ACURA

2934'11

NSX

Service Manual 1991

INTRODUCTION

How to Use This Manual

This manual is divided into 14 sections. The first page of each section is marked with a black tab that lines up with one of the thumb index tabs on this page and the back cover. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

1. A table of contents, or an exploded view index showing:
   - Parts disassembly sequence.
   - Bolt torques and thread sizes.
   - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Special Information

⚠WARNING Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE: Gives helpful information.

CAUTION: Detailed descriptions of standard *workshop* procedures, safety principles and service operations are not included.,,. Please note that this manual does contain warnings and cautions against some specific service methods which could cause PERSONAL INJURY,. or could damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA, might be done, or of the possible hazardous consequences of each conceivable way, nor -could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *must satisfy himself thorough/y* that neither personal safety nor vehicle safety will be jeopardized.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice. No part of this publication may be reproduced, stored in retrieval system, or transmitted, in any form by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. This includes text, figures and tables.

First Edition 7/90 1450 pages
All Rights Reserved
Specifications Apply to U.S.A. and Canada

HONDA MOTOR CO., LTD.
Service Publication Office

* General Info (Including SRS)
Special Tools
Specifications
Maintenance
Engine
Cooling
Fuel and Emissions
* Transaxle
* Steering
Suspension
* Brakes (Including TCS)
* Body
* Heater and Air Conditioner
* Electrical (Including SRS)

General Information

Chassis and Paint Codes 1-2
Identification Number Locations 1-4
Label Locations 1-5
Lift and Support Points 1-6
Towing 1-9
Service Precautions 1-10

SRS

Component Locations 1-12
Description 1-13
Warning/Caution Labels 1-14
Wiring Location 1-16
Precautions/Procedures 1-17

Chassis and Paint Codes

U.S. Model

Vehicle Identification Number

JH4NA1 15* MT00000 1

- Manufacturer Code and Vehicle Type
  - JH4: HONDA MOTOR CO., LTD., JAPAN.
  - ACURA Passenger Car
- **Body Type**
  - NA1 : ACURA NSX
- Transmission Type
  - 15: 5-speed Manual
  - 26: 4-speed Automatic
- Check Digit
- Model Year
  - M: 1991
- Factory Code
  - T: Tochigi Factory Japan
- Serial Number

Transmission Number

J4A4-1000001

- **Transmission Type**
  - J4A4: 5-speed Manual
  - MR9A: 4-speed Automatic
- Serial Number.

Paint Code

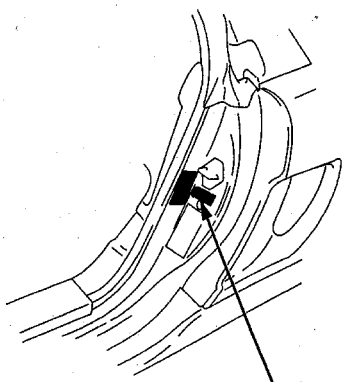
Paint Code	Color
R-77	Formula Red
NH-547	Berlina Black
NH-545M	Sebring Silver Metallic

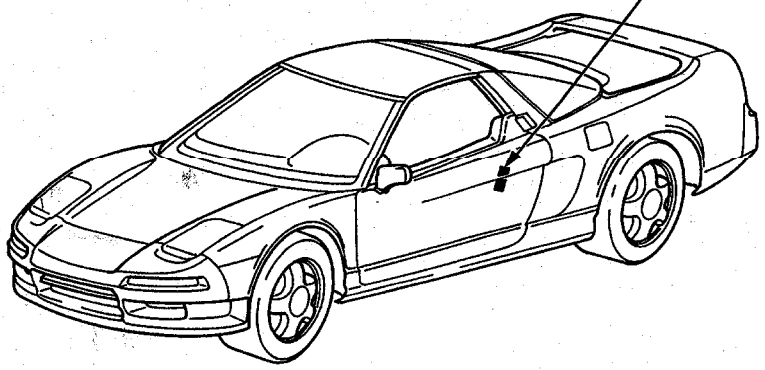
Engine Number

C30A1-1300001

- **Engine Type**
- **Serial Number**

Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification





Paint Code

COLOR
NH-547

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

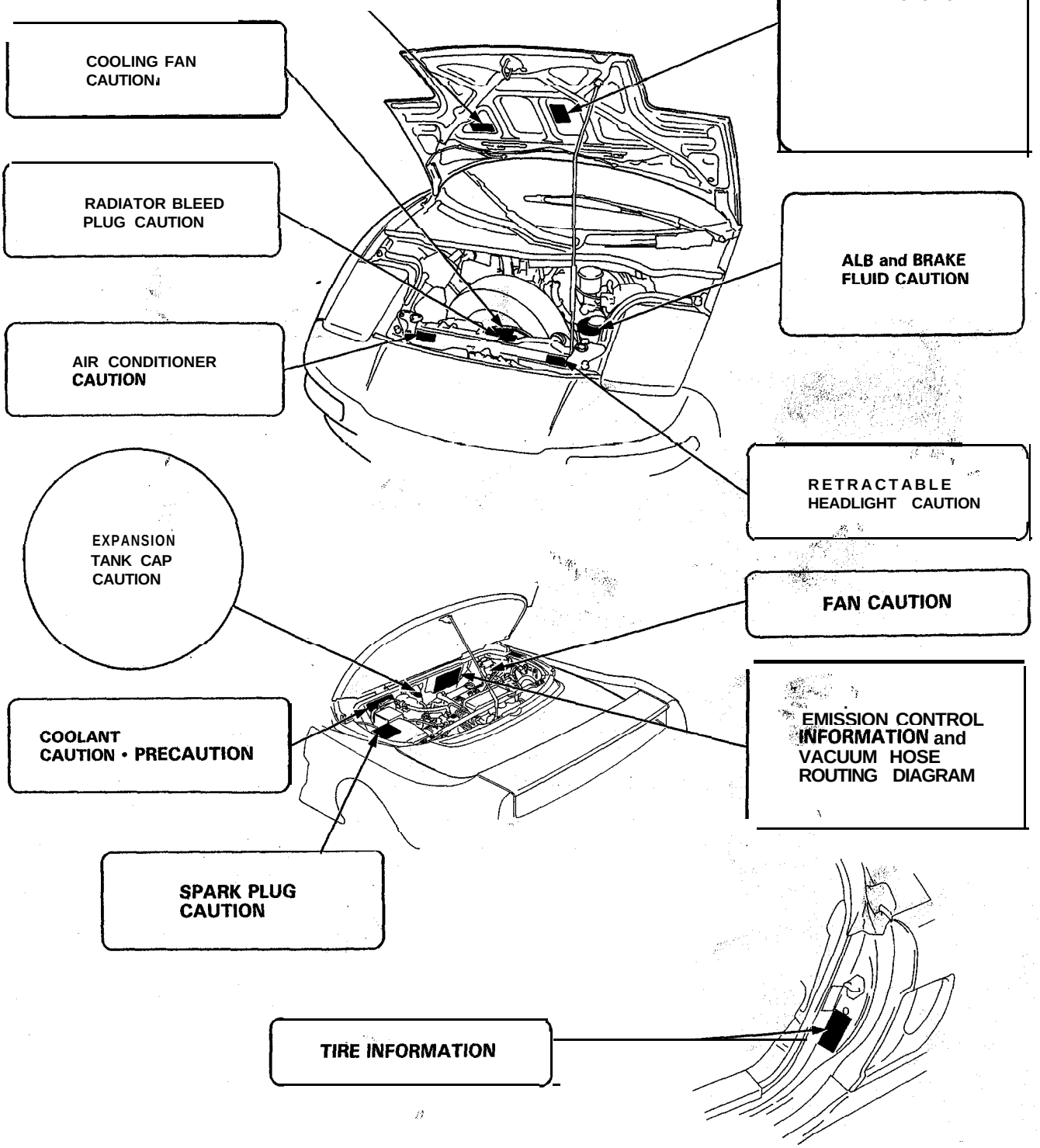
The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

⚠ WARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Label Locations

SRS CAUTION LABELS: Refer to page 1-14.



Lift and Support Points

- Lift

CAUTION:

- If ground clearance is inadequate to clear the shop lift, either:
  - install rubber spacers on the coil springs to raise the car. Use the floor jack procedures to raise the car (see page I-7).

  or

  - Remove the chin spoiler.

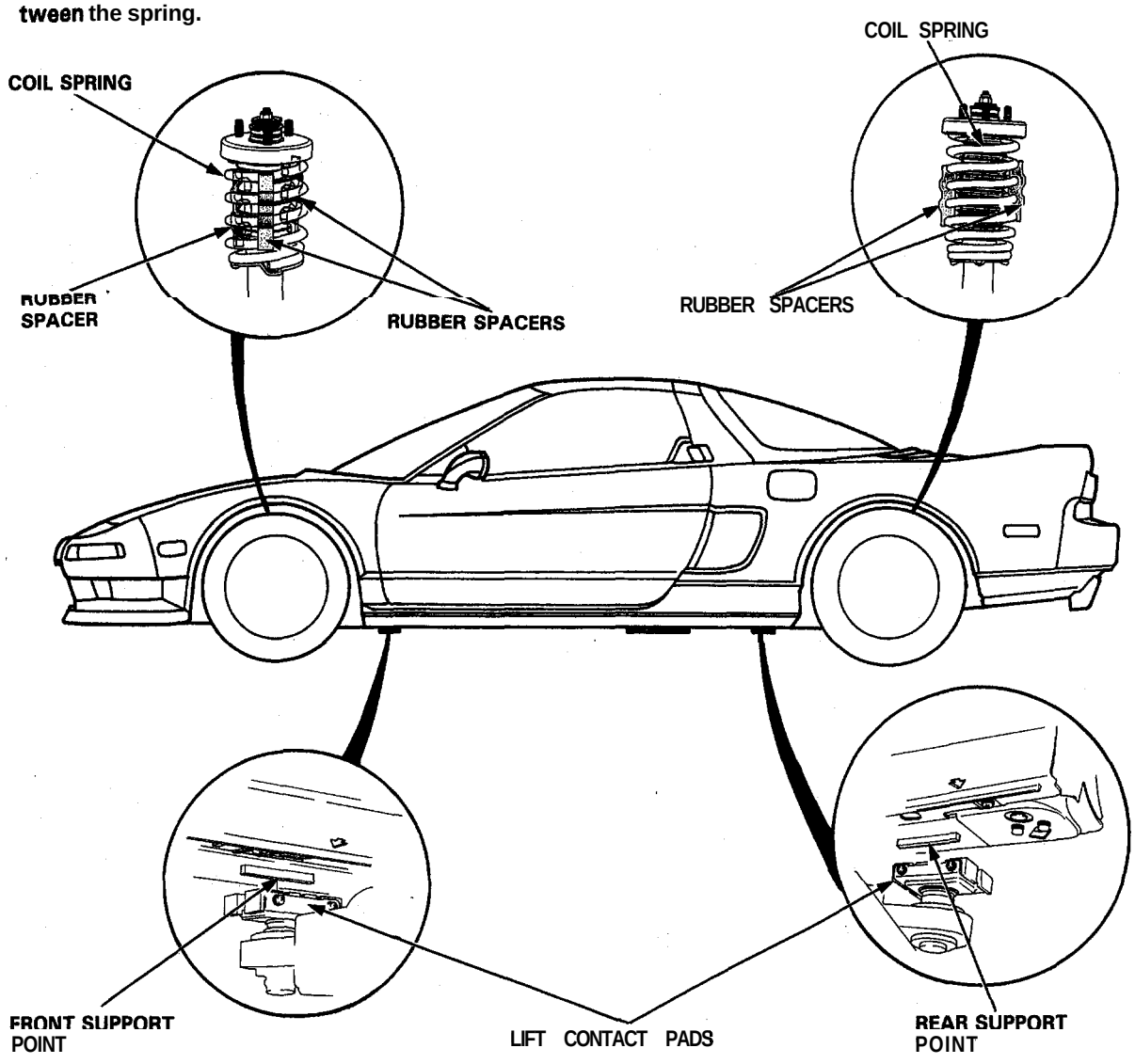
  or

  - If you need even more clearance, install the rubber spacers and remove the chin spoiler.
- Follow the lift manufacturer's instructions.
- Use rubber pad adapters on the lift to avoid damaging the car.

Spacer Installation

1. Place the rubber contact pads as shown.
2. Raise the lift a few inches and rock the car to be sure it is firmly supported.
3. Raise the lift to full height and inspect lift points for solid support.
4. Install rubber spacers on the coil springs.

CAUTION: Remove the rubber spacers after lowering the car. Do not drive the car with rubber spacers installed between the spring.



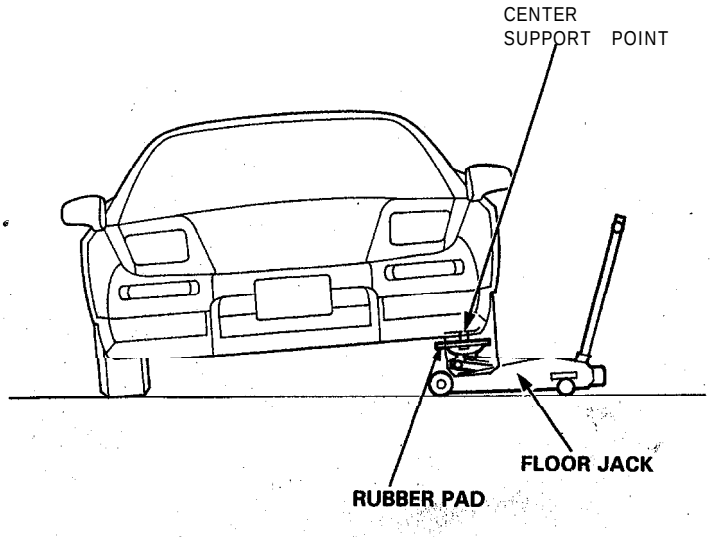
Floor Jack

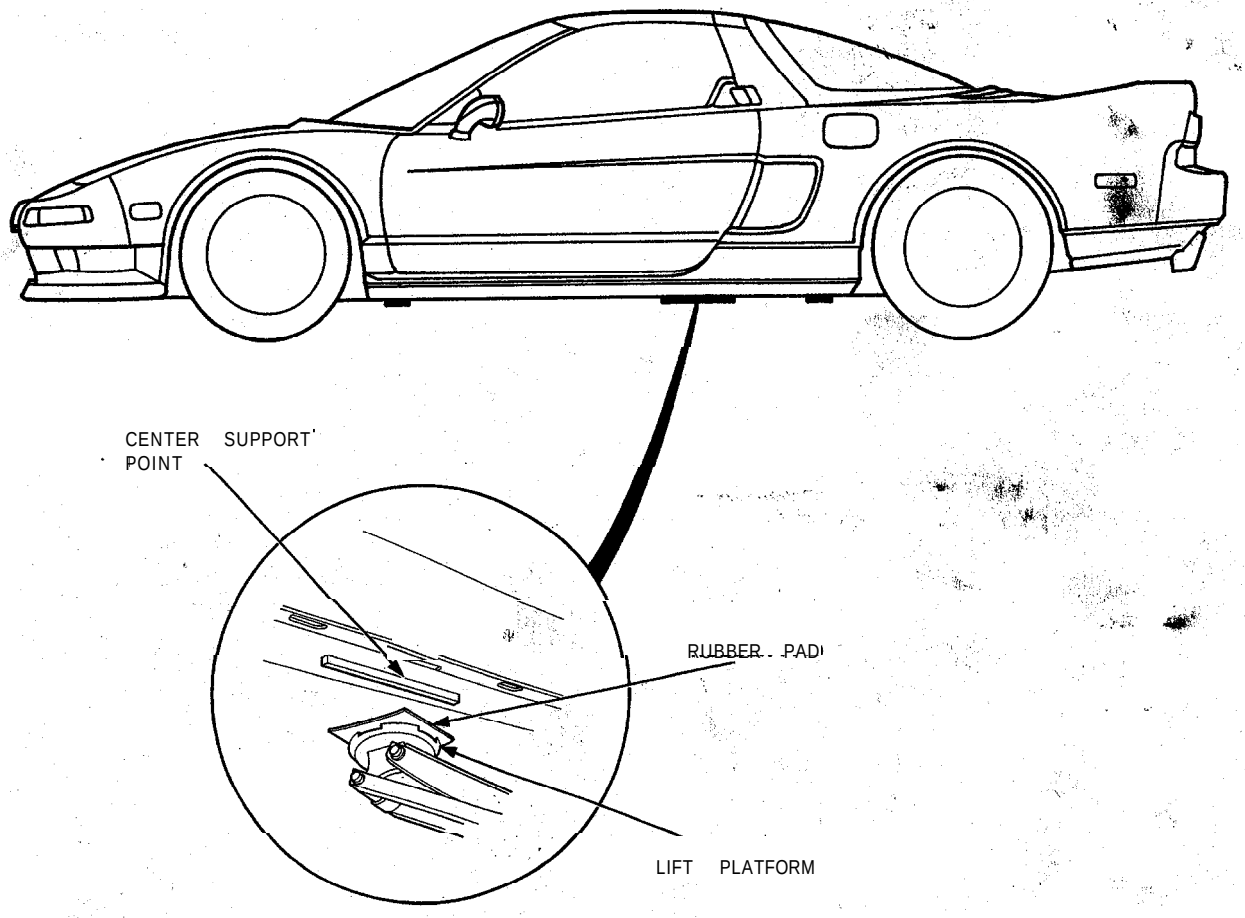
CAUTION: Place a rubber pad between the lift platform and the center support point to avoid damaging the car. The lift platform must contact the support point only: it must not come in contact with any other part of the car.

1. Set the parking brake and block the wheels that are not being lifted.
2. When lifting the rear of the car, put the gearshift lever in reverse (Automatic in PARK).
3. Raise the car high enough to insert the safety stands.
4. Adjust and place the safety stands as shown on page I-8 so the car will be approximately level, then lower the car 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 car.



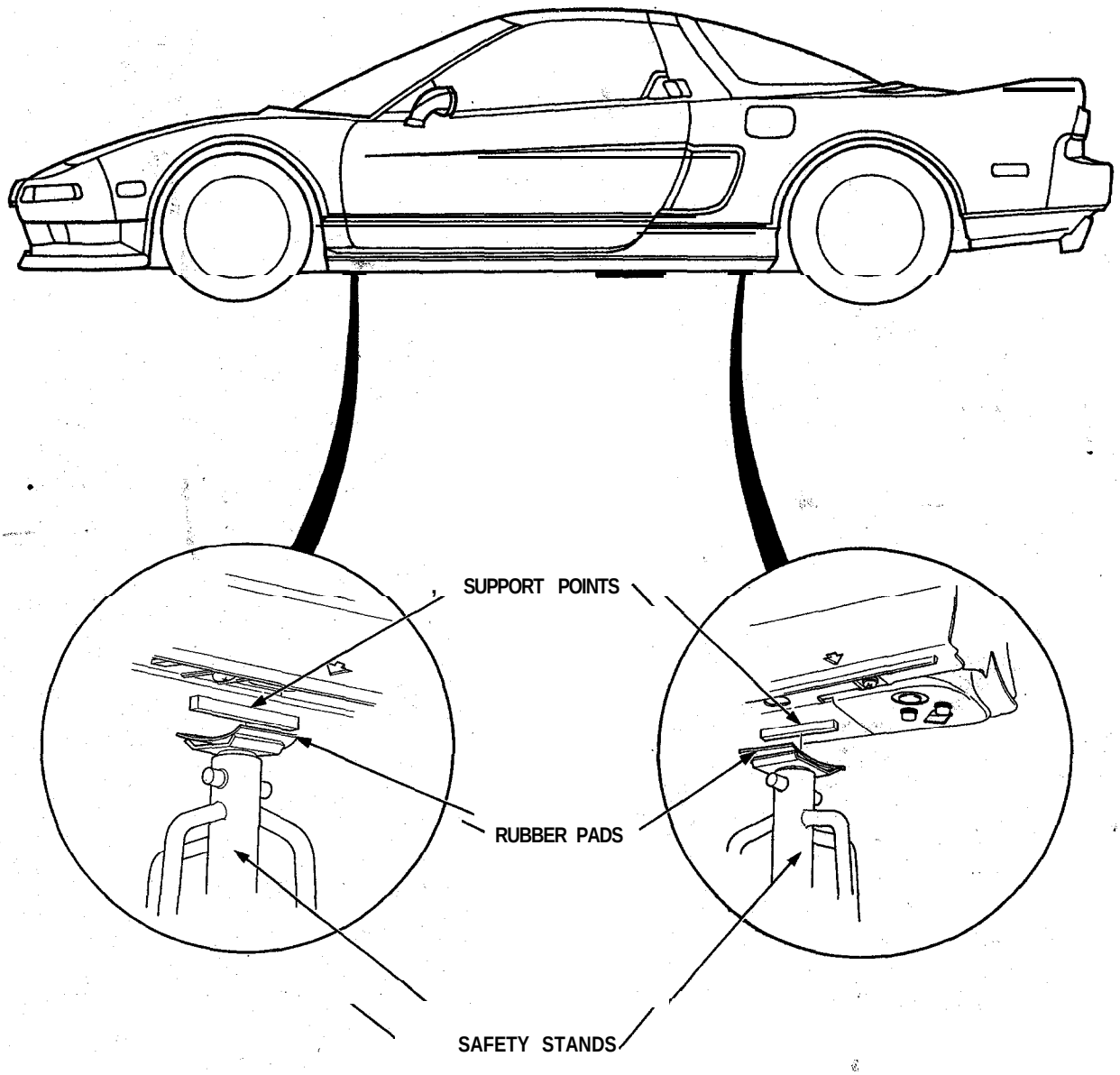


(cont'd)

Lift and Support Points (cont'd)

Safety Stands

CAUTION: Place a rubber pad between the safety stand platforms and the car's front and rear support points to avoid damaging the car. The safety stand platforms must contact the car's support points only; they must not come in contact with any other part of the car.



Towing

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

There are three widely used methods of towing a car:

Flat-bed Equipment — The operator loads the car on the back of a truck. This is the only recommended way of towing the NSX.

Wheel Lift Equipment — The tow truck driver uses two pivoting arms which go under the tires (front or rear) and lift them off the ground. The other two wheels remain on the ground. This towing method is not recommended. Because of the NSX's low ground clearance, the body can be damaged going over large bumps or up inclines.

Bling-type Equipment — The tow truck uses metal chains with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the car off the ground. Damage to the car's suspension and body is almost certain if this method of towing is attempted.

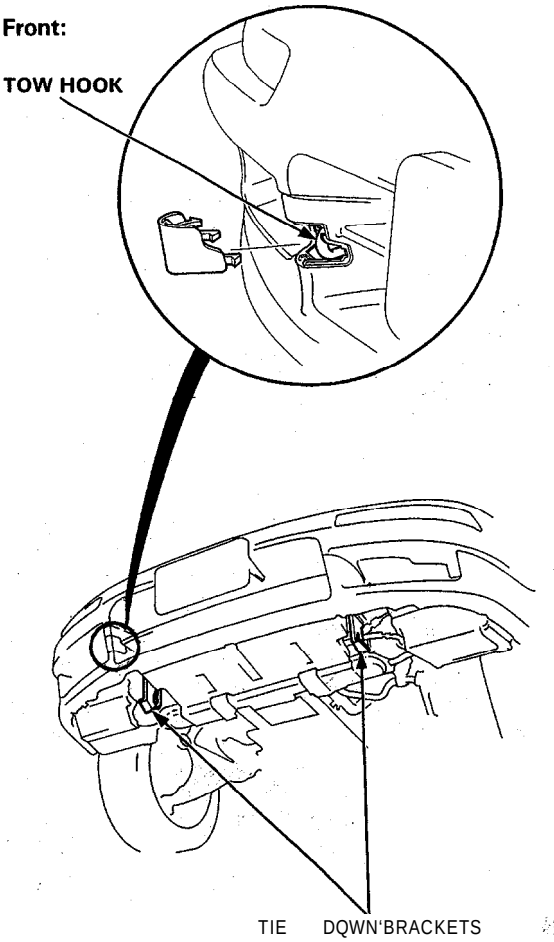
If the NSX cannot be towed by flat-bed, it should be towed with the rear wheels off the ground. If, due to damage, the car must be towed with the rear wheels on the ground, do the following:

- Release the parking brake.
- Shift the 5-speed transmission to Neutral.
- If the car has an automatic transmission, start the engine. Shift the transmission to Drive, then into Neutral, then shut off the engine.
- It is best to tow the car no farther than 50 miles, and keep the speed below 35 mph.

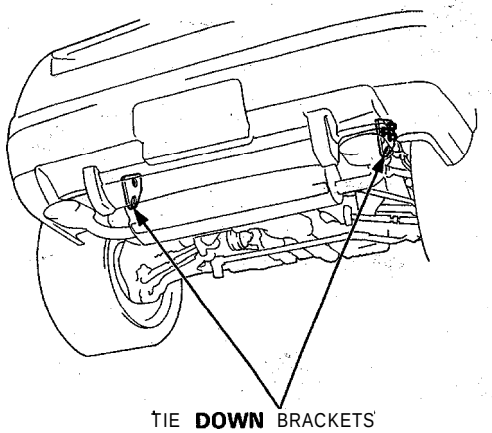
NOTICE:

- Improper towing preparation will damage the transmission. Follow the above procedure exactly. The car must be towed on a flat bed if the engine will not start or the transmission will not shift.
- Trying to lift or tow the car by the bumpers will cause serious damage. The bumpers are not designed to support the car's weight.

Front:



Rear:



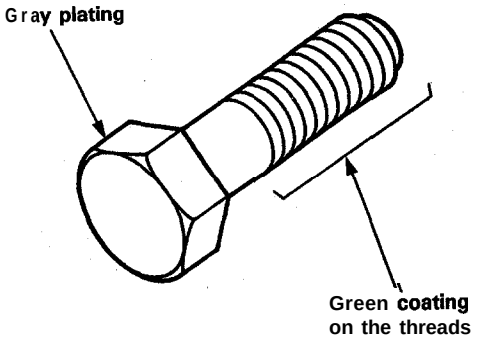
Service Precautions

Handling of Special Nuts and Bolts

Because many sections on this car are constructed with aluminum alloys, use only the special "Dacro" type nuts and bolts recommended by Acura.

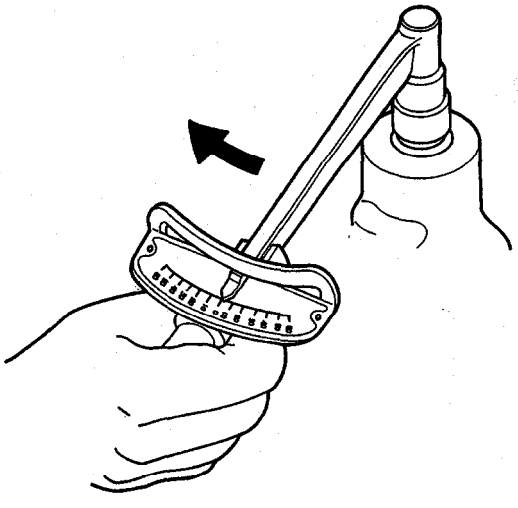
NOTE:

- Dacro finish can be identified by glay 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 car requiring the use Dacro nuts and bolts will be indicated by a (☆) in this manual.



Handling of tires

- The tires on NSX should not be rotated. The front wheels are 15" in. diameter and the rear wheels are 16" in. so they cannot be rotated front-to-rear. The original-equipment tires on NSX have a unidirectional tread pattern, so they cannot be rotated side-to-side.
- The folding spare tire can not be repaired or removed from the rim.

General Information — SRS

Component Locations ..... I- 12
Description 1-13
Warning/Caution Labels ..... I-I 4
Wiring Locations 1-16
Precautions/Procedures ..... I- 17

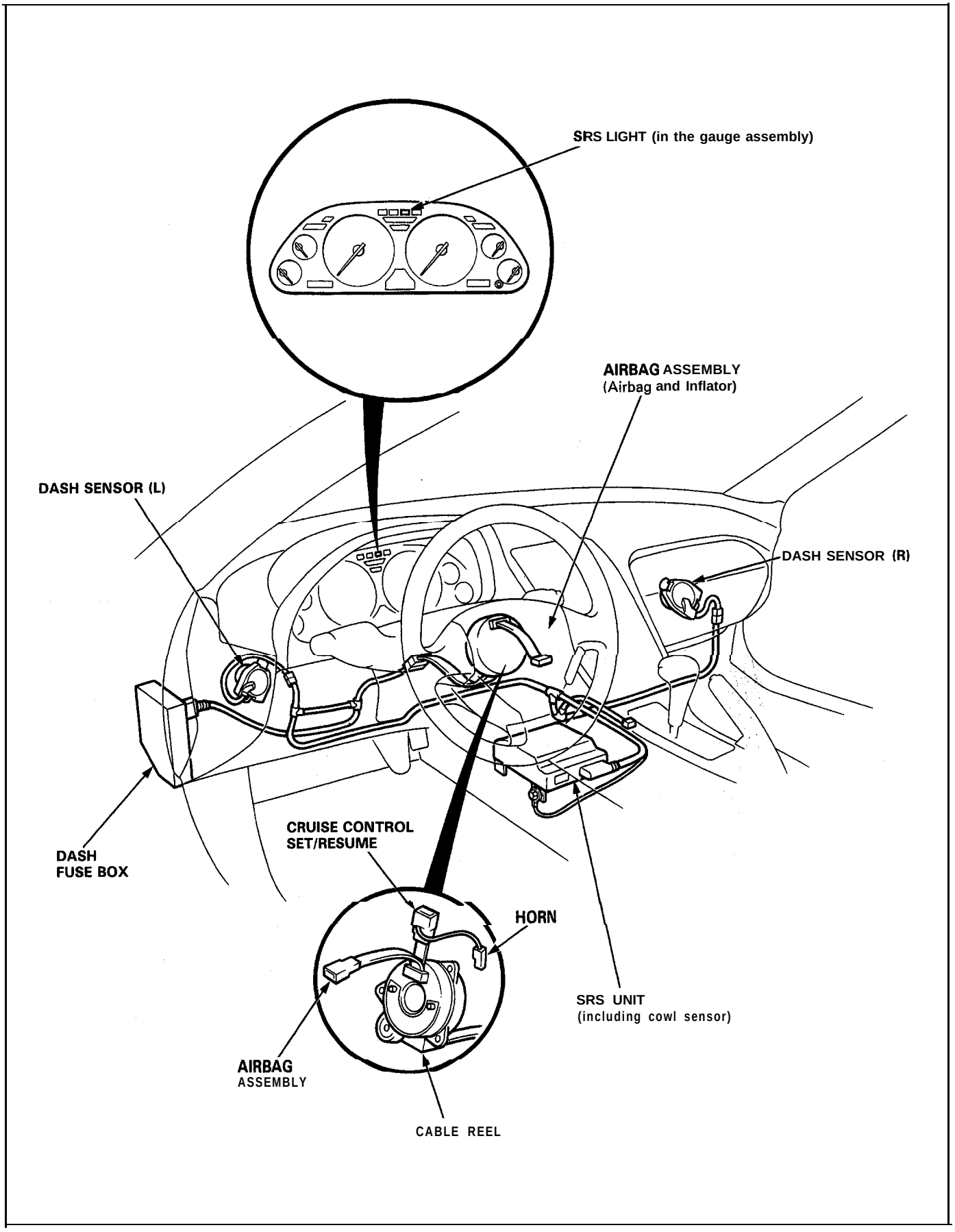
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

⚠ WARNING

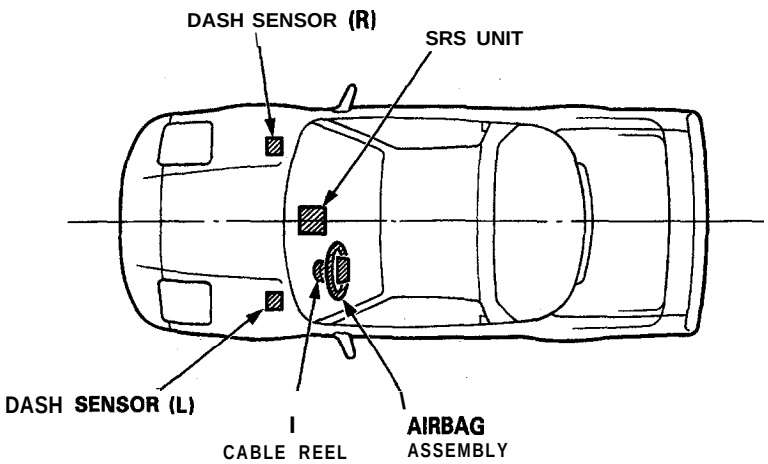
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installtion of the SRS, can lead to personal injury caused **by unintentional activation of a airbag.**
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Component Locations



Description

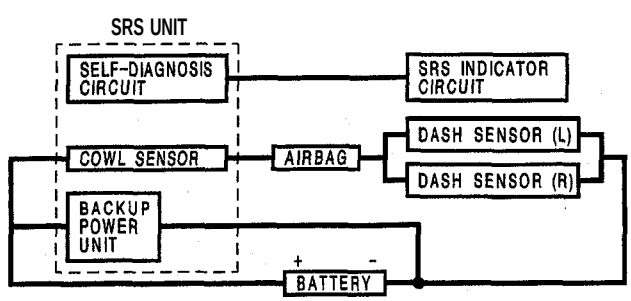
The SRS is a safety device which, when used in conjunction with the seat belt, is designed to protect the driver by operating only when the car receives a frontal impact exceeding a certain set limit.
The system is composed of left and right dash sensors, the SRS control unit (including the cowl sensor), the cable reel and airbag assembly.



OPERATION:
As shown in the diagram below, the left and right dash sensors are connected in parallel. The parallel set of sensors are **connected in series by the airbag inflator circuit and the car battery. In addition, a backup power unit is connected in parallel with the car battery. The backup power unit and the cowl sensor are located inside the SRS control unit.**

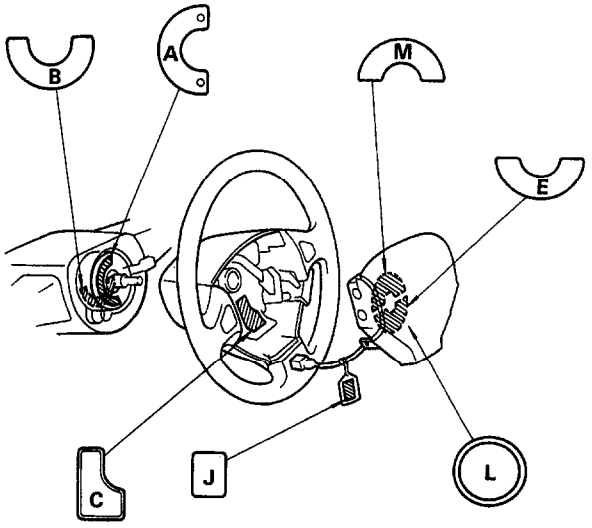
The SRS operational sequence is as follows:
(1) The cowl sensor activates, and one or both dash sensors activate.
(2) Electrical energy is supplied to the airbag inflator by the battery, or the backup power unit if the battery voltage is too low.
(3) Airbag deployment.

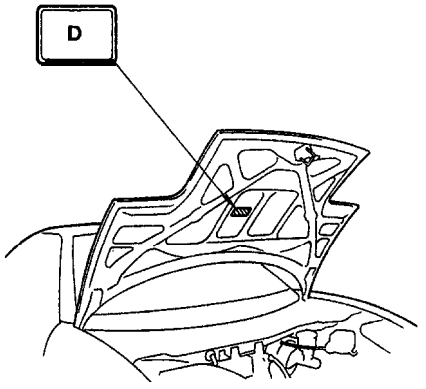
At least the cowl and one dash sensor must be activated simultaneously for at least 0.002 seconds in order for the airbag **to be deployed.**

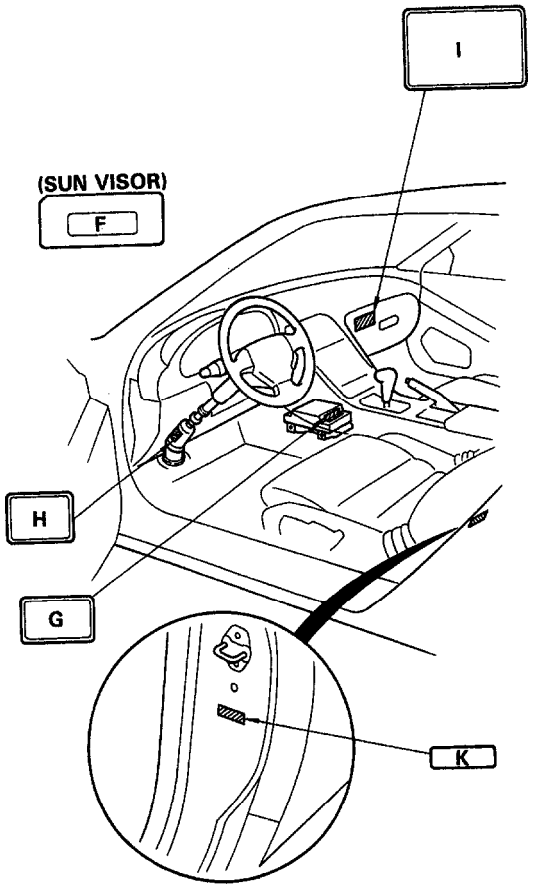


Self-diagnosis system
A self-diagnosis circuit is built into the SRS control unit; when the ignition switch is turned ON, the SRS light comes on and goes out after about 6 seconds if the system is operating normally. If the light does not come on, or does not go out **after 6 seconds, or if it comes on while driving, this indicates an abnormality in the system. It must be inspected and** repaired as soon as possible.

Warning/Caution Labels







A: CABLE REEL CAUTION A

CAUTION: SRS
BEFORE INSTALLING CABLE REEL
- CENTER THE FRONT WHEELS.
- ALIGN THE MARKS.
- READ SERVICE MANUAL.

B: CABLE REEL CAUTION B

CAUTION: SRS
NO SERVICEABLE PARTS INSIDE; DO NOT DISASSEMBLE OR TAMPER.

C: STEERING WHEEL WARNING

WARNING SRS
BEFORE INSTALLING STEERING WHEEL:
- CENTER THE FRONT WHEELS.
- ALIGN THE MARKS. (CABLE REEL)
- READ SERVICE MANUAL.

D: BULKHEAD WARNING

WARNING SRS
THIS VEHICLE IS EQUIPPED WITH A DRIVER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM. (SRS)
ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
DO NOT USE ELECTRICAL TEST EQUIPMENT ON THESE CIRCUITS. TAMPERING WITH OR DISCONNECTING THE SRS WIRING COULD RESULT IN ACCIDENTAL FIRING OF THE INFLATOR OR MAKE THE SYSTEM INOPERATIVE, WHICH MAY RESULT IN SERIOUS INJURY.

E: MODULE WARNING

WARNING SRS
TO PREVENT ACCIDENTAL DEPLOYMENT AND POSSIBLE INJURY:
ALWAYS INSTALL THE PROTECTIVE SHORT CONNECTOR ON THE INFLATOR CONNECTOR WHEN THE HARNESS IS DISCONNECTED.
UNDER NO CIRCUMSTANCES SHOULD DIAGNOSIS BE PERFORMED USING ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.
NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE OR TAMPER.
STORE THE REMOVED AIRBAG ASSEMBLY WITH THE PAD SURFACE UP.
FOR SPECIAL HANDLING OR STORAGE REFER TO THE ACURA SERVICE MANUAL.
DISPOSE OF THE ENTIRE UNIT AS DIRECTED.

F: DRIVER INFORMATION

SRS ALWAYS WEAR YOUR SEAT BELT
- THIS CAR IS EQUIPPED WITH A DRIVER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
- IT IS DESIGNED TO SUPPLEMENT THE SEAT BELT.
- BEFORE DRIVING READ LABEL INSIDE THE GLOVE BOX.

G: SRS UNIT CAUTION

CAUTION SRS
- **NO SERVICEABLE PARTS INSIDE.**
- **DO NOT DISASSEMBLE OR TAMPER.**
- **DO NOT DROP.**
- **STORE IN A CLEAN, DRY AREA.**

H: STEERING COLUMN CAUTION

CAUTION SRS
TO AVOID DAMAGING THE SRS CABLE OR REEL, WHICH COULD MAKE THE SYSTEM INOPERATIVE, REMOVE THE STEERING WHEEL BEFORE REMOVING THE STEERING SHAFT CONNECTOR BOLT.

I: POCKET INFORMATION

DRIVER'S AIRBAG INFORMATION SRS
- SUPPLEMENTAL RESTRAINT SYSTEM (SRS) CAN PROVIDE ADDITIONAL PROTECTION FOR THE DRIVER IN A FRONTAL COLLISION. A FUNCTIONAL DESCRIPTION OF THE SRS IS IN YOUR OWNER'S MANUAL.
- THE SYSTEM MUST BE INSPECTED TEN YEARS AFTER DATE OF MANUFACTURE, AS NOTED ON THE CERTIFICATION PLATE.
- ANY REPAIR, INSPECTION OR NEARBY ACCESSORY INSTALLTION SHOULD BE DONE BY AN ACURA DEALER.
- IF YOUR SRS INDICATOR:
  LIGHTS WHILE DRIVING OR FLASHES;
  FAILS TO LIGHT OR STAYS ON AFTER THE IGNITION IS FIRST TURNED ON:
  SEE YOUR AUTHORIZED ACURA DEALER.

J: STEERING WHEEL WARNING

WARNING SRS
TO PREVENT ACCIDENTAL DEPLOYMENT AND POSSIBLE INJURY:
ALWAYS INSTALL THE PROTECTIVE SHORT CONNECTOR ON THE INFLATOR CONNECTOR WHEN THE HARNESS IS DISCONNECTED.

K: LABEL AIRBAG

L: INFLATOR LABEL

DANGER CONTAINS SODIUM AZIDE AND POTASSIUM NITRATE.
CONTENTS ARE EXTREMELY FLAMMABLE.
DO NOT DISMANTLE OR INCINERATE.
DO NOT PROBE WITH ELECTRICAL DEVICES.

M: INFLATOR COVER LABEL

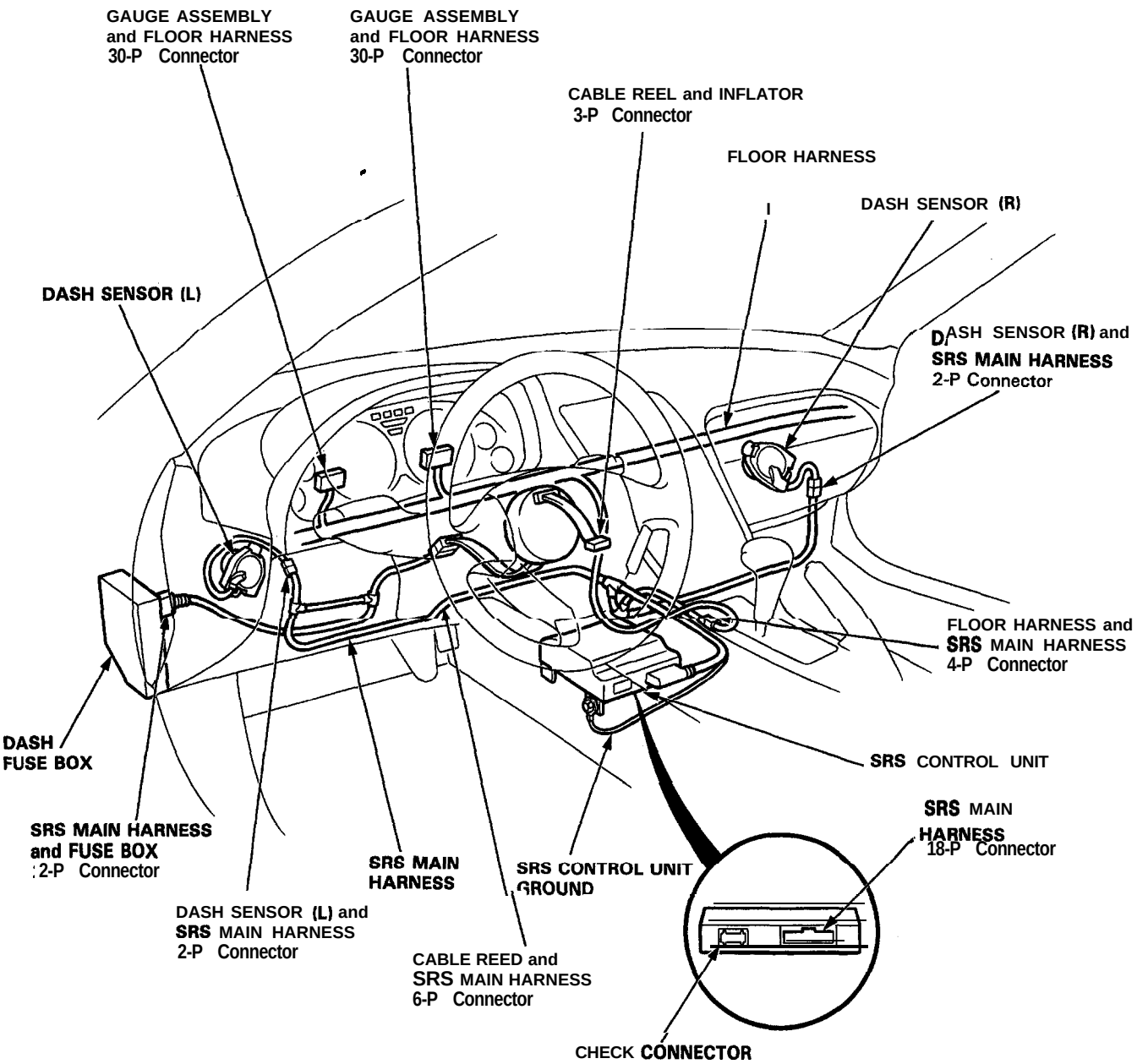
DANGER
EXPLOSIVE/FLAMMABLE SRS
CONTACT WITH ACID, WATER, OR HEAVYMETALS SUCH AS COPPER, LEAD, OR MERCURY, MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F. FOR PROPER HANDLING, STORAGE, AND DISPOSAL PROCEDURES REFER TO THE ACURA SERVICE MANUAL, 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) AIR INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

Wiring Locations

CAUTION: Make sure all SRS ground locations are clean and grounds are securely attached.

NOTE:

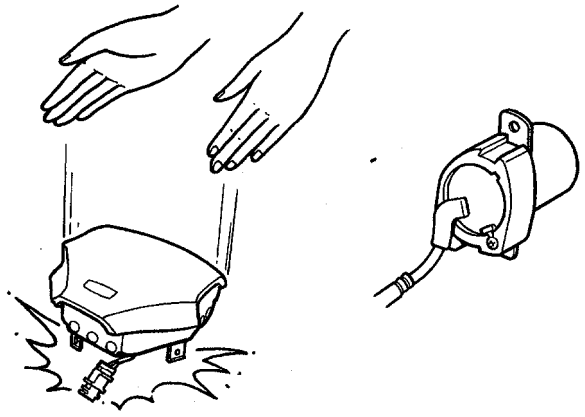
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.



General Precautions

1. Carefully inspect any SRS part before installing. **Do not install any part that shows signs of being dropped or improperly handled, such as dents,** cracks or deformation:

   - Airbag assy.
   - **Dash sensors.**
   - **Cable reel.**
   - **SRS unit.**



2. **Use only the digital multimeter** (KS—AHM—32—003) **to check the system. If using an analog circuit tester, it may cause an accidental deployment** and possible injury.

3. **Do not install used SRS parts from another car.** When repairing, use only new SRS parts.

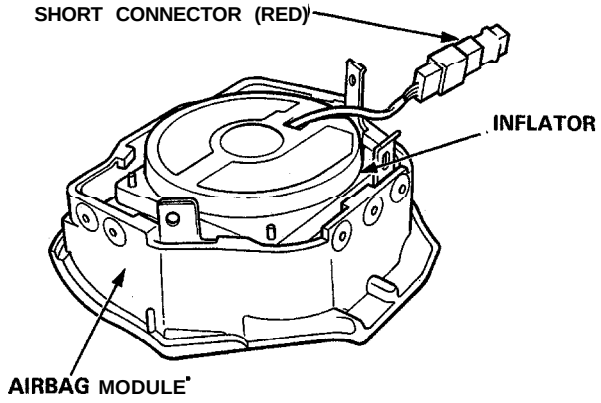
4. **Except when performing electrical inspections, always disconnect both the negative cable and** positive cable at the battery before begining work.

5. Replacement of the lighting and wiper combination **switches and cruise control switch can be done** without removing the steering wheel:

   - **Lighting and wiper combination switch replacement, see section 23.**
   - **Cruise control switch replacement, see section 23.**

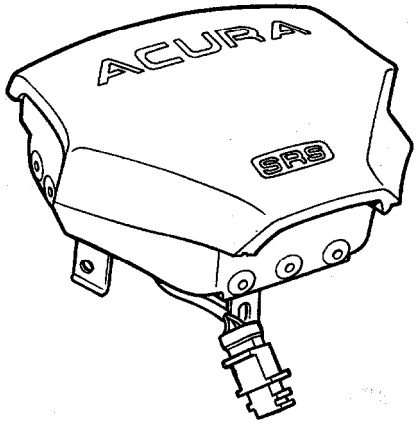
Airbag Assembly

Do not try to disassemble the airbag assembly. There are not separately 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:

1. **Store the removed airbag assembly with the pad** surface up.



⚠ WARNING If the **airbag** is improperly stored face down, accidental deployment could propel the unit with enough' force to cause serious injury.

2. Store the removed airbag assembly on a secure flat **surface away from any high heat source (ex**ceeding 1 00°C/21 2°F) and free of any oil, grease, detergent or water.

CAUTION: Improper handling or storage can internally damage the airbag assembly, making it inoperative.

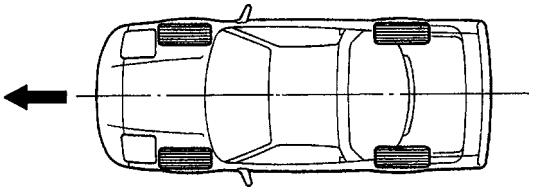
If you suspect the airbag assembly has been damaged, install a new unit and refer to the Deployment/Disposal Procedures for scrapping of the damaged **airbag.**

Precautions/Procedures

Steering

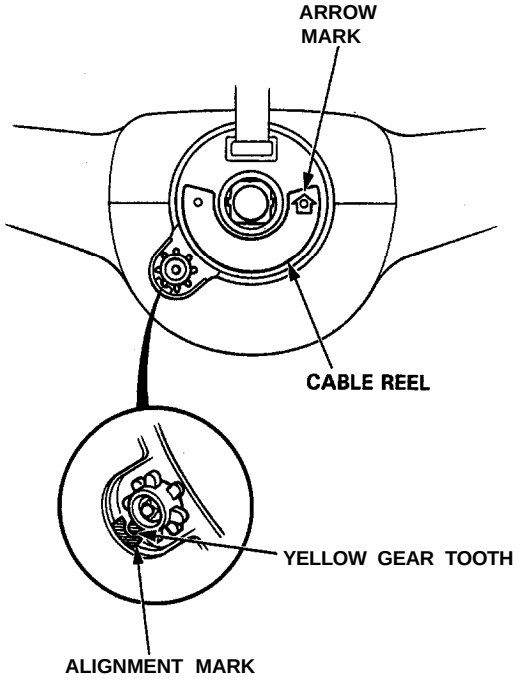
1. Steering Wheel and Cable Reel Alignment:

NOTE: To avoid misalignment of the steering wheel or airbag on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



Rotate the cable reel clockwise until it stops. **Then rotate it counterclockwise (approximately two turns) until:**

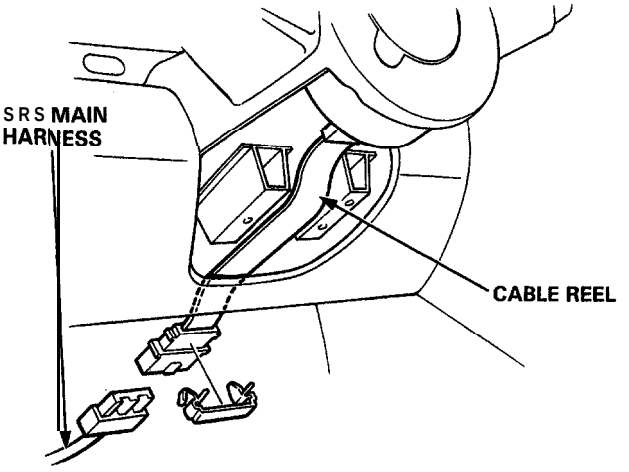
- The yellow gear tooth lines up with the mark on the cover.
- The arrow on the cable reel label points straight up.



2. Steering Column Removal:

CAUTION:

- **Before removing the steering column, first disconnect the connector between the cable reel and the main SRS harness.**
- **If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to O-LOCK position or remove the key from the ignition so that the steering wheel will not turn round.**



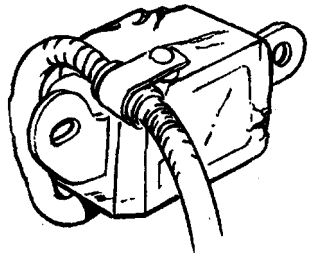
3. Steering wheel:

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).

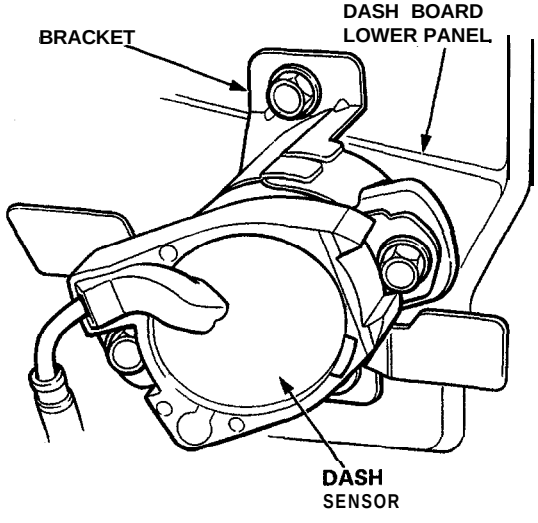
4. After reassembly confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie rods, not by removing and repositioning the steering wheel.

Sensor inspection

1. After any degree of frontal body damage, inspect both dash sensors.
   Replace a sensor if there are any signs of deuts, cracks or deformation.



2. Be sure the sensors are installed securely.



CAUTION: Take extra care when painting or doing body work on any part of the dashboard lower panel. Avoid direct exposure of the sensors or wiring to heat guns, welding or spraying equipment.

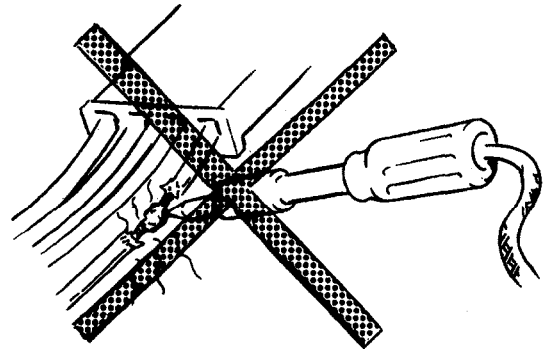
⚠ WARNING

- **Disconnect both the negative and positive battery cables.**
- **Install the short connector before performing work on the dashboard lower panel or the SRS sensors.**

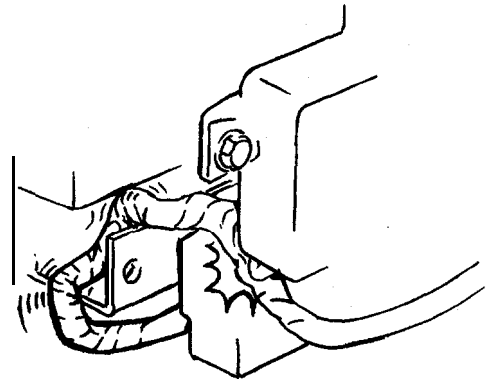
Wiring

1. Never attempt to modify, splice or repair SRS wiring.

   NOTE: SRS wiring can be identified by special yellow outer protective covering.



2. Be sure to install the harness wires so that they are not pinched or interfering with other car parts.



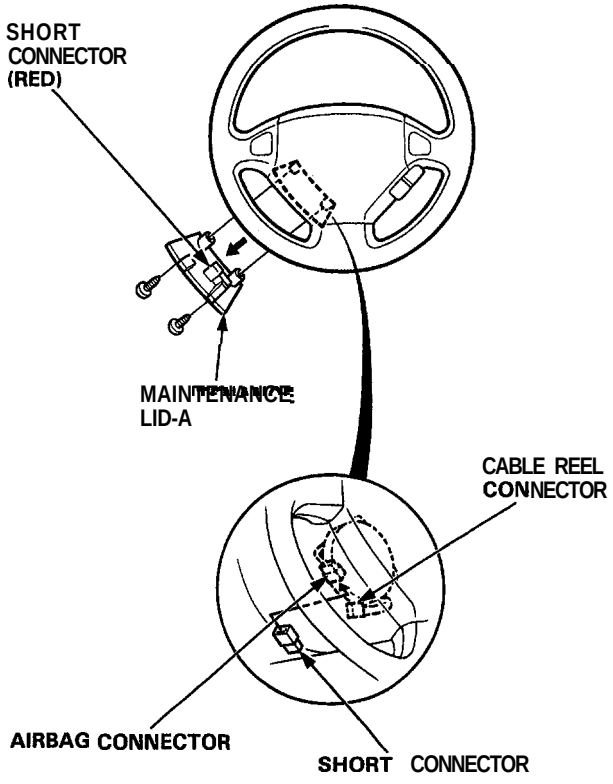
3. Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

(cont'd)

4. installing Short Connector:

⚠WARNING To avoid accidental deployment and possible injury always install the protective short connector on the inflator connector when the harness is disconnected.

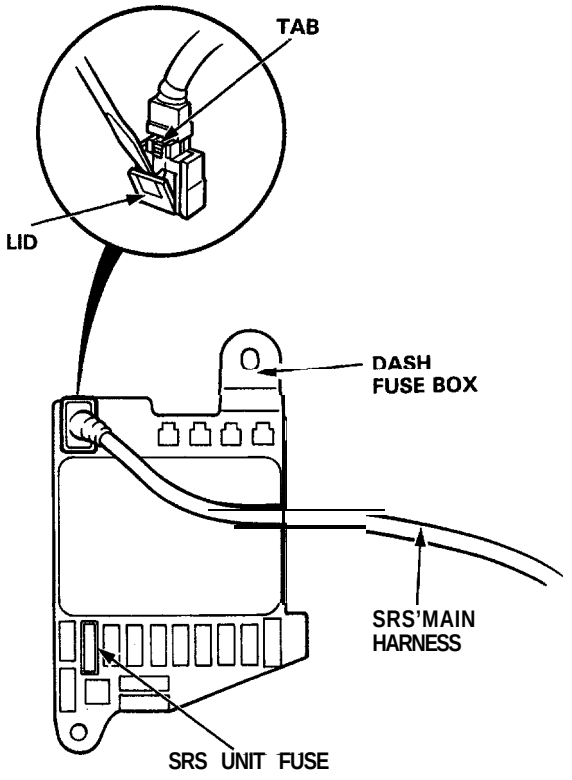
① Disconnect both the negative cable and positive cable from battery.
② **Remove maintenance lid A below the airbag,** then remove the red short connector.
③ **Disconnect the connector between the airbag** and cable reel.
④ **Connect the short connector to the airbag side** of the connector.
⑤ **Reconnect both the positive cable and negative** cable to battery.



5. Removing the connectors at the fuse box:

CAUTION: Avoid breaking the double-locked connectors on the fuse box.

The connectors are double-locked; to remove them, first lift the connector lid with a thin screwdriver, then press the connector tab down and pull the connector out.
To reinstall a connector, push it into position until it clicks, then close the connector lid.



Special Tools

Individual tool lists are located at the front of each section.

specs

Specifications

Standards and Service Limits 3-2
Design Specifications 3-l 1

Standards and Service Limits

Cylinder Head/Valve Train — Sections 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	200 rpm and wide open throttle kPa (kg/cm², psi)	Nominal	1,373 (14.0, 199)	
		Minimum	981 (10.0, 142)	
		Maximum variation	196 (2, 28)	
Cylinder head	Warpage		—	0.05 (0.002)
	Height		150.95-I 51.05 (5.9429-5.9468)	—
Camshaft	End play		0.05-o. 15 (0.002-0.006)	0.5 (0.02)
	Oil clearance		0.050-0.089 (0.002-0.004)	0.15 (0.006)
	Runout		0.015 (0.0006)	0.03 (0.0012)
	Cam lobe Height	M/T IN Primary	37.086 (1.4601)	—
		Mid	38.037 (1.4975)	—
		Secondary	37.326 (1.4695)	—
		EX Primary	36.559 (1.4393)	—
		Mid	37.398 (1.4724)	—
		Secondary	36.741 (1.4465)	—
		A/T IN Primary	37.266 (1.4672)	
		Mid	37.665 (1.4825)	—
		Secondary	37.504 (1.4765)	—
		EX Primary	36.559 (1.43931	—
		Mid	37.398 (1.4724)	—
		Secondary	36.741 (1.4465)	—
Valve	Valve clearance	IN	0.15-o. 19 (0.006-0.007)	—
		EX	0.17-0.21 (0.007-0.008)	—
	Valve stem O.D.	IN	5.475-5.485 (0.2156-0.2159)	5.445 (0.2144)
		EX	5.45-5.46 (0.2146-0.21591	5.42 (0.2134)
	Stem-to-guide clearance	IN	0.025-0.055 (0.001-0.002)	0.008 (0.003)
		EX	0.05-0.08 10.002-0.0031	0.11 (0.04)
Valve seat	Width	IN	0.80-I .00 (0.031-0.039)	1.5 (0.059)
		EX	1.25-1.55 (0.049-0.061)	2.0 (0.079)
	Stem installed height	IN	41.55-42.35 (1.6358-1.6673)	42.435 (1.6707)
		EX	41.55-42.35 (1.6358-1.6673)	42.435 (1.6707)
Valve spring	Free length	M/T IN Outer	43.23 (1.7020) *1	42.40 (1.6693)
			43.24 (1.7024) *2	
		Inner	39.79 (1.5665) *1	39.02 (1.5362)
			39.82 (1.5667) *2	
		EX	46.00 (1.8110) *1	45.12 (1.7763)
			45.98 (1.8102) *2	
		A/T IN	44.59 (1.7555) *1	43.73 (1.72171
			44.60 (1.7559) *2	
		EX	47.40 (1.8661) *1	46.69 (1.8303)
			47.43 (1.8673) *2	
Valve guide	I.D.	IN and EX	5.51-5.53 (0.2169-0.2177)	5.53 (1.5610)
	Installed height	IN and EX	13.75-14.25 (0.5413-1.5610)	14.50 (0.5709)
Rocker arm	Arm-to-shaft clearance	Primary and Secondary IN and EX	0.025-0.052 (0.001 O-0.0020)	0.008 (0.003)
		Mid IN and EX	0.024-0.053 (0.0009-0.0021)	0.008 (0.003)

*1: NIPPON HATSUJO made, *2: CHUO HATSUJO made.
M/T: Manual Transmission A/T: Automatic Transmission

Unit of length: mm (in)

Engine Block – Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Wapage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter		90.00-90.02 (3.5433-3.5441)	90.07 (3.5461)
	Bore taper		—	0.05 (0.002)
	Reboring limit		—	0.5 (0.02)
Piston	Skirt O.D. (at 17 mm (0.67 in) from bottom of skirt)	A	89.986-90.004 (3.5427-3.5434)	89.97 (3.5421)
		B	89.976-89.994 (3.5424-3.5431)	89.96 (3.5417)
	Clearance in cylinder			0.0825 (0.0032)
	Groove width (for ring)	Top	1.22-I .23 (0.0480-0.0484)	1.25 (0.0492)
		Second	1.22-I .23 (0.0480-0.0484)	1.25 (0.0492)
		Oil	2.805-2.820 (0.1104-O. 1110)	2.84 (0.11181
Connecting rod	End play installed on crankshaft		0.15-0.30 (0.006-0.012)	0.40 (0.018)
Piston ring	Ring-to-groove clearance	Top	0.030-0.055 (0.001-0.002)	0.13 (0.005)
		Second	0.030-0.055 (0.001-0.002)	0.13 (0.005)
	Ring end gap	Top	0.25-0.40 (0.010-0.016)	0.60 (0.024)
		Second	0.35-0.50 (0.014-0.020)	0.75 (0.03)
		Oil	0.20-0.70 (0.008-0.028)	0.80 (0.03)
Crankshaft	Main journal diameter		63.976-64.000 (2.5187-2.5197)	
	Taper/out-of-round, main journal		0.005 (0.0002) max.	0.01 (0.0004)
	Rod journal diameter		49.976-50.000 (1 .9676-1 .9685)	
	Taper/out-of-round, rod journal		0.004 (0.0002) max.	0.006 (0.0002)
	End play		0.01 o-o.35 (0.004-0.014)	0.45 (0.018)
	Runout		0.015 (0.0006) max.	0.03 (0.0012)
Bearings	Main bearina-to-iournal oil clearance		0.024-0.048 (0.0009-0.0019)	0.05 (0.002)
	Rod bearing-to-journal oil clearance		0.04-0.06 (0.0016-0.0024)	0.06 (0.0036,

Standards and Service Limits

Engine Lubrication — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Cpacity ℓ (US qt, Imp qt)	6.3 (6.7, 5.5) for engine overhaul 5.0 (5.3, 4.4) for oil-change, including filter	
Oil pump	Displacement ℓ (US gal, Imp gal)/min @rpm	68 (18.0, 15.0) @6,000	
	Inner-to-outer rotor radial clearance Pump body-to-outer rotor radial clearance Pump body-to-outer rotor side clearance	0.02-o. 18 (0.0008.-0.0070) 0.1 o-o. 19 (0.0040-0.0075) 0.02-0.07 (0.001-0.003)	0 . 2 (0.008) 0.2 (0.008) 0.12 (0.005)
Relief valve	Pressure setting 80°C (176°F) at idle kPa (kg/cm², psi) at 3,000 rpm	69 (0.7, 10) min. 343 (3.5, 50) min.	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt. Imp qt) (including engine, heater, cooling line and expansion tank) expansion tank capacity 2.1 ℓ (2.2 US qt. 1.8 Imp qt)	M/T: 16.0 (17.0, 14.1) for overhaul 12.0 (12.7, 10.6) for coolant change A/T: 16.5 (17.4, 14.5) for overhaul 12.0 (12.7, 10.6) for coolant change
Expansion tank cap	Opening pressure kPa (kg/cm², psi)	93-I 23 (0.95-I .25, 14-18)
Thermostat	Start to open °C (°F) Fully open °C (°F) Valve lift at fully open	76-80 (1 69-I 76) 90 (194) 10 (0.39) min.
Water pump	Displacement ℓ (US gal, Imp gal)/min @rpm	150 (39.6, 33.0) @6,000
Cooling fan	Thermoswitch "ON" temperature (LOW) °C (°F) Thermoswitch "OFF" temoerature (LOW) °C (°F) Thermoswitch "ON" temperature (HIGH) °C (°F) Thermoswitch "OFF" temperature (HIGH) °C (°F)	84 ± 1.2 (183 ± 2) Subtract 6 ± 2 (11 ± 3) from the actual "ON" temperature (LOW) 90 ± 1.2 (194 ± 2) Subtract 6 ± 2 (11 ± 3) from the actual "ON" temperature (HIGH)

M/T: Manual Transmission A/T: Automatic Transmission

Unit of length: mm (in)

– Fuel and Emission – Section 11

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure kPa (kg/cm^2, psi) Displacement cc (US oz, Imp oz)/minimum in 10 seconds Relief valve opening pressure kPa (kg/cm^2, psi)	343 (3.5, 50) 333 (11.3, 9.4) 490-637 (5.0-6.5, 71-92) @ 12 V
Pressure regurator	Pressure kPa (kg/cm^2, psi)	323-363 (3.30-3.70, 47-53)
Fuel tank	Capacity ℓ (US gal, Imp gal)	70 (18.5, 15.4)
Engine	Fast idle rpm	I,IOO-1,900
	Idle speed rpm (with headlight and cooling fan off)	M/T 800 ± 50 A/T 750 ± 50 fin gear)
	Idle CO % min.	0.1%

– Clutch – Section 12

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor Stroke Pedal play Disengagement height to floor	186.4 (7.32) 130-I 35 (5.12-5.32) 9-15 (0.35-0.59) 92 (3.62) min.	
Pressure plate	Disc surface runout	0.03 (0.001) max.	0.15 (0.006)
1st clutch disc	Thickness Rivet head depth	8.3-9.0 (0.33-0.35) 1.1 (0.04) min.	5.9 (0.23) 0.5 (0.02)
2nd clutch disc	Thickness Rivet head depth	7.6-8.3 (0.30-0.33) 1.1 (0.04) min.	5.4 (0.21) 0 . 5 (0.02)
Mid plate	Disc surface runout	0.05 10.002)	0.15 (0.006)
Flywheel	Clutch surface runout	0.05 (0.002)	0.15 (0.006)

Standards and Service Limits

Manual Transmission — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.8 (3.0, 2.5) for overhaul 2.7 (2.9, 2.4) for oil change	
Mainshaft	Diameter of ball bearing contact area (transmission housing side)	30.984-31 .OOO (1.2198-1.2205)	30.93 (1.2177)
	Diameter of needle bearing contact area	42.984-43.000 (1 .692-1 .693)	42.93 (1.690)
	Diameter of ball bearing contact area (clutch housing side)	32.002-32.018 (1.260-1.261)	31.95 (1.258)
	Runout	0.02 (0.001) min.	0.05 (0.002)
	End play	0.14-0.21 (0.006-0.008)	Adjust with a shim.
Mainshaft 3rd gear	I.D.	49.009-49.025 (1.9295-I .9301)	49.08 (1 .9323)
	End play	0.06-0.23 (0.002-0.009)	0.3 (0.012)
	Thickness	35.92-35.97 (1.414-1.416)	35.80 (1.409)
Mainshaft 4th gear	I.D.	49.009-49.025 (1.9295-I .9301)	49.08 (1.9323)
	End play	0.06-0.21 (0.002-0.009)	0.3 (0.012)
	Thickness	35.92-35.97 (1 .414-1 .416)	35.80 (1.409)
Mainshaft 5th gear	I.D.	47.009-47.025 (1 .8507-1 .8513)	47.08 (1.8535)
	End play	0.06-0.21 (0.002-0.009)	0.3 (0.012)
	Thickness	34.92-34.97 (1.375-1.377)	34.80 (1.370)
Spacer collar (Mainshaft)	I.D.	36.002-36.012 (1 .417-1 .418)	36.06 (1.420)
	O.D. 4th gear side	42.989-43.000 (1.692-1.693)	42.94 (1.691)
	O.D. 5th gear side	41.989-42.000 (1 .653-1 .654)	41.94 (1.652)
	Length 4th gear side	29.53-29.58 (1.163-1.165)	29.51 (1.162)
	Length 5th gear side	28.53-28.58 (1.123-1.125)	28.51 (1.122)
Countershaft	Diameter of needle bearing contact area (clutch housing side)	43.974-43.990 (1.731-1.732)	43.92 (1.729)
	Diameter of needle and ball bearing contact area (transmission housing side)	33.984-34.000 (1.338-1 .339)	33.93 (1.336)
	Runout	0.02 (0.001) min.	0.05 (0.002)
Countershaft 1 st gear	I.D.	60.510-60.529 (2.382-2.383)	60.58 (2.385)
	End play (when tightened by the specified torque)	0.04-o. 10 (0.002-0.004)	Adjust with a washer.
Countershaft 2nd gear	I.D.	57.010-57.029 (2.244-2.245)	57.08 (2.247)
	End play (when tightened by the specified torque)	0.04-o. 10 (0.002-0.004)	Adjust with a collar.
Countershaft reverse gear	Diameter of needle bearing contact area	54.487-54.500 (2.145-2.146)	54.43 (2.143)
Spacer collar (Countershaft)	I.D.	43.046-43.056 (1.6947-1.6951)	43.10 (1.697)
	O.D.	51.087-52.000 (2.01 I-2.047)	51.03 (2.009)
Reverse idler gear shaft	I.D.	21.987-22.000 (0.8656-0.8661)	21.93 (0.8634)
Reverse driven gear and reverse drive gear	I.D.	28.007-28.020 (1.1026-I. 1031)	28.07 11.1051)

Manual Transmission — Section 13

Unit of length: mm (in)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Oil pump	Driven gear boss-to-transmission housing clearance	0.3-0.8 (0.01-0.03)	0.9 (0.04)
	Driven gear thickness	17.0-17.1 (0.669-0.673)	16.9 (0.665)
	Inner-to-outer rotor radial clearance	0.14 (0.006)	0.20 (0.008)
	Pump body-to-outer rotor radial clearance	0.1-0.2 (0.004-0.008)	0.22 (0.009)
	Pump body-to-outer rotor side clearance	0.03-0.10 (0.001-0.004)	0.15 (0.006)
Svncro ring	Ring-to-gear clearance (ring pushed against gear)	0.85-I. 10 (0.034-0.043)	0.4 (0.016)
Shift fork	Finger thickness — 1st/2nd shift fork	8.9-9.0 (0.350-0.354)	—
	3rd/4th shift fork	7.4-7.5 (0.29-0.30)	—
	5th shift fork	6.4-6.5 (0.25-0.26)	
	Reverse shift fork	6.4-6.5 (0.25-0.26)	—
	Finger-to-syncro sleeve clearance	O-45-0.65 (0.018-0.026)	1 .o (0.039)
Reverse shift arm	Arm-to-Bthlreverse shift piece clearance	0.05-0.30 (0.002-0.012)	0.5 (0.02)
	Groove width	7.05-7.20 (0.278-0.283)	—
	Arm-to-reverse shift fork clearance	0.05-0.35 (0.002-0.014)	0.5 (0.02)
	Diameter (at the contact point with the reverse shift fork)	12.8-13.0 (0.504-0.512)	
Shift arm	Arm-to-shift piece clearance	0.05-0.25 (0.002-0.0101	0.5 (0.02)
	Diameter (at the contact point with the shift piece)	12.9-13.0 (0.508-0.512)	—
Interlock	Interlock-to-select arm clearance	0.03-o. 15 (0.001-0.006)	—
	Diameter (at the contact point with the select arm)	11.95-I 2.00 (0.470-0.472)	—
Shift piece	Shift piece-to-shift forks and 5th/reverse shift piece clearance	0.2-0.5 (0.008-0.020)	0.6 (0.024)
	Diameter (at the contact point with the shift forks and 5th/reverse shift piece)	11.9-12.0 (0.460-0.472)	—

Standards and Service Limits

Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	7.0 (7.4, 6.2) for overhaul 2.9 (3.1, 2.6) for fluid change	
Hydraulic pressure kPa (kg/cm², psi)	Line pressure at 2,000 rpm D or 1	834-883 (8.5-9.0, 121-I 28)	785 (8.0, 114)
	1st clutch pressure at 2,000 rpm D or 1		
	2nd clutch pressure at 2,000 rpm D	490 (5.0, 71) throttle fully closed	441 (4.5, 64) throttle fully closed
	3rd clutch pressure at 2,000 rpm D	883 (9 0 129) throttle' more than 1.5/8 opened	785 (8 0 114) throttle' more than 1.5/8 opened
	4th clutch pressure at 2,000 rpm D		
	1st hold clutch pressure at 2,000 rpm 1	834-883 (8.5-9.0, 121-128)	785 (8.0, 114)
	2nd clutch pressure at 2,000 rpm 2		
	3rd clutch pressure at 2,000 rpm 3		
	4th clutch pressure at 2,000 rpm R		
	Throttle pressure Throttle fully closed	O-I 5 (O-0.1 5, O-2)	—
	Throttle fully open	590-657 (6.1-6.7, 87-95)	—
Stall speed rpm	Check with car on level ground	1,950-2,250	—
Clutch	Clutch initial clearance 1 st-hold	0.7-0.9 (0.028-0.035)	—
	1st	O-65-0.85 (0.026-0.033)	—
	2nd, 3rd, 4th	0.075-0.95 (0.030-0.037)	—
	Clutch return spring free length		
	1st	41.4 (1.630)	39.4 (1.551)
	2nd, 3rd, 4th	33.0 (1.299)	31.0 (1.220)
	Clutch disc thickness Ist-hold, Ist, 2nd, 3rd	1.88-2.00 (0.074-0.079)	Until grooves wone out.
	4th	2.28-2.40 (0.090-0.094)	Until grooves wone out.
	Clutch plate thickness 1 St-hold, 1 st	1.95-2.05 (0.077-0.081)	Discoloration
	2nd, 3rd, 4th	2.25-2.35 (0.089-0.093)	
	Clutch end plate thickness* 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 (0.108-0.1 IO)	
	Mark 9	2.85-2.90 (0.112-O. 114)	Discoloration
Valve body	Stator shaft needle bearing contact I.D. (torque converter side)	28.000-28.021 (1.102-1.103)	Wear of damage
	Stator shaft needle bearing contact I.D. foil pump side)	31.000-31.013 (1.220-1.221)	—
	Oil pump driven gear I.D.	14.016-14.034 (0.552-0.553)	Wear of damage
	Oil pump shaft O.D.	13.980-13.990 (0.550-0.551)	wear of damage
	Oil pump gear side clearance	0.03-0.05 (0.001-0.002)	0.07 (0.003)
	Oil pump gear-to-body clearance Drive	0.210-0.265 (0.008-0.010)	—
	Driven	0.070-0.125 (0.003-0.005)	—
Regurator valve body	Sealing ring contact I.D.	37.000-37.025 (1 .457-1 .458)	37.05 (1.459)

* Clutch end plate diameter: 1st 116 mm
Ist-hold, 2nd, 3rd and 4th 120 mm

— Automatic Transmission (cont'd) — Section 14

Unit of length: mm (i

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
2nd accumulator body	Sealing ring contact I.D.	35.000-35.025 (1.378-1.379)	35.05 (1.380)
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 racher pawl	—	Wear or other defect
	Parking brake gear	—	Wear or other defect
Servo body	Shift fork shaft bore I.D. A	14.000-14.005 (0.5512-0.5513)	—
	B	14.006-14.010 (0.5514-0.5516)	—
	C	14.011-14.015 (0.5516-0.5518)	—
	Shift fork shaft valve bore I.D.	37.000-37.039 (1.457-1.458)	37.045 (1.4459)
Transmission	Diameter of needle bearing contact area		
	On mainshaft and stator shaft	23.980-23.993 (0.944-0.945)	Wear or damage
	On mainshaft 4th gear collar	33.975-33.991 (1.3376-I .3382)	
	On mainshaft 1st gear collar	32.975-32.991 (1.298-1.299)	
	On countershaft (right side)	41.005-41.015 (1.614-1.615)	
	On countershaft 3rd gear collar	43.975-43.991 (1.731-1.732)	
	On countershaft 4th gear	34.975-34.991 (1.377-1.378)	
	On countershaft reverse gear collar	36.975-36.991 (1.4557-1.4567)	
	On countershaft 1st gear collar	33.975-33.991 (1.3376-1.3382)	
	On secondaryshaft 2nd gear	36.975-36.991 (1.4557-1.4567)	
	On reverse idler gear shaft	13.990-14.000 (0.5507-0.5512)	
	Reverse idler shaft holder I.D.	14.416-14.434 (0.5676-0.5683)	Wear or damage
	Inside diameter		
	Mainshaft 1st gear	38.000-38.016 (1.496-1.497)	Wear or damage
	Mainshaft 4th gear	40.000-40.016 (1.5748-1.5754)	
	Countershaft 1 st gear	40.000-40.016 (1.5748-1.5754)	
	Countershaft reverse gear	43.000-43.016 (1.693-1.694)	
	Countershaft 4th gear	41.000-41.016 (1.614-1.615)	
	Countershaft 2nd gear	Involuted spline	
	Countershaft 3rd gear	52.000-52.019 (2.0472-2.0480)	
	Secondary shaft 2nd gear	43.000-43.016 (1.693-I .694)	
	Reverse idler gear	18.007-18.020 (0.7089-0.7094)	Wear or damage
	Mainshaft 1st gear collar length	35.00-35.05 (1.358-I .380)	—
	Mainshaft 1st gear collar flange thickness	2.95-3. 10 (0.116-o. 122)	Wear or damage
	Countershaft reverse gear collar length	16.00-I 6.05 (0.630-0.632)	—
	Countershaft reverse gear collar flange thickness	2.95-3.05 (0.116-O. 120)	Wear or damage
	Diameter of countershaft one-way clutch contact area	88.869-88.895 (3.499-3.410)	Wear or damage
	Diameter of parking gear one-way clutch contact area	72.212-72.225 (2.8429-2.8435)	Wear or damage
	Mainshaft feed pipe O.D.	11.47-I 1.48 (0.4516-0.4520)	11.45 (0.451)
	Mainshaft feed pipe O.D.	5.97-5.98 (0.2350-0.2354)	5.95 (0.2343)
	Mainshaft sealing ring 37 mm thickness	1.980-I .995 (0.078-0.079)	1.80 (0.071)
	Mainshaft bushing I.D.	6.018-6.030 (0.2369-0.2374)	6.045 (0.238)
		11.500-I 1.518 (0.4528-0.4535)	11.53 (0.454)
	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)
	Countershaft bushing I.D.	8.000-8.015 (0.315-0.316)	8.03 (0.316)
		11.500-I 1.518 (0.4528-0.4535)	11.53 (0.454)
	Secondary shaft sealing ring 35 mm thickness	1.980-I .995 (0.078-0.079)	1.80 (0.071)
	Mainshaftsealing ring groove width	2.025-2.060 (0.080-0.081)	2.08 (0.082)
	Secondary shaft sealing ring groove width	2.025-2.060 (0.080-0.081)	2.08 (0.082)

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Selector hub O.D.		55.67-55.70 (2.192-Z. 193)	Wear or damage
	Thrust washer thickness			
	Mainshaft 4th gear right side		4.45-4.55 (0.175-O. 179)	Wear or damage
	Mainshaft 4th gear left side		3.45-3.55 (0.136-o. 140)	Wear or damage
	Mainshaft 1st gear right side		1.45-1.50 (0.057-0.059)	1.40 (0.055)
	Mainshaft 1st gear left side		2.43-2.50 (0.096-0.098)	Wear or damage
	Countershaft 3rd gear collar length	1	35.425-35.440 (1.3947-I .3952)	—
		2	35.440-35.455 (1.3952-1.3959)	—
		3	35.455-35.470 (1.3959-1.3965)	—
		4	35.470-35.485 (1.3965-1.3970)	—
		5	35.485-35.500 (1.3970-I .3976)	—
		6	35.500-35.515 (1.3976-I .3982)	—
	Countershaft spacer length		17.90-I 7.95 (0.705-0.707)	—
	Cotter thickness	1	1.975-2.000 (0.078-0.079)	—
		2	2.000-2.025 (0.078-0.080)	—
		3	2.025-2.050 (0.080-0.081)	
		4	2.050-2.075 (0.081-0.082)	—
		5	2.075-Z. 100 (0.082-0.083)	—
		6	2.100-Z. 125 (0.083-0.084)	—
		7	2.125-Z. 150 (0.084-0.085)	—
		8	2.150-Z. 175 (0.085-0.086)	—
		9	2.175-2.200 (0.086-0.087)	
		10	2.200-2.225 (0.087-0.088)	—
		11	2.225-2.250 (0.088-0.089)	
		12	2.250-2.275 10.089-0.090)	—
		13	2.275-2.300 (0.090-0.091)	
		14	2.300-2.325 (0.091-0.092)	—
		15	2.325-2.350 (0.092-0.093)	
		16	2.350-2.375 (0.093-0.094)	—
	Cotter retainer thickness	1	3.00-3.03 (0.118-O. 119)	—
		2	3.03-3.06 (0.119-O. 120)	—
		3	3.06-3.09 (0.120-O. 122)	—
		4	3.09-3.12 (0.122-0.123)	—
	Countershaft reverse gear thrust washer thickness		1.45-1.50 (0.057-0.059)	1.40 (0.055)
	Countershaft 1st gear spacer length		62.50-62.55 (2.461-2.463)	—
	Thrust washer thickness			
	Countershaft 1st gear right side		3.43-3.50 (0.135-o. 138)	Wear or damage
	Secondary shaft 2nd gear		4.45-4.55 (0.175-O. 179)	Wear or damage
	Secondary shaft spacer length		33.00-33.05 (1 .299-1 .301)	—
	End play			
	Mainshaft 4th gear		0.10-0.22 (0.004-0.009)	—
	Mainshaft 1st gear		0.08-0.33 (0.003-0.013)	—
	Countershaft 3rd gear		o-0.03 (0-0.001)	Adjust with a 3rd gear
	Countershaft 2nd gear		o-0.05 (0-0.002)	collar or a cotter
	Countershaft 4th gear		0.05-o. 16 (0.002-0.006)	Adjust with a cotter retainer
	Countershaft reverse gear		0.10-0.25 (0.004-0.010)	—
	Countershaft 1st gear		0.10-0.31 (0.004-0.012)	—
	Secondary shaft 2nd gear		0.01-0.11 (0.0004-0.0043)	—
	Reverse idler gear		0.05-o. 18 (0.002-0.007)	—

Unit of length: mm (in)

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Spring	Idle shaft spring A	0.7 (0.028)	5.7 (0.224)	14.6 (0.575)	7.0
	Servo detent spring	1 .o (0.039)	7.6 (0.299)	14.8 (0.583)	5.5
	Regulator valve spring A	1.58 x 2.0 (0.062 X 0.079)	14.7 (0.579)	88.6 (3.488)	20.9
	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	14.7
	Stator reaction spring	6.0 (0.236)	38.4 (1.512)	30.3 (1.193)	2.0
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7
	Relief valve spring	1.1 (0.043)	8.4 (0.331)	44.4 (1.748)	19.5
	Cooler relief valve spring	1.2 (0.0471	8.4 (0.331)	35.7 (1.406)	16.5
	Oneway relief valve spring	0.9 (0.035)	6.4 (0.252)	25.1 (0.988)	11.9
	LSD relief valve spring	0.8 (0.031)	8.4 (0.331)	37.3 (1.469)	12.1
	2nd orifice control valve spring	0.8 (0.031)	8.1 (0.319)	47.9 (1.886)	16.0
	3rd orifice control valve spring	0.9 (0.035)	8.6 (0.339)	48.3 (1.902)	16.6
	4th exhaust valve spring	0.6 (0.024)	7.6 (0.299)	24.4 (0.961)	7.9
	Throttle valve spring A/B/C/D	0.9 (0.035)	7.1 (0.280)	29.0 (I.1421	12.6
	1-2 shift valve spring	0.9 (0.035)	8.6 (0.339)	40.4 (1.591)	14.5
	2-3 shift valve spring	0.8 (0.031)	7.0 (0.276)	43.7 (1.720)	21.2
	1 st-hold accumulator spring	3.4 (0.134)	24.3 (0.957)	64.7 (2.547)	6.7
	1 st accumulator spring	2.3 (0.091)	20.0 (0.787)	104.6 (4.118)	14.8
	4th accumulator spring	3.0 (0.118)	18.0 (0.709)	84.5 (3.327)	12.8
	2nd accumulator spring	3.3 (0.130)	20.2 (0.795)	78.0 (3.071)	11.8
	3rd accumulator spring	3.2 (0.126)	19.0 (0.748)	88.6 (3.488)	14.3
	Lock-up shift valve spring	1 .0 (0.039)	8.6 (0.339)	51.3 (2.020)	19.8
	Lock-up timing B spring	0.8 (0.031)	5.6 (0.220)	27.8 (1.094)	16.4
	Lock-up control valve spring A/B/C	0.8 (0.031)	6.6 (0.260)	38.3 (1.508)	25.0
	Servo control valve spring	1 .o (0.039)	8.1 (0.319)	53.5 (2.106)	20.8
	Modulator valve spring A/B	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
	CPC valve spring A/B/C	1 .o (0.039)	6.8 10.268)	32.1 (1.264)	15.6
	4-3 kick down valve spring	0.9 (0.035)	6.6 (0.260)	30.7 il.2091	12.9
	3-2 kick down valve spring	1 .o (0.039)	6.1 (0.240)	27.1 (1.067)	13.4
	2nd exhaust valve spring	1 .o (0.039)	6.1 (0.240)	27.1 (1.067)	13.4

Differential — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Differential carrier	Preset Torque N·m (kg-cm, lb-ft)		0.6-I .4 (6-14, 0.43-I .01)	0.3 (3, 0.3)
Taper roller bearing	Preload N·m (kg-cm, lb-ft)	MIT Reused	2.0-3.0 (20-30, 1.45-2.17)	Adjust with a shim
		A/T New	3.3-4.5 (33-45, 0.73-0.99)	Adjust with a shim
		Reused	3.0-4.2 (30-42, 0.66-0.93)	Adjust with a shim
Clutch disc	Thickness		1.68-1.80 (0.061-0.071)	0.25 (0.01)
Clutch plate	Thickness		2 . 5 5 - 2 . 6 5 (0.100-0.104)	—
Distance between final driven gear and 112mm shim			41.7-41.9 (1.64-1.65)	

M/T: Manual Transmission A/T: Automatic Transmission

Standards and Service Limits

Steering — Section 17

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Play		5.0 (0.2) max.
	Starting force N (kg, lb) MIS		20 (2, 4) min. wheels off the ground
	P/S engine stopped		118 (12, 26) min. } wheels on the ground
	P/S engine running		41 (4.2, 9.3) min. }
Gearbox	Angle of rack guide screw loosened from locked position °	MIS	15°
		P/S	20° +5 0
	Pinion starting preload N·m (kg-cm, lb-ft)	M/S	0.69-I .67 (7-17, 0.51-I .23)
		M/S	0.15-0.25 (1.5-2.5, 0.11-o. 18) (without rack)
		P/S	2.94 (30, 2.17)

M/S: Manual Steering P/S: Power Steering

Suspension — Section 18

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber ° ′ Front at inspection		−0° 20′ ±30′	—
	at adjustment		−0° 20′ ±10′	—
	Rear at inspection		−1° 30′ ±30′	—
	at adjustment		−1° 30′ ±10′	—
	Caster ° ′ Front at inspection		+8° 00′ ±45′	—
	at adjustment		+8° 00′ ±15′	
	Total toe Front		out 3.5 ±1	—
	Rear		In 6.0 ±1	—
	Front wheel turning angle Inward wheel		33° 06′ ±2°	—
	Outward wheel		26° 34′	—
	Side slip Front		Out 6.0 ±1	—
	Rear		In 9.0 ±1	—
Wheel	Rim runout	Axial	O-O.7 (O-0.028)	—
		Radial	O-O.7 (O-0.028)	—
Wheel bearing	End Play	Front	0	0.05 (0.002)
		Rear	0	0.05 (0.002)

Brakes — Section 19

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200 N (20 kg, 44 lb)		To be locked when pulled 1 O-I 4notches	—
Foot brake pedal	Pedal height (with floor mat removed)	M/T	218 (8.58)	—
		A/T	218 (8.58)	—
Master cylinder	Piston-to-oushrod clearance		I-0.4 (O-0.01 6)	—
Disc brake	Disc thickness	Front	28.0 (1.10)	26.0 (1.02)
		Rear	21 .O (0.83)	19.0 (0.75)
	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	9.5 (0.37)	1.6 (0.06)

M/T: Manual Transmission A/T: Automatic Transmission

Unit of length: mm (in)

Air Conditioner — Section 22

	MEASUREMENT		STANDARD (NEW)
Air conditioner system	Lubricant capacity cc (US oz, Imp oz)	Condenser	10 (0.34, 0.28)
		Evaporator	10 (0.34, 0.28)
		Line or hose	10 (0.34, 0.28)
		Reservoir	20 (0.88, 0.56)
Compressor	Lubricant capacity cc (US oz, Imp oz)		60-100 (2.03-3.38, 1.96-2.82)
	Stator coil resistance at 20°C (68°F) Ω		3.4-3.8
	Pulley-to-pressure plate clearance		0.35-0.65 (0.014-0.026)
Compressor belt	Deflection with 98 N (10 kg, 22 lb) between the pulleys		10-12 (0.39-0.47) with used belt 5.5-7.5 (0.22-0.30) with new belt

Electrical — Section 23

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Ignition coil	Rated voltage V		12	
	Primary winding resistance Ω		1.0 ± 10%	
Sprak Plug	Type		See Section 23	
	Gap		1.0-1.1 (0.039-0.043)	
Ignition timing	At idling 0 BTDC		15° ± 2° (Red) BTDC	
Battery	Lighting capacity (5-hour ratio) V-AH	MIT	12-52	
		AK	12-55	
	Starting capacity (5-second ratio) V	M/T	9.2 min.	
	at −15°C (5°F), 300 A draw	A/T	9.4 min./8.8 min.	
Alternator belt	Deflection with 98 N (10 kg, 22 lb-ft) between oullevs		12-14 (0.47-0.55) with used belt 7-9 (0.28-0.35) with new belt	
	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Alternator	Output 13.5 V at hot A @6,000 rpm		110	102
	Coil resistance (rotor) Ω		2.7-3.1	—
	Slip ring O.D.		14.2-14.4	12.8
	Brush length		10.5	3.5
	Brush spring tension g (oz)		300-360 (10.6-12.7)	
Starting motor	Type/Output kW		Reduction/1.6	—
	Mica depth		0.5-0.8 (0.020-0.031)	0.2 (0.008)
	Commutator runout		0-0.02 (0-0.001)	0.05 (0.002)
	Commutator O.D.		29.9-30.0 (1.177-1.181)	29.0 (1.142)
	Brush length		15.0-15.5 (0.590-0.610)	10.0 (0.394)
	Brush sorina tension N (kg, lb)		18.1-23.9 (1.85-2.44, 4.1-5.4)	—

M/T: Manual Transmission A/T: Automatic Transmission

Design Specification

	ITEM		METRIC	ENGLISH	NOTES
Dimentions	Overall Length		4,425 mm	174.0 in	
	Overall Width		1,810 mm	71.3 in	
	Overall Height		1,175 mm	48.3 in	
	Wheelbase		2,530 mm	99.6 in	
	Track F/R		1,510/1,530 mm	59.4/60.2 in	
	Ground Clearance		135 mm	5.3 in	
	Seating Capacity		2		
Weight (USA)	Gross Vehicle Weight Rating (GVWR)		1,610 kg	3,550 lb	
Weight (CANADA)	Gross Vehicle Weight Rating (GVWR)		1,610 kg	3,550 lb	
ENGINE	Type		Water cooled, 4-stroke DOHC with VTEC gasoline engine		
	Cylinder Arrangement		90° V6-cylinder, transverse		
	Bore and Stroke		90.0 x 78.0 mm	3.54 x 3.07 in	
	Displacement		2,977 cm^3 (cc)	181.6 cu in	
	Compression Ratio		10.2		
	Valve Train		Belt driven, double (41 overhead camshafts		
	Lubrication System		Forced and wet sump		
	Fuel Required		Premium UNLEADED grade gasoline with 91 Pump Octane Number (96 R.O.N.) or higher		
STARTER	Type/Makes		Gear reduction/NIPPON DENS0		
	Normal Output		1.6 kW		
	Nominal Voltage		12 v		
	Hour Rating		30 seconds		
	Direction of Rotation		Counterclockwise as viewed from gear end		
	Weight		4.6 kg	10 lb	
CLUTCH	Clutch	M/T	Double plates dry, diaphragm spring		
		A/T	Torque converter		
	Clutch Lining Area	M/T	587.6 cm^2	22.7 sq in	
TRANSMISSION	Transmission	M/T	Synchronized 5-speed forward 1 reverse		
		A/T	Electronically controlled 4-speed automatic; 1 reverse		
	Primary Reduction		Direct 1 : 1		
	Type		Manual	Automatic	
	Gear Ratio	1st	3.071	2.611	
		2nd	1.727	1.551	
		3rd	1.230	1.025	
		4th	0.967	0.684	
		5th	0.771	—	
		Reverse	3.186	1.909	
	Final Reduction	Gear type	Single helical gear		
		Gear ratio	4.062	4.428	

	ITEM	METRIC	ENGLISH	NOTES
AIR CONDITIONER	Cooling Capacity	4,000 Kcal/h	15,872 BTU/h	
	— Conditions:			
	Compressor RPM	1,800 rpm		
	Outside Air Temperature	27 °C	81 °F	
	Outside Air Humidity	50 %		
	Condenser Air Temperature	35 °C	95 °F	
	Condenser Air Velocity	4.5 m/sec	14.8 ft/sec	
	Blower Capacity	420 m^3/h	15,540 cu ftlh	at 12 V
	Compressor Type/Makes	Swash-plate type/NIPPON DENS0		
	No. of Cylinder	10		
	Capacity	155.3 cc/rev	94.7 cu in/rev	
	Max. Speed	7,600 rpm		
	Lubricant Capacity	80 cc	2.7 US oz	
	Condenser Type	Corruaated fin type		
	Evaporator Type	Corrugated fin type		
	Air Temperature	19.5 °C	67 °F	
	Blower Type	Sirocco fan		
	Motor Input	178 W/12 V		
	Speed Control	Infinity variable		
	Max. Capacity	460 m^3/h	16,247 cu ft/h	at 13.5 V
	Temp. control	Air-mix type		
	Comp. clutch Type	Dry, single plate, V-belt drive		
	Power Consumption	40 W/12 V		
	Refrigerant Type	R 12		
	Quantity	9505.8 g	$77,9^{+}_{-1.8}$ lb	
STEERING SYSTEM	Type MIT	Rack and pinion		
	A/T	Electric, power assisted, rack and pinion		
	Overall Ratio M/T	20.8 (18.2-20.8) (Manual variable)		
	A/T	18.6 (Power steering)		
	Turns, Lock-to-Lock	3.24		
	Steering Wheel Dia.	368 mm	14.5 in	
SUSPENSION	Type, Front	Independent double wishbone with compliance pivot, coil spring with stabilizer		
	Type, Rear	Independent double wishbone, coil spring with stabilizer		
	Shock Absorber, Front and Rear	Telescopic, hydraulic nitroaen gas-filled		

M/T: Manual Transmission A/T: Automatic Transmission

(cont'd)

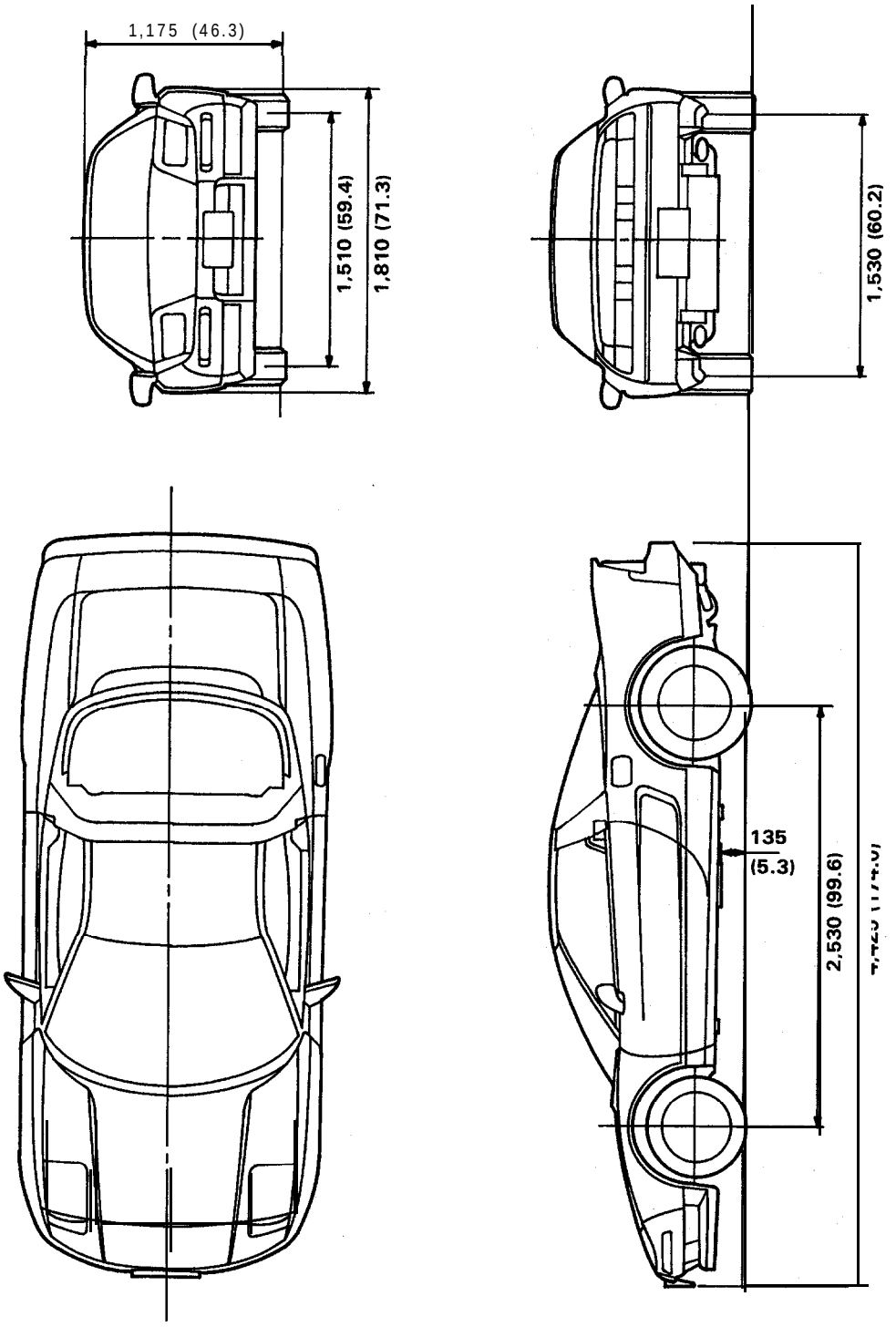
Design Specification

— (Cont'd)

	ITEM	METRIC	ENGLISH	NOTES
WHEEL ALIGNMENT	Camber Front	−0° 20'		
	Rear	−1° 30'		
	Caster	8°		
	Toe Front	Out 3.5 mm	Out 0.14 in	
	Rear	In 8.0 mm	In 0.24 in	
BRAKE SYSTEM	Type, Front and Rear	Power assisted self-adjusting ventilated disc		
	Pad and Lining Surface Area: Front/Rear	58.0/38.8 cm^2	8.99/6.01 sq in	
	Parking Brake Kind and Type	Mechanical expanding, rear two wheel brakes		
TIRE	Size	Front: 205150 ZR 15 Rear: 225150 ZR 16 165/80 D 15 (Folding spare tire)		
ELECTRICAL	Battery	MIT: 12 V-52AH/5HR A/T: 12 V-55AH/5HR		
	Starter	12 V-I.6 kW		
	Alternator	12 V-110 A		
	Fuses In The Fuse Box	7.5 A, 10 A, 15 A		
	In The Relay Box	7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A, 50 A		
	In The Main Fuse Box	7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A, 120A		
	Headlights, High, Low	12 V-65 W, 5 5 W		
	Front Turn Signal Lights	12 V-32 CP		(SAE 1156)
	Front Position Light	12 v-5 w		(SAE 3652)
	Rear Turn Signal Lights	12 v-45 CP		(SAE 3497)
	Stop/Tail Lights	12 V-3212 CP		(SAE 2057)
	Tail Lights	12 v-2 CP		(SAE 194)
	Side Marker Lights Front	12 v-3 CP		(SAE 168)
	Rear	12 v-3 CP		
	Back-up Lights	12 V-32 W		(SAE 1156)
	License Plate Lights	12 V-8 W		
	Gauge Lights	12 v-3.0 w, 1.4 w		
	Indicater Lights	12 V-1.4W		
	Glove Box and Fuse Lights	12 v-3.4 w		
	Dome Lights	12 v-5 w		
	Trunk Lights	12 v-3.4 w		
	Door Courtesy Lights	12 v-3.4 w		
	Footlight	12 v-3.4 w		
	Illumination and Pilot Lights	12 V-I.4 W, 0.84 W 12 V-O.91 W, LED		
	Day Time Running Lights	12 V-32 CP		Canada model only

Body Specifications

Unit: mm (in)



Maintenance

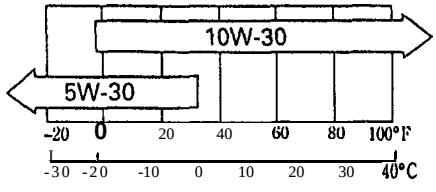
Lubrication Points 4-2
Maintenance Schedule 4-4

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.

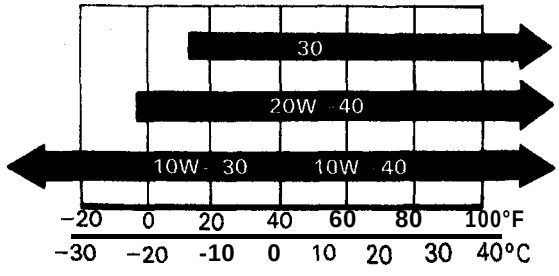
u	o . LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: SG SAE viscosity: 10 W-30 recommended Fuel Efficient Oil: Identified by the words, "Energy Conserving II" SAE Viscosity: See chart below.
2	Transmission Manual Automatic	API Service Grade: SF or SG SAE Viscosity: See chart below. Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON® II type automatic transmission fluid
3	Brake Line (including anti-lock brake system)	Brake fluid DOT3 or DOT4
4	Clutch Line ,	Brake fluid DOT3 or DOT4
5 6	Shift lever pivots (Manual) Release fork (Manual)	Silicone grease with molybdenum disulfide
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	Steering gearbox (Manual) Steering boots Steering column bushings Steering ball joints Select lever (Automatic) Pedal linkage Intermediate shaft Brake master cylinder pushrod Trunk hinges Door hinges upper and lower Door opening detents Fuel filler lid Front hood hinges and latch Clutch master cylinder pushrod Tilt lever Parking brake cable end Throttle cable end Shift cable end and select cable end Rear hatch latch	Multi-purpose grease
26	Caliper Piston seal, Dust seal, Caliper pin, Piston	Silicone grease

Recommended Engine Oil
API Service Grade: SG
Fuel Efficient Oil:
Identified by the words, "Energy Conserving II"

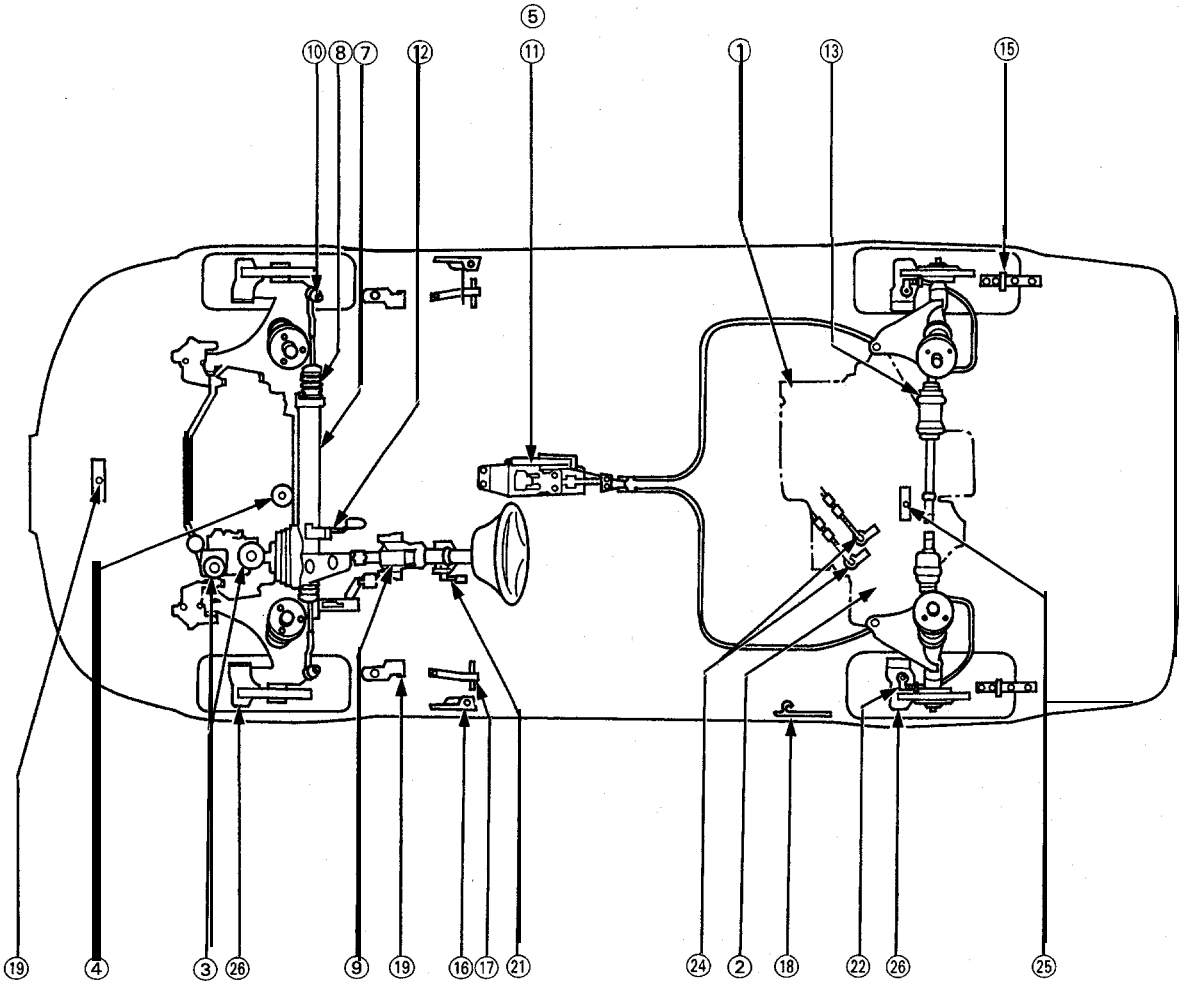


Engine oil viscosity for ambient temperature ranges

Recommended Manual Transmission Oil
API Service Grade: SF or SG



transmission oil viscosity for ambient temperature ranges


⑤
⑩ ⑧ ⑦ ⑫ ⑪ ① ⑬ ⑮
⑲ ④ ③ ㉖ ⑨ ⑲ ⑯ ⑰ ㉑ ㉔ ② ⑱ ㉒ ㉖ ㉕

R = Replace C = Clean I = Inspect After inspection, clean, adjust, repair or replace if necessary.

MAINTENANCE ITEM Service at the interval listed x 1,000 miles (or km) or after that number of months, whichever comes first.	MAINTENANCE INTERVALS												NOTES	SEC & PAGE
	x 1,000 miles	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	
	x 1,000 km	12	24	36	48	60	72	84	96	108	120	132	144	
	months	6	12	18	24	30	36	42	48	54	60	66	72	
Emission Related														
☐ Air cleaner element					R				R				R		11-11:
Idle speed									I					Manual: 800 ± 50 rpm Automatic: 750 ± 50 rpm (in gear)	11-84
Idle CO									I					Check with CO meter	1 1-12
EGR system									I						11-12
Evaporative emission control system									I						1 1-13
Ignition timing									I					15 ± 2° (Red) BTDC	23-91
Positive crankcase ventilation valve									I					If clicking sound is heard as you pinch the PCV hose between the PCV valve and intake manifold, valve is OK.	11-13
Valve clearance (cold)			I		I		I		I		I		I	Intake: 0.15-0.19 mm (0.006—0.007 in) Exhaust: 0.17-0.21 mm (0.007-0.008 in)	6-54
Fuel filter and hoses									R					The rubber fuel hoses need periodic replacement since they are subject to cracks and deterioration during a long period of use.	11-4, 97
Fuel line connections					I*1				I				I	Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or deformed parts.	11-4
Spark plugs									R					NGK: PFR6G-11 ND: PK20PR-L11 Gap: 1.1 mm (0.043 in)	23-96
3 Engine oil	R	R	R	R	R	R	R	R	R	R	R	R	R	5.0 ℓ (5.3 US qt, 4.4 Imp qt) with filter change	8-4
9 Engine oil filter	R	R	R	R	R	R	R	R	R	R	R	R	R		8-5
Alternator drive belt					I*2				I				I	12—14 mm (0.47—0.55 in) @ 98 N (10 kg, 22 lb) tension	23-110
Cooling system hoses and connections					I				I				I		10-2, 3
Radiator coolant							R				R*3			Cooling system capacity Manual: 12.0 ℓ (12.7 US qt, 10.6 Imp qt) Automatic: 12.0 ℓ (12.7 US qt, 10.6 Imp qt) Check specific gravity for freezing point	10-5
Manual transmission oil					R				R				R	2.7 ℓ (2.9 US qt. 2.4 Imp qt)	13-3
Automatic transmission fluid					R				R				R	2.9 ℓ (3.1 US qt, 2.6 Imp qt)	14-94

• Check oil and coolant level at each fuel stop.

☐ Under severe driving conditions, service these items more often.

*1 For cars sold in Carifornia, this service is recommended only; other areas, it is required.

*2 Tension adjustment only.

*3 Thereafter, replace every 2 years or 30,000 miles (48,000 km), whichever comes first.

R = Replace C = Clean I = Inspect After inspection, clean, adjust, repair or replace if necessary.

MAINTENANCE ITEM Service at the interval listed x 1,000 miles (or km) or after that number of months, whichever comes first.	MAINTENANCE INTERVALS												NOTES	SEC & PAGE
	x 1,000 miles	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	
	x 1,000 km	12	24	36	48	60	72	84	96	108	120	132	144	
	months	6	12	18	24	30	36	42	48	54	60	66	72	
Engine (Non-Emission Related)														
Timing belt													R		6-23
Water pump													I		10-11
Catalytic converter heat shield									I					Check condition and tightness	11-127
Exhaust pipe and muffler		I		I		I		I		I		I		Check condition and tightness	9-4
Brakes (Non-Emission Related)															
Front brake pads	I	I	I	I	I	I	I	I	I	I	Min. thickness: 1 .6 mm (0.06 in)				19-10
☐ Front brake discs and calipers		I		I		I		I		I			☐	Min. thickness: 26 mm (1.02 in)	19-10
☐ Rear brake discs, calipers and pads		I		●		I		☐		I			I	Min. thickness: Discs 19 mm (0.75 in) Pads 1.6 mm (0.06 in)	19-18
Brake hoses and lines (including Anti-lock brake system hoses and pipes)		I		I		I		I		I			I	Check for leaks, damage, interference or twisting.	19-26
Parking brake		I		I				I					I	Fully engaged 1 0 to 14 clicks	19-19
Brake fluid (including Anti-lock brake system fluid)				R				R					R	Use only DOT3 or 4 fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-62 19-69
Anti-lock brake system operation				I				I					I	Function test Wheel sensor signal confirmation Anti-lock brake system light circuit	19-41 19-43 19-44
Anti-lock brake system high pressure hose								R						Bleed high pressure fluid	19-62
Steering and Suspension (Non-Emission Related)															
Front wheel alignment		I		I		I		I		I			I		18-6
Steering operation, tie rod ends, steering gearbox and boots		I		I				I					I	Check rack grease and steering linkage. Check the boot for damage or leaking grease.	17-21 17-30
☐ Power steering system		I		I		I		I		I			I		17-31
Suspension mounting bolts		I		I		I		I		I			I	Check tightness of bolts.	18-16, 31

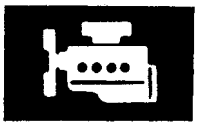
Severe Driving Conditions

Items with an ☐ in the chart will need service more often, if you drive in some severe conditions.

The conditions are:
A. Repeated short distance driving.
B. Dusty conditions.
C. Severe cold weather.
D. Areas with road salt or other corrosive materials.
E. Rough or muddy roads.

The services are:
- Clean the air cleaner element every 7,500 miles (12,000 km) or 6 months and replace every 30,000 miles (48,000 km) or 24 months under condition B or E.
- Replace engine oil and oil filter every 3,750 miles (6,000 km) or 3 months under condition A or B.
- Inspect front and rear brake discs and calipers, and rear brake pads every 7,500 miles (12,000 km) or 6 months under condition A, B, D, or E.
- Inspect the power steering system every 7,500 miles (12,000 km) or 6 month under condition B, C, or E.

Construction and Function

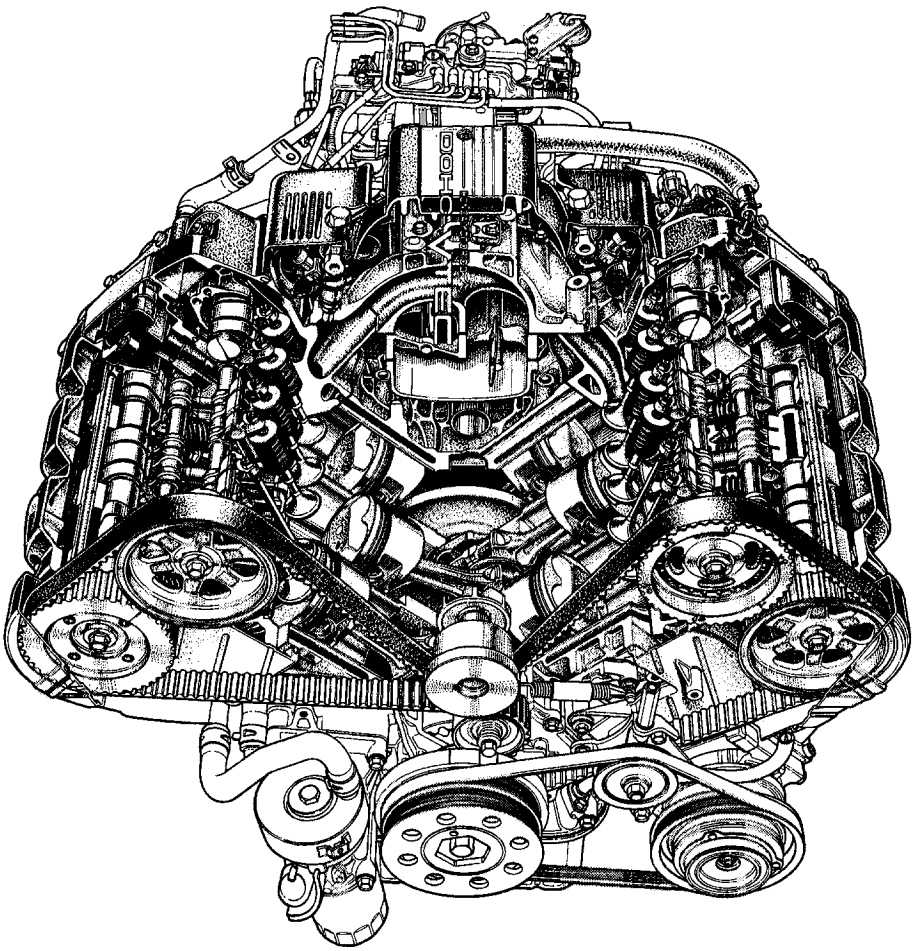


Outline 5-2
Variable Valve Timing and Lift Electronic Control System (VTEC) ... 5-4
Cylinder Head 5-9
Lubrication System 5-11
Exhaust System 5-13
Cooling 5-14

Outline

Description

This engine is a 2,977 cc DOHC mid-ship unit having 6 cylinders of 90° -V configuration; it is water cooled and equipped with a center plug type pent roof combustion chamber. It is specified for unleaded fuel and uses a PGM-FI (Multi-point injection) system. This engine incorporates a new mechanism called Honda Variable Valve Timing and Lift Electronic Control System (VTEC). This mechanism, the world's first, allows the timing and lift of the intake and exhaust valves to be changed simultaneously. The engine also includes a new electronically controlled intake manifold system that can change the volume of the intake chamber.



This engine has the following new features.

- VTEC; High output and a broad power band is achieved through control of low-speed and high-speed valve operation by the PGM-FI ECU.
  (Two knock sensors are used to detect octane level of the fuel.)

- Titanium connecting rods; Accommodate high rotation speed and high output. Titanium material of light weight and high strength is used for the connecting rods.
  (Strength is at the same level as iron.)
  (Weight is about 30% lighter than iron.)

- New mechanism to the intake system; Increased low and middle speed torque and higher output can both be achieved by switching the chamber volume of the intake manifold according to engine speed. This is electronically controlled.

- Cooling system for the mid-ship engine:
  - Radiator located in front compartment (An aluminum alloy radiator and pipes made of aluminum alloy)
  - Engine room cooling fan
  - Expansion tank

- The cylinder block is highly rigid with deep water jackets.

- In order to achieve lighter weight. magnesium is used for the following parts:
  . Cylinder head cover
  . Intake manifold cover
  . Intake manifold chamber

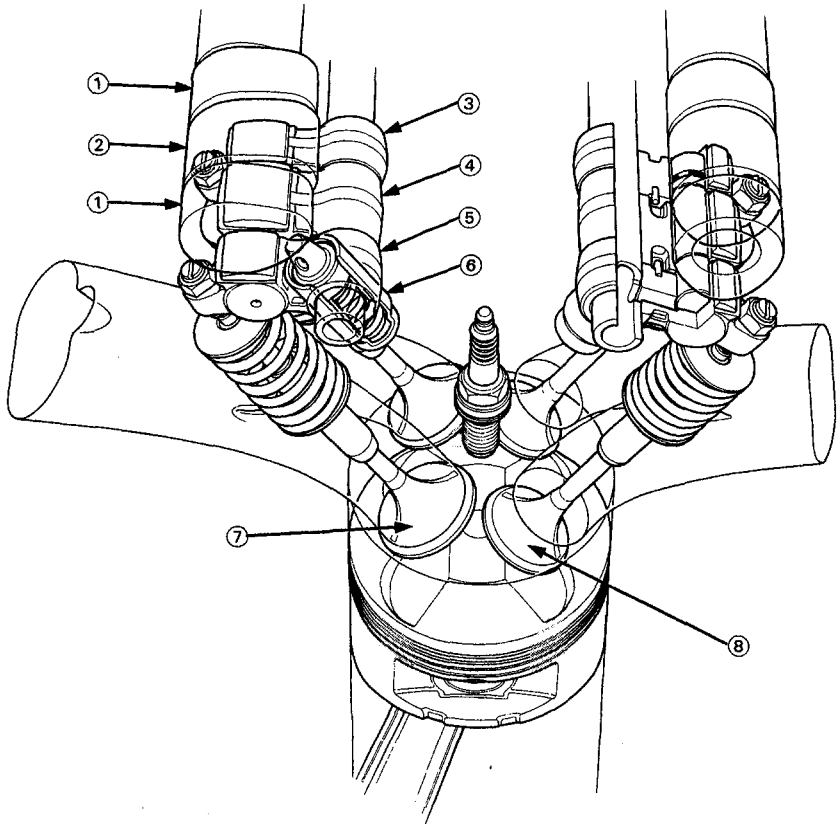
Major Specifications

Type	Water-cooled V6—90° Cross Flow
Displacement	2,977 cm^3 (181.6 cu.in)
Bore x Stroke	90 x 78 mm (3.54 x 3.07 in)
Compression Ratio	10.2
Cam, Valve Mechanism	DOHC (4-camshafts), VTEC
Valve Train	Belt Driven
Fuel Supply System	PGM-FI {Multi-Point Injection)

Variable Valve Timing and Lift Electronic Control System (VTEC)

Outline

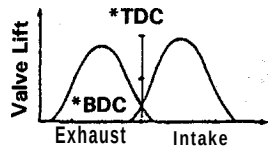
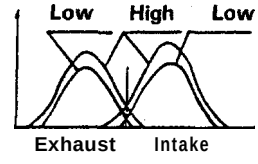
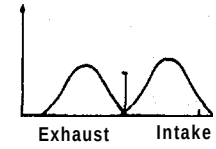
The engine is equipped with multiple cam lobes per cylinder, providing one valve timing and lift profile at low speed and a different profile at high speed. Switch-over from one profile to the other is controlled electronially, and is selected by monitoring current engine speed and load.



① CAM LOBES FOR LOW RPM
② CAM LOBES FOR HIGH RPM
③ PRIMARY ROCKER ARM
④ MID ROCKER ARM
⑤ SECONDARY ROCKER ARM
⑥ LOST MOTION ASSEMBLY
⑦ INTAKE VALVE
⑧ EXHAUST VALVE

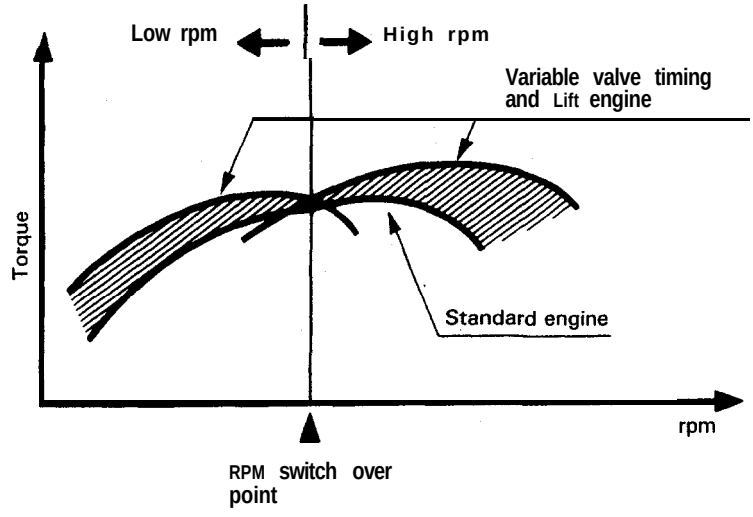
In general, it would be ideal if the high rpm performance of a racing engine and the low rpm performance of a standard passenger car engine could be combined in a single engine. This would result in a maximum performance engine with a wide power band. Two of the major differences between racing engines and standard engines are the timing of the intake/exhaust valves and the degree of valve lift. Racing engines have longer intake/exhaust timing and a higher valve lift than standard engines. The Honda Variable Valve Timing and Lift Electronic Control System takes this into account. When valve actuation is adjusted for low rpm timing and lift, low rpm torque is better than in a standard engine. When valve actuation is then adjusted for high rpm timing and lift, output improves to the level that a racing engine can offer. Until now, few variable valve timing systems have been commercialized. In those that have, only the time that both valves are open (intake/exhaust overlap) could be changed. Honda's system is the first in the world in which both the valve timing and the degree of valve lift can be changed as needed, making it the most advanced valve train mechanism available.

Comparison of Valve Lift of Racing Engines vs. Mass Produced Engines

	Racing Engine	Variable Timing & Lift Engine	Standard Engine
Valve Timing (exhaust/intake) Valve Lift			
Max. Power	0	0	
Low rpm Torque		0	0
idling Stability		0	0

*TDC = Top Dead Center *BDC = Bottom Dead Center
0 = Optimum Characteristic

The engine is equipped with two valve timing and lift settings which change according to driving conditions.

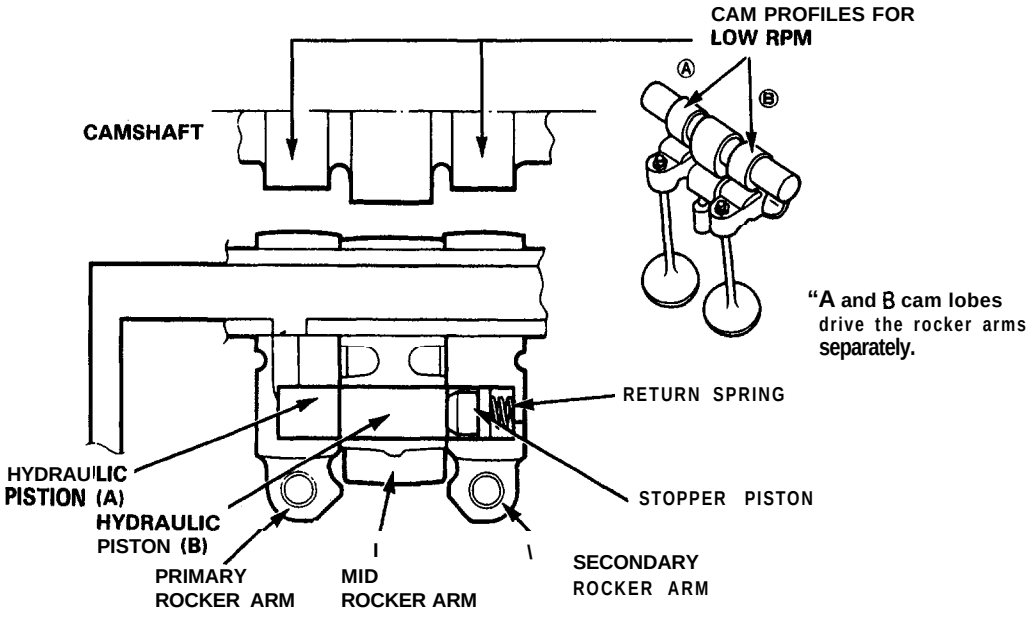


Variable Valve Timing and Lift Electronic Control System (VTEC)

Mechanism

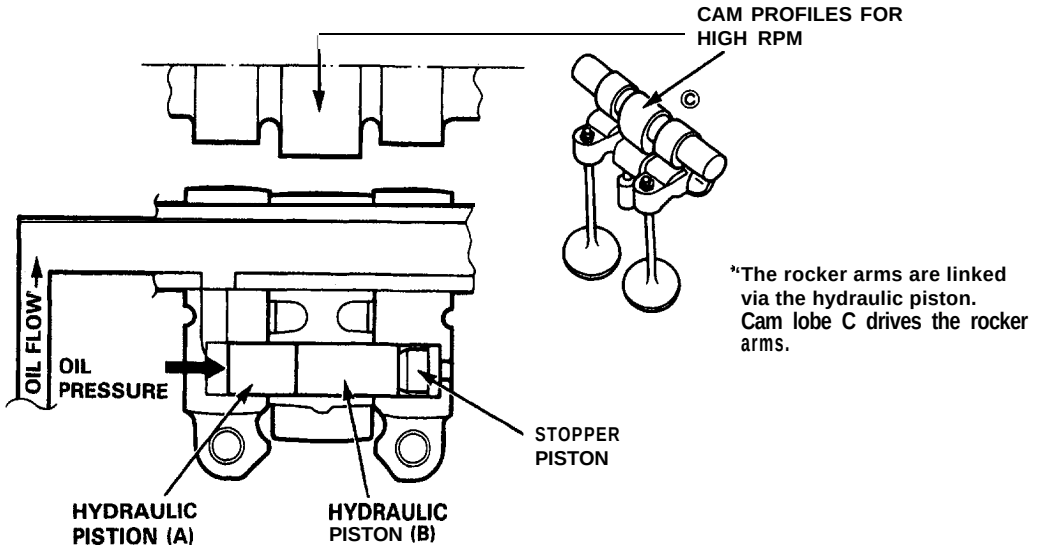
At Low rpm:
As shown, the primary and secondary rocker arms located on both sides are not connected to the mid rocker arm but are driven separately by cam lobes A and B at different timing and lift. Although the mid rocker arm is following the center cam lobe with the lost-motion assembly, it has no effect on the opening and closing of the valves in the low rpm range.

At Low rpm:



At High rpm:
When driving at high rpm, the built-in piston moves in the direction shown by the arrow in the figure below. As a result, the primary, secondary, and mid rocker arms are linked by 2 hydraulic pistons (like a skewer) and the 3 rocker arms move as a single unit. In this state, all the rocker arms are driven by cam lobe C opening and closing the valves at the valve timing and lift set for high operation.

At High rpm:

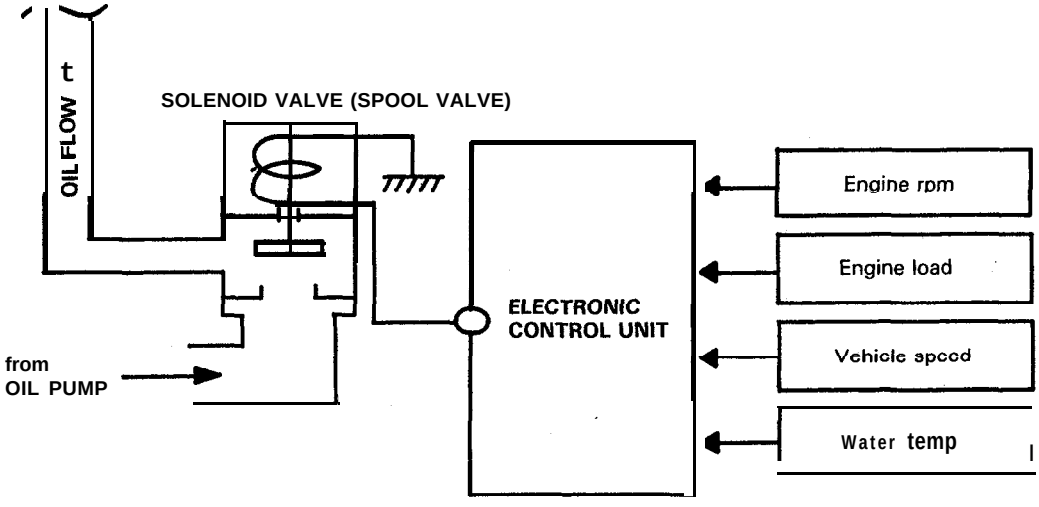


Control System

The control system for this mechanism, as shown below, constantly monitors the changes in engine status such as load, rpm and vehicle speed. This information is transmitted to the Control Unit.

Valve Timing Change Conditions
Engine RPM: 5,800–6,000 rpm
Vehicle Speed: 5 km/h (3 MPH) or faster
Water Temperature: 60°C (140°F) or higher

Control System



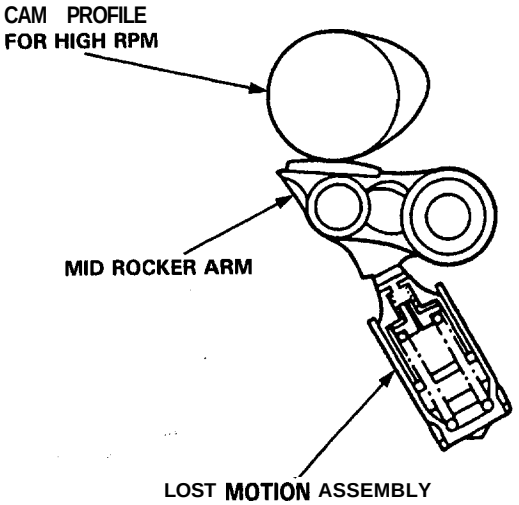
(cont'd)

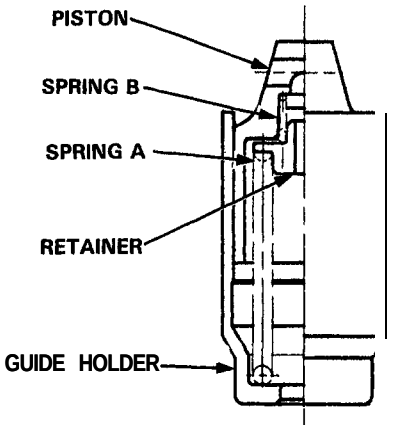
Variable Valve Timing and Lift Electronic Control System (VTEC)

Control System

Lost Motion Mechanism

The mid rocker arm is always driven by the high-speed cam lobe, even at low speeds. At low speeds, the lost motion mechanism keeps the mid rocker arm in contact with the high-speed cam lobe. At high speeds, the lost motion mechanism acts as part of the valve spring load.



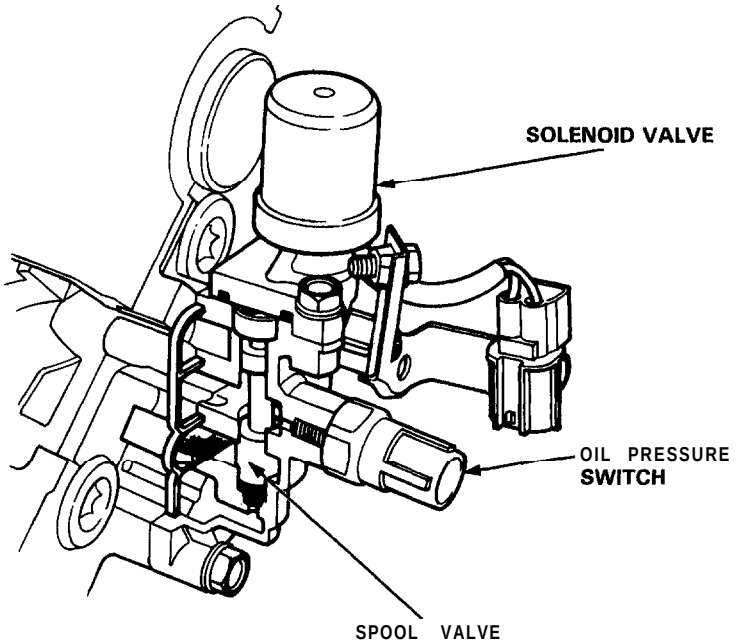


Hydraulic Pressure Control Mechanism

Spool valve/hydraulic pressure switch

The solenoid valve, in response to a signal from the PGM-FI ECU, closes the oil passage to the rocker arm at low speed. This cuts oil pressure to the hydraulic pistons in the rocker arms so the arms operate independently. At high speed, the ECU opens the solenoid valve. The increased oil pressure causes the hydraulic pistons to lock the primary, secondary, and mid rocker arms together.

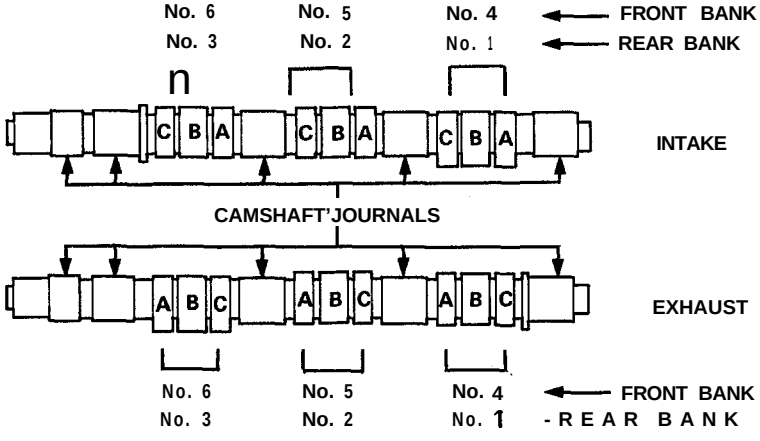
The oil pressure switch serves as a sensor to determine if the switch-over has taken place in response to the ECU signal.



(cont'd)

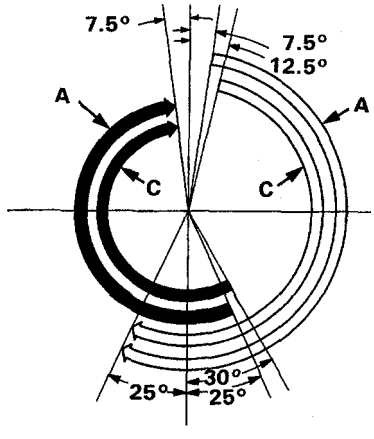
Camshaft

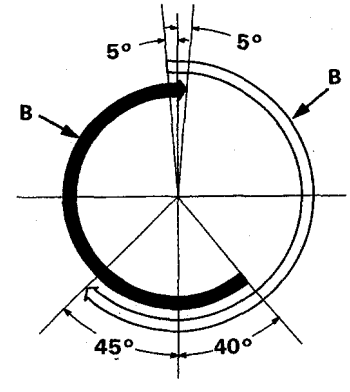
The camshaft is a cast piece. By improving dimensional accuracy, it became possible to achieve minimum space between cams, thus allowing a more compact cylinder head. Each camshaft is supported on four bearing journals with forced lubrication. On the right end of each camshaft is a driven pulley. The exhaust and intake cycles require a total of 36 cam lobes to open and close the valves.



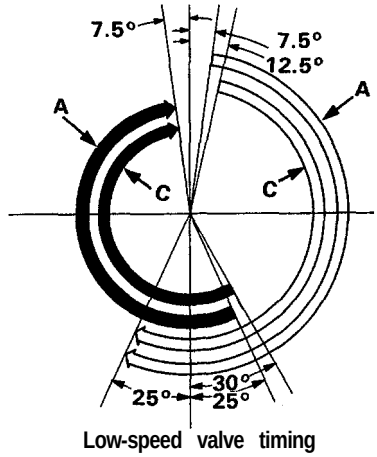
Manual Transmission

: Intake valve open
: Exhaust valve open

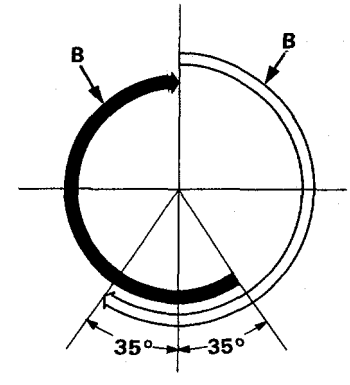




Automatic Transmission



Low-speed valve timing



High-speed valve timing

Valves

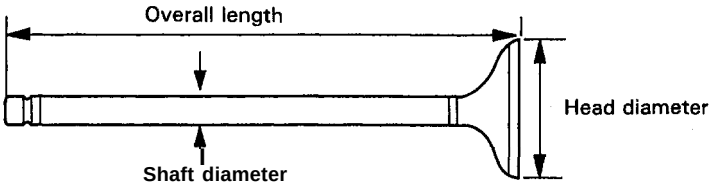
The valves are opened and closed by rocker arms driven by the camshaft. The rocker arm lever ratio is set to the optimum value, keeping cam lift to the minimum while increasing valve lift, thus improving intake/exhaust efficiency.

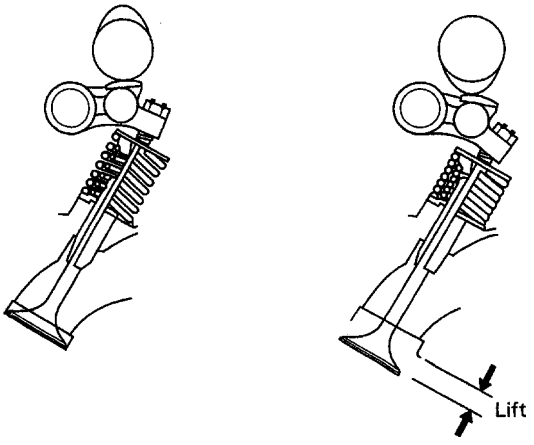
Valve specifications

Unit: mm (in)

ITEM \ VALVE		INTAKE	EXHAUST
HEAD DIAMETER		35 (1.38)	30 (1.18)
SHAFT DIAMETER		5.5 (0.22)	5.5 (0.22)
OVERALL LENGTH		112.45 (4.43)	111.55 (4.39)
VALVE LIFT	MIT	A: 8.7 B: 10.2" C: 8.3	A: 7.7 8: 9.0* c: 7.4
	A/T	A: 9.0 B: 9.5" c: 8.6	A: 7.7 B: 9.0" c: 7.4

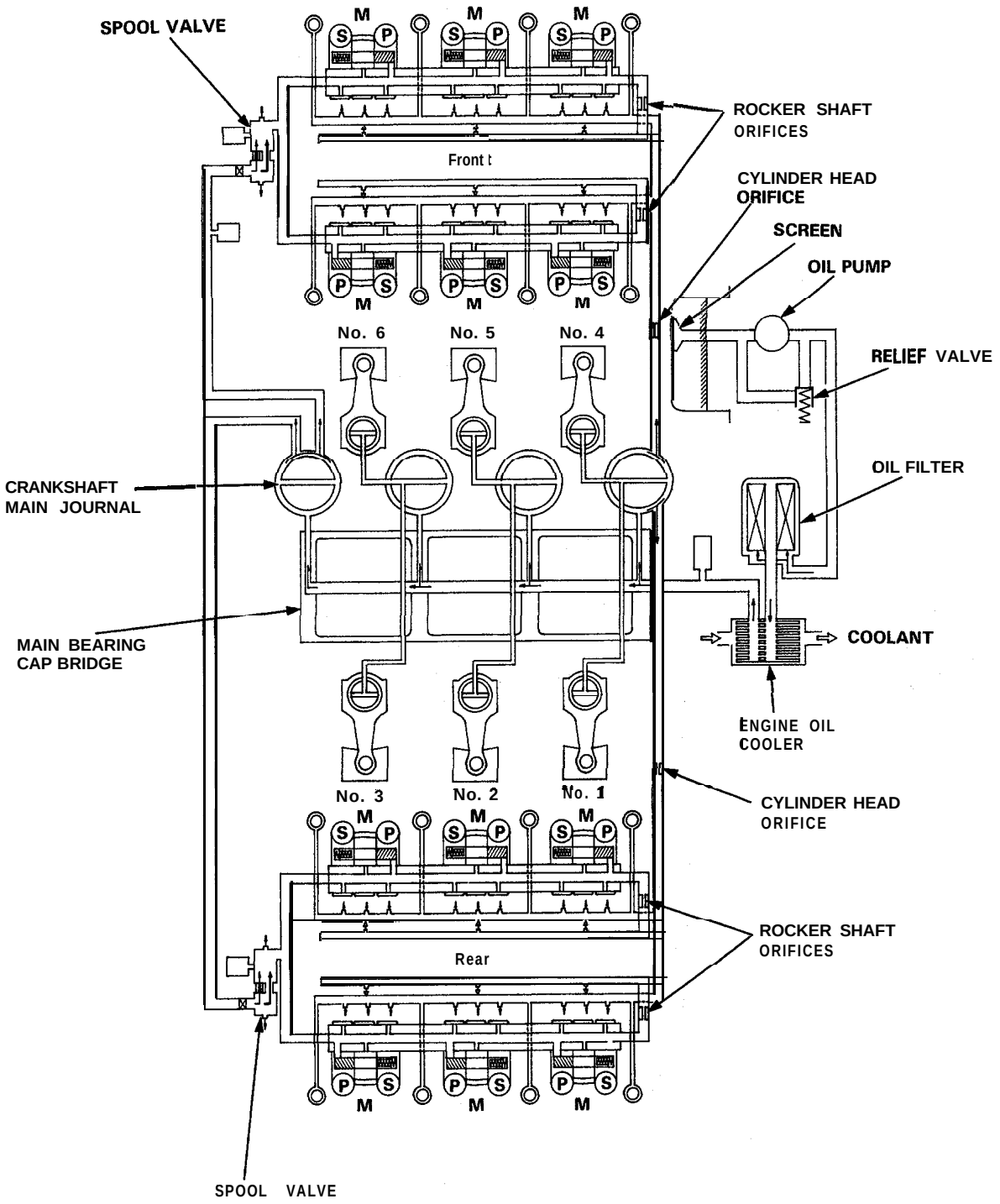
* Indicates high-speed valves





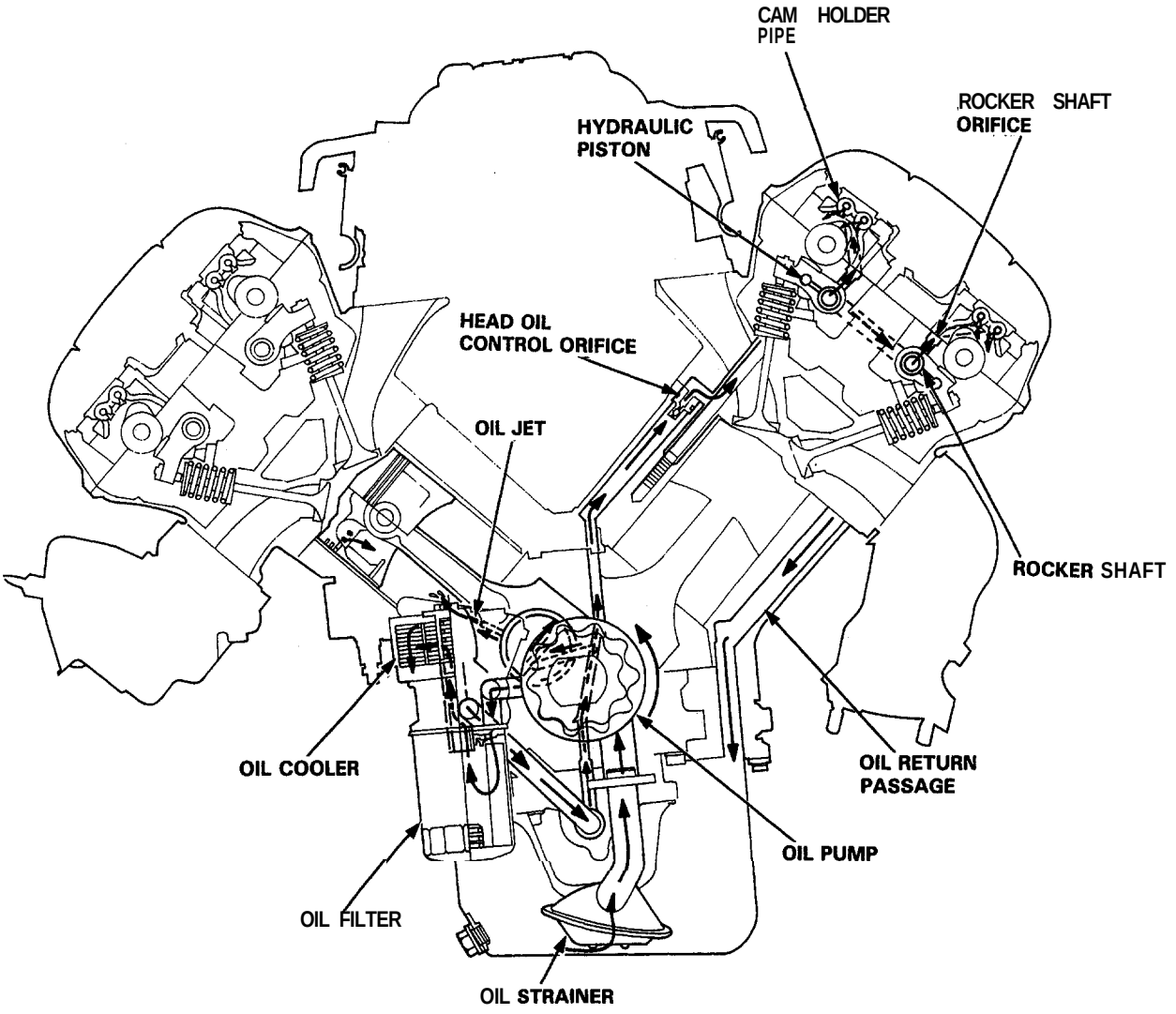
Lubrication System

· Lubrication Flow



Oil Passage

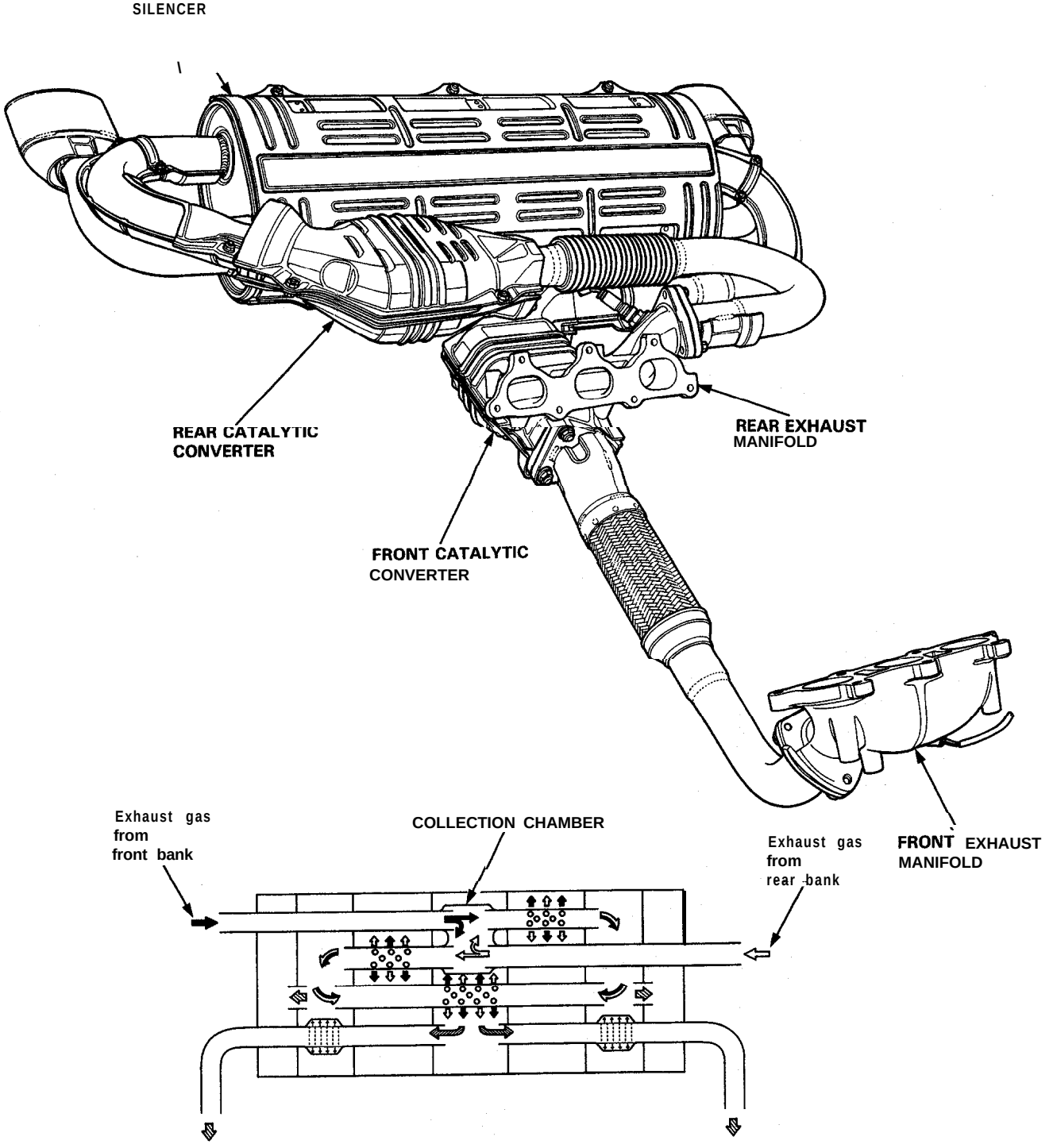
The lubrication system is a full filtration circulation type. The oil pump is directly linked to the crankshaft; oil to the oil pump is pulled through the oil strainer, after which pressure is regulated by the pump relief valve. It is then filtered through the oil filter and pumped to the cylinder block and cylinder head. A baffle plate is provided inside the oil pan; the baffle plate helps minimize the changes in oil level produced inside the pan while driving will affect the amount of oil going to the pump.



Dual Exhaust System

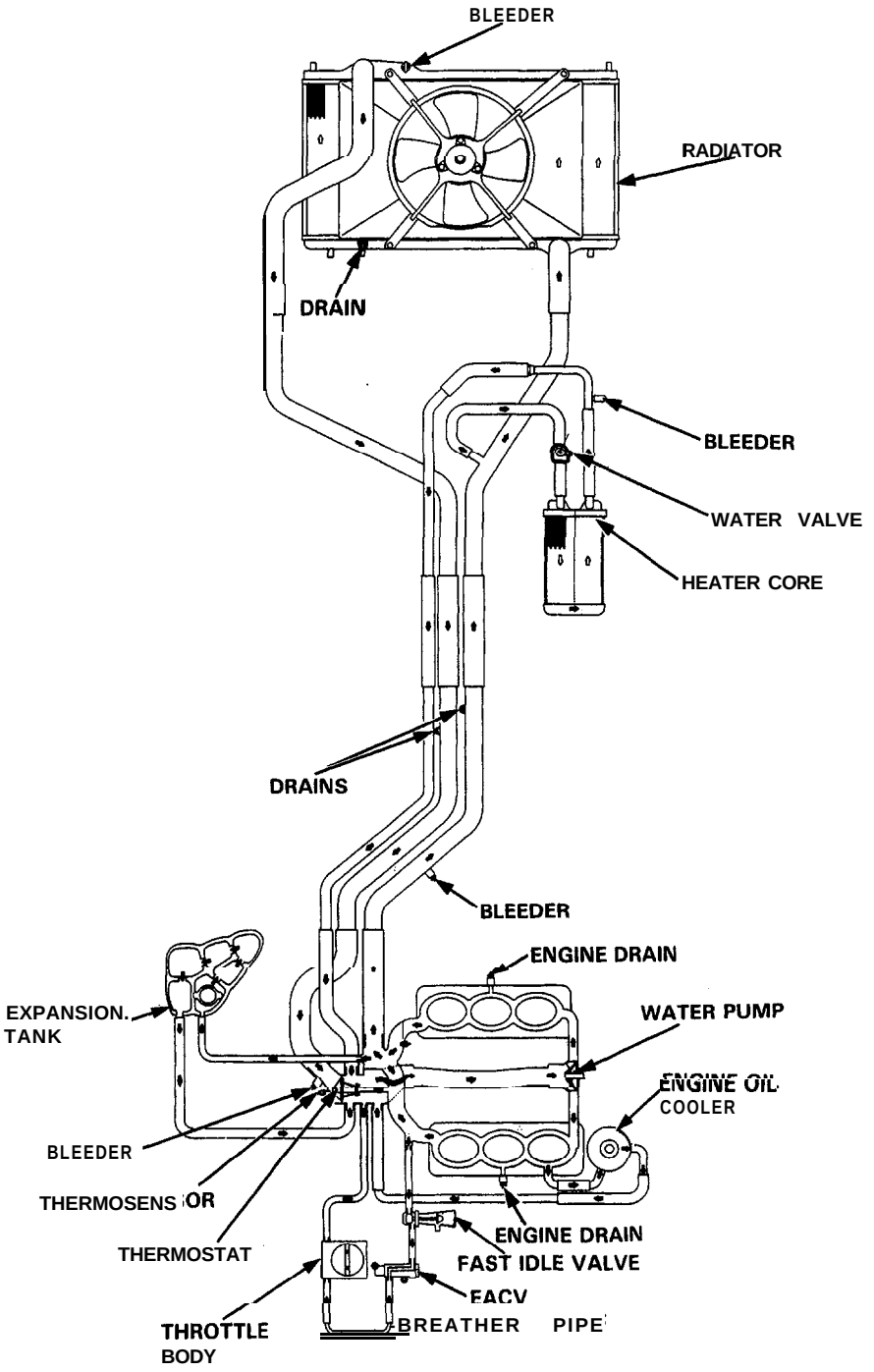
Features

- **A compact dual exhaust system is used to provide low back pressure.**
- **Sound tuning has been optimized to give a sporty exhaust sound note suitable to this type of car. This is done by a collection chamber in Exhaust Pipe B.**



Cooling System

Two cooling systems are employed:
An antifreeze/water system with the radiator mounted in the front of the vehicle.
An air-cooling system driven by fan mounted in the engine compartment.



Radiator

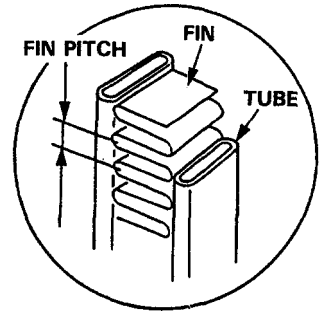
The radiator, made of aluminum alloy, is mounted in the front of the vehicle to gain maximum cooling efficiency from air passage. It is a corrugated-fin type, double row alminum core radiator with electric cooling fan. Since the tubes are in a line, the volume of the cooling water in the radiator is reduced for less weight. The upper and lower tanks are made of resinous material for reduced weight and increased corrosion protection.

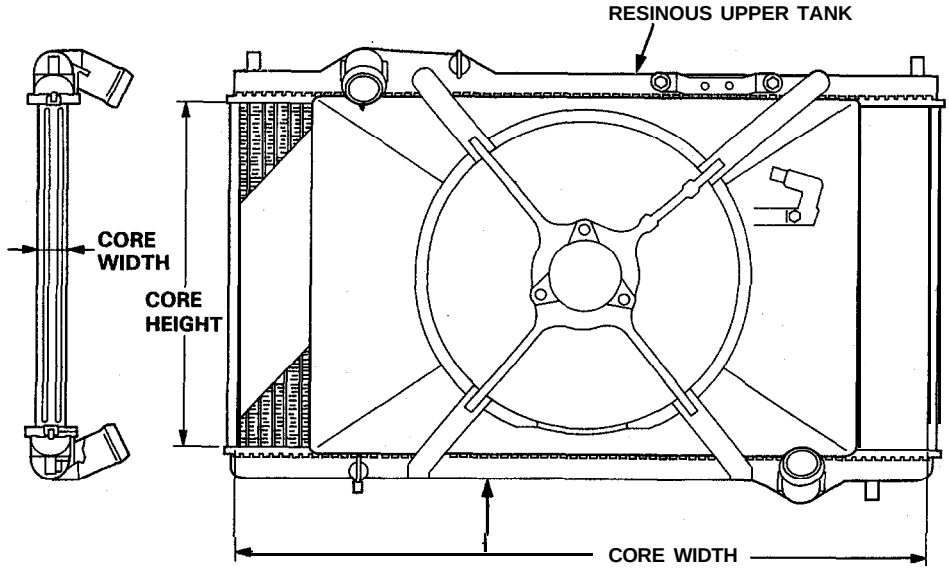
The engine compartment cooling fan is mounted on the right side. It operates in conjunction with the radiator's electric cooling fan in high mode.

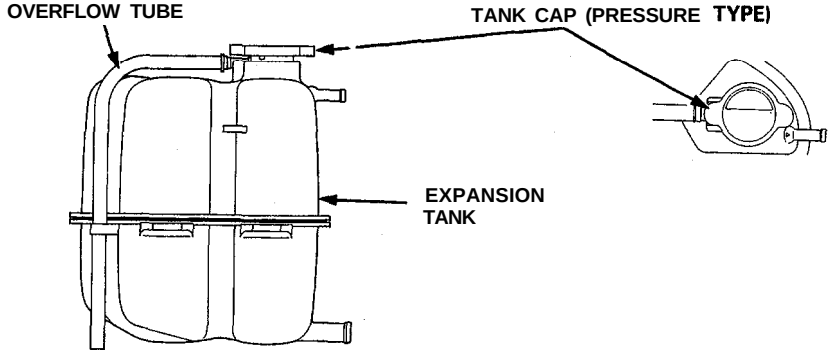
The expansion tank is used to separate air out of the coolant circulating through the system.

Radiator Specifications

Radiator volume (kcal/h)		46,000
Core size	Height (mm)	340
	Width (mm)	688.1
	Thickness (mm)	32
Fin pitch (mm)		2.5

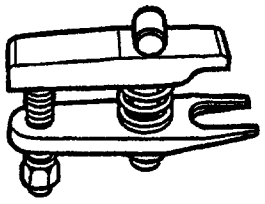




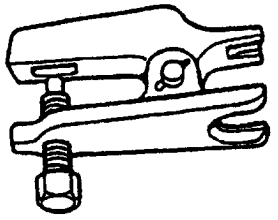


Engine Removal/Installation

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07MAC—SL00100	Ball Joint Remover	1	5-24
②	07941-6920003	Ball Joint Remover	1	5-24



①



②

⚠ WARNING

- Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions *on* the engine (*See* Section 1).
- Make sure the car will not roll off stands and fail while you are working under it.

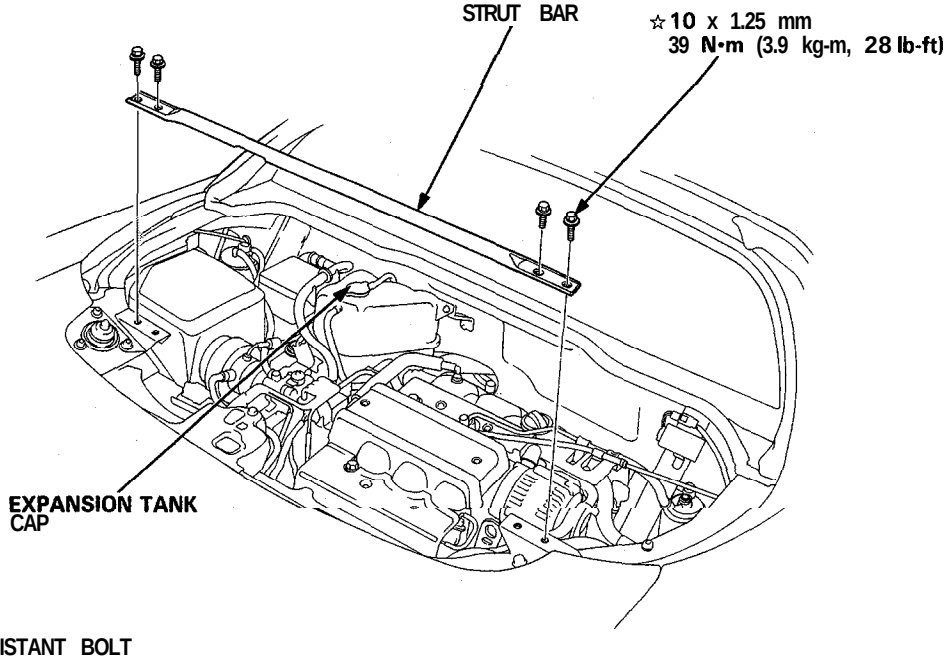
CAUTION:

- Use front and rear fender covers to avoid damaging painted surfaces.
- Unspecified items are common for the M/T cars, A/T cars, and the AIC equipped cars.
- Unplug the wiring connectors carefully while holding the coupler and the connector portion to avoid damage.
- Mark all wiring and hoses to avoid mis-connection. Also, be sure that they do not contact other wiring or hoses or interference with other parts.
- If the ground clearance should be retained, use a scissors jack and install the rubber spacers to the coil springs (page I-6).
- Put rubber pads under the jacking points when using jacks or safety stands to avoid damaging body (page I-7, I-81.

1. Move the seat bottoms and backs as far forward as they will go.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Remove the expansion tank cap to speed draining.

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

4. Raise the hoist to full height.
5. Drain the coolant (See Section 10).
   - Loosen the drain plug from the radiator lower tank.
   - Remove two drain bolts from the water pipes Reinstall the drain bolts with new washers.
   - Loosen the front and rear engine drain bolts to drain coolant from cylinder heads. Connect rubber hoses to the drain bolts for easy operation.
6. Drain transmission oil/fluid. Use a 3/8'' drive socket wrench to remove the drain plug. Reinstall the drain plug using a new washer.
7. Drain the engine oil. Reinstall the drain plug using a new washer.
8. Lower the hoist.
9. Remove the rear hatch (See Section 20).
10. Remove the engine cover (See Section 20).
11. Remove the rear hatch scoop (See Section 20).
12. Remove the strut bar.



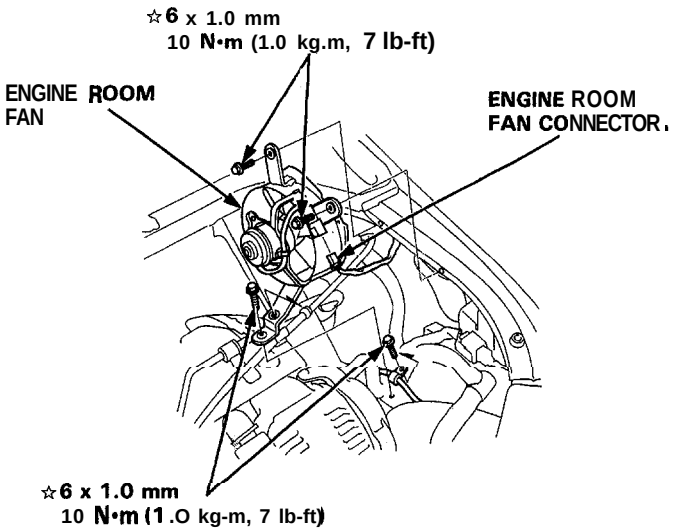
☆ : CORROSION RESISTANT BOLT

(cont'd)

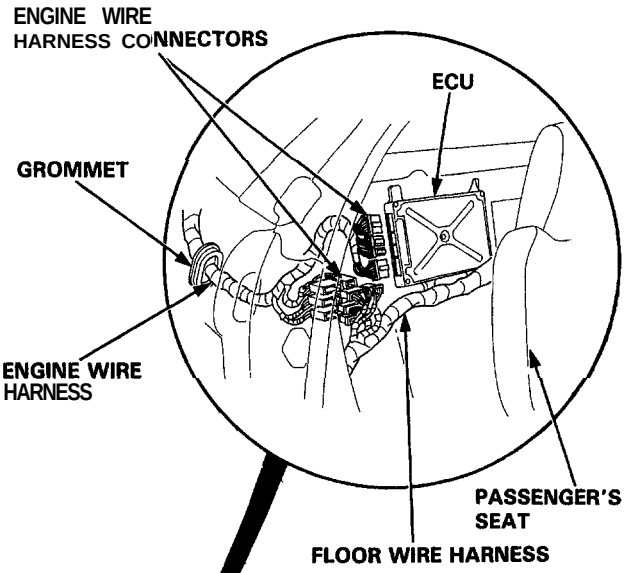
Engine Removal/Installation

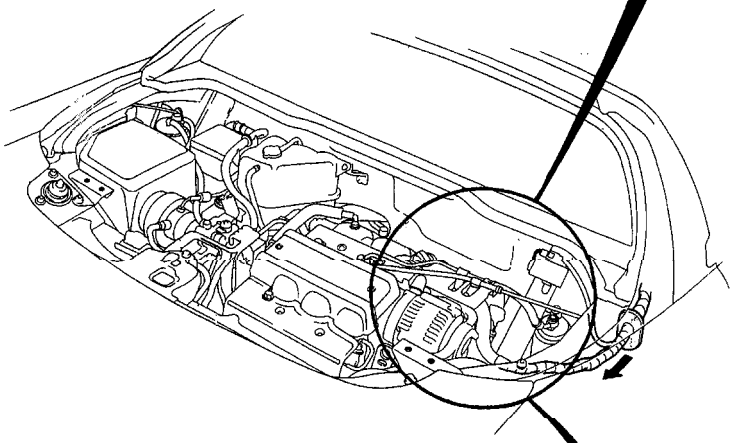
- (cont'd)

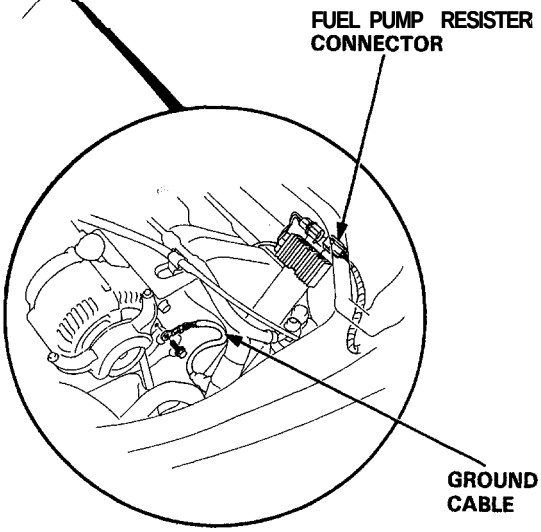
13. Disconnect the resistor connector and fan motor connector, then remove the engine room fan assembly.



14. Remove the rear trim panels behind the passenger's seat, then disconnect four connectors from ECU and five connectors from floor wire harness.





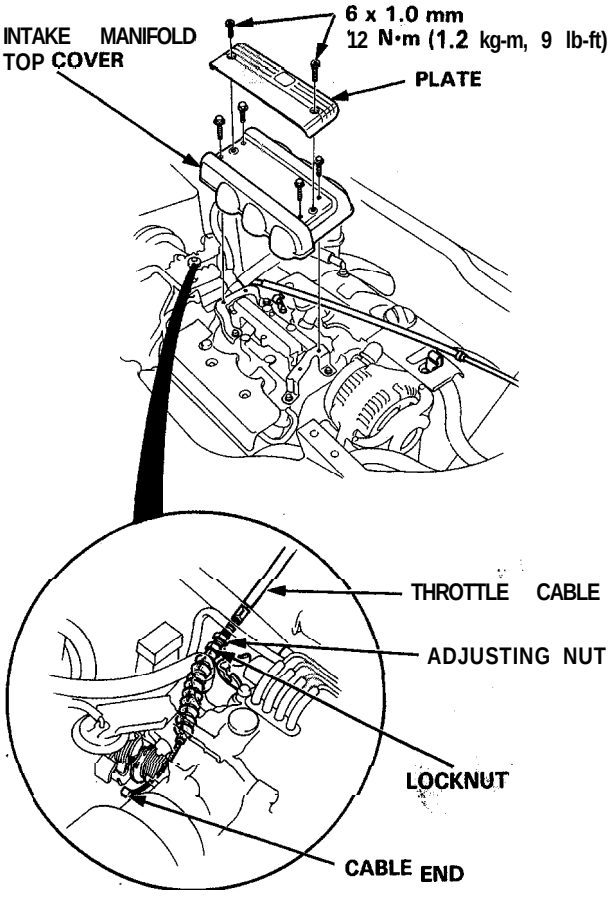


☆ : CORROSION RESISTANT BOLT

15. Remove the intake manifold plate and the top cover.

16. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle bracket and accelerator linkage.

NOTE:
- Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.
- Adjust the throttle cable when installing (See Section 1 1).



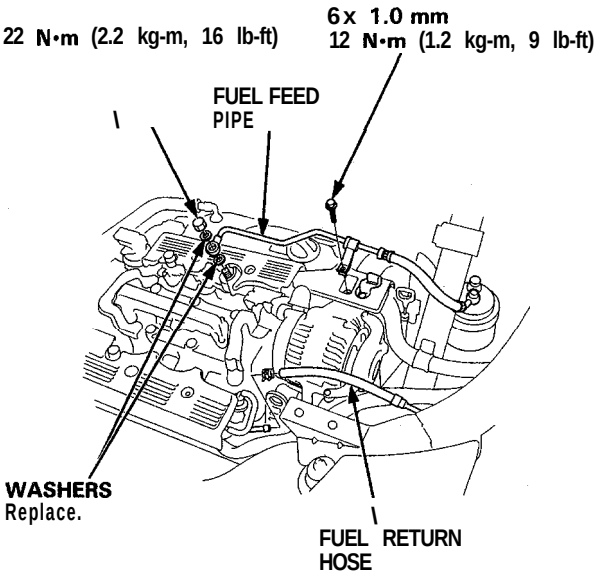
17. Relieve fuel pressure by slowly loosening the service bolt on the fuel filter about one turn (See Section 11).

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

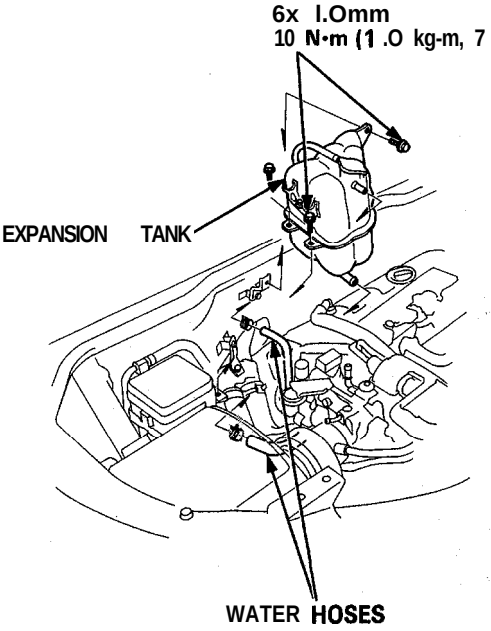
CAUTION:
- Before disconnecting any fuel line, the fuel pressure should be relieved as described above.
- Place a shop towel over the fuel filter to Prevent pressurized fuel from spraying over the engine.

18. Remove the fuel feed pipe.

19. Remove the fuel return hose from the pressure control valve.



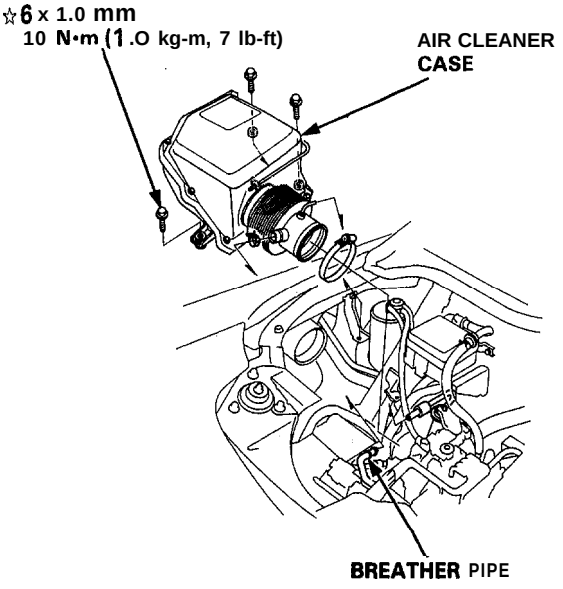
20. Disconnect two hoses, then remove the expansion tank.



(cont'd)

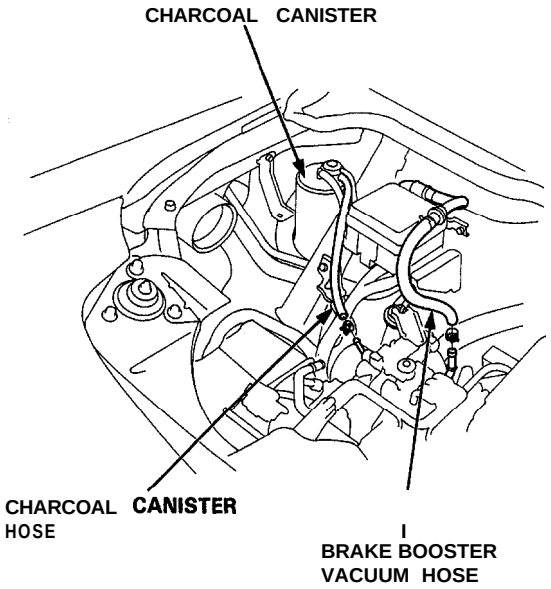
Engine Removal/Installation (cont'd)

21. Remove the breather hose, then remove the air intake duct and the air cleaner case.



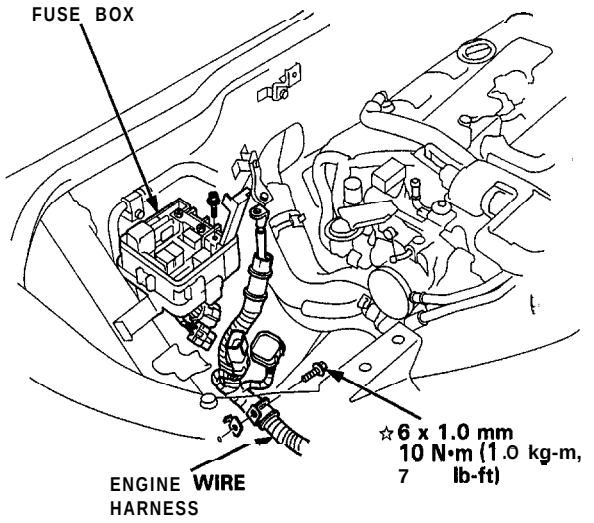
22. Disconnect the charcoal canister hose from throttle body.

23. Disconnect the brake booster vaccium hose from the intake manifold.

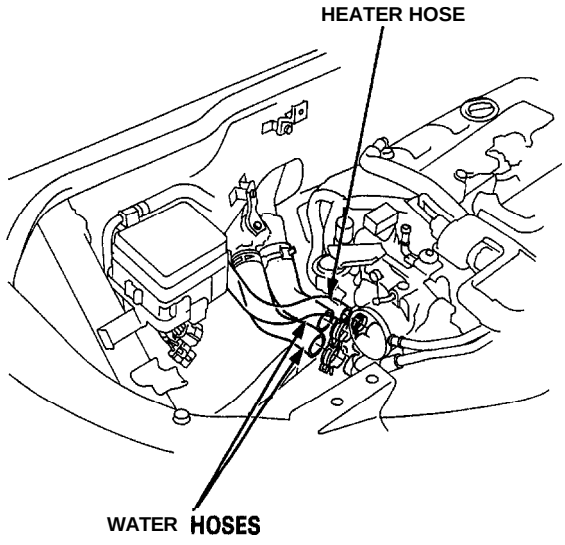


24. Disconnect the two engine wire harness connectors from the side wire harness at left side of engine compartment, and remove the engine wire harness terminal and the starter cable terminal from the under hood relay box and clamps.

25. Remove the ground cable from the transmission.

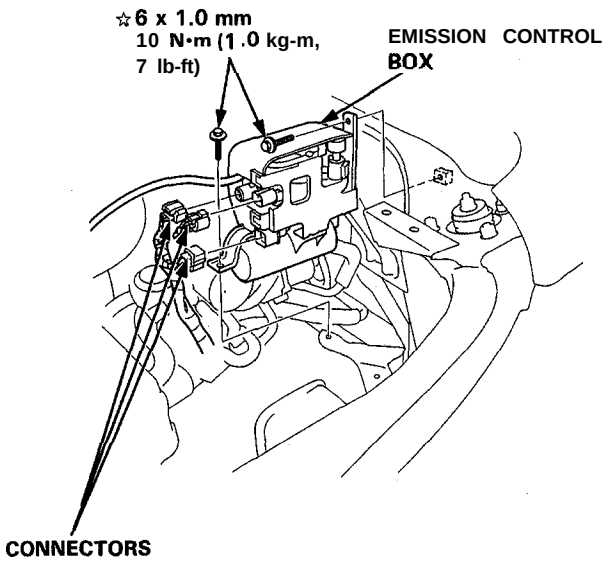


26. Remove the water hoses and the heater hose from the water passage.



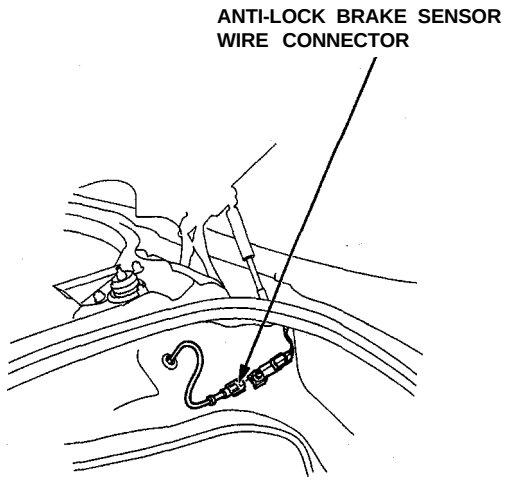
☆ : CORROSION RESISTANT BOLT

27. Disconnect the three connectors, then remove the emission control box. Fix it to the intake manifold.
- Do not disconnect the vacuum hoses.



28. Move the trunk carpet and disconnect the anti-lock brake right sensor connector. Push the wire and connector throuah the bodv hole into the engine compartment.

29. Remove the front engine mounting bolt (page 5-28).



30. Raise hoist to full height.

31. Remove the clutch slave cylinder from the transmission case (M/T, See Section 12)
- Do not disconnect the clutch hose.

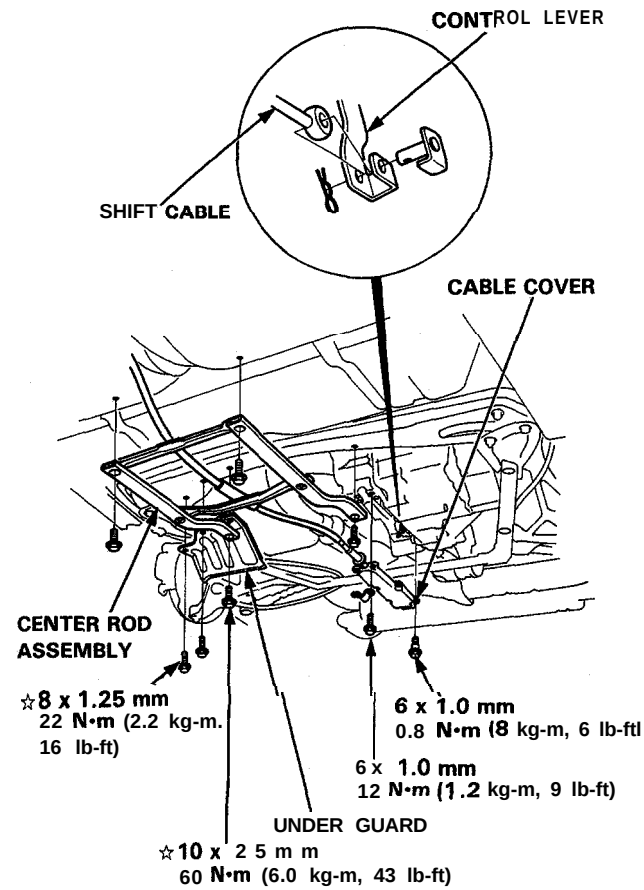
32. Remove the lower cover, then remove the shift cable and select cable with cable bracket (M/T, See Section 13).

33. Remove the cover, then remove the shift cable (A/T See Section 14).

NOTE:
- Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.
- Adjust the cables when installing.

34. Remove the engine under guard and the center rod assembly.

A/T:



☆ : CORROSION RESISTANT BOLT/NUT

(cont'd)

Engine Removal/Installation

· (cont'd)

35. Remove the rear beam rod assembly.

36. Remove the front beam. Remove the A/C compressor, then reinstall the front beam and retorque the two nuts to the front beam.

NOTE:
- Do not remove the compressor hoses.
- Hang the A/C compressor with wire or rope as shown. Do not let it hang from hoses.

37. Remove the left and right parking brake cables.

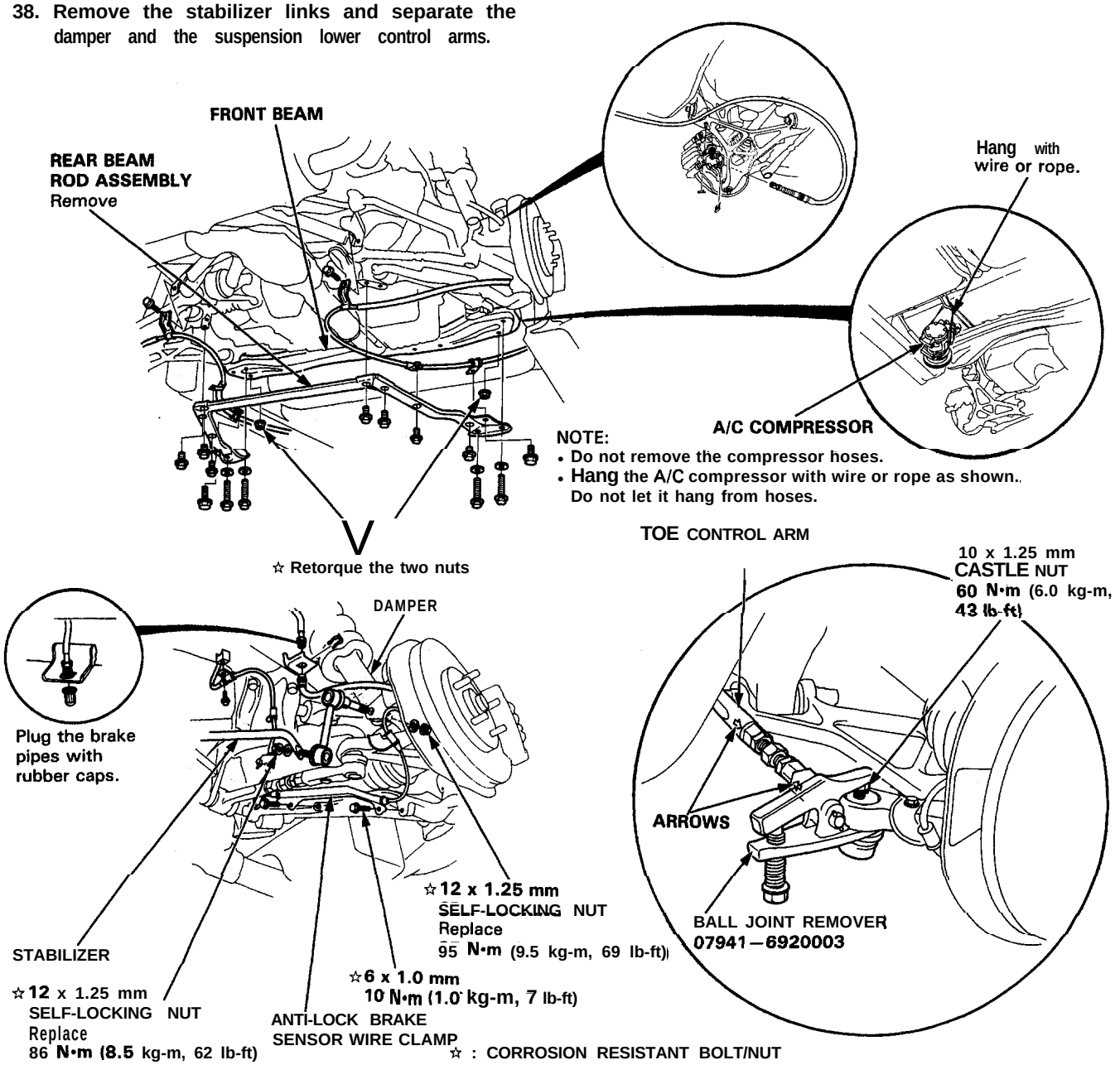
38. Remove the stabilizer links and separate the damper and the suspension lower control arms.

39. Remove the rear brake hoses. Plug the brake pipes with rubber caps.

40. Remove the anti-lock brake sensor wire clamps.

41. Remove the ball joints from the suspension lower control arms (use ball joint remover 07MAC—SL00100), and the toe control arms (use ball joint remover 07941-6920003).

CAUTION: Make sure that the reference marks on the control arm are aligned.



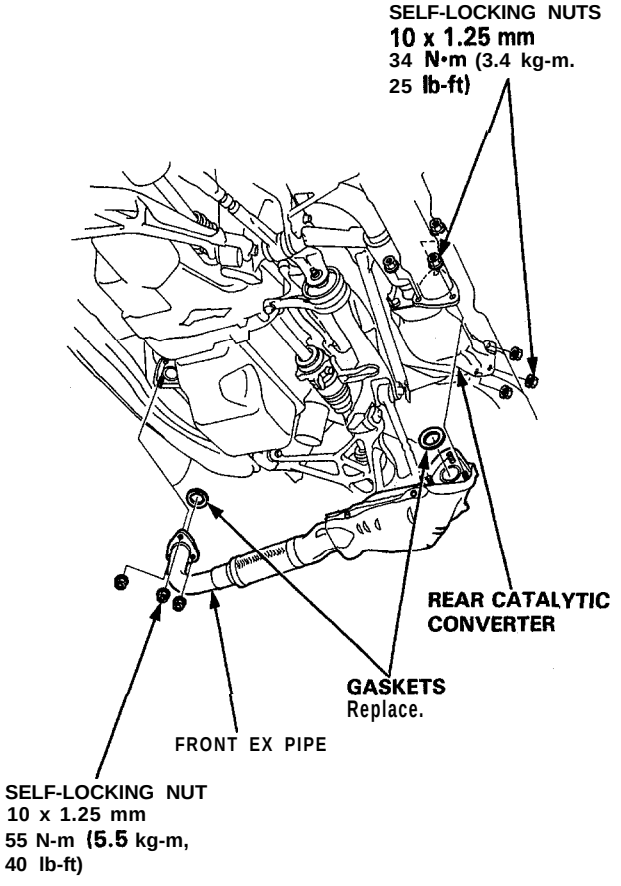
42. Remove the oxygen sensor connectors.

43. Remove the front exhaust pipe A and catalytic converter.

44. Remove the self-locking nuts, then separate the catalytic converter and exhaust silencer.

CAUTION:
- Do not use air wrench or hammer to remove exhaust pipes or catalytic converters if the oxygen sensors are not to be removed.
- Do not use air wrench for tightening self-locking nuts on exhaust pipes or catalytic converters if the oxygen sensors are not to be removed.

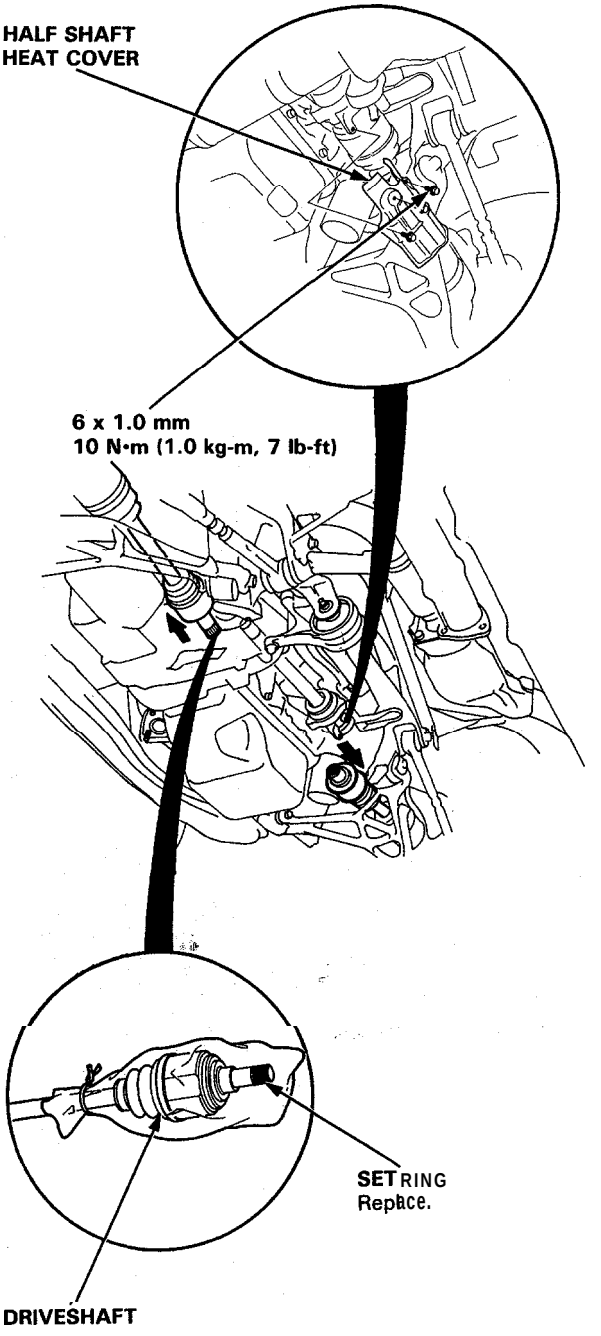
NOTE: Use new gaskets and self-locking nuts when reassembling.



45. Remove the half shaft heat cover

46. Remove the driveshafts.

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



(cont'd)

Engine Removal/Installation

(cont'd)

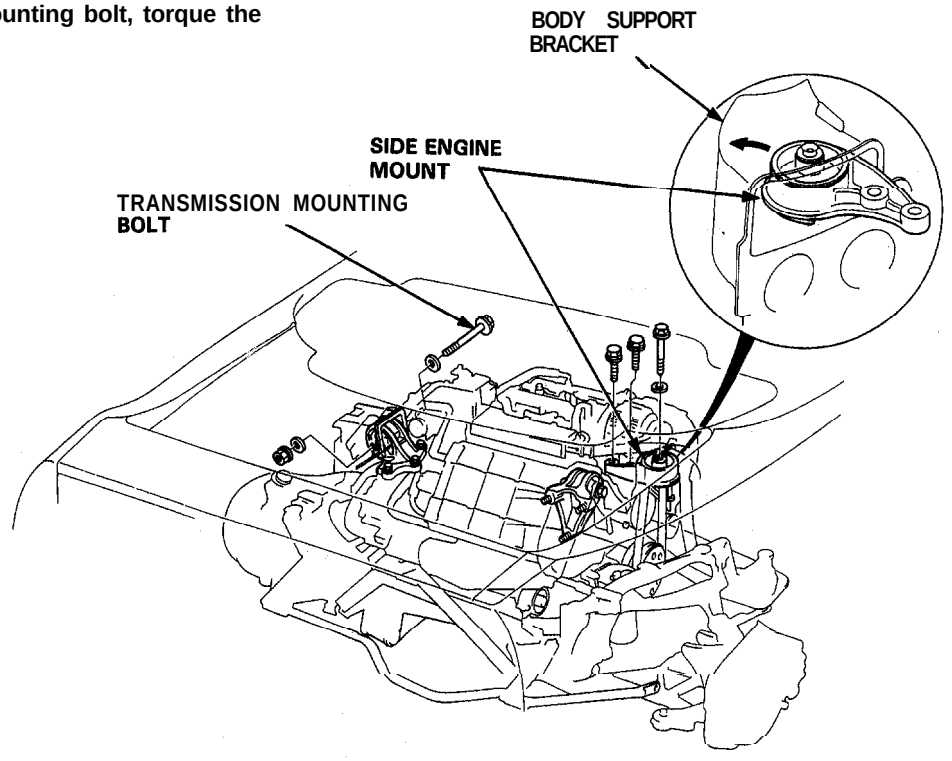
47. Loosen the rear beam side bracket mounting bolts one or two turns, then remove the mounting bolts except the four bolts shown.

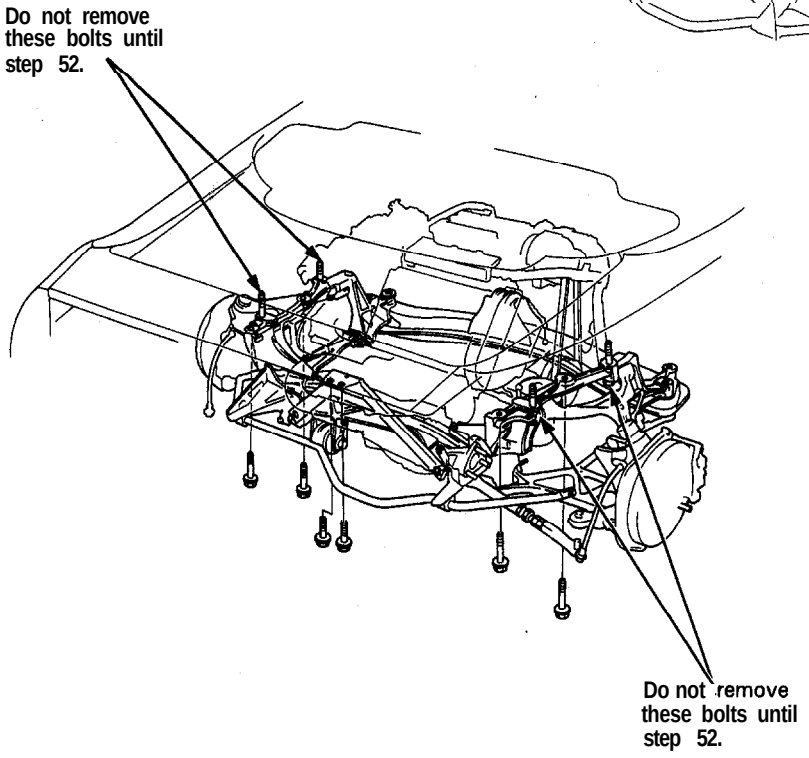
48. Lower hoist, attach a chain hoist to the engine.

49. Install the front engine mounting bolt, torque the nut temporarily.

50. Remove the side engine mount and bolts, then push the side engine mounting bracket into the support bracket of the body.

51. Remove the transmission mounting bolt.





52. Remove the four mounting bolts from the rear beam side bracket.

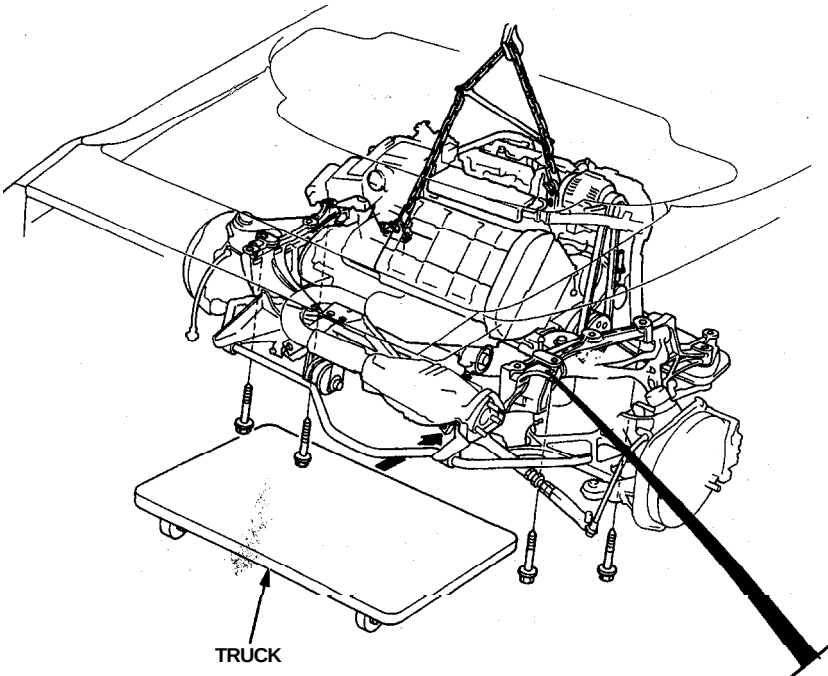
53. Lower the engine, suspension and beam assembly a few inches with the chain hoist.

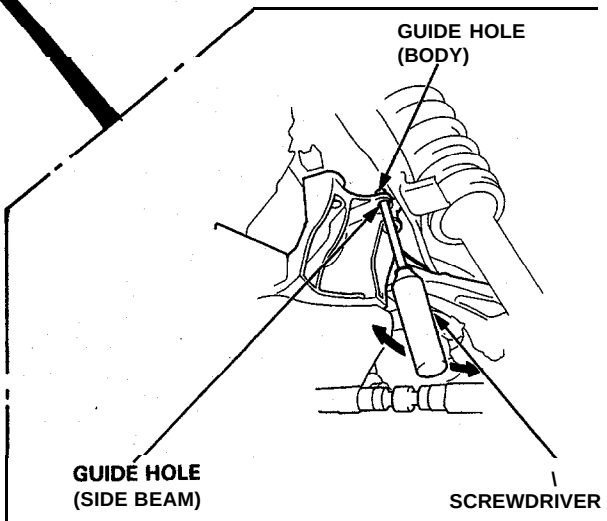
54. Check that wires and hoses are completely removed from the engine assembly.

55. Slowly lower the engine assembly on to a truck.

56. Remove the chain hoist from the engine.

57. Raise the body with the hoist. Roll the engine assembly from under the body.



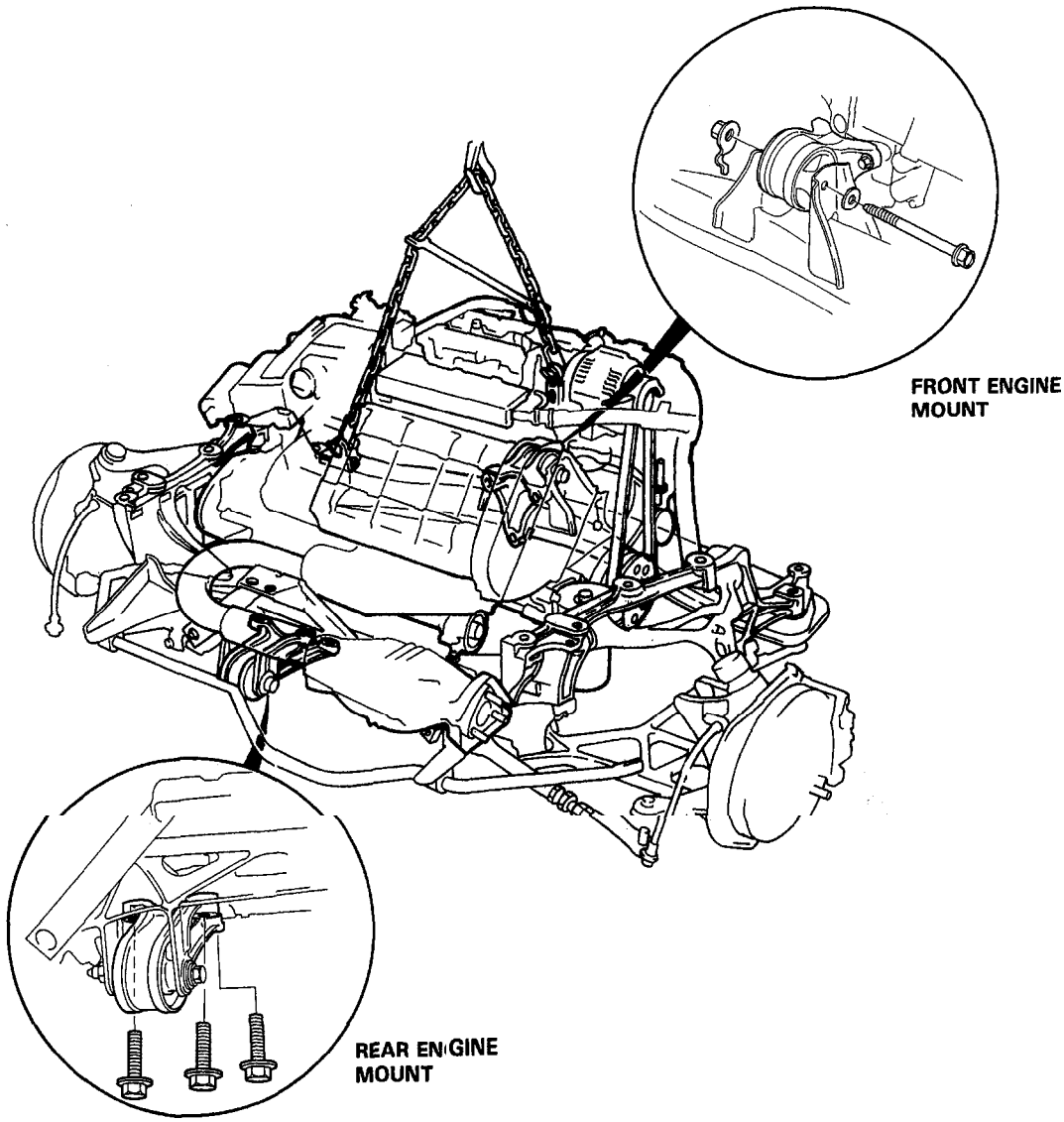


NOTE: When installing, align the bolt holes of the beam brackets and body with screwdriver.

(cont'd)

60. Attach a chain hoist to the engine. Remove the front and rear mounting bolts, then separate the engine from the suspension and the beam assembly.

CAUTION: Do not hit the engine oil cooler on the rear right beam bracket.



61. Install the engine in the reverse order of removal:

NOTE:

- Align the bolt holes of the beam brackets and body with screwdriver (page 5-27).
- Temporarily torque the two front beam nuts and front engine mounting bolt when installing the A/C compressor.
- Combine the front beam and the rear beam rod assembly, then torque the four mounting bolts.
- Check that the set ring on the end of each driveshaft clicks into place.

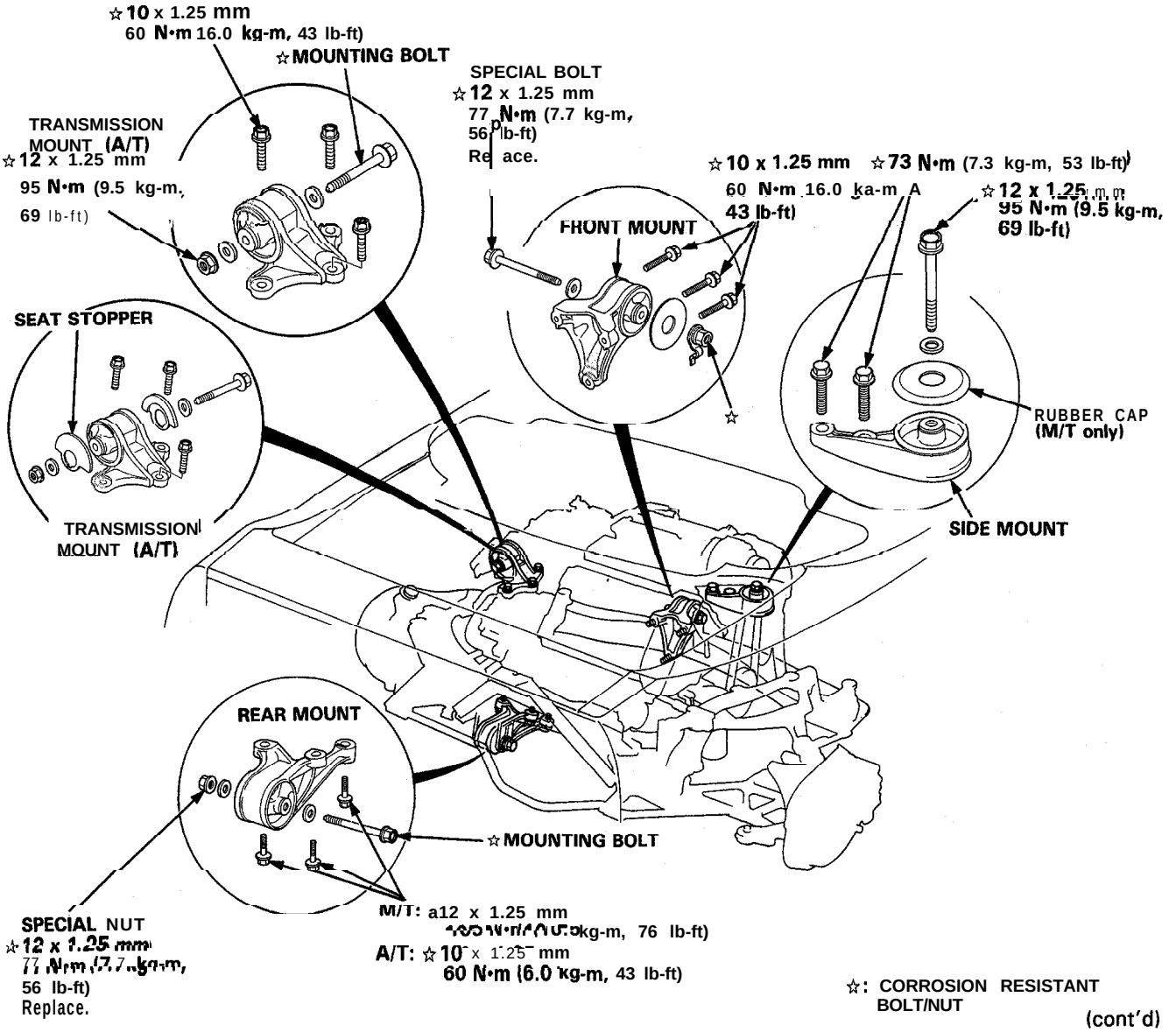
CAUTION: Use new set ring on installation.

After the engine is in place:

- **Torque the engine mounting bolts in sequence shown below.**

  CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration and reduce bushing life; check that the bushings are not twisted or offset.

- Bleed air from the cooling system (See Section 10)
- **Bleed air from the brake lines (See Section 19)**
- **Adjust the throttle cable tension.**
- Check the clutch pedal free play.
- **Adjust the clutch guide assemblies when** disassembling clutch (See Section 12).
- **Check that the transmission shifts into gear smoothly (M/T See Section 13, A/T See Section 14).**
- **Adjust the alternator belt (See Section 23).**
- **Adjust the A/C belt (See Section 22).**
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Inspect for fuel leakage:
  - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.

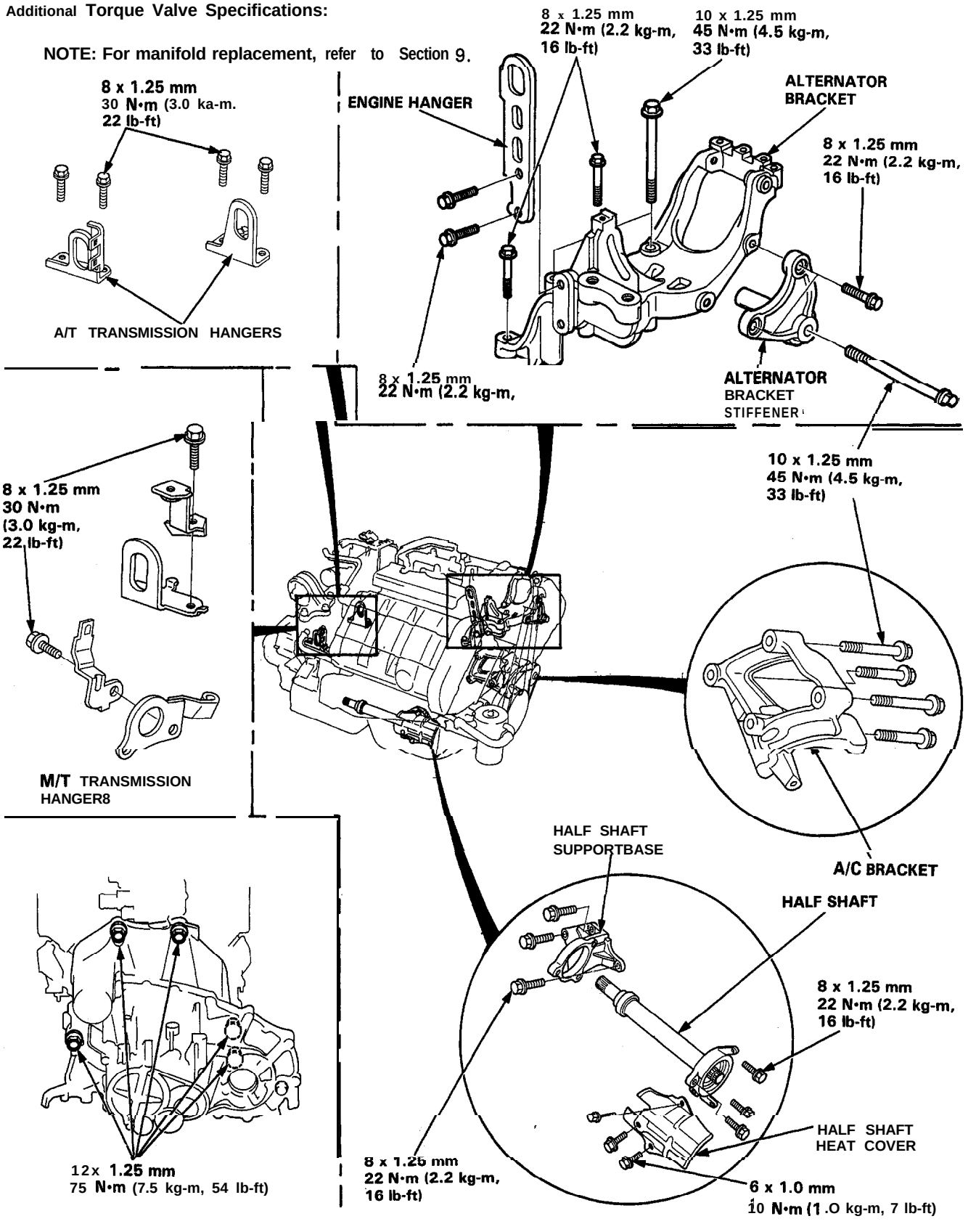


(cont'd)

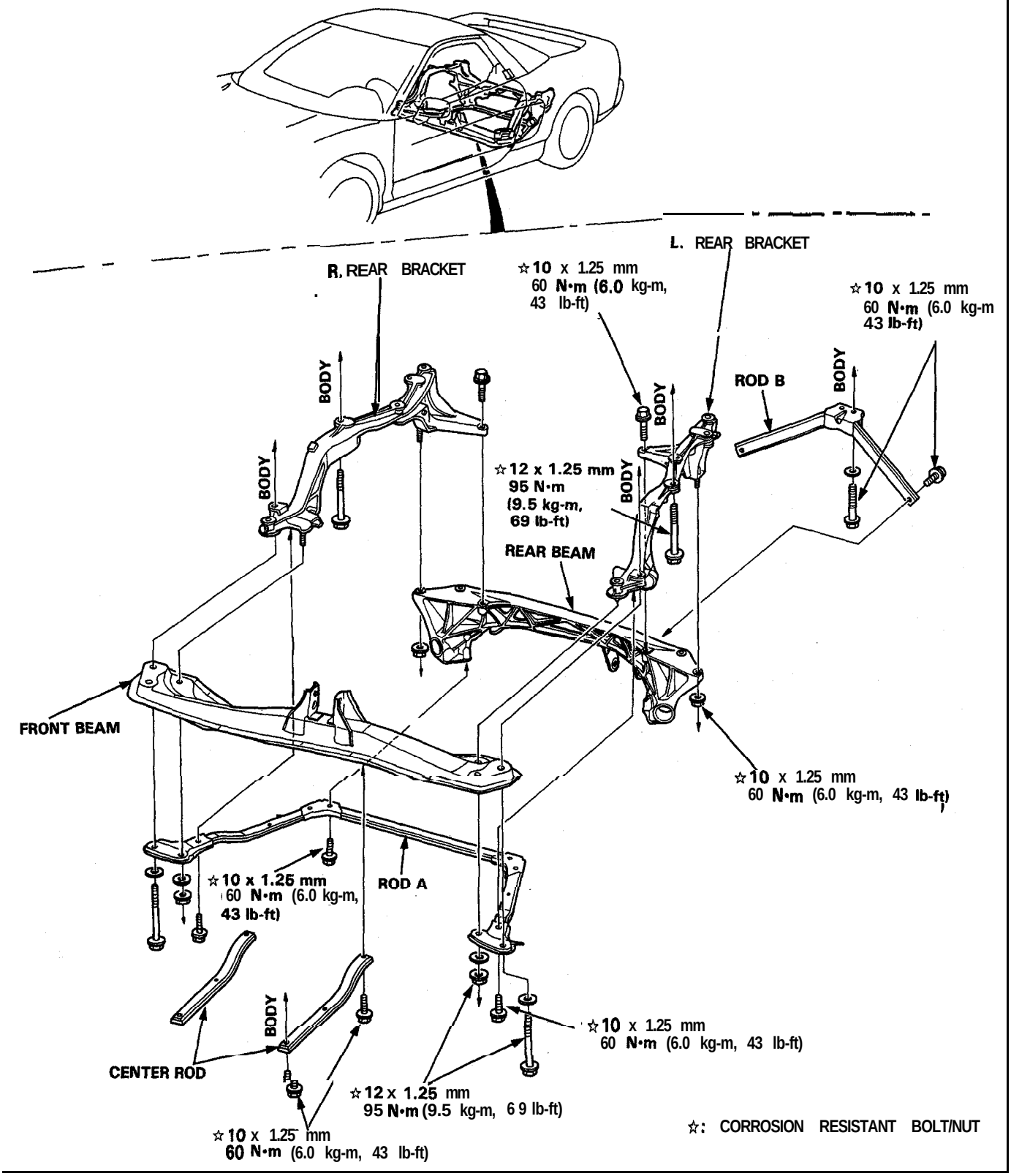
(cont'd)

Additional Torque Valve Specifications:

NOTE: For manifold replacement, refer to Section 9.



Sub-frame Torque Value Specifications:



☆: CORROSION RESISTANT BOLT/NUT

Cylinder Head/Valve Train

Special Tools 6-2
Illustrated Index 6-3
VTEC
- Electrical Connections 6-8
- Troubleshooting
  - Self-diagnostic Procedure 6-10
- Troubleshooting Flowchart
  - Spool Valve 6-15
  - Oil Pressure Switch 6-17
- Spool Valve Inspection 6-20

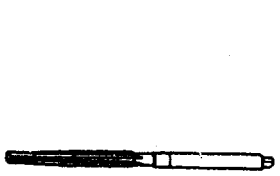
Timing Belt
- Illustrated Index 6-21
- Inspection 6-22
- Tension Adjustment 6-22
- Removal 6-23
- Installation 6-25

CRANK/CYL Sensor 6-27
Cylinder Head Removal 6-28
Rocker Arms and Shafts
- Location 6-35
- Inspection 6-36
- Clearance 6-37

Camshaft inspection 6-38
Valve and Valve Seals 6-40
Cylinder Heads 6-41
Valve Seats 6-42
Valve Guides 6-44
Valve Spring and Valve Seals 6-46
Cylinder Head Installation 6-47
Rocker Arms 6-49
Camshafts 6-49
Rocker Arms Inspection 6-52
Valve Clearance Adjustment 6-54

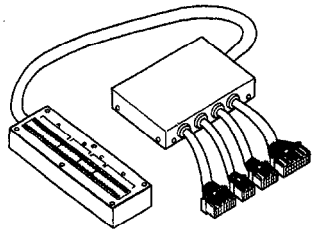
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAH-PJ701 OA	Valve Guide Reamer, 5.5 mm	1	6-45
②	07LAJ-PT301OA	Test Harness	1	6-11
③	07MAA-PR70110	Tappet Adjuster	1	6-55
④	07MAA-PR70120	Tappet Locknut Wrench	1	6-55
⑤	07MAJ-PR70100	Test Harness	1	6-l 1
⑥	07MAJ-PR70200	VTEC Plug	1	6-52, 53
⑦	07757-PJ1010A	Valve Spring Compressor Attachment	1	6-40
⑧	07742-0010100	Valve Guide Driver, 5.5 mm	1	6-44, 45

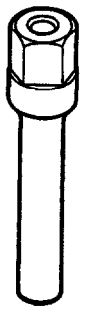


①

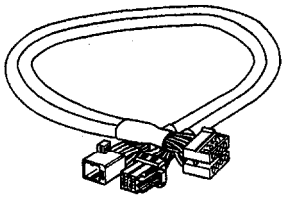
②



③

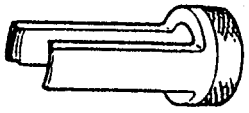


④

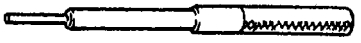


⑤

⑥



⑦



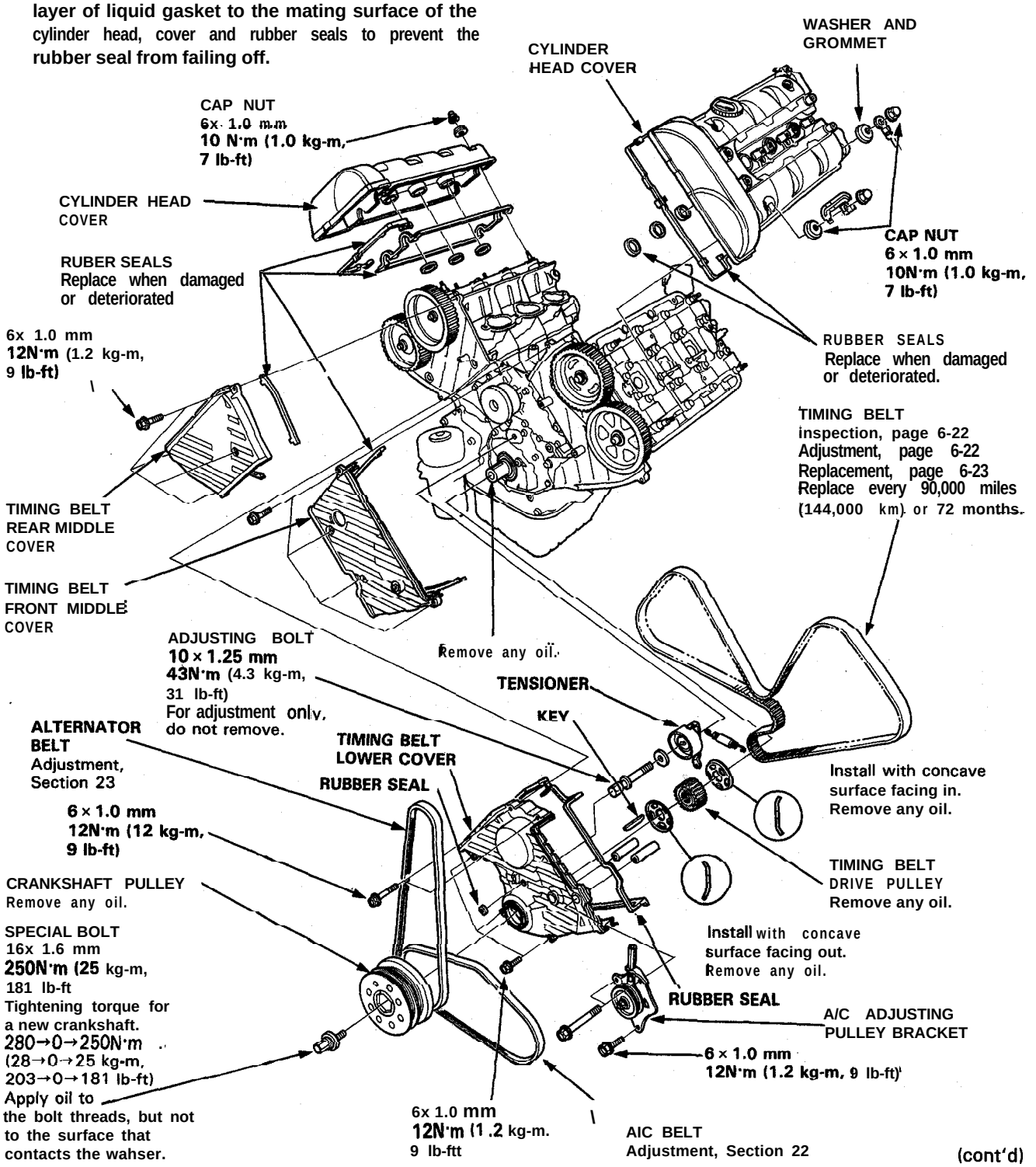
⑧

Illustrated Index

CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.

NOTE:

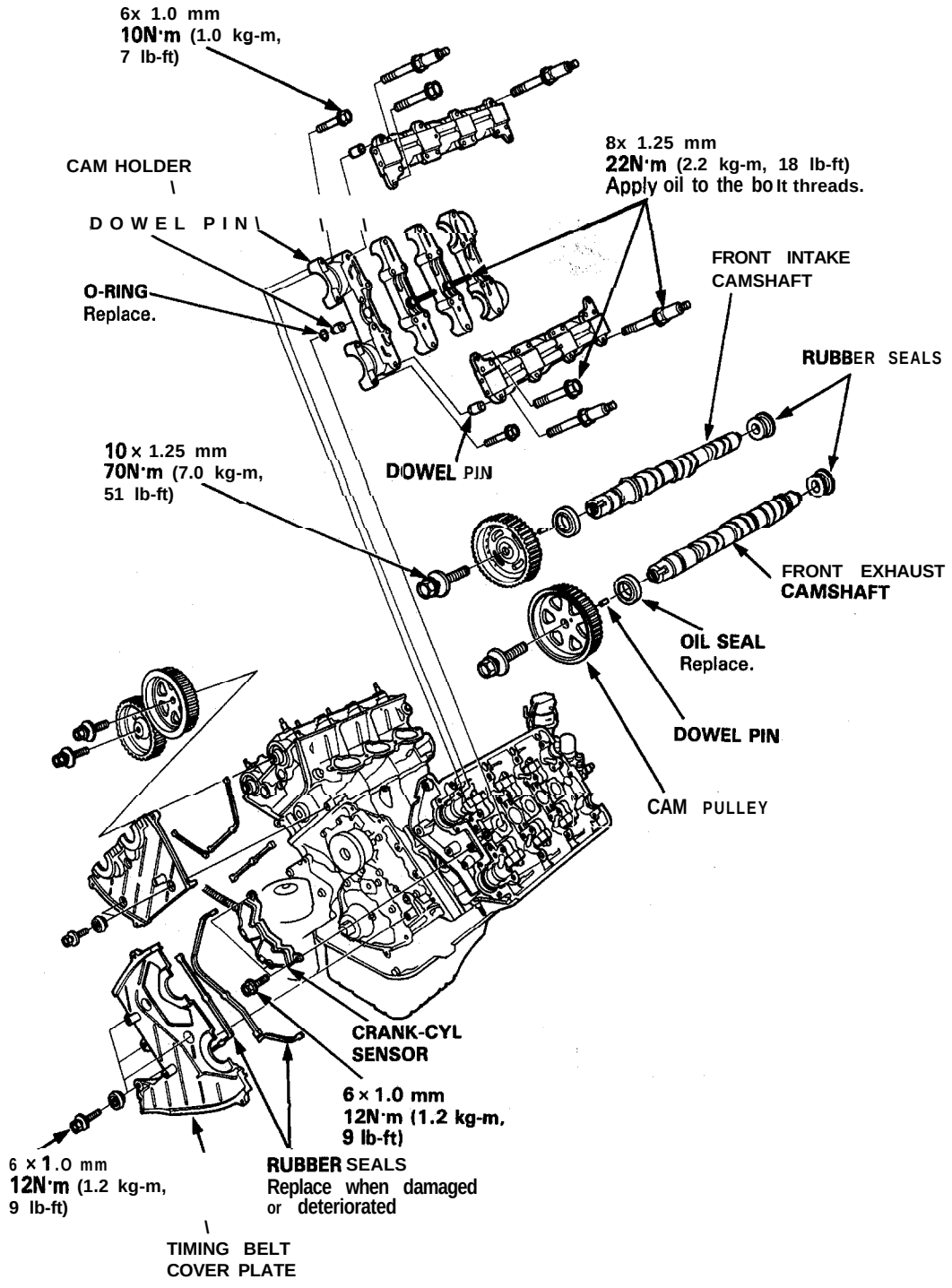
- Use new O-rings and gaskets when reassembling.
- Replace rubber seals, if damaged or deteriorated.
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head, cover and rubber seals to prevent the rubber seal from failing off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.
- When installing the new crankshaft; @tighten hte crankshaft pulley bolt to 280 N·m (28 kg-m, 203 lb-ft), ② loosen it bolt, ③ retighten it to 250 N·m (25 kg-m, 181 lb-ft).

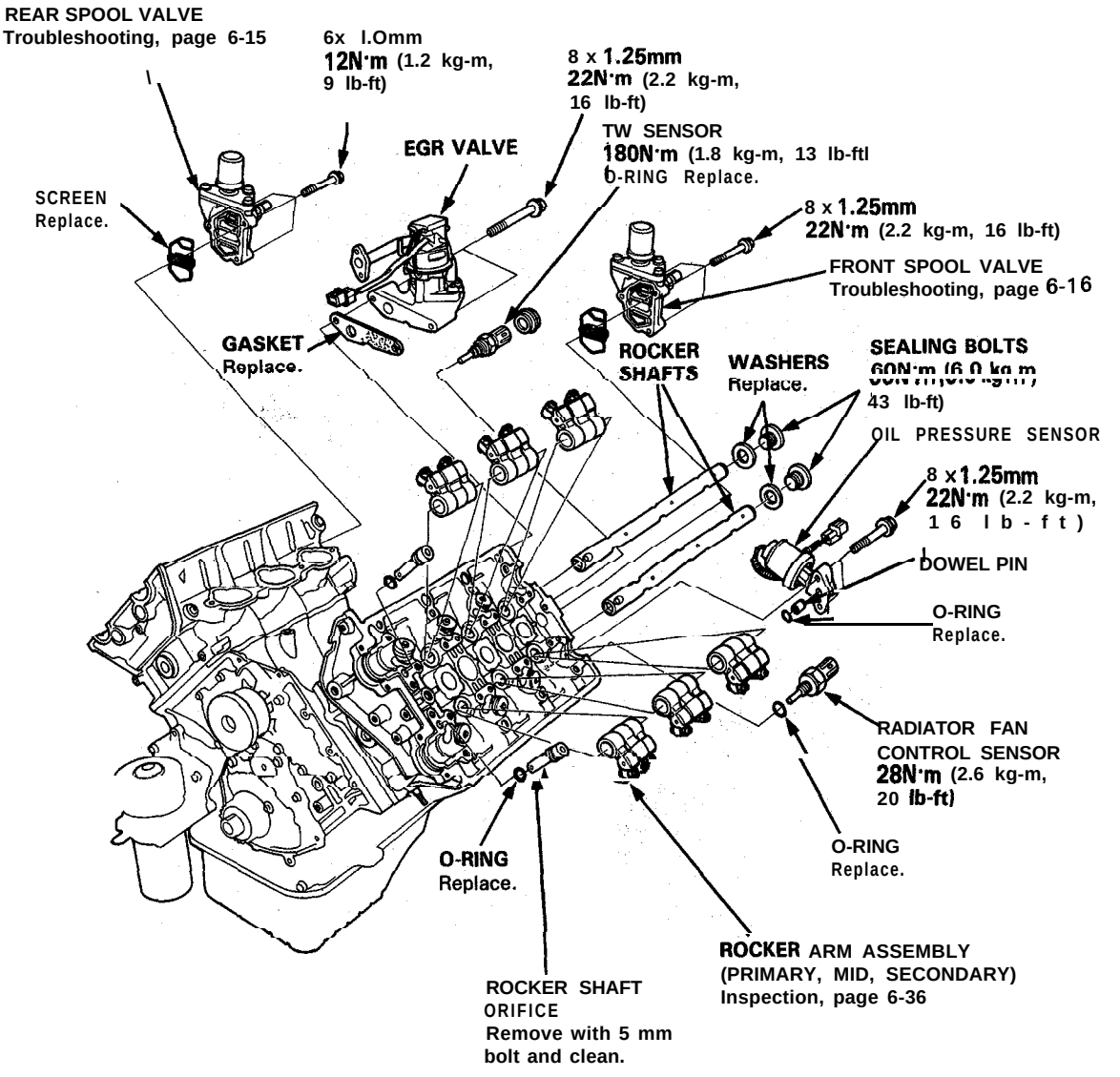


(cont'd)

Illustrated Index (cont'd)

NOTE:
- Use new O-rings and gaskets when reassembling.
- Replace rubber seals, if damaged or deteriorated.




REAR SPOOL VALVE
Troubleshooting, page 6-15
6x l.Omm
12N·m (1.2 kg-m,
9 lb-ft)
8 x 1.25mm
22N·m (2.2 kg-m,
16 lb-ft)
TW SENSOR
180N·m (1.8 kg-m, 13 lb-ftl
O-RING Replace.
EGR VALVE
SCREEN
Replace.
8 x 1.25mm
22N·m (2.2 kg-m, 16 lb-ft)
FRONT SPOOL VALVE
Troubleshooting, page 6-16
GASKET
Replace.
ROCKER
SHAFTS
WASHERS
Replace.
SEALING BOLTS
43 lb-ft)
OIL PRESSURE SENSOR
8 x 1.25mm
22N·m (2.2 kg-m,
16 lb-ft)
DOWEL PIN
O-RING
Replace.
RADIATOR FAN
CONTROL SENSOR
28N·m (2.6 kg-m,
20 lb-ft)
O-RING
Replace.
O-RING
Replace.
ROCKER ARM ASSEMBLY
(PRIMARY, MID, SECONDARY)
Inspection, page 6-36
ROCKER SHAFT
ORIFICE
Remove with 5 mm
bolt and clean.

(cont'd)

Cylinder Head/Valve Train

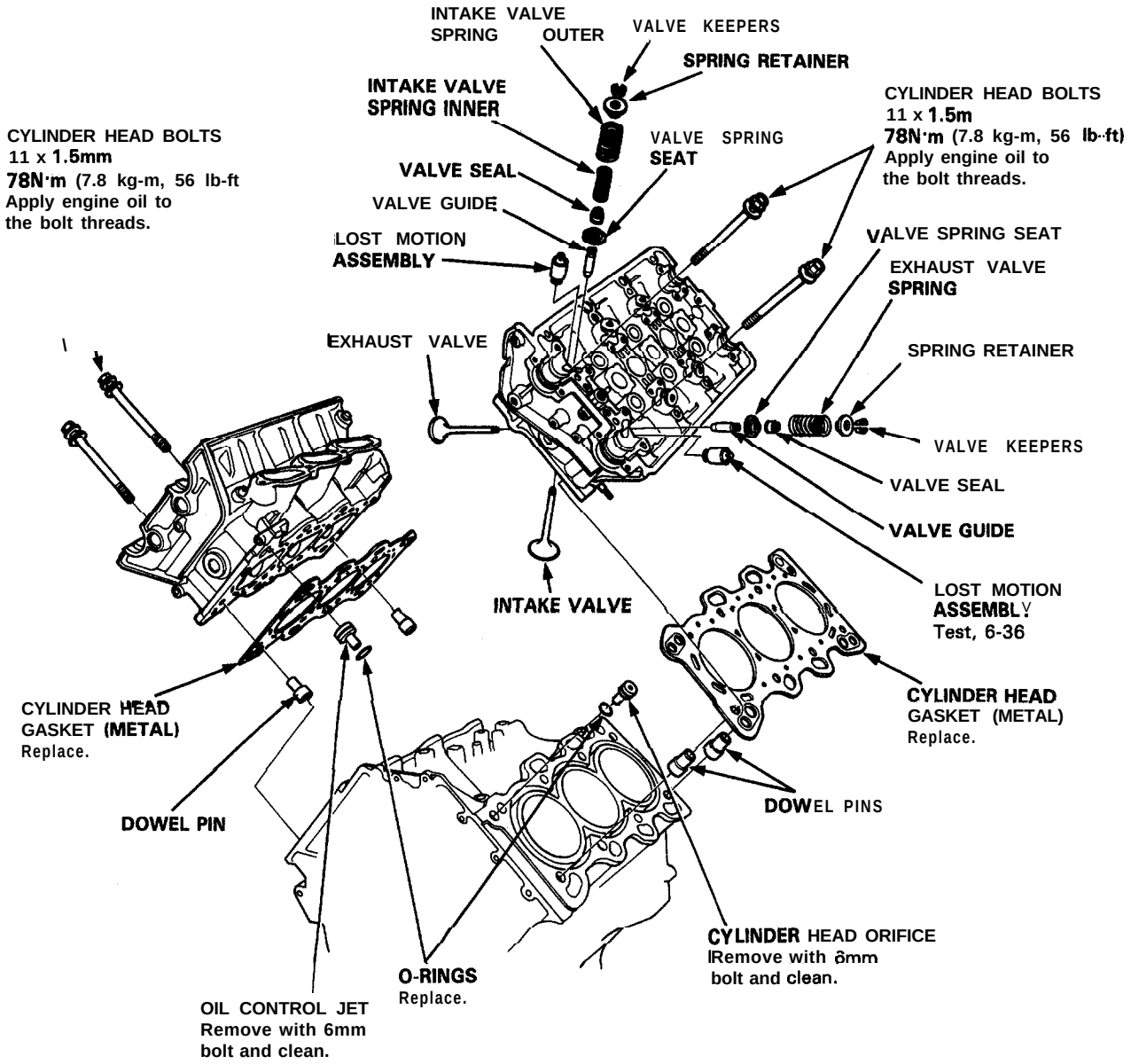
Illustrated Index (cont'd)

CAUTION:

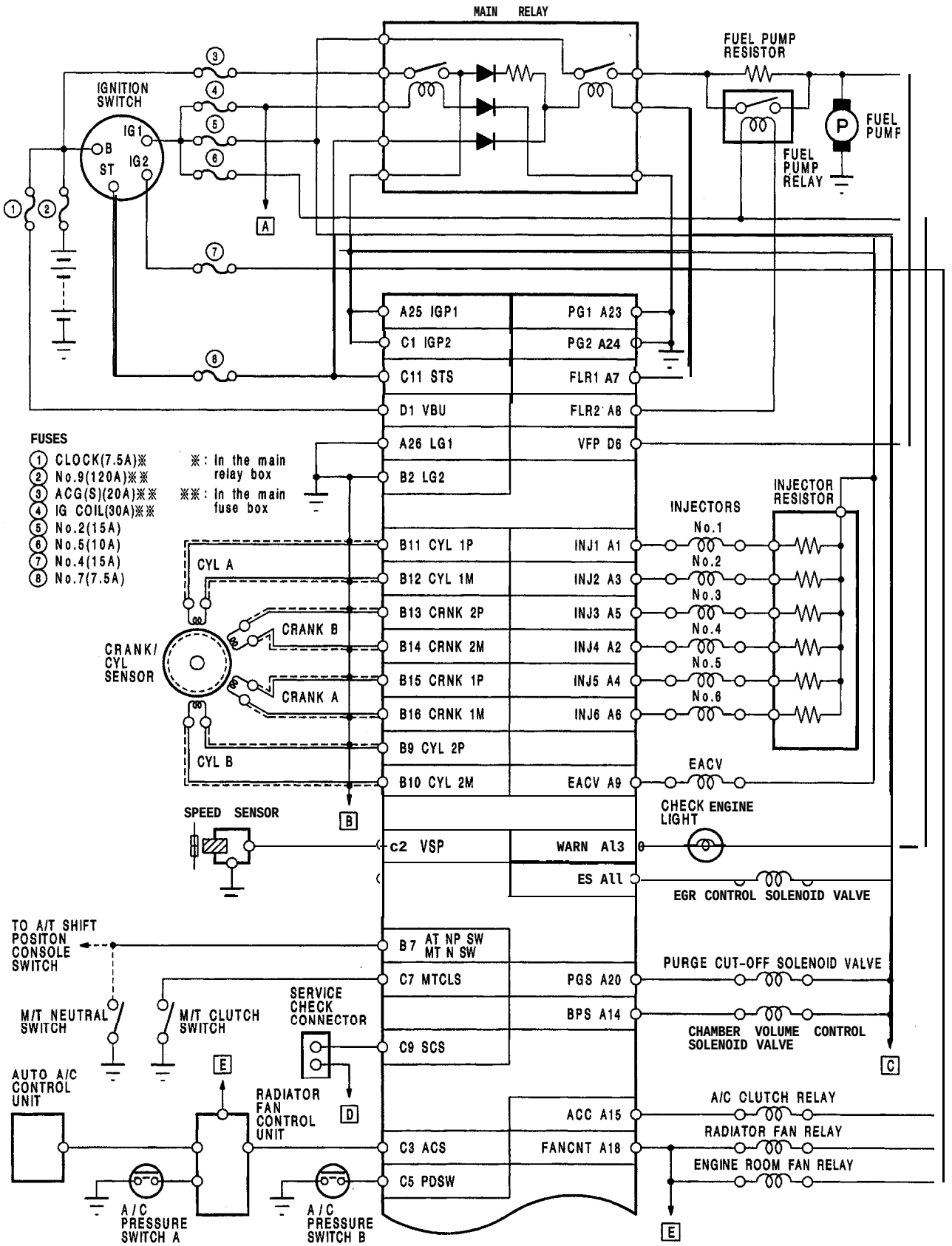
- To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (1 00°F) before removing it.
- In handling a metal gasket, care should be taken not to fold it or damage the contact surface of the gasket.

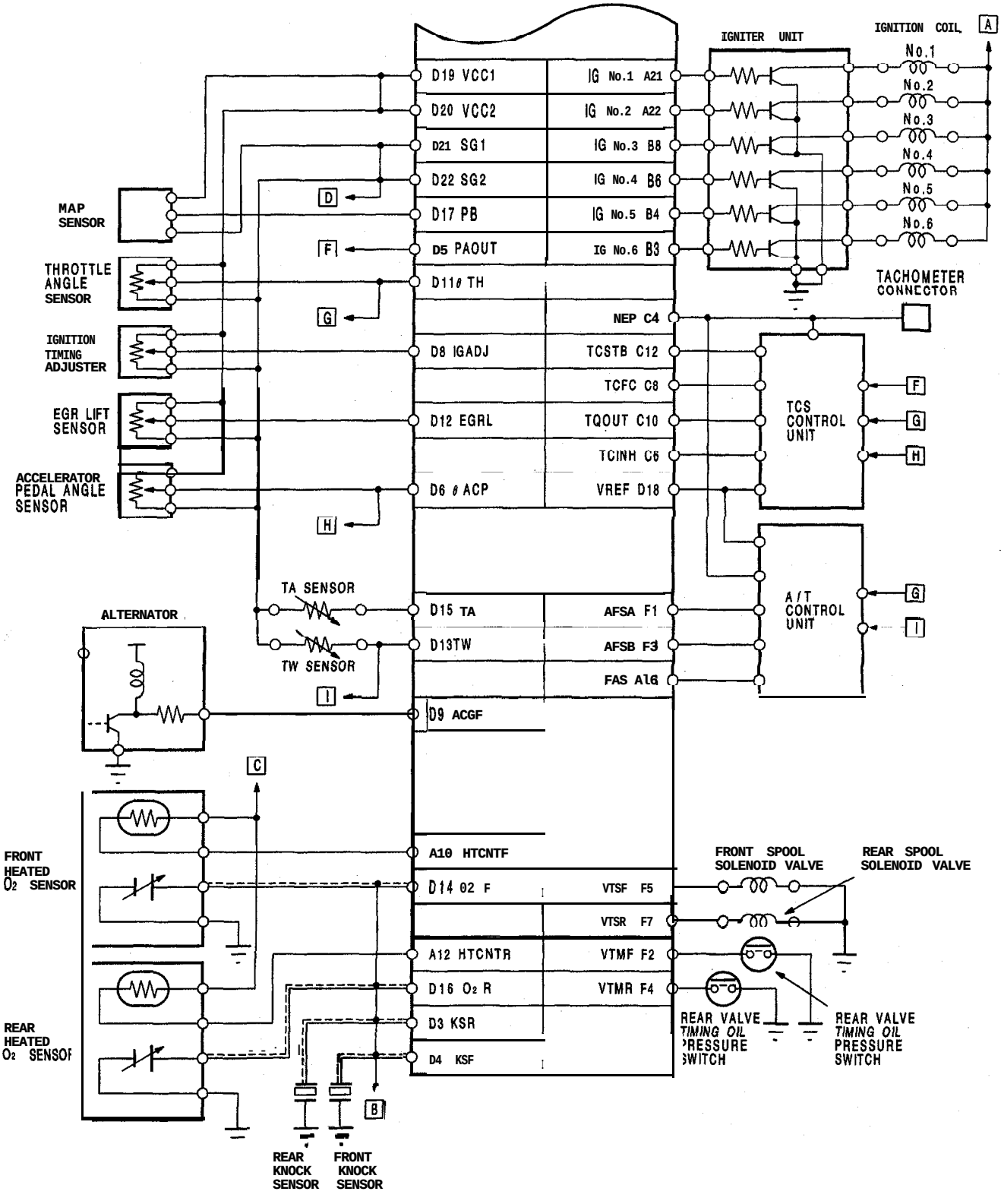
NOTE: Use new O-rings and gaskets when reassembling.

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



Electrical Connections

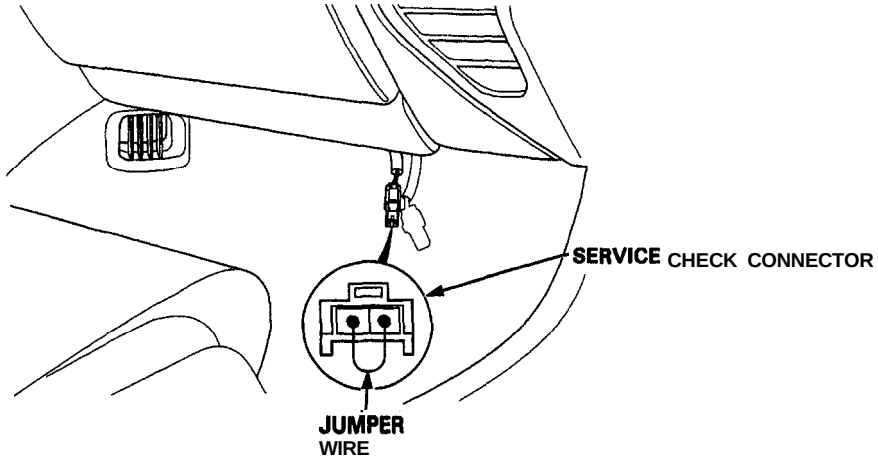




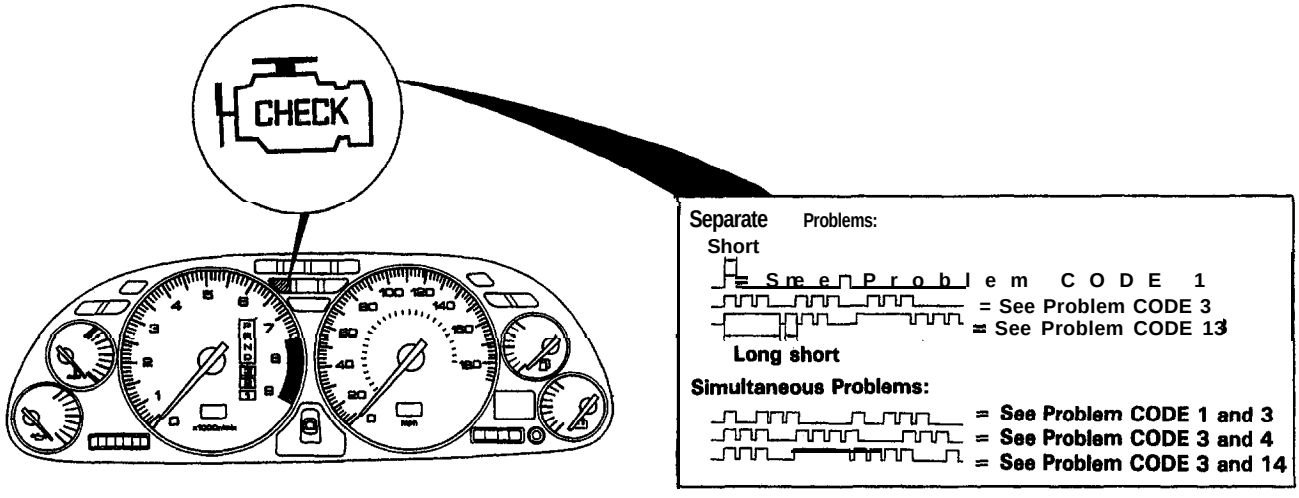
TERMINAL LOCATION

Troubleshooting -Self-diagnostic Procedures

1. Connect the Service Check Connector terminals with a jumper wire as shown (the Service Check Connector is located under the dash on the passenger side of the car).

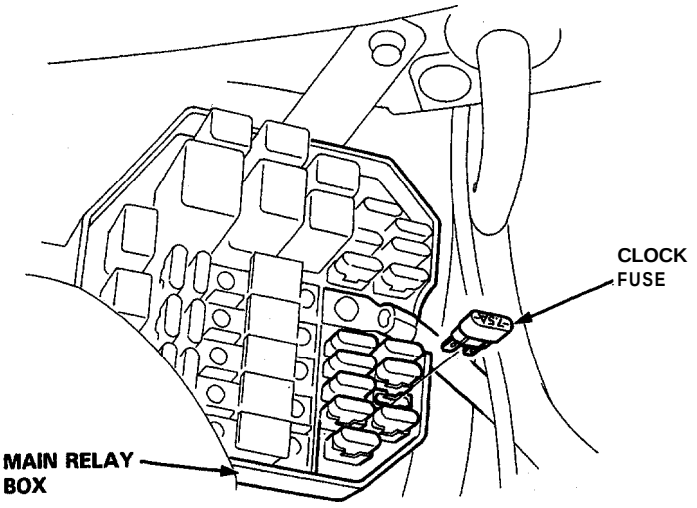


2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by a individual short blinks. Problem codes 10 through 59 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit.



2. **Remove the CLOCK fuse (7.5 A) from the main relay box for 10 seconds to reset ECU.**

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



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

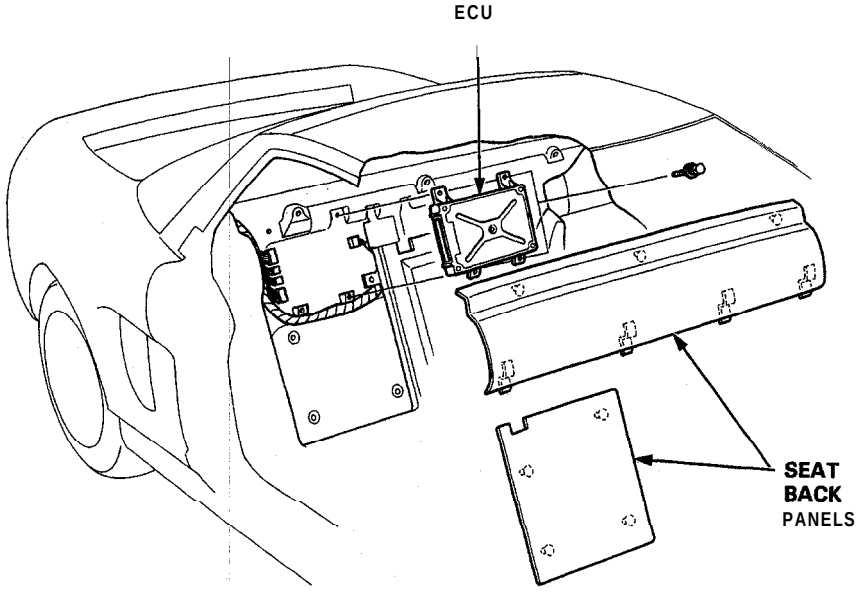
(cont'd)

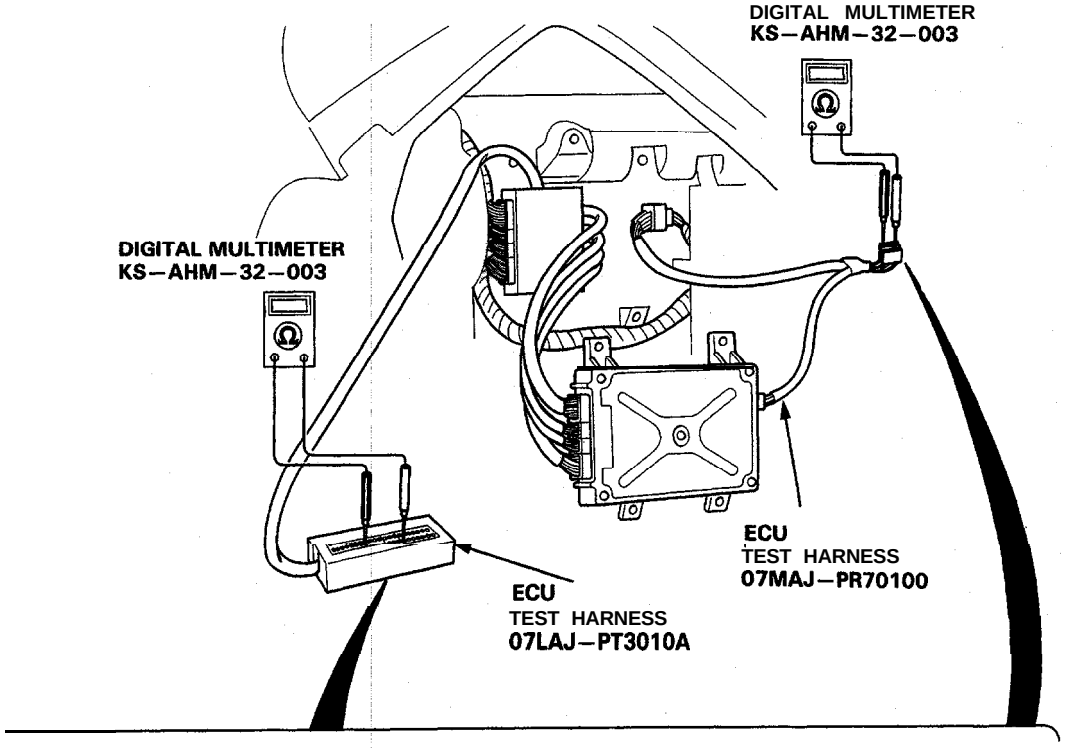
Troubleshooting -Self-diagnostic Procedures (cont'd)

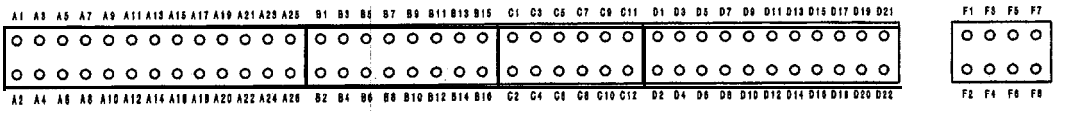
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	11-26
1	FRONT OXYGEN SENSOR	11-30
2	REAR OXYGEN SENSOR	11-30
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	11-40
5		
4	CRANK ANGLE A	11-46
6	COOLANT TEMPERATURE (TW SENSOR)	11-48
7	THROTTLE ANGLE	11-50
9	No. 1 CYLINDER POSITION A (CYL SENSOR)	11-46
10	INTAKE AIR TEMPERATURE (TA SENSOR)	11-52
12	EXHAUST GAS RECIRCULATION SYSTEM (EGR)	11-128
13	ATMOSPHERIC PRESSURE (PA SENSOR)	11-54
14	ELECTRONIC AIR CONTROL (EACV)	11-70
15	IGNITION OUTPUT SIGNAL	11-56
16	FUEL INJECTOR	11-89
17	VEHICLE SPEED SENSOR	11-58
18	IGNITION TIMING ADJUSTMENT	11-60
21	FRONT SPOOL SOLENOID VALVE	6-15
22	FRONT VALVE TIMING OIL PRESSURE SWITCH	6-17
23	FRONT KNOCK SENSOR	11-62
30	A/T FI SIGNAL A	11-64
31	A/T FI SIGNAL B	11-64
35	TC STB SIGNAL	19-100
36	TCFC SIGNAL	19-102
41	FRONT OXYGEN SENSOR HEATER	11-32
42	REAR OXYGEN SENSOR HEATER	11-32
43	FRONT FUEL SUPPLY SYSTEM	11-36
44	REAR FUEL SUPPLY SYSTEM	11-36
45	FRONT FUEL METERING	11-38
46	REAR FUEL METERING	11-38
47	FUEL PUMP	11-99
	REAR SPOOL SOLENOID VALVE	6-15
52	REAR VALVE TIMING OIL PRESSURE SWITCH	6-17
53	REAR KNOCK SENSOR	11-62
54	CRANK ANGLE B	11-46
59	No. 1 CYLINDER POSITION B (CYL SENSOR)	11-46

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.
- The Check Engine light may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine light and D indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 and 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D indicator light. If it comes on, see page 14-52.
- The Check Engine light and TCS indicator light may come on simultaneously when the self-diagnosis indicator blinks 3, 5, 6, 13, 15, 16, 17, 35 and 36. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the TCS indicator light. If it comes on, see page 1 S-84.
- The Check Engine light does not come on when there is a malfunction in the A/T FI signal. However, when the two terminals of the service check connector are connected with a jumper wire and, the Check Engine light will indicate the codes.

If the inspection for a particular failure code requires the ECU test harness, remove the seat back panels. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.







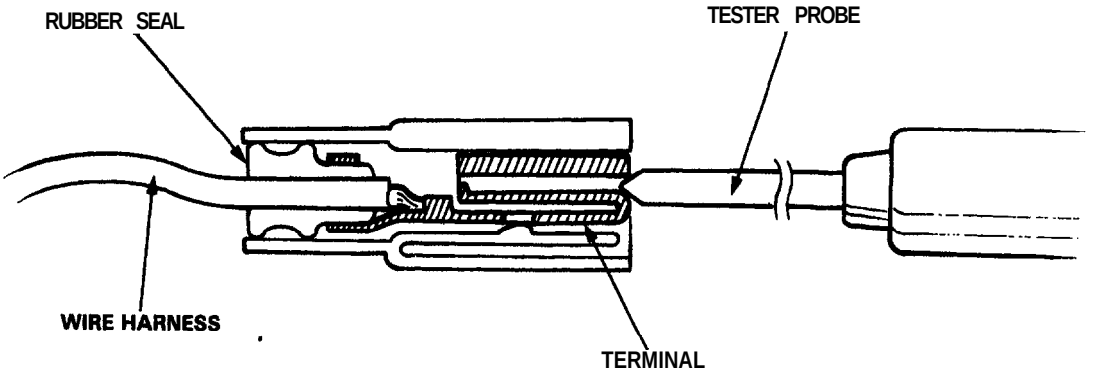
TERMINAL LOCATION

(cont'd)

Troubleshooting — Self-diagnostic Procedures (cont'd)

CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the ECU test harness, 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.

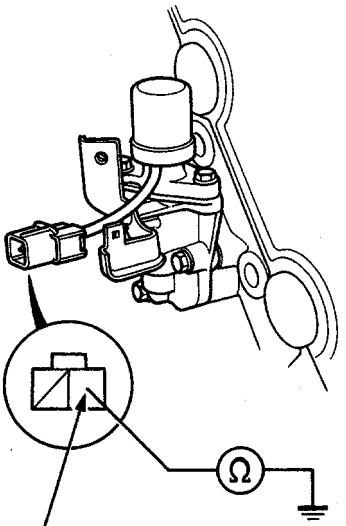


Troubleshooting Flowchart — Spool Valve

(21) (Front) or (51) (Rear) Check Engine indicates code 21 (Front) or 51 (Rear): A problem in the Spool Valve circuit.

Disconnect the 2P connector from the spool valve.

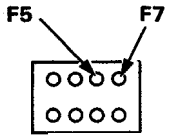
Check for continuity between YEL (Front) or BLU/YEL (Rear) terminal and body ground.



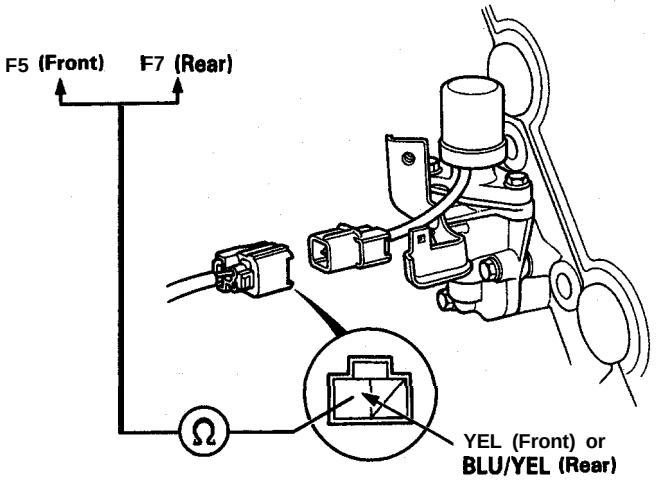
Is there 14–30 Ω?

NO → Replace the spool valve.

YES



Connect the ECU test harness.



Check for continuity between YEL (Front) or BLU/YEL (Rear) terminal and F5 (Front) or F7 (Rear) terminal.

Does continuity exist ?

NO → Repair open in YEL (Front) or BLU/YEL (Rear) wire between ECU and spool valve connector.

YES

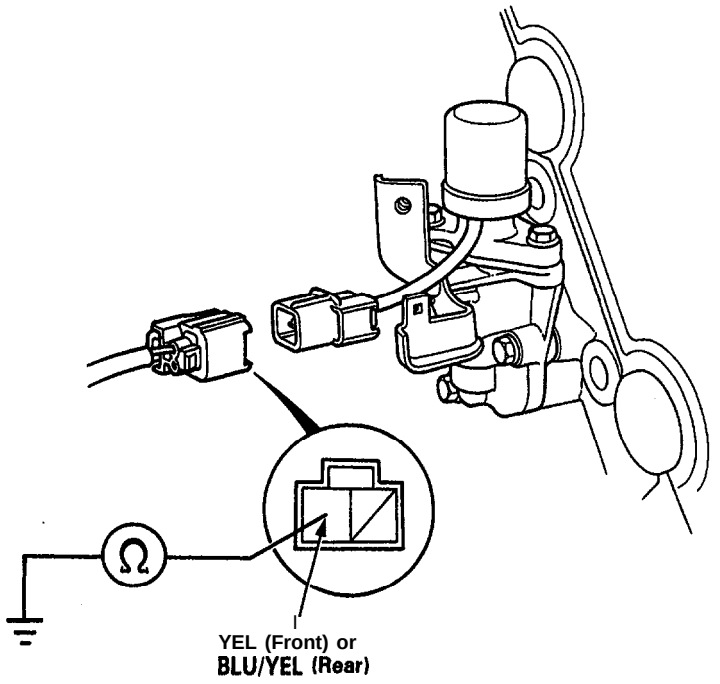
(To page 6-16)

(cont'd)

-Troubleshooting Flowchart — Spool Valve (cont'd)

(From page 6-15)

Check for continuity between YEL (Front) or BLU/YEL (Rear) terminal (harness side) and body ground.



Does continuity exist ?

YES → Repair short in YEL (Front) or BLU/YEL (Rear) wire between ECU and spool valve connector.

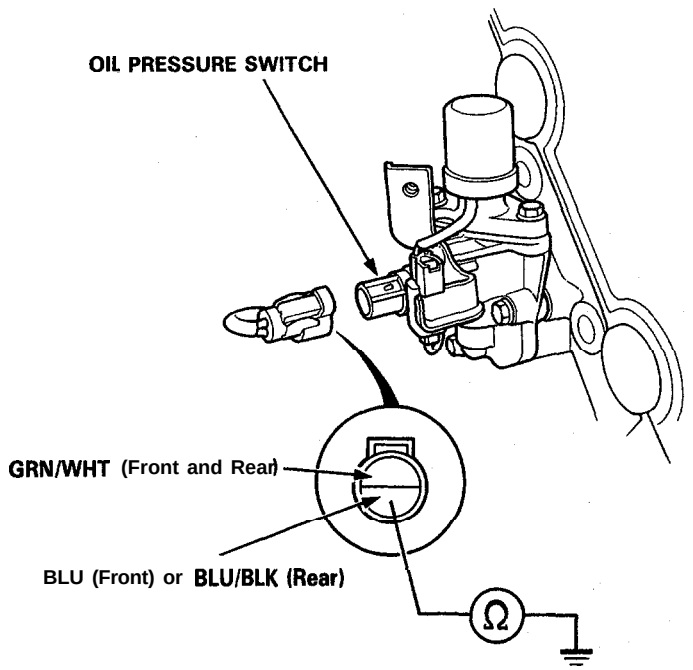
NO

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

-Troubleshooting Flowchart ----Oil Pressure Switch

(22)2 (Front) or (52)2 (Rear) Check Engine indicates code. 22 (Front), 52 (Rear): A problem in the Oil Pressure Switch circuit.

Disconnect the 2P connector from the oil pressure switch.



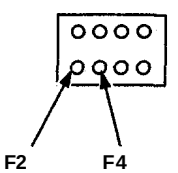
Check for continuity between BLU (Front) or BLU/BLK (Rear) terminal and body ground.

Does continuity exist ?

NO → Repair open in BLU (Front) or BLU/BLK (Rear) wire between 2P connector and body ground.

YES

Connect the ECU test harness.



Check for continuity between BLU (Front) or BLU/BLK (Rear) terminal and F2 (Front) or F4 (Rear) terminal.

Does continuity exist ?

NO → Repair open in BLU (Front) or BLU/BLK (Rear) wire between ECU and 2P connector.

YES

(To page 6-18)

(cont'd)

Troubleshooting Flowchart — Oil Pressure Switch (cont'd)

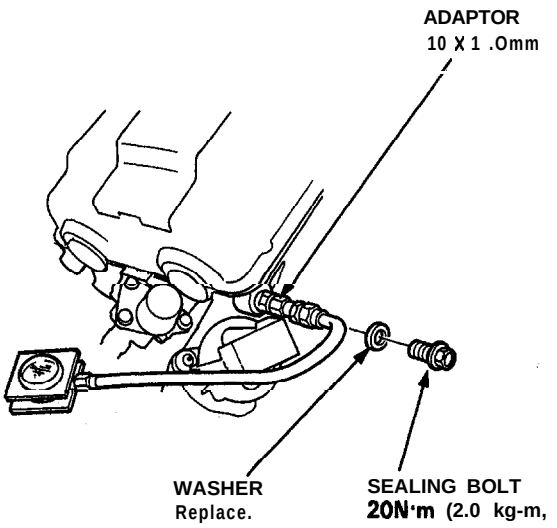
(From page 6-17)

Remove 10 mm sealing bolt and connect oil pressure gauge (for VTEC oil pressure test).

Connect a tachometer.

Start the engine and warm it up to normal operating temperature

Check oil pressure at 1,000 rpm, 3,000 rpm and 5,000 rpm.



NOTE: Keep measuring time as short as possible because engine is running with no load (within one minute).

Is pressure below 49 kPa (0.5 kg/cm^2 7 psi) ?

NO → Inspect the spool valve.

YES

Turn off the engine.
Check for continuity between the, 2 terminals on the oil pressure switch.

Does continuity exist 7

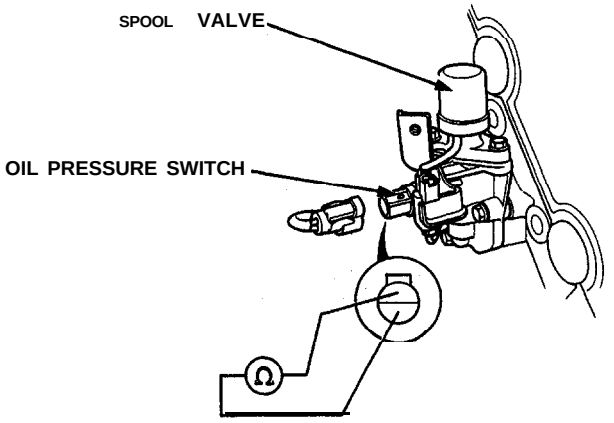
NO → Replace oil pressure switch.

YES

Disconnect the 2P connector from the spool valve.

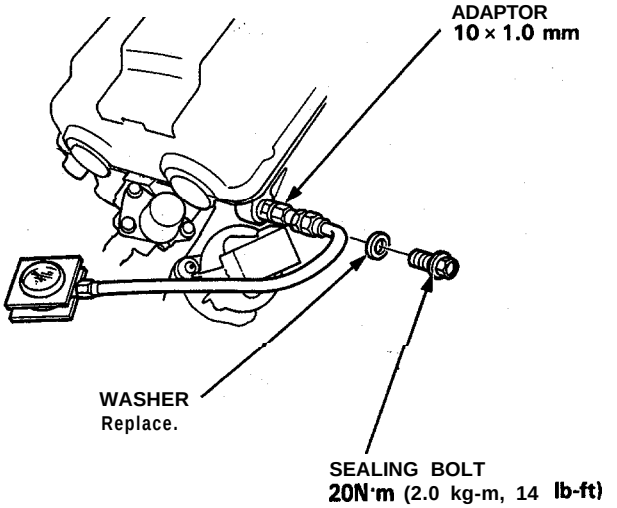
Attach the battery positive terminal to the YEL (Front) or BLU/YEL (Rear) terminal.

(To page 6-19)



(From page 6-18)

Start the engine and check oil pressure at 5,000 rpm.



Note: Keep measuring time as short as possible because engine is running with no load (within one minute).

Is pressure above 392 kPa (4 kg/cm^2, 57 psi) ?

NO → Inspect the spool valve.

YES

Check for continuity between the 2 terminals on the oil pressure switch under above condition.

Does continuity exist ?

YES → Replace oil pressure switch.

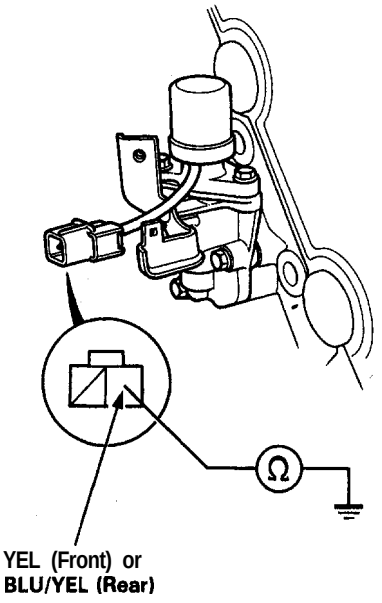
NO

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

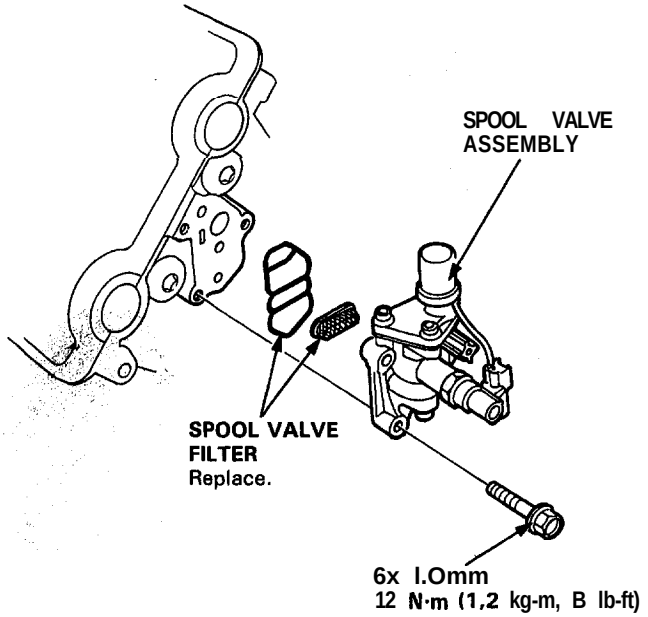
-Spool Valve Inspection

1. Disconnect the 2P connector from the spool valve.
2. **Measure resistance between the YEL (Front) or BLU/YEL (Rear) terminal and body ground.**

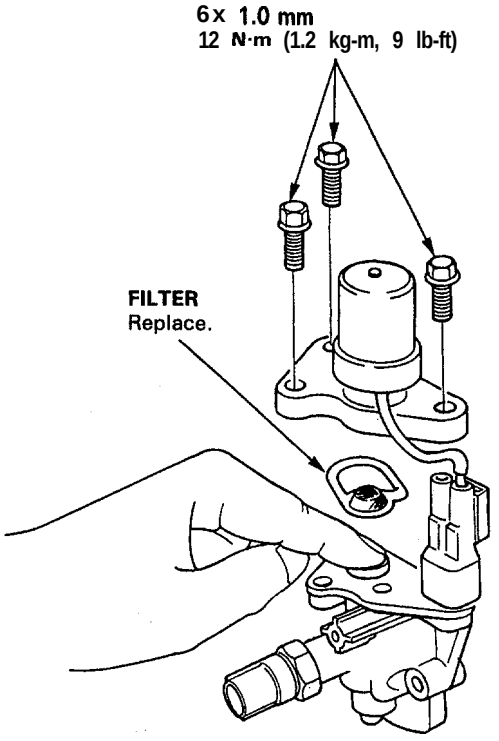
   Resistance: approx 14-30 ohms



3. If the resistance is within specifications, remove the **spool valve assembly from the clinder head, and check the spool valve filter for clogging.**
   - If there is clogging, replace the engine oil filter and **the engine oil.**



4. **If filters are normal, push the spool valve with the** finger and check its movement.
   - **If spool valve is normal, check the engine oil** pessure.

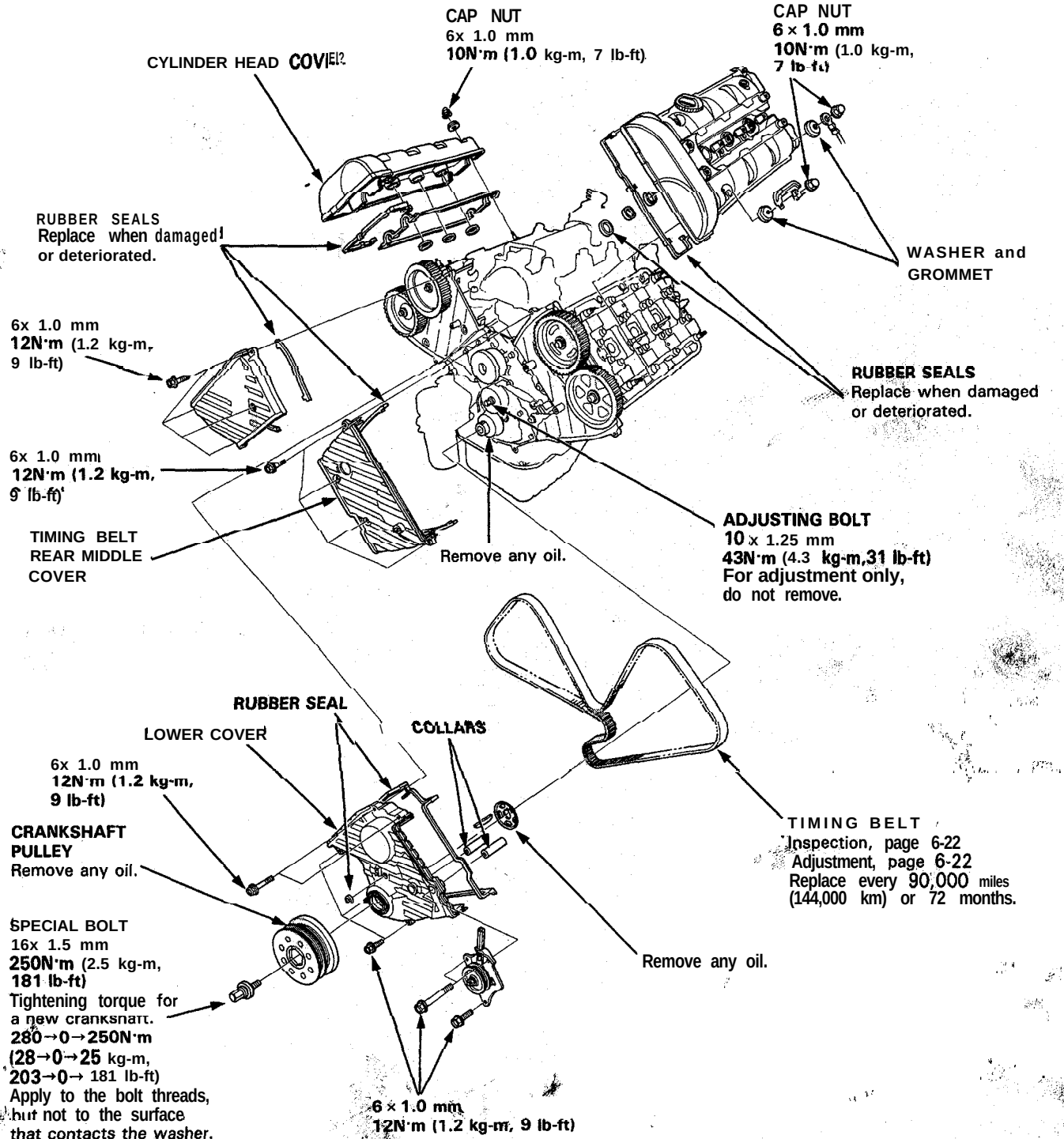


Timing Belt

Illustrated Index

NOTE:

- Turn the crankshaft so that the No. 1 piston is at TDC (page 6-25, 26)
- Replace rubber seals if damaged or deteriorated.
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling of.
- After installation, fill the engine with oil up to the specified level, run the engine fbr more than 3 minutes, then check for oil leakage.
- When installing a new crankshaft; @tighten the crankshaft pulley bolt to 280N·m (28 kg-m, 203 lb-ft), ② loosen it, ③ retighten it to 250 N·m (25 kg-m, 181 lb-ft).



