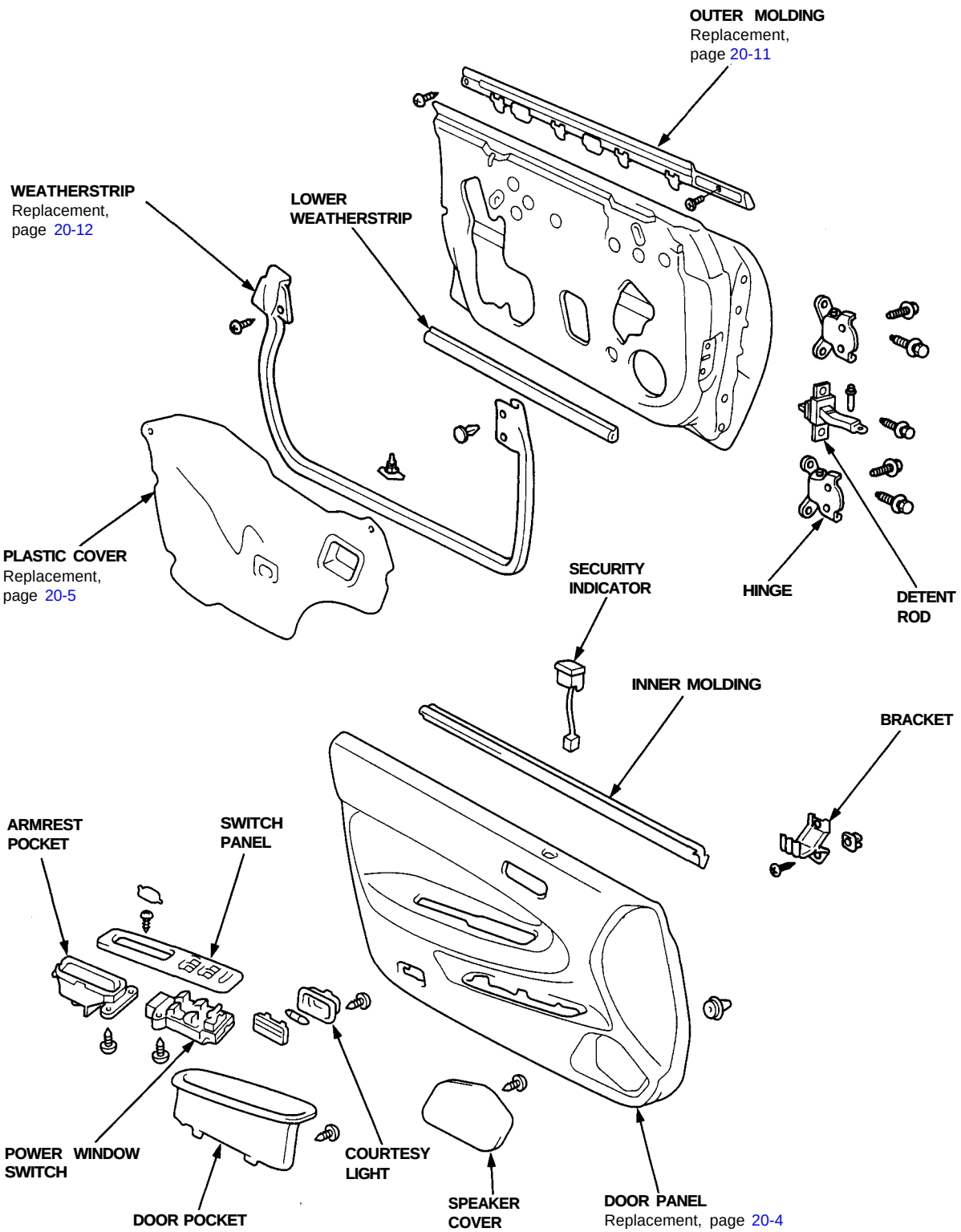


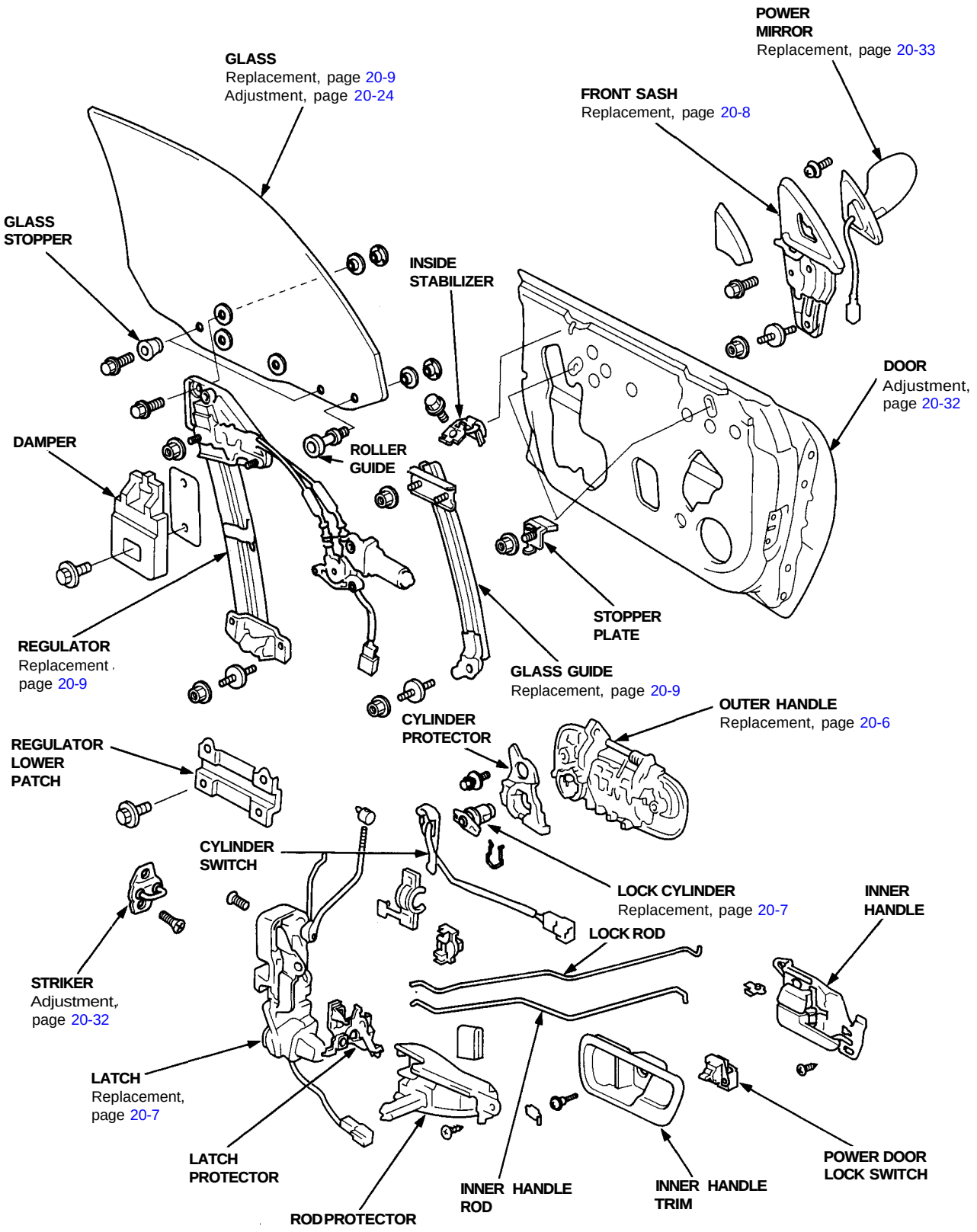
Rear



Doors

Front Door Index



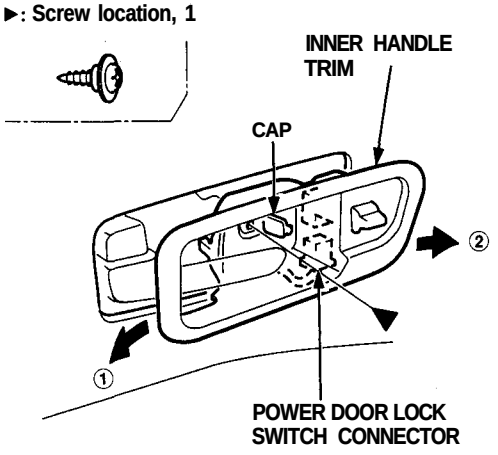

GLASS
Replacement, page 20-9
Adjustment, page 20-24
POWER MIRROR
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FRONT SASH
Replacement, page 20-8
GLASS STOPPER
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GLASS GUIDE
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CYLINDER PROTECTOR
OUTER HANDLE
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REGULATOR LOWER PATCH
CYLINDER SWITCH
LOCK CYLINDER
Replacement, page 20-7
INNER HANDLE
LOCK ROD
STRIKER
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Replacement, page 20-7
LATCH PROTECTOR
ROD PROTECTOR
INNER HANDLE ROD
INNER HANDLE TRIM
POWER DOOR LOCK SWITCH

Doors

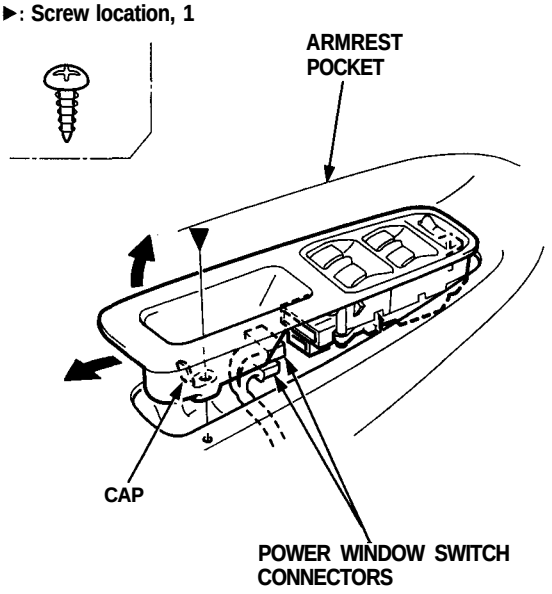
Door Panel/Plastic Cover Replacement

NOTE: Take care not to scratch the door panel and other parts.

1. Pry the cap and remove the screw. Remove the inner handle trim while pulling the inner handle. Disconnect the power door lock connector.

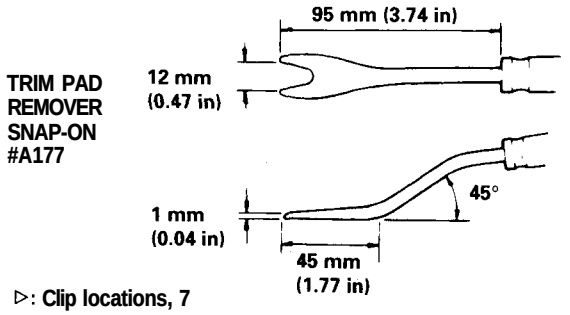


2. Pry the cap and remove the screw. Remove the armrest pocket and disconnect the power window switch connectors.

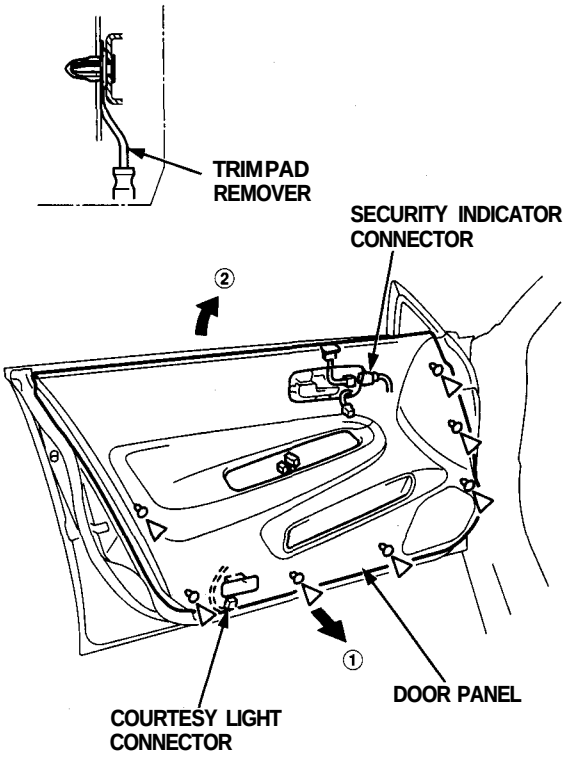


3. Release the clips that hold the door panel. Disconnect the courtesy light and security indicator connectors, then remove the door panel by pulling it upward.

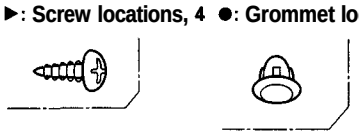
NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.

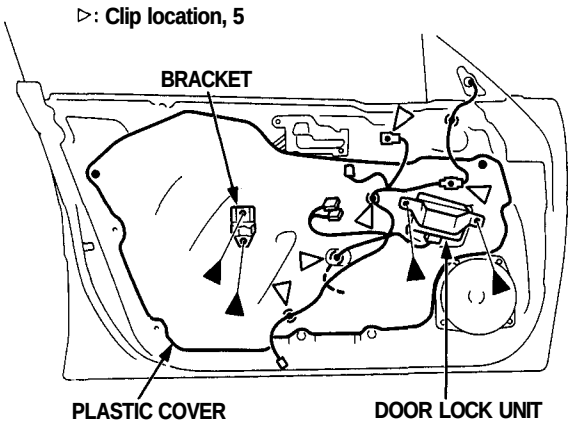


▷: Clip locations, 7

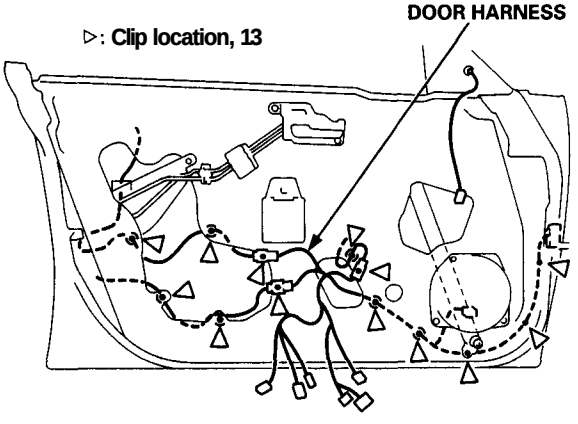


4. Remove the bracket and door lock unit. Disconnect the connectors, detach the grommets and harness clips, then carefully remove the plastic cover.



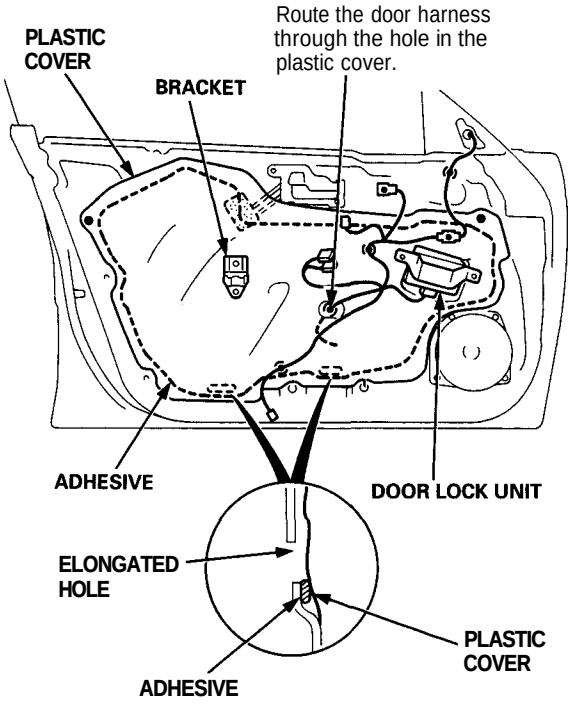


5. Before installing the plastic cover, make sure the door harness and connectors are fastened correctly on the door.



6. Install the plastic cover.

NOTE:
- Apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks.
- Do not plug the elongated holes.



7. Install the door panel (see page 20-4).

NOTE:
- Make sure the door harness is not pinched.
- If necessary, replace any damaged clips.
- Make sure the connectors are connected properly.

8. Install the armrest pocket and inner handle trim (see page 20-4).

NOTE: Make sure the connector is connected properly.

Doors

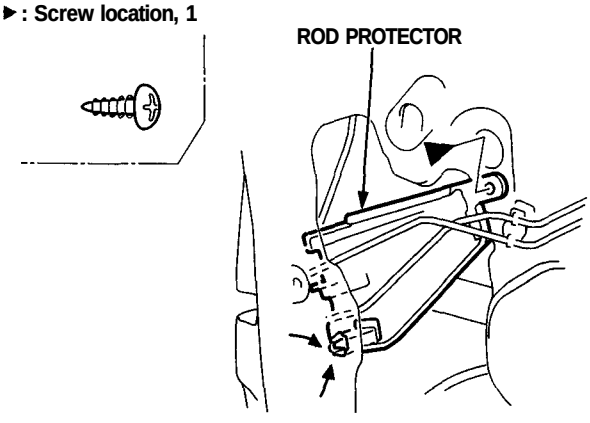
Outer Handle Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-5)

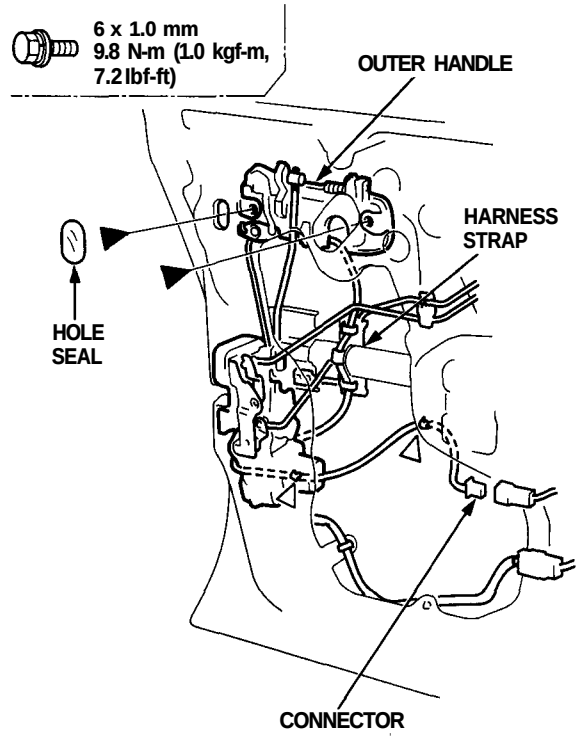
2. Remove the rod protector.

►: Screw location, 1



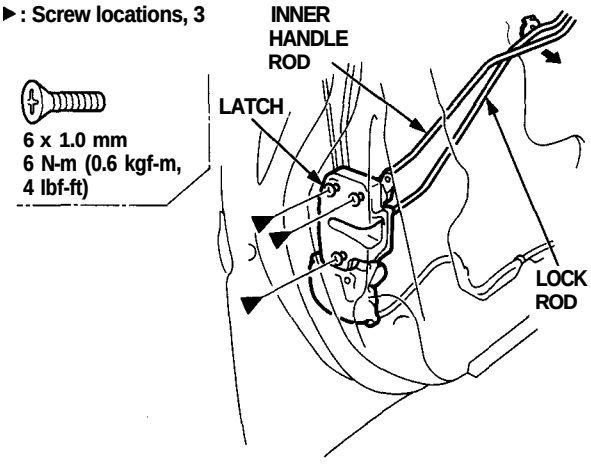
3. Remove the bolts and disconnect the connector. Remove the switch harness from the harness strap.

►: Bolt locations, 2 ▷: Clip locations, 2



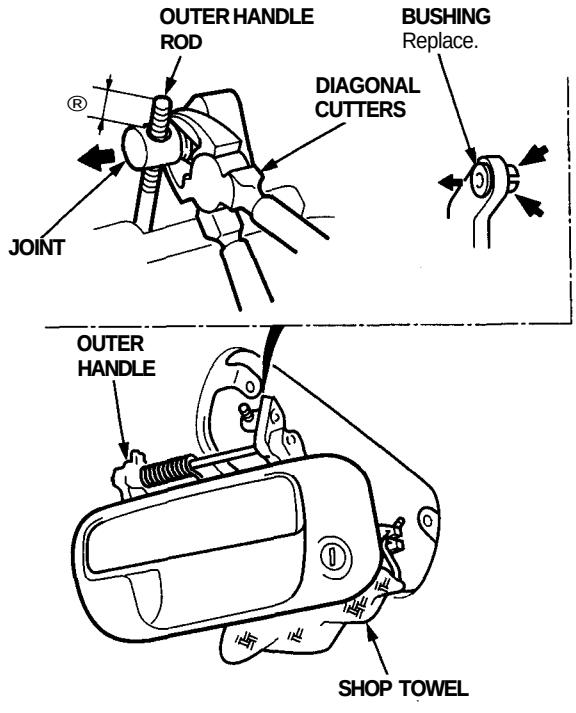
4. Remove the latch.

►: Screw locations, 3



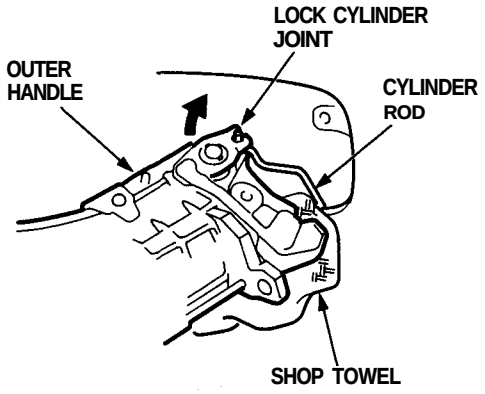
5. Pull out the outer handle with the latch. Pry the outer handle rod out of its joint using diagonal cutters.

NOTE:
- To ease reassembly, note location Ⓐ of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.

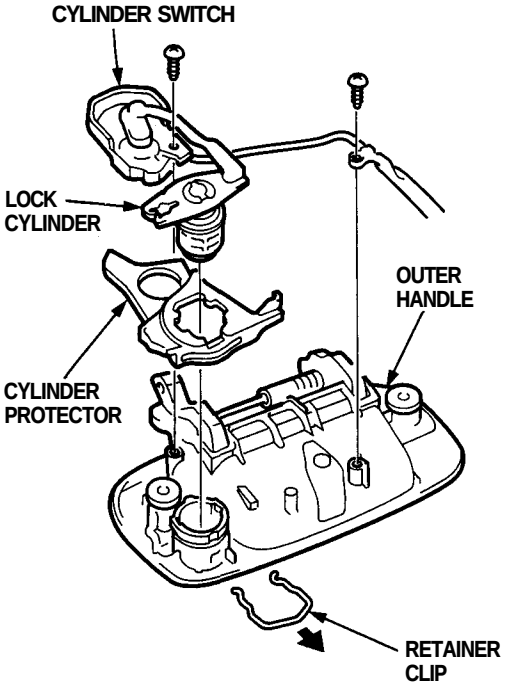


6. Disconnect the cylinder rod as shown.

NOTE: Take care not to damage the lock cylinder joint.



7. Remove the retainer clip, cylinder protector, cylinder switch and lock cylinder from the outer handle.



8. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the outer handle rod and connector are connected securely.
- Make sure the wire harness is routed properly.
- Check the door lock and open operations.

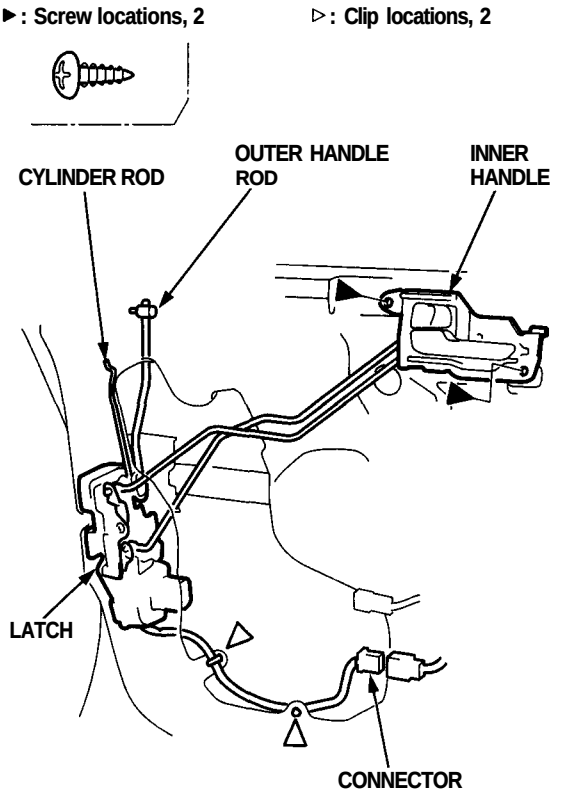
Latch Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-5)
   - Outer handle (see page 20-6)

2. Remove the screws and disconnect the connector, then remove the inner handle and latch.

   NOTE: Take care not to bend the rods.



3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the inner handle rod, lock rod and connector are connected properly.

Doors

Front Sash Replacement

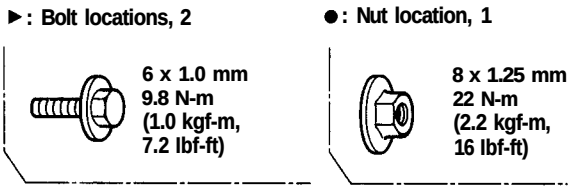
NOTE: Lower the glass.

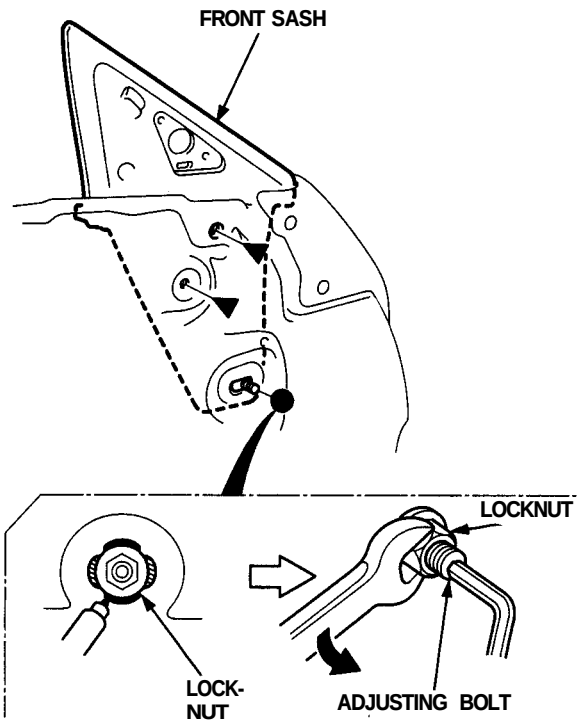
1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-5)
   - Power mirror (see page 20-33)
   - Outer molding (see page 20-11)

2. Detach the clips, then pry the weatherstrip away from the front sash.

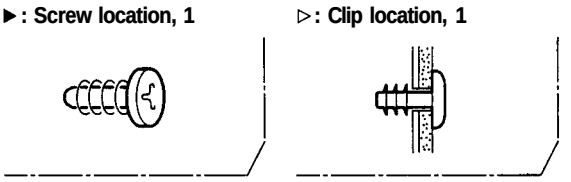
3. Remove the bolts and locknut.

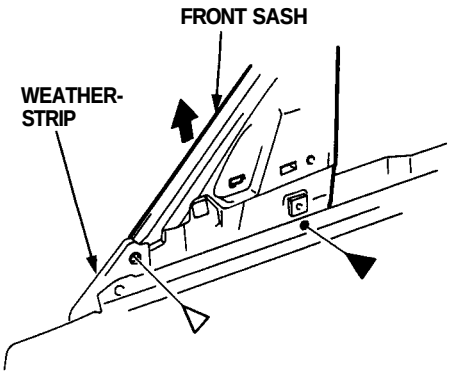
   NOTE:
   - Hold the adjusting bolt with a hex wrench when removing the locknut.
   - Scribe a line around the locknut to show the original adjustment.



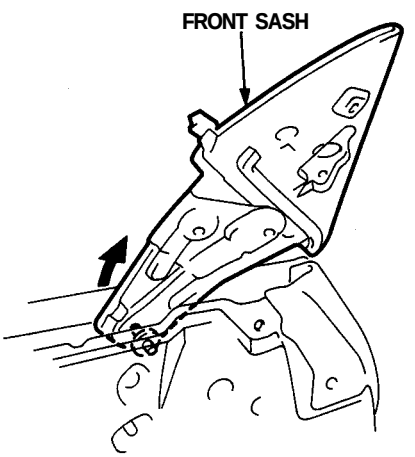


4. Remove the clip and screw.





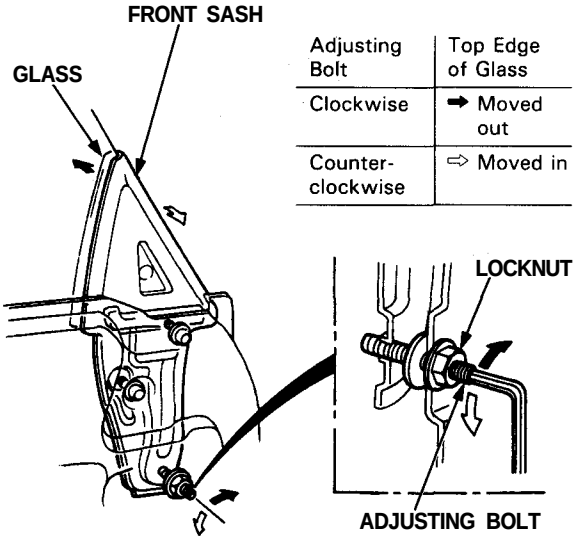
5. Pull the front sash out of the window slot.



6. Installation is the reverse of the removal procedure.

NOTE: After installing, adjust the position of the front sash as necessary.

- Align the front sash with the glass using the adjusting bolt at the bottom of the front sash.



Adjusting Bolt	Top Edge of Glass
Clockwise	➡ Moved out
Counter-clockwise	⇨ Moved in

- Check for water leaks.

NOTE: Do not-high pressure water.

(cont'd)

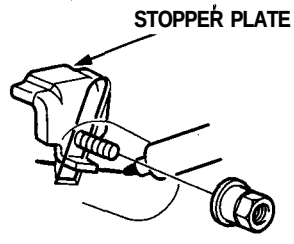
Glass/Regulator/Glass Guide Replacement

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-5)

2. Connect the power window switch to the door harness (see page 20-25).

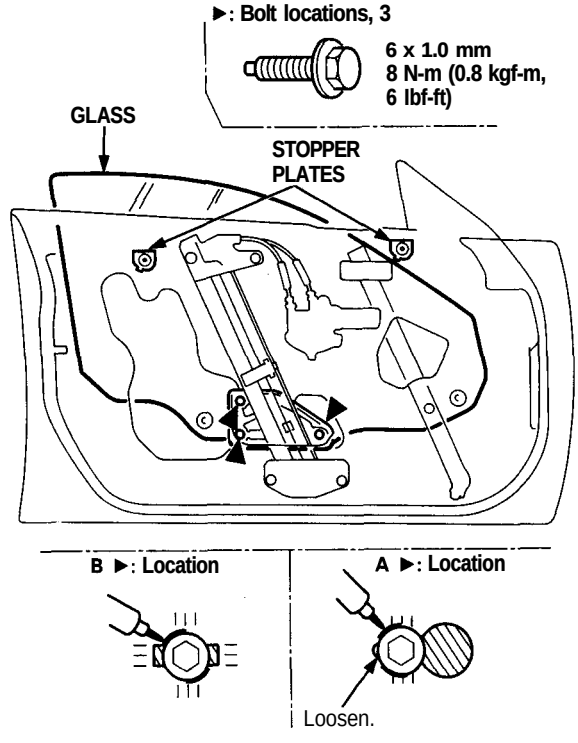
3. Remove the stopper plates.

   NOTE: Scribe a line across the stopper plate position to show the original adjustment.



4. Carefully move the glass until you can see the glass mounting bolts, then remove them.

   NOTE: Scribe a line around the glass mounting bolts to show the original adjustment.



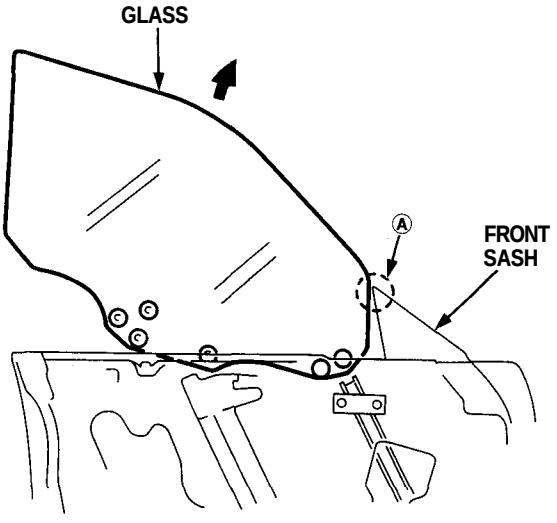
(cont'd)

Doors

Glass/Regulator/Glass Guide Replacement (cont'd)

5. Carefully pull the glass out of the window slot.

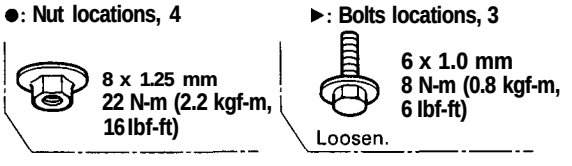
   NOTE: Take care not to damage Ⓐ location on the front sash.

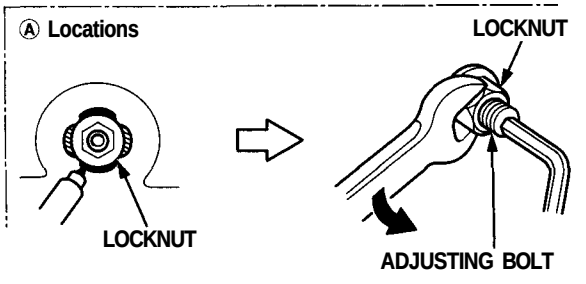


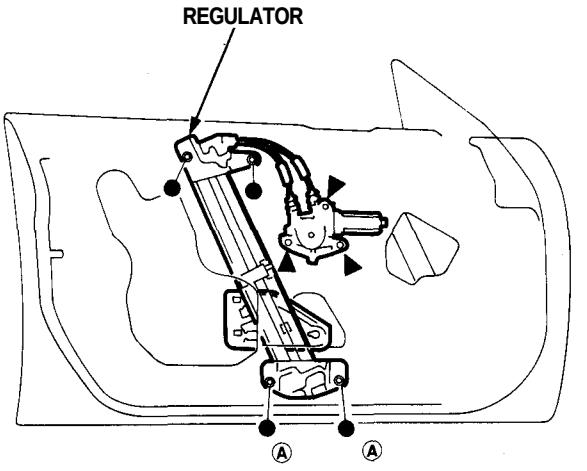
6. Remove the inner handle (see page 20-7).

7. Disconnect the connector, and remove the regulator through the center hole in the door.

   NOTE:
   - Hold the adjusting bolts with a hex wrench when removing the locknuts.
   - Scribe a line around the locknuts to show the original adjustment.

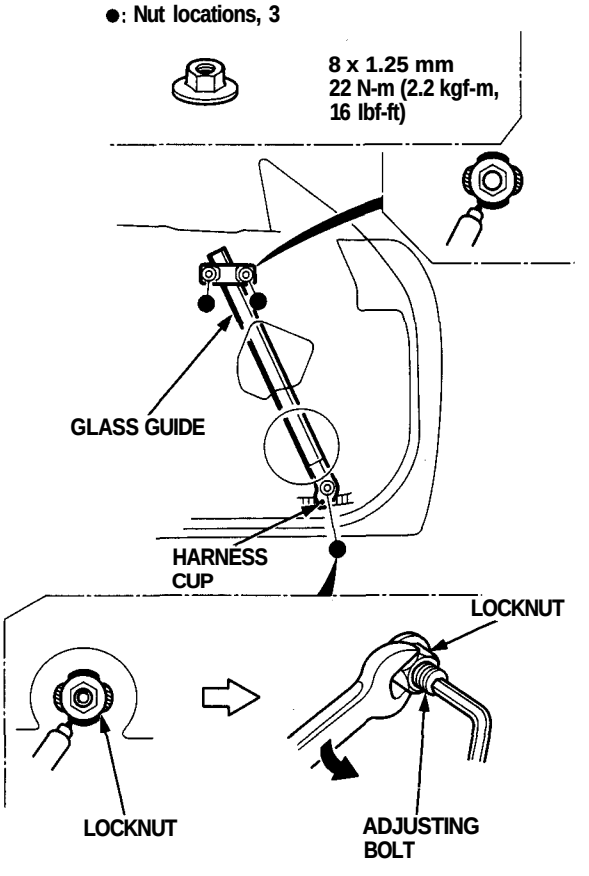




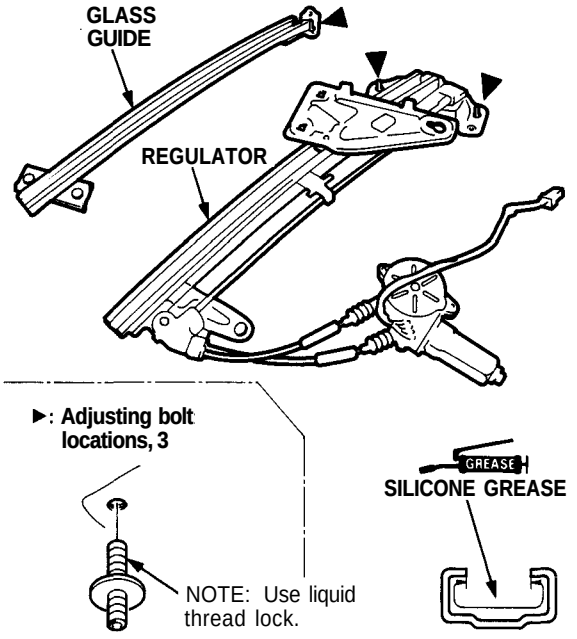


8. Remove the glass guide.

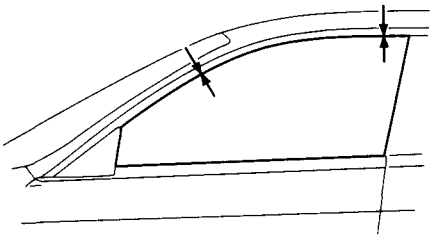
   NOTE:
   - Hold the adjusting bolt with a hex wrench when removing the locknut.
   - Scribe a line around the locknuts to show the original adjustment.



9. Grease all the sliding surfaces of the regulator and glass guide where shown.



10. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and weatherstrip when the glass is closed. Adjust the position of the glass as necessary (see page 20-24).



11. Attach the door harness to the door correctly (see page 20-5).

12. Disconnect the power window switch from the door harness.

13. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks (see page 20-5).

14. Install the door panel (see page 20-4).

Outer Molding Replacement

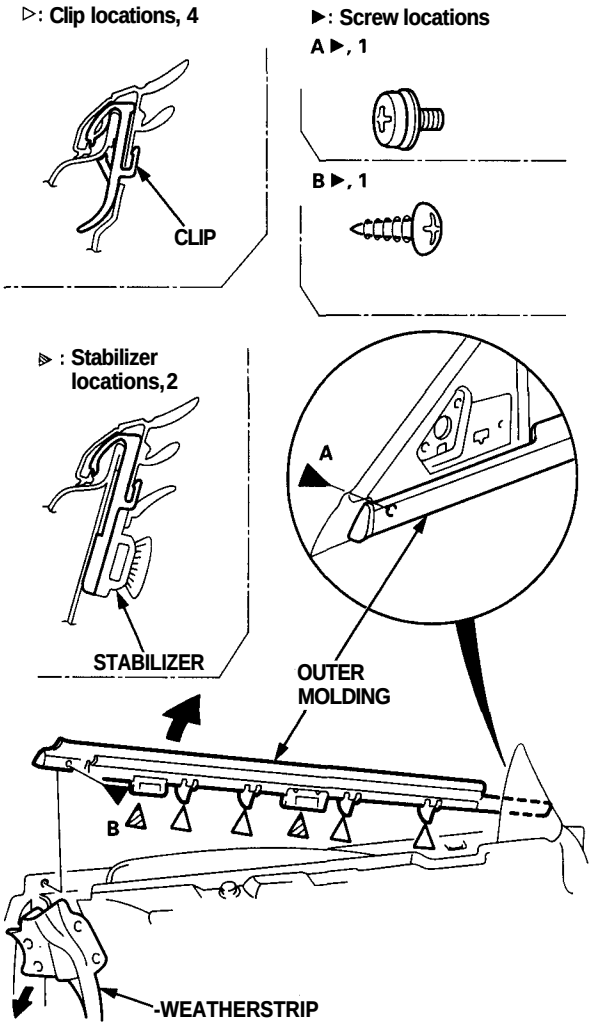
NOTE: Lower the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Power mirror (see page 20-33)

2. Peel the weatherstrip away from the door as necessary (see page 20-12), then remove the screw.

3. Starting at the rear, pry the outer molding up and detach the clips, then remove the outer molding.

   NOTE: Take care not to twist or scratch the outer molding.

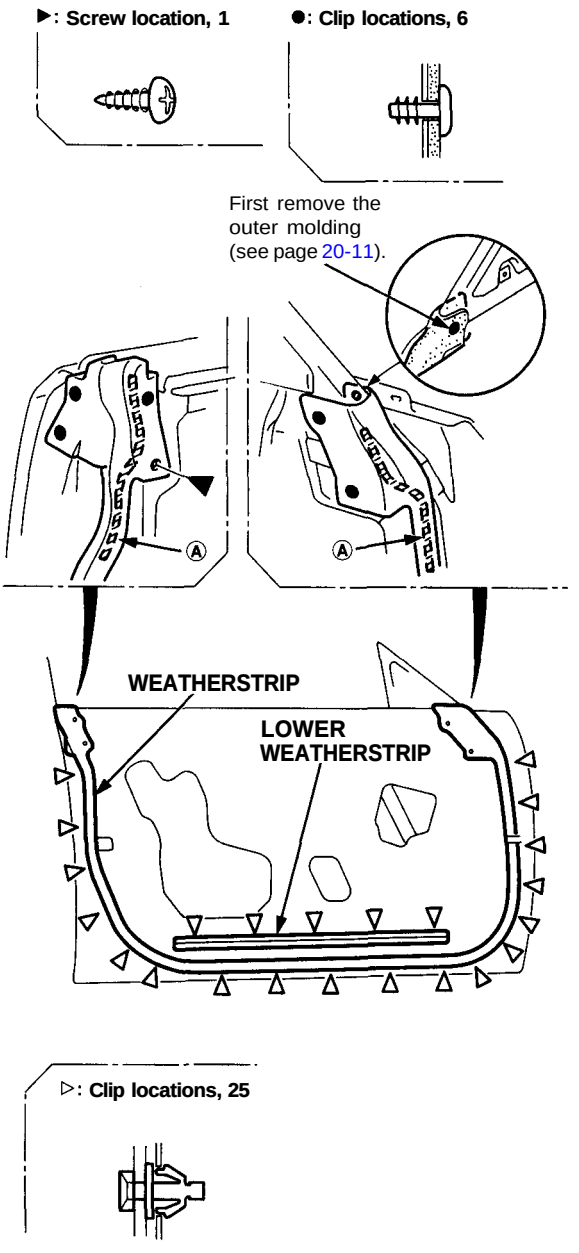


4. Installation is the reverse of the removal procedure.

   NOTE: If necessary, replace any damaged clips and stabilizers.

Doors

Weatherstrip Replacement



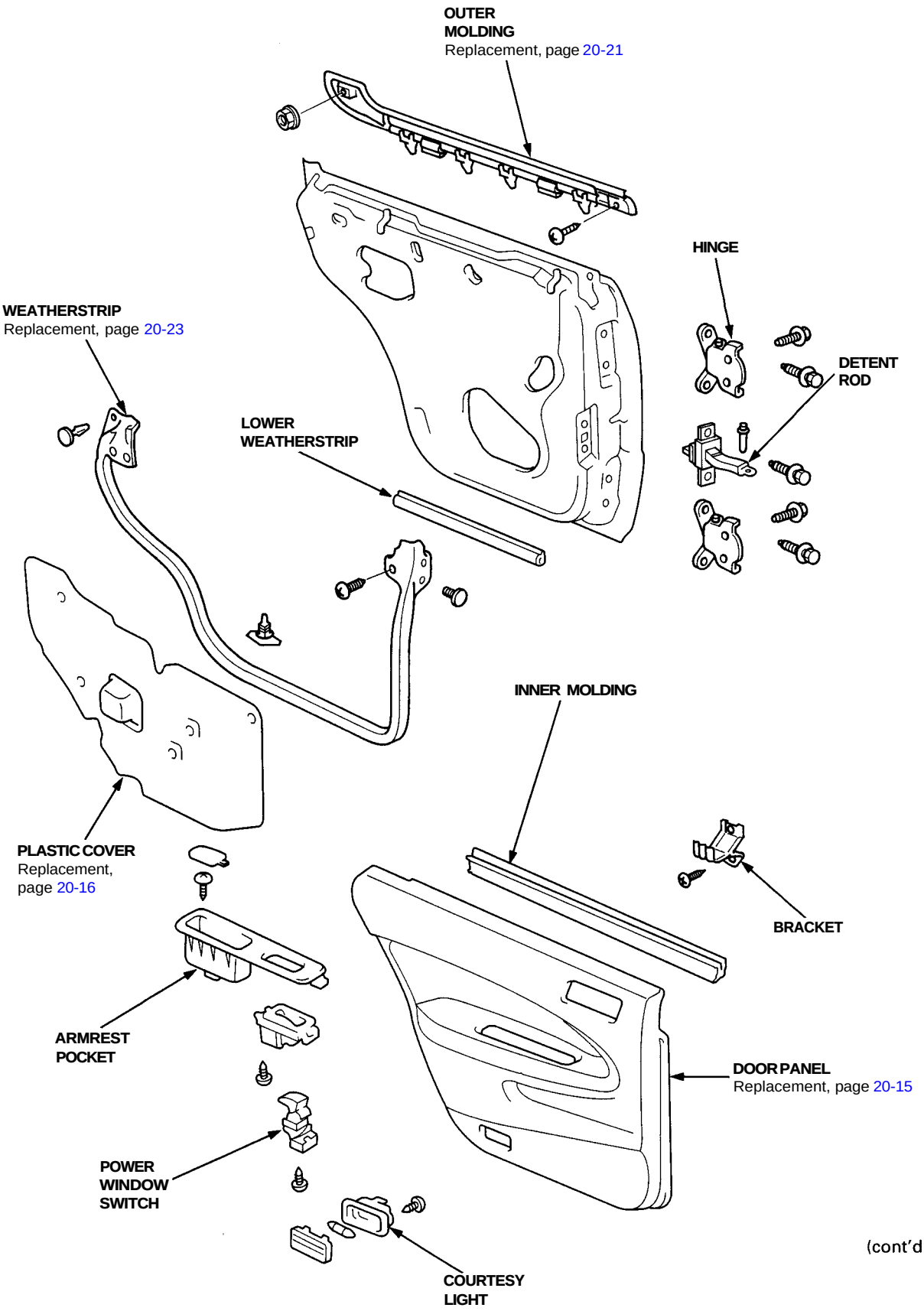
NOTE:

- Before installing the weatherstrip, apply clear sealant to location Ⓐ.

Sealant: Cemedine #8500, or equivalent

- If necessary, replace any damaged clips.

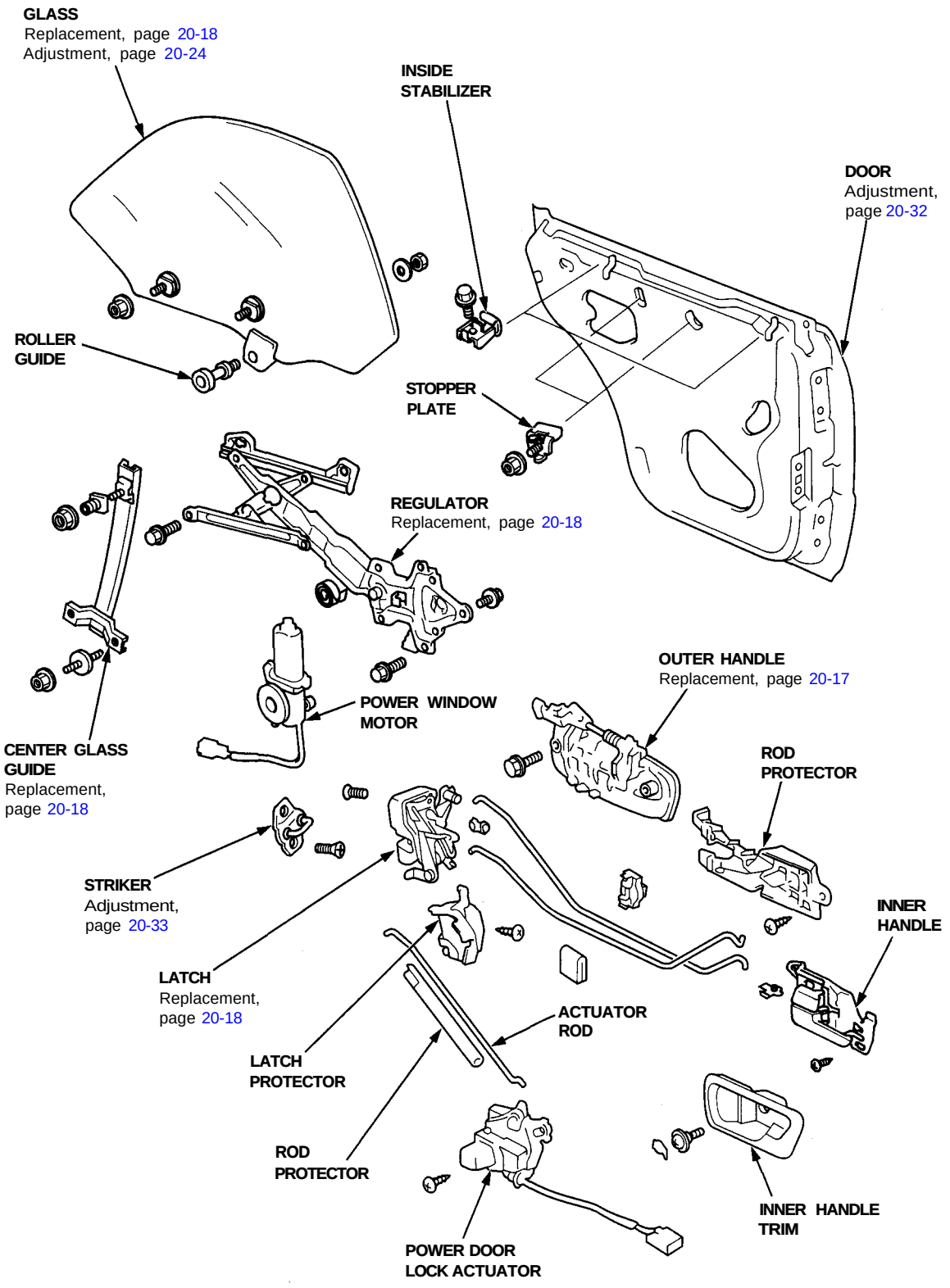
Rear Door Index



(cont'd)

Doors

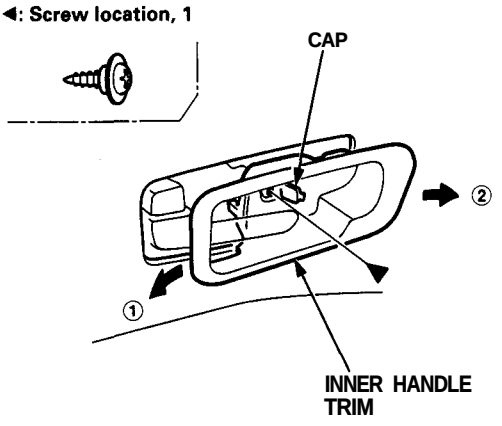
Rear Door Index (cont'd)



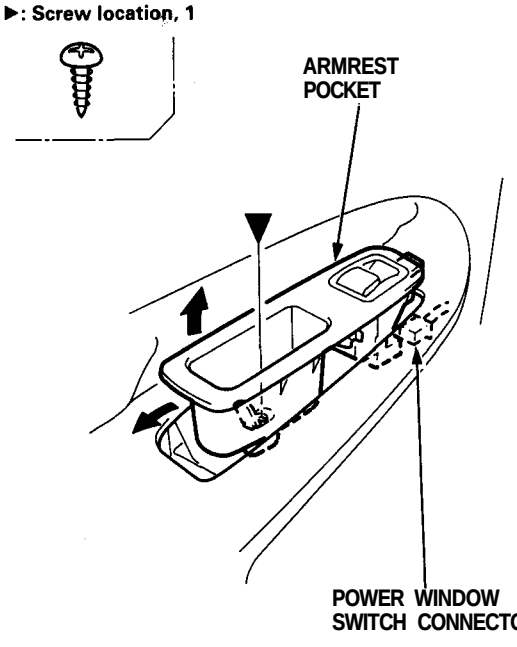
Door Panel/Plastic Cover Replacement

NOTE: Take care not to scratch the door panel and other parts.

1. Pry the cap and remove the screw. Remove the inner handle trim while pulling the inner handle.

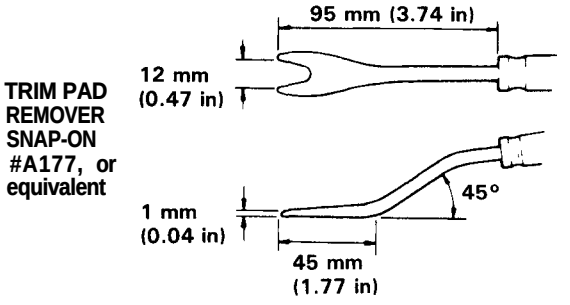


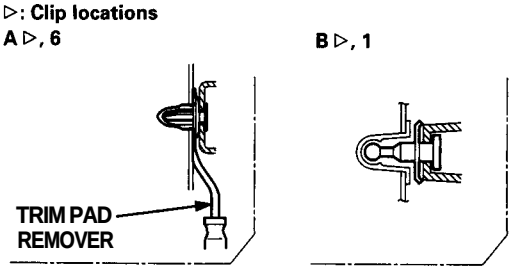
2. Pry the cap and remove the screw. Remove the armrest pocket and disconnect the power window switch connector.

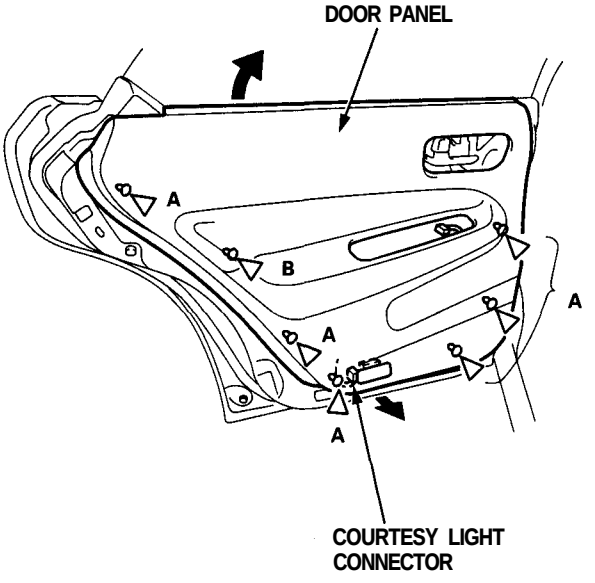


3. Release the clips that hold the door panel. Disconnect the courtesy light, then remove the door panel by pulling it upward.

NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.





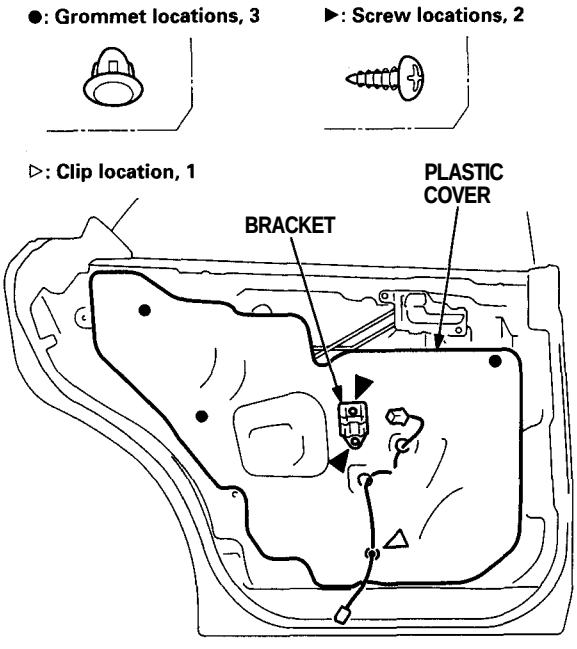


(cont'd)

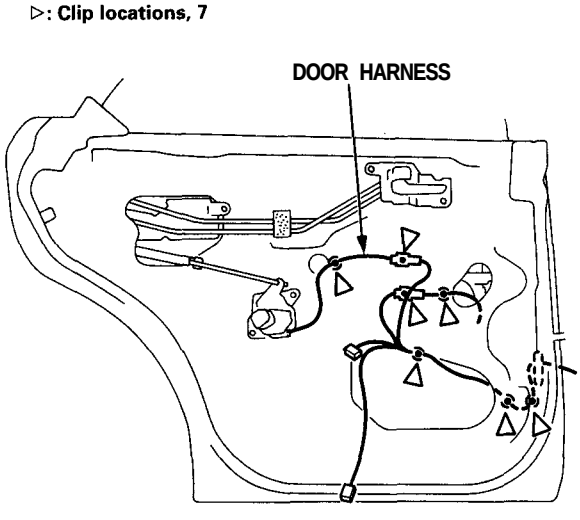
Door

Door Panel/Plastic Cover Replacement (cont'd)

4. Remove the bracket and detach the grommets, then carefully remove the plastic cover.

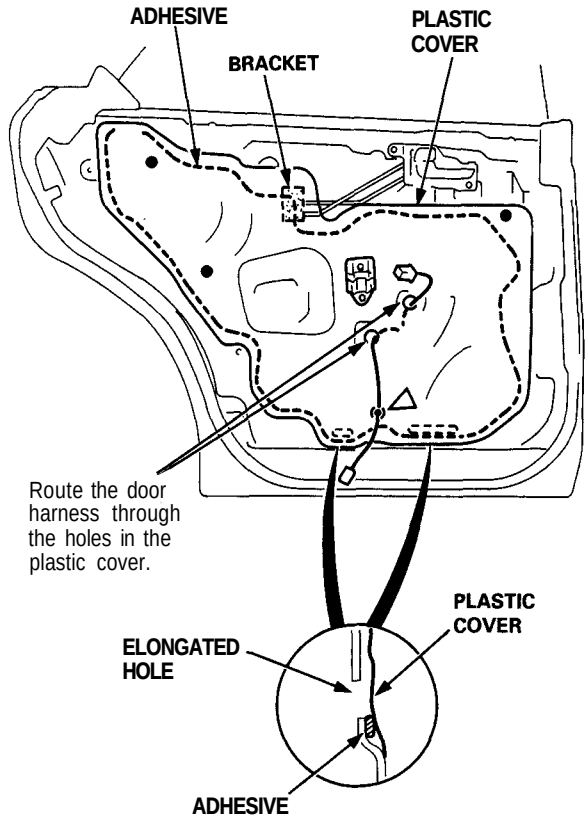


5. Before installing the plastic cover, make sure the door harness and connectors are fastened correctly on the door.



6. Install the plastic cover and bracket.

NOTE:
- Apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks.
- Do not plug the elongated hole.



7. Install the door panel (see page 20-15).

NOTE:
- Make sure the door harness is not pinched.
- If necessary, replace any damaged clips.
- Make sure the connectors are connected properly.

8. Install the armrest pocket and inner handle trim (see page 20-15).

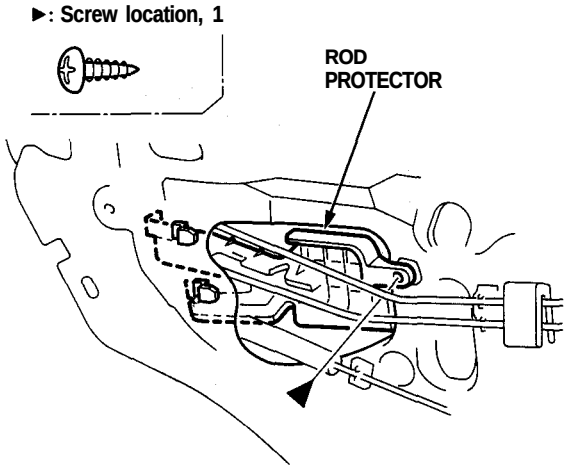
NOTE: Make sure the connector is connected properly.

Outer Handle Replacement

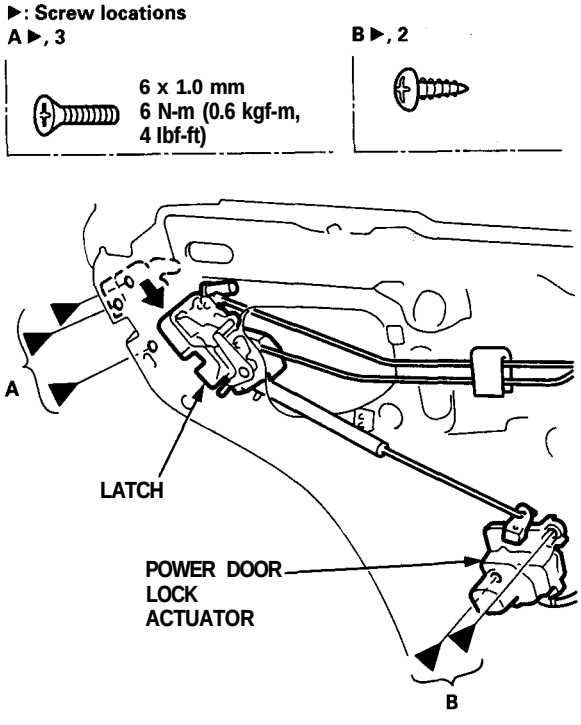
NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-15)
   - Plastic cover (see page 20-16)

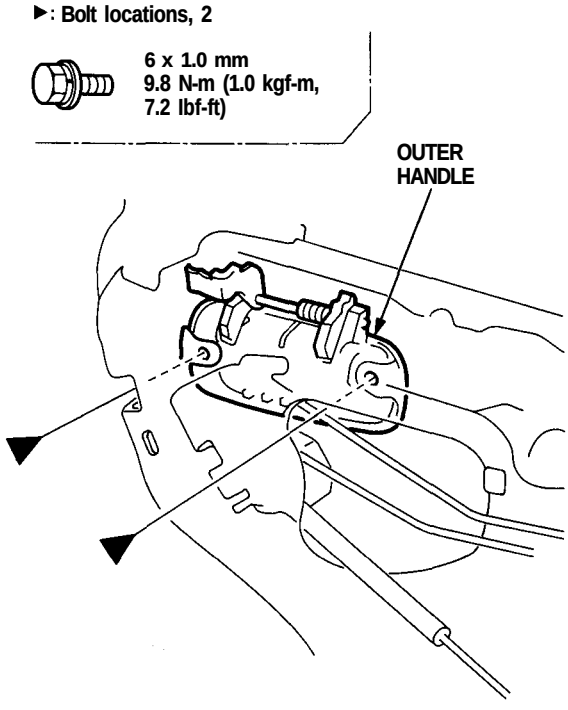
2. Remove the rod protector.

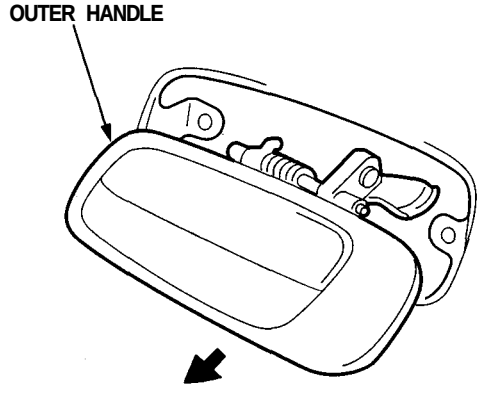


3. Remove the screws and clip, then move the latch.



4. Remove the bolts, and pull out the outer handle.





5. Installation is the reverse of the removal procedure.

NOTE: Check the door lock and open operations.

Doors

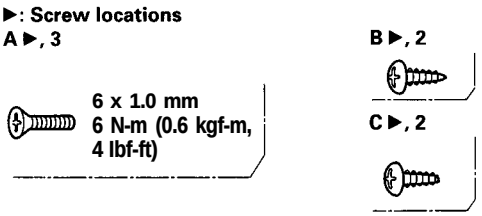
Latch Replacement

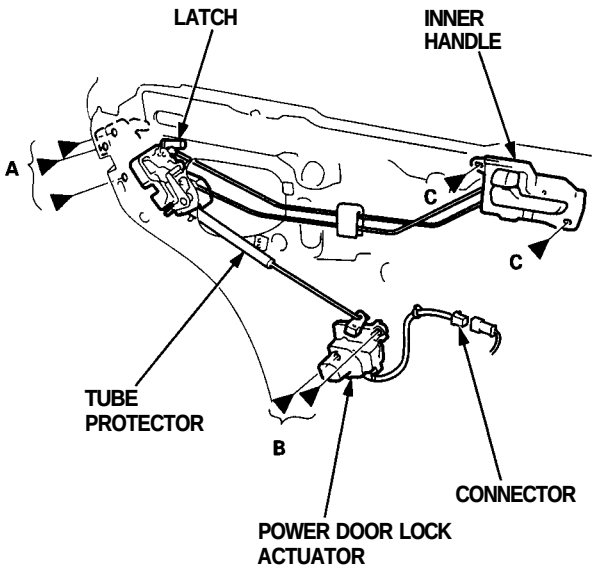
NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-15)
   - Plastic cover (see page 20-16)
   - Rod protector (see page 20-17)

2. Remove the screws and disconnect the connector, then remove the inner handle and latch.

   NOTE: Take care not to bend the rods.





3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the inner handle rod, lock rod and connector are connected properly.

Doors

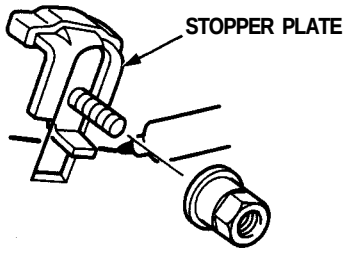
Glass/Regulator/Center Glass Guide Replacement

1. Remove:
   - Door panel (see page 20-15)
   - Plastic cover (see page 20-16)

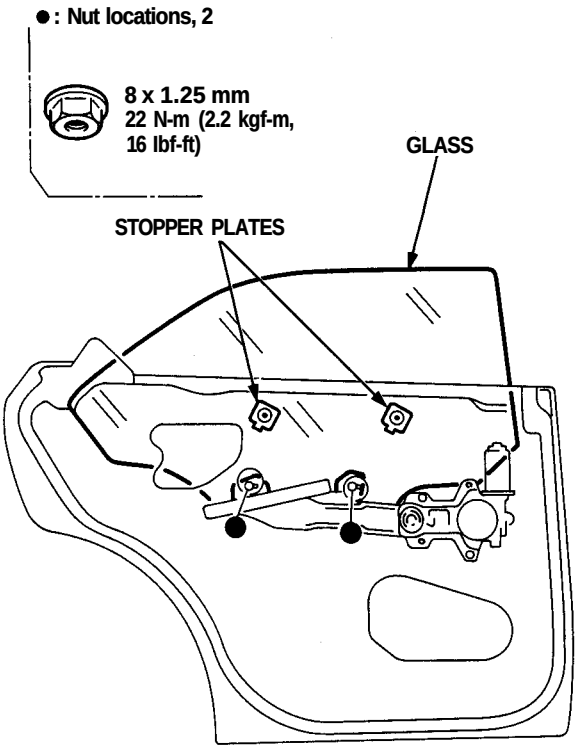
2. Connect the power window switch to the door harness (see page 20-25).

3. Remove the stopper plates.

   NOTE: Scribe a line across the stopper plate position to show the original adjustment.

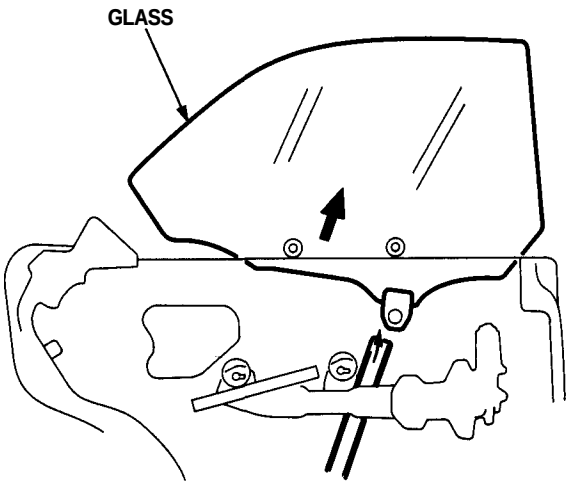


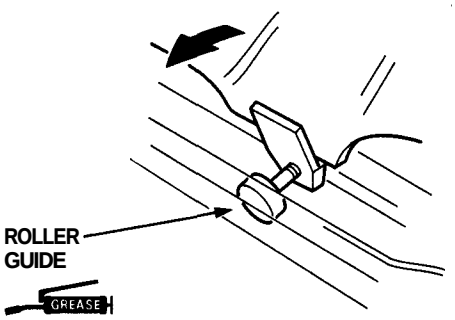
4. Carefully move the glass until you can see the glass mounting nuts, then remove them.



5. Carefully remove the glass from the window slot as shown.

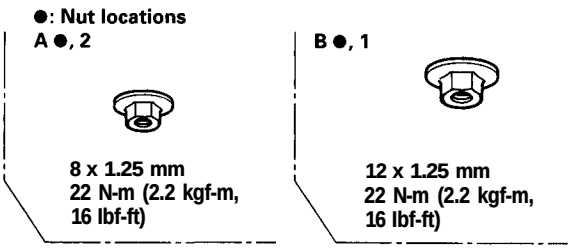
NOTE: Take care not to drop the glass inside the door.

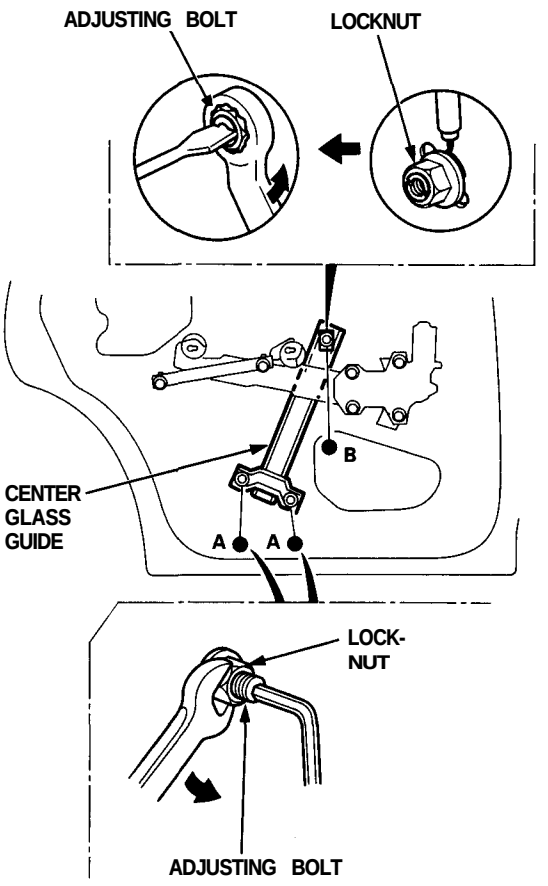




6. Remove the center glass guide.

NOTE:
- Hold the adjusting bolts with a hex wrench or a flat tip screwdriver when removing the locknuts.
- Scribe a line around the locknuts to show the original adjustment.





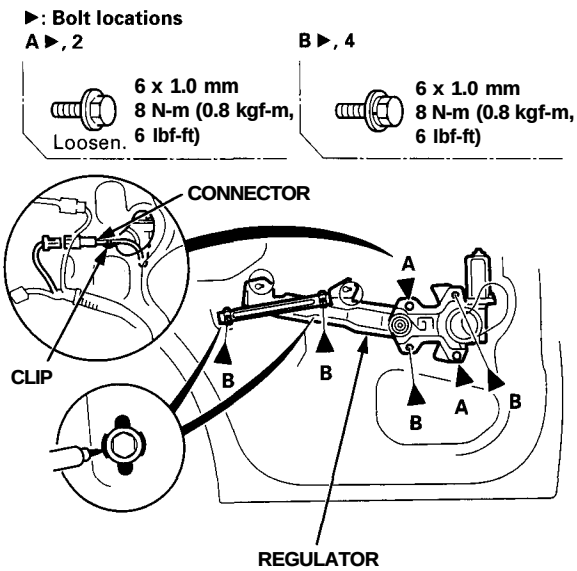
(cont'd)

Doors

Glass/Regulator/Center Glass Guide Replacement (cont'd)

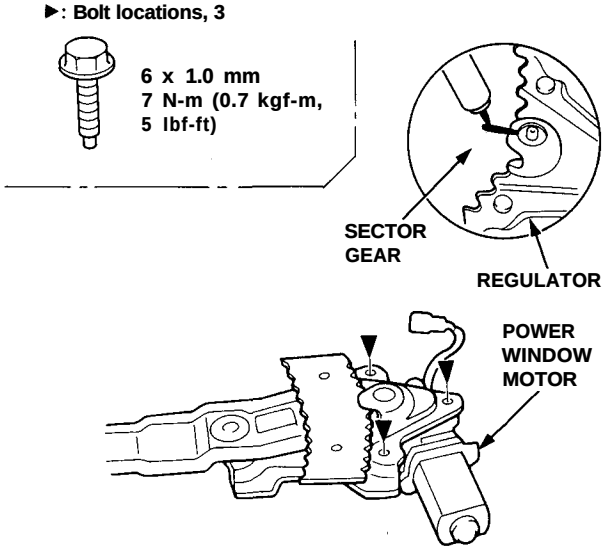
7. Disconnect the connector, and remove the regulator through the center hole in the door.

NOTE: Scribe a line around the roller guide bolts to show the original adjustment.

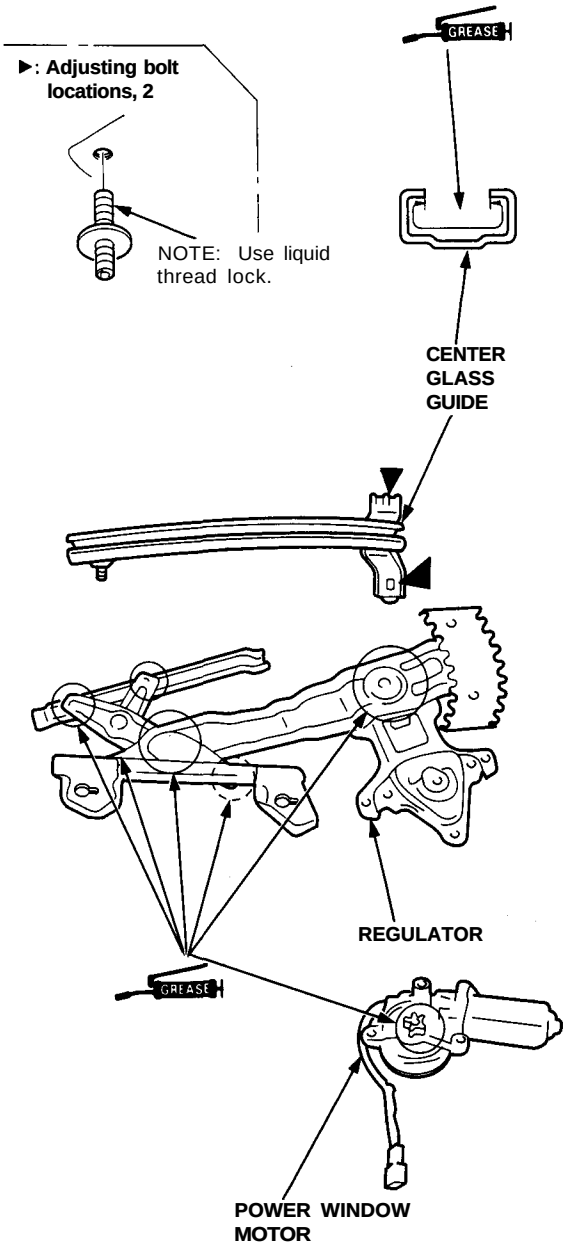


8. Remove the power window motor from the regulator.

NOTE: Before removing the power window motor, mark the location by scribing a line across the sector gear and regulator.



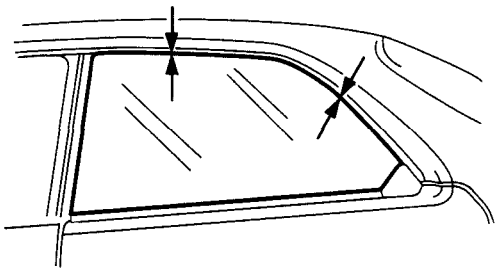
9. Grease all the sliding surfaces of the regulator and center glass guide where shown.



10. Install the power window motor on the regulator.

11. Check that the regulator moves smoothly by connecting a 12 V battery to the power window motor (see section 23).

12. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and weatherstrip when the glass is closed. Adjust the position of the glass as necessary (see page 20-24).



13. Attach the door harness to the door correctly (see page 20-16).

14. Disconnect the power window switch from the door harness.

15. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks (see page 20-16).

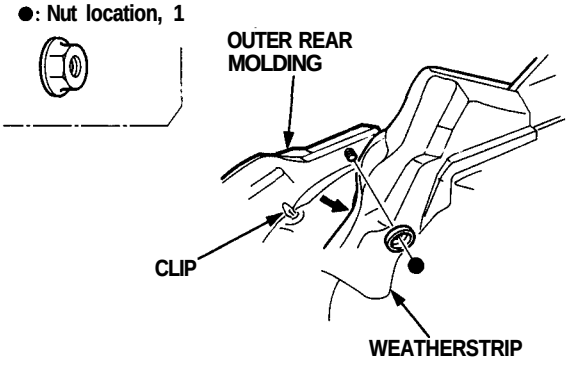
16. Install the door panel (see page 20-15).

Outer Molding Replacement

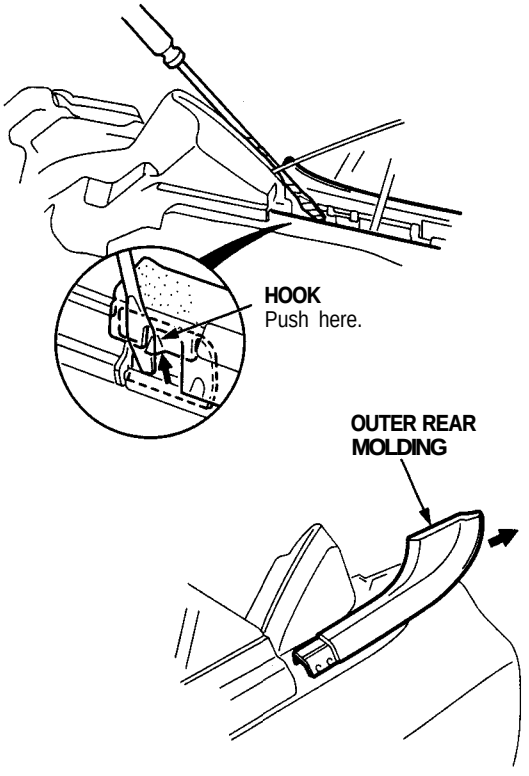
Removal:

NOTE: Lower the glass fully.

1. Remove the door panel (see page 20-15).
2. Peel the weatherstrip away from the door.
3. Remove the nut.



4. Push the hook, and remove the outer rear molding by sliding it rearward as shown.



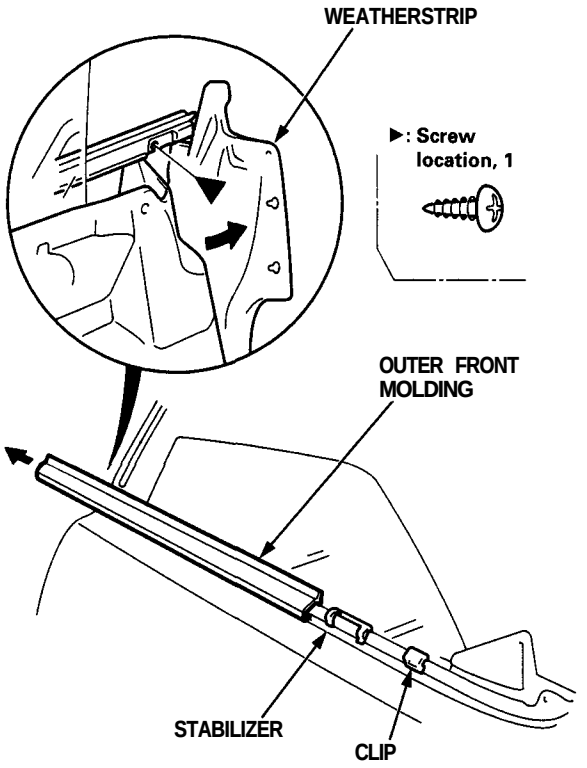
(cont'd)

Door

Outer Molding Replacement (cont'd)

5. Remove the screw, and remove the outer front molding by sliding it forward as shown.

   NOTE: Before removing the outer molding, scribe a line across the stabilizer position to show the original position.



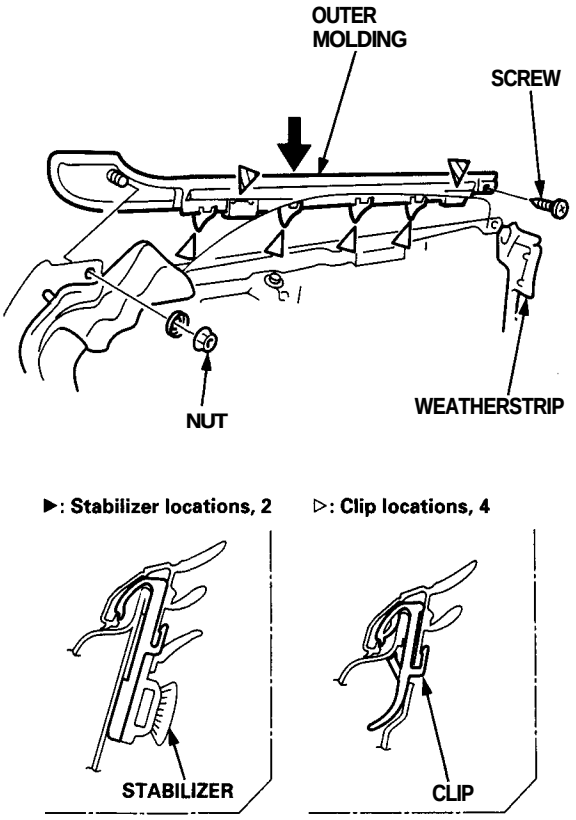
6. Remove the clips and stabilizers from the door panel.

   NOTE: If necessary, replace any damaged clips and stabilizers.

Installation:

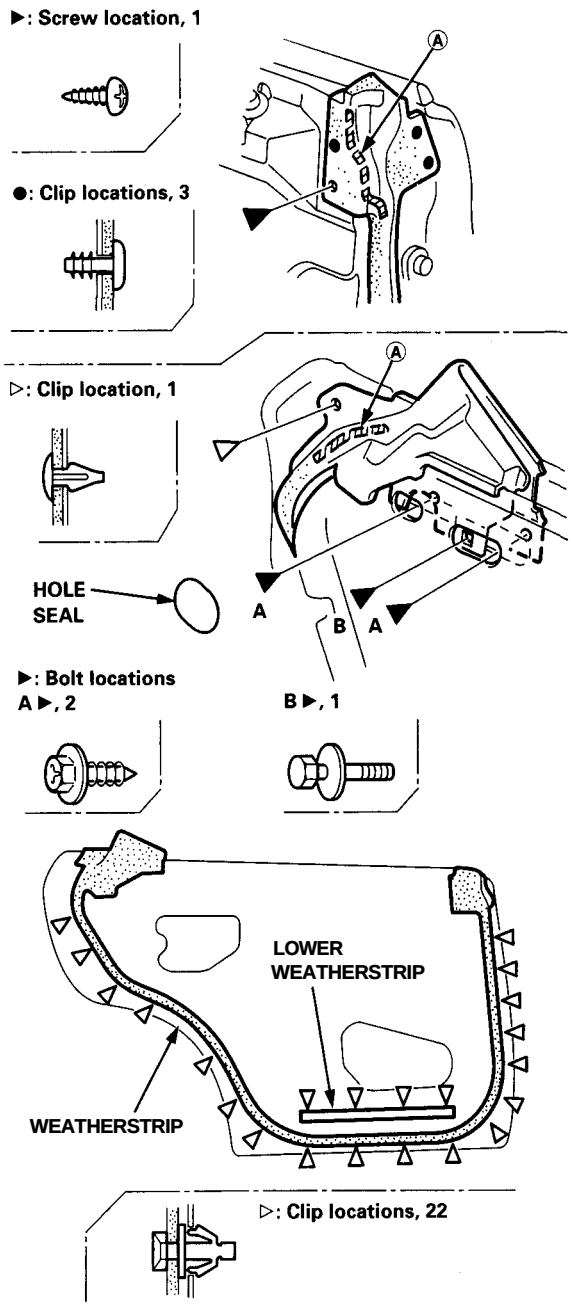
1. Assemble the front and rear molding.

2. Attach the clips and stabilizers to the outer molding.



3. Install the outer molding as shown.

Weatherstrip Replacement



NOTE:

- Before installing the weatherstrip, apply clear sealant to the location Ⓐ.

Sealant: Cemedine #8500, or equivalent

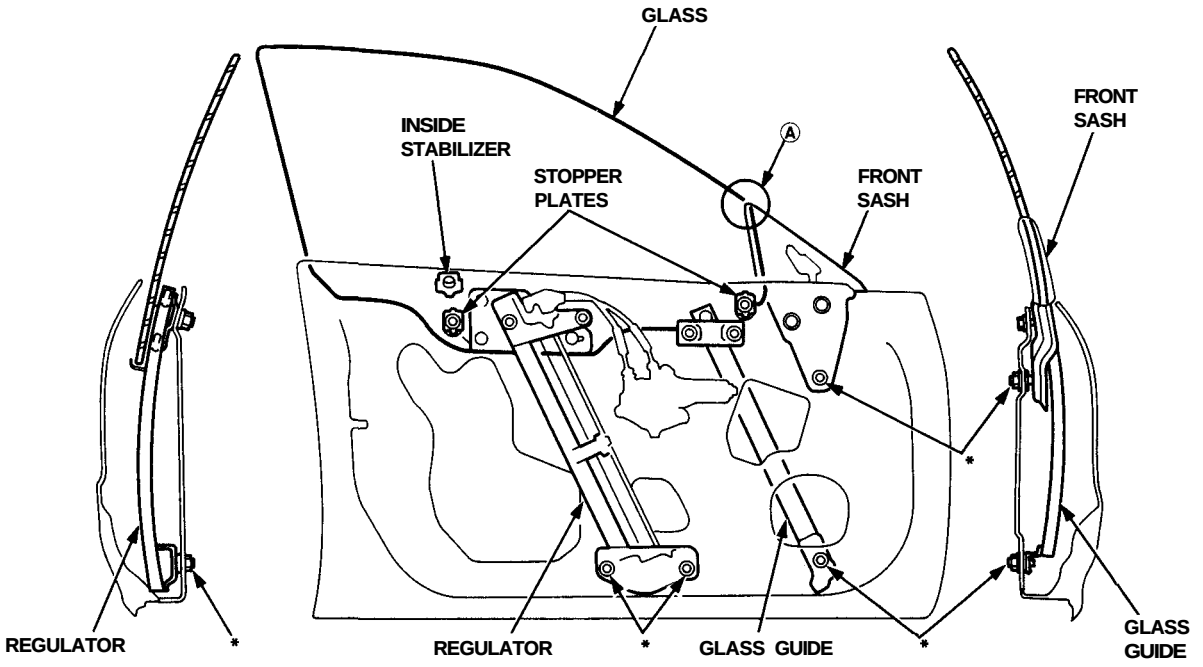
- If necessary, replace any damaged clips.

Doors

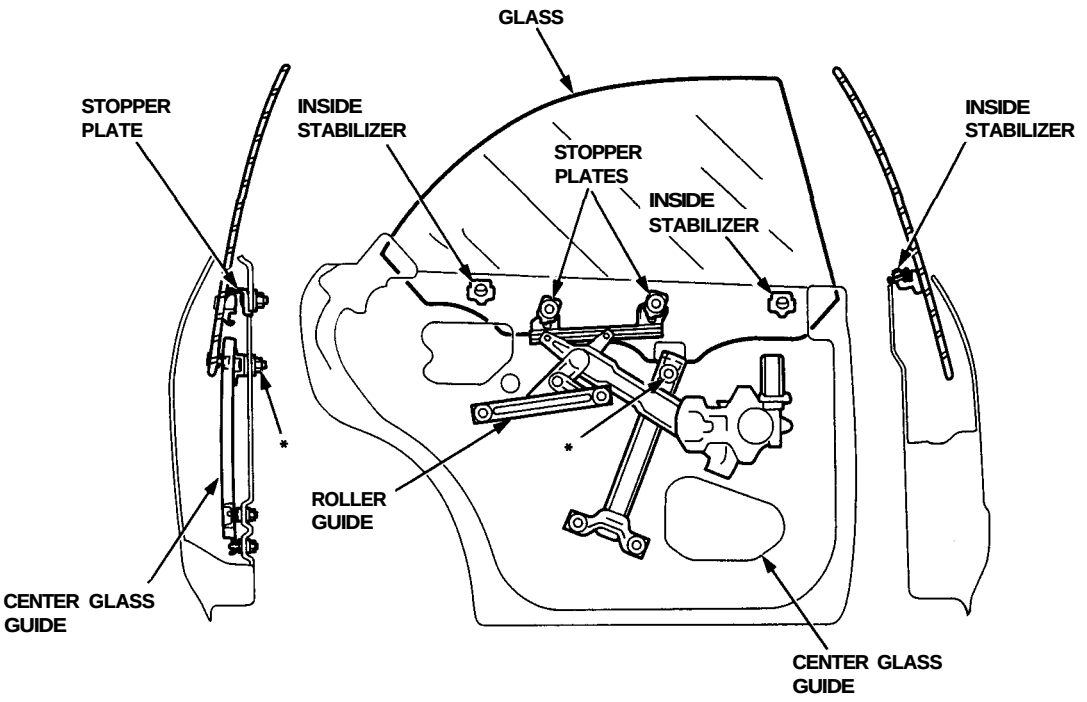
Glass Adjustment

*: Adjusting bolt/locknut locations
NOTE: Take care not to damage location Ⓐ on the front sash.

Front:



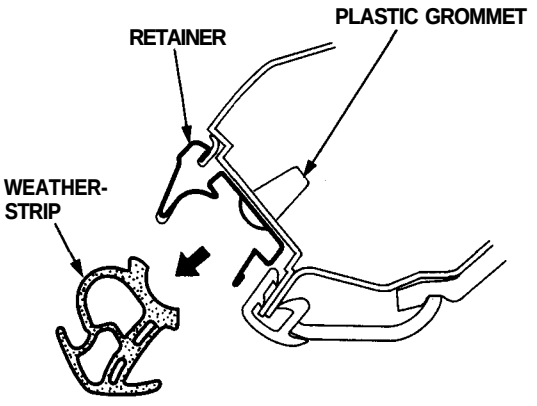
Rear:



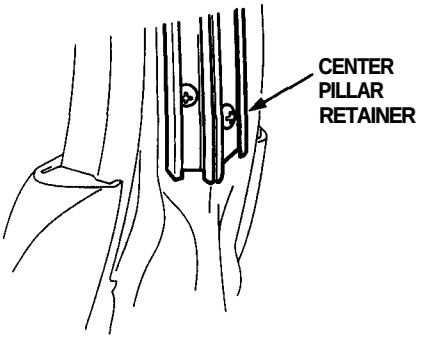
NOTE: Place the vehicle on a firm, level surface when adjusting the glass.

1. Remove the weatherstrip (see page 20-105).

   NOTE: Check the weatherstrip for damage and deterioration, and replace it if necessary.



2. Install the center pillar retainer.



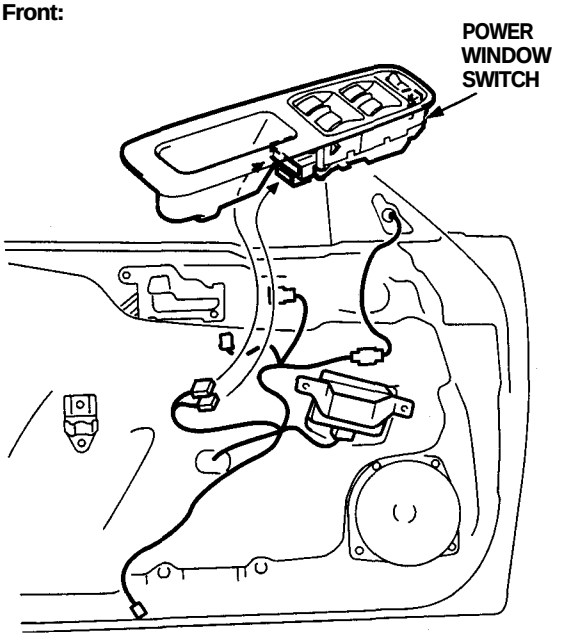
3. Remove the door panel (see pages 20-4, 20-15).

   NOTE: If necessary, peel off the plastic cover.

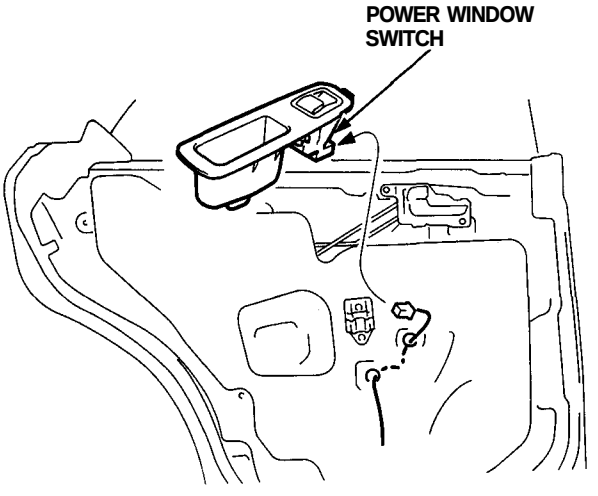
4. Remove the power mirror (see page 20-33).

6. Connect the power window switch to the door harness connectors.

Front:



Rear:



7. To prevent the glass from contacting the body, hold the glass, and close the door carefully.

8. Raise the glass fully.

   NOTE: Check the door fit to the body opening.

(cont'd)

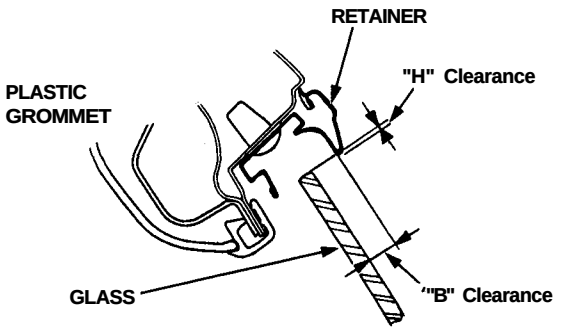
Doors

Glass Adjustment (cont'd)

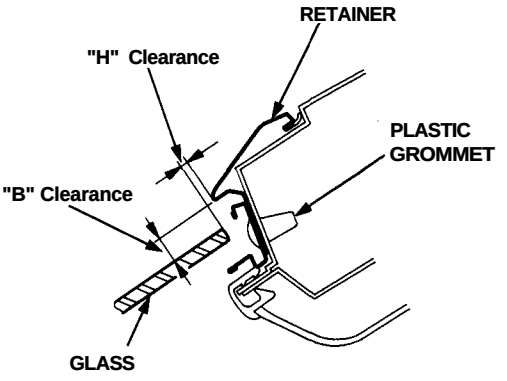
9. Measure and record clearances "H" and "B" at the locations shown.

10. Adjust the clearance as described in steps 11 thru 14.

Measuring Points



Section ①, ②, ③

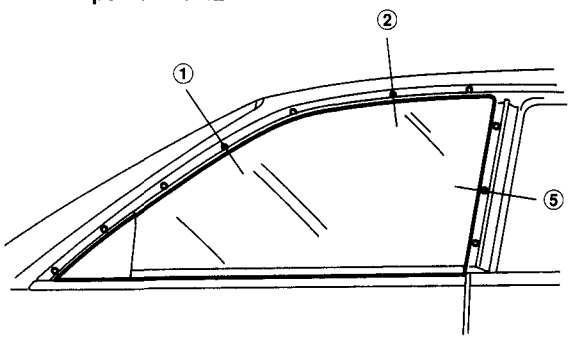


Section ④

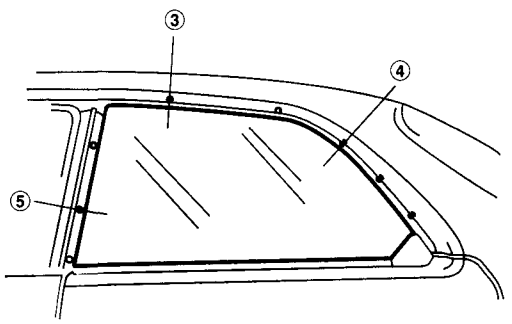
(Standard Clearance)

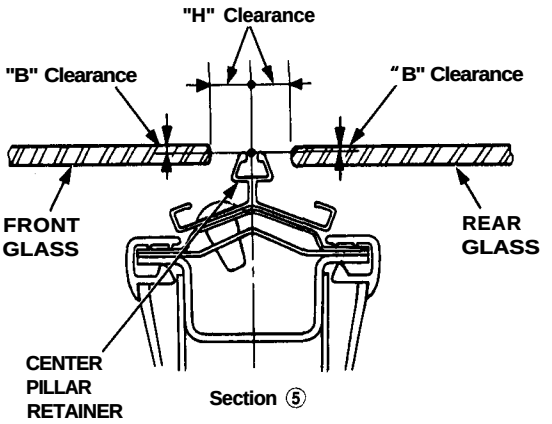
- Permissible tolerance: ±0.1 mm (0.04 in)

Front: Steps 11 and 12



Rear: Steps 13 and 14





Section ⑤

Unit: mm (in)

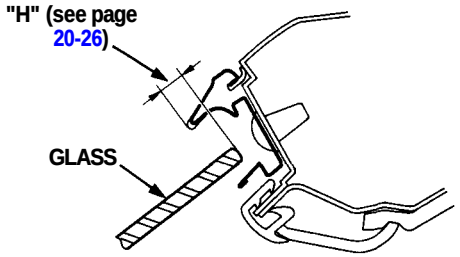
Measuring Point		①	②	⑤
Clearance	H	3.8 (0.15)	8.7 (0.34)	12.3 (0.48)
	B	16.3 (0.64)	18.6 (0.73)	7.7 (0.30)

Unit: mm (in)

Measuring Point		⑤	③	④
Clearance	H	10.8 (0.42)	8.0 (0.31)	3.7 (0.15)
	B	5.9 (0.23)	15.5 (0.61)	11.7 (0.46)

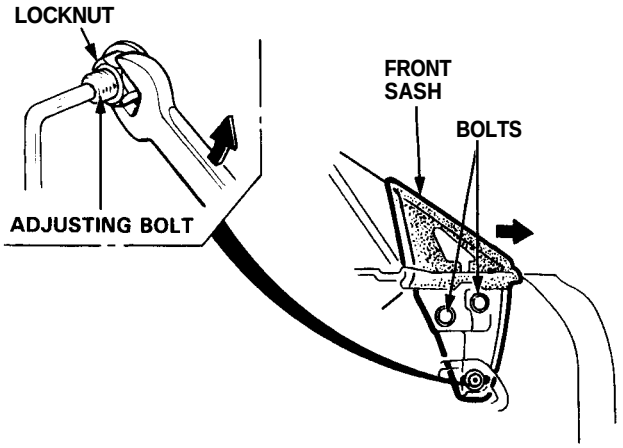
Front Door:

11. Adjust clearance "H" as follows.



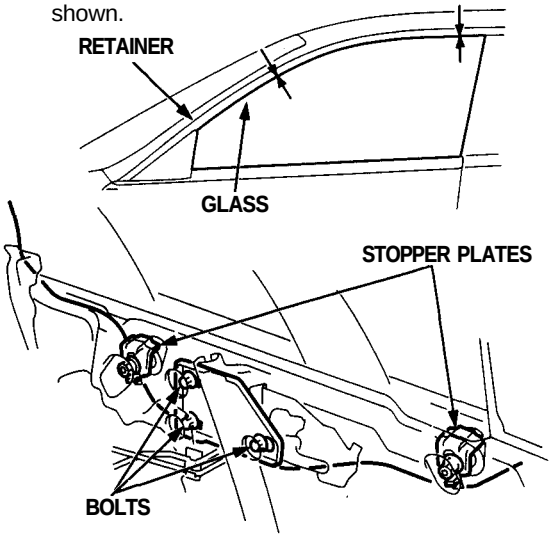
a. Loosen the bolts and locknut securing the front sash, and move the front sash all the way forward.

NOTE: Hold the adjusting bolt with a hex wrench when loosening the locknut.



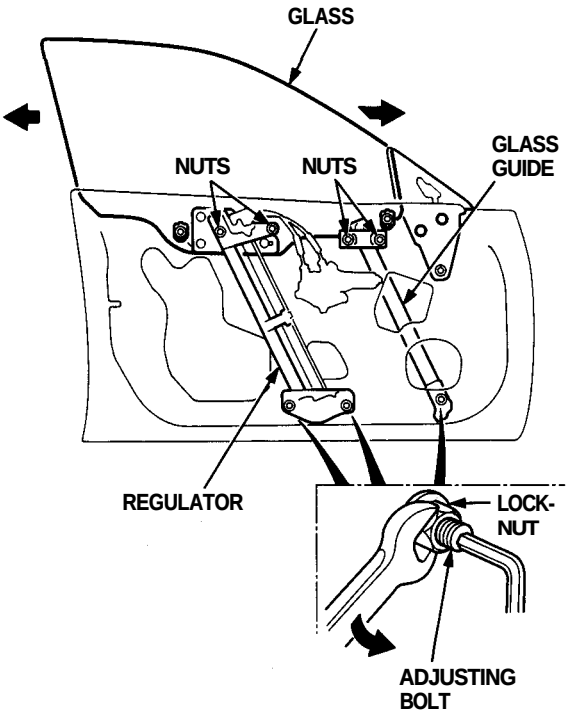
b. Loosen the nut securing the stopper plates.

c. Loosen the bolts securing the glass, and move the glass up or down to align it with the retainer as shown.



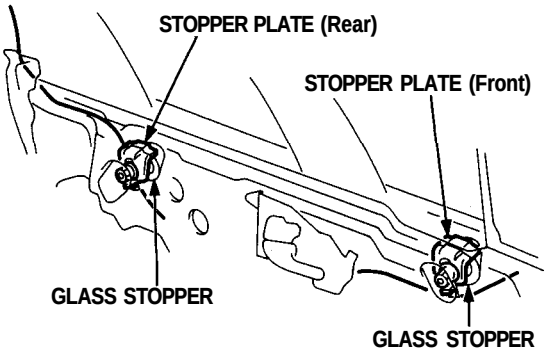
d. Loosen the nuts and locknuts securing the glass guide and regulator. Adjust the glass fore and aft by moving the glass guide and regulator.

NOTE: Hold the adjusting bolts with a hex wrench when loosening the locknuts.



e. Repeat steps c and d until clearance "H" is within the specified limits, then fasten the glass guide and regulator. Press the stopper plates against the glass stoppers, then fasten the stopper plates.

NOTE: Check that the stopper plates contact the glass stoppers evenly.



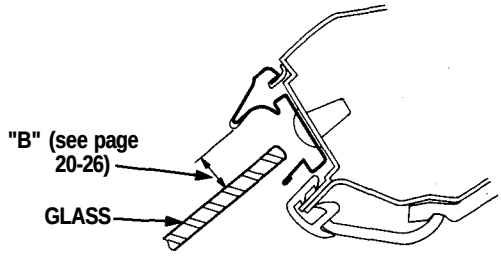
f. Align the front sash with the glass, then fasten the front sash.

(cont'd)

Doors

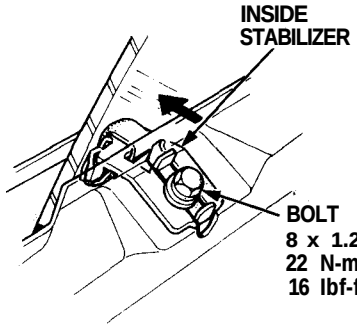
Glass Adjustment (cont'd)

12. Adjust clearance "B" as follows.



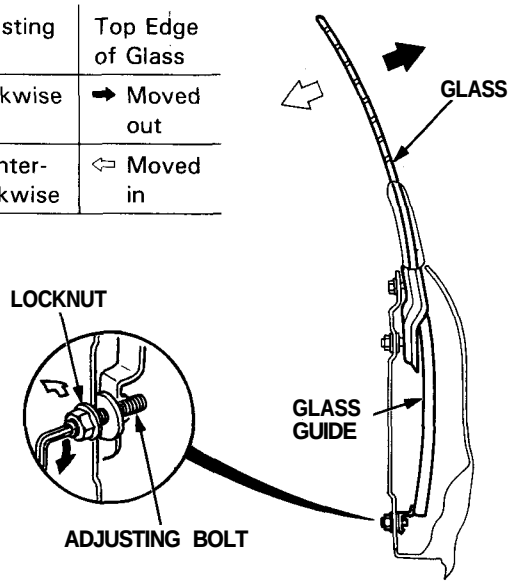
a. Push the inside stabilizers against the glass lightly, then fasten the inside stabilizers.

NOTE: Check that the glass moves smoothly.

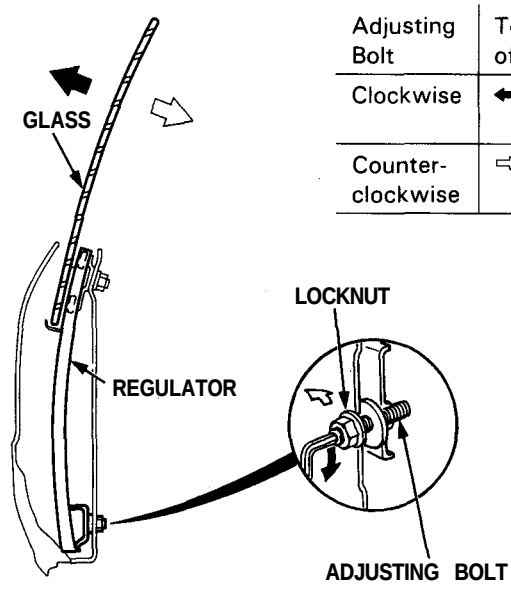


b. Loosen the locknut, and turn the adjusting bolt until the clearance "B" is within the specified value.

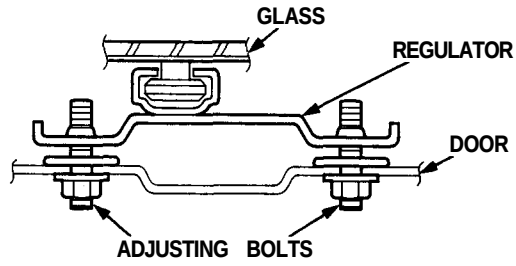
Adjusting Bolt	Top Edge of Glass
Clockwise	➡ Moved out
Counter-clockwise	⇦ Moved in



Adjusting Bolt	Top Edge of Glass
Clockwise	⬅ Moved out
Counter-clockwise	⇨ Moved in



NOTE: Turn the front and rear adjusting bolts the same amount to keep the regulator parallel with the seating surface of the door. After tightening the adjusting bolts, make sure that the ends of the adjusting bolts still project out of the locknuts.



c. Align the front sash with the glass using the adjusting bolt at the bottom of the front sash.

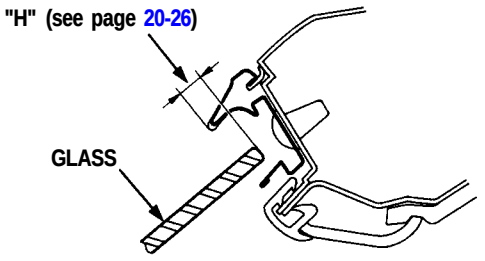
d. Move the glass up and down to seat it, then measure clearance "B" at the designated locations.

e. Measure clearance "H" again to make sure it is still within the specified limits at the designated locations.

NOTE: Repeat the above steps until the correct clearances are obtained.

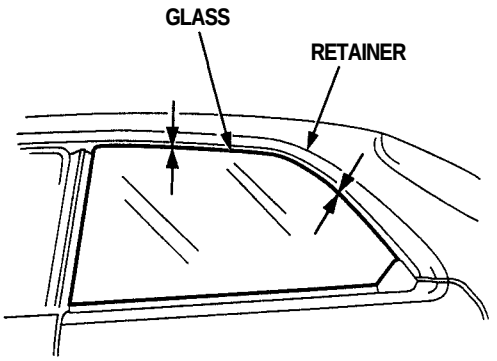
Rear Door:

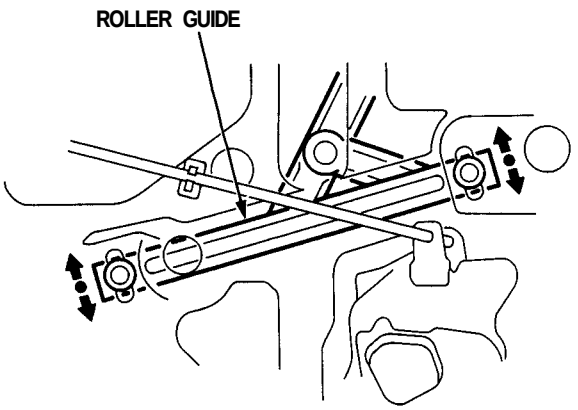
13. Adjust clearance "H" as follows.



a. Loosen the nut securing the stopper plates.

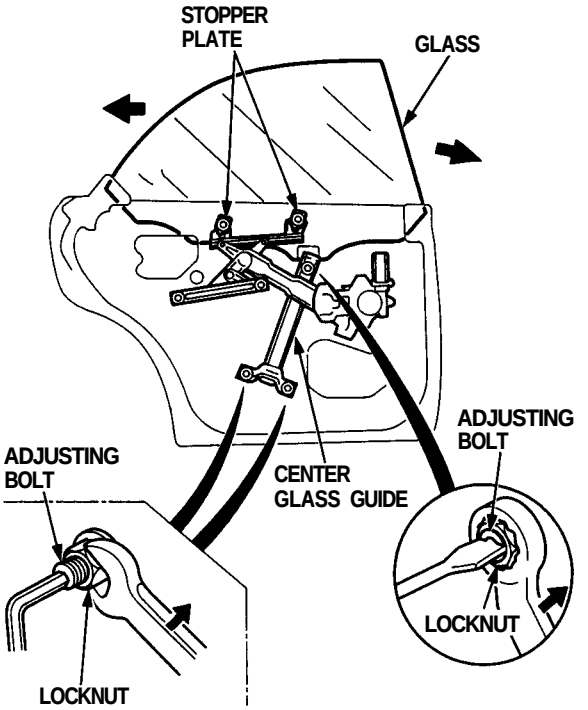
b. Loosen the nut securing the roller guide, and move the guide up or down to align the glass with the body at the rear and center pillars.





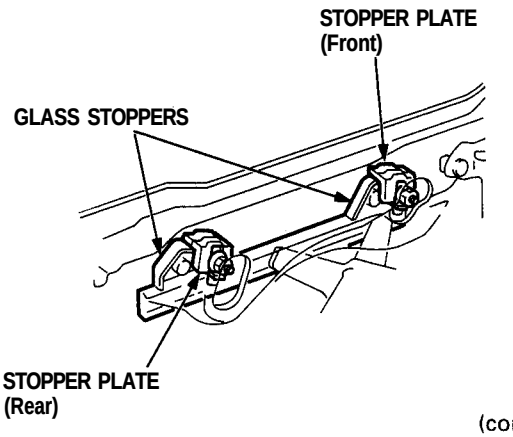
c. Loosen the locknuts securing the center glass guide, and adjust the glass fore and aft by moving the center glass guide.

NOTE: Hold the adjusting bolts with a hex wrench or flat tip screwdriver when loosening the locknuts.



d. Repeat steps b and c until clearance "H" is within the specified limits, then fasten the center glass guide and roller guide. Press the stopper plates against the glass stoppers, then fasten the stopper plates.

NOTE: Check that the stopper plates contact the glass stoppers evenly.

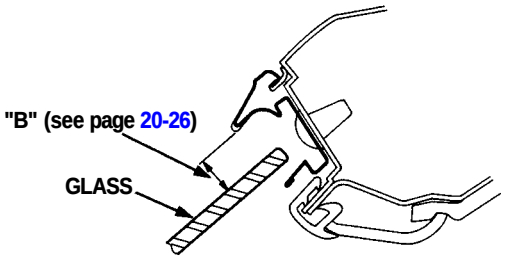


(cont'd)

Doors

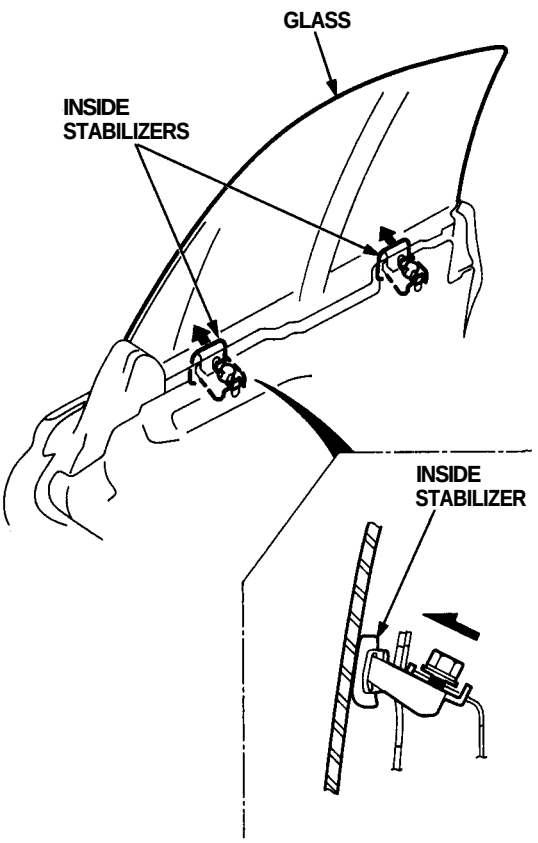
Glass Adjustment (cont'd)

14. Adjust clearance "B" as follows.

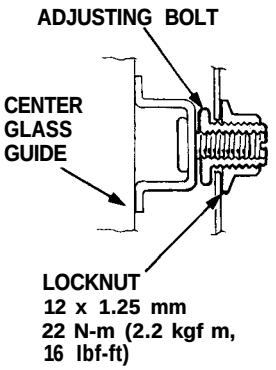


a. Push the glass outward, then push the inside stabilizers against the glass lightly. Fasten the inside stabilizers.

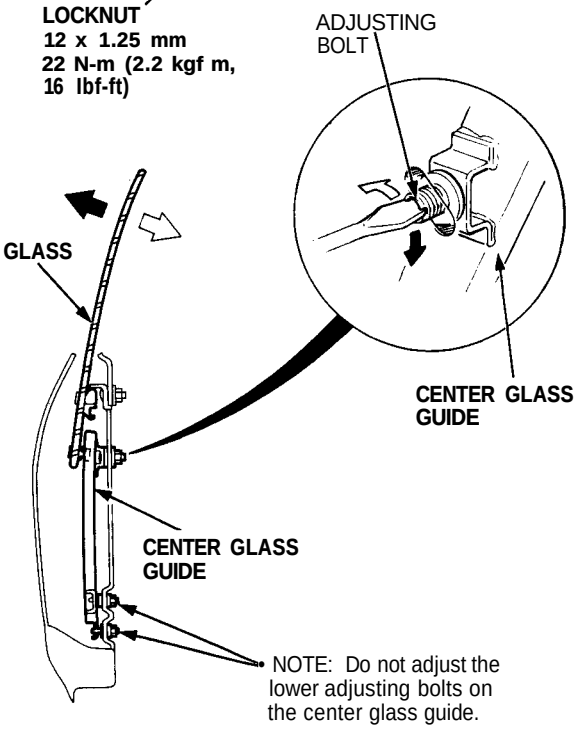
NOTE: Check that the glass moves smoothly.



b. Loosen the upper locknut on the center glass guide, and turn the adjusting bolt until clearance "B" is within the specified value.



Adjusting Bolt	Top Edge of Glass
Clockwise	⬅ Moved out
Counter-clockwise	⇨ Moved in



c. Move the glass up and down to seat it, then measure clearance "B" at the designated locations.

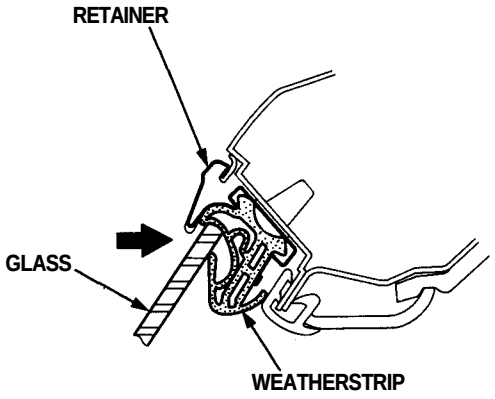
d. Measure clearance "H" again to make sure it is still within the specified limits at the designated locations.

NOTE: Repeat the above steps until the correct clearances are obtained.

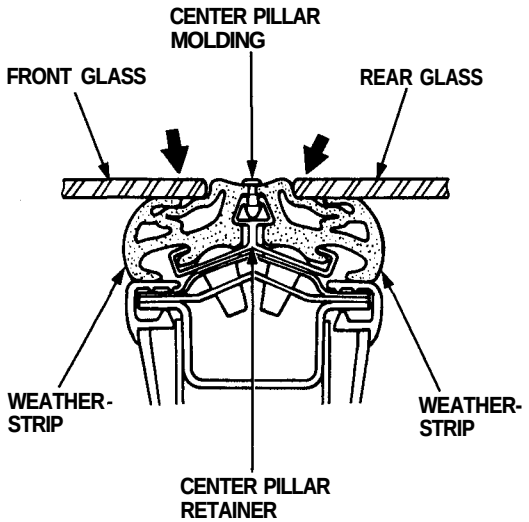
15. After the clearances have been adjusted properly, reinstall the weatherstrip.

16. Check that the glass contacts the weatherstrip evenly.

    NOTE: Measuring points are described on page 20-26

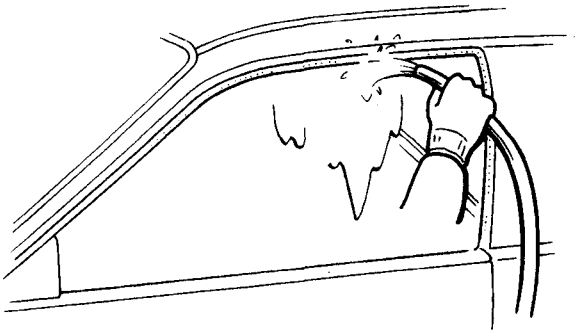


Center Pillar section:



17. Check for water leaks.

    NOTE: Do not use high-pressure water.



18. Route the door harness and connectors, and fasten them to the door (see pages 20-5, 20-16).

19. Disconnect the power window switch from the door harness.

20. Attach the plastic cover, then install the door panel (see pages 20-4, 20-15).

Doors

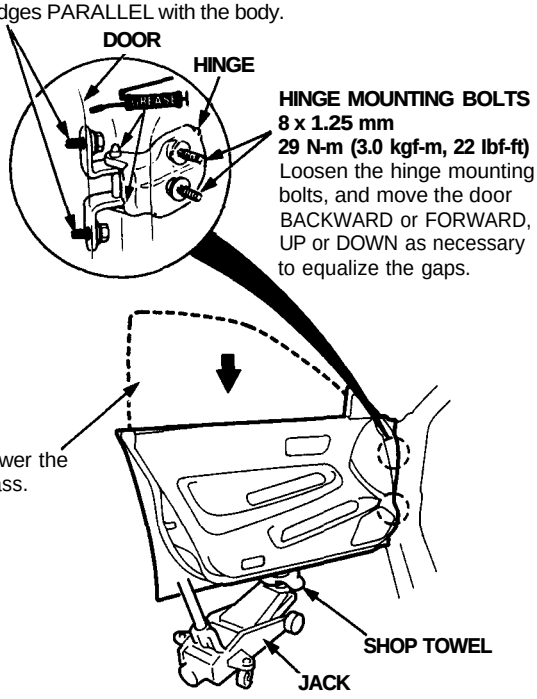
Position Adjustment

NOTE: Place the vehicle on a firm, level surface when adjusting the doors.

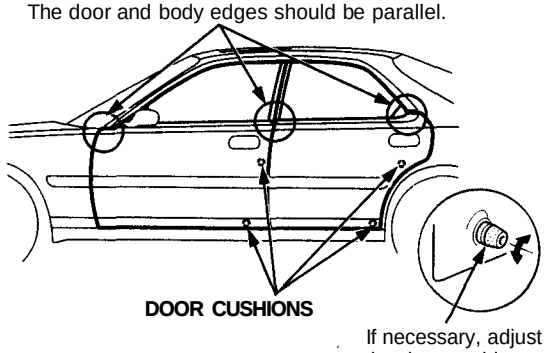
After installing the door, check for a flush fit with the body, then check for equal gaps between the front, rear, and bottom door edges and the body. The door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the door when loosening the door and hinge mounting bolts for adjustment.

DOOR MOUNTING BOLTS
8 x 1.25 mm
29 N-m (3.0 kgf-m, 22 lbf-ft)
Loosen the door mounting bolts slightly to move the door IN or OUT until it's flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.



The door and body edges should be parallel.



NOTE: Check for water leaks.

Doors

Striker Adjustment

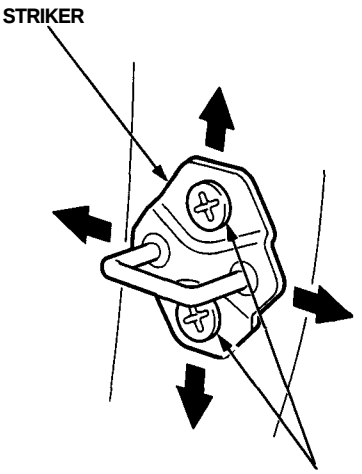
Front:

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line around the striker for reference.

2. Loosen the screws, and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.

   NOTE: Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit.



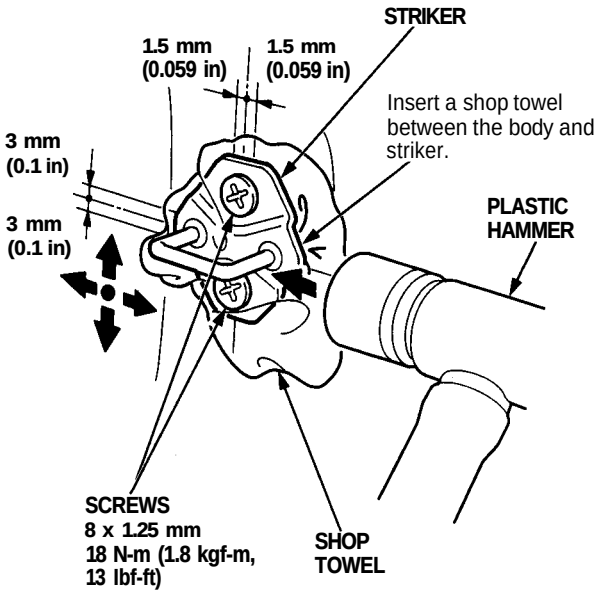
3. If the door latches properly, tighten the screws and recheck.

Rear:

Make sure the door latches securely without slamming. If it needs adjustment:

NOTE: The striker nuts are fixed. The striker can be adjusted 1.5 mm (0.059 in) up or down, and 3 mm (0.1 in) in or out.

1. Loosen the screws, then insert a shop towel between the body and striker.



2. Lightly tighten the screws.

3. Wrap the striker with a shop towel, then adjust the striker by tapping it with a plastic hammer.

   CAUTION: Do not strike the striker too hard.

   NOTE: Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit.

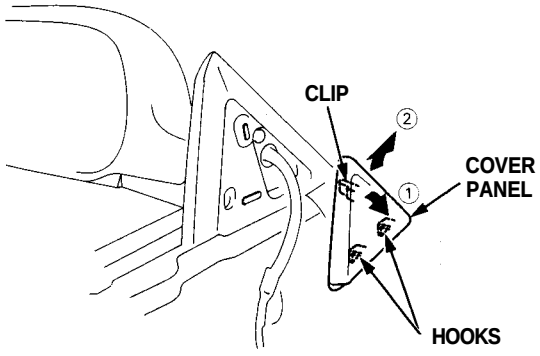
4. If the door latches properly, loosen the screws, then remove a shop towel. Tighten the screws and recheck.

Power Mirror Replacement

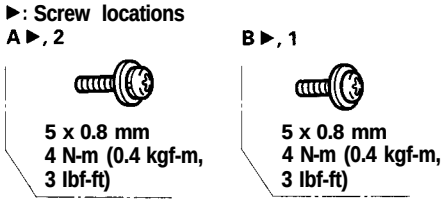
1. Remove the door panel (see page 20-4), and disconnect the connector.

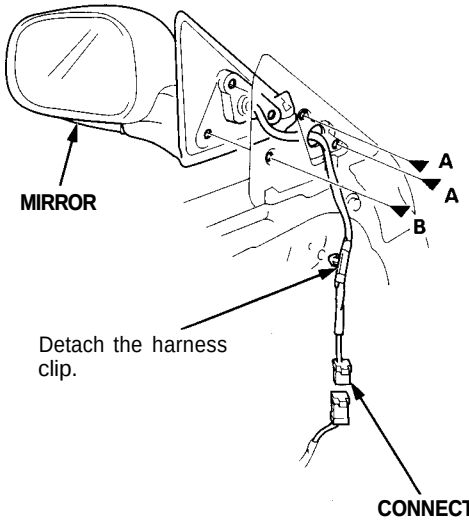
2. Pry the cover panel out with a flat tip screwdriver, then remove the cover panel.

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.



3. Remove the screws while holding the mirror, then remove the mirror.





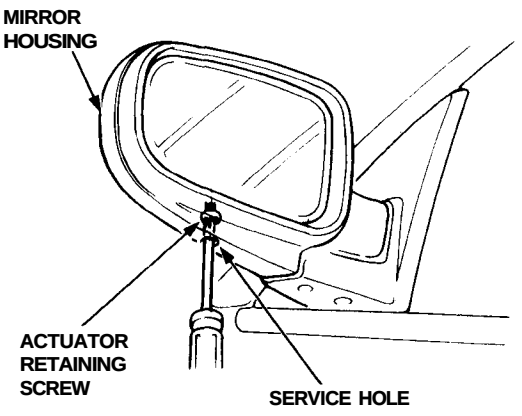
4. Installation is the reverse of the removal procedure.

NOTE: Make sure the connector is connected properly.

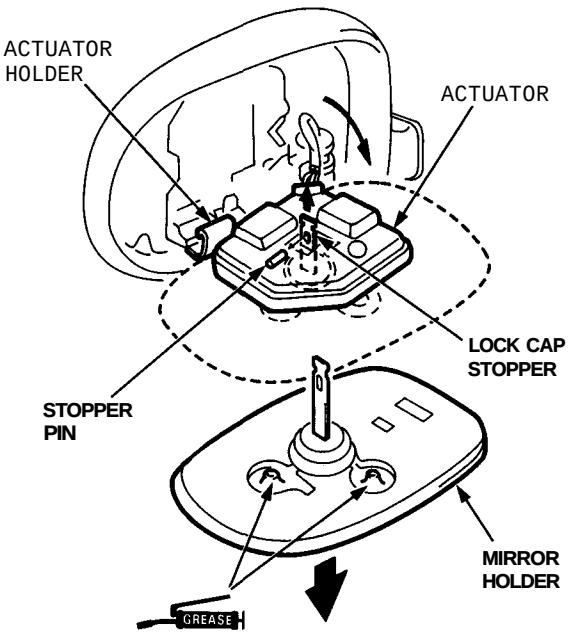
Mirrors

Mirror Holder Replacement

1. Insert a screwdriver in the mirror housing through the service hole, and loosen the actuator retaining screw.



2. Pull out the mirror holder from the mirror housing.



3. Pull the lock cap stopper and remove the stopper pin, then separate the actuator and mirror holder.

   NOTE: If the mirror is equipped with a defogger, you cannot separate the actuator and mirror holder.

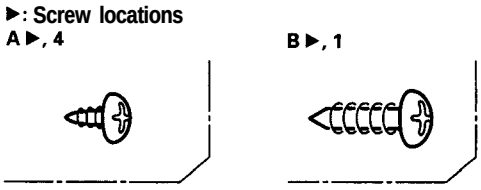
4. Installation is the reverse of the removal procedure.

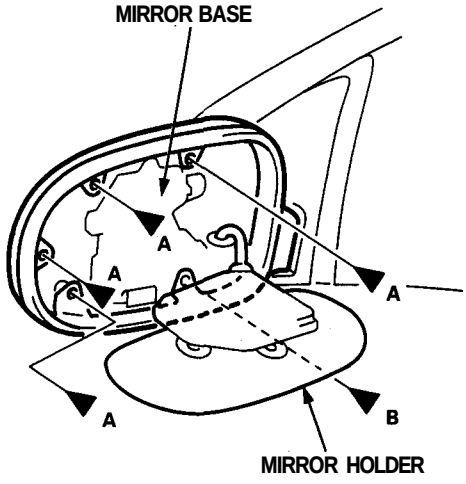
   NOTE: Apply grease to the locations indicated by the arrows.

Mirrors

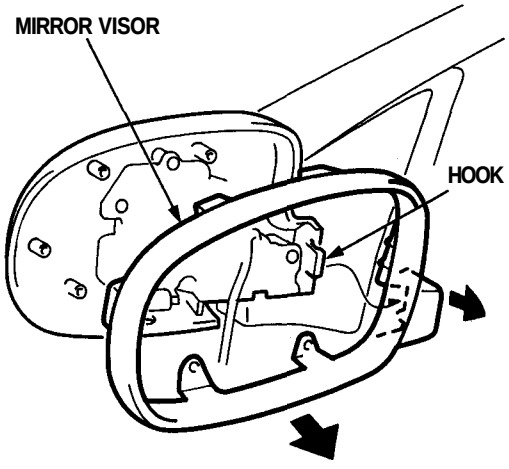
Mirror Visor and Mirror Cover Replacement

1. Remove the mirror holder.
2. Push the mirror base forward, then remove the screws.

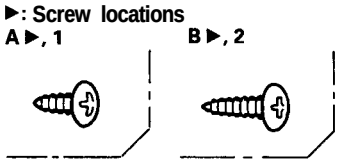


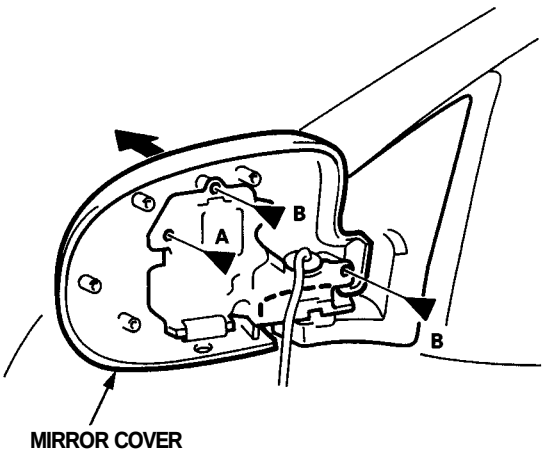


3. Detach the hook, then remove the mirror visor.



4. Remove the screws, then remove the mirror cover.



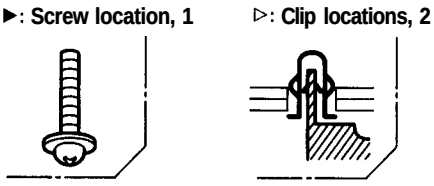


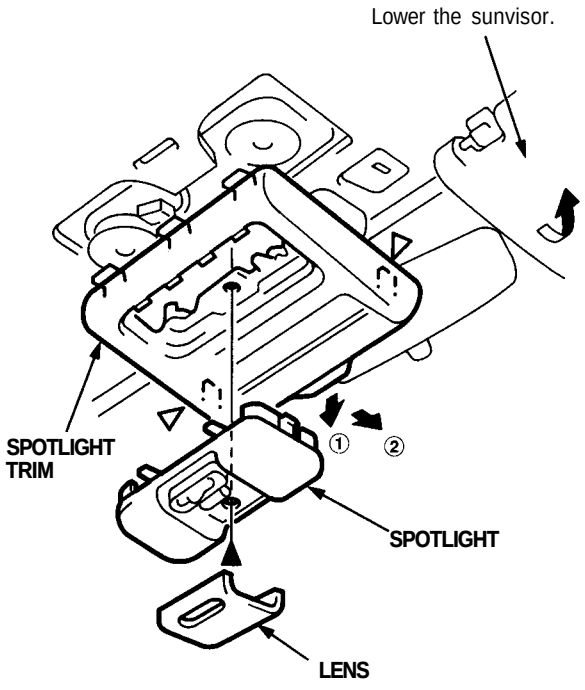
5. Installation is the reverse of the removal procedure.

Rearview Mirror Replacement

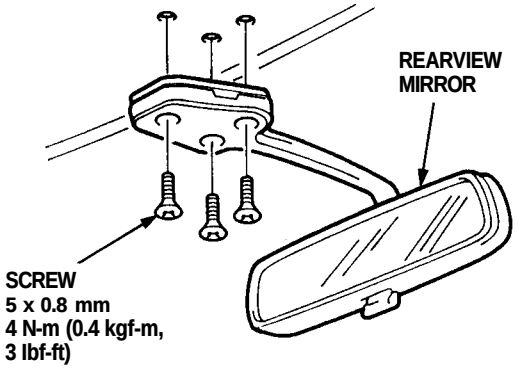
1. Remove the spotlight, then remove the spotlight trim.

CAUTION: When prying with a flat tip screwdriver, wrap it with a shop towel to prevent damage.





2. Remove the screws, then remove the rearview mirror.



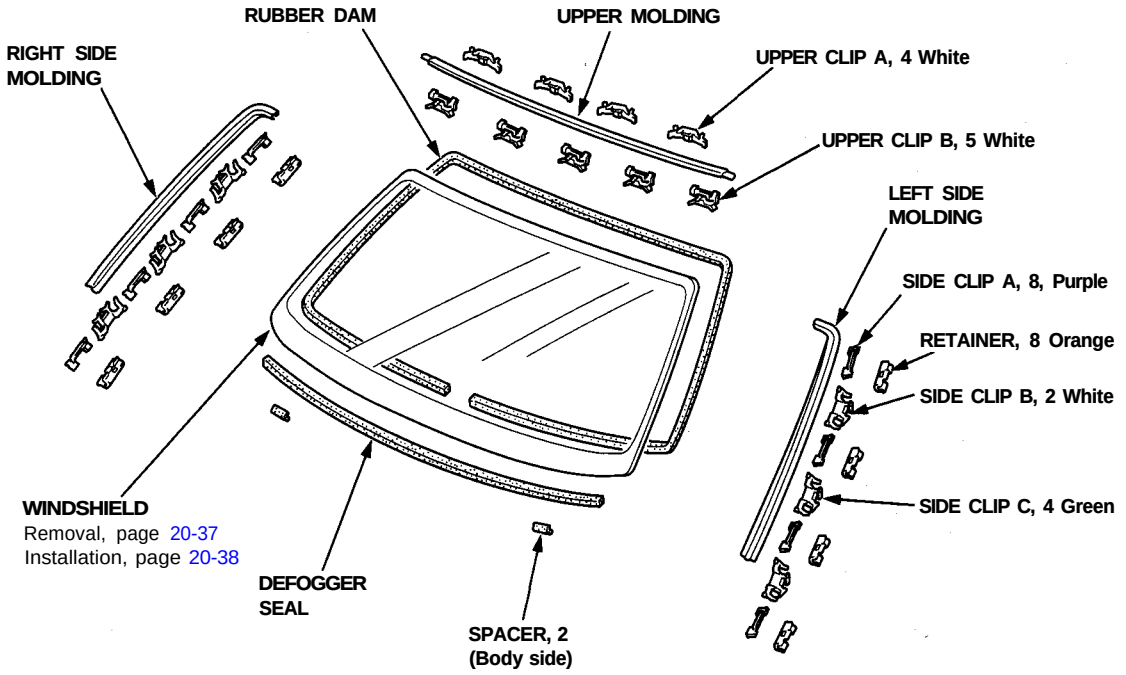
3. Installation is the reverse of the removal procedure.

Windshield/Rear Window

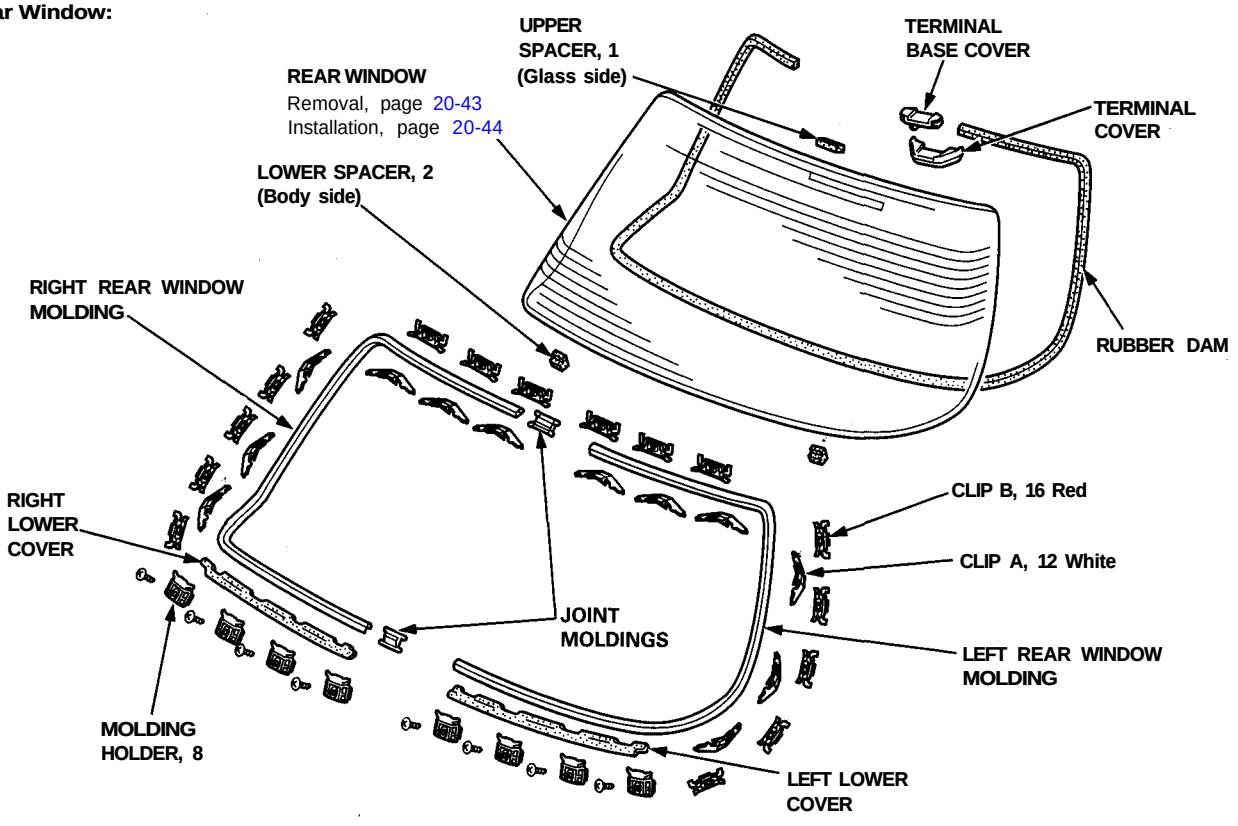
Index

NOTE: The numbers after the part names show the quantities of the parts used.

Windshield:



Rear Window:



Windshield

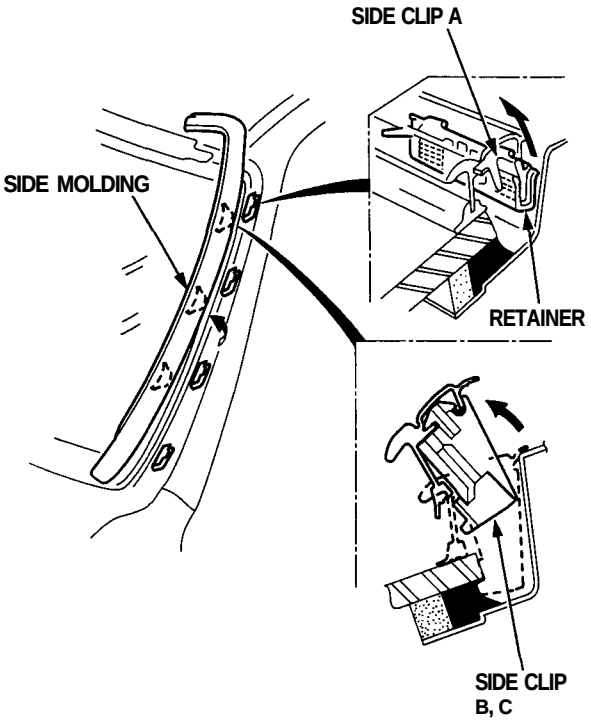
Removal

CAUTION:
- **Wear gloves to remove and install the windshield.**
- **Use seat covers to avoid damaging any surfaces.**

1. To remove the windshield, first remove the:
   - Spotlight (see page 20-35)
   - Spotlight trim and rearview mirror (see page 20-35)
   - Sunvisors (see page 20-61)
   - Front pillar trim (see page 20-57)
   - Windshield wiper arms and air scoop (see page 20-117)

2. Detach the clips from the retainers, then remove both side moldings as shown.

   NOTE: If necessary, replace any damaged clips.

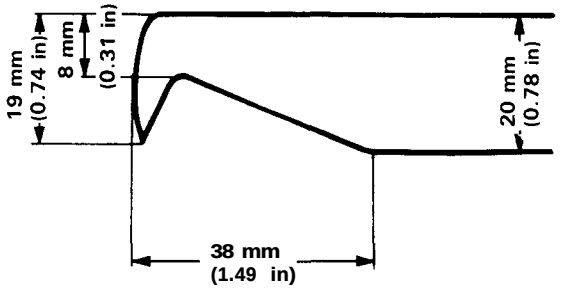


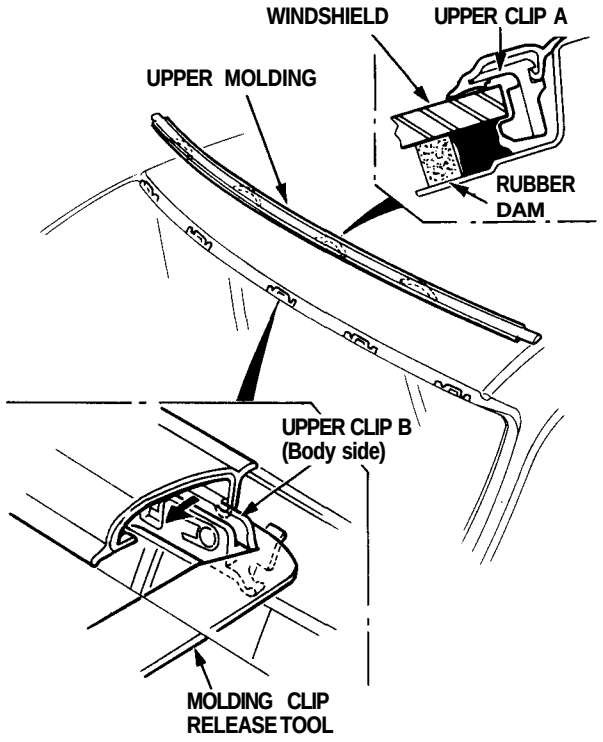
3. Detach the clips with a molding clip release tool, and remove the upper molding.

   NOTE: You will need a molding clip release tool to remove the upper molding. If necessary, make one that has the dimensions shown.

Molding Clip Release Tool:

Thickness: 2 mm (0.08 in), pointed at the end.





4. Remove the other retainers and clips from the body.

5. Pull down the front of the headliner (see page 20-62).

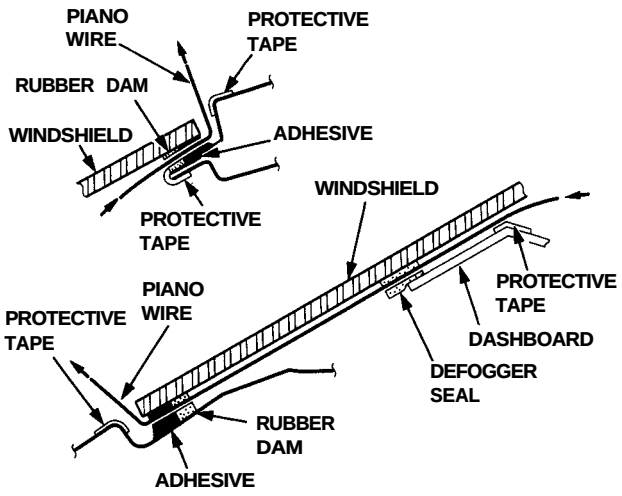
   CAUTION: Take care not to bend the headliner excessively.

(cont'd)

Windshield

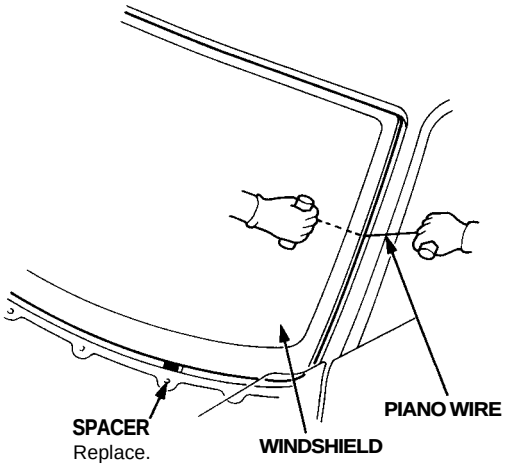
Removal (cont'd)

6. Apply protective tape to along the edge of the dashboard and body as shown. Using as awl, make a hole through the rubber dam and adhesive from inside the car. Push the piano wire through the hole, and wrap each end around a piece of wood.



7. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dam and adhesive around the entire windshield.

CAUTION: Hold the piano wire as close to the windshield as possible to prevent damage to the body and dashboard.



8. Carefully remove the windshield.

9. Cut the spacers away from the body with a knife.

NOTE: Replace the spacers with new ones whenever the windshield is removed.

Windshield

Installation

1. Scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire windshield opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Mask off surrounding surfaces before painting.
   - Remove the rubber dam from the body.

2. Clean the body bonding surface with a sponge dampened in alcohol.

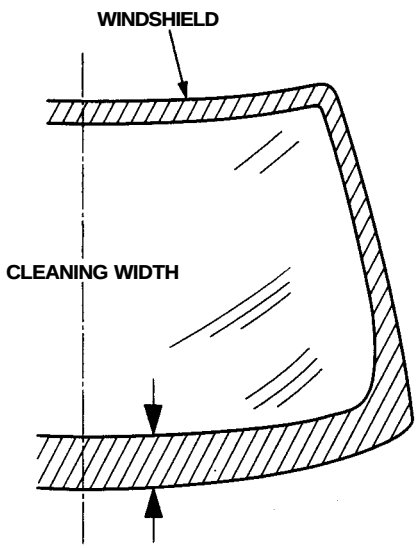
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dam, then clean the windshield surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

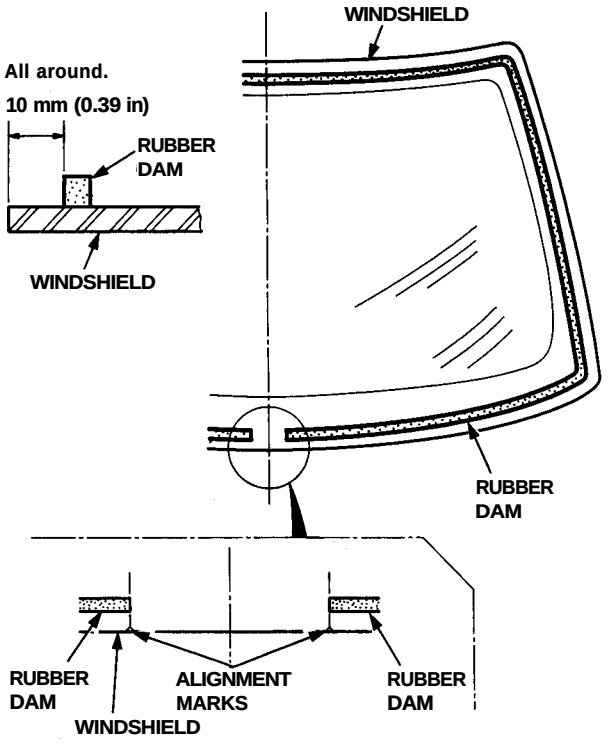
   CAUTION: Avoid setting the windshield on its edges; small chips may later develop into cracks.

   NOTE. Clean the shadowed area.



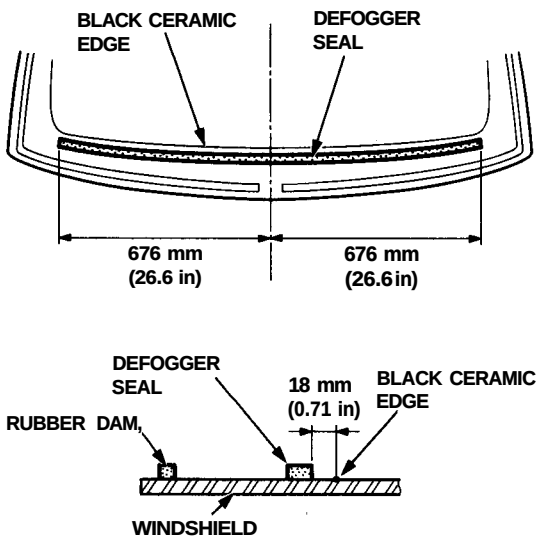
4. Glue the rubber dam to the inside face of the windshield, as shown, to contain the adhesive during installation.

   NOTE: Be careful not to touch the windshield where adhesive will be applied.

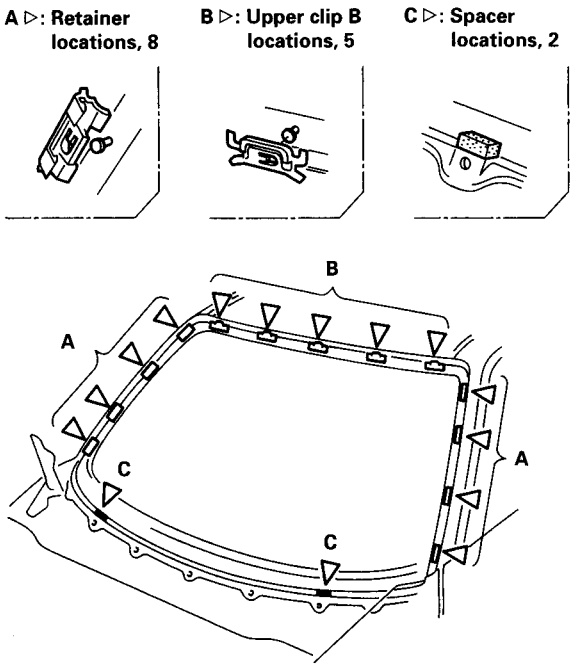


5. Glue the defogger seal to the inside face of the windshield as shown.

   NOTE: Be careful not to touch the windshield where adhesive will be applied.

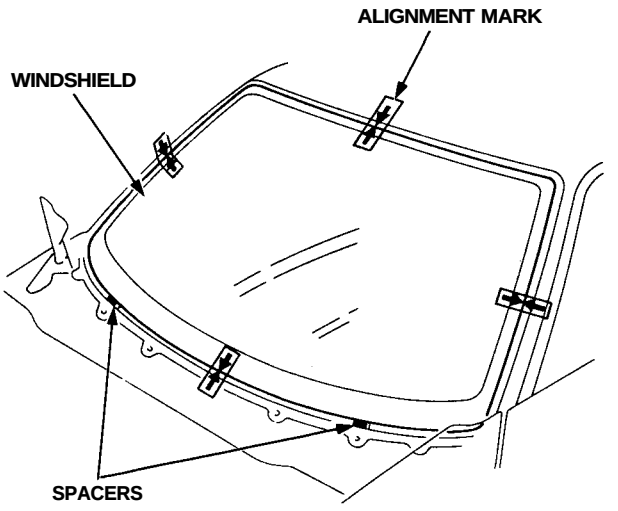


6. Install the retainers and upper clips, and glue the spacers to the body as shown.



7. Set the windshield on the spacers, then center it in the opening. Make alignment marks across the windshield and body with a grease pencil at the four points shown.

   NOTE: Be careful not to touch the windshield where adhesive will be applied.



(cont'd)

Windshield

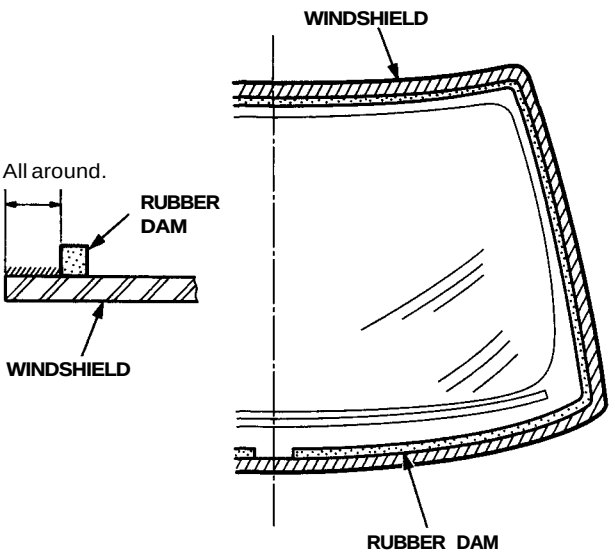
Installation (cont'd)

8. Remove the windshield.

9. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth.

   NOTE:
   - Do not apply body primer to the windshield, and do not get body and glass primer sponges mixed up.
   - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the windshield properly, causing a leak after the windshield is installed.
   - Keep water, dust, and abrasive materials away from the primed surface.

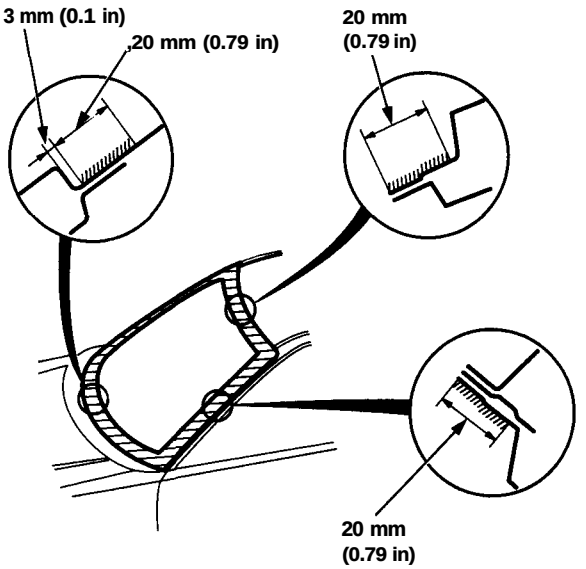
▨ : **Apply glass primer here.**



10. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes.

    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.
    - Mask off the dashboard before painting the flange.

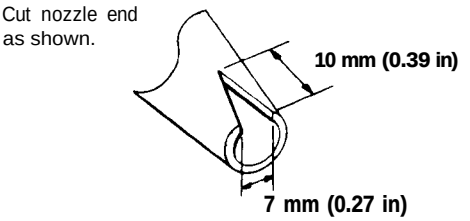
▨ : **Apply body primer here.**



11. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

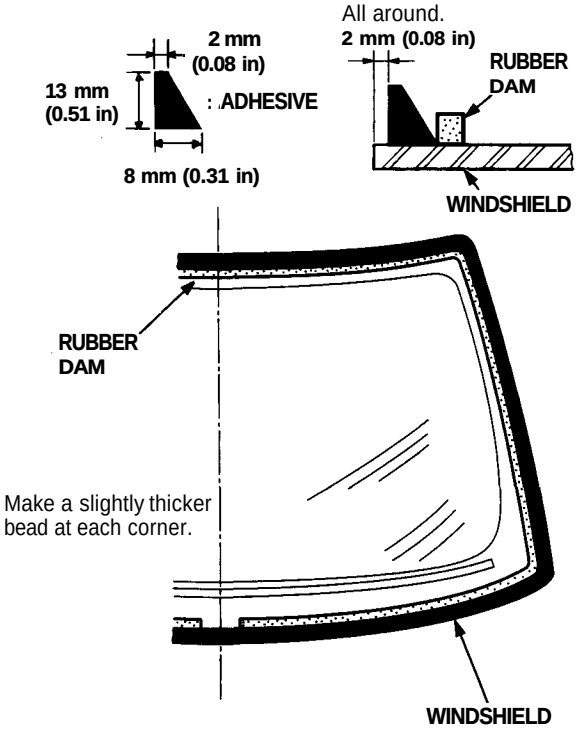
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that come with the adhesive.

12. Before filling a cartridge, cut the end of the nozzle as shown.



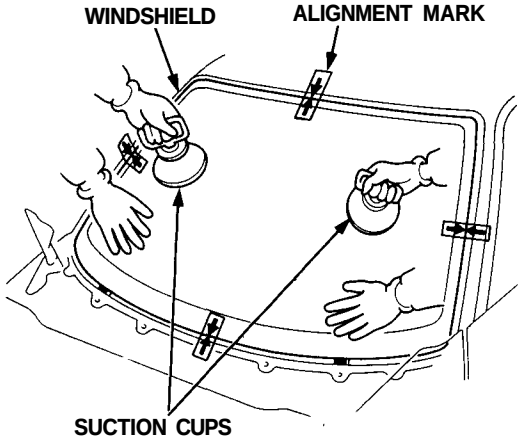
13. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



14. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 7, and set it down on the adhesive. Lightly push on the windshield until its edge is fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until the adhesive is dry.

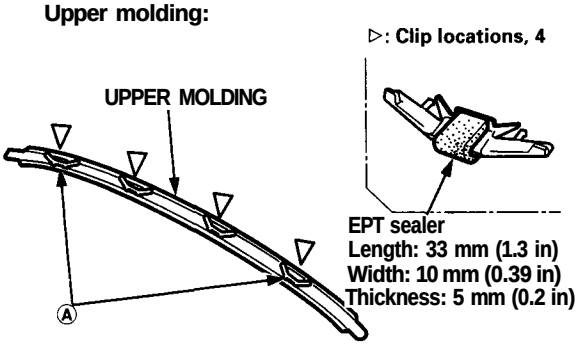


15. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

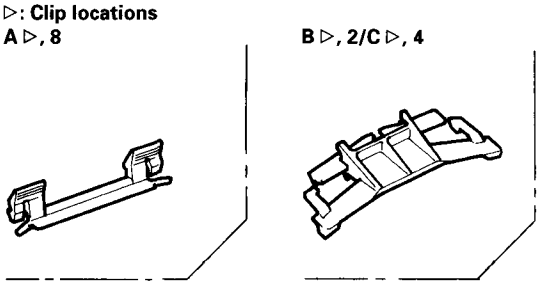
16. Install the clips on the upper molding and both side moldings.

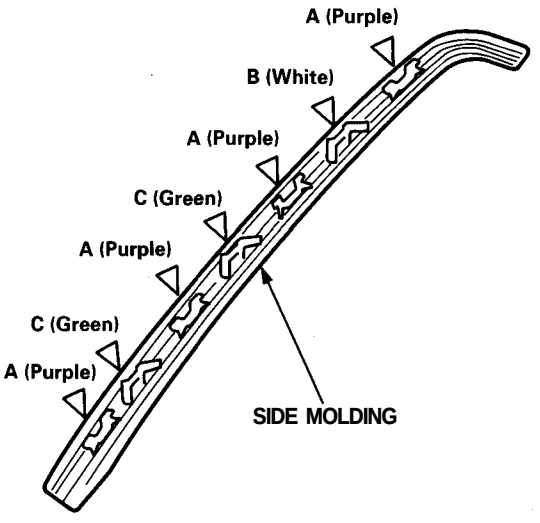
Upper molding:



NOTE: Glue the EPT sealer to the Ⓐ portion clips.

Side molding:



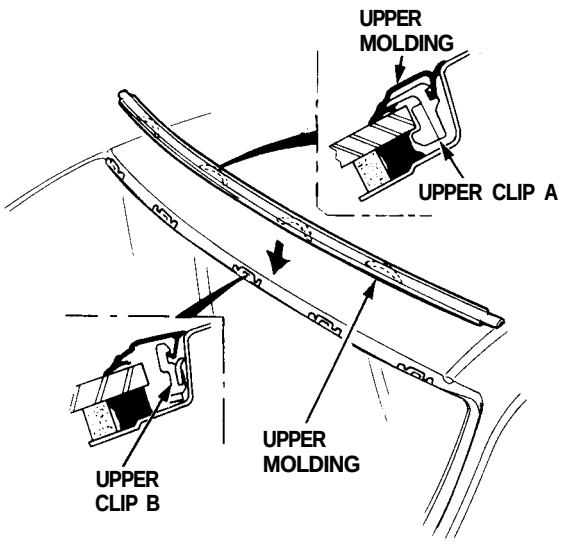


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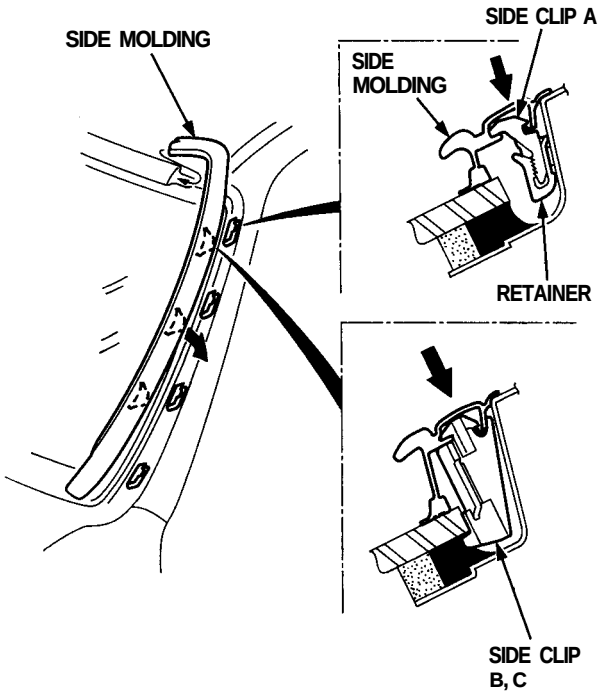
Windshield

Installation (cont'd)

17. Install the upper molding.



18. Install both side moldings.



19. Let the adhesive dry for at least one hour, then spray water over the windshield and check for leaks. Mark leaking areas, and let the windshield dry, then seal with sealant.

NOTE:

- Let the car stand for at least four hours after windshield installation. If the car has to be used within the first four hours, it must be driven slowly.
- Keep the windshield dry for the first hour after installation.
- Check that the ends of the side molding are set under the air scoop.

20. Reinstall all remaining removed parts.

NOTE: Advise the customer not to do the following things for two to three days:

- Slam the doors with all the windows rolled up.
- Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Rear Window

Removal

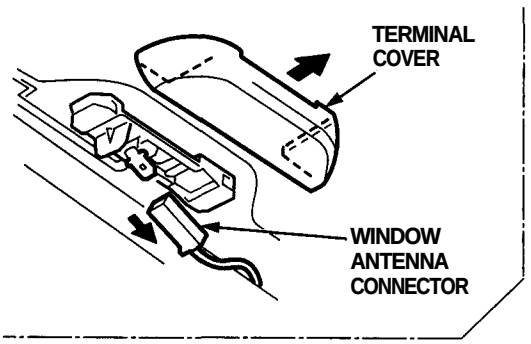
CAUTION:
- **Wear gloves to remove and install the rear window.**
- **Use seat covers to avoid damaging any surfaces.**
- **Do not damage the rear window defogger grid lines, window antenna grid lines, and terminals.**

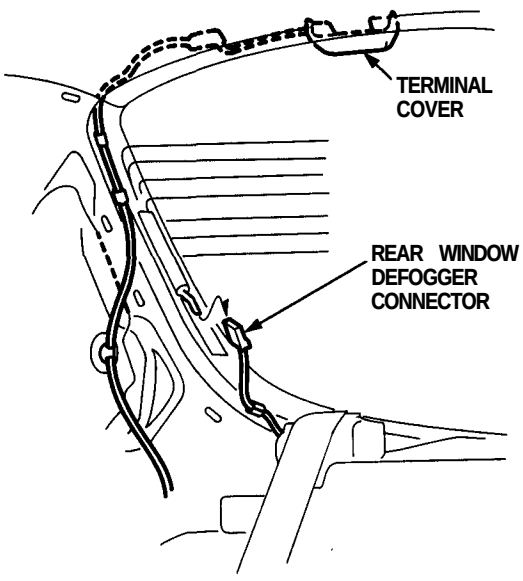
1. To remove the rear window, first remove the:
   - Trunk lid (see page 20-100)
   - Rear seat cushion and seat-back (see page 20-85)
   - Rear pillar trim (see page 20-59)
   - Rear shelf (see page 20-59)

2. Pull down the rear of the headliner (see page 20-61).

   CAUTION: Take care not to bend the headliner excessively.

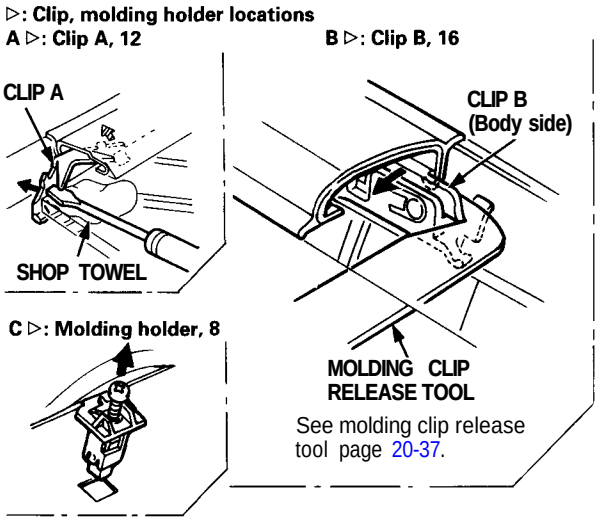
3. Disconnect the rear window defogger connector from each side, remove the terminal cover, then disconnect the window antenna connector.

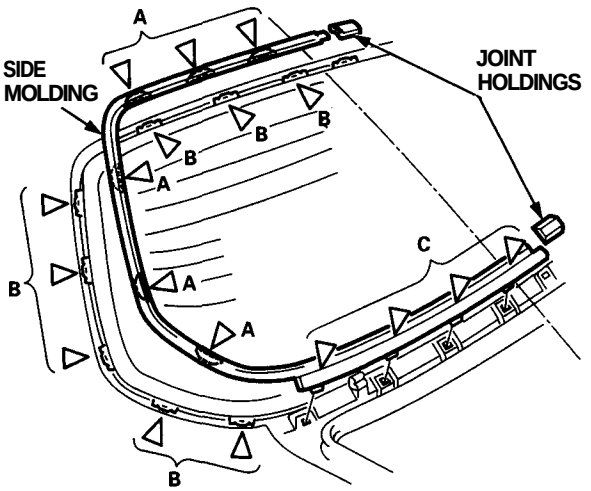




4. Remove the molding holders, detach the clips, then remove both side moldings.

   NOTE: If necessary, replace any damaged molding holders and clips.



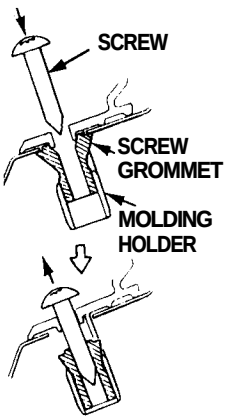


Molding holder removal:

1) Remove or loosen the screw.

2) Place the screw in the screw grommet again (do not screw it in) and press it down.

3) Pull the screw with the molding holder out of the body.



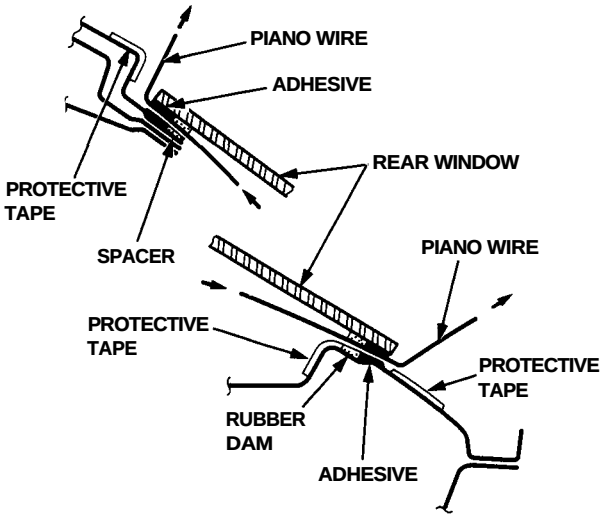
(cont'd)

Rear Window

Removal (cont'd)

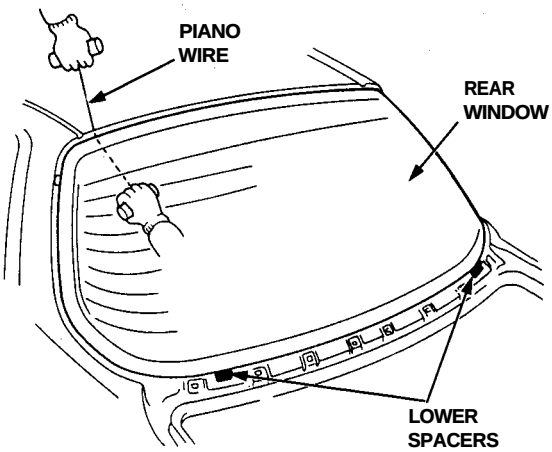
5. Remove the other clips from the body.

6. Apply protective tape to along the edge of the body as shown. Using as awl, make a hole through the rubber dam and adhesive from inside the car. Push the piano wire through the hole, and wrap each end around a piece of wood.



7. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dam and adhesive around the entire rear window.

CAUTION: Hold the piano wire as close to the rear window as possible to prevent damage to the body.



8. Carefully remove the rear window.

9. Cut the lower spacers away from the body with a knife.

NOTE: Replace the lower spacers with new ones whenever the rear window is removed.

Rear Window

Installation

1. Scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire rear window opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding
   - Mask off surrounding surfaces before painting.
   - Remove the upper spacer and rubber dam from the body.

2. Clean the body bonding surface with a sponge dampened in alcohol.

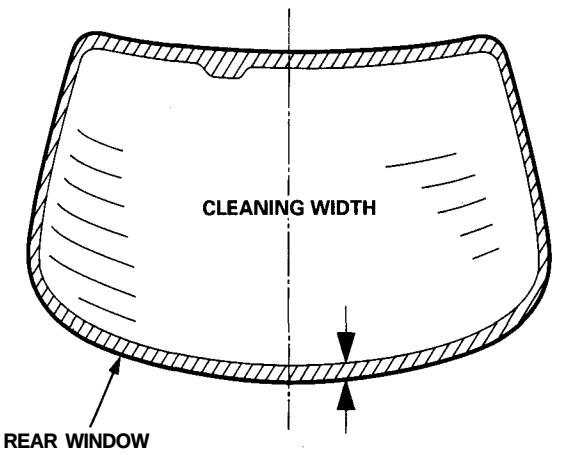
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old rear window is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dam, then clean the rear window surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

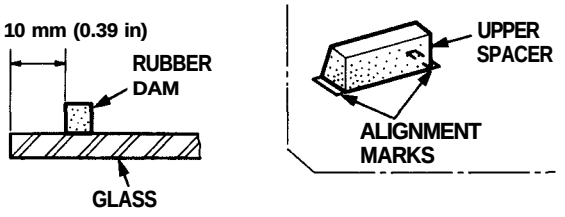
   CAUTION: Avoid setting the rear window on its edges; small chips may later develop into cracks.

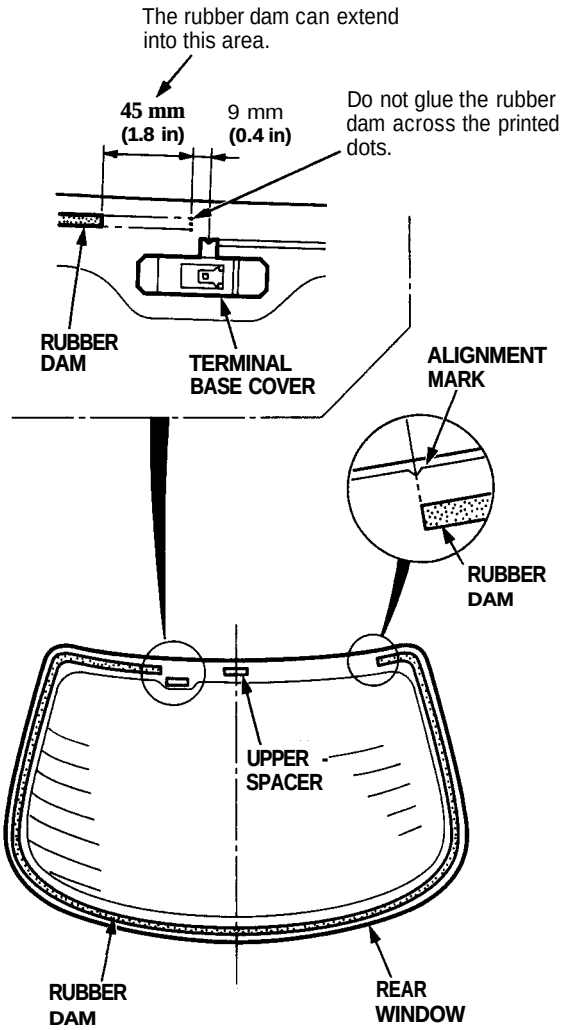
   NOTE: Clean the shadowed area.



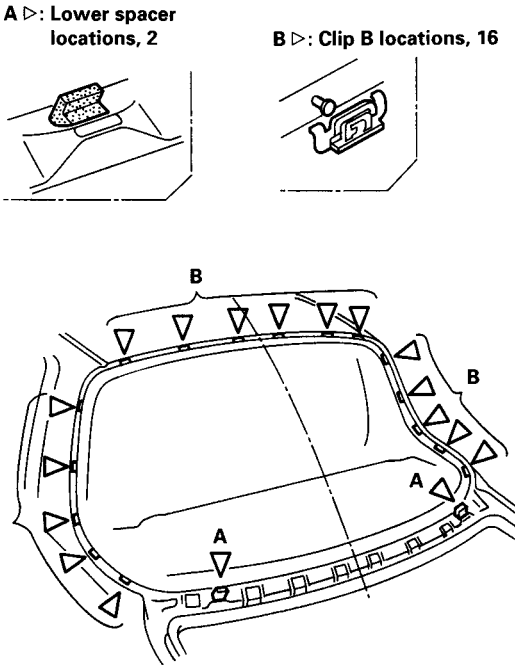
4. Glue the rubber dam to the inside face of the rear window, as shown, to contain the adhesive during installation, and glue the upper spacer as shown.

NOTE: Be careful not to touch the rear window where adhesive will be applied.

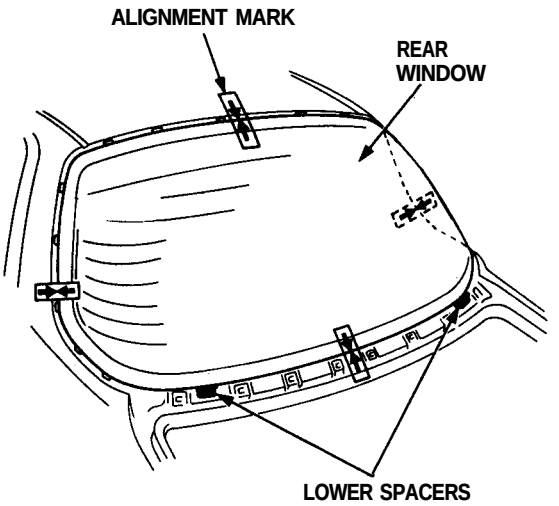




5. Install the clips, and glue the lower spacers to the body as shown.



6. Set the rear window on the lower spacers, then center it in the opening. Make alignment marks across the rear window and body with a grease pencil at the four points shown.



7. Remove the rear window.

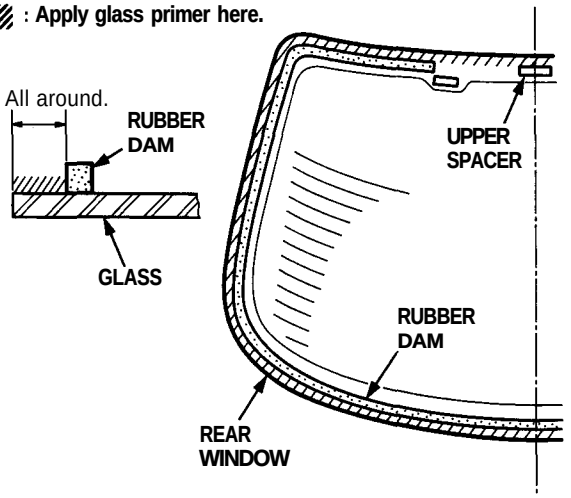
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Rear Window

Installation (cont'd)

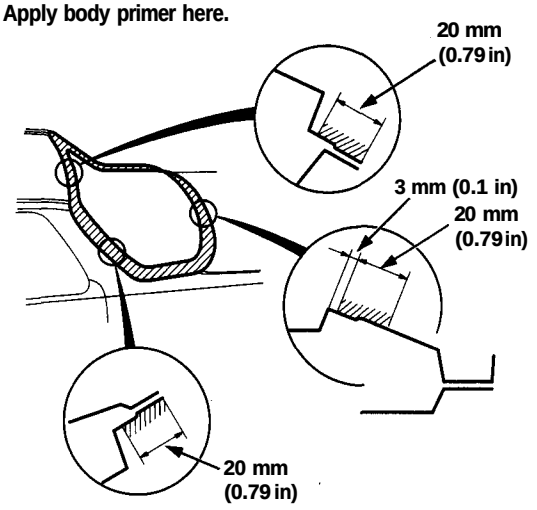
8. With a sponge, apply a light coat of glass primer around the edge of the rear window as shown, then lightly wipe it off with gauze or cheesecloth.
   NOTE:
   - Do not apply body primer to the rear window, and do not get body and glass primer sponges mixed up.
   - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the rear window properly, causing a leak after the rear window is installed.
   - Keep water, dust, and abrasive materials away from the primed surface.

: Apply glass primer here.



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the rear window opening flange. Let the body primer dry for at least 10 minutes.
   NOTE:
   - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
   - Never touch the primed surfaces with your hands.

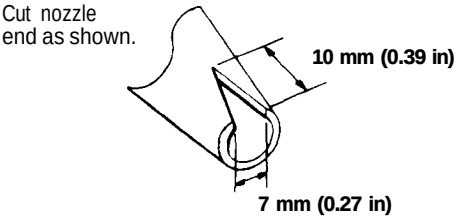
: Apply body primer here.



10. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

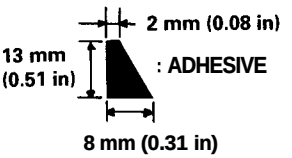
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that came with the adhesive.

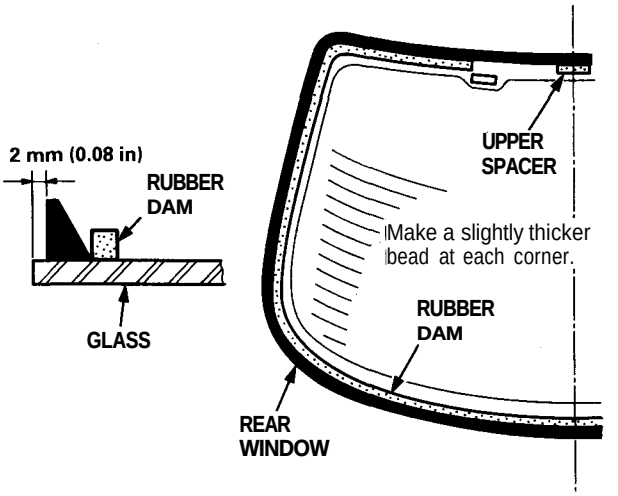
11. Before filling a cartridge, cut the end of the nozzle as shown.



12. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window *as* shown.

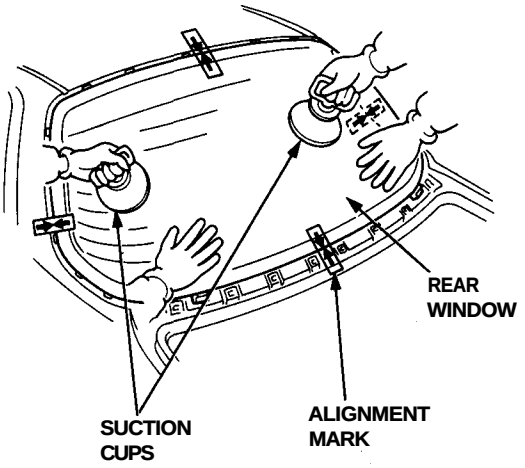
    NOTE: Apply the adhesive within 30 minutes after applying the glass primer.





13. Use suction cups to hold the rear window over the opening, align it with the alignment marks made in step 6, and set it down on the adhesive. Lightly push on the rear window until its edges are fully seated on the adhesive all the way around.

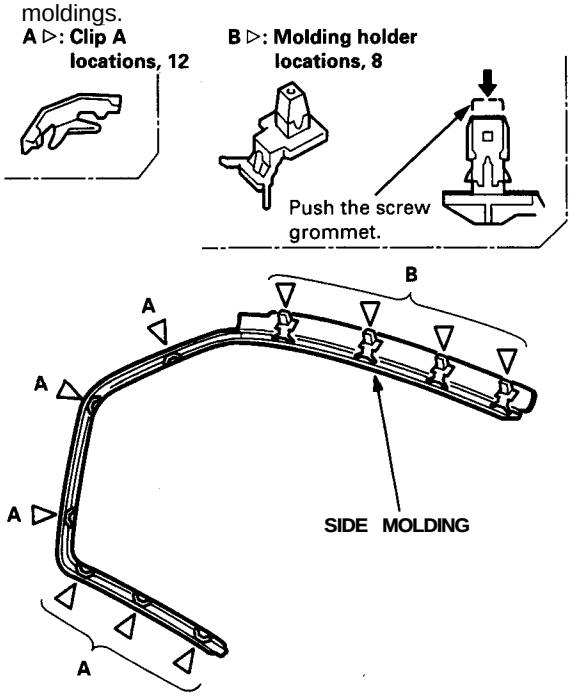
    NOTE: Do not open or close the doors until the adhesive is dry.



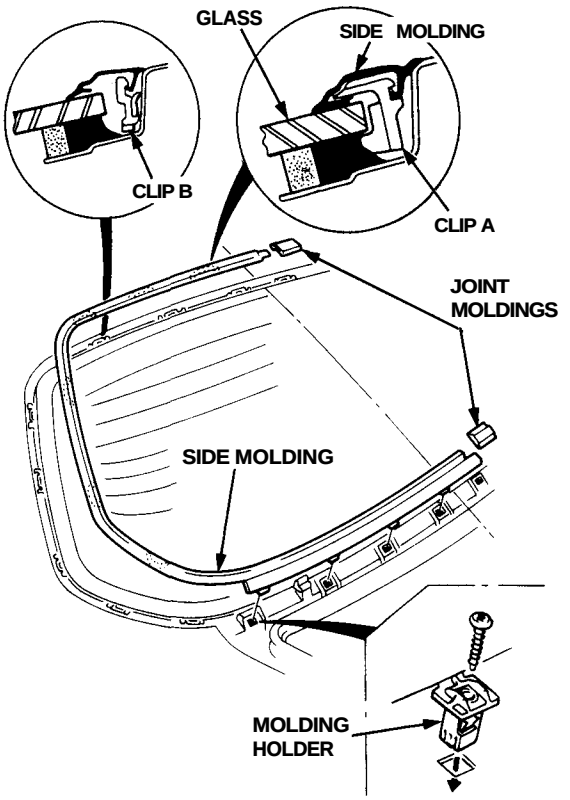
14. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: To remove adhesive from a painted surface or the rear window, use a soft shop towel dampened with alcohol.

15. Install the clips and molding holders on both side moldings.



16. Install both side moldings.



17. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark leaking areas and let the rear window dry, then seal with sealant.

    NOTE: Let the car stand for at least four hours after rear window installation. If the car has to be used within the first four hours, it must be driven slowly.

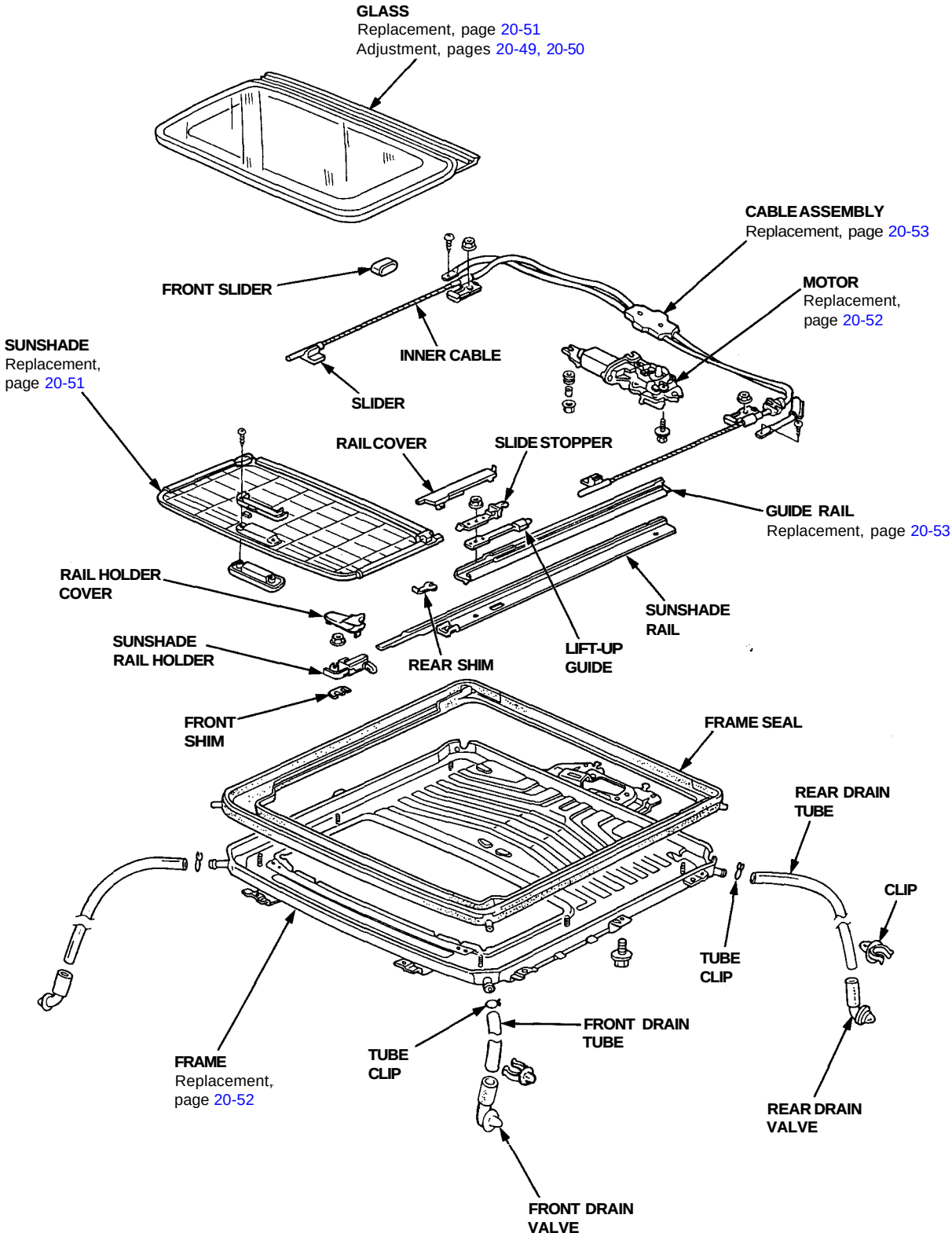
18. Reinstall all remaining removed parts.

    NOTE: Advise the customer not to do the following things for two to three days:

    - Slam the doors with all the windows rolled up.
    - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Moonroof

Index



Troubleshooting

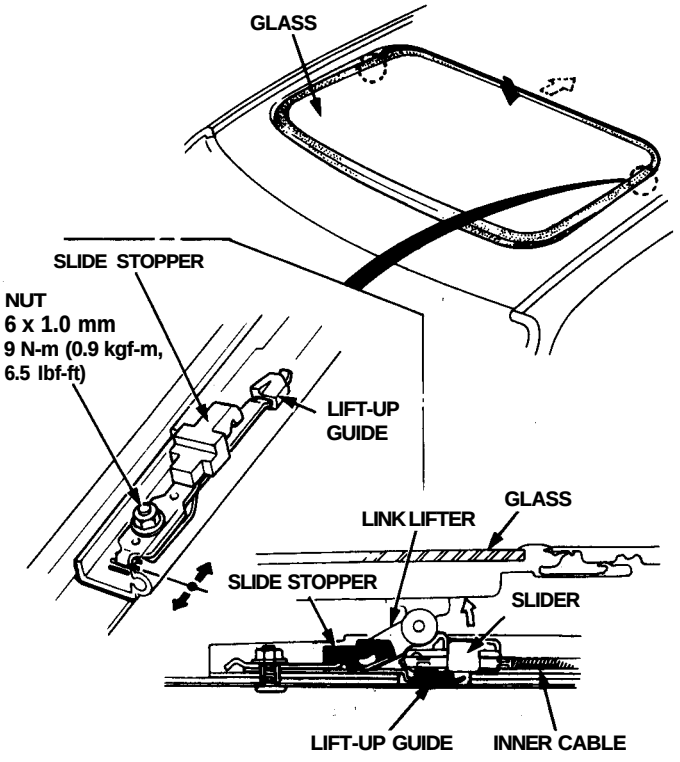
Symptom	Probable Cause
Water leaks	1. Clogged drain tube. 2. Gap between glass weatherstrip and roof panel. 3. Defective or improperly installed glass weatherstrip. 4. Gap between drain seal and roof panel.
Wind noise	1. Excessive clearance between glass weatherstrip and roof panel.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Cable assembly deformed.
Glass does not move, but motor turns	1. Clutch out of adjustment. 2. Foreign matter stuck between guide rail and slider. 3. Inner cable loose. 4. Cable assembly not attached properly.
Glass does not move and motor does not turn (glass can be moved with moonroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor. 5. Faulty relay.

Glass Rear Edge Closing Adjustment

Open the glass about a foot, then close it to check where rear edge begins to rise. If it rises too soon and seats too tightly against the roof panel, or too late and does not seat tightly enough, adjust it.

1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen the nuts (see page 20-50).
3. Move the lift-up guides and slide stopper forward or backward, then tighten the nuts, and recheck glass closing.

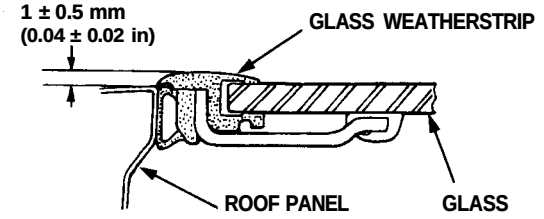
   The lift-up guides have pitches of 1 mm (0.04 in) each and can be adjusted 2 pitches forward or backward.
4. If necessary, lower the rear of the headliner (see pages 20-61), and remove the motor, then adjust the inner cables (location of sliders) until they are parallel.



Moonroof

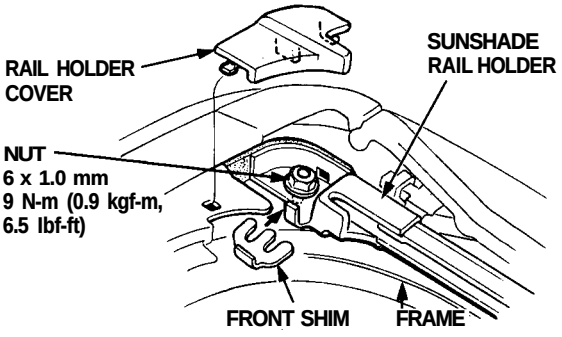
Glass Height Adjustment

The roof panel should be even with the glass weatherstrip, to within 1 ± 0.5 mm (0.04 ± 0.02 in) all the way around. If not, open the glass fully, and:



Front:

1. Remove the rail holder cover and loosen the nut.

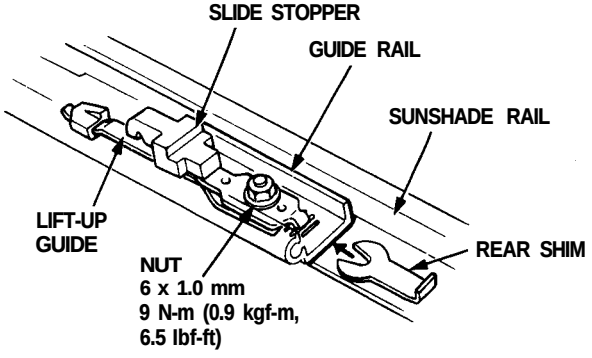


2. Install the front shims between frame and sunshade rail holder.

   Front shim thickness: Max. 2 mm (0.08 in)

Rear:

1. Remove the rail cover and loosen the nut.



2. Install the rear shims between guide rail and sunshade rail.

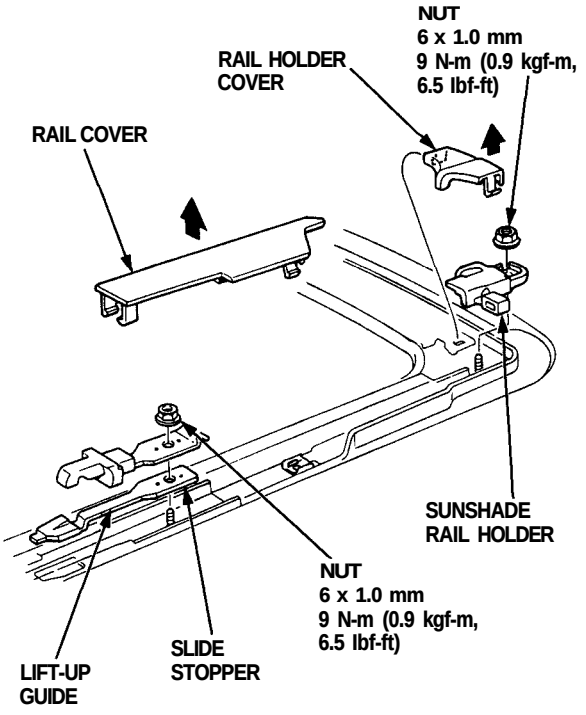
   Rear shim thickness: Max. 2 mm (0.08 in)

3. Repeat on opposite side if necessary.

4. Side-to-side fit of the glass weatherstrip can be adjusted by loosening the frame mounting bolts and moving the frame (see page 20-52).

Slide Stopper, Lift-up Guide and Sunshade Rail Holder Replacement

NOTE: Open the glass fully.



Installation is the reverse of the removal procedure.

NOTE: After installing the lift-up guide and slide stopper, adjust the glass rear edge closing alignment (see page 20-49).

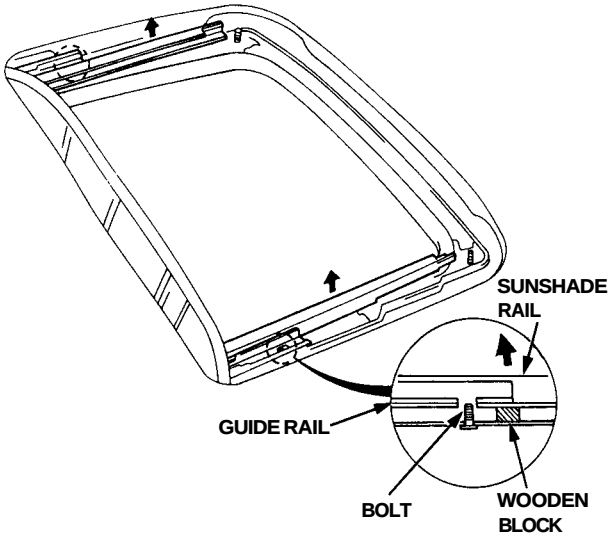
Glass and Sunshade Replacement

1. Open the glass fully.

2. Remove the following parts.
   - Rail holder covers
   - Rail covers
   - Sunshade rail holders
   - Slide stoppers
   - Lift-up guides

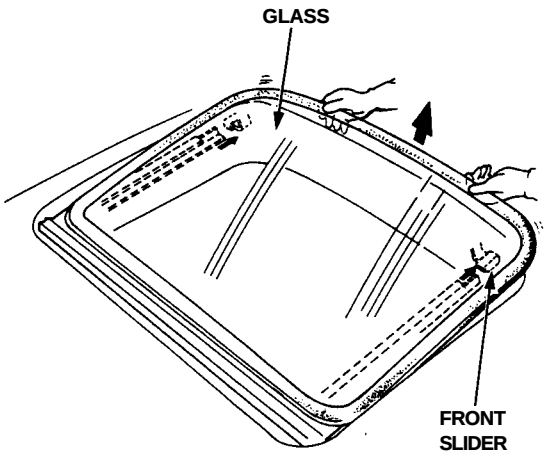
3. Lift the sunshade rail with the guide rail, and insert a spacer such as a wooden block to prevent interference between the sunshade rail and bolt.

   NOTE: The wooden block must be taller than the bolt.

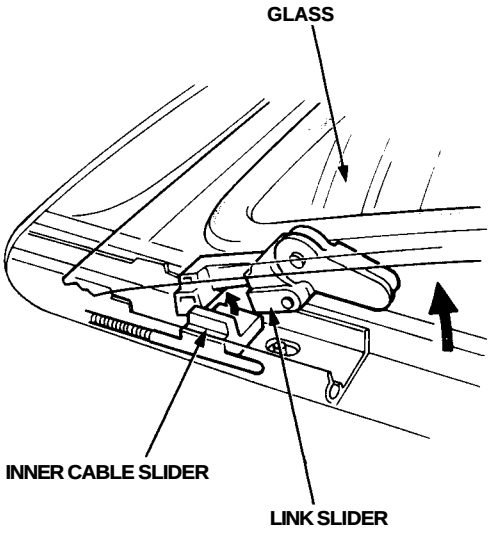


4. Slide the glass forward using the moonroof wrench, then remove the front sliders from the sunshade rails.

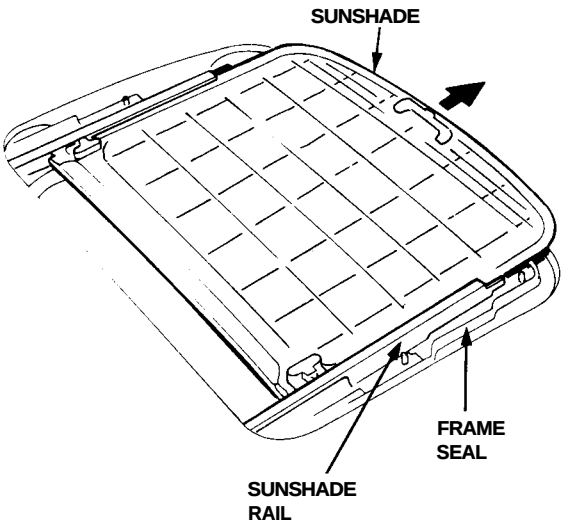
   NOTE: Do not scratch the roof panel with the front slider.



5. Remove the link slider from the inner cable sliders by lifting the glass, then remove the glass.



6. Slide the sunshade forward, then remove the sunshade.



7. Installation is the reverse of the removal procedure.

   NOTE:
   - Take care not to pinch the frame seal in the sunshade rail.
   - Adjust the glass rear edge closing alignment (see page 20-49).

8. Check for water leaks.

   NOTE: Do not use high-pressure water.

Moonroof

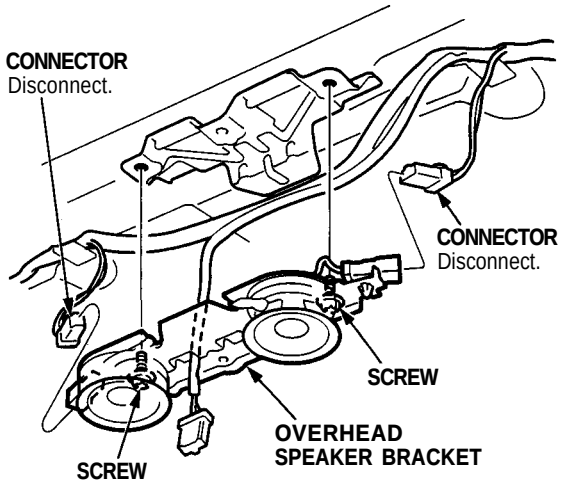
Motor, Drain Tube and Frame Replacement

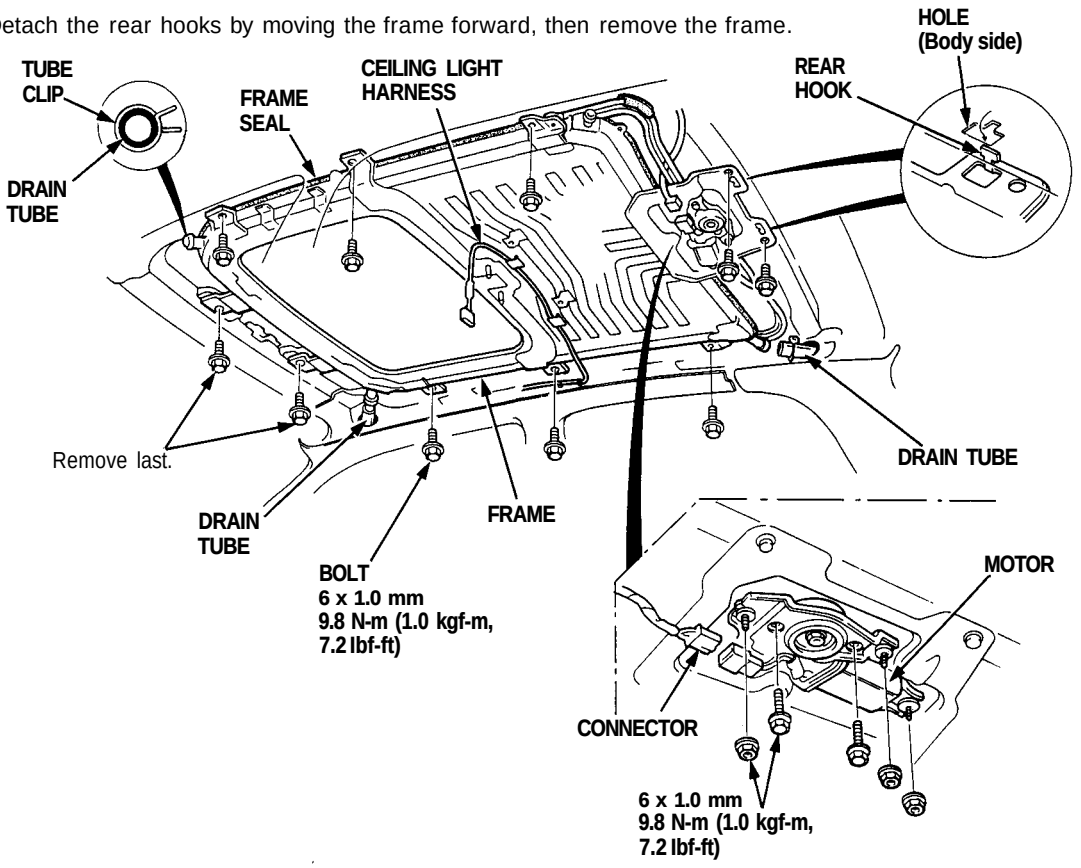
CAUTION:
- **Wear gloves to remove and install the frame.**
- **Be careful not to damage the seats, dashboard and other interior trim.**

1. Remove the headliner (see page 20-61).
2. Remove the overhead speaker bracket.
3. Disconnect the motor connector.

   NOTE: When removing the motor, detach the connector from the frame, remove the bolts and nuts, then remove the motor.
4. Remove the glass (see page 20-51).
5. Disconnect the drain tubes, and detach the ceiling light harness.
6. Remove the bolts.

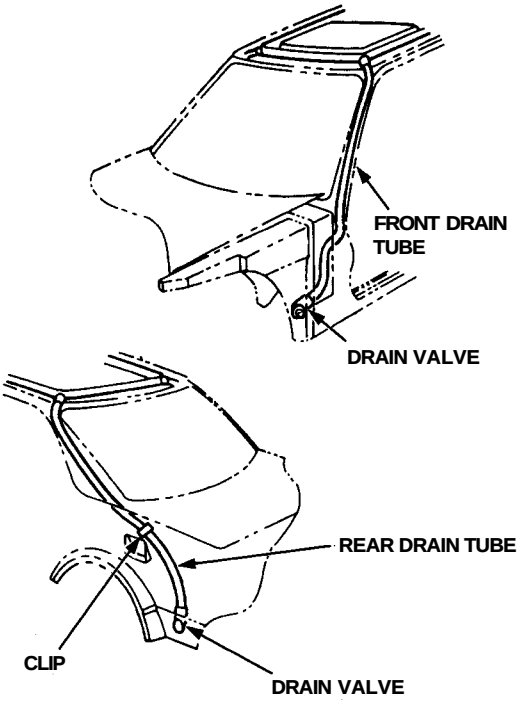
   NOTE:
   - An assistant is helpful when removing the bolts.
   - Remove the front bolts last.
7. Detach the rear hooks by moving the frame forward, then remove the frame.





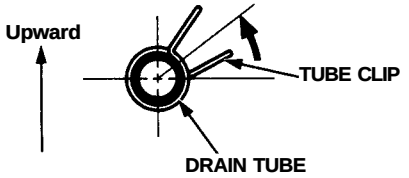
8. Pull the drain tubes out the front and rear pillars.

   NOTE: Before pulling out the drain tube, tie a string to the end of it so it can be reinstalled.



9. Installation is the reverse of the removal procedure.

   NOTE:
   - Before installing the frame, clear the drain tubes and drain valves by using compressed air.
   - Check the frame seal.
   - Clean the surface of the frame.
   - When installing the frame, first attach the rear hooks into the body holes.
   - When connecting the drain tube, slide it over the frame nozzle at least 10 mm (0.39 in).
   - Install the tube clip as shown.



10. Check for water leaks.

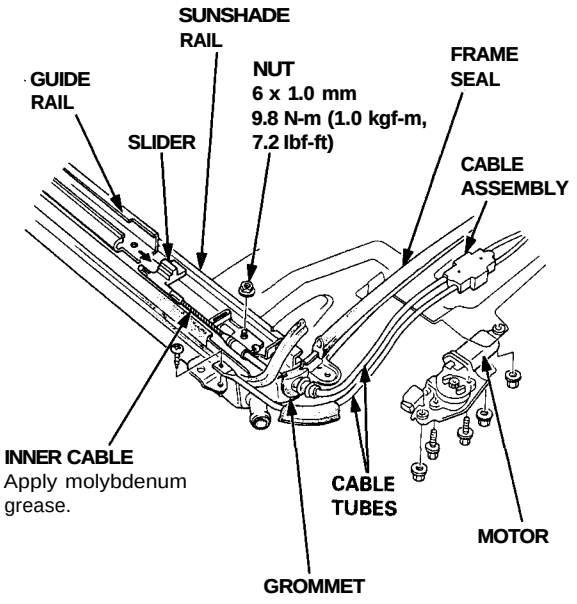
    NOTE: Do not use high-pressure water.

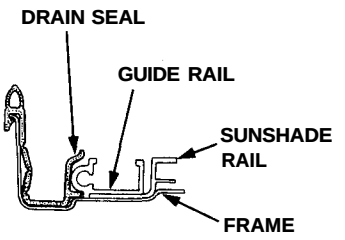
(cont'd)

Guide Rails/Cable Assembly Replacement

CAUTION: Wear gloves to remove and install the guide rails and cable assembly.

1. Remove the frame (see page 20-52).
2. Remove the motor (see page 20-52).
3. Remove the nuts, and lift off each guide rails, then remove the cable assembly with sliders attached.





4. If necessary, remove the sunshade rail and frame seal from the frame.

   NOTE: Take care not to bend the cable tubes and guide rails.

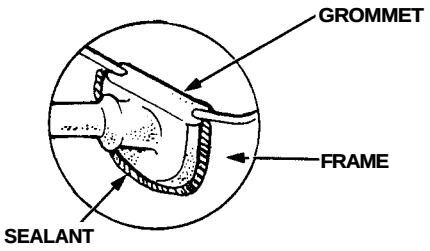
(cont'd)

Moonroof

Guide Rails/Cable Assembly Replacement (cont'd)

5. Installation is the reverse of the removal procedure.

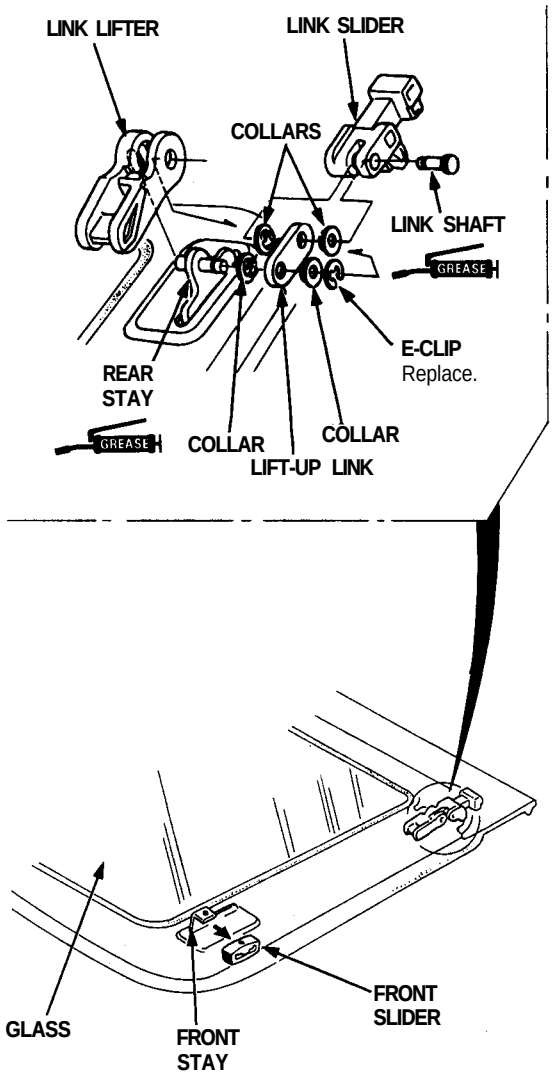
NOTE:
- Damaged parts should be replaced.
- Fill the groove in each grommet with sealant.



- Install the frame seal securely.
- Before installing the motor, make sure both sliders are parallel (see page 20-49).
- Before installing the motor, install the frame and glass, then check the opening drag.

Link Slider/Lift-up Link Replacement

1. Remove the glass (see page 20-51).
2. Pull the front slider from the front stay.



3. Remove the link lifter, then remove the E-clip.
4. Remove the lift-up link from the rear stay. Drive the link shaft out, then separate the lift-up link and link slider.
5. Installation is the reverse of the removal procedure.

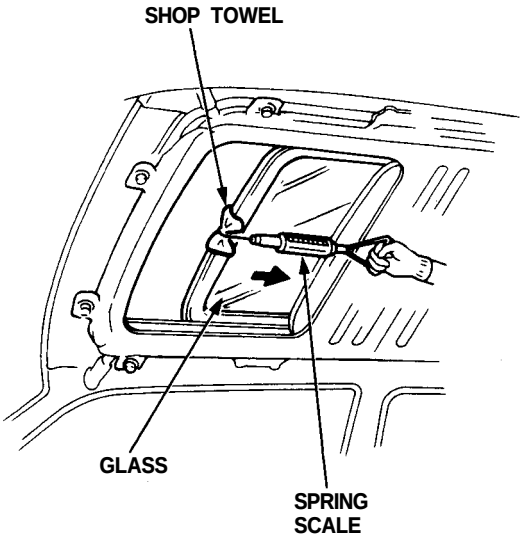
NOTE:
- Damaged parts should be replaced.
- Grease the sliding portion.

Opening Drag Check (Motor Removed)

Before installing the motor, measure the effort required to open the glass using a spring scale as shown.

CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

If load is over 40 N (4 kgf, 9 lbf), check side clearance and glass height adjustment (see page 20-50).

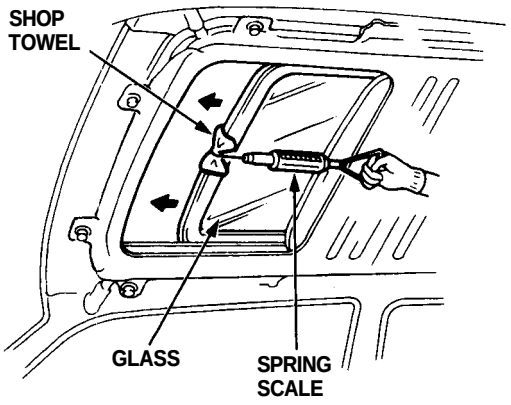


Closing Force Check (Motor Installed)

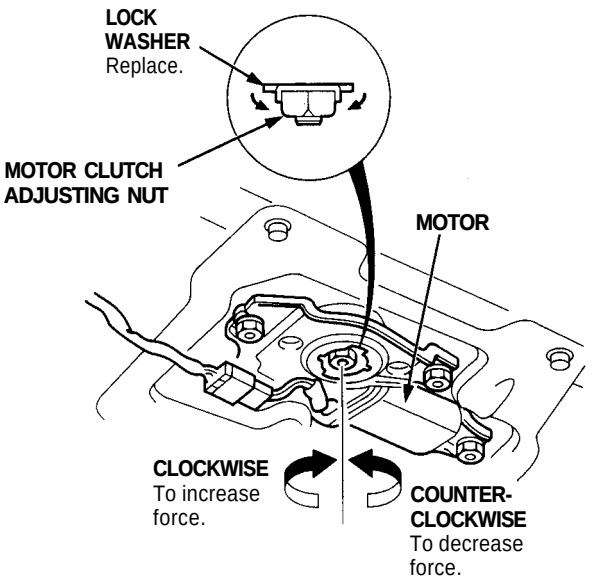
1. After installing all removed parts, have a helper hold the switch to close the glass while you measure force required to stop it. Attach a spring scale as shown. Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

   CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

   Closing Force: 200 - 290 N (20 - 30 kgf, 44 - 66 lbf)



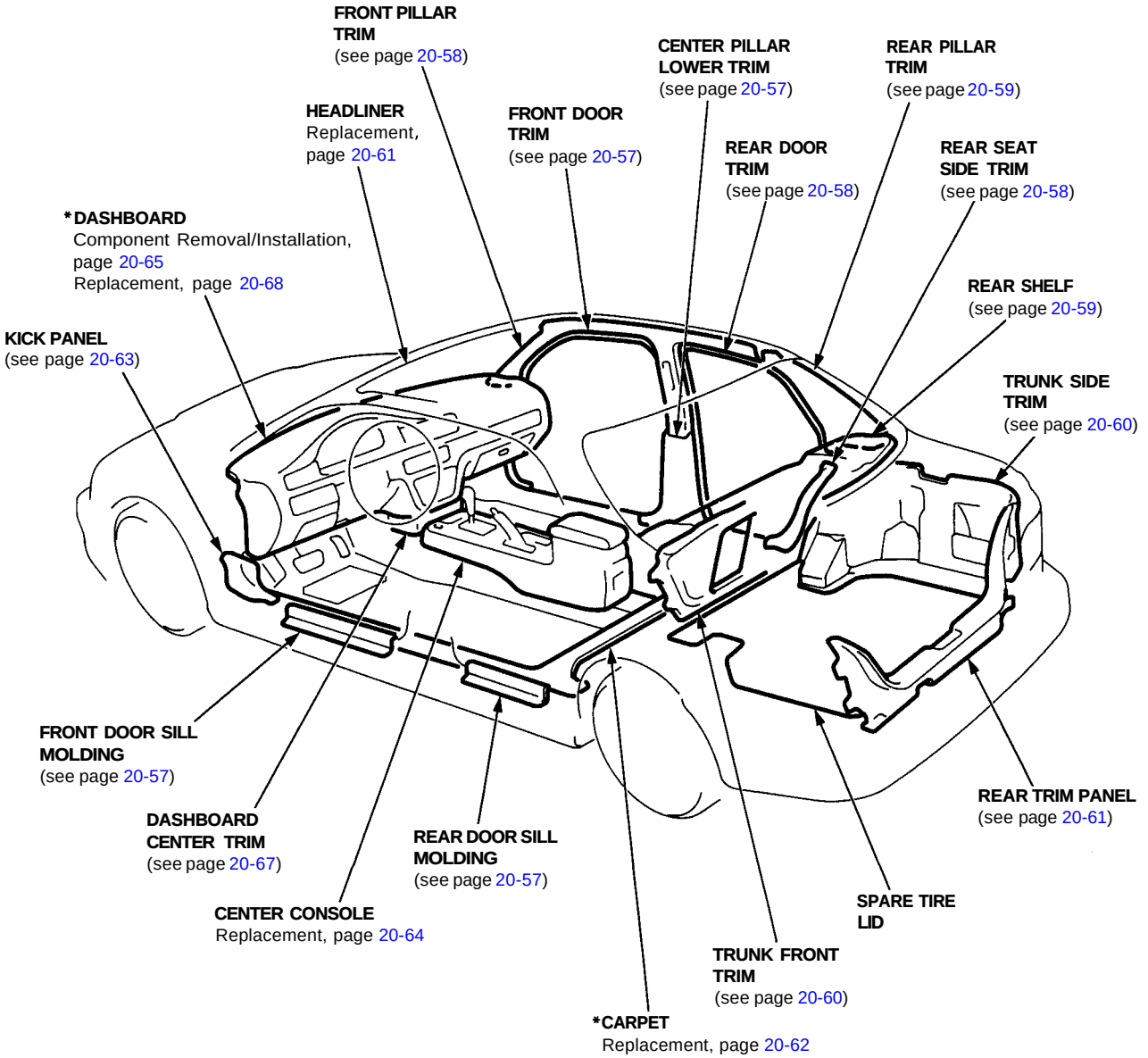
2. If the force is not within specification, install a new lock washer, adjust the tension by turning the motor clutch adjusting nut, and bend the lock washer against the motor clutch adjusting nut.



Interior

Component Location Index

SRS components are located in the areas marked with an asterisk (*). Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



Interior Trim

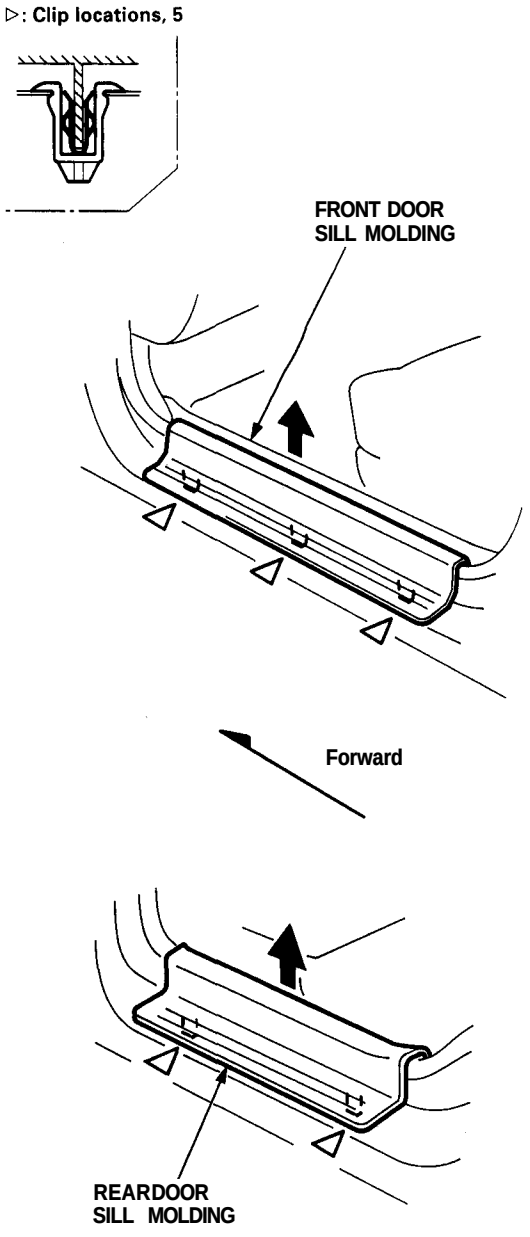
Replacement

CAUTION:
- **Wear gloves to remove and install the trim.**
- **When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.**

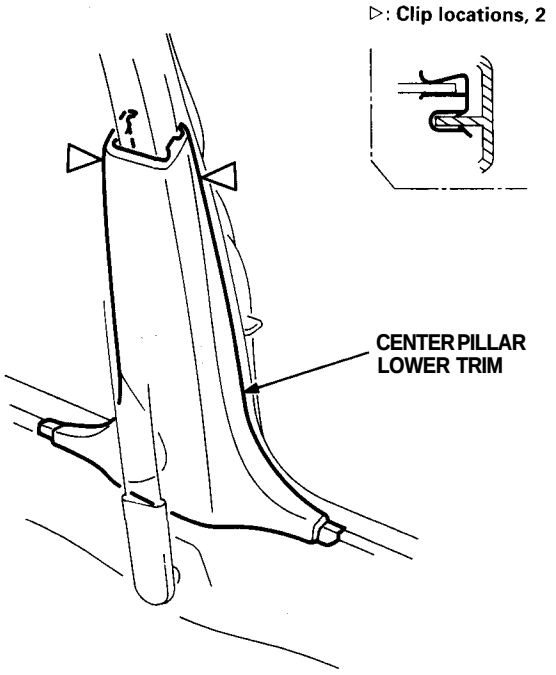
NOTE: Take care not to bend or scratch the trim.

Front and rear door sill moldings/Front door trim/Center pillar lower trim/Front pillar trim:

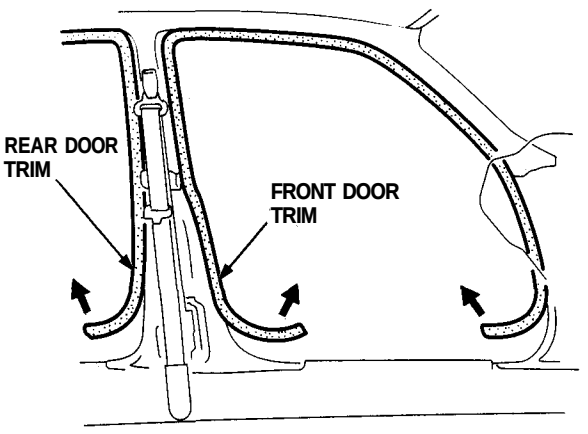
1. Remove the front and rear door sill moldings.



2. Remove the kick panel (see page 20-63).
3. Slide the front seat forward fully.
4. Remove the center pillar lower trim.



5. Remove the front door trim, and pull away the rear door trim as necessary.



(cont'd)

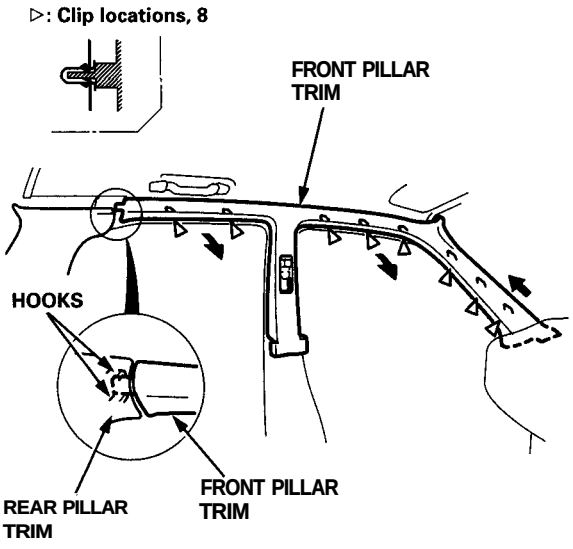
Interior Trim

Replacement (cont'd)

6. Remove the upper anchor bolt from the front seat belt (see page 20-88).

7. Remove the front pillar trim.

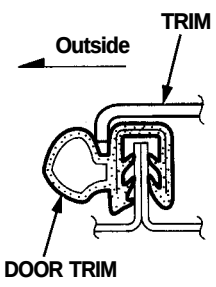
   NOTE: Pull away the top of the rear pillar trim, then remove the rear end of the front pillar trim from the rear pillar trim.



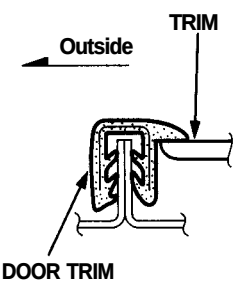
8. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - Make sure the front and rear door trim is installed securely.

Lower portion:



Upper portion:

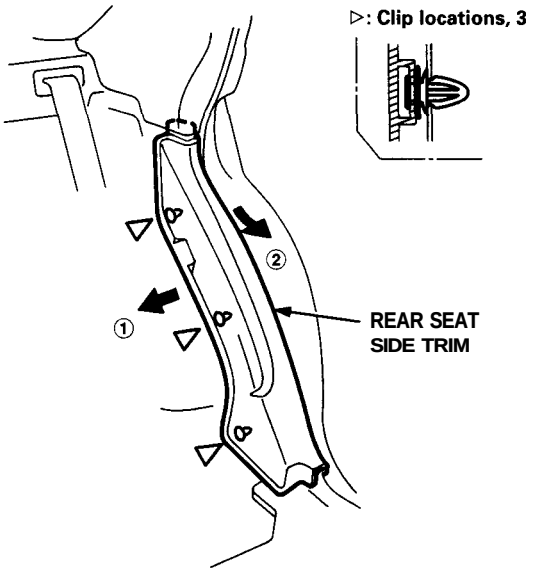


Rear seat side trim/Rear door trim:

1. Remove the rear seat cushion and rear seat-back (see page 20-85).

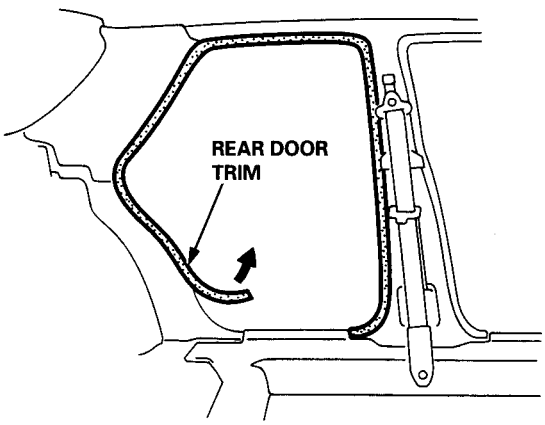
2. Remove the rear door sill molding (see page 20-57).

3. Remove the rear seat side trim.



4. Remove the center pillar lower trim (see page 20-57).

5. Remove the rear door trim.



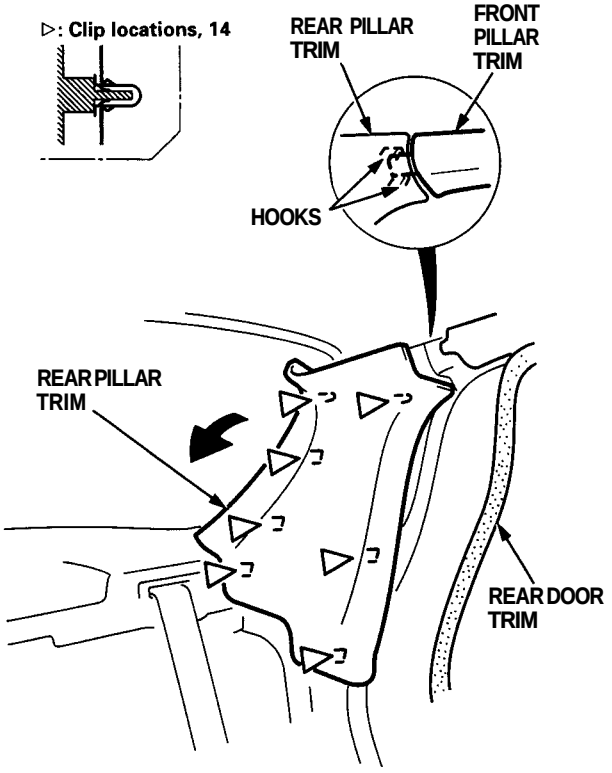
6. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - Make sure the rear door trim is installed securely.

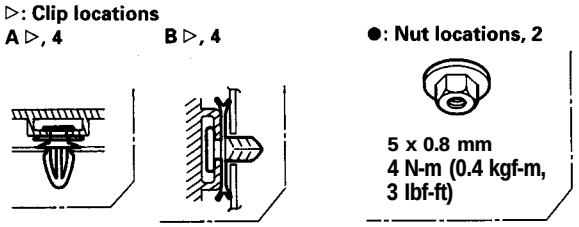
Rear pillar trim/Rear shelf:

1. Remove the rear seat cushion and rear seat-back (see page 20-85).
2. Pull away the rear door trim as on each side necessary.
3. Remove the rear pillar trim from each side.

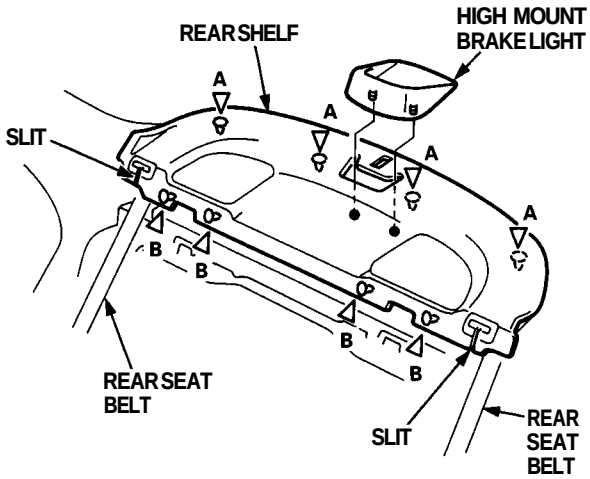
   NOTE: Detach the hooks from the front pillar trim by sliding the rear pillar trim backward.



4. Remove the high mount brake light.
5. Remove the rear shelf.



   NOTE: Slip the rear seat belts through the slit in the rear shelf.



6. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - When installing the rear shelf and rear seat-back, make sure there are no twists or kinks in the rear seat belt.
   - Make sure the rear door trim is installed securely (see page 20-58).

Trunk Trim

Replacement

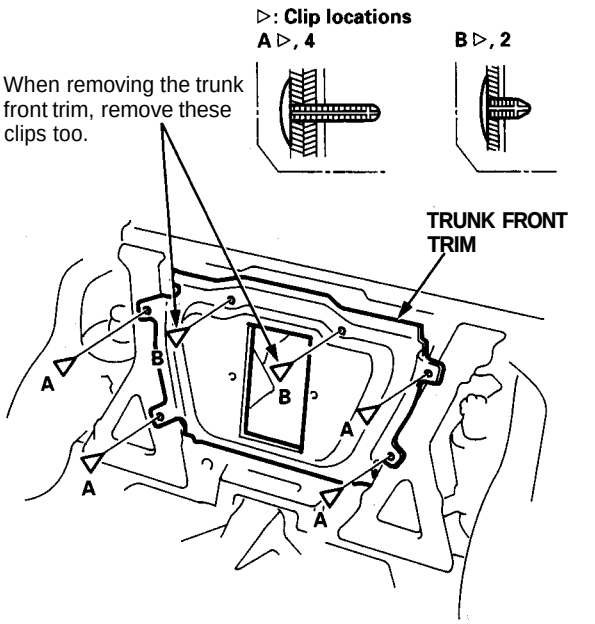
CAUTION:
- **Wear gloves to remove and install the trim and panels.**
- **When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.**

NOTE: Take care not to bend or scratch the trim and panels.

Trunk front trim/Trunk side trim:

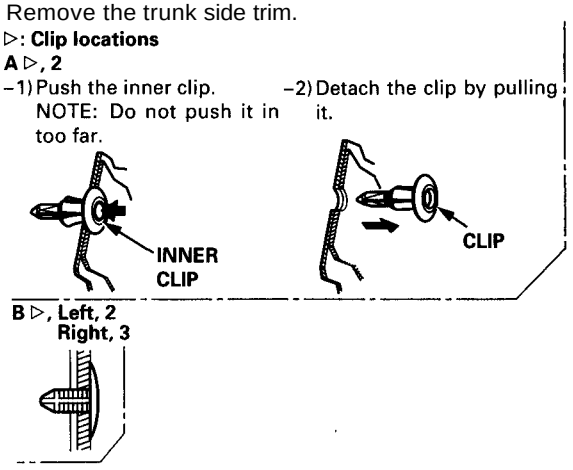
1. Remove the rear seat cushion and rear seat-back (see page 20-85).

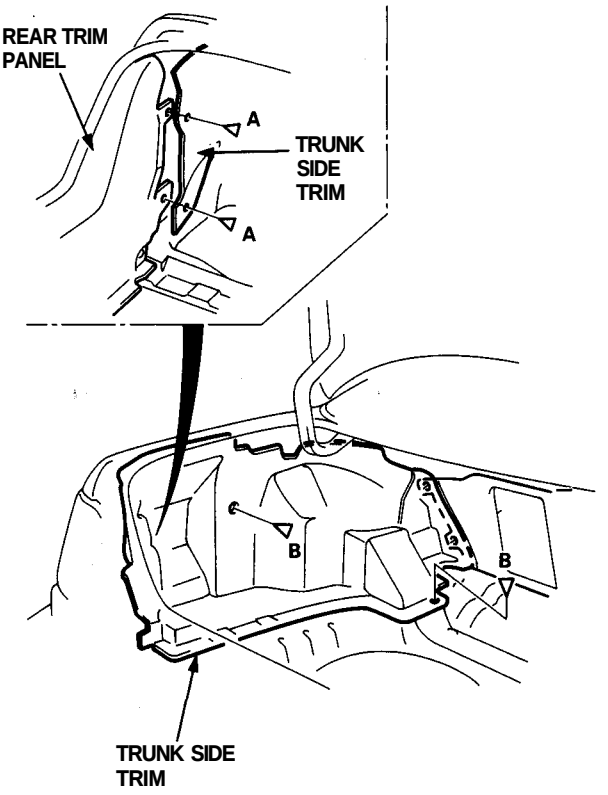
2. Remove the clips. If necessary, remove the trunk front trim.



3. Open the trunk lid, then remove the spare tire lid.

4. Remove the trunk side trim.

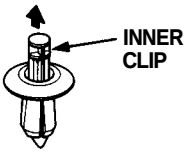




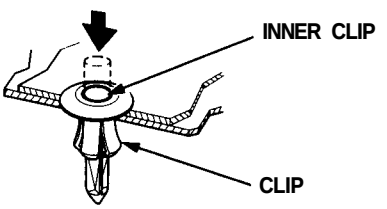
5. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- When installing the trunk side trim, install the A clips on the rear of it as follows.

a. Pull the inner clip up as shown.

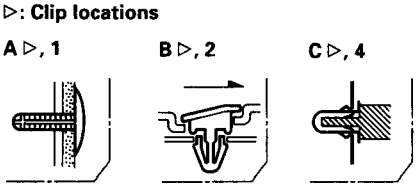


b. Install the clip in the rear trim panel, then push the inner clip until it's flush.

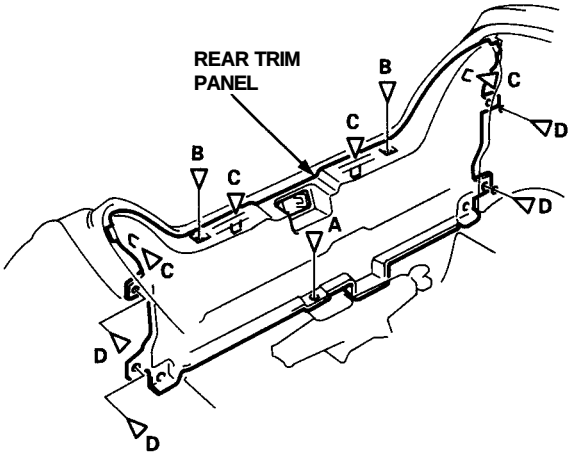


Rear trim panel:

1. Open the trunk lid, then remove the spare tire lid.
2. Remove the rear trim panel.



D ▷, 4 (see page 20-60)



3. Installation is the reverse of the removal procedure.
   NOTE: If necessary, replace any damaged clips.

(cont'd)

Headliner

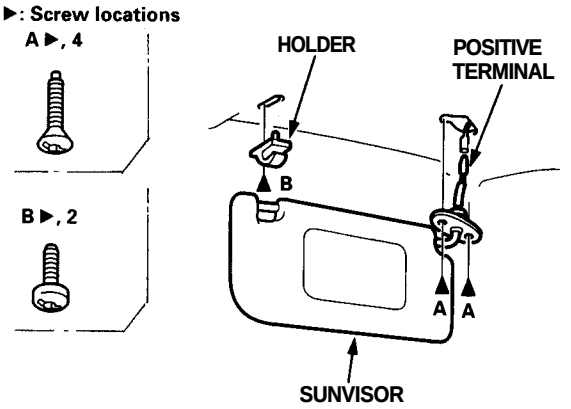
Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

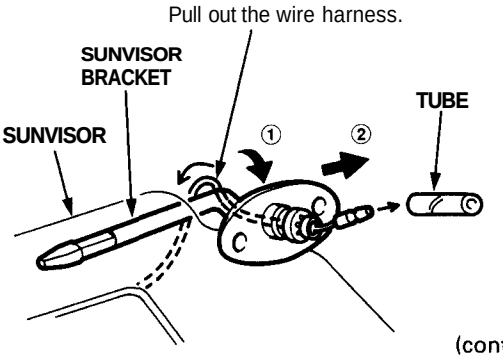
NOTE:
- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard and other interior trim.

1. Remove:
   - Front and rear door sill moldings (one side, see page 20-57)
   - Front and rear door trim (both sides, see pages 20-57,20-58)
   - Front pillar trim (one side, see page 20-58)
   - Center pillar lower trim (one side, see page 20-57)
   - Rear pillar trim (one side, see page 20-59)
   - Spotlight and spotlight trim (see page 20-35)
   - Rearview mirror (see page 20-35)
   - Ceiling light (see section 23)
   - Window antenna terminal cover (see page 20-43)

2. Remove the sunvisor and holder from each side. Disconnect both positive terminals.



NOTE:
- If necessary, remove the sunvisor bracket as shown.
- When installing the sunvisor bracket, apply grease and make sure it's installed properly.



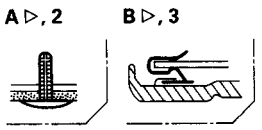
(cont'd)

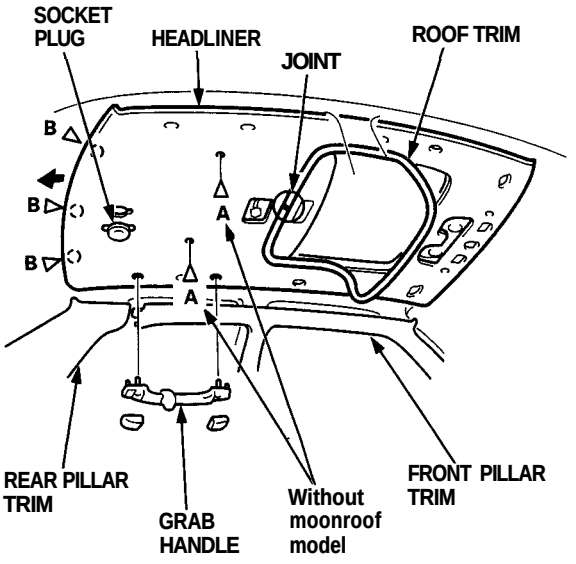
Headliner

Replacement (cont'd)

3. Remove the grab handles and clips, and remove the roof trim and socket plug (moonroof model).

▷: Clip locations





4. Lower the front and rear pillar trim on one side.

5. Detach the clips by sliding the headliner back, then remove it.

   NOTE: Take care not to damage the window antenna terminal.

6. Remove the headliner through the passenger's door opening.

7. Installation is the reverse of the removal procedure.

   NOTE:
   - When inserting the headliner through the door opening, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Check that both sides of the headliner are securely attached to the trim.
   - When installing the roof trim, install the joint toward the rear.

Carpet

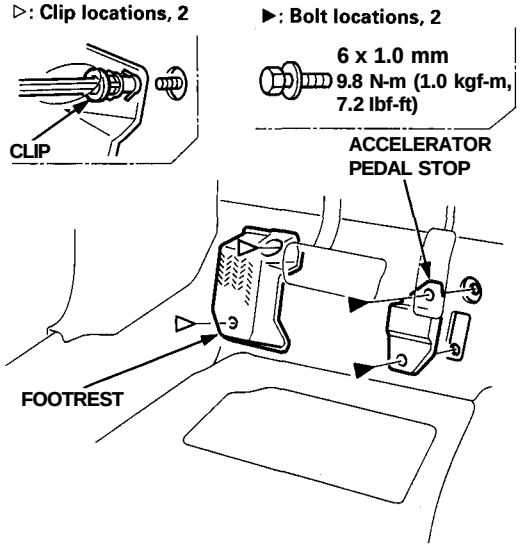
Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

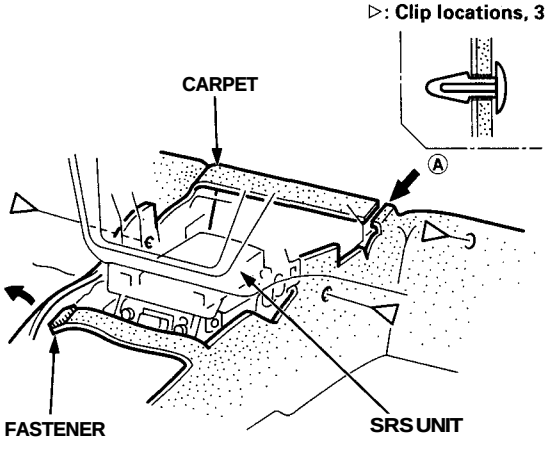
1. Remove:
   - Front seat (see page 20-71)
   - Rear seat cushion (see page 20-85)
   - Front door sill molding (see page 20-57)
   - Rear door sill molding (see page 20-57)
   - Front seat belt lower anchor (see page 20-88)
   - Center pillar lower trim (see page 20-57)
   - Center console (see page 20-64)
   - Dashboard center trim (see page 20-67)
   - Opener cover (see page 20-115)

2. Remove the accelerator pedal stop and footrest.

   NOTE: Loosen the clips using a hex wrench by turning them counterclockwise.



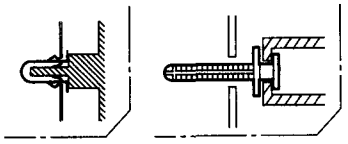
3. Cut area Ⓐ in the carpet, then pull it back as shown.

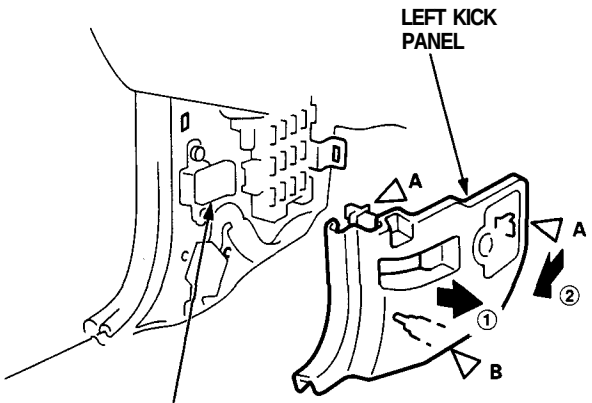


4. Remove the kick panels.

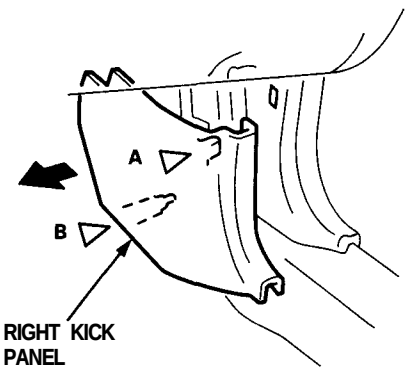
▷: Clip locations

A ▷, 3 B ▷, 2





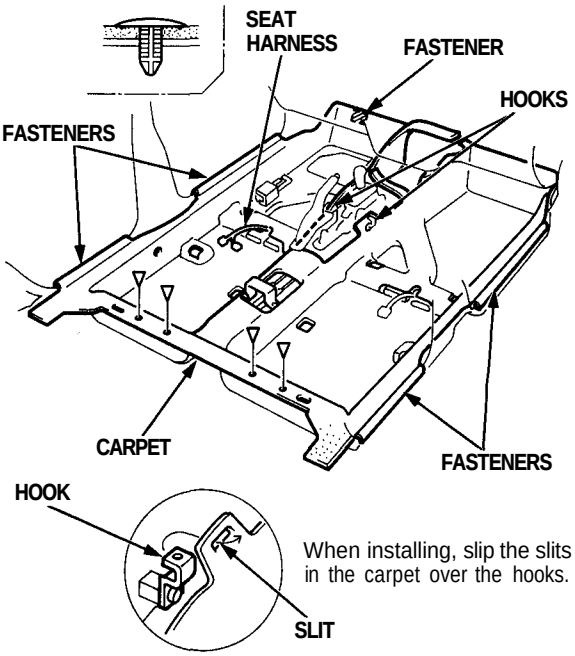
Remove the kick panel while pulling the hood release handle.



5. Detach the retainers, then remove the carpet.

NOTE: Take care not to damage, wrinkle or twist the carpet.

▷: Clip locations, 4

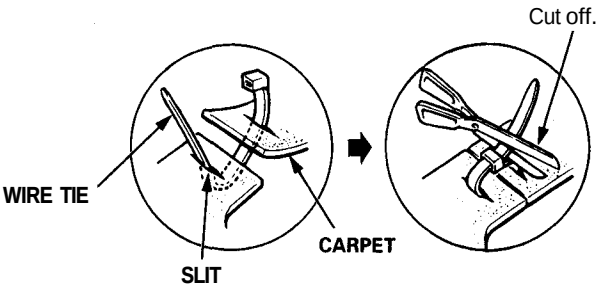


When installing, slip the slits in the carpet over the hooks.

6. Installation is the reverse of the removal procedure.

NOTE:

- Take care not to damage, wrinkle or twist the carpet.
- Make sure the seat harness is routed correctly.
- If necessary, replace any damaged clips.
- Reattach the cut area ® in the carpet with a wire tie as shown.



Center Console

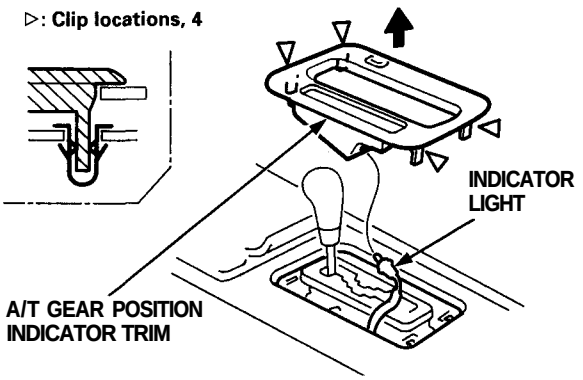
Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

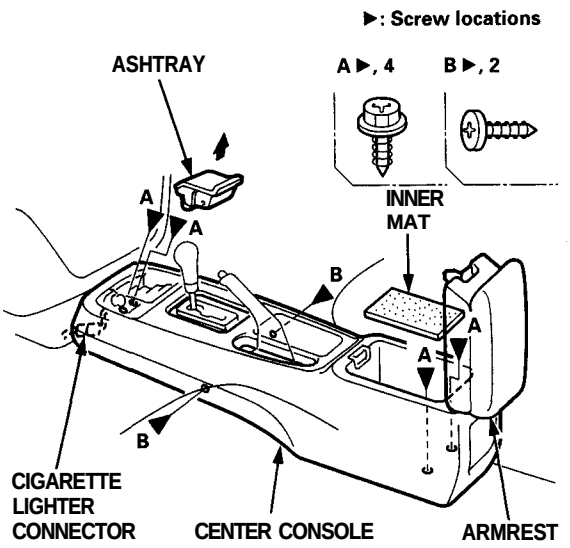
NOTE: Take care not to scratch the center console, front seat and related parts.

Center console/Center console panel removal:

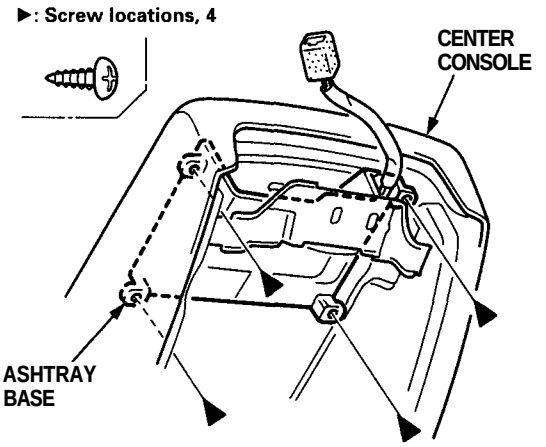
1. Slide the front seats backward fully.
2. Remove the A/T gear position indicator trim, and disconnect the indicator light.



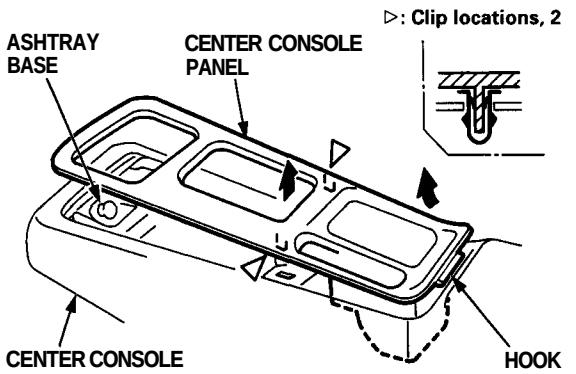
3. Open the armrest, then remove the inner mat and remove the ashtray.



4. Remove the screws, then remove the center console. Disconnect the cigarette lighter connector.
5. Remove the screws from under the center console.



6. Detach the clips, then remove the center console panel.

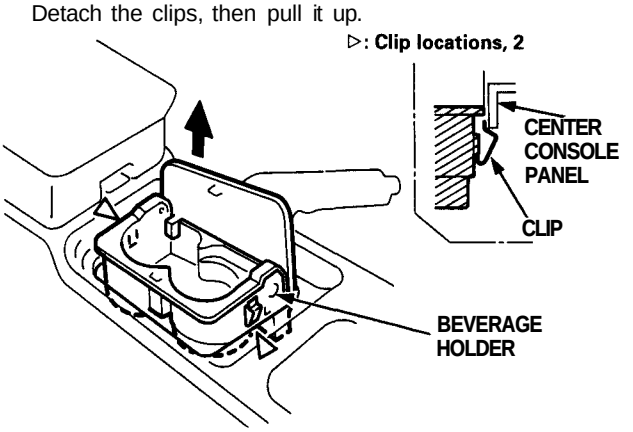


7. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the wire harnesses are not pinched.
- Make sure the connector is connected properly.

Beverage holder removal:

Detach the clips, then pull it up.



Dashboard

Component Removal/Installation

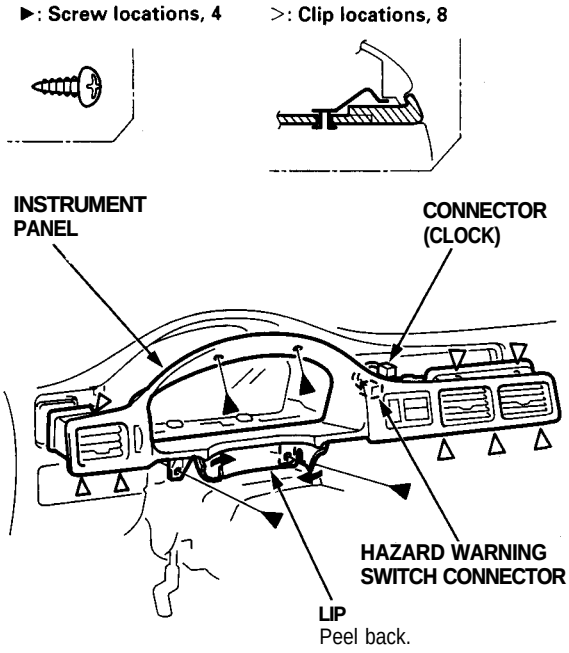
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.

NOTE: Take care not to scratch the dashboard and related parts.

Instrument panel removal:

1. Lower the steering column.
2. Remove the screws, and detach the clips, then carefully pull out the instrument panel. Disconnect the clock and hazard warning switch connectors, then remove the instrument panel.

   NOTE: Remove the lower screws while peeling back the lip.



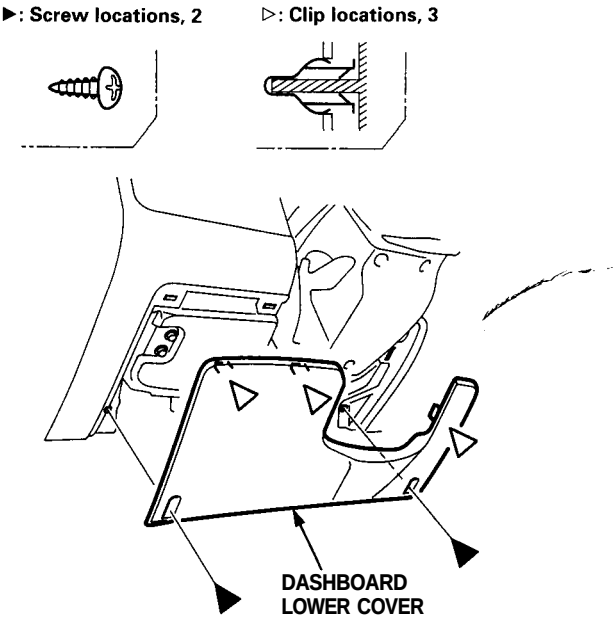
3. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connectors are connected properly.

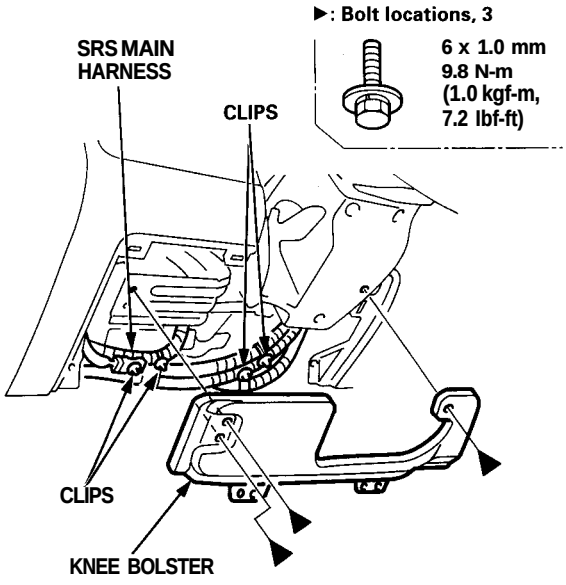
Dashboard lower cover and knee bolster removal:

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the screws, and detach the clips, then remove the dashboard lower cover.



2. Remove the bolts, detach the harness clips and connector clip, then remove the knee bolster.



3. Installation is the reverse of the removal procedure.

(cont'd)

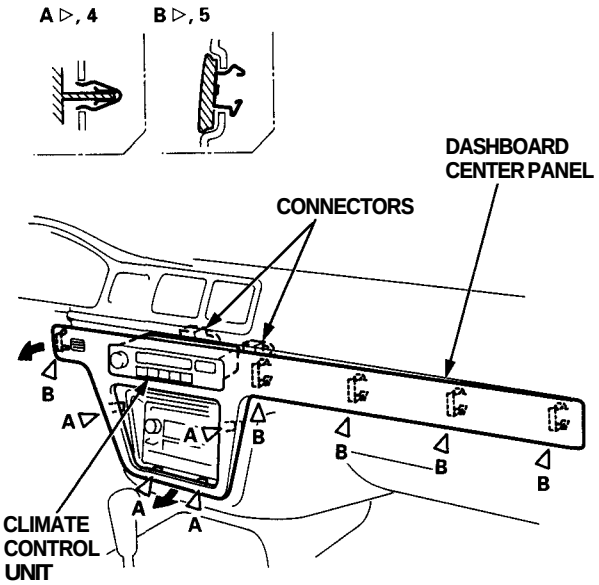
Dashboard

Component Removal/Installation (cont'd)

Dashboard center panel/Radio panel/Switch panel removal:

1, Carefully detach the clips, then pull out the dashboard center panel.

▷: **Clip locations**

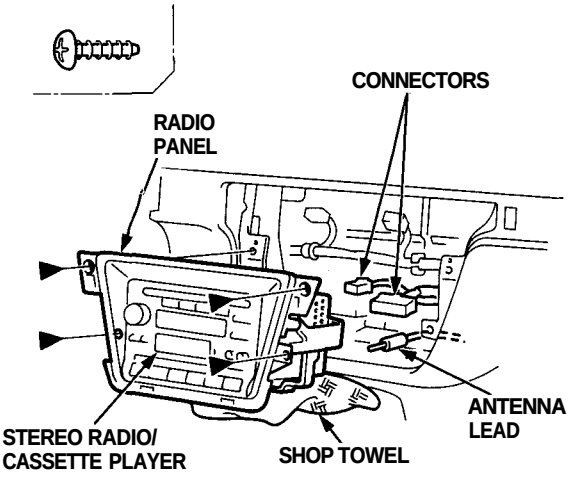


2. Disconnect the connectors, then remove the dashboard center panel.

3. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

4. Remove the screws, then pull out the radio panel with the stereo radio/cassette player. Disconnect the connectors and antenna lead, then remove it.

►: **Screw locations, 4**



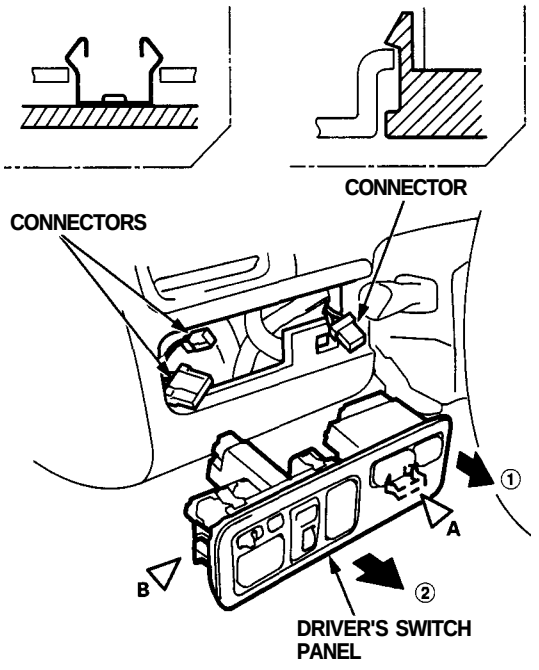
5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connectors and antenna lead are connected properly.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Driver's switch panel removal:

1. Carefully detach the clips, then pull out the driver's switch panel. Disconnect the connectors, then remove it.

A ▷: Clip location, 1 **B ▷: Hook location, 1**

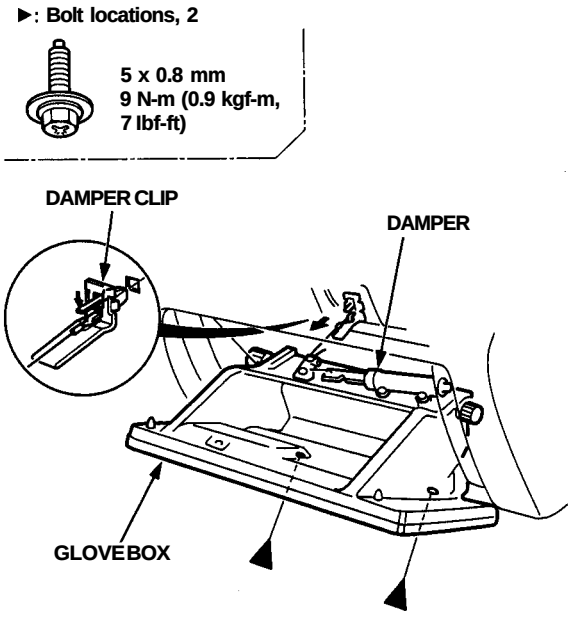


2. Installation is the reverse of the removal procedure.

NOTE: Make sure the connectors are connected properly.

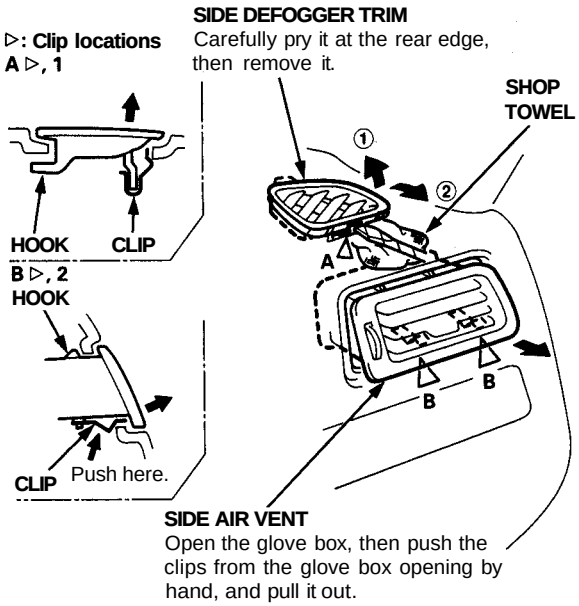
Glove box removal:

1. Open the glove box.
2. Detach the damper clip. Remove the bolts while holding the glove box, then remove it.



3. Installation is the reverse of the removal procedure.

Side air vent (Front passenger's)/Side defogger trim removal:



Replacement

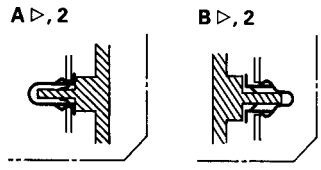
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section 24 before preforming repairs or service.

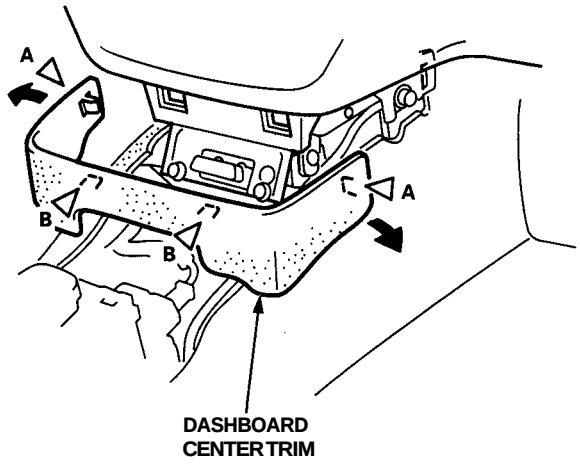
NOTE:
- An assistant is helpful when removing and installing the dashboard.
- Take care not to scratch the dashboard, body and related parts.

1. Remove:
   - Dashboard lower cover (see page 20-65)
   - Knee bolster (see page 20-65)
   - Center console (see page 20-64)
   - Glove box
   - Kick panels (see page 20-63)

2. Remove the dashboard center trim.

▷: Clip locations





3. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

(cont'd)

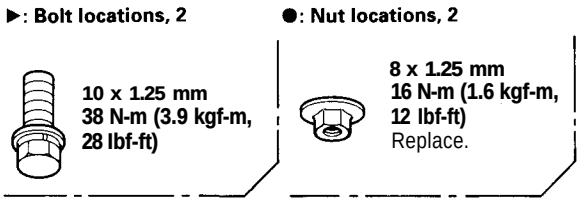
Dashboard

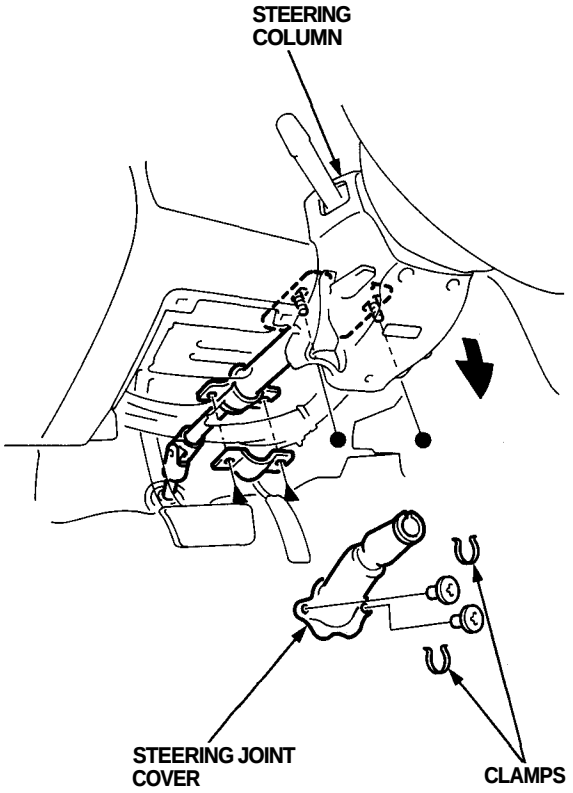
Replacement (cont'd)

4. Lower the steering column (see section 17).

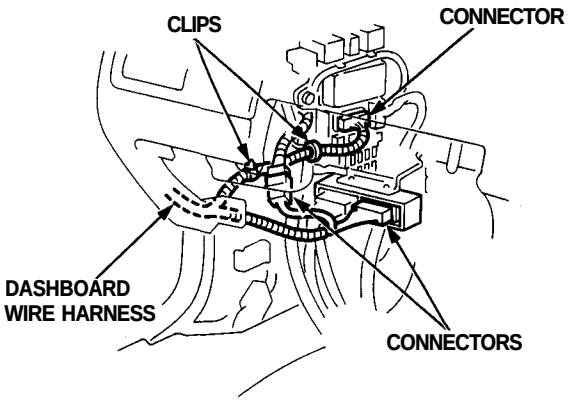
⚠ WARNING To avoid accidental deployment and possible injury, always disconnect the driver's airbag connector before lowering the steering column (see section 24).

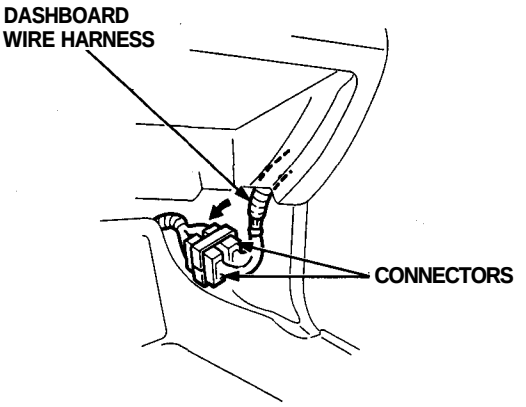
NOTE: To prevent damage to the steering column, wrap it with a shop towel.





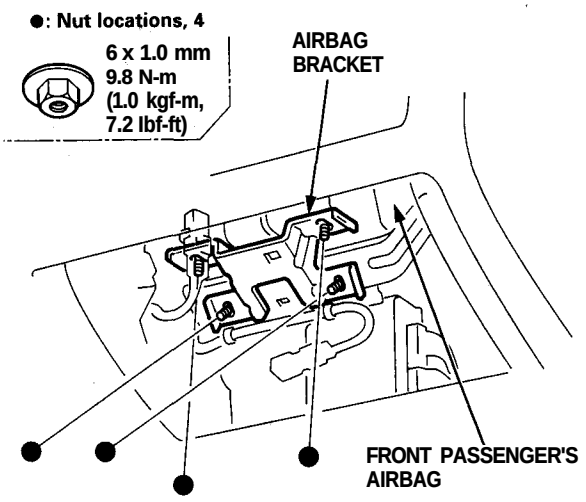
5. Disconnect the dashboard wire harness connectors and harness clips.





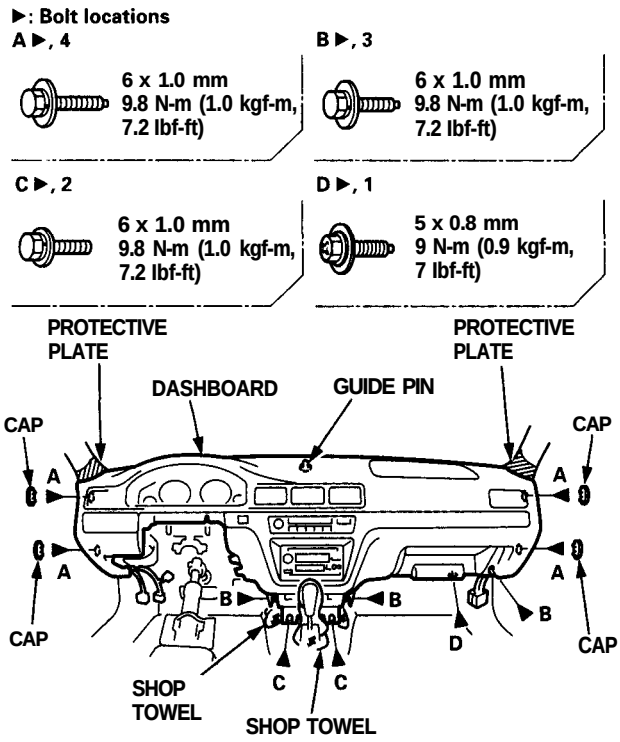
6. Remove the airbag bracket.

⚠ WARNING To avoid accidental deployment and possible injury, always install the protective short connector on the front passenger's airbag connector when the SRS main harness is disconnected (see section 24).



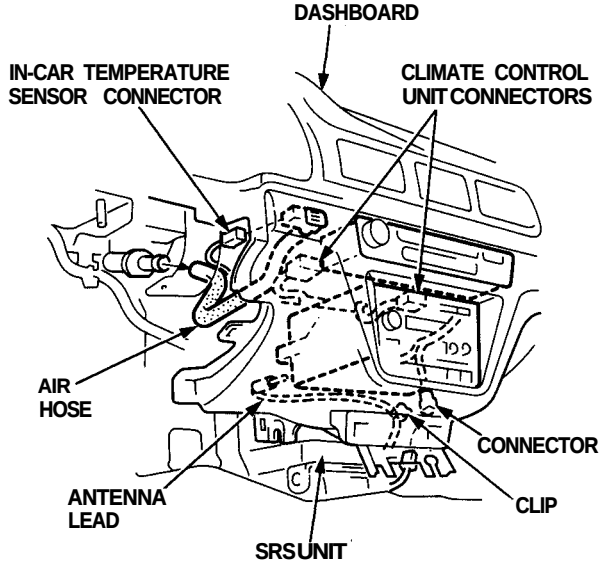
7. Remove the bolts.

CAUTION: Use protective plates on the bottom of the front pillar trim.



8. Lift and pull out the dashboard half-way, then disconnect the connectors, antenna lead and air hose while holding the dashboard.

CAUTION: Do not drop the dashboard.



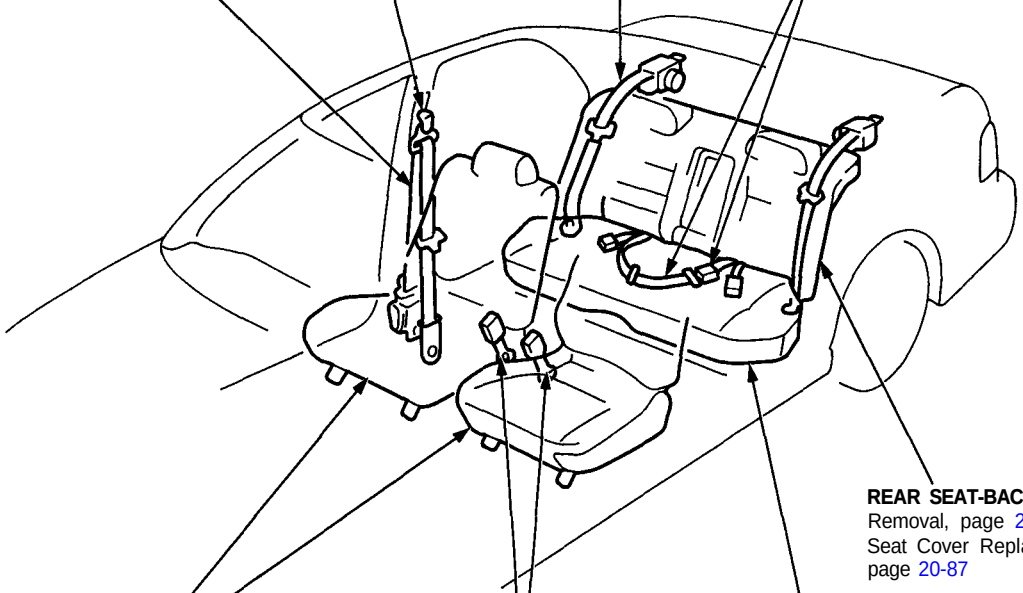
9. Installation is the reverse of the removal procedure.

NOTE:

- Make sure the dashboard fits onto the guide pin correctly.
- Before tightening the bolts, make sure the dashboard wire harnesses are not pinched.
- Make sure the connectors, antenna lead and air hose are connected properly.
- Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Seats/Seat Belts

Component Location Index



REAR SEAT BELT
Replacement, page 20-90
Inspection, page 20-92

FRONT SEAT BELT
Replacement, page 20-88
Inspection, page 20-92

SHOULDER ANCHOR ADJUSTER
(see page 20-88)

REAR SEAT BELT BUCKLE/ CENTER BELT TONGUE
(see page 20-91)

REAR SEAT-BACK
Removal, page 20-85
Seat Cover Replacement, page 20-87

REAR SEAT CUSHION
Removal, page 20-85
Seat Cover Replacement, page 20-86

FRONT SEAT BELT BUCKLES
(see page 20-89)

FRONT SEATS
Removal, page 20-71
Seat-back Replacement, page 20-72
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Seat Cover Replacement, page 20-76
Seat Tracks (Manually adjustable)
Replacement, page 20-78
Seat Linkage (Fully power adjustable)
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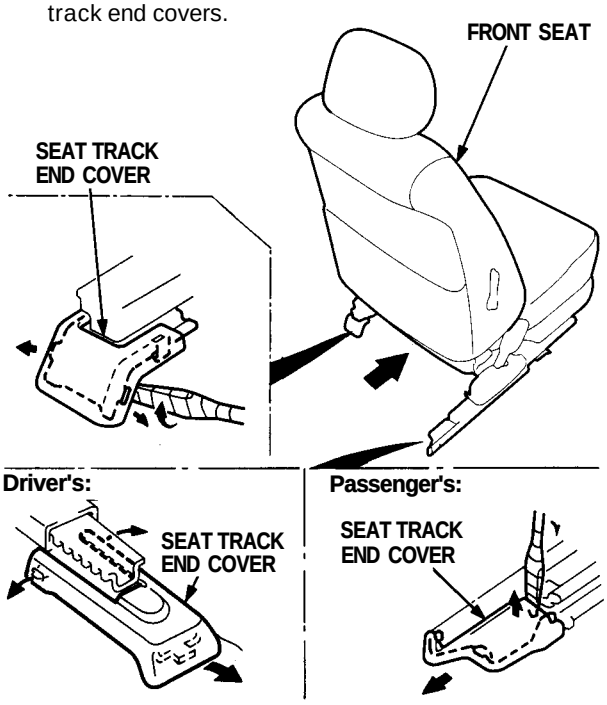
Front Seat

Removal

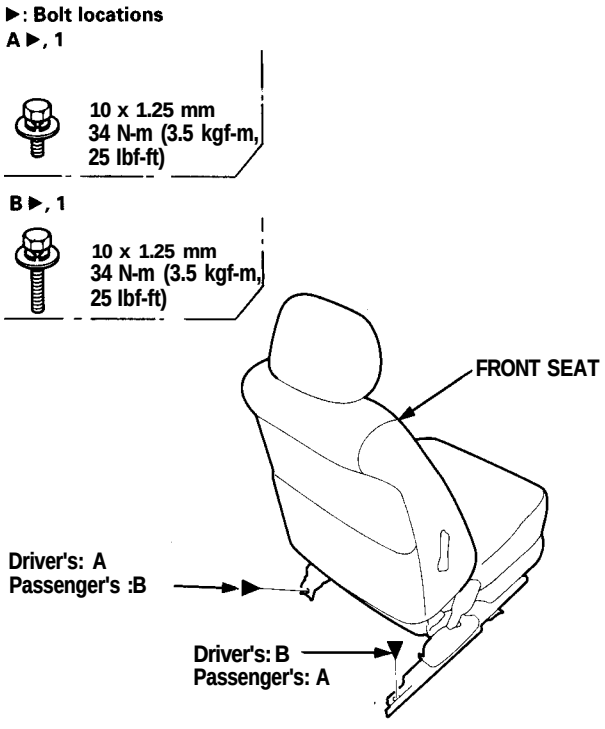
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the seat covers and body.

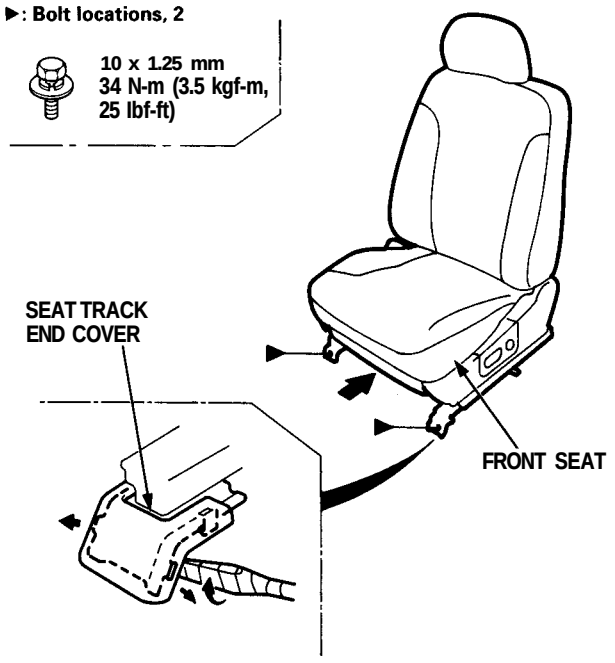
1. Slide the front seat forward, then remove the seat track end covers.



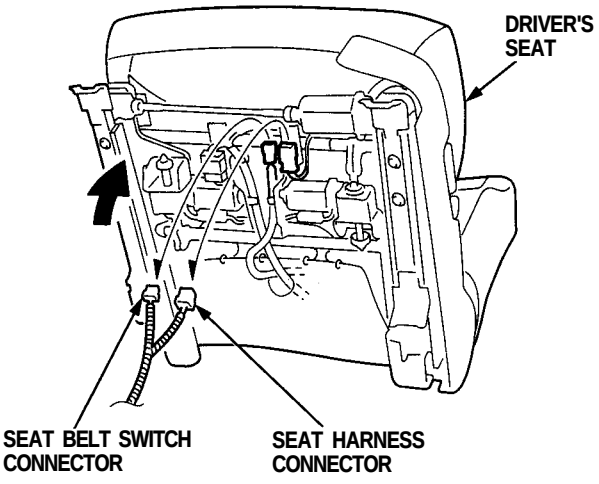
2. Remove the bolts.



3. Slide the front seat backward, then remove the seat track end cover, and remove the bolts.



4. Lift the driver's seat, then disconnect the seat harness connector and seat belt switch connector.



5. Carefully remove the front seat through the door opening.

6. Installation is the reverse of the removal procedure.

   NOTE: Make sure the connectors are connected properly (driver's).

Front Seat

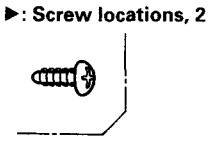
Seat-back Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the seat covers and body.

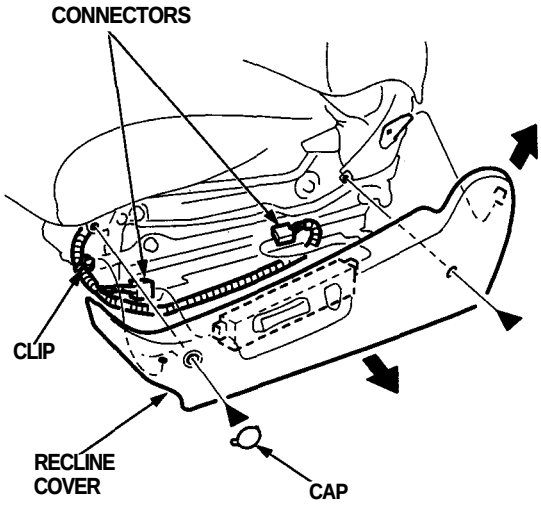
1. Remove the front seat through the door opening (see page 20-71).

2. Remove the recline cover.

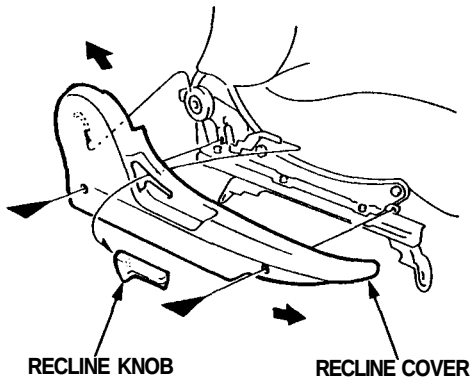


Fully power adjustable:

Disconnect the connectors.

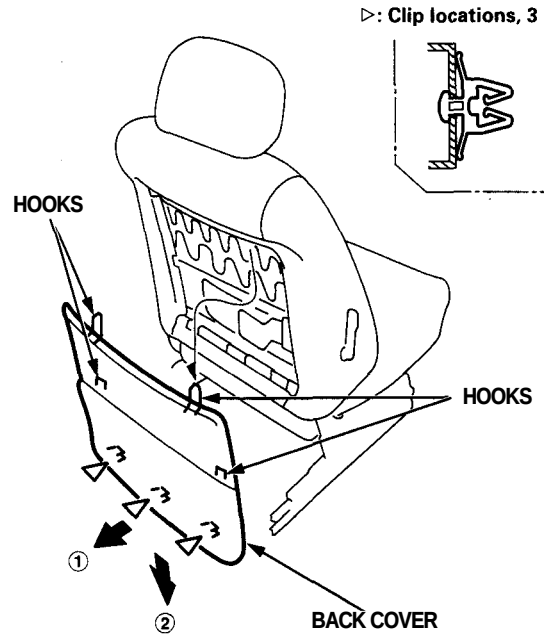


Manually adjustable:



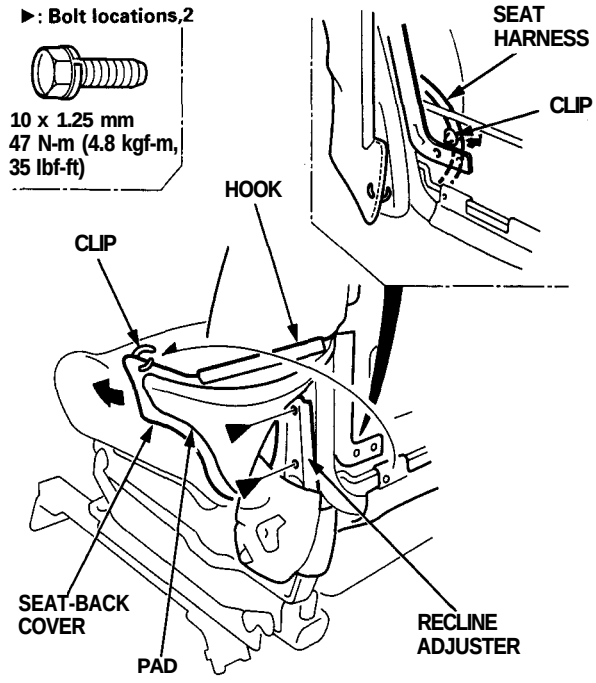
3. Remove the back cover.

NOTE: If necessary, replace any damaged clips.



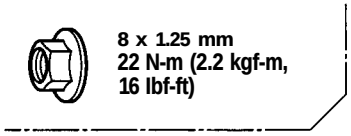
4. Release the hook and clip. Detach the harness clip (fully power adjustable seat). Fold the seat-back cover and pad, then remove the bolts.

NOTE: Replace the released clip of the seat-back cover with a new one.

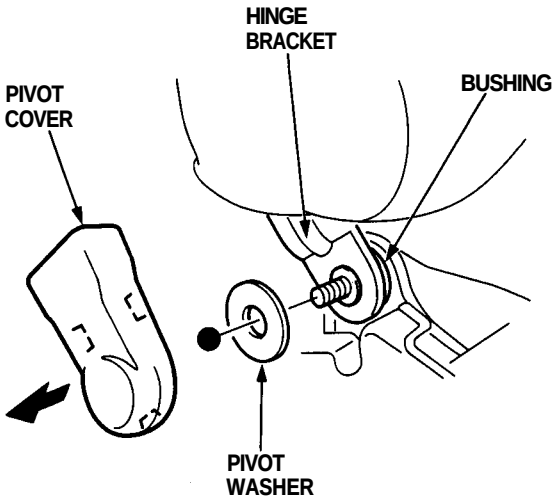


5. Remove the pivot cover, then remove the pivot nut.

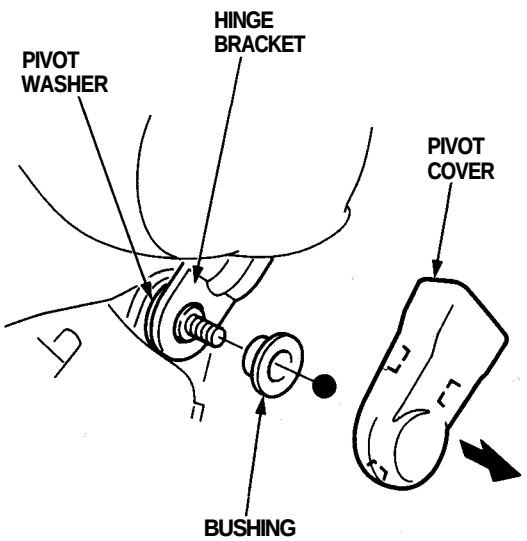
●: Pivot nut location, 1



Fully power adjustable:

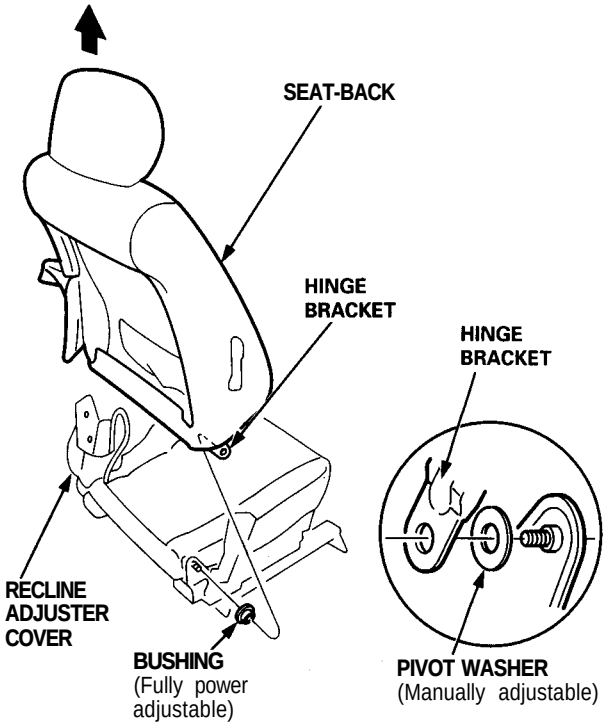


Manually adjustable:

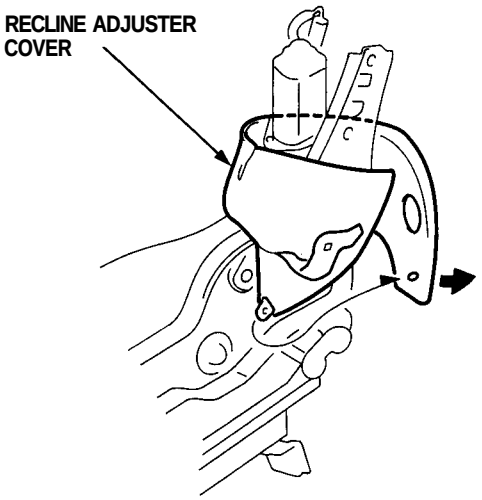


6. Remove the seat-back.

NOTE: Take care not to bend the hinge bracket.



7. If necessary, remove the recline adjuster cover (fully power adjustable seat).



8. Installation is the reverse of the removal procedure.

NOTE:

- Make sure the bushing and pivot washer are installed properly.
- To prevent wrinkles when installing the seat-back cover, make sure the material is stretched evenly over the pad.

Front Seat

Seat Cushion Replacement

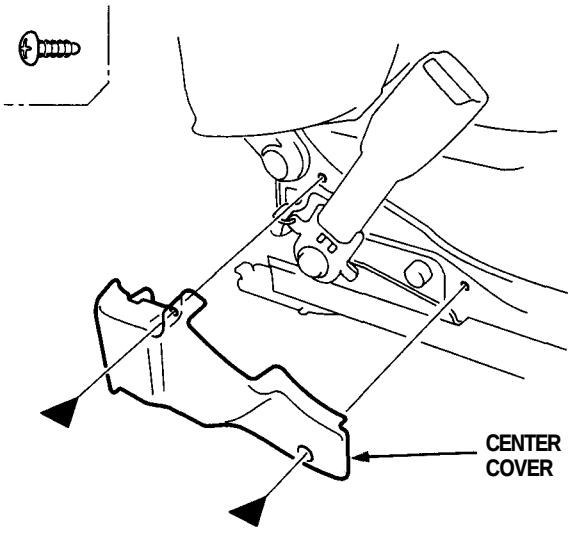
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE: Take care not to scratch the seat covers and body.

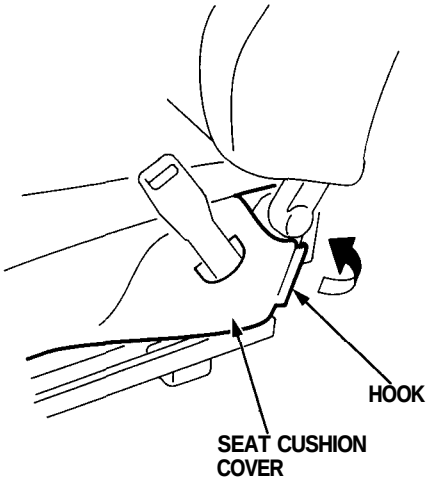
1. Remove the front seat through the door opening (see page 20-71).
2. Remove the recline cover (see page 20-72).
3. Remove the center cover (fully power adjustable seat), or release the hook (manually adjustable seat).

Fully power adjustable:

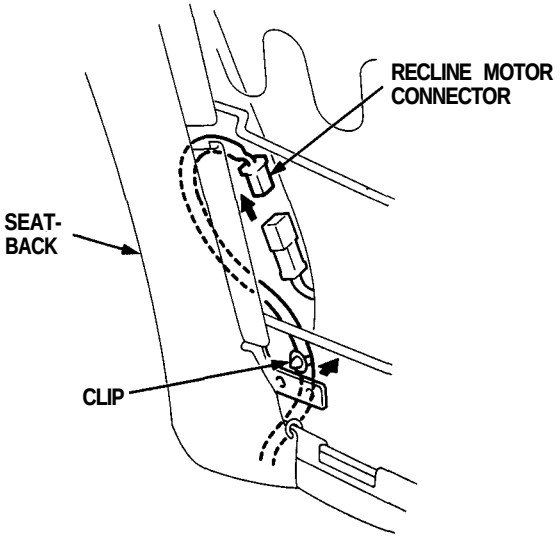
►: Screw locations, 2



Manually adjustable:



4. Fully power adjustable seat: Remove the back cover (see page 20-72), then disconnect the recline motor connector, and detach the harness clip.

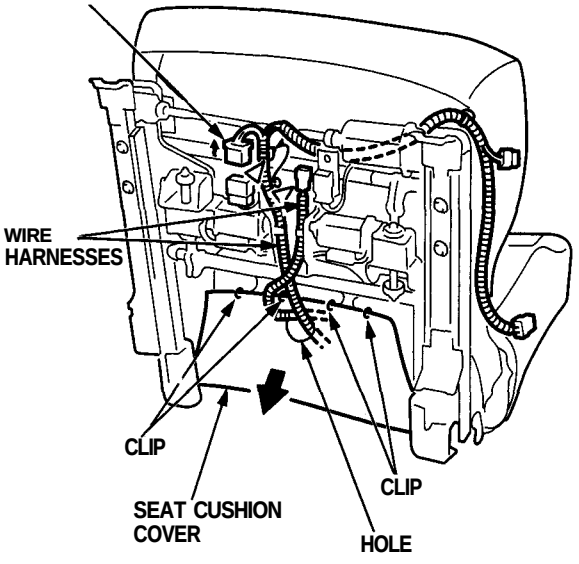


5. Fully power adjustable seat: Disconnect the connectors, and detach the harness clips and connector clips. Release the clips, then fold the seat cushion cover, and slip the wire harnesses through the hole in the seat cushion cover.

NOTE: Replace the released clips of the seat cushion cover with new ones.

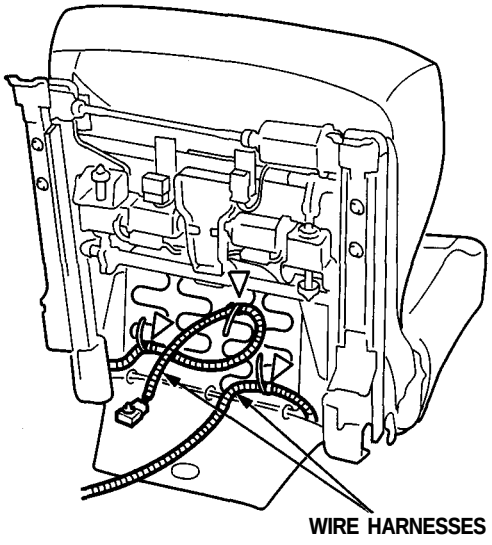
CONNECTOR
Disconnect.

▷: Clip locations, 2



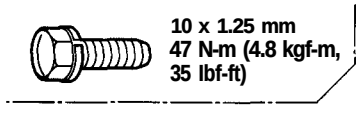
6. Fully power adjustable seat: Release the wire ties from the seat cushion.

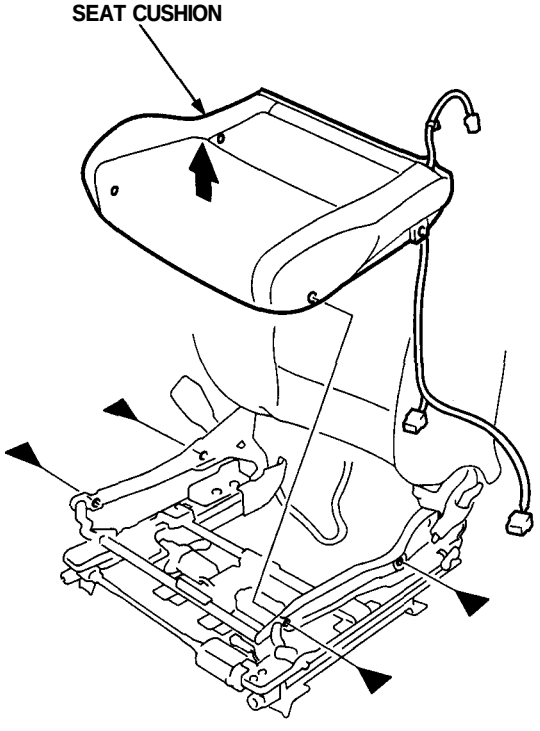
▷: **Wire tie locations, 3**



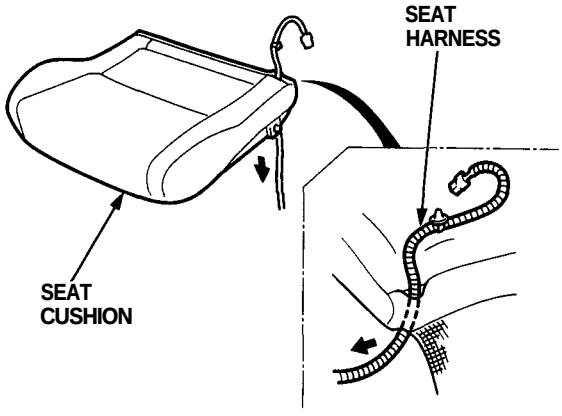
7. Remove the bolts, then remove the seat cushion.

►: **Bolt locations, 4**





8. Fully power adjustable seat: Pull the seat harness out from the seat cushion.



9. Installation is the reverse of the removal procedure.

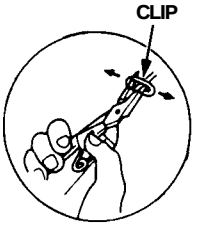
NOTE:
- Make sure the seat harness is routed and fastened properly.
- Make sure the connectors are connected properly.

Front Seat

Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat covers.

NOTE
- Take care not to tear the seams or damage the seat covers.
- Remove the clips as shown.

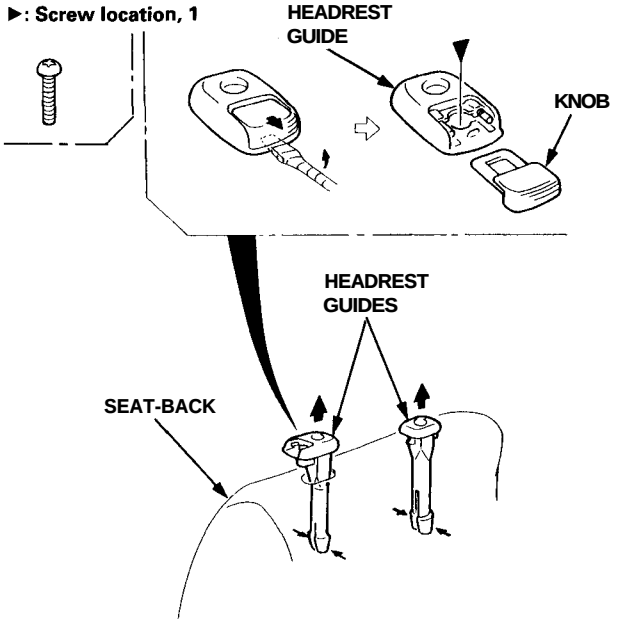


Seat-back cover removal:

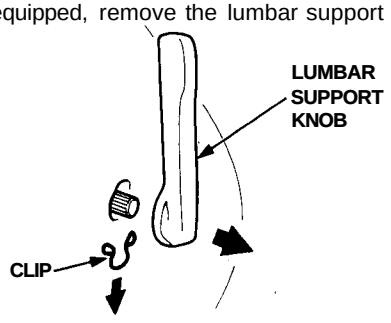
1. Slide the front seat forward, and fold the seat-back forward.

2. Remove the back cover (see page 20-72).

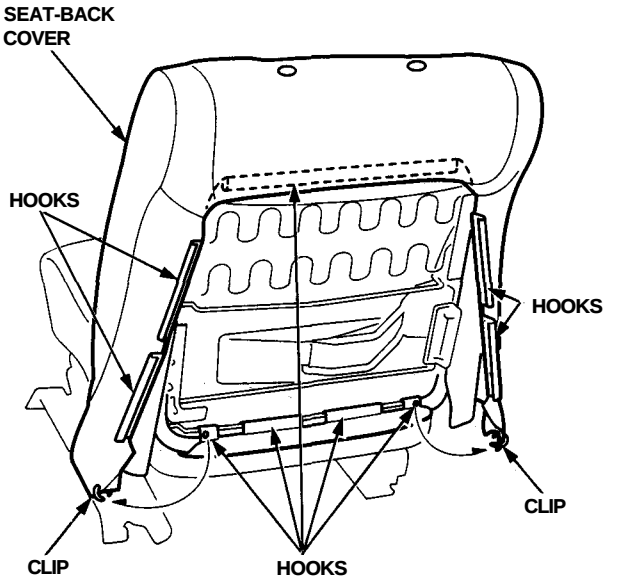
3. Remove the headrest and headrest guides.



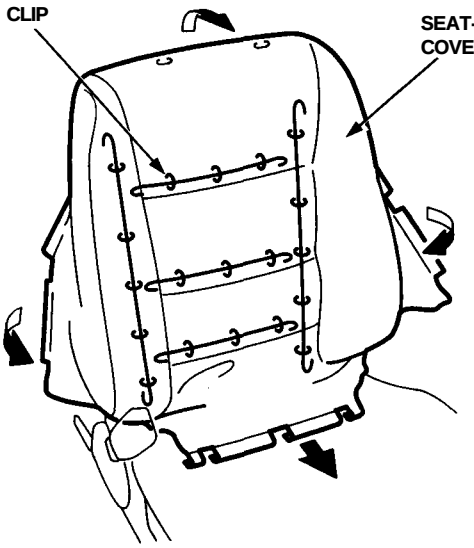
4. If so equipped, remove the lumbar support knob.



5. Loosen the seat-back cover by releasing all the hooks and the clip.



6. Pull back the edge of the seat-back cover all the way around, release the clips, and remove the seat-back cover.



7. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the hooks and clip.
- Replace the released clips with new ones.

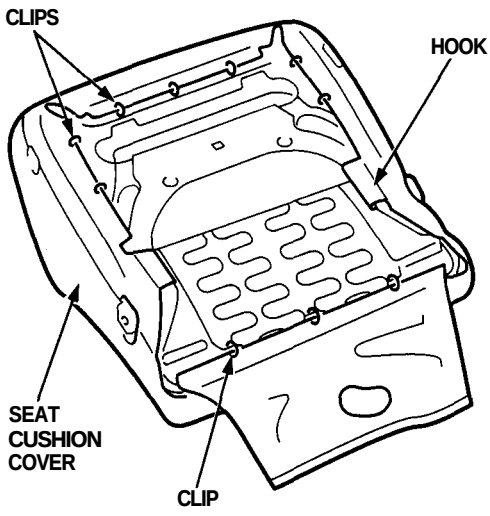
Seat cushion cover removal:

1. Remove the seat cushion (see page 20-74).

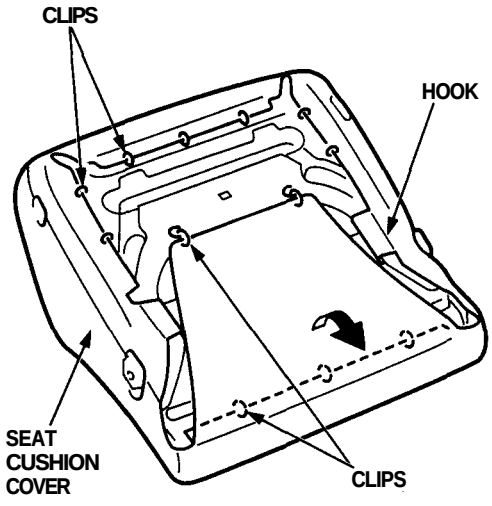
   NOTE: Remove the seat harness from the seat cushion (fully power adjustable seat, see page 20-74).

2. Remove the clips and hooks from under the seat cushion, then loosen the seat cushion cover.

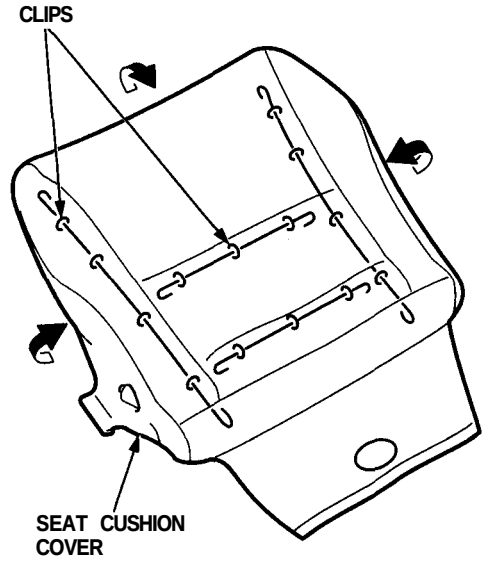
Fully power adjustable:



Manually adjustable:

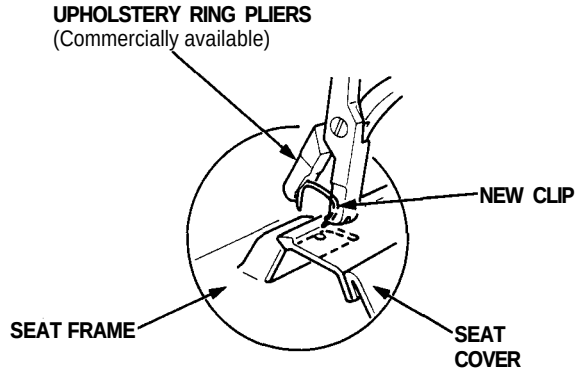


3. Pull back the edge of the seat cushion cover all the way around, release the clips, and remove the seat cushion cover.



4. Installation is the reverse of the removal procedure.

   NOTE:
   - To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips, hooks and inside springs.
   - Replace the released clips with new ones.



Front Seat

Seat Tracks (Manually adjustable) Replacement

NOTE: Take care not to scratch the seat covers and body.

1. Remove the front seat through the door opening (see page 20-71).

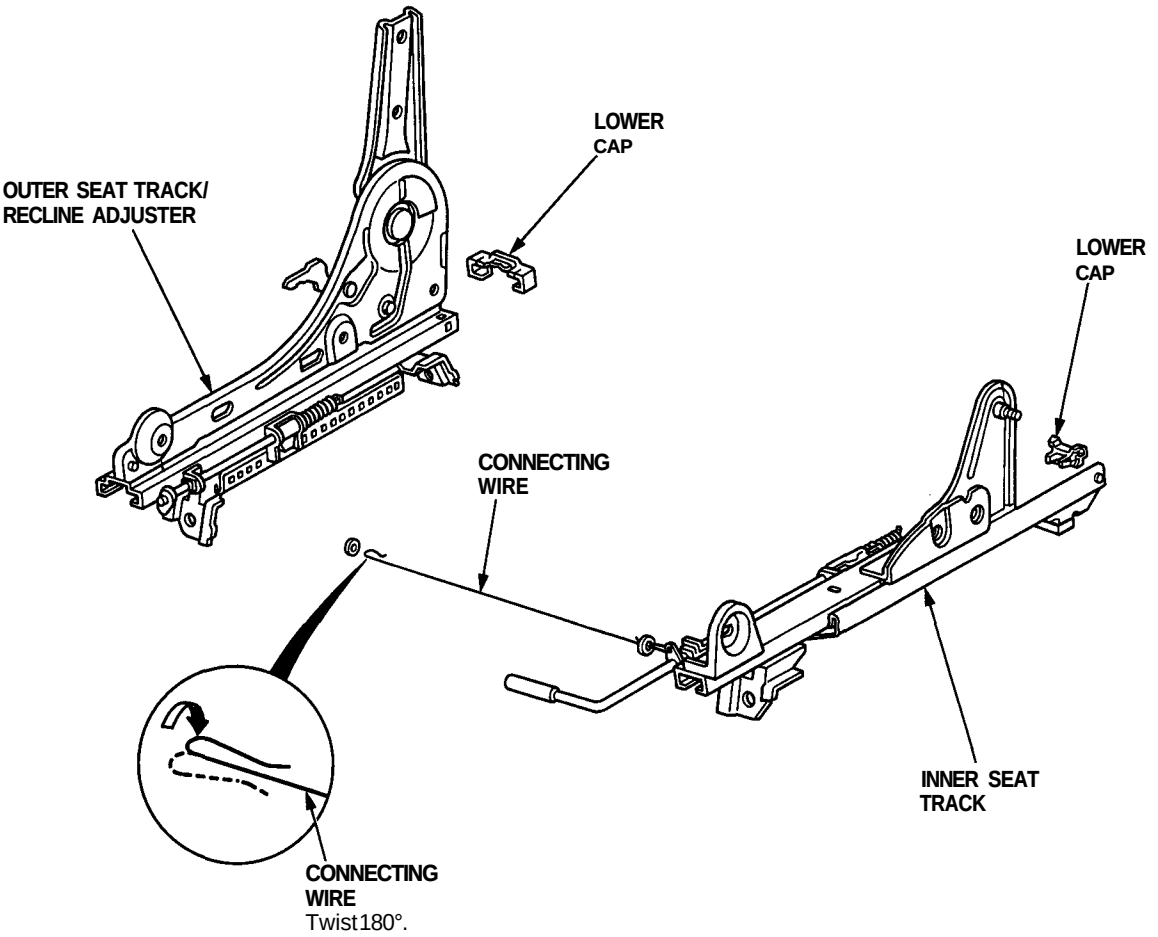
2. Remove:
   - Seat-back (see page 20-72)
   - Seat cushion (see page 20-74)
   - Seat belt buckle (see page 20-89)

3. Disconnect the connecting wire from the seat track.

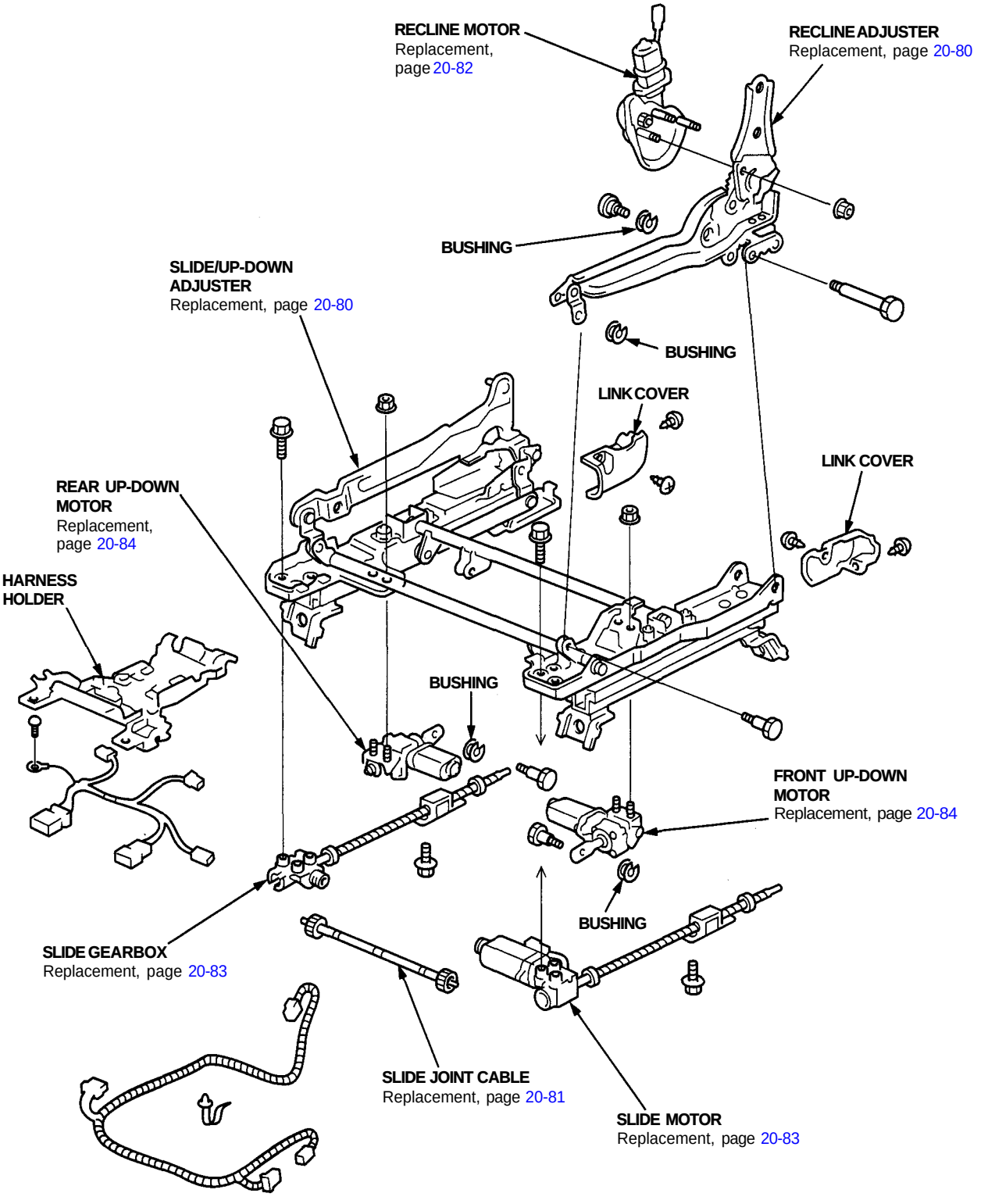
   NOTE: Take care not to bend the connecting wire.

4. Installation is the reverse of the removal procedure.

   NOTE:
   - Grease the sliding portion.
   - Connect the connecting wire by twisting it 180° as shown.
   - Check the seat track and recline adjuster operation.



Seat Linkage (Fully power adjustable) Index



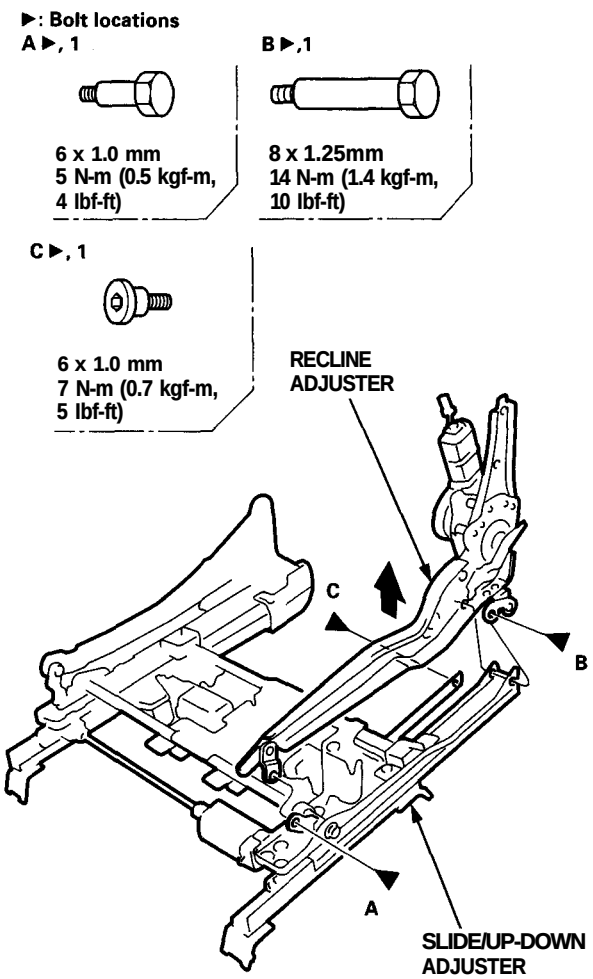
Front Seat

Recline Adjuster, Slide/Up-down Adjuster Replacement

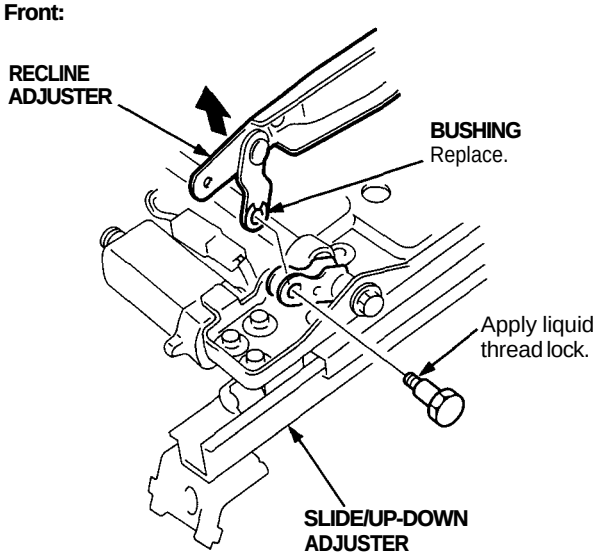
CAUTION: Wear gloves to remove and install the recline adjuster and slide/up-down adjuster.

NOTE:
- Take care not to scratch the seat covers and body.
- Before removing the front seat, raise the seat cushion to its front maximum height.

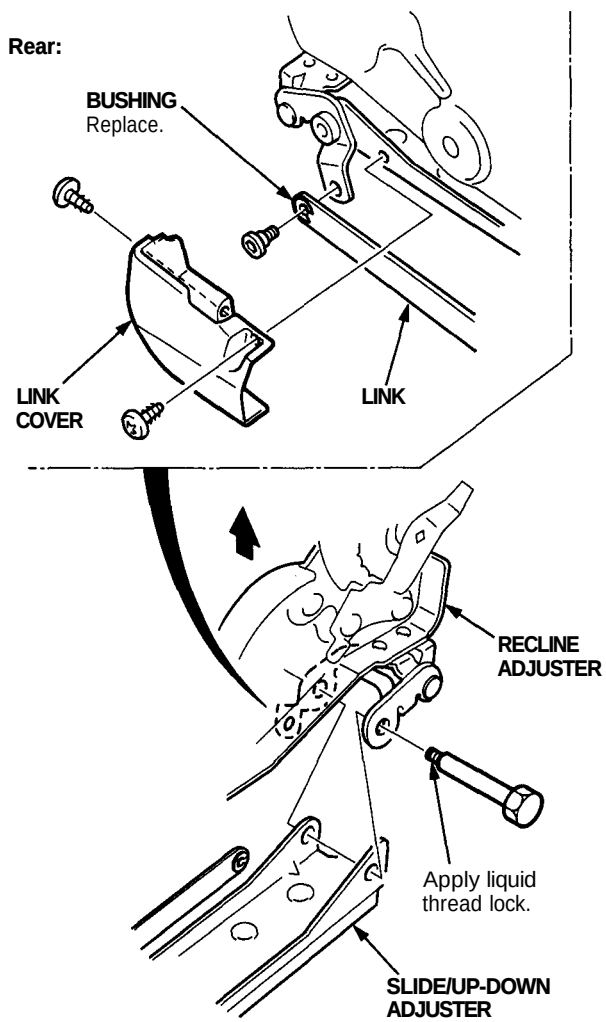
1. Remove the front seat through the door opening (see page 20-71).
2. Remove the seat-back and seat cushion (see pages 20-72, 20-74).
3. If necessary, remove the seat belt buckle (see page 20-89) and recline adjuster cover (see page 20-73).
4. Separate the recline adjuster and slide/up-down adjuster.



Front:



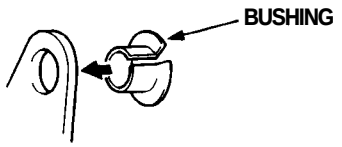
Rear:



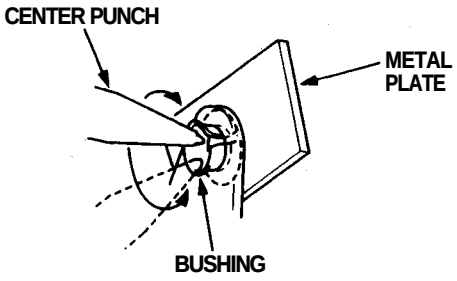
5. Installation is the reverse of the removal procedure.

NOTE:
- Replace the bushings with new ones as follows.

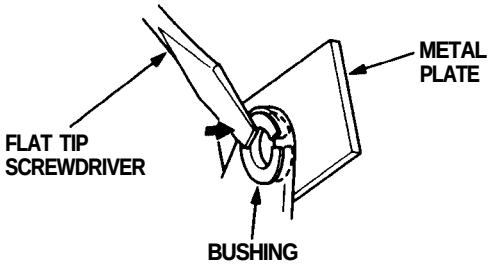
a. Install the bushing.



b. Hold the bushing down against a metal plate, then flare the edge of the bushing using a center punch as shown.



c. Flatten the bushing using a flat tip screwdriver as shown.



- Check the recline adjuster and slide/up-down adjuster operations.

Side Joint Cable Replacement

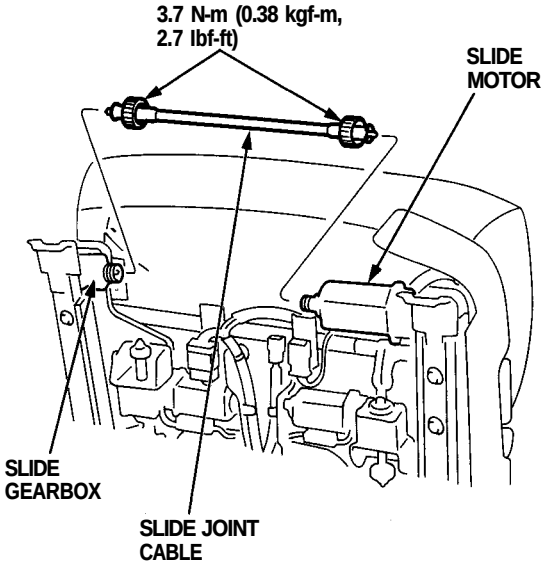
CAUTION: Wear gloves to remove and install the slide joint cable.

NOTE: Take care not to scratch the seat covers.

1. Remove the front seat, then lay it on its back (see page 20-71).

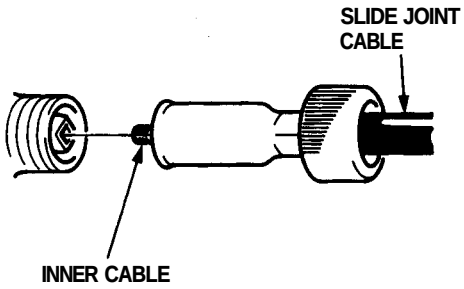
2. Remove the slide joint cable.

   NOTE: Take care not to bend the slide joint cable.



3. Installation is the reverse of the removal procedure.

   NOTE:
   - When installing the slide joint cable, set the inner cable securely.



   - Check that the slide motor and slide gearbox operate properly.

Front Seat

Recline Motor Replacement

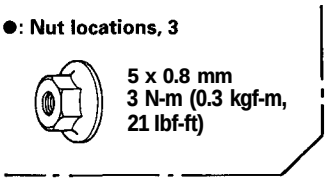
CAUTION: Wear gloves to remove and install the recline motor.

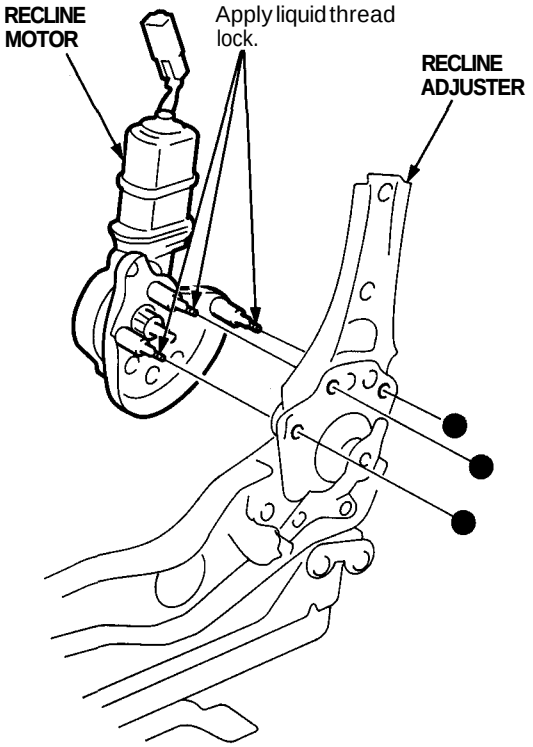
NOTE: Take care not to scratch the seat covers.

1. Remove the front seat through the door opening (see page 20-71).

2. Remove:
   - Seat-back (see page 20-72)
   - Seat cushion (see page 20-74)
   - Recline adjuster cover (see page 20-73)

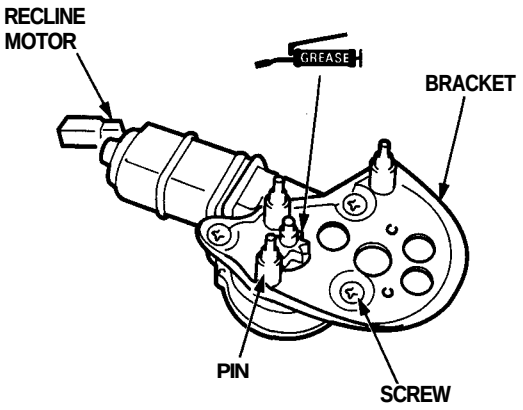
3. Remove the recline motor.





4. Installation is the reverse of the removal procedure.

NOTE:
- Before installing the recline motor, apply grease (molybdenum grease) to the gear portion.
- Replace the recline motor, bracket, pin and screw as an assembly.
- Make sure the connector is connected properly.
- Check the recline adjuster operation.

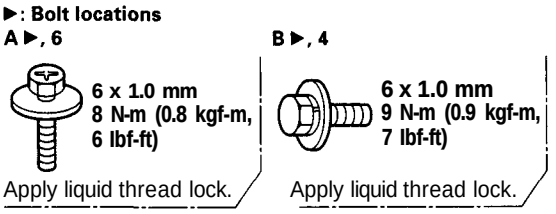


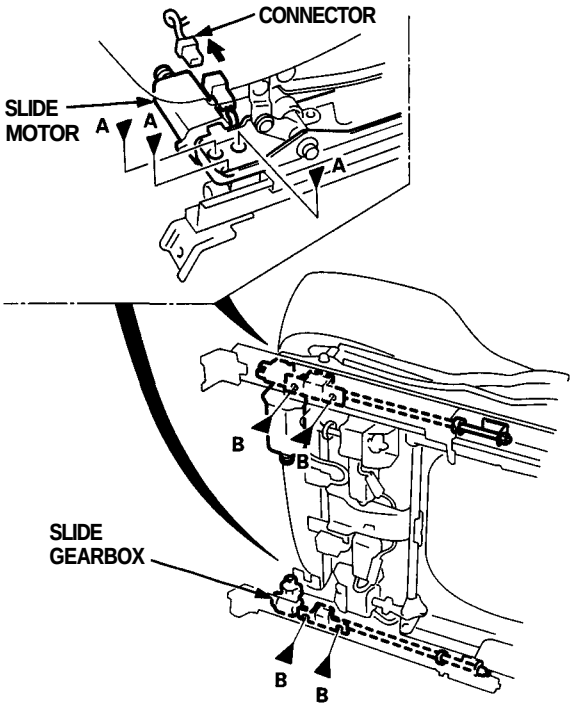
Slide Motor, Slide Gearbox Replacement

CAUTION: Wear gloves to remove and install the slide motor and slide gearbox.

NOTE:
- Take care not to scratch the seat cover.
- To remove the slide motor and slide gearbox, slide the front seat backward fully, and raise the seat cushion to its front maximum height.

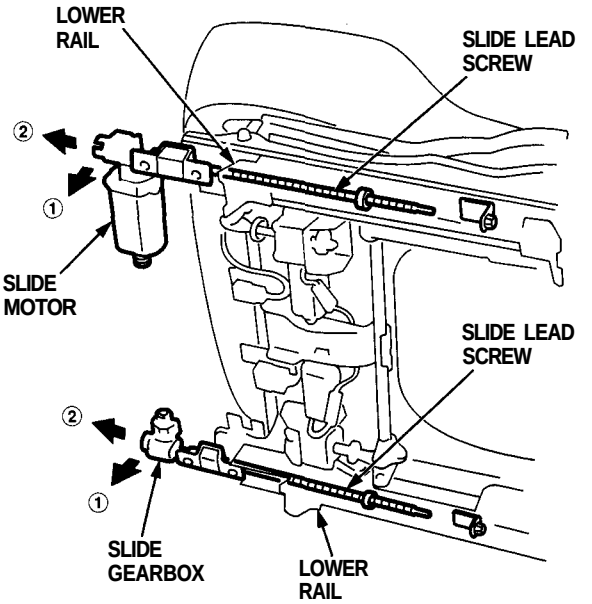
1. Remove the front seat through the door opening (see page 20-71).
2. Remove the recline cover (see page 20-72).
3. Remove the slide joint cable (see page 20-81).
4. Disconnect the slide motor connector.
5. Remove the bolts from each side.





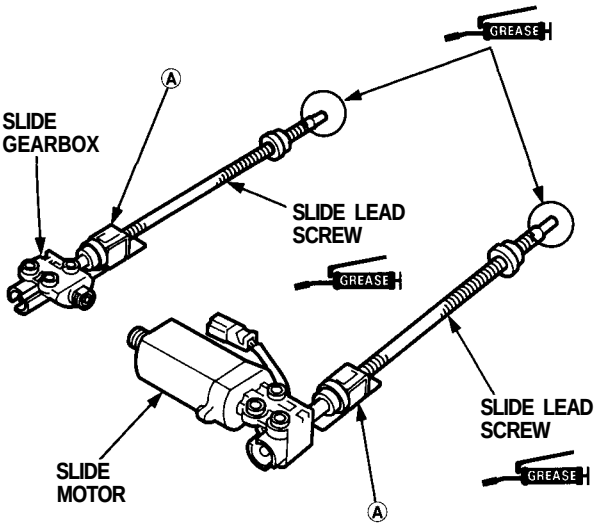
6. Remove the slide motor and slide gearbox while moving the lower rails.

NOTE: Take care not to damage the slide lead screws.



7. Installation is the reverse of the removal procedure.

NOTE:
- Before installing the slide motor and slide gearbox, grease the slide lead screws as shown.
- Before installing the slide motor and slide gearbox, align portion Ⓐ as shown.
- Check the slide lead screw for bending.

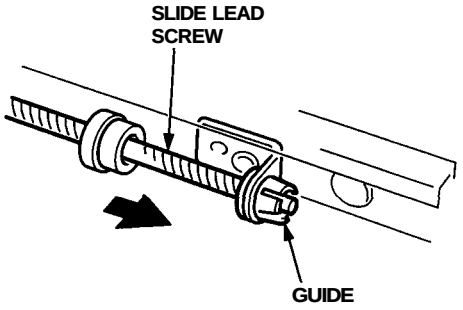


(cont'd)

Front Seat

Slide Motor, Slide Gearbox Replacement (cont'd)

- When installing the slide motor and slide gearbox, make sure the end of the slide lead screw is positioned properly.



- When installing the slide joint cable, engage the inner cable securely.
- Make sure the slide motor connector is connected properly.
- Check the slide motor and slide gearbox operations.

Front Seat

Front and Rear Up-down Motors Replacement

CAUTION: Wear gloves to remove and install the front and rear up-down motors.

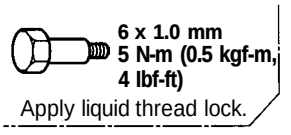
NOTE:
- Take care not to scratch the seat covers.
- Before removing the front seat, raise the seat cushion to its maximum height.

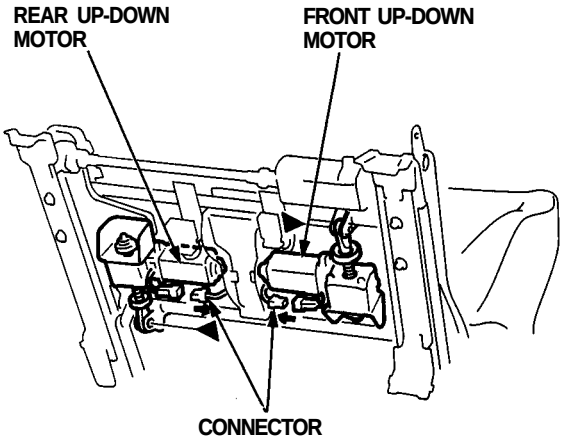
1. Remove the front seat through the door opening (see page 20-71).

2. Remove the seat cushion (see page 20-74).

3. From under the seat linkage, disconnect the front and rear up-down motor connectors, and remove the bolts.

►: Bolt locations, 2



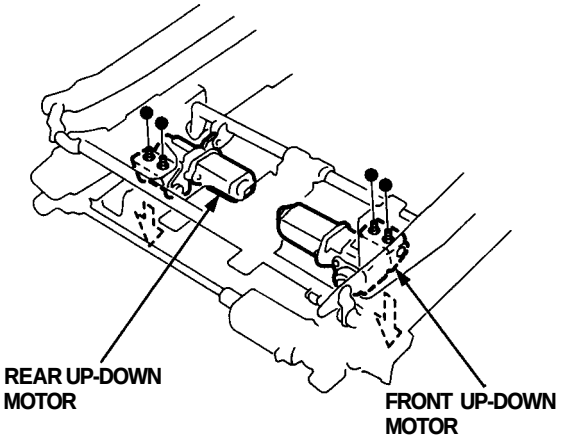


4. From the top of the seat linkage, remove the nuts, then remove the front and rear up-down motors by pulling them down.

●: Nut locations, 4



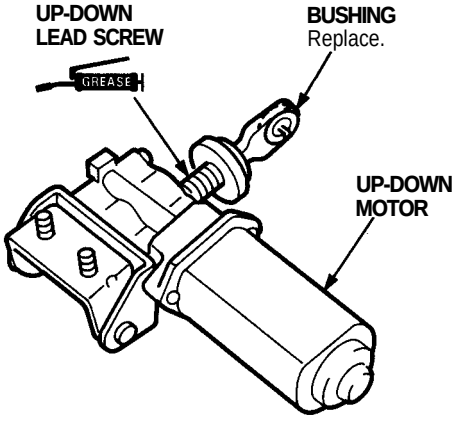
8 x 1.25 mm
14 N-m (1.4 kgf-m, 10 lbf-ft)



5. Installation is the reverse of the removal procedure.

NOTE:

- Before installing the front and rear up-down motors, grease the up-down lead screws.
- Check the up-down lead screw for bending.
- Replace the bushings with new ones as described on page 20-81.
- Make sure the connectors are connected properly.
- Check the front and rear up-down motors operations.



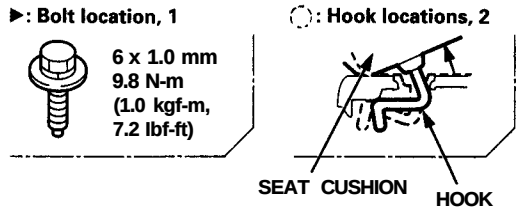
(cont'd)

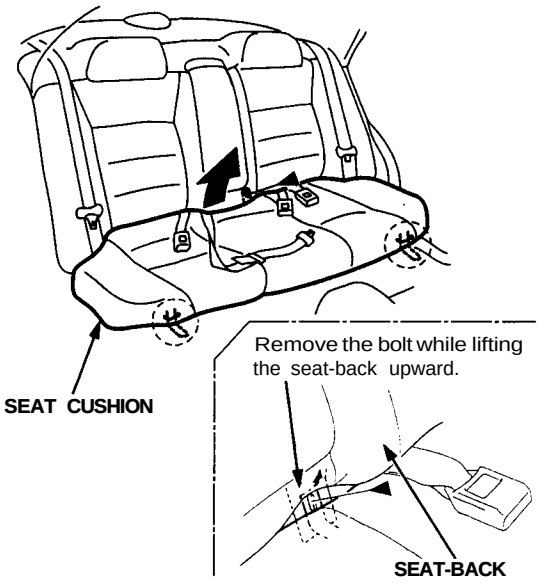
Rear Seat

Removal

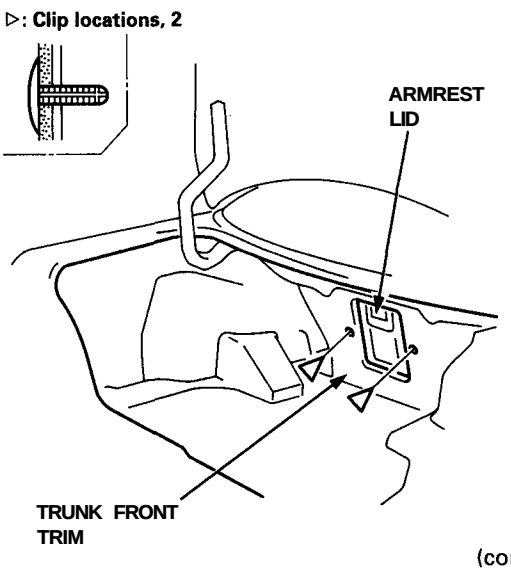
NOTE: Take care not to scratch the seat covers and body.

1. Remove the seat cushion.





2. Open the trunk lid, then remove the clips.



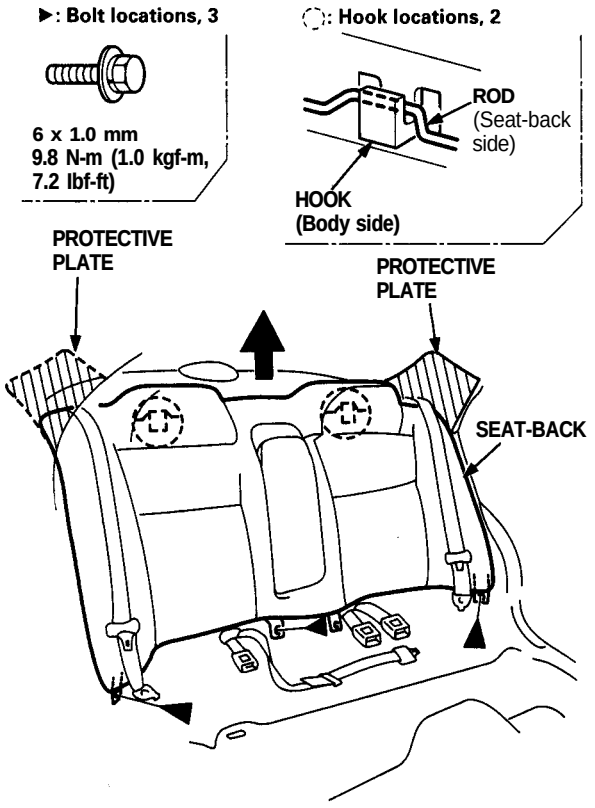
(cont'd)

Rear Seat

Removal (cont'd)

3. Remove the seat-back by lifting it upward.

CAUTION: Use protective plates on the bottom of the rear pillar trim.



4. Installation is the reverse of the removal procedure.

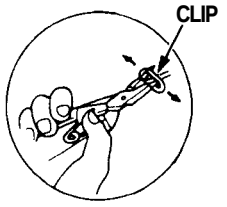
NOTE: Before attaching the seat-back and seat cushion, make sure there are no twists or kinks in the rear seat belts and center belts.

Rear Seat

Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat covers.

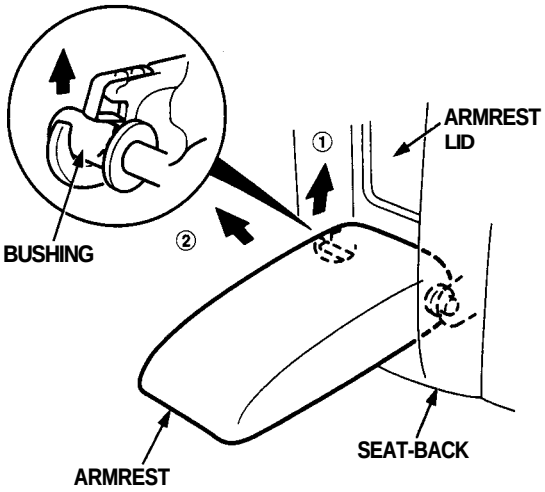
NOTE:
- Take care not to tear the seams or damage the seat covers.
- Remove the clips as shown.