Timing Belt

Inspection

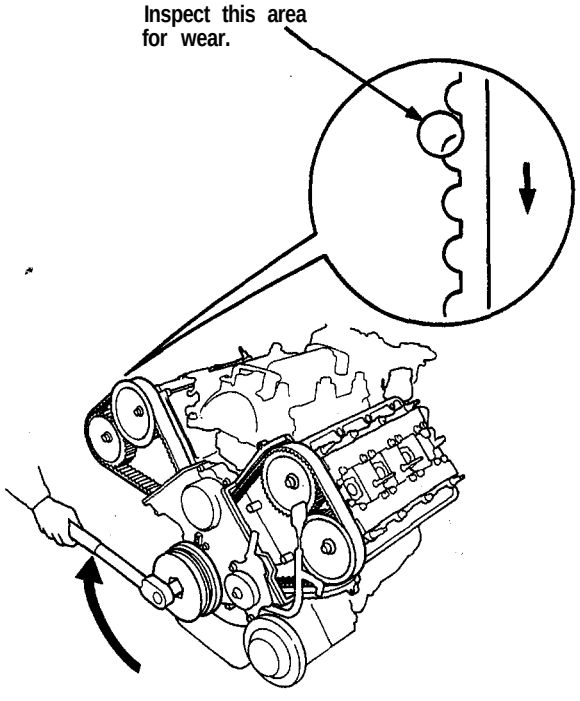
1. Remove the ignition coil covers and harness clamps.
2. Disconnect the connectors, then remove the ignition coils.

NOTE:

3. Remove the cylinder head covers.
4. Inspect the timing belt for cracks and oil soaking.

NOTE:

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



Tension Adjustment

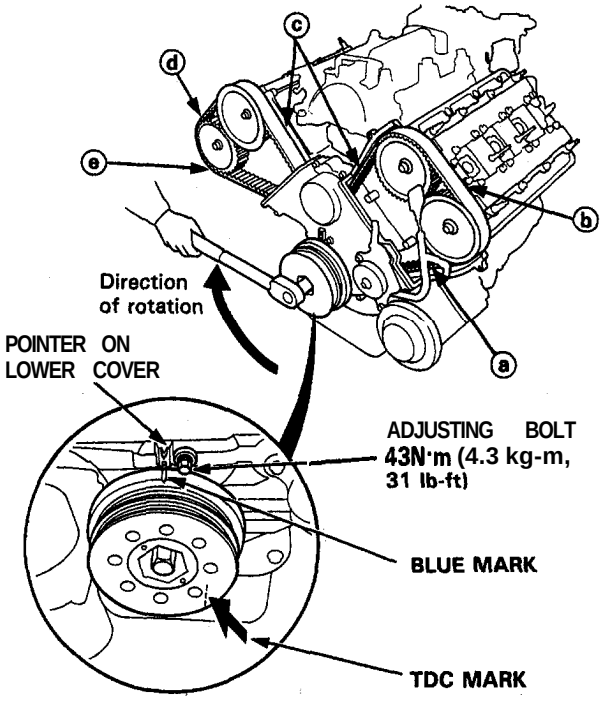
CAUTION:

- Always adjust timing belt tension with the engine cold.
- Do not rotate the crankshaft when adjusting bolt is loose (the timing belt will skid over the teeth of the rear intake cam pulley).
- Never adjust the belt tension on any other occasion than when the belt is removed for belt or parts replacement.

NOTE:

- Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Inspect the timing belt before adjusting the belt tension.
- Always rotate the crankshaft clockwise. Rotating it counterclockwise may result in improper adjustment of the belt tension.

1. Install the timing belt with the No. 1 piston at TDC (page 6-25, 26).
2. Fix the crankshaft, remove the slack in the sequence of ⓐ, ⓑ, ⓒ, and ⓓ by turning each cam pulley.
3. Loosen the timing belt adjusting bolt 1 80° (the slack at ⓔ should be eliminated).
   Then, tighten the timing belt adjusting bolt.
4. Set the No. 1 piston at TDC (page 6-26)
5. Rotate the crankshaft clockwise g-teeth on camshaft pulley (The blue mark on crankshaft pulleys should be line up with the pointer on lower cover).
6. Loosen the timing belt adjusting bolt.
7. Retighten the adjusting bolt torque to 43 N·m (4.3 kg-m, 31 lb-ft).



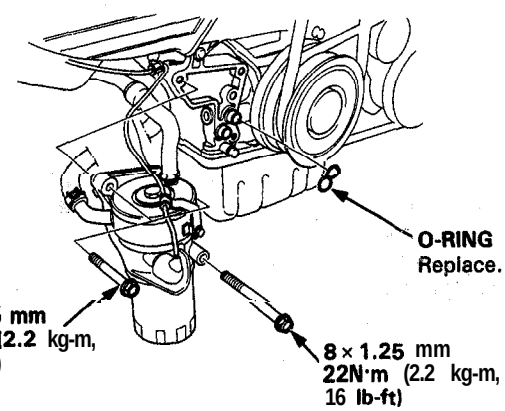
Timing Belt

Removal

CAUTION: Inspect the water pump when replacing the timing belt (page IO- 11).

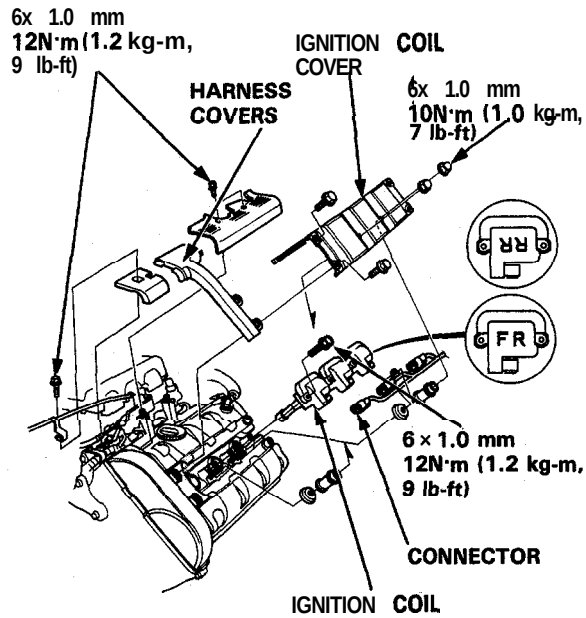
NOTE:
- Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-25, 26).
- Before removing the timing belt, mark direction of rotation if it is to be reused.

1. Disconnect the negative terminal from the battery.
2. Raise the car.
3. Remove the right rear wheel/tire.
4. Remove the engine oil cooler base assembly.
   - Do not disconnect the hoses.

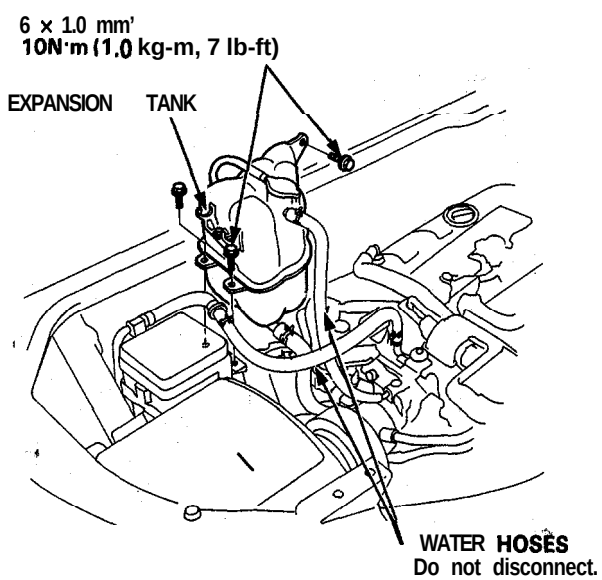


5. Lower the car.
6. Remove the strut bar (page 5-19).
7. Remove the intake mainifold plate.
8. Remove the top cover (page 5-21).
9. Remove the ignition coil covers.
10. Remove the injector cover and the wire harness covers.
11. Remove the ignition coils and the connecters.

NOTE:
- There are front and rear ignition coils and covers. They can be identified by the mark FF (front) or RR (rear) printed on them.
- When installing front and rear ignition coil covers, attach a rubber seal to the intake side.



12. Remove the expansion tank.
    NOTE: Do not disconnect water hoses.

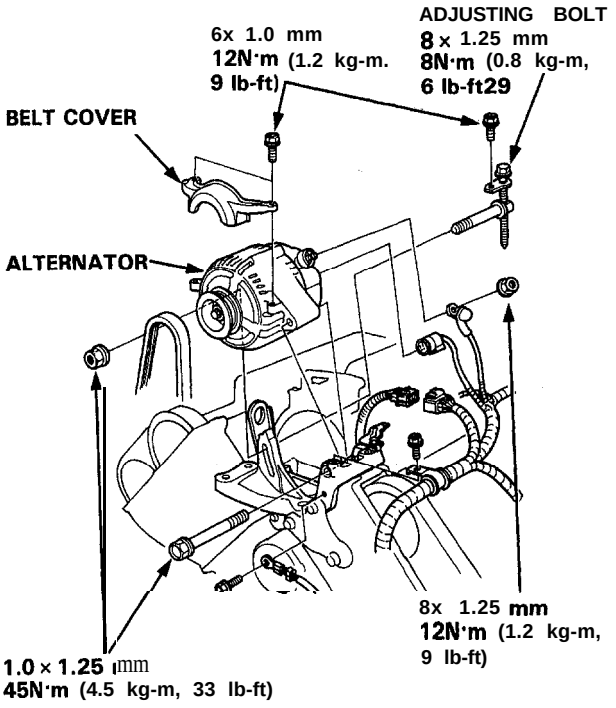


13. Remove the breather hose, and the air cleaner case (page 5-22).

(cont'd)

Timing Belt

-Removal (cont'd)



14.' Remove the connector, the terminal' and the alternator.

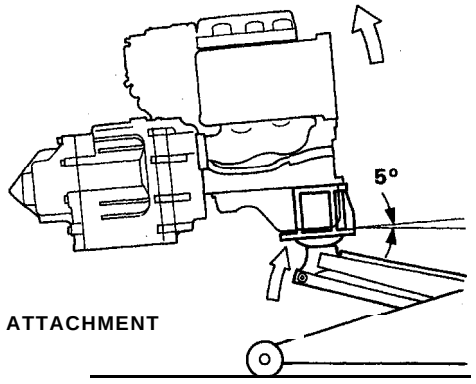
15. Remove the side engine mount, then push into the side mounting bracket housing of the body (page 5-26).

16. Remove the transmission mount.

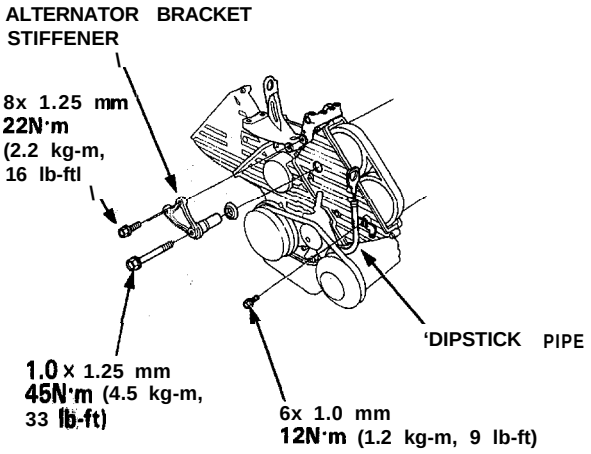
17. Remove the cylinder head covers.

18. Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-25, 26).

19. Install the attachment under the engine, then tilt the engine approximately 5° using a jack.



20. Remove the alternator bracket stiffener.



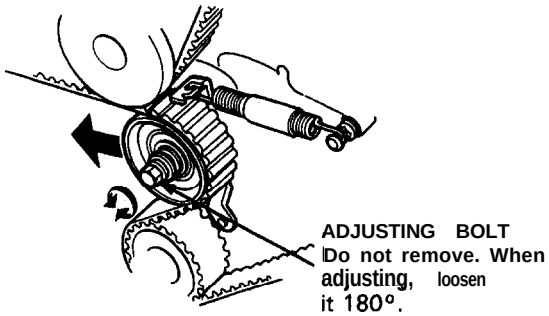
2 1. Remove the A/C adjusting pulley and belt.

22. Remove the dipstick pipe mounting bolt, then remove the front and rear timing belt middle covers.

23. Remove the crankshaft pulley, then remove the timing belt lower cover.

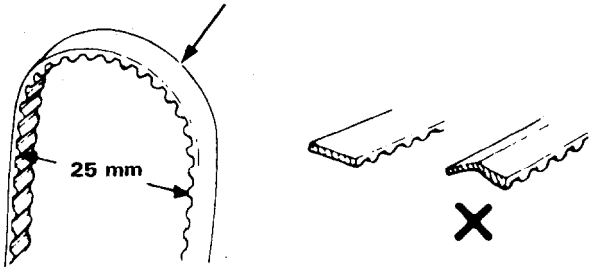
24. Loosen the timing belt adjusting bolt 180° and release the belt tension.

NOTE: Push the tensioner to release tension from the belt, then retighten the adjusting, bolt.



25. Remove the timing belt from the pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in.) in diameter.



- Installation

CAUTION: Do not rotate the crankshaft or camshaft without installing the belt. The piston could hit a valve and damage may result.

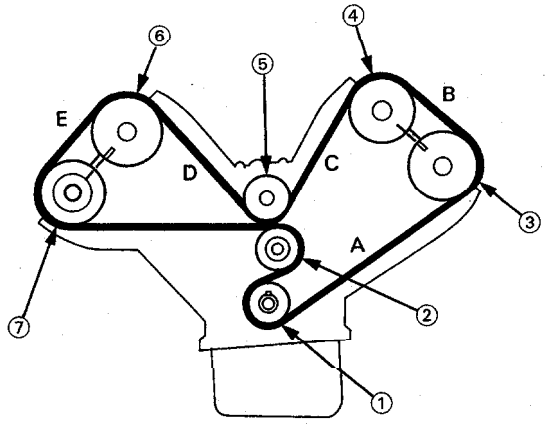
1. install the timing belt in the reverse order of removal; Only keypoints are described here.

2. Remove all spark plugs.

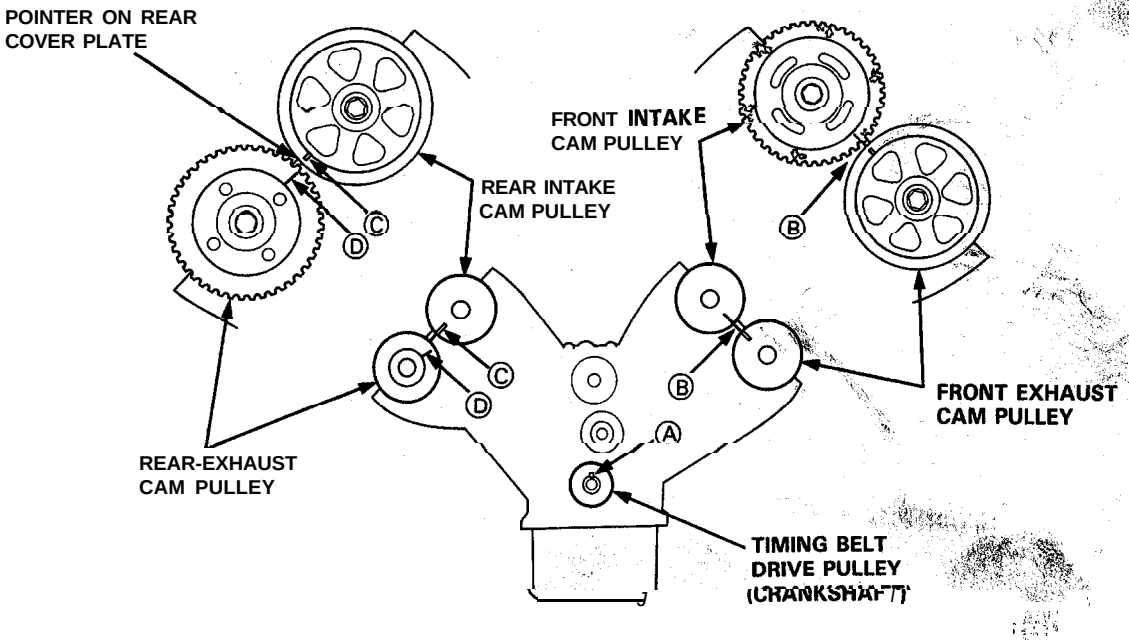
3. Position the crankshaft and the cam pulleys as shown before installing the timing belt.

   Ⓐ Set the crankshaft so that the No.1 piston is at top-dead-center (TDC).
   NOTE: Turn the crankshaft until its keyway is facing up.
   Ⓑ Align the TDC mark on the front exhaust cam pulley and front intake cam pulley to the pointer on the front timing belt cover plate.
   Ⓒ Align the TDC mark on the rear intake cam pulley to the pointer on the rear timing belt cover plate.
   Ⓓ Advance the rear exhaust cam pulley to one half tooth from TDC.

4. Install the timing belt in the sequence shown.
   @Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Front exhaust cam pulley → ④ Front intake cam pulley → @Water pump pulley → ⑥ Rear intake cam pulley → ⑦ Rear exhaust cam pulley.



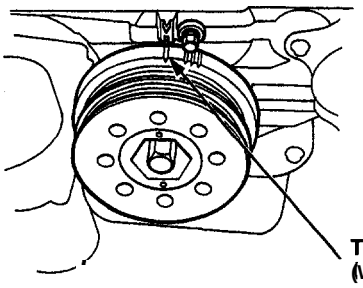
5. Tension the timing belt between the pulleys in the sequence A to E as shown above.
   - Refer to page 6-22 for timing belt tension adjustment.

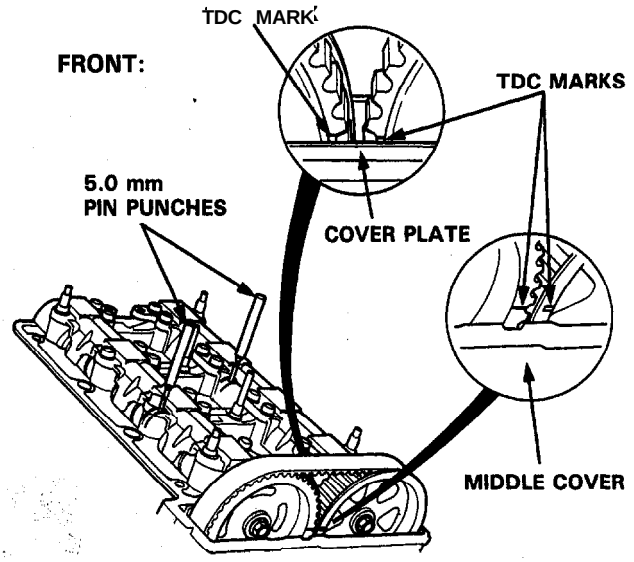


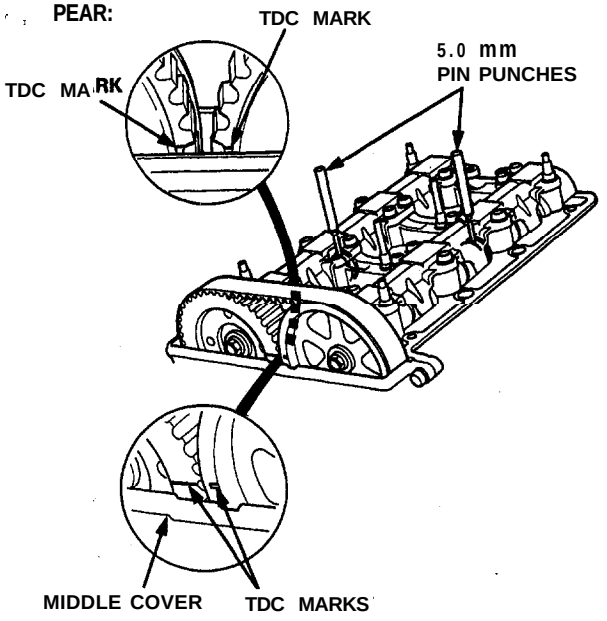
(cont'd)

Installation (cont'd)

6. Check the crankshaft pulley and the cam pulleys at TDC.



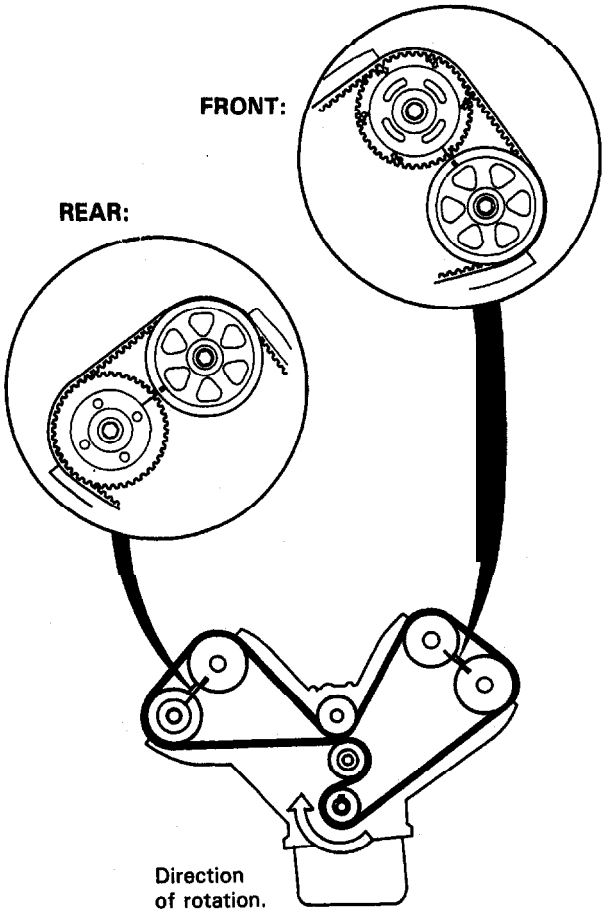




7. If the cam pulleys are not positioned at TDC, remove the timing belt and adjust the positioning following procedure, then reinstall the timing belt.

NOTE:

- Refer to page 6-23 for timing belt removal.
- Bring the "UP" mark of the cam pulleys to the top, and align the TDC marks on the pulleys.
- Align the holes on the camshaft holder pipes to the camshaft holes, insert 5.0 mm pin punches and fix them at TDC.
- Remove the pin punches after the timing belt has been reinstalled.



NOTE:

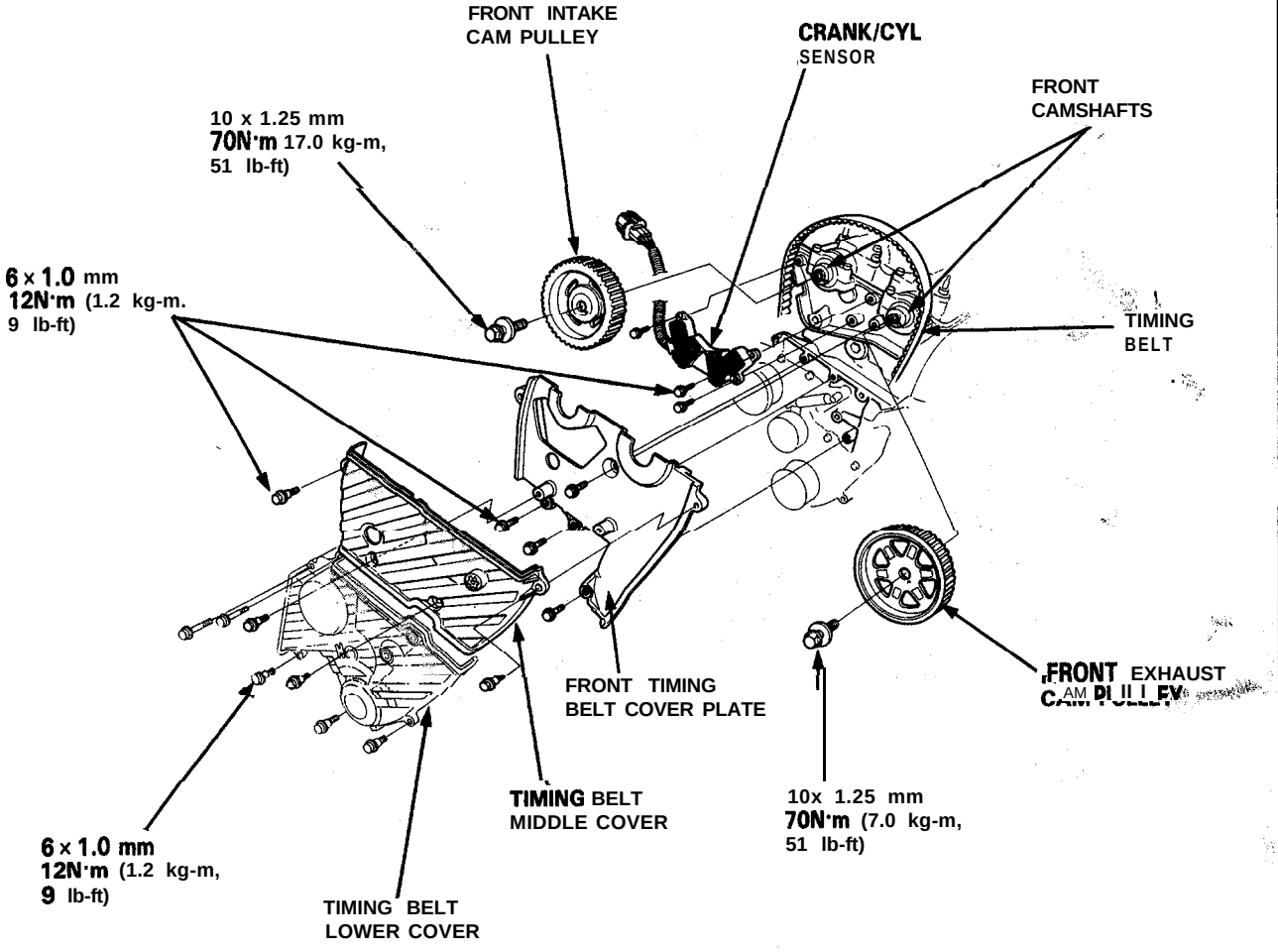
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

CRANK/CYL Sensor

Replacement

NOTE: Turn the crankshaft so that the No.1 piston is at top-dead-center (page 6-26).

1. **Remove the timing belt (page 6-23 and 24).**
2. **Remove the front intake and exhaust cam pulleys.**
3. **Remove the front timing belt cover plate.**
4. **Remove the CRANK/CYL sensor from the front cylinder head.**
5. **Install the CRANK/CYL sensor in the reverse order of removal;**
   - **Refer to page 6-25 and 26, when installing the timing belt.**



Cylinder Heads

Removal

NOTE: Engine removal is not required in this procedure.

CAUTION: To avoid damaging the cylinder heads, wait until the coolant temperature drops below 38°C (100°F) before loosening the retaining bolts.

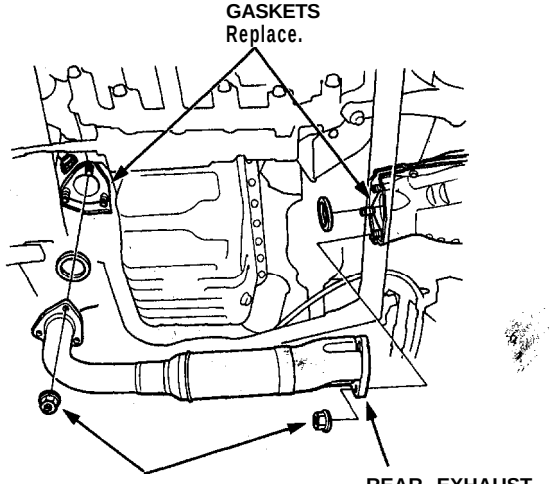
NOTE:
- Inspect the timing belt before removing the cylinder heads.
- Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-25, 261.
- Mark ail emission hoses before disconnecting them.

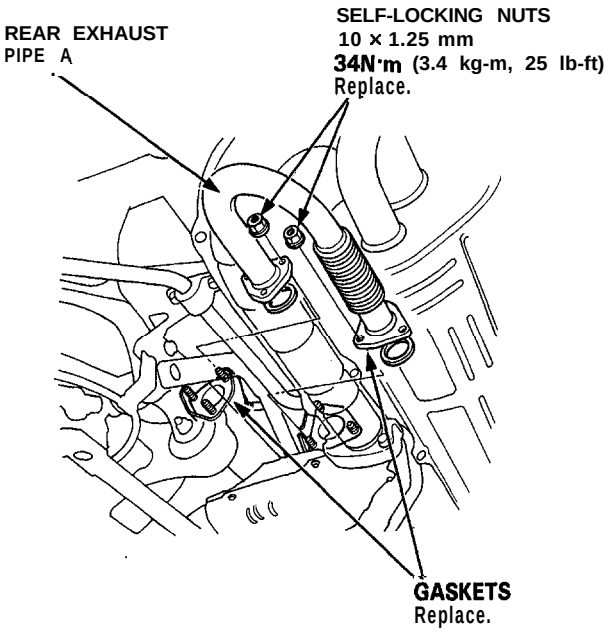
1. Disconnect the negative terminal from the battery.
2. Remove the expansion tank cap.

WARNING Use care when removing the expansion tank cap to avoid scalding by coolant or steam.

3. Raise the car.
4. Remove the right rear wheel/tire.
5. Remove the engine under guard, then remove the front exhaust pipe A.
6. Remove the exhaust pipe A.

CAUTION: Do not use air wrench or hammer for removing the exhaust pipe A and the catalytic converter if the oxygen sensors are not to be removed.





7. Remove the under cover, then remove the water pipe drain bolts and drain the coolant.
8. Attach the hoses to front and rear engine drain bolts, then loosen the bolts and drain the coolant.
   - Bleed air from the cooling system when installing the cylinder heads (page 10-5).

   CAUTION: Failure to comply with the bleeding procedure could cause imperfect bleeding, which may result in severe engine damage.
9. Remove the engine oil cooler base assembly (page 6-23).
10. Lower the car.
11. Remove the strut bar (Page 5-19).
12. Remove the intake manifold plate and top cover (page 5-21).
13. Remove the throttle cable by loosening the locknut, then slip the cable and nut off the throttle bracket and throttle link (page 5-21).

NOTE:
- Take care not to bend the cable when removing it. Always replace a kinked cable with new one.
- Adjust throttle cable when installing (See Section 11).

14. Relieve fuel pressure (See Section 11).
⚠ WARNING Do not smoke while working on fuel system; keep open flame or spark away from work area. Drain fuel only into an approved container.

15. Disconnect the fuel feed hose and the return hose (page 5-21).

16. Remove the ignition coil covers, the wire harness covers, the ignition coils and the connectors (page 6-23).

17. Remove the water hoses, then remove the expansion tank (page 5-21).

18. Remove the breather hose, and the air cleaner case (page 5-22).

19. Remove the brake booster hose, the charcoal canister hose and other hoses from the intake manifold and throttle body (page 5-22).

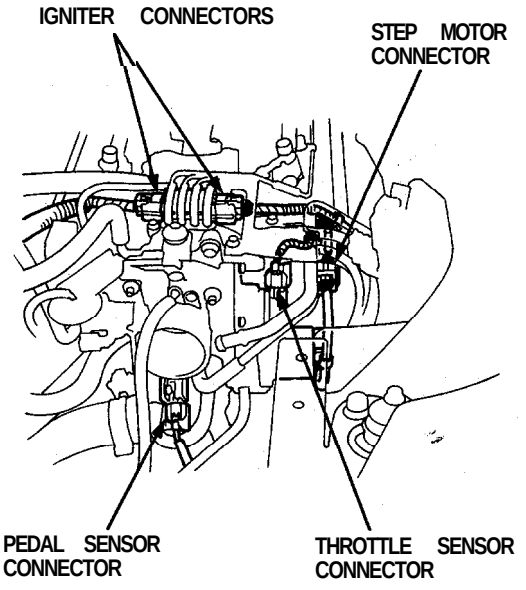
20. Remove the emission control box (page 5-23).
- Do not disconnect emission hoses.
- Disconnect the three connectors before removing.

21. Remove the connector, the terminal and the alternator.

22. Disconnect the engine wire harness connectors, then remove the harness clamps from the cylinder head and the intake manifold.

Front cylinder head:
- CRANK/CYL sensor connector
- A/C compressor magnetic clutch connector
- Oxygen sensor connector
- Ground cable terminal
- Ground terminal
- Three injector connectors (cylinders No.4, 5, and 6)
- TA sensor connector
- Igniter connector
- Condenser connector
- Oil pressure sensor connector (oil pressure gauge)
- Spool valve connector
- Oil pressure switch connector (VTEC)
- TW sensor connector (for emission)
- Temperature sender unit connector
- Pedal sensor connector (throttle body)
- TW sensor connector (for radiator fan)

Rear cylinder head:
- Oil pressure switch connector (oil cooler base)
- Oxygen sensor connector
- Three injector connectors (cylinders No. 1, 2, and 3)
- EACV connector
- Knock sensor connector
- Step motor connector (throttle body)
- Throttle sensor connector
- Spool valve connector
- Oil pressure switch connector (VTEC)
- Igniter connector
- Ground terminal

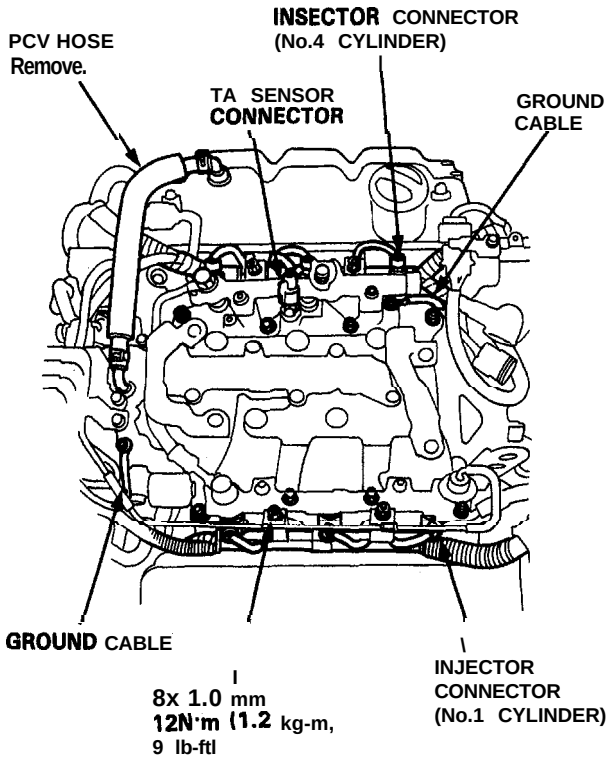


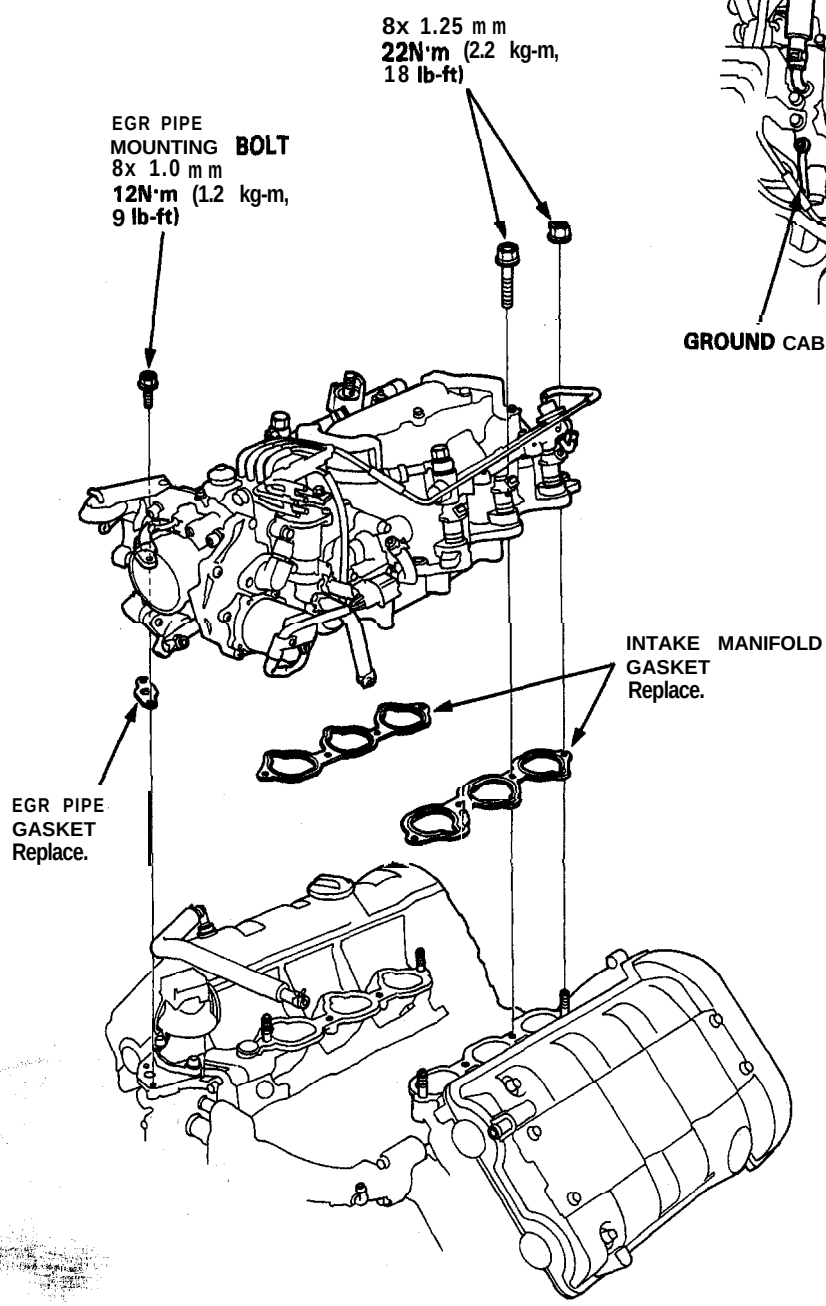
(cont'd)

-Removal (cont'd)

23. Remove the EGR pipe and the intake manifold assembly.

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



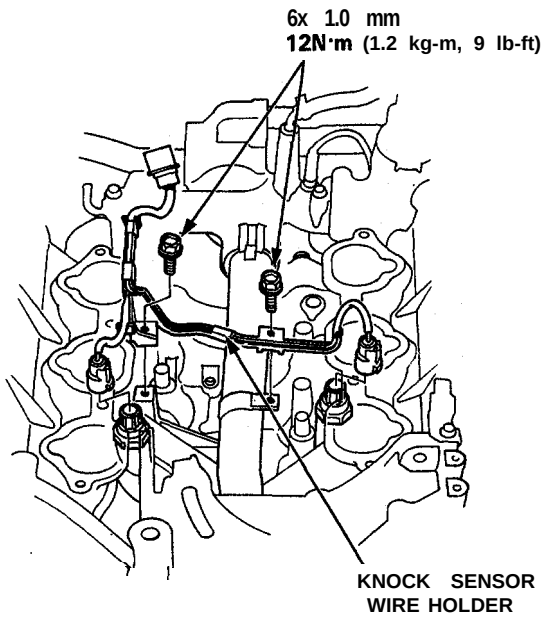


24. Remove the side engine mount, then push it into the side mounting bracket housing of the body (page 5-26).

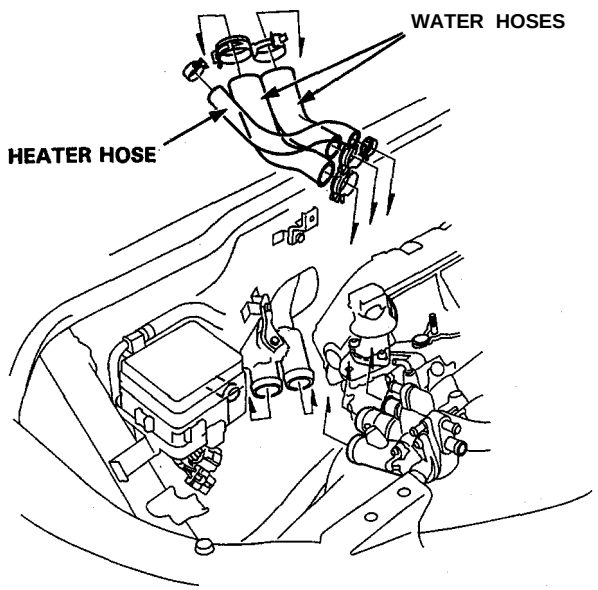
25. Remove the transmission mount.

26. Remove the alternator bracket stiffener (page 6-24).

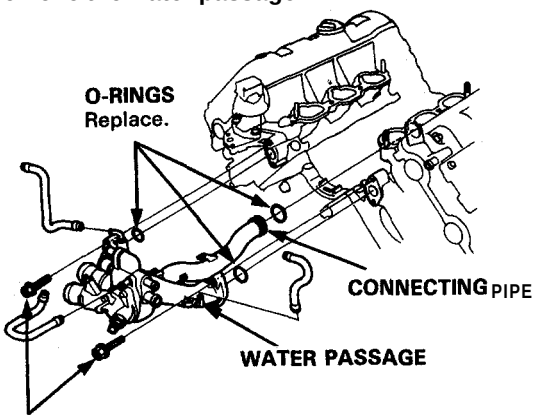
27. Disconnect the knock sensor connectors, then remove the wire holder.



28. Remove the heater hose and the water hoses.



29. Remove the water passage.

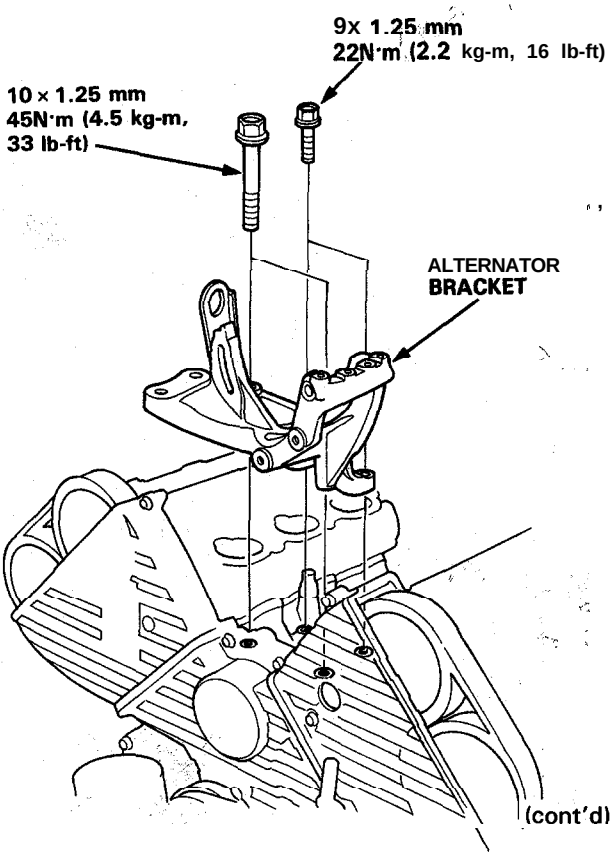


30. Remove the cylinder head covers.

31. Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-25, 26).

32. Install the attachment under the engine, then tilt the engine approximately 5° using a jack (page 6-24)

33. Remove the alternator bracket.



(cont'd)

Removal (cont'd)

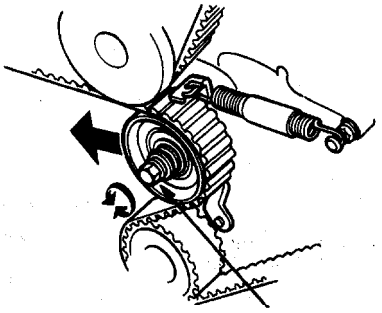
NOTE: Removal of the following items is not necessary if only the rear cylinder head is going to be removed.
- A/C adjusting pulley and A/C belt
- Timing belt lower cover
- Crankshaft pulley

34. Remove the A/C adjusting pulley and belt.

33. Remove the dipstick pipe mounting bolt, then remove the front and rear timing belt middle covers.

35. Remove the crankshaft pulley, then remove the timing belt lower cover.

36. Loosen the timing belt adjusting bolt 180° and release the belt tension.
NOTE: Push the tensioner to release tension from the belt, then retighten the adjusting bolt.

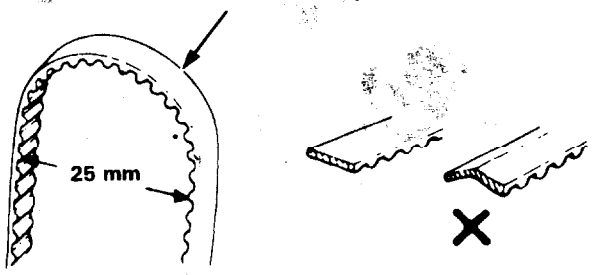


ADJUSTING BOLT
Do not remove.
Loosen it 1 80°.

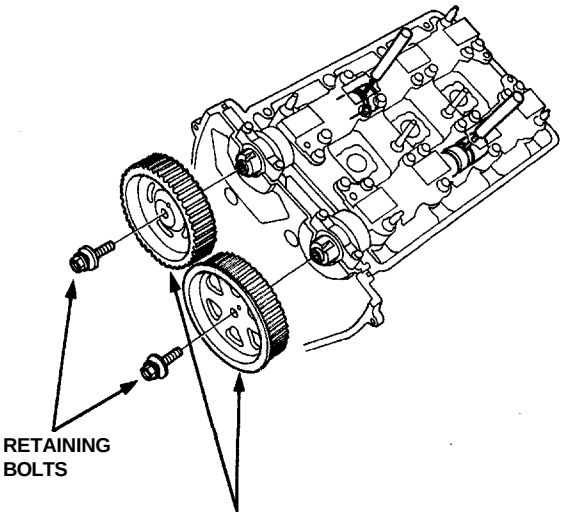
37. Remove the timing belt from the pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in) in diameter.

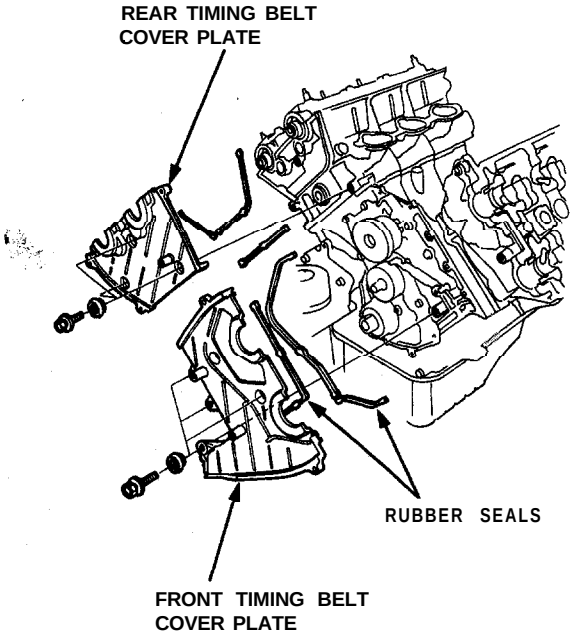
CAUTION:" Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in) in diameter.



38. Remove the cam pulleys.

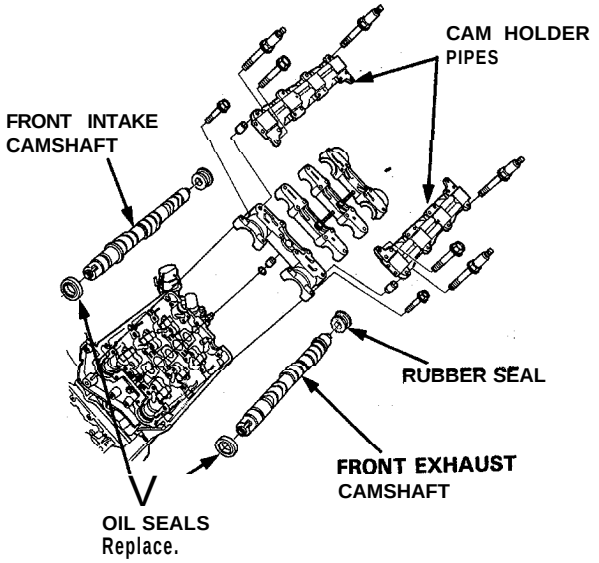


39. Remove the front and rear timing belt cover plates.

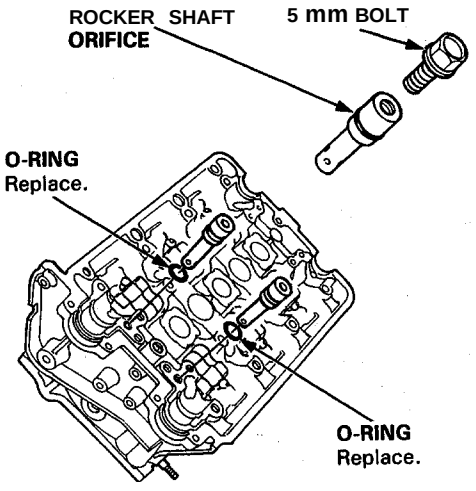


40. Loosen the valve locknuts, backed off the adjusting screw.

41. Remove the cam holder pipes, the cam holders and the camshafts.

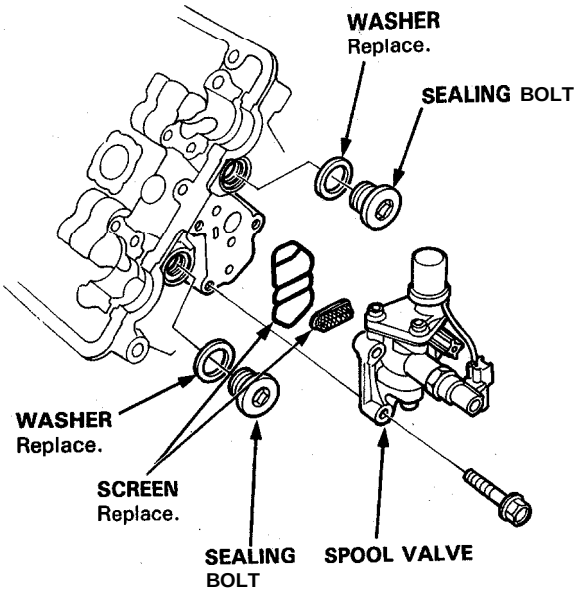


42. Screw a 5 mm bolt into each rocker shaft orifice, then pull out the rocker shaft orifices.



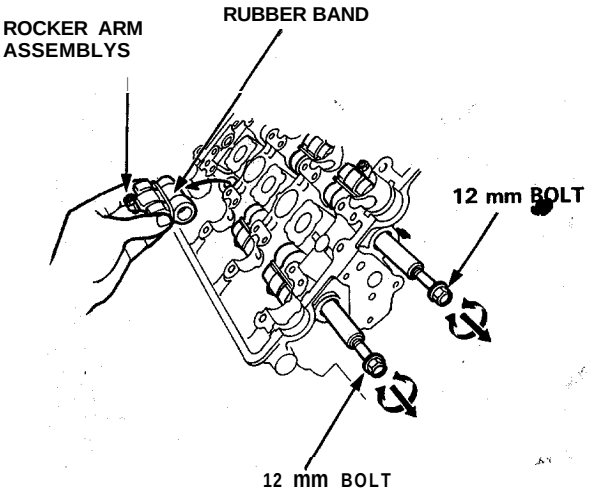
43. Remove the spool valve assemblies.

44. Remove the sealing bolts.



45. Bundle the rocker arms with a rubber band to prevent them from separating.

46. Screw a 12 x 1.25 mm bolt into each rocker shaft. Remove the rocker arms while slowly pulling the rocker shafts out of the cylinder heads toward the transmission.



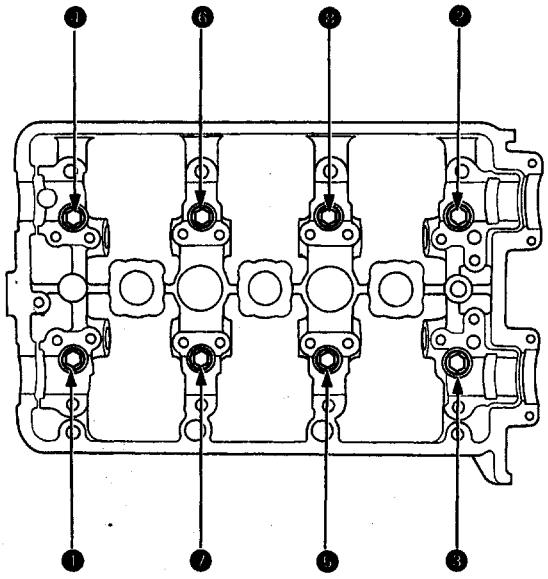
(cont'd)

Removal (cont'd)

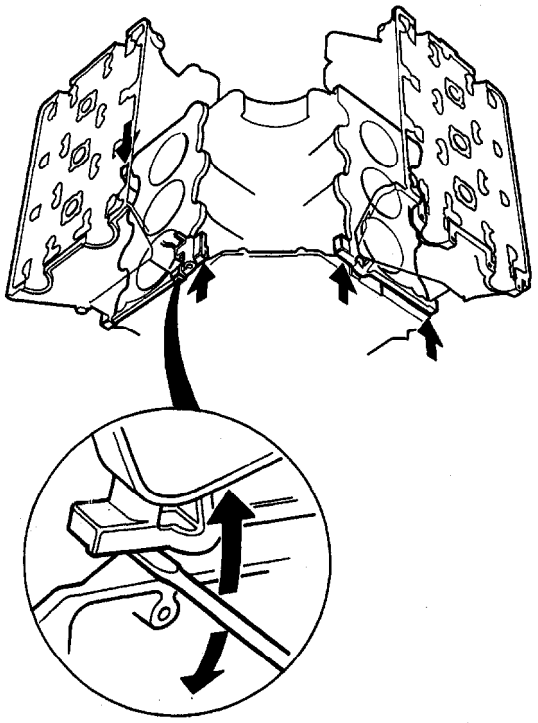
47. Disconnect the connectors and remove the engine wire harness.

48. 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 loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE



NOTE: Separate the cylinder head from the block with a flat blade screwdriver as shown.



49. Remove the front and rear exhaust manifold covers, then remove the front and rear exhaust manifolds.
CAUTION:
- Remove the oxygen sensors before removing the exhaust manifolds.
- Do not use air wrench or hammer for removing the exhaust manifolds if the oxygen sensors are not to be removed.

Rocker Arms and Shafts

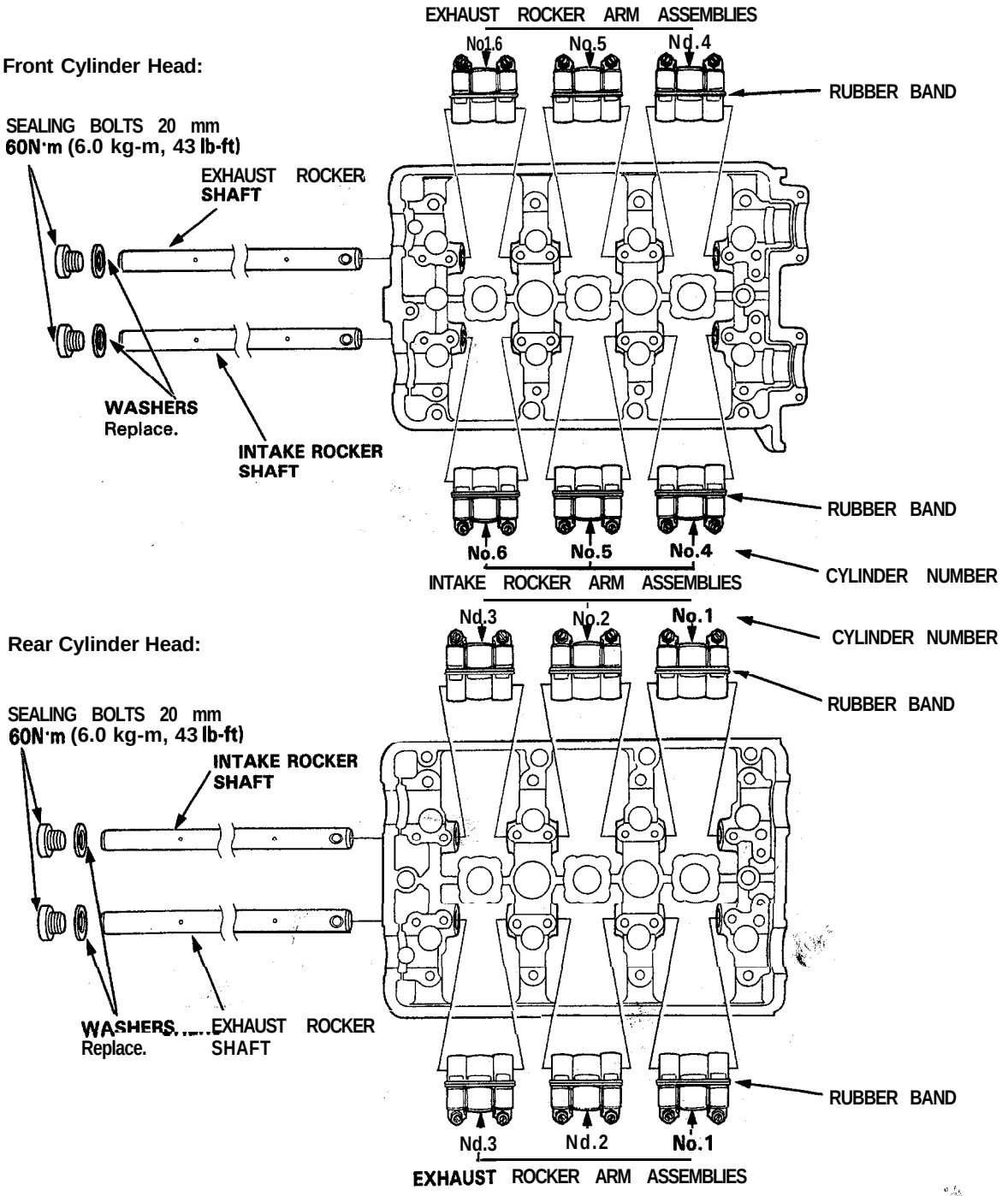
Locations

CAUTION: After installing the locker shaft orifice, try to turn the locker shaft to make sure that the orifice has been inserted in the hole of lockershaft correctly. If the orifice is in place, it should not turn.

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- **Inspect rocker shafts and rocker arms (pages 6-l 3 and 141.**
- **Rocker arms must be installed in the same position if reused.**
- **Install the rocker arms after torquing the cylinder head bolts.**

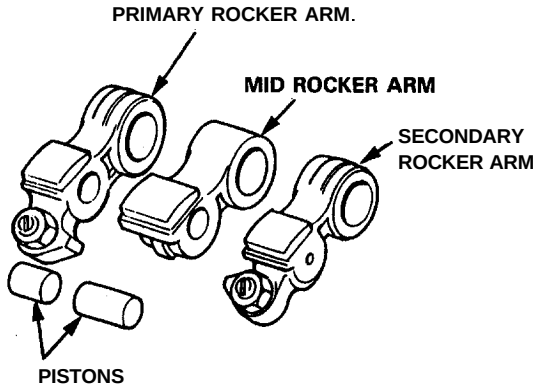
Prior to reinstalling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces.



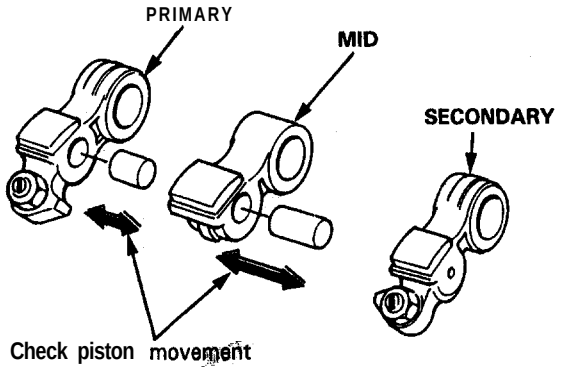
Rocker Arms and Lost Motion Assemblies

Inspection

NOTE: When reassembling the primary rocker arm, carefully apply air pressure to the oil passage of the rocker arm.

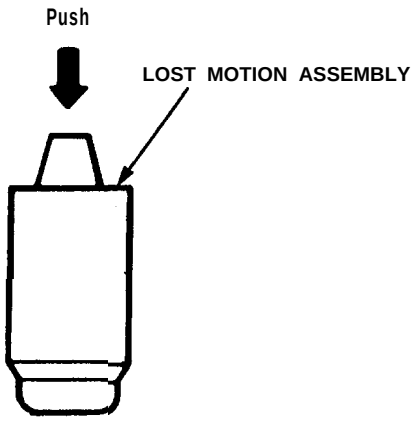


1. inspect the rocker arm piston. Push it manually.
   - If it does not move smoothly, replace the rocker arm assembly.



NOTE:
- Apply oil to the pistons when reassembling.
- Bundle the rocker arms with a rubber band.to prevent them from separating.

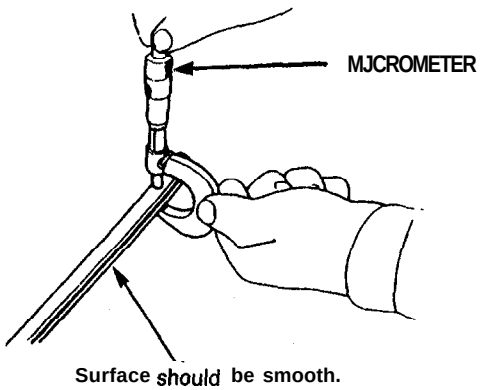
2. Remove the lost motion assembly from the cylinder head and inspect it. Pushing it gently with the finger will cause it to sink slightly. Increasing the force on it will cause it to sink deeper.
   - If the lost motion assembly does not move smoothly, replace it.



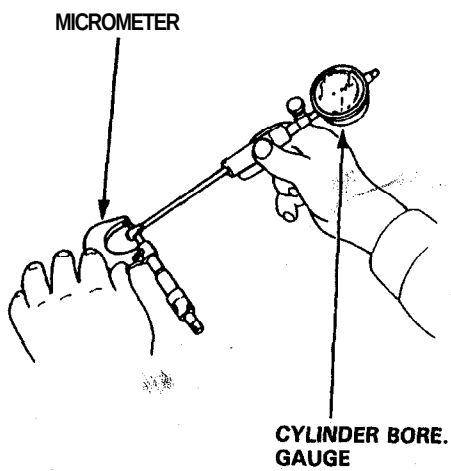
- Clearance

Measure both the intake rocker shafts and exhaust rocker shafts.

1. Measure diameter of shaft at first rocker location.

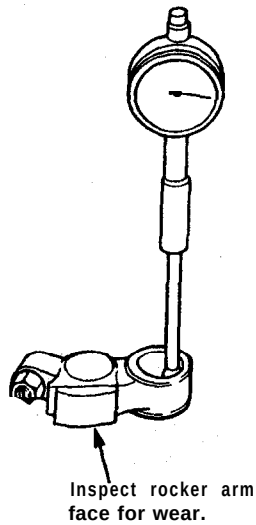


2. **Zero gauge to shaft diameter.**



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

Rocker Arm Radial Clearance:
Service Limit: 0.08 mm (0.003 in.)



Repeat for all rockers.

— If over limit, replace rocker shaft and all over-tolerance rocker arms.

NOTE: If any rocker arm needs replacement, replace all three rocker arms in that set (primary, mid, and secondary).

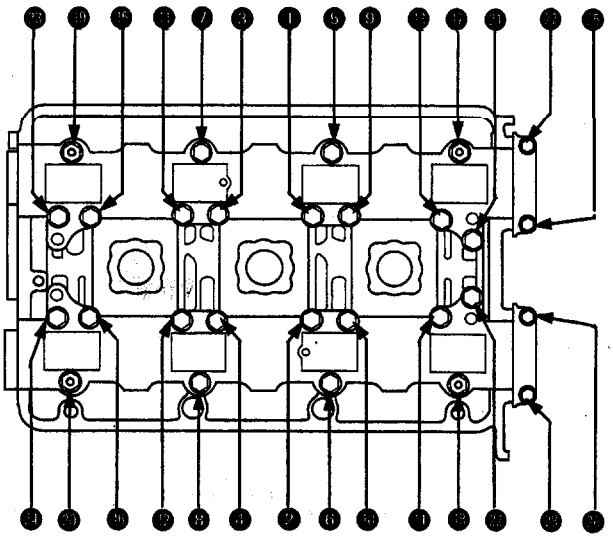
Camshafts

Inspection

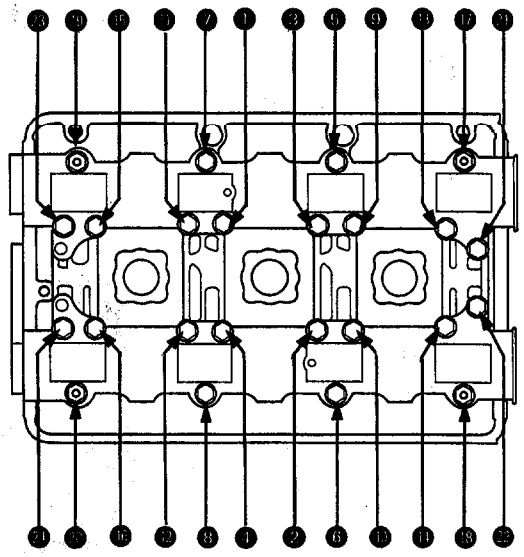
NOTE:
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

1. Put the camshafts, the cam holders the holder pipes on the cylinder head, and then tighten the bolts to the specified torque.
   NOTE: Apply clean engine oil to 8 mm bolt threads.
   Specified torque:
   ① - ㉔ **8 mm × 1.25 mm bolts:**
   22N·m (2.2 kg-m, 16 lb-ft)
   ㉕ - ㉘ **6 mm × 1.0 mm bolts:**
   10N·m (1.0 kg-m, 7 lb-ft)
   CAM HOLDER BOLTS TORQUE SEQUENCE

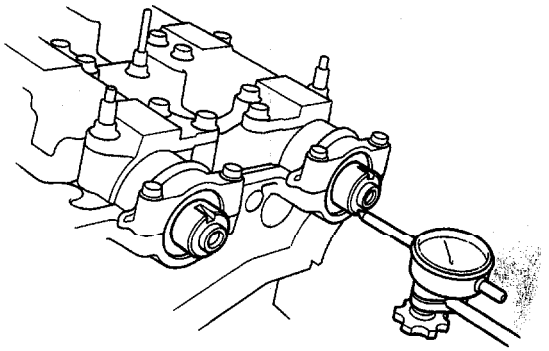
FRONT:



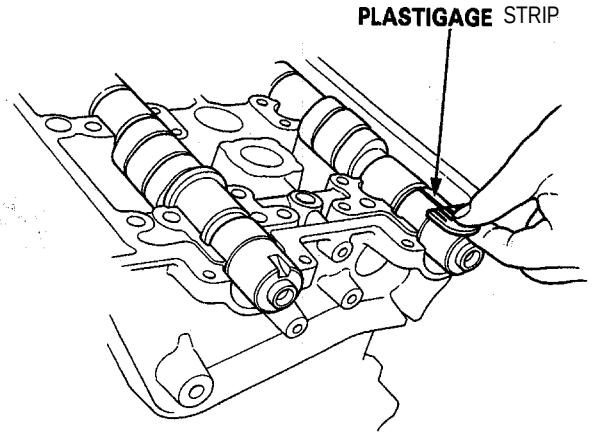
REAR:



2. Seat the camshaft by pushing it toward left end of cylinder head.
3. Zero the dial indicator against the left end, 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.)

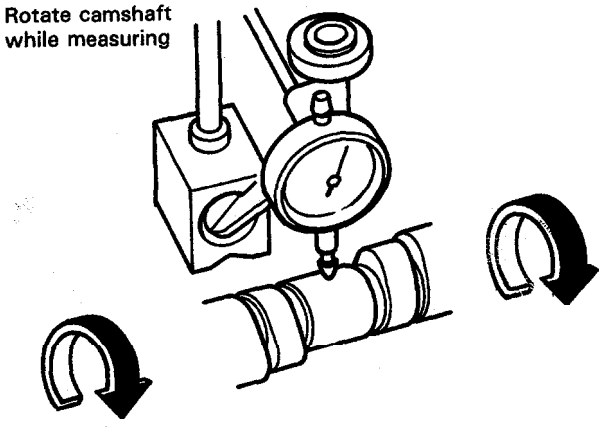


4. Remove the bolts, then remove the cam holders from the cylinder head.
   - Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
   - Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
   - Insert plastigage strip across each journal.
5. Install the cam holders, and then tighten the bolts to the specified torque, as shown in the left column on this page.
6. Remove the cam holders and measure widest portion of plastigage on each journal.
   Camshaft Bearing Radial Clearance:
   Standard (New): 0.050–0.089 mm (0.002-0.004 in.)
   Service Limit: 0.15 mm (0.006 in.)



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

Camshaft Total Runout:
Standard (New): 0.015 mm (0.0005 in)
Service Limit: 0.030 mm (0.0012 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 bearing clearance is still out of tolerance, replace the cylinder head.

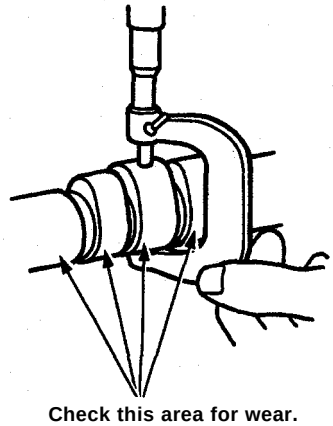
8. Check cam lobe height wear.

Cam lobe height standard (New):
M/T

	INTAKE	EXHAUST
PRIMARY	37.086 mm (1.4601 in)	36.559 mm (1.4393 in)
MID	38.037 mm (1.4975 in)	37.398 mm (1.4724 in)
SECONDARY	37.326 mm (1.4695 in)	36.741 mm (1.4465 in)

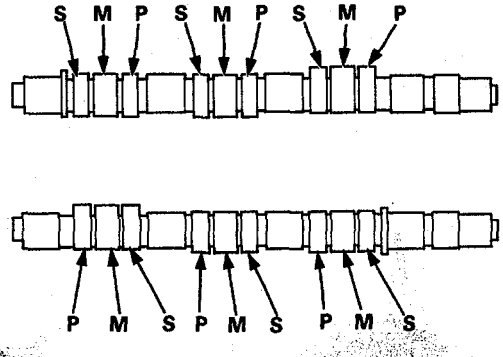
A/T

	INTAKE	EXHAUST
PRIMARY	37.266 mm (1.4672 in)	36.559 mm (1.4393 in)
MID	37.655 mm (1.4825 in)	37.398 mm (1.4724 in)
SECONDARY	37.504 mm (1.4765 in)	36.741 mm (1.4465 in)



Check this area for wear.

Cam position
P : Primary M: Mid S : Secondary

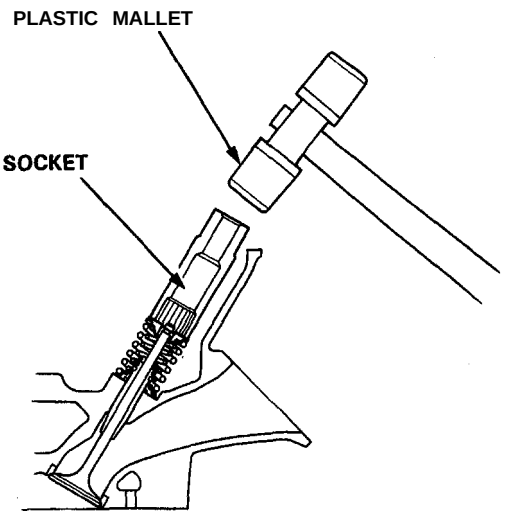


Valves and Valve Seals

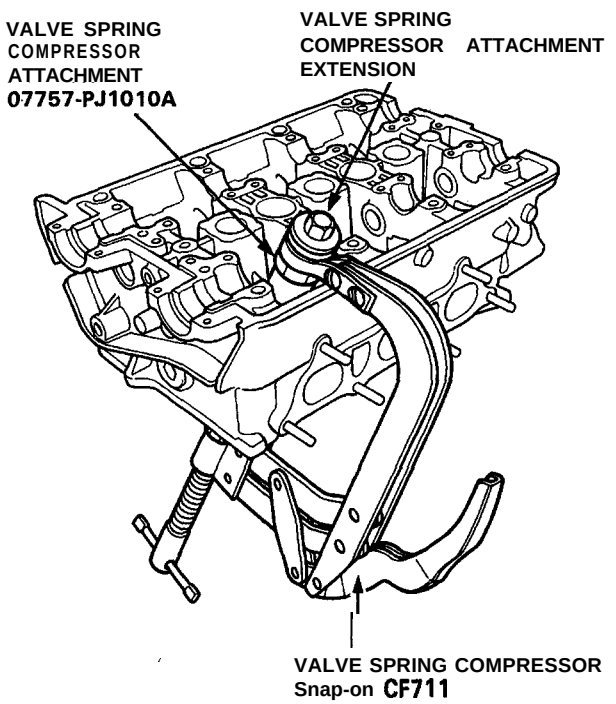
- Replacement

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

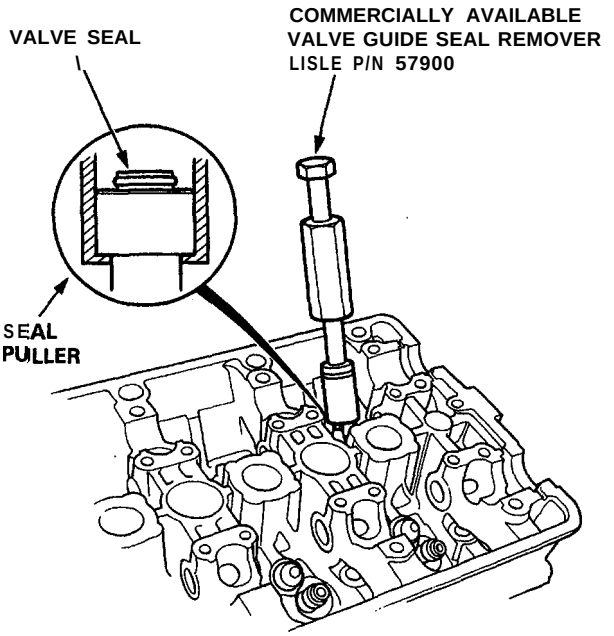
1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



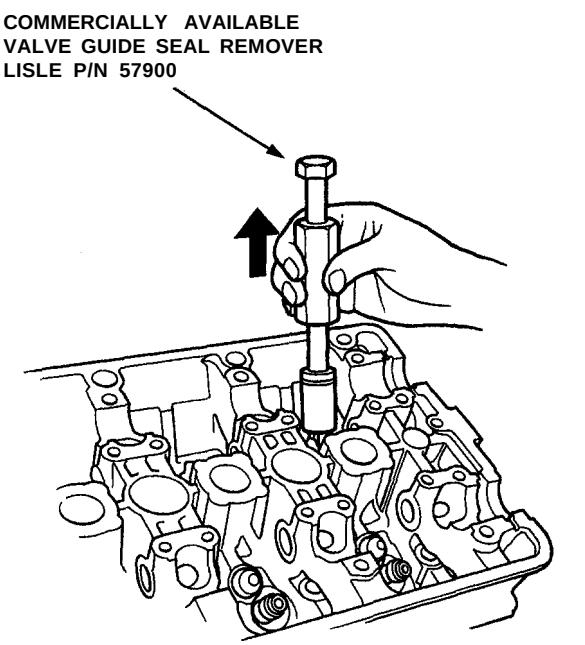
2. Install spring compressor. Compress spring and remove valve keeper.

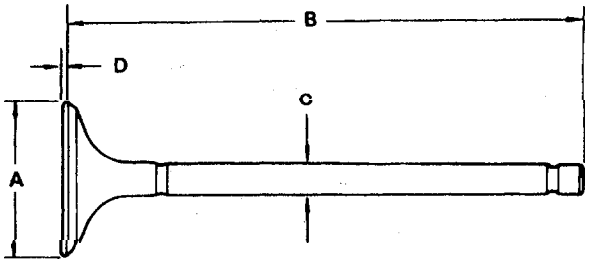


3. **Install the special tool as shown.**



4. **Remove the valve guide seal.**





Intake Valve Dimensions
A Standard (New): 34.9-35.1 mm (1.374–1.382 in)
B Standard (New): 111.05-111.40 mm (4.372-4.388 in)
C Standard (New): 5.475-5.485 mm (0.2158-0.2159 in)
C Service Limit: 5.445 mm (0.2144 in)
D Standard (New): 1.05-1.35 mm (0.041-0.053 in)
D Service Limit: 0.85 mm (0.033 in)

Exhaust Valve Dimensions
A Standard (New): 29.9-30.1 mm (1.177-1.185 in)
B Standard (New): 109.60–109.90 mm (4.315-4.327 in)
C Standard (New): 5.45-5.46 mm (0.2146–0.2150 in)
C Service Limit: 5.42 mm (0.2134 in)
D Standard (New): 1.65–1.95 mm (0.065-0.077 in)
D Service Limit: 1.45 mm (0.057 in)

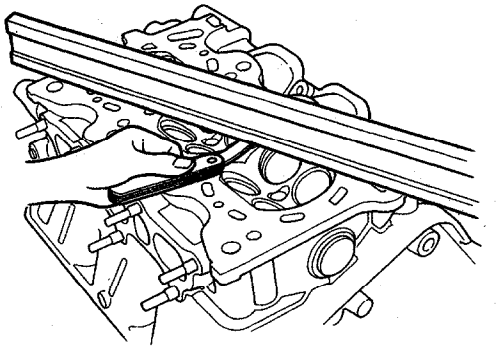
Warpage

NOTE: If camshaft bearing clearances (page 6-38) are not within specification, the head cannot be resurfaced.

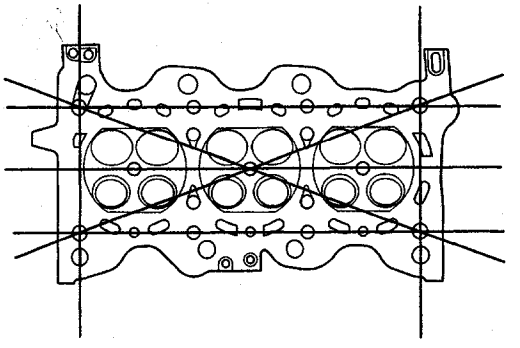
If camshaft bearing radial clearances are within specifications, check the head for warpage.

- 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 cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 151 mm (5.945 in).

PRECISION STRAIGHT EDGE



Measure along edges, and 3 ways across center.



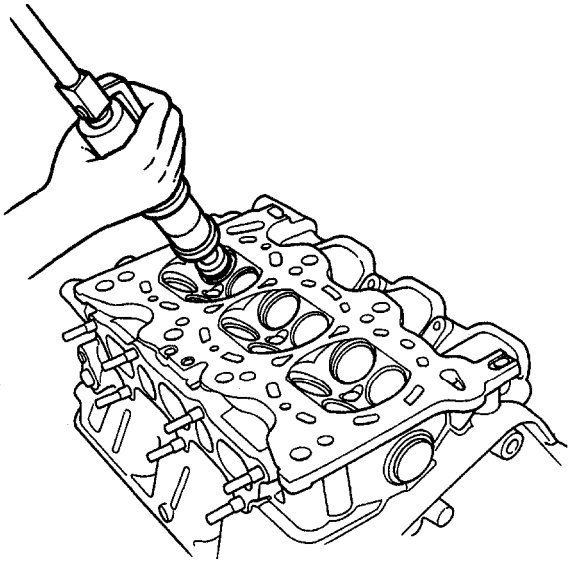
Cylinder Head Height:
Standard (New): 150.95–151.05 (5.943-5.947 in)
Service Limit: 150.8 mm (5.937 in)

Valve Seats

Reconditioning

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

   NOTE: If guides are worn (page 6-43), replace them (page 6-44) before grinding the valve seats.

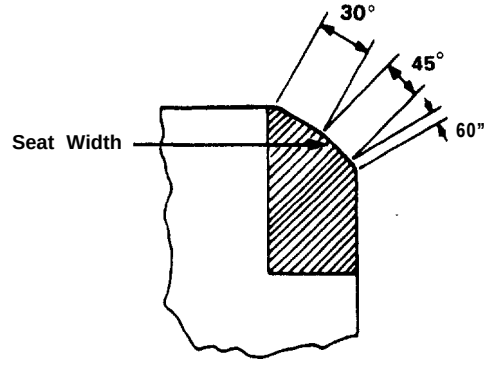


2. Carefully grind a 45° seat, removing only enough material to ensure a smooth and concentric seat.

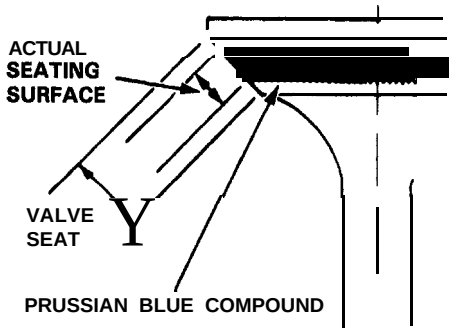
3. Bevel the upper edge of the seat with the 30° stone and the lower edge of the seat with the 60° stone. Check width of seat and adjust accordingly.

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

   Valve seat Width:
   Standard: IN 0.80– 1 .OO mm (0.031-0.039 in)
   EX 1.25-1.55 mm (0.049-0.061 in.)
   Service Limit: IN 1.5 mm (0.059 in)
   EX 2.0 mm (0.079 in)



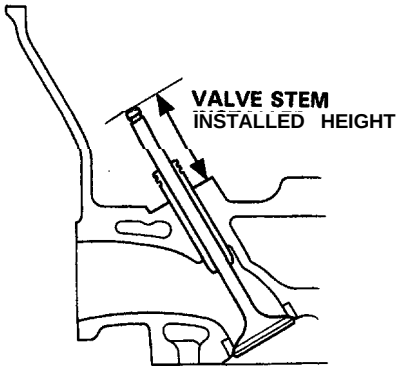
5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert valve in original location in the head, then lift it and snap it closed against the seat several times.



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

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

7. Insert intake and exhaust valves in the head and measure valve stem installed height.
   Valve Stem Installed Height (IN and EX):
   Standard (New): 41.55-42.35 mm
   (1.6358– 1.6673 in)
   Service Limit: 42.435 mm (1.6707 in)



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

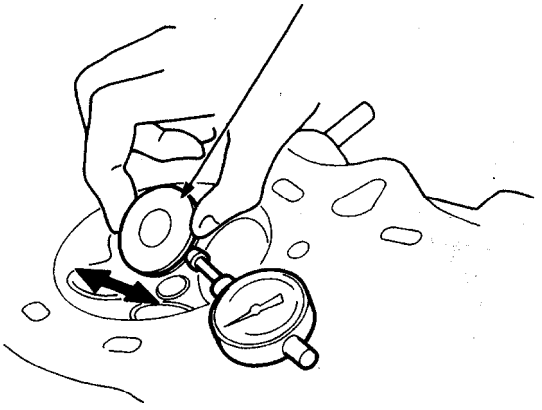
. Valve Movement

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): 0.0125-0.0275 mm (0.0005-0.0011 in)
Service Limit: **0.08 mm (0.003 in)**

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.025-0.04 mm (0.001-0.0016 in)
Service Limit: **0.055 in (0.0022 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 below, 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

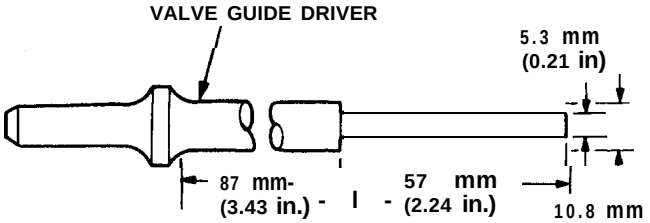
Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.025-0.055 mm (0.001-0.002 in)
Service Limit: **0.08 mm (0.003 in)**

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 Guides

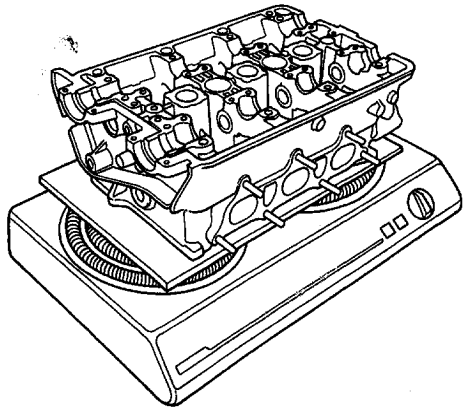
Replacement

1. As illustrated, in the removal steps of this procedure use a commercially-available air-impact driver attachment which may need to be modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using Valve Guide Drivers and a conventional hammer. Tool numbers are at the end of this procedure.



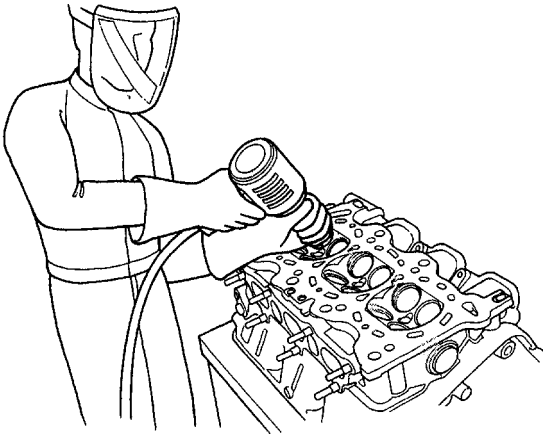
2. Select the proper replacement guides and chill them in the freezer section of a refrigerator for about an hour.

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

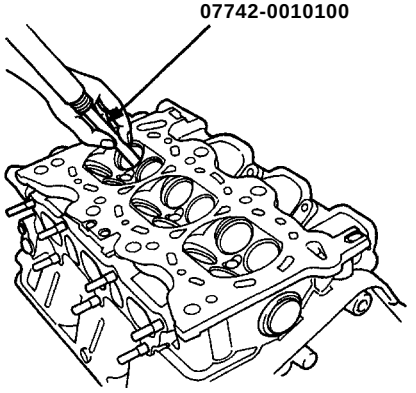


CAUTION:
- Do not use a torch; it may warp the head.
- Do not get the head hotter than 150°C (300°F); excessive heat may loosen the valve seats.
- To avoid burns, use heavy gloves when handling the heated cylinder head.

4. Use the driver and an air hammer working from the camshaft side to drive the guide about 2 mm towards the combustion chamber. This will knock off some of the carbon and make removal easier.



VALVE GUIDE DRIVER
07742-0010100



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

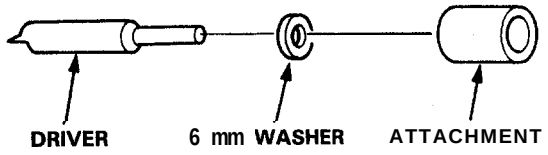
5. Turn the head over and drive the guide out toward the camshaft side of head.

   If a valve guide still won't move, drill it out with a 5/16 inch bit, then try again.

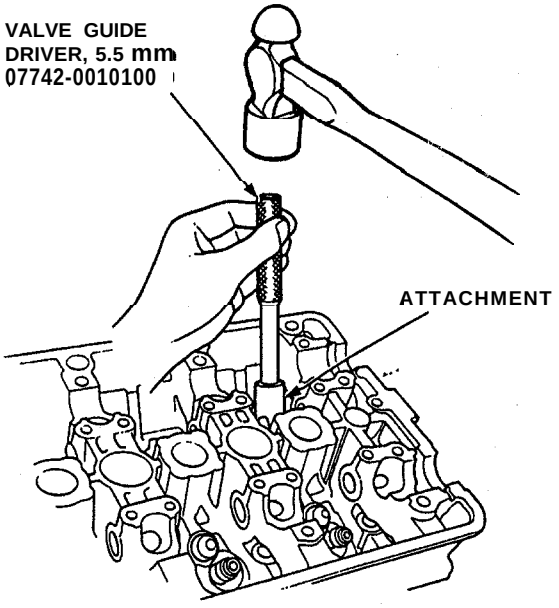
   CAUTION: Drill guides only in extreme cases: you could damage the cylinder head if the guide breaks.

6. Remove the new guide(s) from the refrigerator, one at a time, as you need them.

7. Slip a 6 mm steel washer and the correct driver attachment over the end of the driver (The washer will absorb some of the impact and extend the life of the driver).

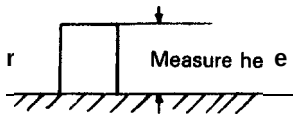


8. Install the new guide(s) from the camshaft side of the head; drive each one in until the attachment bottoms on the head. **If you have all twelve guides to do, you may have to reheat the head one or two more times.**



NOTE: Valve guide replacement can be performed **with this special tool.**

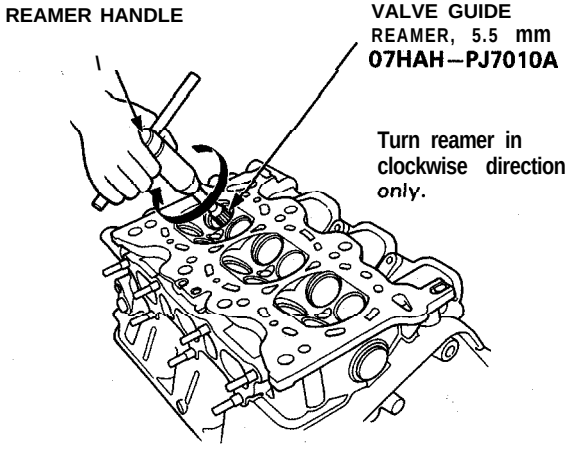
Removal and Installation
VALVE GUIDE DRIVER
07742-0010100
Valve Guide Installed Height:
Intake: **13.75-14.25 mm (0.541-0.561 in)**
Exhaust: **13.75-14.25 mm (0.541-0.561 in)**



-Valve Guide Reaming

NOTE: For new valve guides only.

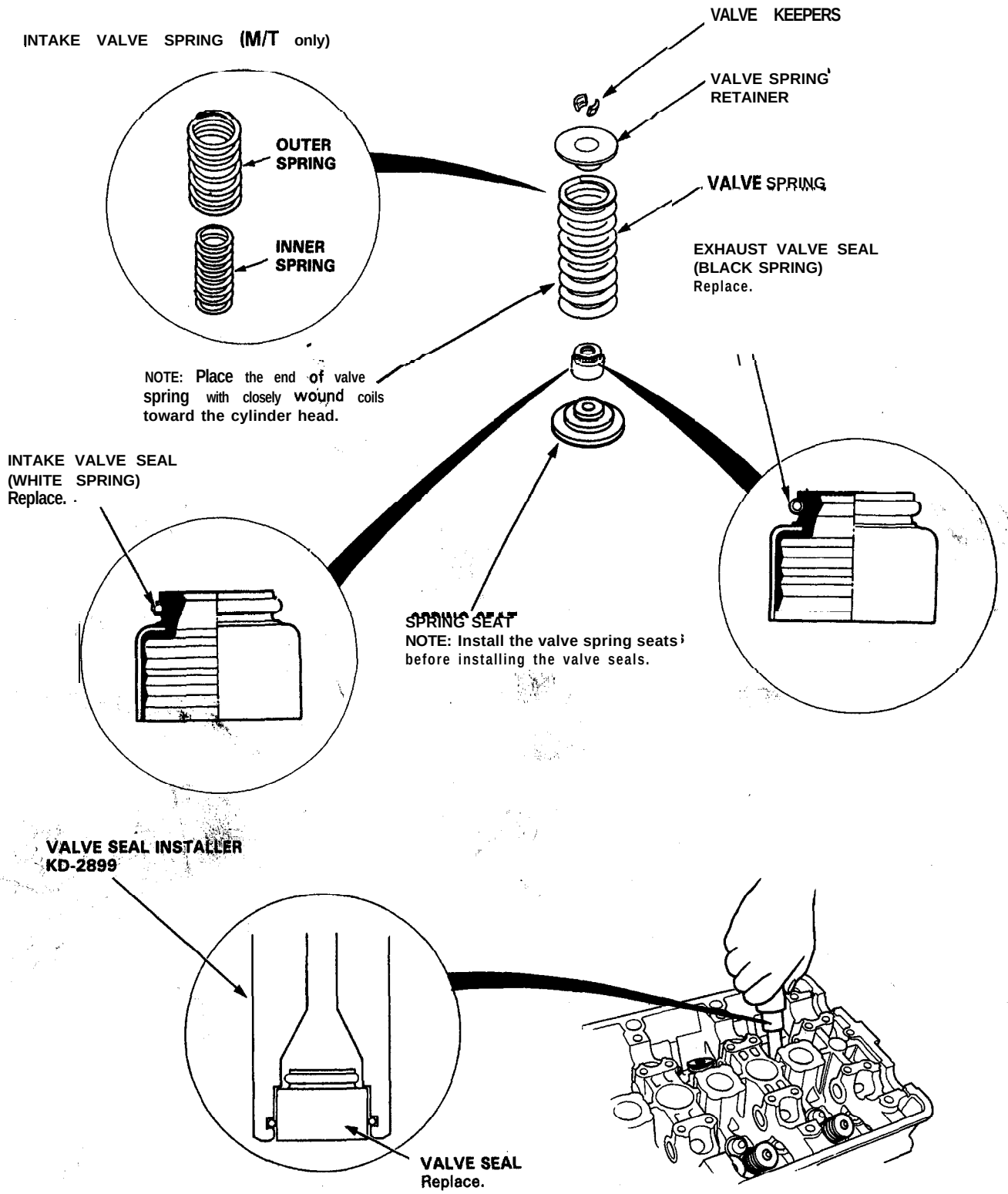
1. **Coat both reamer and valve guide with cutting oil.**
2. **Rotate the reamer clockwise the full length of the** valve guide bore.
3. **Continue to rotate the reamer clockwise while removing it from the bore.**
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. **Check clearance with a valve (page 6-43).**
   – Verify that the valve slides in the IN, EX valve guides without exerting pressure.



Valve Springs and Valves

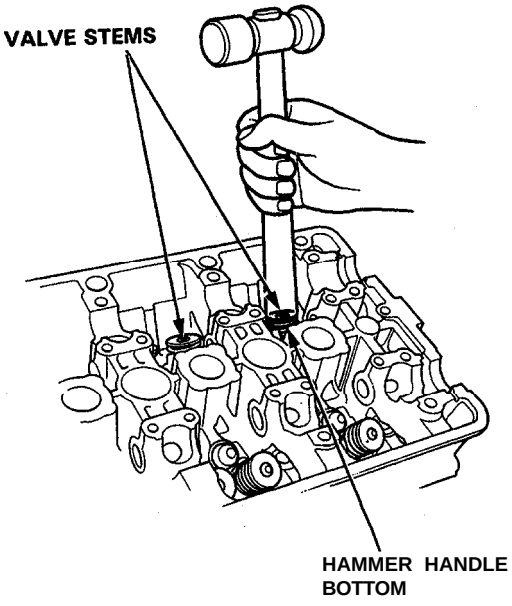
Valve Spring and Valve Seal Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.



Valve Installation

- When installing valves in cylinder head, coat valve stems with oil before inserting into valve guides, and make sure valves move up and down smoothly.
- When valves and springs are in place, lightly tap the end of each valve stem two or three times to ensure proper seating of valve and valve keepers (use hammer handle bottom).



Installation

Install the cylinder heads in the reverse order of removal:

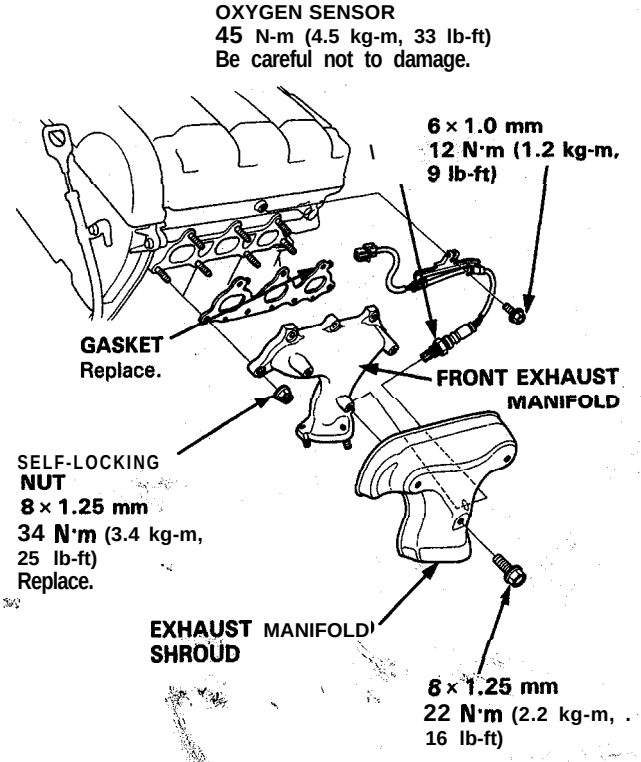
- Always use new head gaskets.
- Cylinder heads and engine block surface must be clean.
- Turn the crankshaft so that No. 1 piston is at TDC (page 6-26).

1. Install the front and rear exhaust manifolds to each cylinder head, then tighten the self-locking nuts in a criss-cross pattern in two or three steps, beginning with the inner nut.
   - Apply oil to the self-locking nut threads.
   - Always use new exhaust manifold gaskets.

   CAUTION:
   - Install the oxygen sensors after installing the exhaust manifolds.
   - Do not use air wrench for tightening the self-locking nuts if the oxygen sensors are not to be removed.

2. install the exhaust manifold covers.

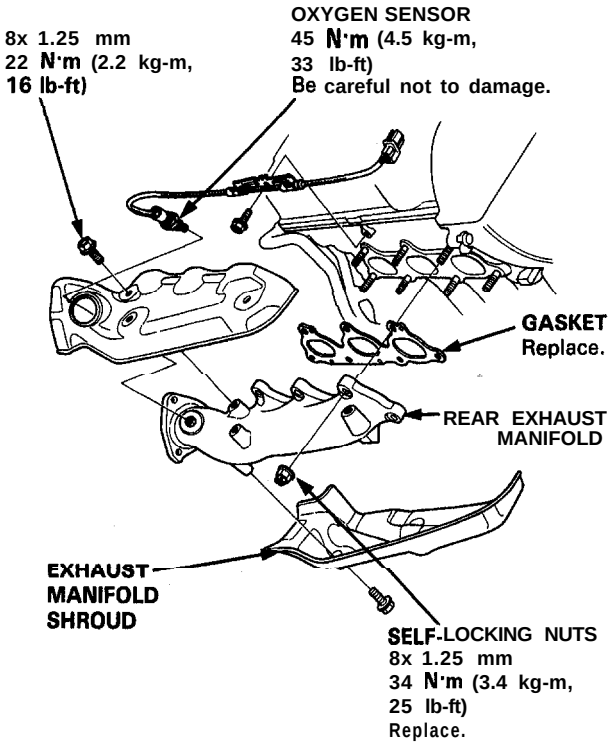
Front:



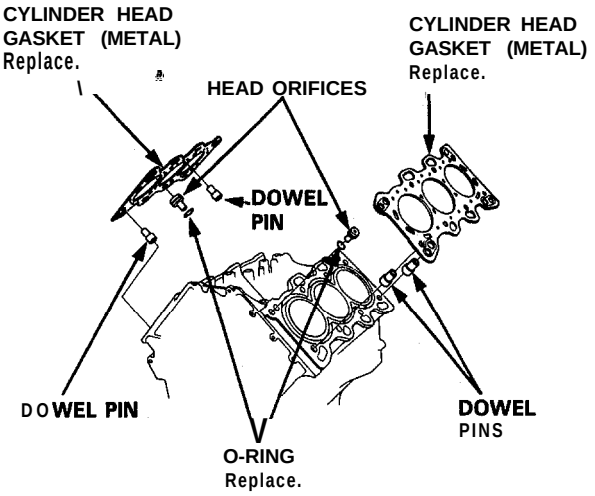
(cont'd)

Installation (cont'd)

Rear:



3. **Install the cylinder heads on the engine block.**
   The cylinder head dowel pins and the head oil control orifice must be aligned.
   - Always new cylinder head gasket.

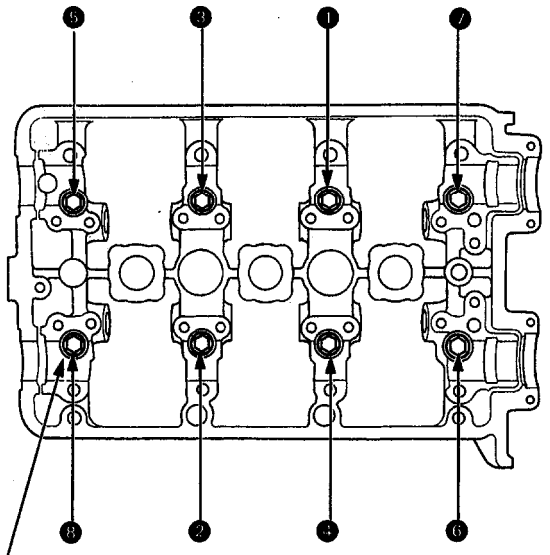


4. Tighten the cylinder head bolts sequentially in two or three steps.
   - Apply clean engine oil to the bolt threads and washer contact surfaces.

   Specified Torque
   11 x 1.5 mm
   78 N-m (7.8 kg-m, 56 lb-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 over-tighten.

CYLINDER HEAD BOLTS TORQUE SEQUENCE



CYLINDER HEAD BOLTS
11 x 1.5 mm
78 N·m (7.8 kg-m, 56 lb-ft)
Apply clean engine oil to the bolt threads and washer contact surfaces.

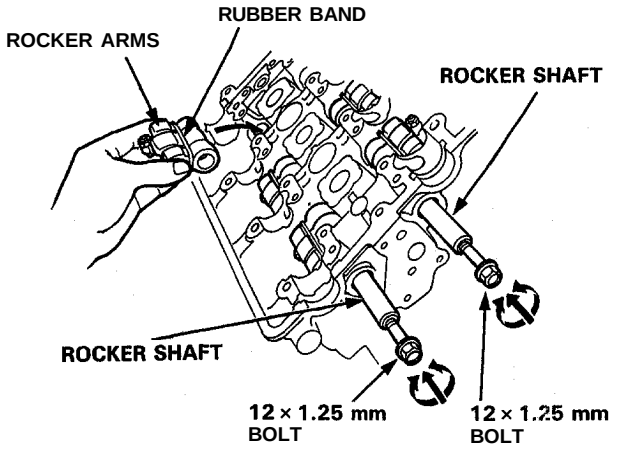
Rocker Arms

Installation

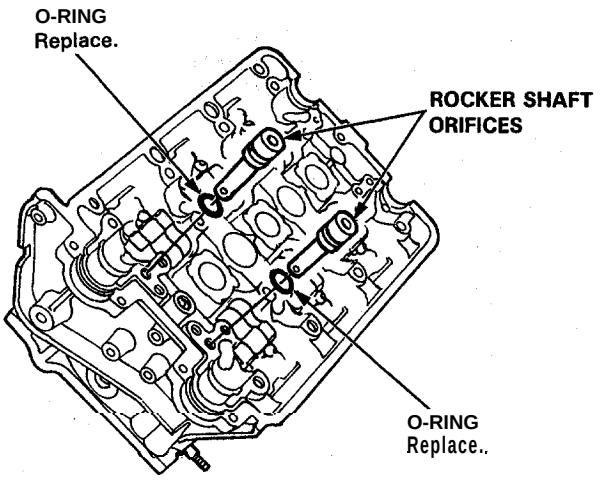
Install the rocker arms in the reverse order of removal:

- Valve adjusting locknuts should be loosened and adjusting screws backed off before installation.
- **The component parts must be installed in the original locations.**

1. Install the lost motion assemblies.
2. Install the rocker arms while passing the rocker arm shaft through the cylinder head.



3. **Install the orifices. If the holes in the rocker arm** shafts and the cylinder head are not in line with each other, mount a 12 x 1.25 mm bolt on the rocker arm **shaft and rotate the shaft.**



CAUTION:

- After installing the locker shaft orifice, try to turn the locker shaft to make sure that the orifice has been inserted in the hole of locker shaft correctly. **If the orifice is in place, it should not turn.**
- Remove the rubber bands after installing the rocker arms.

Camshafts

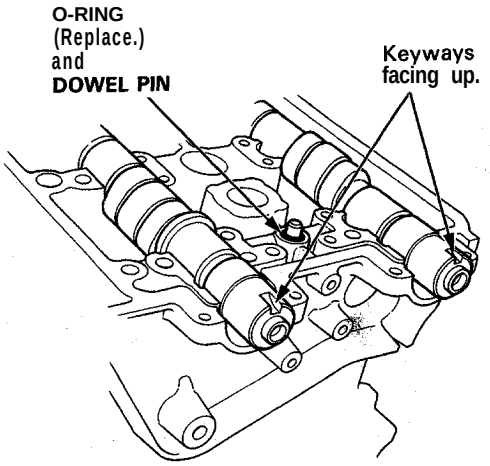
Installation

CAUTION: Valve locknuts should be loosened and adjusting screws backed off before installation.

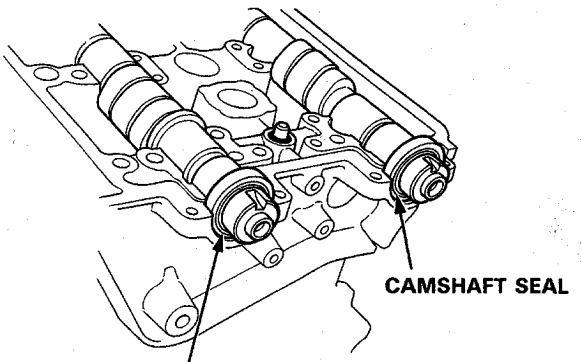
1. After wiping down the cam and journals in cylinder head, lubricate both surfaces and install camshaft.
2. Turn the camshaft until its keyway is facing up. (No. 1 cylinder TDC).
3. install the camshaft seal with the open side (spring) facing in.

Lubricate cam lobes after reassembly.

4. Set a new O-ring and a dowel pin in the oil passage of the No.1 cam holder.



5. **Set the camshaft seal as shown below.**



Seal housing surface should be dry. Apply a light coat of oil to camshaft and inner lip of seal.

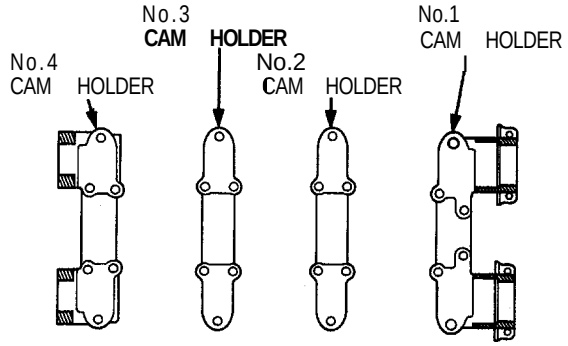
(cont'd)

Installation (cont'd)

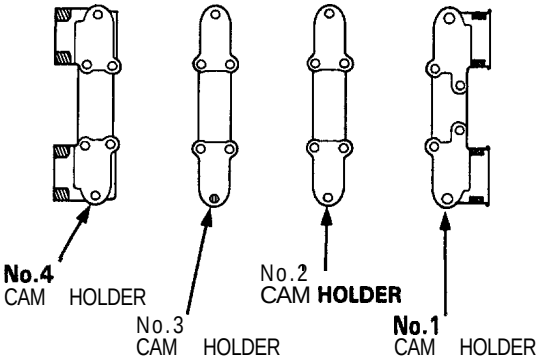
6. Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 4 cam holders.
   - Apply liquid gasket to the shaded areas.

7. Place the cam holders.
   NOTE:
   - "F" or "R" marks are stamped on the cam holders.
   - The arrows must be pointing to the timing belt side.
   - Set two dowel pins in each cam holder.

FRONT:



REAR:



8. Place the cam holder pipes.

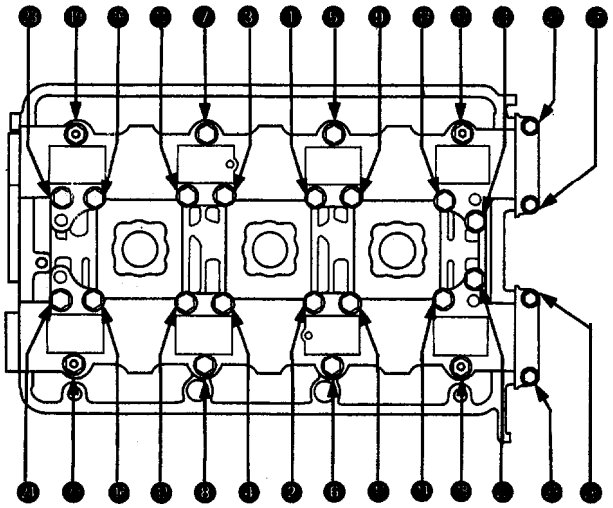
9. Tighten each bolt two turns at a time in the sequence shown below to insure that the rockers do not bind on the valves.

   NOTE: Apply clean engine oil to 8 mm bolt threads.

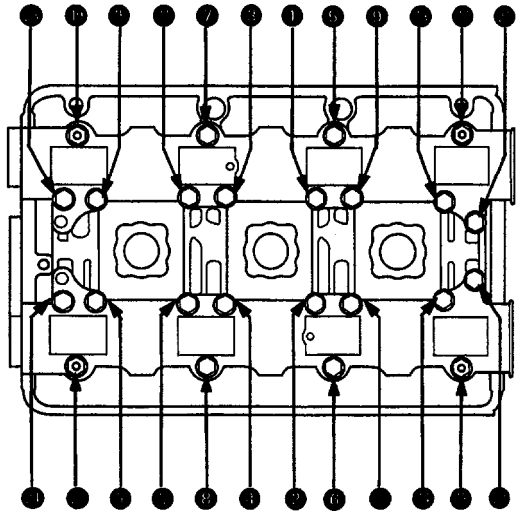
   Specified torque:
   ①-㉔ 8 mm x 1.25 mm bolts:
   22 N-m (2.2 kg-m, 16 lb-ft)
   ㉕-㉘ 6 mm x 1.0 mm bolts:
   10 N-m (1.0 kg-m, 7 lb-ft)

CAM HOLDER BOLT TORQUE SEQUENCE

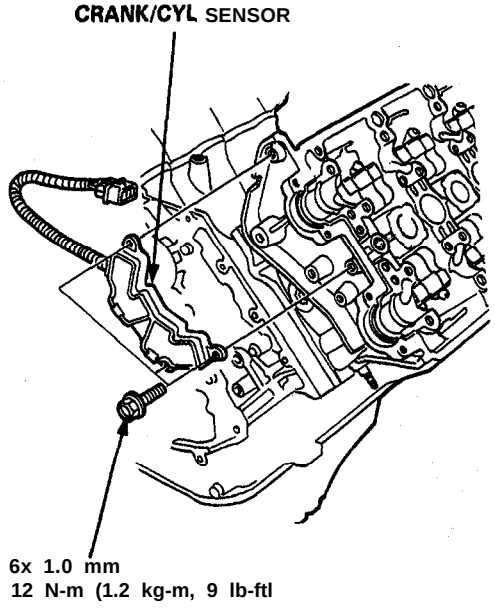
FRONT:



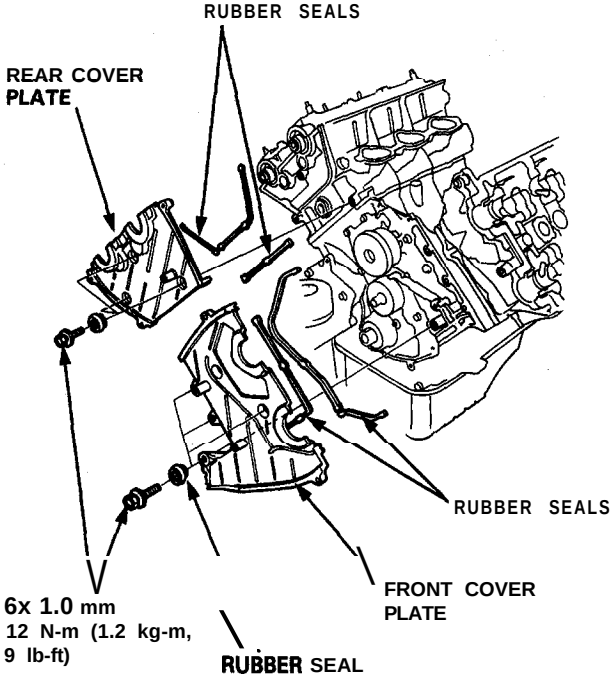
REAR:



10. *Install* the CRANK/CYL *sensor on* the front cylinder head.

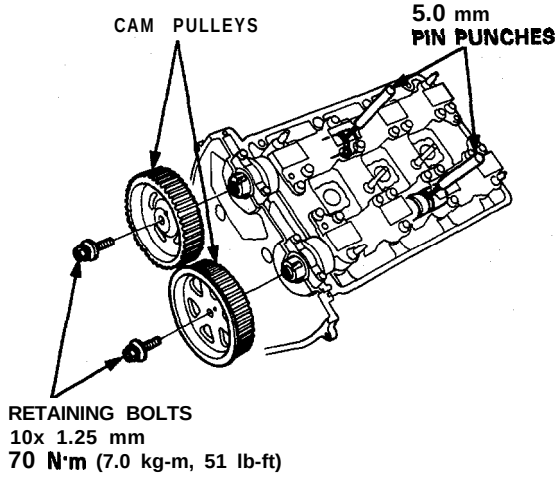


11. install the front and rear timing cover plates.



12. Insert the dowel pins in the camshaft *pulleys.*

13. Install the cam pulleys then tighten the retaining bolts to the torque specified.
NOTE: To set the camshafts at TDC, algin the camshaft holes with the camholder pipe holes and insert 5.0 mm pin punches as shown.



14. install the timing belt (page 6-25).

15. Adjust the valve clearance (6-54).

16. Inspect the rocker arms (pages 6-36, and 6-52 thru 6-541.

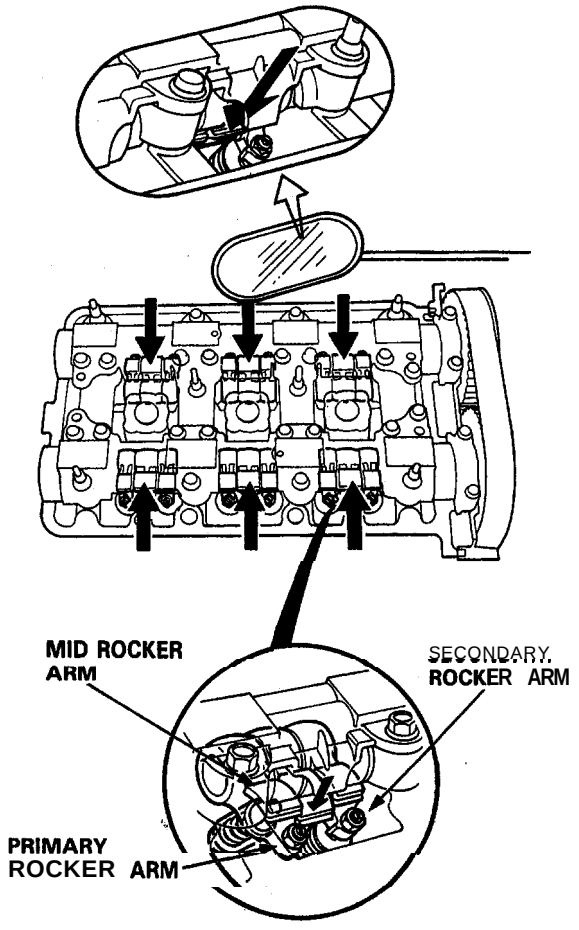
17. After installation, check that hoses and connectors are installed correctly.

NOTE:
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

Rocker Arms

Manual Inspection

1. Remove the ignition coil covers (page 6-23).
2. Remove the ignition coils (page 6-23).
3. Remove the cylinder head covers (page 6-3).
4. Set the No.1 piston at TDC (page 6-26).
5. Push the mid rocker arm on the No.1 cylinder manually.
6. Check that the mid rocker arm moves independently of the primary and secondary rocker arms.



NOTE:

Check the mid rocker arm of each cylinder at TDC.

- If the mid rocker arm does not move, remove the mid, primary and secondary rocker arms as an assembly and check that the pistons in the mid and primary rocker arms move smoothly.
- Replace the rocker arms as an assembly if there is any abnormality.

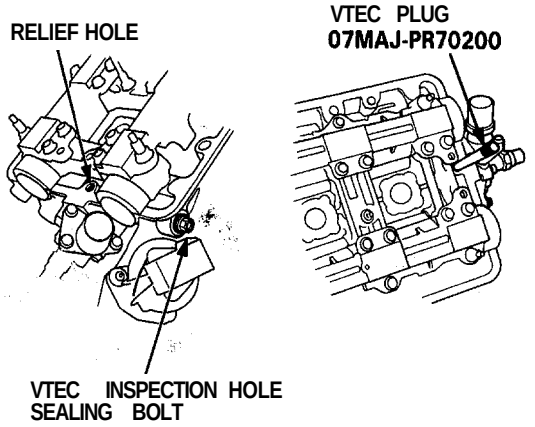
Inspection Using Special Tools

CAUTION:

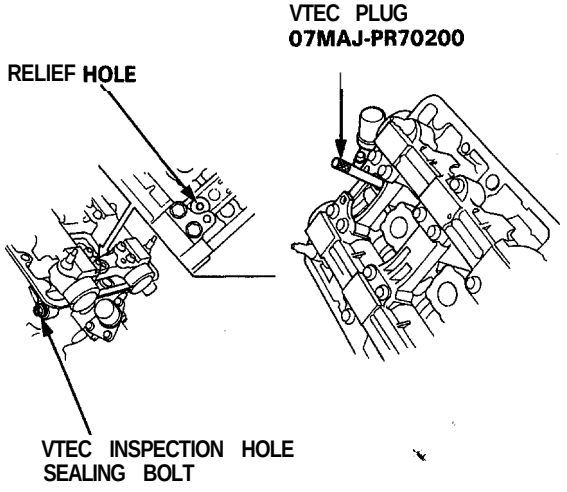
- **Before using the special tool (Valve Inspection Set),** make sure that the air pressure gauge on the air compressor indicates over 245 kPa (2.5 kg/cm², 36 psi).
- Inspect the valve clearance before rocker arm inspection.
- Cover the timing belt with shop towel to prevent the belt.
- Check the mid rocker arm of each cylinder at TDC.

1. Plug the relief hole with the special tool as shown.

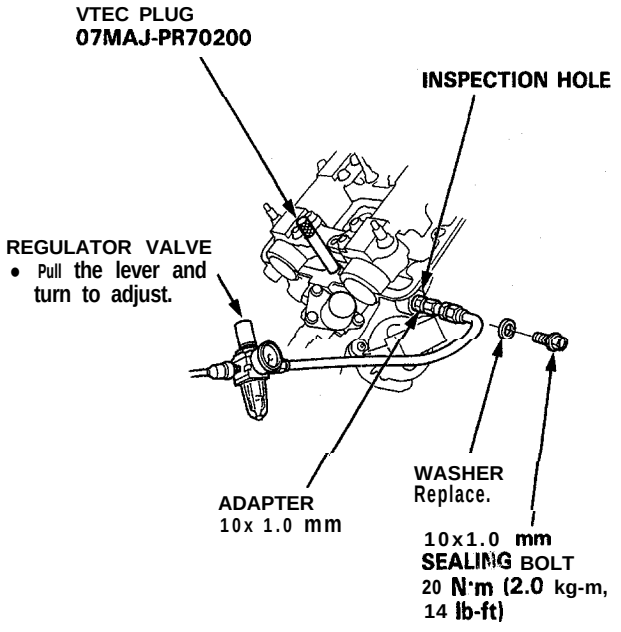
Front cylinder head:



Rear cylinder heed:



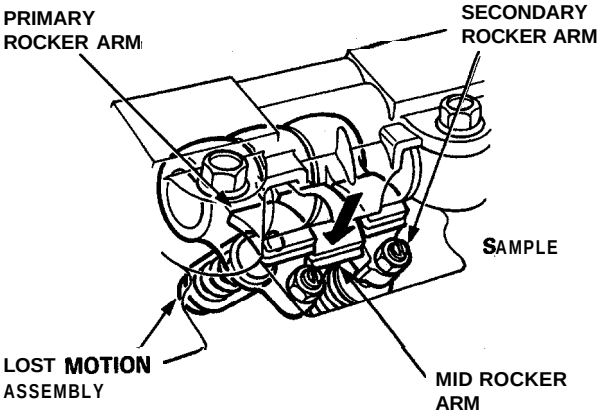
2. **Remove the 10 mm sealing bolt and washer from the inspection hole and connect the special tool.**



3. Apply specified air pressure to the rocker arm pistons after loosening the regulator valve on the VTEC inspection attachment

Specified Air Pressure:
245 kPa (2.5 kg/cm^2, 36 psi)
-490 kPa (5.0 kg/cm^2, 71 psi)

4. Make sure that the primary and secondary rocker arms are mechanically connected by pistons and that the mid rocker arms do not move when pushed manually.



- If the mid rocker arms move independently of the primary and secondary rocker arms, replace the rocker arms as a set.

5. **Remove the special tools.**

6. Check for smooth operation of the lost motion assembly. It is compressed slightly when the mid rocker arm is lightly pushed and compressed deeply when the mid rocker arm is strongly pushed.
   - **Replace the lost motion assembly if it does not move smoothly.**

   After inspection, check that the ECU does not show an error code.

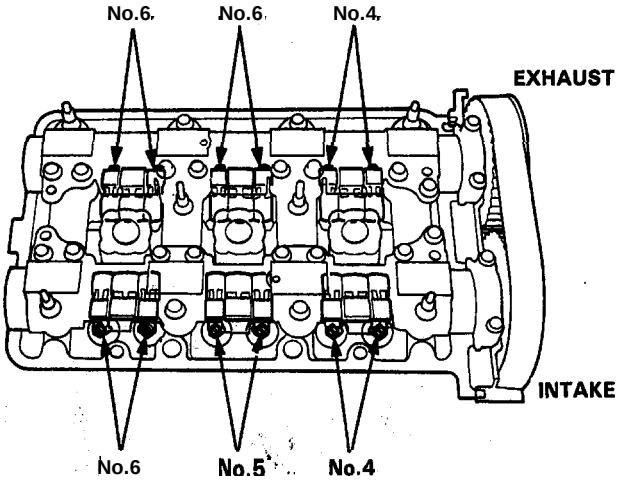
Valve Clearance

Adjustment

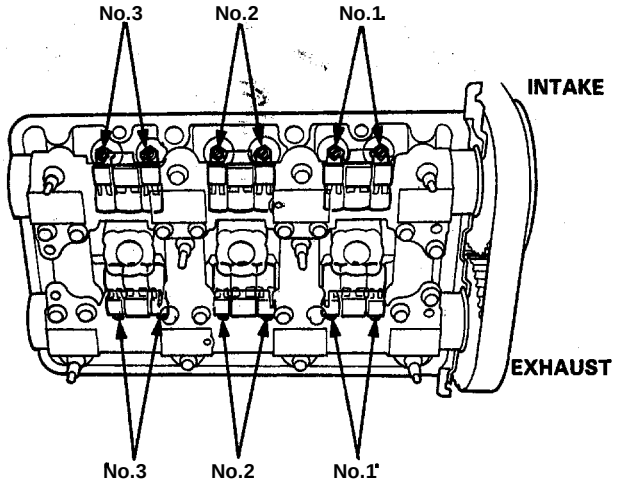
NOTE:
- Valves should be adjusted cold when the cylinder head temperature is less than 38°C (100°F).
- Adjustment is the same for both intake and exhaust valves.
- Adjust valve clearance at TDC of each cylinder.

1. Remove the cylinder head covers.

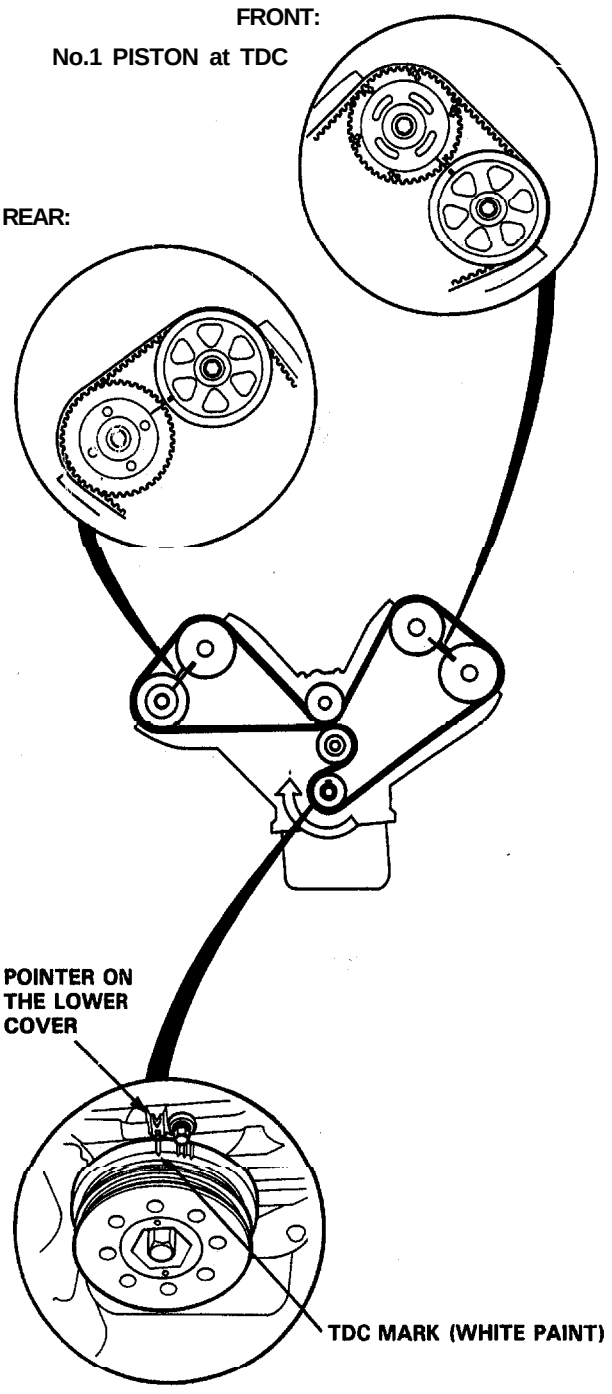
FRONT:



REAR:



2. Rotate crankshaft and set No.1 piston at TDC.
   - TDC mark (white paint) on the crank pulley should align with pointer on the timing lower cover, and TDC grooves on the camshaft pulleys should align with timing belt cover plates.



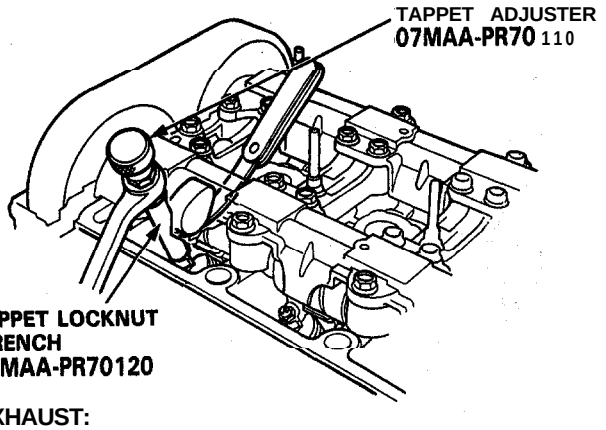
3. Manuallv inspect the rocker arms for independent operation (page 6-52).

4. Adjust valves on No.1 cylinder.
   - Adjusting screws are on primary and secondary rocker arms.

   Intake: 0.15-0.19 mm (0.006-0.007 in)
   Exhaust: 0.17-0.21 mm (0.007-0.008 in)

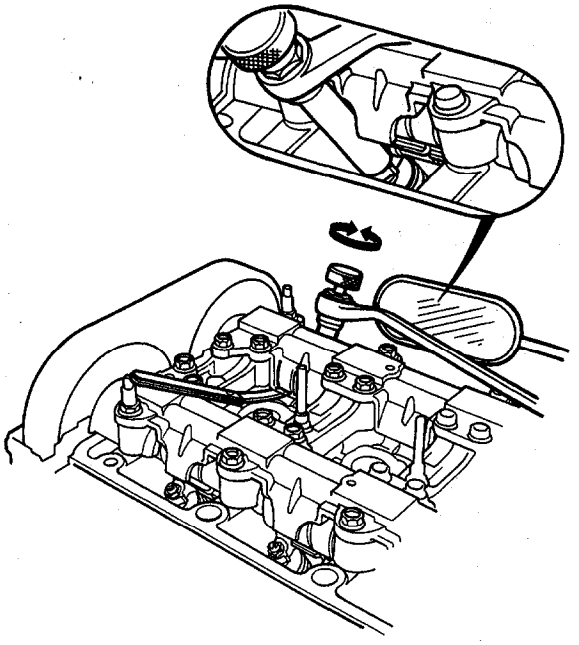
5. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

INTAKE:



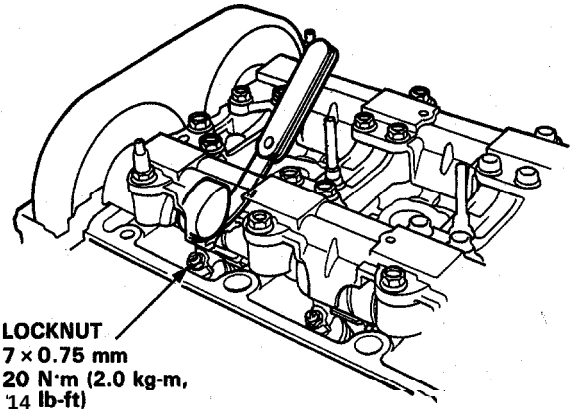
EXHAUST:

NOTE: Use a mirror to check if the special tool is positioned on the locknut correctly.

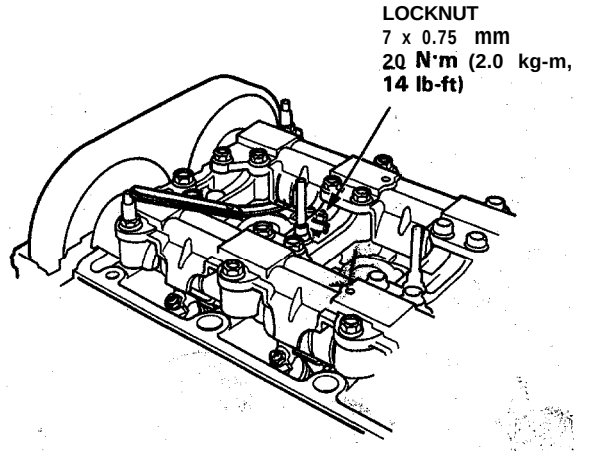


6. Tighten locknut and check clearance again. Repeat adjustment if necessary.

INTAKE:



EXHAUST:

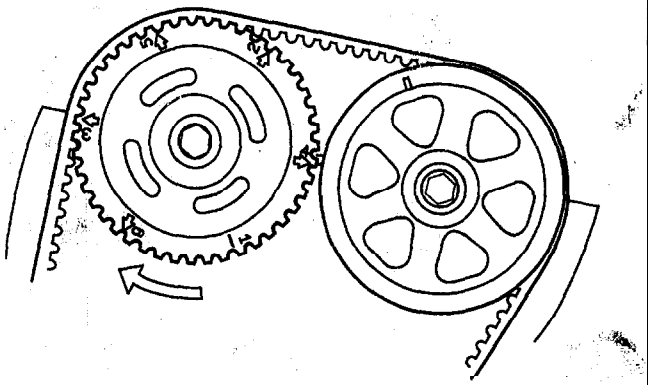


(cont'd

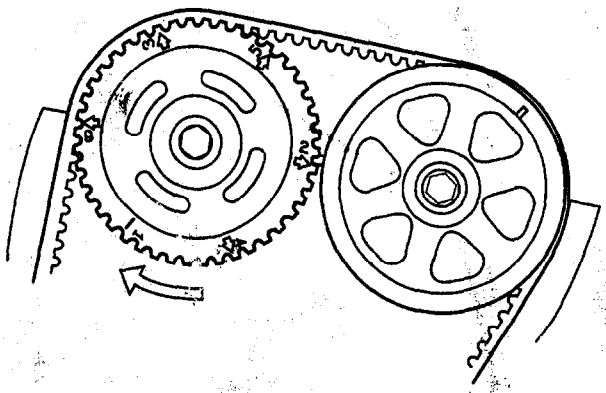
Valve Clearance

<Adjustment (cont'd)

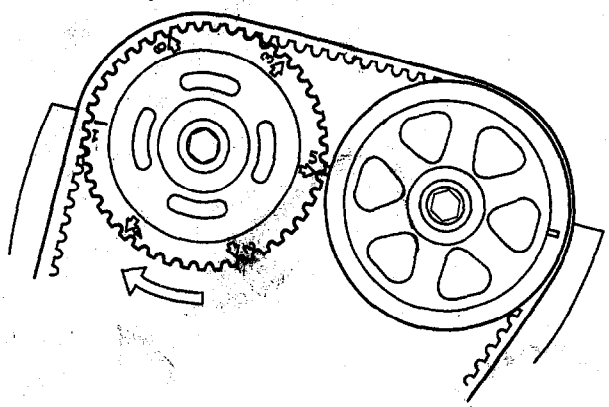
7. Rotate the crankshaft 120° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
Repeat step 3 to step 6
Number 4 piston at TDC:



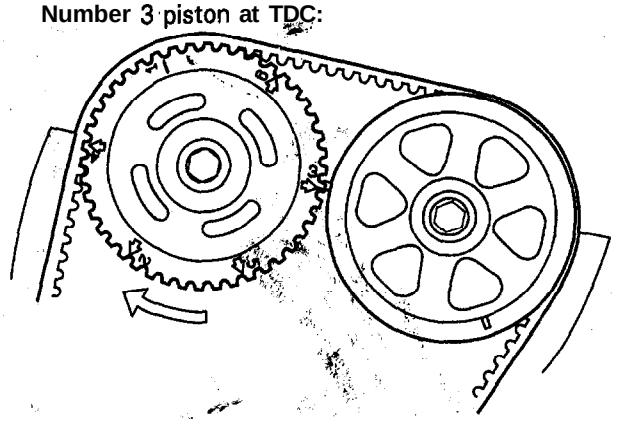
8. Rotate the crankshaft 1 20° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
Repeat step 3 to step 6.
Number 2 piston at TDC:



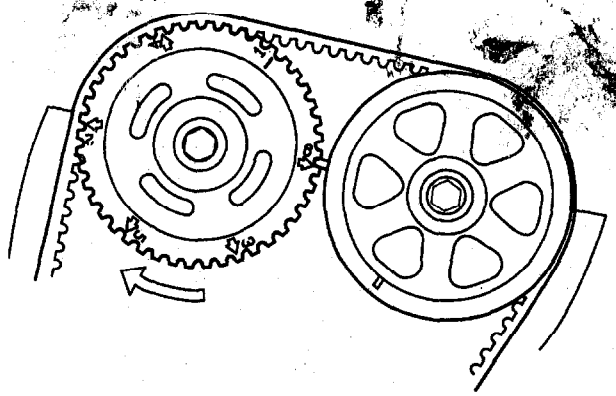
9. Rotate the crankshaft 120° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
-Repeat step 3 to step 6.
Number 5 piston at TDC:



10. Rotate the crankshaft 1 20° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
Repeat step 3 to step 6.
Number 3 piston at TDC:



11. Rotate the crankshaft 120° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
Repeat step 3 to step 6.
Number 6 piston at TDC:

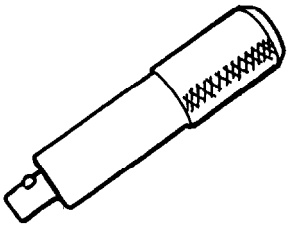


Engine Block

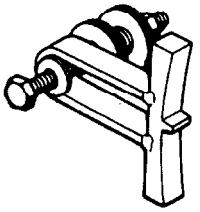
Special Tools 7-2
Illustrated Index 7-3
Flywheel and Drive Plate 7-6
Rod and Main Bearings 7-6
Piston/Connecting Rod Assemblys and Crankshaft Removal 7-9
Crankshaft 7-11
Cylinder Block 7-12
Pistons/Connecting Rod Assemblys ... 7-12
Piston Rings 7-15
Oil Seal 7-18
Crankshaft Installation 7-18

Special Tools

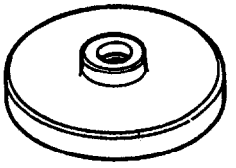
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07746-0010000	Driver	1	7-18
②	07924—PD20003	Ring Gear Holder	1	7-6
③	07948—SB00101	Driver Attachment	1	7-18



①



②



③

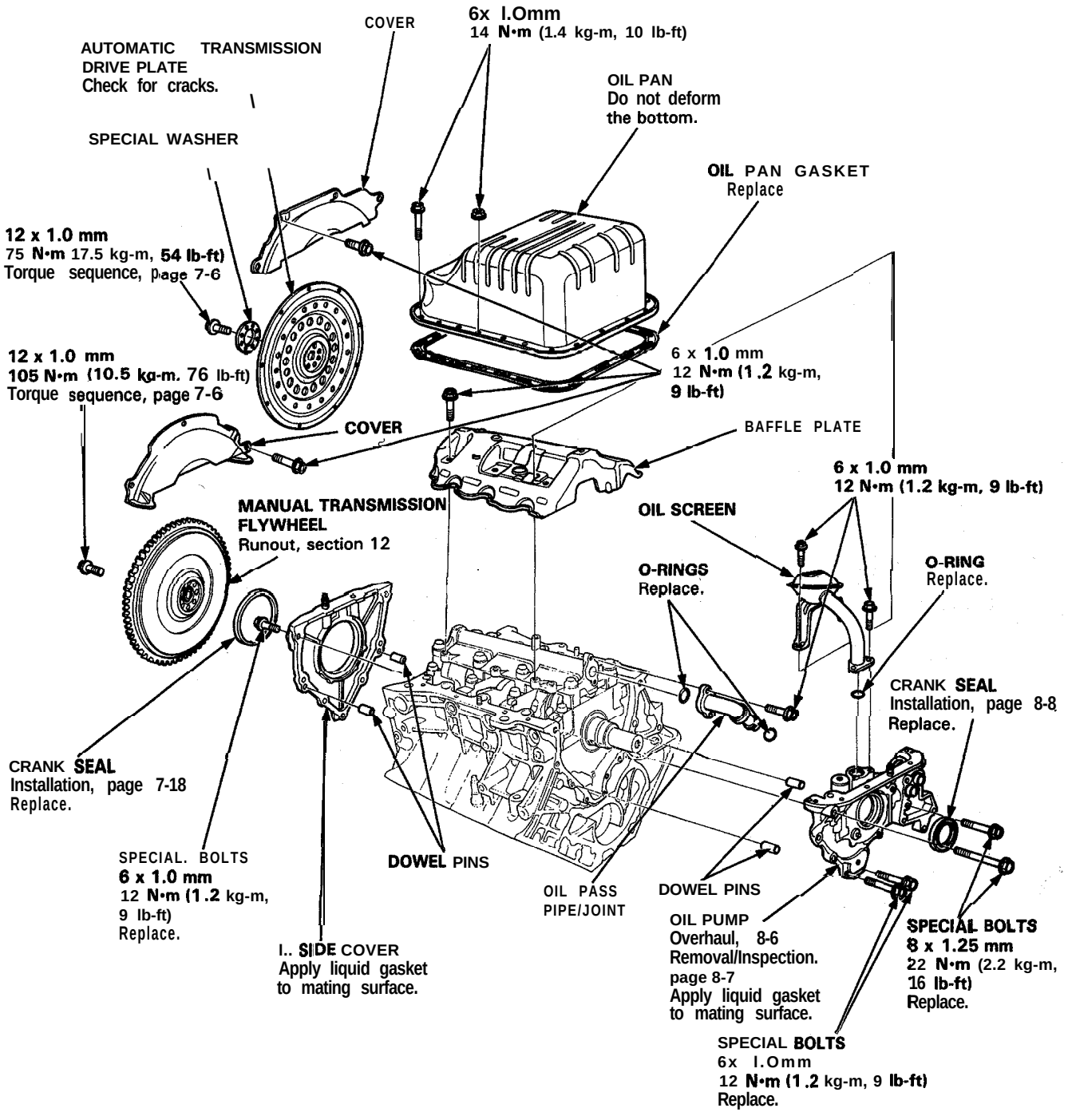
Engine Block

Illustrated Index

Lubricate all internal parts with engine oil during reassembly.

NOTE:

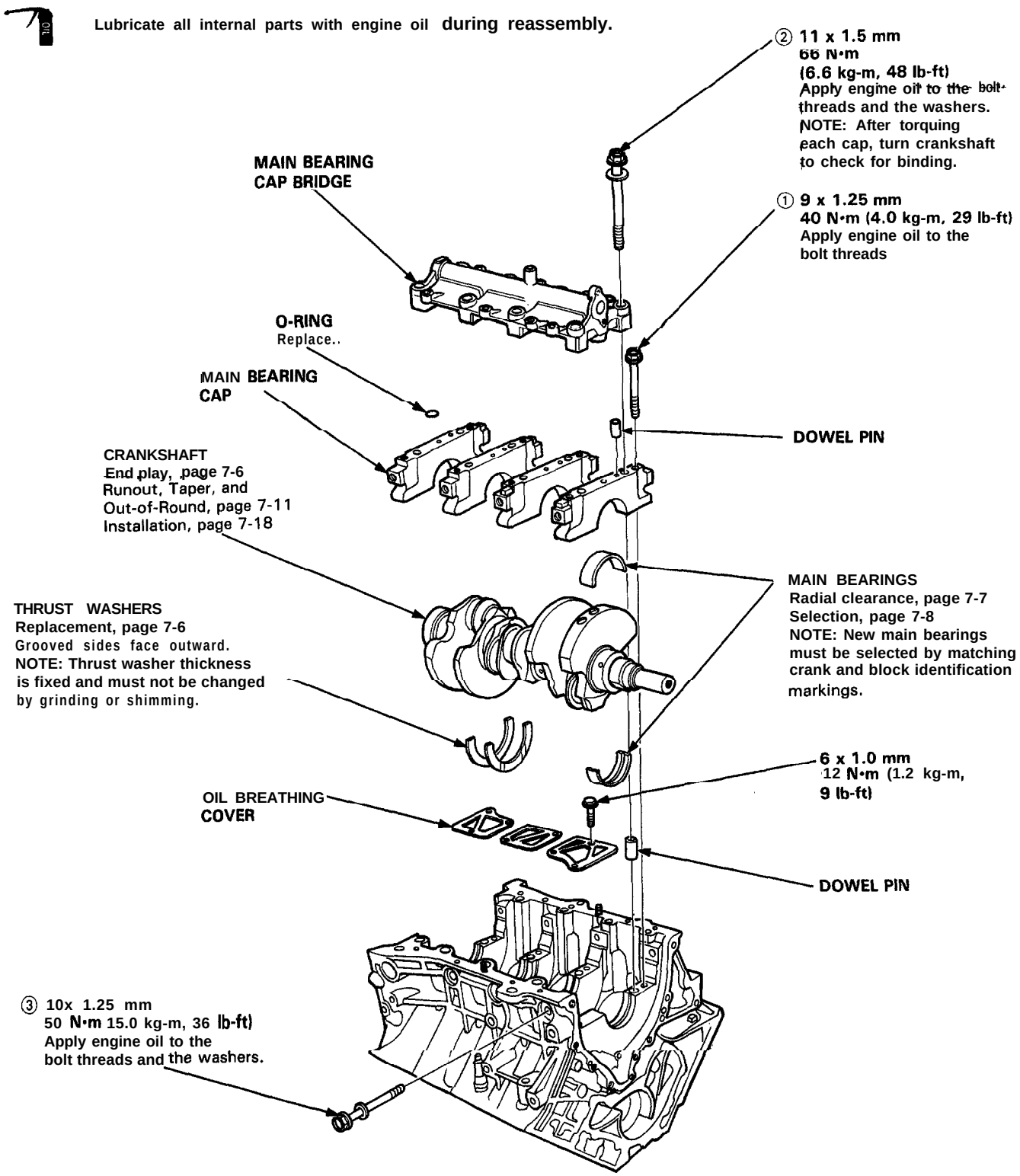
- Apply liquid gasket to the mating surfaces of the left side cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718-550000 OE.
- If the bottom of the oil pan is deformed, it should be repaired or the oil pan should be replaced with new one so as to retain a proper clearance between the screen and the bottom.



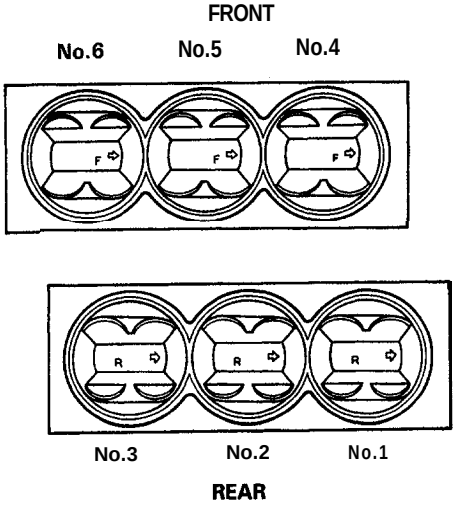
(cont'd)

Engine Block

Illustrated Index (cont'd)



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



CAUTION:

- **The piston skirt is coated with molybdenum; handle the piston carefully to prevent any damage.**
- **The connecting rods are made of titanium. Attempting to remove the piston pin with conventional shop equipment will damage the connecting rod.**
- **If the piston, connecting rod, or piston pin require replacement, all three must be replaced as an assembly.**

PISTON
Inspection, page 7-l 2
NOTE:
- **Before removing piston, inspect the top of the cylinder bore for carbon build-up or ridge. Remove ridge if necessary, page 7-9.**
- **To maintain proper piston clearance, match the letter on the piston top (No letter denotes A.) with the letter for each cylinder stamped on the block.**

CONNECTING ROD ASSEMBLY
End play, page 7-6
Selection, oaae 7-l 4

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

PISTON RINGS
Replacement, page 7-l 5
Measurement, pages 7-l 5 and 16
Alignment, page 7-l 6

CONNECTING ROD BOLT

CONNECTING ROD WASHER

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

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

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 left to right, No. 1 through No. 3 cylinders on the first line and No. 4 through No. 6 cylinders on the second line.

CONNECTING ROD CAP NUT
8 x 0.75 mm
20 N·m (2.0 kg-m, 14 lb-ft)
then turn 95°
After torquing each bearing cap, rotate crankshaft to check for binding.

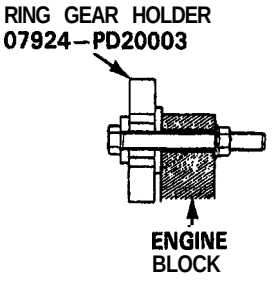
CONNECTING ROD BEARING CAP
Installation, page 7-18
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

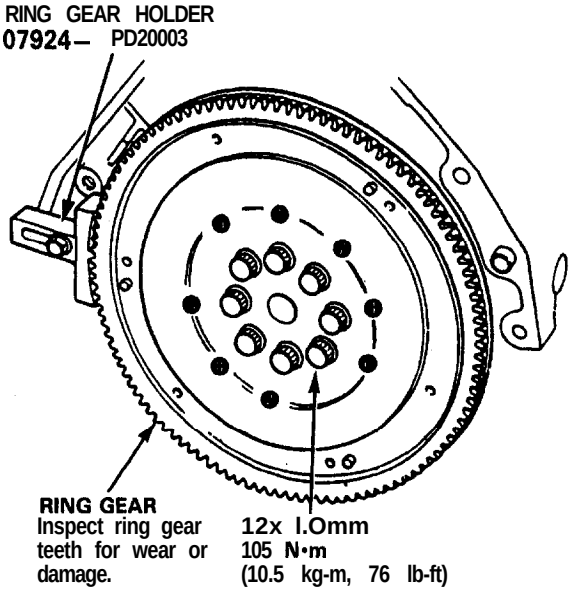
Flywheel and Drive Plate

- Replacement

Manual Transmission:

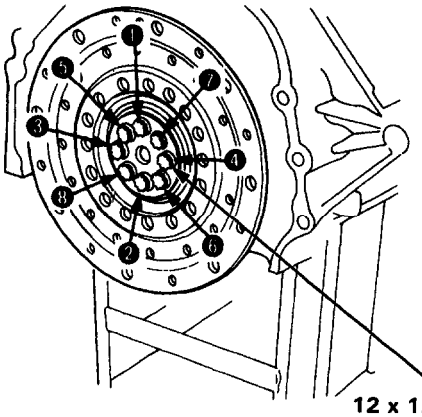
Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.





Automatic Transmission:

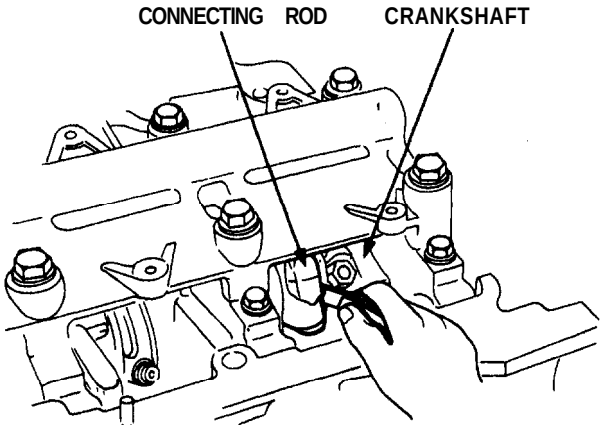
Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Connecting Rod and Crankshaft

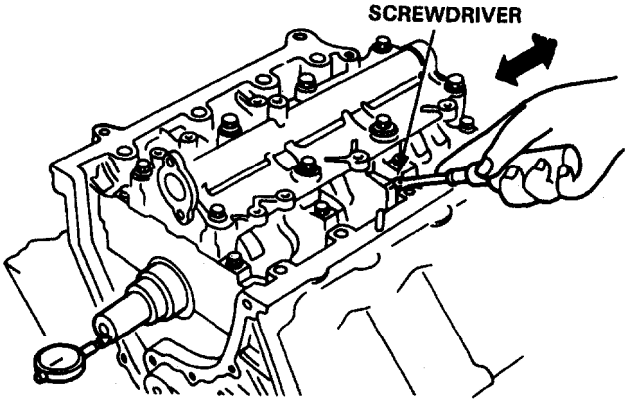
- End Play

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 (pages 7-9, 10 and 7-I 8).**

Push the crank firmly away from the dial indicator, and zero the dial against the end of the crank. Then pull the **crank 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: 0.46 mm (0.018 in)

- **if end play is excessive, inspct 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.

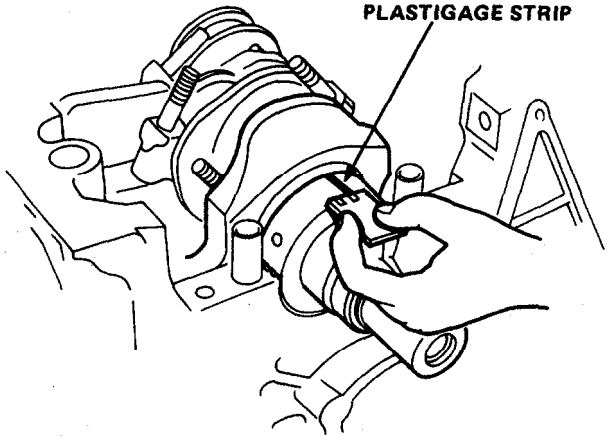
Main Bearings

Clearance

1. To check main bearing clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop rag.
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 crank 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 crank with a jack under the counterweights and check only one bearing at a time.
4. Reinstall the bearings, caps and cap bridge, then torque the 9 mm bridge bolts to 40 N·m 14.0 kg-m, 29 lb-ft). Torque the 11 mm cap bolts to 66 N·m (6.6 kg-m, 48 lb-ft).
5. Torque the side bolts to 50 N·m (5.0 kg-m, 36 lb-ft).
6. Remove the bridge, caps and bearings, and measure the widest part of the plastigage.

Main Bearing Clearance:
Standard (New): 0.024-0.048 mm
(0.0009-0.0019 in)
Service Limit: 0.05 mm (0.002 in)



If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crank, remove the upper half of the bearing, then install a new, complete bearing with the same color code (select the color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

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 crank and start over.

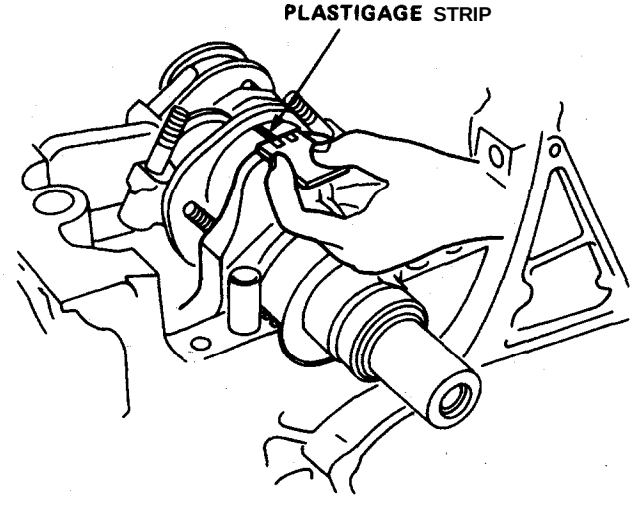
Rod Bearings

- Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop reg.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 20 N·m (2.0 kg-m, 14 lb-ft), then turn 95° (page 7-I 9).

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

Connecting Rod Bearing Clearance:
Standard (New): 0.04-0.06 mm
10.0016-0.0024 in)
Service Limit: 0.06 mm (0.0024 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 color as shown on next page), and recheck the clearance.

   CAUTION: Do not file, shim, or scrape the bearing 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.

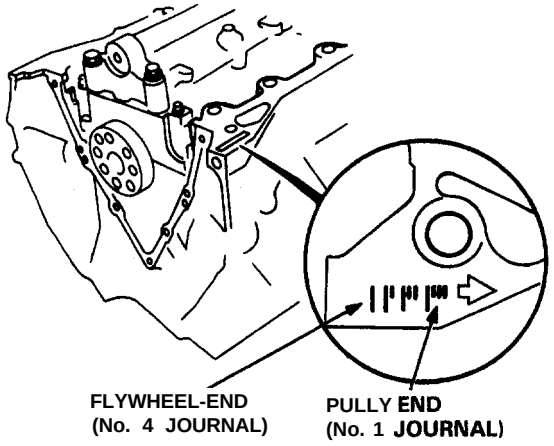
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

Main Bearings

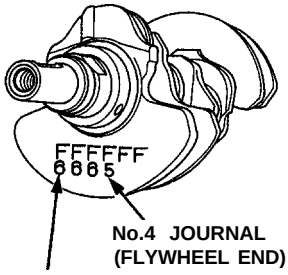
Selection

Crank Bore Code Locations (Letters)

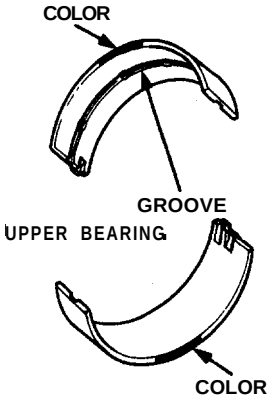
Letters have been stamped on the end of the block as a code for the size of each of the 4 main journal bores. Use them, and the numbers stamped on the crank (codes for main journal size), to choose the correct bearings.



Main Journal Code Locations (Numbers)

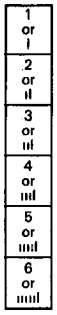


Bearing Design



Bearing Identification

Color code is on the edge of the bearing



Smaller main journal

Smaller bearing (thicken

-Larger crank bore			
A or I	B or II	C or III	D or IIII
-Small bearing (thicker)			
Pink Pink	Pink Yellow	Yellow Yellow	Yellow Green
Pink Yellow	Yellow Yellow	Yellow Green	Green Green
Yellow Yellow	Yellow Green	Green Green	Green Brown
Yellow Green	Green Green	Green Brown	Brown Brown
Green Green	Green Brown	Brown Brown	Brown Black
Green Brown	Brown Brown	Brown Black	Black Black

NOTE: When the different color bearing in top and bottom are mated, the color is irrespective of top or bottom.

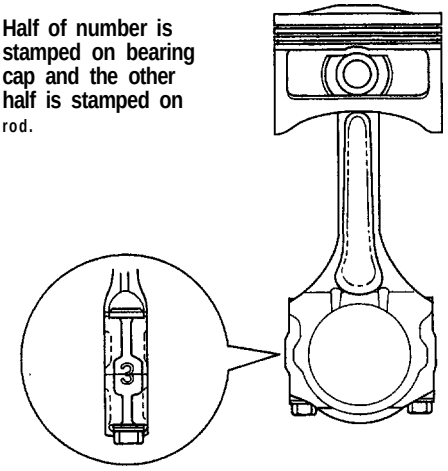
Rod Bearings

Selection

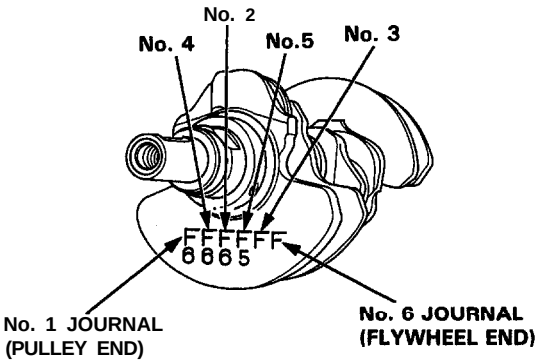
Rod Code Location (Numbers)

Numbers 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 stamped on the crank (codes for rod journal size), to choose the correct bearings.

Half of number is stamped on bearing cap and the other half is stamped on rod.

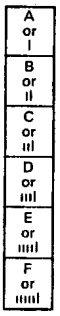


Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing



Smaller rod journal

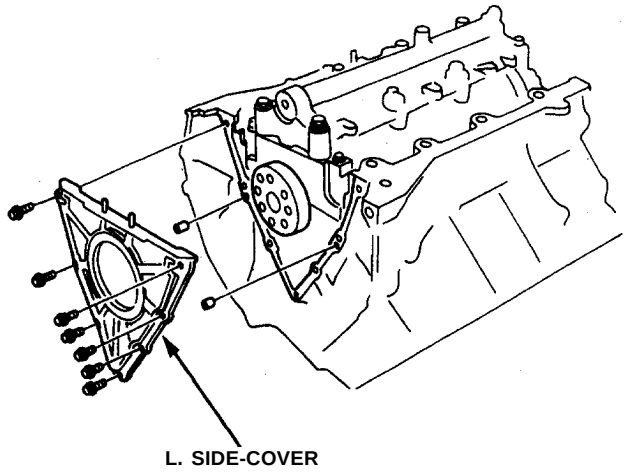
Smaller bearing (thicker)

-Larger big end bore			
1	2	3	4
-Small bearing (thicker)			
Red Red	Red Pink	Pink Yellow	Yellow Yellow
Red Pink	Pink Yellow	Yellow Yellow	Yellow Green
Pink Yellow	Yellow Yellow	Yellow Green	Green Brown
Yellow Yellow	Yellow Green	Green Brown	Brown Brown
Yellow Green	Green Brown	Brown Brown	Brown Black
Green Brown	Brown Brown	Brown Black	Black Black

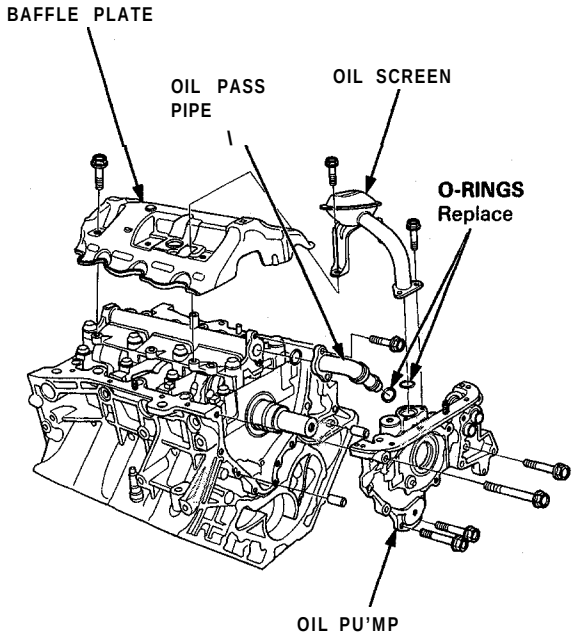
NOTE: When the different color bearing in top and bottom are mated, the color is irrespective of top or bottom.

Removal

1. **Remove the L. side cover.**



2. **Remove the oil screen.**



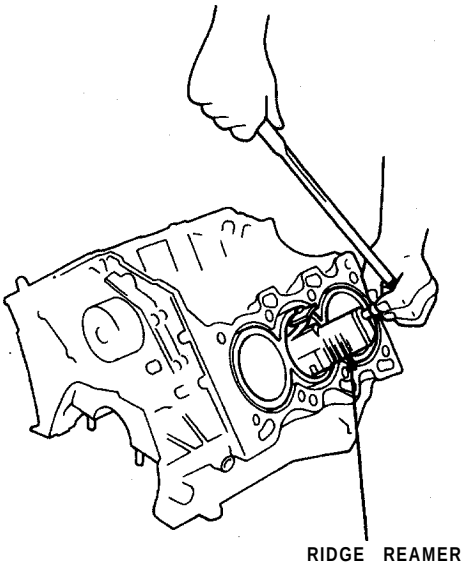
3. **Remove the baffle plate.**

4. **Remove the oil pass pipe and joint.**

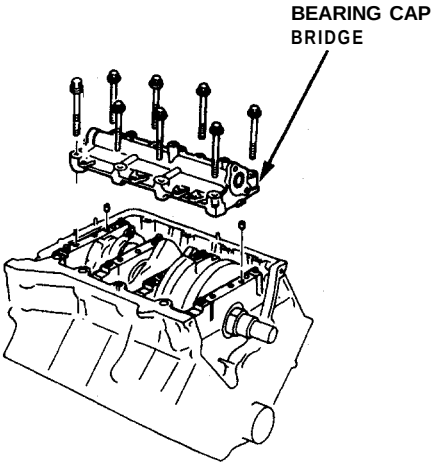
5. **Remove the oil pump.**

6. **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.



7. **Remove the bearing cap bridge.**



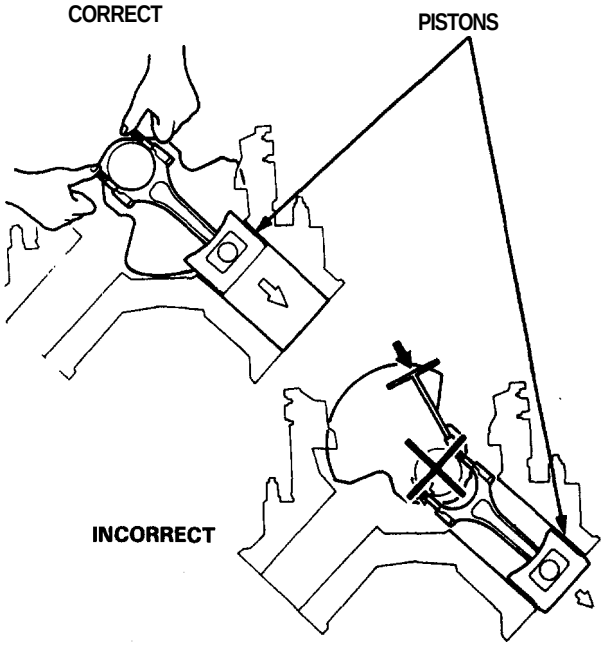
(cont'd)

Piston/Connecting Rod Assemblies and Crankshaft

Removal (cont'd)

- **Remove the connecting rod caps after setting the crank pin at the 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.



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

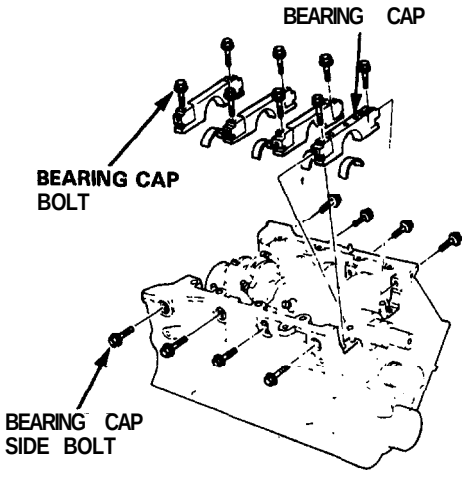
9. Remove upper bearing halves from connecting rods and set aside with their respective caps.

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

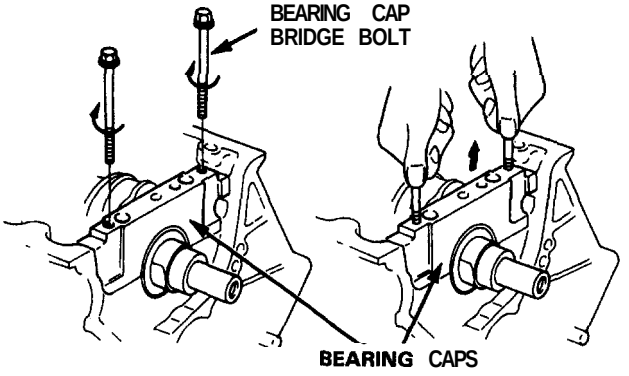
11. **Mark piston/connecting rod assemblies with** cylinder numbers to avoid mixup on reassembly.

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

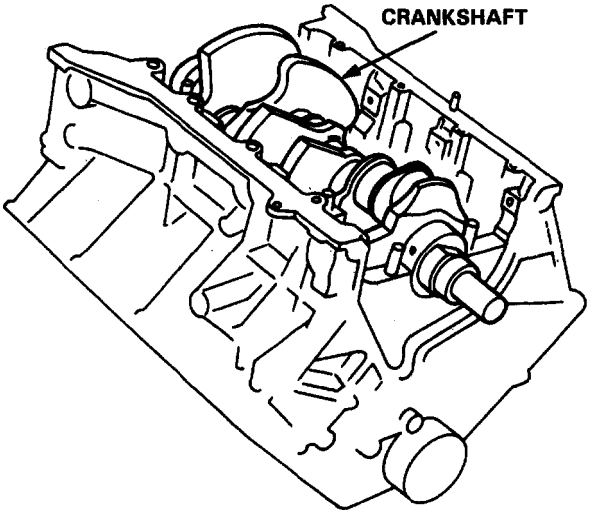
12. Remove the bearing cap bolts and bearing cap side bolts, then remove the bearing caps.



- To help with removal of the caps install the bearing cap bolts in the bearing cap bridge bolt holes.



13. **Lift the crankshaft out of engine, being careful not** to damage journals.



14. Reinstall main caps and bearings on engine in proper order.

Crankshaft

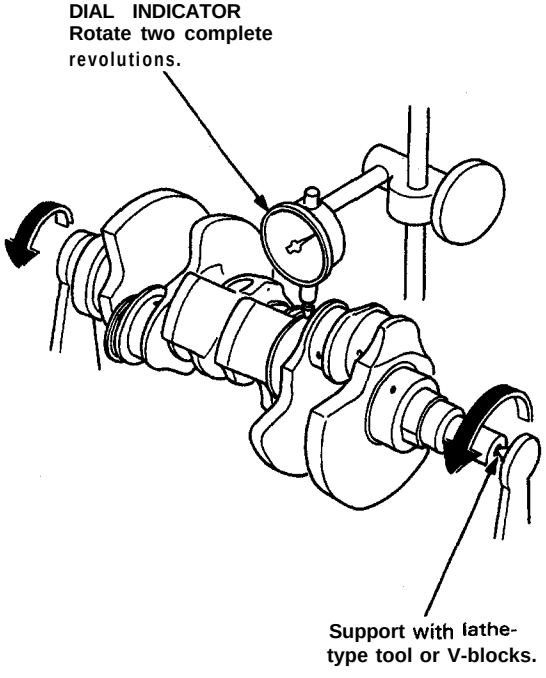
- Inspection

- 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 crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

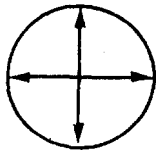
Crankshaft Total Indicated Runout:
Standard (New): 0.015 mm (0.0005 in) min.
Service limit: 0.03 mm (0.0012 in)

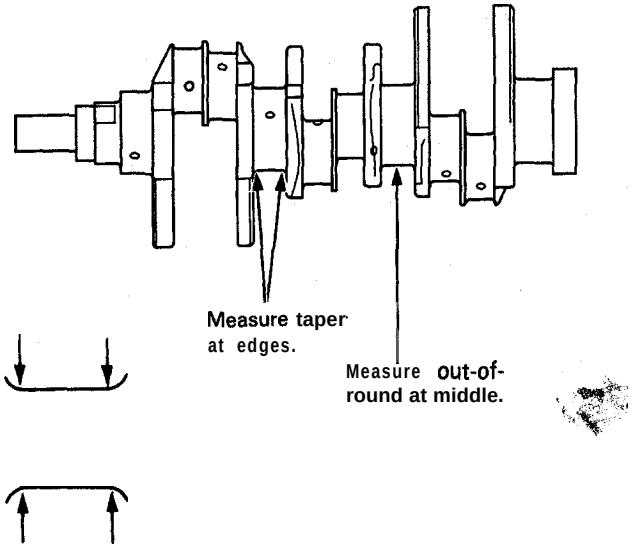


Out-of-Round and Taper

- 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.

Jouinal Out-of-Round:
Standard (New): 0.004 mm (0.00016 in) min.
Service Limit: 0.006 mm (0.00024 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) min.
Service Limit: **0.010 mm (0.0004 in)**

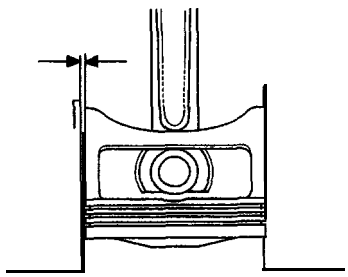
Cylinder Block

Piston-to-Block Clearance

1. Make a preliminary piston-to-block clearance check with a feeler gauge:

   Service Limit: 0.0825 mm (0.0032 in)

0.0825 mm (0.00032 in)



If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.
To confirm the feeler gauge check, further measurement with a micrometer will be necessary.

2. Calculate difference between cylinder bore diameter on page 7-I 3 and piston diameter.

   Piston-to-Cylinder Clearance:

   Service Limit: 0.0825 mm (0.0032 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.

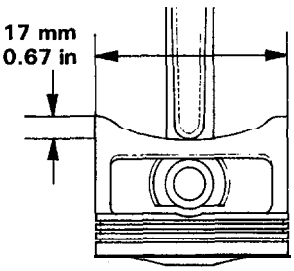
   NOTE: If cylinder is bored, an oversized piston must be used.

2. Measure piston diameter at a point 17 mm (0.67 in.) from bottom of skirt.

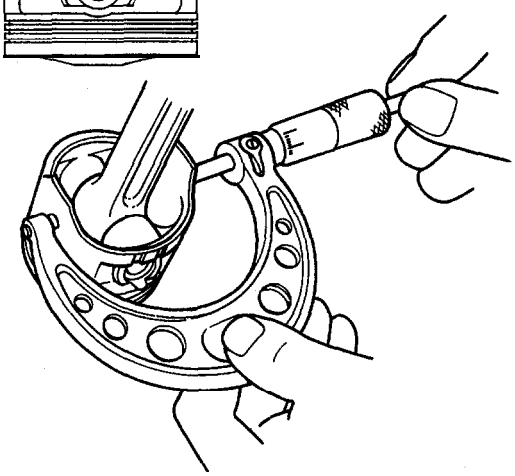
   NOTE: There are two standard-size pistons (A and B). The letter is stamped on the top of the piston. These letters are also stamped on the block as cylinder bore sizes.

   Piston A Diameter
   Standard (New): 89.986-90.004 mm (3.5427-3.5434 in)
   Service Limit: 89.97 mm (3.5421 in)
   Piston 8 Diameter
   Standard (New): 89.976-89.994 mm (3.5424-3.5431 in)
   Service Limit: 89.96 mm (3.5417 in)

17 mm
0.67 in



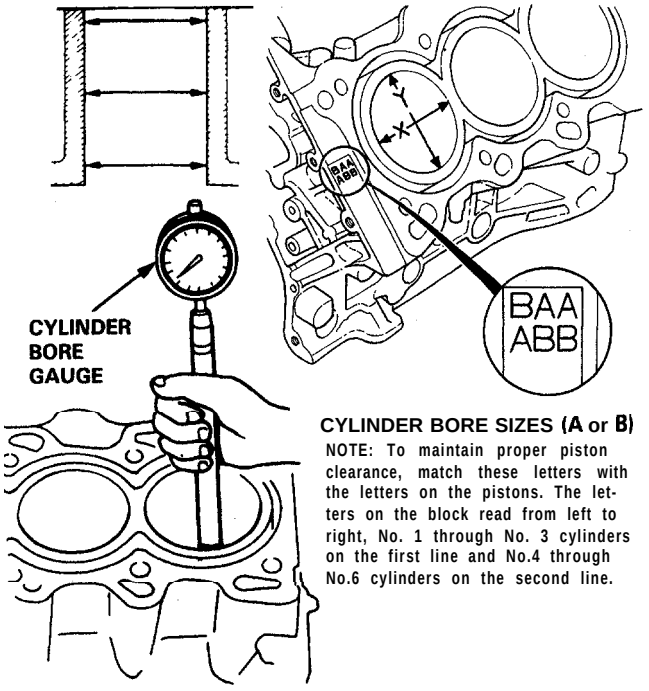
SKIRT DIAMETER



Oversize Piston Diameter
0.25: 90.226-90.244 mm (3.5522–3.5530 in)
0.50: 90.476-90.494 mm (3.5620-3.5627 in)

Inspection

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



CYLINDER BORE SIZES (A or B)
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. 3 cylinders on the first line and No.4 through No.6 cylinders on the second line.

Cylinder Bore Size
Standard (New): 90.00—90.02 mm (3.543-3.544 in)
Service Limit: **90.07 mm (3.546 in)**

Oversize
0.25: 90.25-90.27 mm (3.553-3.554 in)
0.50: 90.50-90.52 mm (3.563-3.564 in)

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

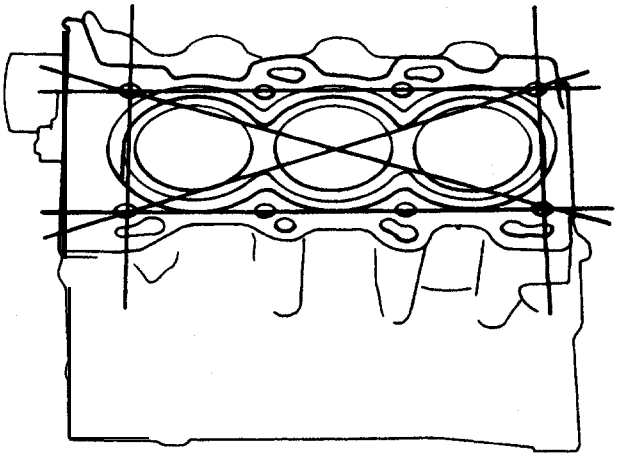
- **If measurements in any cylinder are beyond** Oversize Bore Service Limit, replace the block.
- **If block is to be rebored, refer to Piston** Clearance Inspection (page 7-l 2) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.50 mm (0.020 in)

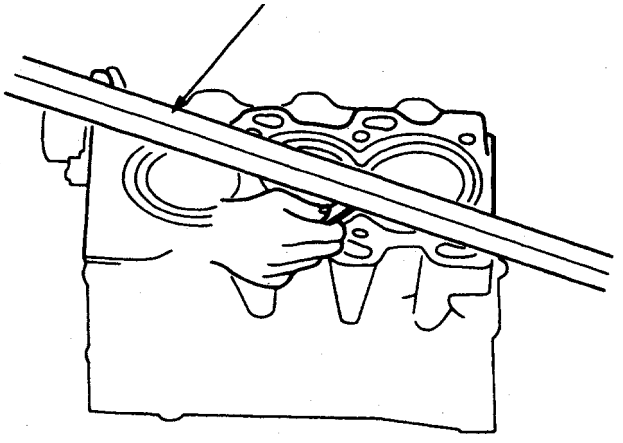
2. **Check the top of the block for warpage.** Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Engine Blcok Warpage:
Standard (New): 0.07 mm (0.003 in)
Service Limit: **0.10 mm (0.004 in)**

PRECISION STRAIGHT EDGE

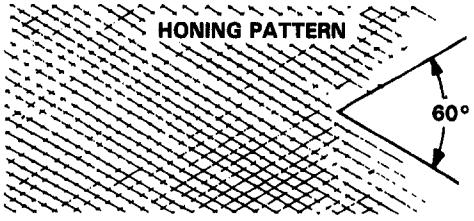


Cylinder Block

Bore Honing

1. Measure cylinder bores as shown on page 7-l 3. If the block is 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.

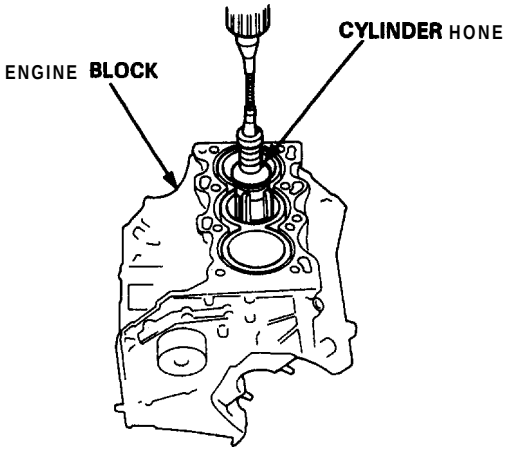
NOTE:
- Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
- Do not use stones that are worn or broken.



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

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

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



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

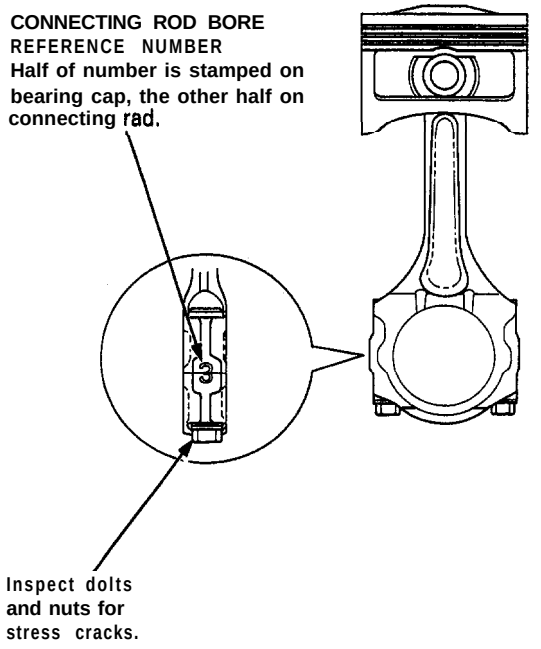
Piston/Connecting Rod Assemblies

Selection

Each rod is sorted into one of four tolerance ranges (from 0 to 0.024 mm, in 0.006 mm increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3 or 4) indicating that tolerance. You may find any combination of 1, 2, 3 or 4 in any engine.

Normal Bore Size: 53 mm (2.09 in)

NOTE:
- Reference numbers are for big end bore size and do NOT indicate the position of rod in engine.
- Inspect connecting rod for cracks and heat damage.



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:

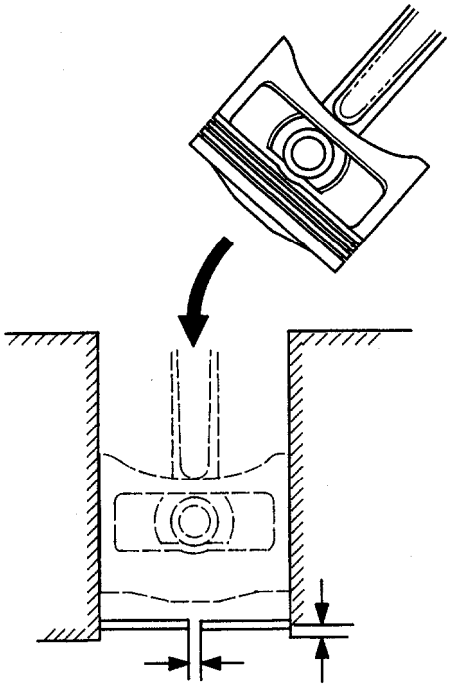
- If the gap is too small, check to see if you have the proper rings for your engine.
- If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-13. If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top Ring
Standard (New): 0.25-0.40 mm (0.010-0.016 in)
Service Limit: 0.60 mm (0.024 in)

Second Ring
Standard (New): 0.35—0.50 mm (0.014-0.020 in)
Service Limit 0.75 mm (0.03 in)

Oil Ring
Standard (New): 0.2-0.7 mm (0.008-0.028 in)
Service Limit: 0.8 mm (0.03 in)



Replacement

1. Using ring expander, remove old piston rings.

2. Clean all ring grooves thoroughly.

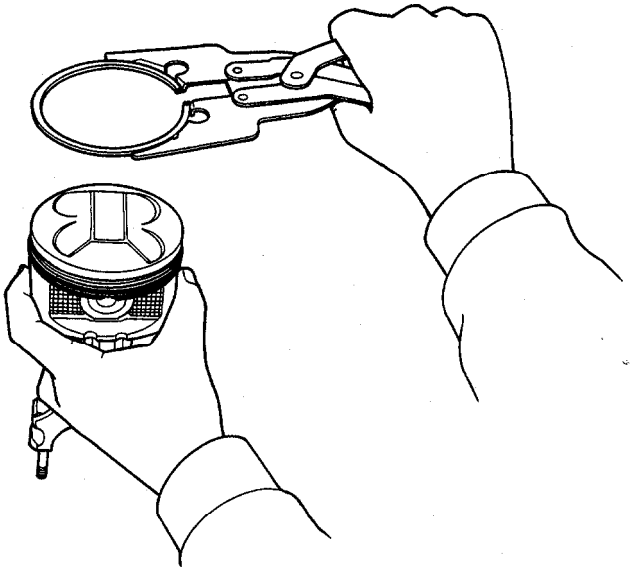
NOTE:
- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Compression ring grooves are 1.2 mm wide and oil ring groove is 2.8 mm wide.
- File down blade if necessary.

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

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

3. Install new rings in proper sequence and position (page 7-16).

NOTE: Do not reuse old piston rings.

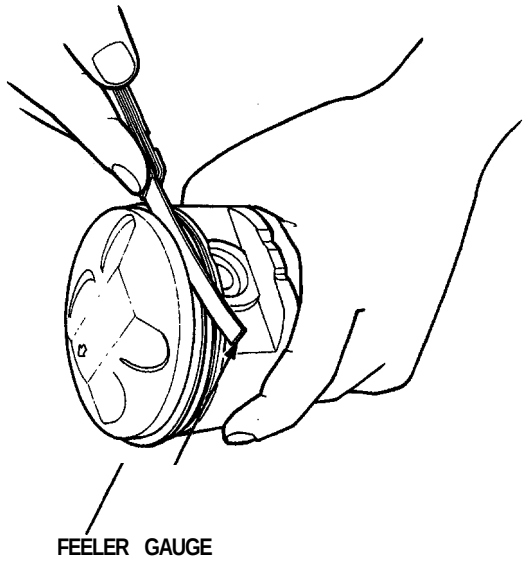


Piston Rings

Land Clearances

After installing a new set of rings, measure ring-to-land clearances:

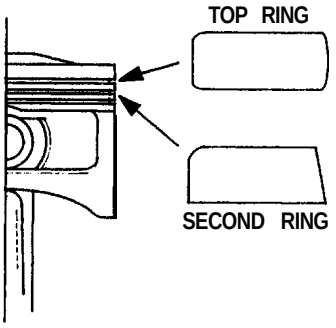
Top and Second Rings Clearance
Standard (New): 0.030-0.055 mm (0.001-0.002 in)
Service Limit: **0.13 mm (0.005 in)**



Alignment

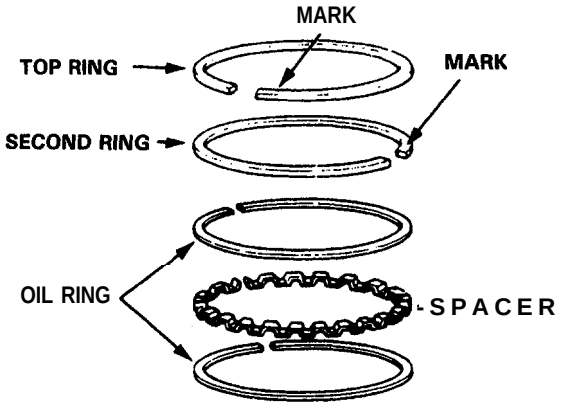
1. **Install the rings as shown on page 7-l 5.**

   identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.

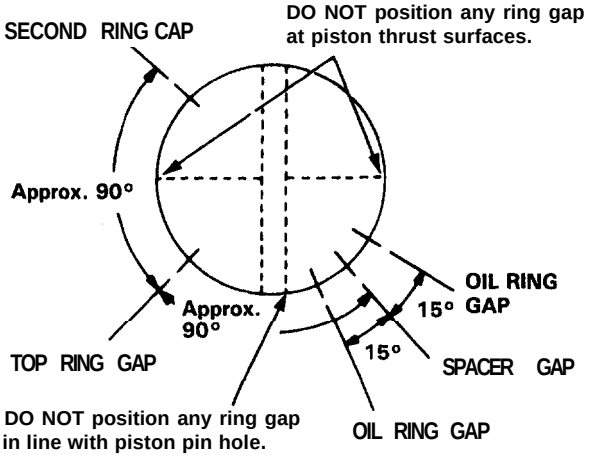


2. **Rotate the rings in grooves to make sure they do not bind.**

3. The manufacturing marks must be facing upward.



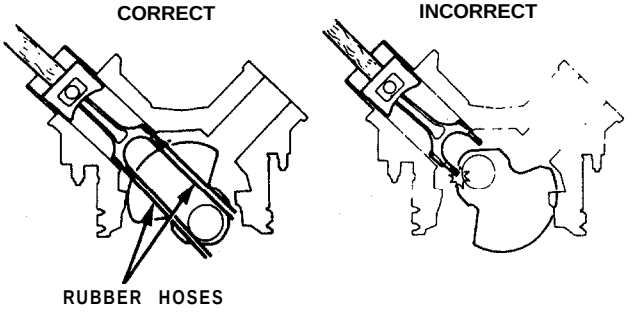
4. position the ring end gaps as shown:



Installation

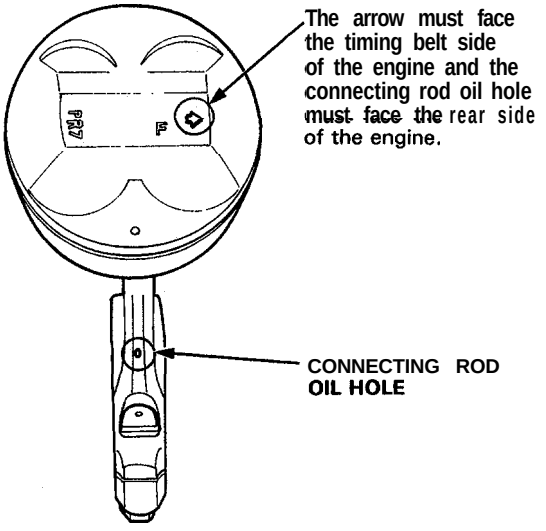
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

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

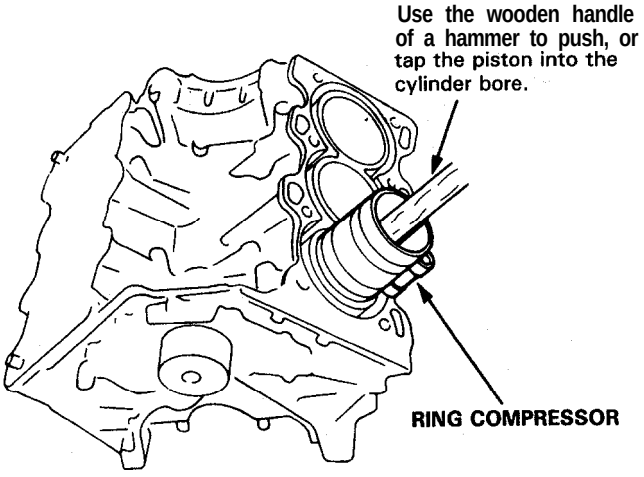


1. If the crankshaft is already installed:
   - Install the piston assemblies in No. 1 and No. 4 cylinders, No. 2 and No. 5 cylinders, and No. 3 and No. 6 cylinder.
   - Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
   - Install the ring compressor, check that the bearing is securely in place; then position the piston in the cylinder and drive 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 driving rod into place.
   - Install the rod caps with bearings, and torque the nuts to 20 N·m (2.0 kg-m, 14 lb-ft), then turn the nut 95 degrees (page 7-19).

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 drive it in using the wooden handle of a hammer.



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

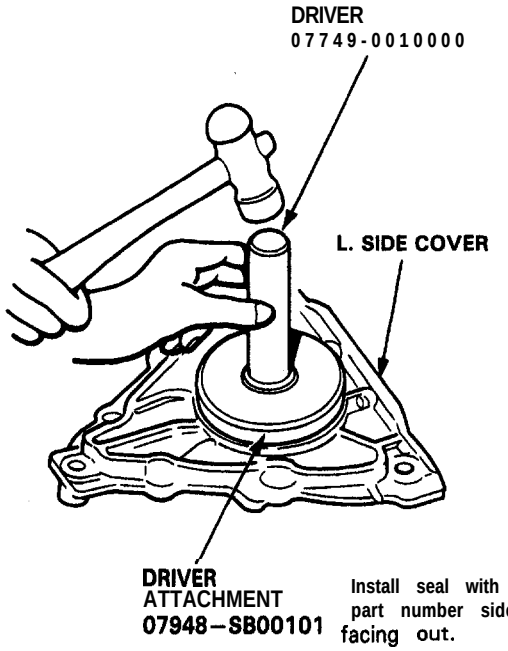


Oil Seal

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.

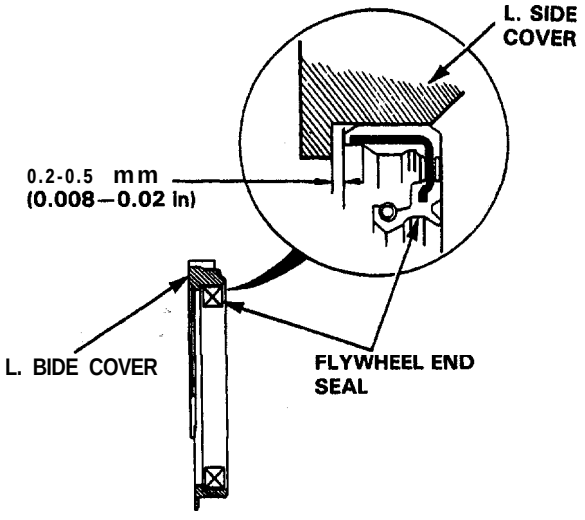
1. **Drive in flywheel-end seal until to bottoms against** L. side cover.



Install seal with the part number side facing out.

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

Clearance: 0.2-0.5 mm (0.008-0.02 in)



NOTE: Refer to page 8-8 for installation of the oil pump side oil seal.

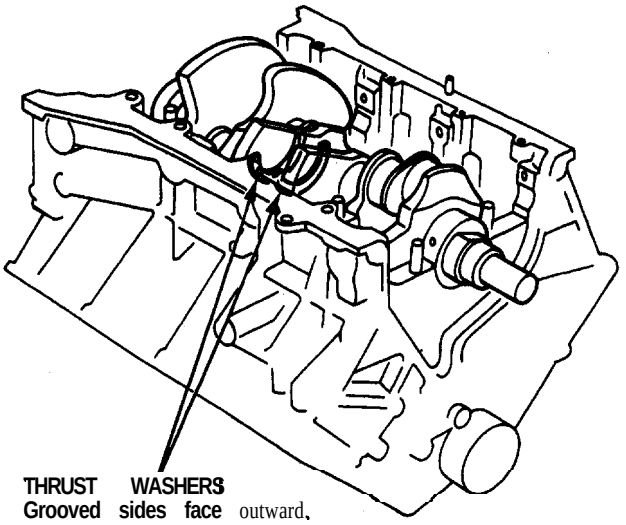
Crankshaft

Installation

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

1. **Insert bearing halves in the engine block and connecting rods.**

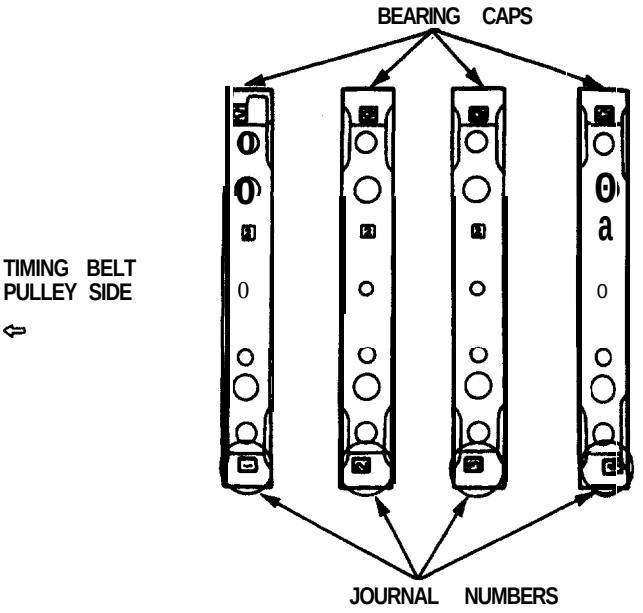
2. Lower the crankshaft into the block.



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

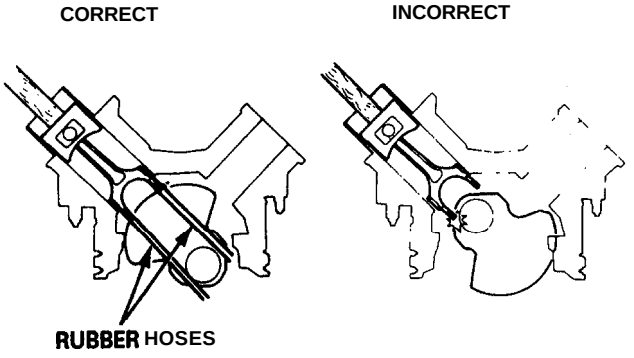
4. **Install the bearings and caps. Tighten 9 x 1.25 mm cap bolts to the specified torque.**

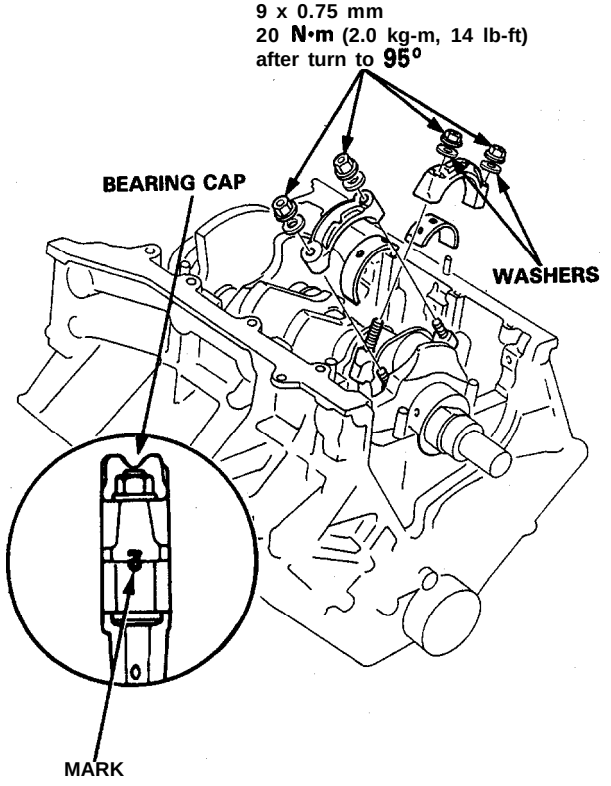
Torque: 40 N·m (4.0 kg-m, 29 lb-ft)



NOTE:

- Guide the piston carefully to prevent damage.
- Fit long rubber noses (about 30 cm long) to connecting rod bolts to protect the crankshaft.
- Install the pistons after setting the crankshaft to BDC for each cylinder.





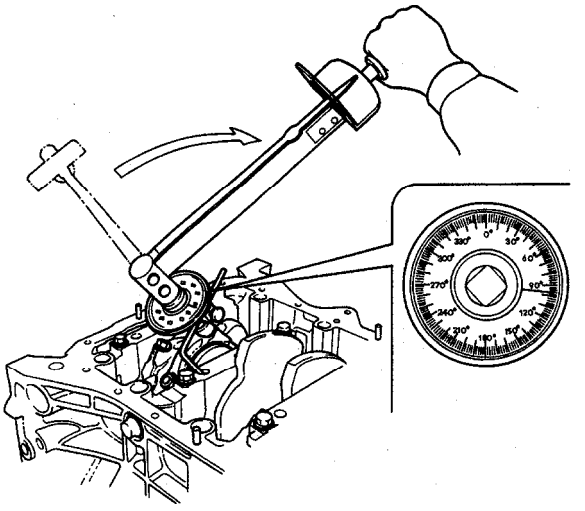
- Line up the marks when installing connecting rod cap.

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

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

CONNECTING ROD CAP NUT TORQUING METHOD

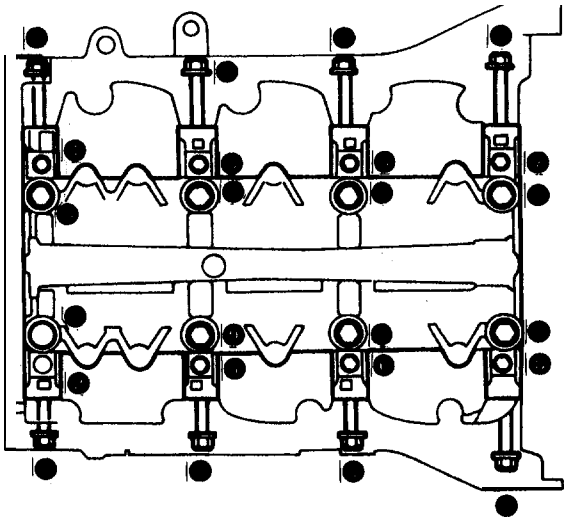
1) Torque the connecting rod cap nut to 20 N•m (2.0 kg-m, 14 lb-ft) with a beam-type torque wrench.
2) Install a torque degree gauge to the cap nut, then turn the cap nut 95 degrees.



(cont'd)

Installation (cont'd)

BEARING CAP BOLTS TORQUE SEQUENCE



6. Install the bearing cap bridge, and tighten 1 1 x 1.5 mm bolts to the specified torque diagonally outward from the center.

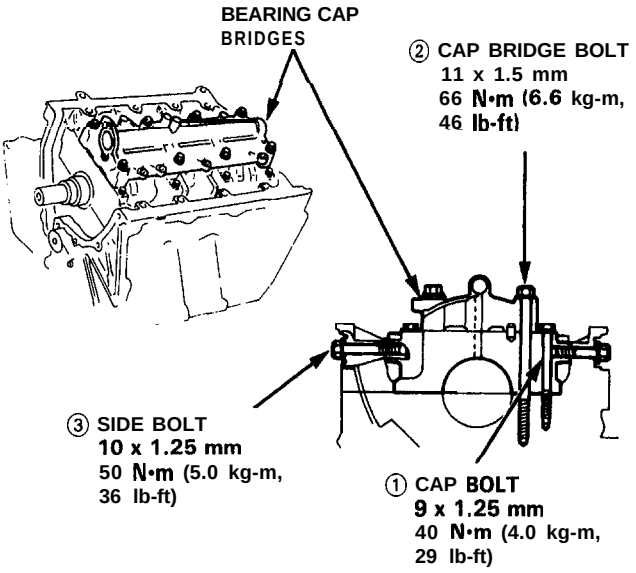
   Torque 66 N·m (6.6 kg-m, 48 lb-ft)

7. Tighten cap side bolts (10 x 1.25 mm) to the specified torque.

   Torque: 50 N·m (5.0 kg-m, 36 lb-ft)

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

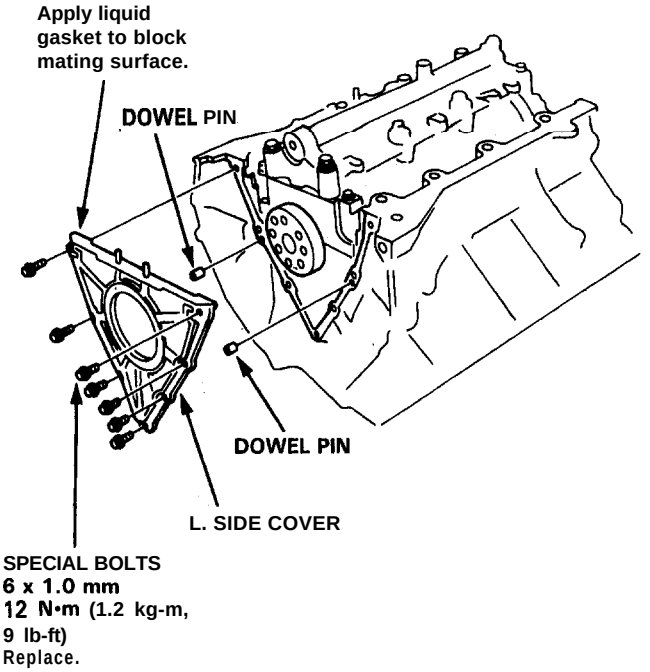
   NOTE: The shorter side bolts are for the front side.



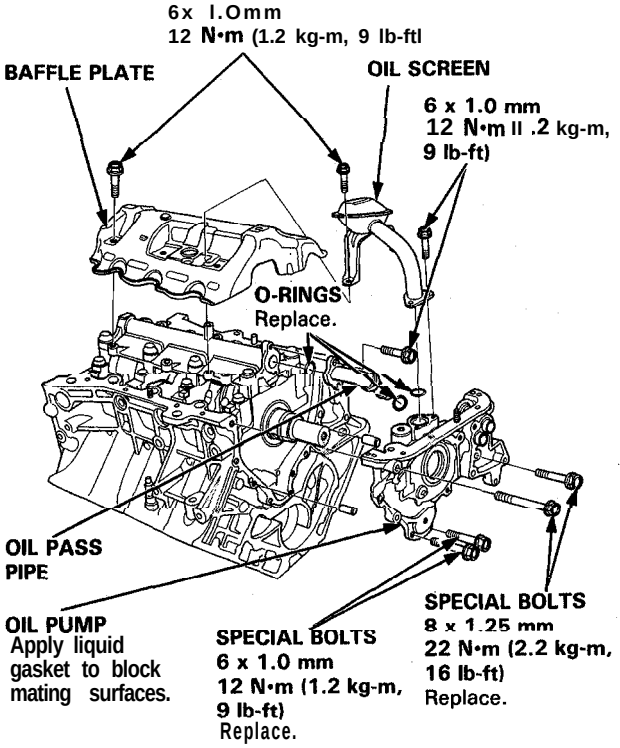
8. Apply liquid gasket to the block mating surface of the left side cover and oil pump case, and install them on the engine block.

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

LEFT SIDE:

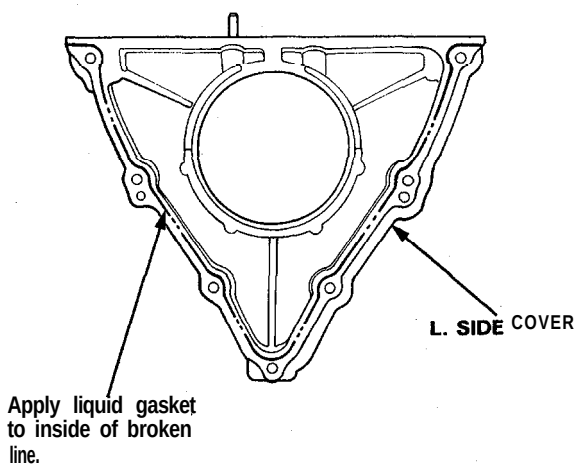


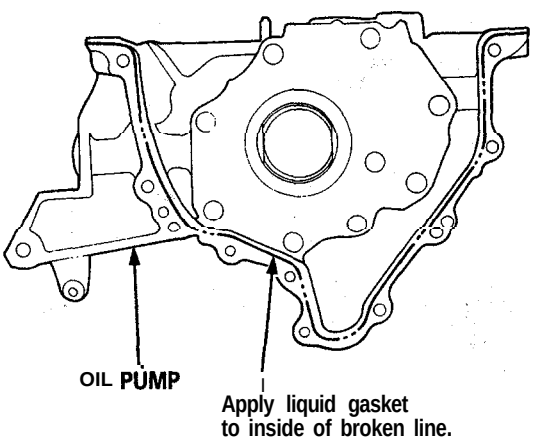
OIL PUMP SIDE:



NOTE:

- Use liquid gasket, Part No. 087 18— 550000 OE.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even band, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.





- Do not install the parts if 20 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.

11. Install the oil pass pipe and joint.

12. Install the baffle plate.

13. Install the oil screen.

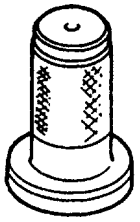
14. Install the oil pan (page 8-9).

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

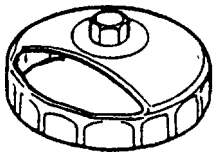
Engine Lubrication

Special Tools 8-2
Illustration Index 8-3
Oil Level Inspection 8-4
Oil Replacement 8-4
Oil Filter Replacement 8-5
Oil Pressure Test 8-5
Oil Pump Illustrated Index 8-6
Oil Pump Removal/Inspection 8-7
Oil Cooler, Oil Filter Base 8-10

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAD—PH70200	Seal Driver	1	8-8
②	07912-6110001	Oil Filter Socket	1	8-5



①

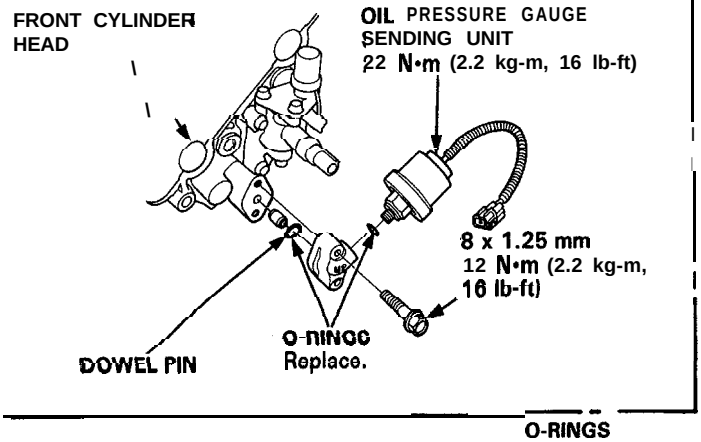


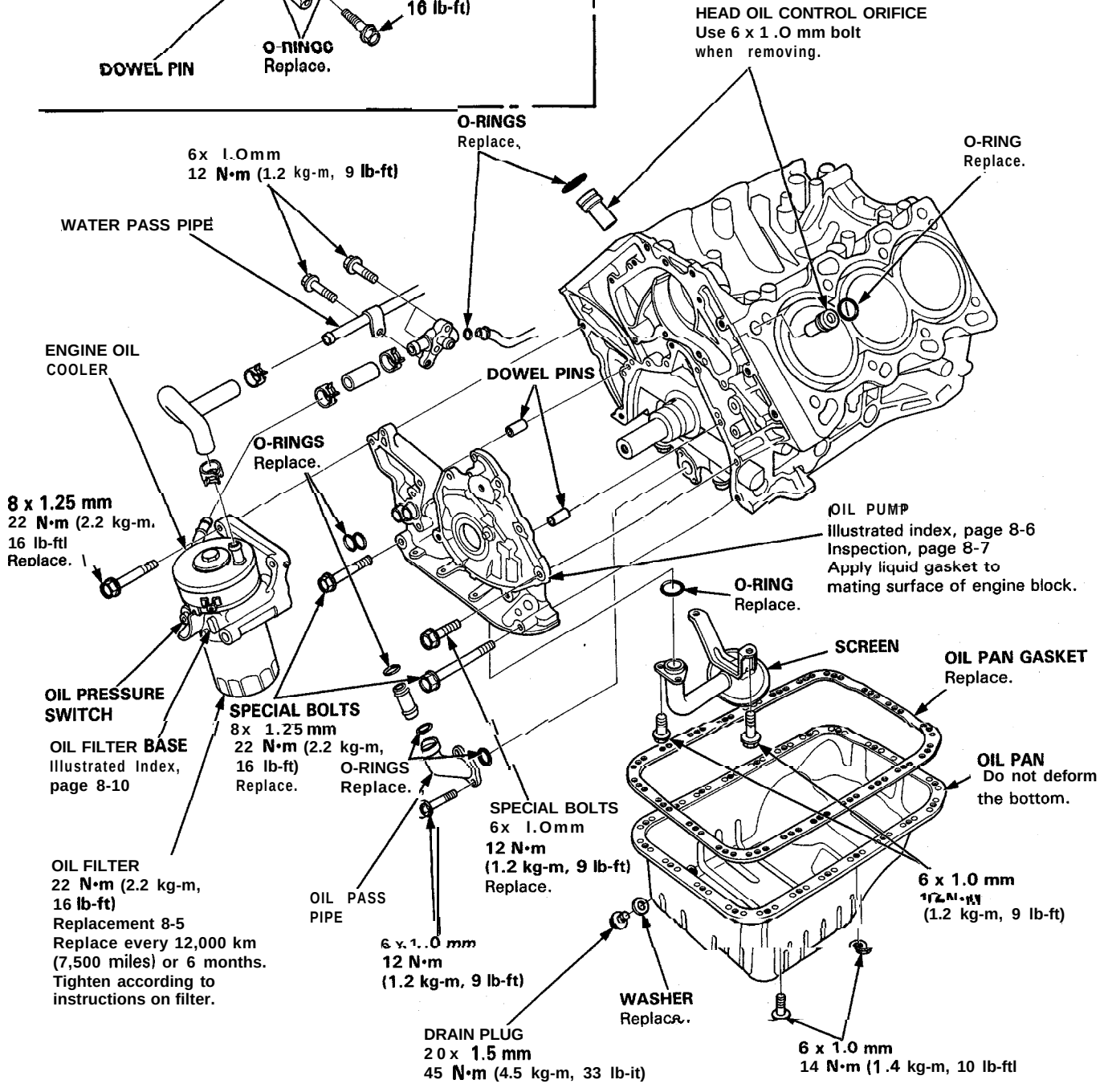
②

Engine Lubrication

Illustrated Index

NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings befere installation.
- Use liquid gasket, Part No. 08718—550000 OE.
- If the bottom of the oil pan is deformed, it should be repaired or the oil pan should be replaced with a new one so as to retain proper clearance between the screen and the bottom.



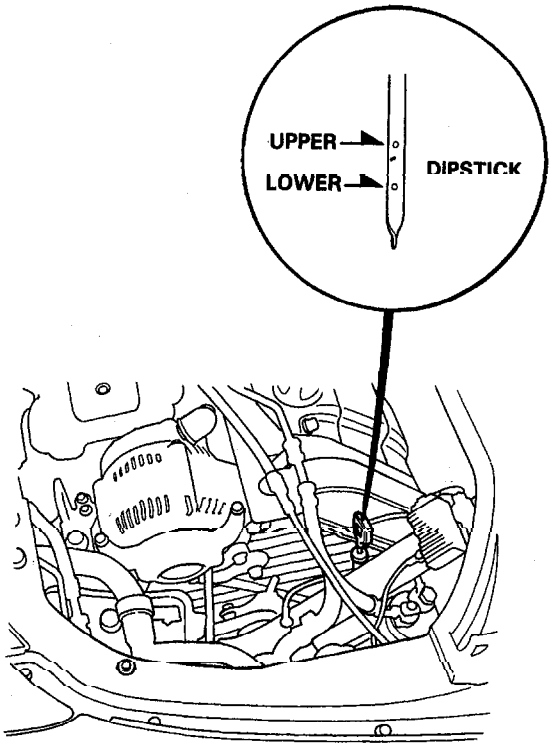


Oil Level

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.

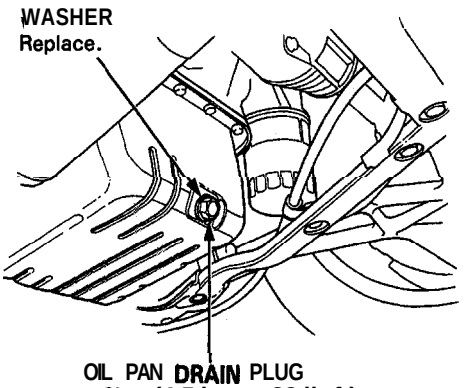
CAUTION: Insert the dipstick carefully to avoid bending it.



Engine Oil

Replacement

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

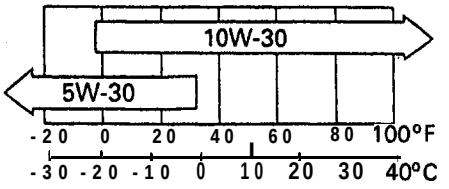


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

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

Requirement	API Service Grade: SG SAE viscosity: 10 W-30 recommended Fuel Efficient oil: Identified by the words, "Energy Conserving II"
Capacity	5.0 ℓ (5.3 US qt, 4.4 Imp qt) for change, including filter. 6.3 ℓ (6.7 US qt, 5.5 Imp qt) for engine overhaul.
Change	Every 12,000 km (7,500 miles)

Engine Oil Viscosity for Outside Temperature Ranges.



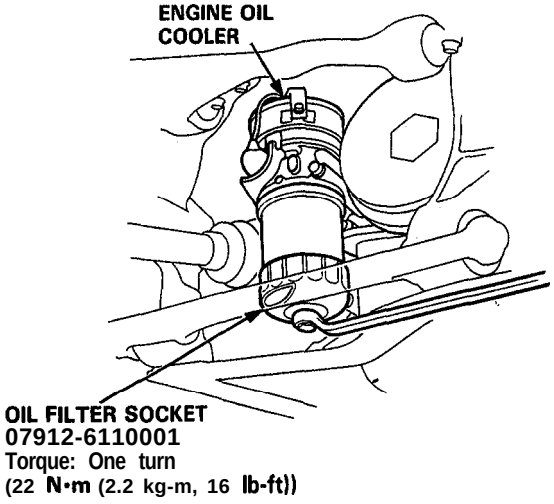
NOTE: Oil filter should be replaced at each oil change.

Oil Filter

Replacement

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

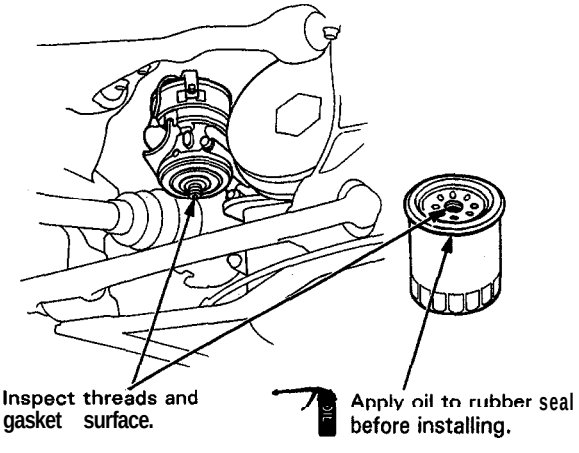
1. Remove the oil filter with the special tool as shown.



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

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

   Torque: One turn (22 N·m (2.2 kg-m, 16 lb-ft)).



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

Oil Pressure

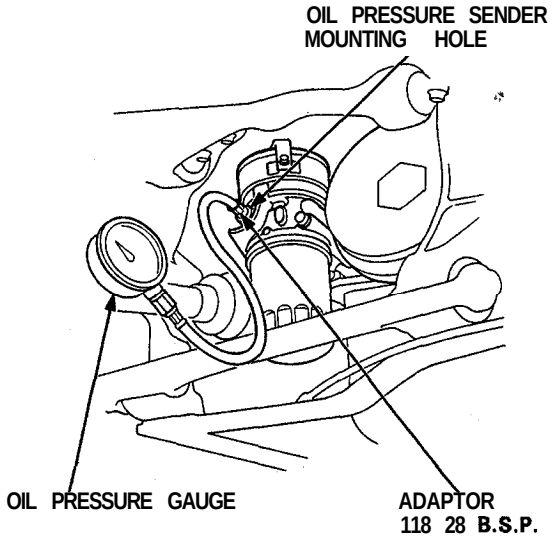
Test

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

1. Remove the oil pressure sender and install an oil pressure gauge.
2. Start the engine and allow to reach operating temperature (fan comes on at least twice).
3. Pressure should be:

   Engine Oil Pressure:
   At Idle: 69 kPa (0.7 kg/cm², 10 psi) minimum
   At 3,000 rpm: 343 kPa (3.5 kg/cm2, 50 psi) minimum

   - If oil pressure is within specifications, replace oil pressure sender and recheck.
   - If oil pressure is NOT within specifications, inspect oil pump (page 8-7).

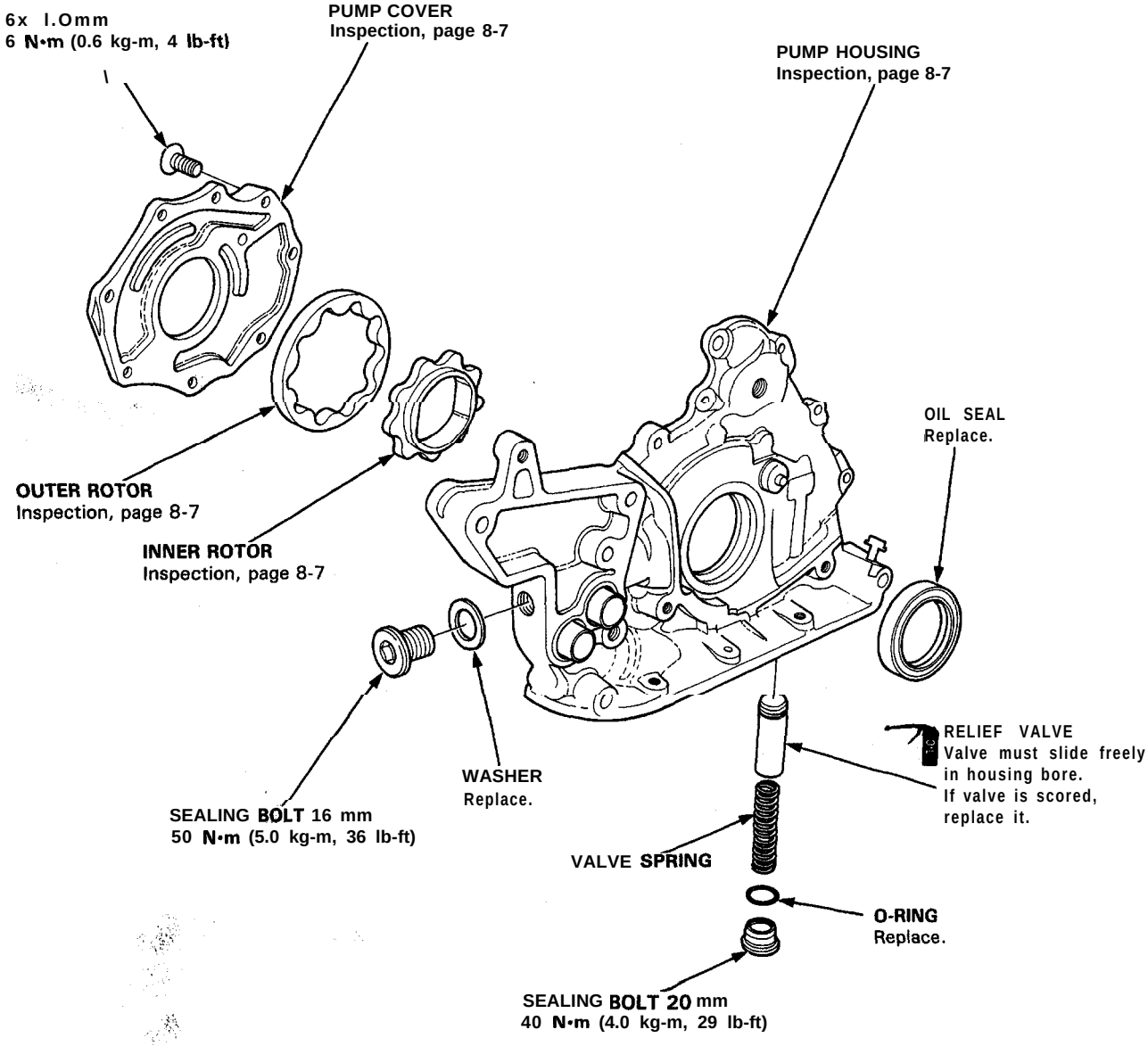


Oil Pump

Overhaul

NOTE:

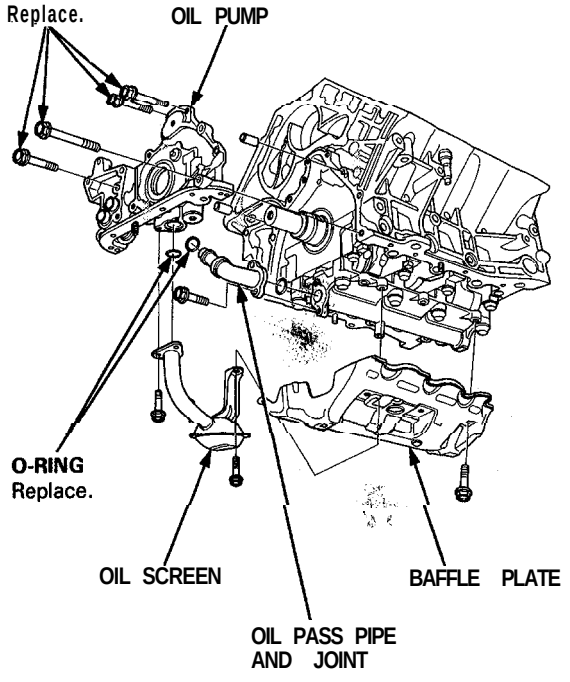
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.



Oil Pump

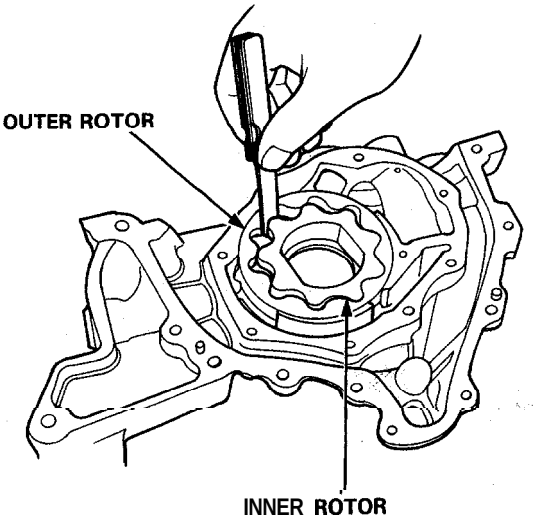
Removal/Inspection

1. Drain the engine oil.
2. Remove the timing belt (page 6-19).
3. Remove the dipstick and the pipe.
4. Remove the oil filter assembly.
5. Remove the oil pan.
6. Remove the oil screen.
7. Remove the baffle plate.
8. Remove the oil pass pipe and the joint.
9. Remove the mounting bolts and the oil pump assembly.



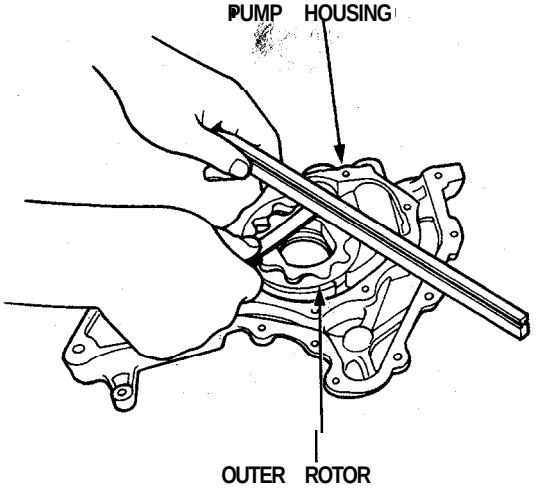
10. Remove the nine screws from the pump housing, then separate the housing and cover.
11. Check the radial clearance on the pump rotor.

Rotor Radial Clearance
Standard (New): 0.02-0.18 mm (0.0008-0.0071 in)
Service Limit: 0.2 mm (0.008 in)



12. Check the axial clearance on the outer pump rotor.

Housing-to-Rotor Axial Clearance
Standard (New): 0.02-0.07 mm (0.0008-0.0028 in)
Service Limit: 0.12 mm (0.005 in)



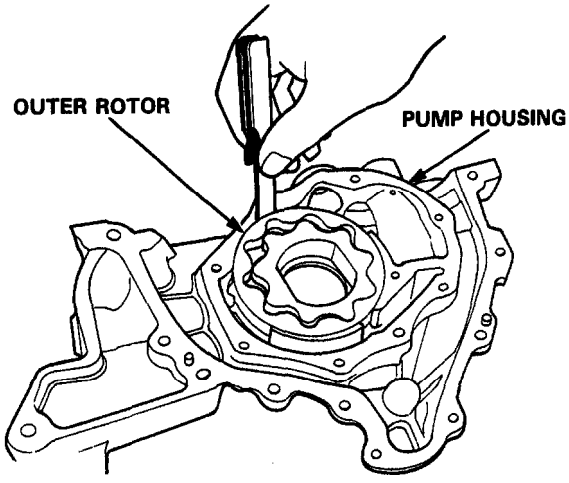
(cont'd)

Oil Pump

Removal/Inspection (cont'd)

13. Check the radial clearance between the housing and the outer rotor.

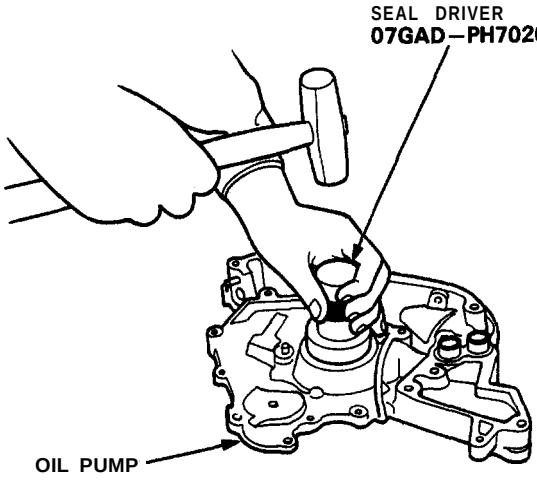
Housing-to-Rotor	Radial	Clearance
Standard (New):	0.10-0.19 mm (0.0008-0.0075 in)	
Service Limit:	0.2 mm (0.008 in)	



14. Inspect both rotors and pump housing for scoring or other damage. Replace oil pump assembly if necessary.

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

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



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

18. Check that the oil pump turns freely.

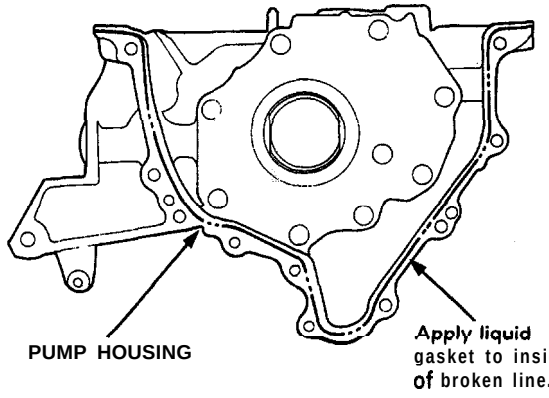
19. Apply a light coat of oil to the seal lip.

20. Install the two dowel pins end new O-ring on the cylinder block.

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

NOTE:

- Use liquid gasket, Part No. 08718-550000 OE.
- 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.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.



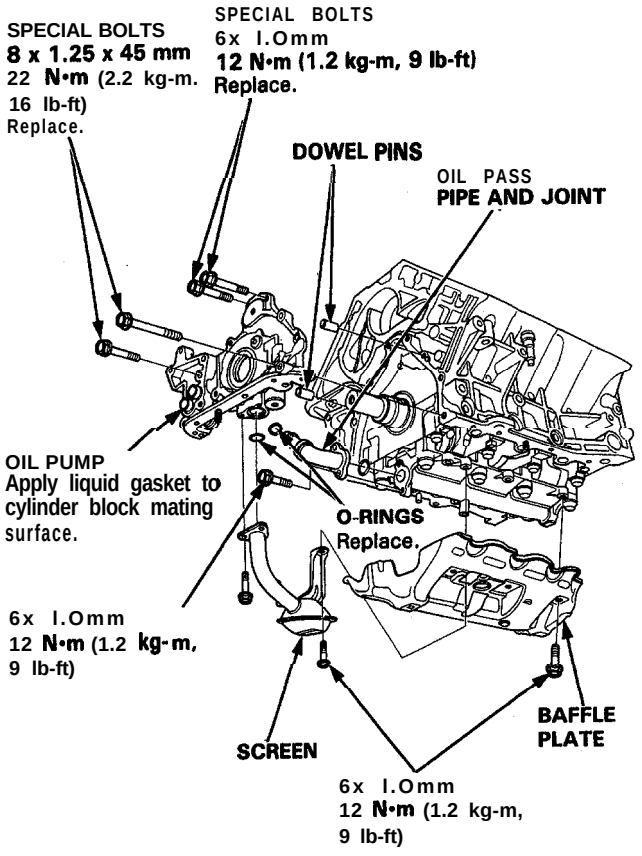
- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

22. Install the oil pump on the cylinder block.

23. Install the oil pass pipe and the joint.

24. Install the baffle plate.

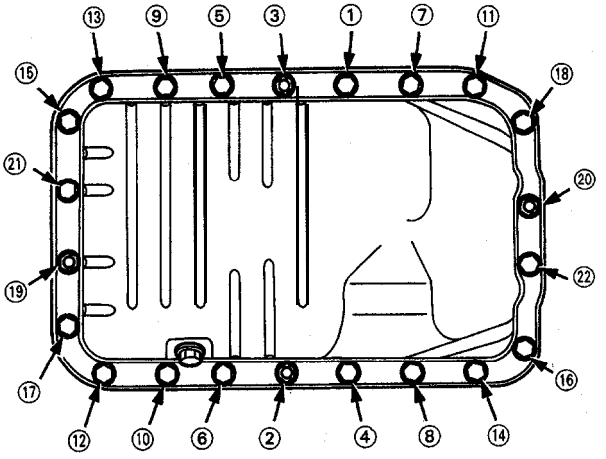
25. Install the oil screen.



26. Install the oil pan and gasket.

NOTE:
- Use the new gasket.
- If the bottom of the oil pan is deformed, it should be repaired or the oil pan should be replaced with a new one so as to retain proper clearance between the screen and the bottom.

OIL PAN BOLTS and NUTS TORQUE SEQUENCE

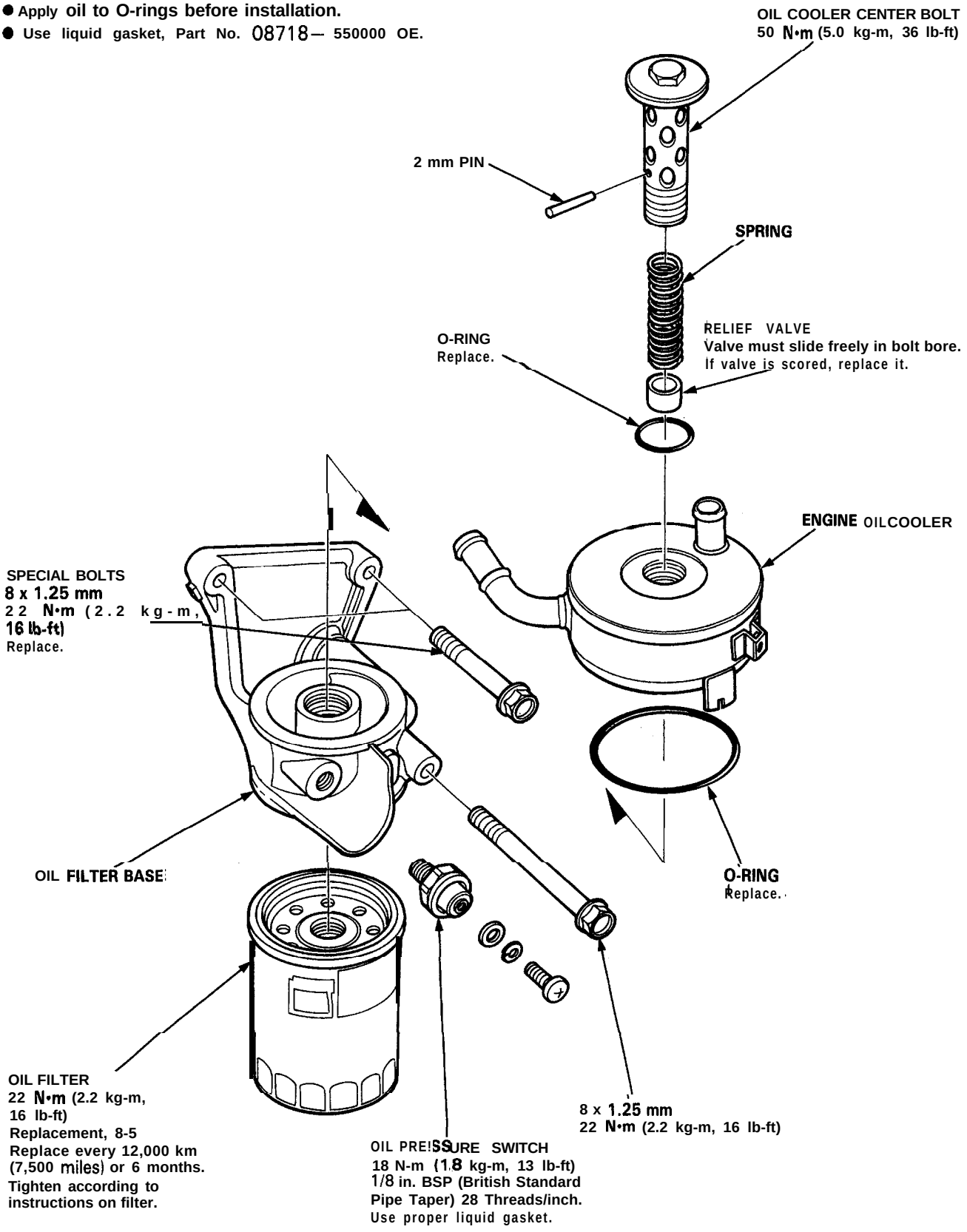


Oil Cooler, Oil Filter Base

Illustrated Index

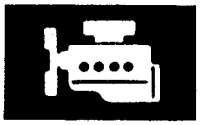
NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08718— 550000 OE.



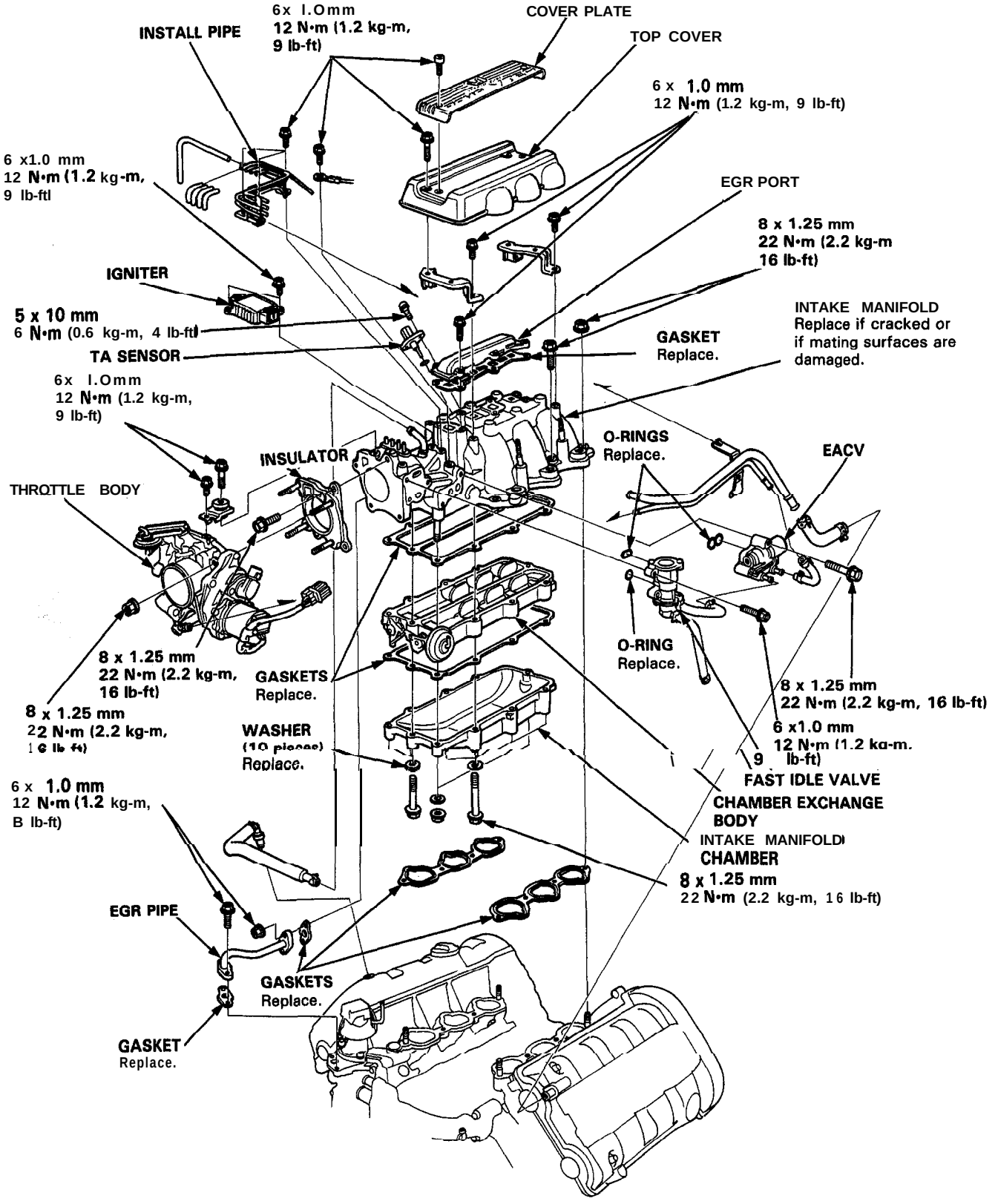
Intake Manifold/Exhaust System

Intake Manifold 9-2
Exhaust Manifold 9-3
Exhaust Pipe and Muffler 9-4



Intake Manifold

Illustrated Index

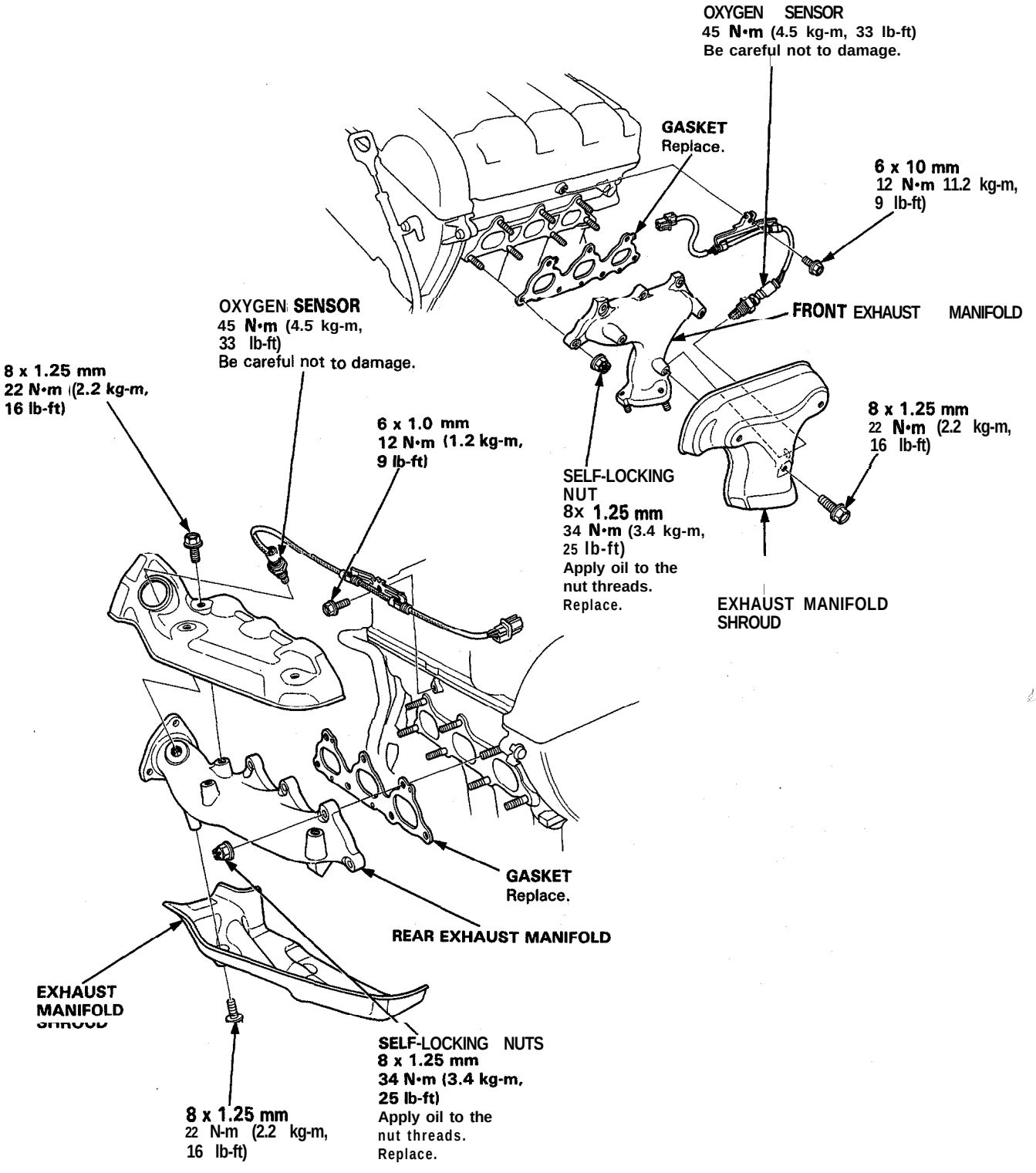


Exhaust Manifold

Illustrated Index

CAUTION:

- Remove the oxygen sensors before removing the exhaust manifolds.
- **Do not use air wrench or hammer to remove or install the exhaust manifolds if the oxygen sensors are not to be removed.**
- **Install the oxygen sensors after installing the exhaust manifolds.**

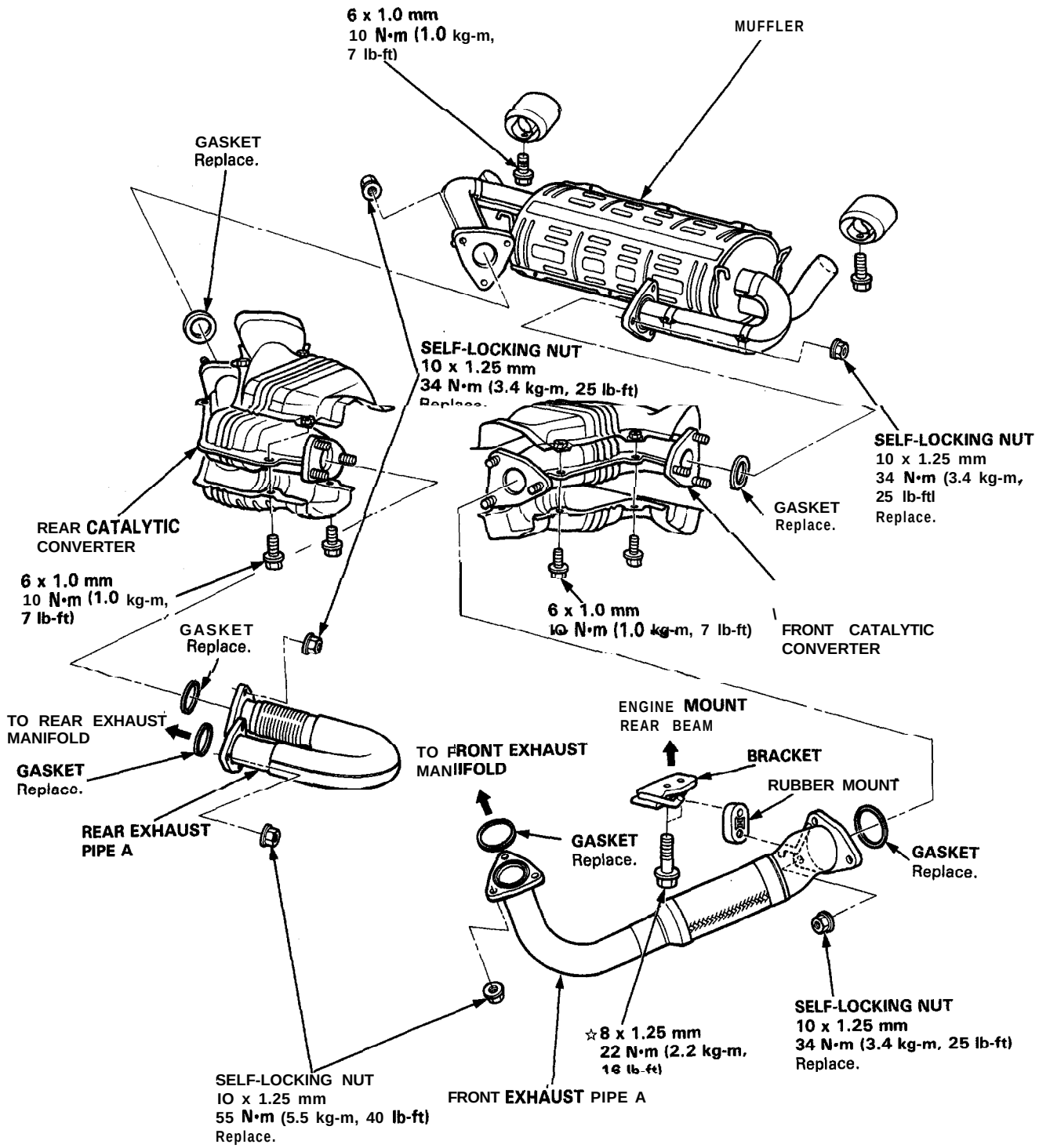


Exhaust Pipe and Muffler

Illustrated Index

CAUTION:

- Remove the oxygen sensors before removing the exhaust pipes.
- Do not use air wrench or hammer to disconnect or connect the exhaust manifolds and the exhaust pipes if the oxygen sensors are not to be removed.
- Install the oxygen sensors after installing the exhaust pipes.



☆ : CORROSION RESISTANT BOLT

Cooling

Illustrated Index IO-2

Radiator

- Replacement 1 O-4
- Refilling and Bleeding 1 O-5

Expansion Tank

- Cap Testing 1 O-8
- Pressure Testing IO-8

Thermostat

- Replacement IO-9
- Testing IO-9

Water Pump

- Illustrated Index ..... IO-IO
- Inspection ..... IO-I 1
- Replacement ..... IO-I 1

Cooling

Illustrated Index

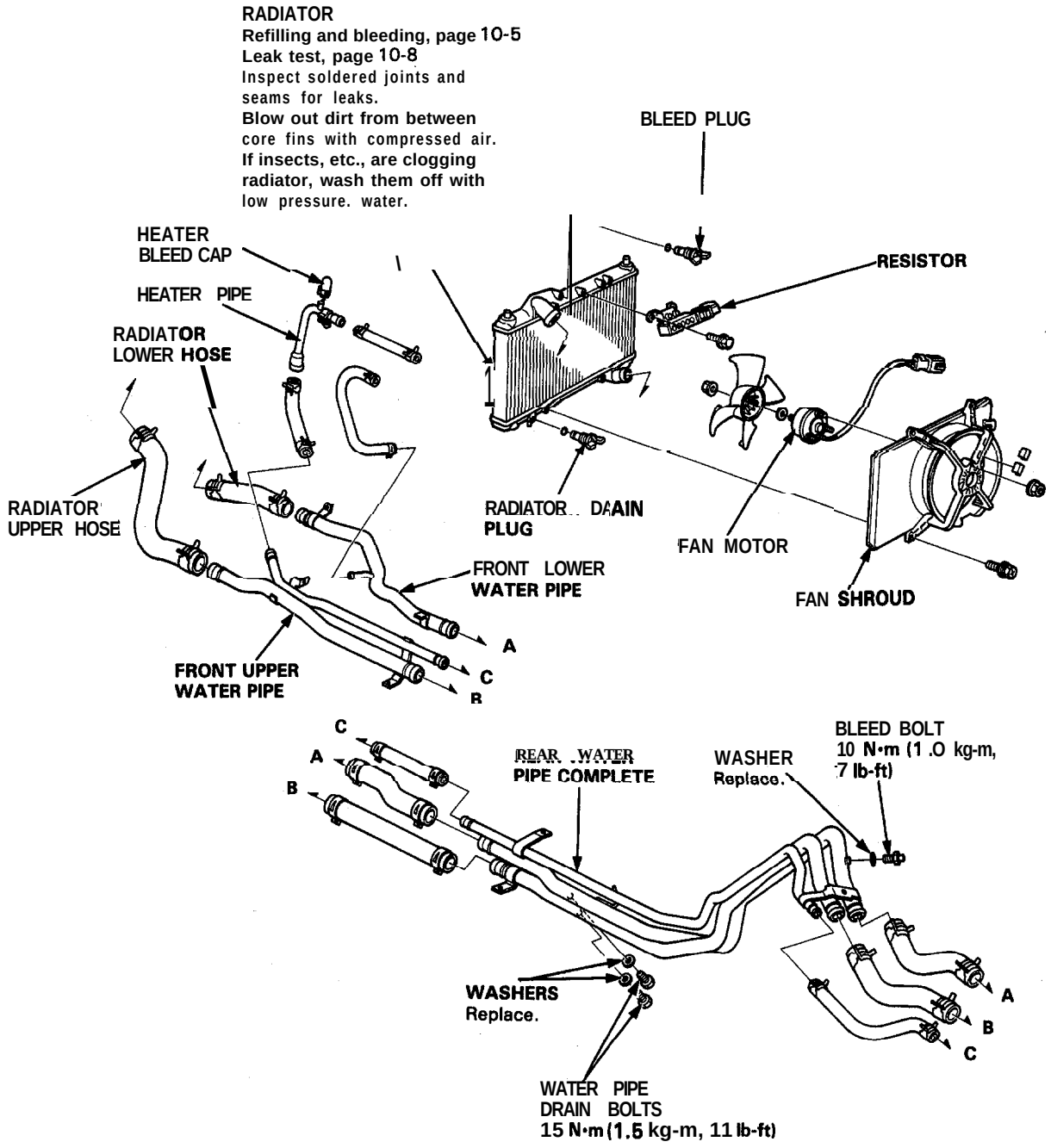
⚠ WARNING **System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.**

Total Cooling System Capacity: Including expansion tank 2.1 ℓ (2.2 US qt. 1.8 Imp qt)
5 M/T: 18.0 ℓ (17.0 US **qt. 14.1 Imp qt)**
4 A/T: 16.5 ℓ (17.4 US **qt. 14.5 Imp qt)**

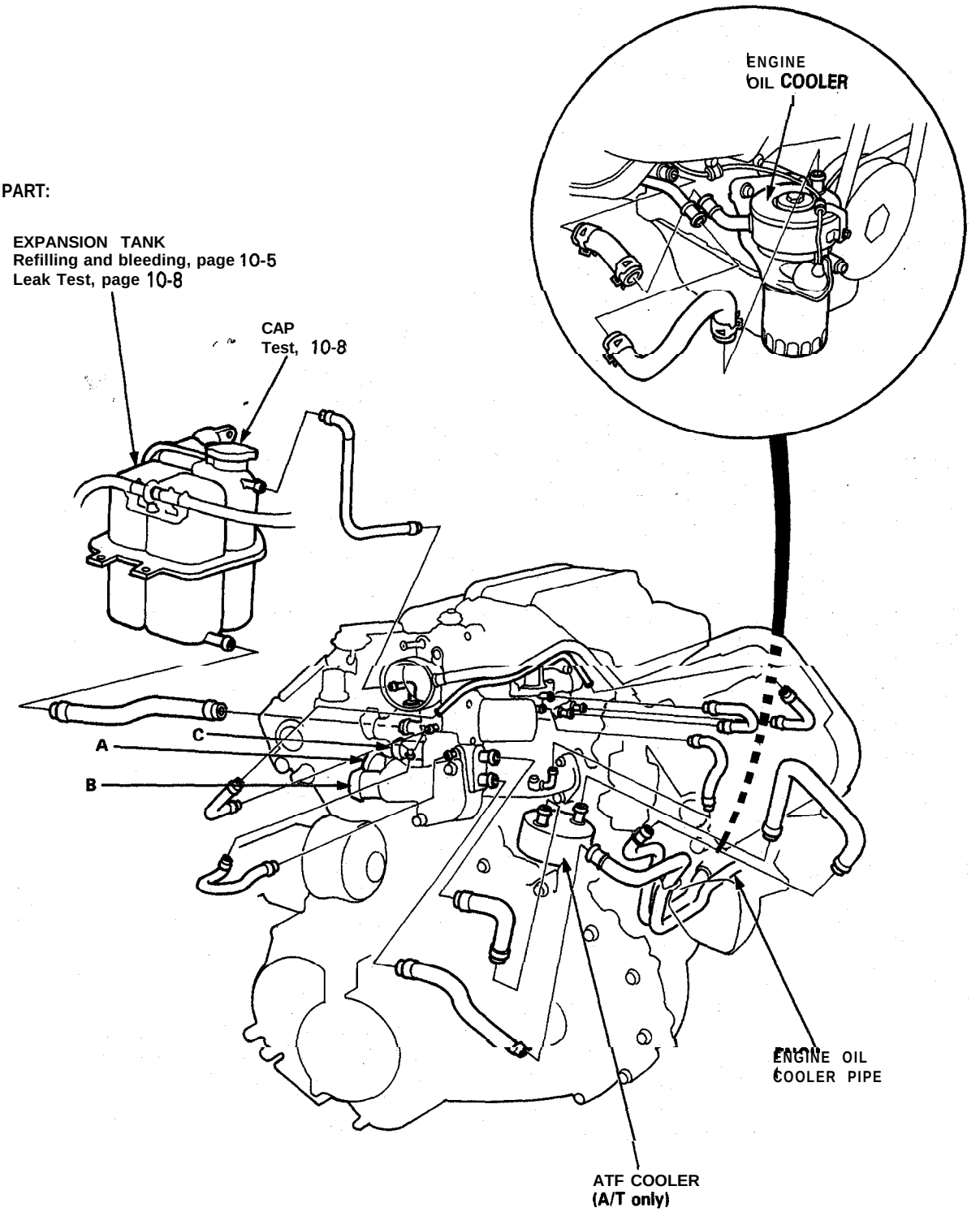
NOTE:

- **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.**

Radiator, Water Pipes and Hoses:



ENGINE PART:


EXPANSION TANK
Refilling and bleeding, page 10-5
Leak Test, page 10-8
CAP
Test, 10-8
ENGINE
OIL COOLER
A
B
C
ENGINE OIL
COOLER PIPE
ATF COOLER
(A/T only)

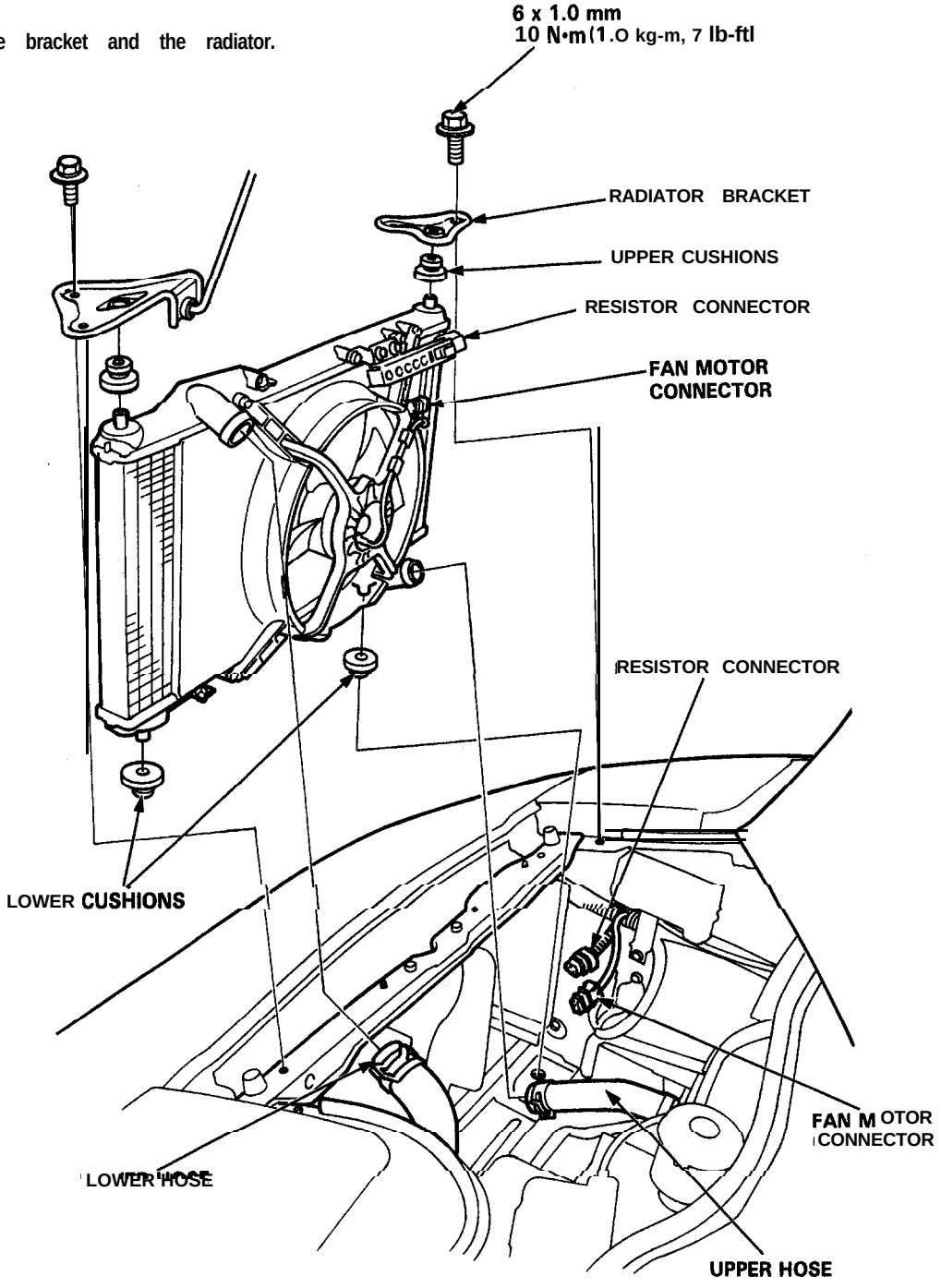
Radiator

Removal

1. Remove the spare tire.
2. Drain the radiator (page 10-5 thru 10-7).
3. Disconnect the fan motor connector and the resistor connector.
4. Remove the upper and lower hoses from the radiator.
5. Remove the bracket and the radiator.

Install the radiator in the reverse order of removal:

NOTE:
- Set the upper and lower cushions securely.
- Fill the radiator and bleed the air (page 1 O-5 thru 10-7).



- Refilling and Bleeding

⚠WARNING **Removing the expansion tank cap 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 expansion tank cap.**

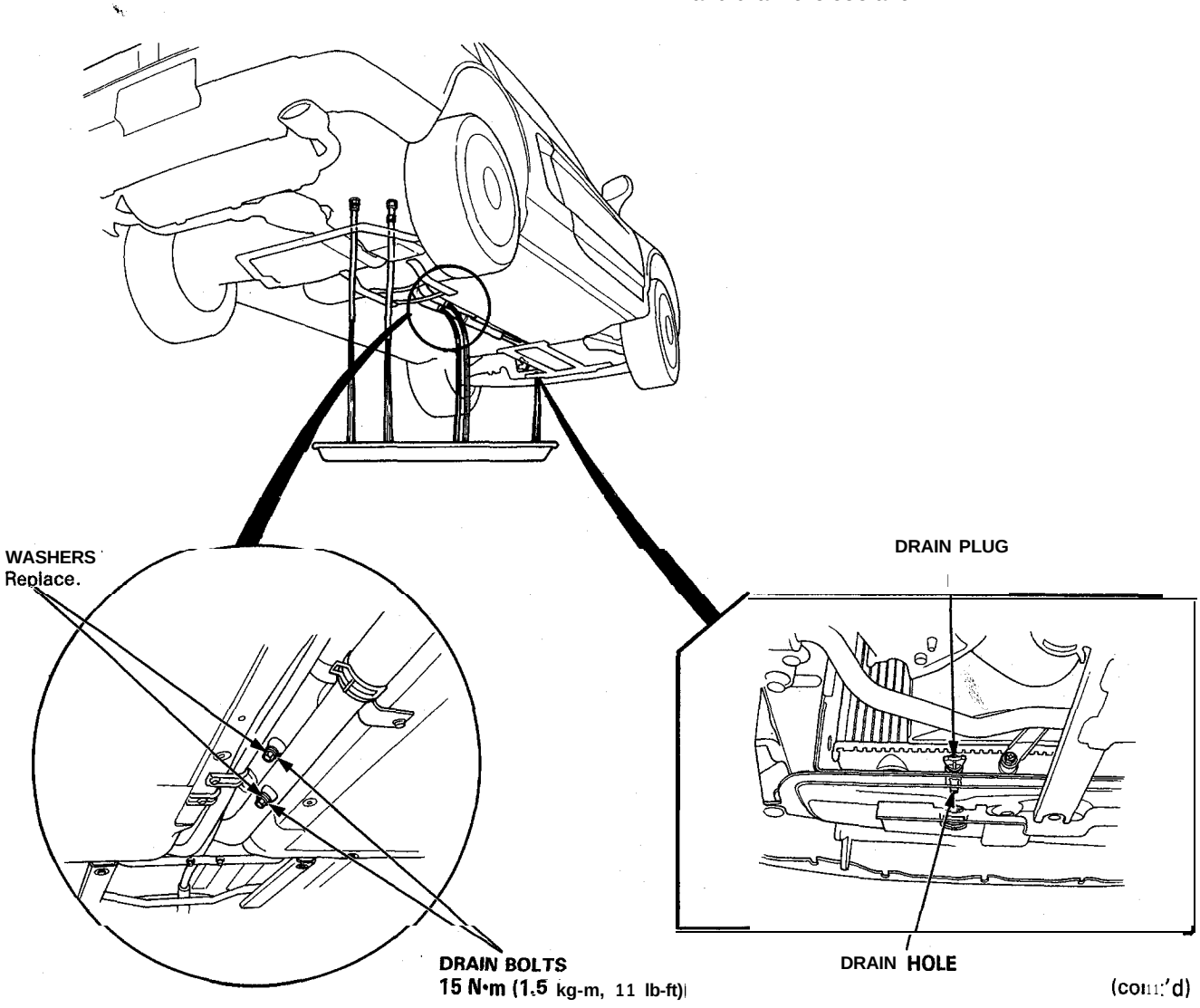
CAUTION: When pouring coolant, be sure to shut the relay box lid and not let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

NOTE:

- Perform this when the engine is cool.
- **Before replacing the coolant, turn the ignition ON,** slowly tune 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. **Open the hood, the rear hatch and the engine** cover.
2. **Remove the cover protecting the water pipes and shift cables on the underside of the car.**
3. **Before removing the expansion tank cap, first** loosen the cap to lower pressure.

   CAUTION: Do not remove the expansion tank cap when engine is hot. The coolant is under pressure **and may blow out and scald you. Open the cap slowly when the engine is cool.**
4. **Loosen the drain plug from the bottom of the** radiator and drain the coolant.
5. **Remove the two drain bolts from the water pipes and drain the coolant.**



(cont'd)

Refilling and Bleeding (cont'd)

6. Install rubber hoses to drain bolts located at the front and rear of the engine under the cylinder bank and loosen the drain bolts to drain the coolant.
   - Bleeding can be done more quckly if all the bleed bolts, plug and cap are opened. When opening them, make sure the coolant level in the expansion tank has come down completely so that the coolant will not pour out of the bleed bolts, plug and cap.

7. When the coolant stops draining, tighten the radiator drain plug, water pipe drain bolts and engine drain bolts.
   - Be sure to replace the water pipe drain bolt washers with new ones.

8. Open all four bleeders.
   1) Loosen the radiator bleed plug.
   2) Remove the heater pipe bleed cap.
   3) Loosen the water pipe bleed bolt.
   4) Loosen the engine bleed bolt on the thermo cover.

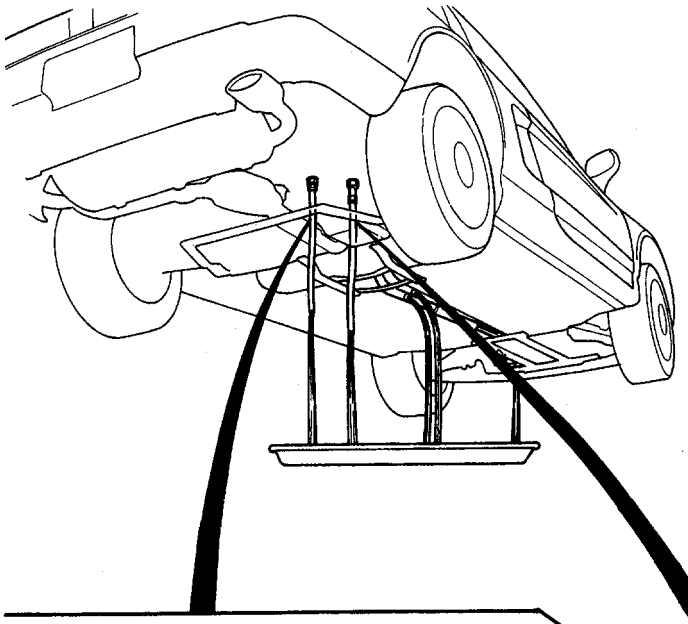
9. Mix the recommended anti-freeze/coolant with an equal amount of water in a clean container.

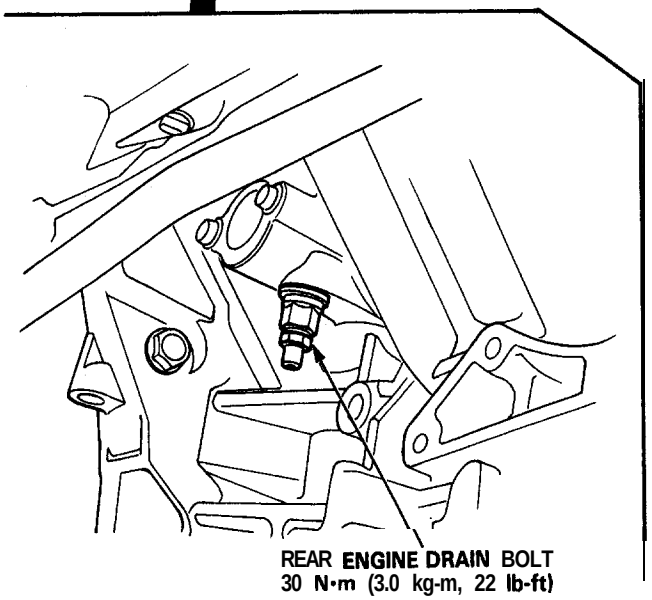
NOTE:
- Use only HONDA-RECOMMENDED anti-freeze/coolant.
- For best corrosion protection, the coolant concentrations must be maintained year-round at 50% MINIMUM. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater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

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

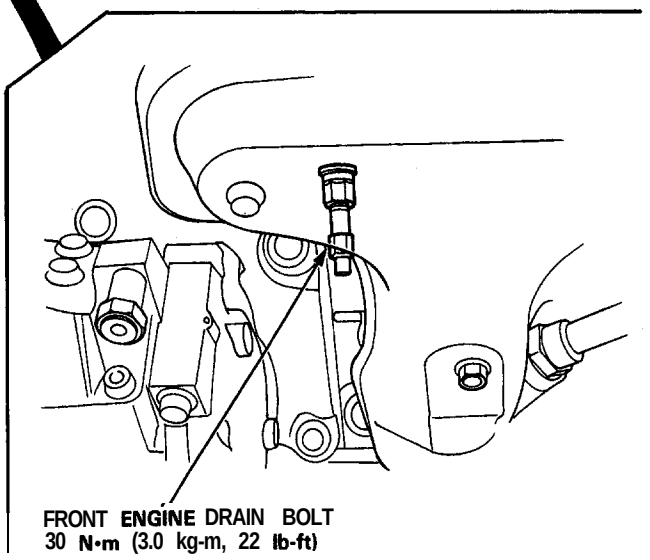
Radiator Coolant Refill Capacity: Including expansion tank 2.1 ℓ (2.2 US qt, 1.8 Imp qt)

Manual: 12.0 ℓ (12.7 US qt. 10.6 Imp qt)
Automatic: 12.0 ℓ (12.7 US qt. 10.6 Imp qt)





REAR ENGINE DRAIN BOLT
30 N·m (3.0 kg-m, 22 lb-ft)



FRONT ENGINE DRAIN BOLT
30 N·m (3.0 kg-m, 22 lb-ft)

10. Fill the expansion tank with coolant. Tighten the bleeders in sequence: thermo cover bleed bolt, radiator bleed plug, heater pipe bleed cap and water pipe bleed bolt as coolant starts to run out in a steady stream without bubbles.

11, After tightening all the bleeding bolts, plug and cap, fill the expansion tank with coolant up to MAX line.

12. Reloosen the thermo cover bleed bolt to remove air again.

13. When bleeding is completed, retighten the thermo cover bleed bolt and fill the expansion tank up to 0.5 ℓ (0.53 US qt, 0.44 Imp qt) or 30 mm (1.2 in) over the MAX line.

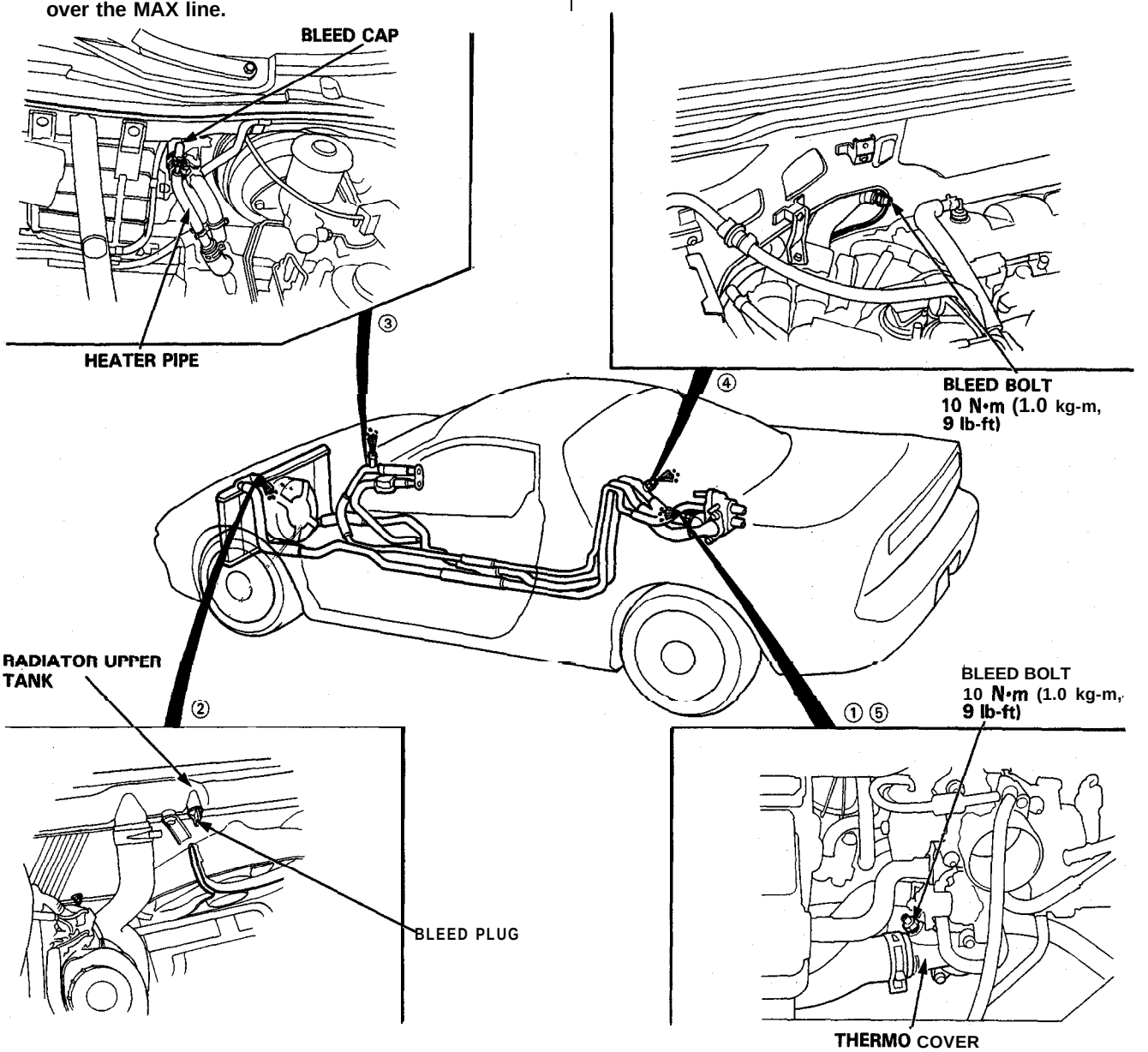
14. Install the expansion tank cap and turn it 60 degrees (where the first lock tab of filler neck is engaged).

15. Start the engine and let it run until warmed up (until the thermostat opens and the radiator cooling fan runs).

16. Turn off the engine. Check the expansion tank and, if needed, add coolant to bring it up to the MAX line.

17. Tighten the expansion tank cap securely.

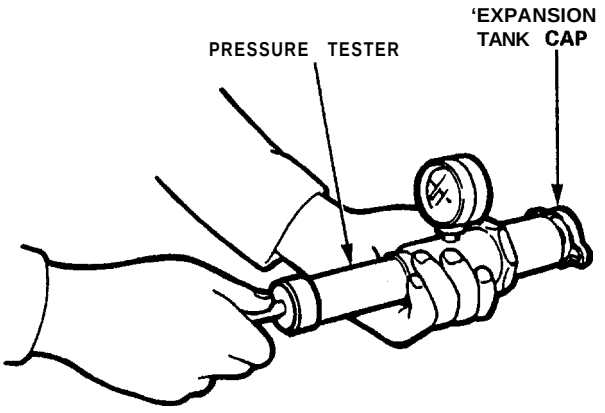
18. Reinstall the cover on the car's underside.



Expansion Tank

Cap Testing

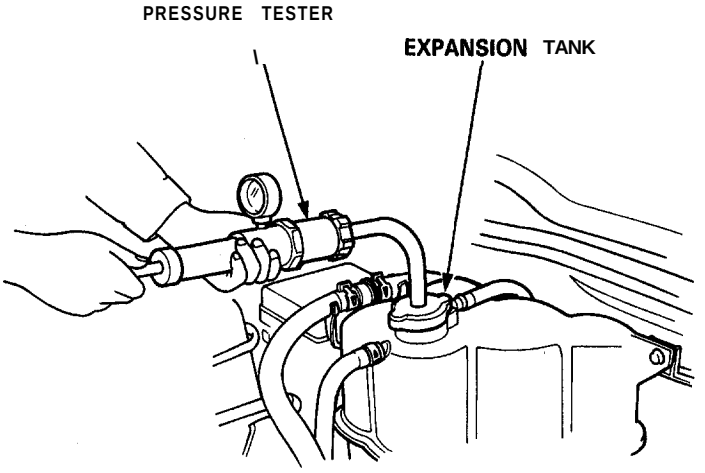
1. Remove the expansion tank cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply a pressure of 93—123 kPa (0.95-1.25 kg/cm², 14— 18 psi).
3. Check for a drop in pressure.



Pressure Testing

1. Wait until the engine is cool, then carefully remove the expansion tank cap and fill the expansion tank with 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 kg/cm², 14-18 psi).
3. Inspect for coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the expansion tank cap.

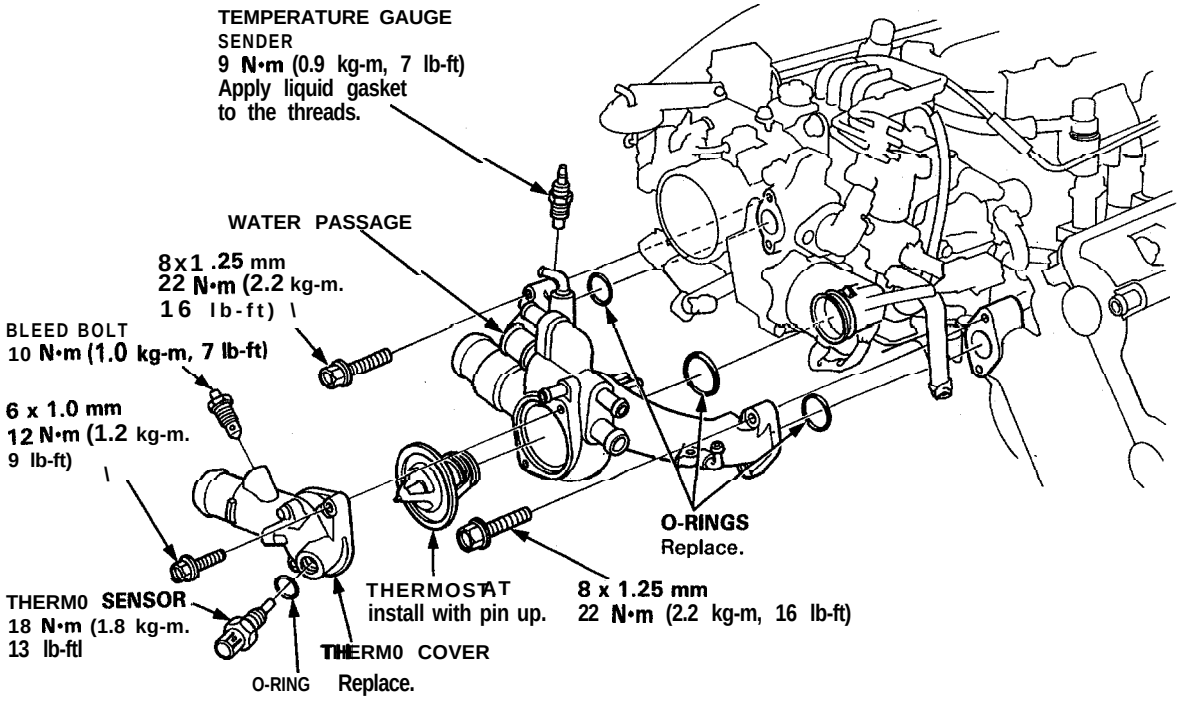
NOTE: Check for engine oil in coolant and/or coolant in engine oil.