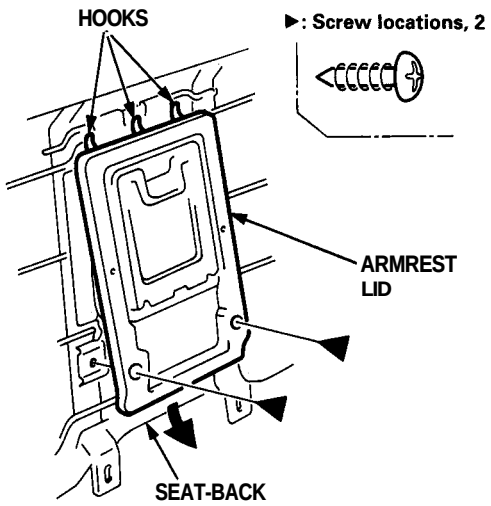


Seat-back cover removal:

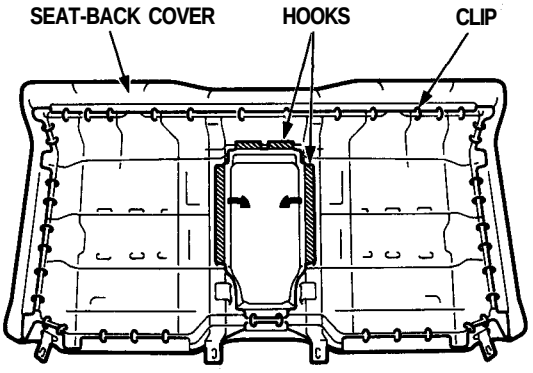
1. Remove the seat-back (see page 20-85).

2. Remove the armrest and armrest lid.

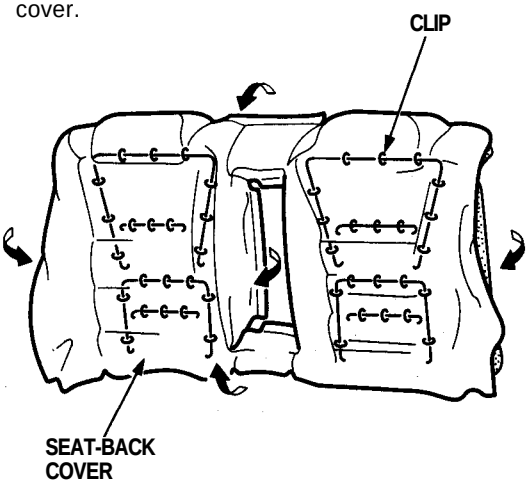




3. Loosen the seat-back cover by releasing all the clips and hooks.



4. Pull back the edge of the seat-back cover all the way around, release the clips, and remove the seat-back cover.



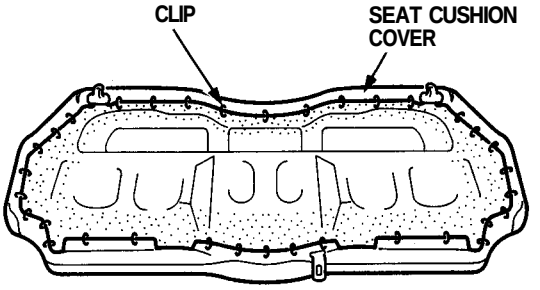
5. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the hooks and clips.
- Replace the released clips with new ones.

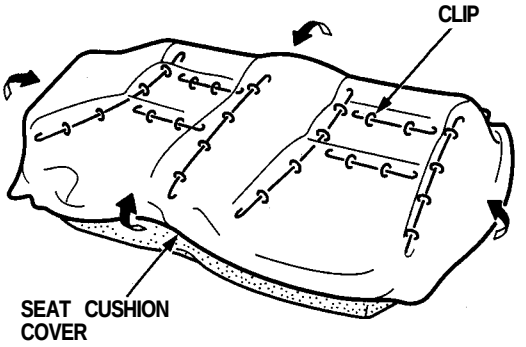
Seat cushion cover removal:

1. Remove the seat cushion (see page 20-85).

2. Loosen the seat cushion cover by releasing all the clips.

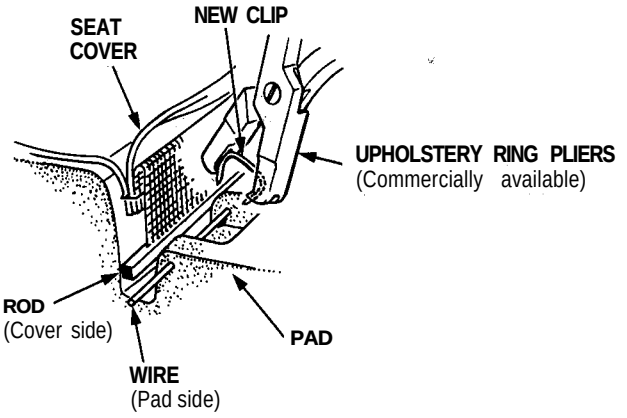


3. Pull back the edge of the seat cushion cover all the way around, release the clips, and remove the seat cushion cover.



4. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips.
- Replace the released clips with new ones.



Seat Belt

Inspection

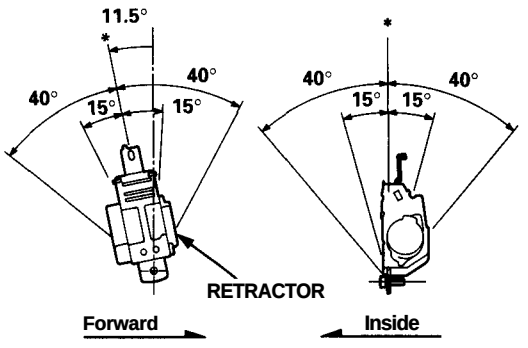
Retractor Inspection

1. Before installing the retractor, check that the seat belt can be pulled out freely.
2. Make sure that the seat belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The seat belt should lock when the retractor is leaned over 40°.

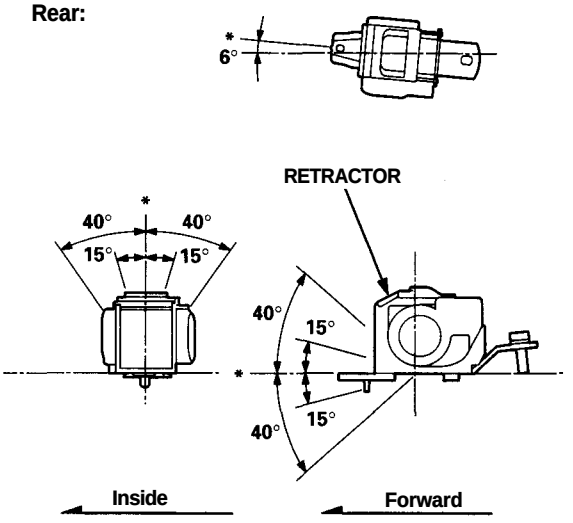
   CAUTION: Do not attempt to disassemble the retractor.

   Front:

   ***: Mounted Position**



   Rear:



3. Replace the seat belt with a new one if there is any abnormality.

On-the-Car Seat Belt Inspection

1. Check that the seat belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on the anchor bolts. If necessary, remove the anchor bolts and check that the washers and other parts are not damaged or improperly installed.
3. Check the seat belts for damage or discoloration. Clean with a shop towel if necessary.

   CAUTION: Use only soap and water to clean.

   NOTE: Dirt build-up in the metal loops of the upper anchors can cause the seat belts to retract slowly. Wipe the inside of the loops with a clean cloth dampened in isopropyl alcohol.

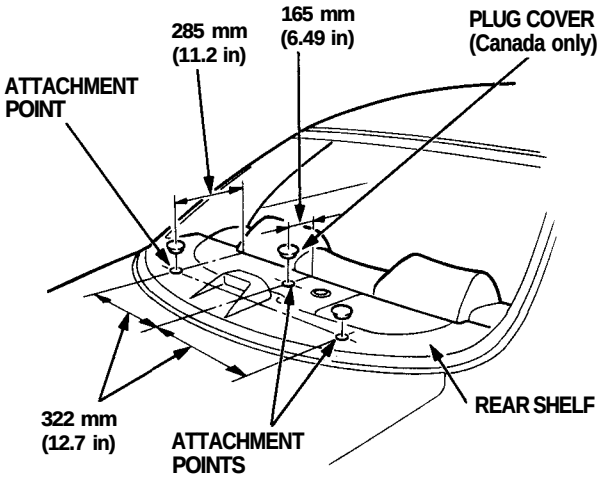
4. Check that the seat belt does not lock when pulled out slowly. The seat belt is designed to lock only during a sudden stop or impact.
5. Make sure that the seat belt will retract automatically when released.
6. For each passenger's seat belt, make sure that the locking mechanism in the seat belt retractor will engage when the seat belt is pulled all the way out.
7. Replace the seat belt with a new one if there is any abnormality.

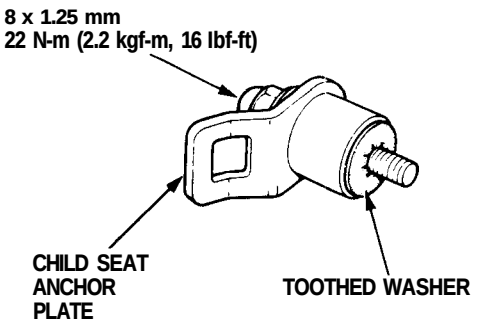
Child Seat Anchor Plate

Attachment points are provided for a rear seat mounted child restraint system which uses a top tether. The attachment points are located on the rear shelf, just behind the rear seat-back. When using a child seat with a top tether, install the child seat anchor plates securely.

NOTE:

- Remove the plug covers from the attachment points of the rear shelf (Canada).
- Use a razor blade or sharp knife to carefully cut a 1 inch diameter circle at the location of the attachment point (USA).





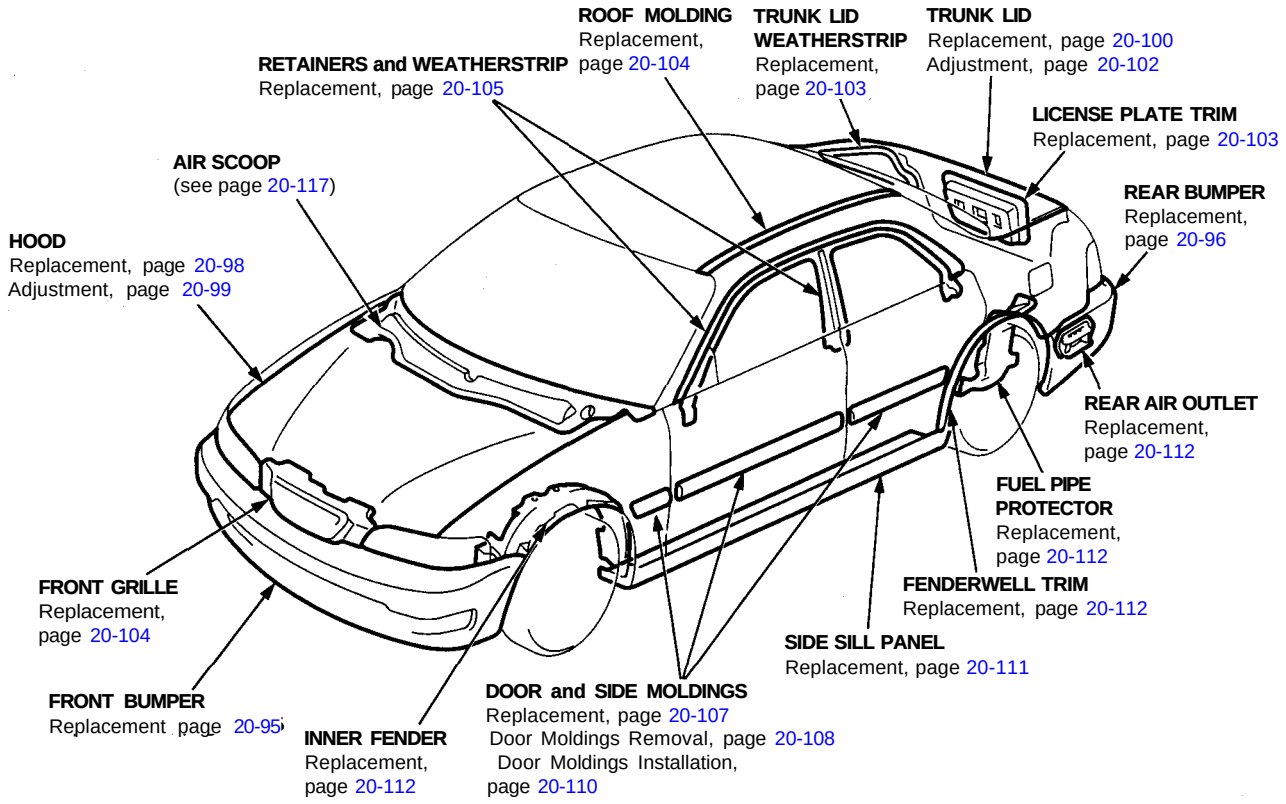
NOTE:

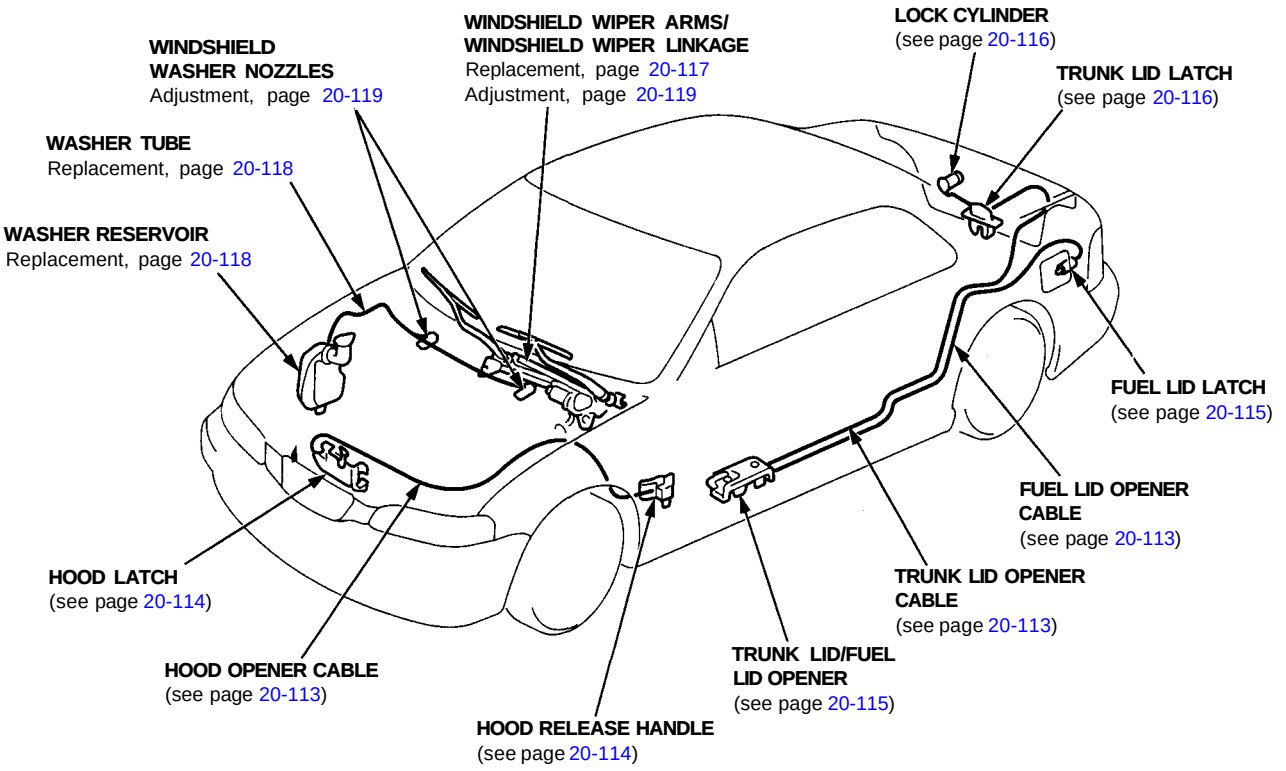
- Do not remove the toothed washer from the child seat anchor plate. Use the child seat anchor plate with the toothed washer attached to it.
- When installing a child seat on the rear seat, follow the instructions of the manufacturer of the child seat.
- Additional anchor plates are available.

⚠ WARNING Do not use the child seat anchor plate for any other purpose; it is designed exclusively for installation of a child seat.

Exterior/Opener Cable/Opener and Latch/Wiper and Washer

Component Location Index





Front Bumper

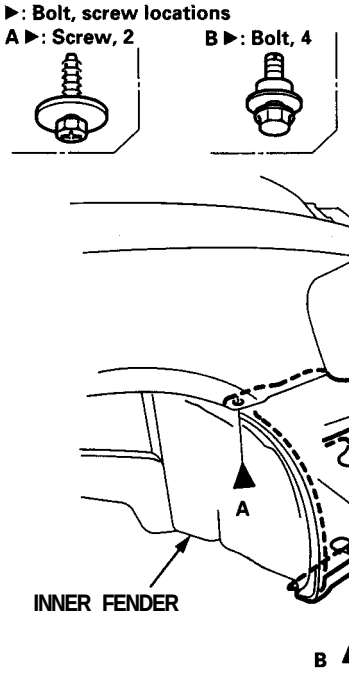
Replacement

CAUTION: Wear gloves to remove and install the front bumper.

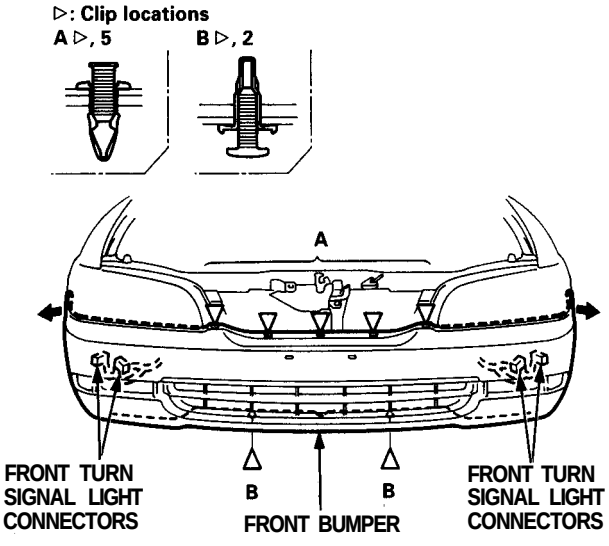
NOTE:
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front bumper and body.
- Open the hood.

1. Remove the front grille (see page 20-104).

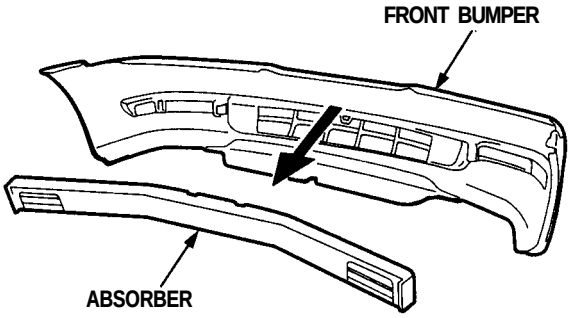
2. Remove the bolts and screw from each side.



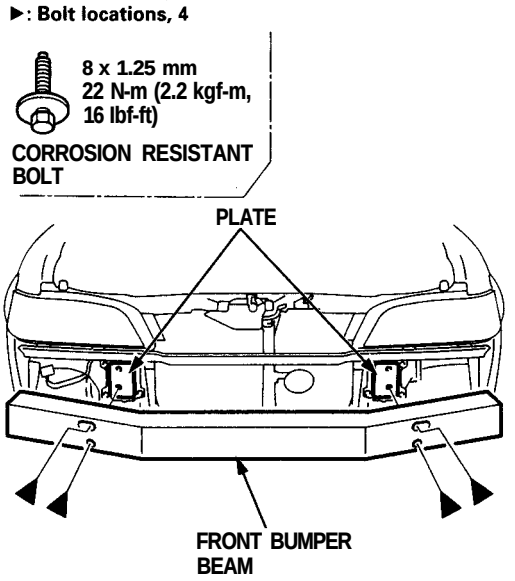
3. Remove the clips. Remove the front bumper, then disconnect the connectors.



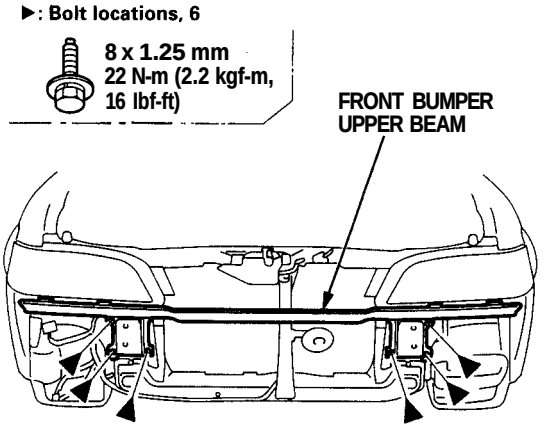
4. Remove the absorber from the front bumper.



5. Remove the front bumper beam.



6. Remove the front bumper upper beam.



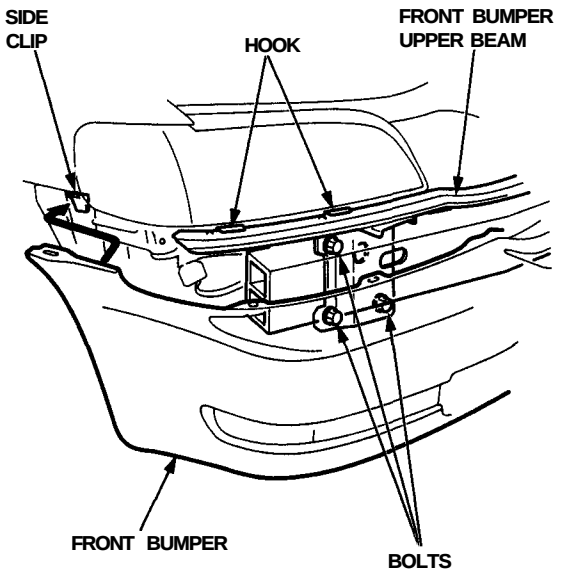
(cont'd)

Front Bumper

Replacement (cont'd)

7. Installation is the reverse of the removal procedure.

NOTE: Align the front bumper with the front fender and headlight properly, then tighten the bolts.



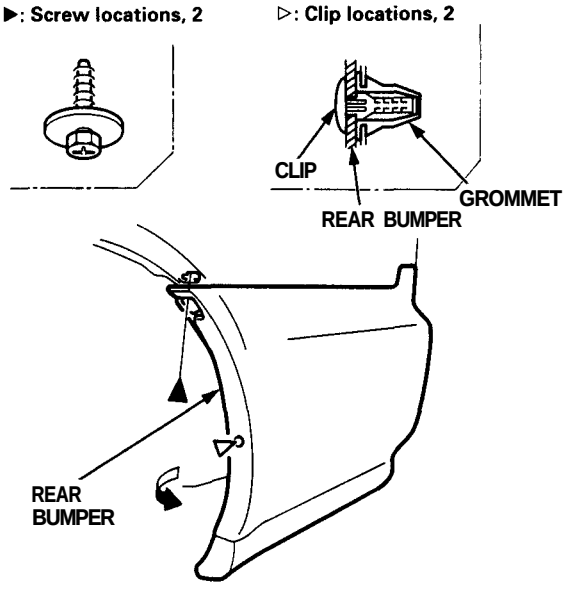
Rear Bumper

Replacement

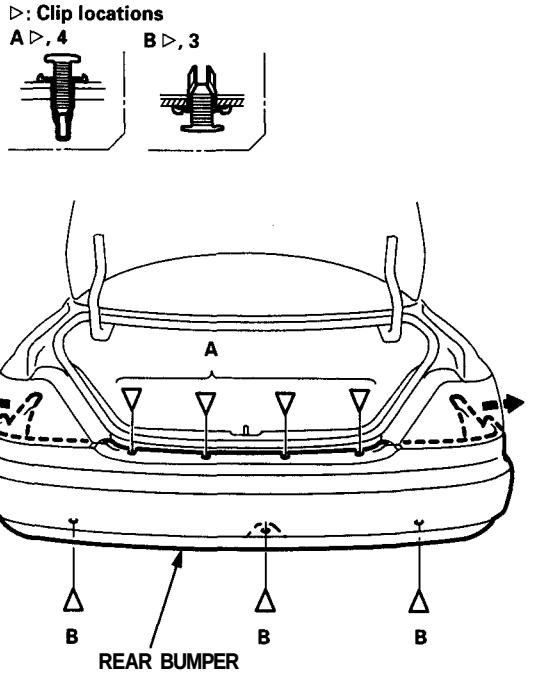
CAUTION: Wear gloves to remove and install the rear bumper.

NOTE:
- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the rear bumper and body.
- Open the trunk lid.

1. Remove the screws and clip from each side.

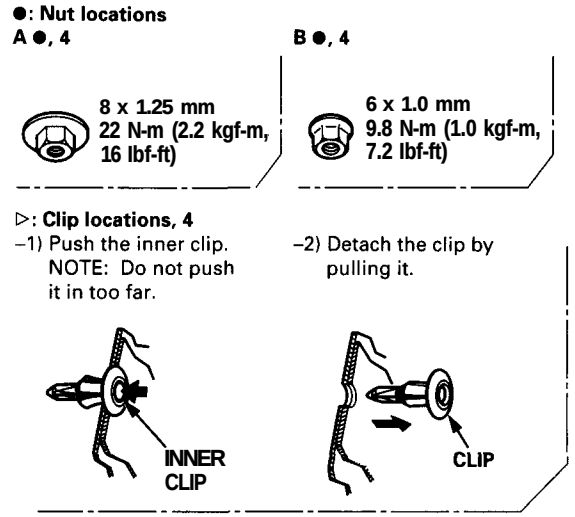


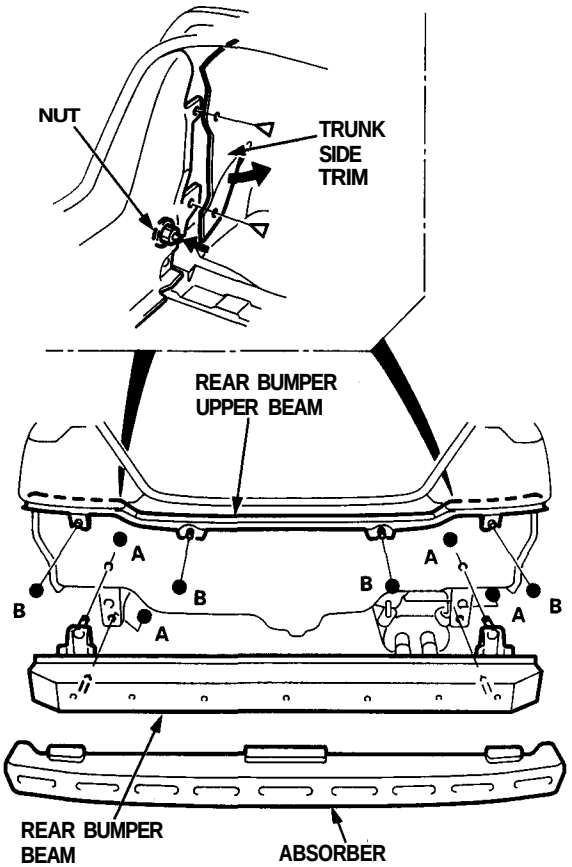
2. Remove the clips, then remove the rear bumper.



3. Pull the trunk side trim back, then remove the nut from the trunk area on each side.

4. Remove the nuts from under the rear floor on each side, then remove the absorber and rear bumper beam. Remove the nuts, then remove the rear bumper upper beam.

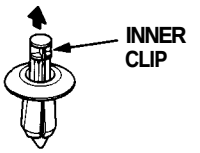




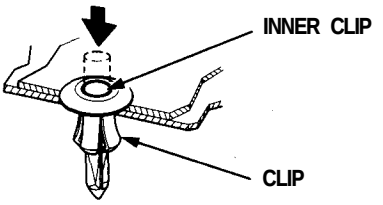
5. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- When installing the trunk side trim, install the clips as follows.

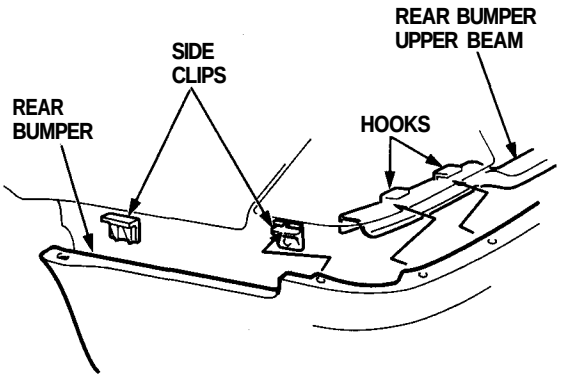
a. Pull the inner clip up as shown.



b. Install the clip in the trunk side trim, then push the inner clip until it's flush.



- Make sure the rear bumper engages the side clips and hooks on each side securely.

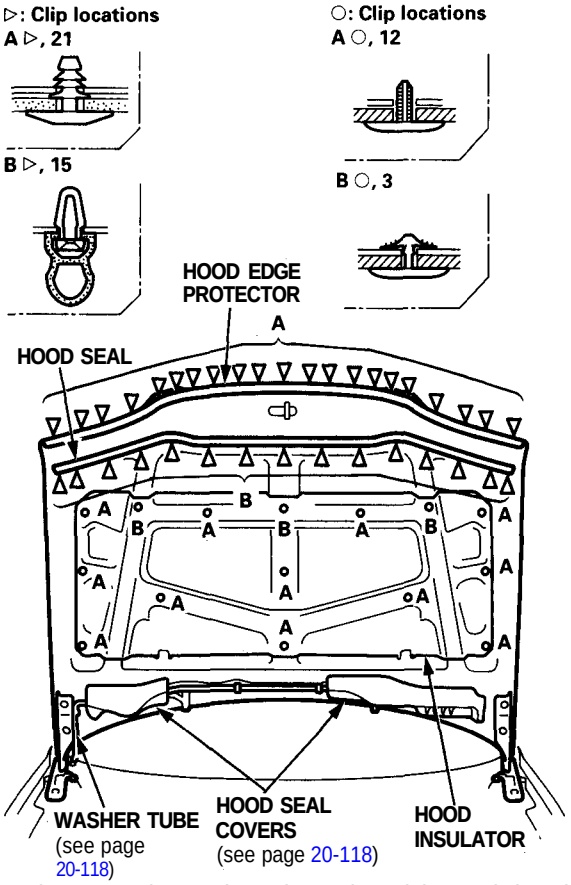


Hood

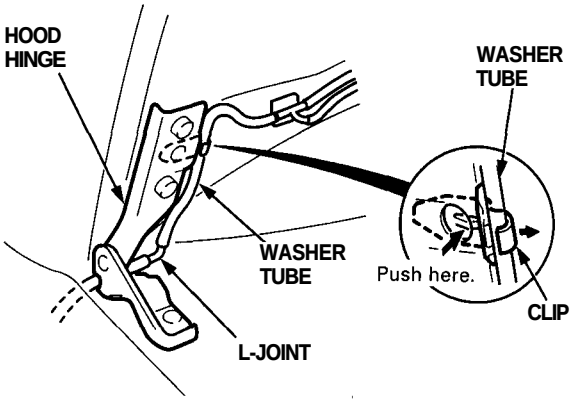
Replacement

NOTE:
- An assistant is helpful when removing the hood.
- Take care not to damage the hood and body.
- When removing the clips, use a clip remover.
- Open the hood.

1. If necessary, remove the hood edge protector and hood insulator.

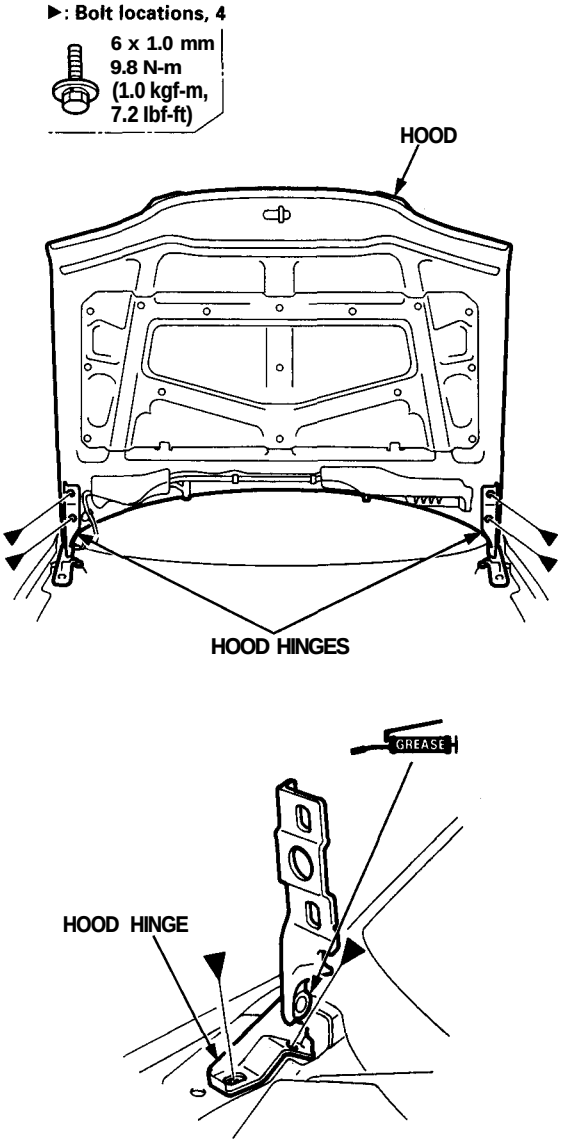


2. Disconnect the washer tube at the L-joint, and detach the clip from the hood hinge.



3. Remove the hood.

NOTE: If necessary, remove the hood hinge.



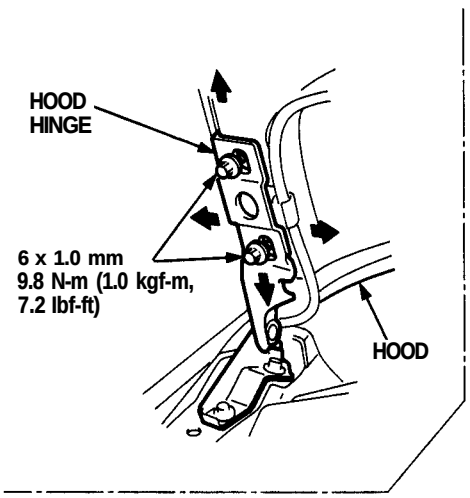
4. Installation is the reverse of the removal procedure.

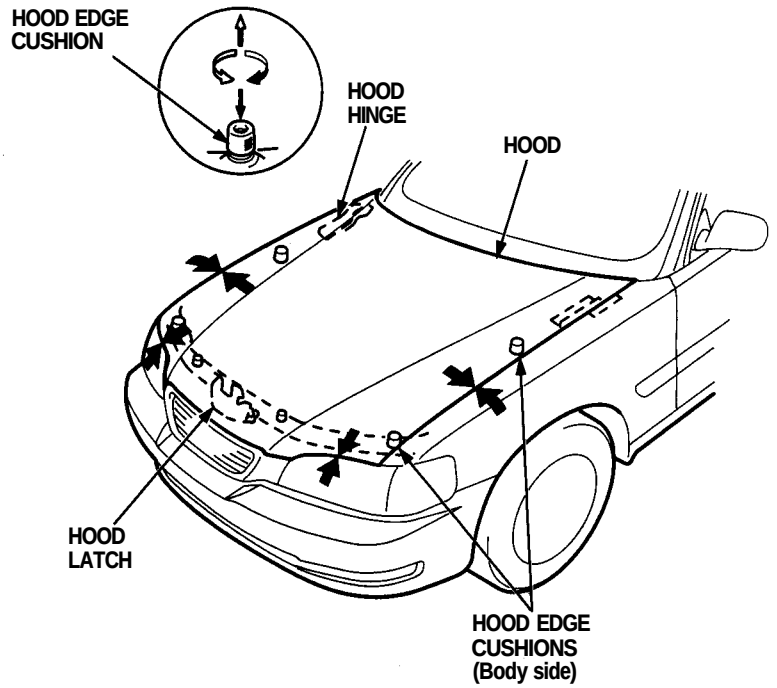
NOTE:
- If necessary, replace any damaged clips.
- Make sure the hood locks securely.
- Make sure the hood opens properly.
- Adjust the hood alignment.
- Adjust the aim of the windshield washer nozzles (see page 20-119).

Adjustment

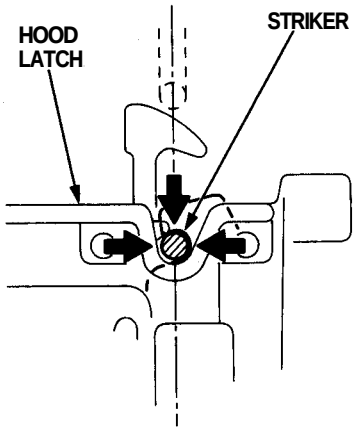
NOTE: Before adjusting the hood, loosen each bolt slightly.

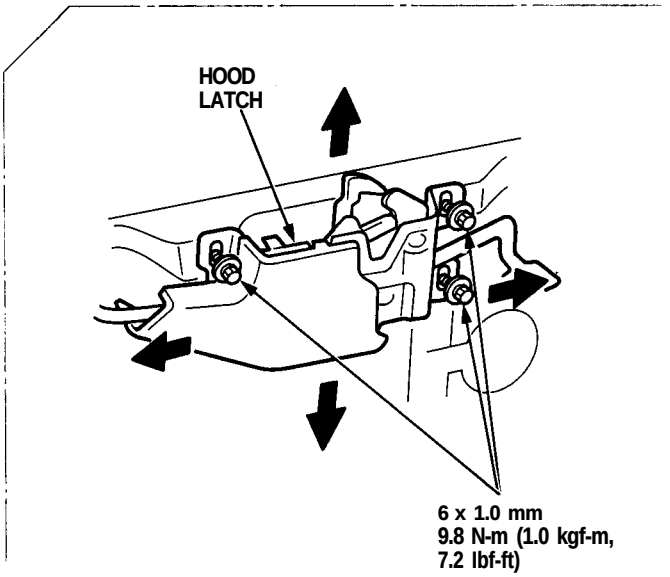
1. Adjust the hood hinges right and left, as well as fore and aft, by using the elongated holes.
2. Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.
3. Adjust the hood latch to obtain the proper height at the forward edge.
4. After adjustment, tighten each bolt securely.





NOTE: Move the hood latch right or left until the striker is centered in the hood latch as shown.





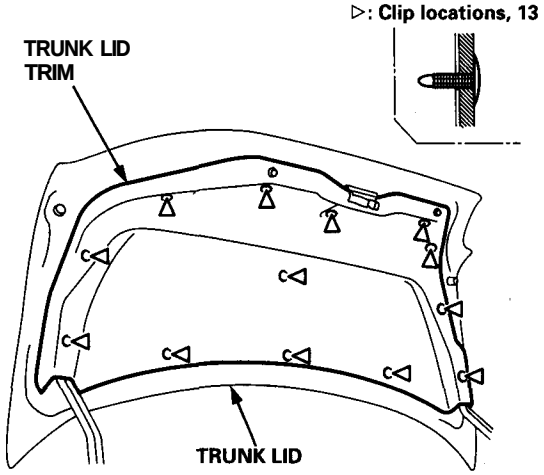
Trunk Lid

Replacement

CAUTION: Wear gloves to remove and install the trunk lid.

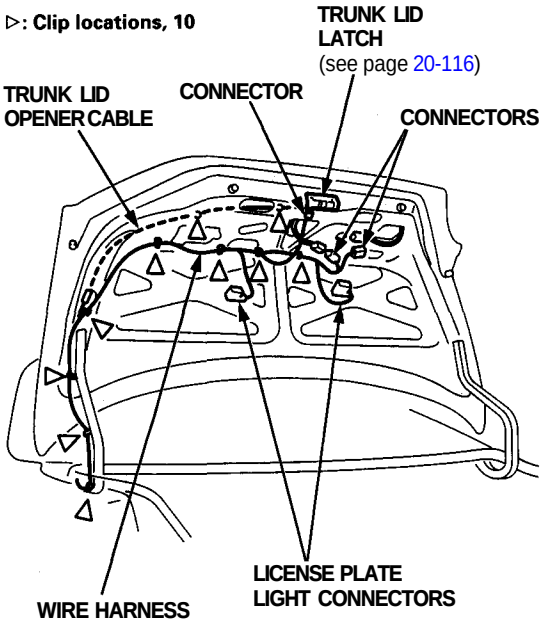
NOTE:
- An assistant is helpful when removing and installing the trunk lid.
- Take care not to damage the trunk lid and body.
- Take care not to scratch the trunk lid trim.
- Open the trunk lid.

1. Remove the trunk lid trim.

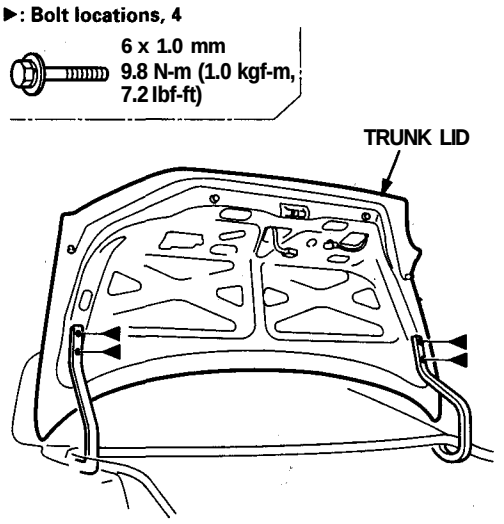


2. Disconnect the connectors and trunk lid opener cable. Remove the wire harness and trunk lid opener cable from the trunk lid.

NOTE: Before pulling out the opener cable, tie a string to the end of it so you can pull it back in when the trunk lid is reinstalled.

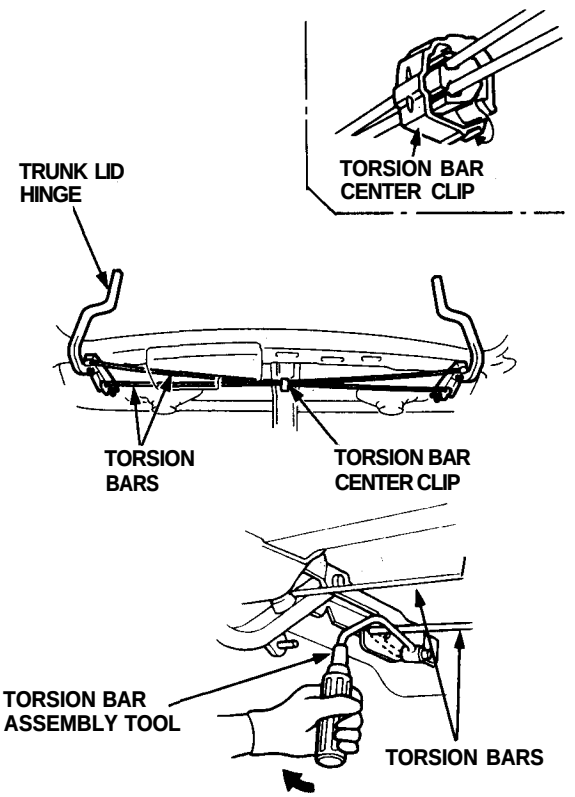


3. Remove the bolts, then remove the trunk lid.



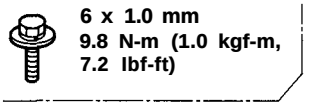
4. If necessary, remove the trunk lid hinge as follows.

a. Remove the rear shelf (see page 20-59).
b. Remove the torsion bars with the torsion bar assembly tool.

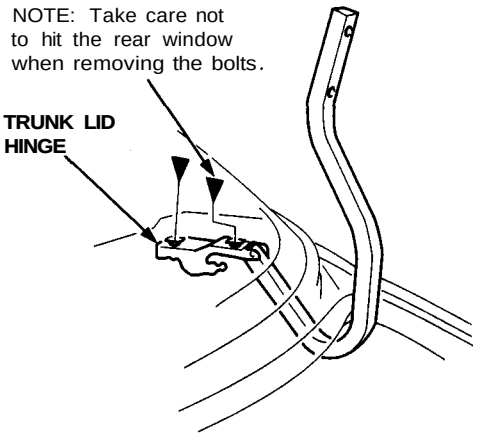


c. Remove the bolts, then remove the trunk lid hinge.

►: Bolt locations, 4



6 x 1.0 mm
9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)



5. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connectors are connected properly.
- Adjust the torsion bars fore or aft with the torsion bar assembly tool as shown.



○ = Normal position
● = Higher tension

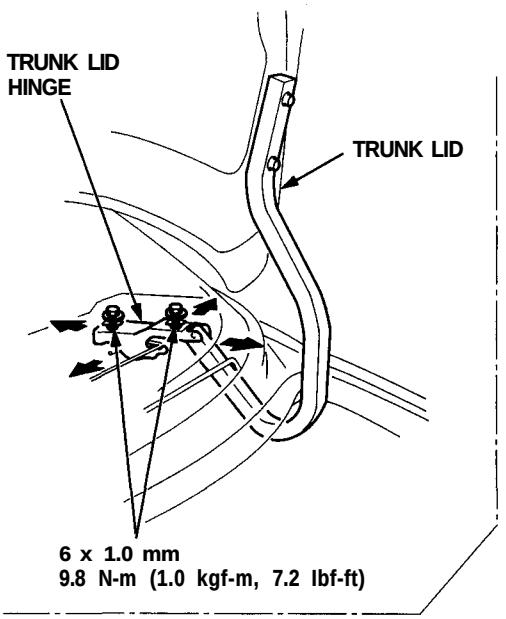
- Make sure the trunk lid locks securely.
- Make sure the trunk lid opens properly.
- Adjust the trunk lid alignment (see page 20-102).

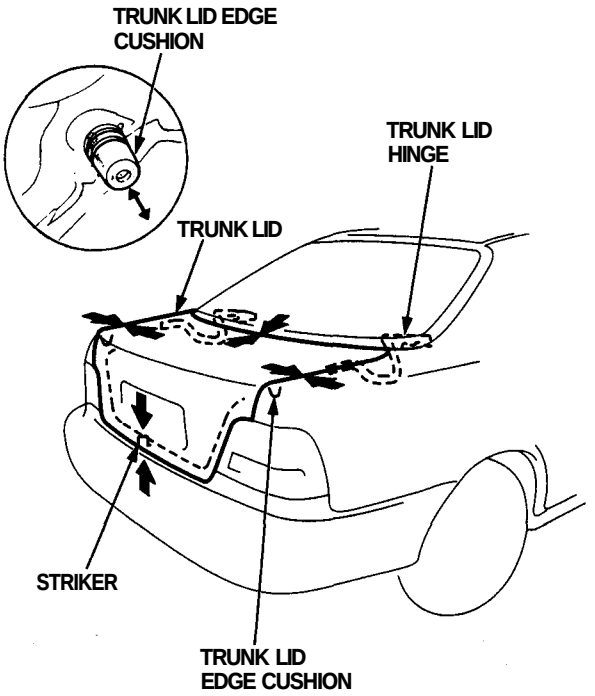
Trunk Lid

Adjustment

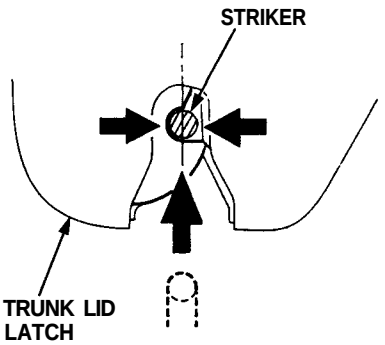
NOTE: Before adjusting the trunk lid, loosen each bolt slightly.

1. Adjust the trunk lid hinges right and left, as well as fore and aft, by using the elongated holes.
2. Turn the trunk lid edge cushions, as necessary, to make the trunk lid fit flush with the body at the rear and side edges.
3. Adjust the fit between the trunk lid and the trunk lid opening by moving the striker.
4. After adjustment, tighten each bolt securely.

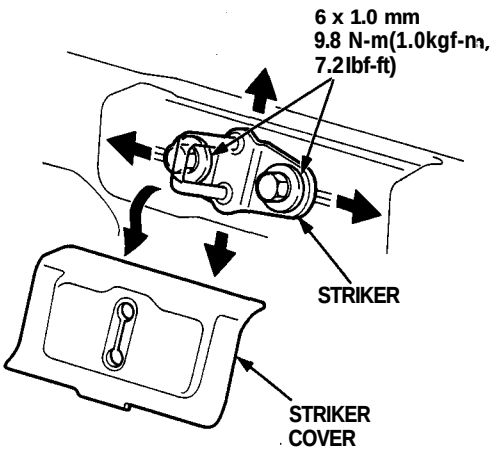




NOTE: Move the striker right or left until it's centered in the trunk lid latch as shown.



NOTE: When adjusting the striker, remove the rear trim panel (see page 20-61), then remove the striker cover.

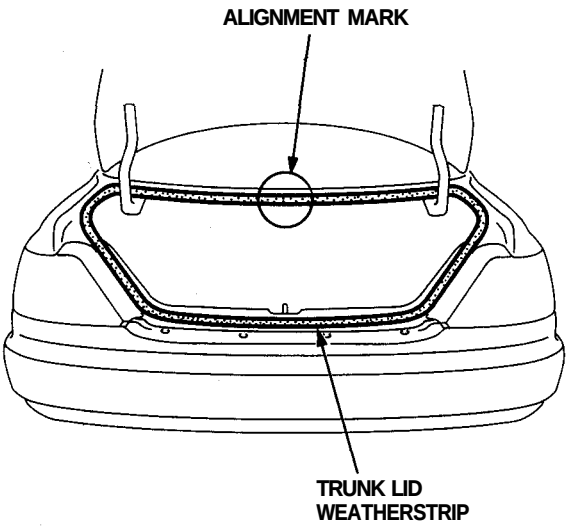


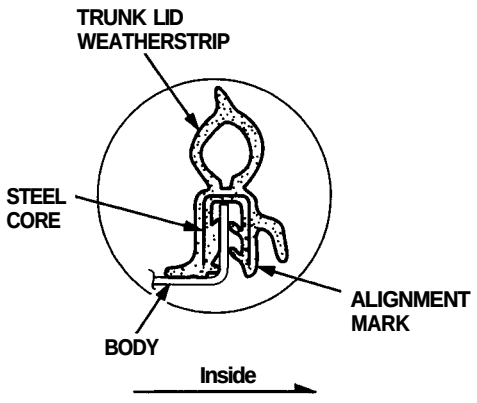
Trunk Lid Weatherstrip

Replacement

When installing the trunk lid weatherstrip, align it with the alignment mark on the trunk lid opening.

NOTE:
- Make sure there are no wrinkles in the weatherstrip.
- Check for water leaks.





License Plate Trim

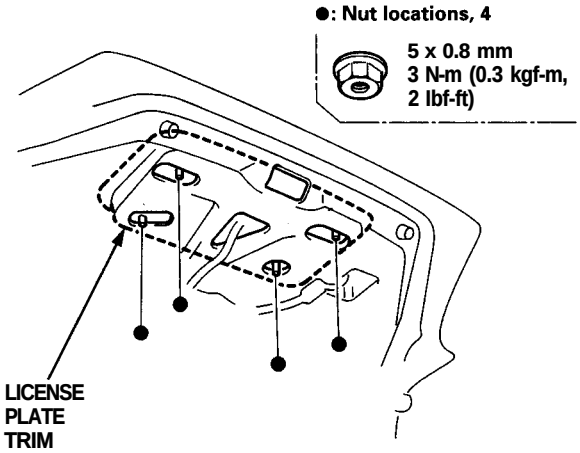
Replacement

CAUTION: Wear gloves to remove and install the license plate trim.

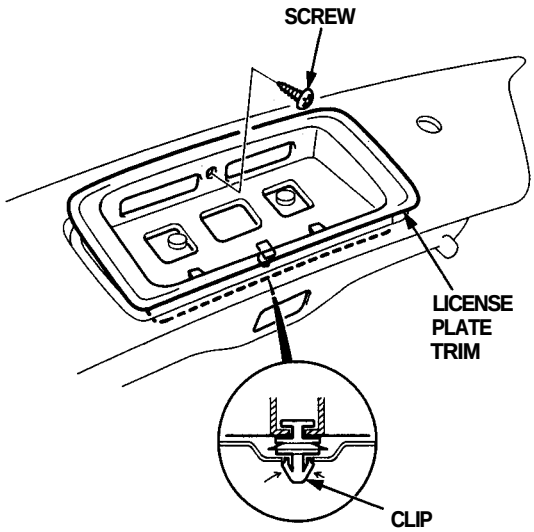
NOTE:
- Take care not to scratch the trunk lid.
- Remove the license plate.

1. Open the trunk lid, then remove the trunk lid trim (see page 20-100).
2. Remove the trunk lid latch (see page 20-116).
3. Remove the nuts.

   NOTE: Take care not to drop the nuts inside the trunk lid.



4. Remove the screw and detach the clip, then remove the license plate trim.



5. Installation is the reverse of the removal procedure.

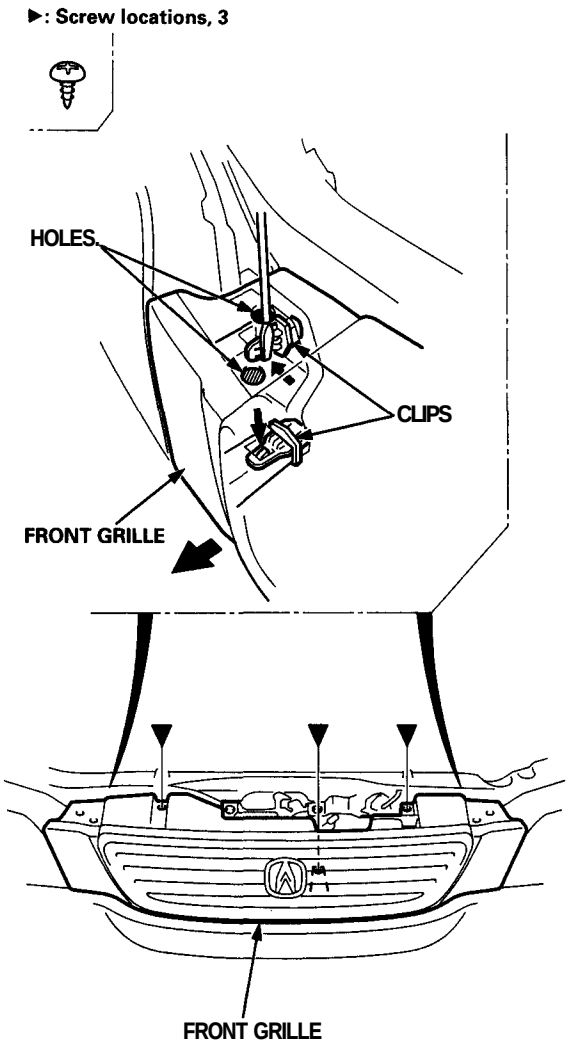
   NOTE: If damaged, replace the clip.

Front Grille

Replacement

NOTE: Take care not to scratch the front grille and front bumper.

1. Open the hood, then remove the screws.
2. Detach the clips on each side with a flat tip screwdriver, then remove the front grille.



3. If necessary, disassemble the front grille.
4. Installation is the reverse of the removal procedure.

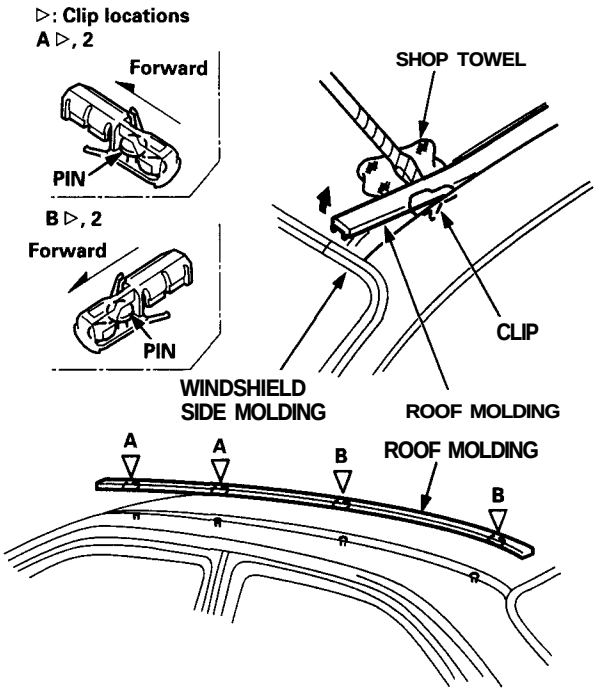
NOTE: If necessary, replace any damaged clips.

Roof Molding

Replacement

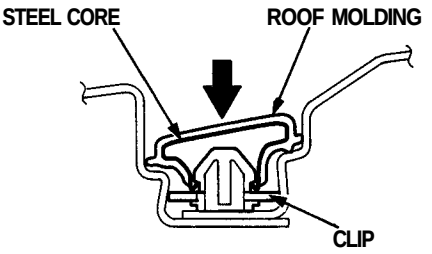
CAUTION:
- **Wear gloves to remove the roof molding.**
- **When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.**

NOTE:
- Take care not to scratch the body.
- The steel core in the roof molding cannot be restored to it original shape once it is bend. Replace the roof molding when the steel care is bend.
- Starting at the front, carefully pry the roof molding.



To install the roof molding, remove any damaged clips from the roof molding, install new clips on the body, then install the roof molding on the car.

NOTE:
- Take care not to damage the windshield side molding.
- Make sure the roof molding is installed securely.



Retainers and Weatherstrip

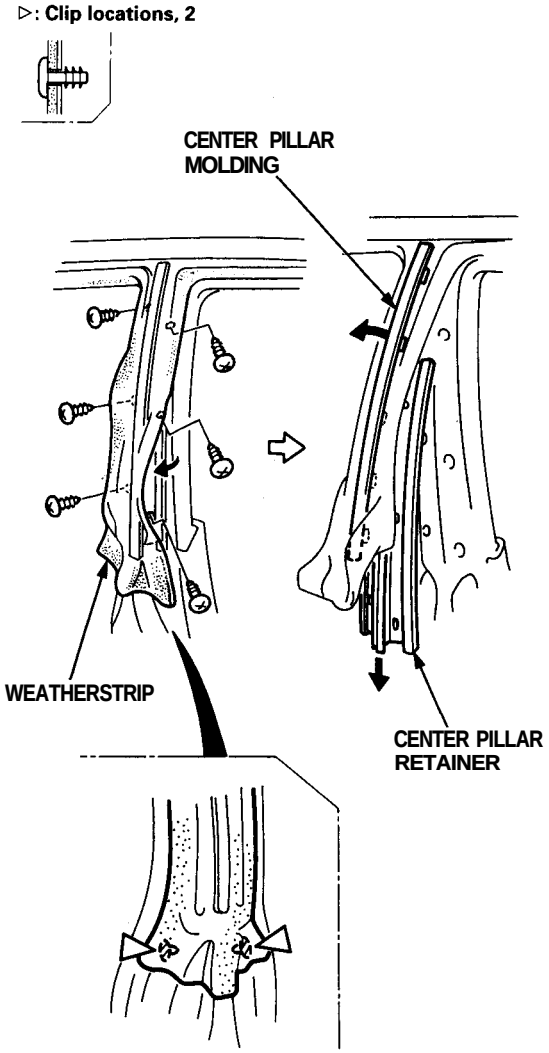
Replacement

CAUTION: Wear gloves to remove and install the retainers.

NOTE:
- Take care not to bend the retainers and not to scratch the body.
- If the weatherstrip is damaged, replace it with a new one.

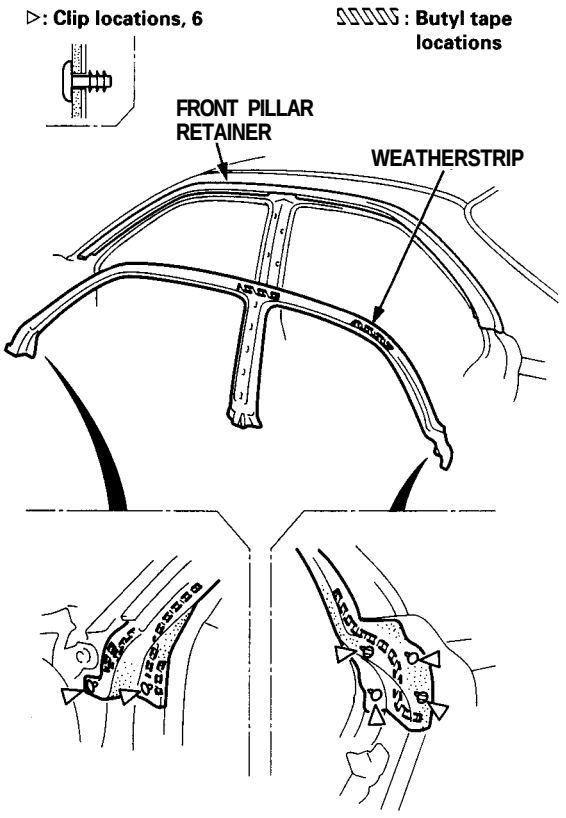
1. Detach the clips from the center pillar lower portion, and remove the screws while peeling back the weatherstrip.

2. Remove the center pillar retainer by sliding it down, then remove the center pillar molding from the weatherstrip.



3. Detach the clips, then pull away the weatherstrip.

NOTE:
- Remove the bonded portions of the weatherstrip gradually.
- If the old weatherstrip is to be reinstalled, scrape off the old butyl tapes, then clean the weatherstrip surface with alcohol. Glue the new butyl tapes on the weatherstrip.

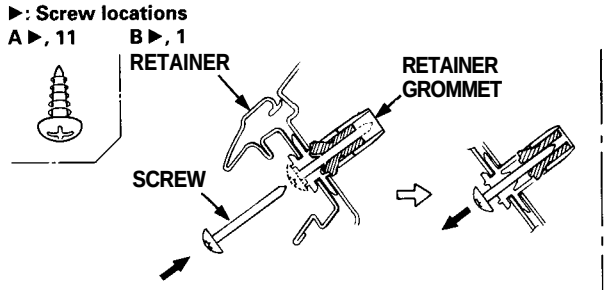


(cont'd)

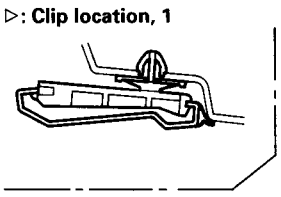
Retainers and Weatherstrip

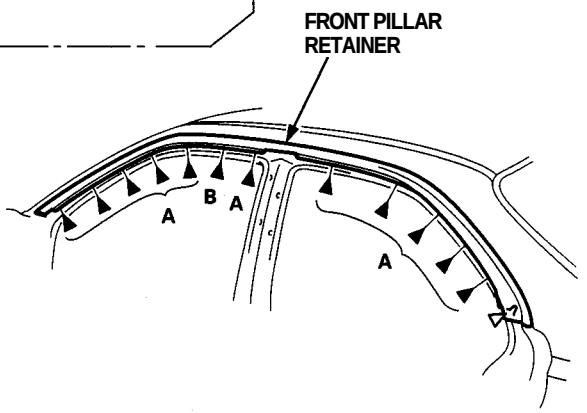
Replacement (cont'd)

4. Remove the screws, and detach the retainer grommet and clip, then remove the front pillar retainer.



Retainer grommet removal:
1) Remove or loosen the screw.
2) Place the screw in the retainer grommet again (do not screw it in) and press it down.
3) Pull the screw with the retainer grommet and retainer out of the body.



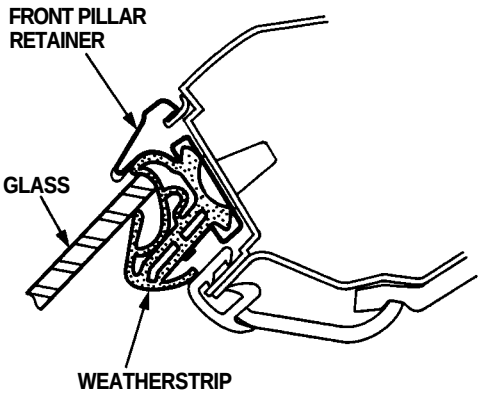


NOTE: When installing the retainer, align the retainer grommet and clip with the body holes.

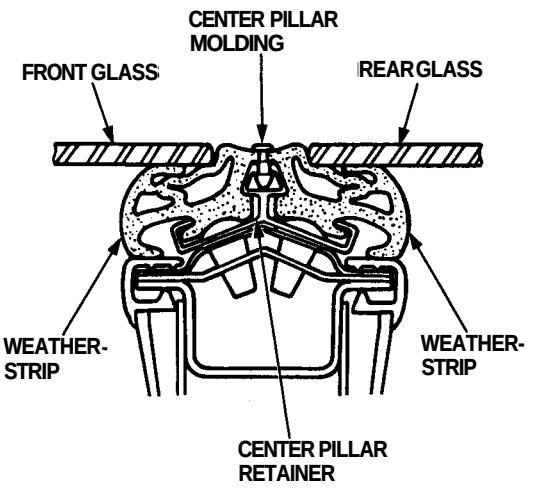
5. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Make sure the weatherstrip is installed on the retainers properly.
- If necessary, adjust the position of the door glass (see page 20-24).
- Check for water leaks.

Roof side section:



Center pillar section:



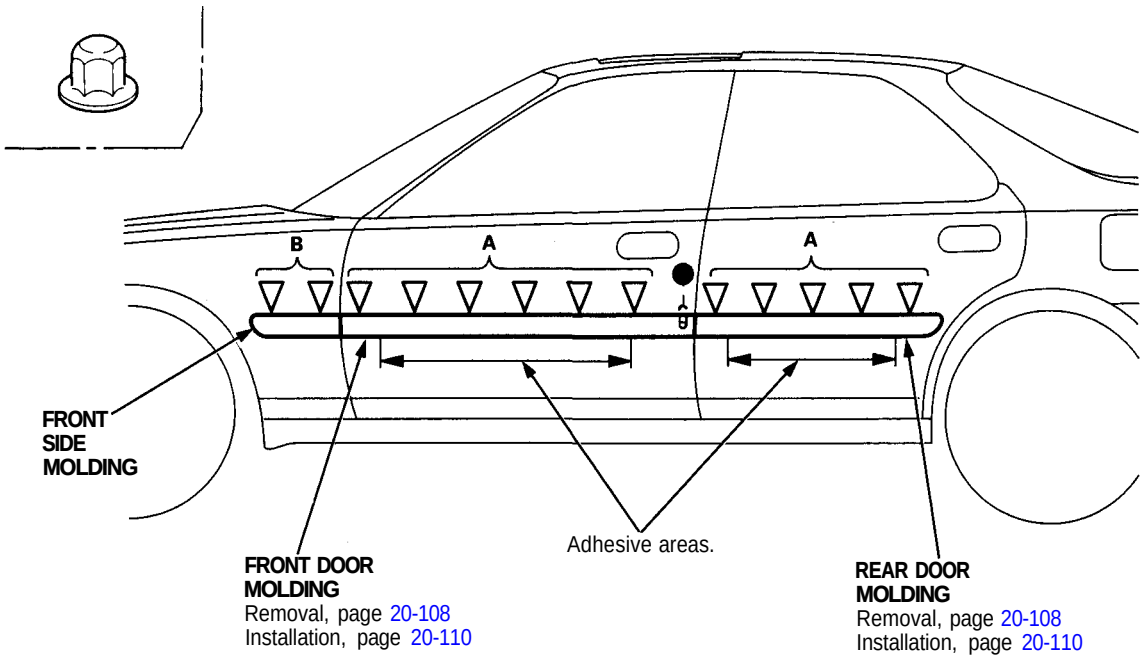
Door and Side Moldings

Replacement

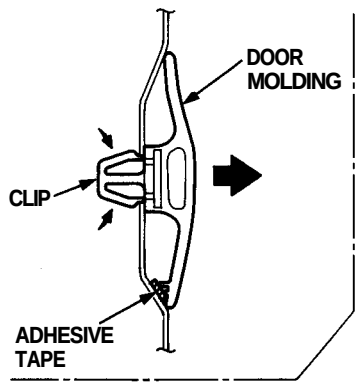
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE:
- To remove the front side molding, remove the inner fender (see page 20-112).
- To remove the door molding, remove the door panel and plastic cover (see pages 20-4, 20-15).
- Take care not to bend the door moldings.
- Before reassembling, clean the door bonding surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.

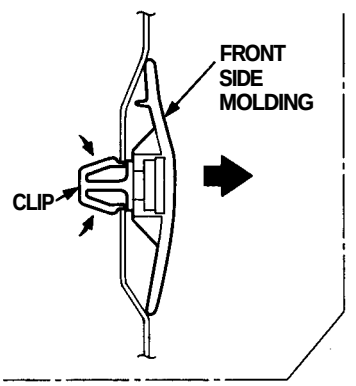
●: Plastic nut location, 1



▷: Clip locations
A ▷, 11



B ▷, 2



Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Door Moldings

Removal

To following materials and tools are required to repair the door moldings.

NOTE: Follow the manufacturer's instructions.

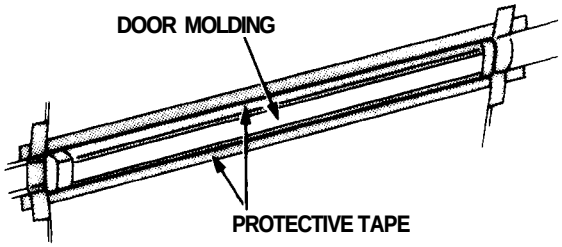
Materials: (Reference)
- Stripe remover
  3M 08907
- Stripe adhesive remover
  3M 08908
- Adhesive tape
  3M Super Automotive Attachment Tape

Tools:
- Protective tape
- Knife or Cutter
- Sponge or Shop towel
- Infrared dryer
- Film
- Putty knife
- Alcohol

CAUTION: Wear gloves to remove and install the door moldings.

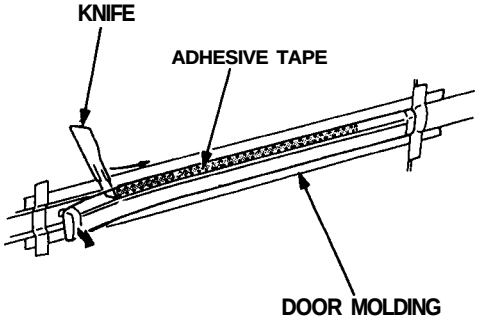
1. Remove the door panel and pull back the plastic cover (see pages 20-4, 20-15).

2. Apply protective tape on and around the molding.

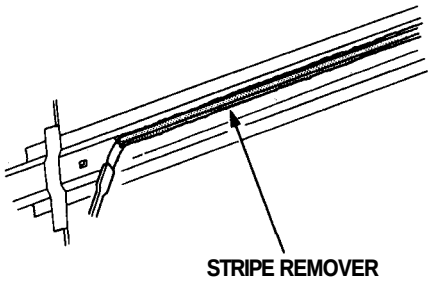


3. Release the clips from inside of the door.
   Carefully cut the adhesive tape with a knife or cutter while pulling the edge of the molding away from the door as shown.

   NOTE: Take care not to scratch or bend the molding.

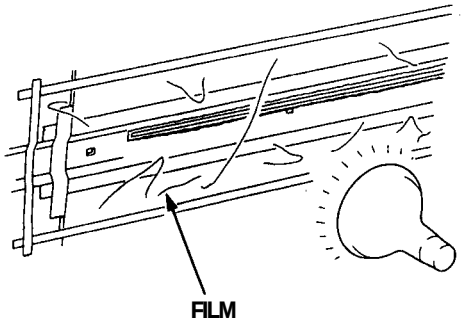


4. Apply the stripe remover evenly to the bonding surface of the door.

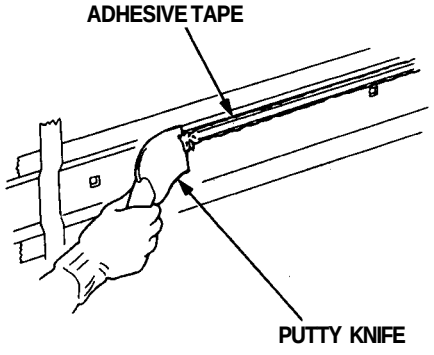


5. Cover the bonding surface of the door with a film, then heat to 104 - 122°F (40 - 50°C) for 5-10 minutes with an infrared dryer.

   NOTE: Use care when heating to prevent deformation of the door.



6. Scrape the adhesive tape with a putty knife.



7. For removal of adhesive tape residue, follow-up with stripe adhesive remover, then scrape the adhesive tape with a putty knife.

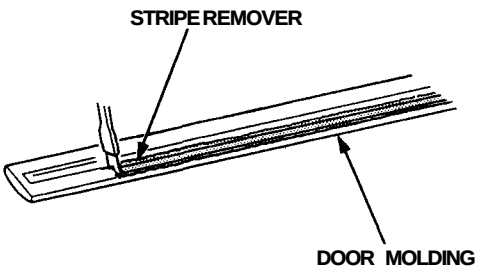
8. Peel off the protective tape, then clean the bonding surface with a sponge dampened in alcohol.

   NOTE: Make sure the bonding surface is kept free or water, oil and grease.

9. Remove the clips from the molding.

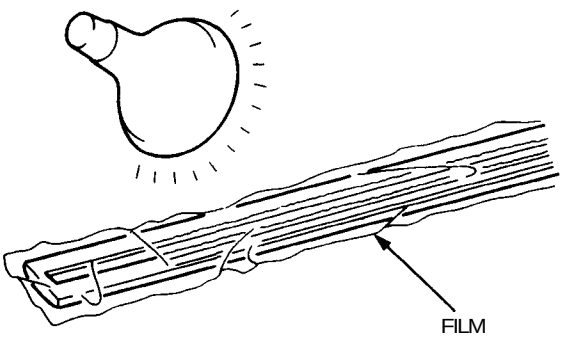
   NOTE: If necessary, replace any damaged clips.

10. Apply the stripe remover evenly to the bonding surface of the molding.

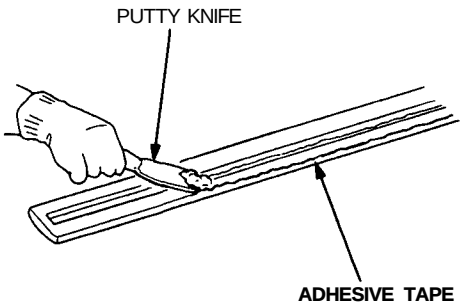


11. Wrap the molding with film, then heat to 104- 122°F (40 - 50°C) for 5 - 10 minutes with an infrared dryer.

    NOTE: Use care when heating to prevent deformation of the molding.



12. Scrape the adhesive tape with a putty knife.



13. For removal of adhesive tape residue, follow-up with stripe adhesive remover, then scrape the adhesive tape with a putty knife.

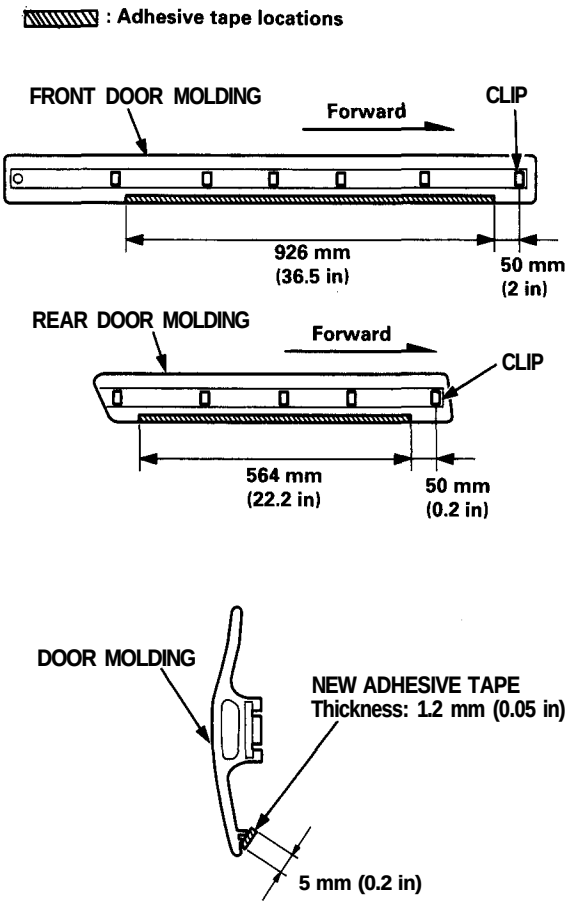
14. Peel off the protective tape, then clean the molding with a sponge dampened in alcohol.

    NOTE: Make sure the bonding surface is kept free of water, oil and grease.

Door Moldings

Installation

1. Glue the new adhesive tape to the moldings as shown.



2. Install the clips on the molding.

3. Heat the bonding surface of the door and door molding with an infrared dryer.
   Door: 104- 140°F (40-60°C)
   Molding: 68 - 86°F (20 - 30°C)

   NOTE: Use care when heating to prevent deformation of the molding.

4. Align the molding with the clip locations and set the molding. Lightly push on the molding until its edge is fully seated on the adhesive tape.

   NOTE: Do not spray water on the molding within the first 24 hours after installation.

5. Reassemble all removed parts.

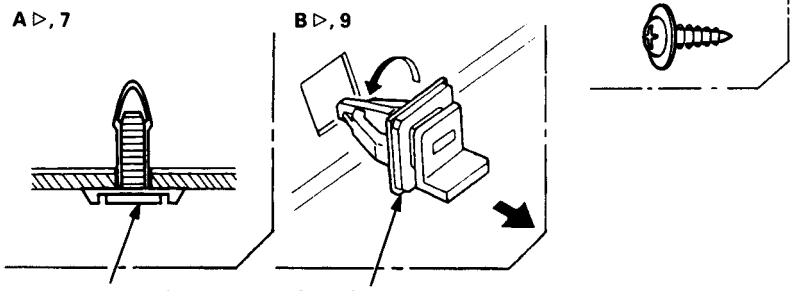
Side Sill Panel

Replacement

NOTE: Take care not to scratch the body.

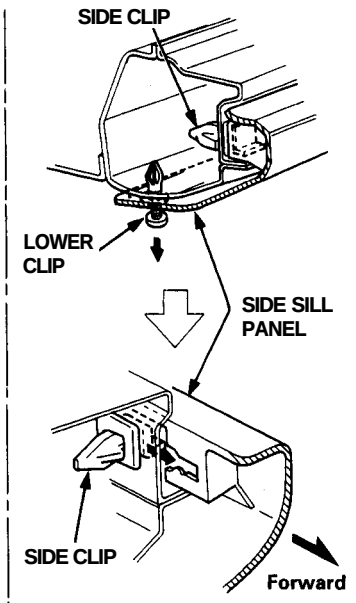
▷: Clip locations

►: Screw locations, 4

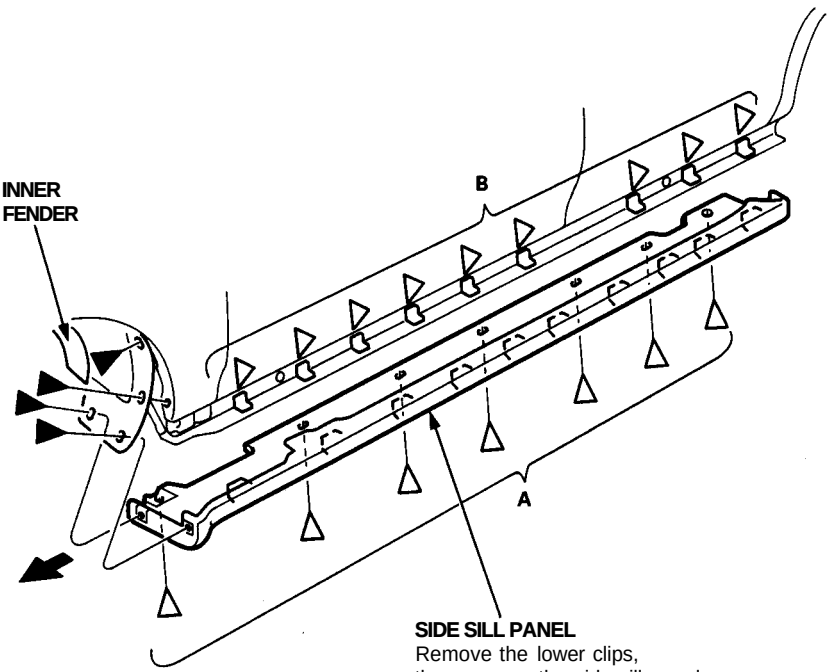


NOTE: Loosen the screw, then remove the lower clip using a clip remover.

SIDE CLIP
Remove the side clips from the body by turning them 45°



NOTE: When removing the side sill panel, the side clips will stay in the body.



SIDE SILL PANEL
Remove the lower clips, then remove the side sill panel by sliding it forward.

To install the side sill panel, remove the side clips from the body, install them on the side sill panel, then install the side sill panel on the car.

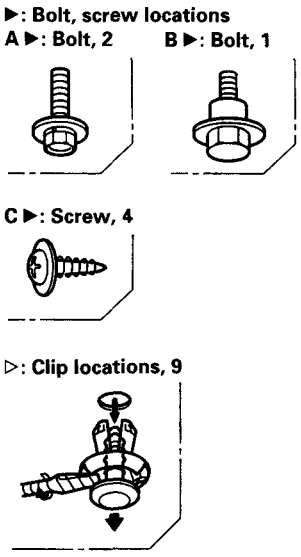
NOTE:
- Take care not to twist the side sill panel.
- If necessary, replace any damaged side and lower clips.

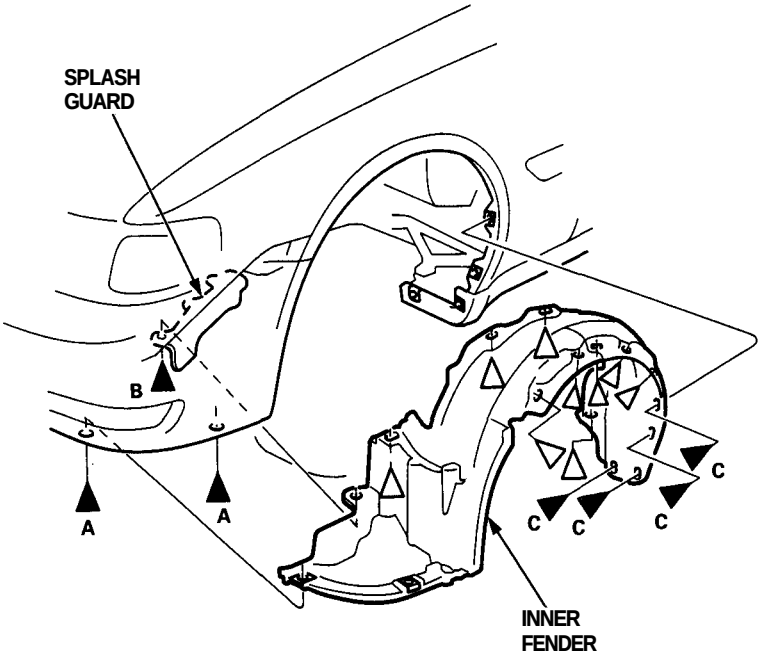
Inner Fender, Fenderwell Trim, Fuel Pipe Protector and Rear Air Outlet

Replacement

NOTE: If necessary, replace any damaged clips.

Innerfender:

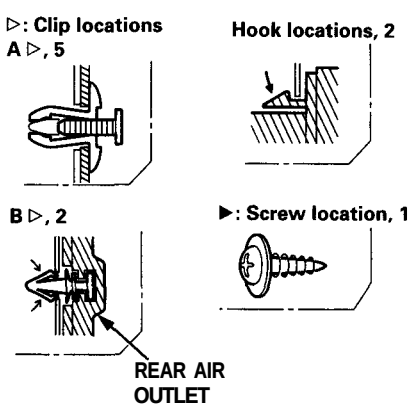


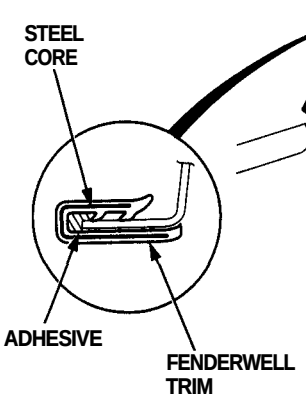


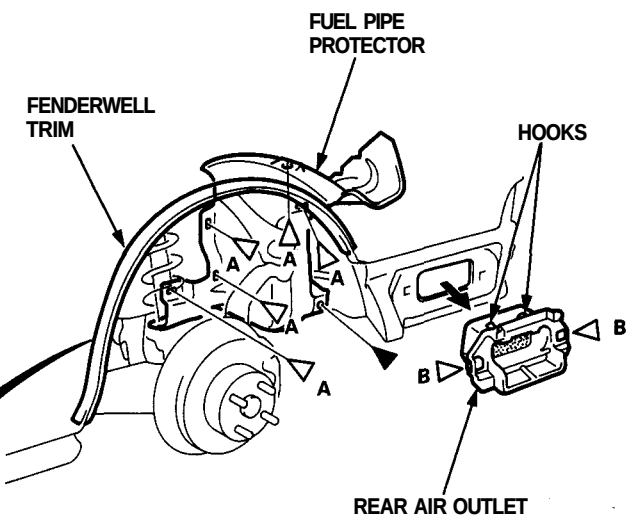
Fenderwell trim/Fuel pipe protector/Rear air outlet:

NOTE:

- Take care not to bend the fenderwell trim.
- Before installing the fenderwell trim, clean the body bonding surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease or water from getting on the surface.
- To remove the fuel pipe protector, first remove the rear wheel (see section 18).
- To remove the rear air outlet, first remove the rear bumper (see page 20-96).







Opener Cables

Replacement

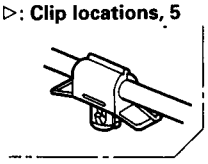
NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the opener cables.

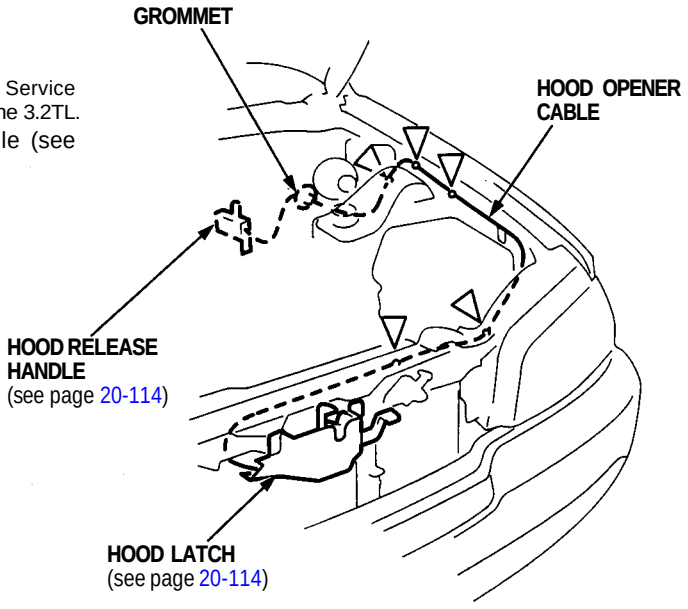
Hood opener cable:

NOTE: Refer to page 20-10a of the '96-98 Acura 3.2TL Service Manual supplement forfor the differences on this page for the 3.2TL.

NOTE: Open the hood, and remove the front grille (see page 20-104).

▷: **Clip locations, 5**



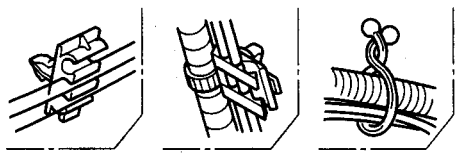


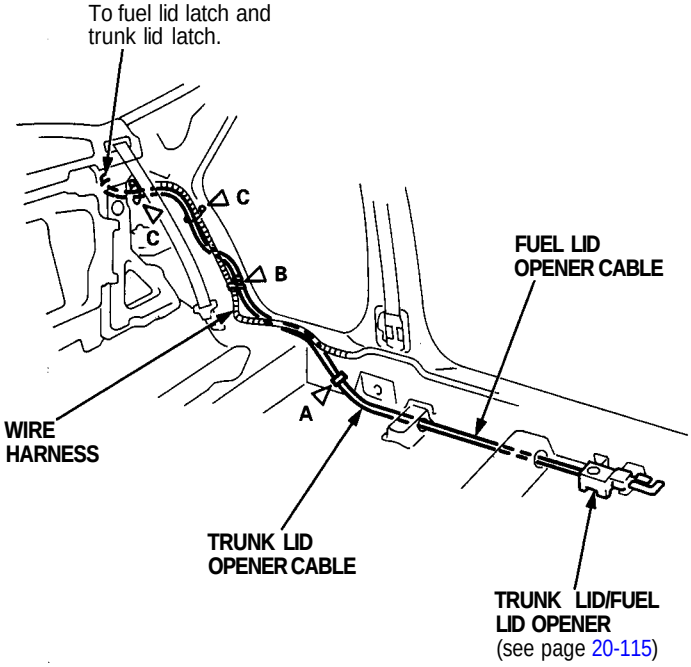
Trunk lid/Fuel lid opener cable:

NOTE: Remove the following parts from the left side of the vehicle, then pull the carpet back, as necessary (see page 20-62).

- Front and rear door sill moldings (see page 20-57).
- Center pillar lower trim (see page 20-57).
- Rear seat cushion and rear seat-back (see page 20-85).
- Rear seat side trim (see page 20-58).
- Spare tire lid and trunk side trim (see page 20-60).
- Trunk lid trim (see page 20-100).

▷: **Clip locations**
A ▷, 1 **B ▷, 1** **C ▷, 2**

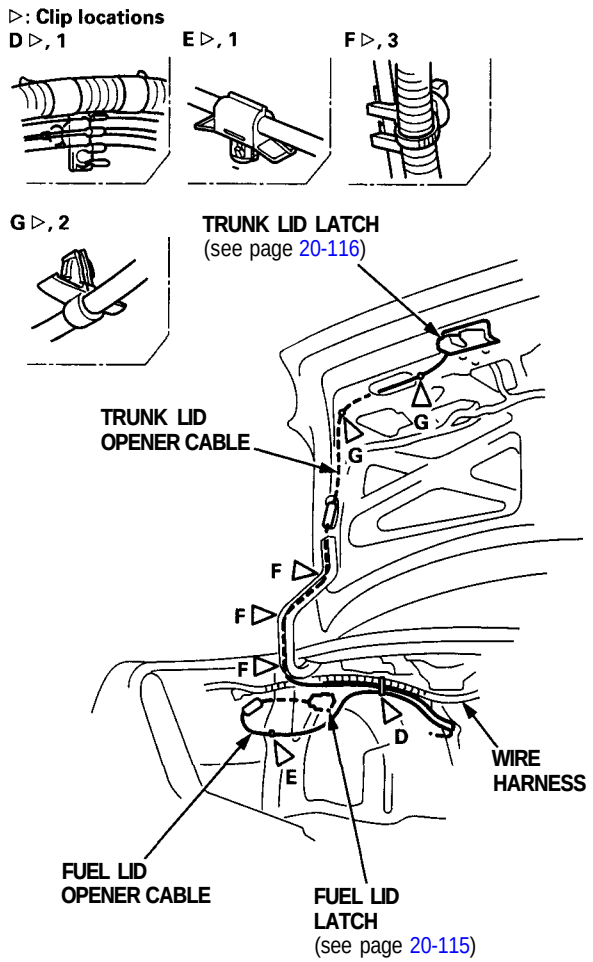




(cont'd)

Opener Cables

Replacement (cont'd)



Installation is the reverse of the removal procedure.

NOTE:

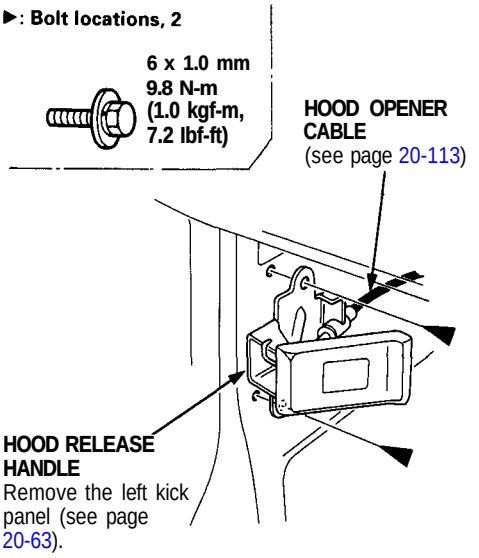
- Make sure each opener cable is routed and connected properly.
- Make sure the hood, trunk lid and fuel lid open properly.

Opener and Latch

Replacement

NOTE: Take care not to bend the opener cables.

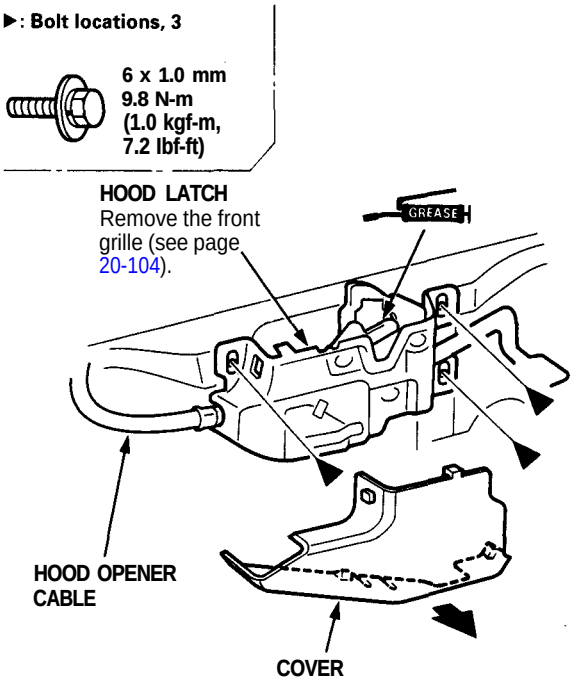
Hood release handle:



Hood latch:

NOTE: Refer to page 20-11a of the '96-98 Acura 3.2TL Service Manual supplement forfor the differences on this page for the 3.2TL.

NOTE: If necessary, remove the cover.



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the opener cable is connected properly.
- Make sure the hood locks securely.
- Make sure the hood opens properly.

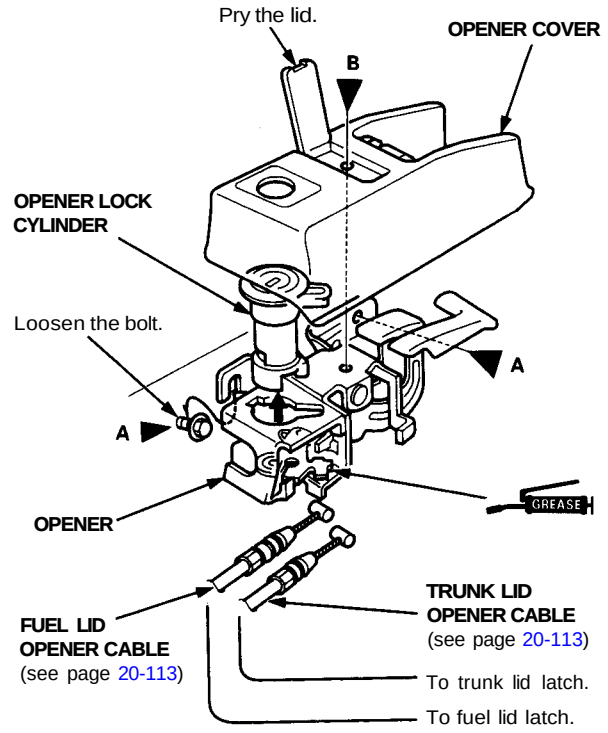
Trunk lid/Fuel lid opener:

▶: Bolt, screw locations

A ▶: Bolt, 2

6 x 1.0 mm
9.8 N-m
(1.0 kgf-m,
7.2 lbf-ft)

B ▶: Screw, 1



Installation is the reverse of the removal procedure.

NOTE:

- Make sure the opener cable is connected properly.
- Make sure the trunk lid and fuel lid open properly.

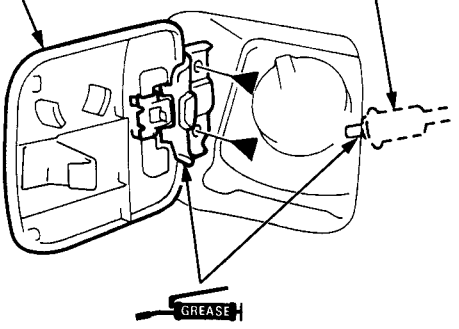
Fuel lid latch:

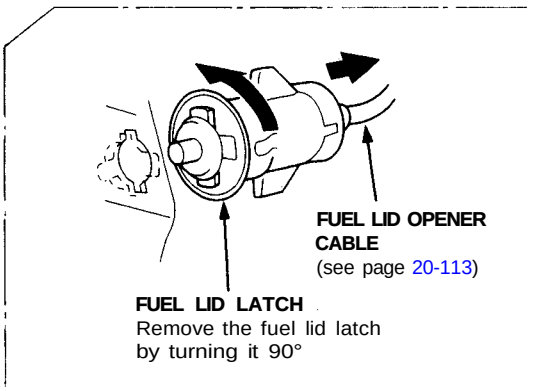
▶: Bolt locations, 2

6 x 1.0 mm
9.8 N-m (1.0 kgf-m,
7.2 lbf-ft)

FUEL LID
After installing, check for a flush fit with the body.

FUEL LID LATCH
Pull the rear edge of the left trunk side trim back (see page 20-60).





Installation is the reverse of the removal procedure.

NOTE:

- Make sure the opener cable is connected properly.
- Make sure the fuel lid locks securely.
- Make sure the fuel lid opens properly.

(cont'd)

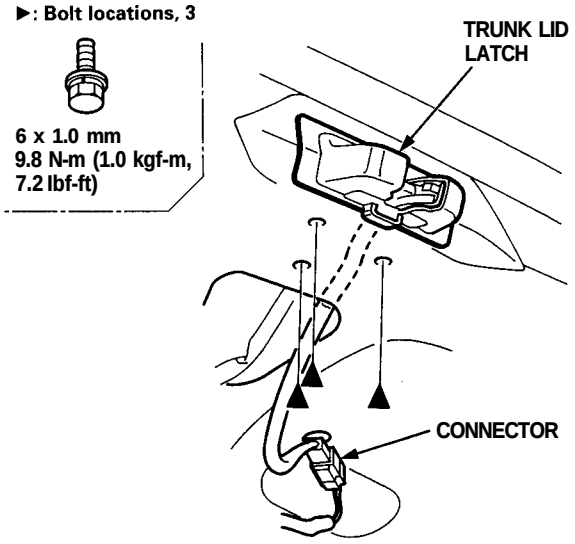
Opener and Latch

Replacement (cont'd)

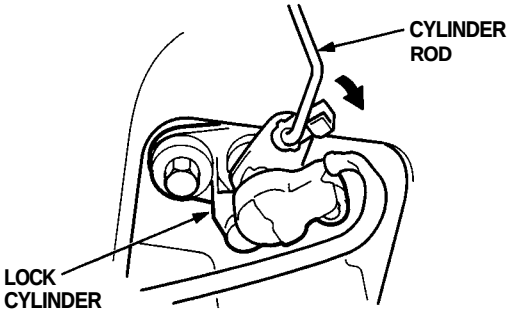
Trunk lid latch/Lock cylinder:

1. Remove the trunk lid trim (see page 20-100).

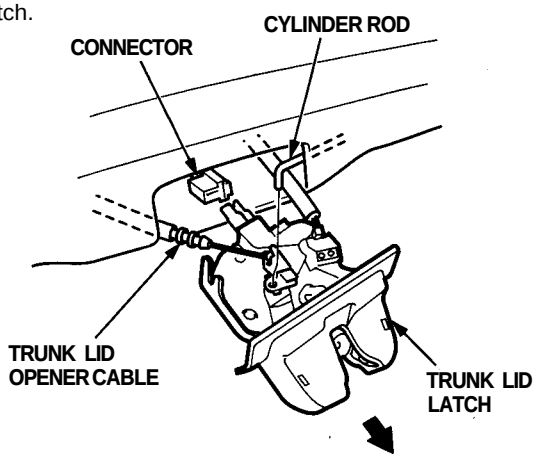
2. Remove the bolts, and disconnect the connector.



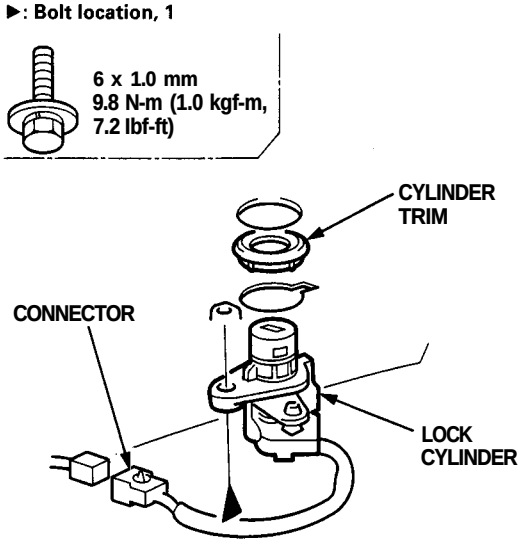
3. Disconnect the cylinder rod from the lock cylinder.



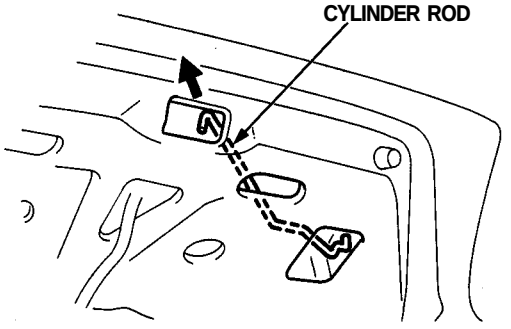
4. Pull the trunk lid latch out, disconnect the cylinder rod, opener cable and connector, then remove the latch.



5. Disconnect the connector, remove the bolt, then pull the lock cylinder and cylinder trim out.



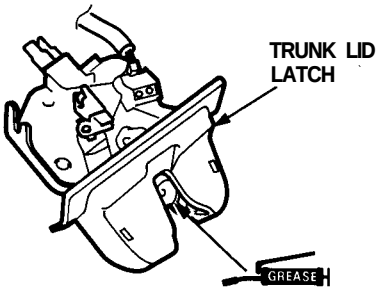
6. Pull the cylinder rod out.



7. Installation is the reverse of the removal procedure.

NOTE:

- Grease the trunk latch.
- Make sure the trunk lid locks securely.
- Make sure the trunk lid opens properly.
- Make sure the connector is connected properly.



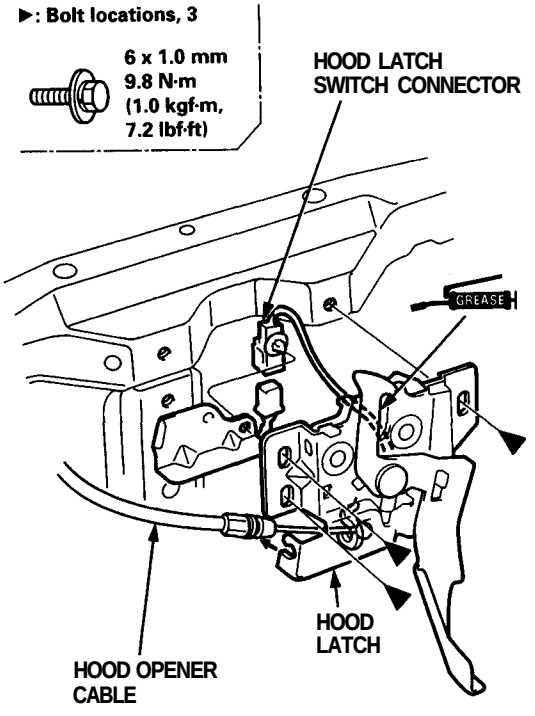
Hood Latch

Replacement

NOTE: Take care not to bend the opener cables.

1. Open the hood, and remove the front bulkhead cover (see page 20-6).

2. Remove the hood latch, and disconnect the hood opener cable and hood latch switch connector.



3. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the hood opener cable is connected properly.
- Make sure the hood locks securely.

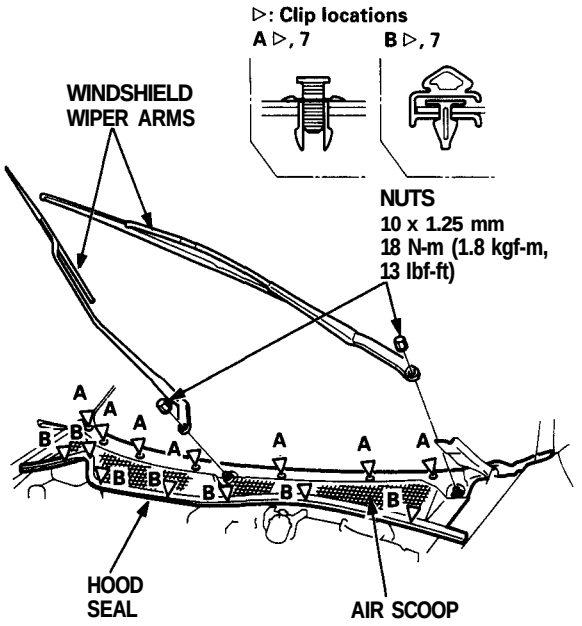
Windshield Wiper Arms/Windshield Wiper Linkage

Replacement

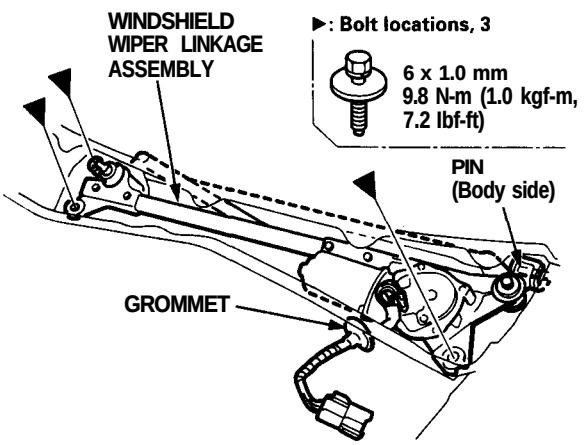
CAUTION: Wear gloves to remove and install the windshield wiper linkage.

NOTE: Take care not to scratch the hood and body.

1. Open the hood.
2. Remove the windshield wiper arms, then remove the hood seal and air scoop.

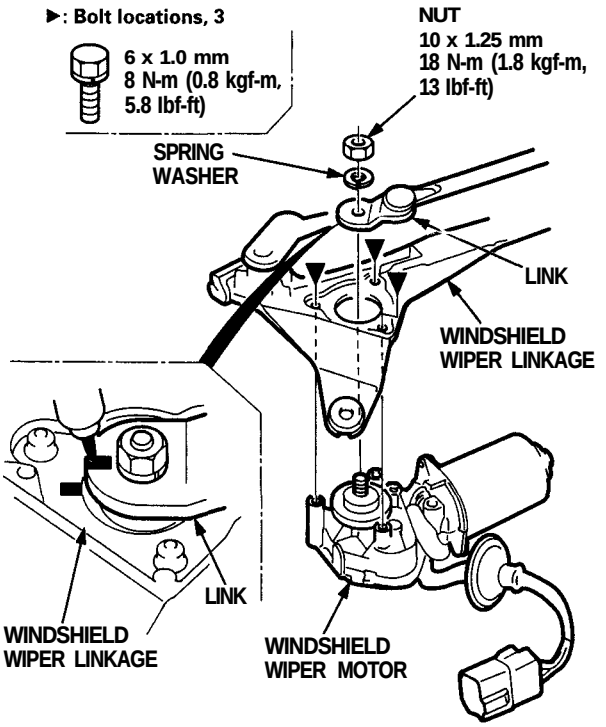


3. Disconnect and detach the connector, then remove the windshield wiper linkage assembly.



4. Separate the windshield wiper linkage and windshield wiper motor.

NOTE: Scribe a line across the link and windshield wiper linkage to show the original adjustment.



5. Installation is the reverse of the removal procedure.

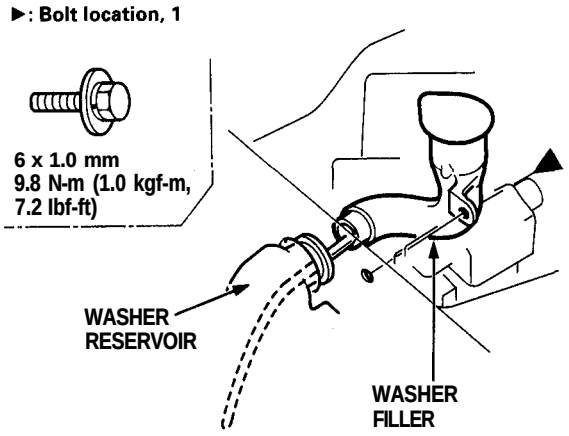
NOTE:
- Make sure the connector is connected properly.
- If necessary, replace any damaged clips.
- Install the windshield wiper arms properly as described on page 20-119.
- Check the windshield wiper motor operation.
- Grease the moving parts.

Washer Reservoir

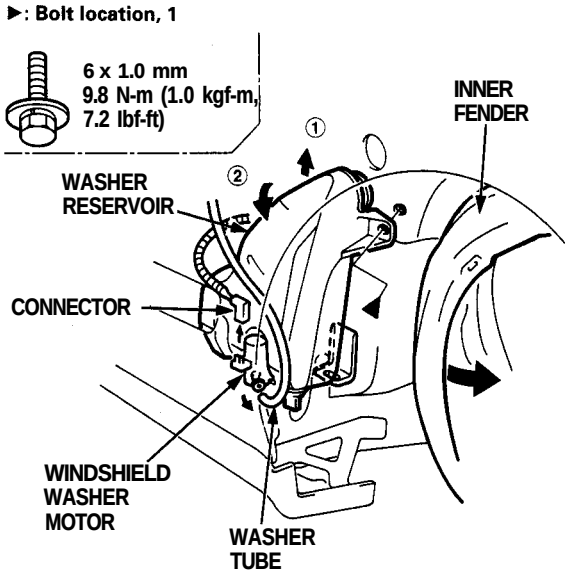
Replacement

CAUTION: Wear gloves to remove and install the washer reservoir.

1. Open the hood.
2. Remove the bolt, then pull out the washer filler.



3. Pull away the inner fender as necessary (see page 20-112).
4. Disconnect the washer tube and windshield washer motor connector.



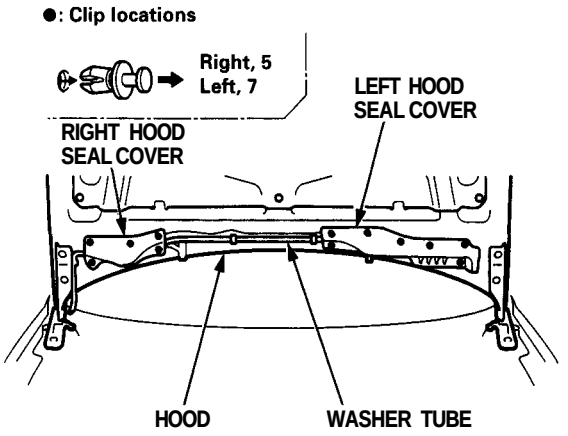
5. Remove the bolt, then remove the washer reservoir.
6. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the windshield washer motor connector and washer tube are connected properly.
- Check the windshield washer motor operation.

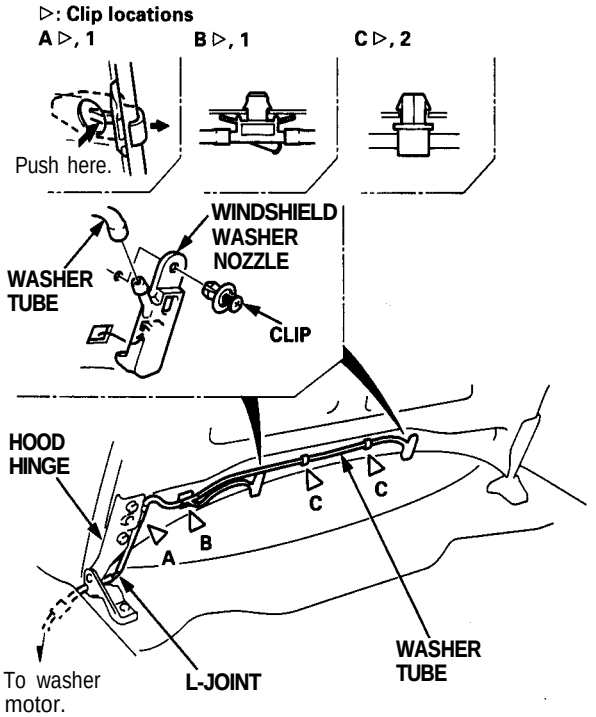
Washer Tube

Replacement

1. Open the hood.
2. Remove the hood seal covers from the hood.



3. Detach the clips, and remove both windshield washer nozzles. Disconnect the washer tube at the L-joint, then remove the washer tube.



4. Installation is the reverse of the removal procedure.

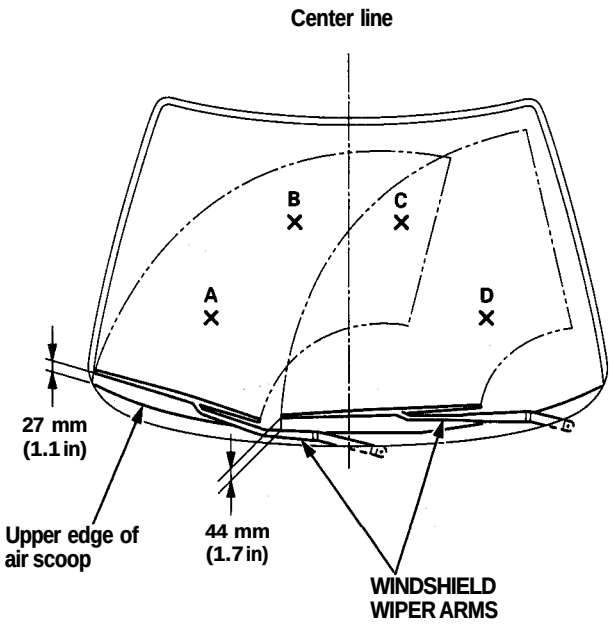
NOTE:
- Take care not to pinch the washer tube.
- If necessary, replace any damaged clips.
- Adjust the aim of the windshield washer nozzles.

Wiper Arms/Washer Nozzles

Adjustment

1. Adjust the wiper arms so that their park positions match the illustration.

View from front to rear



2. By inserting a tack and moving it as necessary, adjust the washer nozzles so that they aim at positions A, B, C, and D shown in the illustration.

   NOTE: Refer to page 20-14a of the '96-98 Acura 3.2TL Service Manual supplement for the differences on this page for the 3.2TL.

   NOTE: The fluid jets should hit within a 50 mm (2.0 in) radius around each of points A, B, C, and D.

Distance / Nozzle aim	from center line	from upper edge of air scoop
A	336 mm (13.2 in)	409 mm (16.1 in)
B	123 mm (4.8 in)	533 mm (21.0 in)
C	123 mm (4.8 in)	533 mm (21.0 in)
D	336 mm (13.2 in)	409 mm (16.1 in)

Emblems

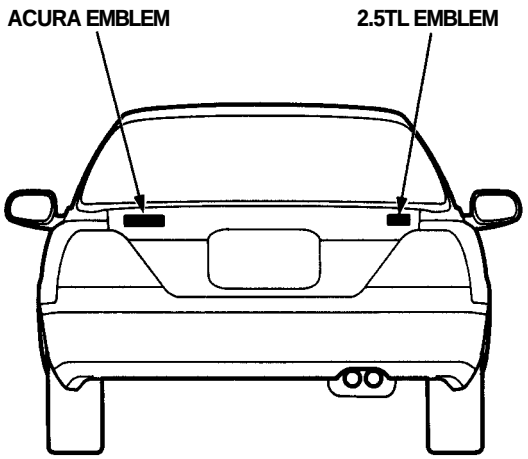
Installation

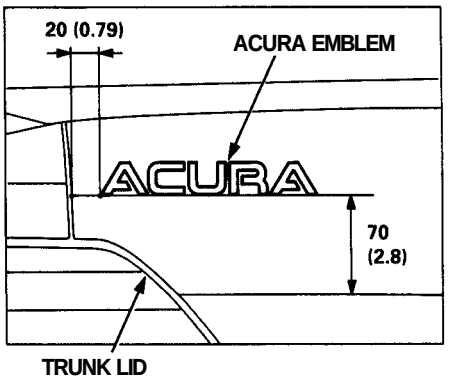
Apply the emblems where shown.

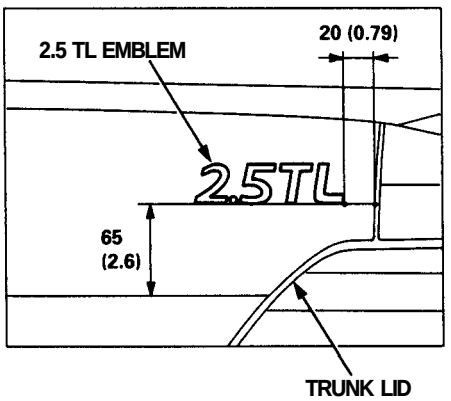
NOTE:
- Before applying, clean the trunk lid surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.

Attachment Points (Reference):

Unit: mm (in)



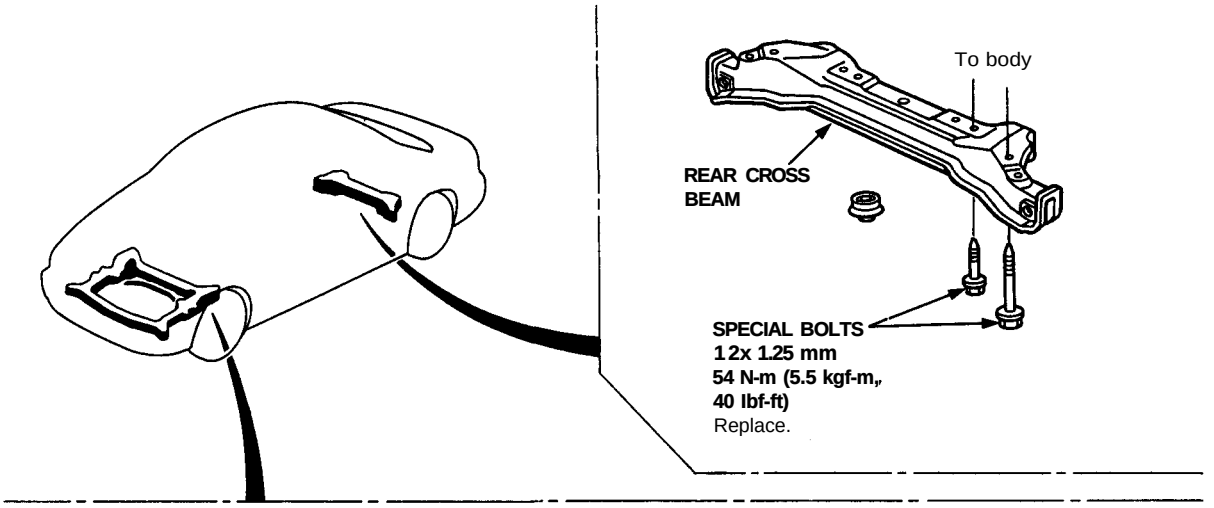


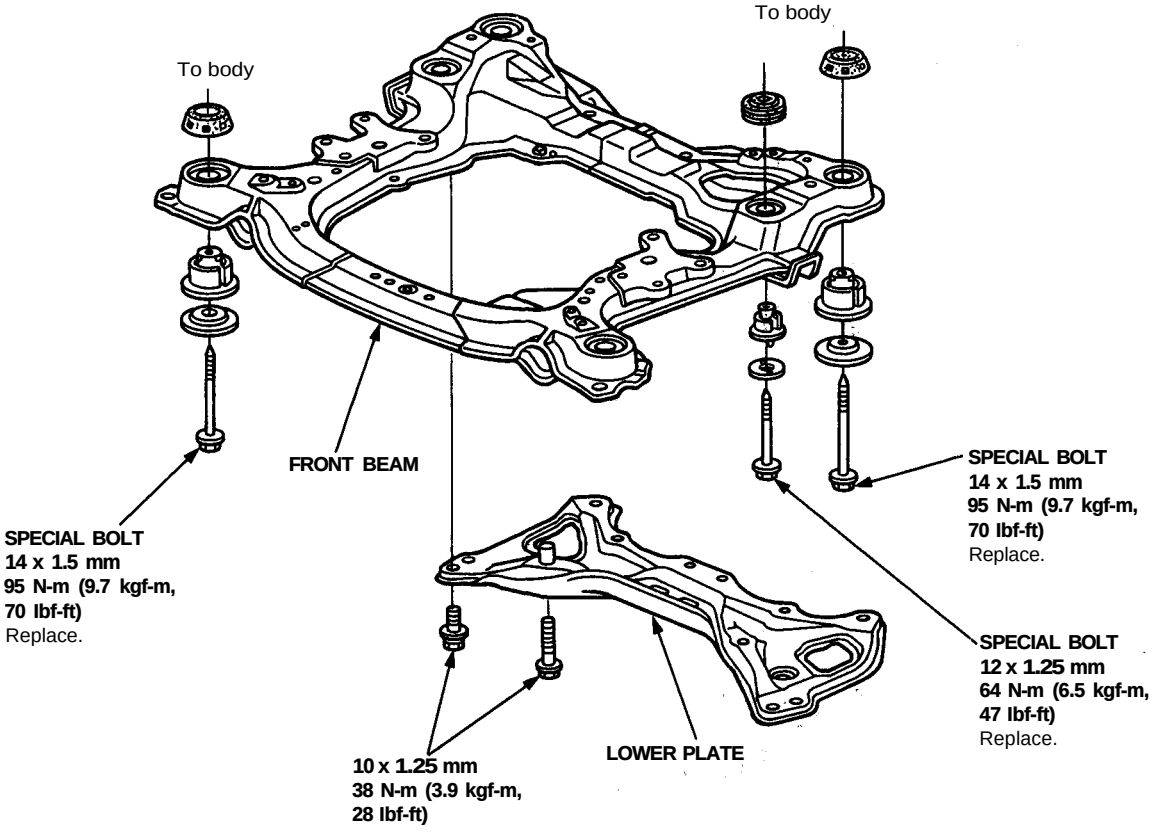


Sub-frame

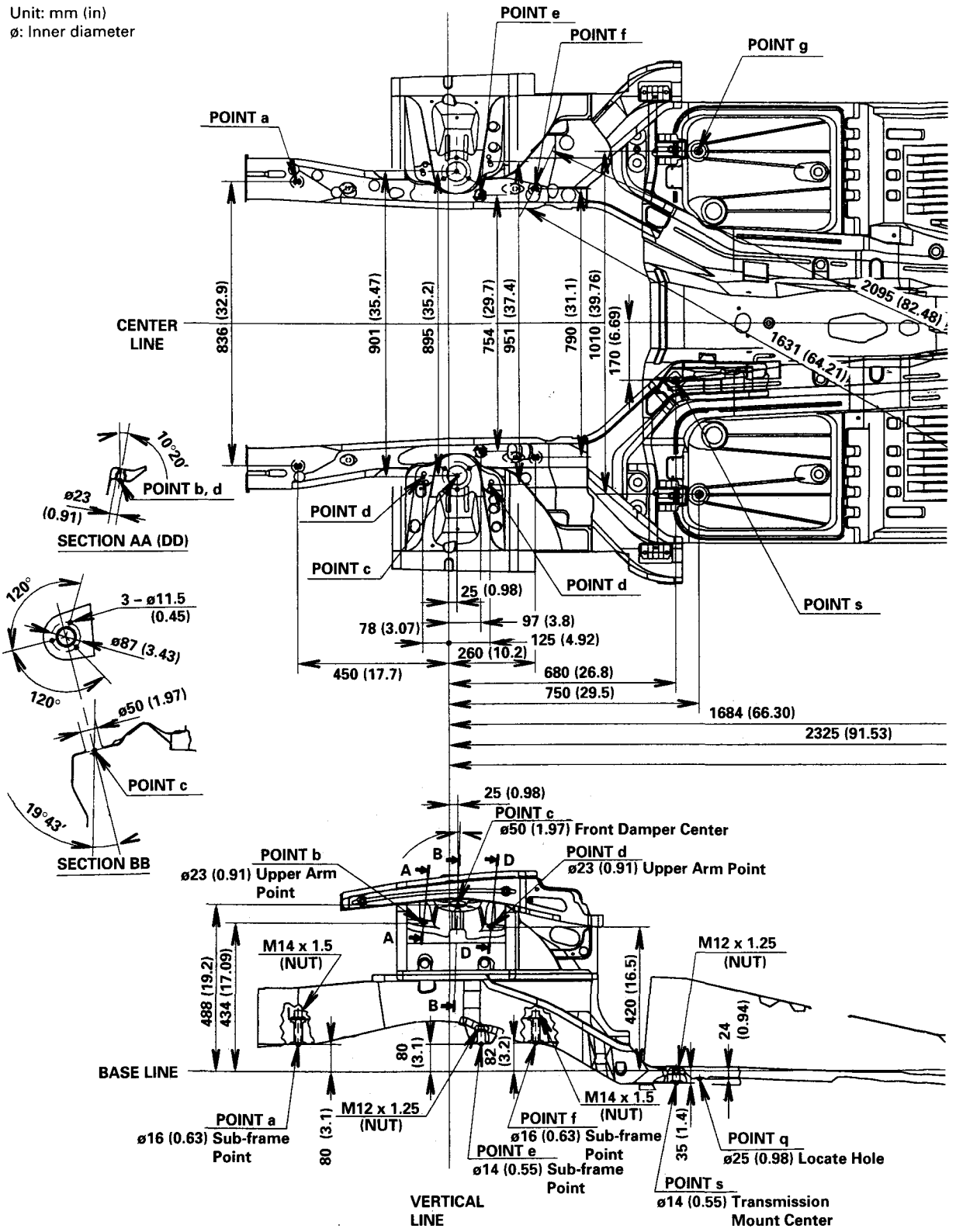
Sub-frame Torque Sequence:

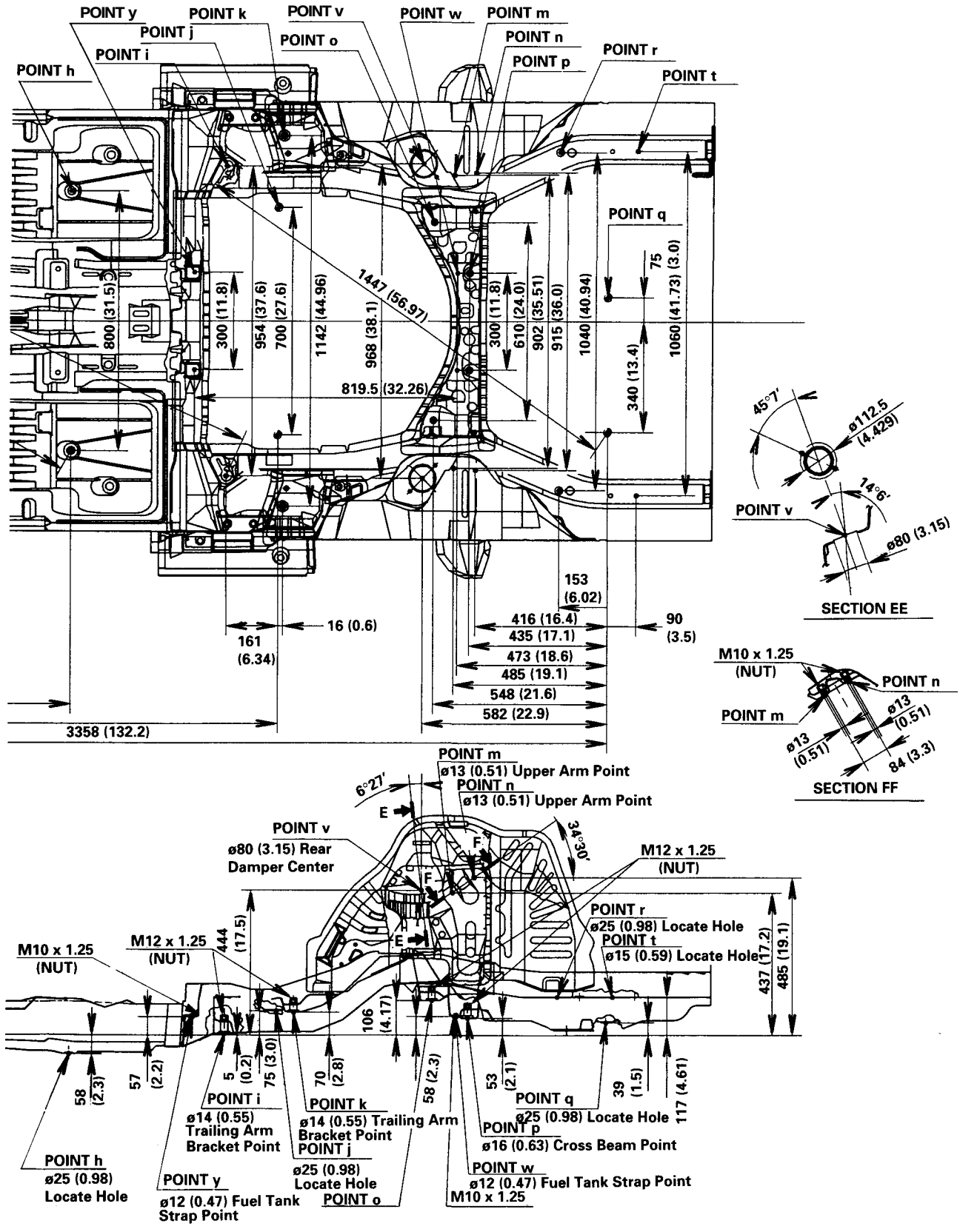
CAUTION: After loosening the sub-frame mounting bolts, be sure to replace them with new ones.





Frame Repair Chart



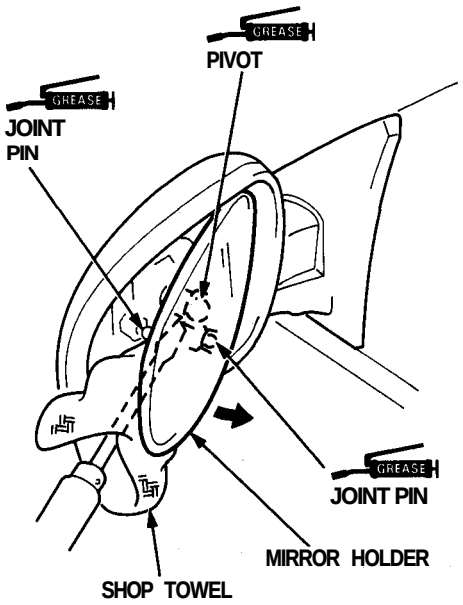

POINT y
POINT k
POINT v
POINT w
POINT m
POINT j
POINT o
POINT n
POINT i
POINT p
POINT r
POINT h
POINT t
POINT q
1447 (56.97)
819.5 (32.26)
800 (31.5)
300 (11.8)
954 (37.6)
700 (27.6)
1142 (44.96)
968 (38.1)
300 (11.8)
610 (24.0)
902 (35.51)
915 (36.0)
1040 (40.94)
75
1060 (41.73) (3.0)
340 (13.4)
153 (6.02)
161 (6.34)
16 (0.6)
416 (16.4)
435 (17.1)
473 (18.6)
485 (19.1)
548 (21.6)
582 (22.9)
90 (3.5)
3358 (132.2)
45°7'
ø112.5 (4.429)
14°6'
POINT v
ø80 (3.15)
SECTION EE
M10 x 1.25 (NUT)
POINT n
POINT m
ø13 (0.51)
ø13 (0.51)
84 (3.3)
SECTION FF
POINT m
ø13 (0.51) Upper Arm Point
POINT n
ø13 (0.51) Upper Arm Point
6°27'
E
POINT v
ø80 (3.15) Rear Damper Center
F
34°30'
M12 x 1.25 (NUT)
POINT r
ø25 (0.98) Locate Hole
POINT t
ø15 (0.59) Locate Hole
M10 x 1.25 (NUT)
M12 x 1.25 (NUT)
444 (17.5)
437 (17.2)
485 (19.1)
106 (4.17)
58 (2.3)
57 (2.2)
5 (0.2)
75 (3.0)
70 (2.8)
58 (2.3)
53 (2.1)
39 (1.5)
117 (4.61)
POINT i
ø14 (0.55) Trailing Arm Bracket Point
POINT k
ø14 (0.55) Trailing Arm Bracket Point
POINT j
ø25 (0.98) Locate Hole
POINT q
ø25 (0.98) Locate Hole
POINT p
ø16 (0.63) Cross Beam Point
POINT h
ø25 (0.98) Locate Hole
POINT y
ø12 (0.47) Fuel Tank Strap Point
POINT o
POINT w
ø12 (0.47) Fuel Tank Strap Point
M10 x 1.25

Mirror

Mirror Holder Replacement

CAUTION: Wear gloves to remove and install the mirror holder.

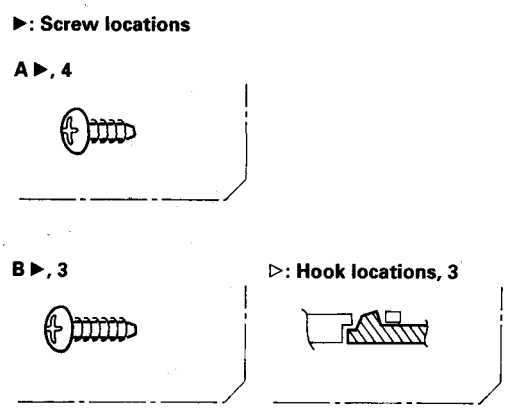
1. Carefully pry out the mirror holder with a flat tip screwdriver as shown.

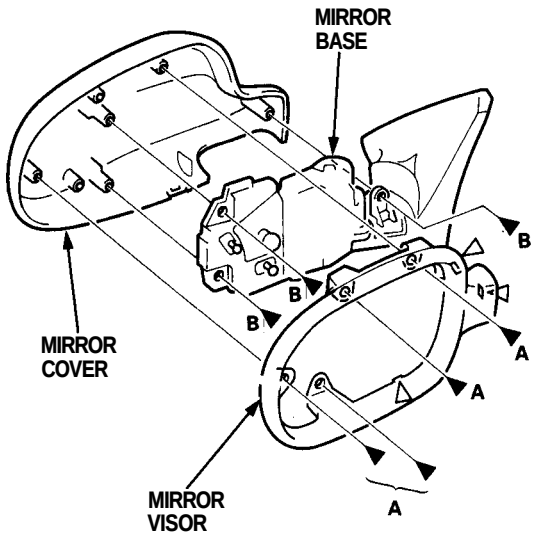


2. Installation is the reverse of the removal procedure.

Mirror Visor and Mirror Cover Replacement

1. Remove the mirror holder.
2. Push the mirror base forward, then remove the screws.
3. Detach the hook, then remove the mirror visor.





4. Installation is the reverse of the removal procedure.

Moonroof

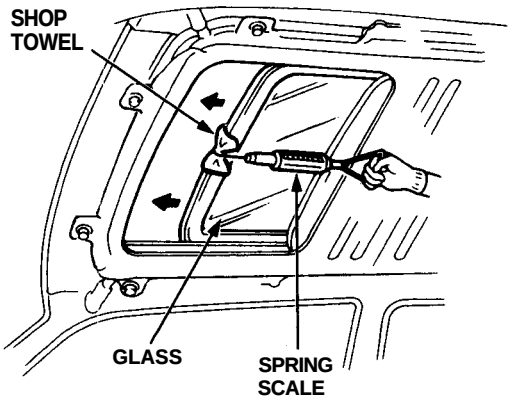
Closing Force and Opening Drag Check

1. Remove the headliner (see page 20-61).

2. Closing force check: Have an assistant hold the switch to close the glass while you measure force required to stop it. Attach a spring scale as shown. Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

   CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

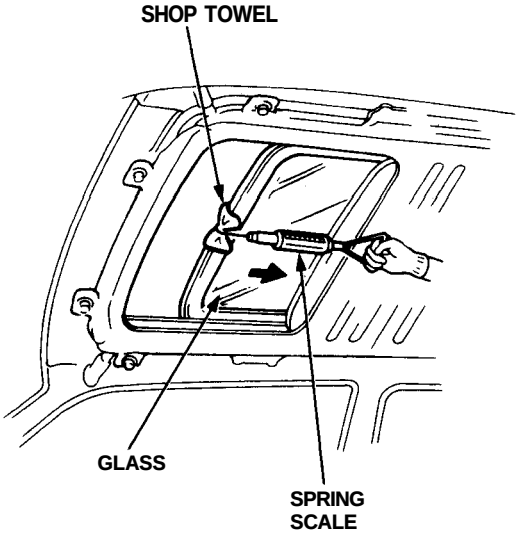
   Closing Force: 200 - 290 N (20 - 30 kgf, 44 - 66 lbf)



3. If the force in not within specification, remove the moonroof motor (see page 20-52), then check:
   — The gear portion and the inner cable for breakage and damage. If the gear portion is broken, replace the motor. If the inner cable is damaged, remove the frame (see page 20-52), and replace the cable assembly (see page 20-53).
   — The moonroof motor (see section 23). If the motor fails to run or doesn't turn smoothly, replace it.
   — The opening drag.

4. Opening drag check: Measure the effort required to open the glass using a spring scale as shown.

   CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.



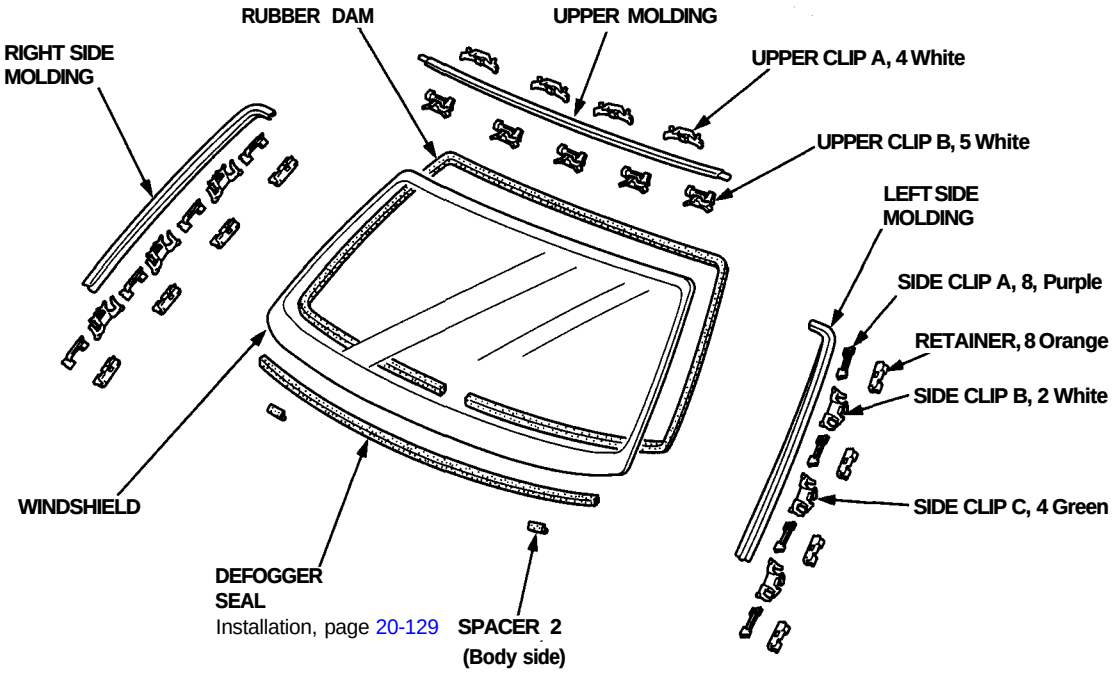
5. If the load is over 40 N (4 kgf, 9 lbf), check:
   — The side clearance and glass height adjustment (see pages 20-49, 20-50).
   — For broken or damaged sliding parts (see pages 20-53, 20-54). If any sliding parts are damaged, replace them.

Windshield/Rear Window

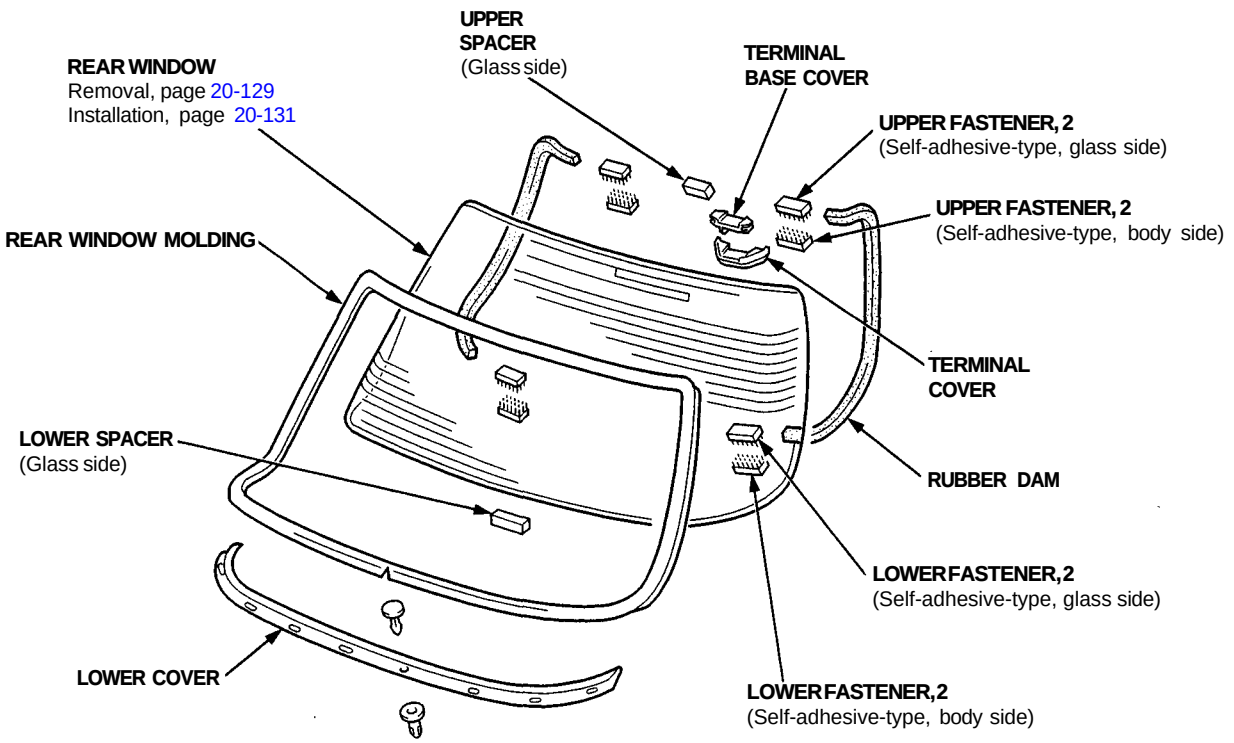
Index

NOTE: The numbers after the part names show the quantities of the parts used.

Windshield:



Rear Window:

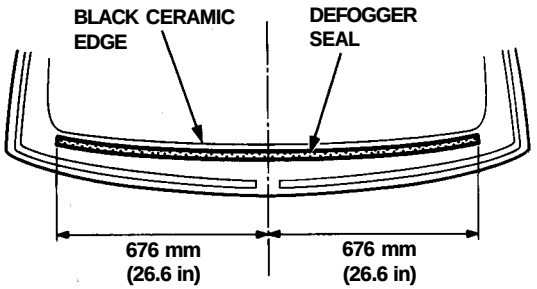


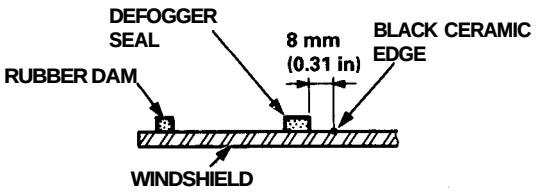
Defogger Seal

Installation

Glue the defogger seal to the inside face of the windshield as shown.

NOTE: Be careful not to touch the windshield where adhesive will be applied.





(cont'd)

Rear Window

Removal

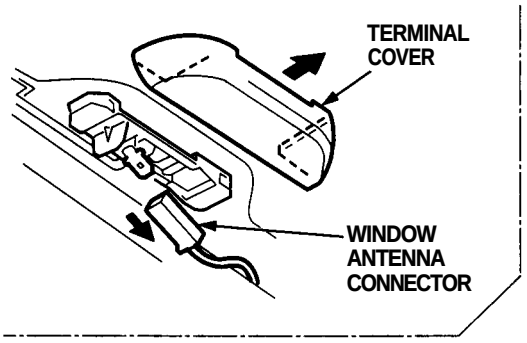
CAUTION:
- **Wear gloves to remove and install the rear window.**
- **Use seat covers to avoid damaging any surfaces.**
- **Do not damage the rear window defogger grid lines, window antenna grid lines, and terminals.**

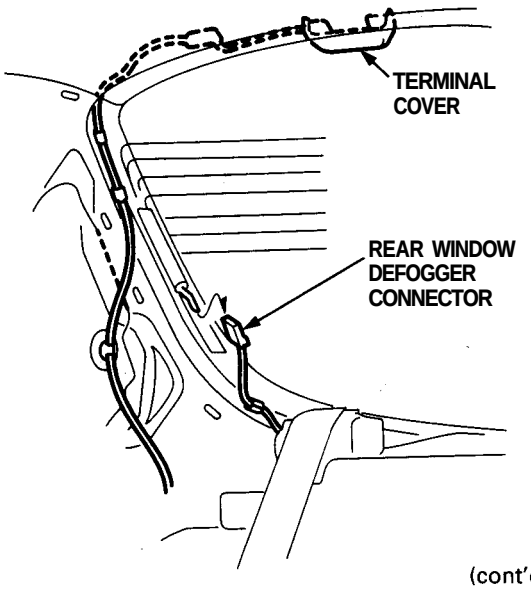
1. To remove the rear window, first remove the:
   - Trunk lid (see page 20-100)
   - Rear seat cushion and seat-back (see page 20-85)
   - Rear pillar trim (see page 20-59)
   - Rear shelf (see page 20-59)

2. Pull down the rear of the headliner (see page 20-61).

   CAUTION: Take care not to bend the headliner excessively.

3. Disconnect the rear window defogger connector from each side, remove the terminal cover, then disconnect the window antenna connector.





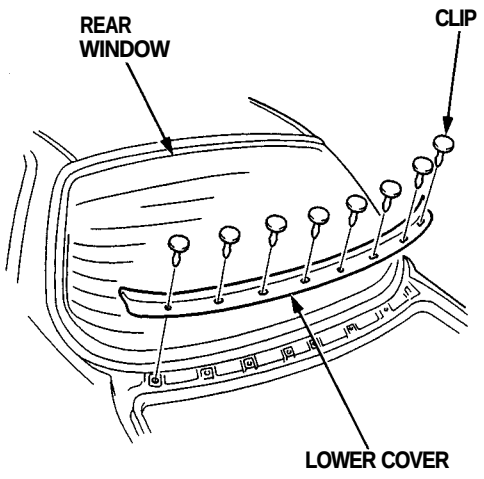
(cont'd)

Rear Window

Removal (cont'd)

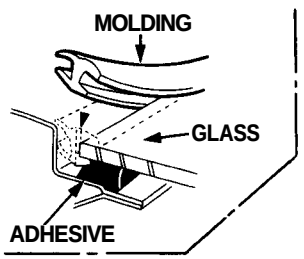
4. Remove the clips, then remove the lower cover.

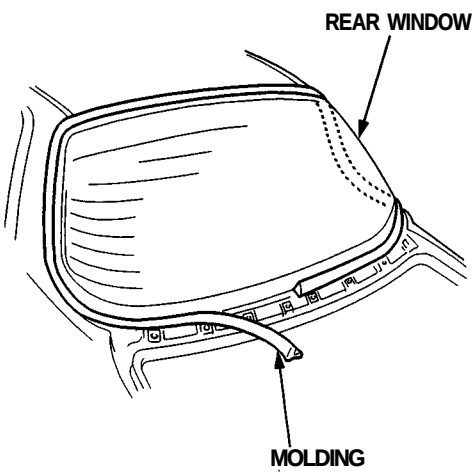
   NOTE: Use a clip remover to remove the clips.



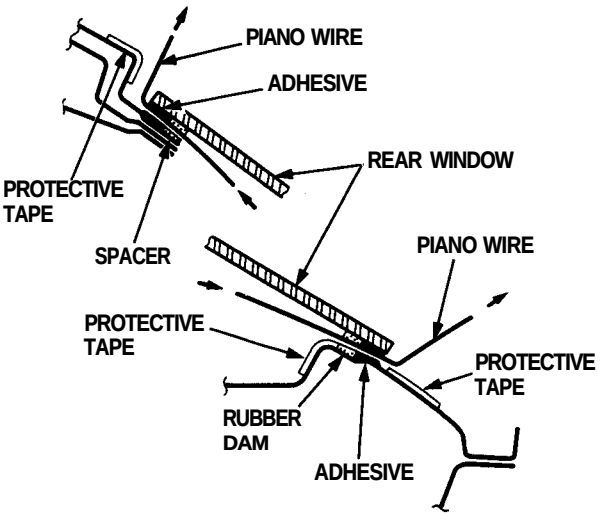
5. Remove the molding.

   NOTE: If the molding removal is difficult to remove, cut it with a knife.



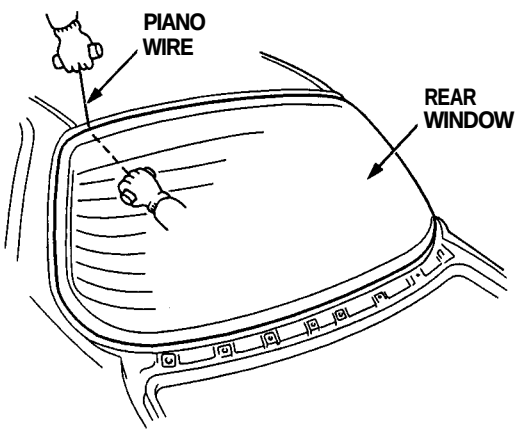


6. Apply protective tape to along the edge of the body as shown. Using as awl, make a hole through the rubber dam and adhesive from inside the car. Push a piece of piano wire through the hole, and wrap each end around a piece of wood.



7. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dam and adhesive around the entire rear window.

   CAUTION: Hold the piano wire as close to the rear window as possible to prevent damage to the body.



8. Carefully remove the rear window.

Installation

1. Using a knife, scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire rear window opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding
   - Mask off surrounding surfaces before painting.
   - Remove the upper spacer and rubber dam from the body.

2. Clean the body bonding surface with a sponge dampened in alcohol.

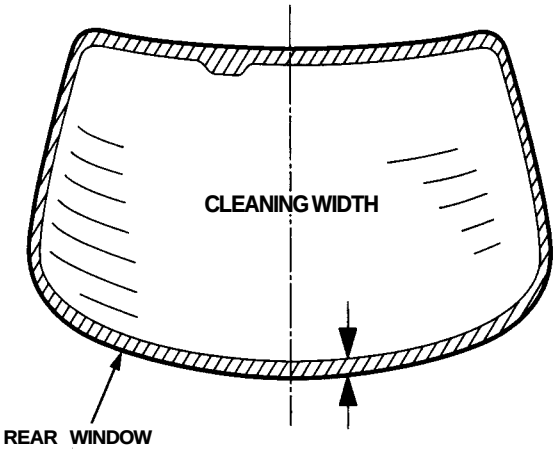
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old rear window is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dam, then clean the rear window surface with alcohol where new adhesive is to be applied.

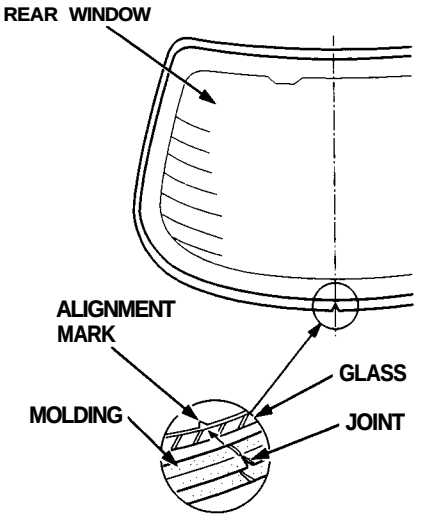
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the rear window on its edges; small chips may later develop into cracks.

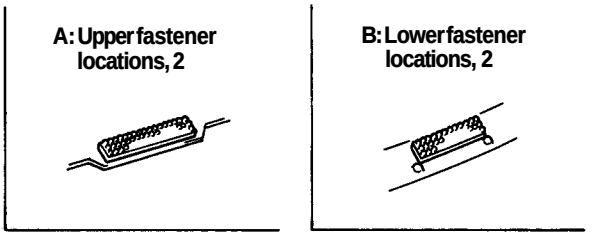
   NOTE: Clean the shadowed area.

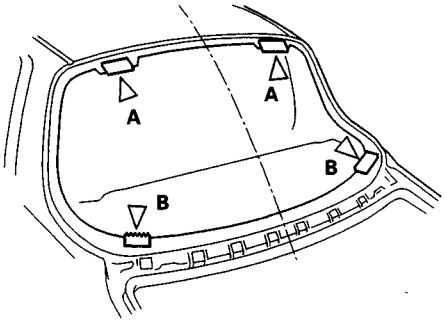


4. Glue the molding around the edge of the rear window as shown.



5. Glue the upper fastener and lower fastener to the body as shown.



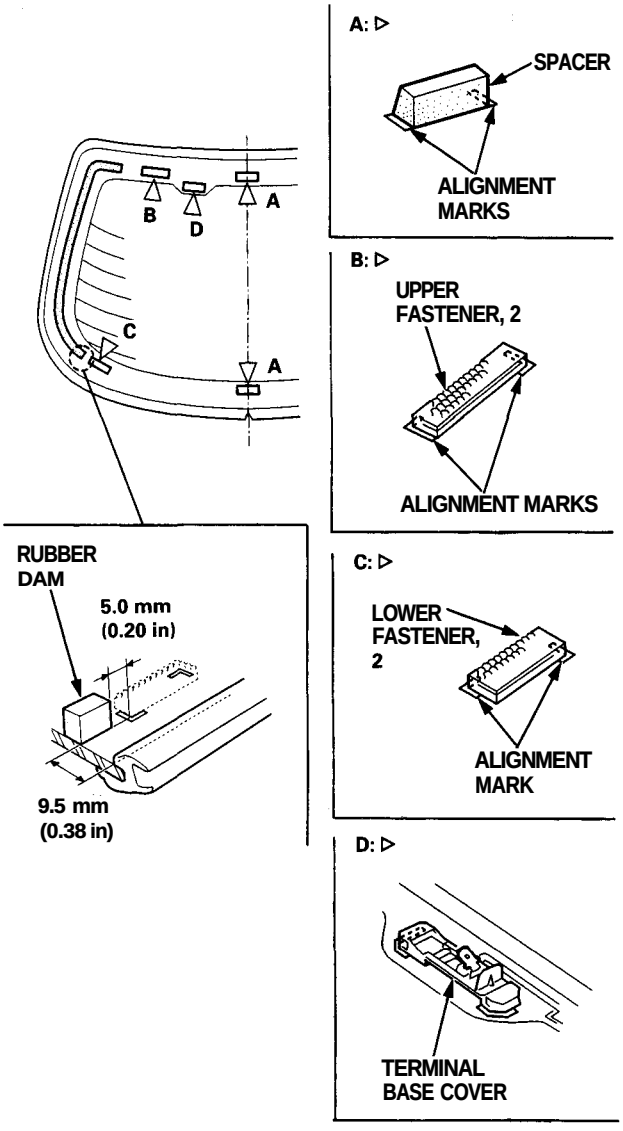


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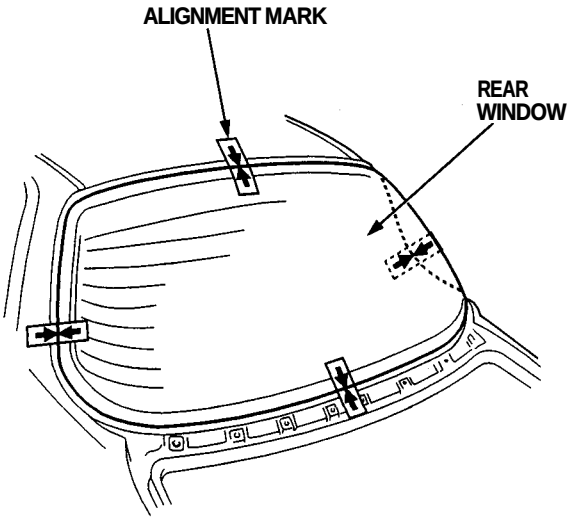
Rear Window

Installation (cont'd)

6. Glue the rubber dam, upper fastener, lower fastener, upper spacer, lower spacer and terminal base cover to the inside face of the rear window, as shown.



7. Set the rear window in the opening, then center it. Make alignment marks across the rear window and body with a grease pencil at the four points shown.



8. Remove the rear window.

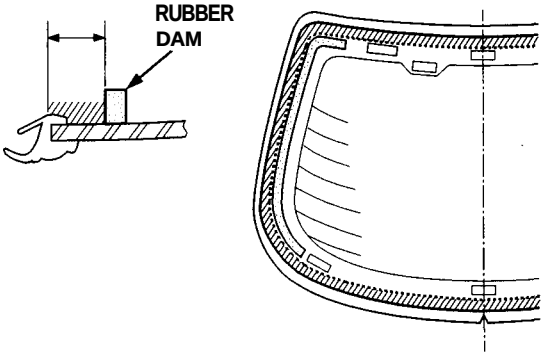
9. With a sponge, apply a light coat of glass primer around the edge of the rear window as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the rear window, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the rear window properly, causing a leak after the rear window is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

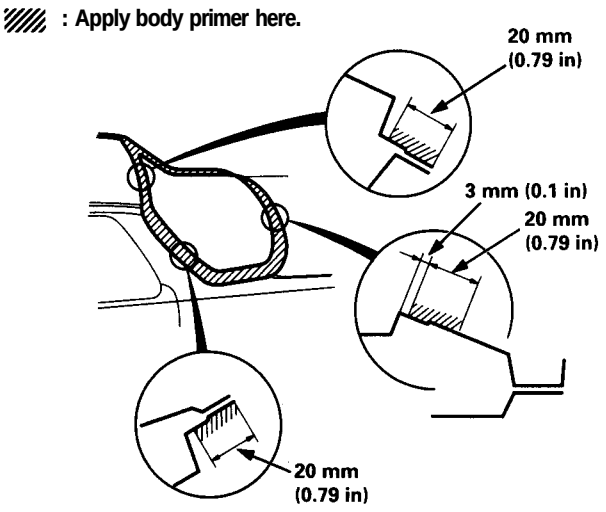
: Apply glass primer here.

All around.



10. With a sponge, apply a light coat of body primer to the original adhesive remaining around the rear window opening flange. Let the body primer dry for at least 10 minutes.

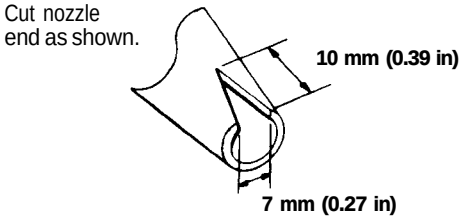
NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.



11. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

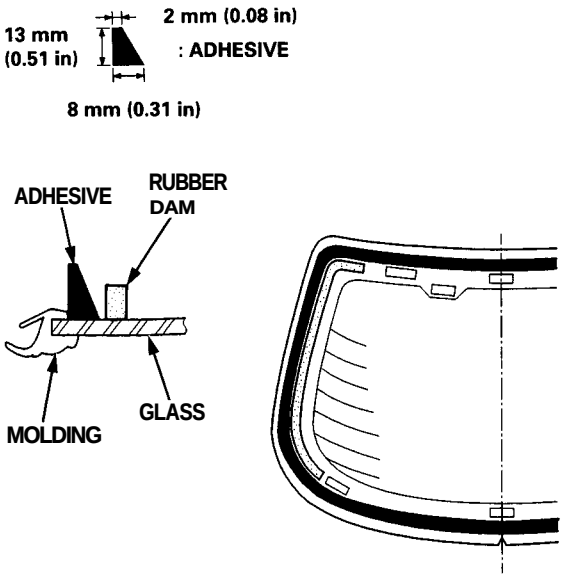
NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

12. Before filling a cartridge, cut the end of the nozzle as shown.



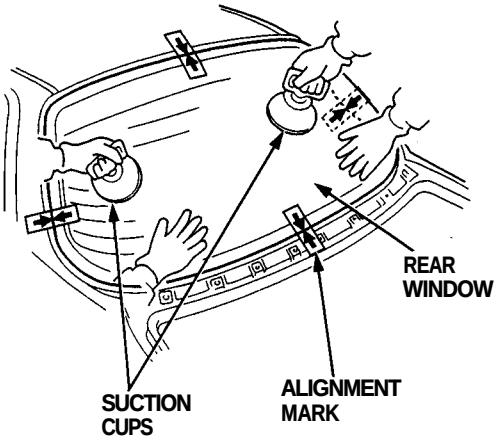
13. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



14. Use suction cups to hold the rear window over the opening, align it with the alignment marks made in step 7, and set it down on the adhesive. Lightly push on the rear window until its edges are fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until the adhesive is dry.



(cont'd)

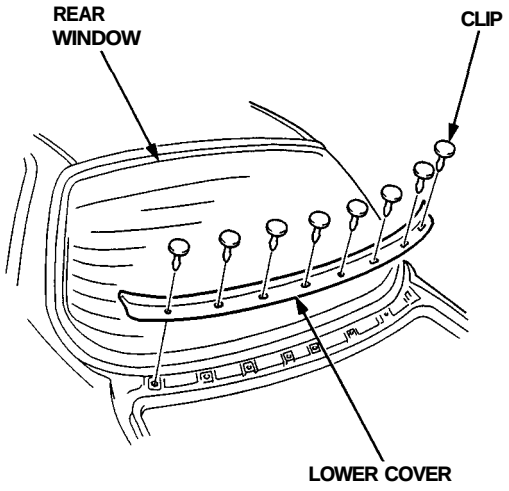
Rear Window

Installation (cont'd)

15. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: To remove adhesive from a painted surface or the rear window, use a soft shop towel dampened with alcohol.

16. Install the lower cover.



17. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark leaking areas and let the rear window dry, then seal with sealant.

    NOTE: Let the car stand for at least four hours after rear window installation. If the car has to be used within the first four hours, it must be driven slowly.

18. Reinstall all remaining removed parts.

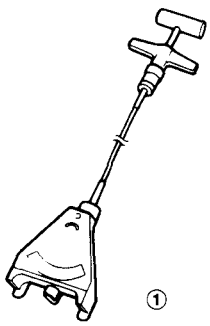
    NOTE: Advise the customer not to do the following things for two to three days:

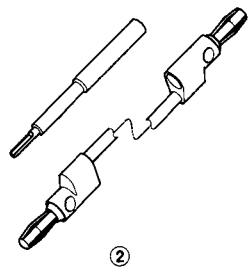
    - Slam the doors with all the windows rolled up.
    - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Special Tools

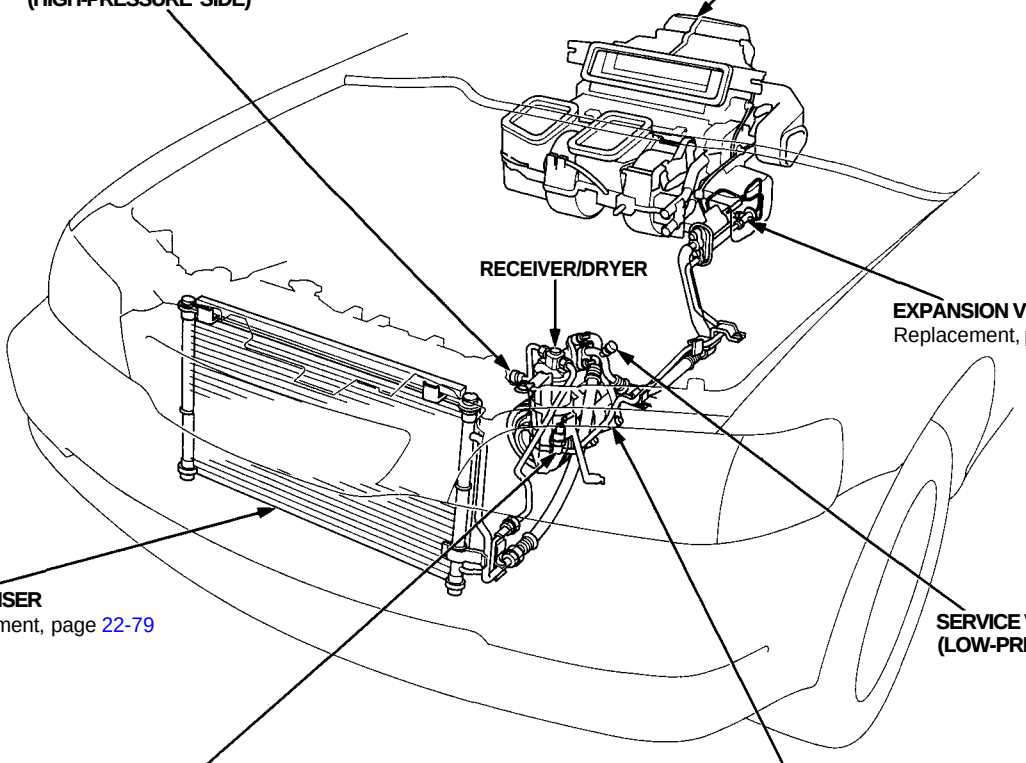
Ref. No.	Tool Number	Description	Qty	Page Reference
①	*07JGG-001010A	Belt Tension Gauge	1	22-78, 22-24a
②	07SAZ-001000A	Backprobe Set	2	22-42, 22-45, 22-46

* Included in the Belt Tension Gauge Set, 07TGG - 001000A.





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CONDENSER
Replacement, page 22-79

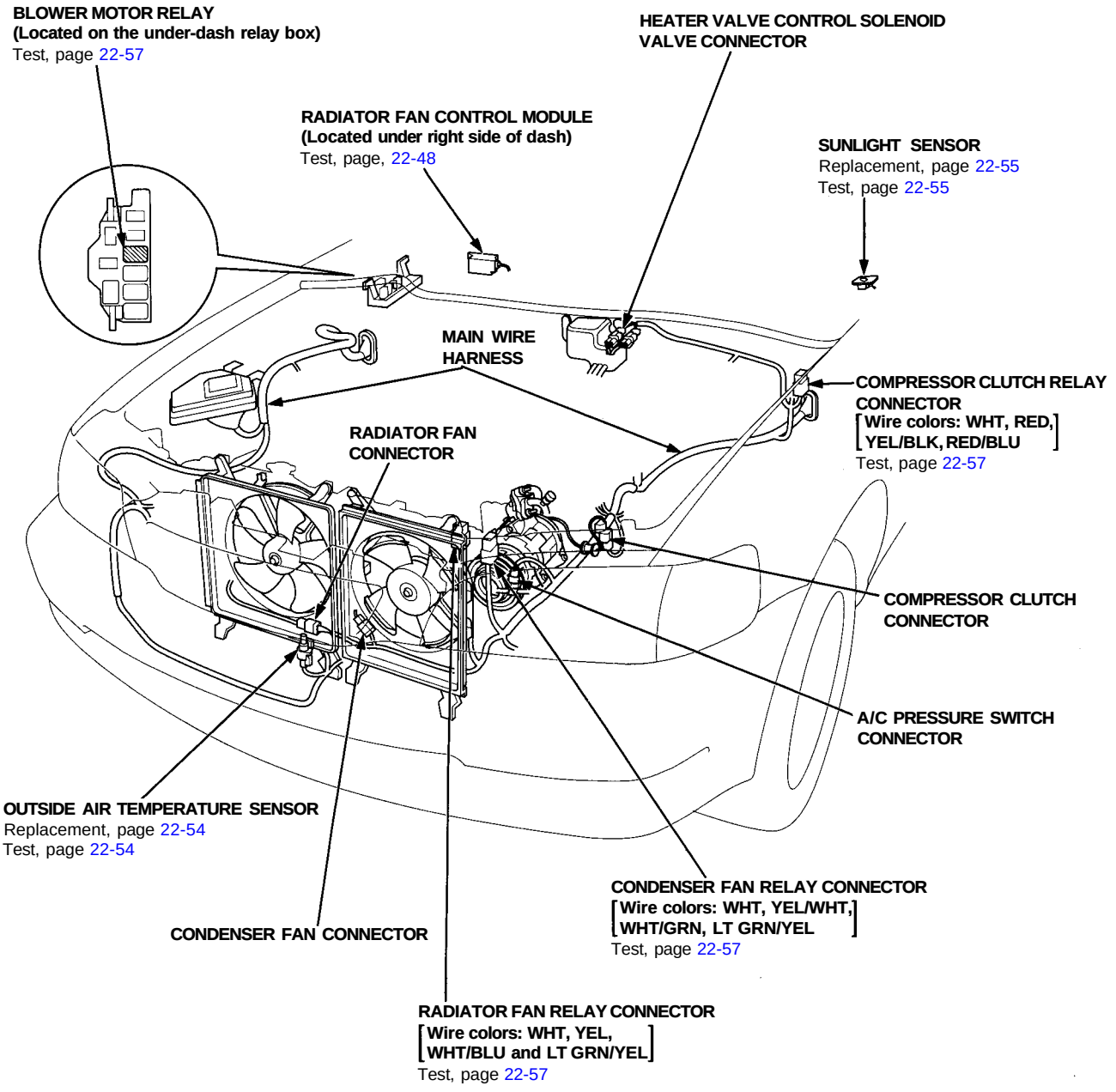
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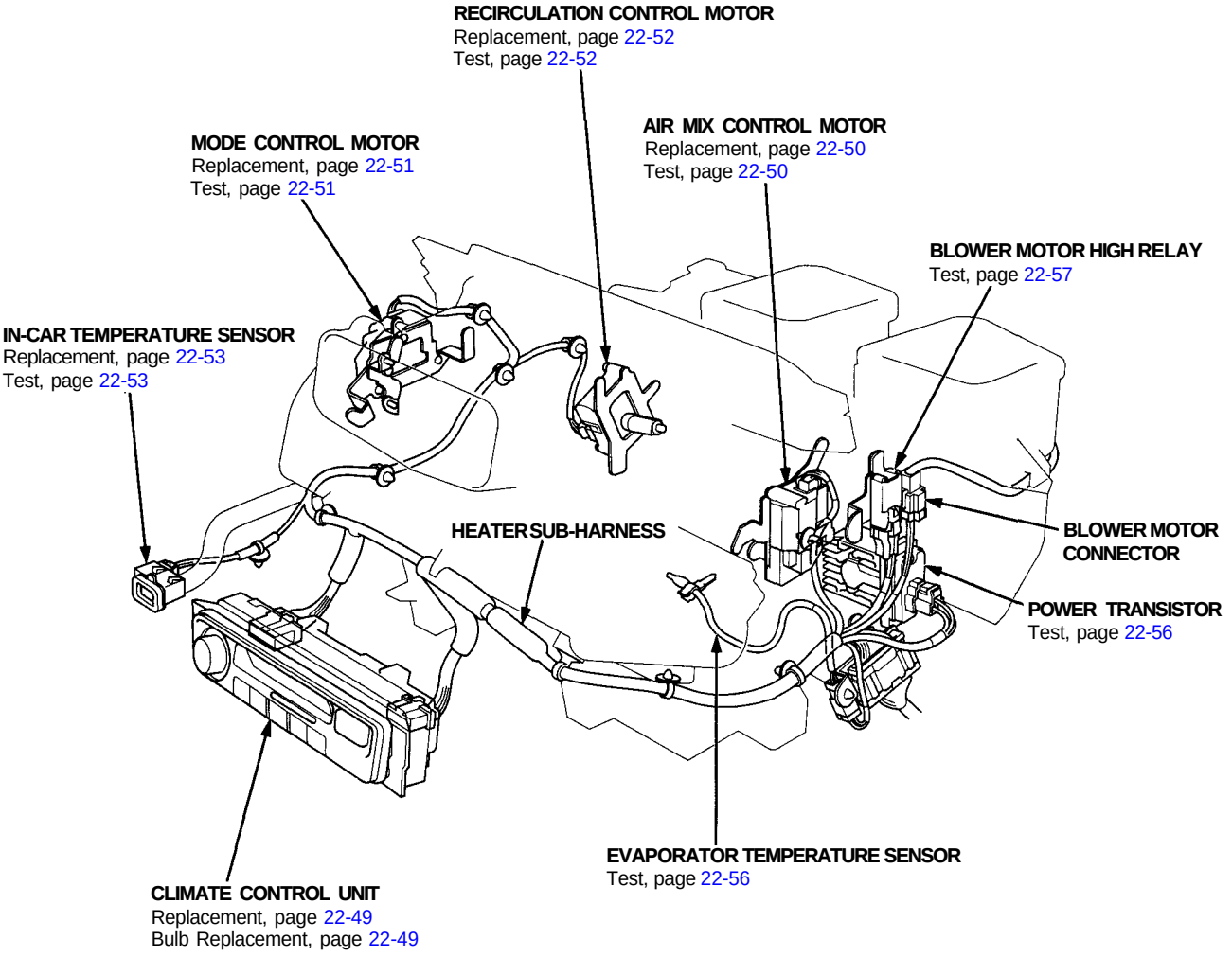
A/C PRESSURE SWITCH
When the refrigerant pressure is below 200 kPa (2.0 kgf/cm^2, 28 psi) due to refrigerant leakage or above 3,200 kPa (32 kgf/cm^2, 455 psi) due to refrigerant blockage, the A/C pressure switch opens the circuit to the A/C switch and stops the air conditioning to protect the compressor.

Wiring/Connector Locations

NOTE: Refer to page 22-3a of the '96-98 Acura 3.2TL Service Manual supplement for the differences on this page for the 3.2TL.



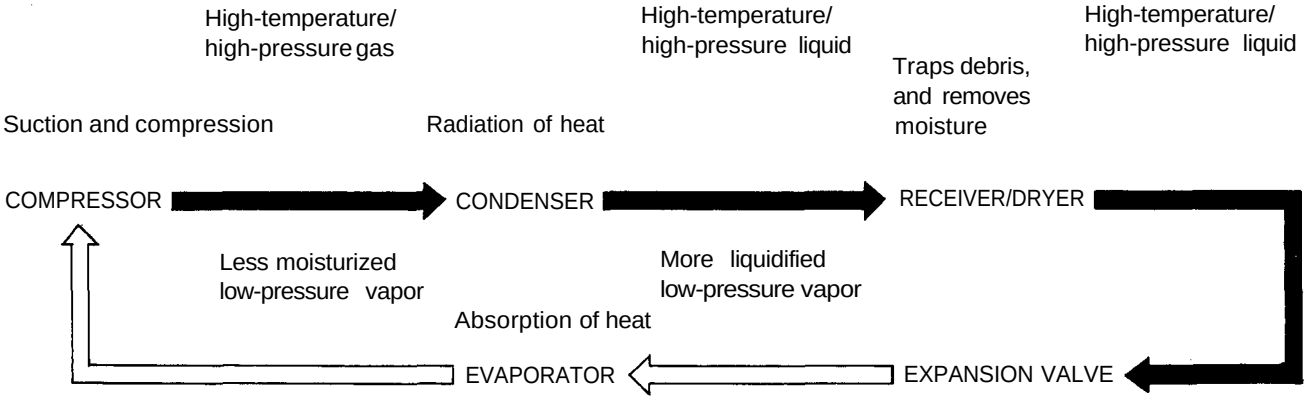
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

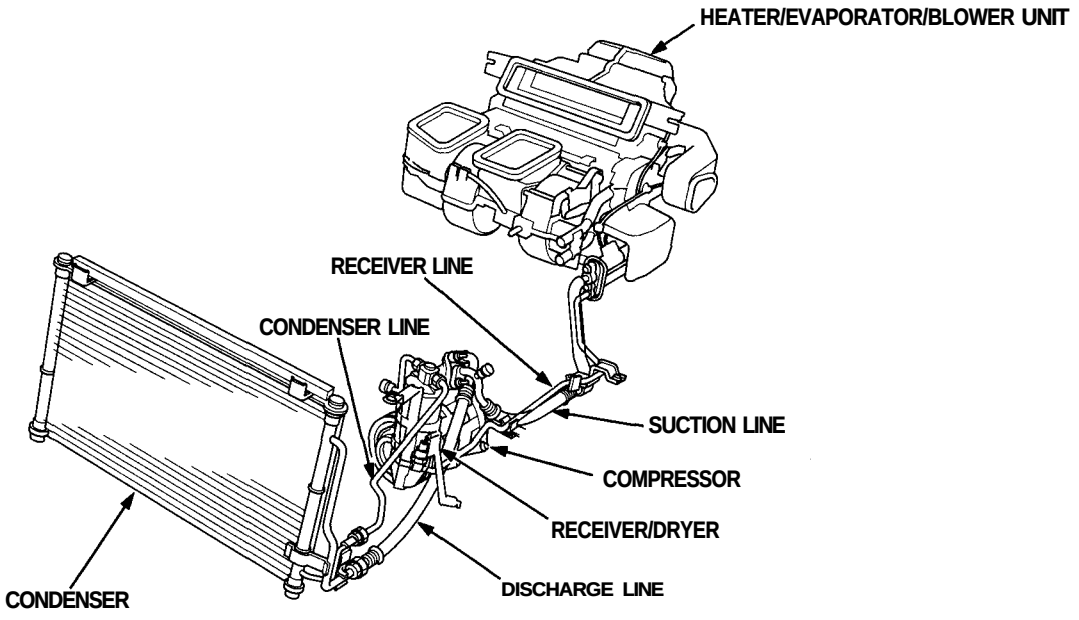


Description

Outline

The air conditioner system removes heat from the passenger compartment by circulating refrigerant through the system as shown below.





This vehicle uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

- Do not mix refrigerants CFC-12 (R-12) and HFC-134a (R-134a). They are not compatible.
- Use only the recommended polyalkyleneglycol (PAG) refrigerant oil (ND-OIL 8) designed for the R-134a compressor. Intermixing the recommended (PAG) refrigerant oil with any other refrigerant oil will result in compressor failure.
- All A/C system parts (compressor, discharge line, suction line, evaporator, condenser, receiver/dryer, expansion valve. O-rings for joints) have to be proper for refrigerant R-134a. Do not confuse with R-12 parts.
- Use a halogen gas leak detector designed for refrigerant R-134a.
- R-12 and R-134a refrigerant servicing equipment are not interchangeable. Use only a Recovery/Recycling/Charging System that is U.L.-listed and is certified to meet the requirements of SAE J2210 to service R-134a air conditioning systems.
- Always recover the refrigerant R-134a with an approved Recovery/Recycling/Charging System before disconnecting anyA/Cfitting.

Troubleshooting

Symptom Chart

For electrical malfunctions which are indicated by the self-diagnostic system, refer to self-diagnosis function (see next page).

NOTE:
- Check the engine coolant level, and allow the engine to warm up before troubleshooting.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a multimeter when testing.
- Before performing any troubleshooting procedures check:
  — Fuses *' No. 17 (30 A), *1 No. 34 (20 A), *1 No. 38 (20 A), *1 No. 39 (10 A), *2 No. 4 (*3), *2 No. 7 (7.5 A), *2 No. 8 (7.5 A)
  — Grounds No. G101, G301, G401, G403, G404
  — Cleanliness and tightness of all connectors
  *': In the under-hood fuse/relay box
  *2: In the under-dash fuse/relay box
  *3: No.4 (15 A): '95 and '96 models
  : No.4 (20 A): '97 and '98 models

Symptom	Remedy
Check the malfunction indicator lamp (MIL).	Perform the procedures in the flowchart (see page 22-28).
No heater and A/C in either manual or AUTO modes.	Perform the procedures in the flowchart (see page 22-29).
Mode control motor does not run, or one or more modes are inoperative.	Perform the procedures in the flowchart (see page 22-30).
Recirculation control doors do not change between FRESH and RECIRCULATE.	Perform the procedures in the flowchart (see page 22-32).
Radiator fan does not run at all (but condenser fan runs with the A/C on).	Perform the procedures in the flowchart (see page 22-34, 2.5L). (see page 22-10a, 3.2L)
Condenser fan does not run at all (but radiator fan runs with the A/C on).	Perform the procedures in the flowchart (see page 22-37, 2.5L). (see page 22-13a, 3.2L)
Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.	Perform the procedures in the flowchart (see page 22-40).
Both fans do not run with the A/C on (2.5L) or at all (3.2L).	Perform the procedures in the flowchart (see page 22-41, 2.5L) (22-18a, 3.2L).
Compressor clutch does not engage.	Perform the procedures in the flowchart (see page 22-43).
A/C system does not come on (compressor and both fans).	Perform the procedures in the flowchart (see page 22-46, 2.5L) (22-16a, 3.2L).

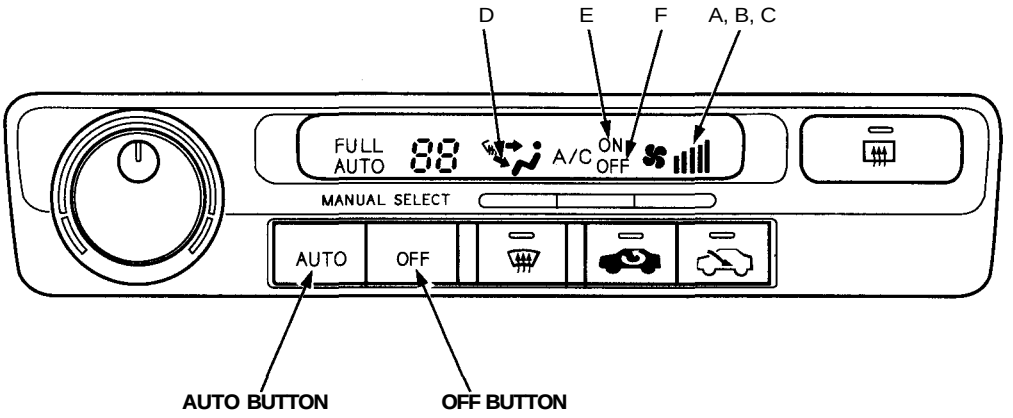
Troubleshooting

Self-diagnosis Function

The climate control unit has a self-diagnosis function.

Running the Self-diagnosis Function

Turn the ignition switch ON (II), then press both the AUTO and OFF buttons at the same time. While the buttons are pressed, indicator lights A, B, C, D, E and F respectively will come on to indicate a faulty component.



	Indicator	Component with problem	Possible cause	See page
A		In-car temperature sensor	Faulty sensor, open or short circuit	22-12
B		Outside air temperature sensor	Faulty sensor, open or short circuit	22-14
C		Sunlight sensor	Faulty sensor, open or short circuit	22-16
D		Evaporator temperature sensor	Faulty sensor, open or short circuit	22-18
E	ON	Air mix control motor	Open or short circuit, obstructed door, faulty motor	22-20
F	OFF	Blower motor	Open or short circuit, faulty motor	22-22 or 22-24 (2.5L), 22-6a (3.2L)

NOTE: In case of multiple problems, the respective indicator lights will come on. If indicator lights A, B, C, D, and E come on at the same time, there may be an open in the common ground wire of the sensors.

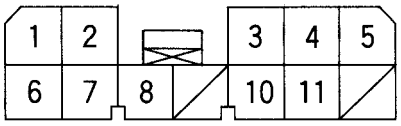
Resetting the Self-diagnosis Function

Turning the ignition switch OFF will cancel the self-diagnosis function. After service work, run the self-diagnosis function once again to check that there is no other problem.

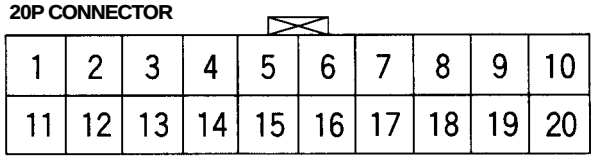
Climate Control Unit Input/Output Signals

CLIMATE CONTROL UNIT CONNECTORS

12P CONNECTOR



20P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

12P CONNECTOR

Terminal No.	Wire Color	Signal		Terminal No.	Wire Color	Signal	
1	WHT/GRN	BACK UP	INPUT	7	RED	BRIGHTNESS CONTROLLER	OUTPUT
2	BLK/YEL	IG2	INPUT	8	BLK	GROUND	OUTPUT
3	YEL/GRN	REAR WINDOW DEFOGGER RELAY	INPUT	9			
4	YEL	HEATER VALVE CONTROL SOLENOID VALVE	INPUT	10	RED/WHT	AIR MIX COOL	INPUT
5	BLU/RED	BLOWER FEEDBACK	INPUT	11	RED/YEL	AIR MIX HOT	INPUT
6	RED/BLK	COMBINATION LIGHT SWITCH	INPUT	12			

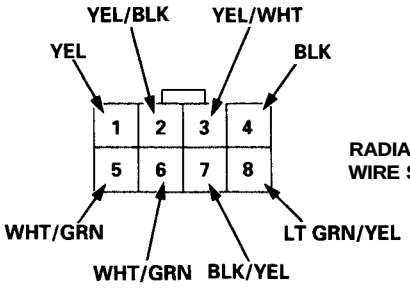
20P CONNECTOR

Terminal No.	Wire Color	Signal		Terminal No.	Wire Color	Signal	
1	RED/BLK	POWER TRANSISTOR BASE	OUTPUT	11	BLK	MODE MOTOR GROUND	INPUT
2	GRN	AIR MIX POTENTIAL +5 V	OUTPUT	12	BLK/GRN	SENSOR GROUND	INPUT
3	BRN	FRESH	INPUT	13	ORN/WHT	SUNLIGHT SENSOR	OUTPUT
4	RED/GRN	RECIRCULATE	INPUT	14	RED/WHT	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	OUTPUT
5	YEL/BLU	MODE DEF	INPUT	15	PNK/WHT	OUTSIDE AIR TEMPERATURE SENSOR	OUTPUT
6	GRY	MODE HEAT/DEF	INPUT	16	GRY/RED	IN-CAR TEMPERATURE SENSOR	OUTPUT
7	BLU/RED	MODE HEAT	INPUT	17	BLU	AIR MIX POTENTIAL	INPUT
8	BRN	MODE HEAT/VENT	INPUT	18	LT GRN	EVAPORATOR TEMPERATURE SENSOR	OUTPUT
9	YEL/RED	MODE VENT	INPUT	19	BLU/BLK	BLOWER MOTOR HIGH RELAY	INPUT
10	PNK	A/C PRESSURE SWITCH	INPUT	20	ORN	VEHICLE SPEED SENSOR (VSS)	OUTPUT

Troubleshooting

Radiator Fan Control Module Input Tests

NOTE: Perform the following tests with the radiator fan control module 8P connector connected, the ignition switch ON (II), and the A/C switch OFF. If you find the cause of a problem, correct it before you continue.



RADIATOR FAN CONTROL MODULE 8P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

Terminal No.	Wire color	Test condition	Desired results	Corrective action if desired results are not obtained
4	BLK	Check for voltage to body ground.	There should be less than one volt.	Repair open to body ground.
6	WHT/GRN	Check for battery voltage:	There should be battery voltage.	Check No. 39 (10 A) fuse in the under-hood fuse/relay box; if OK, repair open in the WHT/GRN wire.
7	BLK/YEL	Check for battery voltage: Ignition switch - ON (II)		Check No. 4* fuse in the under-dash fuse/relay box; if OK, repair open in the BLK/YEL wire.
2	YEL/BLK	Check for battery voltage: Ignition switch - ON (II)		Check No. 8 (7.5 A) fuse in the under-dash fuse/relay box; if OK, repair open in the YEL/BLK wire.
3	YEL/WHT	Check for battery voltage: Ignition switch - ON (II)		Replace the radiator fan control module. Before you connect the new radiator fan control module, disconnect both fan relays. Check for continuity between the YEL/WHT (or YEL) wire and ground, using the 20 kΩ scale on your ohmmeter. There should be no continuity. If there is continuity, the new radiator fan control module will be damaged when you connect it.
1	YEL	Check for battery voltage: Ignition switch - ON (II)		
8	LT GRN/YEL	Connect to body ground: Ignition switch - ON (II)	Condenser fan and radiator fan should come on.	Check for an open in the LT GRN/YEL wire between the radiator fan control module and the condenser fan relay or the radiator fan relay. If OK, check for an open in the YEL/WHT wire between the radiator fan control module and the condenser fan relay, or the YEL wire between the radiator fan control module and the radiator fan relay. If OK, test the condenser fan relay or the radiator fan relay.
5	WHT/GRN	Check for voltage.	Approx. 11 V (engine coolant temperature below 207°F [97°C])	Faulty engine coolant temperature (ECT) switch B, short to body ground, or faulty radiator fan control module.

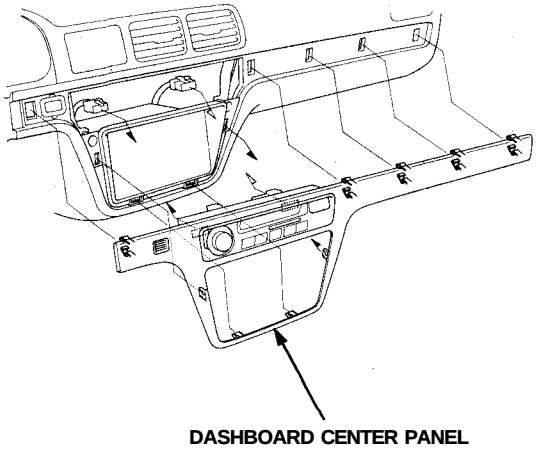
* No.4 (15 A): '95 and '96 models
No.4 (20 A): '97 and '98 models

Climate Control Unit

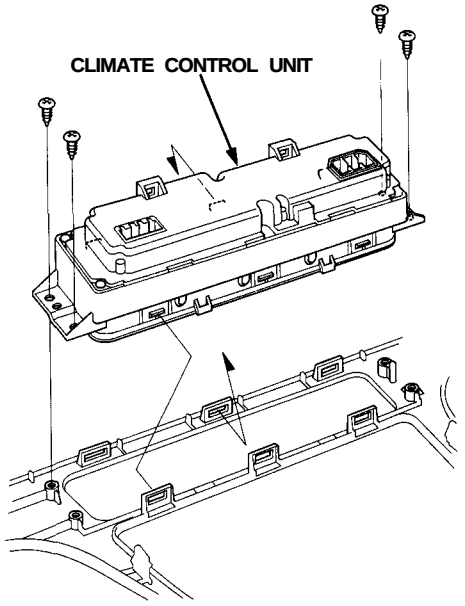
Replacement

1. Remove the dashboard center panel together with the climate control unit, then disconnect the connectors.

CAUTION:
- **Be careful not to damage the dashboard center panel and the dashboard.**
- **Do not pull between the clips: Otherwise, the panel may break.**



2. Remove the four self-tapping screws and the climate control unit.

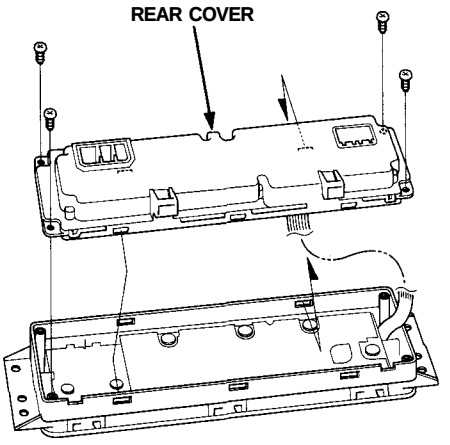


3. Install in the reverse order of removal.

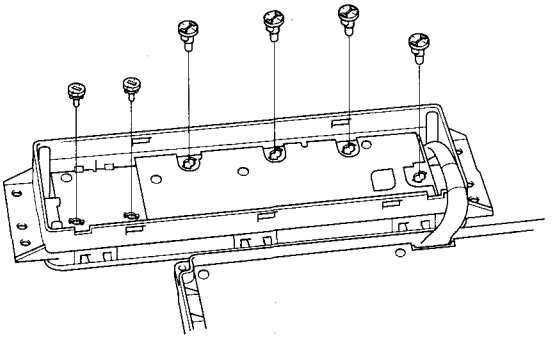
Bulb Replacement

CAUTION:
- **Before replacing bulbs, discharge the static electricity (which accumulated on you when you removed the climate control unit) by touching the door striker or other metal parts of the body.**
- **Do not touch the electronic components on the printed circuit board in the climate control unit.**

1. Remove the climate control unit (see previous column).
2. Carefully remove the four self-tapping screws and the rear cover.



3. Remove the bulb(s) with a flat-tip screwdriver.



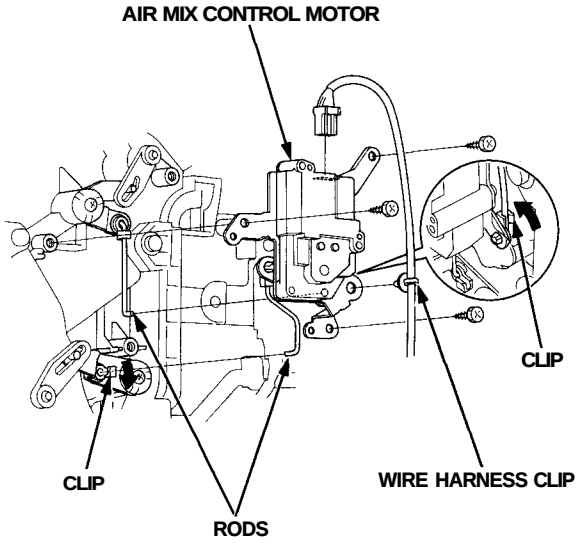
4. Install in the reverse order of removal. Make note of the following items.

NOTE:
- Do not kink or pull on the wires between the control unit and printed circuit board.
- After installation, operate the climate control unit to see whether it works properly.
- Run the self-diagnosis function to confirm that there are no problems in the system.

Air Mix Control Motor

Replacement

1. Turn the ignition switch ON (II), then set the temperature control dial on MAX COOL. Turn the ignition switch OFF.
2. Remove the glove box (see section 20).
3. Remove the wire harness clip, and disconnect the 5P connector from the air mix control motor.
4. Unlock the clips from the air mix control rods, then remove the three self-tapping screws and the air mix control motor.



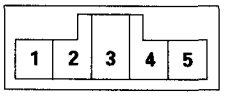
5. Remove the rod from the air mix control motor.
6. Install in the reverse order of removal. After installation, make sure the air mix control motor runs smoothly.

Test

1. Disconnect the 5P connector from the air mix control motor.
2. Connect battery power to the No. 1 terminal of the air mix control motor and ground the No. 5 terminal; the air mix control motor should run, and stop at HOT. If it doesn't, reverse the connections; the air mix control motor should run, and stop at COOL.

   NOTE: If the air mix control motor does not run, remove it, then check the air mix control linkage and doors for smooth movement. If they move smoothly, replace the air mix control motor.
3. Measure the resistance between the No. 2 and No. 3 terminals. It should be approximately 6 kΩ ± 20%.
4. Measure the resistance between the No. 3 and No. 4 terminals. It should be approx. 1.2 kΩ ± 20% at MAX HOT and approximately 4.8 kΩ ± 20% at MAX COOL

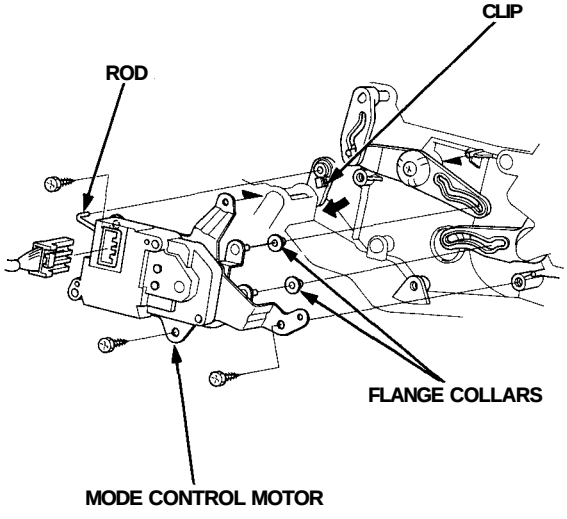
AIR MIX CONTROL MOTOR



Mode Control Motor

Replacement

1. Turn the ignition switch ON (II), then set the mode control switch on VENT. Turn the ignition switch OFF.
2. Remove the dashboard (see section 20).
3. Disconnect the 7P connector from the mode control motor.
4. Unhook the clip from the mode control rod, then remove the three self-tapping screws, the mode control motor and the flange collars.



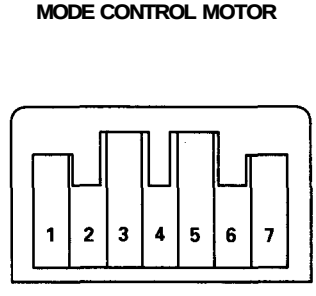
5. Remove the rod from the mode control motor.
6. Install in the reverse order of removal. After installation, make sure the mode control motor runs smoothly.

Test

1. Disconnect the 7P connector from the mode control motor.
2. Connect battery power to the No. 1 terminal, and ground the No. 7 terminal.

   CAUTION: Never connect the battery in the opposite direction.
3. Using a jumper wire, connect the No. 7 terminal individually to the No. 2, 3, 4, 5 and 6 terminals in that order. Each time the connection is made, the mode control motor should run smoothly and stop.

   NOTE: If the mode control motor does not run when jumping the first terminal, jump that terminal again after jumping the other terminals.
   The mode control motor is OK if it runs when jumping the first terminal again.

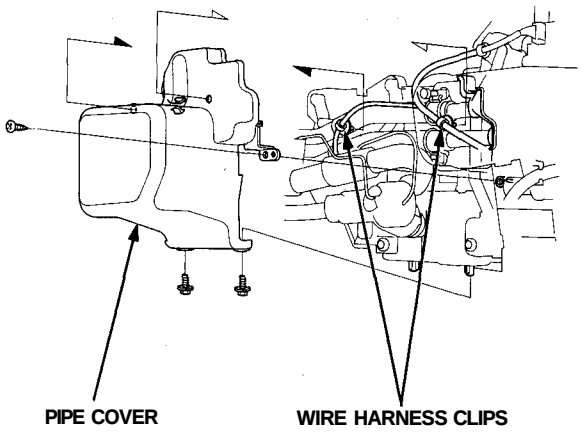


4. If the mode control motor does not run in step 2, remove it, then check the mode control linkage and doors for smooth movement. If they move smoothly, replace the mode control motor.

Recirculation Control Motor

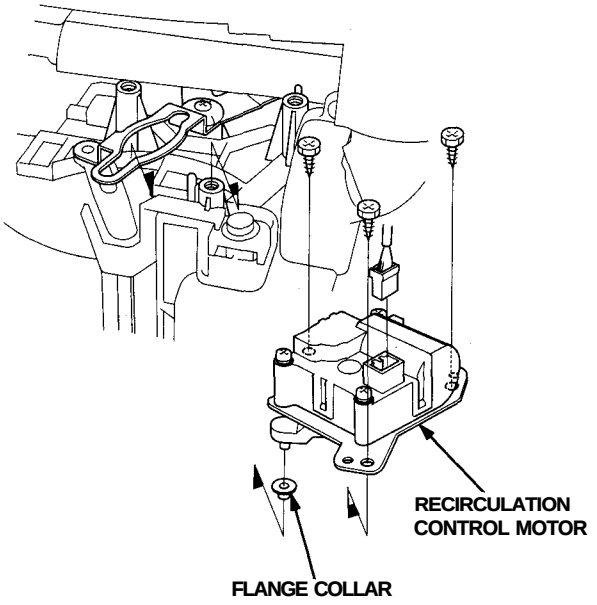
Replacement

1. Remove the wire harness clips, the three self-tapping screws and the pipe cover.



2. Disconnect the 4P connector from the recirculation control motor.

3. Remove the three self-tapping screws, the recirculation control motor and the flange collar.



4. Install in the reverse order of removal. After installation, make sure the recirculation control motor runs smoothly.

Test

1. Disconnect the 4P connector from the recirculation control motor.

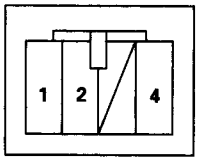
2. Connect battery power to the No. 1 terminal, and ground the No. 2 and No. 4 terminals; the recirculation control motor should run smoothly.

   CAUTION: Never connect the battery in the opposite direction.

3. Disconnect the No. 2 or No. 4 terminals from ground; the recirculation control motor should stop at FRESH or RECIRCULATE.

   NOTE: Don't cycle the recirculation control motor for a long time.

RECIRCULATION CONTROL MOTOR



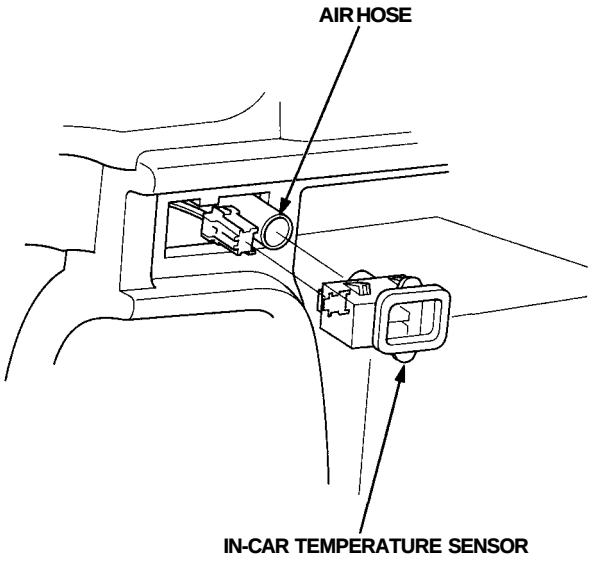
4. If the recirculation control motor does not run in step 1, remove it, then check the recirculation control linkage and doors for smooth movement. If they move smoothly, replace the recirculation control motor.

In-car Temperature Sensor

Replacement

1. Remove the dashboard center panel (see page 22-49).

2. Remove the in-car temperature sensor from the dashboard, then disconnect the 2P connector and the air hose.



3. Install in the reverse order of removal.

NOTE: Be sure to connect the air hose securely.

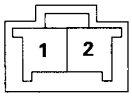
Test

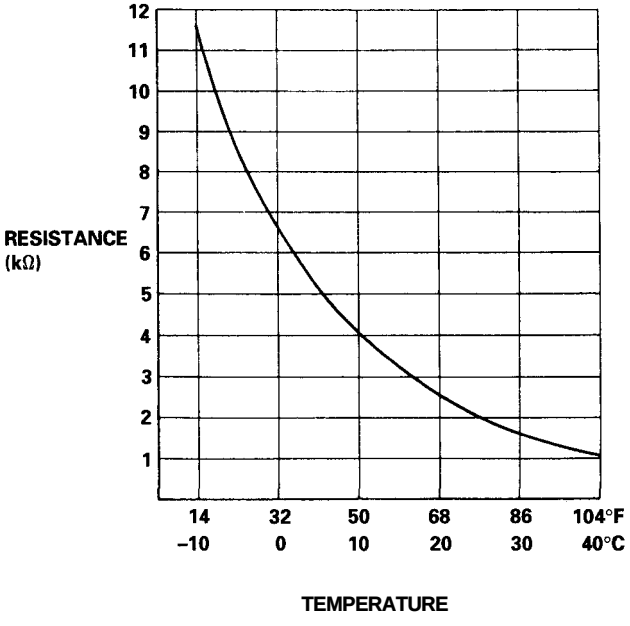
Compare the resistance reading between the No. 1 and No. 2 terminals of the in-car temperature sensor with the specifications shown in following graph; resistance should be within specifications.

NOTE: Check for change in resistance by heating or cooling the sensor with a hair drier, etc.

CAUTION: The sensor uses a thermistor which can be damaged if high current is applied during testing. Therefore, use a circuit tester with an output of 1 mA or less at the 20 kΩ range.

IN-CAR TEMPERATURE SENSOR

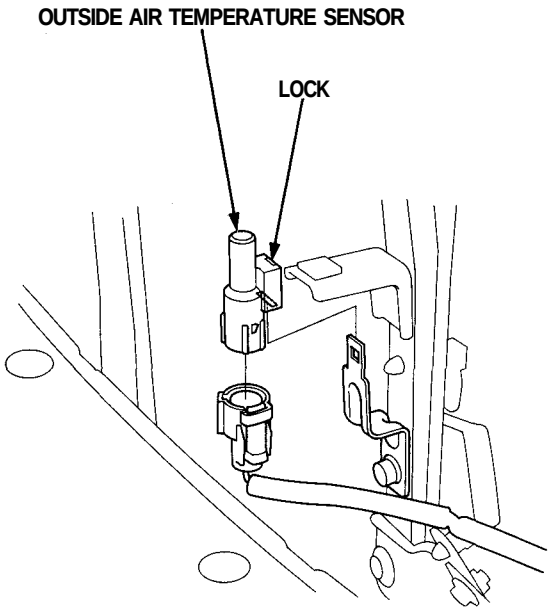




Outside Air Temperature Sensor

Replacement

1. Disconnect the 2P connector from the outside air temperature sensor.
2. Release the lock, and remove the outside air temperature sensor.



3. Install in the reverse order of removal.

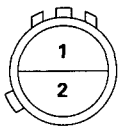
Test

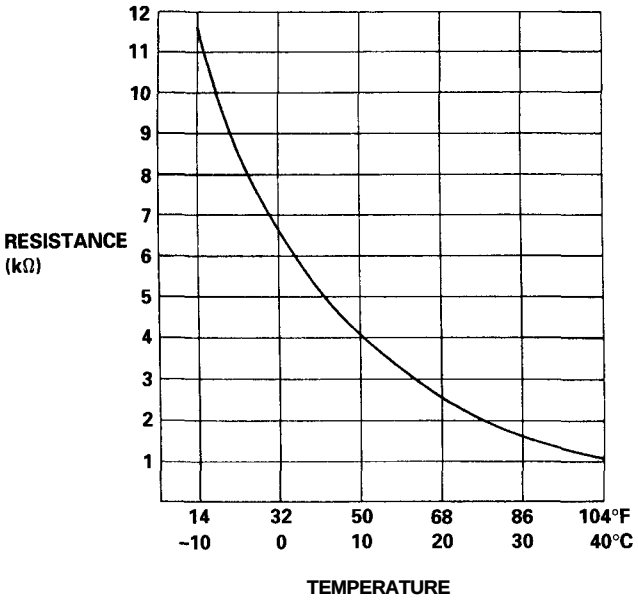
Compare the resistance reading between the No. 1 and No. 2 terminals of the outside air temperature sensor with the specifications shown in following graph; resistance should be within specifications.

NOTE: Dip the sensor in ice water, and measure resistance. Then pour hot water on the sensor, and check for change in resistance.

CAUTION: The sensor uses a thermistor which can be damaged if high current is applied during testing. Therefore, use a circuit tester with an output of 1 mA or less at the 20 kΩ range.

OUTSIDE AIR TEMPERATURE SENSOR



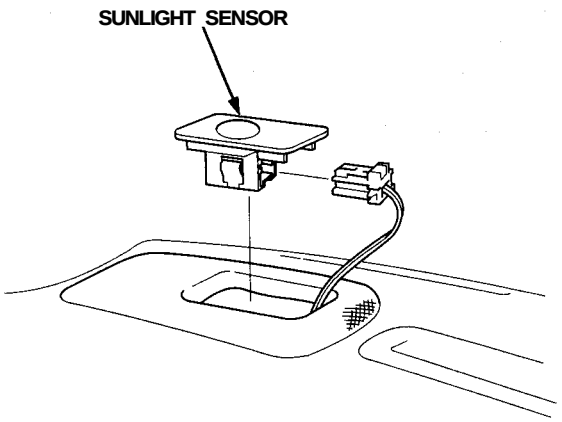


Sunlight Sensor

Replacement

1. Remove the sunlight sensor from the left tweeter speaker grille, and disconnect the 2P connector.

   NOTE: Be careful not to damage the left tweeter speaker grille.



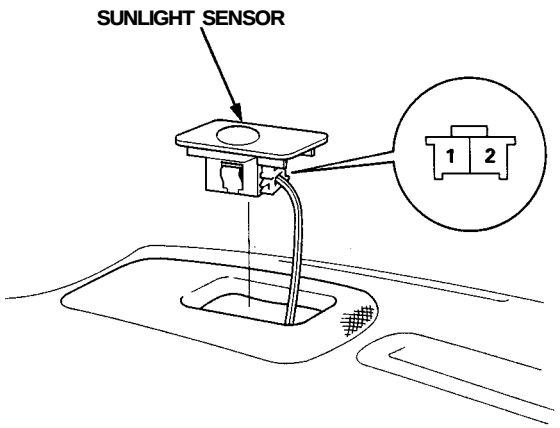
2. Install in the reverse order of removal.

Test

Turn the ignition switch ON (II). Measure the voltage between the terminals with the (+) probe on the No. 1 terminal and the (-) probe on the No. 2 terminal with the 2P connector connected. Voltage should be;

- 3.7 ± 0.2 V or more with the sensor out of direct sunlight.
- 3.6 ± 0.2 V or less with the sensor in direct sunlight.

NOTE: The voltage will not change under the light of a flashlight or a fluorescent lamp.



Evaporator Temperature Sensor

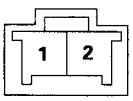
Test

Compare the resistance reading between the No. 1 and No. 2 terminals of the evaporator temperature sensor with the specifications shown in following graph; resistance should be within specifications.

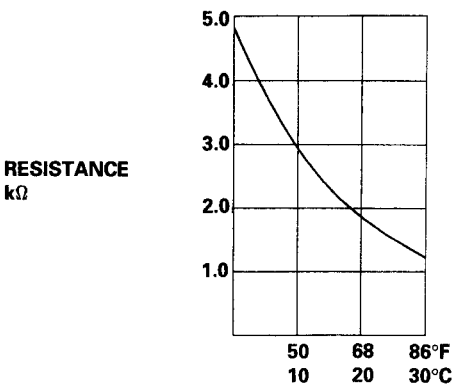
1. Dip the sensor in ice water, and measure resistance.
2. Pour hot water on the sensor, and check for change in resistance.

CAUTION: The sensor uses a thermistor which can be damaged if high current is applied during testing. Therefore, use a circuit tester with an output of 1 mA or less at the 20 kΩ range.

EVAPORATOR TEMPERATURE SENSOR



TERMINAL SIDE OF MALE TERMINALS



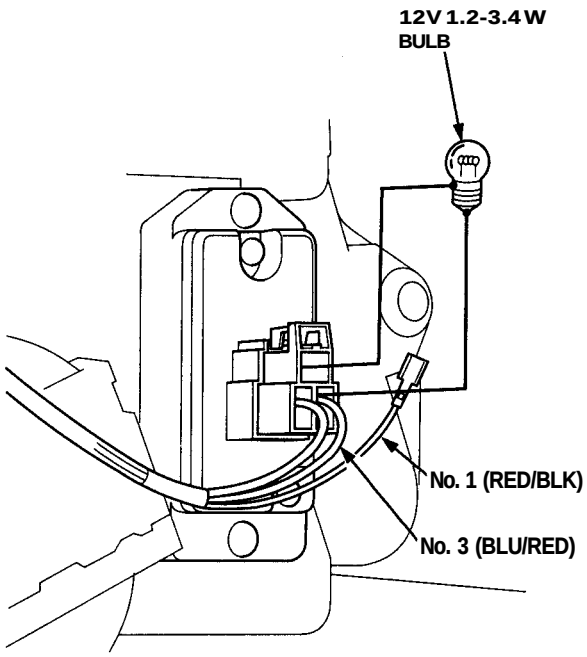
Power Transistor

Test

1. Disconnect the 3P connector from the power transistor.
2. Pull out the No. 1 (RED/BLK) terminal from the connector.
3. Connect a 1.2 - 3.4 watt bulb as shown, then reconnect the 3P connector to the power transistor.
4. Turn the ignition switch ON (II), and check that the blower motor runs.

CAUTION:

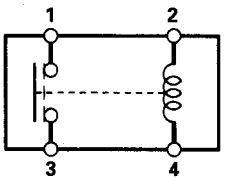
- **To avoid a loose or disconnected terminal, be careful not to damage the locking tab when disconnecting and connecting the terminal.**
- **Insulate the No. 1 (RED/BLK) terminal from the body until the testing is completed.**



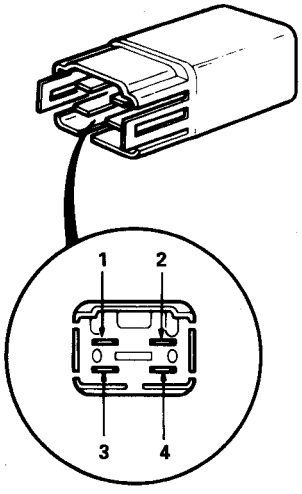
Relays

Test

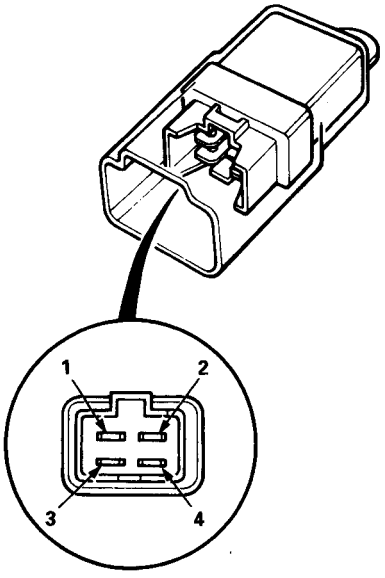
There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals, and there should be no continuity when power is disconnected.



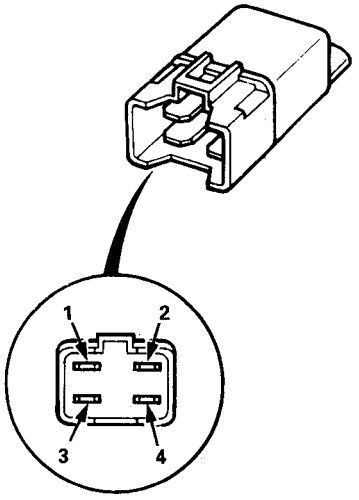
- Blower motor relay



- Radiator fan relay
- Condenser fan relay
- Compressor clutch relay



- **Blower motor high relay**

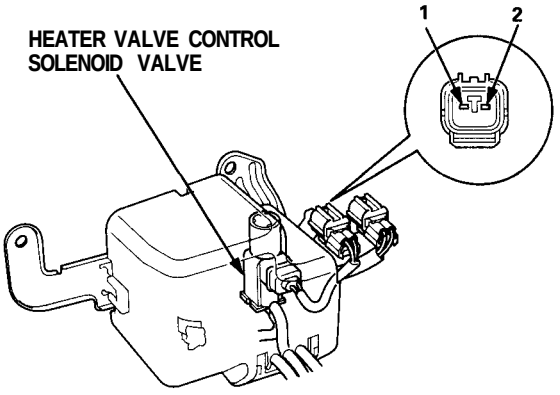


Heater Valve

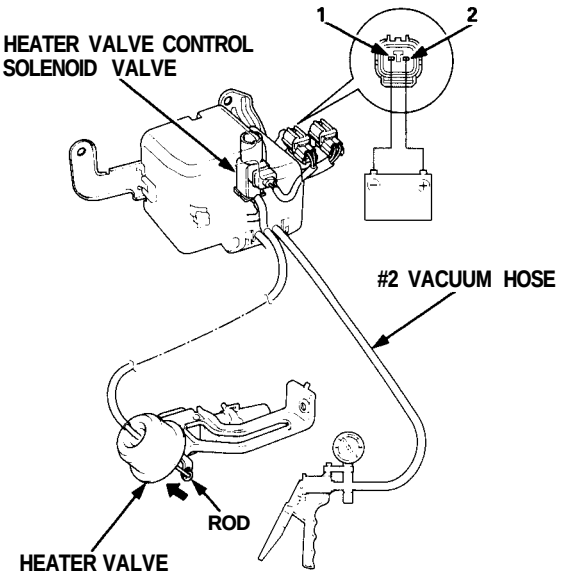
Test

1. Disconnect the 2P connector from the heater valve control solenoid valve.

2. Check for continuity between the No. 1 and No. 2 terminals of the heater valve control solenoid valve.



3. Disconnect the #2 vacuum hose from the intake manifold, then connect a vacuum pump to the #2 vacuum hose.



4. Connect battery power to the No. 2 terminal of the heater valve control solenoid valve, and ground the No. 1 terminal.

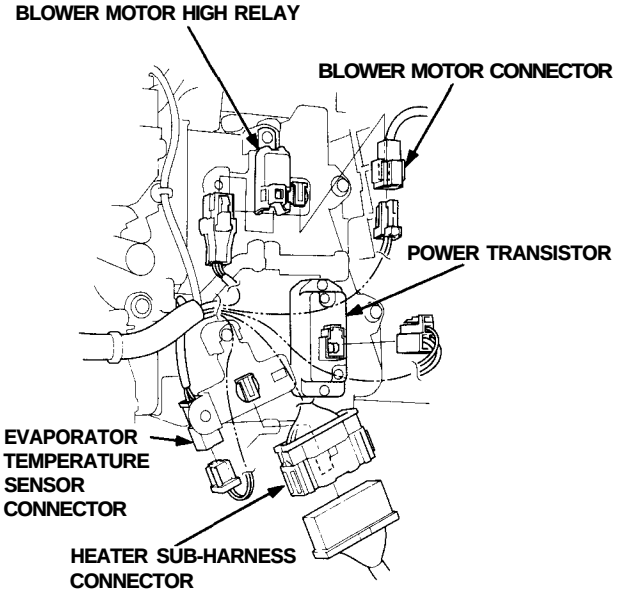
5. Check that the rod of the heater valve is pulled toward the diaphragm when vacuum is applied to the heater valve control solenoid with a vacuum pump.

6. Check that the rod is returned to the original position when power is disconnected.

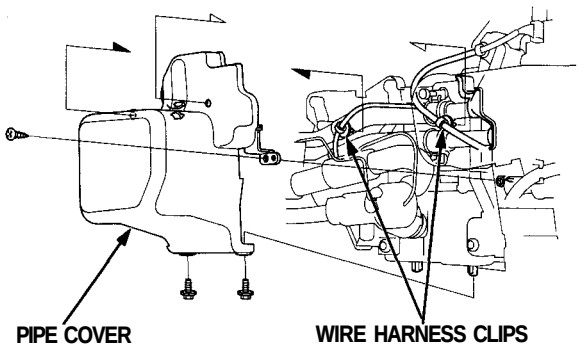
Evaporator

Replacement

1. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-71).
2. Remove the dashboard lower cover, the knee bolster and the glove box (see section 20).
3. Remove the ECM (see section 11).
4. Remove the ABS control unit and the radiator fan control module together with the bracket, then remove the TCM (see section 14). Remove the security control unit.
5. Disconnect the connectors from the power transistor, blower motor high relay, evaporator temperature sensor, blower motor and the heater sub-harness, then remove the blower motor and heater sub-harness connectors from the brackets. Disconnect the passenger's airbag harness clip.

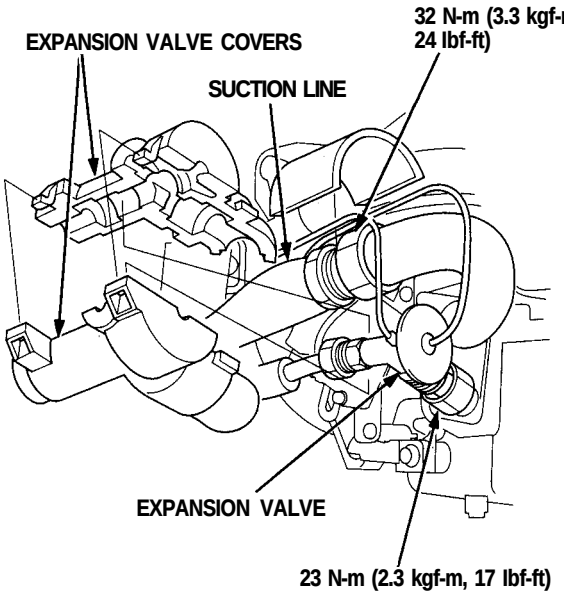


6. Remove the wire harness clips, the three self-tapping screws and the pipe cover.



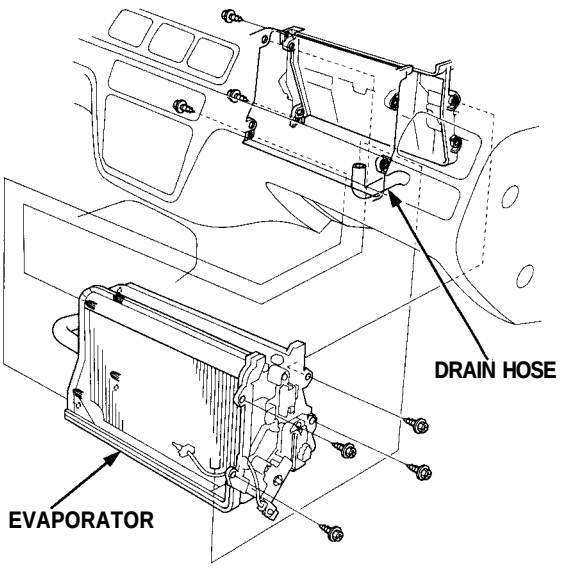
7. Remove the expansion valve covers, then disconnect the suction line and unbolt the expansion valve from the evaporator.

NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



8. Disconnect the drain hose, and remove the seven self-tapping screws. Then pull the evaporator out of the front passengers side to remove it.

NOTE: Be careful not to damage the evaporator fins when removing the evaporator.



9. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new evaporator, add refrigerant oil (ND-OIL 8} (see page 22-66).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (ND-OIL 8) before installing them.

NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.

- Be careful not to damage the evaporator fins when installing the evaporator.
- Install the expansion valve capillary tube with the capillary tube in contact with the suction line directly, and wrap it with tape.

NOTE: Make sure there is no foreign matter stuck between the capillary tube and the suction line.

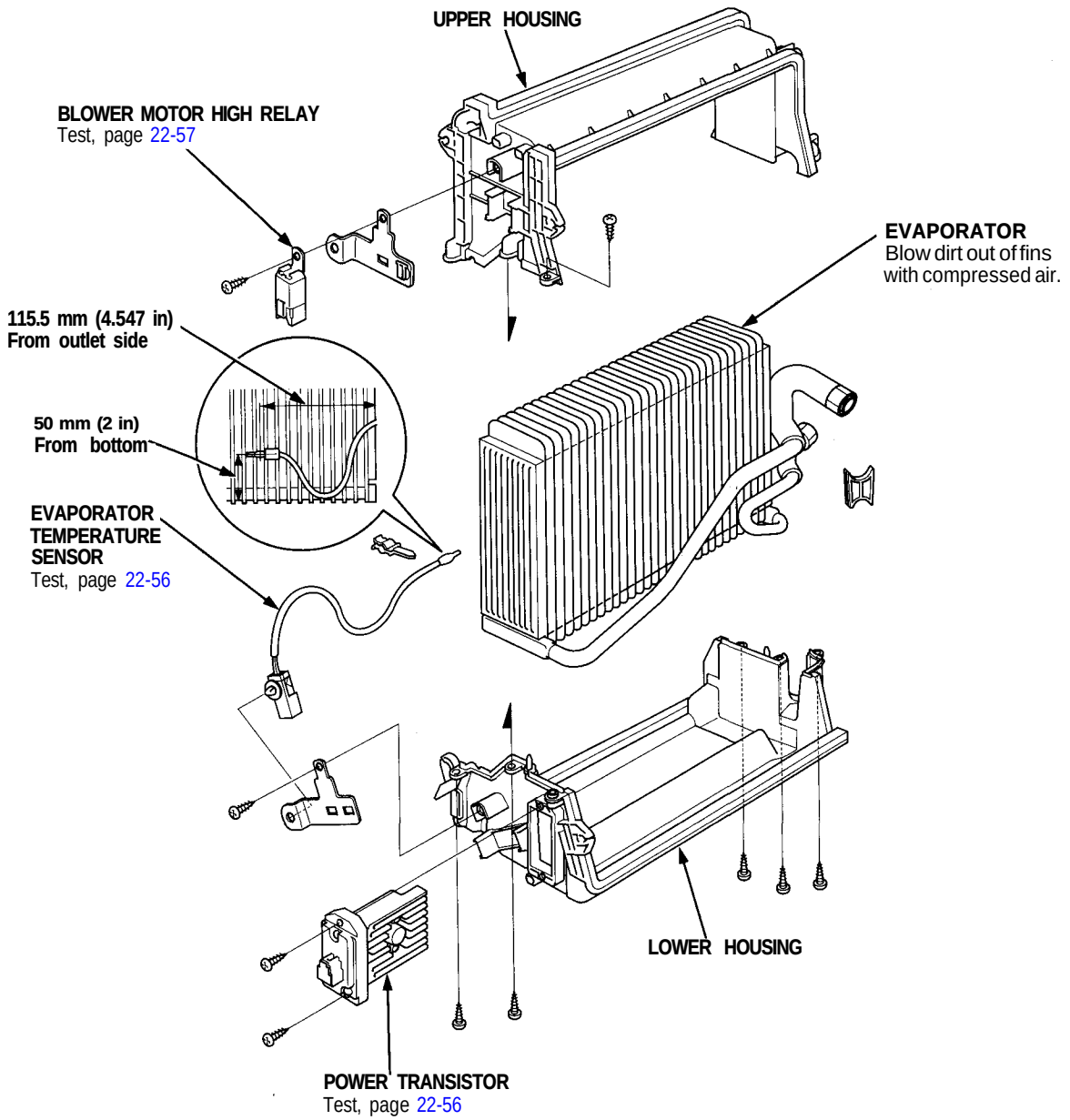
- Make sure that there is no air leakage.
- Charge the system (see page 22-82), and test its performance (see page 22-68).

Evaporator

Overhaul

1. Pull the evaporator temperature sensor out from the evaporator fins.
2. Remove the two self-tapping screws and the power transistor.
3. If necessary, remove the blower motor high relay.
4. Remove the six self-tapping screws from the housings.
5. Carefully separate the housings, then remove the evaporator.
6. Assemble in the reverse order of disassembly. Make note of following items.
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (ND-OIL 8) before installing them.

     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Reinstall the evaporator temperature sensor to its original location.



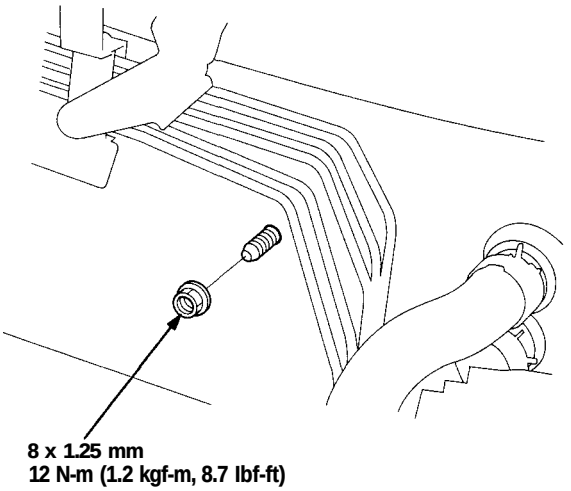
Blower Unit

Replacement

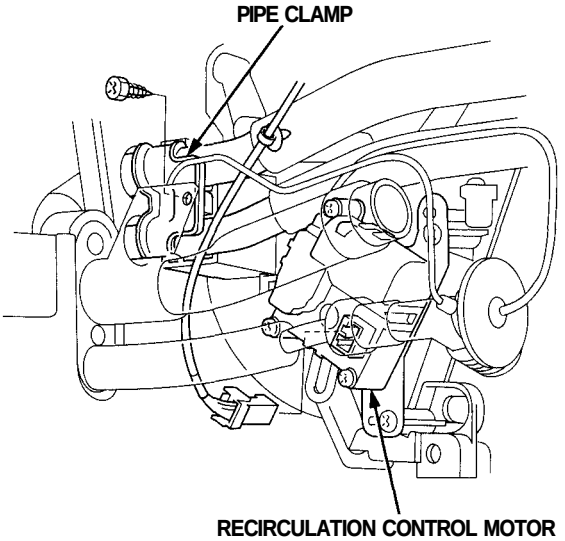
1. Remove the evaporator (see page 22-58).

2. Remove the mounting nut from the blower unit.

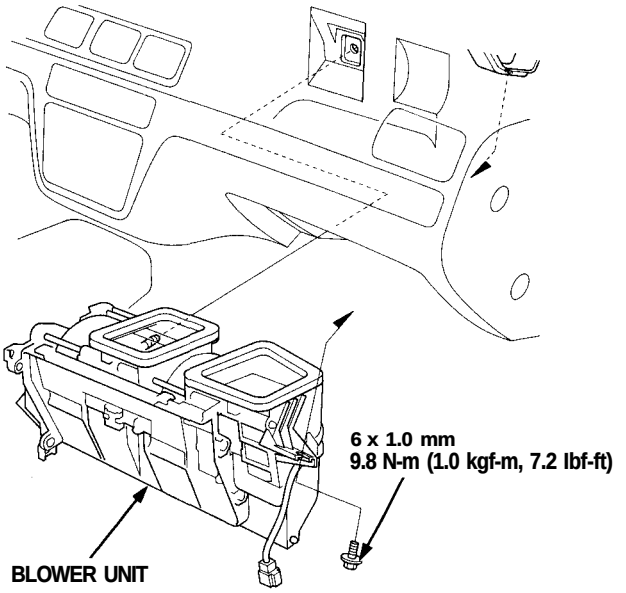
   NOTE: When removing the mounting nut, take care not to damage or bend the fuel pipes, brake pipes, etc.



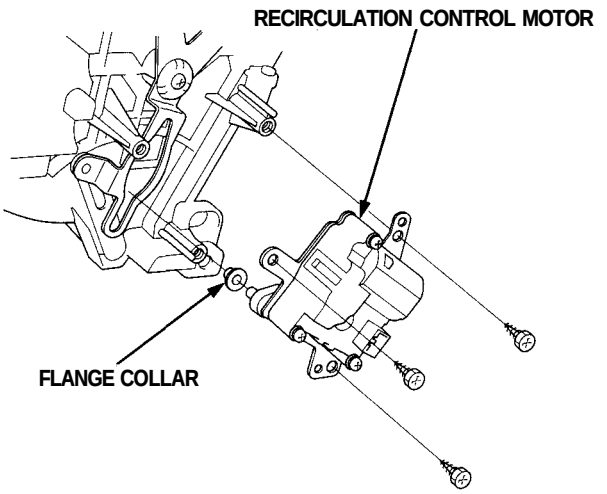
3. Disconnect the connector from the recirculation control motor, and remove the self-tapping screw from the pipe clamp.



4. Remove the mounting bolt, then remove the blower unit by moving it back and toward the right.



5. If necessary, remove the three self-tapping screws, the recirculation control motor and the flange collar.



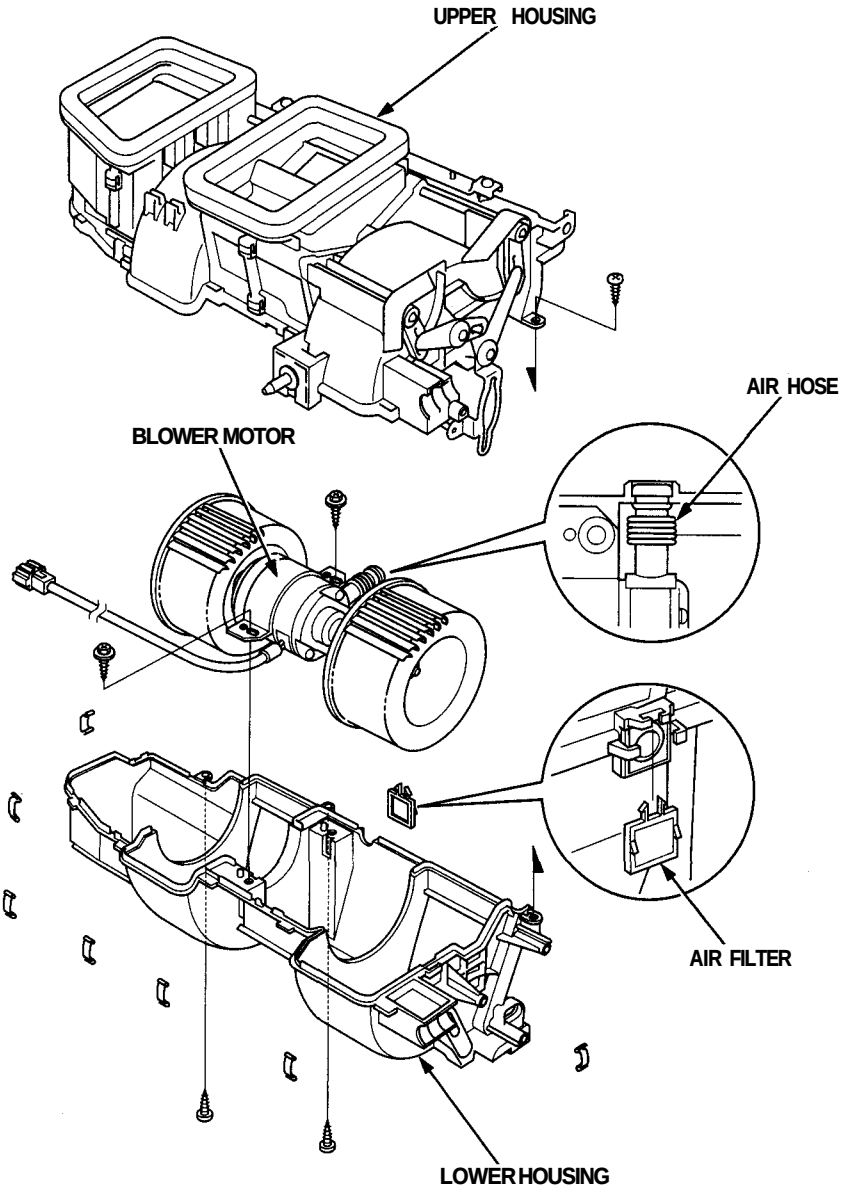
6. Install in the reverse order of removal. Make note of the following items.

   - Make sure that the recirculation control doors and linkage move smoothly without binding.
   - After reinstalling the recirculation control motor, make sure the recirculation control motor runs smoothly (see page 22-52).
   - Make sure that there is no air leakage.

Blower Unit

Overhaul

1. Remove the air filter.
2. Remove the three self-tapping screws and the seven clamps from the housings.
3. Carefully separate the housings.
4. Remove the two self-tapping screws and the blower motor.
5. Assemble in the reverse order of disassembly. Make note of following items.
   - Make sure that the recirculation control doors and linkage move smoothly without binding.
   - When assembling, be sure to install the air hose of the blower motor to the housings as shown.



Heater Unit

Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Disconnect the negative cable from the battery.

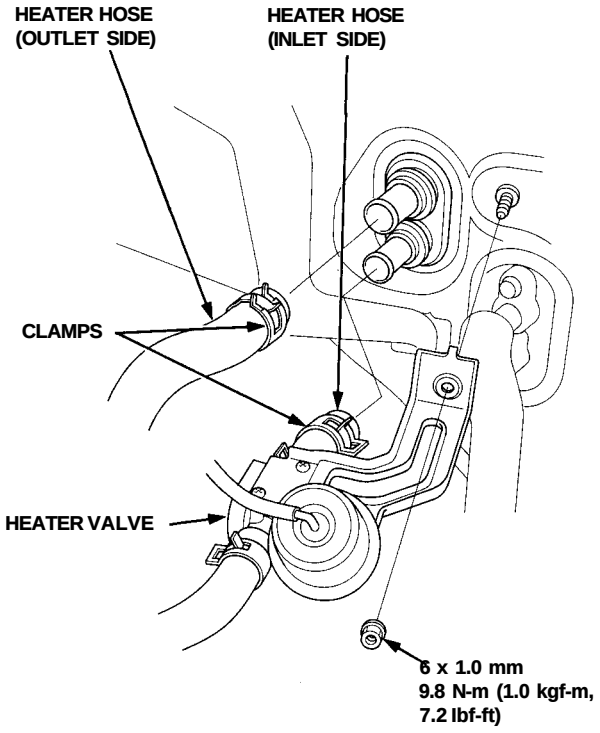
2. When the engine is cool, drain the engine coolant from the radiator (see section 10).

⚠ WARNING Do not remove the radiator cap when the engine is hot; the engine coolant is under pressure and could severely scald you.

3. Remove the mounting nut and the heater valve, then disconnect the heater hoses from the heater unit.

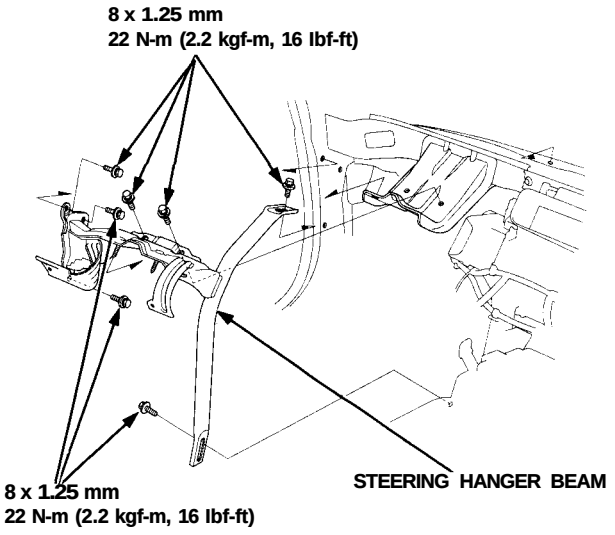
CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant from painted surfaces.

NOTE: Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan.

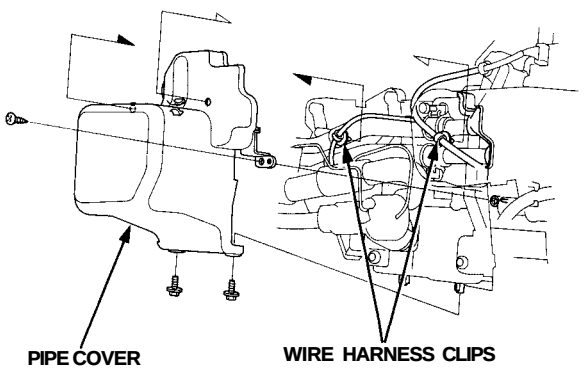


4. Remove the dashboard (see section 20).

5. Remove the seven mounting bolts and the steering hanger beam.



6. Remove the wire harness clips, the three self-tapping screws and the pipe cover.

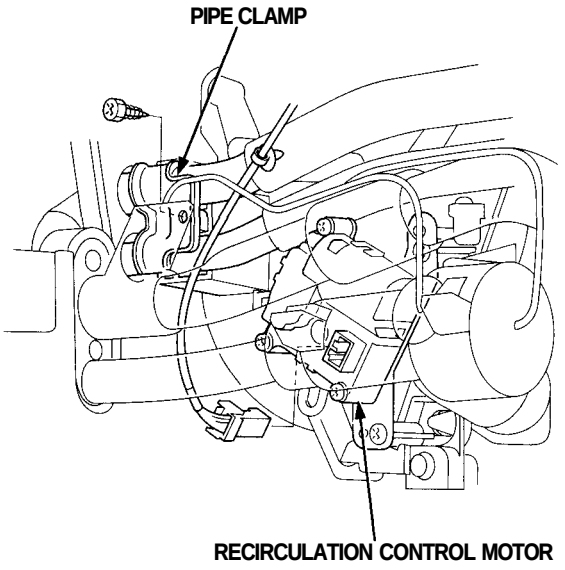


(cont'd)

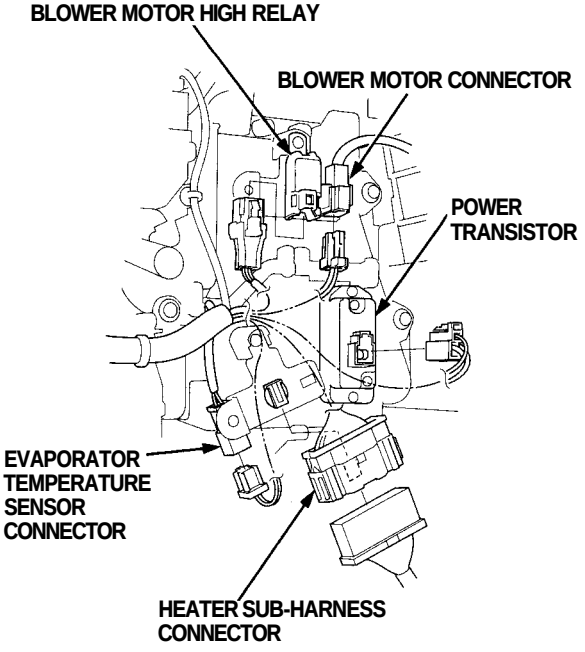
Heater Unit

Replacement (cont'd)

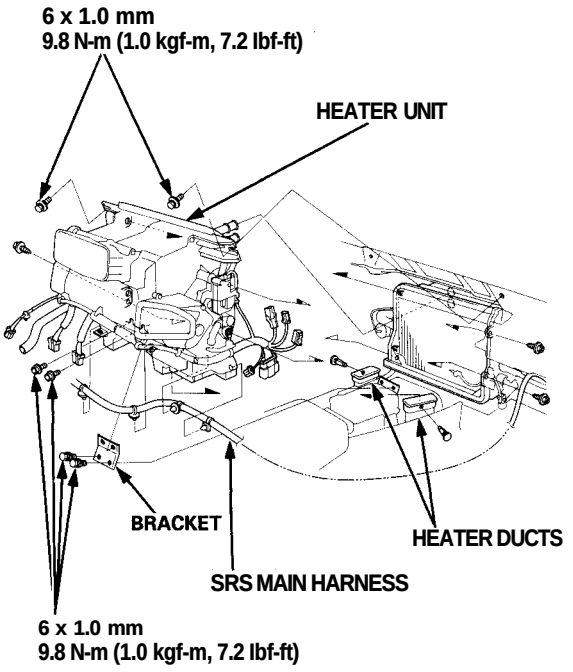
7. Disconnect the connector from the recirculation control motor, then remove the self-tapping screw from the pipe clamp.



8. Disconnect the connectors from the power transistor, blower motor high relay, evaporator temperature sensor, blower motor and the heater sub-harness, then remove the heater sub-harness connector from the bracket.



9. Remove the clips from the right and left heater ducts, and the SRS main harness clips from the heater unit. Remove the three self-tapping screws, the six mounting bolts, the bracket and the heater unit.



10. Install in the reverse order of removal. Make note of the following items.

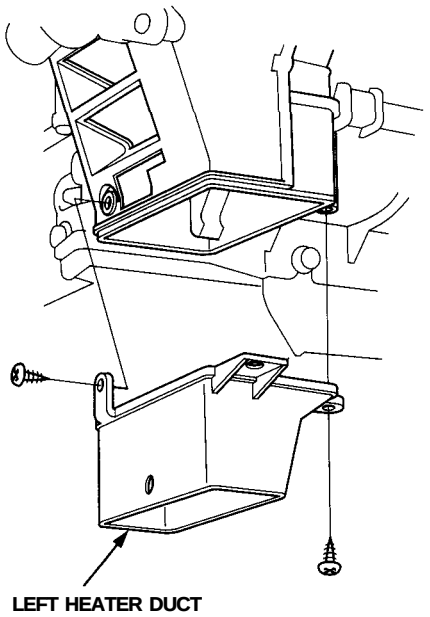
- Apply sealant to the grommets.
- Do not interchange the inlet and outlet heater hoses. Make sure that the clamps are secure.
- Loosen the bleed bolt on the engine, and refill the radiator and the coolant reservoir with the proper engine coolant mixture (see section 10). Tighten the bleed bolt when all the trapped air has escaped and engine coolant begins to flow from it (see section 10).
- Make sure that there is no air leakage.

Heater Core Replacement

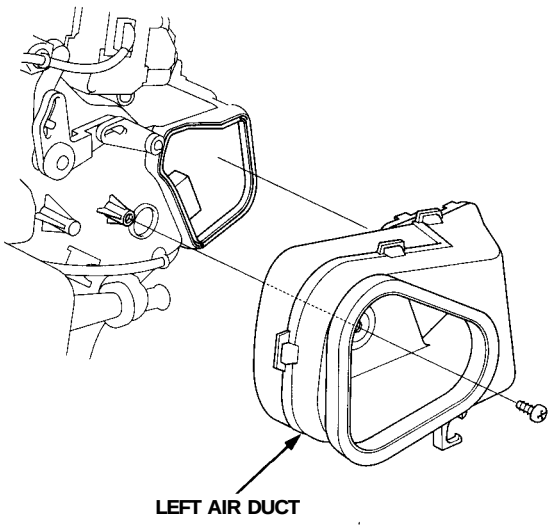
1. Remove the heater unit (see page 22-63).

2. Remove the mode control motor (see page 22-51).

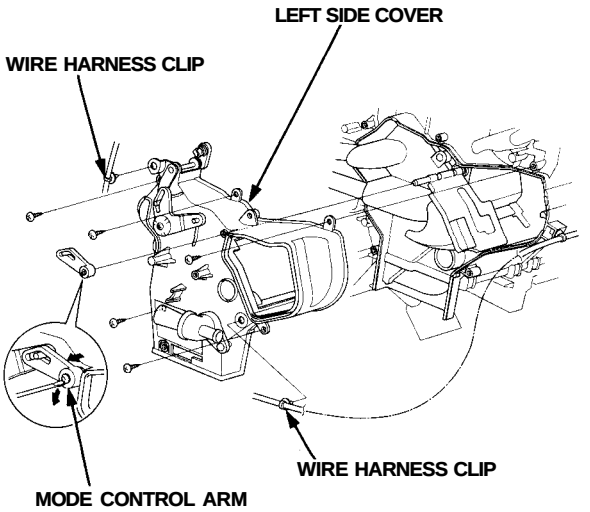
3. Remove the two self-tapping screws and the left heater duct.



4. Remove the self-tapping screw and the left air duct.

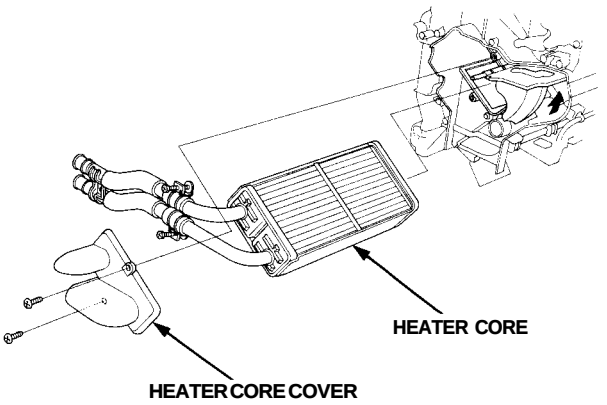


5. Remove the wire harness clips, and the mode control arm with a flat-tip screwdriver as shown. Remove the five self-tapping screws and the left side cover.



6. Remove the two self-tapping screws and the heater core cover, then pull out the heater core.

NOTE: Be careful not to bend the inlet and outlet pipes during heater core removal.



7. Install in the reverse order of removal. Make note of the following items.

- Make sure that the mode control doors and linkage move smoothly without binding.
- After reinstalling the mode control motor, make sure the mode control motor runs smoothly (see page 22-51).

A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil*, which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioner system or your servicing equipment will result.

* DENSO ND-OIL8:
- P/N 38897 - PR7 - A01AH: 120 mℓ (4fl-oz, 4.2 Imp-oz)
- P/N 38899 - PR7 - A01: 40 mℓ (1 1/3 fl-oz, 1.4 Imp-oz)

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove R-134a from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

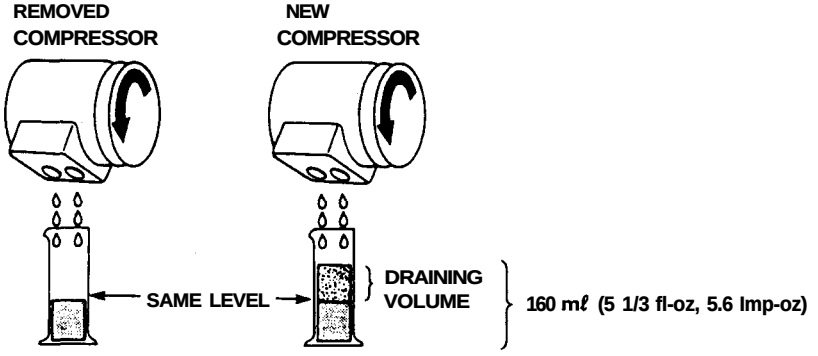
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, use a R-134a refrigerant Recovery/Recycling/Charging System; don't release refrigerant into the atmosphere.
6. Add refrigerant oil after replacing the following parts:

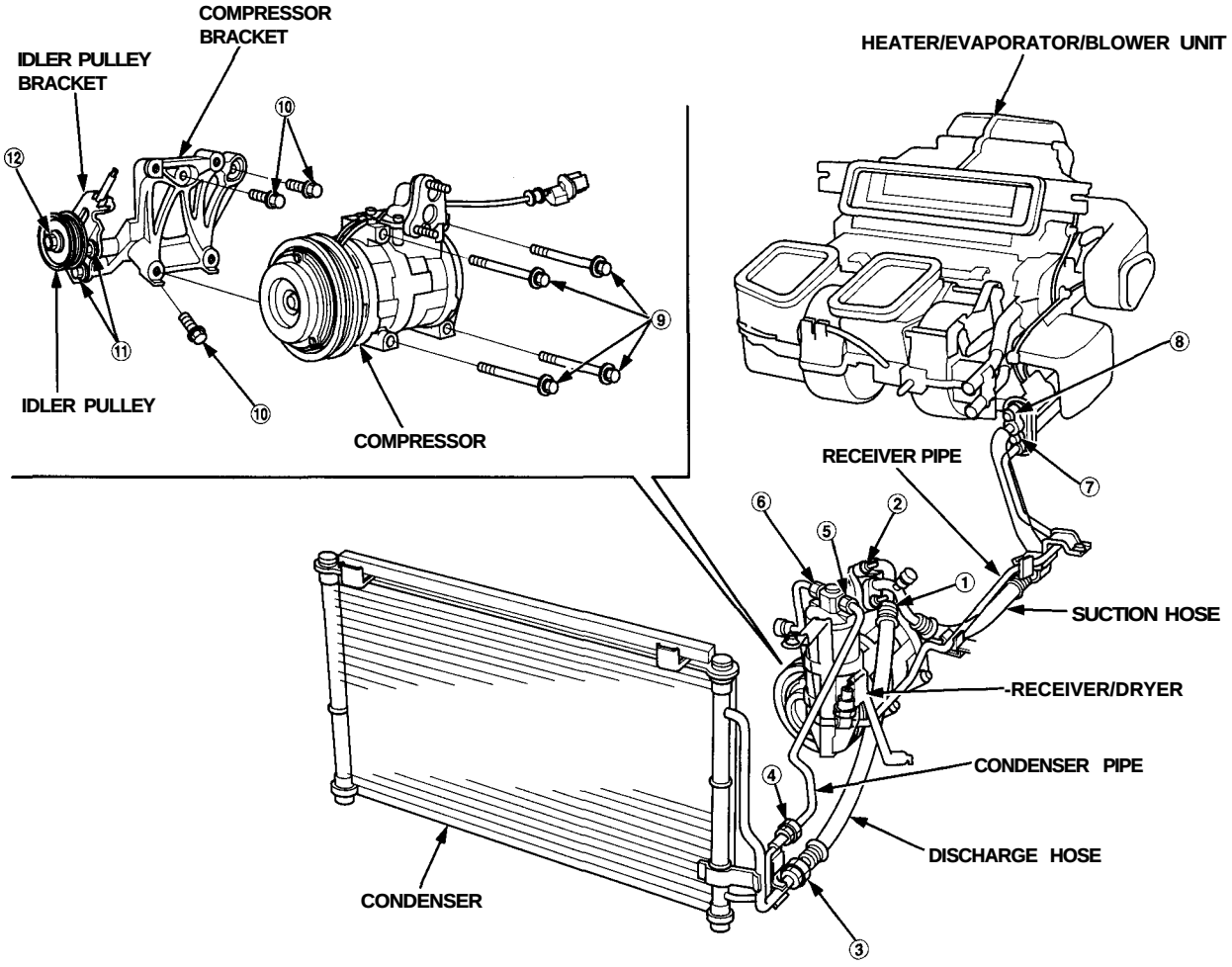
NOTE:
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

Condenser ..... 25 mℓ (5/6 fl-oz, 0.9 Imp-oz)
Evaporator ..... 50 mℓ (1 2/3 fl-oz, 1.8 Imp-oz)
Line or hose ..... 20 mℓ (2/3 fl-oz, 0.7 Imp-oz)
Receiver/Dryer ..... 15 mℓ (fl-oz, 0.5 Imp-oz)
Leakage repair ..... 25 mℓ (5/6 fl-oz, 0.9 Imp-oz)
Compressor ..... For compressor replacement, subtract the volume of oil drained from the removed compressor from 160 mℓ (5 1/3 fl-oz, 5.6 Imp-oz), and drain the calculated volume of oil from the new compressor: 160 mℓ (5 1/3 fl-oz, 5.6 Imp-oz) — Volume of removed compressor = Volume to drain from new compressor.

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 mℓ (1 2/3 fl-oz, 1.8 Imp-oz) from the new compressor.



A/C System Torque Specifications



NOTE: When installing the compressor bracket, tighten the bolts on the oil pan first, then those on the cylinder block (see page 22-73).

① **Suction hose to the compressor (6 x 1.0 mm)..... 9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)**
② **Discharge hose to the compressor (6 x 1.0 mm)..... 9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)**
③ **Discharge hose to the condenser..... 22 N-m (2.2 kgf-m, 16 lbf-ft)**
④ **Condenser pipe to the condenser..... 13 N-m (1.3 kgf-m, 9.4 lbf-ft)**
⑤ **Condenser pipe to the receiver/dryer..... 13 N-m (1.3 kgf-m, 9.4 lbf-ft)**
⑥ **Receiver pipe to the receiver/dryer..... 13 N-m (1.3 kgf-m, 9.4 lbf-ft)**
⑦ **Receiver pipe to the evaporator (6 x 1.0 mm)..... 9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)**
⑧ **Suction hose to the evaporator (6 x 1.0 mm)..... 9.8 N-m (1.0 kgf-m, 7.2 lbf-ft)**
⑨ **Compressor to compressor bracket (8 x 1.25 mm)..... 22 N-m (2.2 kgf-m, 16 lbf-ft)**
⑩ **Compressor bracket to cylinder block (10 x 1.25 mm)..... 49 N-m (5.0 kgf-m, 36 lbf-ft)**
⑪ **Idler pulley bracket to compressor bracket (8 x 1.25 mm)..... 22 N-m (2.2 kgf-m, 16 lbf-ft)**
⑫ **Idler pulley to idler pulley bracket (8 x 1.25 mm)..... 44 N-m (4.5 kgf-m, 32 lbf-ft)**

A/C System Service

Performance Test

The performance test will help determine if the air conditioner system is operating within specifications.

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

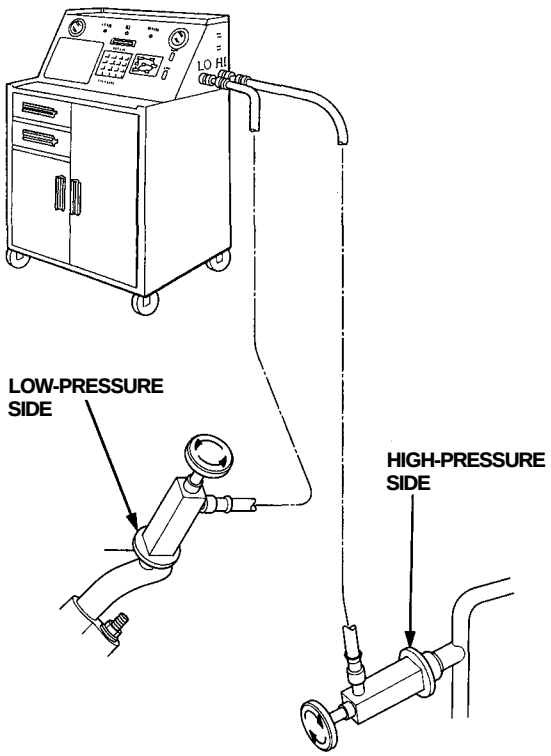
1. Connect a R-134a refrigerant Recover/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

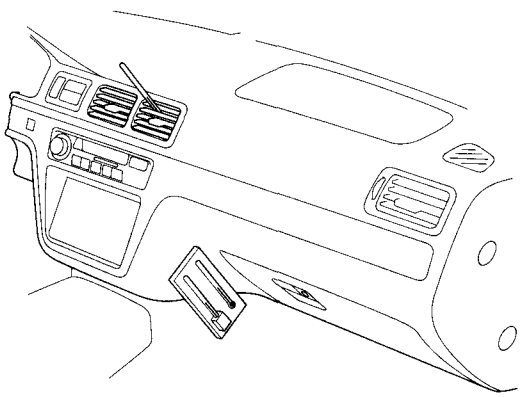
2. Insert a thermometer in the center vent outlet. Determine the relative humidity and air temperature.

3. Test conditions:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control dial on MAX COOL, the mode control switch on VENT and the recirculation control switch on RECIRCULATE.
   - Turn the A/C switch on, and the fan switch on MAX.
   - Run the engine at 1,500 rpm.
   - No driver or passengers in vehicle

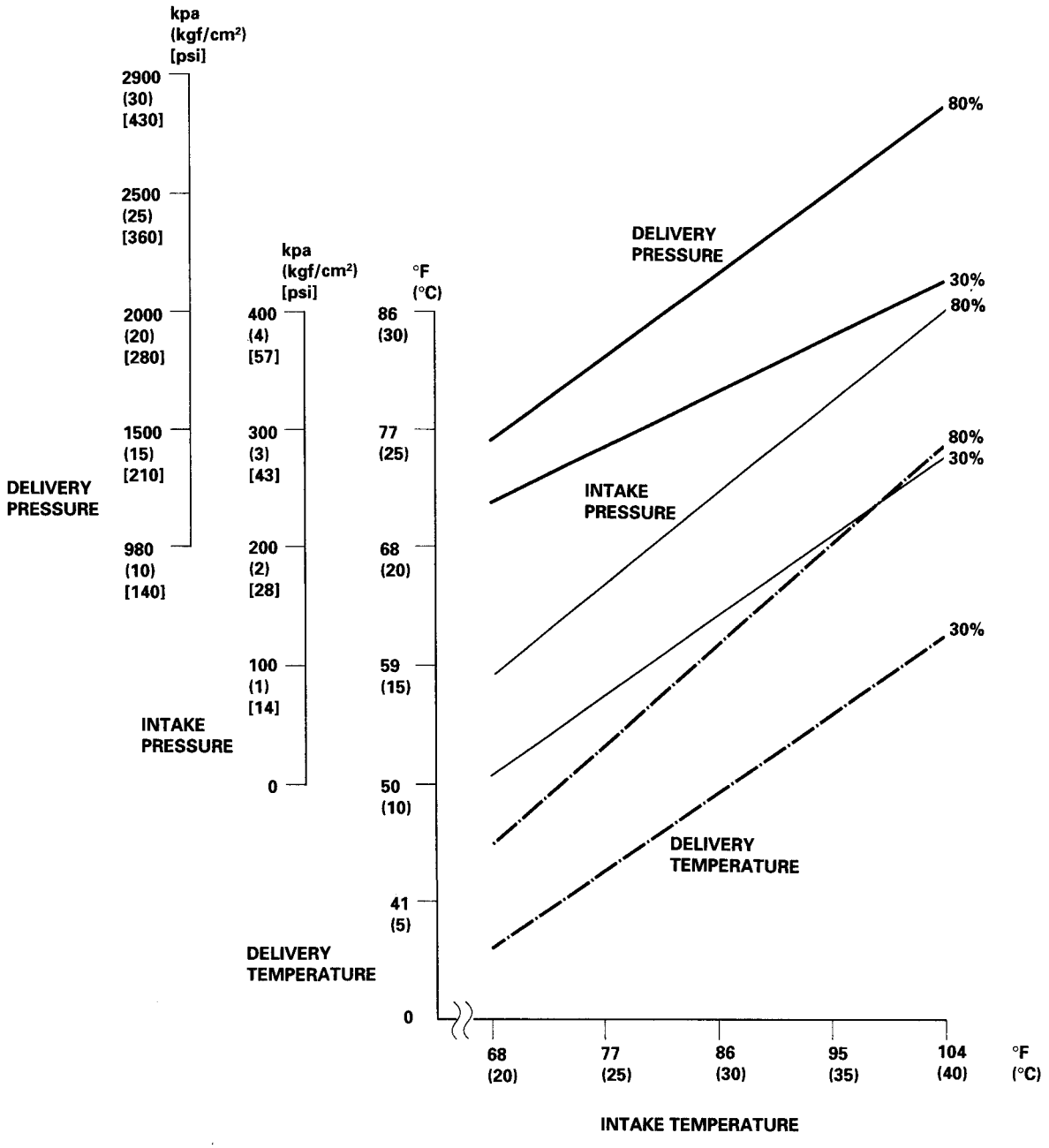
4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

Recovery/Recycling/Charging System





5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level (10% above and 10% below the humidity level).
   - From each point, draw a horizontal line across the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



A/C System Service

Pressure Test Chart

NOTE: Performance Test is on page 22-68.

Test results	Related symptoms	Probable cause	Remedy
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kgf/cm^2, 28 psi) quickly, and then falls gradually.	Air in system	Recover, evacuate, and recharge with specified amount. Evacuation: see page 22-81 Charging: see page 22-82
	Reduced or no air flow through condenser	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean. • Check voltage and fan rpm. • Check fan direction.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Restricted lines
Discharge pressure abnormally low	High and low pressures are balanced soon after stopping compressor. Low side is higher than normal.	• Faulty compressor discharge valve • Faulty compressor seal	Replace the compressor.
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum.	• Faulty expansion valve • Moisture in system	• Replace. • Recover, evacuate, and recharge with specified amount.
Suction (low) pressure abnormally low	Expansion valve is not frosted, and low-pressure line is not cold. Low-pressure gauge indicates vacuum.	• Frozen expansion valve • Faulty expansion valve	Replace the expansion valve.
	Discharge temperature is low, and the air flow from vents is restricted.	Frozen evaporator	Run the fan with compressor off, then check A/C thermostat.
	Expansion valve is frosted.	Clogged expansion valve	Clean or replace.
	Receiver/dryer outlet is cool, and inlet is warm (should be warm during operation).	Clogged receiver/dryer	Replace.
Suction pressure abnormally high	Low-pressure hose and check joint are cooler than the temperature around evaporator.	• Expansion valve open too long • Loose expansion capillary tube	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Recover, evacuate, and recharge with specified amount.
	High and low pressure are equalized as soon as the compressor is stopped, and both gauges fluctuate while running.	• Faulty gasket • Faulty high pressure valve • Foreign particle stuck in high-pressure valve	Replace the compressor.
Suction and discharge pressures abnormally high	Reduced air flow through condenser.	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean condenser and radiator. • Check voltage and fan rpm. • Check fan direction.
Suction and discharge pressure abnormally low	Low-pressure hose and metal end areas are cooler than evaporator.	Clogged or kinked low pressure hose parts	Repair or replace.
	Temperature around expansion valve is too low compared with that around receiver/dryer.	Clogged high-pressure line	Repair or replace.
Refrigerant leaks	Compressor clutch is dirty.	Compressor shaft seal leaking	Replace the compressor.
	Compressor bolt(s) are dirty.	Leaking around bolt(s)	Tighten bolt(s) or replace compressor.
	Compressor gasket is wet with oil.	Gasket leaking	Replace the compressor.

Recovery

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

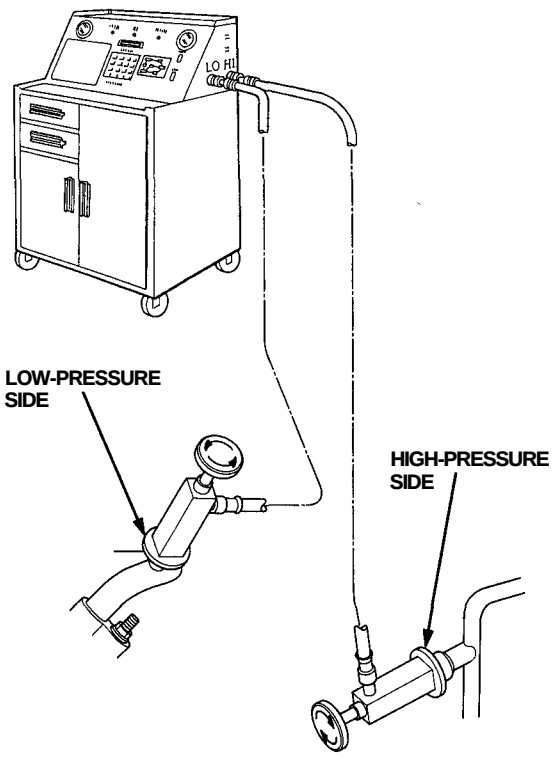
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed.

   NOTE: Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

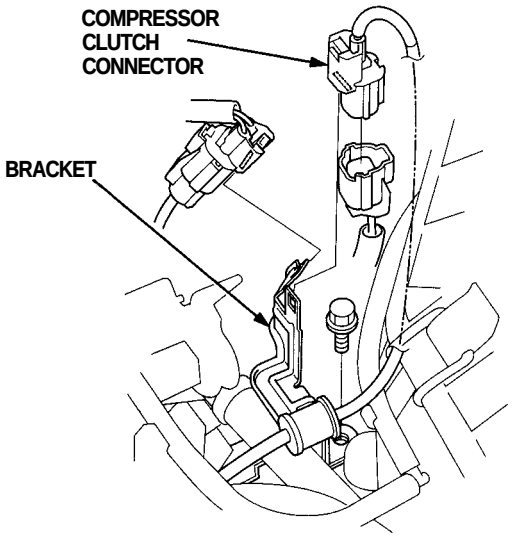
Recovery/Recycling/Charging System



Compressor

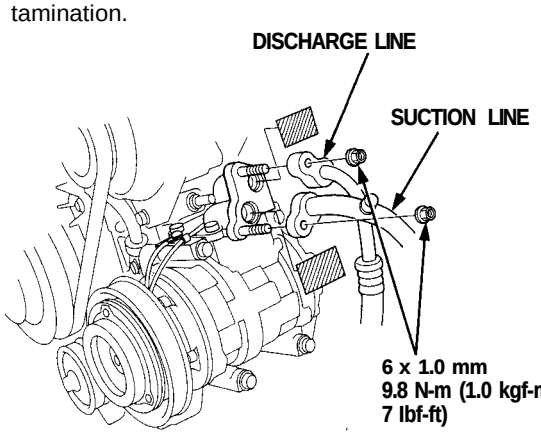
Replacement

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioner work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Recover the refrigerant with a Recovery/Recycling/Charging System (see page 22-71).
4. Remove the intake air duct (see section 5).
5. Remove the A/C compressor belt (see page 22-78).
6. Remove the connectors from the bracket, then disconnect the compressor clutch connector. Remove the bolt and the bracket.

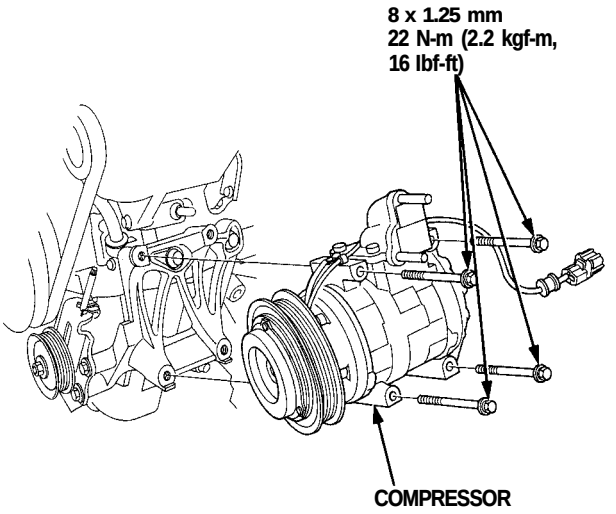


7. Remove the nuts, then disconnect the suction line and the discharge line from the compressor.

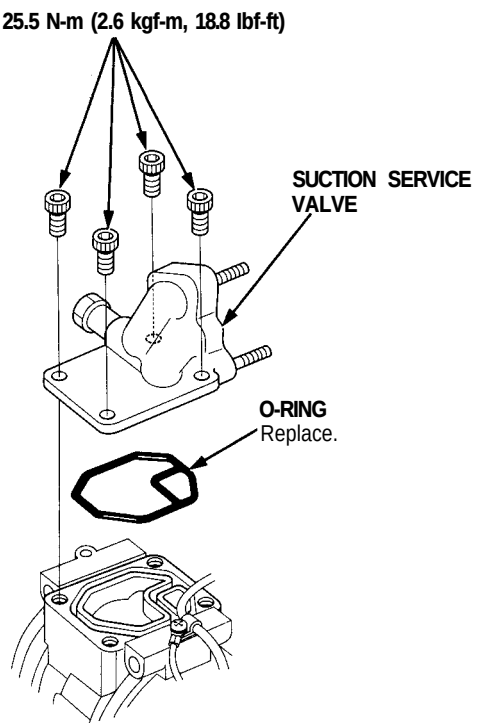
   NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



8. Remove the four mounting bolts and the compressor.

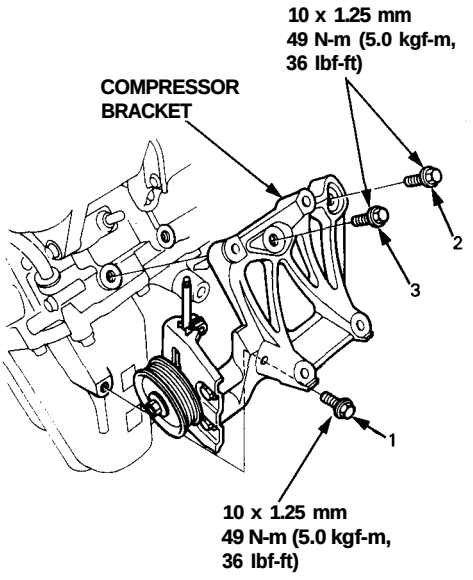


9. Remove the four bolts and the suction service valve from the compressor.

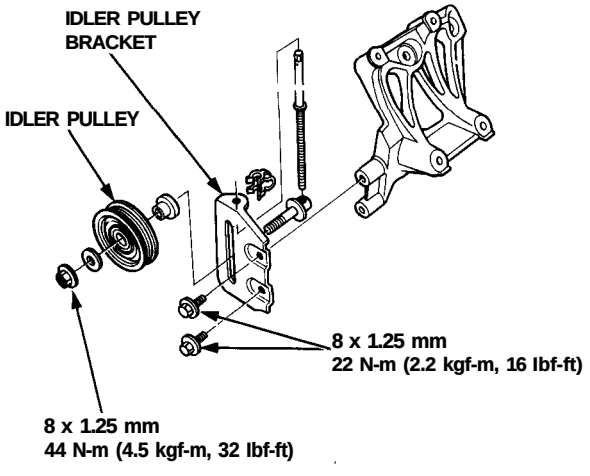


10. If necessary, remove the three mounting bolts and the compressor bracket.

    NOTE: When installing, tighten the mounting bolts in the order of No. 1 through No. 3 and in two steps; first tighten temporarily, then torque to the specified tension after making sure that there is no clearance between the compressor bracket and its mounting face.



11. If necessary, remove the idler pulley and the idler pulley bracket. Check the idler pulley bearing for play and drag. Replace it with a new one if it's noisy or has excessive play or drag.



12. Install in the reverse order of removal. Make note of the following items.

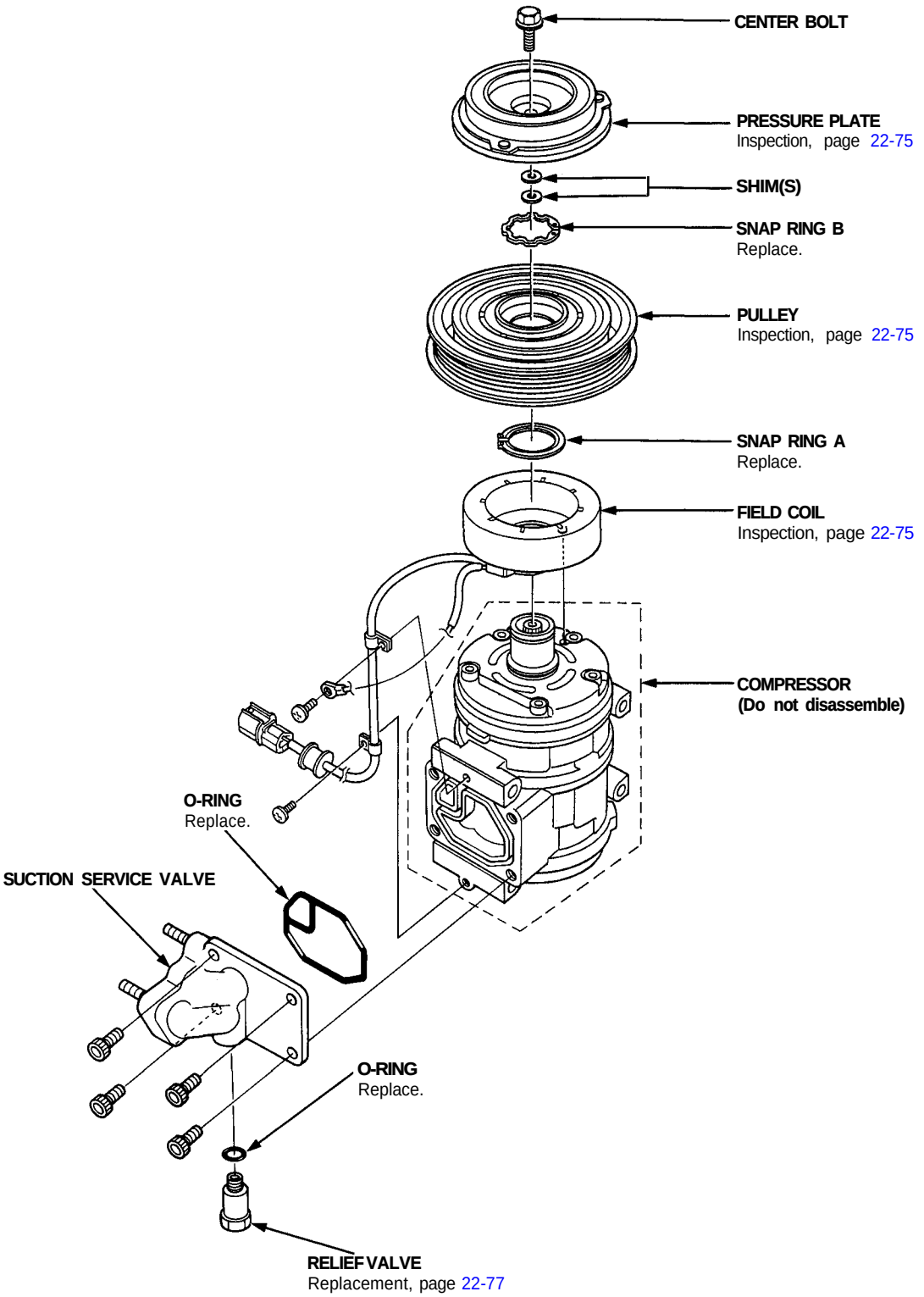
- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 160 mℓ (5 1/3 fl-oz, 5.6 Imp-oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.

  NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.

- Use refrigerant oil (ND-OIL 8) for R-134a DENSO piston type compressors only.
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Adjust the A/C compressor belt (see page 22-78).
- Charge the system (see page 22-82), and test its performance (see page 22-68).

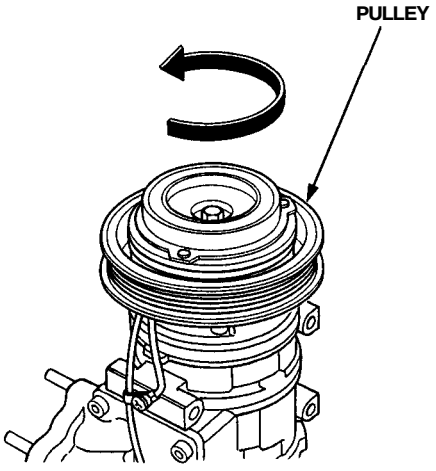
Compressor

Illustrated Index



Clutch Inspection

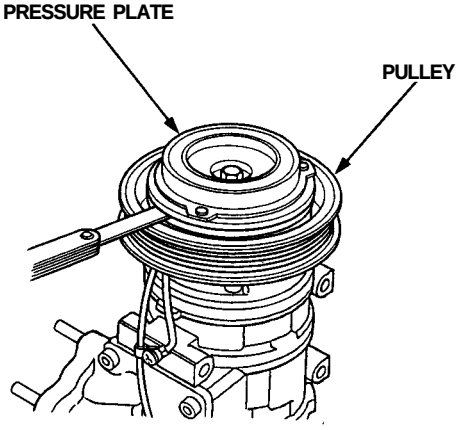
- Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



- Measure the clearance between the pulley and the pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required, following the procedure on page 22-76.

Clearance: 0.5 ± 0.15 mm (0.020 ± 0.006 in)

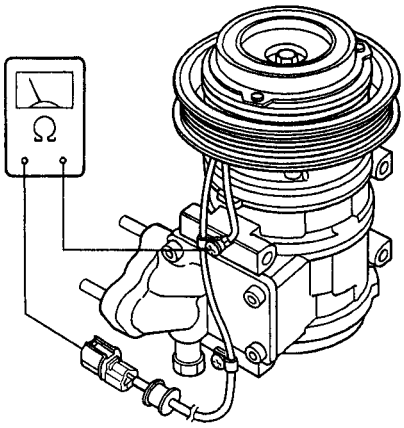
NOTE: The shims are available in three thicknesses: 0.1 mm, 0.3 mm and 0.5 mm.



- Check resistance of the field coil.

Field Coil Resistance: 3.6 ± 0.2 ohms at 68 F (20°C)

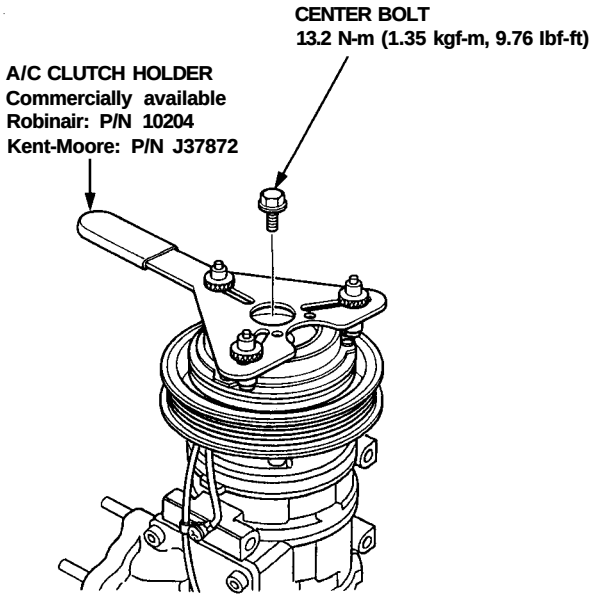
If resistance is not within specifications, replace the field coil.



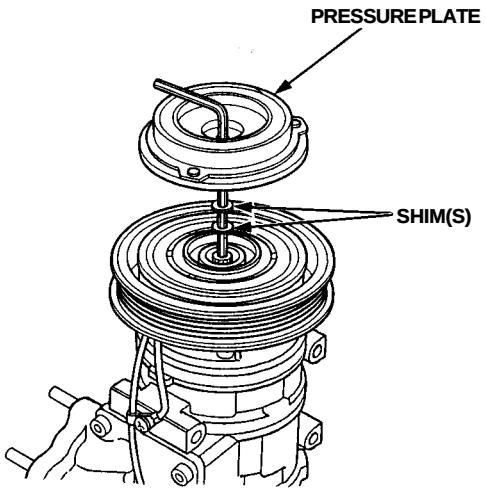
Compressor

Clutch Overhaul

1. Remove the center bolt while holding the pressure plate.

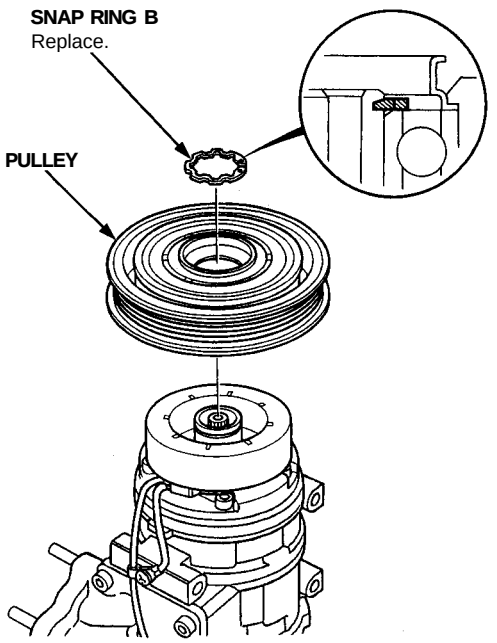


2. Remove the pressure plate and shim(s), taking care not to lose the shim(s).



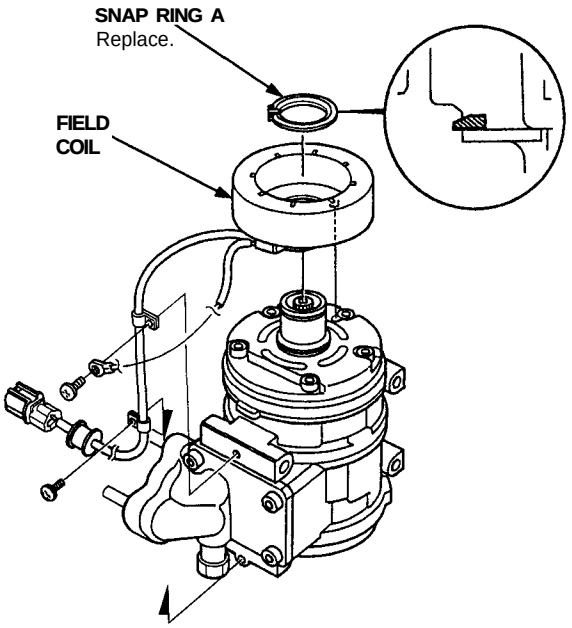
3. Remove the snap ring B with snap ring pliers, then remove the pulley.

NOTE:
- Be careful not to damage the pulley and compressor during removal/installation.
- Once the snap ring B is removed, replace it with a new one.



4. Remove the screw from the field coil ground terminal. Remove the snap ring A with snap ring pliers, then remove the field coil.

   NOTE:
   - Be careful not to damage the field coil and compressor during removal/installation.
   - Once the snap ring A is removed, replace it with a new one.



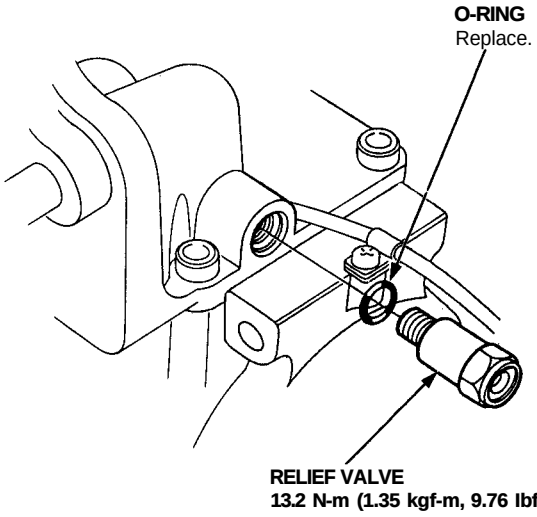
5. Install in the reverse order of removal. Make note of the following items.

   - Install the field coil with the wire side facing down (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Make sure the snap rings are fully seated in the groove.
   - Apply locking agent to the threads of the center bolt, and tighten it securely.
   - Make sure that the pulley turns smoothly after it's reassembled.

Relief Valve Replacement

1. Remove the relief valve and the O-ring.

   NOTE:
   - Do not let the compressor oil run out.
   - Make sure that no foreign matter enters the system.



2. Clean the mating surfaces.

3. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil (ND-OIL 8) before installing it.

   NOTE:
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container, and seat it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

4. Install and tighten the relief valve.

5. Charge the system (see page 22-82), and test its performance (see page 22-68).

A/C Compressor Belt

Adjustment

Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the A/C compressor and the crankshaft pulley.

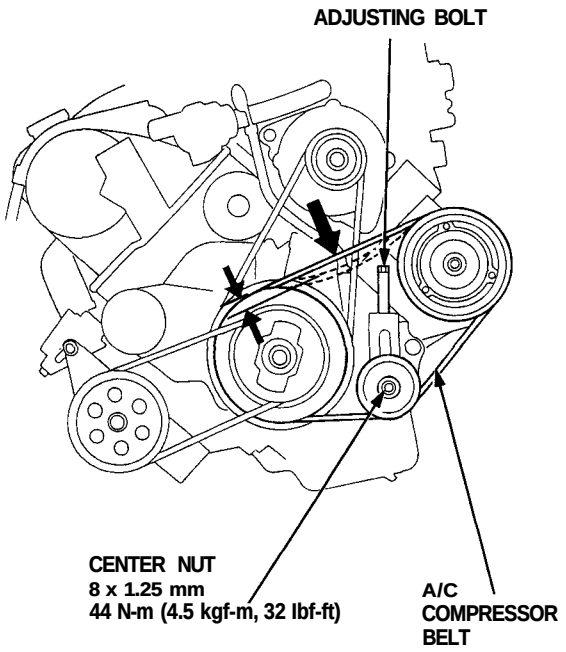
   A/C Compressor Belt
   Used Belt: 9.0 - 11.0 mm (0.35 - 0.43 in)
   New Belt: 5.0 - 6.5 mm (0.20 - 0.26 in)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the center nut of the idler pulley.

3. Turn the adjusting bolt to get proper belt tension, then retighten the center nut.

4. Recheck the deflection of the A/C compressor belt.



Tension Gauge Method

1. Attach the special tool to the A/C compressor belt as shown below, and measure the tension of the belt.

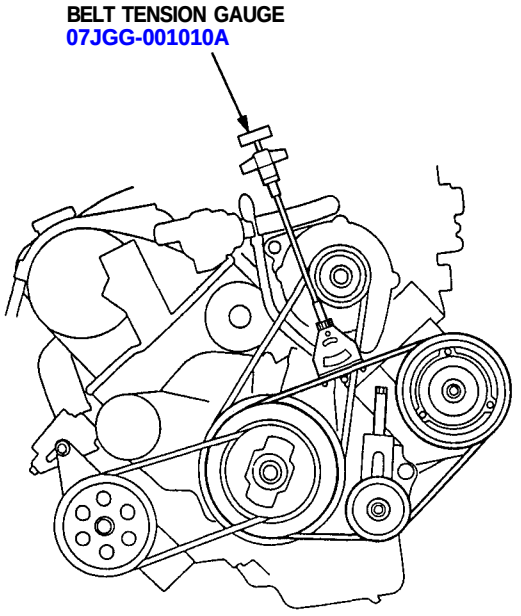
   A/C Compressor Belt
   Used Belt: 390 - 540 N
   (40 - 55 kgf, 88 - 120 lbf)
   New Belt: 830-1,030 N
   (85 - 105 kgf, 190 - 230 lbf)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - Follow the manufacturer's instructions for the belt tension gauge.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the center nut of the idler pulley.

3. Turn the adjusting bolt to get proper belt tension, then retighten the center nut.

4. Recheck the tension of the A/C compressor belt.



Condenser

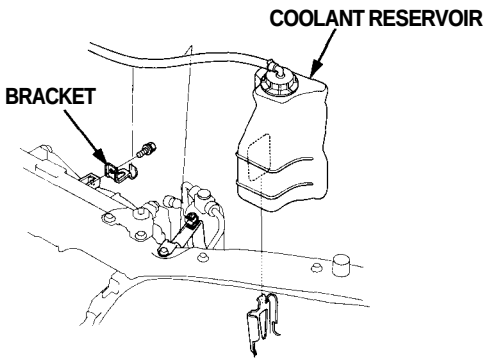
Replacement

1. Recover the refrigerant with a Recovery/Recycling/ Charging System (see page 22-71).

2. Remove the front grille (see section 20).

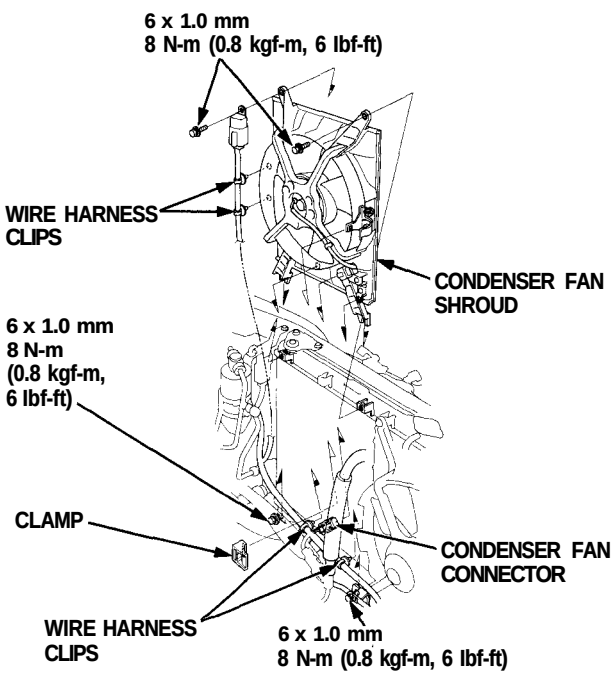
3. Remove the bolt, the reservoir hose bracket and the coolant reservoir.

   NOTE: Do not disconnect the reservoir hose from the coolant reservoir and the radiator.



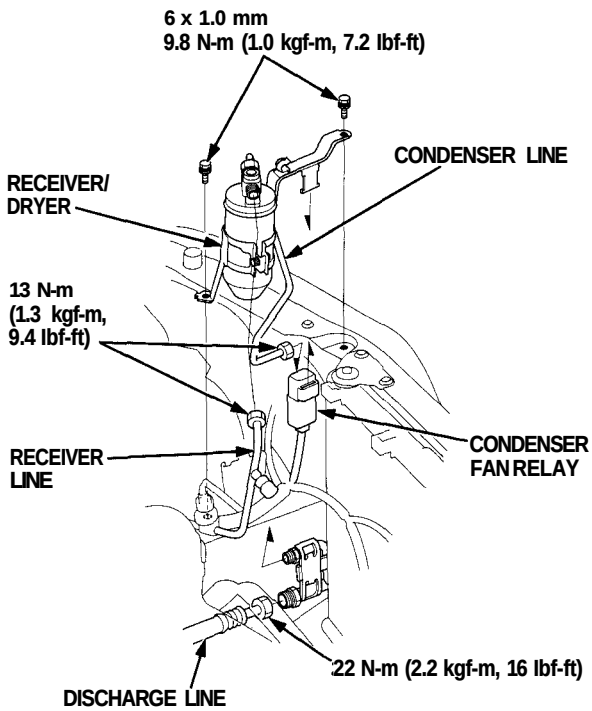
4. Remove the power steering clamp and the wire harness clip from the condenser fan shroud. Disconnect the condenser fan connector. Loosen the two lower mounting bolts, then remove the two upper mounting bolts and the condenser fan shroud.

   NOTE: Be careful not to damage the radiator fins when removing the condenser fan shroud.

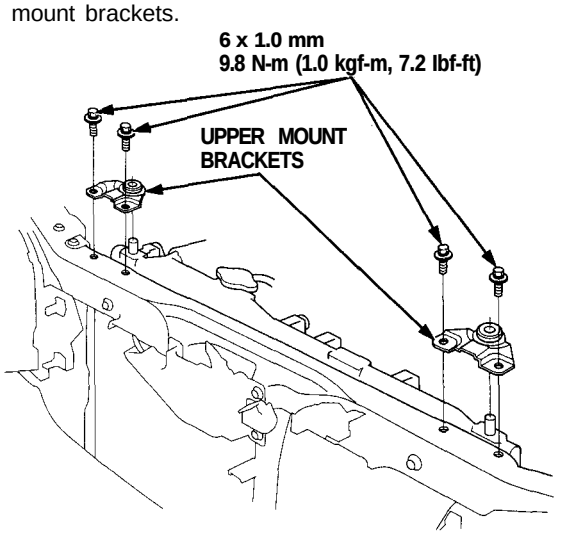


5. Remove the condenser fan relay from the receiver/dryer bracket. Disconnect the receiver line from the receiver/dryer and the condenser line from the condenser, then remove the two bolts and the receiver/dryer. Disconnect the discharge line from the condenser.

   NOTE: Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



6. Remove the four bolts and the two radiator upper mount brackets.



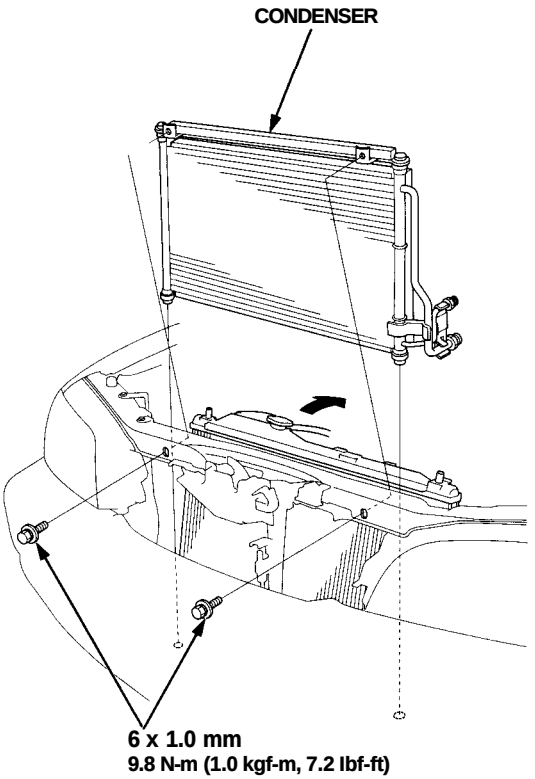
(cont'd)

Condenser

Replacement (cont'd)

7. Remove the two mounting bolts, then lift out the condenser as shown.

   NOTE: Be careful not to damage the radiator and condenser fins when removing the condenser.



8. Install in the reverse order of removal. Make note of the following items.

   - If you're installing a new condenser, add refrigerant oil (ND-OIL 8) (see page 22-66).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (ND-OIL 8) before installing them.

     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.

   - Be careful not to damage the radiator and condenser fins when installing the condenser and the condenser fan shroud.
   - Be sure to install the condenser mount cushions securely into the holes.
   - Charge the system (see page 22-82), and test its performance (see page 22-68).

A/C System Service

Evacuation

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

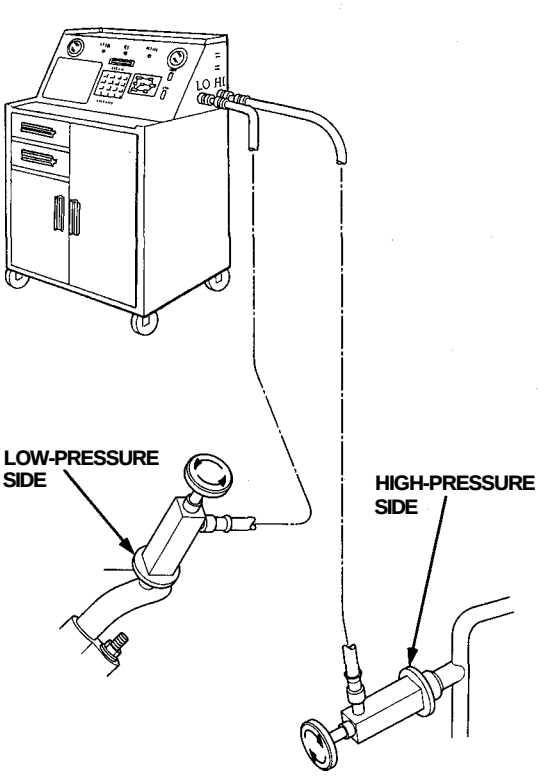
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)

2. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

   NOTE: If low-pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in.Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test).

Recovery/Recycling/Charging System



A/C System Service

Charging

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

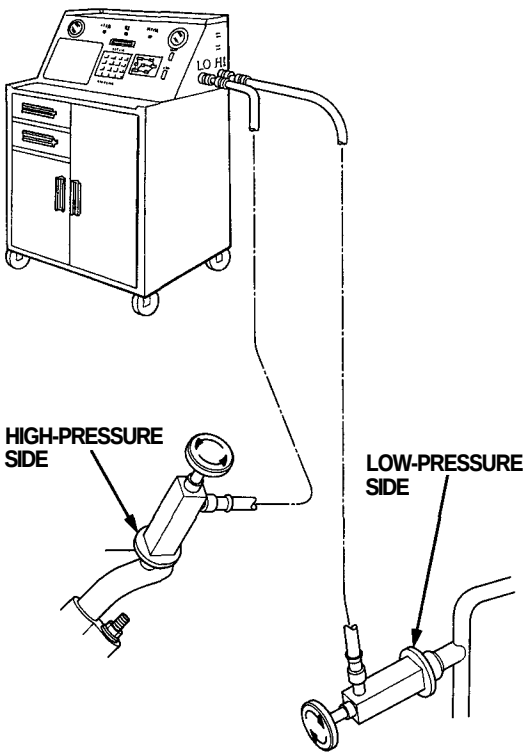
If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Refrigerant capacity: 750^{+0}_{-50} g ($26.5^{+0}_{-1.8}$ oz)

CAUTION: Do not overcharge the system; the compressor will be damaged.

Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

Recovery/Recycling/Charging System



Leak Test

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioner system.

CAUTION: Exposure to air conditioner refrigerant and lubricant vapor or mist can irritate eyes, nose and throat. Avoid breathing the air conditioner refrigerant and lubricant vapor or mist.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioner systems should not be pressure tested or leak tested with compressed air.

⚠ WARNING Some mixtures of air and R-134a have been shown to be combustible at elevated pressures and can result in fire or explosion causing injury or property damage. Never use compressed air to pressure test R-134a service equipment or vehicle air conditioner systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the vehicle, as shown, following the equipment manufacturer's instructions.

   NOTE: Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

2. Open high-pressure valve to charge the system to the specified capacity, then close the supply valve, and remove the charging system couplers.

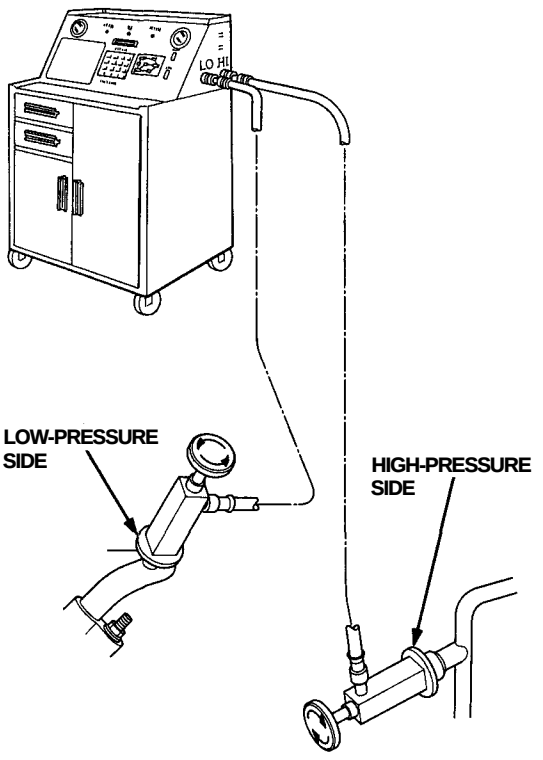
   Refrigerant capacity: 750^{+0}_{-50} g ($26.5^{+0}_{-1.8}$ oz)

3. Check the system for leaks using a R-134a refrigerant leak detector with an accuracy of 14 g (0.5 oz) per year or better.

4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), recover the system according to the Recovery Procedure on page 22-71.

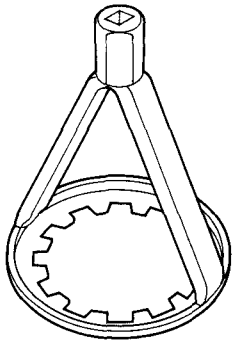
5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-81).

Recovery/Recycling/Charging System

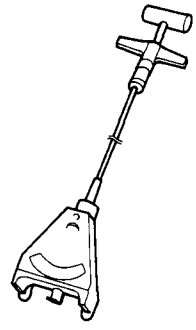


Special Tools

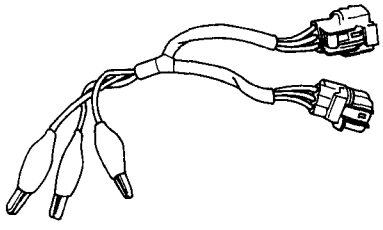
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAC - SE0020A	Fuel Sender Wrench	1	23-122
②	07JGG-001010A	Belt Tension Gauge	1	23-104 (2.5L) or 23-89 (3.2L)
③	07LAJ - PT3020A	Test Harness	1	23-118, 23-119
④	07PAZ-0010100	SCS Service Connector	1	23-84 (2.5L) or 23-74 (3.2L)



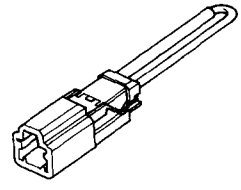
①



②



③



④

Troubleshooting

Tips and Precautions

Before Troubleshooting

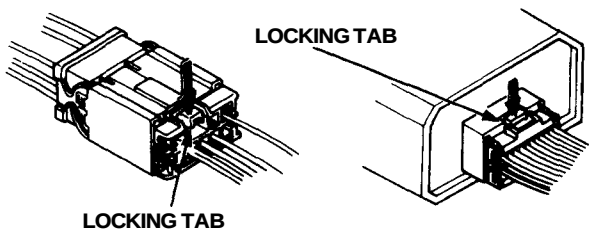
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

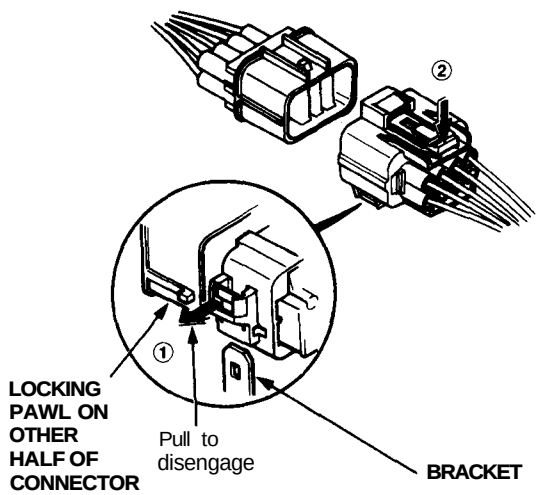
- **Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.**

Handling Connectors

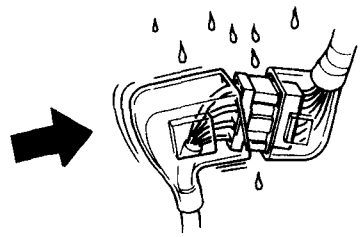
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except waterproof connectors).
- All connectors have push-down release type locks.



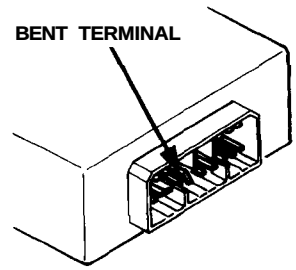
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



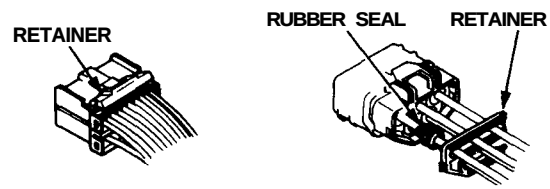
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



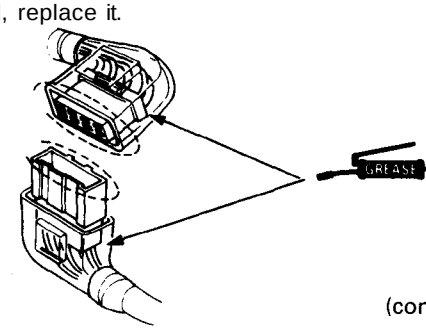
- Before connecting connectors, make sure the terminals are in place and not bent.



- Check for loose retainer and rubber seals.



- The backs of some connectors are packed with grease. Add grease if necessary. If the grease is contaminated, replace it.

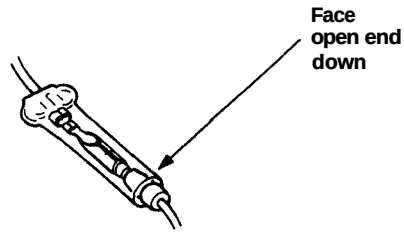


(cont'd)

Troubleshooting

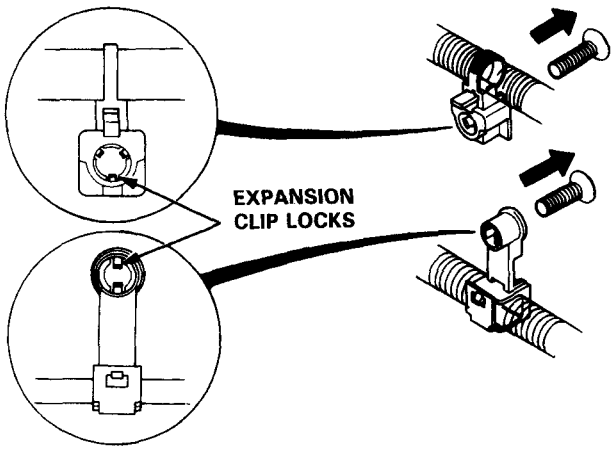
Tips and Precautions (cont'd)

- Insert the connector all the way and make sure it is securely locked.
- Position wires so that the open end of the cover faces down.

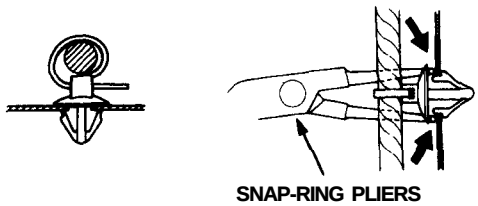


Handling Wires and Harnesses

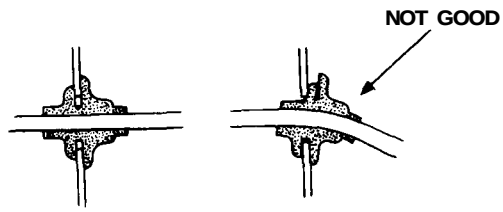
- Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
- Remove clips carefully; don't damage their locks.



Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.

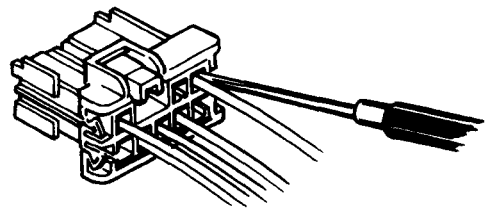


- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.
- Seat grommets in their grooves properly.



Testing and Repairs

- Do not use wires or harnesses with broken insulation. Replace them or repair them by wrapping the break with electrical tape.
- After installing parts, make sure that no wires are pinched under them.
- When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
- If possible, insert the probe of the tester from the wire side (except waterproof connector).



- Use a probe with a tapered tip.



- Refer to the instructions in the Honda Terminal Kit for identification and replacement of connector terminals.

Five-step Troubleshooting

1. Verify The Complaint
   Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. Analyze The Schematic
   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. Isolate The Problem By Testing The Circuit
   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. Fix The Problem
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

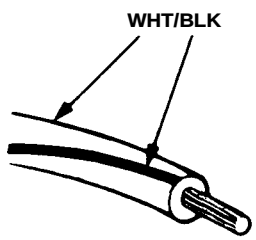
5. Make Sure The Circuit Works
   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Brown
GRY	Gray
PUR	Purple
LT BLU	Light Blue
LT GRN	Light Green

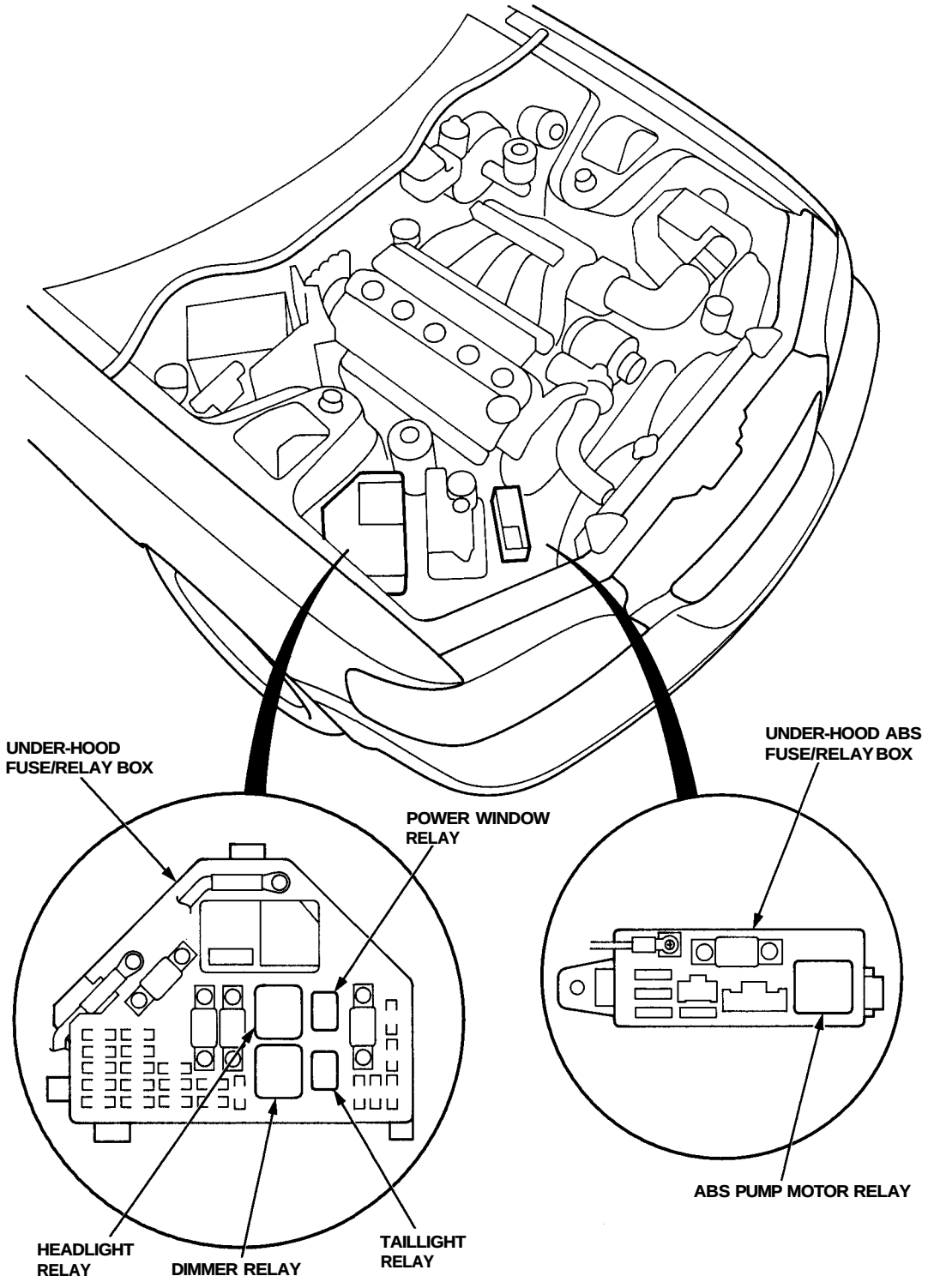
The wire insulation has one color or one color with another color stripe. The second color is the stripe.



NOTE: Different wires with the same color in the same system have been given number suffixes to distinguish them (for example, YEL^{1} and YEL^{2} are not the same).

Relay and Control Unit Locations

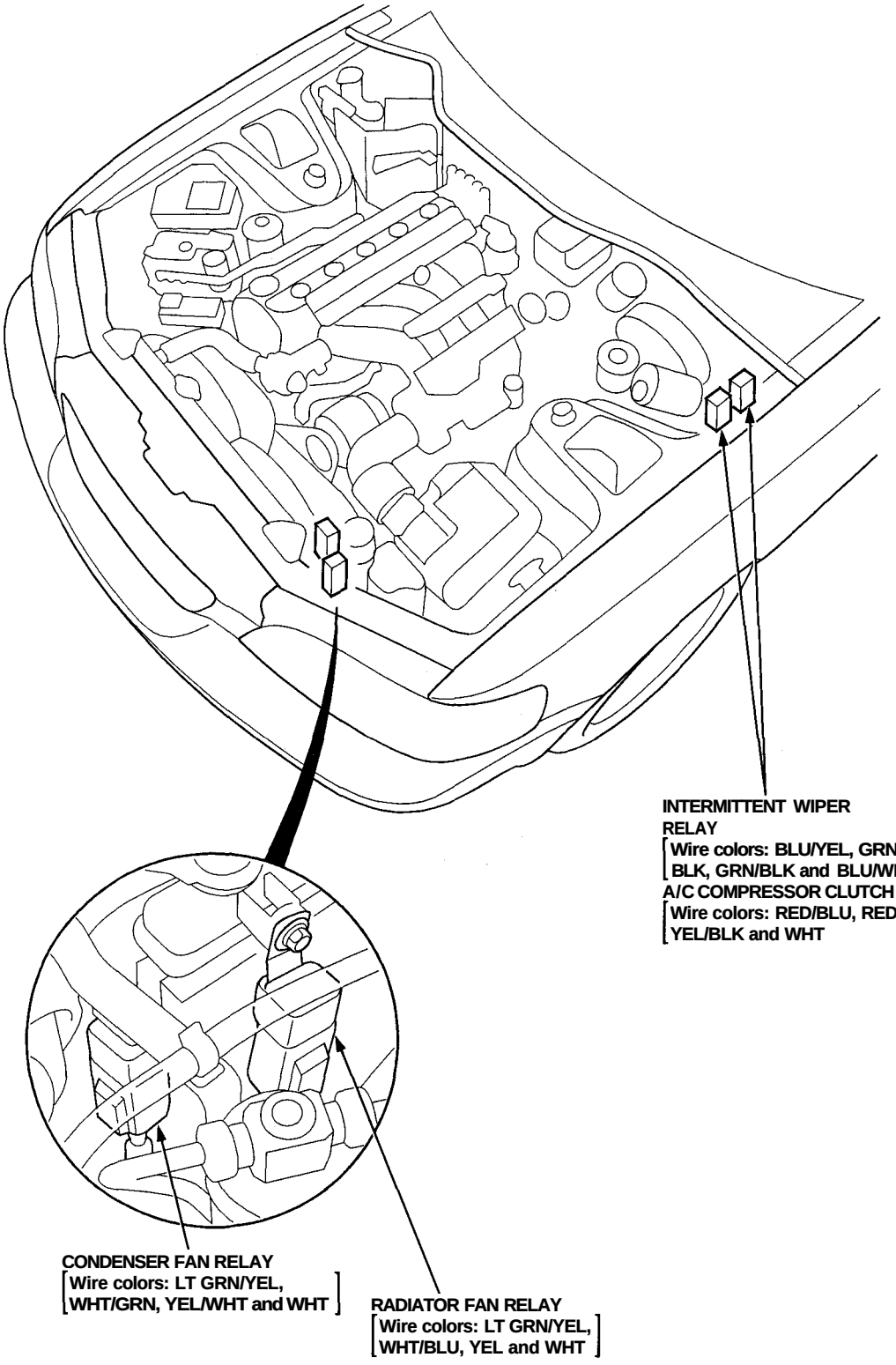
Engine Compartment



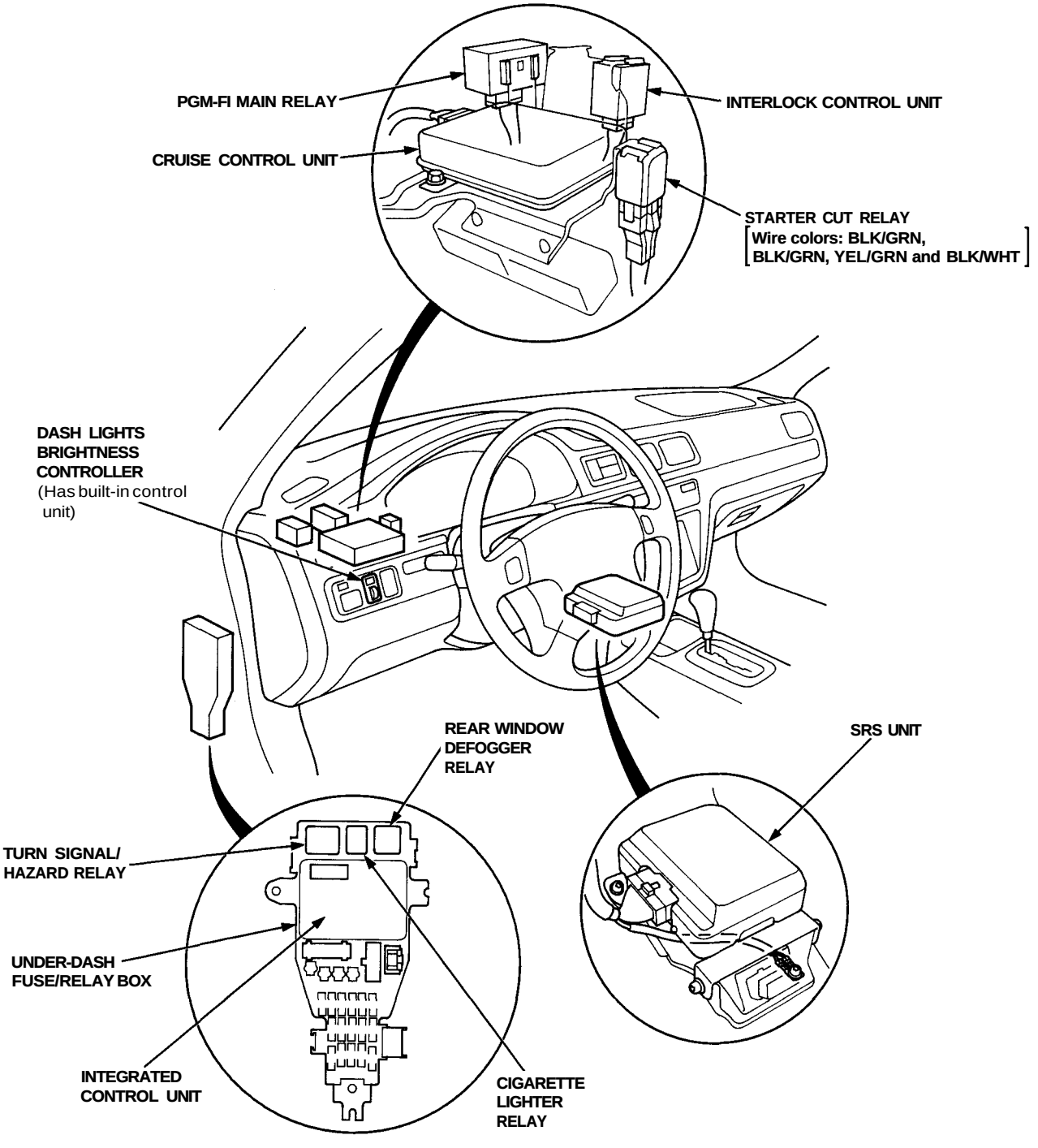
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Relay and Control Unit Locations

Engine Compartment (cont'd)



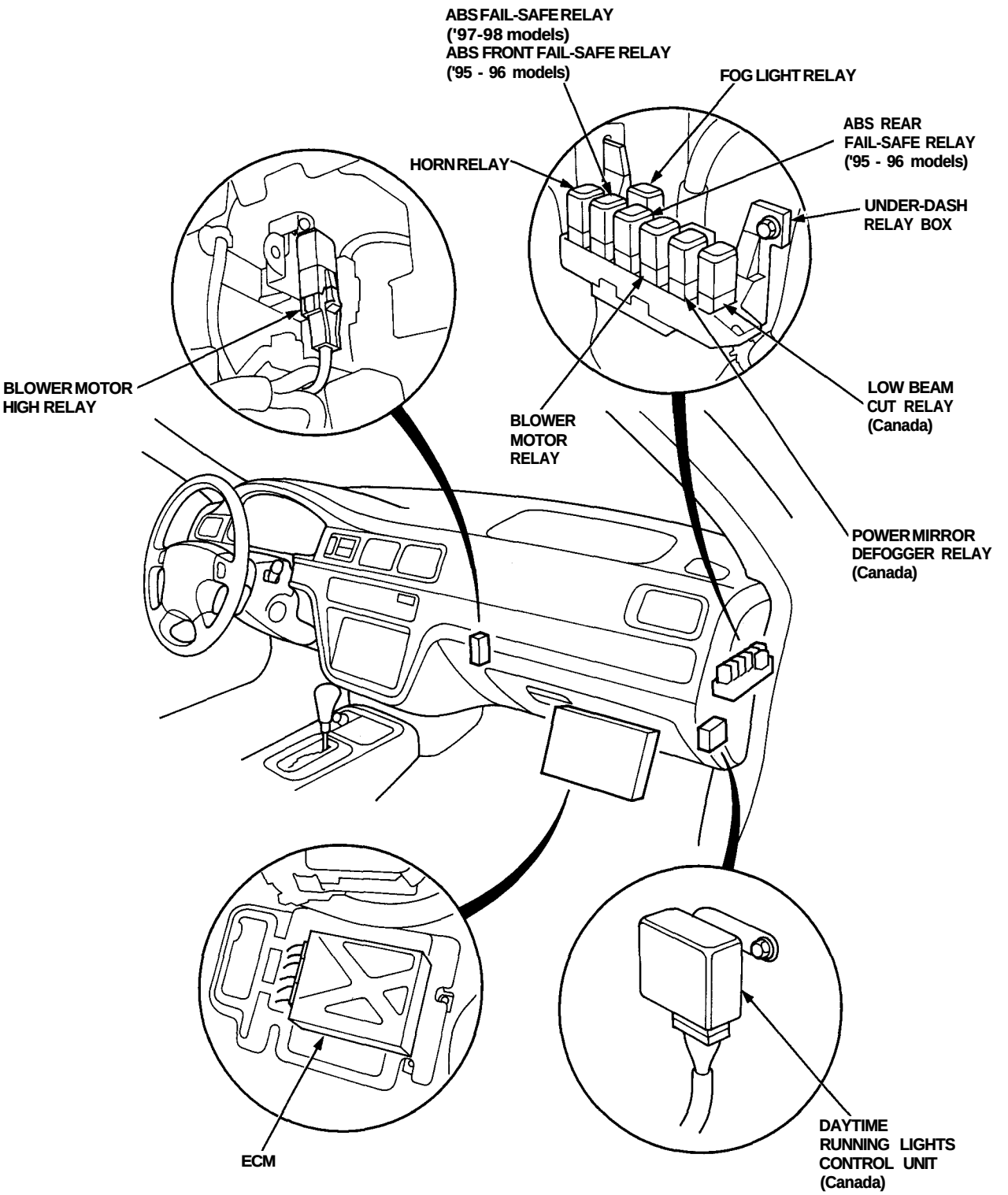
Dashboard

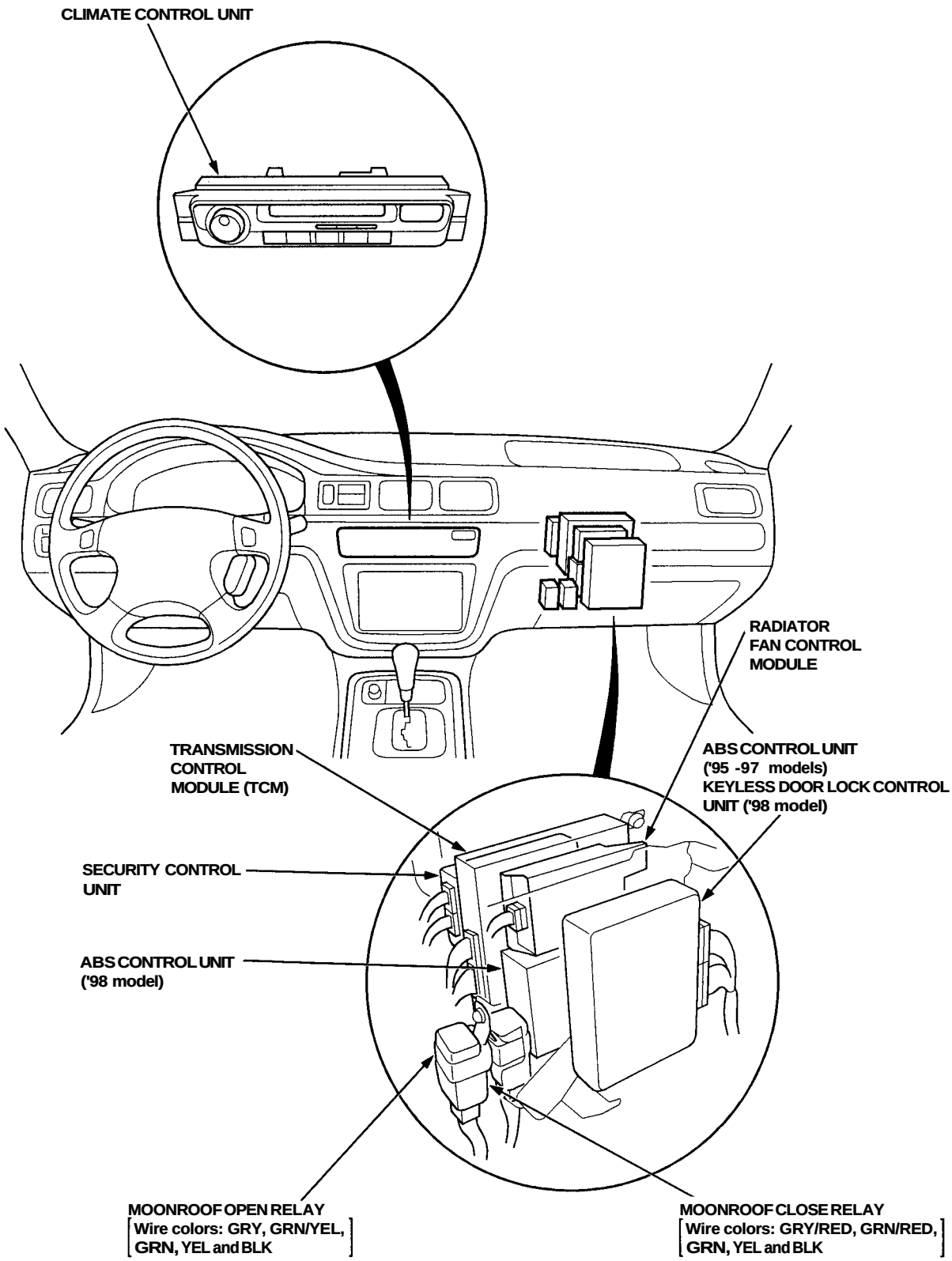


(cont'd)

Relay and Control Unit Locations

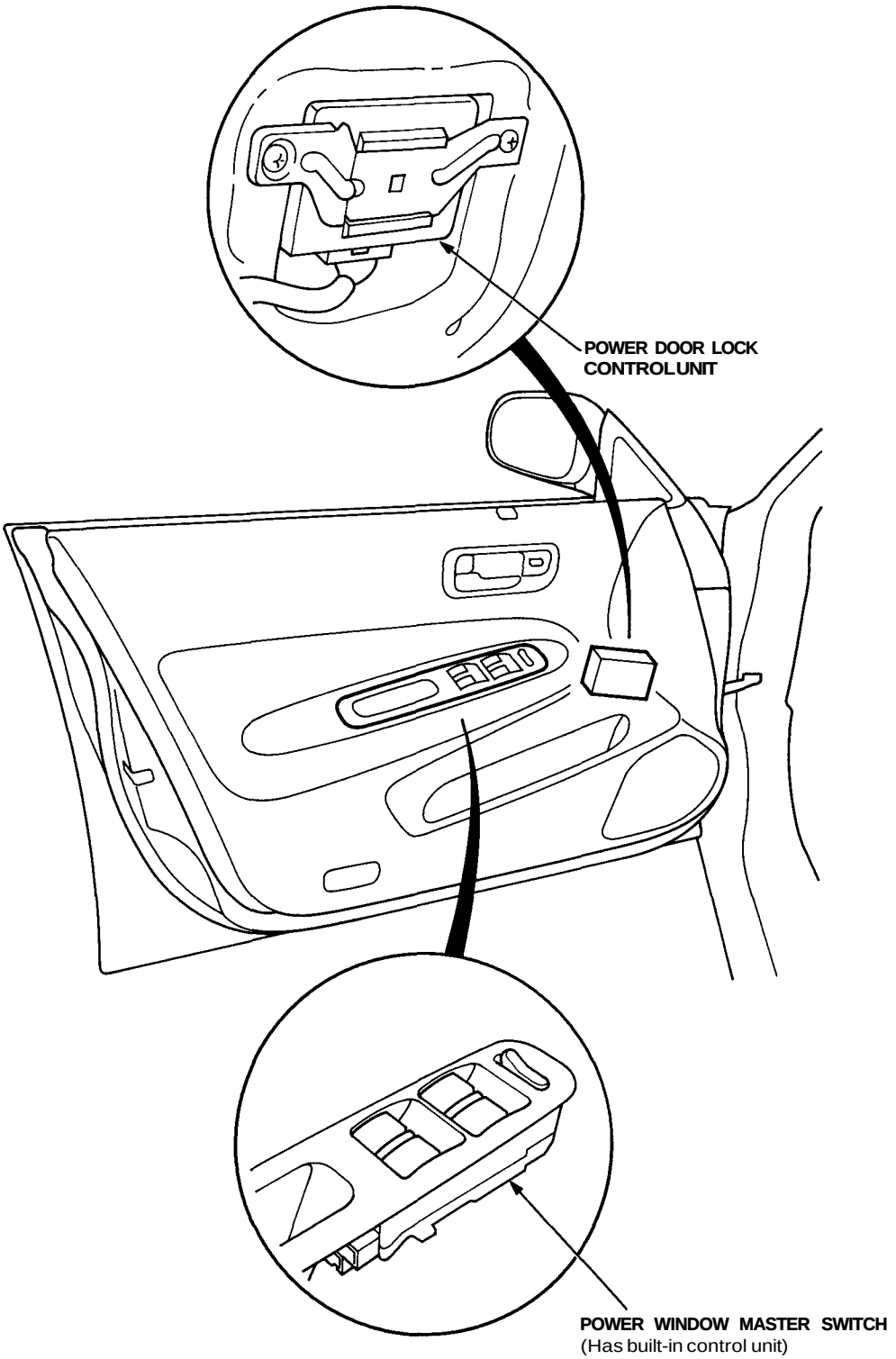
Dashboard (cont'd)




CLIMATE CONTROL UNIT
RADIATOR FAN CONTROL MODULE
TRANSMISSION CONTROL MODULE (TCM)
ABS CONTROL UNIT ('95 -97 models)
KEYLESS DOOR LOCK CONTROL UNIT ('98 model)
SECURITY CONTROL UNIT
ABS CONTROL UNIT ('98 model)
MOONROOF OPEN RELAY
Wire colors: GRY, GRN/YEL, GRN, YEL and BLK
MOONROOF CLOSE RELAY
Wire colors: GRY/RED, GRN/RED, GRN, YEL and BLK

Relay and Control Unit Locations

Door



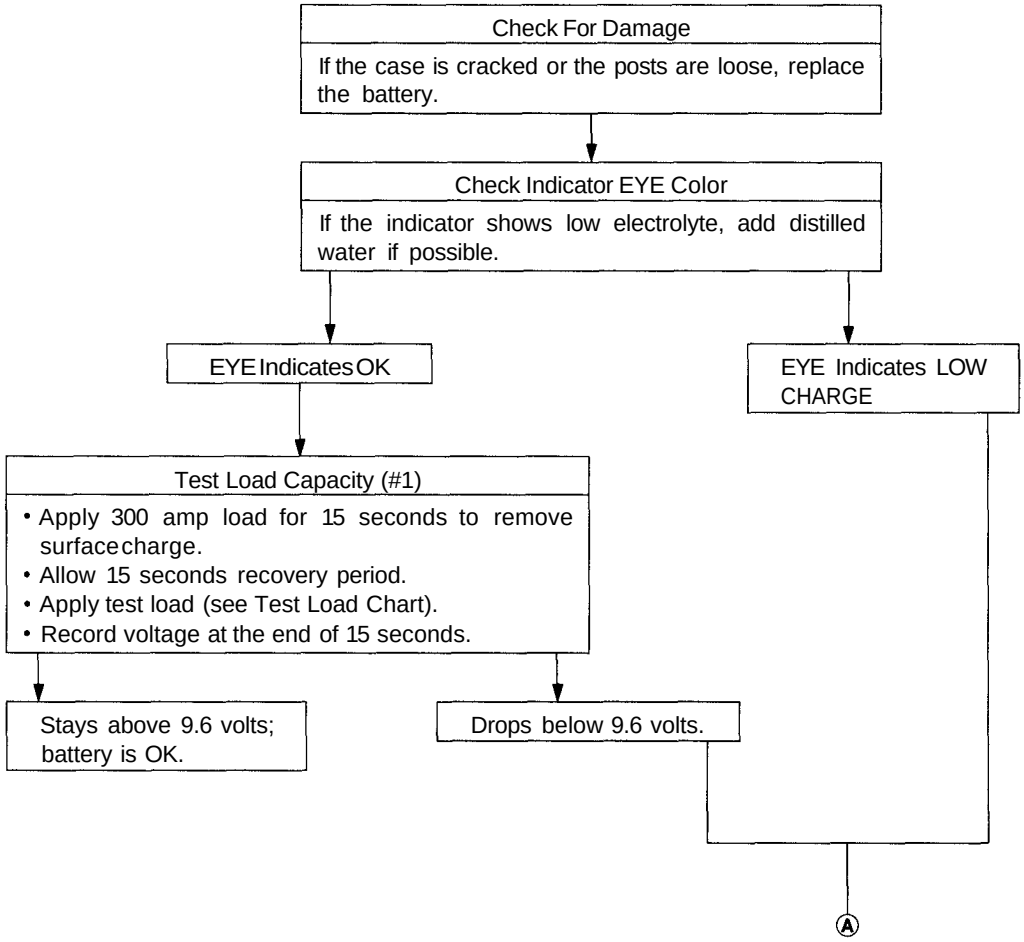
Battery

Test

⚠ WARNING

- **Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.**
  - **— If electrolyte gets on your skin or clothes, rinse it off with water immediately.**
  - **— If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.**
- **A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.**
- **Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.**

Use either a JCI or Bear ARBST tester, and follow the manufacturer's procedures. If you don't have one of these computerized testers, follow this conventional test procedure:
To get accurate results, the temperature of the electrolyte must be between 70°F (21°C) and 100°F (38°C).



Ⓐ

Charge on High Setting (40 amps)

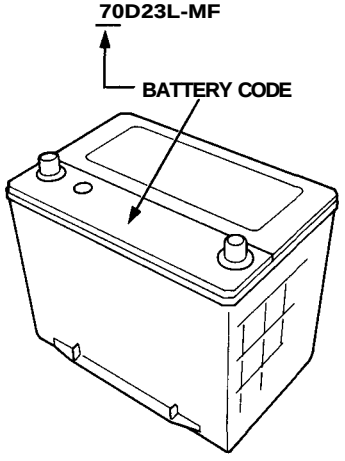
Charge until EYE shows charge is OK; plus an additional 30 minutes to assure full charge.
NOTE: If the battery charge is very low, it may be necessary to bypass the charger's polarity protection circuitry.
If the EYE does not show charge is OK within three hours, the battery is no-good; replace it. Write down how long the battery was charged.

Test Load Capacity (#2)

- Apply 300 amp load for 15 seconds to remove surface charge.
- Allow 15 seconds recovery period.
- Apply test load (see Test Load Chart).
- Record voltage at the end of 15 seconds.

Stays above 9.6 volts; battery is OK.

Drops below 9.6 volts; battery is no-good.



TEST LOAD CHART		
Use the test load or 1/2 the cold cranking amps (CCA) printed on the label on the top of the battery. If neither is indicated, use the information below:		
BATTERY CODE	COLD CRANKING AMPS(CCA)	LOAD (amps)
70	440	220

Power Relays

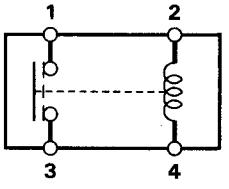
Relay Test

NOTE: See page 23-189 for turn signal/hazard relay input test.

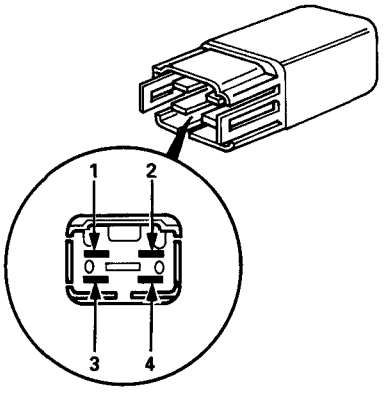
Normally-open type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
   - There should be no continuity between the No. 1 and No. 3 terminals when power is disconnected.

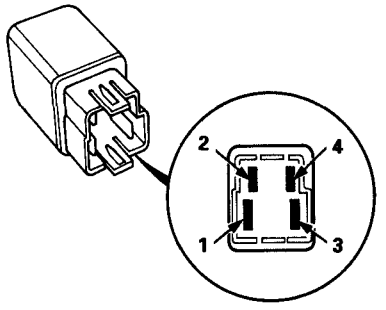
Terminal / Power (No. 2 – No. 4)	1	3
Disconnected		
Connected	○	○



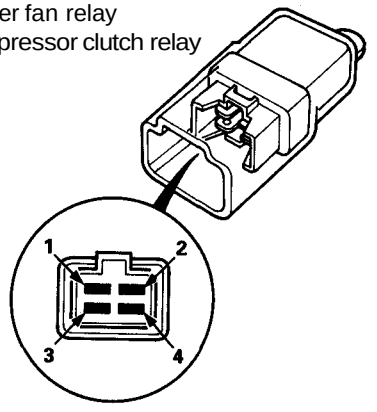
- Cigarette lighter relay
- Fog light relay
- Horn relay
- ABS front fail-safe relay
- ABS rear fail-safe relay ('95-96 models)
- ABS fail-safe relay ('97 - 98 models)
- Blower motor relay
- Power mirror defogger relay (Canada and '98 USA)
- Taillight relay
- Power window relay



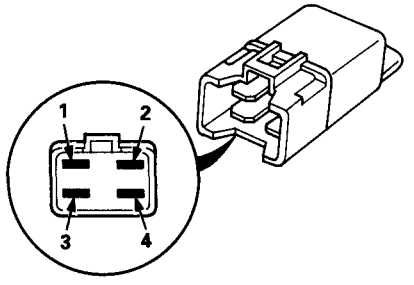
- ABS pump motor relay



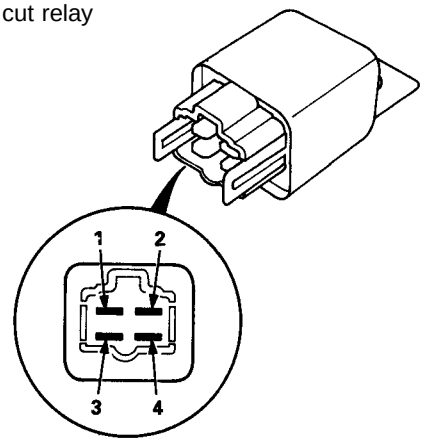
- Radiator fan relay
- Condenser fan relay
- A/C compressor clutch relay



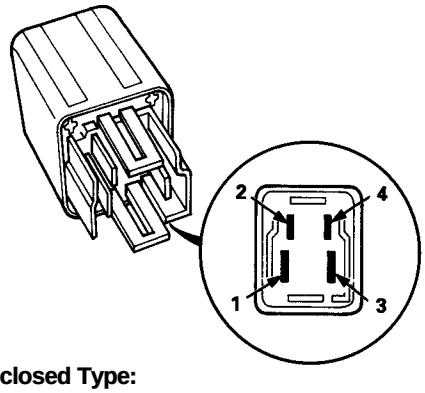
- Blower motor high relay



- Starter cut relay



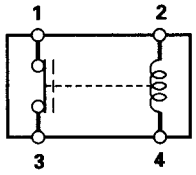
- Headlight relay
- Rear window defogger relay



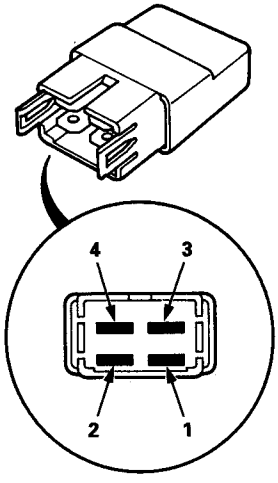
Normally-closed Type:

1. Check for continuity between the terminals.
   - There should be no continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
   - There should be continuity between the No. 1 and No. 3 terminals when power is disconnected.