Thermostat

Replacement

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



Testing

Replace thermostat if it is open at room temperature.

To test a closed thermostat:

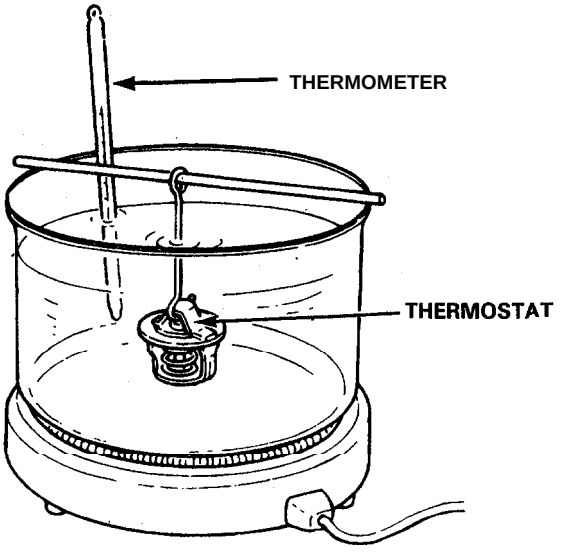
1. Suspend the thermostat in a container of water as shown.
2. Heat the water and check the temperature with a thermometer. Check the temperature at which the thermostat first opens and at full lift.

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

3. Measure lift height of thermostat when fully open.

STANDARD THERMOSTAT

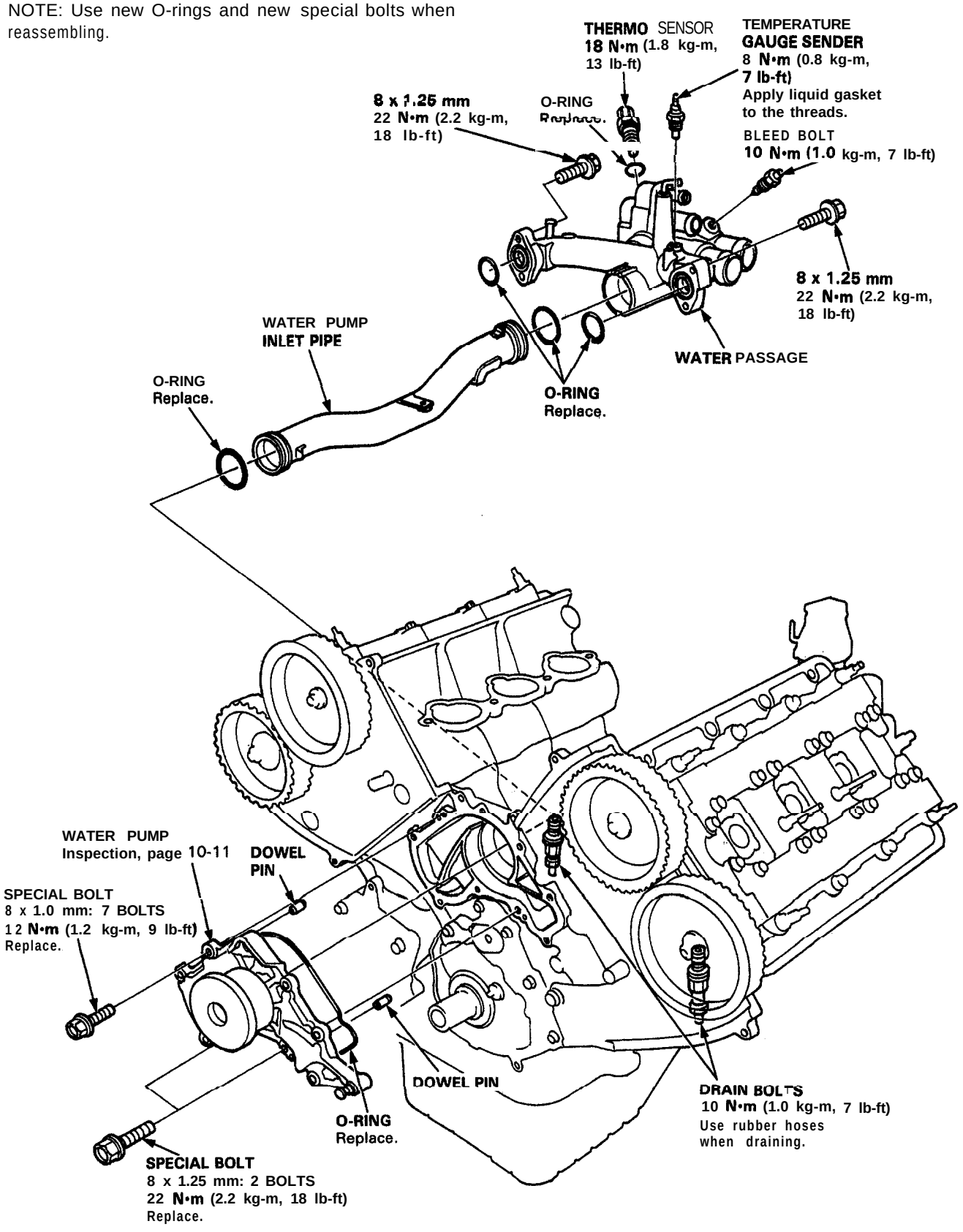
Lift height:	above 10 mm (0.39 in)
Starts opening:	78°C ± 2 (172°F ± 3)
Fully open:	90°C (194°F)



Water Pump

Illustrated Index

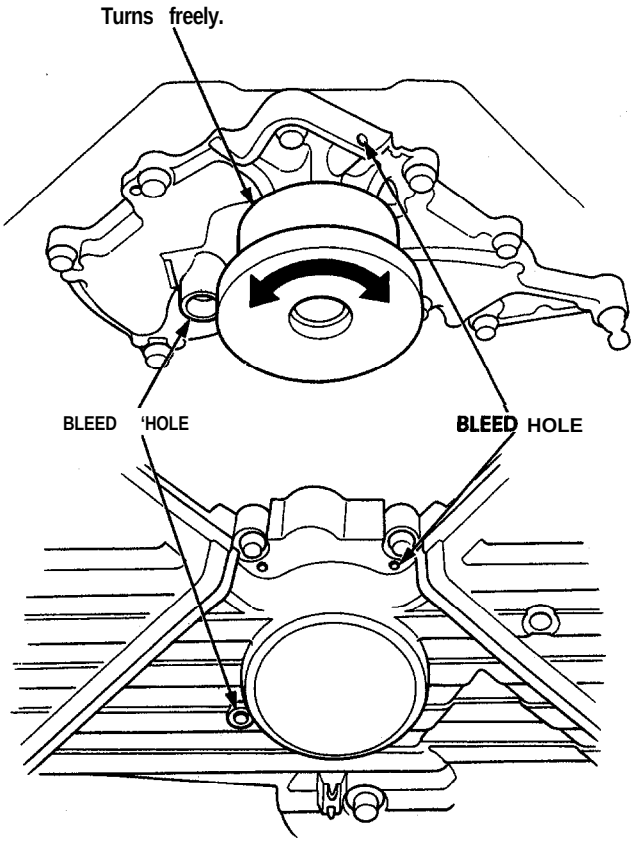
NOTE: Use new O-rings and new special bolts when reassembling.



Inspection

1. Remove the timing belt (page 6-23).
2. Check that the water pump pulley turns freely.
3. Check for signs of seal leakage.

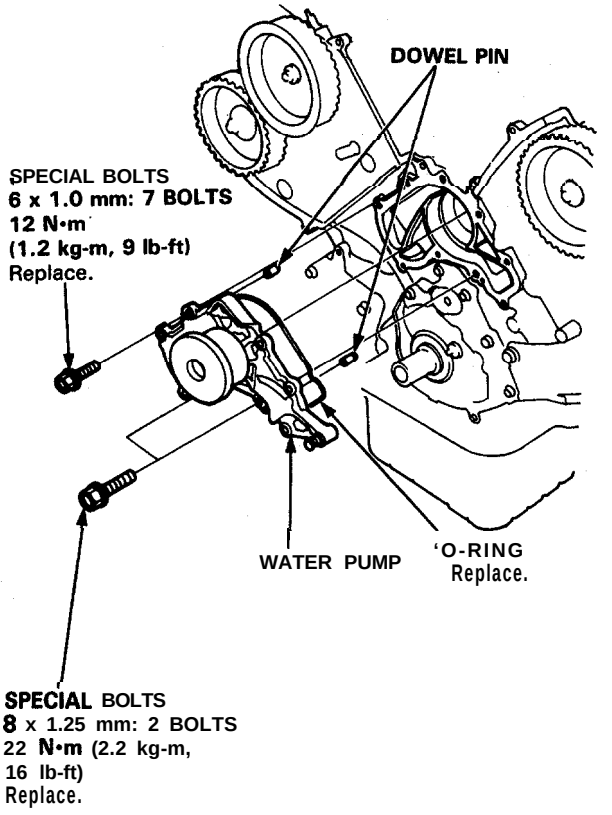
   NOTE: Small amount of "weeping" from the bleed hole is normal.



COVERED:

Replacement

1. Remove the timing belt (page 6-23).
2. Unscrew the bolts, then remove the water pump.
3. Install the water pump in the reverse order of removal.



Fuel and Emission

Special Tools 11-2
Component Locations Index 11-3
System Description
Vacuum Connections 11-5
Electrical Connections 11-8
Troubleshooting
Troubleshooting Guide 11-16
Self-diagnostic Procedures 11-18
How to Read Flowcharts 11-23

PGM-FI Control System
Troubleshooting Flowcharts
System Description 11-24
Electronic Control Unit 11-26
Oxygen Sensors 11-30
Oxygen Sensor Heater 11-32
Fuel Supply System 11-36
Fuel Metering System 11-38
Manifold Absolute Pressure Sensor 11-40
CRANK/CYL Sensor 11-46
Coolant Temperature Sensor 11-48
Throttle Angle Sensor 11-50
intake Air Temperature Sensor 11-52
Atmospheric Pressure Sensor 11-54
Ignition Output Signal 11-56
Vehicle Speed Sensor 11-58
Ignition Timing Adjuster 11-60
Knock Sensor 11-62
A/T FI Signal 11-64

Idle Control System
System Troubleshooting Guide 11-66
System Description 11-67
Troubleshooting Flowcharts
Electronic Air Control Valve 11-70
Air Conditioning Signal 11-72
Alternator FR Signal 11-74
A/T Shift Position Signal 11-76
M/T Neutral Switch Signal 11-78
Clutch Switch Signal 11-80
Starter Switch Signal 11-82
Fast Idle Valve 11-83
Idle Speed Setting 11-84

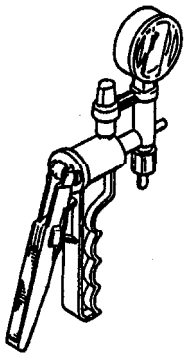
Fuel Supply System
System Troubleshooting Guide 11-86
System Description 11-87
Fuel Pressure 11-87
Fuel Injectors 11-89
Injector Resistor 11-94
Pressure Regulator 11-95
Fuel Filter 11-97
Fuel Pump 11-98
Main Relay 11-103
Fuel Pump Resistor 11-106
Fuel Tank 11-108

Air Intake System
System Troubleshooting Guide 11-110
System Description 11-111
Air Cleaner 11-112
Throttle Cable 11-113
Throttle Body 11-114
Dashpot System 11-117
Chamber Volume Control System 11-119

Emission Control System
System Troubleshooting Guide 11-124
System Description 11-125
Tailpipe Emission 11-125
Catalytic Converter 11-126
Exhaust Gas Recirculation System 11-128
Positive Crankcase Ventilation System 11-134
Evaporative Emission Controls 11-135

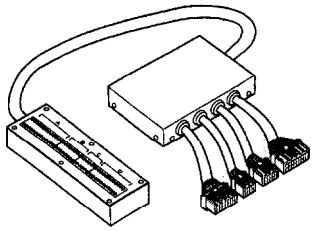
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	A973X–041 -XXXXX	Vacuum Pump/Gauge	1	1 l-44, 114, 118, 120, 129, 137,140
②	KS-AHM-32-003	Digital Multimeter	1	11-21, 32, 37
③	07LAJ–PT3010A	Test Harness	1	11-21
④	07LAJ–PT30200	Test Harness	1	11-131
⑤	07MAJ–PR70100	Test Harness	1	11-21
⑥	07JAZ–001 000A	Vacuum/Pressure Gauge O-4 in. Hg	1	11-139, 140
⑦	07406–0040001	Fuel Pressure Gauge	1	11-88

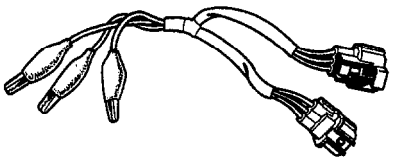


①

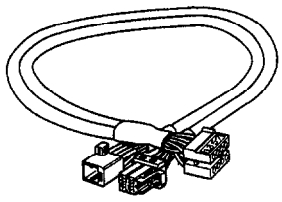
②



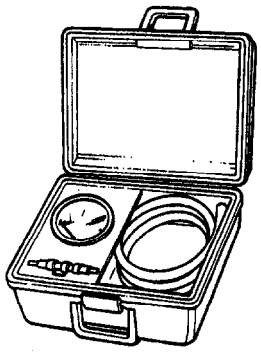
③



④



⑤

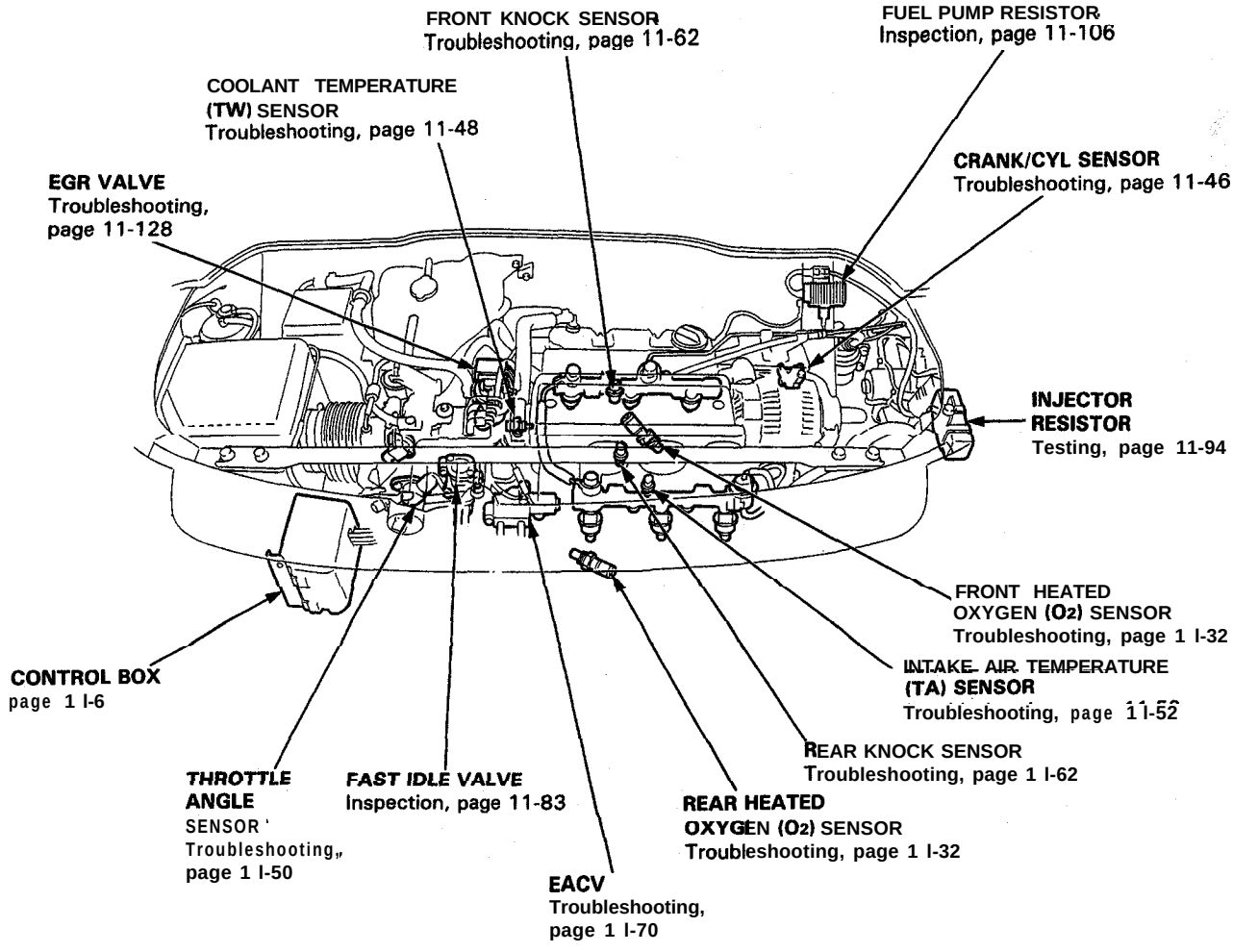


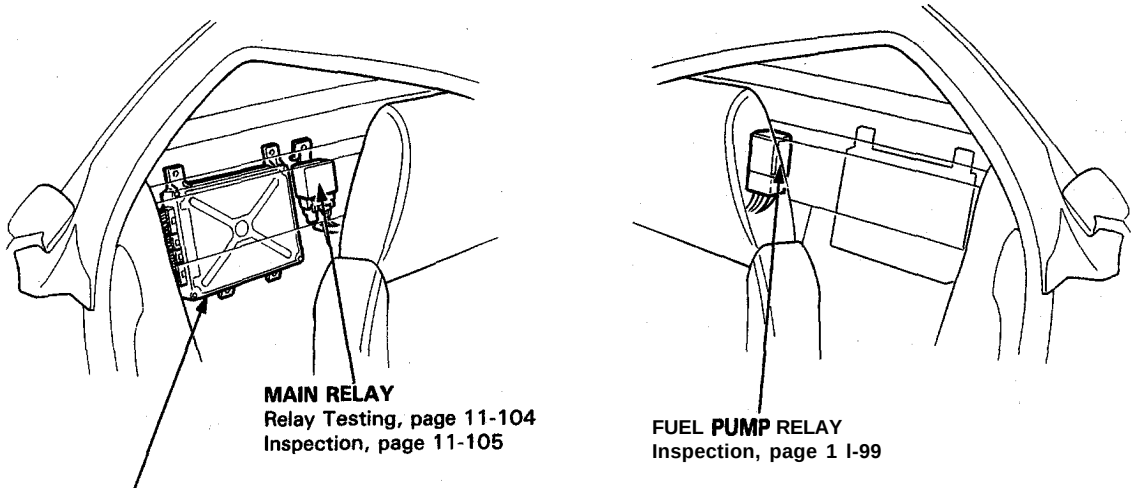
⑥

⑦

Component Locations

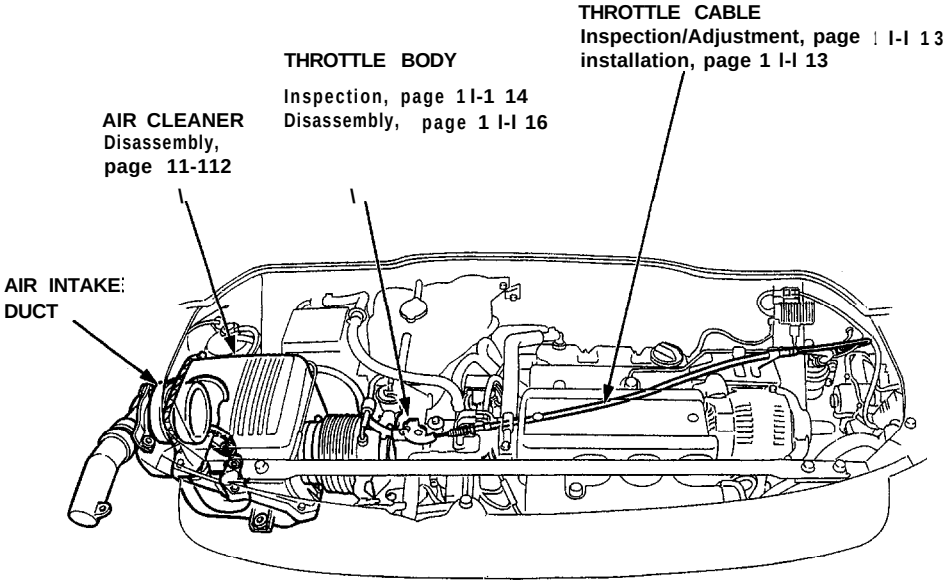
Index

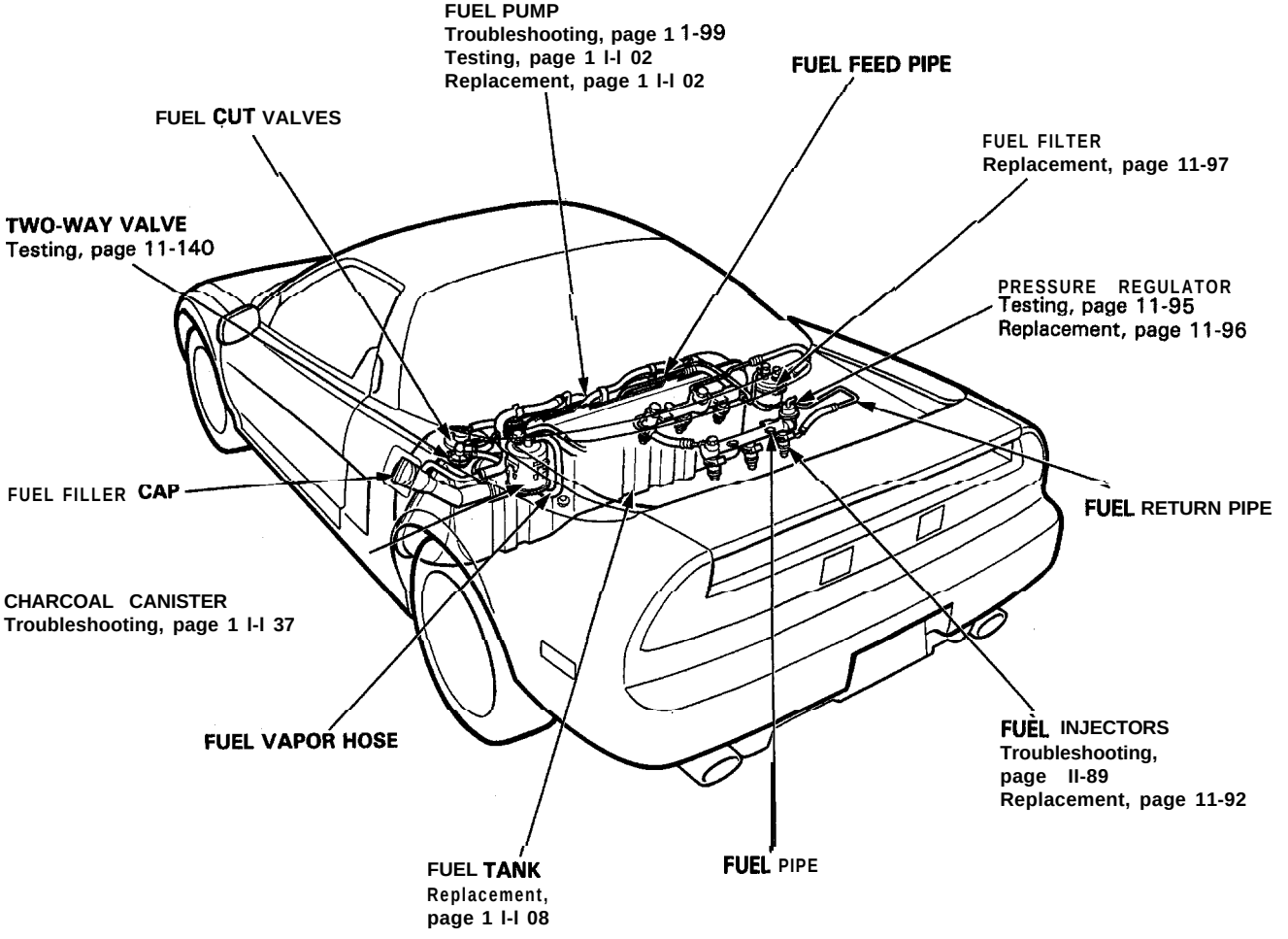




Component Locations

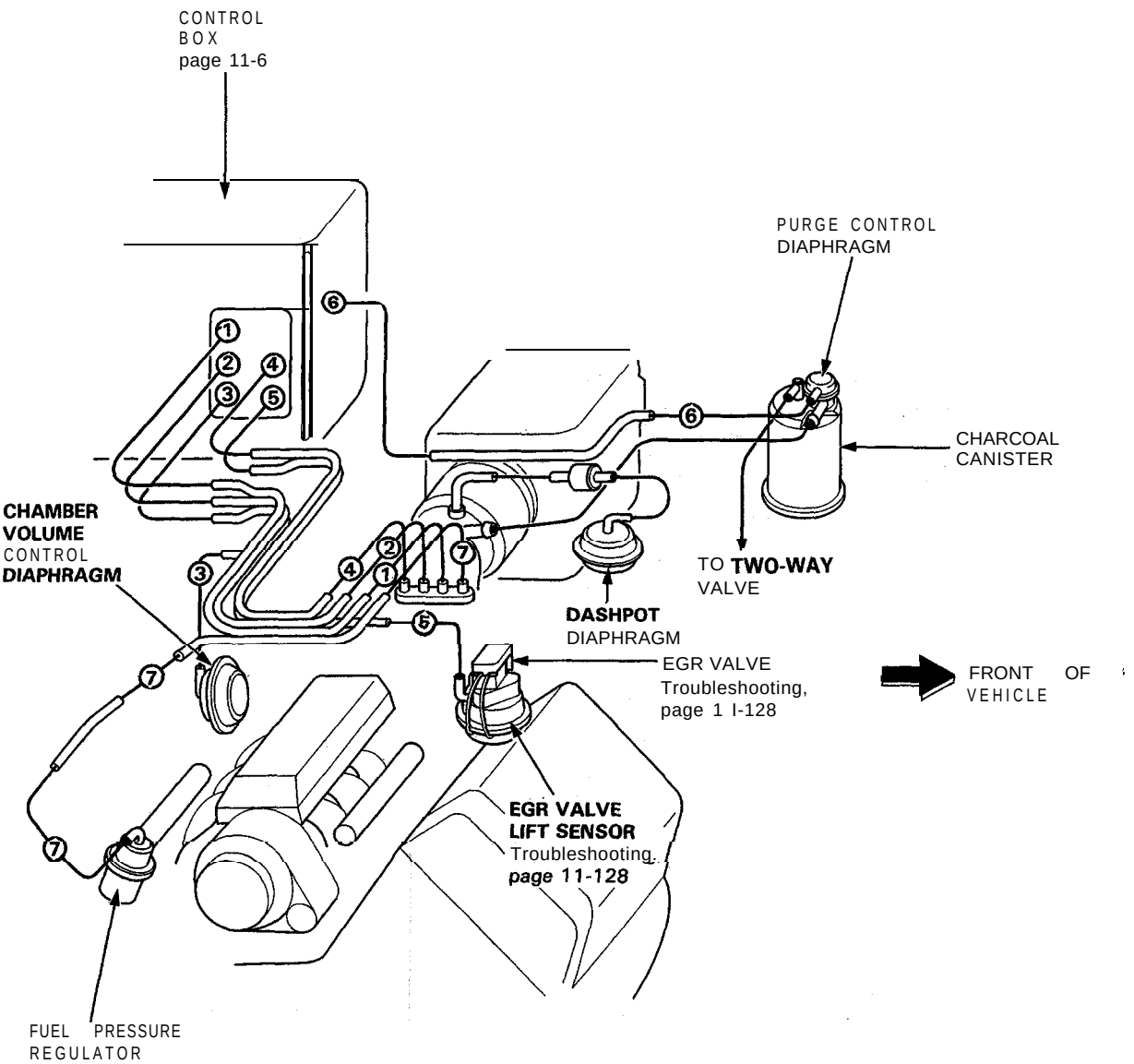
Index





System Description

Vacuum Connections

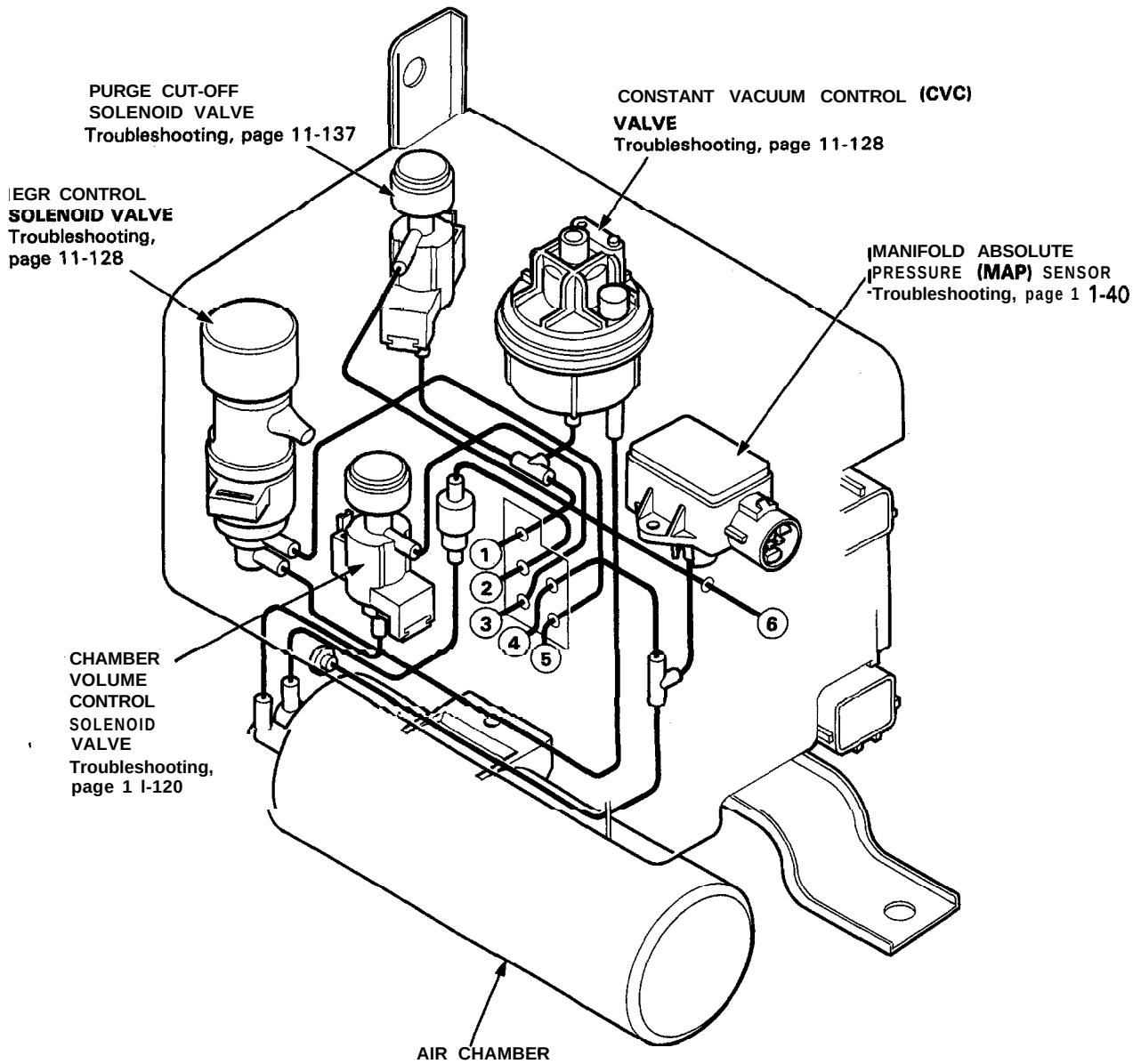


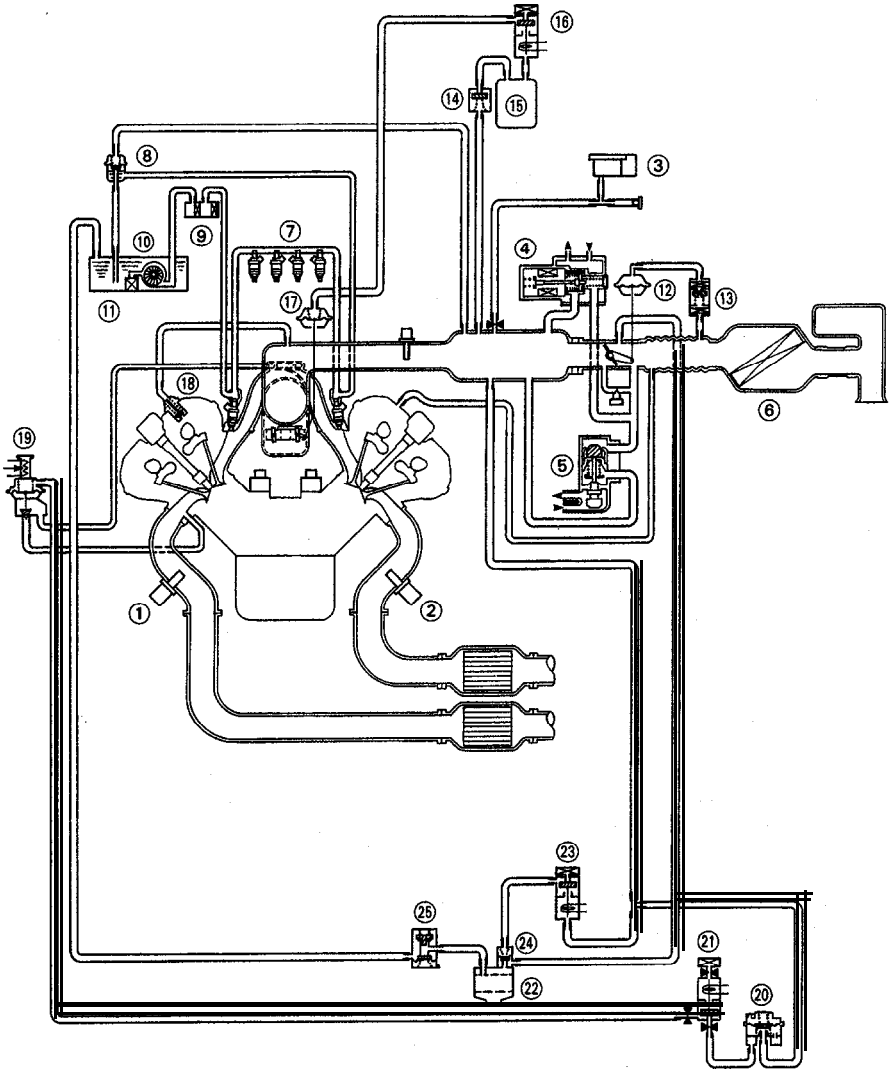
(cont'd)

System Description

Vacuum Connections (cont'd)

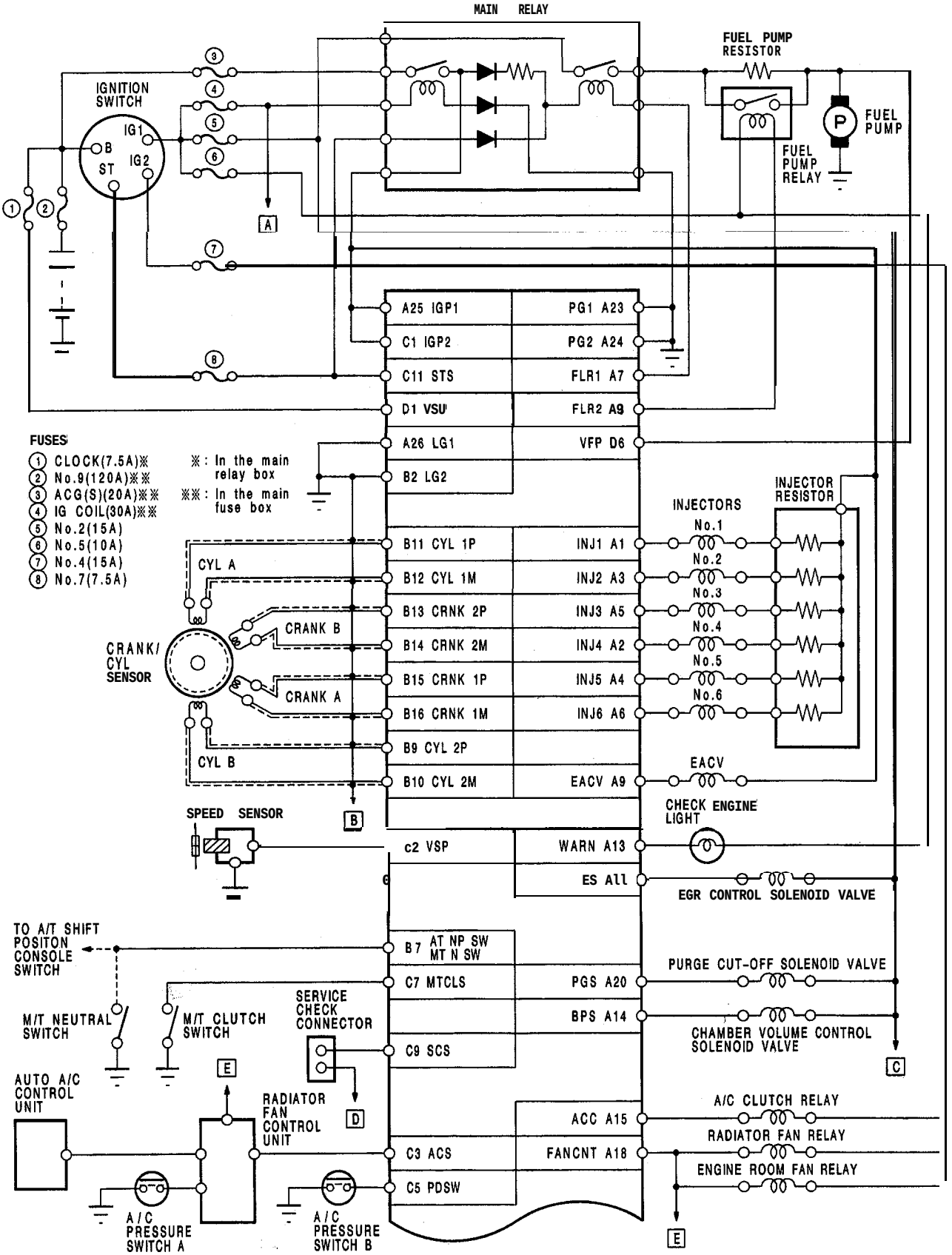
Control Box

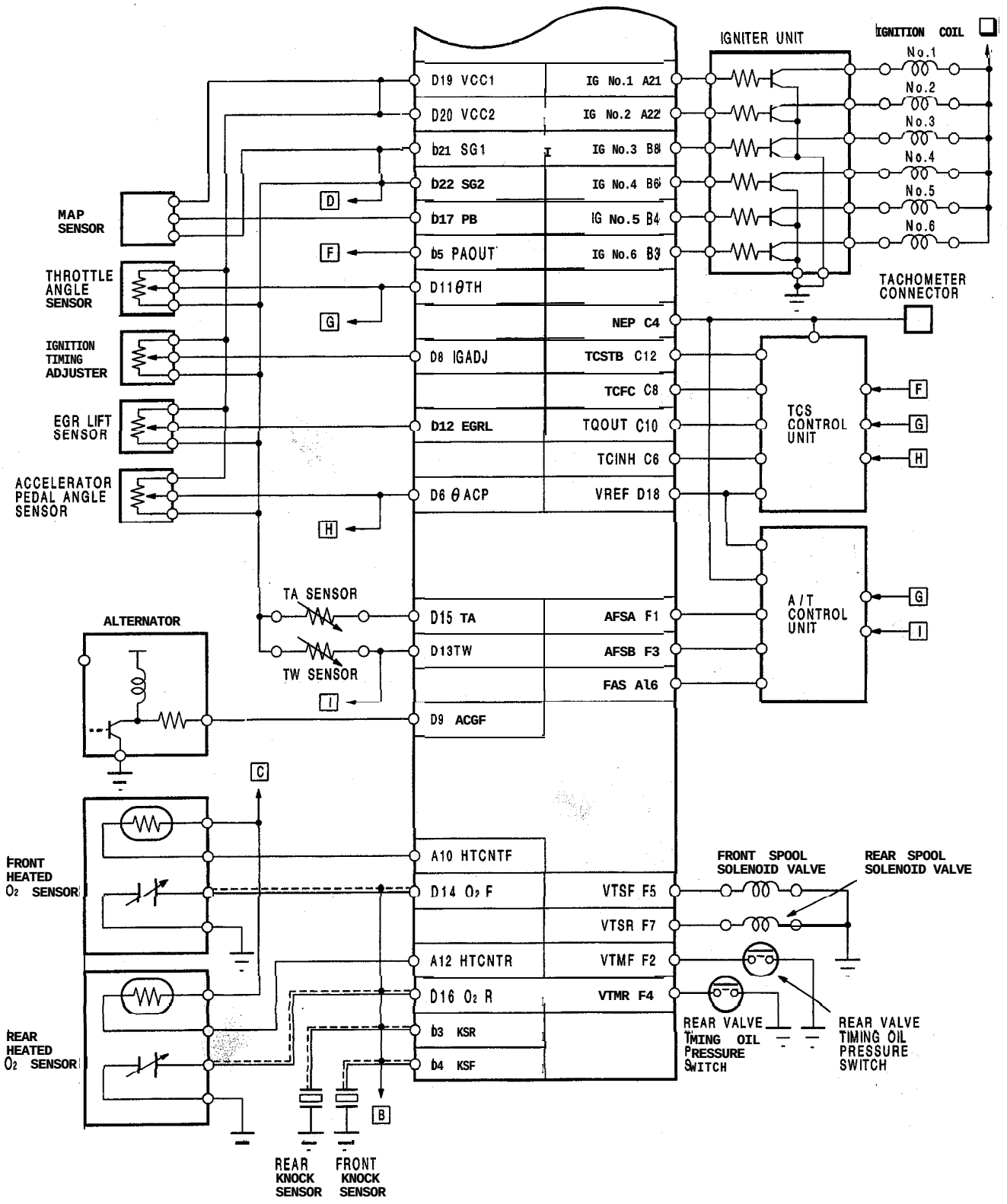


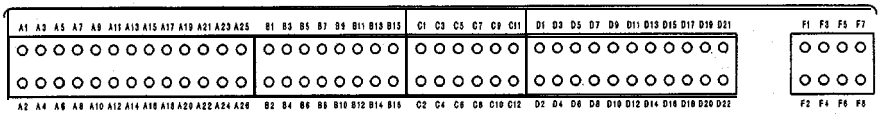


① FRONT OXYGEN (O2) SENSOR
② REAR OXYGEN (O2) SENSOR
③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
④ ELECTRONIC AIR CONTROL VALVE (EACV)
⑤ FAST IDLE VALVE
⑥ AIR CLEANER
⑦ FUEL INJECTOR
⑧ PRESSURE REGULATOR
⑨ FUEL FILTER
⑩ FUEL PUMP
⑪ FUEL TANK
⑫ DASHPOT DIAPHRAGM
⑬ DASHPOT CHECK VALVE
⑭ CHECK VALVE
⑮ AIR CHAMBER
⑯ CHAMBER VOLUME CONTROL SOLENOID VALVE
⑰ CHAMBER VOLUME CONTROL DIAPHRAGM
⑱ PCV VALVE
⑲ EGR VALVE
⑳ CONSTANT VACUUM CONTROL (CVC) VALVE
㉑ EGR CONTROL SOLENOID VALVE
㉒ CHARCOAL CANISTER
㉓ PURGE CUT-OFF SOLENOID VALVE
㉔ PURGE CONTROL DIAPHRAGM VALVE
㉕ TWO-WAY VALVE

Electrical Connections





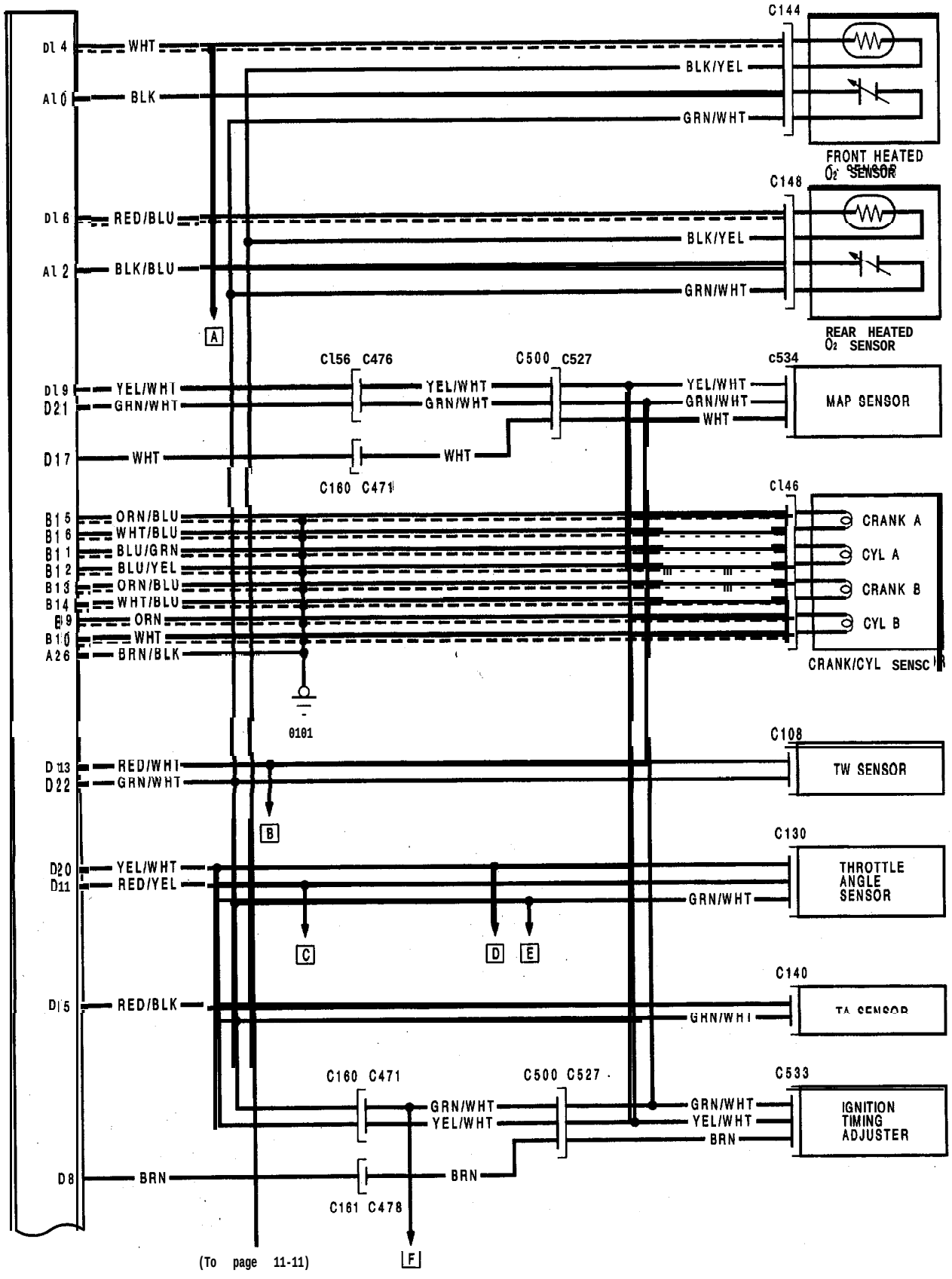


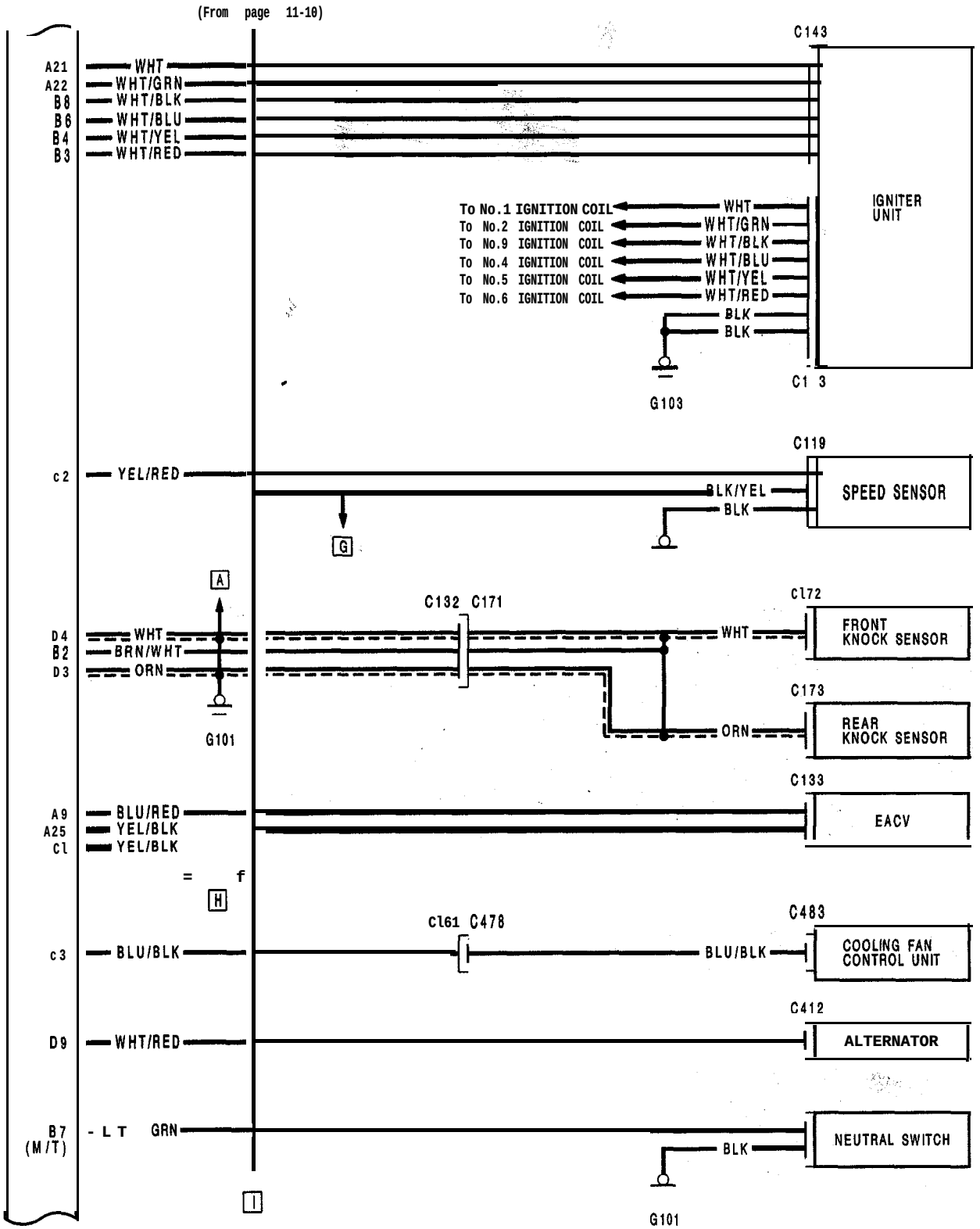
TERMINAL LOCATION

(cont'd)

System Description

Electrical Connections (cont'd)

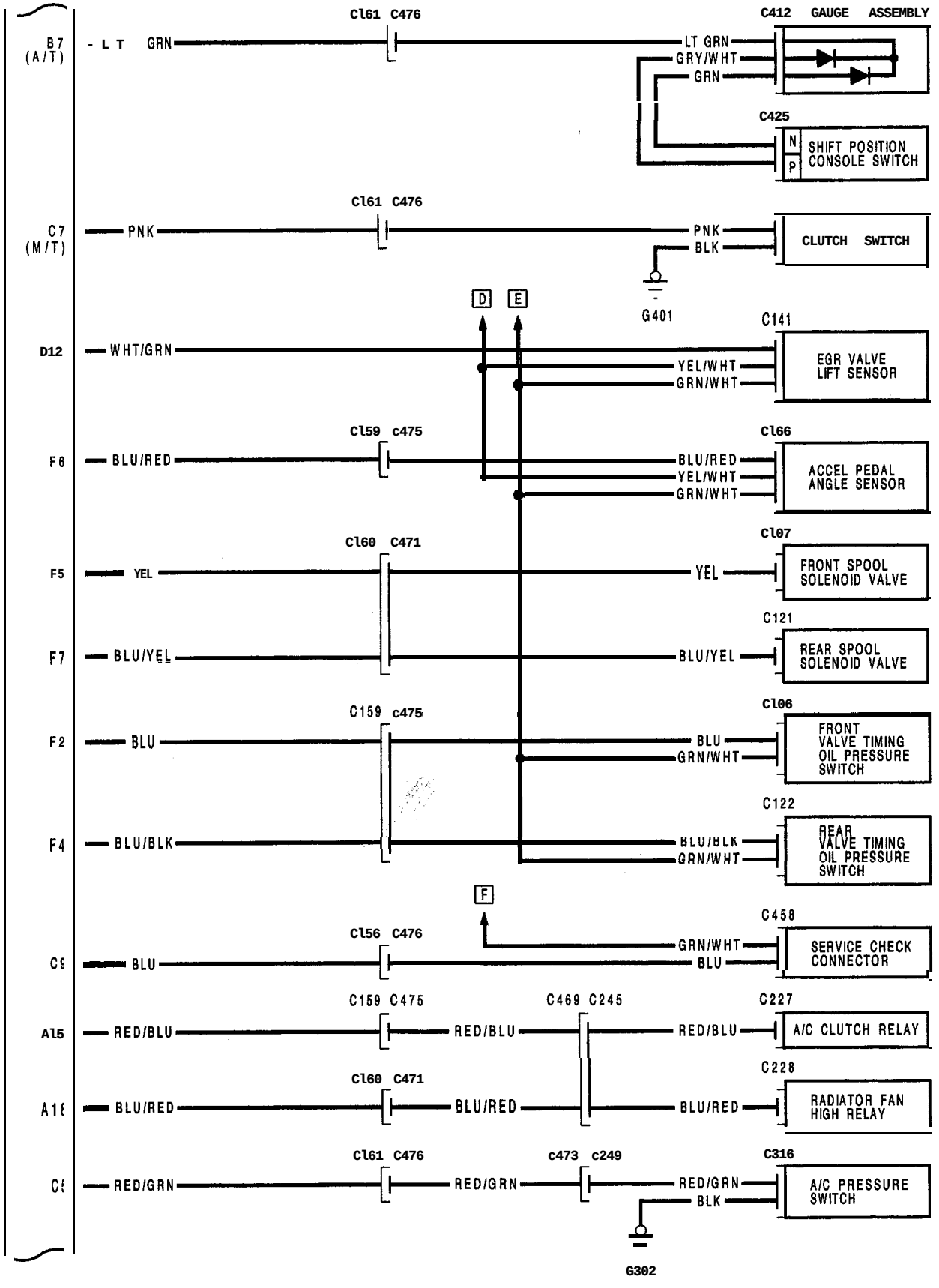


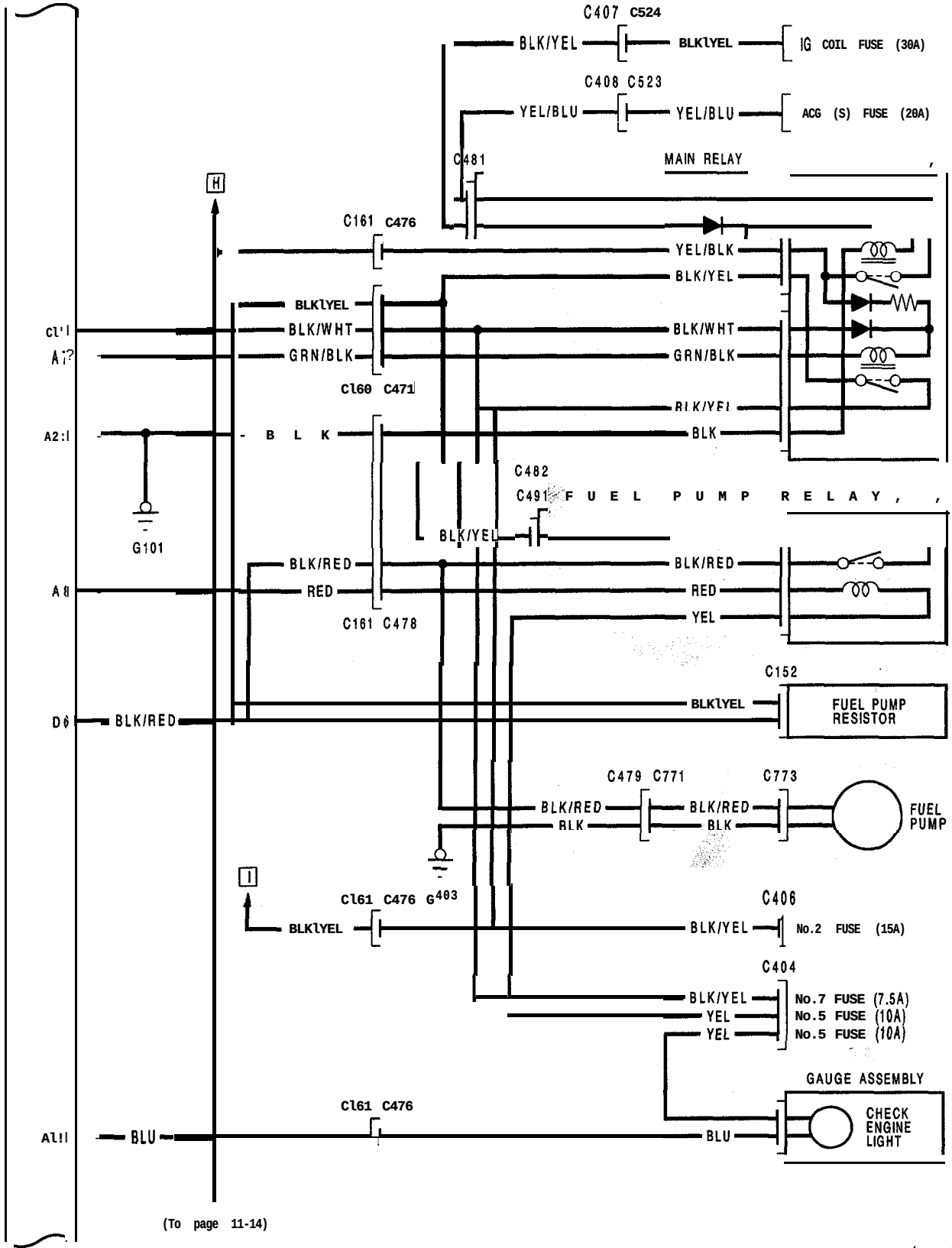

(From page 11-10)
C143
A21 WHT
A22 WHT/GRN
B8 WHT/BLK
B6 WHT/BLU
B4 WHT/YEL
B3 WHT/RED
To No.1 IGNITION COIL
To No.2 IGNITION COIL
To No.9 IGNITION COIL
To No.4 IGNITION COIL
To No.5 IGNITION COIL
To No.6 IGNITION COIL
WHT
WHT/GRN
WHT/BLK
WHT/BLU
WHT/YEL
WHT/RED
BLK
BLK
IGNITER UNIT
C1 3
G103
C119
c2 YEL/RED
BLK/YEL
BLK
SPEED SENSOR
G
A
C132 C171
C172
D4 WHT
B2 BRN/WHT
D3 ORN
WHT
FRONT KNOCK SENSOR
C173
ORN
REAR KNOCK SENSOR
G101
C133
A9 BLU/RED
A25 YEL/BLK
C1 YEL/BLK
EACV
H
C161 C478
C483
c3 BLU/BLK
BLU/BLK
COOLING FAN CONTROL UNIT
C412
D9 WHT/RED
ALTERNATOR
B7 (M/T) - L T GRN
BLK
NEUTRAL SWITCH
I
G101

(cont'd)

System Description

Electrical Connections (cont'd)

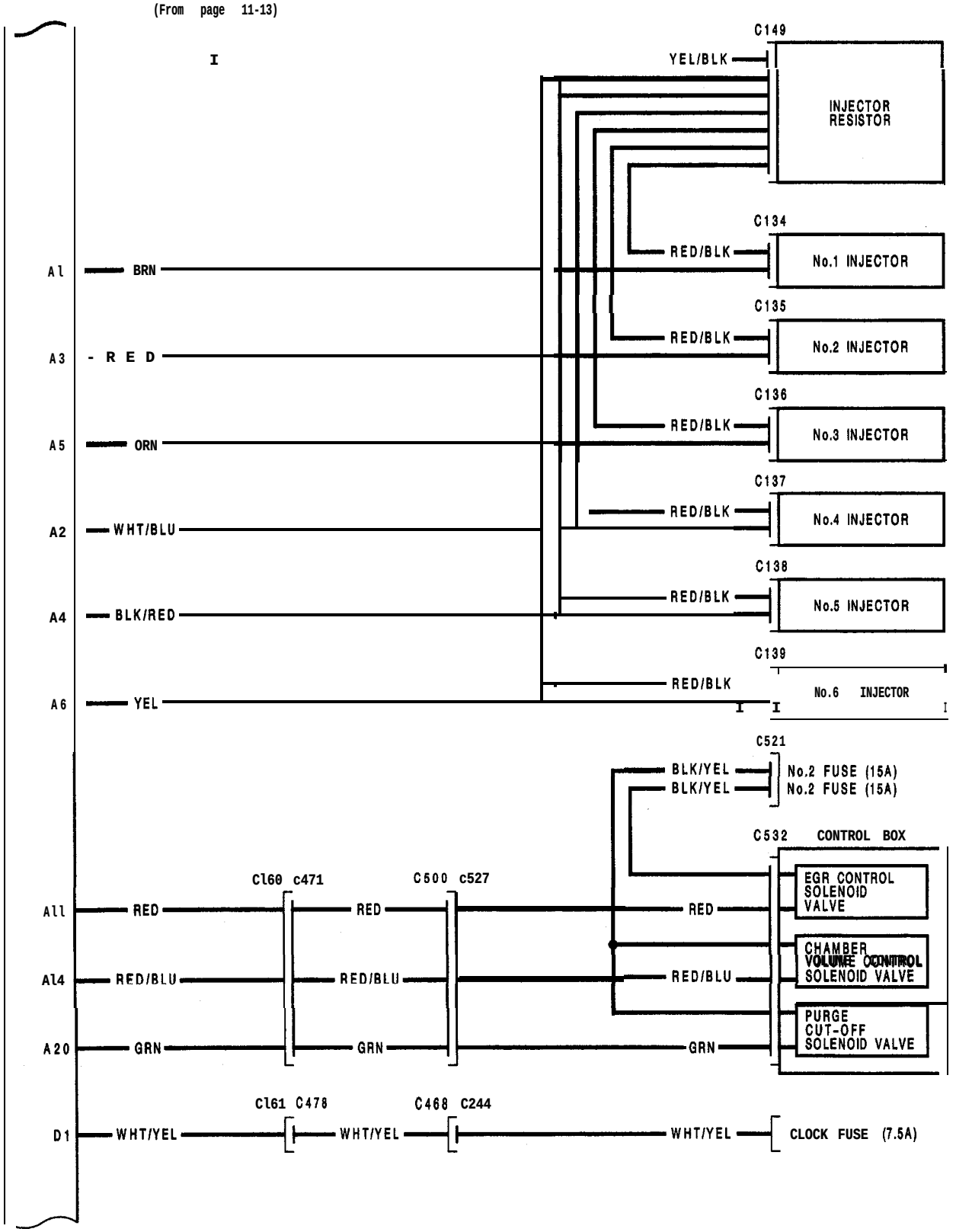


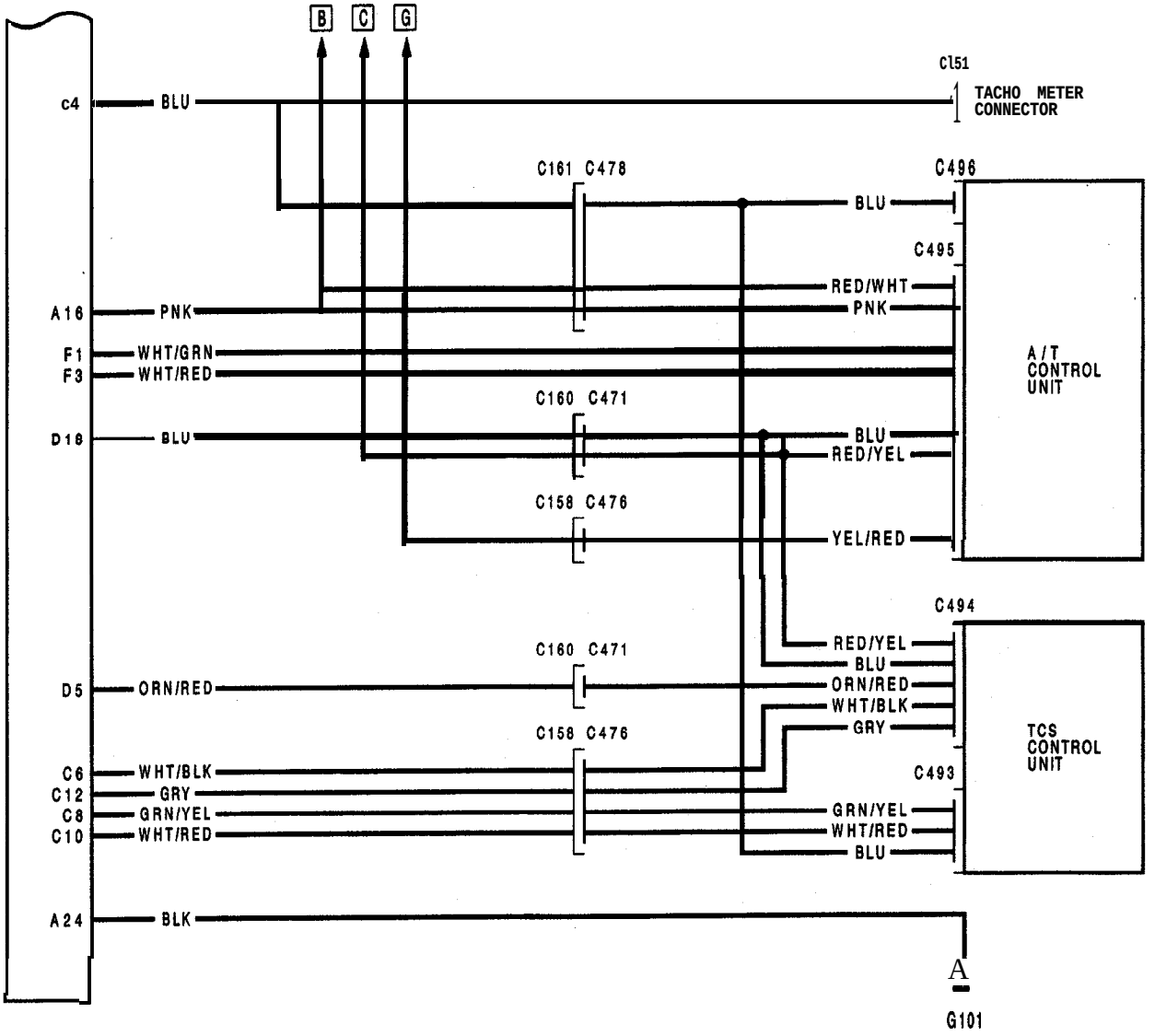


(To page 11-14)

(cont'd)

Electrical Connections (cont'd)




B
C
G
C151
TACHO METER CONNECTOR
C4
BLU
C161 C478
C496
BLU
C495
RED/WHT
PNK
A16
PNK
F1
WHT/GRN
F3
WHT/RED
A/T CONTROL UNIT
C160 C471
D18
BLU
BLU
RED/YEL
C158 C476
YEL/RED
C494
RED/YEL
BLU
C160 C471
D5
ORN/RED
ORN/RED
WHT/BLK
GRY
C158 C476
TCS CONTROL UNIT
C6
WHT/BLK
C12
GRY
C493
C8
GRN/YEL
GRN/YEL
C10
WHT/RED
WHT/RED
BLU
A24
BLK
A
G101

Troubleshooting

Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SYSTEM		PGM-FI									
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	SPOOL SOLENOID VALVE
SYMPTOM		26	30, 32, 36	40	46	48	50	52	54	56	6-19
CHECK ENGINE LIGHT TURNS ON		or									
CHECK ENGINE LIGHT BLINKS		0 or *	1 or 2 / 41 or 42	3 or 5	4 or 54 / 9 or 59	6	7	10	13	15	21 or 51
ENGINE WON'T START		③			③					①	
DIFFICULT TO START ENGINE WHEN COLD		BU		③	③	①			③		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU				③					
	ROUGH IDLE	BU		③							
	WHEN WARM RPM TOO HIGH	BU									
	WHEN WARM RPM TOO LOW	BU									
FREQUENT STALLING	WHILE WARMING UP	BU				③					
	AFTER WARMING UP	BU							③		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU			③						
	FAILS EMISSION TEST	BU	③	②							
	LOSS OF POWER	BU		③			②				③

*** If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.**

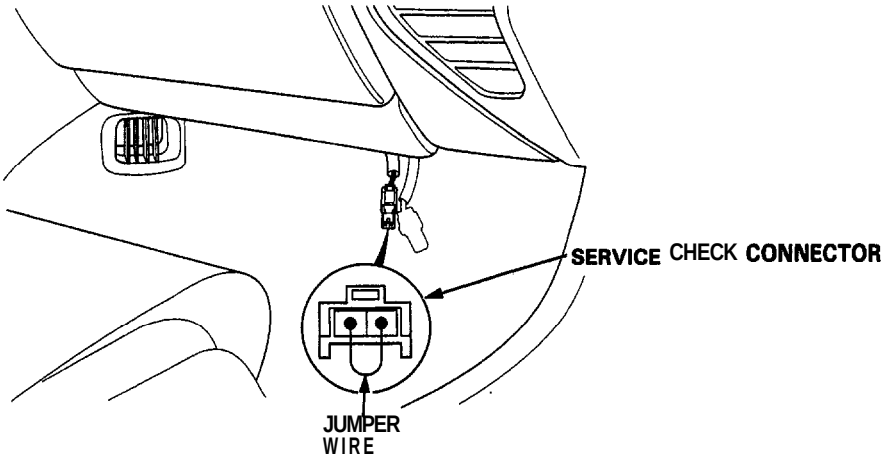
(BU) : When the Check Engine light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

PGM-FI						IDLE CONTROL		FUEL SUPPLY					EMISSION CONTROL	
VALVE TIMING OIL PRESSURE SWITCH	VEHICLE SPEED SENSOR	IGNITION TIMING ADJUSTER	KNOCK SENSOR	A/T FI SIGNAL A	A/T FI SIGNAL B	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	FUEL METERING	FUEL PUMP	OTHER FUEL SUPPLY	AIR INTAKE	EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
6-17	58	60	62	64	64	70	66	89	38	99	86	110	128	124
CHECK	CHECK	CHECK	CHECK			CHECK		CHECK	CHECK				CHECK	
22 or 52	17	18	23 or 53	30	31	14		16	43 or 44 45 or 46	47			12	
								②			③			
							②			②				
						①	②							
②						①		②					③	
						①	②							
						①		②						
						①	②				③			
						③	①				②		③	
						③		①					③	
								②	③		③			①
③			③					③		②	①	③		③

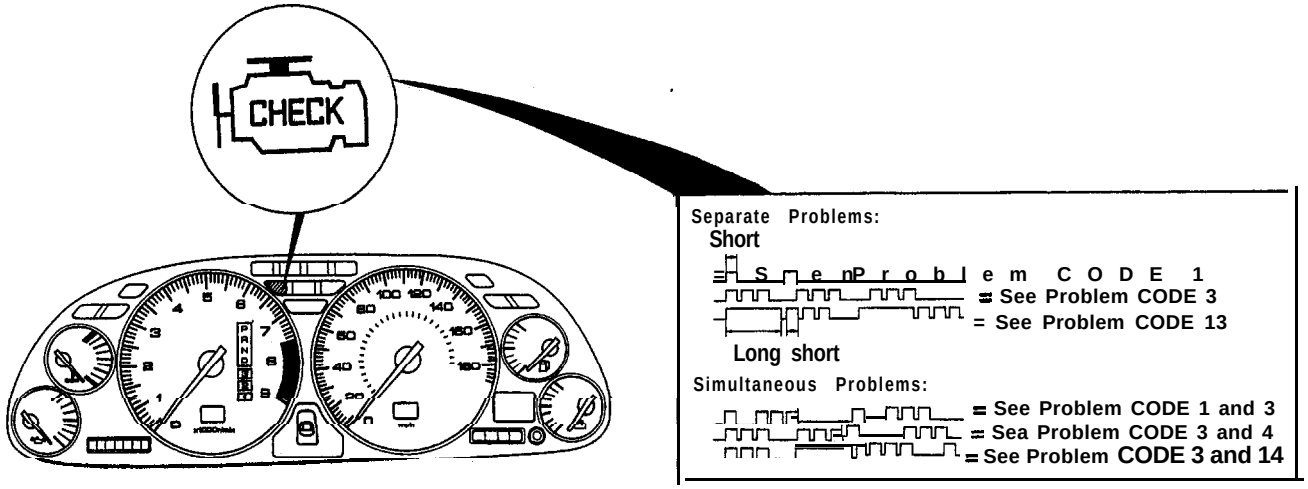
-Self-diagnostic Procedures

I. **When the Check Engine light has been reported on, do the following:**

1. Connect the Service Check Connector terminals with a jumper wire as shown (the Service Check-Connector is located under the dash on the passenger side of the car).



2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by a individual short blinks. Problem codes 10 through 59 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit.

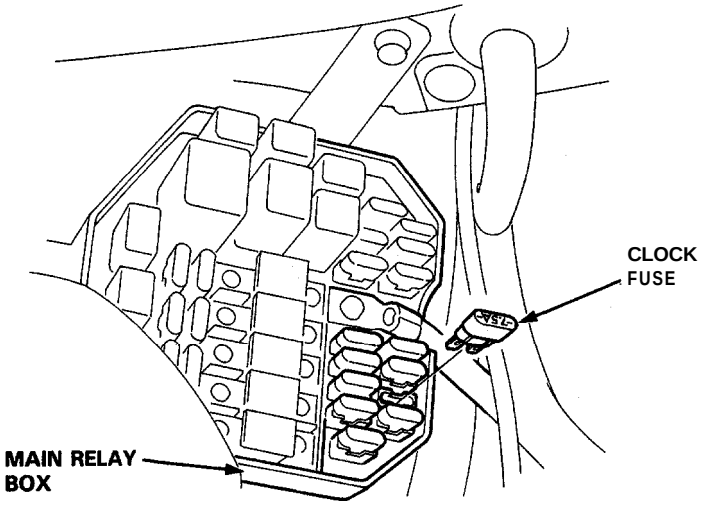


II. ECU Reset Procedure

1. Turn the ignition switch off.

2; Remove the CLOCK fuse (7.5 A) from the main relay box for 10 seconds to reset ECU.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



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

1. Remove the Jumper Wire.

NOTE: If the Service Check Connector is jumped the Check Engine light will stay on.

2. Do the ECU Reset Procedure.

3. Set the radio preset stations and the clock setting.

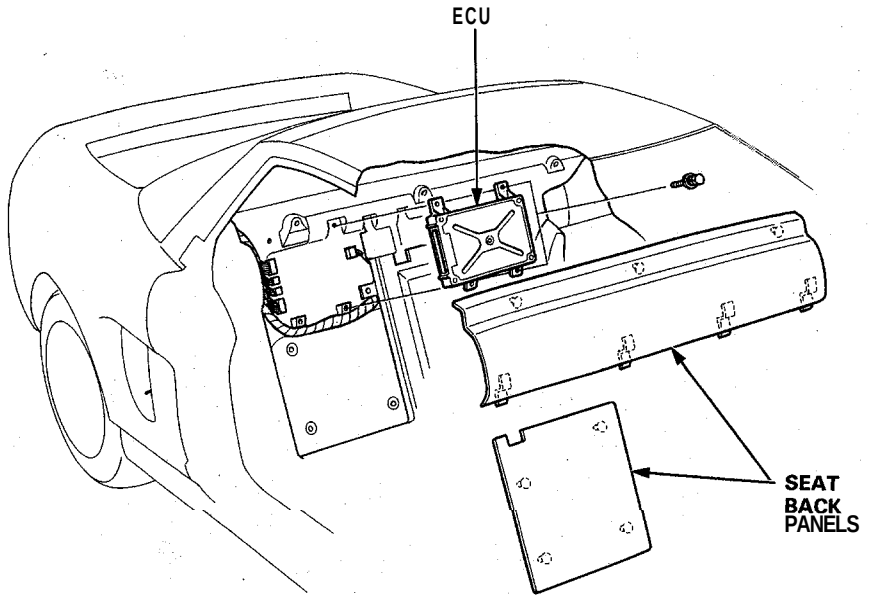
(cont'd)

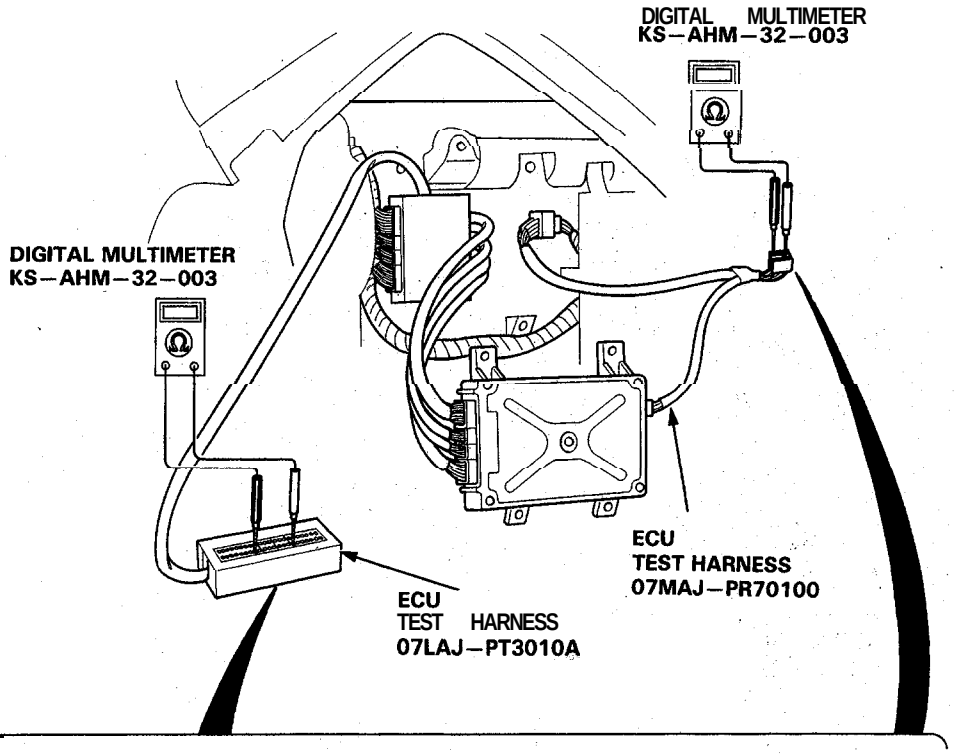
Self-diagnostic Procedures (cont'd)

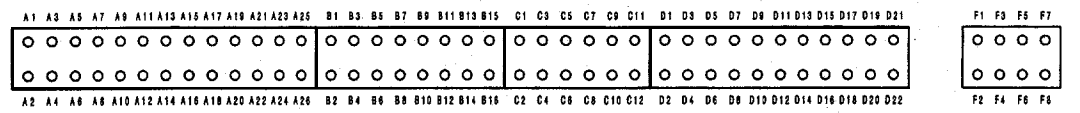
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
	ECU	11-26
	FRONT OXYGEN SENSOR	11-30
	REAR OXYGEN SENSOR	11-30
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	1 1-40
5		
4	CRANK ANGLE A	1 1-46
6	COOLANT TEMPERATURE (TW SENSOR)	11-48
7	THROTTLE ANGLE	11-50
9	No. 1 CYLINDER POSITION A (CYL SENSOR)	11-46
10	INTAKE AIR TEMPERATURE (TA SENSOR)	11-52
12	EXHAUST GAS RECIRCULATION SYSTEM (EGR)	11-128
13	ATMOSPHERIC PRESSURE (PA SENSOR1	1 1 - 5 4
14	ELECTRONIC AIR CONTROL (EACV)	11-70
15	IGNITION OUTPUT SIGNAL	11-56
16	FUEL INJECTOR	1 1-89
17	VEHICLE SPEED SENSOR	11-58
18	IGNITION TIMING ADJUSTMENT	II-60
21	FRONT SPOOL SOLENOID VALVE	6-1 5
22	FRONT VALVE TIMING OIL PRESSURE SWITCH	6-17
23	FRONT KNOCK SENSOR	1 1-62
30	A/T FI SIGNAL A	11-64
31	A/T FI SIGNAL B	11-64
35	TC STB SIGNAL	19-100
36	TCFC SIGNAL	19-102
41	FRONT OXYGEN SENSOR HEATER	11-32
42	REAR OXYGEN SENSOR HEATER	11-32
43	FRONT FUEL SUPPLY SYSTEM	11-36
44	REAR FUEL SUPPLY SYSTEM	11-36
45	FRONT FUEL METERING	11-38
46	REAR FUEL METERING	11-38
47	FUEL PUMP	11-99
51	REAR SPOOL SOLENOID VALVE	6-15
52	REAR VALVE TIMING OIL PRESSURE SWITCH	6-17
53	REAR KNOCK SENSOR	11-62
54	CRANK ANGLE B	11-46
59	No. 1 CYLINDER POSITION B (CYL SENSOR)	11-46

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.
- The Check Engine light may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine light and D indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 and 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D indicator light. If it comes on, see page 14-52.
- The Check Engine light and TCS indicator light may come on simultaneously when the self-diagnosis indicator blinks 3, 5, 6, 13, 15, 16, 17, 35 and 36. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the TCS indicator light. If it comes on, see page 19-84.
- The Check Engine light does not come on when there is a malfunction in the A/T FI signal. However, when the two terminals of the service check connector are connected with a jumper wire and, the Check Engine light will indicate the codes.

If the inspection for a particular failure code requires the ECU test harness, remove the seat back panels. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.







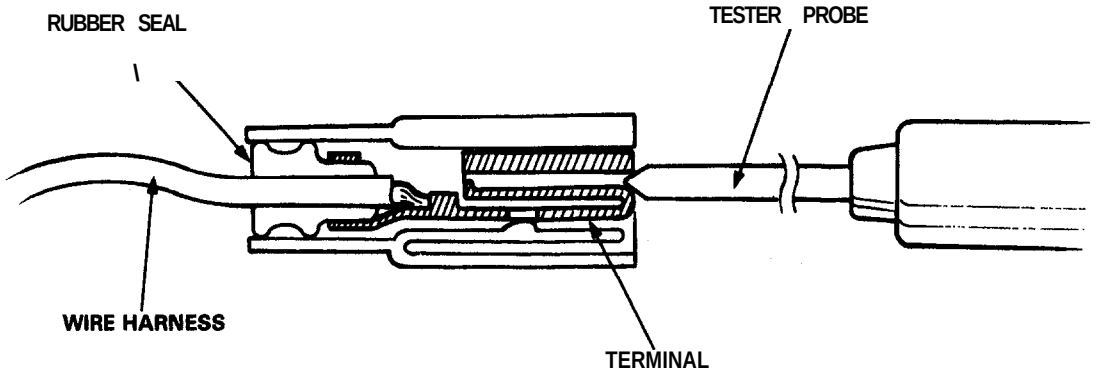
TERMINAL LOCATION

(cont'd)

Self-diagnostic Procedures (cont'd)

CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the ECU test harness, 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.



-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.

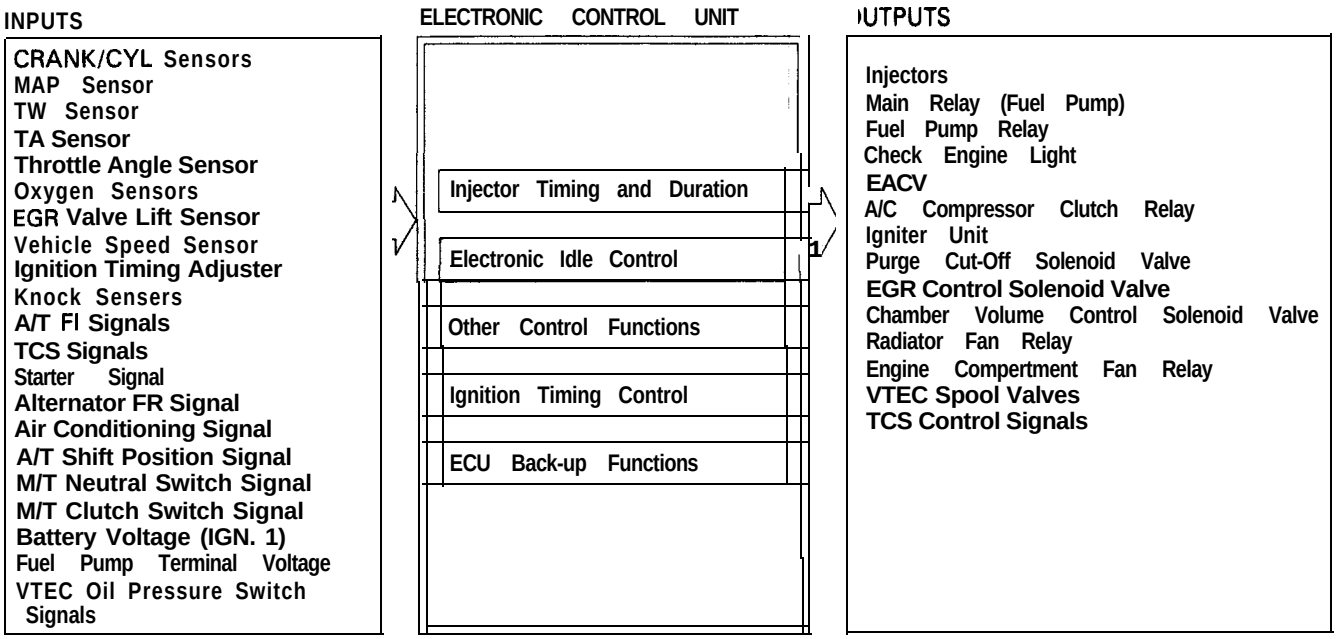
STOP (bold type) — The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

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 through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests. In any event, if the Check Engine light 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.
- Most of the troubleshooting flowcharts have you reset the ECU and try to duplicate the problem code. 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 ECU.
- "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 ECUs), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the ECU test harness, check the test harness connections before proceeding.

PGM-FI Control System

. System Description



Injector Timing and Duration

The ECU 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.

Electronic Air Control

Electronic Air Control Valve (EACV)

When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only) or the alternator is charging, the ECU controls current to the EACV to maintain correct idle speed.

Ignition Timing Control

- The ECU contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for coolant temperature.
- **A Knock Control System is also used. When detonation is detected by the knock sensor, the ignition timing is retarded.**

Other Control Functions

1. **Starting Control**
   When the engine is started, the ECU provides a rich mixture.
2. **Fuel Pump Control**
   - When the ignition switch is initially turned on, the ECU supplies ground to the main relay which supplies current to **the fuel pump for two seconds to pressurize the fuel system.**
   - When the engine is running, the ECU supplies ground to the main relay which supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the ECU cuts ground to the main relay which cuts current **to the fuel pump.**
   - Excellent engine performance is achieved through the use of VTEC (Variable Valve Timing and Lift Electronic Control System), intake manifold chamber control and discharge volume control of the fuel pump.
3. **Fuel Cut-off Control**
   - During deceleration with the throttle valve closed, current to the injectors is cut off to improve fuel economy at speeds over 1,500 rpm.
   - **Fuel cut-off action also takes place when engine speed exceeds, 8,300 rpm regardless of the position of the throttle valve to protect the engine from over-revving.**

4. A/C Compressor Clutch Relay

When the ECU receives a demand for cooling from the air conditioning system (compressor control unit), it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.

5. Purge Cut-off Solenoid Valve

When the coolant temperature is below 70°C (158°F), the ECU supplies a ground to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.

6. Chamber Volume Control Solenoid Valve (CVCSV)

When the engine rpm is below 4,800 rpm the CVCSV is activated by a signal from the ECU, intake air flows through a smaller chamber, then high torque is delivered. At speeds higher than 4,800 rpm, both solenoid valves are deactivated by the ECU, and intake air flows through the a larger chamber in order to increase airflow.

7. EGR Control Solenoid Valve (EGR CSV)

When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECU supplies ground to the EGRCSV which supplies regulated vacuum to the EGR valve.

ECU Back-up Functions

1. Fail-Safe Function

When an abnormality occurs in a signal from a sensor, the ECU ignores that signal and assumes a pre-programmed value that allows the engine to continue to run.

2. Back-up Function

When an abnormality occurs in the ECU itself, the injectors are controlled by a back-up circuit independent of the system in order to permit minimal diving.

3. Self-diagnosis Function (Check Engine light)

When an abnormality occurs in a signal from a sensor, the ECU lights the Check Engine light and stores the failure code in erasable memory. When the ignition is initially turned on, the ECU supplies ground for the Check Engine light for two seconds.

-Troubleshooting Flowchart — ECU

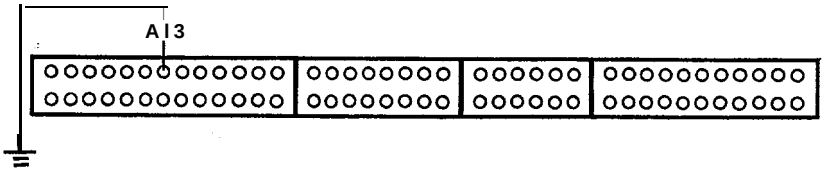
Check Engine light never comes on (even for two seconds) after ignition is turned on.

Is the oil pressure light on?
- NO → Inspect No. 5 fuse.
  - Is No. 5 fuse OK?
    - NO → Replace fuse.
    - YES → Repair open in YEL between No. 5 fuse and gauge assembly.
- YES

Turn the ignition switch OFF.

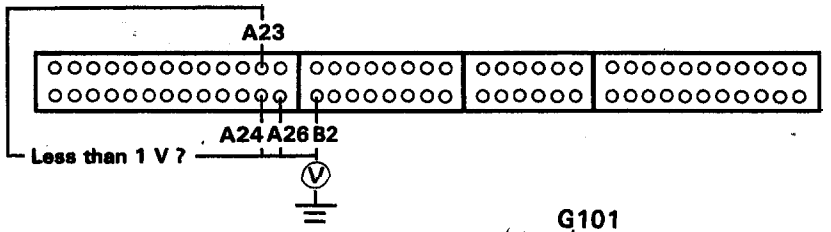
Connect the ECU test harness between the ECU and connector (page 11-21).

Connect A13 terminal to body ground.



Turn the ignition switch ON.

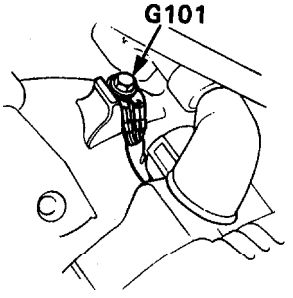
Is Check Engine light on?
- NO → ■ Replace the light bulb. ■ Repair open In BLU wire between ECU (A13) and gauge assembly.
- YES



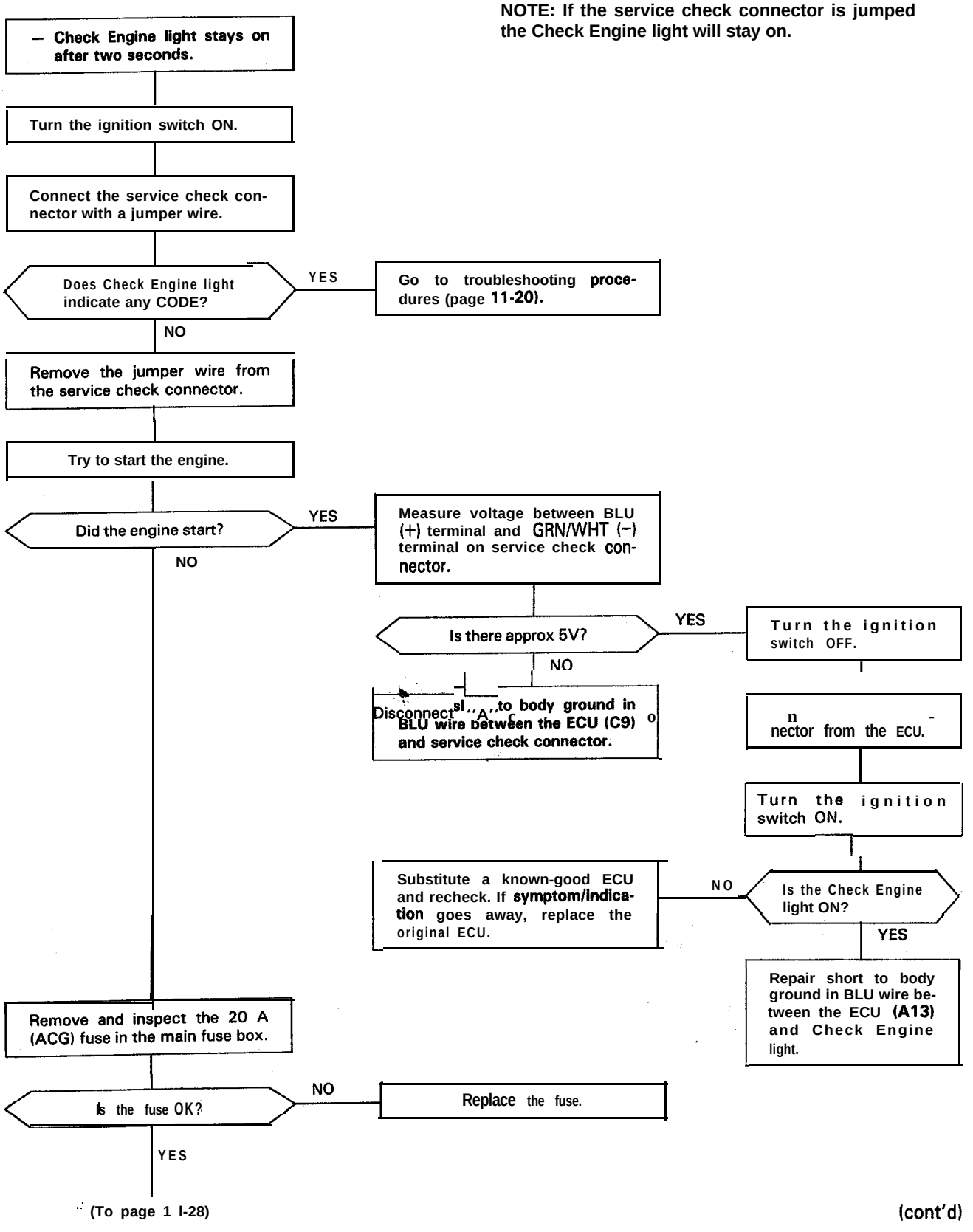
Measure voltage between body ground and the following terminals individually: ● A23, •A24, ● A2B, •B2.

Is there less than 1 V?
- NO → Repair open in wire between ECU and intake manlfold (G101) that had more than IV.
- YES

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



NOTE: If the service check connector is jumped the Check Engine light will stay on.



(cont'd)

PGM-FI Control System

– Troubleshooting Flowchart — ECU (cont'd)

(From page 1 I-27)

Inspect the IG COIL (30 A) fuse in the main fuse box.

Is the fuse OK? — NO → Replace the fuse.

YES

Turn the ignition switch ON.

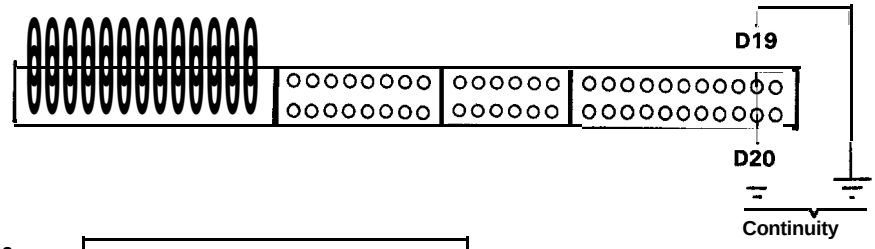
Disconnect the 3P connector of each sensor one at a time:
- MAP sensor
- EGR valve lift sensor
- Accelerator pedal angle sensor

Does Check Engine light remain ON? — NO → Replace the sensor that caused the light to go out upon its disconnection.

YES

Connect the service check connector with a jumper wire.

Disconnect the 3P connector of each sensor one at a time:
- Throttle angle sensor
- Ignition timing adjuster



Does Check Engine light indicate CODE 7 or 18? — YES → Replace the throttle angle sensor or ignition timing adjuster.

NO

Turn the ignition switch OFF.

Remove the jumper wire from the service check connector.

Connect the ECU test harness. Disconnect the "D" connector from the ECU only, not the engine wire harness (page 11-21).

Check for continuity between body ground and the following terminals; D19, D20.

(To page 11-29)

(From page 11-28)

Does continuity exist?

YES → Repair short to body ground in YEL/WHT wire between ECU (D19, D20) and throttle angle sensor, EGR valve lift sensor MAP sensor, Ignition timing Adjuster and Accelerator Pedal angle sensor.

NO

Reconnect all the connectors. Reconnect the "D" connector to the ECU.

Turn the ignition switch ON.

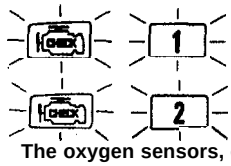
Measure voltage between A26 (+) and the following: C1 (+) and A25 (+).

Is there battery voltage?

NO → — Repair open in YEL/BLK wire between ECU (A25, C1) and main relay.
— Check main relay and wiring connectors at main relay.

YES

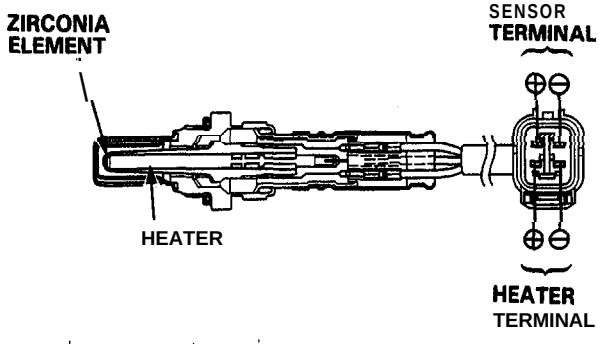
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

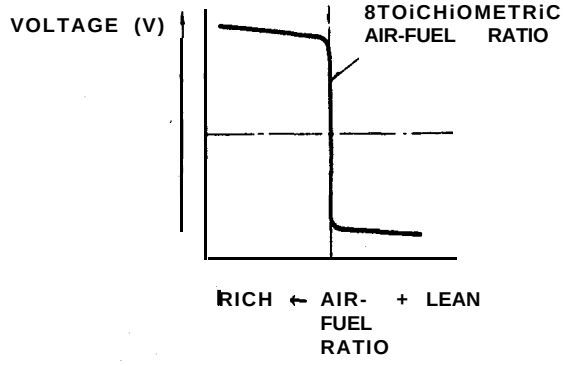


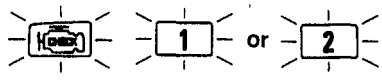
Self-diagnosis Check Engine light indicates code 1: A problem in the Front Oxygen (O_2) Sensor circuit.

Self-diagnosis Check Engine light indicates code 2: A problem in the Rear Oxygen (O_2) Sensor circuit.

The oxygen sensors, detects the oxygen content in the exhaust gas, and input the ECU. In operation, the ECU receives the signals from the sensors and varies the duration during which fuel is injected. The oxygen sensors are combined with a heaters, The heaters stabilize the sensors output. The oxygen sensors are installed in the exhaust manifolds.







- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 1 (Front O_2 sensor) and/or 2 (Rear 02 sensor) are indicated.

Do the ECU Reset Procedures (page 11-19).

Warm up engine to normal operating temperature (cooling fan comes on).

Run engine for 80 seconds.

Road test with the transmission in 4th gear, starting at 1200 rpm accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

Is Check Engine light on and does it indicate CODE 1 or CODE 2?

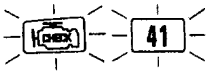
NO → intermittent failure, system is OK at this time. Check for poor connections or loose wires at the 02 sensors C144, C148.

YES

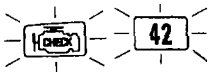
Go to page 11-38 and perform test for CODE 43 or CODE 44.

PGM-FI Control System

Troubleshooting Flowchart — Oxygen Sensor Heater



Self-diagnosis Check Engine light indicates code 41: A problem in the Front Oxygen (O_2) Sensor Heater circuit.



Self-diagnosis Check Engine light indicates code 42: A problem in the Rear Oxygen (O_2) Sensor Heater circuit.

- Engine is running.
- Check Engine light has been reported on, with service check connector jumped (page 11-18), CODE 41 and/or 42 are indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine

Is Check Engine light on and does it indicate CODE 41 or 42 ?

NO → Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at 02 sensor C144, Cl48 and ECU.

YES

Stop the engine

Disconnect the 4P connector from the O_2 sensor.

Measure resistance between terminals C and D on the O_2 sensor.

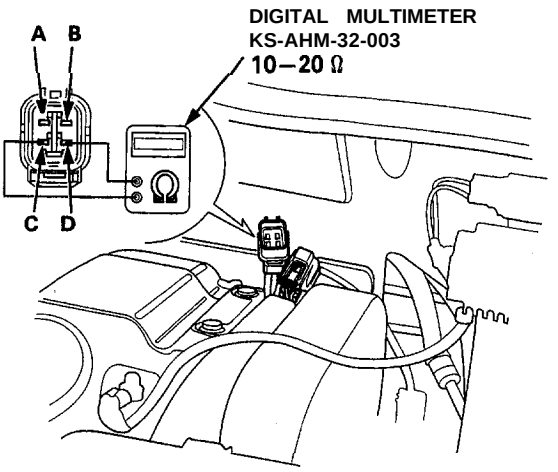
Is there 10—20 Ω?

NO → Replace O_2 sensor.

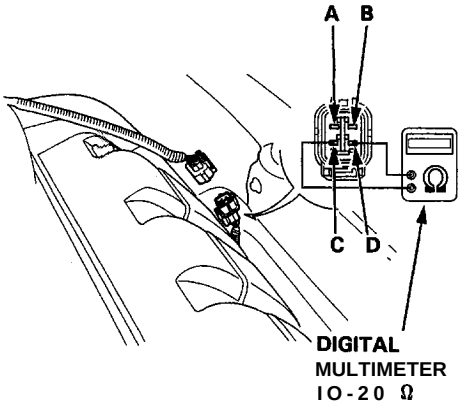
YES

(Page 1 I-33)

FRONT:



REAR:



(From page 1 I-321

Check for continuity to body ground on each terminal on the 02 sensor.

Does continuity exist? YES → Replace 02 sensor.

NO

Check for continuity between terminal A and terminals C and D individually.

Replace O2 sensor. YES

NO

Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal and BLK (−) or BLK/BLU (−)* terminal.

*: REAR

Is there battery Voltage? YES → Disconnect the "A" connector from the ECU.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

Measure voltage between BLK/YEL (+) terminal and BLK (−) or BLK/BLU (−)* terminal.

*: REAR

Is there battery voltage? YES → Repair short in BLK or BLK/BLU* wire between ECU (A10 or A12*) and front 02 sensor.

NO

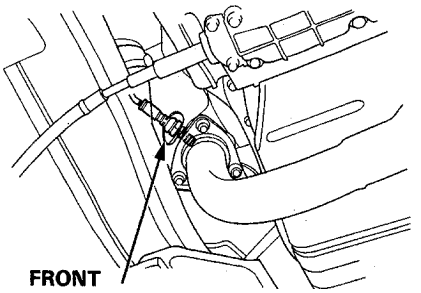
Is there battery voltage? NO →
- Repair open in BLK/YEL wire between the O2 sensor and Main Relay.
- Replace blown No. 2 fuse (15 A) in the dash fuse box.

YES

Turn the ignition switch OFF.

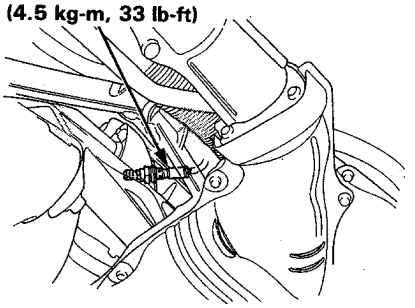
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

(To page 1 I-34)



FRONT
02 SENSOR
45 N•m
(4.5 kg-m, 33 lb-ft)

REAR
02 SENSOR
45 N•m
(4.5 kg-m, 33 lb-ft)



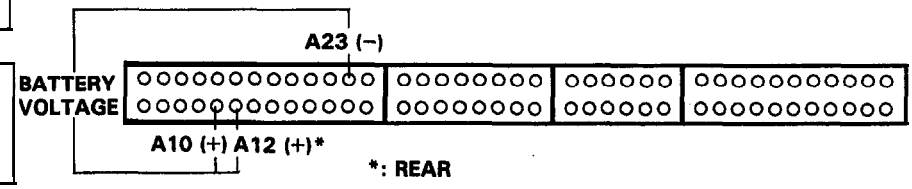
(cont'd)

-Troubleshooting Flowchart — Oxygen Sensor Heater (cont'd)

(From page 1 l-33)

Reconnect the 4P connector to 02 sensor.

Connect the ECU test harness "A" connector to the engine wire harness only, not the ECU. (page 11-21)



Turn the ignition switch ON.

*: REAR

Measure voltage between A10 (+) or Al 2 (+) * terminal and A23 (–) terminal.

Is there battery voltage?

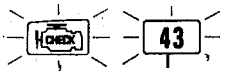
NO → Repair open in BLK or BLK/BLU* wire between ECU (A10) and front 02 sensor.

YES

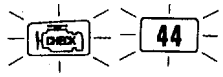
Substitute a known-good ECU and recheck. If symptom/indication goes away. replace the original ECU.

PGM-FI Control System

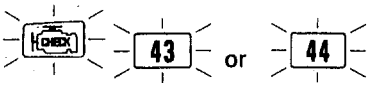
Troubleshooting Flowchart — Fuel Supply System



Self-diagnosis Check Engine light indicates code 43: Most likely a problem in the Front Oxygen (O_2) Sensor circuit or a problem in the Front Fuel Supply System.



Self-diagnosis Check Engine light indicates code 44: Most likely a problem in the Rear Oxygen (O_2) Sensor circuit or a problem in the Rear Fuel Supply System.



NOTE: If 43 or 44 code are accompanied by the Check Engine light and poor driveability, go to page 1 I-86 Fuel Supply System.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18). CODE 43 and/or 44 are indicated.
- or continued from code 1 or 2.

Do the ECU Reset Procedures (page 11-19).

Warm up engine to normal operating temperature (cooling fan comes on).

Hold engine at 3,000 rpm for 2 minutes.
(A/T: Transmission is ❑ or P.)

Is the Check Engine light on and does it indicate CODE 43 or 44?

NO → Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at 02 sensor C144, Cl48 and ECU.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (11-21).

With the ignition switch OFF, wait for at least two minutes.

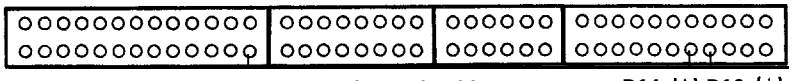
Install a jumper wire on the ECU test harness between A10 and A26 (front): or Al2 and A26 (rear).

Turn the ignition switch ON.

Measure voltage between D14 (+) (front) or D16 (+) (rear) terminal and A26 (−) terminal as soon as the ignition switch is turned on.

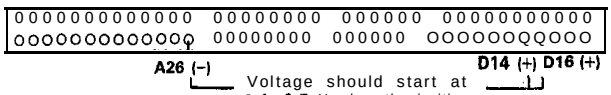
(To page 1 I-37)

NOTE:
- Use DIGITAL MULTIMETER (KS-AHM-32-003) or equivalent.
- Use 2 Volt range.



Voltage should start at 0.4-0.5 V when the ignition switch is first turnedon. anddecrease to below 0.1 V in less than two minutes.

(From page 1 I-36)



Voltage should start at **0.4–0.5** V when the ignition switch is first turned on. and decrease to below 0.1 V in less than two minutes.

Is there **0.1 V or less when the ignition switch is first turned** on?

YES → **Disconnect the 4P connector from the O2 sensor.**

NO

Measure voltage between D14 (+) (front) or D16 (+) (rear) terminal and A26 (–) terminal.

Is there more than 0.1 V?

YES → **Replace 02 sensor.**

NO

Disconnect the "D" connector from the engine wire harness.

Measure voltage between D14 (+) (front) or D16 (+) (rear) terminal and A26 (–) terminal.

Is there more than 0.1 V?

YES → **Repair short in WHT (front) or RED/BLU (rear) wire between ECU (D14) and O2 sensor.**

NO

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

Disconnect the 4P connector from the O2 sensor.

Measure voltage at the engine wire harness side of the O2 sensor connector between A (+) and B (–).

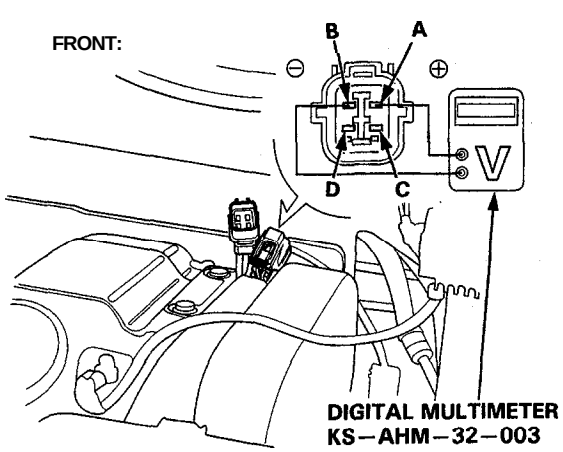
Is there more than 0.1 V?

YES → **Replace 02 sensor.**

NO

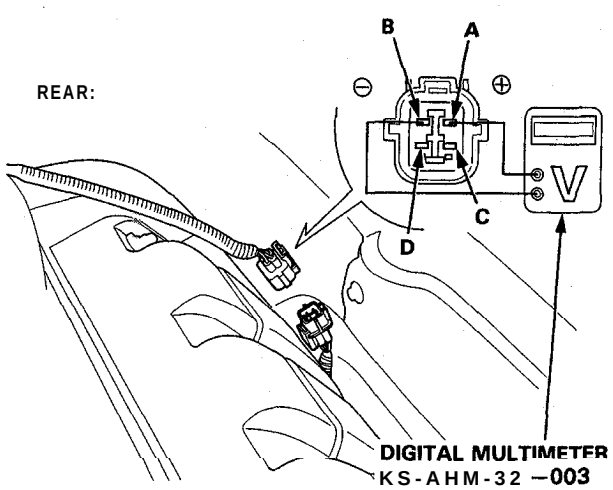
Repair open in WHT (front) or RED/BLU (rear) wire between ECU (D14 or D16) and 02 sensor.

FRONT:



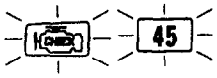
DIGITAL MULTIMETER
KS–AHM–32–003

REAR:

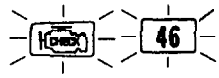


DIGITAL MULTIMETER
KS-AHM-32 –003

Troubleshooting Flowchart — Fuel Metering System



Self-diagnosis Check Engine light indicates code 45: Most likely a problem in the Front Fuel Metering System.



Self-diagnosis Check Engine light indicates code 46: Most likely a problem in the Rear Fuel Metering System.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 45 and/or 48 are indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine

Warm up engine to normal operating temperature (cooling fun comes on).

Do the Road Test. •

- Road Test
- Place the gear shift or selector lever in 3rd gear (M/T) or D position (A/T), cruise at exactly 35 mph for at least 10 seconds.
- Remove your foot from the throttle until the vehicle decels below 30 mph.
- Accelerate to 35 mph and cruise at exactly 35 mph for at least 10 seconds.
- The cruise/decel procedure must be repeated 10 times.
- Stop the vehicle, and turn off the ignition switch.
- Start the engine.
- The cruise/decel procedure must be repeated 5 times.

Does Check Engine light indicate CODE 45 and/or 467

YES

Turn the ignition switch OFF.

Relieve fuel pressure (page 1 l-91).

Attach the fuel pressure gauge and measure the fuel pressure at idle (page 11-92).

Is the pressure less than 230 kpa?

NO

See page 11-101 for fuel filter replacement and page 11-106 for fuel pump inspection.

YES

Substitufe a known-good MAP sensor.

Do the ECU Reset Procedures (page 11-19).

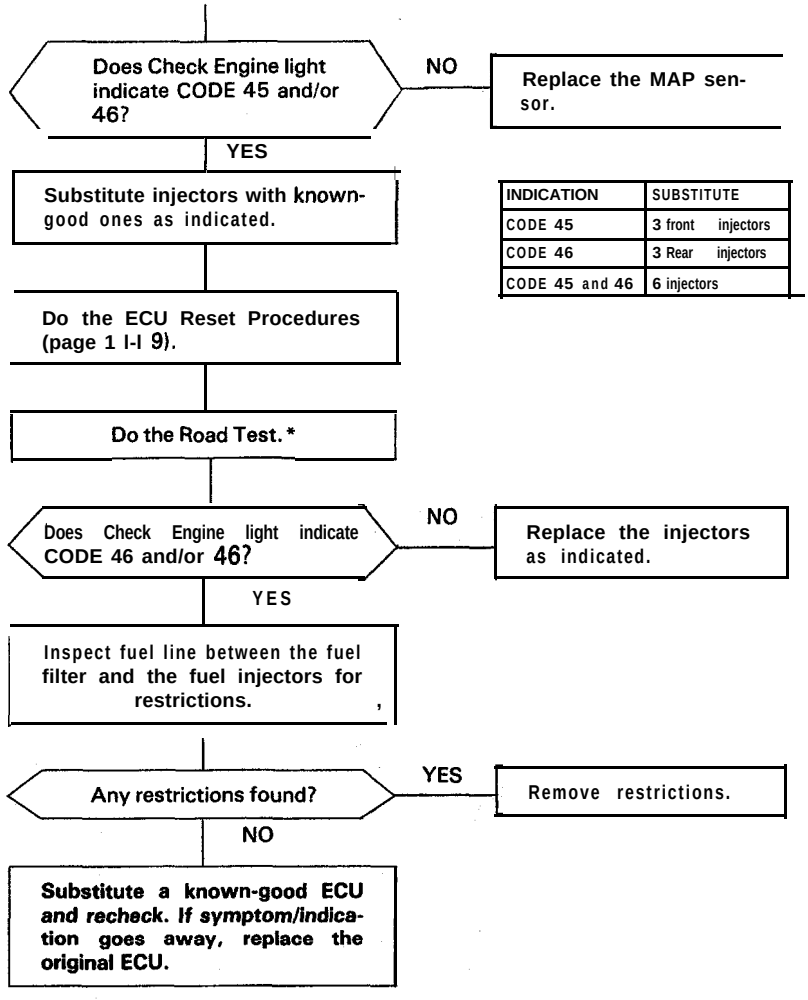
Do the Road Test. *

NO

Intermittent failure, system is OK at this time.

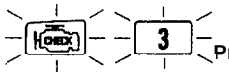
(To page 1 l-39)

(From page 1 l-38)

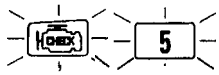


INDICATION	SUBSTITUTE
CODE 45	3 front injectors
CODE 46	3 Rear injectors
CODE 45 and 46	6 injectors

-Troubleshooting Flowchart — MAP Sensor

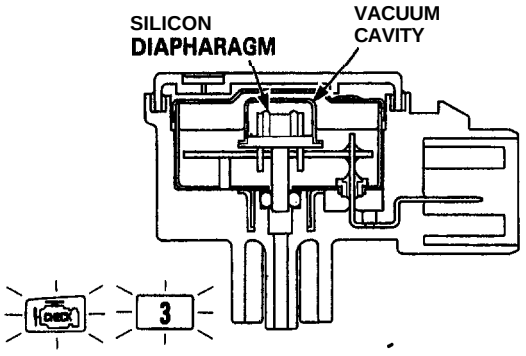


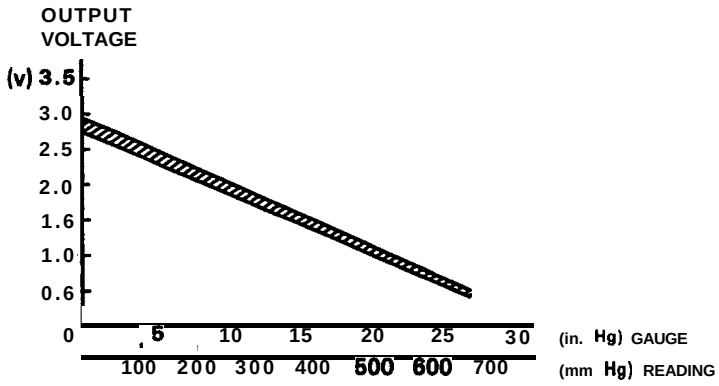
Self-diagnosis check Engine light indicates code 3: Most likely an elektrical problem in the Manifold Absolute Pressure (MAP) Sensor system.



Self-diagnosis check Engine light indicates code 5: Most likely mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor System.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECU.





- Engine Is warm and running.
- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 3 is indicated.

Do the ECU Reset Procedures (page 1 l-19).

Start the engine and allow it to idle.

Is Check Engine light on and does it indicate CODE 3?

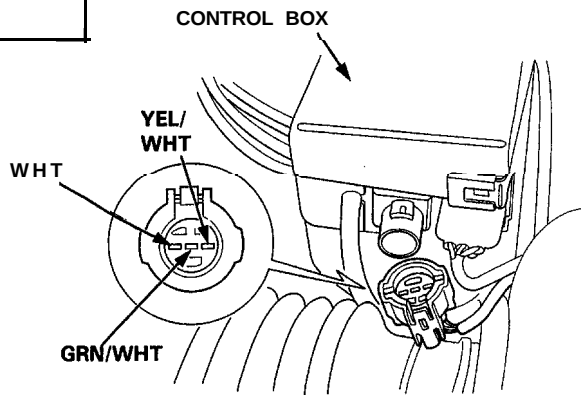
NO → Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at MAP sensor C534 and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.



(To page 11-41)

(From page 11-40)

Measure voltage between YEL/WHT (+) terminal and body ground.

Is there approx. 5V?

YES

NO

Connect the ECU test harness to the ECU only, not to the engine wire harness (page 11-21).

Measure voltage between D19 (+) terminal and D21 (−) terminal.

Is there approx. 5 V?

YES

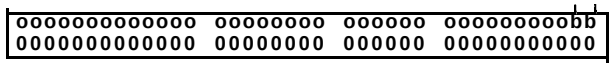
NO

Repair open in YEL/WHT wire between ECU (D19) and MAP sensor.

Substitute a known-good ECU and recheck. If **symptom/indication** goes away, replace the orignal ECU.

5 V?

D19 (+) D21 (−)



Measure voltage between YELI WHT (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5V?

NO

YES

Repair open in GRN/WHT wire between ECU (D21) and MAP sensor.

Measure voltage between WHT (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5V?

NO

YES

Repair open or short in WHT wire between ECU (D17) and MAP sensor.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Turn the ignition switch OFF.

Reconnect the 3P connector to the MAP sensor.

Connect the ECU test harness between the ECU and connector (page 11-211.

Turn the ignition switch ON.

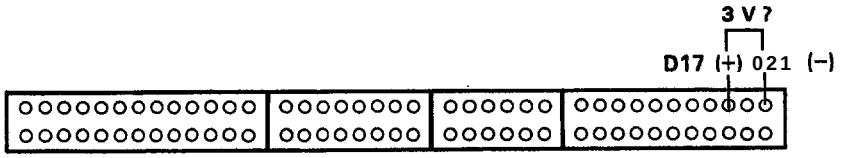
(To page 11-42)

(cont'd)

-Troubleshooting Flowchart ——— MAP Sensor (cont'd)

(From page 1 I-41)

Measure voltage between D17 (+) terminal and D21 (−) terminal.



Is there approx. 3 V ?

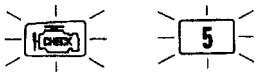
NO → Replace MAP sensor.

YES

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

(cont'd)

Troubleshooting Flowchart — MAP Sensor (cont'd)



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 5 is indicated.

Do the ECU Reset Procedures (page 1 I-19).

Start the engine and keep engine rpm at idle.

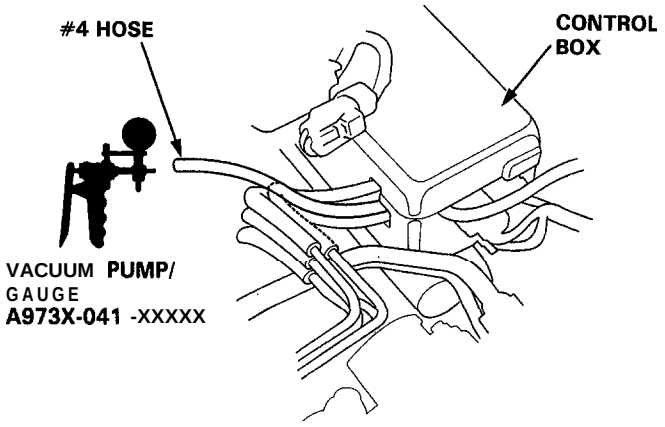
Is Check Engine light on and does it indicate CODE 57 — NO

-Intermittent failure, system is OK at this time (test drive may be necessary).
-Check vacuum hoses, pipes and connections.
-Make sure all connectors are secure.

YES

Stop the engine.

Disconnect #4 hose from the throttle body, connect vacuum pump to the hose and apply vacuum.



Does it hold vacuum? — NO

Connect a vacuum pump to the MAP sensor and apply vacuum.

YES

Does it hold vacuum? — NO — Replace MAP sensor.

YES

Replace #4 hose.

Connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 11-45)

(From page 1 1-44)

Start the engine.

Is there manifold vacuum?

NO → Remove restriction from throttle body.

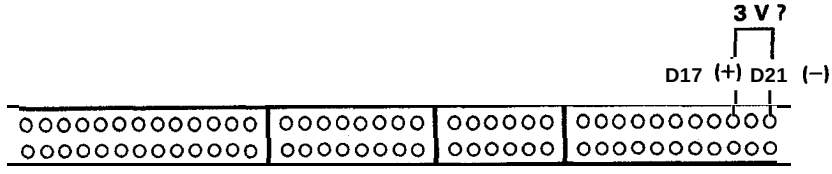
YES

Stop the engine.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

Turn the ignition switch ON.

Measure voltage between D17 (+) terminal and D21 (−) terminal.



Is there approx. 3 V ?

NO → Replace the MAP sensor.

YES

Start the engine and allow it to idle.

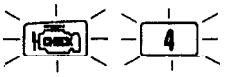
Is there approx. 1 V?

NO → Replace MAP sensor.

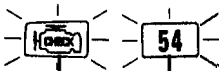
YES

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

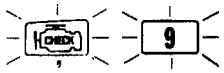
Troubleshooting Flowchart — CRANK/CYL Sensor



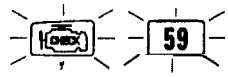
Self-diagnosis Check Engine light indicates code 4: A problem in the circuit of the CRANK A Sensor.



Self-diagnosis Check Engine light indicates code 54: A problem in the circuit of the CRANK B Sensor.

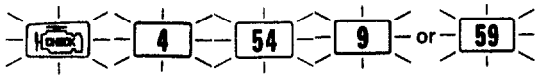


Self-diagnosis Check Engine light indicates code 9: A problem in the circuit of the CYL A Sensor.



Self-diagnosis Check Engine light indicates code 59: A problem in the circuit of the CYL B Sensor.

The CRANK sensor determines timing for fuel injection and ignition of each cylinder and also detects engine RPM. The CYL sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 4, 54, 8 andlor 59 are indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine.

Is Check Engine light on and does it indicate CODE 4, 54, 9 or 59?

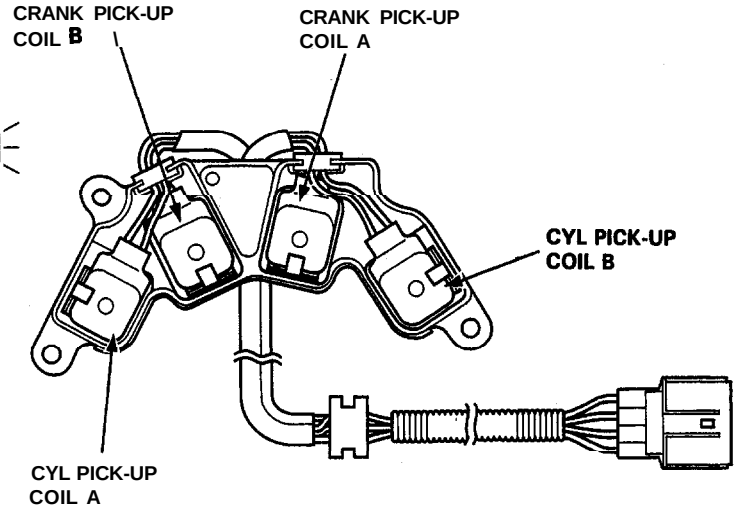
NO → Intermittent failure, system Is OK at this tlme (test drive may be necessary). Check for poor connections or loose wires at CRANK/CYL sensor connector Cl48 and ECU.

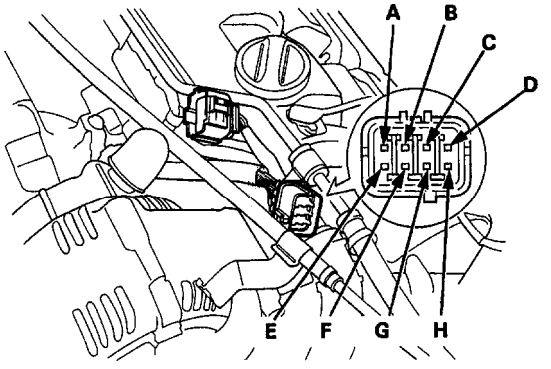
YES

Stop the engine.

Disconnect the 8P connector from the CRANK/CYL sensor.

(To page 1 l-47)





(From page 1 l-46)

Measure resistance between terminals of the indicated sensor

Is there 650-850 Ω

NO → Replace the CRANK/CYL sensor (page 6-27).

YES

Check for continuity to body ground on A-H terminals individually.

Does continuity exist?

YES → Replace the CRANK/CYL sensor (page 6-27).

NO

Reconnect the connector.

Connect the ECU test harness to the engine wire harness only, not to the ECU (page 1 l-21).

Measure resistance between terminals of the indicated sensor on ECU test harness.
*see table

Is there 650-850 Ω?

NO → Repair open in the indicated sensor wires.
*see table

YES

Check for continuity to body ground on B15, B13, B11 or B9 terminals.

Does continuity exist?

YES → Repair short in the indicated sensor wires.
*see table

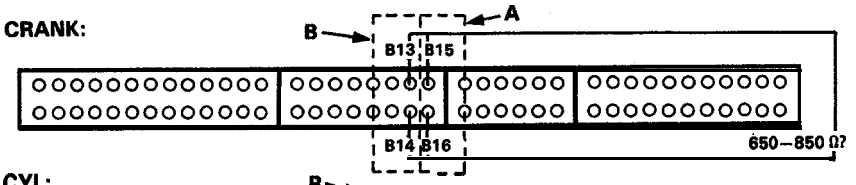
NO

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

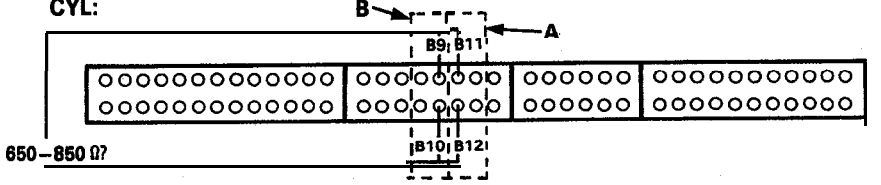
*.

SENSOR	CODE	SENSOR TERMINAL	ECU TERMINAL	WIRE COLOR
CRANK	A 4	A	B15	ORN/BLU
		B	B16	WHT/BLU
CRANK	B 54	C	B14	WHVBLU
		D	B13	ORN/BLU
CYL A	9	G	B12	BLU/YEL
		H	B11	BLU/GRN
CYLB	59	E	B9	ORN
		F	B10	WHT

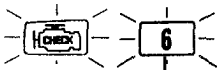
CRANK:



CYL:

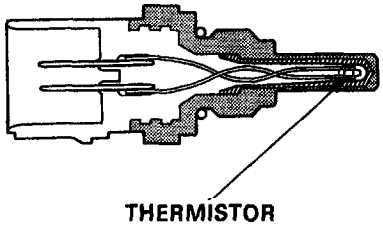


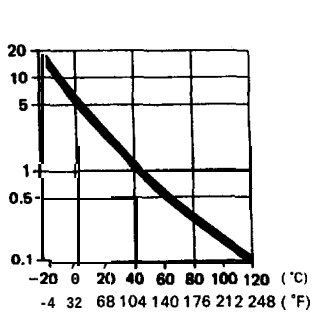
-Troubleshooting Flowchart — TW Sensor

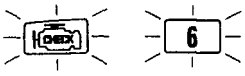


Self-diagnosis Check Engine light indicates code 6: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

The TW sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the coolant temperature increases as shown below.







- Check Engine light has been reported on.
- With service check connector jumped (page 11-18). CODE 6 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 6? — NO → Intermittent failure, system is OK at this time (test drive may be necessary). Ctieck for poor connections or loose wires at TW sensor CI08 and ECU.

YES

Warm up engine to normal operating temperature (cooling fan comes on).

Turn the ignition switch OFF.

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400 Ω ? — NO → Replace TW sensor.

YES

(To page 1 I-49)

(From page 1 l-48)

Turn the ignition switch ON.

Measure voltage between RED/WHT and body ground.

Is there approx. 5V ?

YES

Measure voltage between RED/WHT (+) terminal and GRN/WHT (–) terminal.

NO

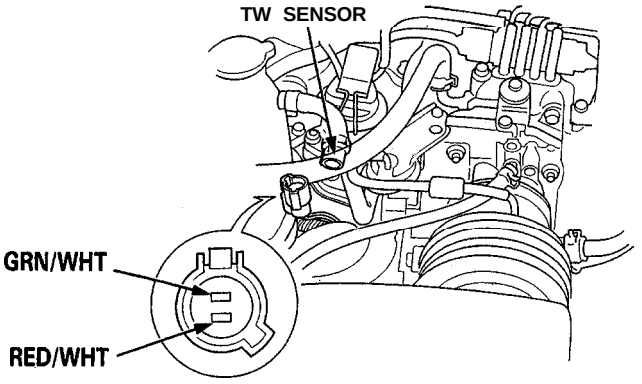
Is there approx. 5V ?

NO

Repair open in GRN/WHT wire between ECU (D22) and TW sensor.

YES

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



A/T only

Disconnect the 22P connector from the A/T control unit.

Is there approx. 5V?

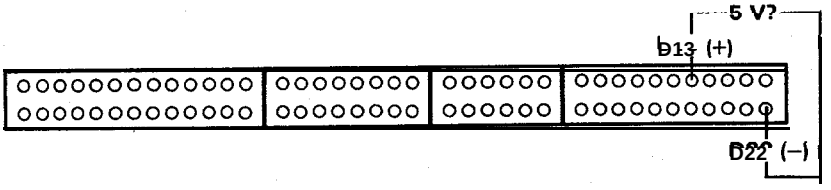
YES

Replace the A/T control unit.

NO

Connect the ECU test harness to the ECU only, not to the engine wire harness (page 11-21).

Measure voltage between D13 (+) terminal and D22 (–) terminal.



Is there approx. 5V?

YES

Repair open in RED/WHT wire between ECU (D13), A/T control unit and sensor.

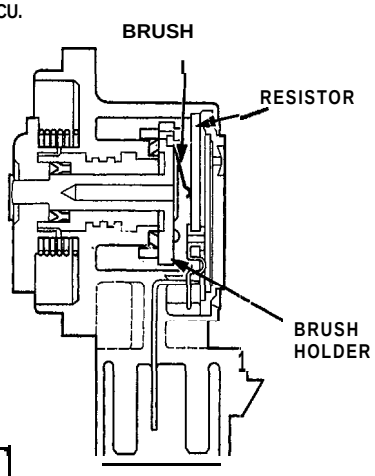
NO

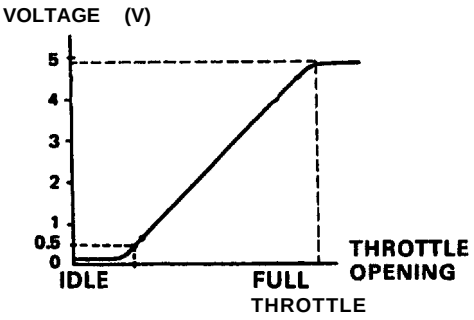
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

-Troubleshooting Flowchart — Throttle Angle Sensor

Self-diagnosis Check Engine light indicates code 7: Most likely a problem in the Throttle Angle Sensor circuit.

The throttle angle sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle angle changes, the throttle angle sensor varies the voltage signal to the ECU.





- Engine is running.
- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 7 Is indicated.

Do the ECU Reset Procedures (page 11-19).

Trun the ignition switch ON.

Is Check Engine light on and does it indicate CODE 7? — NO

Intermittent failure, system is OK at this time (test **drive** may be necessary).
Check for poor connections or loose wires at throttle angle sensor CI 30 and ECU.

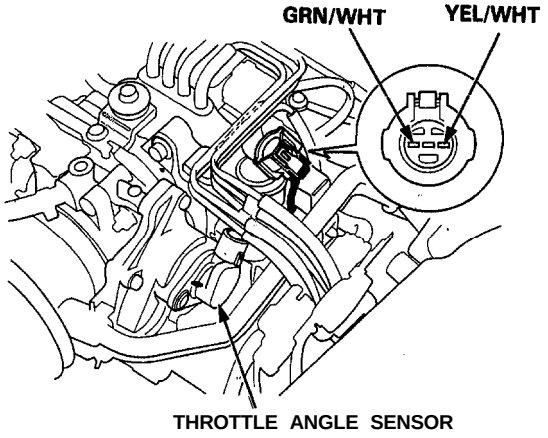
YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the throttle angle sensor.

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (−) terminal.



THROTTLE ANGLE SENSOR

Is there approx. 5V? — NO

Measure voltage between YEL/WHT (+) terminal and body ground.

YES

(To page 1 I-51)

(To page 11-51)

(From page 11-50)

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

Turn the ignition switch ON.

Measure voltage between D11 (+) terminal and D22 (–) terminal.

Is voltage 0.5 V at full close throttle, and 4.8 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to 4.8 V as the throttle is depressed.

NO

A/T only

Disconnect the 22P connector from the A/T control unit.

Is voltage 0.5 V at full close throttle, and 4.8 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to 4.8 V as the throttle is depressed.

NO

- Replace throttle angle sensor.
- Repair open or short in **RED/YEL** wire between ECU **(D11),** A/T control unit and throttle angle sensor.

YES

Replace the A/T control unit.

YES

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

(From page 1 I-50)

Is there approx. 5V ?

YES

Repair open in **GRN/WHT** wire between ECU **(D22)** and throttle angle sensor.

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

Measure voltage between D20 (+) terinal and D22 (–) terminal.

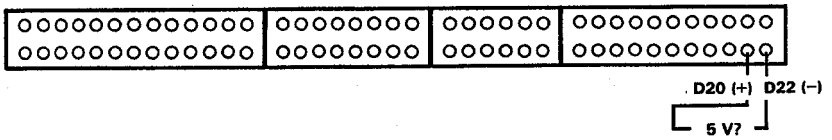
Is there approx. 5V ?

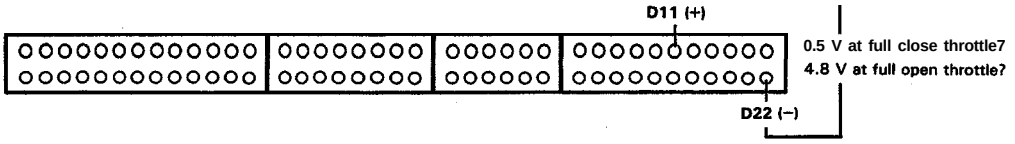
YES

Repair open in **YEL/WHT** wire between ECU **(D20)** and throttle angle sensor.

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

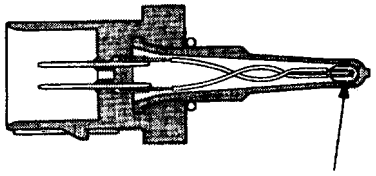




-Troubleshooting Flowchart — TA Sensor

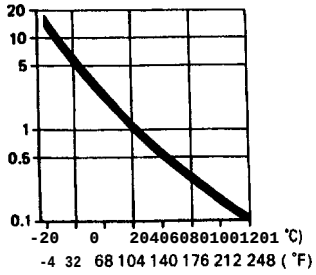
Self-diagnosis Check Engine light indicates code 10: Most likely a problem in the Intake Air Temperature (TA) Sensor ciucuit.

The TA sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.



THERMISTOR

RESISTANCE (kΩ)



INTAKE AIR TEMPERATURE

- **Check Engine light has been reported on.**
- **With service check connector jumped (page 11-18), CODE 10 is indicated.**

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE IO? — NO

Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at TA sensor CI 40 and ECU.

YES

Turn the ignition switch OFF.

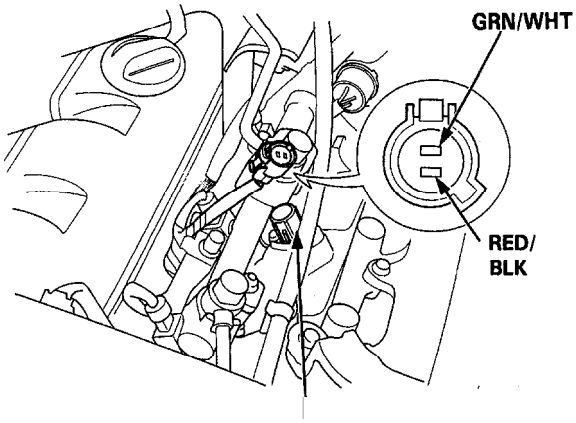
Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there I-4 kΩ ? — NO — **Replace TA sensor.**

YES

(To page 1 I-53)



TA SENSOR

(From page 11-52)

Turn the ignition switch ON.

Measure voltage between RED/BLK (+) terminal and body ground.

Is there approx. 5 V ?

YES

Measure voltage between RED/BLK (+) terminal and GRN/WHT (–) terminal.

Is there approx. 5 V ?

NO

Repair open in GRN/WHT wire between ECU (D22) and TA sensor.

YES

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

NO

Connect the ECU test harness to the ECU only, not to the engine wire harness (page 11-21).

Measure voltage between D15 (+) terminal and D22 (–) terminal.

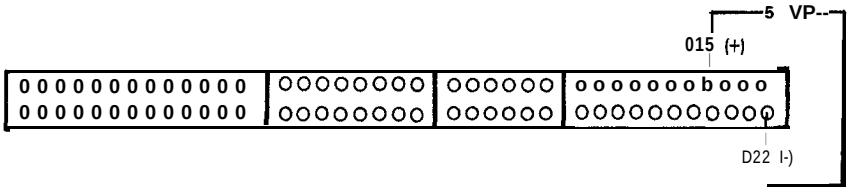
Is there approx. 5V?

YES

Repair open in RED/BLK wire between ECU (D15) and TA sensor.

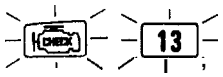
NO

Substitute a known-good ECU and recheck. If symptomlindication goes away, replace the original ECU.



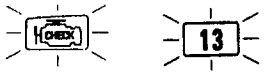
PGM-FI Control System

-Troubleshooting Flowchart — PA Sensor



Self-diagnosis Check Engine light indicates code 13: A problem in the Atmospheric Pressure (PA) Sensor.

The PA sensor is built into the ECU.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 13 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch ON.

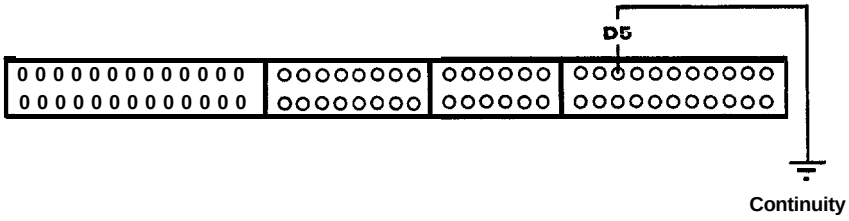
Is Check Engine light on and does it indicate CODE 13?

NO → Intermittent failure, system is OK at this time (test drive may be necessary.)

YES

Turn the ignition switch OFF.

Connect the ECU test harness to the engine wire harness not to the ECU (page 11-21).



Disconnect the 20P connector from the TCS control unit.

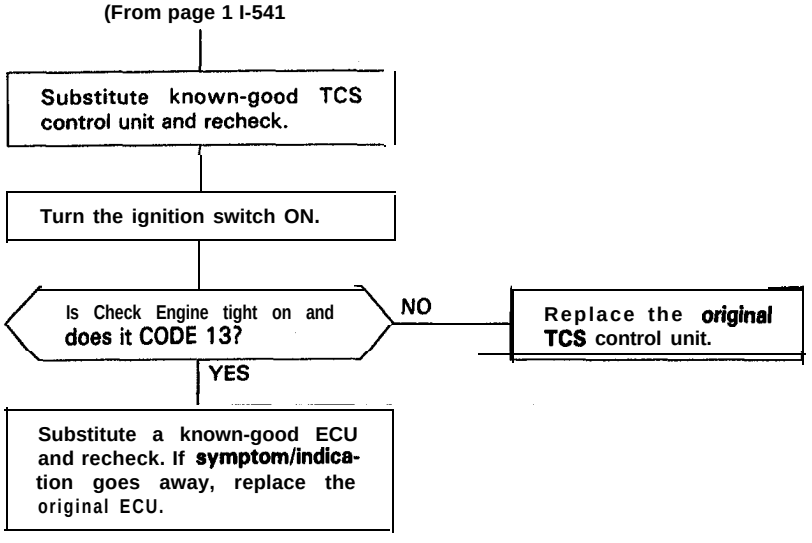
Check for continuity between D5, terminal and body ground.

Does continuity exist?

YES → Repair short in RED/ORN wire between ECU (D5) and the TCS control unit.

NO

(To page 11-54)


(From page 1 I-541
Substitute known-good TCS control unit and recheck.
Turn the ignition switch ON.
Is Check Engine tight on and does it CODE 13?
NO
Replace the original TCS control unit.
YES
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart — Ignition Output Signal

Self-diagnosis Check Engine light indicates code 15: A problem in the Ignition Output Signal circuit.

— Check Engine light has been reported on.
— With service check connector jumped (see page 1 I-18), CODE 15 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 15?

NO → Intermittent failure, system is OK at this time. Check for poor connections or loose wires at Igniter unit C143, C1 23 and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 8P connector from the igniter unit.

Check for continuity to body ground on C and F terminals individually.

Does continuity exist?

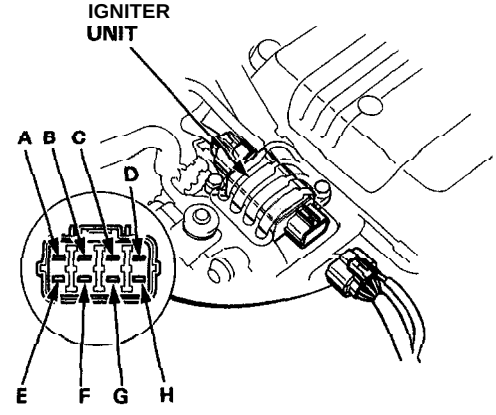
NO → Repair open in BLK wire between 8P connector and G103.

YES

Disconnect the 6P connector from the igniter unit.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

(To page 1 I-57)



IGNITER UNIT SECONDARY TERMINAL (8P)	IGNITION COIL (2P)	WIRE COLOR
A	No. 1	WHT
B	No. 2	WHT/GRN
C	GROUND	BLK
D	No. 3	WHT/BLK
E	No. 4	WHT/BLU
F	GROUND	BLK
G	No. 5	WHT/YEL
H	No. 6	WHT/RED

NOTE:
Inspection of igniter unit secondary circuit (Section 23).

(From page 11-56)

Check for continuity between body ground and the following terminals: A21, A22, B8, B6, B4, B3.

Does continuity exist?

YES → Repair short in each terminal wire.

NO

Check for continuity between terminals of 6P connector and ECU individually. "See table 2.

Does continuity exist?

NO → Repair open in each terminal wire.

YES

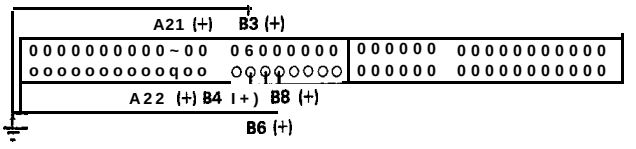
Substitute a known-good igniter unit and recheck.

Does Check Engine warning light indicate CODE 15?

NO → Replace the original igniter unit.

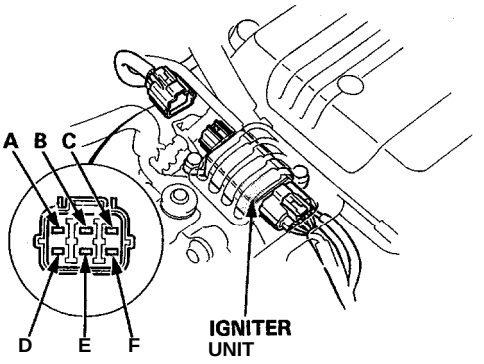
YES

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

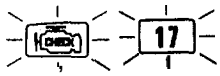


*2:

IGNITER UNIT PRIMARY TERMINAL (6P)	ECU TERMINAL	WIRE COLOR
A	B8 (No. 3)	WHT/BLK
B	A22 (No. 2)	WHT/GRN
C	A21 (No. 1)	WHT
D	B3 (No. 6)	WHT/RED
E	B4 (No. 5)	WHT/YEL
F	B6 (No. 4)	WHT/BLU



-Troubleshooting Flowchart — Vehicle Speed Sensor



Self-diagnosis Check Engine light indicates code 17: A problem in the Vehicle Speed Sensor circuit.

The signal generated by the speed sensor, produces pulses when the front wheels turn.

- Check Engine light has been reported on.
- With service check connector jumped (page 1 I-18). CODE 17 is indicated.

Do the ECU Reset Procedures (page 11-19).

Road test necessary.
In 2nd gear accelerate to 3,500 rpm, then decelerate to 1,500 rpm with throttle fully closed.

is Check Engine light on and does it indicate CODE 17?

NO → Intermittent faliure, system is OK at this time.
Check for poor connections or loose wires at and (located at left shock tower).

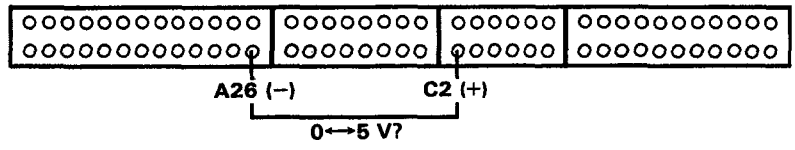
YES

Raise the car.

⚠ WARNING Make sure lifts are placed properly. (Sea page I-8.)

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.



Slowly rotate left rear wheel and measure voltage between C2 (+) terminal and A26 (–) terminal.

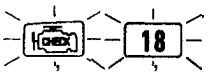
Does voltage pulse 0 V and 5 V?

NO →
- Repair open or short in YEL/RED wire between ECU (C2) and the speed sensor.
- Faulty speed sensor.
- Substitute a known-good ECU and recheck. if symptom/indication goes away, replace the original ECU.

YES

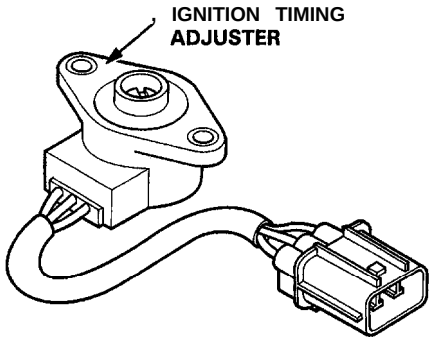
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

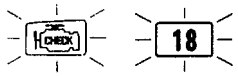
Troubleshooting Flowchart — ignition Timing Adjuster



Self-diagnosis Check Engine lights indicates code 18: A problem in the Ignition Timing Adjuster circuit.

The ignition timing adjuster allows the electronic ignition advance to be set to 15° BTDC at idle.





- Check Engine light is on.
- With service check connector jumped (page 11-18), CODE 18 is indicated.

Do the ECU Reset Procedures (page 1 I-19).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 18?

NO → Intermittent failure system is OK at this time (Test drive may be necessary). Check for poor connections or loose wires at the Ignition Timing adjuster connector C533 and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the control box.

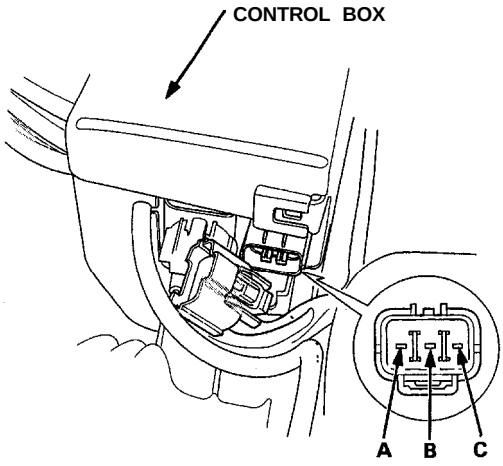
Measure resistance between A terminal and C terminal on Ignition timing adjuster.

Is there 3-6 kΩ?

NO → Replace Ignition timing adjuster (Section 23).

YES

(To page 1 I-61)



(From page 1 I-60)

Measure resistance between A and B terminals and between C and BRN terminals.

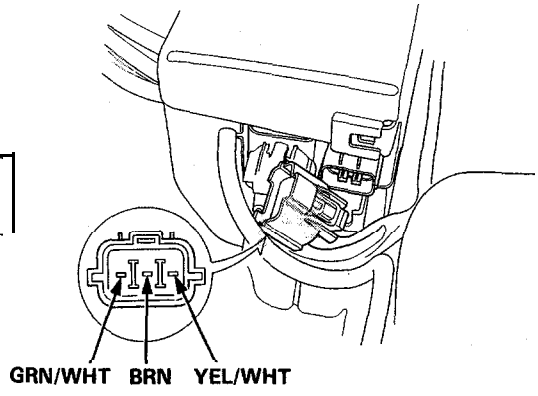
Does the sum of the two resistance checks equal 3.5-6.5 kΩ?

NO → Replace Ignition timing adjuster (Section 23).

YES

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (−) terminal on the main wire harness.



Is there approx. 5 V?

NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Reconnect 3P connector.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

Measure voltage between D8 (+) terminal and D22 (−) terminal.

Is there 0.5–4.5 V?

NO → Repair open or short in BRN wire between ECU (D8) and Ignition timing adjuster.

YES

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

Is there approx. 5 V?

YES → Repair open in GRN/WHT wire between ECU (D22) and Ignition timing adjuster.

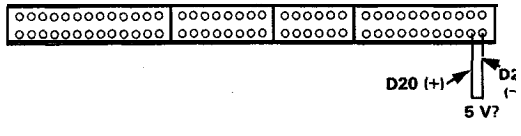
NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.



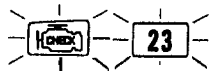
Is there approx. 5 V?

YES → Repair open in YEL/WHT wire between ECU (D20) and Ignition timing adjuster.

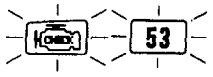
NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

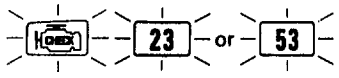
Troubleshooting Flowchart — Knock Sensor



Self-diagnosis Check Engine light indicates code 23: A problem in the circuit of the Front Knock Sensor.



Self-diagnosis Check Engine light indicates code 53: A problem in the circuit of the Rear Knock Sensor.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 23 and/or 53 are indicated.

Do the ECU Reset Procedures (page 1 I-19).

Warm up the engine to normal operating temperature (cooling fan comes on.)

Hold engine at 3000—4000 rpm for 10 seconds.
(A/T: Transmission is N or P)

Is Check Engine light on and does it indicate CODE 23 or 53?

NO → Intermittent failure, system is OK at this time.

YES

Turn the ignition switch OFF.

Connect the ECU test harness to the engine wire harness only, not to the ECU (page 11-21).

Disconnect the knock sensor connector from the engine wire harness.

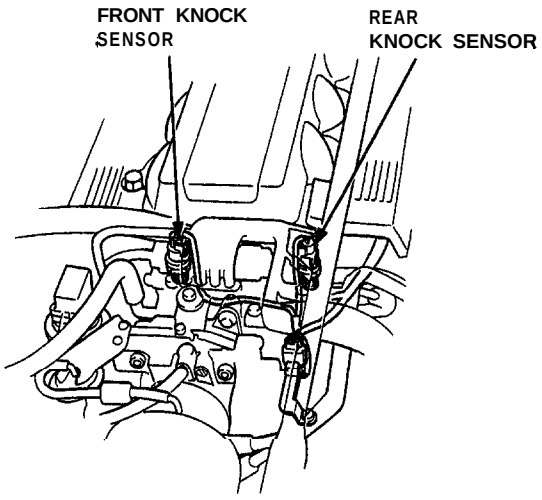
Check for continuity between D4 or D3*, terminal and body ground.

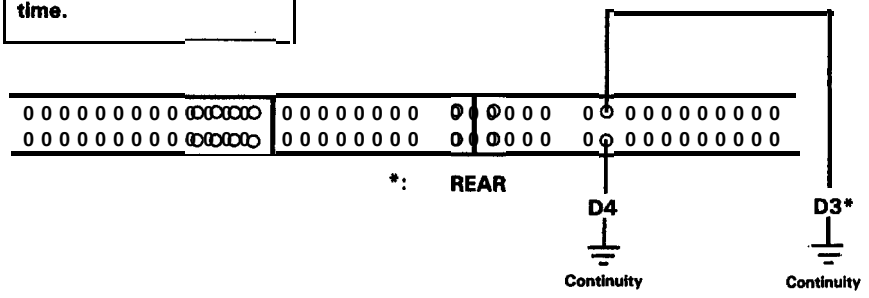
Does continuity exist?

YES → Repair short in WHT or ORN* wire between ECU (D4 or D3*) and the knock sensor.

NO

(To page 1 I-63)





(From page 11-62)

Check for continuity on WHT or ORN* wire between D4 or D3* and 3P connector of engine wire harness.

Does continuity exist?

NO → Repair open in WHT or ORN* wire between ECU (D4 or D3*) and the front knock sensor.

YES

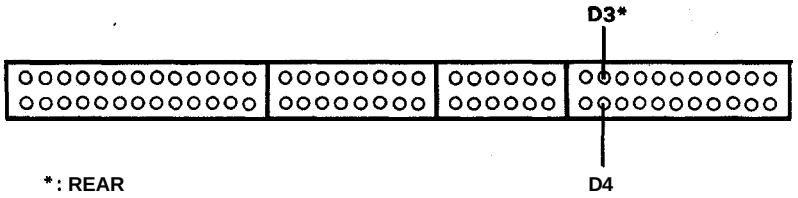
Substitute a known-good front or rear knock sensor and recheck.

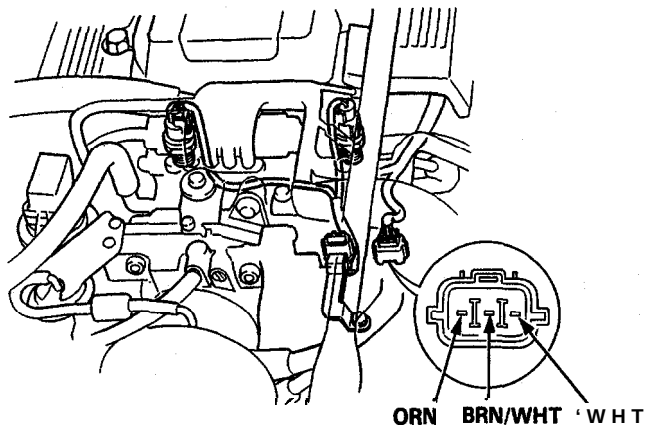
Is Check Engine light on and does it indicate CODE 23 or 53.

NO → Replace the original knock sensor.

YES

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





Troubleshooting Flowchart — A/T FI Signal

Self-diagnosis Check Engine light indicates code 30: A problem in the signal line A (F1) between A/T control unit and PGM-FI ECU.

Self-diagnosis Check Engine light indicates code 31: A problem in the signal line B (F3) between A/T control unit and PGM-FI ECU.

30 or 31

- Check Engine light isn't on.
- With service check connector jumped (page 11-18), CODE 30 and/or 31 are indicated.

Do the ECU Reset Procedures (page 1 I-19).

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

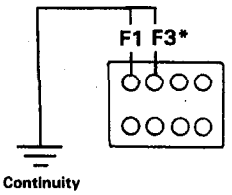
Does Check Engine light indicate CODE 30 or 31? — NO → Intermittent failure, system is OK at this time.

YES

Turn the ignition switch OFF.

Connect the test harness to the floor wire harness only, not to the ECU (page 1 I-21).

Disconnect the 22P connector from the A/T control unit.



Check for continuity between F1 or F3*, terminal and body ground.

*: SIGNAL 8

C Does continuity exist? — YES → Repair short in WHT/GRN or WHT/RED* wire between ECU (F1 or F3*) and the A/T control unit.

NO

(To page 1 I-65)

(From page 1 I-64)

Check for continuity on WHT/GRN or WHT/RED* wire between F1 or F3* and 22P connector of the A/T control unit.

Does continuity exist?

NO

Repair open in WHT/GRN or WHT/RED* wire between ECU (F1 or F3*) and the A/T control unit.

YES

Substitute a known-good A/T control unit and recheck.

Does Check Engine light indicate CODE 30 or 31?

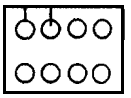
NO

Replace the original A/T control unit.

YES

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

F1 F3*



AL B

Idle Control System

System Troubleshooting Guide

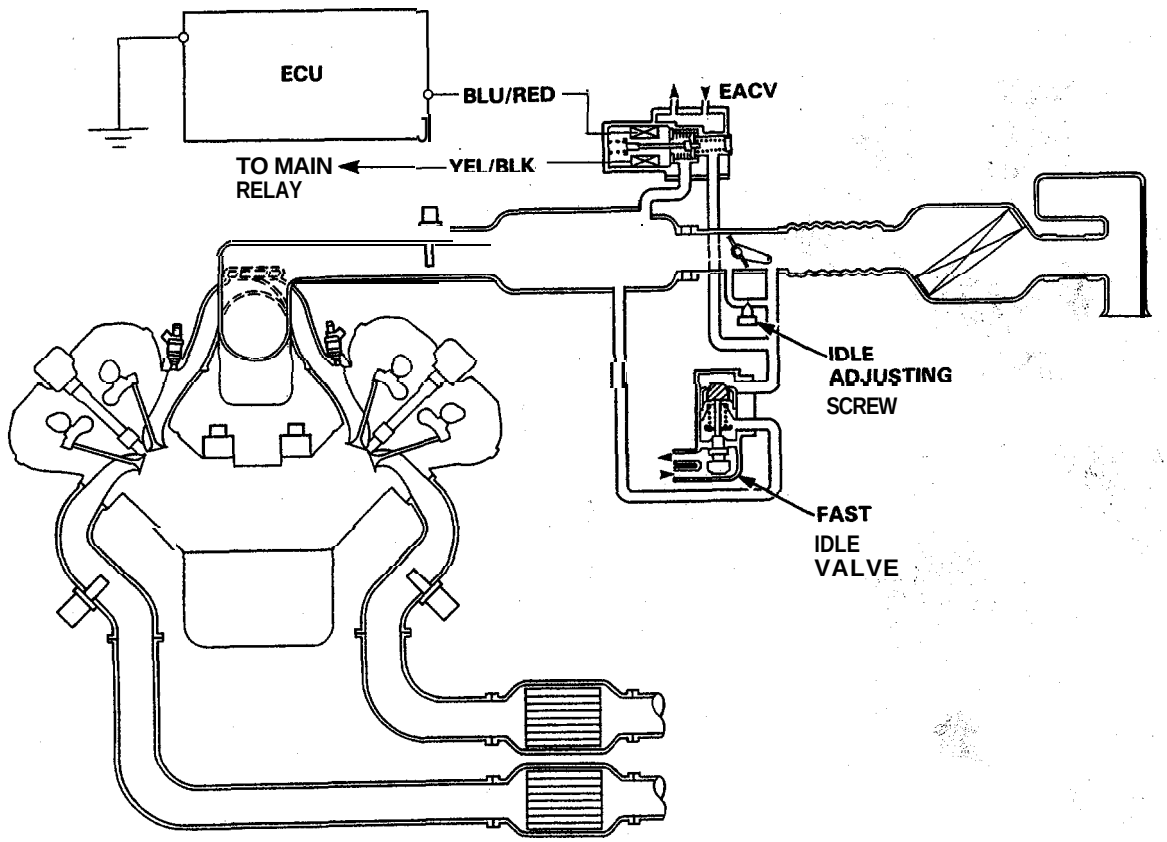
NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Check Engine light does not blink CODE 14, go to inspection described on page 11-70.

PAGE / SUB SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW 86	EACV 70	AIR CONDITIONING SIGNAL 72	ALTERNATOR FR SIGNAL 74	A/T SHIFT POSITION SIGNAL 76	M/T NEUTRAL SWITCH SIGNAL 78	M/T CLUTCH SWITCH SIGNAL 80	STARTER SWITCH SIGNAL a2	FAST IDLE VALVE 83	HOSES AND CONNECTIONS .
DIFFICULT TO START ENGINE WHEN COLD										①	
WHEN COLD FAST IDLE OUT OF SPEC (1,000—2,000 rpm)		③	②							①	
ROUGH IDLE			②								①
WHEN WARM RPM TOO HIGH		③	①							②	③
WHEN WARM RPM TOO LOW	Idle speed is below specified rpm (no load)	②	①								
	Idle speed does not increase after initial start up.		①								
	On models with automatic transmission, the idle speed drops in gear		②			①					
	Idle speeds drops when air conditioner in ON		②	①							
	Idle speed fluctuates with electrical load		②								①
FREQUENT STALLING	WHILE WARMING UP		①								
	AFTER WARMING UP	①									
FAILS EMISSION TEST											①

System Description

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

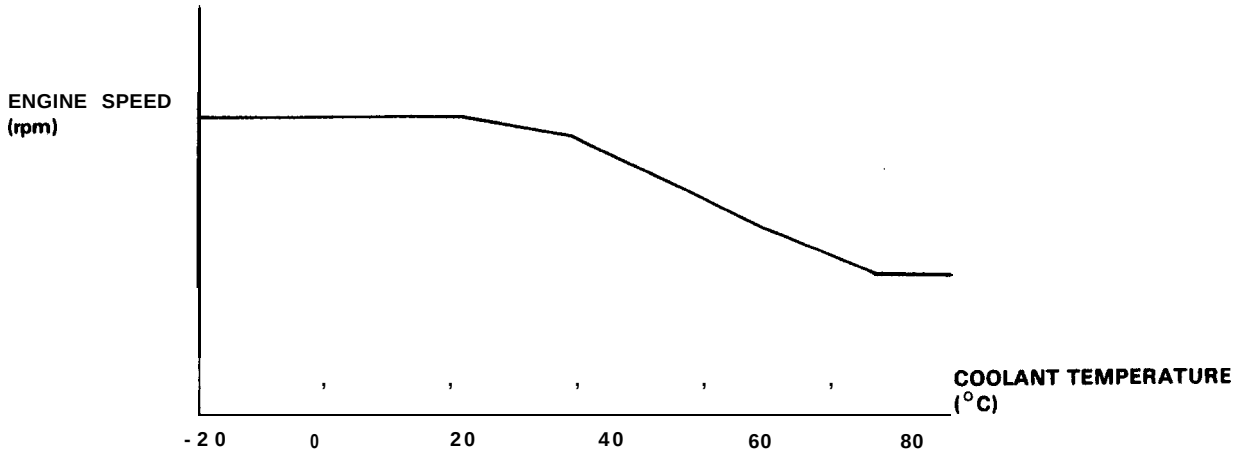


(cont'd)

System Description (cont'd)

1. After the engine starts, the EACV 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 EACV is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the coolant temperature.



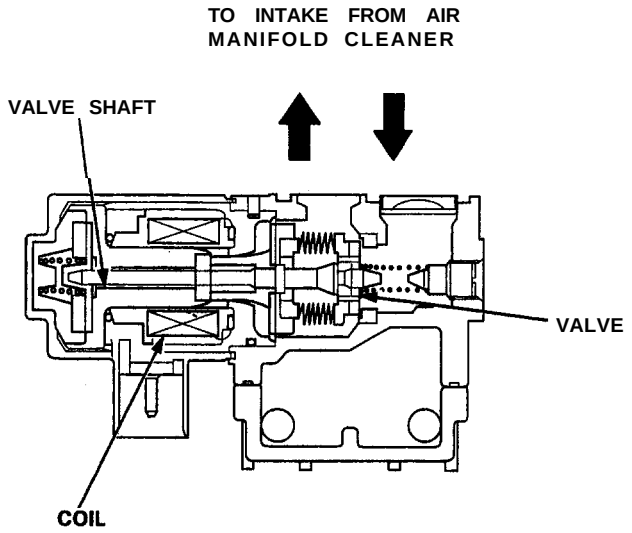
1. When the idle speed is out of specification and the Check Engine warning light does not blink CODE 14, check the following items:
   - **Adjust the idle speed (page 1 l-84)**
   - **Air conditioning signal (page 1 l-72)**
   - **Alternator FR signal (page 1 l-74)**
   - **A/T shift position signal (page 1 l-76)**
   - **M/T neutral switch signal (page 1 l-78)**
   - **M/T clutch switch signal (page 1 l-80)**
   - Starter switch signal (page 1 l-82)
   - **Fast idle valve (page 1 l-83)**
   - **Hoses and connections**
   - **EACV and its mounting O-rings**

2. **If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 11-84).**

   - If the idle speed still cannot be adjusted to specification (and the Check Engine warning light does not blink CODE 14) after EACV replacement, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Self-diagnosis: Check Engine light indicates code 14: A problem in the Electronic Air Control Valve (EACV) circuit.

The EACV changes the amount of air bypassing the throttle body in response to a current signal from the ECU in order to maintain the proper idle speed.



- Check Engine light has been reported on.
- With service check connector jumped (page 1 I-18). CODE 14 is indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine.

Is Check Engine light on and does it indicate CODE 14?

NO → Intermittent failure, system Is OK at this time (test driving may be necessary). Check for poor connection or loose wires at EACV C133 and ECU.

YES

Stop the engine.

Connect the ECU test harness "A" connector to the engine wire harness only. not the ECU (page 1 I-21).

Turn the ignition switch ON.

(To page 1 1-71)

(From page 1 1-70)

Measure voltage between A9 (+) terminal and A23 (–) terminal.

Is there battery voltage? YES → Replace EACV.

NO

Remove the CI33 connector from the EACV and connect a jumper wire* to the two pins on the wire harness connector.

CAUTION:
* the "A" connector must be disconnected for this test or the ECU will be damaged.

Measure voltage between A9 (+) terminal and A23 (–) terminal.

Is there battery voltage? YES → Replace EACV.

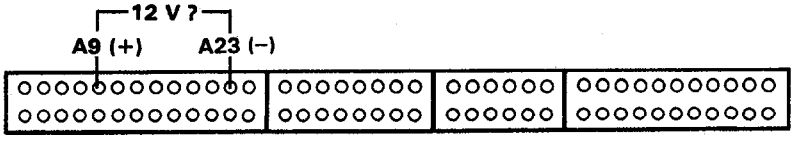
NO

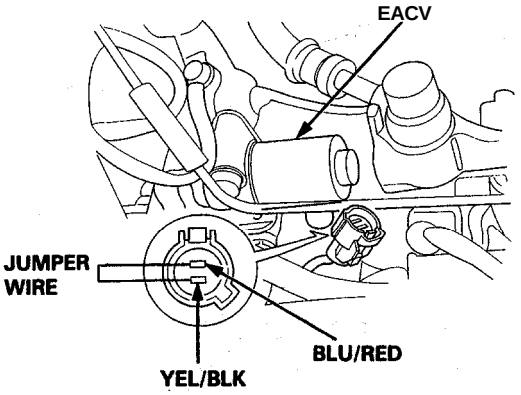
Measure voltage between the YEL/BLK wire on C133 and body ground.

Is there battery voltage? NO

YES

Repair open in BLU/RED wire between ECU (A9) and EACV.





(cont'd)

Idle Control System

-Troubleshooting Flowchart ——— Air Conditioning Signal

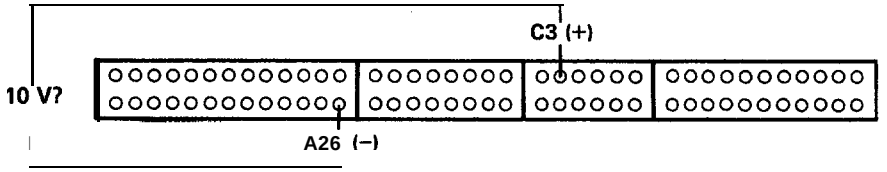
This signals the PGM-FI ECU when there is a demand for cooling from the air conditioning system.

Inspection of Air Conditioning Signal.

Connect the ECU test harness between the ECU and connector. Disconnect "C" connector from the engine wire harness only, not the ECU (page 1 l-21).

Turn the ignition switch ON.

Measure voltage between C3 (+) terminal and A26 (−) terminal.



Is there approx. 10 V?

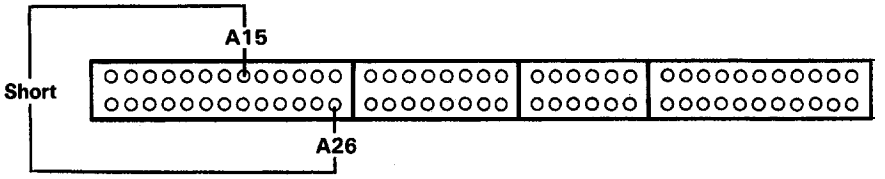
NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Reconnect "C" connector to the engine wire harness.

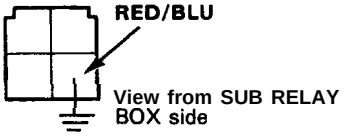
Momentarily connect A15 terminal to A26 terminal several times.



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

NO

Connect the RED/BLU terminal of the 4P connector on the A/C clutch relay to body ground.



YES

Start the engine.

Blower switch ON.

(To page 1 1-73)

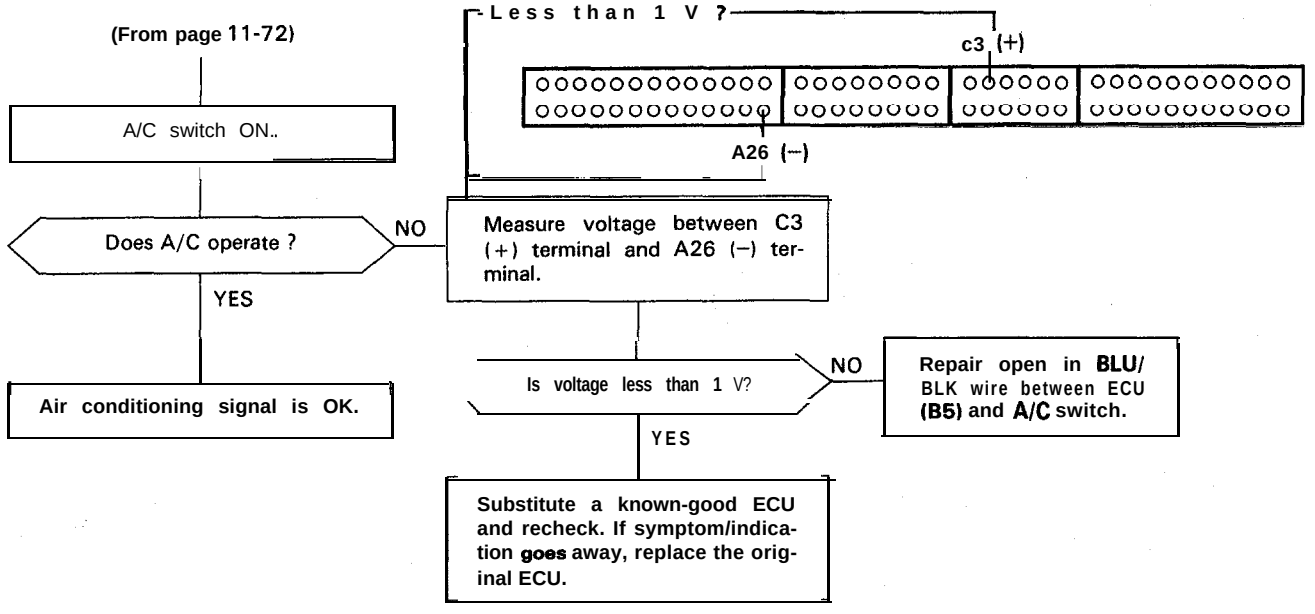
Is there a clicking noise from the A/C compressor clutch?

NO

See Air conditioner inspection (section 22).

YES

Repair open in RED/BLU wire between ECU (A15) and A/C clutch relay.


(From page 11-72)
A/C switch ON..
Does A/C operate ?
NO
YES
Air conditioning signal is OK.
Less than 1 V ?
c3 (+)
A26 (–)
Measure voltage between C3 (+) terminal and A26 (–) terminal.
Is voltage less than 1 V?
NO
Repair open in BLU/BLK wire between ECU (B5) and A/C switch.
YES
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Idle Control System

-Troubleshooting Flowchart — Alternator FR Signal

This signals the PGM-FI ECU when the alternator is charging.

Inspection of Alternator FR signal.

Connect the ECU test harness between the ECU and connector. Disconnect "D" connector from the engine wire harness only, not the ECU (page 11-21).

Turn the ignition switch ON.

Measure voltage between D9 (+) terminal and A26 (–) terminal.

Is there approx. 5 V?

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Turn the ignition switch OFF.

Reconnect "D" connector to the engine wire harness.

Warm up engine to normal operating temperature" (cooling fan comes on).

Measure voltage between D9 (+) terminal and A26 (–) terminal.

Does the voltage decrease when headlights and rear defogger are turned on ?

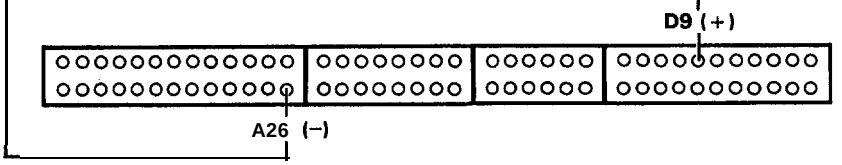
NO

Stop the engine.

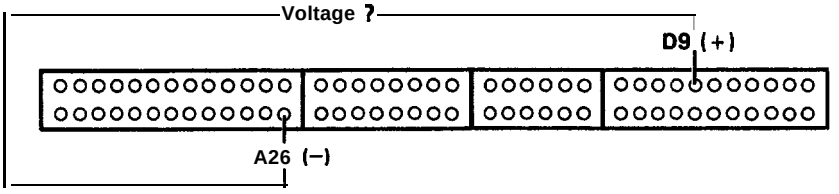
YES

Alternator FR signal is OK.

5 V?



Voltage ?



(To page 1 l-75)

(From page 1 I-74)

Disconnect "D" connector from ECU only, not the engine wire harness.

Disconnect the negative battery cable from the battery.

Check for continuity between D9 terminal and body ground.

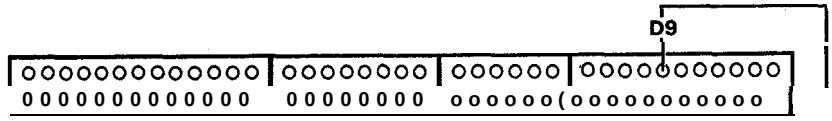
Does continuity exist ?

YES

Disconnect GRN connector from the alternator.

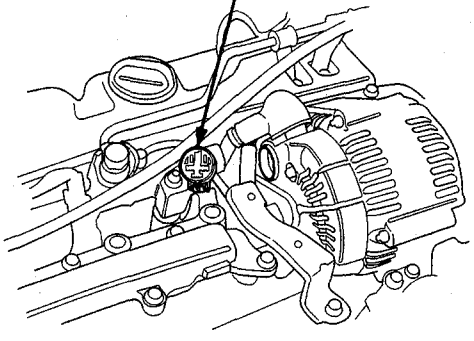
NO

Disconnect GRN connector from the alternator.



Continuity 7

GRN CONNECTOR



Connect WHT/RED wire to body ground.

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

NO

See Alternator Inspection.

YES

Repair short in WHT/RED wire between ECU (D9) and alternator.

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

YES

NO

Repair open in WHT/RED wire between ECU (D9) and alternator.

See Alternator Inspection.

This signals the PGM-FI ECU when the transmission is in Neutral or Park.

Inspection of A/T Shift Position Signal.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

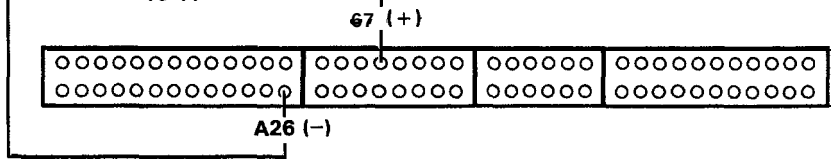
Does the indicator light properly? NO → See A/T Shift Position Indicator Inspection.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector. Disconnect "6" connector from the engine wire harness only, not the ECU (page 11-21).

10 V?



Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A26 (–) terminal.

Is there approx. 10 V? NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

Turn the ignition switch OFF.

Reconnect "B" connector to the engine wire harness.

Turn the ignition switch ON.

(To page 11-77)

(From page 1 1-76)

Measure voltage between B7 (+) terminal and A26 (–) terminal with the transmission in N.

Is there less than 1 V?

NO

- Repair open in LT GRN wire between ECU (B7) and gauge assembly.
- Repair open in GRN wire between the gauge assembly and shift position console switch.

YES

Measure voltage between B7 (+) terminal and A26 (–) terminal with the transmission in P.

Less than 1 V ?

B7 (+)

A26 (–)

Is there less than 1 V?

NO

Repair open in GRN/WHT wire between gauge assembly and shift position console switch.

YES

Measure voltage between B7 (+) terminal and A26 (–) terminal with the transmission in gear.

Is there approx. 10 V?

NO

Repair short in LT GRN wire between ECU (B7) and gauge assembly.

YES

A/T shift position signal is OK.

Troubleshooting Flowchart — M/T Neutral Switch Signal

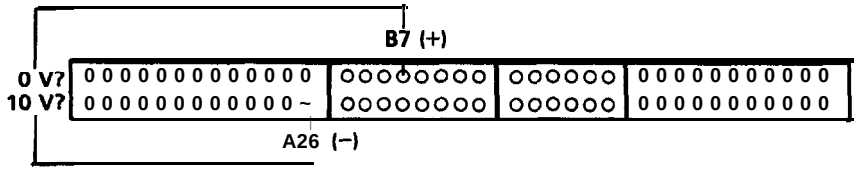
This signals the PGM-FI ECU when the transmission is in Neutral.

inspection of M/T neutral Switch Signal

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

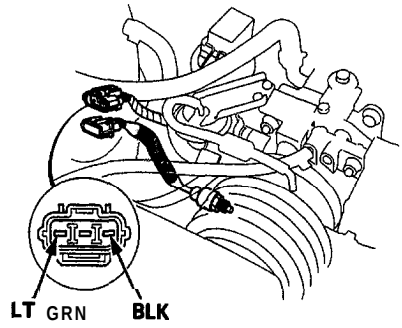
Measure voltage between B7 (+) terminal and A26 (−) terminal in Neutral position.



Is there voltage?

YES → Disconnect the 3P connector on the MIT neutral switch.

NO



Connect LT GRN terminal to BLK terminal.

Shift transmission in gear.

Is there voltage? NO → Replace M/T neutral switch.

YES → Repair open in LT GRN wire between ECU (B7) and M/T neutral pressure switch or BLK wire between M/T neutral switch and G101.

Is there approx. 10 V? NO → Disconnect "B" connector from engine wire harness only, not the ECU.

YES

Is there approx. 10 V? NO → Substitute a known-good ECU and recheck. If prescribed voltage is now avaiiebie, replace the original ECU.

YES → Reconnect "B" connector to main wire harness and disconnect 3P connector on the M/T neutral switch.

M/T neutral switch signal is OK.

Is there approx. 10 V? NO → Repair short in LT GRN wire between ECU (B7) end the M/T neutral switch.

YES → Replace M/T neutral switch.

Idle Control System

Troubleshooting Flowchart — Clutch Switch Signal

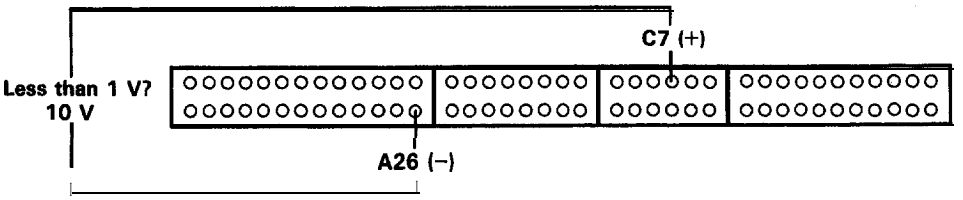
This signals the PGM-Fi ECU when the clutch is engaged.

Inspection of clutch switch signal.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

Measure voltage between C7 (+) terminal and A26 (−) terminal.

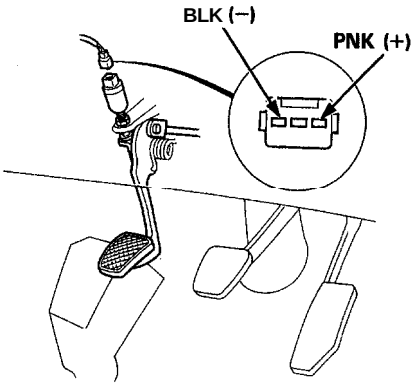


is voltage less than 1 V?

NO

Turn the ignition switch OFF.

Disconnect the 3P connector from the clutch switch.



Check for continuity between the A terminal and B terminal on the clutch switch.

Does continuity exist?

NO

Replace the clutch switch.

YES

Turn the ignitio; switch ON.

YES

Depress the clutch pedal.

Measure voltage between C7 (+) terminal and A26 (−) terminal.

(To page 11-81)

Measure voltage between PNK (+) terminal and body ground.

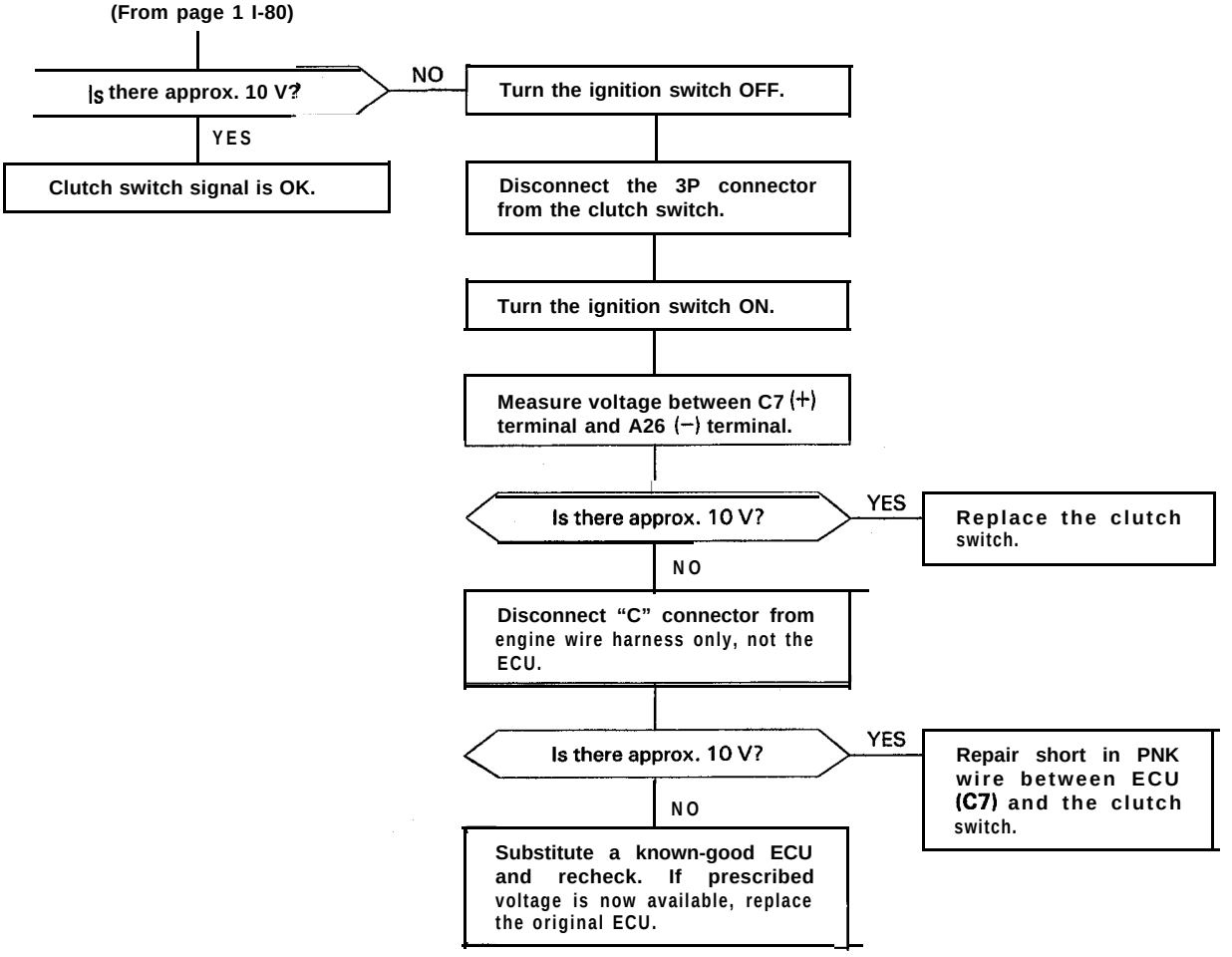
Is there approx. 10 V?

NO

Repair open in PNK wire between ECU (C7) and the clutch switch.

YES

Repair open in BLK wire between the clutch switch and 0401.


(From page 1 I-80)
Is there approx. 10 V?
NO
Turn the ignition switch OFF.
YES
Clutch switch signal is OK.
Disconnect the 3P connector from the clutch switch.
Turn the ignition switch ON.
Measure voltage between C7 (+) terminal and A26 (−) terminal.
Is there approx. 10 V?
YES
Replace the clutch switch.
NO
Disconnect "C" connector from engine wire harness only, not the ECU.
Is there approx. 10 V?
YES
Repair short in PNK wire between ECU (C7) and the clutch switch.
NO
Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Idle Control System

-Troubleshooting Flowchart — Starter Switch Signal

This signals the PGM-FI ECU when the engine is cranking.

Inspection of Starter Switch Signal.

Connect the ECU test harness between the ECU and connector (page 1 l-211.

Measure voltage between Cl1 (+) terminal and A26 (−) terminal.

Is there battery voltage ?

NO

Inspect No. 7 fuse.

Is No. 7 fuse OK ?

NO

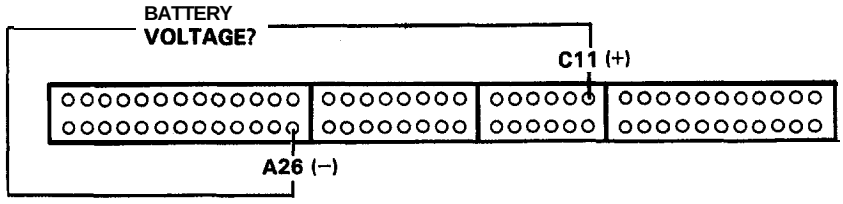
Replace fuse.

YES

Repair open in BLK/WHT wire between ECU (C11) and No. 7 fuse.

YES

Starter switch signal is OK.

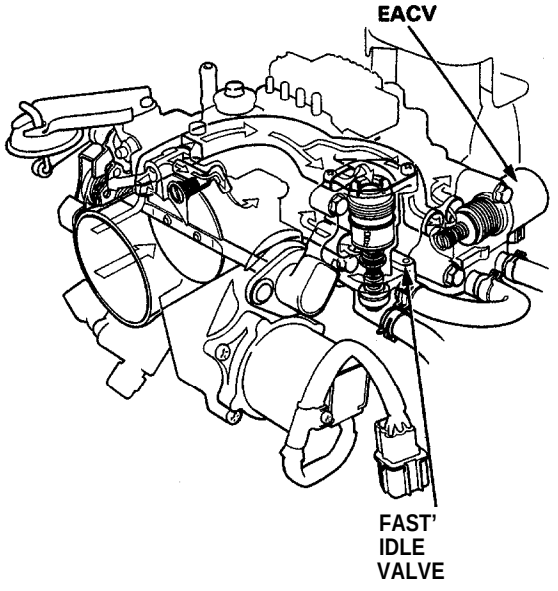


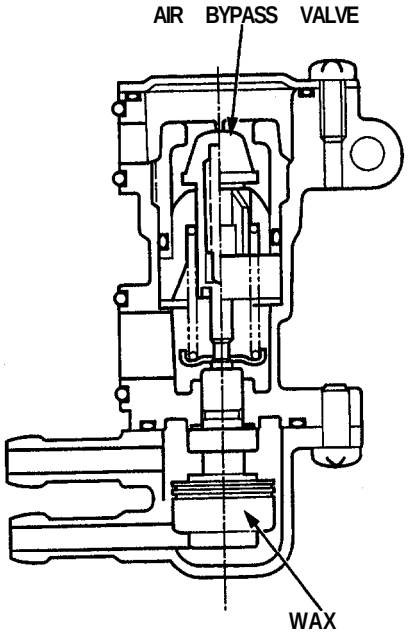
NOTE: Clutch pedal must be depressed on M/T models.

Fast Idle Valve

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle air bypass 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 manifold.

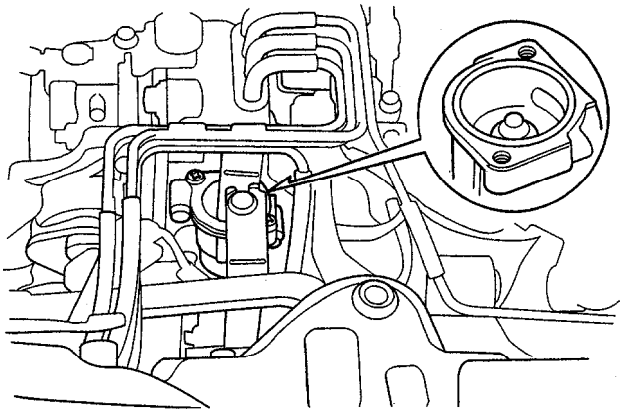




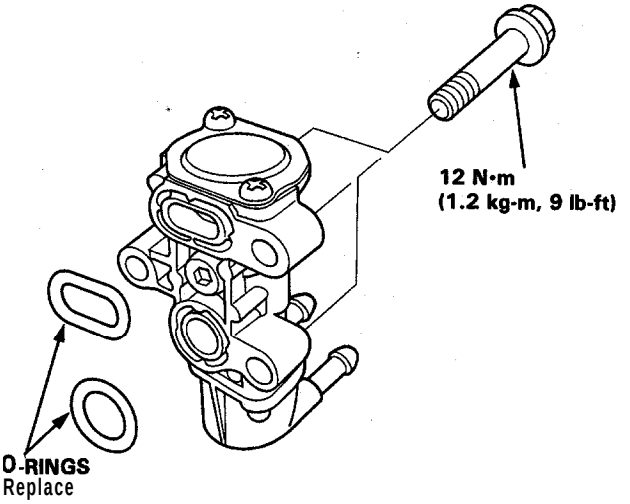
Inspection

NOTE: The fast idle valve is factory adjusted; it should not be disassembled.

1. Start the engine.
2. Remove the cover of the fast idle valve.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F) and idling.



- If not, replace the fast idle valve and retest.

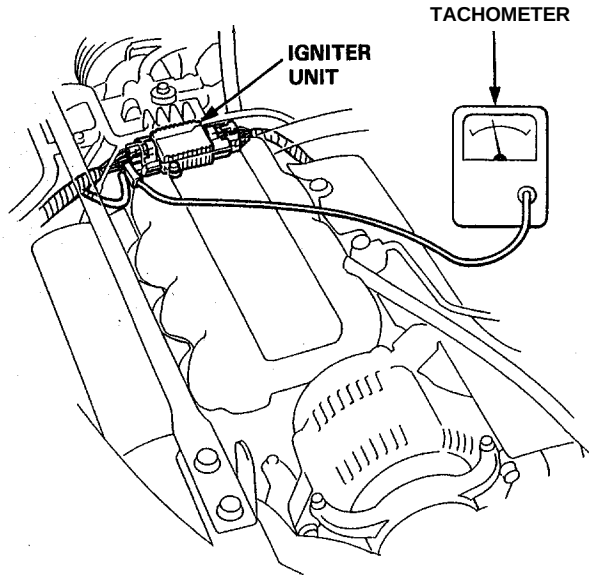


4. Warm up the engine (cooling fan comes on).
5. Check that the valve is completely closed. If not, air suction can be felt in the valve seat area.
   - If any suction is felt, the valve is leaking. Replace the fast idle valve and recheck.

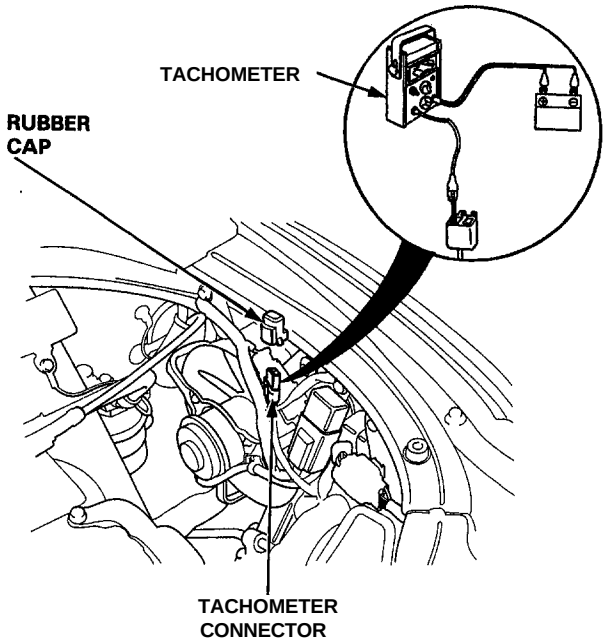
— Idle Speed Setting

Inspection/Adjustment

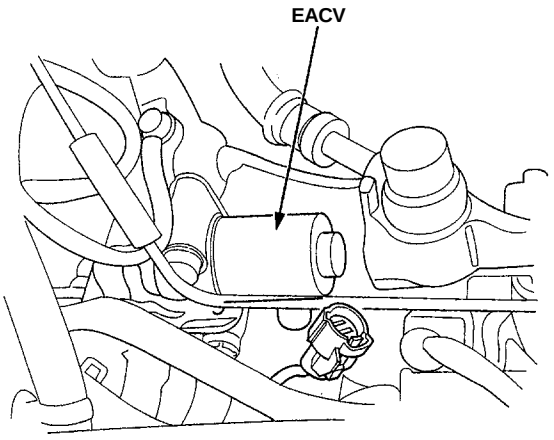
1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. **Connect a tachometer.**
   - **Connect a tachometer to loop of igniter unit secondary, or...**



   - **Remove the rubber cap from the tachometer** connector and connect a tachometer.



3. **Disconnect the 2P connector from the EACV.**

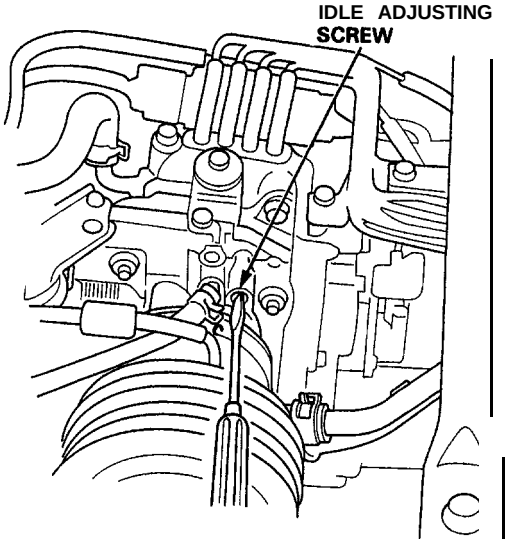


4. Start the engine with the accelerator pedal slightly **depressed. Stabilize the rpm at 1000, then slowly** release the pedal until the engine idles.
5. **Check idling in no-load conditions in which the** headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

Manual	650 ± 50 rpm
Automatic	600 ± 50 rpm (in gear)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.



6. **Turn the ignition switch OFF.**

7. **Reconnect the 2P connector on the EACV, then remove CLOCK fuse in the main relay box for 10 seconds to reset ECU.**

8. **Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.**

   Idle speed should be:

Manual	800 ± 50 rpm
Automatic	750 ± 50 rpm (in gear)

Fuel Supply System

System Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SUB SYSTEM / SYMPTOM		FUEL INJECTOR 89	INJECTOR RESISTOR 94	PRESSURE REGULATOR 95	FUEL FILTER 97	FUEL PUMP 98	MAIN RELAY 103	FUEL PUMP RELAY FUEL PUMP RESISTOR 106	CONTAMI-NATED FUEL
ENGINE WON'T START		③	③		③	①	②		③
DIFFICULT TO START ENGINE WHEN COLD OR HOT									①
ROUGH IDLE		①	②						③
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①	②	③		③		③	③
	FAILS EMISSION TEST	②	③	①					
	LOSS OF POWER	③	③		①	③		③	②

System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, fuel pump relay, fuel pump resistor, main relay, fuel filter, pressure regulator, injectors and injector resistor.

This system delivers pressure regulated fuel to the injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

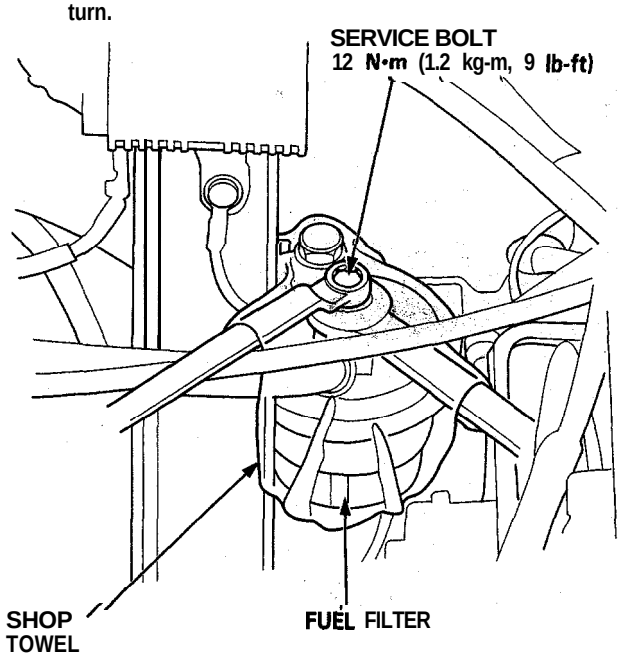
Relieving

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area.**
- **Be sure to relieve fuel pressure while the engine is Off.**

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt at top of the fuel filter.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Remove fuel filler cap.
3. **Use a box end wrench on the 6 mm service bolt al the fuel filter, while holding the special banjo bolt with another wrench.**
4. Place a rag or shop towel over the 6 mm service bolt.
5. 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 to relieve fuel pressure.
- **Replace all washers whenever the bolts are removed to disassemble parts.**

(cont'd)

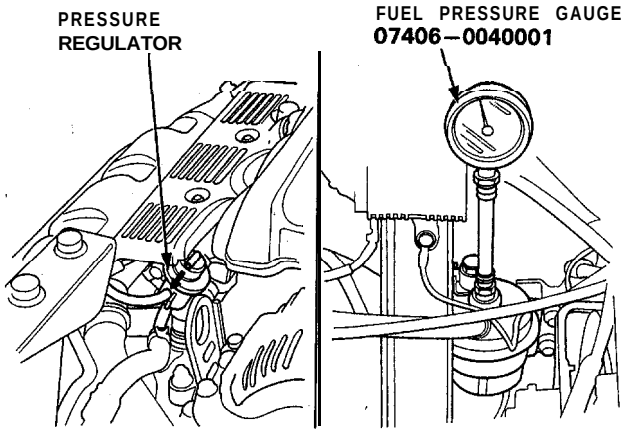
Fuel Pressure (cont'd)

Inspection

1. Relieve fuel pressure (page 1 I-87).
2. Remove the service bolt on the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
3. Start the engine. measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

   Pressure should be:
   323-363 kPa (3.30-3.70 kg/cm², 46-53 psi)
4. Reconnect vacuum hose to the pressure regulator.

   Pressure should be:
   250-304 kPa (2.55-3.10 kg/cm², 36-44 psi)



- If the fuel pressure is not as specified, first check the fuel pump (page 1 I-99). If the pump is OK, check the following:

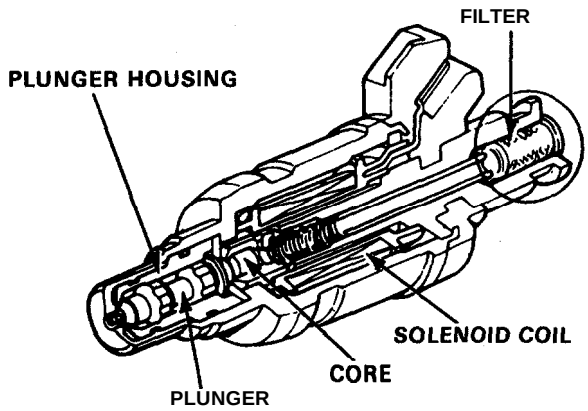
— If the pressure is higher than specified, inspect for:
  . Pinched or clogged fuel return hose or piping.
  . Faulty pressure regulator (page 1 I-95).
— If the pressure is lower than specified, inspect for:
  . Clogged fuel filter.
  . Pressure regulator failure (page 1 I-95).
  . Leakage in the fuel line.

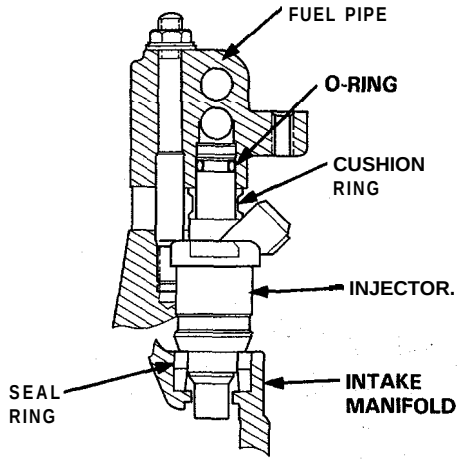
Fuel Injectors

Troubleshooting Flowchart

Self-diagnosis Check Engine light indicates code 16: A problem in the fuel injector circuit.

The injectors are the solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected close to the intake valve. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open (i.e., the duration the current is supplied to the solenoid coil). The injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.





CHECK 16

- Check Engine light has been reported on.
- With service check connector jumped (page 1 1-18), CODE 18 is indicated.

Do the ECU Reset Procedures (page 1 l-19).

Turn the ignition switch to START position.

s NO k Engine light on and does ate CODE 16?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at injectors, injector resistor and ECU.

YES

(To page 1 l-90)

(cont'd)

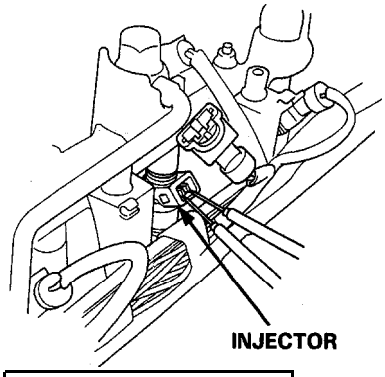
-Fuel Injectors (cont'd)

(From page 1 I-89)

Turn the ignition switch OFF.

Disconnect the 2P connector from the injector that does not click.

Measure resistance between the 2 terminals of the injector.



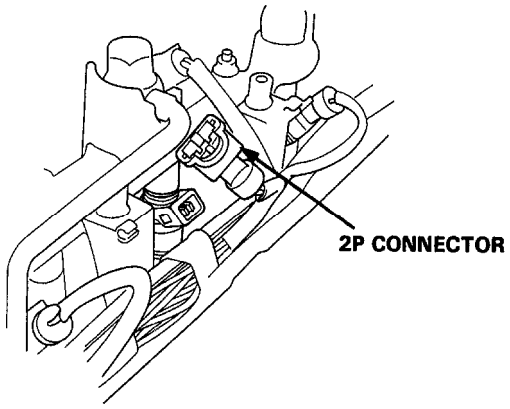
Is there 1.5—2.5Ω?

NO → Replace the injector/ injectors that are not 1,5—2,5Ω.

YES

Turn the ignition switch ON.

Measure voltage between RED/ BLK (+) terminal on the 2P connector and body ground.



Is there battery voltage ?

NO →

- Turn the ignition switch OFF.
- Disconnect 8P connector on the injector resistor.
- Turn the ignition switch ON.
- Measure voltage between YEL/ BLK (+) terminal and body ground.

YES

(To page 11-91)

(To page 11-91)

(From page 11-90)

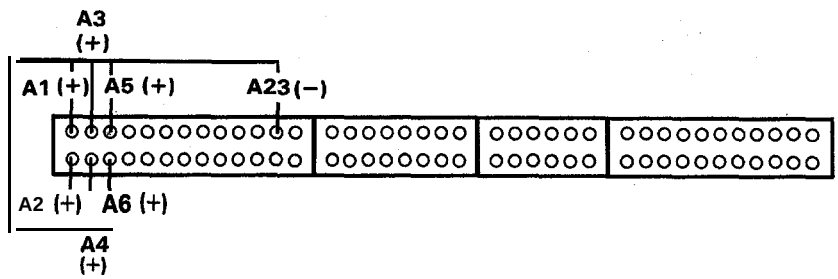
Reconnect the 2P connector to the injector.

Turn the ig nition switch OFF.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

Turn the ignition switch ON.

Measure voltage between A23 (−) terminal and following terminals.
- No. 1 injector: AI (+) terminal.
- No. 2 injector: A3 (+) terminal.
- No. 3 injector: A5 (+) terminal.
- No. 4 injector: A2 (+) terminal.
- No. 5 injector: A4 (+) terminal.
- No. 6 injector: A6 (+) terminal.



Is there battery voltage ? NO → Repair open in the wire between the ECU (A1, A3, A5, A2, A4 or A6) and the injector.

YES

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

(From page 11-90)

Is there battery voltage? NO → Repair open in the YEL/BLK wire between the injector resistor and the main relay.

YES

Test the of injector resistor (page 1 I-96)

Is the injector resistor testing OK? NO → Replace injector resistor.

YES

- Replace the injector resistor.
- Repair open RED/BLK wire between 2P connector and resistor.

(cont'd)

Fuel Injectors (cont'd)

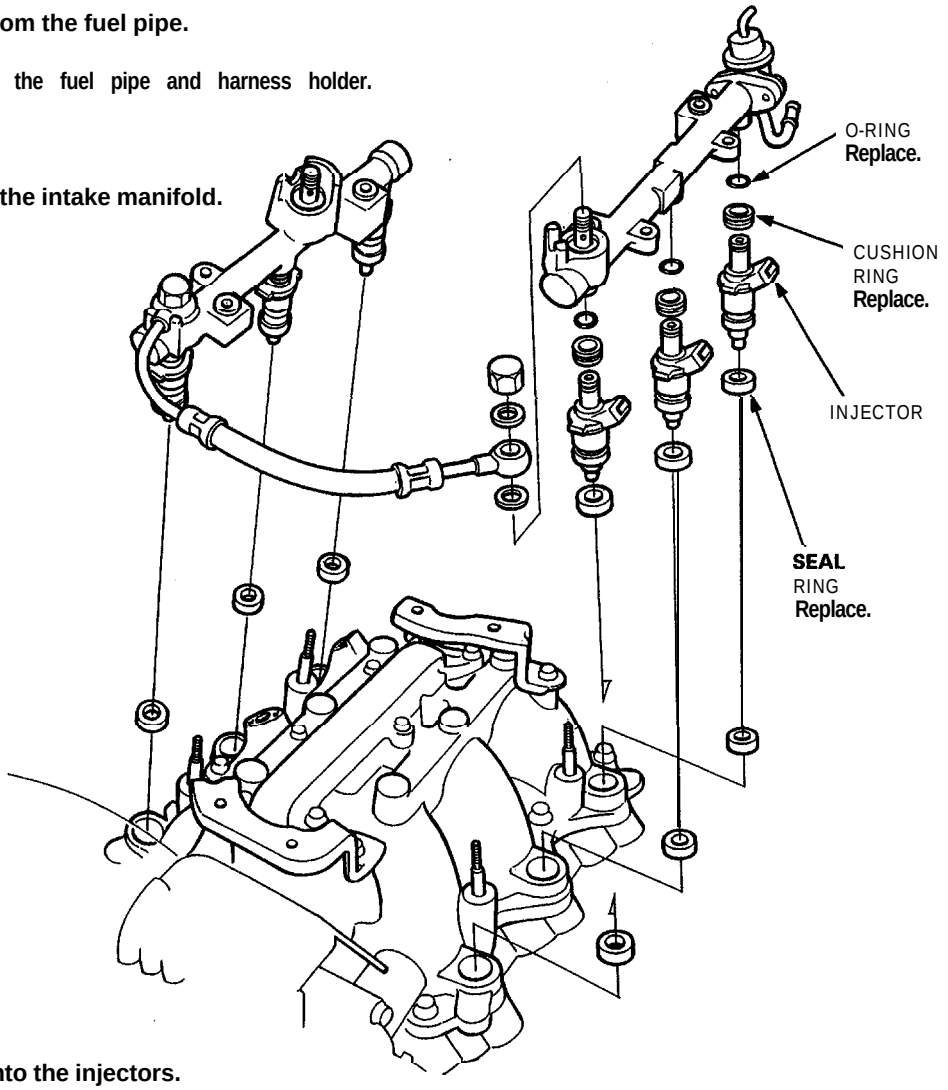
Replacement

⚠WARNING Do not smoke during the work. Keep open flames away from your work area.

1. Relieve fuel pressure (page 1 I-87).
2. Remove the intake manifold covers.
3. Disconnect the connectors from the injectors.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

   NOTE: Place a rag or shop towel over the hoses before disconnecting them.

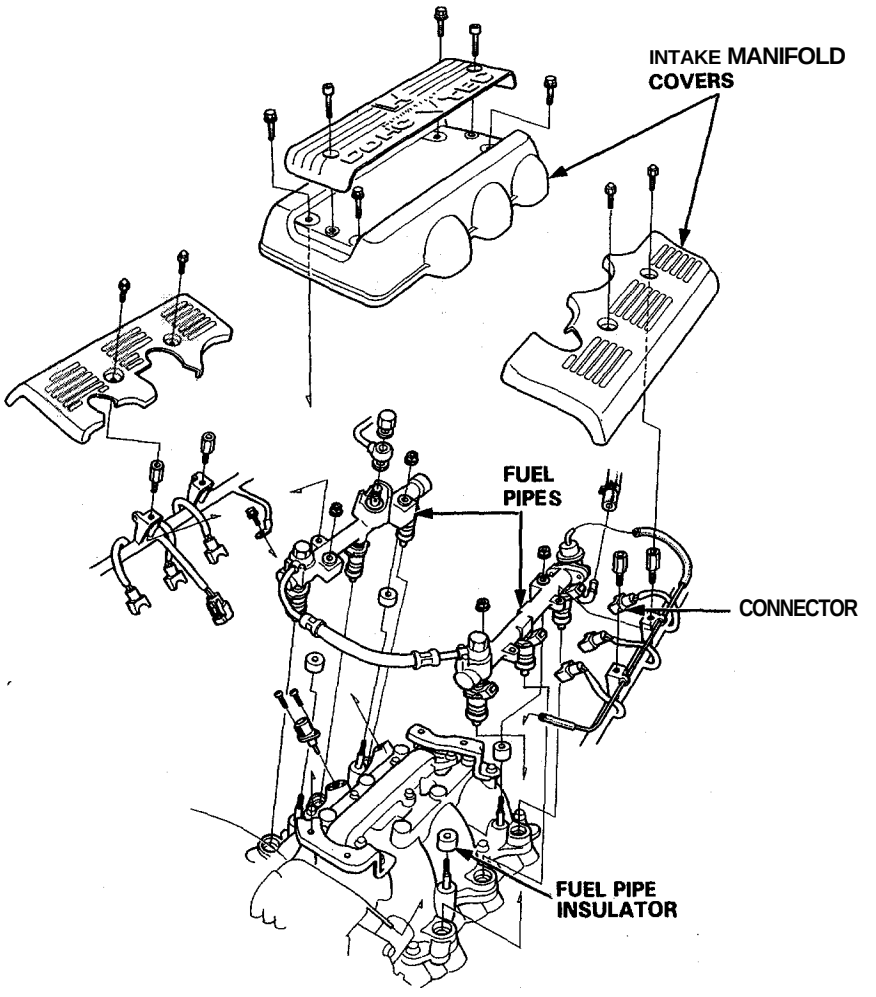
5. Disconnect the fuel hose from the fuel pipe.
6. Loosen the retainer nuts on the fuel pipe and harness holder.
7. Disconnect the fuel pipe.
8. Remove the injectors from the intake manifold.



9. Slide new cushion rings onto the injectors.
10. Coat new O-rings with clean engine oil and put them on the injectors.
11. Insert the injectors into the fuel pipe first.
12. Coat new seal rings with clean engine oil and press them into the intake manifold.

13. **install the injectors and fuel pipe assembly in the manifold.**

CAUTION: To prevent damage to the O-ring, install the injectors in the fuel pipe first, then install them in the intake manifold.



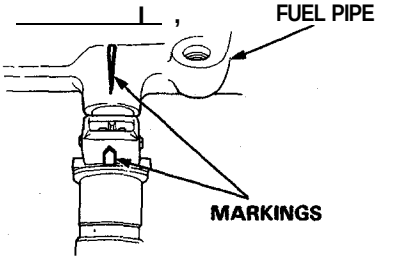
14. **Align the center line on the connector with the mark on the fuel pipe.**

15. **Install and tighten the retainer nuts.**

16. **Connect the fuel hose to the fuel pipe.**

17. Connect the vacuum hose and fuel return hose to the pressure regulator.

18. **Install the connectors on the injectors.**



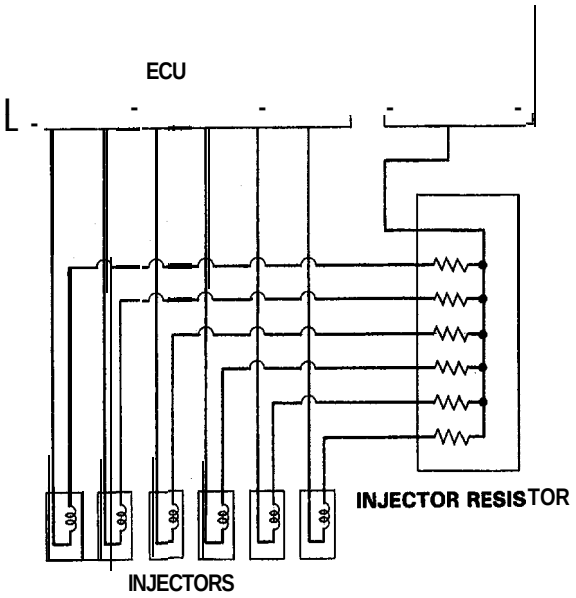
19. Install the intake manifold covers.

20. Turn the ignition switch ON 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.

- Injector Resistor

Description

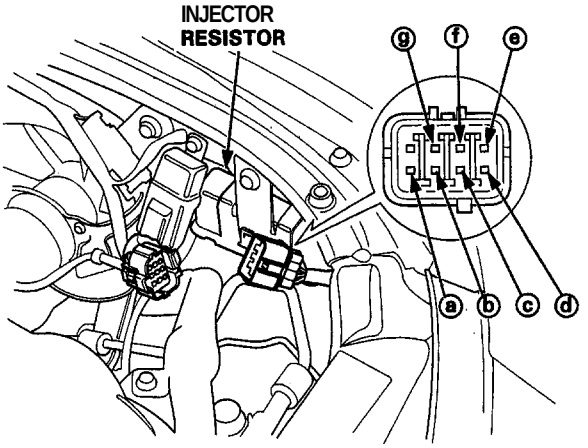
The resistor lowers the current supplied to the injectors to prevent damage to the injector coils. This allows a faster response time of the injectors.

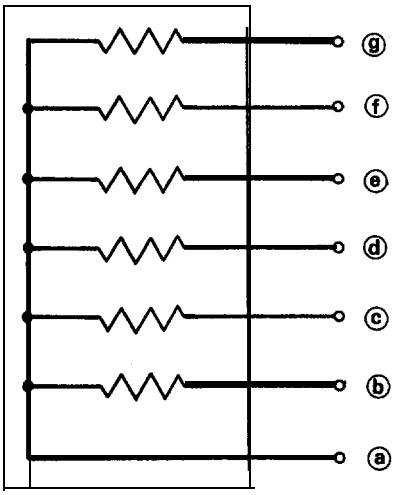


Testing

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (b, c, d, e, f and g) and the power terminal (a).

   Resistance should be: 5-7 Ω





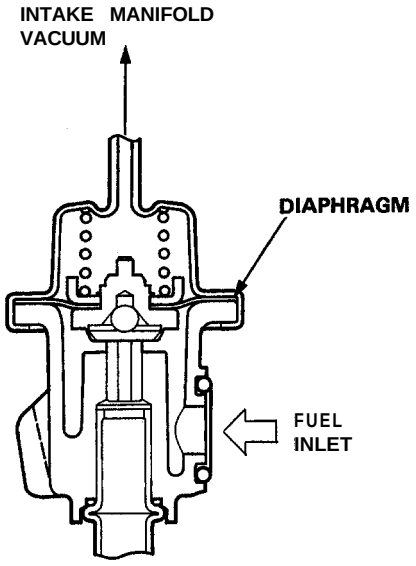
- Replace the resistor with a new one if any of the resistances are outside of the specification.

Pressure Regulator

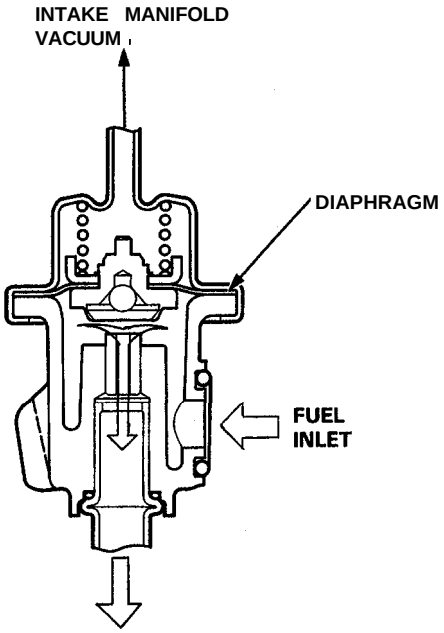
Description

The fuel pressure regulator maintains a constant fuel pressure to the injectors. When the difference between **the fuel pressure and manifold pressure exceeds 3.5 kg/cm* (50 psi), the diaphragm is pushed upward, and** the excess fuel is fed back into the fuel tank through the return line.

CLOSE



OPEN



Testing

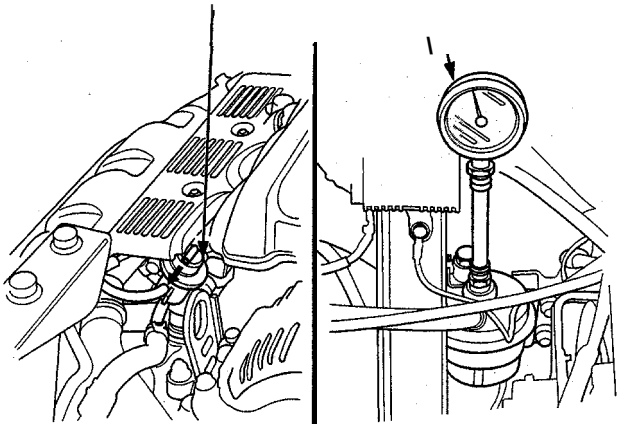
⚠ WARNING **Do not smoke during the test. Keep** open flames away from your work area.

1. Attach a pressure gauge to the service port of the **fuel filter (page 1 l-88).**

   Pressure should be:
   323-363 kpa (3.30-3.70 kg/cm², 46-53 psi)
   (with the regulator vacuum hose disconnected)

PRESSURE REGULATOR

FUEL PRESSURE GAUGE
07406–0040001



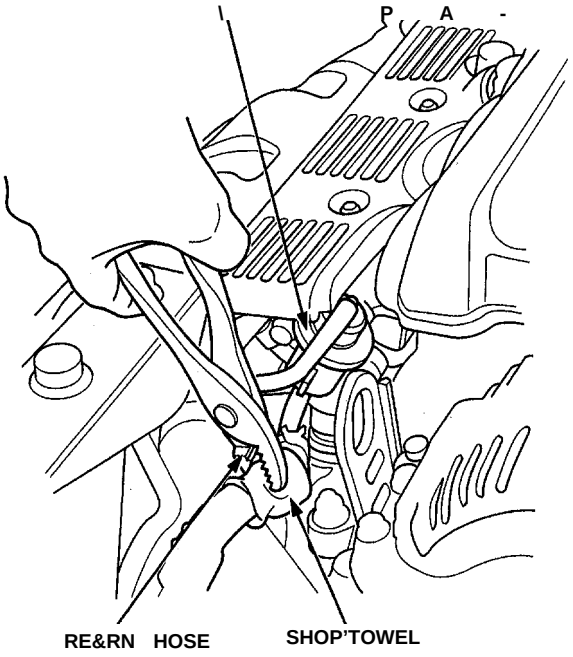
2. **Reconnect the vacuum hose to the pressure** regulator.

(cont'd)

Pressure Regulator (cont'd)

3. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected again.
   - If the fuel pressure did not rise, check to see if it rises with the fuel return hose lightly pinched.
   - If the fuel pressure still does not rise, replace the pressure regulator.

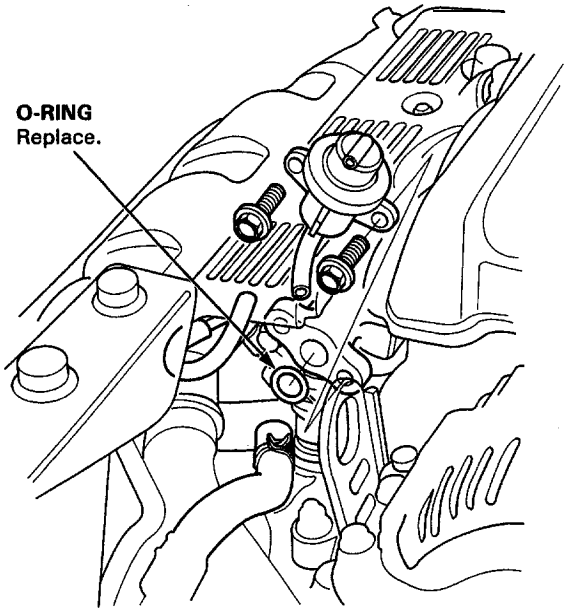
PRESSURE REGULATOR



Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 1 l-87).
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 regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

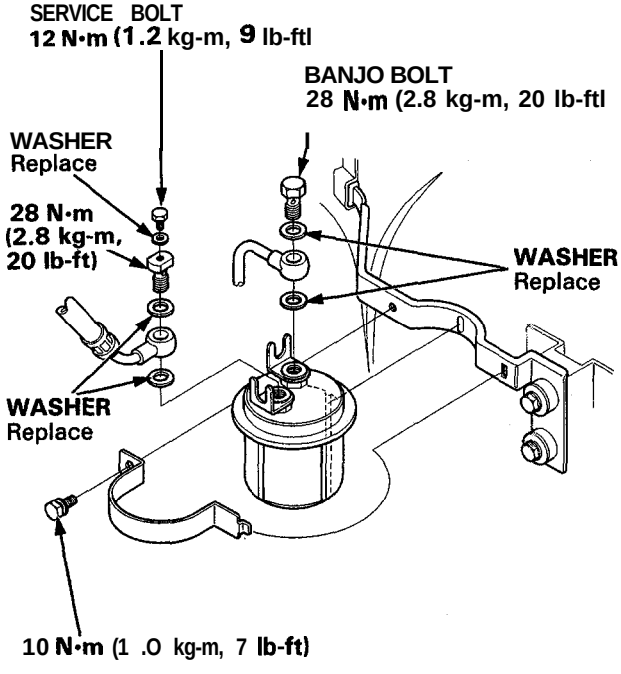
-Fuel Filter

Replacement

⚠ WARNING **Do not smoke while working on fuel system. Keep open flame away from work area.**

The filter should be replaced: every 4 years or 60,000 miles (96,000 km), whichever comes first or whenever the fuel pressure drops below the specified value (323-363 kPa, 3.30-3.70 kg/cm², 46-53 psi with the pressure regulator vacuum hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (page 1 I-87).
3. **Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.**
4. **Remove the fuel filter clamp and fuel filter.**
5. When assembling, use new washers, as shown.

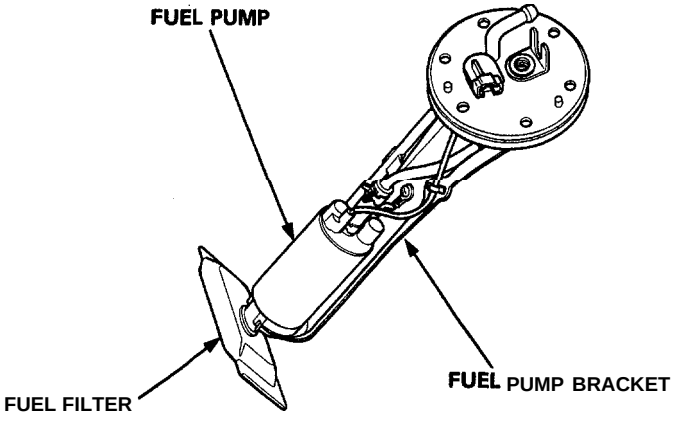


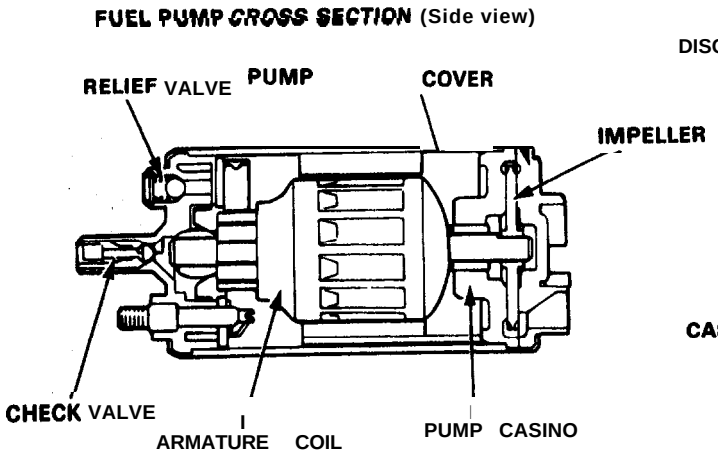
Fuel Supply System

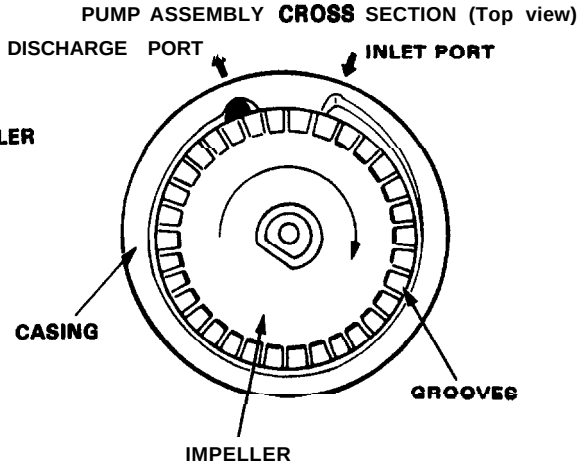
Fuel Pump

Description

Because of its compact impeller design, the fuel pump is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.







The fuel pump is comprised of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet port, and a discharge port. The pump assembly consists of the impeller (driven by the motor), the pump casing (which forms the pumping chamber), and the pump cover.

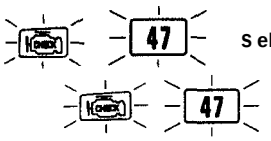
OPERATION

(1) When the engine is started, the main relay actuates the pump, and the motor turns together with the impeller. Differential pressure is generated by the numerous grooves around the impeller.

(2) Fuel entering the inlet port flows inside the motor from the pumping chamber and is forced through the discharge port via the check valve.
If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.

(3) When the engine stops, the pump stops automatically. However, a check valve closes by spring action to retain the residual pressure in the line, helping the engine to restart more easily.

Troubleshooting Flowchart



Self-diagnosis Check Engine light indicates code 47: A problem in the fuel Pump circuit.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 47 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch to START position.

Does the engine start?

NO → Inspect the fuel pump resistor (page 11-108).

YES

Warm up engine to normal operating temperature (cooling fan comes on).

Is the check Engine light on and does it indicate CODE 47?

NO → Turn the ignition switch OFF.

YES

Disconnect #4 hose from the install pipe, connect vacuum pump to the hose.

Apply vacuum 300 to 400 mmHg.

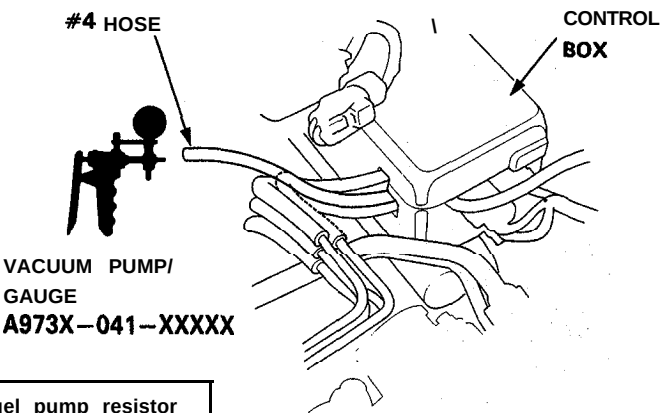
Start the engine

Hold engine speed at 6500 rpm for 10 seconds.

Is the check Engine warning light on and does it indicate CODE 47?

NO → Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at fuel pump, main relay, fuel pump relay and fuel pump resistor.

YES



(To page 11-100)

(To page 11-100)

(cont'd)

· Fuel Pump (cont'd)

(From page 1 1-99)

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 1 I-211.

Start the engine.

Measure the voltage between D6 (+) terminal and A23 (−) terminal.

Is there voltage?

NO → Repair open in BLK/RED wire between ECU (D6) and fuel pump resistor.

YES

Install a jumper wire between A8 terminal and A24 terminal on the ECU test harness.

Measure the voltage between D6 (+) terminal and A23 (−) terminal.

Is there battery voltage?

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

NO

Turn the ignition switch OFF.

Remove a jumper wire from the ECU test harness.

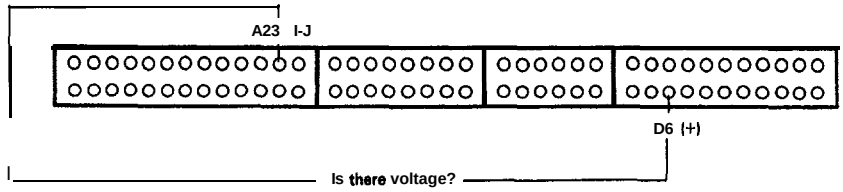
Disconnect "A" connector from the ECU only, not the engine wire harness.

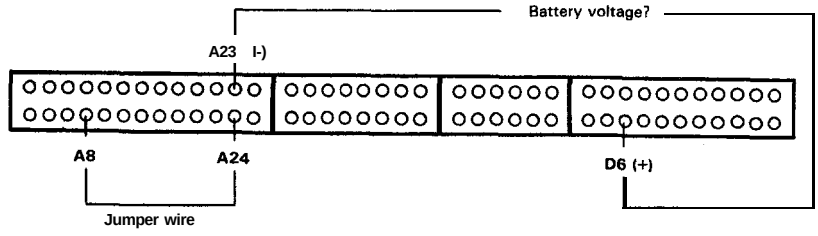
Turn the ignition switch ON.

(To page 11-101)

(From page 1 I-99)

Connect the ECU test harness between the ECU and connector (page 11-21).





(From page 1 I-100)

Measure the voltage between A8 (+) terminal and A23 (−) terminal.

Is there battery voltage? YES → Replace Fuel Pump Relay.

NO

Turn the ignition switch OFF.

Install a jumper wire" between YEL (+) terminal and RED (−) terminal on the fuel pump relay connector.

Turn the ignition switch ON.

Measure the voltage between A8 (+) terminal and A23 (−) terminal.

Is there battery voltage? YES → Replace fuel pump relay..

NO

Remove a jumper wire.

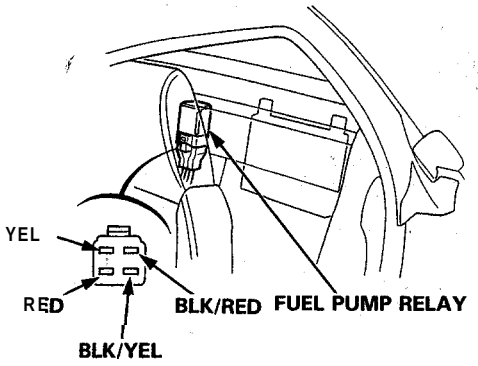
Measure the voltage between YEL (+) terminal (on the fuel pump relay connector) and body ground (−).

CAUTION:
*the "A" connector must be **disconnected** for this test or the ECU will be damaged.

Is there battery voltage? NO → Repair open in YEL wire between No. 5 fuse and fuel pump relay.

YES

Repair open in RED wire between ECU (A8) and fuel pump relay.



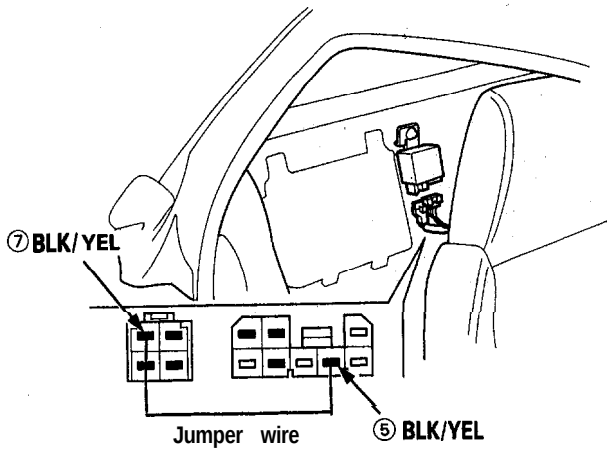
(cont'd)

Fuel Pump (cont'd)

Testing

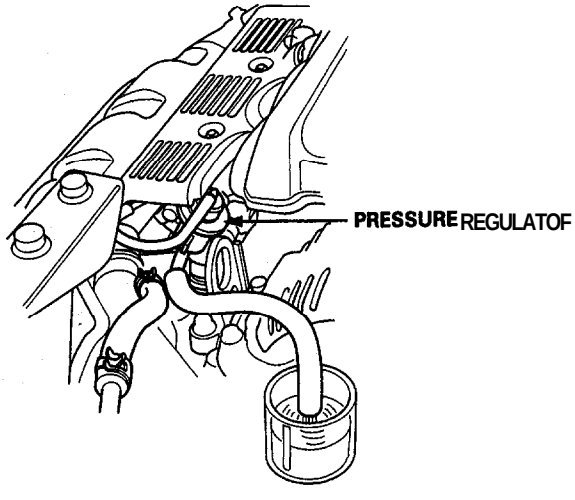
⚠ WARNING **Do not smoke during the test. Keep open flame away from your work area.**

1. With the ignition switch OFF, disconnect the main relay connector.
2. Connect a jumper wire between the BLK/YEL wire ⑤ and BLK/YEL wire ⑦.



3. Relieve fuel pressure as described on page 1 I-87 then tighten the service bolt.
4. Disconnect the fuel return hose from the regulator.
5. Turn the ignition switch' ON for 10 seconds and measure the amount of fuel flow.

   Amount should be:
   333 cm^3 (11.2 oz) min. in 10 seconds at 12 V

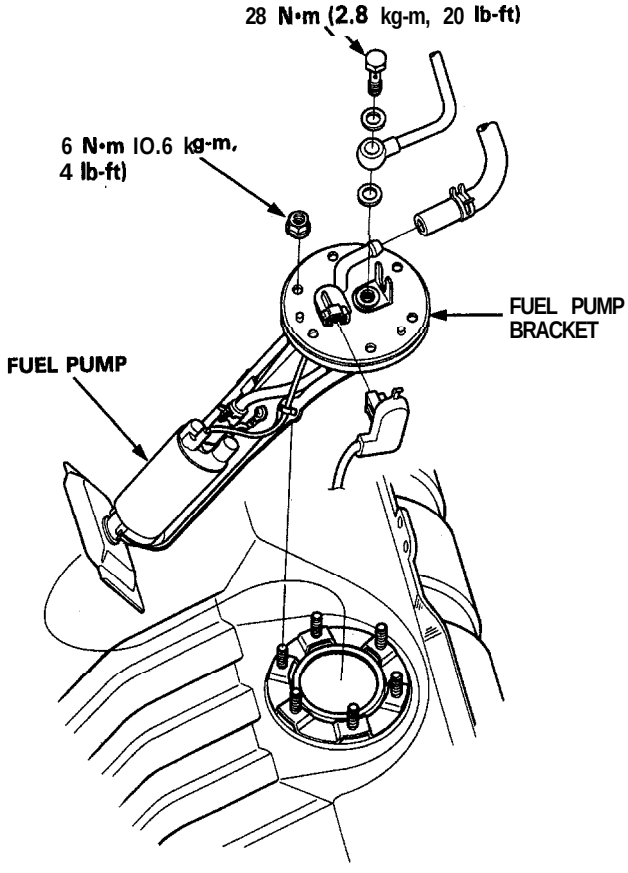


- If fuel flow is less than 333 cm^3 (11.2 oz), or there is no fuel flow, check for:
  - Clogged fuel filter.
  - Clogged fuel line.
  - Pressure regulator failure (page 1 I-95).

Replacement

⚠ WARNING **Do not smoke while working on fuel system. Keep open flames away from your work area.**

1. Remove the fuel tank (page 1 I-108).
2. Disconnect the connector from the fuel pump.
3. Remove the fuel pump mounting nuts.
4. Remove the fuel pump from the fuel tank.



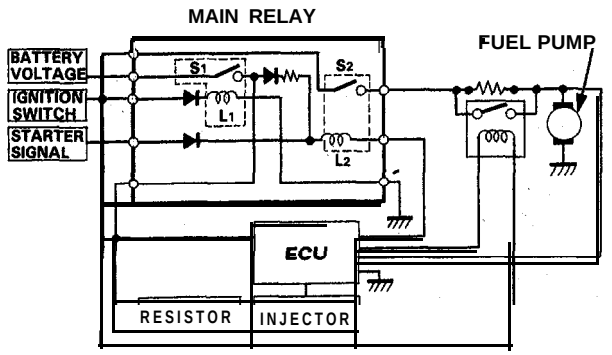
Main Relay

Description

The main relay actually contains two individual relays. This relay is installed behind the passengers seat back panel.

One relay is energized whenever the ignition is on which **supplies the battery voltage to the ECU, power to the injectors, and power for the second relay.**

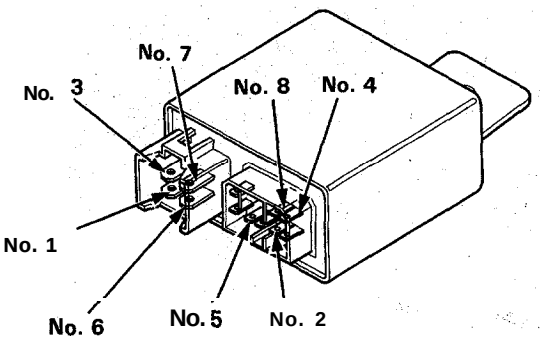
The second relay is energized for 2 seconds when the ignition is switched on, and when the engine is running **which supplies power to the fuel pump.**

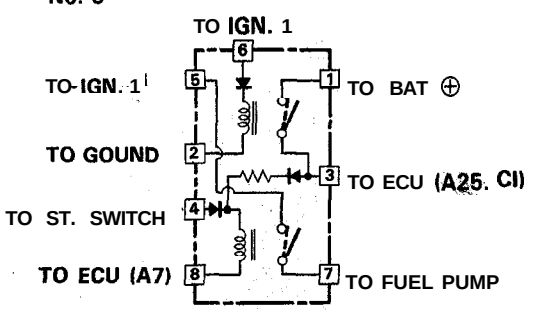


Relay Testing

NOTE: If the car starts and continues to run, the main relay is OK.

1. Remove the main relay.
2. **Attach the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.**
   - **If there is continuity, go on to step 3.**
   - **If there is no continuity, replalce the relay and** retest.





3. **Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the 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. 3** terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity of the main relay. Then check that there **is continuity between the No. 5 terminal and No. 7** terminal of the main relay.
   - **If there is continuity, the relay is OK;**
     If the fuel pump still does not work, go to Harness Testing in the next column.
   - **If there is no continuity, replace the relay and** retest.

(cont'd)

-Main Relay (cont'd)

Troubleshooting Flowchart

- Engine will not start
- inspection of main relay.

Disconnect the main relay connectors.

Measure the voltage between YEL/BLU terminal ① and body ground.

Is there battery voltage? NO → Replace ACG fuse.

YES

Turn the ignition switch ON.

Measure the voltage between BLK/YEL terminal ⑤ and body ground.

Is there battery voltage? NO → Replace No. 2 fuse.

YES

Measure the voltage between BLK/YEL terminal ⑥ and body ground.

Is there battery voltage? NO → Replace IG COIL fuse.

YES

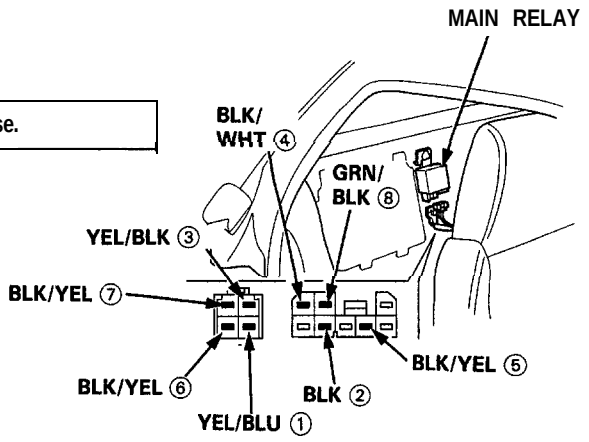
Turn the ignition switch START position.

Measure the voltage between BLK/WHT terminal ④ and body ground.

Is there battery voltage? NO → Replace No. 7 fuse.

YES

(To page 1 I-105)



(From page 1 1 - 104)

Turn the ignition switch off.

Connect the ECU test harness between the ECU and connector. Disconnect "A" connector from the engine wire harness only, not the ECU (page 1 1-21).

Check for continuity between GRN/BLK terminal ⑧ and A7 terminal.

Does continuity exist?

NO → Repair open in GRN/BLK wire between ECU (A71 and Main Relay.

YES

battery voltage?

n

A23 (–) A25 (+)

Turn the ignition switch ON.

Measure the voltage between A25 (+) terminal and A23 (–) terminal.

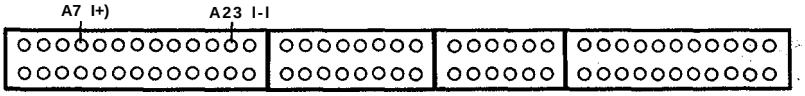
Is there battery voltage?

NO → Replace main relay.

YES

1 v or less?

A7 I+) A23 I-I



Measure the voltage between A7 (+) terminal and A23 (–) terminal.

Is there 1 V or less? (for 2 seconds)

NO → Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Replace main relay.

-Fuel Pump Resistor

Troubleshooting Flowchart

- Engine will not start.
- Inspection of fuel pump resistor.

Disconnect the fuel pump resistor connector.

Turn the ignition switch ON.

Measure the voltage between BLK/YEL (+) (on harness side1 and body ground (–).

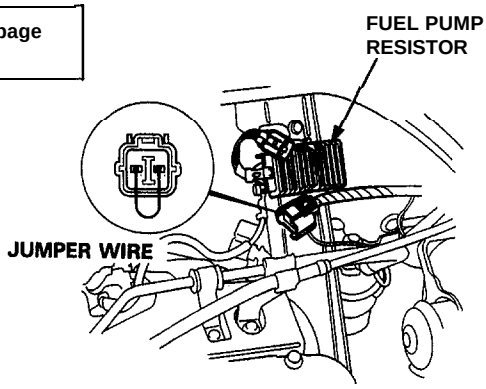
Is there battery voltage? (for 2 seconds)

NO → Inspect the main relay (page 11-104)

YES

Turn the ignition switch OFF.

Install a jumper wire between two terminals on the wire harness side of fuel pump resistor.



Turn the ignition switch to START position.

Does the engine start?

YES → Replace fuel pump resistor.

NO

Turn the ignition switch OFF.

Disconnect the fuel pump connector.

Turn the ig nitio n switch ON.

(To page 1 l-107)

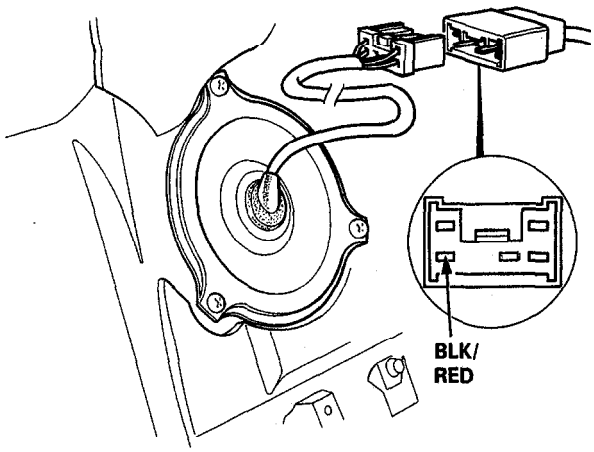
(From page 1 I-106)

Measure the voltage between BLK/RED (+) (on wire harness side of fuel pump) and body ground.

Is there battery voltage? (for 2 seconds)

YES → Inspect the fuel pump (page 1 I-102)

NO → Repair open in **BLK/RED** wire between the fuel pump resistor and the fuel pump.



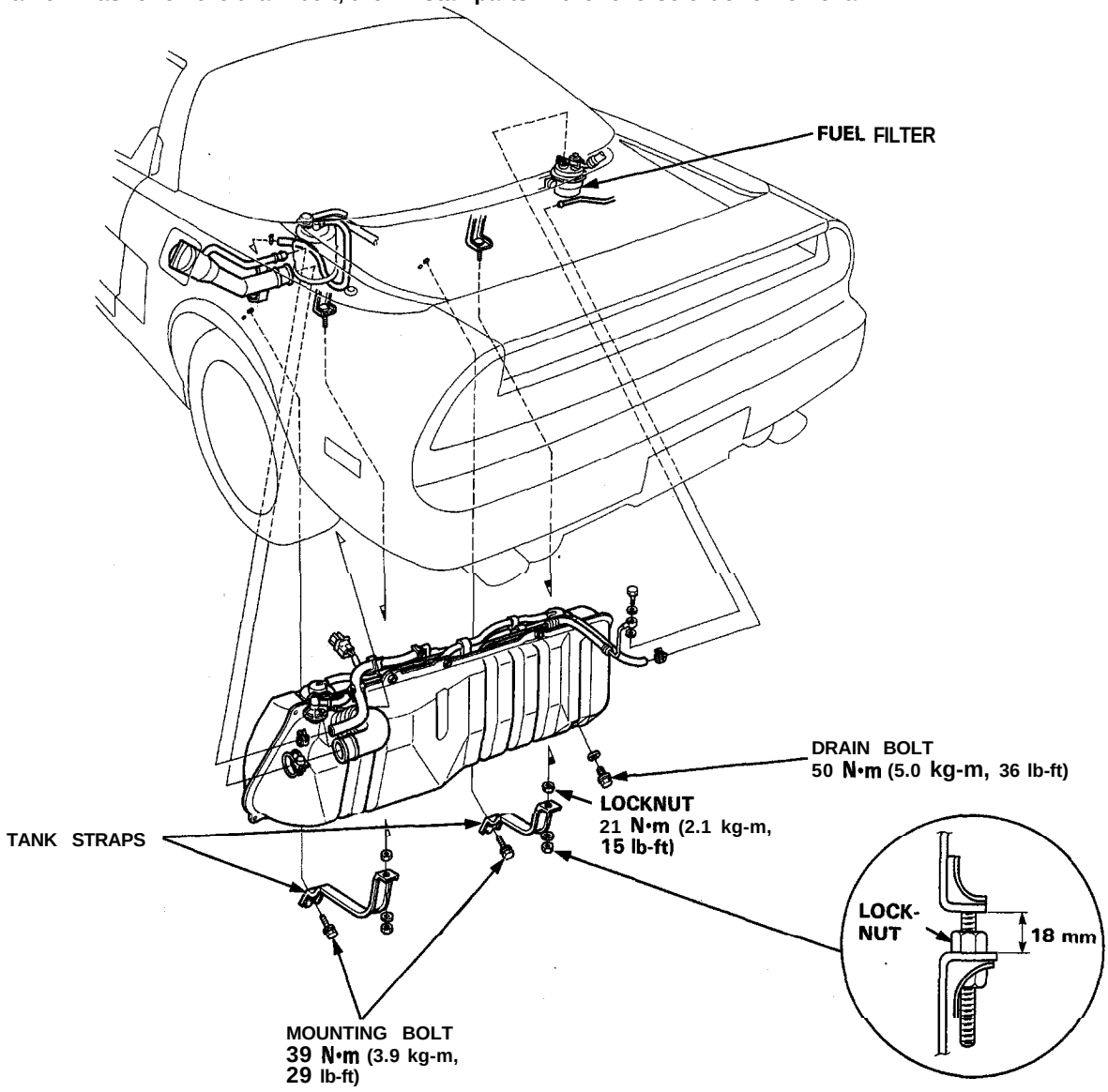
- Fuel Tank

Replacement

⚠ WARNING

- **Do not smoke while working on fuel system. Keep open flame away from work area.**
- **Make sure lifts are placed properly. (See page I-6.)**

1. **Raise the car.**
2. **Remove the drain bolt and drain the fuel into an approved container.**
3. **Remove the center rod (Section 5).**
4. **Disconnect the M/T shift cable and M/T clutch cable or A/T shift cable from the transmission (Section 14).**
5. **Disconnect the 6P connector from the fuel tank.**
6. **Disconnect the hoses.**
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
7. **Place a jack, or other support, under the tank.**
8. **Remove the strap bolts and nuts, and let the straps fall free.**
9. **Remove the fuel tank.**
   NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount,
10. **Install a new washer on the drain bolt, then install parts in the reverse order of removal.**



Air Intake System

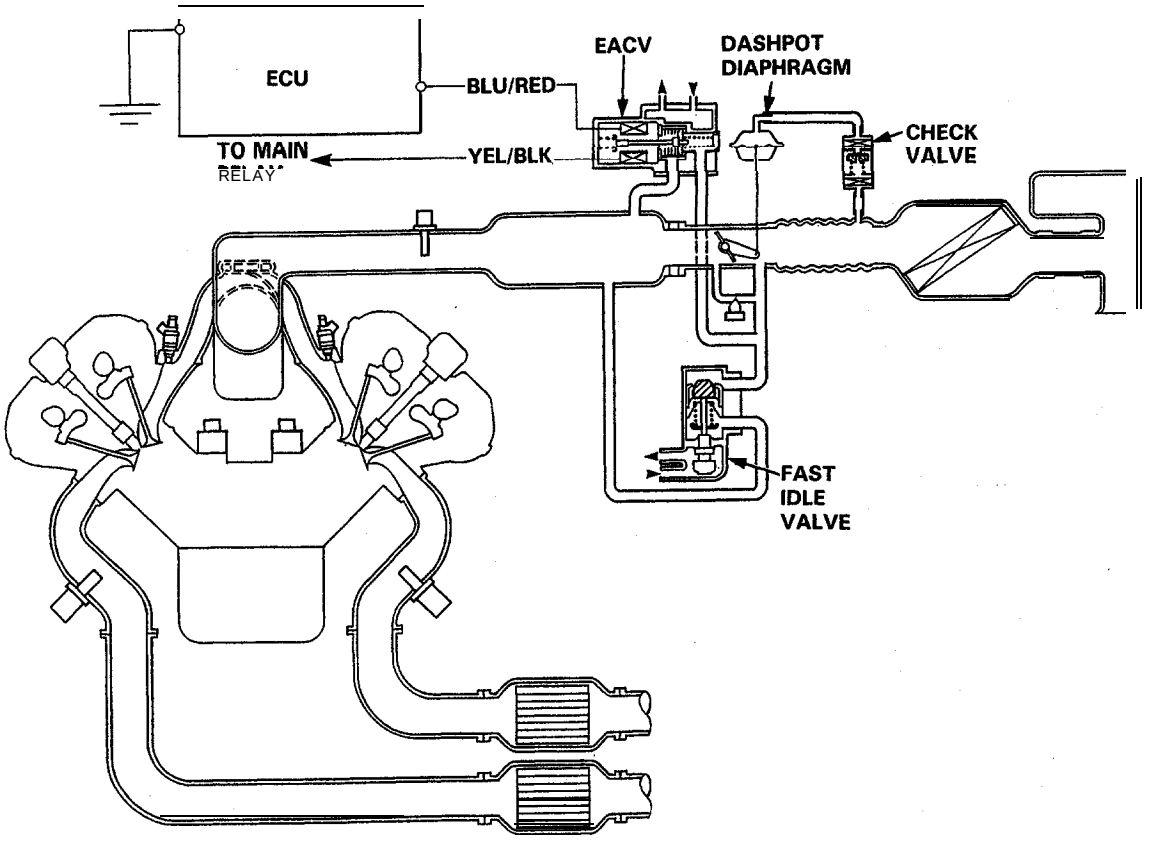
System Troubleshooting Guide

NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.

PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	DASHPOT SYSTEM	CHAMBER VOLUME CONTROL SYSTEM
	113	114	117	119
WHEN COLD FAST IDLE OUT OF SPEC	③	②		①
WHEN WARM RPM TOO HIGH	②	①	③	
LOSS OF POWER		①		②

System Description

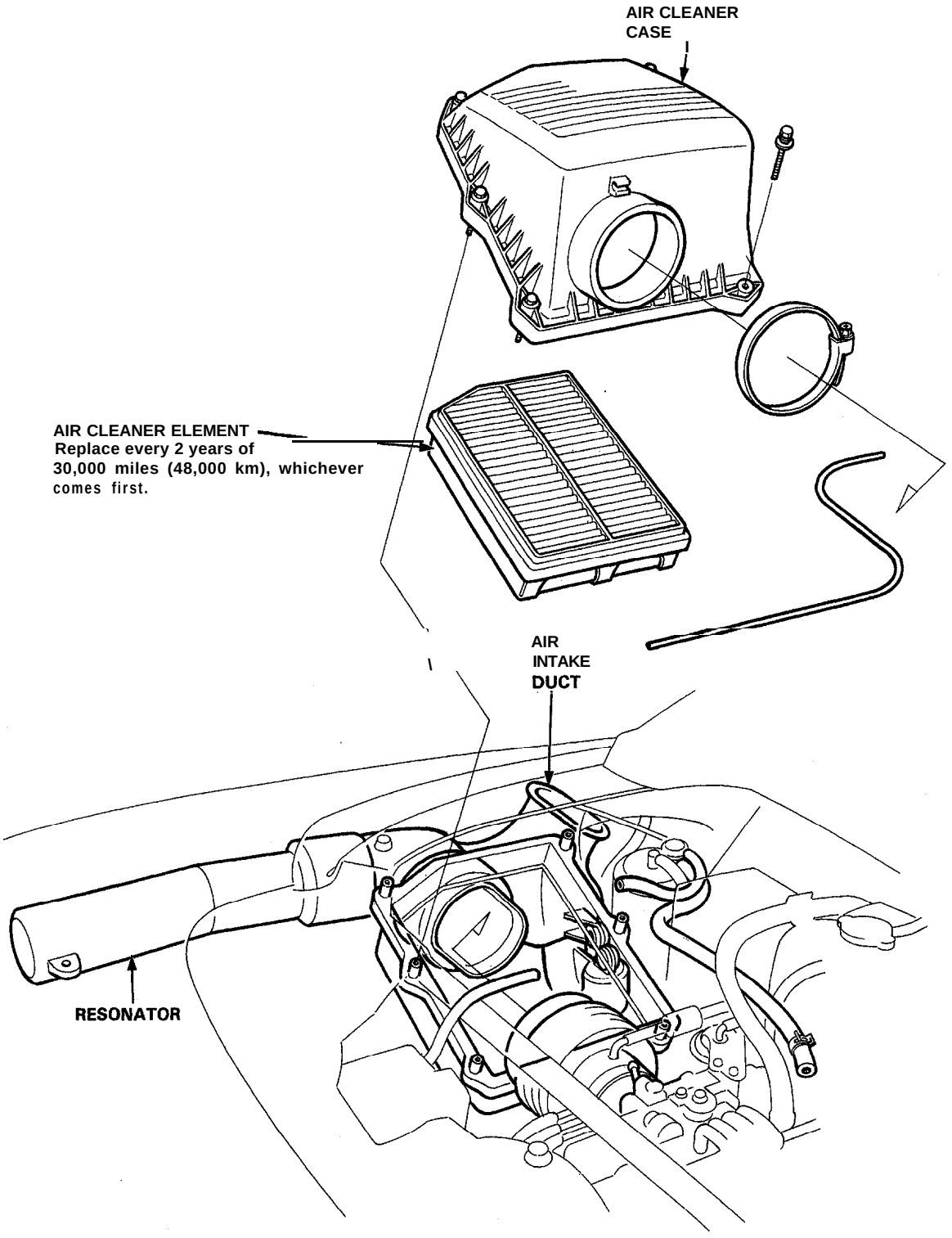
The system supplies air for all engine needs. It consists of the air cleaner, air intake pipe, throttle body, EACV, fast idle mechanism, and intake manifold. A resonator in the air intake pipe provides additional silencing as air is drawn into the system.



Air Intake System

Air Cleaner

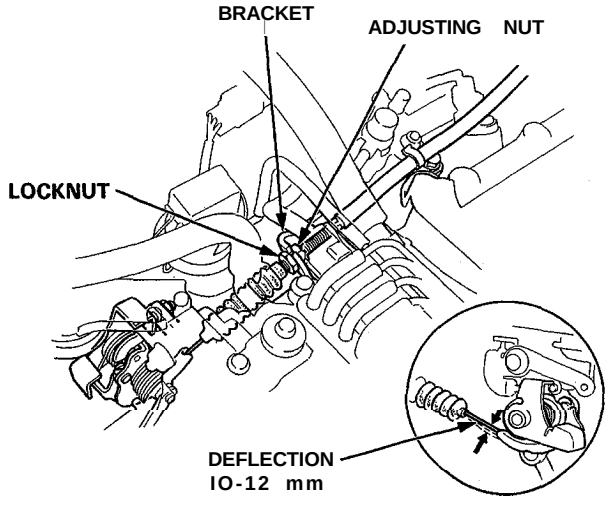
Air Cleaner Element Replacement



Throttle Cable

Inspection/Adjustment

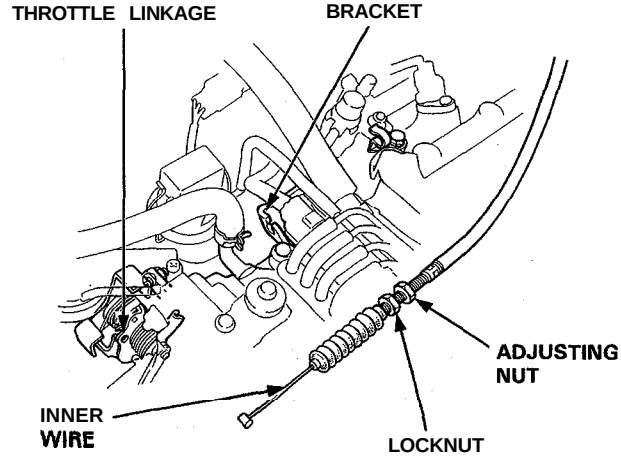
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be IO- 12 mm (0.39-0.47 in.)



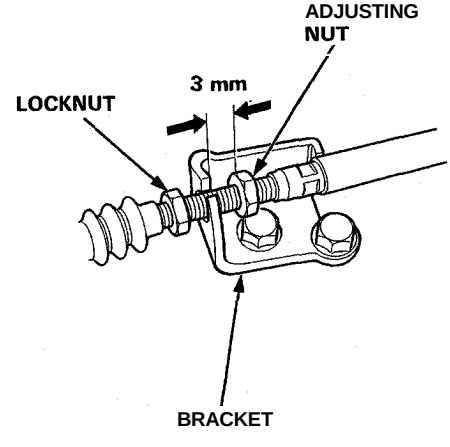
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

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. Warm up the engine to normal operating temperature (the cooling fan comes on).



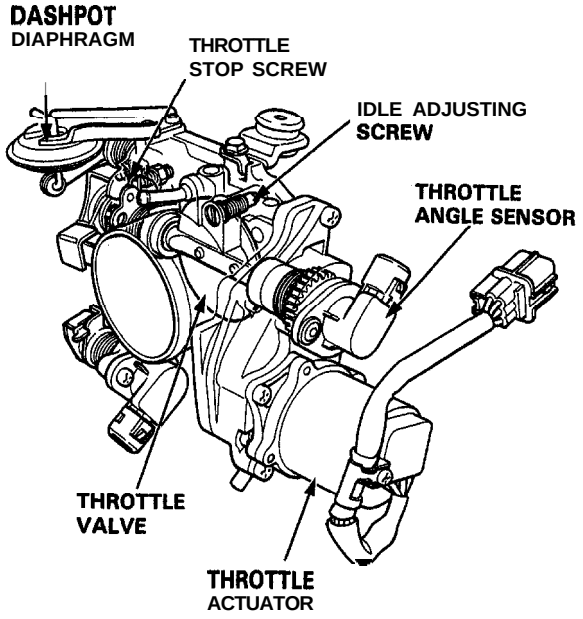
3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be IO- 12 mm. If not, see Inspection/ Adjustment.



Throttle Body

Description

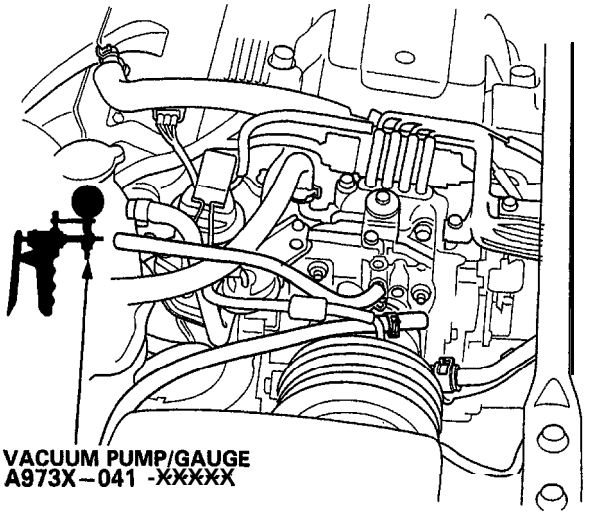
The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant which is fed from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the canister/purge port are located on the top of the throttle body. A dashpot is used to slow the throttle as it approaches the closed position.



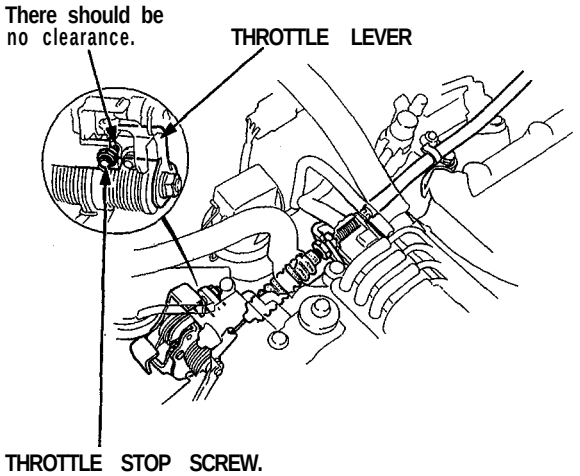
Inspection

CAUTION: Do not adjust the throttle stop screw since it preset at the factory.

1. Start the engine and allow it to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates no vacuum.
   - If there is vacuum, check the throttle cable (page 1 l-l 13).
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.

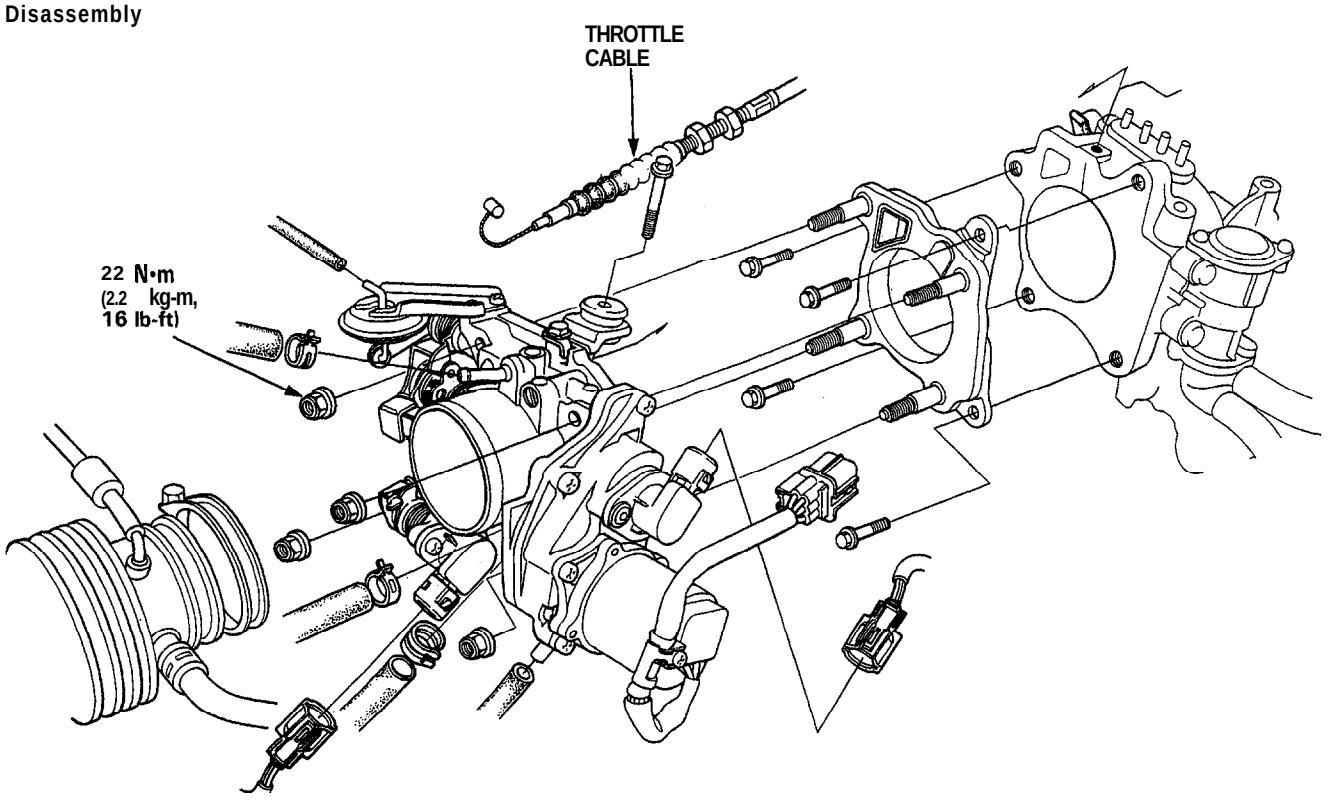


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

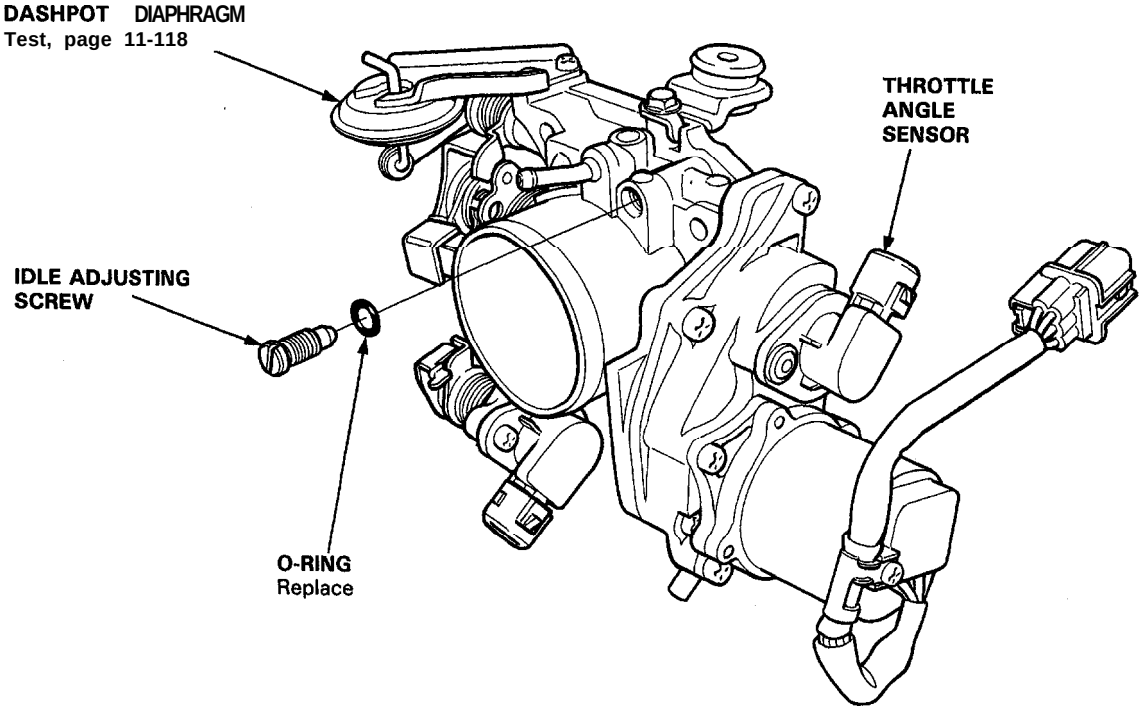
-Throttle Body (cont'd)

Disassembly



CAUTION:

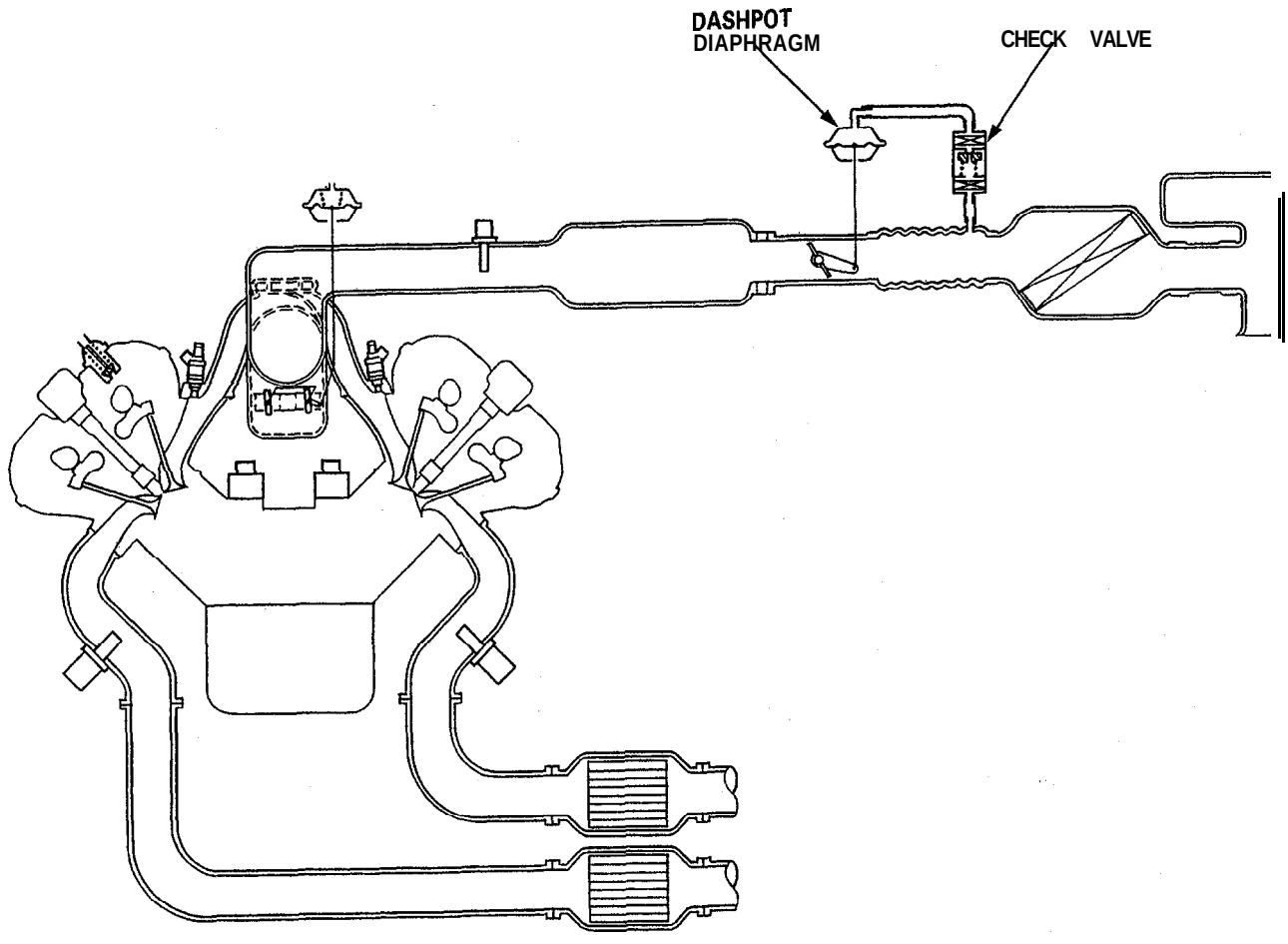
- The throttle stop screw in non-adjustable.
- **After reassembly, adjust the throttle cable (page 11-113).**



· Dashpot System

Description

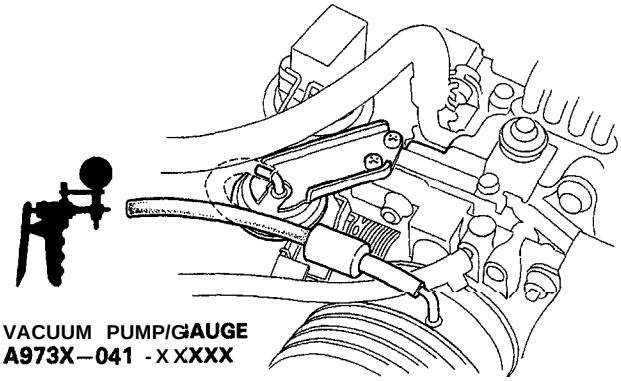
The dashpot is employed to slow the closing of the throttle valve during gear shifting or deceleration.



Dashpot System

Testing

1. Check the vacuum line for leaks, blockage or a disconnected hose.
2. Disconnect the vacuum hose from the dashpot diaphragm, and connect a vacuum pump to the hose.



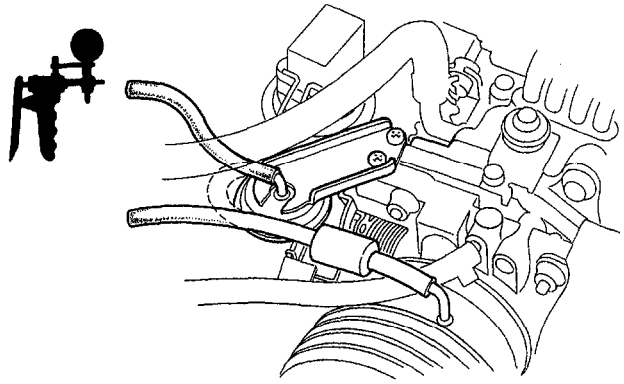
VACUUM PUMP/GAUGE
A973X–041 -XXXXX

3. Apply vacuum and check the speed the vacuum goes out.

   Vacuum should go out slowly.

   - If the vacuum holds or goes out quickly, replace the dashpot check valve and retest.