Terminal / Power (No. 2 – No. 4)	1	3
Connected		
Disconnected	○	○



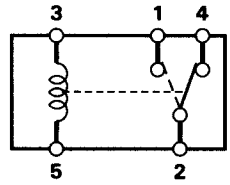
- Low beam cut relay (Canada)



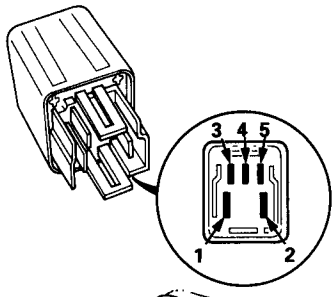
Five-terminal type:

1. Check for continuity between the terminals.
   - There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 5 terminals.
   - There should be continuity between the No. 2 and No. 4 terminals when power is disconnected.

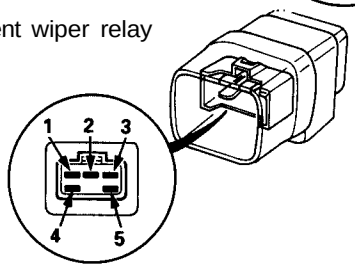
Terminal / Power (No. 3 – No. 5)	1	2	4
Disconnected		○	○
Connected	○	○	



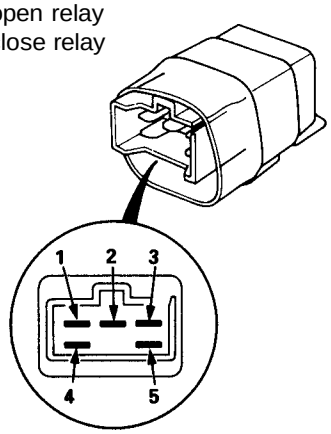
- Dimmer relay



- Intermittent wiper relay



- Moonroof open relay
- Moonroof close relay



Under-dash Fuse/Relay Box

Removal/Installation

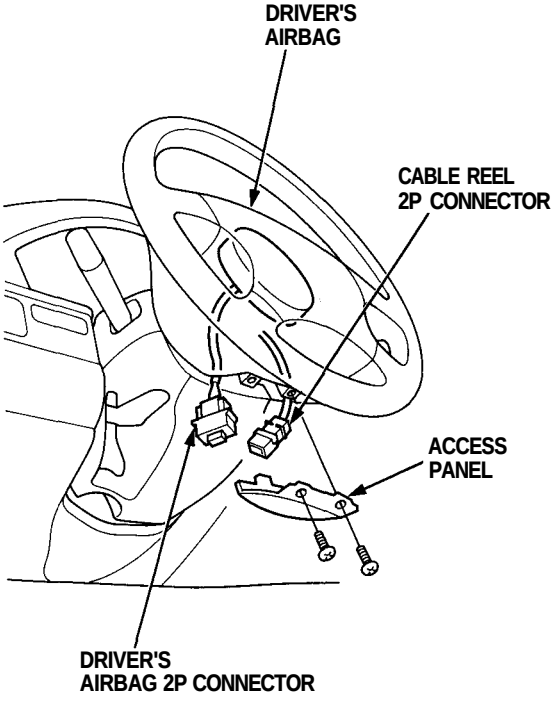
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

Removal:

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. '95 - 96 models: Connect the short connectors (RED) to the airbag side of the connectors.

Driver's Side:

- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.
- Disconnect the 2P connector between the driver's airbag and cable reel (see section 24).

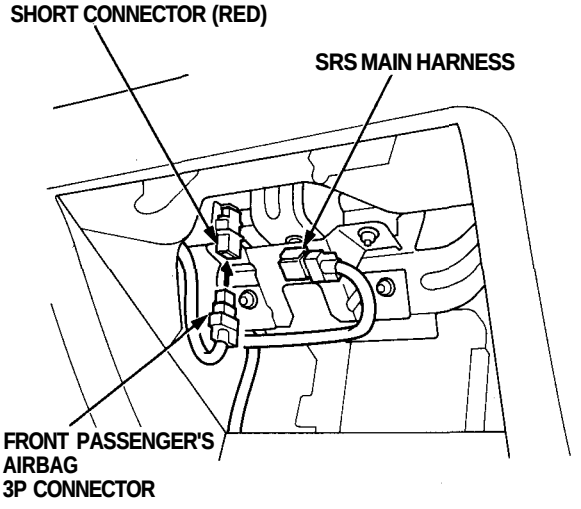


Front Passenger's Side:

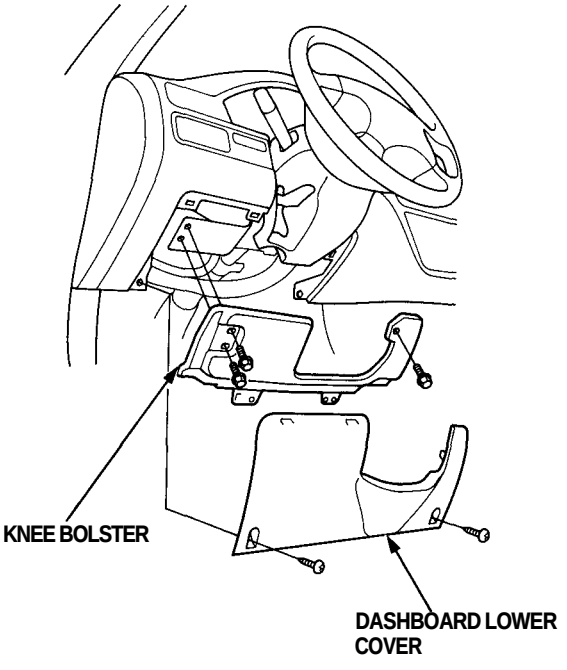
- Remove the glove box.

  NOTE: Before removing the glove box, remove the glove box damper (see section 20).

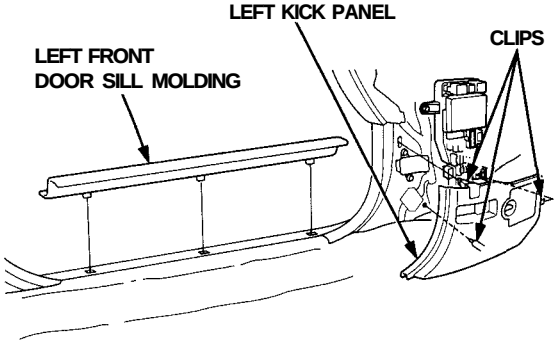
- Disconnect the front passenger's airbag 3P connector from the SRS main harness, then connect the short connector (RED) to the front passenger's airbag 3P connector.



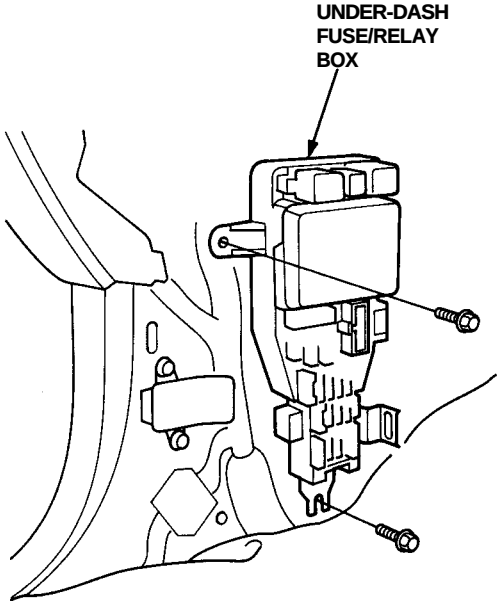
4. Remove the driver's foot rest (see section 20).
5. Remove the dashboard lower cover and knee bolster.



6. Remove the left front door sill molding and the left kick panel.



7. Remove the two mounting bolts, and pull the under-dash fuse/relay box away from the left kick panel.



8. Disconnect the under-dash fuse/relay box connectors, and remove the under-dash fuse/relay box.

NOTE: To disconnect the SRS main harness 2P connector from the under-dash fuse/relay box, see section 24.

Installation:

1. Connect the connectors to the under-dash fuse/relay box, then install the fuse/relay box in the reverse order of removal.

NOTE: To reconnect the SRS main harness 2P connector, see section 24.

2. '95 - 96 models: Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

3. '95 - 96 models: Remove and properly store the short connector (RED), then reconnect the front passenger's airbag connector (and reinstall the glove box).

4. Reconnect the battery positive cable, then the negative cable.

5. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

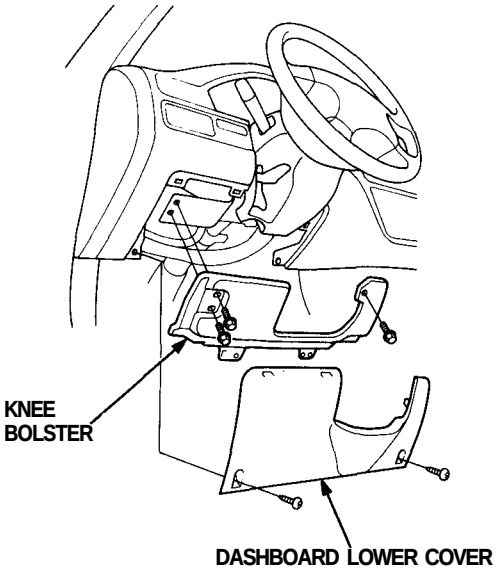
6. Confirm that all systems work properly.

Ignition Switch

Test

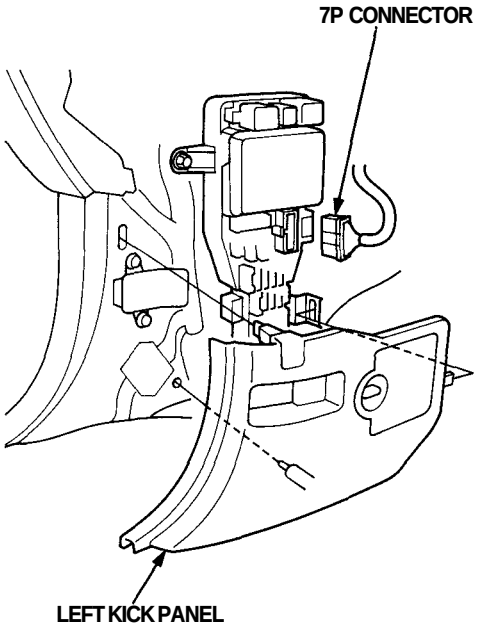
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster.



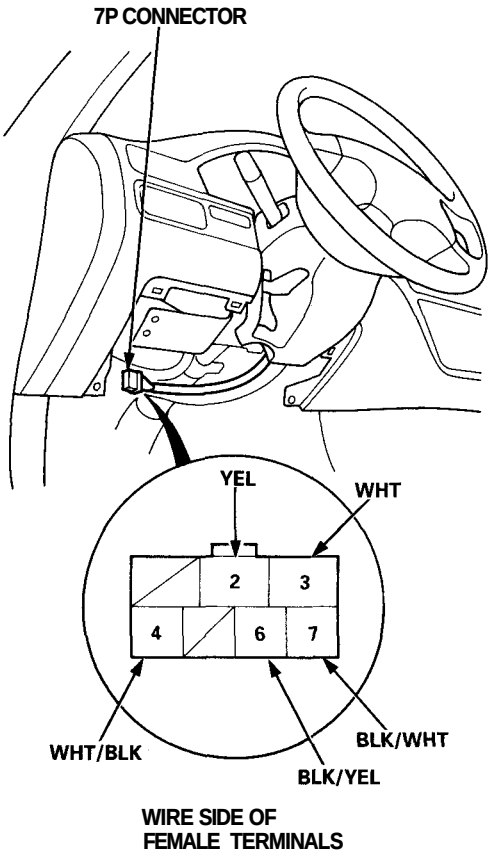
2. Remove the left front door sill molding and the left kick panel.

3. Disconnect the switch harness 7P connector from the under-dash fuse/relay box.



4. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	2 (IG2)	3 (BAT)	4 (ACC)	6 (IG1)	7 (ST)
O (LOCK)					
I (ACC)		○——	——○		
II (ON)	○——	○——	——○	——○	
III (START)		○——		——○	——○



5. If the continuity checks do not agree with the table, check for a bad connection between the switch and switch harness.

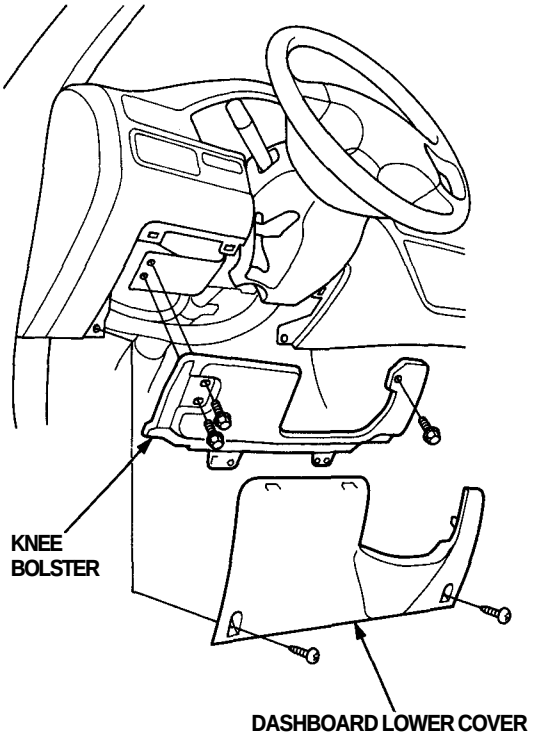
- If the connection is OK, replace the switch.
- If the connection isn't OK, repair as necessary, and recheck. If continuity checks still do not agree with the table, replace the switch.

Steering Lock Replacement

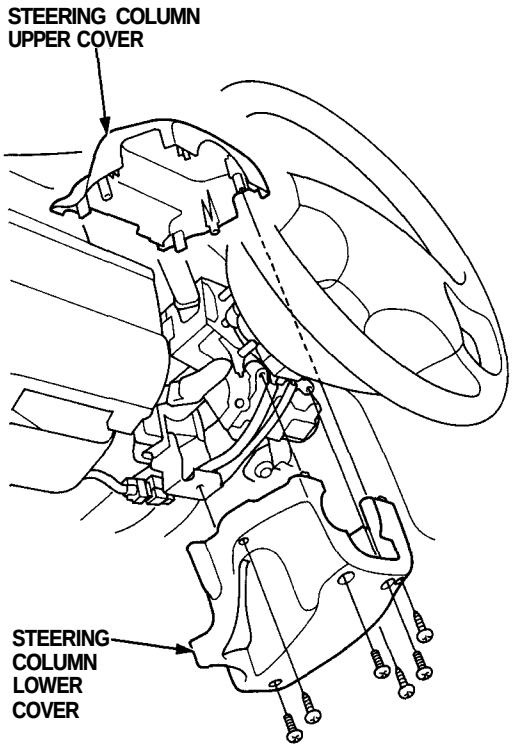
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

Removal:

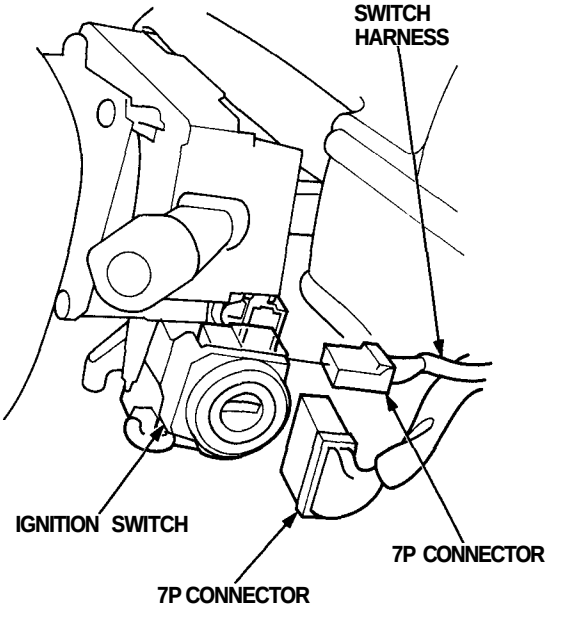
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. Remove the dashboard lower cover and knee bolster.



4. Remove the steering column covers.



5. Disconnect the connectors from the switch.

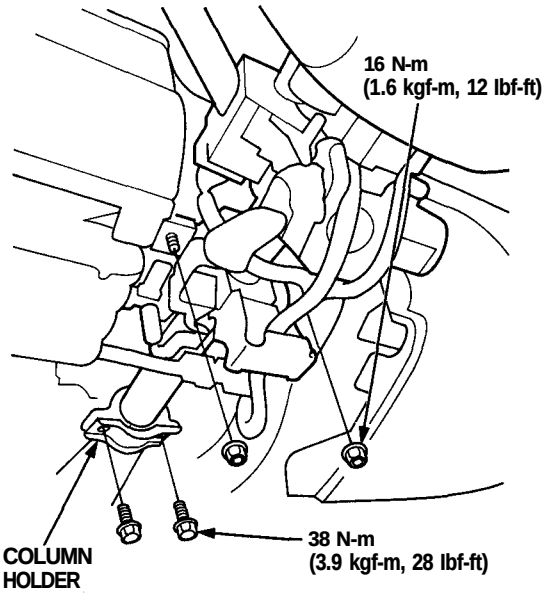


(cont'd)

Ignition Switch

Steering Lock Replacement (cont'd)

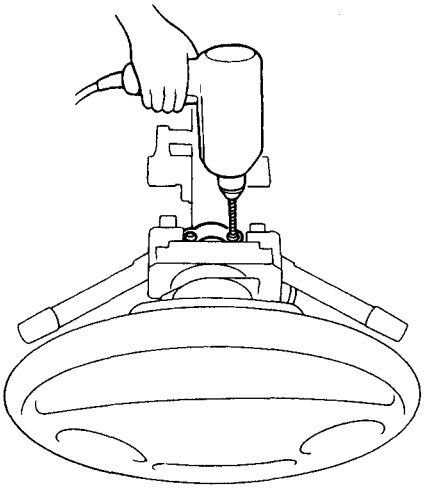
6. Remove the column holder mounting bolts and nuts.



7. Lower the steering column assembly.

8. Center-punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit.

CAUTION: Do not damage the switch body when removing the shear bolts.



9. Remove the shear bolts from the switch body, then remove the steering lock assembly.

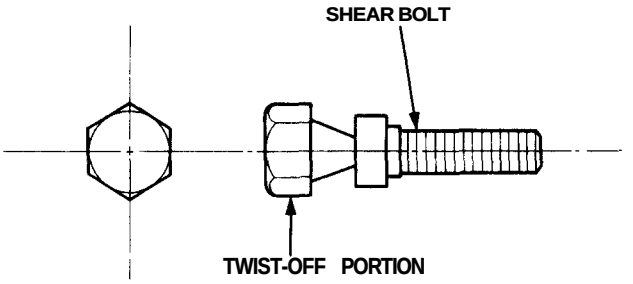
Installation:

1. Install the new ignition switch without the key inserted.

2. Loosely tighten the new shear bolts.

3. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.

4. Tighten the shear bolts until the hex heads twist off.



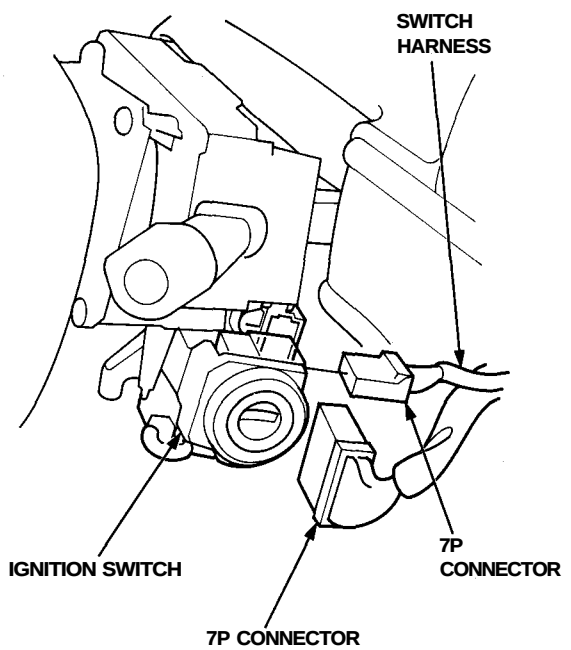
5. Install in the reverse order of removal.

6. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Electrical Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

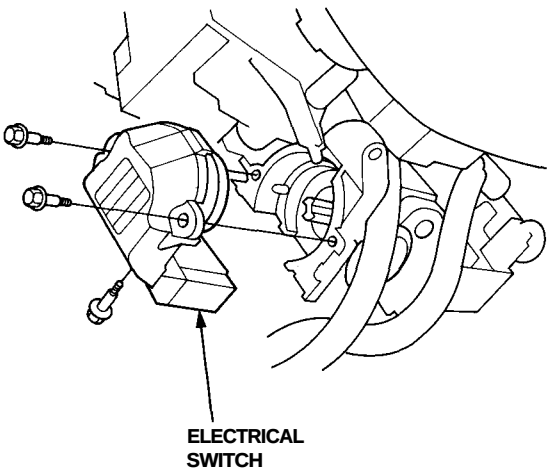
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
3. Remove the dashboard lower cover and knee bolster (see page 23-67).
4. Remove the steering column covers (see page 23-67).
5. Disconnect the connectors from the switch.



6. Remove the column holder mounting bolts and nuts (see page 23-68).
7. Lower the steering column assembly.
8. Center-punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit (see page 23-68).

   CAUTION: Do not damage the switch body when removing the shear bolts.

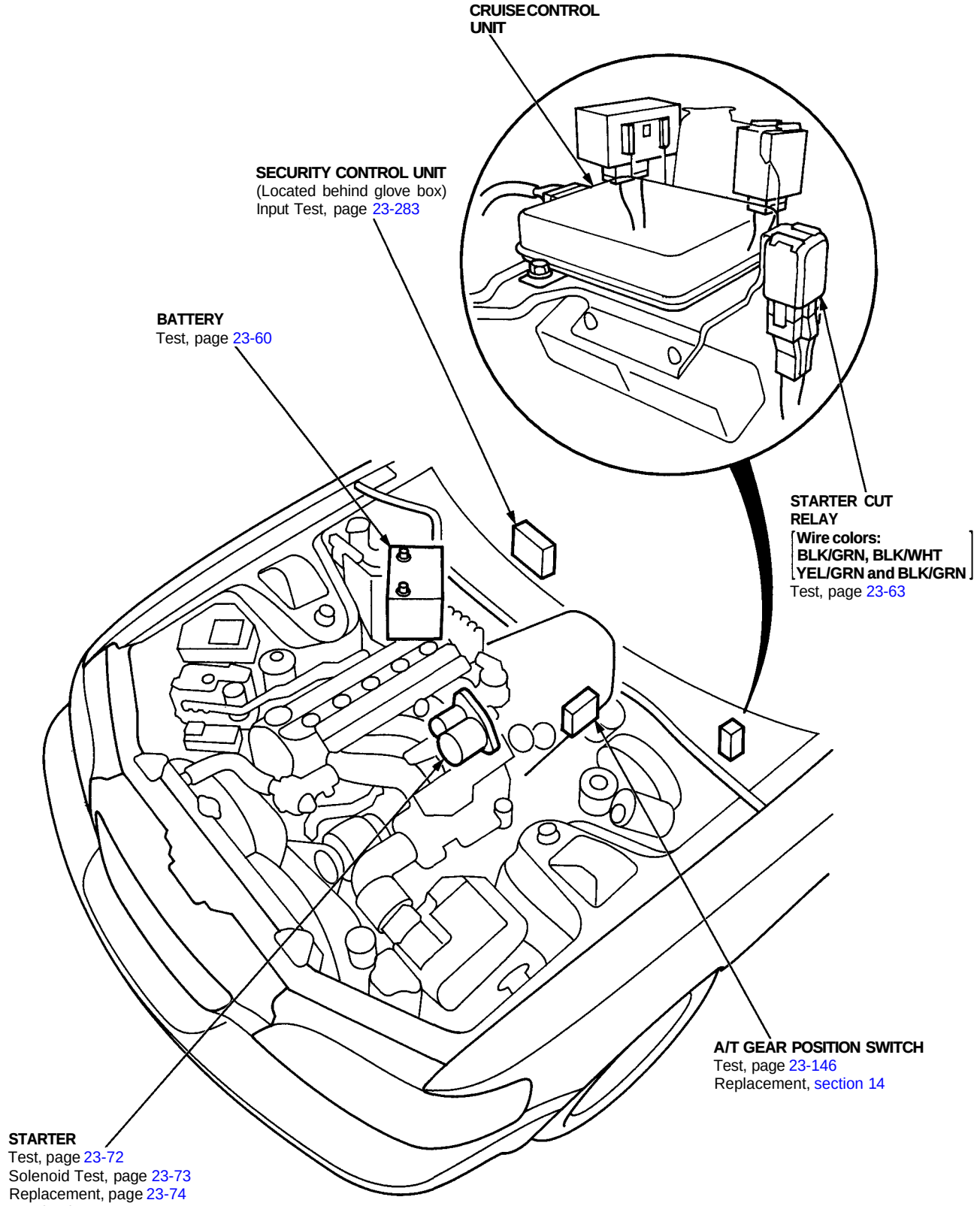
9. Remove the shear bolts from the switch body, then remove the steering lock assembly.
10. Remove the three screws, and replace the electrical switch.



11. Install in the reverse order of removal (see page 23-68 for steering lock installation).

Starting System

Component Location Index



Starting System

Starter Test

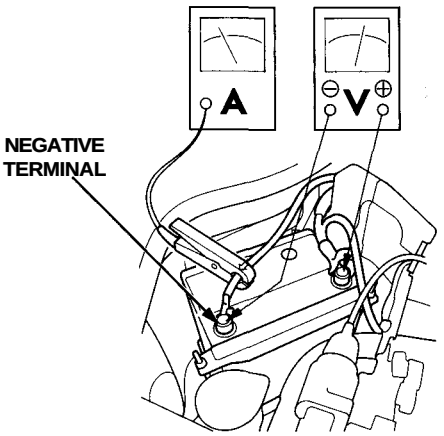
NOTE: The air temperature must be between 59 and 100°F (15 and 38°C) before testing.

Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

Alternate Procedure:

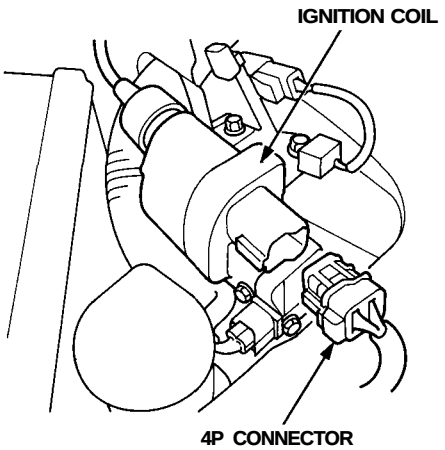
- Use following equipment:
  — Ammeter, 0 - 400 A
  — Voltmeter, 0 - 20 V (accurate within 0.1 volt)
  — Tachometer, 0 - 1,200 rpm
- Hook up a voltmeter and ammeter as shown.



NOTE: After this test, or any subsequent repair, reset the ECM to clear any codes (see section 11).

Check the Starter Engagement

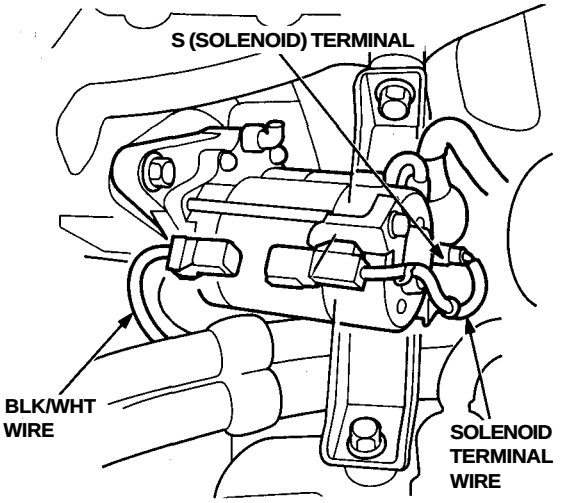
1. Disconnect the 4P connector from the ignition coil.



2. With the shift lever in P or N, turn the ignition switch to START (III).
   - The starter should crank the engine. If the starter does not crank the engine, go to step 3.
   - If it cranks the engine erratically or too slowly, go to "Check for Wear and Damage" on the next page.

3. Check the battery, battery positive cable, ground, starter cut relay, security control unit, and the wire connections for looseness and corrosion. Test again. If the starter still does not crank the engine, go to step 4.

4. Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter. Make sure the shift lever is in P or N, then connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.



   - If the starter still does not crank the engine, remove it, and diagnose its internal problem.
   - If the starter cranks the engine, go to step 5 and continue the test.

5. Check the ignition switch (see page 23-66).

6. Check the starter cut relay (see page 23-63).

7. Check the A/T gear position switch (see page 23-146).

8. Check the security control unit (see page 23-283).

9. Check for an open in the BLK/GRN wire between the ignition switch and starter cut relay, and check for an open in the BLK/WHT wire between the starter cut relay and starter.

Check for Wear and Damage
The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it, and inspect the starter drive gear and torque converter ring gear for damage.

Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. If the clutch is damaged, replace the clutch assembly.

Check Cranking Voltage and Current Draw
Cranking voltage should be no less than 8.5 volts.
Current draw should be no more than 380 amperes.

If cranking voltage is too low, or current draw too high, check for:
- Dead or low battery
- Open circuit in starter armature commutator segments
- Starter armature dragging
- Shorted armature winding
- Excessive drag in engine

Check Cranking rpm
Engine speed during cranking should be above 100 rpm.

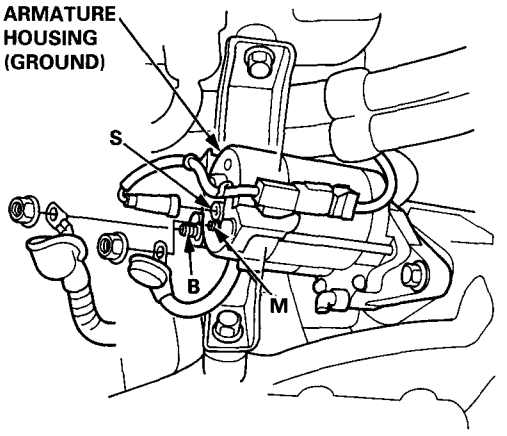
If speed is too low, check for:
- Loose battery or starter terminals
- Excessively worn starter brushes
- Open circuit in commutator segments
- Dirty or damaged helical spline or drive gear
- Defective drive gear overrunning clutch

Check Starter Disengagement
With the shift lever in P or N, turn the ignition switch to "START (III)", and release to "ON (II)". The starter drive gear should disengage from the drive plate/ring gear when you release the key.

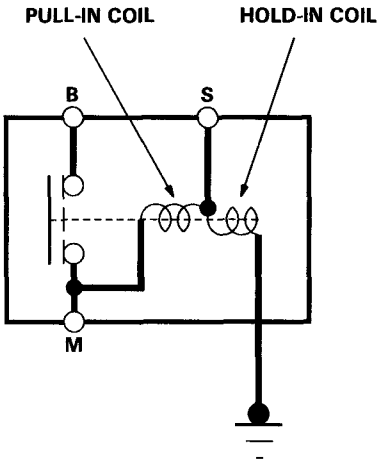
If the drive gear hangs up on the drive plate/ring gear, check for:
- Solenoid plunger and switch malfunction
- Dirty drive gear assembly or damaged overrunning clutch

Starter Solenoid Test

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.



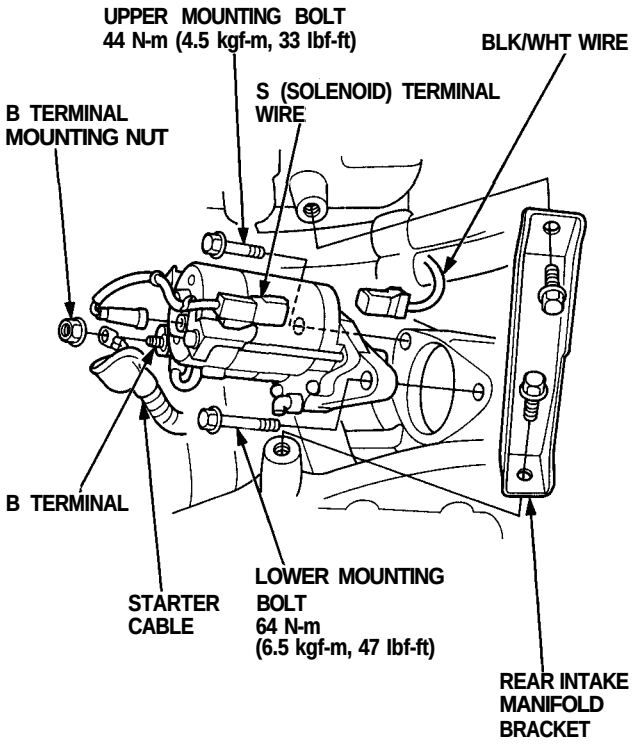
4. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.



Starting System

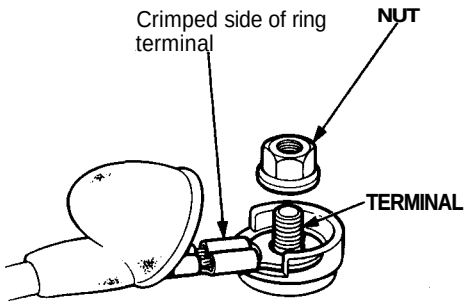
Starter Replacement

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Remove the rear intake manifold bracket.
4. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S (SOLENOID) terminal wire.



5. Remove the two bolts holding the starter, then remove the starter.
6. Install in the reverse order of removal.

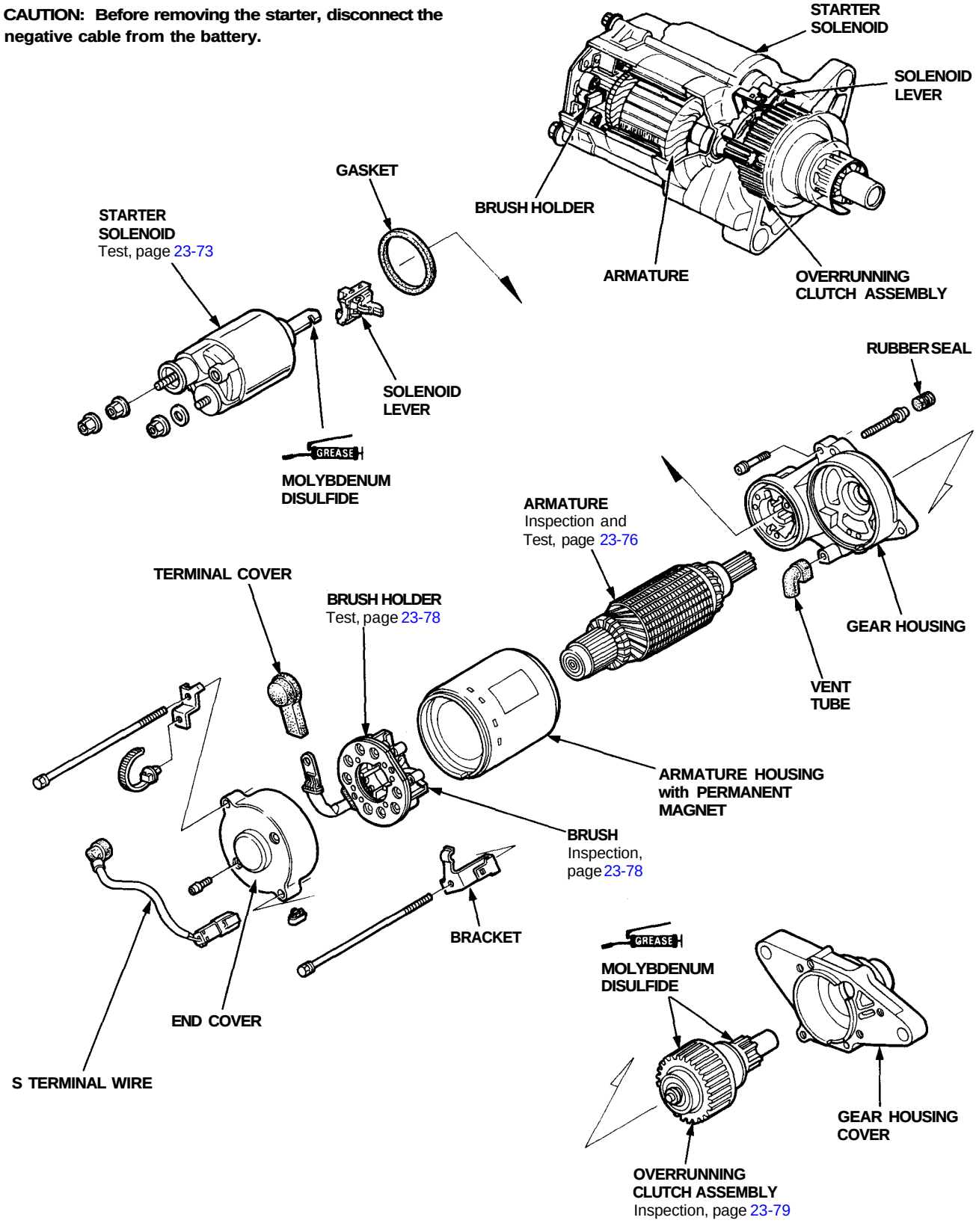
   NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



7. Connect the battery positive cable and negative cable to the battery.
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Starter Overhaul

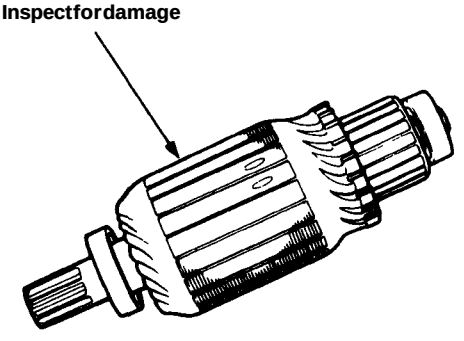
CAUTION: Before removing the starter, disconnect the negative cable from the battery.



Starting System

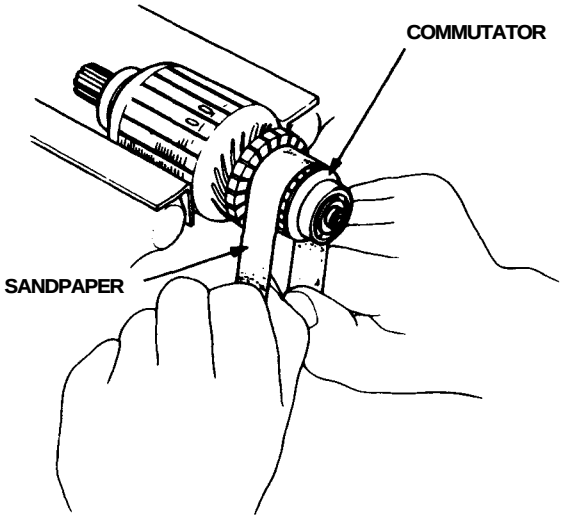
Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the permanent magnet. If there is wear or damage, replace the armature.



2. Check commutator surface and diameter.

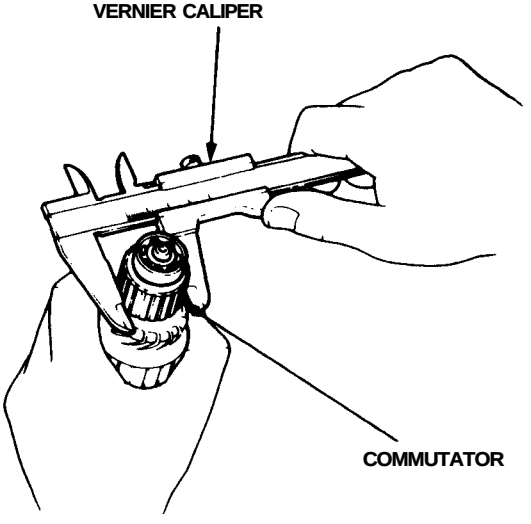
- If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper.



- If commutator diameter is below the service limit, replace the armature.

Commutator Diameter

Standard (NEW)	Service Limit
28.0-28.1 mm (1.102-1.106 in)	27.5 mm (1.083 in)

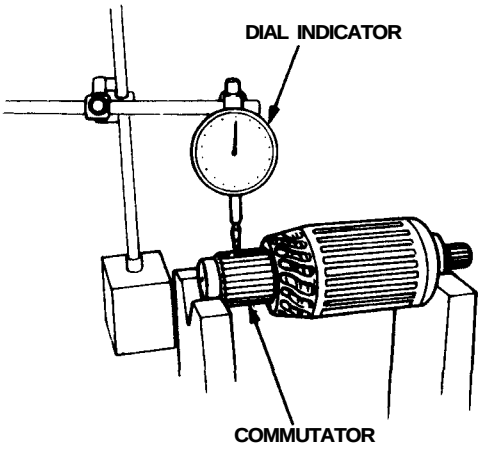


3. Measure the commutator runout.

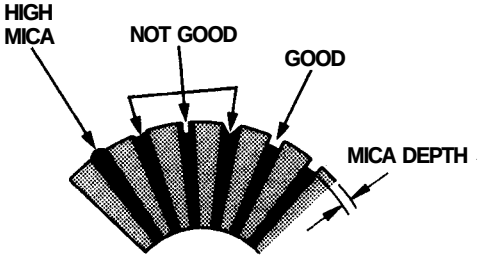
- If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
- If the commutator runout is not within the service limit, replace the armature.

Commutator Runout

Standard (NEW)	Service Limit
0-0.02 mm (0-0.0008 in)	0.05 mm (0.002 in)



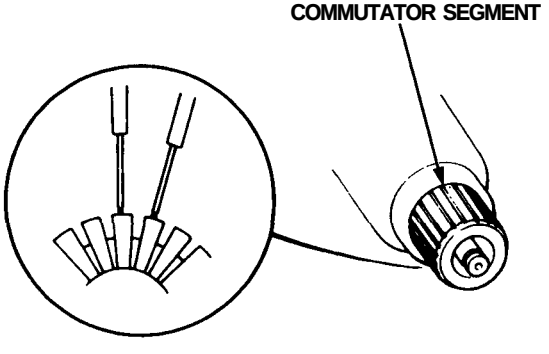
4. Check for mica depth. If necessary, undercut the mica with a hacksaw blade to achieve proper depth. If the service limit cannot be maintained, replace the armature.



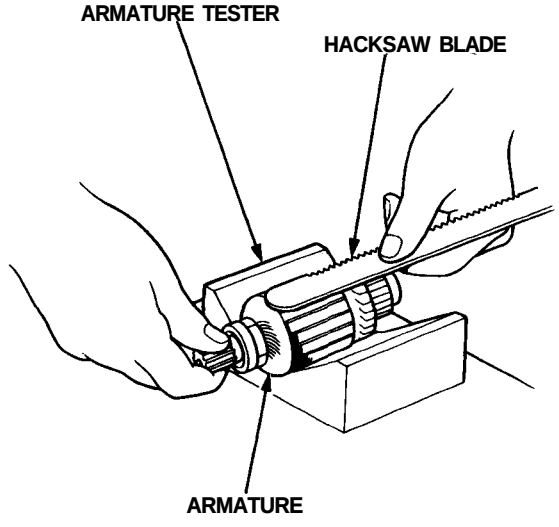
Commutator Mica Depth

Standard (NEW)	Service Limit
0.4-0.5 mm (0.016 -0.020 in)	0.15 mm (0.006 in)

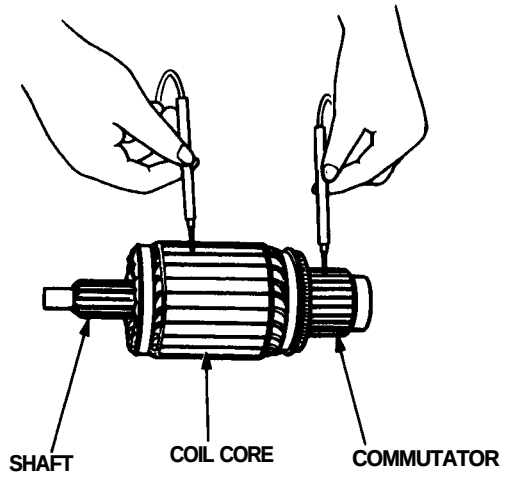
5. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.



6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core. If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.



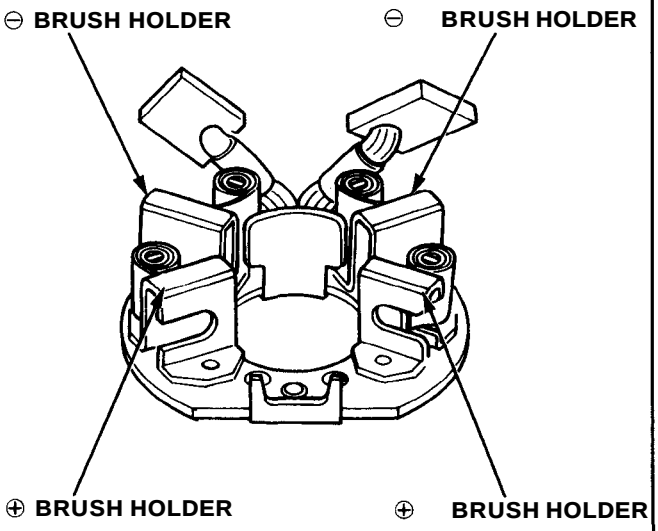
7. Check with an ohmmeter that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



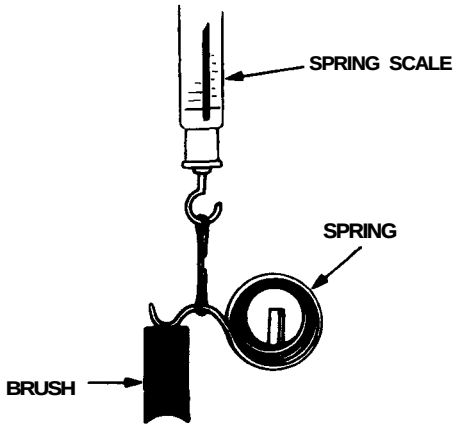
Starting System

Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders. If there is continuity, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.



Spring Tension

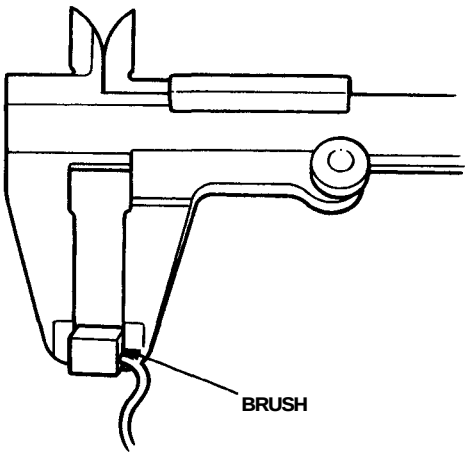
15.7-17.7 N (1.60-1.80 kgf, 3.53-3.97 lbf)

Starter Brush Inspection

Measure the brush length. If not within the service limit, replace the brush holder assembly.

Brush Length

Standard (NEW)	Service Limit
15.8- 16.2 mm (0.62 -0.64 in)	11.0 mm (0.43 in)

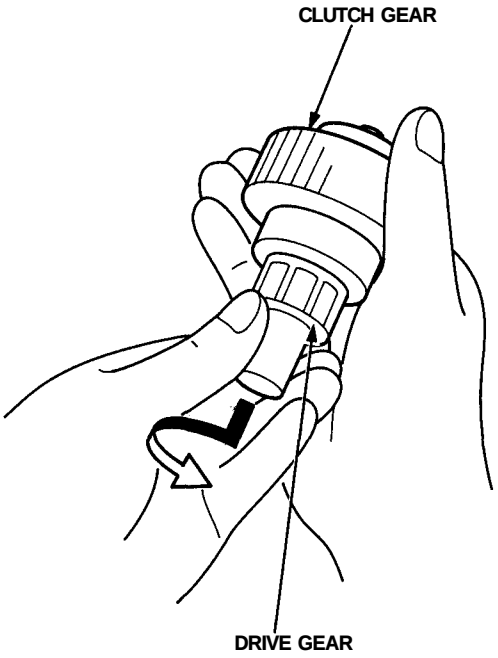


NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.

2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.



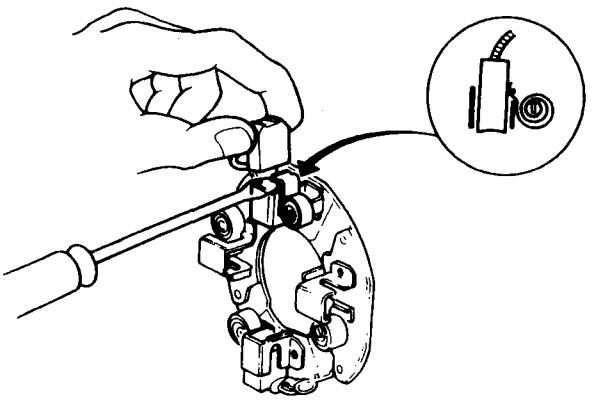
3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

4. Check the condition of the torque converter ring gear if the starter drive gear teeth are damaged.

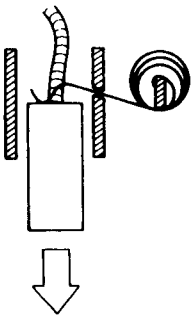
Starter Reassembly

NOTE: Use the illustration on page 23-75 as reference for reassembly.

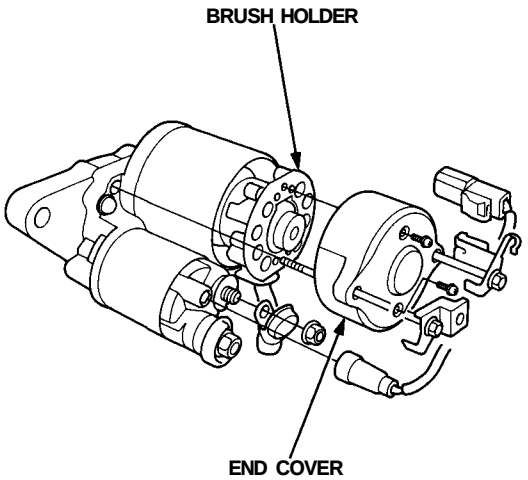
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3. Install the end cover on the brush holder.



Starting System

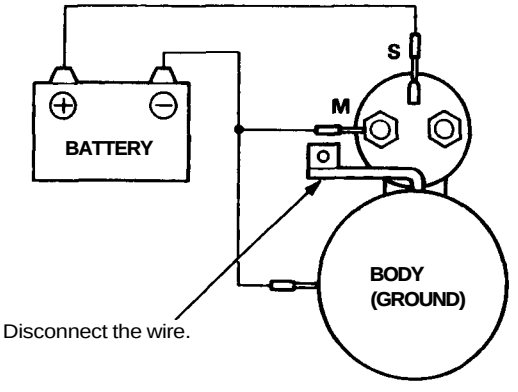
Performance Test

NOTE: Before starting the following checks, disconnect the wire from terminal M, and make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the car).

Pull-in Coil Test:

Connect the battery as shown. If the starter pinion pops out, it is working properly.

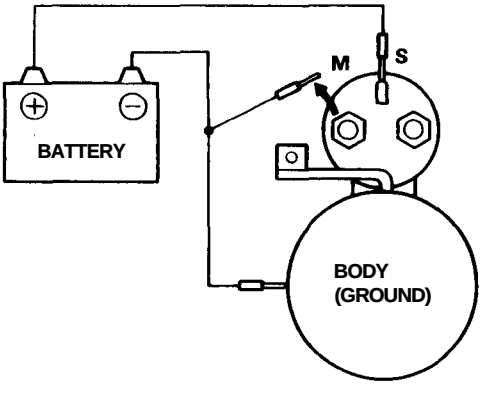
CAUTION: Do not leave the battery connected for more than 10 seconds.



Hold-in Coil Test:

Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly.

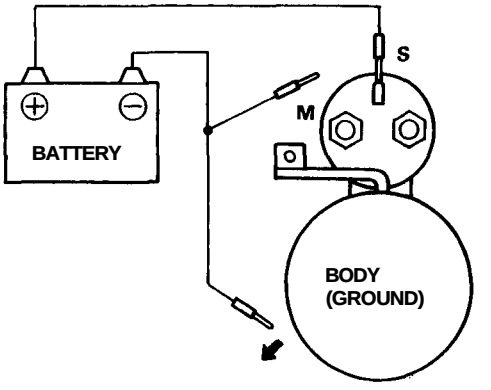
CAUTION: Do not leave the battery connected for more than 10 seconds.



Retracting Test:

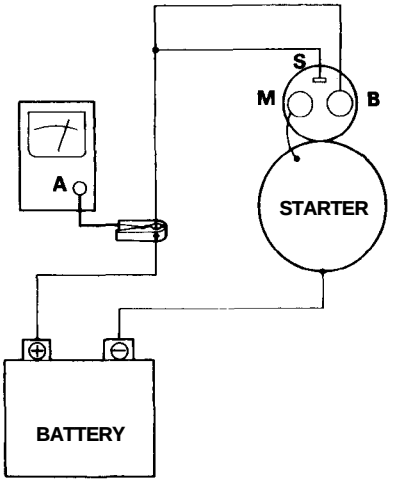
Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly.

CAUTION: Do not leave the battery connected for more than 10 seconds.



Starter No-load Test:

1. Clamp the starter firmly in a vise.
2. Connect the starter to the battery as shown in the diagram below, and confirm that the motor starts and keeps rotating.



3. If the electric current and motor speed meet the specifications when the battery voltage is at 11 V, the starter is working properly.

Specifications:

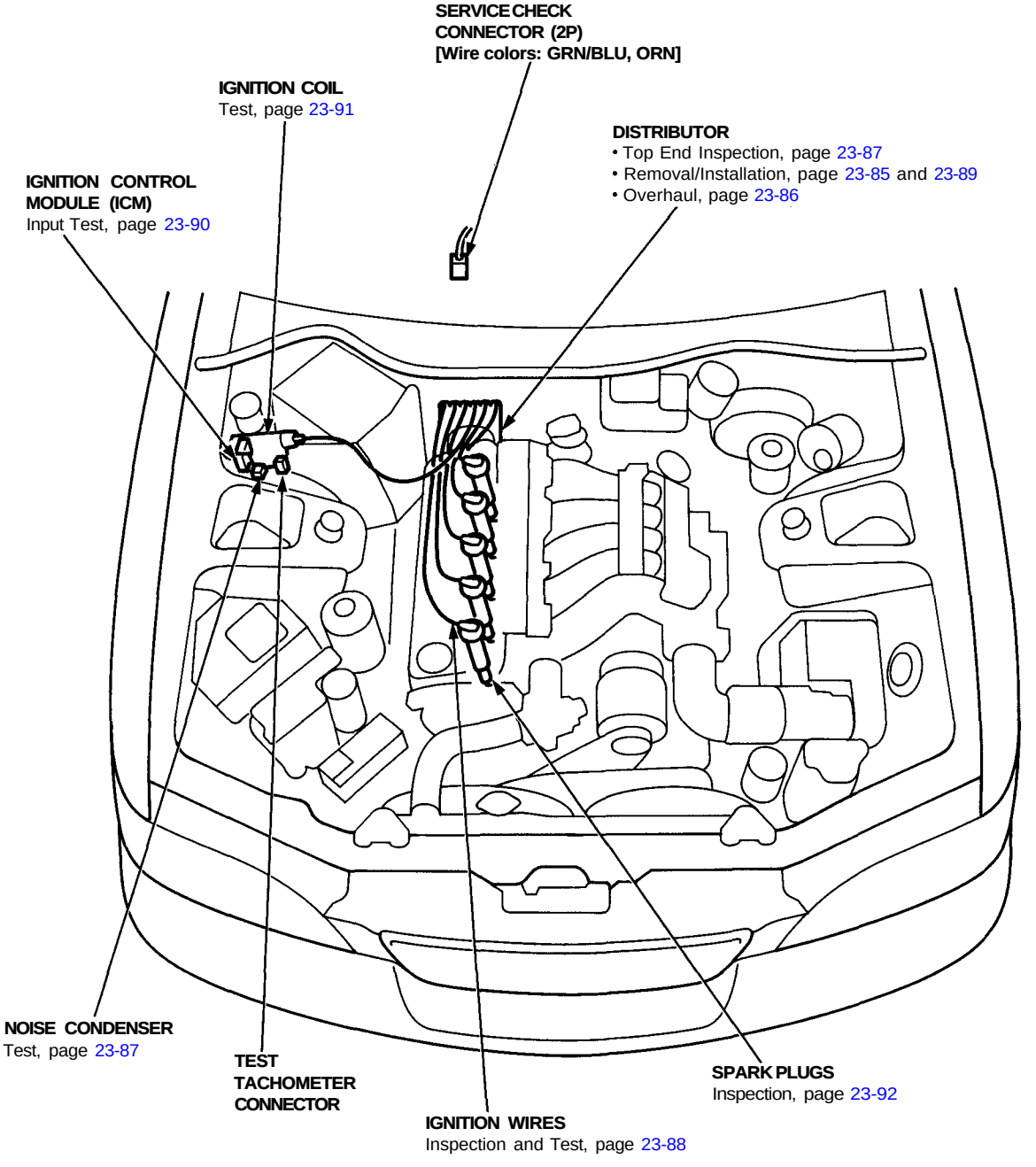
• 80 A or less current draw • 2,600 rpm or more rpm

Ignition System

Component Location Index

IGNITION TIMING CONTROL SYSTEM

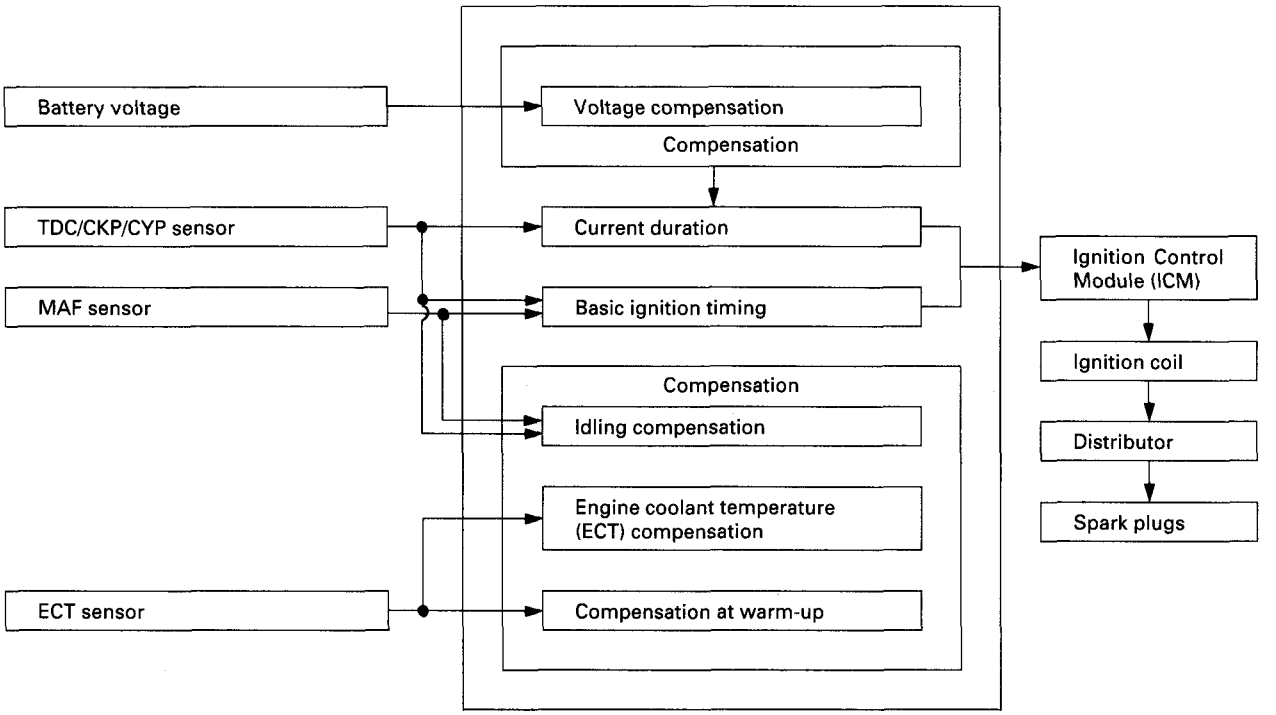
- Description, page 23-82
- Inspection, page 23-84



Ignition System

Description

Ignition Timing Control:
The programmed ignition (PGM-IG) used in this engine provides optimum control of ignition timing. A microcomputer determines the timing in response to engine speed and intake air flow mass. The input signals are transmitted by the TDC/CKP/CYP sensor, throttle position (TP) sensor, engine coolant temperature (ECT) sensor, and MAF sensor. This system, which is not dependent on a governor or vacuum diaphragm, is capable of setting lead angles with complicated characteristics which cannot be provided by conventional governors or diaphragms.



Basic Control:
The control unit has stored within it the optimum basic ignition timing for operating conditions based upon engine speed and intake air flow mass. With compensating signals from sensors, the system determines optimum ignition timing and duration for ambient conditions and sends voltage pulses to the ICM.

Compensation of ignition timing:

Compensation Item	Related Sensor and Information	Description
Idling	TDC/CKP/CYP sensor MAF sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.
Compensation at warm-up	ECT sensor	Lag angle is adjusted according to warm-up conditions to bring about a good balance between operating performance and exhaust gas level.
ECT compensation	ECT sensor	Compensation for lead angle at low engine coolant temperature and lag angle at high engine coolant temperature.

Control at Start:
Ignition timing is fixed at 5° BTDC for cranking. The cranking is detected by the TDC sensor (cranking rpm) and starter signal.

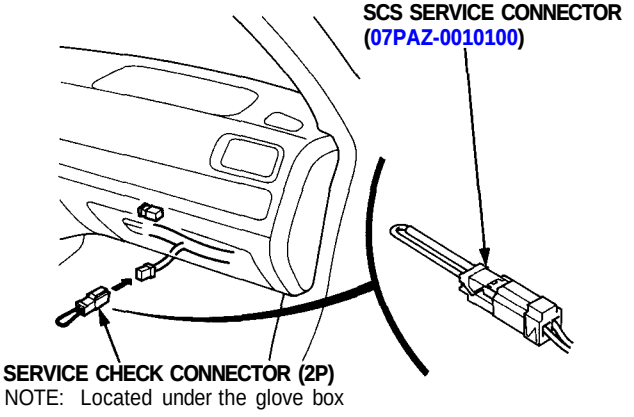
Ignition System

Ignition Timing Inspection

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Start the engine. Hold the engine at 3,000 rpm with no load (shift lever in N or P position) until the radiator fan comes on, then let it idle.

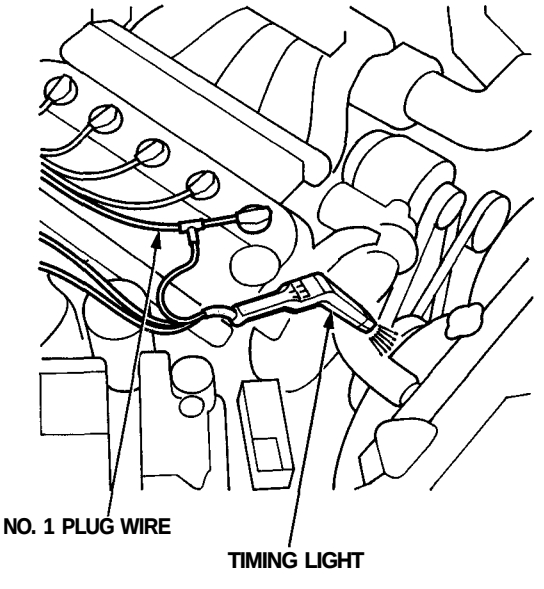
2. Pull out the service check connector located under the glove box. Connect the GRN/BLU and ORN wire terminals with the special tool.



NOTE: Located under the glove box

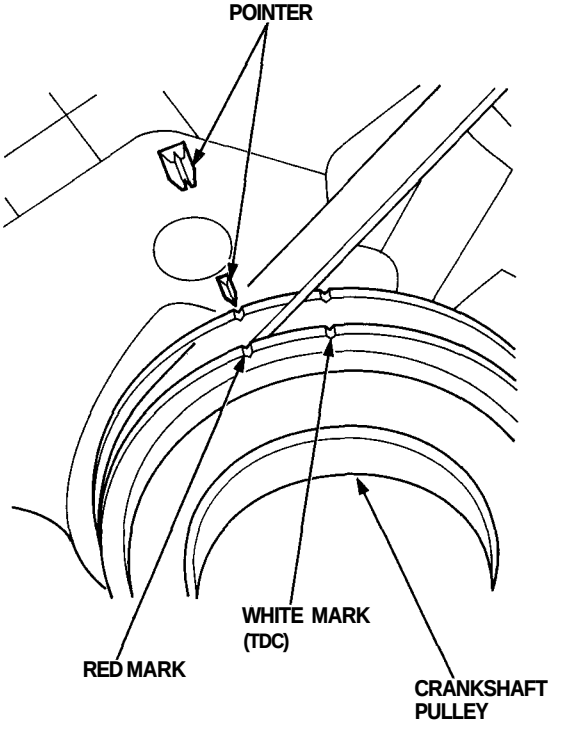
3. Check the idle speed (see page 23-85).

4. Connect a timing light to the No. 1 ignition wire.
   - Point the light toward the pointer on the timing belt cover.



5. Inspect ignition timing at idle speed.

   Ignition Timing:
   15° ± 2° BTDC (RED) at 700 ± 50 rpm with shift lever in N or P position and electrical systems turned off.



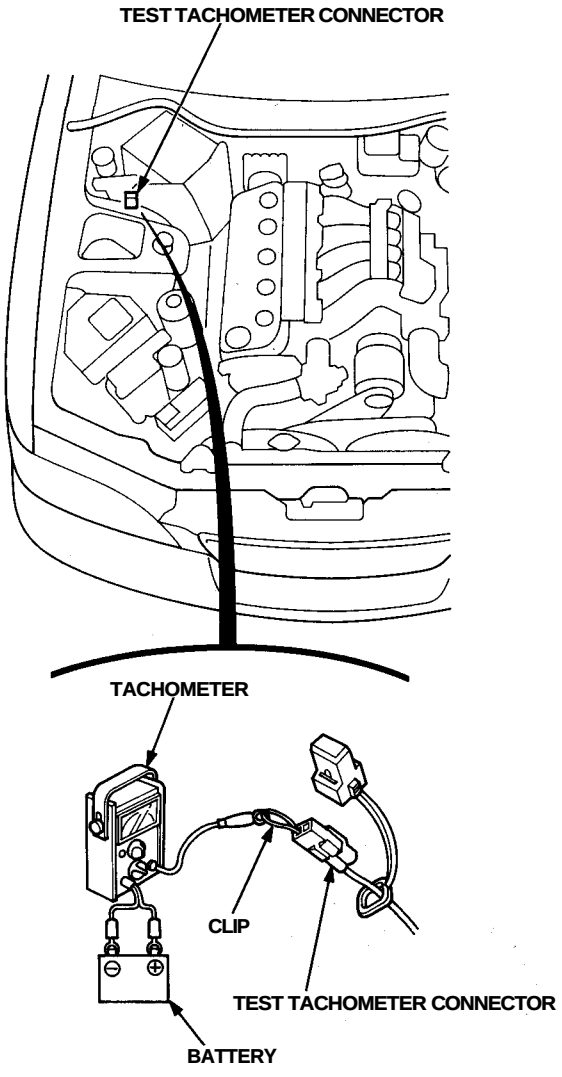
6. If the ignition timing is incorrect, replace the ECM (there is no way to adjust ignition timing).

7. Disconnect the special tool from the service check connector.

Idle Speed Check

1. Start the engine. Hold the engine at 3,000 rpm with no load (shift lever in N or P) until the radiator fan comes on, then let it idle.

2. Connect a tachometer to the test tachometer connector.

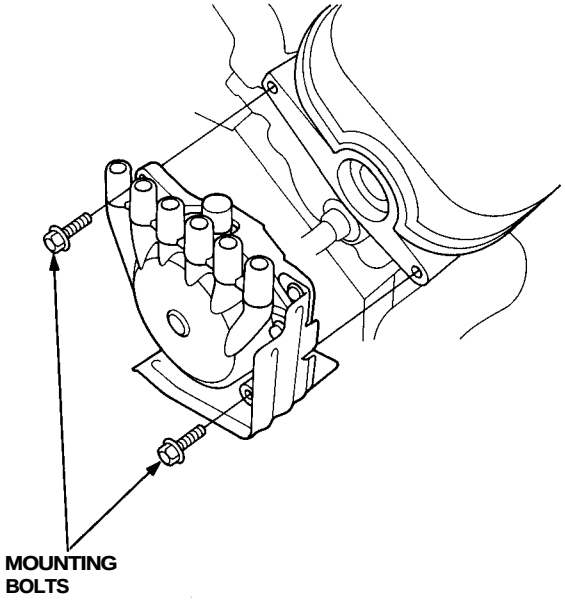


Idle speed: 700 ± 50 rpm with shift lever in position N or P and electrical systems turned off.

3. Adjust the idle speed if necessary (see section 11).

Distributor Removal

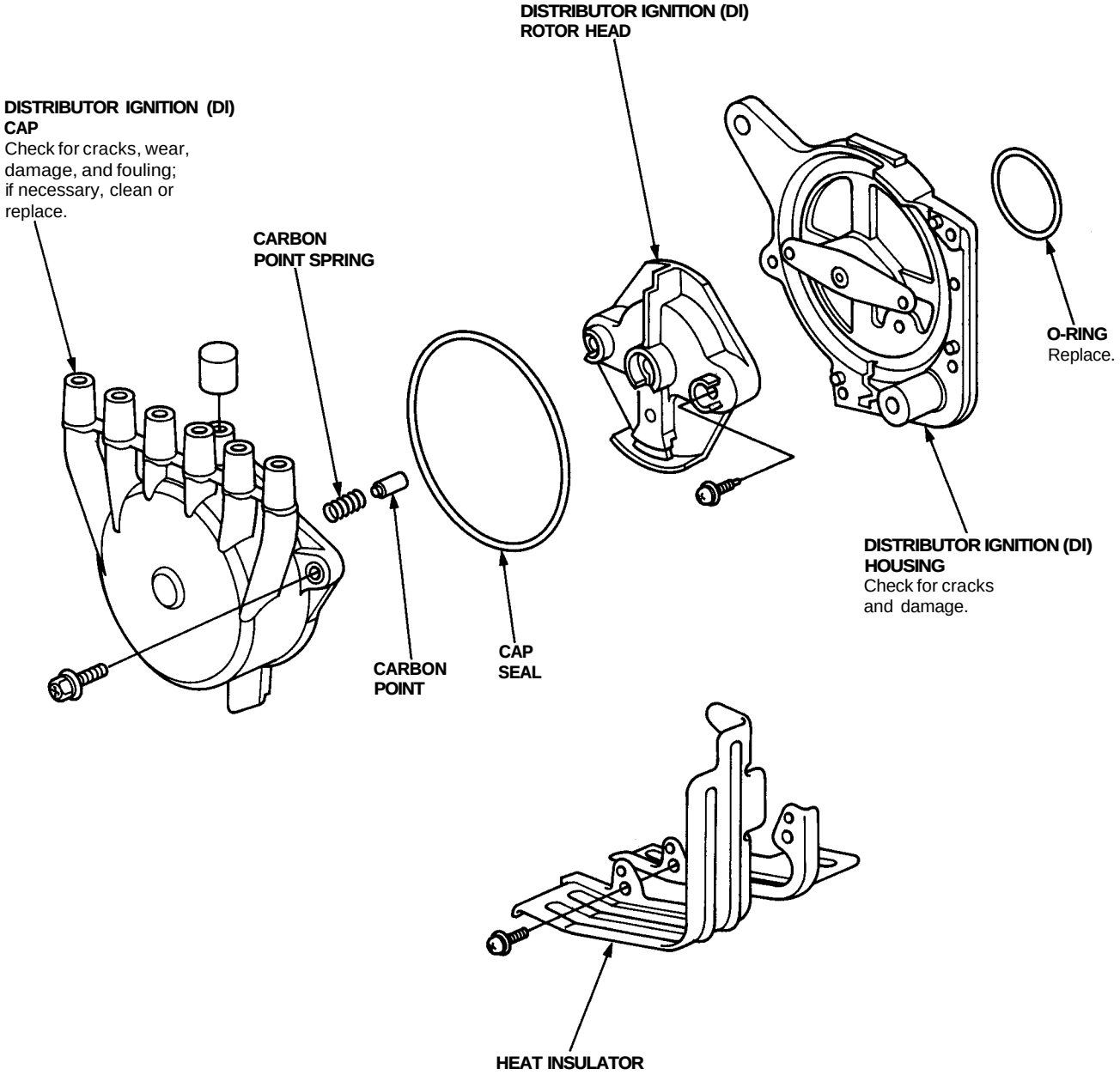
1. Disconnect the ignition wires from the distributor ignition (DI) cap.



2. Remove the distributor mounting bolts, then remove the distributor from the cylinder head.

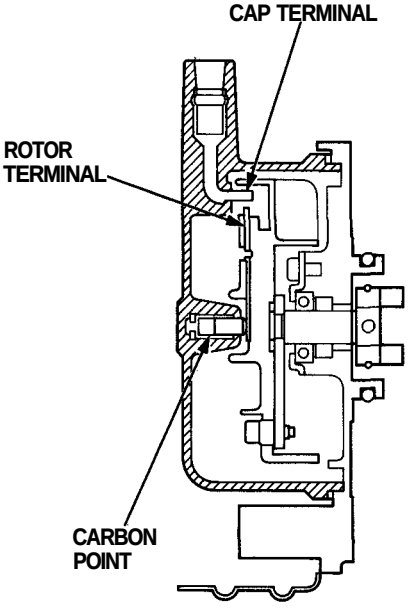
Ignition System

Distributor Overhaul



Distributor Top End Inspection

1. Check for rough or pitted rotor and cap terminals.
2. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.

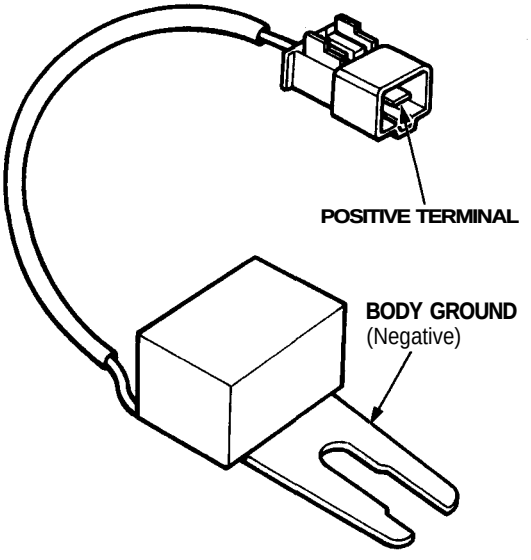


3. Check the distributor ignition (DI) cap for cracks, wear, and damage. If necessary, clean or replace it.

Noise Condenser Capacity Test

1. Use a commercially available condenser tester. Connect the condenser tester probes and measure the condenser capacity.

   Condenser capacity: 0.47 ± 0.09 microfarads (μF)



NOTE: The noise condenser is intended to reduce ignition noise. However, condenser failure may cause the engine to stop running.

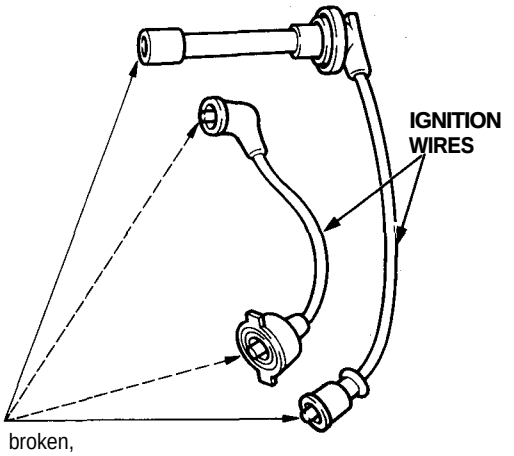
2. If not within the specifications, replace the noise condenser.

Ignition System

Ignition Wire Inspection and Test

CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

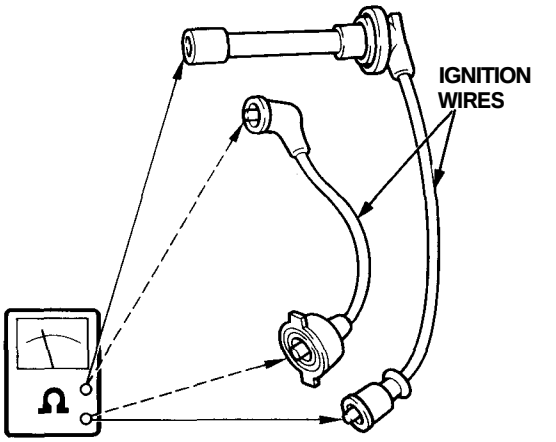
1. Check the condition of the ignition wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



Check for broken, corroded, and bent terminals.

2. Connect ohmmeter probes and measure resistance.

Ignition Wire Resistance:
25kΩ max. at 68°F (20°C)



3. If resistance exceeds 25 kΩ, replace the ignition wire.

Distributor Installation

NOTE:
- Use the illustration on page 23-86 as reference for reassembly.
- Before you install the distributor, bring the No. 1 piston to compression stroke TDC.

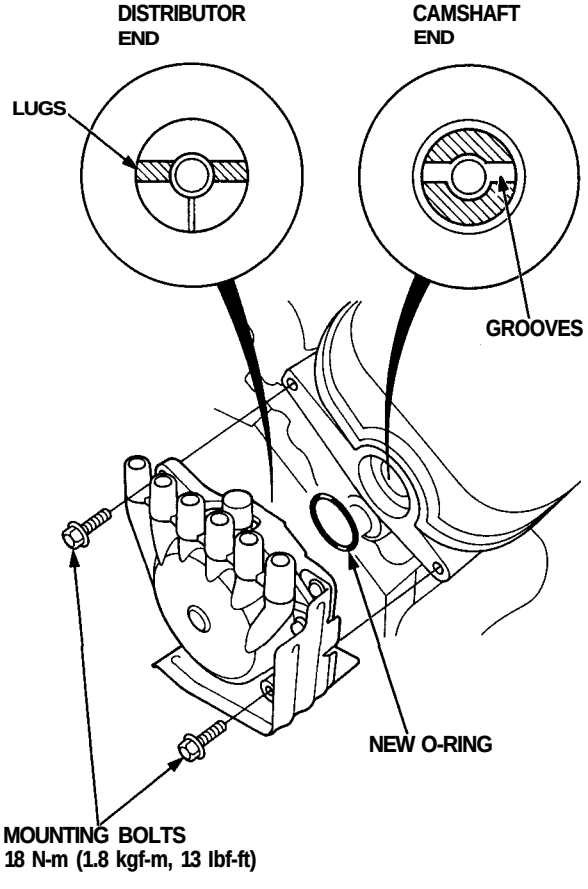
1. Coat a new O-ring with engine oil, then install it.

2. Clean the mating surfaces of the distributor and the cylinder head.

   NOTE: Make sure that the distributor vent hole is not clogged.

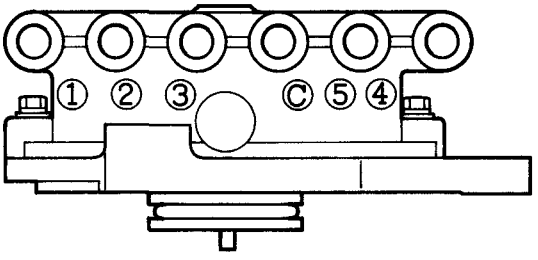
3. Slip the distributor into position.

   NOTE: The lug on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.



4. Install the mounting bolts, then tighten them.

5. Connect the ignition wires and ignition coil wire in the numbered sequence shown.



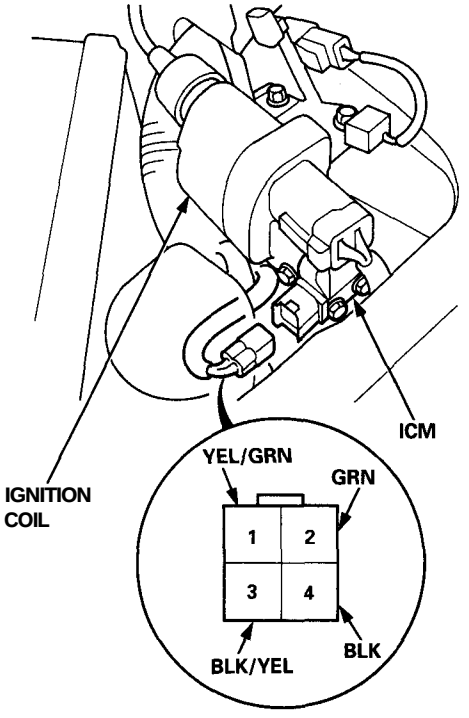
6. Inspect the timing with a timing light as shown on page 23-84.

Ignition System

Ignition Control Module (ICM) Input Test

NOTE:
- See section 11 when the malfunction indicator lamp (MIL) blinks.
- Perform an input test on the ignition control module (ICM) after finishing the fundamental tests for the ignition system and fuel emission system.

Disconnect the 4P connector from the ICM. Make the following input tests at the connector terminals. If all tests prove OK, yet the system still fails to work, replace the ICM.



WIRE SIDE OF FEMALE TERMINALS

1. Check for continuity between the No. 4 terminal and body ground.

   - If there is continuity, go to step 2.
   - If there is no continuity, check for:
     — An open in the BLK wire.
     — Disconnected terminals.
     — Poor ground (G101).

2. With the ignition switch ON (II), there should be battery voltage between the No. 3 (+) and No. 4 (-) terminals.

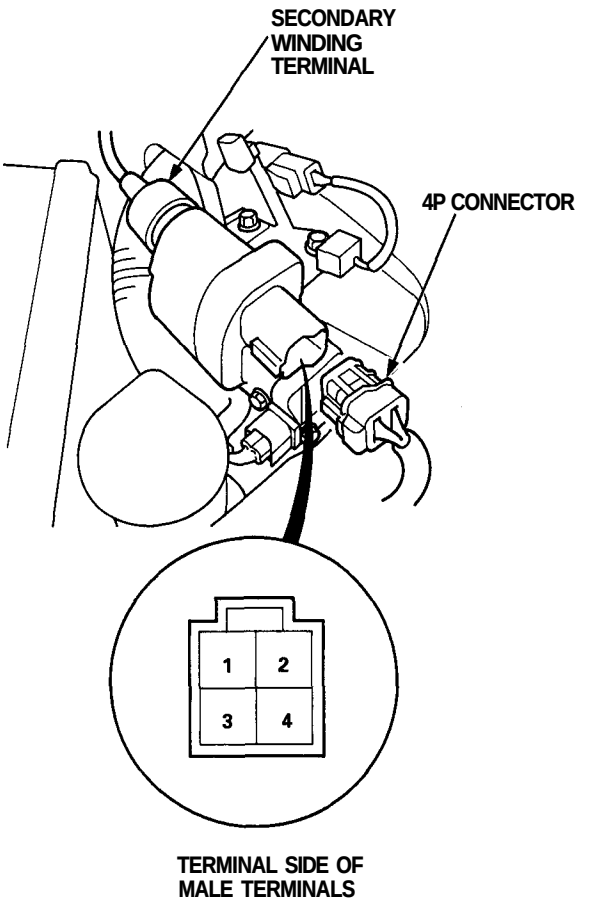
   - If there is battery voltage, go to step 3.
   - If there is no voltage, check for:
     — An open in the BLK/YEL wire.
     — Disconnected terminals.
     — Faulty ignition coil (see page 23-91).

3. With the ignition switch ON (II), there should be battery voltage between the No. 2 (+) and No. 4 (-) terminals.

   - If there is no voltage, check for:
     — An open in the GRN wire between the ignition coil and ICM.
     — Faulty ignition coil (see page 23-91).

Ignition Coil Test

1. Turn the ignition switch OFF.
2. Disconnect the 4P connector and ignition coil wire.



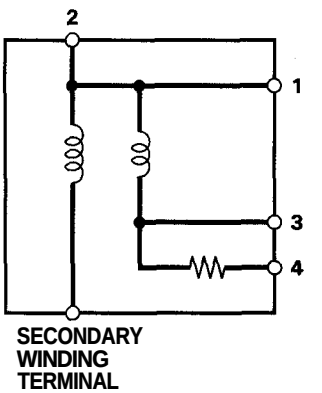
3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.

NOTE: Resistance will vary with the coil temperature; specifications are at 68°F (20°C).

Primary Winding Resistance (Between the No. 2 and No. 3 terminals): 0.36 - 0.44 ohms

Secondary Winding Resistance (Between the No. 2 and secondary winding terminals): 10.8-16.2kΩ

Resistance between the No. 3 and No. 4 terminals: 2.0-2.3kΩ

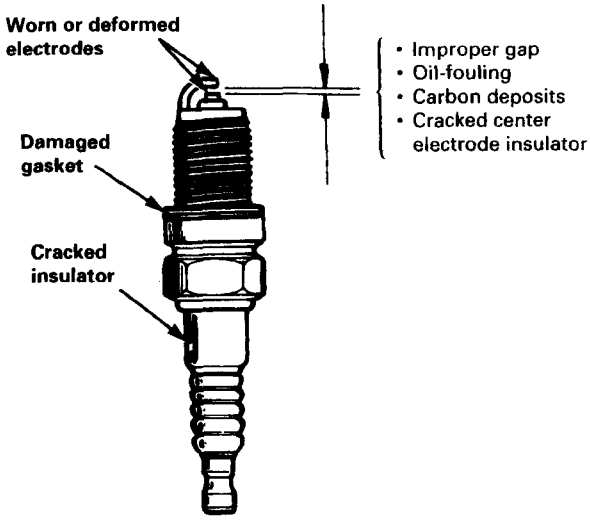


4. Check for continuity between the No. 1 and No. 2 terminals. Replace the coil if there is no continuity.

Ignition System

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



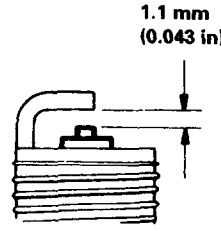
Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

Fouled plug may be caused by:
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too high
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

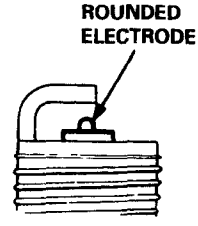
2. Check the electrode gap.
   - Adjust the gap with a suitable gapping tool.

Electrode Gap

Standard	1.1 $^{+0}_{-0.1}$ mm (0.043 $^{+0}_{-0.004}$ in)



- Replace the plug if the center electrode is rounded as shown below:



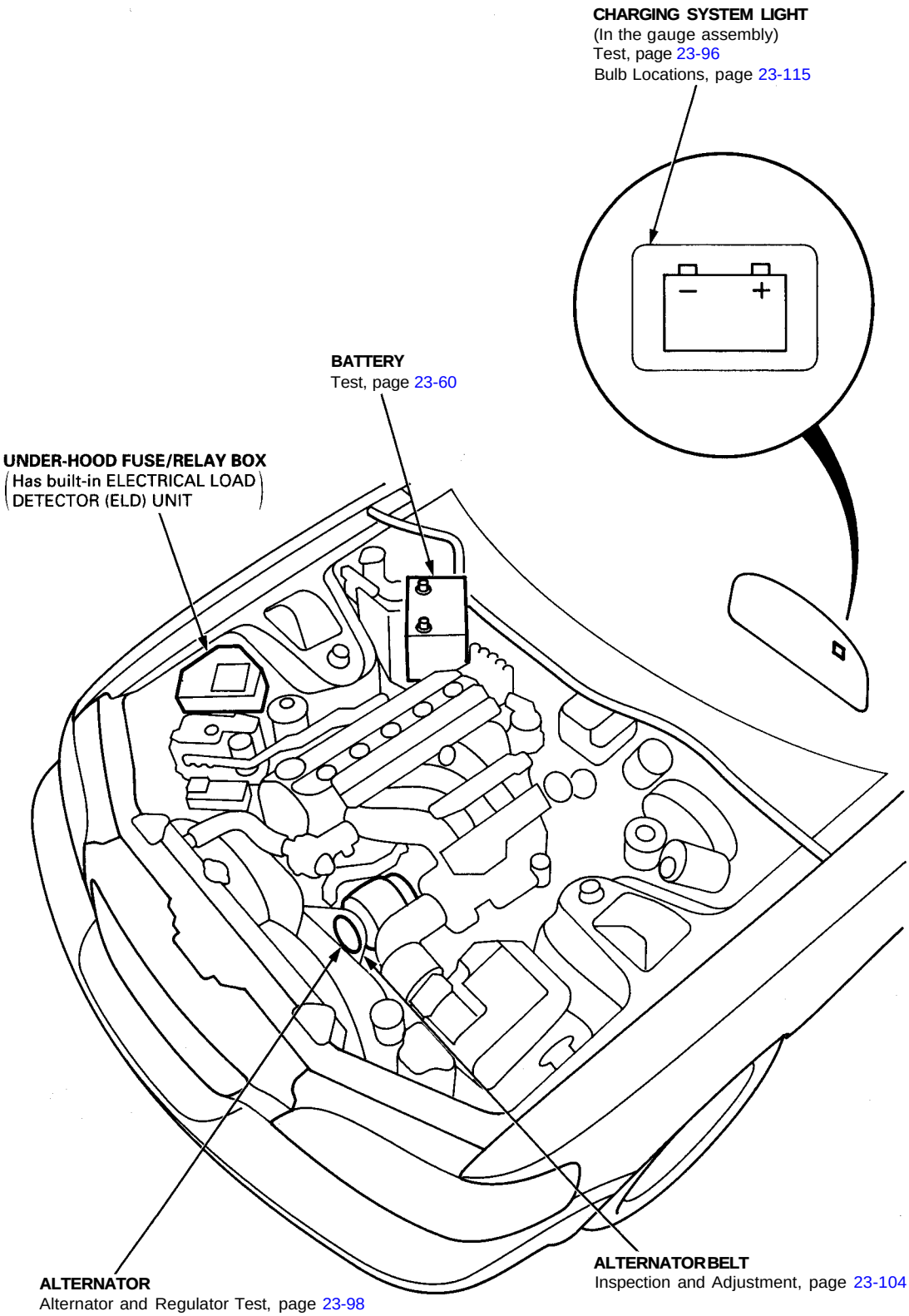
Spark Plugs

BKR5E-N11 (NGK) K16PR-L11 (DENSO)

3. Apply a small quantity of anti-seize compound to the plug threads, and screw the plugs into the cylinder head finger-tight. Then torque them to 18 N-m (1.8 kgf-m, 13 lbf-ft).

Charging System

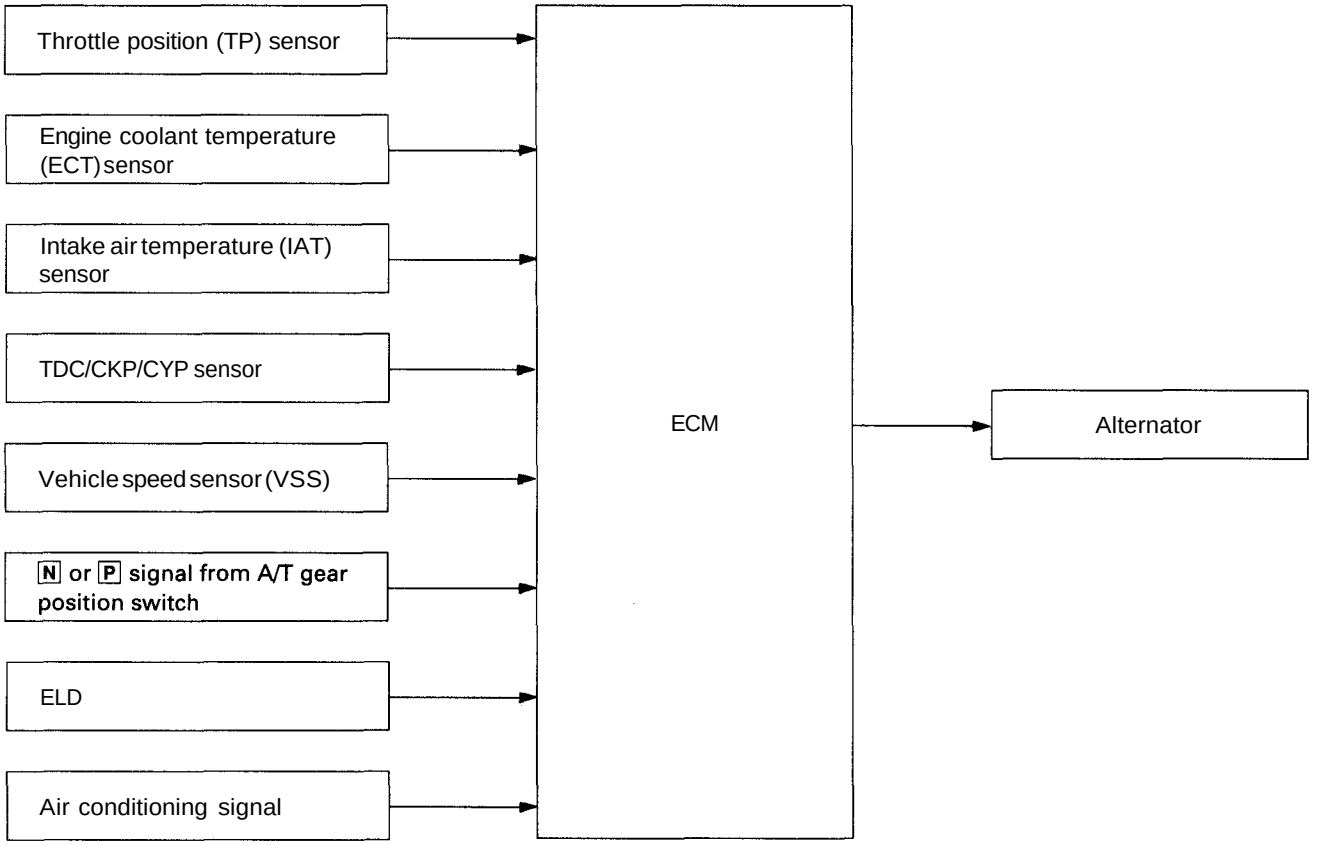
Component Location Index

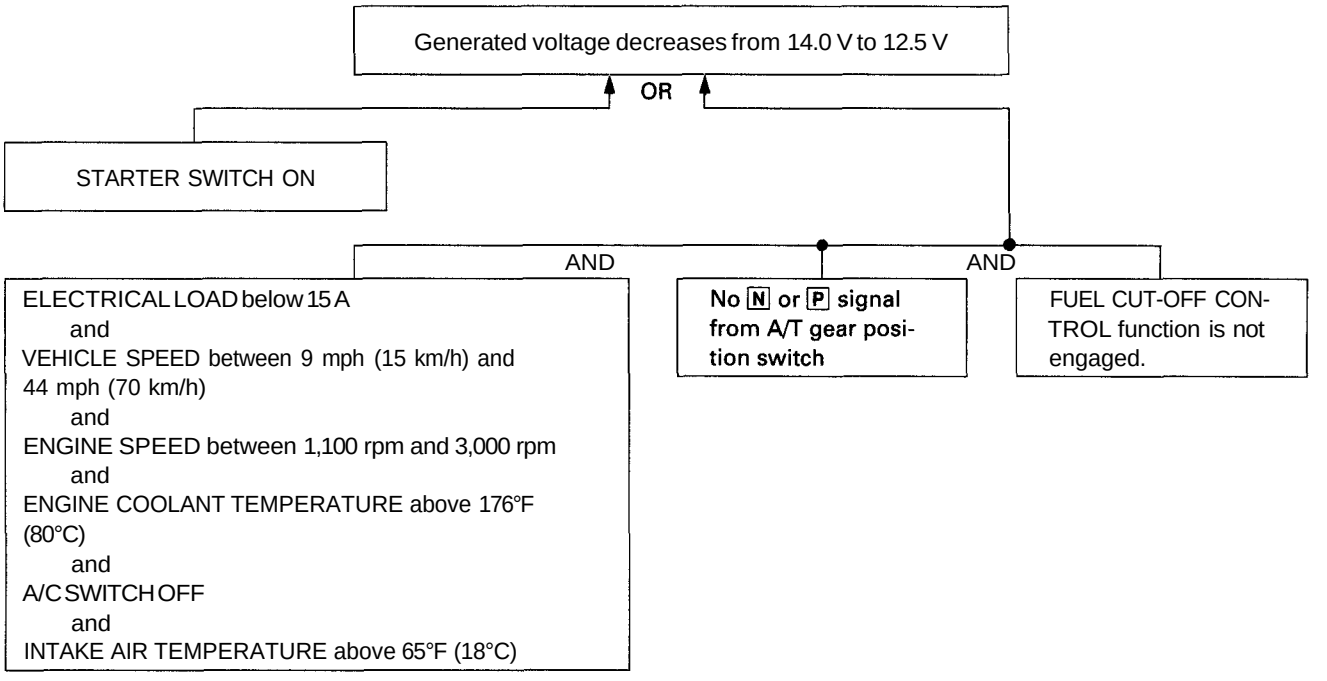


Charging System

Description

To improve fuel economy, the alternator control system within the ECM changes the voltage generated at the alternator in accordance with driving conditions.





Charging System

Troubleshooting

If the charging system light is on, or the battery is dead or low, test the following items in the order listed below.

1. Battery (see page 23-60)
2. Charging System Light
3. Alternator/Regulator

Check the No. 4 (15 A)*1 or (20 A)*2 fuse in the under-dash fuse/ relay box.

Is the fuse OK?
- NO → **Replace the fuse.**
- YES →

Check for an open in the L circuit:
1. Disconnect the 4P connector from the alternator.
2. Ground the No. 4*1 or No. 3*2 terminal of the 4P connector.
3. Turn the ignition switch ON (II).

Does the charging system light come on?
- NO → **Check for a blown charging system light bulb. If the bulb is OK, repair the open in the WHT/BLU wire.**
- YES →

4. Disconnect the No. 4*1 or No. 3*2 terminal of the 4P connector from the ground.

Does the charging system light go off?
- YES → **The charging system light circuit is OK.**
- NO →

Check for a short to body ground in the L circuit:
1. Turn the ignition switch OFF.
2. Disconnect the ABS control unit (C447)*1 and integrated control unit (C401), as applicable.
3. Turn the ignition switch ON (II).

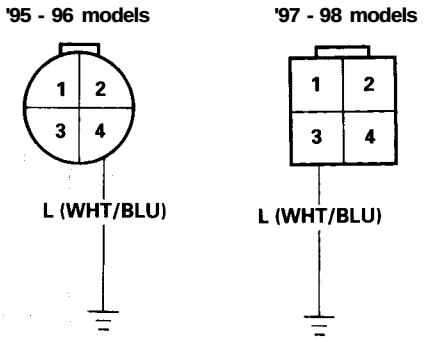
Does the charging system light stay off?
- NO → **Turn the ignition switch OFF, and repair the short to ground in the WHT/BLU wire.**
- YES →

*1: '95 -96 models
*2: '97 - 98 models

1

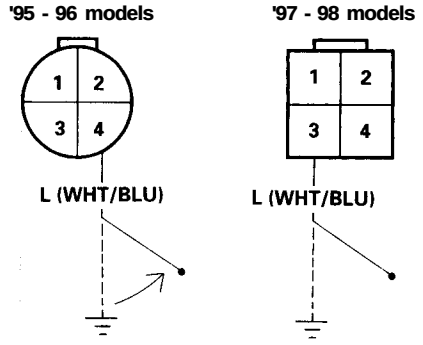
(To page 23-97)

ALTERNATOR 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ALTERNATOR 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(From page 23-96)

1

Check for short in control unit(s):
1. Turn the ignition switch OFF.
2. Reconnect the ABS control unit connector.
3. Turn the ignition switch ON (II), and check the charging system light.
4. Turn the ignition switch OFF again.
5. Reconnect the integrated control unit connector.
6. Turn the ignition switch ON (II), and check the charging system light again.

Did the light stay off when you turned on the ignition switch after connecting each control unit connector?

NO → **Replace the control unit that caused the light to come on.**

YES

Check for an open in the IG circuit: Measure the voltage at the No. 3*1 or No. 1*2 terminal of the 4P connector.

Is there battery voltage?

NO → **Turn the ignition switch OFF, and repair the open circuit in the BLK/YEL wire.**

YES

Check the Alternator/Regulator:
1. Connect the 4P connector to the alternator.
2. Turn the ignition switch ON (II).

Does the charging system light come on?

NO → **Check the alternator/regulator (see page 23-98).**

YES

3. Start the engine.

Does the charging system light go off?

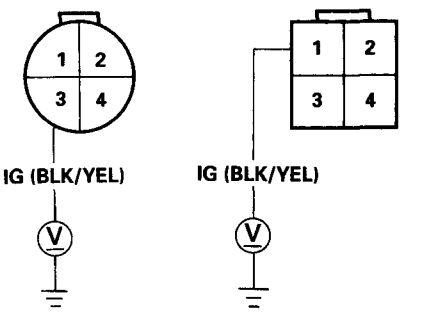
NO → **Check the alternator/regulator (see page 23-98).**

YES

The charging system light circuit is OK.

*1: '95 -96 models
*2: '97 - 98 models

ALTERNATOR 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Charging System

Troubleshooting (cont'd)

NOTE: Be sure the battery is sufficiently charged (see page 23-60).

Alternator/Regulator Test-1:
1. Connect the Sun VAT-40 (or equivalent tester), and turn the selector switch to position 1 (starting).
2. Shift to [P] or [N] position, and start the engine. Hold the engine at 3,000 rpm with no load until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm, and hold it there.

Is the voltage over 15.1 V?

YES → **Replace the voltage regulator.**

NO

Alternator/Regulator Test-2:
1. Release the accelerator pedal, and let the engine idle.
2. Make sure all accessories are turned off. Turn the selector switch to position 2 (charging).
3. Remove the inductive pick-up, and zero the ammeter.
4. Place the inductive pick-up over the B terminal wire of the alternator so that the arrow points away from the alternator.
5. Raise the engine speed to 2,000 rpm, and hold it there.

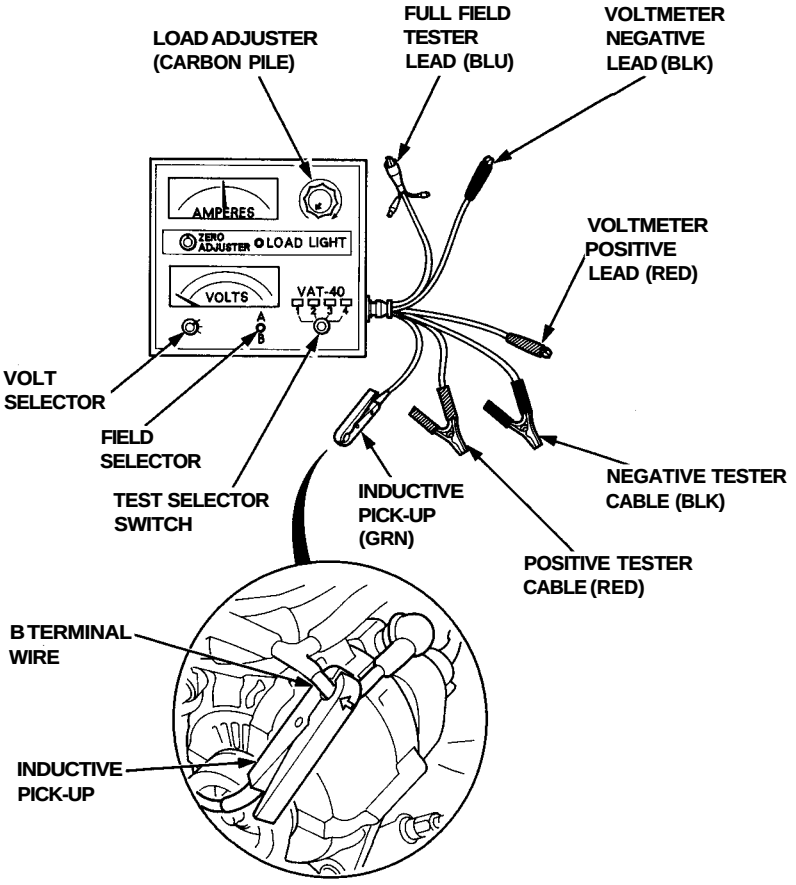
Is the voltage less than 13.5 V?

YES → **Test and repair the alternator components.**

NO

Alternator/Regulator Test-3:
Apply a load with the VAT-40 until the battery voltage drops to between 12 – 13.5 V.

2



(To page 23-99)

(From page 23-98)

2

Is the amperage 75 A or more?

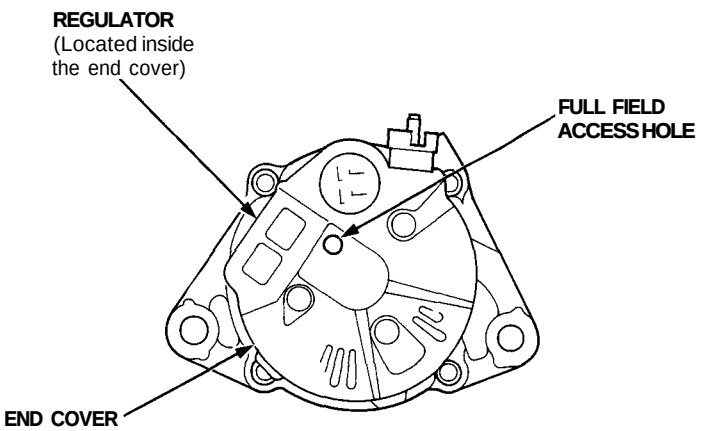
YES → **The charging system is OK.**

NO

Alternator/Regulator Test-4:
With the engine speed still at 2,000 rpm, full-field the alternator.

CAUTION: The voltage will rise quickly when the alternator is full-fielded. Do not allow the voltage to exceed 18 V; it may damage the electrical system.

NOTE: Attach a probe to the VAT-40 full field test lead, and insert the probe into the full field access hole at the back of the alternator. Switch the field selector to the "A (Ground)" position momentarily, and check the amperage reading.



Is the alternator output 75 A or more?

NO → **Test and repair the alternator components.**

YES

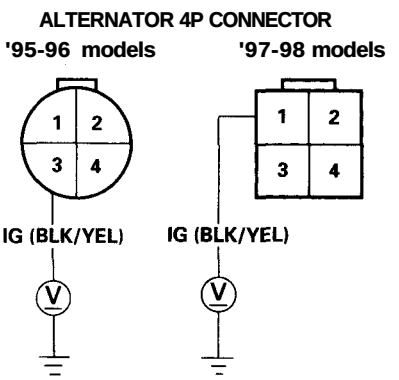
BLK/YEL Wire Test:
1. Turn the ignition switch OFF, then turn it on (II) again.
2. Disconnect the 4P connector from the alternator.
3. Check for voltage at the No. 3 *1 or No. 1*2 terminal of the 4P connector.

Is there battery voltage?

NO → **Repair the open in the BLK/YEL wire.**

YES

Replace the voltage regulator.

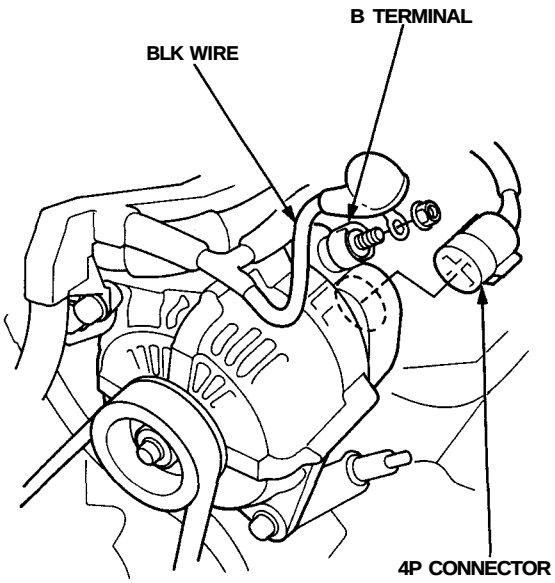


*1:'95-96 models
*2: '97 - 98 models

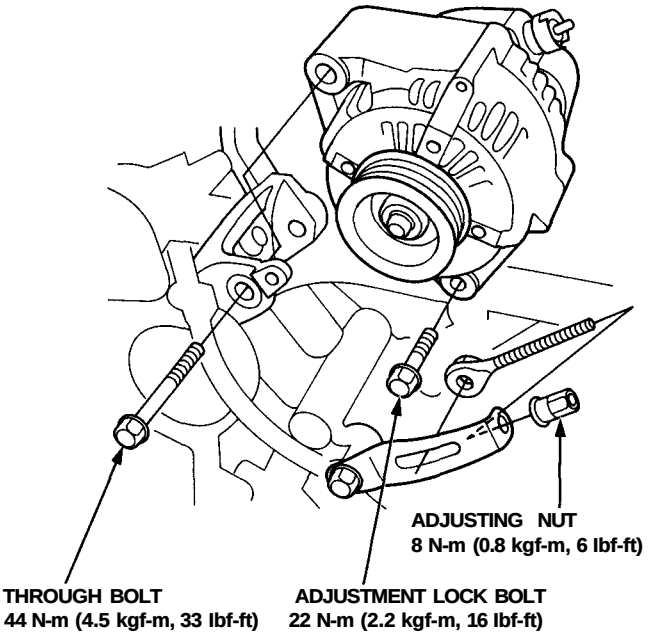
Charging System

Alternator Replacement

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable.
3. Disconnect the 4P connector from the alternator.
4. Remove the terminal nut and BLK wire from the B terminal.



5. Loosen the through bolt, then loosen the adjustment lock bolt, and then the adjusting nut.

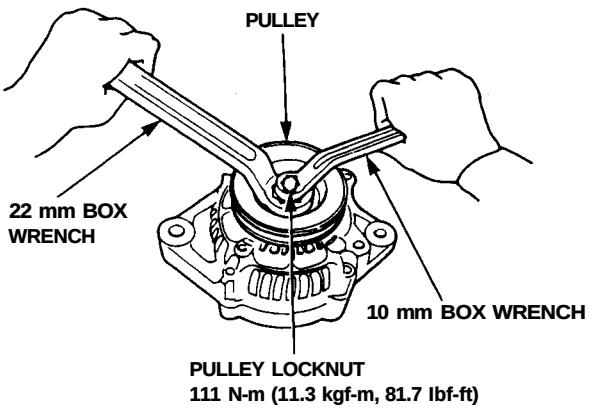


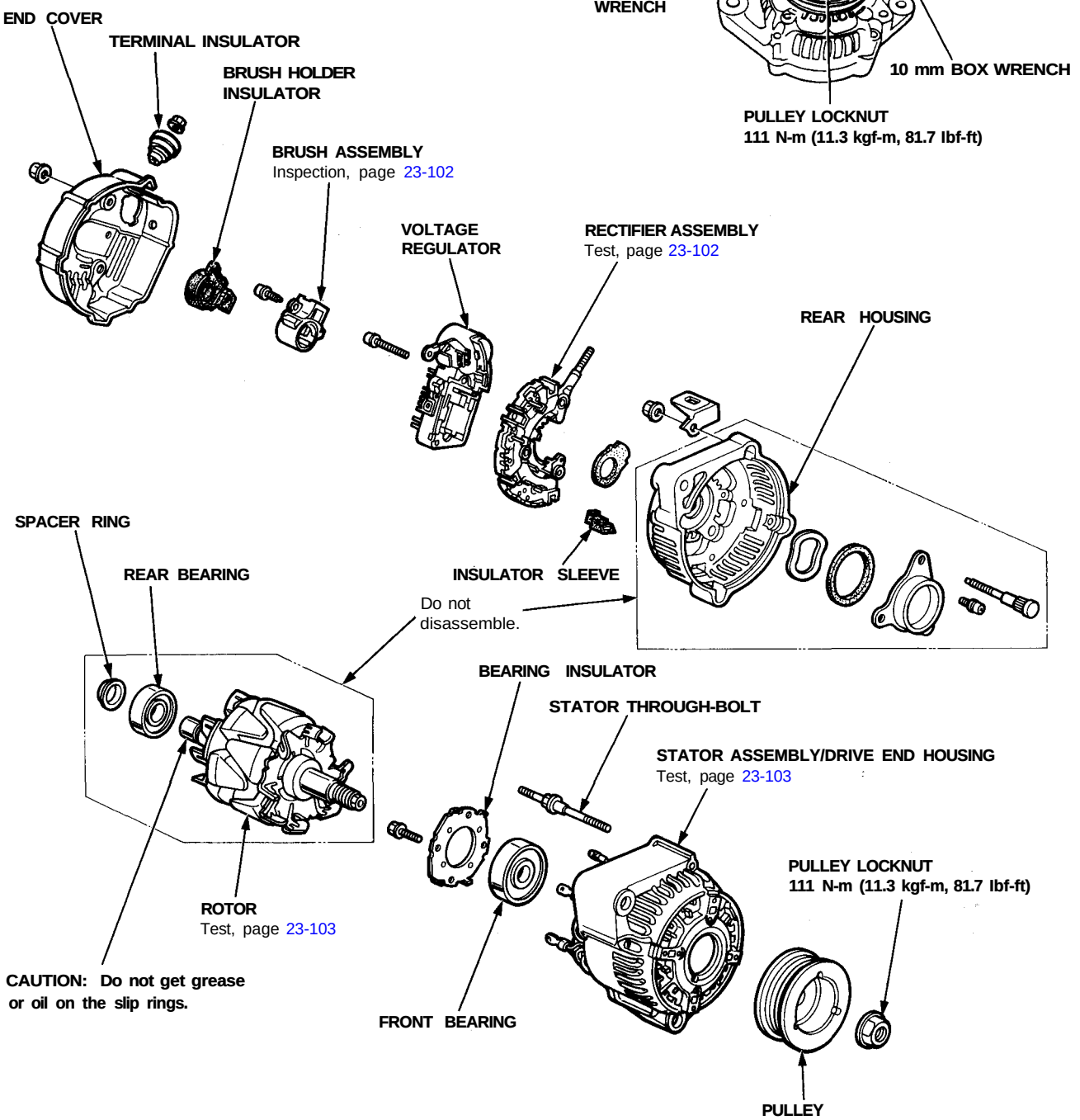
6. Remove the belt from the alternator.
7. Remove the adjustment lock bolt and the through bolt, then remove the alternator.
8. Install in the reverse order of removal.
9. Adjust the alternator belt tension (see page 23-105).
10. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Alternator Overhaul

NOTE: Do not remove the pulley unless the front bearing needs replacement.

To loosen the pulley locknut, use the tools as shown. If necessary, use an impact wrench.



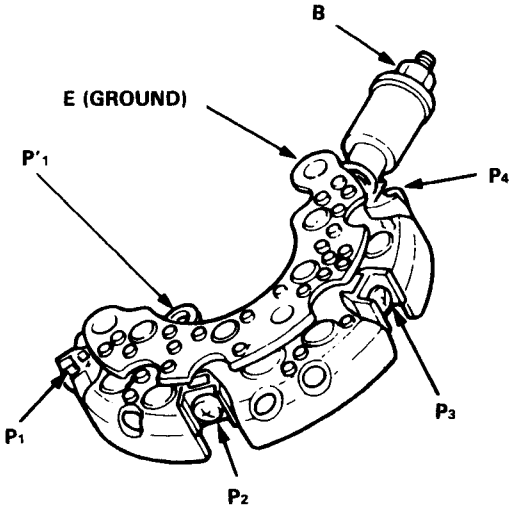


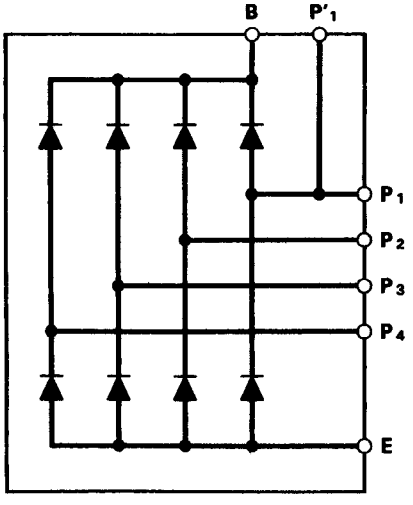
Charging System

Rectifier Test

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes (four pairs), each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 16 checks.

1. Check for continuity in each direction, between the B and P, and between the E (ground) and P terminals of each diode pair. All diodes should have continuity in only one direction.





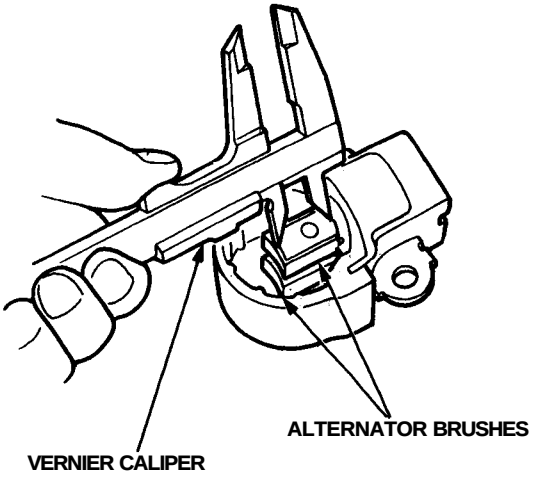
2. If any of the eight diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

Alternator Brush Inspection

1. Remove the end cover, then take out the brush holder by removing its two screws.

2. Measure the length of the brushes with a vernier caliper.

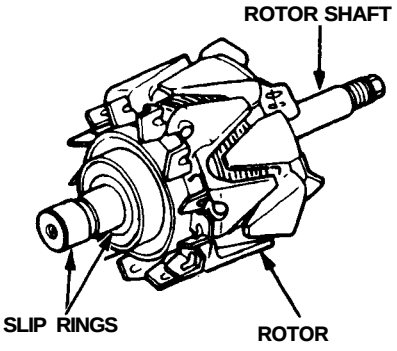
Alternator Brush Length:
Standard: 10.5 mm (0.41 in)
Service Limit: 1.5 mm (0.06 in)



If the brushes are less than the service limit, replace the alternator brush assembly.

Rotor Slip Ring Test

1. Check the resistance between the slip rings.
   There should be 1.8 - 3.0 ohms.
   - If resistance meets the specification, go to step 2.
   - If resistance does not meet the specification, replace the alternator.

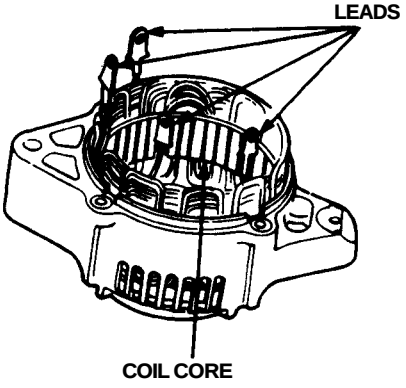


2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.

3. If the rotor fails either continuity check, replace the alternator.

Stator Test

1. Check that there is continuity between each pair of leads.



2. Check that there is no continuity between each lead and the coil core.

3. If the coil fails either continuity check, replace the alternator.

Charging System

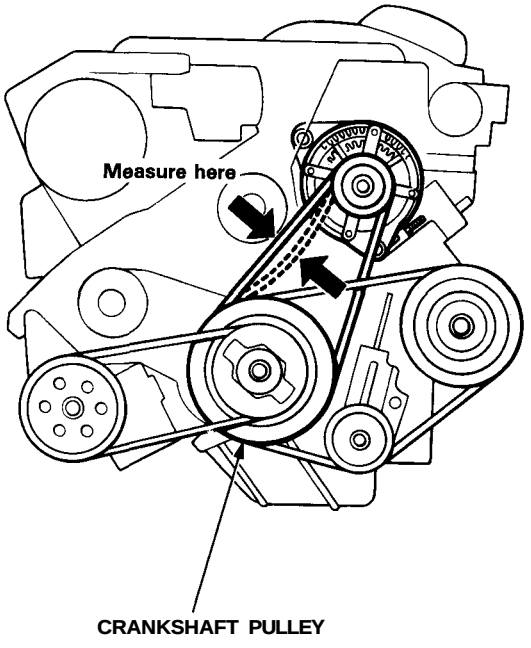
Alternator Belt Inspection and Adjustment

Deflection Method:

Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and the crankshaft pulley.

Deflection: 9.0 - 11.5 mm (0.35 - 0.45 in)

NOTE: On a brand-new belt (one that has been run for less than five minutes), the deflection should be 5.5 - 7.0 mm (0.22 - 0.28 in) when first measured. If the belt is worn or damaged, replace it.

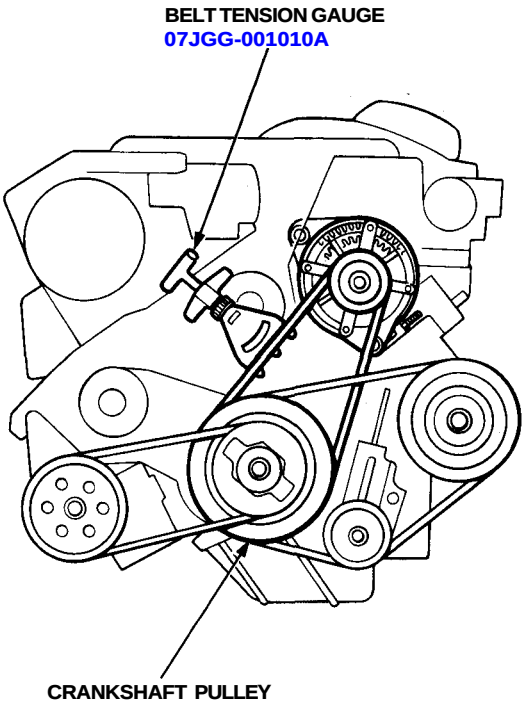


Belt Tension Gauge Method:

Following the gauge manufacturer's instructions, attach the special tool to the belt, and measure the tension.

Tension: 390 - 540 N (40 - 55 kgf, 88 - 121 lbf)

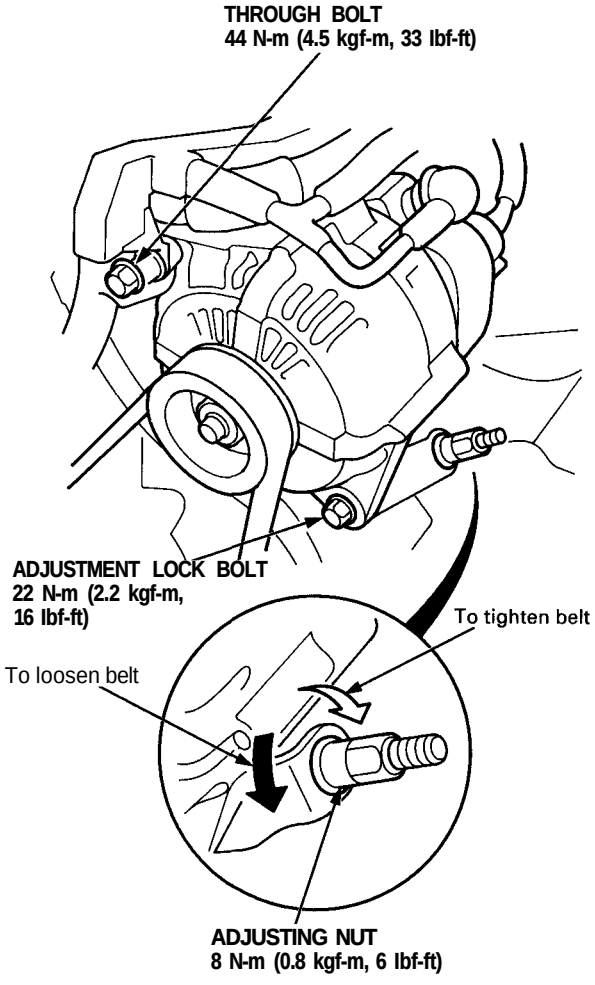
NOTE: On a brand-new belt, (one that has been run for less than five minutes), the tension should be 830 - 1030 N (85 - 105 kgf, 187 - 231 lbf) when first measured. If the belt is worn or damaged, replace it.



If adjustment is necessary:

1. Loosen the through bolt and the adjusting lock bolt.

2. Move the alternator by turning the adjusting nut to obtain the proper belt tension, then retighten the bolts.

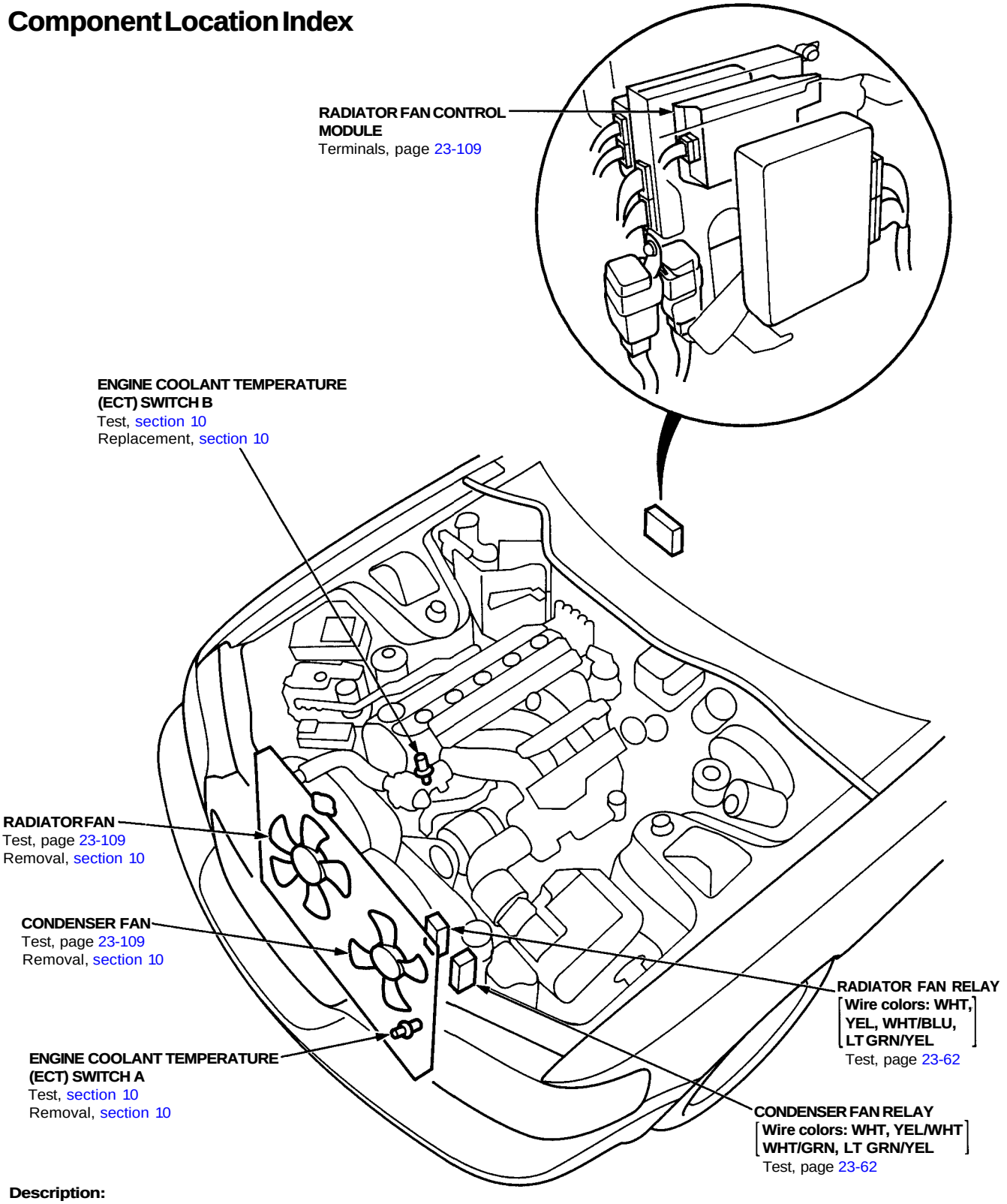


3. Recheck the deflection or tension of the belt.

NOTE: For the power steering pump belt and A/C compressor belt adjustments, refer to section 17 and section 22.

Fan Controls

Component Location Index



Description:

Radiator Fan Control System

When the engine coolant temperature (ECT) is above approximately 207°F (97°C) after the engine has stopped, the radiator fan will run for about 15 minutes.

The engine coolant temperature (ECT) switch B is on the thermostat cover, and the radiator fan control module is located under the right side of the dash.

Fan Controls

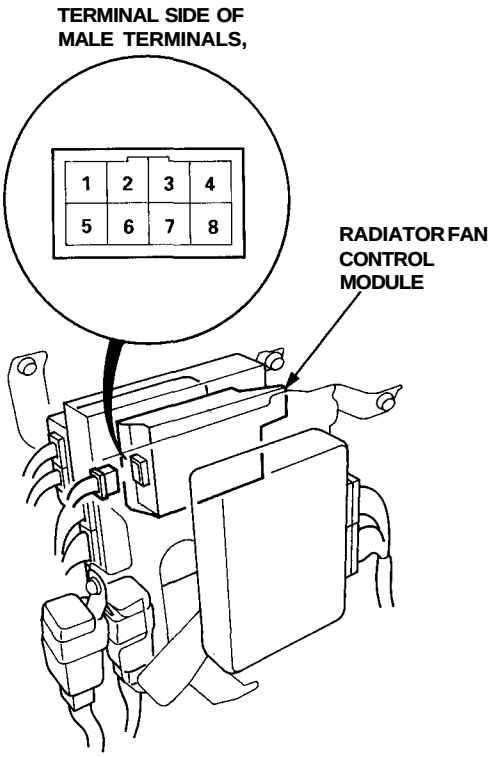
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 34 (20 A) or No. 38 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 39 (10 A) fuse (In the under-hood fuse/relay box)	Blown No. 4 (15 A)*1 or (20 A)*2 fuse (In the under-dash fuse/relay box)	Blown No. 8 (7.5 A) fuse (In the under-dash fuse/relay box)	Radiator fan or condenser fan relay	Radiator fan or condenser fan motor	Engine coolant temperature (ECT) switch A	Engine coolant temperature (ECT) switch B	Faulty radiator fan control module	A/C system	Poor ground	Open circuit, loose or disconnected terminals
Only one fan operates (with engine and A/C ON).		1				2	3					G301	WHT[1], WHT[2], WHT/BLU, WHT/GRN[2], YEL[1], YEL/WHT, or LT GRN/YEL
Fans do not rotate.	Under all conditions				1			2				G301	YEL/BLK, LT GRN/YEL or YEL[2]
	A/C ON										1		
Radiator fan control module fails to function properly.			1	2					3	4		G101 G401 G404	WHT/GRN[1], BLK/YEL[1], WHT/GRN[2] or BLK/YEL[2]

*1: '95 – 96 models
*2: '97 – 98 models

Radiator Fan Control Module Terminals

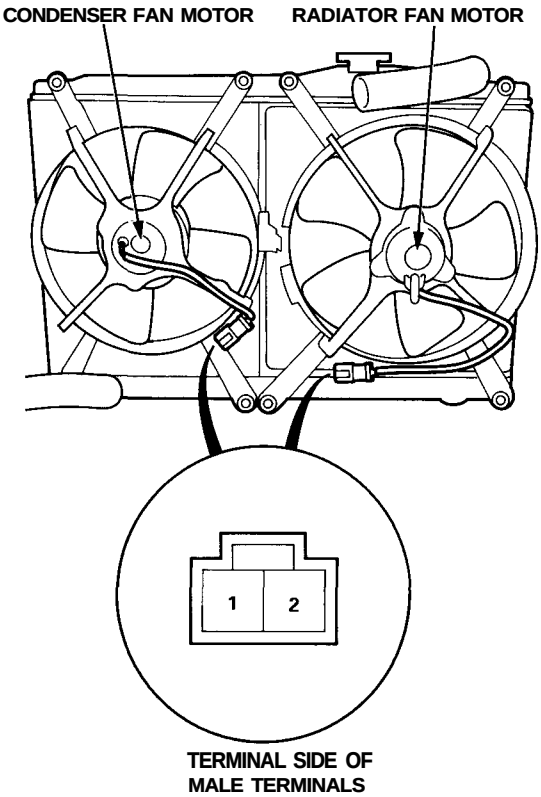


NOTE: See section 22 for the input test.

Terminal	Wire	Connects to
1	YEL[1]	Radiator fan relay (Coil ⊕)
2	YEL/BLK	Power supply [For radiator fan and condenser fan relays via radiator fan control module with ignition switch ON (II)]
3	YEL/WHT	Condenser fan relay (Coil ⊕)
4	BLK	Ground (G401, G404)
5	WHT/GRN[2]	Engine coolant temperature (ECT) switch B
6	WHT/GRN[1]	Power supply (For radiator fan control module with ignition switch OFF)
7	BLK/YEL[1]	IG1 (Control module reset signal)
8	LT GRN/YEL	Radiator fan and condenser fan relays (Coil ⊖)

Fan Motor Test

1. Disconnect the 2P connector from each fan motor.

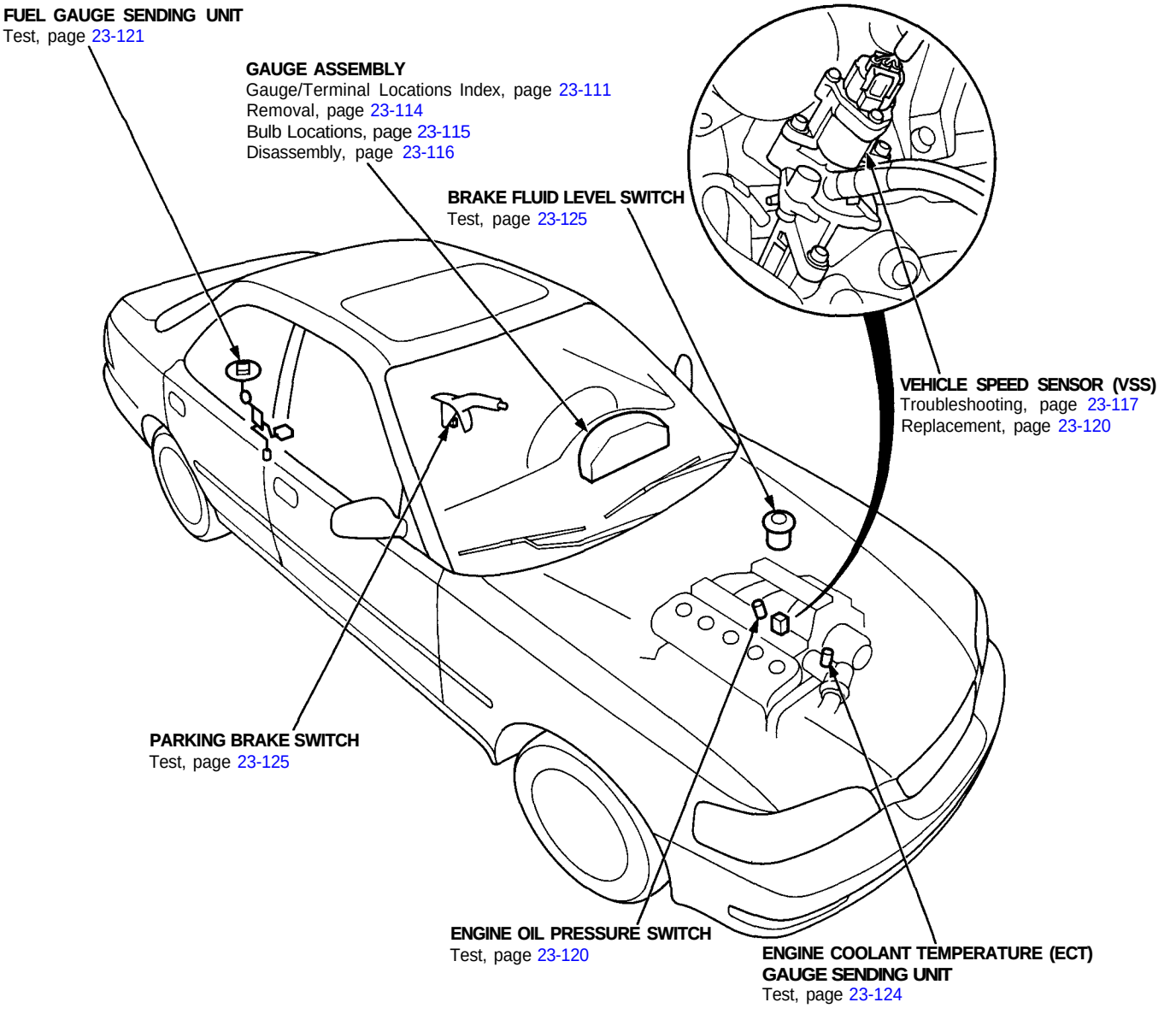


2. Test the motor by connecting battery power to the No. 2 terminal and ground to the No. 1 terminal.

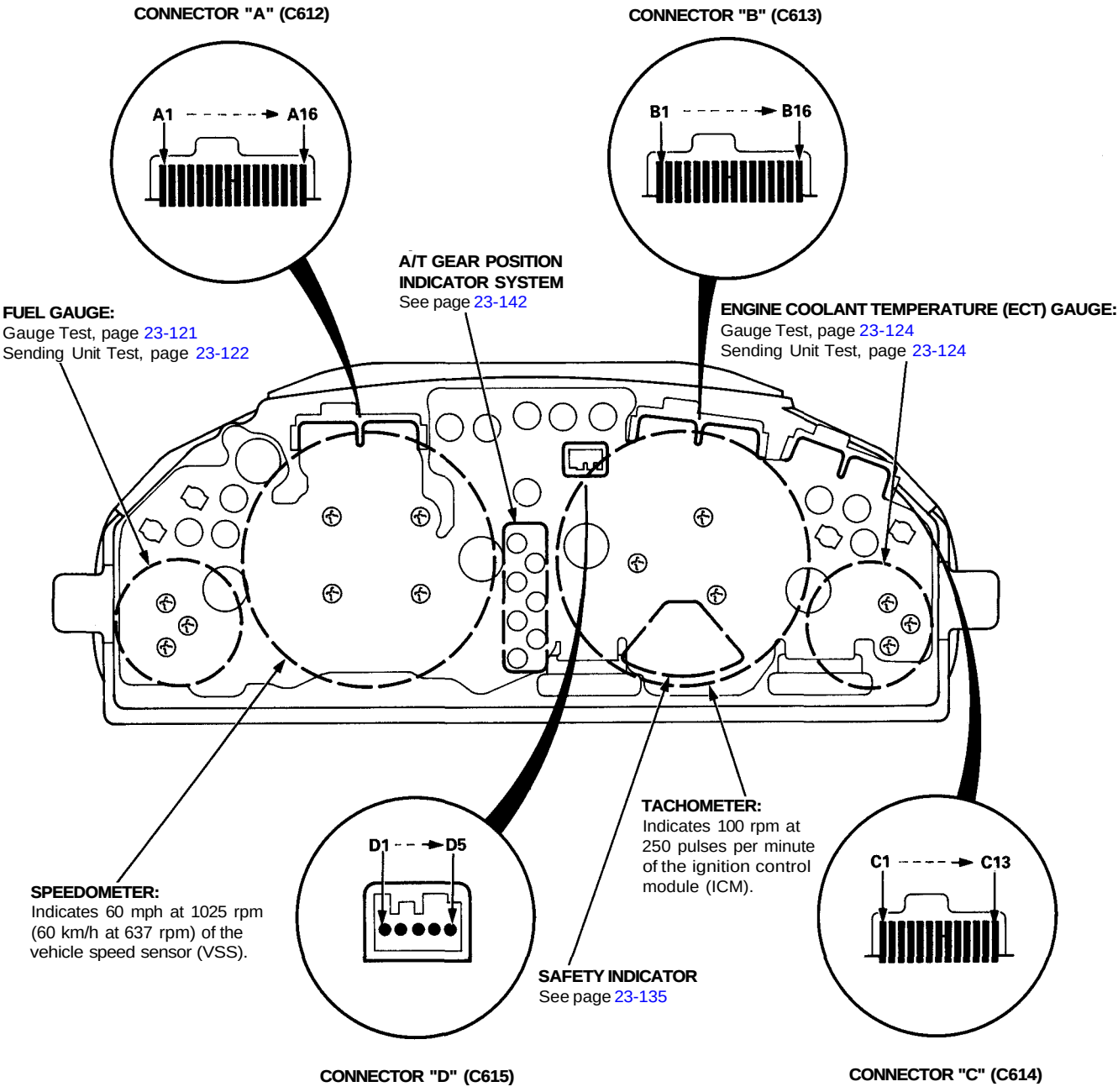
3. If the motor fails to run or does not run smoothly, replace it.

Gauge Assembly

Component Location Index



Gauge/Terminal Location Index



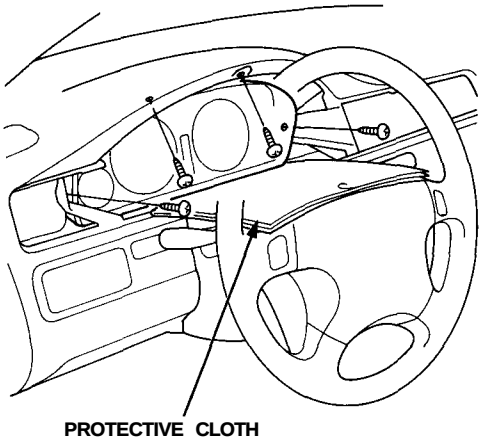
Gauge Assembly

Removal

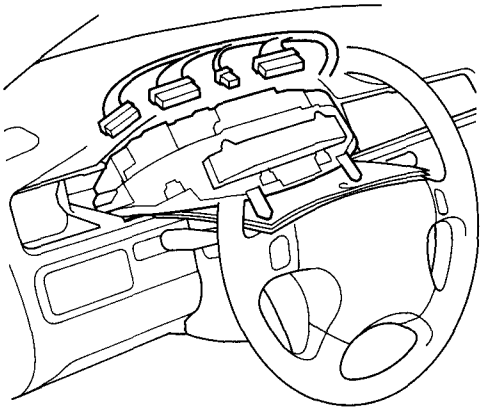
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the instrument panel (see section 20).

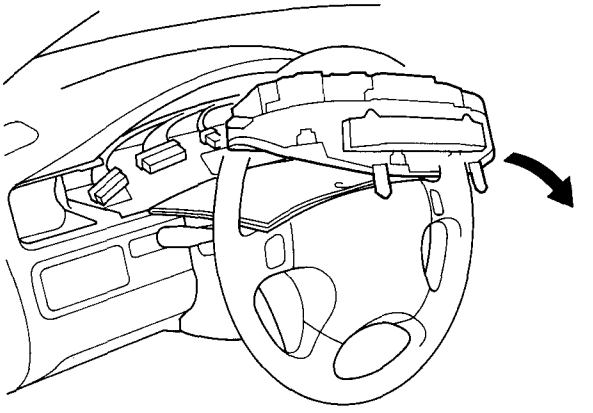
2. Remove the four screws from the gauge assembly, and spread *a* protective cloth on the upper column cover.



3. Pry the gauge assembly out, and disconnect the connectors.

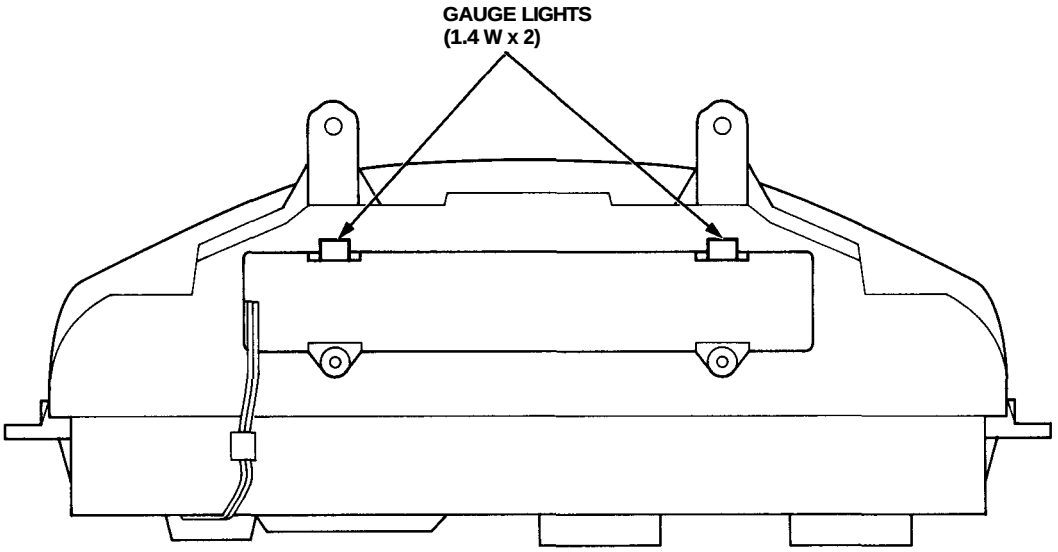


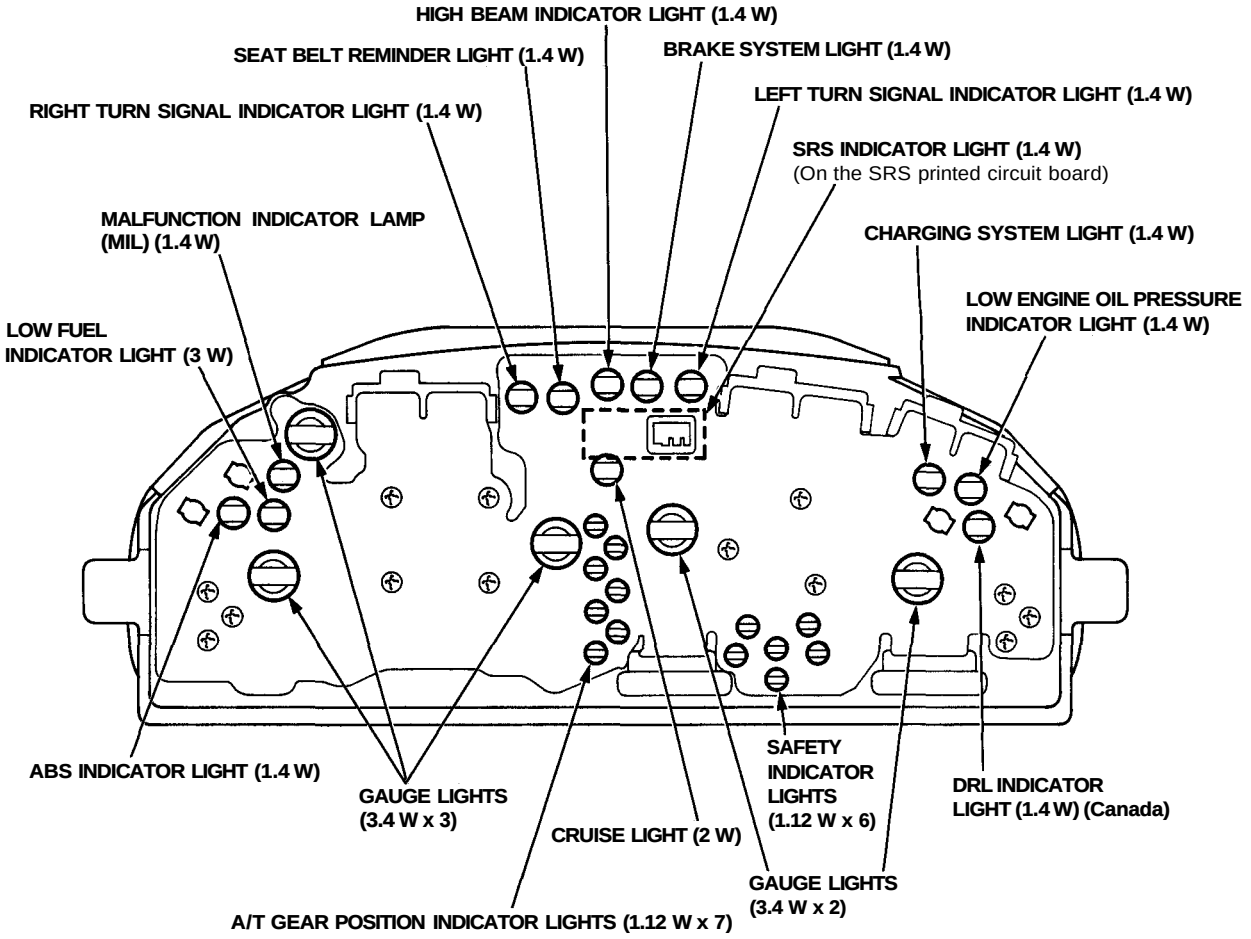
4. Carefully remove the gauge assembly.



5. Install in the reverse order of removal.

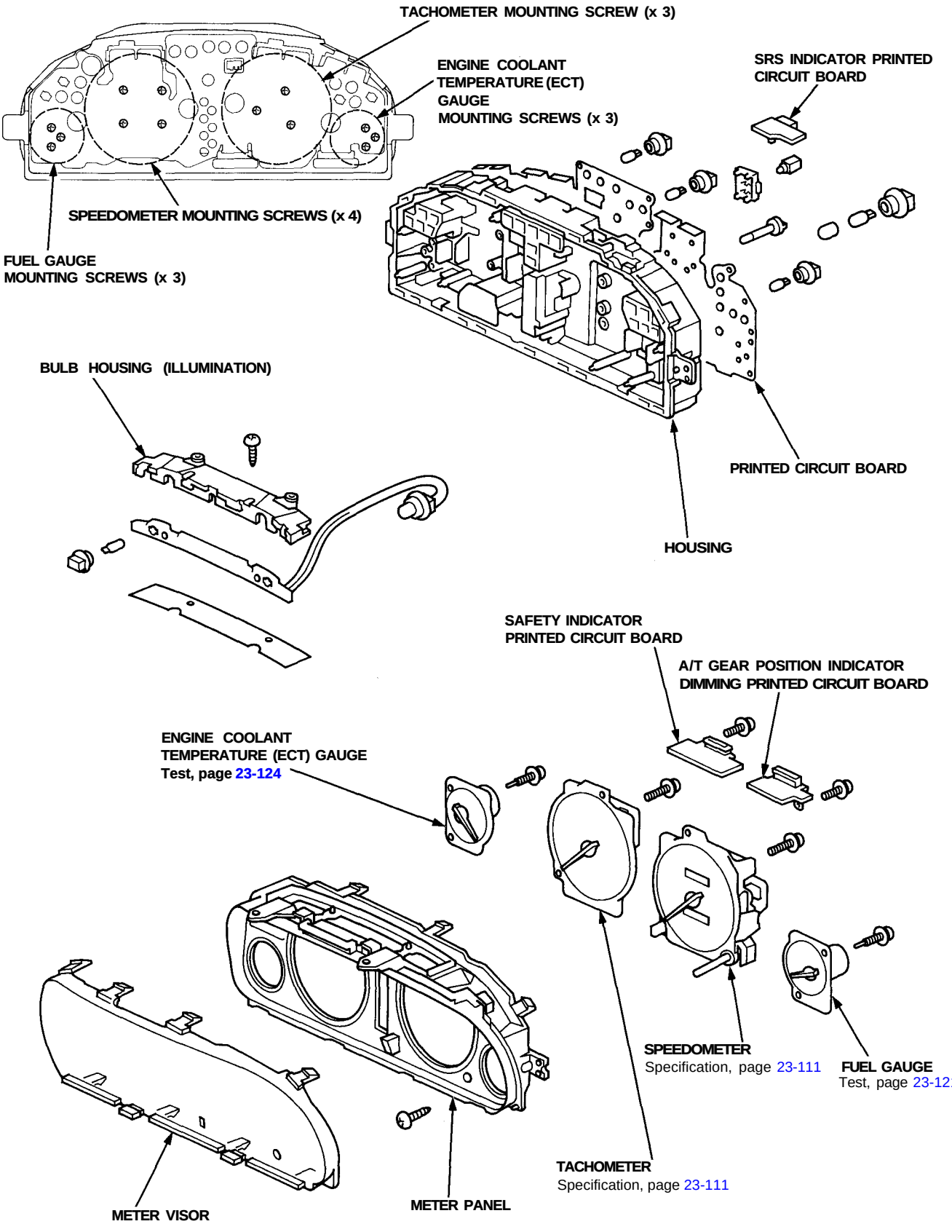
Bulb Locations





Gauge Assembly

Disassembly



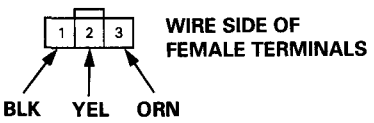
Speedometer/Trip Meter/Odometer

Troubleshooting

NOTE:
- The numbers in the table show the troubleshooting sequence.
- If necessary, replace the speedometer, trip meter, and odometer as a unit.

Symptom \ Item to be inspected	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Speedometer	Trip meter/odometer	Main printed circuit film	Vehicle speed sensor (VSS) troubleshooting
Trip meter and odometer work, but speedometer does not.		1		2	
Speedometer works, but trip meter and odometer do not.			1	2	
Speedometer, trip meter, and odometer do not work.	1				2

VSS Input Test



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G101) • An open in the wire
2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Short to ground • An open in the wire
3	ORN	Ignition switch ON (II)	Check for voltage to ground: There should be about 5 V or more.	• Short to ground • An open in the wire

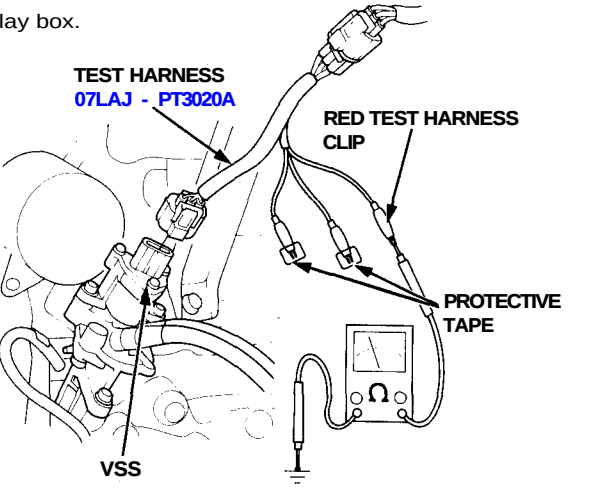
NOTE: A short to ground in the ORN wire can be caused by a short in any component connected to it.

Vehicle Speed Sensor (VSS)

Troubleshooting

Speedometer, trip meter, and odometer do not work.
Before testing, inspect the No. 1 (10 A) fuse in the under-dash fuse/relay box.

Test the BLK wire:
1. Disconnect the 3P connector from the vehicle speed sensor (VSS).
2. Connect the test harness only to the engine wire harness.
3. Connect the RED test harness clip to the positive probe of an ohmmeter.
4. Check for continuity between the RED test harness clip and body ground.

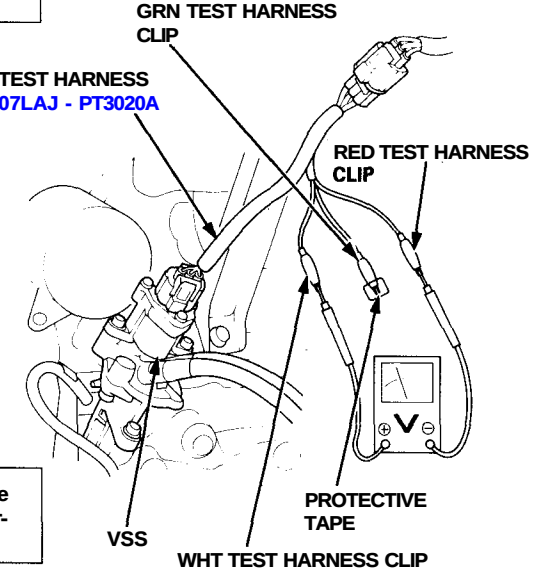


Is there continuity?

NO → **Repair open in the BLK wire between the VSS and G101.**

YES

Test the YEL wire:
1. Connect the other test harness connector to the VSS.
2. Connect the WHT test harness clip to the positive probe of a voltmeter, and connect the RED test harness clip to the negative probe.
3. Turn the ignition switch ON (II).



Is there battery voltage?

NO → **Repair open in the YEL wire between the VSS and the under-dash fuse/relay box.**

YES

A

(To page 23-119)

(From page 23-118)

A

Test the ORN wire:
Connect the GRN test harness clip to the positive probe of a voltmeter, and connect the RED test harness clip to the negative probe.

Is there about 5 V or more?

NO → **Repair open or short in the ORN wire between the VSS and ECM, transmission control module (TCM), and cruise control unit.**

YES

Test the VSS:
1. Turn the ignition switch OFF.
2. Raise the front of the car, and support it with safety stands.
3. Put the car in neutral with the ignition switch ON (II).
4. Slowly rotate one wheel with the other wheel blocked.

Does voltage pulse from 0 to approx. 5 V or more?

NO → **Replace the VSS (see page 23-120).**

YES

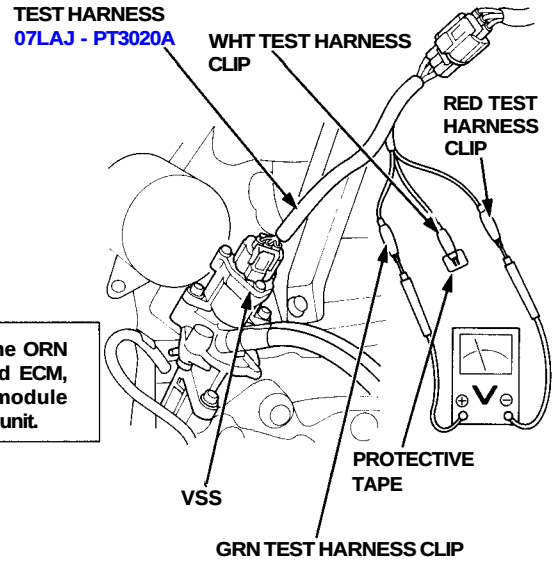
Test the Speedometer:
1. Disconnect the 16P connector "A" (C612) from the gauge assembly.
2. Connect a voltmeter between the ORN wire, and body ground.
3. Slowly rotate one wheel with the other wheel blocked.

Does the meter indicate pulsing voltage (0 to approx. 5 V or more)?

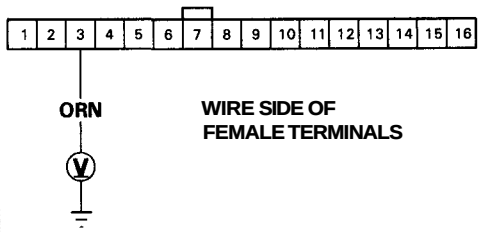
NO → **Repair open in the ORN wire between the VSS and the speedometer.**

YES

Replace the speedometer.



GAUGE ASSEMBLY 16P CONNECTOR "A" (C612)

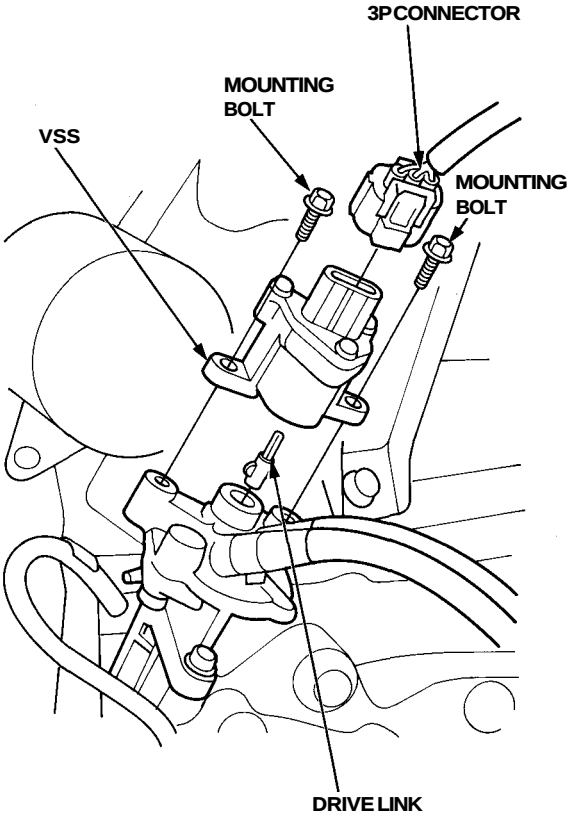


Vehicle Speed Sensor (VSS)

Replacement

1. Disconnect the 3P connector from the vehicle speed sensor (VSS).
2. Remove the two mounting bolts, then remove the VSS.

   NOTE: The VSS drive link is a very small part; be careful not to lose it.

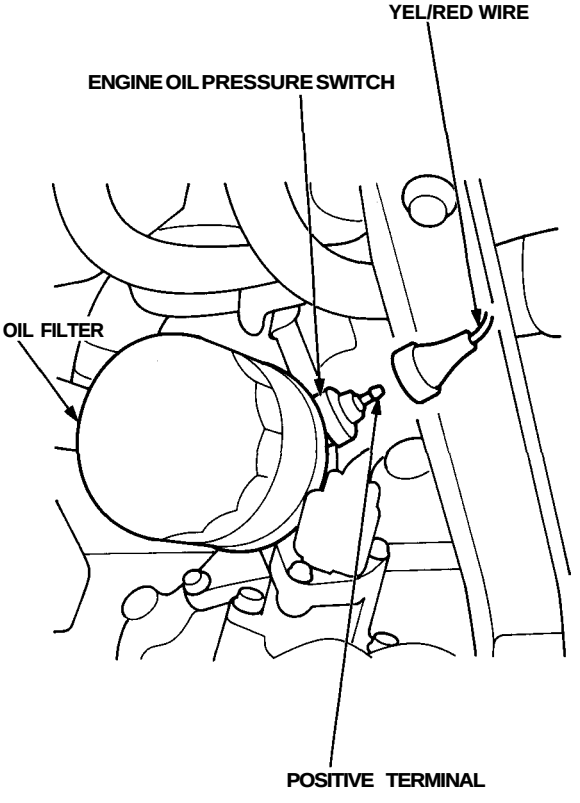


3. Install in the reverse order of removal.

Engine Low Oil Pressure Indicator System

Switch Test

1. Remove the YEL/RED wire from the engine oil pressure switch.
2. Check for continuity between the positive terminal and the engine (ground).
   - There should be continuity with the engine stopped.
   - There should be no continuity when the engine runs.

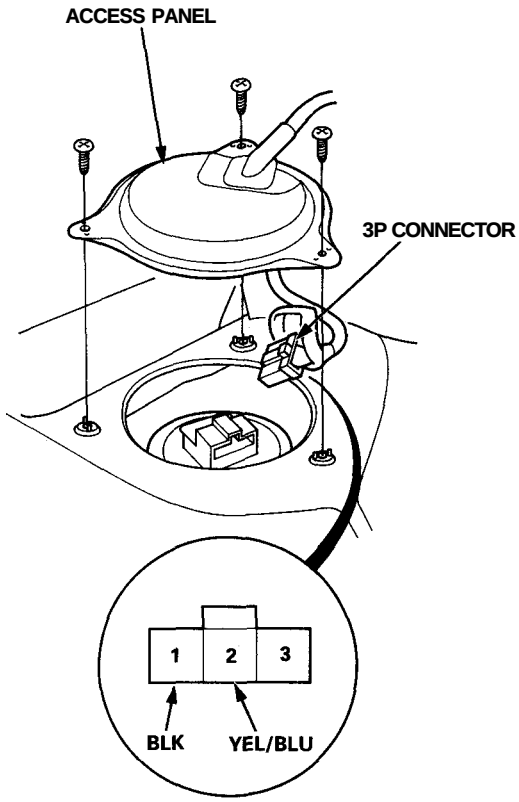


3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure and, if necessary, inspect the oil pump (see section 8).

Fuel Gauge

Gauge Test

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Remove the access panel from the floor.
3. Disconnect the 3P connector from the fuel gauge sending unit.



WIRE SIDE OF FEMALE TERMINALS

4. Connect the voltmeter positive probe to the No. 2 terminal and the negative probe to the No. 1 terminal, then turn the ignition switch ON (II).
   There should be between 5 and 8 V.

   - If the voltage is as specified, go to step 5.
   - If the voltage is not as specified, check for:
     — an open in the YEL/BLU or BLK wire.
     — poor ground (G701).

5. Turn the ignition switch OFF.
6. Attach a jumper wire between the No. 1 and No. 2 terminals, then turn the ignition switch ON (II).
7. Check that the pointer of the fuel gauge starts moving toward the "F" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "F" on the gauge dial. Failure to do so may damage the fuel gauge.

   NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

   - If the pointer of the fuel gauge does not move at all, replace the gauge.
   - If the gauge is OK, inspect the fuel gauge sending unit.

Fuel Gauge

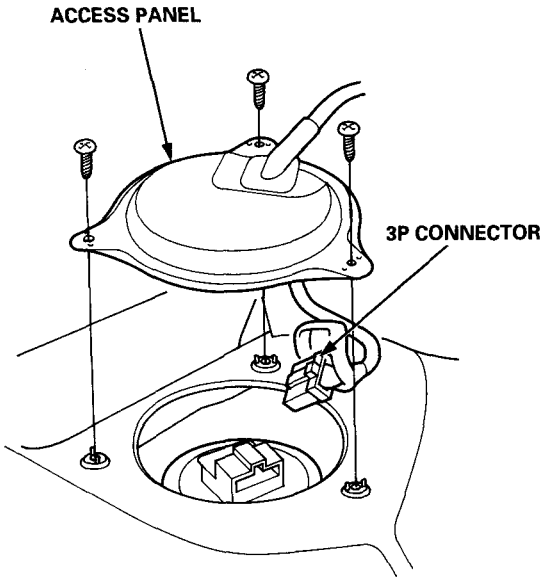
Sending Unit Test

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from your work area.

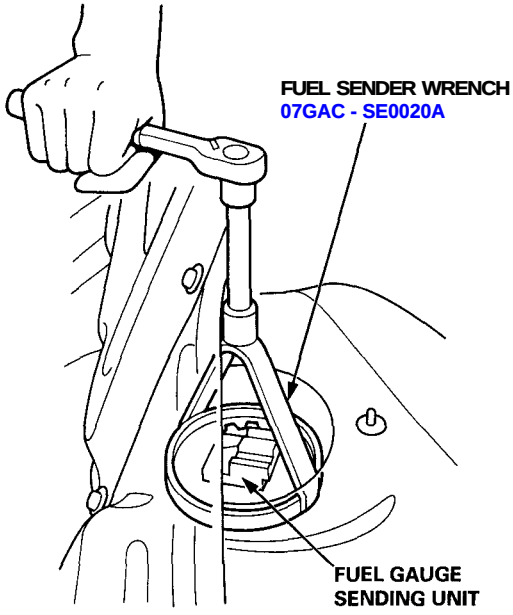
1. Remove the rear seat, trunk front trim, and carpet (see section 20).

2. Remove the fuel tank access panel.

3. With the ignition switch OFF, disconnect the 3P connector from the fuel gauge sending unit.

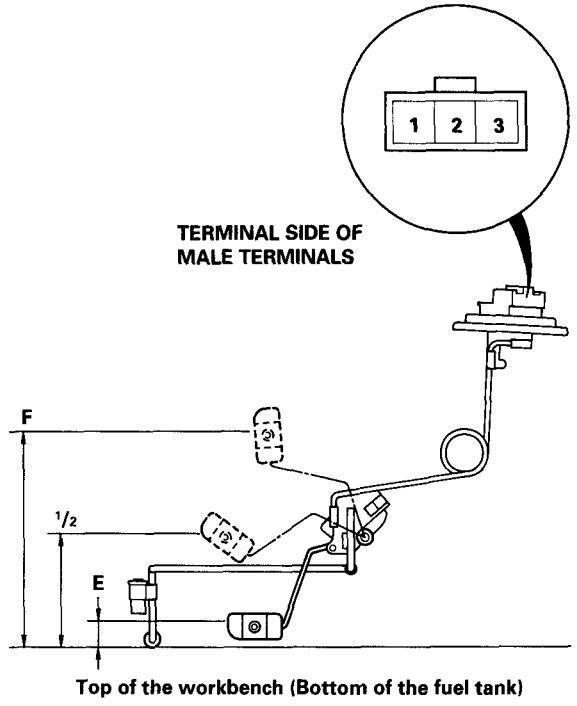


4. Remove the fuel gauge sending unit using the special tool as shown.



5. Measure the resistance between the No. 1 and No. 2 terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105 – 108	29.5 – 35.5	3.5 – 5



If you do not get the above readings, replace the fuel gauge sending unit.

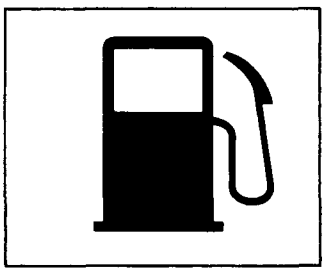
Low Fuel Indicator System

Indicator Light Test

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Park the car on level ground.

⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from the work area. Drain fuel only into an approved container.

3. Drain the fuel into an approved container. Then install the drain bolt with a new washer.
4. Add less than 8.5 ℓ (2.2 U.S.Gal, 1.8 Imp. Gal) of fuel, and turn the ignition switch ON (II). The low fuel indicator light should come on within four minutes.

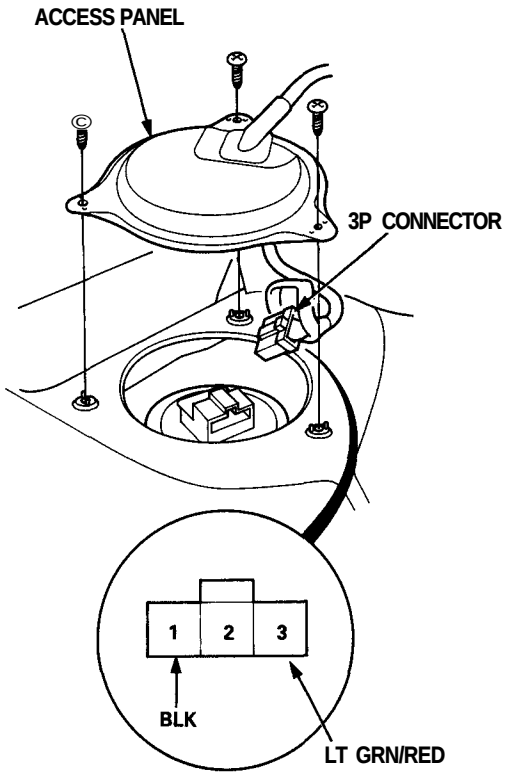


LOW FUEL INDICATOR LIGHT

- If the light comes on within four minutes, go to step 7.
- If the light does not come on within four minutes, go to step 5.

5. Remove the fuel tank access panel from the floor, and disconnect the 3P connector from the fuel gauge sending unit.
6. Connect the No. 1 and No. 3 terminals with a jumper wire.

- If the light comes on, check the sending unit.
- If the light does not come on, check for:
  — an open in the LT GRN/RED wire between the fuel unit and fuel gauge assembly.
  — blown bulb.
  — poor ground (G701).



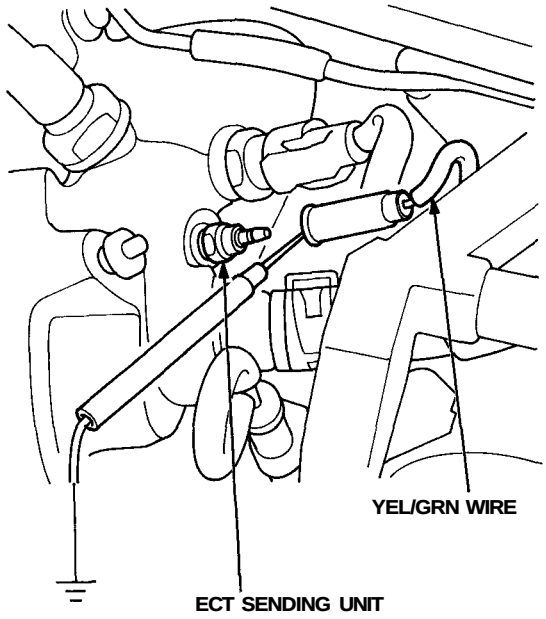
WIRE SIDE OF FEMALE TERMINALS

7. Add 4 ℓ of fuel (1.1 U.S. Gal, 0.9 Imp.Gal). The light should go off within four minutes.

Engine Coolant Temperature (ECT) Gauge

Gauge Test

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the ECT sending unit, and ground it with a jumper wire.



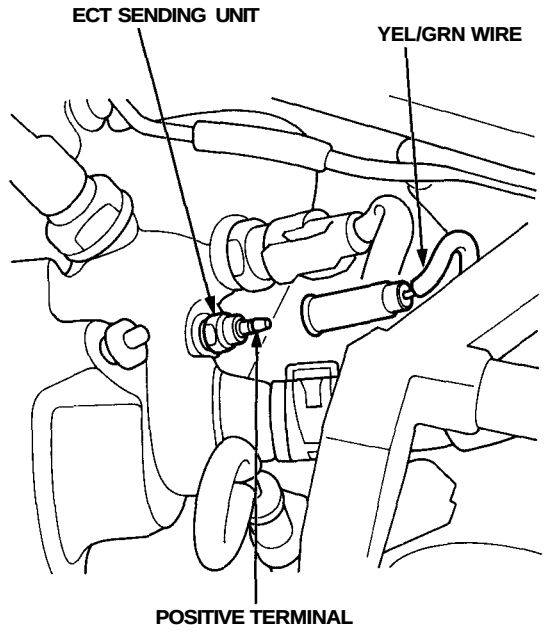
3. Turn the ignition switch ON (II). Check that the pointer of the ECT gauge starts moving toward the "H" mark.

CAUTION: Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.

- If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire. If the wires are OK, replace the ECT gauge.
- If the ECT gauge works, test the ECT sending unit.

ECT Sending Unit Test

1. Disconnect the YEL/GRN wire from the ECT sending unit.



2. Using an ohmmeter, measure the change in resistance between the positive terminal and the engine (ground) with the engine cold and with the engine at operating temperature.

Temperature	133°F (56°C)	185°F (85°C) – 212°F (100°C)
Resistance (Ω)	137	46 – 30

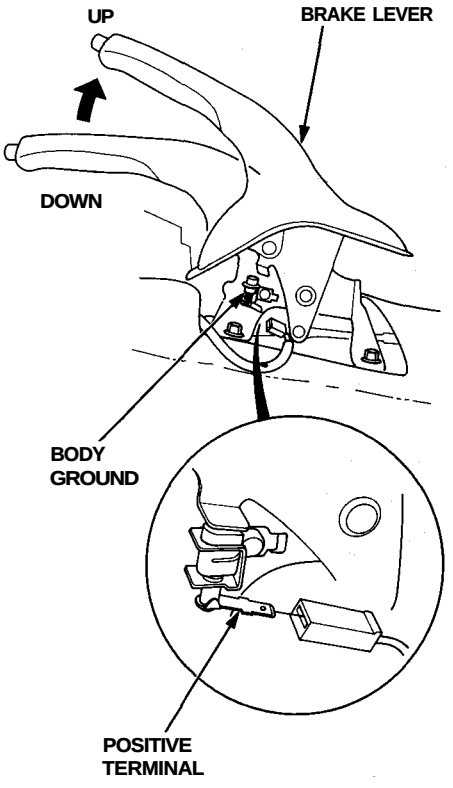
3. If the obtained readings are substantially different from the specifications above, inspect the coolant level and the cooling system. If the cooling system is OK, replace the sending unit.

Brake System Indicator

Parking Brake Switch Test

1. Remove the center console, and disconnect the connector from the switch.
2. Check for continuity between the terminal and body ground in each switch position according to the table.

Terminal / Position	Positive Terminal	Body Ground
BRAKE LEVER UP	○	○
BRAKE LEVER DOWN		

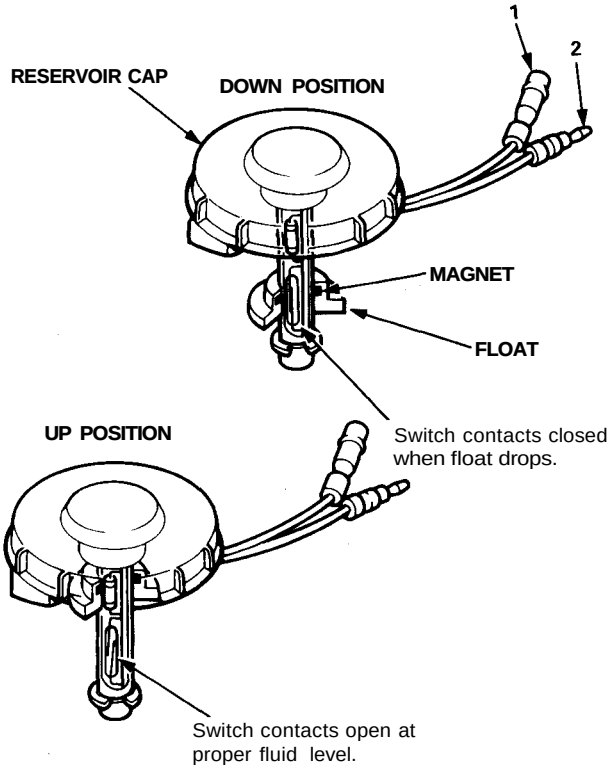


NOTE (Canada): If the parking brake switch is OK, but the brake system indicator does not function, perform the input test for the daytime running lights control unit.

Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely; if it doesn't, replace the reservoir cap assembly.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2
FLOAT UP		
FLOAT DOWN	○	○

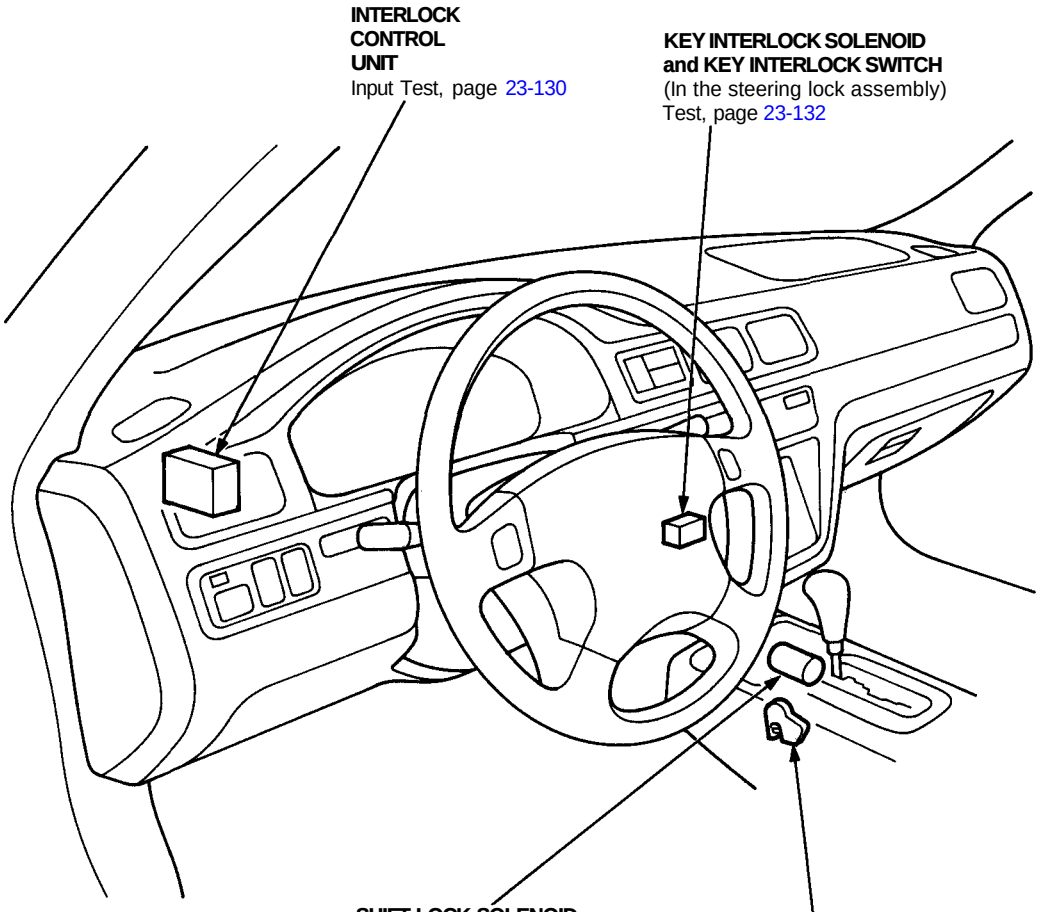


Interlock System

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

A/T GEAR POSITION INDICATOR
See page 23-115
A/T GEAR POSITION SWITCH
Test, page 23-146

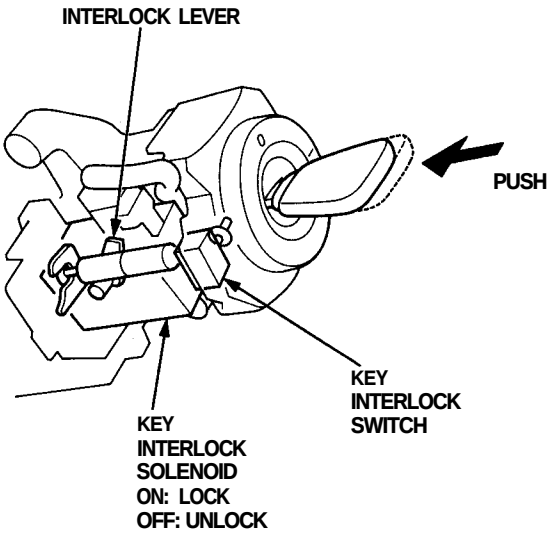


Description

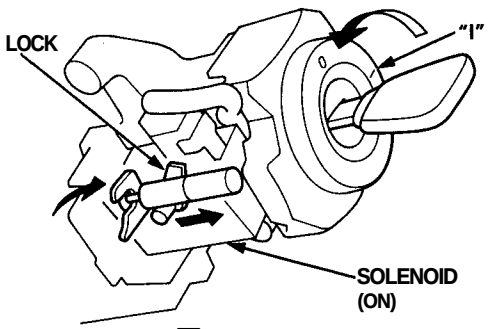
The car is equipped with the following devices to prevent inadvertent shifting:

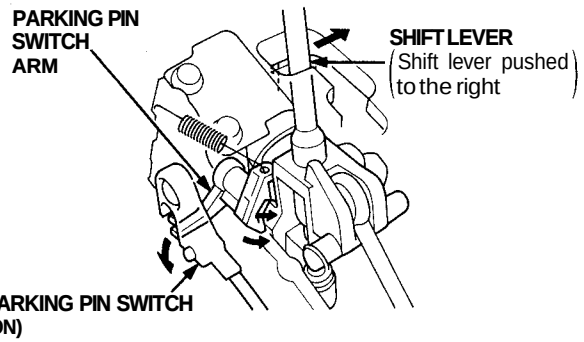
- Key cylinder with interlocked ignition key (Key Interlock System)
- Shift lever with shift lock (Shift Lock System)

Key Interlock System:
When the shift lever is in any other position than [P] or is not securely locked in [P] (parking pin switch is ON), a solenoid is activated, making it impossible to remove the ignition key from the ignition switch.
To be able to remove the key, the shift lever must be in [P] and must be securely locked in this position (parking pin switch must be turned off by the lock pin).

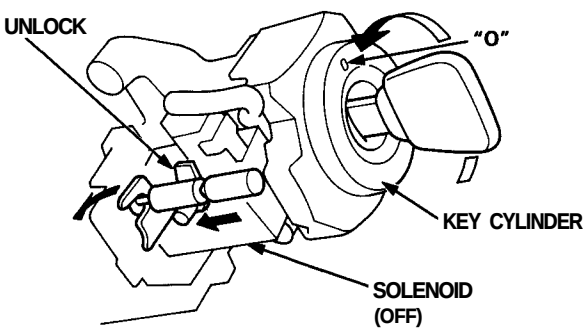


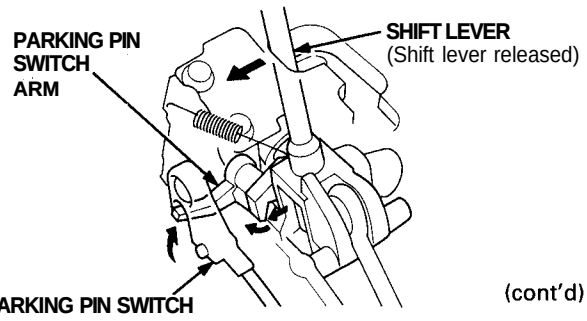
The shift lever is in any other position than [P], and the parking pin switch is ON:





The shift lever is in [P], and the parking pin switch is OFF.





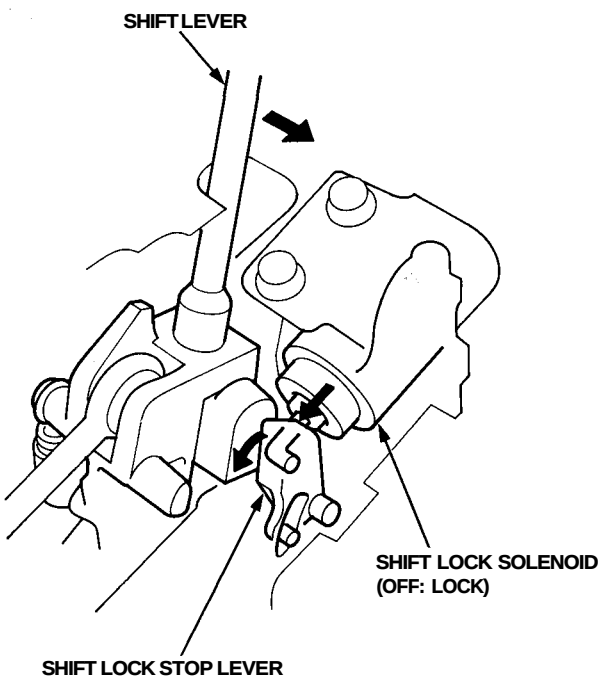
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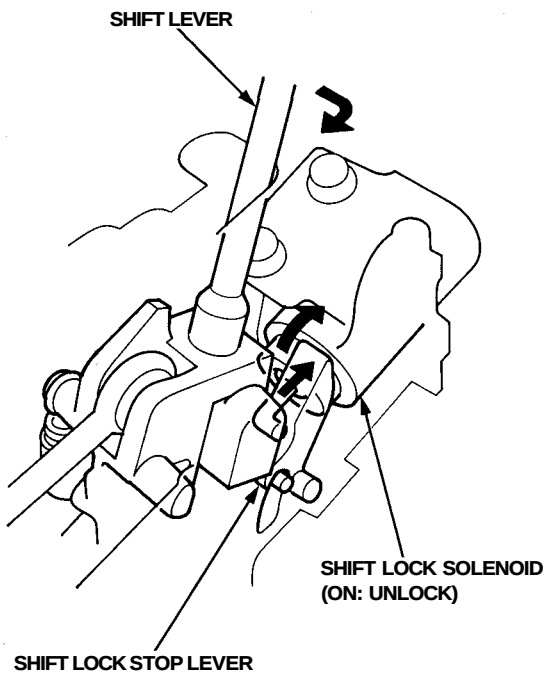
Interlock System

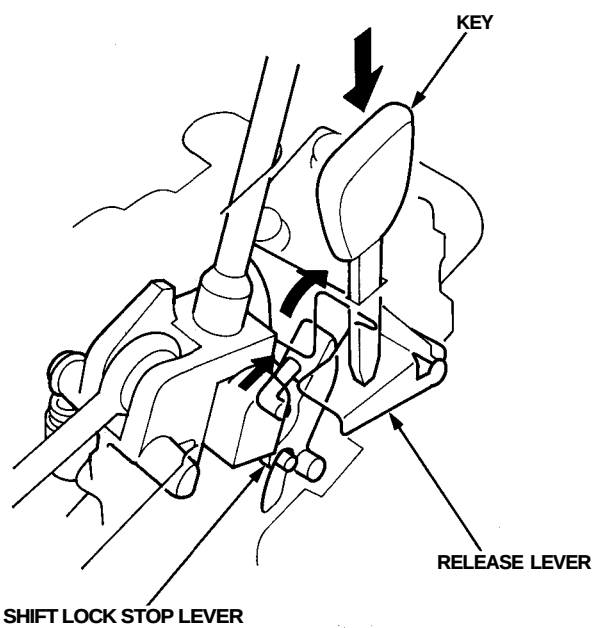
Description (cont'd)

Shift Lock System:
The shift lock system prevents the shift lever from moving to another position than [P] unless you step on the brake pedal and the accelerator is in its rest position.

NOTE:
- The shift lever cannot be shifted when the brake pedal and the accelerator are depressed at the same time.
- In case of system malfunction, the shift lever can be released by pushing a key into the release slot near the shift lever.







Interlock System

Control Unit Input Test

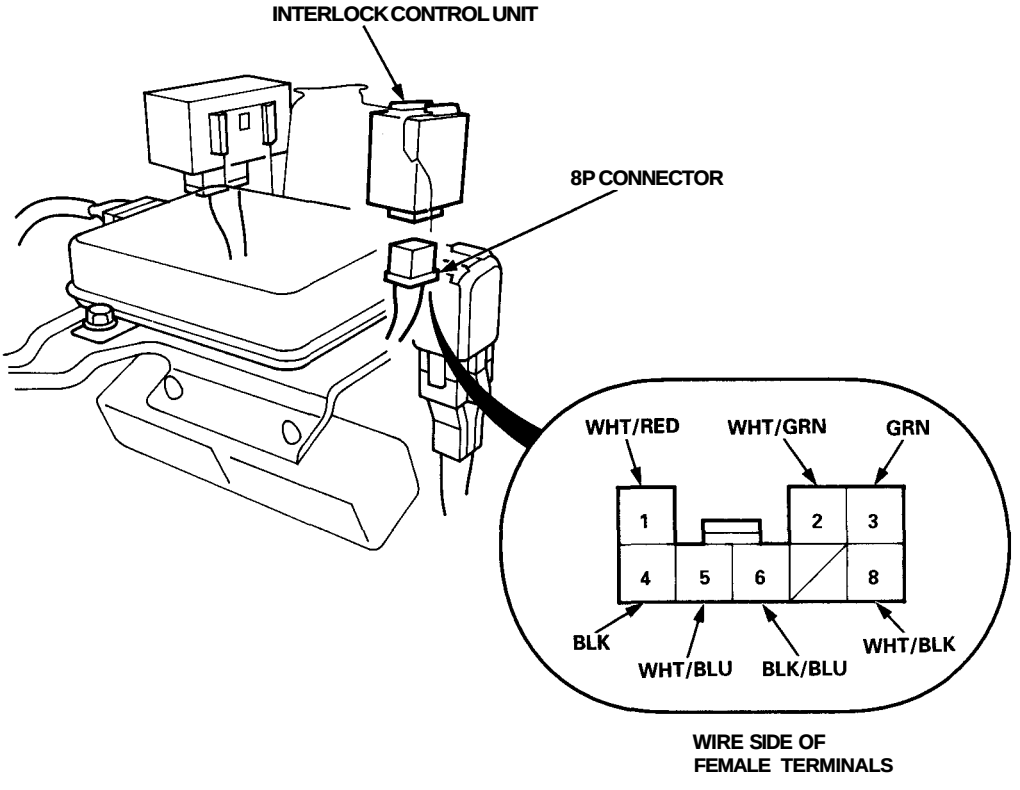
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

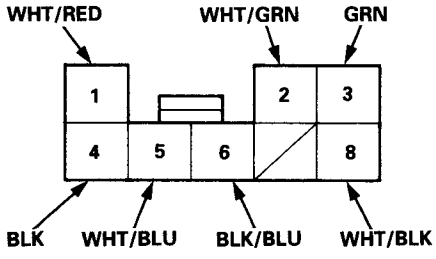
1. Disconnect the 8P connector from the interlock control unit.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

- If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
- If the terminals look OK, make the following input tests at the connector.
  - — If a test indicates a problem, find and correct the cause, then recheck the system.
  - — If all the input tests prove OK, substitute a known-good control unit, and recheck the system. If the check is OK, the control unit must be faulty; replace it.

NOTE: If the shift lock solenoid clicks when the ignition switch is turned ON (II) and you step on the brake pedal (with the shift lever in P), the shift lock system is electronically normal; if the shift lever cannot be shifted from P, test the A/T gear position switch as described on page 23-146, and see section 14.





WIRE SIDE OF FEMALE TERMINALS

Shift Lock System

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
2	WHT/GRN	Ignition switch ON (II) Brake pedal pushed	Check for voltage to ground: There should be about 12 V.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty TCM • Faulty brake switch (see page 23-184) • Faulty throttle position (TP) sensor (see section 11) • An open in the wire
		Ignition switch ON (II) Brake pedal and accelerator pushed at the same time	Check for voltage to ground: There should be 1 V or less.	
3	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty shift lock solenoid • An open in the wire
6	BLK/BLU	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground • An open in the wire

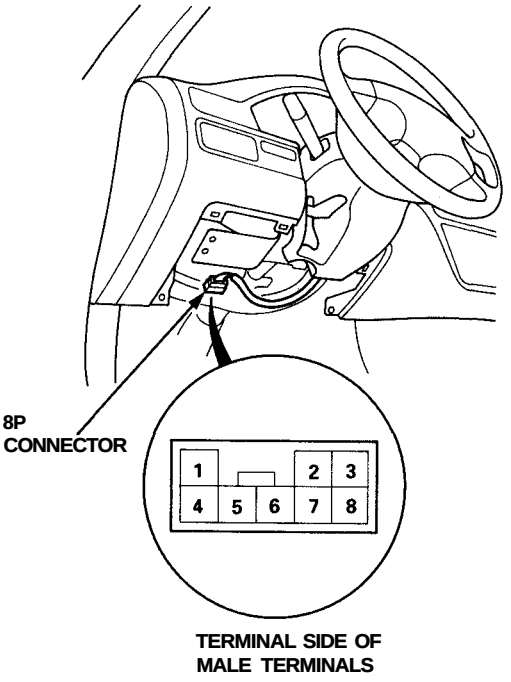
Key Interlock System

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	WHT/RED	Ignition switch turned to ACC (I) and key pushed in	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
5	WHT/BLU			
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
6	BLK/BLU	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground • An open in the wire
8	WHT/BLK	Shift lever in P and pushed to the right	Check for continuity to ground: There should be continuity.	• Faulty parking pin switch • Poor ground (G401, G404) • An open in the wire
		Shift lever in P and released	Check for continuity to ground: There should be no continuity.	• Faulty parking pin switch • Short to ground

Interlock System

Key Interlock Solenoid Test

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Disconnect the 8P connector from the main wire harness.



3. Check for continuity between the terminals in each key position according to the table.

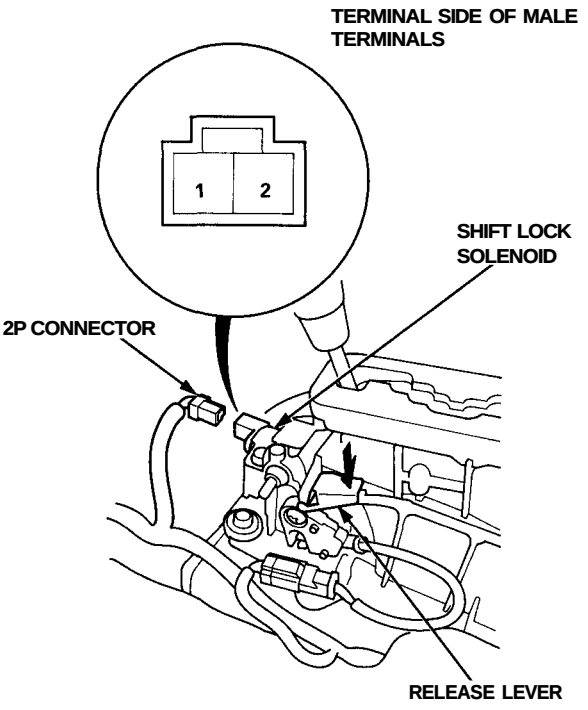
Position		Terminal 5	6	8
Ignition switch ACC (I)	Key pushed in	○	○	○
	Key released	○	○	

4. Check that the key cannot be removed with power and ground connected to the No. 5 and No. 8 terminals.
   - If the key cannot be removed, the key interlock solenoid is OK.
   - If the key can be removed, replace the steering lock assembly (the interlock solenoid is not available separately).

Shift Lock Solenoid Test

1. Remove the center console (see section 20).
2. Disconnect the shift lock solenoid 2P connector.
3. Connect battery power to the No. 1 terminal and to the No. 2 terminal of the solenoid momentarily.

   NOTE:
   - Do not connect power to the No. 2 (-) terminal (reverse polarity) or you will damage the diode inside the solenoid.
   - Make sure there is clearance between the stop pin and base bracket when the solenoid is ON and OFF (see next page).



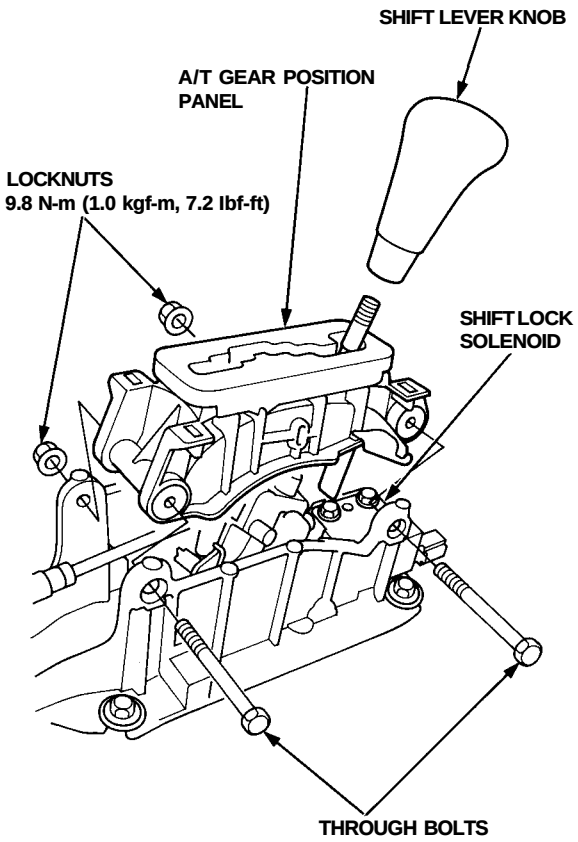
4. Check that the shift lock releases when the release lever is pushed, and check that it locks when the release lever is released.
5. If the solenoid does not work, replace the solenoid.

Shift Lock Solenoid Replacement

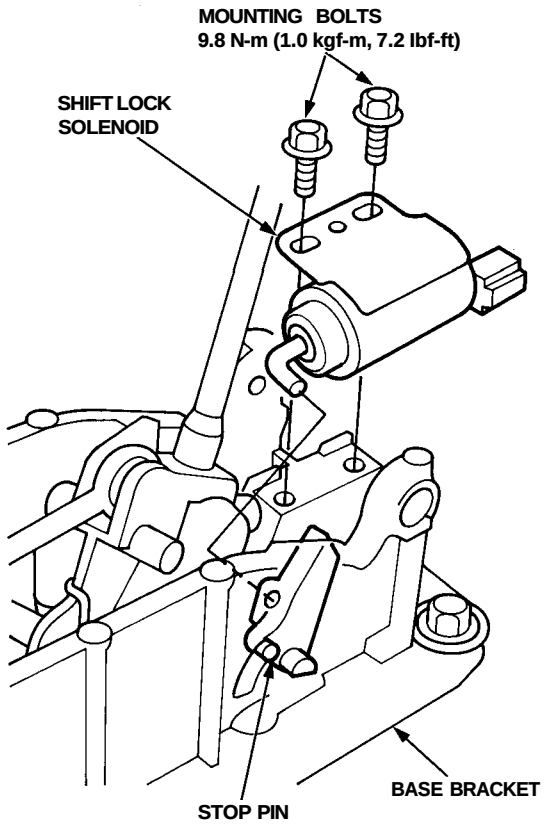
1. Remove the center console and shift lever knob (see section 20).

2. Disconnect the connectors from the shift lock solenoid and parking pin switch.

3. Remove the two locknuts and through bolts, then remove the A/T gear position panel.

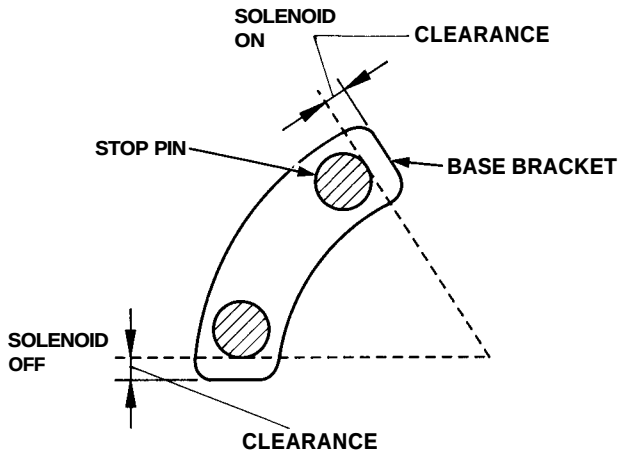


4. Remove the two mounting bolts, then remove the shift lock solenoid.



5. Install the shift lock solenoid in the reverse order of removal.

NOTE: Make sure there is clearance between the stop pin and base bracket when the solenoid is ON and OFF.

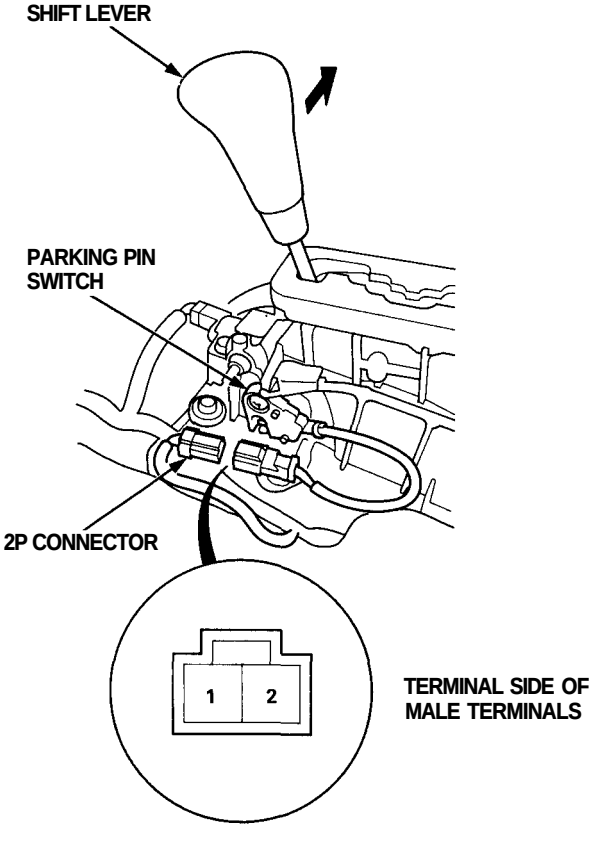


Interlock System

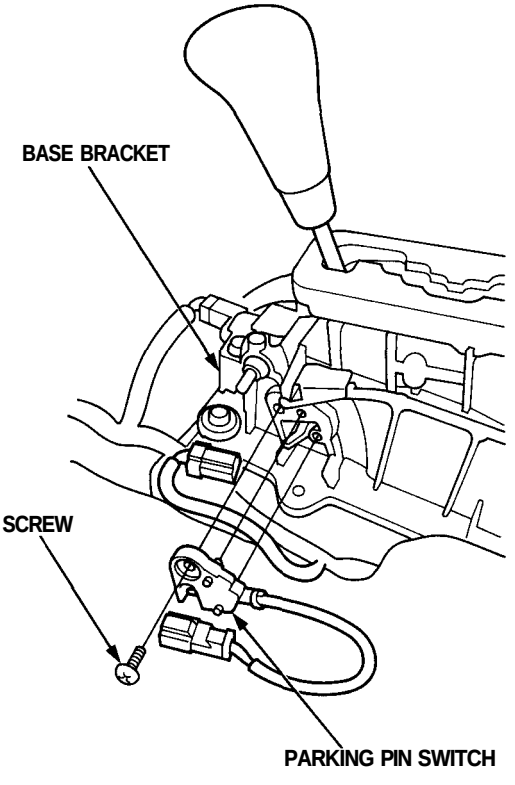
Parking Pin Switch Test/Replacement

1. Remove the center console (see section 20).
2. Disconnect the parking pin switch 2P connector.
3. Check for continuity between the terminals in each switch lever position according to the table.

Position		Terminal 1	Terminal 2
Shift lever in P	Shift lever pushed to the right	○—○	○—○
	Shift lever released		



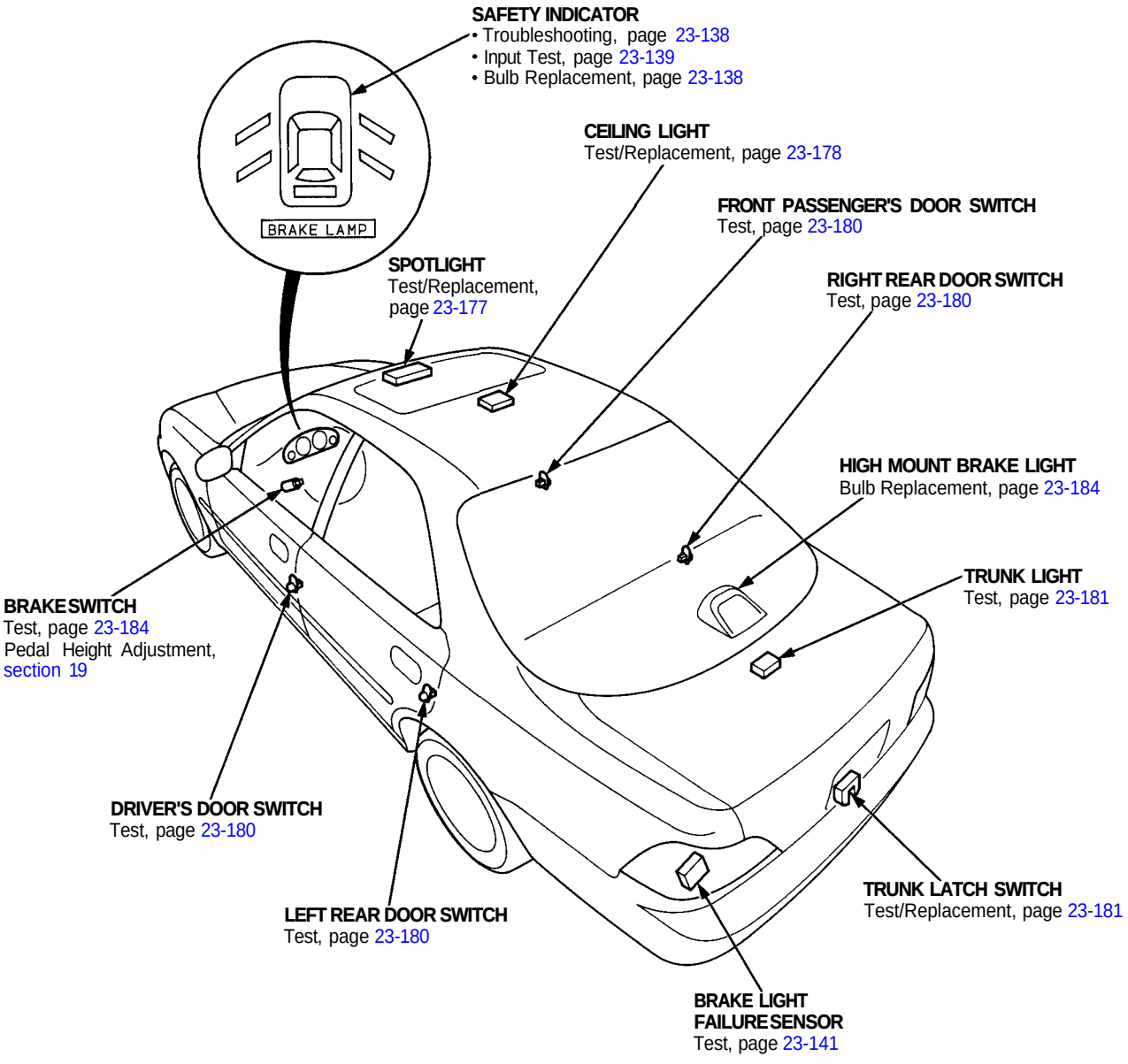
4. If necessary, replace the parking pin switch.
5. Remove the screw, then remove the parking pin switch from the base bracket.



Safety Indicator

ComponentLocationIndex

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



Description

Safety Indicator System:
Bulbs are used to indicate when the trunk lid or a door is not fully closed, or when a brake light is faulty. The bulbs will remain ON for about two seconds after the ignition switch has been turned ON (II) to show that the system circuit is functioning.

Brake Light Bulb Failure Indicator:
If all brake light bulbs are OK, the indicator light stays off because the WHT/GRN wire is constantly being grounded by the brake light failure sensor. With the brake light off, the ground is provided through the diode, the failure sensor relay coil, and the bulb filaments. With the brake light on, both relays in the sensor, connected in series, supply ground. If either of the two bulbs is not working, the chain is broken and the WHT/GRN wire is not being grounded. The indicator light comes on.

Safety Indicator

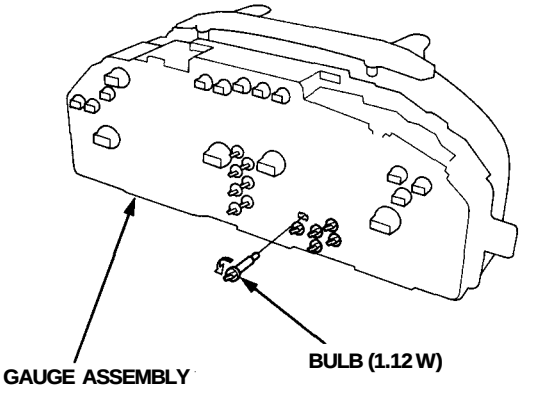
Troubleshooting

NOTE:
- The numbers in the table show the troubleshooting sequence.
- Make sure that the ceiling light bulb and the trunk indicator light bulb are not blown.

Item to be inspected / Symptom	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Blown No. 37 (15 A) fuse (In the under-hood fuse/relay box)	Safety indicator input test	Blown bulb	Brake light failure sensor	Door switch	Trunk latch switch	Poor ground	Open circuit, loose or disconnected terminals
No indicators operate.	1		2					G401 G404	YEL
Indicator lights do not come on when the ignition switch is turned to ON (II).			1	2					
Door indicator light does not come on with doors open.			2	3		1			GRN/BLU GRN/RED GRN/WHT GRN/YEL
Trunk indicator light does not come on with trunk lid open.			2	3			1	G502	ORN[1]
Brake indicator light does not come on with blown brake light bulb.			1	3	2				WHT/GRN or ORN[2]
Brake indicator light remains on with good brake light bulbs.			2		1			G502	
Ceiling light does not come on with door open (with switch in middle position).		1	2	3					BLK/WHT

Bulb Replacement

1. Remove the gauge assembly (see page 23-114).
2. Remove the bulb.
3. Install in the reverse order of removal.



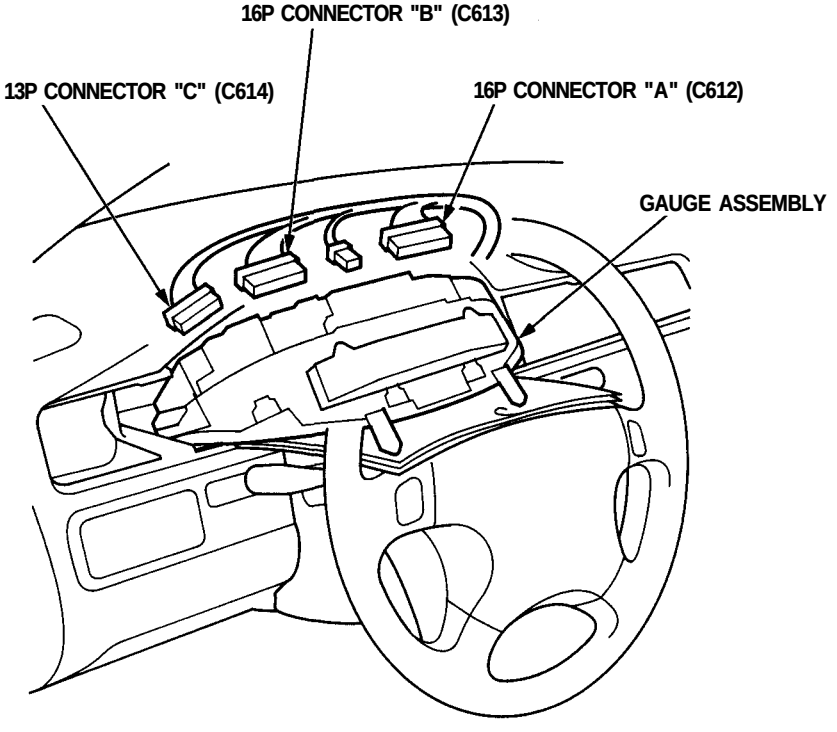
Indicator Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

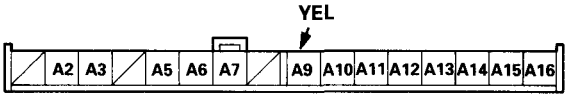
1. Remove the gauge assembly from the dashboard (see page 23-114), and disconnect the 16P connectors (C612, C613) and 13P connector (C614) from the gauge assembly.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the printed circuit board must be faulty; replace it.



CONNECTOR "A" (C612): WIRE SIDE OF FEMALE TERMINALS



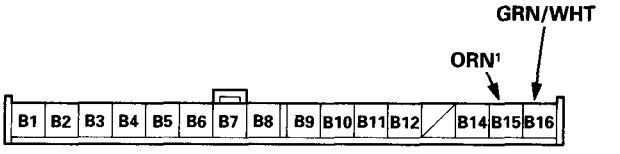
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A9	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire

(cont'd)

Safety Indicator

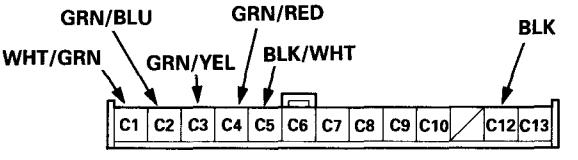
Indicator Input Test (cont'd)

CONNECTOR "B" (C613): WIRE SIDE OF FEMALE TERMINALS



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B15	ORN[1]	Trunk lid open	Check for continuity to ground: There should be continuity. NOTE: Before testing, remove the No. 37 (15 A) fuse from the under-hood fuse/relay box.	• Faulty trunk latch switch • An open in the wire
B16	GRN/WHT	Right rear door open	Check for continuity to ground: There should be continuity. NOTE: Before testing, remove the No. 37 (15 A) fuse from the under-hood fuse/relay box.	• Faulty door switch • An open in the wire

CONNECTOR "C" (C614): WIRE SIDE OF FEMALE TERMINALS



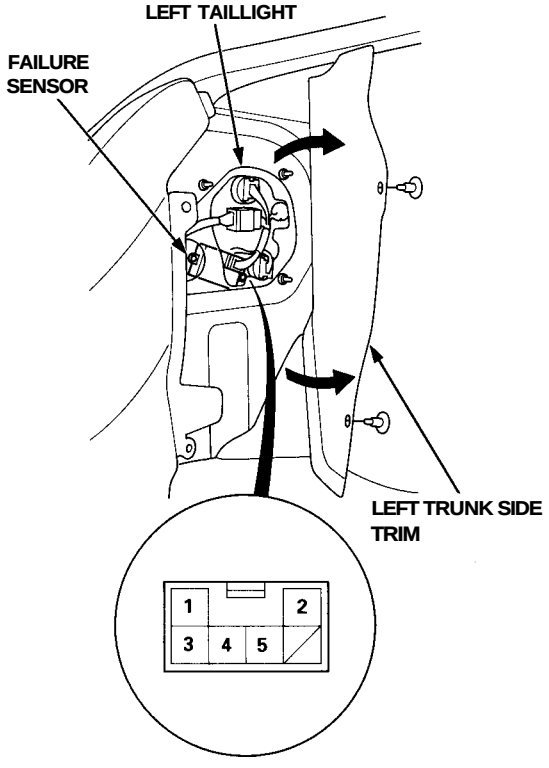
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
C1	WHT/GRN	Brake pedal pushed	Check for continuity to ground: There should be less than 200 ohms with the pedal pushed.	• Blown No. 30 (20 A) fuse in the under-dash fuse/relay box • Faulty brake switch • Blown brake light bulbs • Faulty brake light failure sensor • Poor ground (G502) • An open in the wire
C2	GRN/BLU	Driver's door open	Check for continuity to ground: There should be continuity. NOTE: Before testing, remove the No. 37 (15 A) fuse from the under-hood fuse/relay box.	• Faulty door switch • An open in the wire
C3	GRN/YEL	Left rear door open		
C4	GRN/RED	Front passenger's door open		
C5	BLK/WHT	Ceiling light switch in middle position	Connect to ground: The ceiling light should come on.	• Blown No. 37 (15 A) fuse in the under-hood fuse/relay box • Faulty ceiling light • An open in the wire
C12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire

Brake Light Failure Sensor Test

1. First make sure the brake lights come on when the brake pedal is pressed.

   - If all the brake lights come on, go to step 2.
   - If one of the brake lights does not come on, check whether the bulb is blown. If the bulb is OK, go to step 2.
   - If none of the brake lights come on, check the brake light circuit.

2. Open the trunk lid, and pull back the left trunk side trim to uncover the failure sensor.



WIRE SIDE OF FEMALE TERMINALS

3. Make sure the BRAKE LAMP light in the safety indicator does not come on and stay on when the No. 1 terminal of the 6P connector is grounded and the ignition switch is turned from OFF to ON (II).

   - If the BRAKE LAMP light comes on and stays on, check for an open in the WHT/GRN wire between the safety indicator and the No. 1 terminal of the failure sensor, and whether the safety indicator circuit (printed circuit board) has a problem.
   - If the BRAKE LAMP light does not stay on, go to step 5.

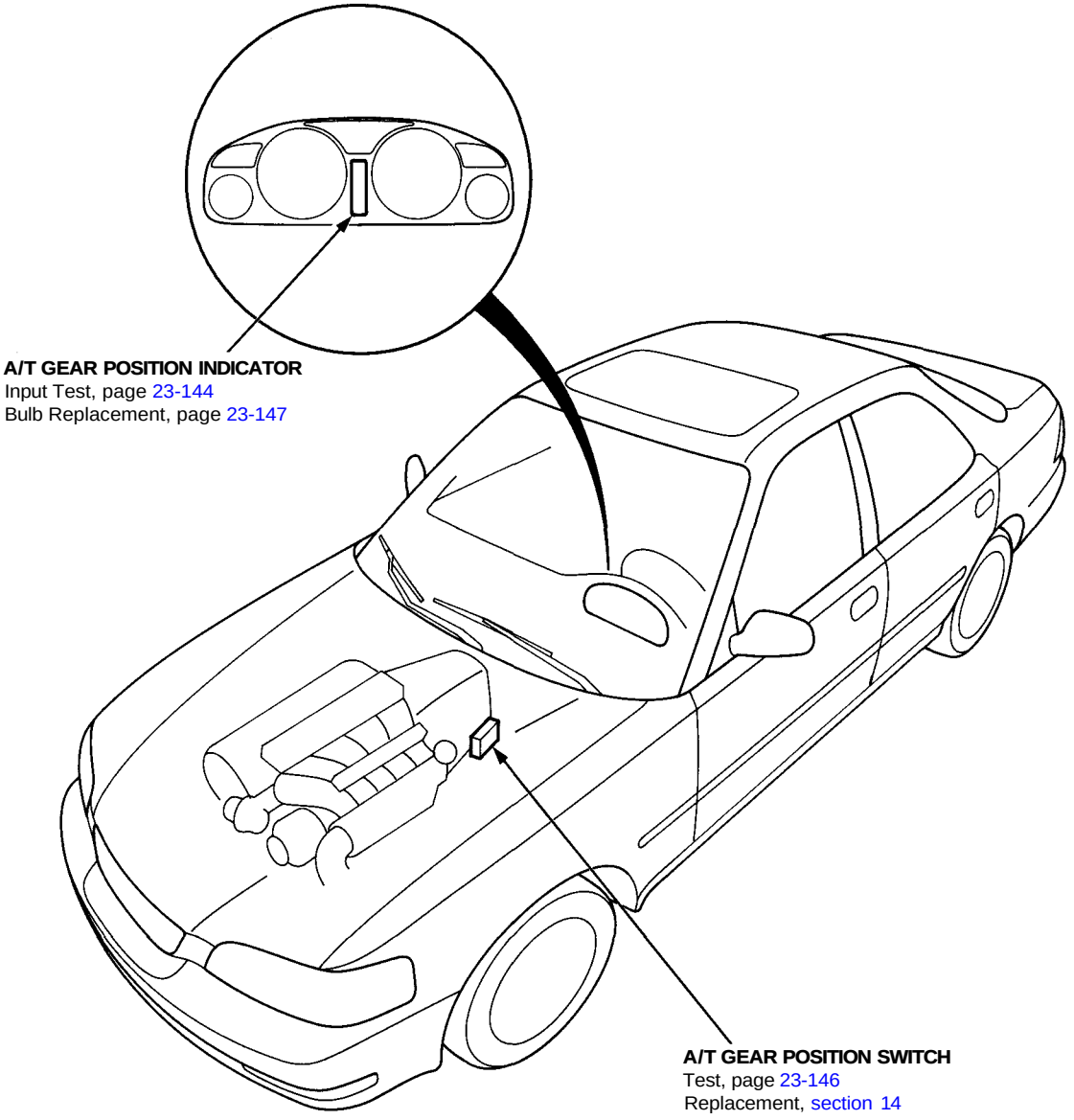
4. Make sure the BRAKE LAMP light does not come on when the ignition switch is turned from OFF to ON (II) with the No. 2 terminal of the 6P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP light comes on and stays on, replace the failure sensor.
   - If the BRAKE LAMP does not stay on, check for an open in the BLK wire between the No. 2 terminal of the failure sensor and ground, and check for poor ground at G502.

A/T Gear Position Indicator

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



A/T GEAR POSITION INDICATOR
Input Test, page 23-144
Bulb Replacement, page 23-147

A/T GEAR POSITION SWITCH
Test, page 23-146
Replacement, section 14

A/T Gear Position Indicator

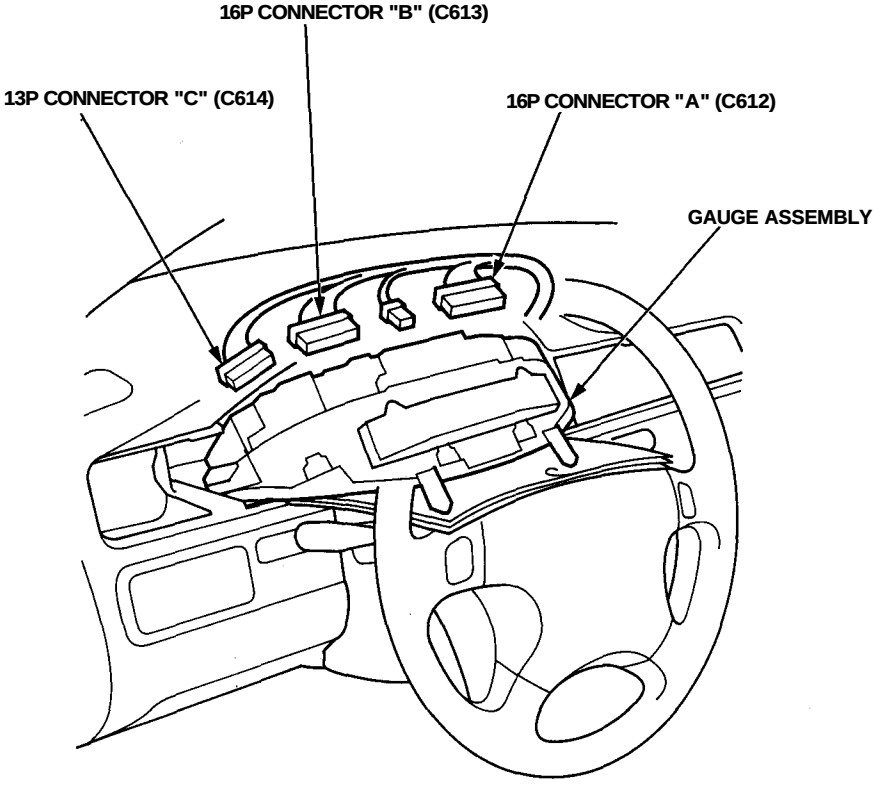
Indicator Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

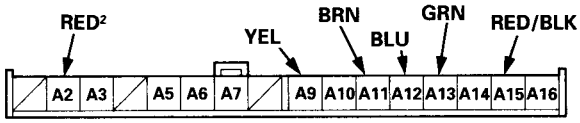
1. Remove the gauge assembly from the dashboard (see page 23-114), and disconnect the 16P connectors (C612, C613), and 13P connector (C614) from the gauge assembly.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

- If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
- If the terminals look OK, make the following input tests at the 16P (C612, C613) and 13P (C614) connectors.
  — If a test indicates a problem, find and correct the cause, then recheck the system.
  — If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.

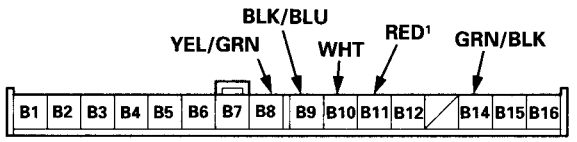


CONNECTOR "A" (C612): WIRE SIDE OF FEMALE TERMINALS



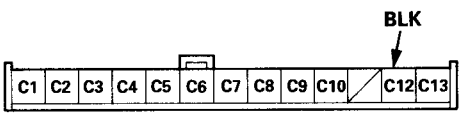
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A2	RED²	Combination light switch ON and dash lights brightness control dial on full bright	Check for voltage between RED/BLK and RED terminals: There should be battery voltage.	• Blown No. 21 (15 A) fuse in the under-hood fuse/relay box • Faulty taillight relay • Faulty dash lights brightness controller • An open in the wire
A15	RED/BLK			
A9	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
A11	BRN	Shift lever in 1	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other position.	• Faulty A/T gear position switch • An open in the wire
A12	BLU	Shift lever in 2		
A13	GRN	Shift lever in D3		

CONNECTOR "B" (C613): WIRE SIDE OF FEMALE TERMINALS



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	YEL/GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Faulty transmission control module (TCM) or ECM • An open in the wire
B9	BLK/BLU	Shift lever in P NOTE: Don't push the brake pedal.	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other position.	• Faulty A/T gear position switch • An open in the wire
B10	WHT	Shift lever in R		
B11	RED¹	Shift lever in N		
B14	GRN/BLK	Ignition switch ON (II) and shift lever in any position except D4	Check for voltage to ground: There should be battery voltage for two seconds after the ignition switch is turned ON (II), and less than 1 V two seconds later.	• Faulty transmission control module (TCM) • An open in the wire

CONNECTOR "C" (C614): WIRE SIDE OF FEMALE TERMINALS

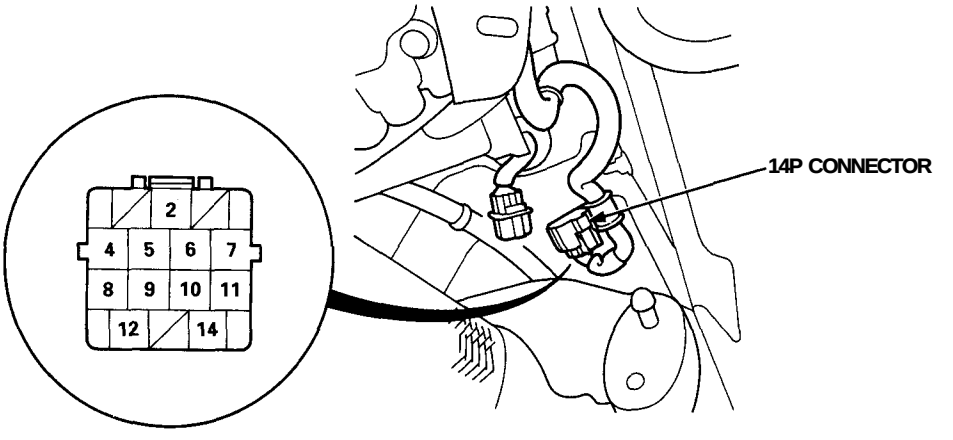


Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
C12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire

A/T Gear Position Indicator

A/T Gear Position Switch Test

1. Raise the car, and remove the transmission splash shield (see section 14).
2. Disconnect the 14P connector from the A/T gear position switch.
3. Check for continuity between the terminals in each switch position according to the table.
   - Move the shift lever back and forth without pushing the shift lever at each switch position, and check for continuity within the range of free play of the shift lever.
   - If there is no continuity within the range of free play, adjust the position of the A/T gear position switch (see section 14).

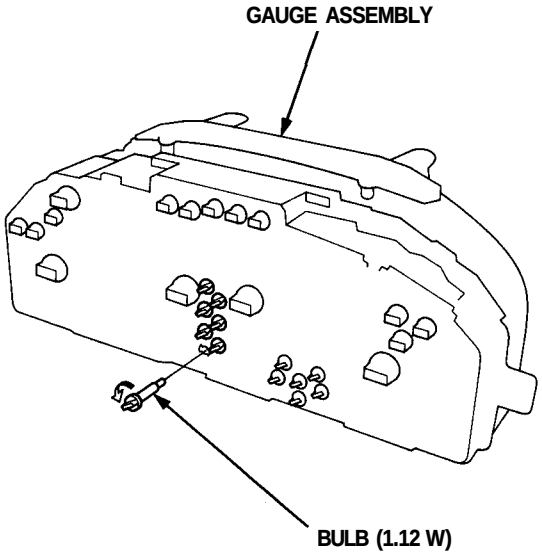


WIRE SIDE OF FEMALE TERMINALS

A/T Gear Position Switch										Back – up Light Switch		Neutral Position Switch	
Terminal / Position	Body Ground	2	4	5	6	7	8	10	11	12	14	Body Ground	9
1	○							○					
2	○						○		○				
D3	○		○				○						
D4	○			○			○						
N	○				○							○	○
R	○					○				○	○		
P	○	○										○	○

Bulb Replacement

1. Remove the gauge assembly (see page 23-114).
2. Remove the bulb.



3. Install in the reverse order of removal.

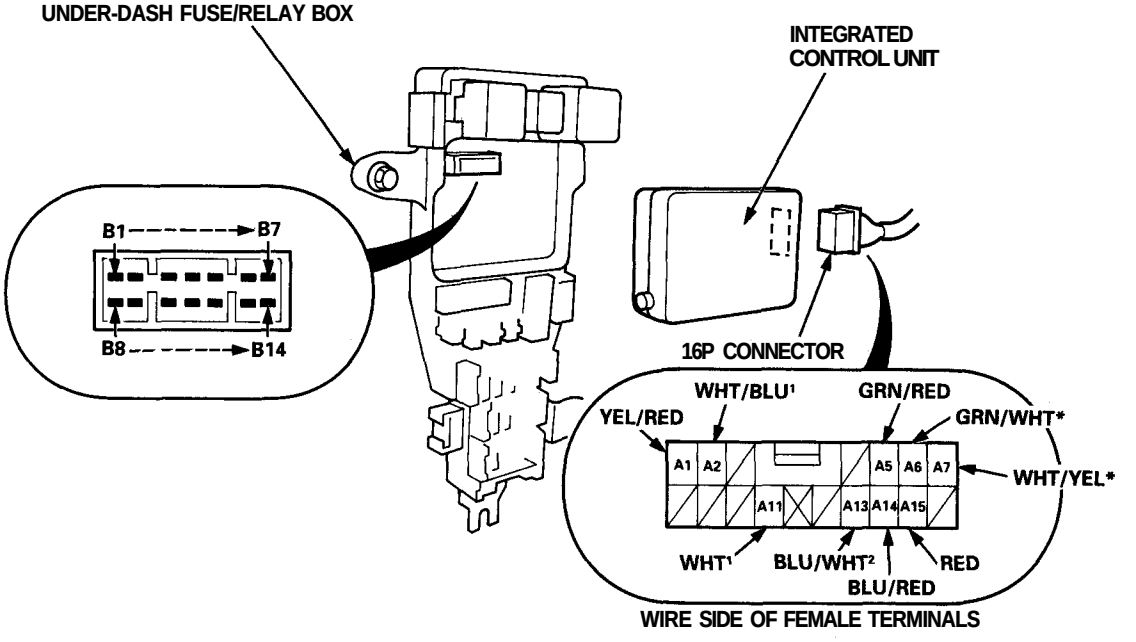
Integrated Control Unit

Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the driver's side kick panel, then disconnect the 16P connector from the integrated control unit.
2. Remove the integrated control unit from the under-dash fuse/relay box.
3. Inspect the connector and socket terminals to be sure they are all making good contact.

- If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
- If the terminals look OK, make the following input tests at the connector and socket.
  - — If any test indicates a problem, find and correct the cause, then recheck the system.
  - — If all the input tests prove OK, the control unit must be faulty; replace it.



*: '97 - 98 models

Intermittent Wiper System:

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B9		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty intermittent wiper relay • An open in the wire
B3			Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty wiper switch • An open in the wire
B4		Ignition switch ON (II) and washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty washer switch • An open in the wire
B10		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • An open in the wire
A6*	GRN/WHT	Intermittent dwell time control ring turned	Check for resistance between the terminals: It should vary from 0 Ω to 30 kΩ as the ring is turned.	• Faulty intermittent dwell time controller • An open in the wire
A7*	WHT/YEL			

*: '97 - 98 models

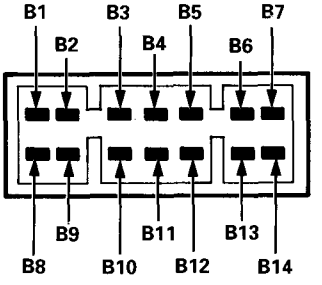
Oil Pressure Indicator Flasher System:

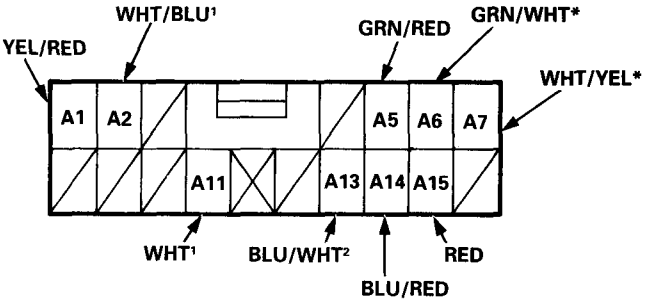
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B2		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty under-dash fuse/relay box
A2	WHT/BLU[1]	Engine running	Check for voltage to ground: There should be battery voltage.	• Faulty charging system • An open in the wire
A1	YEL/RED	Ignition switch OFF (0)	Check for continuity to ground: There should be continuity.	• Faulty oil pressure switch • An open in the wire
		Ignition switch ON (II)	Check light operation. If the light does not come on, connect the YEL/RED terminal to ground: The light should come on as the ignition switch is turned ON (II).	• Blown bulb • An open in the wire
		Start the engine	Check for voltage to ground: There should be battery voltage.	• Insufficient oil • Improper lubrication • Faulty oil pressure switch

(cont'd)

Integrated Control Unit

Input Test (cont'd)





WIRE SIDE OF FEMALE TERMINALS

*: '97 - 98 models

Seat Belt Reminder and Key-in Warning System:

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B2		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty under-dash fuse/relay box
B1		Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
A13	BLU/WHT²	Ignition key is inserted into the ignition switch.	Check for voltage to ground: There should be 1 V or less.	• Faulty ignition key switch • An open in the wire • Poor ground (G401, G404)
A14	BLU/RED	Driver's seat belt is not buckled.	Check for voltage to ground: There should be 1 V or less.	• Faulty seat belt switch • Poor ground (G501) • An open in the wire

Power Window Key-off Timer System:

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B1		Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
B2		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty under-dash fuse/relay box
B12		Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (15 A) fuse in the under-hood fuse/relay box • An open in the wire
A5	GRN/RED	Front passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty front passenger's door switch • An open in the wire
A15	RED	Connect the B12 terminal to the RED terminal.	Check window operation: Power windows should operate as the switch is pushed.	• Faulty power window relay • Poor ground (G201) • An open in the wire



Entry Light Timer System

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B12		Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (15 A) fuse in the under-hood fuse/relay box • An open in the wire
A11	WHT[1]	Under all conditions	Attach to ground: Ignition key light should come on.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Blown LED • An open in the wire
B1	Fuse/relay box socket	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire

Lights-on Reminder System:

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B8	Fuse/relay box socket	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
B13		Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 21 (15 A) fuse in the under-hood fuse/relay box • Faulty taillight relay • An open in the wire
B2		Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
B1		Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire

Key-in Reminder System

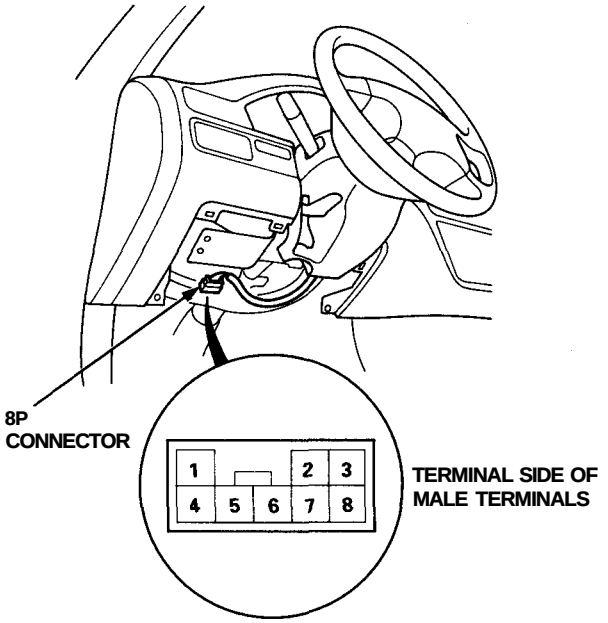
Ignition Key Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

NOTE: Refer to page 23-152 for the input test of the beeper circuit.

When the ignition key is not removed, the key-in beeper in the integrated control unit senses ground through the closed ignition key switch. When you open the driver's door, the beeper circuit senses ground through the closed door switch. With ground at the "BLU/WHT[2]" and "A13" terminals, the beeper sounds.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Disconnect the 8P connector from the main wire harness.



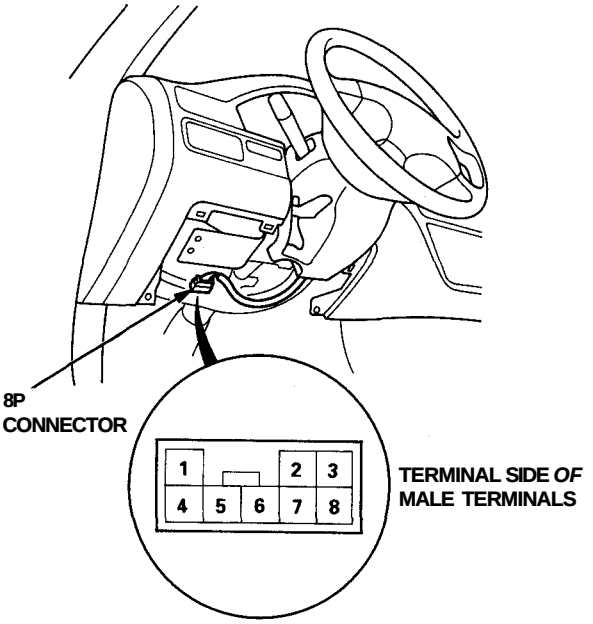
3. Check continuity between terminals No. 4 and No. 7.
   - There should be continuity with the key in the ignition switch.
   - There should be no continuity with the key removed.

Entry Light Timer System

Ignition Key Light Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Disconnect the 8P connector from the main wire harness.



3. Connect power is to terminal No. 8, and ground to terminal No. 2. The LED should come on. If the LED does not come on, replace it.

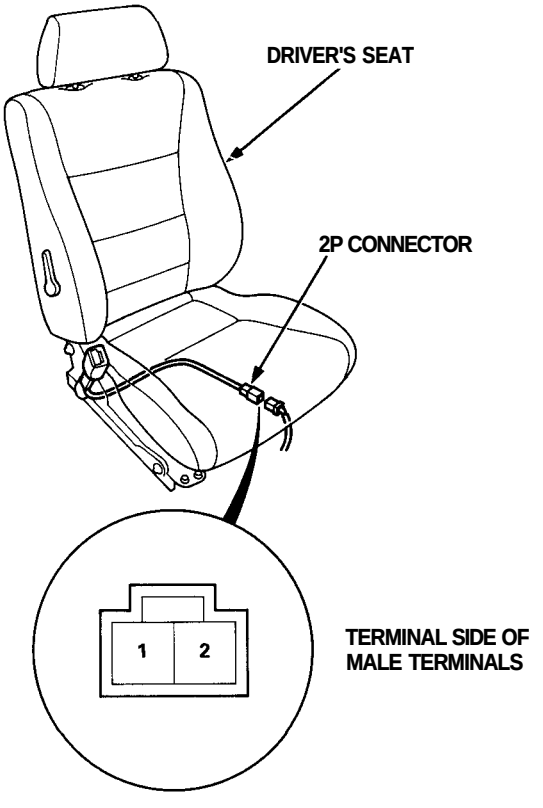
Seat Belt Reminder System

Seat Belt Switch Test

1. Slide the driver's seat to the middle position, then disconnect the 2P connector from the back of the seat.

2. Check for continuity between the No. 1 and No. 2 terminals in each condition according to the table.

Terminal / Condition	1	2
UNBUCKLED	○	○
BUCKLED		

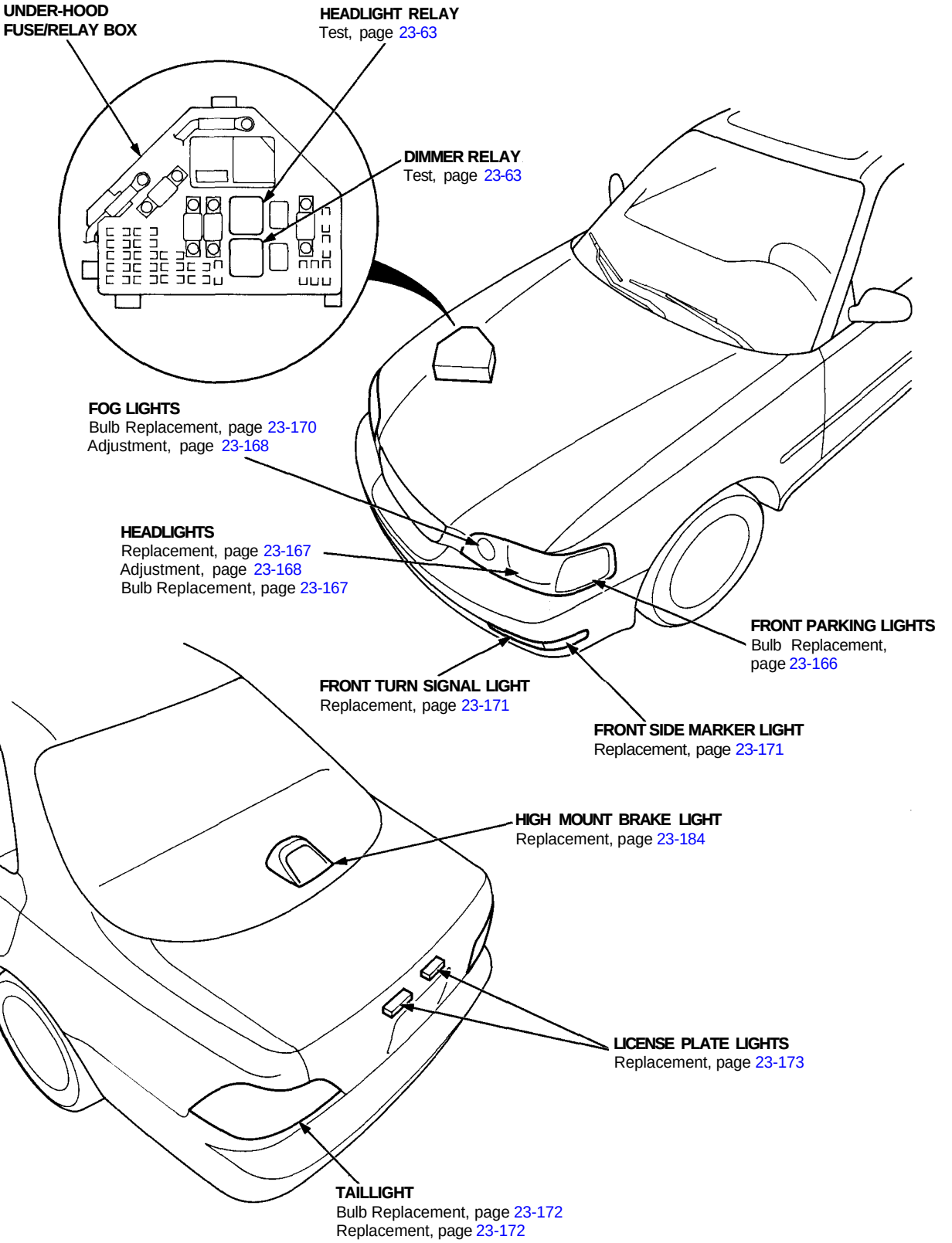


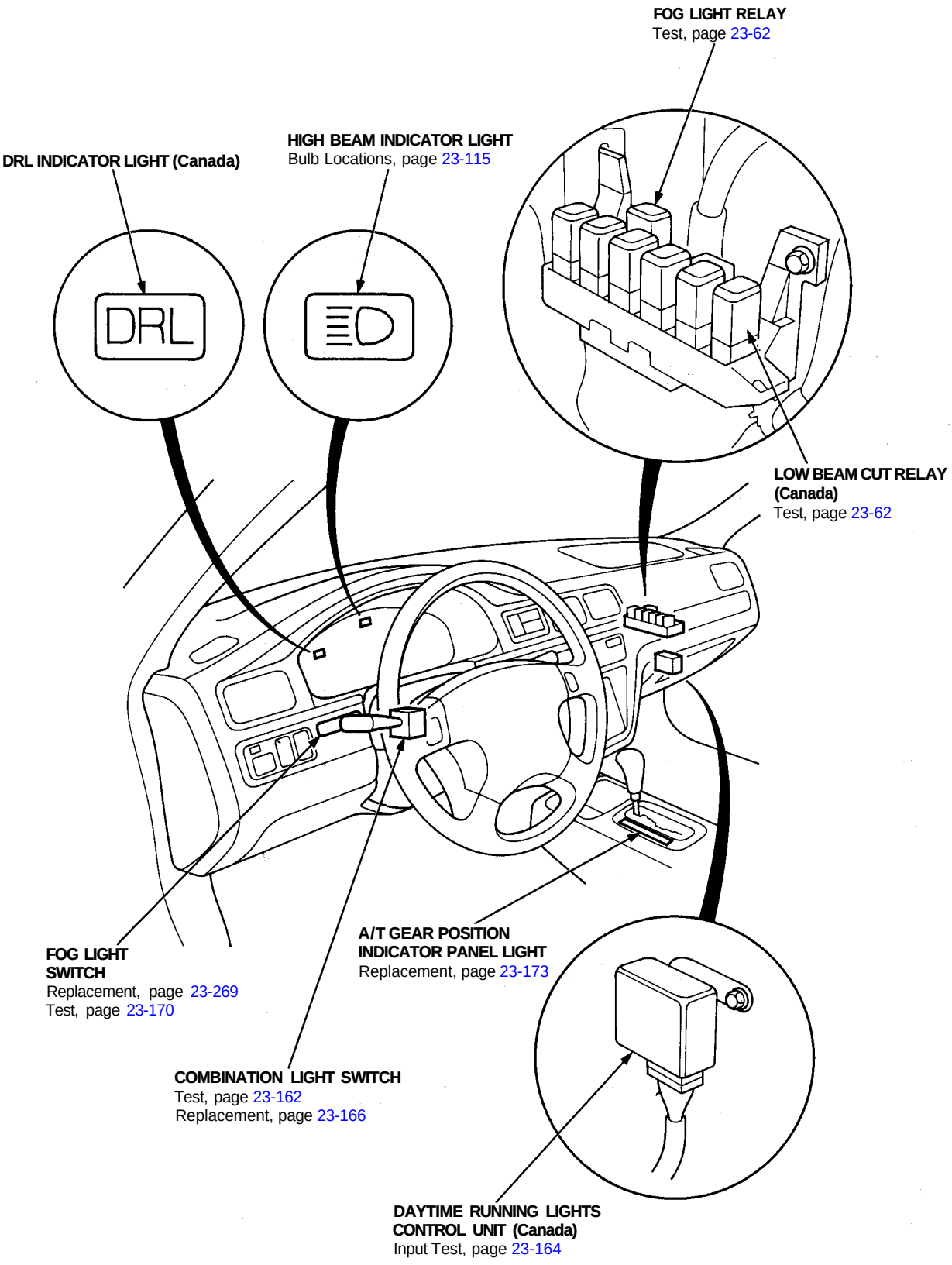
3. If necessary, replace the seat belt switch.

Lighting System

Component Location Index

NOTE: Refer to page 23-100a of the '96-98 Acura 3.2TL Service Manual supplement for the differences on this page for the 3.2TL.



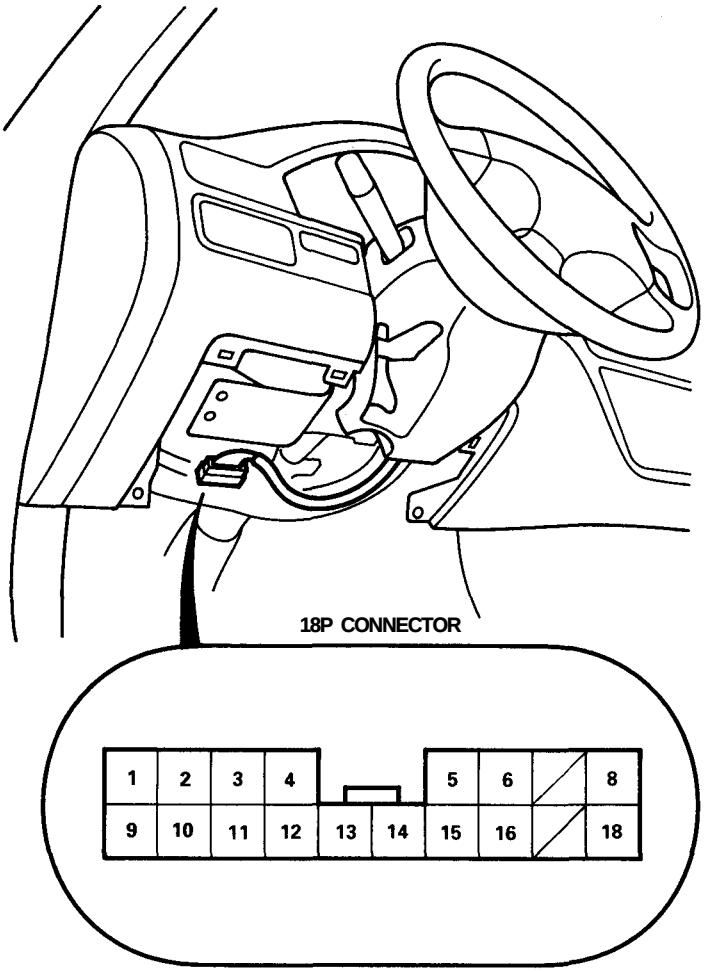

FOG LIGHT RELAY
Test, page 23-62
HIGH BEAM INDICATOR LIGHT
Bulb Locations, page 23-115
DRL INDICATOR LIGHT (Canada)
DRL
LOW BEAM CUT RELAY
(Canada)
Test, page 23-62
FOG LIGHT
SWITCH
Replacement, page 23-269
Test, page 23-170
A/T GEAR POSITION
INDICATOR PANEL LIGHT
Replacement, page 23-173
COMBINATION LIGHT SWITCH
Test, page 23-162
Replacement, page 23-166
DAYTIME RUNNING LIGHTS
CONTROL UNIT (Canada)
Input Test, page 23-164

Lighting System

Combination Light Switch Test

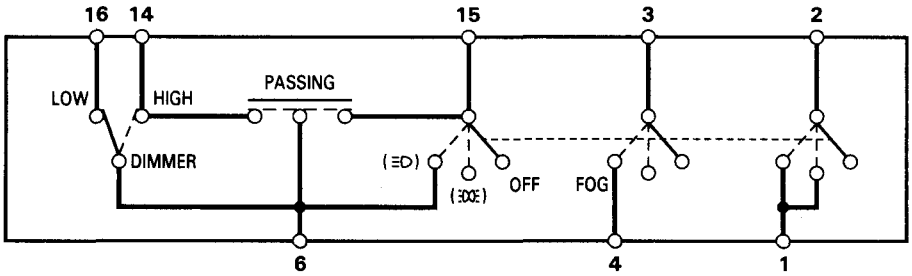
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Disconnect the 18P connector from the main wire harness.
3. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, check for continuity between them in each switch position according to the table. If there is no continuity between any of them, check for continuity in the switch harness.
     — If there is continuity in the switch harness, replace the combination light switch.
     — If there is no continuity in the switch harness, replace it.



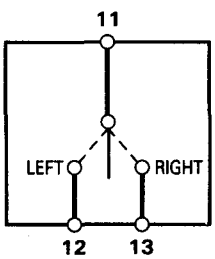
TERMINAL SIDE OF MALE TERMINALS

Headlight/Dimmer/Passing Switch



Position \ Terminal			1	2	3	4	6	14	15	16
Headlight switch	OFF									
	≡OO≡		○	○						
	≡D	LOW	○	○	○	○	○		○	○
		HIGH	○	○	○	○	○	○	○	
Passing switch (Headlight switch "OFF")		OFF								
		ON					○	○	○	
Passing switch (Headlight switch "≡D")		OFF					○		○	
		ON					○	○	○	

Turn Signal Switch



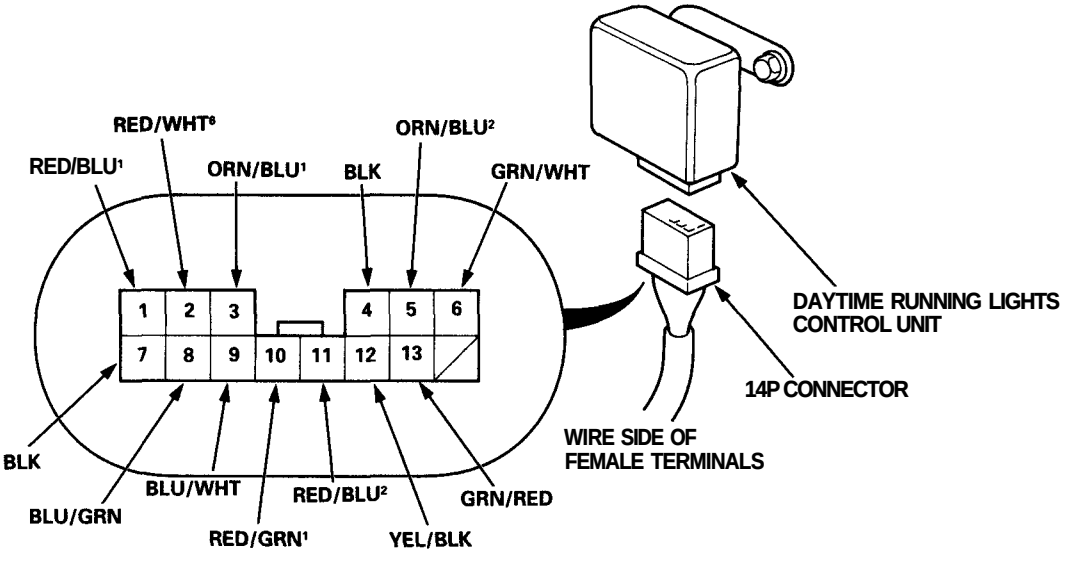
Position \ Terminal	11	12	13
RIGHT	○		○
Neutral			
LEFT	○	○	

Lighting System

Daytime Running Lights Control Unit Input Test (Canada)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Disconnect the 14P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



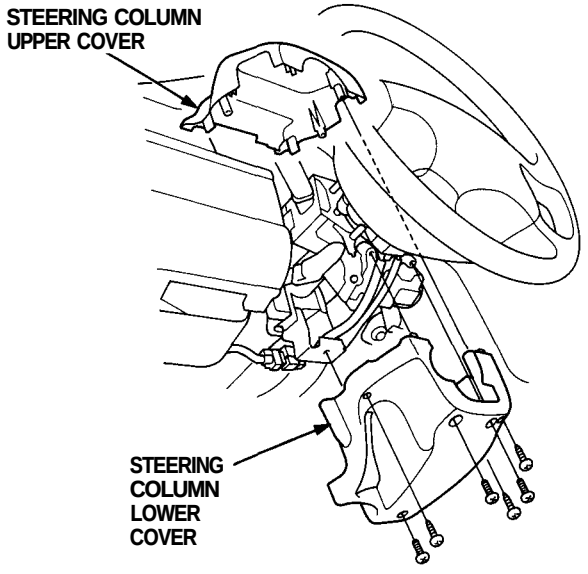


Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	RED/BLU[1]	Combination light switch ON (≡D)	Connect to ground: The headlights and high beam indicator light should come on.	• Blown No. 19, No. 20 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty headlight relay • Faulty low beam cut relay • Blown headlight bulb (high beam) • Blown high beam indicator light • An open in the wire
11	RED/BLU[2]			
2	RED/WHT[6]	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 23 (15 A) fuse in the under-hood fuse/relay box • An open in the wire
3	ORN/BLU[1]	Passing switch ON	Check for continuity to ground: There should be continuity.	• Faulty combination light switch • Faulty headlight relay • Faulty dimmer relay • Poor ground (G201) • An open in the wire
5	ORN/BLU[2]			
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
7				
6	GRN/WHT	Parking brake lever up	Check for continuity to ground: There should be continuity.	• Faulty parking brake switch • An open in the wire
8	BLU/GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Faulty headlight relay • An open in the wire
9	BLU/WHT	Ignition switch ON (II)	Connect to ground: The DRL indicator light should come on.	• Faulty DRL indicator light • Blown No. 1 (10 A) fuse in the under-hood fuse/relay box • An open in the wire
10	RED/GRN[1]	Combination light switch ON (≡D)	Check for voltage to ground: There should be battery voltage.	• Blown No. 20 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty headlight relay • An open in the wire
12	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 10 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
13	GRN/RED	Brake fluid reservoir float in down position	Check for continuity to ground: There should be continuity.	• Faulty brake fluid level switch • An open in the wire

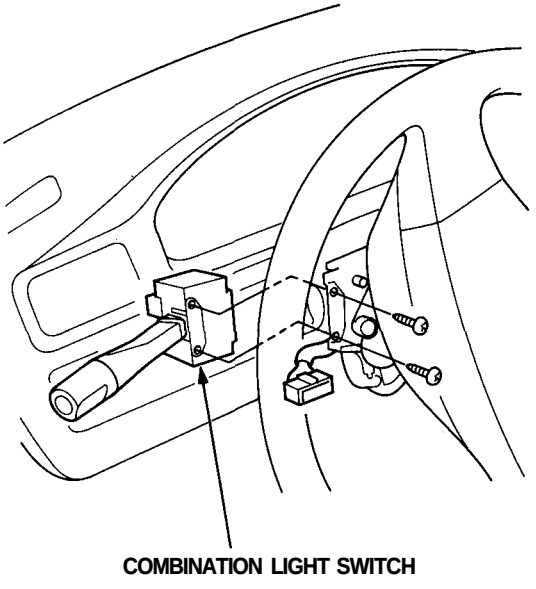
Combination Light Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).
2. Remove the steering column covers.



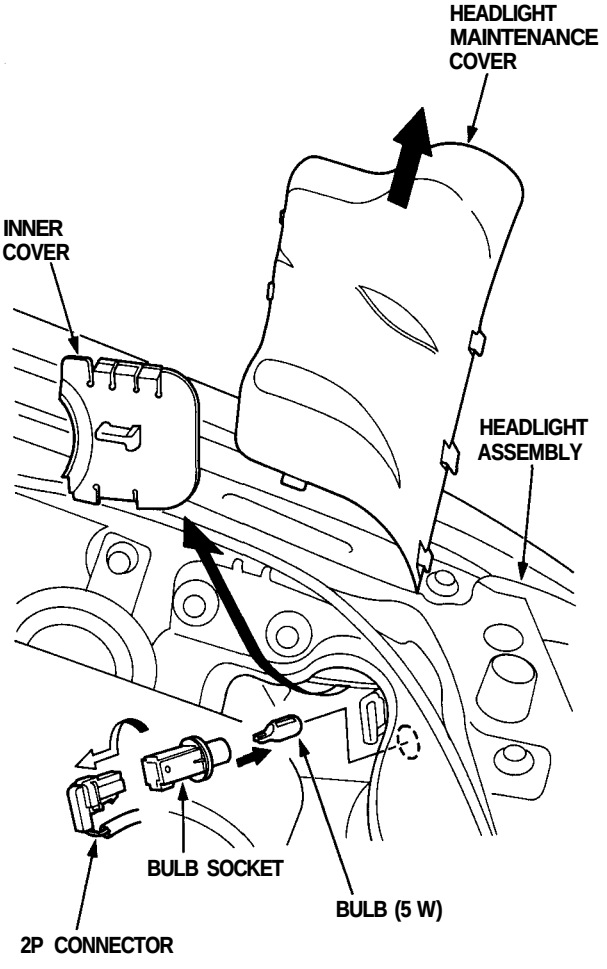
3. Disconnect the connector from the combination light switch, then remove the two screws and the switch.



4. Install the combination light switch in the reverse order of removal.

Bulb Replacement

1. Remove the maintenance cover and inner cover (left front parking light), then disconnect the 2P connector from the light.
2. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.

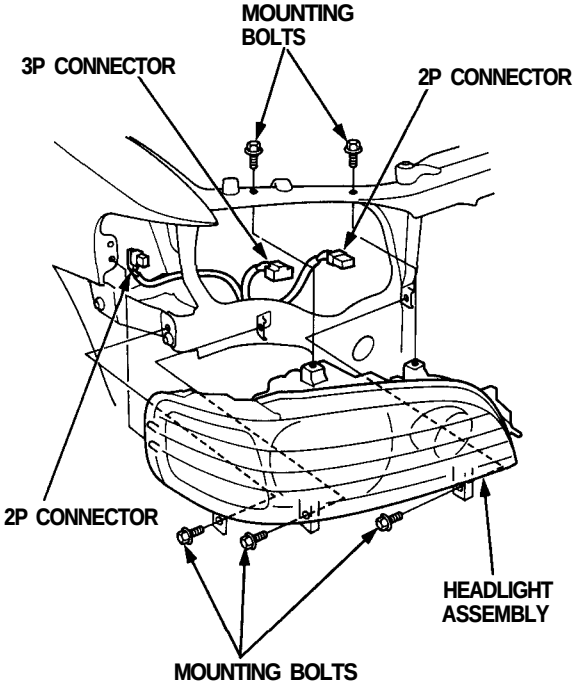


Headlights

Replacement

CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

1. Remove the front bumper (see section 20).
2. Remove the headlight maintenance cover (left headlight), then disconnect the 2P and 3P connectors.
3. Remove the mounting bolts, then remove the headlight assembly.



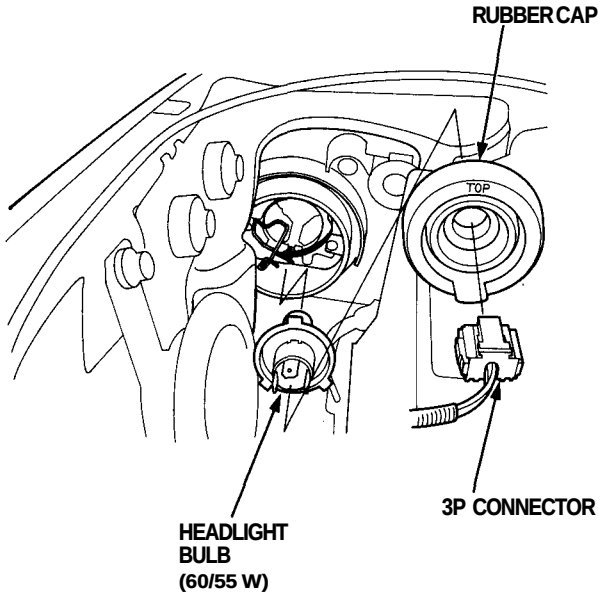
4. Install the headlight in the reverse order of removal.
5. After replacement, adjust the headlights to local requirements (see page 23-168).

Bulb Replacement

CAUTION:

- **Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**
- **Do not touch the glass of the halogen bulbs.**

1. Remove the headlight maintenance cover (left headlight), then disconnect the 3P connector from the headlight.
2. Remove the rubber cap.
3. Pull the retaining spring away from the bulb, then remove the bulb.



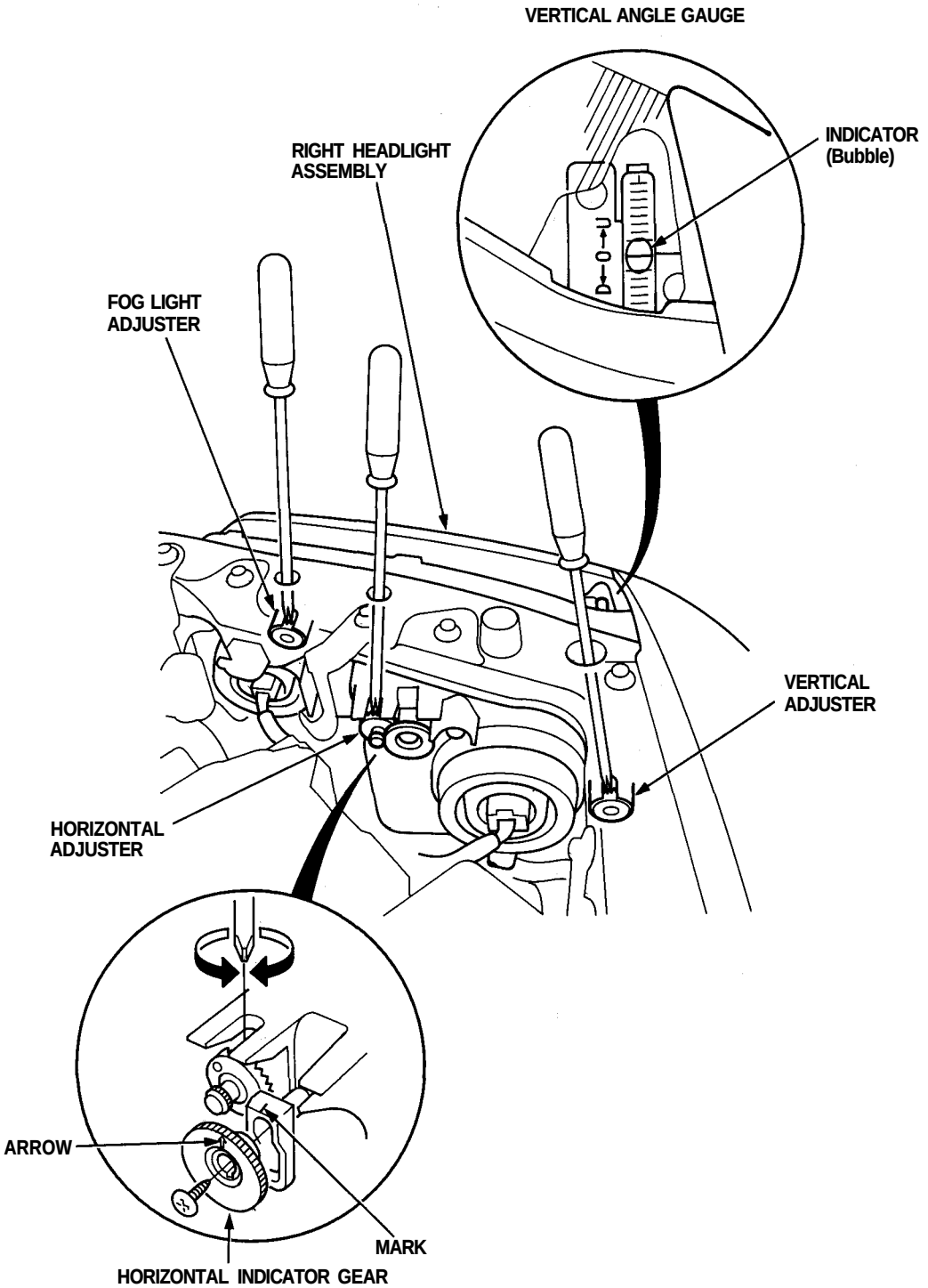
4. After replacement, adjust the headlights to local requirements (see page 23-168).

Headlights

Adjustment

Before adjusting the headlights:

- Park the car on level ground.
- Make sure the fuel tank is full.
- The driver or someone who weighs the same should sit the driver's seat.
- Load the trunk with the items you usually carry. (If you usually pull a trailer, attach it to the car.)
- Push down on the front and rear bumpers several times to make sure the car is sitting normally.

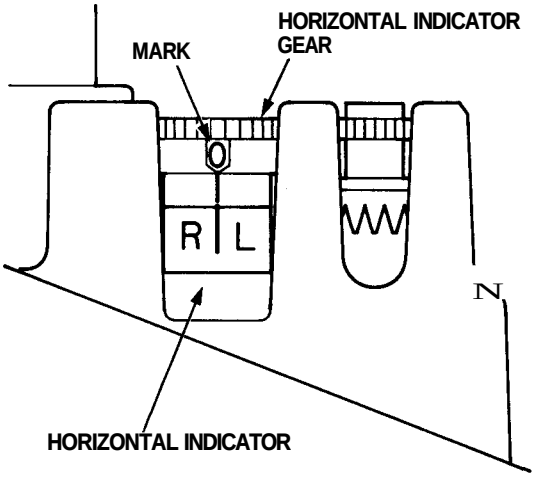


CAUTION: Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.

1. Open the hood.

2. Check the horizontal adjustment indicator. The "0" mark on the horizontal indicator gear should be aligned with the mark on the horizontal indicator.

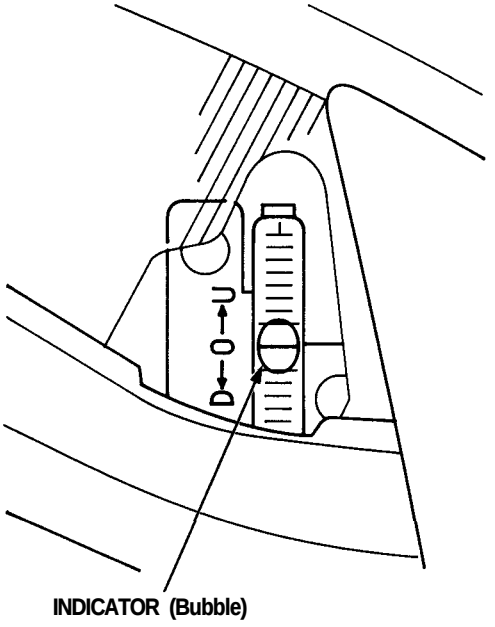
NOTE: The illustration shows the right side adjuster.



3. Check the vertical adjustment indicator. The bubble should be centered underneath the longest scribe mark on the gauge.

4. If either indicator is not aligned with its "O" mark as described above, an adjustment can be made by using a Phillips screwdriver.

VERTICAL INDICATOR:



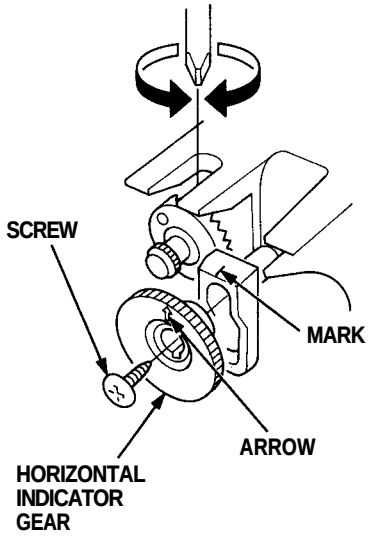
5. Adjust the headlights to local requirements by turning the adjusters.

6. After headlight replacement, it may be necessary to readjust the horizontal indicator gear.

   - First install the headlight, and adjust its horizontal and vertical aimings according to local requirements.
   - Then check that the arrow on the horizontal indicator gear is aligned with the mark on the horizontal indicator.
     — If they are not aligned, remove the screw, adjust the indicator gear, and retighten the screw.

NOTE: As the outer lenses are made of an acryliccoated, polycarbonate material, do not cover the headlights when they are turned on.

HORIZONTAL INDICATOR:

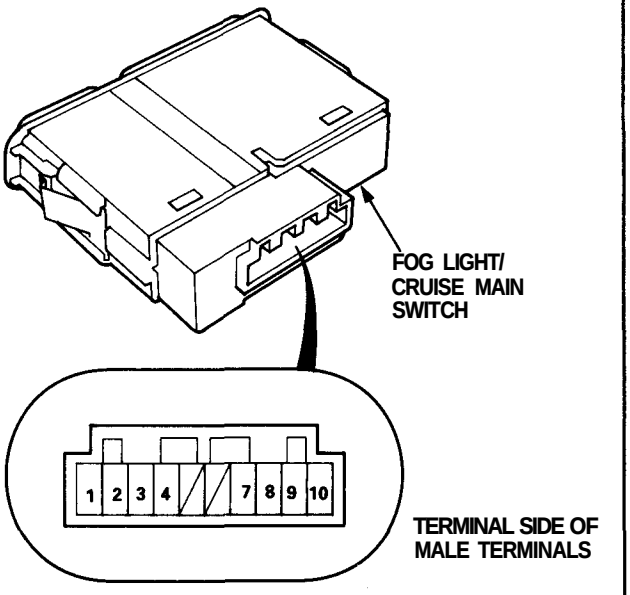


Fog Light

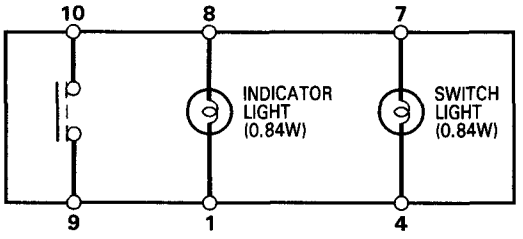
Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the fog light switch (see page 23-269).
2. Check for continuity between the terminals in each switch position according to the table.



Terminal / Position	1	4		7	8	9	10
OFF	○	○	○	○	○		
		○	○	○			
ON	○	○	○	○	○	○	○
		○	○	○			

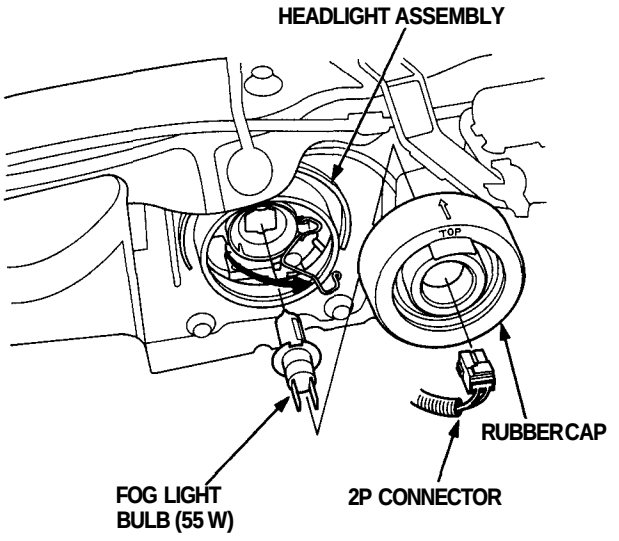


Bulb Replacement

CAUTION:

- **Halogen headlights become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**
- **Do not touch the glass of the halogen bulbs.**

1. Disconnect the 2P connector from the fog light.
2. Remove the rubber cap.
3. Pull the retaining spring away from the bulb, then remove the bulb.

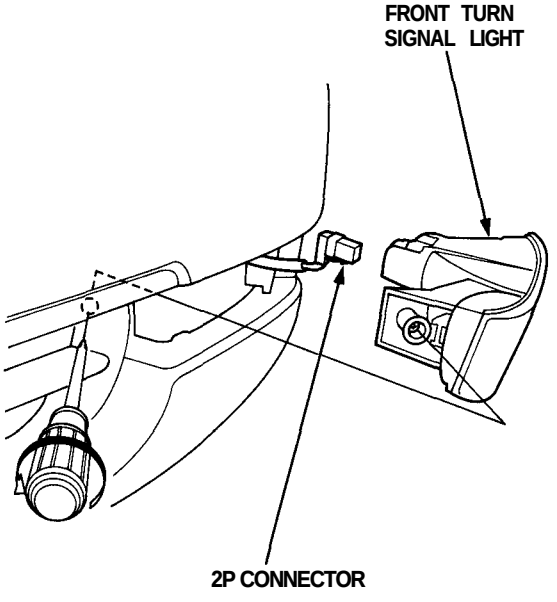


4. After replacement, adjust the headlights to local requirements (see page 23-168).

Front Turn Signal Lights

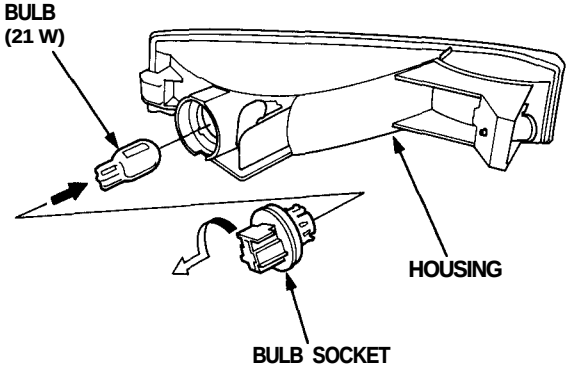
Replacement

1. Remove the screw, and pull the front turn signal light assembly out of the front bumper.



2. Disconnect the 2P connector from the light.

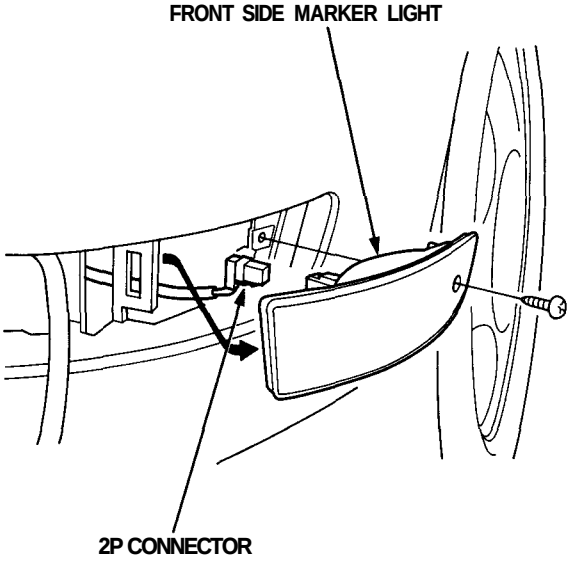
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



Front Side Marker Lights

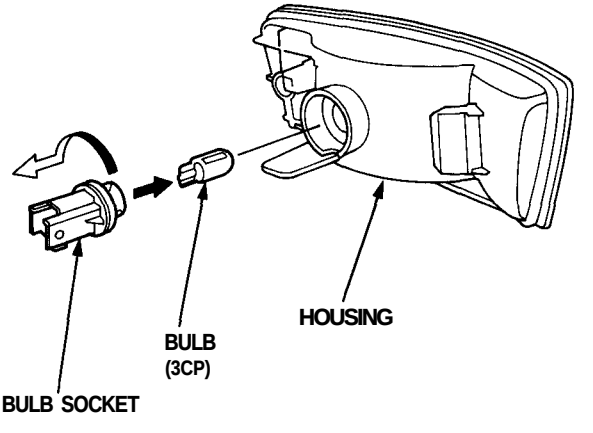
Replacement

1. Remove the screw, and pull the front side marker light assembly out of the front bumper.



2. Disconnect the 2P connector from the light.

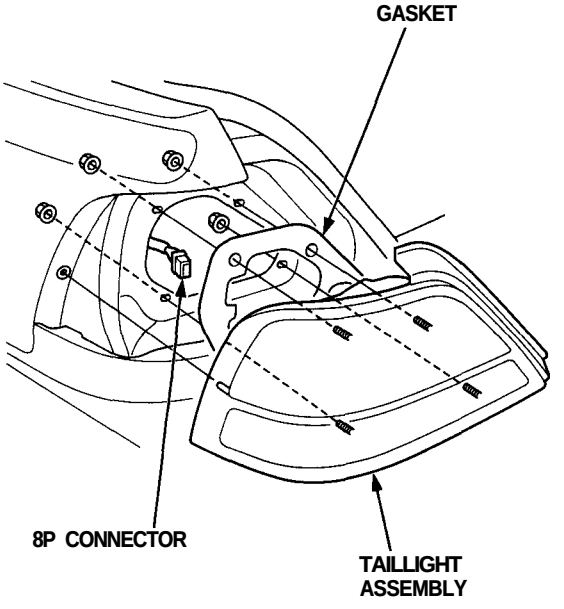
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



Taillights

Replacement

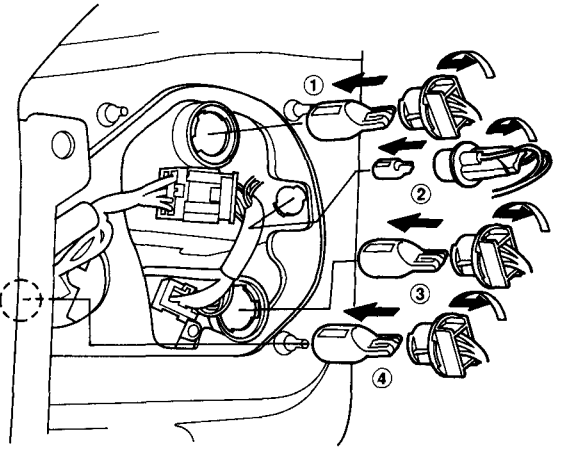
1. Open the trunk lid, and pull back the trunk side trim.
2. Disconnect the 8P connector from the taillight assembly.
3. Remove the four mounting nuts and the taillight assembly.



NOTE:
- Inspect the gasket; replace it if it is distorted or stays compressed.
- After installing them, run water over the lights to make sure they do not leak.

Bulb Replacement

1. Open the trunk lid, and pull back the trunk side trim.
2. Turn the bulb socket 45° counterclockwise, remove it from the taillight housing, then replace the bulb.

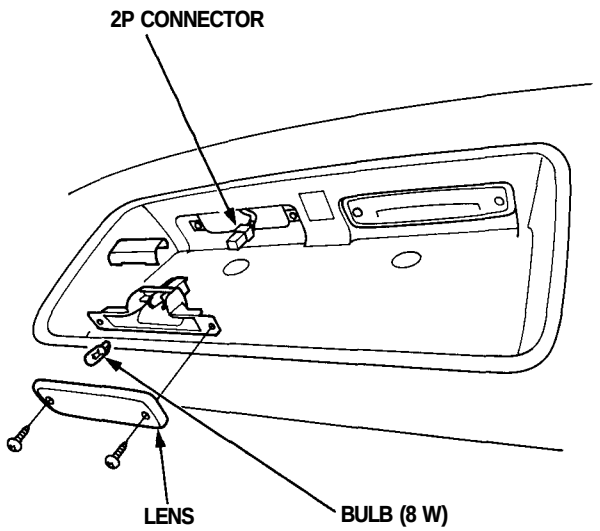


① BRAKE LIGHT/TAILLIGHT BULB (21/5 W)
② REAR SIDE MARKER LIGHT BULB (3CP)
③ TURN SIGNAL LIGHT BULB (21 W)
④ BACK-UP LIGHT BULB (21 W)

License Plate Lights

Replacement

1. Remove the two screws from the license plate light assembly.
2. Pull the light out, and disconnect the 2P connector from it.

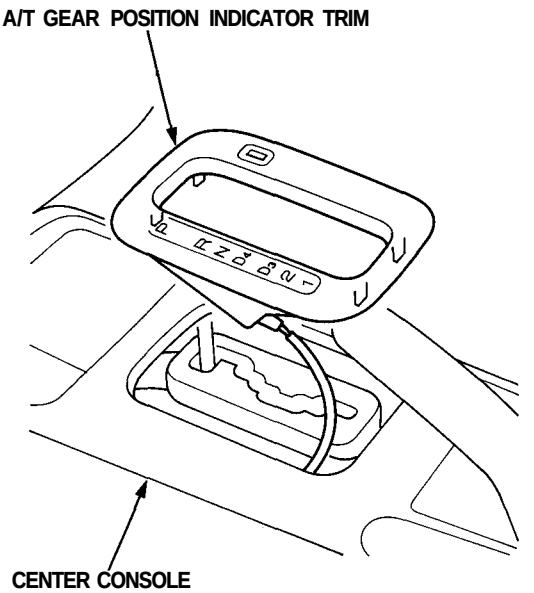


3. Take the lens off, then replace the bulb.

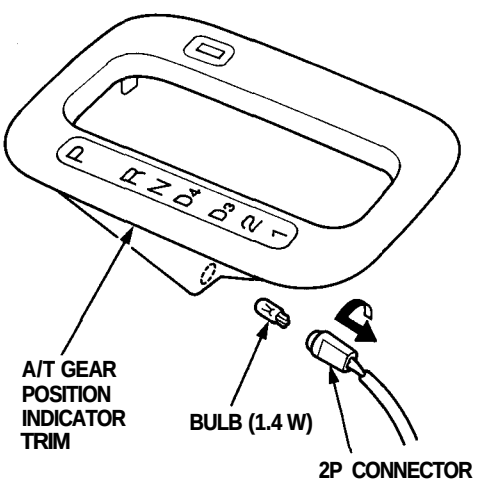
A/T Gear Position Indicator Trim Light

Replacement

1. Carefully pry the A/T gear position indicator trim out of the center console.



2. Turn the 2P connector counterclockwise to remove it from the A/T gear position indicator trim.
3. Remove the bulb from the 2P connector.



Glove Box Light

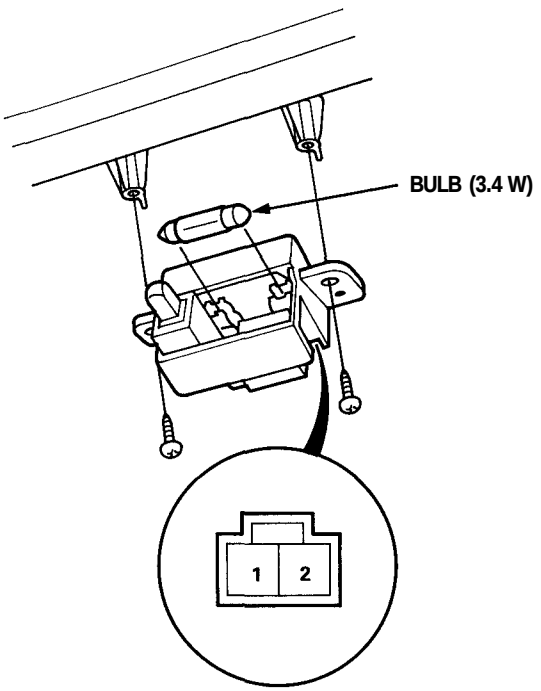
Test

1. Open the glove box, and disconnect the 2P connector.

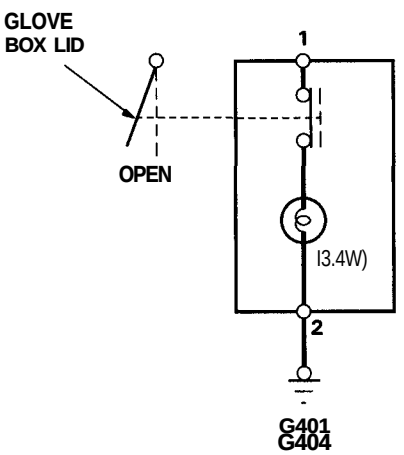
   NOTE: If necessary, remove the glove box.

2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1		2
CLOSE (OFF)			
OPEN (ON)	○	—○—	○



TERMINAL SIDE OF MALE TERMINALS



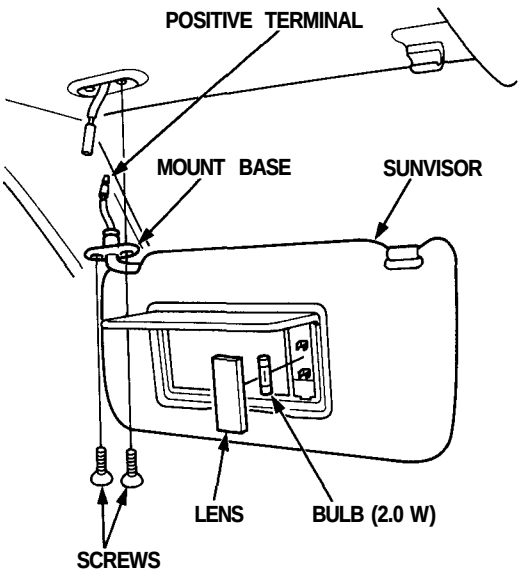
Vanity Mirror Lights

Test

NOTE: The illustration shows the driver's vanity mirror; the front passenger's vanity mirror is symmetrical.

1. Remove the two screws from the sunvisor bracket.

2. Disconnect the positive terminal, and remove the sunvisor.

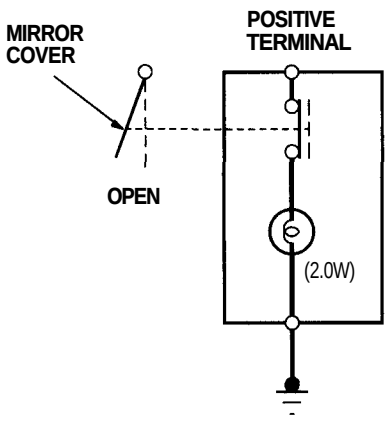


NOTE: The switch is built into the vanity mirror.

3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	POSITIVE TERMINAL		MOUNT BASE
CLOSE (OFF)			
OPEN (ON)	○	—○—	○

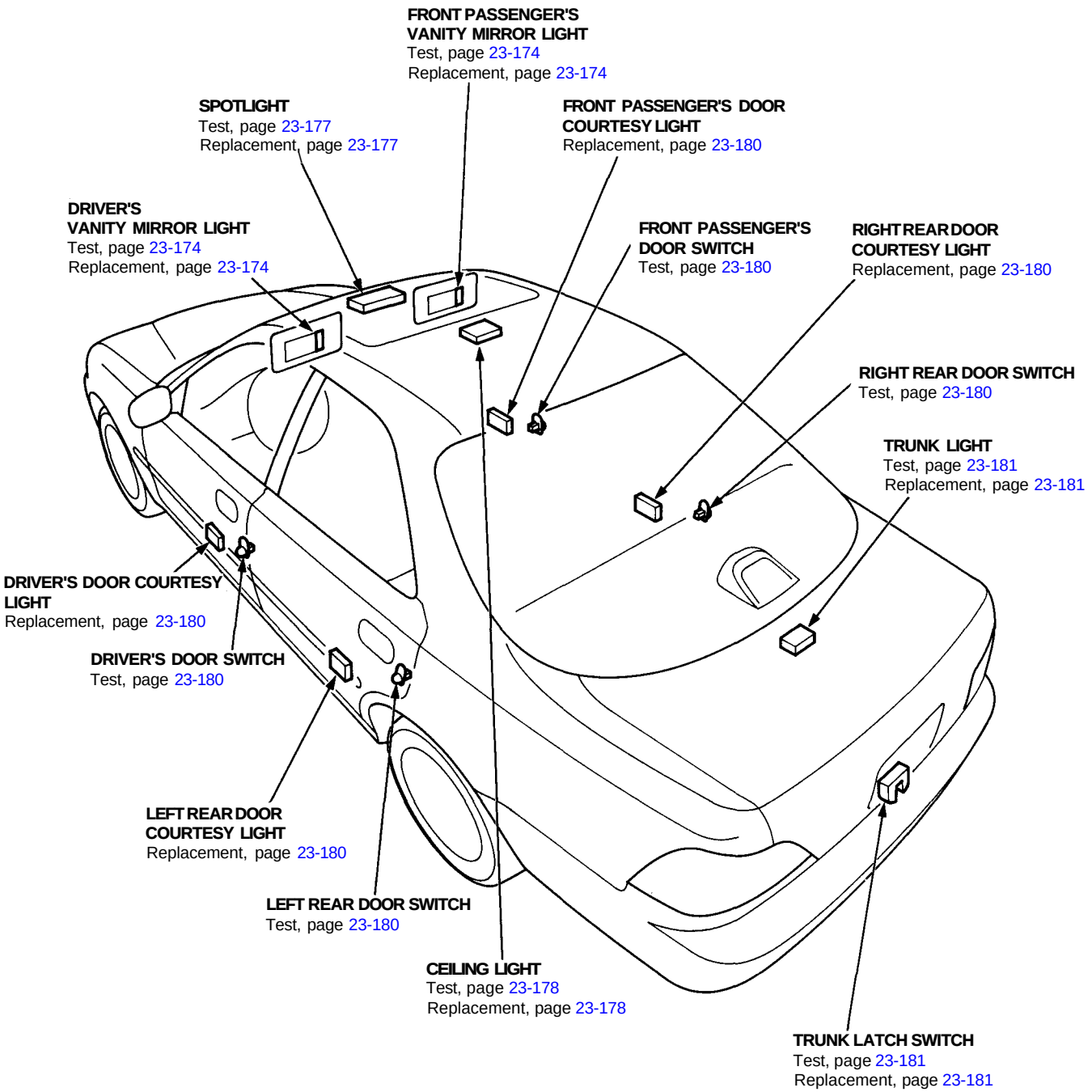
4. If necessary, pry off the lens, and replace the bulb.



At MOUNT BASE

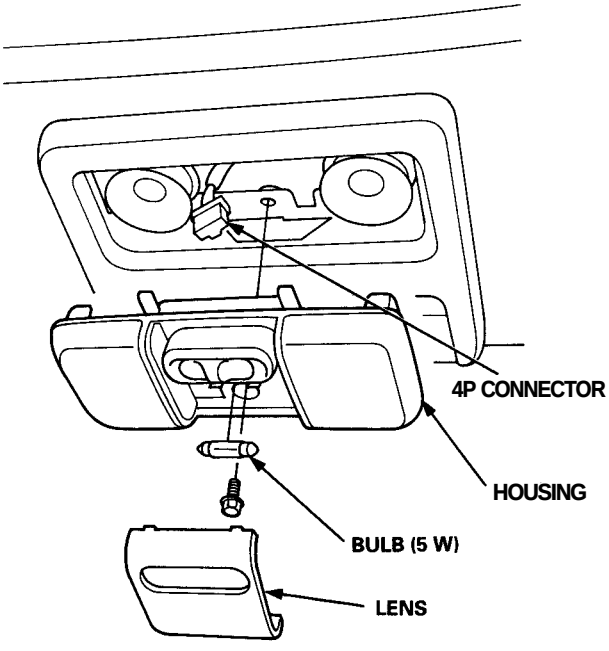
Interior Lights

Component Location Index



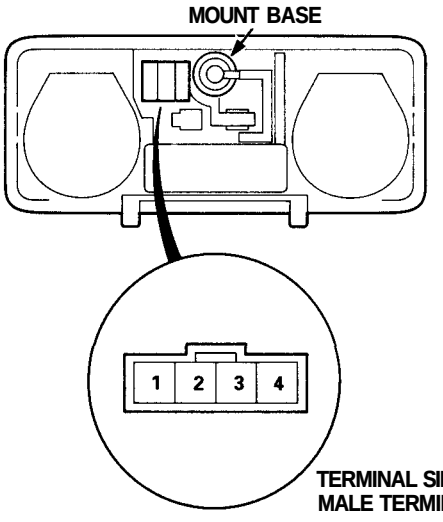
Spotlight Test/Replacement

1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the bolt and the housing.
4. Disconnect the 4P connector from the housing.

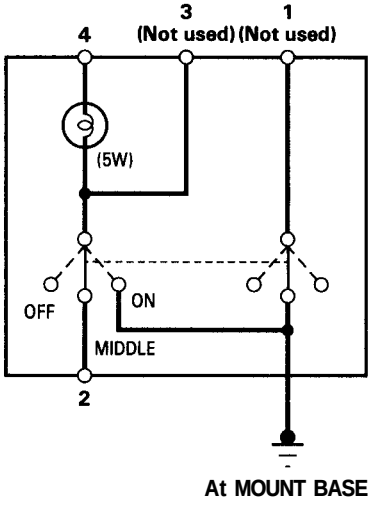


5. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	4		3	2	1	MOUNT BASE
OFF	○	⊖	○			
MIDDLE	○	⊖	○	○	○	○
ON	○	⊖	○			○



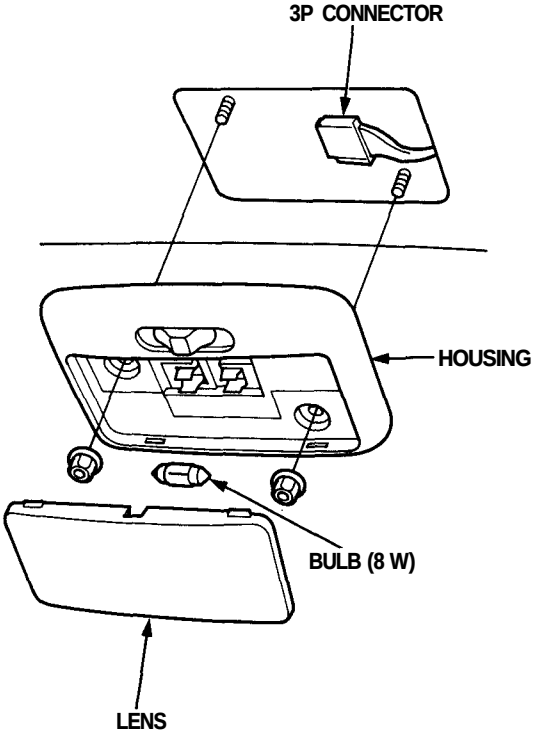
NOTE: The No. 1 and No. 3 terminals are not used.



Interior Lights

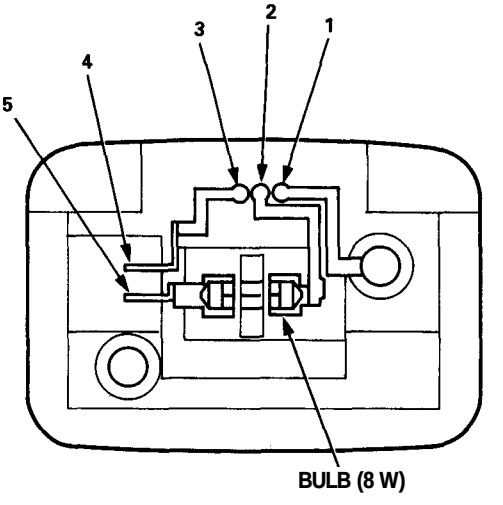
Ceiling Light Test (With Moonroof)

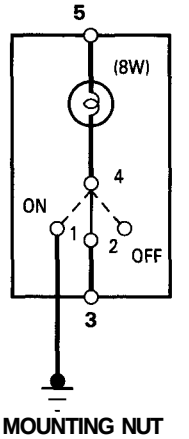
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the two mounting nuts and the housing.



4. Disconnect the 3P connector from the housing.
5. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2 or 3	4		5
OFF			○	⊙	○
MIDDLE		○	○	⊙	○
ON	○		○	⊙	○

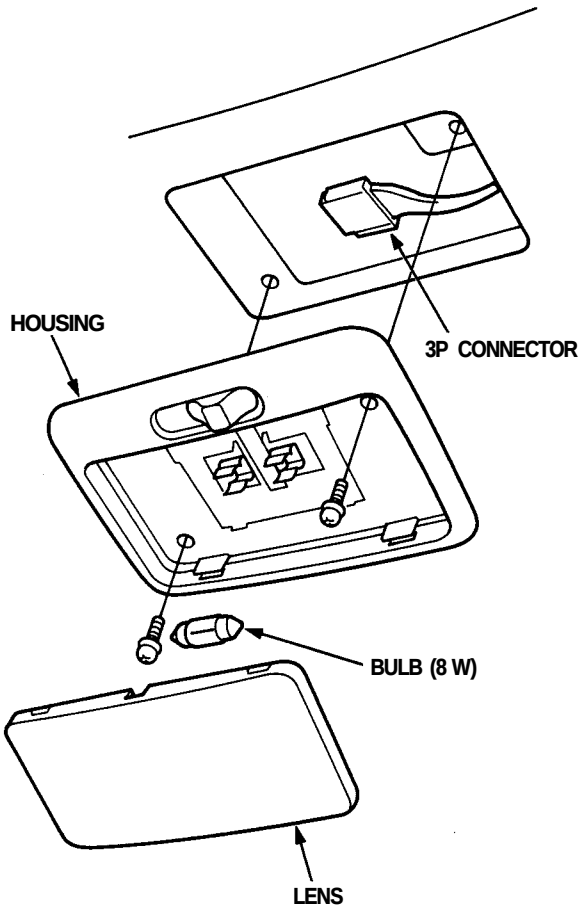




At MOUNTING NUT

Ceiling Light Test (Without Moonroof)

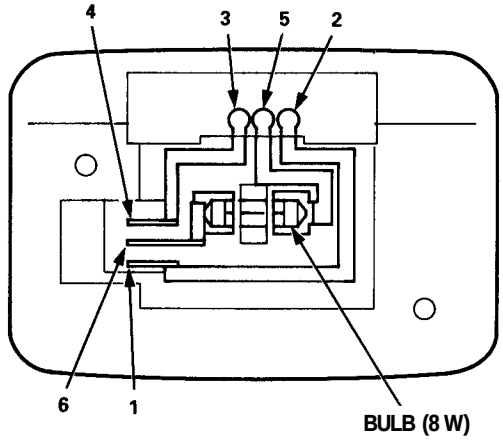
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the two screws and the housing

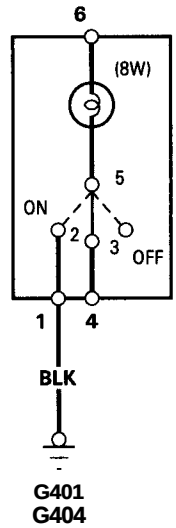


4. Disconnect the 3P connector from the housing.

5. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1 or 2	3 or 4	5		6
OFF			○	○	○
MIDDLE		○	○	○	○
ON	○		○	○	○



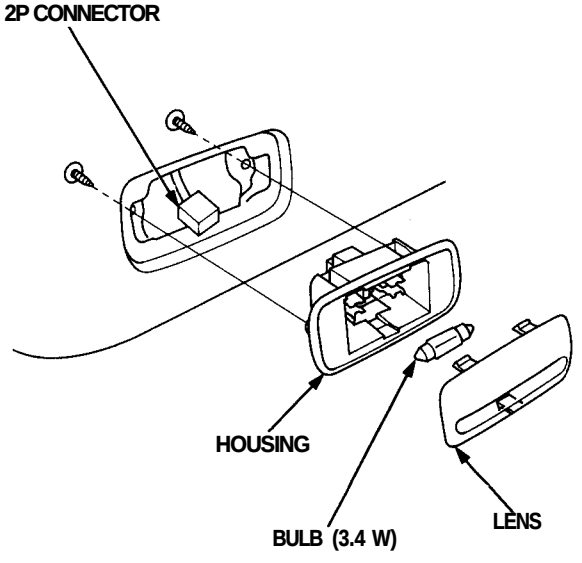


Interior Lights

Courtesy Lights Replacement

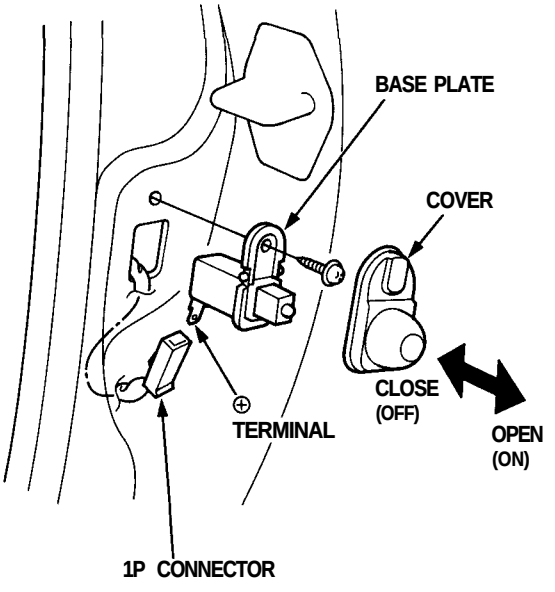
NOTE: The bulb or lens alone can be replaced without removing the door panel.

1. To replace the entire light, remove the door panel (see section 20).
2. Remove the two screws, then remove the light housing from the door panel.
3. Disconnect the 2P connector, and remove the light.



Door Switch Test

1. Remove the cover and the screw, then pull the switch out.
2. Disconnect the 1P connector, and remove the switch.

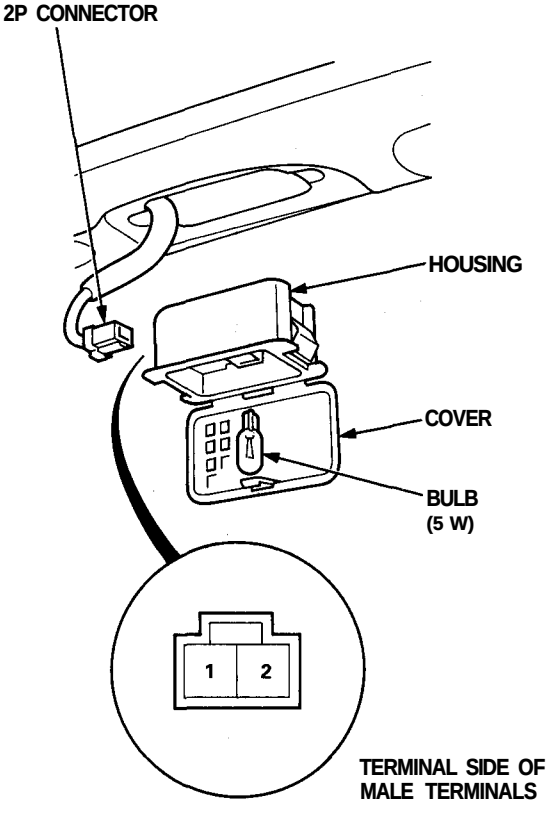


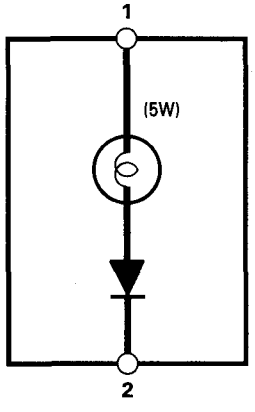
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	⊕ TERMINAL	BASE PLATE
CLOSE (OFF)		
OPEN (ON)	○	○

Trunk Light Test/Replacement

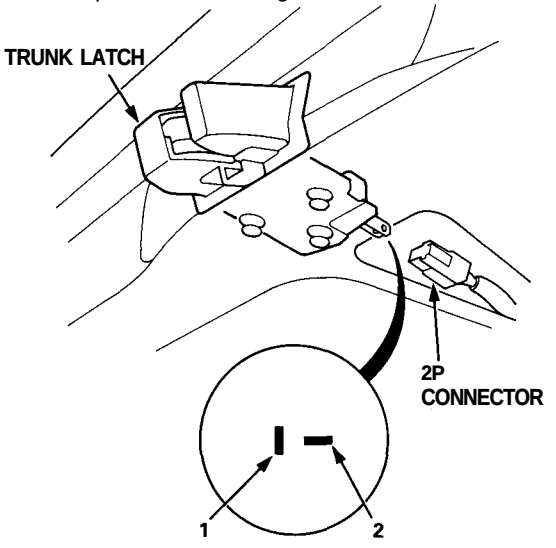
1. Open the trunk light cover.
2. Pry out the light assembly.
3. Disconnect the 2P connector from the housing.
4. Make sure that the bulb is OK. Check for continuity between the No. 1 and No. 2 terminals.





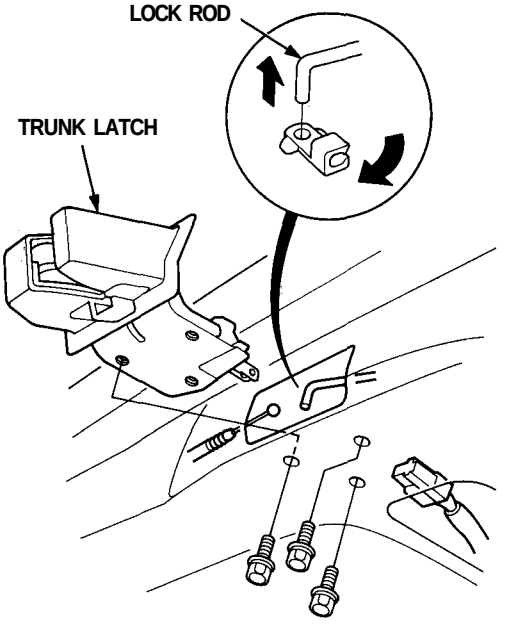
Latch Switch Test/Replacement

1. Open the trunk lid.
2. Disconnect the 2P connector from the trunk latch.
3. Check for continuity between the terminals in each switch position according to the table.



Position \ Terminal	1	2
OPEN	○	○
CLOSE		

4. If necessary, remove the three bolts from the trunk lid, then remove the trunk latch assembly. The switch cannot be replaced separately.

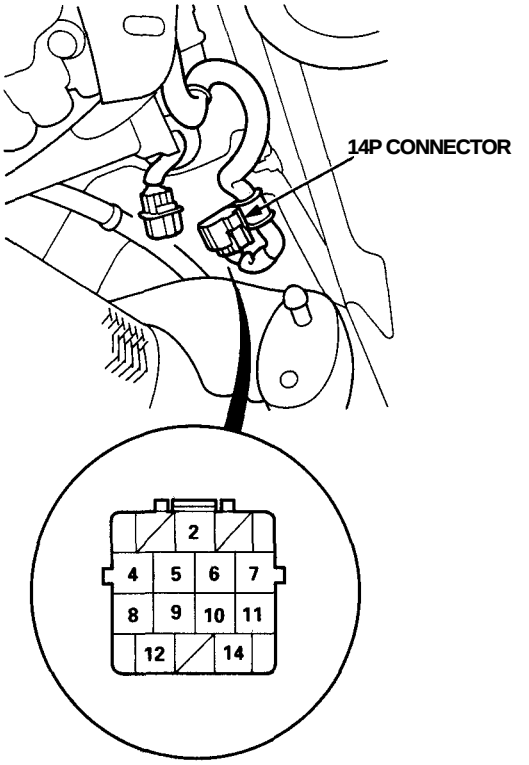


Back-up Lights

Test

NOTE: Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.

1. Test the back-up light switch by shifting the shift lever to R and turning the ignition switch ON (II).
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the 14P connector from the A/T gear position switch (back-up light switch).



WIRE SIDE OF FEMALE TERMINALS

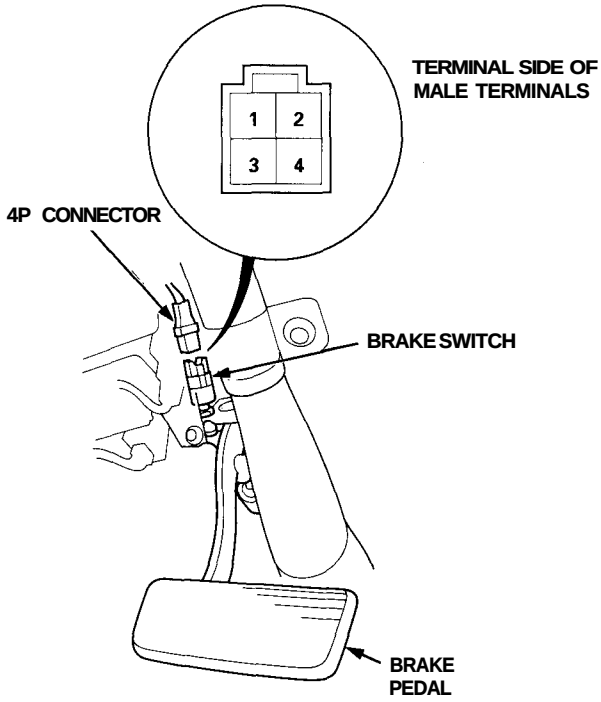
4. Check for continuity between the No. 12 and No. 14 terminals. Move the lever back and forth at the R position without pushing down on the lever, and check for continuity within the range of free play of the shift lever.

   - If there is no continuity within the range of free play, adjust the A/T gear position switch (see section 14).
   - If there is continuity, but the back-up lights do not go on, check for:
     — Poor ground (G502)
     — An open in the YEL or GRN/BLK wire

Brake Lights and High Mount Brake Light

Brake Switch Test

1. If one of the brake lights does not go on, check the bulb in the taillight or the high mount brake light.
2. If none of the brake lights go on, check the No. 30 (20 A) fuse in the under-hood fuse/relay box.
3. If the fuse and bulbs are OK, disconnect the 4P connector from the brake switch.



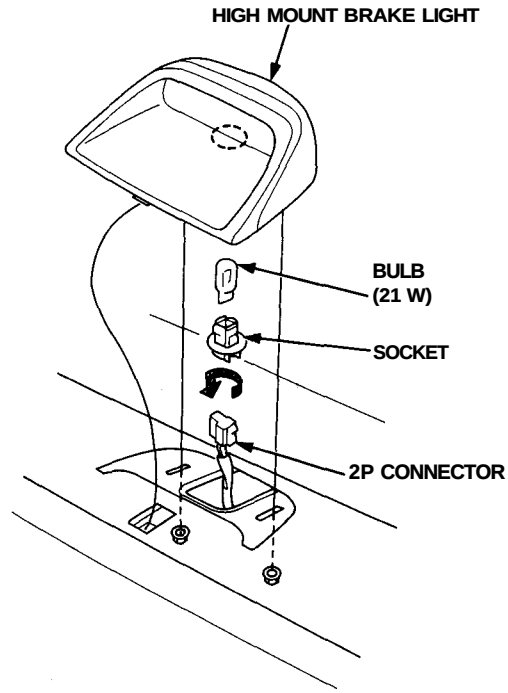
4. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	2	3
RELEASED		
DEPRESSED	○	○

- If there is no continuity with the brake pedal depressed, adjust the pedal height (see section 19), and recheck.
- If there is still no continuity, replace the switch.
- If there is continuity, but the brake lights do not go on, check for:
  - — Poor ground (G502, G501)
  - — An open in the WHT/YEL or GRN/WHT wire
  - — Faulty brake light failure sensor (see page 23-141)

High Mount Brake Light Replacement

1. Open the trunk lid, and disconnect the 2P connector from the high mount brake light.
2. Remove the two nuts, then remove the high mount brake light from the rear shelf.



3. Install the high mount brake light in the reverse order of removal. Clean the rear window before installing the light.

Dash Lights Brightness Controller

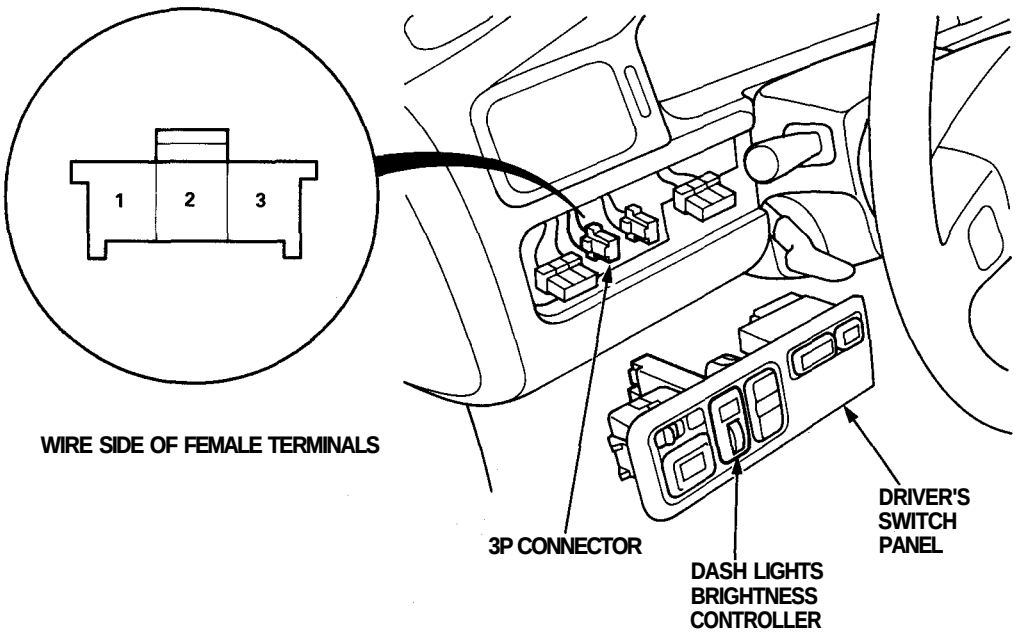
Controller Input Test

NOTE: The control unit is built into the dash lights brightness controller.

1. Carefully pry the controller out of the dashboard, then disconnect the 3P connector from the controller.

2. Inspect the connector terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the controller must be faulty; replace it.

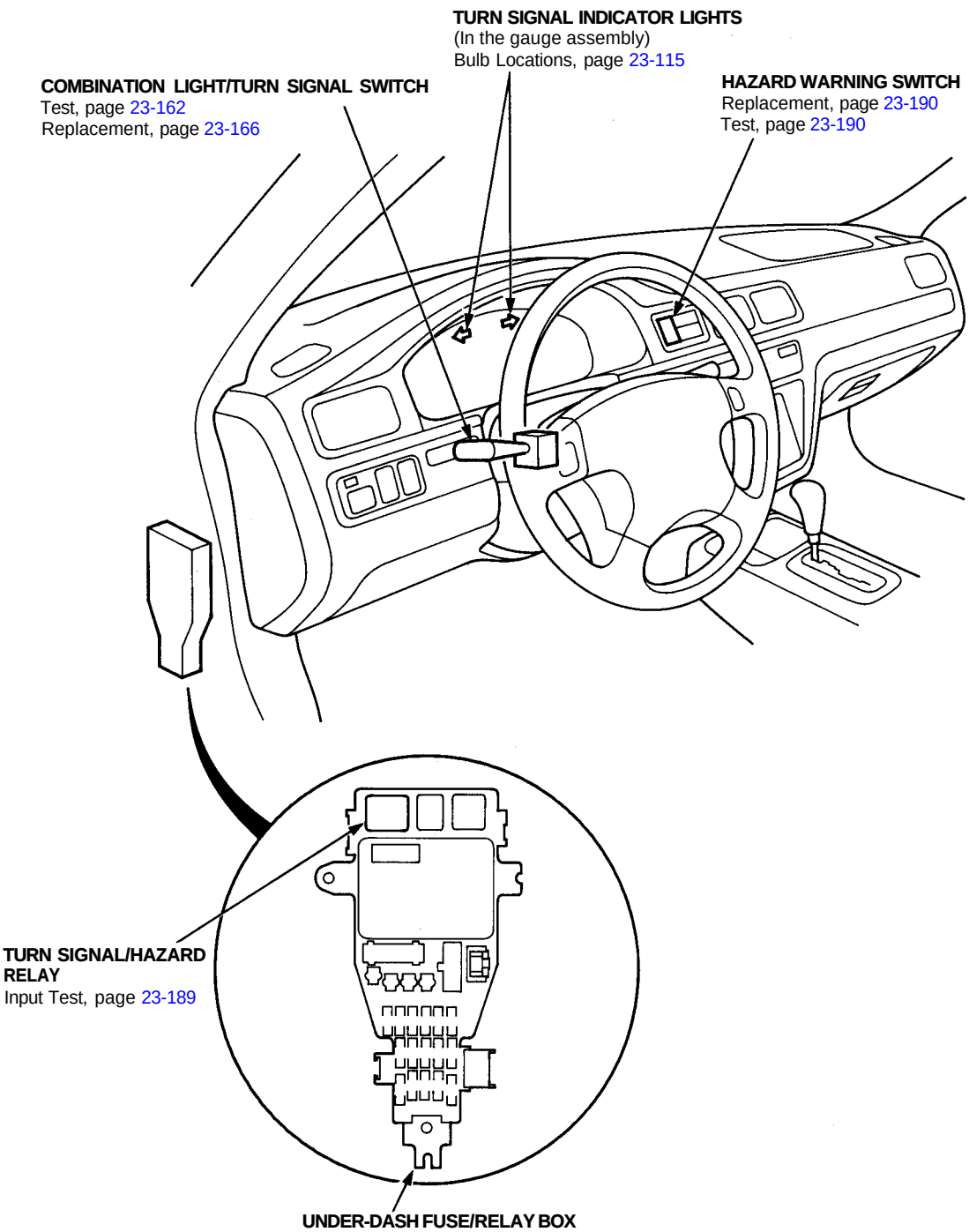


Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 21 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty taillight relay • An open in the wire
2	RED	Combination light switch ON	Connect to ground: Dash lights should come on full bright.	• An open in the wire
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire

Turn Signal/Hazard Flasher System

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



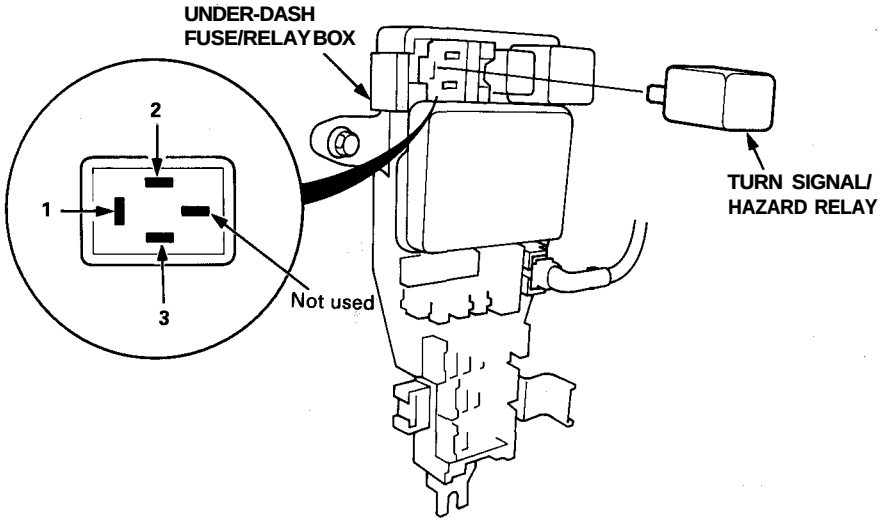
Turn Signal/Hazard Relay Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the turn signal/hazard relay from the under-dash fuse/relay box.

2. Inspect the relay and fuse/relay box socket terminals to be sure they are all making good contact.

- If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
- If the terminals look OK, make the following input tests at the fuse/relay box socket.
  - — If any test indicates a problem, find and correct the cause, then recheck the system.
  - — If all the input tests prove OK, the turn signal/hazard relay must be faulty; replace it.



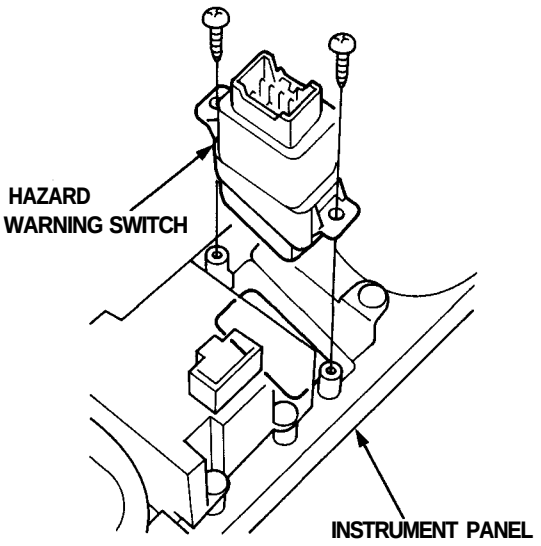
Trml	Test condition	Test: Desired result	Possible cause if result is not obtained
1	Hazard warning switch ON; connect the No. 2 terminal to the No. 1 terminal.	Hazard lights should come on.	• Poor ground (G201, G301, G401, G404, G502) • Faulty hazard warning switch • An open in the wire
	Ignition switch ON (II) and turn signal switch in right or left; connect the No. 2 terminal to the No. 1 terminal.	Right or left turn signal lights should come on.	• Faulty turn signal switch
2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 5 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire • Faulty hazard warning switch
	Hazard warning switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 35 (15 A) fuse in the under-hood fuse/relay box • An open in the wire • Faulty hazard warning switch
3	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire

Turn Signal/Hazard Flasher System

Switch Replacement

CAUTION: Be careful not to damage the dashboard and instrument panel.

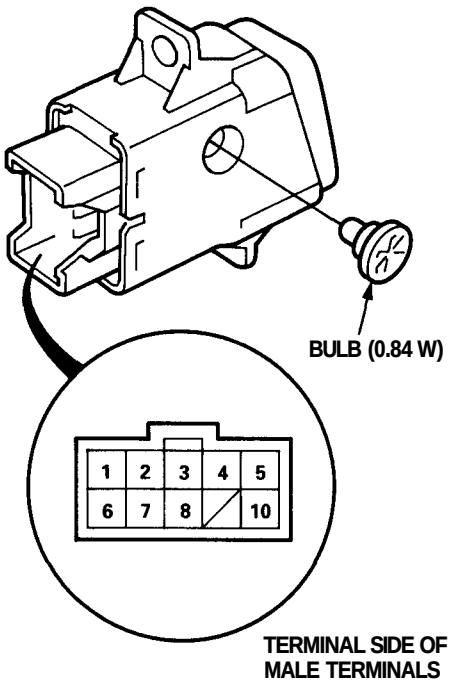
1. Remove the instrument panel (see section 20).
2. Remove the hazard warning switch from the instrument panel.

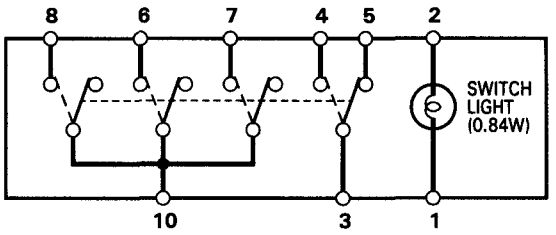


3. Install in the reverse order of removal.

Switch Test

1. Remove the hazard warning switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.



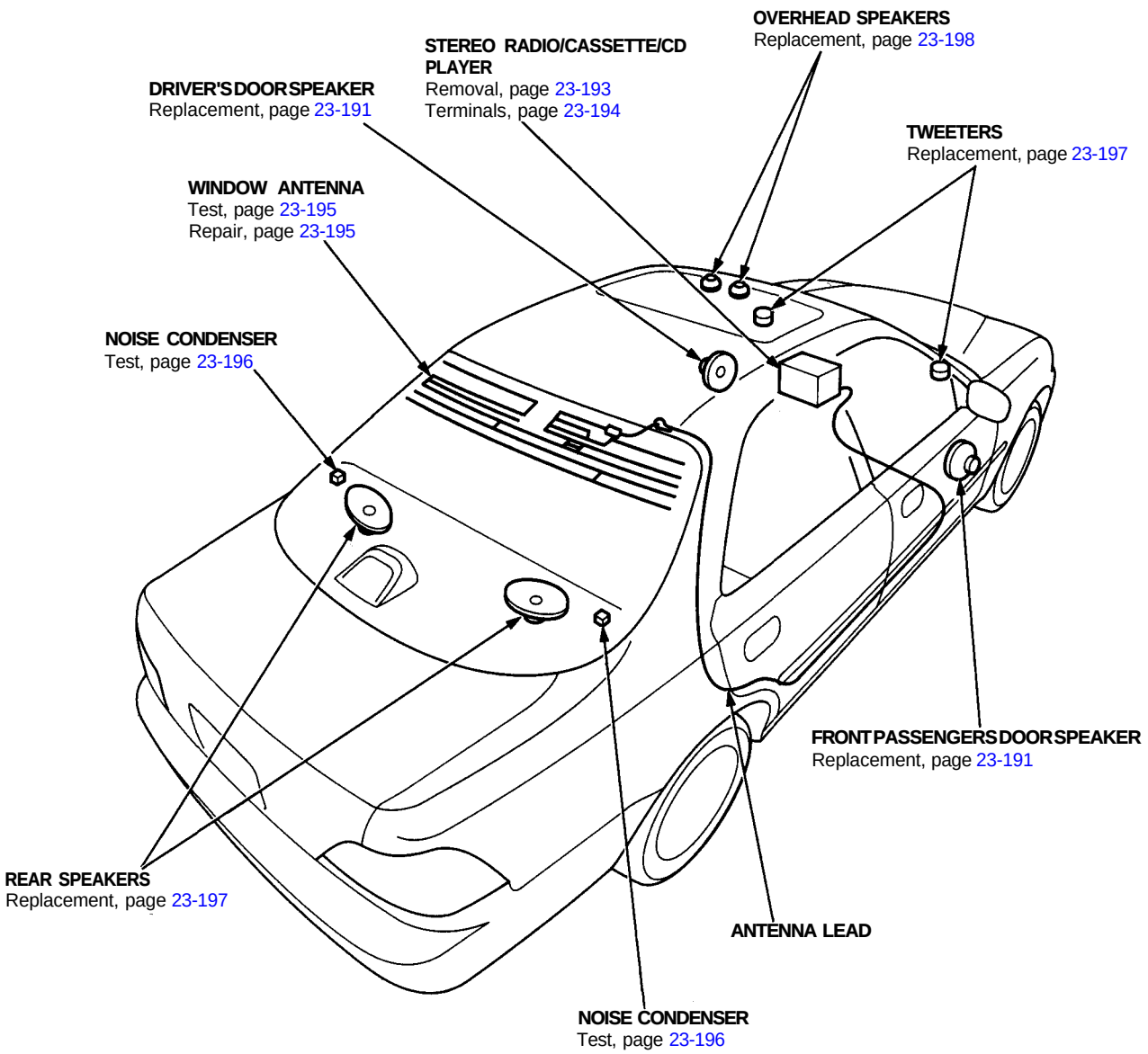


Terminal / Position	1		2	3	4	5	6	7	8	10
OFF	○	⊖	○	○		○				
ON	○	⊖	○	○	○		○	○	○	○

Stereo Sound System

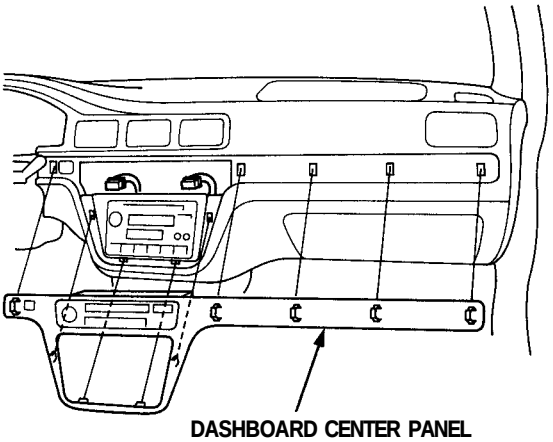
Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

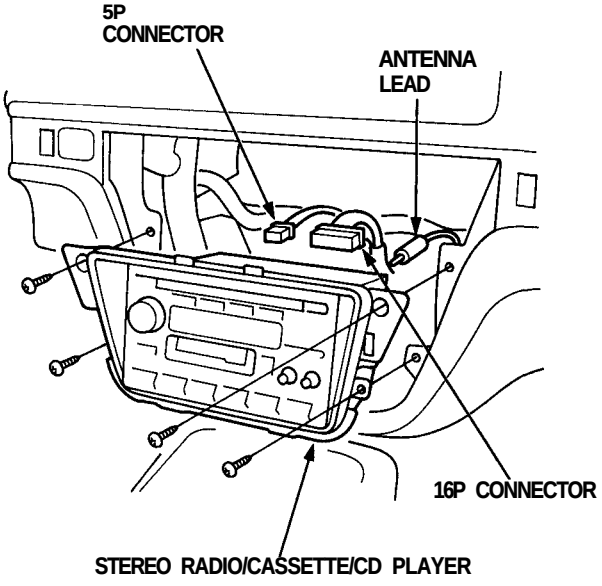


Removal

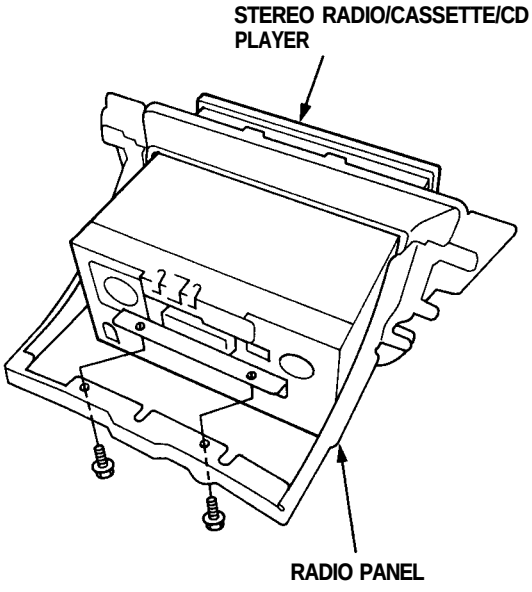
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.
2. Pry out the dashboard center panel from the dashboard.
3. Disconnect the connectors from the climate control unit.



4. Remove the radio panel and stereo radio/cassette/CD Player from the dashboard.
5. Disconnect the 16P and 5P connectors, and antenna lead from the stereo radio/cassette/CD player.



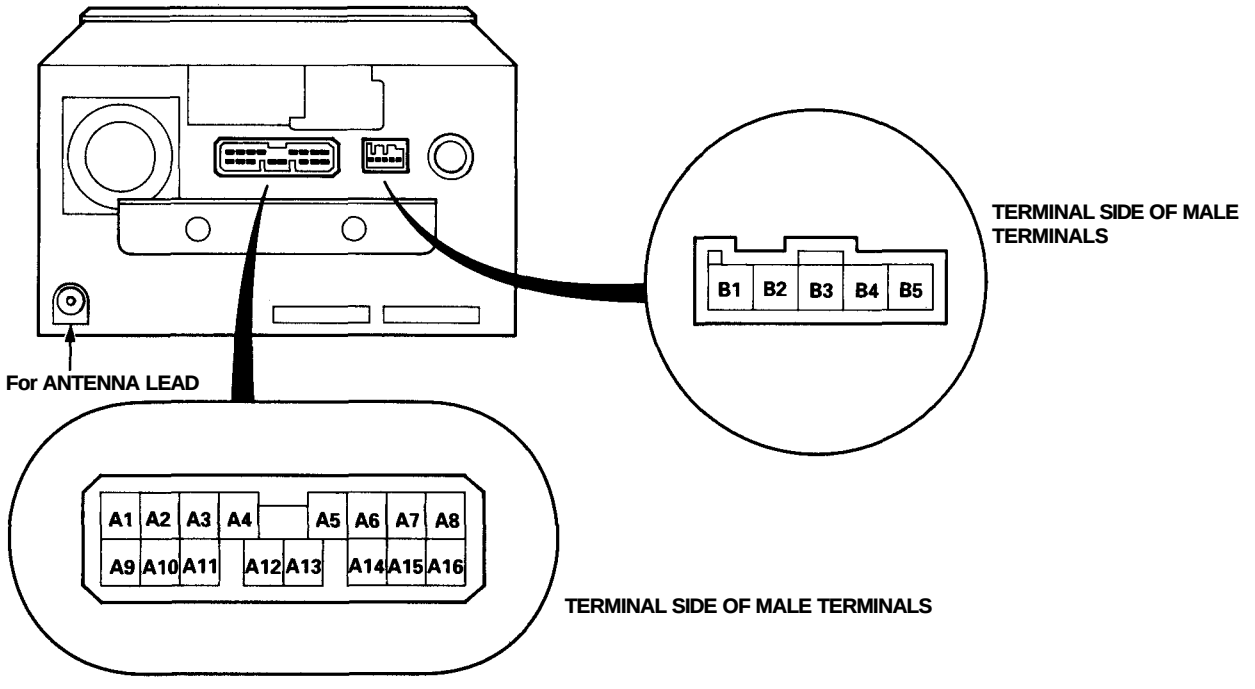
6. Remove the stereo radio/cassette/CD player from the radio panel.



7. Install in the reverse order of removal.
8. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Stereo Sound System

Stereo Radio/Cassette/CD Player Terminals

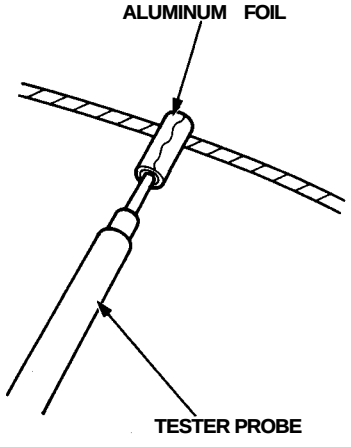


Trml	Wire	Connects to
A1	RED/GRN	Front passenger's door speaker ⊕, Right tweeter ⊕
A2	BLU/GRN	Driver's door speaker ⊕, Left tweeter ⊕
A3	RED/BLK	Lights-on signal
A4	WHT/GRN	Constant power (Tuning memory)
A5	WHT/YEL	ACC (Main stereo power supply)
A6	———	(Not used)
A7	BLU/YEL	Left rear speaker ⊕
A8	RED/YEL	Right rear speaker ⊕
A9	BRN/BLK	Front passenger's door speaker ⊖, Right tweeter ⊖
A10	GRY/BLK	Driver's door speaker ⊖, Left tweeter ⊖
A11	———	(Not used)
A12	PNK	Security (IN)

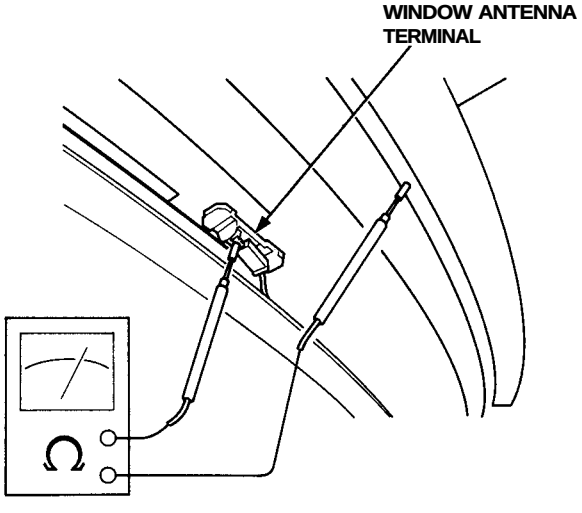
Trml	Wire	Connects to
A13	BLK[2]	Security ground (G401, G404)
A14	BLK[1]	Ground (G601)
A15	GRY/WHT	Left rear speaker ⊖
A16	BRN/WHT	Right rear speaker ⊖
B1	GRN	Right overhead speaker ⊖
B2	GRN/BLU	Right overhead speaker ⊕
B3	GRN/ORN	Left overhead speaker ⊖
B4	GRN/RED	Left overhead speaker ⊕
B5	———	(Not used)

Window Antenna Wire Test

1. Wrap aluminum foil around the tip of the tester probe as shown.



2. Touch one tester probe to the window antenna terminal, and move the other tester probe along the antenna wires to check that continuity exists.