4. Connect a vacuum pump to the dashpot diaphragm.



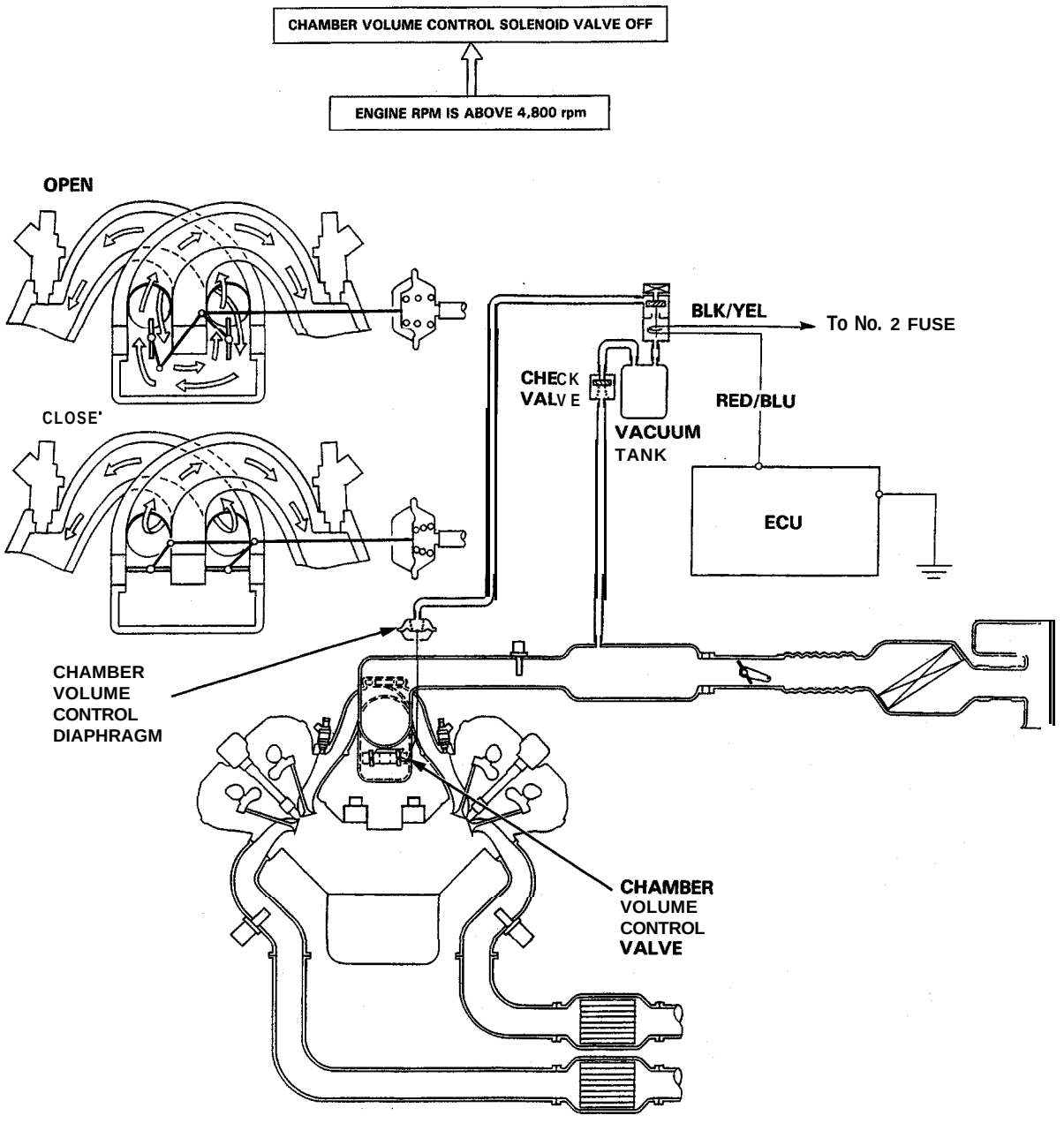
5. Apply vacuum and check that the rod pulls in and vacuum holds.

   - If the vacuum does not hold or the rod does not move, replace the dashpot diaphragm and retest.

Chamber Volume Control System

Description

Satisfactory power performance is achieved by closing and opening the chamber volume control valves. High torque at low RPM is achieved when the valves are closed, whereas high power at high RPM is achieved by when the valves are opened.

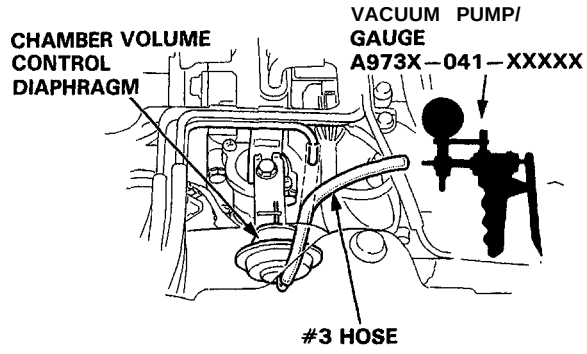


(cont'd)

Air Intake System

Chamber Volume Control System (cont'd)

Troubleshooting Flowchart



Inspection of Chamber Volume Control System.

Start engine and allow it to idle.

Remove # 3 vacuum hose from the chamber volume control diaphragm and connect vacuum gauge to the hose.

Is there vacuum?

NO

Disconnect the lower hose on chamber volume control solenoid valve in the control box and connect a vacuum gauge to the hose.

Is there vacuum?

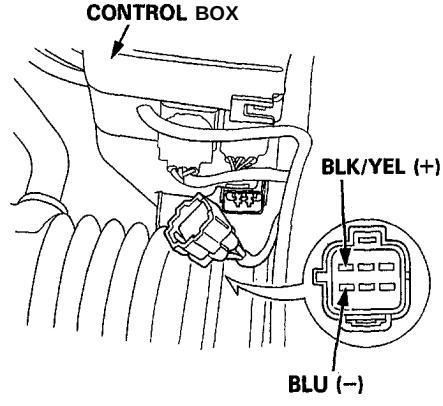
NO

Repair the blockage or vacuum leak between the vacuum tank and the Intake manifold.

YES

Disconnect the 6P connector from the control box.

Measure voltage between BLK/YEL (+) terminal and BLU (–) terminal.



Is there battery voltage?

YES

Replace the chamber volume control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

YES

(To page 11-1211

(To page 11-121)

(From page 1 I-I 20)

Raise engine speed to 5,000 rpm.

Check for vacuum at #3 vacuum hose.

Is there vacuum?

YES → Disconnect the 6P connector from the control box.

NO

Chamber volume control system is OK.

(From page 1 I-1 20)

Is there battery voltage?

NO → Repair open in BLK/YEL wire between the 6P connector and No. 2 (15 A) fuse.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

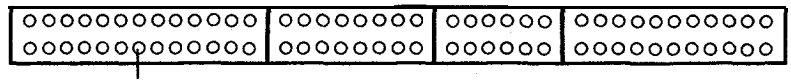
Check for continuity of RED/BLU wire between ECU (A14) and the 6P connector.

Does continuity exist?

NO → Repair open in RED/BLU wire between ECU (A14) and the 6P connector.

YES

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



Is there vacuum?

YES → Replace chamber volume control solenoid valve.

NO

Turn the ignition switch OFF.

Disconnect "A" connector from ECU.

Check for continuity to ground on the RED/BLU wire.

Is there continuity to ground?

YES → Repair short to ground at RED/BLU wire between ECU (A14) and the 6P connector.

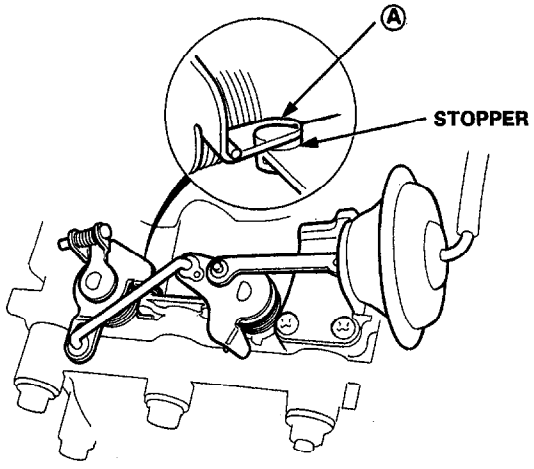
NO

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

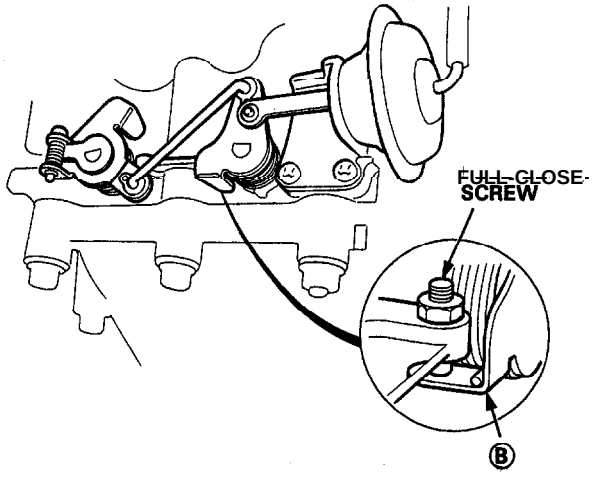
Chamber Volume Control Valve Test

CAUTION: Do not adjust the chamber volume control valve full-close screw. It was preset at the factory.

1. **Check the chamber volume control valve shaft for binding or sticking.**
2. **Check the chamber volume control valve for smooth movement.**
3. **Check the A of the chamber volume control valve is in close contact with the stopper when the bypass valve is fully open.**



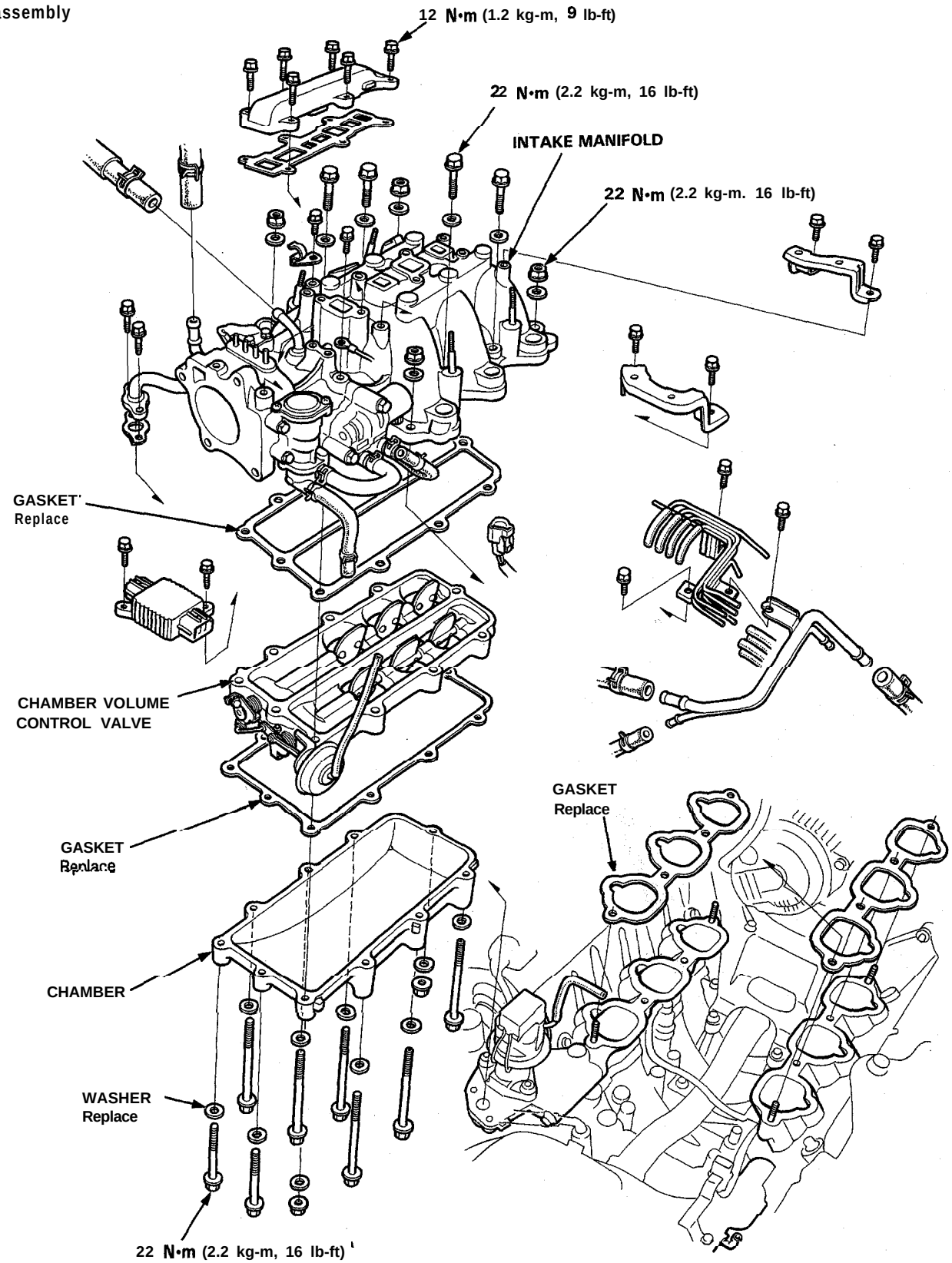
4. **Check that B of the chamber volume control valve is in close contact with the full-close screw when the valve is fully closed.**



- 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 chamber volume control valve (page 11-123).

Chamber Volume Control System

Disassembly



Emission Control System

System Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	EGR SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		126	128	134	135
ROUGH IDLE			①	②	
FREQUENT STALLING AFTER WARM-ING UP	AFTER WARM-ING UP		①		
	FAILS EMISSION TEST	①	③		②
POOR PERFORMANCE	LOSS OF POWER	①	②		

System Description

The emission control system includes a three-way catalytic converter, exhaust gas recirculation (EGR) system, crankcase ventilation system and evaporative 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.

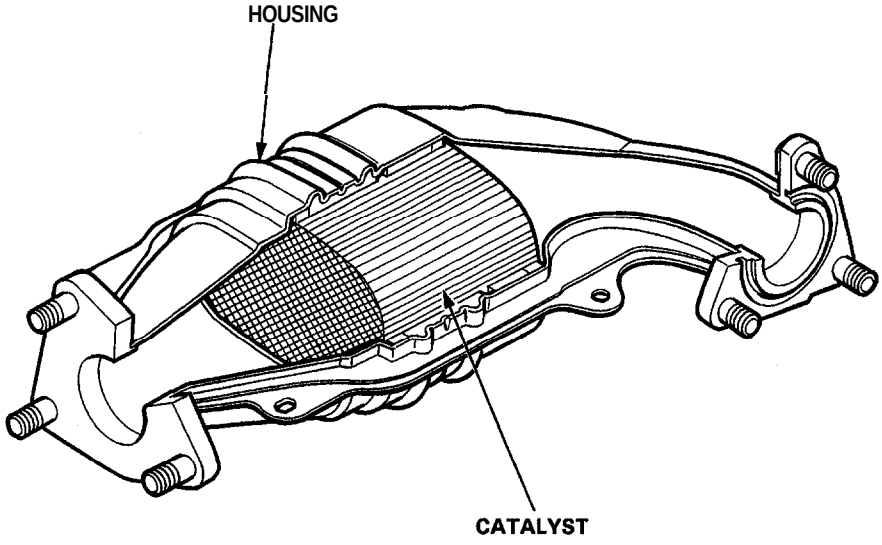
1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 1 l-84).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   CO meter should indicate 0.1 % maximum.

Catalytic Converter

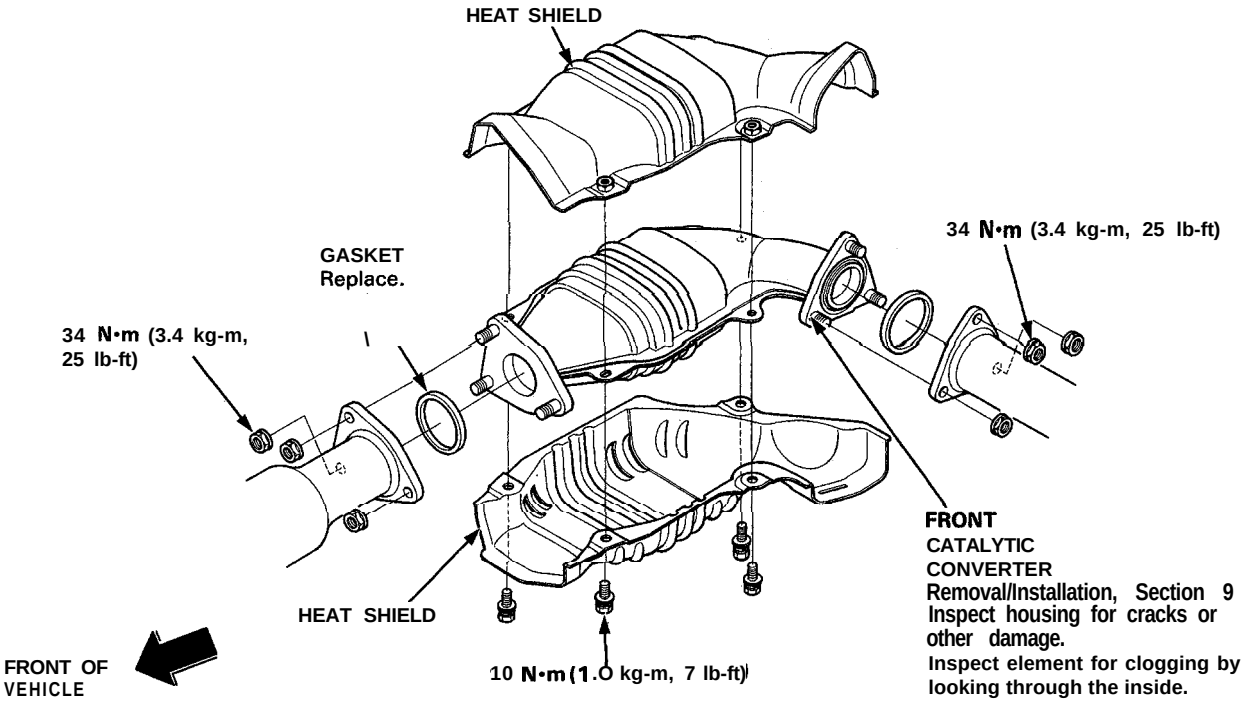
Description

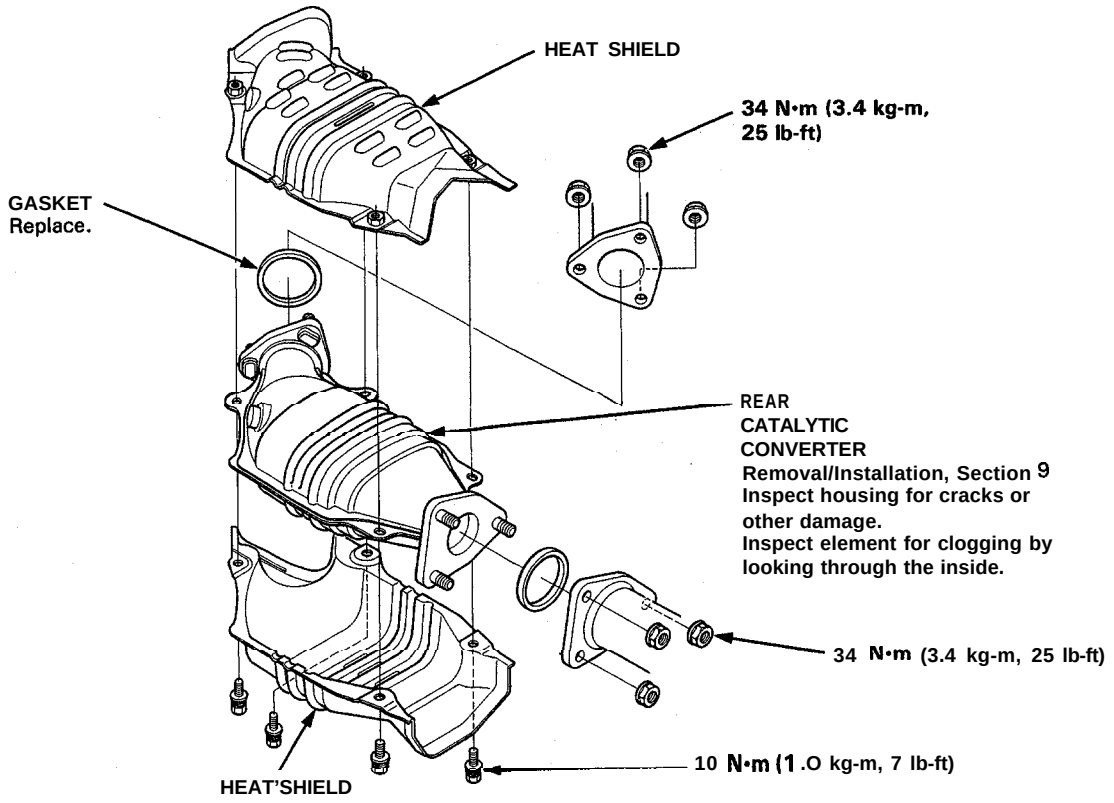
The d-way catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor



inspection

If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if any of the visible area is damaged or plugged.

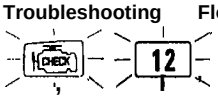




Emission Control System

-Exhaust Gas Recirculation System

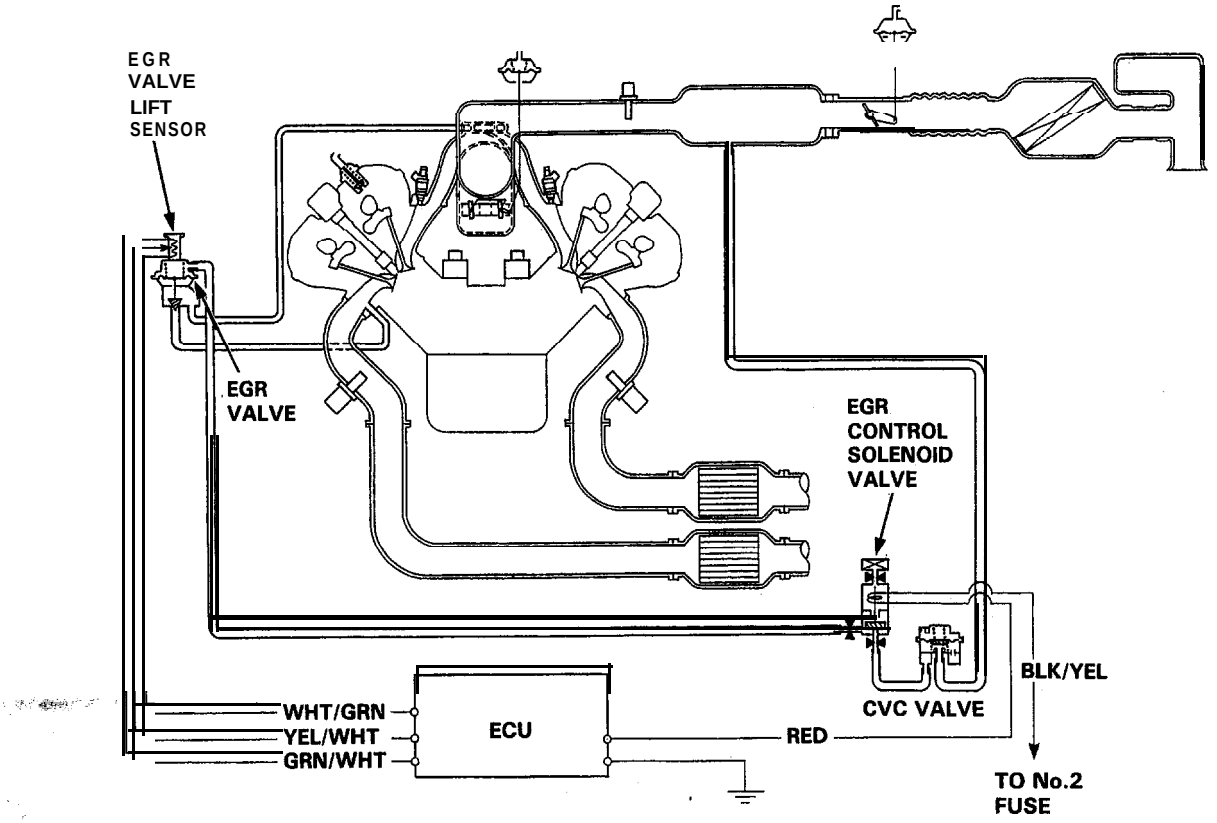
Troubleshooting Flowchart

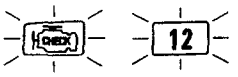


Self diagnosis Check Engine light indicates code 12: Most likely a problem in the Exhaust Gas Recirculation (EGR) system.

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, CVC valve, EGR control solenoid valve, PGM-FI ECU and various sensors.

The ECU 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 ECU. The ECU 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 ECU cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.





— Check Engine light has been reported on.
— With service check connector jumped (page 11-18), CODE 12 is indicated.

Do the ECU Reset Procedures (page 11-19).

Road test necessary: Warm up the engine to normal operating temperature (cooling fan comes on). Drive the car on the road for approx. 10 minutes. Try to keep the engine speed in the 1700—2600 range.

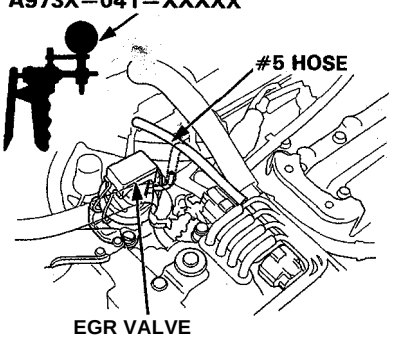
Is Check Engine light on and does it indicate CODE 12?

NO → Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at EGR valve C141, and control box C532.

YES

With the engine at idle, disconnect the #5 hose from the EGR valve and connect a vacuum pump/gauge to the hose.

VACUUM PUMP/GAUGE A973X—041—XXXXX

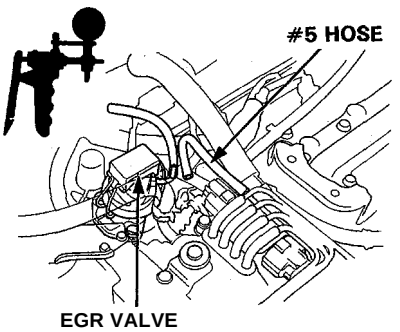


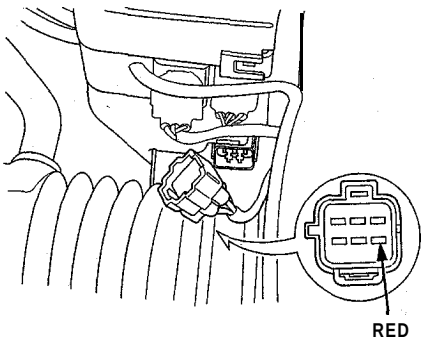
Is there any vacuum?

YES → Disconnect 8P connector from the control box and check the #5 hose for vacuum again.

NO

Move the vacuum pump/gauge to the EGR valve.





(To page 11-127)

(To page 11-127)

(cont'd)

- Exhaust Gas Recirculation System (cont'd)

(From page 1 l-1 29)

With the engine at idle, apply 8" of vacuum to the EGR valve.

Does the engine stall and does the EGR valve hold vacuum ?

NO → Replace **EGR** valve.

YES

Disconnect the 6P connector from the control box.

Measure voltage between **BLK/YEL** (+) terminal on the main wire harness and body ground.

Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the solenoid valve and No.2 fuse.**

YES

Reconnect the vacuum pump/gauge to the #5 hose.

Start the engine and allow it to idle.

(To page 11-131)

(From page 1 l-l 29)

Is there any vacuum ?

YES → Check vacuum hose routing of the entire **EGR** system. If hose routing is OK, **replace** EGR control solenoid valve.

NO

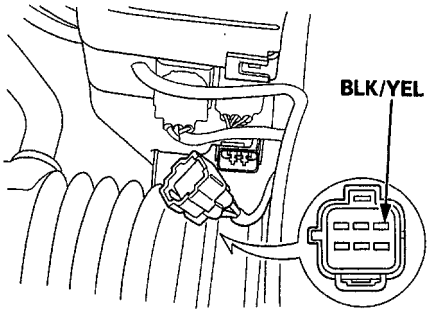
Check for continuity ground on RED wire of 6P connector.

Does continuity exist?

YES → Repair open in RED wire between EGR control solenoid valve and ECU (A11).

NO

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



(From page 1 l-l 30)

Connect the battery positive terminal to the A terminal of the 6P connector. While watching the vacuum gauge, connect the battery negative terminal to the D terminal.

Is there approx. 8" within 1 second? NO

YES

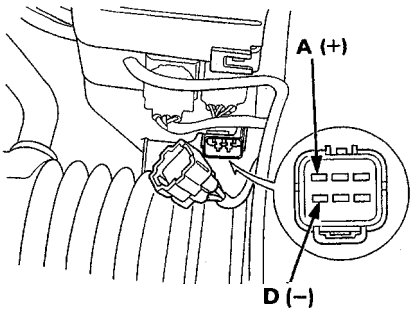
Turn the ignition switch OFF and reconnect the 6P connector.

Turn the ignition switch OFF and inspect the #1 and #5 hoses for leaks, restrictions, or misrouting.

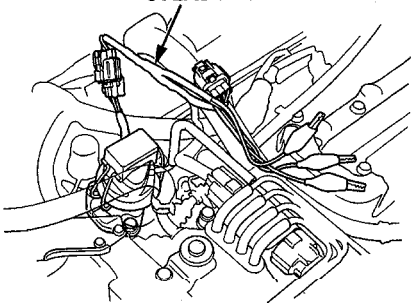
Are the hoses OK? NO

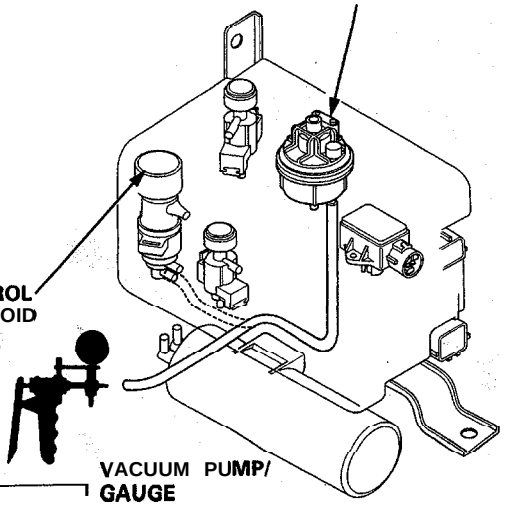
Connect as necessary.

YES



TEST HARNESS
07LAJ-PT30200





Disconnect the lower hose on EGR control solenoid valve and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.

Is there 6"– 10" of vacuum? NO

Replace CVC valve.

YES

Replace the EGR control solenoid valve.

Connect the test harness between the EGR valve lift sensor and engine wire harness.

Turn the ignition switch ON.

Measure voltage between GRN (+) teminal and RED (–) terminal.

Is there approx. 5 V? NO

YES

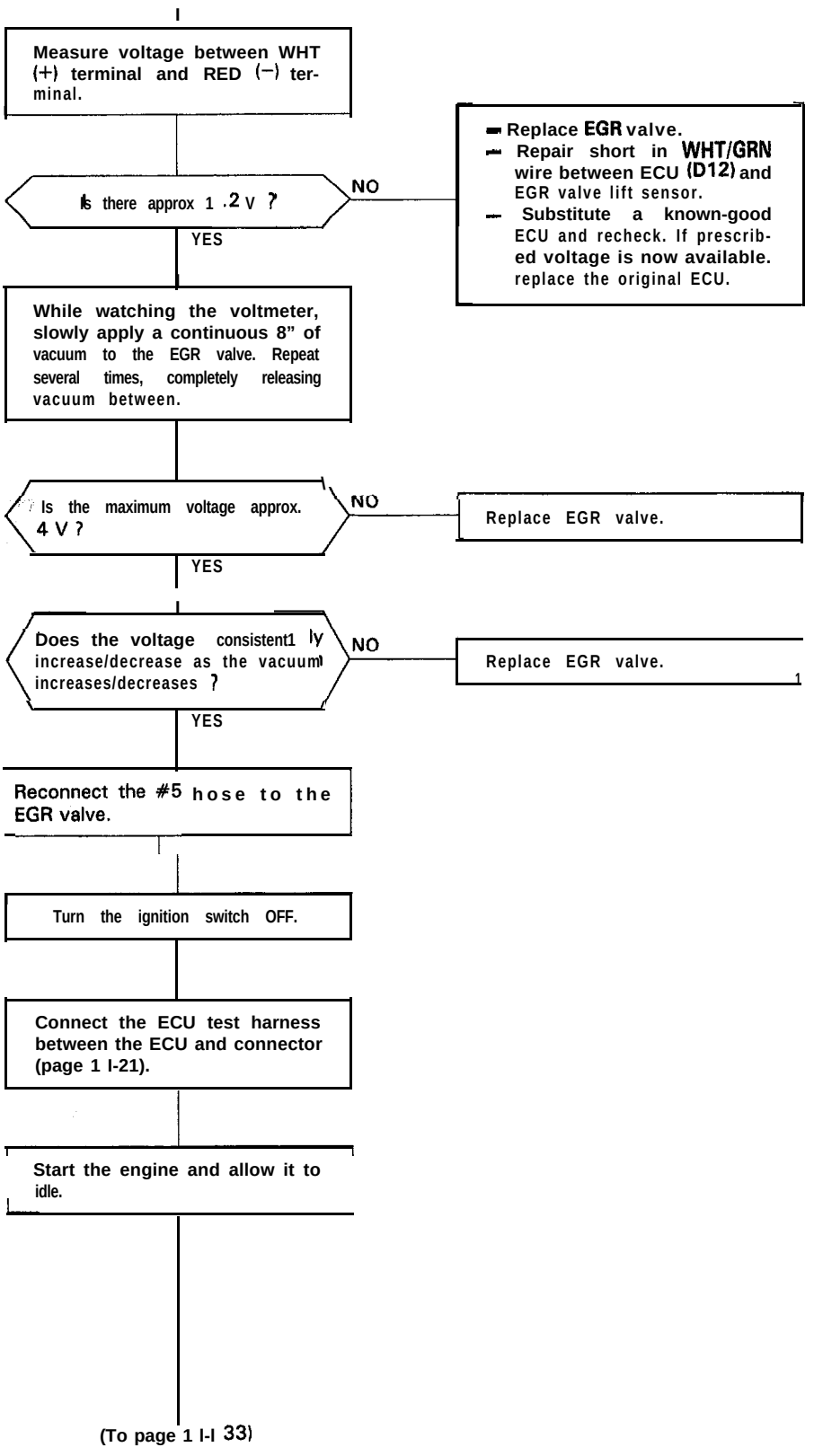
- Repair open in **YEL/WHT** wire between EGR valve and ECU **(D20).**
- Repair open in **GRN/WHT** wire between EGR valve and ECU **(D22).**

(To page 1 l-l 32)

(cont'd)

Exhaust Gas Recirculation System (cont'd)

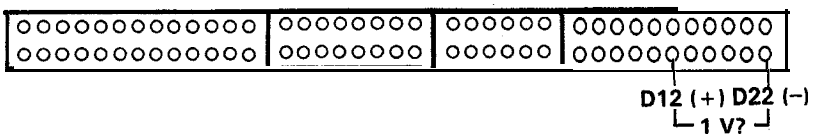
(From page 1 I-I 31)



(To page 1 I-I 33)

(From page 1 I-I 32)

Measure voltage between D12 (+) terminal and D22 (–) terminal.



Is there approx. 1.2 V?

NO → Repair open in **WHT/BLK** wire between ECU **(D12)** and the sensor.

YES

Connect A11 terminal to A26 terminal with a jumper wire.

Did the engine stall ?

NO → Repair open in RED wire between ECU **(A1 1)** and EGR control solenoid valve.

YES

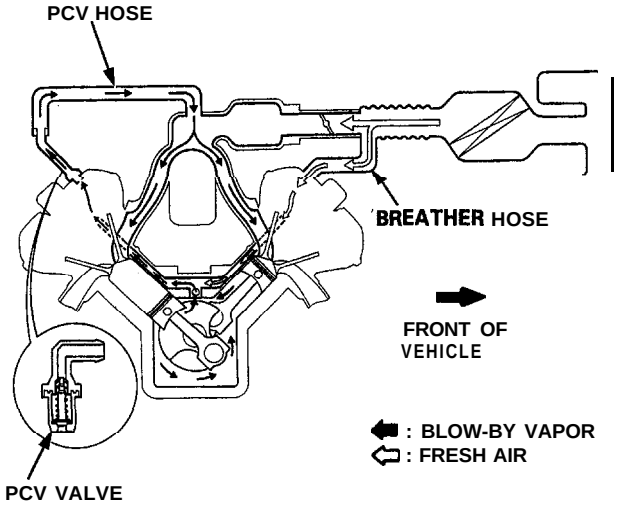
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Emission Control System

- Positive Crankcase Ventilation System

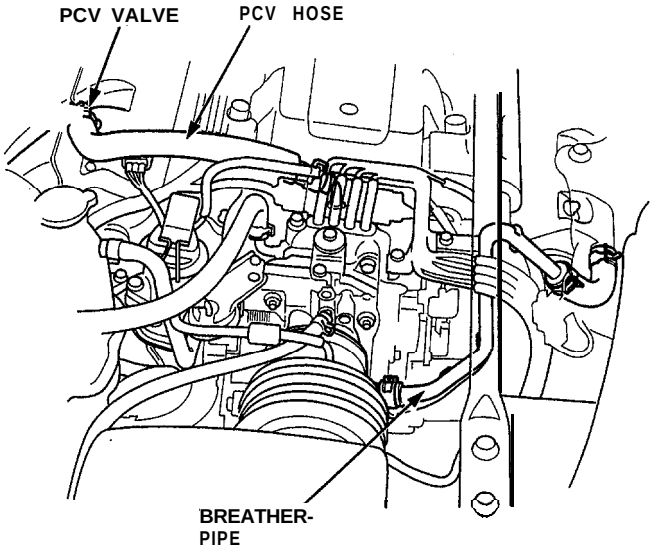
Description

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.

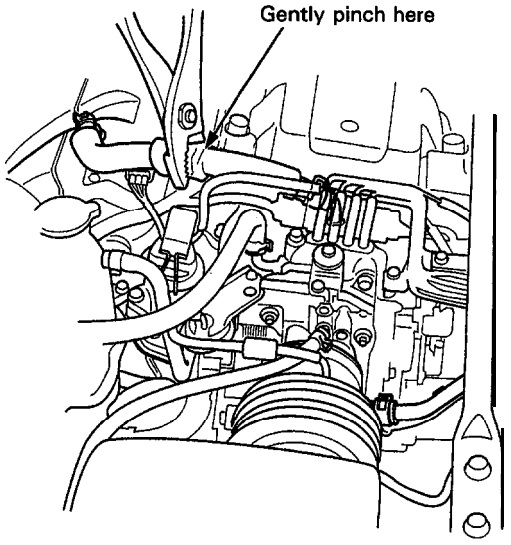


Inspection

1. Check the crankcase ventilation 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.

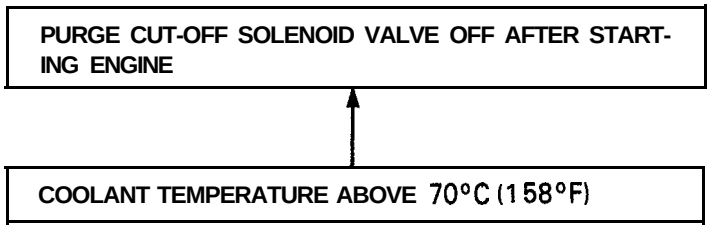
Evaporative Emission Controls

Description

The evaporative *controls* are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

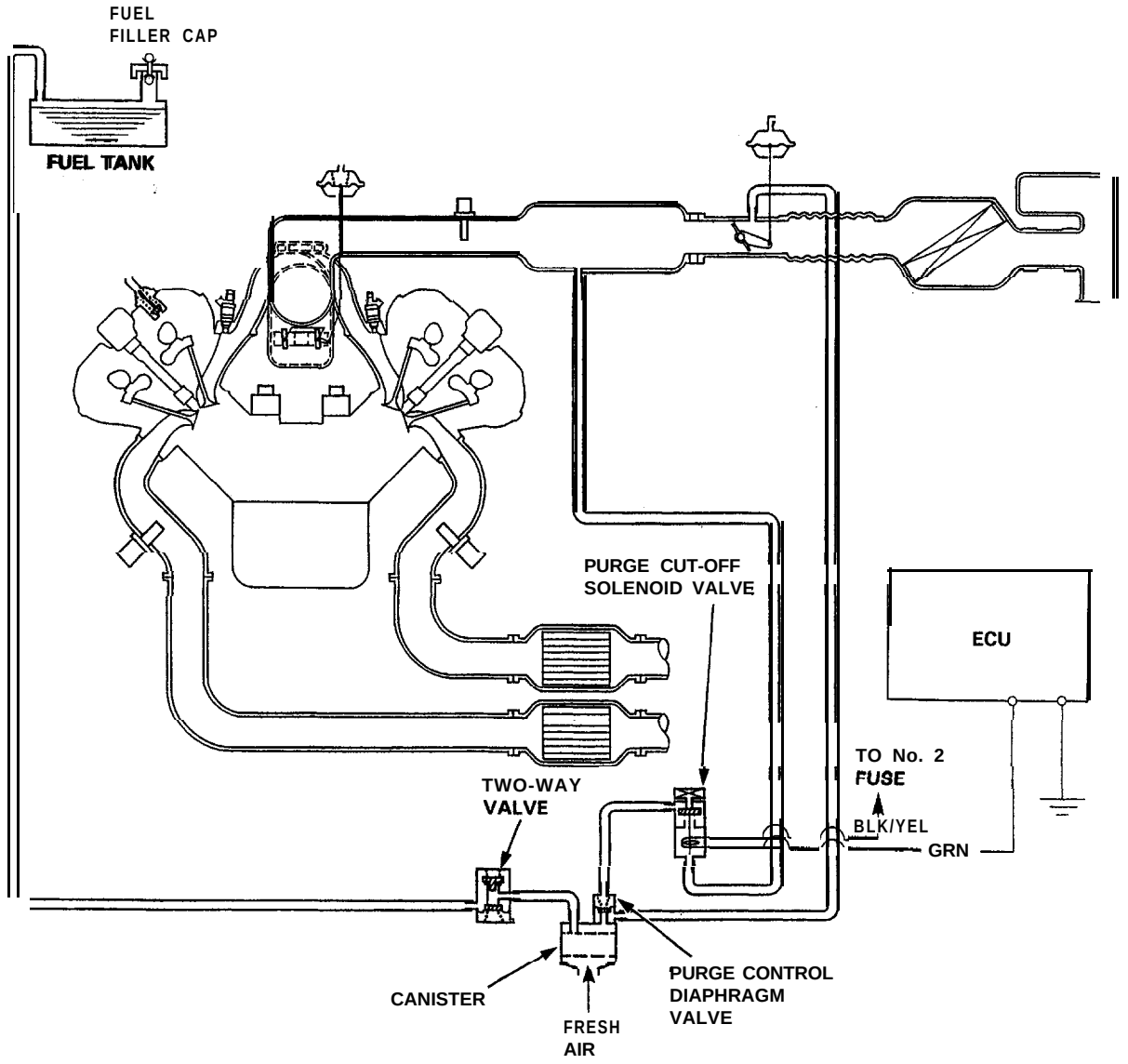
A. Charcoal Canister
A canister for the temporary storage of fuel vapor until the fuel vapor can be purged from the canister into the engine and burned.

B. Vapor Purge Control System
Canister purging is accomplished by drawing fresh air through the canister and into a port on the throttle body. The purging vacuum is controlled by the purge control diaphragm valve and the purge cut-off solenoid valve.



C. Fuel Tank Vapor Control System
When fuel vapor pressure in the fuel tank is higher than the set value of the two-way valve, the valve opens and regulates the flow of fuel vapor to the canister.

(cont'd)


FUEL
FILLER CAP
FUEL TANK
PURGE CUT-OFF
SOLENOID VALVE
ECU
TO No. 2
FUSE
BLK/YEL
GRN
TWO-WAY
VALVE
CANISTER
FRESH
AIR
PURGE CONTROL
DIAPHRAGM
VALVE

Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

Disconnect vacuum hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.
NOTE: Engine coolant temperature must be below 70°C (158°F).

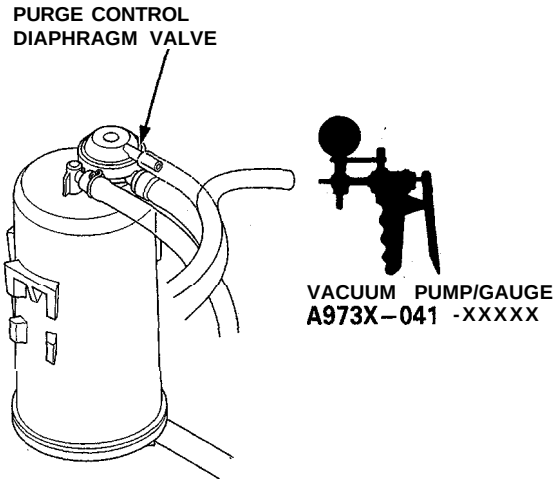
Is there vacuum ?

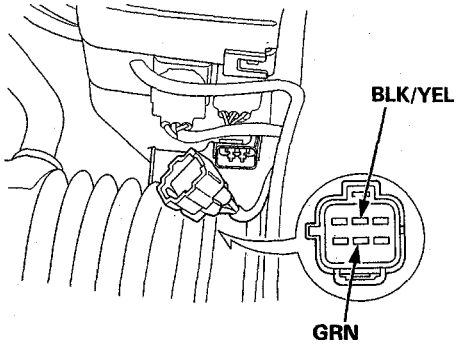
YES

Disconnect the 6P connector.

NO

(To page' 1 I-I 38)





Measure voltage between BLK/YEL (+) terminal and GRN (–) terminal.

Is there battery voltage ?

YES

Inspect vacuum hose routing.
If OK, replace purge cut-off solenoid valve.

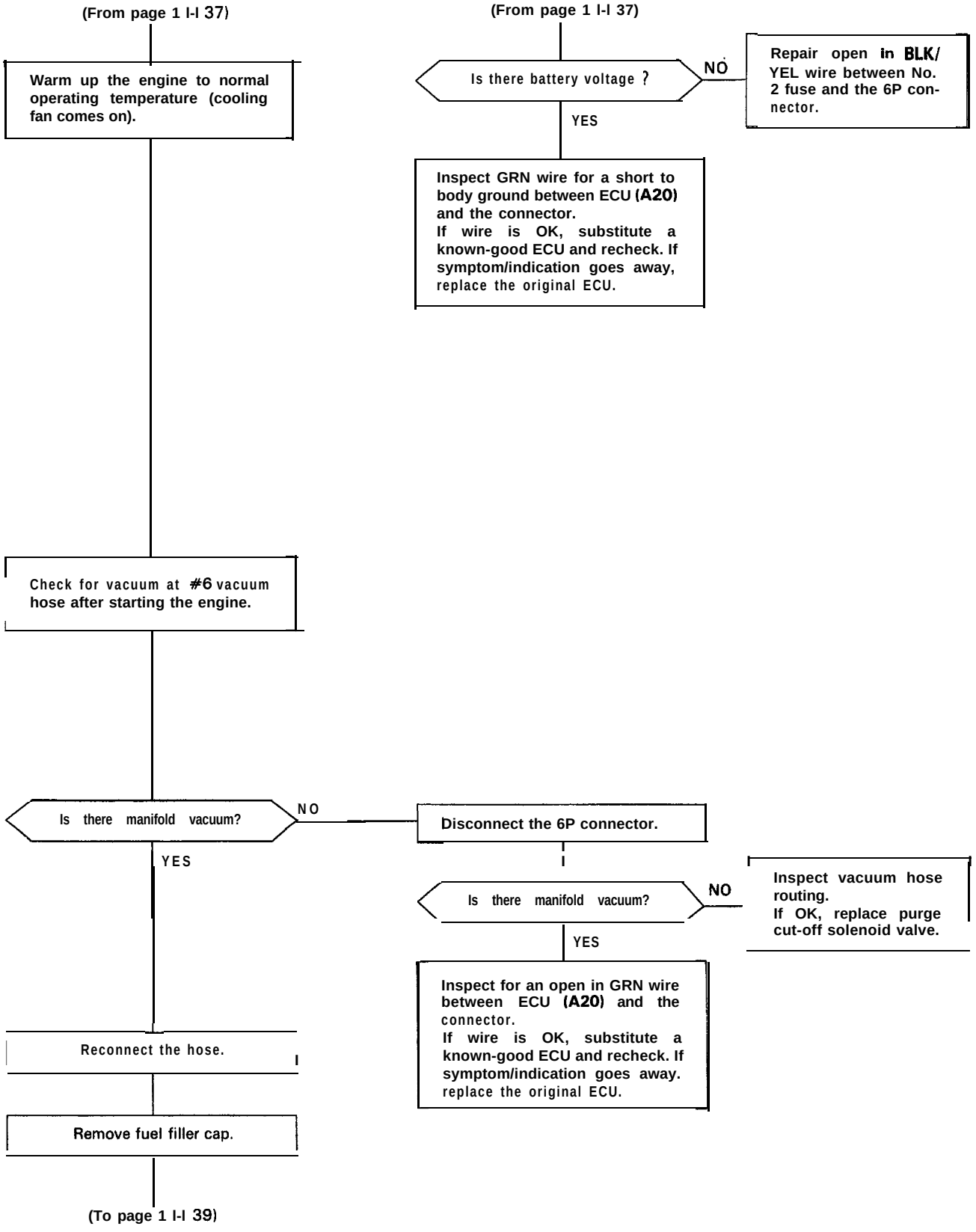
NO

Measure voltage between BLK/YEL (+) terminal and body ground.

(To page 1 I-I 38)

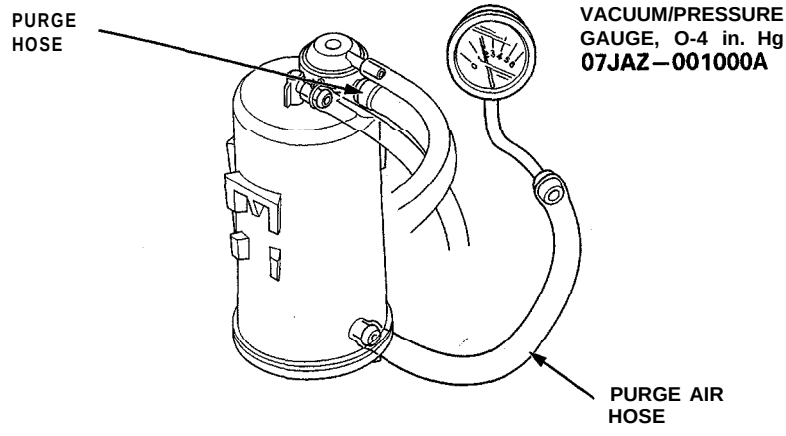
(cont'd)

Evaporative Emission Controls (cont'd)



(From page 1 l-l 38)

Connect a vacuum gauge to canister purge air hose.



Start the engine and raise speed to 3,500 rpm.

Does vacuum appear on gauge within 1 minute ?

NO

Connect a vacuum gauge to the canister purge hose and raise the engine speed to 3,500 rpm.

YES

See two-way valve test to complete.
Evaporative emission control are OK.

Does vacuum appear on the gauge?

NO

Inspect the purge hose and throttle body port for pinch or blockage.

YES.

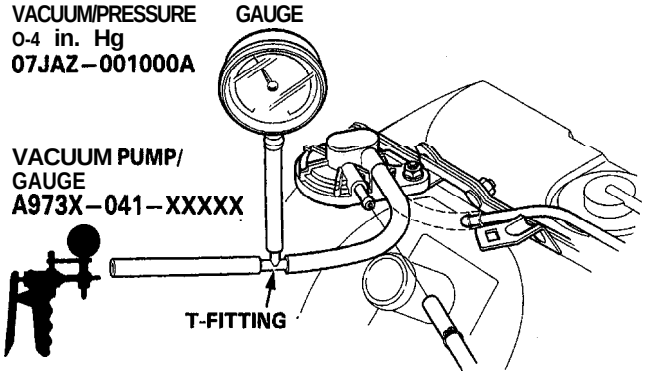
Replace the canister.

(cont'd)

– Evaporative Emission Controls (cont'd)

Two-Way Valve Test

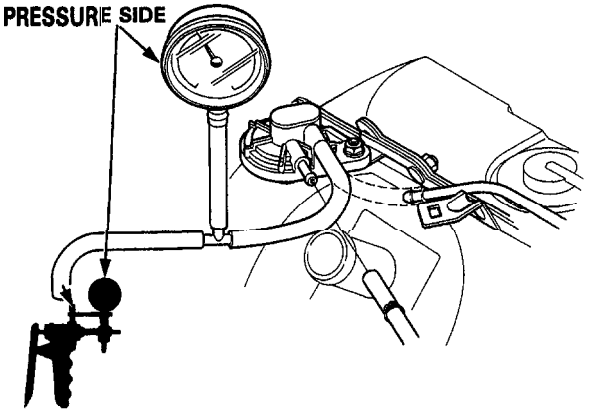
1. Remove the fuel filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge.

   Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
   - If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), stall new valve and retest.

4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

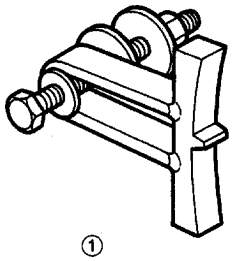
   Pressure should stabilize at 10 to 35 mmHg (0.4 to 1.4 in. Hg).
   - If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new valve and retest.

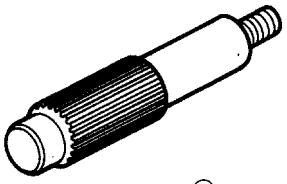
Clutch

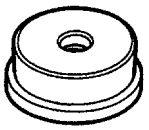
Special Tools 12-2
Illustrated Index 12-3
Pedal Free Play 12-4
Clutch Master Cylinder
  Removal 12-5
  Installation 12-5
Slave Cylinder
  Removal 12-6
  Installation 12-6
Clutch Master Cylinder (CANADA)
  Overhaul/Inspection 12-7
  Removal/Installation 12-8
  Disassembly 12-9
  Reassembly 12-9
Slave Cylinder (CANADA)
  Overhaul/Inspection 12-I 0
  Removal/Installation 12-I 1
Pressure Plate, Clutch Disc, Mid Plate
  Removal ..... 1 f-I 2
Pressure Plate
  Inspection 12-13
Release Bearing
  Inspection 12-13
1st and 2nd Clutch Discs
  Inspection ..... 1 2 - 1 4
Mid Plate
  Inspection 12-15
Mid Plate Guide
  Inspection 12-15
  Initialization 12-I 6
  Replacement 12-17
Flywheel, Flywheel Bearing
  Inspection 12-18
  Replacement 12-I 9
Pressure Plate, Clutch Disc, Mid Plate
  Installation 12-20

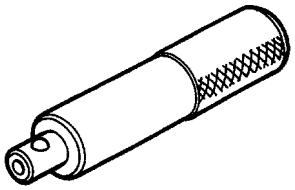
Special Tools

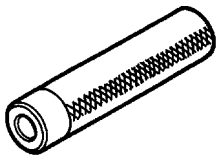
Ref.No.	Tool Number	Description	Q'ty	Page Reference
①	07LAB—PV00100 or 07924—PD20003	Ring Gear Holder	1	12-12
②	07MAF—PR80100	Clutch Alignment Shaft	1	12-20
③	07746-0010200	Attachment, 37 x 40 mm	1	12-19
④	07749-0010000	Driver	1	12-19
⑤	07936-3710100	Handle	1	12-20


①


②

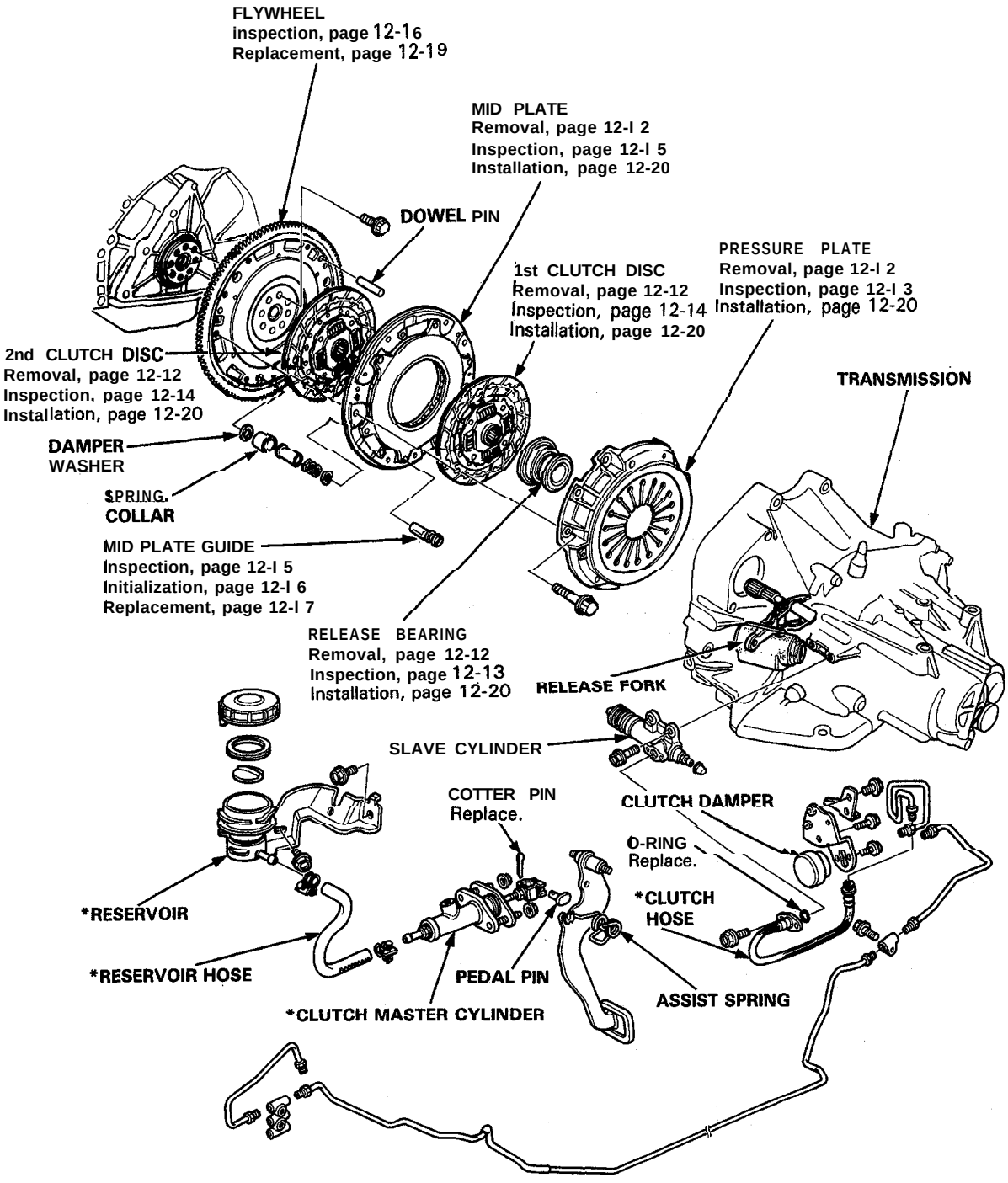

③


④


⑤

NOTE:

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked * are removed, the clutch hydraulic system must be bled.

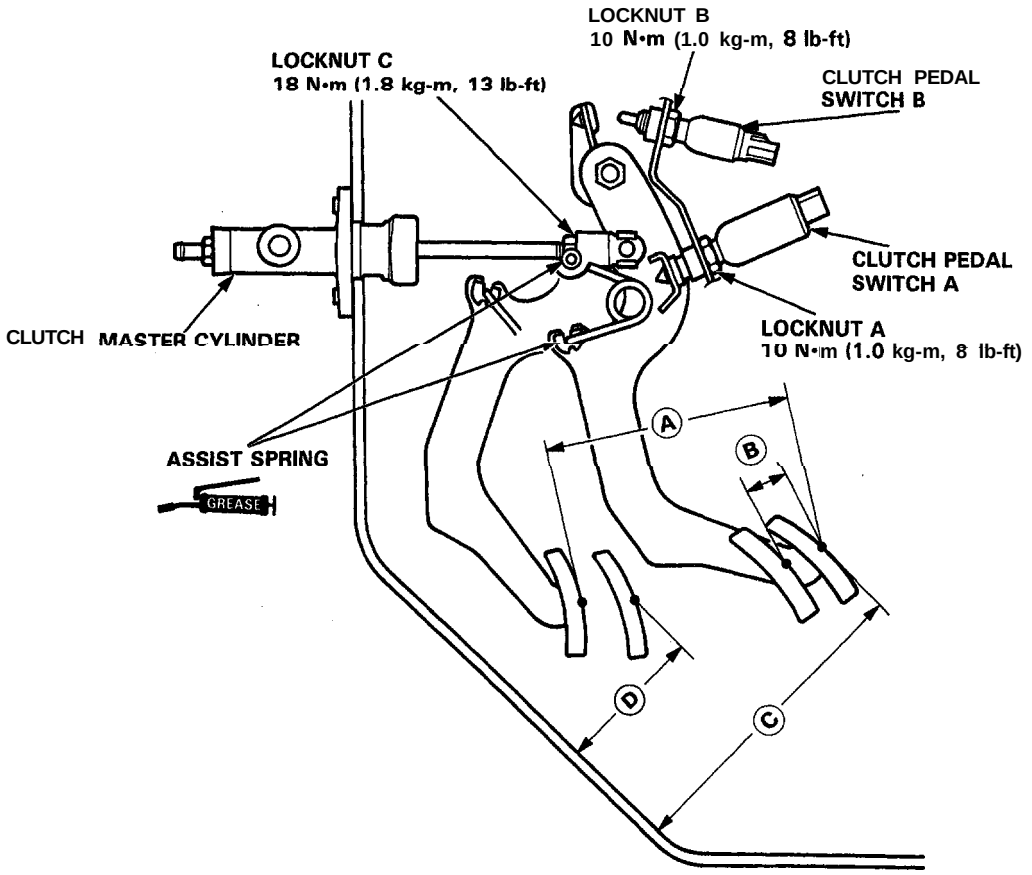


Pedal Free Play

NOTE:
@ The clutch is self-adjusting to compensate for wear.
● Total clutch pedal free play is 9-l 5 mm (0.35-0.59 in).

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the pedal switch until it no longer touches the clutch pedal.
2. Loosen locknut C, and turn the push rod in or out to get the specified stroke and height at the clutch pedal.
3. Tighten locknut C.
4. Thread in the clutch pedal switch A in until it contacts the clutch pedal.
5. Turn the switch in further 1/4—1/2 turn.
6. Tighten locknut A.
7. Loosen locknut B and pedal switch B.
8. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
9. Release the clutch pedal 15-20 mm from the fully depressed position and hold it there.
   Adjust the position of pedal switch B so that the engine will start with the clutch pedal in this position.
10. Thread in pedal switch B in 1/4—1/2 turn further.
11. Tighten locknut B.

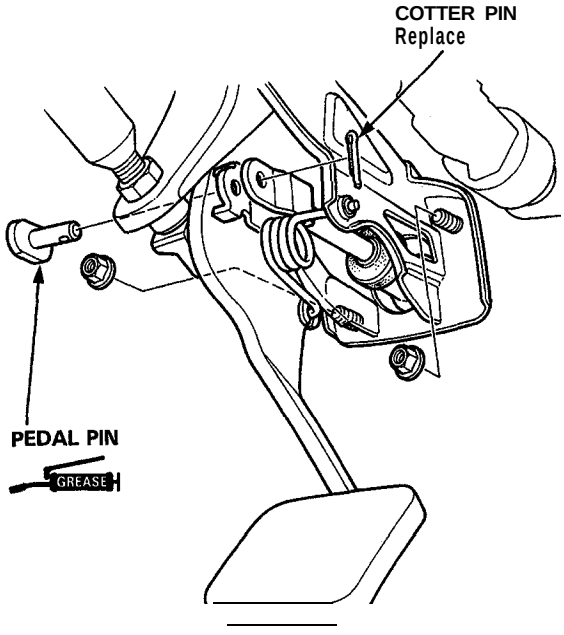


(A) (STROKE AT PEDAL): 130-135 mm (5.12-5.31 in.)
(B) (PEDAL PLAY): 1.0-7.0 mm (0.04-0.28 in.)
(C) (CLUTCH PEDAL HEIGHT): 186.4 mm (7.34 in.)
(D) (CLUTCH PEDAL DISENGAGEMENT HEIGHT): 93 mm (3.66 in.) minimum to the floor.

Clutch Master Cylinder

Removal

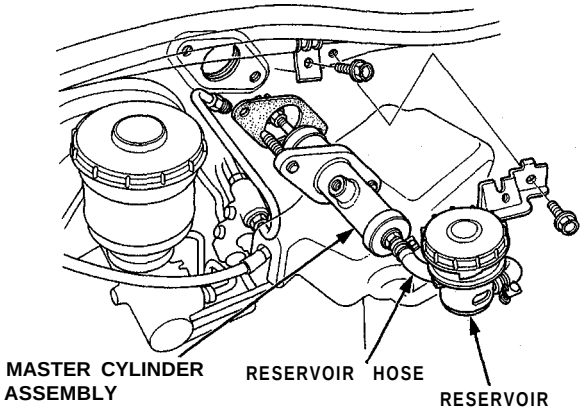
1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.

3. Remove the clutch pipe and reservoir hose from the master cylinder.

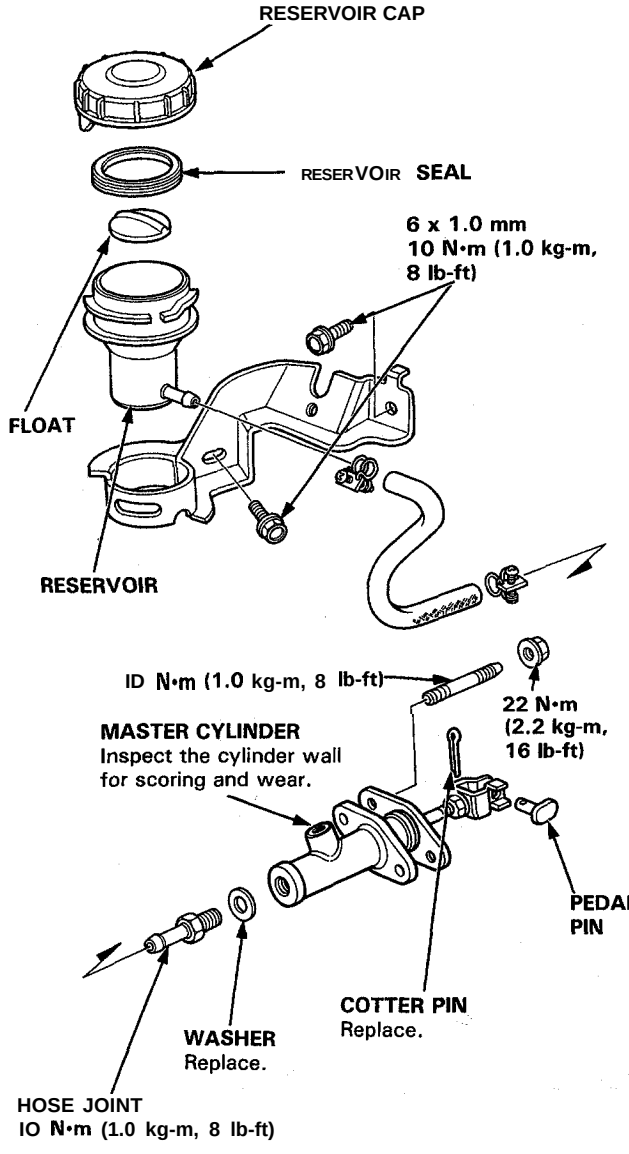
CAUTION:
- Avoid spilling brake fluid on paint as it may damage the finish.
- Plug the end of the clutch pipe and reservoir hose with a shop towel to prevent fluid from flowing out of the clutch pipe and reservoir hose after disconnecting.



Installation

1. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (page 12-6).



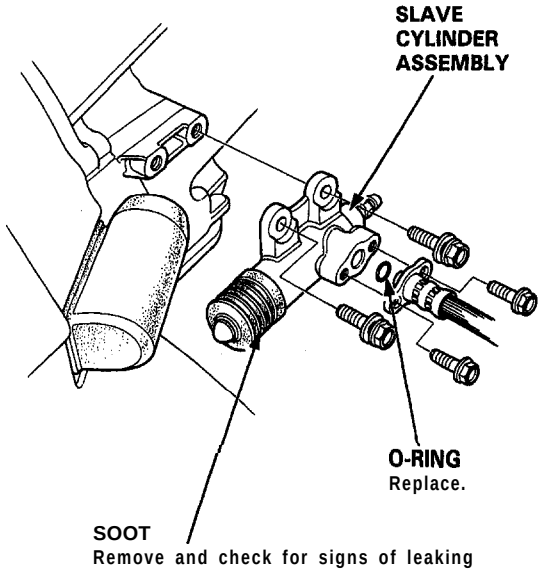
Slave Cylinder

Removal

1. Disconnect the clutch pipe from the slave cylinder.

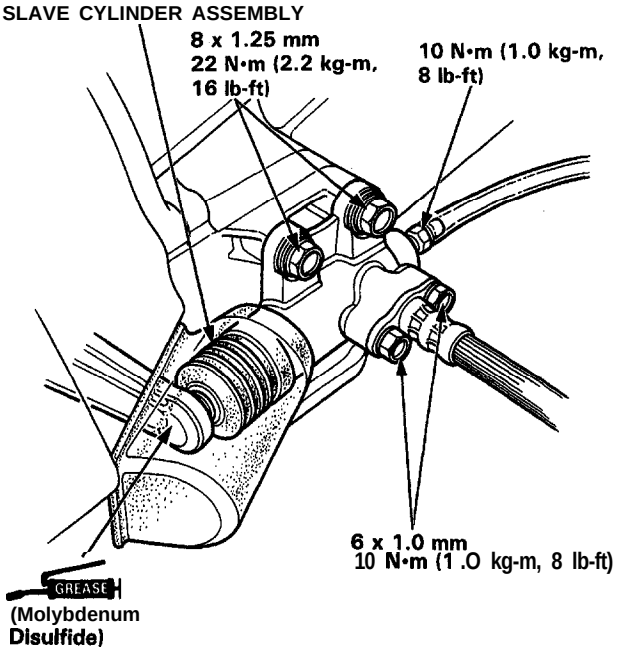
   CAUTION:
   - **Avoid spilling brake fluid on the painted surfaces, as it may damage the finish.**
   - **Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.**

2. Remove the slave cylinder from the clutch housing.



Installation

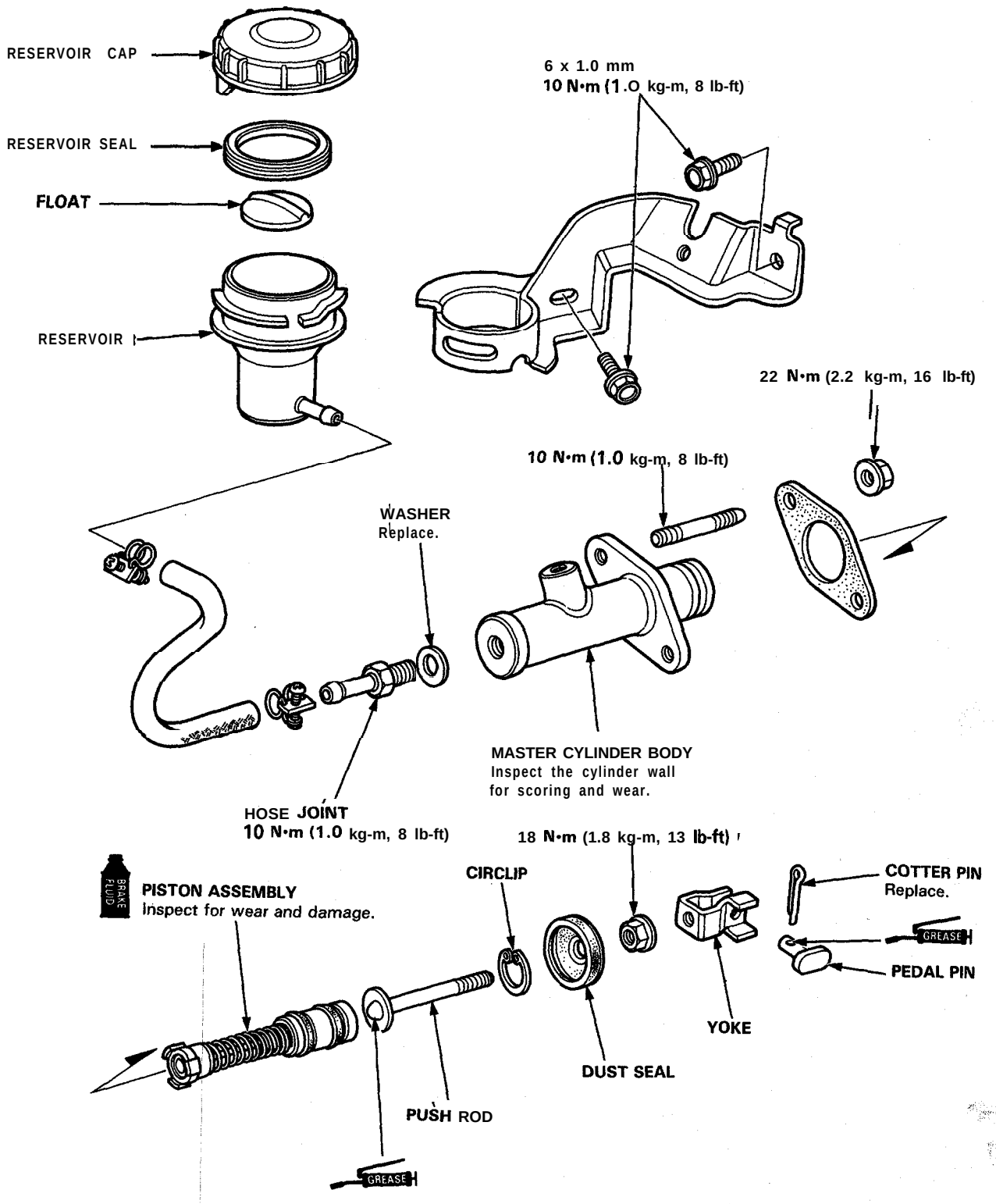
1. **Install the slave cylinder assembly on the clutch housing.**



2. Bleed the clutch hydraulic system:
   - Attach a hose to the bleeder screw and suspend the hose in a container of brake fluid.
   - Make sure there is an adequate supply of fluid at the master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
   - **Refill the master cylinder fluid when done.**
   - **Use only DOT 3 or 4 brake fluid.**

Clutch Master Cylinder (CANADA)

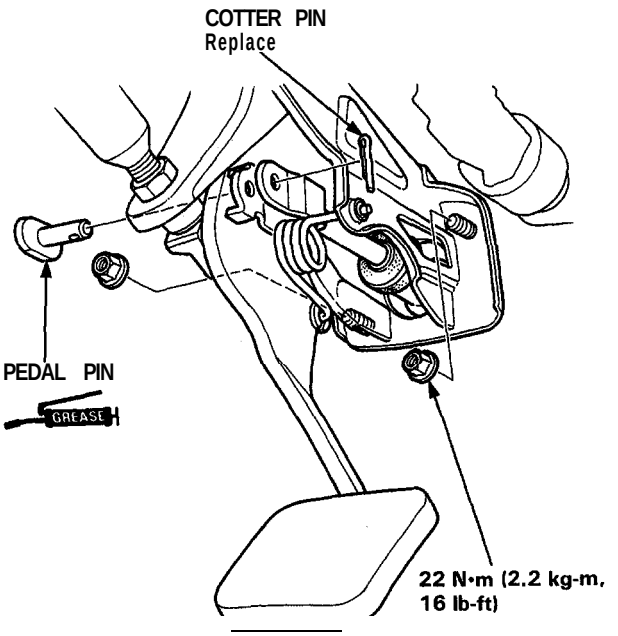
Overhaul/Inspection



Clutch Master Cylinder (CANADA)

Removal/Installation

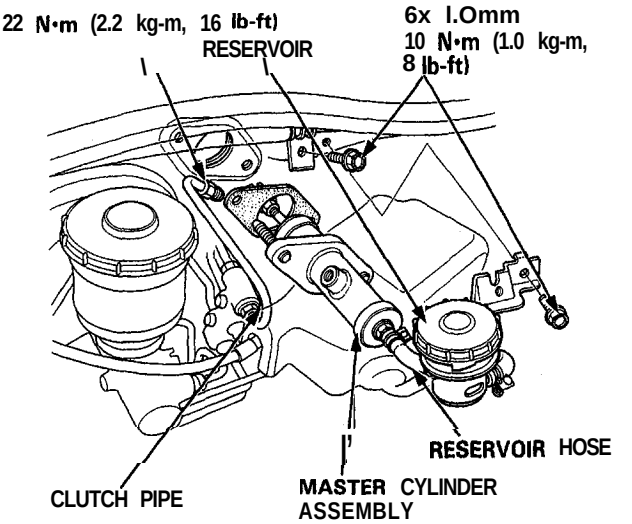
1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.

3. Remove the clutch pipe and reservoir hose from the master cylinder.

CAUTION:
- Avoid spilling brake fluid on paint as it may damage the finish.
- Plug the end of the clutch pipe and reservoir hose with a shop towel prevent fluid from flowing out of the clutch pipe and reservoir hose after disconnecting.



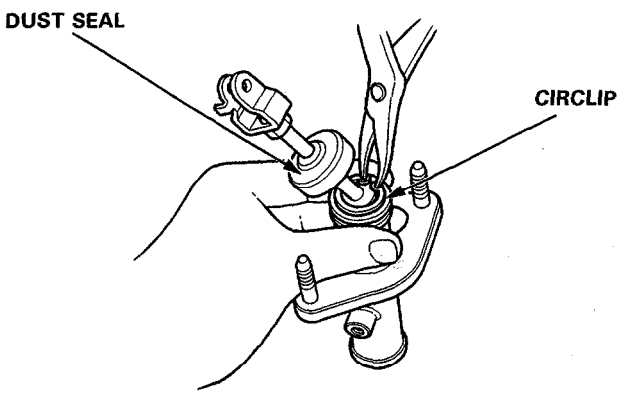
4. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (page 12-11).

Disassembly

CAUTION: Avoid spilling brake fluid on paint as it may damage the finish.

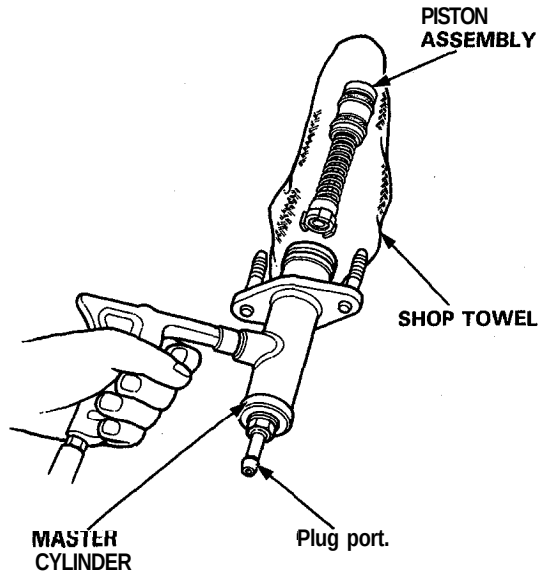
1. Remove the dust seal from the master cylinder.



2. Pry the circlip off the master cylinder.

3. **Carefully remove the piston by applying air pressure through the clutch line hose.**

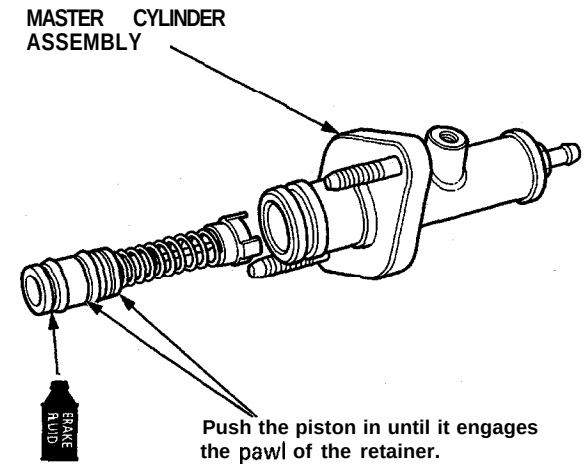
CAUTION:
- **Hold a shop towel over the master cylinder, to stop the piston in case it comes out suddenly.**
- **Plug the end of the clutch hose port with a shop towel to prevent fluid from coming out.**
- Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.



Reassembly

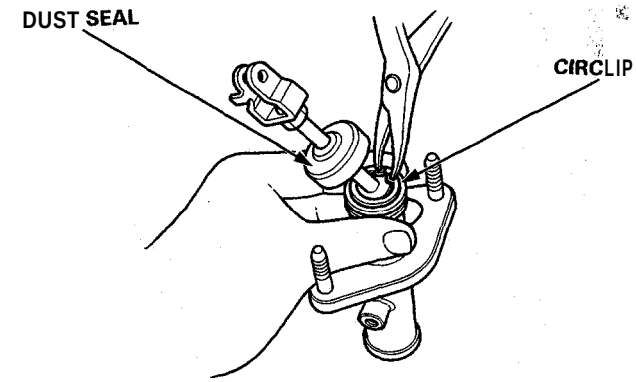
CAUTION:
- Before assembling, make sure all parts are completely clean.
- Replace parts with new ones whenever specified to do so.
- **Do not allow dust or water to enter the system.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the brake fluid which was drained out.**
- Avoid spilling the brake fluid on painted surfaces, as **it may damage the finish.**

1. Assemble the piston noting the proper direction of the parts (page 1 2-7).



2. Slide the piston assembly into the master cylinder.

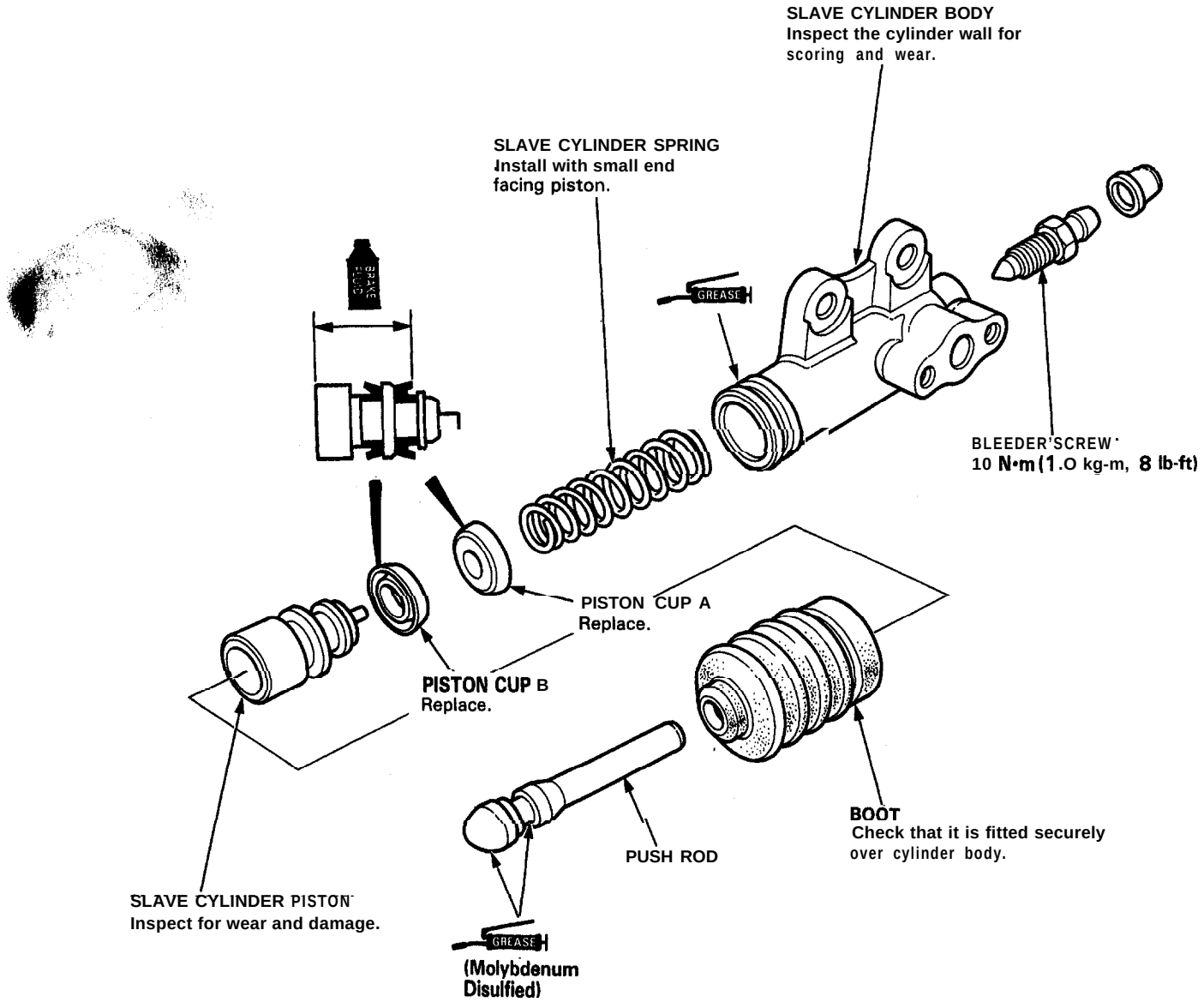
3. **Install the circlip in the groove of the master cylinder.**



4. Install the dust seal.

Slave Cylinder (CANADA)

Overhaul/Inspection

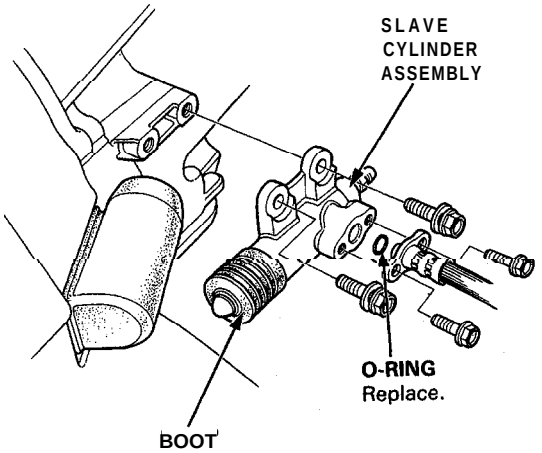


Removal

1. Disconnect the clutch pipe from the slave cylinder.

CAUTION:
- **Avoid spilling brake fluid on the painted surfaces, as it may damage the finish.**
- **Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.**

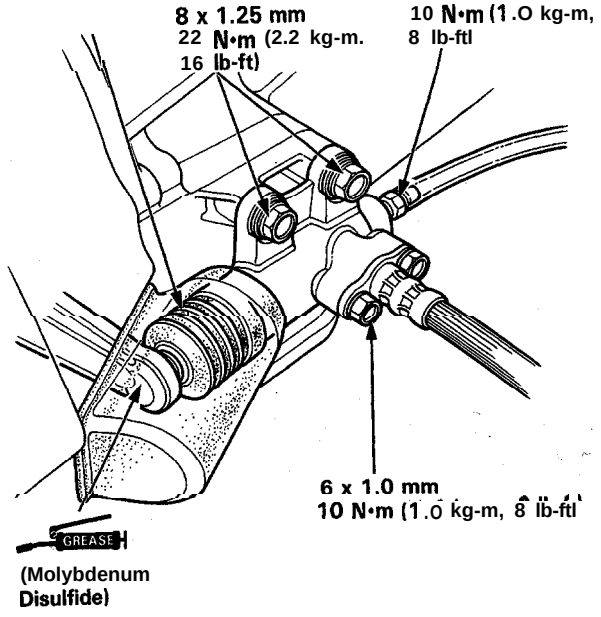
2. Remove the slave cylinder from the clutch housing.



Installation

1. **Install the slave cylinder assembly on the clutch housing.**

SLAVE CYLINDER ASSEMBLY



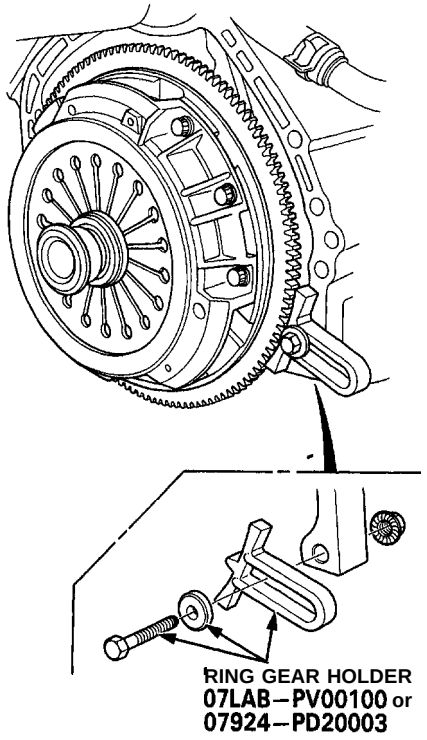
2. Bleed the clutch hydraulic system:

- **Attach a hose to the bleeder screw and suspend the hose in a container of brake fluid.**
- **Make sure there is an adequate supply of fluid at the master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.**
- **Refill the master cylinder fluid when done.**
- **Use only DOT 3 or 4 brake fluid.**

Pressure Plate, Clutch Disc, Mid Plate

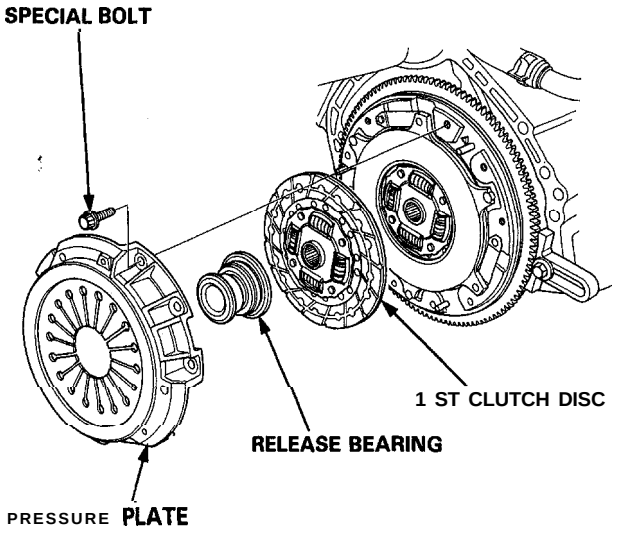
- Removal

1. Install the Ring Gear Holder.

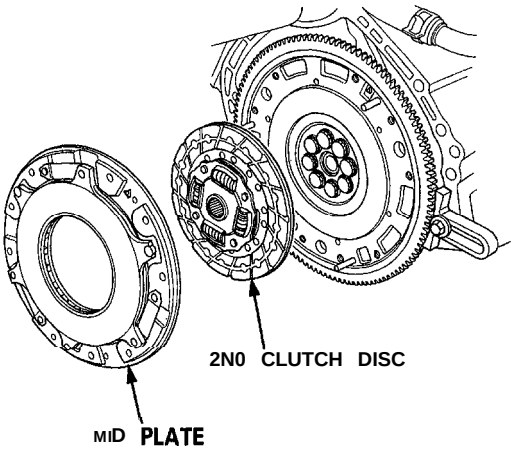


2. To prevent warping, unscrew the pressure plate mounting bolts two turns at a time in a crisscross pattern, then remove the pressure plate and the 1 st clutch disc.

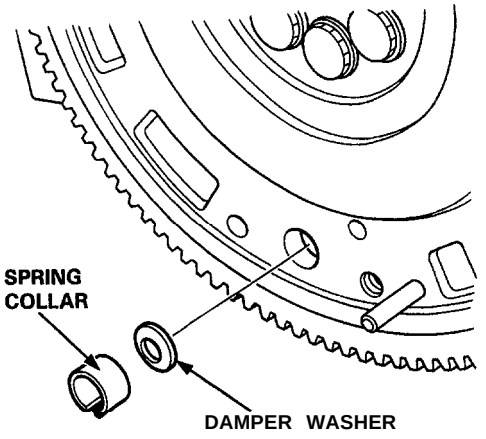
3. Remove the release bearing from the pressure plate.



4. Remove the mid plate and the 2nd clutch disc.



5. Remove the spring collar and damper washer from the flywheel.



Pressure Plate

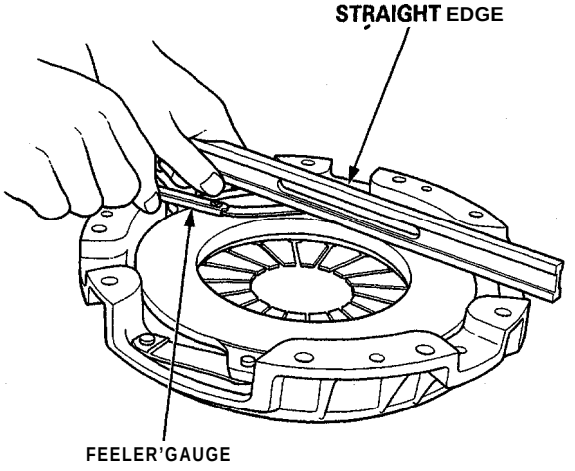
Inspection

NOTE: If replacement is required, always replace the pressure plate, mid plate and flywheel as a set.

1. Inspect the pressure plate surface for wear, cracks, or burning.
2. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.
3. Inspect for warpage using a straight edge and feeler gauge.

   Standard (New): 0.03 mm (0.0012 in.) min.
   Service Limit: 0.15 mm (0.0059 in.)

   Measure across the pressure plate at three points.

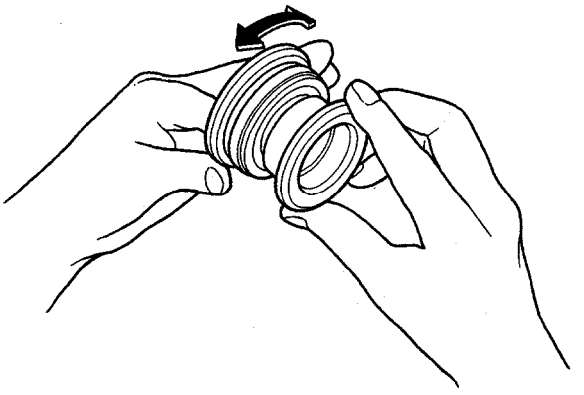


Release Bearing

Inspection

1. Check the release bearing for excessive play by spinning it by hand.

   CAUTION: Do not wash it in solvent.



2. Replace the release bearing with a' new one if there is excessive play.

1st and 2nd Clutch Discs

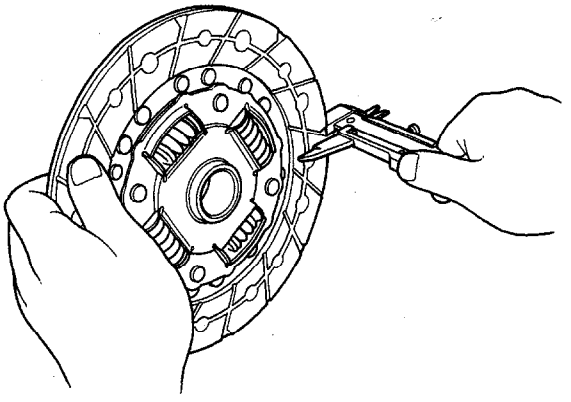
Inspection

1. inspect the lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.

2. Measure the clutch disc thickness.

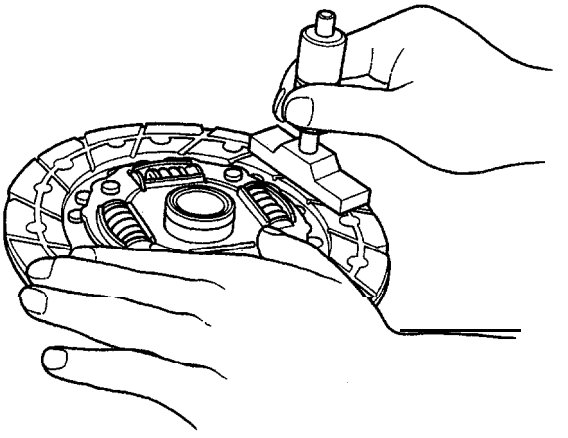
   Standard:
   1st Clutch Disc: 8.3-9.0 mm
   (0.327–0.354 in.)
   2nd Clutch Disc: 7.6-8.3 mm
   (0.299-0.327 in.)

   Service Limit:
   1st Clutch Disc: 5.9 mm (0.232 in.)
   2nd Clutch Disc: 5.4 mm (0.213 in.)



3. Measure the depth from the lining surface to the rivets, on both sides.

   1st and 2nd Clutch Discs:
   Standard: 1.1 mm 10.043 in.) min.
   Service Limit: 0.5 mm 10.020 in.)



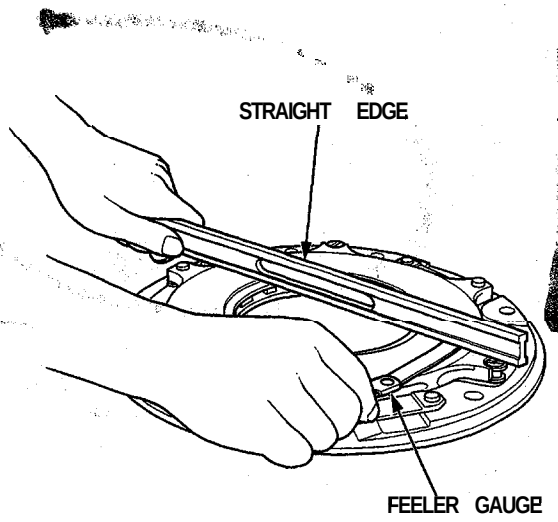
Mid Plate

Inspection

NOTE: If replacement is required, always replace the pressure plate, mid plate and flywheel as a set.

1. Inspect the mid plate surface for wear, cracks, or burning.
2. Inspect for warpage using a straight edge and feeler gauge.

Standard: (New): 0.05 mm (0.0020 in.) min.
Service Limit: 0.15 mm (0.0059 in.)



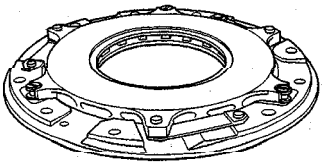
Mid Plate Guide

Inspection

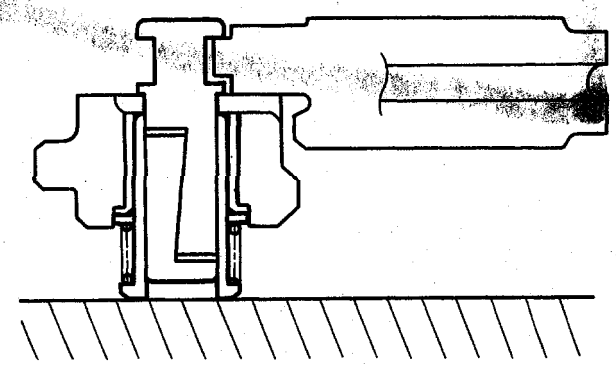
NOTE: Make sure all parts are clean before inspection.

1. Make sure the mid plate guide moves when you apply 1 O-60 kg/per one place of pressure to the disc surface of the mid plate.

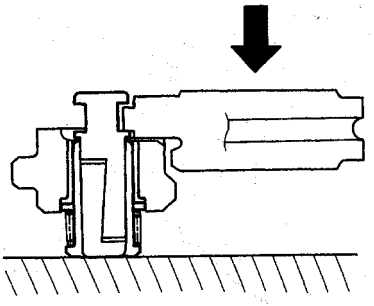
NOTE: inspection all the mid plate guides as described above.



Before Pressing:



After Pressing:

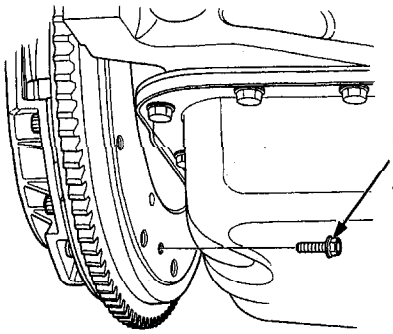


Mid Plate Guide

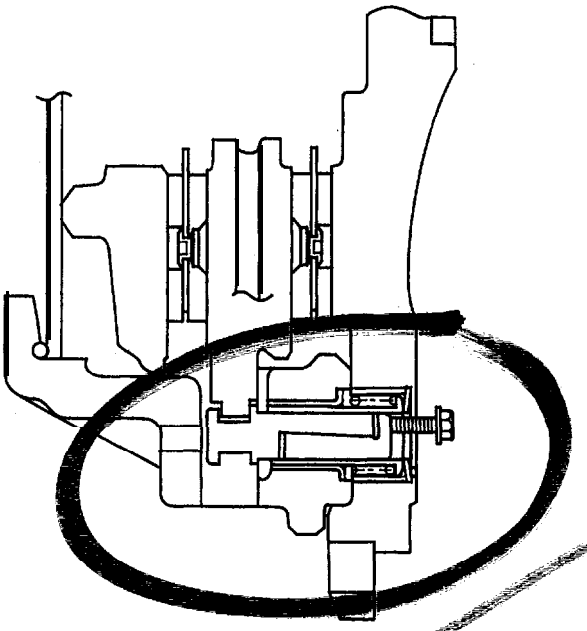
Initialization

NOTE:
- If the pressure plate mounting bolts are unscrewed, the mid plate guide must be initialized.
- Initialize after tightening the pressure plate mount bolts.

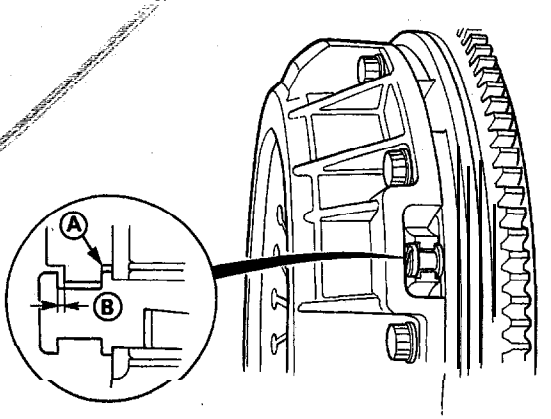
1. Screw the 5 mm bolt into the back of the flywheel until it just touches the mid plate guide.



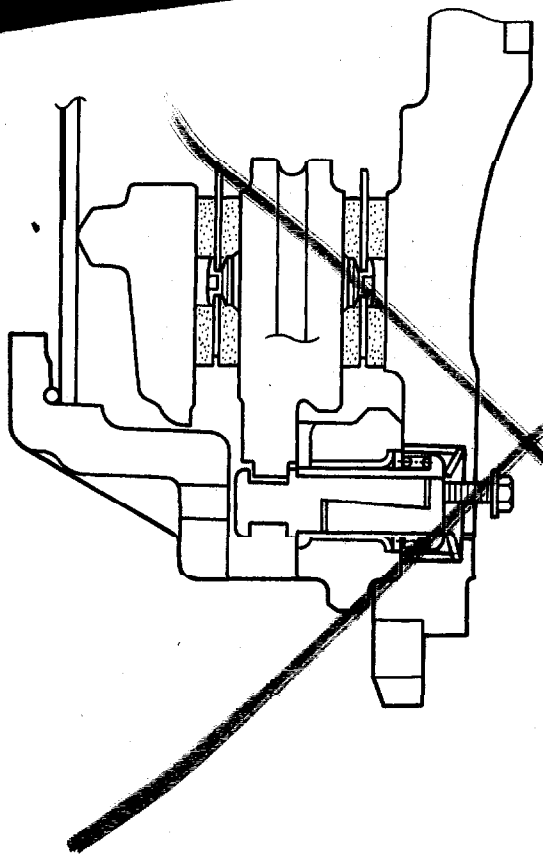
2. Screw the 5 mm bolt in 150-210° further.



3. Make sure that:
   - The mid plate guide touches the back of the mid plate (Ⓐ).
   - There is 0.40—0.55 mm (0.016-0.022 in.) clearance between the mid plate guide and the front of the mid plate.



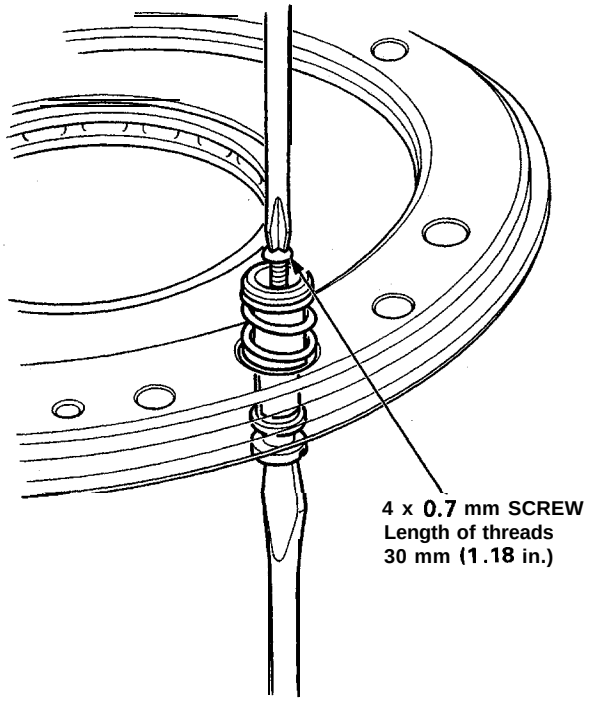
4. Initialize the remaining mid plate guides as described above, then remove the 5 mm bolt.



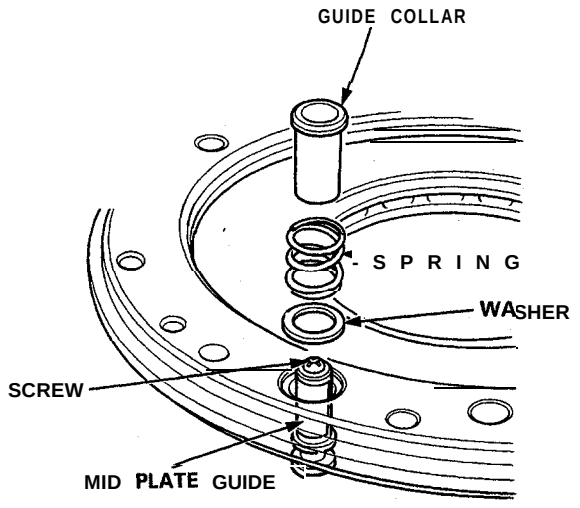
Replacement

NOTE: Make sure all parts are clean before installation.

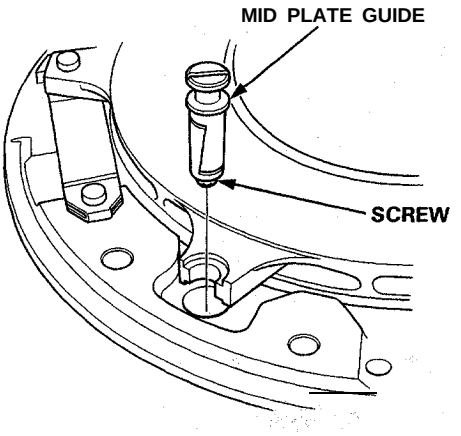
1. **Thread and tighten a 4 mm screw into mid plate guide.**



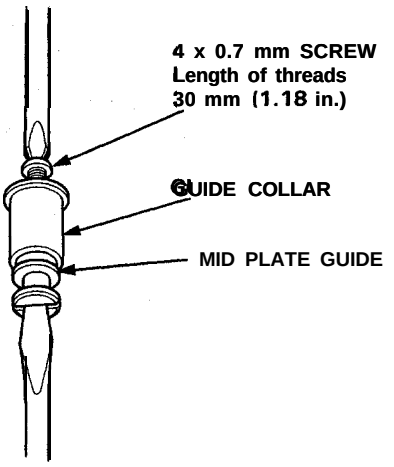
2. Remove the guide collar, spring and washer



3. **Remove the mid plate guide with the screw installed.**



4. Thread and tighten a 4 mm screw into the new mid plate guide, then remove the mid plate guide from the guide collar.

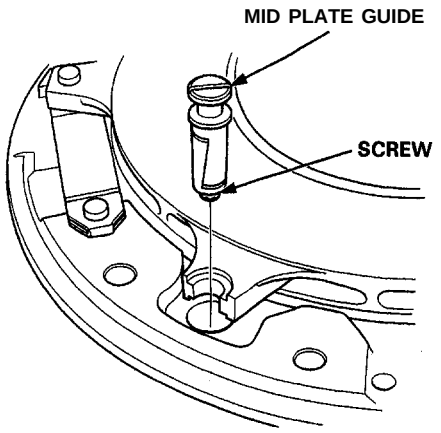


(cont'd)

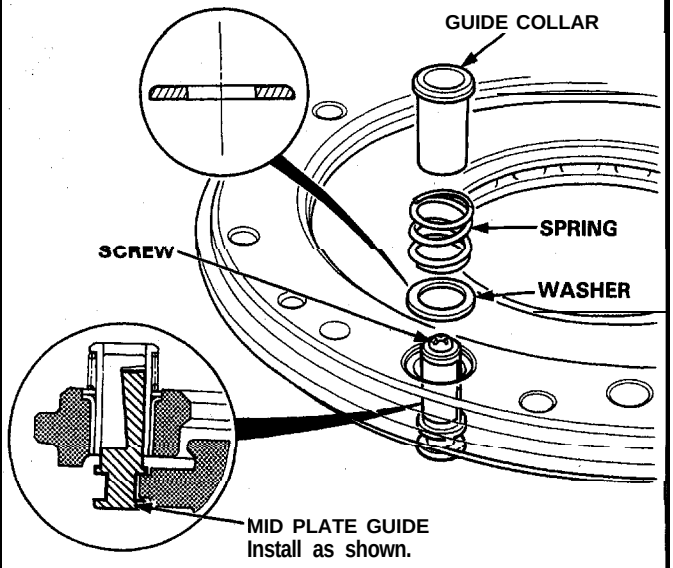
Mid Plate Guide

Replacement (cont'd)

5. Install the new mid plate guide with the screw installed.



6. Install the washer, spring and guide collar, then remove the screw.



7. Initialize the mid plate guides after installing the clutch assembly.
(See page 12-I 6).

Flywheel, Flywheel Bearing

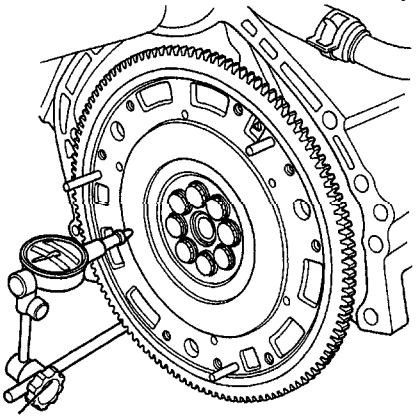
Inspection

NOTE: If replacement is required, always replace the pressure plate, mid plate and flywheel as a set.

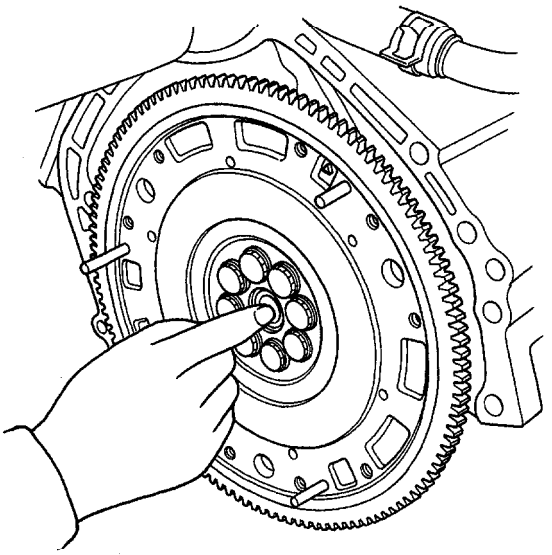
1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

   NOTE: The runout can be measured with engine installed.

   Standard (New): 0.05 mm (0.0020 in.) max.
   Service Limit: 0.15 mm 10.0059 in.)

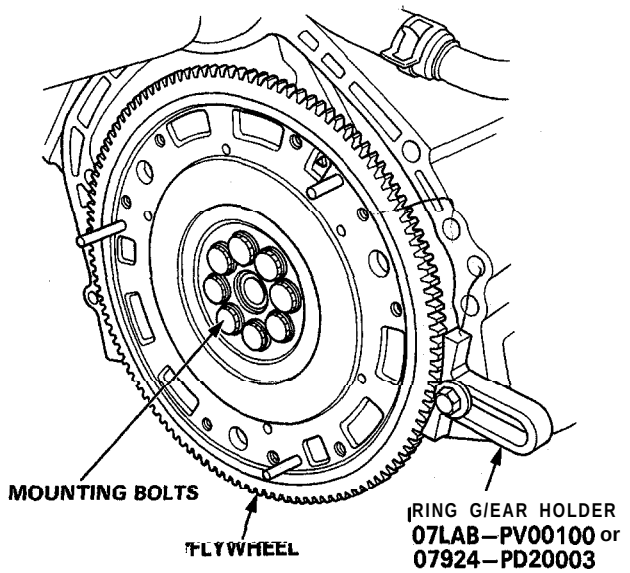


4. Turn the inner race of the flywheel bearing with your finger. The bearing should turn smoothly and quietly. Check that the bearing outer race fits tightly in the flywheel. Replace the bearing if the race does not turn smoothly, quietly, or fit tight in the flywheel.

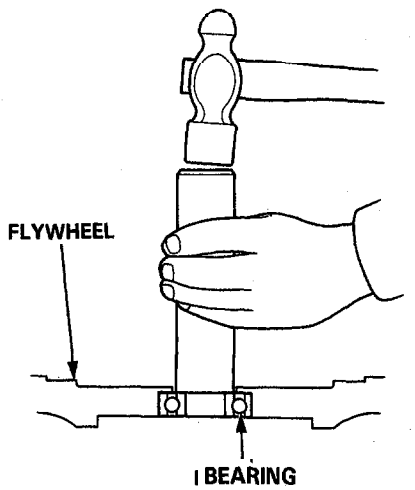


Replacement

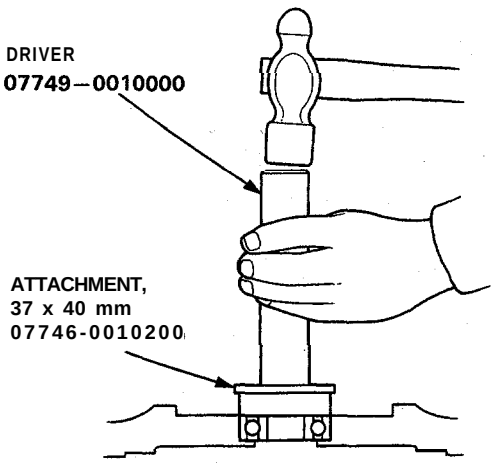
1. Remove the flywheel mounting bolts and the flywheel.



2. Remove the bearing from the flywheel.

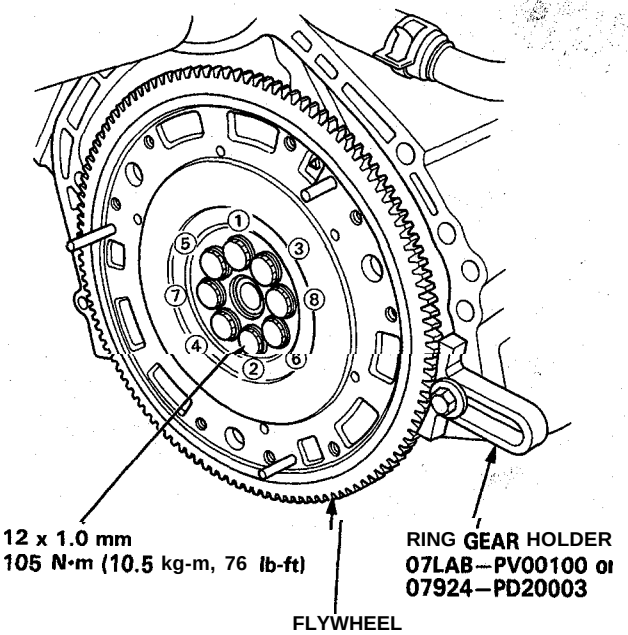


3. Drive in the new bearing into the flywheel using the special tools.



4. Align the hole in the flywheel with the crankshaft dowel pin and install the flywheel. Install the bolts finger tight.

5. Install the special tool, then torque the flywheel bolts in a crisscross pattern, as shown.

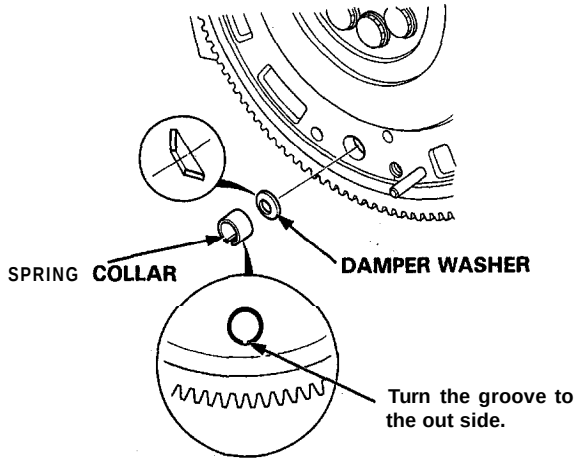


Pressure Plate, Clutch Disc Mid Plate

Installation

NOTE:
- Install the pressure plate, clutch discs and mid plate is a set.
- Do not mix-up the 1 st and 2nd clutch discs. The 2nd clutch disc has a flat plate between the two friction surfaces. The 1st clutch disc has a spring plate between the two friction surfaces.

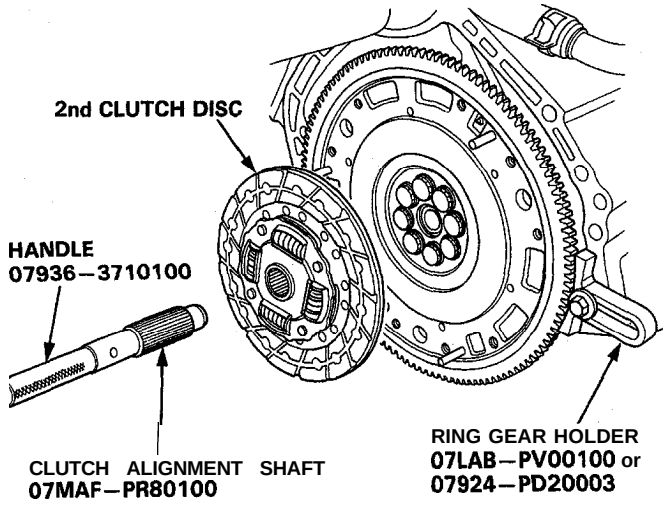
1. Install the damper washer and spring collar.



2. Install the ring gear holder.

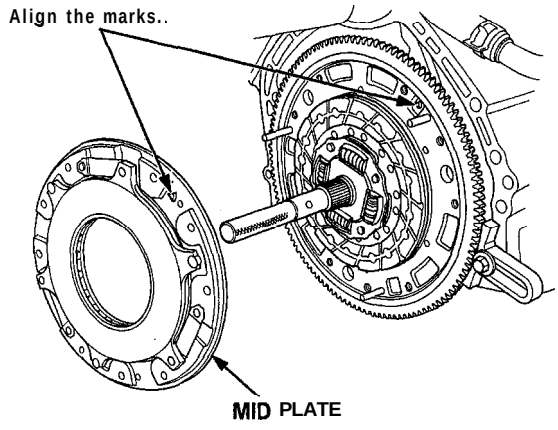
3. Install the 2nd clutch disc.

NOTE: The index mark on the 2nd clutch disc should face away from the flywheel.



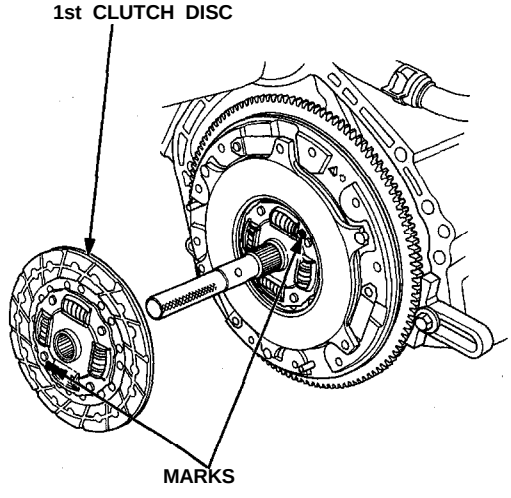
4. Install the mid plate.

NOTE: Align the mark on the flywheel with the mark on the mid plate.



5. Install the 1st clutch disc.

NOTE:
- The marks on the 1st and 2nd clutch discs should be 180° a part.
- The index mark on the 1st clutch disc should face away from the flywheel.

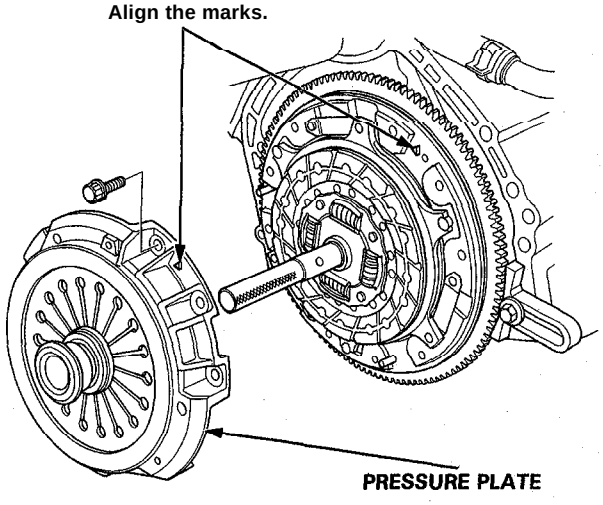


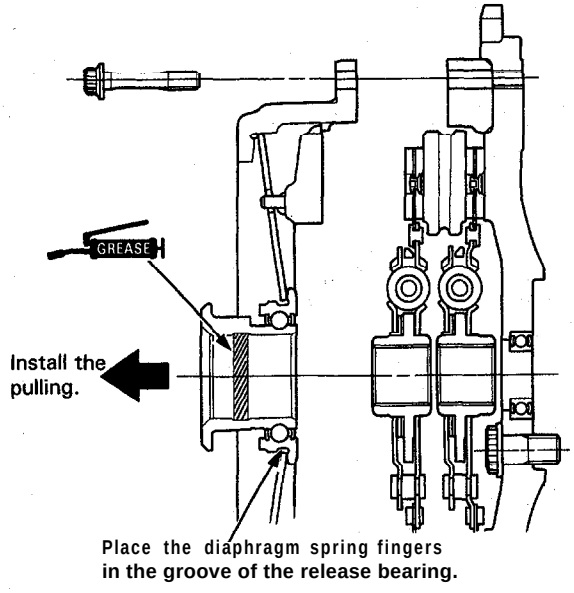
6.. Install the release bearing on the pressure plate.

7. Install the pressure plate.

NOTE:

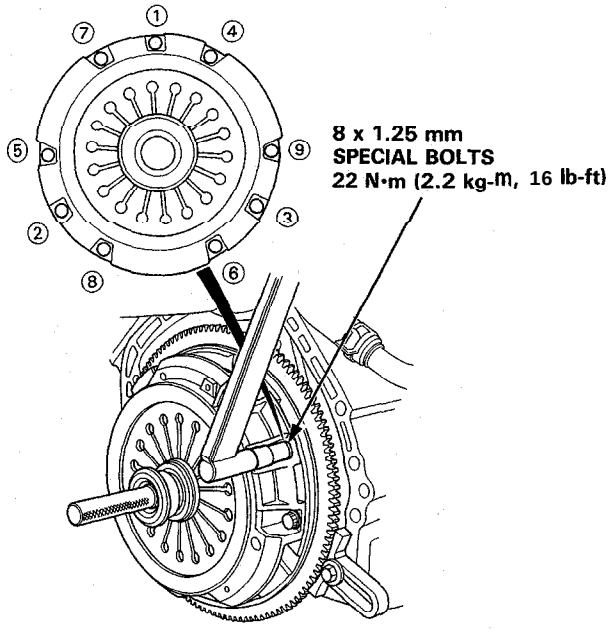
- Align the mark on the mid plate with the mark on the pressure plate.
- After installed, make sure the release bearing no come off.





6. Torque the bolts in a crisscross pattern as shown. Tighten them two turns at a time to prevent warping the diaphragm spring.

NOTE: Place the diaphragm spring fingers in the groove of the release bearing.

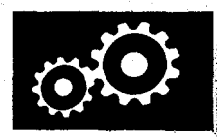


9. Remove the alignment tool and ring gear holder.

10. Initialize the mid plate guides (See Page 12— 16).

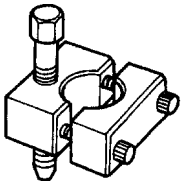
Manual Transmission

Special Tools 13-2
Maintenance 13-3
Back-up light Switch, Neutral Switch
Replacement 13-3
Gearshift Mechanism
Overhaul 13-4
Cable Adjustment 13-5
Transmission Assembly
Removal 13-6
Illustrated index 13-I 0
Transmission Housing
Removal 13-I 2
Reverse Shift Arm, Reverse Shift Fork
Clearance inspection 13-13
Reverse Idler Gear Shaft Assembly
Removal 13-14
Disassembly/Reassembly 13-I 5
Reverse Shift Fork Assembly
Disassembly/Reassembly 13-I 6
Mainshaft, Countershaft, Differential Assemblies
Removal 13-I 6
Shift Lever, Select Lever
Removal 13-17
Change Holder Assembly
Disassembly/Reassembly 13-I 9
Change Holder Assembly, Shift Fork
Clearance Inspection 13-20
Shift Fork, Synchro Sleeve
Clearance Inspection 13-21
Shift Fork Assembly
. Disassembly/Reassembly 13-22
Mainshaft Assembly
Index 13-23
Clearance Inspection 13-24
Disassembly 13-25
Inspection 13-26
Reassembly 13-27
Countershaft Assembly
index 13-29
Clearance inspection 13-30
Disassembly 13-31
Inspection 13-32
Reassembly 13-33
Synchro Ring, Gear
Inspection 13-35
Synchro Sleeve, Synchro Hub
Inspection 13-36
Installation 13-36
Oil Pump
Disassembly/Reassembly 13-37
Clearance Inspection 13-38
Countershaft Bearing (Clutch Housing)
Replacement 13-39
Mainshaft Oil Seal (Clutch Housing)
Replacement 13-40
Mainshaft Thrust Shim
Adjustment 13-41
Transmission
Reassembly 13-43
Transmission Assembly
Installation 13-48

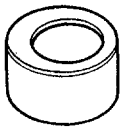


Special Tools

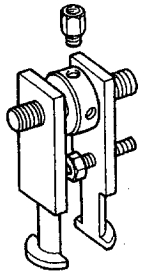
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAJ–PG20110	Mainshaft Holder	1	13-42
②	07GAJ–PG20130	Mainshaft Base	1	13-42
③	* 07736–A01OOOA	Adjustable Bearing Puller, 25-40 mm	1	13-39
④	07746-0010400	Attachment, 52 x 55 mm	1	13-40
⑤	07746-0010500	Attachment, 62 x 68 mm	1	13-39
⑥	07746-0030100	Driver 40 mm I.D.	1	13-42
⑦	07746-0030400	Attachment 35 mm I.D.	1	13-42
⑧	07749-0010000	Driver	1	13-39



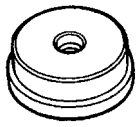
①



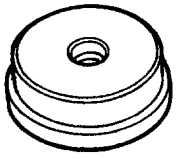
②



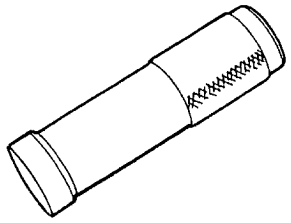
③



④

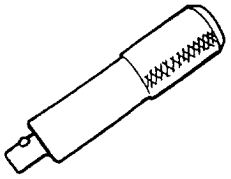


⑤



⑥

⑦



⑧

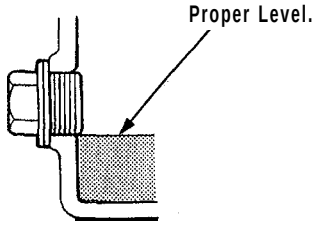
* Must be used with commercially available 3/8 x 1.6 Slide Hammer

Maintenance

Transmission Oil

NOTE: Check with the oil at operating temperature, engine OFF, and the car on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.

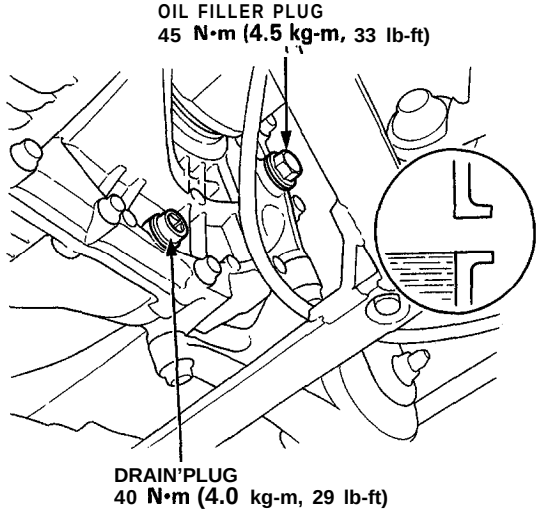


2. The oil level must be up to the fill hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug.
3. If the oil is dirty, remove drain plug and drain transmission.
4. Reinstall the drain plug with a new washer, and refill to proper level.
5. Reinstall the oil filler plug with a new washer.

NOTE: The drain plug washer should be replaced at every oil change.

Oil Capacity
2.7 ℓ (2.9 U.S. qt.) after drain.
2.8 ℓ (3.0 U.S. qt.) after overhaul.

Use only SAE1 OW-30 or 1 OW-40, that exceeds SE grade.

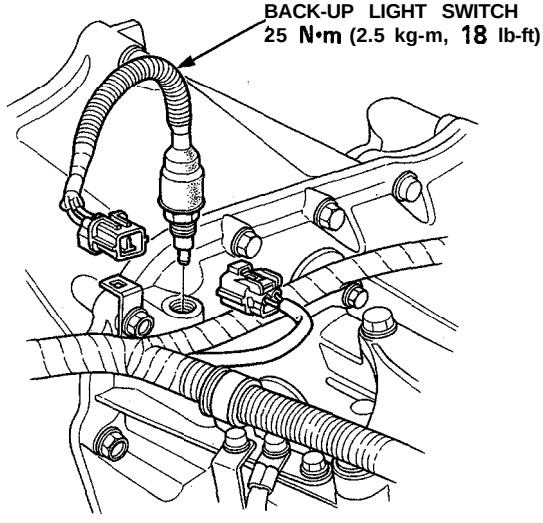


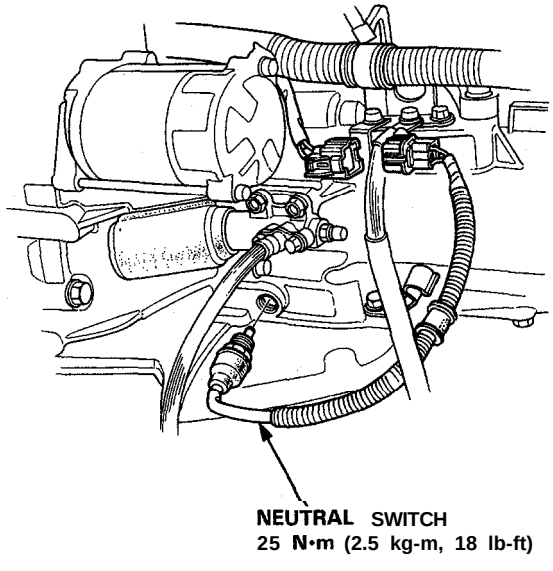
Back-up Light Switch, Neutral Switch

Replacement

NOTE: To check the switch, see section 23.

1. Disconnect the connector, then remove the switch connector from the connector clamp.
2. Remove the switch.
3. Apply liquid gasket (P/N0871 8-550000 OE) to the switch threads, then install the switch.



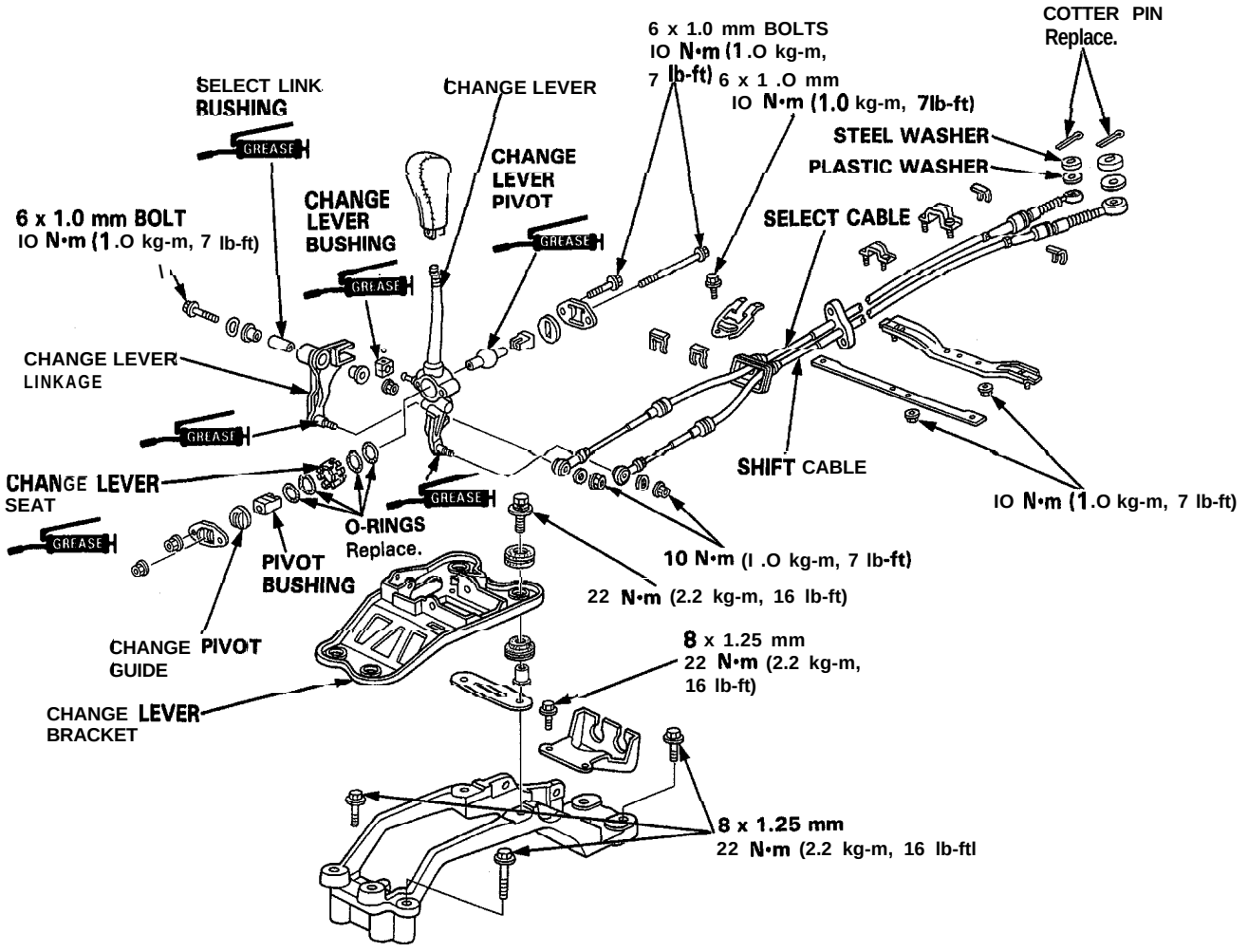


Gearshift Mechanism

Overhaul

NOTE:

- inspect rubber parts for wear or damage when disassembling.
- Check that the new cotter pin is seated firmly.



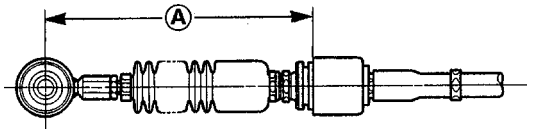
Cable Adjustment

NOTE: See page 13-6, 13-47 for removal and installation.

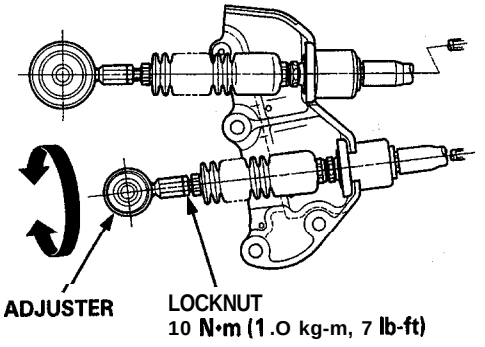
Select Cable

1. With the transmission in neutral, measure the distance Ⓐ.

   Ⓐ: 140.5-141.5 mm (5.53-5.57 in)



2. If distance Ⓐ is out of spec, loosen the locknut and turn the adjuster as necessary.



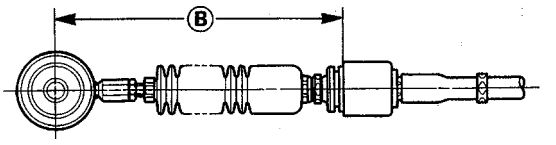
3. Tighten the locknut.

   NOTE: After adjustment, check operation of the gearshift lever.

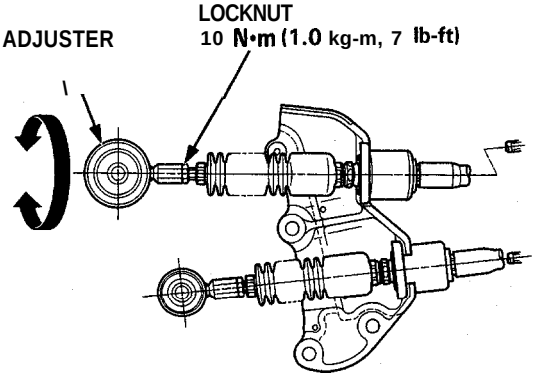
Shift Cable

1. With the transmission in neutral, measure distance Ⓑ.

   Ⓑ: 157.5– 158.5 mm (6.20-6.24 in)



2. If distance Ⓑ is out of spec, loosen the locknut and turn the adjuster as necessary.



3. Tighten the locknut.

   NOTE: After adjustment, check operation of the gearshift lever.

Transmission Assembly

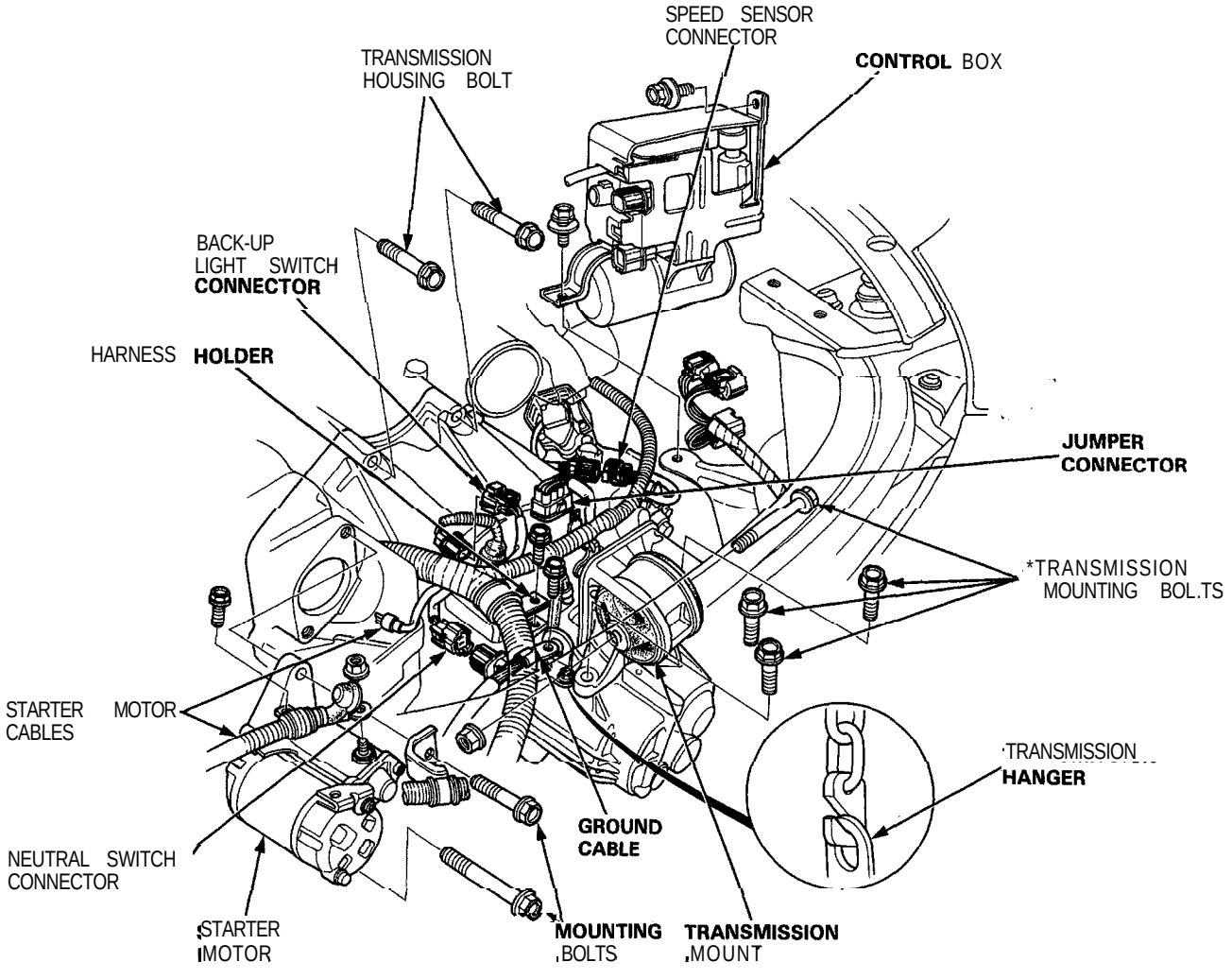
Removal

ARNING Make sure lifts are placed properly, and hoist brackets are attached to correct position. (See page I-6).

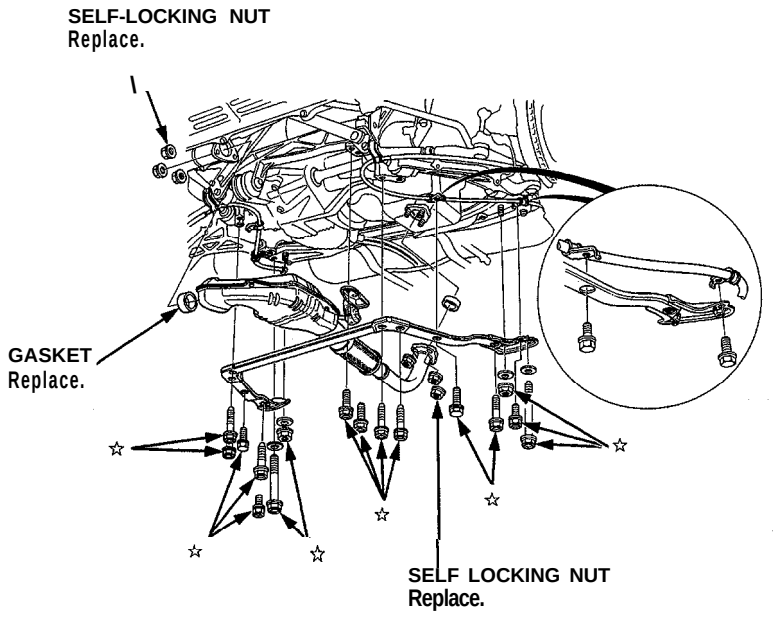
CAUTION:
- **Use fender covers to avoid damaging painted surfaces.**
- **Before removing the transmission, be sure to check and record the rear camber.**

1. Check and record the rear camber. (See section 18.)
2. Disconnect the battery negative (−), and positive (+) cables from the battery.
3. Drain transmission oil. Reinstall the drain plug with a new washer.
4. Remove the strut bar.
5. Remove the air cleaner case.
6. Remove the connectors from the control box and remove the control box.

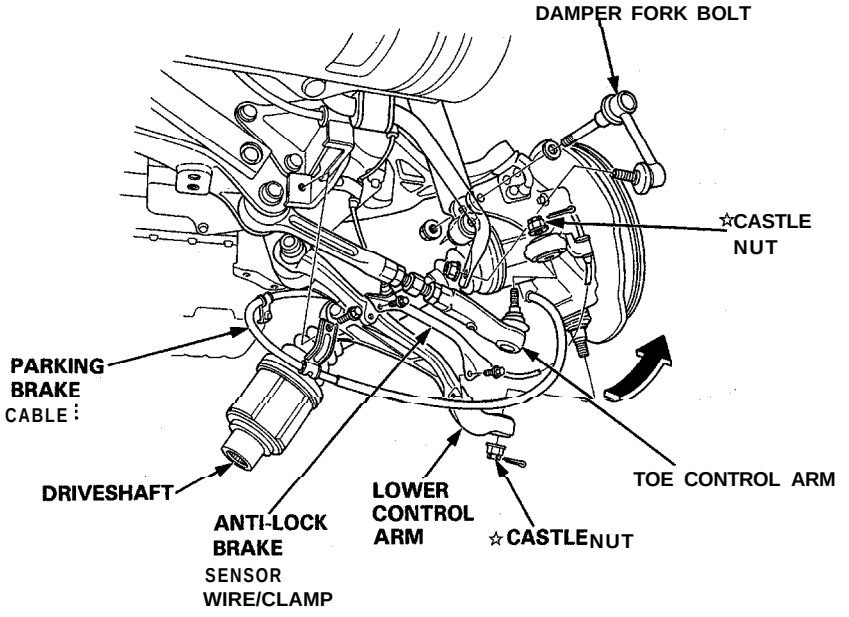
   CAUTION: Do not remove the vacuum tubes from the control box.
7. Remove the wire harness holder, jumper connector and transmission ground cable.
8. Disconnect the switch connectors, then remove the back-up light switch and neutral switch.
9. Disconnect the starter motor cables, then remove the starter motor.
10. Remove the transmission housing bolts.



1 1. Remove the parking brake cable holders from the rear beam rod.
12. Remove the rear beam rod.
13. Remove the front exhaust pipe A.



14. Remove the parking brake cable holder and the Anti-lock Brake sensor wire clamp.
15. Loosen the ball joint nut, then separate the toe control arm from the knuckle using the special tool. (See Section 18.)
16. Remove the damper fork bolt.
17. Remove the ball joint nut using the special tool and separate the lower control arm from the knuckle. (See Section 18.)
18. Remove the right driveshaft from the intermediate shaft.

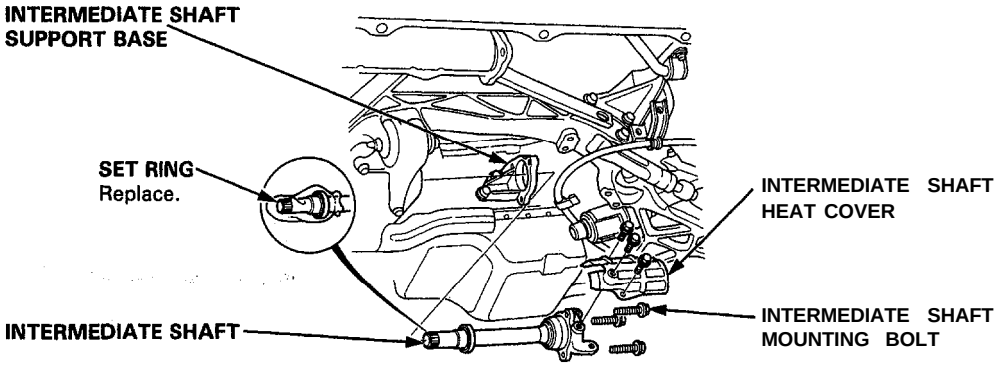


(cont'd)

Removal (cont'd)

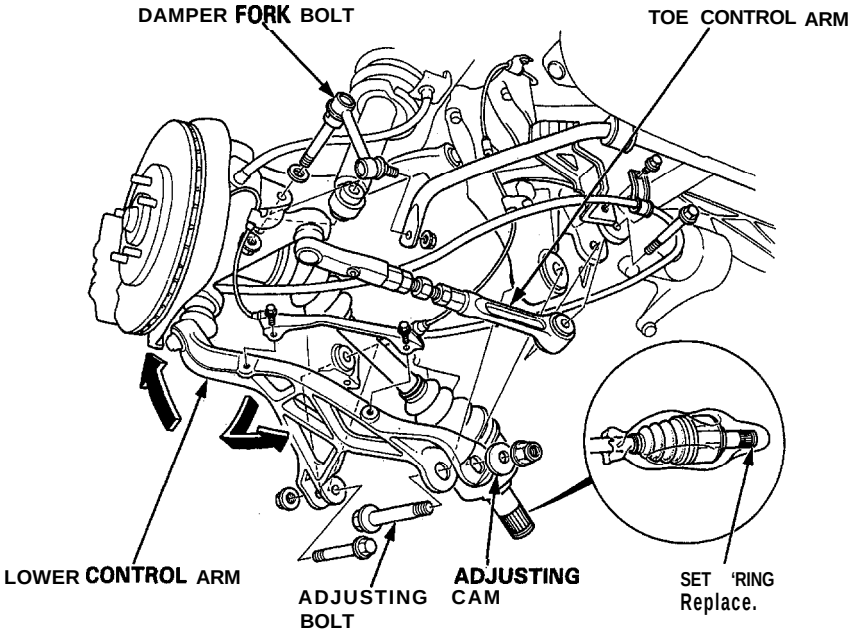
19. Remove the intermediate shaft heat cover and the intermediate shaft mounting bolts.
20. Pry the intermediate shaft out of the differential, Pull and remove it.

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



21. Remove the parking brake cable holder and the Anti-lock Brake sensor wire clamp.
22. Scribe a reference mark on the flange of the adjusting bolt, adjusting cam and lower control arm.
23. Loosen the ball joint nut, then separate the toe control arm from the knuckle using the special tool. (See Section 18.)
24. Remove the damper fork bolt.
25. Remove the bolts and lower control arm from the side beam.
26. Remove the left driveshaft from the differential.
27. Pry the driveshaft out of the differential, Pull and remove it.

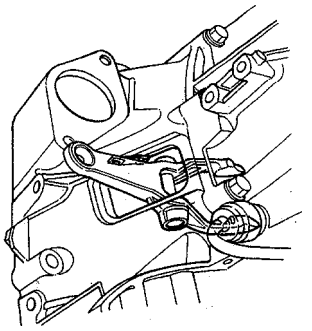
NOTE:
- Coat all precision finished surfaces with clean engine oil or grease.
- Tie plastic bags over the driveshaft ends.

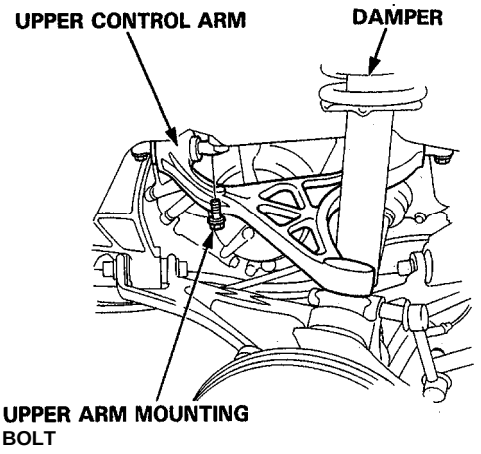


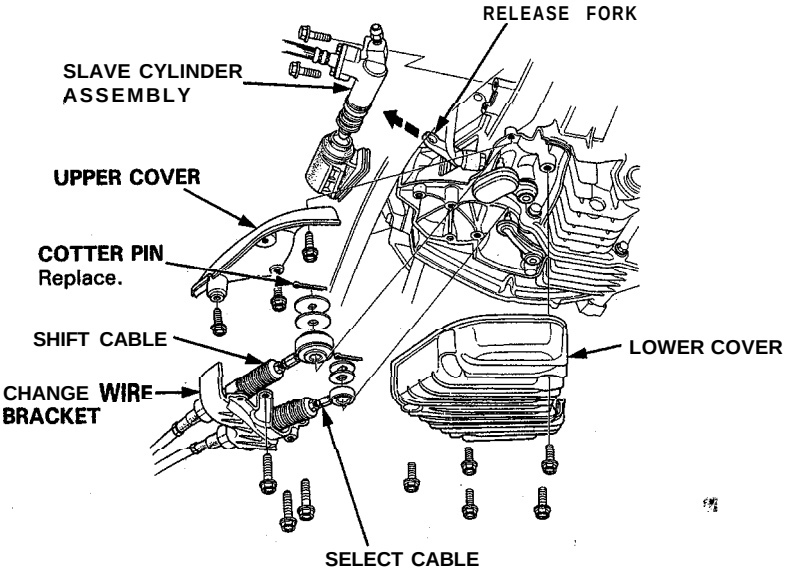
28. Remove the one of the upper control arm mounting bolts.
29. Remove the lower cover, change wire braket and upper cover.
30. Remove the shift cable and select cable.
31. Remove the slave cylinder from the transmission.

NOTE: Do not operate the clutch pedal once the slave cylinder has been removed.

32. Remove the release fork from the clutch release hanger, then hang the release fork on the clutch housing.



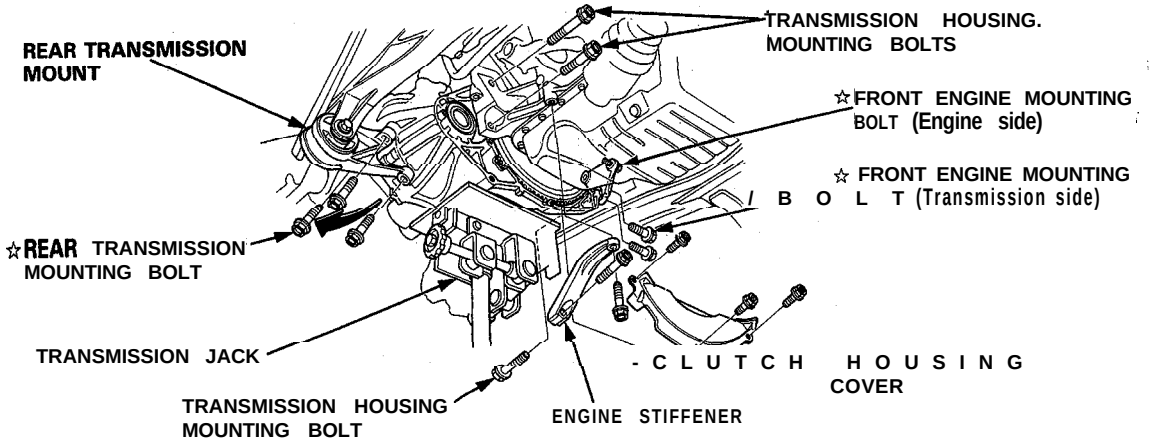




33. Remove the clutch housing cover.
34. Attach a chain hoist to the transmission hangers.
35. Place a jack under the transmission and raise the transmission just enough to take weight off mounts.
36. Remove the front engine mounting bolts on the transmission side and retighten the bolt on the engine side.

CAUTION: Loosen the front engine mounting bolt on the engine side, but do not remove it. After removing the two bolts on the transmission side, be sure to retighten the bolt on the engine side.

37. Remove the rear transmission mounting bolts and engine stiffener.
38. Remove the transmission housing mounting bolts.
39. Pull the transmission away from the engine until it clears the Mainshaft, then lower it on the transmission jack.



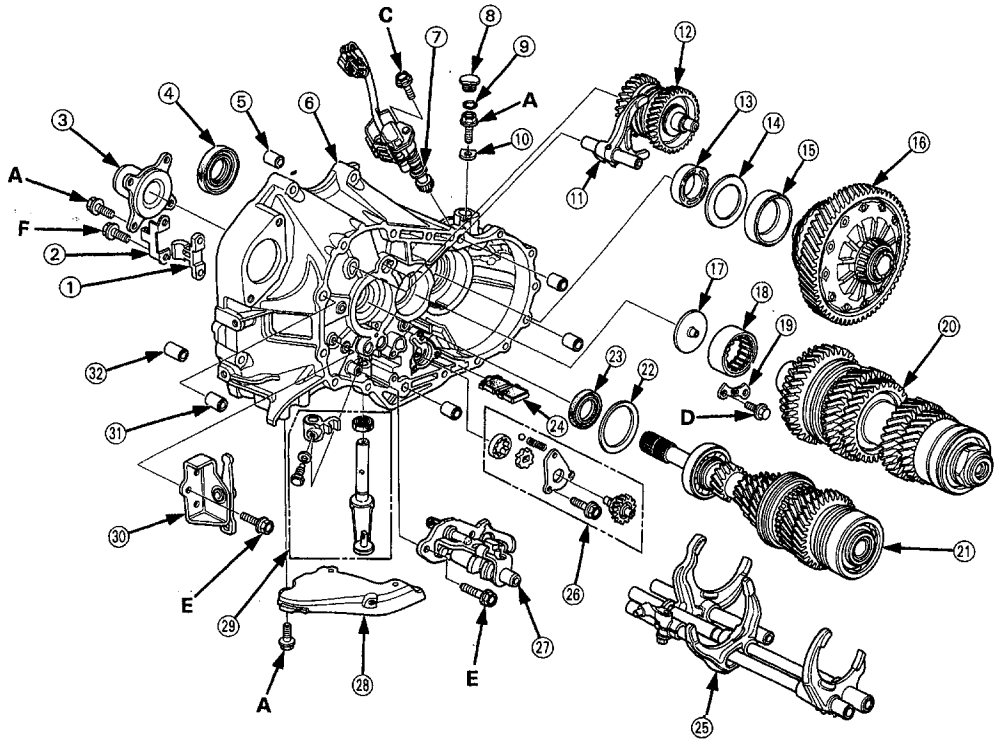
Illustrated Index

Clean all parts thoroughly in solvent and dry with compressed air.

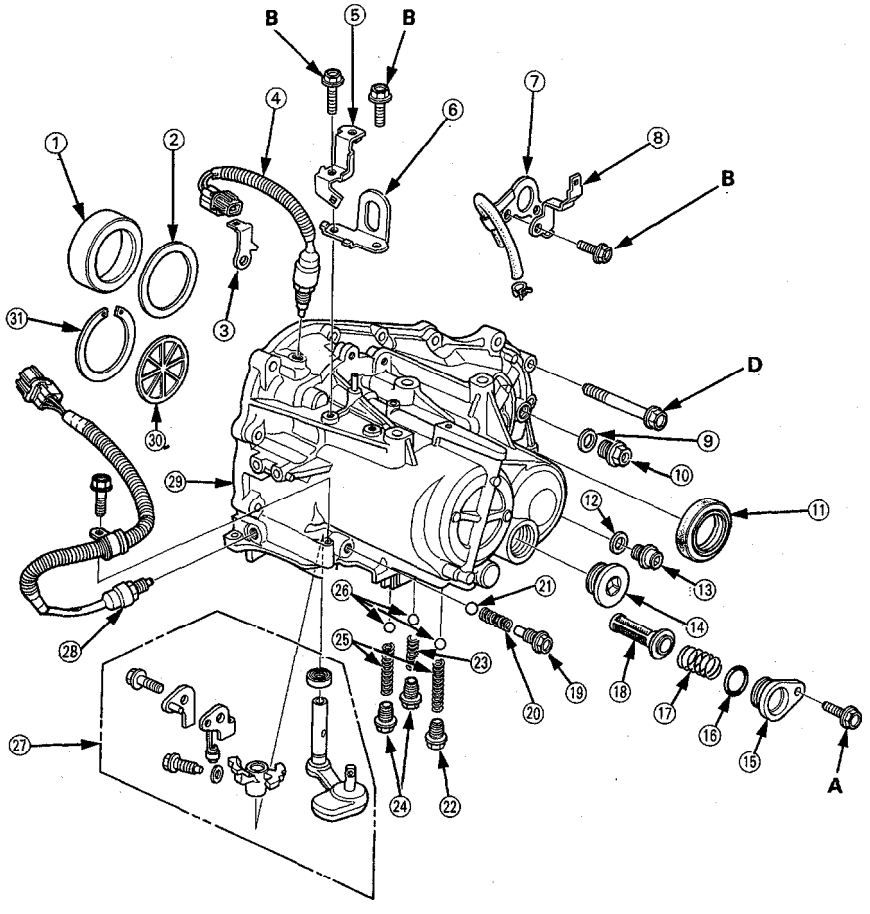
Lubricate all parts with oil before reassembly.

NOTE:

- **This transmission uses no gaskets between the major housings; use P/N 08718-550000 OE sealant.** Assemble the housings within 20 minutes after applying the sealant and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.
- Always clean the magnet ㉔ whenever the transmission housing is disassembled.



① CLUTCH RELEASE HANGER
② RELEASE HANGER SPRING
③ RELEASE BEARING GUIDE
④ 40 x 68 x 12.5 mm OIL SEAL
Replace.
⑤ 10 x 20 mm DOWL PIN
⑥ CLUTCH HOUSING
⑦ SPEED SENSOR
⑧ SENSOR DUMMY COVER
⑨ O-RING
Replace.
⑩ HOLDER PLATE
⑪ REVERSE SHIFT FORK ASSEMBLY
. Disassembly/Reassembly, page 13-16
⑫ REVERSE IDLE GEAR SHAFT ASSEMBLY
. Disassembly/Reassembly, page 13-15
⑬ OIL GUIDE RING
⑭ 90 mm WASHER
⑮ BEARING OUTER RACE
⑯ DIFFERENTIAL ASSEMBLY
. See Section 15
⑰ OIL GUIDE PLATE
⑱ 44 x 72 x 23 mm NEEDLE BEARING
⑲ BEARING RETAINING PLATE
⑳ COUNTERSHAFT ASSEMBLY
. Index, page 13-29
㉑ MAINSHAFT ASSEMBLY
. Index, page 13-23
㉒ 75 mm SPRING WASHER
㉓ 32 x 46 x 7 mm OIL SEAL
Replace.
㉔ TRANSMISSION MAGNET
㉕ SHIFT FORK ASSEMBLY
. Disassembly/Reassembly. page 13-22
㉖ OIL PUMP ASSEMBLY
. Disassembly/Reassembly, page 13-37
㉗ CHANGE HOLDER ASSEMBLY
. Disassembly/Reassembly, page 13-19
㉘ UPPER COVER
㉙ SELECT LEVER ASSEMBLY
. Removel, page 13-17
. Installation, page 13-43
㉚ REVERSE SHIFT ARM
㉛ 14 x 20 mm DOWEL PINS
㉜ 14 x 20 mm DOWEL PIN



① BEARING OUTER RACE
② 75 mm THRUST SHIM
Selection.
③ CLAMP
④ BACK-UP LIGHT SWITCH
25 N•m (2.5 kg-m, 18 lb-ft)
⑤ CLAMP
⑥ TRANSMISSION HANGER A
⑦ TRANSMISSION HANGER B
⑧ STAY
⑨ WASHER
Replace.
⑩ OIL FILLER PLUG
45 N•m (4.5 kg-m, 33 lb-ft)
⑪ 42 x 63 x 12.5 mm OIL SEAL
Replace.
⑫ WASHER
Replace.
⑬ DRAIN PLUG
40 N•m (4.0 kg-m, 29 lb-ft)
⑭ 36 mm SEALING BOLT
35 N•m (3.5 kg-m, 25 lb-ft)
⑮ STRAINER COVER
⑯ O-RING
Replace.
⑰ STRAINER SET SPRING
⑱ OIL PUMP STRAINER
⑲ 14 mm SEALING BOLT
33 N•m (3.3 kg-m, 24 lb-ft)
⑳ SPRING (L. 25 mm)
㉑ STEEL BALL (LARGE)
㉒ 16 mm SEALING BOLT
42 N•m (4.2 kg-m, 30 lb-ft)
㉓ SPRING (L. 24.2 mm)
㉔ 16 mm SEALING BOLTS
42 N•m (4.2 kg-m, 30 lb-ft)
㉕ SPRING (L. 30 mm)
㉖ STEEL BALL (SMALL)
㉗ SHIFT LEVER ASSEMBLY

• Removal, page 13-l 7
• Installation, page 1'3-43

㉘ NEUTRAL SWITCH
25 N•m (2.5 kg-m, 18 lb-ft)
㉙ TRANSMISSION HOUSING
㉚ OIL GUIDE PLATE
㉛ 82 mm THRUST SHIM

• Selection, page 13-41

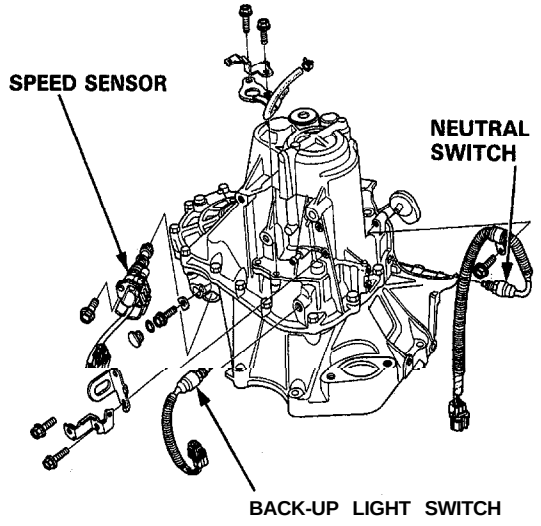
Torque Value	Bolt Size
A-12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm
B- 24 N•m (2.4 kg-m, 17 lb-ft)	8 x 1.25 mm
C-26 N•m (2.6 kg-m, 19 lb-ft)	8 x 1.25 mm
D-45 N•m (4.5 kg-m, 33 lb-ft)	10 x 1.25 mm
E- 12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1 .O mm SPECIAL BOLT
F- 15 N•m (1.5 kg-m, 11 lb-ft)	6 x 1 .0 mm SPECIAL BOLT
G-26 N•m (2.6 kg-m, 19 lb-ft)	8 x 1.25 mm SPECIAL BOLT

Transmission Housing

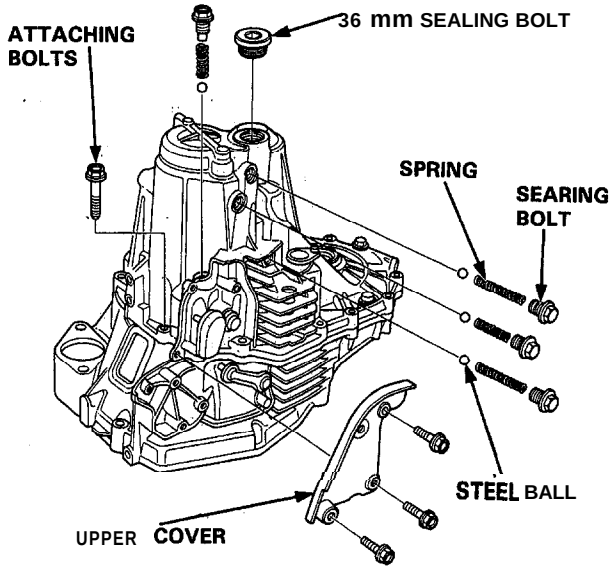
Removal

NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

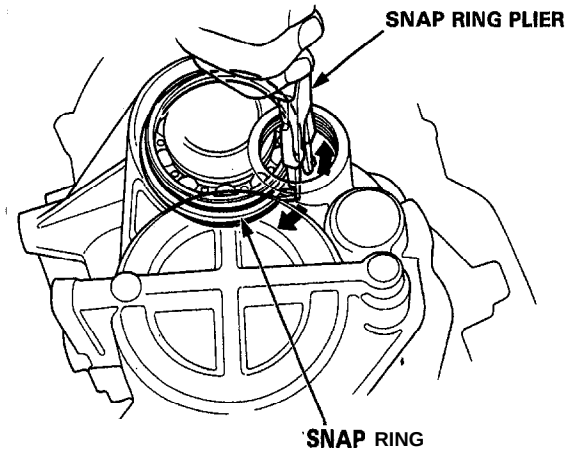
1. Remove the back-up light switch, neutral switch and speed sensor.



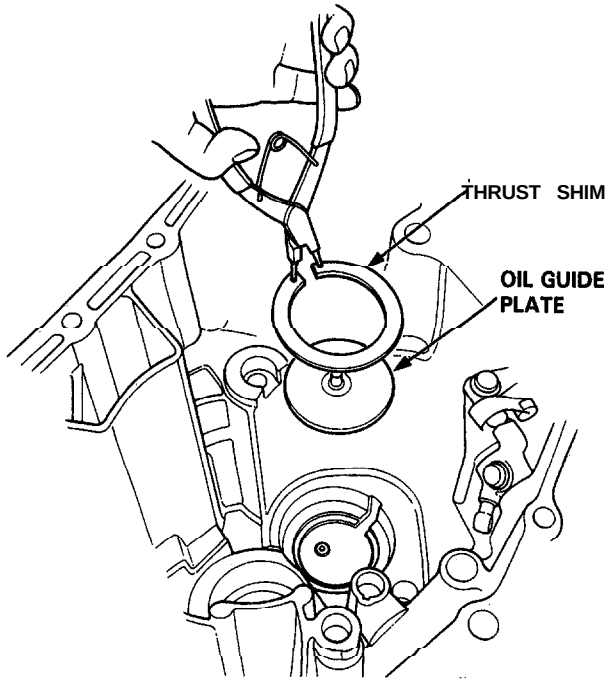
2. Remove the sealing bolts, springs and steel balls.
3. Remove the upper cover, then remove the transmission housing attaching bolts.
4. Remove the 36 mm sealing bolt.



5. Expand the snap ring on the countershaft ball bearing and remove it from the groove using a pair of snap ring pliers.



6. Separate the clutch housing from the transmission housing.
7. Remove the thrust shim and oil guide plate from the transmission housing.

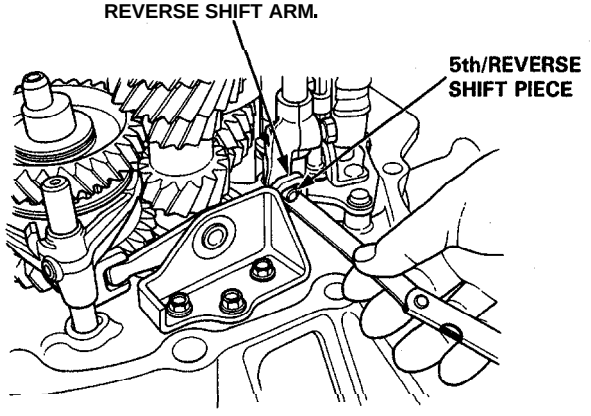


Reverse Shift Arm., Reverse Shift Fork

-Clearance Inspection

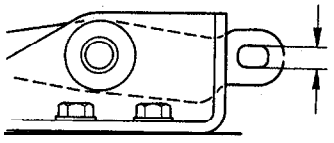
1. Measure the clearance between the reverse shift arm and the 5th/reverse shift piece.

   Standard: 0.05-0.30 mm (0.0020-0.0118 in)
   Service Limit: 0.5 mm (0.020 in)



2. If the clearance exceeds the service limit, measure the width of the groove in the reverse shift arm.

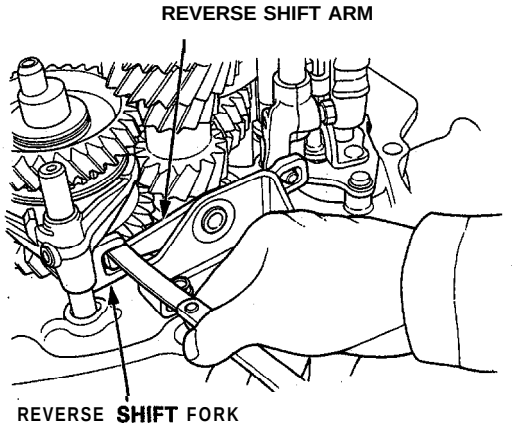
   Standard: 7.05-7.20 mm (O-2776-0.2835 in.)



If the width of the groove exceeds the standard, replace the reverse shift arm with a new one.
If the width of the groove is within the standard, replace the 5th/reverse shift piece with a new one.

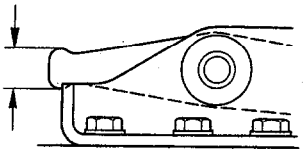
3. Measure the clearance between the reverse shift arm and reverse shift fork.

   Standard: 0.05-0.35 mm (0.0020-0.0138 in.)
   Service Limit: 0.5 mm (0.020 in.)



4. If the clearance exceeds the service limit, measure the width of the reverse shift arm.

   Standard: 12.8-13.0 mm (0.5039—0.512 in.)



If the width exceeds the standard, replace the reverse shift arm with a new one.
If the width is within the standard, replace the reverse shift fork with a new one.

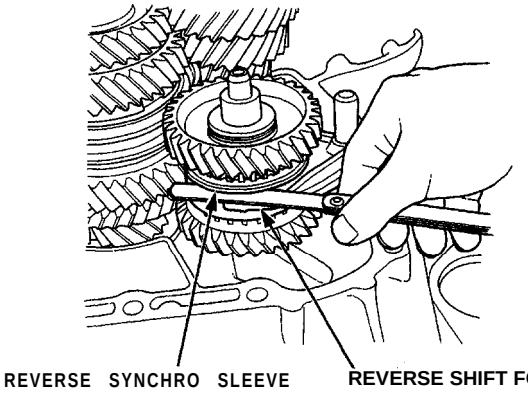
(cont'd)

Reverse Shift Arm, Reverse Shift Fork

- Clearance Inspection (cont'd)

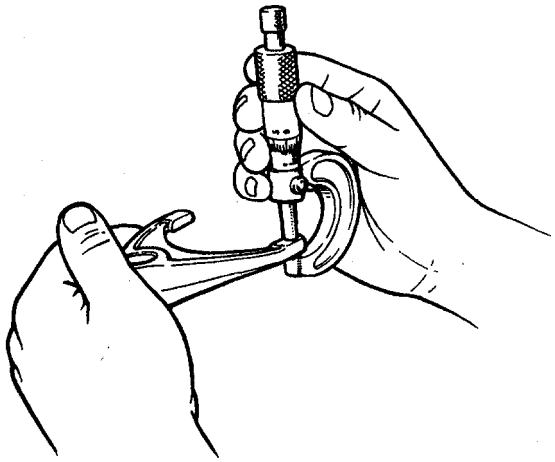
5. Measure the clearance between the reverse shift fork and reverse synchro sleeve.

   Standard: 0.45-0.65 mm (0.0177-0.0256 in.)
   Service Limit: 1 .O mm (0.394 in.)



6. If the clearance exceeds the service limit, measure the thickness of the shift fork fingers.

   Standard: 6.4-6.5 mm (0.2520–0.2559 in)



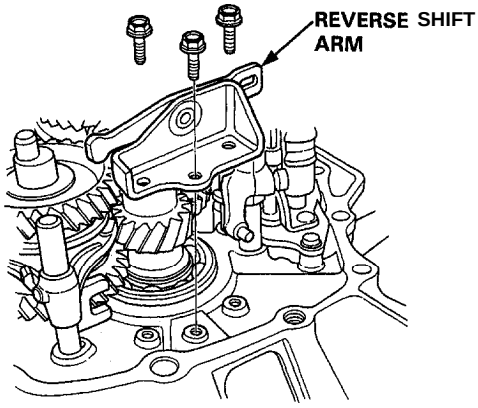
If the thickness exceeds the standard, replace the reverse shift fork with a new one.
If the thickness is within the standard, replace the reverse synchro sleeve with a new one.

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

Reverse Idler Gear Shaft Assembly

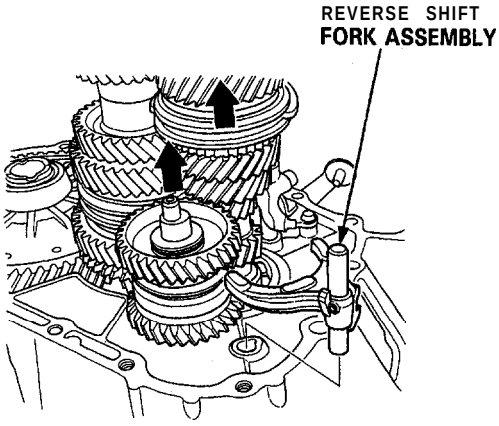
- Removal

1. Remove the reverse shift arm from the clutch housing.

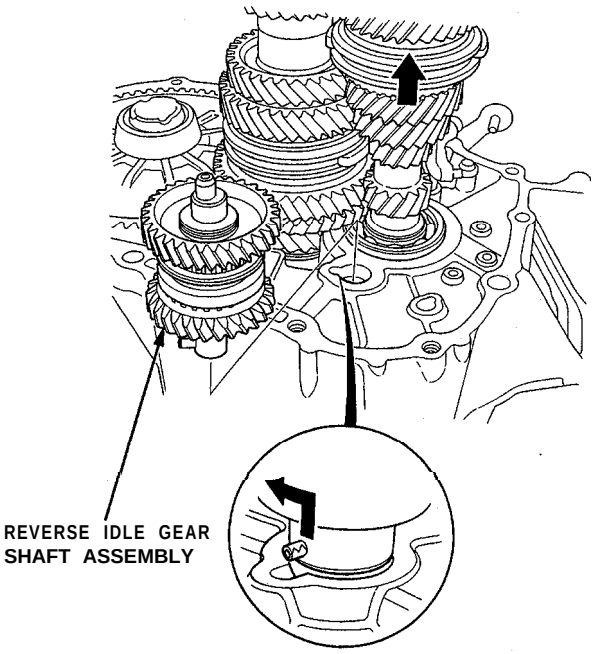


2. Shift the reverse shift fork to the driven gear side.

3. Lift the mainshaft assembly and reverse idler gear shaft assembly, then remove the reverse shift fork assembly.

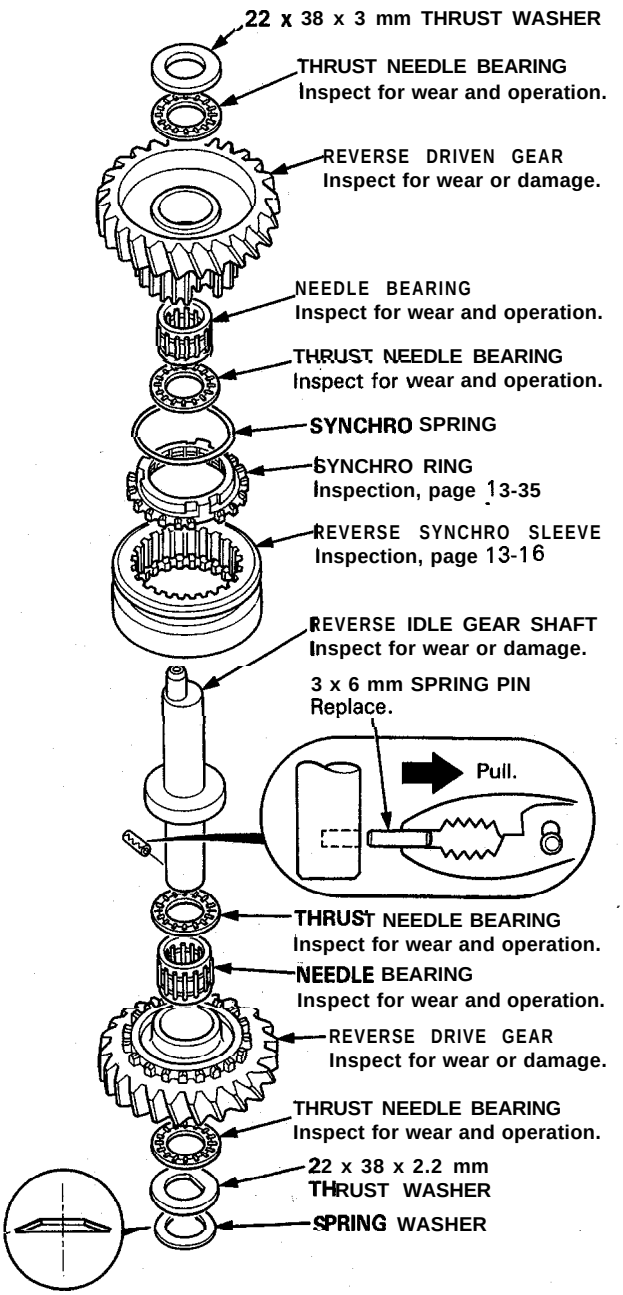


4. Lift the reverse idler gear shaft, then remove the spring pin from the groove and remove the idler gear shaft assembly.



NOTE:
- The thrust needle bearing are the same size.
- The needle bearing are the same size.

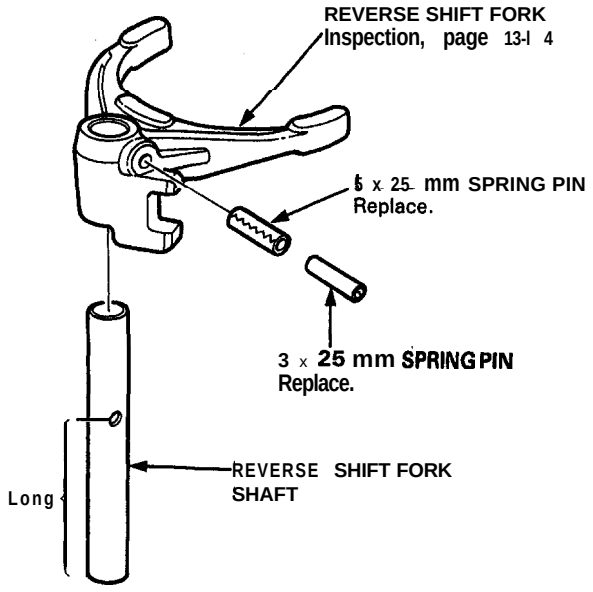
Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surface.



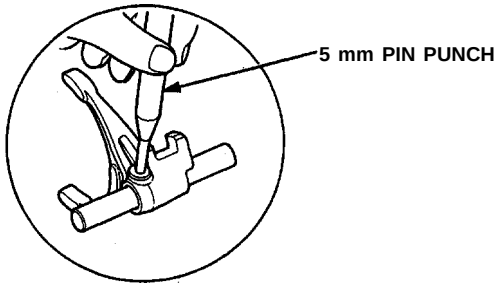
Reverse Shift Fork Assembly

Disassembly/Reassembly

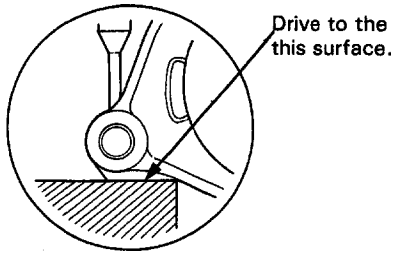
NOTE: The spring pin grooves should be 180° apart.



Disassembly:
Remove with the 3 mm spring pin and 5 mm spring pin.



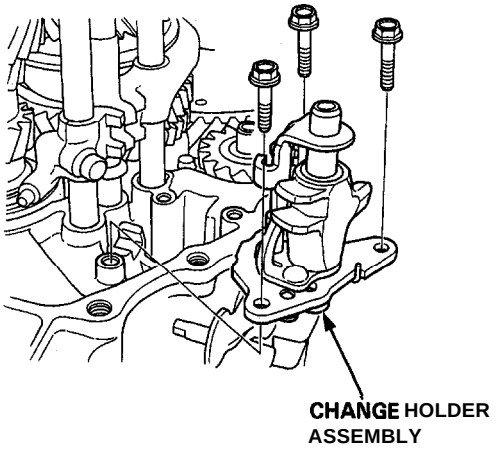
Reassembly:
Install the 5 mm spring pin first, then install the 3 mm spring pin.



Mainshaft, Countershaft, Differential Assemblies

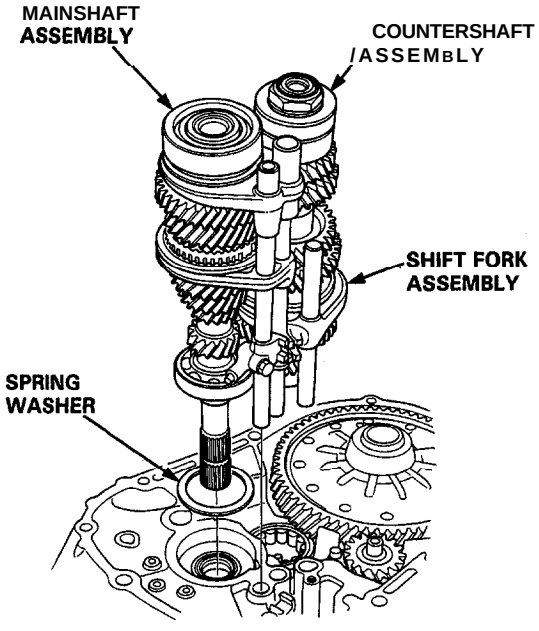
Removal

1. Remove the change holder assembly from the clutch housing.

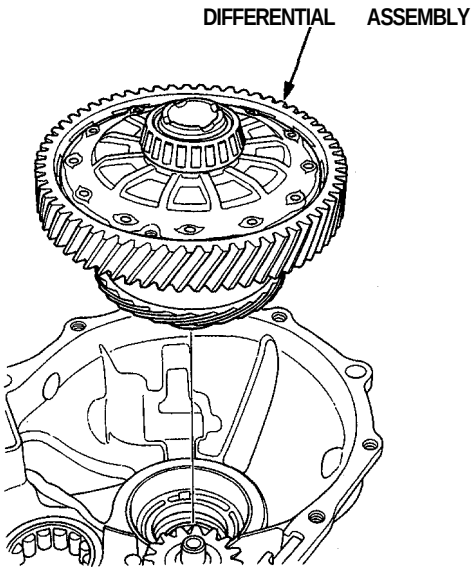


2. Remove the mainshaft assembly and countershaft assembly with the shift fork from the clutch housing.

NOTE: Tape the mainshaft splines to protect them before removing the mainshaft and countershaft assemblies.

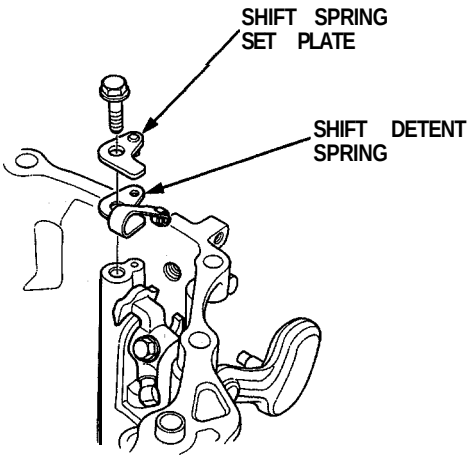


3. Remove the differential assembly from the clutch housing.



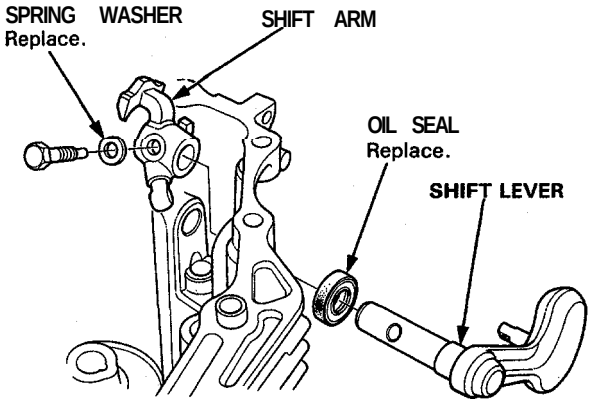
Removal

1. Remove the shift spring set plate and shift detent spring from the transmission housing.



2. Remove the bolt and spring washer.

3. Pull out the shift lever, then remove the shift arm.



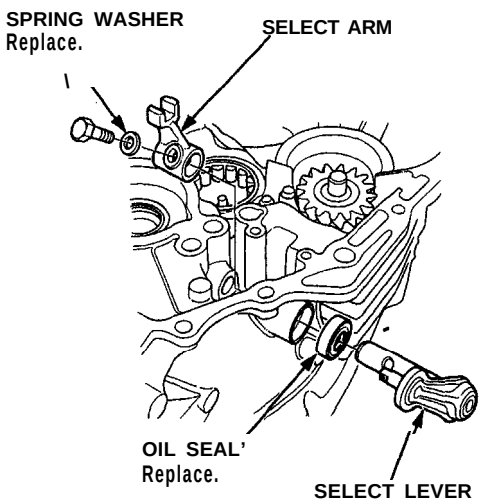
(con'd)

Shift Lever, Select Lever

Removal (cont'd)

4. Remove the bolt and spring washer.

5. Pull out the select lever, then remove the select arm.

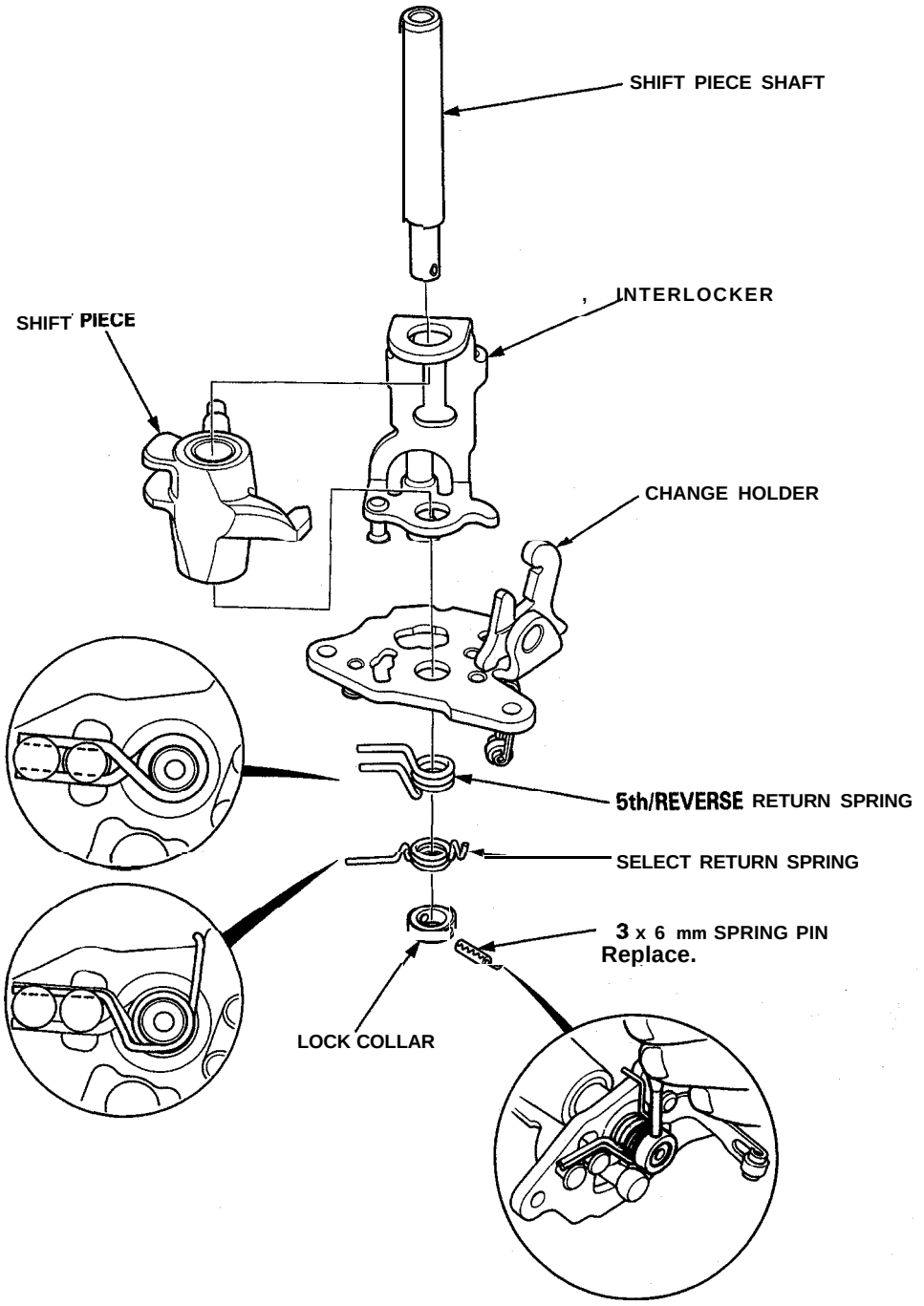


Change Holder Assembly

-Disassembly/Reassembly

NOTE: Make sure the return springs are installed properly.

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

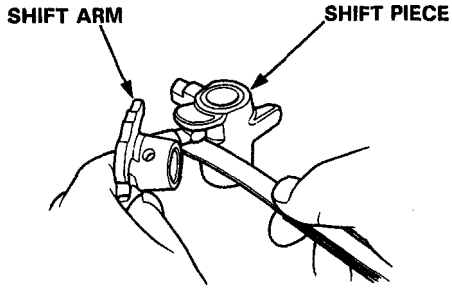


Change Holder Assembly, Shift Fork

· Clearance Inspection

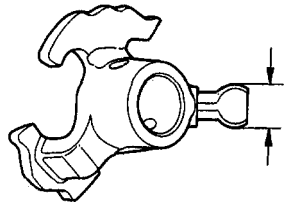
1. Measure the clearance between the shift piece and shift arm.

   Standard: 0.05—0.25 mm (0.0020-0.0098 in.)
   Service Limit: 0.5 mm (0.020 in.)



2. If the clearance exceeds the service limit, measure the width of the shift arm.

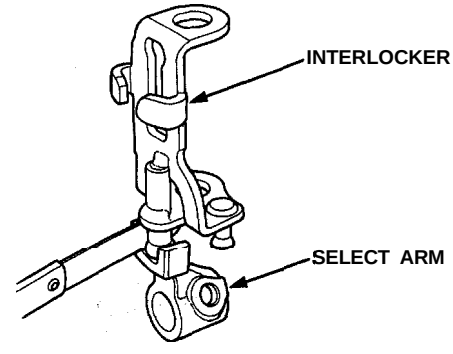
   Standard: 12.9-13.0 mm (0.5079-0.5118 in.)



If the width of the shift arm exceeds the standard, replace the shift arm with a new one.
If the width of the shift arm is within the standard, replace the shift piece with a new one.

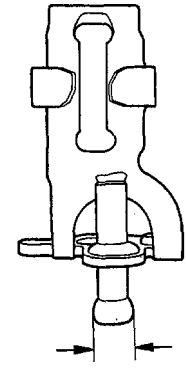
3. Measure the clearance between the interlocker and select arm.

   Standard: 0.03-0.15 mm (0.0012-0.0059 in.)



4. If the clearance exceeds the standard, measure the interlocker finger.

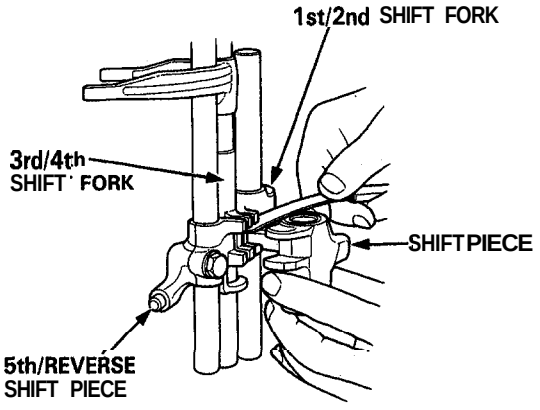
   Standard: 11.95— 12.00 mm (0.4705-0.4724 in.)



If the width of the interlocker exceeds the standard, replace the interlocker with a new one.
If the width of the interlocker is within the standard, replace the select arm with a new one.

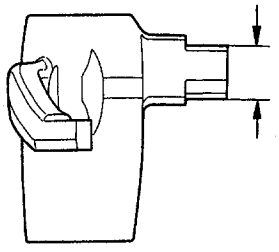
5. Measure the clearance between the shift fork, the 5th/Reverse shift piece and shift piece.

   Standard: 0.2-0.5 mm (0.0079-0.0197 in.)
   Service Limit: 0.6 mm (0.024 in.)



6. If the clearance exceeds the service limit, measure the width of the shift piece.

   Standard: 11.9– 12.0 mm (0.4685-0.4724 in.)

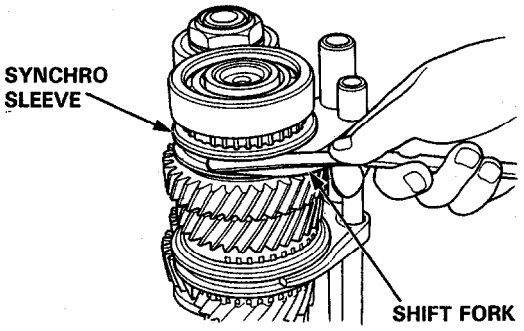


If the width of the shift piece exceeds the standard, replace the shift piece with a new one.
If the width of the shift piece is within the standard, replace the 5th/Reverse shift piece with a new one.

Clearance Inspection

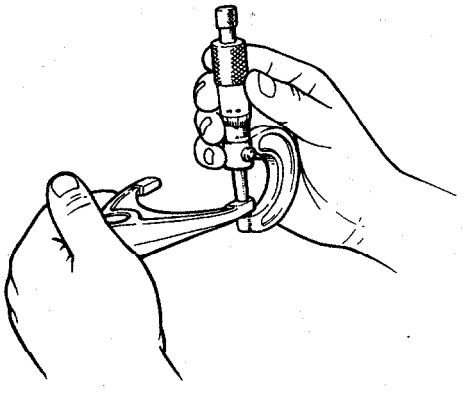
1. Measure the clearance between each shift fork and its matching synchro sleeve.

   Standard: O-45-0.65 mm (0.0177–0.0256 in)
   Service Limit: 1 .O mm (0.0394 in)



2. If the clearance exceeds the service limit, measure the width of the shift fork fingers.

   Standard:
   1st/2nd SHIFT FORK: 8.9–9.0 mm (0.3504–0.3543 in.)
   3rd/4th SHIFT FORK: 7.4-7.5 mm (0.2913-0.2953 in.)
   5th SHIFT FORK: 6.4-6.5 mm (0.2520-0.2559 in.)



If the width of the shift fork fingers exceeds the standard, replace the shift fork with a new one.
If the width of the shift fork fingers is within the standard, replace the synchro sleeve with a new one.

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

Shift Fork Assembly

-Disassembly/Reassembly

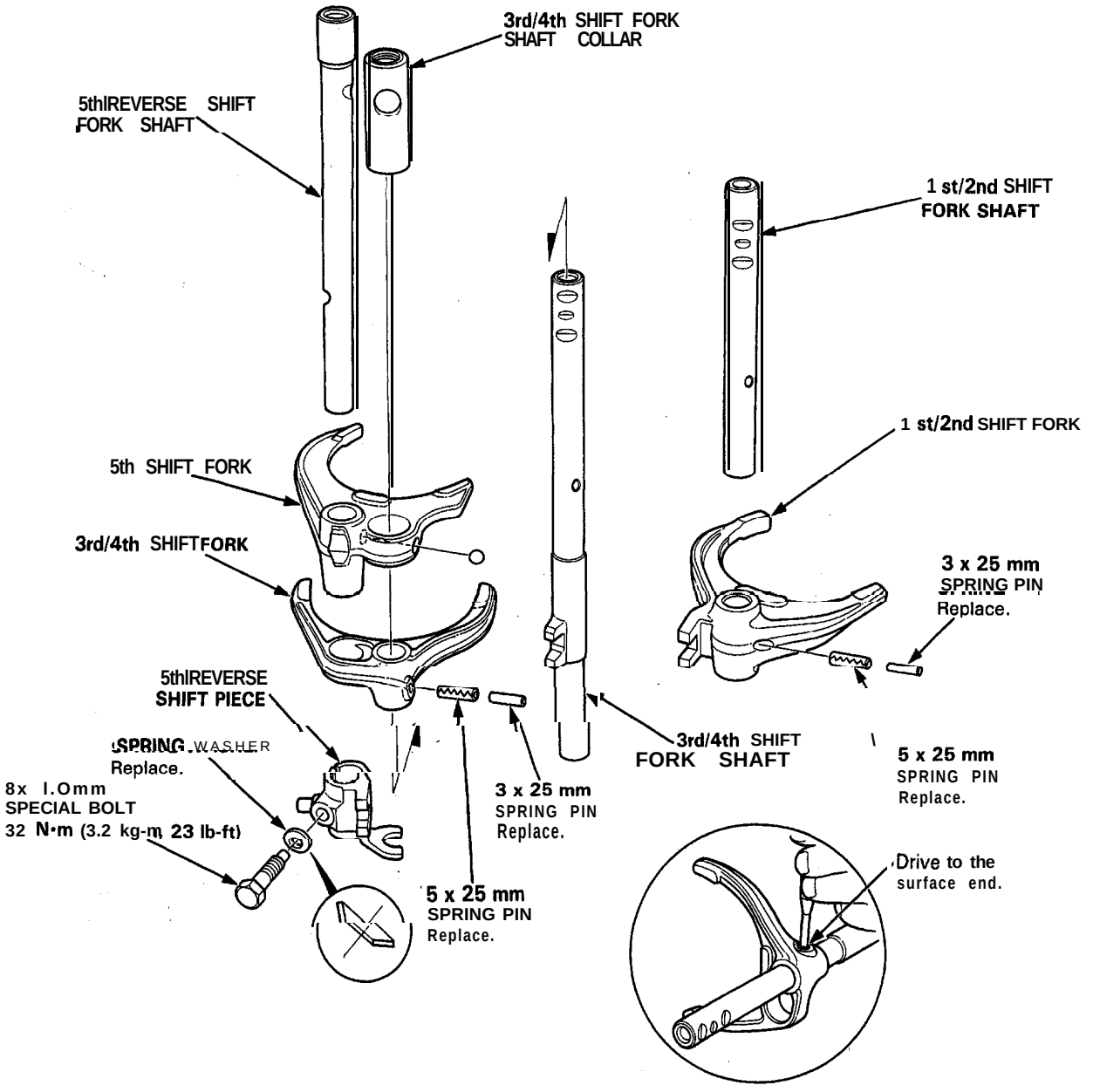
NOTE:

- **Be careful, not to lose the 5th shift fork steel ball.**
- Install the spring pins, so their grooves are 1 80° apart.

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

Disassembly: Remove with the 3 mm spring pin and 5 spring pin.

Reassembly: Install the 5 mm spring pin first, then install the 3 mm spring pin.

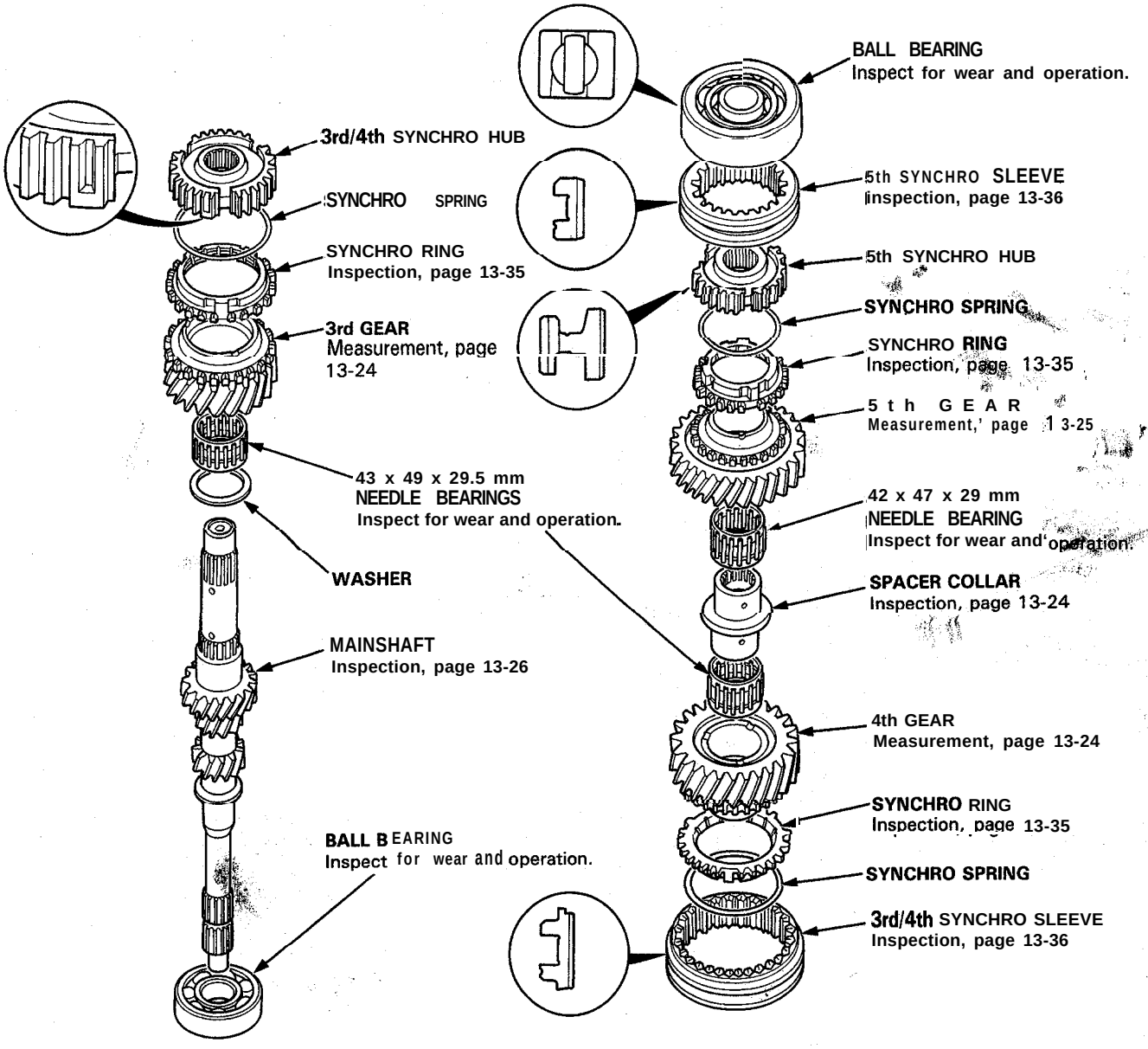


Mainshaft Assembly

- Index

NOTE: The 3rd/4th and 5th synchro hubs are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces The 3rd/4th **and 5th synchro hubs, however, should be installed with a press before lubricating them.**



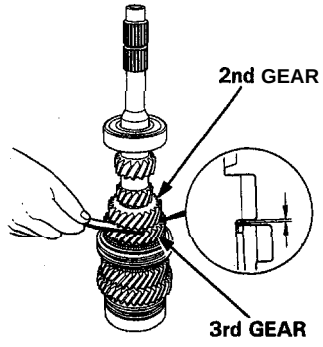
Mainshaft Assembly

Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

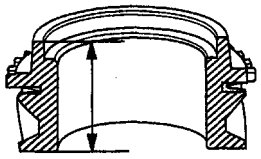
1. Measure the clearance between 2nd and 3rd gears.

   Standard: 0.06-0.23 mm (0.0024-0.0091 in)
   Service Limit: 0.3 mm (0.012 in)



2. If the clearance exceeds the service limit, measure the thickness of 3rd gear.

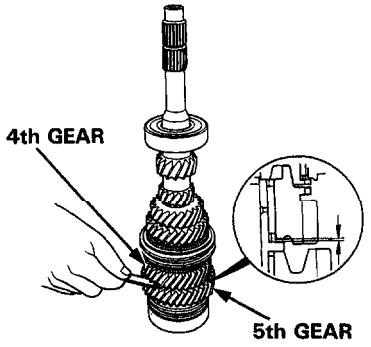
   Standard: 36.92-35.97 mm (1.4142— 1.4161 in)
   Service Limit: 35.80 mm 11.4094 in)



If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

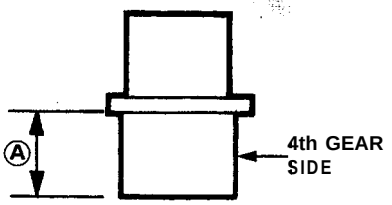
3. Measure the clearance between 4th gear and the spacer collar.

   Standard: 0.06-0.21 mm (0.0024-0.0083 in)
   Service Limit: 0.3 mm (0.012 in)



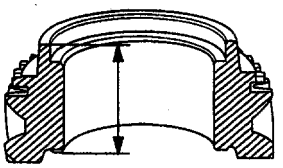
4. If the clearance exceeds the service limit, measure distance Ⓐ on the spacer collar.

   Standard: 29.53-29.68 mm (1.1626-1.1646 in)
   Service Limit: 29.51 mm (1.1618 in)



5. If distance Ⓐ is more than the service limit, replace the spacer collar with a new one.
   If distance Ⓐ is within the service limit, measure the thickness of 4th gear.

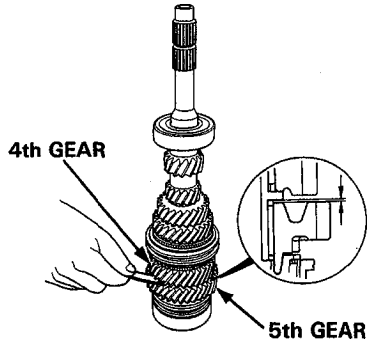
   Standard: 35.92-35.97 mm (1.4142-1.4161 in)
   Service Limit: 35.80 mm (1.4094 in)



If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

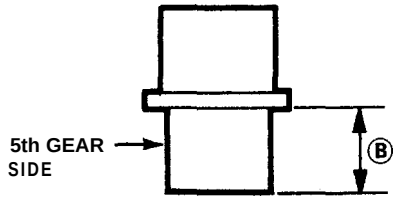
6. Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06-0.21 mm (0.0024-0.0083 in)
Service Limit: 0.3 mm (0.012 in)



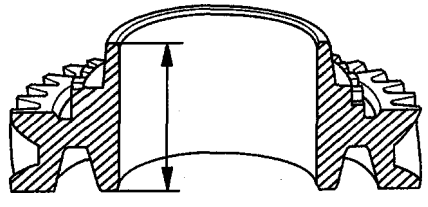
7. If the clearance exceeds the service limit, measure distance Ⓑ on the spacer collar.

Standard: 28.53-28.58 mm (1.1252-1.1272 in)
Service Limit: 28.51 mm (1.1224 in)



8. If distance Ⓑ is more than service limit, replace the spacer collar with a new one.
If distance Ⓑ is within the service limit, measure thickness of 5th gear.

Standard: 34.92-34.97 mm (1.3748— 1.3768 in)
Service Limit: 34.80 mm (1.3700 in)



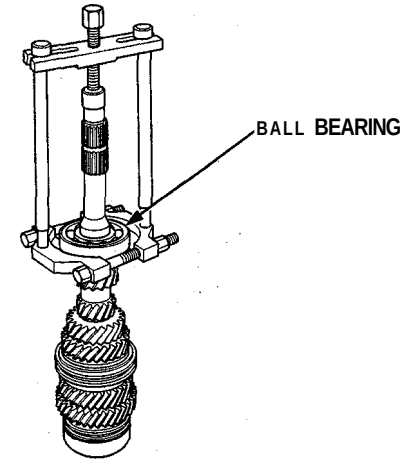
If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

Disassembly

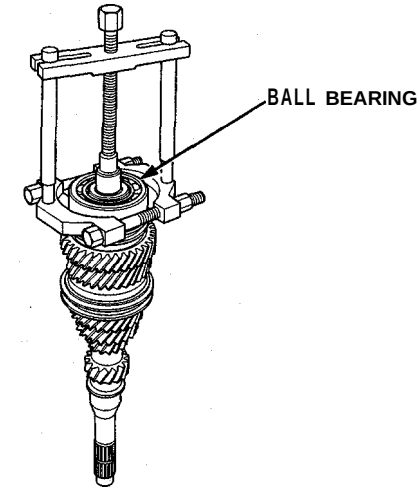
CAUTION: Remove the synchro hubs using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

1. Remove the ball bearing using a bearing puller as shown.

Clutch housing side:



Transmission housing side:

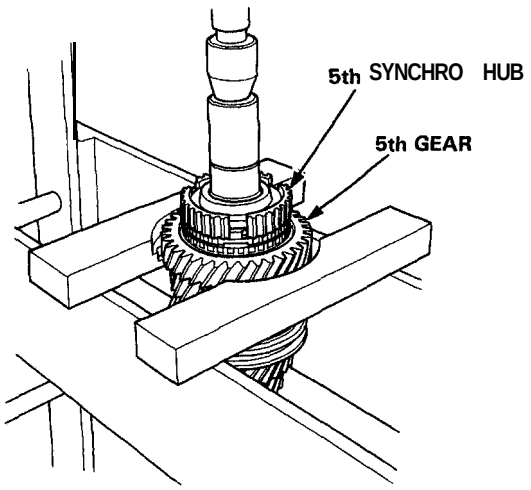


(cont'd)

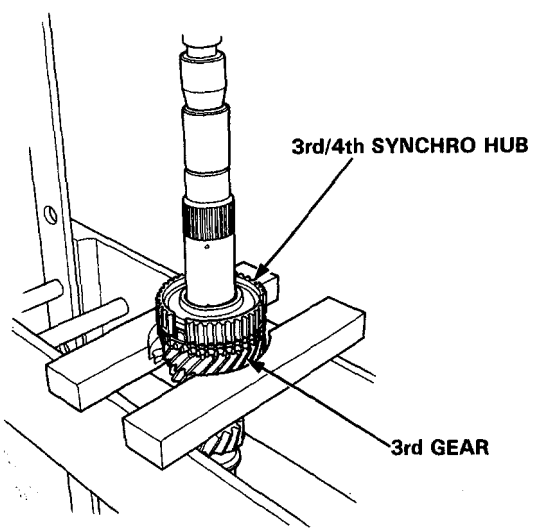
Mainshaft Assembly

Disassembly (cont'd)

2. Support 5th gear on steel blocks as shown and press the shaft out of the 5th synchro hub.



3. In the same manner as above, support the 3rd gear on steel blocks and press the shaft out of the 3rd/4th synchro hub.



Inspection

1. Inspect the gear surface and bearing surface for wear or damage, then measure the mainshaft at points A, B and C.

Standard:

A (Ball bearing surface): 32.002–32.018 mm (1.2599–1.2605 in)

B (Needle bearing surface): 42.984-43.000 mm (1.6923–1.6929 in)

C (Ball bearing surface): 30.984-31 .OOO mm (1.2198–1.2205 in)

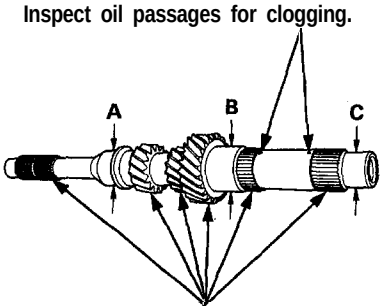
Service limit:

A:31.95 mm (1.2579 in)

B:42.93 mm (1.6902 in)

C:30.93 mm (1.2177 in)

Inspect oil passages for clogging.



Inspect for wear or damage.

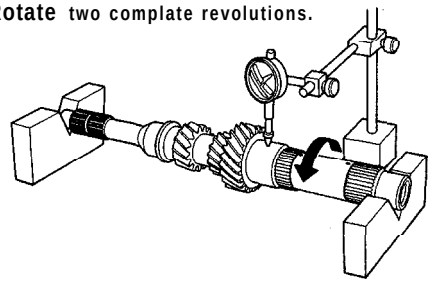
If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: 0.02 mm (0.0008 in.) min.
Service Limit: 0.05 mm (0.0020 in.)

NOTE: Support the mainshaft at both ends as shown.

Rotate two complate revolutions.



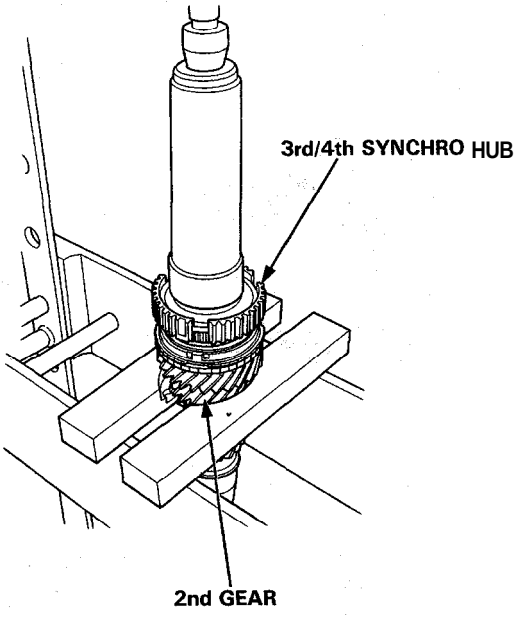
If the runout exceeds the service limit, replace the mainshaft with a new one.

Reassembly

CAUTION:

- Press the 3rd/4th and 5th synchro hubs on the mainshaft without lubrication.
- When installing the 3rd/4th and 5th synchro hubs, support the shaft on steel blocks and install the synchro hubs using a press.
- install the 3rd/4th and 5th synchro hubs with a maximum pressure of 1.000 kg, and press the 3rd/4th and 5th synchro hubs with a pressure of 2.000 kg.
- The clutch housing ball bearing is installed when it's time to check the mainshaft clearances.

1. Support 2nd gear on steel blocks as shown, then install the 3rd/4th synchro hub using a press.

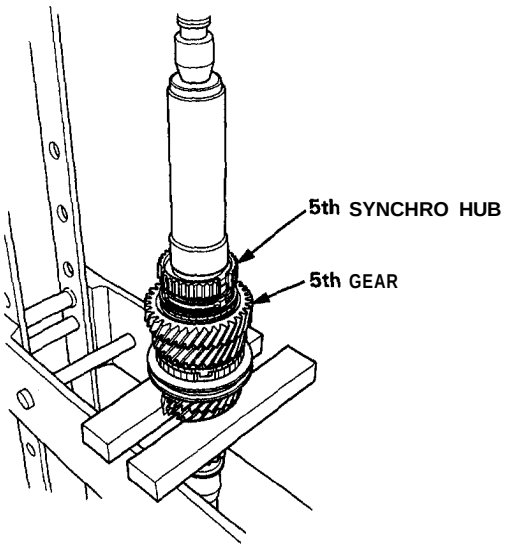


(cont'd)

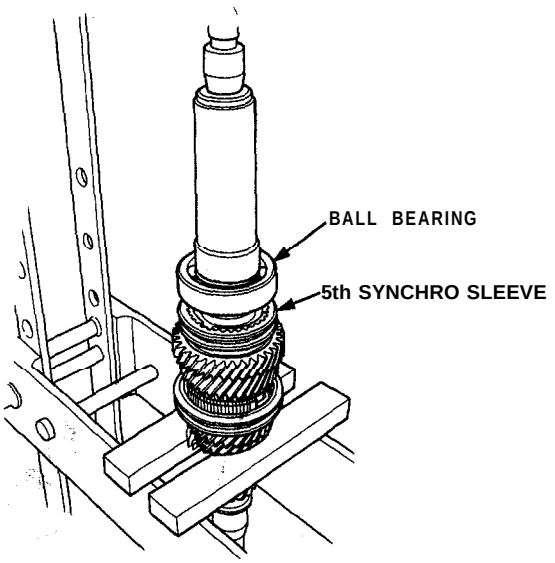
Mainshaft Assembly

Reassembly (cont'd)

2. Install the 5th synchro hub using a press as shown.



3. install the transmission housing side ball bearing using a press as shown.

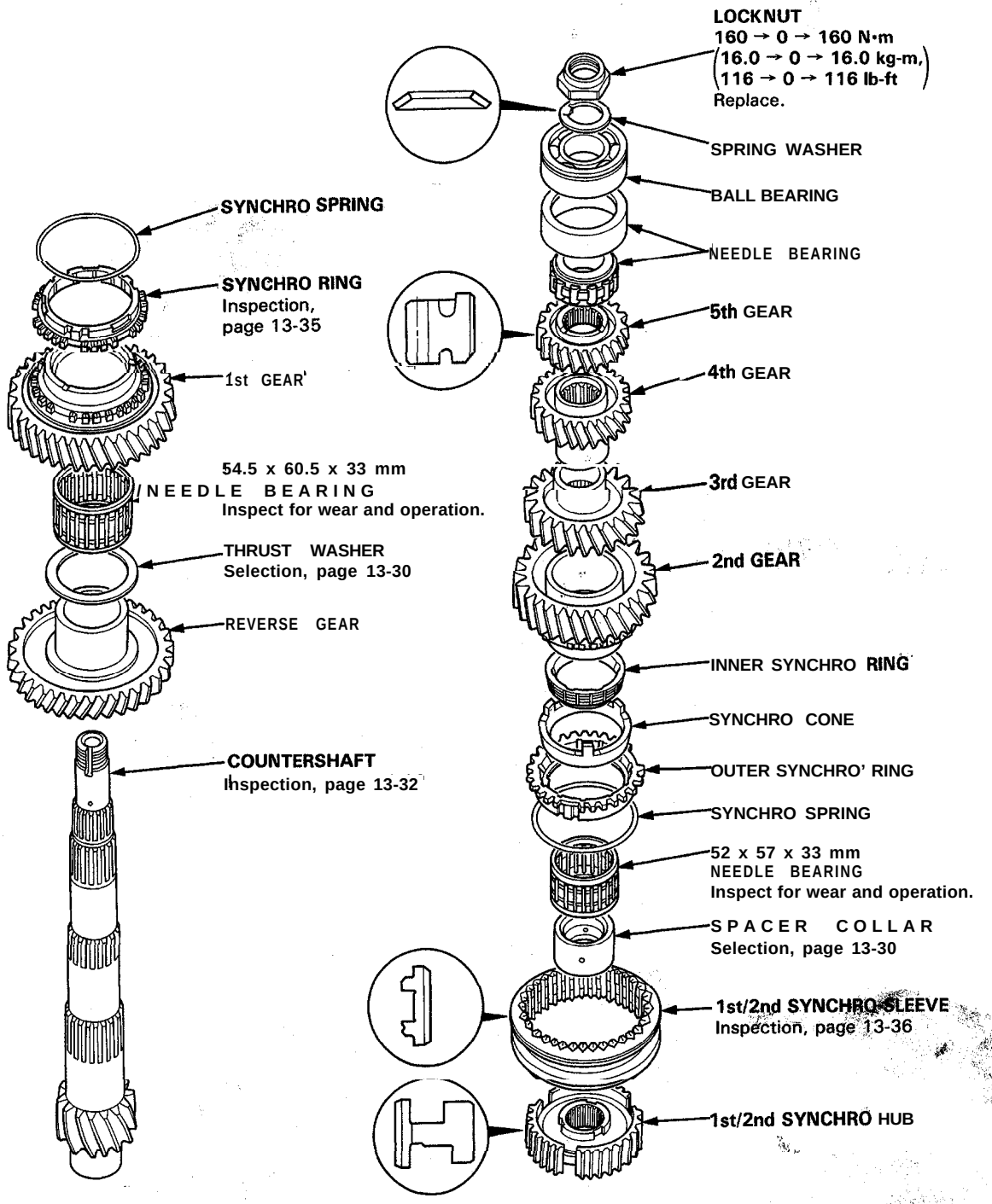


Countershaft Assembly

Index

NOTE: The 3rd, 4th and 5th gears are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces. The 3rd, 4th and 5th gears, should be installed without lubrication using a press.

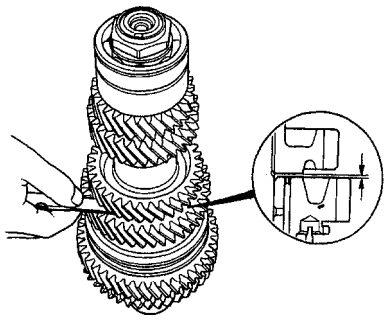


Countershaft Assembly

Clearance Inspection

1. Measure the clearance between 2nd and 3rd gear.

   Standard: 0.04-0.10 mm (0.0016-0.0039 in.1

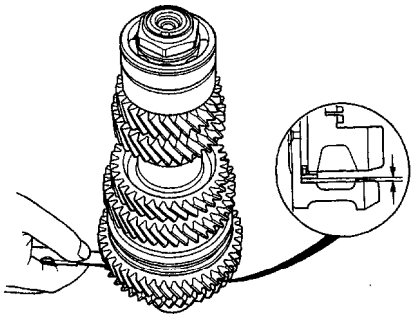


2. If the clearance exceeds the standard, select the appropriate spacer collar for the correct clearance from the chart below.

	PART NUMBER	THICKNESS
A	23912—PR8—000	33.003—33.005 mm (1.2993—1.3012 in)
B	23913—PR8—000	32.998-33.000 mm (1.2991—1.2992 in)

3. Measure the clearance between 1st and reverse gear.

   Standard: 0.04-0.10 mm (0.0016—0.0039 in)



4. If the clearance exceeds the standard, select the appropriate thrust washer for the correct clearance from the chart below.

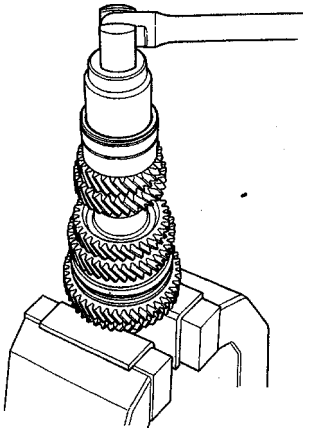
	PART NUMBER	THICKNESS
A	23921—PR8—000	1.42—1.44 mm (0.0559-0.0567 in)
B	23922—PR8—000	1.45—1.47 mm (0.0571-0.0579 in)
C	23923—PR8—000	1.48—1.50 mm (0.0583-0.0591 in)
D	23924—PR8—000	1.51—1.53 mm (0.0594—0.0602 in)
E	23925—PR8—000	1.54—1.56 mm (0.0606—0.0614 in)

-Disassembly

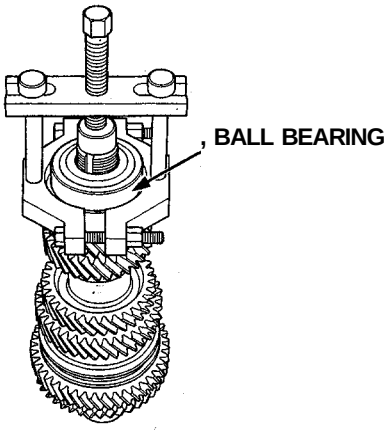
CAUTION: Remove the gears using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

1. **Raise the locknut tab from the groove of the shaft** and remove the locknut and the spring washer.

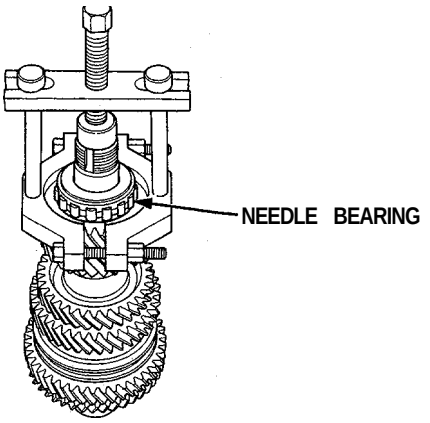
   NOTE: Locknut has left-hand threads.



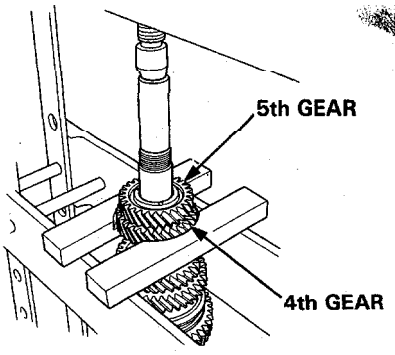
2. **Remove the ball bearing using a bearing puller as shown.**



3. Remove the outer bearing race of the needle bearing, then remove the needle bearing using a bearing puller as shown.



4. **Support 4th gear on steel blocks as shown and press the shaft out of 5th and 4th gears.**

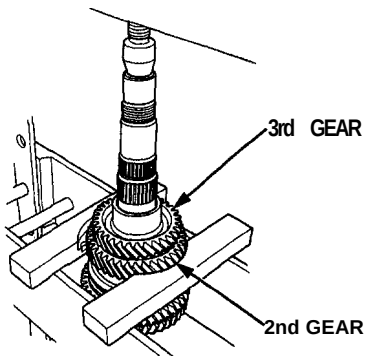


(cont'd)

Countershaft Assembly

-Disassembly (cont'd)

5. Support 2nd gear on steel blocks as shown and press the shaft out of 3rd and 2nd gears.

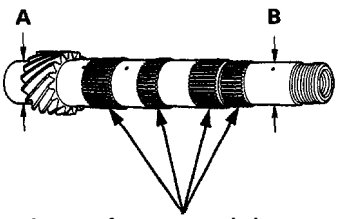


-Inspection

1. Inspect the gear surfaces and bearing surfaces for wear or damage, then measure the countershaft at points A and B.

Standard:
A (Needle bearing surface): 43.974-43.990 mm (1.7313-1.7319 in)
B (Ball bearing surface): 33.984-34.000 mm (1.3380-1.3386 in)
Service Limit:
A: 43.92 mm (1.7291 in)
B: 33.93 mm (1.3358 in)

NOTE: Inspect oil passages for clogging.



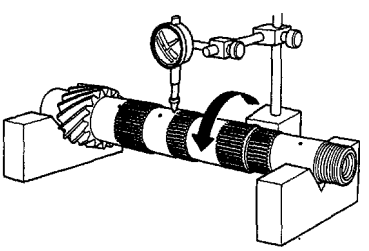
Inspect for wear and damage.

If any part of the countershaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: 0.02 mm (0.0008 in) min.
Service Limit: 0.05 mm (0.0020 in)

NOTE: Support the countershaft at both ends as shown.


Rotate two complete revolutions.

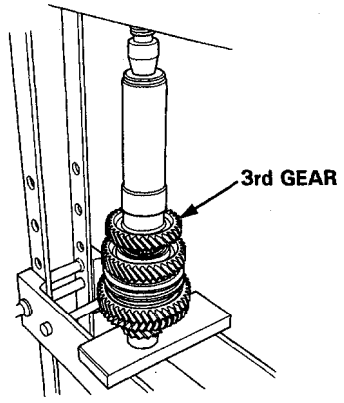
If the runout exceeds the service limit, replace the countershaft with a new one.

-Reassembly

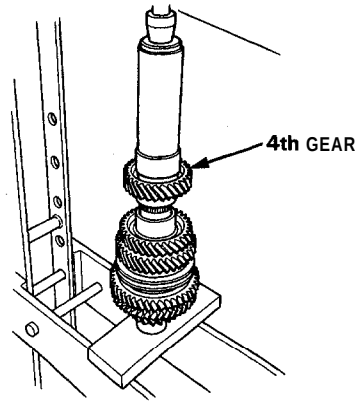
CAUTION:

- **Press the 3rd, 4th and 5th gears on the counter-shaft without lubrication.**
- When installing the 3rd. 4th and 5th gears, support the shaft on steel blocks and install the gears using a press.
- **Install the 3rd, 4th and 5th gears with a maximum pressure of 1,000 kg, and press the 3rd. 4th and 5th gears with a pressure of 2,600 kg.**

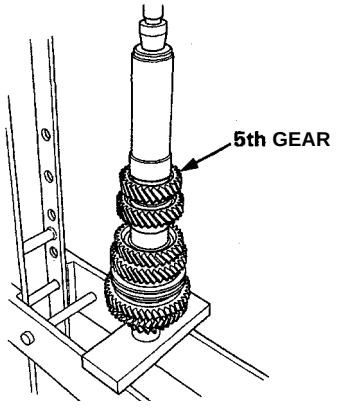
1. Support the countershaft on a steel block as shown and install 3rd gear using a press.



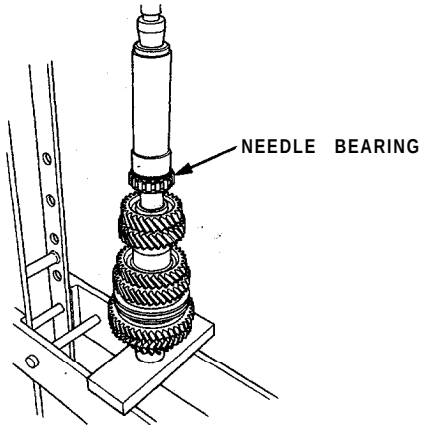
2. Install 4th gear using a press as shown.



3. Install 5th gear using a press as shown.



4. Install the needle bearing using a press as showr then install the bearing outer race.

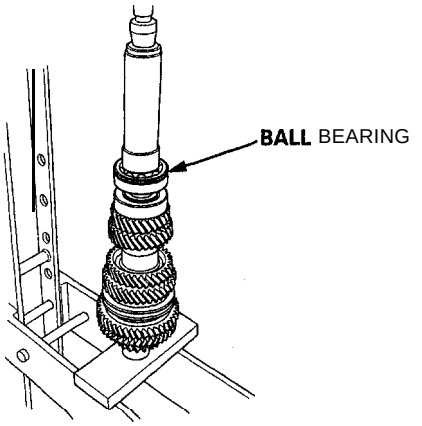


(cont'c

Countershaft Assembly

▪ Reassembly (cont'd)

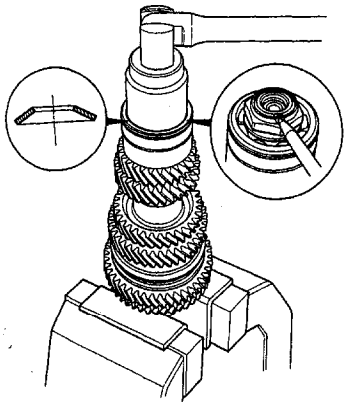
5. Install the ball bearing using a press as shown.



6. Install the spring washer, tighten the locknut, then stake the locknut tab into the groove.

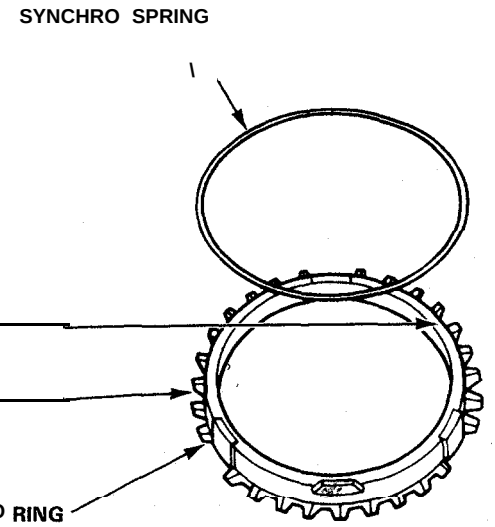
   NOTE: Locknut has left-hand threads.

   LOCKNUT
   160 → 0 → 160N.m
   (16.0 → 0 → 16.0 kg-m, 116 → 0 → 116 lb-ft)



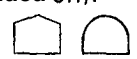
Synchro Ring, Gear

Inspection

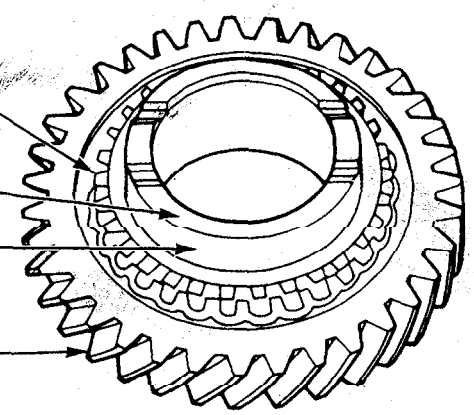


1. Inspect the inside of the synchro ring for wear.
2. Inspect the synchrosleeve teeth and matching teeth on the synchro ring for wear (rounded off).

3. Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).



4. Inspect the gear hub thrust surface for wear.
5. inspect the cone surface for wear or roughness.
6. Inspect the teeth on all gears for uneven wear, scoring, galling, cracks.

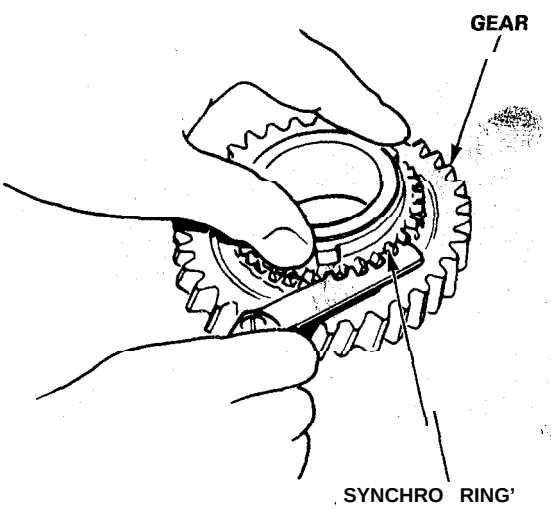


7. Coat the cone surface of the gear with oil and place the synchro ring on the matching gear. Rotate the ring, making sure that it does not slip.

   Measure the clearance between the ring and gear all the way around.

   NOTE: Hold the ring against the gear evenly while measuring the clearance.

   Ring-to-Gear Clearance
   Standard: 0.85-1.1 mm (0.0335-0.0433 in]
   Service Limit: 0.4 mm (0.0157 in)



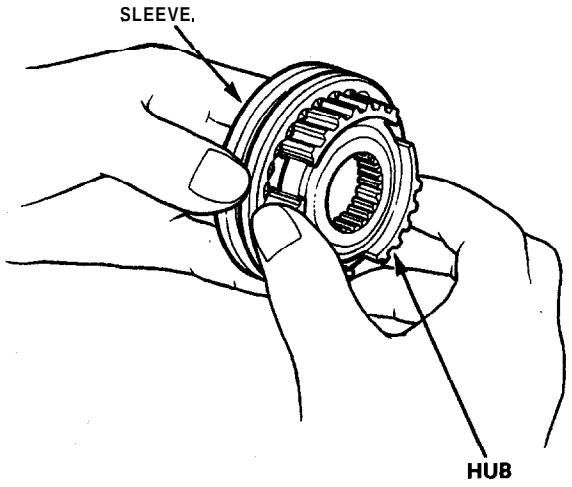
8. Separate the synchro ring and gear, then coat them with oil.
9. Install the synchro spring on the synchro ring, then set it aside for later reassembly.

Synchro Sleeve, Synchro Hub

Inspection

1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, which indicates wear.
2. Install each hub in its mating sleeve and check for freedom of movement.

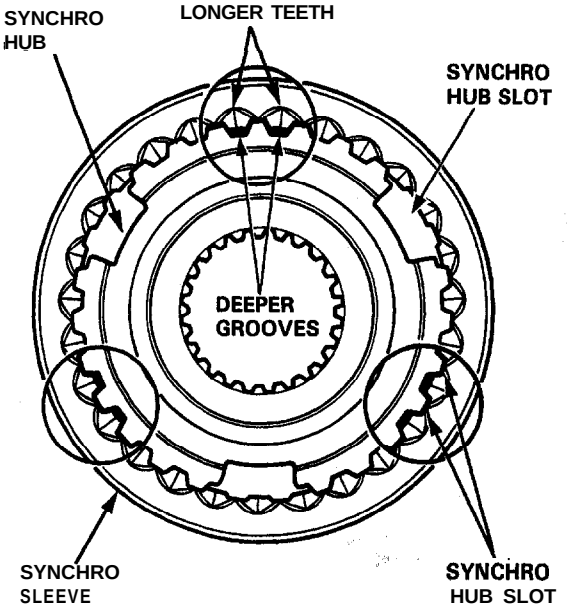
NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.



Installation

Each synchro sleeve has three sets of longer teeth (1 20 degrees apart) that must be matched with the three sets of deeper grooves in the hub when assembled.

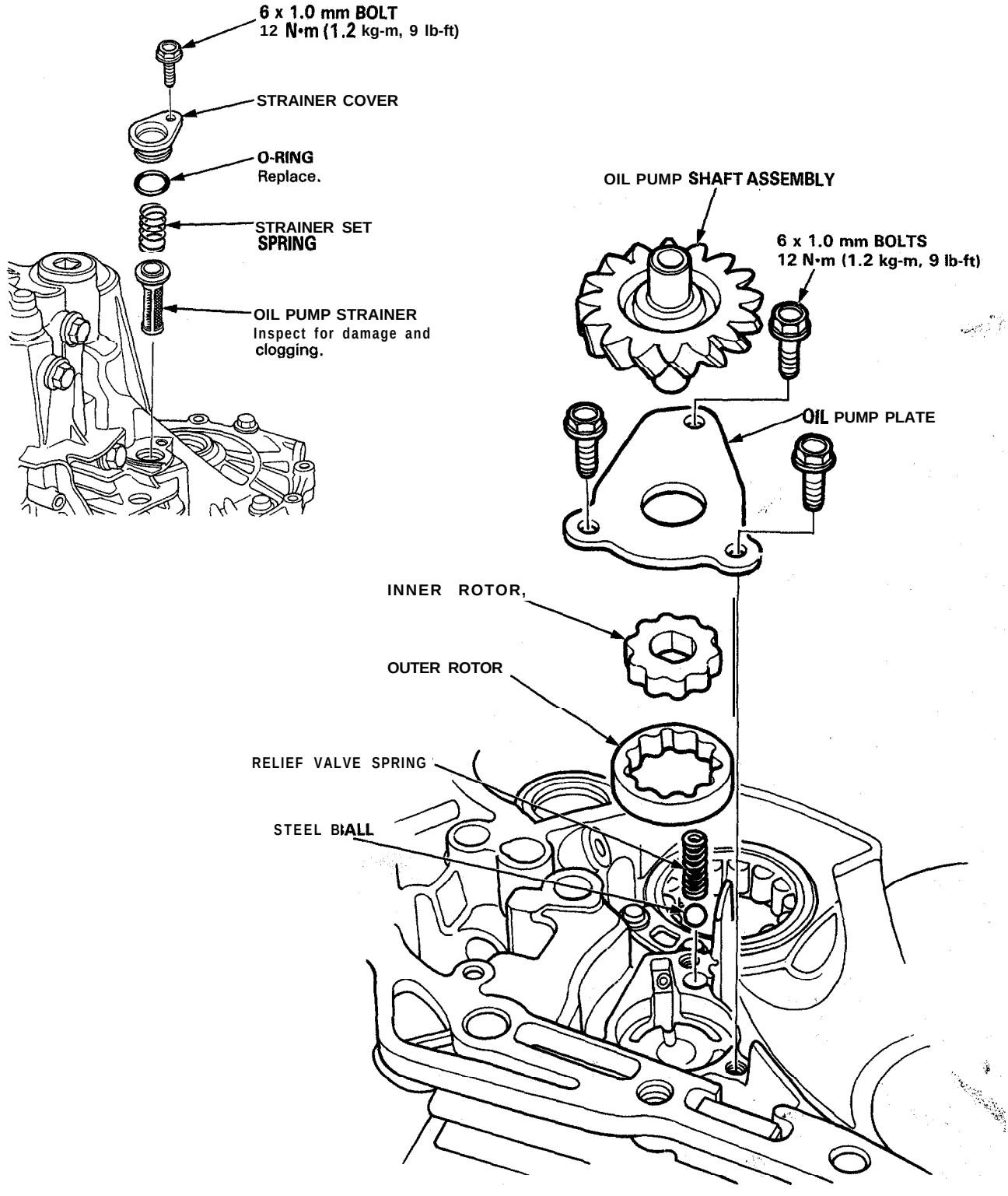
NOTE: Installing the synchro sleeve with its longer teeth in the 1 st/2nd synchro hub slots will damage the spring ring.



Oil Pump

Disassembly/Reassembly

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

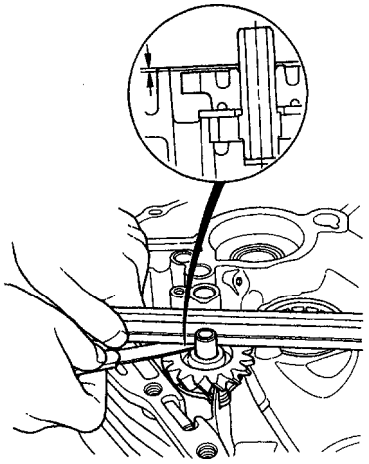


Oil Pump

Clearance Inspection

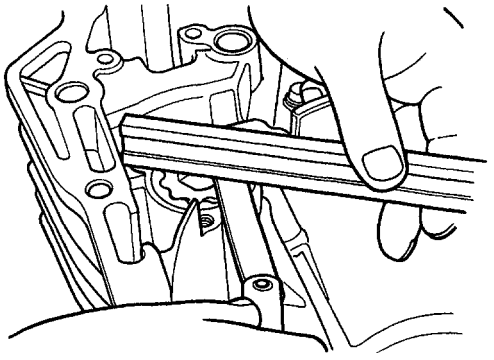
1. **Check the clearance between the transmission mating surface of the clutch housing and the oil pump gear.**

   Standard: 0.3-0.8 mm (0.012-0.032 in.)
   Service Limit: 0.9 mm (0.035 in.)



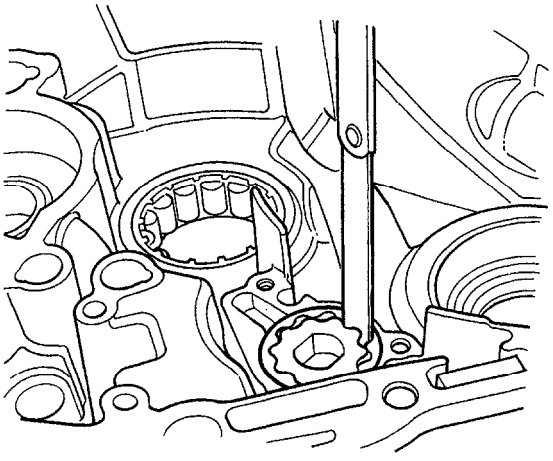
2. **Check the axial clearance on the pump rotor.**

   Clutch Housing-to-Rotor Axial clearance
   Standard: 0.03-0.1 mm (0.0012-0.0039 in)
   Service Limit: 0.15 mm (0.0059 in)



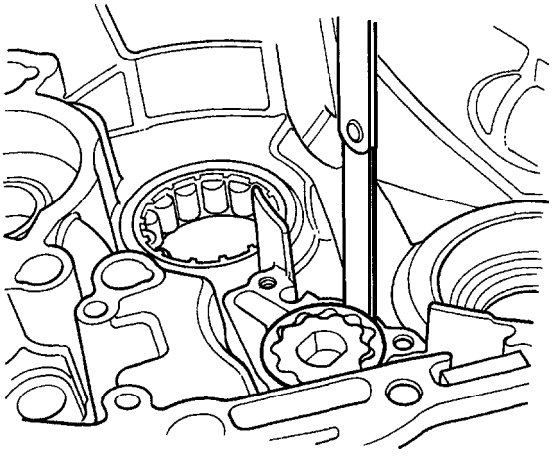
3. **Check the radial clearance on the pump rotor.**

   Inner Rotor-to-Outer Rotor Radial clearance
   Standard: 0.14 mm (0.0055 in)
   Service Limit: 0.2 mm (0.008 in)



4. **Check the radial clearance between the clutch housing and the outer rotor.**

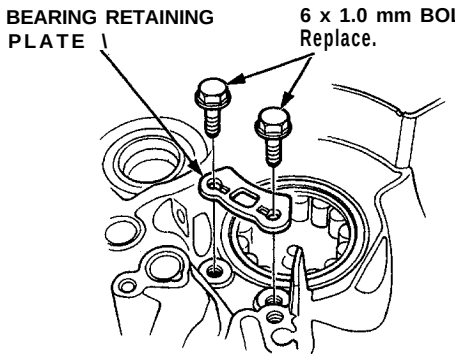
   Clutch housing-to-Rotor Radial Clearance
   Standard: 0.1-0.2 mm (0.0039-0.0079 in)
   Service Limit: 0.22 mm (0.0087 in)



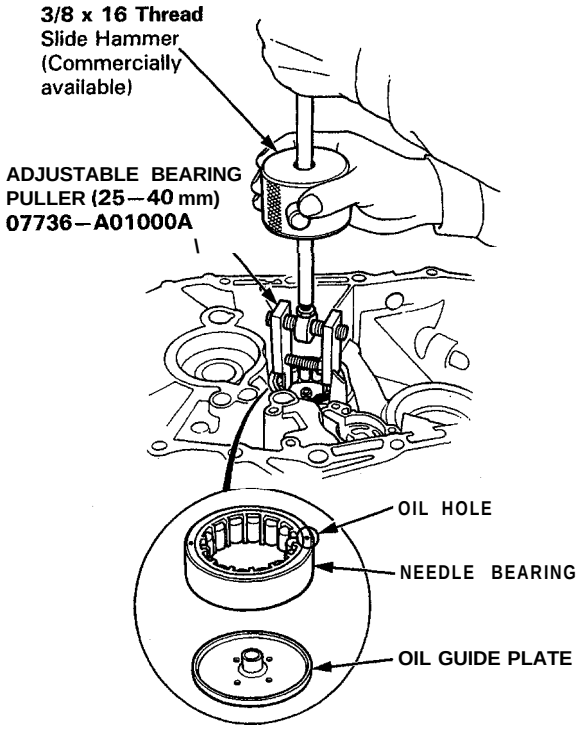
Countershaft Bearing (Clutch Housing)

Replacement

1. Remove the bearing retaining plate.



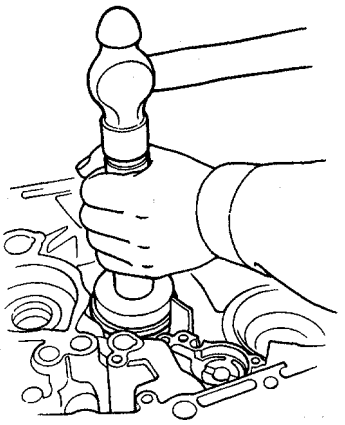
2. Remove the needle bearing with the special tool, then remove the oil guide plate.

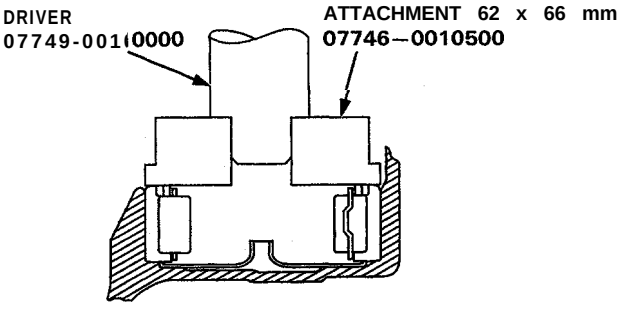


3. Position the oil guide plate and new needle bearing in the bore of the clutch housing.

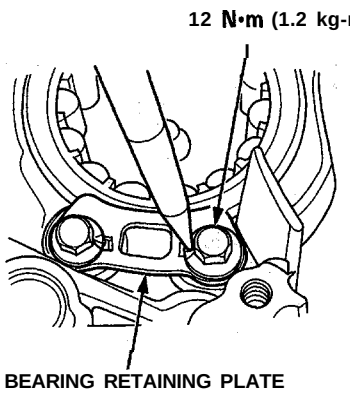
NOTE: Position the needle bearing with the oil hole facing up.

4. Drive the needle bearing in using the special tools.





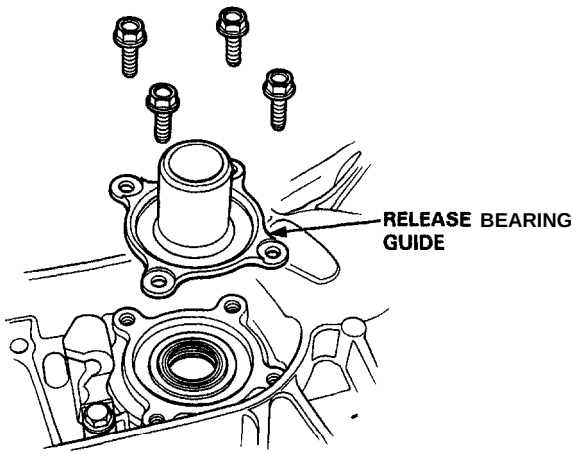
5. Install the bearing retaining plate and stake the bolt heads in the groove in the bearing retaining plate?!



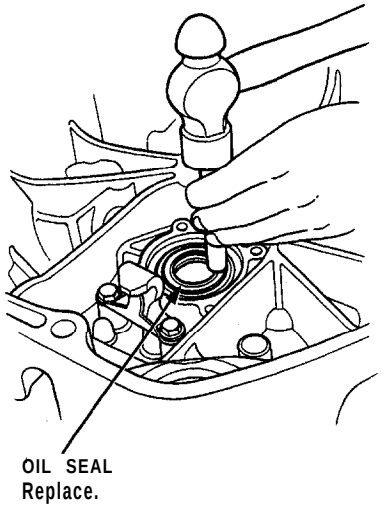
Mainshaft Oil Seal (Clutch Housing)

-Replacement

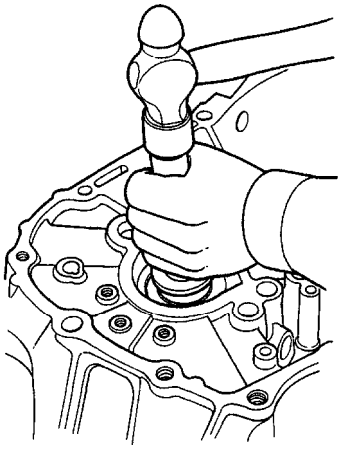
1. Remove the release bearing guide.

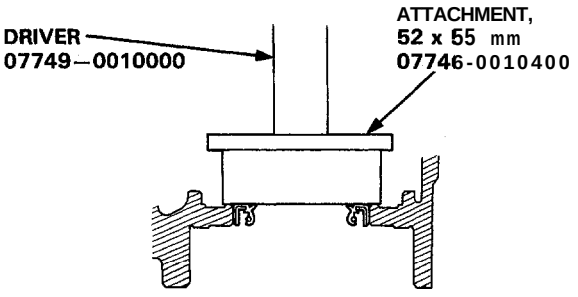


2. Remove the oil seal.

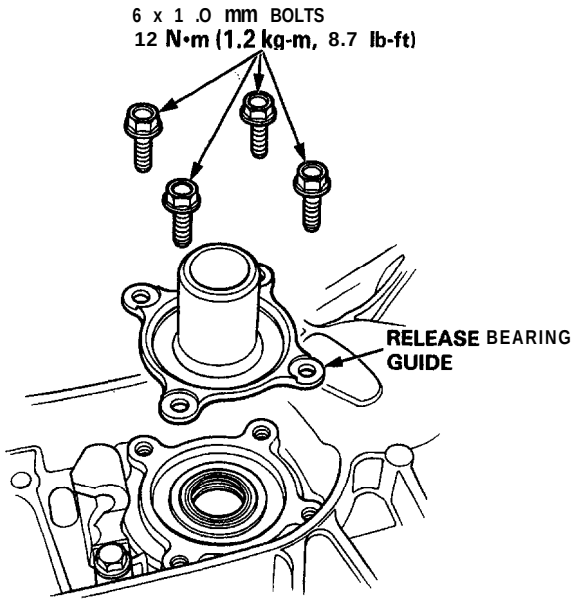


3. Drive in a new oil seal from the transmission side using the special tools.





4. Install the release bearing guide.



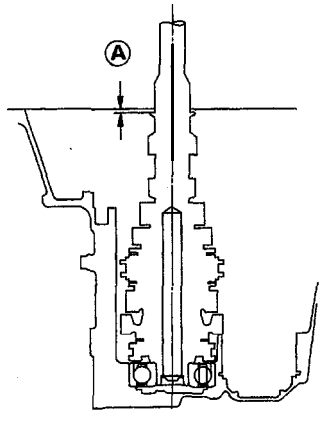
Mainshaft Thrust Shim

-Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing.
2. Install the mainshaft in the transmission housing.

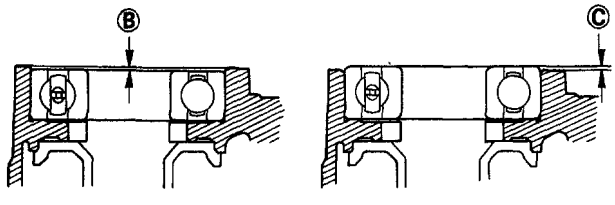
   NOTE: Do not install the clutch housing side ball bearing.
3. Measure distance Ⓐ between the end of the transmission housing and mainshaft.

   NOTE:
   - Use a straight edge and feeler gauge.
   - Measure at three locations and average the readings.



4. Set the mainshaft ball bearing in the clutch housing, and measure distance Ⓑ or Ⓒ between the surfaces of the clutch housing and the bearing inner race.

   NOTE:
   - Use a straight edge and feeler gauge.
   - Measure at three locations and average the readings.
   - Do not install the spring washer.



5. Select the proper shim on the basis of the following calculations.

   NOTE: Do not use more than one shim.

   (Basic Formula)
   Ⓐ + Ⓑ − 0.99 mm = shim thickness (max.)
   Ⓐ + Ⓑ − 1.06 mm = shim thickness (min.)
   Ⓐ − Ⓒ − 0.99 mm = shim thickness (max.)
   Ⓐ − Ⓒ − 1.06 mm = shim thickness (min.)

	PART NUMBER	THICKNESS
A	23931−PR8-000	0.50 mm (0.0197 in)
B	23932−PR8-000	0.55 mm (0.0217 in)
C	23933−PR8-000	0.60 mm (0.0236 in)
D	23934−PR8-000	0.65 mm (0.0256 in)
E	23935−PR8-000	0.70 mm (0.0276 in)
F	23936−PR8-000	0.75 mm (0.0295 in)
G	23937−PR8-000	0.80 mm (0.0315 in)
H	23938−PR8-000	0.85 mm (0.0335 in)
I	23939−PR8-000	0.90 mm (0.0354 in)
J	23940−PR8-000	0.95 mm (0.0374 in)
K	23941−PR8-000	1.00 mm (0.0394 in)
L	23942−PR8-000	1.05 mm (0.0413 in)
M	23943−PR8-000	1.10 mm (0.0433 in)
N	23944−PR8-000	1.15 mm (0.0453 in)

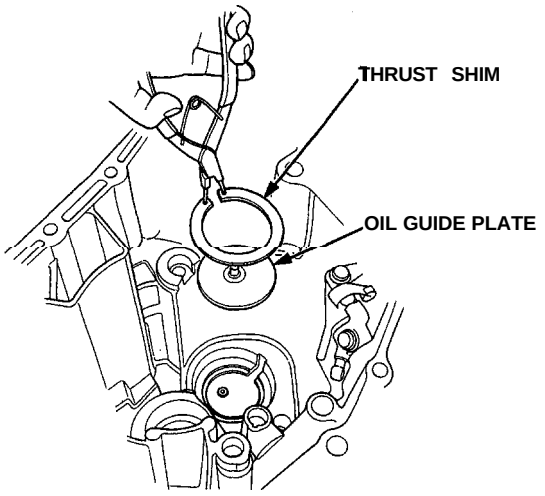
(cont'd)

Mainshaft Thrust Shim

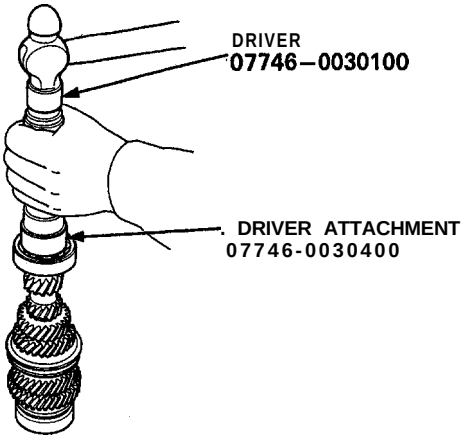
-Adjustment (cont'd)

NOTE: Clean all the parts thoroughly before installation

6. Install the oil guide plate and thrust shim into the transmission housing.



7. Install the ball bearing onto the mainshaft, then install the spring washer and mainshaft assembly into the clutch housing.



8. Install the transmission housing.

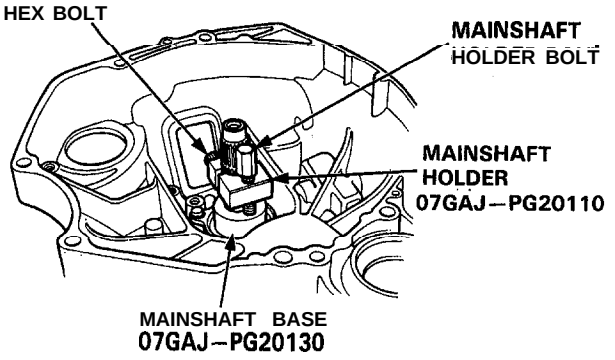
   Housing Mount Bolts: 45 N·m (4.5 kg-m, 33 lb-ftl

9. Check the thrust clearance in the manner described below.

   NOTE: Carry out the measurement at normal room temperature.

   a. Slide the mainshaft base over the mainshaft.

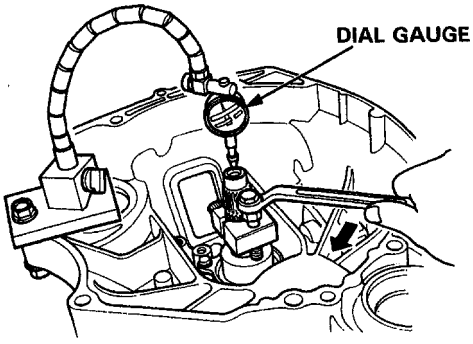
   b. Attach the mainshaft holder to the mainshaft as follows:
   - Back-out the mainshaft holder bolt and loosen the two hex bolts.
   - Fit the holder over the mainshaft so its lip is towards the transmission.
   - Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



   c. Seat the mainshaft fully by tapping its end with a plastic hammer.

   d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

   e. Zero a dial gauge on the end of the mainshaft.



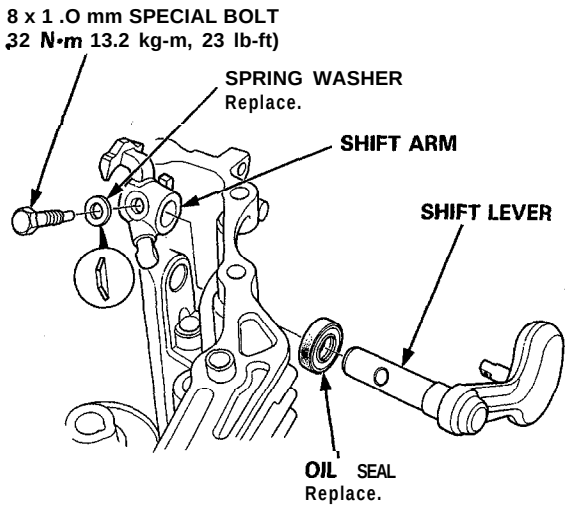
   f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the 'dial gauge is the amount of mainshaft end play.

   CAUTION: Turning the shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

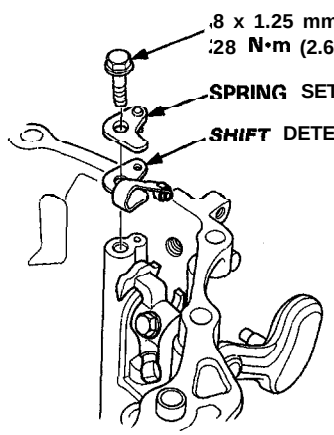
   g. Clearance is correct if reading is between 0.14-0.21 mm (0.0055-0.0083 in).
   If not, recheck shim thickness, as necessary.

Reassembly

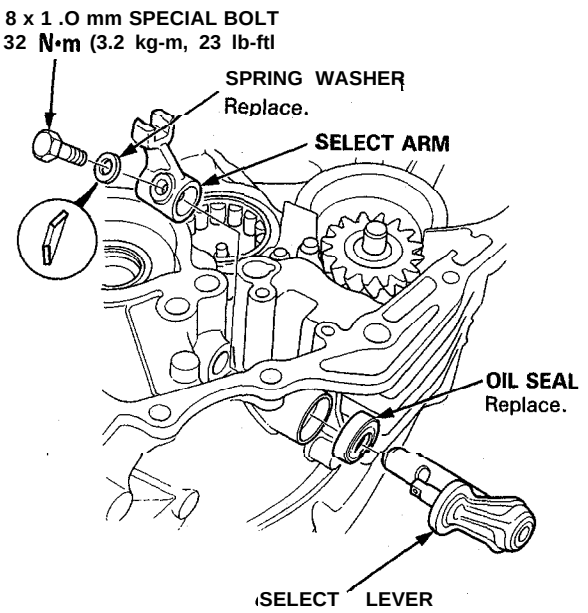
1. Install the oil seal, shift arm and shift lever in the transmission housing.



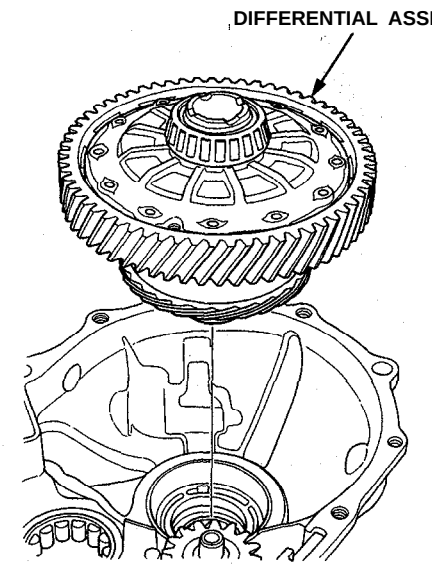
2. Install the shift detent spring and spring set plate.



3. Install the oil seal, select arm and select lever in the clutch housing.



4. Install the differential assembly in the clutch housing.

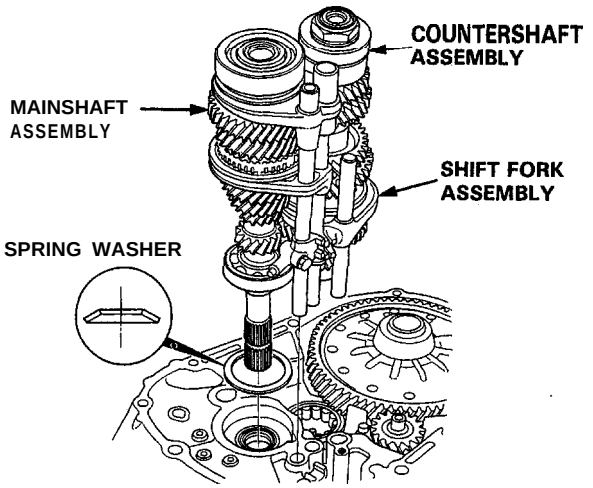


(cont'd)

- Reassembly (cont'd)

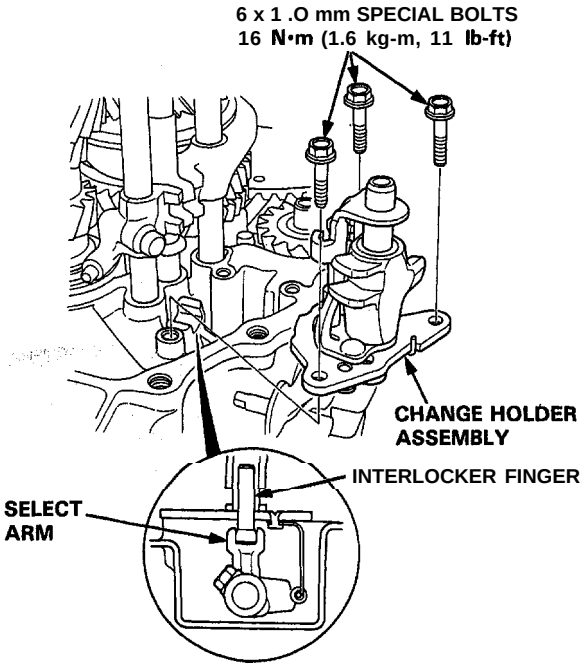
5. Install the spring washer, then insert the mainshaft and countershaft into the shift forks and install them as an assembly.

   NOTE: Tape the mainshaft spline, before installation.

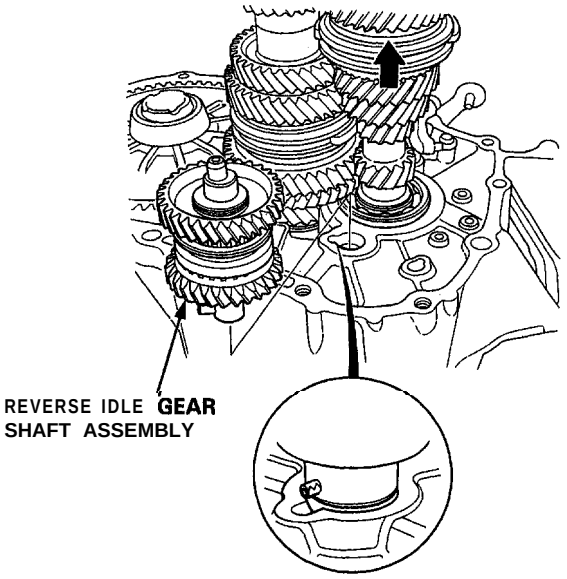


6. install the change holder assembly in the clutch housing.

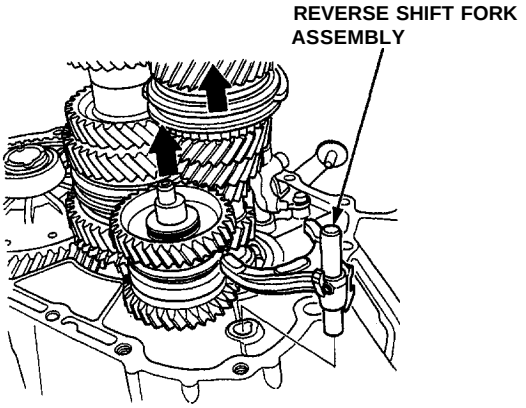
   NOTE: Plate the interlocker finger in the groove of the select arm.



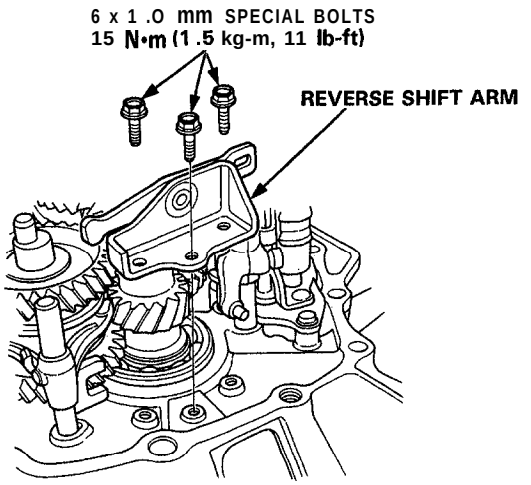
7. Lift the mainshaft assembly, then install the reverse idle gear shaft assembly with the spring pin matching the groove of the clutch housing.



8. Shift the reverse shift fork to the driven gear side. Lift the mainshaft assembly and reverse idle gear shaft assembly, then install the reverse shift fork assembly.

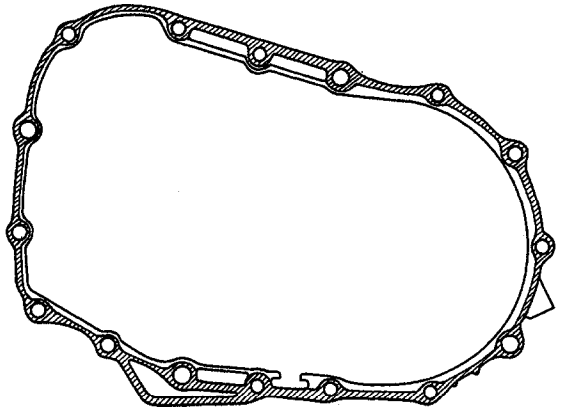


9. Install the reverse shift arm.



10. Apply liquid gasket to the transmission mating surface of the clutch housing.

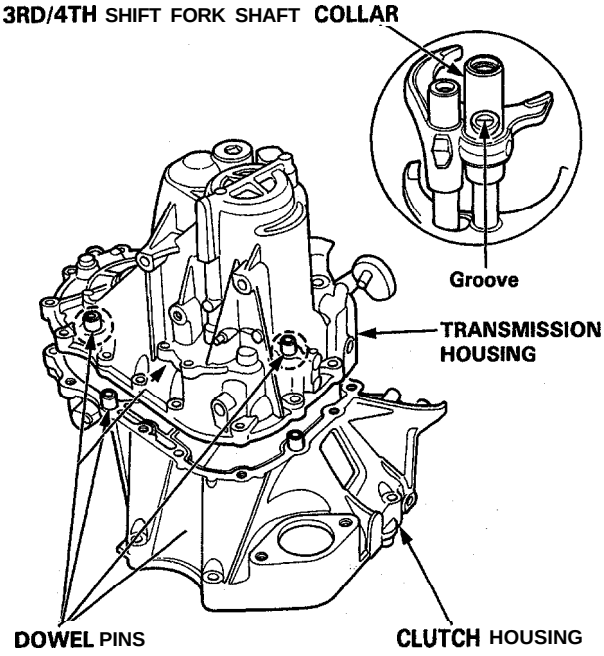
NOTE: This transmission uses no gasket between the major housings; use Honda Genuine liquid gasket (P/N 0Y740–99986). Assemble the housing within 20 minutes after applying the liquid gasket and allow it to cure at least 30 minutes after assembly before filling it with oil.



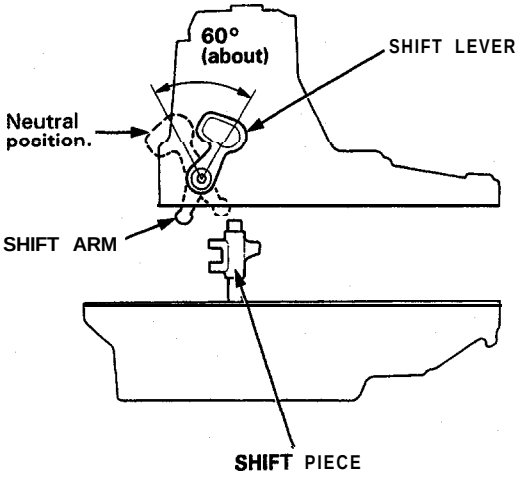
11. Install the dowel pins on the clutch housing.

12. Place the transmission housing over the clutch housing, being careful to line up the shafts.

NOTE: Make sure the 3rd/4th shift fork shaft collar mates with the 3rd/4th shift fork shaft.



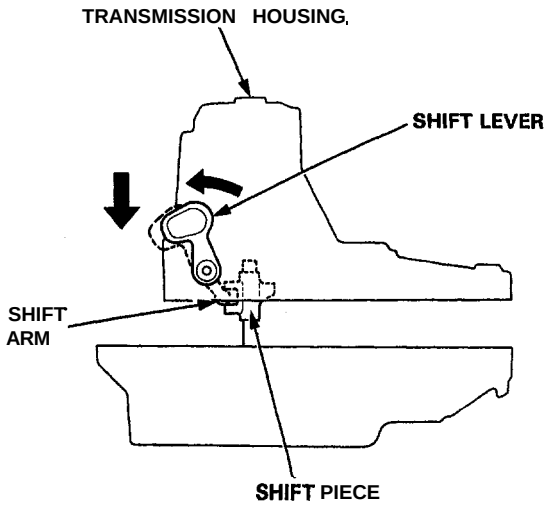
a. Place the shift lever as a shown.



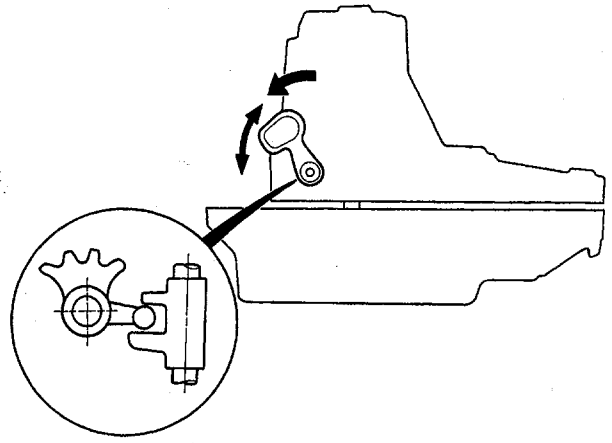
(cont'dl

Reassembly (cont'd)

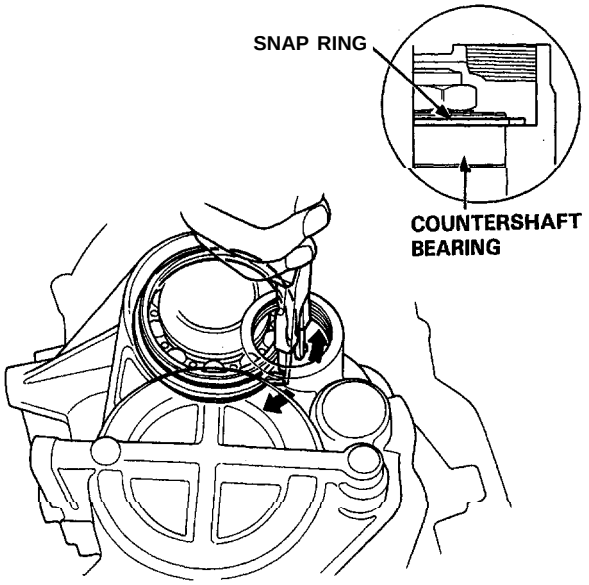
b. Lower the transmission housing, then place the shift arm in the groove of the shift piece by turning the shift lever.



c. Check the operation of the shift lever.

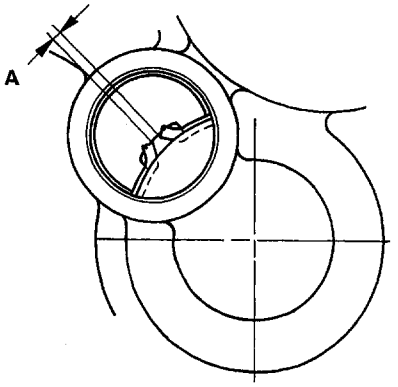


13. Lower the transmission housing with the snap ring expanded and set the snap ring in the groove of the countershaft bearing.



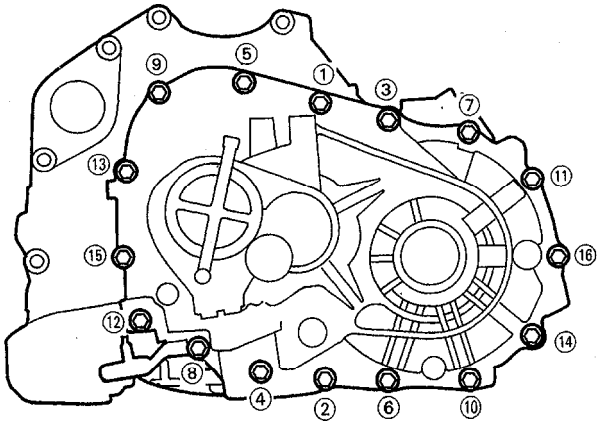
14. Check that the snap ring is securely seated in the groove of the countershaft bearing.