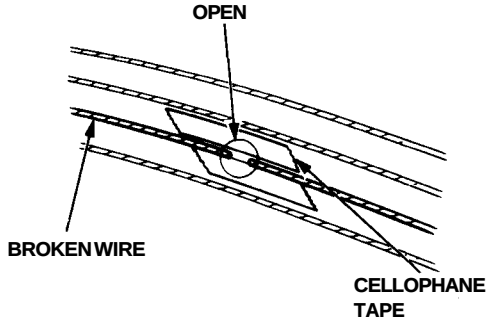


Window Antenna Wire Repair

NOTE: To make an effective repair, the broken section must be no longer than one inch.

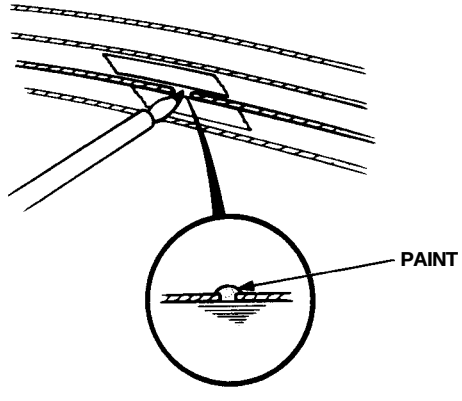
1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.

2. Carefully mask above and below the broken portion of the window antenna wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.

   NOTE: Thoroughly mix the paint before use.



4. Check for continuity in the repaired wire.

5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

Stereo Sound System

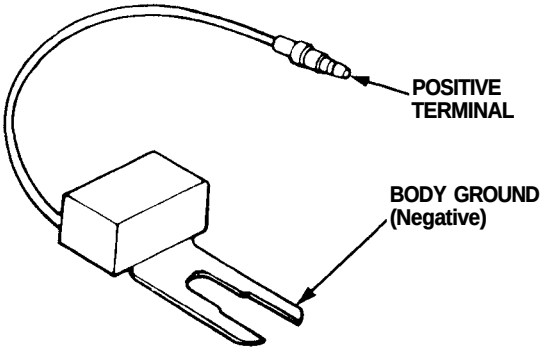
NoiseCondenserCapacity

Test:

1. Use a commercially available condenser tester. Connect the tester probes and measure the condenser capacity.

   NOTE: Make sure not to confuse the tester probes or you may damage the condenser.

Noise condenser capacity: 0.1 ± 0.02 microfarads (μF)

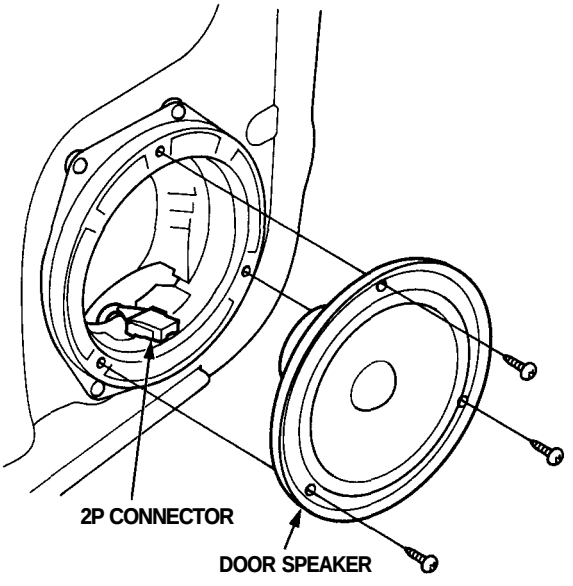


2. If not within the specification, replace the noise condenser.

Door Speaker Replacement

1. Remove the door panel.
2. Remove the three screws, then disconnect the 2P connector from the speaker.

   NOTE: The illustration shows the driver's door speaker; the passenger's door speaker is symmetrical.



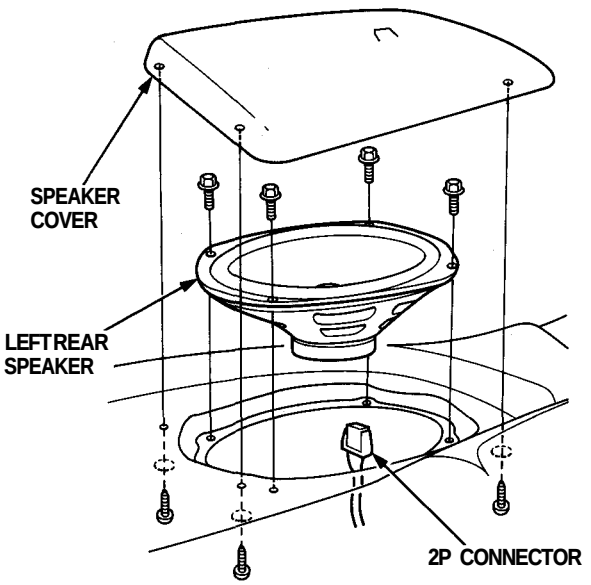
3. Install in the reverse order of removal.

Rear Speaker Replacement

1. Remove the three screws from the trunk side, then remove the speaker cover.

2. Remove the four screws, then disconnect the connector from the speaker, and remove the speaker.

   NOTE: The illustration shows the left rear speaker; the right rear speaker is symmetrical.

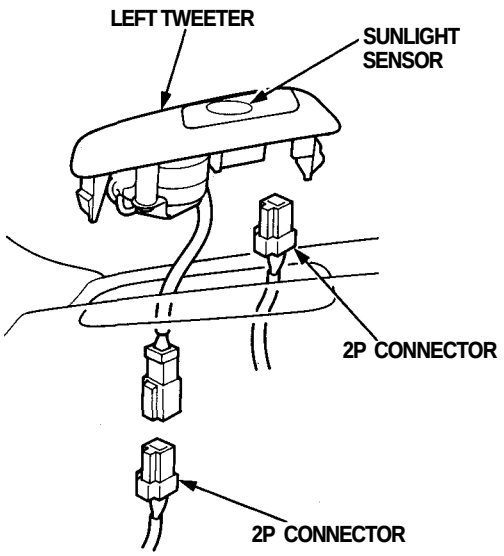


3. Install in the reverse order of removal.

Tweeter Replacement

1. Carefully pry the tweeter out of the dashboard, then disconnect the 2P connector(s) from the speaker (and sunlight sensor).

   NOTE: The illustration shows the left tweeter; the right tweeter is similar, but has no sunlight sensor.

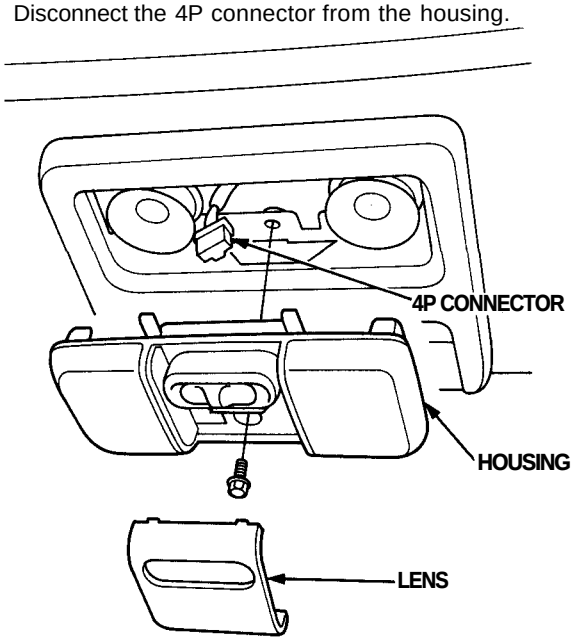


2. Install in the reverse order of removal.

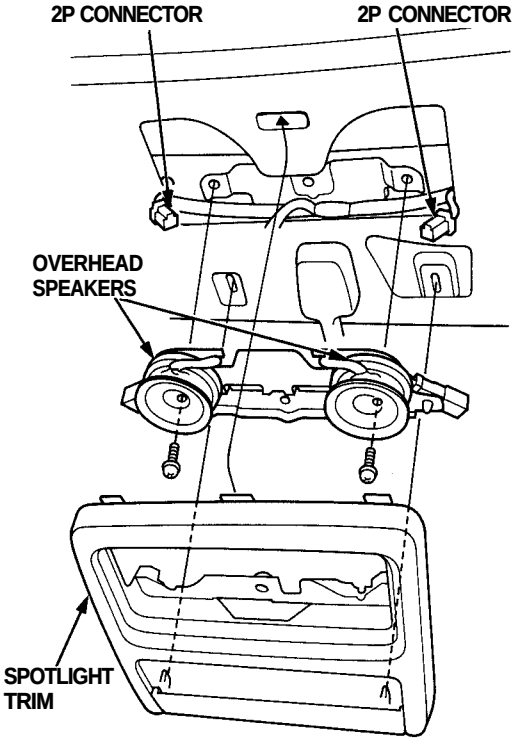
Stereo Sound System

Overhead Speaker Replacement

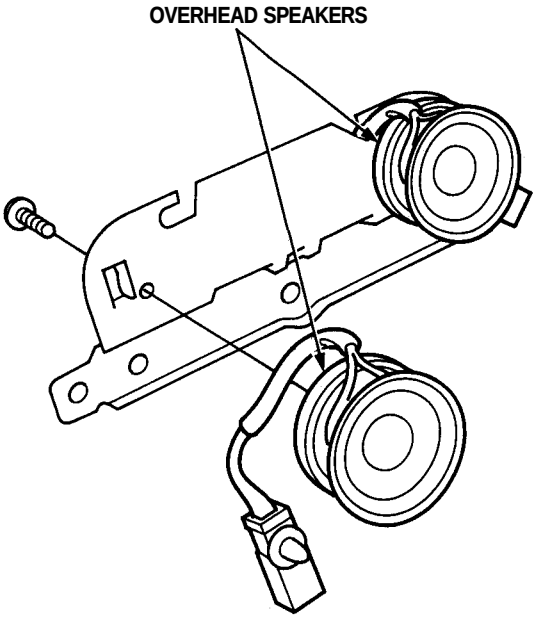
1. Turn the spotlight switch OFF.
2. Pry off the lens.
3. Remove the bolt and the housing.
4. Disconnect the 4P connector from the housing.



5. Remove the spotlight trim.
6. Remove the two screws, then disconnect the 2P connectors from the wire harness.



7. Disconnect the wires from the overhead speaker, then remove the screw.



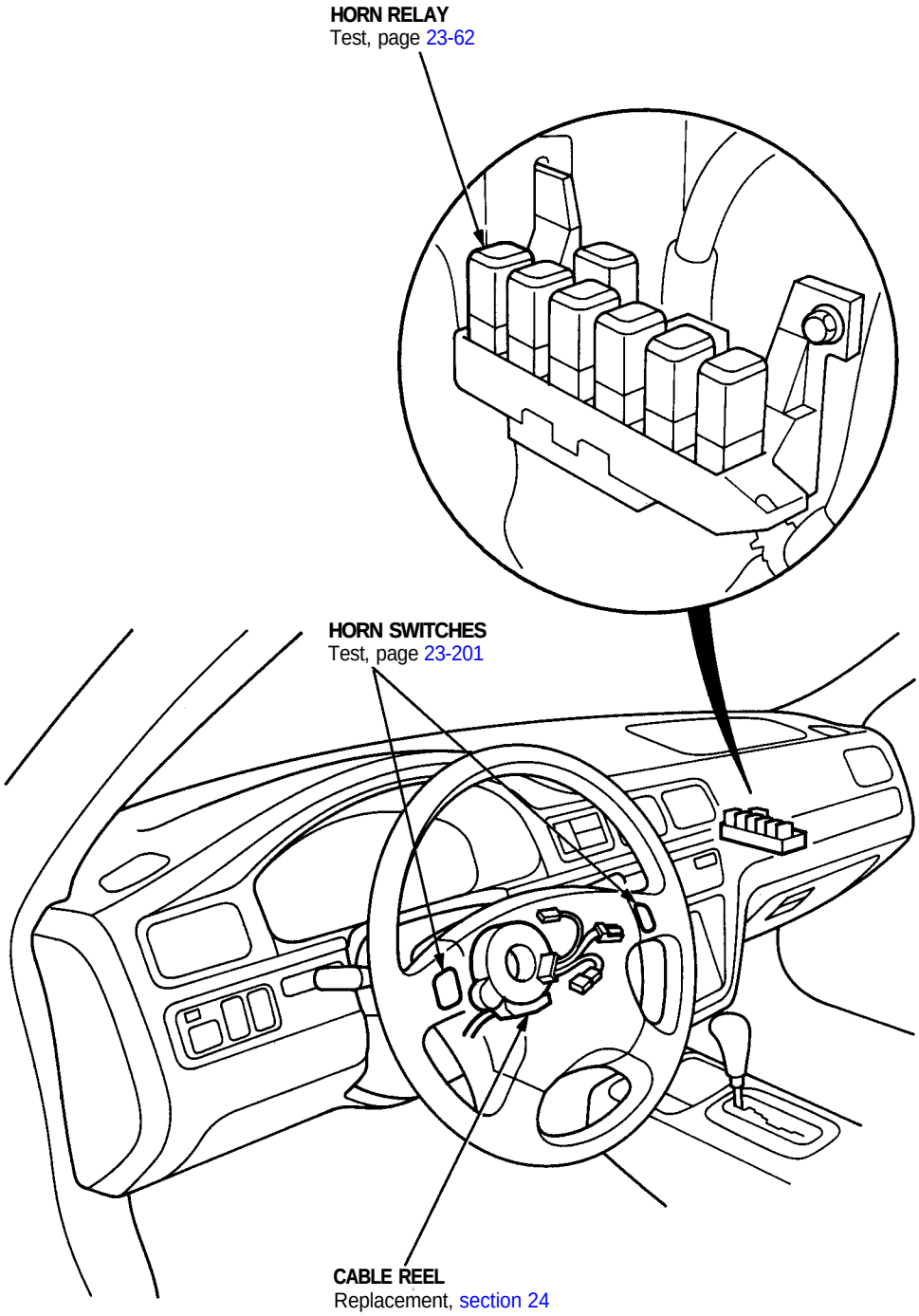
8. Install in the reverse order of removal.

Horns

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

HORN ASSEMBLY
Test, page 23-203



Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

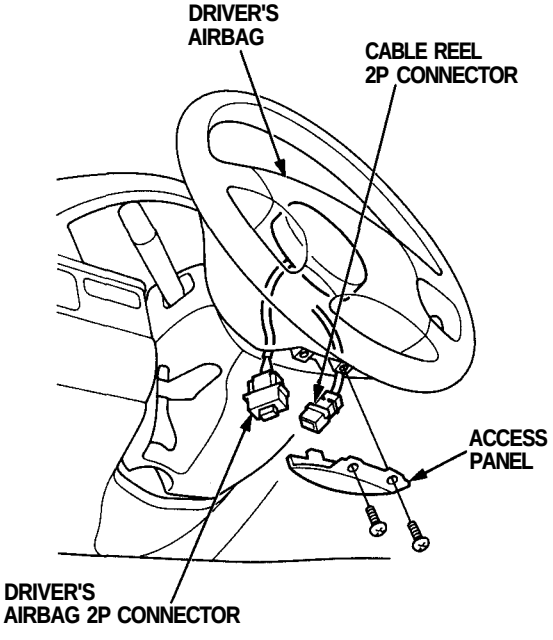
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.

3. Disconnect the airbag connector(s).

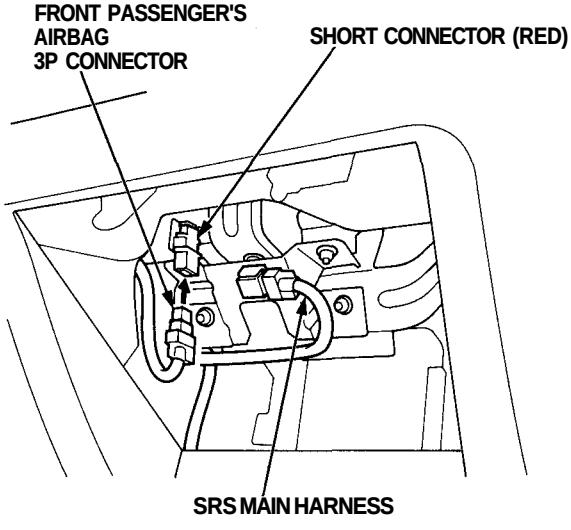
Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



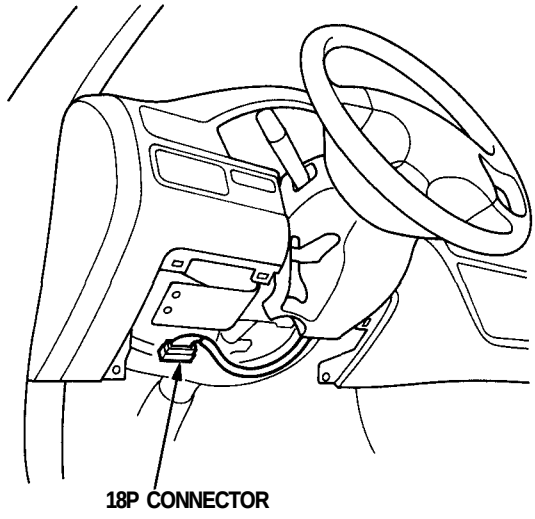
Front Passenger's Side ('95 - 96 models only):

- Remove the glove box (see section 20).
- Disconnect the front passenger's 3P connector from the SRS main harness, and connect the short connector (RED) to the front passenger's airbag 3P connector.



4. Remove the dashboard lower cover and knee bolster (see page 23-64).

5. Disconnect the combination switch harness 18P connector from the main harness.

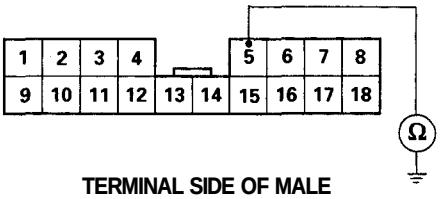


(cont'd)

Horns

Switch Test (cont'd)

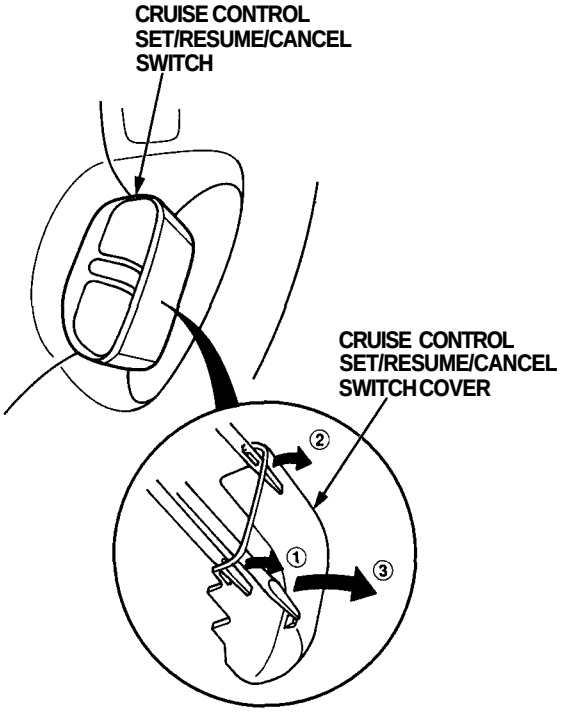
6. Check for continuity between the No. 4 terminal of the 18P connector of the combination switch harness and body ground with the horn switch pressed.



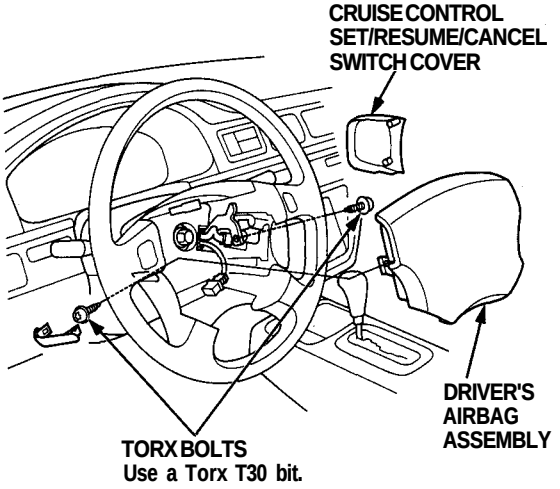
TERMINAL SIDE OF MALE TERMINALS

- If there is continuity, the horn switch is OK.
- If there is no continuity, go to step 7.

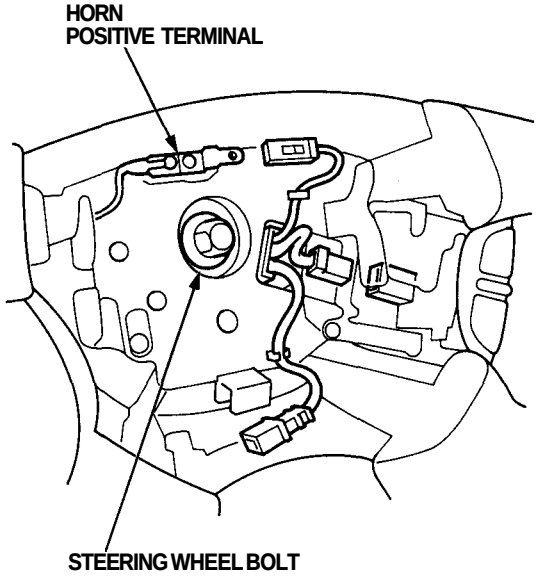
7. Carefully remove the cruise control set/resume/cancel switch cover by prying between the cover and the switch in the sequence shown.



8. Remove the Torx bolts using a Torx T30 bit, then remove the driver's airbag assembly.



9. Check for continuity between the horn positive terminal and the steering wheel bolt with the horn switch pressed.

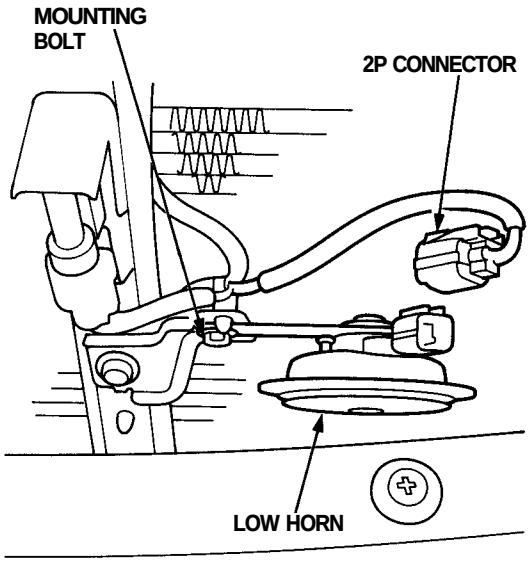


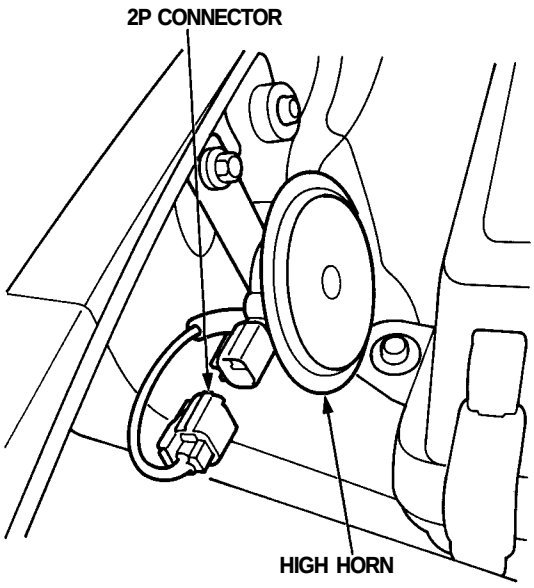
- If there is continuity,
  — check the cable reel.
  — check the combination switch harness.
- If there is no continuity, replace the horn switch.

10. If all the tests prove OK, reconnect the battery cables, and enter the anti-theft code for the radio. Then enter the customer's radio station presets.

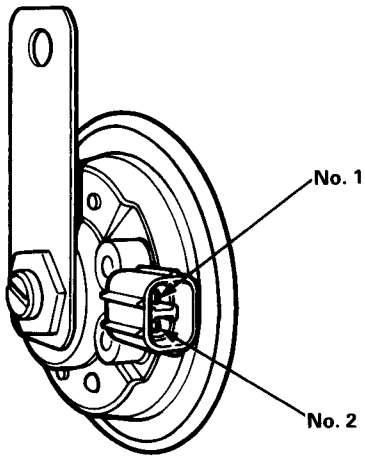
Horn Removal/Test

1. Disconnect the 2P connector from the horns.
2. Remove the low and high horns.





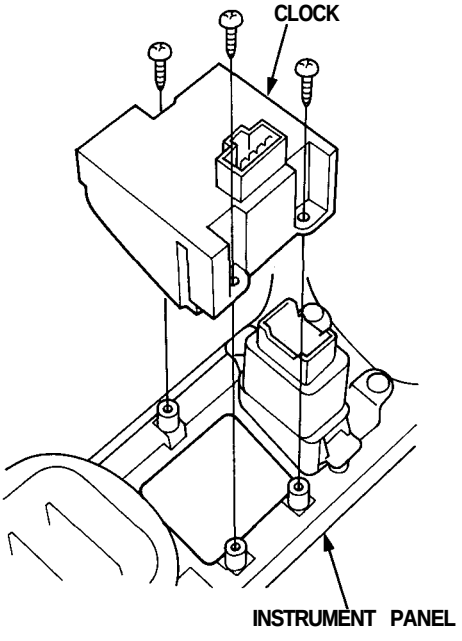
3. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.



4. If the horn fails to sound, replace it.

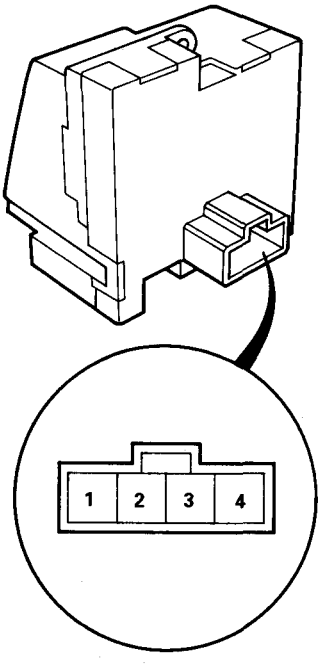
Replacement

1. Remove the instrument panel, (see section 20)
2. Remove the clock from the instrument panel.



3. Install in the reverse order of removal.

Terminals



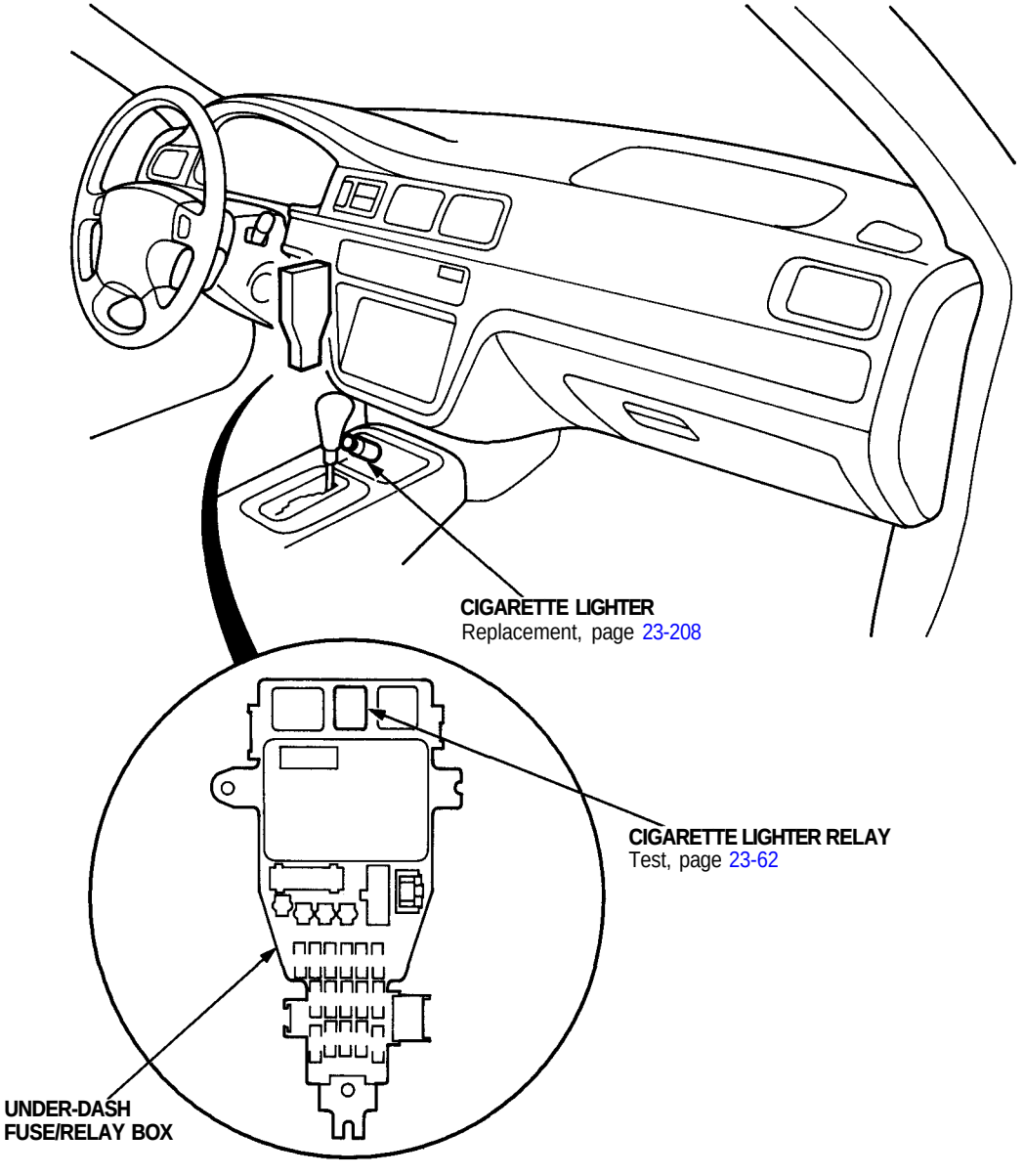
TERMINAL SIDE OF MALE TERMINALS

Terminal	Wire	Destination
1	WHT/GRN	Constant power (Time memory)
2	YEL	IG1 (Main clock power supply)
3	RED/BLK	Lights-on signal
4	BLK	Ground (G401,G404)

Cigarette Lighter

Component Location Index

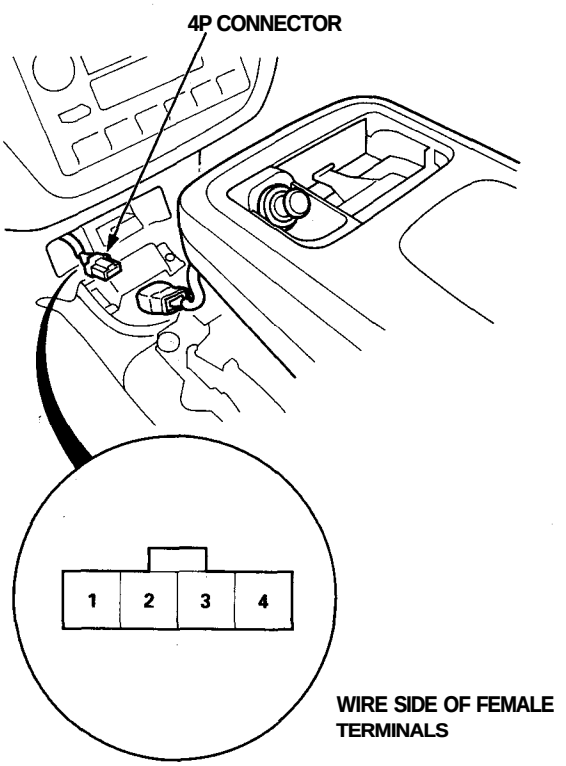
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



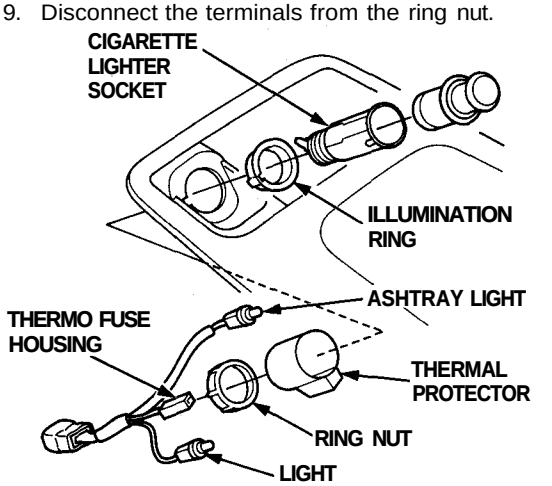
Cigarette Lighter

Test/Replacement

1. Remove the A/T gear position indicator trim light from the A/T gear position indicator trim (see page 23-173).
2. Remove the center console (see section 20).
3. Disconnect the 4P connector from the cigarette lighter.
4. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, go to step 5.



5. Turn the ignition switch ON (II).
6. Check for voltage between the No. 1 and No. 4 terminals.
   There should be battery voltage.
   - If there is no battery voltage, check for
     — blown No. 37 (15 A) fuse in the under-hood fuse/relay box.
     — blown No. 11 (10 A) fuse in the under-dash fuse/relay box.
     — faulty cigarette lighter relay.
     — poor ground (G401, G404).
     — an open in the wire.
7. Turn the headlight switch ON, and check for voltage between the No. 2 and No. 3 terminals with the combination light switch ON.
   There should be battery voltage.
   - If there is no voltage, check for
     — blown No. 21 (15 A) fuse in the under-hood fuse/relay box.
     — faulty taillight relay.
     — faulty combination light switch.
     — an open in the wire.
8. If all tests prove OK, replace the cigarette lighter.
9. Disconnect the terminals from the ring nut.

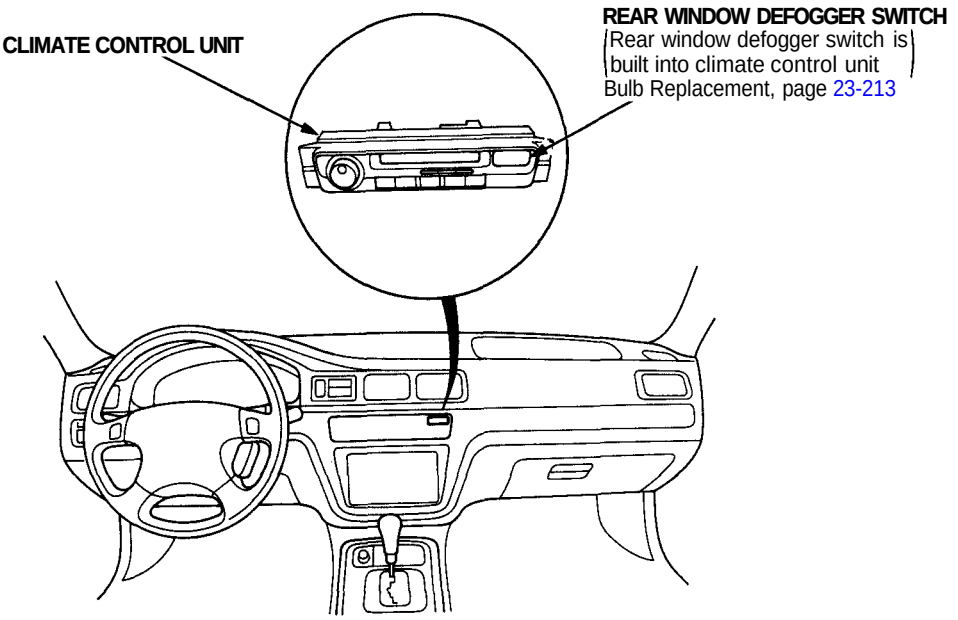


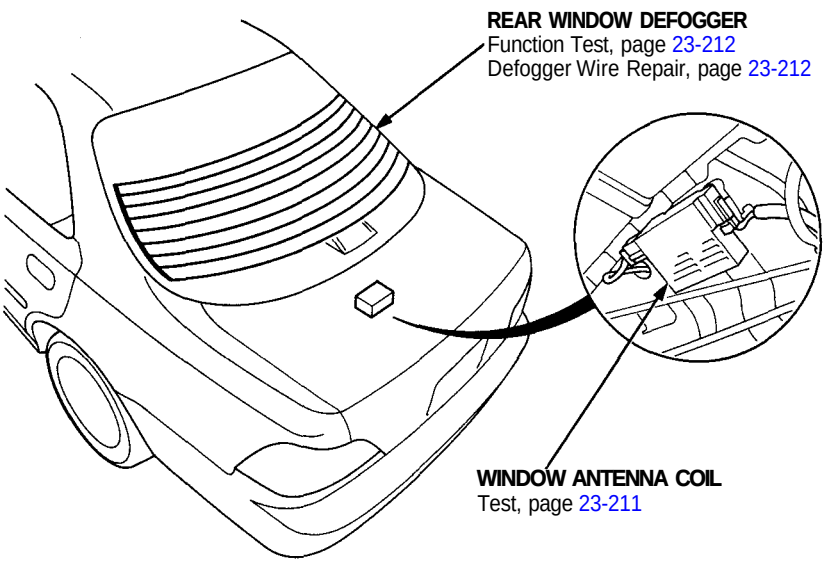
10. Remove the ring nut, and separate the cigarette lighter socket from the body.
11. When installing the cigarette lighter, align each lug on the face panel, illumination ring, and cigarette lighter socket with the groove in the hole, then position the bulb on the body between the stops in the rear console.

Rear Window Defogger

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.





Description

Function:
The rear window defogger is controlled by the climate control unit. When the defogger switch in the climate control unit is pushed, it sends a signal to the defogger timer in the climate control unit, and the defogger stays on for about 25 minutes or until the ignition is switched off.
The indicator light in the switch comes on when the defogger is ON.

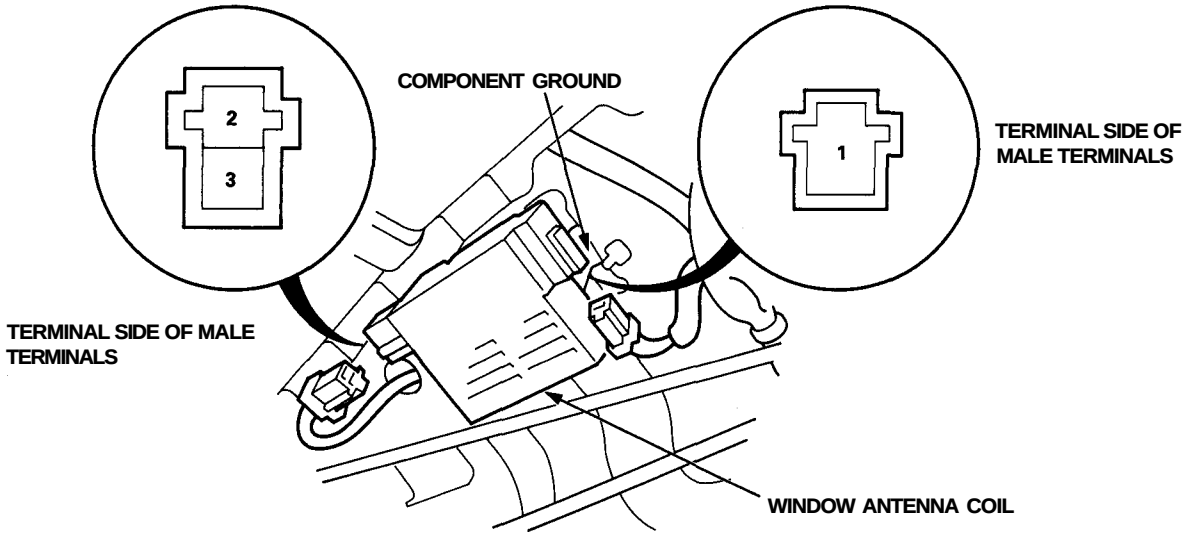
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown indicator light (LED)	Blown No. 8 (7.5 A) fuse (In the under-dash fuse/relay box)	Defogger timer circuit input (In the climate control unit)	Blown No. 7 (7.5 A) fuse (In the under-dash fuse/relay box)	Blown No. 16 (40 A) fuse (In the under-hood fuse/relay box)	Blown No. 39 (10 A) fuse (In the under-hood fuse/relay box)	Function test	Window antenna coil	Defogger relay	Broken defogger wire	Poor ground	Open circuit, loose or disconnected terminals
Defogger works, but indicator light does not come on.	1											
Defogger does not work and indicator light does not come on.		1	3	2		4					G401 G404	YEL, YEL/GRN BLK/YEL, WHT/GRN
Defogger does not work, but indicator light comes on.					1		2		3	4		
Operation time is too long or too short. Normal operation time is about 25 minutes.			1									
Poor radio reception when the rear defogger is on.								1				

Window Antenna Coil Test

1. Open the trunk lid.
2. Check for continuity between the window antenna coil No. 3 terminal and component ground, and between terminals No. 1 and No. 2. If there is no continuity, replace the window antenna coil.



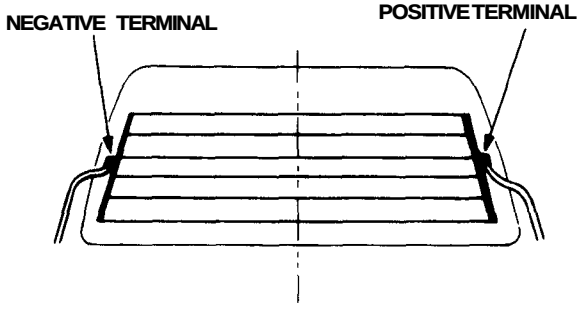
Rear Window Defogger

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe.

1. Check for voltage between the positive terminal and body ground with the ignition switch and defogger switch ON.
   There should be battery voltage.

   - If there is no voltage, check for:
     — faulty defogger relay.
     — an open in the BLK/GRN wire.
   - If there is battery voltage, go to step 2.



2. Check for continuity between the negative terminal and body ground.
   If there is no continuity, check for an open in the defogger ground wire.

3. Touch the voltmeter positive probe to the halfway point of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.

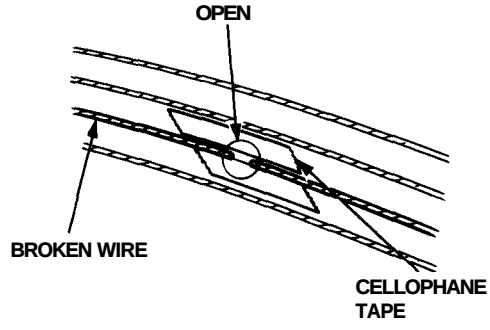
   - If the voltage is as specified, the defogger wire is OK.
   - If the voltage is not as specified, repair the defogger wire.
     — If it is more than 6 V, there is a break in the negative half of the wire.
     — If it is less than 6 V, there is a break in the positive half of the wire.

Defogger Wire Repair

NOTE: To make an effective repair, the broken section must be no longer than one inch.

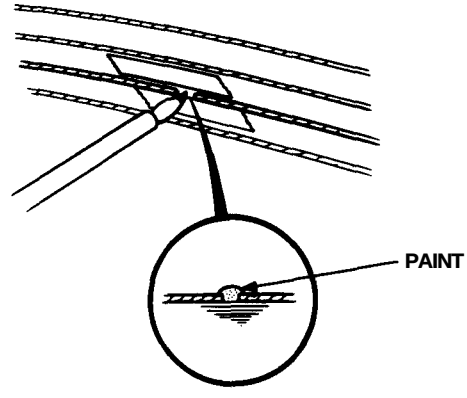
1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.

2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.

   NOTE: Thoroughly mix the paint before use.



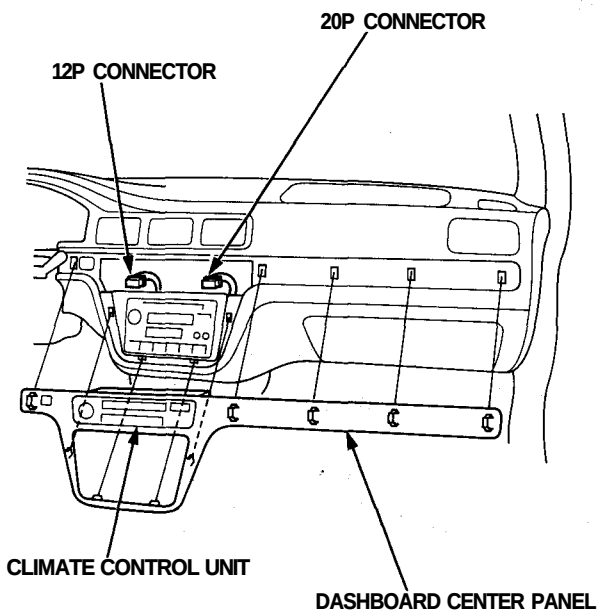
4. Check for continuity in the repaired wire.

5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

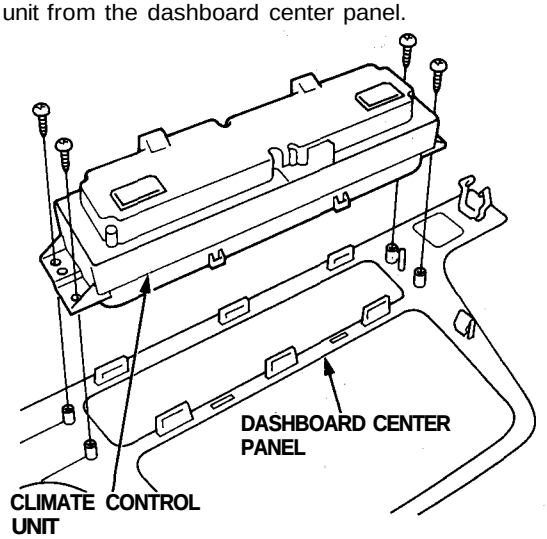
Switch Light Bulb Replacement

1. Pry out the dashboard center panel from the dashboard.

2. Disconnect the 12P and 20P connectors from the climate control unit.



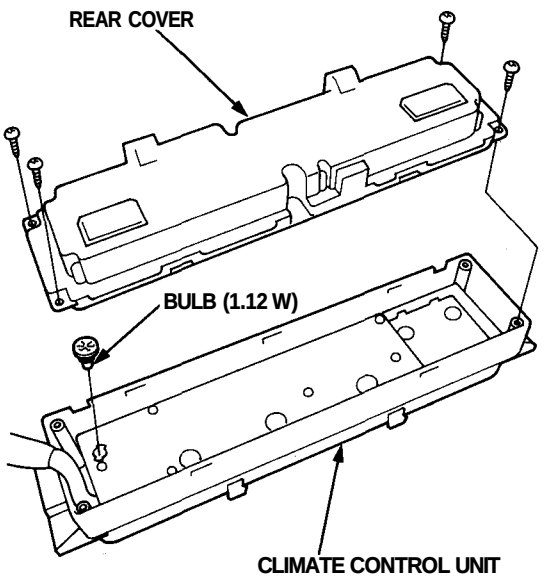
3. Remove the four self taping screws from the climate control unit, then remove the climate control unit from the dashboard center panel.



4. Remove the four self taping screws from the climate control unit.

CAUTION:
- **Before replacing bulbs, discharge the static electricity, which accumulated on you when you removed the climate control unit, by touching the door striker or other parts of the car body.**
- **Do not touch the electronic components on the printed circuit board in the climate control unit.**

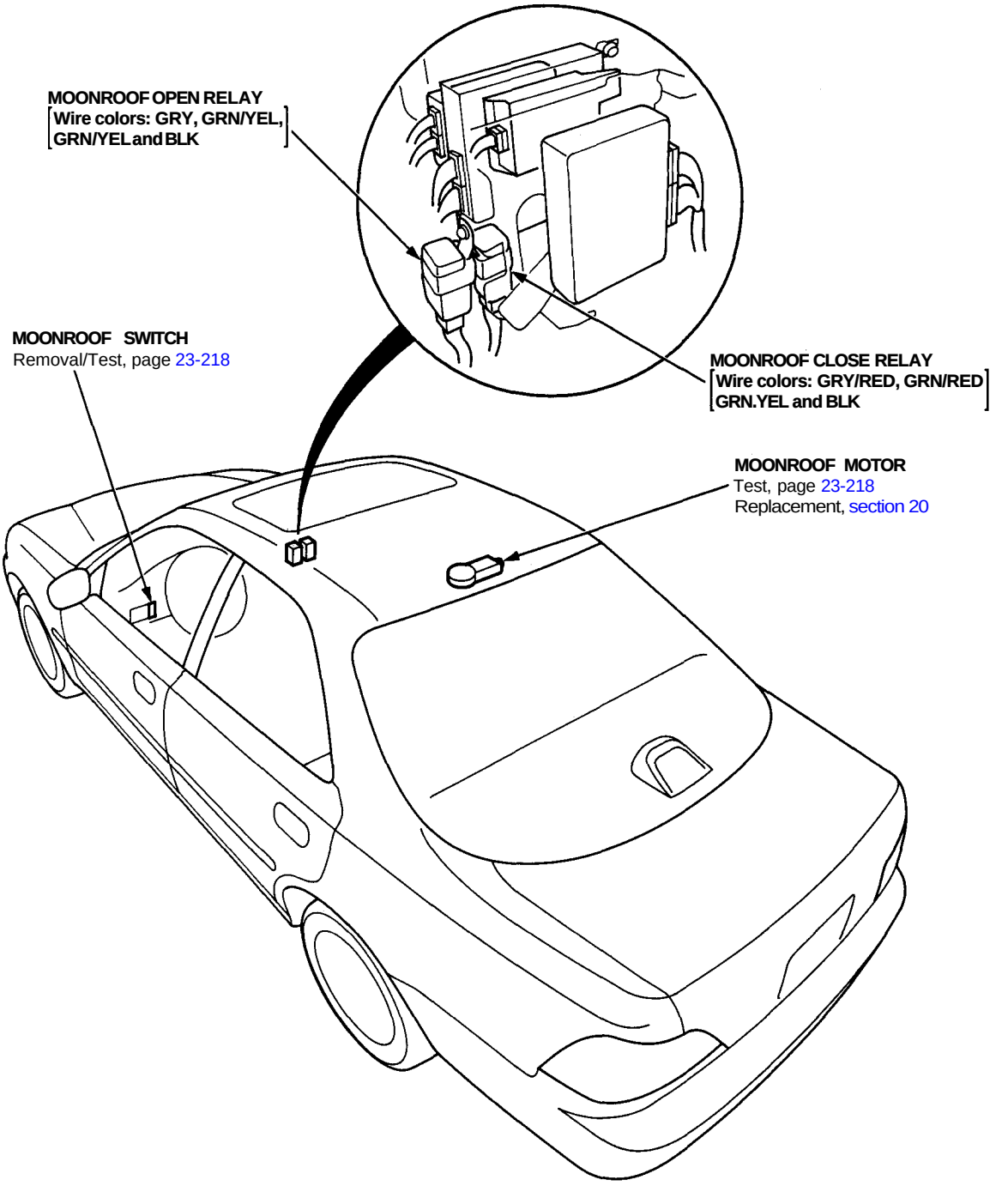
5. Remove the rear cover from the climate control unit.



Moonroof

Component Location Index

Function Test page 23-217



Moonroof

Troubleshooting

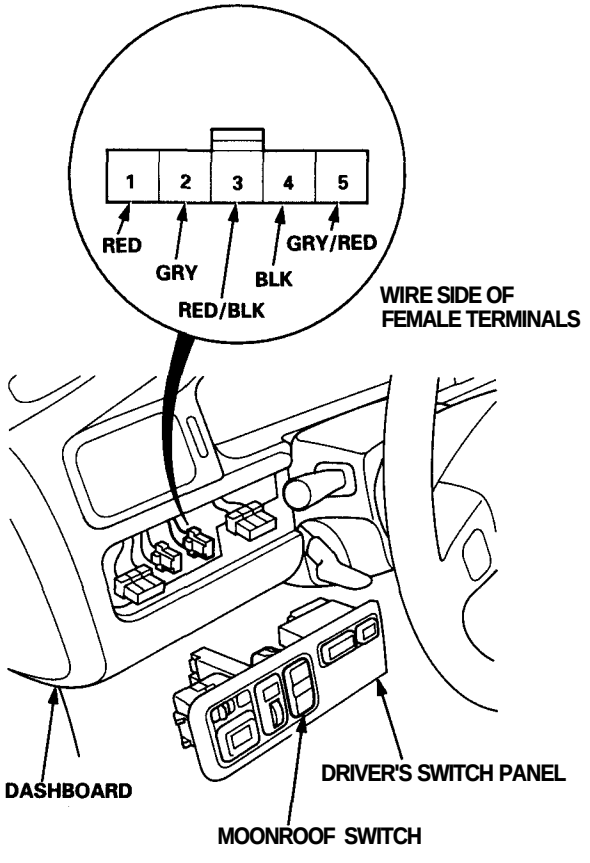
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom / Item to be inspected		Clutch out of adjustment, foreign matter stuck between guide rail and moonroof, or outer cable not attached properly.	Blown No. 29 (30 A) fuse (In the under-hood fuse/relay box)	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Function Test	Open relay	Close relay	Moonroof motor	Moonroof switch	Poor ground	Open circuit in wires, loose or disconnected terminals
Moonroof does not move, but motor turns.		1									
Moonroof does not move and motor does not turn (moonroof can be moved with moonroof wrench).	With either switch		1	2	3			5	4	G401 G403 G404	GRN, YEL, GRY or GRY/RED
	With OPEN switch					1	2		3		GRY or GRY/RED
	With CLOSE switch					2	1		3		GRY/RED or GRY

Function Test

NOTE: Be careful not to damage the switch and the driver's switch panel.

1. Carefully pry out the switches from the dashboard.
2. Disconnect the connectors from the switches.

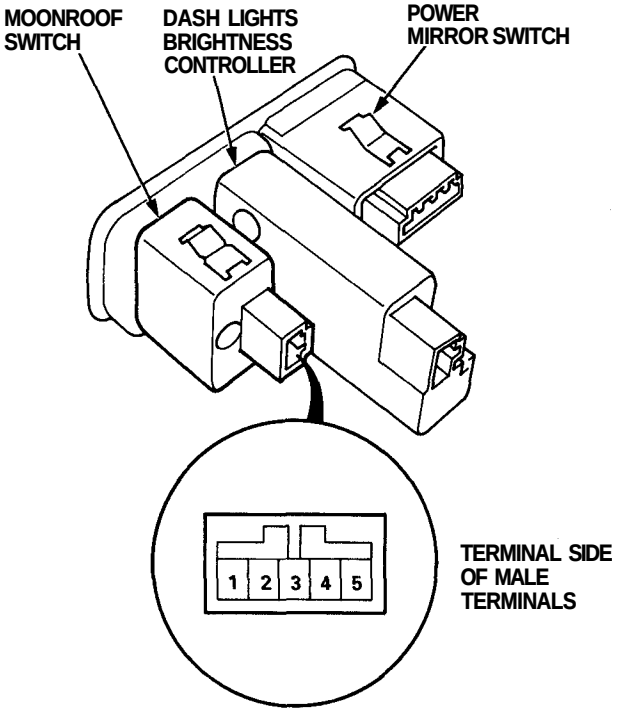


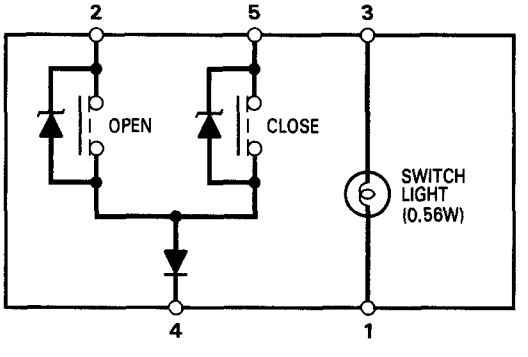
3. Connect the GRY terminal to body ground with a jumper wire, then turn the ignition switch on (II). The moonroof should open.
   - If the moonroof opens, check the switch.
   - If the moonroof doesn't open, check for an open in the GRY wire.
4. Connect the GRY/RED terminal to body ground with a jumper wire, then turn the ignition switch on (II). The moonroof should close.
   - If the moonroof closes, check the switch.
   - If the moonroof doesn't close, check for an open in the GRY/RED wire.
5. Check for continuity to body ground on the BLK wire.
   There should be continuity.
   - If there is continuity, check the switch.
   - If there is no continuity, check for an open in the BLK wire.

Moonroof

Switch Test

1. Carefully remove the switches from the driver's switch panel.
2. Check for continuity between the terminals in each switch position according to the table.





Position \ Terminal	1		3	2		4		5
OFF								
OPEN	○	⊖	○	○	▶	○		
CLOSE						○	◀	○

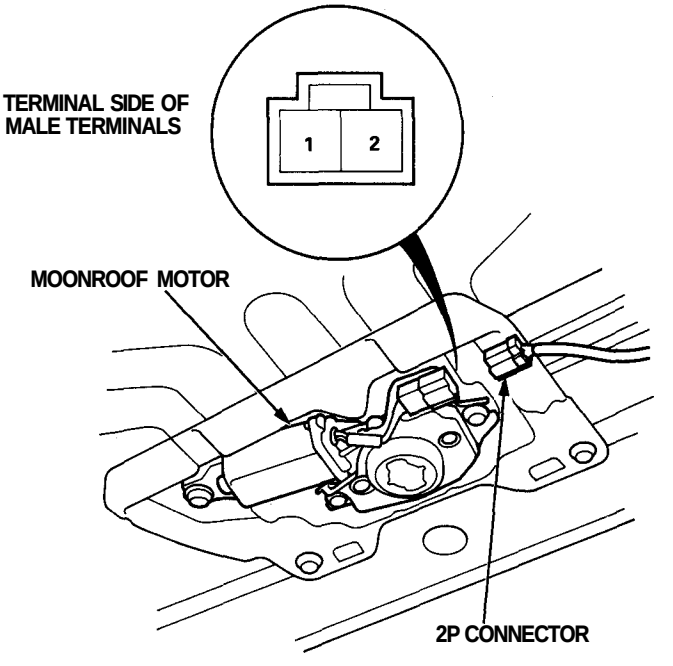
Motor Test

1. Remove the headliner (see section 20).
2. Disconnect the 2P connector from the moonroof motor.
3. Check the motor by connecting power and ground according to the table.

Position \ Terminal	1	2
OPEN	⊖	⊕
CLOSE	⊕	⊖

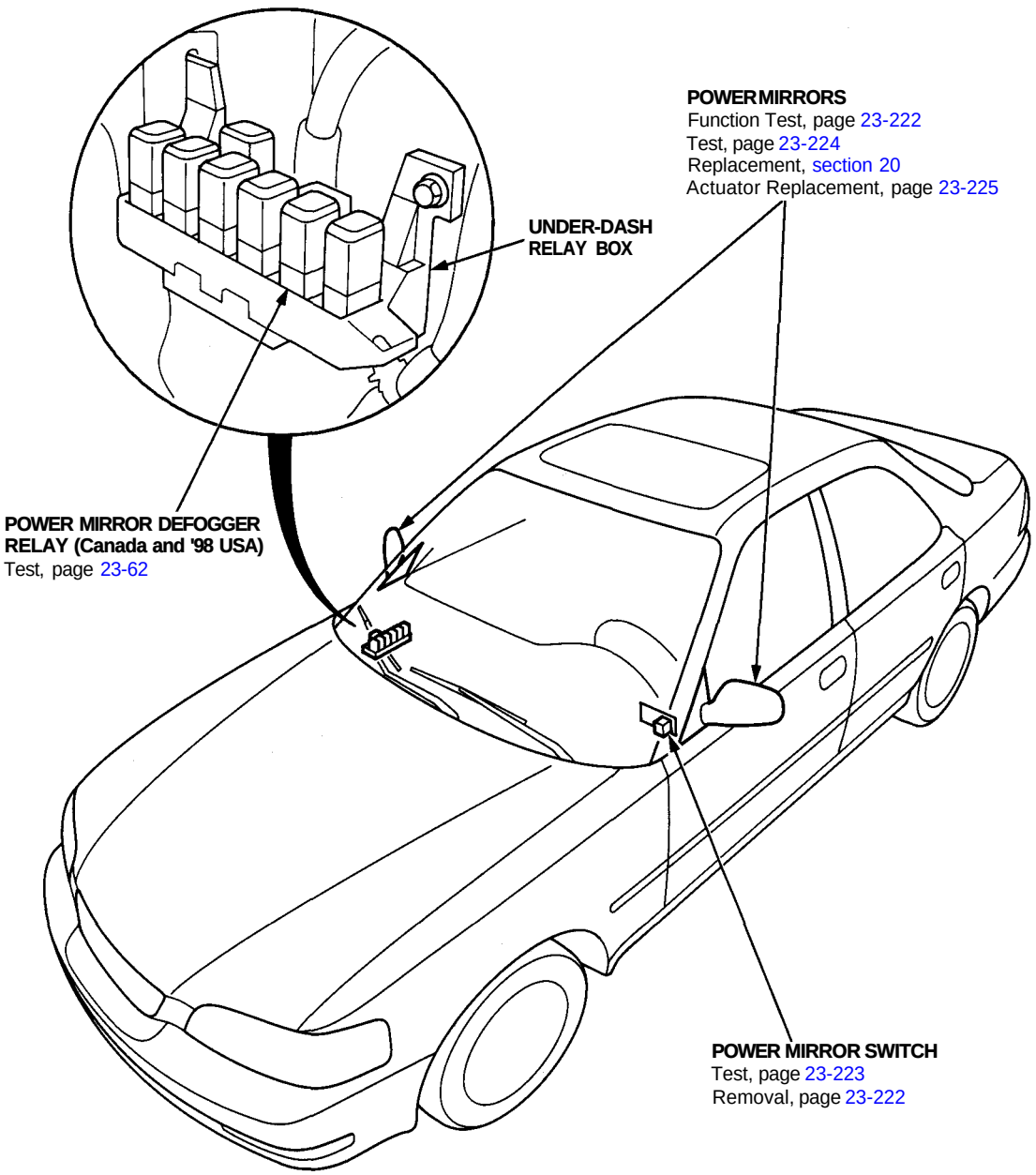
4. If the motor does not run, replace it.

   NOTE: See closing force check in section 20 for motor clutch test.



Power Mirrors

Component Location Index

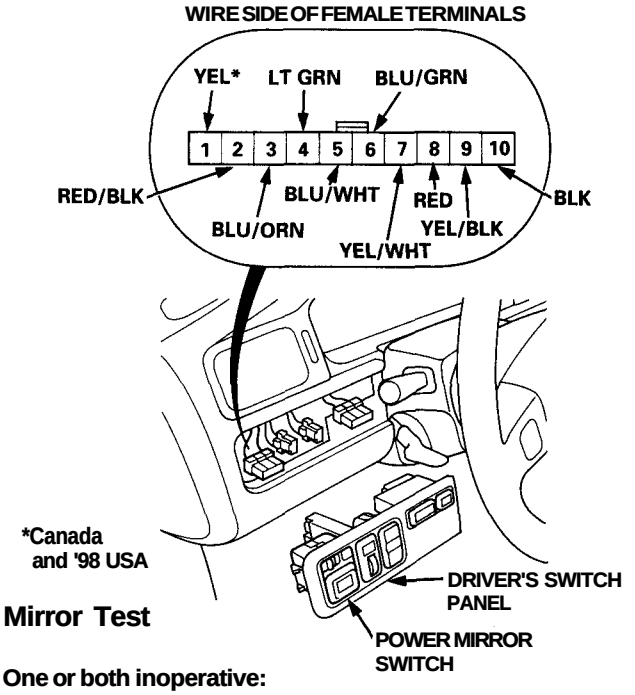


Power Mirrors

Function Test

NOTE: Be careful not to damage the switch and the driver's switch panel.

1. Carefully pry out the switches from the dashboard.
2. Disconnect the connectors from the switches.



Mirror Test

One or both inoperative:

1. Check for voltage between the YEL/BLK terminal and body ground with the ignition switch ON (II). There should be battery voltage.
   - If there is no voltage, check for:
     — blown No. 8 (7.5 A) fuse in the under-dash fuse/relay box.
     — an open in the YEL/BLK wire.
   - If there is battery voltage, go to step 2.
2. Check for continuity between the BLK terminal and body ground. There should be continuity.
   - If there is no continuity, check for:
     — an open in the BLK wire.
     — poor ground (G401, G404).

Left mirror inoperative:

Connect the YEL/BLK terminal of the 10P connector to the YEL/WHT terminal and the BLU/WHT (or LT GRN) terminal to body ground with jumper wires. The left mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

- If the mirror does not tilt down (or does not swing left), remove the left door panel and check for an open in the BLU/WHT (or LT GRN) wire between the left power mirror and the switch. If the wire is OK, check the left power mirror motor.
- If the mirror neither tilts down nor swings left, repair the YEL/WHT wire.
- If the mirror operates properly, check the mirror switch.

Right mirror inoperative:

Connect the YEL/BLK terminal of the 10P connector to the BLU/GRN terminal and the BLU/WHT (or BLU/ORN) terminal to body ground with jumper wires. The right mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

- If the mirror does not tilt down (or does not swing left), remove the right door panel, and check for an open in the BLU/WHT (or BLU/ORN) wire between the right power mirror and the switch. If the wire is OK, check the right power mirror motor.
- If the mirror neither tilts down nor swings left, repair the BLU/GRN wire.
- If the mirror operates properly, check the mirror switch.

Defogger test (Canada and '98 USA):

1. Connect the YEL/BLK with the YEL terminal of the switch and the YEL terminal of the relay with the BLK terminal by jumper wires. There should be battery voltage when the ignition switch is turned ON (II).
   - If there is no voltage, check for:
     — an open in the YEL wire.
     — poor ground (G401, G404).
   - If there is voltage, go to step 2.
2. Connect the RED/WHT and ORN terminals of the relay with a jumper wire, and check for voltage between the RED/WHT terminal and body ground. There should be battery voltage and both mirrors should warm up with the ignition switch ON (II), and defogger switch ON.
   - If there is no voltage or neither mirror warms up, check for:
     — an open in the RED/WHT and ORN wires.
     — blown No. 23 (15 A) in the under-hood fuse/relay box.
     — poor ground (G403, G405).
   - If only one mirror fails to warm up, check its defogger.
   - If both mirrors fail to warm up, check the defogger switch and defogger relay.

Switch Test

1. Remove the switch as described in Function Test (see page 23-222).

2. Check for continuity between the terminals in each switch position according to the table.

Mirror Switch:

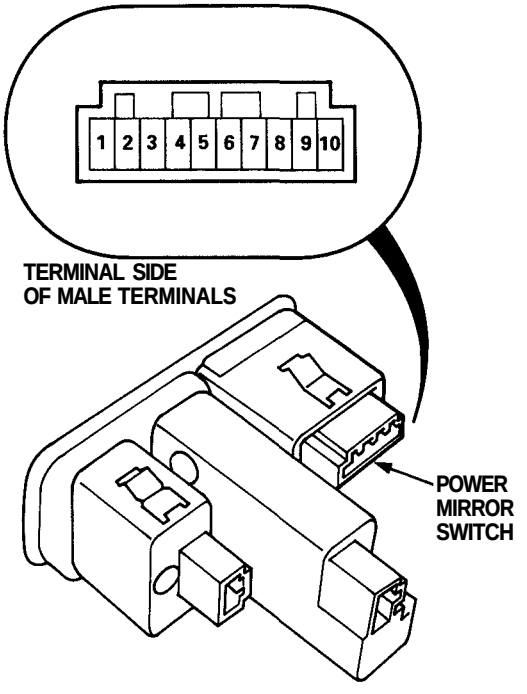
	Position \ Terminal	3	4	5	6	7	9	10
R	OFF	○		○	○			○
	UP	○			○		○	○
	DOWN	○		○	○		○	
	LEFT	○		○	○		○	
	RIGHT	○		○	○		○	
L	OFF		○	○		○		○
	UP		○			○	○	○
	DOWN		○	○		○	○	
	LEFT		○	○		○	○	
	RIGHT		○	○		○	○	

Defogger Switch (Canada and '98 USA):

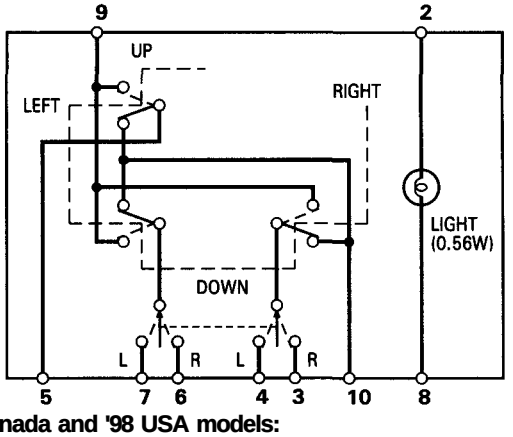
Position \ Terminal	9	1		10
ON	○	○	⊖	○
OFF		○	⊖	○

Switch Light:

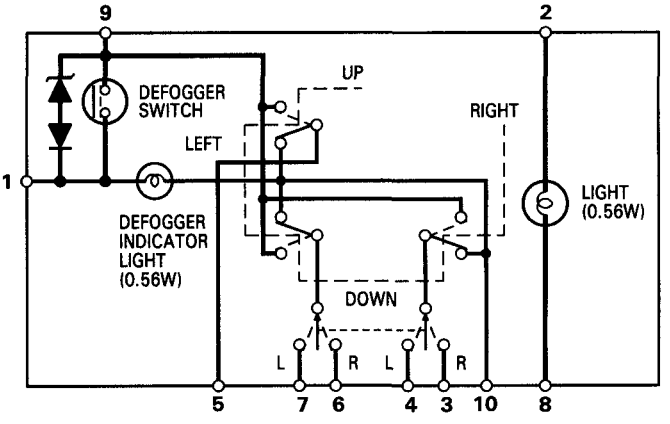
Position \ Terminal	2		8
ON/OFF	○	⊖	○



USA model:



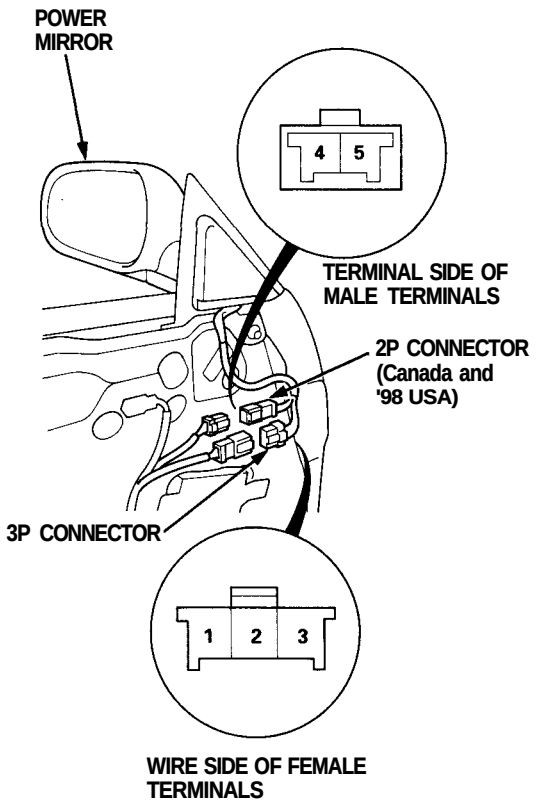
Canada and '98 USA models:

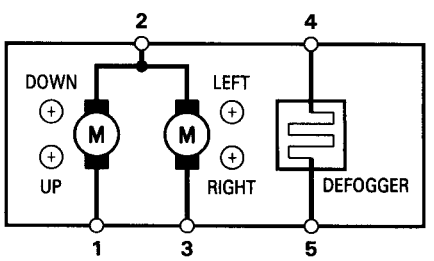


Power Mirrors

Power Mirror Test

1. Remove the door panel (see section 20), then disconnect the 3P connector and 2P connector (Canada and '98 USA) from the power mirror actuator.





2. Check actuator operation by connecting power and ground according to the table.

Terminal / Position	1	2	3
TILT UP	⊕	⊖	
TILT DOWN	⊖	⊕	
SWING LEFT		⊕	⊖
SWING RIGHT		⊖	⊕

3. Check for continuity between the terminals according to the table.

Canada and '98 USA:

Terminal / Position	4	5
ON	○	○

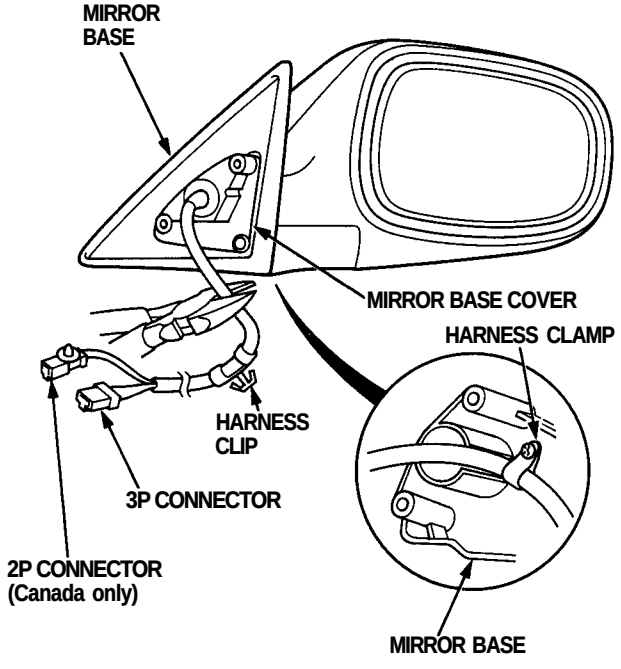
4. If the mirror actuator fails to operate properly, replace it (see page 23-225).

Mirror Actuator Replacement

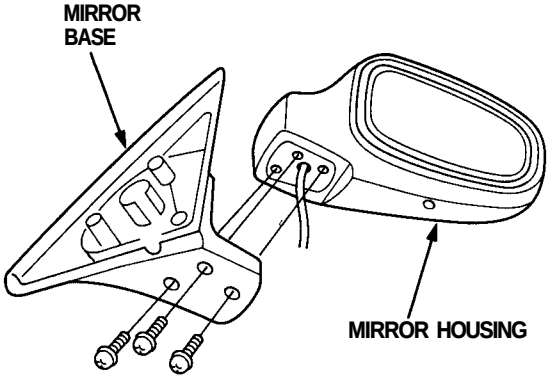
Removal:

1. Remove the door mirror from the car, and disconnect the electrical connector(s).

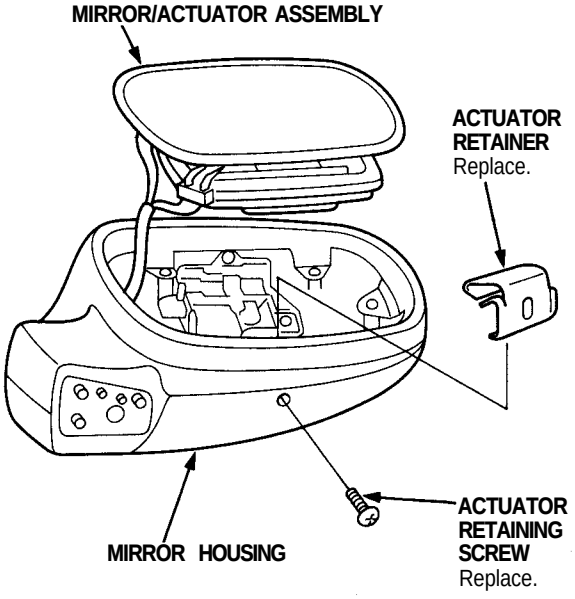
2. Cut the wire harness with wire cutters, remove the mirror base cover, and remove the harness clamp from the mirror base.



3. Remove the three mounting screws, and separate the mirror base from the mirror housing.

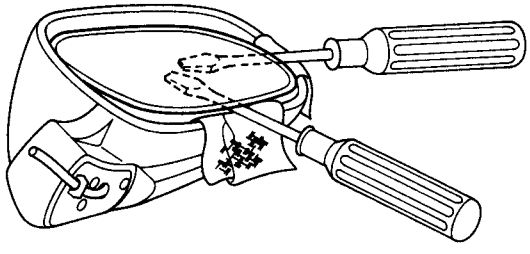


4. '95 - 96 models: Insert a screwdriver into the hole on the bottom of the mirror housing, and remove the actuator retaining screw. Then carefully press on the mirror to create a gap between mirror and mirror housing, insert a finger into the gap, and take out the mirror/actuator assembly.



5. '97 - 98 models: Insert a flat tip screwdriver into the groove between the mirror housing and the mirror holder, then pry off the mirror.

NOTE: Be careful not to damage the mirror housing.

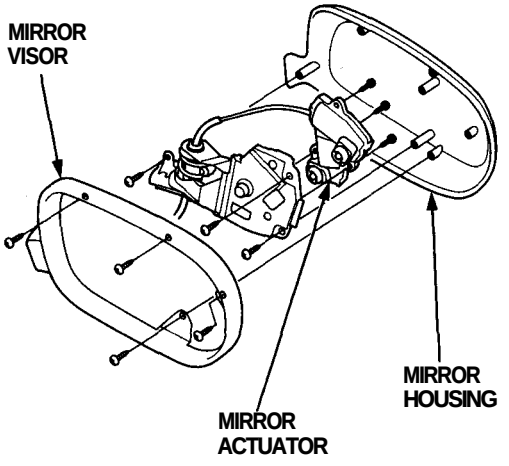


(cont'd)

Power Mirrors

Mirror Actuator Replacement (cont'd)

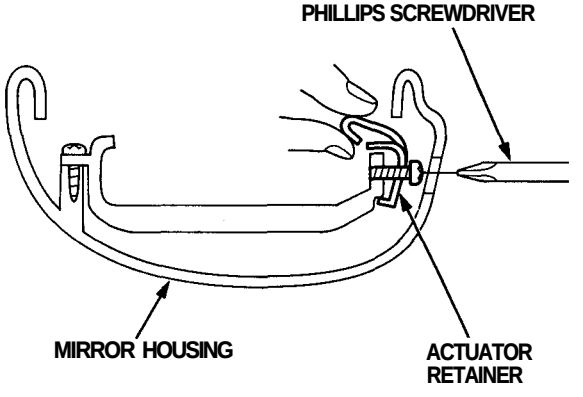
6. '97 - 98 models: Remove the four screws, and separate the mirror visor from the mirror housing. Then remove the actuator.



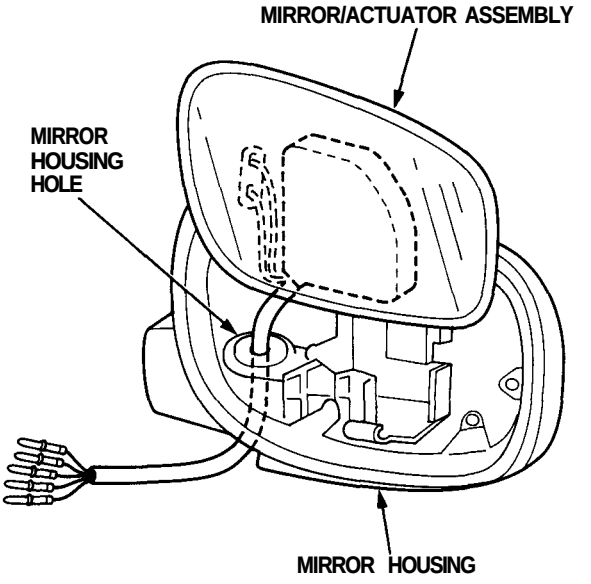
Installation:

7. '95 - 96 models: Loosely install a new actuator retainer on the frame in the mirror housing with a new retainer screw.

   NOTE: If the retainer is not loose enough, it will impede the installation of the new mirror/actuator assembly.

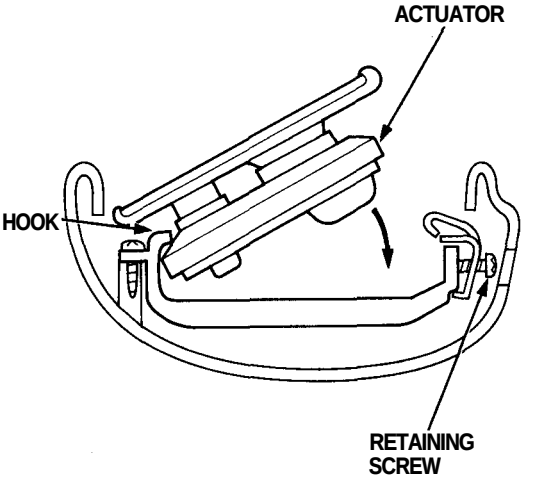


8. '95 - 96 models: Route the wire harness of the new mirror/actuator assembly through the hole in the mirror housing.



9. '95 - 96 models: Position the upper edge of the actuator under the hooks of the frame, then insert the new mirror/actuator assembly into the housing, and tighten the retaining screw.

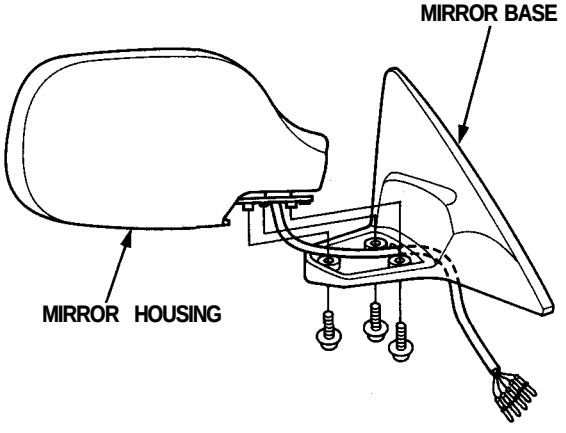
   NOTE: Make sure the actuator is held securely by the hooks and the retainer.



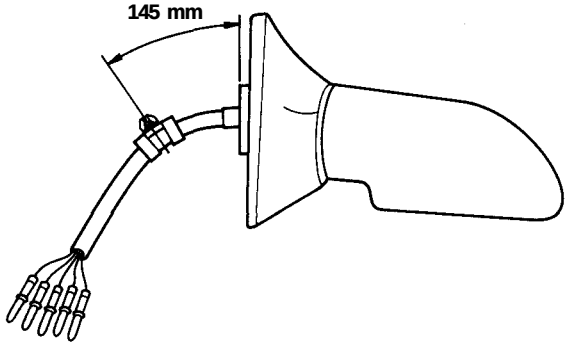
10. '97 - 98 models: Route the wire harness of the new actuator through the shaft hole. Assemble the actuator and the mirror visor by installing the screws.

11. '97-98 models: Attach the actuator to the mirror by pressing it into place by hand.

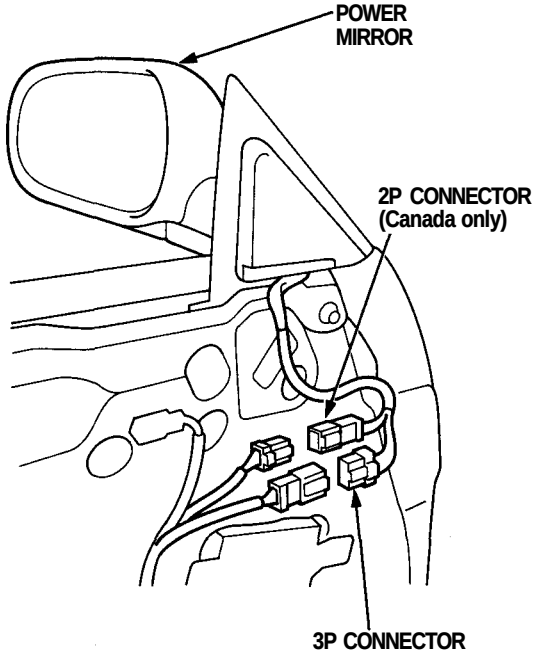
12. Route the harness through the hole in the mirror base, and reinstall the mirror housing on the mirror base.



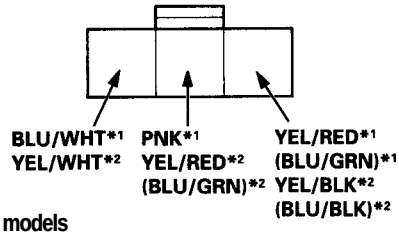
13. Reinstall the harness clamp and the mirror base cover removed in step 2, and tape the harness clip to the wire harness 145 mm (5.7 in) from the mirror base cover.



14. Insert the terminals into the connector(s) as shown below, then reconnect the connectors, and reinstall the mirror to the car.



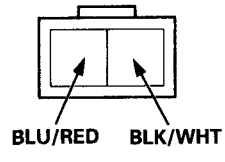
3P CONNECTOR: WIRE SIDE OF FEMALE TERMINALS



*1: '95 -96 models
*2: '97 -98 models

( ): Right side

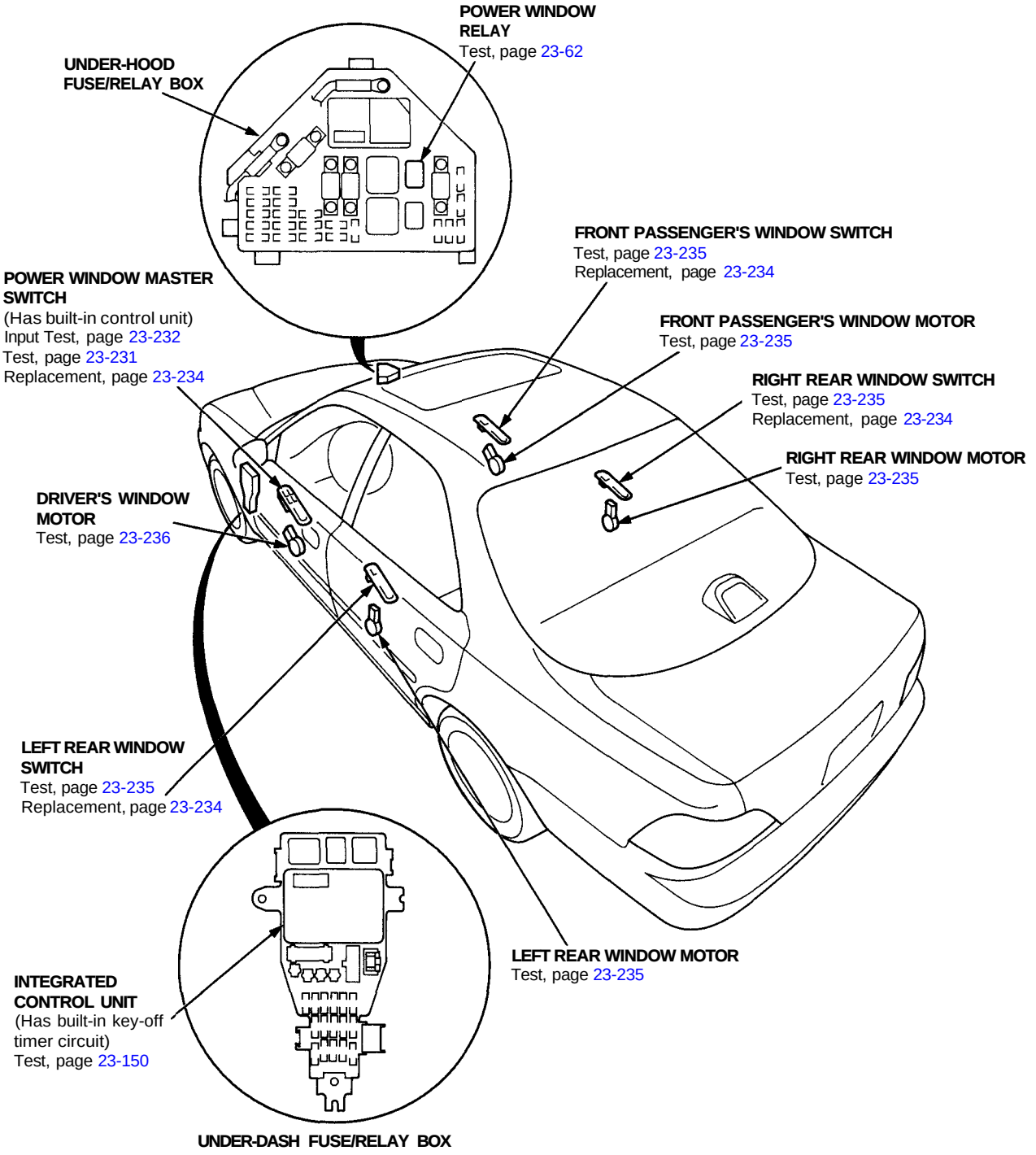
2P CONNECTOR: TERMINAL SIDE OF MALE TERMINALS
(Canada and '98 USA)



15. Test the mirror for smooth movement in all directions.

Power Windows

Component Location Index



Description

Power Window Key-off Timer Operation:

The power windows can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position, as long as neither of the front doors has been opened. This provides a convenience to parked occupants while offering a degree of security against unwanted or accidental window operation.

Power Windows

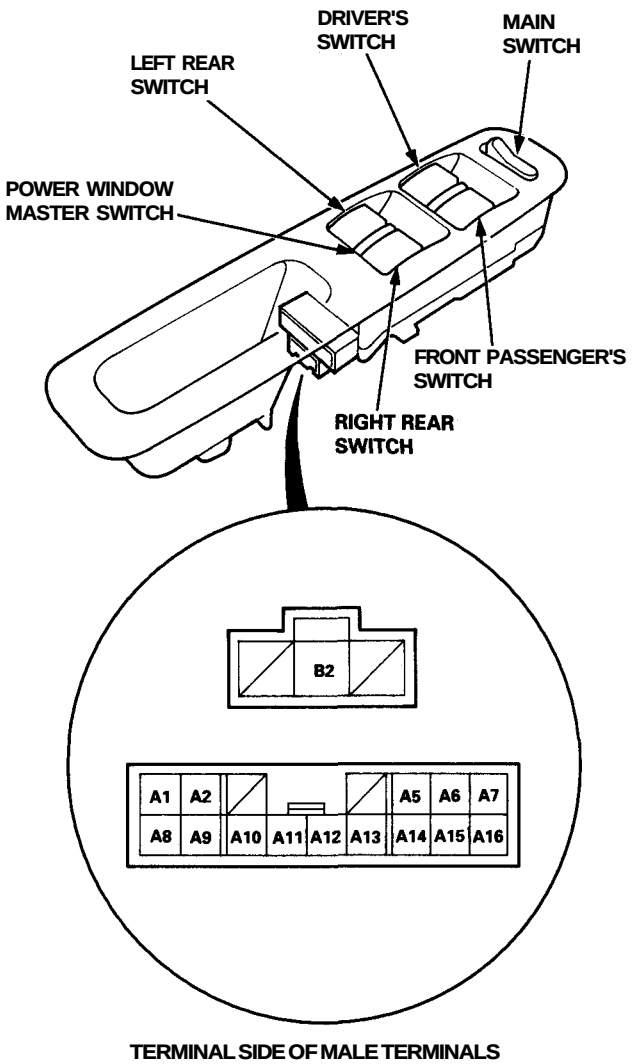
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom		Blown No. 15 (100 A) fuse (In the under-hood fuse/relay box)	Blown No. 37 (15 A) fuse (In the under-hood fuse/relay box)	Power window relay	In the under-hood fuse/relay box: Blown No. 28 (20 A) fuse	In the under-hood fuse/relay box: Blown No. 26 (20 A) fuse	In the under-hood fuse/relay box: Blown No. 24 (20 A) fuse	In the under-hood fuse/relay box: Blown No. 25 (20 A) fuse	Power window master switch	Passenger's switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Power window master switch input	Door switches	Key-off timer circuit (In the integrated control unit)	Poor ground	Open circuit in the wires, loose or disconnected terminals
All windows do not work.		1	2	3													4	G201 G405	RED
Driver's window does not work.					1						2			3	4			G405	WHT/YEL
Driver's window does not work in AUTO.									1			2			3				BLU
Passenger's windows do not work.	Front passenger's					1			2	3			4	5					BLU/BLK
	Left rear							1	2	3			4	5					GRN/BLK
	Right rear						1		2	3			4	5					YEL/BLK
All windows do not work within 10 minutes after the ignition switch is OFF (neither front door opened)			1													2	3		

Master Switch Test

1. Remove the power window master switch together with the armrest pocket, (see page 23-234).
2. Disconnect the connectors from the power window master switch.
3. Check for continuity between the terminals in each switch position according to the tables.



TERMINAL SIDE OF MALE TERMINALS

Driver's Switch:

The driver's switch is combined with the control unit so you cannot isolate the switch to test it. Instead, run the master switch input test procedures at terminals A5, A7, A8, A14 and A16 on page 23-232. If the tests are normal, the driver's switch must be faulty.

Front Passenger's Switch:

Position \ Terminal / Main Switch	A1	A10	A12	B2
OFF — ON		○	○	○
OFF — OFF		○	○	
UP — ON	○		○	○
UP — OFF	○		○	
DOWN — ON	○	○	○	○
DOWN — OFF	○	○		

Left Rear Switch:

Position \ Terminal / Main Switch	A6	A13	A15	B2
OFF — ON		○	○	○
OFF — OFF		○	○	
UP — ON	○		○	○
UP — OFF	○		○	
DOWN — ON	○	○	○	○
DOWN — OFF	○	○		

Right Rear Switch:

Position \ Terminal / Main Switch	A2	A9	A11	B2
OFF — ON		○	○	○
OFF — OFF		○	○	
UP — ON	○		○	○
UP — OFF	○		○	
DOWN — ON	○	○	○	○
DOWN — OFF	○	○		

Power Windows

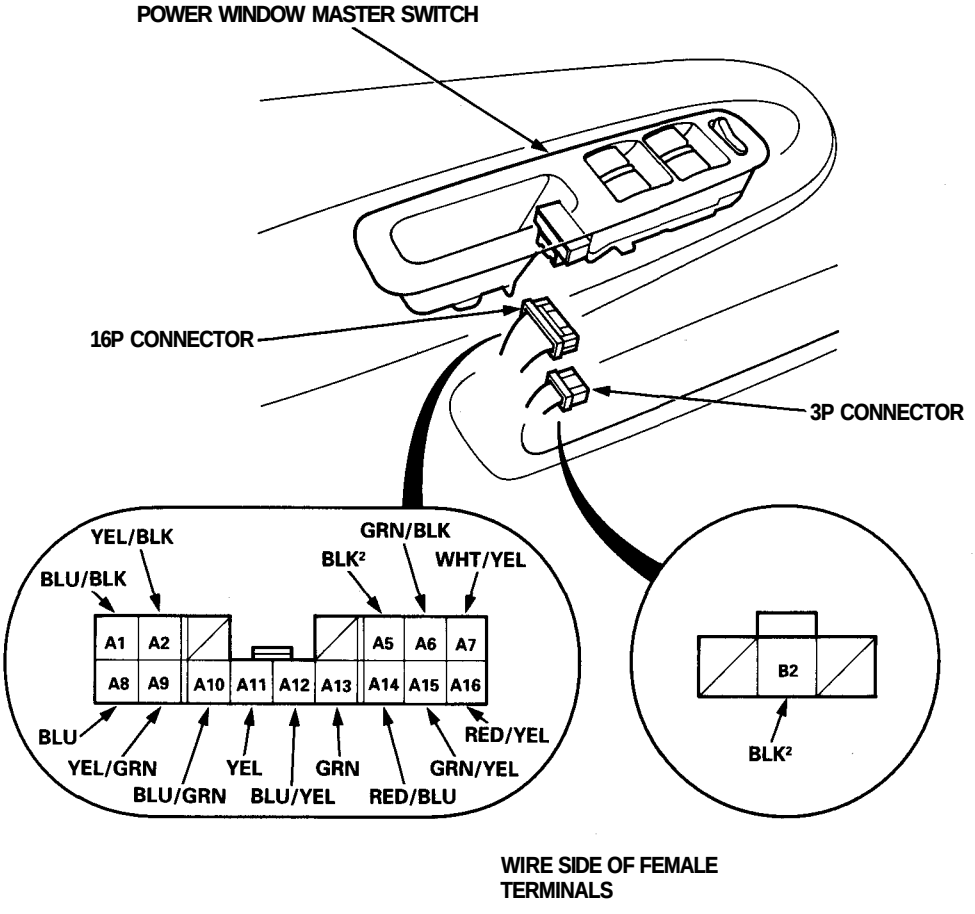
Master Switch Input Test

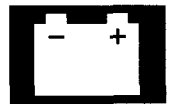
NOTE: The control unit is built into the power window master switch, and only controls driver's door window operations.

1. Remove the driver's door panel, and disconnect the 16P and 3P connectors from the master switch.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the power window master switch must be faulty; replace it.





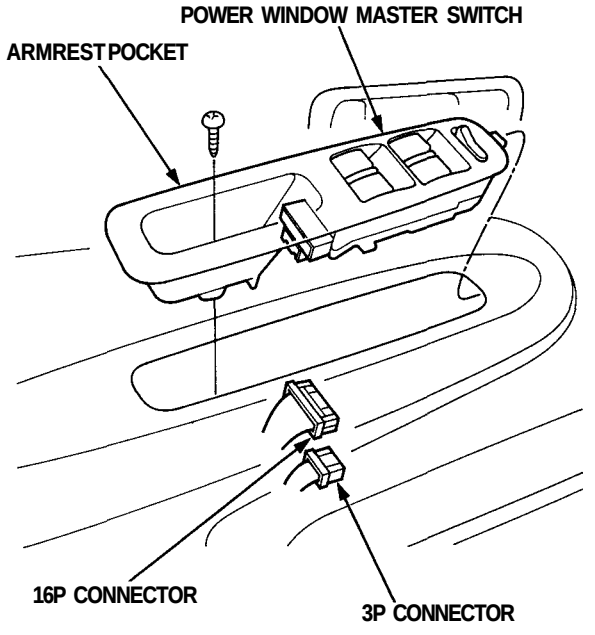
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A5 B2	BLK[2]	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G405) • An open in the wire
A7	WHT/YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 24, 25, 26, or 28 (20 A) fuse in the under-hood fuse/relay box • Faulty power window relay • An open in the wire
A1	BLU/BLK			
A2	YEL/BLK			
A6	GRN/BLK			
A14	RED/BLU	Connect the WHT/YEL terminal to the RED/YEL terminal, and the RED/BLU terminal to the BLK[2] terminal, then turn the ignition switch ON (II).	Check the driver's window motor: It should run (the window moves down).	• Faulty driver's window motor • An open in the wire
A16	RED/YEL			
A12	BLU/YEL	Connect the BLU/BLK terminal to the BLU/GRN terminal, and the BLU/YEL terminal to the BLK[2] terminal, then turn the ignition switch ON (II).	Check the front passenger's window motor: It should run (the window moves down).	• Faulty front passenger's window motor • Faulty front passenger's window switch • An open in the wire
A10	BLU/GRN			
A11	YEL	Connect the YEL/BLK terminal to the YEL/GRN terminal, and the YEL terminal to the BLK[2] terminal, then turn the ignition switch ON (II).	Check the right rear motor: It should run (the window moves down).	• Faulty right rear window motor • Faulty right window switch • An open in the wire
A9	YEL/GRN			
A15	GRN/YEL	Connect the GRN/BLK terminal to the GRN terminal, and the GRN/YEL terminal to the BLK[2] terminal, then turn the ignition switch ON (II).	Check the left rear motor: It should run (the window moves down).	• Faulty left rear window motor • Faulty left rear window switch • An open in the wire
A13	GRN			
A8	BLU	Connect the WHT/YEL terminal to the RED/YEL terminal, and the BLK[2] terminal to the RED/BLU terminal, then turn the ignition switch ON (II).	Check for voltage between the BLU and BLK[2] terminals: Approx. 6 V should be indicated as the driver's window motor runs.	• Faulty pulser • Faulty driver's window motor • An open in the wire
A5	BLK[2]			

Power Windows

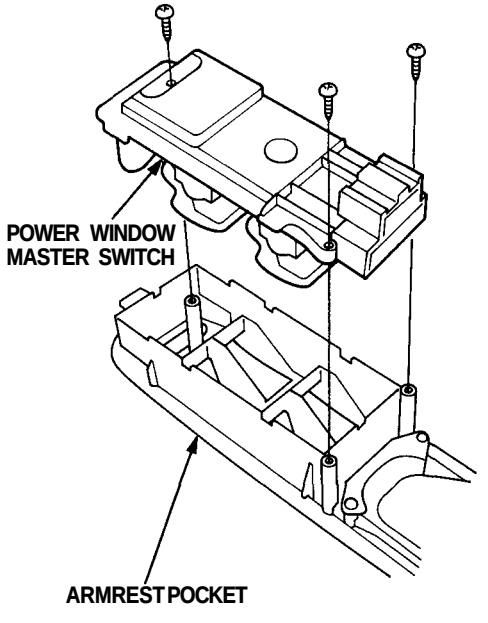
Master Switch Replacement

1. Remove the power window master switch together with the armrest pocket from the driver's door panel.

2. Disconnect the 16P and 3P connectors from the power window master switch.



3. Remove the three mounting screws, then remove the master switch from the armrest pocket.



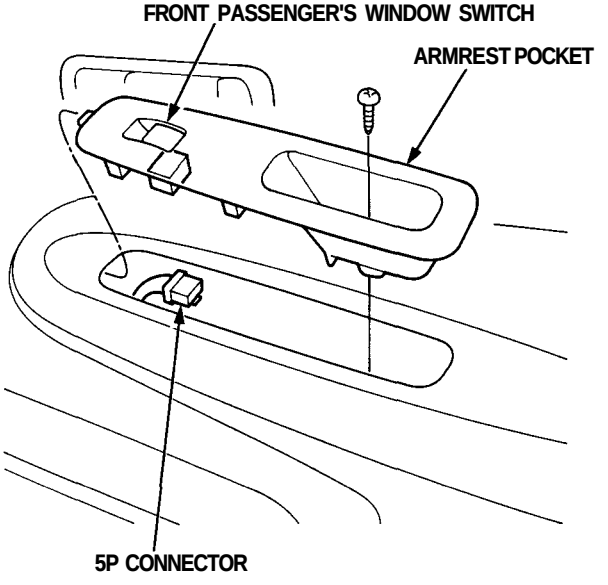
4. Install in the reverse order of removal.

Passenger's Window Switch Replacement

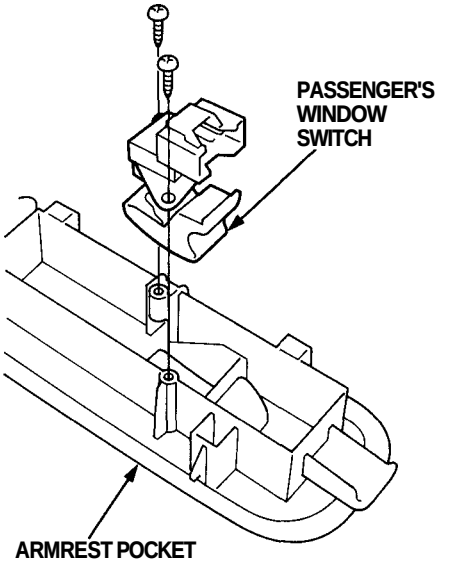
NOTE: The illustration shows the front passenger's window switch; the left rear window switch and right rear window switch are similar.

1. Remove the passenger's window switch together with the armrest pocket from the passenger's door panel.

2. Disconnect the 5P connector from the passenger's window switch.



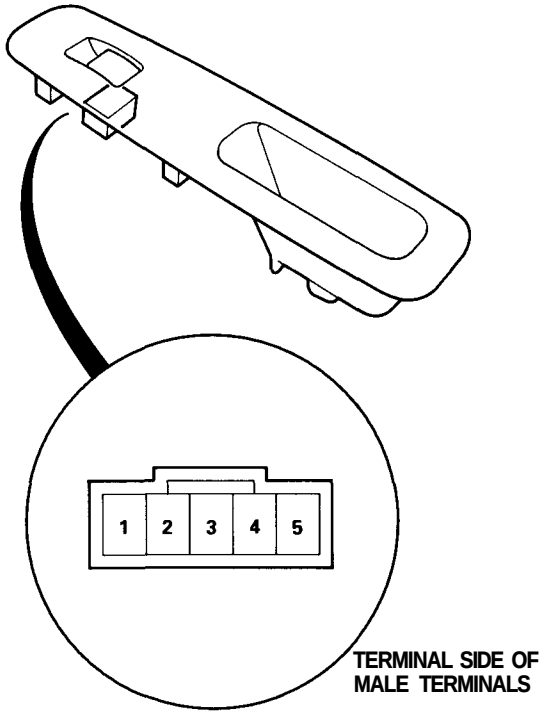
3. Remove the two mounting screws, then remove the passenger's window switch from the armrest pocket.



4. Install in the reverse order of removal.

Passenger's Window Switch Test

1. Remove the passenger's window switch together with the armrest pocket from the passenger's door panel.



2. Check for continuity between the terminals in each switch position according to the table.

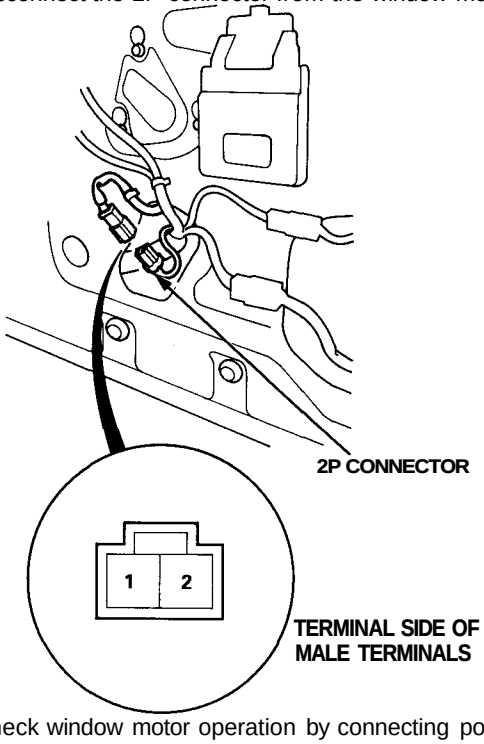
Position \ Terminal	1	2	3	4	5
UP	○		○	○	
OFF		○	○		
DOWN	○		○		

Passenger's Window Motor Test

NOTE: The illustration shows the front passenger's window motor; the left rear window motor and right rear window motor are similar.

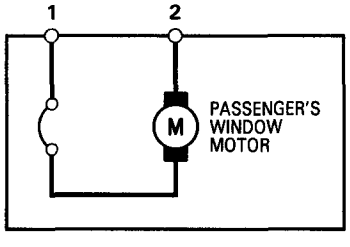
1. Remove the passenger's door panel, and disconnect all the connectors (see section 20).

2. Disconnect the 2P connector from the window motor.



3. Check window motor operation by connecting power and ground according to the table.

Direction \ Terminal	1	2
UP	⊕	⊖
DOWN	⊖	⊕



CAUTION: When the motor stops running, disconnect one lead immediately.

4. If the motor does not run or fails to run smoothly, replace it.

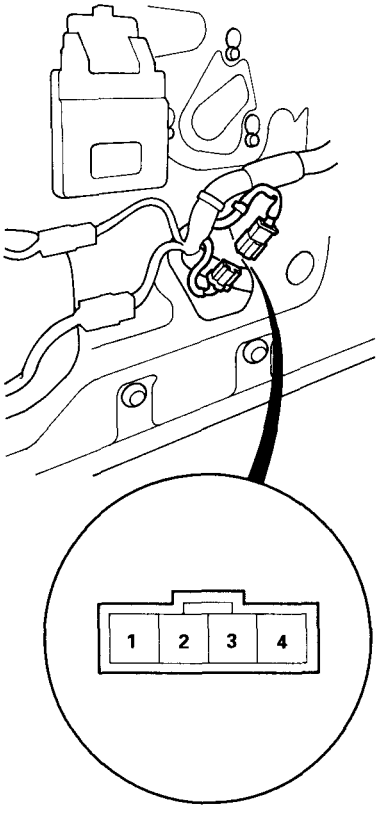
Power Windows

Driver's Window Motor Test

Motor Test:

1. Remove the driver's door panel, and disconnect all connectors (see section 20).

2. Disconnect the 4P connector from the window motor.



TERMINAL SIDE OF MALE TERMINALS

3. Test the motor in each direction by connecting battery power and ground according to the table.

Terminal / Direction	1	2
UP	⊕	⊖
DOWN	⊖	⊕

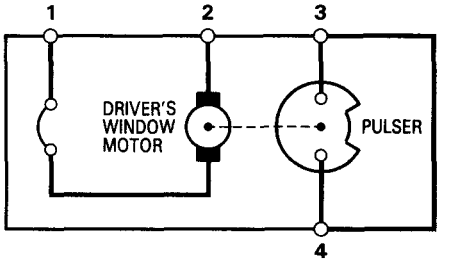
CAUTION: When the motor stops running, disconnect one lead immediately.

4. If the motor does not run or fails to run smoothly, replace it.

Pulser Test:

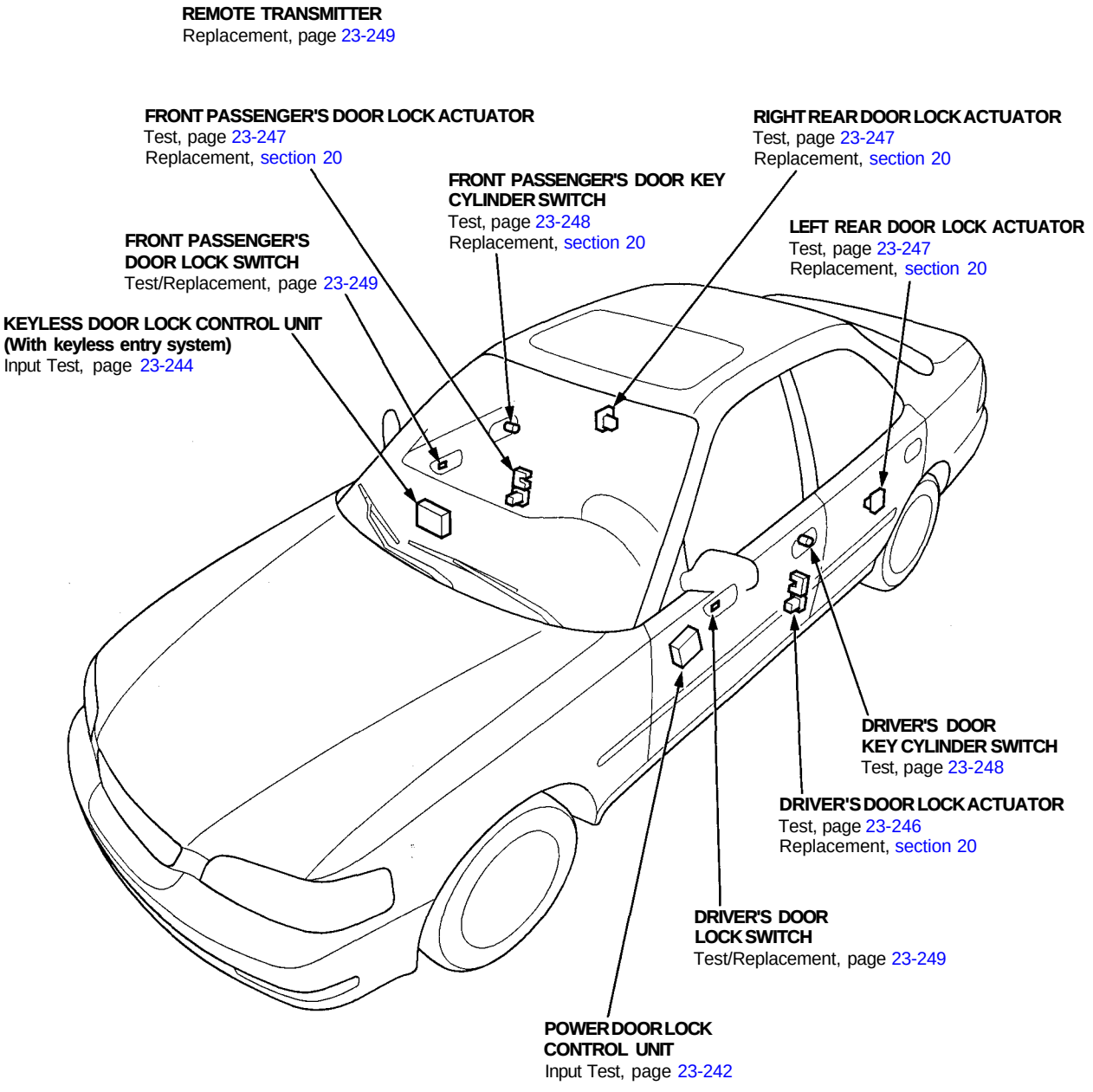
5. Connect the test leads of an analog ohmmeter to the No. 3 and No. 4 terminals.

6. Run the motor by connecting power and ground to the No. 1 and No. 2 terminals. The ohmmeter needle should move back and forth alternately.



Power Door Locks

Component Location Index



Description

This door lock system has been adopted to improve convenience and safety. If you insert the key into the driver's door key cylinder, turn it to the unlock position, and then pull it out immediately, ONLY the driver's door will unlock. However, if you keep the key in the unlock position for one second or more, ALL doors will unlock.

Power Door Locks

Troubleshooting (Without Keyless Entry) ('95 - 97 models)

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 32 (20 A) fuse (In the under-hood fuse/relay box)	Disconnected or obstructed door lock rod/linkage	Driver's door lock knob switch (In the door lock actuator)	Driver's door key cylinder switch	Front passenger's door key cylinder switch	Driver's door lock actuator	Passenger's door lock actuator	Driver's door lock switch	Passenger's door lock switch	Control unit input	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system doesn't work at all.		1									2	G405	WHT
Doors don't lock or unlock with the driver's door lock switch.	All doors								1		2	G405	GRN/WHT or GRN/RED
	One or more doors		1				2	3					WHT/RED or YEL/RED
Doors don't lock or unlock with the passenger's door lock switch.	All doors									1	2	G403	BLK/WHT or BLK/RED[2]
	One or more doors		1				2	3					WHT/RED or YEL/RED
Doors don't lock with the driver's door lock knob.	All doors		1	2							3	G405	BLU/WHT or BLK/RED[1]
	One or more doors		1				2	3					WHT/RED or YEL/RED
Doors don't lock or unlock with the passenger's door key.	All doors					1					2	G403	GRY or GRN/YEL
	One or more doors		1				2	3					WHT/RED or YEL/RED
Doors don't unlock with the driver's door key.	Driver's door		1		2		3						WHT/RED or YEL/RED
	*All doors			2	1						3	G405	GRN/BLK, WHT/RED or YEL/RED
Doors don't lock with the driver's door key.	Driver's door		1		2		3						WHT/RED or YEL/RED
	All doors			2	1						3	G405	GRY, WHT/RED or YEL/RED

* If the system is working normally, all doors will unlock when you hold the door key in the unlock position (lock cylinder switch and door lock knob switch turned ON) for one second or more.

Troubleshooting (With Keyless Entry) ('98 model)

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 32 (20 A) fuse (In the under-hood fuse/relay box)	Door lock knob switch (In the driver's door lock actuator)	Control unit input	Passenger's door lock actuators	Disconnected or obstructed door lock rod/linkage	Driver's door lock key cylinder switch	Front passenger's door lock key cylinder switch	Driver's door lock switch	Passenger's door lock switch	Ignition key switch	Dead batteries in remote transmitter	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system does not work at all.		1		2									G401 G404	WHT
Doors do not lock or unlock with driver's door lock switch.	All doors			2					1				G405	GRN/WHT, GRN/RED
	One or more doors		1		2									WHT/RED, RED, YEL/RED
Doors do not lock or unlock with front passenger's door lock switch.	All doors			2						1			G403	BLK/WHT[2] BLK/RED[2]
	One or more doors		1		2									WHT/RED, RED, YEL/RED
The power door lock system works properly, but the keyless entry system does not.				2							3	1		
Doors do not lock with driver's door lock knob switch.	All passenger's doors		1	3		2							G405	BLU/WHT[1]
	One or more passenger's doors				1									YEL/RED, WHT/RED
Doors do not lock or unlock with front passenger's door lock key cylinder switch.	All doors			3		2		1					G403	GRY[1] GRN/YEL
	One or more doors				1									YEL/RED, WHT/RED
Doors do not lock or unlock with driver's door lock key cylinder switch.	All doors			3		2	1						G405	GRN/BLK[2] GRY[1]
	One or more doors		1		2									WHT/RED, RED, YEL/RED

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

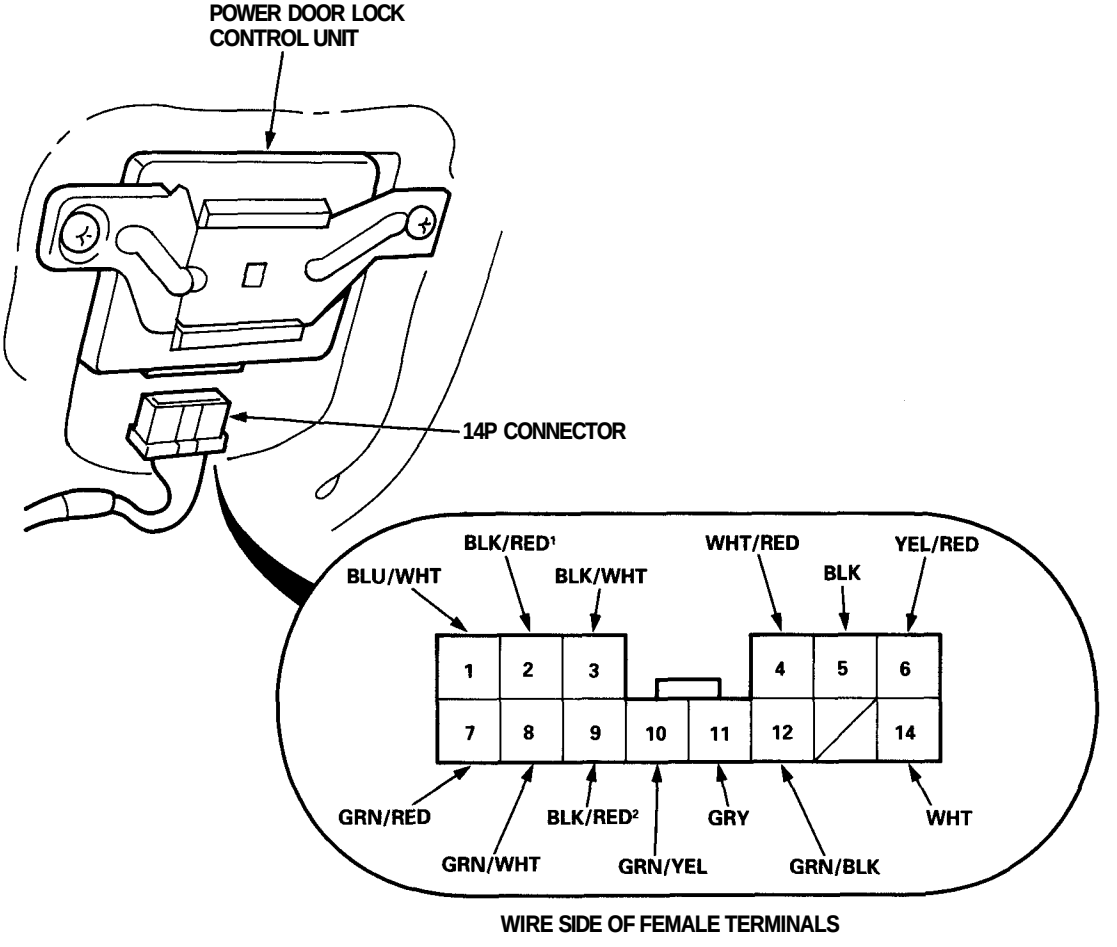
NOTE:

- When the remote transmitter button is pressed the first time, only the driver's door will unlock. When the button is pressed the second time, all the doors will unlock.
- The doors will relock automatically after 20 seconds if a door is not opened, or the key is out of the ignition switch.
- The keyless entry system will not lock the doors when the key is in the ignition switch.

Power Door Locks

Control Unit Input Test (Without Keyless Entry) ('95 - 97 models)

1. Remove the driver's door panel (see section 20).
2. Disconnect the 14P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Disconnect the 14P connector from the power door lock control unit.

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G405) • An open in the wire
6	YEL/RED	Connect the YEL/RED terminal to the WHT terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should unlock.	• Faulty actuator • An open in the wire • Blown No. 32 (20 A) fuse in the under-hood fuse/relay box
4	WHT/RED	Connect the WHT/RED terminal to the WHT terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should lock.	

Reconnect the 14P connector to the power door lock control unit.

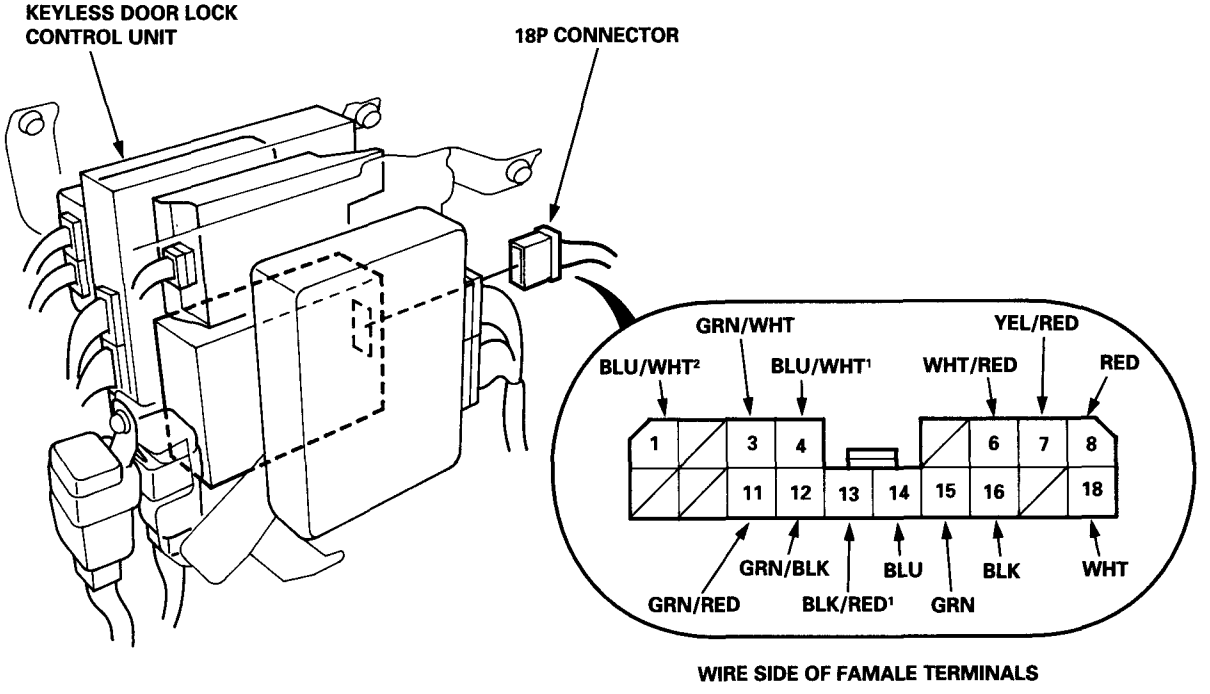
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
14	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 32 (20 A) fuse in the under-hood fuse/relay box • An open in the wire
8	GRN/WHT	Driver's door lock switch in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G405) • An open in the wire
7	GRN/RED	Driver's door lock switch in UNLOCK		
3	BLK/WHT	Front passenger's door lock switch in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty front passenger's door lock switch • Poor ground (G403) • An open in the wire
9	BLK/RED[2]	Front passenger's door lock switch in UNLOCK		
1	BLU/WHT	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock actuator • Poor ground (G405) • An open in the wire
2	BLK/RED[1]	Driver's door lock knob in UNLOCK		
12	GRN/BLK	Driver's door key cylinder in UNLOCK	Check for voltage to ground: There should be 1 V or less as the switch is turned.	• Faulty driver's door key cylinder switch • Poor ground (G405) • An open in the wire
10	GRN/YEL	Front passenger's door key cylinder in UNLOCK	Check for voltage to ground: There should be 1 V or less as the switch is turned.	• Faulty front passenger's door key cylinder switch • Poor ground (G403) • An open in the wire
11	GRY	Driver's door key cylinder in LOCK	Check for voltage to ground: There should be 1 V or less as the switch is turned.	• Faulty driver's or front passenger's door key cylinder switch • Poor ground (G403 or G405) • An open in the wire
		Front passenger's door lock cylinder in LOCK		

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Power Door Locks

Control Unit Input Test (With Keyless Entry) ('98 model)

1. Remove the glove box (see section 20).
2. Disconnect the 18P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
16	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G403) • An open in the wire
18	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 44 (20 A) fuse in the under-hood fuse/relay box. • An open in the wire
11	GRN/RED	Driver's door lock switch in UNLOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G405) • An open in the wire
3	GRN/WHT	Driver's door lock switch in LOCK		



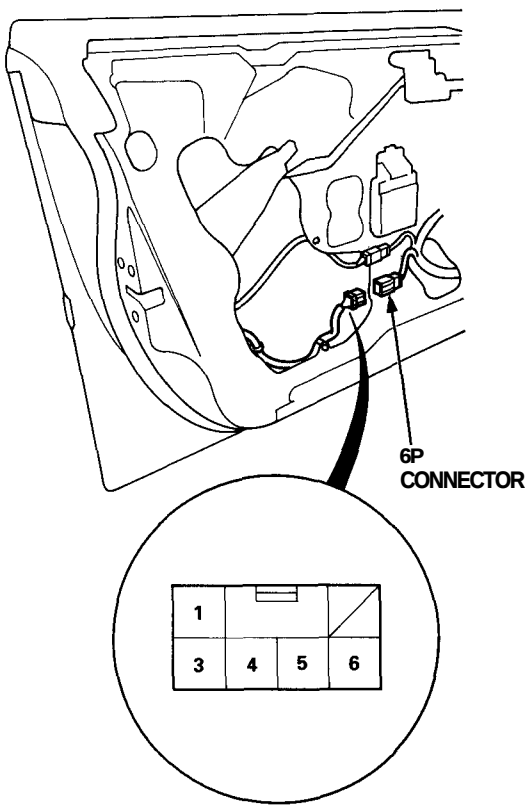
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
11	GRN/RED	Front passenger's door lock switch in UNLOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty front passenger's door lock switch • Poor ground (G403) • An open in the wire
3	GRN/WHT	Front passenger's door lock switch in LOCK		
11	GRN/RED	Front passenger's door lock key cylinder switch in UNLOCK		• Faulty front passenger's door lock key cylinder switch • Poor ground (G501) • An open in the wire
3	GRN/WHT	Front passenger's door lock key cylinder switch in LOCK		
3	GRN/WHT	Driver's door lock key cylinder switch in LOCK	Check for voltage to ground: There should be 5 V or more.	• Faulty driver's door lock key cylinder switch • Poor ground (G405) • An open in the wire
13	BLK/RED[1]	Driver's door lock key cylinder switch in UNLOCK	Check for voltage to ground: There should be 1 V or less.	
12	GRN/BLK[1]	Driver's door lock knob in UNLOCK	Check for voltage to ground: There should be 5 V or more.	• Faulty driver's door lock actuator • Poor ground (G405) • An open in the wire
4	BLU/WHT[1]	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	
15	GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Faulty security control unit • An open in the wire
14	BLU			
1	BLU/WHT[2]			
6	WHT/RED	Connect the WHT terminal to the WHT/RED terminal, and the YEL/RED (or RED) terminal to the BLK terminal momentarily	Check door lock operation: All passenger's doors (or driver's door) should lock as the wires are connected momentarily.	• Faulty passenger's door lock actuator • Faulty driver's door lock actuator • An open in the wire
7	YEL/RED	Connect the WHT terminal to the YEL/RED terminal, and the WHT/RED terminal to the BLK terminal momentarily	Check door unlock operation: All passenger's doors should unlock as the wires are connected momentarily.	
8	RED	Connect the WHT terminal to the RED terminal, and WHT/RED terminal to the BLK terminal momentarily	Check door unlock operation: Driver's door should unlock as the wires are connected momentarily.	• Faulty driver's door lock actuator • An open in the wire

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Power Door Locks

Driver's Door Lock Actuator Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P connector from the actuator.



WIRE SIDE OF FEMALE TERMINALS

3. Check actuator operation by connecting power and ground according to the table.

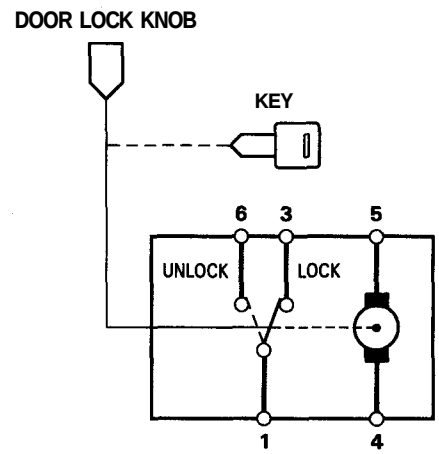
Position \ Terminal	4	5
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

4. If the actuator fails to work properly, replace it.

5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	3	6
LOCK	○	○	
UNLOCK	○		○

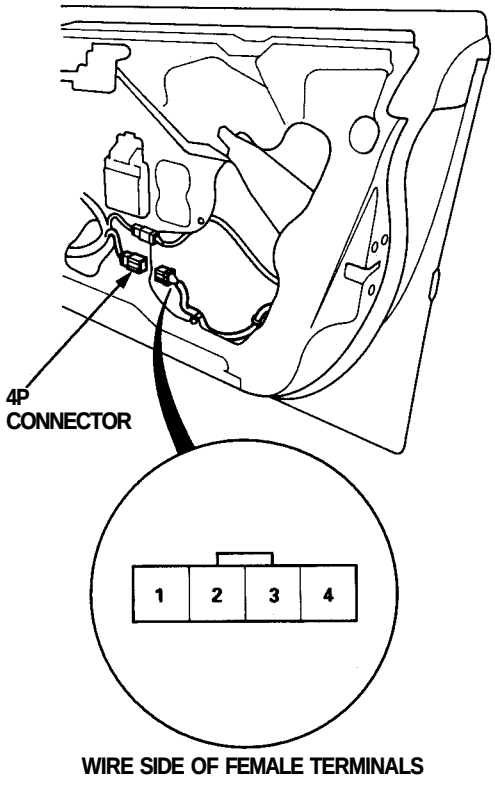


Passenger's Door Lock Actuator Test

1. Remove the passenger's door panel (see section 20).

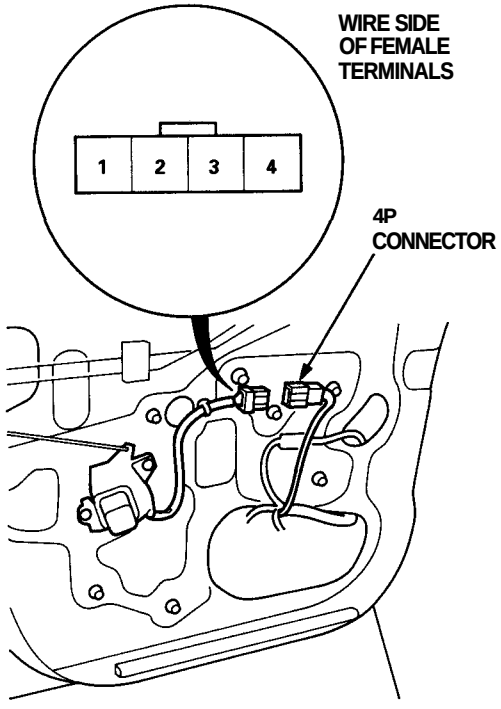
2. Disconnect the 4P connector from the actuator.

Front Passenger's Door:



Rear Passenger's Door:

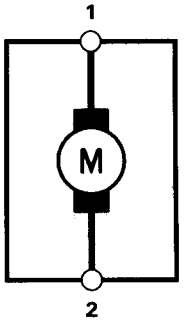
NOTE: The left rear actuator is shown; the right rear actuator is similar.



3. Check actuator operation by connecting power and ground according to the table.

Terminal / Position	1	2
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

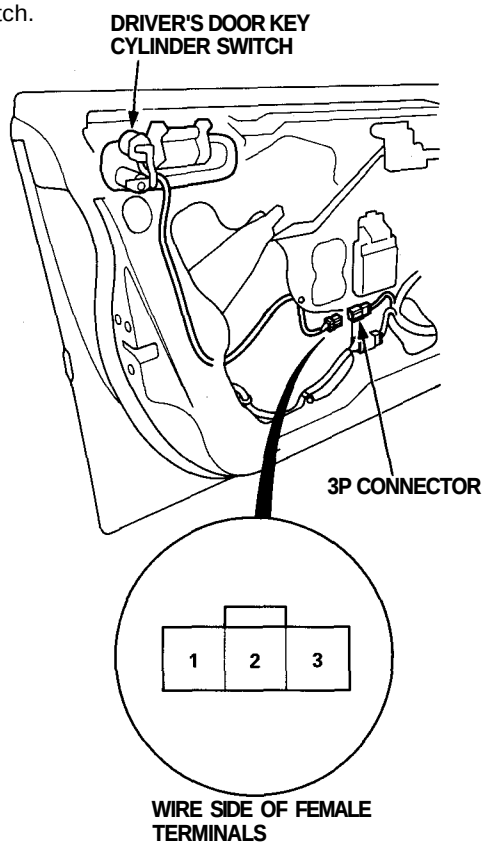


4. If the actuator fails to work properly, replace it.

Power Door Locks

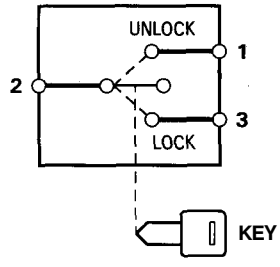
Driver's Door Key Cylinder Switch Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 3P connector from the key cylinder switch.



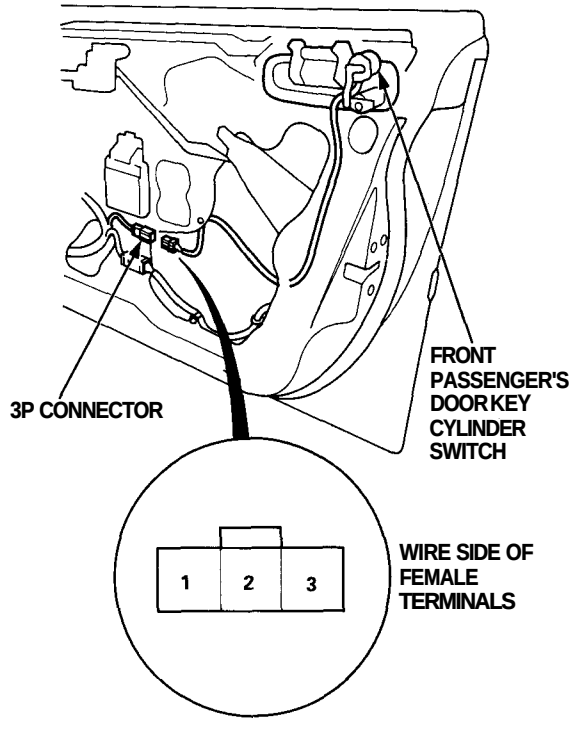
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	3
LOCK		○——	——○
OFF			
UNLOCK	○——		



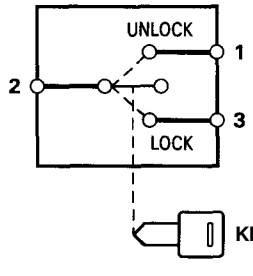
Front Passenger's Door Key Cylinder Switch Test

1. Remove the front passenger's door panel (see section 20).
2. Disconnect the 3P connector from the key cylinder switch.



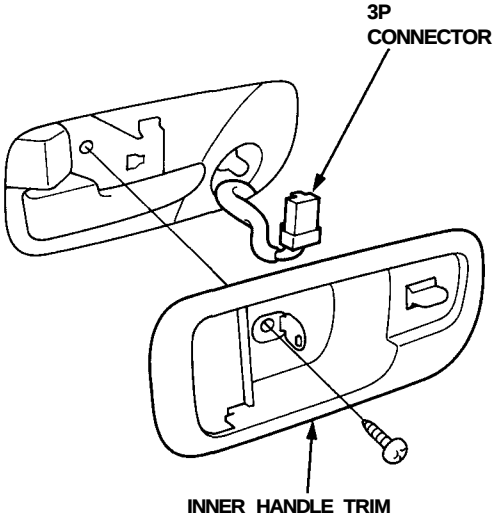
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2	3
LOCK		○——	——○
OFF			
UNLOCK	○——		



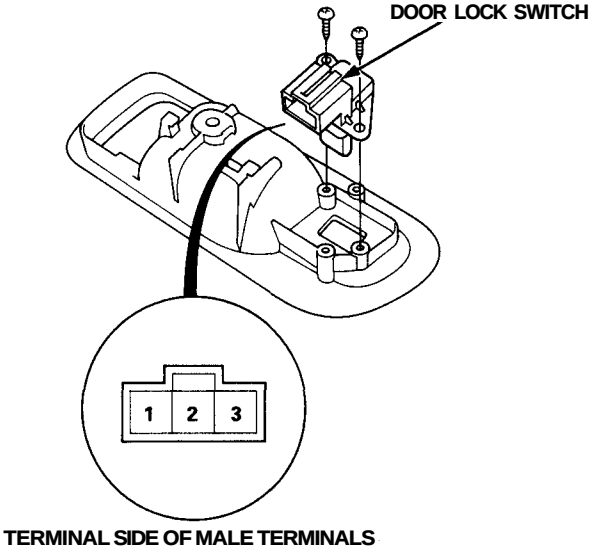
Door Lock Switch Test

1. Remove the inner handle trim.
2. Disconnect the 3P connector from the door lock switch.



3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2	3
LOCK	○	○	
OFF			
UNLOCK		○	○



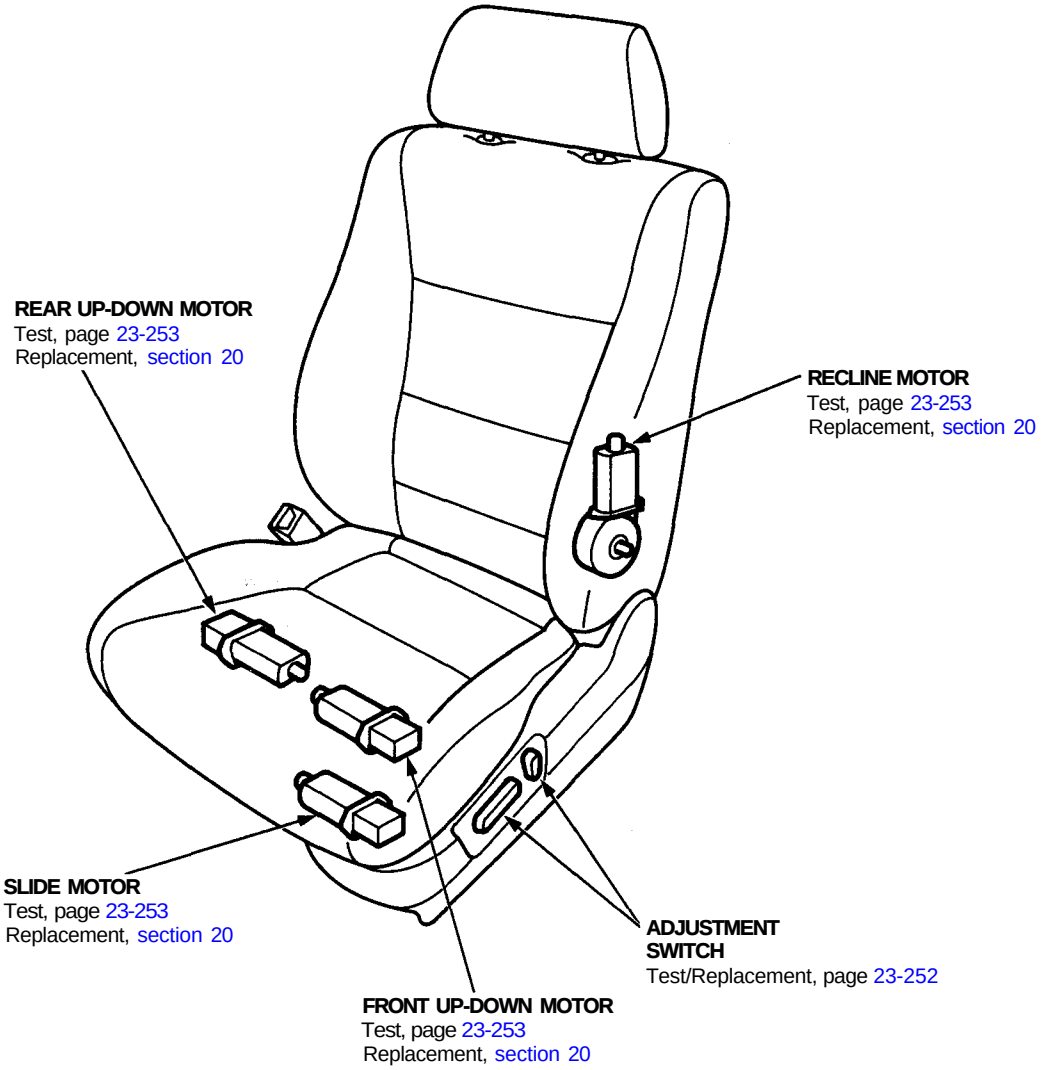
Remote Transmitter Replacement

Use the following procedure when replacing one or both remote transmitters:

1. Open the driver's door.
2. Press and hold the driver's master door lock switch up in the UNLOCK position.
3. Quickly insert and remove the key from the ignition switch five times, then insert the key the sixth time, and leave it in the ignition switch.
   (This routine must be done within 10 seconds.)
   All the doors will lock and unlock to indicate that the control unit is in the program mode.
4. Press either button on the replacement transmitter. All the doors except the driver's door will lock and unlock to indicate that the control unit has accepted the transmitter into its memory. If either transmitter button is pressed again, all the doors will lock and unlock.
5. To program a second transmitter, press either button on that transmitter. The doors should lock and unlock as described in step 4.
6. Release the driver's master door lock switch.
7. To exit the program mode, close the driver's door or remove the key from the ignition switch.

Driver's Power Seat

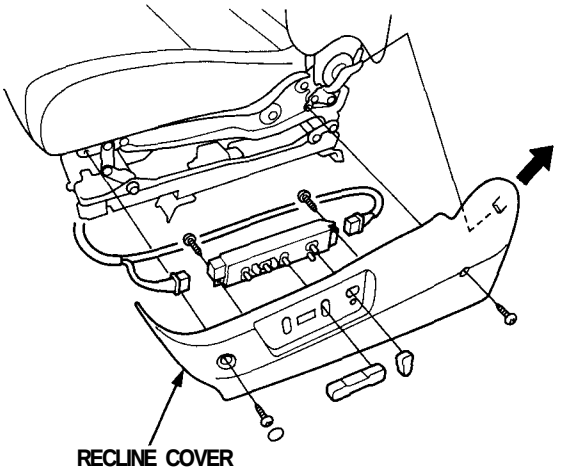
Component Location Index



Driver's Power Seat

Switch Test/Replacement

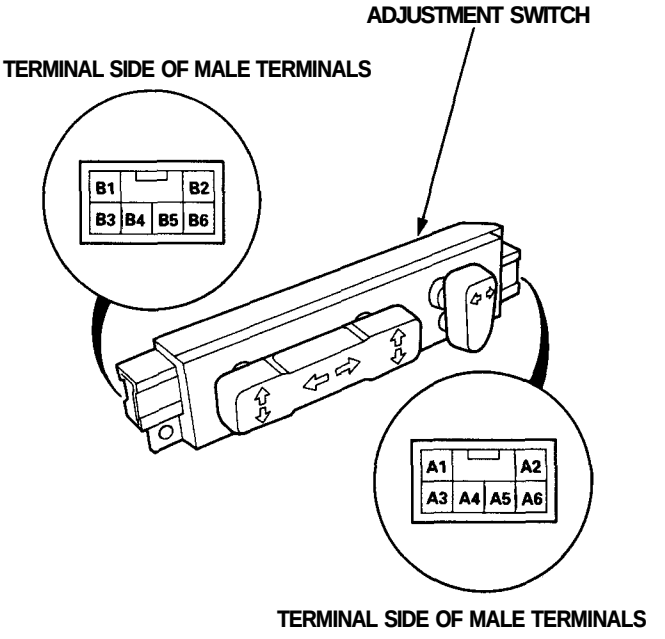
1. Remove the recline cover from the driver's seat by removing the two screws, and pulling off the adjustment switch knobs.



2. Disconnect the 6P connectors from the adjustment switch, then remove the switch from the cover by removing its two mounting screws.

3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
SLIDE SWITCH	FORWARD						○	—	—	—	—	○	
	BACKWARD						○	○					
RECLINE SWITCH	FORWARD		○	○									
	BACKWARD		○	—	○								
FRONT UP–DOWN SWITCH	UP						○	—	—	○			
	DOWN						○	—	—	—	○		
REAR UP–DOWN SWITCH	UP		○	—	—	—	—	—	○				
	DOWN		○										○



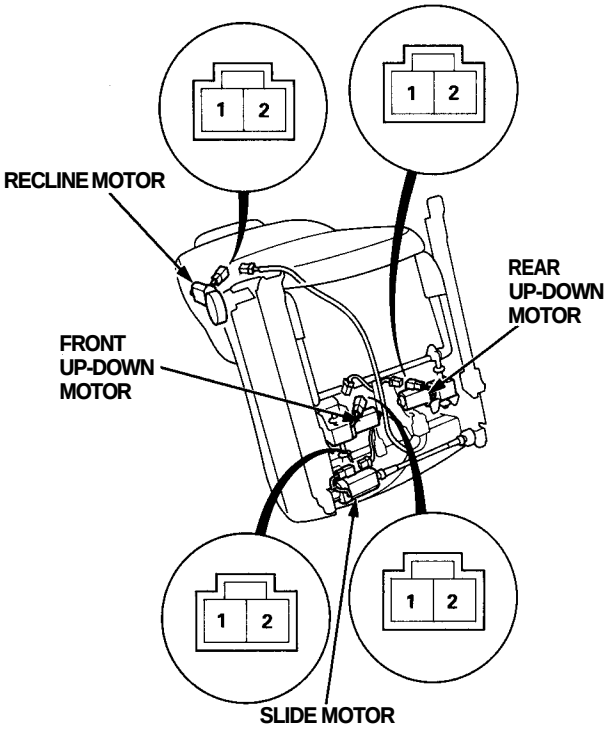
Motor Test

CAUTION: Be careful not to damage the seat, interior trim or body.

1. Remove the driver's seat (see section 20).
2. Disconnect the 2P connectors from the power seat motors.
3. Test the motors:

Position \ Terminal		1	2
SLIDE MOTOR	FOR-WARD	⊕	⊖
	BACK-WARD	⊖	⊕
RECLINE MOTOR	FOR-WARD	⊕	⊖
	BACK-WARD	⊖	⊕
FRONT UP-DOWN MOTOR	UP	⊕	⊖
	DOWN	⊖	⊕
REAR UP-DOWN MOTOR	UP	⊕	⊖
	DOWN	⊖	⊕

CAUTION: When a motor stops running, disconnect battery power immediately.



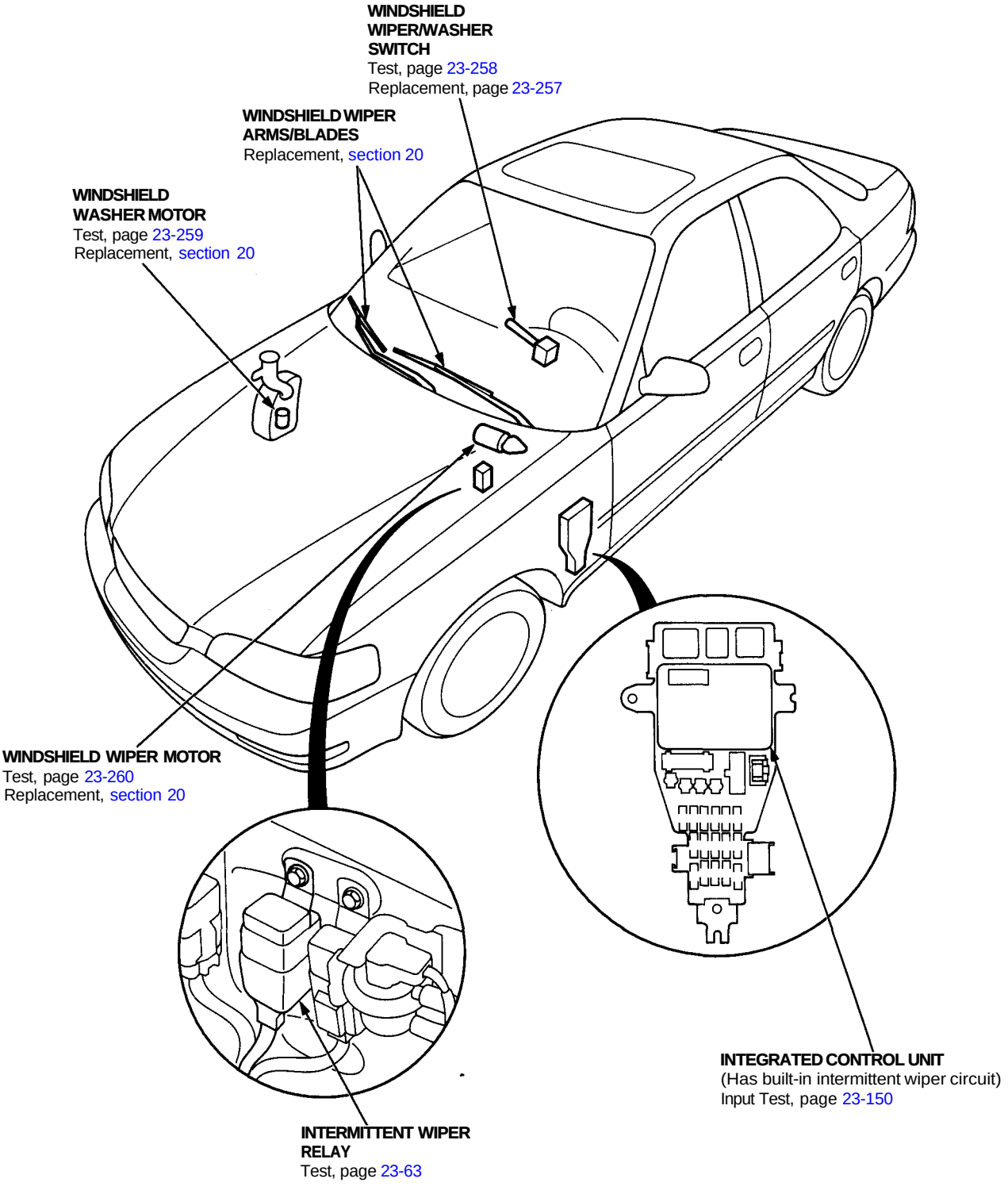
TERMINAL SIDE OF MALE TERMINALS

4. If the motor does not run or fails to run smoothly, replace it (see section 20).

Wiper/Washer

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.



Wiper/Washer

Troubleshooting

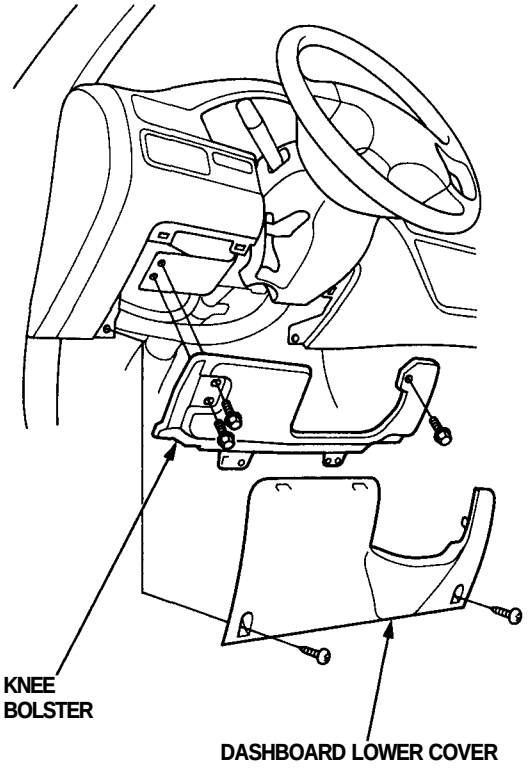
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 6 (30 A) fuse (In the under-dash fuse/relay box)	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	Intermittent wiper relay	Combined operation of wiper/washer (In the integrated control unit)	Not enough washer fluid in reservoir	Disconnected or blocked washer hose or clogged outlet	Disconnected wiper linkage	Poor ground	Open circuit, loose or disconnected terminals
Wipers do not work.	In all positions	1	4		2							3	G405	GRN/BLK
	In INT		1		3			2						GRN or BLU/WHT
	In LO or HI		1		2									BLU/YEL[1] or BLU
	In MIST			1	2									BLU/YEL[1]
Blades do not return to park position when wipers are turned OFF.			2		1									BLU/WHT
Erratic intermittent cycle or wipers do not work in INT.								1	2				G301	GRN/BLK, GRN, BLU/WHT or BLU/YEL[2]
Little or no washer fluid is pumped.						4	3			1	2		G201	BLK/YEL
Wipers and washer do not work at the same time.									1					BLK/YEL
Erratic intermittent cycle or wipers do not operate intermittently.									2	1				GRN/WHT, WHT/YEL

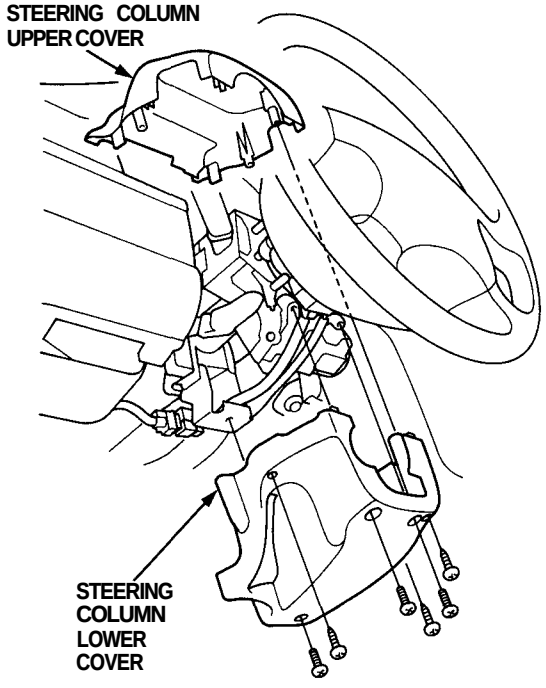
Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

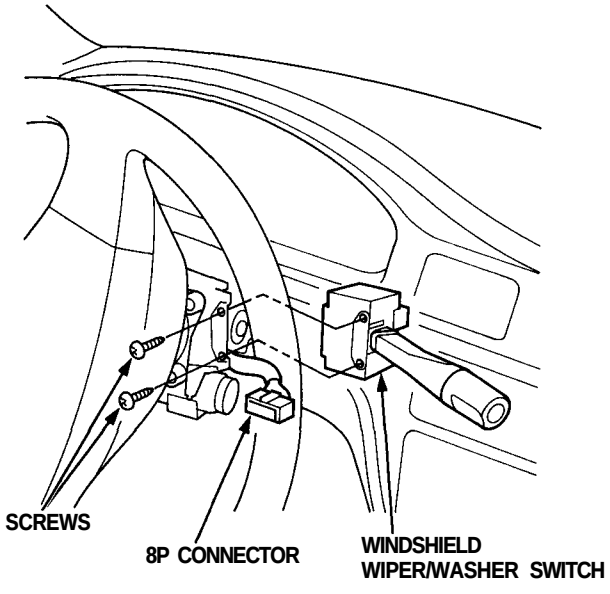
1. Remove the dashboard lower cover and knee bolster.



2. Remove the steering column covers.



3. Remove the two screws and the switch.

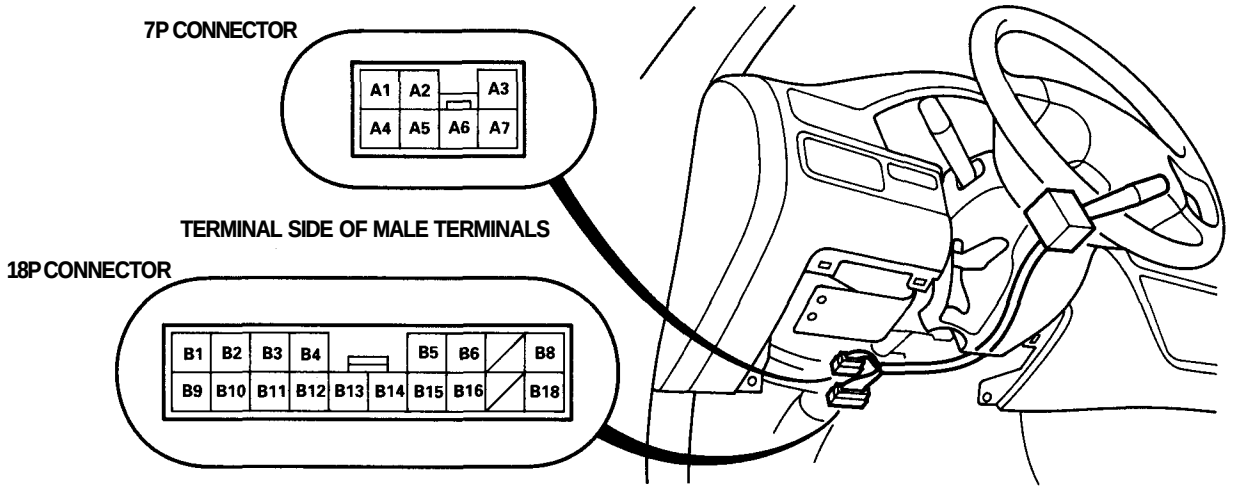


4. Install in the reverse order of removal.

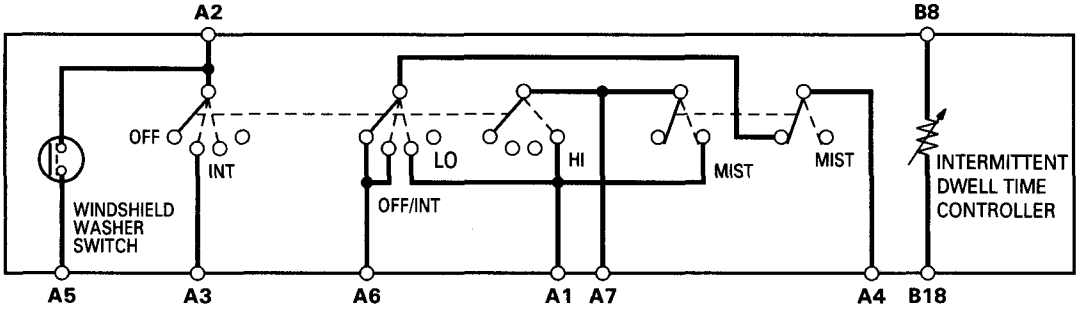
Wiper/Washer

Wiper/Washer Switch Test

1. Remove the dashboard lower cover and knee bolster (see page 23-257).
2. Disconnect the 7P and 20P connectors from the main wire harness.
3. Check for continuity between the terminals in each switch position according to the table.



Windshield Wiper/Washer Switch

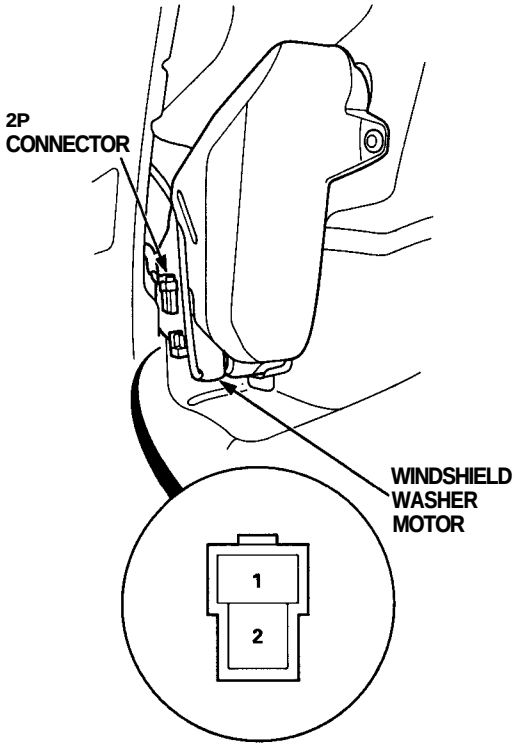


Terminal / Position	A1	A2	A3	A4	A5	A6	A7	B18		B8
OFF				○		○				
INT		○	○							
				○		○				
LO	○			○						
HI	○						○			
Mist switch "ON"	○						○			
Washer switch "ON"		○			○					
Intermittent controller turned								○	0 – 30kΩ	○

Windshield Washer Motor Test

1. Remove the inner fender (see section 20).

2. Disconnect the 2P connector from the washer motor.



TERMINAL SIDE OF MALE TERMINALS

3. Test the washer motor operation by connecting battery power and ground according to the table.

Terminal / Battery	1	2
Disconnected		
Connected	⊕	⊖

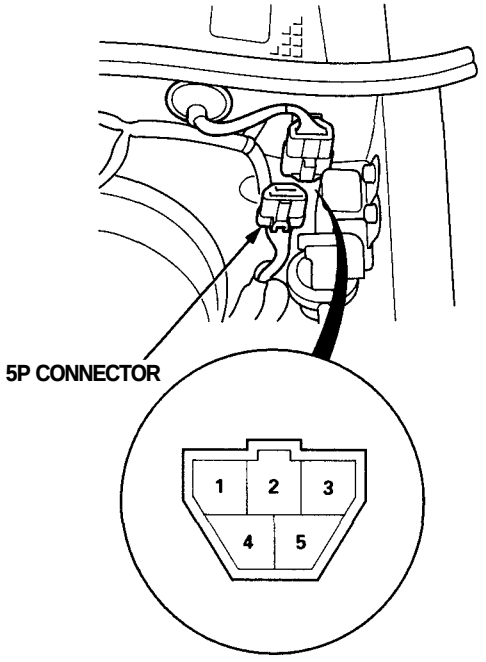
- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

Wiper/Washer

Windshield Wiper Motor Test

1. Open the hood, and remove the cap nuts and the wiper arms.
2. Disconnect the 5P connector from the windshield wiper motor.
3. Test the motor by connecting battery power and ground according to the table.

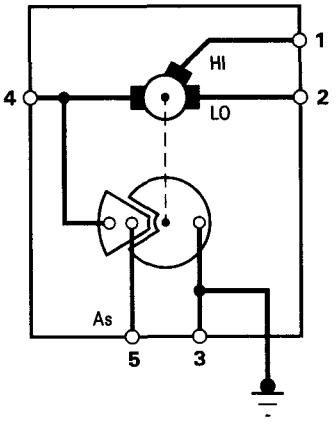
Terminal / Position	1	2	4
LOW SPEED		⊖	⊕
HIGH SPEED	⊖		⊕



TERMINAL SIDE OF MALE TERMINALS

4. If the motor fails to run smoothly, replace it.

5. Connect an analog voltmeter between the No. 3 and the No. 5 terminals. Run the motor at low or high speed.



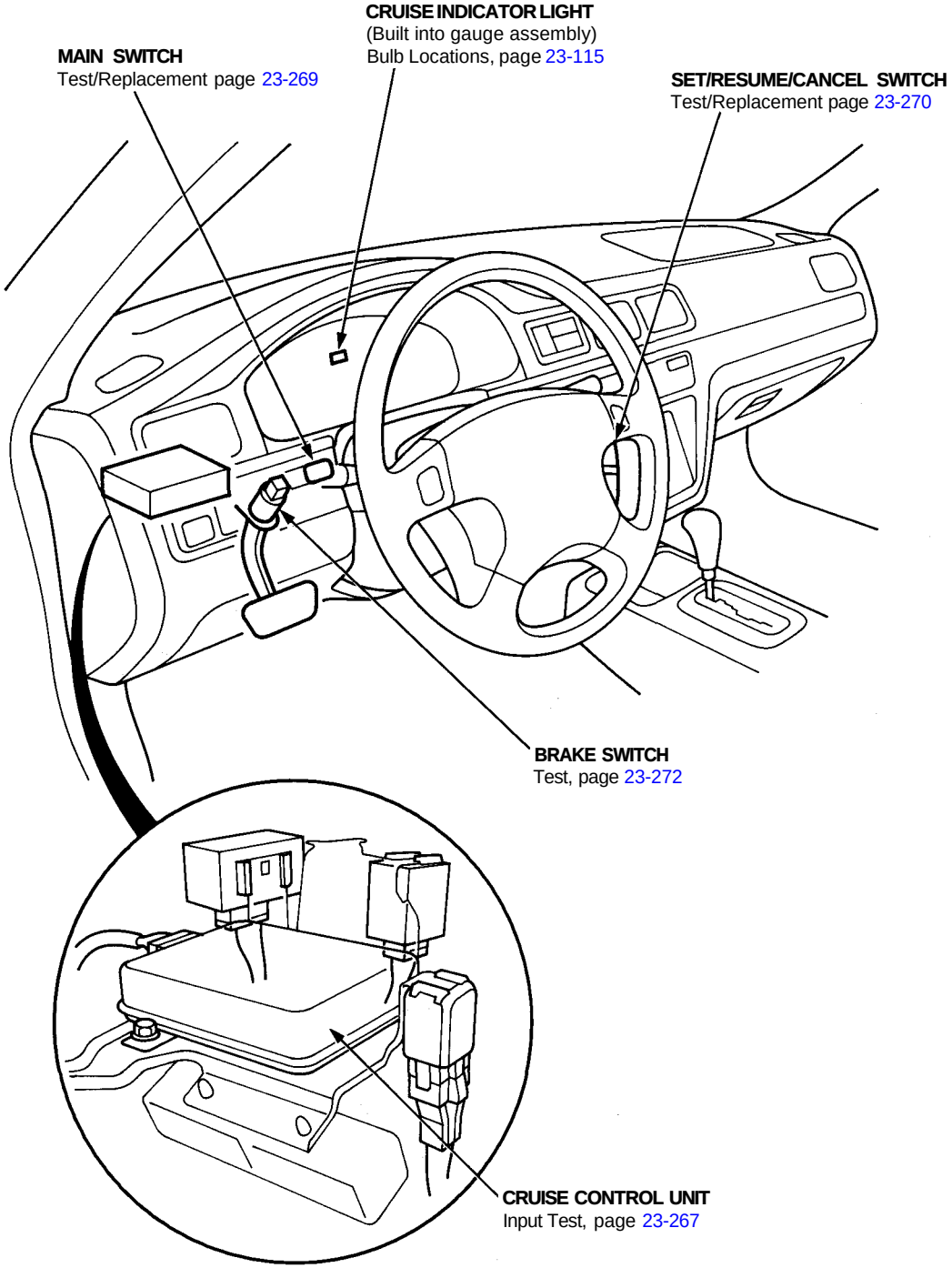
NOTE: "As" means Automatic stop

The voltmeter should indicate 0 V and 4 V or less alternately.