Dimension A as installed: 1.60-8.15 mm (0.0630-0.3209 in)



15. Tighten the transmission housing attaching bolts in the numbered sequence shown below.

Torque: 45 N·m (4.5 kg-m, 33 lb-ft)



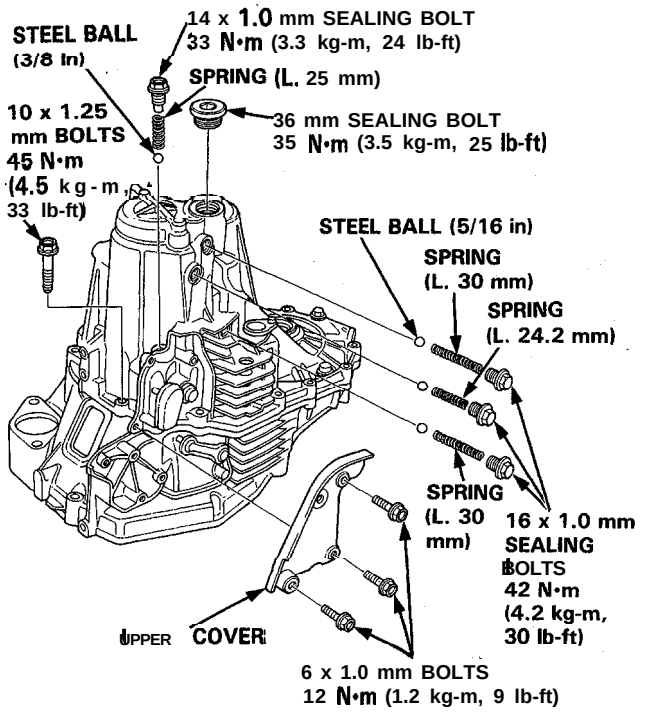
16. install the 36 mm sealing bolt.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740–99986) to the flange.

17. Install the steel balls, spring and sealing bolts.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740–99986) to the threads, but don't plug the hole with liquid gasket.

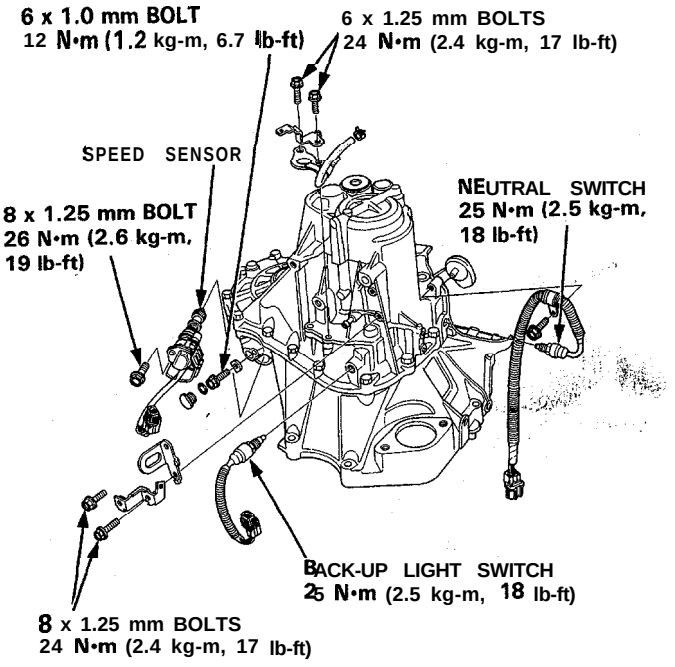
18. Install the upper cover.



19. Install the back-up light switch and neutral switch.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740–99986) to the threads.

20. Install the speed sensor.

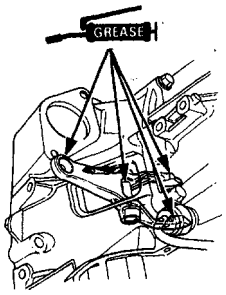


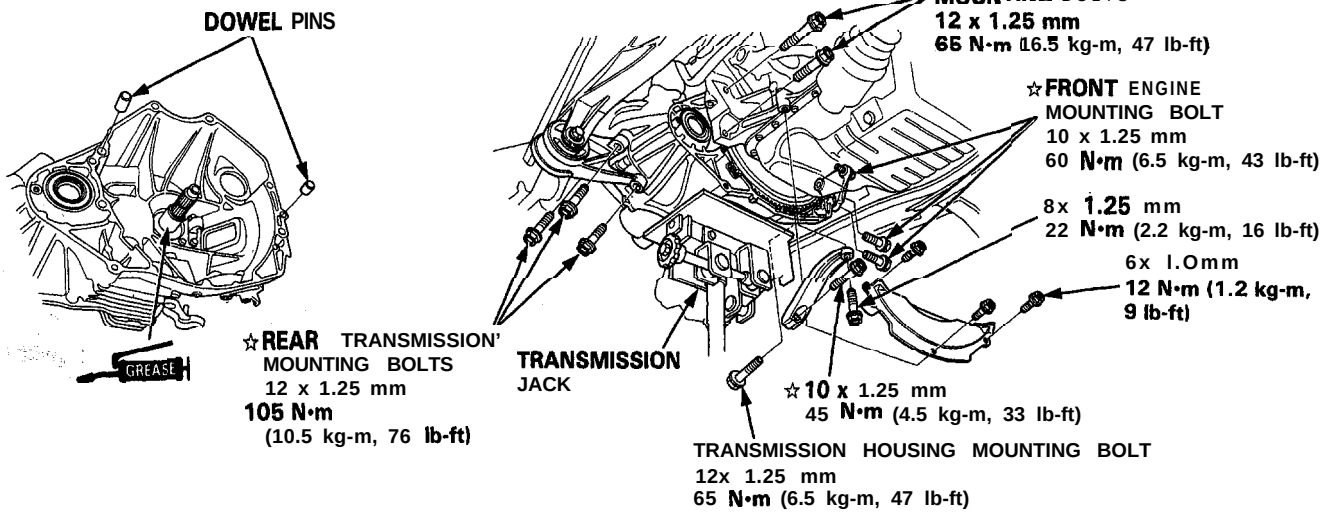
Transmission Assembly

Installation

NOTE: Check that the two dowel pins are installed in the clutch housing.

1. **Place the transmission on the transmission jack, and raise it to the engine level.**
2. **Set the release fork to the clutch housing. (See page, 13-9)**
3. Install the 2 transmission housing mounting bolts and engine stiffener.
4. **Install the 3 rear transmission mounting bolts.**
5. **Loosen the front engine mounting bolt, then install the 2 front engine** mounting bolts to the transmission side.
6. Remove the transmission jack.
7. **Install the clutch housing cover.**

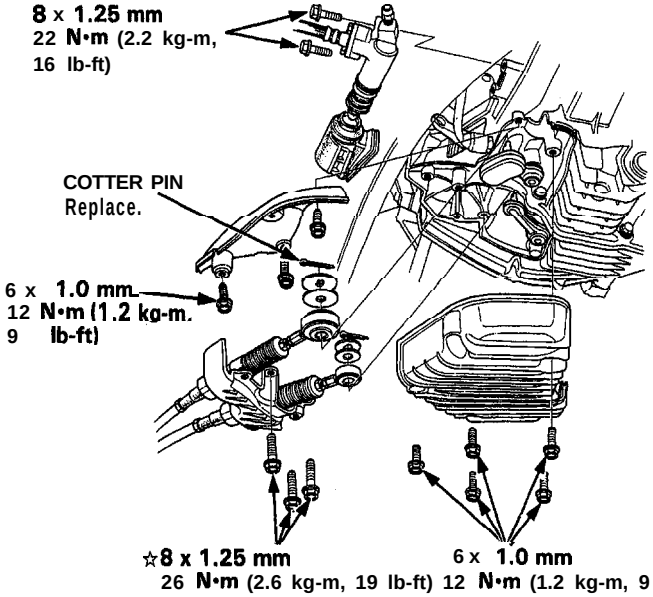


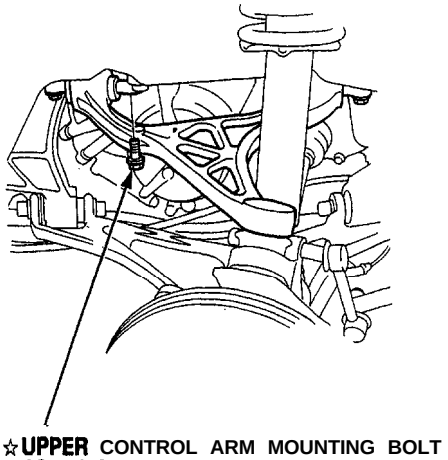


8. **Install the slave cylinder.**
9. **Install the shift cable and select cable.**

CAUTION: Take care not to bend the cables.

10. Install the upper cover, change wire bracket and lower cover.,
11. **Install the upper control arm mounting bolt.**





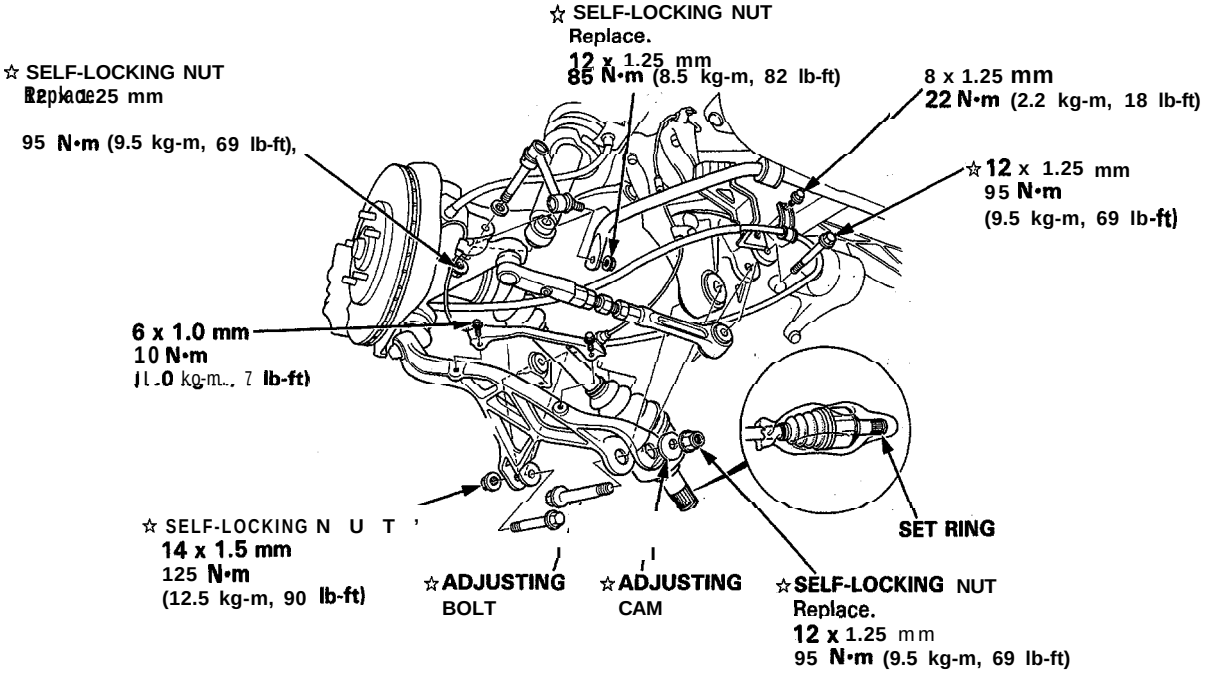
12. Install a new set ring on the end of the left driveshaft and intermediate shaft.
13. Install the left driveshaft.
14. Install the lower arm to the side beam.

CAUTION: Align the reference marks on the adjusting bolt, adjusting cam and lower control arm.

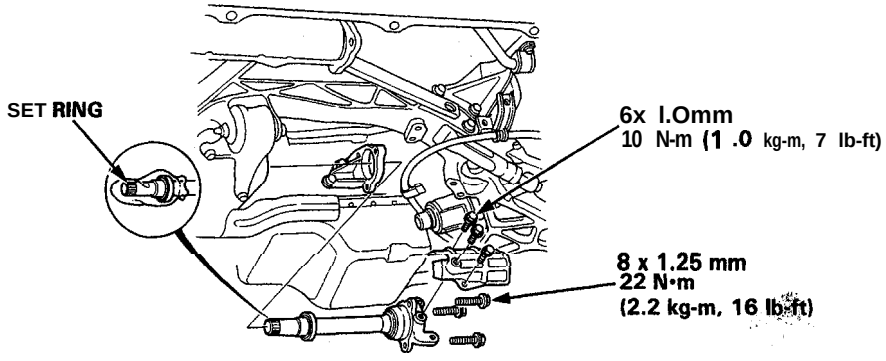
15. Install the damper fork bolt.
16. Install the ball joint nut to the toe control arm at the knuckle.

CAUTION: Make sure that the arrow marks on the toe control arm are aligned.

17. Install the ALB sensor wire clamp and parking brake cable holder.



18. Install the intermediate shaft and tighten the intermediate shaft mounting bolts to the intermediate shaft support base.
19. Install the intermediate shaft heat cover.



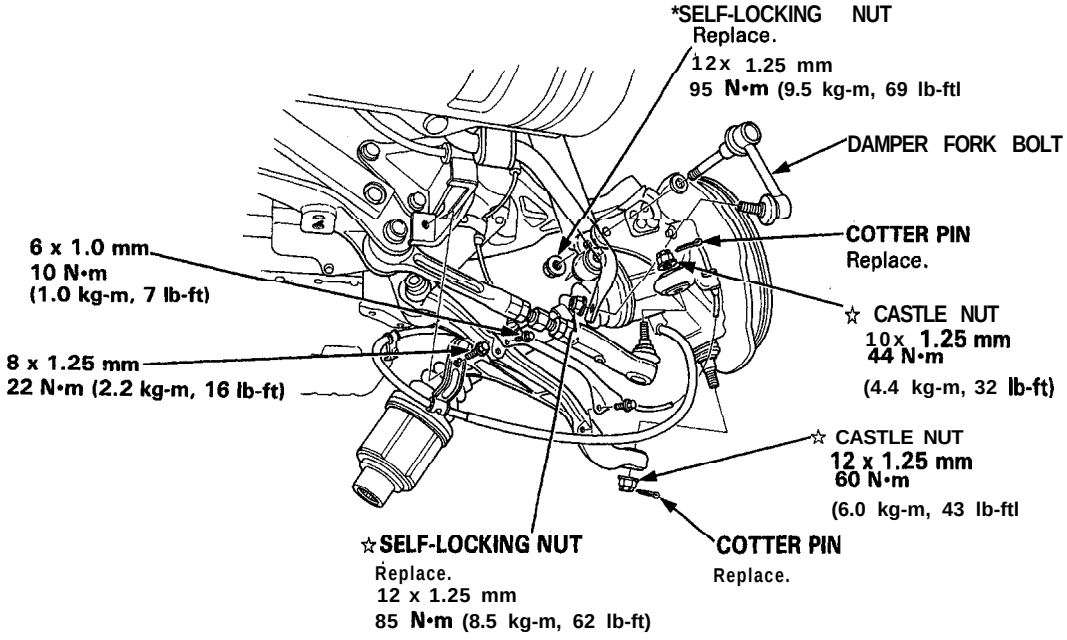
(cont'd)

Installation (cont'd)

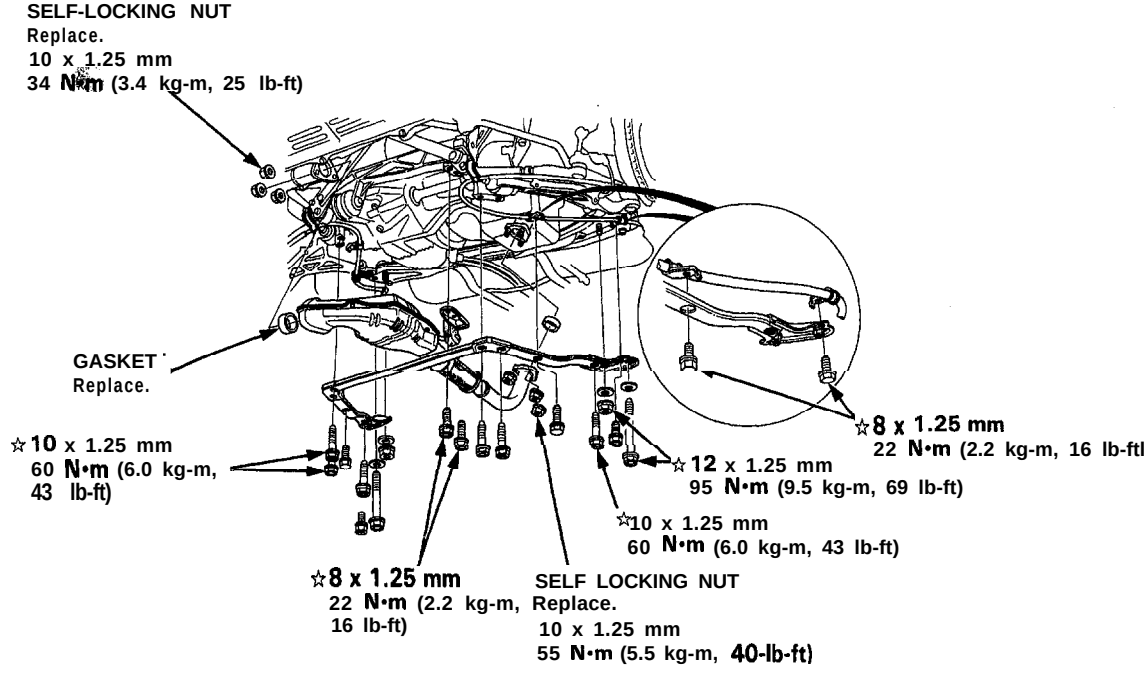
20. Install the right driveshaft onto the intermediate shaft.
21. Install the castle nut on the lower control arm at the knuckle.
22. Install the damper fork bolt.
23. Install the castle nut on the toe control arm at the knuckle.

CAUTION: Make sure that the arrow marks on the toe control arm are aligned.

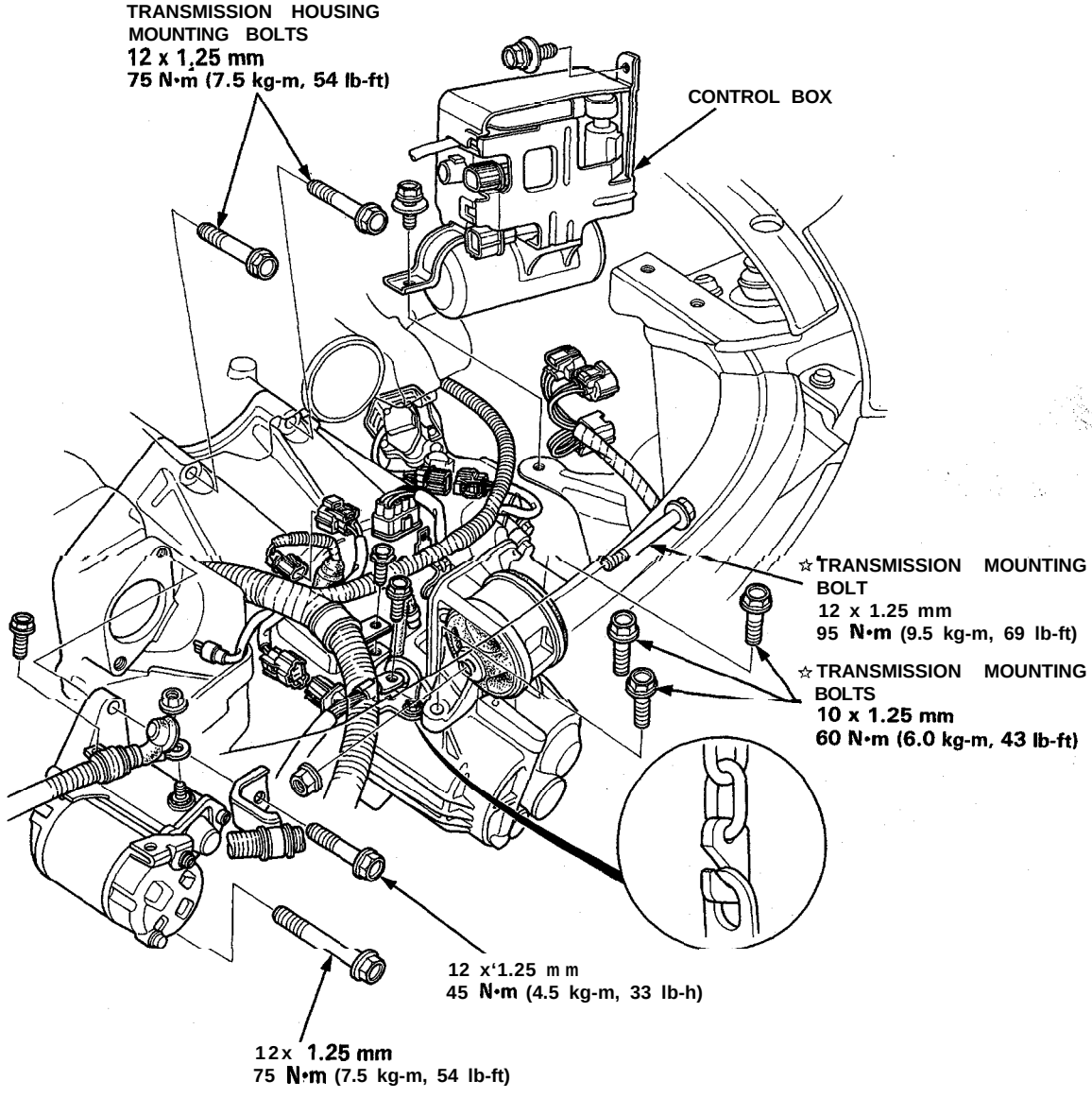
24. Install the Anti-lock brake sensor wire clamp and parking brake cable holder.



25. Install the front exhaust pipe A.
26. Install the raer beam rod.
27. Install the parking brake cable.



28. Install the transmission mount and 2 transmission housing mounting bolts.
29. Install the starter motor and connect the starter motor cables.
30. Install the transmission ground cable and jumper connector, and connect the back-up light switch, neutral switch and speed sensor connectors.
31. Install the control box and connect the control box connectors.
32. Install the air cleaner case.
33. Install the strut bar.
34. Refill the transmission with oil.
35. Connect the battery positive (+) and negative (−) cables to the battery.
36. Inspect the rear camber (See Section 18).
37. Check the clutch operation.
38. Shift the transmission and check for smooth operation.



Automatic Transmission

Special Tools. 14-2
Description 14-3
Component Location 14-47

Electrical System
Circuit Diagram 14-48
Troubleshooting Procedures 14-50
Symptom-to-Component Chart. 14-52
Electrical Troubleshooting 14-54
Lock-up Control Solenoid Valve A/B 14-79
Shift Control Solenoid Valve A/B 14-80
Linear Solenoid 14-81
A/T Speed Sensors 14-83

Hydraulic System
Symptom-to-Component Chart. 14-84
Road Test 14-88
Stall Speed 14-89
Pressure 14-90
Fluid Level. 14-94
Transmission
Removal 14-96
Illustrated Index
L. Side Cover 14-100
Transmission Housing 14-102
Torque Converter Housing/Valve Body . . . 14-104
L. Side Cover
Removal 14-106
Transmission Housing
Removal 14-107
Valve Body
Removal 14-108
Assembly 14-109
Repair 14-110
Oil Pump. 14-111
Main Valve Body 14-112
Secondary Valve Body 14-114
Servo Body/Throttle Valve Body. 14-116
Regulator Valve Body 14-118
Lock-up Valve Body. 14-119
2nd Accumulator Body 14-120
Mainshaft 14-121
Countershaft
Disassembly/Inspection/Reassembly 14-122
Inspection/Installation 14-123
One-Way Clutch/Parking Gear 14-126
Secondary Shaft 14-127
Clutch
Illustrated Index 14-128
Disassembly 14-131
Reassembly. 14-133
1st-Hold Clutch Bearing 14-137
Torque Converter Housing Bearing
Mainshaft Bearing 14-138
Countershaft Bearing. 14-139
Secondary Shaft Bearing 14-139
Transmission Housing Bearing 14-140
Reverse Idler Gear 14-141
Manual Valve Detent Spring. 14-142
Parking Brake Stopper 14-142
Transmission
Reassembly. 14-143
Torque Converter 14-148
Transmission
Installation 14-149
Shift Cable
Adjustment. 14-153
*Removal/Installation 14-154
*Gearshift Selector 14-155
*Shift Indicator Panel 14-156

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NS-X includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special caution and tools and should therefore be done by an anthorized Acura dealer.

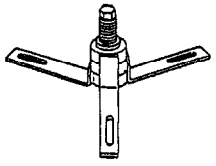
⚠ WARNING

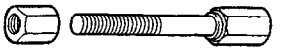
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

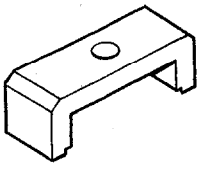
- Special Tools

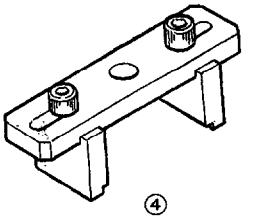
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAC-PK401OA	Housing Puller	1	14-107
②	07GAE-PG40200	Clutch Spring Compressor Bolt Assembly	1	14-131, 134
③	07HAE-PL50100	Clutch Spring Compressor Attachment	1	14-131, 134
④	07LAE-PX40100	Clutch Spring Compressor Attachment	1	14-131, 134
⑤	07LAJ-PT301OA	ECU Test Harness	1	14-51
⑥	07406-0020003	A/T Oil Pressure Gauge Set	1	14-90
⑥ – 1	07406-0020201	A/T Oil Pressure Gauge Replacement Hose	(1)	14-90
⑦	07406-0070000	A/T Low Pressure Gauge	1	14-90
⑧*	07736-A01000A*	'Adjustable Bearing Puller, 25-40 mm	1	14-139
⑨	07746-0010500	Attachment, 62 x 68 mm	1	14-138
⑩	07746-0010600	Attachment, 72 x 75 mm	1	14-137. 138, 139
⑪	07749-0010000	Driver	1	14-137, 138, 139
⑫	07924-PJ40000	Mainshaft Holder	1	14-106, 146
⑬	07947-6340500	Attachment	1	14-138

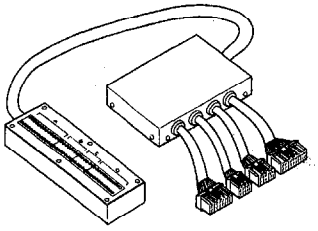
* ⑧ must be used with commercially available 3/B x 16 thread Slide Hammer.

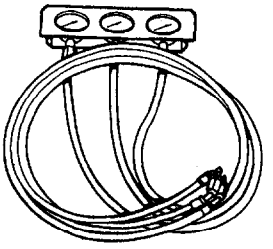

①

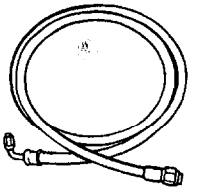

②

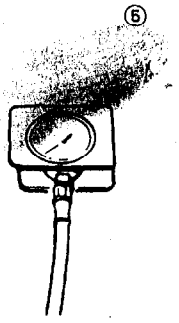

③

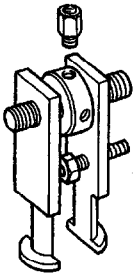

④

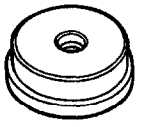

⑤

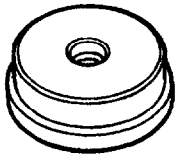

⑥

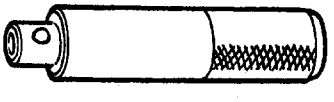

⑥-1

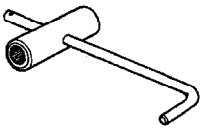

⑦

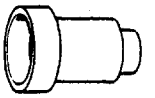

⑧


⑨


⑩


⑪


⑫


⑬

Description

The automatic transmission is a combination of a 3-element torque converter and a triple-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 in 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 torque converter 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 three parallel shafts, the mainshaft, the countershaft, and the secondary shaft. The mainshaft is in line with the engine crankshaft.
The mainshaft includes the clutches for Ist, and 4th, and gears for 3rd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).
The countershaft includes the clutches for Ist-Hold and 3rd, and gears for 2nd, 3rd, 4th, Reverse and 1st.
The secondary shaft includes the 2nd clutch and gears for 2nd and 3rd.
The 4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.
The gears on the mainshaft and secondary shaft 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, 3, and D.

ELECTRONIC CONTROL

The electronic control system consists of an automatic transmission control unit, sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The A/T control unit is located on the insulator center bulkhead, behind the driver's seat.

HYDRAULIC CONTROL

The valve assembly includes the main valve body, secondary valve body, servo valve body, regulator valve body, lock-up valve body and the 2nd accumulator body.
They are bolted to the torque converter case as an assembly.
The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, relief valve, one-way relief valve and oil pump gears.
The secondary valve body contains the 3-2 kick-down valve, CPC (clutch pressure control) valve, 2nd orifice control valve, 3rd orifice control valve, modulator valve, 4th exhaust valve, servo control valve, 2nd exhaust valve and 4-3 kick-down valve.
The servo valve body contains the accumulator pistons and servo valve. The throttle valve body includes the throttle B valve which is bolted onto the servo valve body.
The regulator valve body contains the pressure regulator valve, lock-up control valve and cooler refief valve. Fluid from the regulator passes through the manual valve to the various control valves.
The lock-up valve body contains the lock-up timing B valve and lock-up shift valve. The 2nd accumulator body contains the accumulator pistons and LSD relief valve.
The torque converter check valve is located in the torque converter housing, under the main valve body.
The Ist, Ist-Hold, 3rd and 4th clutches receive oil from their respective feed pipes.

SHIFT CONTROL MECHANISM

Input from various sensors located throughout the car determines which shift control solenoid valve the A/T control unit 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 3 or D positon in 2nd, 3rd and 4th. pressurized fluid is drained from the back of the torque converter through an oil 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, an electronic control unit optimizes the timing of the lock-up mechaism.
The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. 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 A/T control unit.

(cont'd)

Description

(cont'd)

GEAR SELECTION

The selector lever has seven positons: ❑ ❑ REVERSE, [N] NEUTRAL, ❑ 1 st through 4th gear positions, ❑ 3rd gear, ❑ 2nd gear and ❑ 1st gear.

Position	Description
[P] PARK	Rear 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.
(D) DRIVE	General driving; starts in low speed, shifts automatically, 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 2nd, 3rd and 4th.
(3) THIRD	Driving in 3rd gear; stays in 3rd gear, does not shift up and down. For climbing or downhill and light engine braking on high speed condition.
(2) SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking'or better traction starting off on loose or slippery surface.
[1] FIRST	Driving in 1st gear, stays in 1st gear, does not shift up and down. For engine braking.

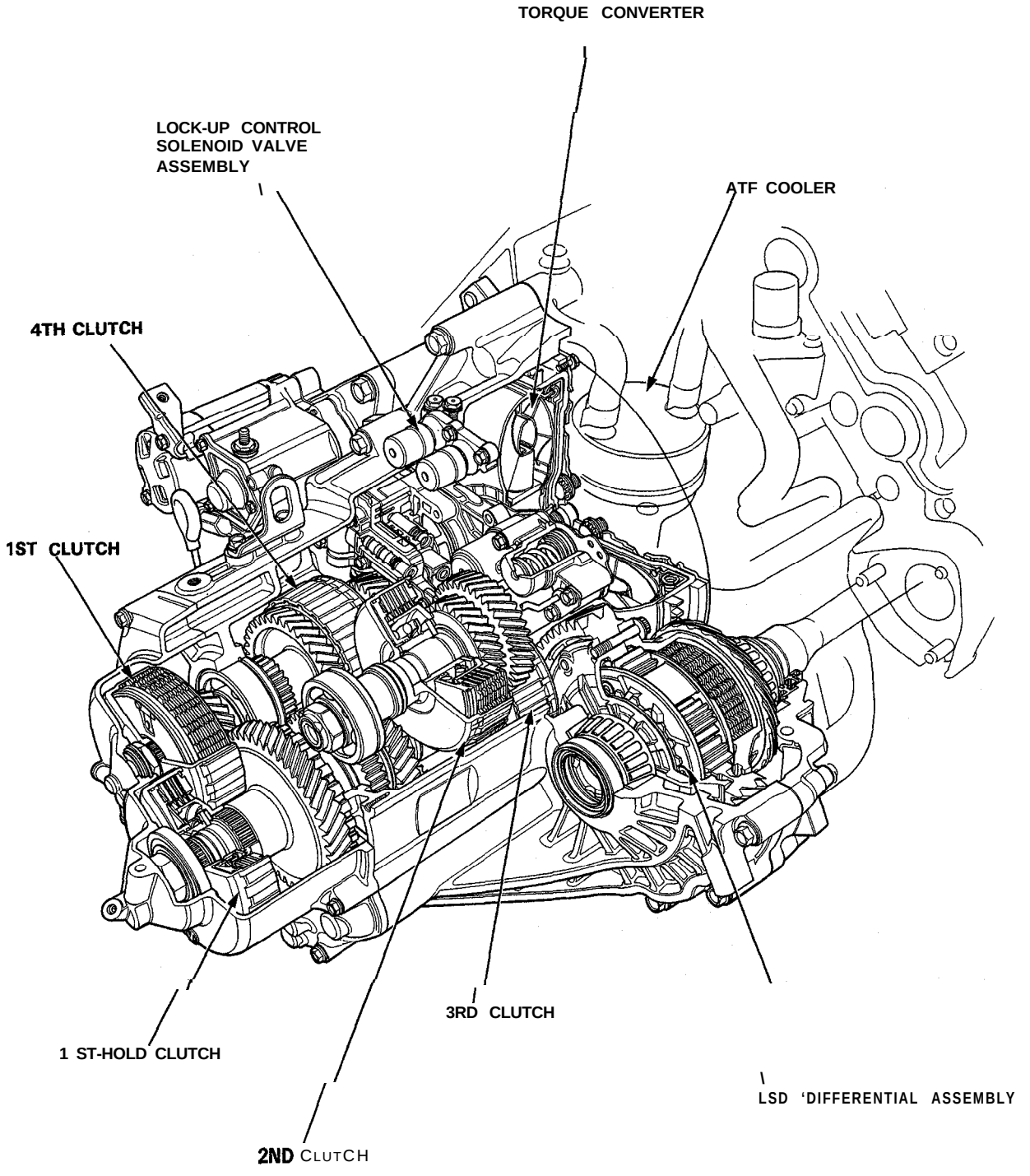
Starting is possible only in ❑ and [N] position through use of a slide-type, neutral-safety switch.

POSITION INDICATOR

A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.

ATF COOLER

With this mid-engine type car, the radiator is mounted at the front of the car, so the ATF cooler is installed directly on the transmission housing.


TORQUE CONVERTER
LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
ATF COOLER
4TH CLUTCH
1ST CLUTCH
3RD CLUTCH
1 ST-HOLD CLUTCH
LSD 'DIFFERENTIAL ASSEMBLY
2ND CLUTCH

(cont'd)

Description

- Clutches (cont'd)

The Acura four speed automatic transmission uses hydraulically actuated clutches to engage or disengage the transmission gears. When clutch pressure is introduced into the clutch drum, the clutch piston is applied. 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 clutch pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other while disengaged. This allows the gear to spin independently of its shaft, transmitting no power.

[I st Clutch1
The first clutch engages/disengages first gear, and is located at the end of the mainshaft, just behind the end cover. The first clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

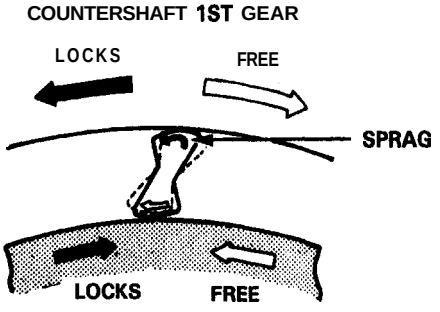
[I st-Hold Clutch]
The first hold clutch engages/disengages low hold or 1 position, and is located at the end of the countershaft, just behind the end cover. The 1st hold clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

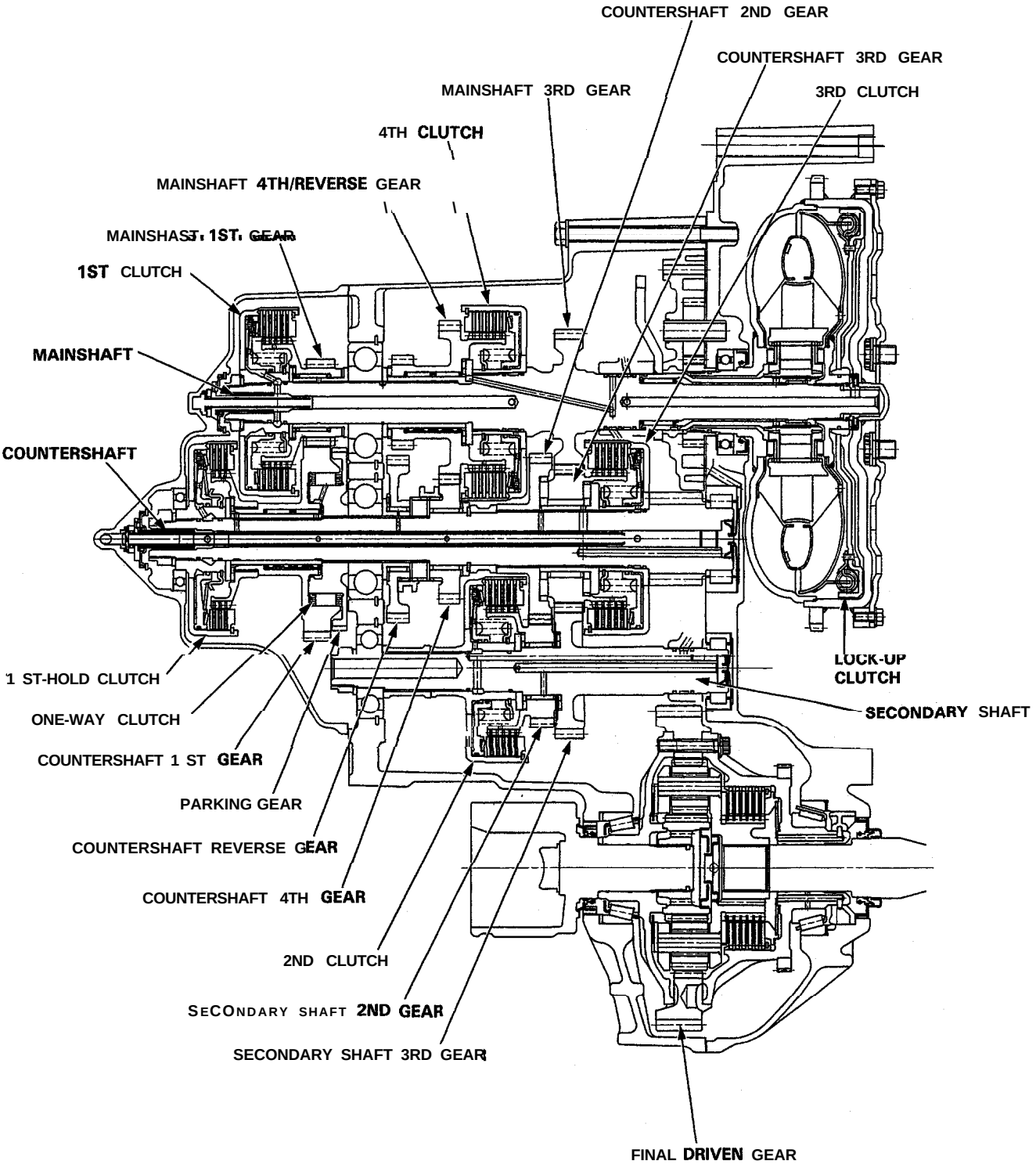
[2nd Clutch1
The second clutch engages/disengages second gear, and is located on the secondary shaft. The second clutch is supplied clutch pressure through the secondary shaft by a circuit connected to the 2nd accumulator body.

[3rd Clutch1
The third clutch engages/disengages third gear, and is located at the end of the countershaft, opposite the end cover The third clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

[4th Clutch]
The fourth clutch engages/disengages fourth gear, as well as reverse gear, and is located at the center of the mainshaft. The fourth clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[One-way Clutch1
The one-way clutch is positioned between the parking gear and first gear, with the parking gear splined to the countershaft. The first 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 first gear to the countershaft first gear.
The first clutch and gears remain engaged in the 1 st, 2nd, 3rd, and 4th gear ranges in the ❑ position. However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the [D] 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 first clutch still engaged.




COUNTERSHAFT 2ND GEAR
COUNTERSHAFT 3RD GEAR
MAINSHAFT 3RD GEAR
3RD CLUTCH
4TH CLUTCH
MAINSHAFT 4TH/REVERSE GEAR
MAINSHAFT 1ST GEAR
1ST CLUTCH
MAINSHAFT
COUNTERSHAFT
1 ST-HOLD CLUTCH
ONE-WAY CLUTCH
COUNTERSHAFT 1 ST GEAR
PARKING GEAR
COUNTERSHAFT REVERSE GEAR
COUNTERSHAFT 4TH GEAR
2ND CLUTCH
SECONDARY SHAFT 2ND GEAR
SECONDARY SHAFT 3RD GEAR
LOCK-UP CLUTCH
SECONDARY SHAFT
FINAL DRIVEN GEAR

(cont'd)

Description

- Clutches (cont'd)

Lock-up Clutch

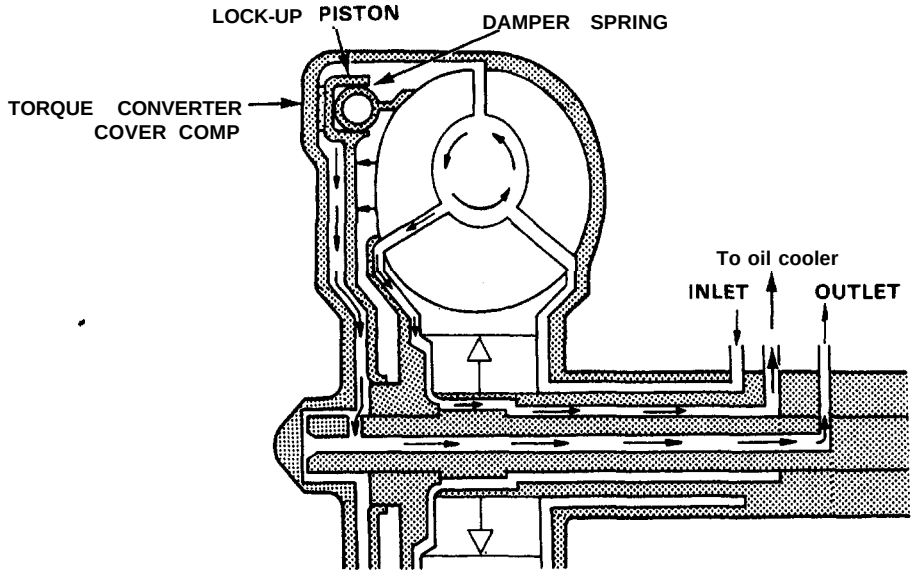
1 . Operation (clutch on)

With the lock-up clutch on, the oil in the chamber between the converter cover and lock-up piston is discharged, and the converter oil exerts pressure through the piston against the converter cover. As a result, the converter turbine is locked on the converter cover firmly. The effect is to bypass the converter, thereby placing the car in direct drive.

Power flow

The power flows by way of:

Engine
↓
Drive plate
↓
Torque converter cover
↓
Lock-up piston
↓
Damper spring
↓
Turbine
↓
Mainshaft

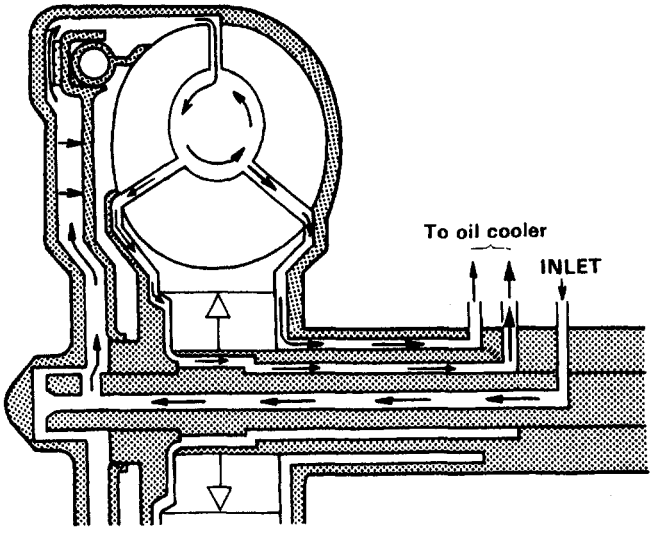


2. Operation (clutch off)

With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result, the lock-up piston is moved away from the converter cover; that is, the torque converter lock-up is released.

Power flow

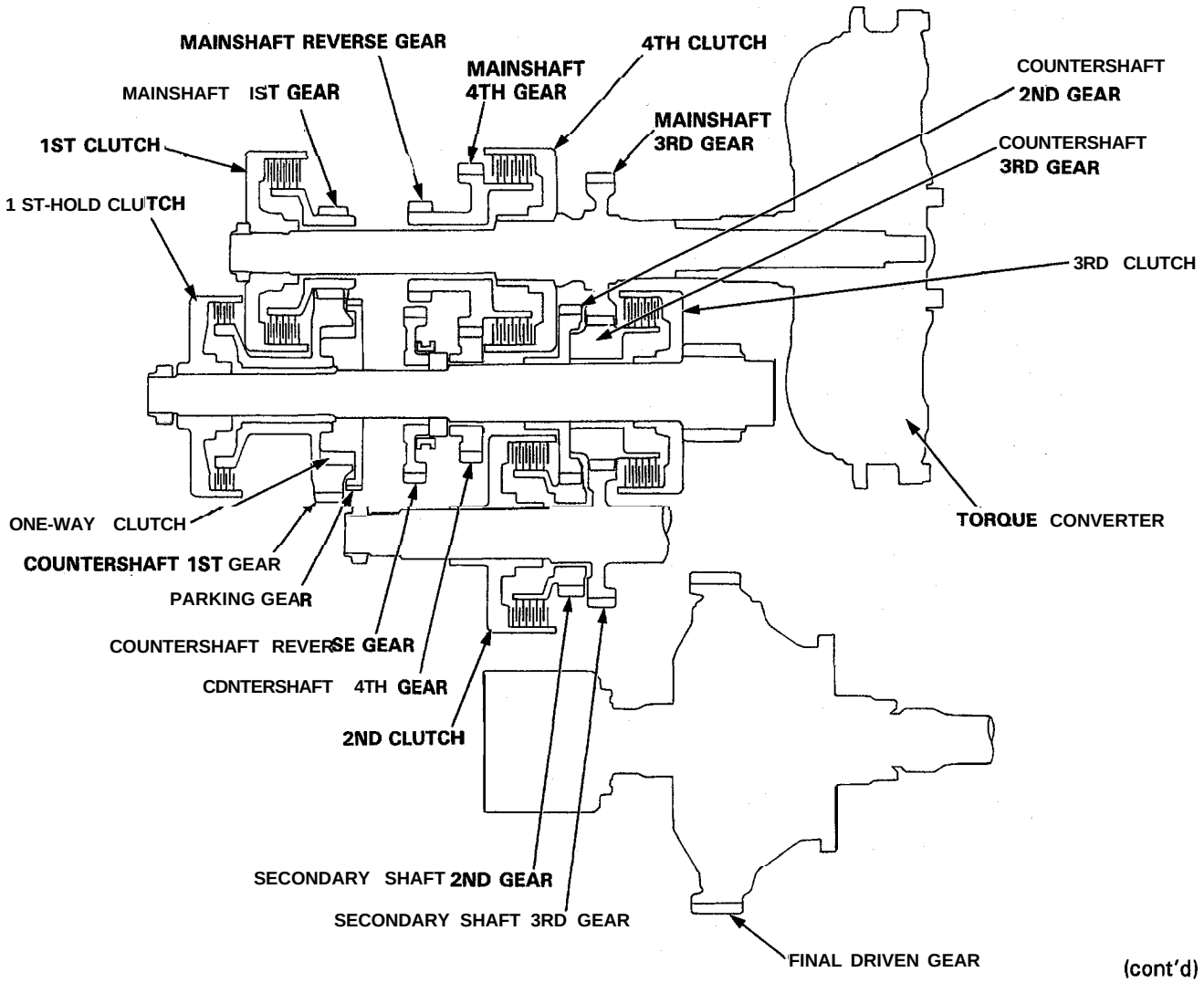
Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft



- Power Flow

RANGE \ 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	○	×	×	×	×	×	×	×	×	×
D 1ST	○	×	○	○	×	×	×	×	×	×
D 2ND	○	×	○*	×	○	×	×	×	×	×
D 3RD	○	×	○*	×	×	○	×	×	×	×
D 4TH	○	×	○*	×	×	×	○	○	×	×
3	○	×	○*	×	×	○	×	×	×	×
2	○	×	○*	×	○	×	×	×	×	×
1	○	○	○	×	×	×	×	×	×	×

0: Operates, x : Doesn't operate, *: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.



(cont'd)

Description

Power Flow (cont'd)

1 Position

At 1 position, hydraulic pressure is applied to the 1st clutch and to the 1st hold clutch.

The power flow when accelerating is as follows;

1. Hydraulic pressure is applied to the 1 st clutch on the mainshaft and power is transmitted via the 1 st clutch to the mainshaft 1st gear.

2. **Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch on the inside of the countershaft 1st gear. The one-way clutch is used to drive the countershaft.**

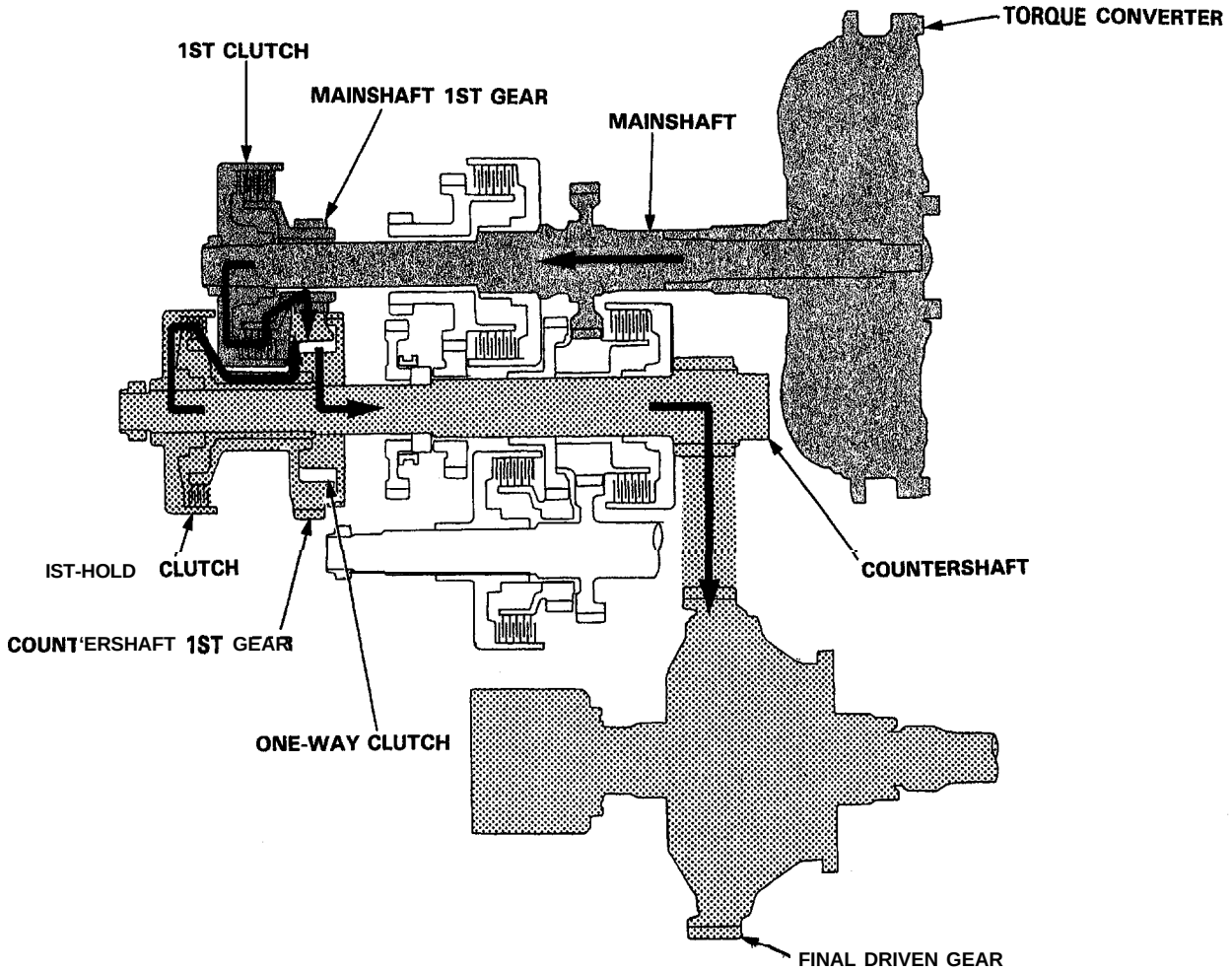
3. **Power is transmitted to the final drive gear and drives the final driven gear.**
   Hydraulic pressure is applied to the 1st hold clutch but the countershaft is rotated by the one-way clutch.

The power flow when decelerating is as follows;

1. **Rolling resistance from the road surface through the rear wheels to the final drive gear, then to the countershaft 1st gear via the Ist-hold clutch which is applied during deceleration.**

2. The one-way clutch becomes free at this time because of the countershaft rotates in reverse at the time of accelerating.

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 1 st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can ba obtained with 1st speed gear.

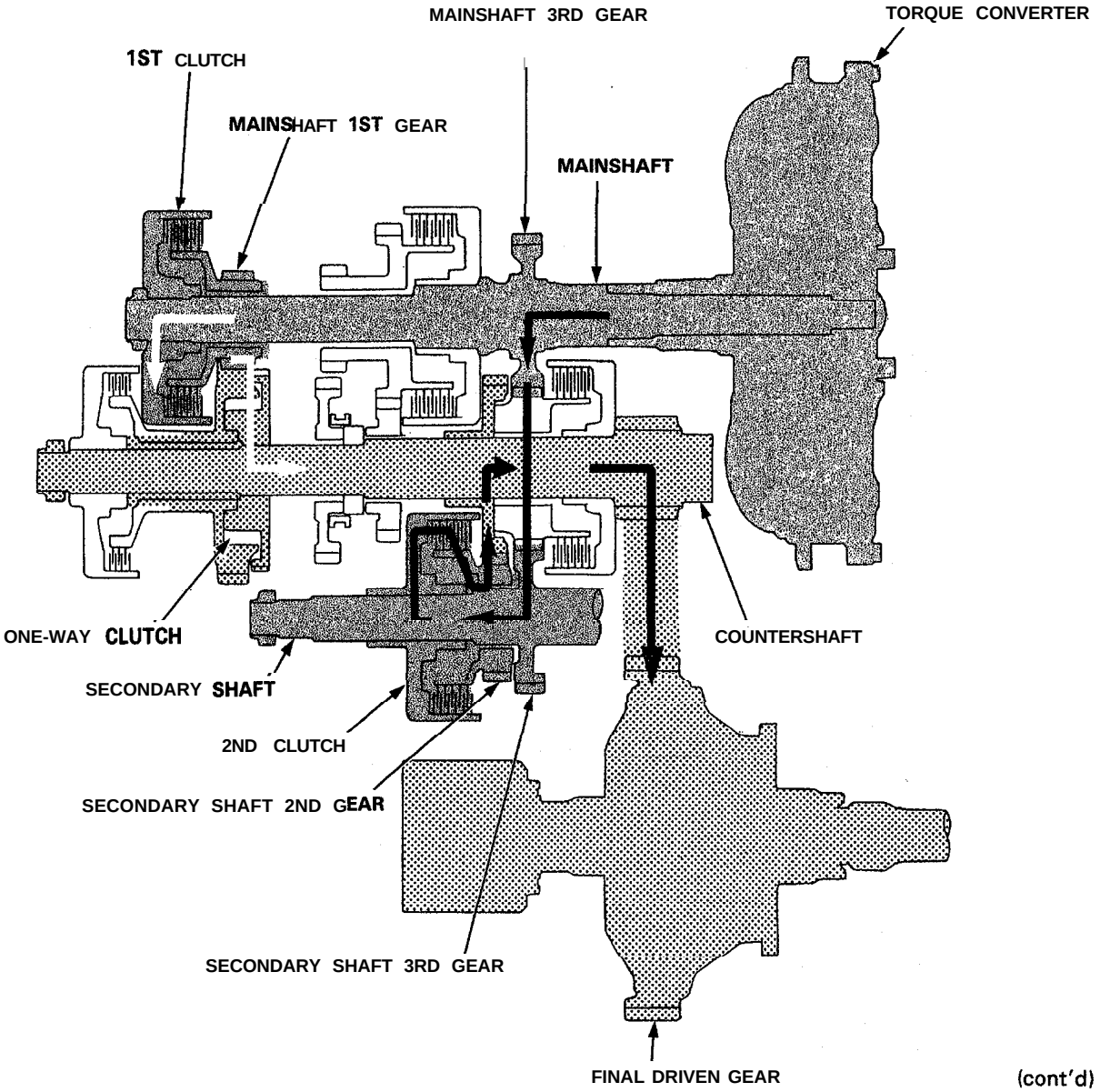


2 Position is provided to drive only in 2nd speed.

1. Power from the mainshaft 3rd gear drives the countershaft 3rd gear. Since at this time there is no hydraulic pressure to the 3rd clutch. The countershaft 3rd gear turns freely and drives the secondary shaft 3rd gear.
2. The power is also transmitted to the secondary shaft 2nd gear because hydraulic pressure is applied to 2nd clutch.
3. The secondary shaft 2nd gear drives the countershaft 2nd gear. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE:

- At 2 position, 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.
- Power flow in D position, 2nd speed is the same as 2 position.



(cont'd)

Power Flow (cont'd)

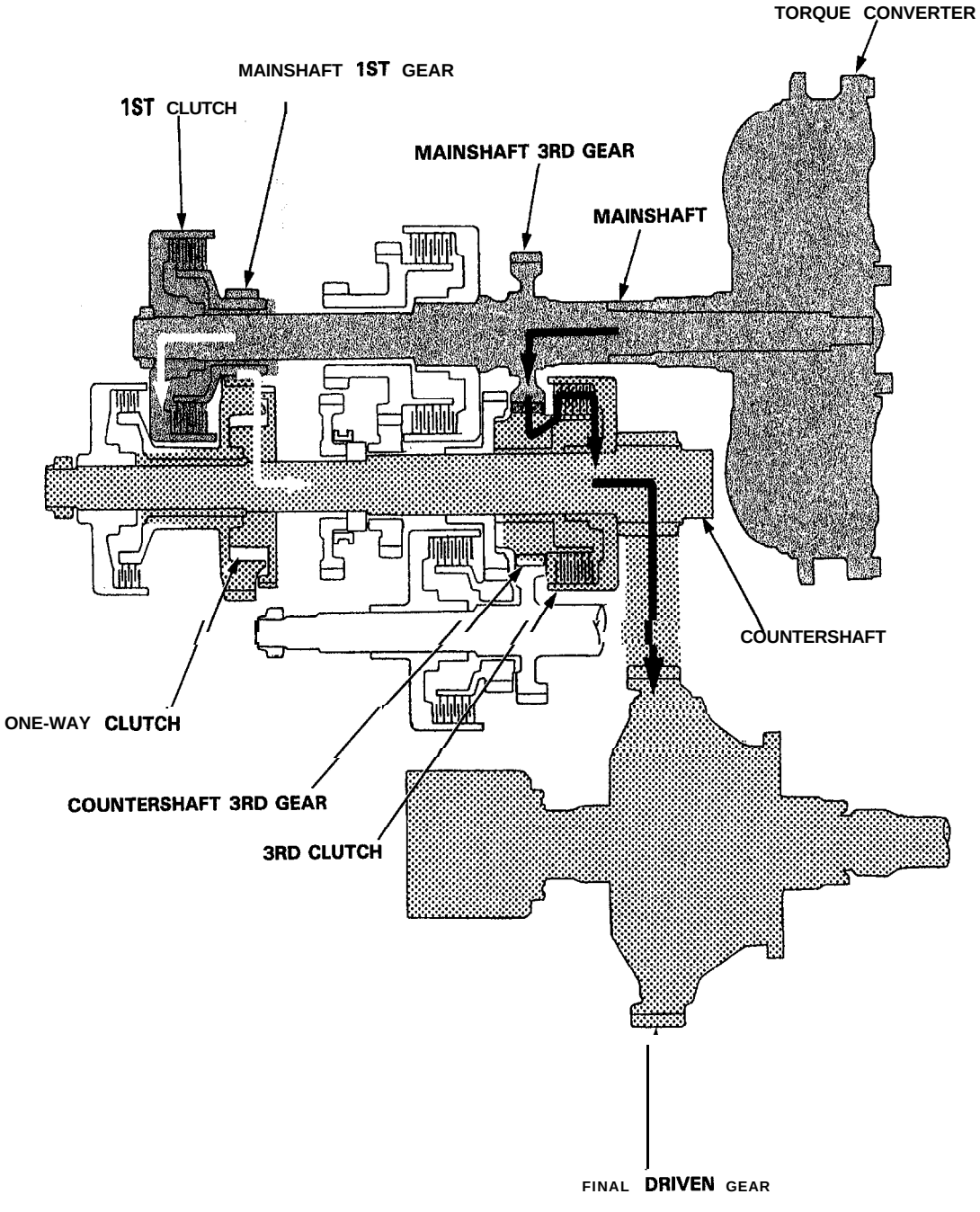
3 Position is provided to drive only in 3rd speed.

1. Hydraulic pressure is applied to the 3rd clutch. Power from the mainshaft 3rd is transmitted to the countershaft 3rd gear.

2. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE:

- At 3 position, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of the 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.
- Power flow in D position, 3rd speed is the same as 3 position.

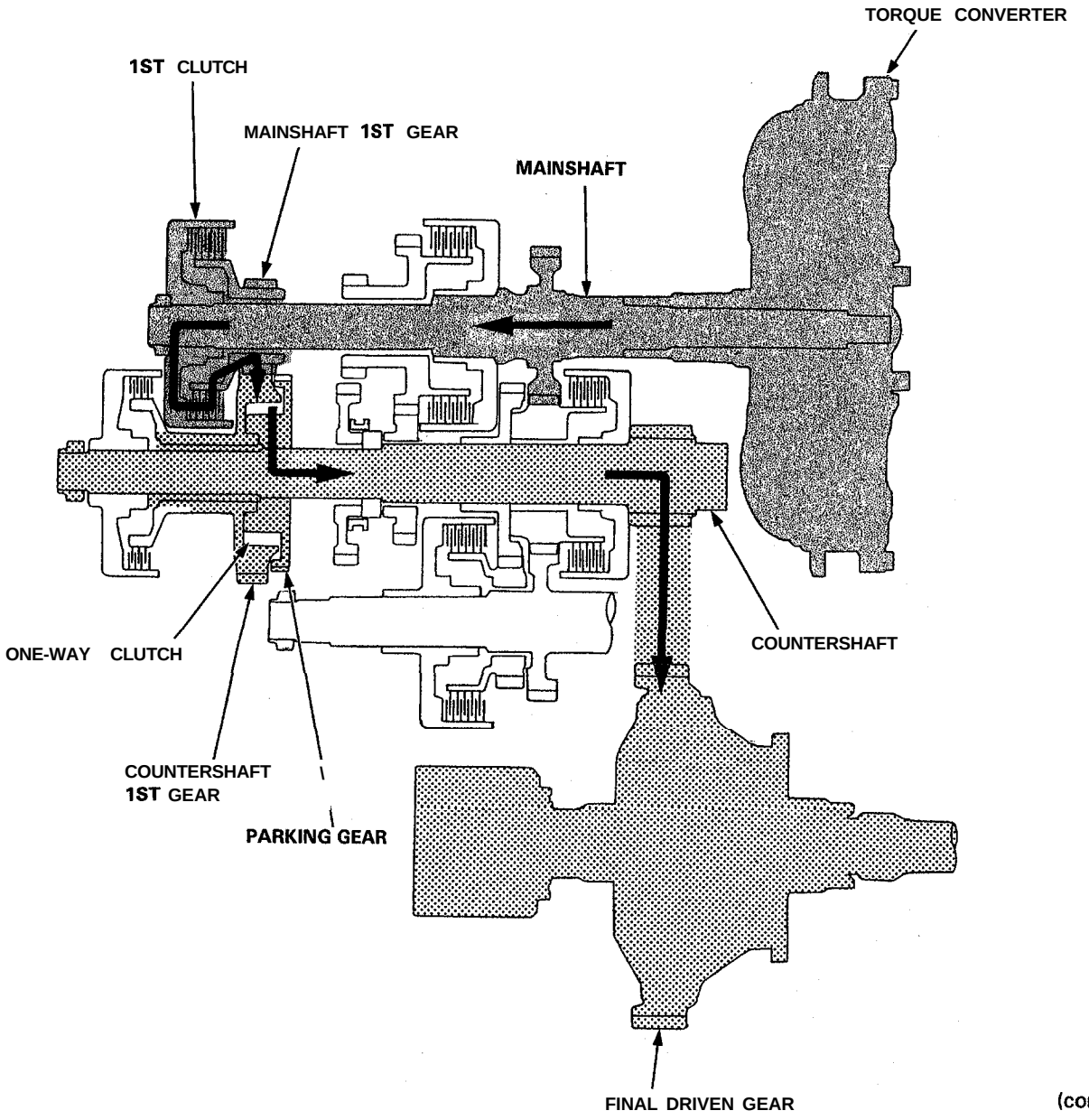


In D position, the optimum gear is automatically selected from the gear ratios of 1 st, 2nd, 3rd and 4th speeds, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

D Position, 1st speed

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, and drives the countershaft via the one-way clutch.
3. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE: In the D position, hydraulic pressure is not applied to the Ist-hold clutch.



(cont'd)

Power Flow (cont'd)

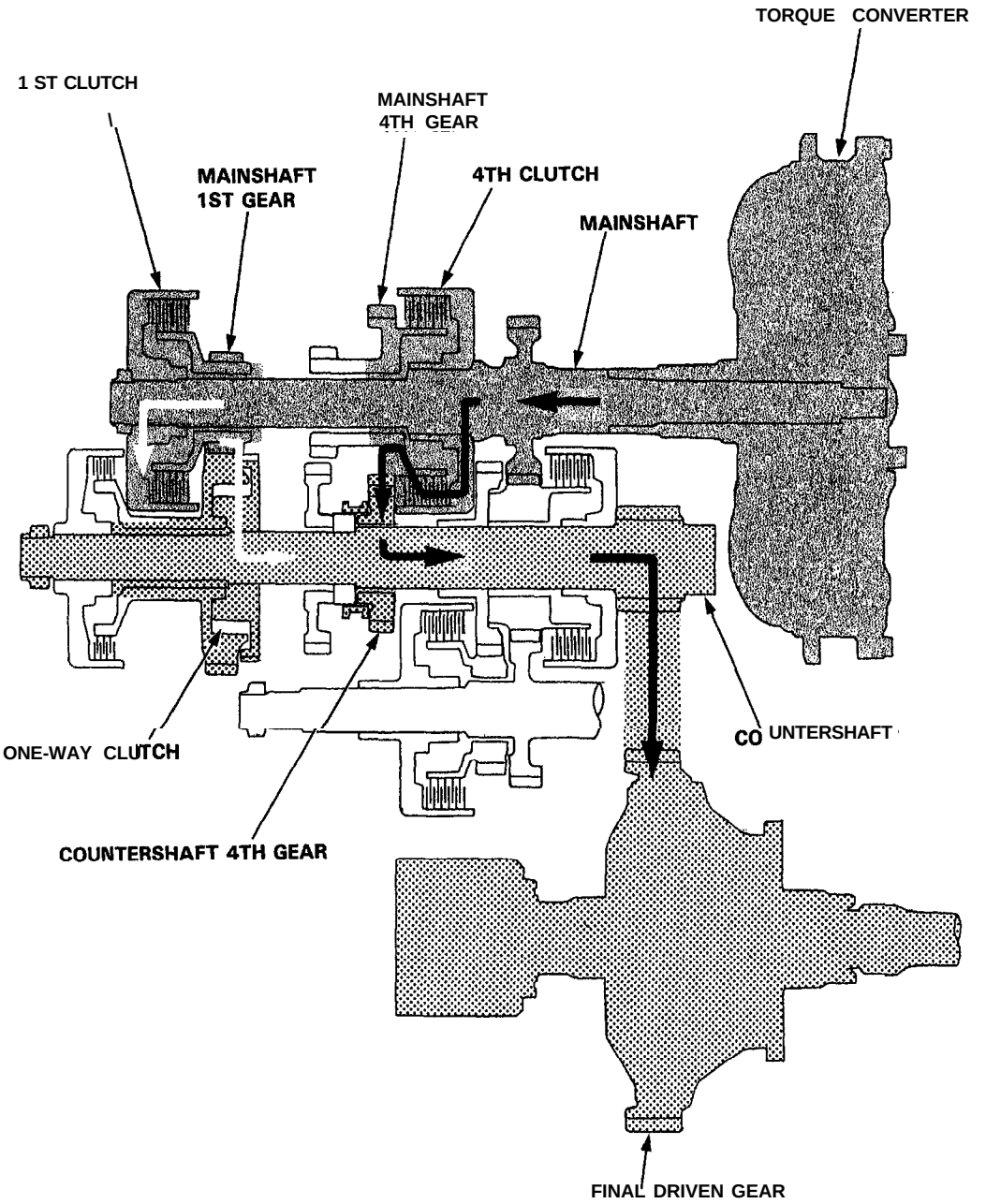
D Position, 4th speed

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 through countershaft 4th gear to the countershaft.

3. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE: At D position, 4th speed, 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.



Electronic Control System

Electronic Control System

The electronic control system consists of the A/T control unit, sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

The A/T control unit is located on the insulator center bulkhead, behind the driver's seat.

Shift control

Shifting is related to engine torque through the linear solenoid used to operate throttle valve B which is controlled by the A/T control unit the control throttle pressure.

Getting a signal from each sensor, the A/T control unit detects the appropriate gear shifting and activates shift control **solenoid valves A and/or B.**

The combination of driving signals to shift control solenoid valves A and B is shown in the table below.

Shift control sol. valve / Range (gear)	A	B
D (1st)	OFF	ON
❑ (2nd)	ON	OFF
❑ ❑ (3rd), ❑ (1st)	ON	OFF
❑ (4th), ❑ (2nd)	OFF	OFF

Lock-up control

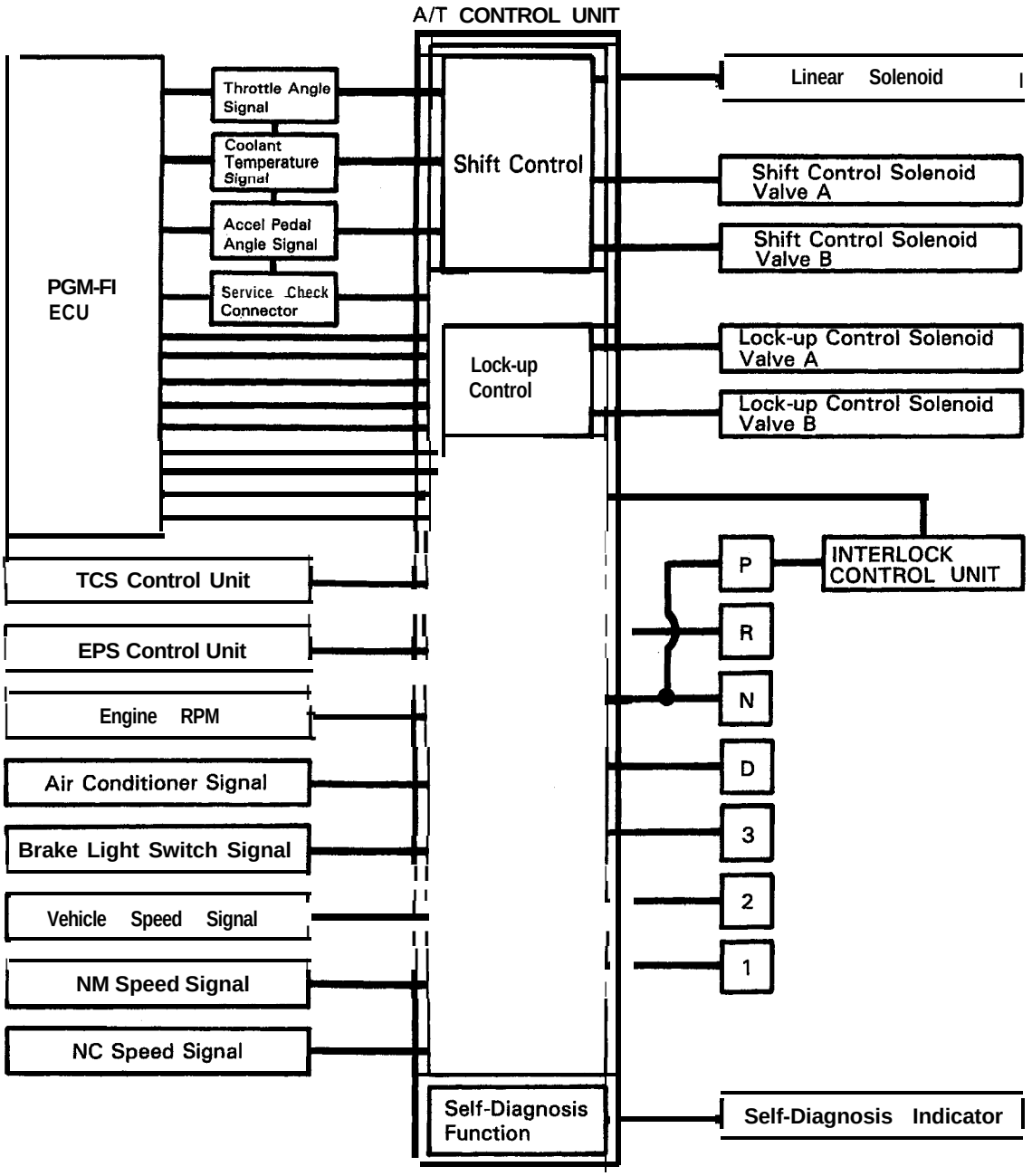
From sensor input signals, the A/T control unit detects whether to turn the lock-up ON or OFF and activates lock-up control solenoid valve A and/or B accordingly.

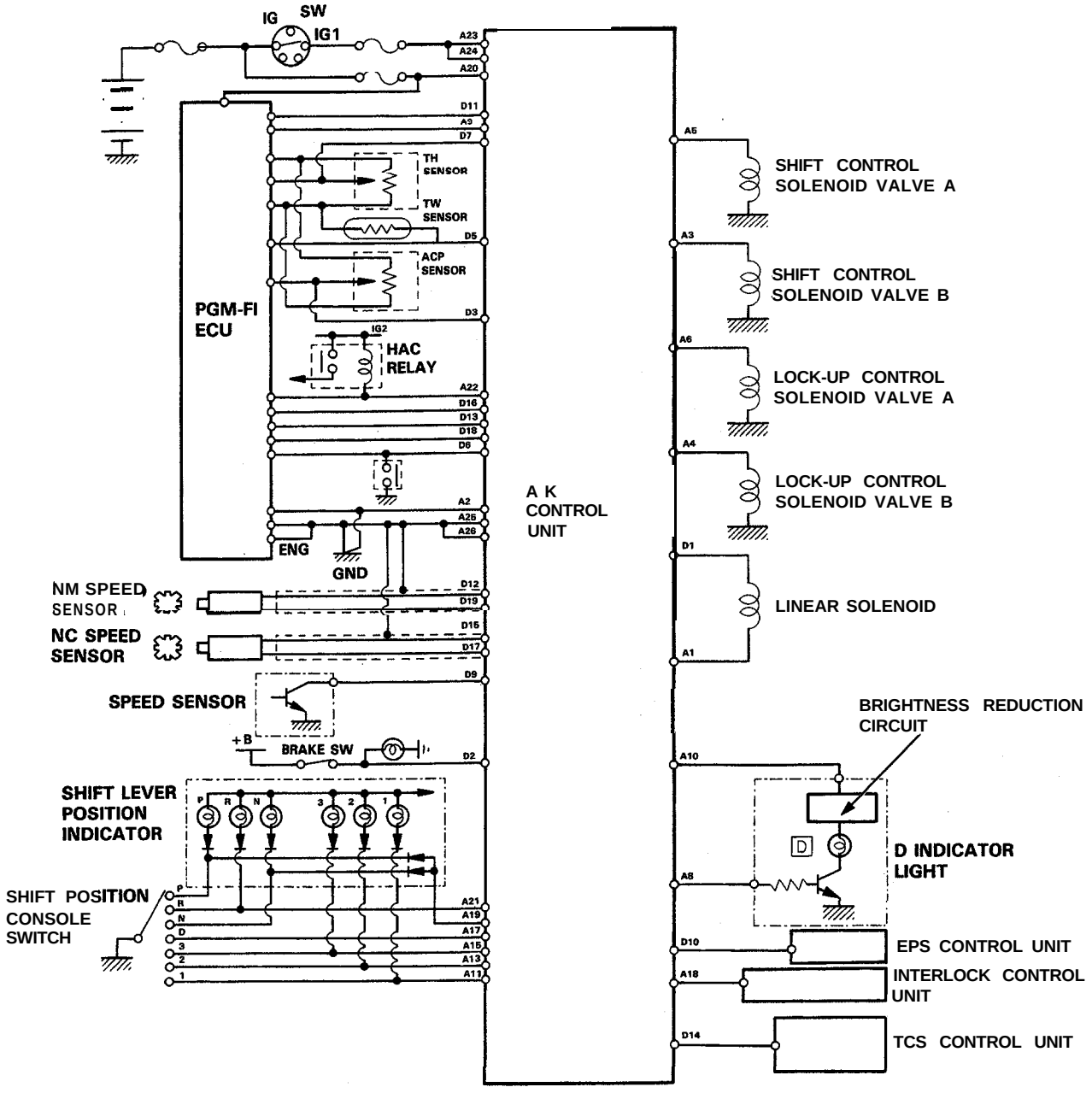
The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

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

(cont'd)

- Electronic Control System (cont'd)





A1	A3	A5		A9	A11	A13	A15	A17	A19	A21	A23	A25
A2	A4	A6	A8	A10				A18	A20	A22	A24	A26

D1	D3	D5	D7	D9	D11	D13	D15	D17	D19	
D2		D6		D10	D12	D14	D16	D18		

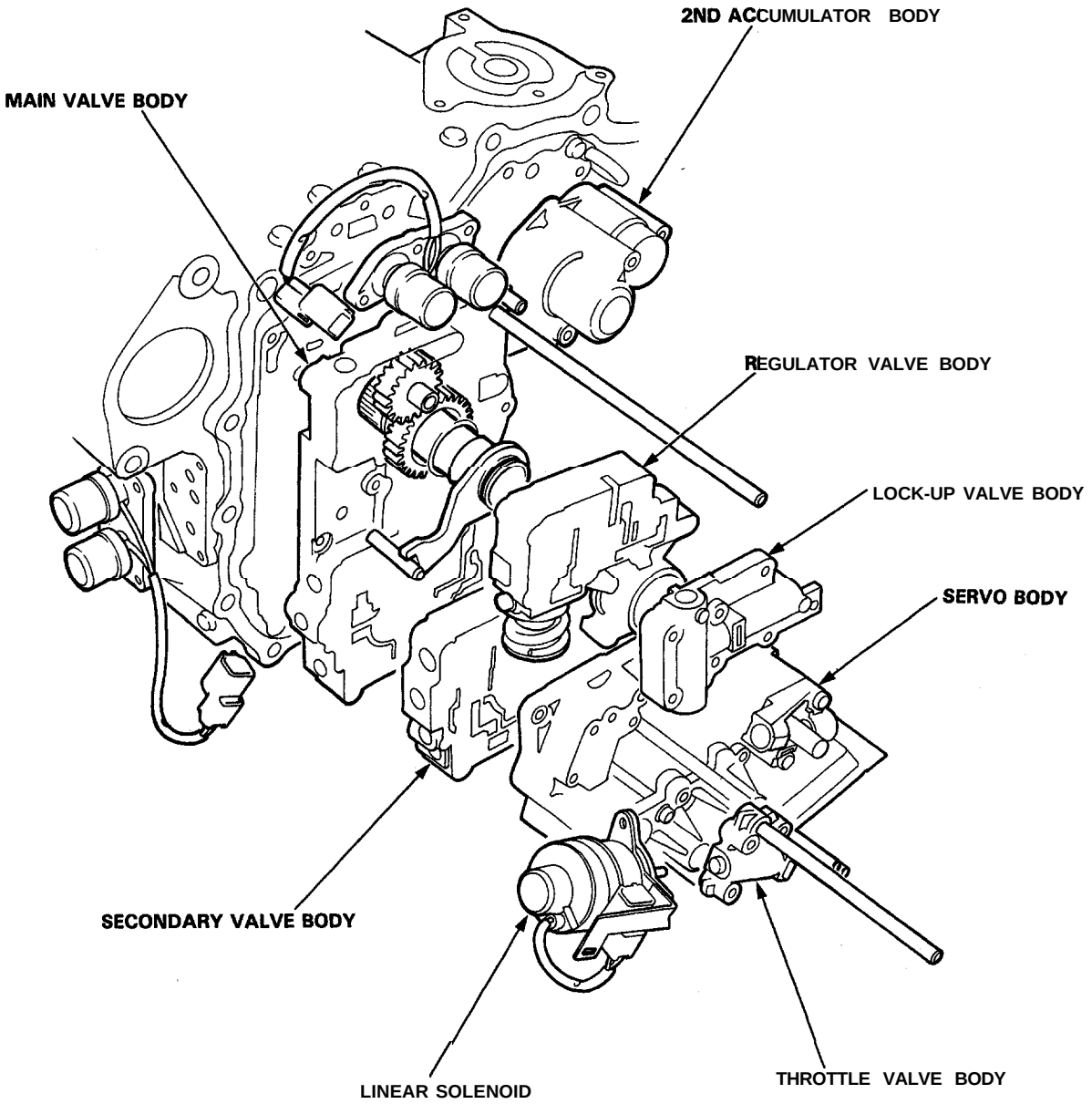
TERMINAL LOCATION

Description

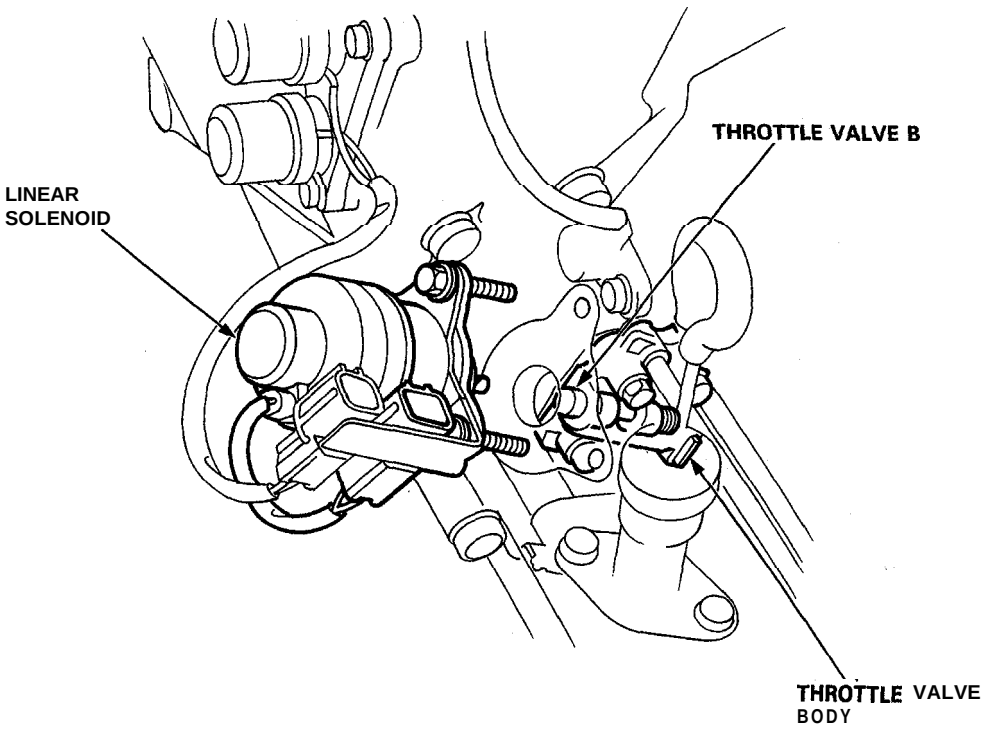
- Hydraulic Control

The valve bodies include the main valve body, regulator valve body, lock-up valve body, secondary valve body, servo body, throttle valve body and 2nd accumulator body.

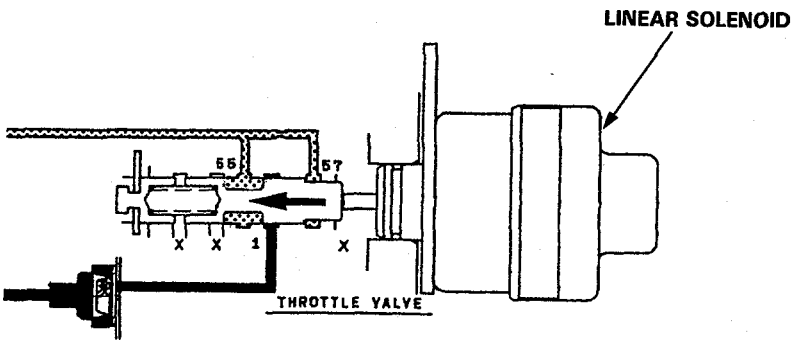
The oil pump is driven by splines on the left end of the torque converter which is attached to the engine. Oil flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, and the servo body, directing pressure to each of the clutches.



Throttle Valve Body
The throttle valve body is mounted on the servo valve body with the throttle valve built in,



Throttle Valve B, Linear Solenoid
Throttle valve B converts changes in the throttle opening to changes in transmission hydraulic pressure, to determine transmission shift quality and lock-up operation. Throttle valve B also operates on accumulator back pressure, to make smooth changes from one gear to another.
The end of the valve contacts the linear solenoid which is controlled by the A/T control unit.
The throttle pedal load has been reduced by eliminating the cable.



(cont'd)

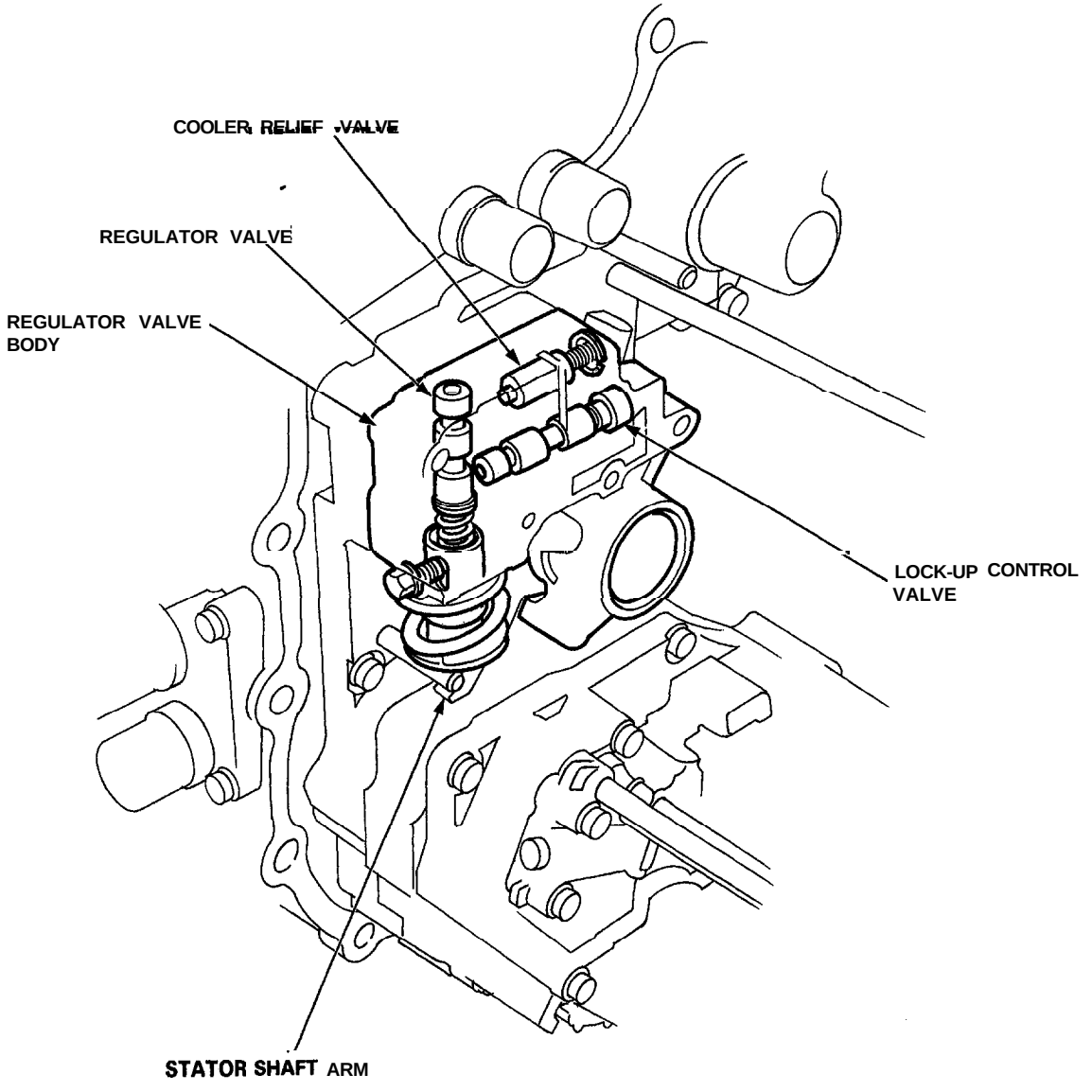
Description

Hydraulic Control (cont'd)

Regulator Valve Body

The regulator valve body is mounted on the main valve body with the regulator valve, lock-up control valve and cooler relief valve built in. The stator shaft arm contacts the end of the regulator valve.

The hydraulic pressure (line pressure) is controlled by the regulator valve.

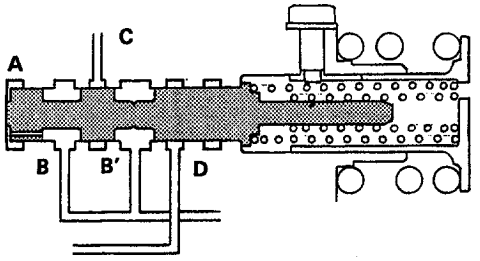


Regulator Valve

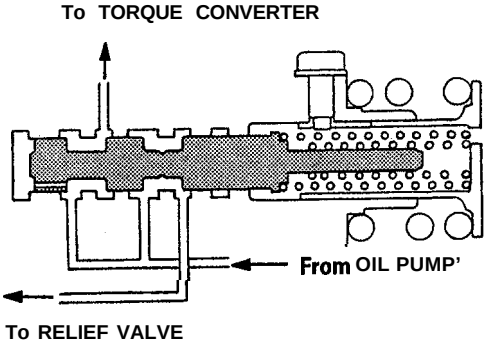
The regulator valve maintains a constant hydraulic pressure sent from the oil pump to the hydraulic control system, while also furnishing oil to the lubricating system and torque converter.

Oil flows through B and B'. The oil which enters through B flows through the valve orifice to A pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the oil through B' from D thus changes. This operation is continued, thus maintaining the line pressure.

(ENGINE NOT RUNNING)

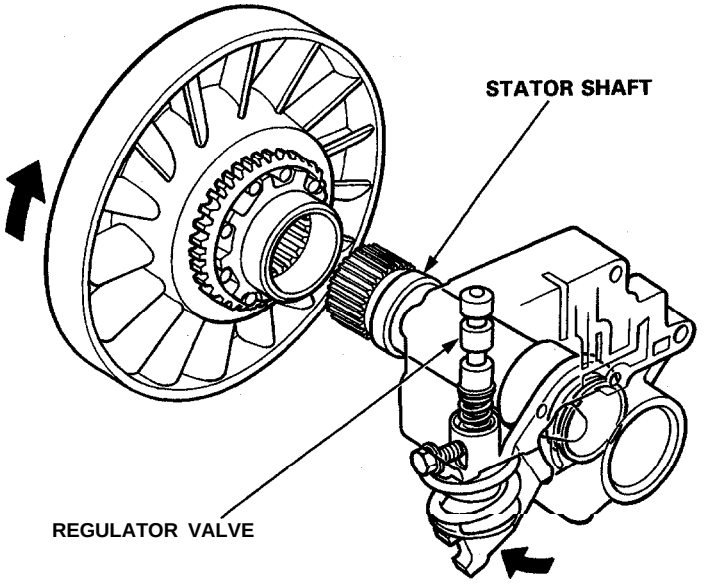


(ENGINE RUNNING)



Stator Reaction Hydraulic Pressure Control

Hydraulic pressure increase according to torque is performed by the regulator valve using stator torque reaction. The stator shaft is splined in the stator and its arm end contacts the regulator spring cap. When the car 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 this ➡ direction in proportion to the reaction. The spring compresses and the valve moves to increase the regulated control pressure or line pressure. Line pressure is maximum when the stator reaction is maximum.



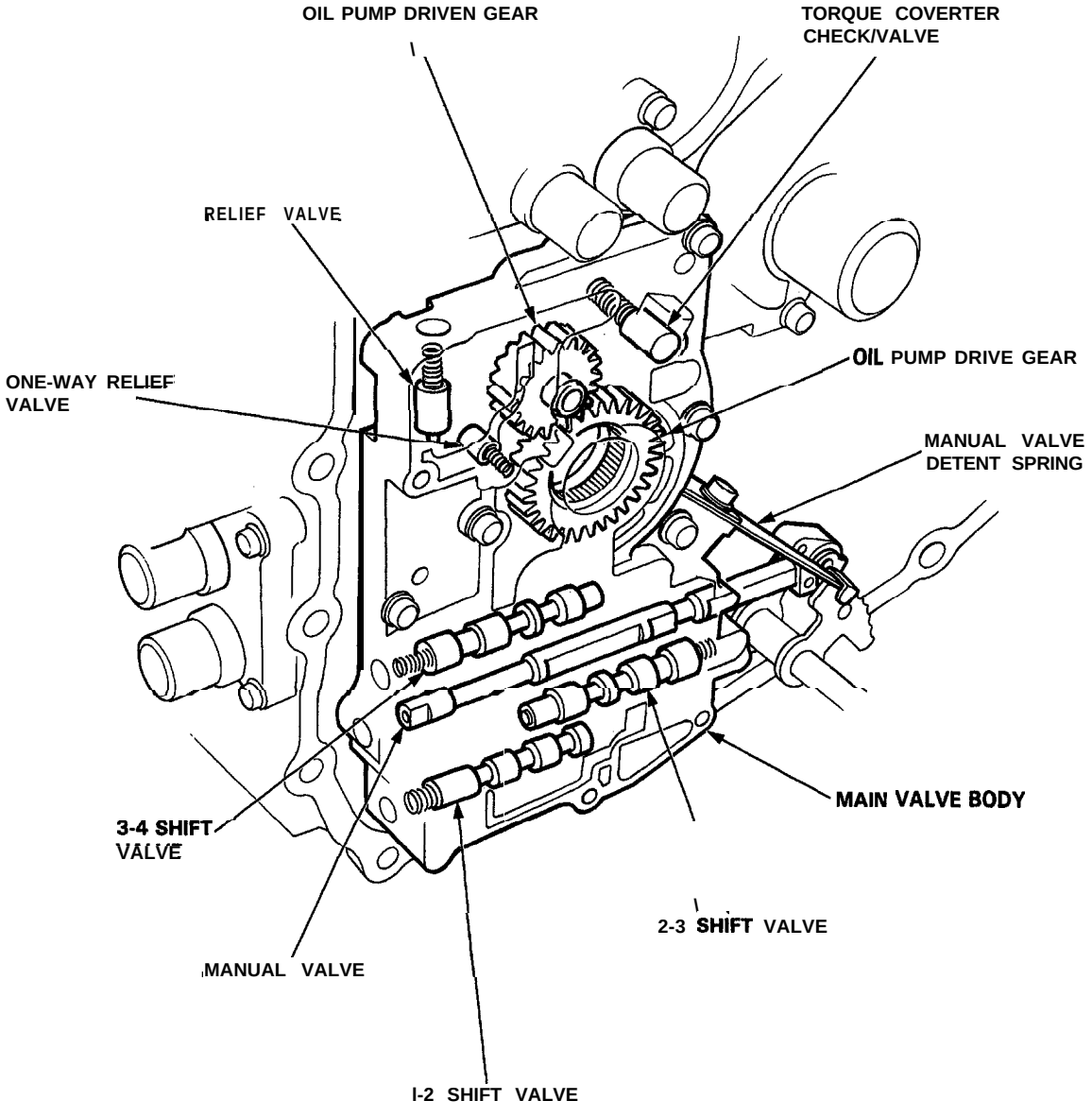
(cont'd)

Description

- Hydraulic Control (cont'd)

Main Valve Body

The main valve body is located on the torque converter housing. The oil pump gear, torque converter check valve, manual valve, 1-2, 2-3, 3-4 shift valves, relief valve and one-way relief valve are all built into the main valve body. The primary function of this valve body is switching on and off oil passages and controlling the hydraulic pressure going to the hydraulic control system.

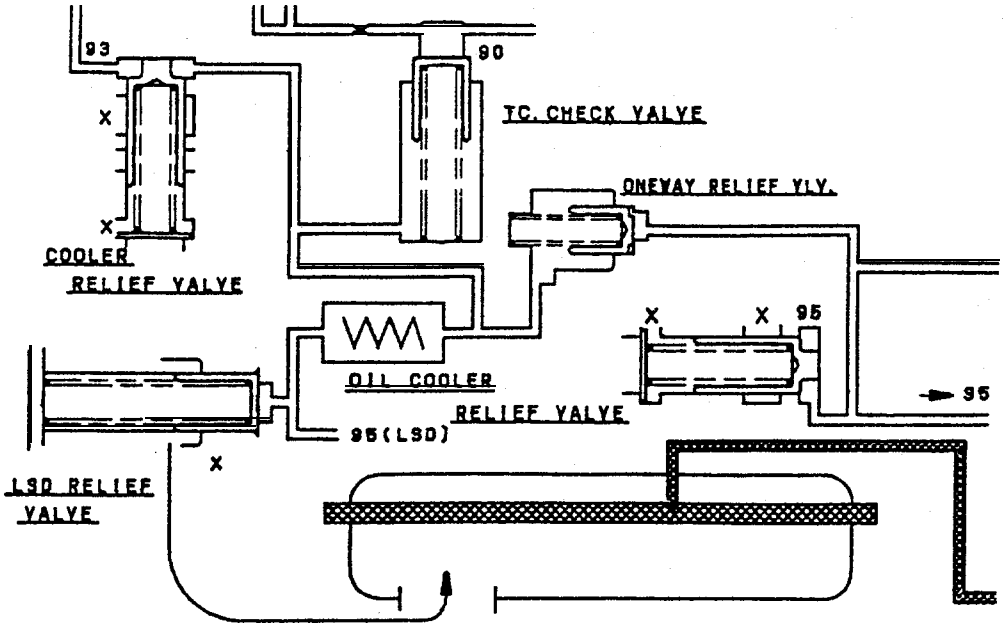


Oil Pump

The external tooth gear type oil pump consists of a housing together with the main valve body, a pump drive gear, a pump driven gear, and a pump shaft. The oil pump is installed on the torque converter housing. The pump's driving force is transmitted by the torque converter pump (directly connected to the engine) to the pump shaft. The gears are provided in the housing. The intake and exhaust lines and the torque converter line are provided in the housing.

One way Relief Valve

The one-way relief valve is used at times of high speed or high temperature to send relief oil to the oil cooler so that cooling of ATF will be effective.



(cont'd)

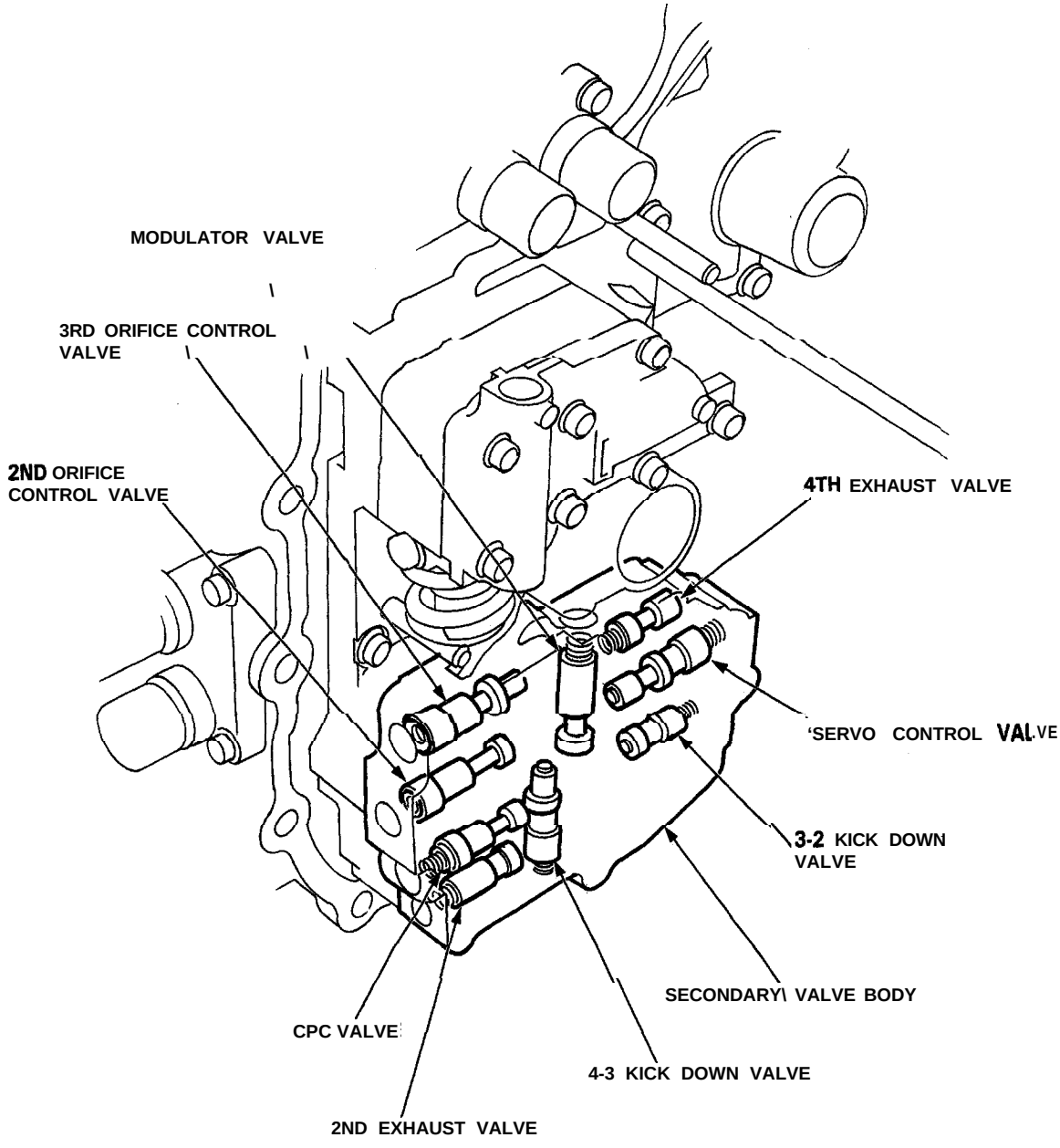
Description

Hydraulic Control (cont'd)

Secondary Valve Body

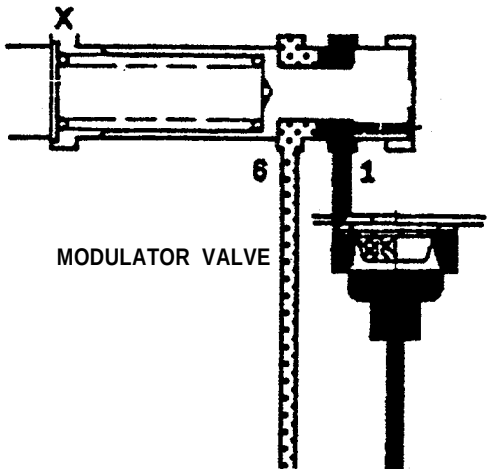
The secondary valve body is also mounted on the main valve body with the 3-2 kick down valve, CPC valve, 2nd orifice control valve, 3rd orifice control valve, modulator valve, 4th exhaust valve, 2nd exhaust valve, servo control valve and 4-3 kick down valve built in.

Primarily, it regulates shift valve operation timing and clutch pressure for shock reduction during shifting.



Modulator Valve

The modulator valve maintains line pressure from the regulator which is supplied to shift control solenoid valves A/B and lock-up control solenoid valves A/B, thus maintaining accurate shift and lock-up characteristics.

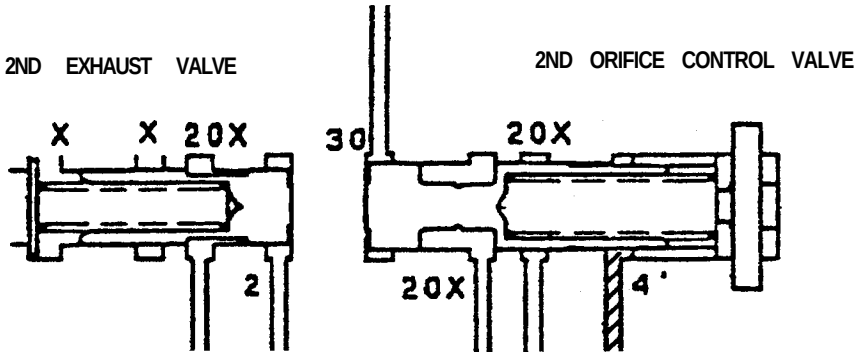


2nd Orifice Control Valve

For smooth shifting between the 2nd and 3rd gear, the open pressure on the 2nd gear side is relieved through a fixed orifice. The valve also moves to equalize pressure differences between the 2nd and 3rd gear.

2nd Exhaust Valve

The 2nd exhaust valve is installed to release 2nd clutch pressure quickly when shifting from the range at which hydraulic pressure is applied to the 2nd clutch to the N position.



(cont'd)

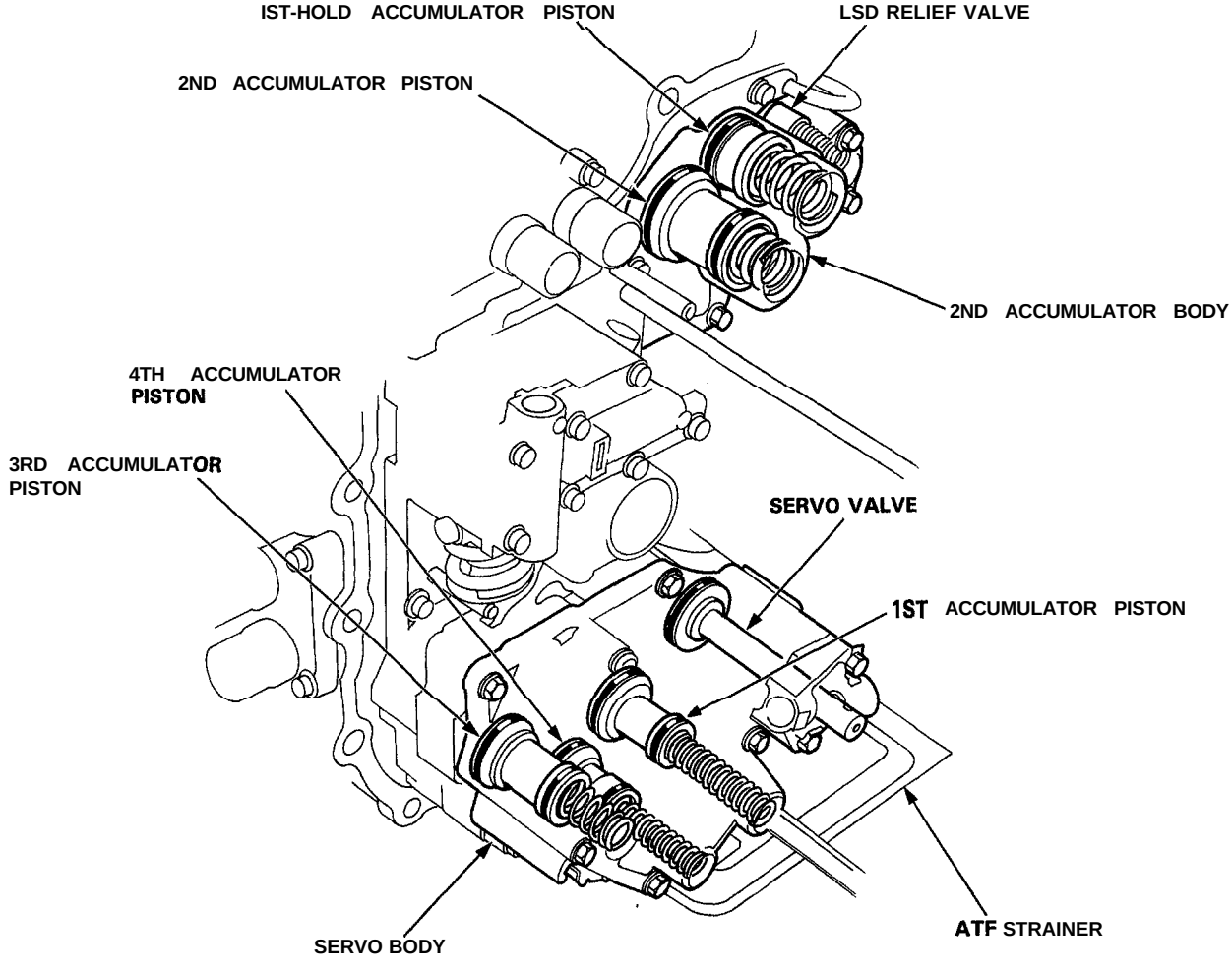
Description

Hydraulic Control (cont'd)

Servo Valve Body/2nd Accumulator Body

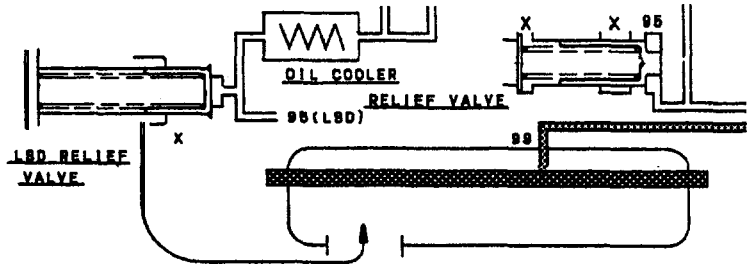
The servo valve body is mounted on the secondary valve body with the servo valve, 1 st accumulator piston, 3rd accumulator piston and 4th accumulator piston built in. The primary function of the servo valve body is forward and reverse switching and control.

The 2nd accumulator body is mounted on the torque converter housing with the 1 st-hold accumulator, 2nd accumulator and LSD relief valve built in.



LSD Relief Valve

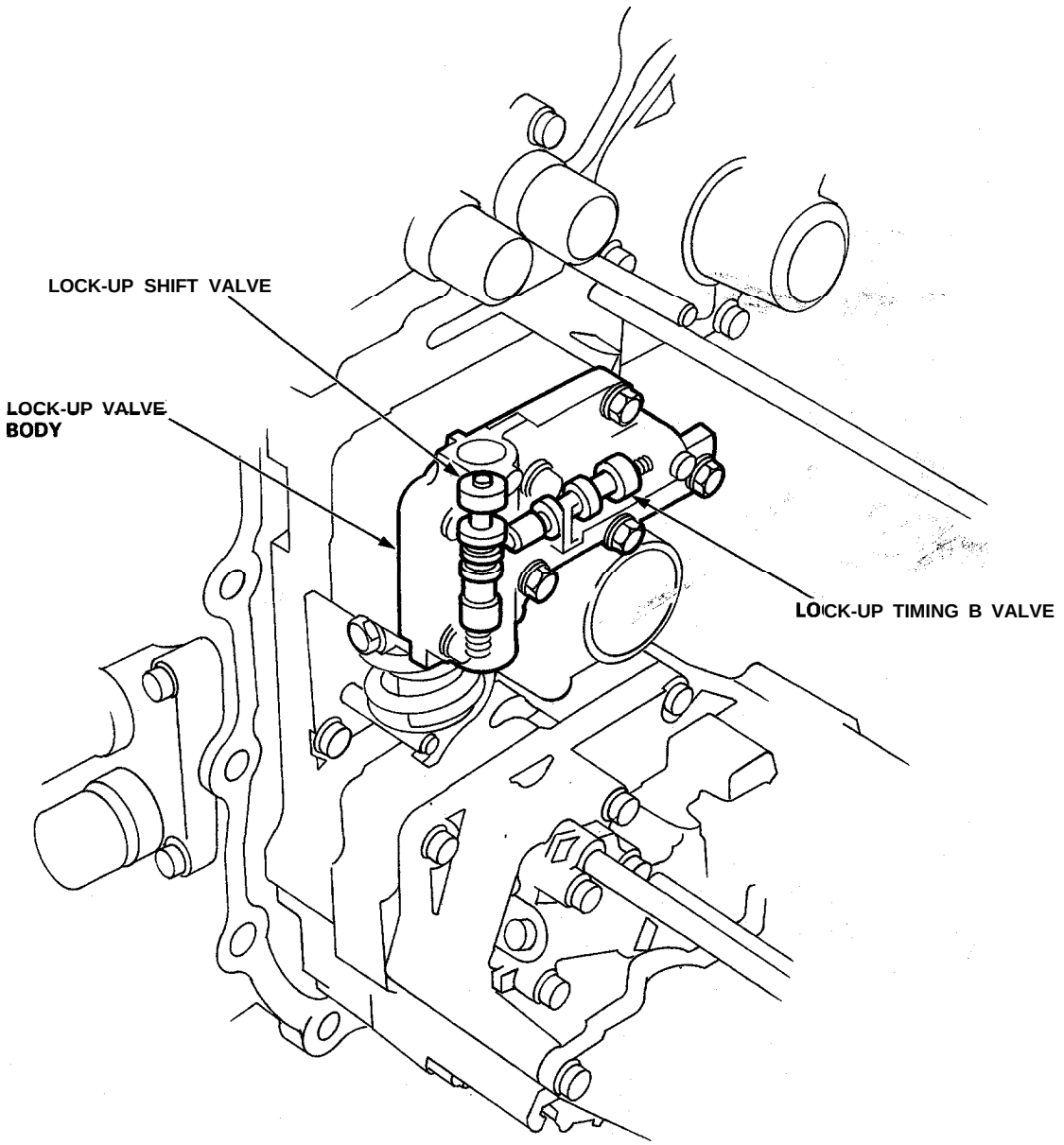
When the resistance of oil flow inside the LSD becomes large, the LSD relief valve is opened, and oil is sent to the oil cooler and cooled.



Lock-up Valve Body

The lock-up valve body is mounted on the regulator valve body with the lock-up shift valve and lock-up timing B valve built in.

The capacity of the lock-up clutch is controlled by the lock-up valve body.



Description

Hydraulic Flow

General of Hydraulic Pressure

Oil Pump → Regulator Valve → { Line Pressure; Torque Converter Pressure; Lubrication Pressure }

Distribution of Hydrualic Pressure

- Manual Valve → to select Line Pressure
- Throttle Valve B → Throttle B Pressure
- I-2 Shift Valve
- 2-3 Shift Valve
- 3-4 Shift Valve

→ Clutch Pressure

- Line Pressure → { Servo Valve; Throttle Valve }

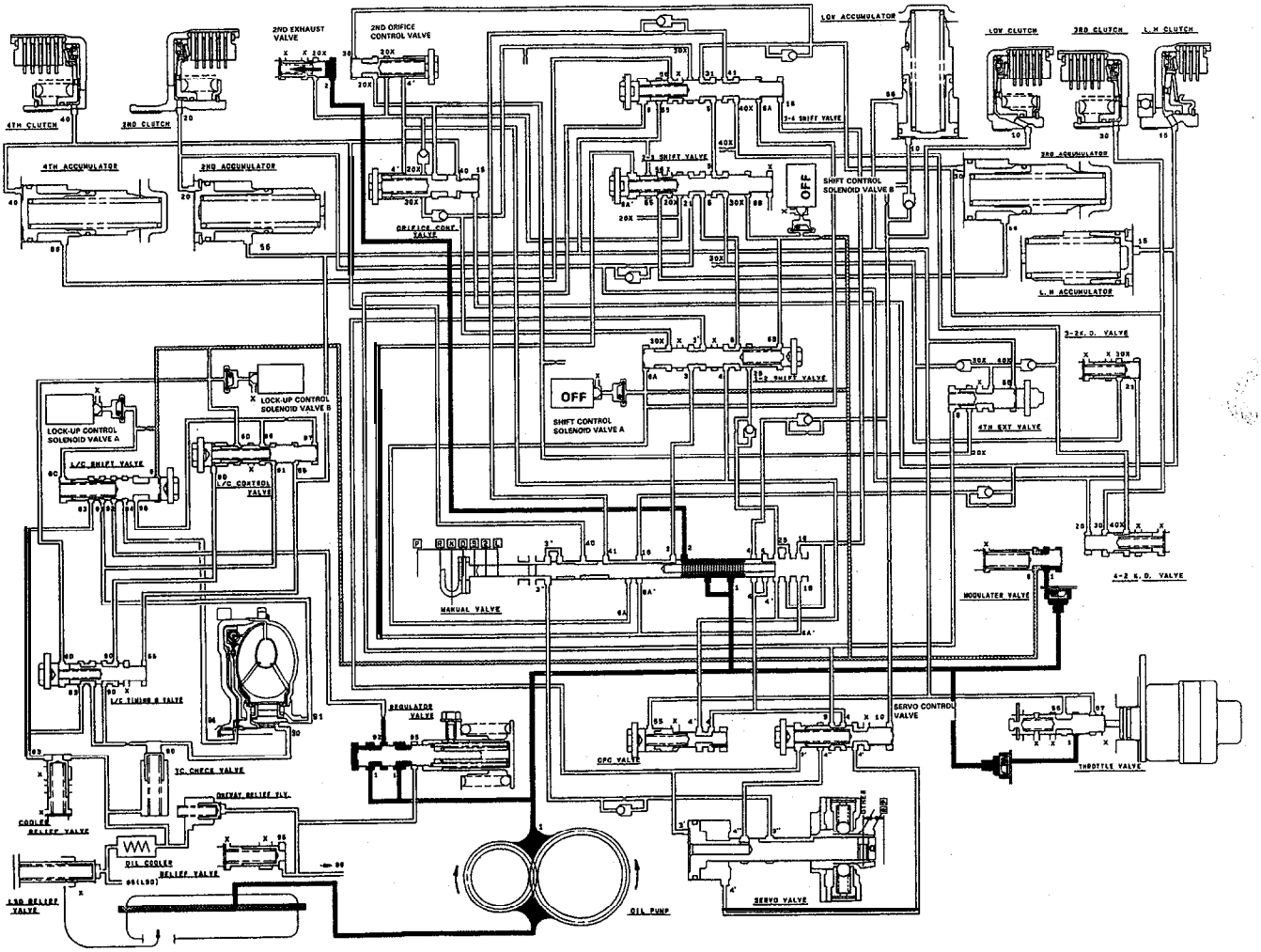
NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	10	1ST CLUTCH	90	TORQUE CONVERTER
2	LINE	15	1ST-HOLD CLUTCH	91	TORQUE CONVERTER
3	LINE	16	1ST-HOLD CLUTCH	92	TORQUE CONVERTER
3′	LINE	18	LINE	93	OIL COOLER
3′′	LINE	20	2ND CLUTCH	94	TORQUE CONVERTER
4	LINE	21	2ND CLUTCH	95	LUBRICATION
4′	CLUTCH PRESSURE CONTROL	25	LINE	96	TORQUE CONVERTER
5	CLUTCH PRESSURE CONTROL	30	3RD CLUTCH	97	TORQUE CONVERTER
6	MODULATOR	31	3RD CLUTCH	99	SUCTION
6A	MODULATOR (SHIFT SOL. V A)	40	4TH CLUTCH	X	BLEED
6B	MODULATOR (SHIFT SOL. V B)	41	4TH CLUTCH		
6C	MODULATOR (L/C SOL. V A)	55	THROTTLE B		
6D	MODULATOR (L/C SOL. V B)	56	THROTTLE B		
9	LINE	57	THROTTLE B		

N position

As the engine turns, the oil pump also starts to operate. Automatic transmission fluid is drawn from (99) and discharged into (1). Then, ATF pressure is controled by the regulator valve and becomes line pressure (1). The torque converter inlet pressure (1) enters (94) of torque converter through the orifice and discharges into (90).

The torque converter check valve prevents the torque converter pressure from falling.

Under this condition, the hydraulic pressure is not applied to the clutches.



(cont'd)

Description

- Hydraulic Flow (cont'd)

1 Position

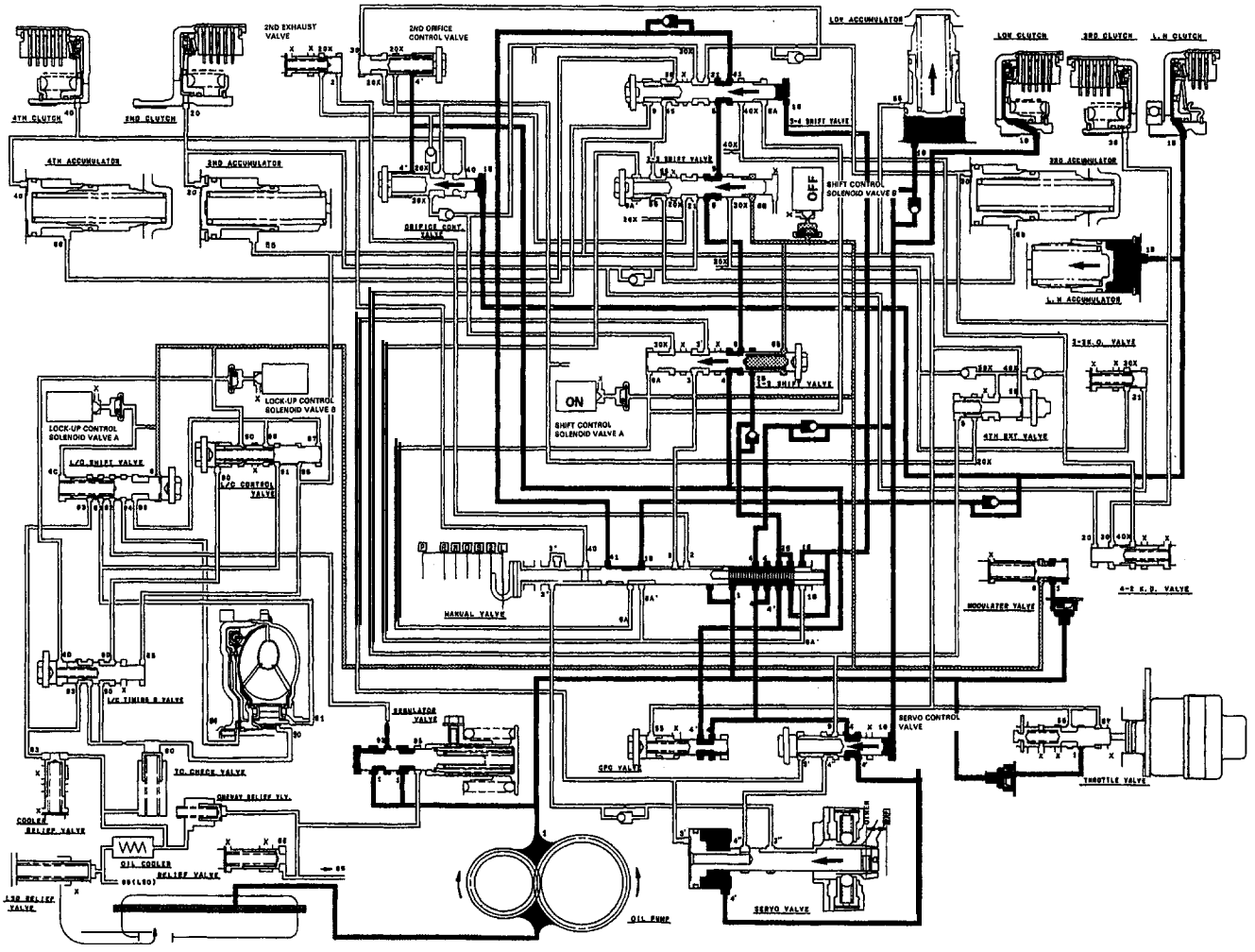
The line pressure (1) becomes the line pressure (4), (18), (25) as it passes through the manual valve. Also, the line pressure (1) goes to the modulator valve through the filter and becomes the modulator pressure (6). The modulator pressure (6) **is supplied to the l-2 shift valve and 2-3 shift valve.**

The t-2 shift and 2-3 shift valves are moved to the left side because the shift control solenoid valve A is turned ON and B is OFF by the A/T control unit.

The line pressure (18) is supplied to the 3-4 shift valve, and it is moved to the left side. The line pressure (4) is the 1 st **clutch pressure (IO), then the 1st clutch is engaged.**

The line pressure (4) becomes the Ist-hold clutch pressure (16) via the 1-2 shift valve, 2-3 shift valve, 3-4 shift valve and manual valve, then the Ist-hold clutch is engaged.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



2 Position

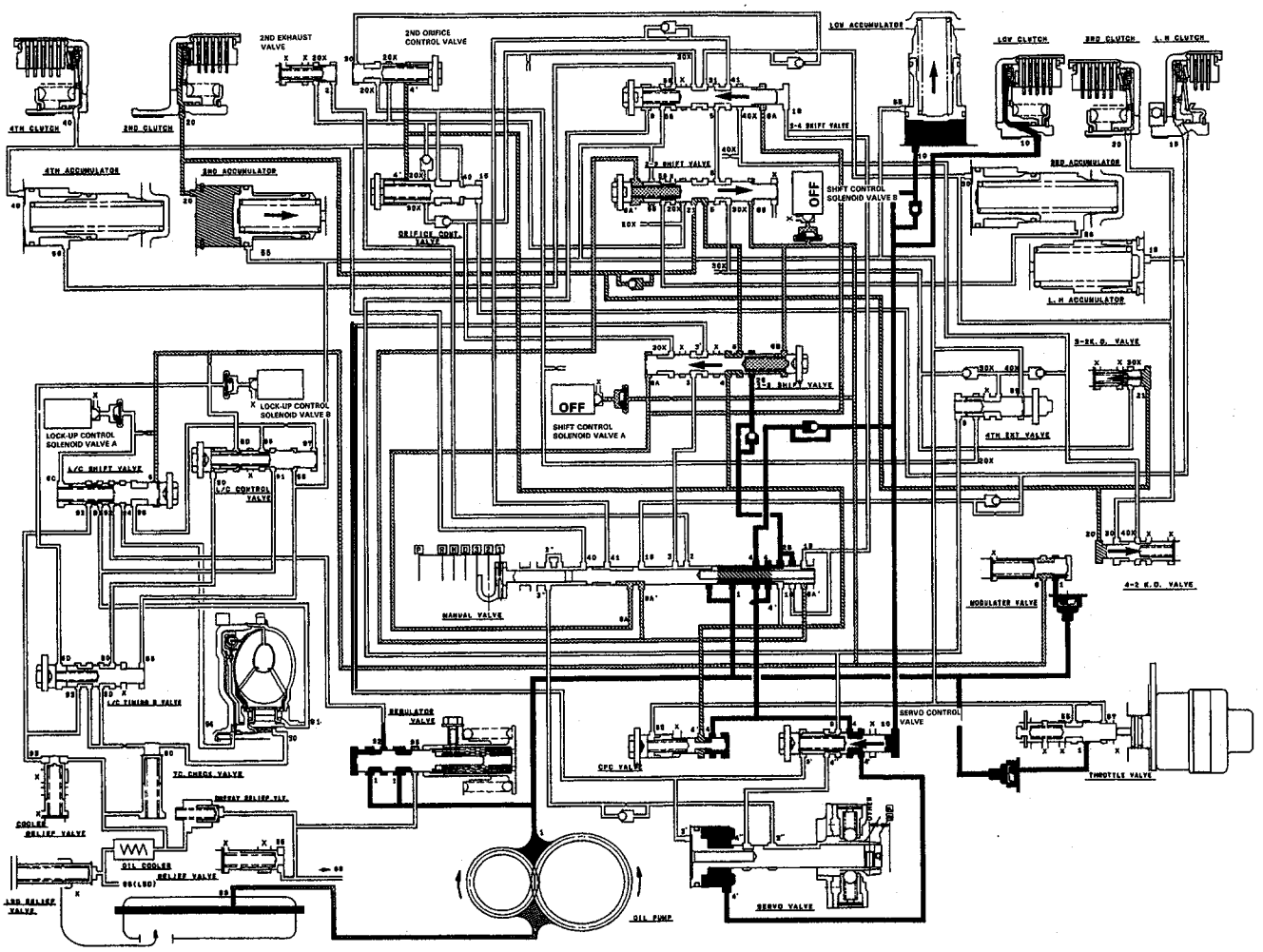
The line pressure (1) becomes the line pressure (4), (25) as it passes through the manual valve.

The line pressure (1) goes to the modulator valve and becomes the modulator pressure (6). The modulator pressure (6) **is supplied to the I-2 shift valve and 3-4 shift valve. The I-2 shift and 3-4 shift valves are moved to the left side end the 2-3 shift valve is moved to the right side because the shift control solenoid valve A and B are turned OFF by the A/T control unit.**

The line pressure (4) goes through the line (20) to the 2nd clutch, then the 2nd clutch is engaged.

The line pressure (4) also flows to the throttle valve and the line pressure (1) flows to the 1st clutch. However no power **is transmitted by means of the one-way clutch.**

NOTE: When used, "left" or "right" indicates direction on the flow chart.



(cont'd)

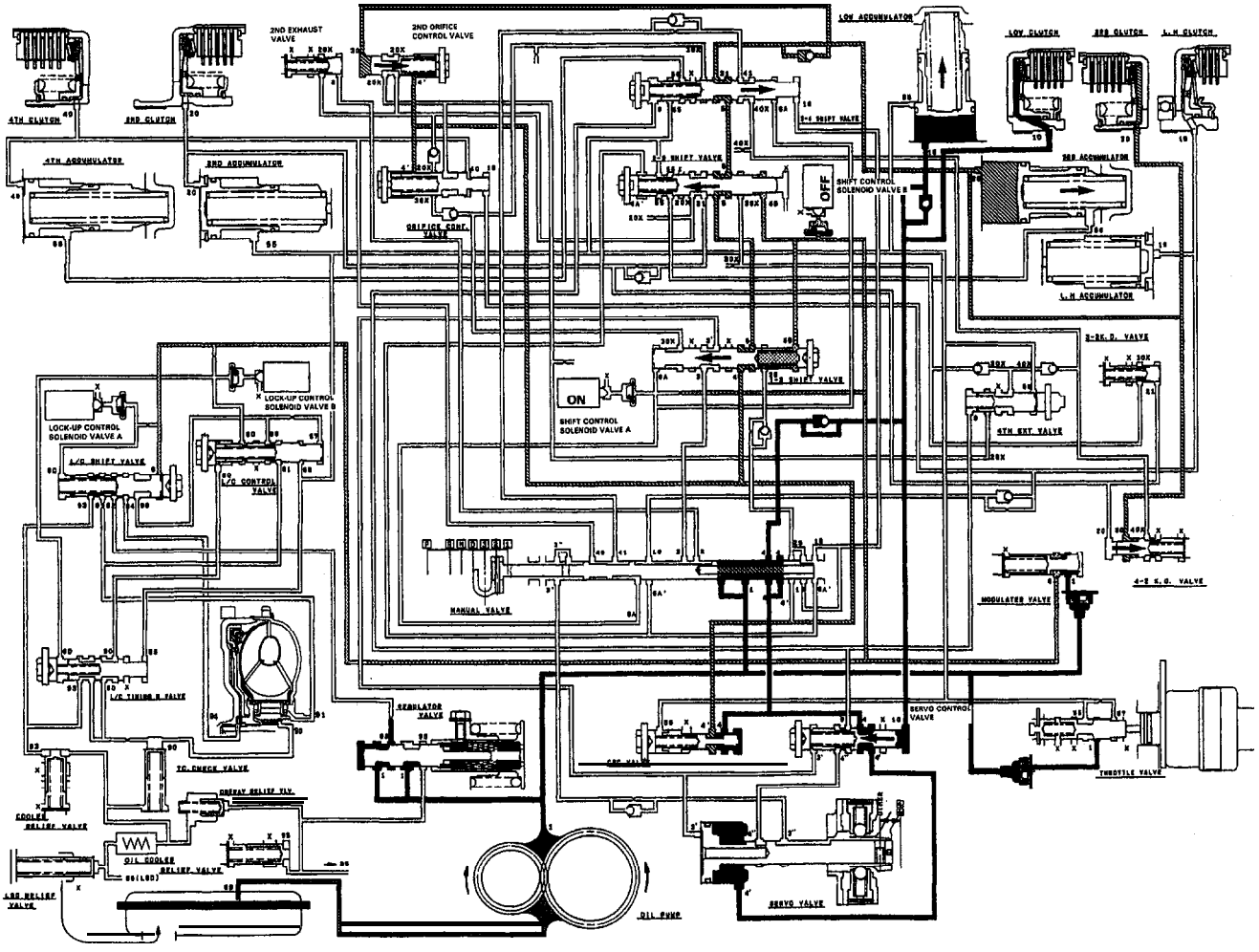
Description

Hydraulic Flow (cont'd)

3 Position

The line pressure (1) becomes the modulator pressure (6) as it passes the modulator valve.
Also, the modulator pressure (6) is supplied to the 1-2 shift valve and 2-3 shift valve, and they are moved to the left side because the shift control solenoid A is turned ON and B is OFF by the A/T control unit.
The line pressure (4) becomes the clutch pressure control (5) and the 3rd clutch pressure (31).
Then it goes to the 3rd clutch. The 3rd clutch is engaged.
The line pressure (4) also flows to the throttle valve and line pressure (1) flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in 2nd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.

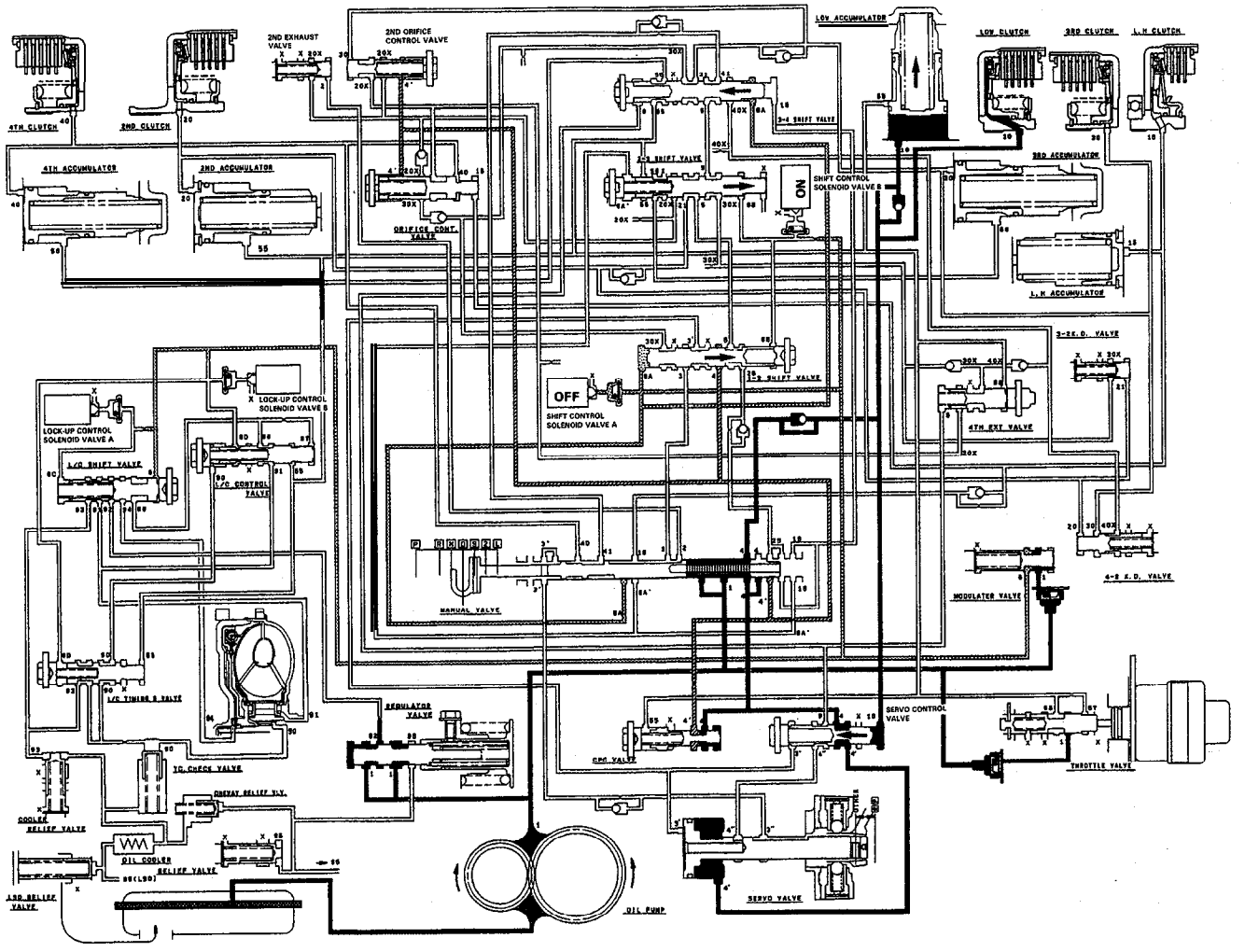


D Position

1. 1st speed

The flow of fluid through the torque converter is the same as in N position.
The line pressure (1) becomes the line pressure (4) and it becomes the 1st clutch pressure (IO).
The 1 st clutch pressure is applied to the 1 st clutch and 1 st accumulator, consequently the vehicle will move as the engine power is transmitted.
The line pressure (1) becomes the modulator pressure (6) by the modulator valve and travels to each shift valve.
The 1-2 shift valve is moved to the right side because the shift control solenoid valve A is turned OFF and B is ON by the A/T control unit.
The line pressure (1) also flows to the throttle valve.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



(cont'd)

Description

- Hydraulic Flow (cont'd)

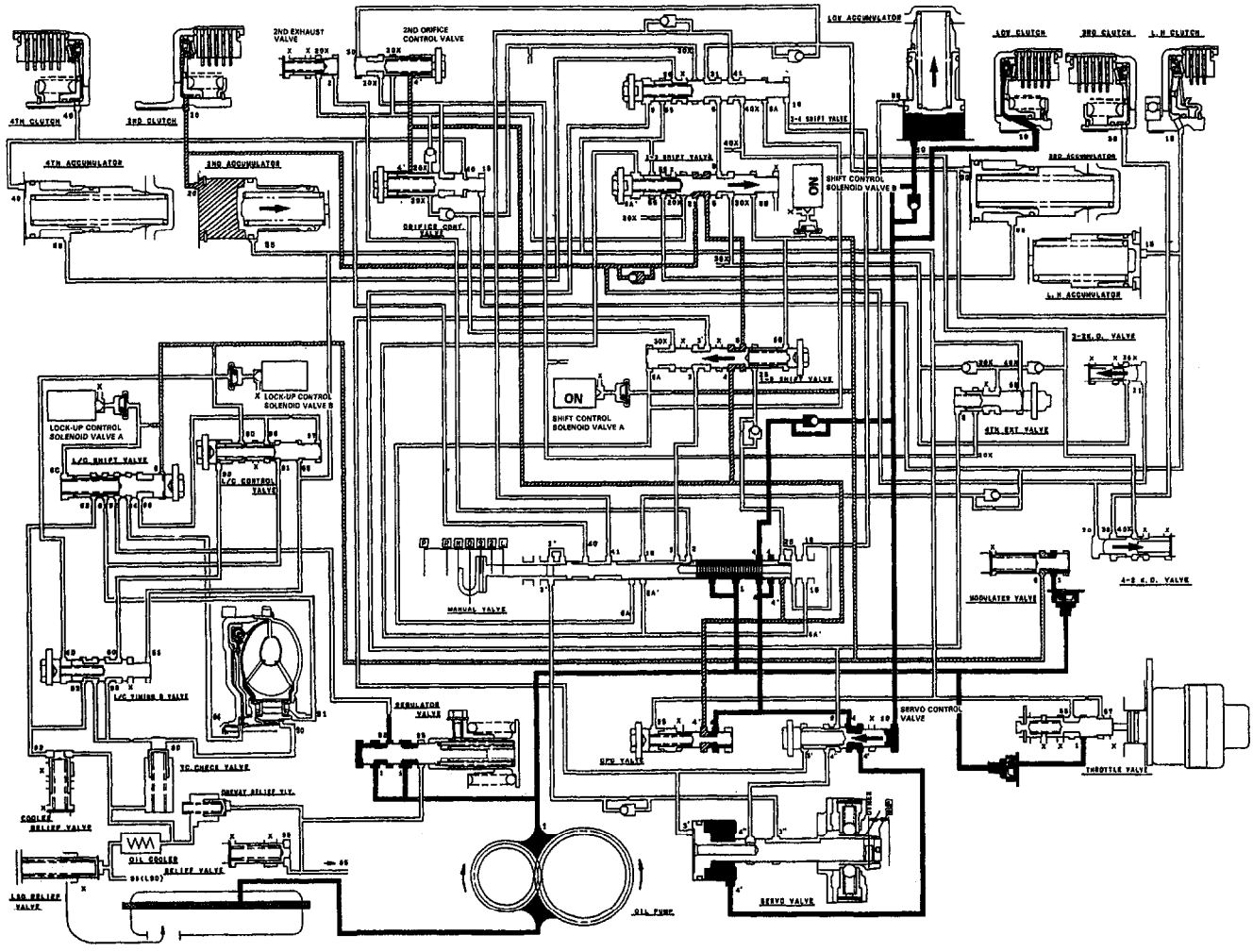
2. 2nd speed

The flow of fluid up to the 1-2 and 2-3 shift valves is the, same as in the 1st speed range. As the speed of the car reaches the prescribed value, the solenoid valve A is turned ON by means of the A/T control unit, As a result, the 1-2 shift valve is moved to the left side and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged. **Fluid flows by way of:**

-Line Pressure (4) → CPC Valve – Clutch Control Pressure (4') → l-2 Shift Valve Clutch Pressure Control (5) → 2-3 Shift Valve – 2nd Clutch Pressure (21) → Orifice – 2nd Clutch Pressure (20) → 2nd Clutch

The hydraulic pressure also flows to the 1 st clutch. However no power is transmitted by means of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



3. 3rd Speed

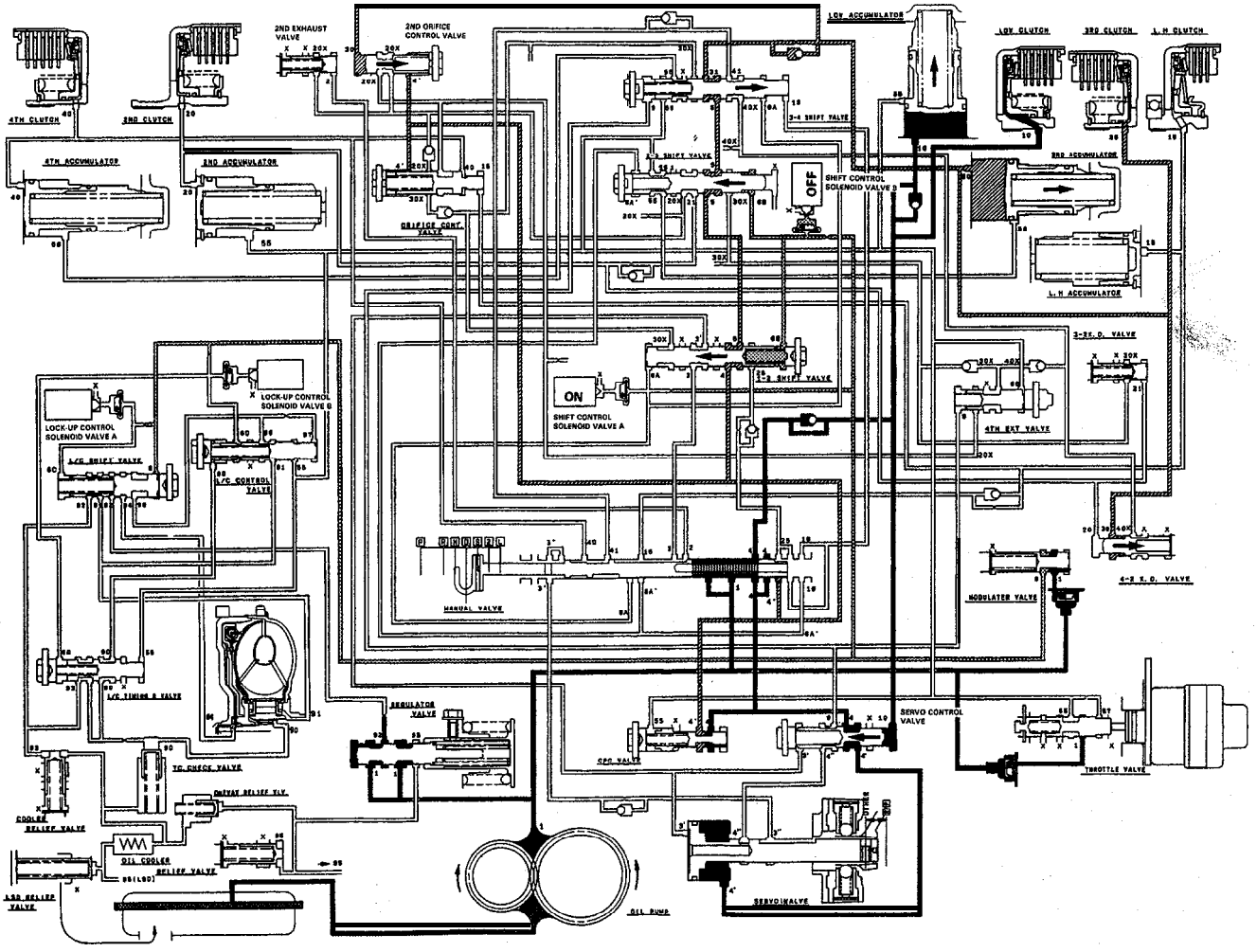
The flow of fluid up to the l-2, 2-3 and 3-4 shift valves is the same as in the 2nd speed. As the speed of the car reaches the prescribed value, the shift control solenoid valve B is turned OFF (Shift control solenoid valve A remains ON). The 2-3 shift valve is then moved to the left side, uncovering the oil port leading to the 3rd clutch. Since the 3-4 shift valve is moved to the right side to cover the oil port to the 4th clutch, the 3rd clutch is engaged.

Fluid flows by way of:

-Line Pressure (4) → CPC Valve — Clutch Pressure Control (4') → l-2 Shift Valve — Clutch Pressure Control (5) → 2-3 Shift Valve — Clutch Pressure Control (5) → 3-4 Shift Valve — 3rd Clutch Pressure (31) → 3rd Clutch

The hydraulic pressure also flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in the 2nd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



(cont'd)

Hydraulic Flow (cont'd)

4. 4th Speed

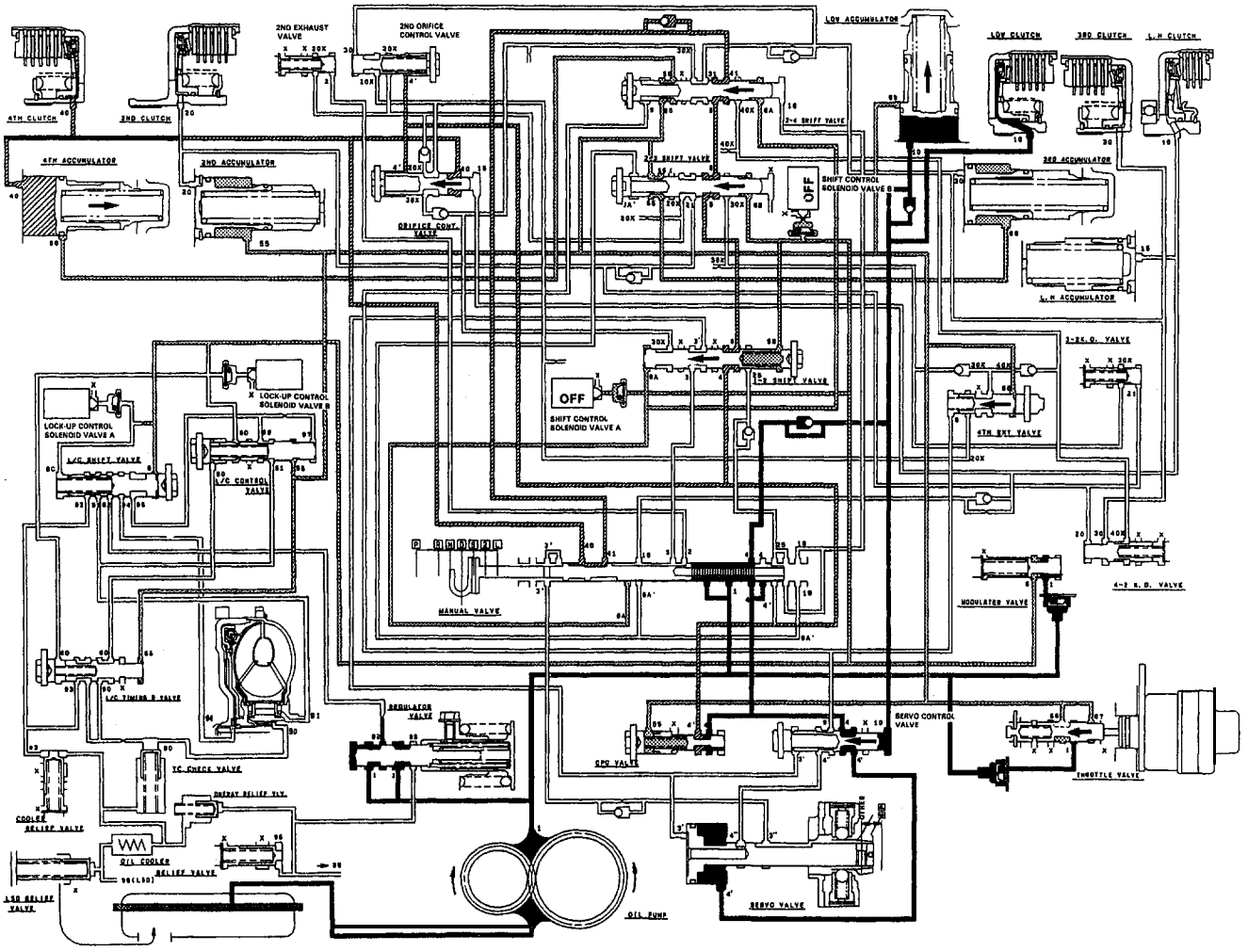
The flow of fluid up to the I-2, 2-3 and 3-4 shift valves is the same as in the 3rd speed. When the speed of the car reaches the prescribed value, the shift control solenoid valve A is turned OFF (Shift control solenoid valve B remains OFF). As this takes place, the 3-4 shift valve is moved to the left side and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by way of:

-Line Pressure (4) → CPC Valve → Clutch Pressure Control (4') → I-2 Shift Valve → Clutch Pressure Control (5) → 2-3 Shift Valve → Clutch Pressure Control (5) → 3-4 Shift Valve → 4th Clutch Pressure (41) → Manual Valve → 4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in 2nd and 3rd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



[R] Position

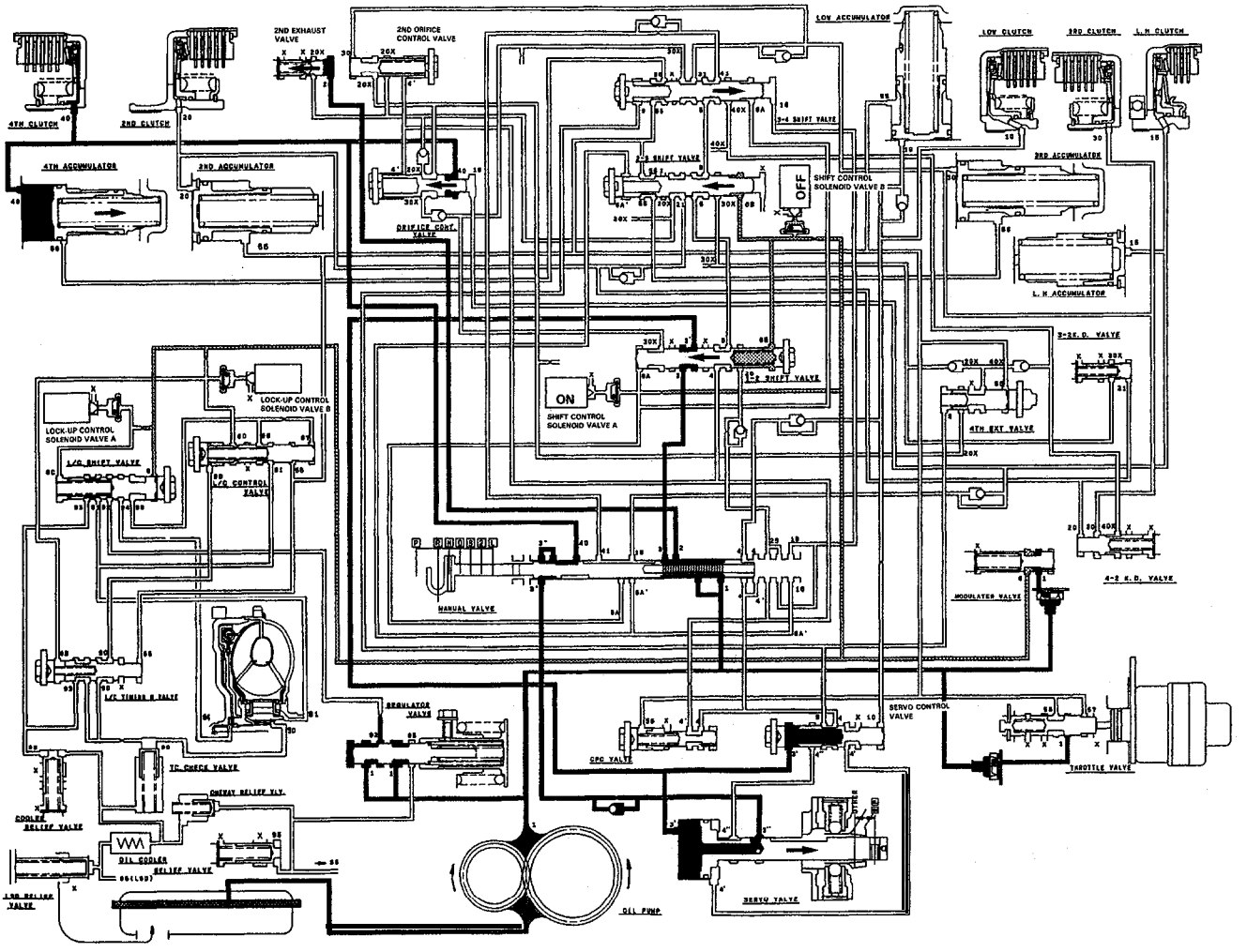
The flow of fluid through the torque converter circuit is the same as in the [N]. The fluid (1) from the oil pump flows through the manual valve and becomes the line pressure (3). It then flows through the 1-2 shift valve to the servo valve (3), causing the shift fork shaft to be moved in to the reverse position.

Under this condition, the shift control solenoid valve A is turned ON and the valve B is turned OFF as in 3rd speed. As a result, the 1-2 shift valve is also moved to the left side. The fluid (3)' will flow through the servo valve and manual valve to the 4th clutch; power is transmitted through the 4th clutch.

Reverse Inhibitor Control

When the [R] position is selected while the vehicle is moving forward at a speed over 6 MPH, the control unit outputs 1st signal (A: OFF, B: ON), the l-2 shift valve is moved to the right side. The line pressure (3) is intercepted by the 1-2 shift valve, consequently the power is not transmitted as the 4th clutch and servo valve are not operated.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



(cont'd)

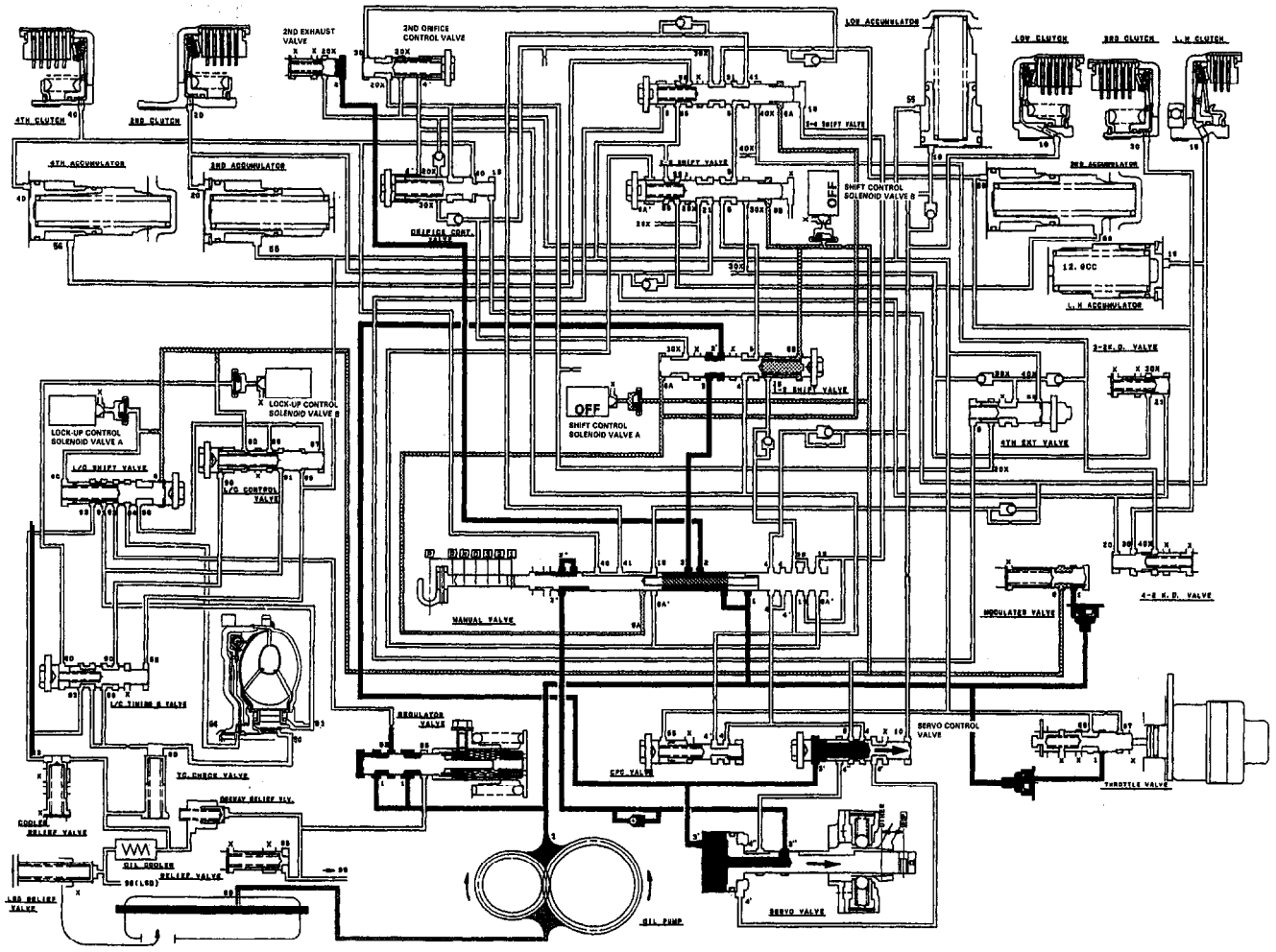
Description

- Hydraulic Flow (cont'd)

P Position

The flow of fluid through the torque converter is the same in N position.

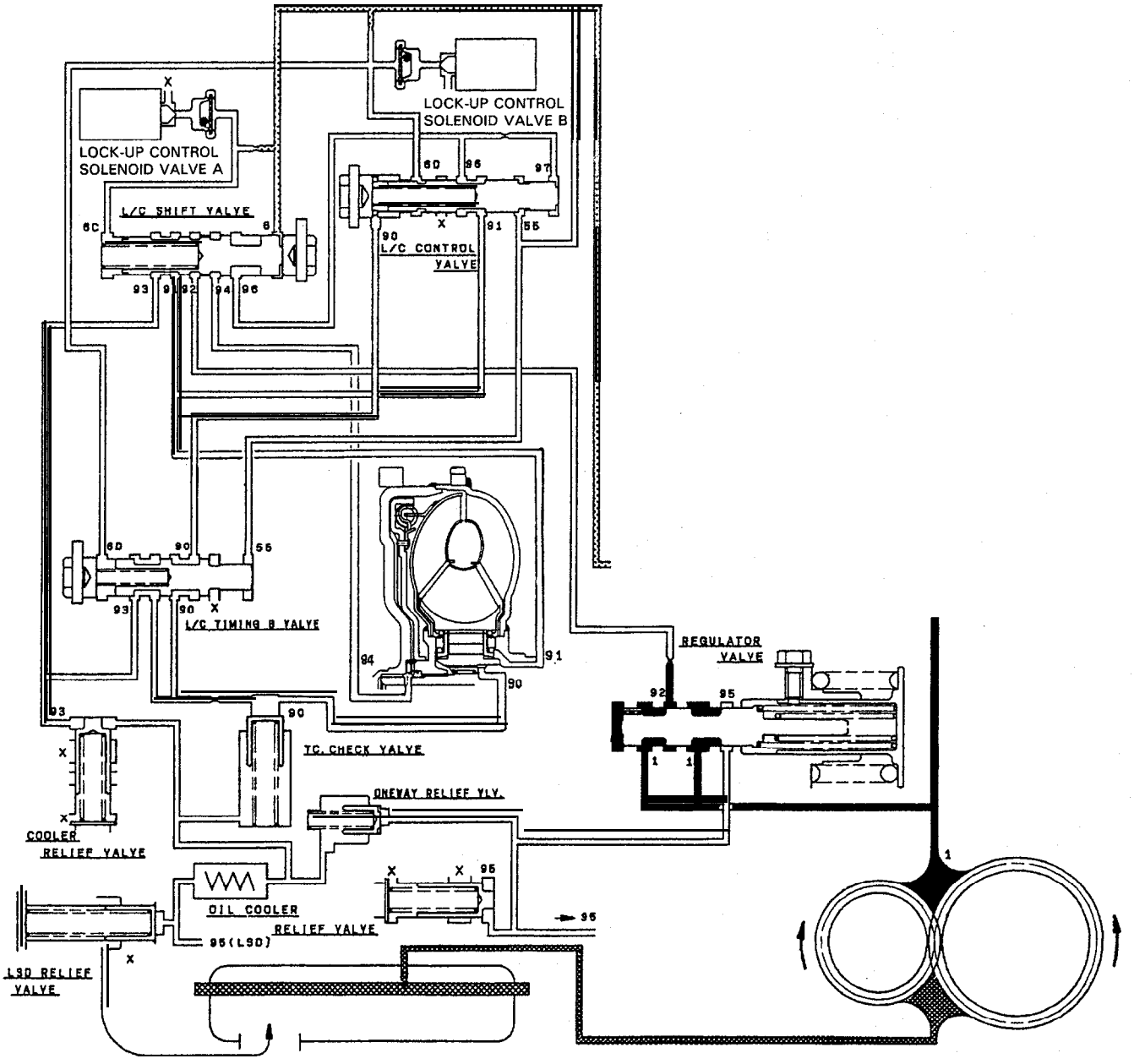
The line pressure (1) is intercepted by the manual valve, and is not supplied to the clutches. The power is not transmitted.



- Lock-up System

In ❑ in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil 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 control unit optimizes the timing of the lock-up system. Under certain conditions, the lock-up operation is applied during deceleration, in 3rd and 4th speed.

The lock-up shift valve body controls the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the A/T control unit.



(cont'd)

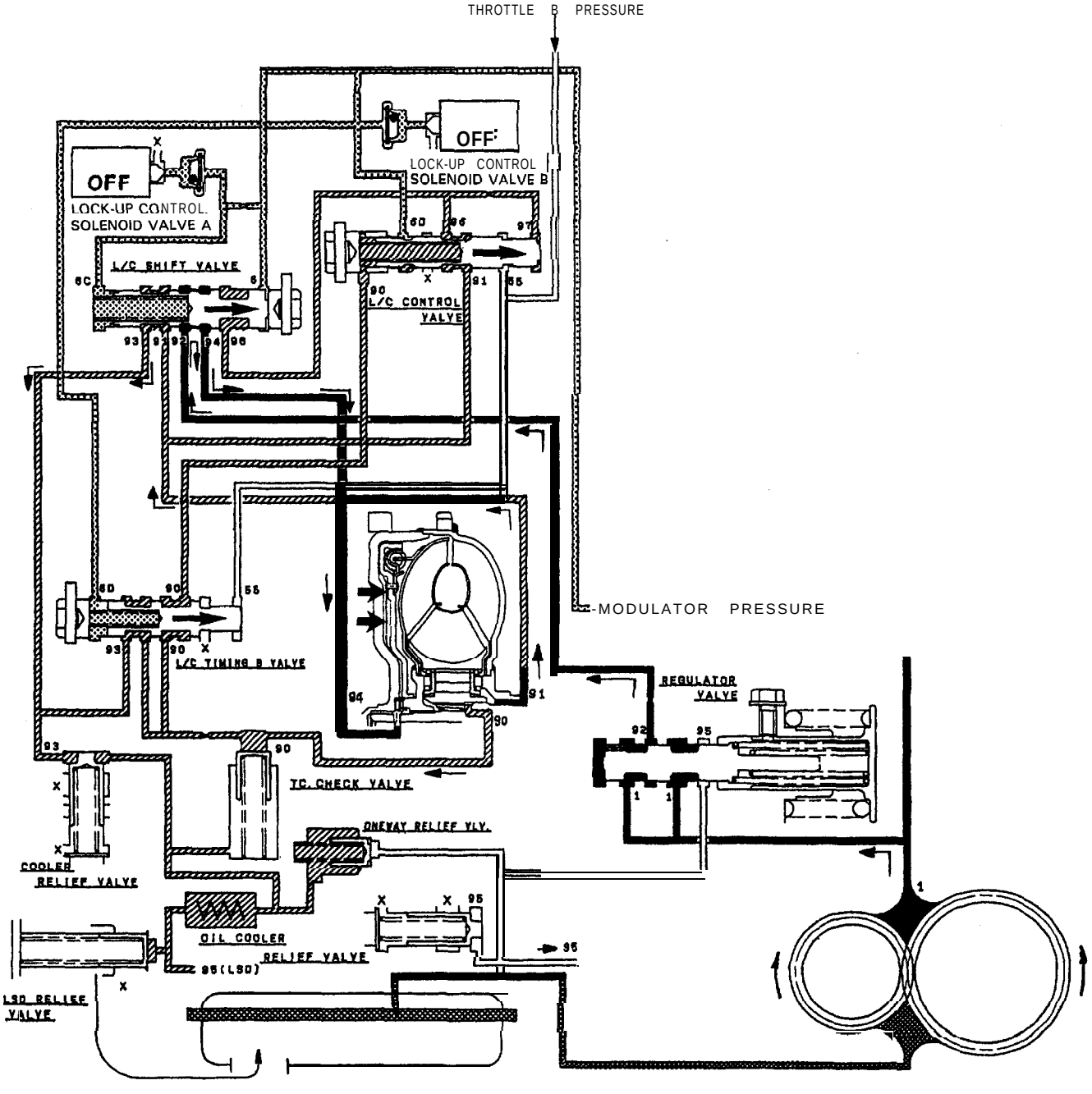
Description

Lock-up System (cont'd)

No Lock-up

Pressured 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 pressure 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 oil pump will flow through the left side of the lock-up clutch to the torque converter; i.e., the lock up clutch is in OFF condition.**

NOTE: When used, "left" or "right" indicates direction on the flow chart.



Partial Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: OFF

The control unit switches the solenoid valve A to ON to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force, thus the lock-up shift valve is moved to the left side.

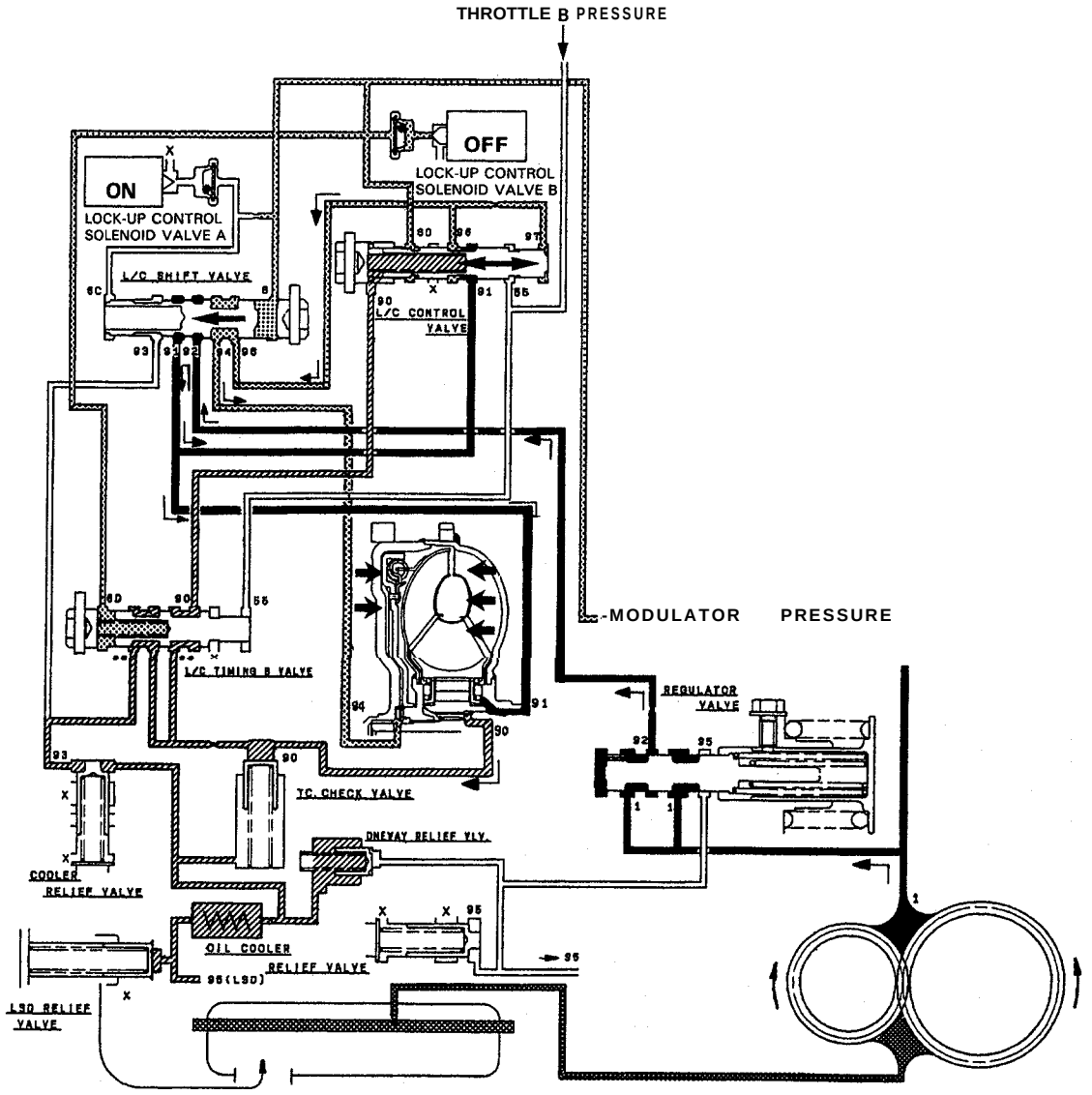
The torque converter pressure is spearated into two passages:

Torque Converter Inner Pressure: entered into right side-to engage lock-up clutch

Torque Converter Back Pressure: entered into left side-to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve whereas the position of the lock-up timing valve B is determined by the throttle B pressure, tension of the valve spring and pressure regulated by the modulator. Also the position of the lock-up control valve is determind by the throttle valve B pressure, back pressure of the lock-up control valve and torque converter pressure regulated by the check valve. In low speed range, the throttle B pressure working on the right side of the lock-up control valve is low, causing the valve to be moved to the right side. With the lock-up control solenoid valve B kept OFF, the modulator pressure is maintained in the left end of the lock-up control valve; in other words, the lock-up control valve is moved slightly to the left side. This slight movement of the lock-up control valve causes the back pressure to be lowered slightly, resulting in partial lock-up.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



(cont'd)

Description

Lock-up System (cont'd)

Half Lock-up

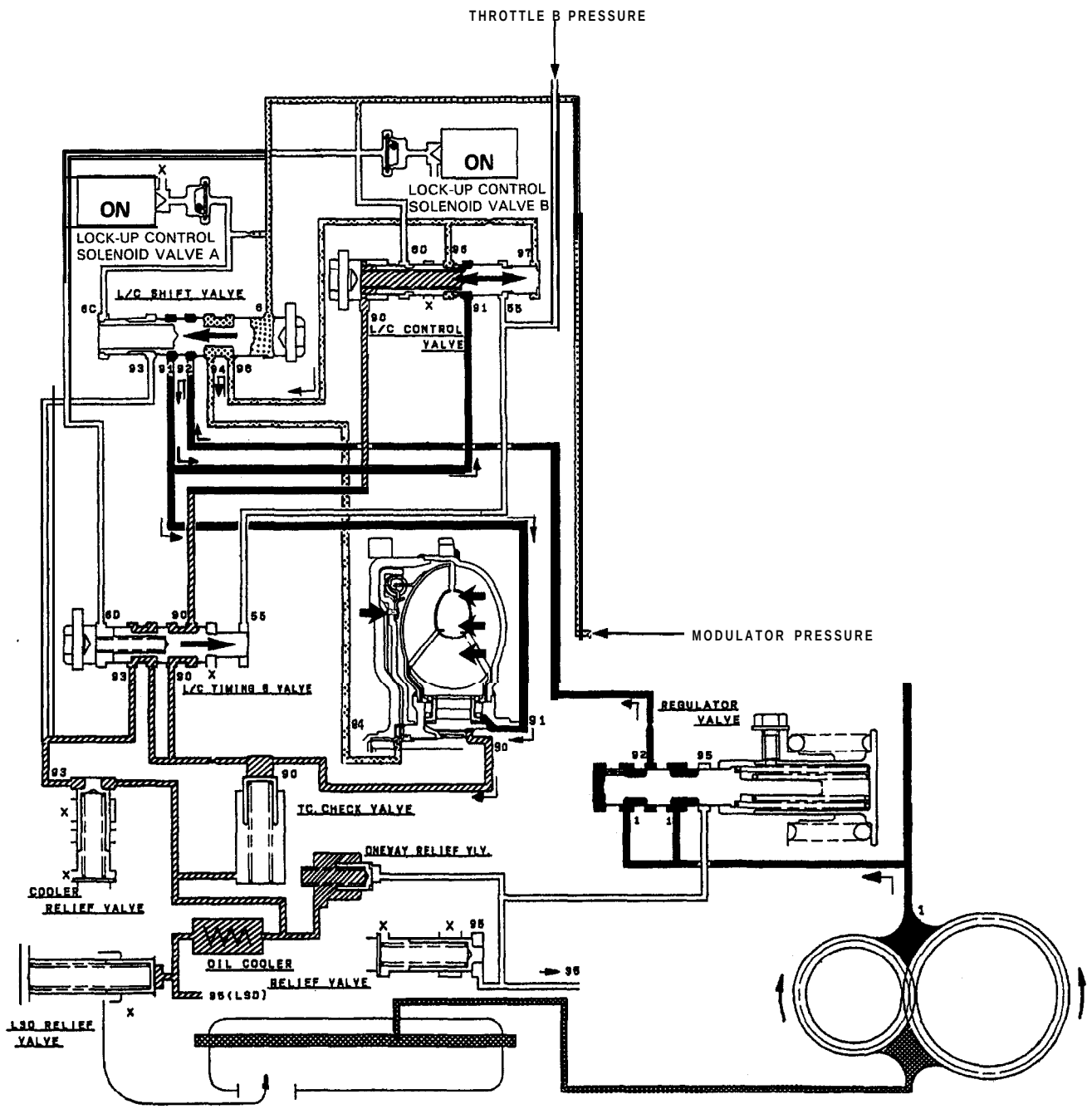
Lock-up Control Solenoid Valve A: ON **Lock-up Control Solenoid Valve B: ON**

The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lock-up control valve to lower.

Also the modulator pressure in the left cavity of the lock-up timing valve B is low. However the throttle B pressure is still low at this time, consequently the lock-up timing valve B 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 right side, causing the back pressure (F2) to lower. This allows a greater amount of the fluid (F1) to work on the lock-up clutch so as to engage the clutch. The back pressure (F2) which still exists prevents the clutch from engaging fully.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



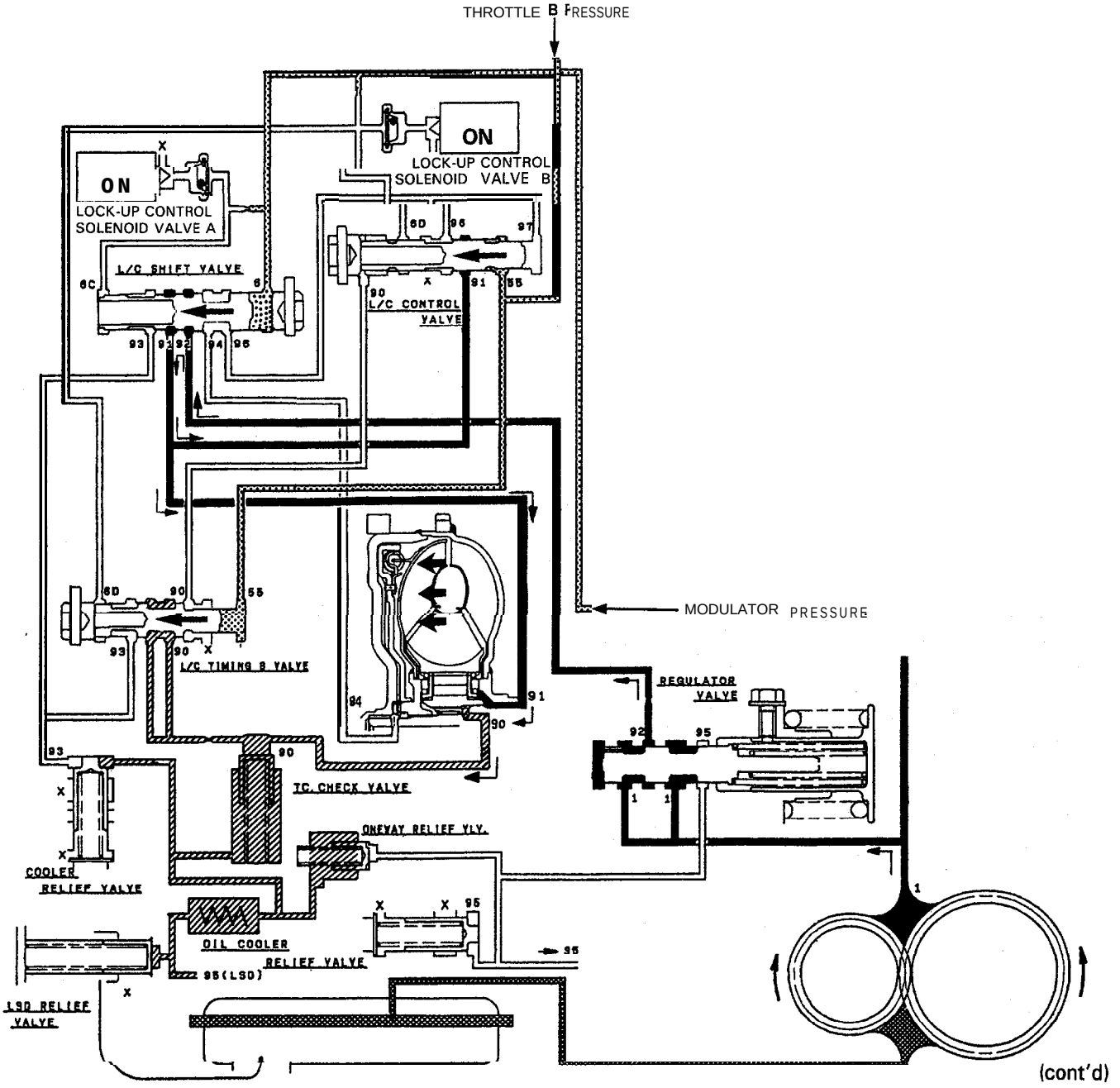
Full Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON

When the vehicle speed further increases, the throttle valve B pressure is increased in accordance with the throttle opening. **The lock-up timing valve B overcomes the spring force and moves to the left side. Also this valve closes the oil port** leading to the torque converter check valve.

Under this condition, the throttle B pressure working on the right end of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); i. e., the lock-up control valve is moved to the left side. As this happens, 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 flow chart.



(cont'd)

Description

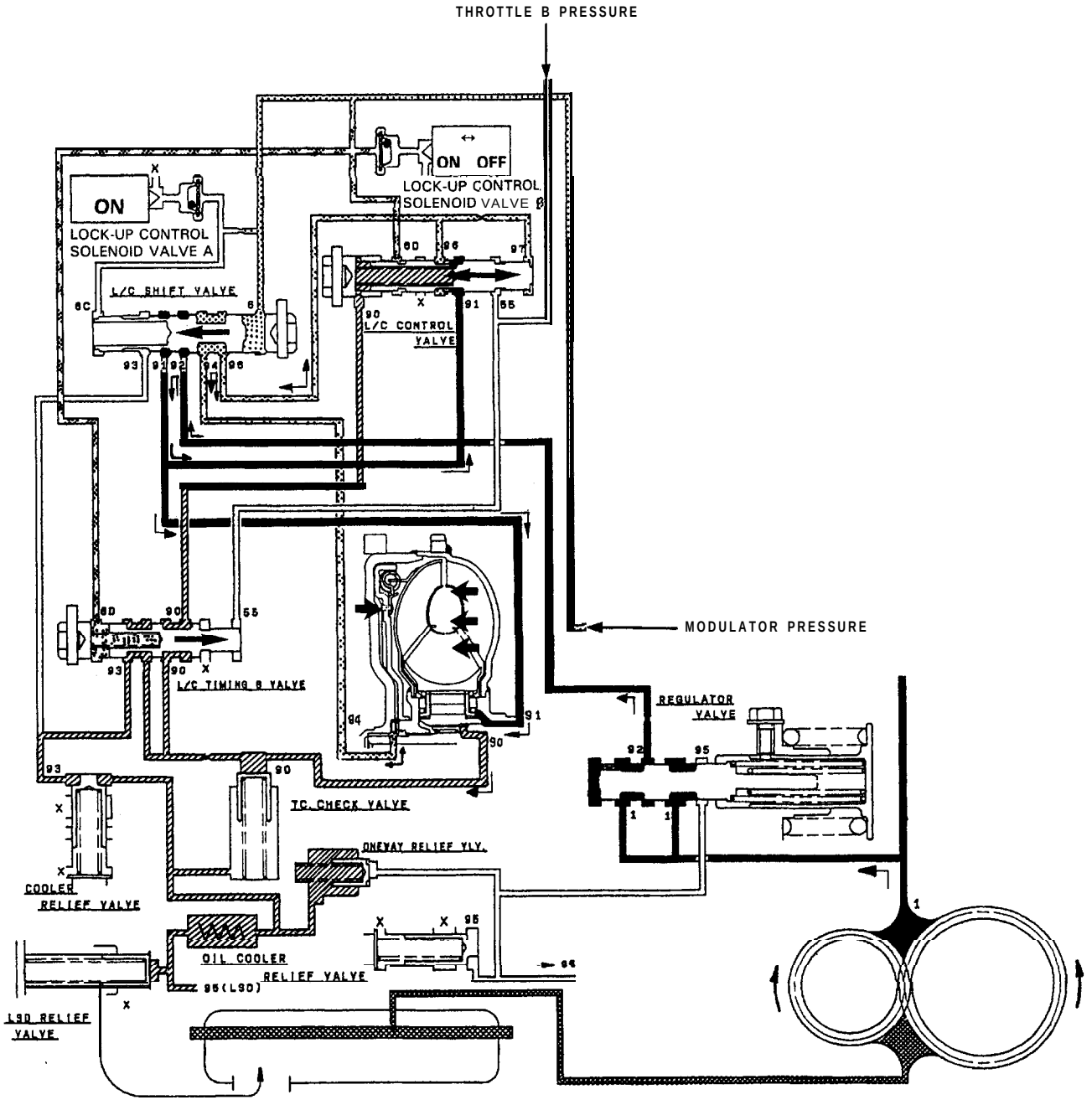
Lock-up System (cont'd)

Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON **Lock-up Control Solenoid Valve B: Duty Operation (ON ↔ OFF)**

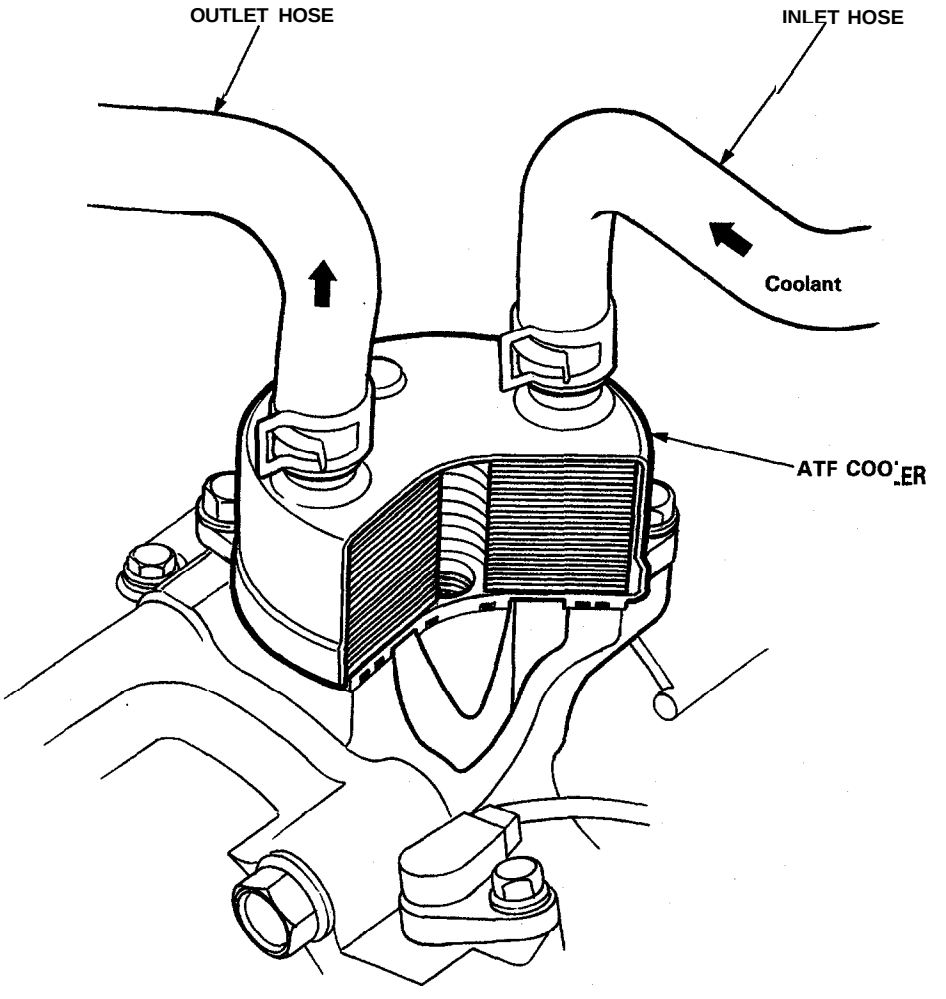
The A/T control unit switches the solenoid valve B to ON and OFF alternately at high speeds under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

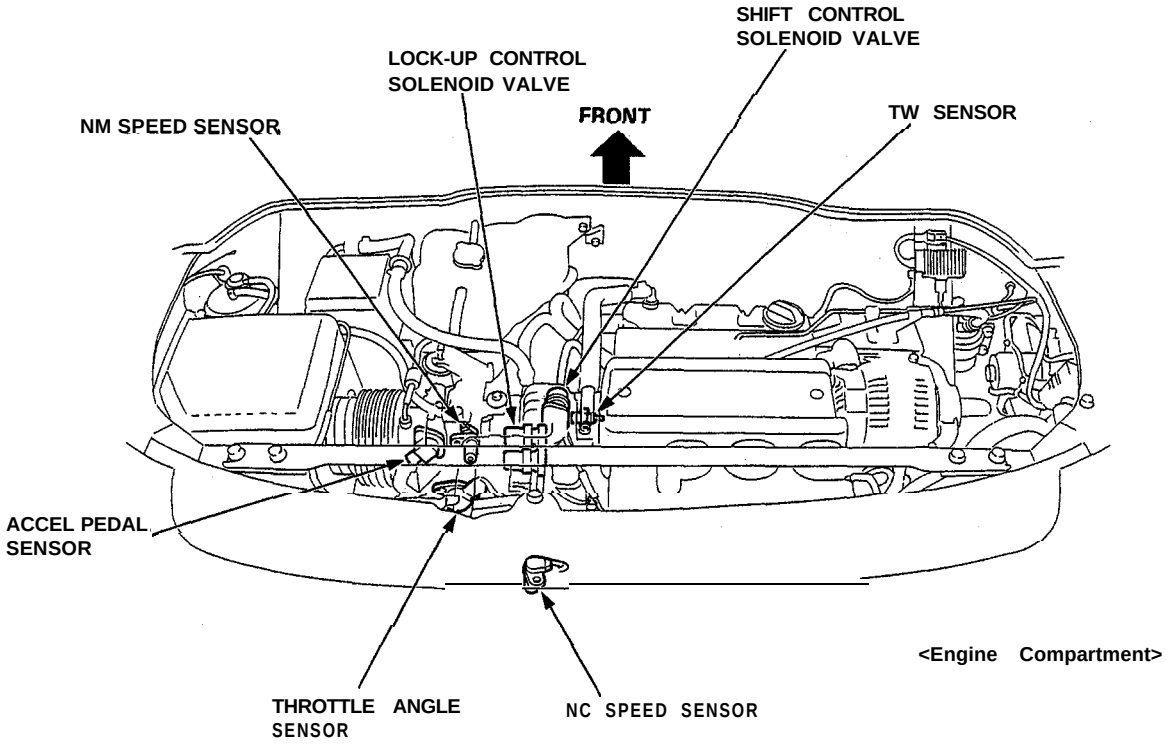
NOTE: When used, "left" or "right" indicates direction on the flow chart.



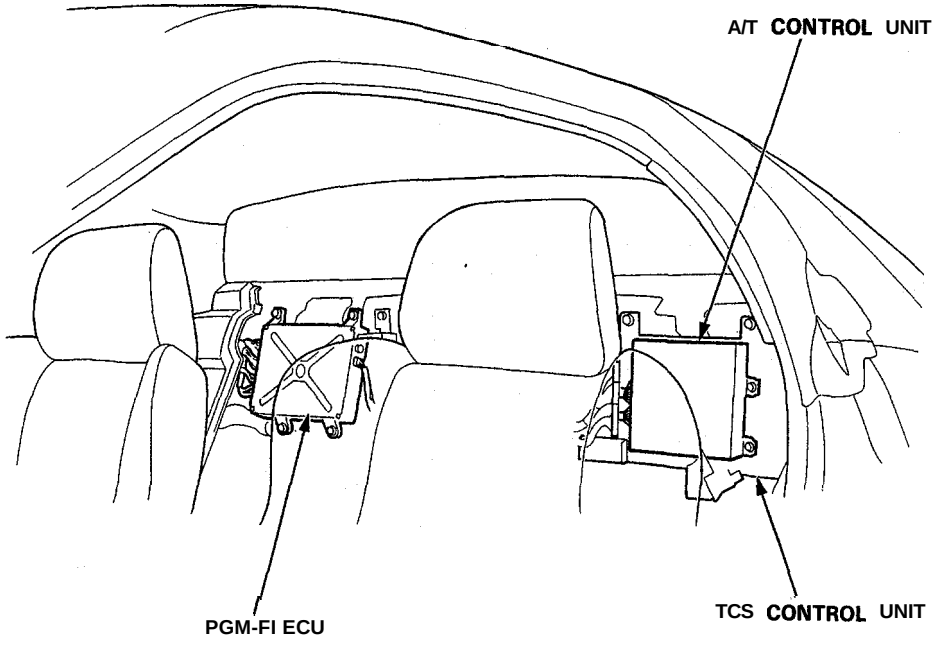
ATF Cooler

The radiator is mounted at the front of the vehicle. The ATF cooler is installed directly on the transmission housing. The ATF is cooled by the engine coolant.

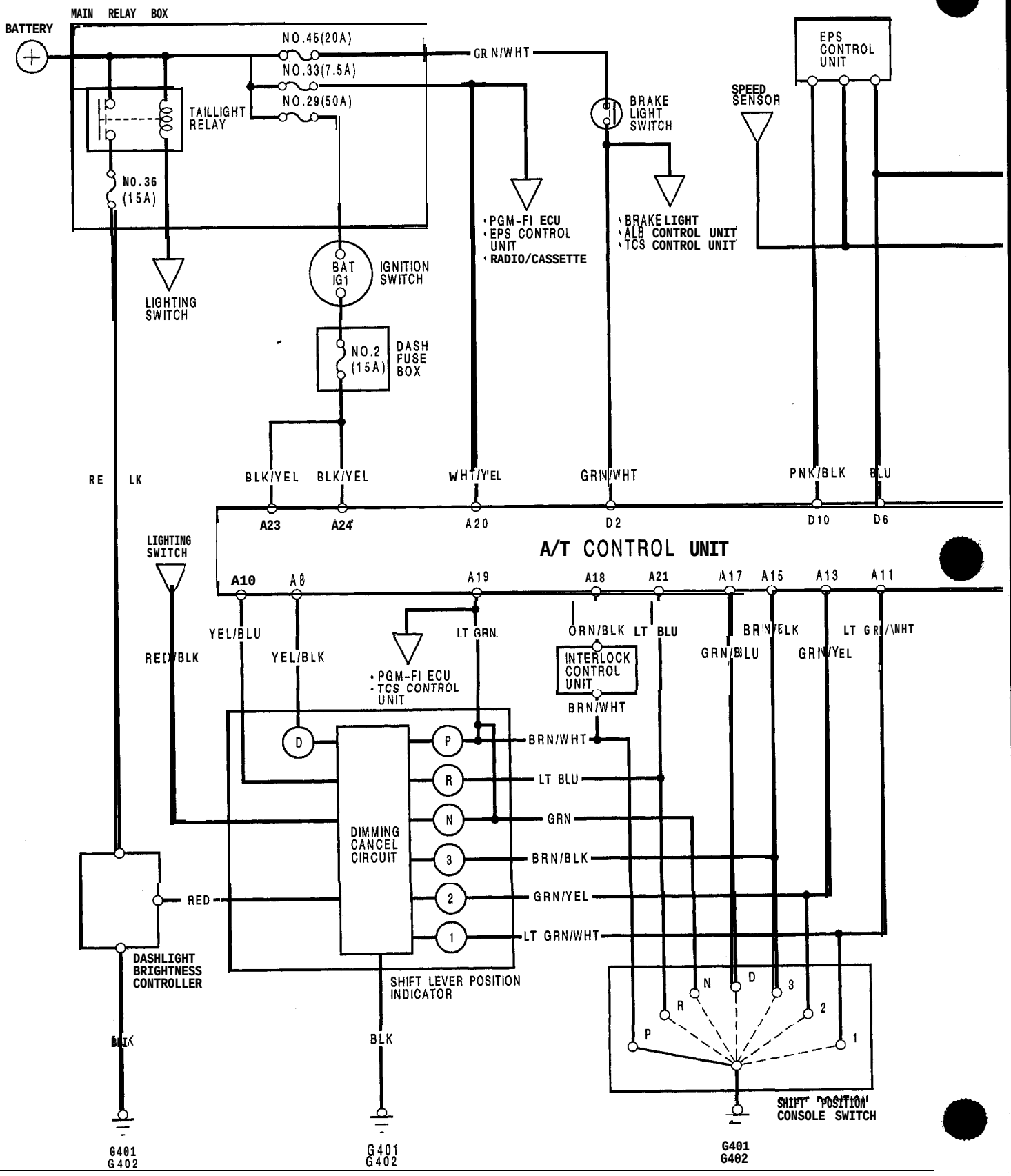


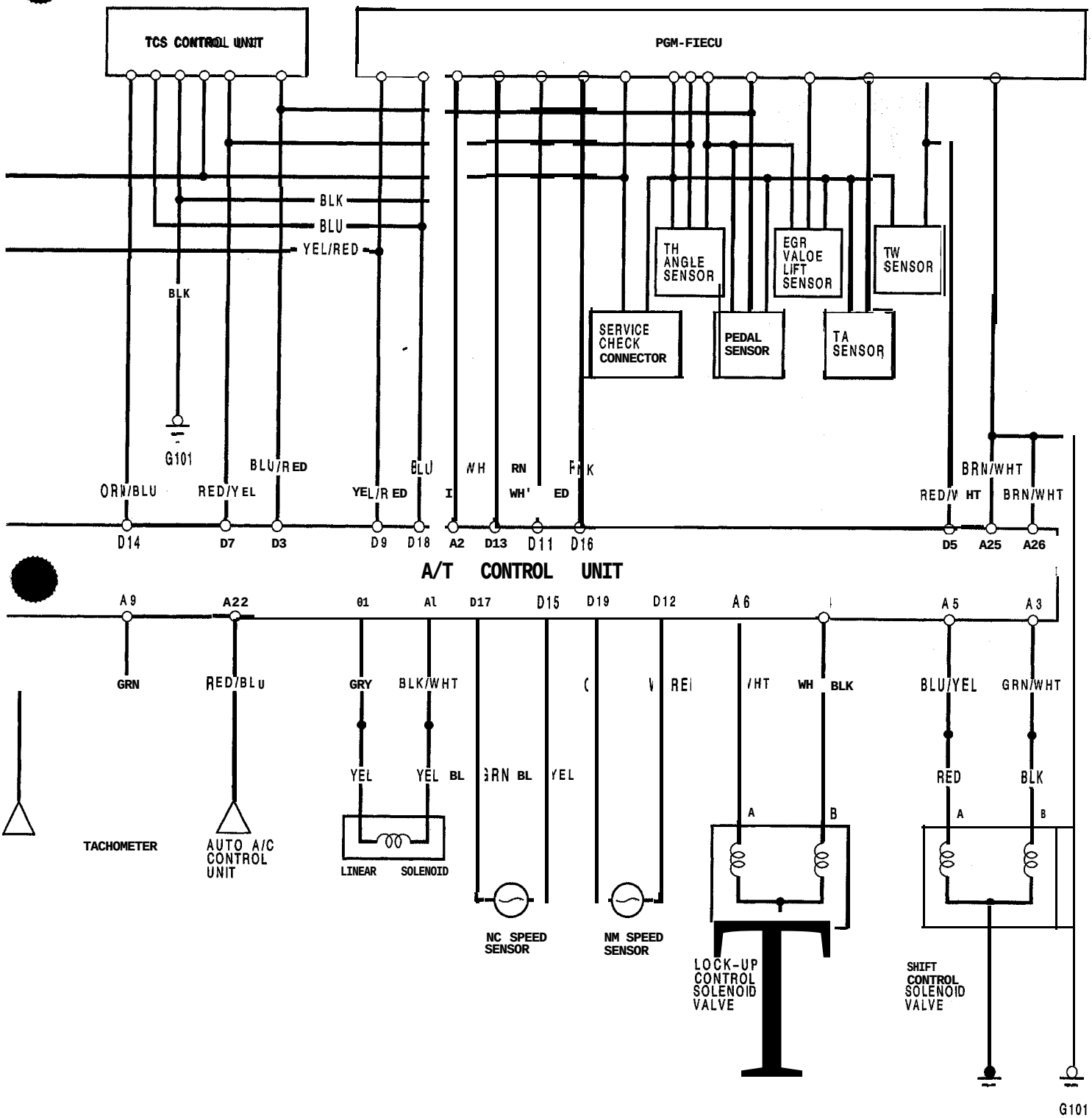


<Engine Compartment>



Circuit Diagram





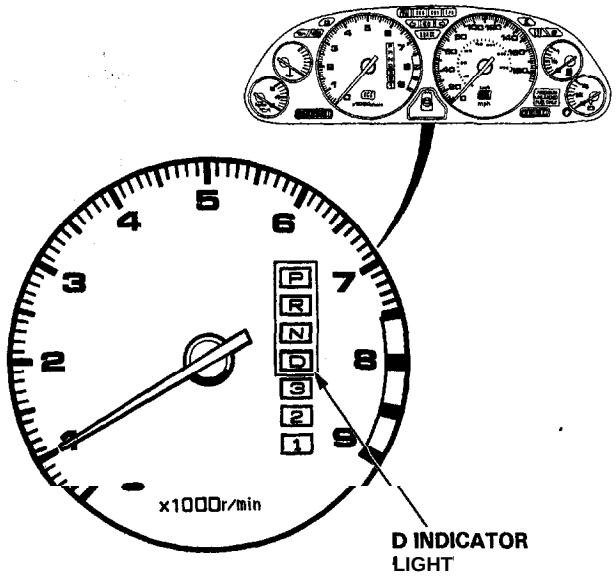
A25	A23	A21	A19	A17	A15	A13	A11	A9		A5	A3	A1
A26	A24	A22	A20	A18				A10	A8	A6	A4	A2

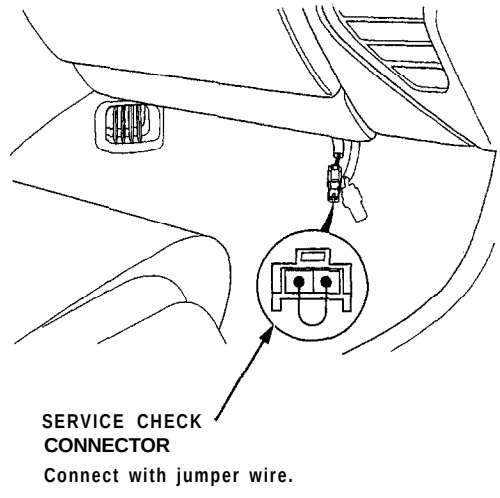
	D19	D17	D15	D13	D11	D9	D7	D5	D3	D1
		D18	D16	D14	D12	D10		D6		D2

TERMINAL LOCATION View from terminal side

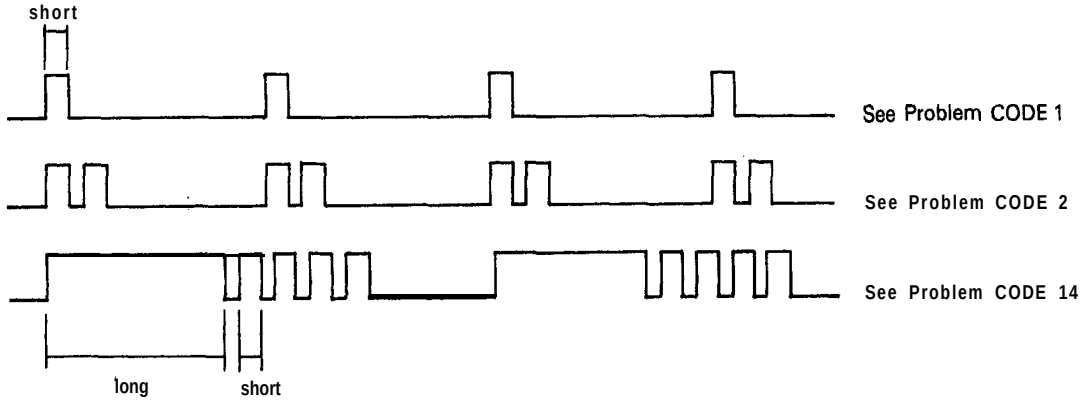
When the A/T control unit senses an abnormality in the input or output systems, the D indicator light in the gauge assembly will blink. However, when the Service Check Connector (located to the lower right of the glove compartment) is connected with a jumper wire, the D indicator light will blink the problem code when the ignition switch is turned on.

When the D indicator light has been reported on, connect the two terminals of the Service Check Connector together. Then turn on the ignition switch and observe the D indicator light.



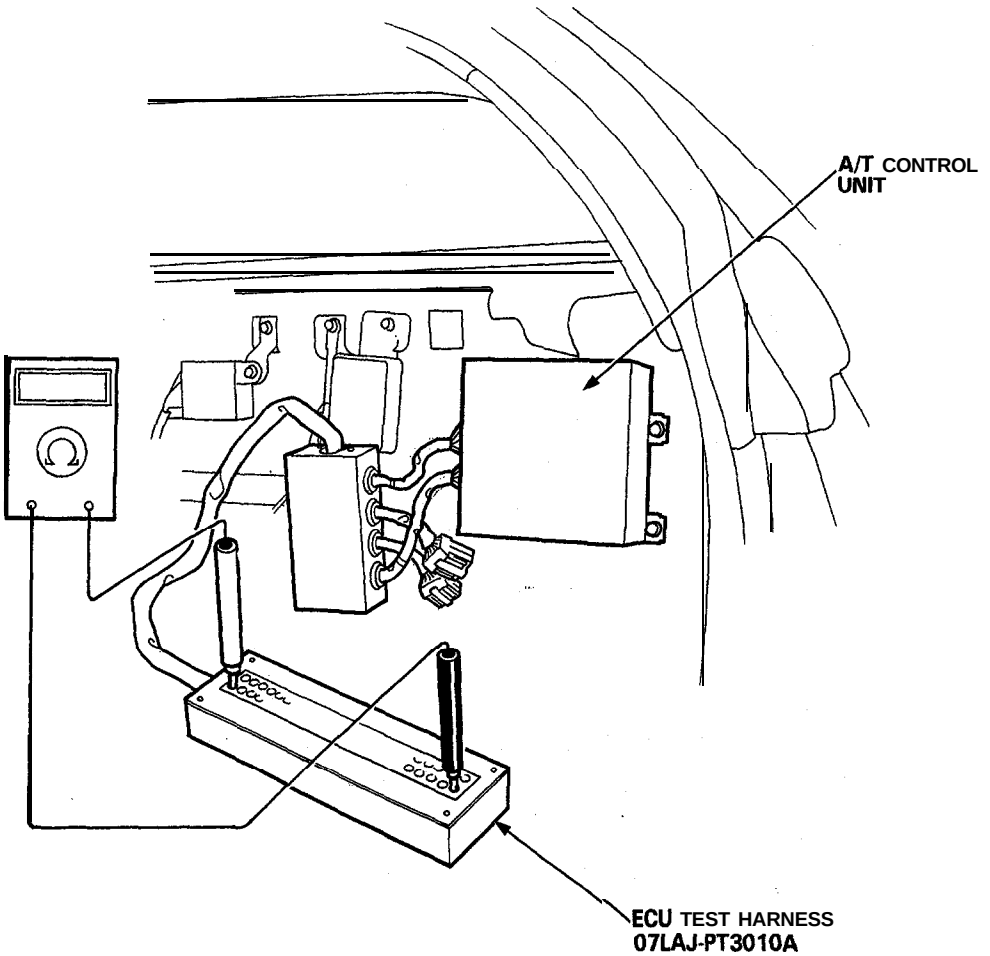


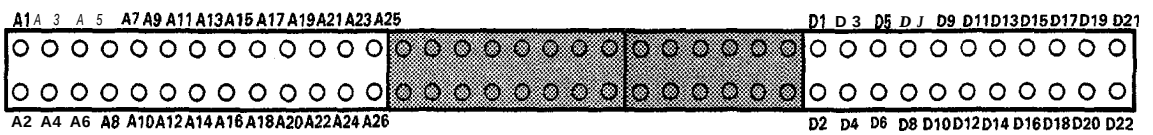
Problem codes 1 through 9 are indicated by individual short blinks, Problem codes 10 through 16 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code. After determining the problem code, refer to the electrical system Symptom-to-Component Chart on page 14-52.



Some PGM-FI problems will also make the D indicator light come on. After repairing the PGM-FI system, disconnect the CLOCK fuse (7.5 A) in the main relay box for more than 10 seconds to reset the A/T control unit memory.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.





Terminal Locations

NOTE:

- Only the A and D sections of the ECU test harness are used for A/T troubleshooting.
- Unless otherwise noted, use only the Digital Multimeter, KS-AHM-32-003, for testing.

Symptom-to-Component Chart

· Electrical System

Number of D indicator light blinks while Service Check Connector is jumped.	D indicator light	Possible Cause	Symptom	Refer to page
1	Blinks	• 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	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Unstable idle speed.	14-54
2	Blinks	• 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	• Lock-up clutch does not engage.	14-55
3	Blinks or OFF	• Disconnected throttle angle sensor connector • Short or open in throttle angle sensor wire • Faulty throttle angle sensor	• Lock-up clutch does not engage.	14-56
4	Blinks	• Disconnected speed sensor connector • Short of open in speed sensor wire • Faulty speed sensor	. Lock-up clutch does not engage.	14-57
5	Blinks	• Short in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ↔ 4th gears. • Lock-up clutch does not engage.	14-58
6	OFF	• Disconnected shift position console switch connector • Open in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ↔ 4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.	14-60
7	Blinks	• Disconnected shift control solenoid valve A connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	• Fails to shift (between 1st ↔ 4th, 2nd ↔ 4th or 2nd ↔ 3rd gears only). • Fails to shift (stuck in 4th gear)	14-62
8	Blinks	• Disconnected shift control solenoid valve B connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	• Fails to shift (stuck in 1st or 4th gears).	14-63

Number of D indicator light blinks while Service Check Connector is jumped.	D indicator light	Possible Cause	Symptom	Refer to page
9	Blinks	. Disconnected NC speed sensor connector . Short or open in the NC speed sensor wire • Faulty NC speed sensor	. Lock-up clutch does not engage.	14-64
10	Blinks	. Disconnected water temperature sensor connector . Short or open in the water temperature sensor wire . Faulty water temperature sensor	. Lock-up clutch does not engage.	14-66
11	OFF	. Disconnected gauge assembly connector . Short or open in tachometer wire . Faulty tachometer	. Lock-up clutch does not engage.	14-67
14	OFF	. Short or open in FAS wire . Trouble in PGM-FI unit	. Transmission jerks hard when shiftina.	14-68
15	OFF	. Disconnected NM speed sensor connector . Short of open in NM speed sensor wire . Faulty NM speed sensor	. Transmission jerks hard when shifting.	14-70
16	Blinks	. Disconnected linear solenoid connector . Short or open in linear solenoid wire . Faulty linear solenoid	. Transmission jerks hard when shifting . Lock-up clutch does not engage.	14-73

If the self-diagnosis D indicator light does not blink, perform an inspection according to the table listed below.

Symptom	Probable Cause	Ref. page
D indicator light does not come on for 2 seconds after ignition is first turned on.	–	14-74
D indicator light is on steady, not blinking whenever the ignition is on.	–	14-76
Lock-up clutch does not have duty operation (ON-OFF).	Check A/C signal with A/C on	14-77
Lock-up clutch does not engage.		
Fails to shift from 2nd to 1st gear after releasing the brake pedal from a stop when in the D position.	Check brake light signal.	14-78

- If a customer describes the symptoms for codes 3,6, or 11, yet the D indicator light is not blinking, it will be necessary to recre ate the symptom by test driving, and then checking the D indicator light with the ignition still ON.
- If the D indicator light displays codes 1, 2, 3, 8, 11 or 16, check first the No. 9, 13 and 18 fuse before electrical troubleshootinc If any of the fuses have blown, repair them and then recheck.
- If the D indicator light displays codes other than those listed above or stays lit continuously, the control unit is faulty.
- Sometimes the D indicator light and the Check Engine light may come on simultaneously. If so, check the PGM-FI system ac cording to the number of blinks on the PGM-FI ECU self-diagnosing indicator, then reset the memory by removing the CLOCK fuse in the main relay box for more than IO seconds. Drive the vehicle for several minutes at speed over 30 mph (50 Km/h) then recheck the lights.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radi presets before removina the fuse so vou can reset them.

Troubleshooting Flowchart

Self-diagnosis D indicator light blinks once.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A6 (RED/WHT) and A25 (BRN/WHT) terminals.

Is there voltage?

YES — **Repair short to power source in RED/WHT** wire between the A6 terminal and the lock-up control solenoid valve A.

NO

Turn the ignition switch OFF.

Disconnect the 2P connector from the lock-up control solenoid valve assembly.

Check for continuity between the A6 (RED/WHT) and A25 (BRN/WHT) terminals.

Is there continuity?

YES — Repair short to ground in REDIWHT wire between the A6 terminal and the lock-up control solenoid valve A.

NO

Connect the 2P connector to the lock-up control solenoid valve assembly.

Measure the resistance between the A6 (RED/WHT) and A25 (BRN/WHT) terminals.

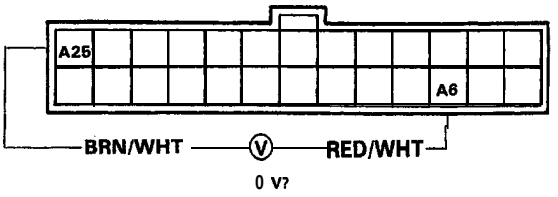
Is the resistance 12—24 Ω?

NO — Check for open in **RED/WHT** wire between the A6 terminal and the lock-up control solenoid valve A. If wire is OK, check the Lock-up Control Solenoid Valve A.

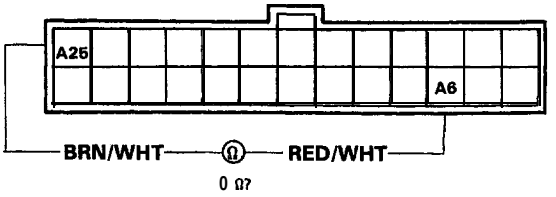
YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

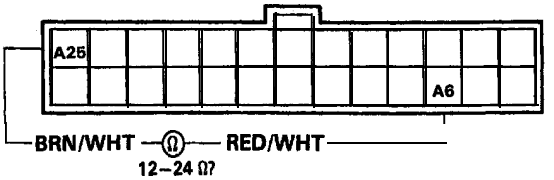
NOTE: View from terminal side.



0 V?



0 Ω?



12—24 Ω?

Self-diagnosis D indicator light blinks twice.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A4 (WHT/BLK) and A25 (BRN/WHT) terminals.

Is there voltage?

YES → Repair short to power source in WHTIBLK wire between the A4 terminal and the lock-up control solenoid valve B.

NO

Turn the ignition switch OFF.

Measure the resistance between the A4 (WHT/BLK) and A25 (BRN/WHT) terminals.

Is the resistance 12-24 Ω?

NO → Check for open in WHTIBLK wire between the A4 terminal and the lock-up control solenoid valve B. If wire is OK, check the Lock-up Control Solenoid Valve B.

YES

Disconnect the 2P connector from the lock-up control solenoid valve assembly.

Check for continuity between the A4 (WHTIBLK) and A25 (BRN/WHT) terminals.

Is there continuity?

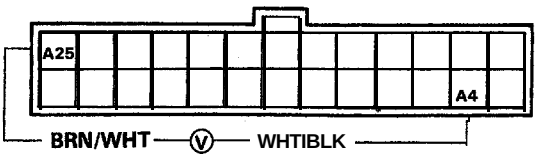
YES → Repair short to ground in WHTIBLK wire between the A4 terminal and the lock-up control solenoid valve B.

NO

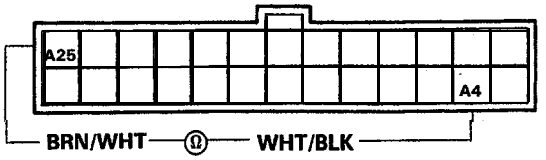
Connect the 2P connector to the lock-up control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

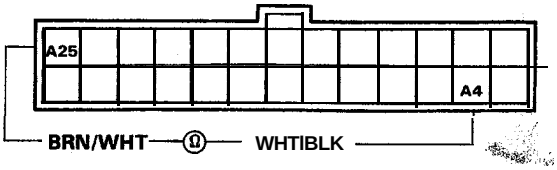
NOTE: View from terminal side.



0 V?



12–24 Ω?



0 Ω?

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks three times.

Turn the ignition switch ON.

Check whether the PGM-FI self-diagnosis indicator blinks (Section 11).

Does the Self-diagnosis indicator blink? — YES → Repair the PGM-FI System. See Section 11.

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the D18 (BLU) and A25 (BRN/WHT) terminals.

Is the voltage 4.75-5.25 V? — NO → Repair open short in BLU wire between the D18 terminal and the D18 terminal of the PGM-FI ECU.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the connectors and the control unit.

Turn the ignition switch ON.

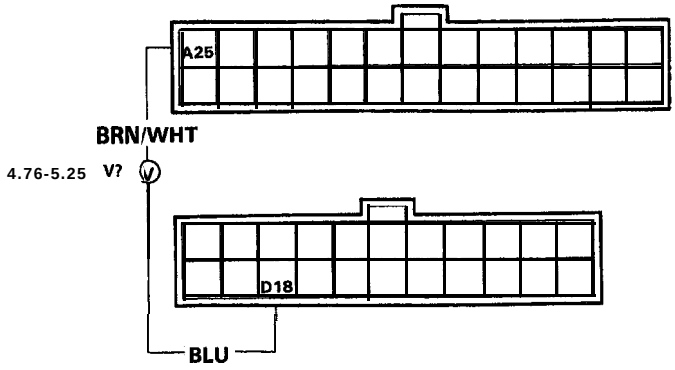
Measure the voltage between the D7 and A25 terminals.

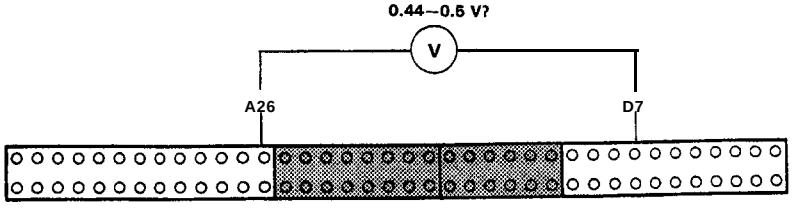
Is the voltage 0.44-0.56 V?* — NO → Repair open or short In RED/YEL wire between the D7 terminal and the throttle angle sensor.

YES * ± 10%

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

NOTE: View from terminal side.





ECU TEST HARNESS TERMINAL

Self-diagnosis D indicator light blinks four times.

Raise the car.

Shift transmission to ❑ .

Disconnect the 26P and 22P connectors from the control unit.

Turn the ignition switch ON.

Rotate the rear wheel and check for voltage between the A25 (BRN/WHT) and D9 (YEL/RED) terminals.

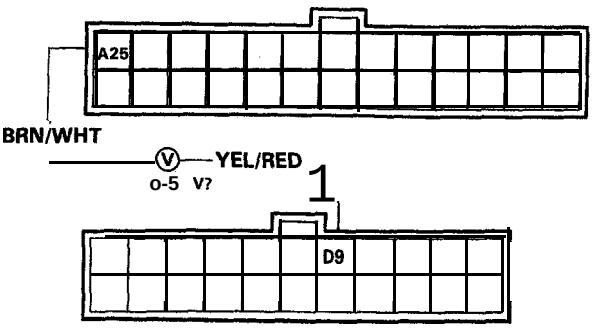
Does the voltage 0—5 V appear alternately?

NO → **Check for short or open in YEL/RED wire between the D9 terminal and the Speed Sensor. If wire is OK, check the Speed Sensor. See Section 23.**

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

⚠ WARNING Make sure lifts are placed properly. (See page I-6.)



NOTE: View from terminal side.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks five times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly?

NO → See A/T shift position indicator inspection (Section 23).

YES

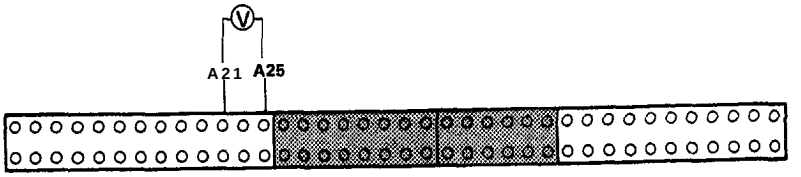
Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON.

Shift to other than [R] position.

Measure the voltage between the A21 and A25 terminals.



ECU TEST HARNESS TERMINAL

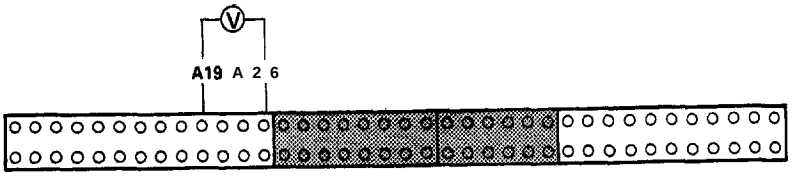
Is there battery voltage?

NO → Check for short in SKY BLU wire between the A21 terminal end the shift position console switch or shift position indicator. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

YES

Shift to other than ❑ and ❑ position.

Measure the voltage between the A19 and A25 terminals.



Is there battery voltage?

NO → Check for short in LT GRN wire between the A19 terminal and the shift posltion console switch. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

YES

To page 14-59

From page 14-58

Shift to other than ❑ position.

A17 A25

Measure the voltage between the A17 and A25 terminals.

Is there battery voltage? NO

Check for shoft in **GRN/BLU** wire between the AI 7 terminal and the shift position console switch. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

YES

Shift to other than ❑ position.

Measure the voltage between the A15 and A25 terminals.

Is there battery voltage? NO

Check for shoft in **BRN/BLK** wire between the AI 5 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

YES

Shift to other than 2 position.

Measure the voltage between the AI3 and A25 terminals.

Is there battery voltage? NO

Check for short in **GRN/YEL** wire between the AI 3 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

YES

Shift to other than ❑ position.

Measure the voltage between the A11 and A25 terminals.

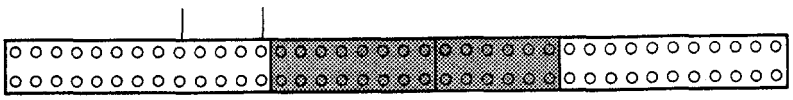
Is there battery voltage? NO

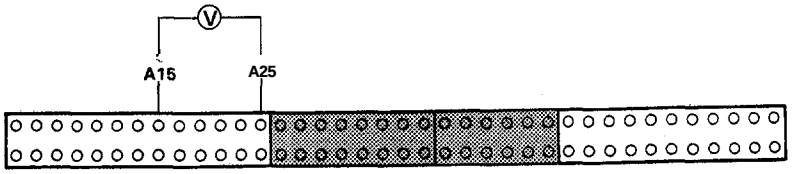
Check for short in LT **GRN/WHT** wire between the AI 1 terminal and the shift position console switch or shift position indicator. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.

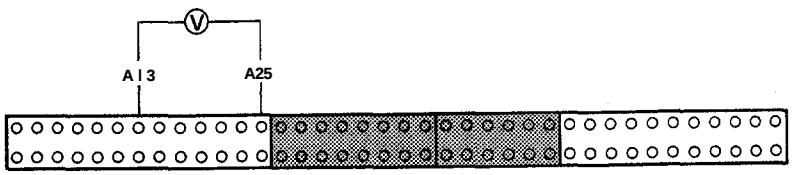
YES

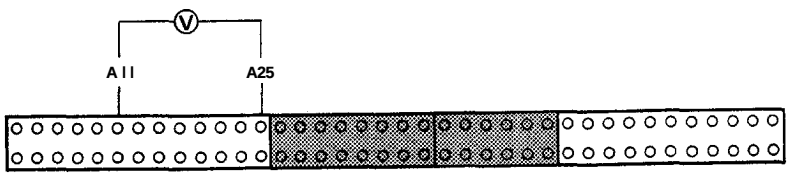
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

ECU TEST HARNESS TERMINAL









(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks six times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly?' NO → See AK shift position indicator inspection. (Section 23)

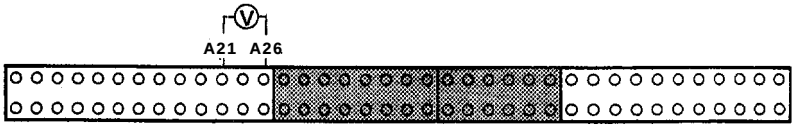
YES

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON.

Shift to ❑ position.



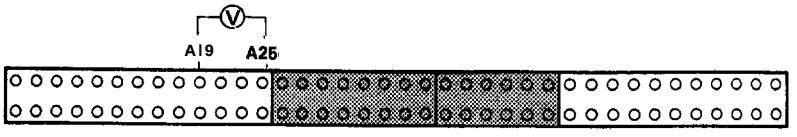
ECU TEST HARNESS TERMINAL

Measure the voltage between the A21 and A25 terminals.

Is there voltage? YES → Repair open in SKY BLU wire between the A21 terminal and the shift position console switch.

NO

Shift to ❑ or ❑ position.



ECU TEST HARNESS TERMINAL

Measure the voltage between the A19 and A25 terminals.

Is there voltage? YES → Repair open in LT GRN wire between the A19 terminal and the shift position console switch.

NO

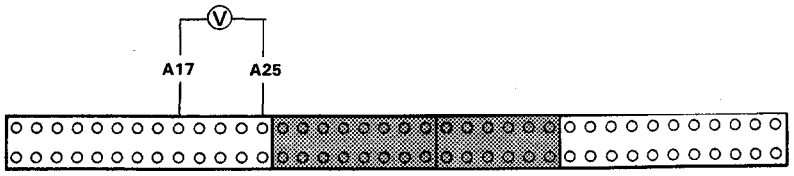
To page 14-61

From page 14-60

ECU TEST HARNESS TERMINAL

Shift to D position.

Measure the voltage between the A17 and A25 terminals.



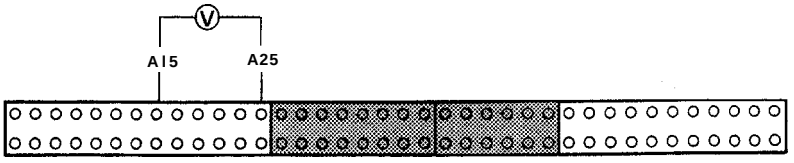
Is there voltage?

YES → Repair open in GRN/BLU wire between the A17 terminal and the shift position console switch.

NO

Shift to ❑ position.

Measure the voltage between the A15 and A25 terminals.



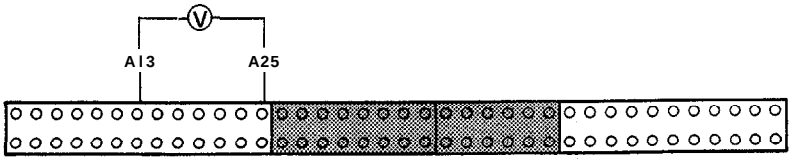
Is there voltage?

YES → Repair open in BRN/BLK wire between the A15 terminal and the shift position console switch.

NO

Shift to ❑ position.

Measure the voltage between the A13 and A25 terminals.

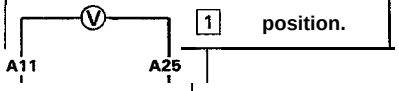


Is there voltage?

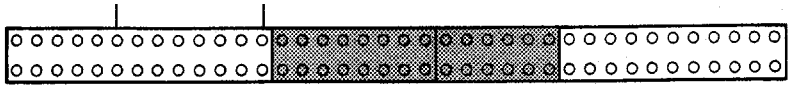
YES → Repair open in GRN/YEL wire between the A13 terminal and the shift position console switch.

NO

1 position.



Measure the voltage between the A11 and A25 terminals.



Is there voltage?

YES → Repair open in LT GRN/WHT wire between the A11 terminal and the shift position console switch.

NO

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks seven times.

Disconnect the 26P connector from the countrol unit.

Turn the ignition switch ON.

Measure the voltage between the A5 (BLU/YEL) and A25 (BRN/WHT) terminals.

Is there voltage? YES → Repair short to power source in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.

NO

Turn the ignition switch OFF.

Measure the resistance between the A5 (BLU/YEL) and A25 (BRN/WHT) terminals.

Is the resistance 12-24 Ω? NO → Check for open in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A. If wire is OK, check the Shift Control Solenoid Valve A.

YES

Disconnect the 2P connector from the shift control solenoid valve assembly.

Check for continuity between the A5 (BLU/YEL) and A25 (BRN/WHT) terminals.

Is there continuity? YES → Repair short to ground in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.

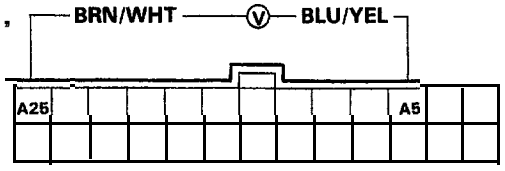
NO

Connect the 2P connector to the shift control solenoid valve assembly.

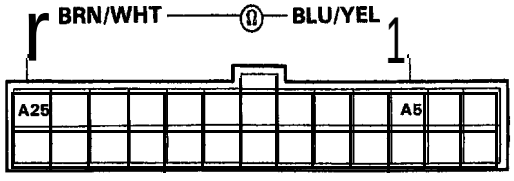
Check for loose control unit connectors. If necessary, substitute a known-good control unlt and recheck.

NOTE: View from terminal side.

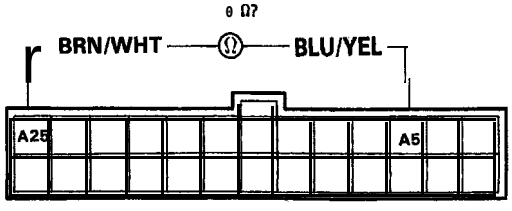
0 V?



12–24 Ω?



0 Ω?



Self-diagnosis D indicator light blinks eight times.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A3 (GRN/WHT) and A25 (BRN/WHT) terminals.

Is there voltage?

YES → Repair short to power source in GRN/WHT wire between the A3 terminal and shift control solenoid valve B.

NO

Turn the ignition switch OFF.

Measure the resistance between the A3 (GRN/WHT) and A25 (BRN/WHT) terminals.

Is the resistance 12-24 Ω?

NO → Check for open in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B. If wire is OK, check the Shift Control Solenoid Valve B.

YES

Disconnect the 2P connector from the shift control solenoid valve assembly.

Check for continuity between the A3 (GRN/WHT) and A25 (BRN/WHT) terminals.

Is there continuity?

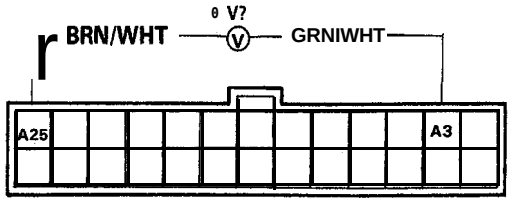
YES → Repair short to ground in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B.

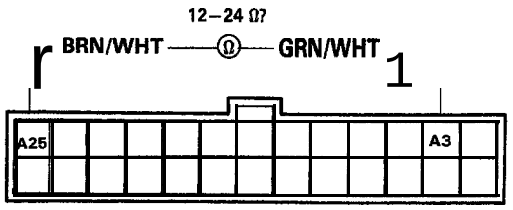
NO

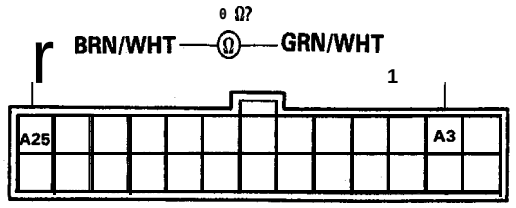
Connect the 2P connector to the shift control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

NOTE: View from terminal side.







(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks nine times.

Check the state of installation of the NC SPEED SENSOR.

OK? — NO → Reinstall and recheck.

YES

Disconnect the 2P connector from the NC speed sensor coupler.

Measure the resistance of the NC speed sensor.

Is the resistance 400—600 ohms? (20°C) — NO → Replace the NC speed sensor.

YES

Reconnect the NC speed sensor.

Disconnect the 22P connector from the control unit.

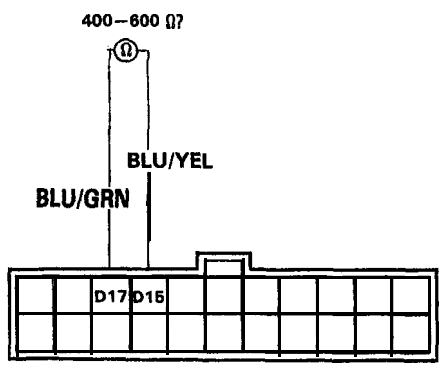
Measure the resistance between D17 (BLU/GRN) and D15 (BLU/YEL).

Is the resistance 400-600 ohms? (20°C) — NO →

YES

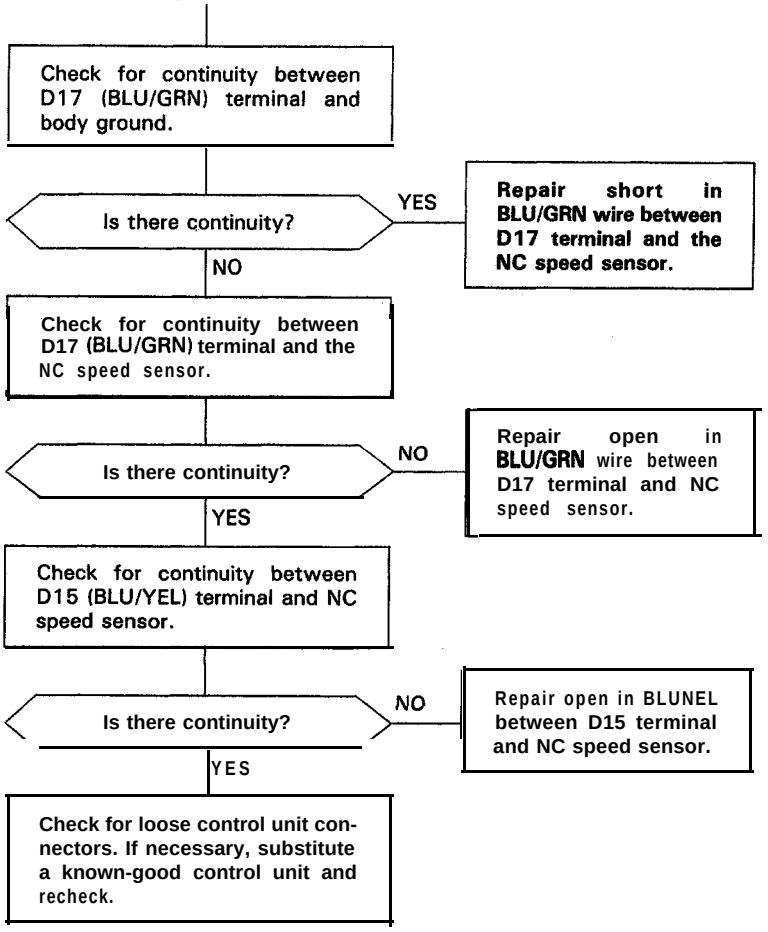
Check for loose control unit connector. If necessary, substitute a known-good control unit and recheck.

To page 14-65



NOTE: View from terminal side.

From page 14-64



(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks ten times.

Turn the Ignition switch ON.

Check whether the PGM-FI self-diagnosis indicator blinks (Section 11).

Does the self-diagnosis indicator blink? — YES → Repair the PGM-FI System. See Section 11.

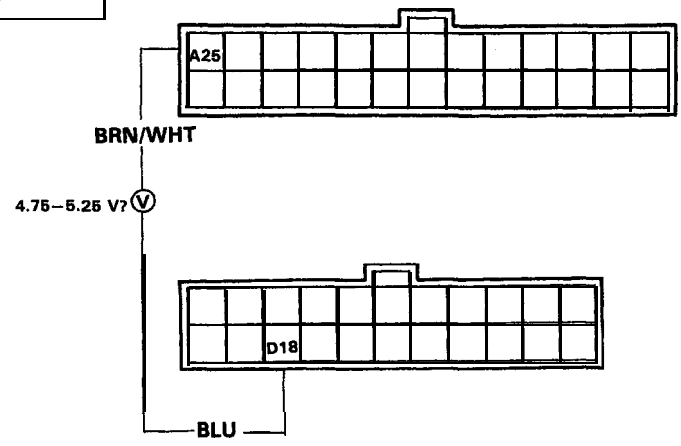
NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the D18 (BLU) and A25 (BRN/WHT) terminals.



NOTE: View from terminal side.

Is the voltage 4.75-5.25 V? — NO → Repair open or short in BLU wire between the D18 terminal and the D18 terminal of the PGM-FI ECU.

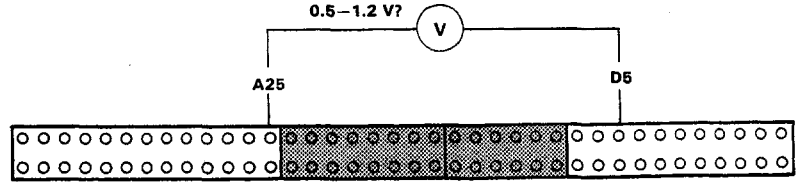
YES

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and the connectors.

Start the engine and warm it up to normal operating temperature.

Measure the voltage between the D5 and A25 terminals.



ECU TEST HARNESS TERMINAL

Is the voltage 0.50–1.20V?* — NO → Repair open or short in RED/WHT wire between the D5 terminal and the coolant temperature sensor.

YES

* ± 10%

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

Self-diagnosis D indicator light blinks eleven times.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON

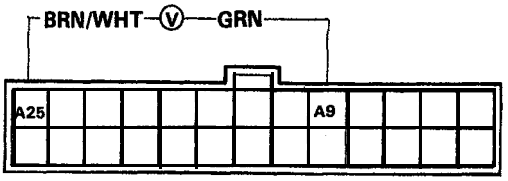
Measure the voltage between the A9 (GRN) and A25 (BRN/WHT) terminals.

Is there battery voltage?

NO → Repair open or short in GRN wire between the A9 terminal and the gauge assembly.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.



NOTE: View from terminal side.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light **blinks fourteen times.**

Start the engine and warm it up to normal operating temperature.

Shift to [P] position.

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON and *wait* for at least two seconds.

Using an analog voltmeter, measure the voltage between the D 16 (+) and A25 (−) terminals.

Is there approx. 5 V for over five seconds?

NO → Does the meter jerk from 0 V to 4 V approx. every four seconds?

YES → Refer to PGM-FI A/T Signal (Section 11).

NO → Is the Check Engine light on?

YES → Repair the PGM-FI System (Section 11).

NO

Turn the ignition switch OFF.

Disconnect the A connector from the PGM-FI ECU.

Check for continuity on the PNK wire between the D 16 terminal on the A/T control unit and the A16 terminal on the PGM-FI ECU.

To page 14-69

YES

Raise the car.

Start the engine.

Shift to ❑ position.

Raise the engine to over 2,000 rpm (over 40 mph in 4th gear) for five seconds.

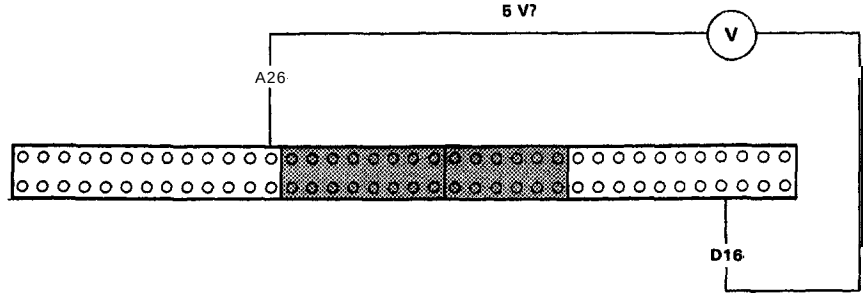
Release and depress the throttle so that the transmission downshifts and upshifts.

Using an analog voltmeter, measure the voltage between D16 (+) and A25 (−) terminals

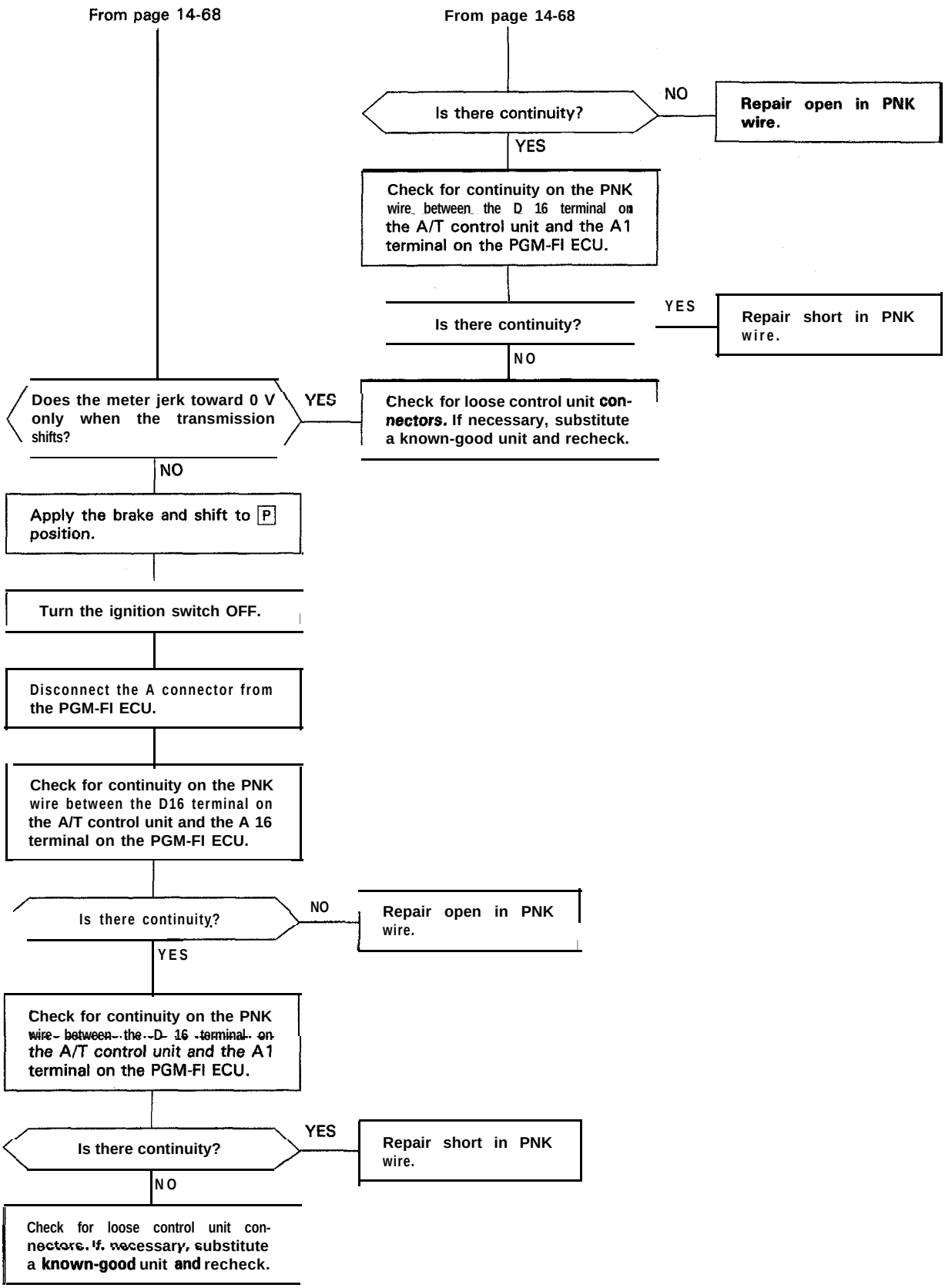
To page 14-69

⚠ WARNING

- **Make sure** lifts are placed properly. (See page I-6.1
- While testing, be careful of the rotating rear wheels.



ECU TEST HARNESS TERMINAL


From page 14-68
From page 14-68
Is there continuity?
NO
Repair open in PNK wire.
YES
Check for continuity on the PNK wire between the D 16 terminal on the A/T control unit and the A1 terminal on the PGM-FI ECU.
Is there continuity?
YES
Repair short in PNK wire.
NO
Does the meter jerk toward 0 V only when the transmission shifts?
YES
Check for loose control unit connectors. If necessary, substitute a known-good unit and recheck.
NO
Apply the brake and shift to P position.
Turn the ignition switch OFF.
Disconnect the A connector from the PGM-FI ECU.
Check for continuity on the PNK wire between the D16 terminal on the A/T control unit and the A 16 terminal on the PGM-FI ECU.
Is there continuity?
NO
Repair open in PNK wire.
YES
Check for continuity on the PNK wire between the D 16 terminal on the A/T control unit and the A1 terminal on the PGM-FI ECU.
Is there continuity?
YES
Repair short in PNK wire.
NO
Check for loose control unit connectors. If necessary, substitute a known-good unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D indicator light blinks fifteen times.

Check the state of installation of NM (NC) speed sensor.

OK? — NO → Reinstall and recheck.

YES

Disconnect the 2P connector from the NM speed sensor.

Measure the resistance of the NM speed sensor.

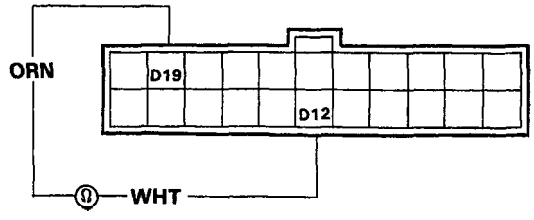
Is the resistance 400–600 ohms? — NO → Replace the NM speed sensor.

YES

Reconnect the 2P connector to the NM speed sensor.

Disconnect the 22P connector from the control unit.

Measure the resistance between D19 (ORN) and D12 (WHT) terminals.



NOTE: View from terminal side.

Is the resistance 400–600 ohms? (20°C) — NO → Check for continuity between D19 (ORN) terminal and body ground.

YES

Disconnector the 2P connector from the NC speed sensor.

Is there continuity? — YES → **Repair short in ORN or WHT wires between D19 terminal and the NM speed sensor.**

NO

Measure the resistance of the NC speed sensor.

Check for continuity between D19 (ORN) terminal and the NM speed sensor.

To page 14-71

To page 14-7 1

From page 14-70

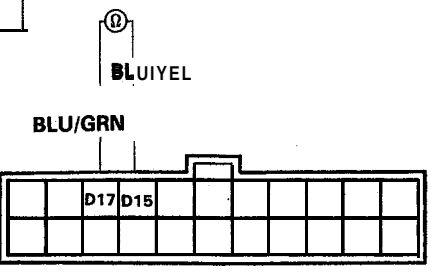
Is the resistance 400-600 ohms? (20°C)

NO → Repalce the NC speed sensor.

YES

Reconnect the 2P connector to the NC speed sensor.

Measure the resistance between D17 (BLU/GRN) and D15 (BLU/YEL) terminals.



From page 14-70

Is there continuity?

NO → Repaiir open in ORN wire between D19 terminal and the NM speed sensor.

YES

Check for continuity between D12 (WHT) terminal and the NM speed sensor.

Is there continuity?

NO → Repair open in WHT wire between D 12 terminal and the NM speed sensor.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

Self diagnosis D indicator light blinks sixteen times.

Disconnect the 26P and 22P connectors from the control unit.

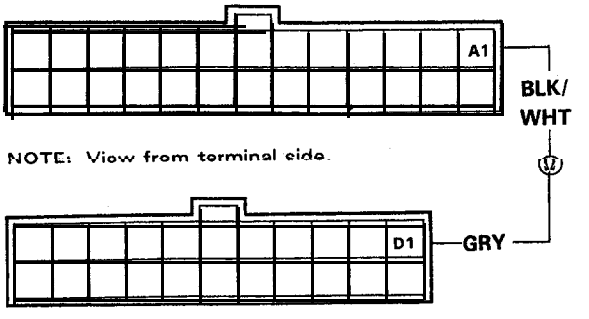
Measure the resistance between the AI (BLK/WHT) and the D1 (GRY) terminals.

Is the resistance approximately 5 Ω?

YES → Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

NO

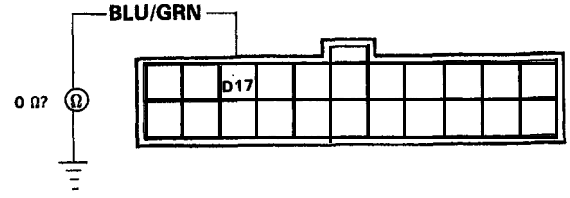
Disconnect the 2P connector from the linear solenoid.



Troubleshooting Flowchart (cont'd)

From page 14-71

NOTE: View from terminal side.



Check for continuity between D17 (BLU/GRN) terminal and body ground.

Is there continuity?

YES → Repair short in BLU/GRN or BLU/YEL wires between D 17 terminal and the NC speed sensor.

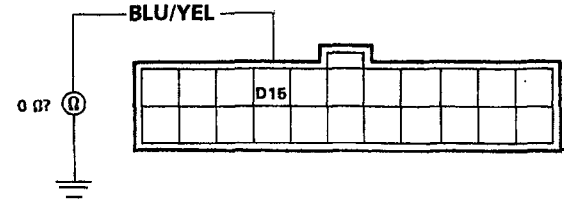
NO

Check for continuity between D17 (BLU/GRN) terminal and the NC speed sensor.

Is there continuity?

NO → Repair open in BLU/GRN wire between D17 terminal and the NC speed sensor.

YES



Check for continuity between D15 (BLU/YEL) terminal and the NC speed sensor.

Is there continuity?

NO → Repair open in BLU/YEL wire between D15 terminal and the NC speed sensor.

YES

Check for loose control unit connectors. If necessary, substitute a known-good unit and recheck.

From page 14-74

Is there battery voltage?

NO → Repair open or short BLK/YEL wire between the A23 andlor A24 terminals and dash fuse box.

YES

Turn the ignition switch OFF.

Reconnect the 26P and 22P conectors to the control unit.

Turn the ignition switch ON. Be sure that the voltage is available for 2 seconds between the A8 (YEL/BLK) terminal and A25 (BRN/WHT) terminal.

Is there voltage?'

YES → Check for open or short in YEL/BLK wire between the A8 terminal and the gauge assembly. If wire is OK, check the D indicator light and the shift position indicator.

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the control unit.

Check for continuity between the A8 (YEL/BLK) terminal and the gauge assembly.

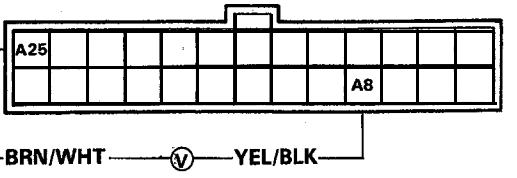
Is there continuity?

NO → **Repair open in YEL/BLK wire between the A8 terminal and the gauge assembly.**

YES

Check for loose control unit connectors. Check the shift position console switch. If necessary, substitute a known-good control unit and recheck.

NOTE: View from terminal side.



(cont'd)

Troubleshooting Flowchart (cont'd)

D indicator light is on steady, not blinking whenever the ignition switch ON.

Measure voltage between the A8 (YEL/BLK) terminal and body ground.

Is there voltage?

NO → Replace the A/T control unit.

YES

Measure voltage between the YEL/BLK wire at the gauge assembly and body ground.

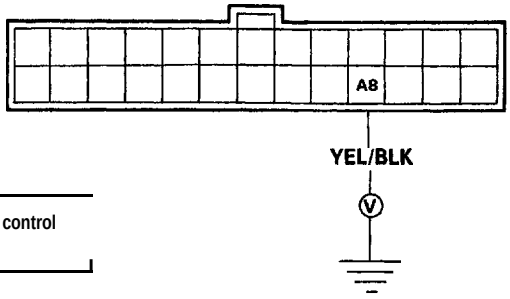
Is there voltage?

NO → Replace faulty shift position indicator.

YES

Repair short to power source on YEL/BLK wire between the A8 terminal and gauge assembly.

NOTE: View from terminal side.



Inspection of the A/C signal.

Start the engine.

Turn the blower switch ON.

Puch the A/C switch ON.

Does A/C compressor clutch engage? NO → See Air Conditioner inspection. (Section 22.)

YES

Stop the engine.

Disconnect the 26P connector from the control unit.

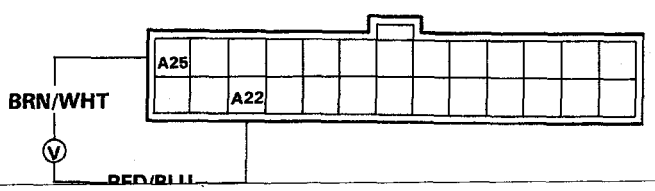
Start the engine.

Measure the voltage between A22 (RED/BLU) and A25 (BRN/WHT) terminals. (A/C compressor OFF)

Is there battery voltage? NO → Repair open in RED/BLU wire between A22 terminal and Auto AIC control unit.

YES

A/C signal is OK.



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 connector from the lock-up control

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 valves A and B as an assembly.

Troubleshooting Flowchart (cont'd)

inspection of the brake light signal.

Check that the brake lights come on with the brake pedal pushed.

Are brake lights ON?' — NO → Faulty brake light circuit.

YES

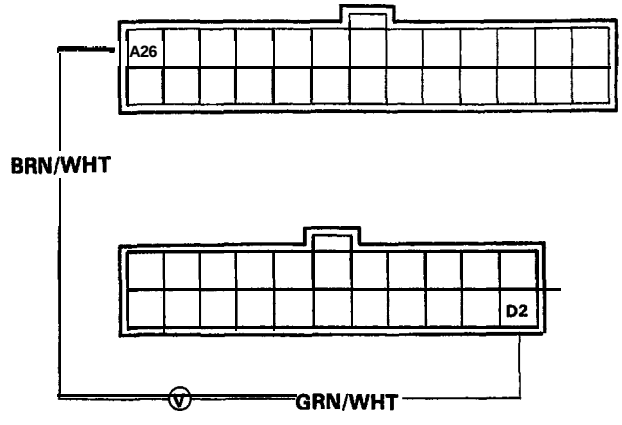
Disconnect the 26P and 22P connectors from the control unit.

Measure the voltage between D2 (GRN/WHT) and A25 (BRN/WHT) terminal with the brake pedal pushed.

Is there battery voltage? — NO → Repair open in GRN/WHT wire between D2 terminal and brake light switch.

YES

Brake light signal OK.



NOTE: View from terminal side.

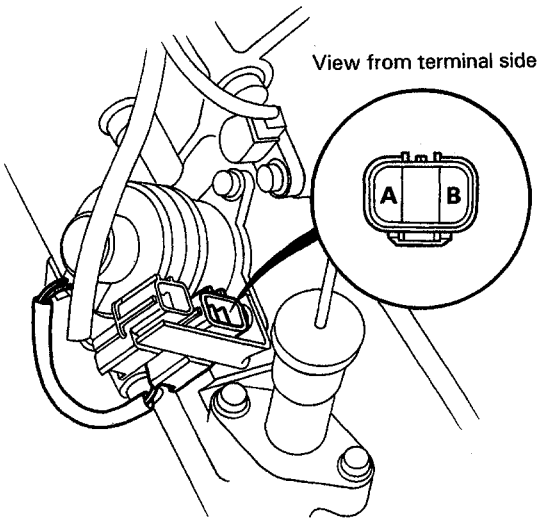
hold valve A/B; solenoid valves A and B

Linear Solenoid

Test

1. Remove the linear solenoid connector.
2. Measure the resistance between the A and B terminal.

   STANDARD: 4.65 – 5.35 Ω

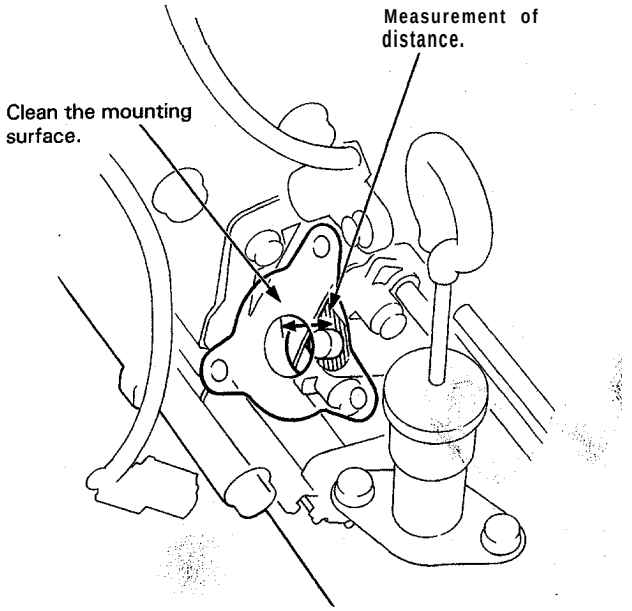


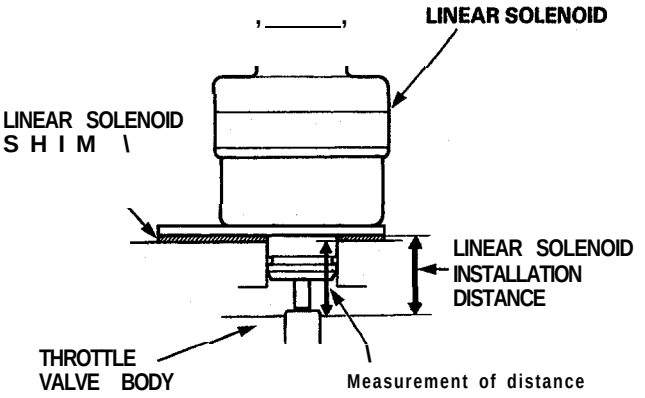
3. **Replace the linear solenoid if resistance is out of** specification.
4. Connect the A terminal of the linear solenoid connector to the battery. A clicking sound should be heard. Connect the B terminal of the linear solenoid connector to the battery. A clicking sound should be heard.
5. If not, check for continuity between the A/T control unit AI or D1 harness and body ground page 14-73.
6. Replace the linear solenoid assembly if there is continuity between the AI or D1 and body ground.

Replacement

NOTE: Select the appropriate shim when the linear solenoid is replaced.

1. Remove the linear solenoid and shim from the transmission housing.
2. Clean the mounting surface.
3. Measure the distance between the mounting surface of the linear solenoid and the throttle valve body.





LINEAR SOLENOID INSTALLATION DISTANCE:
23.5 – 23.7 mm (0.925 – 0.933 in)

NOTE: If the measurement of distance is 21.6 mm (0.850 in), select the shim of 2.0 mm (0.079 in) to obtain the installation distance of 23.6 mm (0.929 in).

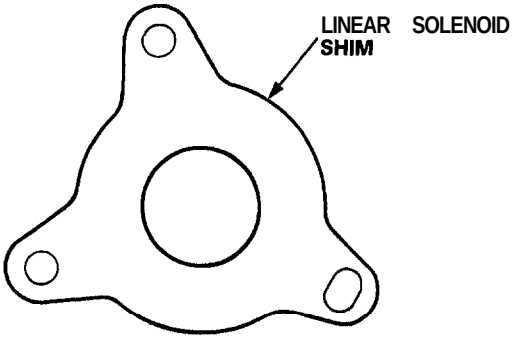
(cont'd)

Linear Solenoid

Replacement (cont'd)

4. Select a new shim from the chart below.

   NOTE: Identification color is painted on the side of the shim.



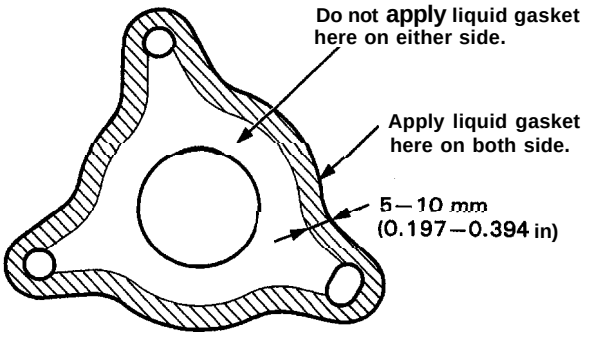
LINEAR SOLENOID SHIM

NO	PART NUMBER	THICKNESS	COLOR
1	28252-PR9-000	1.2 mm (0.047 in)	BLACK
2	28253-PR9-000	1.4 mm (0.055 in)	BROWN
3	28254-PR9-000	1.6 mm (0.063 in)	RED
4	28255-PR9-000	1.8 mm (0.071 in)	PINK
5	28256-PR9-000	2.0 mm (0.079 in)	YELLOW
6	28257-PR9-000	2.2 mm (0.087 in)	GREEN
7	28258-PR9-000	2.4 mm (0.094 in)	BLUE
8	28259-PR9-000	2.6 mm (0.102 in)	SKY BLUE
9	28260-PR9-000	2.8 mm (0.110 in)	WHITE

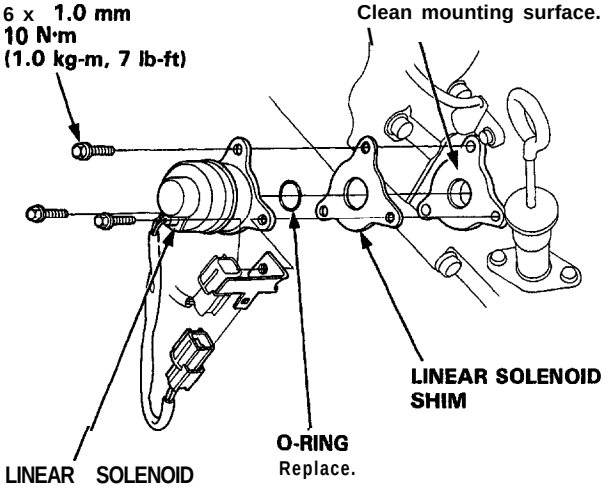
5. Apply liquid gasket to both sides of the linear solenoid shim as shown. Use liquid gasket Part No. 08718-550000 OE.

   CAUTION:
   - Install the linear solenoid within 10 minute of applying the liquid gasket.
   - After installation, wipe off any liquid gasket, that squeezed out from around the linear solenoid shim.

   NOTE:
   - Check that the mounting surfaces are clean and dry before applying liquid gasket. Degrease if necessary.
   - Apply the liquid gasket evenly.
   - Do not install the parts if 10 minutes or more has passed since you first applied the liquid gasket. If 10 minutes has passed, reapply liquid gasket after removing the residue.
   - Wait at least 30 minutes before filling with oil.



6. Install the linear solenoid and shim to the transmission housing.

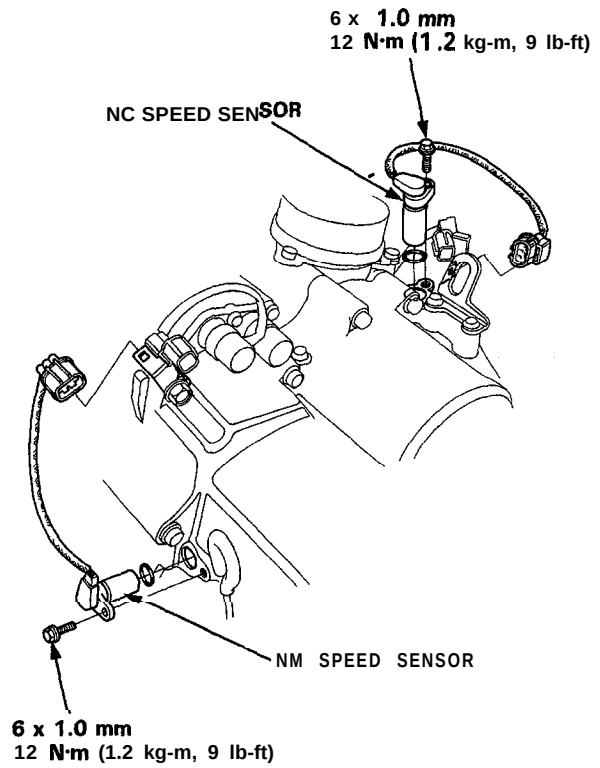


A/T Speed Sensors

▪ Replacement

1. **Remove the 6 mm bolt from the transmission housing and remove the A/T speed sensor.**

2. **Replace the O-ring with a new one before reassembling the A/T speed sensor.**



Symptom-to-Component Chart

Hydraulic System (cont'd)

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R, 2 and 3, but not in D or 1.	8, 29, 44, 48	C, M, O
Car moves in D, 2, 1, R but not in 3.	10, 31	C, L
Car moves in D, 3, 1, R but not in 2.	9, 30, 49	C, L
Car moves in D, 3, 2, 1, but not in R.	1, 11, 22, 34, 38, 39, 40	C, L, Q
Car moves in N.	1, 8, IO, 9,11, 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L, u
No engine braking in ❑ position.	12	C, D, L
Slips in 1st gear.	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	C
Flares on 1-2 upshift.	3, 15	E, L, V
Flares on 2-3 upshift.	3, 15, 24, 44	E, L, V
Flares on 3-4 upshift.	3, 15, 25, 44	E, L, V
No upshift, trans stays in 1st gear.	14, 19, 23	G, L
No downshift to 1st gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	14, 26	V
Harsh shift (up and down shifting).	2, 4, 15, 23, 24, 27, 47	A, E,H, I, L, V
Harsh shift (1 -2).	2, 9	C, D, V
Harsh shift (2—3).	2, 10, 23, 24	C, D, H, L,V
Harsh shift (3—4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27, 28	L, V, Q
Harsh kickdown shift (2 — 1).	48	O
Harsh downshift at closed throttle,	15	E, T
Harsh shift when manually shifting to 1.	33	L
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P or from R to N.	38, 39, 40, 45	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Trans will not shift into 4th gear in D.	1, 21, 28, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Linear solenoid shim too thin.
3.	Linear solenoid shim too thick.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure requlator stuck.
8.	1 st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st hold clutch defective.
14.	Modulator valve stuck.
15.	Throttle B valve stuck.
16.	ATF strainer clogged.
17.	Torque converter defective.
18.	Torque converter check valve stuck.
19.	1-2 shift valve stuck.
20.	2-3 shift valve stuck.
21.	3-4 shift valve stuck.
22.	EAT D inhibitor valve stuck.
23.	Clutch pressure control valve stuck.
24.	2nd orifice control valve stuck.
25.	3rd orifice control valve stuck.
26.	3-2 kickdown valve stuck.
27.	3rd kickdown valve stuck.
28.	4th exhaust valve stuck.
29.	1 st accumulator defective.
30.	2nd clutch accumulator defective.
31.	3rd clutch accumulator defective.
32.	4th/reverse accumulator defective.
33.	1st hold clutch accumulator defective.
34.	Servo valve stuck.
35.	Lock-up clutch timing valve stuck.
36.	Lock-up clutch shift valve stuck.
37.	Lock-up clutch control valve stuck.
38	Shift fork bent.

	NOTES
L.	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential clutch and planetary gear assembly. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the trnsmisison housing. If OK, replace the end 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 feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
0.	A worn or damaged sprag clutch is mostly a result of shifting the trans in D while the wheels

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	Items on the NOTES CHART
Car creeps in N.	RI, R2	
Car does not move in D.	R4	
Trans locks up in R.	R3, R12	
Excessive drag in trans.	R6	R, K
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R6	S
Various shifting problems.	R9, R I O	
Harsh upshifts.	RI1	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
RI.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	Sprag clutch installed upside down.
R5.	Reverse hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
RIO.	Valves improperly installed.
RI 1.	Ball check valves not installed.
R12.	Shift fork bolt not installed.

NOTES	
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 valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1-2 valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
H.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of main valve body and torque convertor case may couse oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.

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 all four wheels.
2. Connect the tachometer, and start the engine.
3. After the engine has warmed up to normal operating temperature, shift into 2 position.
4. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
5. Allow 2 minutes for cooling, then repeat same test in 1, 3, D and R position.

NOTE: Stall speed test must be made only for checking the cause of trouble.

Stall Speed RPM: Specification: 1,950—2,250 rpm

TROUBLE	PROBABLE CAUSE
Stall rpm high in 2 position	. Low fluid level or oil pump output . Clogged oil strainer . Pressure regulator valve stuck closed . Slippage of 2nd clutch
Stall rpm high in 1 position	. Slippage of 1st clutch or 1st hold clutch
Stall rpm high in 3 position	. Slippage of 3rd clutch
Stall rpm high in D position	. Slippage of 1 st clutch or 1 st gear one-way clutch
Stall rpm high in R position	. Slippage of 4th clutch
Stall rpm low in 2 position	. Engine output low . Torque converter one-way clutch slipping

Pressure

Testing

⚠ WARNING
- While testing, be careful of the rotating rear wheels.
- Make sure lifts are placed properly.

CAUTION:
- Before testing, be sure the transmission fluid is filled to the proper level.
- Warm up the engine before testing.

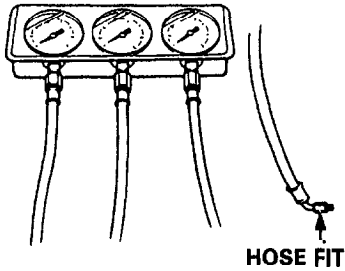
1. Raise the car. (See page I-6.)

2. Warm up the engine, then stop the engine and connect a tachometer.

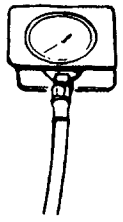
3. Connect the oil pressure gauge to each inspection hole(s).
   18 N·m (1.8 kg-m, 12 lb-ft)

   CAUTION: Connect the oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.

   A/T OIL PRESSURE GAUGE SET
   07406-0020003
   A/T OIL PRESSURE GAUGE REPLACEMENT HOSE
   07406-0020201



HOSE FITTING



A/T LOW PRESSURE GAUGE
07406-0070000

4. Start the engine and measure the respective pressure as follows.
   - Line Pressure/Clutch Pressure
   - Clutch Low/High Pressure
   - Throttle B Pressure

5. Install a new washer and the sealing bolt in the inspection hole and tighten to the specified torque.
   18 N·m (1.8 kg-m, 12 lb-ft)

   NOTE: Do not reuse old aluminum washers.

- Line Pressure/Clutch Pressure Measurement

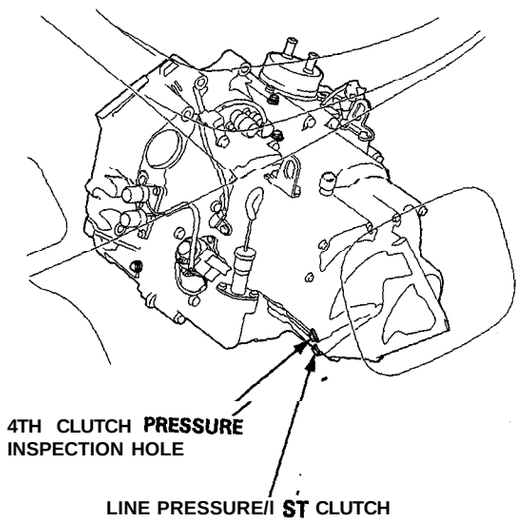
-1. Allow the rear wheels to rotate freely.

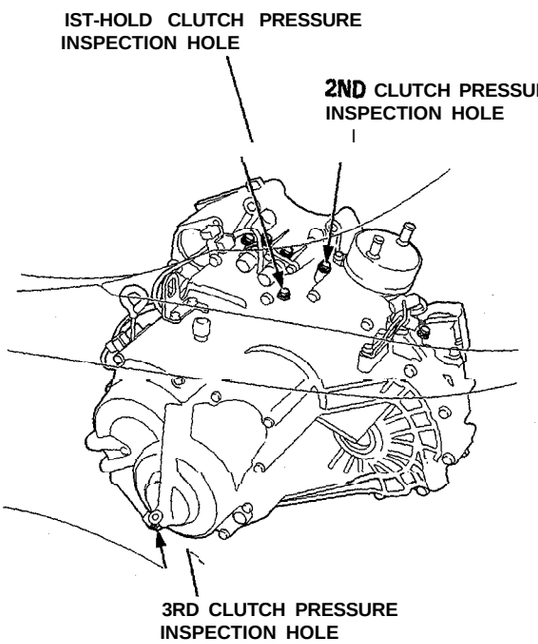
-2. Run the engine at 2,000 rpm.

-3. Shift the select lever as shown on the chart on the next page.

-4. Measure each clutch pressure.

⚠ WARNING While testing, be careful of the rotating rear wheels.





PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line/1st Clutch	D or 1	No or low line/1st pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump, 1st Clutch	834-883 kPa (8.5—9.0 kg/cm², 121—128 psi)	785 kPa (8.0 kg/cm², 114 psi)
1st hold Clutch	1	No or low 1st hold pressure	1st Hold Clutch		
2nd Clutch	2	No or low 2nd pressure	2nd Clutch		
3rd Clutch	3	No or low 3rd pressure	3rd Clutch		
2nd Clutch	D	No or low 2nd pressure	2nd Clutch	490 kPa (5.0 kg/cm², 71 psi) (throttle fully closed) 883 kPa (9.0 kg/cm², 128 psi) (throttle more than 2/8 opened)	441 kPa (4.5 kg/cm², 64 psi) (throttle fully closed) 785 kPa (8.0 kg/cm², 114 psi) (throttle more than 2/8 opened)
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	R		Servo valve or 4th Clutch	834-883 kPa (8.5—9.0 kg/cm², 121-128 psi)	785 kPa (8.0 kg/cm², 114 psi)

(cont'd)

Pressure

Testing (cont'd)

● **Clutch Low/High Pressure Measurement**

-1. Allow the rear wheels to rotate freely.

-2. Start the engine and let it idle.

-3. Shift the select lever to D position.

-4. Slowly press down the accelerator pedal to increase engine rpm until pressure is indicated on the oil pressure gauge. Then release the accelerator pedal, allowing the engine return to an idle, and measure the pressure reading.

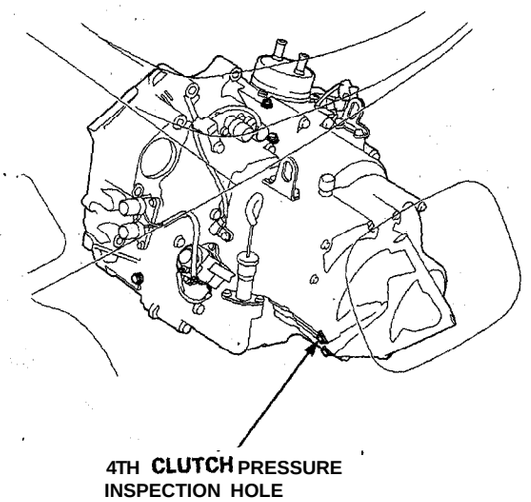
⚠ WARNING While testing, be careful of the rotating rear wheels.

-5. Repeat step -4 for each clutch pressure being inspected.

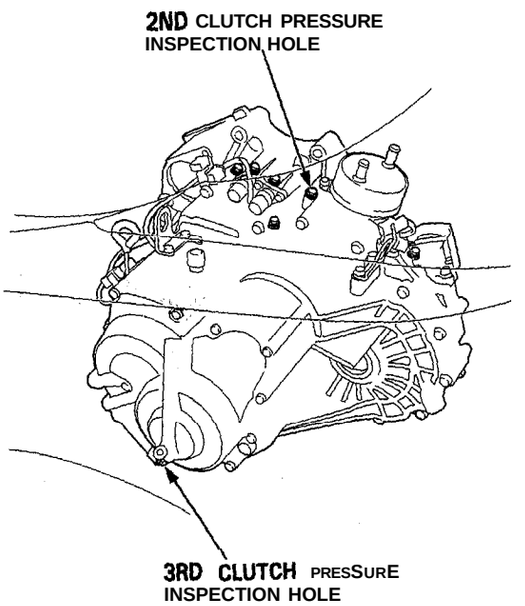
-6. With the engine idling, press down the accelerator pedal approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the gauge, measure the highest pressure reading obtained.

⚠ WARNING While testing, be careful of the rotating rear wheels.

-7. Repeat step -6 for each clutch pressure being inspected.



4TH CLUTCH PRESSURE INSPECTION HOLE



2ND CLUTCH PRESSURE INSPECTION HOLE

3RD CLUTCH PRESSURE INSPECTION HOLE

PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D	No or low 2nd pressure	2nd Clutch	490-883 kPa (5.0-9.0 kg/cm², 71-128 psi) varies with throttle opening	441 kPa (4.5 kg/cm², 64 psi) with accelerator pedal released 785 kPa (8.0 kg/cm², 114 Ps' with accelerator ped more than 2/8 open
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		

● **Throttle B Pressure Measurement**

-1. Allow the rear wheels to rotate freely.

-2. Disconnect the linear solenoid connector.

-3. Shift the select lever to D position.

-4. Run the engine at 1,000 rpm.

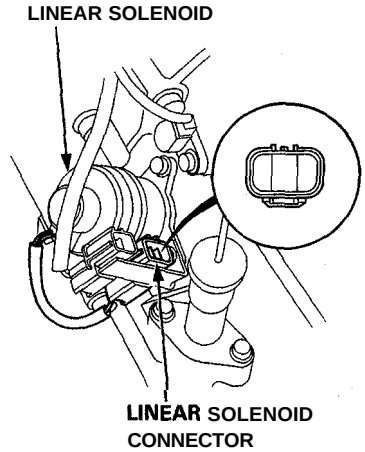
-5. Measure full closed throttle B pressure.

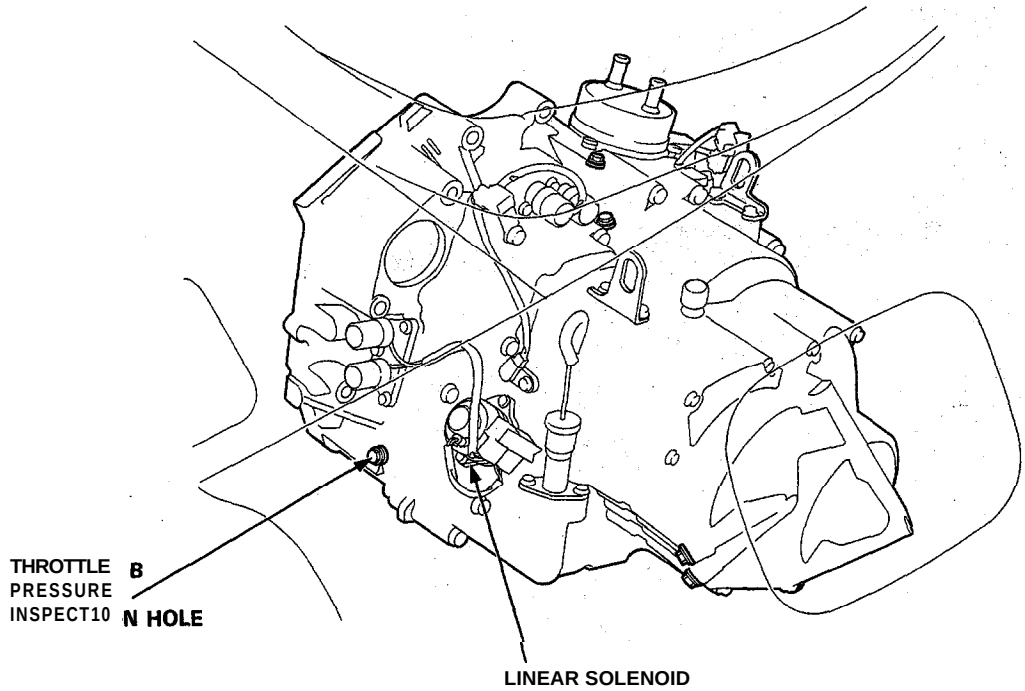
⚠ WARNING While testing, be careful of the rotating rear wheels.