Cruise Control

Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

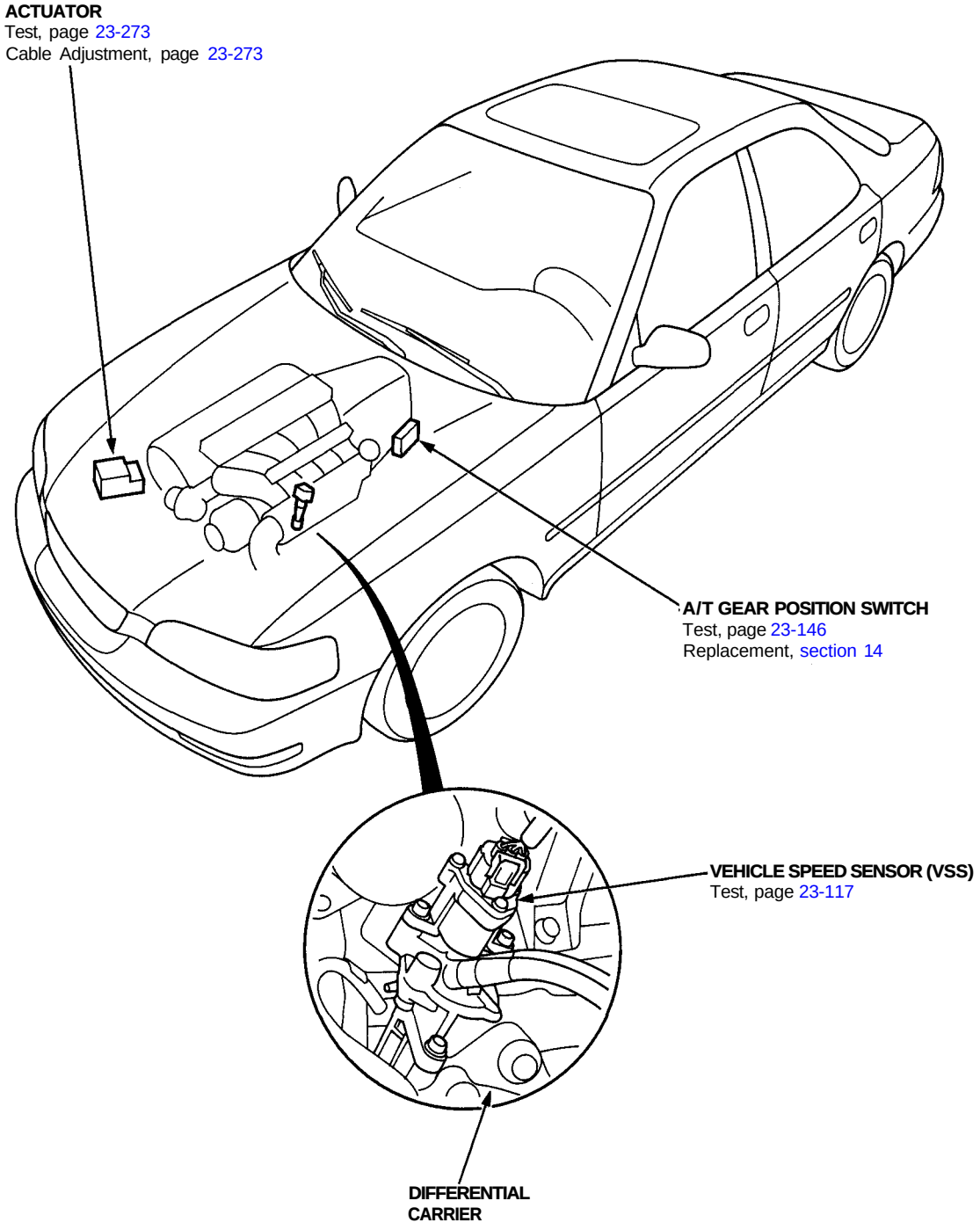


(cont'd)

Cruise Control

Component Location Index (cont'd)

NOTE: Refer to page 23-137a of the '96-98 Acura 3.2TL Service Manual supplement for the differences on this page for the 3.2TL.



Description

The cruise control system uses mechanically and electrically operated devices to maintain vehicle speed at a setting selected by the driver.

The cruise control unit receives command signals from the cruise control main switch and the cruise control set/resume/cancel switch. It receives information about operating conditions from the brake switch, ECM, vehicle speed sensor (VSS), or the A/T gear position switch. The cruise control unit sends operational signals to the devices that regulate the throttle position. The throttle position maintains the selected vehicle speed. Essentially, the control unit compares the actual speed of the vehicle to the selected speed. Then, the control unit uses the result of that comparison to open or close the throttle.

The brake switch releases the system's control of the throttle at the instant the driver depresses the brake pedal. The switch sends an electronic signal to the control unit when the brake pedal is depressed; the control unit responds by allowing the throttle to close. The A/T gear position switch sends a disengage signal input to the control unit that also allows the throttle to close.

Operation:

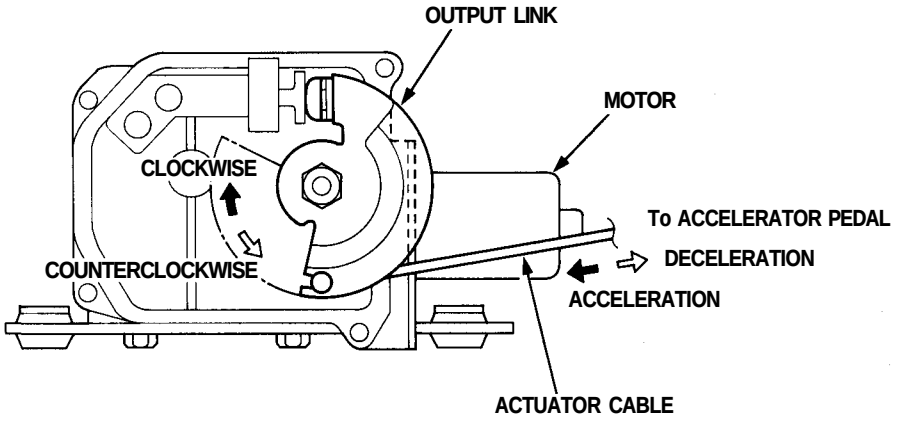
The cruise control system will set and automatically maintain any speed above 25 mph (40 km/h). To set a speed, make sure that the main switch is in the "ON" position. After reaching the desired speed, press the set switch. The cruise control unit will receive a set signal and, in turn, will actuate the cruise control actuator. If you depress the set switch is when the cruise control system is on, the "cruise light", an indicator in the gauge assembly, will come on. You can cancel the cruise control system by depressing the cancel switch or by pushing the main switch to "OFF". This removes power to the control unit and erases the set speed from memory. If the system is disengaged temporarily by the brake switch or the A/T gear position switch and vehicle speed is still above 25 mph (40 km/h), press the resume switch. With the resume switch depressed and the set memory retained, the vehicle will automatically return to the previous set speed.
For gradual acceleration without depressing the accelerator pedal, push the resume switch down and hold it there until the desired speed is reached. This will send an acceleration signal to the control unit. When the switch is released, the system will be reprogrammed for the new speed. To slow the vehicle down, depress the set switch. This will send a deceleration signal to the control unit, causing the vehicle to coast. When you reach the desired speed, release the set switch. This will reprogram the system for the new speed.

(cont'd)

Cruise Control

Description (cont'd)

The electrically operated actuator controls the throttle position in the same way as a vacuum operated actuator. The magnetic clutch is part of the safety system and controls acceleration and deceleration.

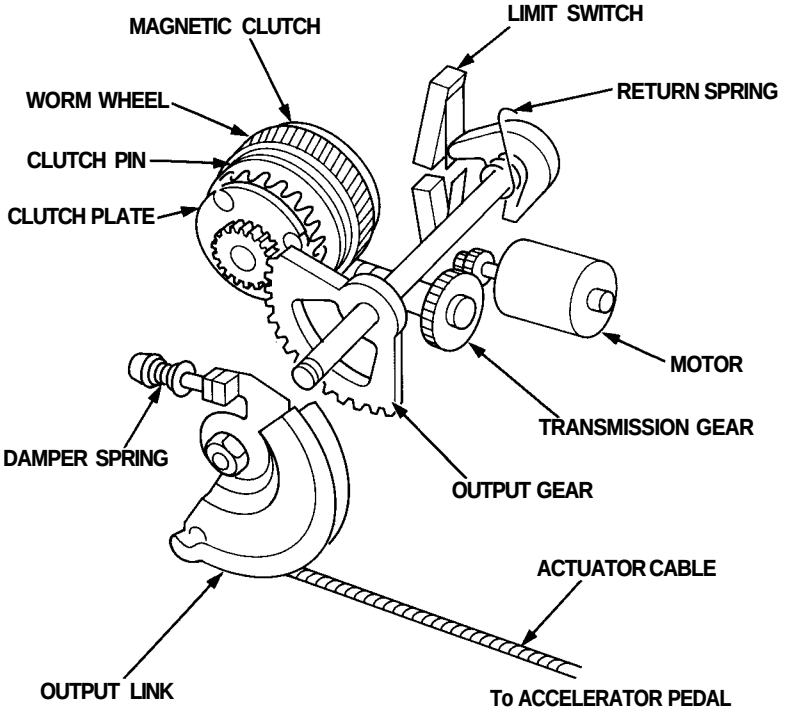


Acceleration

Due to the rotation of the motor output shaft, power is transmitted to the magnetic clutch by the transmission gear and the worm wheel. The magnetic clutch is rotated and magnetized. It attracts the clutch plate and power is transmitted to the output link by the gear directly connected to the clutch plate and the output gear. The output link rotates clockwise, then the actuator cable opens the throttle, and the car accelerates.

Deceleration

The motor output shaft rotates in reverse direction of acceleration, then, in the same way, the power is transmitted to the output link. The output link rotates counterclockwise, then the actuator cable closes the throttle, and the car decelerates.



Cruise Control

Troubleshooting

NOTE:
- The numbers in the table show the troubleshooting sequence.
- Before troubleshooting,
  — Check the No. 1 (10 A) and the No. 4 (15 A)*1 or (20 A)*2 fuses in the under-dash fuse/relay box, and the No. 30 (20 A) fuses in the under-hood fuse/relay box.
  — Check that the horns sound.
  — Check the tachometer to see if it works properly.

Item to be inspected / Symptom	Main switch	SET/RESUME/CANCEL switch	Brake switch and mounting	A/T gear position switch	Vehicle speed sensor (VSS)	Dimming circuit in gauges	Actuator and cable deflection	Control unit	Poor ground	Open circuit in wires, loose or disconnected terminals
Cruise control cannot be set.	2	3	4	5				1	G401 G404	BLU/RED, LT GRN/RED, BLK/YEL, LT GRN, GRY, ORN, BRN, BRN/BLK, BRN/WHT or PNK
Cruise control can be set, but indicator light does not go on.						2		1	G401 G404	YEL or BLU/BLK
Cruise speed is noticeably higher or lower than what was set.					1		2	3		
Excessive overshooting and/or undershooting when trying to set speed.					2		1	3		
Steady speed not held, even on a flat road with cruise control set.					1		2	3		
Car does not decelerate or accelerate accordingly when SET or RESUME button is pushed.		1						2		LT GRN/BLK LT GRN/RED
Set speed not cancelled when shift lever is moved to [N].				1				2		
Set speed not cancelled when brake pedal is pushed.			1					2		
Set speed not cancelled when main switch is pushed OFF.	1							2		
Set speed not resumed when RESUME button is pushed (with main switch on, but set speed temporarily cancelled).		1						2		LT GRN/BLK LT GRN/RED

*1: '95 – 96 models
*2: '97 – 98 models

Control Unit Input Test

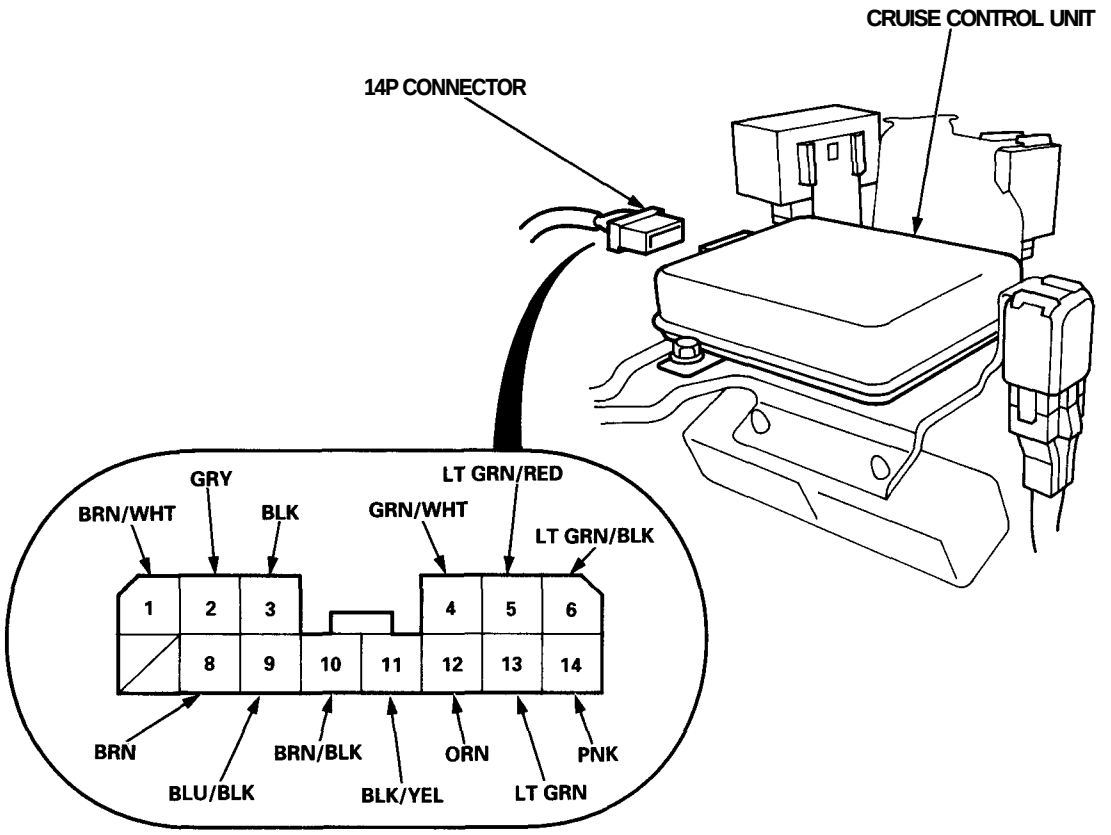
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the dashboard lower cover and knee bolster (see page 23-64).

2. Disconnect the 14P connector from the control unit.

3. Inspect the connector and socket terminals to be sure they are all making good contact.

   If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   If the terminals look OK, make the following input tests at the connector.
   — If any test indicates a problem, find and correct the cause, then recheck the system.
   — If all the input tests prove OK, the control unit must be faulty; replace it.

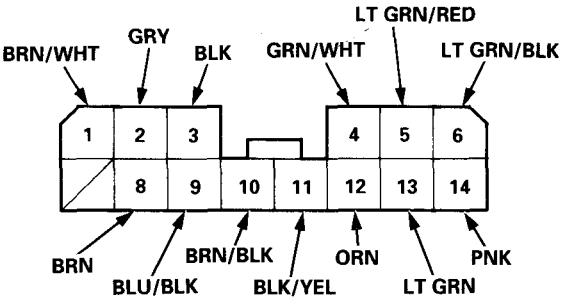


WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Cruise Control

Control Unit Input Test (cont'd)



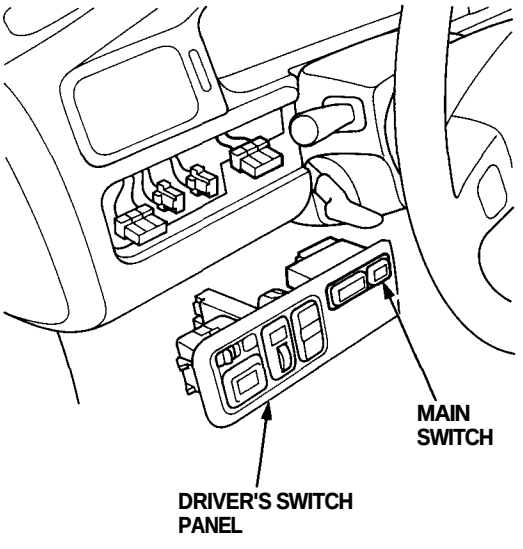
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BRN/WHT	Connect battery power to the BRN terminal	Check the operation of the magnetic clutch: Clutch should click and output link should be locked.	• Faulty actuator • Poor ground (G201) • An open in the wire
2	GRY	Ignition switch ON (II), main switch ON and brake pedal depressed, then released	Check for voltage to ground: There should be 0 V with the pedal depressed and battery voltage with the pedal released.	• Faulty brake switch • An open in the wire
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire
4	GRN/WHT	Brake pedal depressed, then released	Check for voltage to ground: There should be battery voltage with the pedal depressed, and 0 V with the pedal released.	• Faulty brake switch • An open in the wire
5	LT GRN/RED	Set button pressed	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty set/resume/cancel switch • Faulty horn relay • Faulty cable reel • An open in the wire
6	LT GRN/BLK	Resume button pressed		
8	BRN	Connect battery power to the BRN terminal and ground to the BRN/BLK terminal	Check the operation of the actuator motor: You should be able to hear the motor.	• Faulty actuator • An open in the wire
10	BRN/BLK			
9	BLU/BLK	Ignition switch ON (II)	Attach to ground: Cruise indicator in the gauge assembly should come on.	• Blown bulb • Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty dimming circuit in the gauge assembly • An open in the wire
11	BLK/YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 4 (15 A)*1 or (20 A)*2 fuse in the under-dash fuse/relay box • An open in the wire
12	ORN	Ignition switch ON (II) and main switch ON; raise the front of the car, block one wheel and rotate the other wheel slowly.	Check for voltage between the ORN ⊕ and BLK ⊖ terminals: There should be 0 – 5 V or more, –0 – 5 V or more repeatedly.	• Faulty vehicle speed sensor (VSS) • An open in the wire
13	LT GRN	Ignition switch ON (II) and main switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 4 (15 A)*1 or (20 A)*2 fuse in the under-dash fuse/relay box • Faulty main switch • An open in the wire
14	PNK	Shift lever in 2, D3, or D4	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity when the A/T shift lever is in other positions.	• Faulty A/T gear position switch • An open in the wire

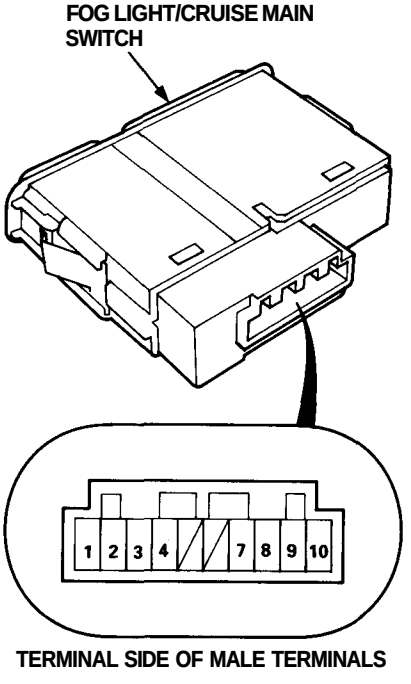
*1: '95 – 96 models
*2: '97 – 98 models

Main Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Carefully pry the switches out of the dashboard.
2. Disconnect the connectors from the switches.

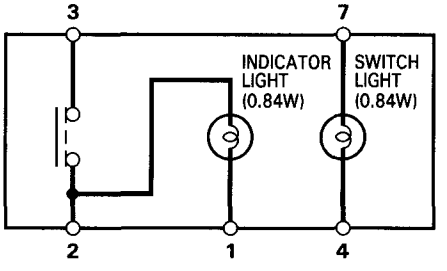




TERMINAL SIDE OF MALE TERMINALS

3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1		2	3	4		7
OFF	○	○	○		○	○	○
ON	○	○	○	○	○	○	○



If there is no continuity, replace the switch.

Cruise Control

Set/Resume Switch Test/Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

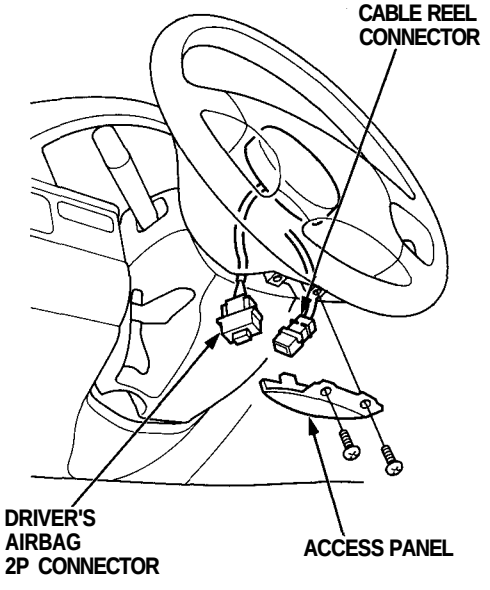
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's pre-set buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.

3. Disconnect the airbag connector(s).

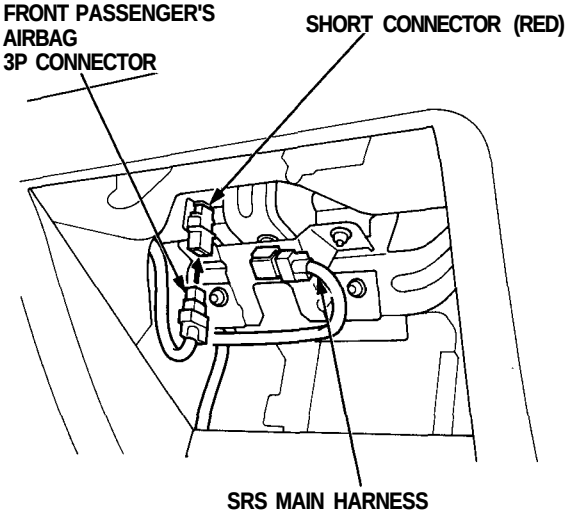
Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



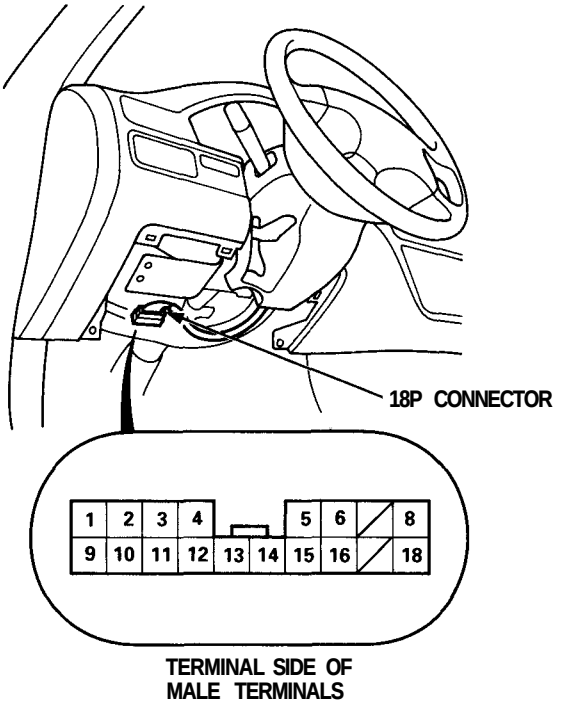
Front Passenger's Side ('95 - 96 models only):

- Remove the glove box (see section 20).
- Disconnect the front passenger's 3P connector from the SRS main harness, and connect the short connector (RED) to the front passenger's airbag 3P connector.



4. Remove the dashboard lower cover and knee bolster (see page 23-64).

5. Disconnect the combination switch 18P connector from the main harness.

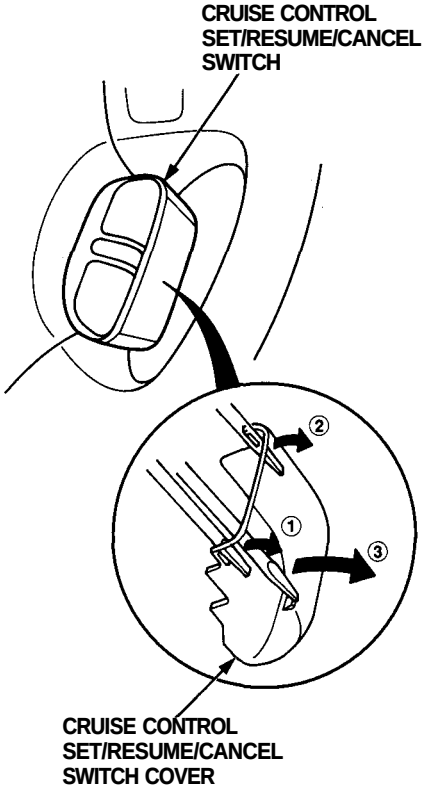


6. Check for continuity between the terminals of the combination switch harness connector in each switch position according to the table.

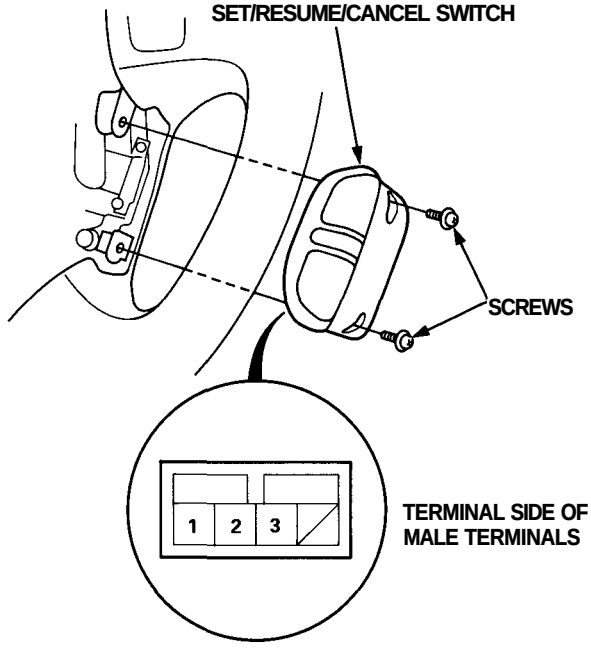
Position \ Terminal	5		9	10
SET (ON)	○		○	
RESUME (ON)	○			○
CANCEL (ON)	○	▶	○	
		▶		○

- If there is continuity, and it matches the table, the switch is OK.
- If there is no continuity in one or both positions, go to step 7.

7. Carefully remove the cruise control set/resume/cancel switch cover by prying between the cover and the switch in the sequence shown.



8. Remove the two screws, and disconnect the 4P connector. Then remove the switch.



9. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1		2	3
SET (ON)	○			○
RESUME (ON)	○		○	
CANCEL (ON)	○	▶		○
		▶	○	

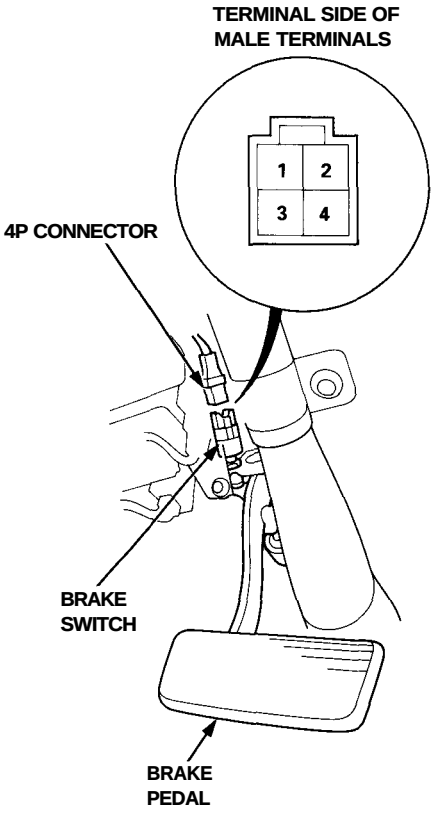
- If there is continuity, and it matches the table, replace the cable reel.
- If there is no continuity in one or both positions, replace the switch.

10. If all the tests prove OK, reconnect the battery cables, and enter the anti-theft code for the radio. Then enter the customer's radio station presets.

Cruise Control

Brake Switch Test

1. Disconnect the 4P connector from the switch.



2. Check for continuity between the terminals according to the table.

Terminal / Brake pedal	1	2	3	4
DEPRESSED		○—○		
RELEASED	○			○

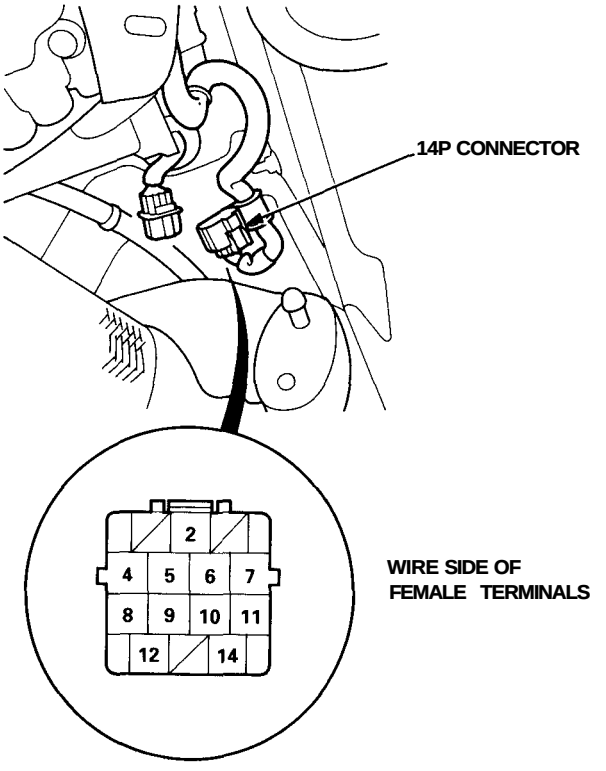
3. If necessary, replace the switch or adjust pedal height (see section 19).

A/T Gear Position Switch Test

1. Disconnect the 14P connector from the A/T gear position switch.

2. Check for continuity between the terminals in each position according to the table and confirm that there is continuity only in positions [2], [D3], and [D4].

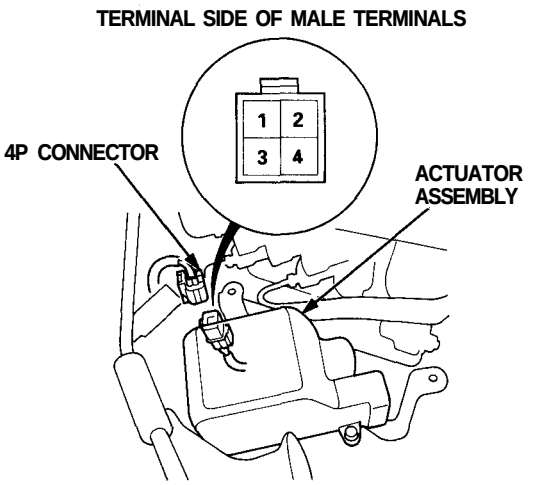
Terminal / Position	Body Ground	8
[1]		
[2]	○	○
[D3]	○	○
[D4]	○	○
[N]		
[R]		
[P]		



3. If necessary, replace the A/T gear position switch.

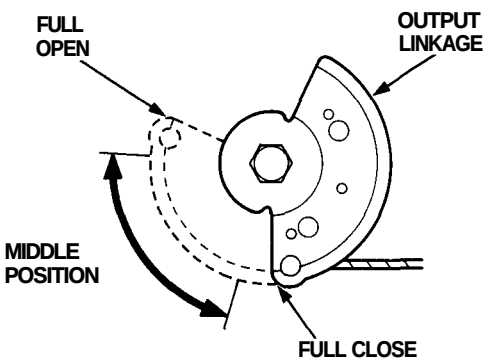
Actuator Assembly Test

1. Disconnect the 4P connector from the actuator.
2. Check the output linkage for smooth movement.
3. Connect battery power to the No. 4 terminal and ground to the No. 1 terminal.
4. Check for a clicking sound from the magnetic clutch. The output linkage should be locked.
5. If the output linkage is not locked, replace the actuator assembly.



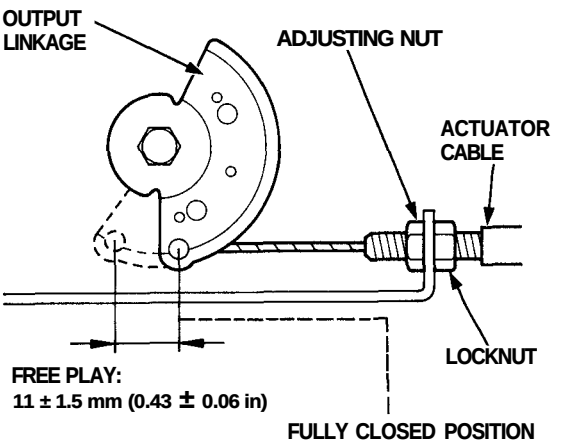
6. Check the operation of the actuator motor in each output linkage position according to the table. You should be able to hear the motor.

Battery power polarities		Output linkage position		
⊕	⊖	FULL CLOSE	MIDDLE POSITION	FULL OPEN
No. 3 Terminal	No. 2 Terminal	The motor runs.	The motor runs.	The motor stops.
No. 2 Terminal	No. 3 Terminal	The motor stops.	The motor runs.	The motor runs.



Actuator Cable Adjustment

1. Check that the actuator cable operates smoothly with no binding or sticking.
2. Start the engine, and warm it up to normal operating temperature (the radiator fan comes on twice).
3. Measure how far the output linkage moves from the fully closed position. Free play should be 11 ± 1.5 mm (0.43 ± 0.06 in).

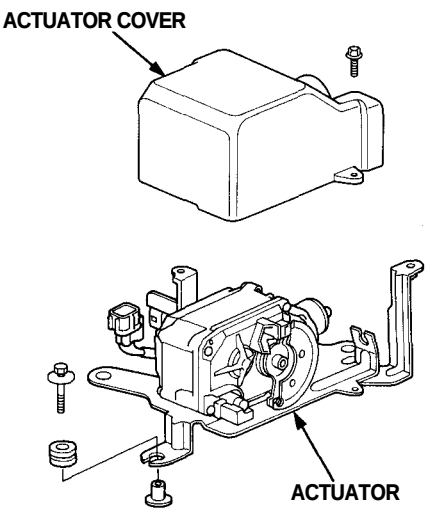


4. If the free play is not within specs, loosen the locknut, and turn the adjusting nut as required.

   NOTE: If necessary, check the throttle control system (see section 11), then recheck the output linkage free play.

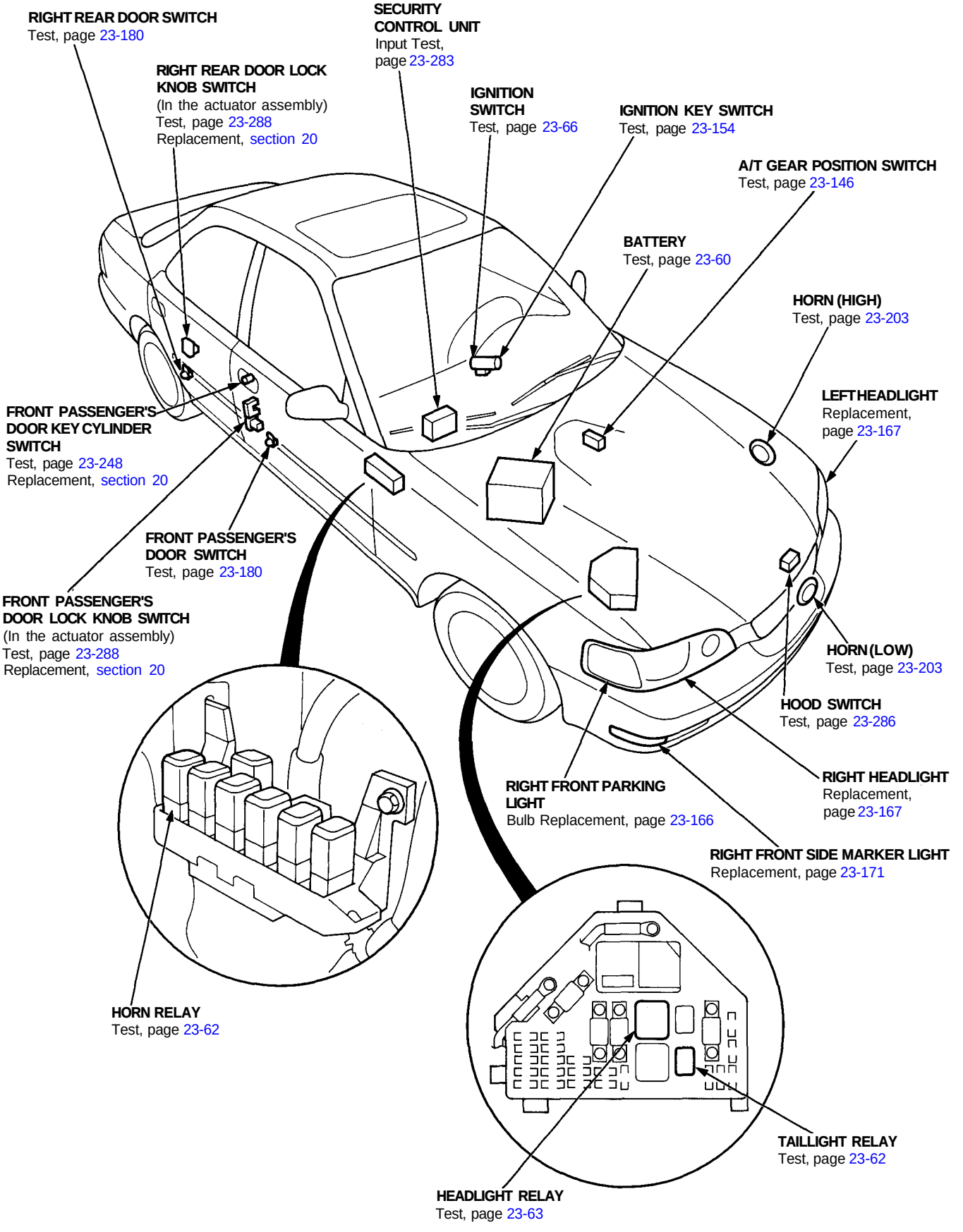
5. Retighten the locknut, and recheck the free play.

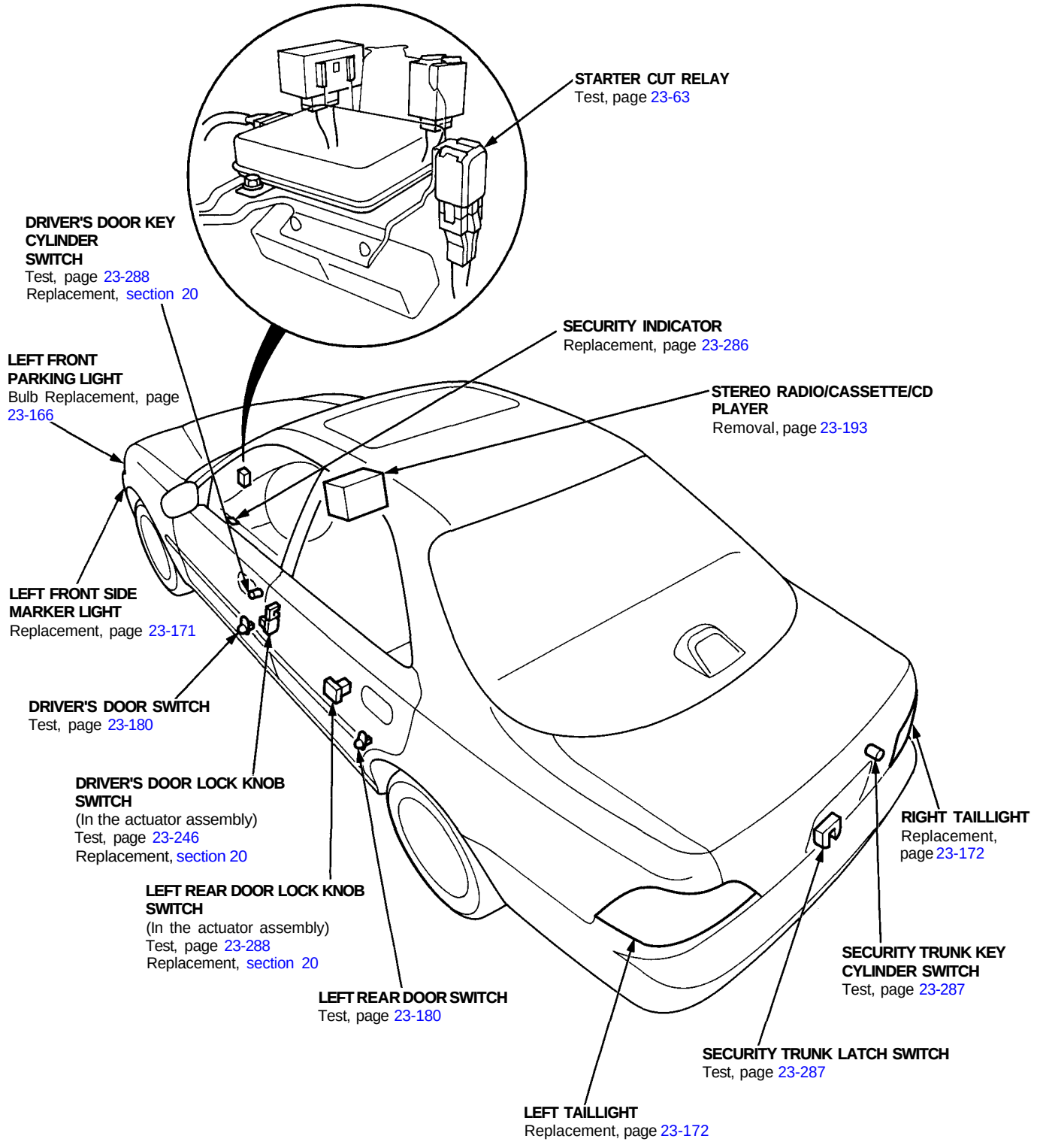
Actuator Disassembly



Security Alarm System

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STARTER CUT RELAY
Test, page 23-63
DRIVER'S DOOR KEY CYLINDER SWITCH
Test, page 23-288
Replacement, section 20
SECURITY INDICATOR
Replacement, page 23-286
LEFT FRONT PARKING LIGHT
Bulb Replacement, page 23-166
STEREO RADIO/CASSETTE/CD PLAYER
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DRIVER'S DOOR LOCK KNOB SWITCH
(In the actuator assembly)
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LEFT REAR DOOR LOCK KNOB SWITCH
(In the actuator assembly)
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SECURITY TRUNK KEY CYLINDER SWITCH
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SECURITY TRUNK LATCH SWITCH
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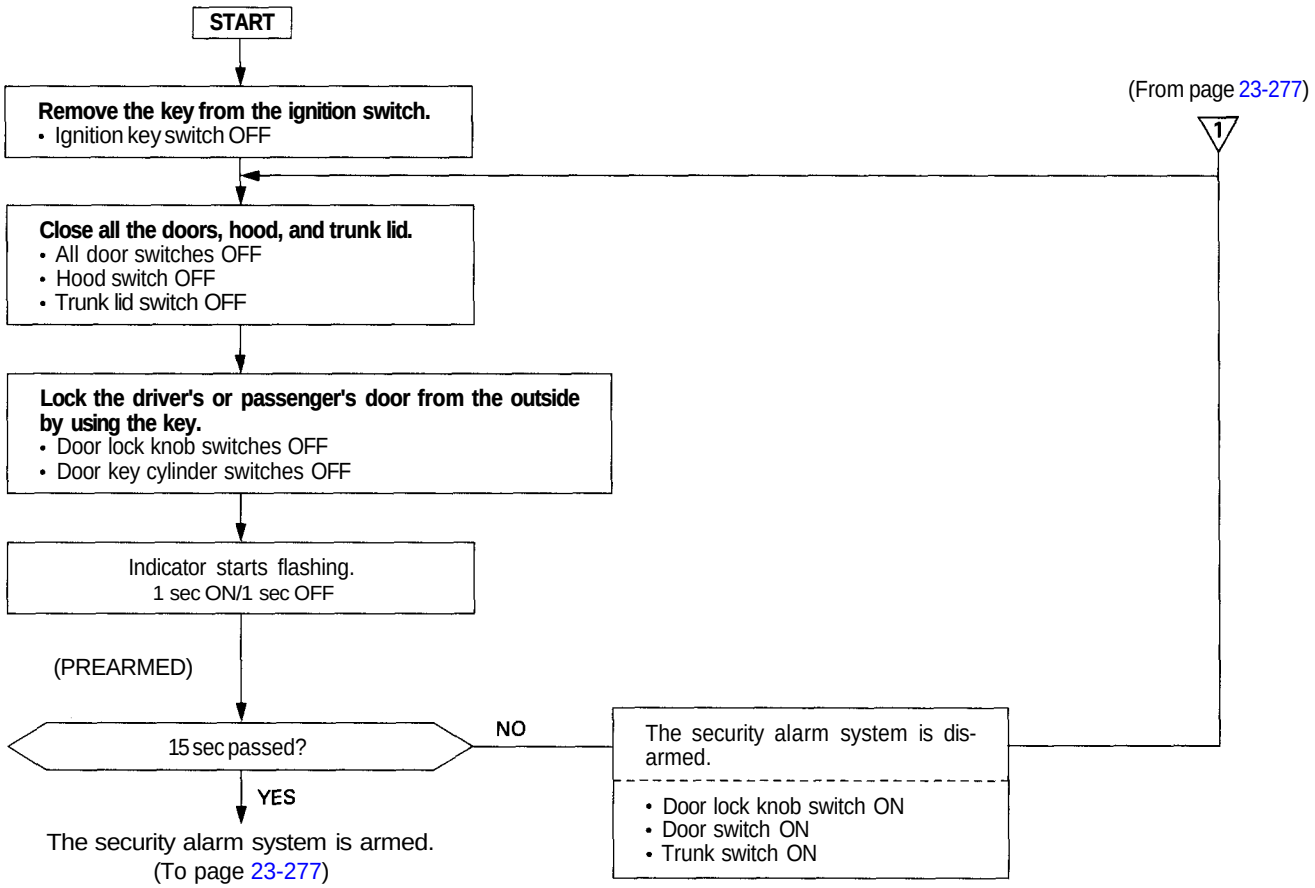
Security Alarm System

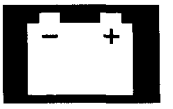
Description

This system is activated automatically 15 seconds after everything has been closed and locked. The security alarm system indicator light located on the driver's side door panel will flash after the doors are properly locked.
If any of the following conditions occur, the horns will sound, the headlights will flash, and the side marker lights, parking lights and taillights will flash for about two minutes, or until the system is disarmed by unlocking either door from the outside with the key.

① Door is opened forcibly.
② Trunk lid is opened without using the key.
③ Hood is opened.
④ Battery terminal(s) is (are) removed and reconnected.
⑤ Engine starter circuit and battery circuit are bypassed by breaking the ignition switch.
⑥ Hood/trunk lid opener is operated.

Flowchart of the security alarm system operation:





(From page 23-276)

Indicator flashes.
0.2 sec ON/2.4 sec OFF (ARMED)

Want the system disarmed? — YES

NO

Trunk opened with key? — YES
- Trunk lid switch ON
- Trunk key cylinder switch ON (UNLOCK)

NO

Illegal activity (any of the following)

1. Door is opened forcibly, or
2. Trunk lid is opened without using the key, or
3. Hood is opened, or
4. Battery terminal(s) is (are) disconnected and reconnected, or
5. Engine starter circuit and battery circuit are bypassed by breaking the ignition switch, or
6. Hood/trunk lid opener is operated.

NO

Alarm

- The horns, headlights, side marker lights, and taillights sound and flash repeatedly for two minutes.
- Engine starter circuit is interrupted.

About two minutes passed? — YES

NO — Want the system disarmed? — YES

Unlock either door with the key.
- Either door key cylinder switch ON (UNLOCK)

The security alarm system is disarmed.
Indicator stops flashing.

Rearm the security alarm system? — NO — END

YES — 1

(To page 23-276)

Security Alarm System

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 30 (20 A) fuse in the under-hood fuse/relay box	Blown No. 4 (15 A)*1 or (20 A)*2 fuse in the under-hood dash fuse/relay box	Faulty indicator light (LED)	Horn circuit	Starting system	A/T gear position switch	Lighting system	Door lock cylinder	Ignition key switch	Security trunk lock cylinder switch	Security trunk latch switch	Hood switch	Door switch	Security control unit input	Poor ground	Open circuit in wires, loose or disconnected terminals
Security alarm can't be set (and indicator light does not flash).		1	2	3						4						G401 G404	WHT/YEL, BLK/YEL, GRN[1] or BLU/WHT[1]
Starting system does not operate.						1	2								3		BLK/GRN, YEL/GRN or GRY[2]
Security alarm can be set, but alarm does not operate when the trunk, hood or either door is unlocked without the key.	Horn alarm	1			2										3	G201 G301	WHT/YEL, BLU/RED, or WHT/BLU
	Headlight alarm							1							2		BLU/GRN[2] or RED/WHT
	Both alarms														1		
Alarm not cancelled when the door is opened with the key.									1						2	G403 G405	BLK/RED, GRN/YEL[2], GRN/BLK, or BLU/YEL
Alarm not cancelled when the key is inserted in the ignition switch.			1							2					3	G401 G404	BLK/YEL or BLU/WHT[1]
Alarm not cancelled when the trunk lid is opened with the key.											1	2			3	G502	GRN/ORN or BLU/GRN[1]
Alarm does not operate when the hood is opened.													1		2	G201	YEL/RED
Alarm does not operate when the door is opened.														1	2		GRN/YEL[1], GRN/WHT, GRN/BLU or GRN/RED

*1: '95 – 96 models
*2: '97 – 98 models

Control Unit Input Test

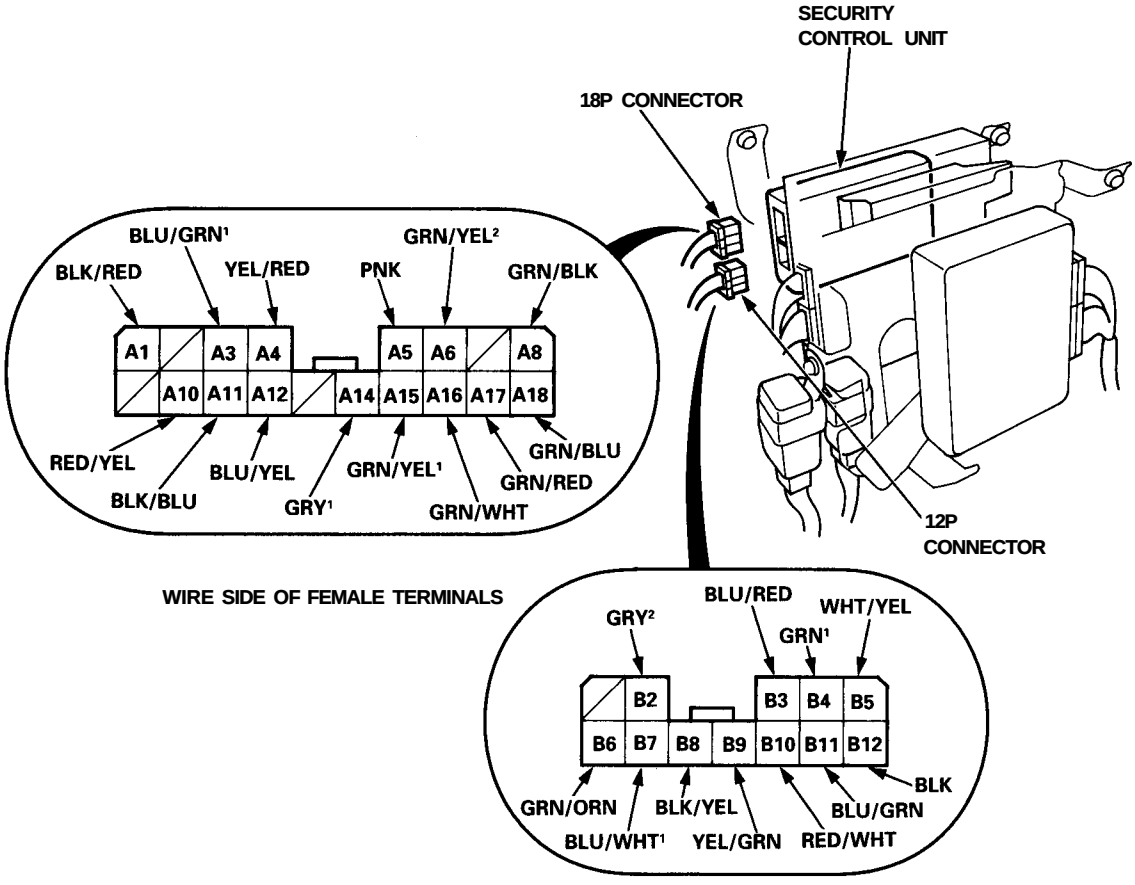
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS (section 24) before performing repairs or service.

1. Remove the glove box (see section 20).

2. Disconnect the 12P and 18P connectors from the security control unit.

3. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector terminals.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



(cont'd)

Security Alarm System

Control Unit Input Test (cont'd)

Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A1	BLK/RED	Driver's door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door lock knob switch (built into the actuator) • Poor ground (G405) • An open in the wire
A3	BLU/GRN[1]	Trunk lid open	Check for continuity to ground: There should be continuity.	• Faulty security trunk latch switch • Poor ground (G502) • An open in the wire
		Trunk lid closed	Check for continuity to ground: There should be no continuity.	
A4	YEL/RED	Hood open	Check for continuity to ground: There should be continuity.	• Faulty hood switch • Poor ground (G201) • An open in the wire
		Hood closed	Check for continuity to ground: There should be no continuity.	
A5	PNK	Under all conditions	Check for continuity to ground: There should be continuity.	• Faulty stereo radio/cassette/CD player • Poor ground (G401, G404) • An open in the wire
A6	GRN/YEL[2]	Front passenger's door key in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door or front passenger's door key cylinder switches • Poor ground (G403 or G405) • An open in the wire
A8	GRN/BLK	Driver's door key in UNLOCK		
A10	RED/YEL	Left rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty left rear door lock knob switch (built into the actuator) • Poor ground (G501) • An open in the wire
A11	BLK/BLU	Right rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty right rear door lock knob switch (built into the actuator) • Poor ground (G401, G404) • An open in the wire
A12	BLU/YEL	Front passenger's front door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty front passenger's door lock knob switch (built into the actuator) • Poor ground (G403) • An open in the wire
A14	GRY[1]	Driver's door key in LOCK	Check for continuity to ground: There should be continuity as the door keylock is turned to LOCK.	• Faulty driver's door or front passenger's door key switches • Poor ground (G403 or G405) • An open in the wire
		Front passenger's front door key in LOCK		
A15	GRN/YEL[1]	Left rear door opened	Check for continuity to ground: When the door is opened, there should be continuity, and when the door is closed, there should be no continuity.	• Faulty left rear door or right rear door switches • An open in the wire
		Left rear door closed		
A16	GRN/WHT	Right rear door opened		
		Right rear door closed		
A17	GRN/RED	Front passenger's door opened	Check for continuity to ground: When the door is opened, there should be continuity, and when the door is closed, there should be no continuity.	• Faulty driver's door or front passenger's door switches • An open in the wire
		Front passenger's door closed		
A18	GRN/BLU	Driver's door opened		
		Driver's door closed		



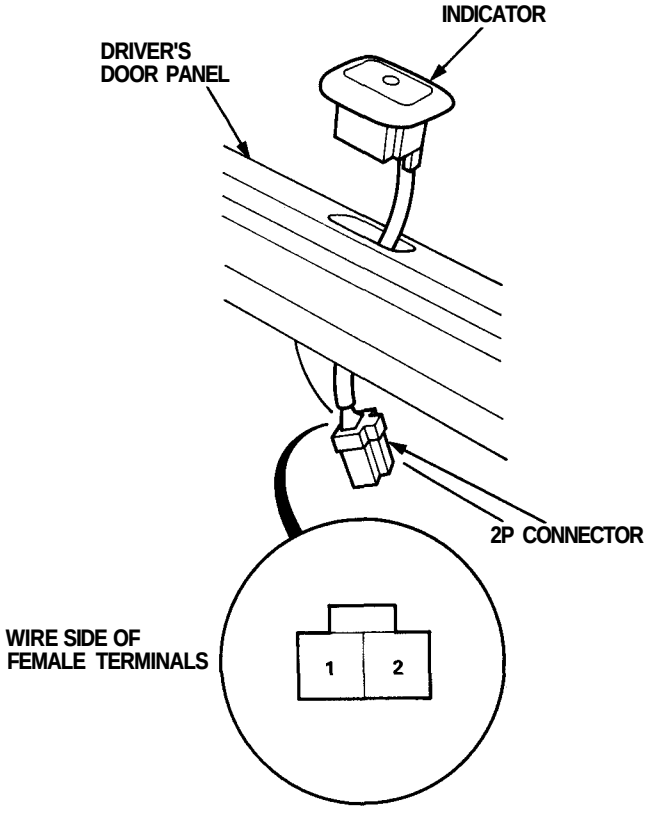
Trml	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	GRY[2]	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • An open in the wire
B3	BLU/RED	Under all conditions	Connect to ground: All horns should sound.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty horn relay • Either horn faulty • Poor ground (G201, G301) • An open in the wire
B4	GRN[1]	Under all conditions	Connect to ground: The security indicator should come on.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty security indicator • An open in the wire
B5	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • An open in the wire
B6	GRN/ORN	Trunk key in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty security trunk key cylinder switch • Poor ground (G502) • An open in the wire
		Trunk key in neutral position	Check for continuity to ground: There should be no continuity.	• Faulty security trunk key cylinder switch • Short to ground
B7	BLU/WHT[1]	Ignition key is inserted into the ignition switch.	Check for continuity to ground: There should be continuity.	• Faulty ignition key switch • Poor ground (G401, G404) • An open in the wire
		Ignition key is removed from the ignition switch.	Check for continuity to ground: There should be no continuity.	
B8	BLK/YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 4 (15 A)*1 or (20 A)*2 fuse in the under-dash fuse/relay box • An open in the wire
B9	YEL/GRN	Ignition switch at START (III)	Check for voltage to ground: There should be battery voltage.	• Faulty starter cut relay • An open in the wire
B10	RED/WHT	Under all conditions	Connect to ground: The taillights should come on.	• Faulty taillight relay • Faulty taillight system • An open in the wire
B11	BLU/GRN[2]	Under all conditions	Connect to ground: The headlights should come on.	• Faulty headlight relay • Faulty headlight system • An open in the wire
B12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G404) • An open in the wire

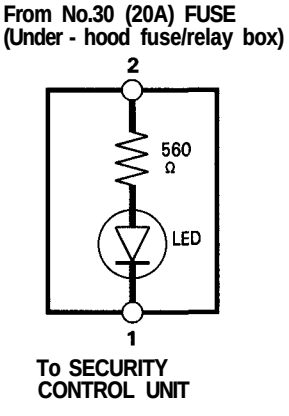
*1: '95 – 96 models
*2: '97 – 98 models

Security Alarm System

Security Indicator Test/Replacement

1. Remove the driver's door panel (see section 20).
2. Disconnect the 2P connector from the security indicator.
3. Carefully pry out the security indicator from the driver's door panel.



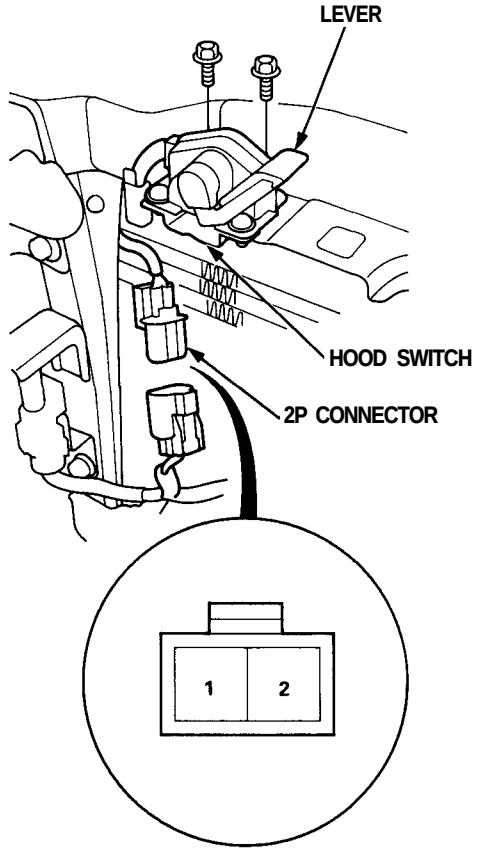


4. Test the security indicator by connecting battery power to the No. 2 terminal, and ground to the No. 1 terminal.
5. If the security indicator does not come on, replace it.

Hood Switch Test/Replacement

1. Open the hood.
2. Disconnect the 2P connector from the hood switch.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2
Hood open (Lever released)	○	○
Hood closed (Lever pushed down)		

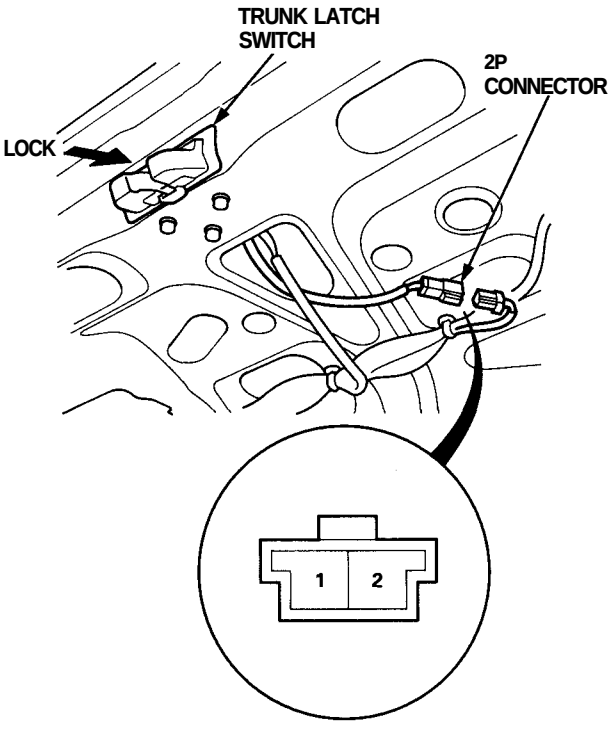


TERMINAL SIDE OF MALE TERMINALS

Security Trunk Latch Switch Test

1. Open the trunk lid.
2. Disconnect the 2P connector from the security trunk latch switch.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2
Trunk lid open (Trunk latch UNLOCKED)	○	○
Trunk lid closed (Trunk latch LOCKED)		



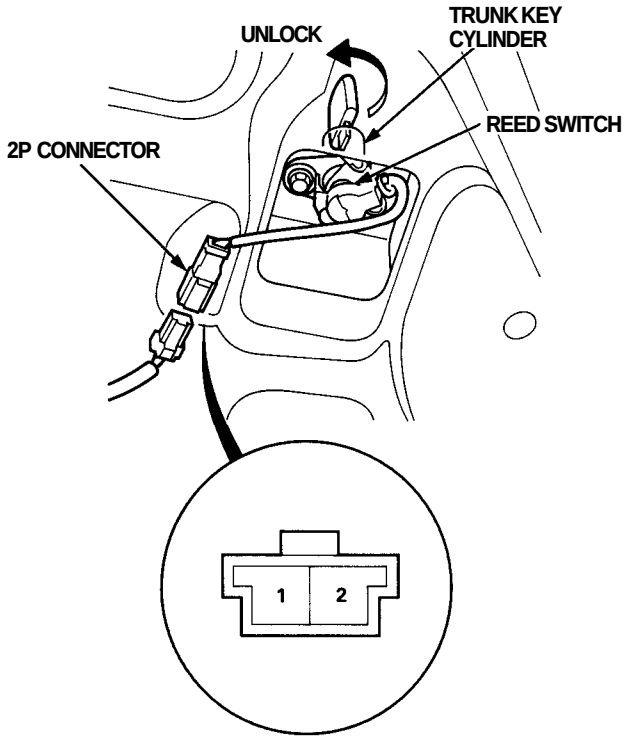
TERMINAL SIDE OF MALE TERMINALS

4. Be sure to unlock the trunk latch after testing the switch.

Security Trunk Key Cylinder Switch Test

1. Open the trunk lid.
2. Disconnect the 2P connector from the security trunk key cylinder switch.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	2
UNLOCK (Key cylinder turned clockwise)	○	○
LOCK		

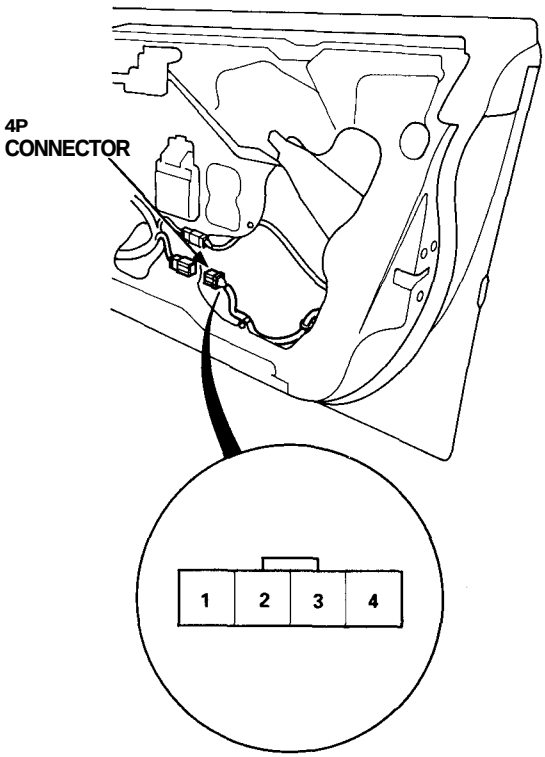


TERMINAL SIDE OF MALE TERMINALS

Security Alarm System

Passenger's Door Lock Knob Switch Test

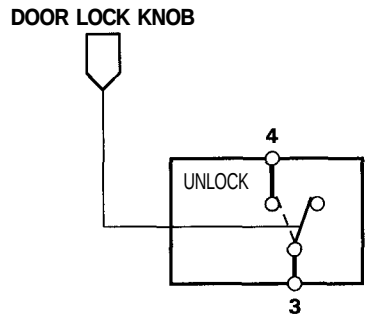
1. Remove the passenger's door panel (see section 20).
2. Disconnect the 4P connector from the door lock actuator.



WIRE SIDE OF FEMALE TERMINALS

3. Check for continuity between the terminals in each switch position according to the table.

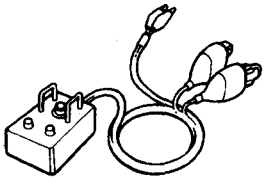
Position \ Terminal	3	4
LOCK		
UNLOCK	○	○



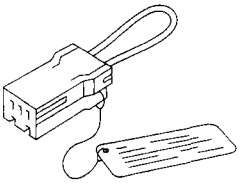
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①*1	07HAZ – SG00400	Deployment Tool	1	24-71
②	07MAZ – SP0020A	SRS Service Connector	1	24-30
③*2	07MAZ – SP00500	Test Harness B	1	24-20
④*1	07PAZ– 0010100	SCS Service Connector	1	24-15
⑤	07QAZ – SR30100	Jumper Wire Harness	1	24-20
⑥	07SAZ – SW50200	SRS Service Connector	1	24-22
⑦	07TAZ – SZ50200	SRS Service Connector (2 Ω)	1	24-47
⑧*3	07TAZ – 001020A	Backprobe Adapter, 17 mm	2	24-39

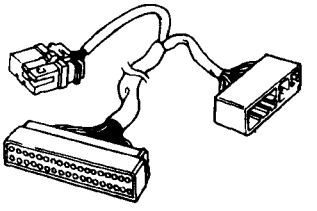
*1: Included in SRS Tool Set 07MAZ - SM5000B
*2: Included in SRS Tool Set 07MAZ - SL0010A
*3: Use with the stacking patch cords from T/N 07SAZ-001000A, Backprobe Set.



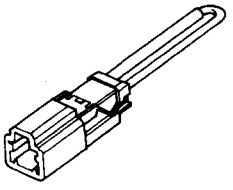
①



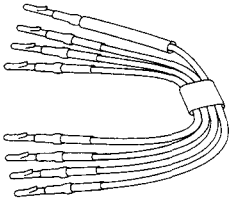
②



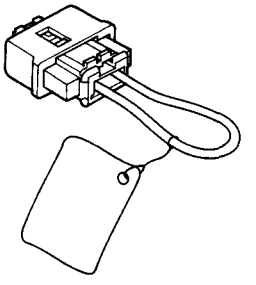
③



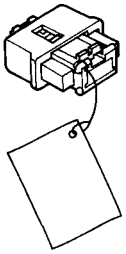
④



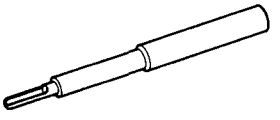
⑤



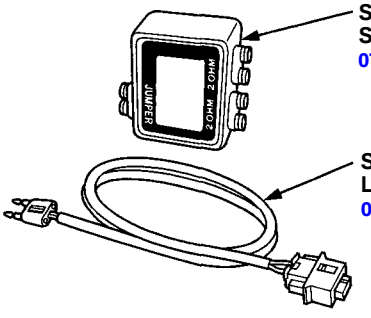
⑥



⑦



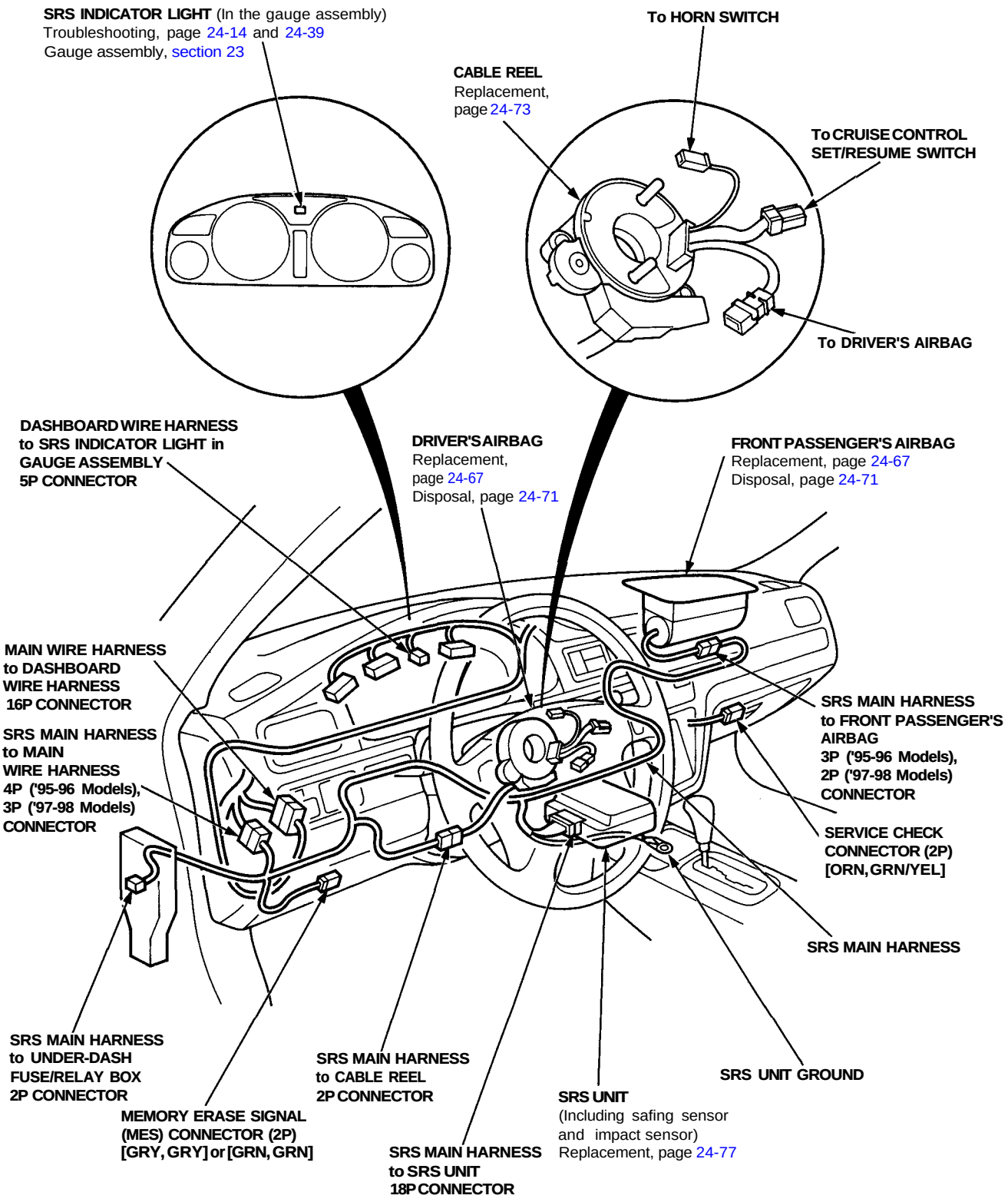
⑧



NOTE: The SRS Service Connector, T/N 07SAZ - SW50200, and the SRS Service Connector (2 Ω), T/N 07TAZ - SZ50200, are not available. Instead, use the SRS Inflator Simulator, T/N 07SAZ-TB4011A, and the SRS Simulator Lead C, T/N 07TAZ-SZ5011A. When the SRS Service Connector, T/N 07SAZ - SW50200, is called for, connect the lead to the Simulator's "Jumper" jack. When the SRS Service Connector (2 Ω), T/N 07TAZ - SZ50200, is called for, connect the lead to one of the simulator's "2 Ω" jacks.

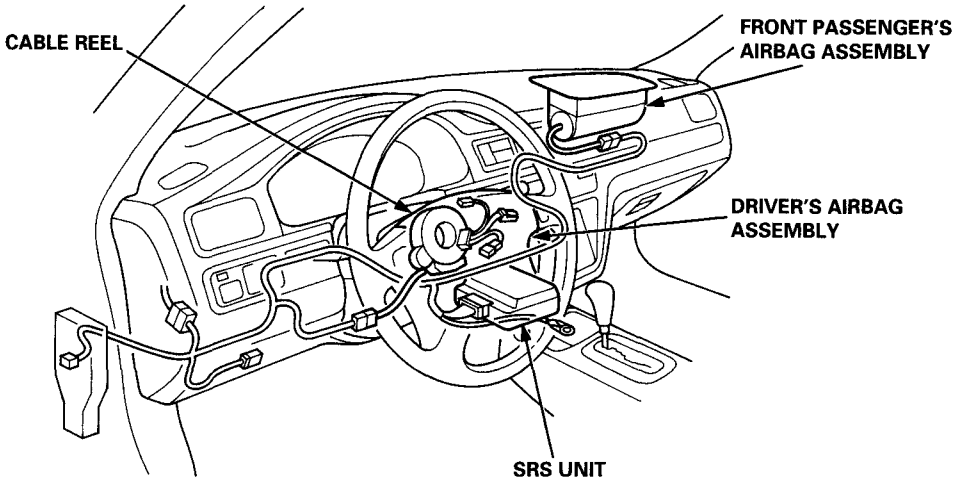
Component/Wiring Locations

Index



Description

The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of the SRS unit (including safing sensor and impact sensor), the cable reel, the driver's airbag, and front passenger's airbag.

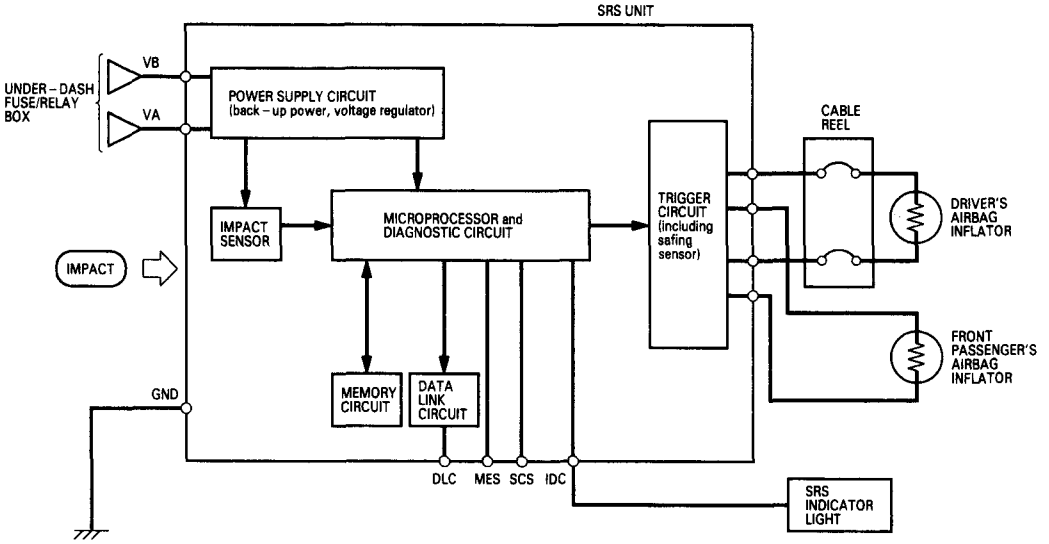


Operation

The main circuit in the SRS unit senses and judges the force of impact and, if necessary, ignites the inflator charges. If battery voltage is too low or power is disconnected due to the impact, the voltage regulator and the back-up power circuit respectively will keep voltage at a constant level.

For the SRS to operate:

(1) The impact sensor must activate, and send electric signals to the microprocessor.
(2) The microprocessor must compute the signals, and must send signals to the airbag inflators.
(3) The inflators must ignite and deploy the airbags.



Self-diagnosis System

A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON (II), the SRS indicator light comes on and goes off after about six seconds if the system is operating normally.
If the light does not come on, or does not go off after six seconds, or if it comes on while driving, it indicates an abnormality in the system. The system must be inspected and repaired as soon as possible.

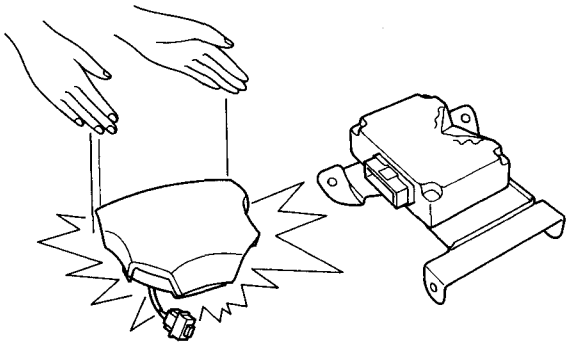
For better serviceability, the memory will store the cause of the malfunction, and the data link circuit passes on the information from the memory to the data link connector (DLC). This information can be read with the Honda PGM Tester connected to the DLC (16P).

Precautions/Procedures

General Precautions

- Carefully inspect any SRS part before you install it. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:

  — Airbag assemblies
  — Cable reel
  — SRS unit



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.

- Do not install used SRS parts from another vehicle. When making SRS repairs, use only new parts.

- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery, and wait at least three minutes before beginning work.

- Replacement of the combination light and wiper/washer switches and cruise control switch can be done without removing the steering wheel:

  — For combination light and wiper/washer switch replacement, see section 23.
  — For cruise control set/resume/cancel switch replacement, see section 23.

- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injury.

- Whenever the airbag has been activated, replace the SRS unit.

- The original radio has a coded theft protection circuit. Be sure to get the customer's code number before disconnecting the battery cables.

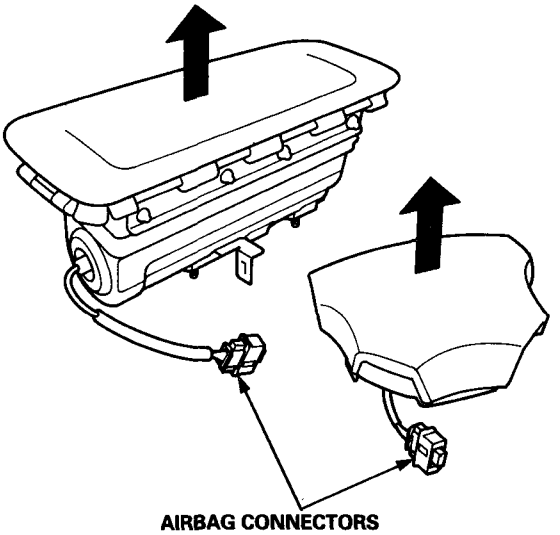
Airbag Handling and Storage

Do not try to disassemble the airbag assembly. It has no serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.

For temporary storage of the airbag assembly during service, please observe the following precautions:

- Store the removed airbag assembly with the pad surface up. On '95-96 models, make sure you connect the short connector (RED) to the passenger's airbag connector. The driver's airbag connector on '95-96 models and both airbag connectors on a '97-98 models have built-in short contacts (see page 24-11).

⚠ WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.



AIRBAG CONNECTORS
(with built-in short contact)

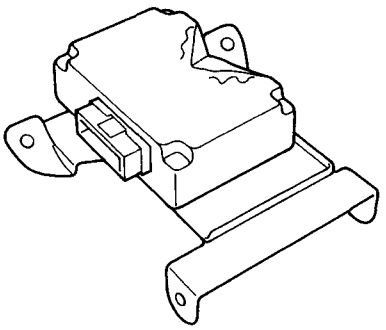
- Store the removed airbag assembly on a secure flat surface away from any high heat source (exceeding 212°F/100°C) and free of any oil, grease, detergent or water.

CAUTION: Improper handling or storage can internally damage the airbag assembly, making it inoperative. If you suspect the airbag assembly has been damaged, install a new unit, and refer to the Deployment/Disposal Procedures for disposing of the damaged airbag.

Precautions/Procedures

SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding, or spraying equipment.
- Disconnect the airbag connector(s) before disconnecting SRS harness connectors (see page 24-12). On '95-96 models, connect the short connector to the front passenger's airbag connector.
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 104°F/40°C) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it away from dust.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbags could accidentally deploy and cause damage or injury.

Inspection After Deployment

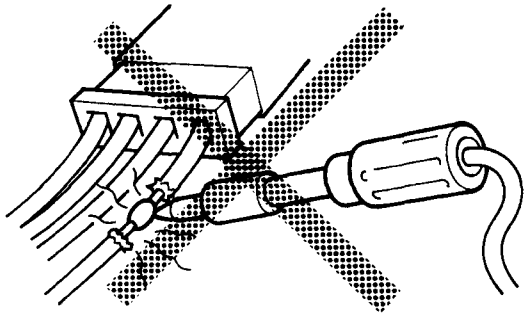
After a collision in which the airbags were deployed, replace the SRS unit, and inspect the following:

1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the vehicle is completely repaired, turn the ignition switch on. If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.

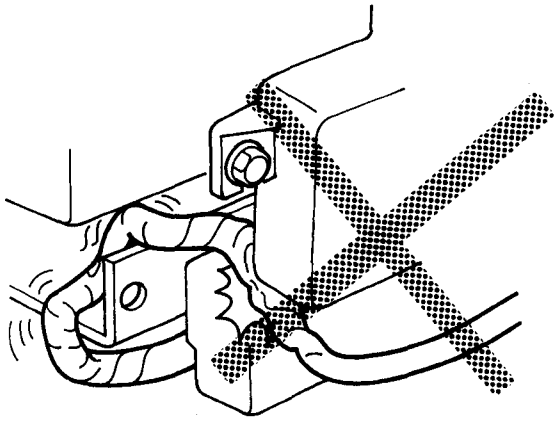
Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring.

  NOTE: SRS wiring can be identified by special yellow outer covering.



- Be sure to install the harness wires so that they are not pinched or interfering with other parts.

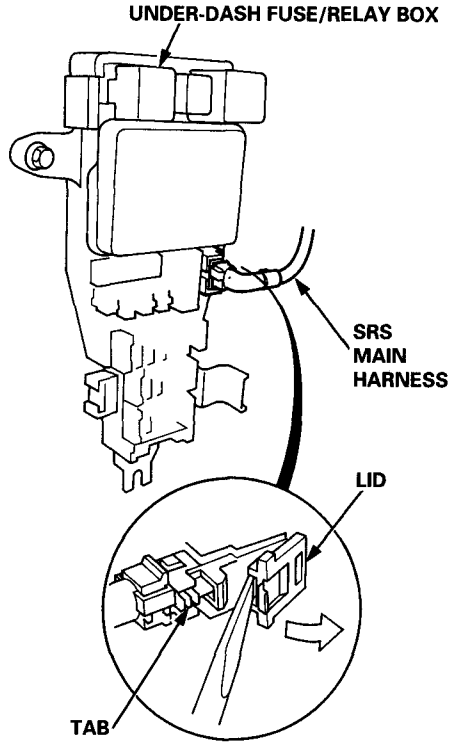


- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

Disconnecting the SRS Connector at the Under-dash Fuse/Relay Box:

CAUTION: Avoid breaking the connector; it's double-locked.

1. First lift the connector lid with a thin screwdriver, then press the connector tab down, and pull the connector out.



2. To reinstall the connector, push it into position until it clicks, then close its lid.

Precautions/Procedures

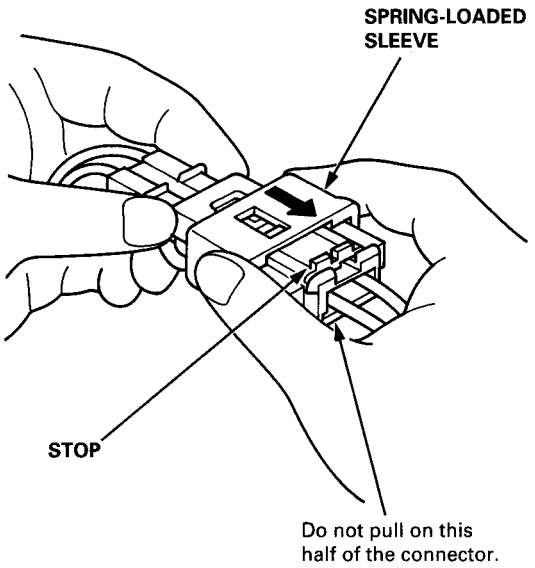
Spring-loaded Lock Connector

Some SRS system connectors have a spring-loaded lock.

Disconnecting

To release the lock, pull the spring-loaded sleeve toward the stop while holding the opposite half of the connector. Then pull the connector halves apart.

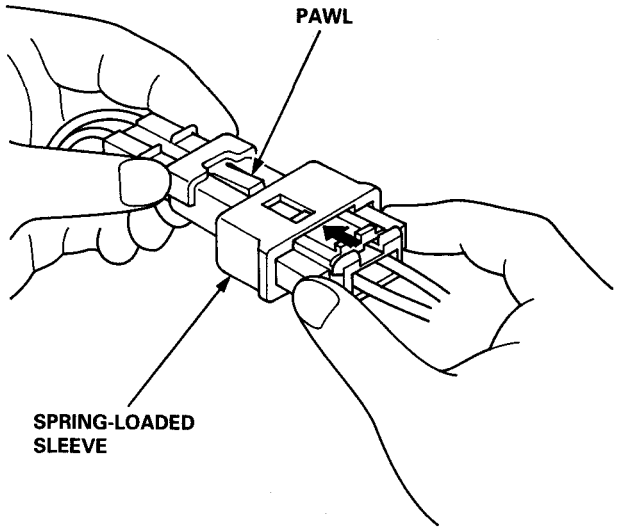
NOTE: Be sure to pull on the sleeve and not on the connector half itself.



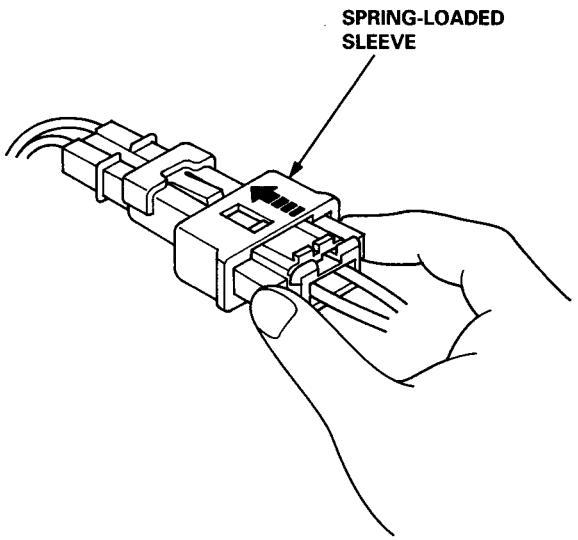
Connecting

1. Hold the pawl-side connector half, and press on the back of the sleeve-side connector half in the direction shown. As the two connector halves are pressed together, the sleeve is pushed back by the pawl.

   NOTE: Do not touch the sleeve.



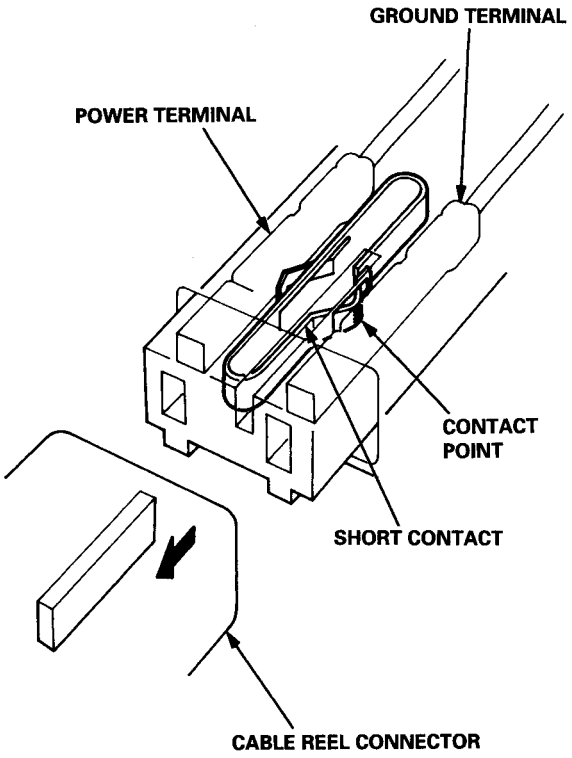
2. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.



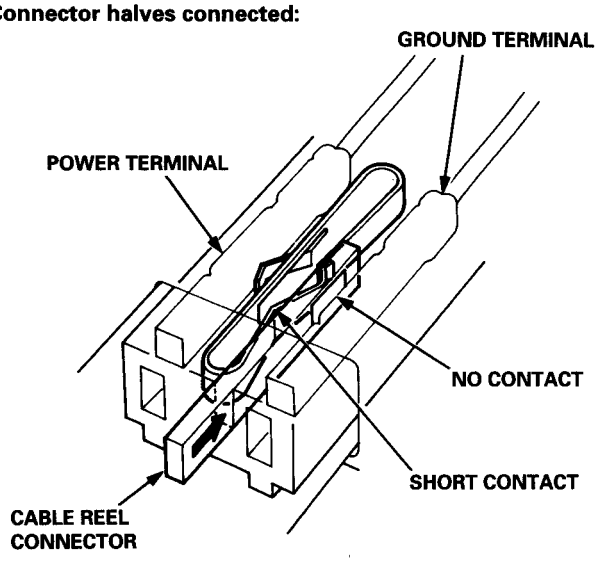
Spring-loaded Lock Connector with Built-in Short Contact

The driver's airbag ('95-98 models) and front passenger's airbag ('97-98 models) have a spring-loaded lock connector with a built-in short contact. When this connector is disconnected, the power terminal and the ground terminal in the airbag connector are automatically shorted.

Connector halves disconnected:

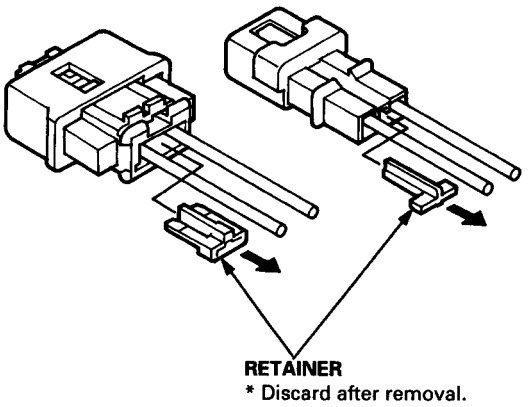


Connector halves connected:

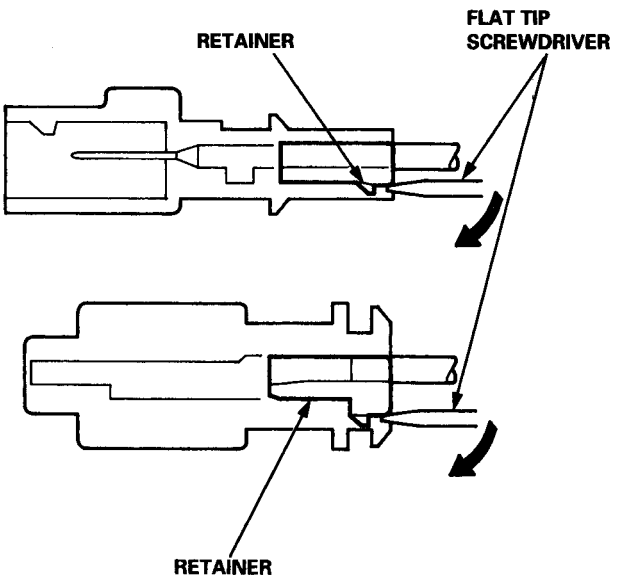


Backprobing Spring-loaded Lock Connectors

- When checking voltage or resistance on this type of connector the first time, it is necessary to remove the retainer to insert tester probes from the wire side. It is not necessary to reinstall the removed retainer; the terminals will stay locked in the connector housing.



- To remove the retainer, insert a flat tip screwdriver between connector body and retainer, and carefully pry out the retainer. Take care not to break the connector.

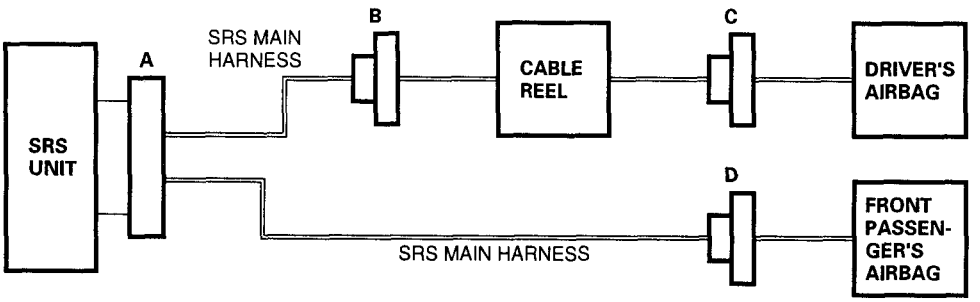


Precautions/Procedures

Disconnecting the Airbag Connectors

⚠ WARNING To prevent accidental airbag deployment, turn the ignition switch OFF, disconnect the negative battery cable, and wait three minutes before disconnecting any SRS connectors.

- Before disconnecting the SRS main harness (A) from the SRS unit, disconnect both airbags (C, D).
- Before disconnecting the cable reel 2P connector (B), disconnect the driver's airbag 2P connector (C).

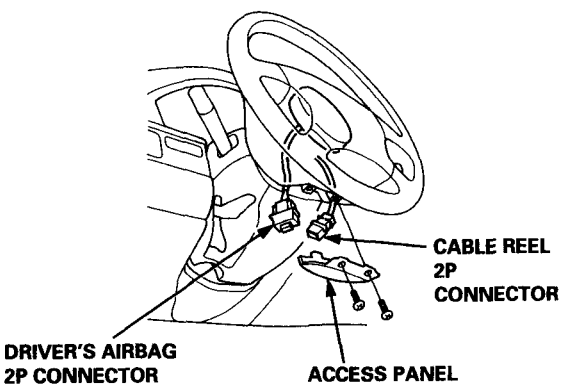


1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.
2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.
3. Disconnect the airbag connector(s).

Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.

NOTE: When disconnected, the airbag connector is automatically shorted.

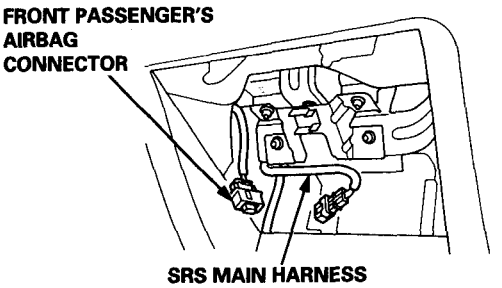


Front Passenger's Side:

- Remove the glove box.
- Disconnect the connector between the front passenger's airbag and SRS main harness.

NOTE:

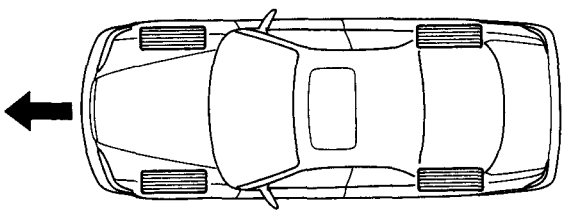
- When disconnected, the airbag connector on '97-98 models is automatically shorted.
- On '95 or '96 models connect the short connector (RED) to the airbag connector.



Steering-related Precautions

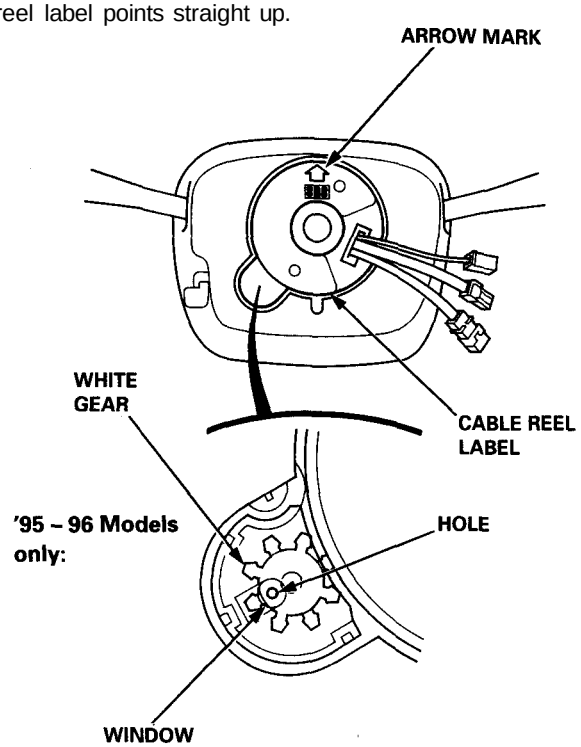
Steering Wheel and Cable Reel Alignment

NOTE: To avoid misalignment of the steering wheel on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



'95-96 Models: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the hole in the white gear lines up with the window on the cover and the arrow mark on the cable reel label points straight up.

'97-98 Models: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



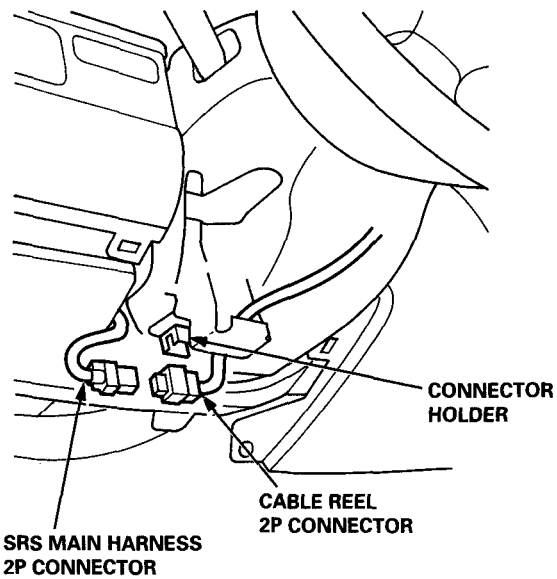
Steering Column Removal

CAUTION

- **Before removing the steering column, first disconnect the connector between the cable reel and the SRS main harness.**
- **If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to 0-LOCK position, or remove the key from the ignition so that the steering wheel will not turn.**

NOTE:

- When the airbag assembly and cable reel are disconnected, and the battery is reconnected and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will come on. In such a case, make sure to confirm the DTC, then clear the SRS unit memory.
- For disconnecting the spring-loaded lock type connector, refer to page 24-10.



Do not replace the original steering wheel with any other design, because it will make it impossible to properly install the airbag (only use genuine Honda replacement parts).

After reassembly, confirm the wheels are still turned straight ahead and that the steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie-rods, not by removing and repositioning the steering wheel.

Troubleshooting - '95-96 Models

Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on.

NOTE: The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.

- When you connect the SCS service connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

Precautions

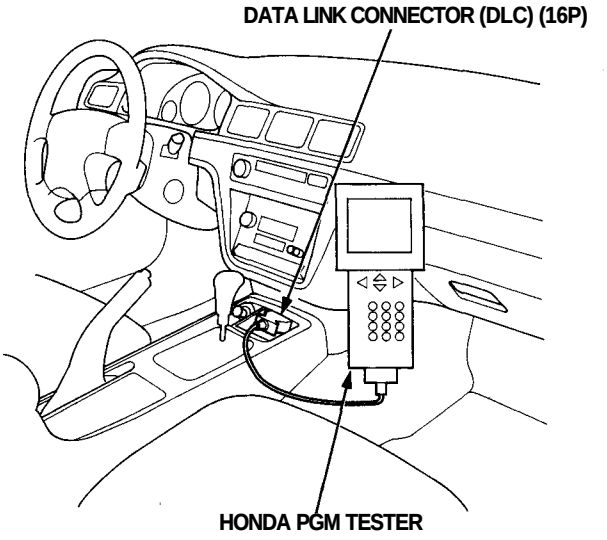
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the driver's airbag connector, and connect the short connector (RED) to the front passenger's airbag connector.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the test harness and the SCS service connectors.
  For backprobing spring-loaded lock type connectors, refer to page 24-12.
- Make sure the battery is sufficiently charged (see section 23). If the battery is dead or low, or the back-up power circuit in the SRS unit is faulty, measuring values won't be correct. Therefore, in case of multiple DTCs including DTC 5-1 (SRS unit), replace the SRS unit first, then troubleshoot the other code(s).

Troubleshooting - '95-96 Models

Reading the DTC

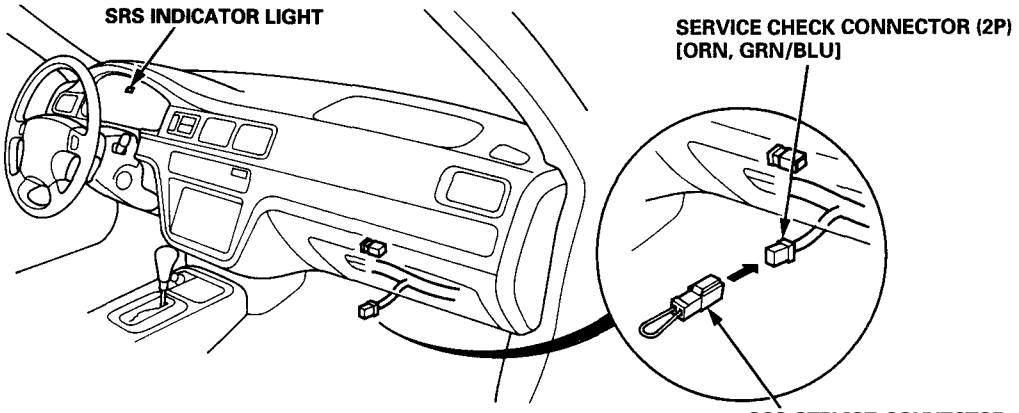
When the SRS indicator light is on, read the DTC using one of these methods:

A. Connect the Honda PGM Tester to the 16P Data Link Connector (DLC), and follow the tester's prompts. If the tester indicates no DTC, double-check by jumping the service check connector and watching the SRS indicator light (see page 24-15).



B. The SRS indicator light can also indicate the DTC by the number of blinks when the SCS service connector is connected to the service check connector (2P).

1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS service connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.

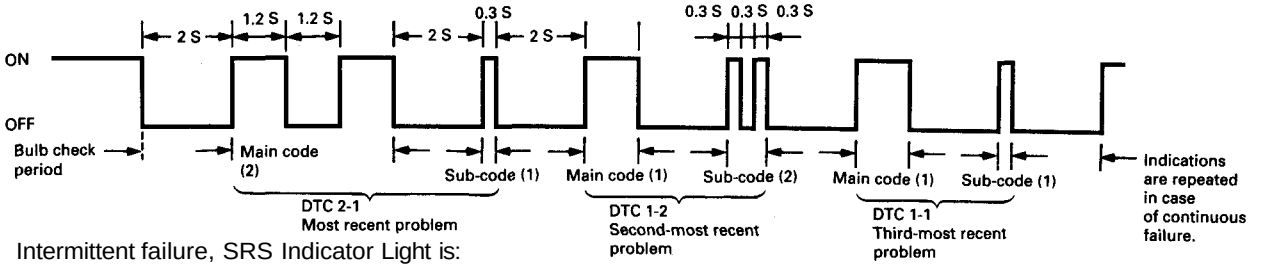


2. Turn the ignition switch ON (II). The SRS indicator light comes on for about twelve seconds and goes off. Then it will indicate the DTC:
   - The DTC consists of a main code and a sub-code.
   - Including the most recent problem, up to three different malfunctions can be indicated.
   - In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
   - In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
   - If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
   - In case the system is normal (no DTC), the SRS indicator light will start blinking continuous short blinks (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS service connector from the service check connector (2P).

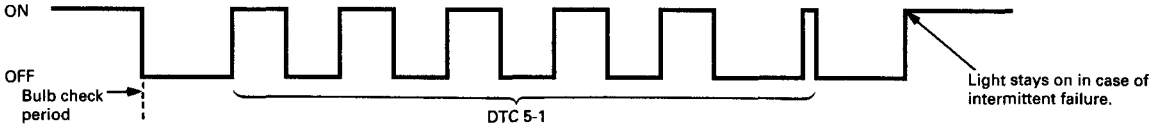
Examples of DTC Indications:

S: Second

1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



3. Normal (no failure), SRS Indicator Light is:



Troubleshooting - '95-96 Models

Troubleshooting Intermittent Failures

If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. Connect the SCS service connector to the service check connector. The SRS indicator light will blink continuous short blinks.



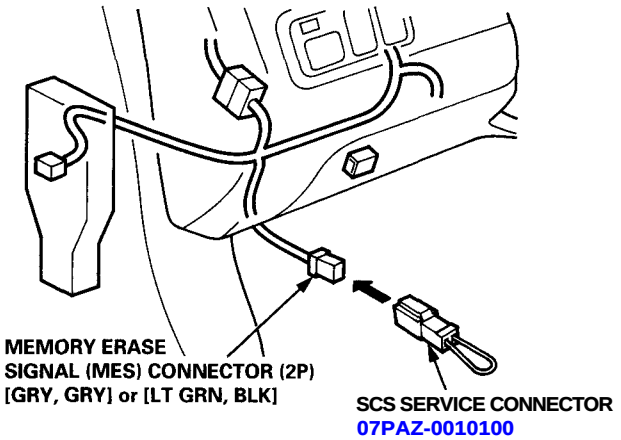
5. Shake the wire harness and the connector, and/or take a test-drive (quick acceleration, quick braking, cornering) to find the cause of the intermittent failure. If the problem recurs, the SRS indicator light will stop blinking and stay on.



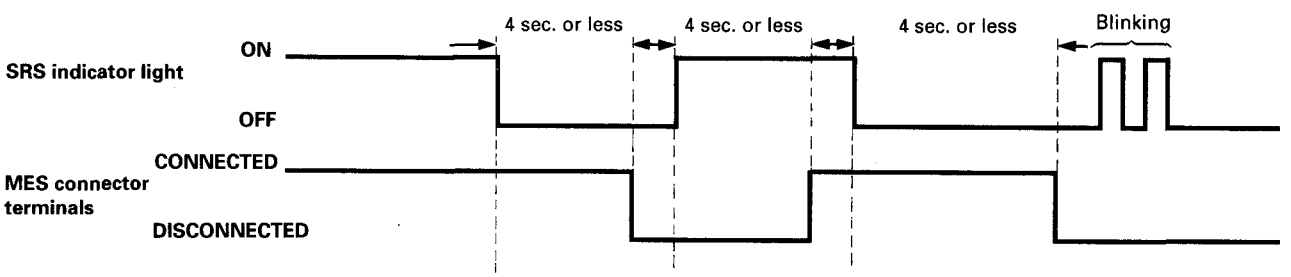
6. If you can't duplicate the intermittent failure, the system is OK at this time. Disconnect the SCS service connector.

Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS Vehicle System Supplement), or the following procedure.



1. Make sure the ignition switch is OFF.
2. Connect the SCS service connector to the MES connector (2P). Do not use a jumper wire.
3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS service connector from the MES connector within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS service connector to the MES connector (2P) within the four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS service connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.



Diagnostic Trouble Code (DTC) Chart

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none	Faulty SRS indicator light circuit	Troubleshooting	24-19
comes on	1-1	Open in the driver's airbag inflator or increased resistance	Troubleshooting	24-22
	1-2	Short to another wire in the driver's airbag inflator or decreased resistance		24-24
	1-3	Short to power in the driver's airbag inflator		24-26
	1-4	Short to ground in the driver's airbag inflator		24-28
	2-1	Open in the passenger's airbag inflator or increased resistance	Troubleshooting	24-30
	2-2	Short to another wire in the passenger's airbag inflator or decreased resistance		24-31
	2-3	Short to power in the passenger's airbag inflator		24-32
	2-4	Short to ground in the passenger's airbag inflator		24-33
	5-1	Internal failure of the SRS unit	SRS unit replacement	24-77
	10-1	SRS unit replacement code (SRS unit must be replaced)		
	9-1 none	Faulty SRS indicator light circuit Faulty SRS power supply system	Troubleshooting	24-34

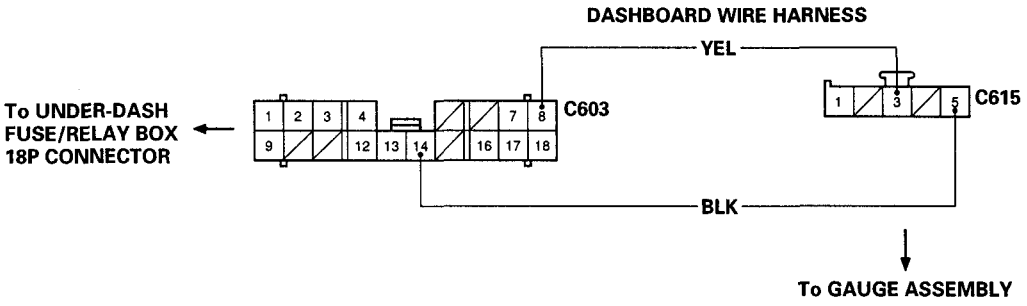
NOTE:

- In case DTC 5-1 is indicated, replace the SRS unit. If multiple DTCs including DTC 5-1 are indicated, first replace the SRS unit, then recheck the DTC indication.
- When you return the SRS unit in case of a warranty claim, do not erase the memory. The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.
- If an intermittent failure occurs, DTC 9-1 will be indicated. In case of a continuous problem, there will be no DTC.

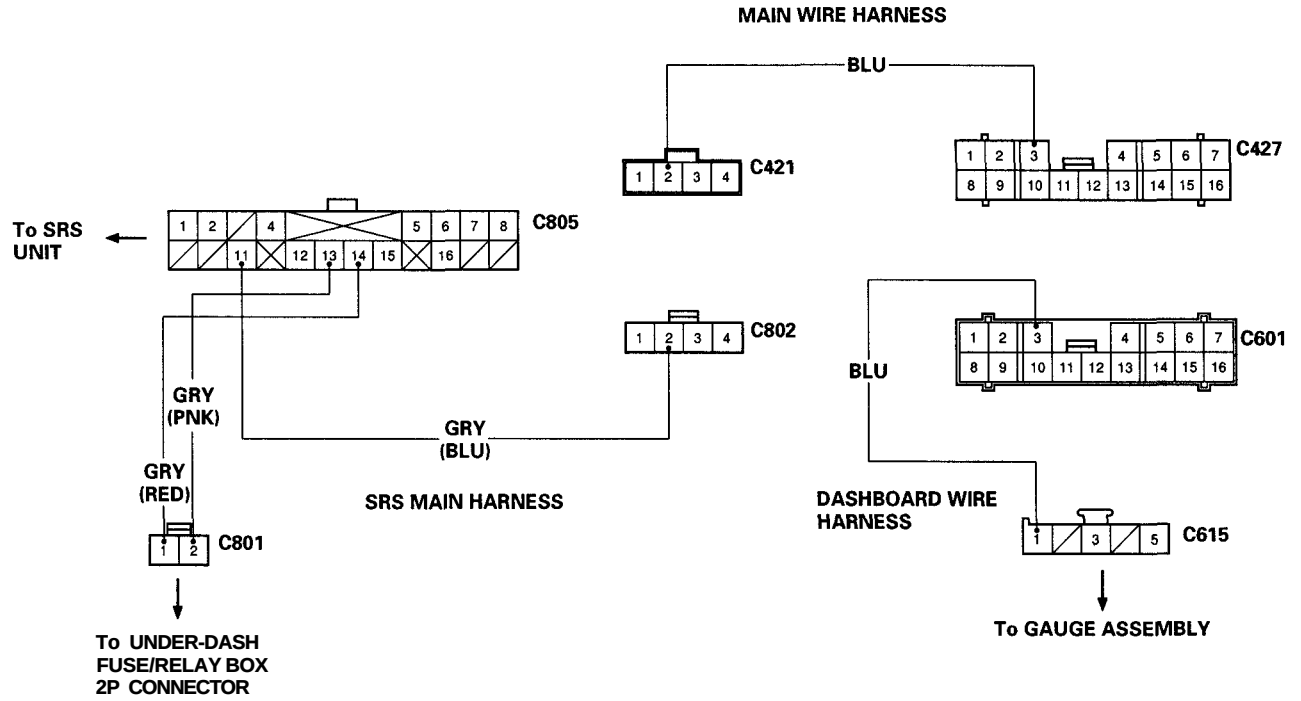
Troubleshooting - '95-96 Models

SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



C421: MAIN WIRE HARNESS 4P CONNECTOR
C427: MAIN WIRE HARNESS 16P CONNECTOR
C601: DASHBOARD WIRE HARNESS 16P CONNECTOR
C603: DASHBOARD WIRE HARNESS 18P CONNECTOR
C615: DASHBOARD WIRE HARNESS 5P CONNECTOR
C801: SRS MAIN HARNESS 2P CONNECTOR
C802: SRS MAIN HARNESS 4P CONNECTOR
C805: SRS MAIN HARNESS 18P CONNECTOR

Troubleshooting - '97-98 Models

Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on.

NOTE: The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.

- When you connect the SCS service connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

Precautions

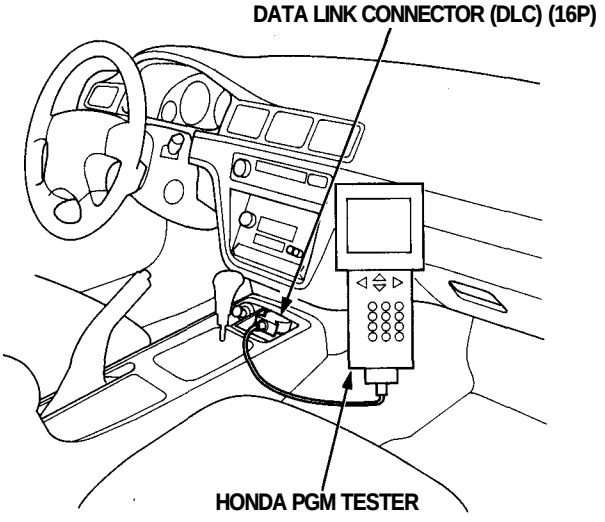
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the driver's airbag connector, and the front passenger's airbag connector.
- Make sure the battery is sufficiently charged (see section 23). If the battery is dead or low, measuring values won't be correct.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the test harness and the SCS service connectors.
  For backprobing spring-loaded lock type connectors, refer to page 24-11.

Troubleshooting - '97-98 Models

Reading the DTC

When the SRS indicator light is on, read the DTC using one of these methods:

A. Connect the Honda PGM Tester to the 16P Data Link Connector (DLC), and follow the tester's prompts. If the tester indicates no DTC, double-check by jumping the service check connector and watching the SRS indicator light (see page 24-39).



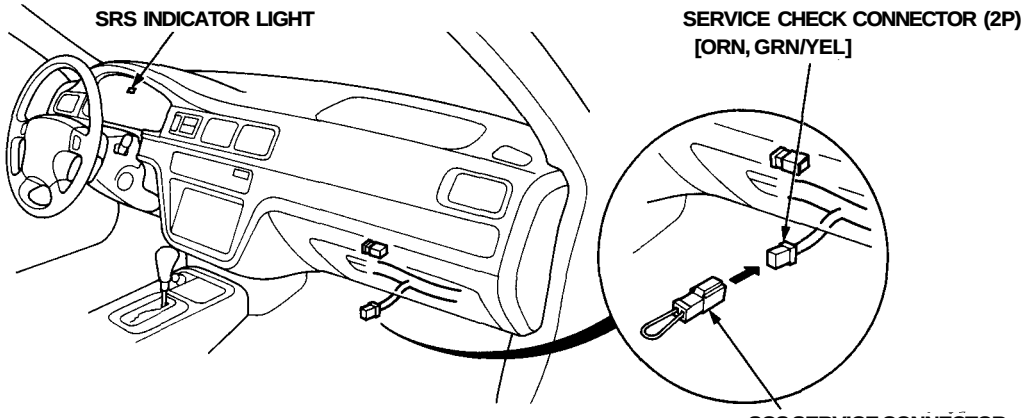
(cont'd)

Troubleshooting - '97-98 Models

Reading the DTC (cont'd)

B. The SRS indicator light can also indicate the DTC by the number of blinks when the SCS service connector is connected to the service check connector (2P).

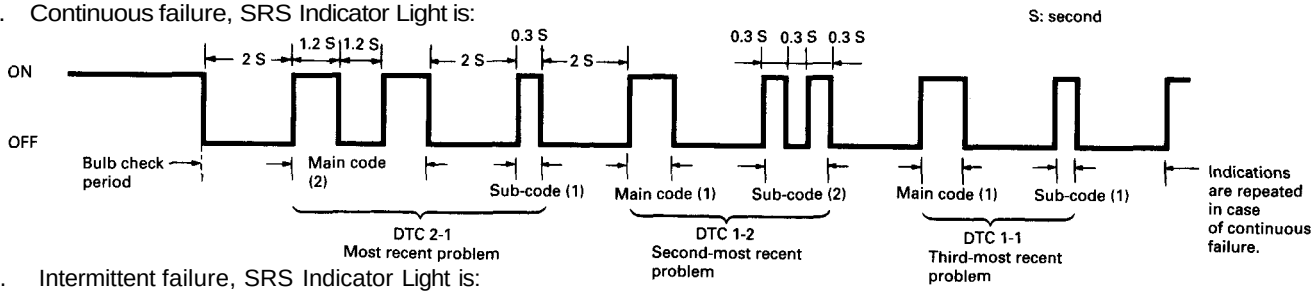
1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS service connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.



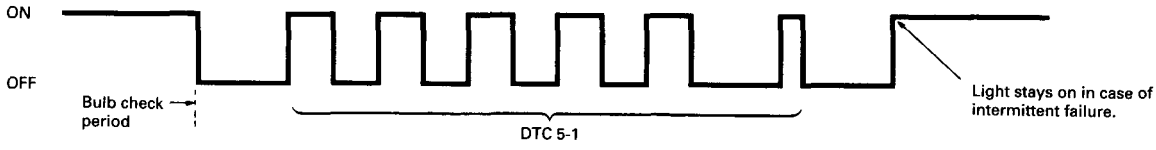
2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six seconds and goes off. Then it will indicate the DTC:
   — The DTC consists of a main code and a sub-code.
   — Including the most recent problem, up to three different malfunctions can be indicated.
   — In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
   — In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
   — If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
   — In case the system is normal (no DTC), the SRS indicator light will stay on (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS service connector from the service check connector (2P).

Examples of DTC Indications:

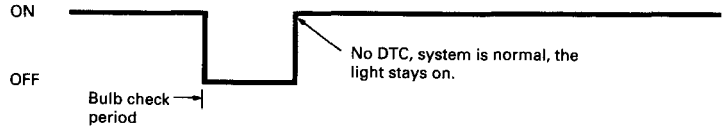
1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



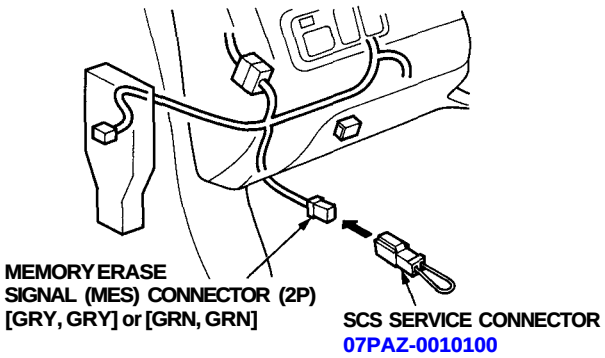
3. Normal (no failure), SRS Indicator Light is:



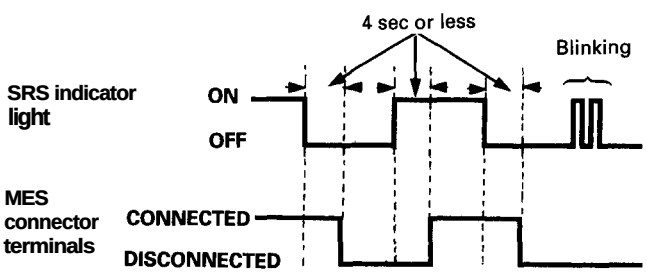
Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS vehicle System Supplement) or the following procedure.

1. Make sure the ignition switch is OFF.
2. Connect the SCS service connector to the MES connector (2P). Do not use a jumper wire.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS service connector from the MES connector (2P) within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS service connector to the MES connector (2P) within the four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS service connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.

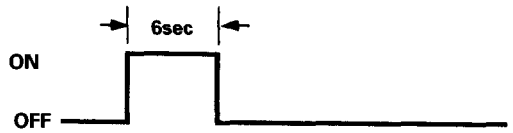


Troubleshooting Intermittent Failures

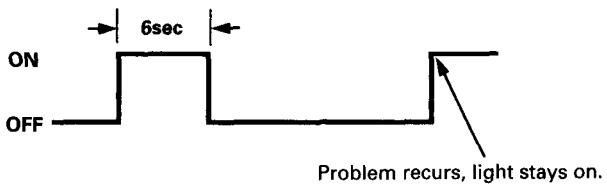
If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. The SRS indicator light comes on for about six seconds and goes off.



5. Shake the wire harness and the connector, take a test drive (quick acceleration, quick braking, cornering), and turn the steering wheel fully left and right, and hold it there for five to ten seconds to find the cause of the intermittent failure.
   If the problem recurs, the SRS indicator light will stay on.



6. If you can't duplicate the intermittent failure, the system is OK at this time.

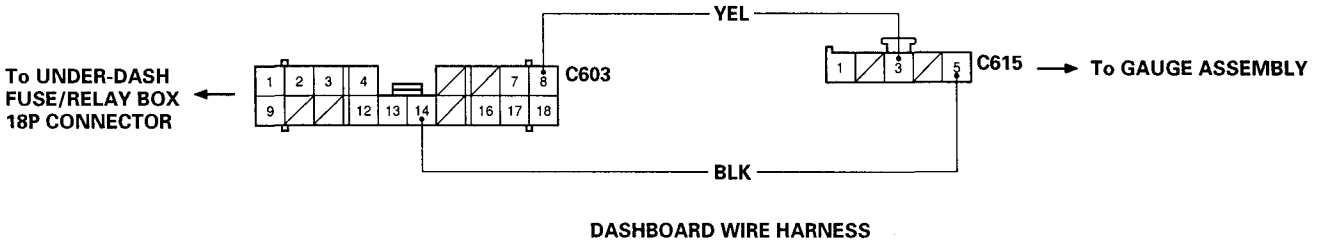
Troubleshooting - '97-98 Models

Diagnostic Trouble Code (DTC) Chart

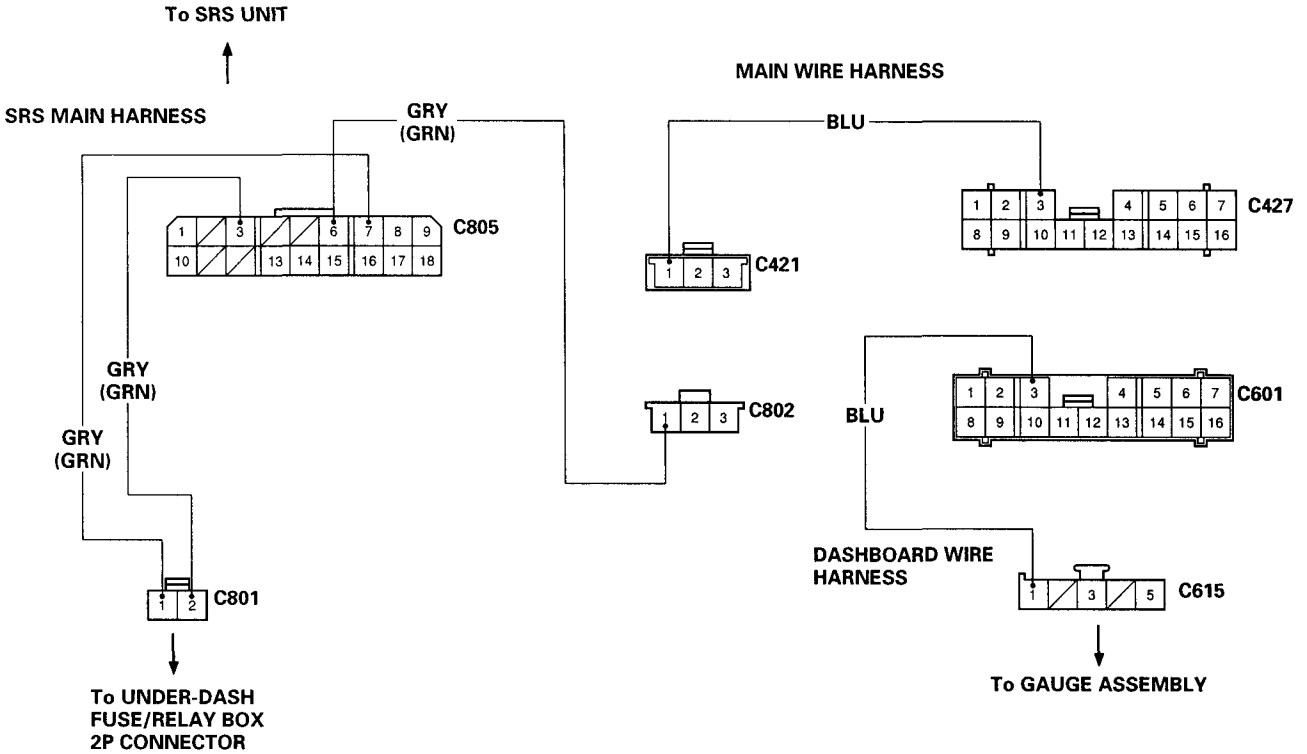
SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none	Faulty SRS indicator light circuit	Troubleshooting	24-44
comes on	1-1	Open in the driver's airbag inflator	Troubleshooting	24-47
	1-2	Increased resistance in the driver's airbag inflator		24-47
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-49
	1-4	Short to power in the driver's airbag inflator		24-51
	1-5	Short to ground in the driver's airbag inflator		24-53
	2-1	Open in the passenger's airbag inflator	Troubleshooting	24-55
	2-2	Increased resistance in the passenger's airbag inflator		24-55
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance		24-56
	2-4	Short to power in the passenger's airbag inflator		24-57
	2-5	Short to ground in the passenger's airbag inflator		24-59
	5-1	Internal failure of the SRS unit	SRS unit replacement	24-77
	5-2			
	5-3			
	5-4			
	5-5			
	6-1	Internal failure of the SRS unit	SRS unit replacement	24-77
	6-2			
	6-3			
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-77
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-77
	8-2			
	8-3			
	8-4			
	8-5			
	8-6			
	9-1 or no code	Faulty SRS indicator circuit or internal failure of the SRS unit	Troubleshooting	24-60
	9-2	Faulty SRS power supply (VB line)		24-65
	10-1	SRS unit replacement code (SRS unit must not be used any longer)	SRS unit replacement	24-77

SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



C421 MAIN WIRE HARNESS 3P CONNECTOR
C427 MAIN WIRE HARNESS 16P CONNECTOR
C601 DASHBOARD WIRE HARNESS 16P CONNECTOR
C603 DASHBOARD WIRE HARNESS 18P CONNECTOR
C615 DASHBOARD WIRE HARNESS 5P CONNECTOR

C801 : SRS MAIN HARNESS 2P CONNECTOR
C802 : SRS MAIN HARNESS 3P CONNECTOR
C805 : SRS MAIN HARNESS 18P CONNECTOR

Airbag

Replacement

After a collision in which the airbags were deployed, the airbag assemblies and the SRS unit must be replaced.

⚠ WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- **Always disconnect the airbag connectors when the SRS main harness is disconnected.**
- **'95-96 Models: Always keep the short connector (RED) on the passenger's airbag when the harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

NOTE:
- Do not install used SRS parts from another vehicle. When repairing, use only new SRS parts.
- Carefully inspect the airbag before you install it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

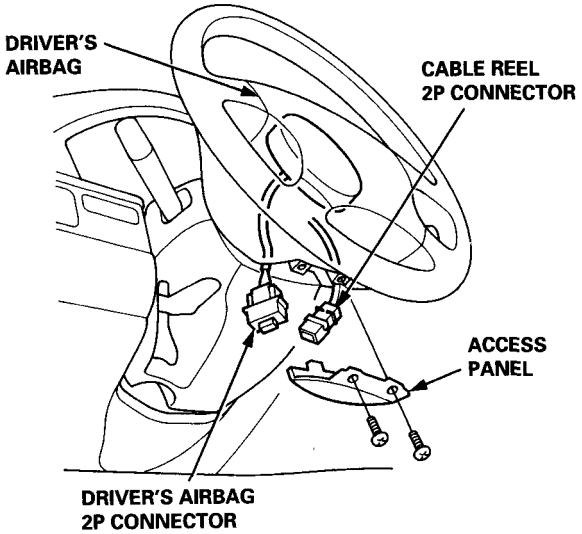
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

3. Disconnect the airbag connectors:

Driver's Side:

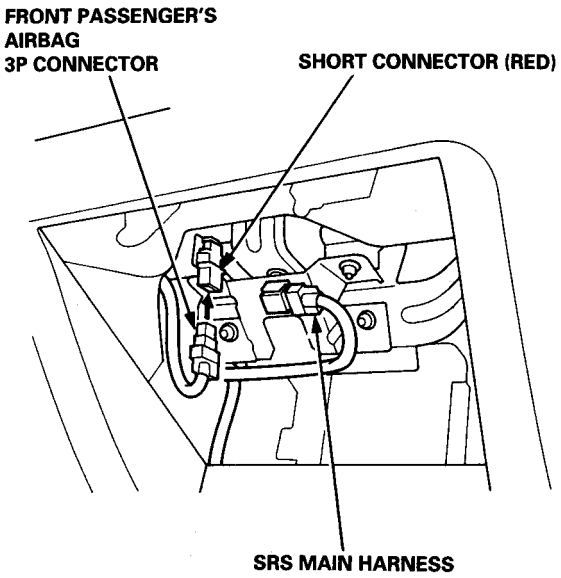
- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



Front Passenger's Side:

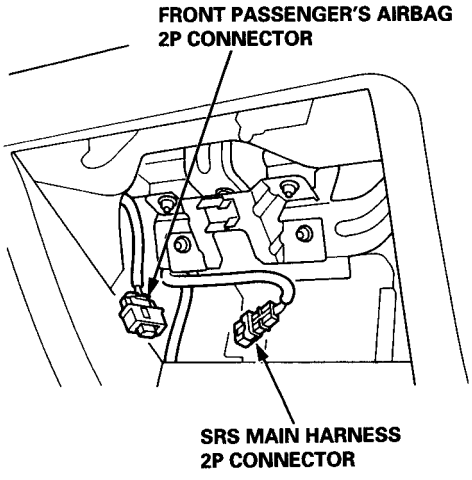
'95-96 Models:

- Remove the glove box, then remove the short connector (RED) from it's holder.
- Disconnect the 3P connector between the front passenger's airbag and SRS main harness, then connect the short connector (RED) to the airbag side of the connector.



'97-98 Models:

- Remove the glove box.
- Disconnect the 2P connector between the front passenger's airbag and SRS main harness.



(cont'd)

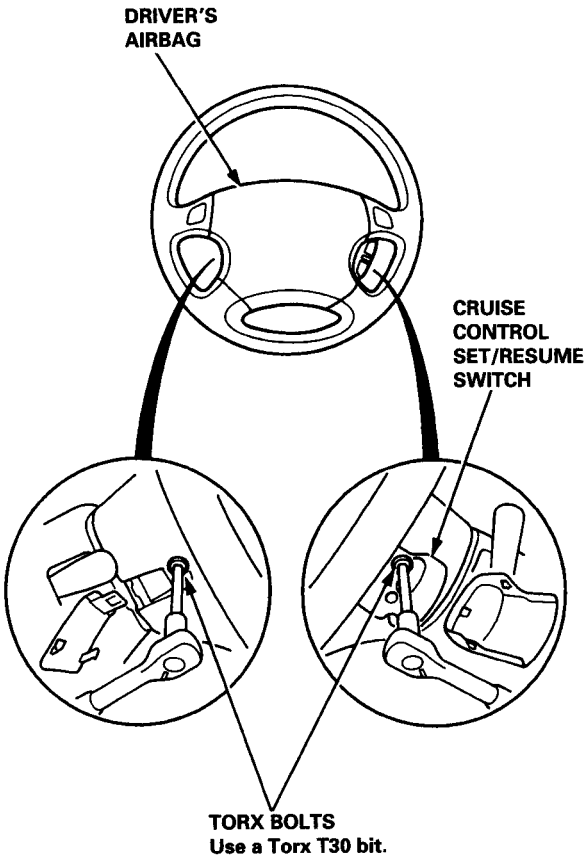
Airbag

Replacement (cont'd)

4. Remove the airbags:

Driver's Side:

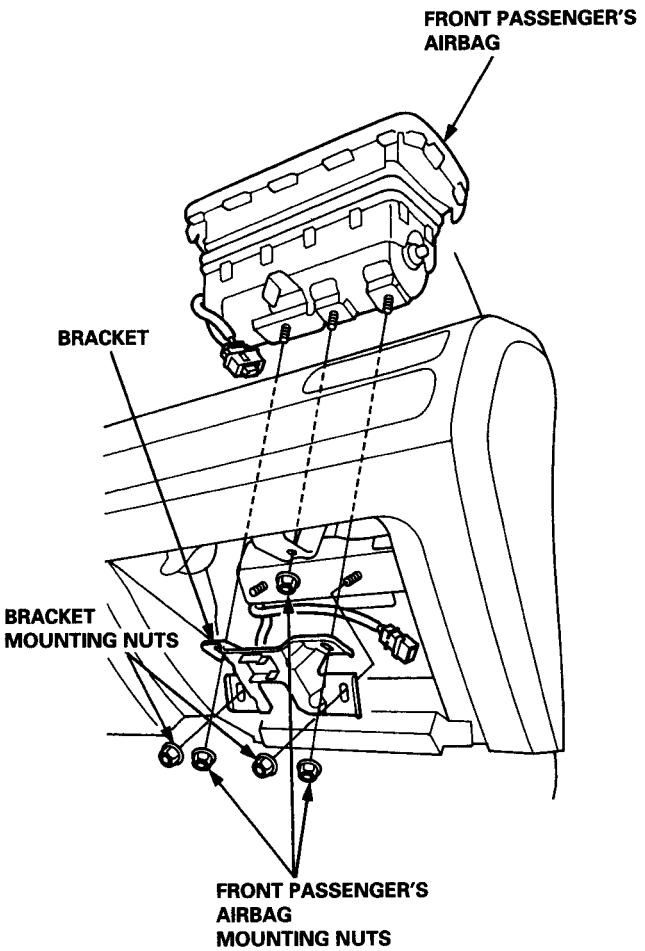
- Remove the two Torx bolts using a Torx T30 bit, then remove the driver's airbag.



Front Passenger's Side:

- Remove the four mounting nuts from the bracket.
- Remove the bracket and one mounting nut, then lift the front passenger's airbag out of the dashboard.

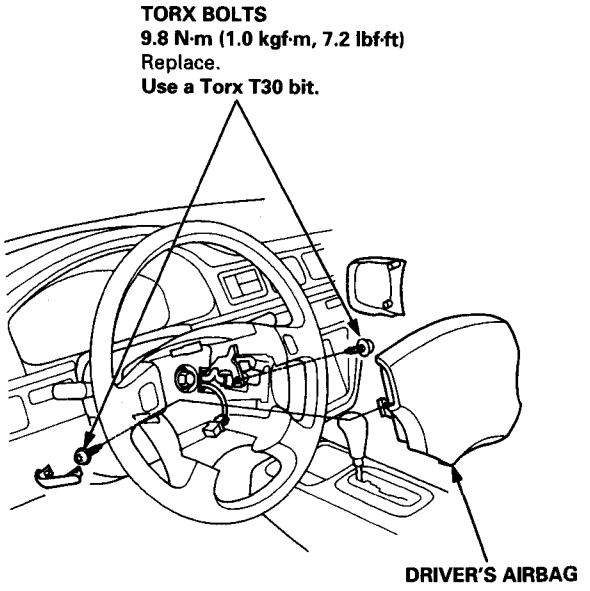
NOTE: The lid of the airbag has pawls on its side which attach it to the dashboard. To remove the airbag, cover the lid and dashboard with a cloth, and pry carefully with a flat tip screwdriver.



CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other parts.

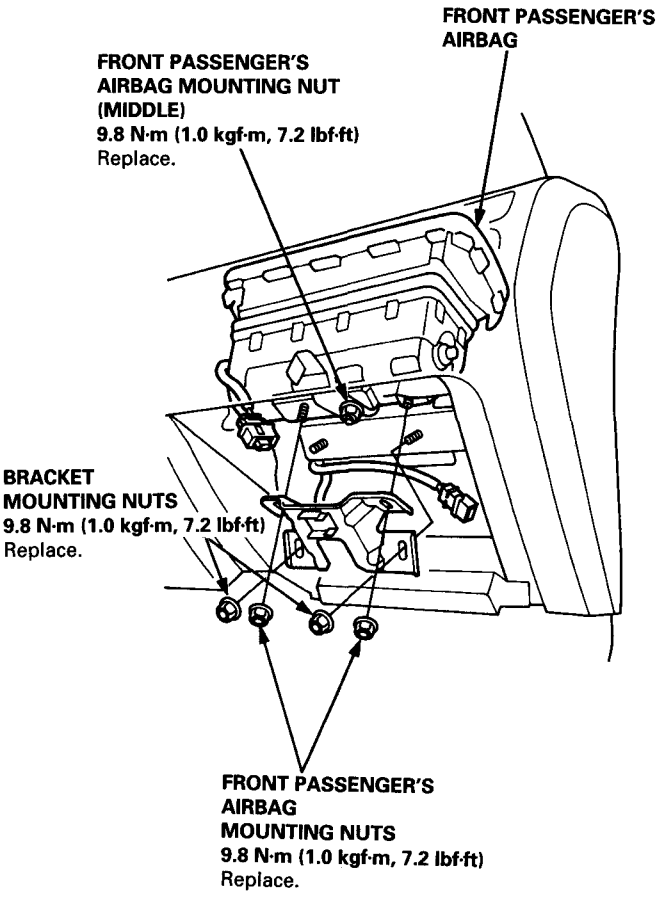
5. Install the new airbags:

Driver's Side: Place the driver's airbag in the steering wheel, and secure it with new Torx bolts.



Front Passenger's Side:

- Place the front passenger's airbag into the dashboard.
- Tighten the middle airbag mounting nut, then install the bracket and four mounting nuts.
- Tighten the two outer airbag mounting nuts first, then tighten the two bracket mounting nuts.



(cont'd)

Airbag

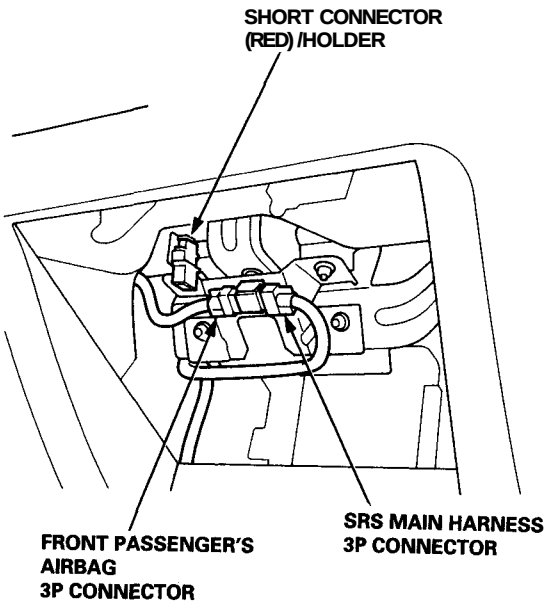
Replacement (cont'd)

6. Reconnect the airbag connectors.

Front Passenger's Side:

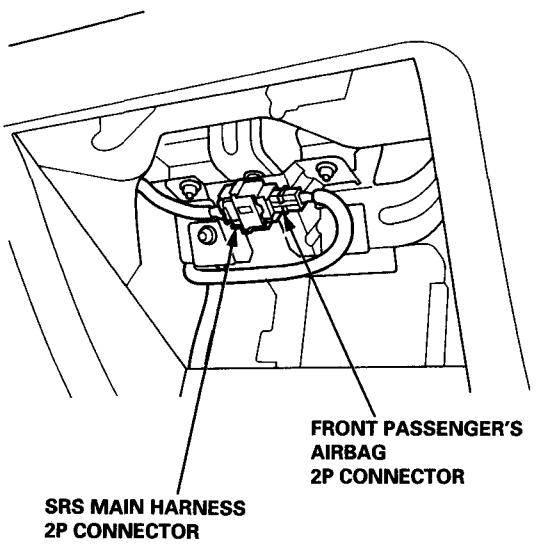
'95-96 Models:

- Attach the short connector (RED) to the connector holder, then reinstall the glove box.



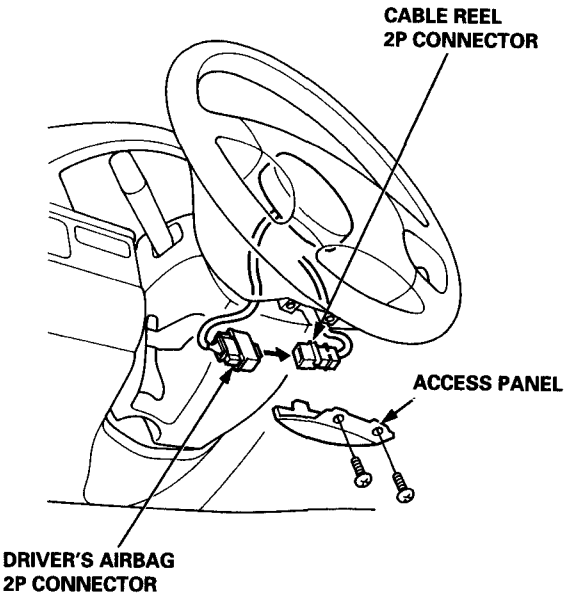
'97-98 Models:

- Attach the airbag connector to the connector holder, then install the glove box.



Driver's Side:

- Connect the driver's airbag 2P connector to the cable reel 2P connector, then install the access panel on the steering wheel.



7. Connect the battery positive cable, then connect the negative cable.

8. After installing the airbag, confirm proper system operation:

   - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
   - Make sure both horn buttons work.
   - Take a test-drive, and make sure the cruise control switches work.

9. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

Disposal

Before scrapping any airbags (including those in a whole vehicle to be scrapped), the airbags must be deployed. If the vehicle is still within the warranty period, before you deploy the airbags, the Acura District Technical Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), can they be scrapped. If the airbags appear intact (not deployed), treat them with extreme caution. Follow this procedure:

Deploying the Airbags: In-vehicle

NOTE: If an SRS vehicle is to be entirely scrapped, its airbags should be deployed while still in the vehicle. The airbags should not be considered as salvageable parts and should never be installed in another vehicle.

⚠WARNING Confirm that each airbag assembly is securely mounted; otherwise, severe personal injury could result from deployment.

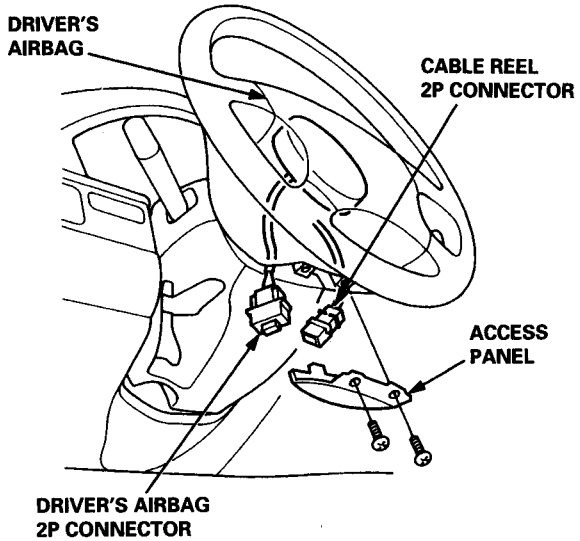
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable.

3. Confirm that the special tool is functioning properly by following the check procedure on the label on the tool or the procedure on page 24-72.

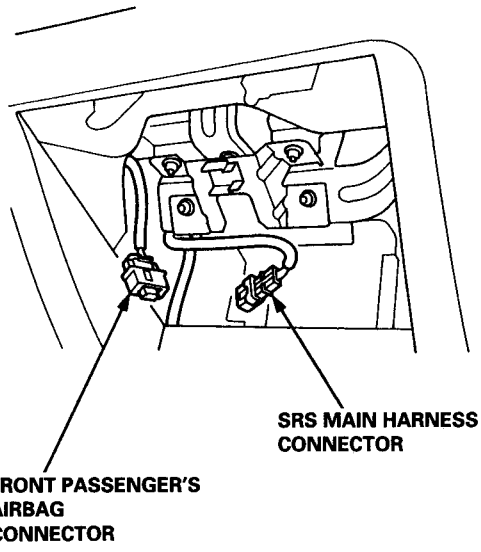
Driver's Airbag:

4. Remove the access panel, then disconnect the 2P connector between the driver's airbag and the cable reel.

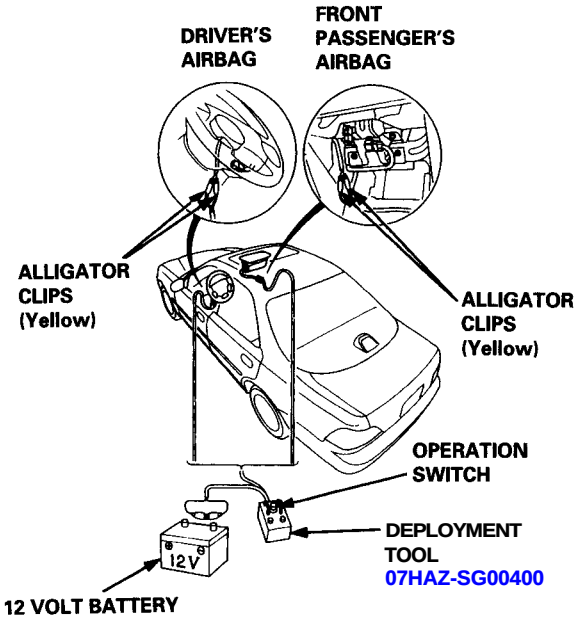


Front Passenger's Airbag:

5. Remove the glove box, then disconnect the connector between the front passenger's airbag and SRS main harness.



6. Cut off the airbag connector, strip the ends of the airbag wires, and connect the special tool alligator clips to the airbag. Place the special tool approximately thirty feet (10 meters) away from the airbag.



(cont'd)

Airbag

Disposal (cont'd)

7. Connect a 12 volt battery to the tool:

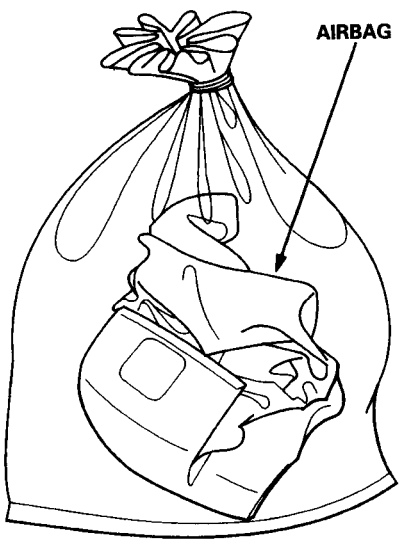
   - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. Go to Damaged Airbag Special Procedure.
   - If the red light on the tool comes on, the airbag is ready to be deployed.

8. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible a loud noise and rapid inflation of the bag, followed by slow deflation).

   - If audible/visible deployment happens, and the green light on the tool comes on, continue with this procedure.
   - If the airbag doesn't deploy, yet the green light comes ON, its igniter is defective. Go to Damaged Airbag Special Procedure.
   - During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.

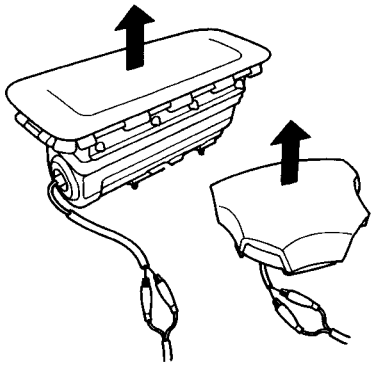
9. Dispose of the complete airbag. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

CAUTION:
- **Wear a face shield and gloves when handling a deployed airbag.**
- **Wash your hands and rinse them well with water after handling a deployed airbag.**



Deploying the Airbag: Out-of-vehicle

If an intact airbag has been removed from a scrapped vehicle, or has been found defective or damaged during transit, storage or service, it should be deployed as follows:



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool label.
2. Position the airbag face up, outdoors on flat ground at least thirty feet (10 m) from any obstacles or people.
3. Follow steps 5, 6, 7, and 8 of the in-vehicle deployment procedure.

Damaged Airbag Special Procedure

⚠ WARNING If an airbag cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-67.
2. In all cases, make a short circuit by twisting together the two airbag inflator wires.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your Acura District Technical Manager for how and where to return it for disposal.

Deployment Tool: Check Procedure

1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. Disconnect the battery and the yellow clips.

Cable Reel

Replacement

⚠ WARNING Store a removed airbag with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

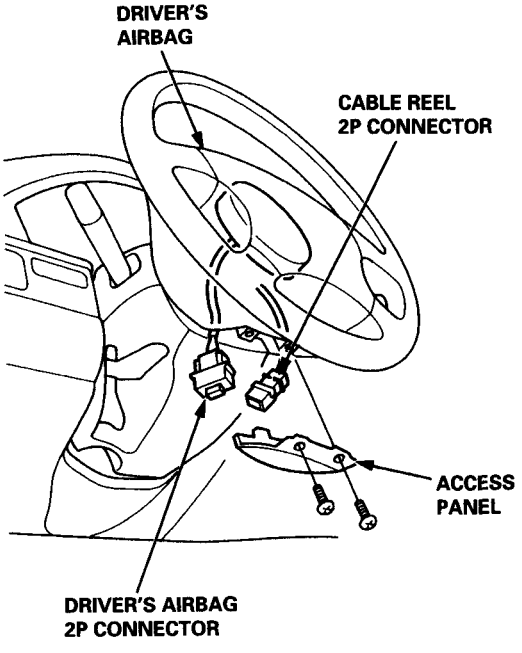
CAUTION:
- **Always disconnect the airbag connector when the SRS main harness is disconnected.**
- **Do not disassemble or tamper with the airbag.**

NOTE: Carefully inspect the airbag before installing it. Do not install an airbag that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

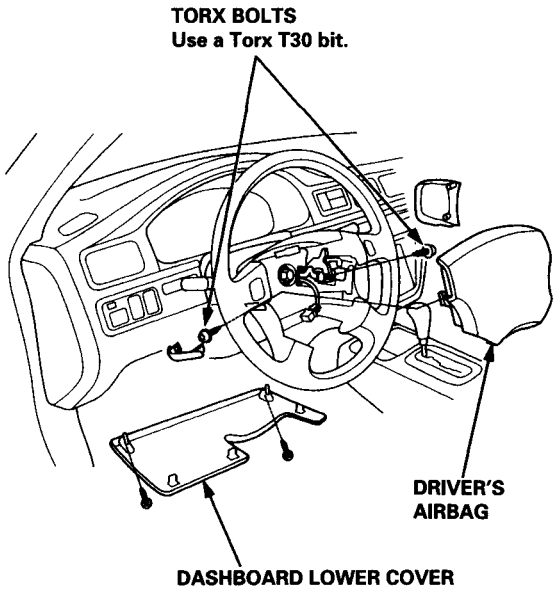
3. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



4. Make sure the wheels are aligned straight ahead.

5. Remove the dashboard lower cover.

6. Remove the driver's airbag assembly from the steering wheel (two T30 Torx bolts).

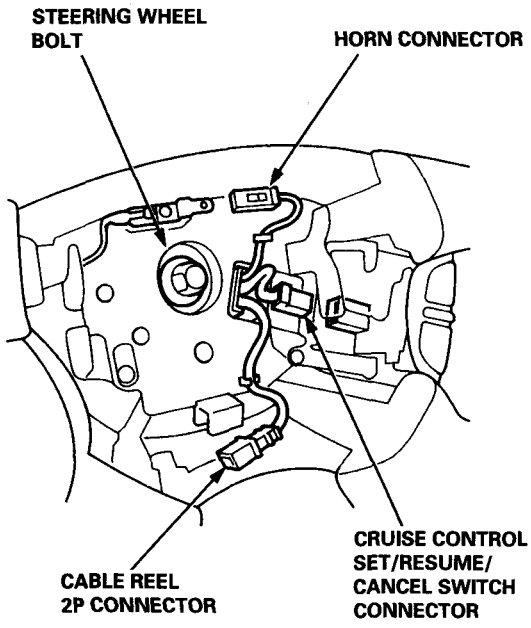


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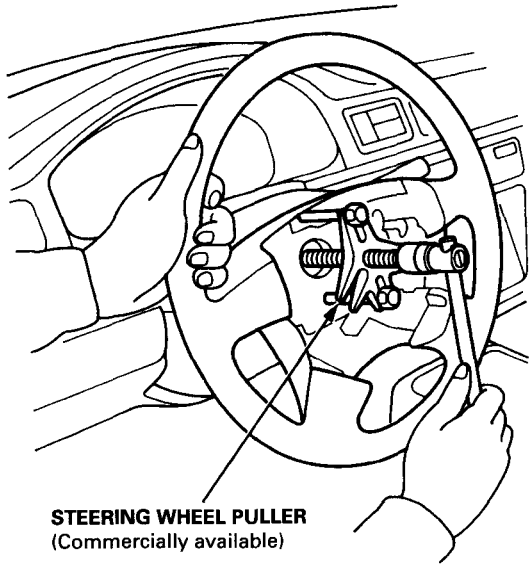
Cable Reel

Replacement (cont'd)

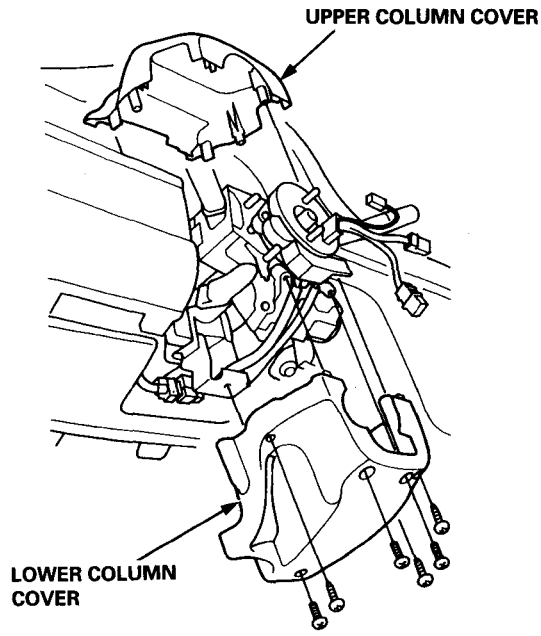
7. Disconnect the connectors from the horn and cruise control set/resume/cancel switches, then remove the steering wheel bolt.



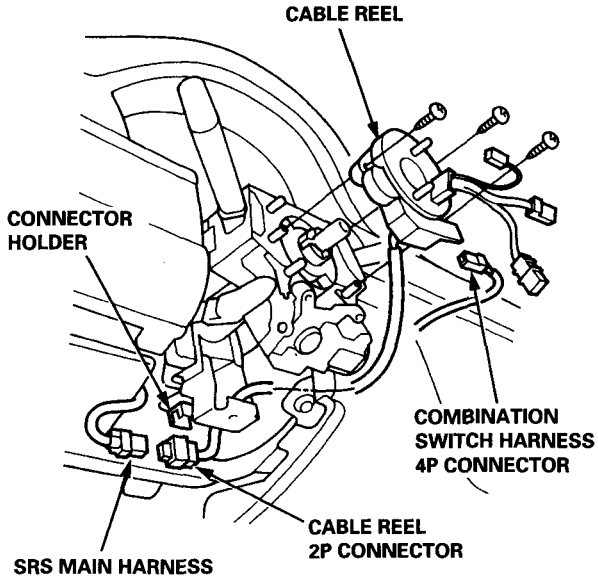
8. Remove the steering wheel with a steering wheel puller.



9. Remove the steering column covers.



10. Disconnect the 4P connector between the cable reel and combination switch harness, and the 2P connector between the cable reel and SRS main harness.

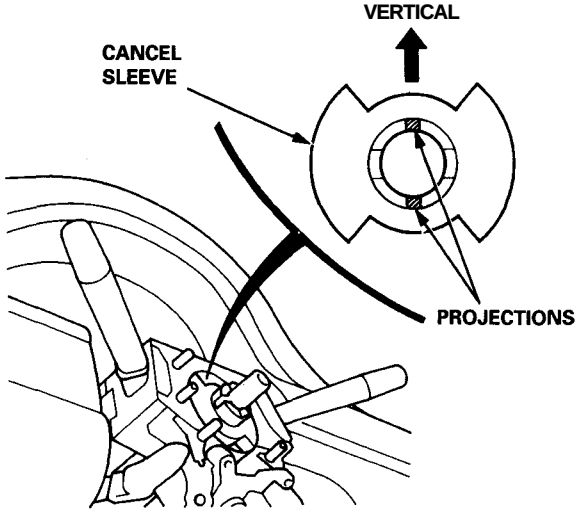


11. Remove the cable reel from the column.

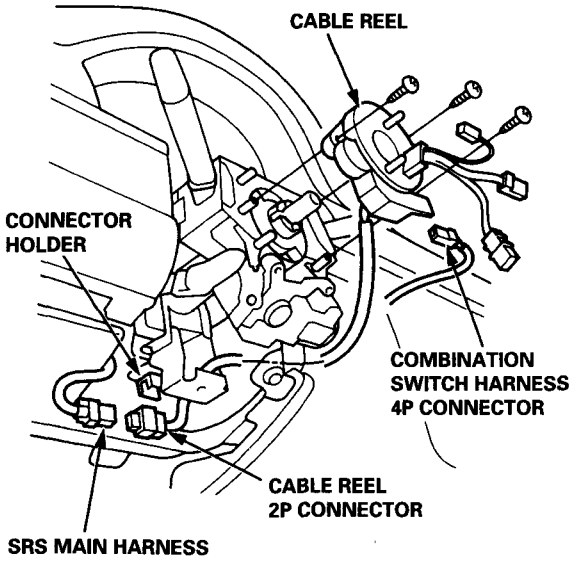
NOTE:

- Before installing the steering wheel, the front wheels should be aligned straight ahead.
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.
- After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct (road test). If minor spoke angle adjustment is necessary, do so only by adjusting the tie-rods, not by removing and repositioning the steering wheel.

12. Set the cancel sleeve so that the projections are aligned as shown.

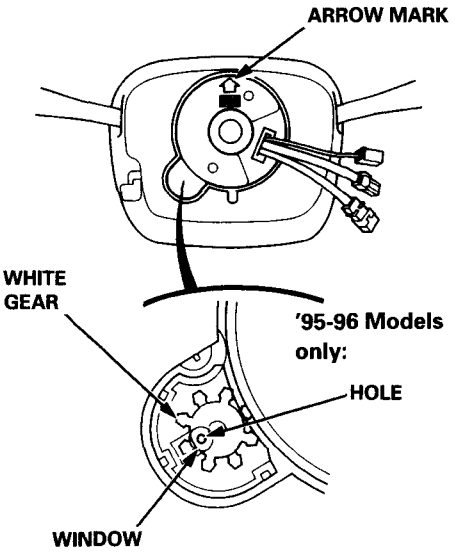


13. Carefully install the cable reel on the steering column shaft. Then connect the 4P connector to the cable reel, and connect the 2P connector to the SRS main harness.

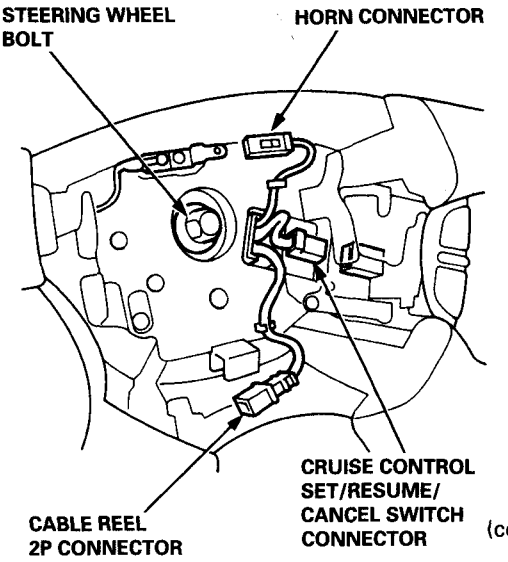


14. Install the steering column covers.

15. If necessary, center the cable reel. (New replacement cable reels come centered.) '97-98 Models: Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.
'95-96 Models: Rotate the cable reel clockwise until it stops.
Then rotate it counterclockwise (approximately two turns) until the hole in the white gear lines up with the window on the cover and the arrow mark on the cable reel label points straight up.



16. Install the steering wheel, then connect the horn connector and cruise control set/resume/cancel switch connector.

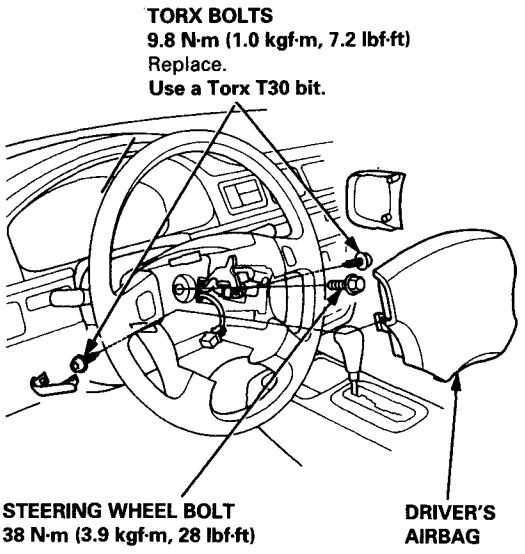


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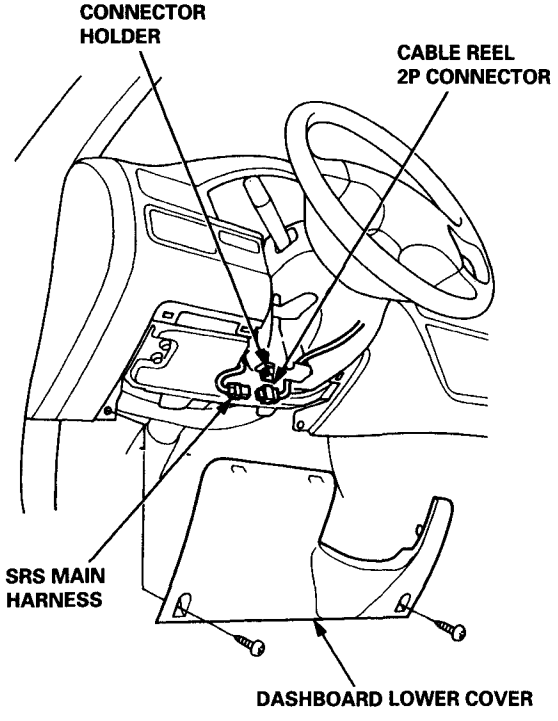
Cable Reel

Replacement (cont'd)

17. Tighten the steering wheel bolt to the specified torque. Then install the driver's airbag.



18. Attach the cable reel 2P connector to the connector holder. Then install the dashboard lower cover.



19. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

20. Reconnect the battery positive cable, then the negative cable.

21. After installing the cable reel, confirm proper system operation:

- Turn the ignition ON (II); the SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Make sure the headlight and wiper switches work.
- Go for a test drive, and make sure the cruise control switches work.

22. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

SRS Unit

Replacement

CAUTION:
- **During installation or replacement, do not bump (impact wrench, hammer etc.) the area near the SRS unit.**
- **Do not damage the SRS unit terminals or connectors.**
- **Do not disassemble the SRS unit; it has no serviceable parts.**
- **Store the SRS unit in a clean, dry area.**
- **Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**

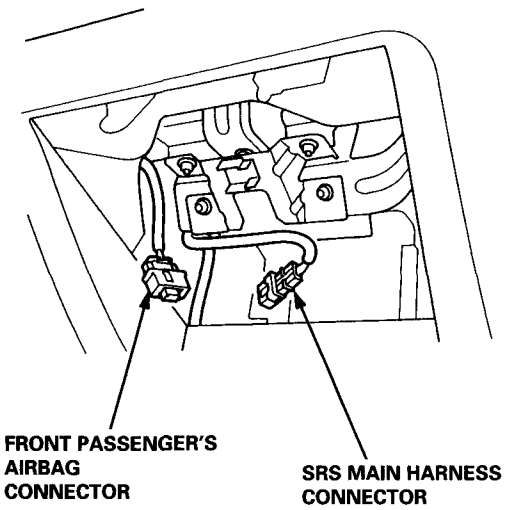
1. Make sure you have the anti-theft code for the radio, then write down the frequencies for the radio's preset buttons.

2. Disconnect the battery negative cable, then disconnect the positive cable from the battery, and wait at least three minutes.

3. Disconnect the airbag connectors.

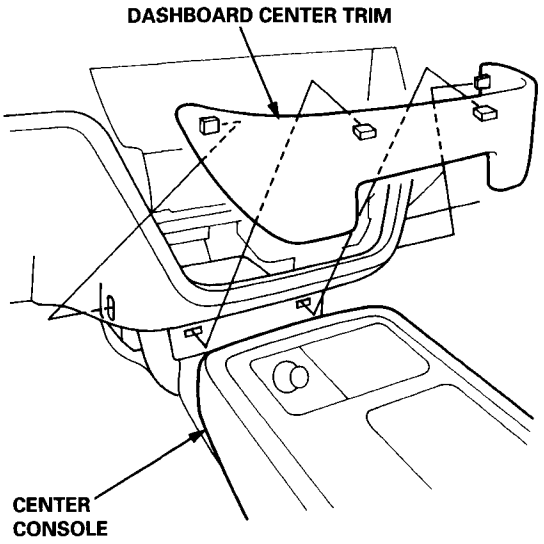
Driver's Side:
- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel (see page 24-12).

Front Passenger's Side:
- Remove the glove box.
- Disconnect the connector between the front passenger's airbag and SRS main harness. On '95-96 models, connect the short connector to the front passenger's airbag connector.



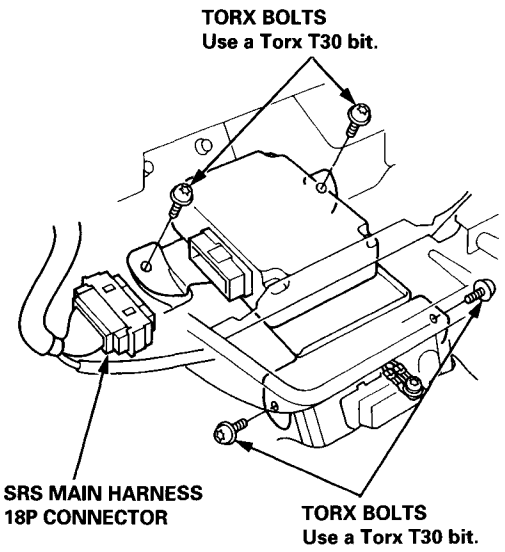
4. Remove the radio panel (see section 23).

5. Remove the center console and dashboard center trim.



6. Disconnect the SRS main harness 18P connector from the SRS unit.

7. Remove the four Torx bolts from the SRS unit, then pull the SRS unit out of the dashboard.

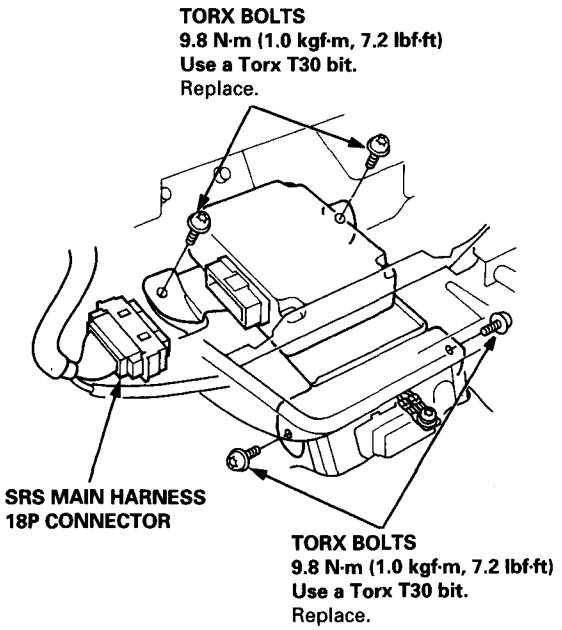


(cont'd)

SRS Unit

Replacement (cont'd)

8. Install the new SRS unit.



9. Connect the SRS main harness 18P connector to the SRS unit, then push it into position until it clicks.

10. Reinstall the radio panel bracket and radio panel assembly.

11. Reinstall the dashboard center trim and center console.

12. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

13. Reconnect the front passenger's airbag connector to the SRS main harness, then reinstall the glove box.

14. Reconnect the battery positive cable, then the negative cable.

15. After installing the SRS unit, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

16. Enter the anti-theft code for the radio, then enter the customer's radio station presets.

SUPPLEMENTAL RESTRAINT SYSTEM

The Acura TL SRS includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the front airbags, seat belt tensioners, and side airbags ('99-01 models).**
- **Do not bump the SRS unit. Otherwise, the system may fail in a collision, or the airbags may deploy when the ignition switch in ON (II).**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

NOTE: The original radio has a coded theft protection circuit. Be sure to get the customer's code number before
– disconnecting the battery.
– removing the No. 39 (10A) fuse from the under–hood fuse/relay box.
– removing the radio.
After service, reconnect power to the radio and turn it on. When the word "CODE" is displayed, enter the customer's 5-digit code to restore radio operation.