-6. Connect battery voltage to the linear solenoid.

-7. Measure full opened throttle B pressure.

⚠ WARNING While testing, be careful of the rotating rear wheels.





PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	D	Pressure too high	Linear Solenoid	O-15 kPa (O-O. 15 kg/cm², O-2 psi)	O-15 kPa 10-O. 15 kg/cm², O-2 psi)
		No or low pressure	Faulty throttle B valve	598-657 kPa (6.1-6.7 kg/cm², 87-95 psi)	598-657 kPa (6.1—6.7 kg/cm², 87-95 psi)

Fluid Level

- Checking/Changing

Checking

With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the **engine is shut off (within one minute).**

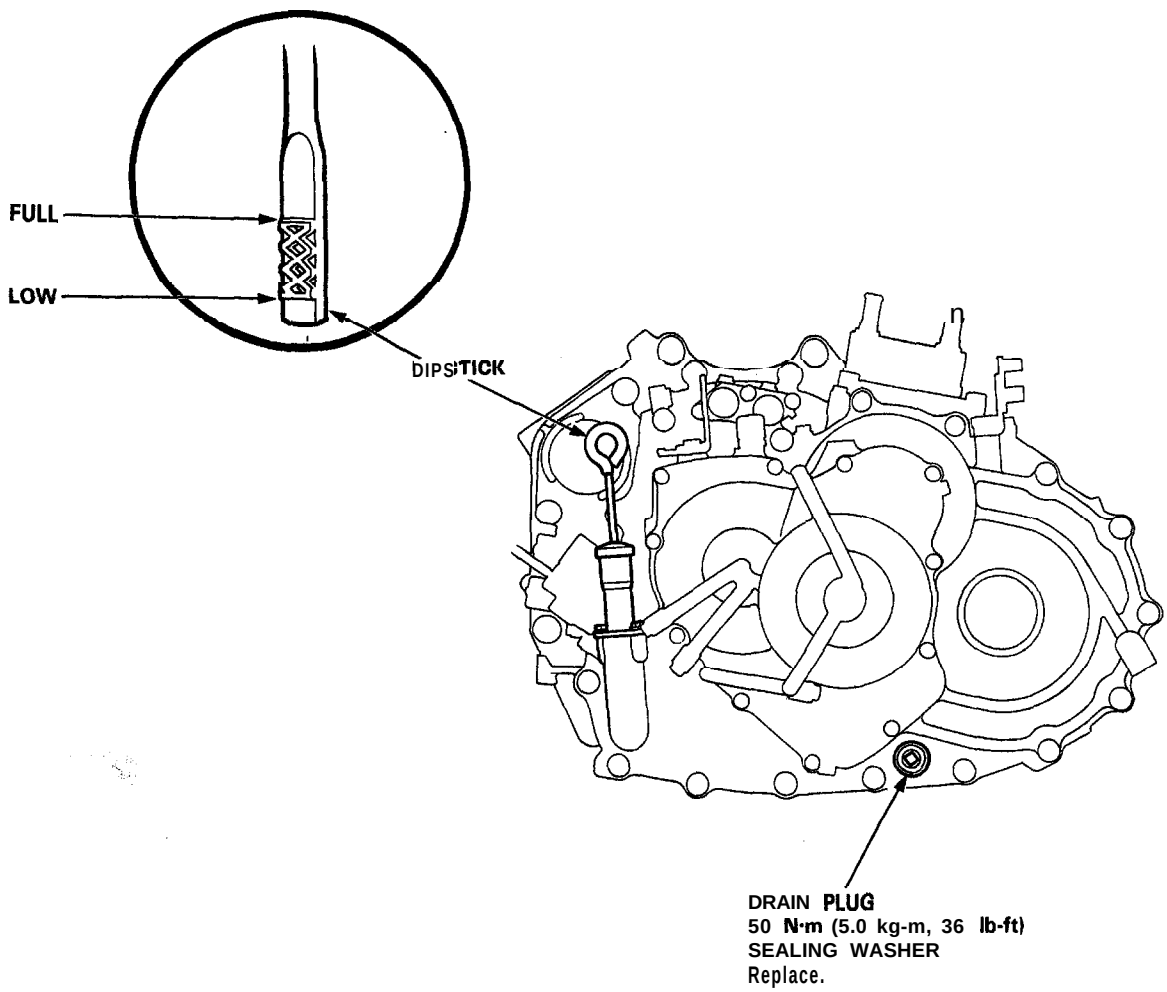
The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. **If the level is at, or below, the low mark, add Honda** Premium Formula Automatic Transmission Fluid or an equivalent DEXRON-II type automatic transmission fluid.

Changing

1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn **the engine off, then remove drain plug.**

2. Reinstall the drain plug with a new washer, then refill **the transmission to the full mark on the dipstick.**

Automatic Transmission Fluid Capacity:
2.9 ℓ (3.1 US qt., 2.6 Imp. qt.) at change
7.0 ℓ (7.4 US qt., 6.2 Imp. qt.) after overhaul
6.3 ℓ (6.7 US qt., 5.5 Imp. qt.) after overhaul with new torque converter.



-Removal

⚠ WARNING Make sure lifts are placed properly, and hoist brackets are attached to correct position. (See page I-6.)

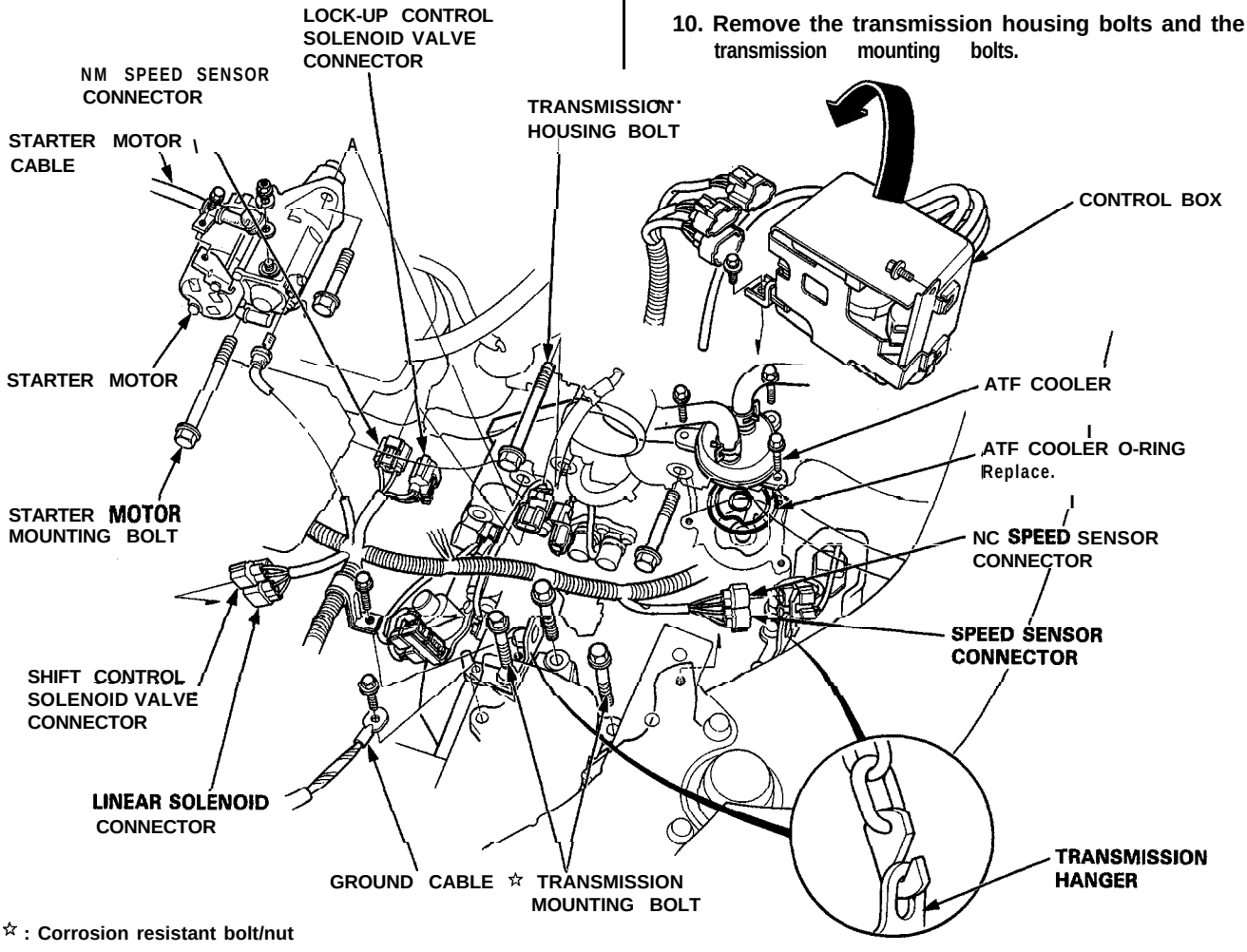
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Check and record the rear camber. (See Section 18.)
2. Disconnect the battery negative (−) first, and positive (+) cable from the battery.
3. Drain automatic transmission fluid (ATF). Reinstall the drain plug with a new washer.

   NOTE: Removing the ATF level gauge will allow the ATF to drain more rapidly.
4. Remove the strut bar.
5. Remove the air cleaner case. (See Section 11.)
6. Remove the connectors from the control box and remove the control box.

   CAUTION: Do not remove the vacuum tubes from the control box.
7. Remove the wire harness holder, disconnect the speed sensor wire connectors, solenoid valve wire connectors, starter motor cables and transmission ground cable.
8. Remove the ATF cooler as it is connected by the hoses.

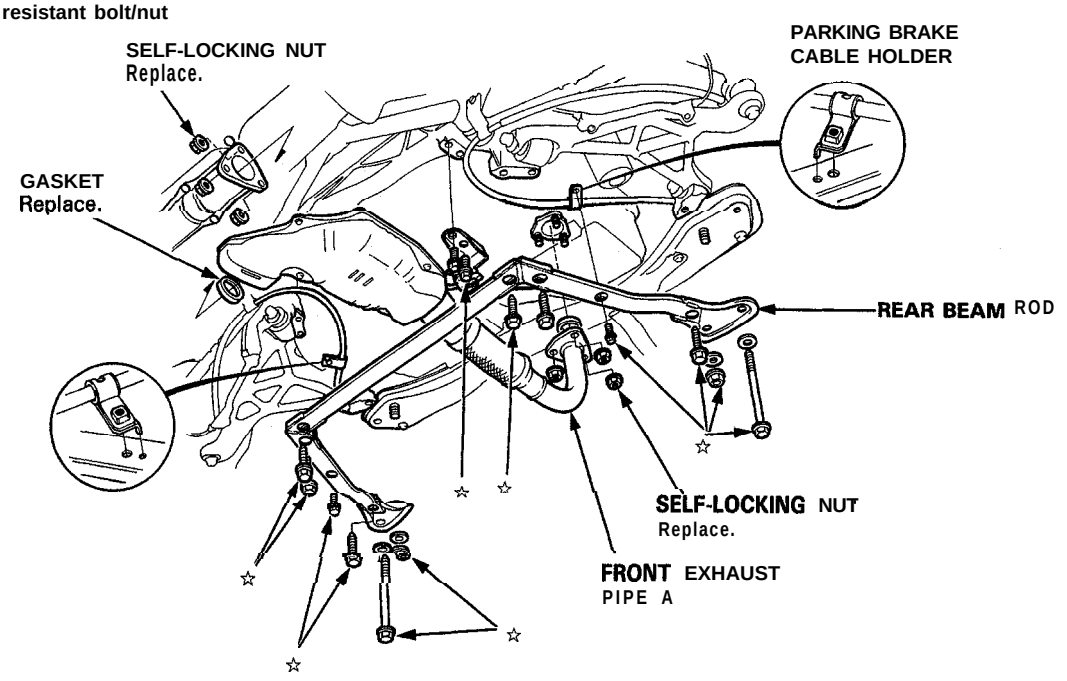
   CAUTION: Do not remove the hoses from the ATF cooler.
9. Remove the starter motor mounting bolts, then remove the starter motor.
10. Remove the transmission housing bolts and the transmission mounting bolts.



☆ : Corrosion resistant bolt/nut

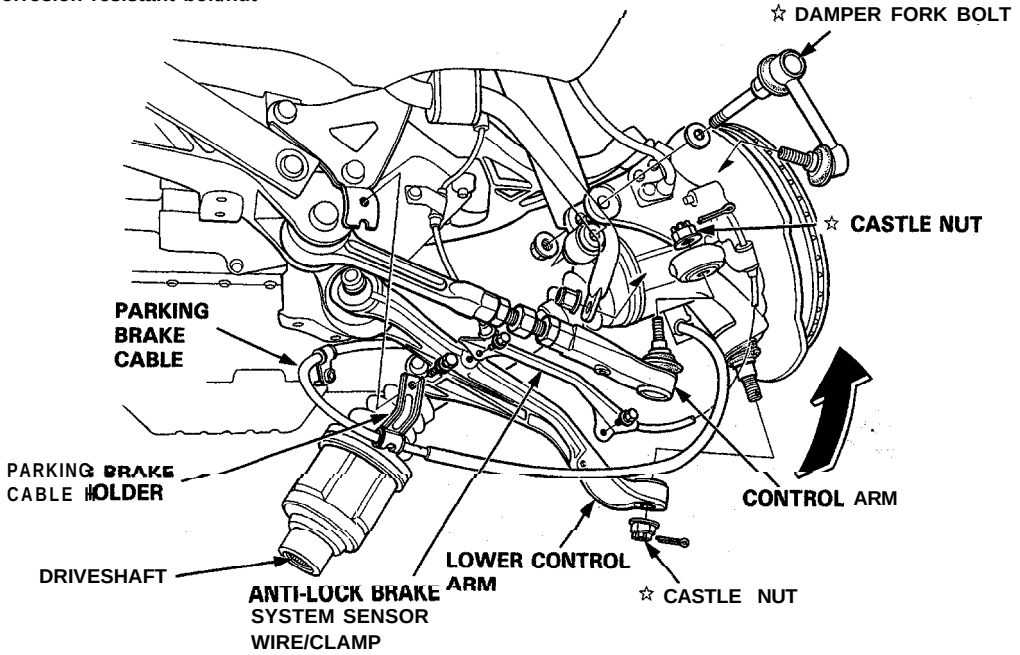
11. Remove the parking brake cable holders from the rear beam rod.
12. Remove the rear beam rod.
13. Remove the front exhaust pipe A.

☆ : Corrosion resistant bolt/nut



14. Remove the parking brake cable holder and the anti-lock brake system sensor wire clamp.
15. Remove the castle nut and separate the control arm from the knuckle (See Section 18).
16. Remove the damper fork bolt.
17. Remove the castle nut and separate the lower control arm from the knuckle (See Section 18).
18. Remove the right driveshaft from the intermediate shaft.

☆ : Corrosion resistant bolt/nut



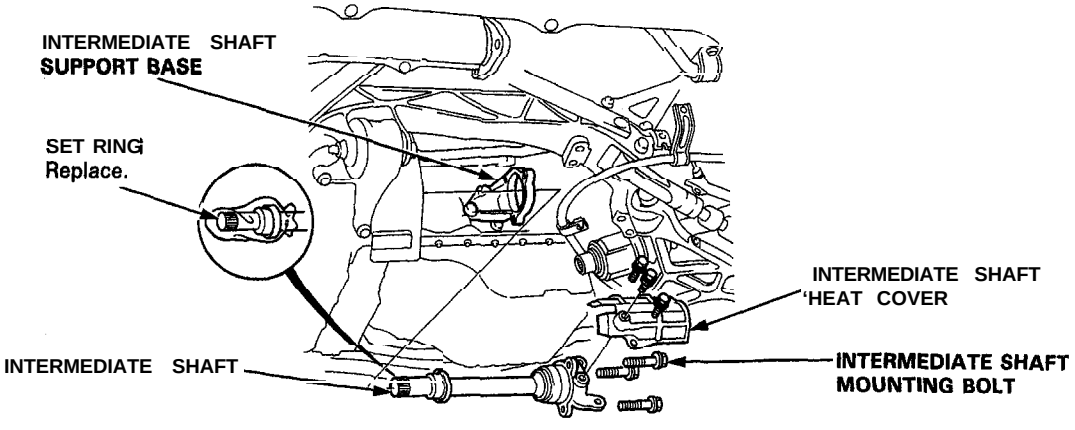
(cont'd)

- Removal (cont'd)

19. Remove the intermediate shaft heat cover and the intermediate shaft mounting bolts.
20. Pry the intermediate shaft out of the differenctial. Pull and remove it.

NOTE:

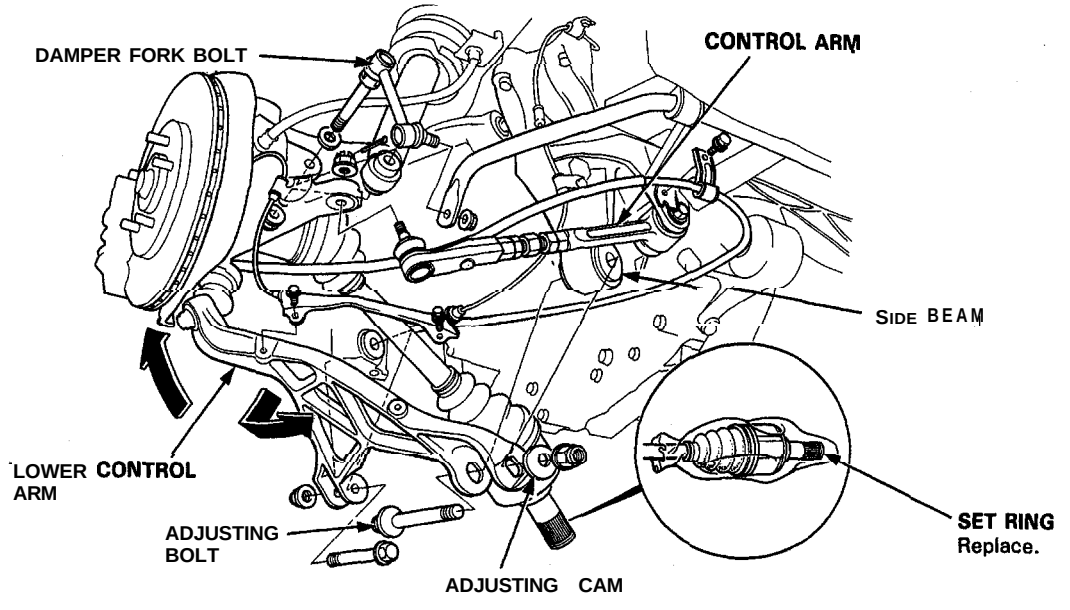
- Coat all precision finished surfaces with clean engine oil or grease.
- Tie plastic bags over the driveshaft ends.



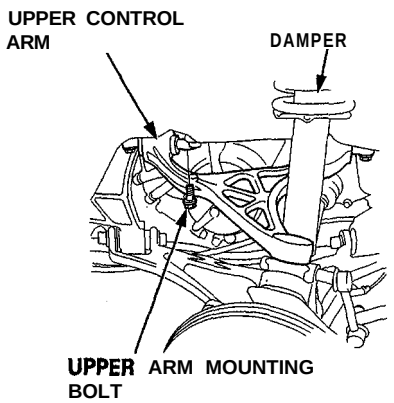
31. Remove the parking brake cable holder and the anti-lock brake system sensor wire clamp.
32. Make a reference mark on the flange of the adjusting bolt, adjusting cam and lower control arm.
33. Remove the castle nut and separate the control arm from the knuckle (See Section 18).
34. Remove the damper fork bolt.
35. Remove the bolts and lower arm from the side beam.
36. Pry the driveshaft out of the differential. Pull and remove it.

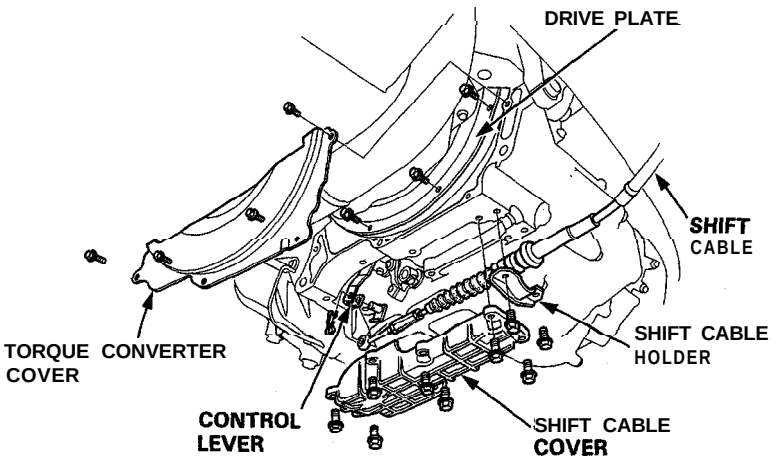
NOTE:

- Coat all precision finished surfaces with clean engine oil or grease.
- Tie plastic bags over the driveshaft ends.



37. Remove the one bolt of the upper arm mounting bolts,
38. Remove the shift cable cover and shift cable holder.
39. Remove the shift cable from the control lever.
40. Remove the torque converter cover and then remove the drive plate bolts.

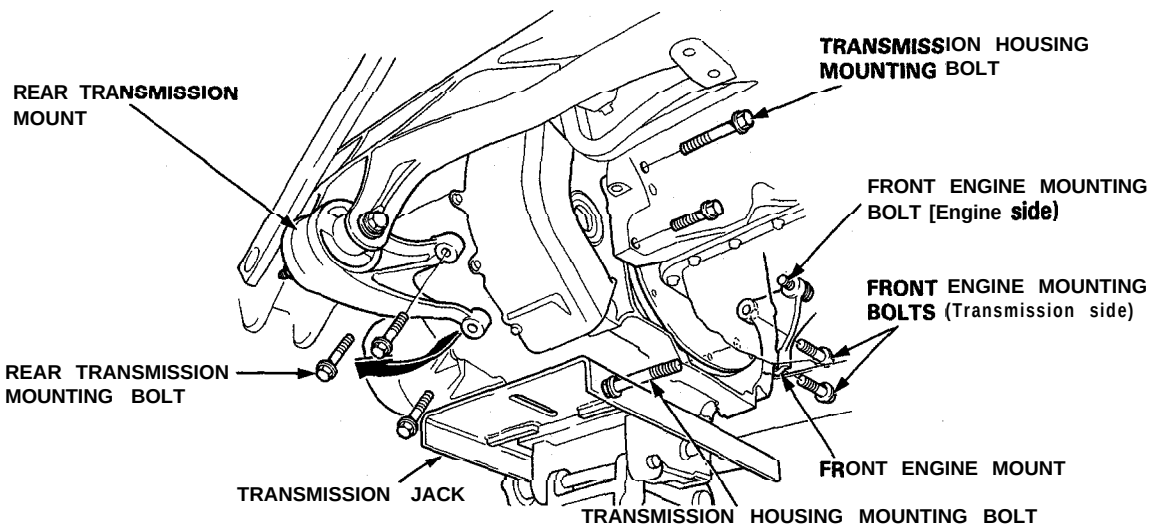




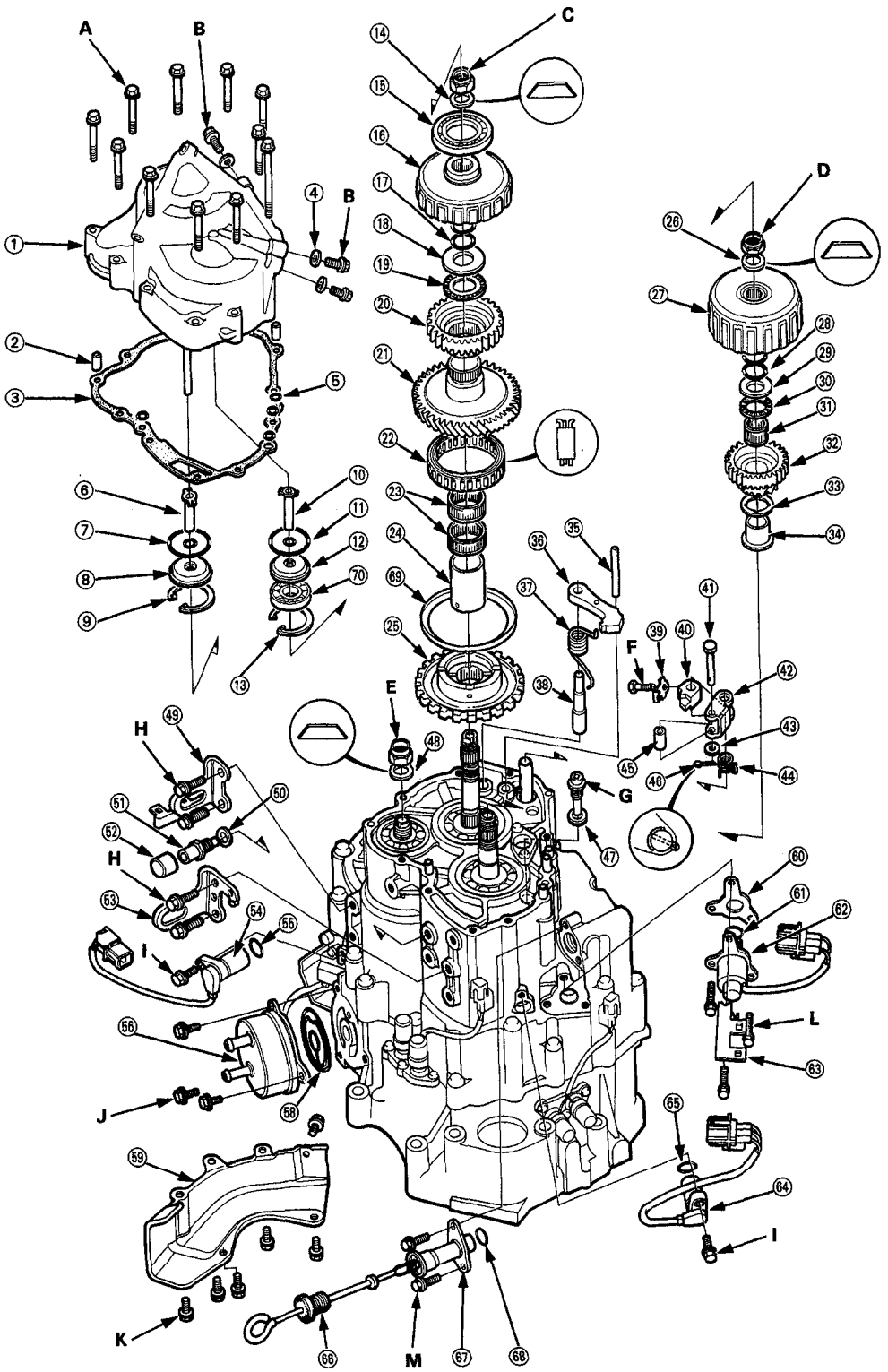
41. Attach a chain hoist to the transmission hangers.
42. Place a jack under the transmission and raise the transmission just enough to take weight off of the mounts.
43. Remove the front engine mounting bolts on the transmission side and retighten the bolt on the engine side.

CAUTION: Loosen the front engine mounting bolt on the engine side, but do not remove it. After removing the two bolts on the transmission side, be sure to retighten the bolt on the engine side.

44. Remove the rear transmission mounting bolts.
45. Remove the transmission housing mounting bolts..
46. Pull the transmission away from the engine until it clears the dowel pins, then lower it on the transmission jack.



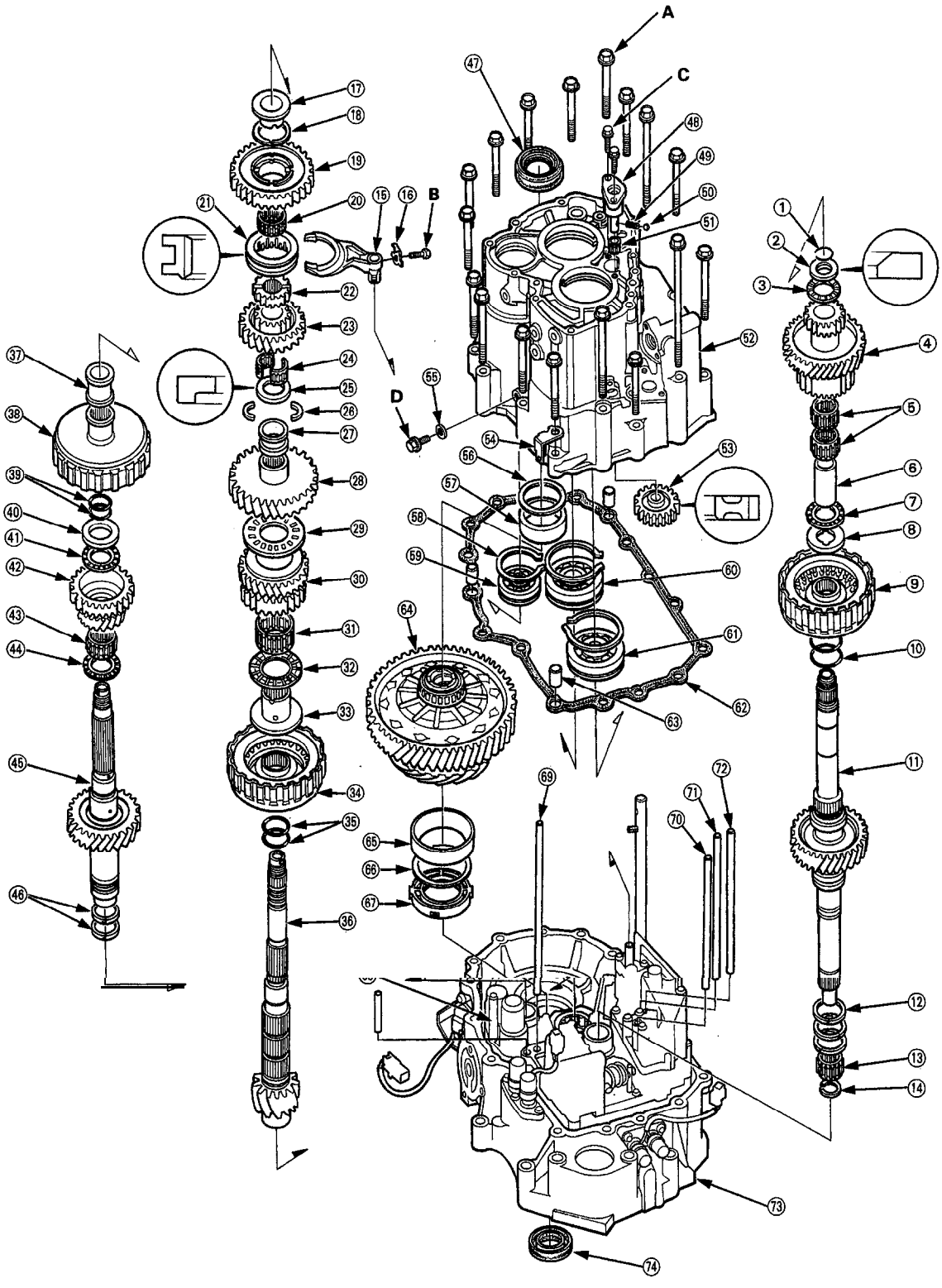
L. Side Cover


A
B
C
D
E
F
G
H
I
J
K
L
M
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
58
59
60
61
62
63
64
65
66
67
68
69
70

① L. SIDE COVER
② DOWEL PIN
③ GASKET Replace.
④ SEALING WASHER Replace.
⑤ O-RING Replace.
⑥ IST-HOLD CLUTCH FEED PIPE
⑦ O-RING Replace.
⑧ FEED PIPE FLANGE
⑨ SNAP RING
⑩ 1ST CLUTCH FEED PIPE
⑪ O-RING Replace.
⑫ FEED PIPE FLANGE
⑬ SNAP RING
⑭ DISC SPRING Replace.
⑮ BALL BEARING
⑯ IS+-HOLD CLUTCH ASSEMBLY
⑰ O-RING Replace.
⑱ THRUST WASHER
⑲ THRUST NEEDLE BEARING
⑳ IST-HOLD CLUTCH HUB
㉑ COUNTERSHAFT 1ST GEAR
㉒ ONE-WAY CLUTCH
㉓ NEEDLE BEARING
㉔ COUNTERSHAFT 1ST GEAR COLLAR
㉕ PARKING GEAR
㉖ DISC SPRING Replace.
㉗ 1ST CLUTCH ASSEMBLY
㉘ O-RING Replace.
㉙ THRUST WASHER
㉚ THRUST NEEDLE BEARING
㉛ NEEDLE BEARING
㉜ MAINSHAFT 1ST GEAR
㉝ THRUST WASHER
㉞ MAINSHAFT 1ST GEAR COLLAR
㉟ PARKING BRAKE PAWL STOPPER
㊱ PARKING BRAKE PAWL
㊲ PARKING BRAKE PAWL SPRING
㊳ PARKING BRAKE PAWL SHAFT
㊴ LOCK WASHER Replace.
㊵ PARKING BRAKE STOPPER
㊶ ROLLER PIN
㊷ PARKING BRAKE LEVER
㊸ WASHER
㊹ PARKING BRAKE SPRING
㊺ ROLLER
㊻ COTTER PIN Replace.
㊼ SEALING WASHER Replace.
㊽ DISC SPRING Replace.
㊾ TRANSMISSION HANGER/CONNECTOR STAY
㊿ SEALING WASHER Replace.
(51) BREATHER JOINT
(52) BREATHER CAP
(53) TRANSMISSION HANGER
(54) NC SPEED SENSOR
(55) O-RING Replace.
(56) ATF COOLER
(58) ATF COOLER FILTER/GASKET Replace.
(59) SPEED SENSOR COVER
(60) LINEAR SOLENOID SHIM
(61) O-RING Replace.
(62) LINEAR SOLENOID
(63) CONNECTOR STAY
(64) NM SPEED SENSOR
(65) O-RING Replace.
(66) ATF LEVEL GAUGE
(67) ATF LEVEL GAUGE PIPE
(68) O-RING Replace.
(69) RETAINER PLATE
(70) BALL BEARING

TORQUE SPECIFICATION

JO.	TORQUEVALUE	BOLT SIZE	REMARKS
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
B	18 N·m (1 .8 kg-m, 13 lb-ft)	8 x 1.25 mm	OIL PRESSURE CHECK BOLT
C	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	2 4 x 1.25 mm	COUNTERSHAFT LOCKNUT (Left-hand threads)
D	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	2 3 x 1.25 mm	MAINSHAFT LOCKNUT
E	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	2 4 x 1.25 mm	SECONDARY SHAFT LOCKNUT
F	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt (Replace.)
G	50 N·m (5.0 kg-m, 36 lb-ft)	18 x 1.5 mm	DRAIN PLUG
H	30 N·m (3.0 kg-m, 22 lb-ft)	8 x 1.25 mm	
I	12 N·m (1 .2 kg-m, 9 lb-ft)	6x I.Omm	
J	30 N·m (3.0 kg-m, 22 lb-ft)	8 x 1.25 mm	ATF COOLER BOLT
K	12 N·m (1.2 kg-m, 9 lb-ft)	6x I.Omm	
L	10 N·m (1.0 kg-m, 7 lb-ft)	6 x 1.0 mm	LINEAR SOLENOID BOLT
M	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	

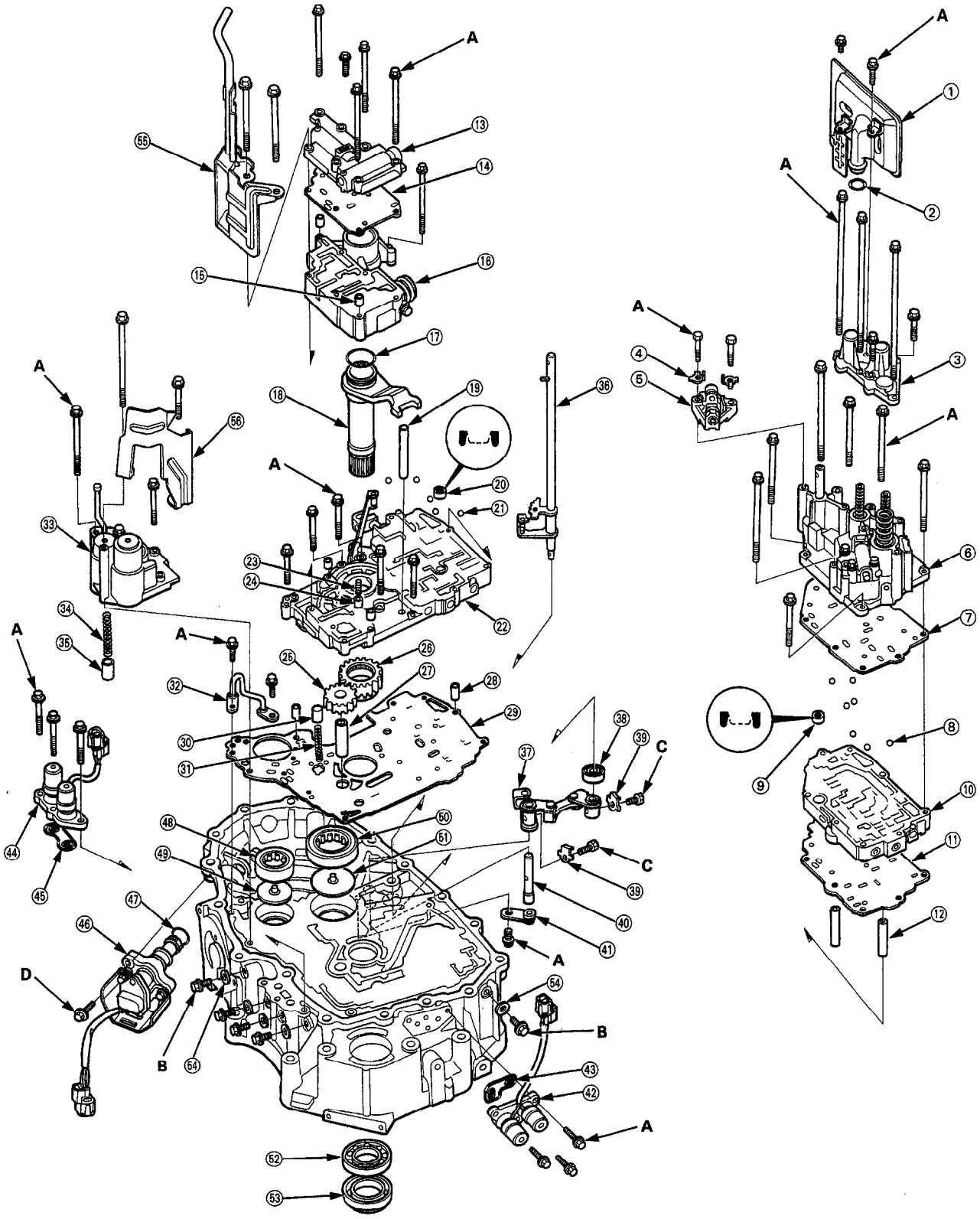

A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
69
70
71
72
73
74

① SNAP RING
② WASHER
③ THRUST NEEDLE BEARING
④ MAINSHAFT 4TH GEAR
⑤ NEEDLE BEARING
⑥ MAINSHAFT 4TH GEAR COLLAR
⑦ THRUST NEEDLE BEARING
⑧ THRUST WASHER
⑨ 4TH CLUTCH ASSEMBLY
⑩ O-RING Replace.
⑪ MAINSHAFT
⑫ SEAL RING 37 mm
⑬ NEEDLE BEARING
⑭ SET RING
⑮ REVERSE SHIFT FORK
⑯ LOCK WASHER Replace.
⑰ COUNTERSHAFT REVERSE GEAR COLLAR
⑱ THRUST WASHER
⑲ NEEDLE BEARING
⑳ COUNTERSHAFT REVERSE GEAR
㉑ REVERSE SELECTOR
㉒ REVERSE SELECTOR HUB
㉓ COUNTERSHAFT 4TH GEAR
㉔ NEEDLE BEARING (Separate type)
㉕ COTTER RETAINER
㉖ COTTER
㉗ COUNTERSHAFT 2ND GEAR SPACER
㉘ COUNTERSHAFT 2ND GEAR
㉙ THRUST NEEDLE BEARING
㉚ COUNTERSHAFT 3RD GEAR
㉛ NEEDLE BEARING
㉜ THRUST NEEDLE BEARING
㉝ COUNTERSHAFT 3RD GEAR COLLAR
㉞ 3RD CLUTCH ASSEMBLY
㉟ O-RING Replace.
㊱ COUNTERSHAFT
㊲ SPACER 31 mm
㊳ 2ND CLUTCH ASSEMBLY
㊴ O-RING Replace.
㊵ THRUST WASHER
㊶ THRUST NEEDLE BEARING
㊷ SECONDARY SHAFT 2ND GEAR
㊸ NEEDLE BEARING
㊹ THRUST NEEDLE BEARING
㊺ SECONDARY SHAFT
㊻ SEAL RING 35 mm
㊼ DIFFERENTIAL OIL SEAL Replace.
㊽ REVERSE IDLER GEAR SHAFT/HOLDER
㊾ REVERSE IDLER GEAR SHAFT SPRING
㊿ STEEL BALL
(51) NEEDLE BEARING
(52) TRANSMISSION HOUSING
(53) REVERSE IDLER GEAR
(54) CONNECTOR STAY
(55) SEALING WASHER Replace.
(56) THRUST SHIM
(57) BEARING OUTER RACE
(58) SNAP RING
(59) SECONDARY SHAFT BALL BEARING
(60) COUNTERSHAFT BALL BEARING
(61) MAINSHAFT BALL BEARING
(62) GASKET Replace.
(63) DOWEL PIN
(64) DIFFERENTIAL GEAR ASSEMBLY
(65) BEARING OUTER RACE
(66) THRUST SHIM
(67) DIFFERENTIAL OIL GUIDE RING
(68) 2ND CLUTCH FEED PIPE
(69) IST-HOLD CLUTCH FEED PIPE
(70) 4TH CLUTCH FEED PIPE
(71) 1ST CLUTCH FEED PIPE
(72) 3RD CLUTCH FEED PIPE
(73) TORQUE CONVERTER HOUSING
(74) DIFFERENTIAL OIL SEAL Replace.

TORQUE SPECIFICATION

No.	TORQUE VALUE	BOLT SIZE	REMARKS
A	55 N·m 15.5 kg-m, 40 lb-ft)	10 x 1.25 mm	
B	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt (Replace.)
C	12 N·m (1.2 kg-m, 9 lb-ft)	6x I.Omm	
D	18 N·m (1.8 kg-m, 13 lb-ftl	8 x 1.25 mm	OIL PRESSURE CHECK BOLT

Torque Converter Housing/Valve Body



① ATF STRAINER Replace or clean.
② O-RING Replace.
③ ACCUMULATOR COVER
④ LOCK WASHER Replace.
⑤ SERVO DETENT BASE
⑥ SERVO VALVE BODY
⑦ SERVO SEPARATOR PLATE
⑧ CHECK BALLS
⑨ SECONDARY VALVE BODY FILTER Replace.
⑩ SECONDARY VALVE BODY
⑪ SECONDARY SEPARATOR PLATE
⑫ DOWEL PIN
⑬ LOCK-UP VALVE BODY
⑭ LOCK-UP SEPARATOR PLATE
⑮ DOWEL PIN
⑯ REGULATOR VALVE BODY
⑰ O-RING Replace.
⑱ STATOR SHAFT ASSEMBLY
⑲ STOPPER PIN
⑳ MAIN VALVE BODY FILTER Replace.
㉑ CHECK BALLS
㉒ MAIN VALVE BODY
㉓ ONE-WAY RELIEF VALVE SPRING
㉔ ONE-WAY RELIEF VALVE
㉕ OIL PUMP DRIVEN GEAR
㉖ OIL PUMP DRIVE GEAR
㉗ OIL PUMP DRIVEN GEAR SHAFT
㉘ DOWEL PIN
㉙ MAIN SEPARATOR PLATE
㉚ TORQUE CONVERTER CHECK VALVE
㉛ TORQUE CONVERTER CHECK VALVE SPRING
㉜ ATF LUBRICATION PIPE
㉝ 2ND ACCUMULATOR BODY
㉞ LSD RELIEF VALVE SPRING
㉟ LSD RELIEF VALVE
㊱ CONTROL SHAFT
㊲ CONTROL LEVER
㊳ OIL SEAL Replace.
㊴ LOCK WASHER Replace.
㊵ CHANGE SHAFT
㊶ CHANGE SHAFT CAP
㊷ SHIFT CONTROL SOLENOID VALVE ASSEMBLY
㊸ SHIFT CONTROL SOLENOID FILTER/GASKET Replace.
㊹ LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
㊺ LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
㊻ SPEED SENSOR ASSEMBLY
㊼ O-RING Replace.
㊽ SECONDARY SHAFT NEEDLE BEARING Replace.
㊾ OIL GUIDE PLATE Replace.
㊿ COUNTERSHAFT NEEDLE BEARING Replace.
(51) OIL GUIDE PLATE Replace.
(52) MAINSHAFT BALL BEARING Replace.
(53) MAINSHAFT OIL SEAL Replace.
(54) SEALING WASHER Replace.
(55) 4TH OIL GUIDE PLATE/PIPE
(56) 3RD OIL GUIDE PLATE

TORQUE SPECIFICATION

No.	TORQUE VALUE	BOLT SIZE	REMARKS
A	12 N·m (1.2 kg-m, 9 lb-ft)	6 x 1.0mm	
B	18 N·m (1.8 kg-m, 13 lb-ft)	8 x 1.25 mm	OIL PRESSURE CHECK BOLT
C	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt
D	30 N·m (3.0 kg-m, 22 lb-ft)	8 x 1.25 mm	

L. Side Cover

Removal

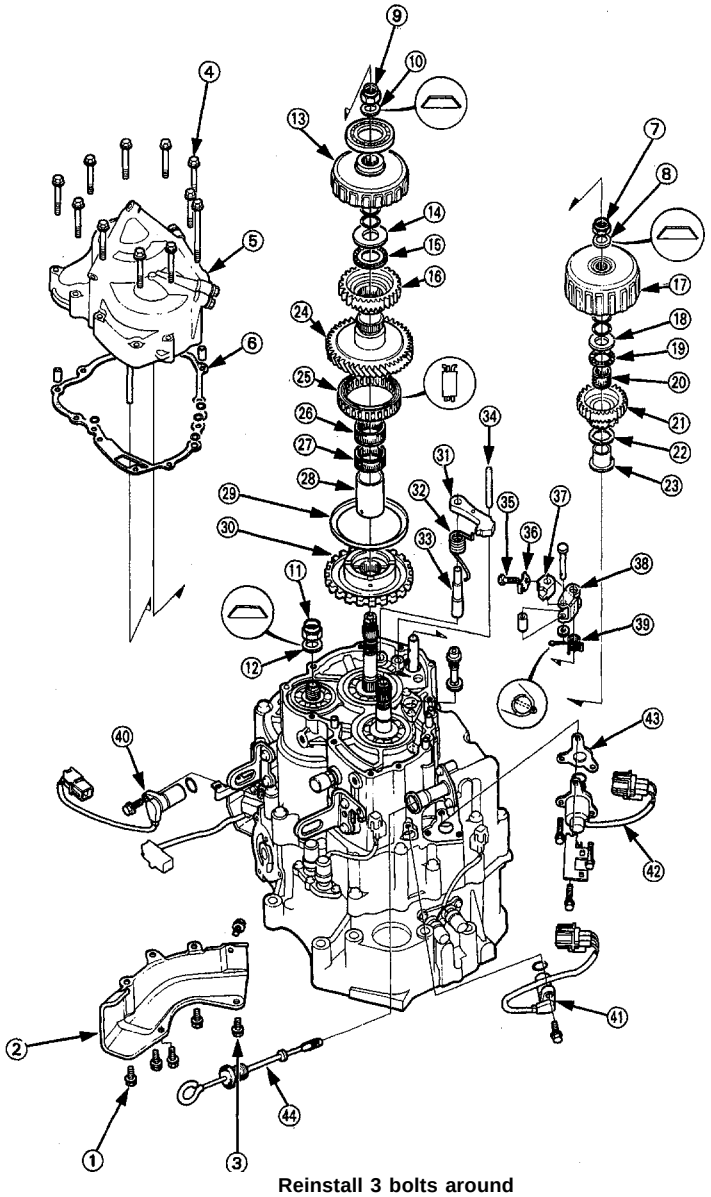
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Cut the lock tab and raise it, then remove the locknut of each shaft.
- Countershaft locknut has left-hand threads.

1. Remove the speed sensor cover, then reinstall three bolts around the driveshaft oil seal.
   CAUTION: Do not damage the driveshaft oil seal lip.

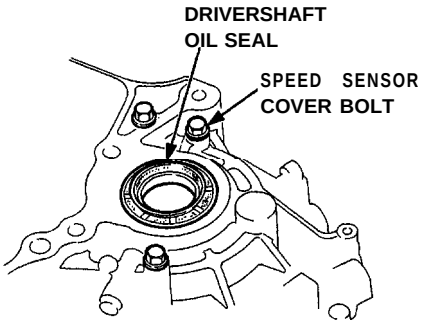
2. **Slip the special tool onto the mainshaft and engage the parking brake pawl with the parking gear.**

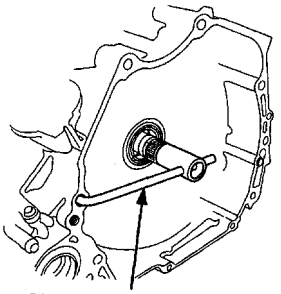
3. Remove the transmission L. Side Cover in the following numbered sequence.
   NOTE: Remove the special tool from the mainshaft after removing the locknuts.



Reinstall 3 bolts around the driveshaft oil seal.

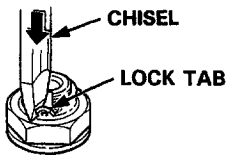
CAUTION: Protect the lip of the driveshaft oil seal by reinstalling three bolts, after removing the speed sensor cover.





MAINSHAFT HOLDER
07924—PJ40000

NOTE: Using a chisel, cut the lock tab. Pry it up and then remove the locknut from each shaft.



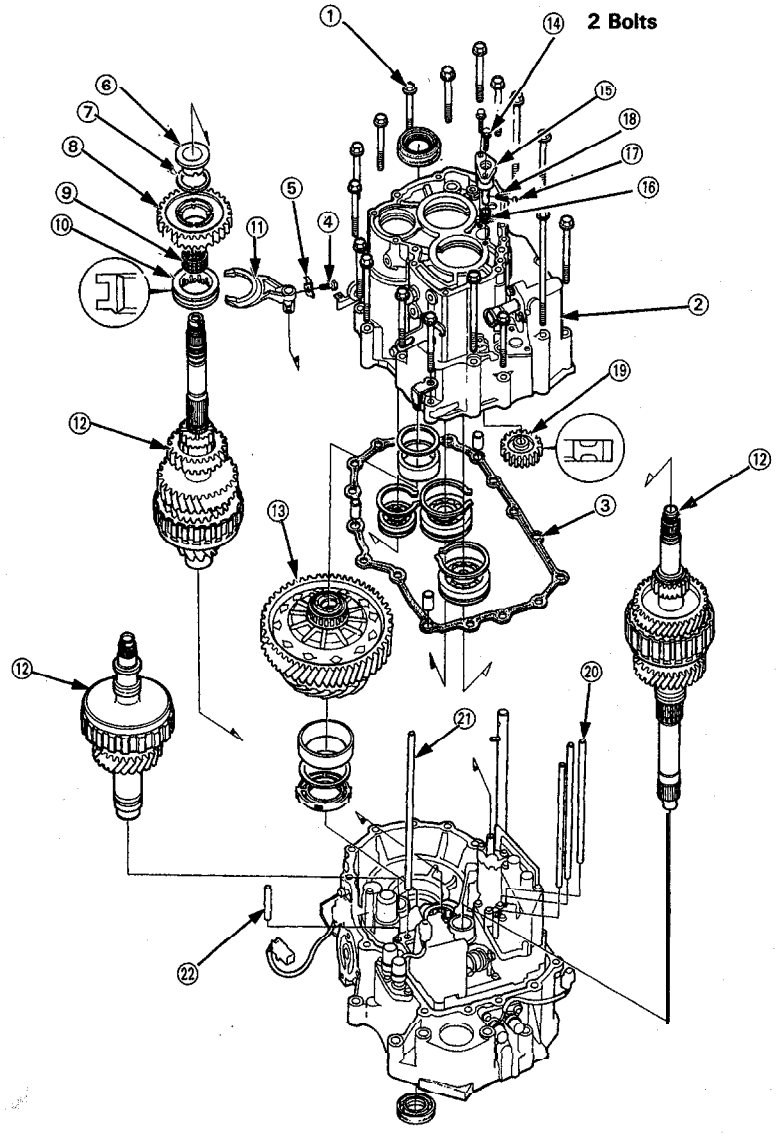
Transmission Housing

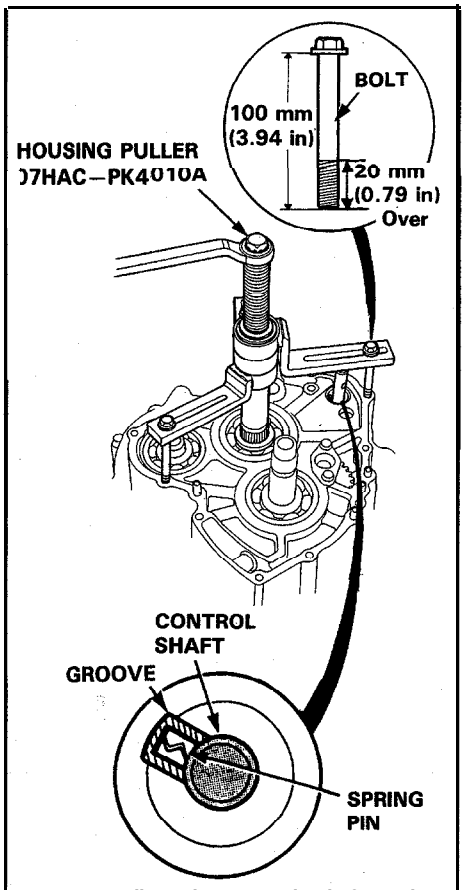
– Removal

NOTE:

- **Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.**
- Blow out all passages.
- **Steel ball in reverse idler gear shaft is under spring pressure, take care not to let it pop out.**

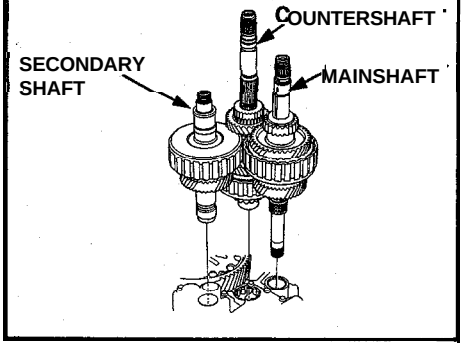
1. Remove the transmission housing in the following numbered sequence.
   CAUTION: Set the special tool with bolts as shown.





NOTE: Align the control shaft spring pin with the groove in the transmission housing.

⑫ NOTE: Remove three shafts together.



Valve Body

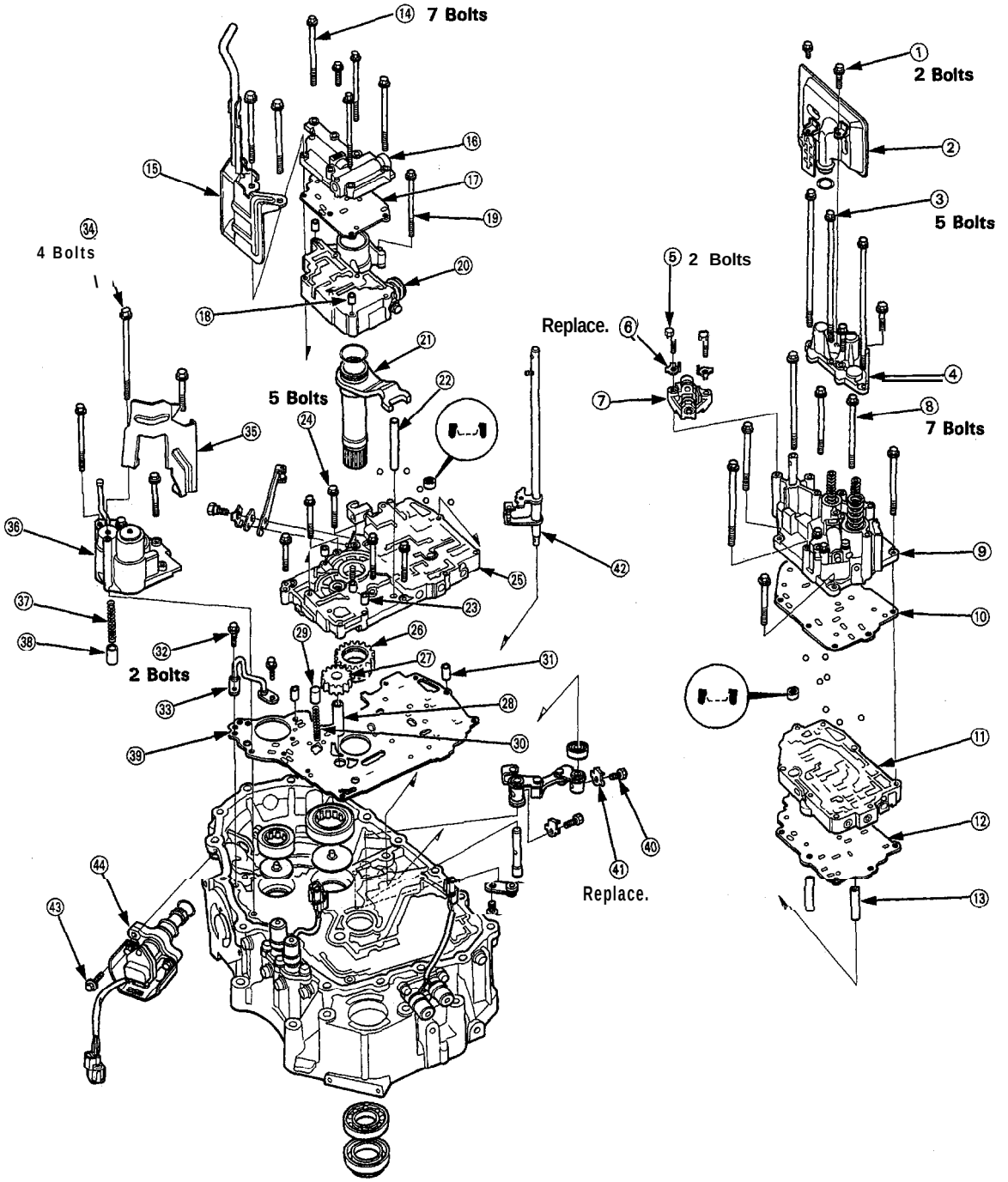
Removal

NOTE:

- **Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air. Blow out all passages.**
- Accumulator covers are spring loaded; to prevent stripping the threads in the torque converter housing, press down on the accumulator covers while unscrewing the bolts in a crisscross pattern.

1. **Remove the valve body in the following numbered sequence.**

CAUTION: **Do not use a magnet to remove the check balls: it may magnetize the balls.**

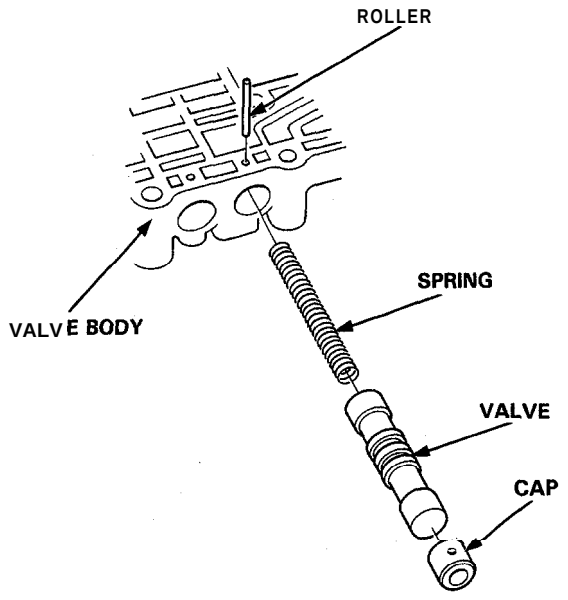


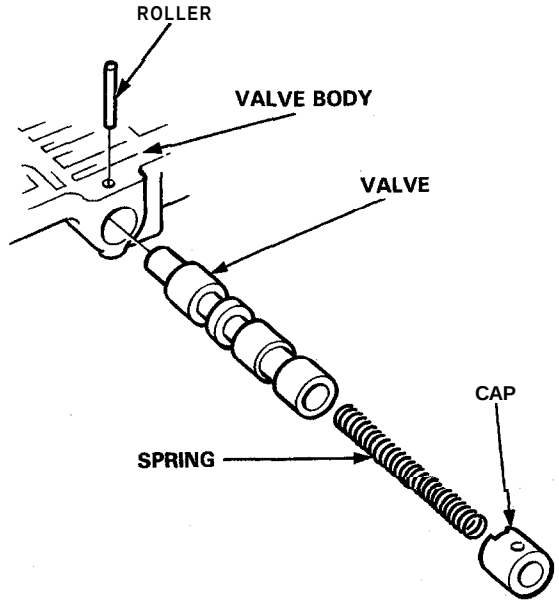
Valve

- Assembly

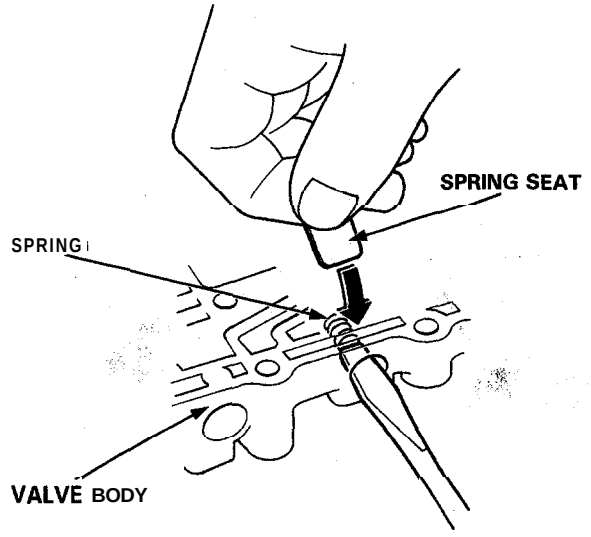
NOTE: Coat all parts with ATF before assembly.

1. **Install the valve, valve spring and cap in the valve body and secure with the roller.**

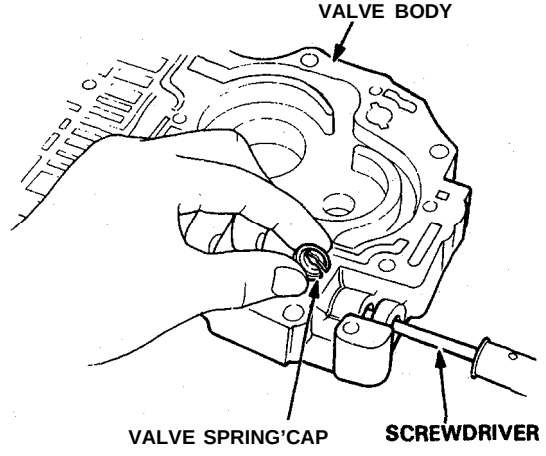




2. **Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver then install the spring seat.**



3. **Set the spring in the valve and install it in the valve body.**
   Install the spring with a screwdriver, then install the valve cap with the cutout aligned with the screwdriver.



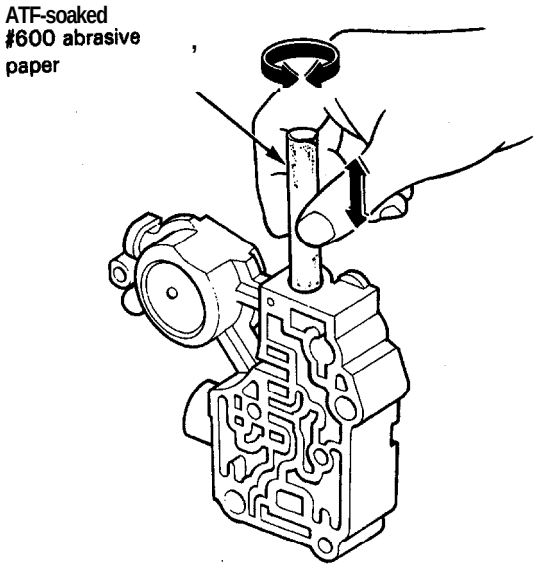
Repair

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.

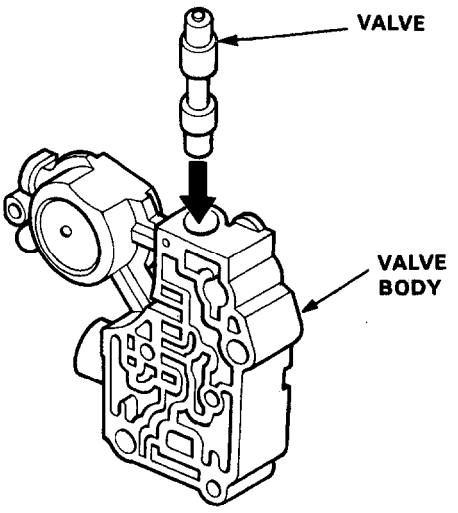
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

   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 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 and 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.

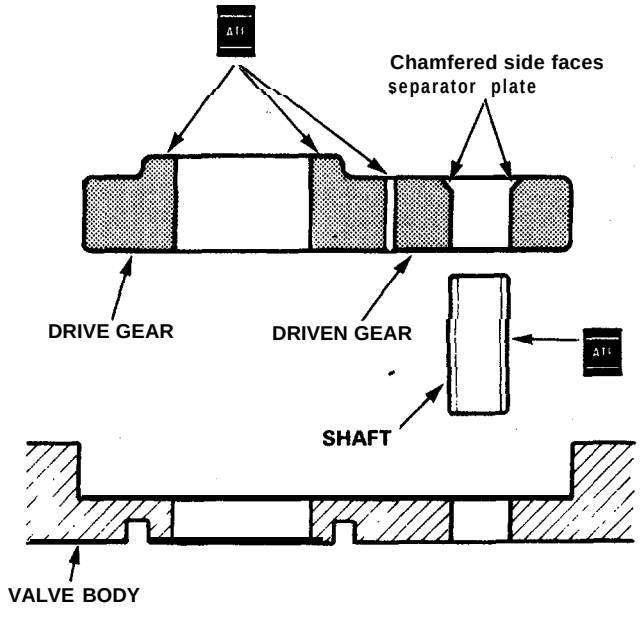


7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

Oil Pump

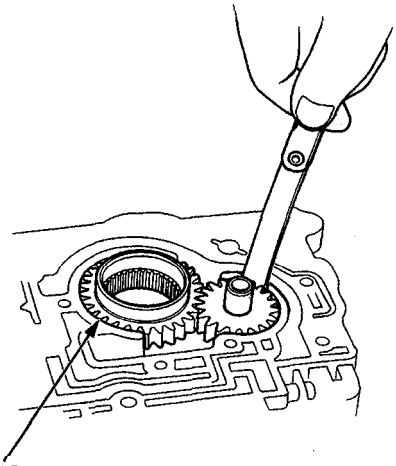
Inspection

1. Install the pump gears and shaft in the main valve body.



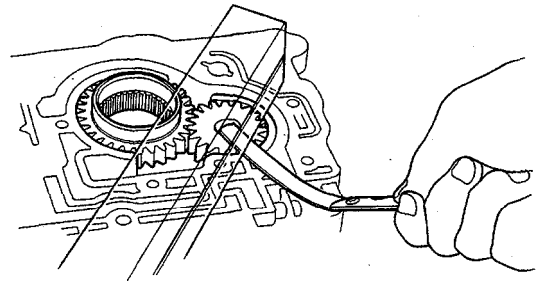
2. Install the oil pump shaft and measure the side clearance of the drive and driven gears.

Pump Gears Side (Radial) Clearance:
Standard (New): Drive gear (diameter)
0.210-0.265 mm
(0.0083-0.0104 in)
Driven gear (radius)
0.035-0.063 mm
(0.0014-0.0025 in)



3. Measure the thrust clearance of the driven gear-to-valve body.

Drive/Driven Gear thrust (Axial) Clearance:
Standard (New): 0.03-0.05 mm
(0.001-0.002 in.)
Service Limit: 0.07 mm (0.0028 in.)



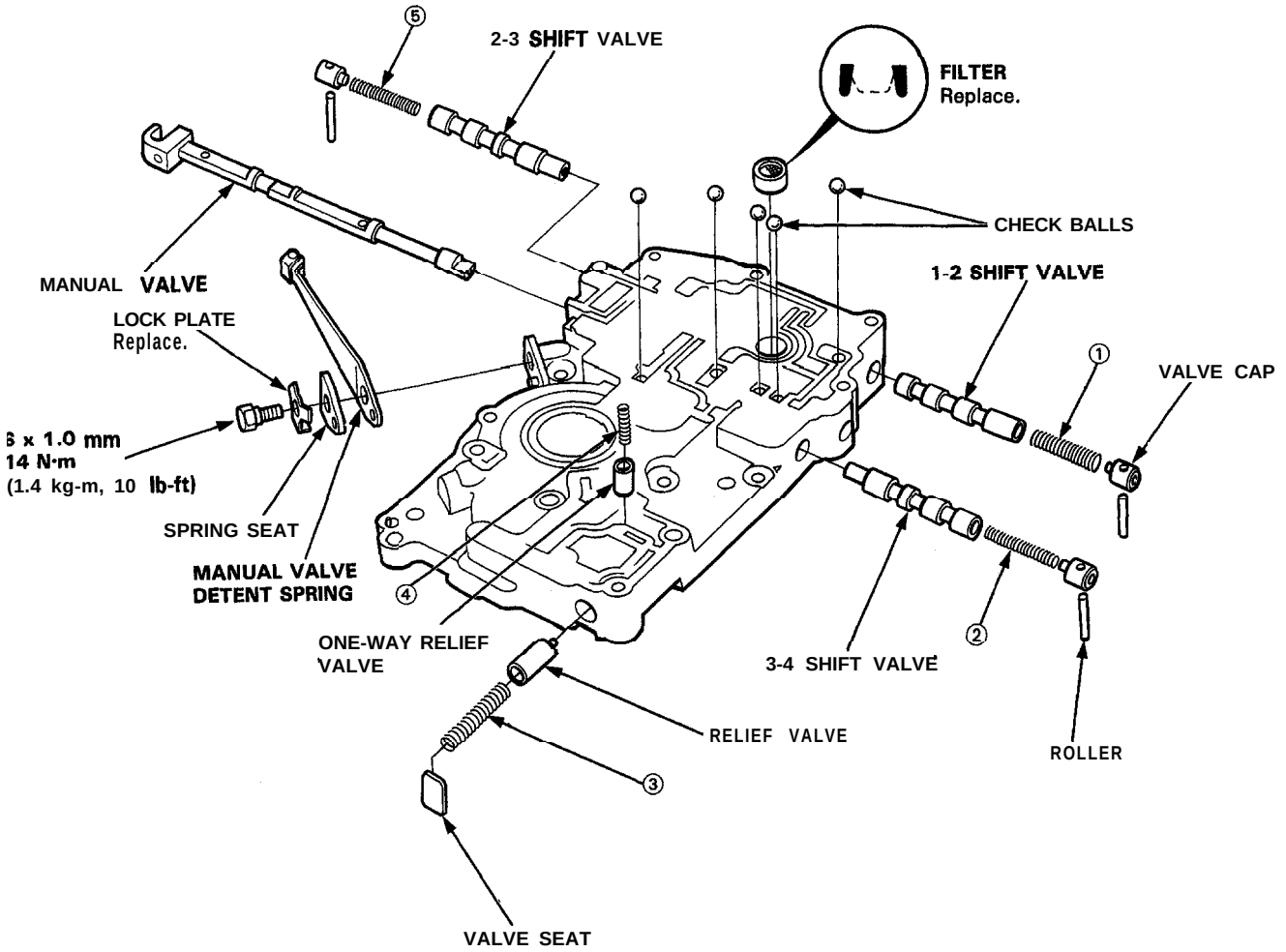
Main Valve Body

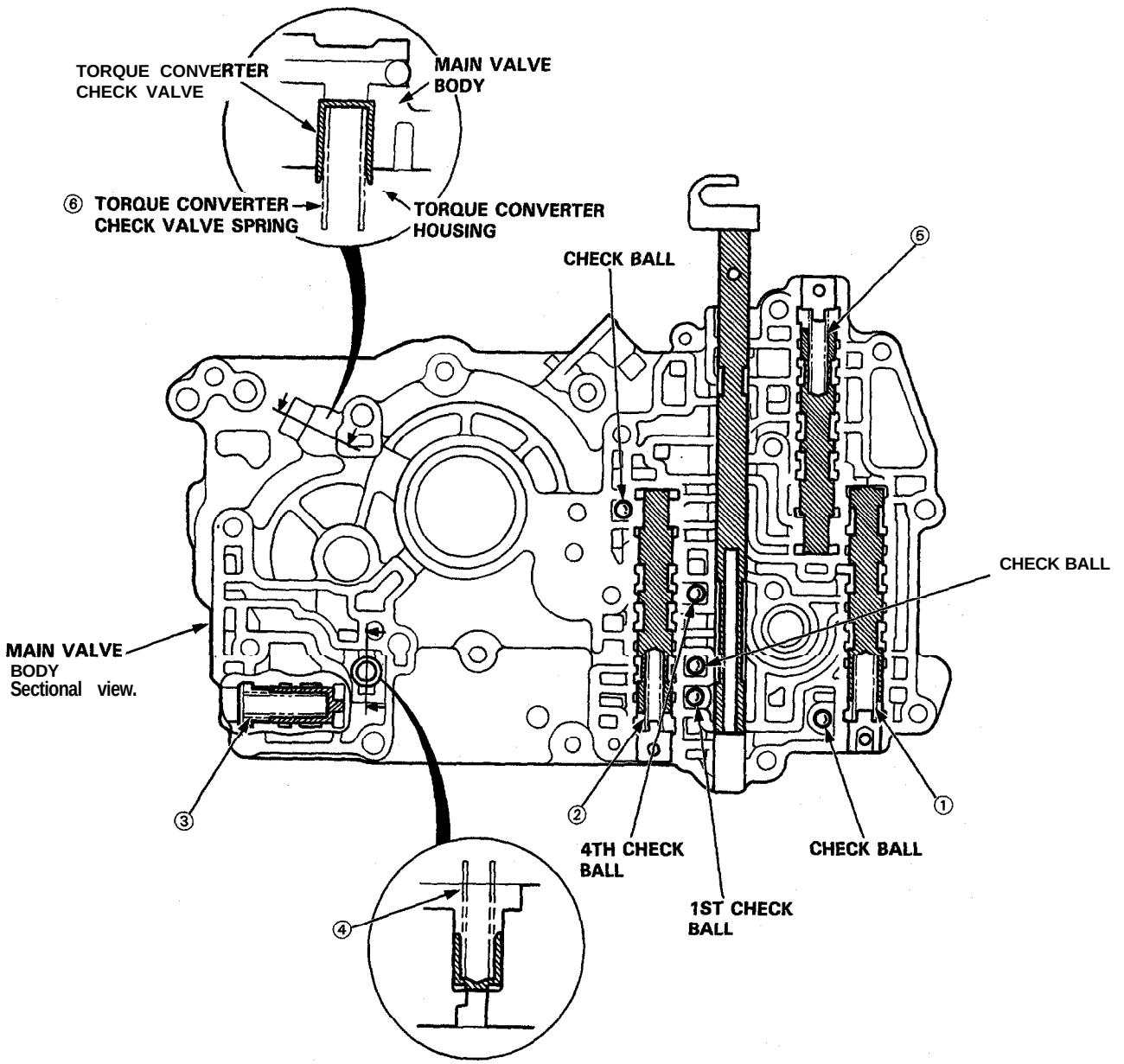
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace 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 14-1 10.
- Coat all parts with ATF before reassembly.
- Adjust and select the manual valve detent spring when the manual valve or manual valve detent spring is replaced. See page 14-142.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit of length: mm (in

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1-2 shift spring	0.8 (0.031)	8.6 (0.339)	40.4 (1.591)	14.5
②	2-3/3-4 shift spring	1.1 (0.043)	7.0 (0.276)	43.7 (1.720)	21.2
③	Relief valve spring	0.9 (0.035)	8.4 (0.331)	44.4 (1.748)	19.5
④	One-way relief valve spring	0.8 (0.031)	6.4 (0.252)	25.1 (0.988)	11.9
⑤	2-3/3-4 shift spring	1.1 (0.043)	7.0 (0.276)	43.7 (1.720)	21.2
⑥	Torque converter check valve spring		8.4 (0.331)	41.8 (1.646)	15.7

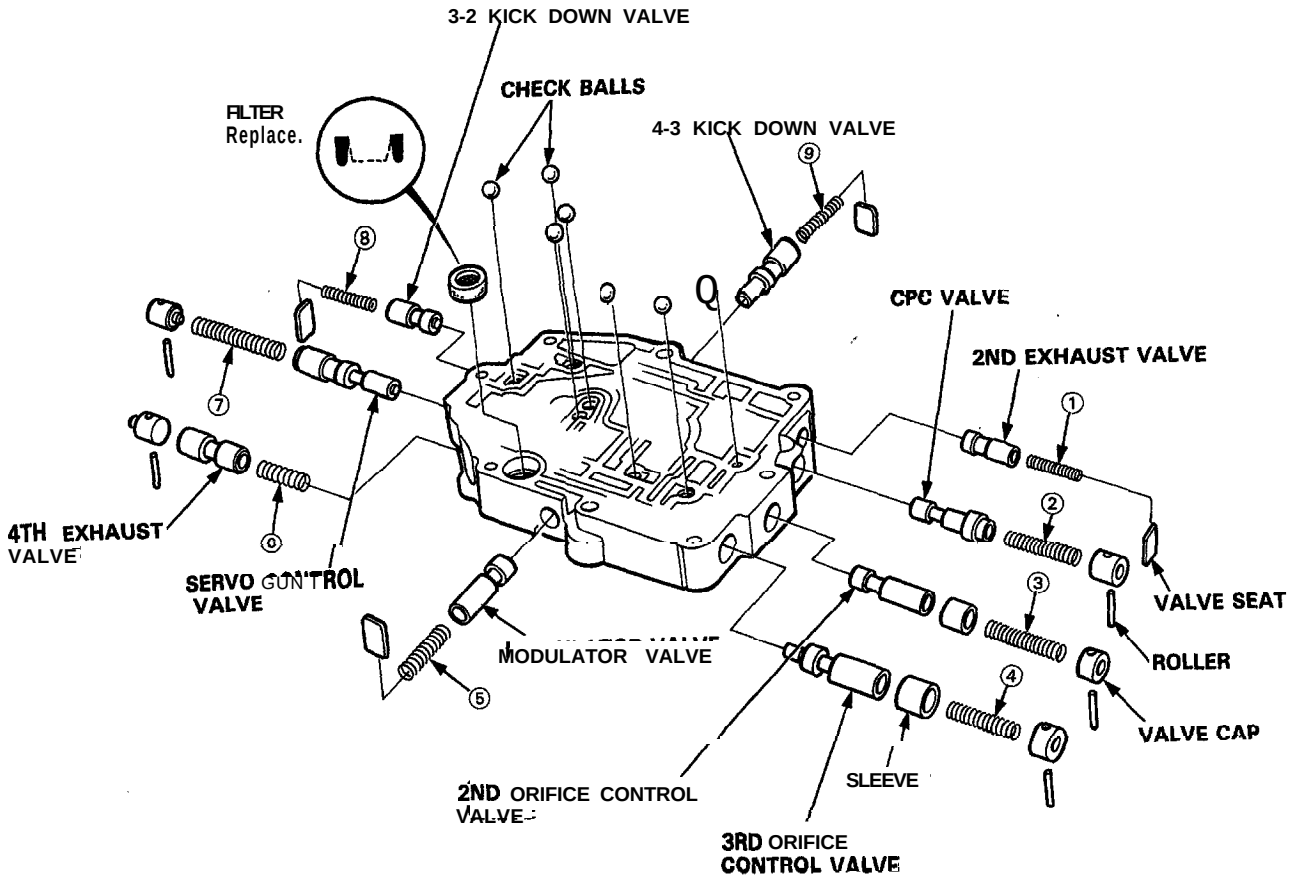
Secondary Valve Body

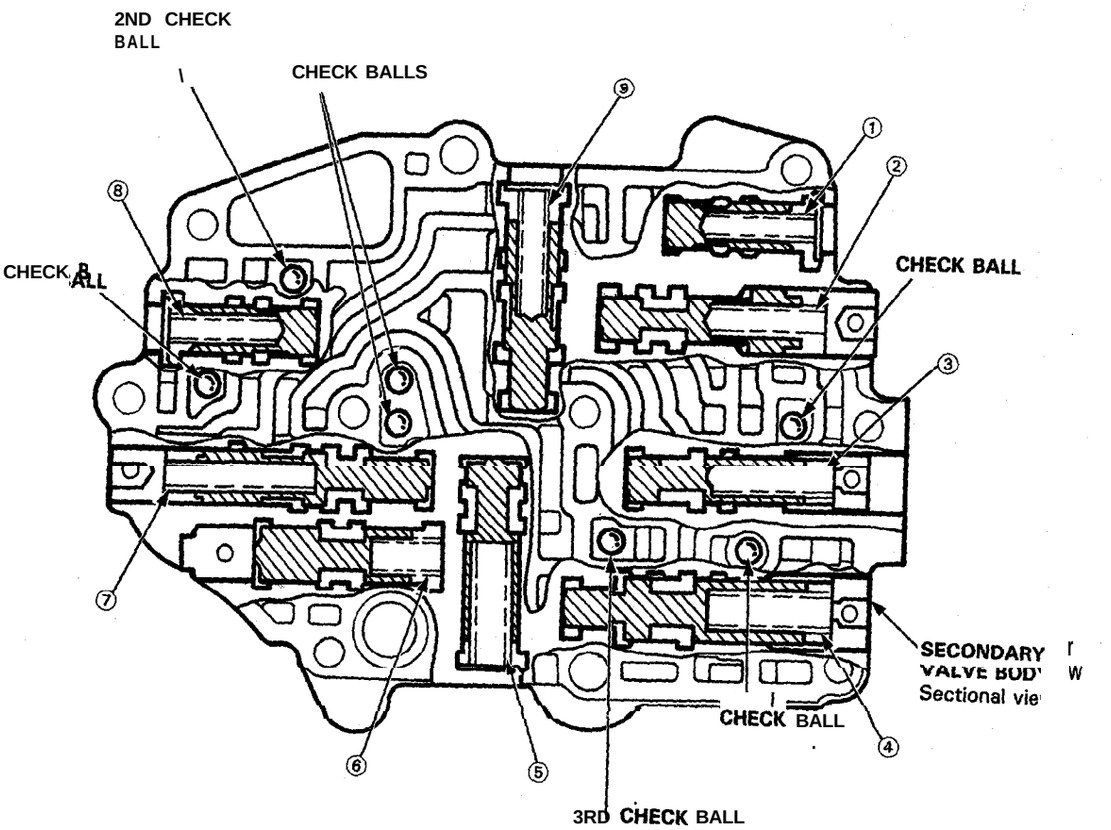
Disassembly/Inspection/Reassembly

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.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-110.
- Coat all parts with ATF before reassembly.

CAUTION: DO not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

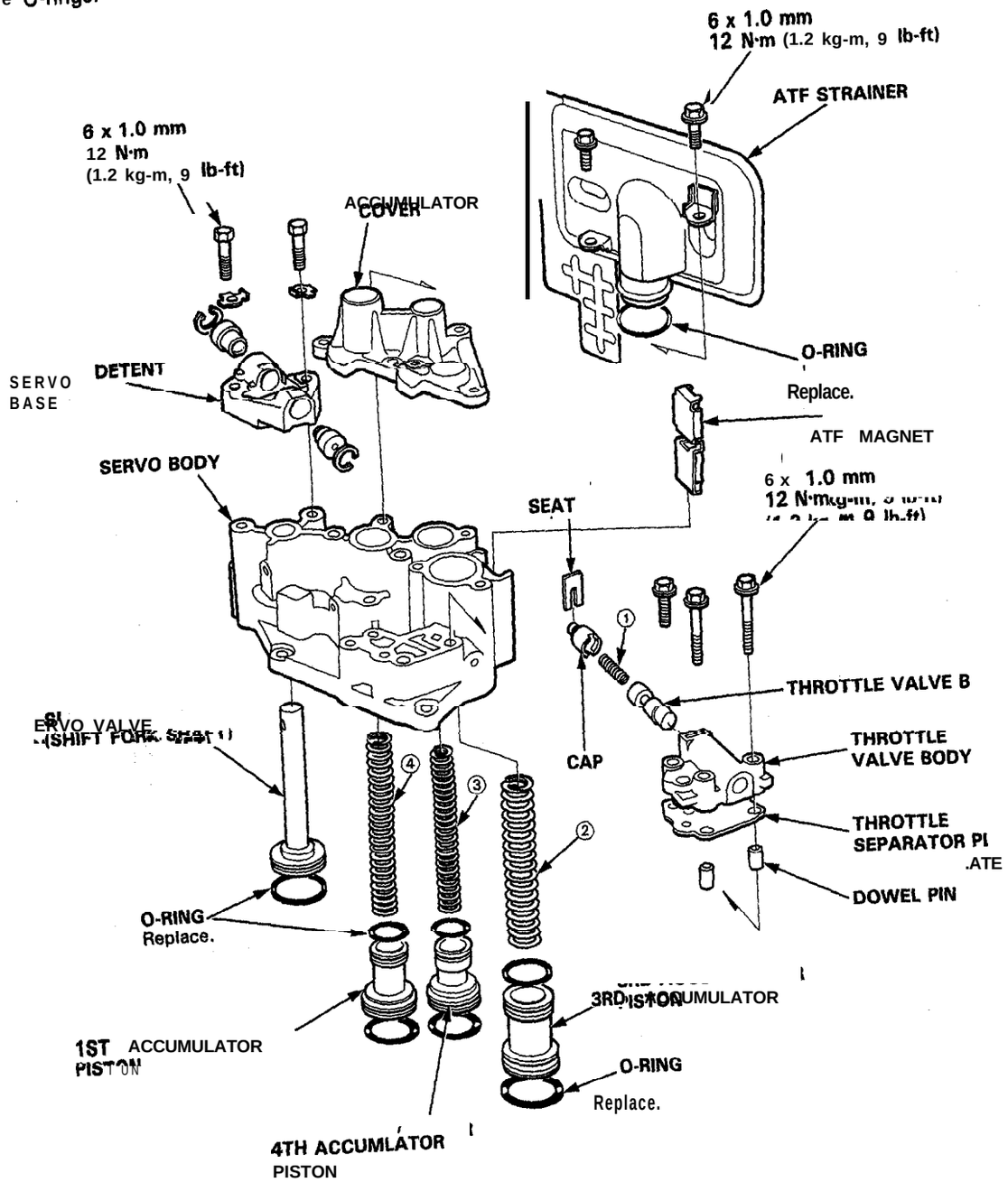
Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	2nd exhaust valve spring	1.0 (0.039)	6.1 (0.240)	27.1 (1.067)	73.4
②	CPC valve spring	1.0 10.039)	6.8 (0.268)	32.1 (1.264)	15.6
③	2nd orifice control valve spring	0.8 (0.031)	8.1 (0.319)	47.9 (1.886)	16.0
④	3rd orifice control valve spring	0.9 (0.035)	8.6 (0.339)	48.3 (7.902)	16.6
⑤	Modulator valve spring	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	70.5
⑥	4th exhaust valve spring	0.8 (0.024)	7.6 (0.299)	24.4 (0.967)	7.9
⑦	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	53.5 (2.106)	20.8
⑧	3-2 kick down valve spring	1.0 (0.039)	6.1 (0.240)	27.1 (7.067)	73.4
⑨	4-3 kick down valve spring	0.9 (0.035)	6.6 (0.260)	30.7 (1.209)	72.9

Servo Body Disassembly/Inspection/Reassembly

Disassembly

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, see Valve Body Repair on page 14-110.
- Check all valves for free movement. If any fail to slide freely,
- Coat all parts with ATF before reassembly.
- Replace the O-rings.



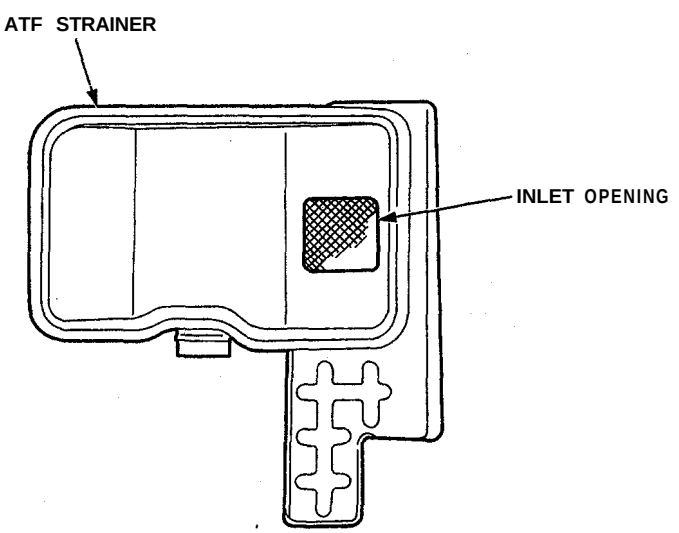
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Throttle valve B spring	0.9 (0.035)	7.1 (0.280)	29.0 (1.142)	12.6
②	3rd accumulator spring	3.2 (0.126)	19.0 (0.748)	88.6 (3.488)	14.3
③	4th accumulator spring	3.0 (0.118)	18.0 (0.709)	84.5 (3.327)	12.8
④	1 st accumulator spring	2.3 (0.091)	20.0 (0.787)	104.6 (4.118)	14.8

NOTE:

- After disassembly of the ATF strainer, check that it is in good condition, and the inlet opening is not clogged. Replace the strainer with a new one if it is clogged or damaged.
- The strainer can be reused if it is not clogged. Clean the inlet opening thoroughly with compressed air before reinstalling it.



Regulator Valve Body

Disassembly/Inspection/Reassembly

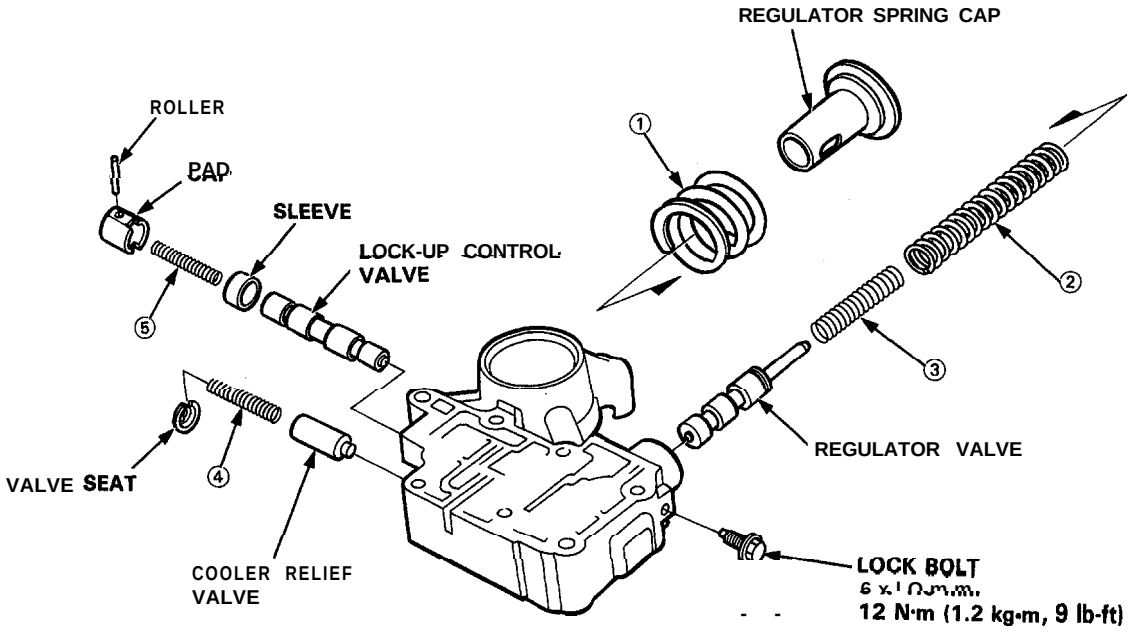
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-110.

1. Hold the regulator spring cap in place while removing the lock bolt. Once the bolt is removed, release the spring cap slowly.

   CAUTION: The regulator spring cap can pop out when the lock bolt is removed.

2. Reassembly is in the reverse order of disassembly.

   NOTE:
   - Coat all parts with ATF.
   - Align the hole in the regulator cap with the hole in the valve body, press the spring cap into the body and tighter the lock bolt.



SPRING SPECIFICATIONS

Unit of length: mm (in

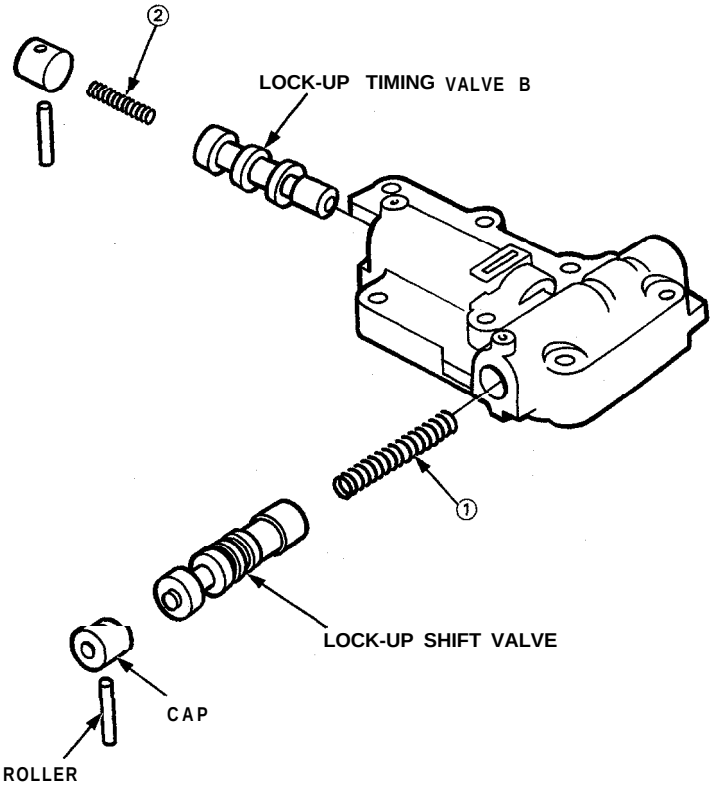
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Stator reaction spring	6.0 (0.236)	38.4 (1.512)	30.3 (1.193)	2.0
②	Regulator valve spring A	1.58 x 2.0 (0.062 x 0.079)	14.7 (0.579)	88.6 (3.488)	20.9
③	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	14.7
④	Cooler relief valve spring	1.2 (0.047)	8.4 (0.331)	35.7 (1.406)	16.5
⑤	L/C control spring	0.8 (0.031)	6.6 (0.260)	38.3 (I.5081	25.0

Lock-up 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.**
- **Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-1 IO.**
- **Coat all parts with ATF before reassembly.**



SPRING SPECIFICATIONS

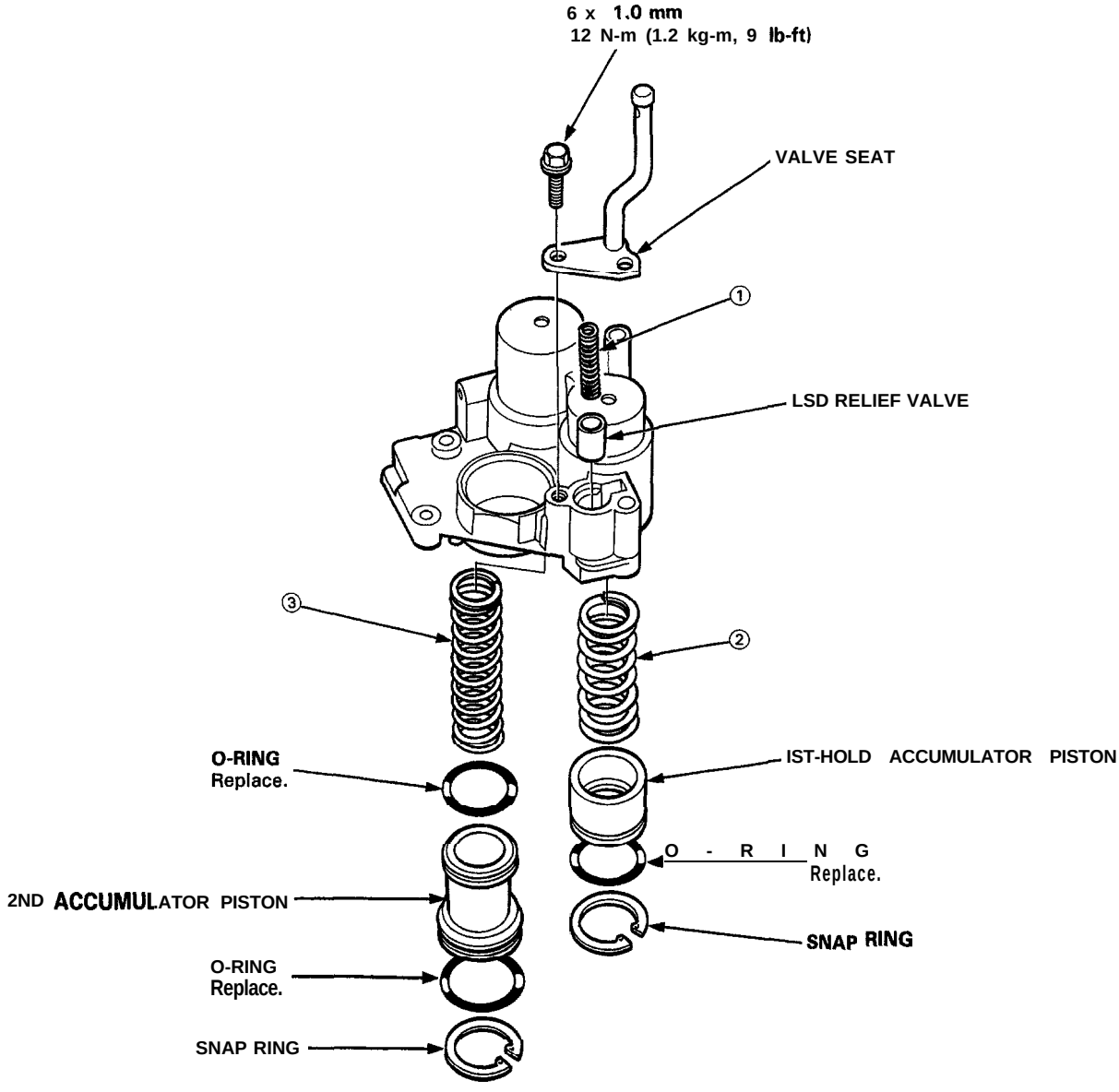
Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift valve spring	1 .o (0.039)	8.6 (0.339)	51.3 (2.0201	19.8
②	Lock-up timing valve B spring	0.8 (0.031)	5.6 (0.220)	27.8 (1.094)	16.4

2nd Accumulator 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.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-110.
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

Unit of length: mm (in)

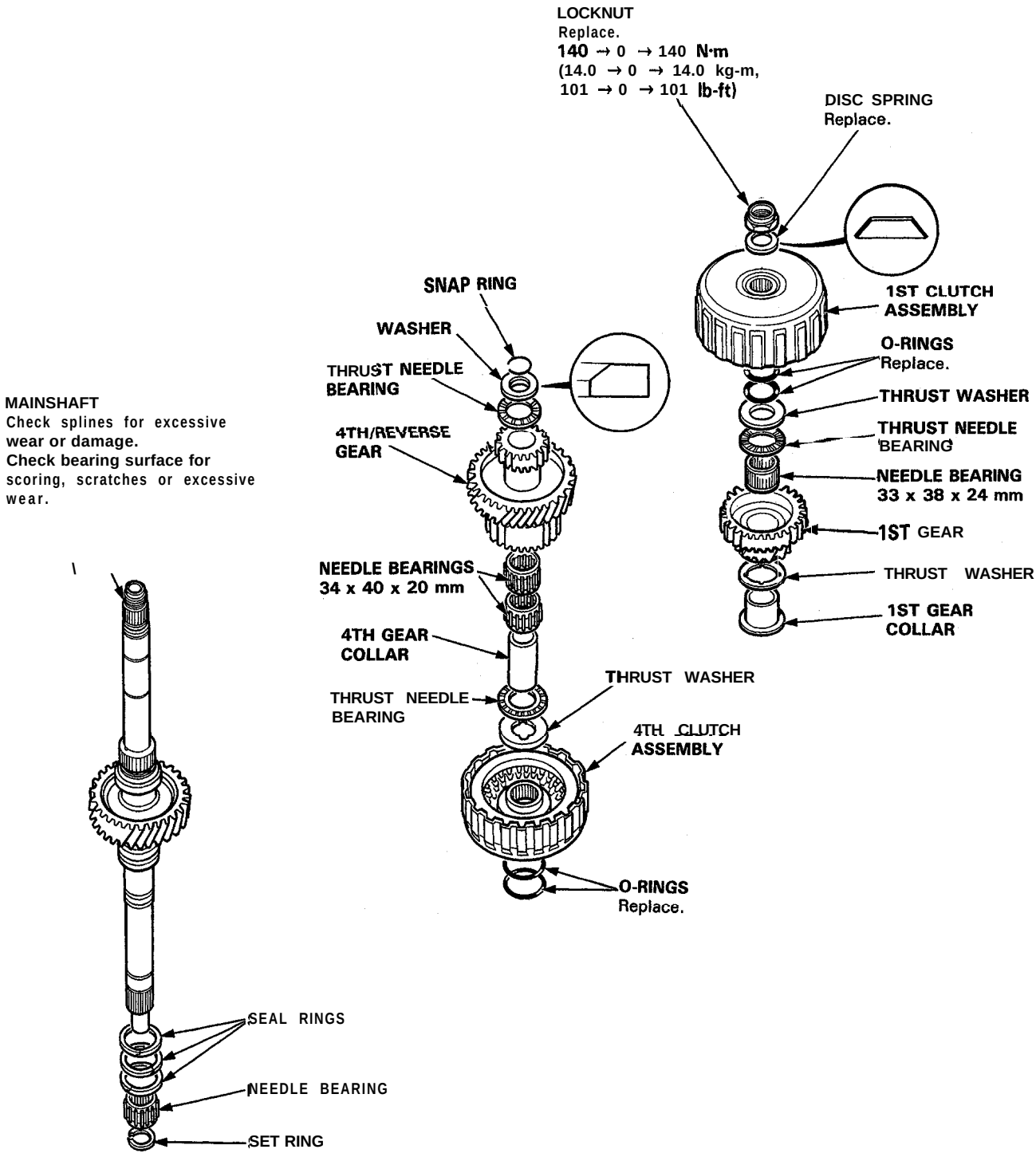
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	LSD relief valve spring	0.8 (0.031)	8.4 (0.331)	37.3 (1.469)	12.1
②	Ist-hold accumulator spring	3.4 (0.134)	24.3 (0.957)	64.7 (2.547)	6.7
③	2nd accumulator spring	3.3 (0.130)	20.2 (0.795)	78.0 (3.071)	11.8

Mainshaft

Disassembly/Inspection/Reassembly

NOTE:

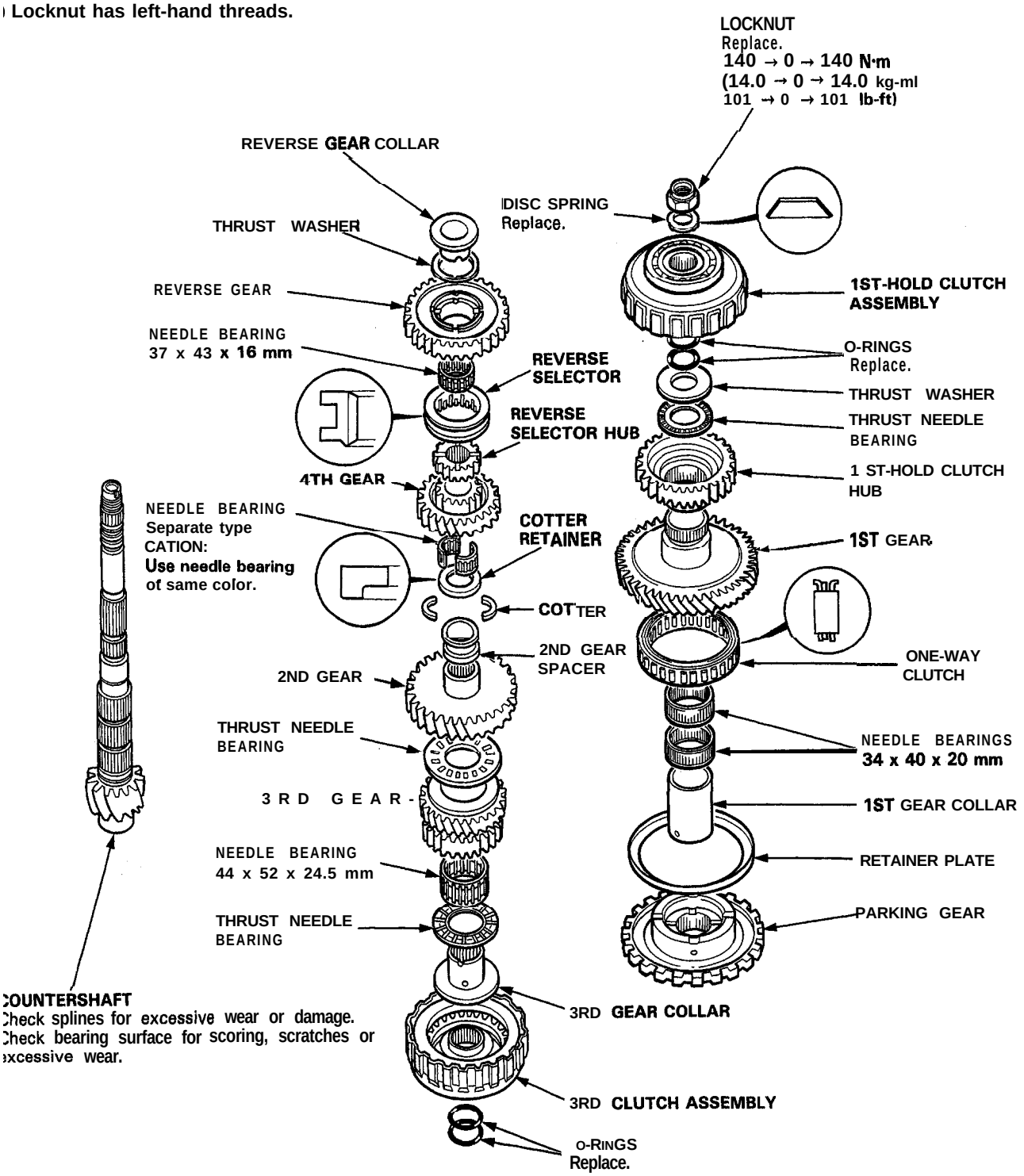
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.



Countershaft

Disassembly/Inspection/Reassembly

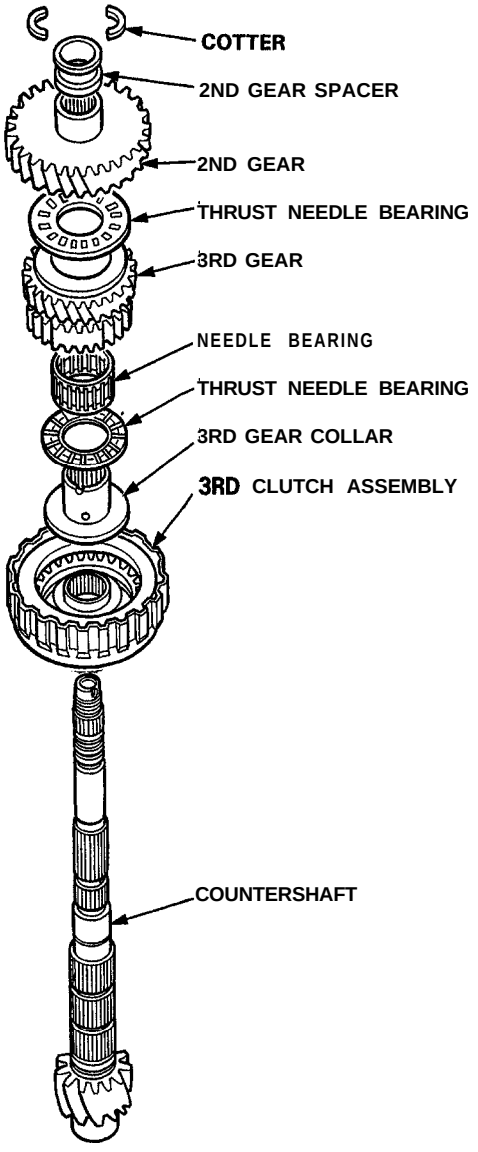
NOTE:
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Insoect thrust needle and needle bearings for galling and rough movement.
- Locknut has left-hand threads.



Inspection/Installation

NOTE: **Lubricate all parts with ATF during assembly.**

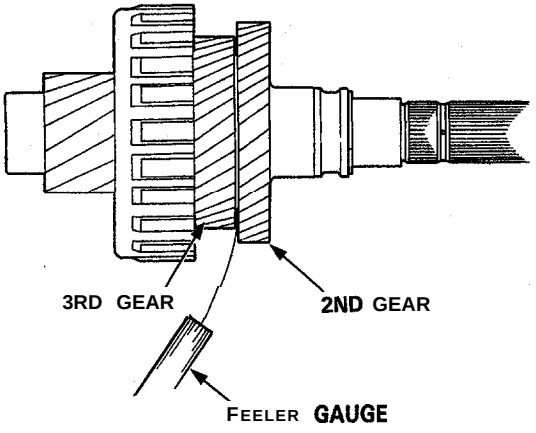
1. **Assemble the parts below on the countershaft.**

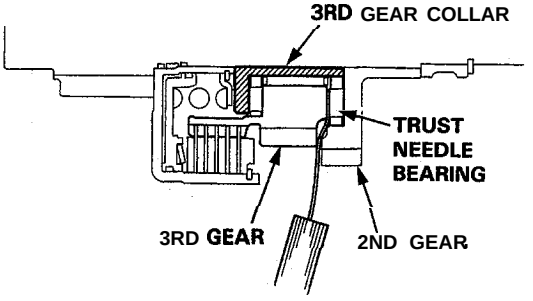


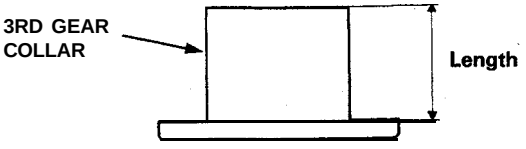
2. Hold the 2nd gear against the 3rd gear. Measure the clearance between the 3rd gear and thrust needle bearing with a feeler gauge.

NOTE: Take measurements in at least three places and take the average as the actual clearance.

STANDARD: O-0.03 mm (O-0.001 in)







3RD GEAR COLLAR

No	Part Number	Length mm (in)
1	90413-PR9-000	35.425-35.440 (1.3947-I .3952)
2	90414-PR9-000	35.440-35.455 (1.3952-1.3959)
3	90415-PR9-000	35.455-35.470 (1.3959-1.3965)
4	90416-PR9-000	35.470-35.485 (1.3965-1.3970)
5	90417-PR9-000	35.485-35.500 (1.3970-I .3976)
6	90418-PR9-000	35.500-35.515 (1 .3976-1 .3982)

Inspection/Installation (cont'd)

3. If the clearance is out of tolerance;

   -1. Select and install a new 3rd gear collar and recheck the clearance.

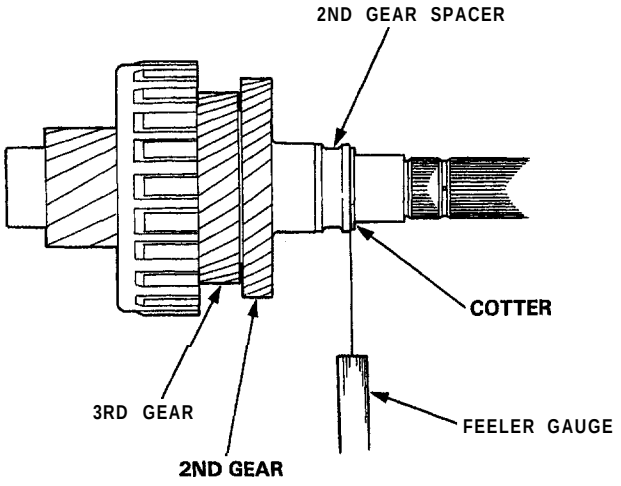
   -2. If the clearance is still out of tolerance, replace the two thrust needle bearings and recheck the clearance.

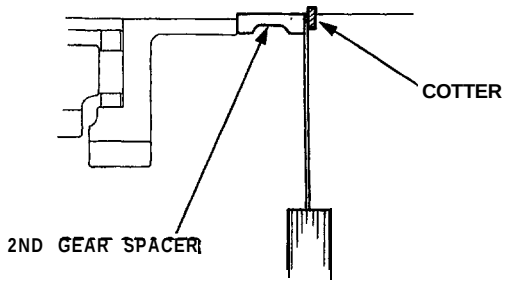
   NOTE:
   - If the clearance still exceeds the service limit even with *new* thrust needle bearings, check the 3rd gear, 2nd gear and 3rd gear collar for wear, and replace any worn parts.
   - After replacing parts, make sure that the clearance is within tolerance.

4. Hold the 2nd gear against the 3rd gear. Measure the clearance between the 2nd gear spacer and cotters with a feeler gauge.

   NOTE: Take measurements in at least three places, and take the average as the actual clearance.

STANDARD: O-0.05 mm (O-0.002 in)





5. If the clearance is out of tolerance, select and install a new cotters.

COTTER 31.5 mm

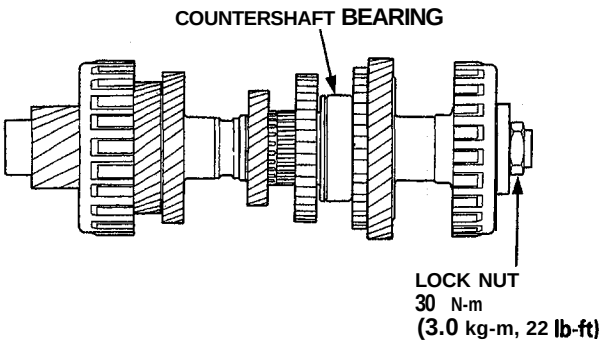
No	Part Number	Thickness mm (in)
1	90441 -PR9-000	1.975-2.000 (0.078-0.079)
2	90442-PR9-000	2.000-2.025 (0.079-0.080)
3	90443-PR9-000	2.025-2.050 (0.080-0.081)
4	90444-PR9-000	2.050-2.075 (0.081-0.082)
5	90445-PR9-000	2.075-2.100 (0.082-0.083)
6	90446-PR9-000	2.100-2.125 (0.083-0.084)
7	90447-PR9-000	2.125-2.150 (0.084-0.085)
8	90448-PR9-000	2.150-2.175 (0.085-0.086)
9	90449-PR9-000	2.175-2.200 (0.086-0.087)
10	90450-PR9-000	2.200-2.225 (0.087-0.088)
11	90451 -PR9-000	2.225-2.250 (0.088-0.089)
12	90452-PR9-000	2.250-2.275 (0.089-0.090)
13	90453-PR9-000	2.275-2.300 (0.090-0.091)
14	90454-PR9-000	2.300-2.325 (0.091-0.092)
15	90455-PR9-000	2.325-2.350 (0.092-0.093)
16	90456-PR9-000	2.350-2.375 (0.093-0.094)

NOTE: After replacing the cotters, make sure that the clearance is held within tolerance.

6. Remove the countershaft bearing from the transmission housing. See page 14-l 40.

7. Assemble the countershaft including bearing and all parts shown to on page 14-l 22.

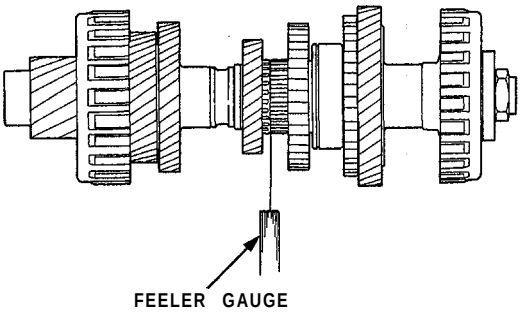
8. Torque the countershaft locknut to 30 N·m (3.0 kg-m, 22 lb-ft).

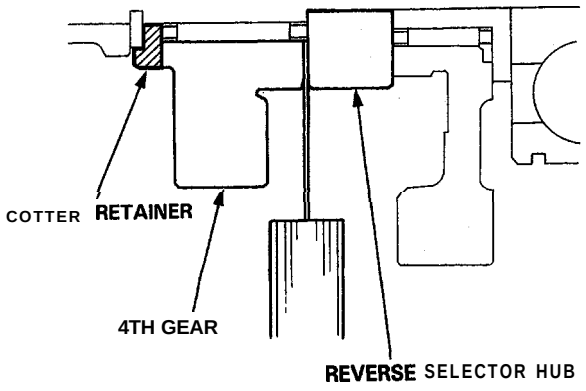


9. Measure the clearance between 4th gear and reverse selector hub with a feeler gauge.

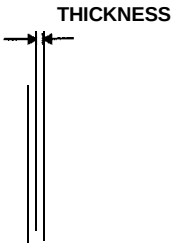
NOTE: Take measurements in at least three places, and take the average as the actual clearance.

STANDARD: 0.05-0.16 mm (0.002-0.006 in)





10. If the clearance is out of tolerance, select and install a new cotter retainer.



COTTER RETAINER

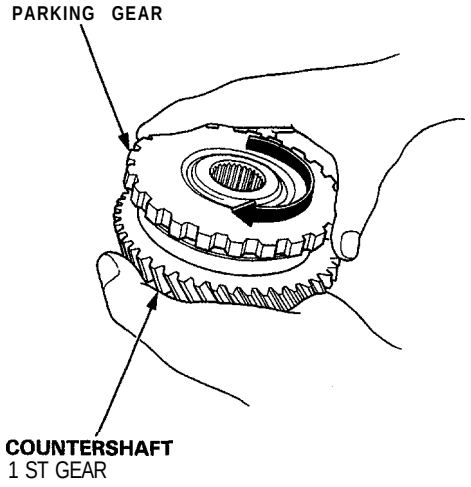
No.	Parts Number	Thickness
1	90432-PR9-000	3.00 – 3.03 mm (0.118 – 0.119 in)
2	90433-PR9-000	3.03 – 3.06 mm (0.119 – 0.120 in)
3	90434-PR9-000	3.06 – 3.09 mm (0.120 – 0.122 in)
4	90435-PR9-000	3.09 – 3.12 mm (0.122 – 0.123 in)

NOTE: After replacing the cotter retainer, make sure that the clearance is within tolerance.

One-Way Clutch/Parking Gear

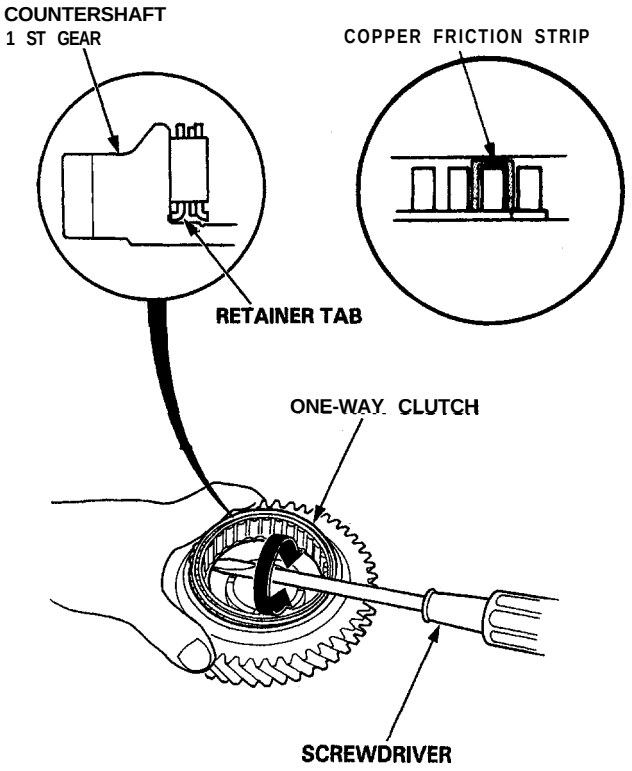
Disassembly and Inspection

1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.

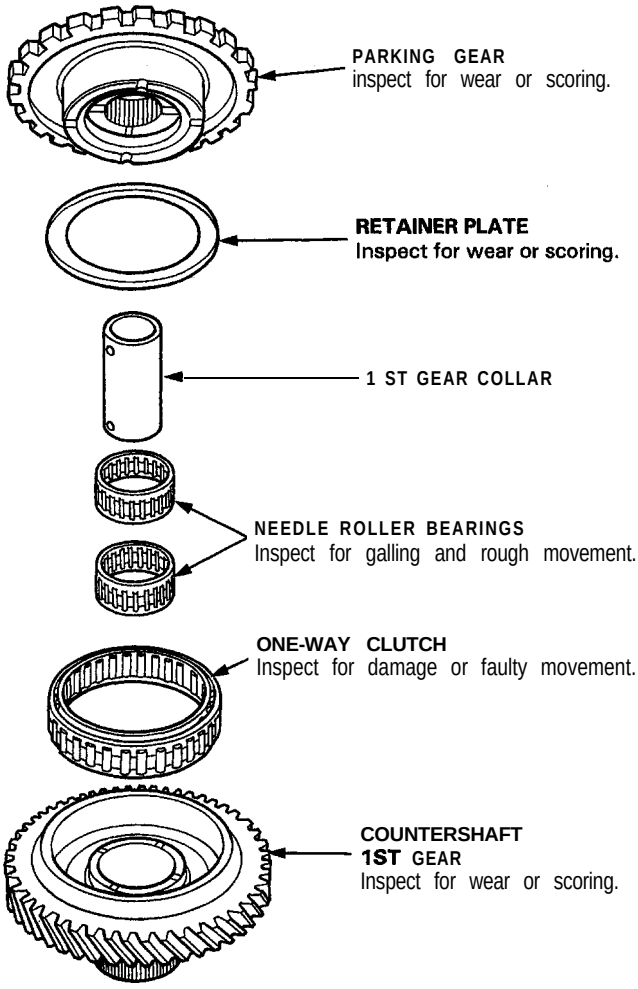


2. Remove the one-way clutch by prying it up with the end of a screwdriver.

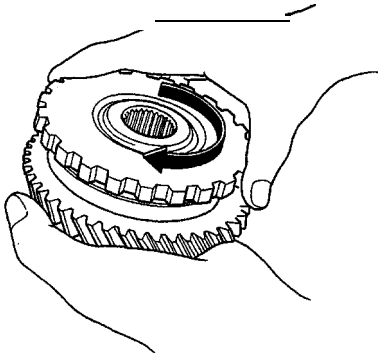
CAUTION: Do not pry **on the three copper friction strips; if you break a strip, the clutch will not work properly.**



Inspect the parts as follows:



3. After the parts are assembled, hold the countershaft 1 st gear and turn the parking gear in direction shown to be sure it turns freely.

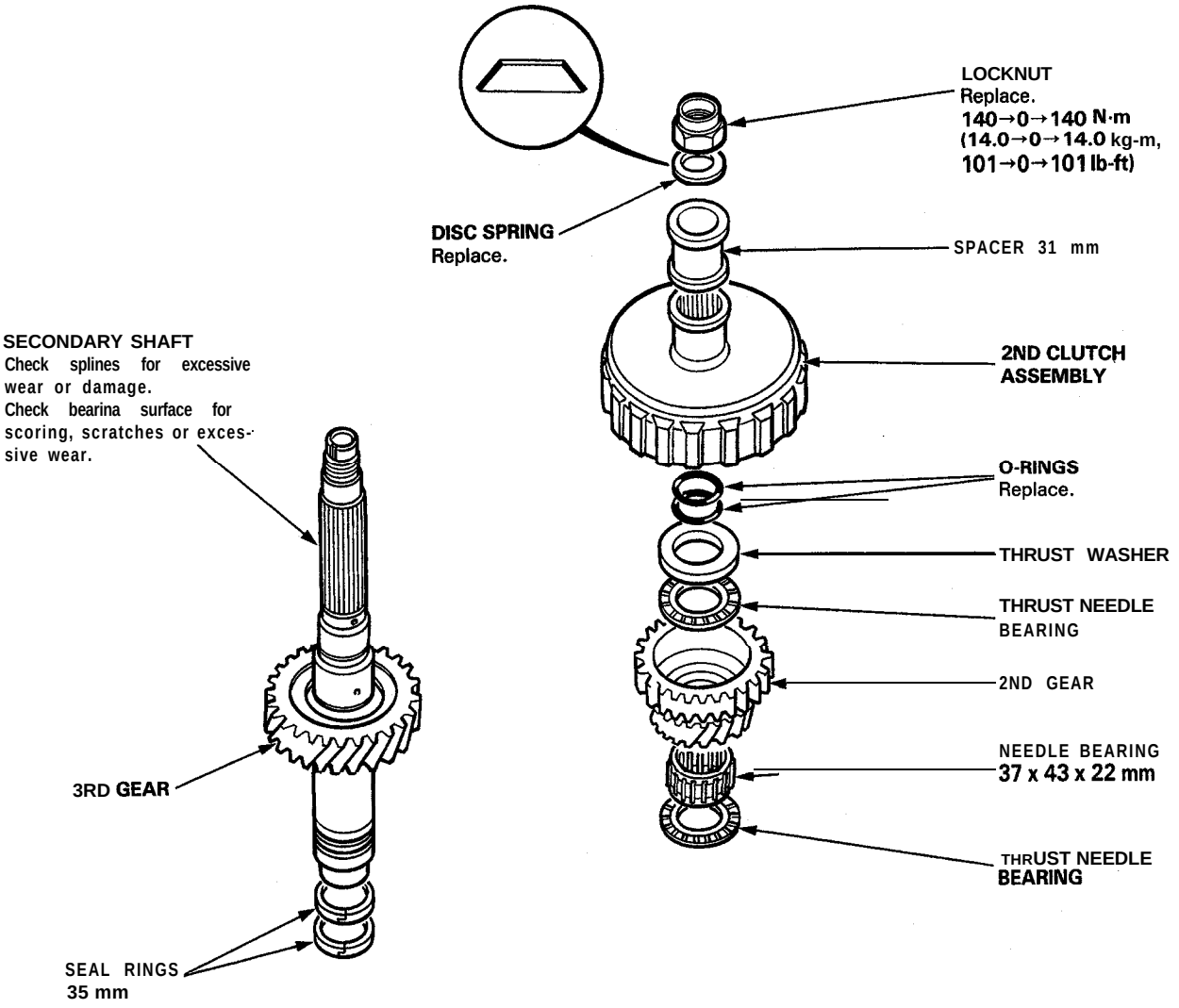


Secondary Shaft

Disassembly/Inspection/Reassembly

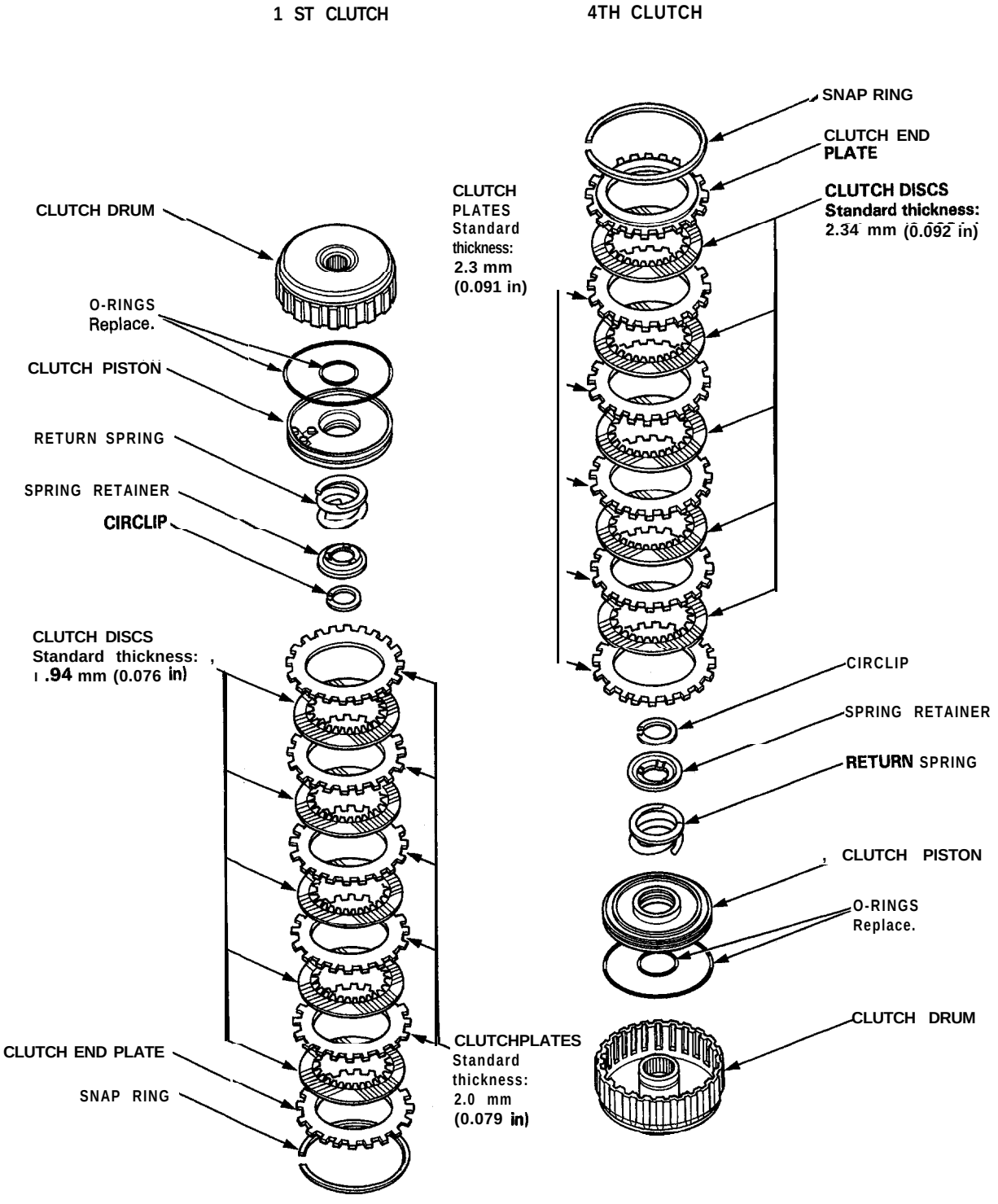
NOTE:

- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.



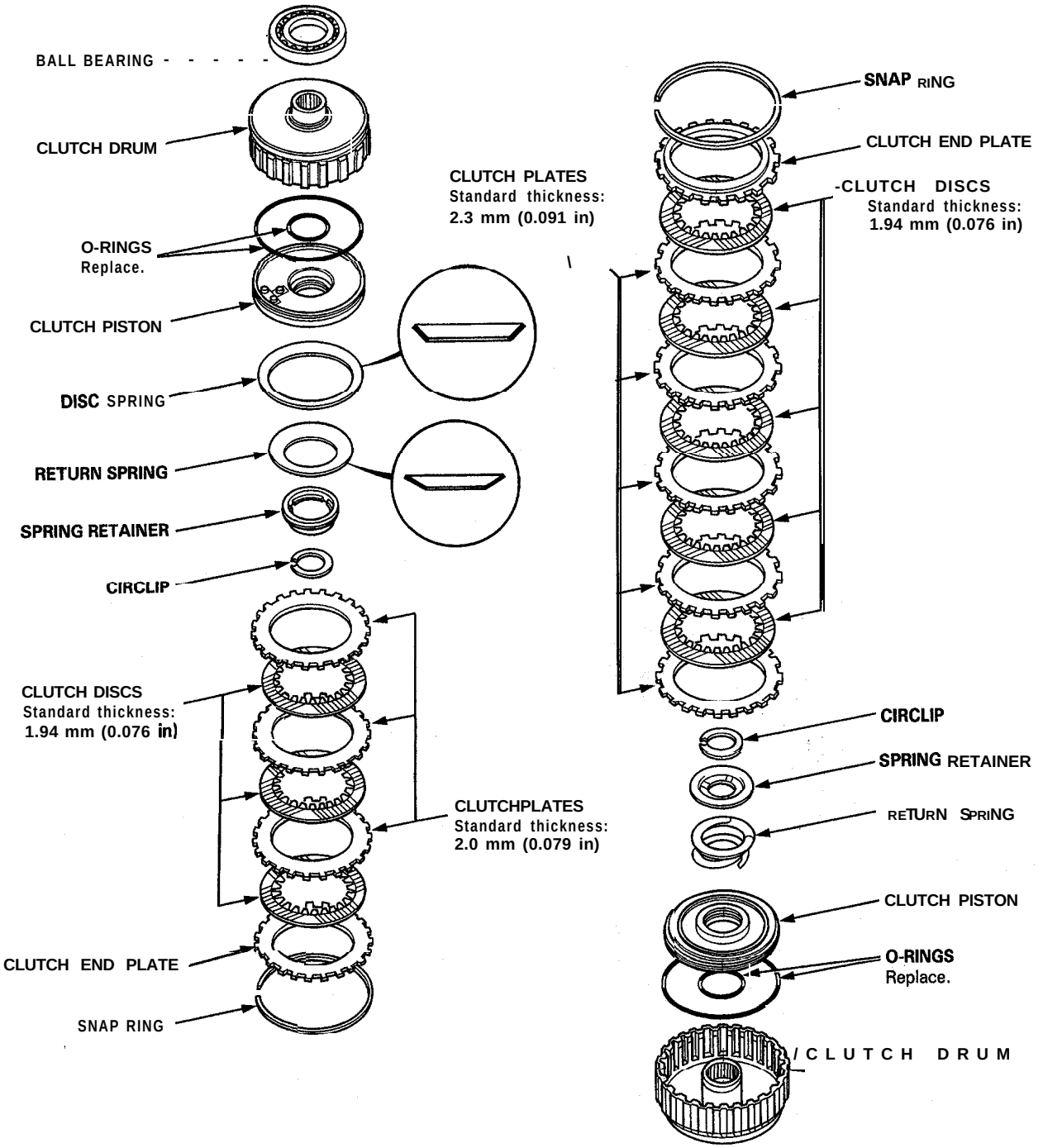
Clutch

Illustrated Index



1 ST-HOLD CLUTCH

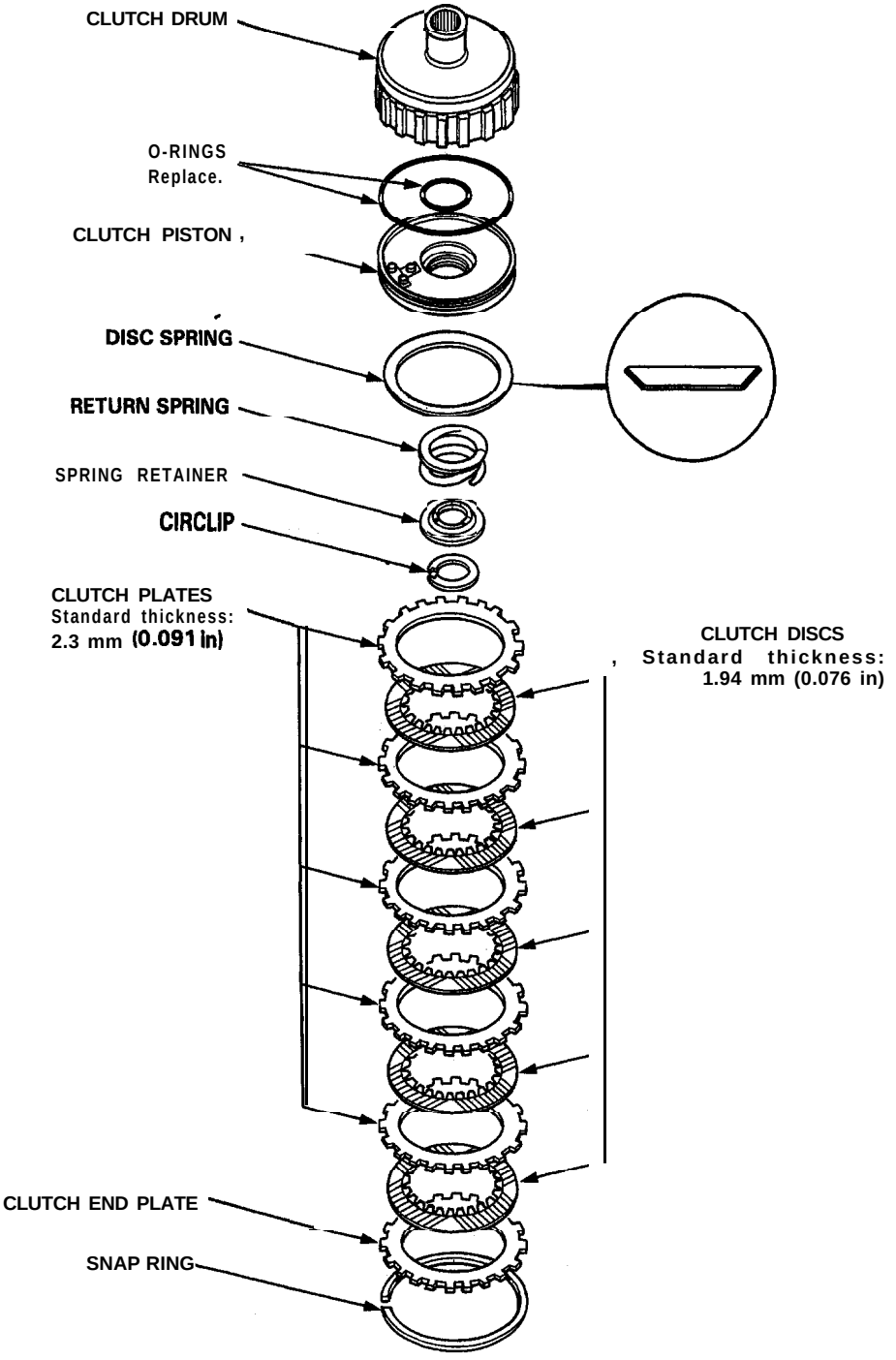
3RD CLUTCH



(cont'd)

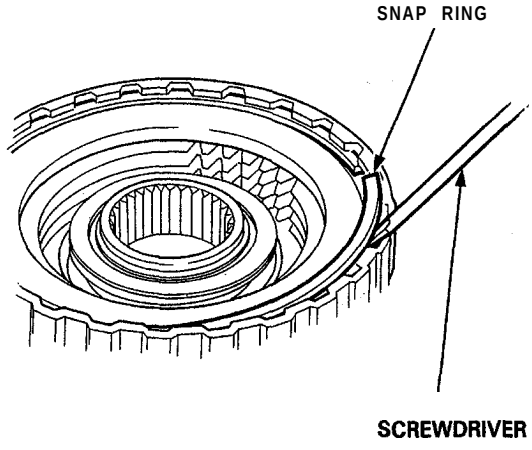
Illustrated Index

2ND CLUTCH



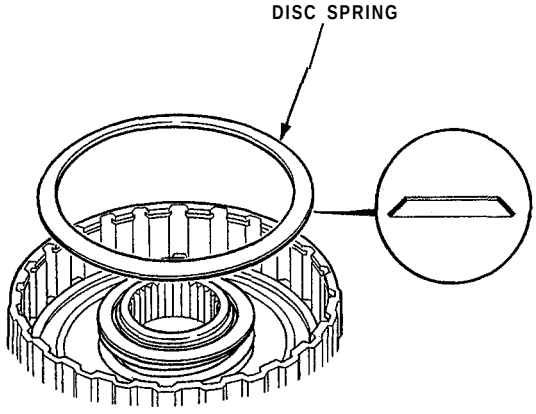
- Disassembly

1. Remove the snap rings, then remove the clutch end plate, clutch discs and plates.

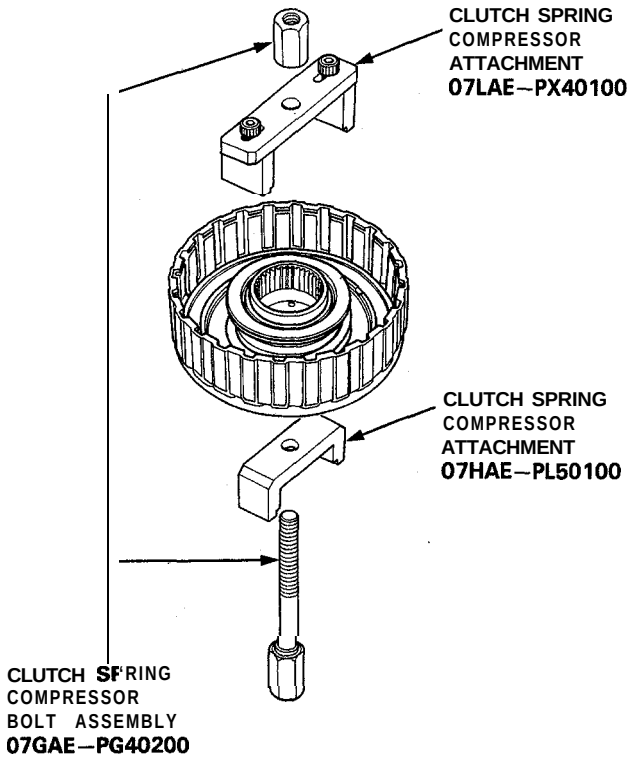


2. Remove the disc spring.

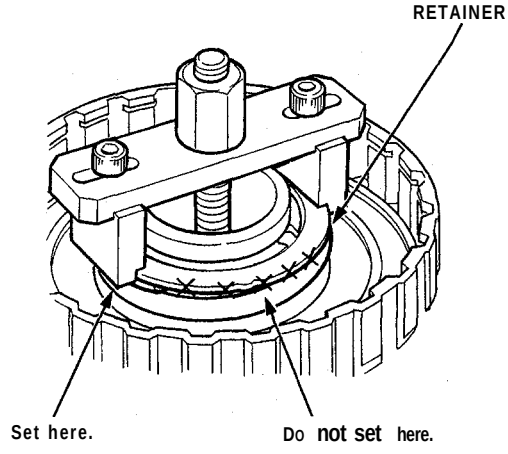
NOTE: For 1st hold and 2nd clutches



3. Install the special tools as shown.



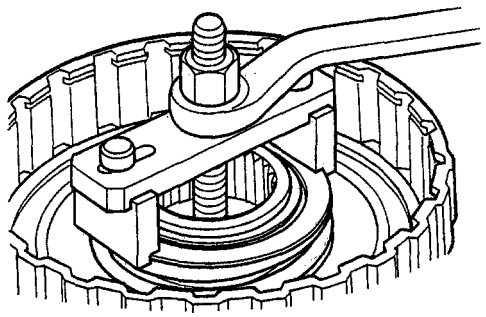
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



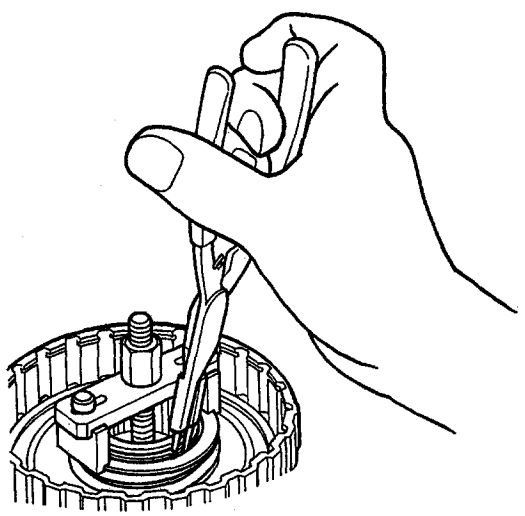
(cont'd)

Disassembly (cont'd)

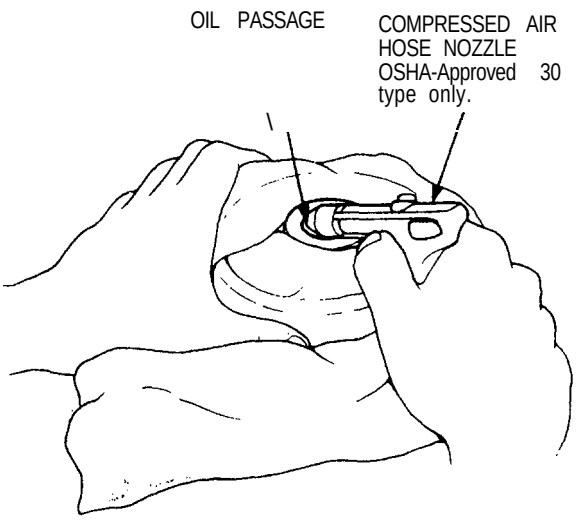
4. Compress the clutch return spring.



5. Remove the circlip. Then remove the special tool, 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.

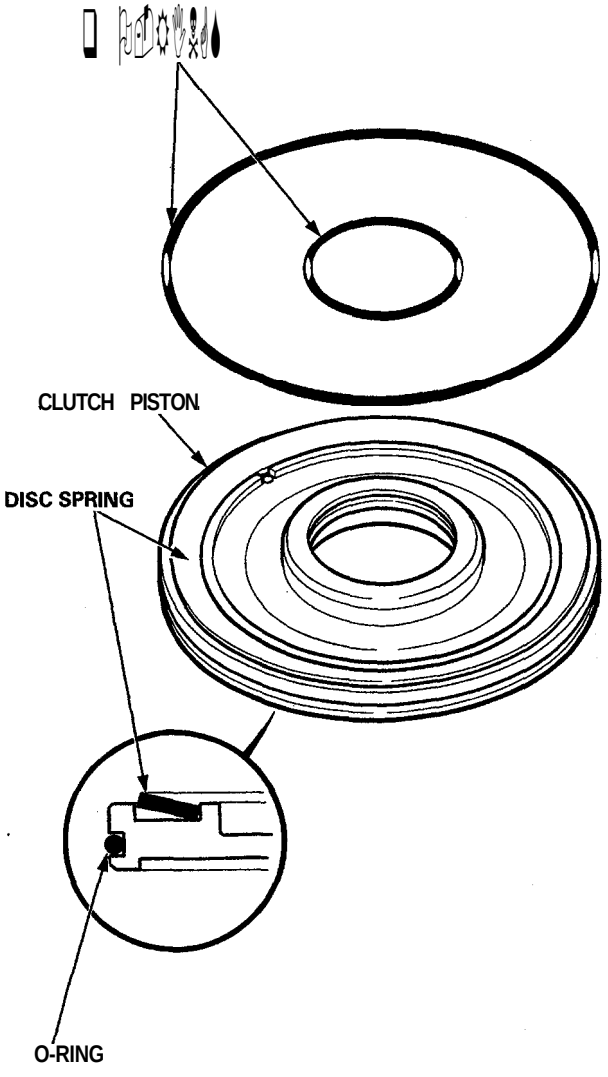


- Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

1. install a new O-ring on the clutch piston.

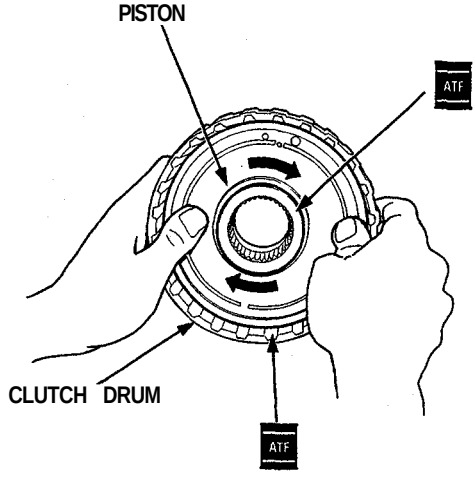
2. Be sure that the disc spring is securely staked.
   NOTE: For Ist, 3rd and 4th clutches



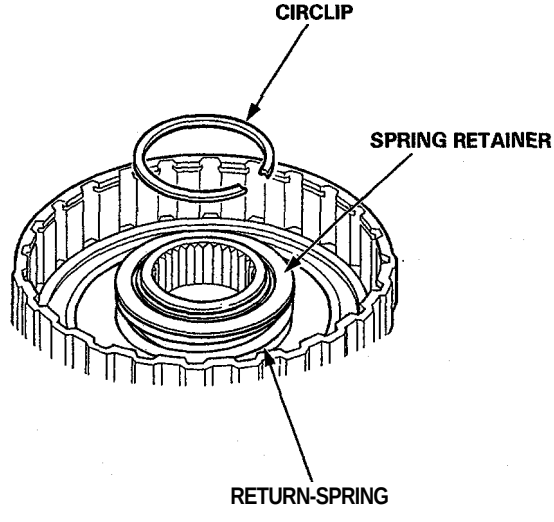
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

   NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch O-ring by installing the piston with force.



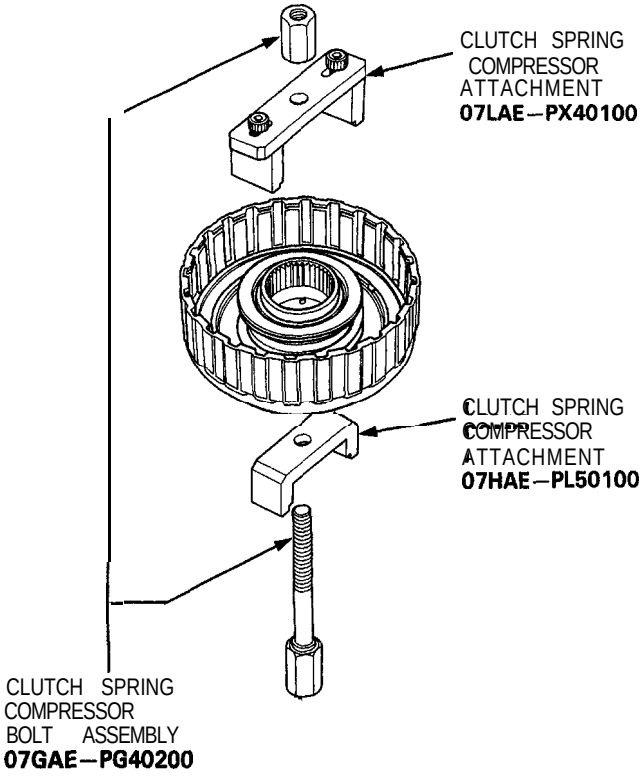
4. Install the return spring and spring retainer and position the circlip on the retainer.



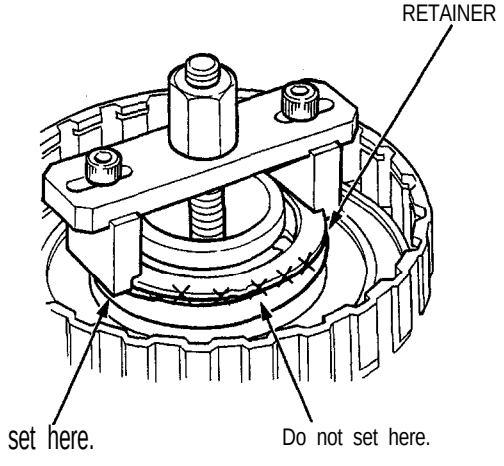
(cont'd)

Reassembly (cont'd)

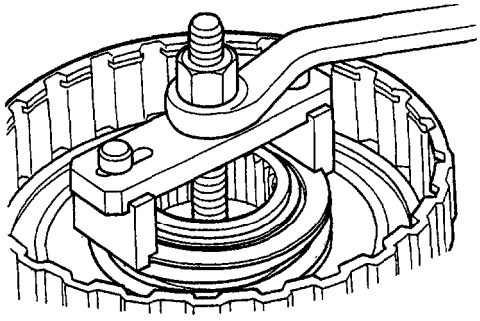
5. Install the special tools as shown.



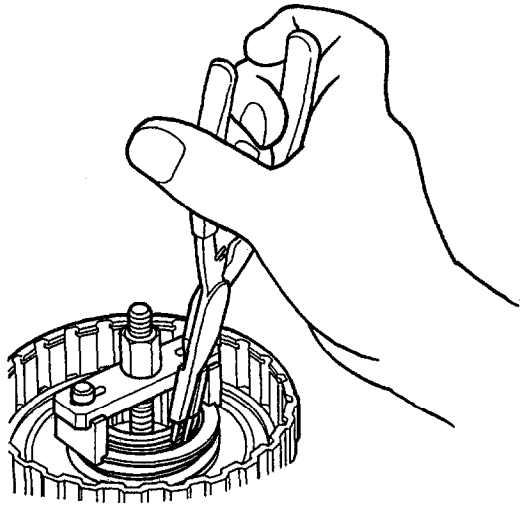
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the retainer spring, the retainer may be damaged.



6. Compress the clutch return spring.



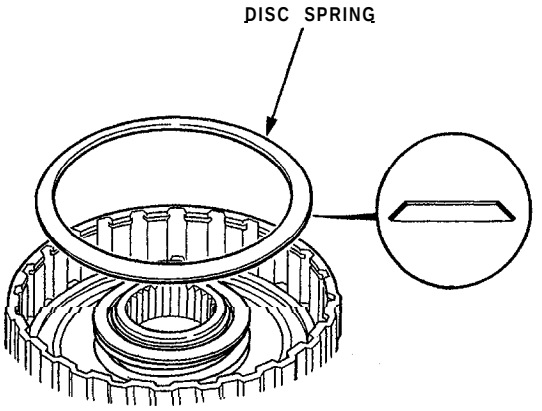
7. Install the circlip.



8. Remove the special tools.

9. install the disc spring.

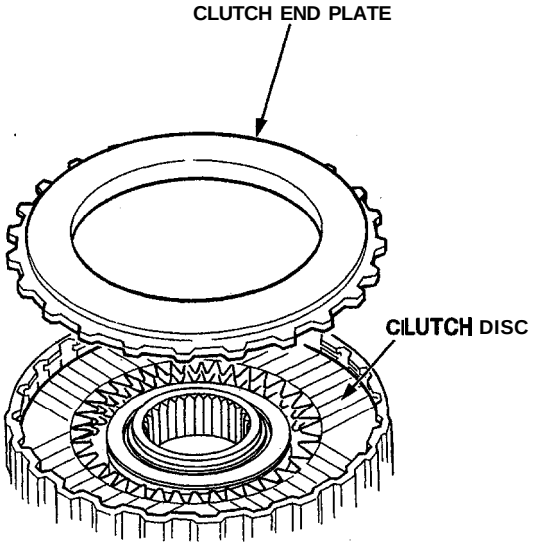
NOTE:
- For 1st hold and 2nd clutches
- Install the disc spring in the right direction.



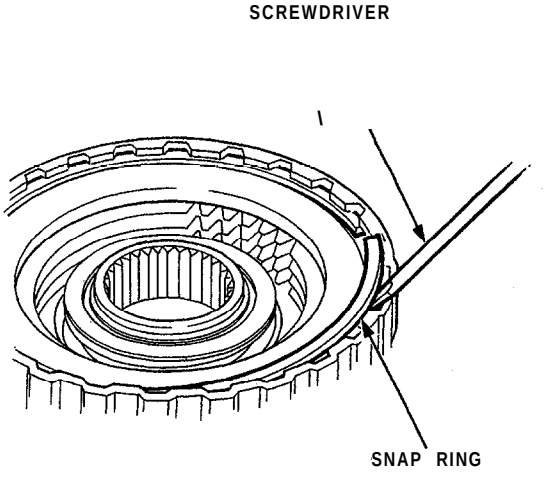
10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with 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



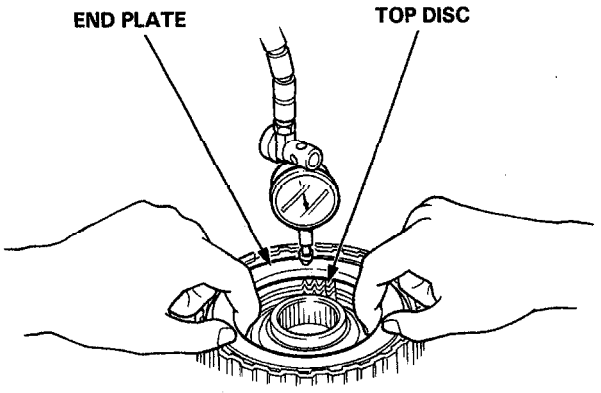
(cont'd)

Reassembly (cont'd)

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.

End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 – 0.85 mm (0.026 – 0.033 in)
2nd	0.75 – 0.95 mm (0.030 – 0.037 in)
3rd	0.75 – 0.95 mm (0.030 – 0.037 in)
4th	0.75 – 0.95 mm (0.030 – 0.037 in)
1st-Hold	0.70 – 0.90 mm (0.028 – 0.035 in)



14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

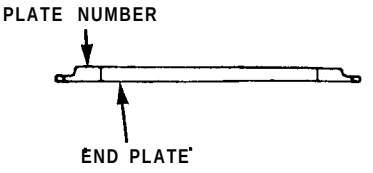
NOTE: If the thickest clutch end plate is installed but the clearance is still over the standard, replace the clutch discs and clutch plates.

2ND, 3RD, 4TH and 1ST HOLD CLUTCH

PART No.	PLATE No.	THICKNESS mm (in)
22551 –PX4–003	1	2.1 (0.083)
22552–PX4–003	2	2.2 (0.087)
22553–PX4–003	3	2.3 (0.091)
22554–PX4–003	4	2.4 (0.094)
22555–PX4–003	5	2.5 (0.098)
22556–PX4–003	6	2.6 (0.102)
22557–PX4–003	7	2.7 (0.106)
22558–PX4–003	8	2.8 (0.1 IO)
22559–PX4–003	9	2.9 (0.114)

1 ST CLUTCH

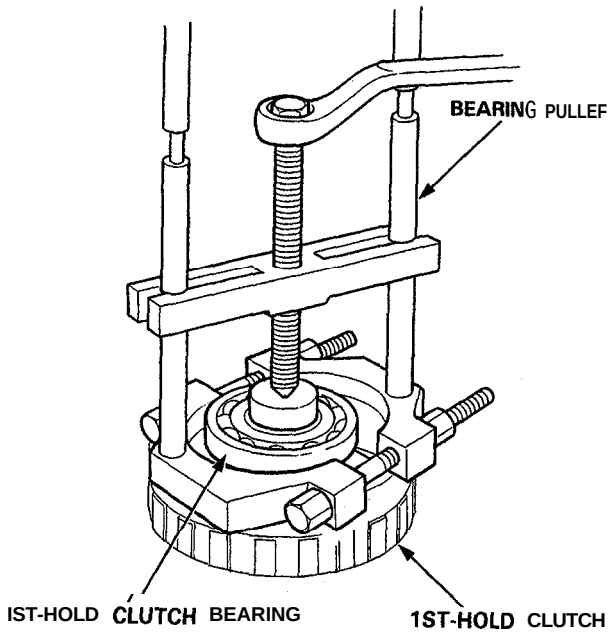
PART No.	PLATE No.	THICKNESS mm (in)
22631 –PR9–003	1	2.1 (0.083)
22632–PR9–003	2	2.2 (0.087)
22633–PR9–003	3	2.3 (0.091)
22634–PR9–003	4	2.4 (0.094)
22635–PR9–003	5	2.5 (0.098)
22636–PR9–003	6	2.6 (0.102)
22637–PR9–003	7	2.7 (0.106)
22638–PR9–003	8	2.8 (0.1 IO)
22639–PR9–003	9	2.9 (0.114)



1 st-Hold Clutch Bearing

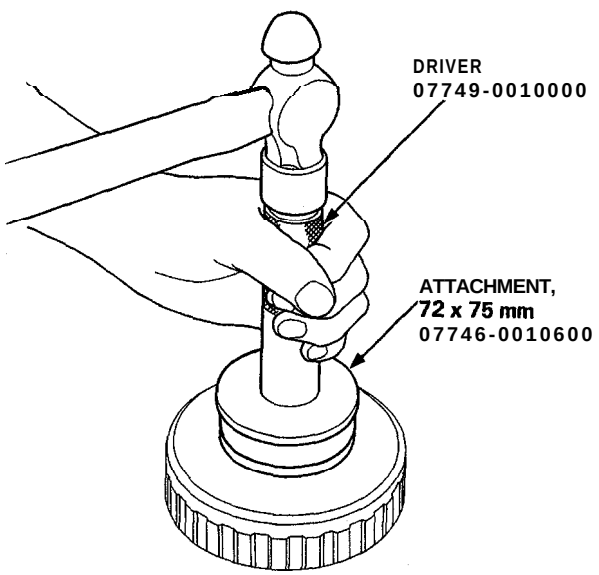
Replacement

1. Remove the Ist-hold clutch bearing using a bearing puller.



2. Install a new bearing using the special tools.

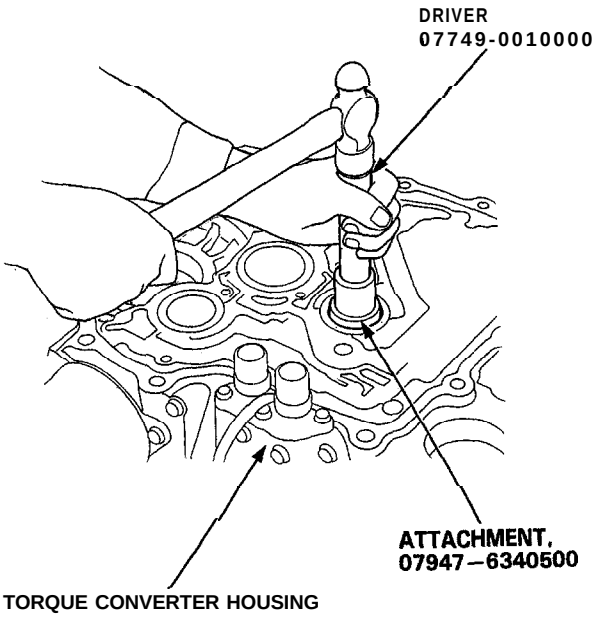
NOTE: Drive in the bearing until it fully bottoms.



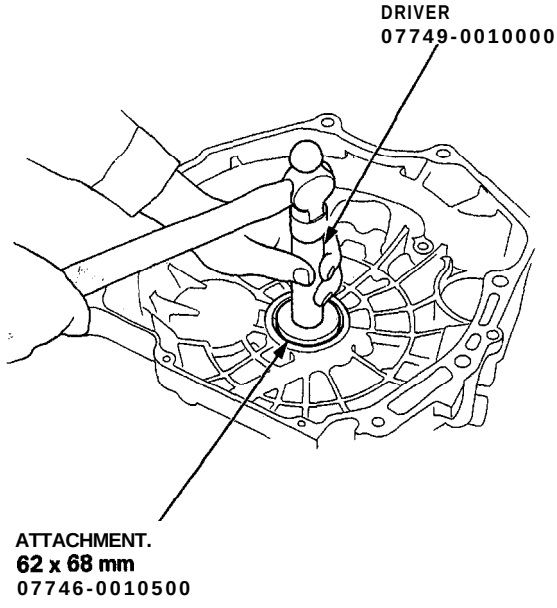
Torque Converter Housing Bearings
Mainshaft Bearing

Replacement

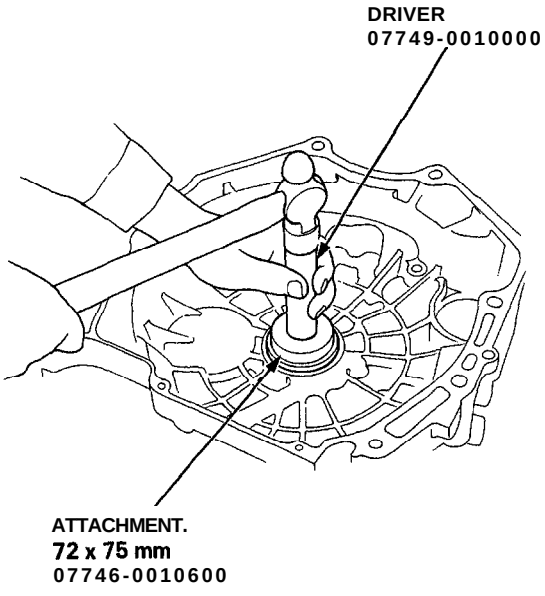
1. Drive out the mainshaft bearing and oil seal using the special tools.



2. Drive in the new mainshaft bearing until it bottoms in the housing, using the special tools.



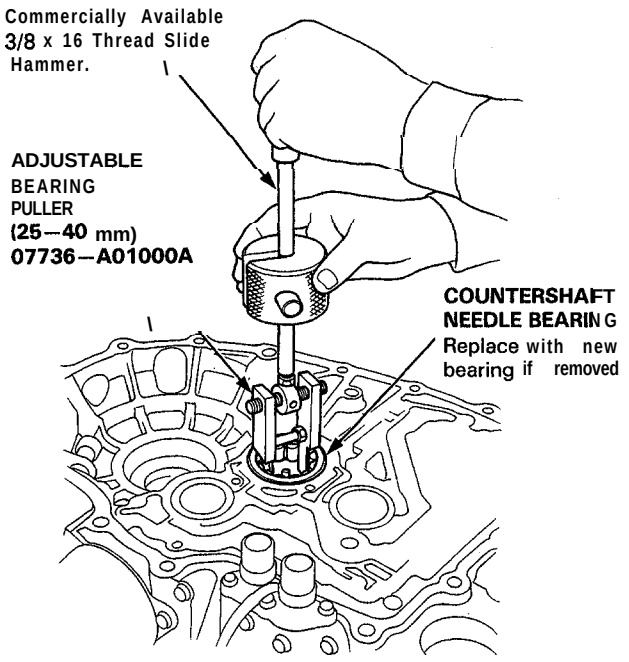
3. Install the new oil seal flush with the housing using the special tools.



Countershaft Bearing

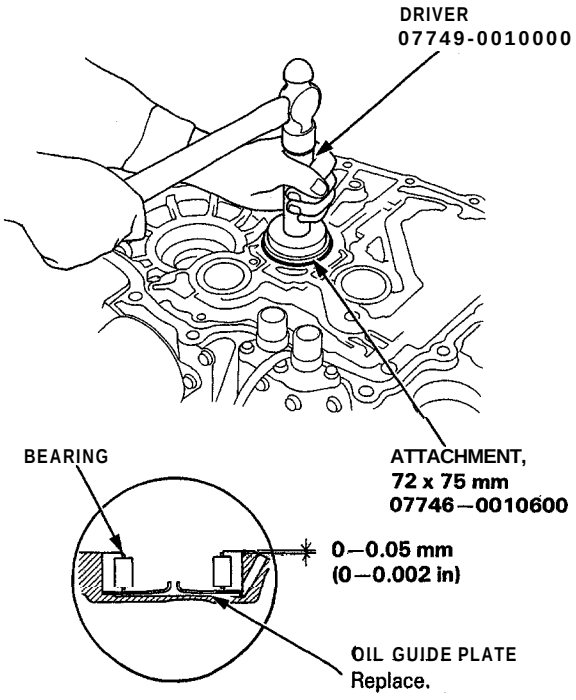
- Replacement

1. Remove the countershaft bearing using the special tool.



2. Replace the oil guide plate.

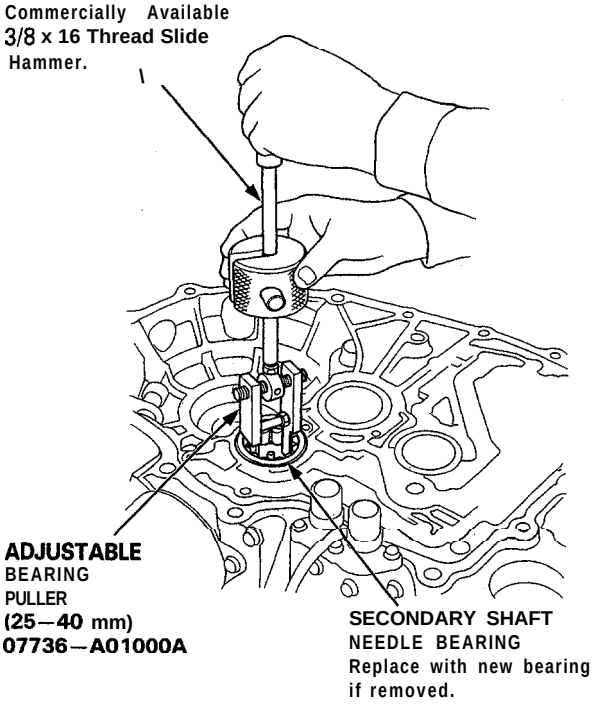
3. Drive the new bearing into the housing using the special tools.



Secondary Shaft Bearing

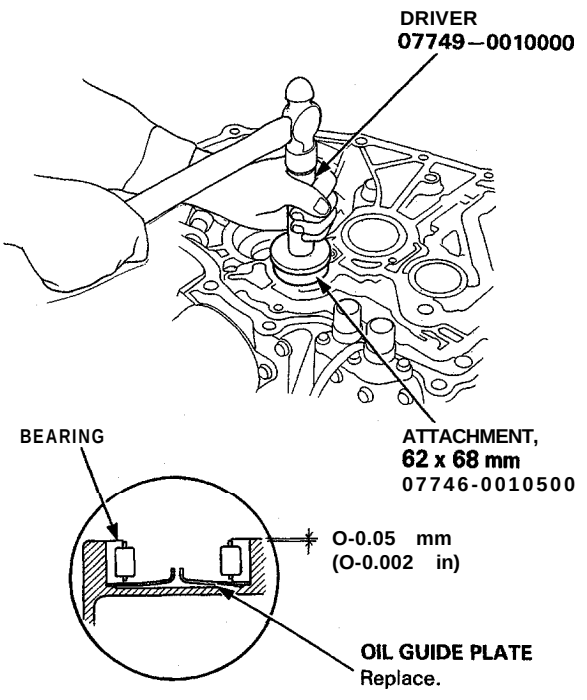
- Replacement

1. Remove the secondary shaft bearing using the special tool.



2. Replace the oil guide plate.

3. Drive the new bearing into the housing using the special tools.

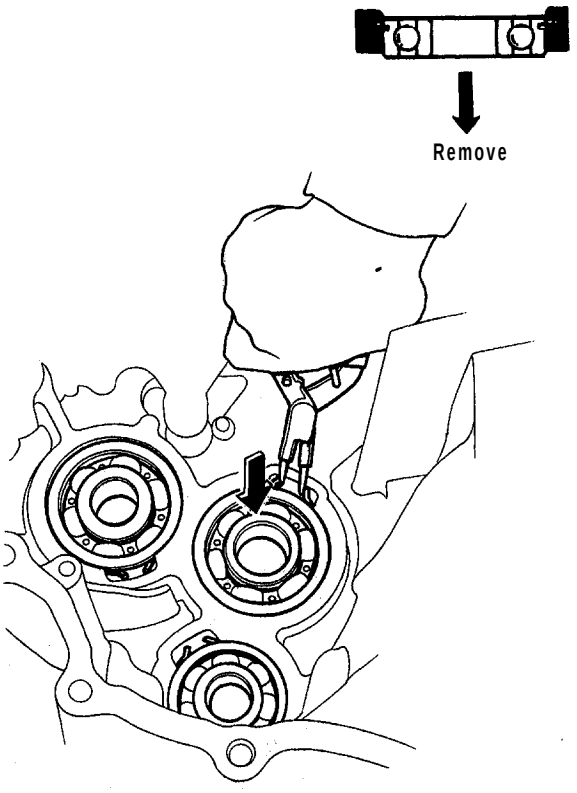


Transmission Housing Bearings

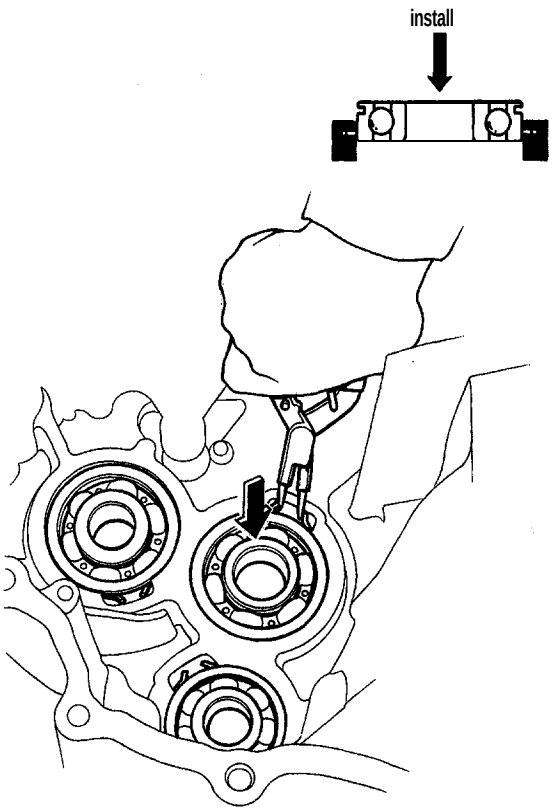
Replacement

1. To remove the mainshaft, countershaft and secondary shaft 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.

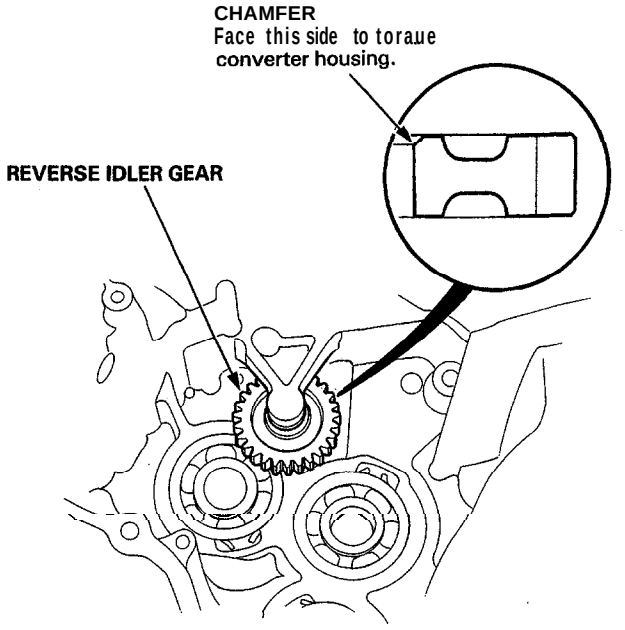


Reverse Idler Gear

Installation

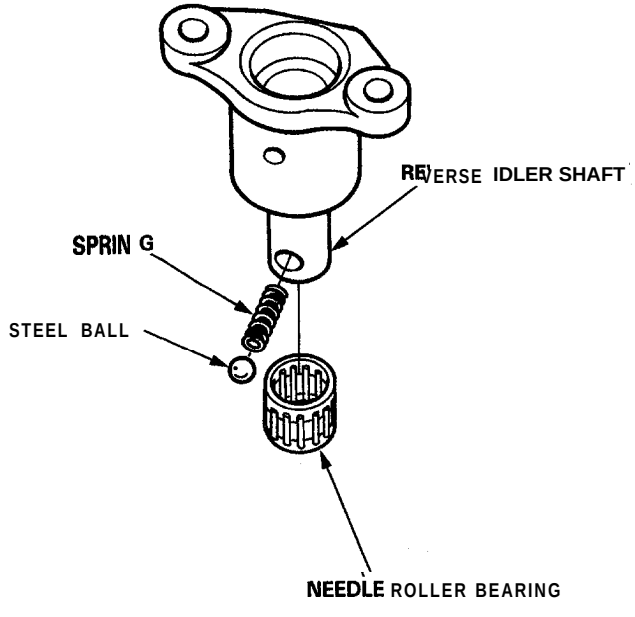
1. Install the reverse idler gear.

   NOTE: install the reverse idler gear so that the large chamfer on the shaft bore faces the torque converter housing.

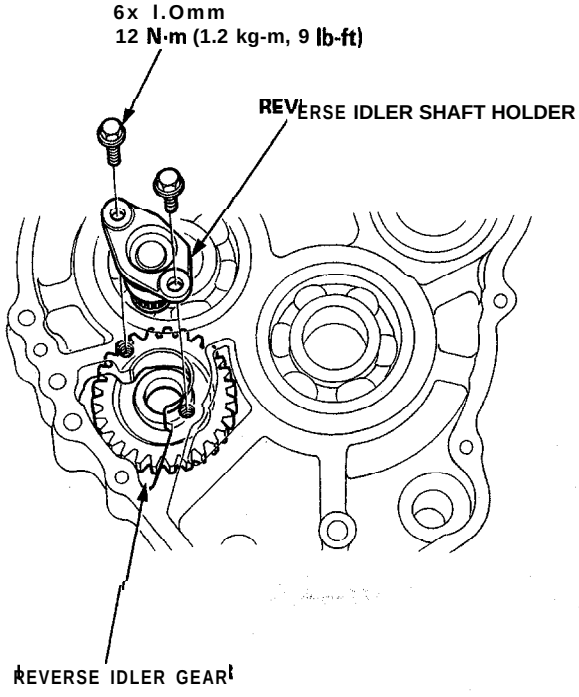


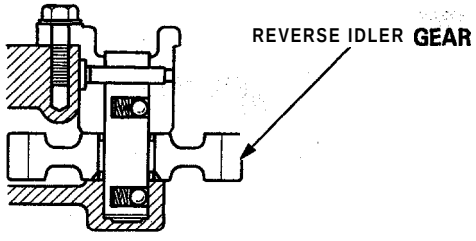
2. Set the spring in the reverse idler shaft. Push the spring in with the steel ball then install the needle bearing.

   NOTE: The steel ball is under spring pressure. Take care not to let it pop out.



3. Install the reverse idler shaft holder into the transmission housing, then tighten the bolts.





Manual Valve Detent Spring

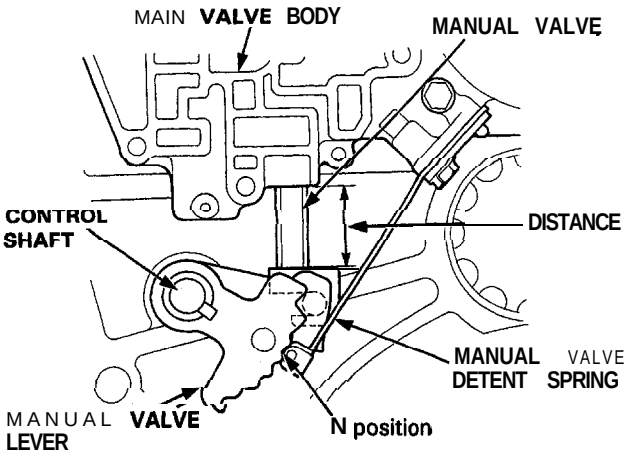
Replacement/Adjustment

NOTE: Select the appropriate manual valve detent spring when below parts are replaced.

- **Manual Valve**
- **Manual Valve Detent Spring**
- **Manual Valve Lever of Control Shaft**

1. **Install the main valve body, including the oil pump gears, onto the torque converter housing and tighten to 12 N·m (1.2 kg-m, 9 lb-ft).**
   See page 14-143.
2. **Install the control shaft.**
3. **Install the manual valve detent spring on the main valve body and tighten to 14 N·m (1.4 kg-m, 10 lb-ft).**
4. **Set the manual valve to N position.**
5. **Measure the distance between the main valve body and manual valve as shown.**

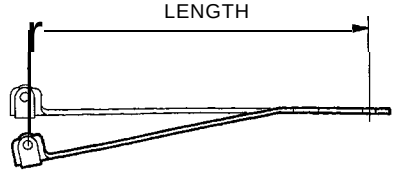
   DISTANCE: 28.0-29.0 mm (1.102—1.142 in)



6. **If the measurement is out of tolerance, select the appropriate manual valve detent spring using table below, then install it and recheck.**

MANUAL VALVE DETENT SPRING

No.	Part Number	Length
1	24618-PR9-000	103.5 mm (4.07 in)
2	24619-PR9-000	104.0 mm (4.09 in)
3	24620-PR9-000	104.5 mm (4.11 in)

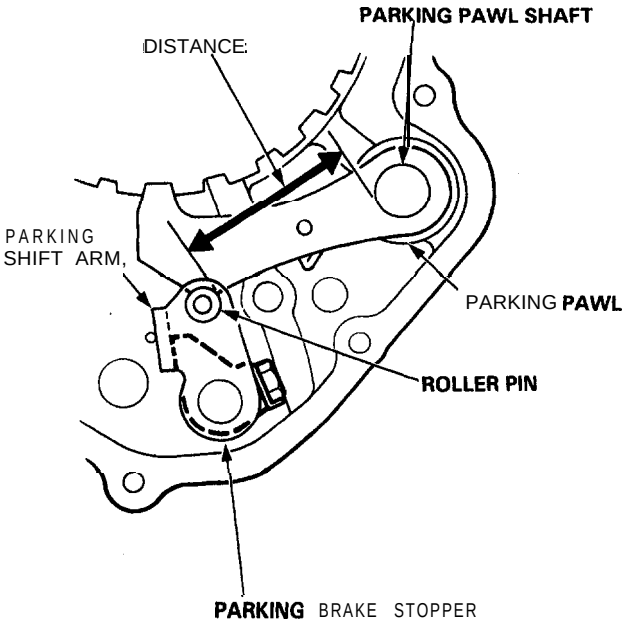


Parking Brake Stopper

Inspection/Adjustment

1. **Set the parking shift arm in the PARK position.**
2. **Measure the distance between the face of the parking pawl shaft and face of the parking shift arm roller pin as shown.**

   DISTANCE: 52.1-53.1 mm (2.051-2.091 in)



3. **If the measurement is out of tolerance, select the appropriate parking brake stopper using the table below, and install it on the parking shift arm.**

PARKING BRAKE STOPPER

No.	Part Number
1	24537-PA9-003
2	24538-PA9-003
3	24539-PA9-003

Reassembly

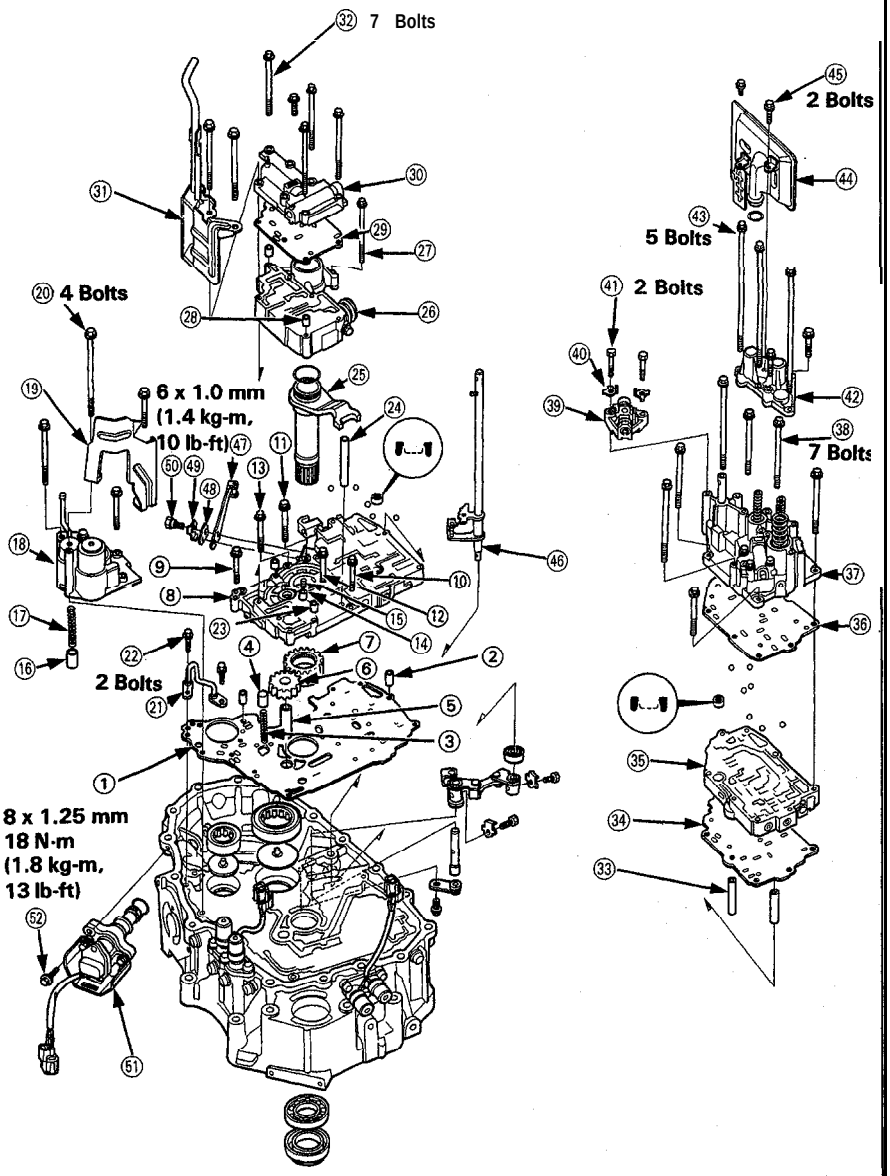
NOTE: Coat all parts with ATF.

1. Reassemble the valve bodies in the following numbered sequence.

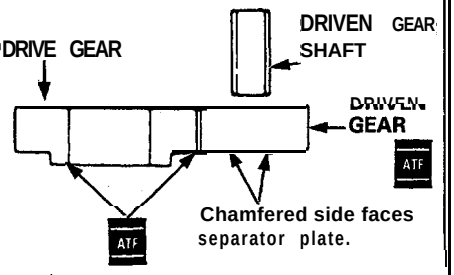
CAUTION: To prevent stripping the threads, press down on the accumulator cover while installing the bolts.

TORQUE:
6 x 1 .0 mm: all bolts except (50): 12 N·m (1.2 kg-m, 9 lb-ft)
6 x 1 .O mm: (50): 14 N·m (1.4 kg-m, 10 lb-ft)

NOTE: Install the oil pump driven gear with its chamfered side facing down.

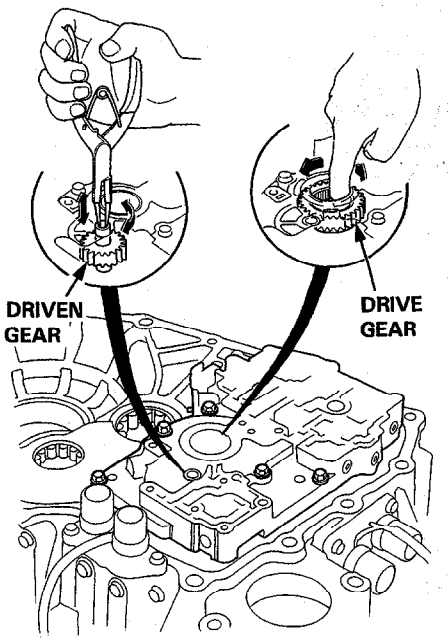


NOTE: Install the oil pump driven gear with its chamfered side facing down.



NOTE: Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in the axial and normal operating directions.

CAUTION: If the pump gear and pump shaft do not move freely, loosen the valve body bolts, realign the shaft, and then retighten to the specified torque. Failure to align the pump shaft correctly will result in seized pump gear or pump shaft.

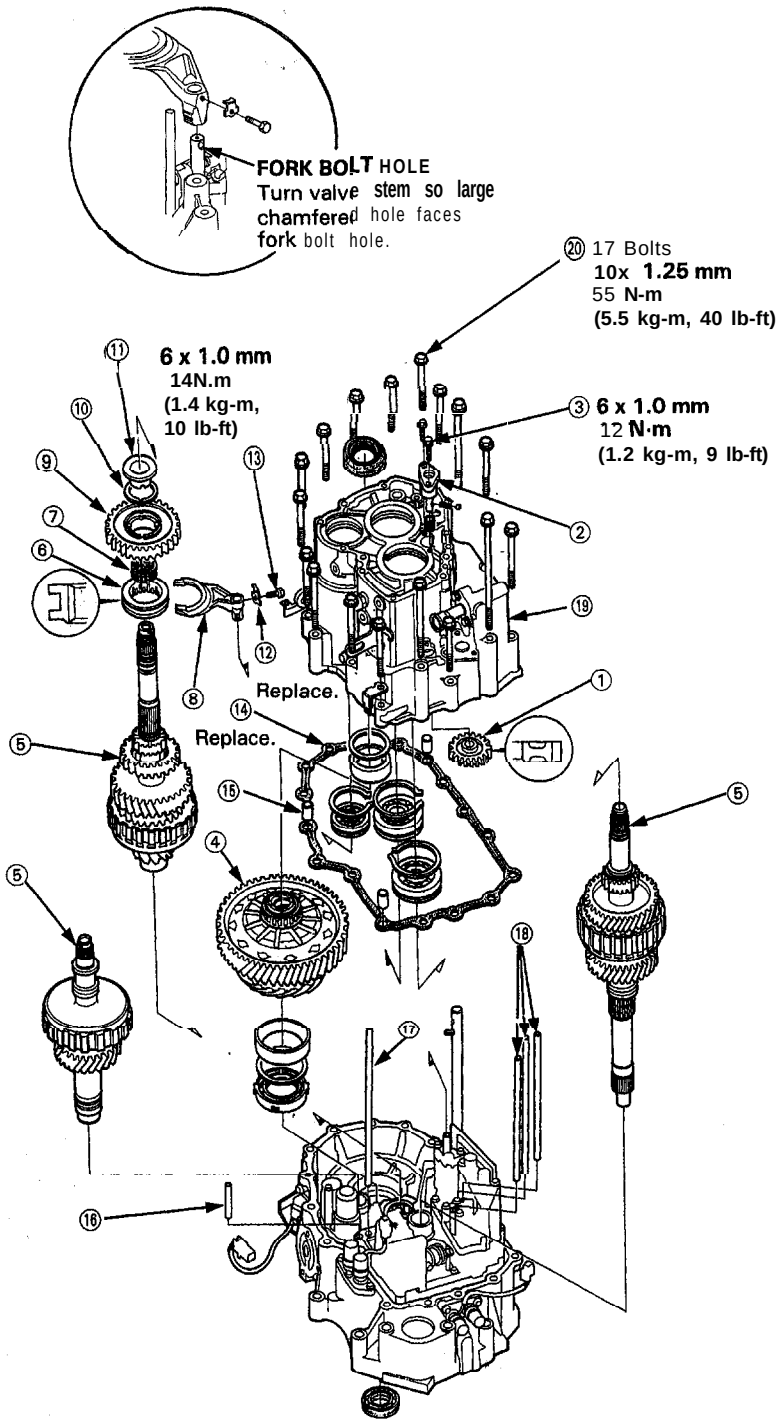


(cont'd)

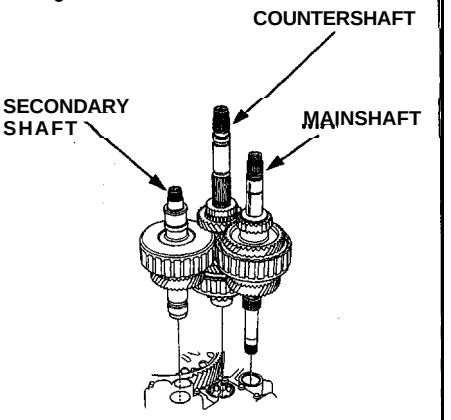
Reassembly

2. Assemble the transmission housing in the following numbered sequence.

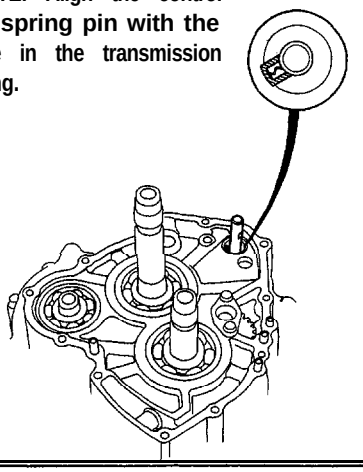
NOTE: See page 14-l 41 when installing the reverse idler gear.



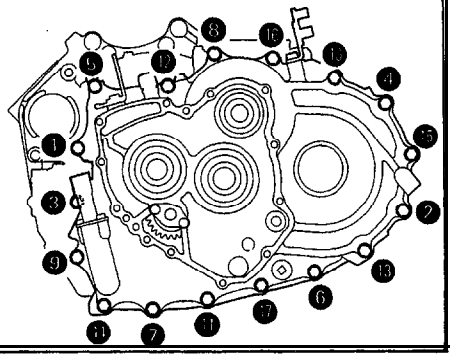
⑤ NOTE: Install the three shafts together.



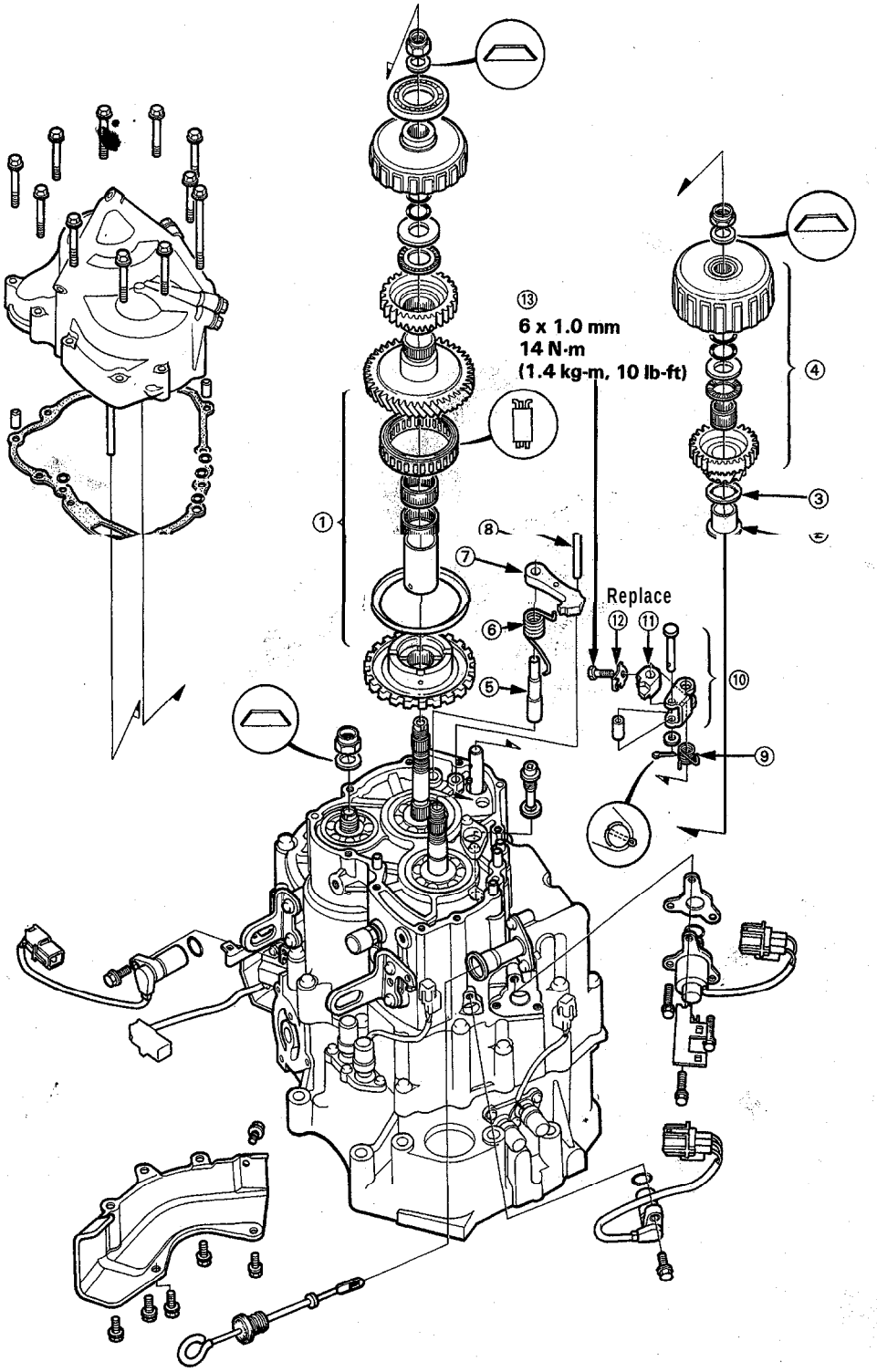
⑳ NOTE: Align the control shaft spring pin with the groove in the transmission housing.



㉑ NOTE: Torque bolts to 55 N·m (5.5 kg-m, 40 lb-ft) in order of ① thru ⑰ in two or more steps.



3. Assemble the transmission in the following numbered sequence.



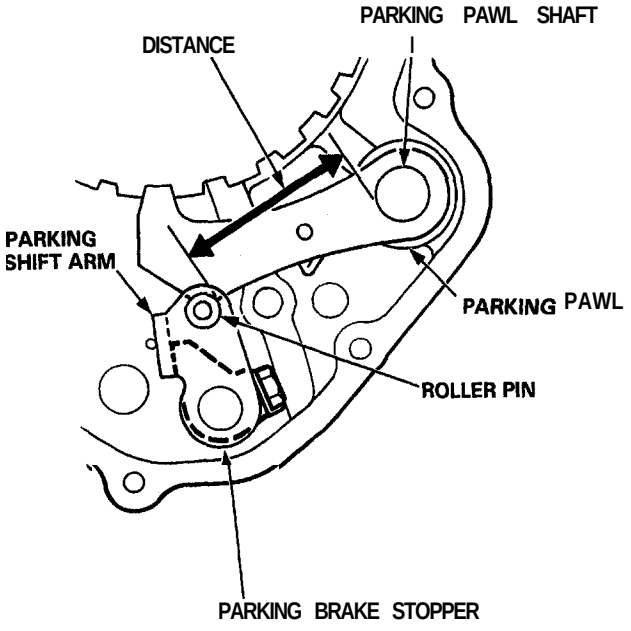
(cont'd)

Reassembly

4. Set the parking shift arm in the PARK position.

5. Measure the distance between the face of the parking pawl shaft and face of the parking shift arm rollers pin as shown.

   DISTANCE: 52.1 – 53.1 mm (2.051 – 2.091 in)

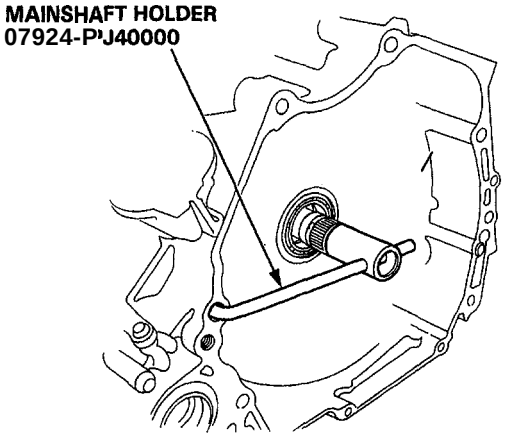


6. If the measurement is out of tolerance, select the appropriate parking brake stopper using the table below, and install it on the parking shift arm.

   PARKING BRAKE STOPPER

NO.	PARTS NUMBER
1	24537–PA9–003
2	24538–PA9–003
3	24539–PA9–003

7. Install the special tool as shown, and shift to PARK position.

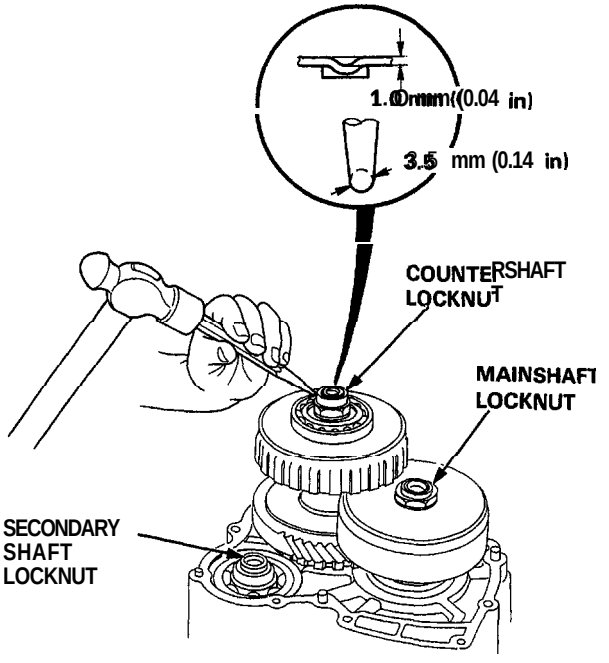


8. Install and torque the new locknuts. Tighten to specified torque, then loosen and retighten to specified torque.

   TORQUE: 140 → 0 → 140 N·m
   (14.0 → 0 → 14.0 kg-m, 101 → 0 → 101 lb-ft)

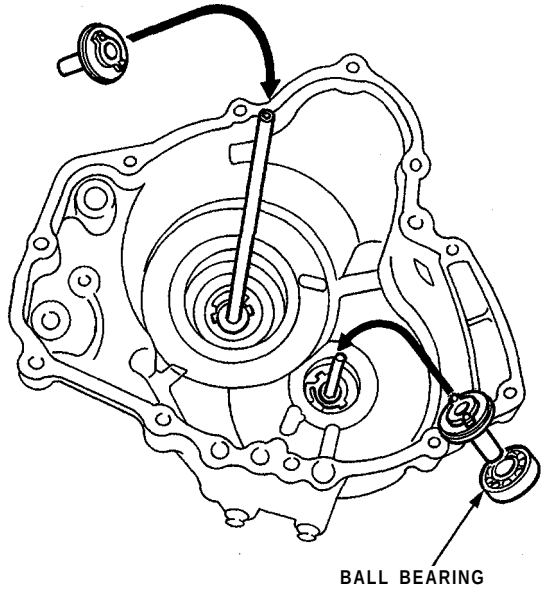
   NOTE: Countershaft locknut has left-hand threads.

9. **Stake each locknut into its shaft, using a 3.5 mm punch.**



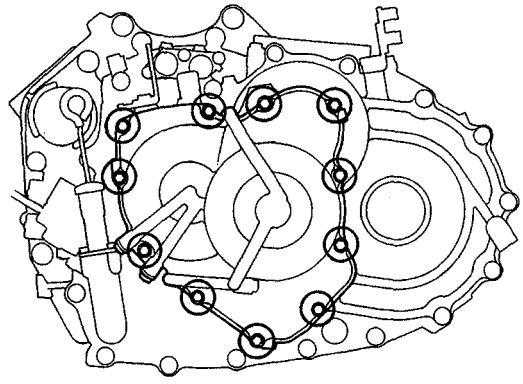
10. Install the feed pipes and ball bearing in the L. Side Cover, aligning the lugs of the 1st and Ist-hold clutch feed pipes with the grooves of the L. side cover.

11. Install the snap ring.



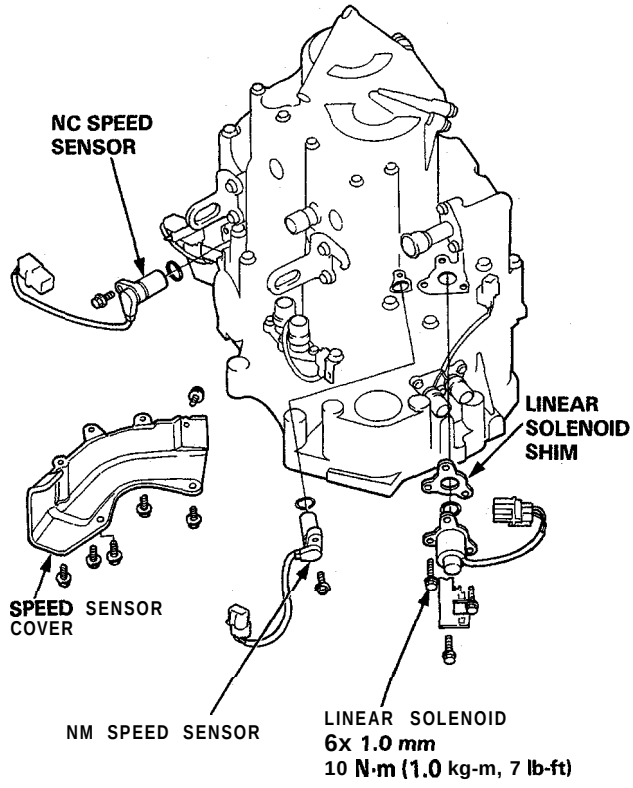
12. Install the L. Side Cover.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

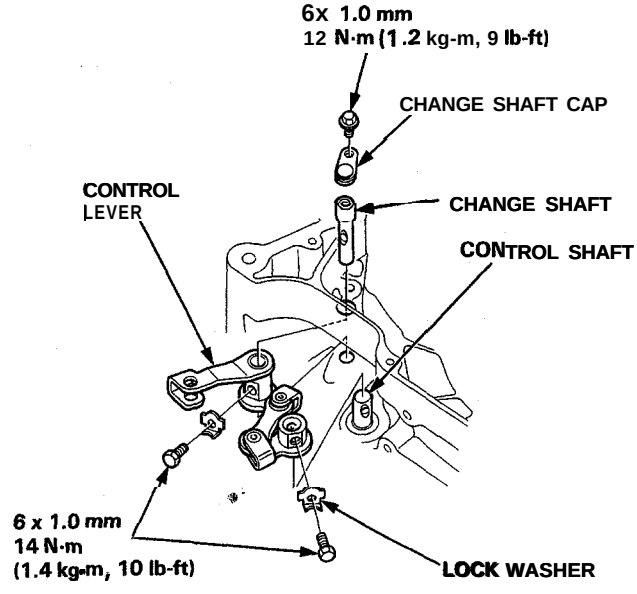


13. Install the speed sensors, speed sensor cover and linear solenoid.

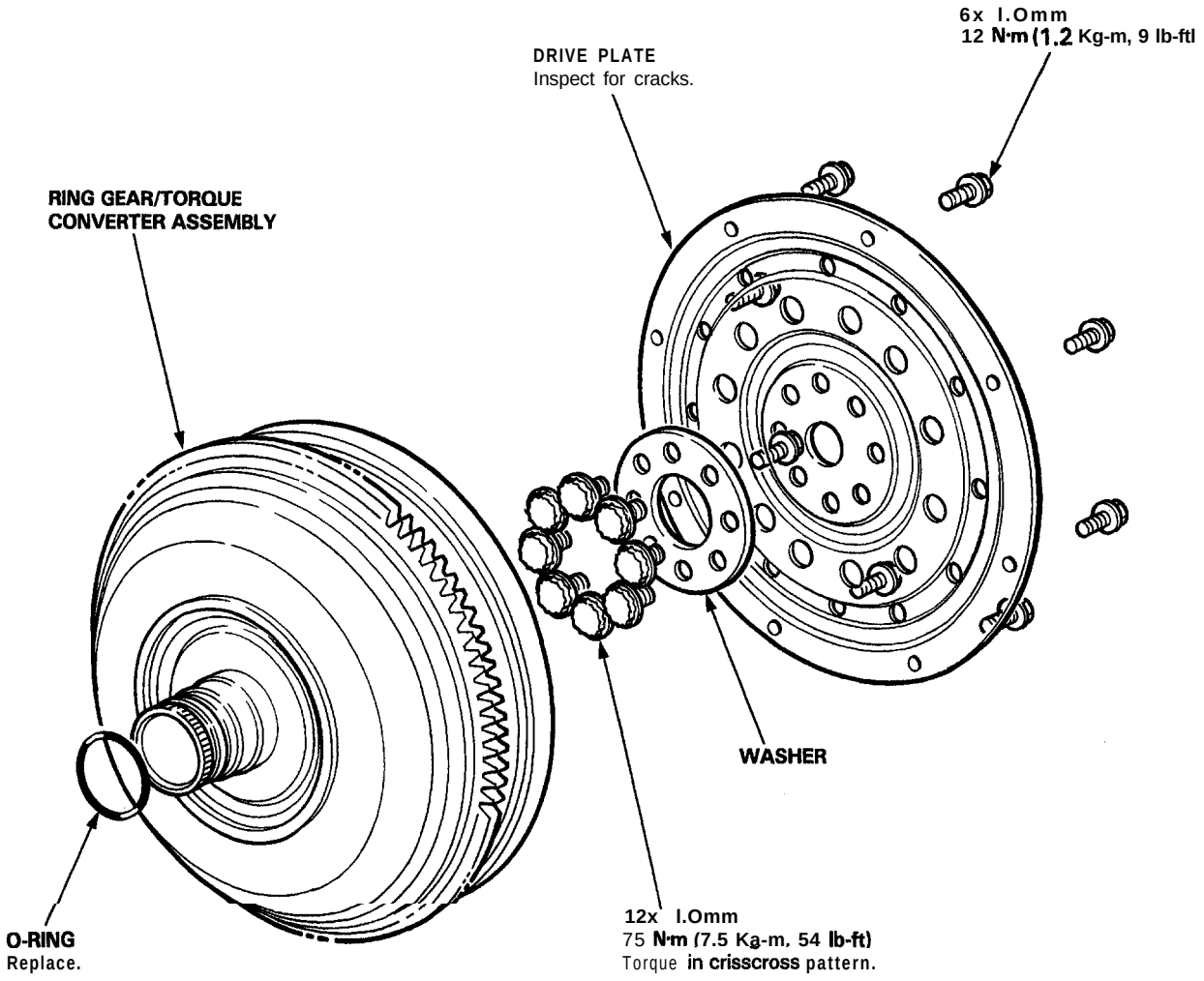
TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



14. Install the control lever, new lock washers, change shaft and change shaft cap on the other end of the control shaft. Tighten the bolts and then bend the tab over against the bolt head.



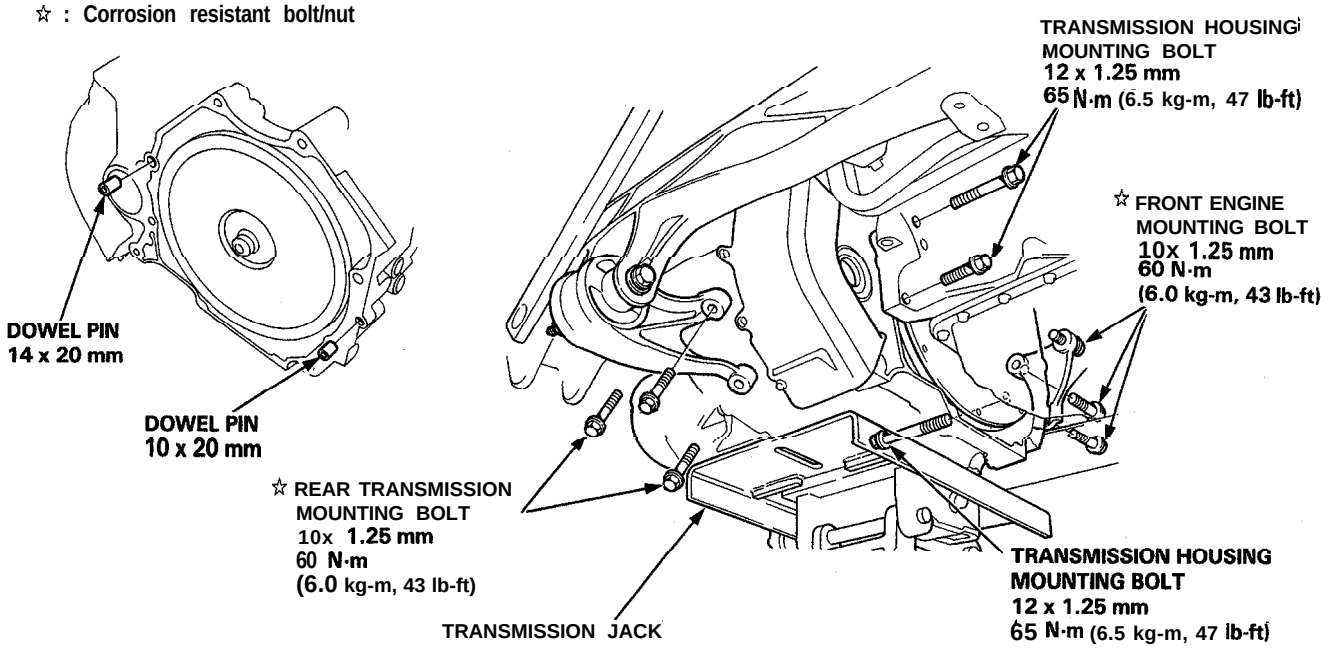
Disassembly



Installation

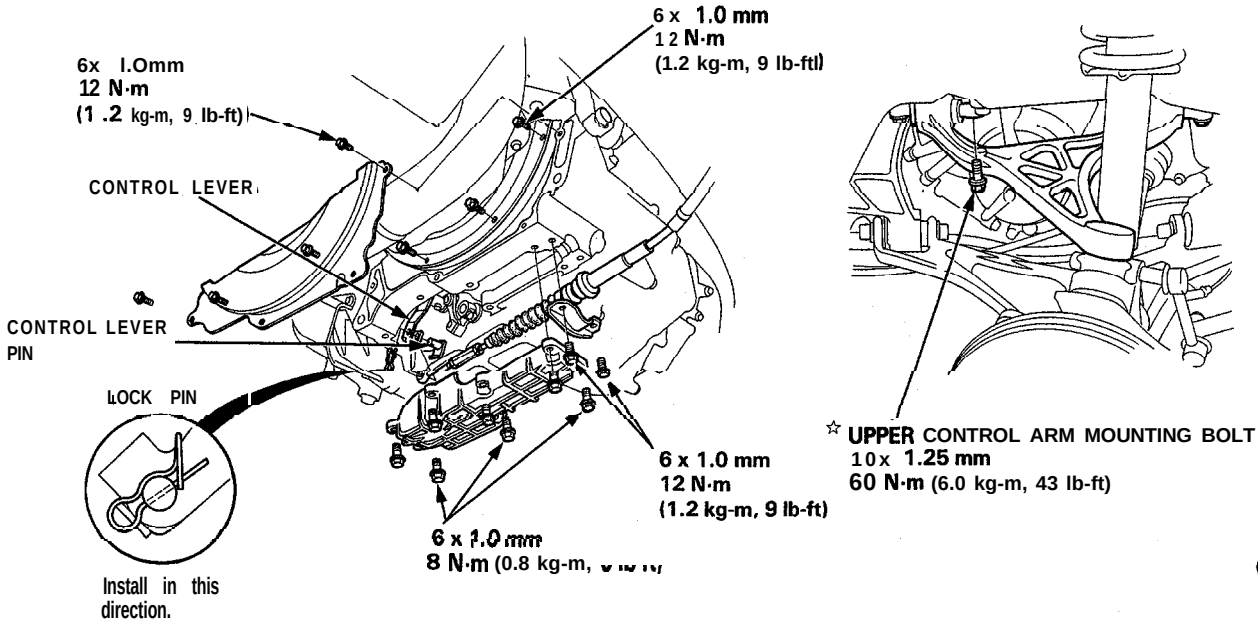
1. Place the transmission on the transmission jack, and raise to the engine level.
2. Check that the 14 mm and 10 mm dowel pins are installed in the torque converter housing.
3. Install the 3 transmission housing mounting bolts.
4. Install the 3 rear transmission mounting bolts.
5. Loosen the front engine mounting bolt, then install the 2 front engine mounting bolts to transmission side.
6. Remove the transmission jack.

☆ : Corrosion resistant bolt/nut



7. Attach the torque converter to the drive plate with 8 bolts to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate the crankshaft as necessary to tighten bolts to 1/2 of specified torque, then final torque, in a crisscross pattern. Check for free rotation after tightening the last bolt.
8. Install the torque converter cover.
9. Install the shift cable, shift cable holder and shift cable cover.
10. Install the upper control arm mounting bolt.

☆ : Corrosion resistant bolt/nut



(cont'd)

Installation (cont'd)

11. Install a new set ring on the end of the left driveshaft and intermediate shaft.
12. Install the left driveshaft.
13. install the lower control arm to the side beam.

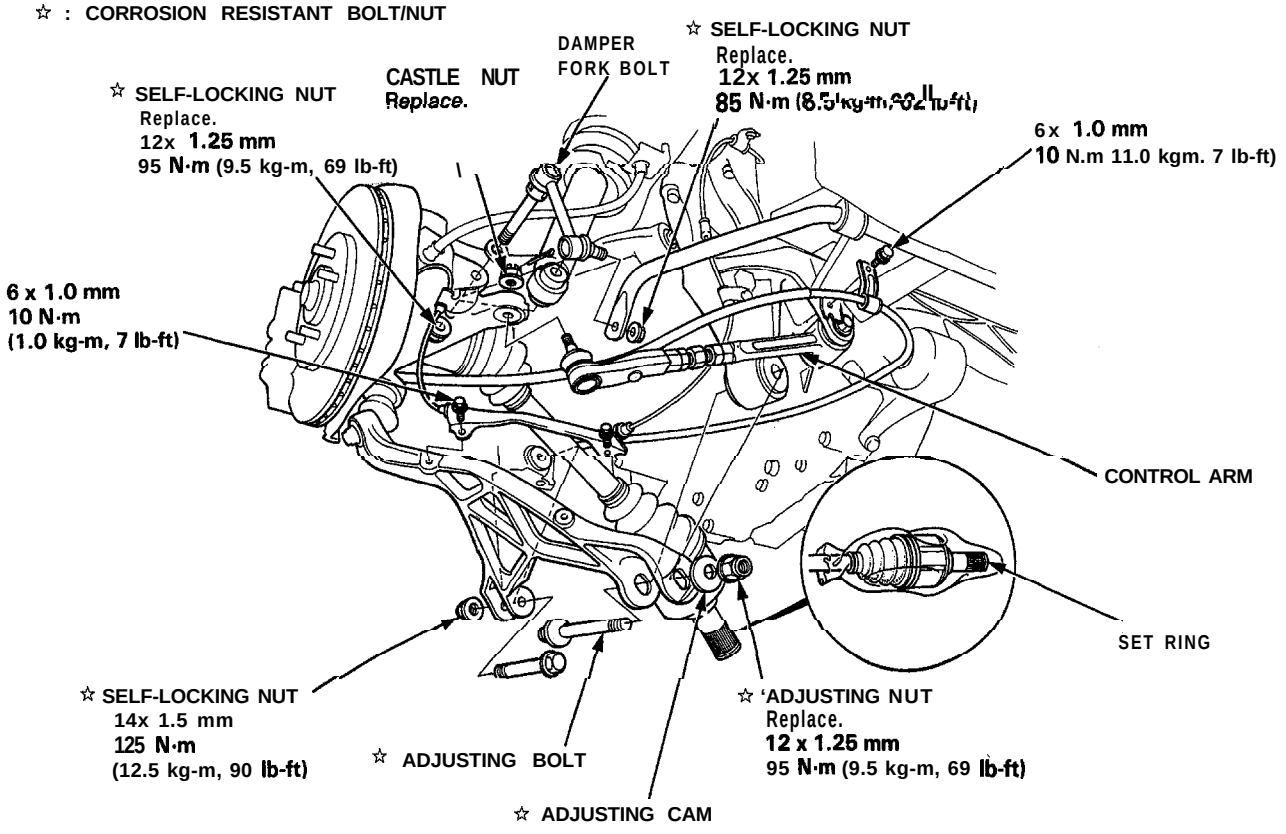
CAUTION: Line up the reference marks on the adjusting bolt, adjusting cam and lower control arm.

14. Install the damper fork bolt.
15. Install the castle nut to the control arm at the knuckle.

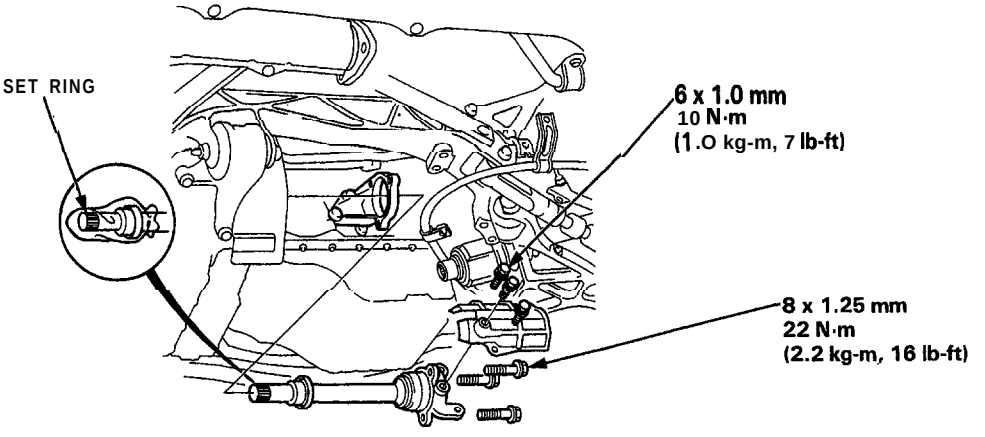
CAUTION: Make sure that the reference marks on the control arm are aligned.

16. Install the anti-lock brake system sensor wire clamp and parking brake cable holder.

☆ : CORROSION RESISTANT BOLT/NUT

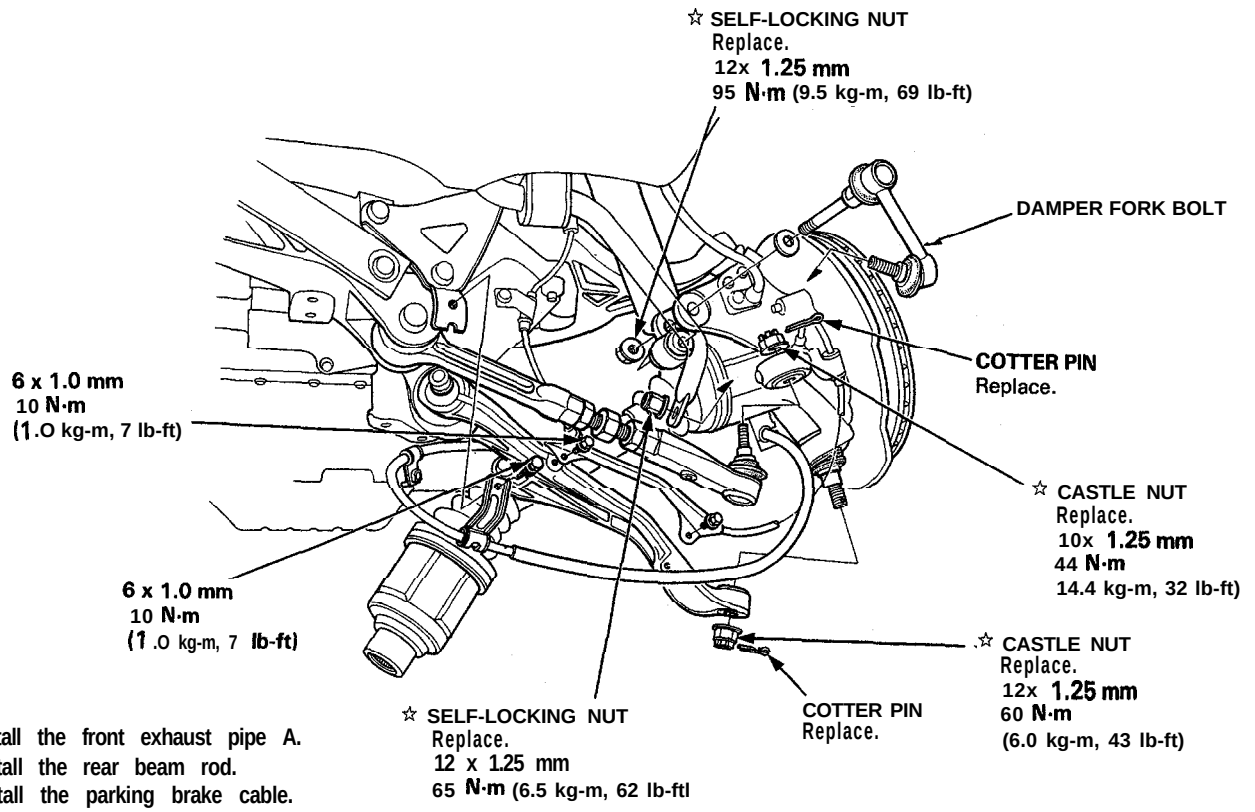


17. Install the intermediate shaft and tighten the intermediate shaft mounting bolts to the intermediate shaft support base.
18. Install the intermediate shaft heat cover.



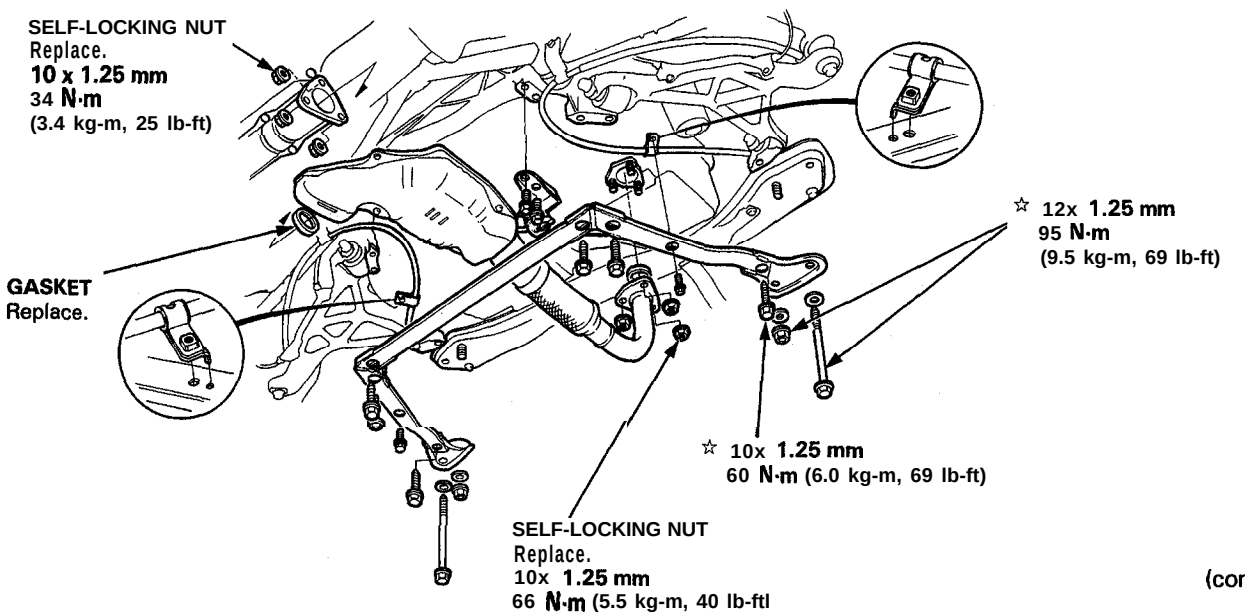
19. Install the right driveshaft on the intermediate shaft.
20. Install the castle nut on the lower arm at the knuckle.
21. Install the damper fork bolt.
22. Install the castle nut on the control arm at the knuckle.
    CAUTION: Make sure that the reference marks on the control arm are aligned.
23. Install the ALB sensor wire clamp and parking brake cable holder.

☆ : Corrosion resistant bolt/nut



24. Install the front exhaust pipe A.
25. Install the rear beam rod.
26. Install the parking brake cable.

☆ : Corrosion resistant bolt/nut

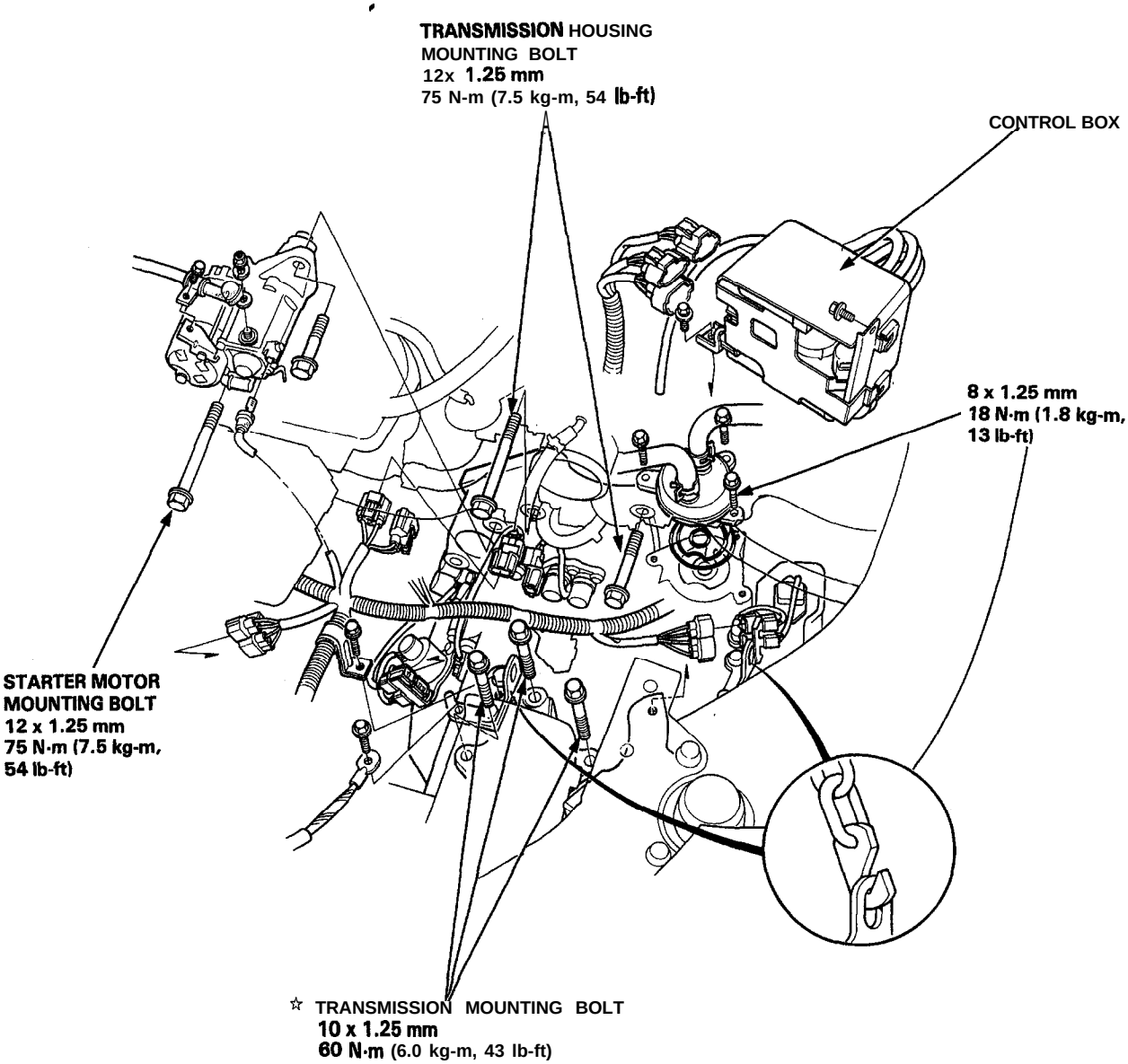


(cont'd)

· Installation (cont'd)

27. Install the 3 transmission mounting bolts, and the 2 transmission housing mounting bolts.
28. Install the starter motor and tighten the starter motor mounting bolts.
29. Install the ATF cooler.
30. Connect the transmission ground cable, starter motor cable, solenoid valve wire connectors and speed sensor wire connectors.
31. Install the control box and connect the control box connectors.
32. Install the air cleaner case.
33. Install the strut bar.
    TORQUE: 39 N·m (3.9 kg-m, 28 lb-ft)
34. Refill the transmission with ATF.
35. Connect the battery positive (+) and negative (–) cable to the battery.
36. Inspect the rear camber (See Section 18).
37. Start the engine. Set the parking brake, and shift the transmission through all gears three times. Check for proper shift cable adjustment.
38. Check the ignition timing (See Section 23).
39. Let the engine each operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
40. Road test as described on page 14-88.

☆ : Corrosion resistant bolt/nut



Shift Cable

Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting on pages 14-84 thru 14-87.

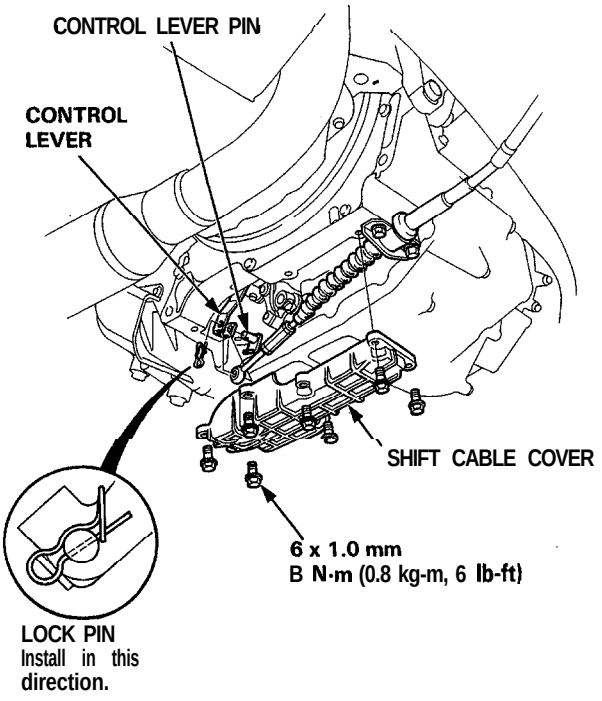
2. Stop the engine.

3. Raise the car. (See page I-6.)

4. Shift the selector lever to 1 position.

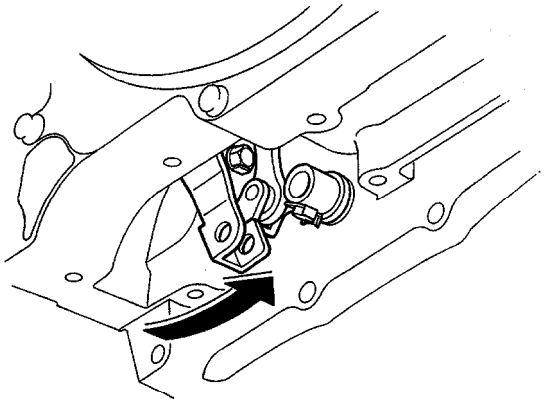
5. Remove the shift cable cover.

6. Remove the control lever pin and lock pin from the control lever.



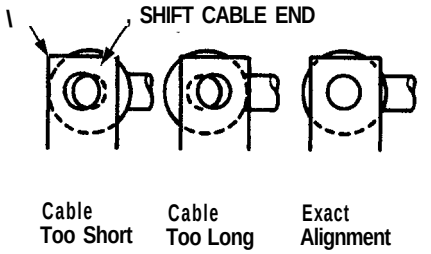
7. Shift the control lever to 1 position.

NOTE: 1 position moves the control lever toward to the front of the car.

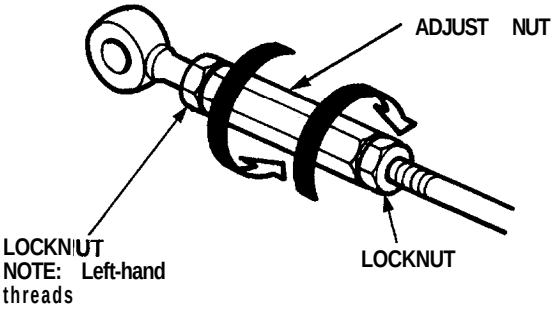


8. Check that the hole in the control lever is perfectly aligned with the hole in the shift cable.

CONTROL LEVER



9. If not perfectly aligned, loosen the locknut on the shift cable and adjust as required.



10. Tighten the locknut.

11. Install the control lever pin and lock pin.

NOTE:
- If you feel the control lever pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
- Install the lock pin as shown in step 6.

12. Intall the shift cable cover.

13. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to Troubleshooting on pages 14-84 thru 14-87.

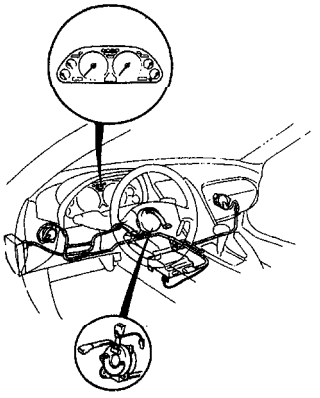
Shift Cable

Removal/Installation

SRS wire harness is routed near the gearshift selector.

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be carefull not to damage the SRS wire harness when servicing the gearshift selector.

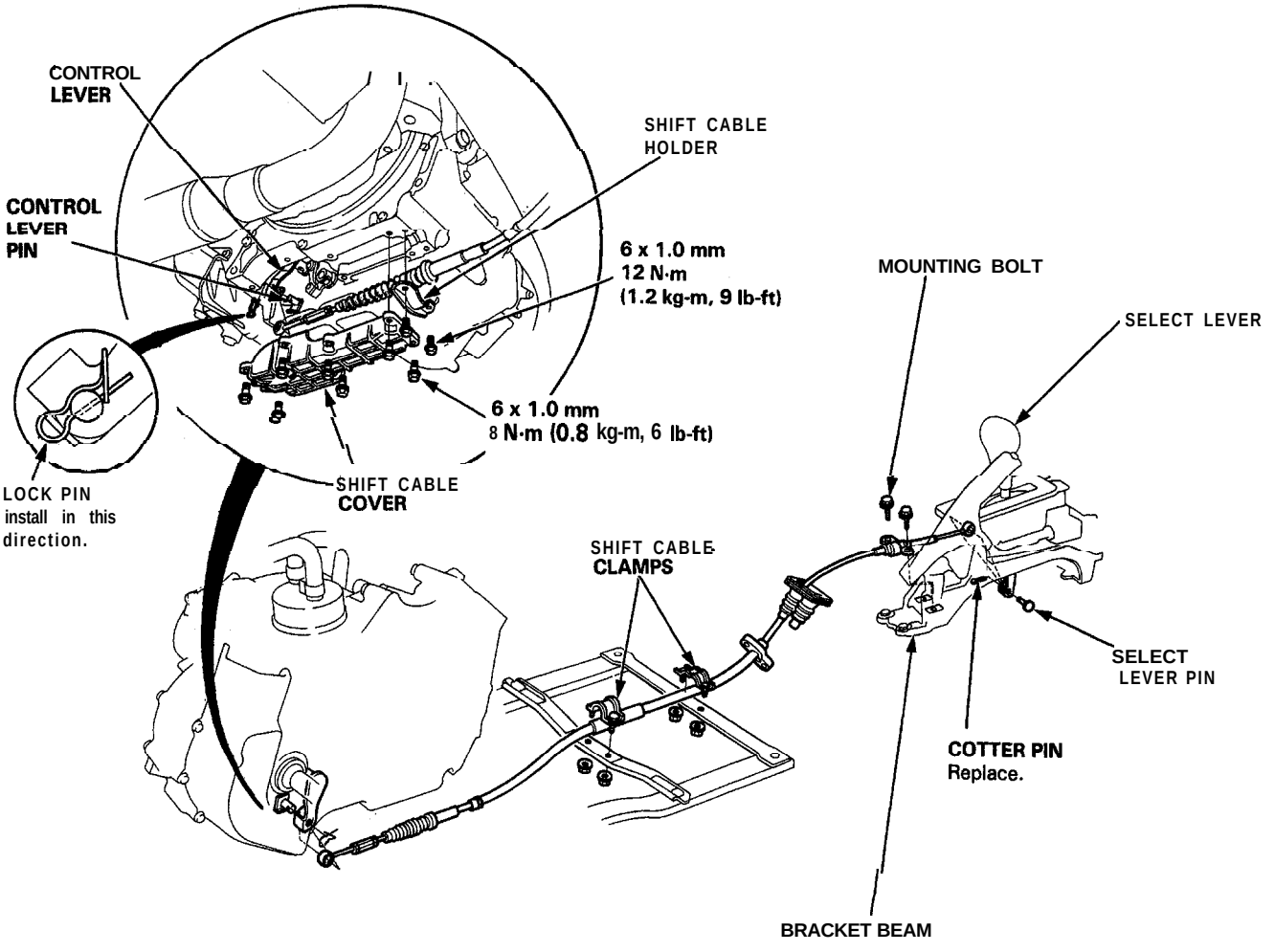


⚠ WARNING Make sure lifts are placed properly.

1. Remove the center console panel.
2. Remove the shift cable by removing the cotter pin and selector lever pin from the selector lever, and mounting bolts from the bracket beam.
3. Remove the shift cable clamps.
4. Remove the shift cable holder and shift cable cover.
5. Remove the shift cable by removing the lock pin and control lever pin from the control lever.

   CAUTION: Take car not to bend the cable when removing it.

6. Install the shift cable in the reverse order of removal.
7. Check the cable adjustment on reassembly, on page 14-153.

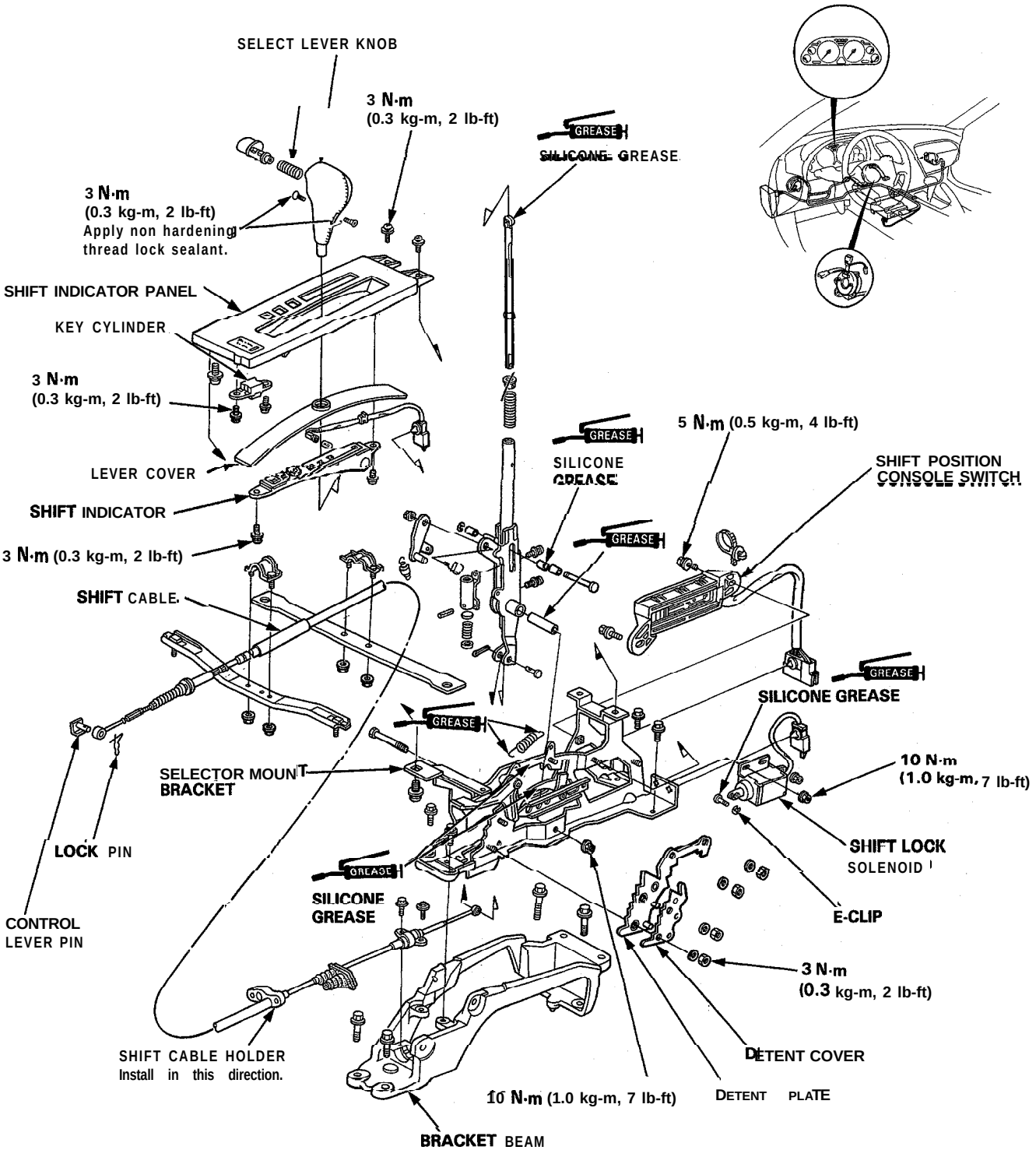


Gearshift Selector

SRS wire harness is routed near the gearshift selector.

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be carefull not to damage the SRS wire harness when servicing the gearshift selector.



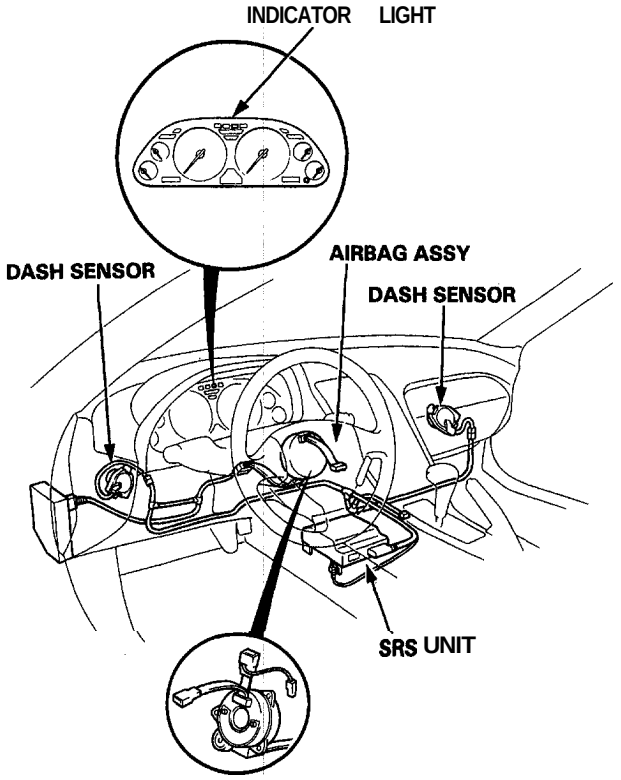
Shift Indicator Panel

Adjustment

SRS wire harness is routed near the gearshift selector.

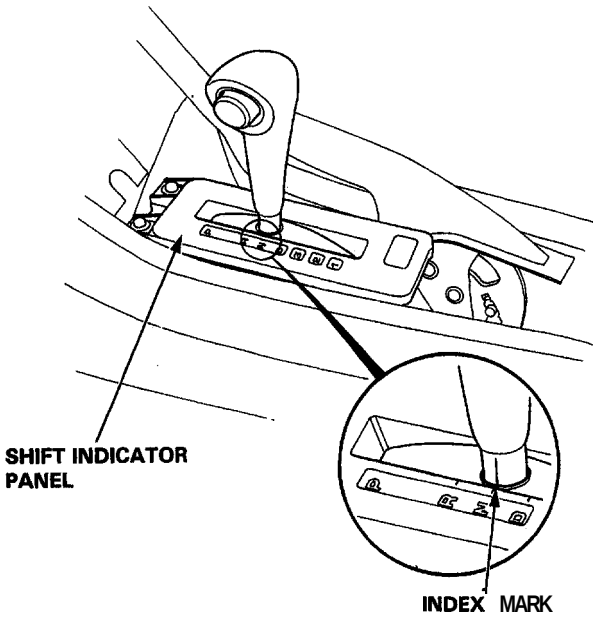
⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be carefull not to damage the SRS wire harness when servicing the shift indicator panel.



1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel with the transmission in NEUTRAL.
2. If not aligned, remove the center console panel. (See section 20.)
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.

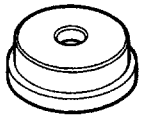


Differential

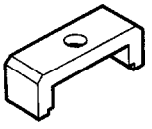
Special Tools 15-2
Illustrated Index 15-3
Preset Torque
Inspection 15-4
Bearing
Replacement 15-5
Differential
Disassembly 15-6
Clutch Disc, Clutch plate
Replacement 15-8
Differential
Reassembly 15-9
Oil Seal
Replacement 15-11
Bearing Outer Race
Replacement
(Clutch Housing Side) 15-12
Bearing Preload
Adjustment 15-12
Oil Seal
Installation 15-14

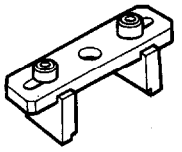
Special Tools

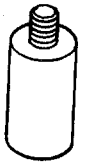
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAD—SD40101	Attachment, 78 x 70 mm	1	15-12
②	07GAE—PL50100	Clutch Spring Compressor Bolt Assembly	1	15-6, 15-I 0
③	07HAE—PG40200	Clutch Spring Compressor Attachment	1	15-6, 15-I 0
④	07LAE—PX40100	Clutch Spring Compressor Attachment	1	15-6, 15-I 0
⑤	07MAD—PR90200	Pilot 32 x 60 mm	1	15-14
⑥	07MAD—PR90300	Attachment, 45 x 55 mm	1	15-5
⑦	07MAJ—PR90100	Differential Inspection Tools	1	15-4, 15-6, 15-11, 15-13
⑧	07746-0010500	Attachment, 62 x 68 mm	1	15-12
⑨	07749-0010000	Driver	1	15-12, 15-14
⑩	07965—SA00600	Driver Attachment	1	15-14

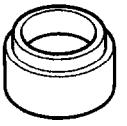

①

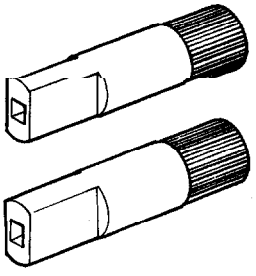
②

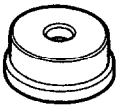

③

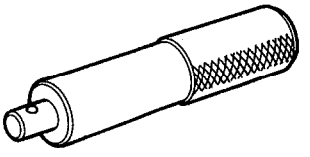

④

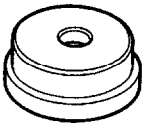

⑤


⑥


⑦


⑧

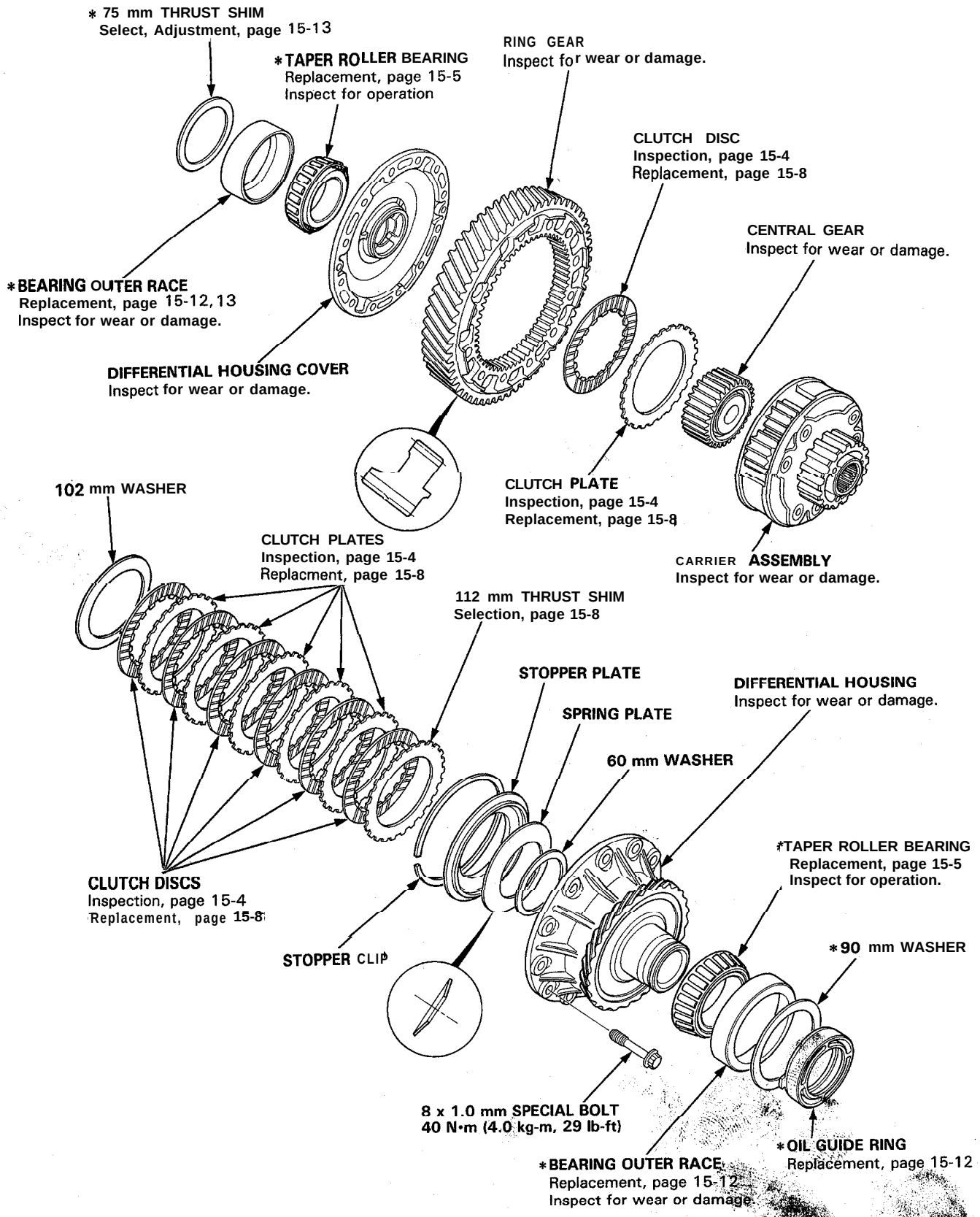

⑨


⑩

Differential

Illustrated Index

NOTE: If the * mark parts are replaced, the bearing preload must be adjusted (page 15-12).



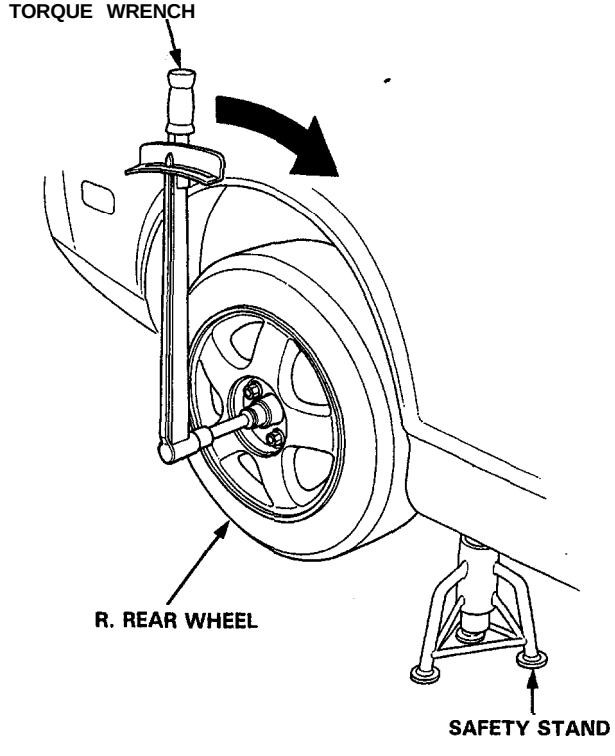
Preset Torque

-Inspection

On-Car:

1. Lift up right rear wheel and place the safety stand. **(Lift and Support Points, page I-6).**
2. Block the other three wheels.
3. **Measure preset torque clockwise using a torque** wrench as shown.

   Standard: **60 — 140 N·m**
   (6 — 14 kg·m, 43-101 lb-ft)
   Service Limits: 30 N·m (3 kg-m, 22 lb-ft)

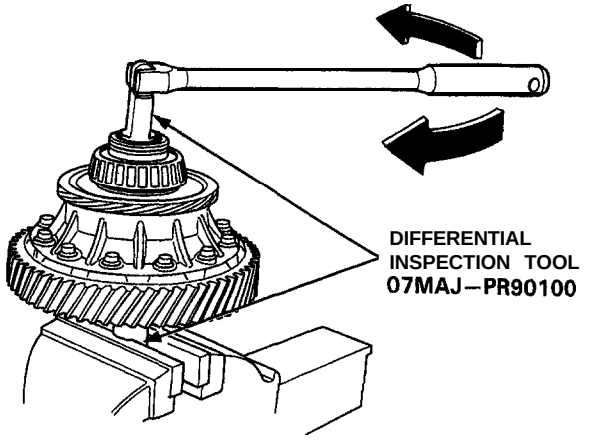


4. **If preset torque is less than the service limit,** replace the clutch discs with new ones.

   NOTE: Adjust the thrust shim whenever the clutch discs are replaced. (See page 15-8).

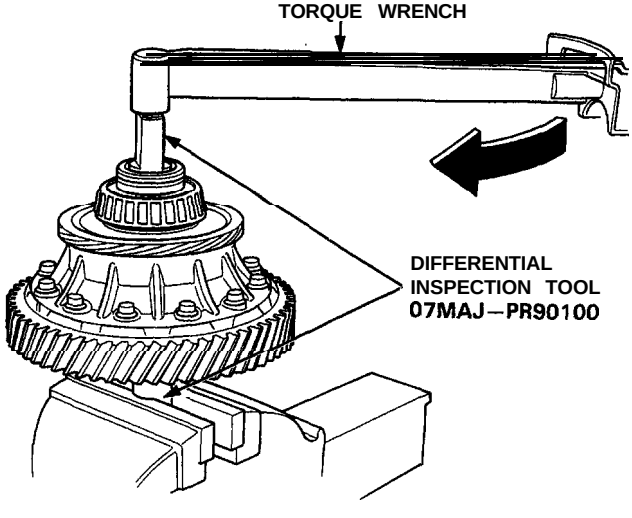
Assembly:

1. Place one special tool in a vise. Place the left side of **the differential assembly on the special tool, then preset the differential with 3-5 rotations, both** clockwise and counterclockwise.



2. **Measure preset torque clockwise using a torque** wrench as shown.

   Standard: **60 — 140 N·m**
   (6 — 14 kg-m, 43-101 lb-ft)
   Service Limit: 30 N·m (3 kg-m, 22 lb-ft)



3. **If preset torque is less than the service limit,** replace the clutch discs with new ones.

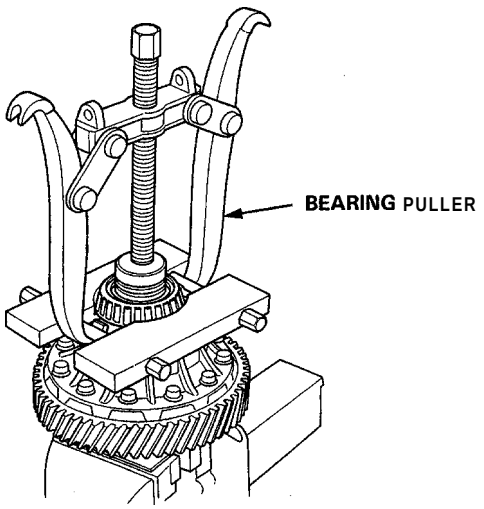
   NOTE: Adjust the thrust shim whenever the clutch discs are replaced. (See page 15-8).

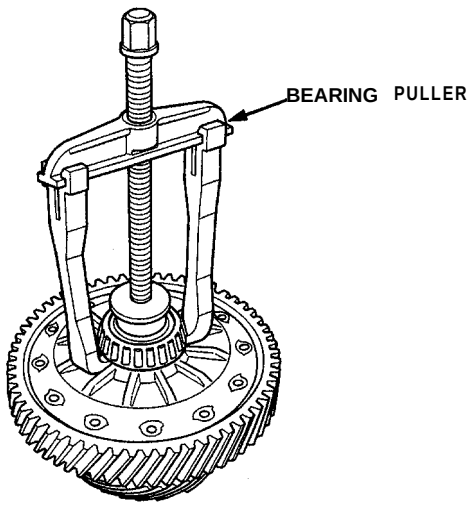
Bearing

Replacement

NOTE:
- The bearing and outer race should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.

1. Remove the bearings using standard bearing pullers.

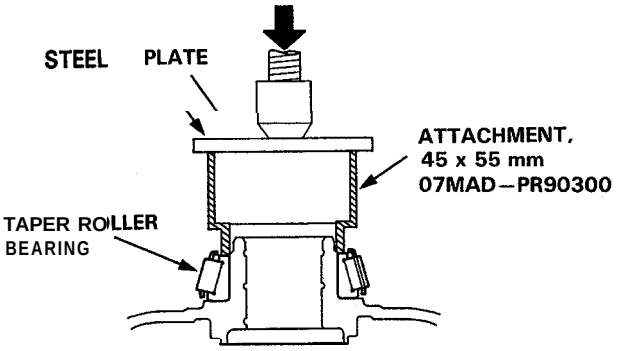




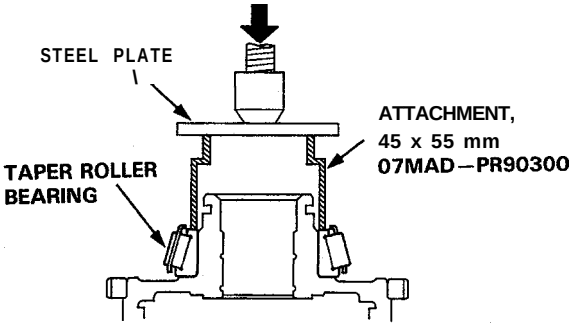
2. Install the bearings using a press as shown.

NOTE: Press the bearings squarely until they bottom against the case.

Transmission Housing Side:



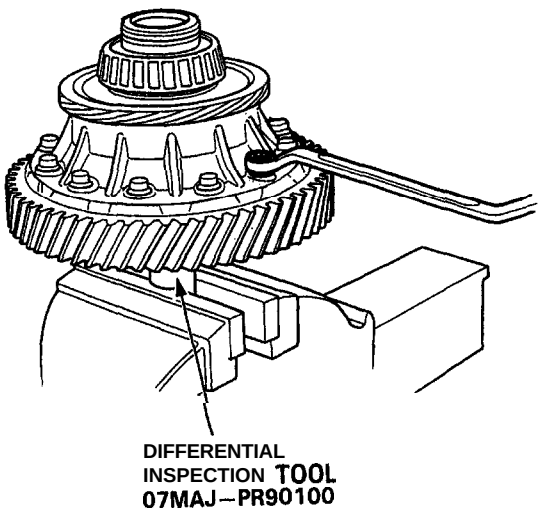
Clutch Housing Side:



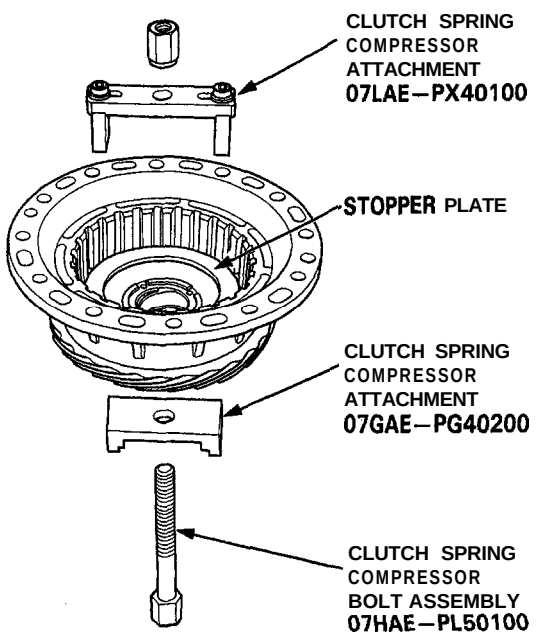
Differential

Disassembly

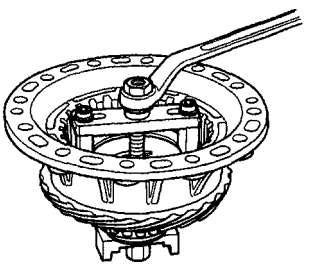
1. **Hold the differential in a vise using a special tool, then remove the differential housing mounting bolts.**



2. **Remove the differential case, then install the special tools on the stopper plate as shown.**

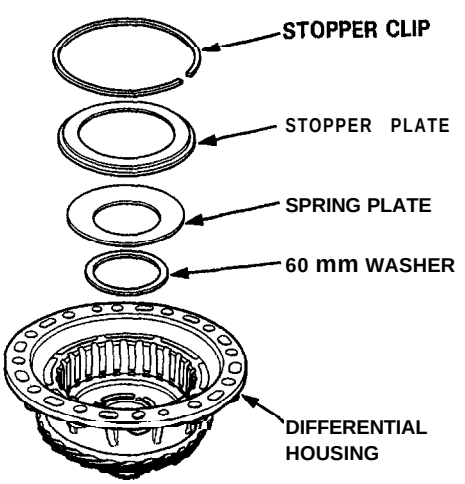


3. **Compress the spring plate.**

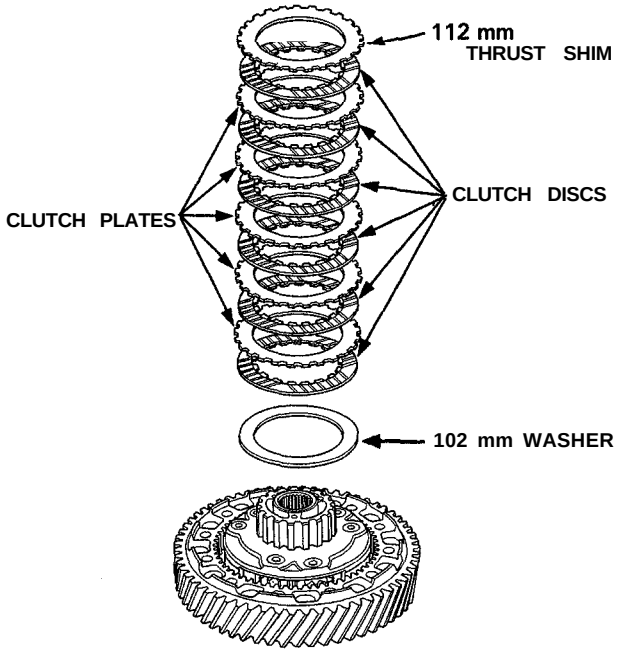


4. **Remove the stopper clip.**

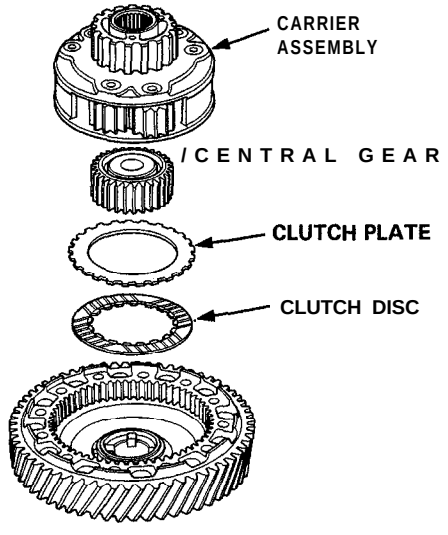
5. **Remove the special tools and then remove the stopper plate, spring plate and 60 mm washer.**



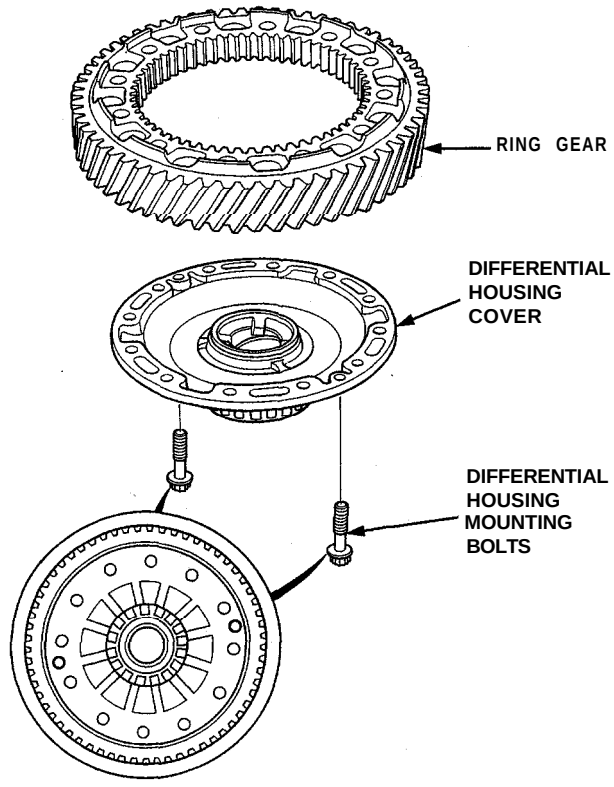
6. Remove the 112 mm thrust shim, clutch discs, clutch plates and 102 mm washer.



7. Remove the carrier assembly, central gear, clutch plate and clutch disc.



8. Remove the ring gear by installing the differential housing mounting bolts into the threaded holes and tightening them.



Clutch Disc, Clutch Plate

Replacement

NOTE: The clutch disks and clutch plates should be replaced as a set.

1. Remove the clutch discs and clutch plates. **(See page 15-6).**
2. Soak the clutch discs for five minutes in transmission oil.
3. **Install the clutch discs, clutch plates and a standard shim.**

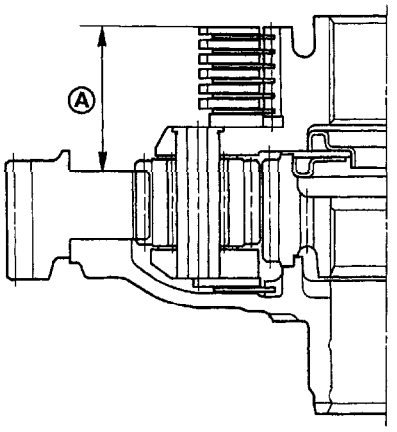
112 mm THRUST SHIM

○Standard shim

	PART NUMBER	THICKNESS
A	41261-PR8-000	1.2 mm (0.0472 in.)
B	41262-PR8-000	1.4 mm (0.0551 in.)
C	41263-PR8-000	1.6 mm (0.0630 in.)
D	41264-PR8-000	1.8 mm (0.0709 in.)
E	41265-PR8-000	2.0 mm (0.0787 in.)
F	41266-PR8-000	2.2 mm (0.0866 in.)
G	41267-PR8-000	2.4 mm (0.0945 in.)
Ⓗ	41268-PR8-000	2.6 mm (0.1024 in.)
I	41269-PR8-000	2.8 mm (0.1102 in.)
J	41270-PR8-000	**3.0 mm (0.1181 in.)**

<Reference>

Measure Ⓐ: 41.7-41.9 mm (1.6417-1.6496 in)



4. install the differential case.

NOTE: Tighten the bolts evenly in several steps, then torque them in a criss-cross pattern.

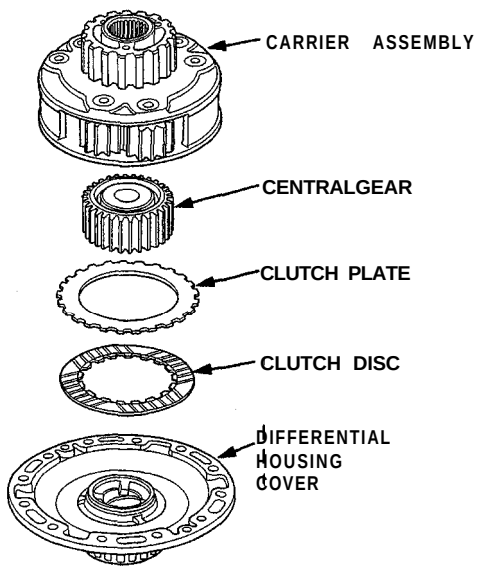
Torque: 40 N·m (4.0 kg-m, 29 lb-ft)

5. Make sure the preset torque is within the standard. **(See page 15-4).**
6. If preset torque is beyond the standard, replace the 112 mm thrust shim as necessary.

Reassembly

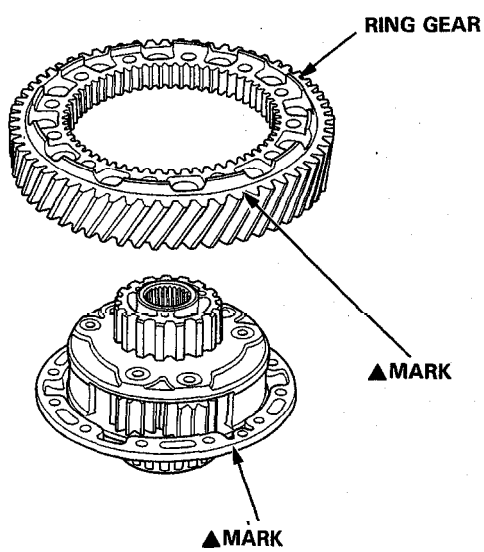
1. install the clutch disc, clutch plate, central gear and carrier assembly.

NOTE: Lubricate the clutch disc surface with transmission oil.



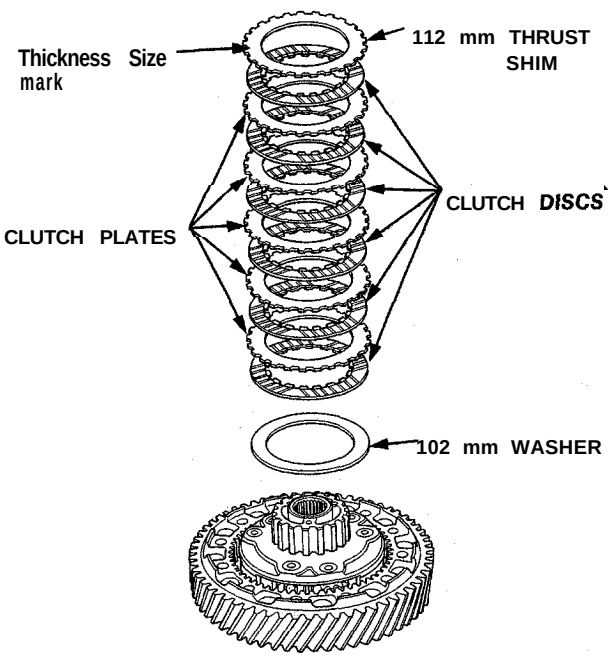
2. Install the ring gear.

NOTE: Align the mark on the differential housing cover with the mark on the ring gear.

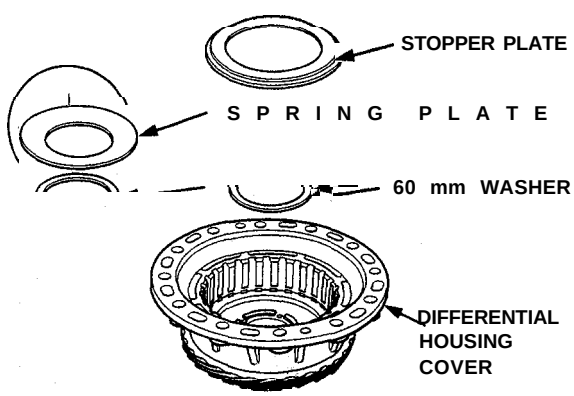


3. **Install the 102 mm washer, clutch discs, clutch plate and 112 mm thrust shim.**

NOTE:
- Lubricate the clutch discs with transmission oil.
- **Position the 112 mm thrust shim with the** thickness size mark facing away from the clutch discs.



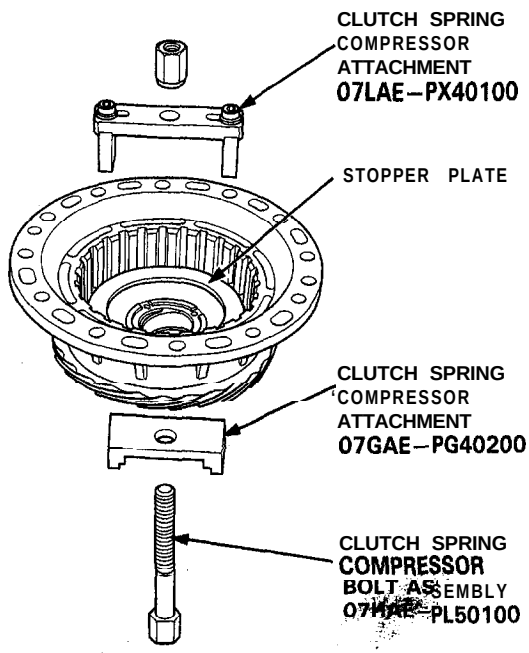
4. Install the 60 mm washer, spring plate and stopper plate.



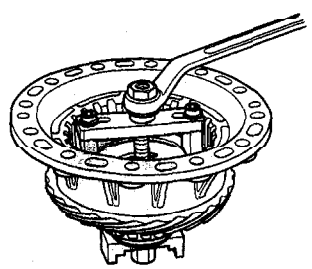
(cont'd)

Reassembly (cont'd)

5. Install the special tools on the stopper plate.

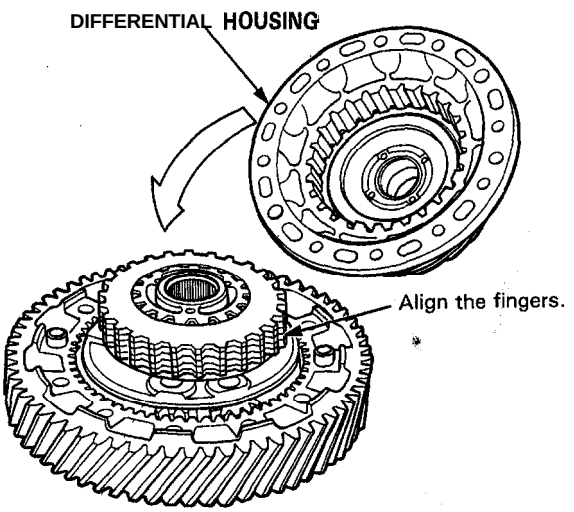


6. Compress the spring plate, then install the stopper clip.

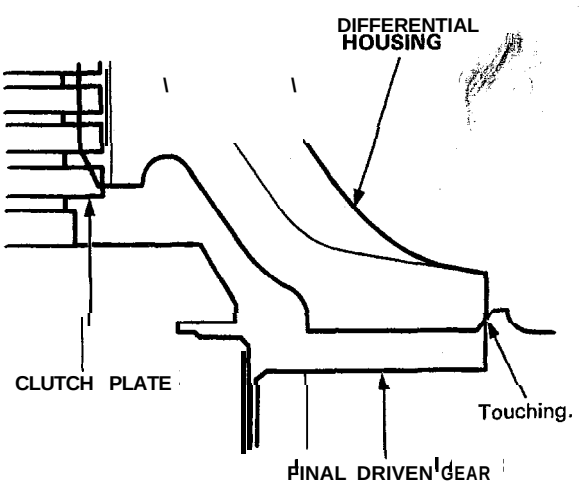


7. Install the differential housing.

NOTE: Align the fingers of the clutch plates and clutch discs.

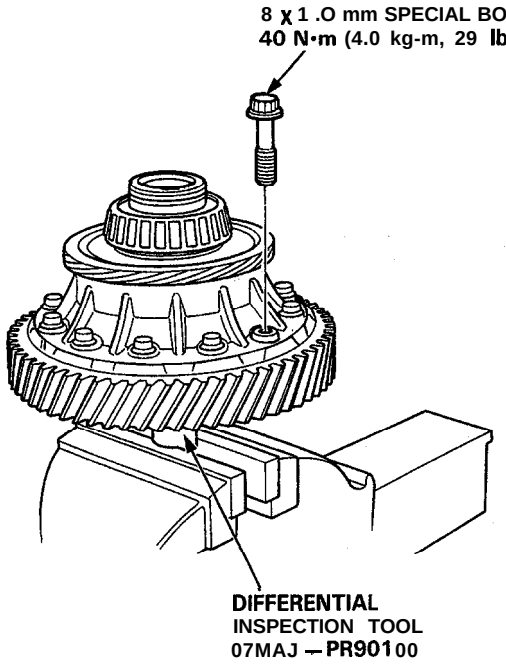


8. Make sure the differential housing touches the final driven gear.



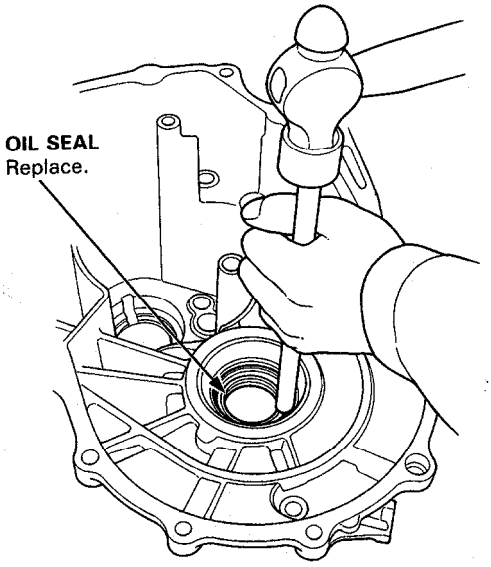
8. **Hold the differential in a vise using a special tool, then install the differential housing mount bolts.**

   NOTE: Tighten the bolts two turns at a time, then torque them in a crisscross pattern.

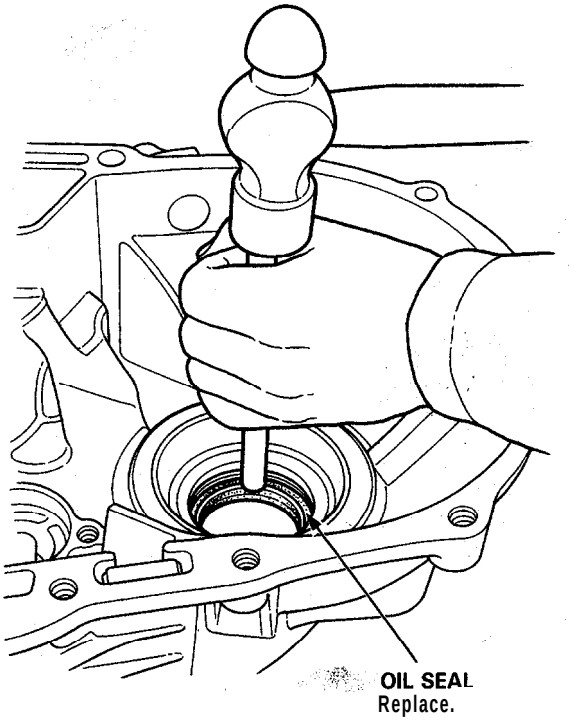


Removal

1. Remove the differential assembly.
2. Remove the oil seal from the transmission housing.



3. Remove the oil seal from the clutch housing.

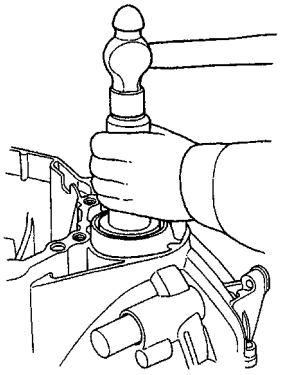


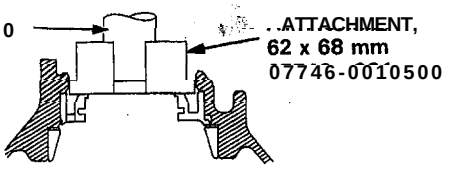
Bearing Outer Race

Replacement (Clutch housing side)

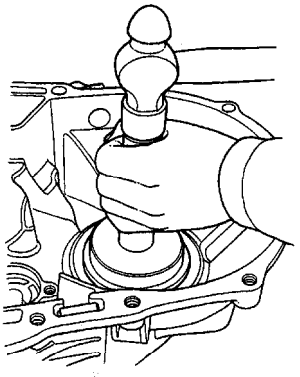
NOTE:
- The outer race and bearing should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.

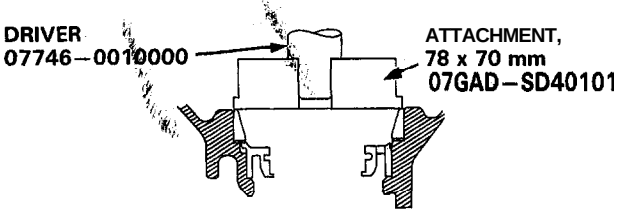
1. Remove the outer race, 90 mm washer and oil guide ring.





2. Install the oil guide ring and 90 mm washer, then drive the outer race into the clutch housing.





Bearing Preload

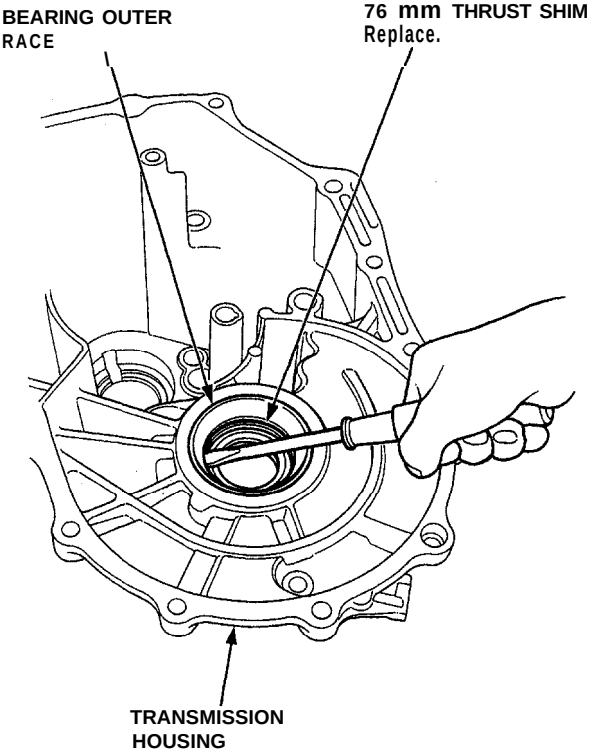
Adjustment

NOTE: If any of the items listed below are replaced, the bearing preload must be adjusted.
- TRANSMISSION HOUSING
- CLUTCH HOUSING
- DIFFERENTIAL
- TAPER ROLLER BEARING and OUTER RACE
- 75 mm THRUST SHIM
- 90 mm WASHER
- OIL GUIDE RING

1. Remove the bearing outer race and 75 mm thrust shim from the transmission housing by prying up on the bearing outer race or by heating the housing to about 100°C (212°F).

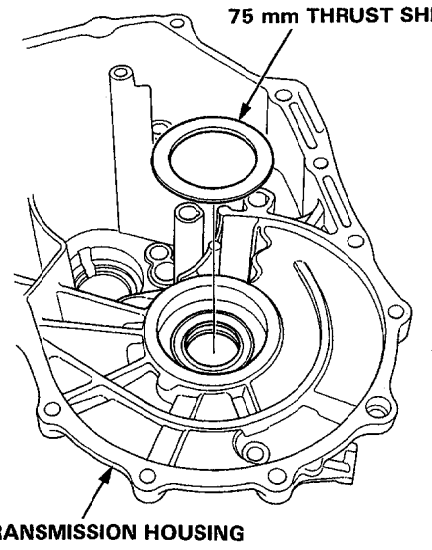
   CAUTION: Do not reuse the thrust shim if the outer race was pried out.

   NOTE:
   - Let the transmission cool to the room temperature if the outer race was removed by heating the case before adjusting the bearing preload.
   - Do not heat the transmission housing in excess of 100°C (212°F).
   - Replace the bearing with a new one whenever the outer race is replaced.
   - Repeat on the clutch side.
   - There is no shim on the clutch side.



2. First try a 1.97 mm thrust shim (J).

CAUTION: Do not use more than one shim to adjust the bearing preload.



3. Select shim from the following table.

75 mm SHRUST SHIM

◯Standard shim

	PART NUMBER	THICKNESS
A	41481-PR8-000	1.70 mm (0.0669 in.)
B	41482-PR8-000	1.73 mm (0.0681 in.)
C	41483-PR8-000	1.76 mm (0.0693 in.)
D	41484-PR8-000	1.79 mm (0.0705 in.)
E	41485-PR8-000	1.82 mm (0.0723 in.)
F	41486-PR8-000	1.85 mm (0.0728 in.)
G	41487-PR8-000	1.88 mm (0.0740 in.)
H	41488-PR8-000	1.91 mm (0.0752 in.)
I	41489-PR8-000	1.94 mm (0.0764 in.)
Ⓙ	41490-PR8-000	1.97 mm (0.0776 in.)
K	41491-PR8-000	2.00 mm (0.0787 in.)
L	41492-PR8-000	2.03 mm (0.0799 in.)
M	41493-PR8-000	2.06 mm (0.0811 in.)
N	41494-PR8-000	2.09 mm (0.0823 in.)
O	41495-PR8-000	2.12 mm (0.0835 in.)
P	41496-PR8-000	2.15 mm (0.0846 in.)
Q	41497-PR8-000	2.18 mm (0.0858 in.)
R	41498-PR8-000	2.21 mm (0.0870 in.)
S	41499-PR8-000	2.24 mm (0.0882 in.)
T	41500-PR8-000	2.27 mm (0.0894 in.)

4. After installing the shim, install the outer race in the transmission housing.

NOTE:
- Install the outer race squarely.
- Check that there is no clearance between the outer race, shim and transmission housing.

5. Install the differential assembly in the clutch housing, then install the transmission housing.

NOTE: Do not install the mainshaft, countershaft and reverse idle gear shaft assembly.

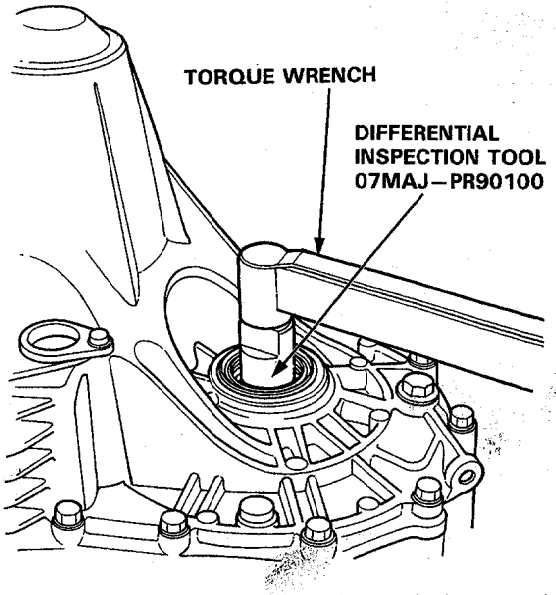
Torque: 43 N·m (4.3 kg-m, 31 lb-ft)

6. Rotate the differential assembly in both directions to seat the bearings.

7. Measure the starting torque of the differential assembly with the differential inspection tool and a torque wrench.

NOTE: Measure the bearing preload at normal room temperature in both directions.

Standard: 2.0—3.0 N·m
(20—30 kg-cm, 17-26 lb-in)



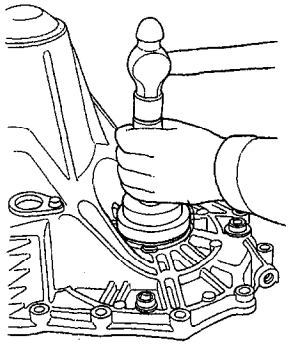
8. If the bearing preload is beyond the standard, select the shim that will give you the correct preload and recheck.

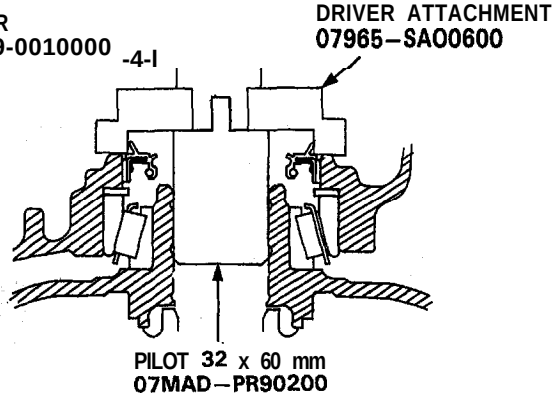
NOTE: Changing one of the shims to the next size will increase or decrease preload about 3—4 kg-cm (2.60-3.47 lb-in).

Oil Seal

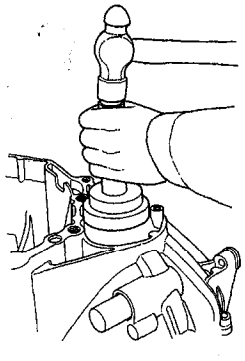
Installation

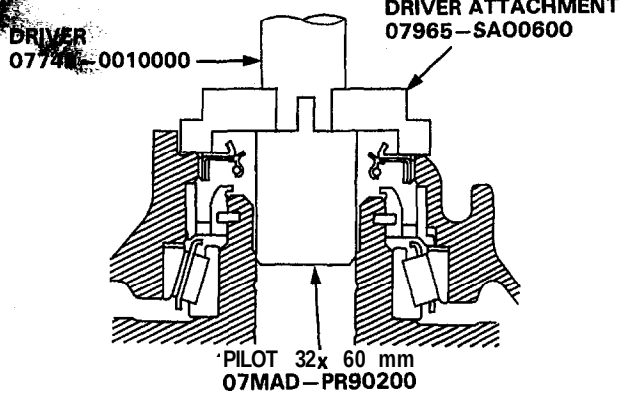
1. Install the oil seal in the transmission housing.





2. Install the oil seal in the clutch housing.





Driveshafts

Special Tools 16-2

Driveshafts

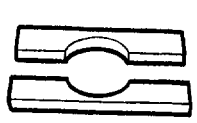
- Removal 16-3
- Disassembly 16-6
- Inspection 16-7
- Reassembly 16-8

Intermediate Shaft

- Replacement 16-12
- Disassembly 16-13
- Index/Inspection 16-15
- Reassembly 16-16

Special Tools

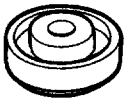
Number	Tool Number	Description	Q'ty	Page Reference
①	07GAF—SD40700	Hub Dis/Assembly Base	2	16-13, 14, 16
②	07GAF—SE00200	Hub Driver Attachment	1	16-16
③	07GAD—PG40100	Attachment	1	16-16
④	07JAD—SH30100	Oil Seal Driver Attachment	1	*16-16*
⑤	07MAC—SL00100	Ball Joint Remover	1	*16-5*
⑥	*07746-0010400*	Attachment, 52 x 55 mm	1	*16-14*
⑦	07749—0010000	Driver	1	*16-14, 16*
⑧	*07941-6920003*	Ball Joint Remover	1	16-4



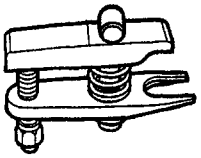
①

②

③



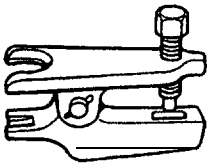
④



⑤

⑥

⑦



⑧

-Removal

INSPECTION

Driveshaft Boot

Check the boots on the driveshaft for cracks, damage, leaking grease or loose boot bands.

If any damage is found, replace the boot.

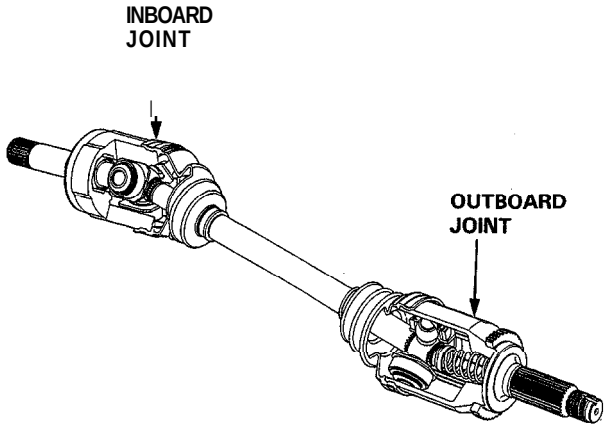
Spline Looseness

Turn the driveshaft by hand and make sure the spline and joint are not excessively loose.

If damage is found, replace the inboard joint.

Twisted or Cracked

Make sure the driveshaft is not twisted or cracked. Replace if necessary.



1. Raise the car and place safety stands in the proper locations (see section 1).

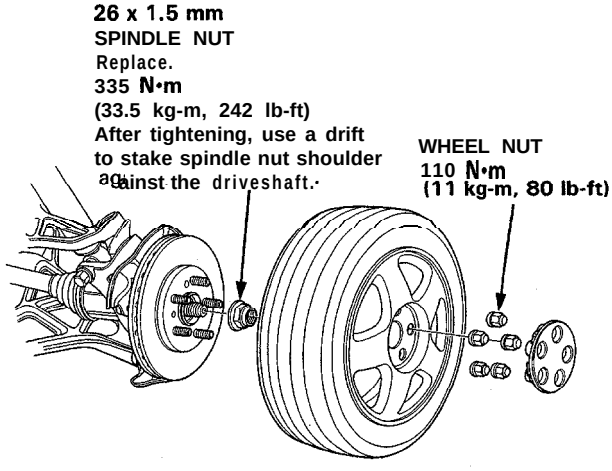
2. **Remove the rear wheels.**

3. Drain the transmission oil (see section 13).

   NOTE: It is not necessary to drain the transmission **oil when the right driveshaft is removed.**

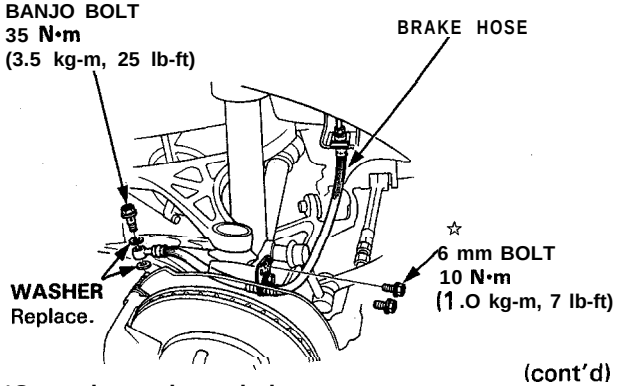
4. Raise the locking tab on the spindle nut and loosen it.

   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



5. **Remove the banjo bolt and disconnect the brake** hose, then remove the brake hose clamp from the knuckle.

   CAUTION: Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish;
   Wash spilled brake fluid off immediately with clean water.



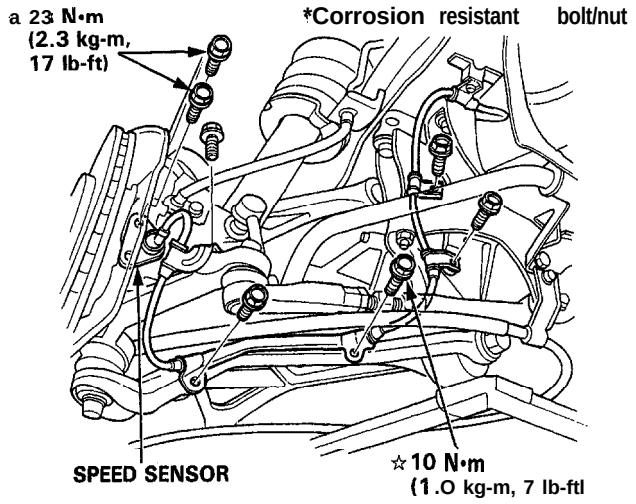
(cont'd)

*Corrosion resistant bolt

Removal (cont'd)

6. Remove the speed sensor from the knuckle and rear lower arm, but do not disconnect it.

   NOTE: Avoid twisting the wires when reinstalling the sensors.

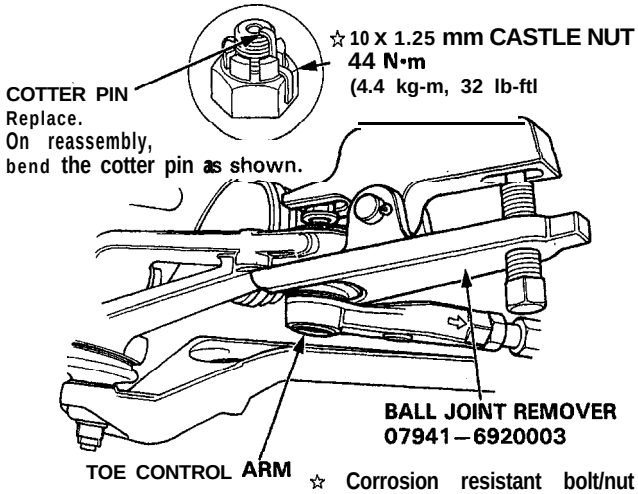


7. Remove the cotter pin from the toe control arm castle nut and remove the nut.

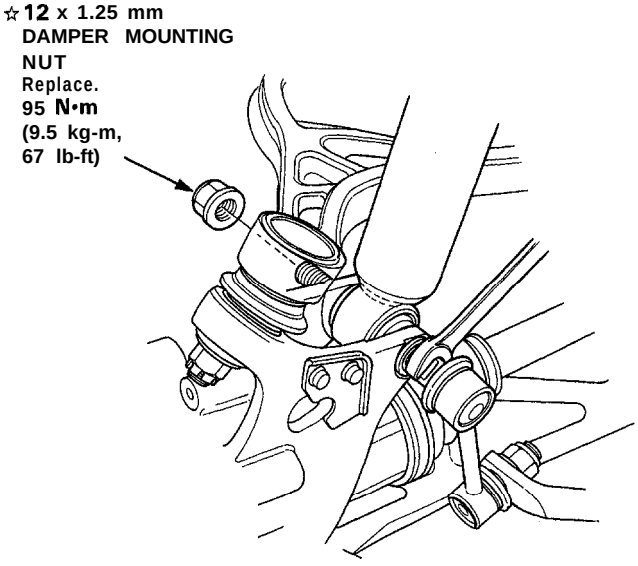
8. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball. joint remover.

9. Position the special tool between the knuckle and control arm as shown, then separate the toe control arm.

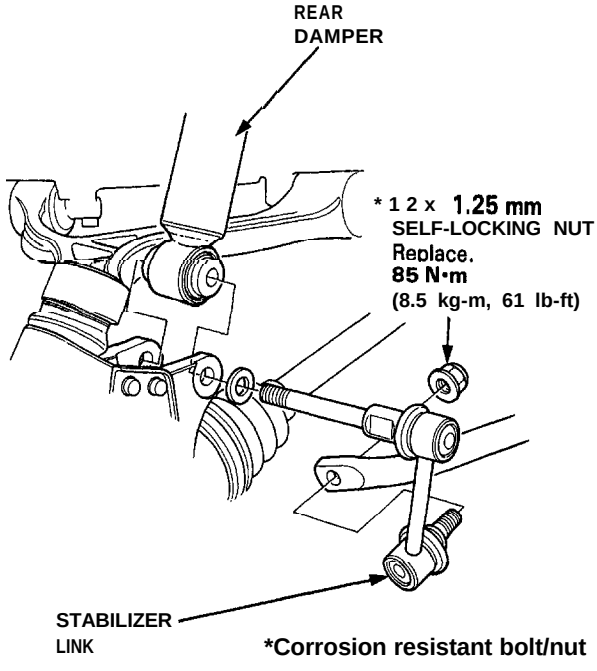
   CAUTION: Be careful not to damage the ball-joint boot.



10. Hold the stabilizer link with a wrench and remove the damper mounting nut.



11. Remove the stabilizer link from the stabilizer bar and knuckle.



12. Remove the cotter pin from the lower control arm ball joint castle nut and remove the nut.

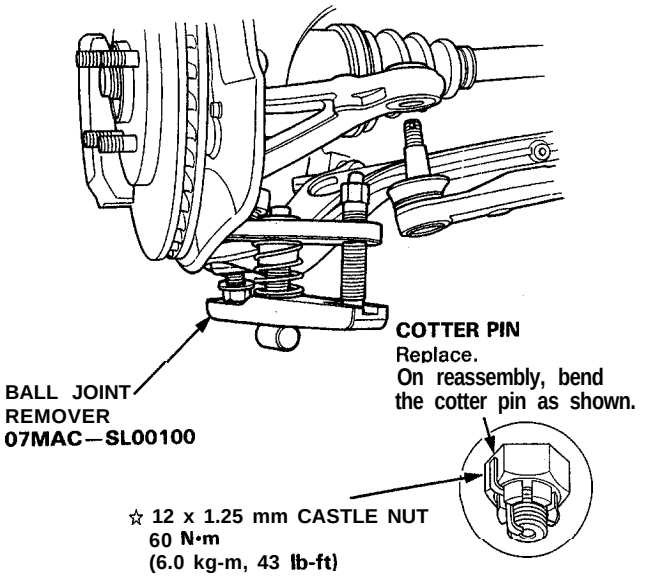
13. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

NOTE: Use the ball joint remover (07MAC—SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

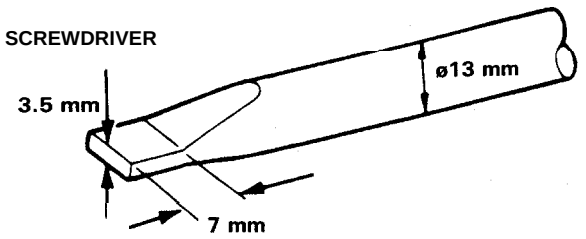
14. Position the special tool between the knuckle and lower control arm as shown, then separate the lower control arm.

CAUTION: Be careful not to damage the ball joint boot.

*Corrosion resistant bolt/nut

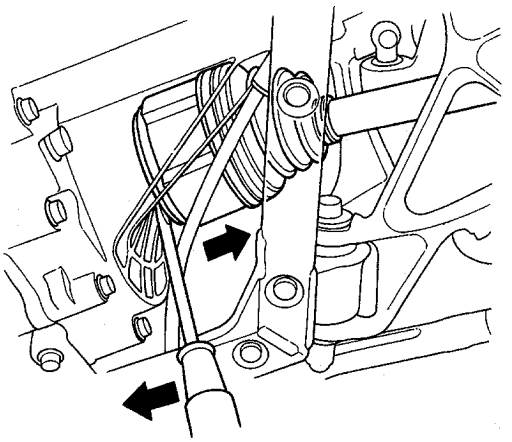


15. Pry the driveshaft assembly with a screwdriver as shown to force the set ring past the groove.



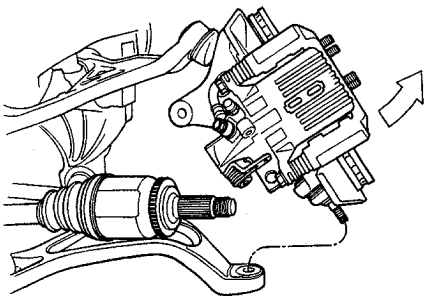
16. Pull the inboard joint and remove the driveshaft and CV joint from of the differential case or intermediate shaft as an assembly.

CAUTION:
- Do not pull on the driveshaft, as the CV joint may come apart.
- Use care when prying out the assembly and pull it straight to avoid damaging the differential oil seal or intermediate shaft dust seal.



17. Remove the spindle nut.

18. Pull the knuckle outward and remove the driveshaft outboard joint from the rear wheel hub using a plastic hammer.



19. Installation is the reverse order of removal. After installing the driveshafts, adjust the wheel alignment (see section 18).

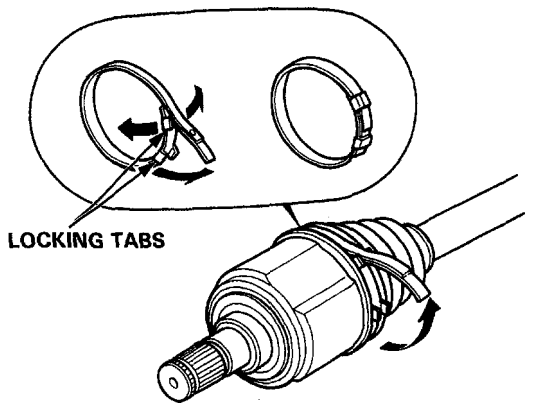
Driveshafts

-Disassembly

1. **To remove the boot band, pry up the locking tabs with screwdriver and raise the end of the band.**

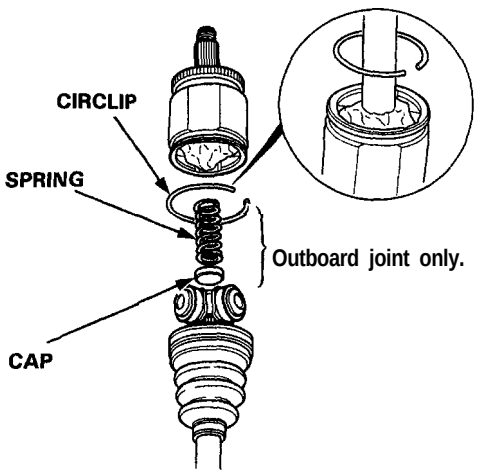
   NOTE: Carefully clamp the driveshaft in a vise with soft jaws.

   CAUTION: Take care not to damage the boots.

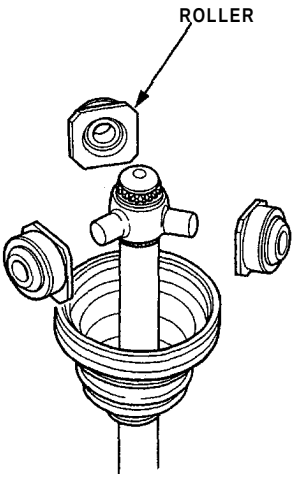


2. **Remove both joints.**

   - **Outboard joint side only:**
     - **Remove the circlip from the outboard joint groove.**
     - **Remove the outboard joint and spring.**

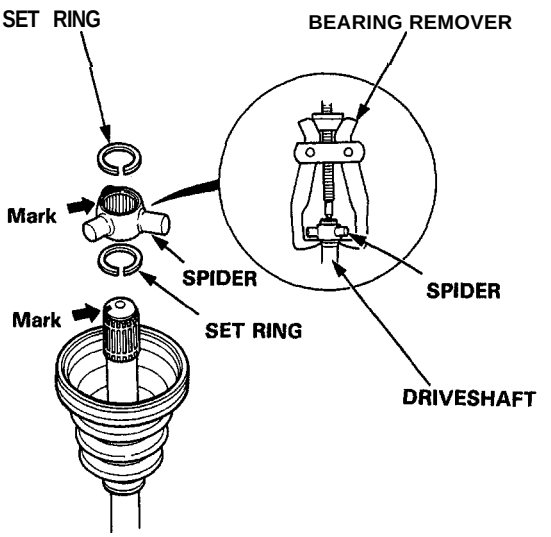


3. **Remove the rollers from the spider.**



4. **Remove the set ring, then remove the spider with a bearing remover.**

   NOTE: Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.



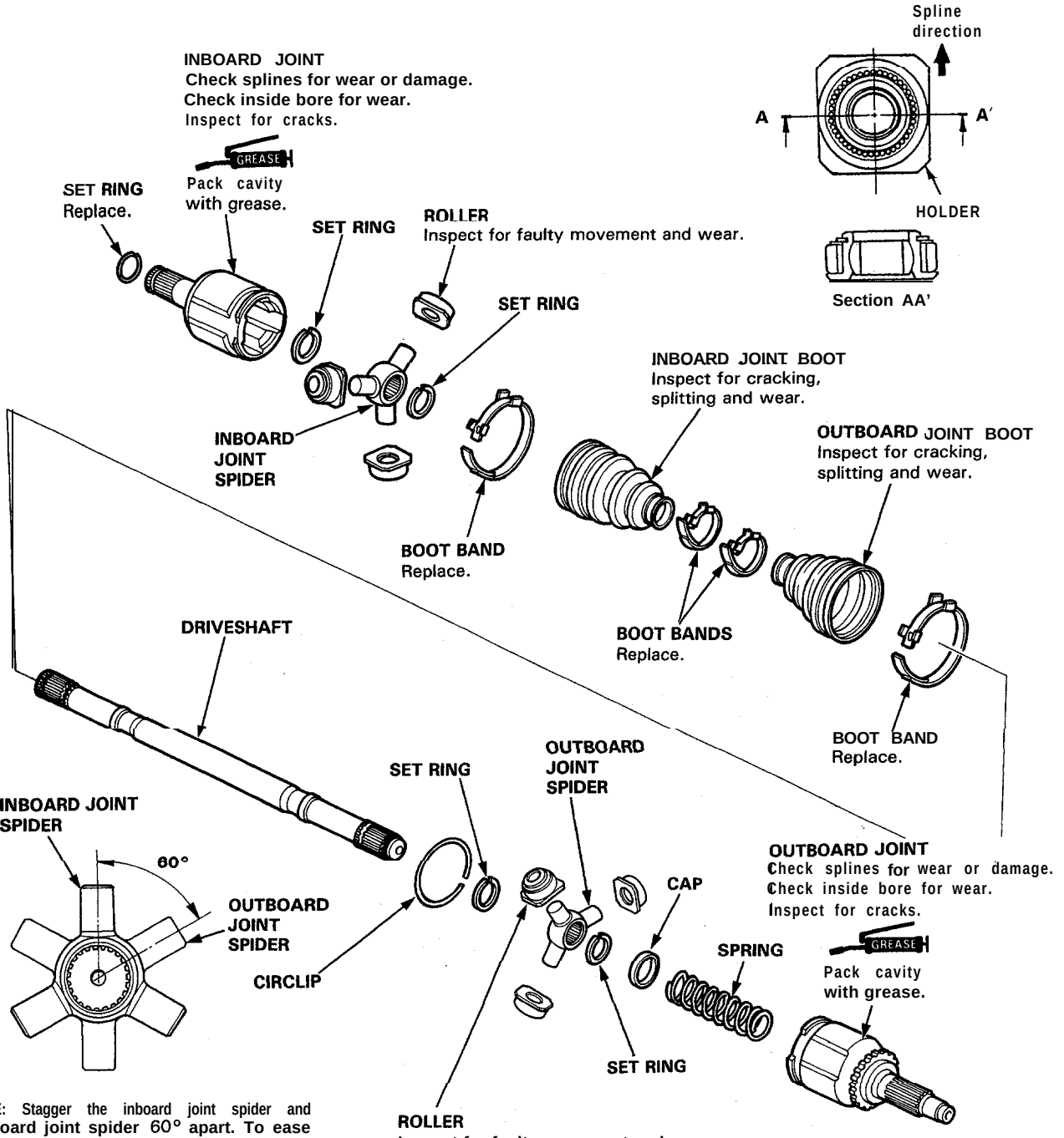
- Inspection

GREASE **Thoroughly pack the inboard joint and outboard joint with joint grease included in the new joint boot set.**

Grease Quantity:

Inboard Joint	120-130 g
Outboard Joint	170-180 g

NOTE: Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.



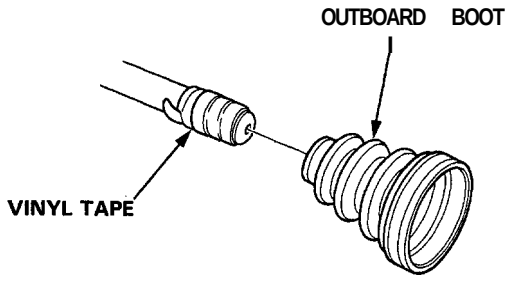
NOTE: Stagger the inboard joint spider and outboard joint spider 60° apart. To ease assembly, mark alignment marks on driveshaft and spiders before disassembling them.

— Reassembly

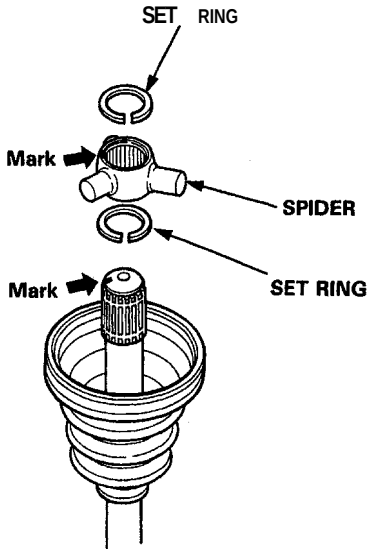
Outboard joint side

NOTE: Wrap the splines with vinyl tape to prevent damage to the boot.

1. **install the outboard boot to the driveshaft, then remove the vinyl tape.**

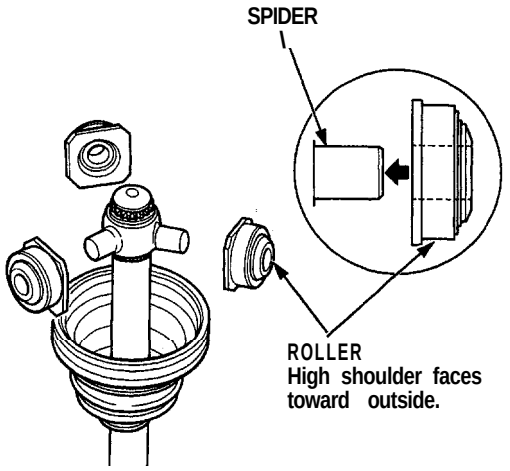


2. Install the set ring into the driveshaft groove.
3. **Install the spider on the driveshaft by aligning the** marks on the spider and end of the driveshaft.
4. install the set ring into the driveshaft groove.



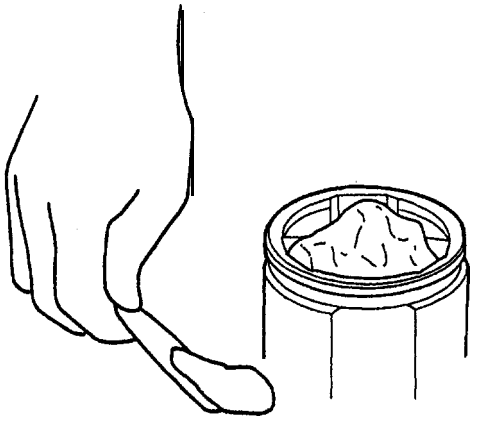
5. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:
- Reinstall the rollers in their original positions on the spider.
- Hold the driveshaft assembly with the rollers up, **to prevent them from falling off.**

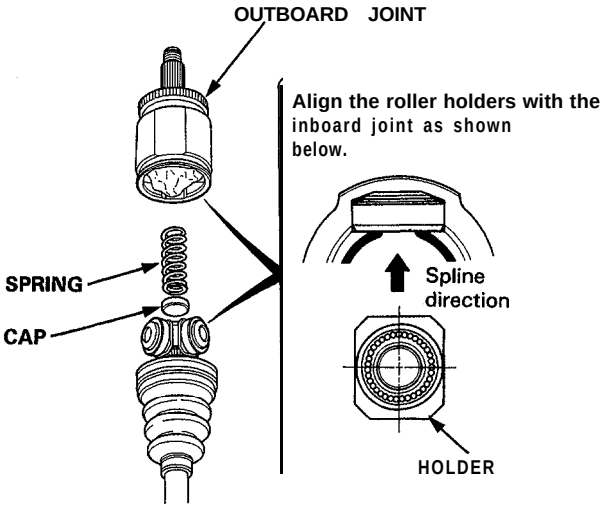


6. Pack the joint with joint grease included in the new **joint boot set.**

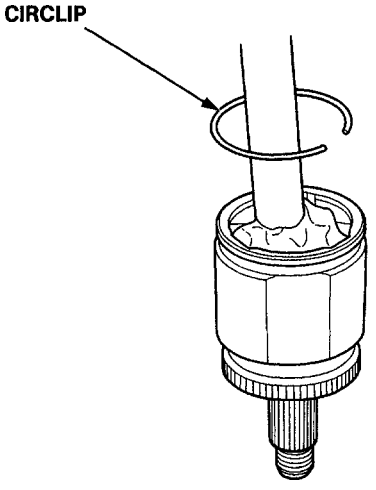
Grease Quantity: 170—'I 80 g



7. Install the spring and cap, than fit the outboard joint onto the driveshaft.



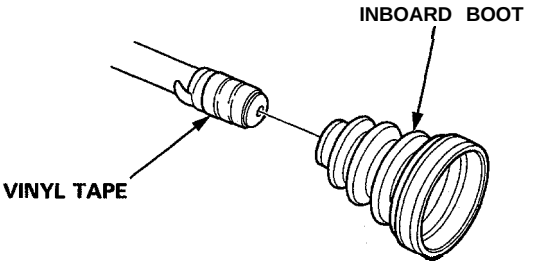
8. Fit the circlip into the outboard joint inner groove.



inboard joint side

NOTE: Wrap the splines with vinyl tape to prevent damage to the boot.

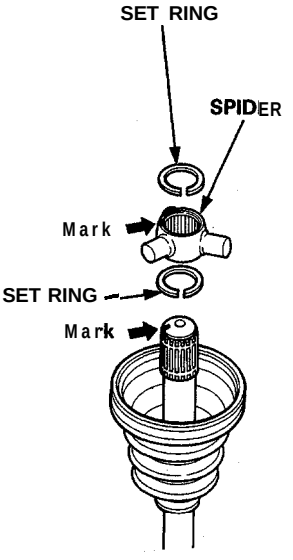
9. Install the inboard boot to the driveshaft, then remove the vinyl tape.



IO. Install the set ring into the driveshaft groove.

11. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.

12. Install the set ring into the driveshaft groove.

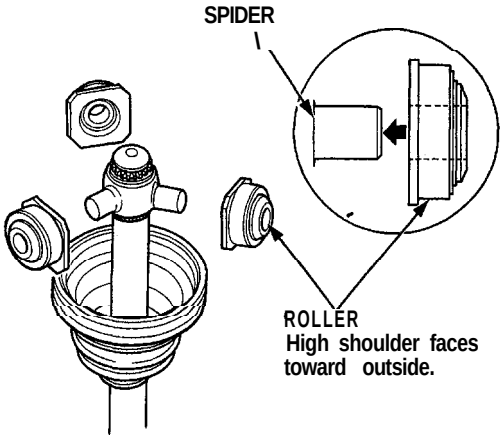


(cont'd)

Reassembly (cont'd)

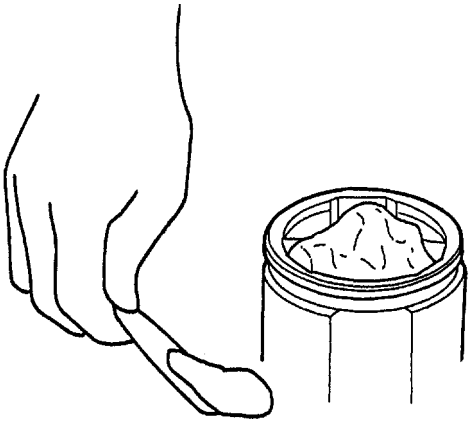
13. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:
- Reinstall the rollers in their original positions on the spider.
- Hold the drivashaft assembly with the rollers up, to prevent them from falling off.

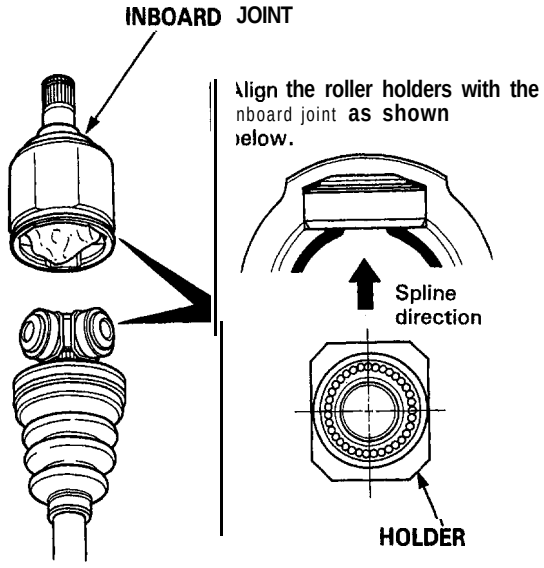


14. Pack the joint with joint grease included in the new joint boot set.

Grease Quantity: 120—130 g



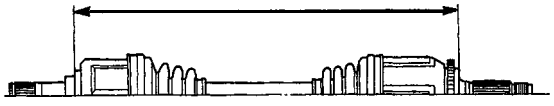
15. Fit the inboard joint onto the driveshaft.



16. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and extension.

NOTE: The ends of the boots seat in the grooves of the driveshaft and joint.

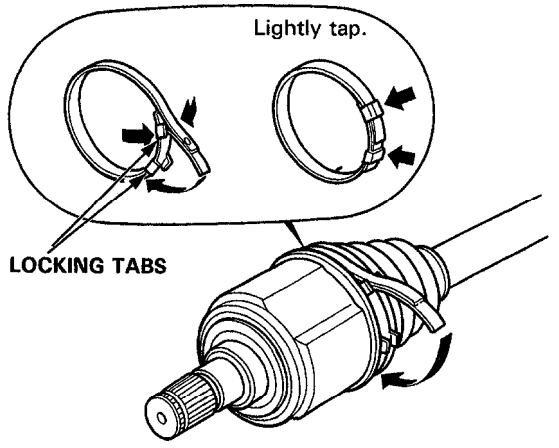
L. Driveshaft
M/T: 513.5-514.0 mm (20.22-20.24 in)
A/T: 519.5-520.0 mm (20.45-20.47 in)



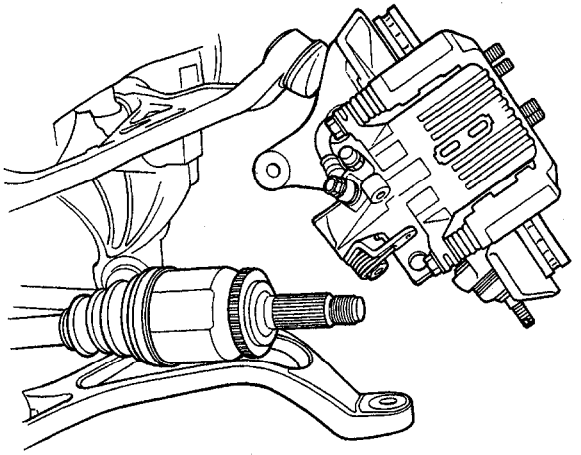
R. Driveshaft
M/T/A/T: 542.0—542.5 mm (21.34-21.36 in)

17. Install new boot bands on the boots and bend both sets of locking tabs.

18. Lightly tap on the doubled-over portions to reduce their height.



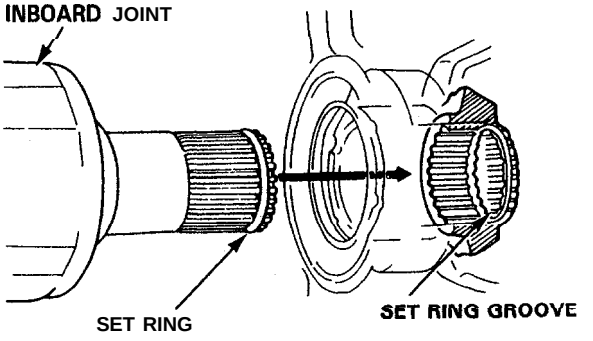
NOTE: Install the outboard joint in the knuckle before installing the driveshaft into the differential or intermediate shaft. Loosely install the spindle nut this time.

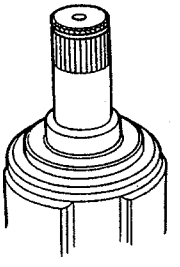


19. Install the new set rings in the driveshaft groove and intermediate shaft groove.

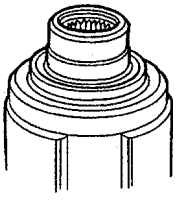
20. Install the inboard end of the driveshaft into differential or intermediate shaft.

CAUTION:
- Always use a new set ring whenever the driveshaft is being installed.
- Make sure the L. driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential.
- Insert the R. driveshaft CV joint subaxle into the intermediate shaft until the intermediate shaft set ring locks in the groove in the R. driveshaft.





L. Driveshaft inboard end



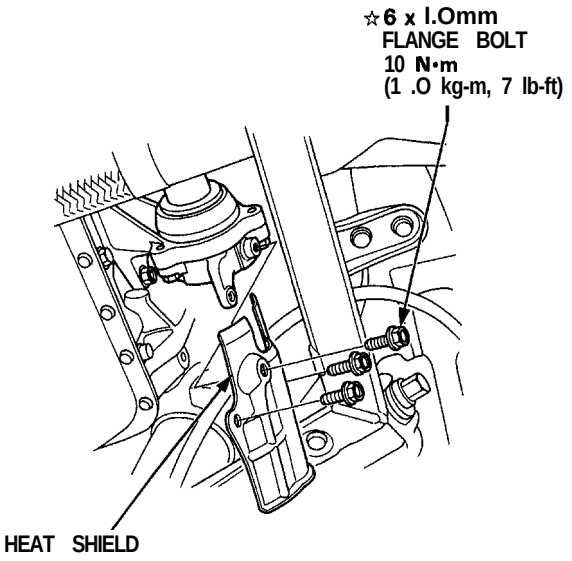
R. Driveshaft inboard end (Intermediate shaft side)

Intermediate Shaft

-Replacement

1. Drain the oil from the transmission (see section 13).
2. Remove the right driveshaft assembly (page 16-3).
3. Remove the heat shield.

*Corrosion resistant bolt/nut



4. The bearing support assembly is a light press fit in the support base. To remove the bearing support assembly, remove the 8 x 1.25 mm flange bolts, with the support base still attached to the engine block. Tap the flanged section of the bearing support with a plastic hammer toward the wheel side, then remove the bearing support assembly from the support base.

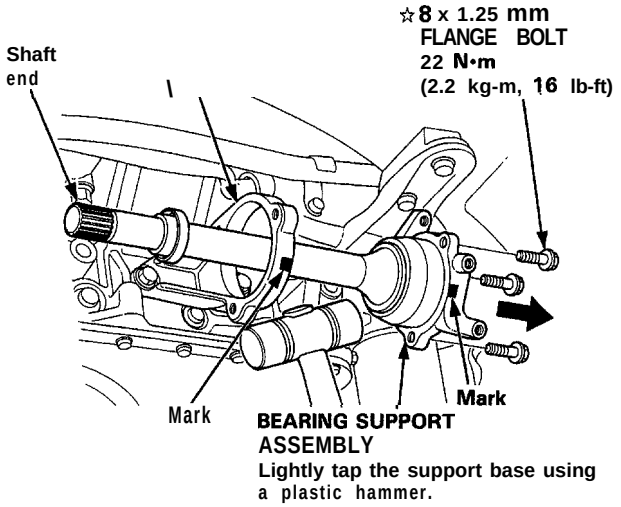
CAUTION: To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential.

NOTE: Mark the support base and bearing support during disassembly to ensure proper positioning during reassembly.

CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

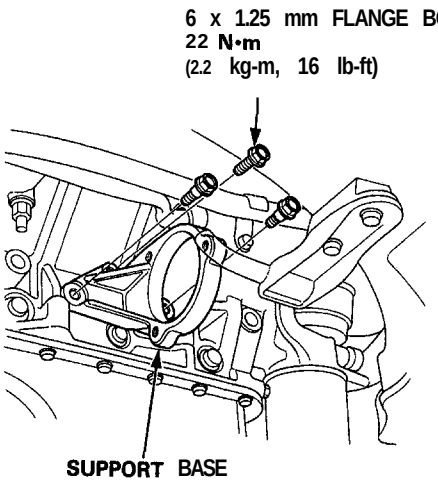
*Corrosion resistant bolt/nut

SUPPORT BASE



Lightly tap the support base using a plastic hammer.

5. Remove the support base from the engine block.

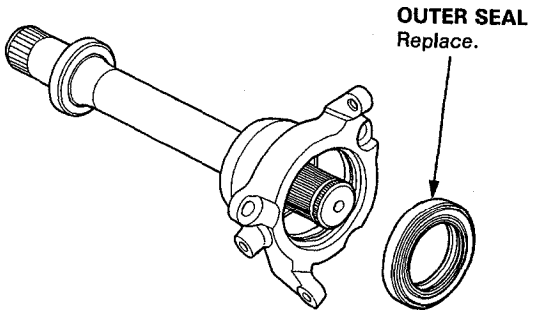


6. Installation is the reverse order of removal. Align the marks and install by tapping on the bearing support assembly shaft end.

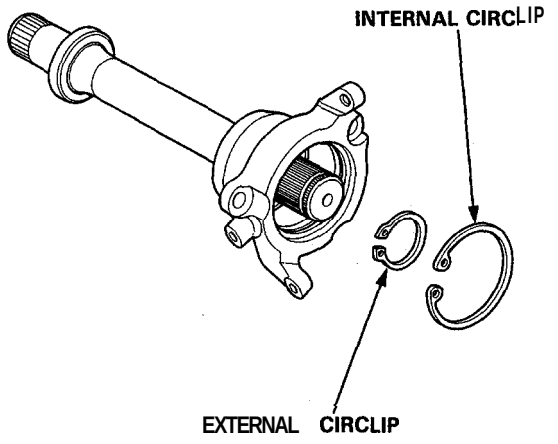
Disassembly

CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

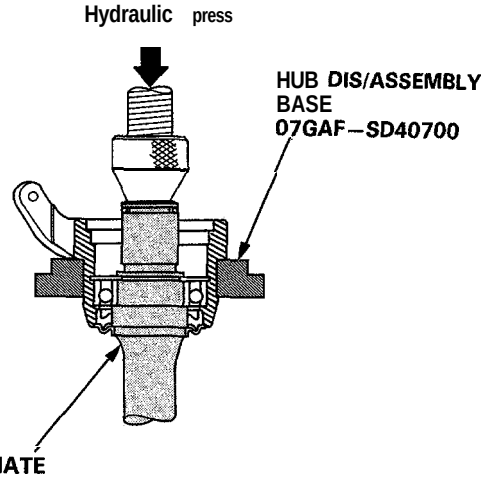
1. Remove the intermediate shaft outer seal from the bearing support.



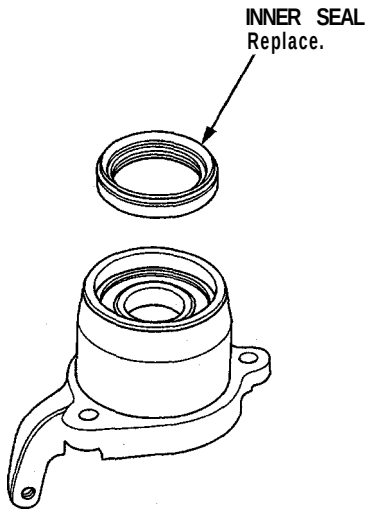
2. Remove the external circlip and internal circlip.



3. Press the intermediate shaft out of the shaft bearing using the special tool.



4. Remove the intermediate shaft inner seal from the bearing support.

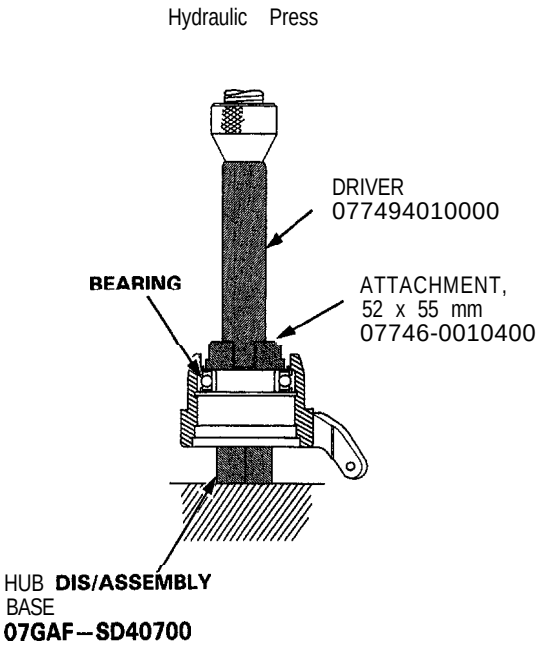


(cont'd)

Intermediate shaft

— Disassembly (cont'd)

5. Press the intermediate shaft bearing out of the bearing support using the special tools.

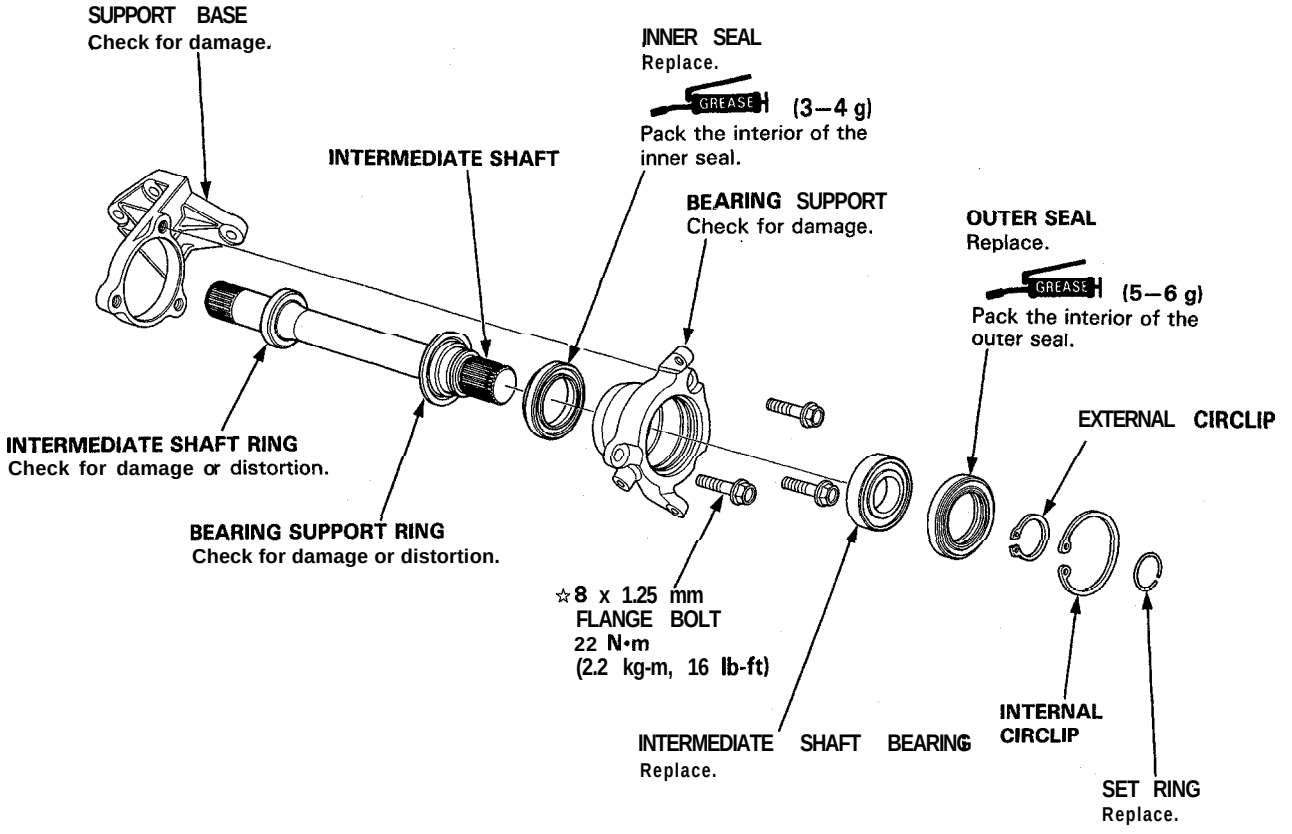


Index/Inspection

CAUTION:

- The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.
- The bearing support and support base are fitted, and must be replaced as an assembly.

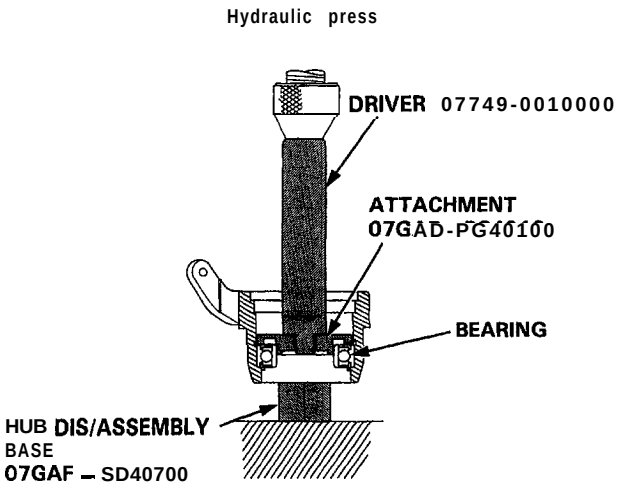
*Corrosion resistant bolt/nut



Intermediate shaft

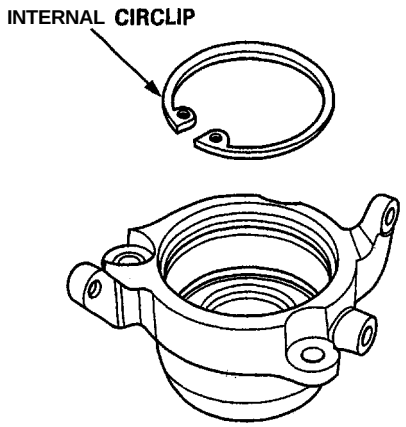
– Reassembly

1. Press the intermediate shaft bearing into the bearing support using the special tools.

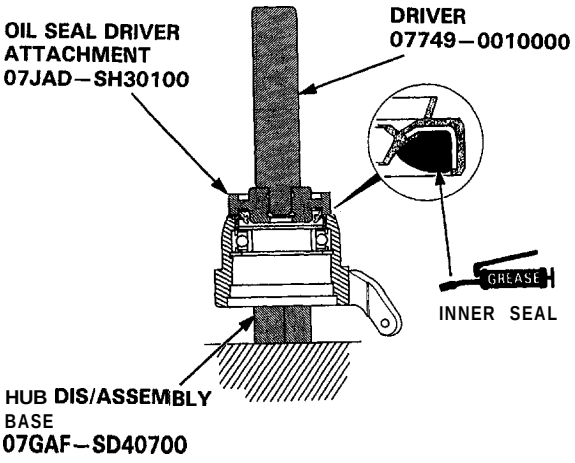


2. Seat the internal circlip in the groove of the bearing support.

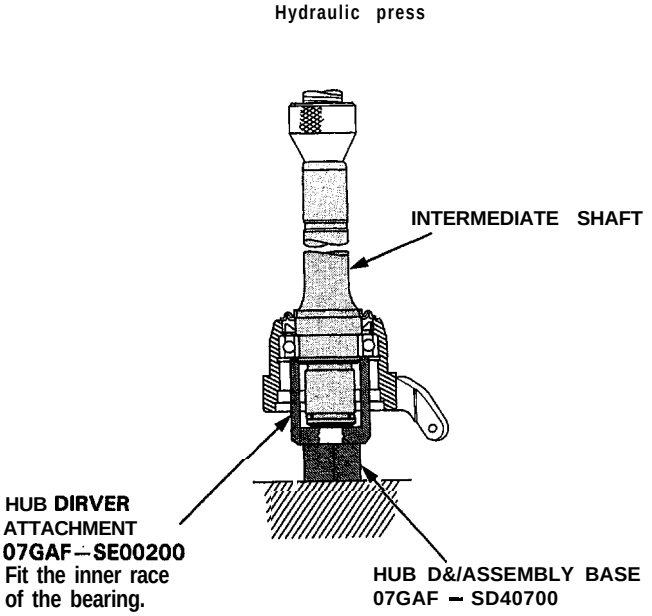
CAUTION: Install the circlip with the tapered end facing out.



3. Drive the intermediate shaft inner seal into the bearing support using the special tools.

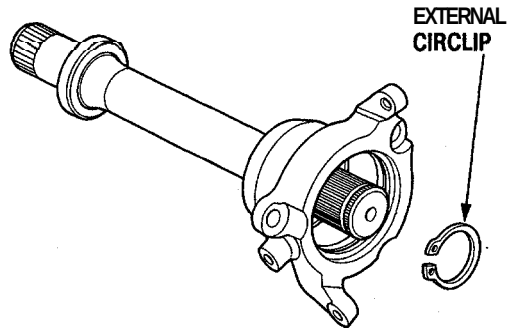


4. Press the intermediate shaft into the shaft bearing using the special tools.

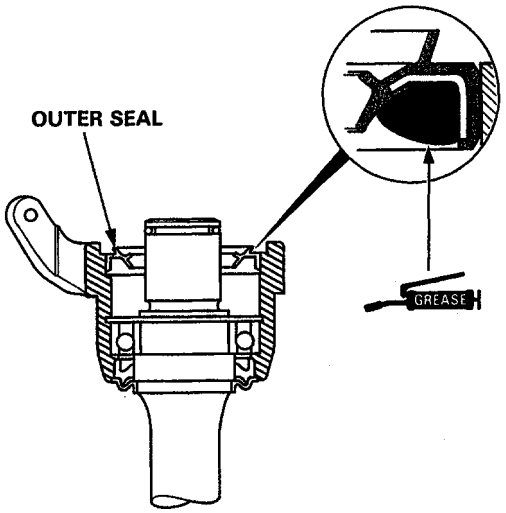


5. Seat the external circlip in the groove of the intermediate shaft.

CAUTION: Install the circlip with the tapered end facing out.



6. Install the outer seal into the bearing support.



Steering

Special Tools 17-2
System Description
Steering Column . . ..a..... 17-3
Energy-absorbing Steering
Column /Wheel 17-5
Inspection
Steering Wheel Rotational Play . . 17-6
Steering Effort Check 17-6
Power Asist With Car Parked . . . 17-6
Steering Gearbox Adjustment . . . 17-7
Steering Wheel
* Removal 17-8
Disassembly/Inspection 17-9
* Installation 17-10
Steering Column
* Removal 17-12
Inspection 17-14
* Installation 17-15

Manual Steering

Component Location
Index 17-18
Steering Gearbox
Removal/Installation 17-I 9
Illustrated Index 17-2 1
Disassembly 17-22
Reassembly . . ..*.....*..... 17-25
Ball Joint Boot Replacement 17-30

Power Steering

System Description 17-31
Electrical Power Steering 17-31
Major Components 17-32
System Operation 17-33
Function and Operation 17-34
Circuit Diagram 17-40
Wiring Locations 17-41
Troubleshooting
Troubleshooting Precautions 17-42
Troubleshooting Procedures 17-43
Test Harness Installation 17-45
Troubleshooting
Steering is heavy 17-46
Steering pulls to either side ... 17-47
Indicator light does not come on 17-47
Indicator light stays on 17-49
Troubleshooting chart 17-51
Troubleshooting by problem code 17-52
Component Location
Index 17-63
EPS Gear Box Installation and Removal 17-64
Illustrated Index 17-68
EPS Gear Box Inspection 17-69
Ball Joint Boot Replacement 17-72
*Power Unit Installation and Removal 17-73
*EPS Control Unit Installation and Removal 17-74

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

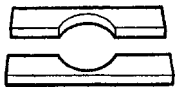
The NSX includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools and should therefore be done by an authorized Acura dealer.

⚠WARNING

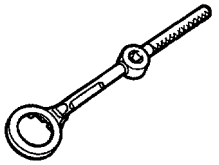
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS selectrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Special Tools

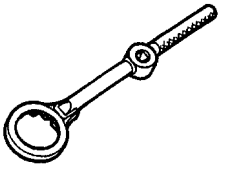
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAF-SD40700	Hub Dis/Assembly Base	2	17-24
②	07MAA-SL001 OA	40 mm, Locknut Wrench	1	17-7, 70
③	07MAA-SL0020A	43 mm, Locknut Wrench	1	17-7, 28
④	07MAA-SL0030A	50 mm, Locknut Wrench	1	17-23, 27
⑤				
⑥	07MAA/07M07MAZ-SL00100	Ball Joint Harness Screw Boot Wrench A Clip Guide	1	17-23,17-30,17-45,26,40,72,75, 5
⑦				53, 54, 55, 56, 59, 60, 61
⑧	07MAZ-SL00200	Test Harness B	1	17-45, 53, 55
⑨	07MAZ-SL00300	Test Harness C	1	17-45
⑩	07MAZ-SL00400	EPS power unit checker	1	17-45, 58
⑪	07941-6920003	Ball Joint Remover	1	17-19, 64
⑫	07973-6920001	P/S Adjustment Guide	1	17-25
⑬	07974-SD90000	Steering Inspection Arm	1	17-22, 26, 69



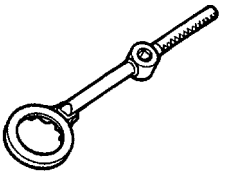
①



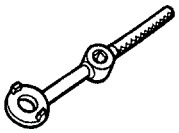
②



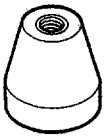
③



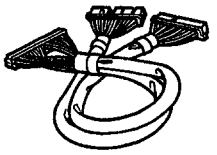
④



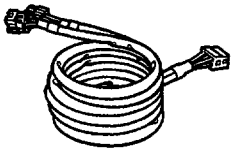
⑤



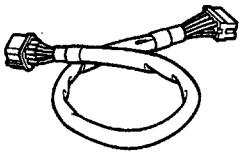
⑥



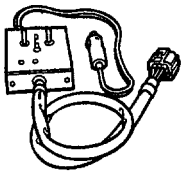
⑦



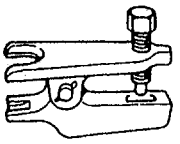
⑧



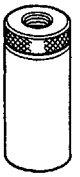
⑨



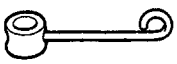
⑩



⑪



⑫



⑬

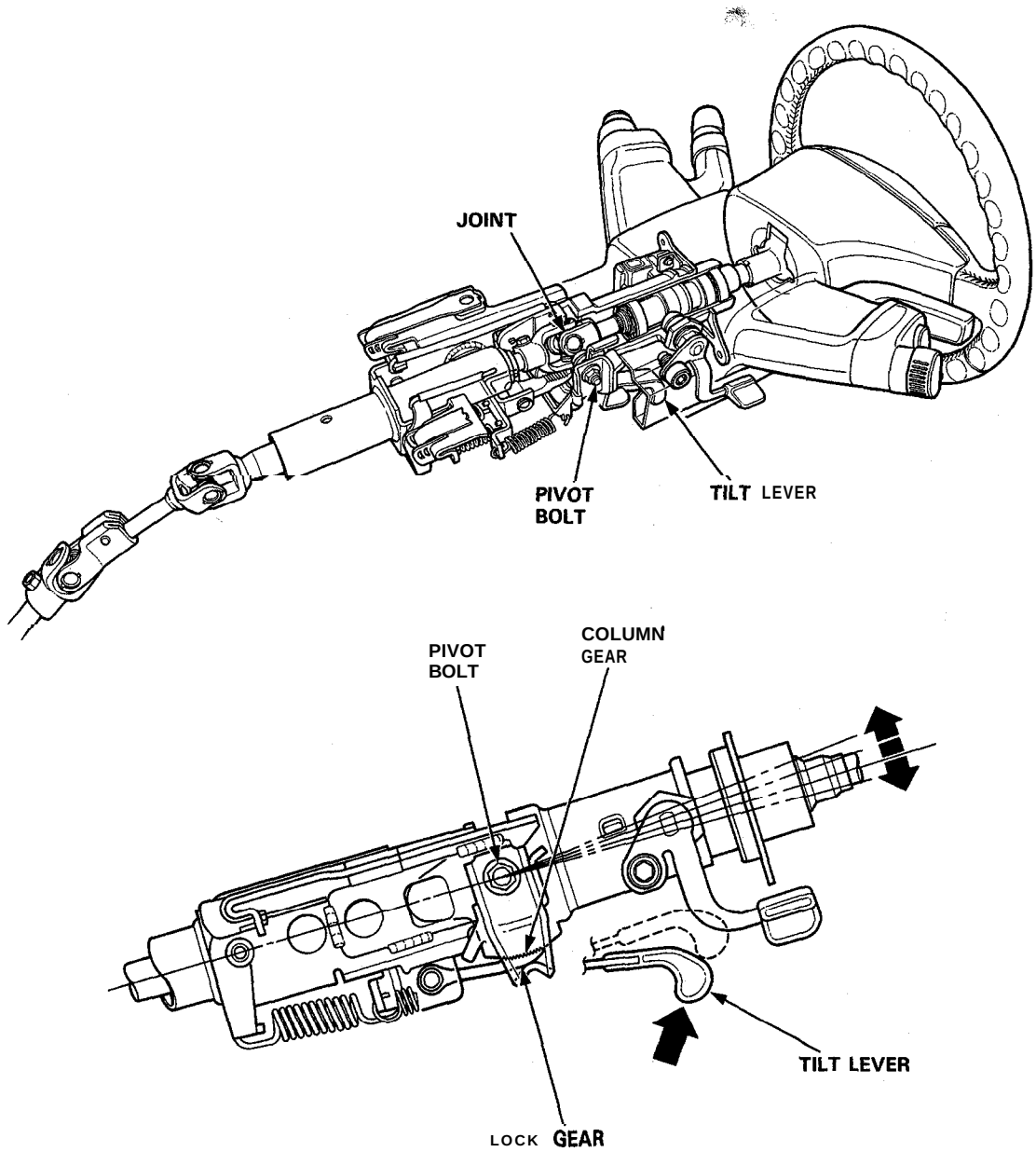
System Description

-Steering Column

The NSX has a tilt/telescopic steering column. The tilt/telescopic mechanism makes it possible to adjust the steering wheel in fore and aft, and up and down directions.

Tilt Mechanism

There is a joint on the upper steering shaft, and the portion of the column between the steering wheel and this joint is adjustable up and down. When the tilt lever is operated, the lock gears are detached from the column gear to release the lock. The column moves upward or downward on two pivot bolts. When the tilt lever is returned to a fixed position after selecting the steering wheel height, the lock gear is engaged with the column gear to secure the column.



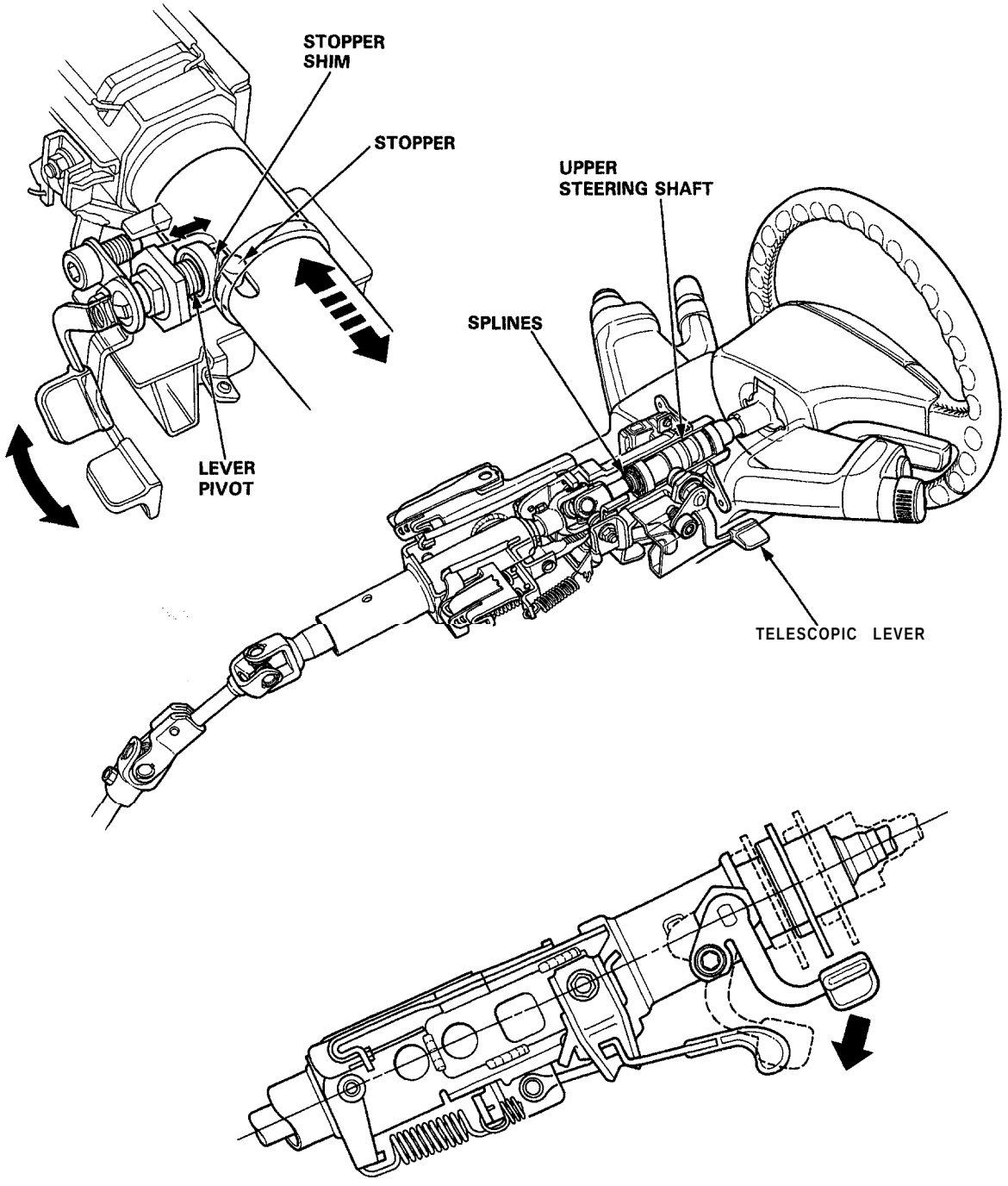
(cont'd)

System Description

-Steering Column (cont'd)

Telescopic Mechanism

The upper steering shaft is divided into two shafts, connected by splines, making it possible for the shaft to telescope while transmitting the rotation of the steering wheel. When the telescopic lever is lowered, the lever pivot turns in a direction to loosen the stopper shim at the tip of the lever pivot, allowing the shaft to make telescope. The telescopic stroke is limited by the slot and stopper on the movable shaft. After selecting a steering wheel position and returning the telescopic lever to the fastening position, the stopper shim is pressed against the movable shaft the lever pivot to fasten the sliding part.



Energy-absorbing Steering Column/Wheel

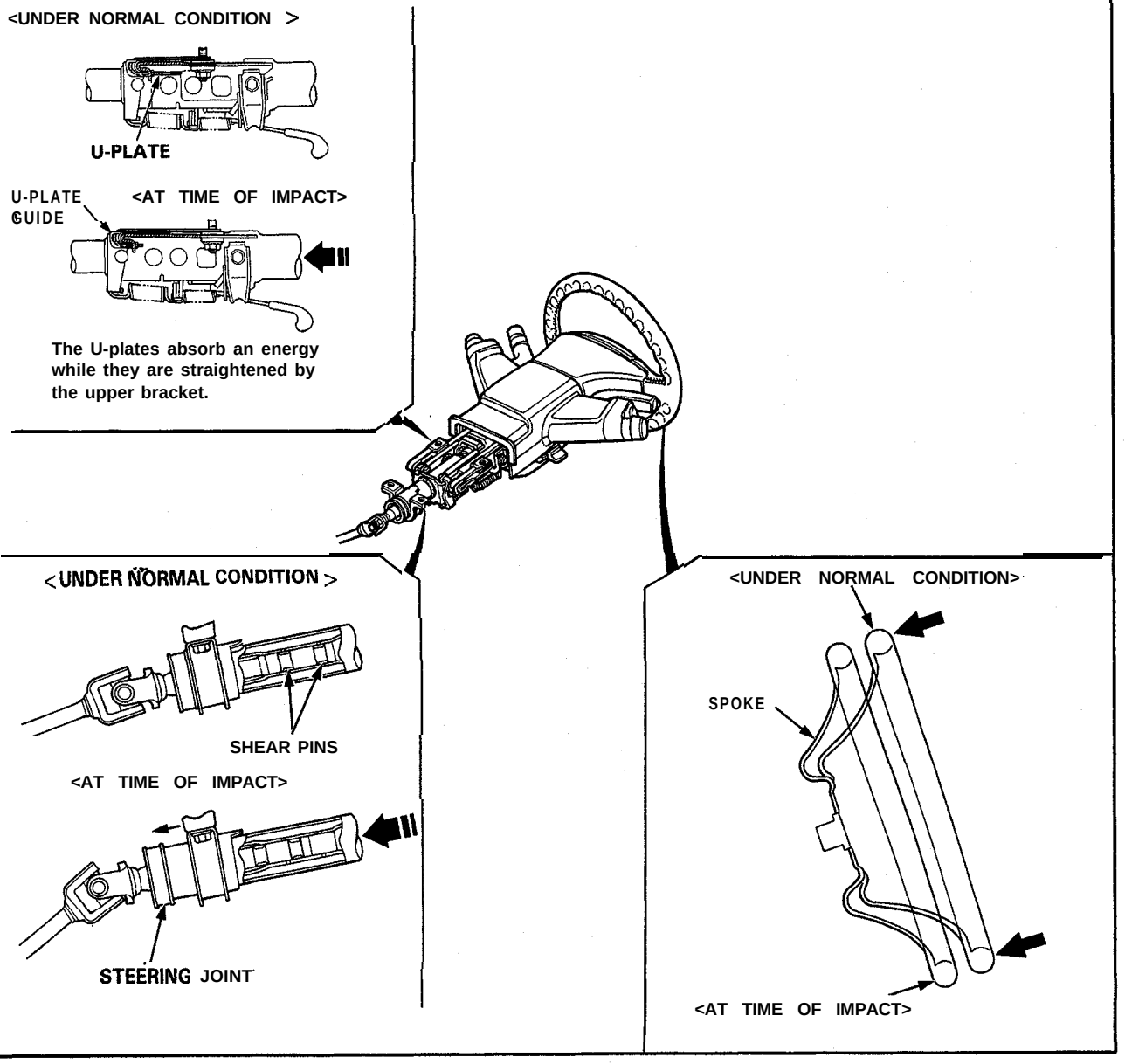
Both the steering column and steering wheel are designed to absorb impact energy during a collision.

Steering Wheel

The steering wheel absorbs the energy of a collision through the deformation of the spoke portion. Should the impact absorbing capacity of the column side decrease due to the deformation of the vehicle body during a collision, the steering wheel will help absorb the impact.

Steering Column

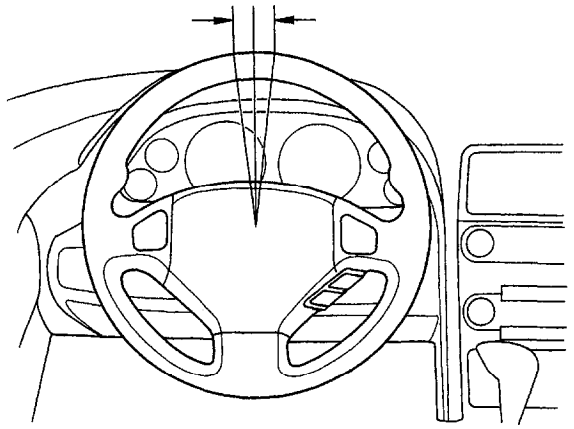
The steering column is fastened on the body through a U-shaped plate, and the lower part of the column is inserted into a lower holder. Due to this construction, the steering column will slide in its axial direction when a large impact is given in the axial direction of the column. Since the U-shaped plate is fastened to the body, the U-shaped plate is bent and deformed along the guide when the column slides in its axial direction. Through the deformation of the plate, the energy is absorbed and the column slides forward. When exposed to a greater impact, a shear pin will break and the energy is absorbed by the lower shaft.



Inspection

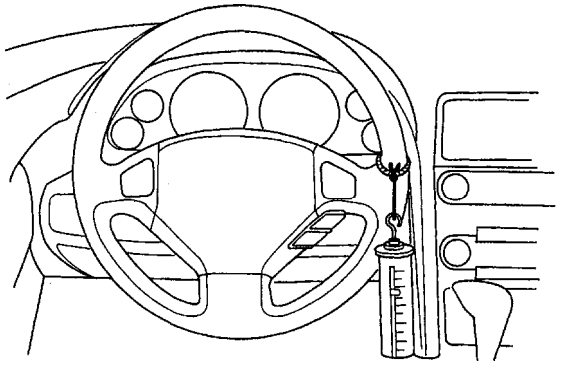
- Steering Wheel Rotational Play

1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.
   Service Limit: 5 cm (0.2 in)



- Steering Effort Check (Manual Steering Only)

1. Raise the front wheels off the ground (see section 1).
2. Turn the steering wheel with a spring scale and check its reading.
3. If the reading exceeds the service limit, adjust the steering gearbox as shown on the next page.
   Service Limit: 20 N (2 kg, 4.4 lb)

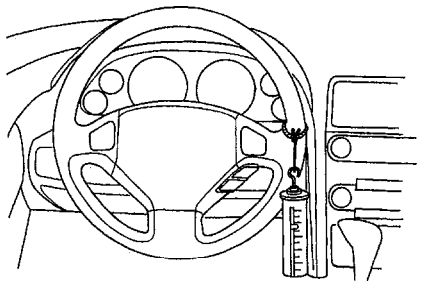


-Power Assist Check With Car Parked (Electrical Power Steering Only)

Turn the steering wheel with a spring scale. Read the measurement when the front wheels or steering wheel start to move.

Operation Standard

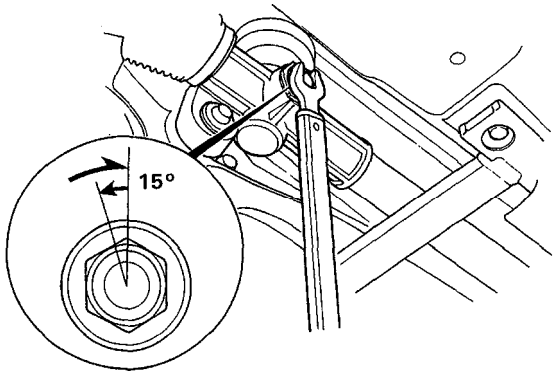
Condition	Stationary Swing operation load
Without power assist (engine off)	12 kg (26.46 lb) maximum
With power assist (engine running)	4.2 kg (9.26 lb) maximum



--Steering Gearbox Adjustment

Manual Steering:

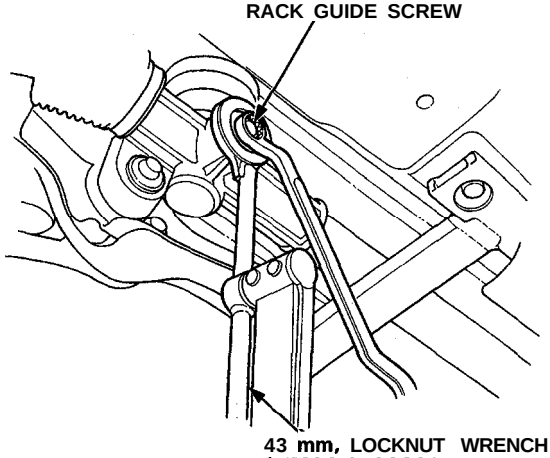
1. Loosen the rack guide screw locknut.
2. Tighten, loosen and retighten the rack guide screw two times to 5 N·m (0.5 kg-m, 3.6 lb-ft), then back it off 15°.



3. Tighten the locknut on the rack guide screw with the special tool.
4. Check for tight or loose steering through the complete turning travel.
5. Recheck steering effort.

To calculate the indicated torque value, use the formula on page 17-26.

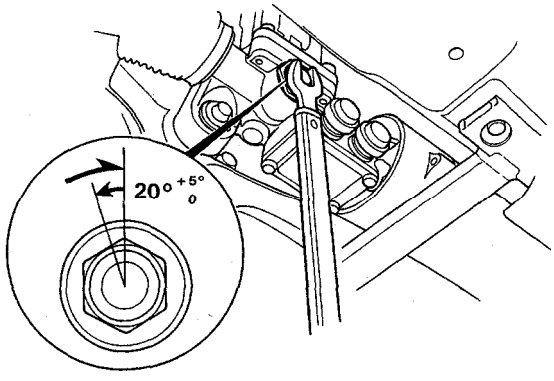
Actual: 66 N·m (6.8 kg-m, 49 lb-ft)
Indicated: 52 N-m (5.2 kg-m, 38 lb-ft)



43 mm, LOCKNUT WRENCH
07MAA-SL0020A

Electrical Power Steering:

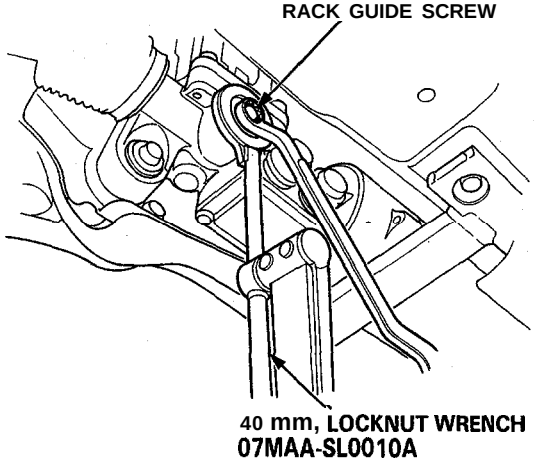
1. Loosen the rack guide screw locknut.
2. Tighten, loosen and retighten the rack guide screw two times to 4 N·m (0.4 kg-m, 2.9 lb-ft), then back it off $20^{\circ}{}^{+5^{\circ}}_{0}$.



3. Tighten the locknut on the rack guide screw with the special tool.
4. Check for tight or loose steering through the complete turning travel.
5. Recheck steering assist.

To calculate the indicated torque value, use the formula on page 17-70.

Actual: 25 N-m (2.5 kg-m, 18 lb-ft)
Indicated: 19 N·m (1.9 kg-m, 14 lg-ft)



40 mm, LOCKNUT WRENCH
07MAA-SL0010A

Steering Wheel

-Removal

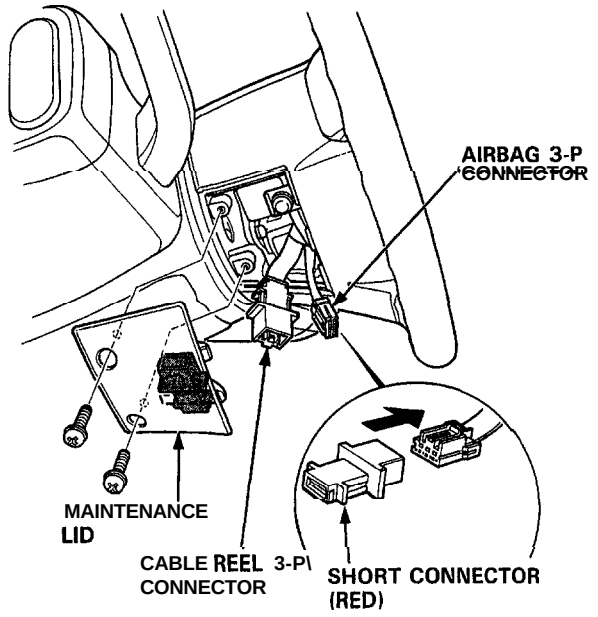
Airbag Removal

⚠WARNING Store a removed **airbag** assembly with the pad **surfce up, if the airbag is improperly stored face** down, accidental deployment could propel the unit with enough force to cause serious injury.

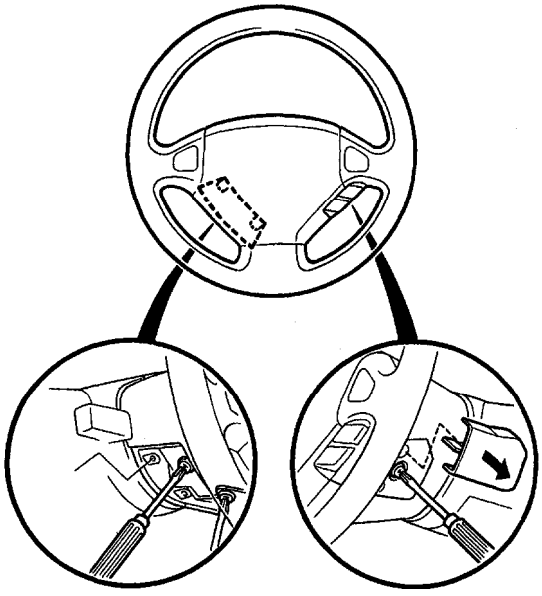
CAUTION:

- **Before removing the steering wheel, aline the front** wheels straight ahead.
- Do not install used SRS parts from another car. **When repairing, use only new SRS parts.**
- 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.
- Always keep the short connector on the **airbag** connector when the harness is disconnected.
- **Do not disassemble or tamper with the airbag** assembly.

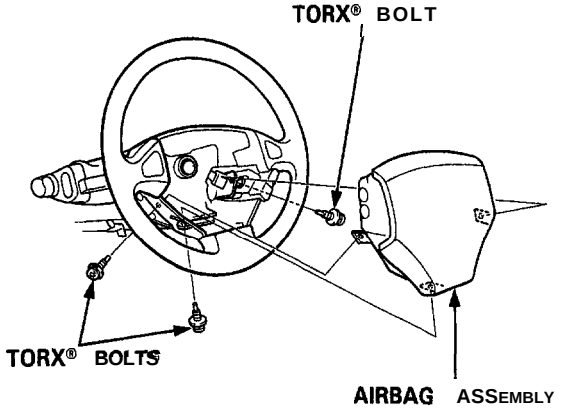
1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the maintenance lid form the steering wheel **lower cover, then remove the short connector.**
3. **Disconnect the connector between the airbag and** cable reel.
4. **Connect the short connector to the airbag side of** the connector.



5. **Remove the two TORX® bolts using a TORX® T30** bit, then remove the airbag assembly.



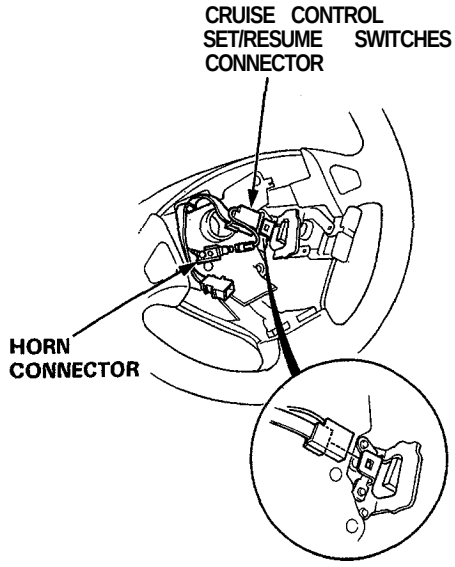
CRUISE CONTROL SET/RESUME SWITCH



(cont'd)

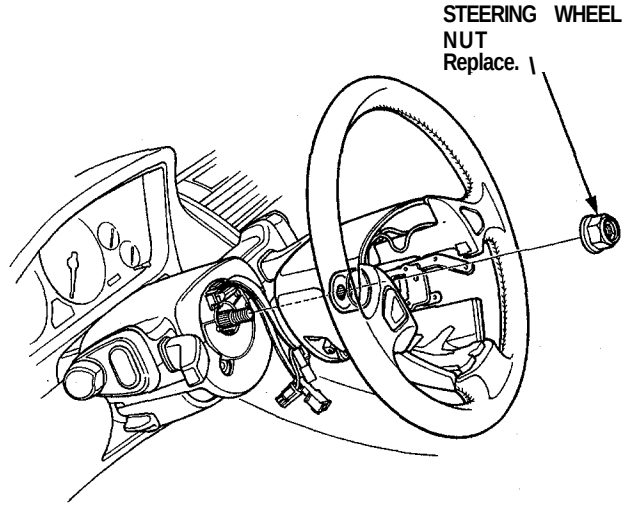
-Removal (cont'd)

7. Disconnect the connectors from the horn and cruise control set/resume switches remove the airbag connector from its dips.



8. **Remove the steering wheel nut.**

9. Remove the steering wheel by rocking it slightly from **side-to-side as you pull steadily with both hands.**



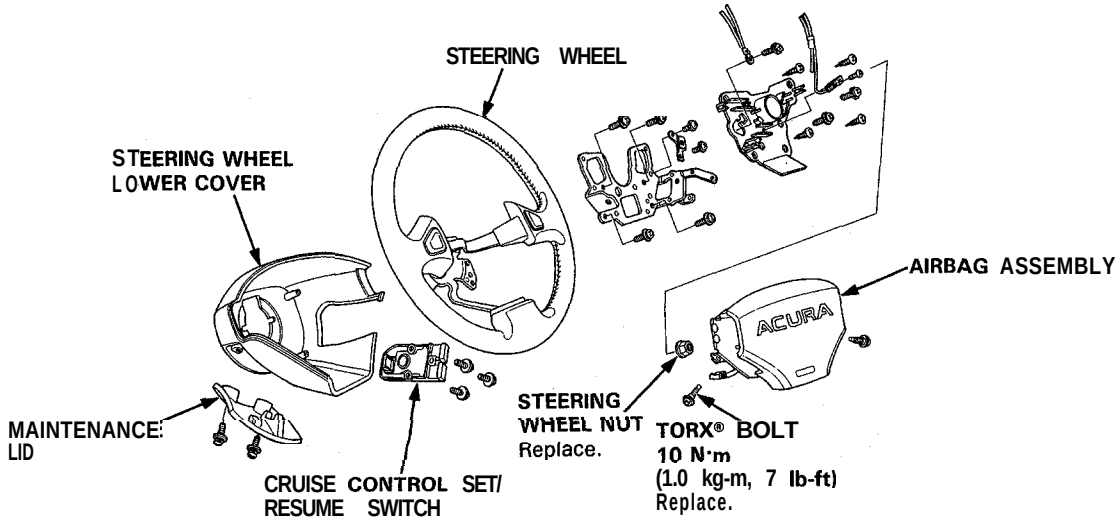
-Disassembly/Reassembly

⚠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 car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 23).

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.
- Always keep the short connector on the **airbag** connector when the harness is disconnected.
- **Do not disassemble or tamper with the airbag assembly.**



Steering Wheel

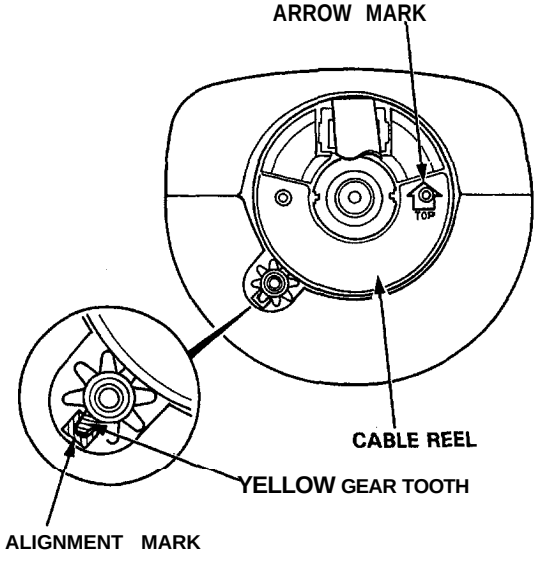
Installation

CAUTION:

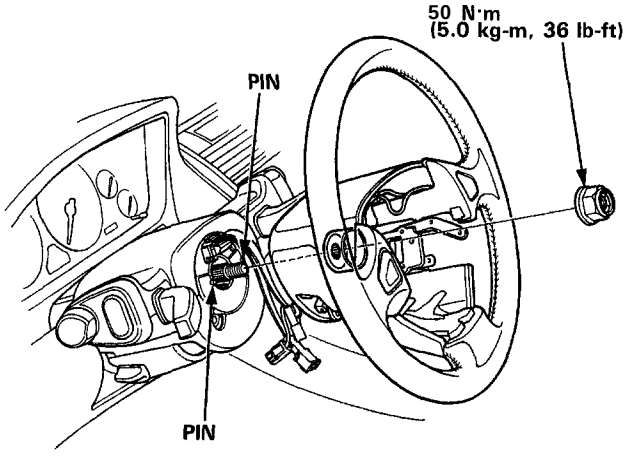
- **Before installing the steering wheel, align the front wheels straight ahead.**
- Be sure to install the harness wires so that they are **not pinched or interfering with other car parts.**
- **Do not replace the original steering wheel with any** other design, since it will make it impossible to properly 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 later **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) until:**
   - The yellow gear tooth lines up with the mark on the cover.
   - The arrow on the cable reel label points straight up.

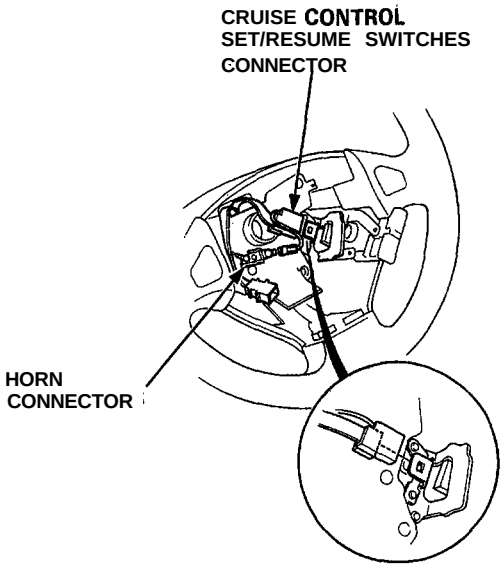


2. Install the steering wheel.
   NOTE: Be sure the steering wheel shaft engages the cable reel.

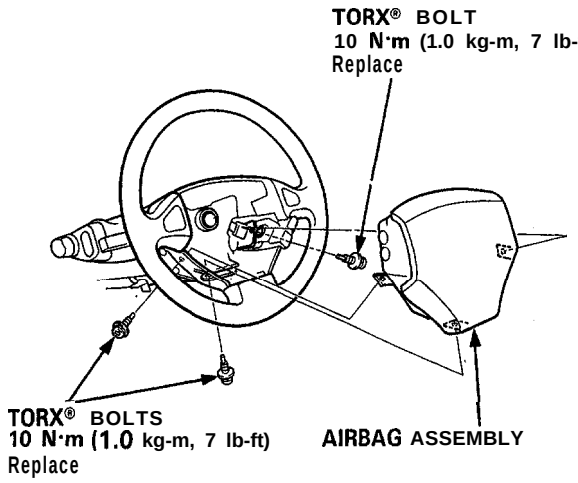


3. Insert the cruise control set/resume 4-P connector **and airbag connector to the steering wheel clips.**

4. **Connect the horn connector.**



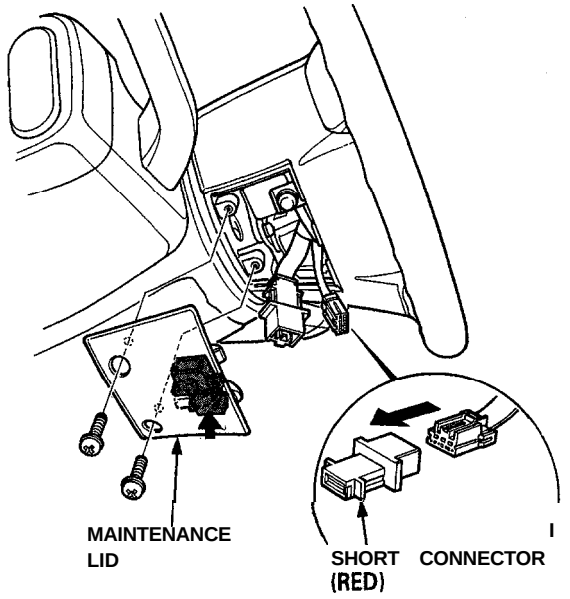
5. Install the airbag assembly with new TORX® bolts.



7. Disconnect the short connector from the airbag connector.

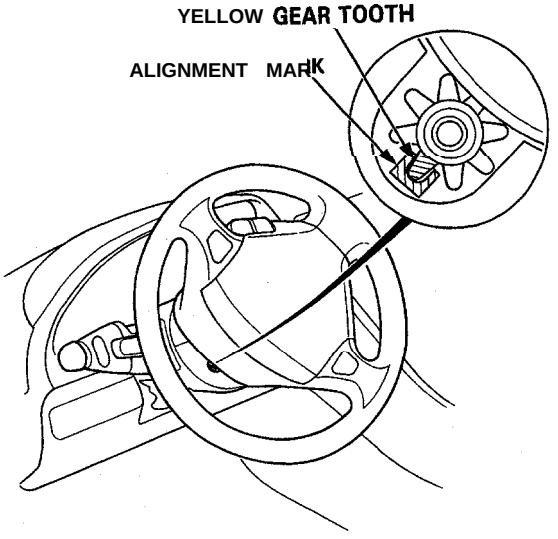
8. Connect the airbag 3-P connector and cable reel 3-P connector.

9. Attach the short connector to the lid, and install the lid on the steering wheel lower cover.



10. Connect the battery positive terminal and then connect the negative terminal.

11. After installing the airbag assembly, confirm proper system operation:
- Turn the ignition to II: the instrument panel SRS warning light should come on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume switch.
- Turn the steering wheel counterclockwise and make sure the yellow gear tooth still lines up with the alignment mark.



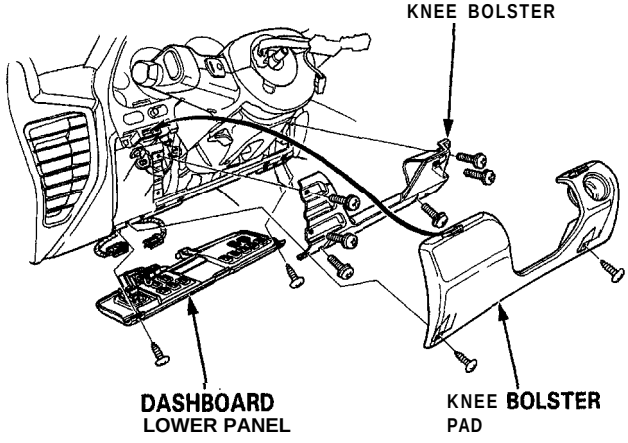
Steering Column

-Removal

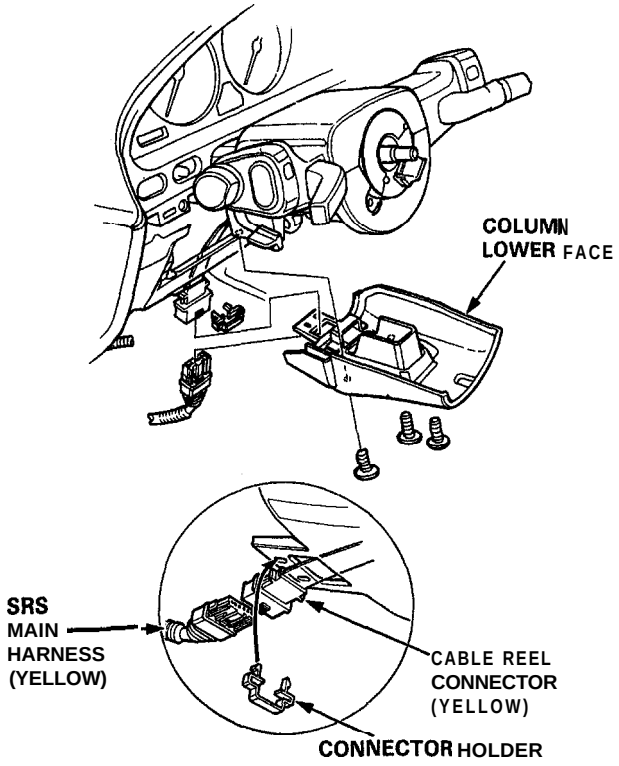
1. Disconnect both the negative cable and positive cable from the battery.

2. Remove the airbag assembly and steering wheel from the column (page 17-8).

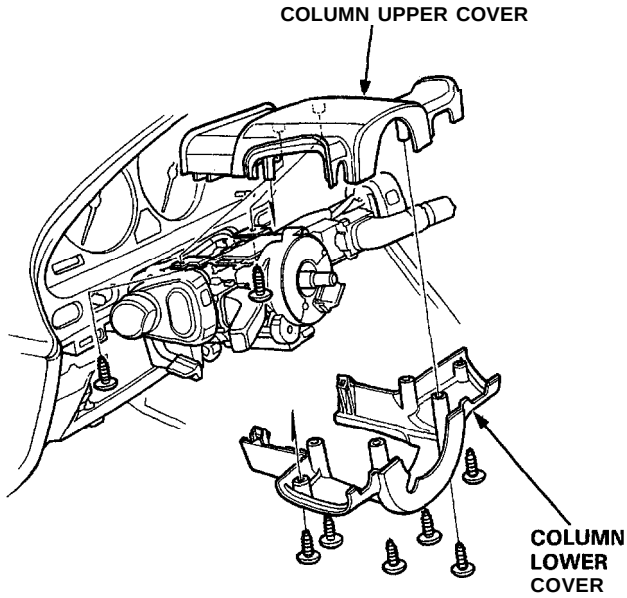
3. Remove the dashboard lower panel, knee bolster pad, and knee bolster.



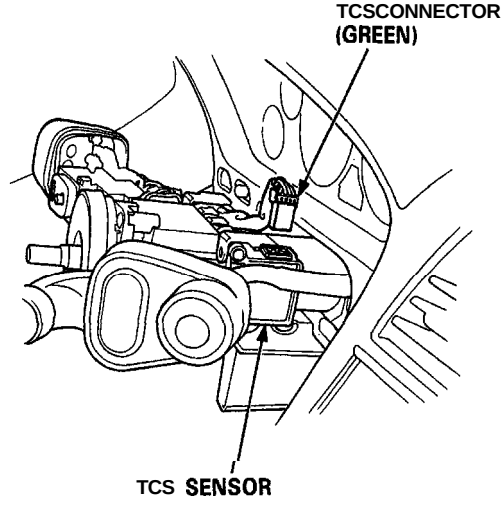
4. Remove the column lower face. Disconnect the connector between the cable reel and the SRS main harness, then remove the connector holder.



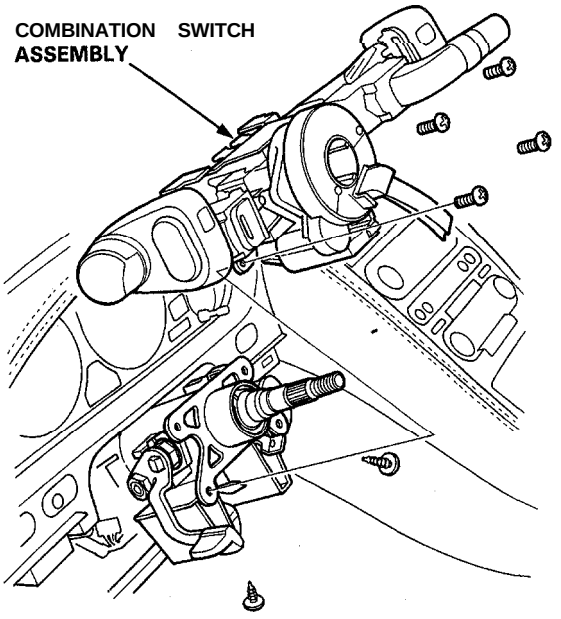
5. Remove the column lower cover, and column upper cover.
NOTE: Be careful not to damage the column covers.



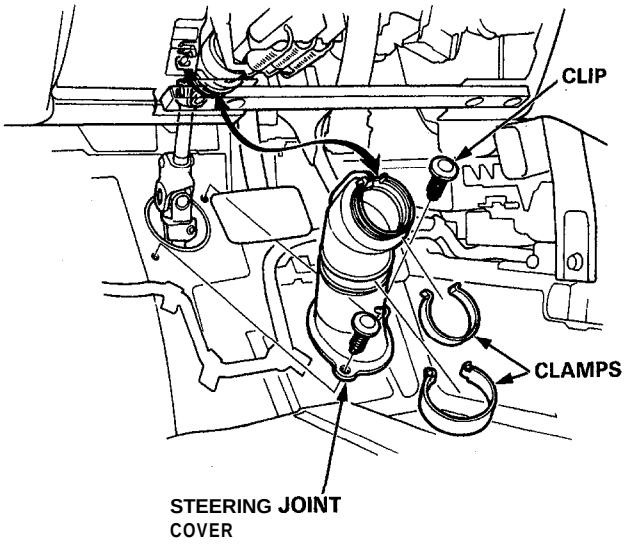
6. Disconnect the TCS sensor.



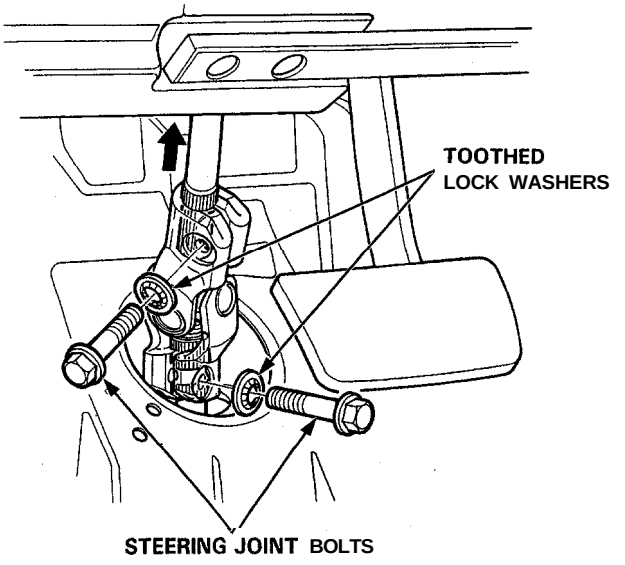
7. Remove the combination switch assembly from the column shaft.
NOTE: The combination switch can be removed by disconnecting only the TCS connector.



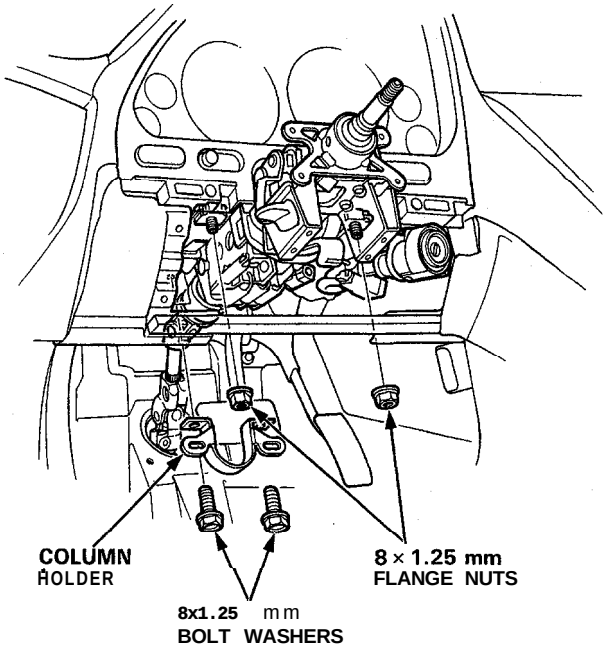
8. Remove the steering joint cover.



9. Remove the steering joint bolts and washers from the joints.

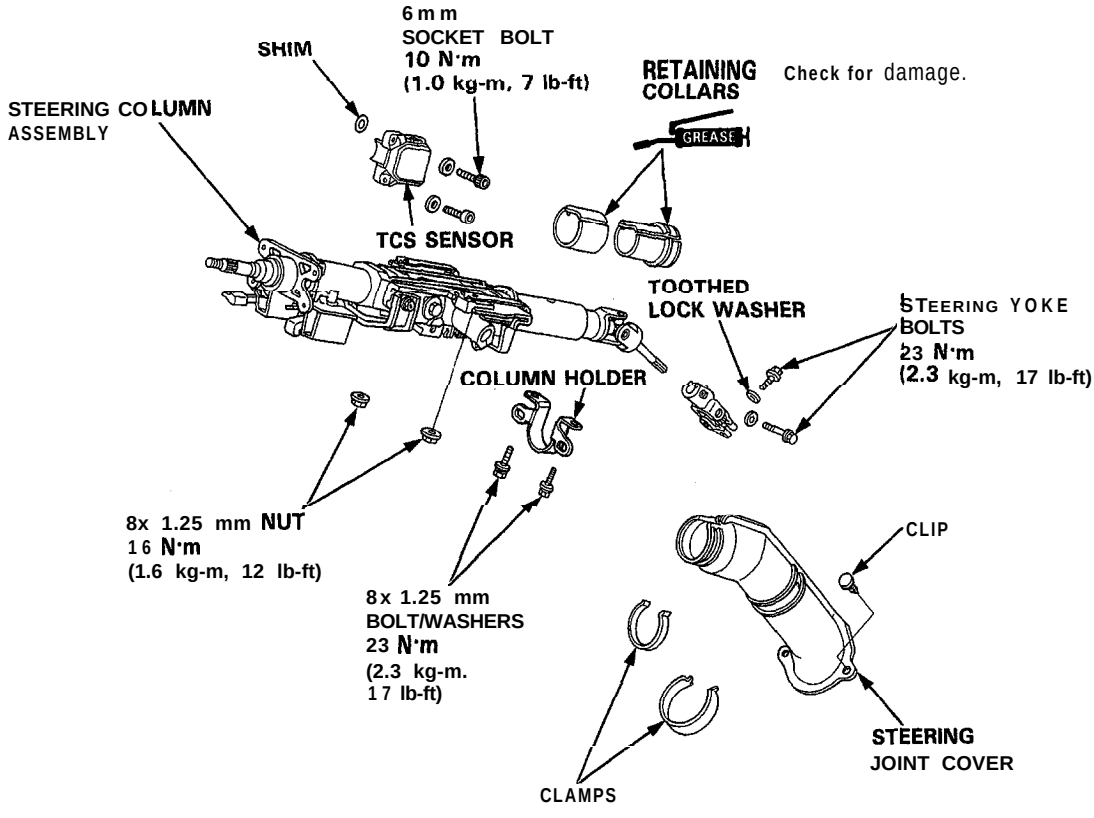


10. Disconnect the ignition switch connectors and remove the column holder, then remove the column assembly by removing the attaching nuts.



Steering Column

Inspection



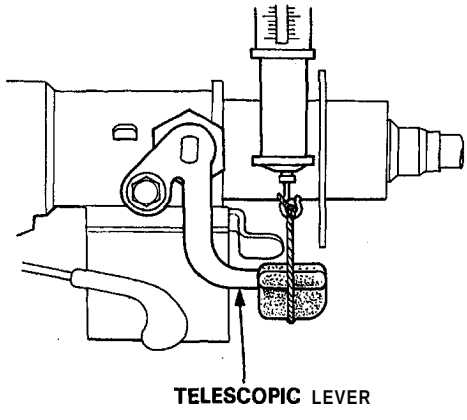
NOTE:

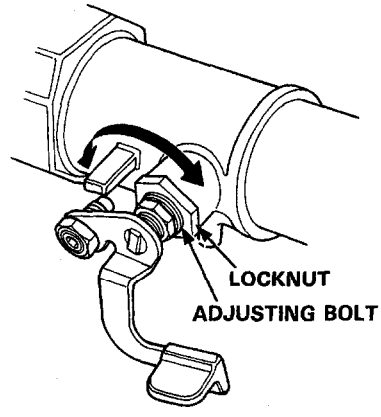
- Check the telescopic mechanism, tilt mechanism, and steering joint bearings or steering shaft for movement and damage. Replace as an assembly if damaged or faulty.
- If either the steering column assembly or TCS sensor is removed, select the appropriate shim and adjust the distance between the steering shaft and TCS sensor. Refer to Section 19 for shim selection.

Attach a spring scale to the knob of the telescopic lever. Measure the force required to move the lever.

Preload: 70-90 N (7 -9 kg, 15-20 lbs)

If the force measured is not within the specification, loosen the locknut then the telescopic adjusting bolt until the correct force can be obtained.

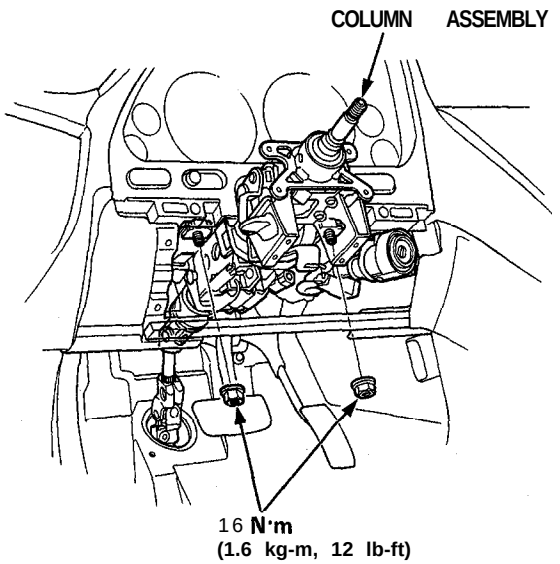




-Installation

1. Slip the lower end of the steering joint onto the pinion shaft.

2. **Reposition the column assembly on the hanger bracket and loosely tighten with 8 mm nuts.**



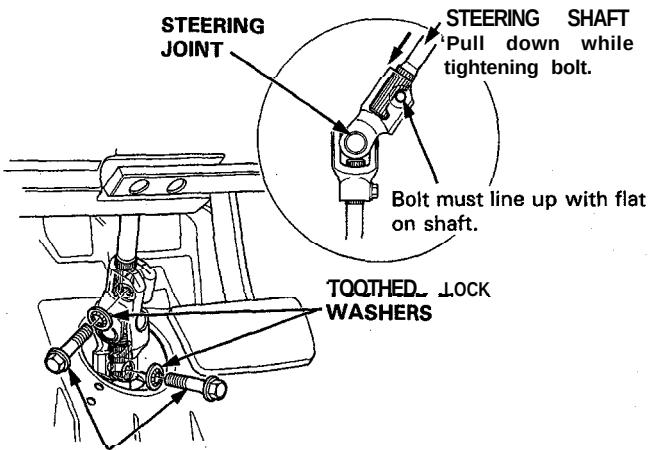
3. **Tighten to the steering joint yoke bolts.**

NOTE:

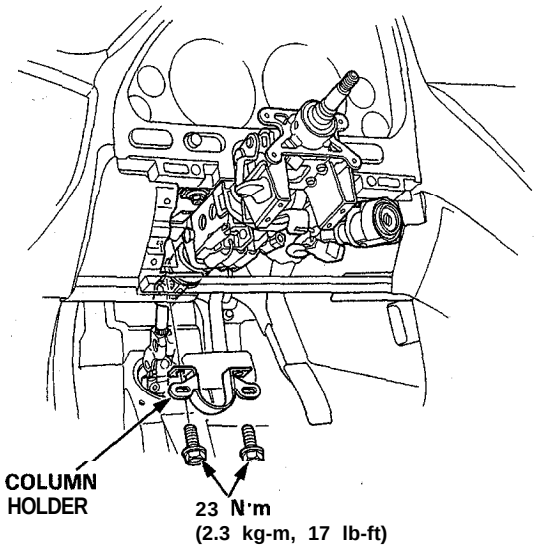
- **Be sure that the lower bolt is securely in the groove in the steering gearbox pinion.**
- Be sure the pinion shaft and the steering column shaft are aligned; the joint should slip on freely. If not, reposition the steering rack to correct the misalignment.

STEERING JOINT

Slip the upper end of the steering joint onto the steering shaft (line up the bolt hole with the *groove* around the shaft) and loosely install the upper bolt.

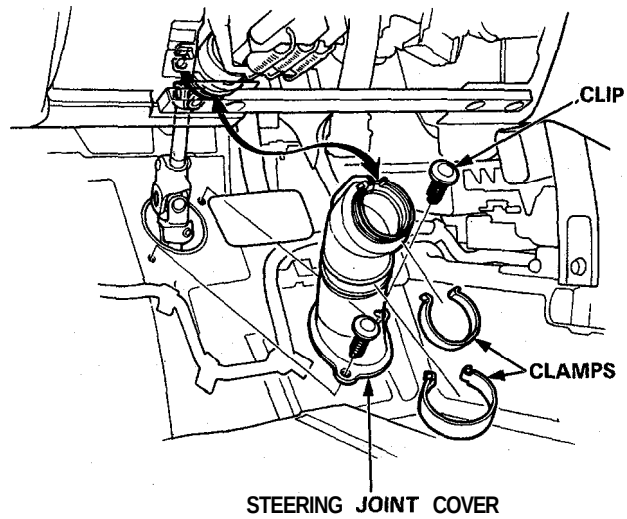


4. **Install the column holder and bolts.**



5. **Tighten the 8 mm nuts to the specified torque.**

6. Install the steering joint cover with the clamps and clip.

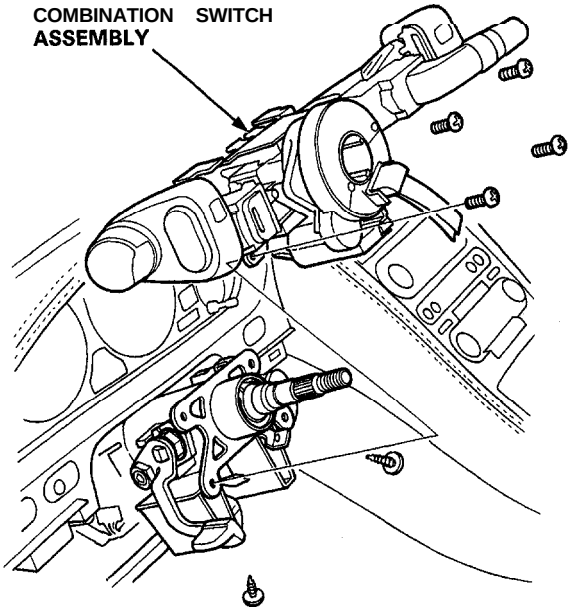


(cont'd)

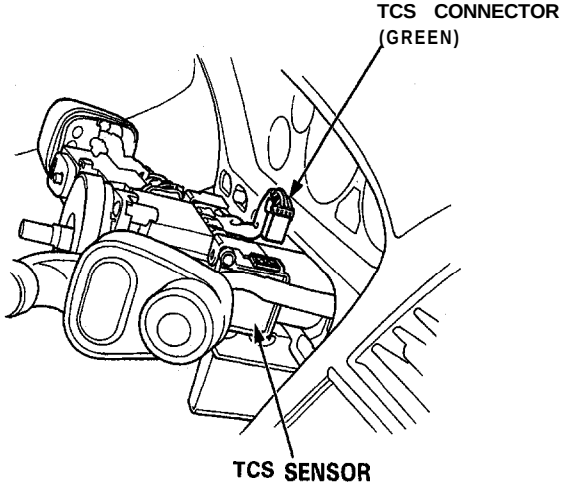
Steering Column

- Installation (Cont'd)

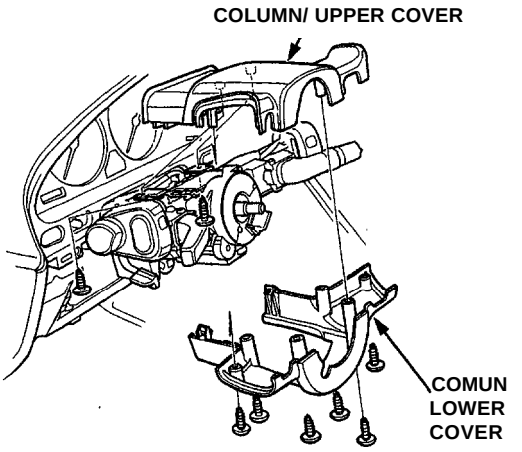
7. Install the combination switch assembly on the column shaft.



8. Reconnect TCS sensor.

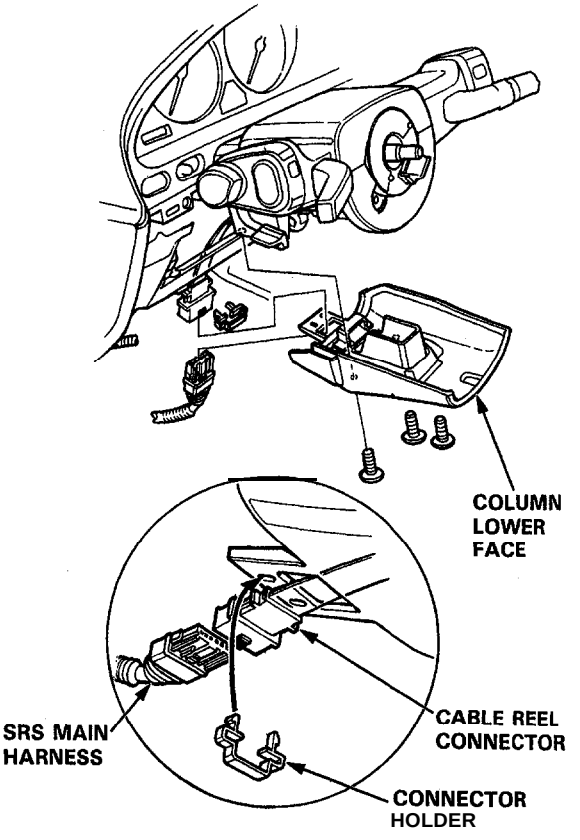


9. Install the column upper cover, and column lower cover.
NOTE: Be careful not to damage the column covers.



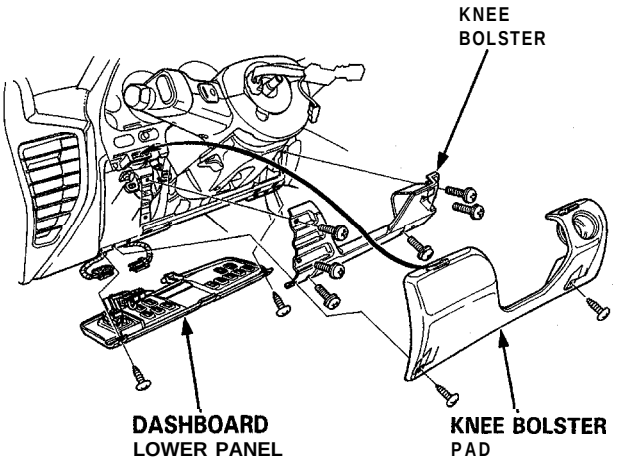
10. Connect the harness from the cable reel to the SRS main harness below the pedal bracket, then attach the connector holder to the column lower face.

11. Install the column lower face.

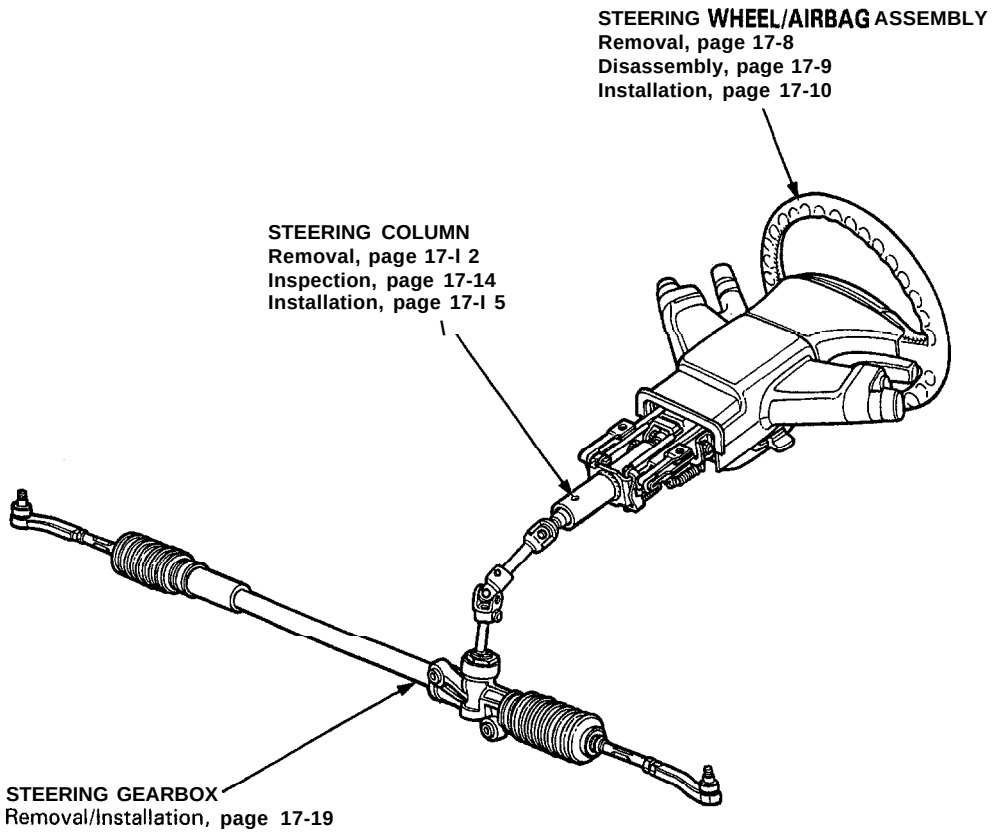


12. Install the knee bolster and pad.

13. Connect the foot light harness and light-on warning chime to the driver under cover, then install the dashboard lower panel.



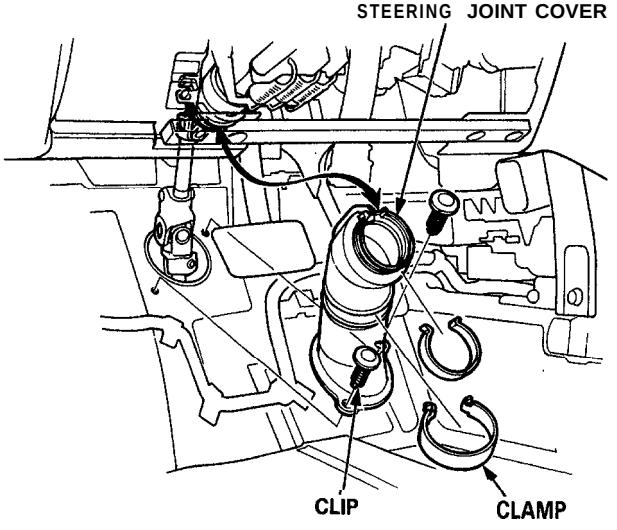
14. Install the steering wheel and SRS airbag assembly to the column. (17-10).


STEERING WHEEL/AIRBAG ASSEMBLY
Removal, page 17-8
Disassembly, page 17-9
Installation, page 17-10
STEERING COLUMN
Removal, page 17-I 2
Inspection, page 17-14
Installation, page 17-I 5
STEERING GEARBOX
Removal/Installation, page 17-19
Disassembly, page 17-22
Inspection, page 17-21
Reassembly, page 17-25

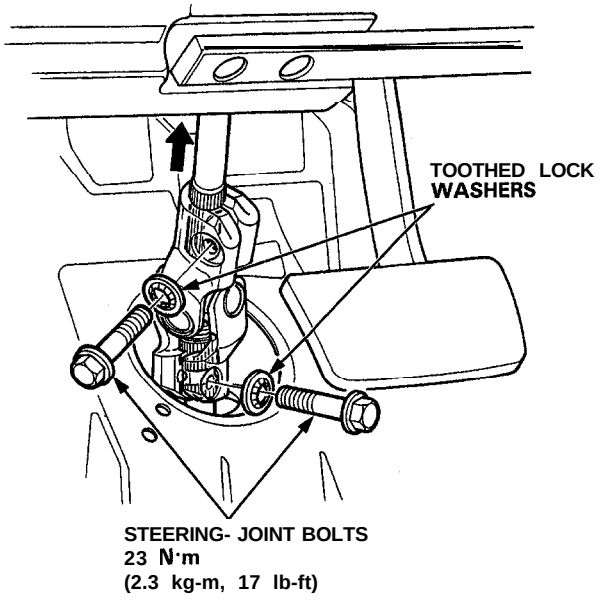
-Gearbox Removal/Installation

NOTE:
- Before removing the steering gearbox, align the front wheels straight ahead.
- Disconnect the battery negative terminal and then disconnect the positive terminal.

1. Remove the steering joint cover.



2. Remove the steering joint bolts, and move the joint toward the column.



3. Raise the car and place safety stands in the proper locations (see section 1).

4. Remove the front wheels.

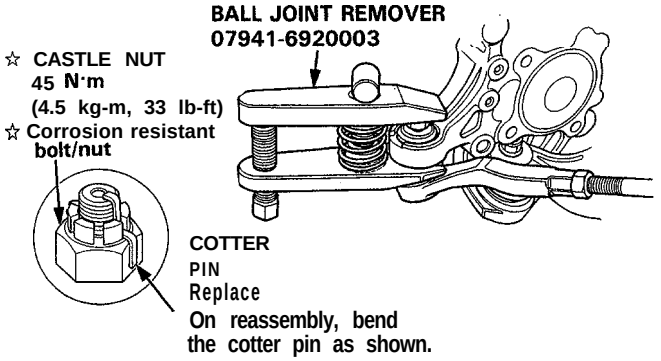
5. Remove the cotter pin from the tie-rod ball joint nut and remove the nut.

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 ball joint remover.

7. Separate the tie-rod ball joint and knuckle using the special tool.

CAUTION: Avoid damaging the ball joint boot.

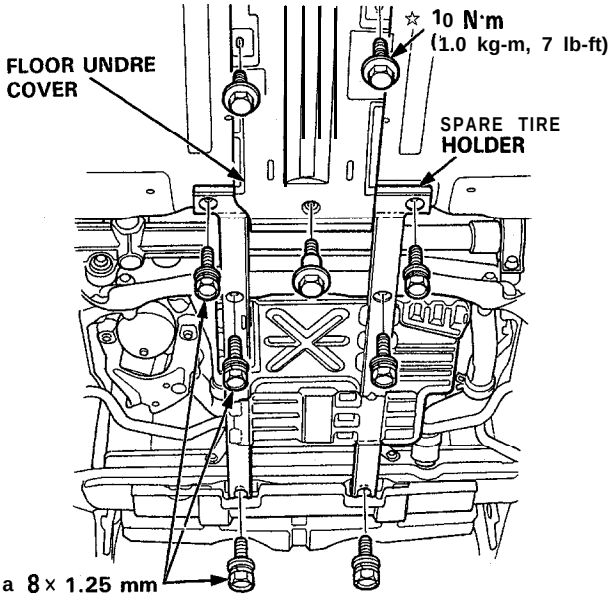
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



8. Remove the folding spare tire and spare tire holdre plate.

9. Remove the battery.

10. Remove the spare tire holder.

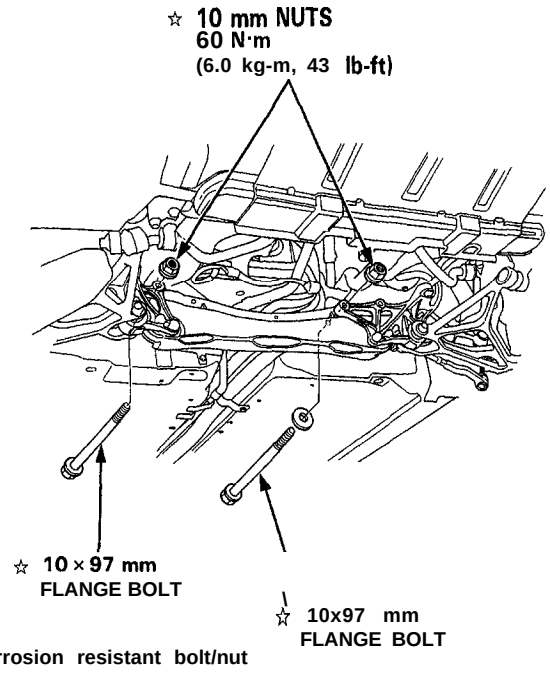


☆ Corrosion resistant bolt/nut

(cont'd)

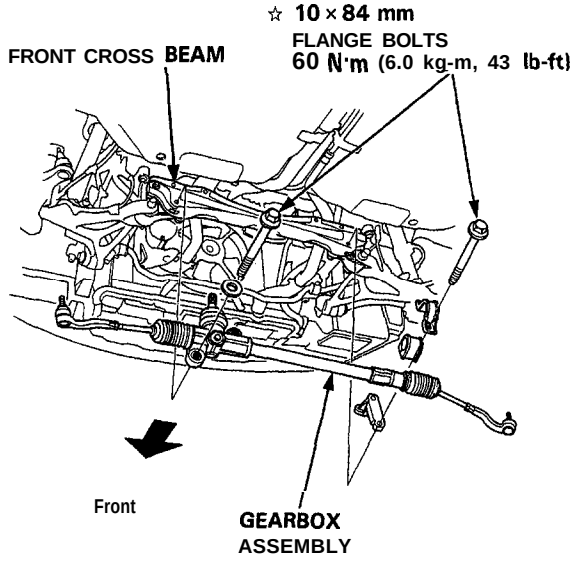
-Gearbox Removal/Installation (Cont'd)

11. Remove the bolts and nuts of the gearbox and cross beam.



*Corrosion resistant bolt/nut

12. Remove the steering gearbox from the cross beam by removing the mounting bolts.

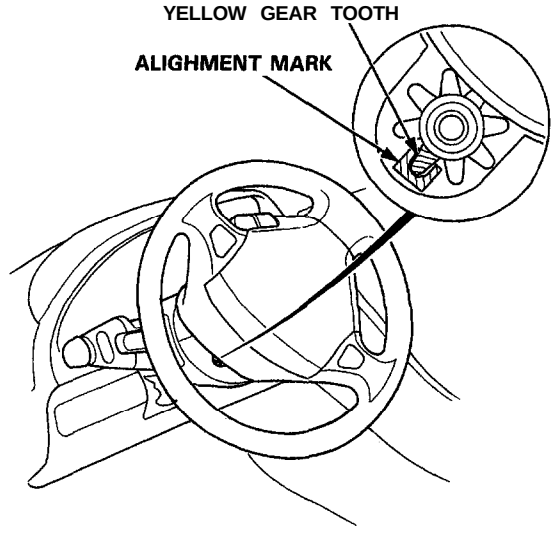


☆Corrosion resistant bolt/nut

13. Installation is the reverse order of removal.
- Install the gearbox assembly and spare tire holder plate frame.
- Install the battery.
- Install the spare tire holder plate and folding spare tire.
- Install the steering joint.

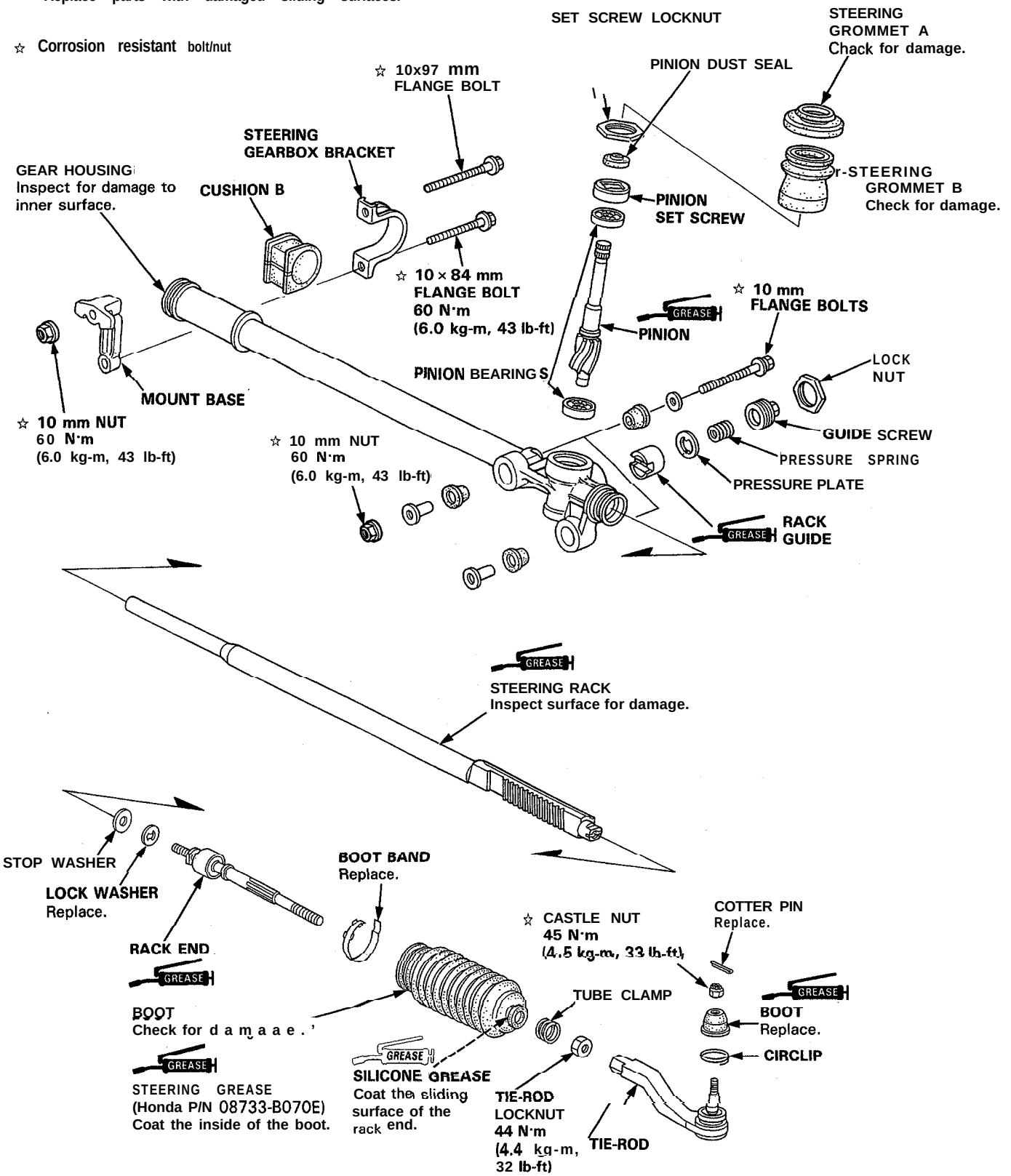
14. Connect the battery positive terminal and then connect the negative terminal.

15. After confirm proper system operation:
- Turn on the ignition to II: the instrument panel SRS warnig light should go on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume switch.
- Turn the steering wheel counterclockwise to make sure the yellow gear tooth still lines up with the alignment mark.



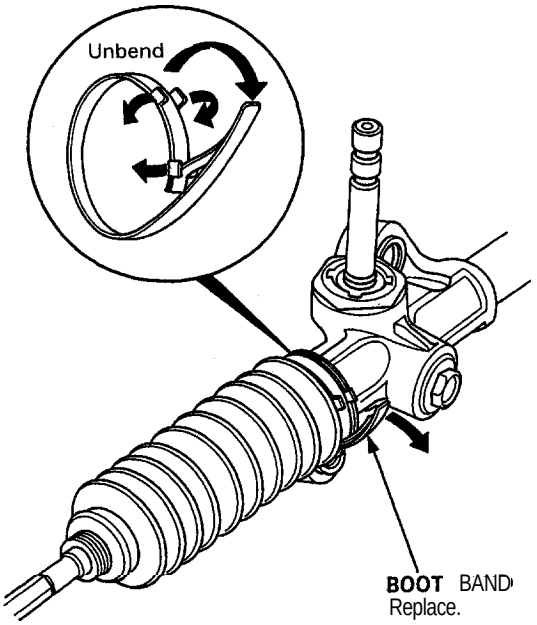
CAUTION:

- **Before disassembling the gearbox, wash it off with solvent and a brush.**
- Thoroughly clean all disassembled parts.
- Replace parts with damaged sliding surfaces.

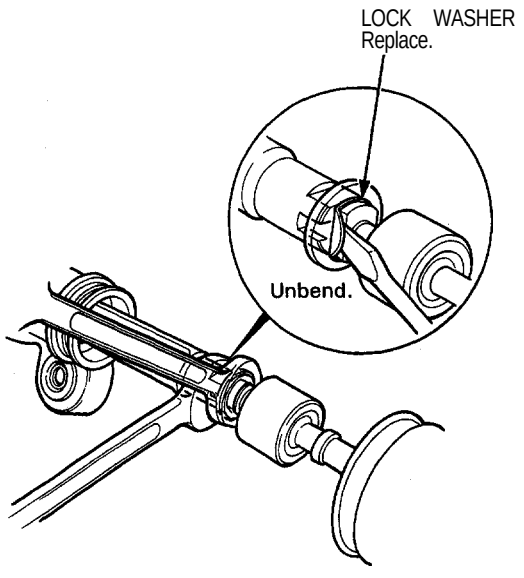


Overhaul

1. Carefully clamp the gearbox in a vise with soft jaws.
2. Remove the boot band.



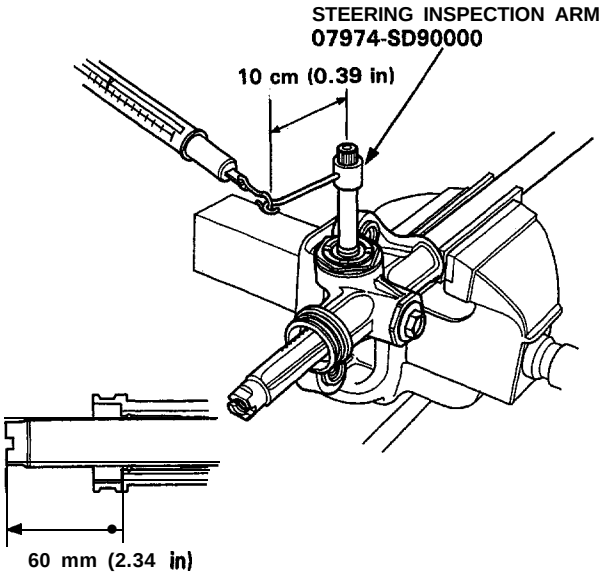
3. Pull the boots away from the ends of the gearbox, and unbend the tie-rod lock washers.
4. Hold the rack with a wrench, and unscrew the tie-rods with another wrench.



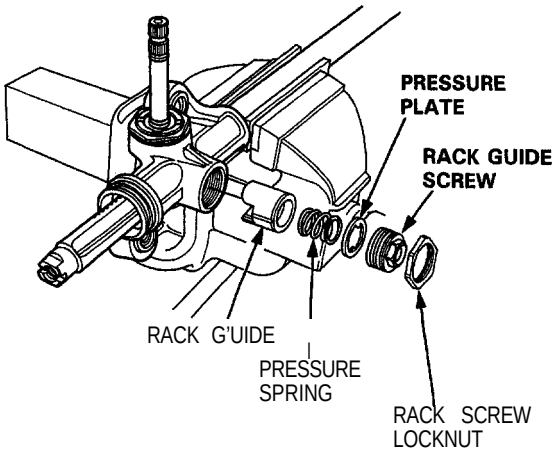
4. Before disassembly, install the special tool on the pinion shaft and check the preload.
   If the preload is out of the specification, adjust the rack guide (page 17-27).
   If the preload is still out of the specification, disassemble the gearbox and check each part.

   NOTE: Slide the steering rack in the cylinder until the end of the projects rack 60 mm (2.34 in.) from the cylinder end. Inspection is made near this rack position.

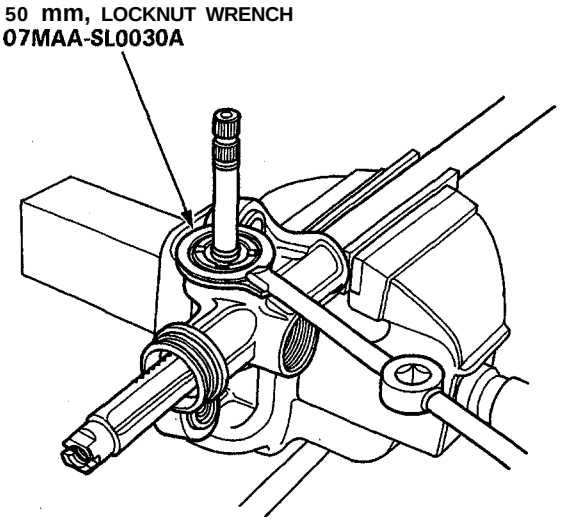
5. Check the pinion preload with a spring scale.
   Preload 7-17 N (0.7-1.7 kg, 1.5-3.8 lb)



6. Loosen the rack screw locknut, and remove the rack guide screw.

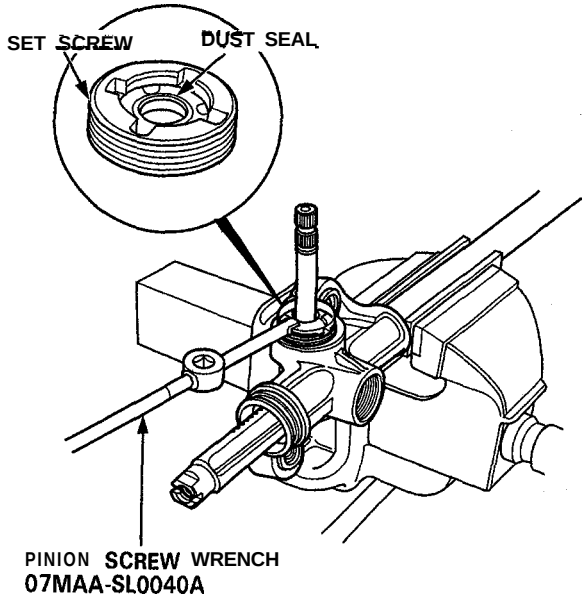


7. Remove the set screw locknut using the special tool.



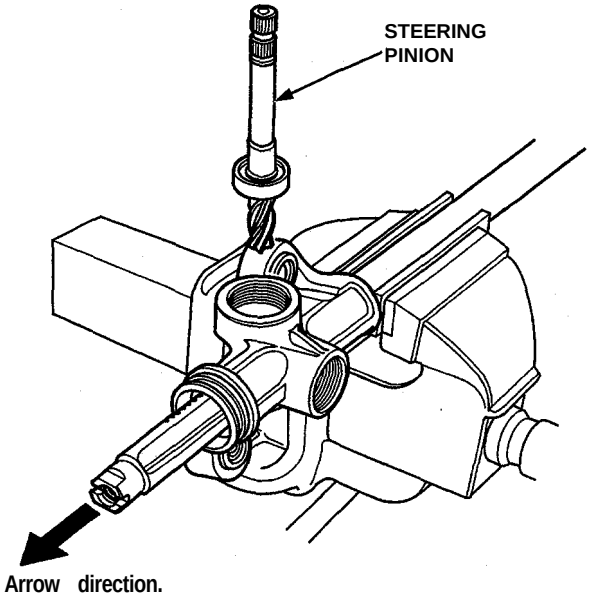
8. **Remove the set screw using the special tool.**

- Check the dust seal for damage and remove it if it must be replaced. Refer to page 17-25 for installation.



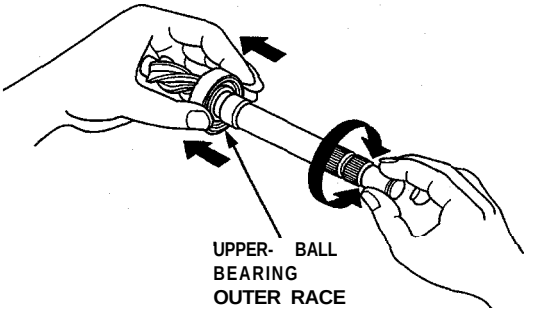
9. **Move the rack toward the gearbox side (i.e. in the direction of the arrow) as far as it goes, and out the pinion assembly pull when the pinion gear contacts the cutout in the rack.**

NOTE: The rack cannot be removed from the rack-end side.



- **Check the bearing movement while pulling the bearing outer race as shown.**

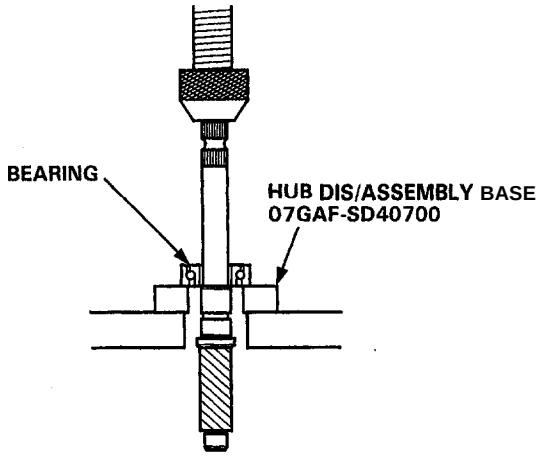
NOTE: This type of the bearing has play. The play should not be excessive.



(cont'd)

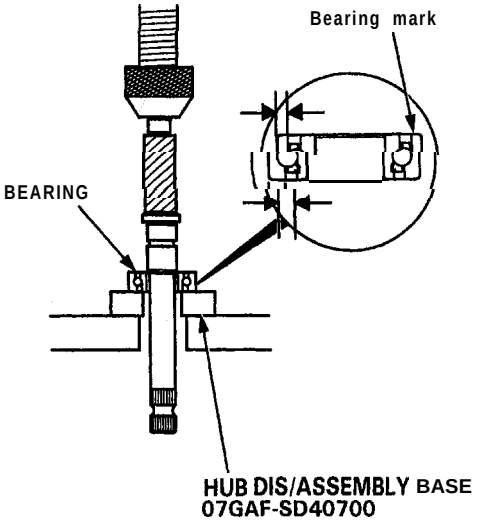
● If the bearing is noisy or has excessive play, replace the bearing using the special tools.

NOTE: Hold the outer race with the tool securely.

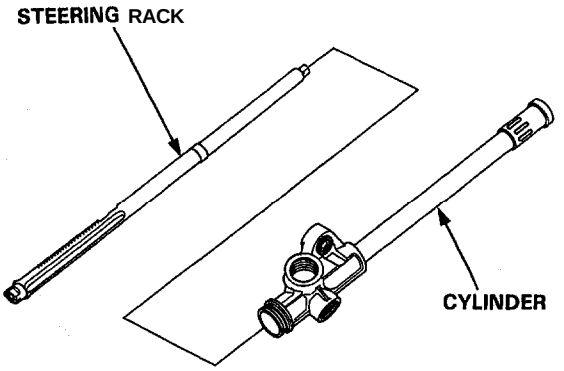


• Press the steering pinion into the new bearing.

NOTE:
● Install the bearing with the wider side of the inner race toward the gear.
● Hold the inner race with the tool securely.



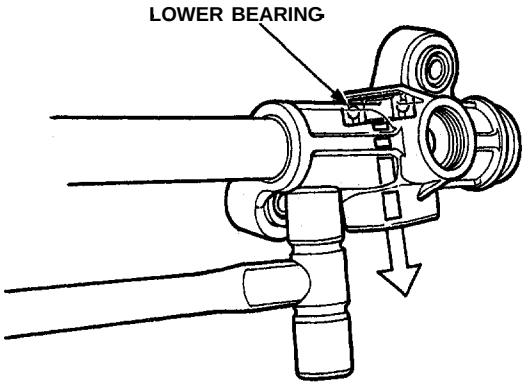
10. Remove the steering rack from the cylinder.



● Check the gearbox lower bearing and replace it if it is damaged.

Remove the bearing by lightly tapping with a plastic hammer as shown. If the bearing is hard to remove by tapping, heat the gearbox by soaking it in 100°C (212°F) water.

CAUTION: To avoid burns, use heavy gloves when handling the heated gearbox.

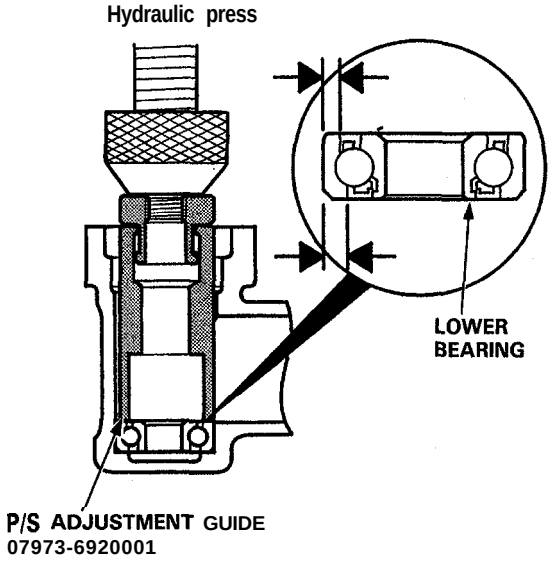


Tap with a plastic hammer to remove the bearing.

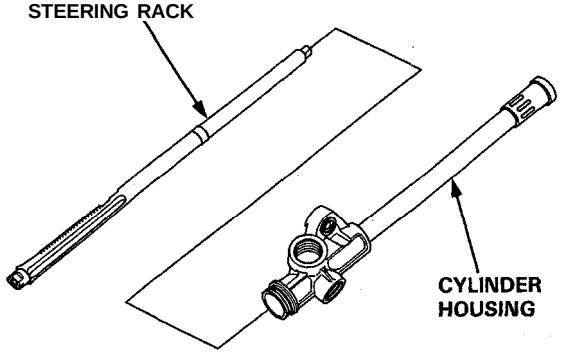
- Press the new bearing into the gearbox housing until it seats using the hydraulic press and special tool.

NOTE:

- Install the bearing with the wider side of the outer race toward the bottom of the gearbox.
- Hold the outer race with the tool securely.
- Do not allow dust and other foreign materials to enter the bearing.

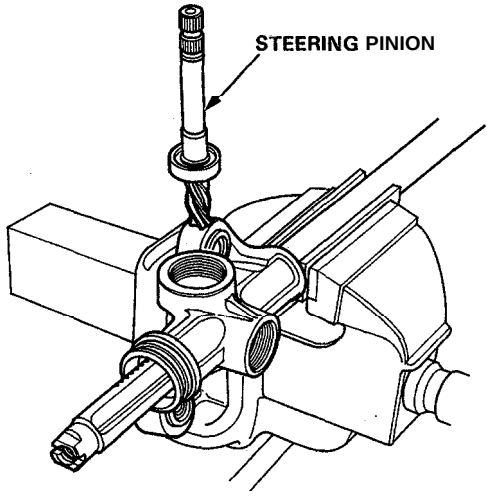


11. Inser the steering rack into the cylinder housing, being careful not to damage the steering rack sliding surface.



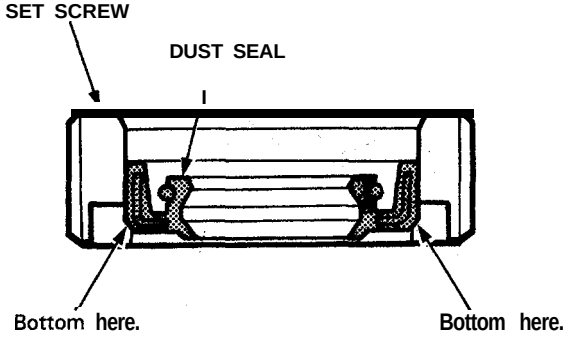
12. Install the steering pinion into the gearbox.

NOTE: Do not engage the steering pinion with the steering rack this time.



13. If the dust seal was removed, drive in the new dust seal until it bottoms on the step on the rack screw.

14. Grease the sealing lip of the dust seal.



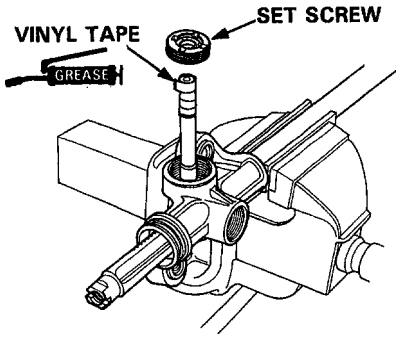
(cont'd)

Manual Steering

-Overhaul (Cont'd)

15. Wrap the splined area of the steering pinion with vinyl tape and grease the surface of the tape.

16. Slide the set screw over the steering pinion, being careful not to damage the sealing lip of the dust seal, then remove the vinyl tape.



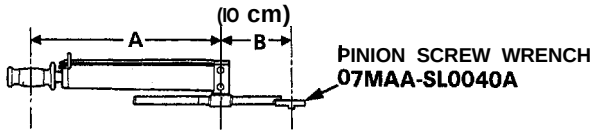
17. Tighten the pinion set screw to a torque wrench reading (indicated) of 5.7 ~ 7.1 N·m (57 ~ 71 kg-cm, 49 ~ 62 in-lb).

NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 25 cm (10 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the torque value using the following formulas.

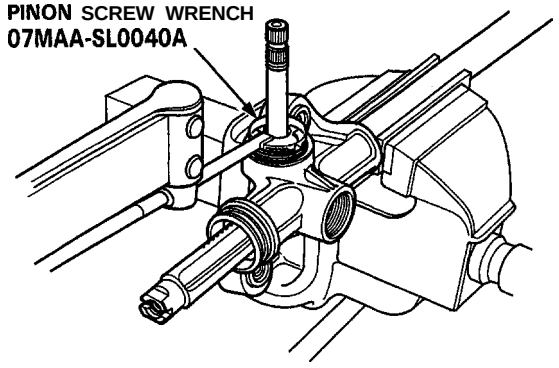
$A/(A+B)=Y$

Y x Actual torque = X

X = Torque wrench reading.

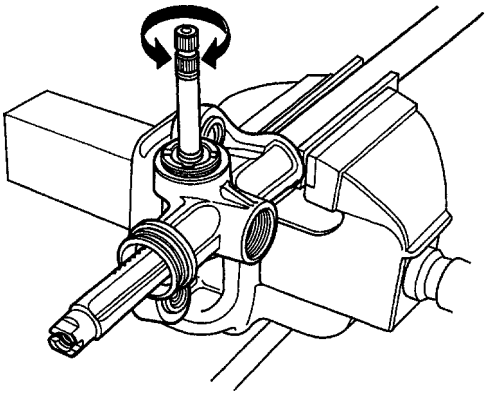


Indicated: 5.7-7.1 N·m (57-71 kg-cm, 49-62 in-lb)
Actual: 8.0-10 N·m (80—100 kg-cm, 82-87 in-lb)

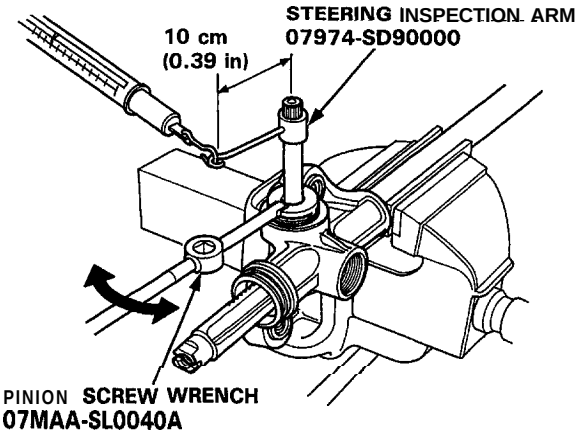


18. Turn the pinion right and left several times to make set it, then loosen the pinion set screw.

NOTE: Be sure that the pinion gear and rack gear are not engaged.



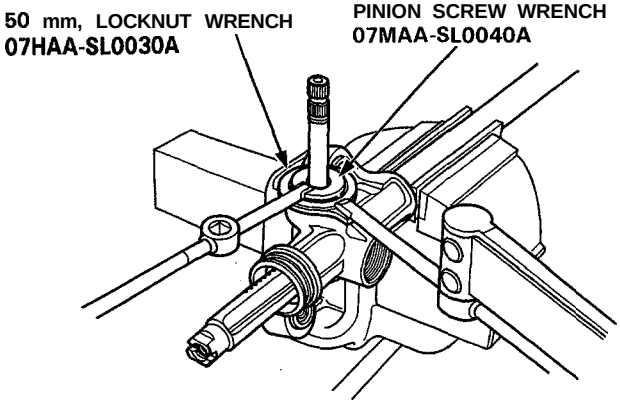
19. Install the special tool onto the pinion shaft. Attach a spring scale to the tool and pull the scale adjust the pinion set screw until the gauge reads 1.5 ~ 2.5 N (0.15-0.25 kg, 0.33-0.55 lb).



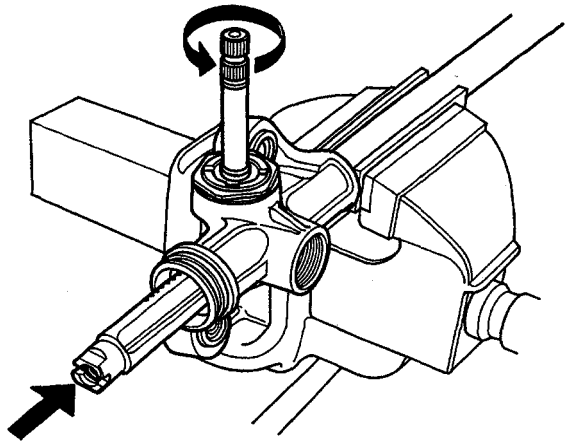
20. Install the pinion set screw locknut, then hold the pinion set screw and tighten the locknut to a torque wrench reading [indicated) of 54 ~ 69 N-m (5.4 ~ 6.9 kg-m, 39 ~ 50 lb-ft).

NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 50 cm (20 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.

Actual: 70-90 N·m (7-9 kg-m, 50-65 lb-ft)
indicated: 54-69 N·m (5.4-6.9 kg-m, 39-50 lb-ft)
Tool length (B): 15 cm (6 in)

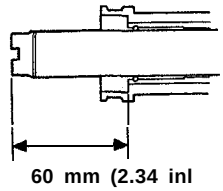


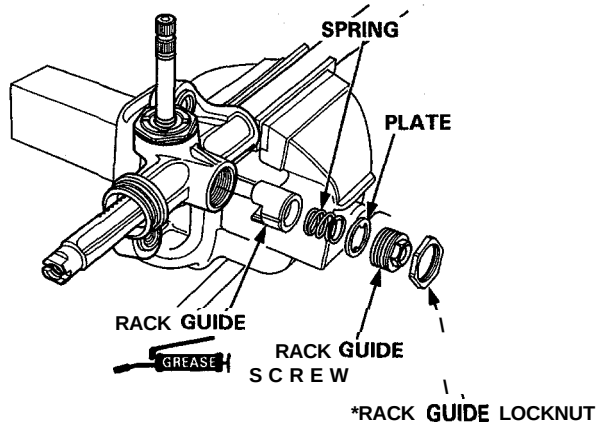
21. Turn the pinion shaft slowly, then insert the rack and engage the rack and pinion gears.



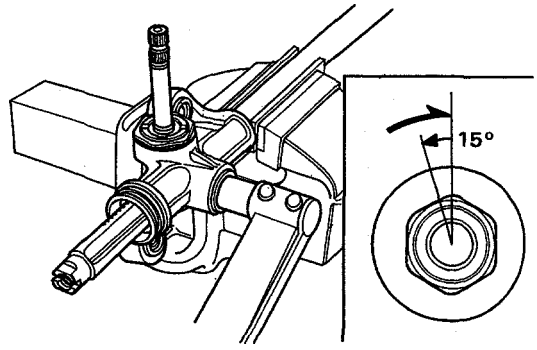
22. The system is in neutral when the rack end projects 60 mm (2.34 in) from the cylinder end.

23. Install the rack guide, pressure plate, pressure spring and rack screw guide.





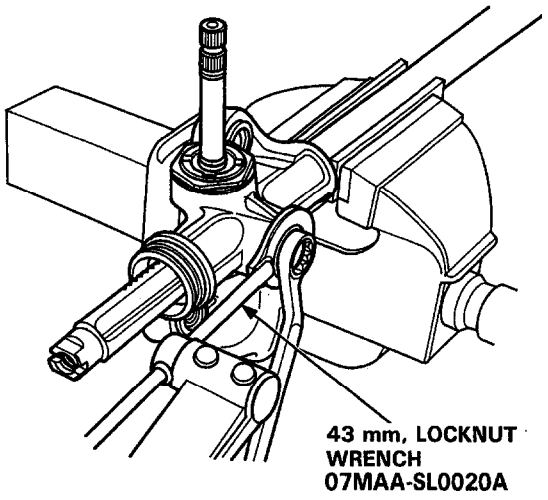
24. Tighten, loosen and retighten the rack guide screw two times to 5 N·m 10.5 kg-m, 3.6 lb-ft), then back it off 15°.



(cont'd)

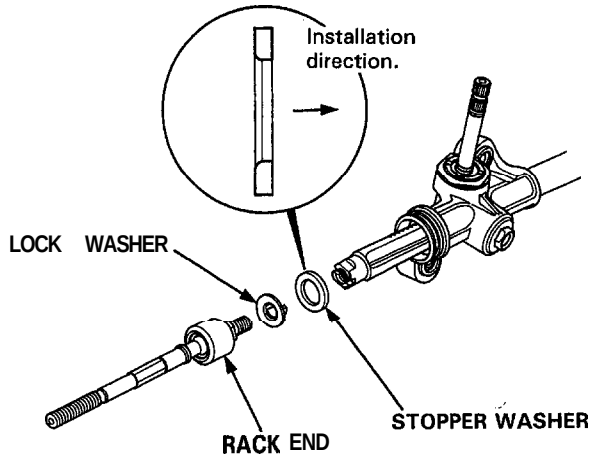
25. Install the locknut on the rack guide screw, and tighten the locknut to a torque wrench reading (indicated) of 52 N·m (5.2 kg-m, 38 lb-ft) while holding the rack guide screw with a wrench.

NOTE: The above specification is the torque wrench reading (indicated) when the locknut is tightened using a torque wrench 50 cm (20 in) long. If you tighten the locknut using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.
Actual: 68 N·m (6.8 kg-m, 49 lb-ft)
Indicated: 52 N·m (5.2 kg-m, 38 lb-ft)
Tool length (B): 150 mm (6 in)

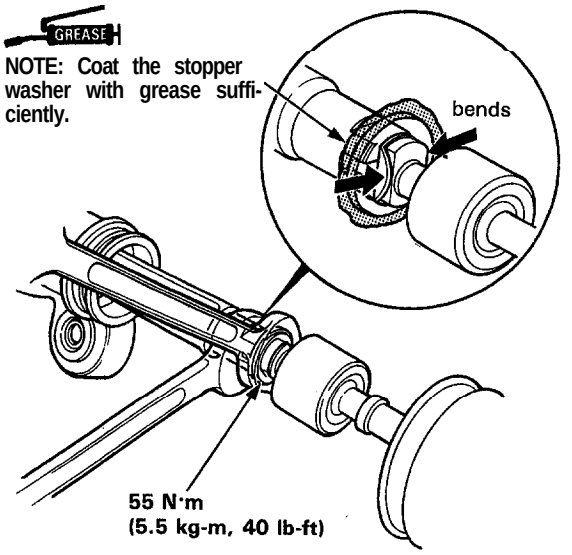


26. Screw each rack end into the rack while holding the lock washer so its tabs are in the slots in the rack end.

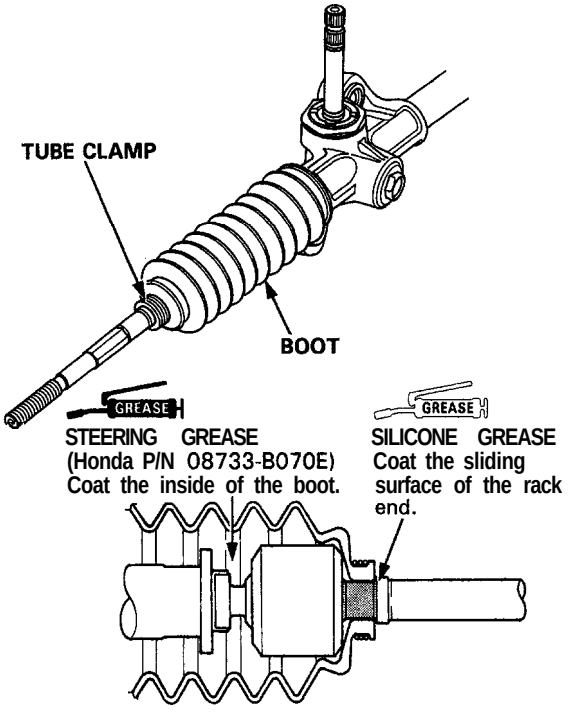
NOTE: Install the stopper washer with the chamfered side facing out.



27. Tighten the rack end securely, then bend the lock washer back against the flat on the flange as shown.



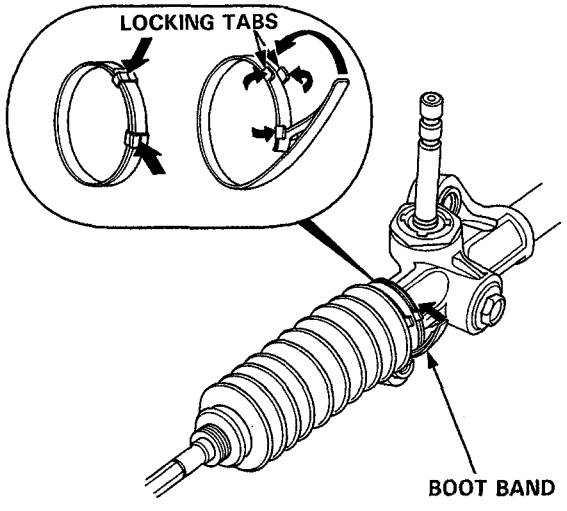
28. Install the boots on the rack end with the tube clamps.
NOTE:
- Coat the rack end and inside of the boot with the grease.
- Before installing the boot, be sure that the pressure inside of the boot is the atmospheric pressure.
- Install the boot band with the rack in the straight ahead condition (i.e. right and left tie-rods are equal in length).



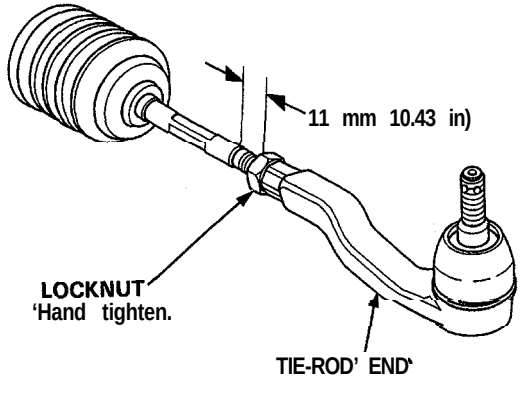
29. Install the new boot bands on the boot and bend both sets of locking tabs.

30. Lightly tap on the doubled portions to reduce their height.

NOTE: After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.



31. If the tie-rod ends were removed, install the tie-rods on the right and left rack ends and screw them in until the threaded section is 11 mm (0.43 in) in length.



32. Install the gearbox on the cross-beam (page 17-20).

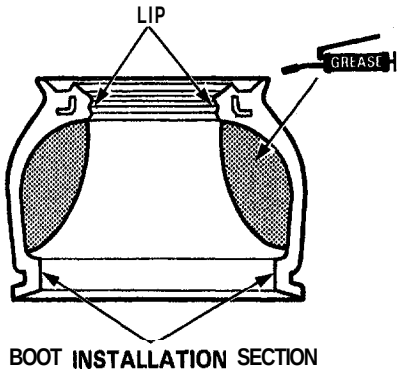
33. Check the wheel alignment and adjust if necessary (Section 18).

-Ball Joint Boot Replacement

1. Remove the circlip and the boot.

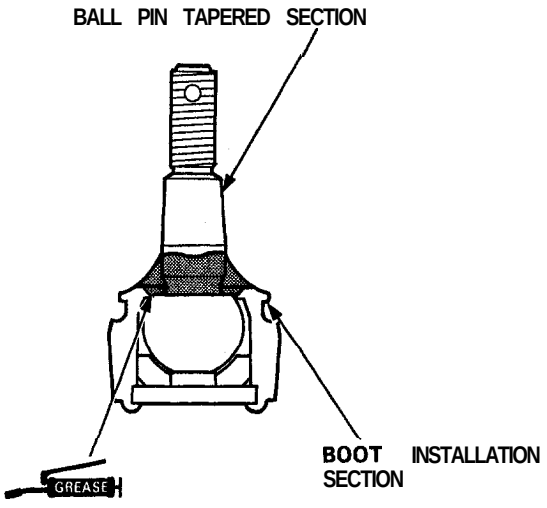
   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



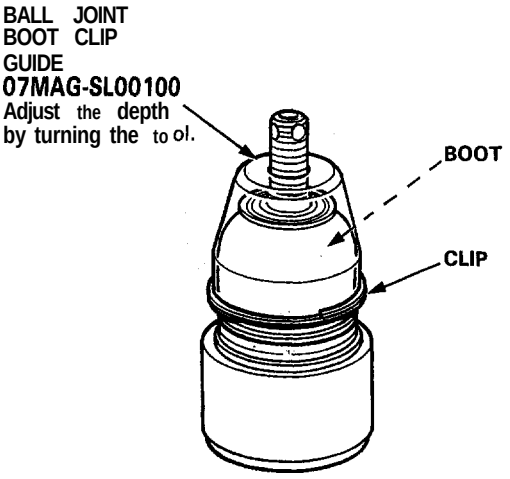
3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

   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. Insert the special tool into the threads in the ball pin and align the end of the tool with the groove in the boot.
   Slide the clip 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.

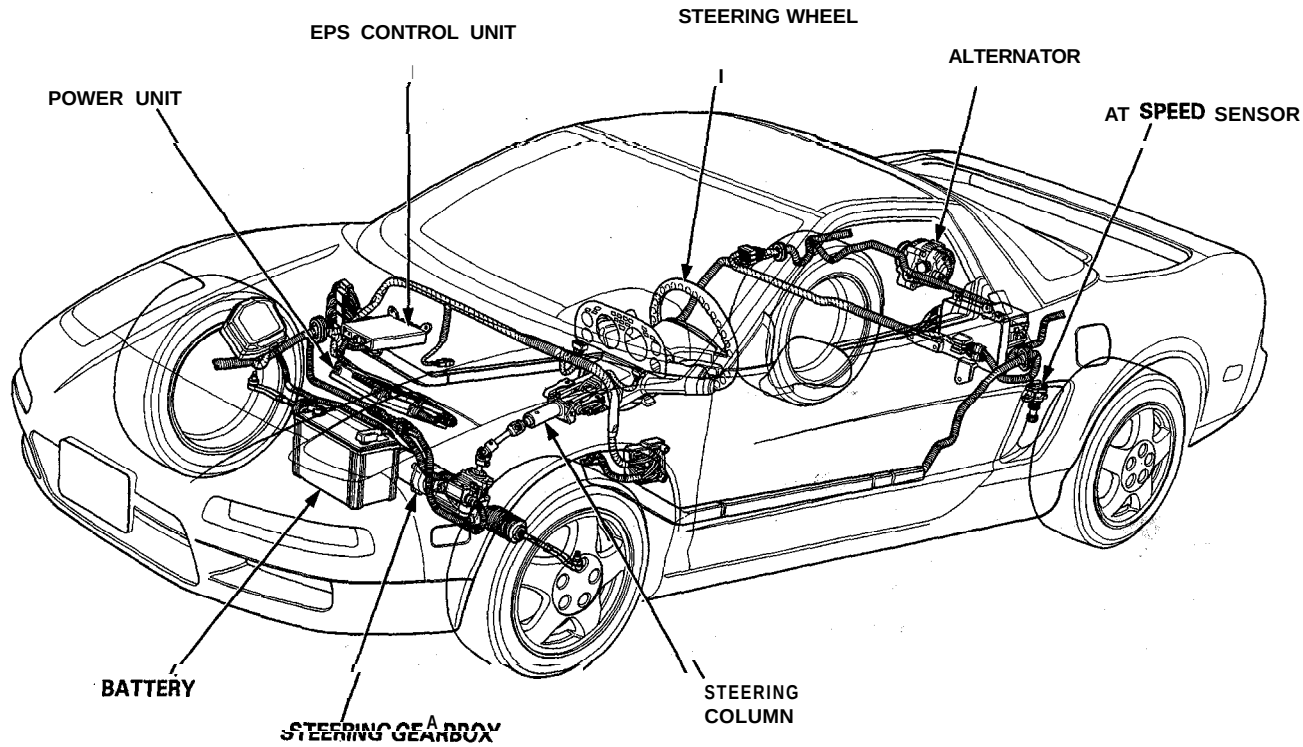
System Description

Electrical Power Steering (EPS)

Outline

The NSX uses an electric motor-driven power steering, which possesses the characteristics best suited for a mid engine automobile. This system is a power-assisted steering device, with a motor inside the steering gearbox driven by the control unit and power unit. Its distinctive features are described below:

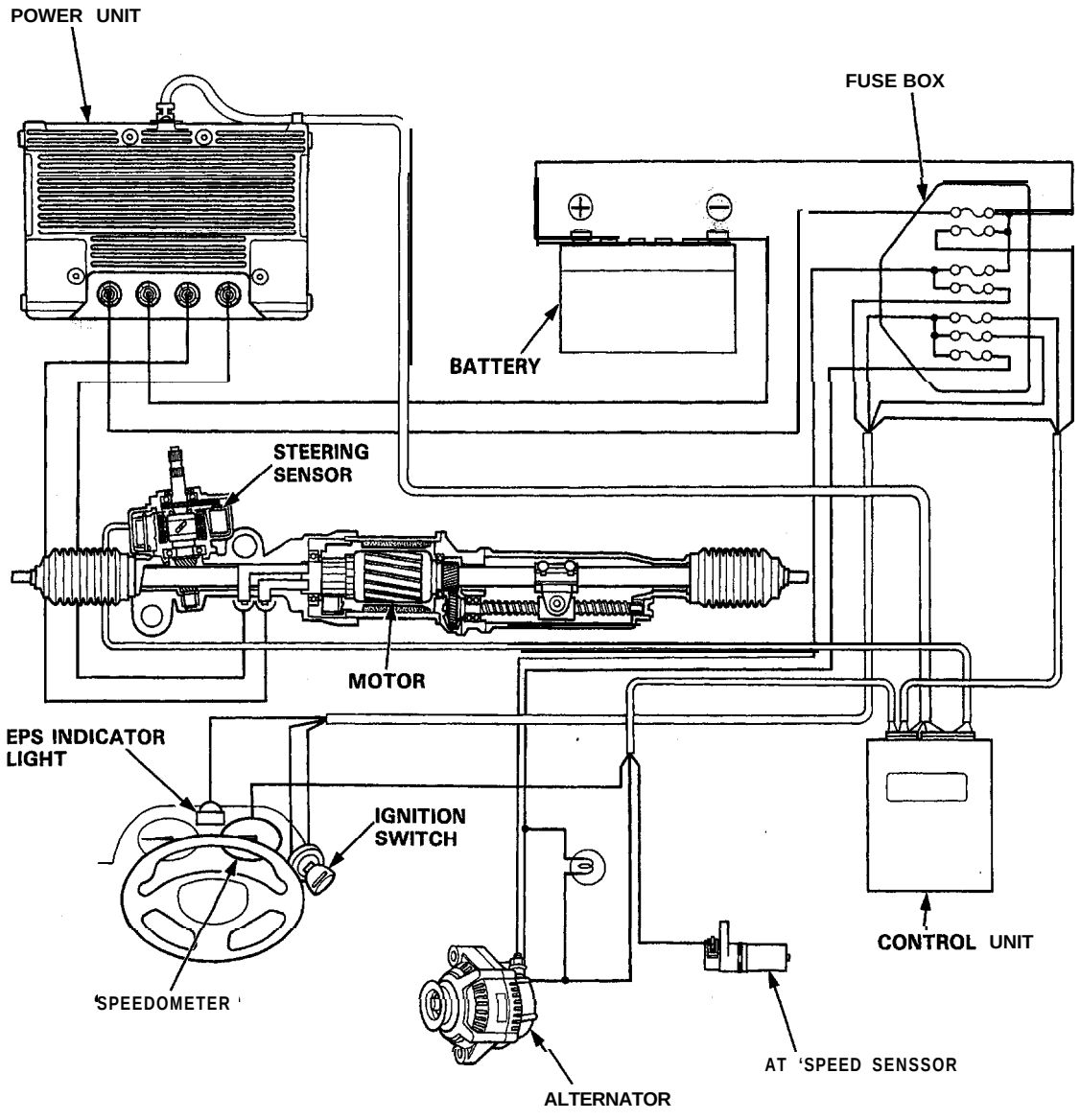
- Minimized loss of engine horsepower are decreased, fuel consumption.
- A linear steering feel and the reduction of kick back.
- Since it requires no complicated hydraulic piping, etc., the system is compact and light in weight.



-Major Components

The Electrical Power Steering system is composed of the following major components:

- A steering gearbox that converts rotary operation of the steering wheel into transverse operation via a rack and pinion mechanism. Steering sensors and an actuating motor are incorporated.
- A control unit that computes the optimum amount of power assistance, taking into account steering torque, steering speed, and vehicle speed. Selfdiagnosis functions are included.
- A power unit that drives the motor according to the signals from the control unit. A current sensor is built in to give feedback information to the control unit. Two relays shut off the power if a problem in the system occurs.
- Two speed sensors, the speedometer and the automatic transmission sensor, send vehicle speed information to the control unit. Two sensors are used as a double-check.



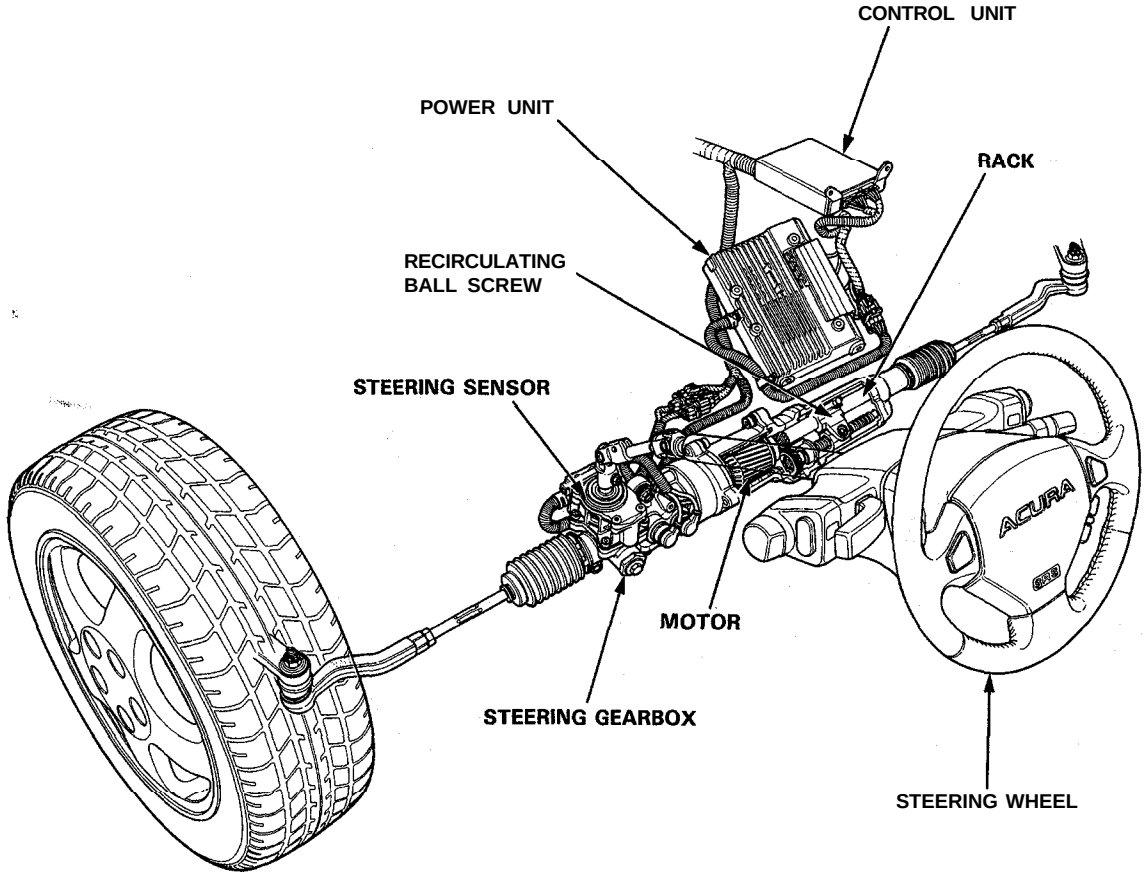
-System Operation

Manual Steering Operation

Steering wheel input rotates the pinion of the gearbox through the universal joint. Due to the rack and pinion mechanism, the rotation of pinion is converted into a transverse motion at the rack, which steers the front wheels throught the tie-rods and knuckles the same as an ordinary rack and pinion system.

Assisting Operation

In addition to the manual steering operation, the steering sensor on the pinion shaft transmits a signal to the control unit when it receives a steering input. The control unit calculates an adequate motor control with addition of speed signals the two speed sensors, then transmits a control signal to the power unit. Based on the signal from the control unit, the power unit drives the motor inside the gearbox. The torque generated by the motor is transmitted to ball screw through gears and converted into an assisting thrust in the axial direction of rack. The assisting thrust acts in the steering direction and lessens the steering force required at the steering wheel.



System Description

*Function and Operation

Steering Sensor

The steering sensor consists of a torque sensor, an interface, and the rotation sensor.

Torque Sensor

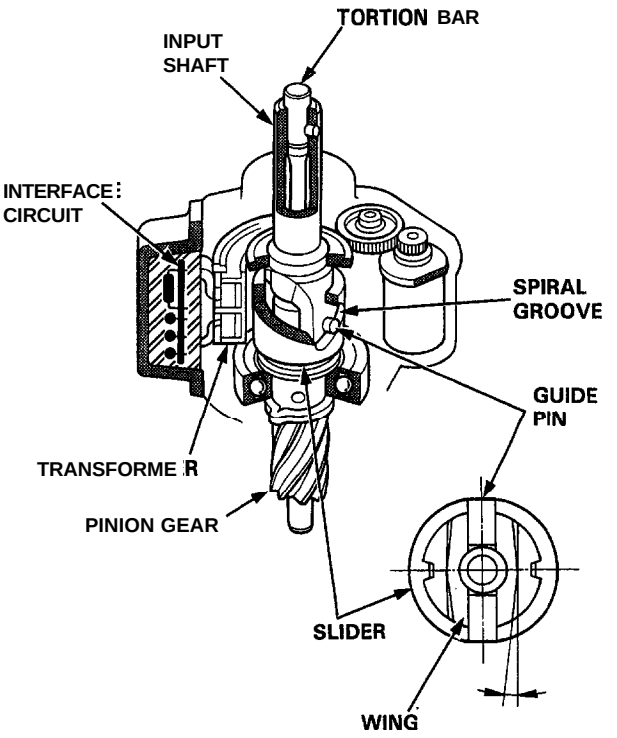
The torque sensor converts steering torque input and its direction to voltage signals, in conjunction with the interface.

A torsional force caused by steering operation is converted to an axial movement of a slider core. A variable differential transformer is installed around the slider core. Within the tranceformer are three coils, primary coil on the inside, and two secondary coils, one for right turns and one for left turns.

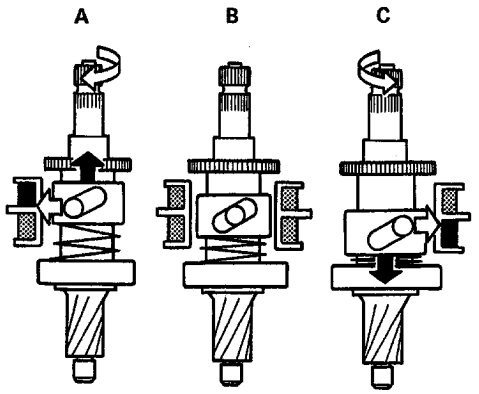
Alternating current is passed through the primary coil when the system is energized. The amount of mutual induction from the primary coil to the secondary coils changes depending on the position of the slider coil.

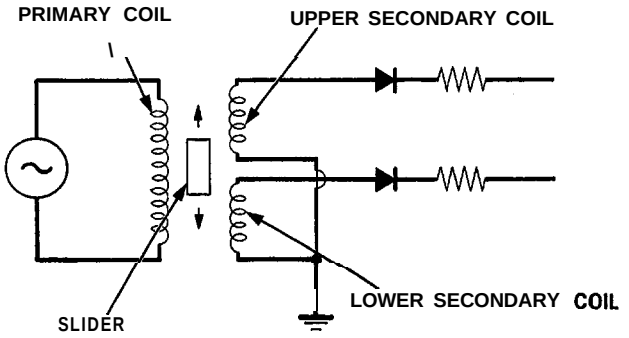
The input shaft and the slider are one piece. Rotation of the shaft moves the slider in a circular direction. The pinion is turned via the torsion bar. The slider core is installed on the pinion shaft on grooves, and turns with the pinion shaft.

When there is little resistance, the input shaft tot-don bar, pinion shaft, and the slider core turn together to the same angle. The slider core does not move up/down.



When there is resistance on the input shaft (hard to steer situation), and the slider pin is turned at an angle by the steering wheel, the tortion bar is twisted due to the resistance. Accordingly, the pinion shaft turns at a smaller angle. The difference in the turning angles changes the position of the slider pin in the groove, forcing the slider core upward or downward, depending on the direction of the direction of the turn.





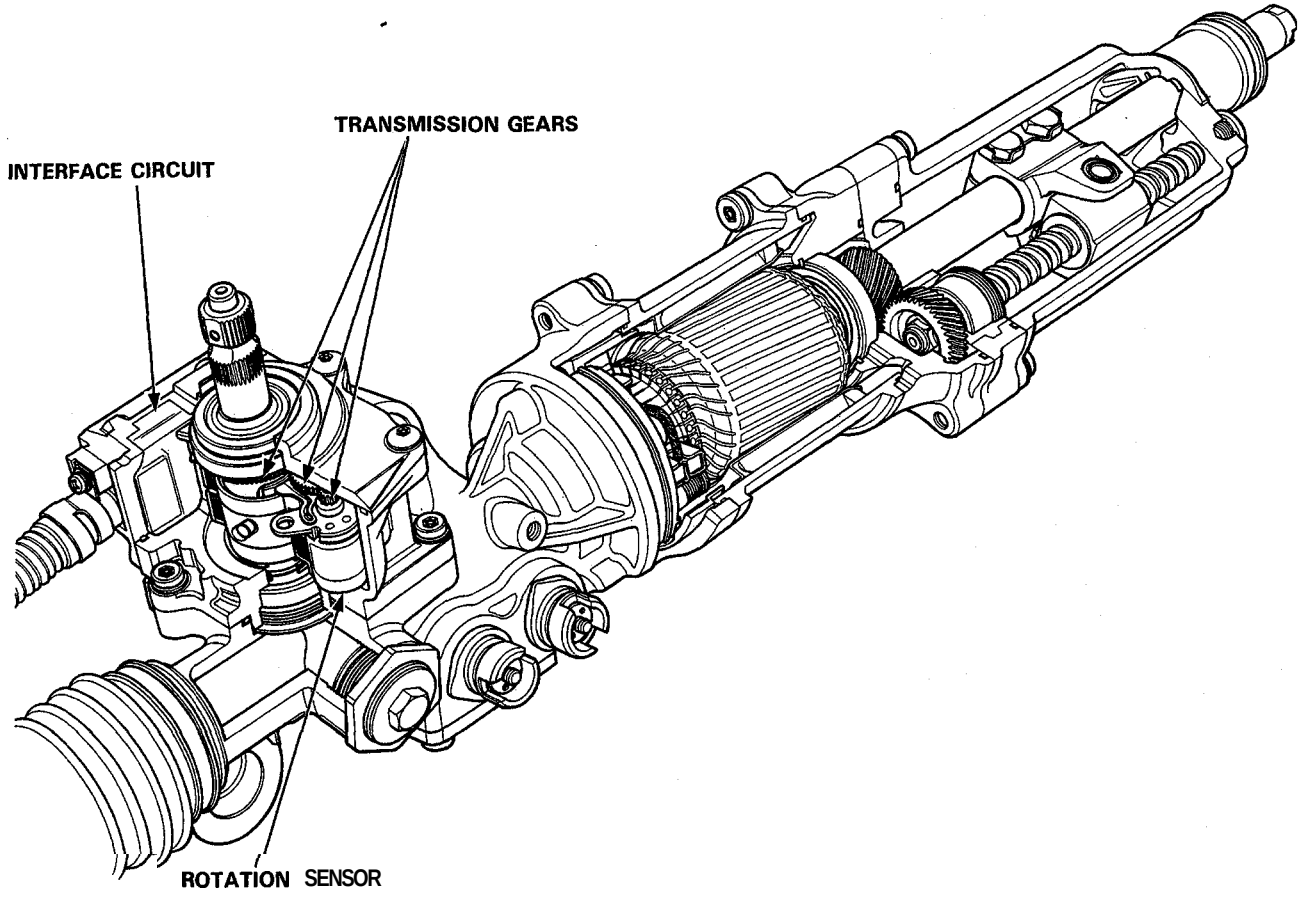
DWG No.	Steering condition	Slider movement	Induction voltage on secondary coil
A	Steering to right (load steering)	Upward shift	Voltage on upper coil increases and that on the lower decreases
B	Advancing straight ahead (no load steering)	Neutral	Voltage on upper and lower coils are equal
C	Steering to left (load steering)	Downward shift	Voltage on lower coil increases and that on the upper decreases

Rotation Sensor

The rotation sensor is housed inside the steering gearbox near the pinion. It converts the rotation speed and direction of steering into voltage signals. The rotation of the steering wheel is transmitted to the pinion, which drives the sensor by accelerating its speed through the three pieces of transmission the gears. Acting as a kind of direct current generator, the sensor generates direct current voltage proportionately with the rotational speed of the pinion. When the steering direction is reversed, the voltage is generated in the opposite direction. No power is generated when driving straight ahead without turning the steering wheel.

Interface Circuit

The interface circuit is housed inside the steering gearbox near the pinion. It rectifies and amplifies the signals from the torque sensor and the rotation sensor and transmits steering signals to the control unit. A phase compensating circuit is also built in, which changes the output signals in accordance with the drive signals input from the control unit.



System Description

Control Unit

The control unit receives input signals from the car's speed sensors, torque sensor and steering rotation sensor, and outputs control signals to the power unit. It performs a multitude of control works including a circuit which diagnoses troubles in each functional part of the system and the control unit itself. The control unit operates the system while the engine is in the process of starting, on receipt of voltage generated by the alternator. The system remains operational if the engine stalls with the ignition switch in ON position.

< Basic Control >

(1) Travelling speeds are compiled into data, receiving input signals from the car's speed sensors.
(2) The magnitude and direction of torque are compiled into data, receiving input signals from the torque sensor.
(3) The rotational speed and direction of steering are compiled into data, receiving input signals from the steering rotation sensor.
(4) Determination of motor torque data from the prescribed assisting force map, based on the car speed data, steering rotational speed data and the steering torque data.
(5) Changeover of control modes and output of control signals to the power unit, based on data on car speed, direction of torque and rotational direction of steering.

Normal Control Mode:

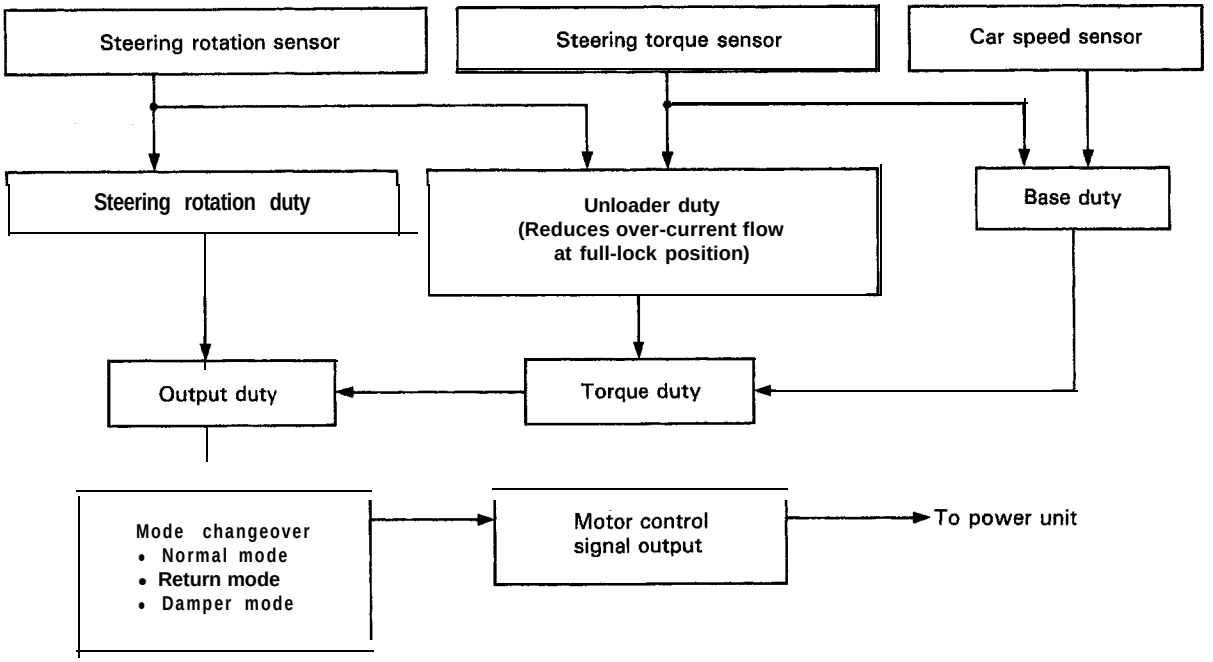
The rotational direction of motor is determined afater changing over to the left/right steering mode in accordance with torque direction data. The mode is switched to the straight ahead mode when the output data is zero.

Return Control Mode:

According to torque direction data and steering rotational direction data, the mode is changed over to the return control mode to improve the steering return characteristic.

Damper Control Mode:

According to car speed data, torque value data and steering rotational speed data, the mode is changed over to the damper control mode to improve the convergence property of the steering.



Self-Diagnosis Function

The EPS control unit monitors the system inputs and outputs, and the driving current of the motor. If there is a problem in the system, the control unit turns the system off by actuating the relay in the power unit. Power assist stops and normal manual steering operation resumes. The control unit also turns the EPS indicator light on to alert the driver, and memorizes the problem in the form of a code. Connecting the terminals of the service check connector with a jumper wire enables the EPS indicator light to blink the problem code when the ignition switch is turned on.

Unloader Control

If the steering wheel is turned fully and held in the full-lock position, the steering torque reaches the maximum point, and an over-current flows to the motor and the power unit. The control unit detects this and reduces the current flow to the motor.

Average Moving Current Control

The electric current flow to the motor is estimated from the current values detected by the current sensor, and the average current is obtained at two second intervals. The motor driving current is suppressed when the average current value exceeds a predetermined marginal value. The control unit regurates the motor current during continuous loading to suppress any excessive temperature rise in the power unit and the motor.

Over-Voltage Control

If there is an excessive increase in power source voltage due to a poor 'battery condition, an alternator voltage regulator problem, etc., the motor assisting force increases, resulting in excessive control. To prevent this, the control unit signals to the power unit are corrected to ensure that adequate assisting force is generated.

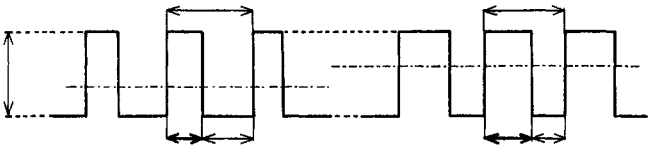
Power Unit

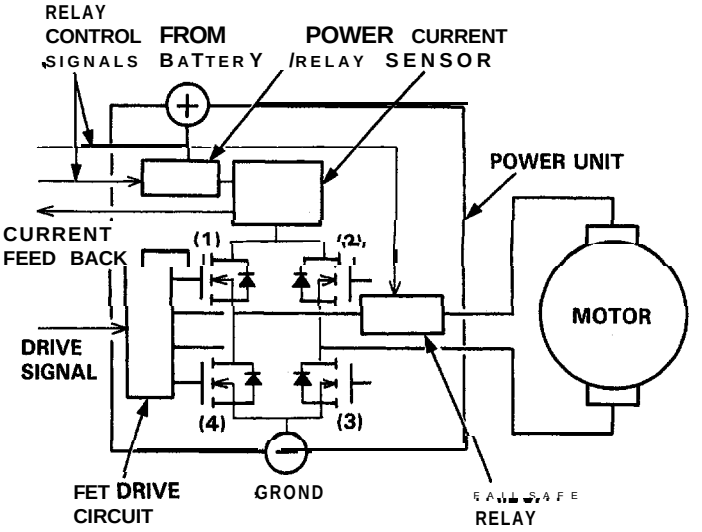
The power unit consists of a driving circuit, current sensor, field effect transistor (FET) bridge circuit, and two relays. It receives control signals from the CPU and controls the driving current of the motor. The driving circuit controls the rotational direction and speed of the motor by driving the FET bridge circuit with a pulse width modulation (PWM) method on receipt of an input of driving signals from the control unit.

<Rotational Speed Control >

The PWM driving signal is a digital signal repeating the process of voltage ON/OFF at a constant frequency, which changes the ratio of ON time per one cycle of this signal. The ratio is called the duty ratio. When there is a change in duty ratio, the average voltage changes as smoothly as an analog type. The ratio of digital signal voltage (E) and the average voltage (V) is called the duty ratio (δ). Its relationship is expressed by $V = E \times \delta$. When the duty ratio is low, the rotational speed of motor is slow. As the duty ratio increases, the rotational speed increases to increase the torque.

(Motor rotational speed slow) (Motor rotational speed fast)





<Rotational Direction Control >

Normal Mode Control:

The table below shows the normal control mode to control the flow of current from the battery:

Steering condition	FET (1)	FET (2)	FET (3)	FET (4)	Motor operation
Steering to right	ON	OFF	OFF	PWM	Operates in direction steering to the rrght
Straight ahead	OFF	OFF	OFF	OFF	Stops
Steering to left	OFF	ON	PWM	OFF	Operates in direction steering to the left

("PWM" in the table indicates PWM control based on torque sensor data).

Return Control Mode:

Return control mode improves the steering return characteristics. ("PWM" in the table denotes PWM control based on torque sensor data while "PWM-r" PWM control based on rotation sensor).

Steering condition	FET (1)	FET (2)	FET (3)	FET (4)
Return from right steering to straight ahead	PWM-r	OFF	OFF	PWM
Return from left steering to straight ahead	OFF	PWM-r	PWM	OFF

Damper Control Mode:

The damper mode control which improves the convergence of steering, is performed with damper mode signals from the control unit. In this mode, a short current circuit is formed on the motor side by turning off FET (1) and (2), and on FET (3) and (4), which suppresses the returning speed of the steering.

<Motor Driving Current Control >

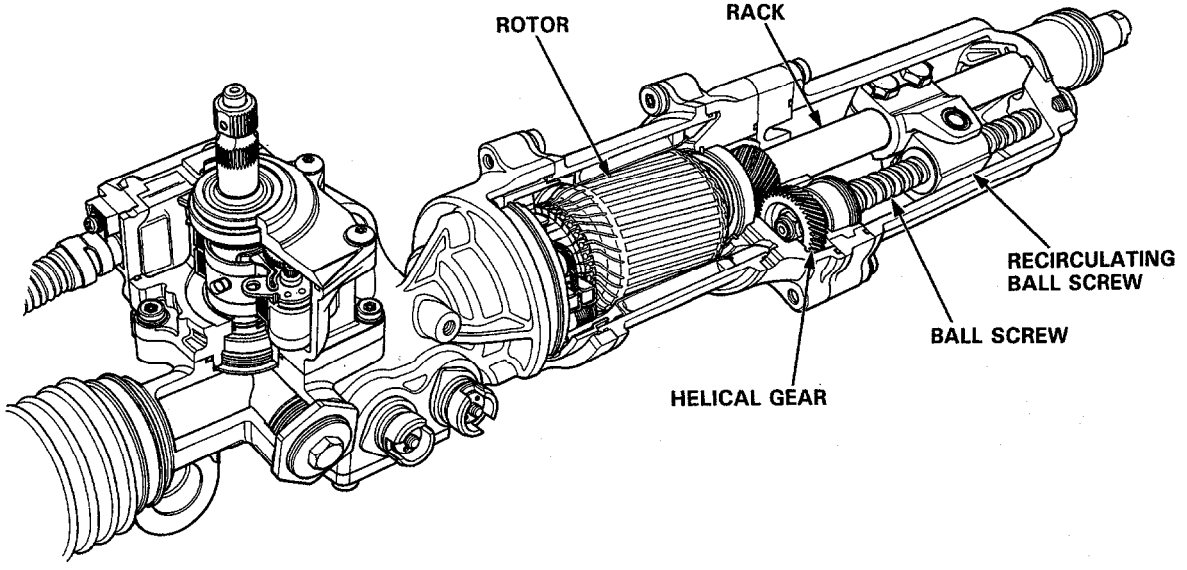
A current sensor, power relay and fail-safe relay are built into the power unit. The current sensor detects motor driving current and transmits data to the control unit. If there is a problem in the system, a cut-off signal is sent from the control unit to relay, then the relay cuts off motor current to switch to manual steering operation.

Steering Gearbox

<Motor and Power Assist Mechanism >

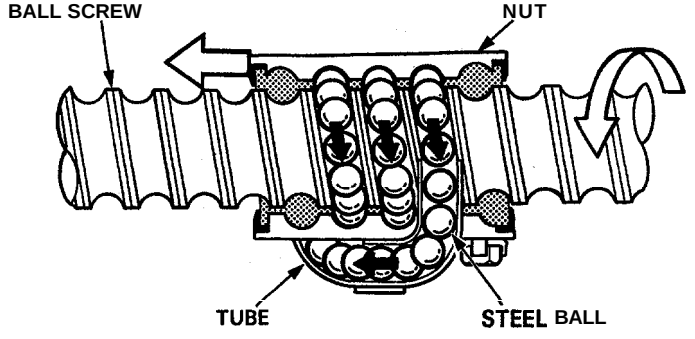
A motor is housed inside the gearbox housing. It consists of a yoke with a permanent magnet fixed in it, a rotor with a field coil, and brushes which pass electricity to rotor commutators. The motor is on the rack shaft of the steering gearbox. The drive current from the power unit flows through the power relay and fail-safe relay to the brushes of the motor. The drive current flows to rotor commutators through brushes, exciting the field coil of the rotor and rotates the rotor with the magnetic action of the permanent magnet inside the yoke. The rotor rotates in the opposite direction when the direction of drive current is reversed.

The rotation torque of the motor is transmitted to the ball screw throught the helical gear. The rotation torque on the ball screw is converted into assist thrust in the direction of steering rack by the recirculating ball screw. The recirculating ball screw acts to reduce the steering thrust put into the steering rack through the joint to lessen the steering force required at the steering wheel.

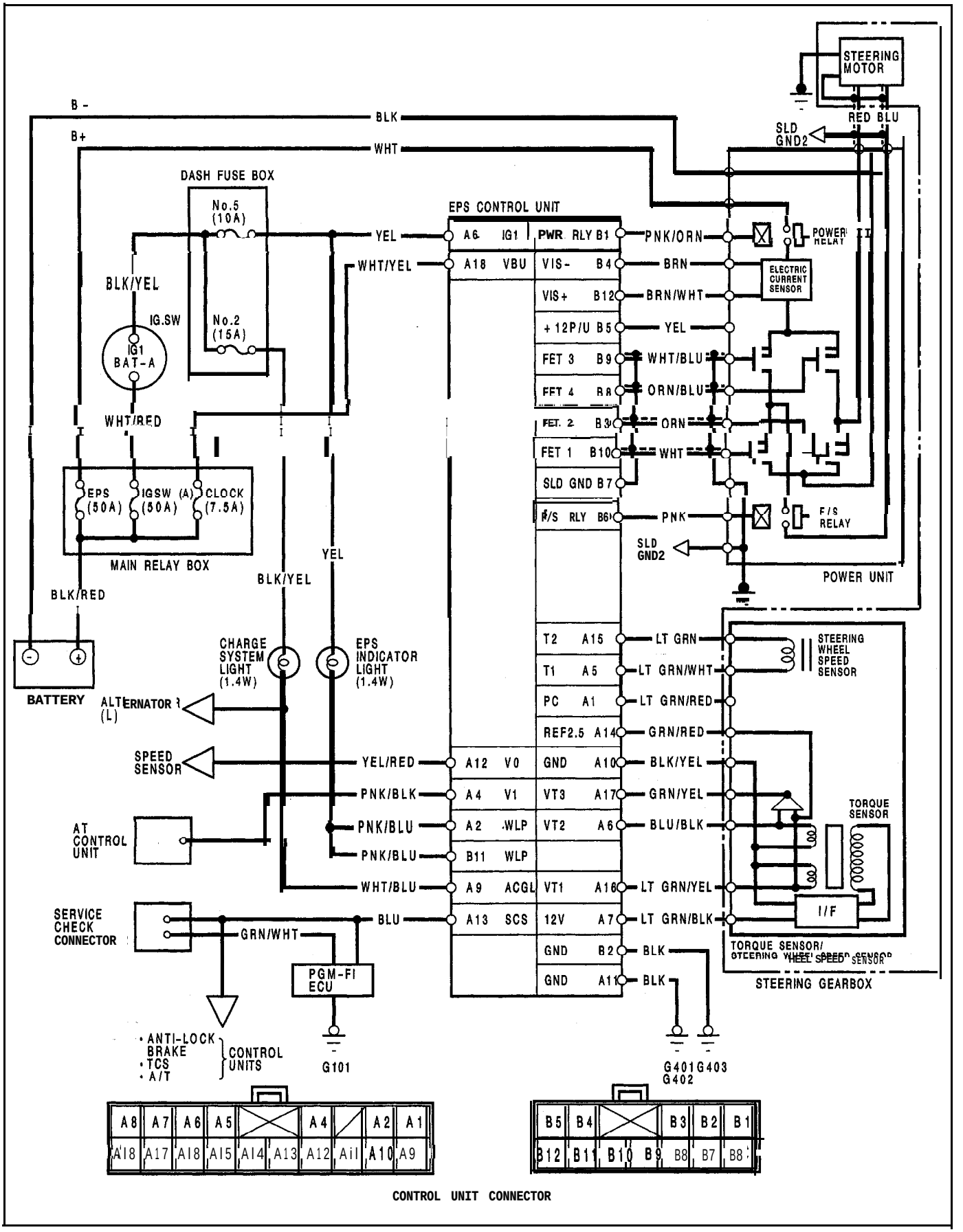


<Recirculating Ball Screw >

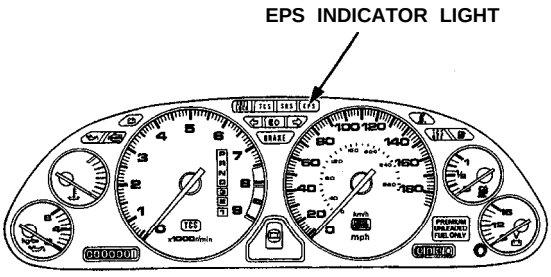
The recirculating ball screw is constructed so that balls roll between the screw shaft and the nut, and those coming out of the screw face enter the screw groove again through a tube for recirculation. The rotation torque on the shaft is converted into thrust in axial direction as the slope of the screw shaft presses against the nut throught balls. Since the torque conversion is made in this method through the screw shaft and balls, the friction is small, high transmission efficiency is obtained for both the forward and backward directions, and the steering feels identicalto the ordinary manual steering. Furthermore, sicnce the force from the backward direction (force pressing the steering rack) is converted into the rotation torque of the screw shaft, instantaneous kick-back from road surface will rapidly rotate the motor. In such a rapid rotation, the inertia of the motor increases, which acts to reduce the kick-back. Any great kick-back will be transmitted from the steering rack to the torque sensor on the pinion, which acts to twist the pinion shaft in the same direction as the input direction of kick-back. As a result, the motor operates the kick-back to reduce assist force.

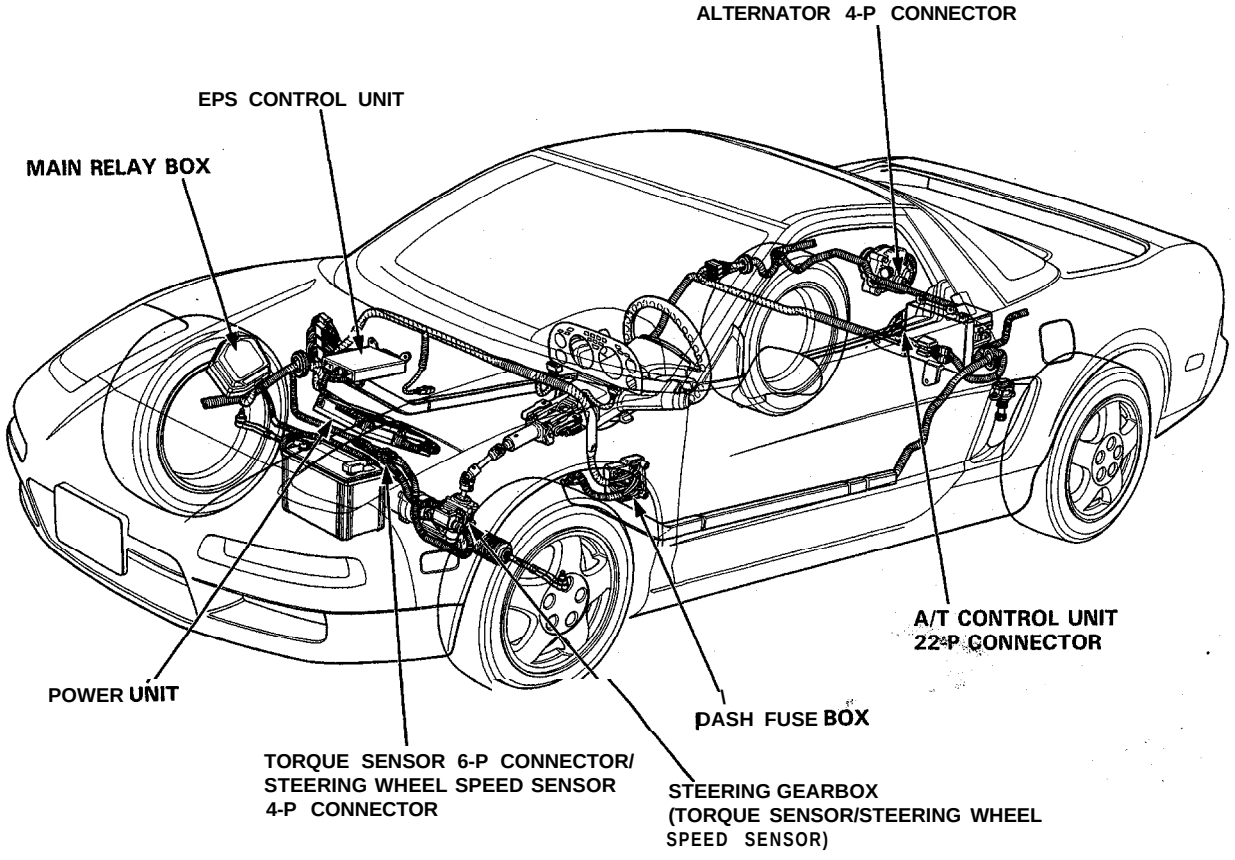


Circuit Diagram



CONTROL UNIT CONNECTOR


EPS INDICATOR LIGHT

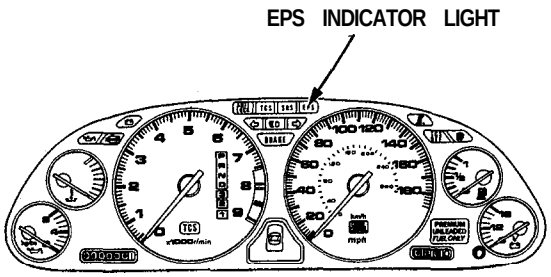

ALTERNATOR 4-P CONNECTOR
EPS CONTROL UNIT
MAIN RELAY BOX
A/T CONTROL UNIT
22-P CONNECTOR
POWER UNIT
DASH FUSE BOX
TORQUE SENSOR 6-P CONNECTOR/
STEERING WHEEL SPEED SENSOR
4-P CONNECTOR
STEERING GEARBOX
(TORQUE SENSOR/STEERING WHEEL
SPEED SENSOR)

Troubleshooting

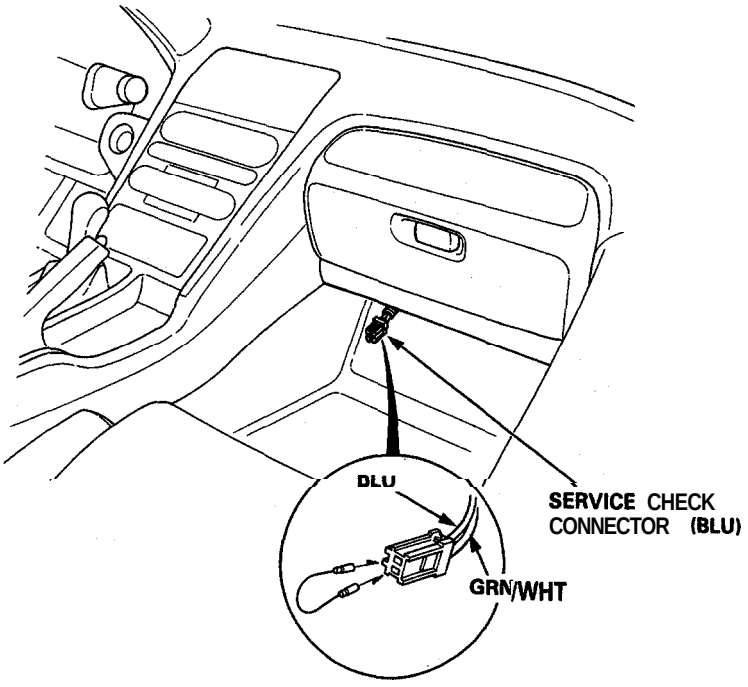
-Troubleshooting Precautions

- Always use the test harness to verify the resistance, voltage, current and other electrical characteristics for the EPS control unit, torque sensor, steering circuit sensor, power unit, and their connectors.
  The test probe must not make direct contact with the connector terminals.
- **Make sure that the terminals are not bent or damaged in any way when a test harness is installed.**
- A digital circuit tester must be used to perform the inspections.
  An analog circuit tester must be used only when this procedure is indicated in the specification figures.
- The EPS system connector should not be disconnected except when necessary.
- Inspect the connection condition and ground of each EPS system connector before peforming the troubleshooting procedures.

Under normal conditions, the EPS indicator light in the gauge assembly comes on when the ignition switch is turned to the ON position, then goes off after the engine is started. This indicates that the bulb and its circuits are operating correctly.



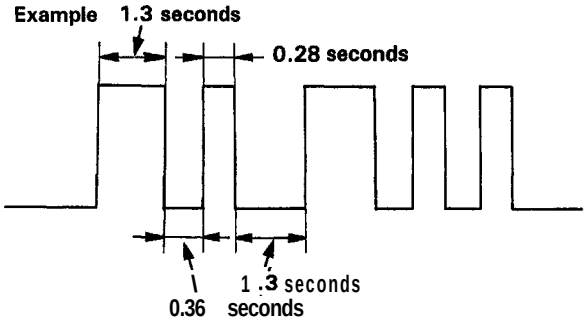
When the EPS control unit senses an abnormality in the system, the control unit memorizes the problem, the EPS indicator light blinks at equal intervals, and the power steering assist is turned off.
When the EPS indicator light has been reported on, connect the two terminals of the service check connector with a jumper wire. Then turn on the ignition switch and observe the blinking frequency.



SERVICE CHECK CONNECTOR (BLU)

· Problem Code Display

When the service check connector terminals are connected with a jumper wire, the EPS control unit blinks the EPS indicator light to indicate the problem code. The problem codes 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 problem code, then refer to the Troubleshooting Chart on page 17-51.



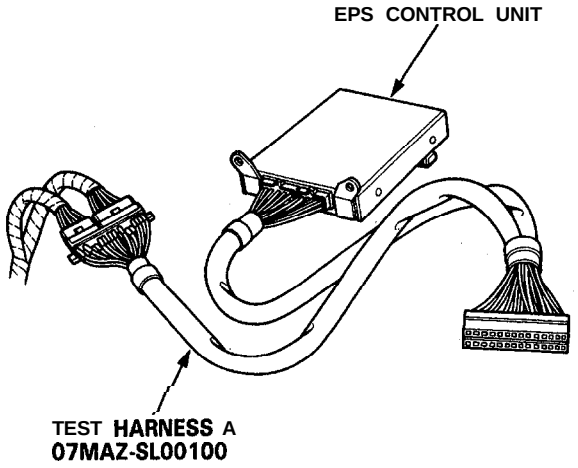
The control unit can memorize any number of simultaneous problems. The problem codes are repeated sequentially beginning with the lowest number.

The problem code is stored in the control unit memory even when the ignition switch is turned off. After repairing the EPS system, disconnect the CLOCK fuse in the relay box for more than 10 seconds to reset the EPS control unit memory.

-Test Harness Installation

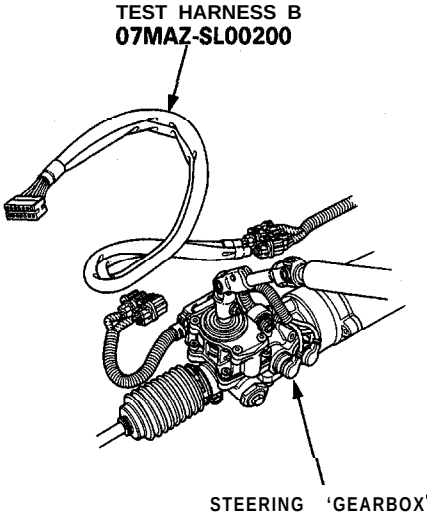
Test Harness A

- Remove the glove box and disconnect the EPS control unit connector.
  Connect test harness A.



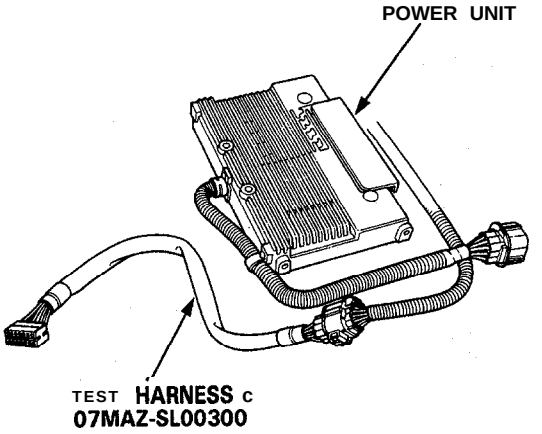
Test Harness B

- Disconnect the torque sensor and steering speed sensor connectors and connect test harness B.



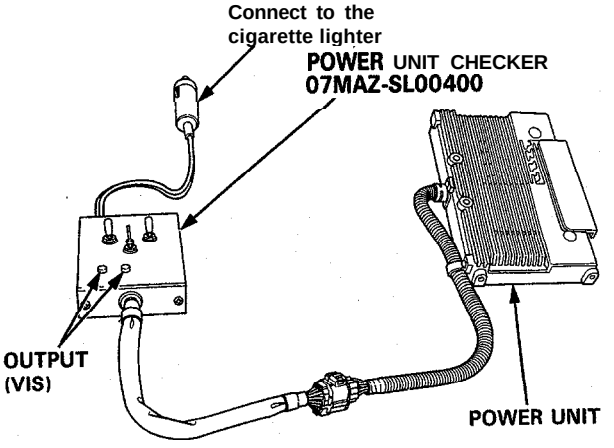
Test Harness C

- Pull the carpet back from the passenger's side and remove the power unit cover.
  Disconnect the connector and connect test harness C.



Power Unit Checker

- Pull the floor carpet back from the passenger's side and remove the power unit cover.
  Disconnect the connector and connect the power unit checker.
- Remove the cigarette lighter and connect the power unit checker.



Flowcharts

Steering is heavy.

Start the engine.

Is the EPS indicator light on?

NO

Check the tire pressure and front wheel-alignment.

Are they normal?

NO

Correct the air pressure or wheel alignment.

YES

Refer to the Troubleshooting Chart (see page 17-51).

YES

Park the vehicle on a level surface with the wheels pointing straight ahead.

Measure the stationary swing operation load.
Refer to the chart on the left.

Is it within specification?

NO

Inspect the mechanical steeing system.

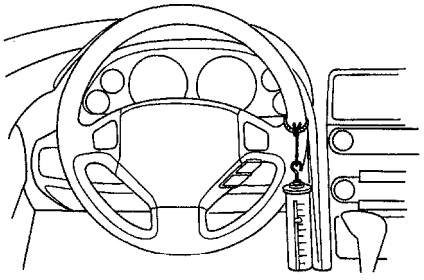
YES

EPS system is OK.

- **Power Assist Check with Car Parked**
  Connect a spring scale to the steering wheel and turn the wheel. Read the measurement when the front wheels start to move.

Operation standard

Condition	Stationary swing operation load
Without power assist (engine off)	12 kg (24.46 lb) maximum
With power assist (engine running)	4.2 kg (9.26 lb) maximum



The steering wheel pulls to one side during driving.

Start the engine.

Is the EPS indicator light on?

NO → **Check the tire pressure, wheel alignment and steering mechanical system.**

YES

Refer to the Troubleshooting Chart (see page 17-51).

The EPS indicator light does not come on when the ignition switch is turned ON.

Turn the ignition switch ON.

Are the other indicator lights (ALB, TCS, etc.) on?

NO → **Check the No. 5 (15 A) fuse.**
Check the indicator light power supply circuit.

YES

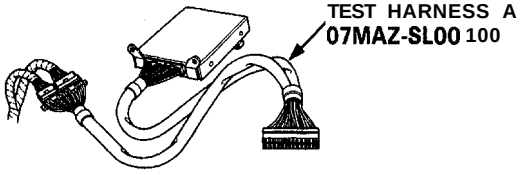
(To page 17-48)

(cont'd)

-Flowcharts (cont'd)

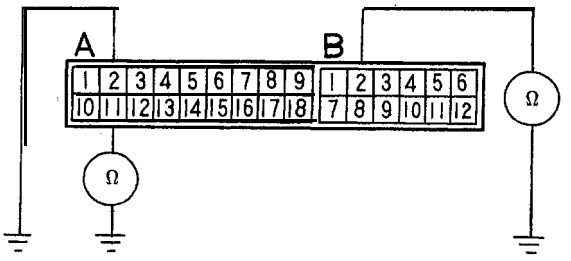
(From page 17-47)

Turn the ignition switch OFF and connect test harness A.



Turn the ignition switch ON.

Ground the A2 terminal to the body.



Is the EPS indicator light on?

YES → Check the continuity between terminals **B2** and Al 1 and the body ground.
If continuity is present, replace the EPS control unit. If there is no continuity, check the ground of terminals B2 and A 11.

NO

Turn the ignition switch OFF.

Remove the gauge assembly and inspect the EPS indicator bulb.

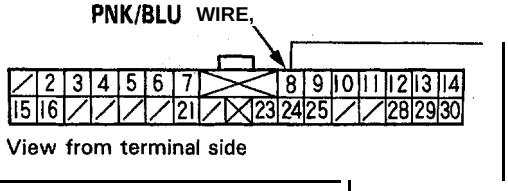
Is the bulb burned out?

YES → Replace the indicator light bulb.

NO

Turn the ignition switch ON.

Ground the No. 8 (PNK/BLU) terminal of the 30-P gauge assembly connector to body.



Is the EPS indicator light on?

NO → The circuit in the gauge assembly is defective.

YES

Repair open in the **PNK/BLU** wire between the gauge assembly and EPS control unit.

The EPS indicator light stays on after the engine is started.

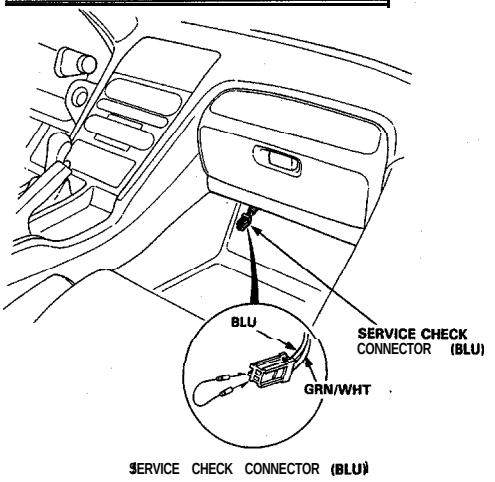
Start the engine.

Is the charging system light off? NO → Check the charging system (see section 23).

YES

Stop the engine.

Short the service check connector and turn the ignition switch ON.



SERVICE CHECK CONNECTOR (BLU)

Is a problem code displayed? YES → Refer to the Troubleshooting Chart (see page 17-51).

NO

Turn the ignition switch OFF.

Disconnect EPS control unit connectors A and B.

Turn the ignition switch ON.

Is the EPS indicator light off? NO → Repair short to ground in the PNK/BLU wire between the gauge assembly and the EPS control unit.

YES

(To page 17-50)

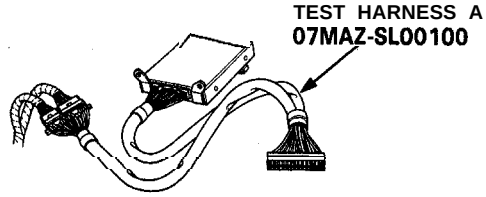
(cont'd)

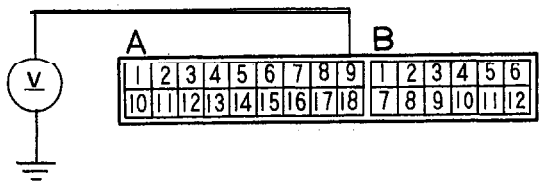
Flowcharts (cont'd)

(From page 17-49)

Turn the ignition switch OFF and connect test harness A.

Start the engine and check the voltage between the A9 terminal and body ground.





Is there more than 12 V?

NO → Repair open in the **WHT/BLU** wire between the EPS control unit and the alternator.

YES

Check the EPS control unit power supply (see page 17-59). If it is O.K. substitute a known-good EPS control unit and recheck.

-Troubleshooting Chart

The EPS has been reported on:

Connect the service check connector with a jumper wire (see page 17-43). Turn on the ignition switch. Read the problem code and perform the troubleshooting according to the troubleshooting chart below.

Page reference	Problem code	EPS Indicator light	System indicated	Related components: EPS control unit	Torque sensor	Steering wheel speed sensor	EPS power unit		Speed sensor signal	Wire harness	No 2 (15 A) fuse	EPS motor
17-52	11	☼	Torque sensor (VT_1, VT_2)	○	0					0		
	12	☼	Toraue sensor (VT_3)	0	0					0		
	13	☼	Torque sensor (VTA)	0	0					0		
	14	☼	Torque sensor (REF 2.5)	0	0					0		
17-54	21	☼	Steering wheel speed sensor	0		○				0		
17-56	22	☼	EPS power unit	○		0	○			0		0
17-59	31	○	Power supply (ECU ignition input)	0				○		0	0	
17-60	33	☼	Speed sensor signal. input	0					○	0		
17-62	23,34 41,42 43,44	☼	EPS control unit	○								

Troubleshooting

-Flowcharts

Problem code 11, 12, 13 and 14:
- Torque sensor related problems.

Turn the ignition switch OFF.

Connect the EPS test harness A.

Turn the ignition switch ON.

Check the voltage between the A7 (+) and A10 (−) terminals.

Is there more than 8.5 V?

NO → Substitute a known-good EPS control unit and recheck.

YES

Position the steering wheel so the front wheels are pointing straight ahead. Release the streering wheel and check the voltage between the terminals indicated in the chart on the right and Al 0 (−) terminal.

Turn the steering wheel to the left side and gradually apply force when the wheel is turned all the way to the left. At this time, check the voltage between the terminals indicated in the chart on the right and A10 (−) terminal. Turn the steering wheel to the right and use the same method to check the voltage.

Are all the voltages within the standard values?

YES → Substitute a known-good EPS control unit and recheck.

NO

(To page 17-53)

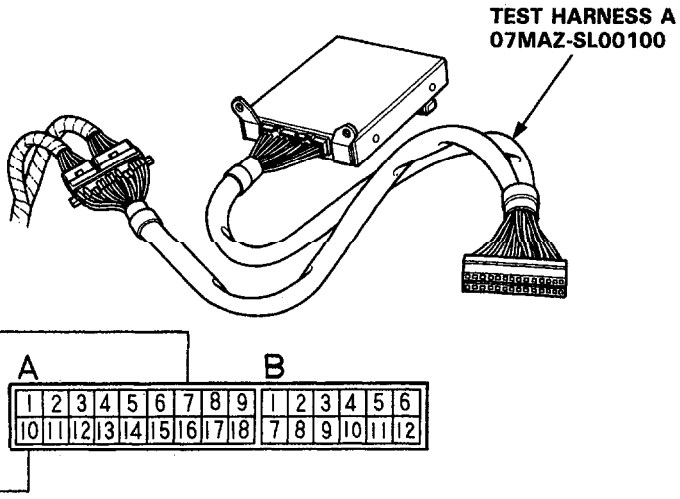


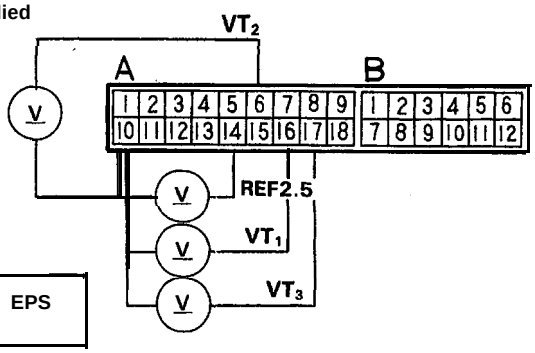
Chart of Standard Output Values

Test harness A terminal No. (Name)	Standard Value (V)		
	Straight ahead	Turned to the left	Turned to the right
AI6 (VT,)	(*1)2.82±0.55	(*1)−(−0.25)	(*1)−(+0.25)
A 6 (VT_2)	(*2)2.82±0.55	(*2)−(+0.25)	(*2)−(−0.25)
AI7 (VT_3)	(*3) 2.5±0.30	(*3)−(−2.5)	(*3)−(+2.5)
AI4 (REF 2.5)	2.5± 0.17	2.5k0.17	2.5±0.17
A10 (GND)			

***: VT when the wheels are straight**

NOTE: The indication (*1)−(0.25) means that the voltage decreases 0.25 V maximum when the steering wheel is turned compared to the VT_1 value when the wheels are positioned straight ahead.

NOTE: The output variations of VT_1, VT_2 and VT_3 must correspond to the manually applied force.



(From page 17-52)

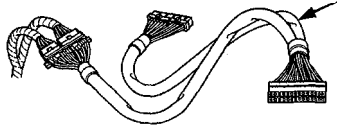
Turn the ignition switch OFF.

Disconnect *the* torque sensor 6-P connector from the steering gearbox and connect the test harness B.

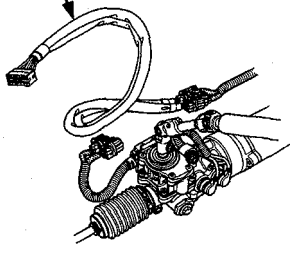
Disconnect the test harness A from the EPS control unit only.

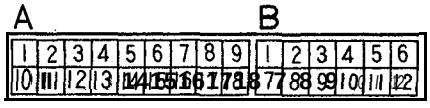
Check the continuity between the terminals of the test harness A and B as indicated in the chart on the right.

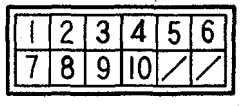
TEST HARNESS B
07MAZ-SL00200



TEST HARNESS A
07MAZ-SL00100







Terminal Name	Test harness A terminal No.	Test harness B terminal No.
12v	A7	3
VT_1	A16	2
VT_2	A6	1
VT_3	A17	5
REF2.5	A14	4
GND	A10	6

Is there continuity?

NO → Repair in the wire with no continuity.

YES

Check the continuity on terminals A6, A7, A10, A14, A16 and A17 individually to body ground.

Is there continuity?

YES → Repair short in the wire with continuity to body ground.

Faulty torque sensor. Replace the steering gearbox assembly.

(cont'd)

Flowcharts (cont'd)

Problem code 21:
- **Steering wheel speed sensor related problem.**

Turn the ignition switch OFF end disconnect the ESP control unit connectors.

Connect test harness A to the wire harness side only.

Position the steering wheel so the front wheels are pointing straight ahead.

Measure the voltage between the A5 (+) and A 15 (−) terminals.

Turn the steering wheel to the left and check the voltage between the A5 (+) and AI5 (−) terminals.

NOTE:
- **Turn the steering wheel at an approx. speed of 180° per second.**
- **Use an analog tester.**

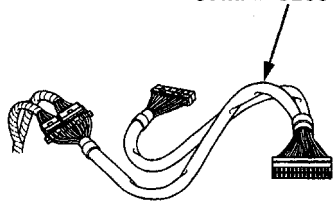
Do the voltages match the standard values in the chart on the right?

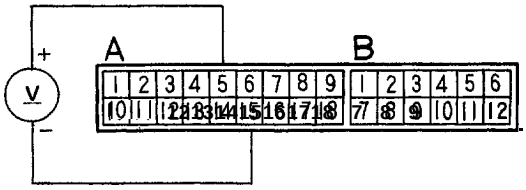
YES → **Substitute a known-good EPS control unit and recheck.**

NO

(To page 17-55)

TEST HARNESS A
07MAZ-SL00100

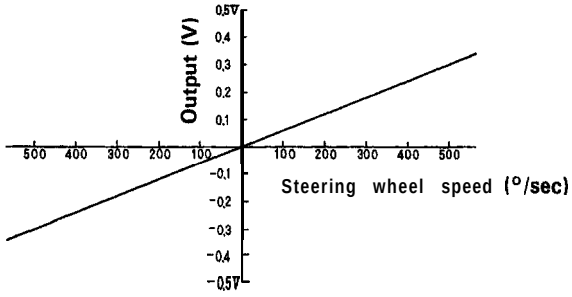




Standard Output Values

Steering wheel operation	Standard
Straight ahead	o v
Turned to the left	Approx. -0.1 V
Turned to the right	Approx. +0.1 V

Output Characteristics



NOTE: The output must correspond to the steering wheel speed.

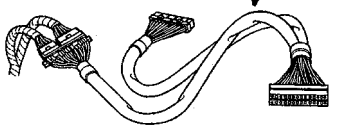
(From page 17-54)

Disconnect the steering wheel angle sensor 4-P connector from the steering gear box and connect test harness B.

Check the continuity between the terminals of the test harness A and B as indicated in the chart on theright: , .

Terminal Name	Test harness A terminal No.	Test harness B terminal No.
T_1	A5	10
T_2	A15	9

TEST HARNESS A
07MAZ-SL00100



NOTE: Only connect the wire harness side.

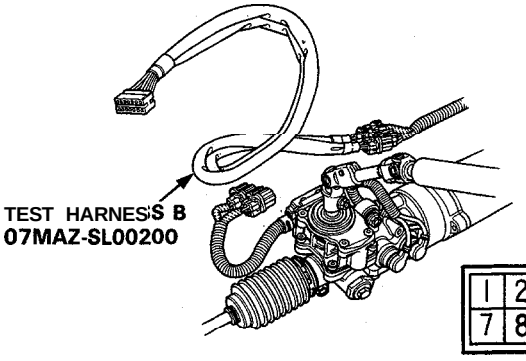
Is there continuity?

NO → Repair open in the wire with no continuity.

YES

A									B						
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	
10	11	12	13	14	15	16	17	18	7	8	9	10	11	12	

Check the continuity on terminals A5 and Al 5 individually to body ground.



1	2	3	4	5	6
7	8	9	10		

Is there continuity?

YES → Repair short in the wire with continuity to body ground.

NO

Faulty steering wheel angle sensor.
Replace the steering gearbox assembly.

(cont'd)

-Flowcharts (cont'd)

Problem code 22:
- **EPS power unit related problem.**

Turn the ignition switch OFF and connect test harness A to the wire harnes only.

Disconnect the EPS power unit connector and connect the test harness C.

Check the continuity between the terminals of the test harness A and C as indicated in the chart on the right.

Is there continuity?

NO → **Repair open in the wire with no continuity.**

YES

Check the continuity on terminals as indicated in the chart individually to body ground.

Is there continuity?

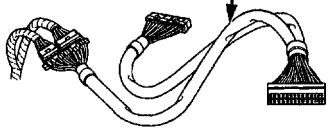
YES → **Repair short in the wire with continuity to body ground.**

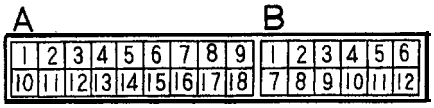
NO

Disconnect the negative and positive cables from the battery.

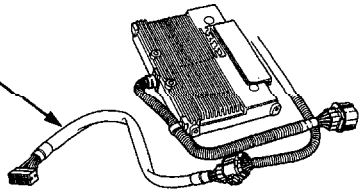
(To page 17-57)

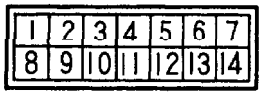
TEST HARNESS A
07MAZ-SL00100





TEST HARNESS C
07MAZ-SL00300





Terminal Name	Test harness A terminal No.	Test harness B terminal No.
+12 P/U	B5	14
FS RLY	B6	10
PWR RLY	B1	11
FET 4	B8	4
FET 3	B9	5
EFT 2	B3	1
FET 1	B10	2
VIS +	B12	6
VIS -	B4	6
SLO GND	B7	9

(From page 17-56)

Remove the RED and BLU wires from the power unit.

Check for continuity between the RED and BLU wires.

Is there continuity?

NO

YES

Check for continuity RED and BLU wires individually to body ground.

Is there continuity?

YES

NO

Connect the RED and BLU wires to the power unit terminals and the battery terminals.

Check the voltage between the WHT (+) and BLK (−) terminals on the power unit.

Is there battery voltage?

NO

YES

Repair open in the WHT or BLK wire between the power unit and the battery, or check for a blown EPS (50 A) fuse in the main relay box.

(To page 17-58)

Remove the RED and BLU wires from the EPS motor on the steering gearbox.

Check for continuity RED wire between the power unit and EPS motor.
Use the same method to check for BLU wire.

Is there continuity?

NO

Repair open in RED or BLU wire with no continuity.

YES

Faulty EPS motor. Replace the steering gearbox assembly.

Remove the RED and BLU wires from the EPS motor on the steering gearbox.

Check for continuity RED and BLU wires individually to body ground.

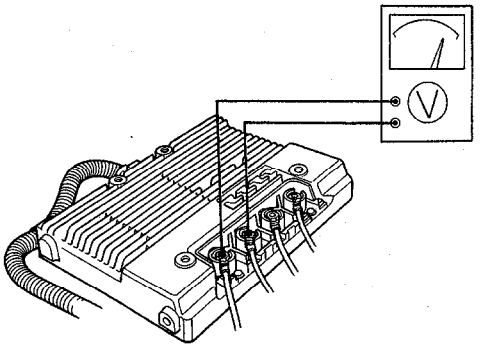
Is there continuity?

YES

Repair short in RED or BLU wire with continuity to body ground.

NO

Faulty EPS motor. Replace the steering gearbox assembly.



(cont'd)

-Flowcharts (cont'd)

(From page 17-57)

Connect the power unit checker to the power unit.

Start the engine.

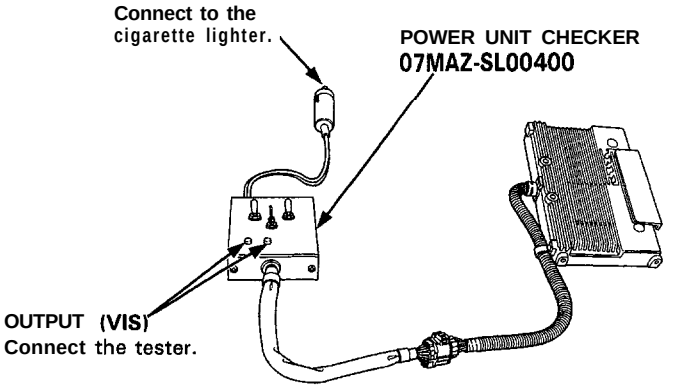
Follow the sequence indicated in the chart on the right to check the operation of the power unit.

Are the values for all items within the standard values?

NO → Replace the power unit.

YES

Check the steering wheel speed sensor. bee page 17-54)



CAUTION: Be careful because the steering wheel will rotate if the FET drive switch is turned ON.

Power Unit Checker Operation Sequence

Sequence	Check Item	Check Operation			Standard Value (VIS Output)
		F/S Relay	Power Relay	EFT Drive	
1	All ON trouble	OFF	OFF	OFF	1.0 V±0.7 V
2	F/S Relay ON trouble	OFF	ON	ON for left and right	1.0 V±0.7 V
3	Power Relay ON trouble	ON	OFF	ON for left and right	1.0 V±0.7 V
4	FET Operation left	ON	ON	ON for left	(*)+(1.25 V ±0.5 V)
5	FET operation right	ON	ON	ON for right	(*)+(1.25 V ±0.5 V)

(*): VIS output of sequence 1

NOTE:

- When the steering wheel is turned to the left and right lock point in sequence 4 and 5, turn on the FET drive swtich.
- This operation must be completed in a short period of time under maximum load (within 10 sec.) because the motor load is large.

Problem code 3 1:

- **EPS control unit related problem.**

Turn the ignition switch ON.

Do the other indicator lights (ALB, TCS, etc.) come on?

NO → **Check the No.5 (15 A) fuse and replace if necessary. ,**

YES

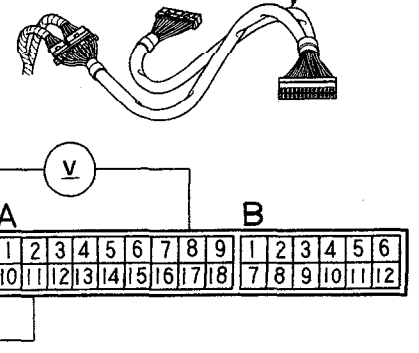
Turn the ignition switch OFF.

Connect test harness A to the wire harness only.

Turn the ignition switch ON.

Check the voltage between the A8 (+) and All (−) terminals of the test harness A.

TEST HARNESS A
07MAZ-SL00100



Is there more than 10 V?

NO → **Inspect the battery (see section 23). Repair open in the YEL wire between the control unit and the dash fuse box.**

YES

Substitute a known-good EPS control unit and recheck.

(cont'd)

-Flowcharts (cont'd)

Problem code 33:

- Speed sensor related problem.

NOTE: Before performing the troubleshooting, check the related systems described below.

Is the speedometer operating normally?	NO	Inspect the speed sensor and speedometer system.
	YES	Proceed the troubleshooting procedures described below.
Does the A/T warning indicator come on?	NO	
	YES	Perform the A/T troubleshooting (see section 14).

Check the speed sensor signal (Vo).

Turn the ignition switch OFF.

Connect test harness A to the wire harness only.

Disconnect the 3-P connector from the speed sensor.

Check for continuity between the No.1 (YEL/RED) terminal of the 3-P connector and the A12 terminal of the test harness A.

Is there continuity?

NO → **Repair open in the YEL/RED wire between the EPS control unit and speed sensor.**

YES

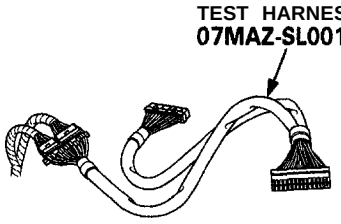
Check the continuity between the No. 1 (YEL/RED) terminal and body ground.

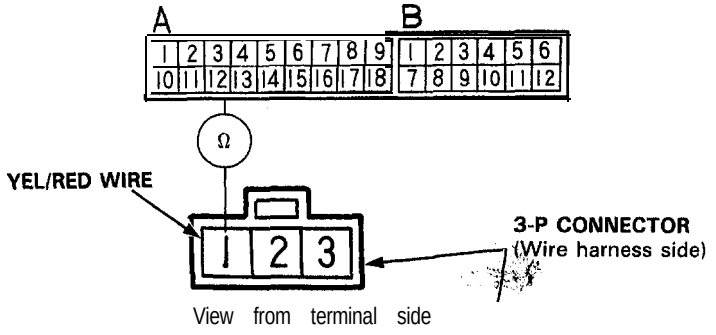
Is there continuity?

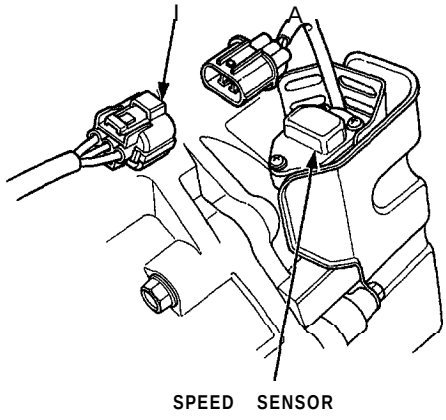
YES → **Repair short in the wire with continuity to body ground.**

NO

(To page 17-61)







Check the A/T speed sensor signal (V_1).

(From page 19-60)

Connect test harness A to the EPS control unit.

Disconnect the 22-P connector from the A/T control unit.

Turn the ignition switch ON and check the voltage between the No. 18 (PNK/BLK) terminal of the 22-P connector and body ground.

Is there approximately 5 V?

YES → Substitute a known-good A/T contorol unit and recheck.

NO

Turn the ignition switch OFF.

Remove the test harness A from the EPS control unit only.

Check for continuity between the A4 terminal of the test harness A and No. 18 (PNK/BLK) terminal of the 22-P connector.

Is there continuity?

NO → Repair open in the PNK/BLK wire between the EPS control unit and A/T control unit.

YES

Check for continuity between the A4 terminal and body ground.

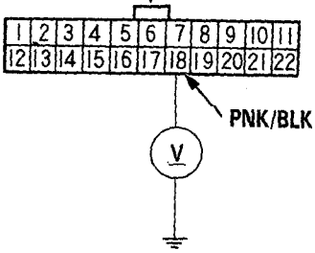
Is there continuity?

YES → Repair short in the PNK/BLK wire with continuity to body ground.

NO

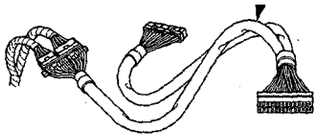
Substitute a known-good EPS control unit and recheck.

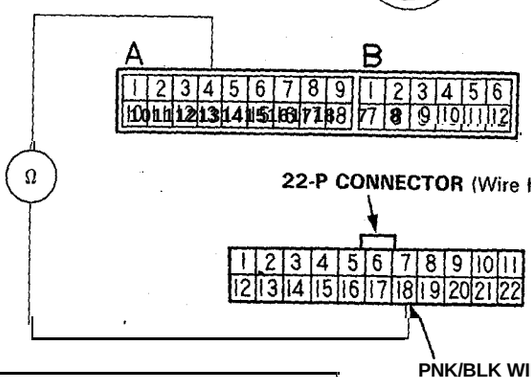
22-P CONNECTOR (To A/T CONTROL UNIT)
(Wire harness side)



NOTE: Do not connect the connector on the control unit side of test harness A.

TEST HARNESS A
07MAZ-SL00100





(cont'd)

Troubleshooting

Flowcharts (cont'd)

Problem code 23, 34, 41, 42, 43 and 44:

- **EPS control unit related problem.**

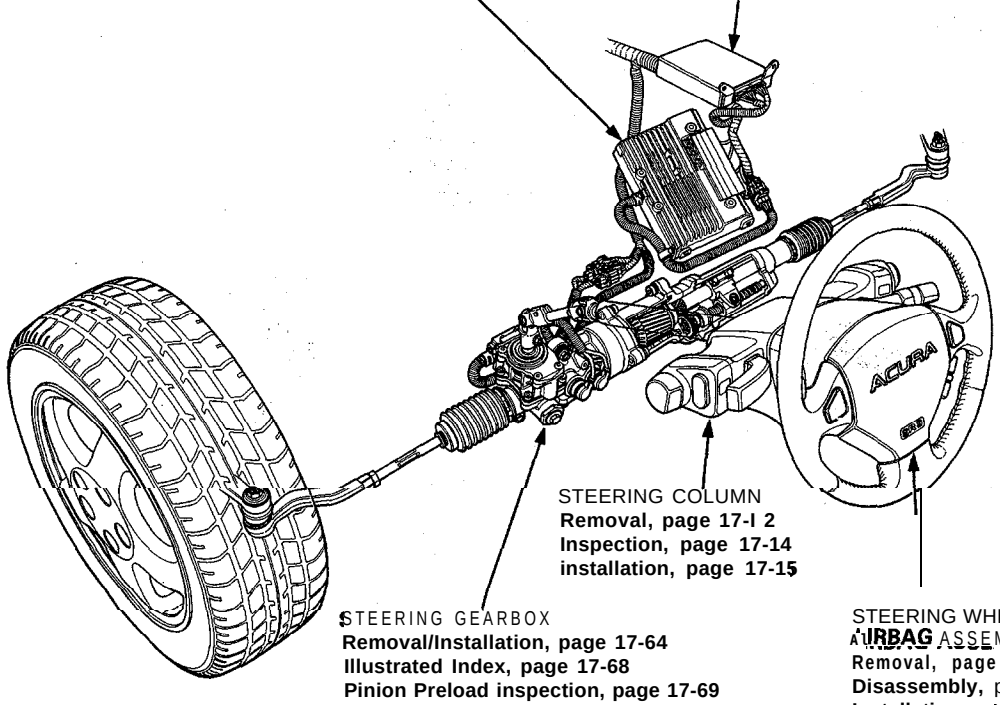
  Check for poor connections or loose wires at the EPS control unit. If there is no abnormality, replace the EPS control unit.

Component Location

Index

NOTE:

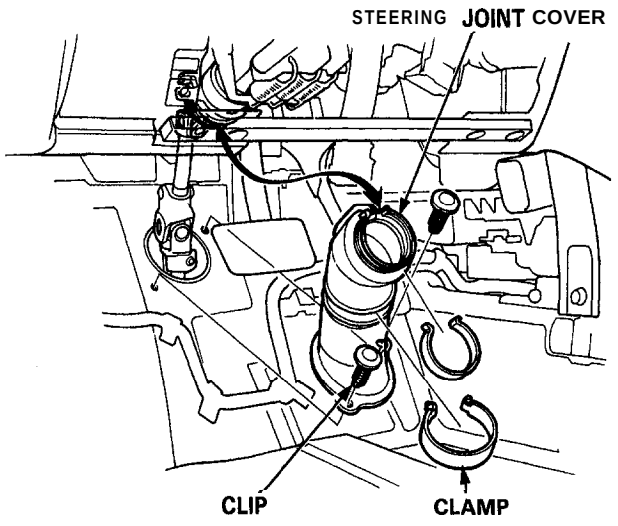
- **If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 231.**
- **Before removing the gearbox, remove the ignition key to lock the steering shaft.**
- **After installing the gearbox, check the wheel alignment and adjust if necessary.**



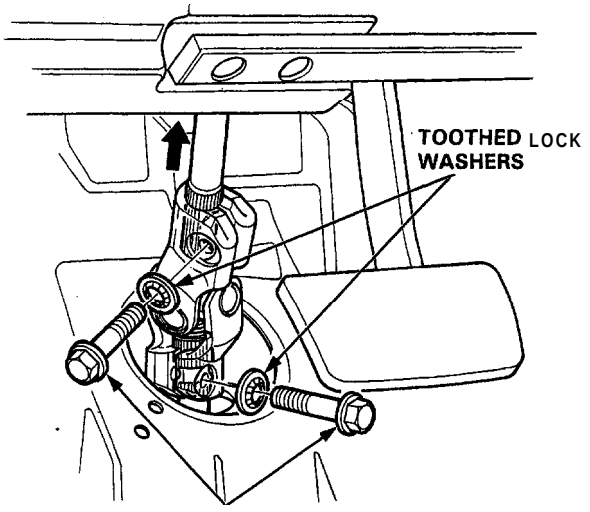
-Gearbox Removal/Installation

NOTE: Before removing the steering gearbox, align the front wheels ahead straight.

1. Remove the steering joint cover.



2. Remove the steering joint bolts, and move the joint toward the column.



3. Raise the car and place safety stands in the proper locations (See section 1).

4. Remove the front wheels.

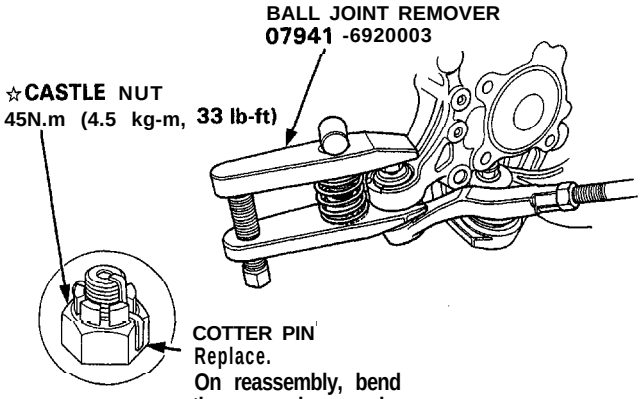
5. Remove the cotter pin from the tie-rod ball joint nut and remove the nut.

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 ball joint remover.

7. Separate the tie-rod ball joint and knuckle using the special tool.

CAUTION: Avoid damaging the ball joint boot.

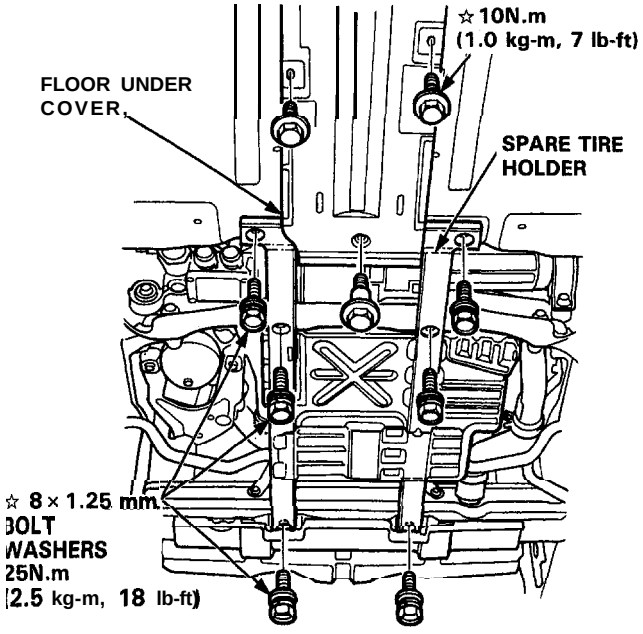
NOTE: If necessary, apply penetrating type lubricant to loosen the bail joint.



8. Remove the folding spare tire and spare tire holder plate.

9. Remove the battery.

10. Remove the spare tire holder.



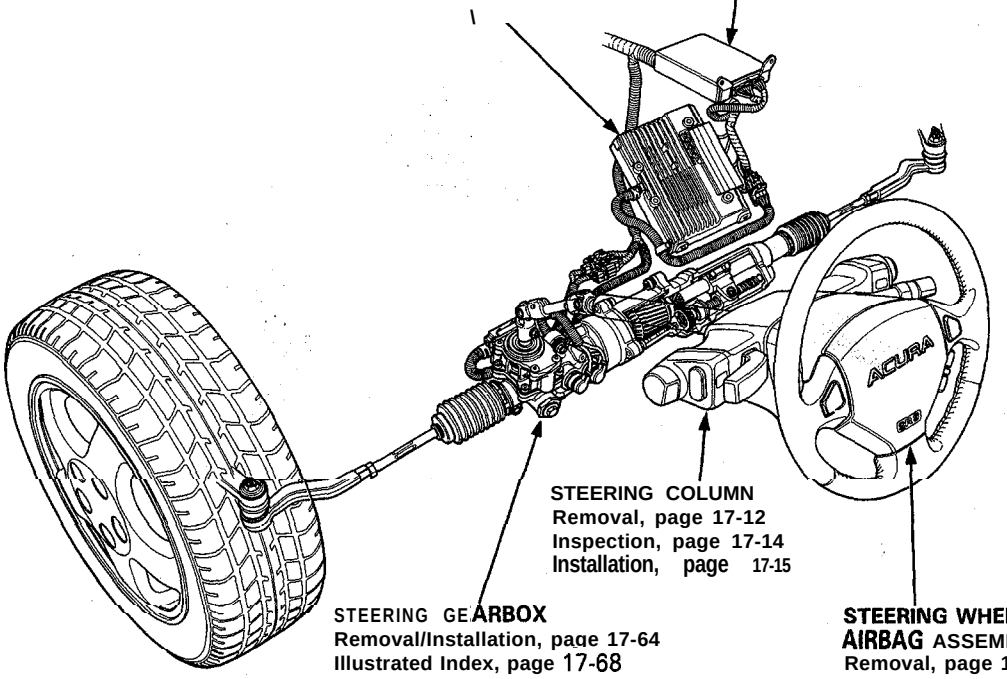
*Corrosion resistant bolt/nut

Component Location

Index

NOTE:

- If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 23).
- Before removing the gearbox, remove the ignition key to lock the steering shaft.
- After installing the gearbox, check the wheel alignment and adjust if necessary.



CONTROL UNIT
Replacement, page 17-74

POWER UNIT
Replacement, page 17-73

STEERING COLUMN
Removal, page 17-12
Inspection, page 17-14
Installation, page 17-15

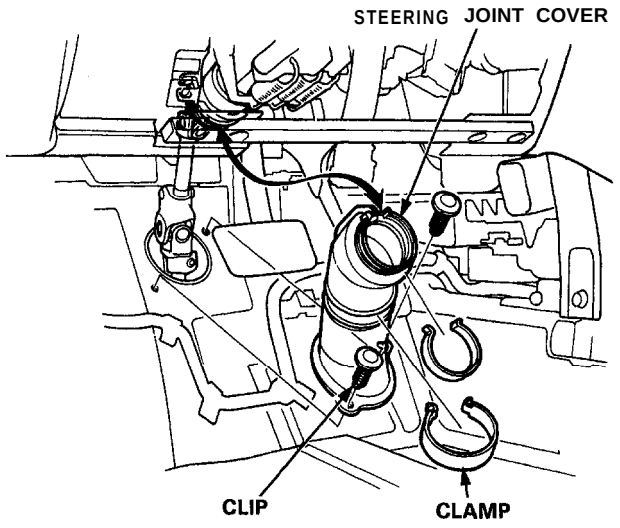
STEERING GEARBOX
Removal/Installation, page 17-64
Illustrated Index, page 17-68
Pinion Preload Inspection, page 17-69
Rack Guide Screw Adjustment, page 17-69

STEERING WHEEL/ AIRBAG ASSEMBLY
Removal, page 17-8
Disassembly, page 17-9
Installation, page 17-10

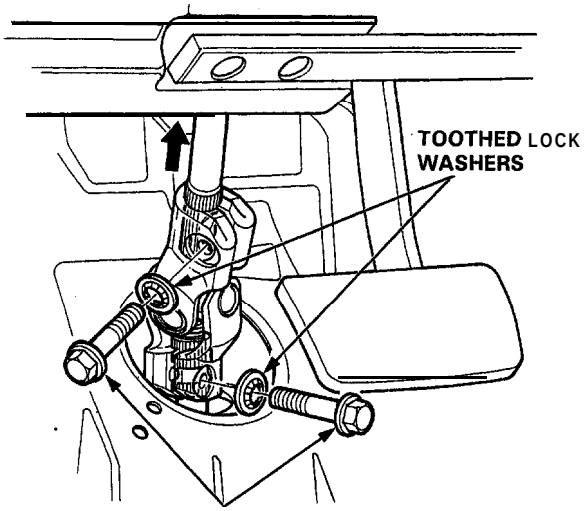
-Gearbox Removal/Installation

NOTE: Before removing the steering gearbox, align the front wheels ahead straight.

1. Remove the steering joint cover.



2. Remove the steering joint bolts, and move the joint toward the column.



3. Raise the car and place safety stands in the proper locations (See section 1).

4. Remove the front wheels.

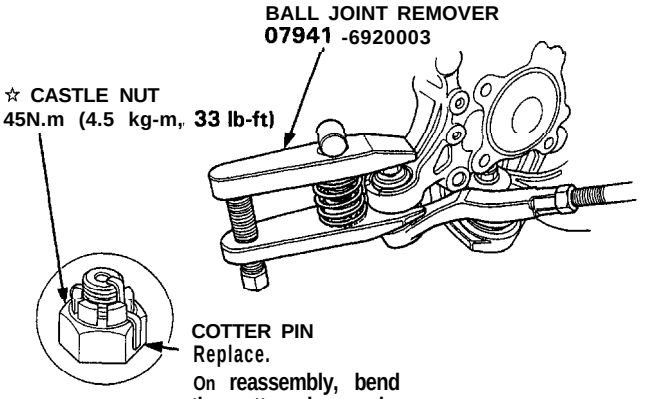
5. Remove the cotter pin from the tie-rod ball joint nut and remove the nut.

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 ball joint remover.

7. Separate the tie-rod ball joint and knuckle using the special tool.

CAUTION: Avoid damaging the ball joint boot.

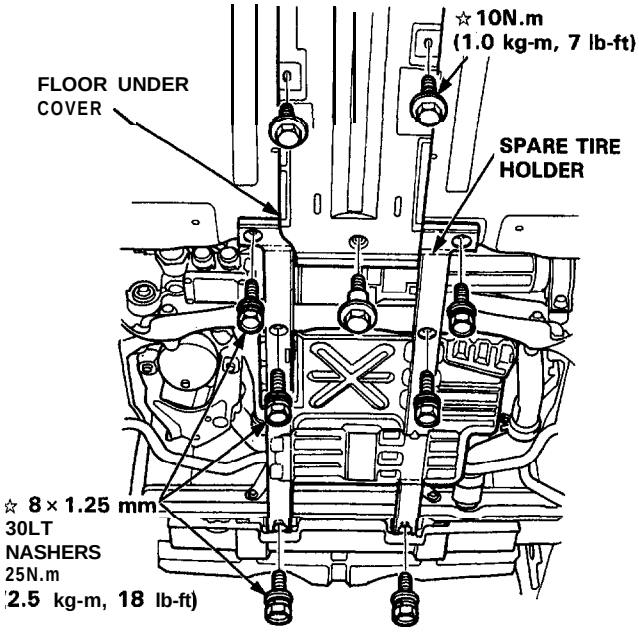
NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



8. Remove the folding spare tire and spare tire holder plate.

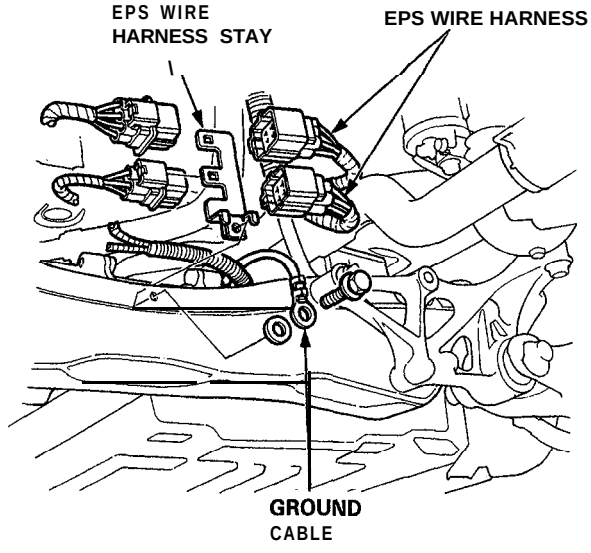
9. Remove the battery.

10. Remove the spare tire holder.



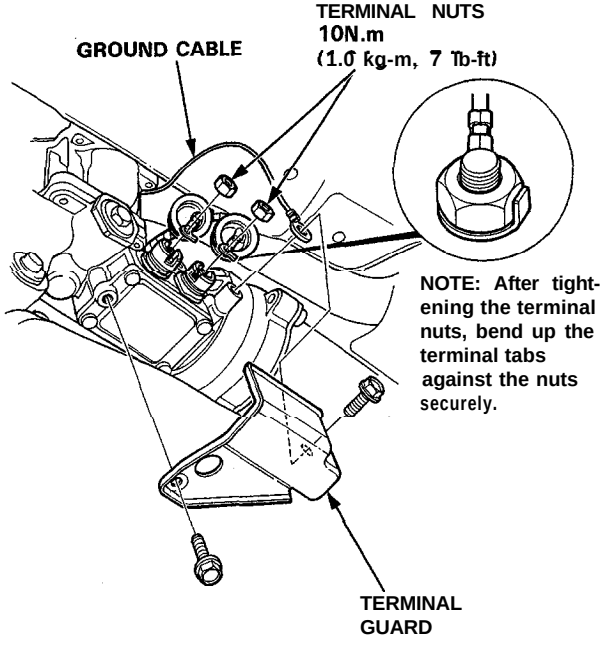
11. Disconnect the connectors from the EPS wire harness.

12. Remove the ground cable by removing the EPS wire harness stay.

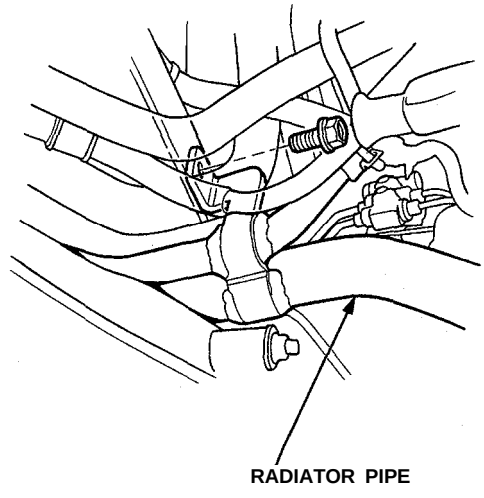


13. Remove the terminal guard and ground cable.

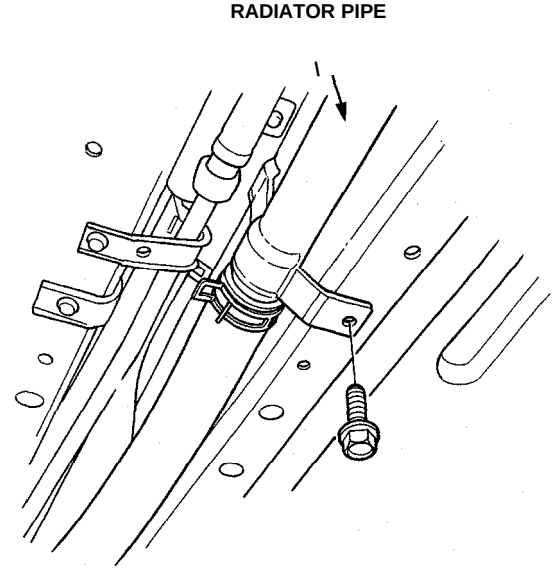
14. Remove the terminal nuts and the wires from the gearbox terminals.



15. Remove the radiator pipe bracket at the firewall.



16. Remove the radiator pipe bracket at the floor, and space the radiator pipe away from and gearbox.

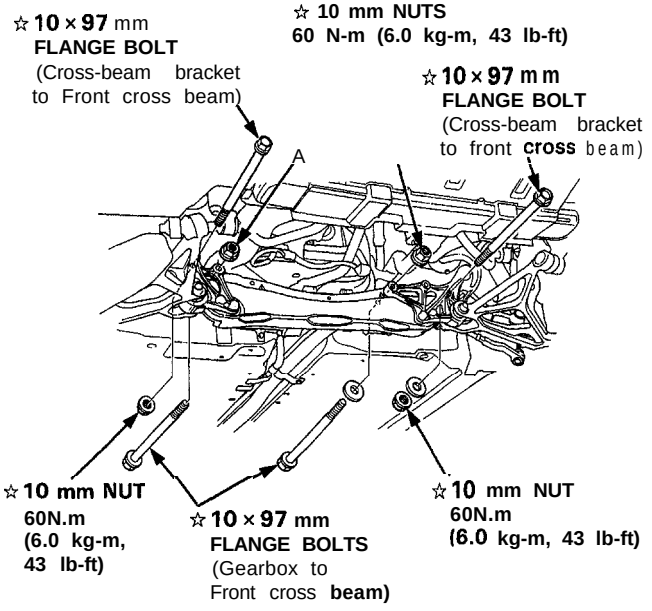


(cont'd)

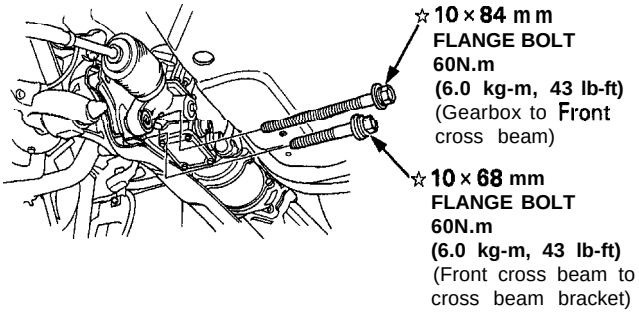
▪ Gearbox Removal/Installation (cont'd)

CAUTION: Before removing the gearbox, place a stand jack under the gearbox and front cross-beam to lightly support them.
Lower the gearbox together with the cross-beam.

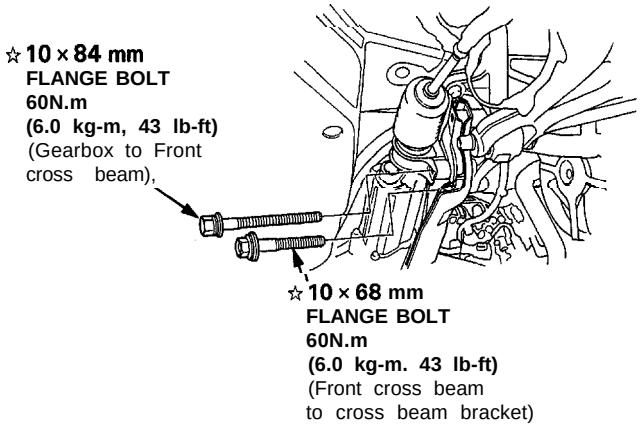
17. Remove the bolts and nuts of the gearbox and cross-beam.



LEFT SIDE



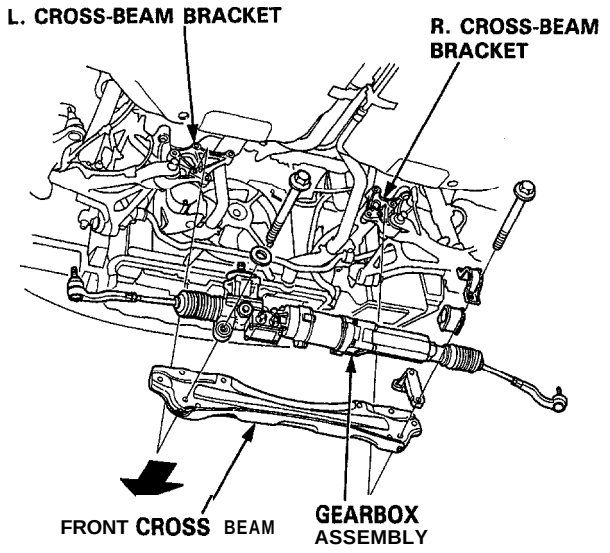
RIGHT SIDED



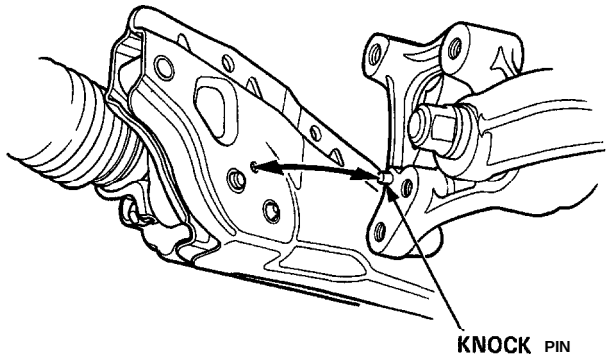
☆ **Corrosion resistant bolt/nut**

18. Lower the gearbox and cross-beam with care so as not to interfere with the radiator pipe.

NOTE: The cross beam is attached to the cross beam bracket with knock pins.
Remove the cross beam by lightly taping on it with a plastic hammer, then remove the gearbox.



19. **When installing the** cross **beam to the** cross beam **bracket, be sure to align the holes in the cross beam** with the knock pins on the cross beam bracket.

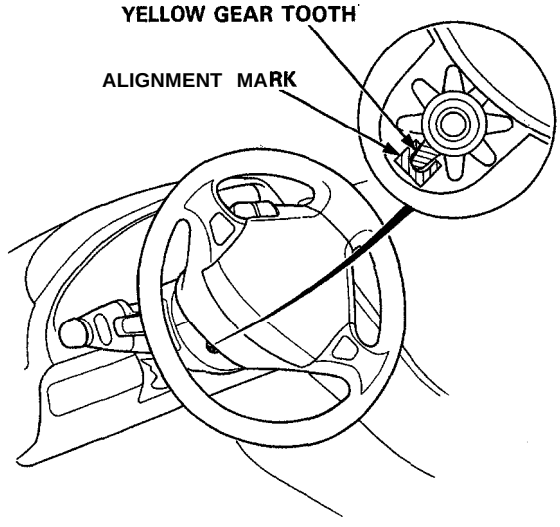


20. installation is the reverse order of removal.
    - Install the gearbox assembly and SST holder plate frame.
    - Install the battery.
    - Install the SST holder plate and folding spare tire.
    - Install the steering gearbox joint cover.

Connect the battery positive terminal and then connect the negative terminal.

NOTE: After installation, turn the ignition switch ON and check the Electrical Power Steering warning light for operation. Check and adjust the wheel alignment (Section 18).

- Turn on the ignition to II: the instrument panel SRS warning light should go on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume switch.
- Turn the steering wheel counterclockwise and make sure the yellow gear tooth still lines up with the alignment mark.

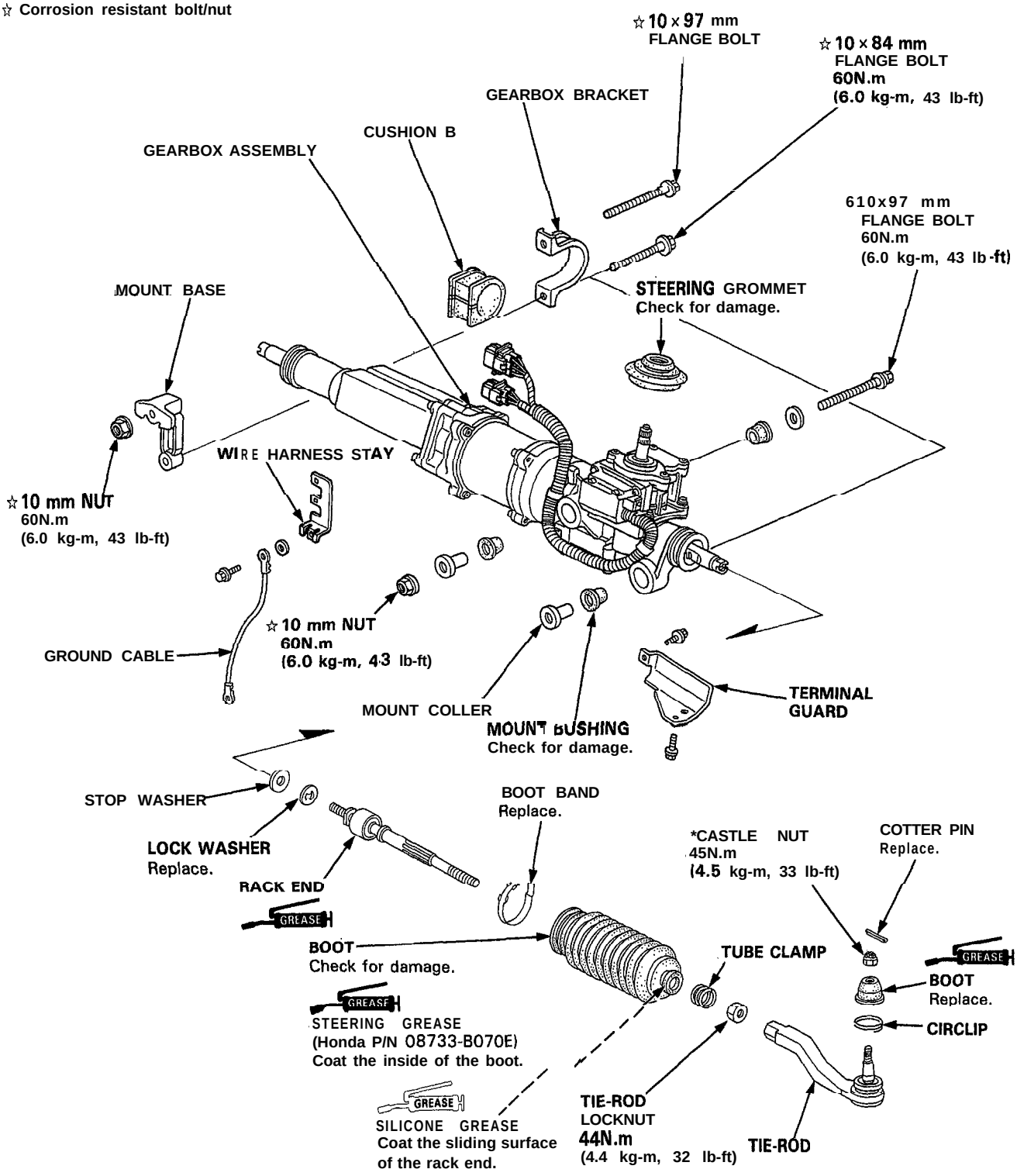


Illustrated Index

CAUTION:

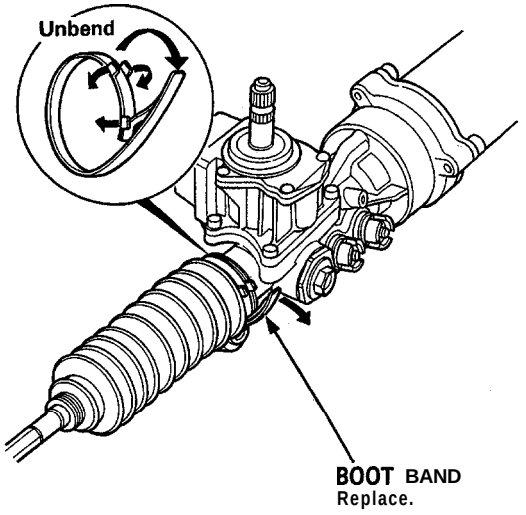
- **Do not try to disassemble the EPS gearbox. If the gearbox is faulty, replace it as an assembly.**

☆ Corrosion resistant bolt/nut

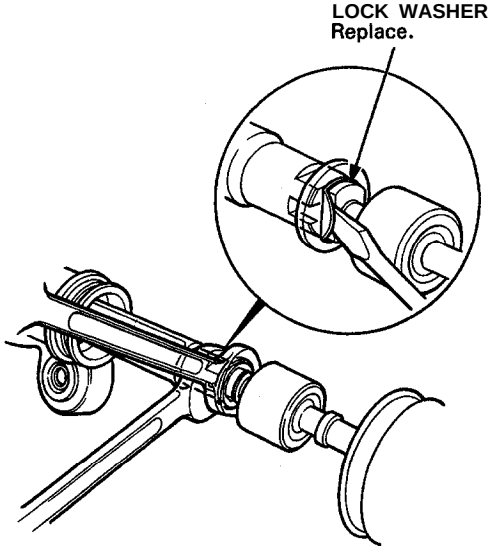


-Inspection

1. Carefully clamp the gearbox in a vise with soft jaws.
2. **Remove the boot bands.**



3. Pull the boots away from the ends of the gearbox, unbend the tie-rod lock washers.
4. **Hold the rack with a wrench, and unscrew the tie-rods with another wrench.**

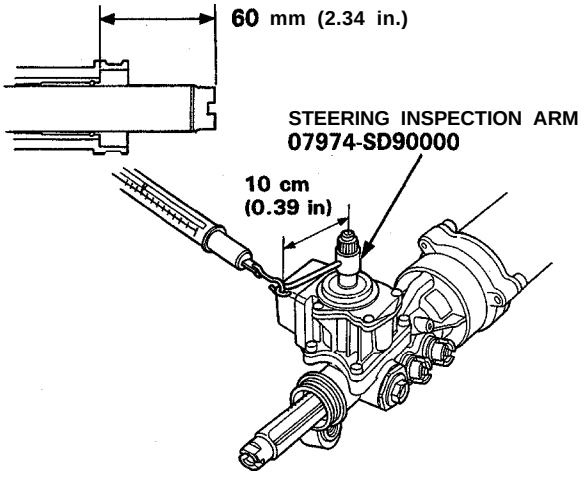


- Preload Inspection:

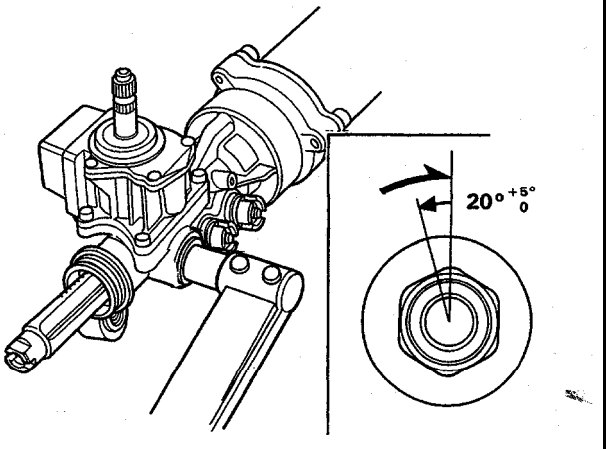
NOTE: Slide the steering rack in the cylinder until the end of the rack projects 60 mm (2.34 in.) from the cylinder end. Inspection is made near this rack position.

Install the special tool on the pinion shaft and check the preload with a spring scale.
If the preload is out of the specification, adjust the rack guide.

Preload 30N (3 kg, 6.6 lb)



- Rack guide screw adjustment:
Remove the rack guide screw locknut.
- **Tighten, loosen and retighten the rack guide screw two times to 4N.m (0.4 kg-m, 2.9 lb-ft), back it off $20^{\circ}{}^{+5^{\circ}}_{0}$.**



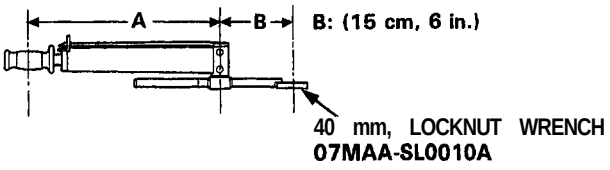
(cont'd)

- Inspection (cont'd)

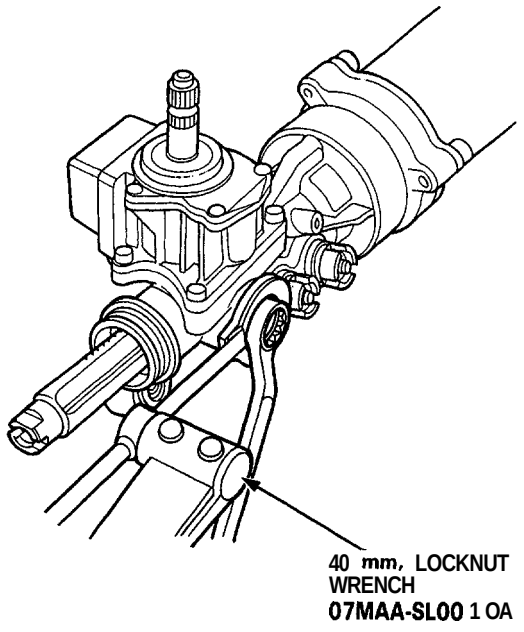
– Install the locknut on the rack guide screw, and tighten the locknut while holding the rack guide screw with a wrench.

NOTE: The above specification is the torque wrench reading (indicated) when the locknut is tightened using a torque wrench 50 cm (20 inches) long. If you tighten the locknut using a torque wrench of a different length, obtain the indicated torque value (torque wrench reading) using the following formulas.

A/(A + B) = Y
Y x Actual torque =X
X = Torque wrench reading.



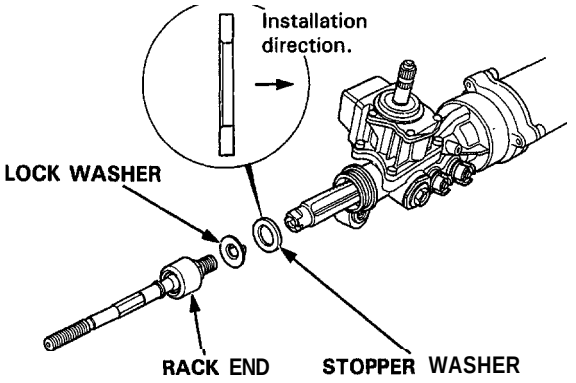
Actual: 25N.m (2.5 kg-m, 18 lb-ft)
Indicated: 19N.m (1.9 kg-m, 14 lb-ft)
Tool length (B): 15 cm (6 in)



Tie-rod installation:

5. Screw each rack end into the rack while holding the lock washer so its tabs are in the slots in the rack end.

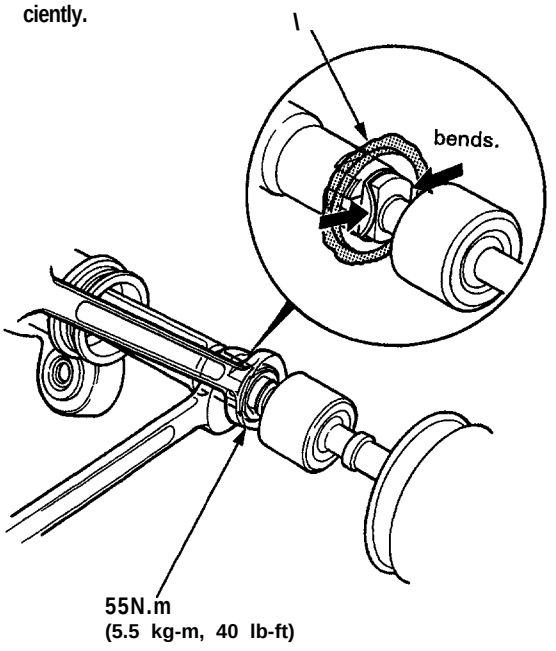
NOTE: Install the stopper washer with the chamfered side facing out.



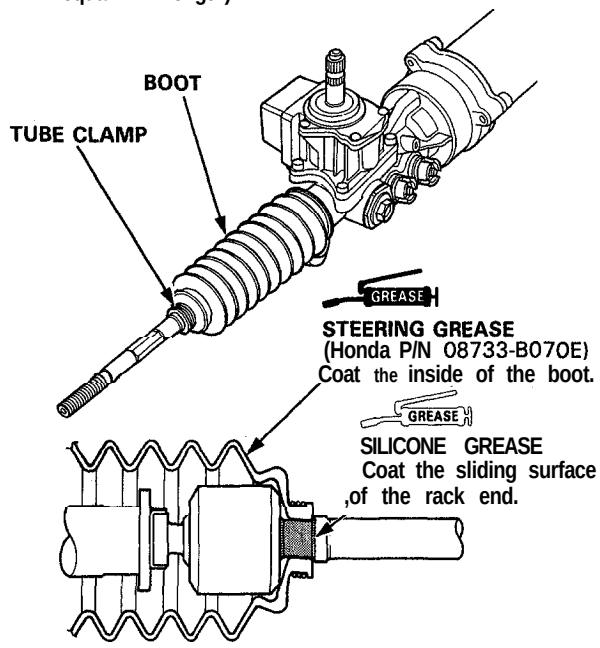
6. **Tighten the rack end securely, then band the lock** washer back against the flat on the flange as shown.

GREASE

NOTE: Coat the stopper washer with grease sufficiently.

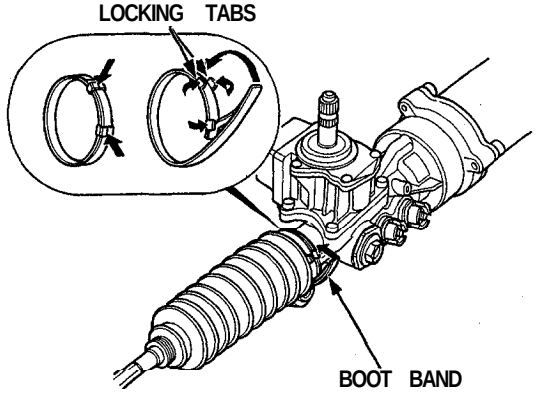


7. install the boots on the rack end with the tube clamps.
   NOTE:
   - Coat the rack end and inside of the boot with the grease.
   - Before installing the boot, be sure that the pressure inside of the boot is the atmospheric pressure.
   - Install the boot band with the rack in the straight ahead condition (i.e. right and left tie-rods are equal in length).

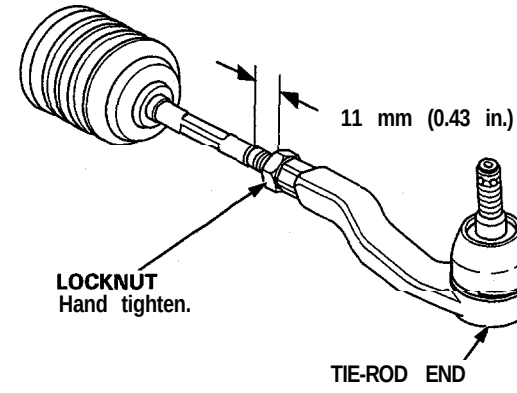


8. Install the new boot bands on the boot and bend both sets of locking tabs.
   Lightly tap on the doubled portions to reduce their height.

   NOTE: After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.



9. If the tie-rod ends were removed, install the tie-rods on the right and left rack ends and screw them in until the threaded section is 11 mm (0.43 in.) in length.



10. Install the gearbox and the cross-beam (17-66).
    Check the wheel alignment and adjust if necessary (Section 18).

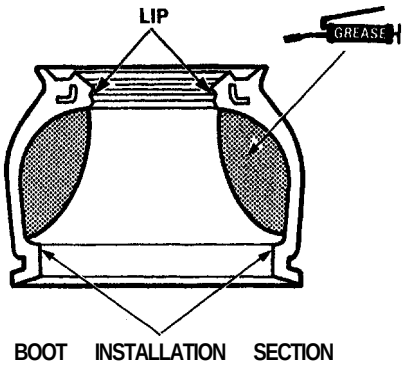
Power Steering

-Ball Joint Boot Replacement

1. Remove the circlip and the boot.

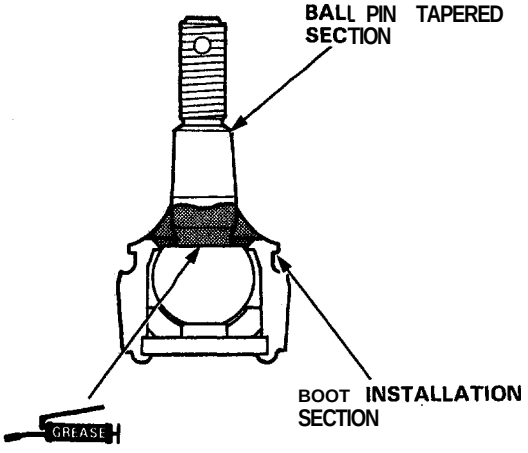
   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



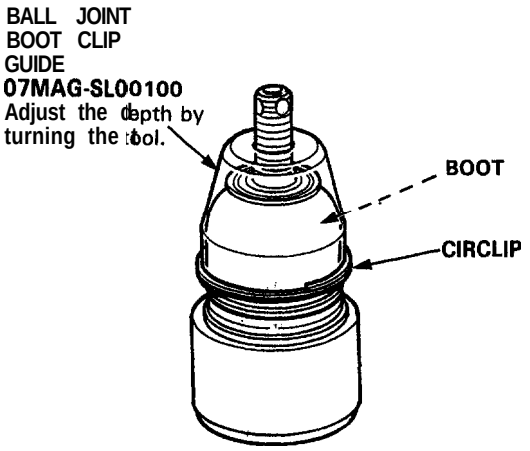
3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

   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. Insert the special tool into the threads in the ball pin and align the end of the tool with the groove in the boot.
   Slide the clip over the tool and into position.

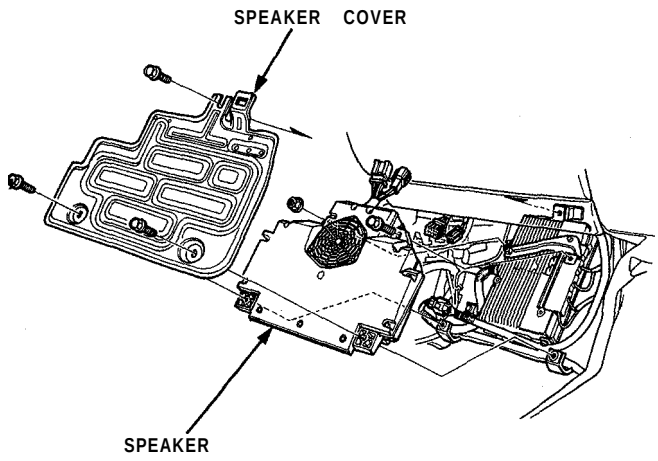


CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

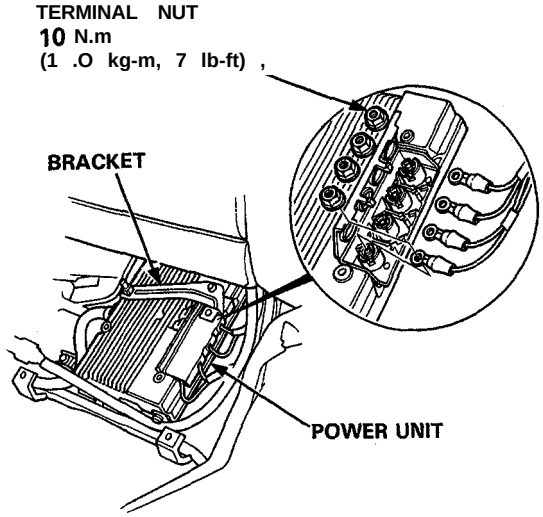
Power Unit

Replacement

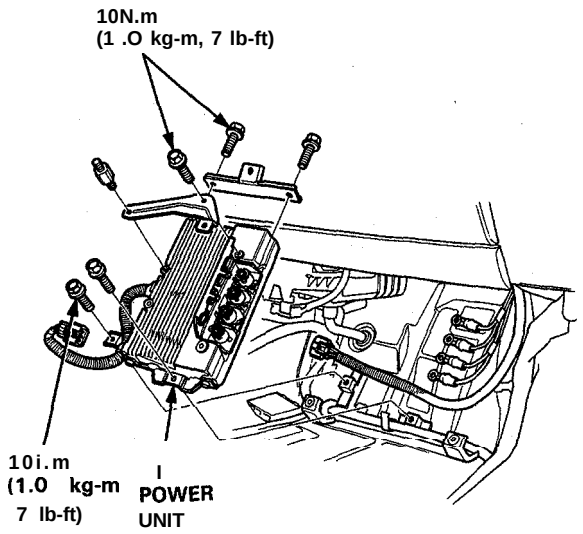
1. Remove the floor mat and speaker cover.
2. Disconnect the connector from the speaker and remove the speaker by removing the bolt and nut.



3. Remove the power unit bracket.
4. Remove the terminal nuts and disconnect the cables from the power unit terminals.



5. Remove the power unit by disconnecting the connector.



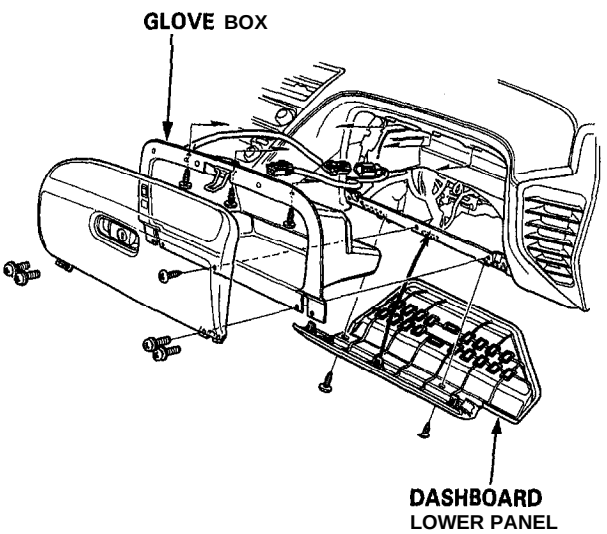
Installation is the reverse order of removal.

NOTE: Turn the ignition switch ON and check the EPS warning light for operation.

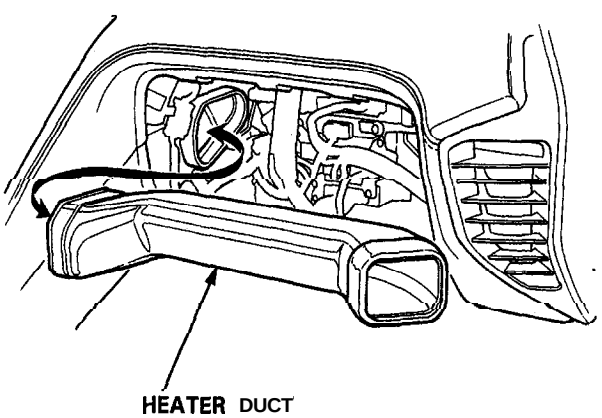
Control- Unit

Replacement

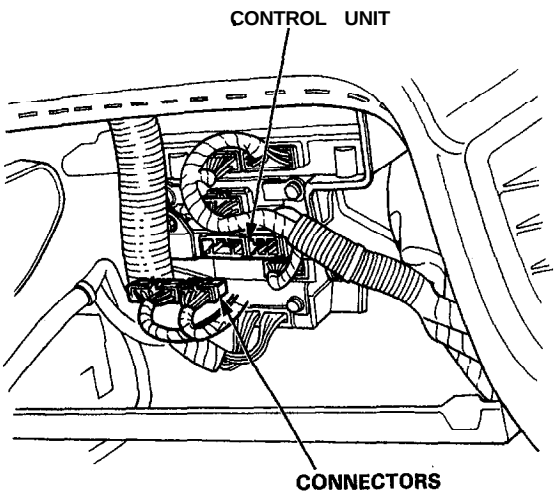
1. Remove the dashboard lower panel and glove box and disconnect the light connector.



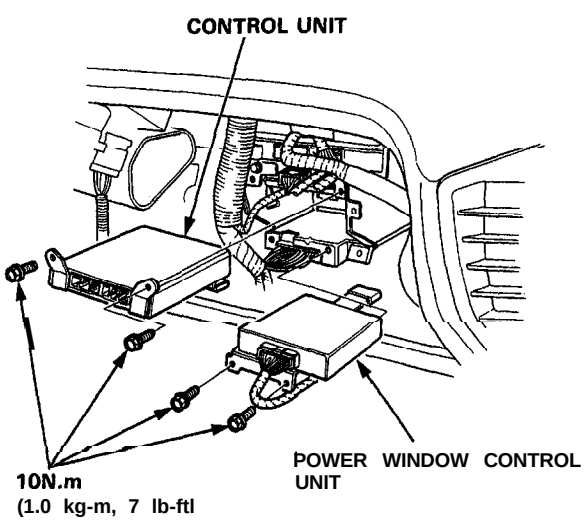
2. Remove the heater duct.



3. Disconnect the connectors from the control unit by removing the wire harness band.



4. Remove the power window control unit by pulling it toward you, then remove the control unit.



Installation is the reverse order of removal.

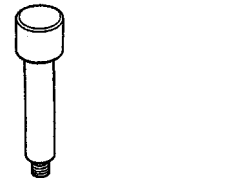
NOTE: Turn the ignition switch ON and check the EPS warning light for operation.

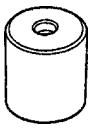
Suspension

Special Tools 18-2
Component Location
Index 18-3
System Description 18-4
Wheel Alignment
Height 18-6
Front Wheel Alignment
Adjusting Procedure 18-7
Front Turning Angle
Inspection 18-10
Rear Wheel Alignment
Adjusting Procedure 18-11
Runout 18-13
Bearing End Play 18-13
Front Suspension
Torque Specification 18-14
Hub Replacement 18-15
Illustrated Index 18-20
Knuckle/Control Arms/
Compliance Pivot Removal 18-21
Ball Joint Boot Replacement 18-25
Front Damper
Removal 18-24
Disassembly/Inspection 18-27
Reassembly 18-28
Installation 18-28
Rear Suspension
Torque Specification 18-29
Hub Replacement 18-30
Illustrated Index 18-34
Knuckle/Control Arms
Removal 18-35
Ball Joint Boot Replacement 18-38
Rear Damper
Removal 18-39
Disassembly/Inspection 18-40
Reassembly 18-42
Installation 18-42
Disposal 18-43

Special Tools

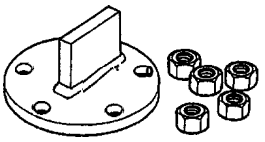
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAF—SD40100	Hub Dis/Assembly Pin	1	18-32, 33
②	07GAF—SD40200	Hub Assembly Driver Attachment	1	18-18, 33
③	07GAF— SD40700	Hub Dis/Assembly Base	2	18-18, 32
④	07GAG -SD40700	Ball Joint Boot Clip Guide	1	18-38
⑤	07MAB—SL00100	Front Hub Holder	1	18-17, 19
⑥	07MAC—SL09100	Ball Joint Remover	1	18-21, 22, 23, 36
⑦	07MAG —SL00200	Bali Joint Boot Clip Guide	1	18-25
⑧	07941-6920003	Ball Joint Remover	1	18-21, 35
⑨	07965—SD90100	Hub Dis/Assembly Base	1	18-18, 33
⑩	07974—SA50800	Ball Joint Boot Clip Guide	1	18-38

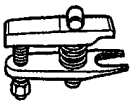

①


②

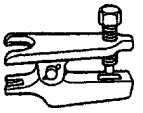
③

④


⑤


⑥

⑦


⑧

⑨

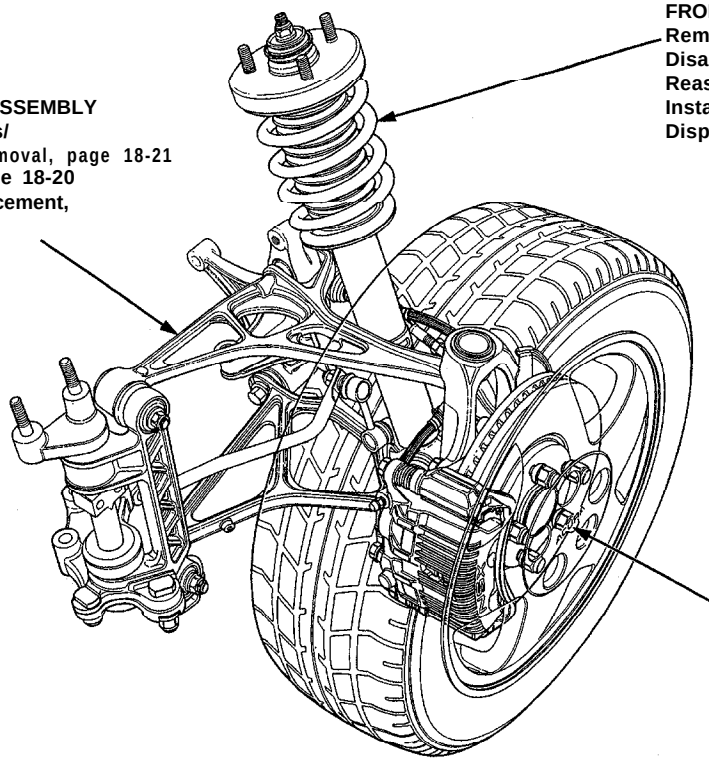
⑩

Component Location

Index

⚠ WARNING The **front and rear dampers contain nitrogen gas and oil under pressure. The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.**

Front Suspension:

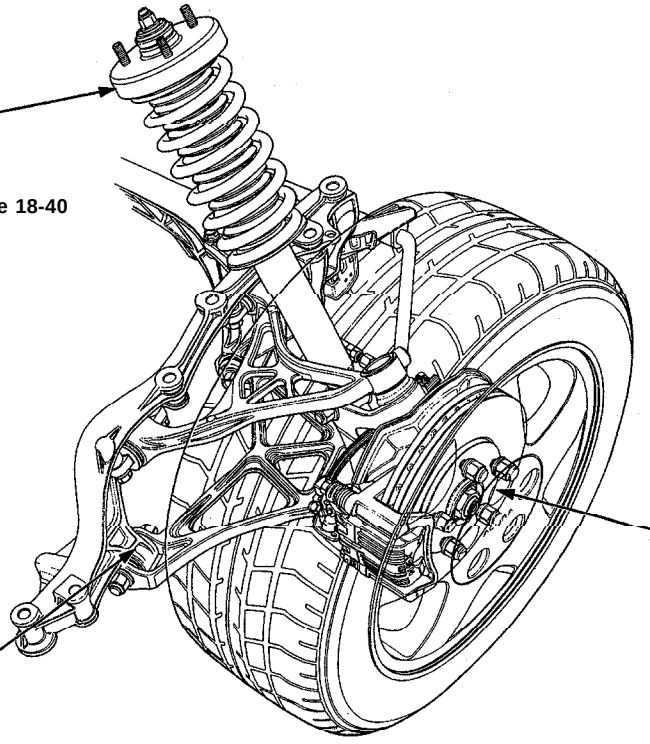


FRONT DAMPER
Removal, page 18-24
Disassembly/Inspection, page 18-27
Reassembly, page 18-28
Installation, page 18-28
Disposal, page 18-43

FRONT SUSPENSION ASSEMBLY
- **Knuckle/Control Arms/ Compliance Pivot Removal, page 18-21**
- **Illustrated Index, page 18-20**
- **Ball Joint Boot Replacement, page 18-25**

FRONT HUB
Replacement, page 18-l 5

Rear Suspension:



REAR DAMPER
Removal, page 18-39
Disassembly/Inspection, page 18-40
Reassembly, page 18-42
Installation, page 18-42
Disposal, page 18-43

REAR HUB
Replacement, page 18-30

REAR SUSPENSION ASSEMBLY
- **Knuckle/Control Arms Removal, page 18-35**
- **illustrated Index, page 18-34**
- **Ball Joint Boot Replacement, page 18-38**

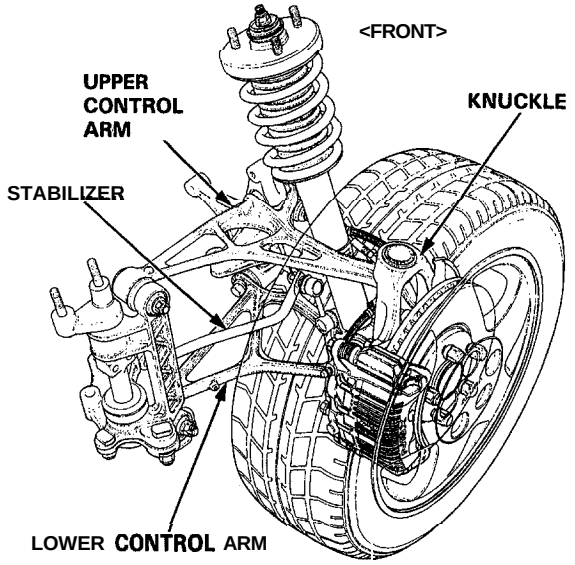
System Description

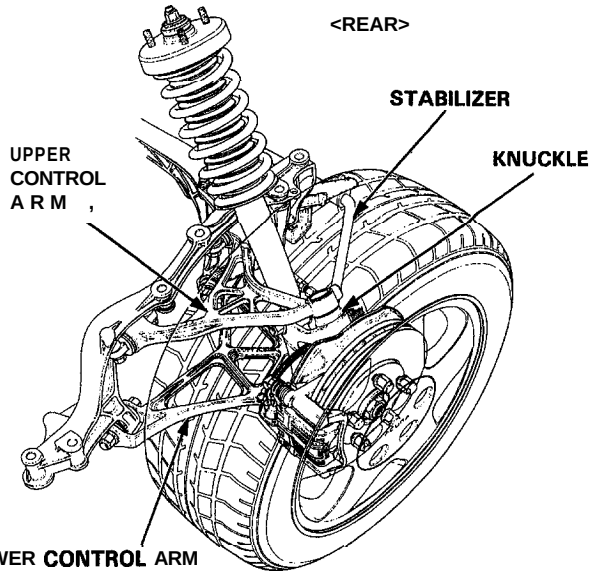
Suspension Composition

Outline

Double wishbone independent suspension has been selected for each of the four wheels. This eliminates damper friction along the steering axis and permits suspension geometry that takes full advantage of the performance potential of the wide, low aspect ratio tires. The double wishbone design also allows the use of aerodynamically-efficient and aesthetically pleasing low fender lines.

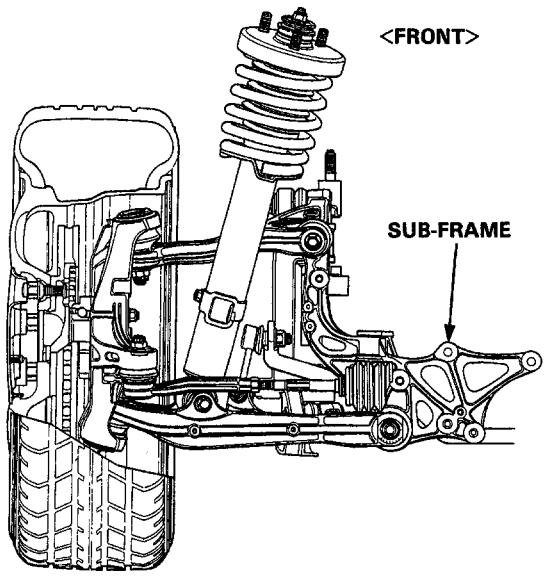
The knuckles and the suspension arms are manufactured from light-weight, high-strength aluminum alloys. This gives a notable reduction in unsprung weight which results in increased traction and improved ride. It also allows the individual suspension components to be designed in detail for maximum strength and rigidity.

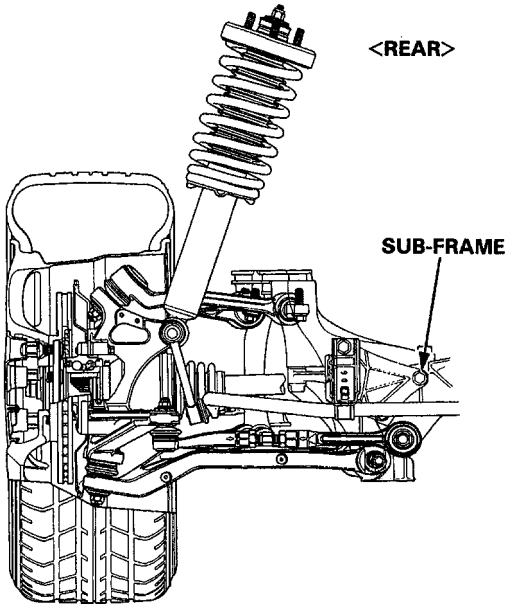




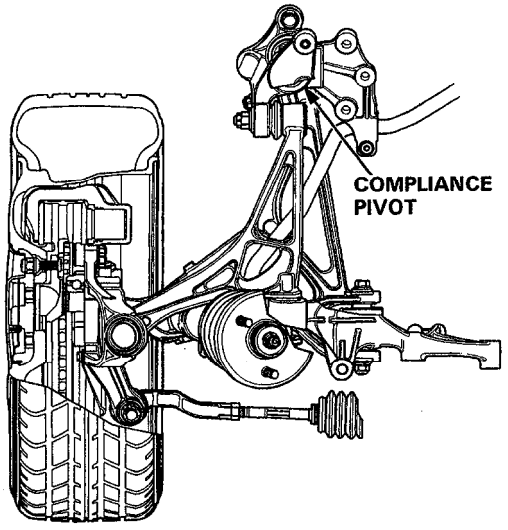
To further increase suspension link rigidity and to obtain optimum knuckle geometry, the knuckles and ball joints are contained within the wheel profile. At each corner of the car, the individual suspension system is attached to the aluminum stressed skin chassis by a cast aluminum sub-frame. This design further reduces overall weight and ensures that suspension loads are fed into the chassis at the most efficient points and in the most efficient directions.

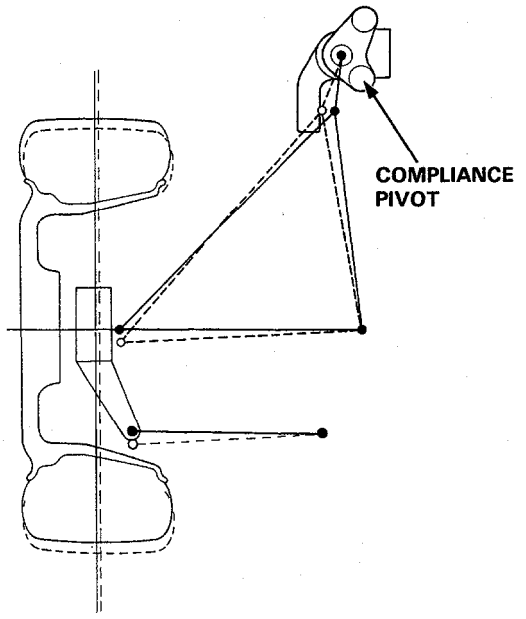
A large front caster angle combined with small trail distance improves straight-line stability and response without causing heavy steering effort.



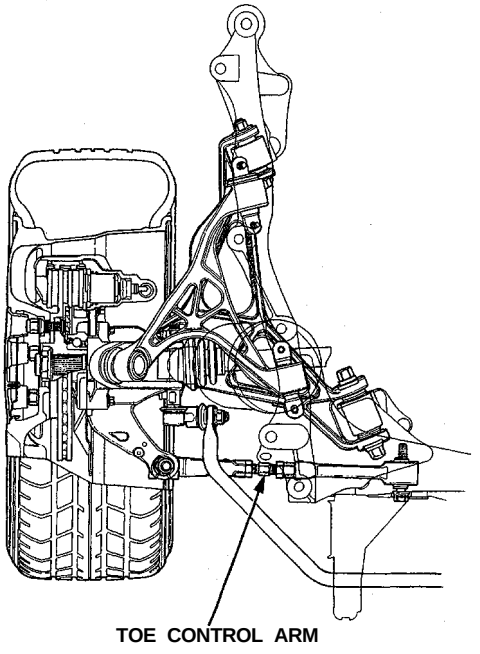


(Front Compliance Mechanism)
To avoid the usual compromise between ride quality and handling characteristics, a pivot-type "compliance mechanism" has been designed as an integral part of the front suspension. When one of the front wheels is subjected to a rearward movement by an uneven. road surface or by heavy braking, the load produced has two separate effects. As with any suspension system, the load acts in the vertical direction to compress the suspension spring and reduce the ride height. On the NSX the load also acts through both the upper and lower control arms to twist the compliance pivot. This allows the wheel to move rearward by a controlled amount, thus absorbing energy. The result is an outstanding ride quality with only minimal changes to track width and wheel geometry. In Corning, the compliance pivot does not come into play and the lateral suspension stiffness required for maximum roadholding and optimum control response is maintained.





(Rear Toe Control Arm)
Many conventional passenger-car independent rear suspension systems are subject to undesirable changes in toe-in angle with wheel movement. This results in instability both in Corning and in acceleration. In the NSX, the design and pivot locations of the rear toe control arm produce a slight controlled increase in toe-in during bump travel. As a result, the NSX is extremely stable under heavy cornering loads and over bumpy road surfaces.



Wheel Alignment

Height

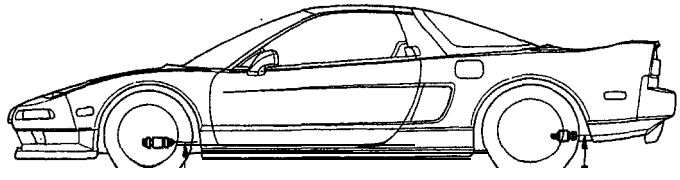
NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.

NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

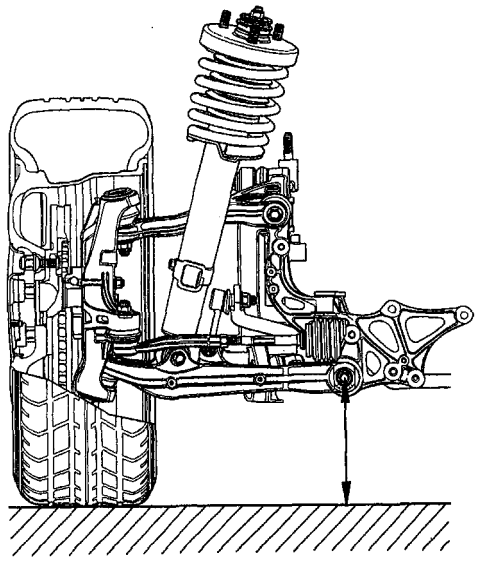
- **Check that the suspension is not modified.**
- Check the tire size and tire pressure.
- **Check the runout of the wheels and tires.**
- **Check the suspension ball joints. (Hold a wheel with your hands and move it up and down and right and left to check for wobbling.)**
- **Check the height of each suspension (see below).**

Standard value

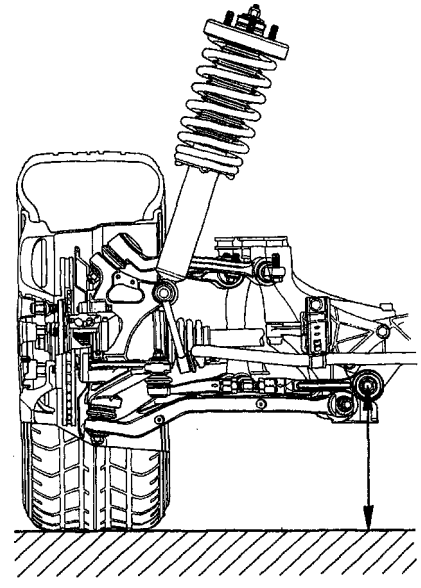
	Tire size	Tire pressure psi (kpa)	Standard height mm (in) [empty car]
Front	205/50 ZR15	33 (230)	170-180 mm (6.7-7.1 in)
Rear	225/50 ZR16	40 (275)	213-223 mm (8.4-8.9 in)



Front:
Ground clearance to the center of the lower control arm bolt



Rear:
Ground clearance to the center of the toe control arm bolt



Height inspection:

- Before checking for the height, bounce the car up and down several times before measuring.
- Check the height with the car empty, parked on a level surface, with properly inflated tires (tread wear indicators must not be showing). If the height is out of specification, load or unload the car as necessary.

Front Wheel Alignment Adjusting Procedure

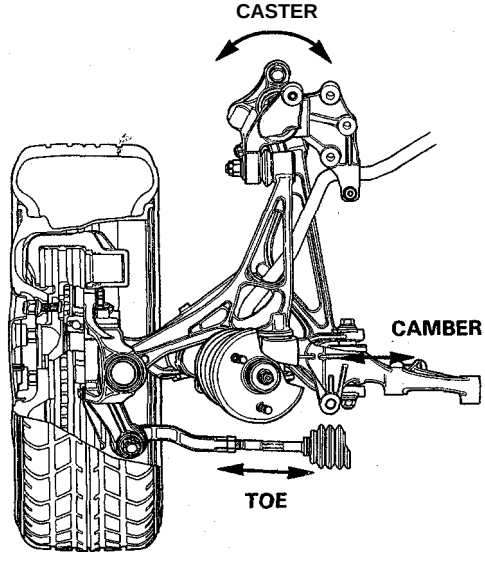
Adjustment

NOTE: NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.

The NSX suspension can be adjusted for camber, caster (front only), and toe. However, because each of them relates to the other, the camber changes when the toe is adjusted for example. Therefore, the total adjustment of the front/rear wheel alignment is required whenever either one of the clements (i.e. camber, caster, or the toe) is adjusted.

<Front wheel alignment adjusting procedure>

Check the ride height.
↓
Measure camber.
↓
Adjust camber.
↓
Adjust toe.
↓
Adjust caster.
↓
Readjust camber.
↓
Readjust toe.



(cont'd)

Front Wheel Alignment Adjustment Procedure (cont'd)

NOTE:

- NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.
- The ride height is very important for setting the alignment. For every 10 mm of change in the front ride height, the camber will change approximately 10 minutes.
- The front alignment settings on the NSX are interactive.
  A slight change in toe will dramatically change the camber.

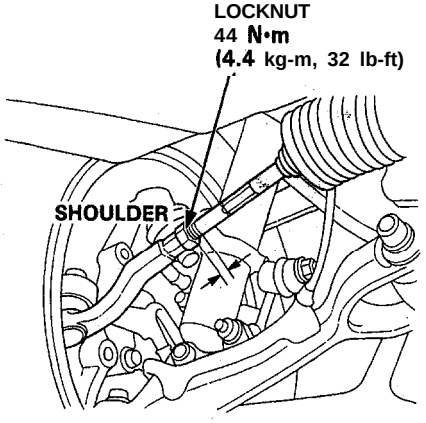
1. Drive the car on the alignment rack.
2. Check the tire pressure and ride height as described on page 18-6.
3. Center the steering wheel.

Toe

1. Measure the length of the threaded section on the right and left rack ends.

   Standard: 11 mm for shoulder
   Difference between right and left: 1 mm max.

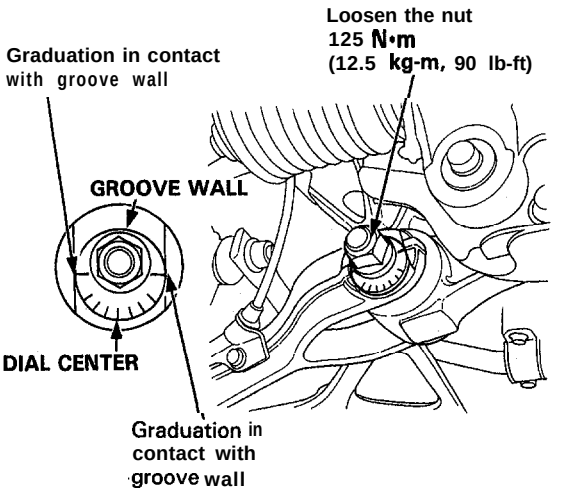
2. If the measurement is out of the specification, loosen the locknut and adjust properly.



Camber

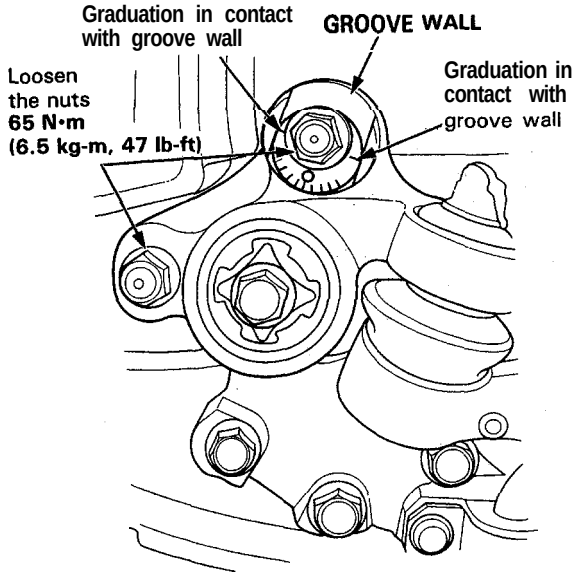
1. Loosen the locknut on the front lower control arm adjusting point and adjust the cam position so that the right and left gaduations on the adjusting cam are in contact.

2. Mark the arm in the position which aligns with the dial center of the adjusting cam.



Caster

- Loosen the pivot adjuster mounting nuts under the compliance pivot and adjust the cam position so that the right and left gaduations on the adjusting cam are in contact with the groove walls.



4. Measure and record the readings for the camber and toe according 'to the alignment equipment manufacture's instructions.

5. Adjust the camber and toe at the same time on one side of the car. Repeat for the other side of the car.

NOTE:

- One graduation on the camber adjusting cam equals approximately 10 minutes of camber change.
- One full turn of the tie rod equals approximately 8 mm.

6. Measure the caster according to the alignment equipment manufacture's instructions.

7. Adjust the caster.

NOTE: One graduation on the caster adjusting cam equals approximately 10 minutes of caster change.

8. Measure the readings for camber and toe.

9. Readjust the camber and toe to the specifications shown.

Front Specifications

Toe -3.5 mm ± 1.0 mm
Camber -0 dagrees 20' ± 30'
Caster +8 degrees 00' ± 45'

Wheel Alignment

. Front Turning Angle Inspection

NOTE:

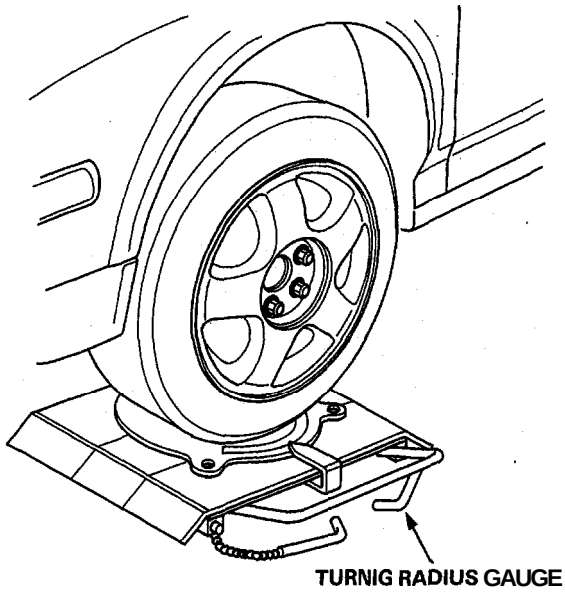
- Place a car on a level surface before inspection.
- Release the parking brake and be sure that the car is empty.
- Check that the suspensions are at the standard height (page 18-6).

1. Jack up the car and set the turning radius gauges beneath the front wheels, and place boards under the rear wheels the same thickness as one of the turning radius gauges, then lower the car.

   NOTE:
   Be sure that the car is parallel to the ground with the wheels on the turning radius gauges and boards.

2. Remove the lock pin on the gauge.
   Turn the steering wheel fully to the right and left while applying the brake, and measure the turning angle of both wheels.

   Turning angle: inward: 33°06′ ± 2°
   Outward: 26°34′ (Reference value)



3. If the measurements are not within the specifications or if the inward turning angles differ between the right and left, check the toe and adjust accordingly (page 18-8).

Rear Wheel Alignment Adjusting Procedure

<Rear wheel alignment adjusting procedure>

Check the ride height.

↓

Measure camber and toe.

↓

Adjust camber.

↓

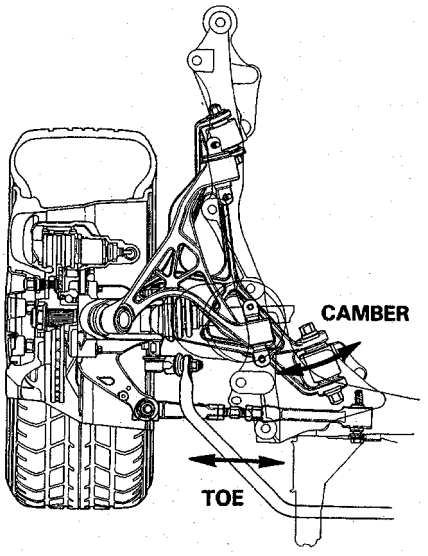
Adjust toe.

↓

Readjust camber.

↓

Readjust toe.



(cont'd)

Wheel Alignment

Rear Wheel Alignment Adjusting Procedure (cont'd)

NOTE:

- NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.

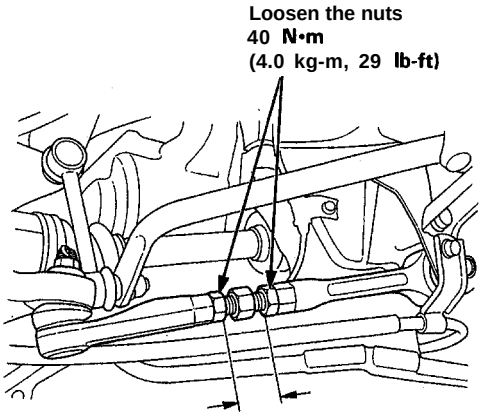
1. Drive the car on the alignment rack.
2. Check the tire pressure and ride height as described on page 18-6.
3. Center the steering wheel.

Toe

1. Measure the length of the threaded section on the right and left toe control arms.

   Standard: 40 mm
   Difference between right and left: 1 mm max.

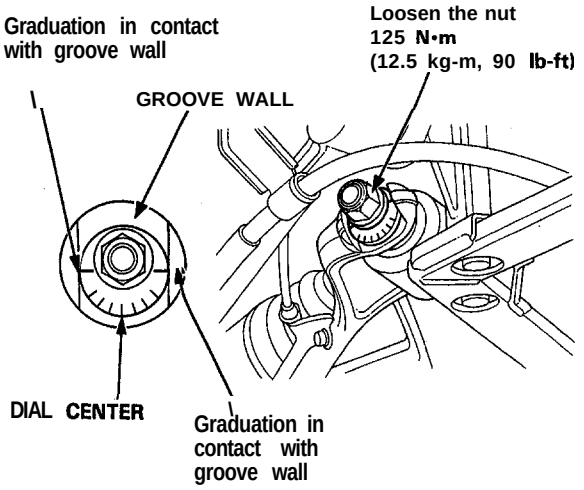
2. If the measurement is out of the specification, loosen the locknut and adjust properly.



Camber

1. Loosen the locknut on the rear lower control arm adjusting point and adjust the cam position so that the right and left graduations on the adjusting cam are in contact.

2. Mark the arm in the position which aligns with the dial center of the adjusting cam.



4. Measure the readings for camber and toe according to the alignment equipment manufacture's instructions.
5. Adjust the camber and toe at the same time on one side of the car. Repeat for the other side of the car.

Rear Specifications

Toe +6.0 mm ± 1.0 mm
Camber -1 degrees 30' ± 30'

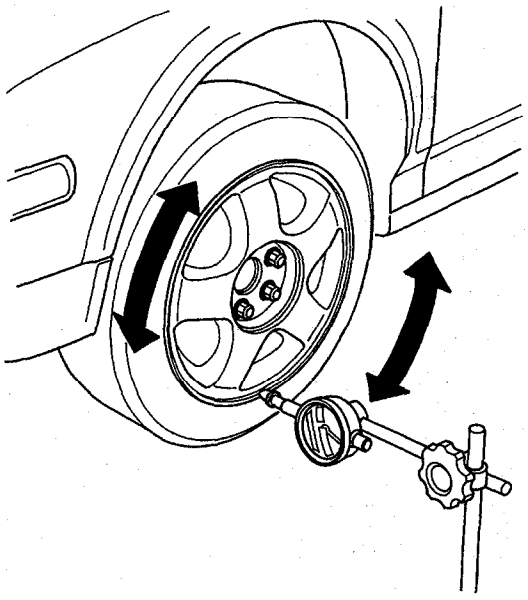
Runout

Jack up the car and raise the wheels off the ground (Section 1).

Place the dial gauge on each front and rear wheel rim, turn the wheel slowly by hand, and check the front/rear wheel runout.

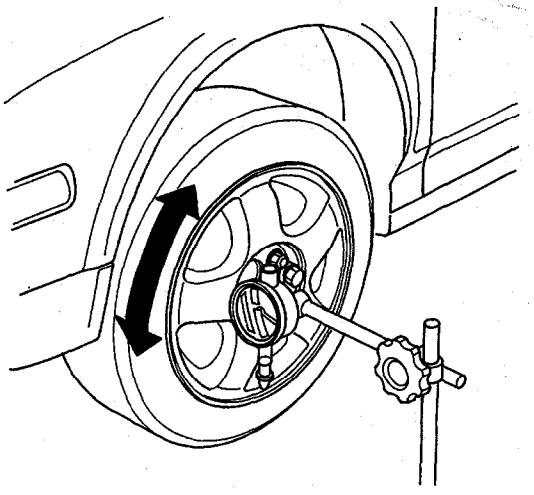
Front and Rear Wheel Axial Runout

Standard:
O-O.7 mm (O-0.028 in)



Front and Rear Wheel Radial Runout

Standard: O-O.7 mm (O-0.028 in)

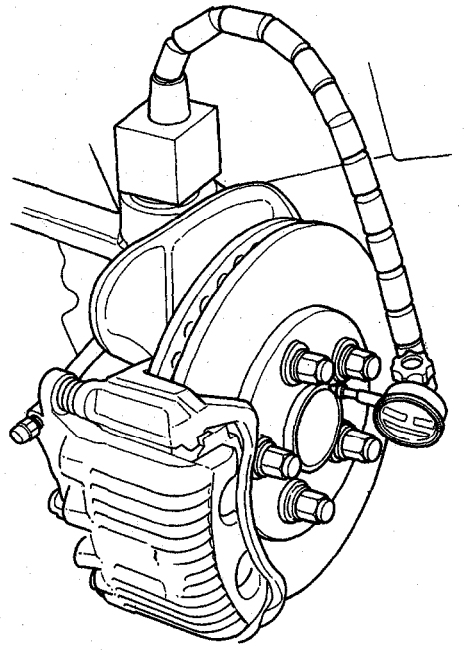


Turn the wheel slowly by hand and check for excessive axial and radial runout.

Bearing End Play

Front Wheel End Play
Standard: 0 mm (0 in)
Service limit: 0.05 mm (0.002 in) max. Replace.

Rear Wheel End Play
Standard: 0 mm (0 in)
Service limit: 0.05 mm (0.002 in) max. Replace.



Front Suspension

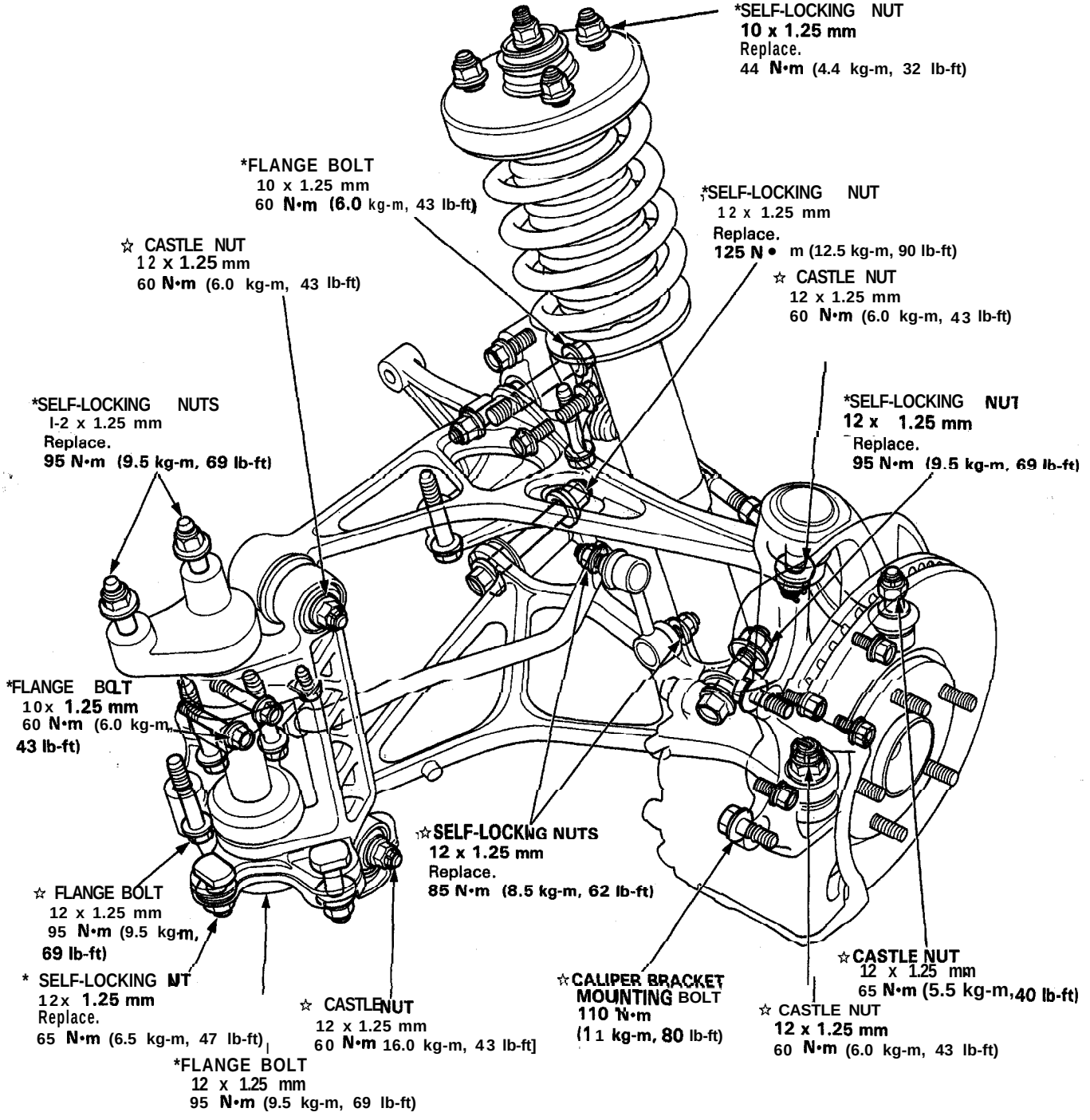
Torque Specifications

CAUTION:

- Replace the self-locking nuts after removal.
- Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts.(It should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).
- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

☆ Corrosion resistant bolt/nut.

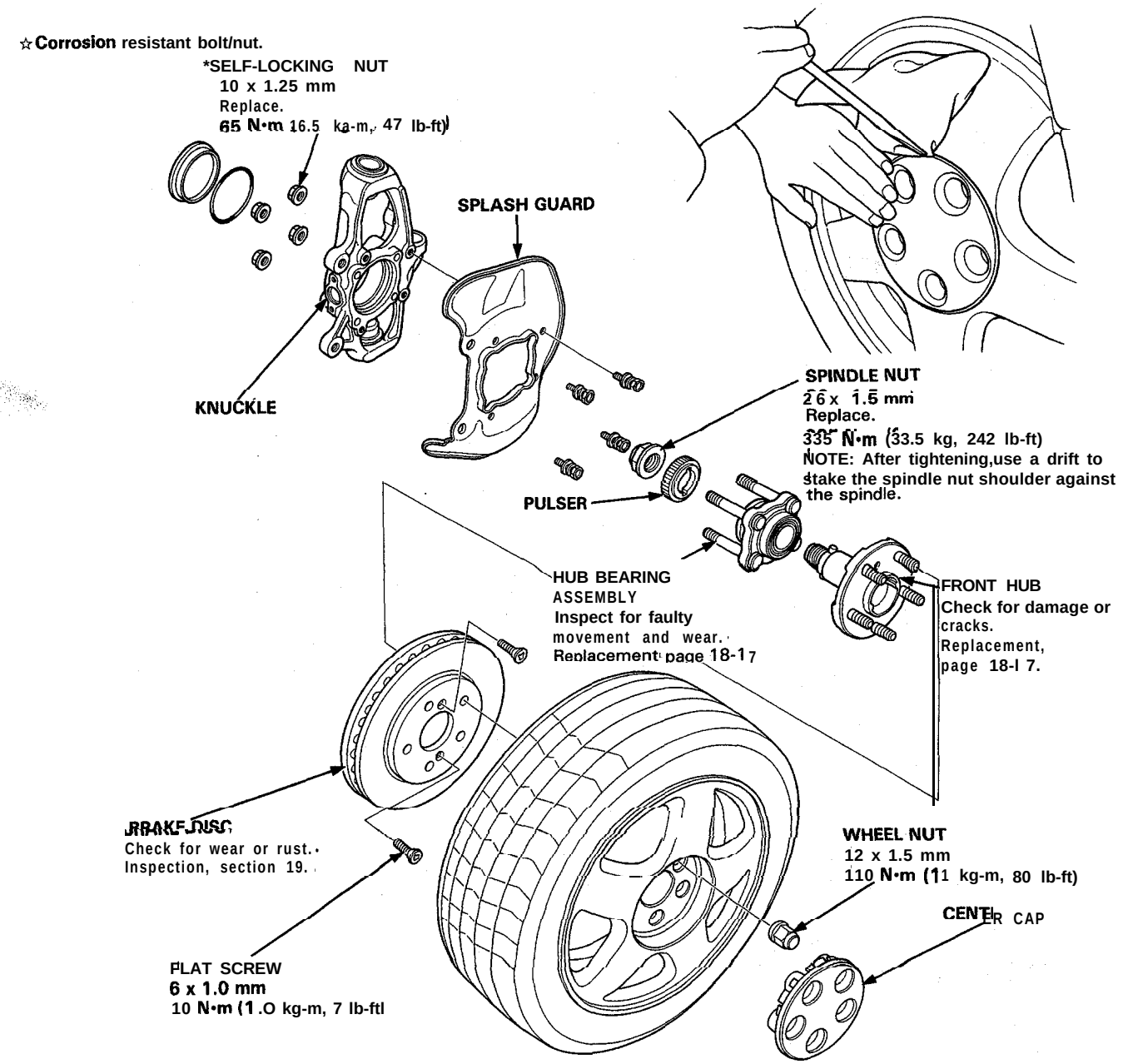


Hub Replacement

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver.Avoid damage to the cap by not allowing it to fall during removel.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.

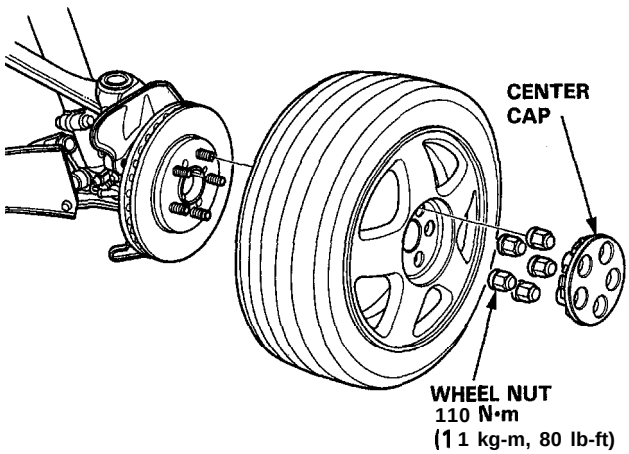
CAUTION: Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.



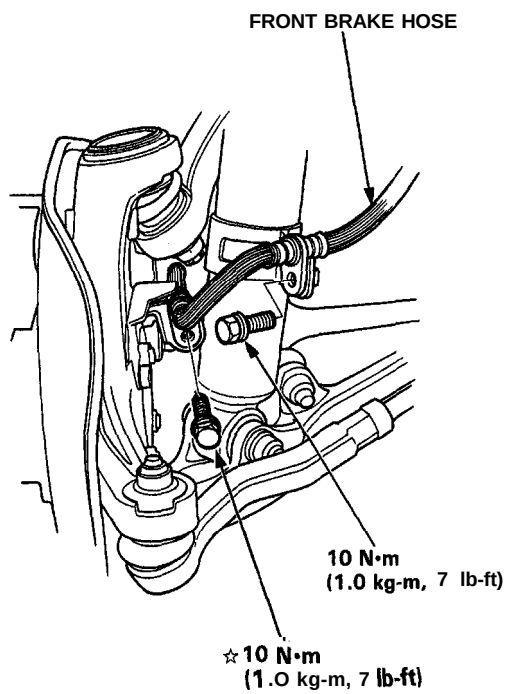
Hub Replacement

1. Loosen the wheel nuts slightly.
2. Raise the front of car and support on safety stands in proper locations (See section 1).
3. Remove the wheel nuts and wheel.

NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



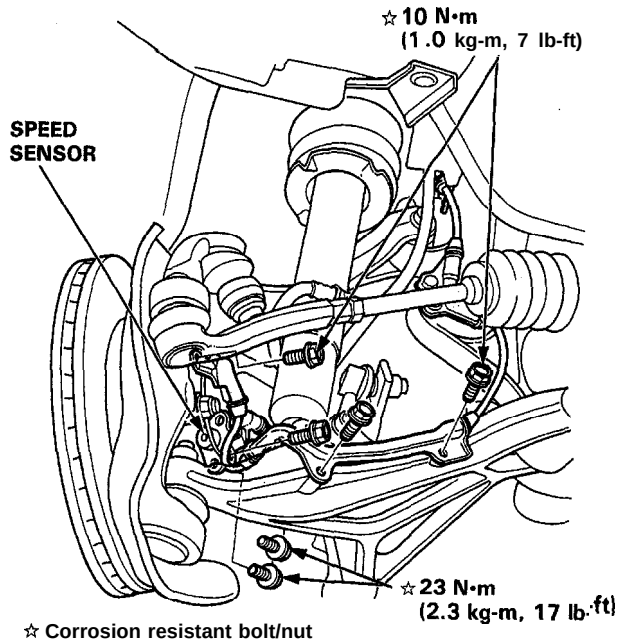
4. Remove the brake hose mounting bolts.



*Corrosion resistant bolt/nut

5. Remove the speed sensor from the knuckle and front lower control arm, but do not disconnect it.

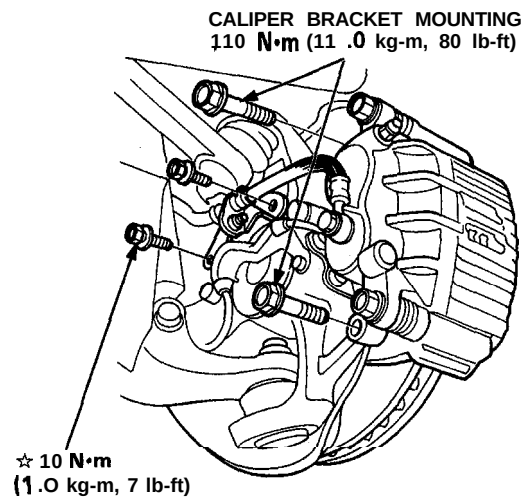
NOTE: Be careful when installing the sensors to avoid twisting wires.



☆ Corrosion resistant bolt/nut

6. Remove the caliper bracket mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental damago to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage.

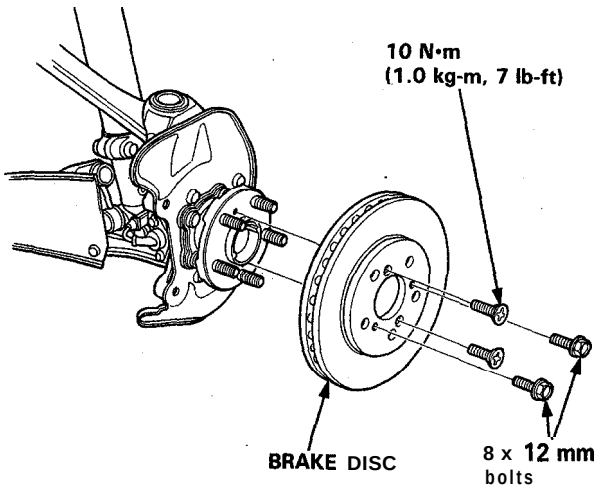


☆ Corrosion resistant bolt/nut

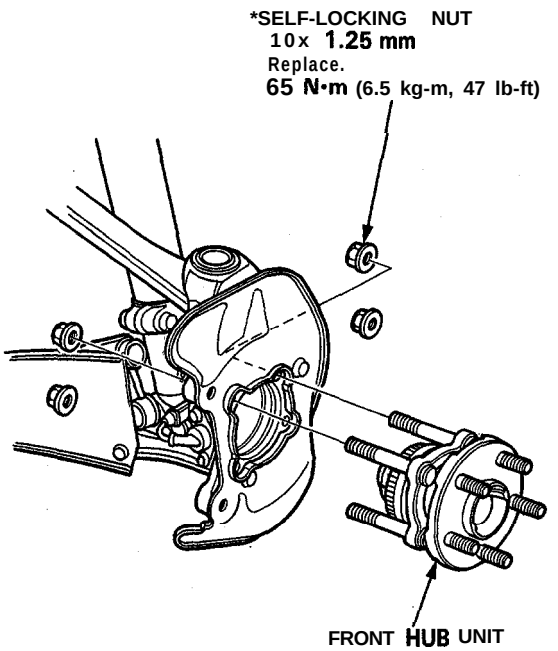
7. Remove the 6 mm brake disc retaining screws.

   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.



8. **Remove the hub unit from the knuckle.**

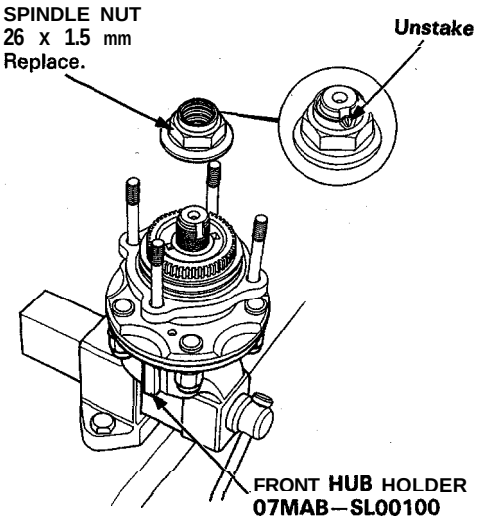


*Corrosion resistant bolt/nut

Front Wheel Bearing Replacement:

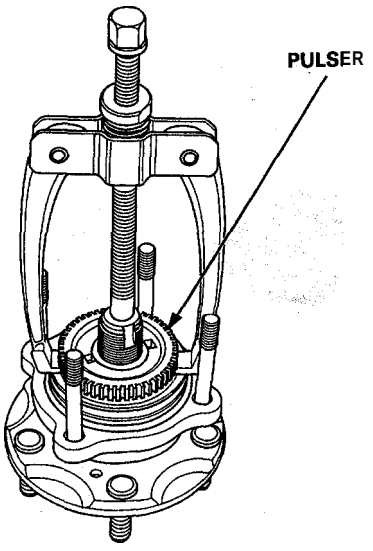
1. **Attach the special tool to the hub and tighten the nuts, then set the special tool in a vise and secure it.**

2. **Pry the spindle nut stake away from the spindle, then remove the spindle nut.**



3. Remove the special tool.

4. Remove the pulser using a commercially available bearing puller.

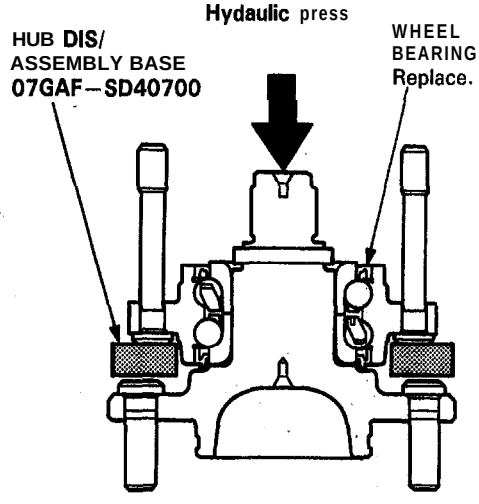


(cont'd)

Hub Replacement (cont'd)

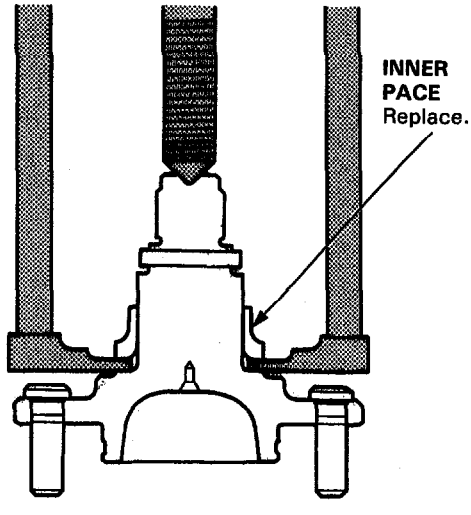
5. Separate the wheel bearing from the hub using the special tools and a hydraulic press.

CAUTION:
- Hold onto the hub to keep it from failing when pressed clear.



6. Remove the outboard bearing inner race from the hub using the a commercially available bearing puller.

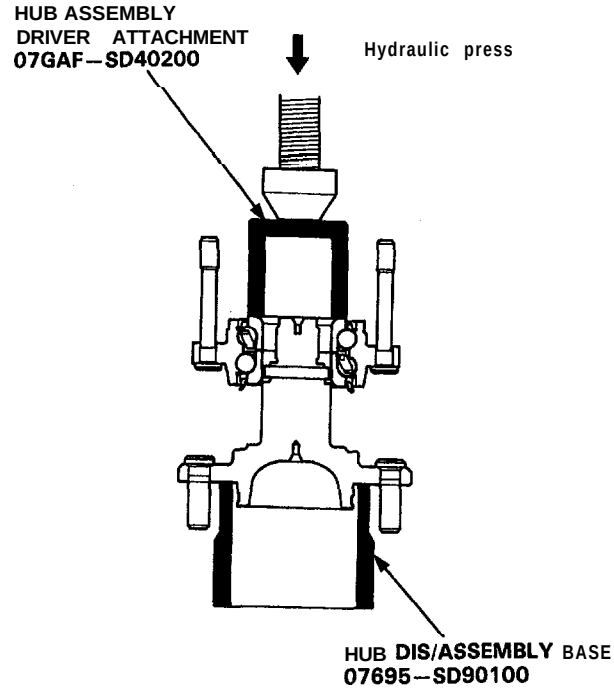
CAUTION: To prevent damage to the tool make sure the threads are fully engaged before pressing.



NOTE: Wash the bearing and hub thoroughly in high flash point solvent before reassembly.

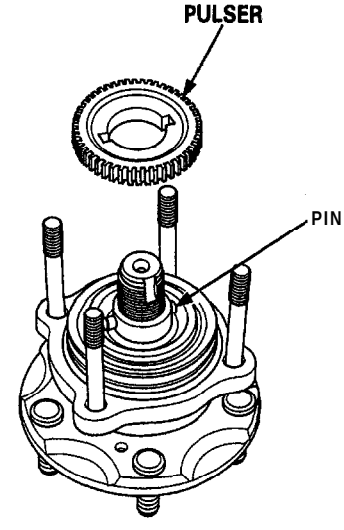
NOTE: Replace the bearing with a new one after removal.

7. Press a new wheel bearing into the hub using the special tools shown and a hydraulic press.



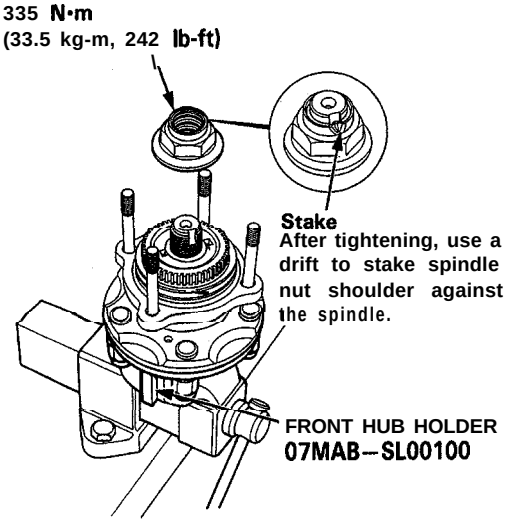
8. Install the pulser.

NOTE: Be sure the pulser engages with the pin on the spindle.



9. Attach the special tool to the hub and tighten the nuts, then set the special tool in a vise and secure it.

10. Tighten the new spindle nut to specified torque, then stake the spindle nut shoulder against the spindle.



11. Remove the special tool.

Knuckle/Control Arms/Compliance Pivot

Illustrated Index

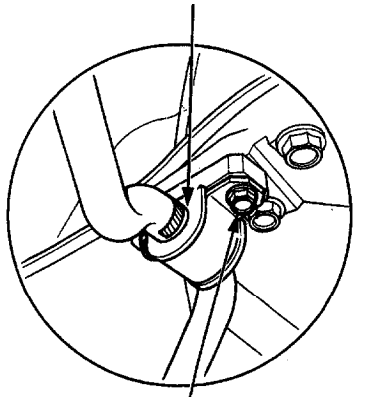
Overall Suspension

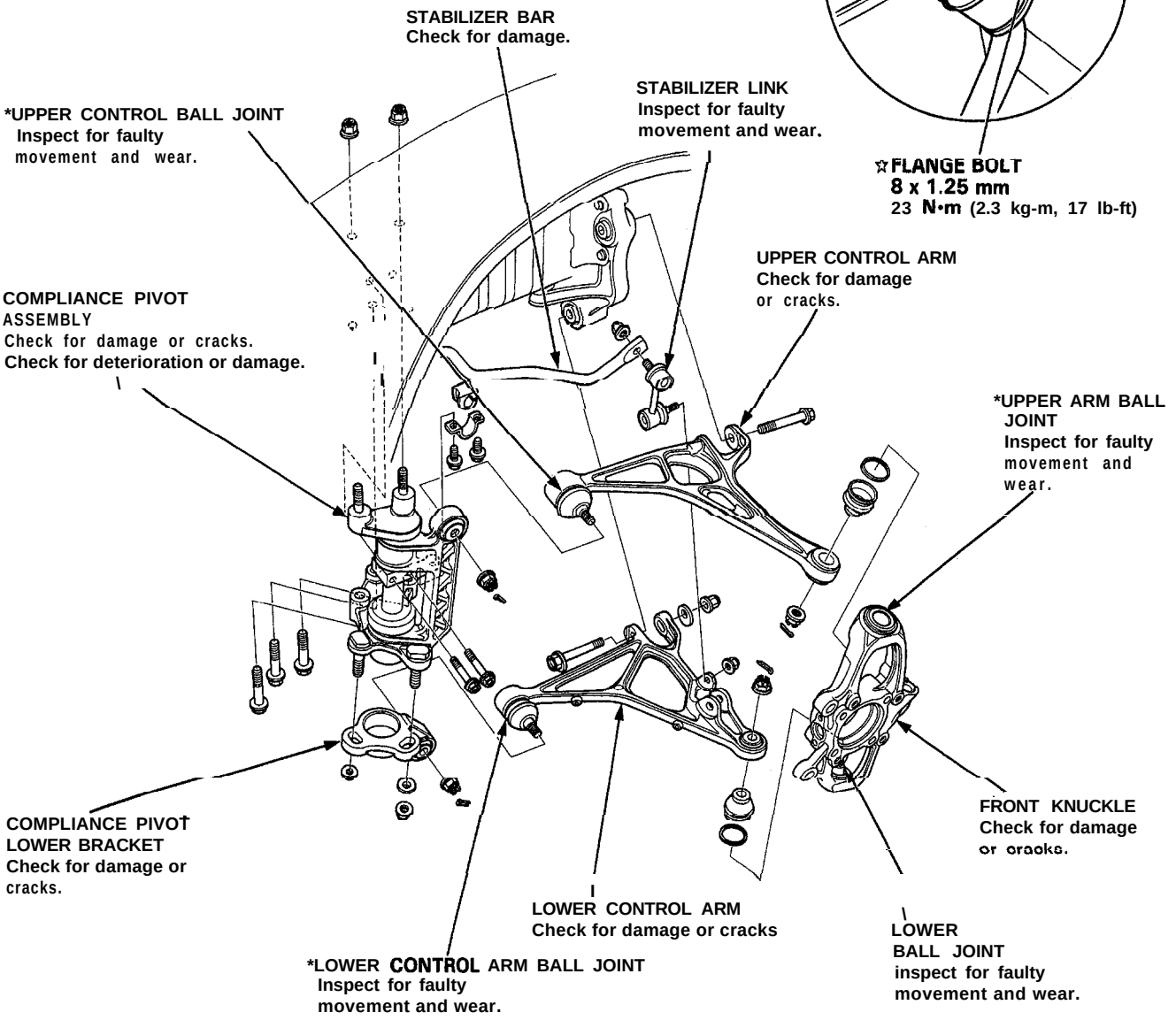
NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- Torque specifications, see page 18-14.

☆ Corrosion resistant bolt/nut

NOTE: Align the white line on the stabilizer bar with the bushing end and install the stabilizer bar.



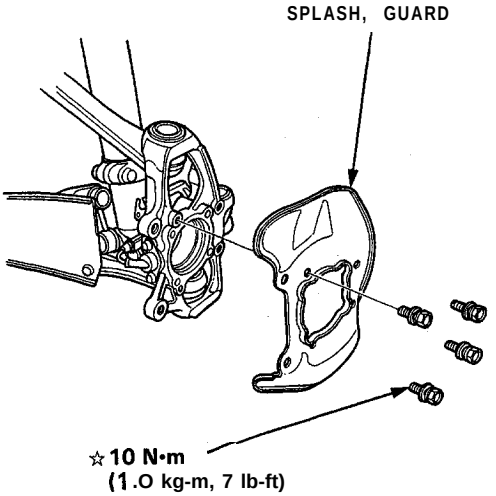


NOTE: Replace the joint boot if any are damaged. The parts marked with an asterisk (*) have a retainer attaching the ball joints. Replace the retainer whenever the boot is replaced.

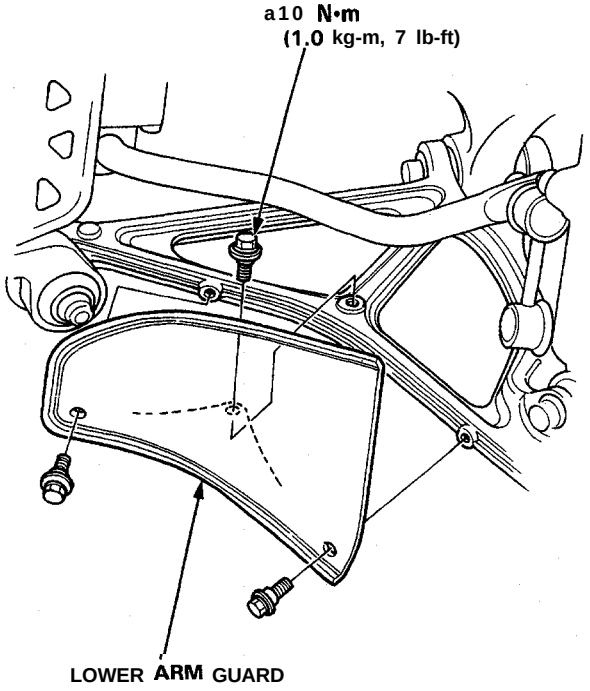
CAUTION: Do not remove the arms, knuckle, and compliance pivot by striking them with a hammer, and take care not to drop them.

Removal

1. Remove the front wheel and bearing unit assembly (page 18-I 5).
2. Remove the splash guard from the knuckle.



3. Remove the lower control arm guard.

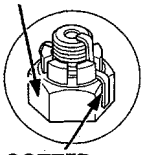


4. Remove the cotter pin and the tie-rod ball joint nut.
5. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damage by the ball joint remover.
6. Break loose the tie-rod ball joint using the special tool, then lift the tie-rod out of the knuckle.

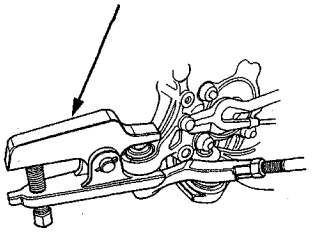
CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

☆ CASTLE NUT
55 N·m
15.5 ka-m. 40 lb-ft)



BALL JOINT REMOVER
07941-6920003



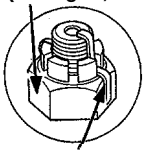
*Corrosion resistant bolt/nut

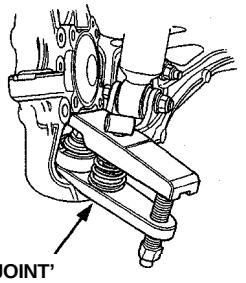
7. Remove the cotter pin and lower control arm ball joint nut.
8. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damage by the ball joint remover.
9. Separate the ball joint and lower control arm using the special tool.

CAUTION: Avoid damaging the ball joint boot.

NOTE: Use the ball joint remover (07MAC—SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

☆12 x 1.25 mm
CASTLE NUT
60 N·m
(6.0 kg-m, 43 lb-ft)





☆ Corrosion resistant bolt/nut (cont'd)

Removal (cont'd)

10. Remove the cotter pin and the upper ball joint nut.

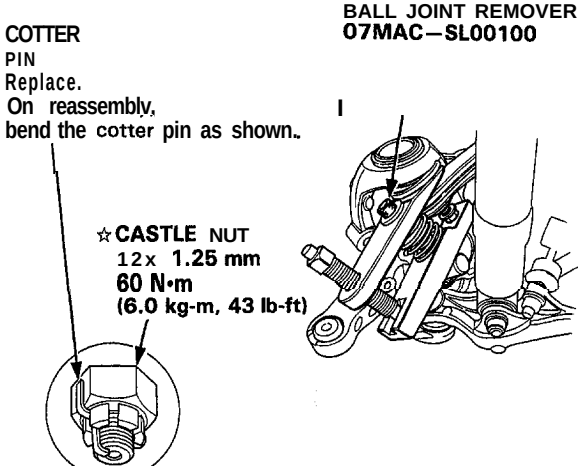
11. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

12. Break loose the upper ball joint using the special tool.

NOTE: Use the ball joint remover (07MAC–SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

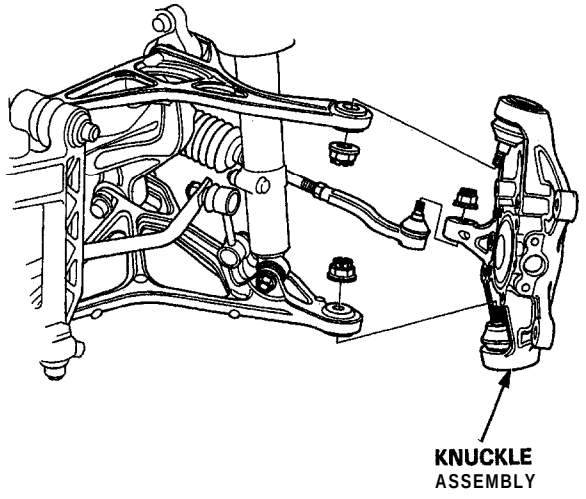
CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

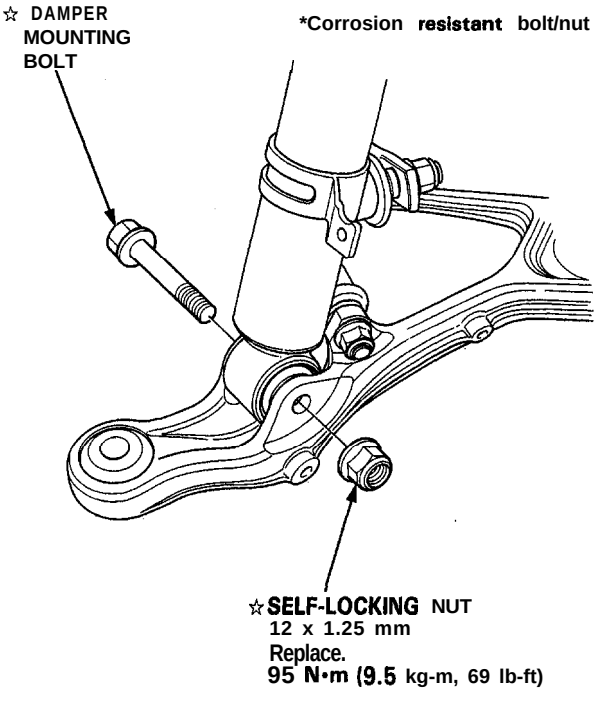


*Corrosion resistant bolt/nut

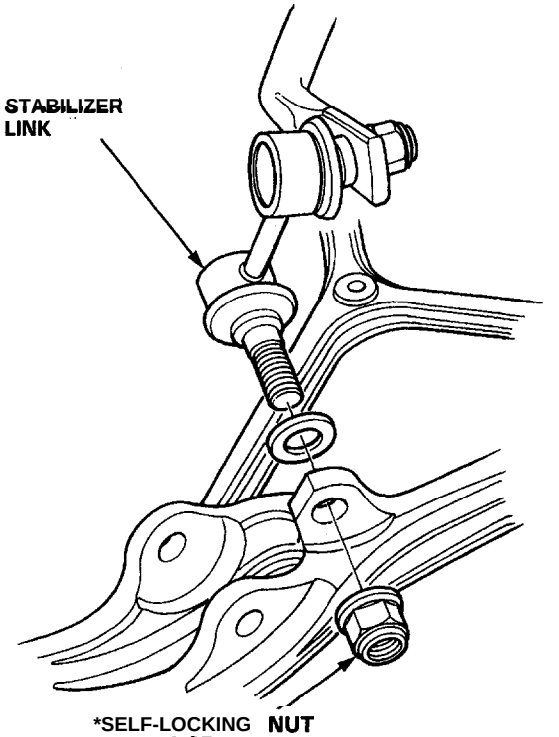
13. Remove the knuckle assembly.



14. Separate the lower control arm and damper by removing the damper mounting bolt.



15. Separate the lower control arm from the stabilizer link by removing the link connecting nut.



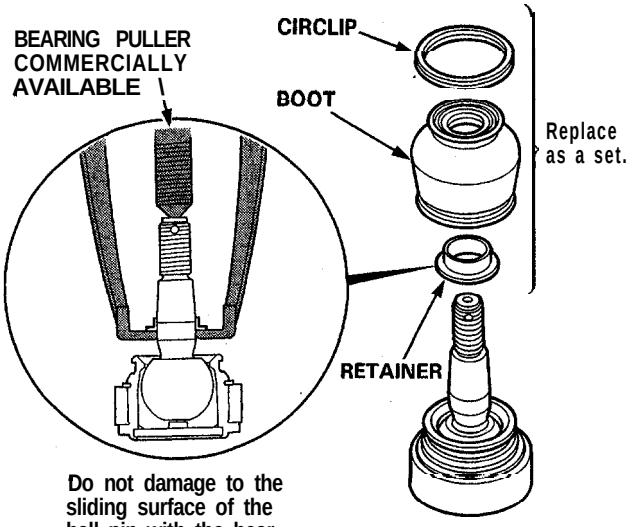
Ball Joint Boot Replacement

CAUTION: The upper control arm ball joint, lower control arm ball joint and knuckle upper ball joint are attached with the boot retainer to improve the sealing efficacy of the boot.

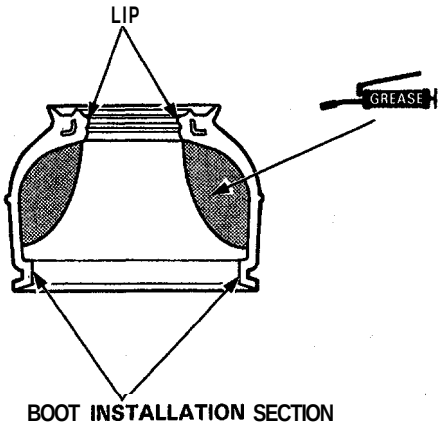
1. Remove the circlip and boot.

2. **Remove the retainer.**

   NOTE: The knuckle lower ball joint dose not have a retainer.



3. **Pack the interior of the boot and lip with grease.**



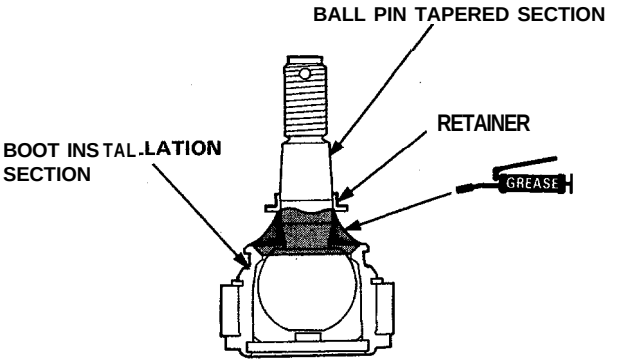
BOOT INSTALLATION SECTION

CAUTION: Do not contaminate the boot installation section with grease.

4. **Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.**

5. Insert the new retainer lightly into the ball joint pin.

   NOTE: When installing the ball joint, press the retainer into the ball joint pin.



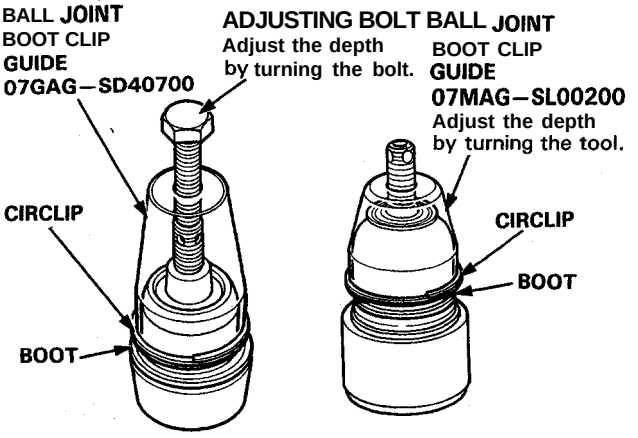
CAUTION:

- **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.**

6. Install the boot in the groove of the boot installation section securely, then bleed air.

7. **Adjust the special'tool with the adjusting bolt until the end of the tool aligns with the groove on the boot.**

8. **Slide the clip over the tool and into position.**



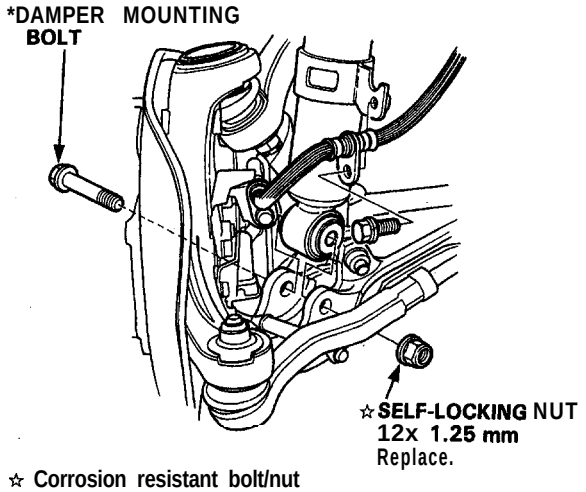
- knuckle lower ball joint only.

CAUTION: After installing the boot, check the ball pin tapered section and threads for grease contamination and wipe them if necessary.

Damper Front

Damper Removal

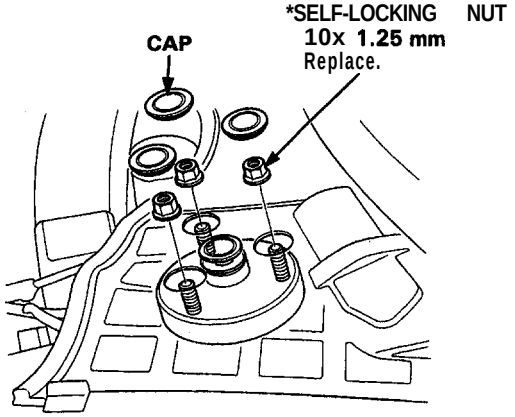
1. Remove the front wheel.
2. Remove the brake hose clamps form the damger.
3. Separate the damper and lower arm by removing the damper mounting bolt.



☆ Corrosion resistant bolt/nut

4. Remove the caps from the top of the cowl then remove the self-locking nuts.
5. Remove the damper assembly.

☆ Corrosion resistant bolt/nut

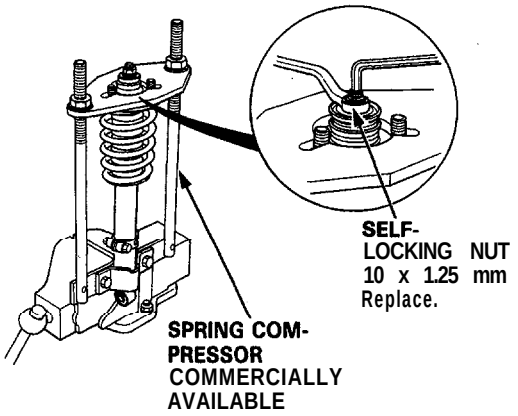


Damper Disassembly/Inspection

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 nut.

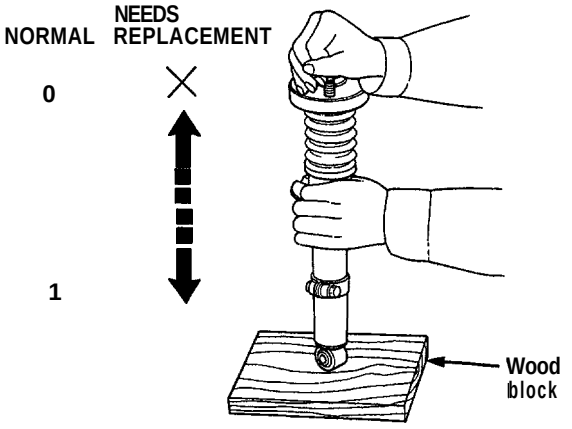


2. Remove the spring compressor then disassemble the damper as shown on the next page.

Inspection:

1. Reassemble all parts, except the spring.
2. Push on the damper assembly as shown.
3. Check for smooth operation through a full stroke, both compression and extension.

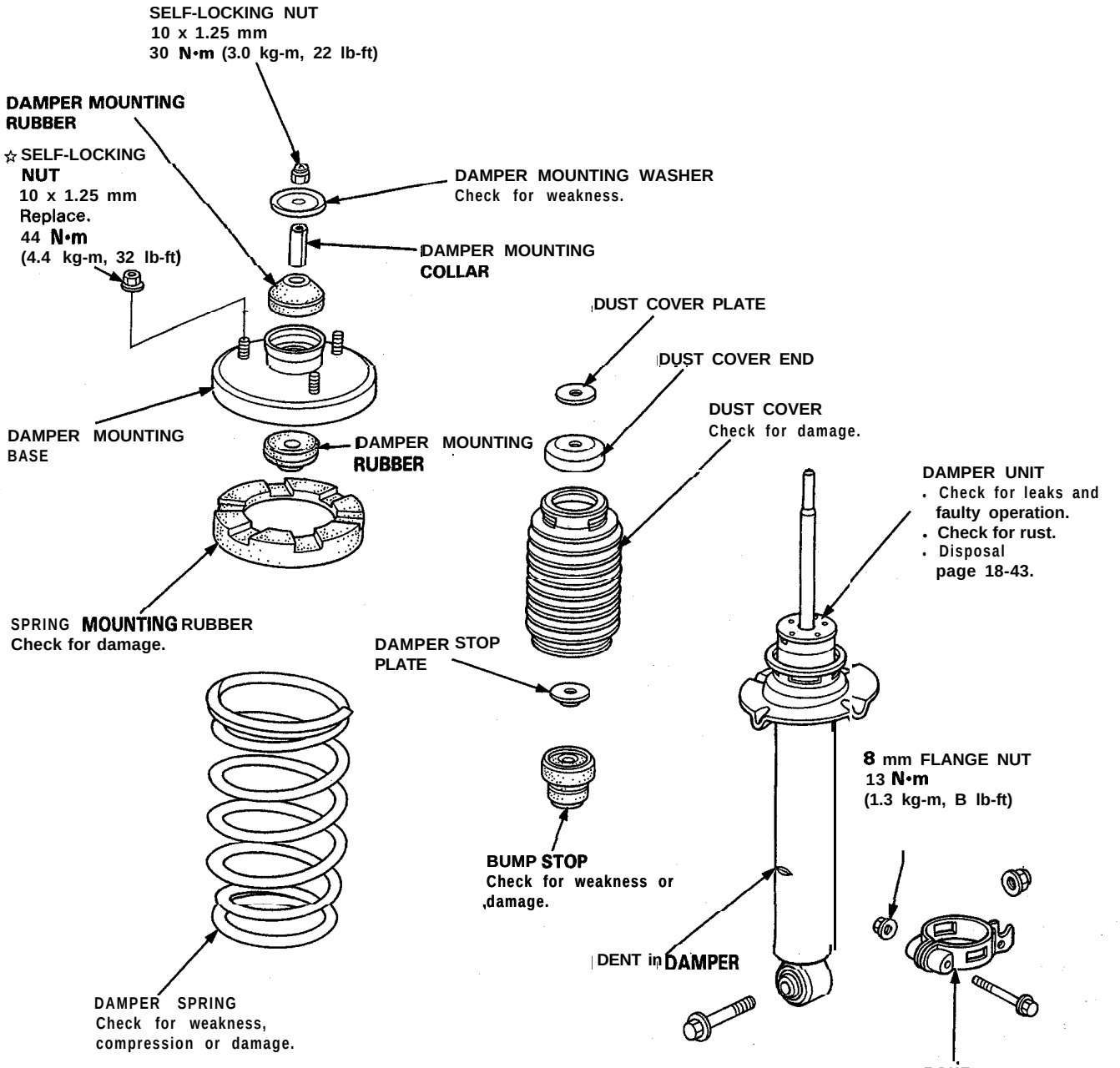
   NOTE: The damper should move smoothly. If it does not (no compression or no extension), then gas is leaking, and the damper should be replaced.



4. Check for oil leaks, abnormal noises or binding during these tests.

NOTE: Disposal is see page 18-43.

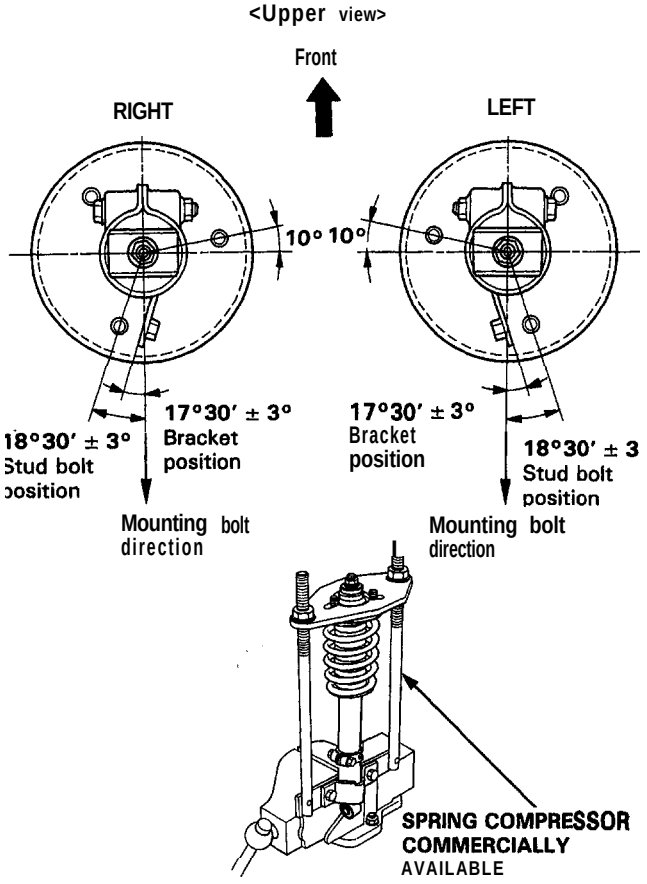
Inspecton



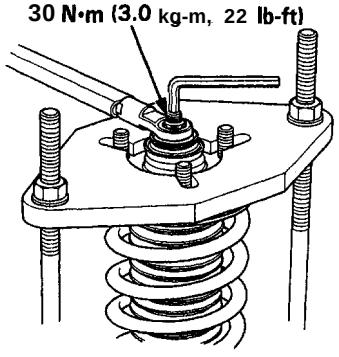
*Corrosion resistant bolt/nut

Damper Reassembly

1. Install the damper unit, damper spring, bump stop, bump stop plate, dust cover, dust cover end, dust cover plate, spring mounting rubber, damper bushings, and collar on the spring compressor.
2. Install the damper mounting base on the damper unit as shown.

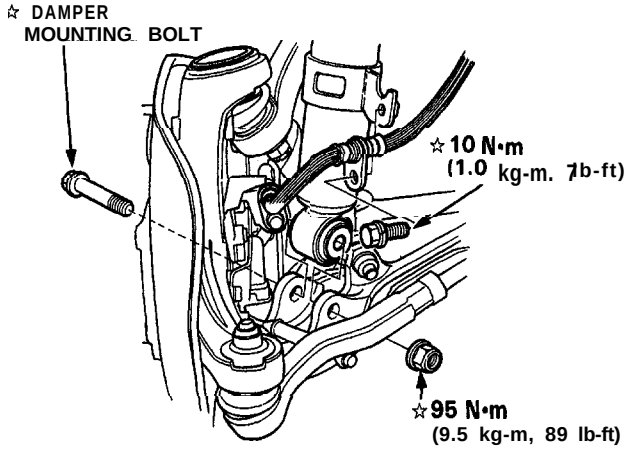


3. Compress the damper spring.
4. Install the damper mount washer and a new self-locking nut 10 mm.
5. Hold the damper shaft and tighten the 10 mm self-locking nut.



Damper Installation

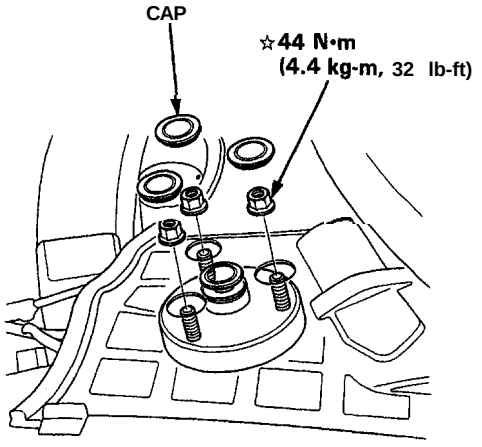
1. Reposition the damper on the frame with the welded nut of the. hose bracket facing outside as shown.



*Corrosion resistant bolt/nut

2. install the damper end on the lower arm and loosely tighten the mounting nut.

   NOTE: The bolts and nuts should be tightened with the vehicle's weight on the damper.
3. Secure the damper mounting bolt using a new self-locking nut.
4. Secure the damper assembly to the frame with the new three self-locking nuts.
5. Install the caps in the top of the cowl.



☆Corrosion resistant bolt/nut

6. Install the brake hose clamps with the two bolts.

Torque Specifications

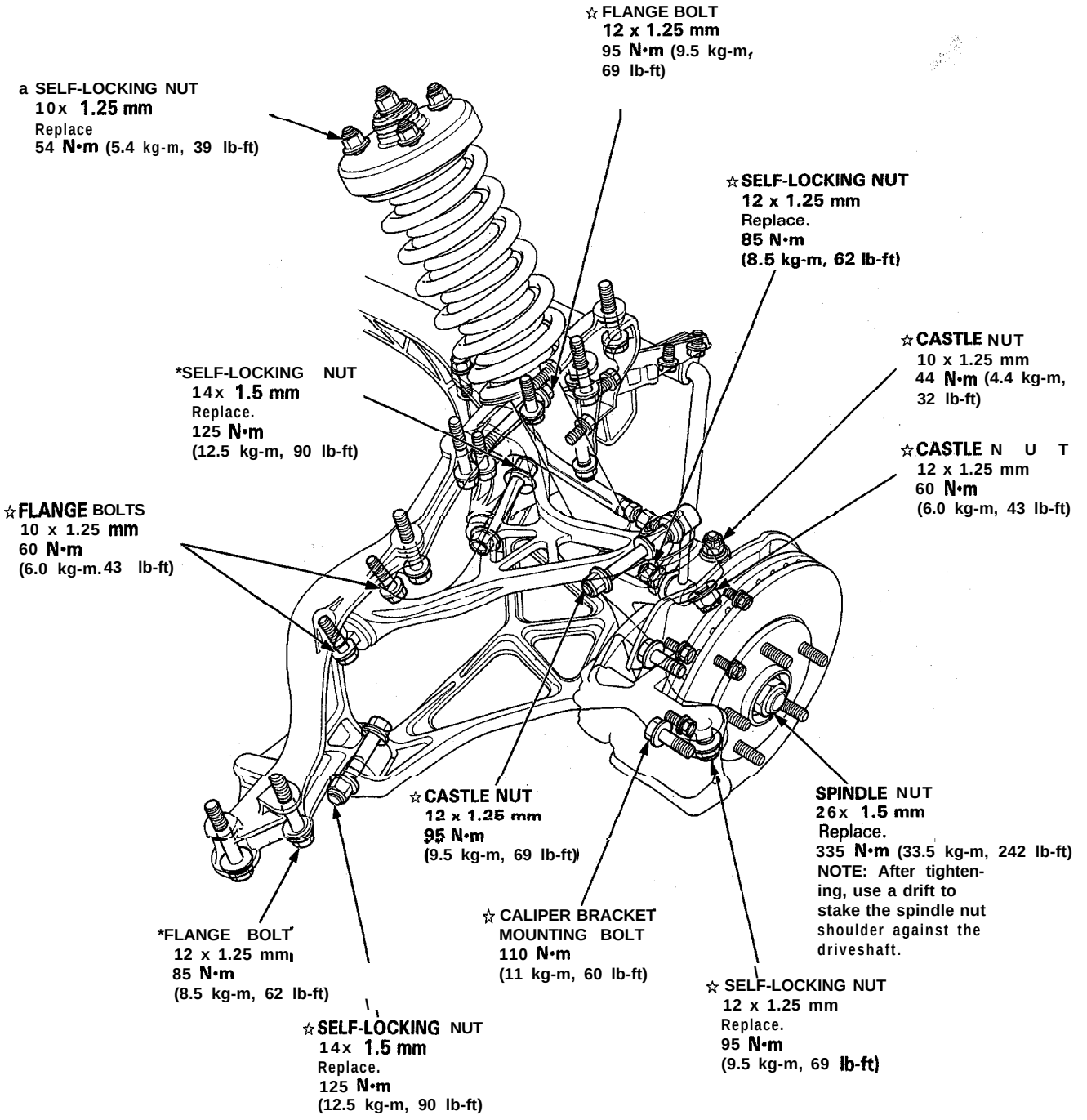
CAUTION:

- Replace the self-locking nuts after removal.
- Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts. (It should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).

The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

*Corrosion resistant bolt/nut



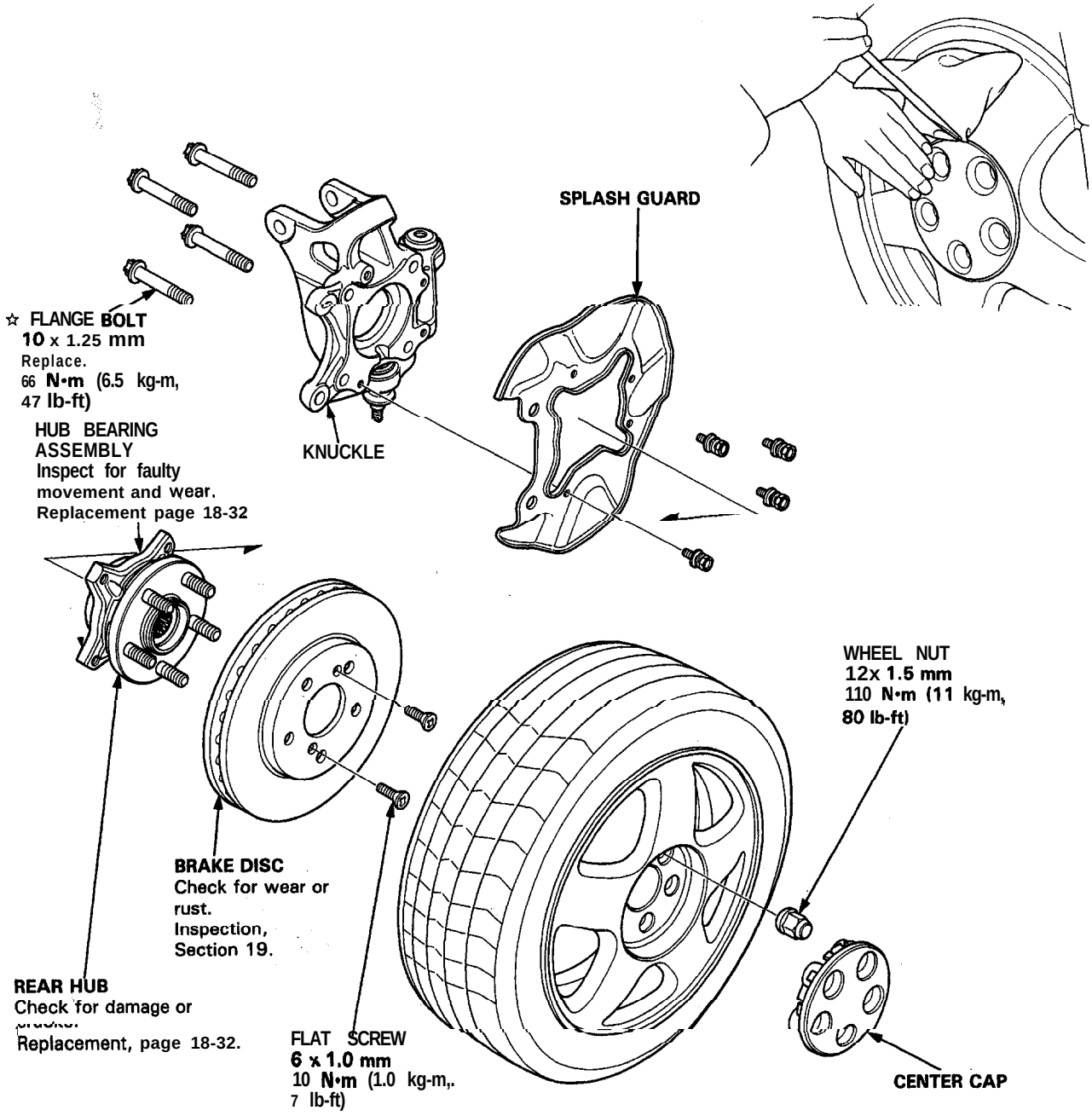
Rear Suspension

Hub Replacement

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.

CAUTION: Use a rag at the point you are goint to pry, because aluminum alloy wheels can be easily damaged.

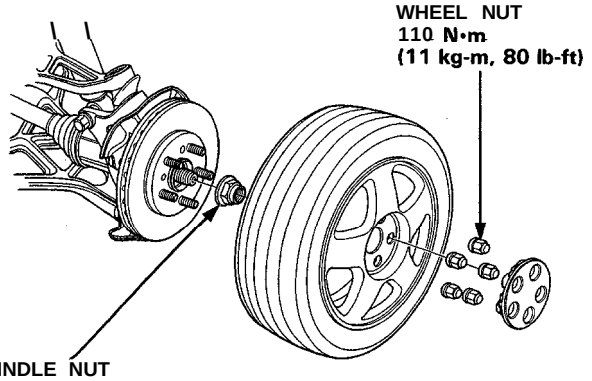


*Corrosion resistant bolt/nut

Hub Replacement

1. Remove the center cap, then pry the spindle nut lock tab away from the spindle and loosen the nut.

2. Raise the car and support it with safety stands (see Section 1).



After tightening, use a drift to stake spindle nut shoulder against the driveshaft.

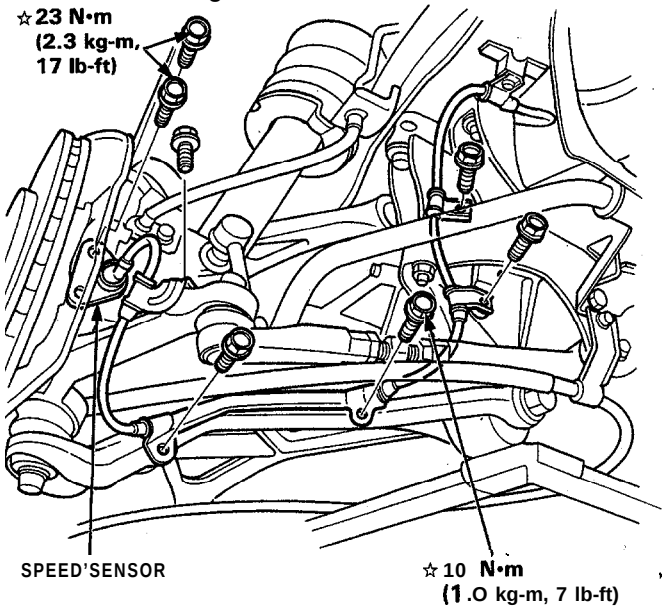
3. Remove the rear wheels.

NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.

4. Remove the spindle nut.

5. Remove the speed sensor from the knuckle and rear lower control arm, but do not disconnect it.

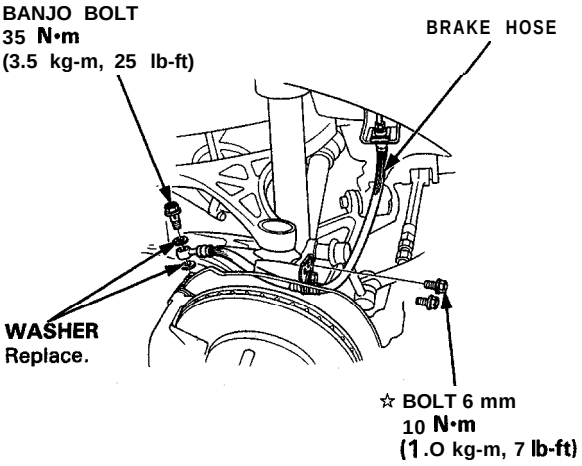
NOTE: Be careful when installing the sensors to avoid twisting wires.



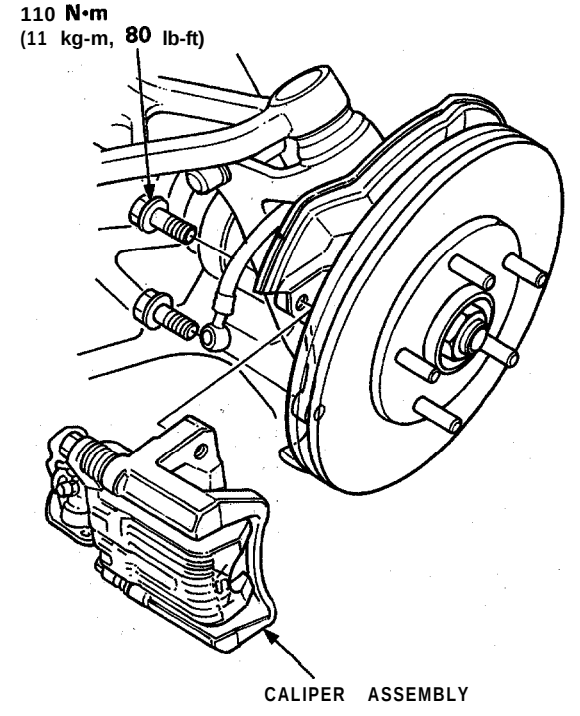
a Corrosion resistant bolt/nut

6. Remove the banjo bolt and disconnect the brake hose, then remove the brake hose clamp from the knuckle.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish;
Wash spilled brake fluid off immediately with clean water.



7. Remove the rear caliper by removing the mounting bolts.



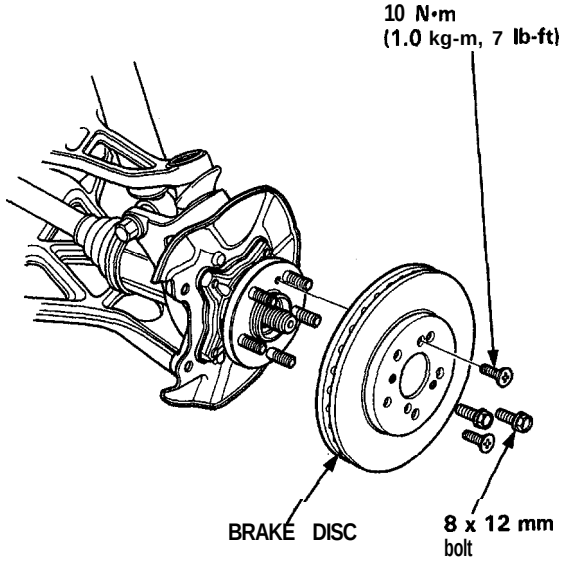
☆ Corrosion resistant bolt/nut

(cont'd)

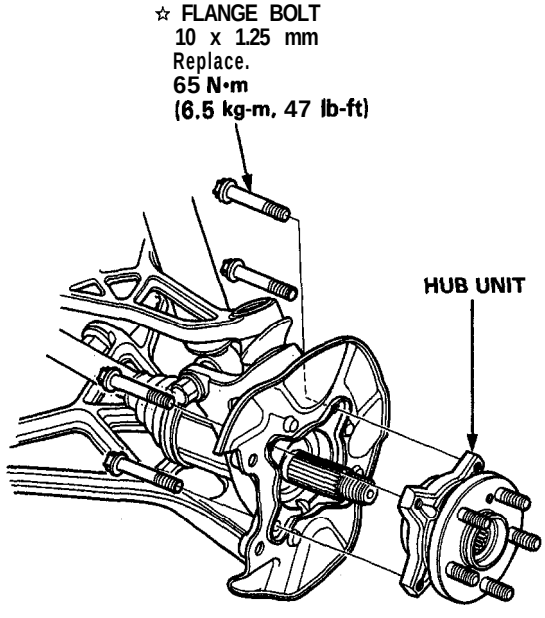
Hub Replacement (cont'd)

8. Remove the 6 mm brake disc retaining screws. '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 disc excessively.



9. Remove the hub unit from the knuckle.

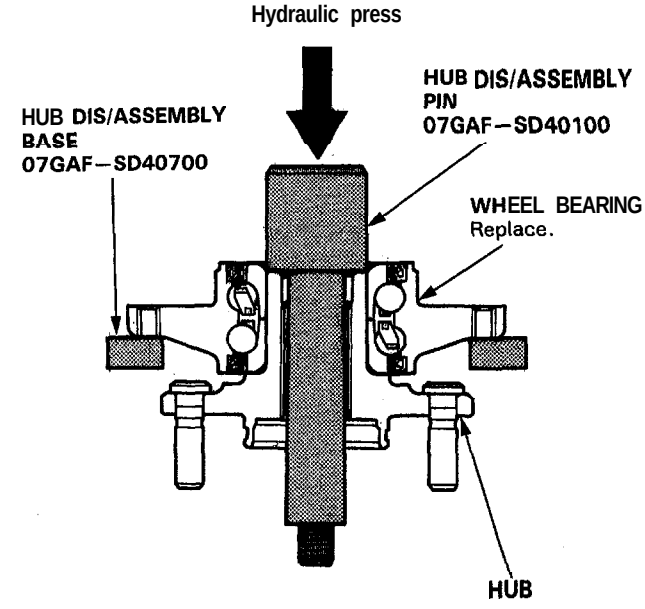


☆ Corrosion resistant bolt/nut

Rear Wheels Bearing Replacement:

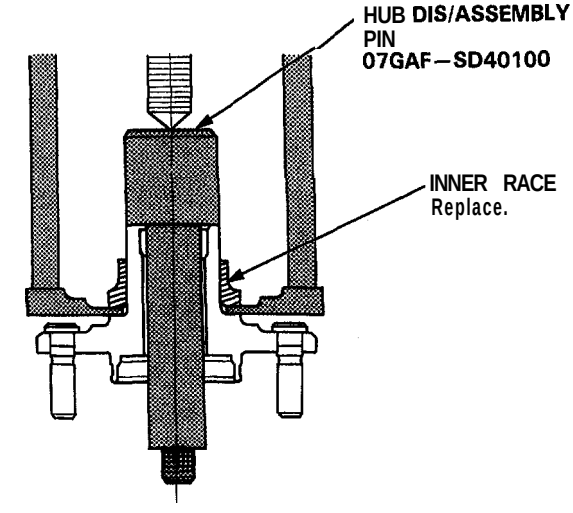
1. Separate the wheel bearing from the hub using the special tools and a hydraulic press.

   CAUTION:
   - Hold onto the hub to keep it from failing when pressed clear.



2. Remove the outboard bearing inner race from the hub using the a commercially available bearing puller.

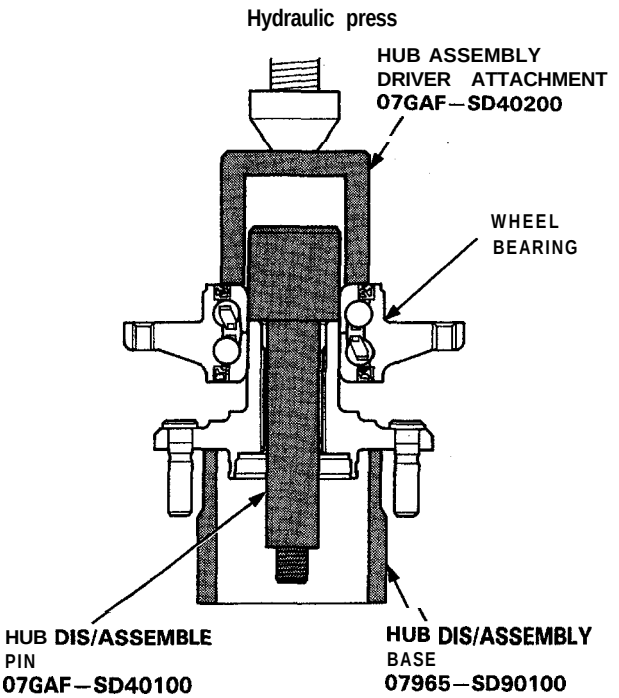
   CAUTION: To prevent damage to the tool make sure the threads are fully engaged before pressing.



NOTE: Wash the bearing and hub thoroughly in high flash point solvent before reassembly.

NOTE: Replace the bearing with a new one after removal.

3. **Press a new wheel bearing into the hub using the** special tools shown and a hydraulic press.



4. Install in reverse order of removal.

Knuckle/Control Arms

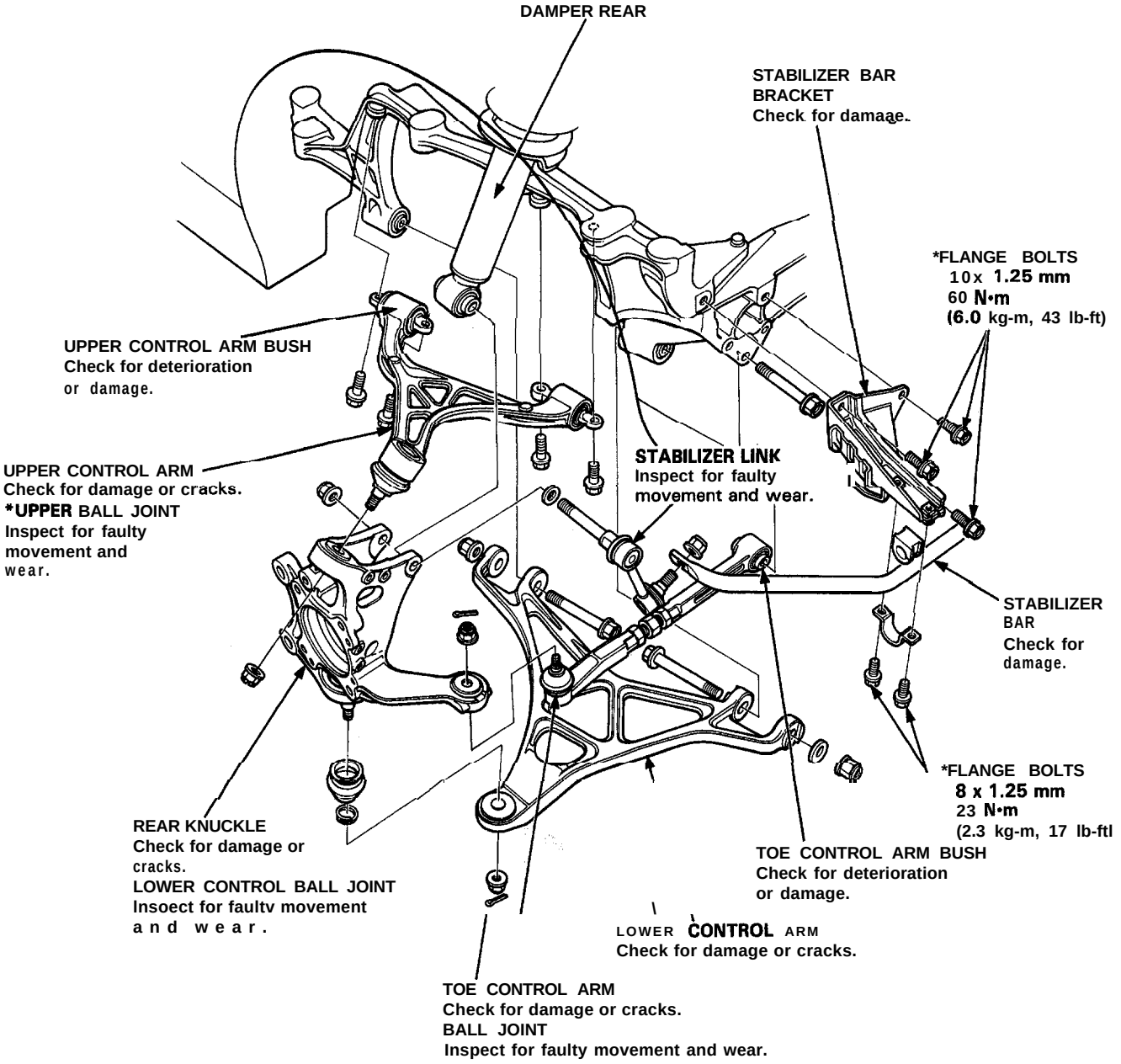
Illustrated Index

Overall Suspension

NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- Torque specifications, see page 18-29.
- Align the white line on the stabilizer bar with the bushing end and install the stabilizer bar.

*Corrosion resistant bolt/nut



NOTE: Replace the joint boot if any are damaged. The parts marked with an asterisk (*) have a retainer attaching the ball joints. Replace the retainer whenever the boot is replaced.

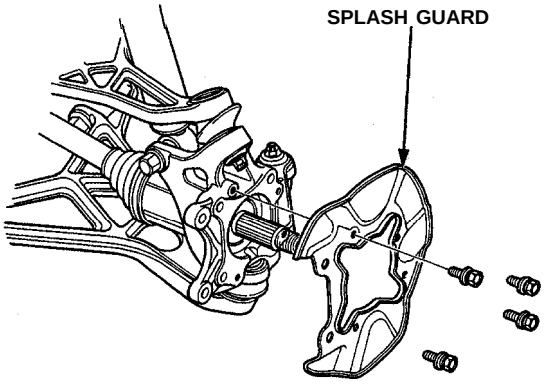
CAUTION:

- Do not remove the arms and knuckle by striking them with a hammer, and take care not to drop them.
- Make sure that the reference marks on the toe control arm are aligned.

- Removal

1. Remove the rear wheel and bearing unit assembly (page 18-30).

2. Remove the splash guard from the knuckle.

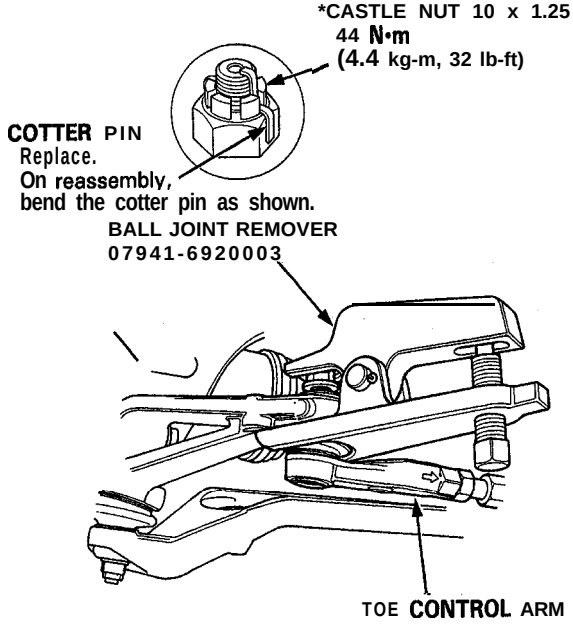


3. Remove the cotter pin from the castle nut of the toe control arm.

4. Install the 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.

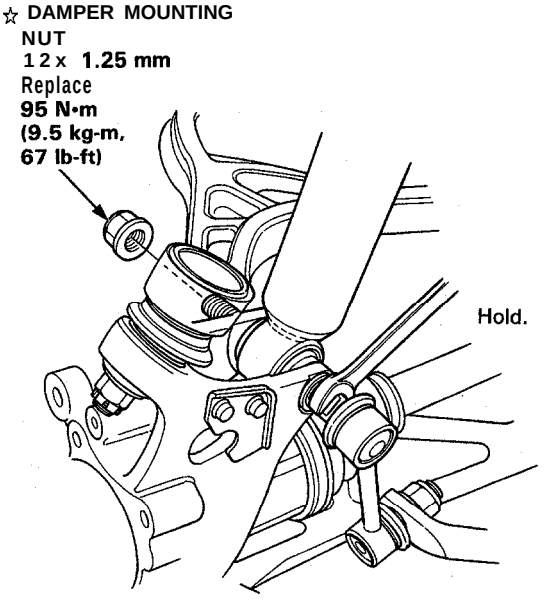
5. Position the special tool between the knuckle and toe control arm as shown, and separate the toe control arm.

CAUTION: Be careful not to damage the ball joint boot.



☆ Corrosion resistant bolt/nut

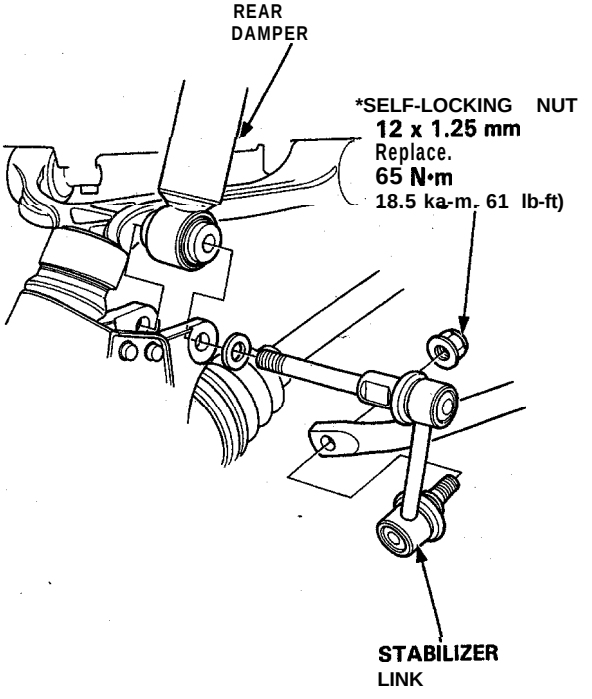
6. Hold the stabilizer link with the wrench and remove the damper mounting nut.



*Corrosion resistant bolt/nut

7. Remove the stabilizer link from the stabilizer bar and knuckle.

☆ Corrosion resistant bolt/nut



(cont'd)

Removal (cont'd)

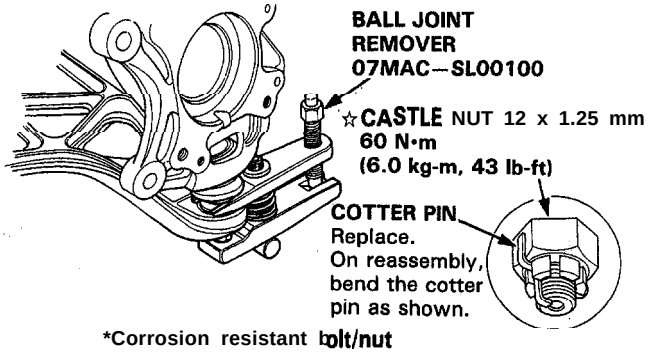
8. Remove the cotter pin from the castle nut of the lower control arm ball joint and remove the nut.

9. 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 ball joint remover.

10. Position the special tool between the knuckle and lower control arm as shown, and separate the lower arm.

NOTE: Use the ball joint remover (07MAC–SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

CAUTION: Be careful not to damage the ball joint boot.



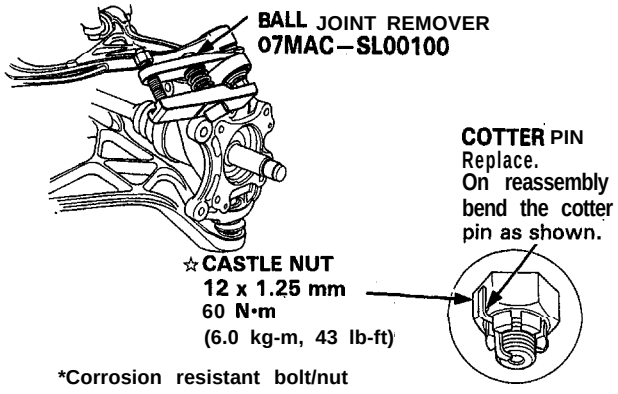
*Corrosion resistant bolt/nut

11. Remove the cotter pin from the castle nut of the upper control arm ball joint and remove the nut.

12. 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 ball joint remover.

13. Position the special tool between the knuckle and upper control arm as shown.

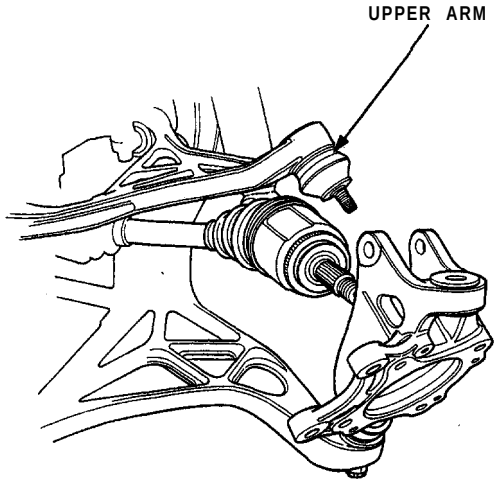
CAUTION: Be careful not to damage the ball joint boot.



*Corrosion resistant bolt/nut

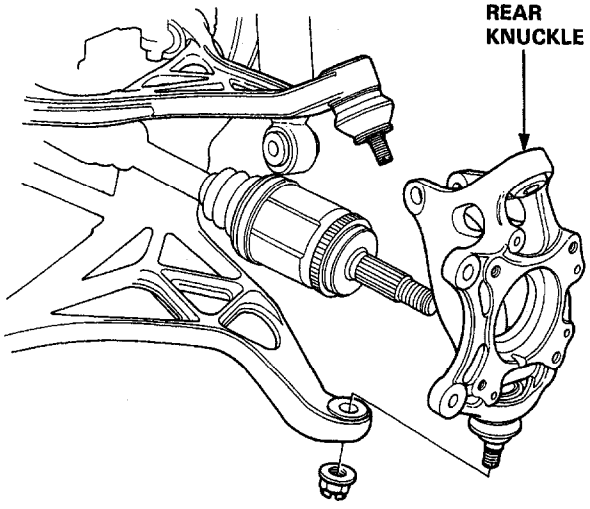
14. Separate the knuckle from the upper control arm and driveshaft outboard joint.

NOTE: Do not remove the driveshafts from the differential case or intermediate shaft.



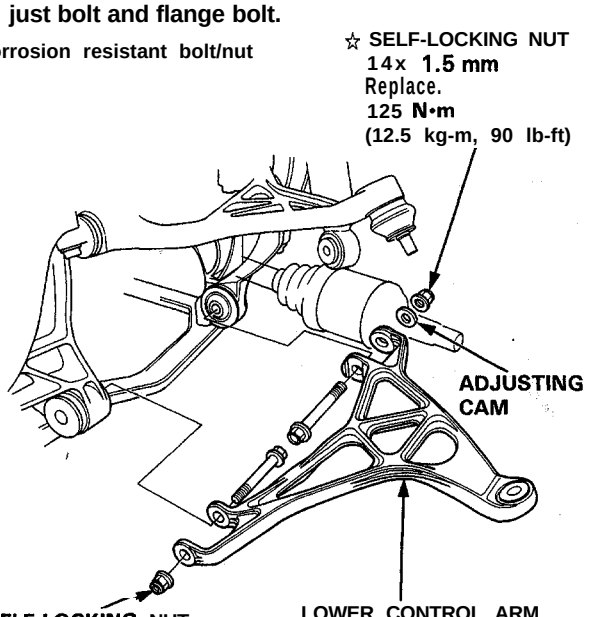
NOTE: Tie plastic bags over the driveshaft ends.

15. Remove the knuckle assembly from the lower control arm.

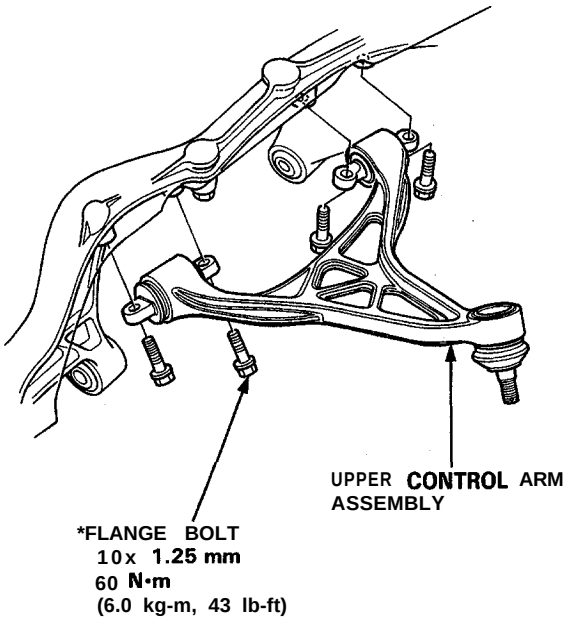


16. Remove the lower control arm by removing the adjust bolt and flange bolt.

*Corrosion resistant bolt/nut

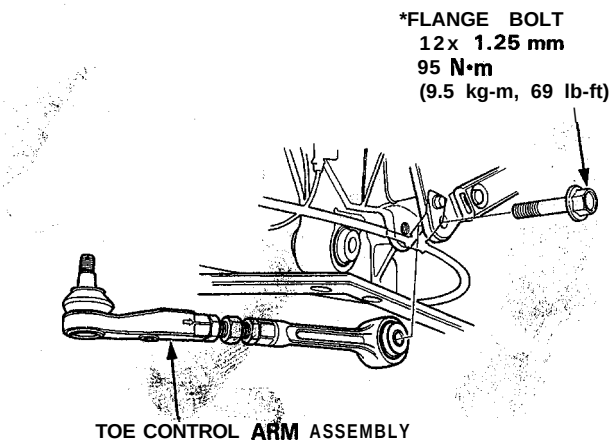


17. Remove the upper control arm by removing the flange bolts.



*Corrosion resistant bolt/nut

18. Remove the toe control arm.



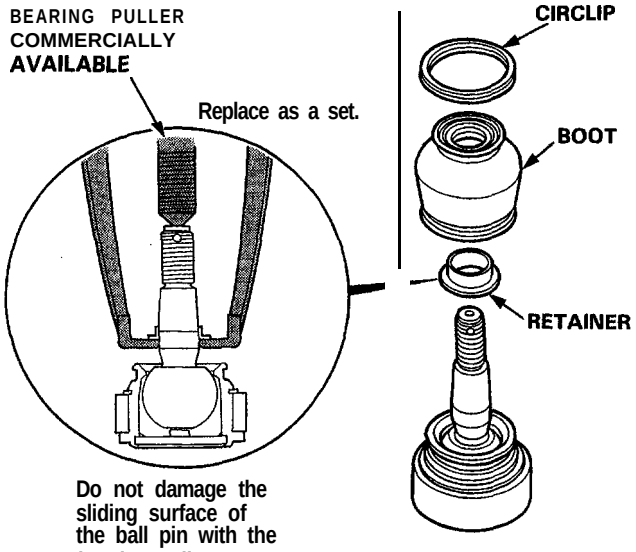
CAUTION: Make sure that the reference marks on the toe control arm are aligned.

Knuckle/Control Arms

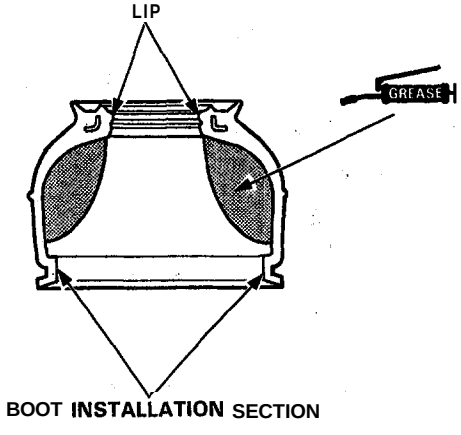
Ball Joint Boot Replacement

NOTE: The upper control arm ball joint is attached with the boot retainer to improve the sealing efficacy of the boot.

1. **Remove the circlip and boot.**
2. Remove the retainer (upper ball joint only).



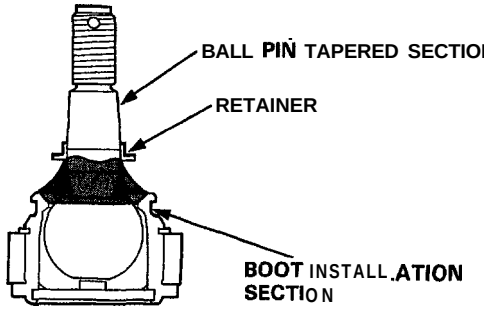
3. **Pack the interior of the boot and lip with grease.**



CAUTION: Do not contaminate the boot installation section with grease.

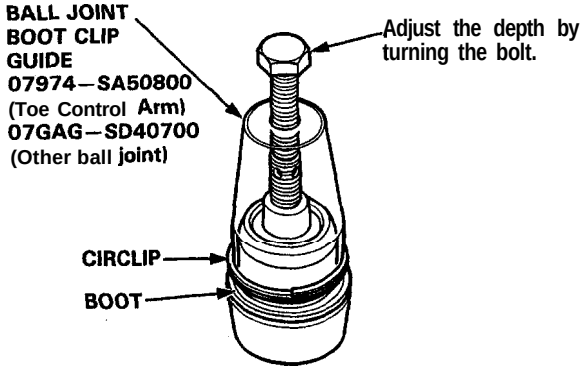
4. **Wipe the grease off the sliding surface of the ball pin and pack with fresh grease (upper ball joint only).**
5. Insert the new retainer lightly into the ball joint pin.

NOTE: When installing the ball joint, press fit the retainer into the ball joint pin.



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.

6. Install the boot in the groove of the boot installation section securely, then bleed air.
7. **Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot.**
8. **Slide the clip over the tool and into position.**



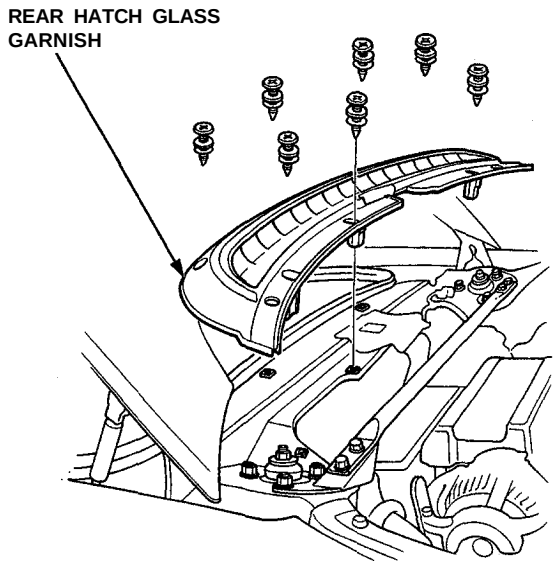
- Upper control arm ball joint
- Knuckle lower ball joint
- Toe control arm ball joint

CAUTION: After installing the boot, check the ball pin tapered section and threads for grease contamination and wipe them if necessary.

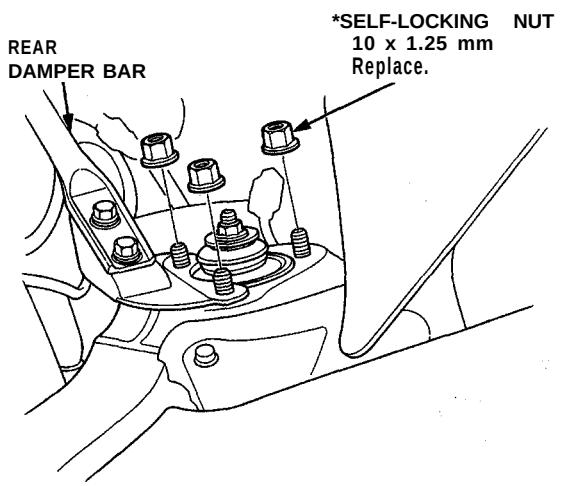
Damper Rear

Removal

1. Remove the rear wheel.
2. Remove the lower rear hatch glass garnish.

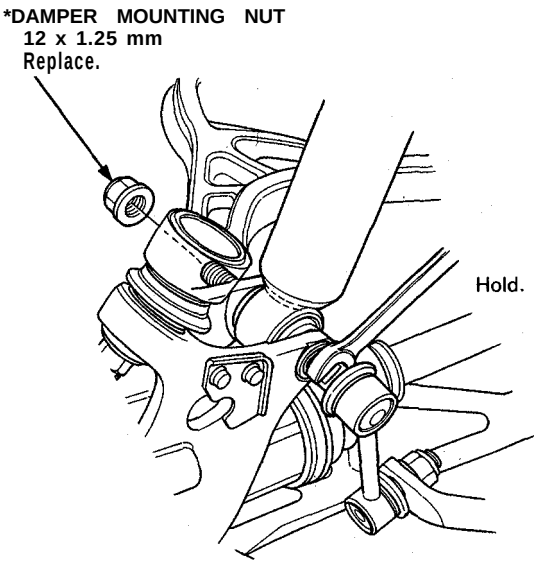


3. Remove the three self-locking nuts.
4. Remove the rear damper bar.



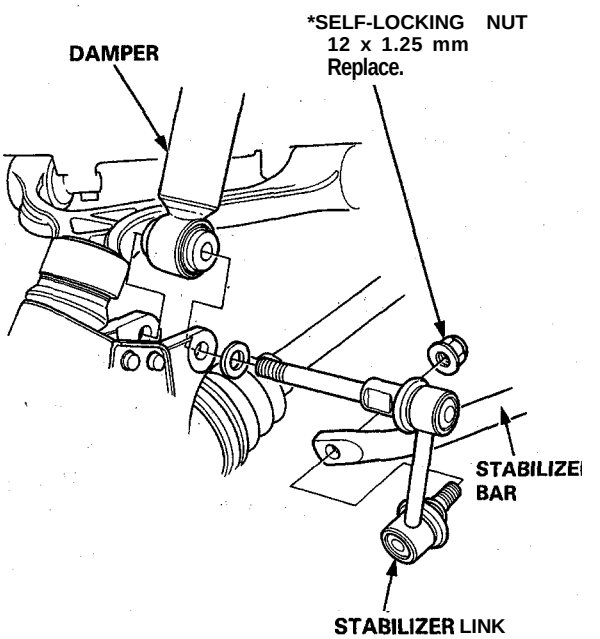
*Corrosion resistant bolt/nut

5. Hold the stabilizer link with a wrench and remove the damper mounting nut.



*Corrosion resistant bolt/nut

6. Remove the stabilizer link from the stabilizer bar and knuckle.
7. Remove the rear damper assembly.



☆ Corrosion resistant bolt/nut

Damper Rear

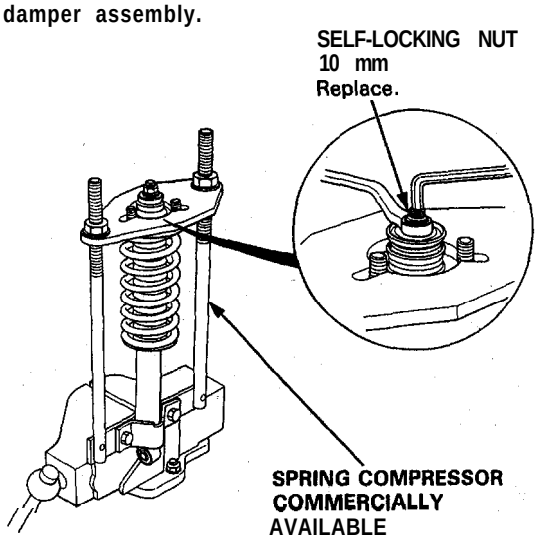
Damper Disassembly/Inspection

Disassemblv:

1. Compress the damper spring with the spring compressor according to the manufacture's instructions.

   CAUTION: Do not compress the spring more than necessary to remove the 10 mm flange nut.

2. **Remove the 10 mm self-locking nut from the damper assembly.**

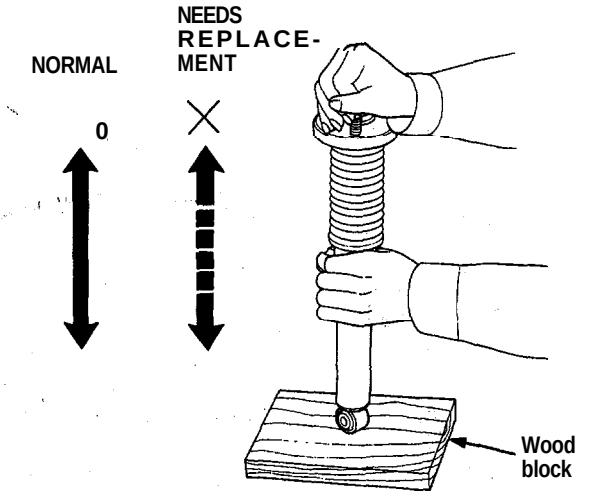


3. **Remove the spring compressor and disassembly the damper as shown on page 18-41.**

Inspection:

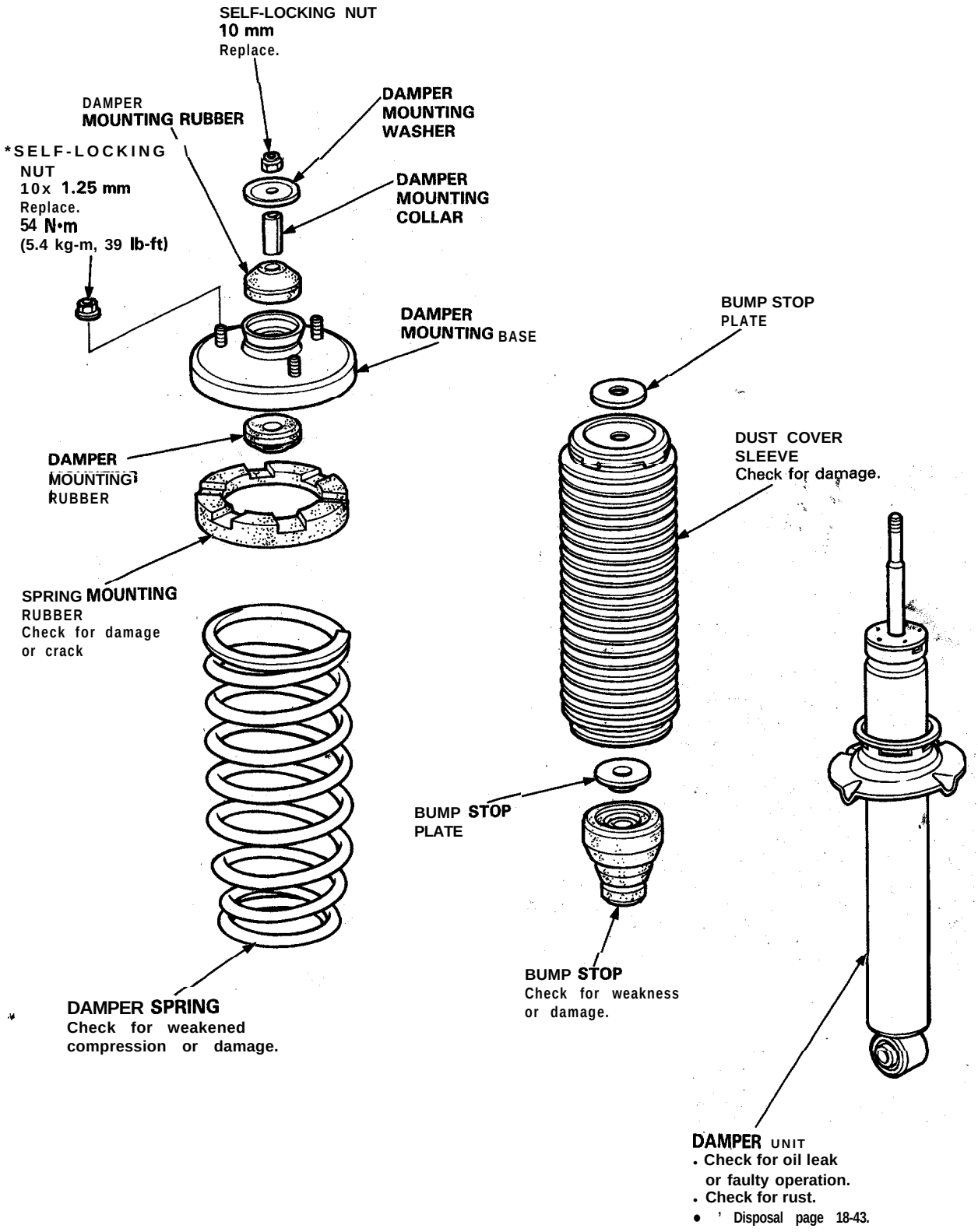
1. Reassemble all parts, except the spring.
2. Push on the damper assembly as shown.
3. **Check for smooth operation through a full stroke,** both compression and extension.

   NOTE: The damper should move smoothly. If it does not (no compression or no extension), then gas is leaking, and the damper should be replaced.



4. Check for oil leaks, abnormal noises or binding during these tests.

Inspection

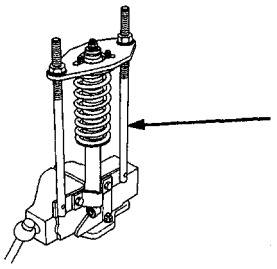


*Corrosion resistant bolt/nut

Damper Rear

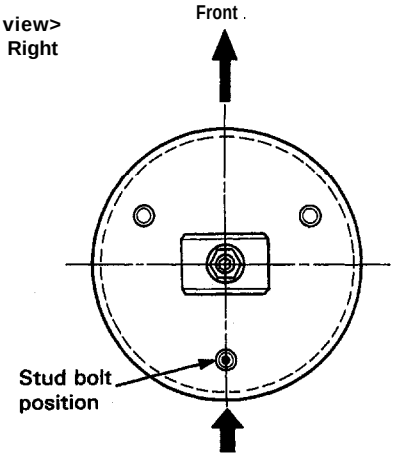
Reassembly

1. Install the damper unit on a spring compressor.
2. Install the bump stop, bump stop plate, dust cover sleeve, damper spring, bump stop plate, damper mounting collar, damper mounting rubber, spring mounting rubber and damper mounting base on the damper unit.
3. Compress the damper spring.



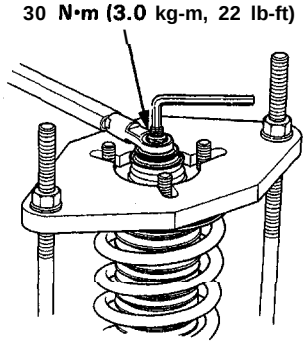
CAUTION: Install the damper mounting base so that the angle of the stuf bolts is as shown.

<Upper view>
Left and Right



4. Install the damper mounting rubber and damper mounting washer, and loosely install a new 10 mm self-locking nut.
5. Hold the damper shaft and tighten the 10 mm self-locking nut.

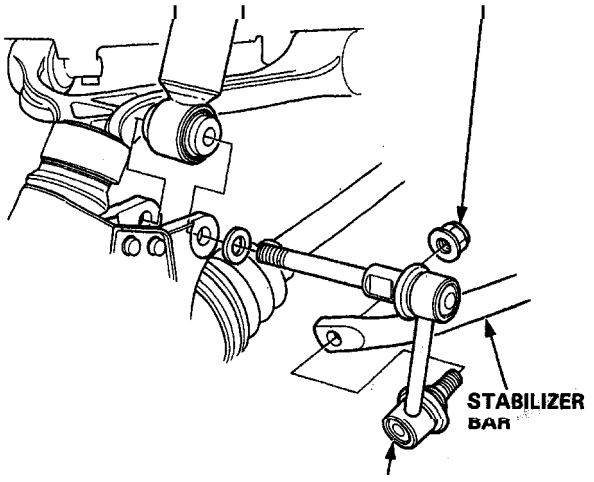
30 N•m (3.0 kg-m, 22 lb-ft)



Installation

1. Reposition the damper assemble between the frame and knuckle.
2. Install the stabilizer link and connect the stabilizer bar.
3. Loosely tighten the new self-locking nut.

☆ SELF-LOCKING NUT
12 x 1.25 mm
85 N•m
(8.5 kg-m, 82 lb-ft)

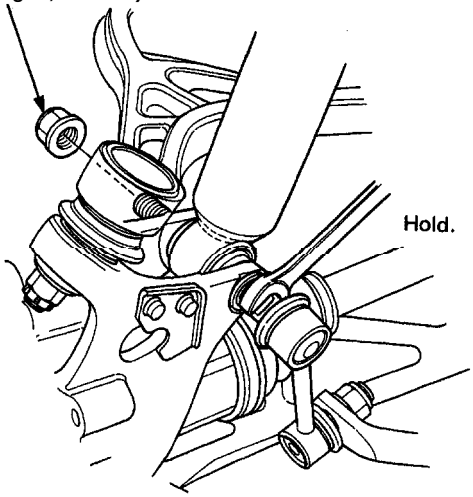


☆ Corrosion resistant bolt/nut

4. Loosely tighten the new damper mounting nut.

NOTE: The damper mounting nuts should be tightened with the damper under vehicle load.

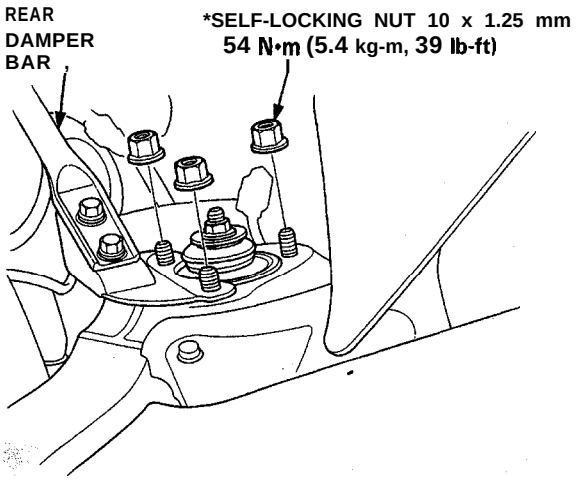
☆ DAMPER MOUNTING NUT
12 x 1.25 mm
95 N•m
(9.5 kg-m, 87 lb-ft)



*Corrosion resistant bolt/nut

5. Install the rear damper bar on the stud bolts of damper as shown.

6. Loosely tighten the new self-locking nuts.

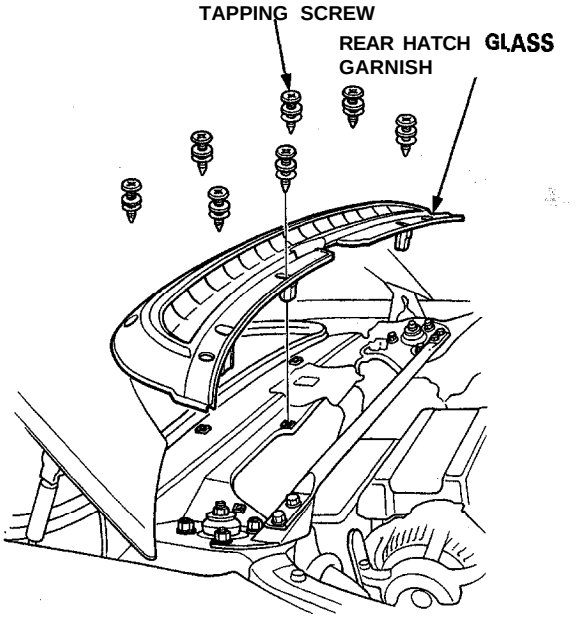


☆ Corrosion resistant bolt/nut

7. Secure the damper mounting nut and stabilizer link nut.

8. Secure the damper assembly to the frame with the self-locking nuts.

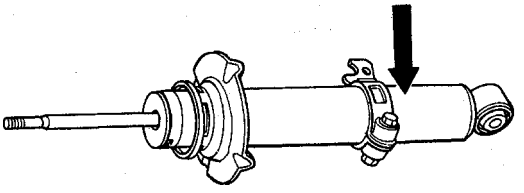
9. Install the rear hatch glass garnish.



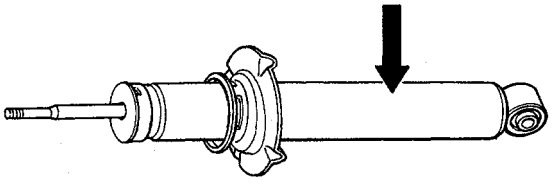
⚠WARNING The dampers contain nitrogen gas and oil under pressure.
The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.

Place the damper on a level surface with its rod extended and drill a hole of 2-3 mm (0.078-0.118 in) diameter in the body to release the gas.

Front Damper



Rear Damper



⚠WARNING Always wear eye protection to avoid getting metal shavings in your eyes when the gas damper pressure is relieved.

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

⚠ WARNING

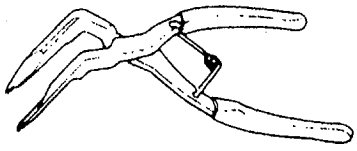
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Brakes (Anti-Lock Brake System)

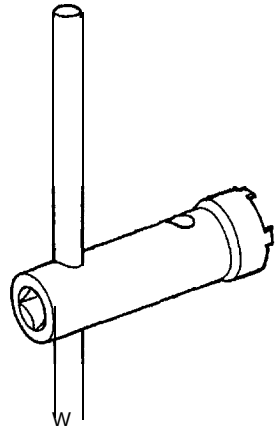
Special Tools 19-2
Illustrated Index 19-3
Pedal Height Adjustment 19-4
Parking Brake Adjustment 19-4
Front Brakes Index/Inspection 19-5
Front Brake Pads Inspection/Replacement 19-6
Front Caliper Disassembly 19-8
Reassembly 19-9
Front Brake Disc Run-Out Inspection 19-9
Thickness and Parallelism Inspection 19-10
Bleeding 19-10
Master Cylinder and Brake Booster Index/Torque 19-12
Master Cylinder Inspection 19-13
Brake Booster Tests 19-14
Pushrod Clearance Adjustment 19-I 5
Rear Brakes 'Torque/Inspection 19-16
Rear Brake Pads Inspection/Replacement 19-17
Rear Brake Disc Run-Out Inspection 19-19
Thickness and Parallelism Inspection 19-20
Rear Caliper Disassembly 19-20
Reassembly 19-23
Brake Hoses/Pipes 19-26
Parking Brake 19-27
ALB Description Features/Construction/ Operation 19-28
Circuit Diagram 19-38
Wiring/Connector Location 19-40
ALB Checker Function Test 19-41
Wheel Sensor Signal Confirmation 19-43
Troubleshooting Anti-Lock Brake System Indicator Light 19-44
Symptom-to-System Chart 19-46
Flowcharts 19-47
Hydraulic System Hydraulic Connections 19-61
Relieving Accumulator/ Line Pressure 19-62
Modulator/Solenoid Unit Index/Torque 19-63
Solenoid Leak Test 19-64
Solenoid Flushing 19-65
Power Unit Torque/Inspection 19-66
Accumulator/Pressure Switch Index/Torque 19-67
Accumulator/Pressure Switch Removal 19-618
Accumlator Disposal 19-68
Bleeding 19-69
★ Electronic Components Control Unit Replacement 19-70
Relays Inspection 19-71
Pulsers/Sensors Inspection 19-71
Replacement 19-72

Special Tools

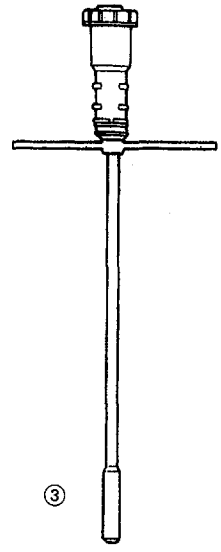
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07914–SA50001	Snap Ring Pliers	1	19-21, 24
②	07916–6390001	Locknut Wrench	1	19-20, 25
③	07HAA–SG00100 or 07HAA–SG00101	Bleeder-T Wrench	1	19-62, 69
④	07HAE–SG001 00	Brake Spring Compressor	1	19-21, 24
⑤	07JAG–SD40100	Pushrod Adjustment Gauge	1	19-15
⑥	07HAJ–SG00100	ALB Checker (US)	1	19-41, 43, 69
	07HAJ–SG00200	ALB Checker (Canada)	1	19-41, 43, 69
⑦	07KAZ–001000A	Window Switch	1	19-65



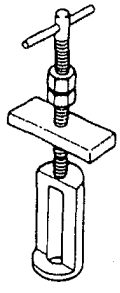
①



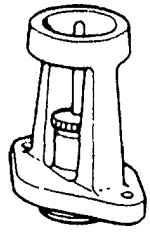
②



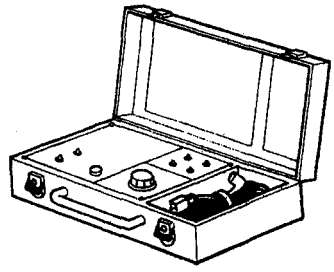
③



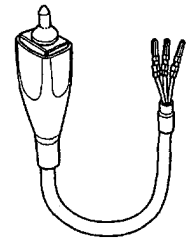
④



⑤

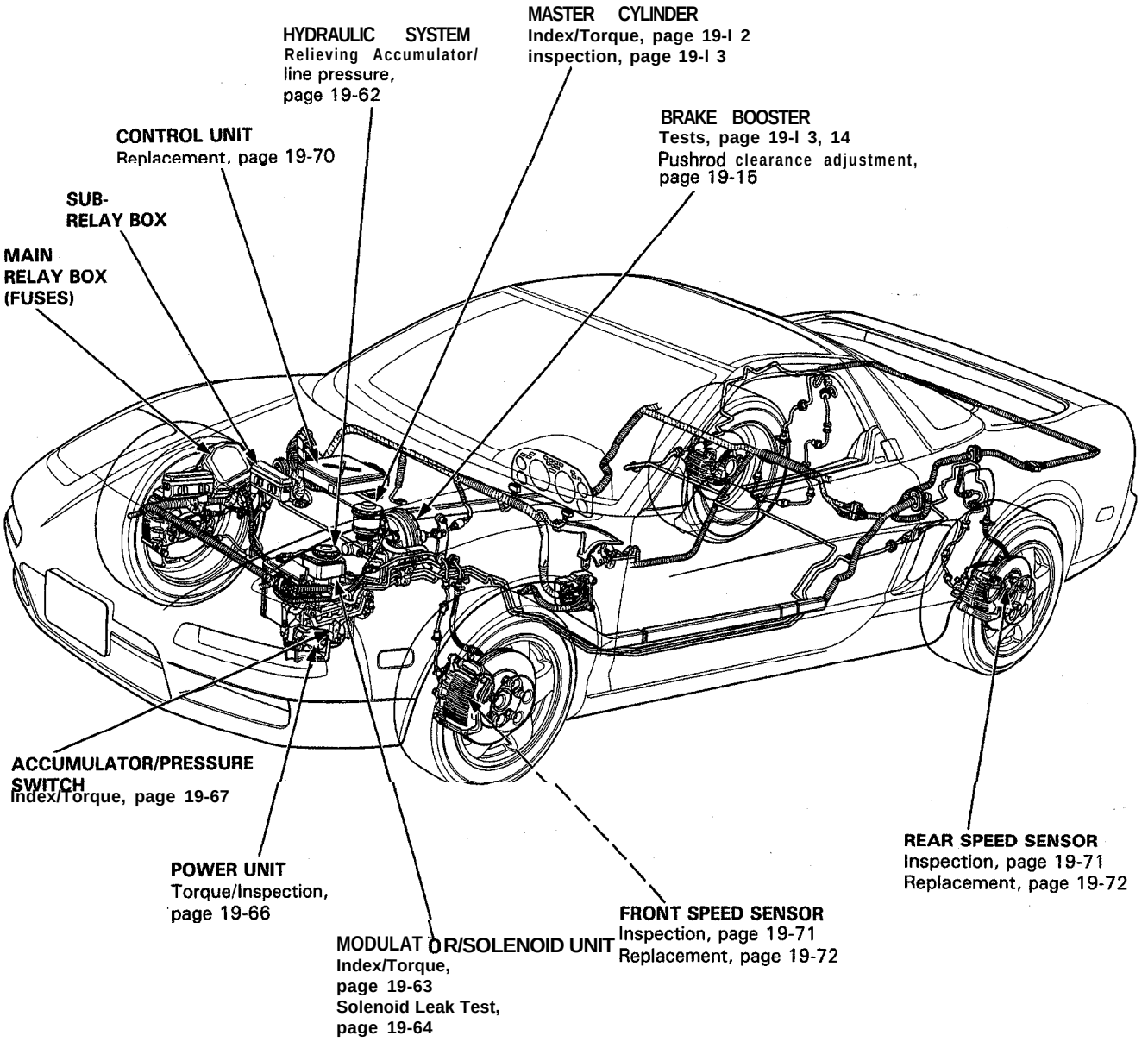


⑥ NOTE: Use 07HAJ–SG001 00 (US) or 07HAJ–SG00200 (Canada) ALB Checker only.



⑦

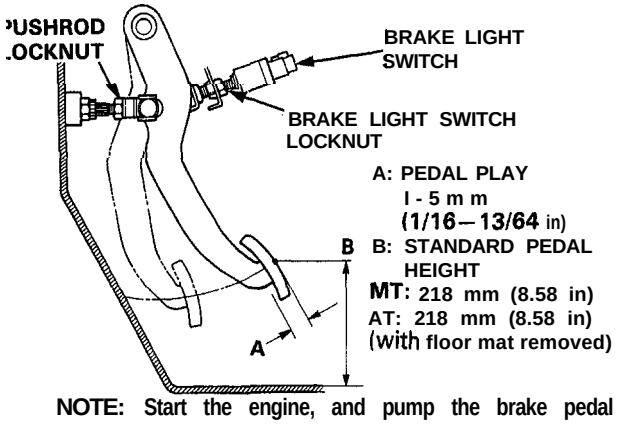
⚠ WARNING **The accumlator contains high-pressure nitrogen gas, do not puncture, expose to flame or attempt to disassemble the accumlator or it may explode; severe personal injury may result.**



Pedal Height

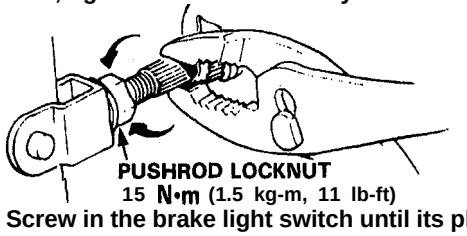
Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.



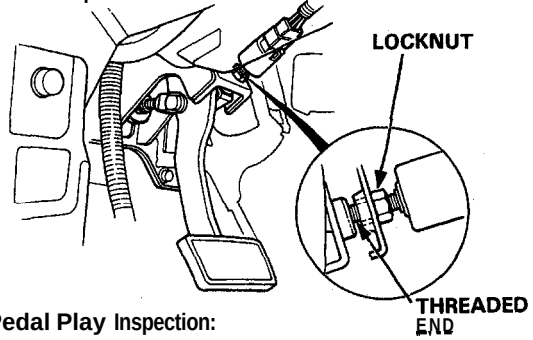
NOTE: Start the engine, and pump the brake pedal several times. Measure the brake pedal height while the pedal is applied for five second or more.

2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the standard pedal height from the floor is 218 mm (8.58 in). After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/2 turn and tighten the locknut firmly.

CAUTION: Check that the brake lights go off when the pedal is released.



Brake Pedal Play Inspection:
Stop the engine and inspect the play by pushing the pedal by hand.

Brake Pedal Play: 1-5 mm (1/16 – 13/64 in)

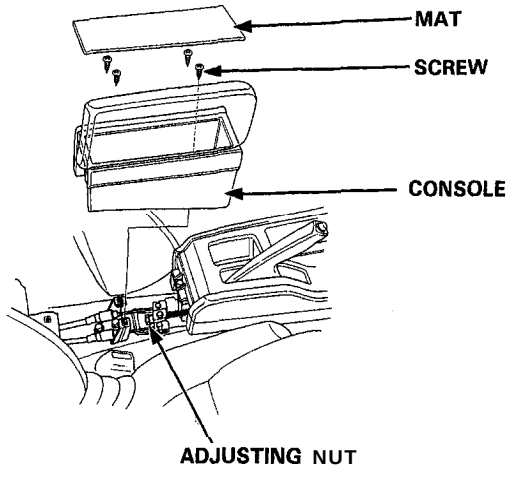
NOTE: Do not adjust the pedal height with the pushrod depressed.

CAUTION: If the pedal free play is out of specification, brake drag may occur.

Parking Brake

Adjustment

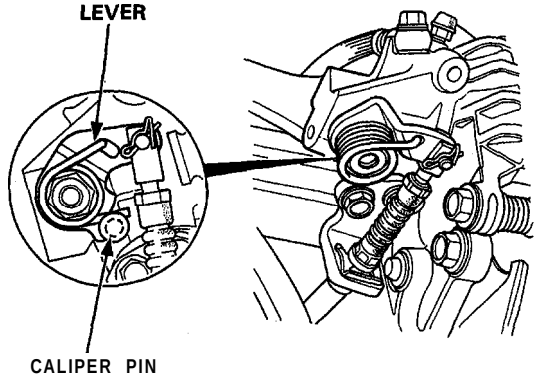
1. Remove the console mat, the four screws and the console box.



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 brakes before adjusting the brake pedal.

⚠WARNING Block the front wheels before jacking up the each side of the car.

2. Raise the rear wheels off the ground.
3. Make sure the lever of the rear brake caliper contacts the brake caliper pin.
4. Pull the parking brake lever up one notch.
5. Tighten the adjusting nut until the rear wheels drag slightly when turned.
6. Release the parking lever and check that the rear wheels do not drag when turned. Readjust if necessary.
7. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 10 to 14 clicks.



Front Brakes

Index/Inspection

⚠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.

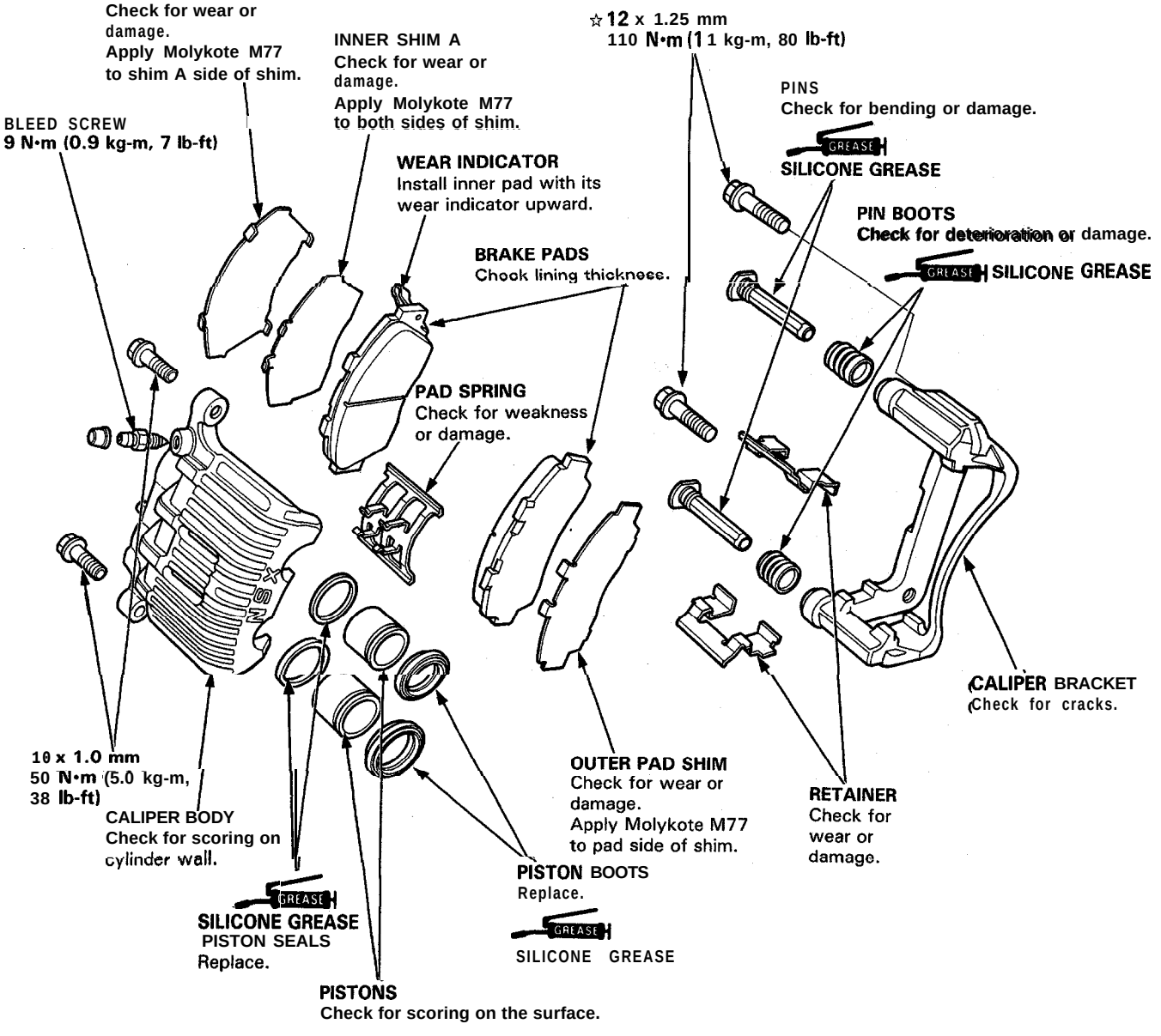
NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

☆ : CORROSION RESISTANT BOLT

CAUTION:

- 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.
- 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.
- 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.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.



Front Brake Pads

Inspection/Replacement

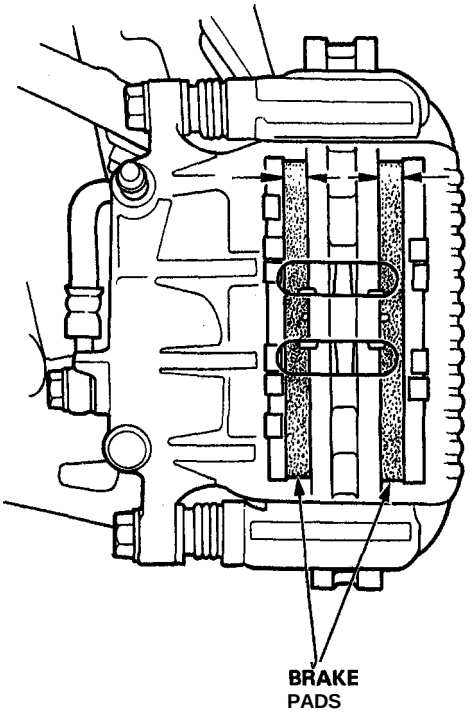
⚠ WARNING

- **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 lug nuts slightly, then raise each side of the car and support on safety stands (page 1-6 through 8). Remove the front wheels.

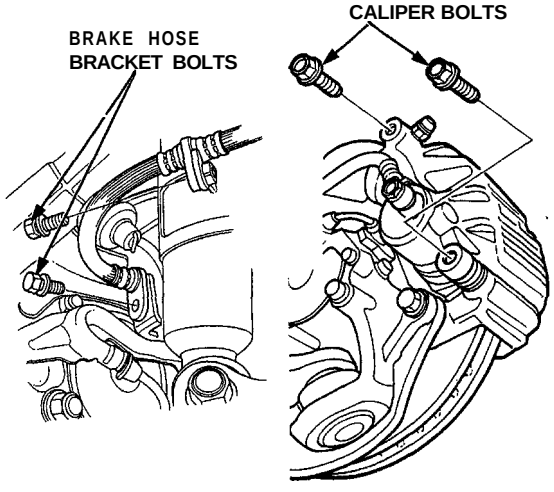
2. If the brake pad thickness is less than service limit at step 5, replace the front pads as a set.

   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.



3. Remove the two brake hose bracket bolts. Remove the two caliper bolts and move the caliper out of the way.

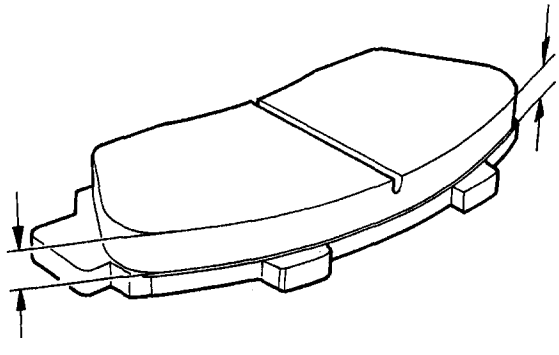
   CAUTION: Support the caliper with a piece of wire so that it does not hang from the brake hose.



4. Remove the pad shims, pad retainers and pads.

5. Using a vernier caliper, measure the thickness of each brake pad lining.

   Brake Pad Thickness:
   Standard: 11 mm (0.43 in)
   Service Limit: 1.6 mm (0.06 in)

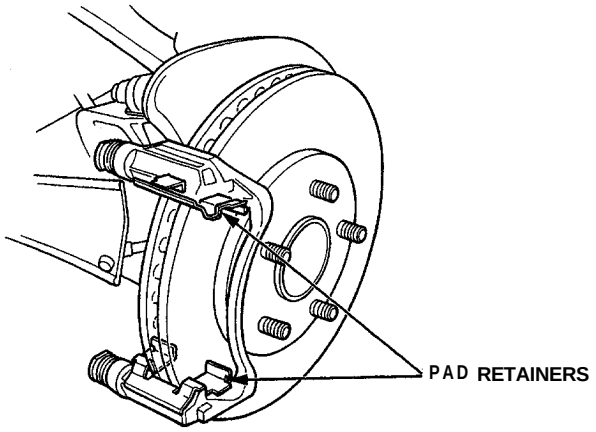


NOTE: Measurement does not include pad backing thickness.

6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.

7. Install the pad retainers.

⚠WARNING When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

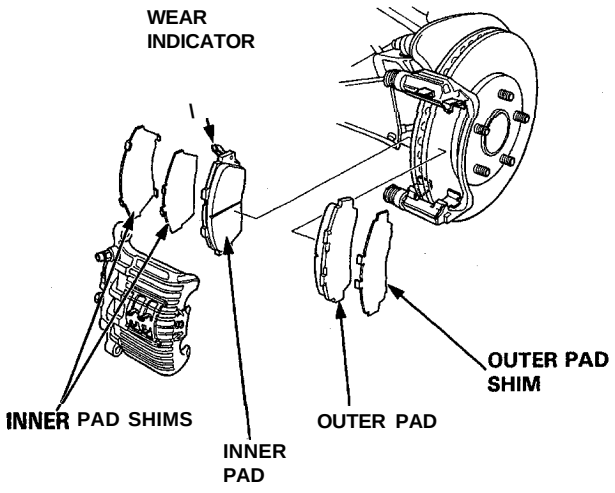


8. Apply Molykote M77 to both sides of the inner shims A and the back of the pads. Wipe excess grease off the shims.

9. Install the brake pads.

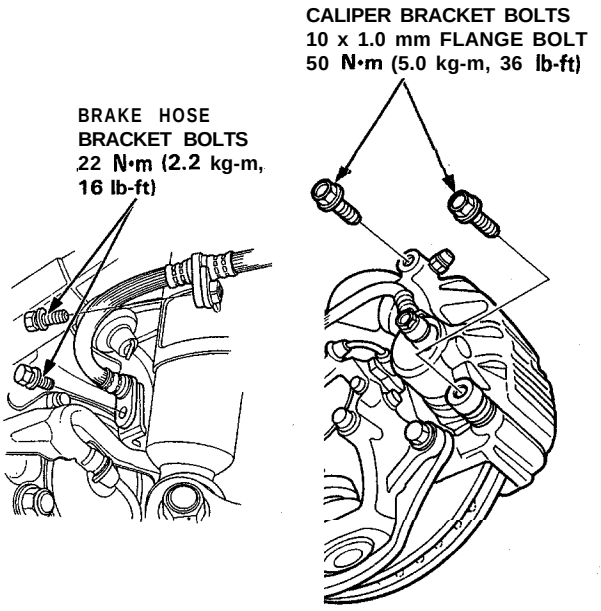
NOTE:
- Install the inner pad with its wear indicator facing upward.
- Apply Molykote M77 to the shims (page 19-5). Wipe excess grease off the shims.

10. Install the brake pad shims correctly.



11. Push in the pistons so that the caliper will fit over the pads.

12. Set the caliper down into position, then install the brake hose bracket bolts and the caliper bolts. Tighten the bolts to the specified torque.



13. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Clean the mating surface of the wheel and hub before installing the wheel.

⚠WARNING Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs or pads.

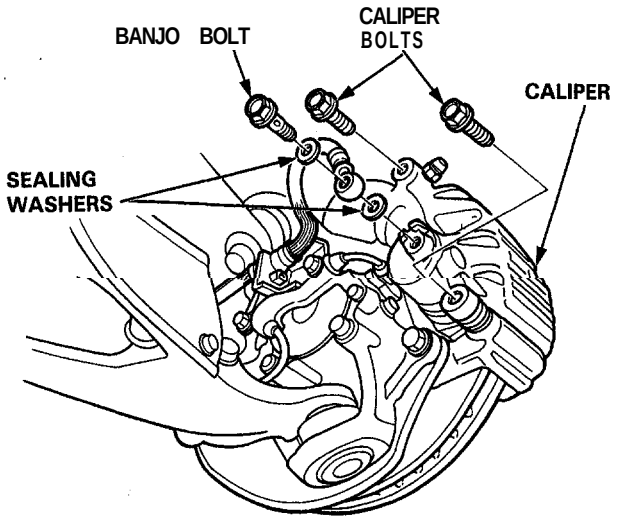
Front Caliper

Disassembly

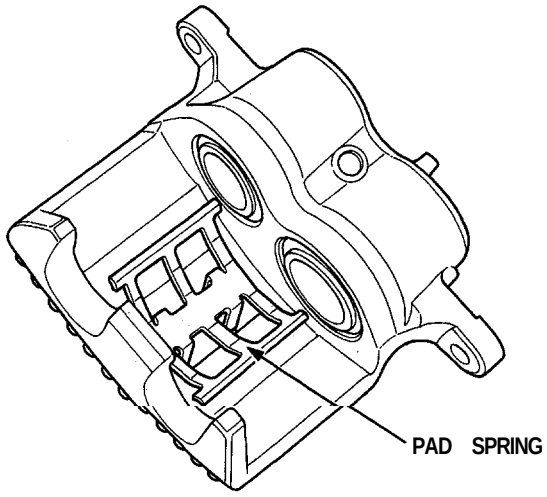
CAUTION:
- Before reassembling, check that all parts are free of dust and other foreign particles.
- **Replace parts with new ones whenever specified to do so.**
- **Use only clean DOT 3 or 4 brake fluid.**
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- **Do not mix different brands of brake fluid as they may not be compatible.**
- 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.**

1. **Remove the banjo bolt and disconnect the brake hose from the caliper.**

2. Remove the caliper bolts, then remove the caliper.



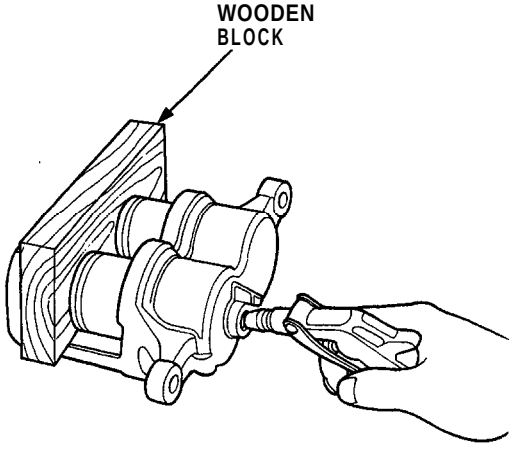
3. Remove the pad spring from the caliper body.



4. **If necessary, apply compressed air to the caliper fluid inlet to get the pistons out. Place a shop rag or wooden block as shown to cushion the pistons when there are expelled.**

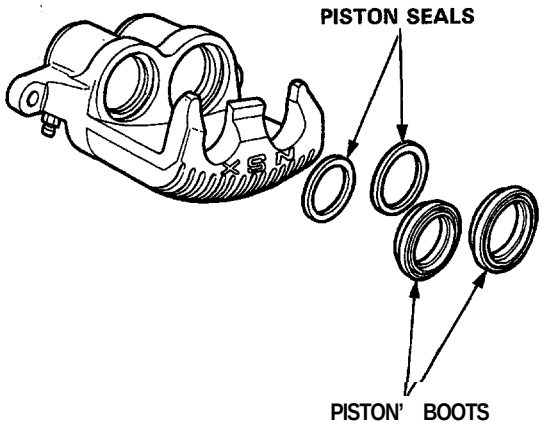
Use low pressure air in short spurts.
Remove the pistons from the caliper.

⚠WARNING
- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA-approved 30 PSI nozzle.**



5. Remove the piston boots and piston seals.

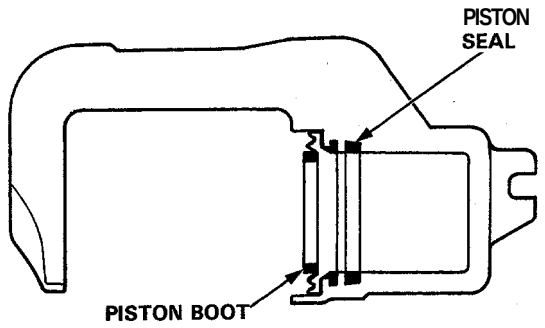
CAUTION: Take care not to damage the cylinders.



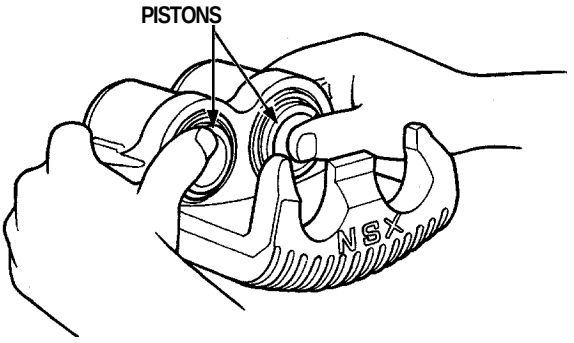
Reassembly

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.
- Use only clean DOT3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- 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.

1. Clean the pistons and caliper bores with brake fluid and inspect for wear or damage.
2. Apply silicone grease to new piston seals, then install the piston seals in the cylinder grooves.
3. Apply silicone grease to new piston boots, then install the piston boots in the clyinder grooves.



4. Lubricate the caliper cylinders and pistons with brake fluid, then install the pistons in the cylinders with the dished end facing in.



5. Reinstall the caliper in the reverse order of removal.

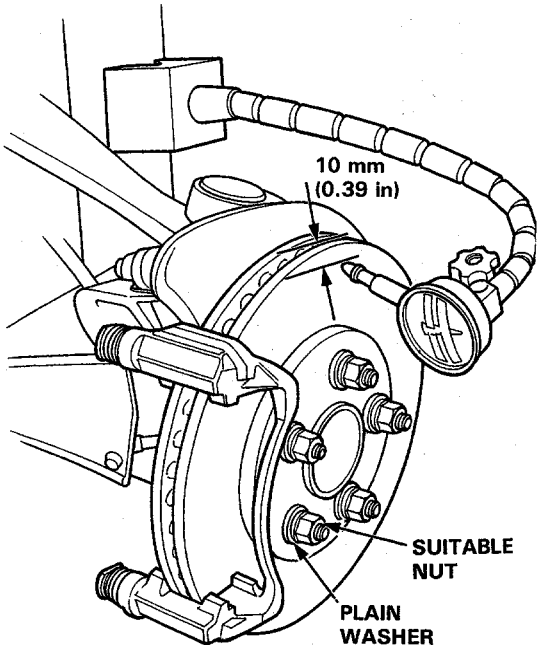
⚠WARNING Always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

6. Fill the brake reservoir up and bleed the brake system (page 19-10).

Run-Out Inspection

1. Raise each side of the car and support on safety stand (page 1-6 through 8). Remove the front wheels.
2. Remove the brake disc pads (page 19-6).
3. Inspect the disc surface for cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use suitable nuts (1 2 x 1.5 mm) and plain washers to hold the disc securely against the hub, then mount a dial indicator as shown.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)
5. If the disc is beyond the service limit, refinish the rotor.



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

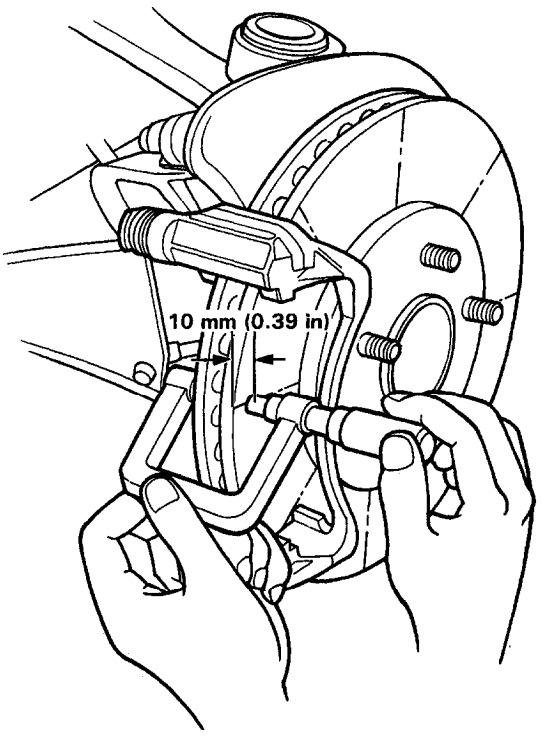
Front Brake Disc

Thickness and Parallelism Inspection

1. Raise each side of the car and support on safety stands (page l-6 through 8). Remove the front wheels.

2. Remove the brake disc pads (page 19-6).

3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake disc thickness:
Standard: 28 mm 11.10 in)
Max. Refinishing Limit: 26 mm (1 .02 in)

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

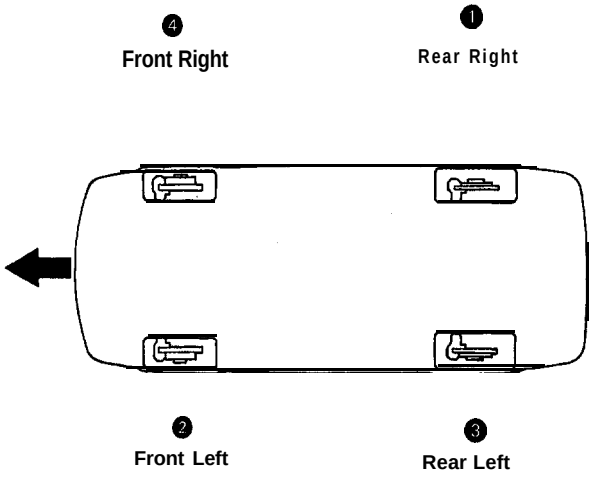
4. If the disc is beyond the limits for thickness or parallelism, refinish the rotor.

Bleeding

CAUTION:
- Use only clean DOT3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- 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.

NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each brake caliper. Add fluid as required. Use only clean DOT3 or 4 brake fluid.

BLEEDING SEQUENCE

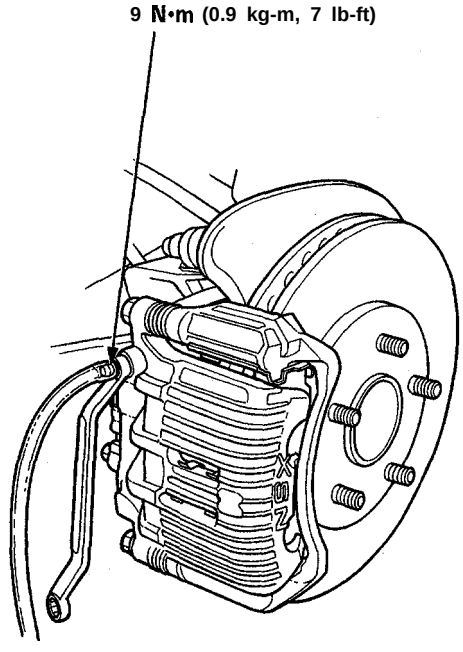


1. Have someone slowly pump the brake pedal several times, then apply steady pressure.

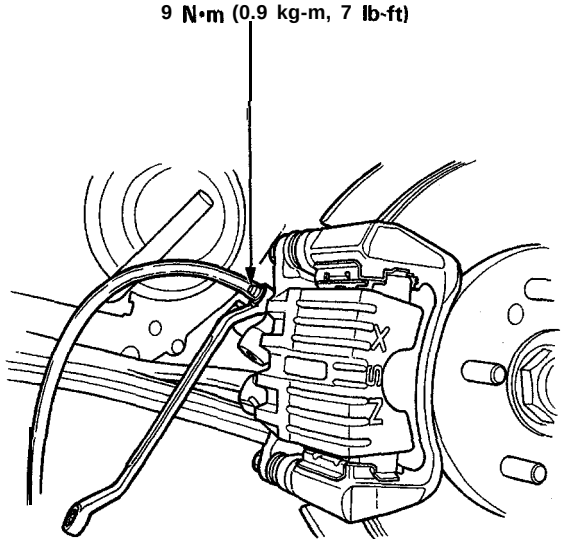
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.

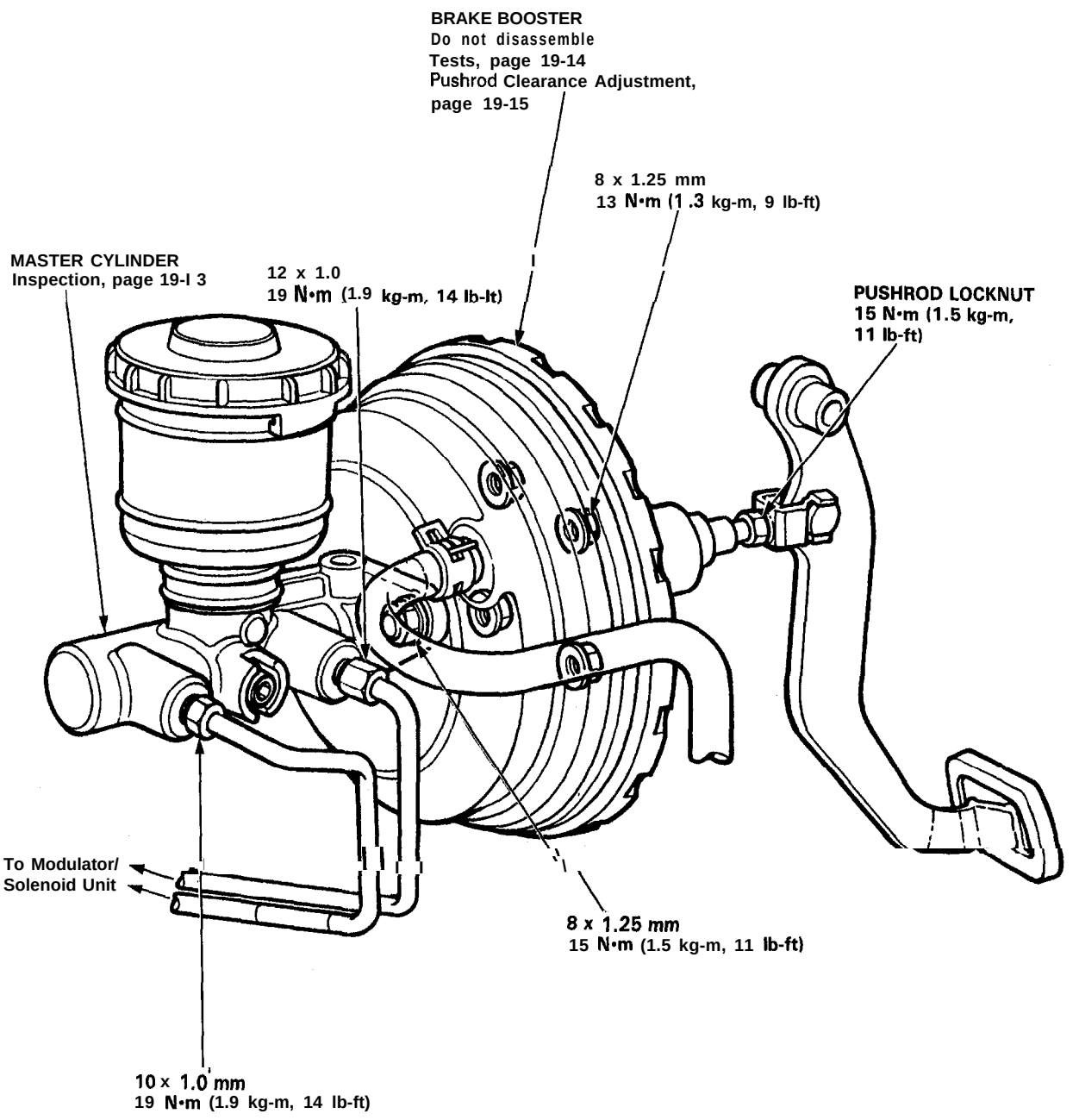
FRONT



REAR



Index/Torque

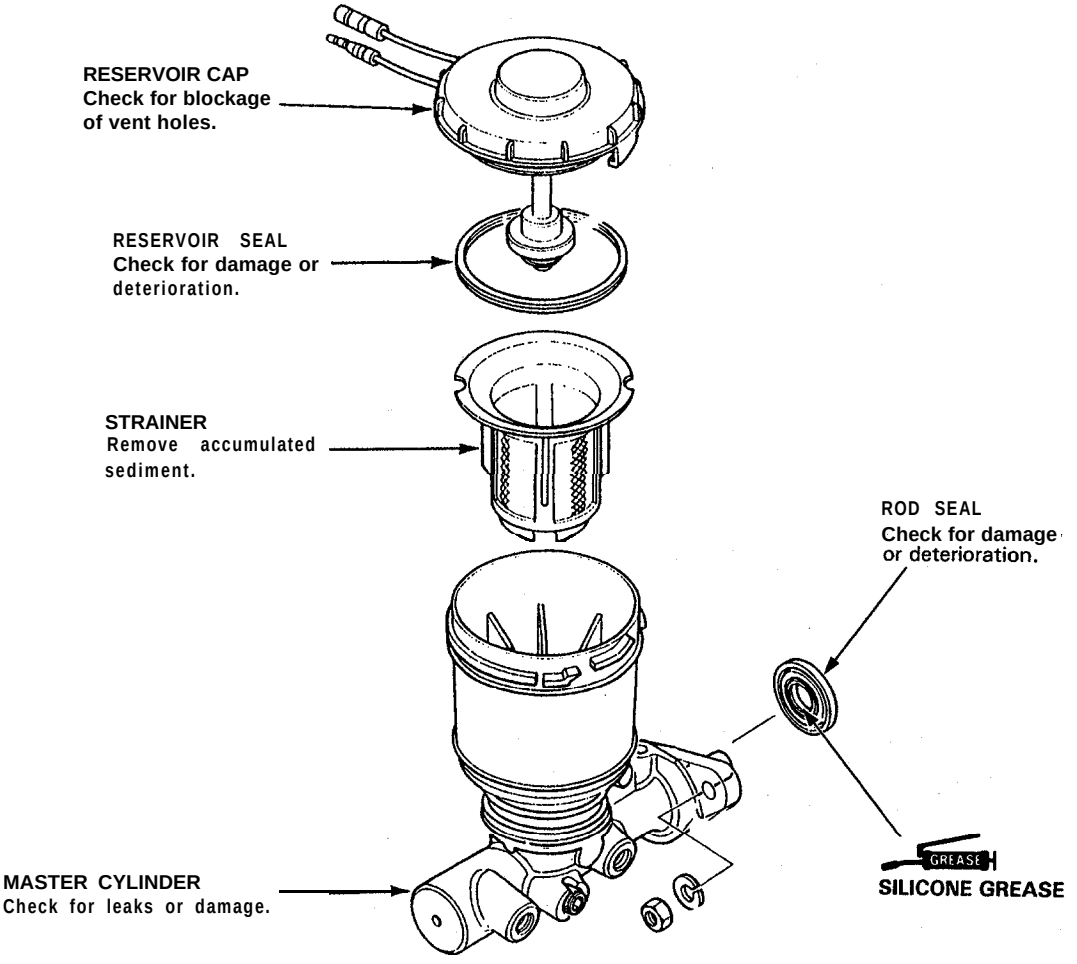


Master Cylinder

Inspection

CAUTION:

- **Be careful not to bend or damage the brake pipe when removing the master cylinder.**
- 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.
- **To prevent spills, cover the hose joints with rags or shop towels.**
- 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.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT3 or 4 Brake fluid.**
- When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.



Brake Booster

Tests

Functional Test

1. With the engine stopped, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, the **master cylinder, brake line or a brake caliper is faulty.**

2. **Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is working.** If the pedal height does not vary, the booster or **check valve is faulty.**

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.**

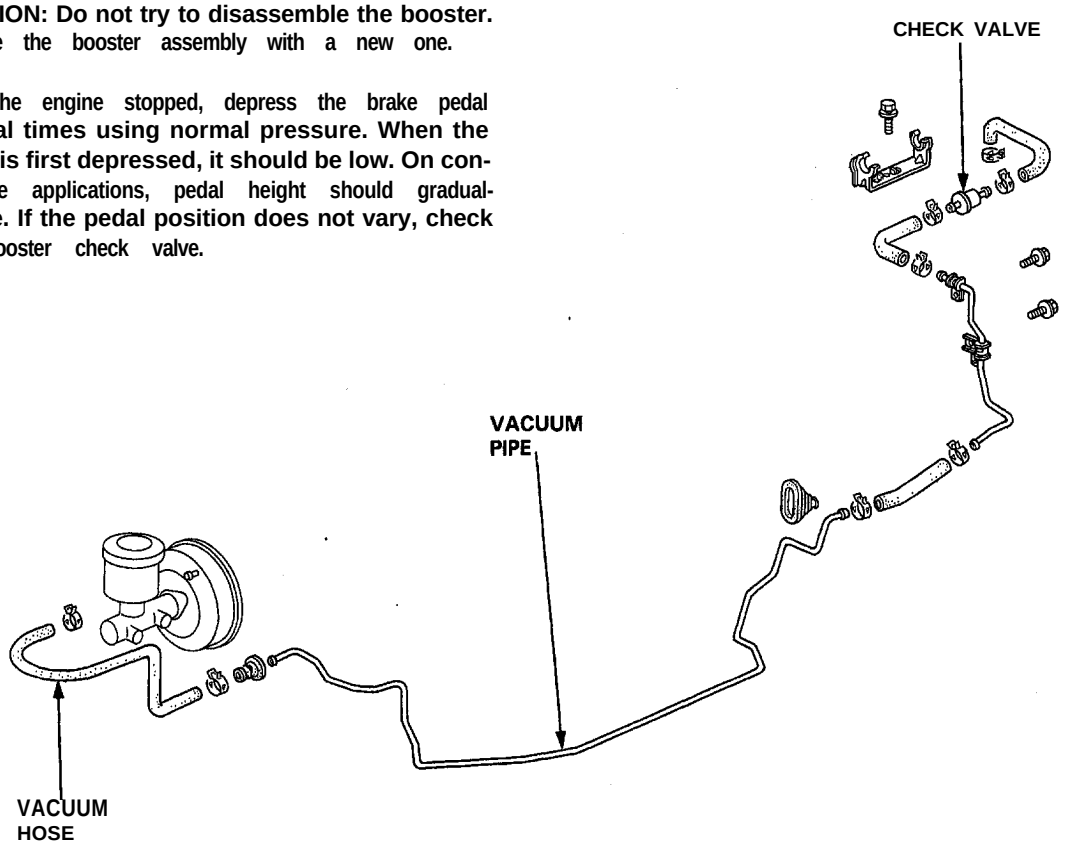
   CAUTION: Do not try to disassemble the booster. Replace the booster assembly with a new one.

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, pedal height should gradual**ly rise. If the pedal position does not vary, check** the booster check valve.

Check Valve Test

1. Disconnect the brake booster vacuum hose at the booster.

2. **Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the** check valve is not working correctly.
   Replace the check valve and retest.

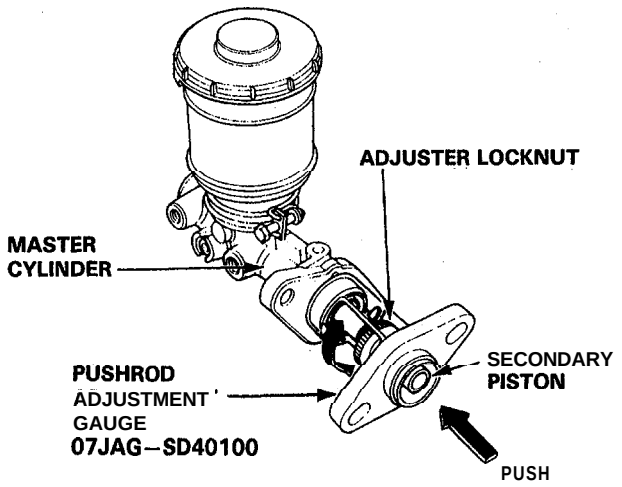


Brake Booster

Pushrod Clearance Adjustment

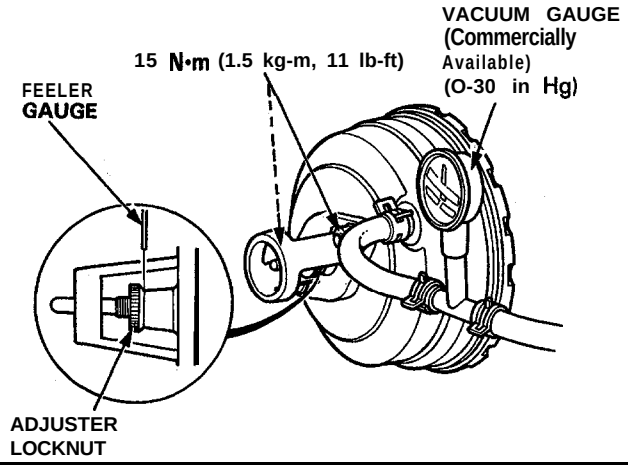
NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Using the special tool, adjust bolt so the top of it is flush with end of master cylinder piston.

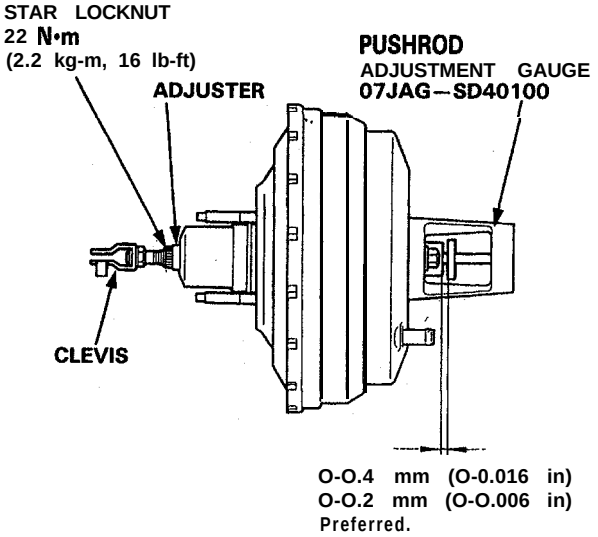


2. Without disturbing the adjusting bolt's position, install the special tool upside down on the booster.
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge (O-30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

   Clearance: O-O.4 mm (O-0.016 in)
   Preferred: O-O.2 mm (O-0.008 in)

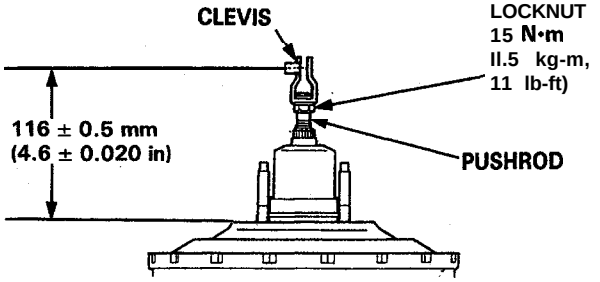


6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
7. Tighten the star locknut securely.
   Remove the special tool and install a new master cylinder rod seal in the booster.



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance is 0 mm.

8. Adjust the pushrod length as shown if necessary.



9. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

   Standard Pedal Height From Floor:
   Manual Transmission: 218 mm (8.58 in)
   Automatic Transmission: 218 mm (8.58 in)
   (with floor mat removed)
   The pedal should have
   1-5 mm free play.

10. Adjust the brake light switch (page 19-4).

Rear Brakes

Torque/Inspection

⚠ 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.**

GREASE : BRAKE CYLINDER GREASE (P/N 08733—B020E) OR EQUIVALENT RUBBER GREASE

GREASE : SILICONE GREASE

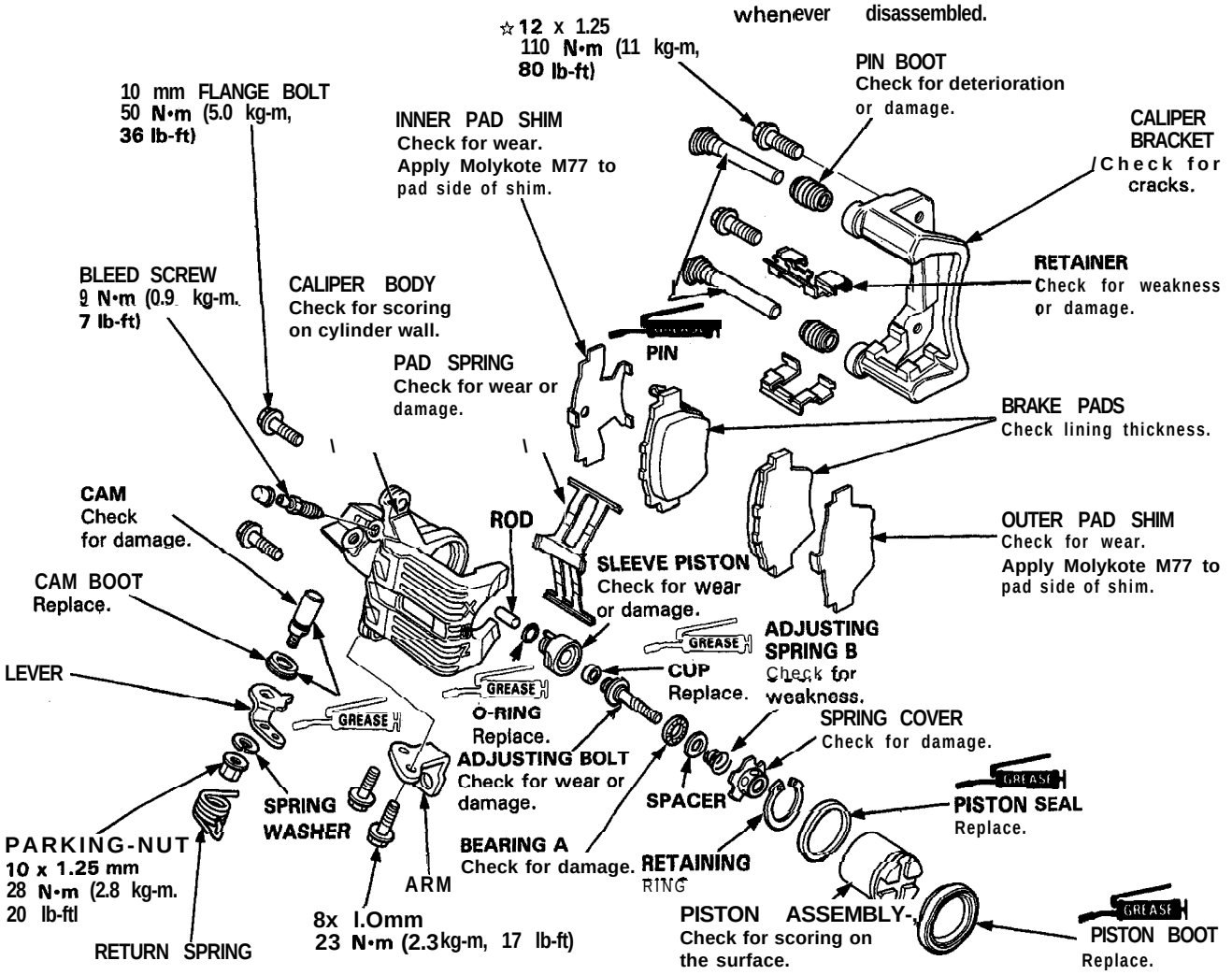
☆: CORROSION RESISTANT BOLT

CAUTION:

- **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.**
- 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.
- **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.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT3 or 4 Brake fluid.**

NOTE:

- **Coat piston, piston seal, and caliper bore with clean brake fluid.**
- **Reolace all rubber parts with new ones whenever disassembled.**



Rear Brake Pads

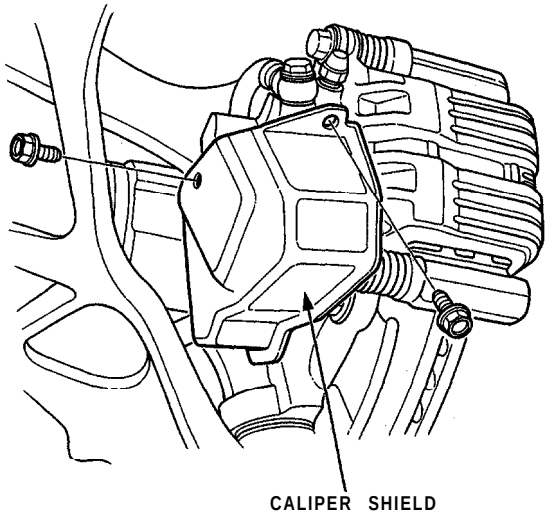
Inspection/Replacement

⚠ WARNING

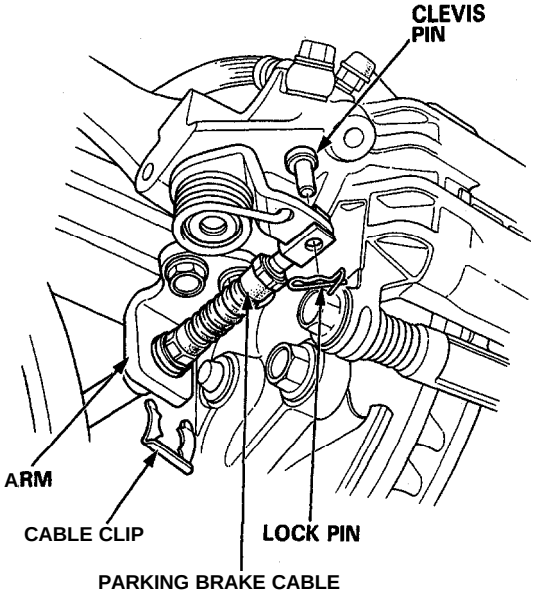
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.**

1. Loosen the rear wheel lug nuts slightly, then raise each side of the car and support on safety stands (page 1-6 through 8). Remove the rear wheels.

2. Remove the caliper shield.



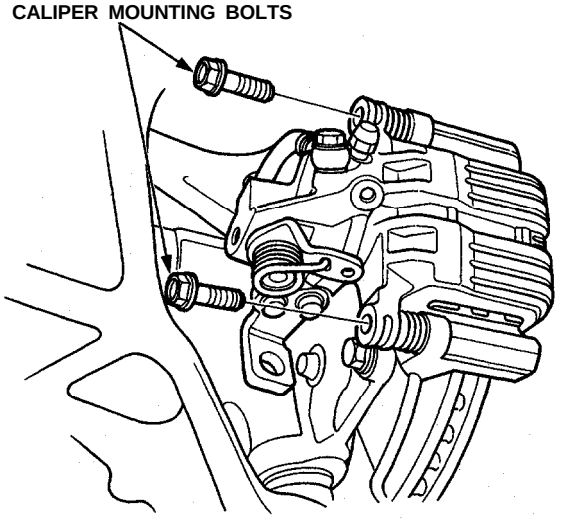
3. Remove the lock pin and clevis pin. Remove the cable clip and disconnect the cable from the arm.



4. Remove the two caliper mounting bolts and the caliper from the bracket.

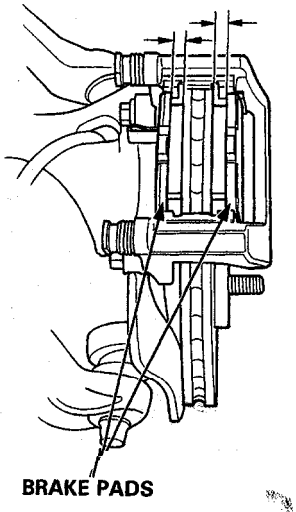
CAUTION:

- 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.



If lining thickness is less than service limit at step 6, replace the rear pads as a set.

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.



(cont'd)

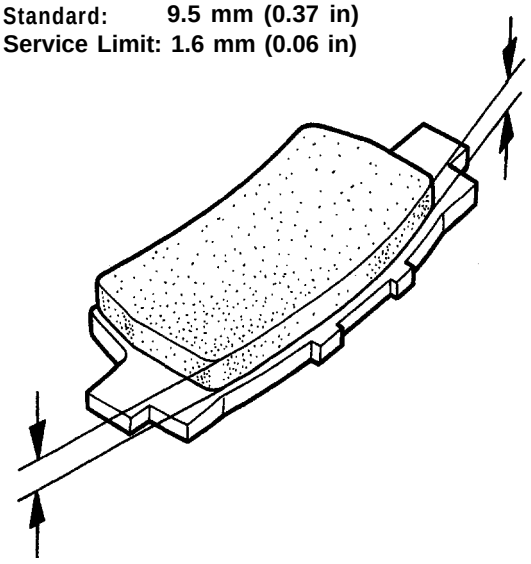
Rear Brake Pads

Inspection/Replacement (cont'd)

5. Remove the pad shims, pads and pad retainers.

6. Using a vernier caliper, measure the thickness of each brake pad lining.

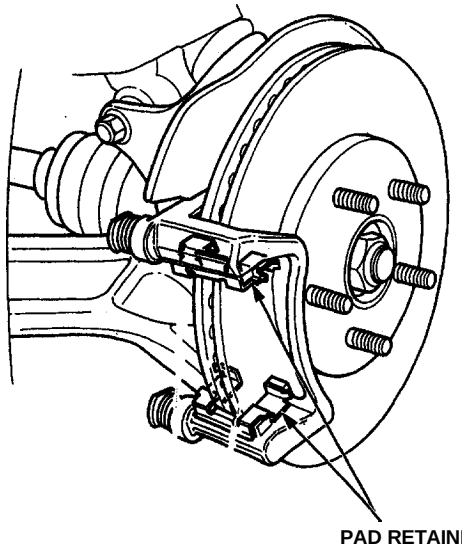
Brake Pad Thickness:
Standard: 9.5 mm (0.37 in)
Service Limit: 1.6 mm (0.06 in)



NOTE: Measurement does not include pad backing thickness.

7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.

8. Make sure that the pad retainers are installed in the correct positions.



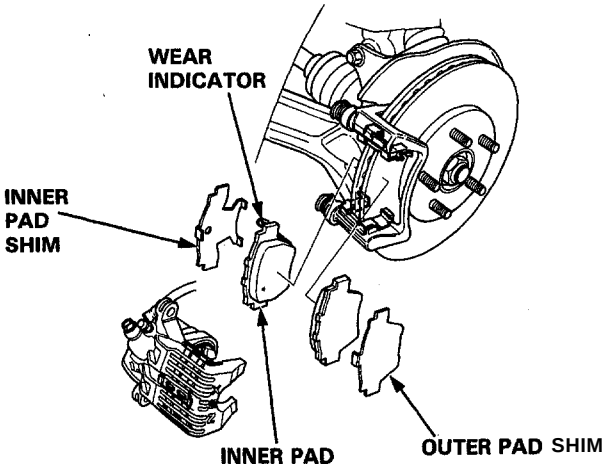
9. Install the new brake pads and pad shims on caliper bracket.

⚠ WARNING

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- A contaminated brake discs or pads reduces stopping ability. Keep grease off the discs and pads.

NOTE:

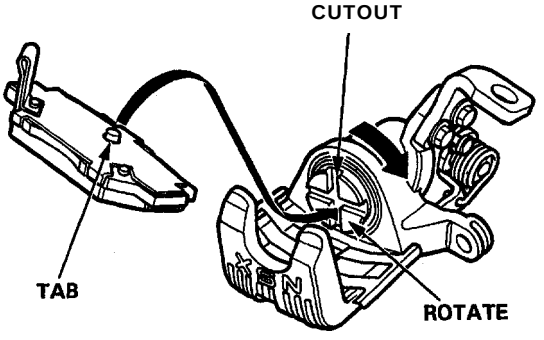
- Apply a Molykote 77 to the shims (page 1 Q-I 6). Wipe excess grease off the shims.
- Install the inner pad with its wear indicator facing upward.
- Make sure that the pad spring is installed onto the caliper body.



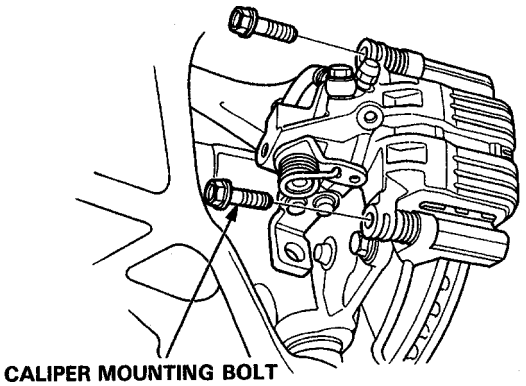
10. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning back the piston back.

CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

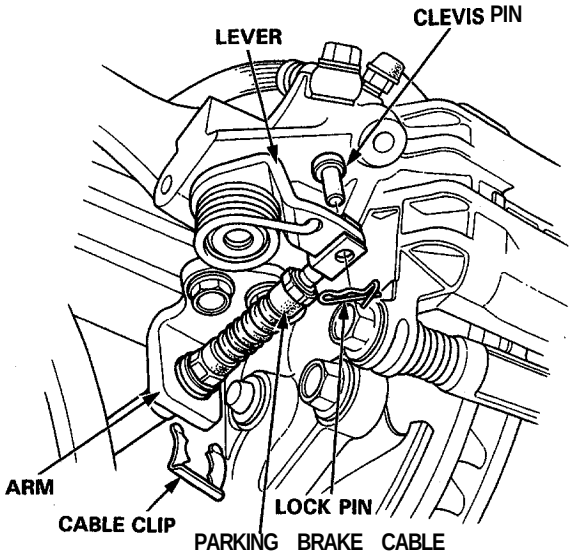
11. Install the brake caliper.



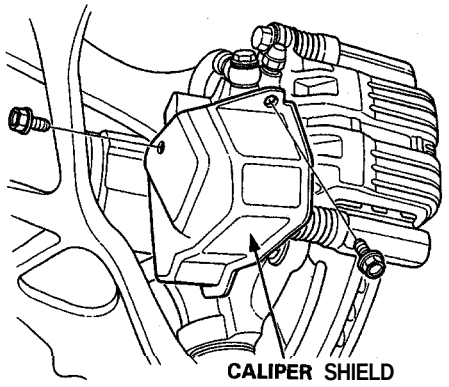
12. Install and tighten the two caliper mounting bolts.



13. 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.



14. Install the caliper shieled.



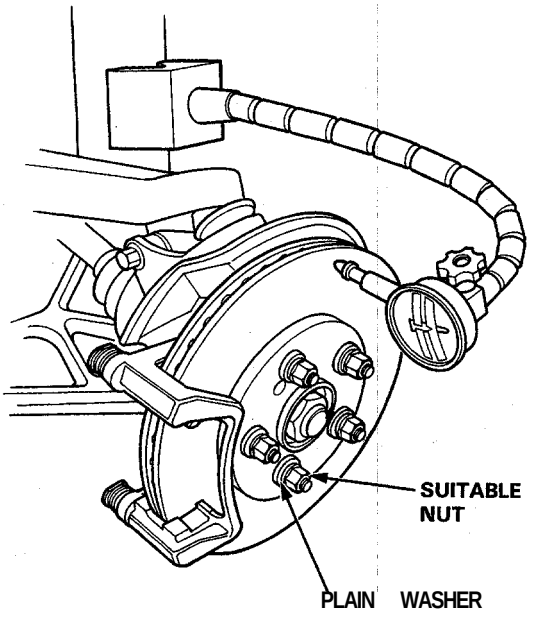
NOTE: Clean the mating surfaces of the wheel and hub before installing the wheel.

Run-Out Inspection

1. Raise each side of the car and, support on safety stands (page l-6 through 8). Remove the rear wheels.
2. Remove the brake pads (page 19-l 7).
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use suitable nuts (1 2 x 1.5 mm) and plain washers to hold the disc securely against the hub, then mount a dial indicator as shown.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)

   Max. Refinishing Limit: 19 mm '(0.75 in)
5. If the disc is beyond the service limit, refinish the rotor.



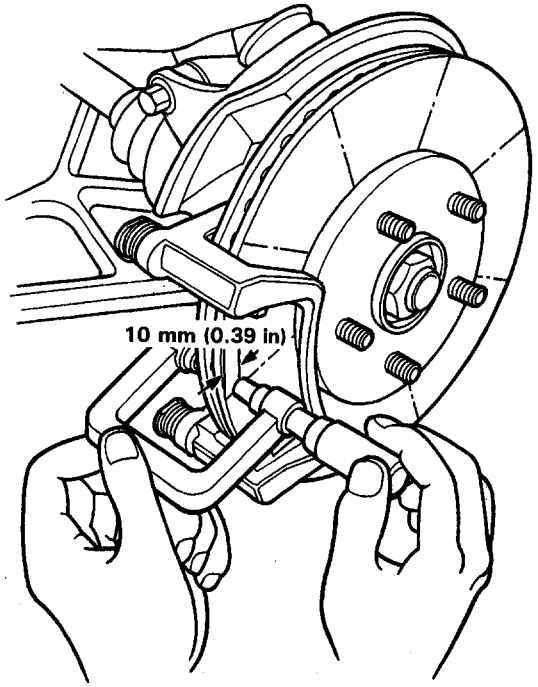
NOTE: A new disc should be refinished if its runout is greater than 0.1 mm (0.004 in).

Thickness and Parallelism Inspection

1. Raise both sides of the car and support on safety stands (page l-6 through 8).
   Remove the rear wheels.

2. Move the caliper and pads out of the way as described on the preceding page.

3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 21 mm (0.83 in)
Max. Refinishing Limit: 19 mm (0.75 in)

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

4. If the disc is beyond the limits for thickness or parallelism, refinish the rotor.

Disassembly

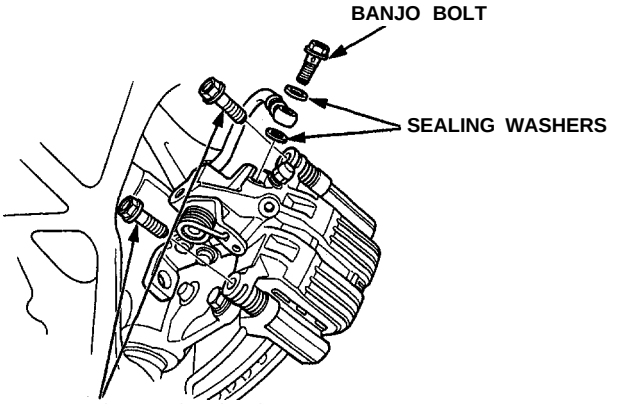
CAUTION:
- Make sure all parts are clean before reassembly.
- Use only new replacement parts.
- Use only DOT3 or 4 clean brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Do not mix different brands of brake fluid.
- Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish.
  Wash spilled brake fluid off immediately with clean water.

1. Remove the caliper shield (page 19-17).

2. Disconnect the parking cable (page 19-17).

3. Remove the banjo bolt and two sealing washers.

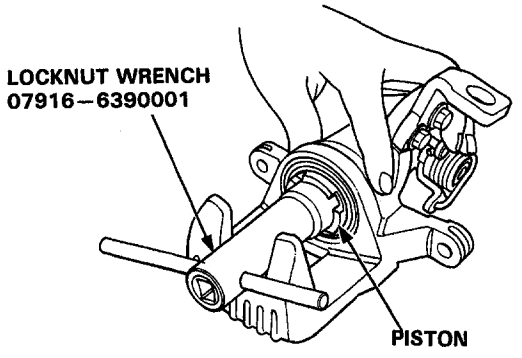
4. Remove the two caliper mounting bolts and caliper body from the bracket.



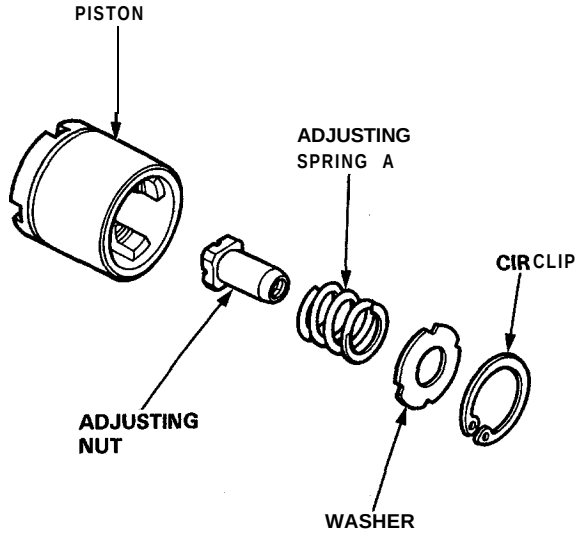
5. Remove the pad spring from the caliper.

6. Remove the piston and piston boot while rotating the piston.

   CAUTION: Avoid damaging the piston and piston boot.



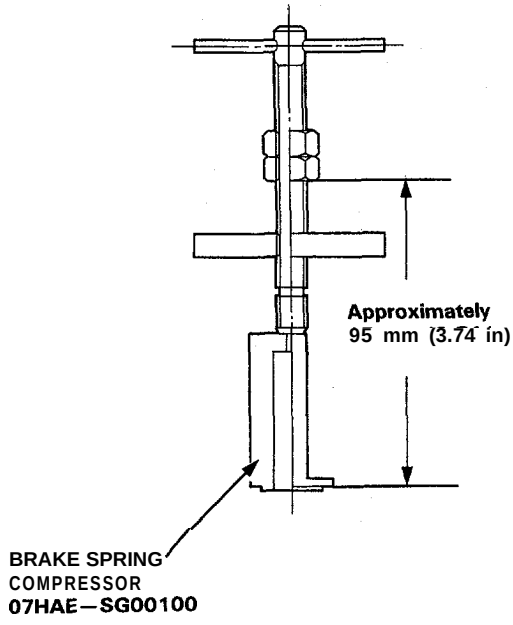
7. Remove the circlip, washer, adjusting spring A, and the adjusting nut from the piston.



8. Remove the piston seal.

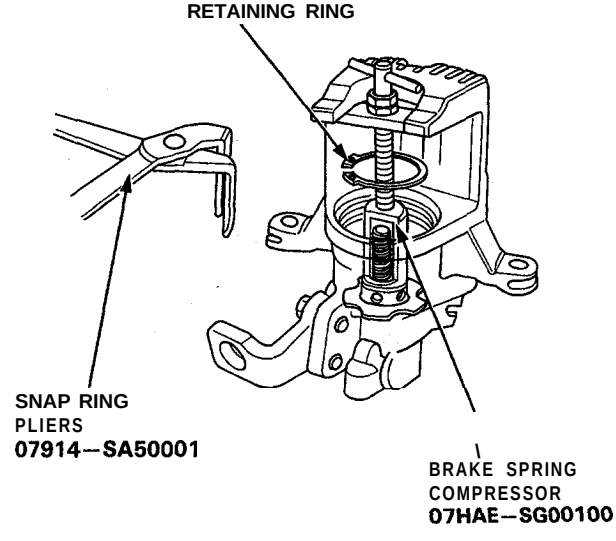
CAUTION: Take care not to damage the cylinder bore.

9. Adjust the special tool as shown.



10. Install the special tool between the caliper body and spring guide as shown.

11. Compress the adjusting spring B by turning the shaft of the special tool, then remove the retaining ring with snap ring pliers.



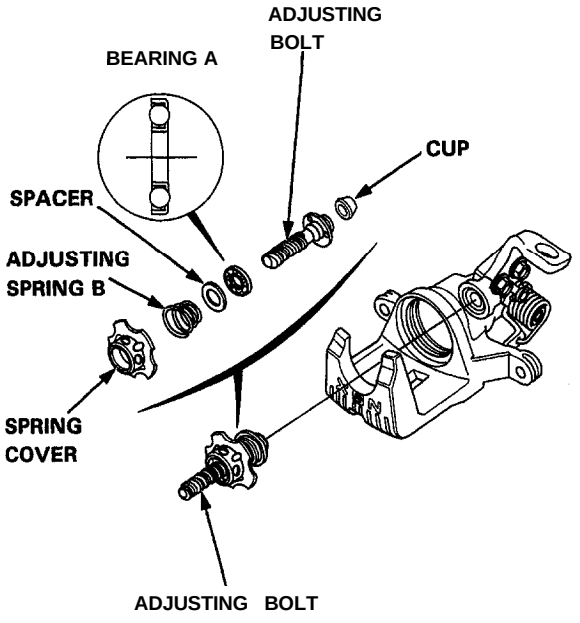
(cont'd)

Rear Caliper

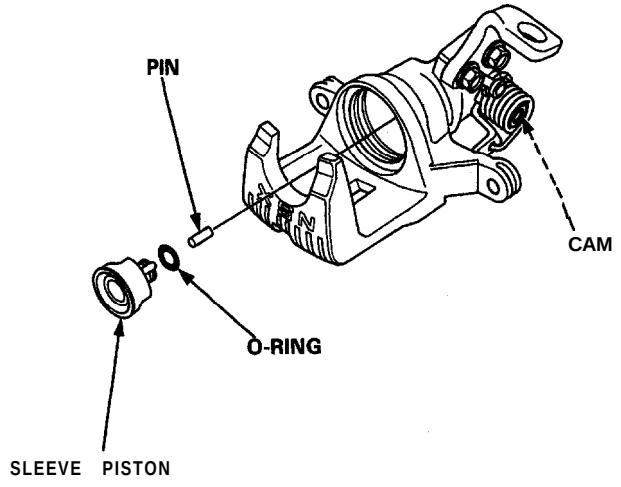
Disassembly (cont'd)

12. Remove the adjusting bolt.

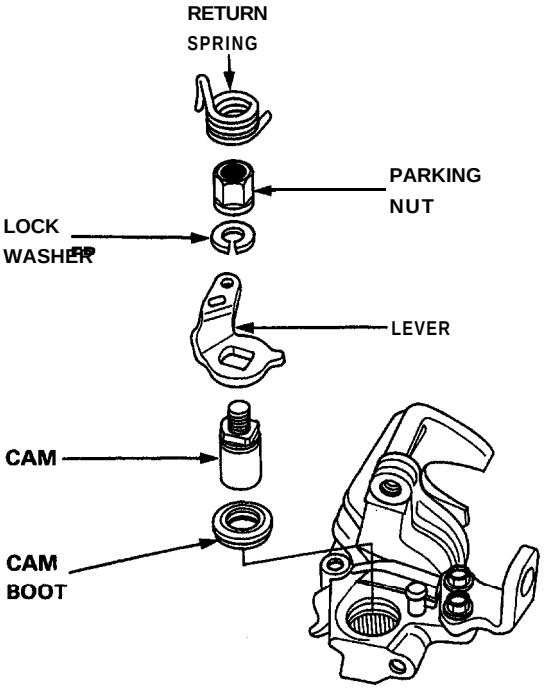
13. Remove the spring cover, adjusting spring B, spacer, bearing A and cup from the adjusting bolt.



14. Remove the sleeve piston, and remove the pin from the cam.



15. Remove the return spring, parking nut, lock washer, lever, cam and cam boot.



Reassembly

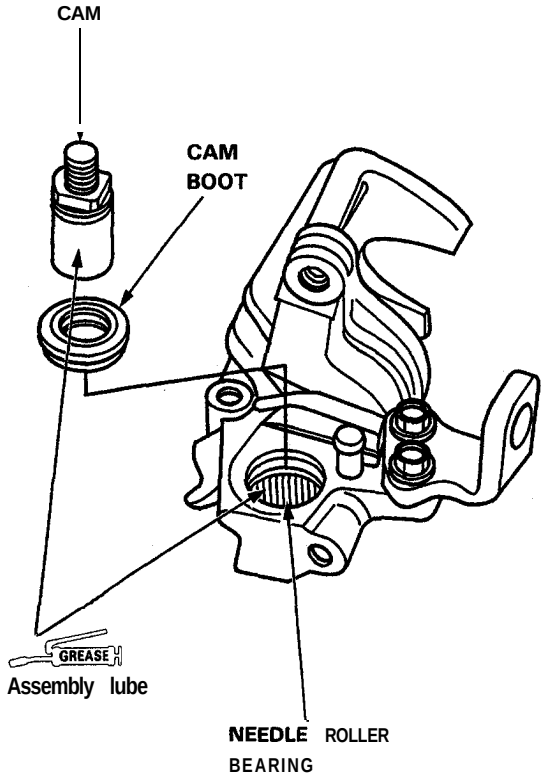
CAUTION:
- Make sure **all** parts are clean before ressembly.
- **Use only new replacement parts.**
- **Use only clean DOT3 or 4 brake fluid.**
- **Do not allow dirt or other foreign matter *to* contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish. **Wash spilled brake fluid off immediately with clean water.**

1. Pack all cavities of the needle bearing with a commercially available assembly lube

2. **Coat the *new* cam boot with a commercially** available assembly lube and install in the caliper.

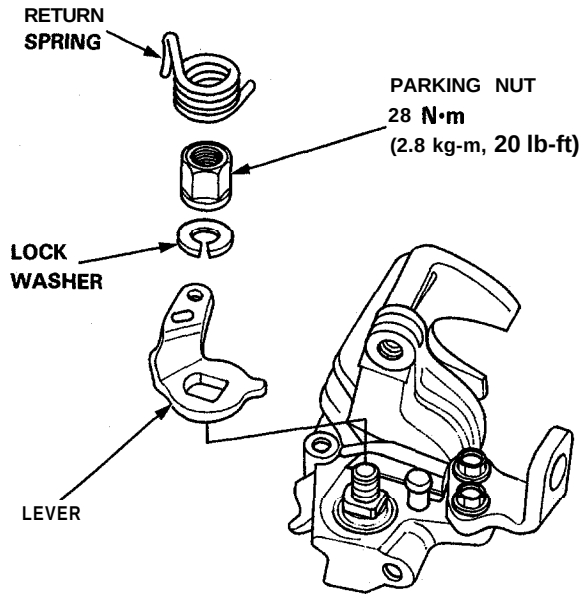
3. Install the cam with threaded end facing up.

CAUTION:
- **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.**



4. Install the lever, lock washer and parking nut, then tighten the parking nut.

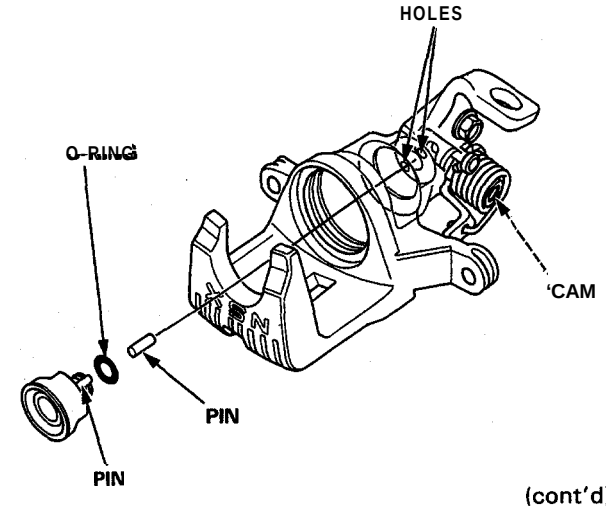
5. **Install the return spring.**



6. Install the pin in the cam.

7. Install a new O-ring on the sleeve piston.

8. 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.



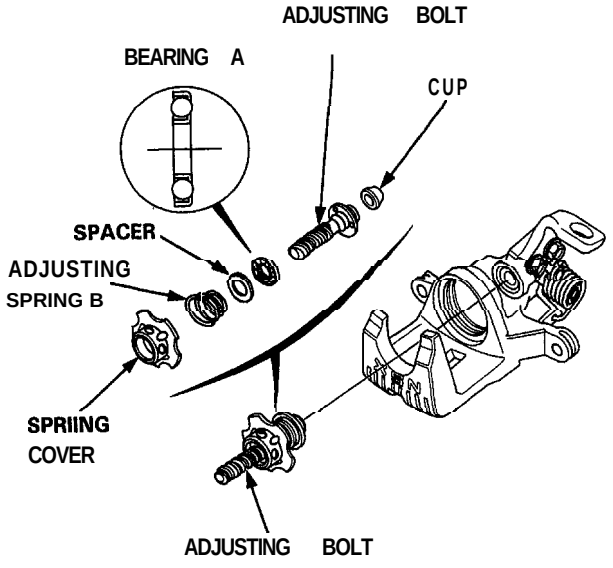
(cont'd)

· Reassembly (cont'd)

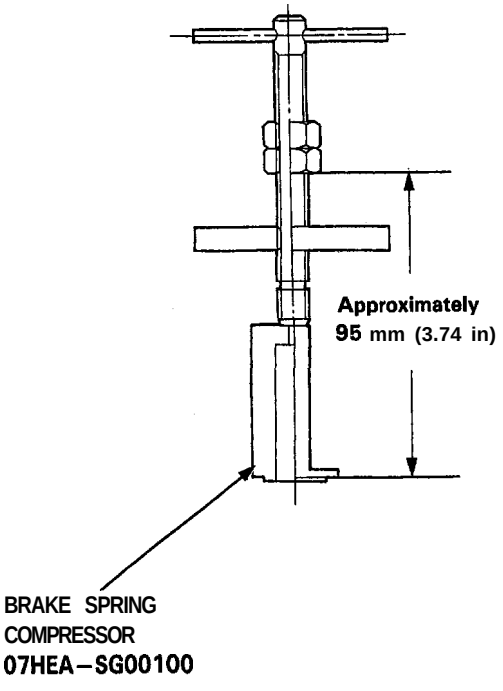
9. Install a new cup with its groove facing the bearing A side on the adjusting bolt.

10. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install in the caliper cylinder.

NOTE: Install the bearing A with its open end facing the spacer.



11. Adjust the special tool as shown.



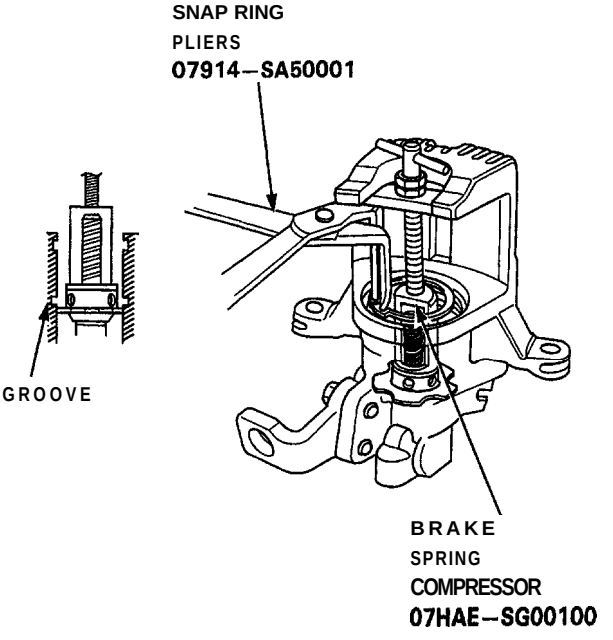
12. Install the special tool as shown.

13. Compress the spring until it bottoms out.

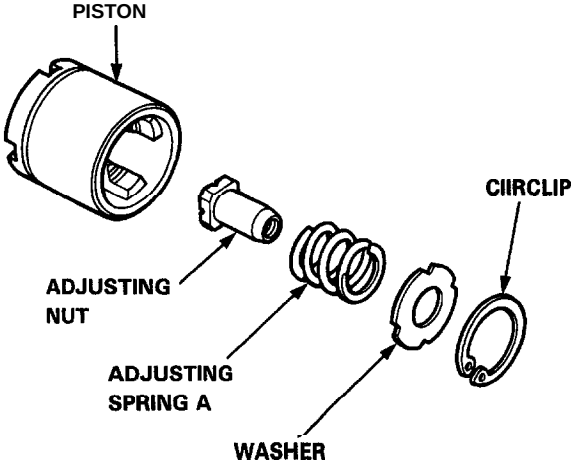
14. Check that the flared end of the spring cover is below the retaining ring groove.

15. Install the retaining ring then remove the brake spring compressor.

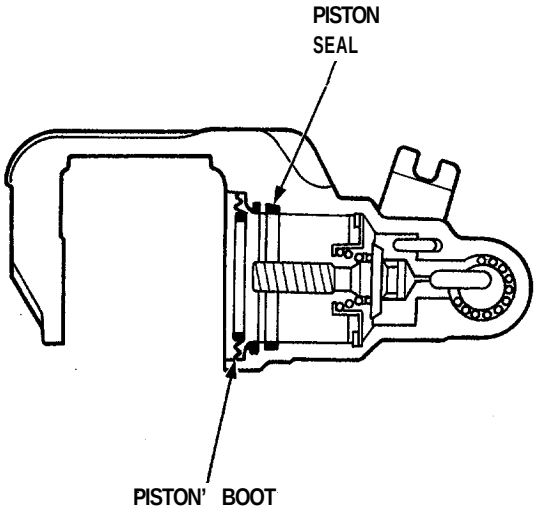
NOTE: Check that the retaining ring is seated in the groove properly.



16. Install the adjusting nut, adjusting spring A, and washer, then secure with the circlip.

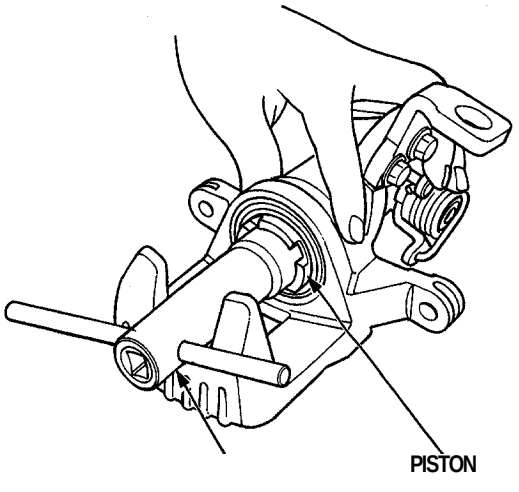


17. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.



18. Coat the outside of the piston with silicone grease, and install it on the adjusting bolt while rotating it clockwise.

CAUTION: Avoid damaging the piston boot.



19. Install the brake pad retainers and brake pads.

20. Install the pad spring on the caliper.

21. Install the caliper on the caliper bracket and tighten the caliper mounting bolts.

22. Connect the brake hose to the'caliper with new sealing washers and tighten the banjo bolt.

23. Connect the parking brake cable to the arm on the caliper.

24. Fill the brake reservoir up and bleed the brake system (page 19-I 0).

25. Operate the brake pedal several times, then adjust the parking brake lever.

NOTE: Before adjustments, make sure the parking brake arm on the caliper touches the pin.

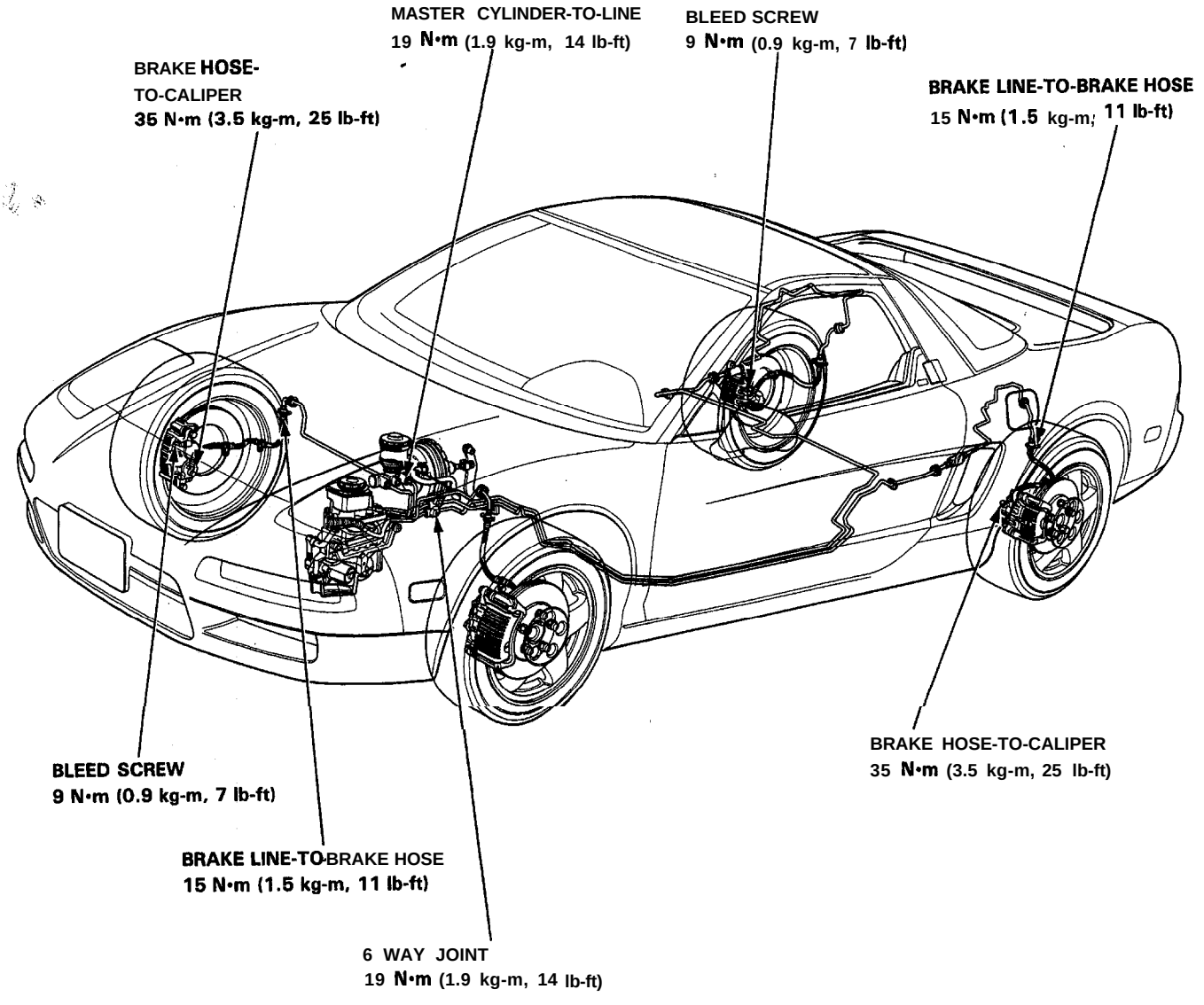
26. Install the caliper shield and tighten the bolts.

Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

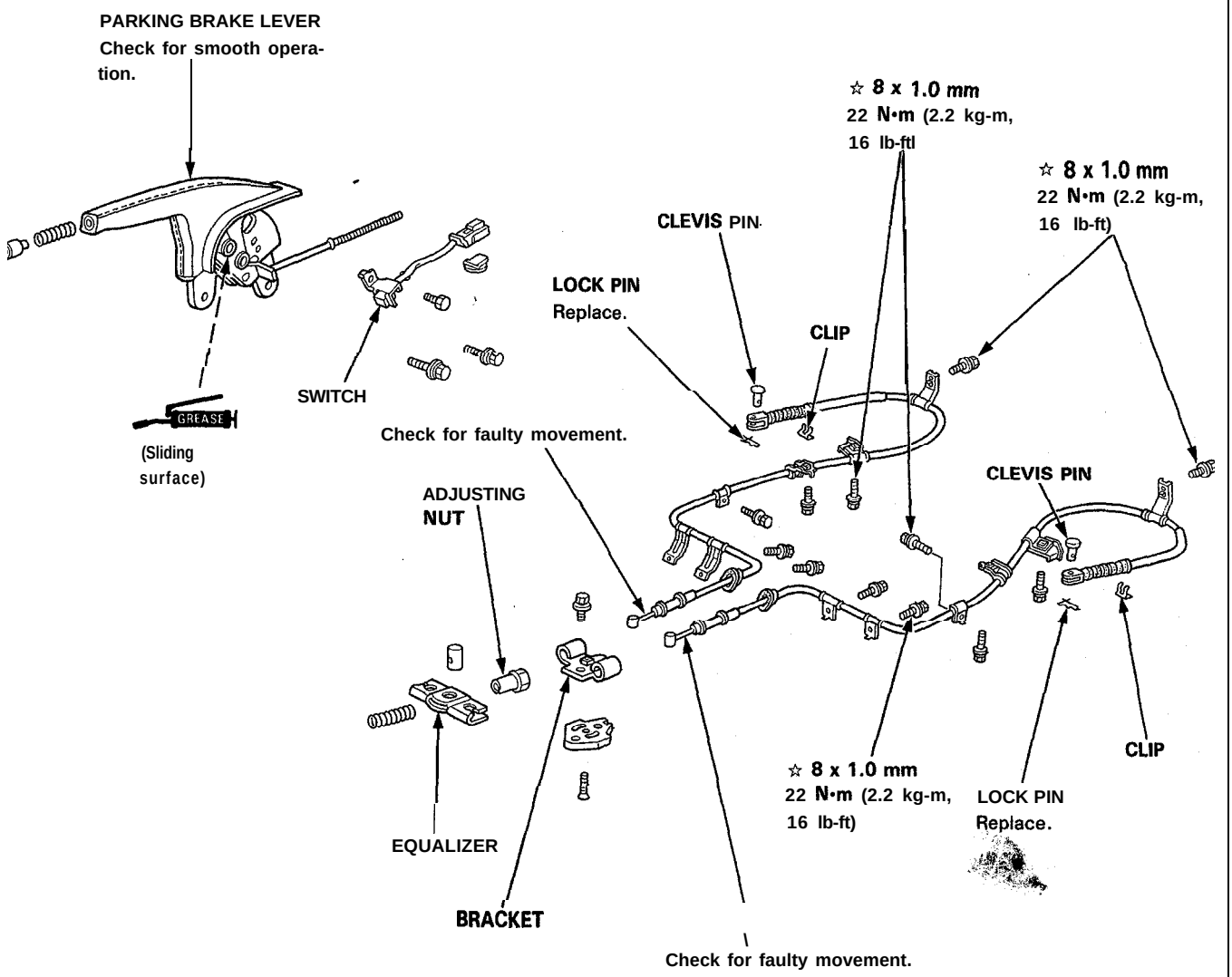
CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



Parking Brake

- Disassembly and Reassembly

☆ : CORROSION RESISTANT BOLT



ALB Description

Features/Construction/Operation

General

In a conventional brake system, if the brake pedal is depressed excessively, 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 maneuverabily of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.

The Anti-Lock Brake system modulates the pressure of the brake fluid applied to each caliper, thereby preventing the **locking of the wheels, whenever the wheels are likely to be locked due to excessive braking. It then restores normal** hydraulic pressure when there is no longer any possibility of wheel locking.

4 Channel Anti-Lock Brake system Features

- Increased braking stability can be achieved regardless of changing driving conditions.
- The maneuverability of the vehicle is improved as the system prevents the front wheels from locking.
- When the anti-lock brake system goes into action, kick-back is felt on the brake pedal.
- The anti-lock brake system is equipped with a self-diagnosis function. When an abnormality is detected, the system indicator light comes on.
  The location of the system's trouble can be diagnosed from the frequency of the system indicator light display blinks.
- **This system has individual control of the front and rear wheels.**
  Braking force is controlled on each of the four wheels independently, resulting in optimum braking efects on the four wheels.
  The system has a fail-safe function that allows normal braking if there's a problem with the anti-lock brake system.
- **DIFFERENCES BETWEEN THE 3 CHANNEL AND 4 CHANNEL ANTI-LOCK BRAKE SYSTEM**

Items	3 Channel	4 Channel
Gear Pulser	Front: 50 Rear: 50	Front: 47 Rear: 50
Control Unit	12 and 18 pins	18 and 20 pins
Modulator Solenoid Unit	4 Pistons 3 Solenoid Valves	4 Pistons 4 Solenoid Valves
Service Check Connector	No	Yes
System Control Methord	Front wheels controlled independently. Rear wheels controlled commonly	Four wheels controlled independently.
Rear Brakes are provided with PCV function (Prooortionina Control Valve)	Yes	No

Construction

In addition to the conventional braking system, the anti-lock brake system is composed of: gear pulsers attached to the rotating part of individual wheels; speed sensors, which generate pulse signals in correspondence to the revolution of the gear pulsers; control unit, which controls the working of the anti-lock brake system by performing calculations based on the signals from the individual speed sensors and the individual switches; modulator unit, which adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the control unit; an accumulator, in which high-pressure brake fluid is stored; a pressure switch, which detects the pressure in the accumulator and transmits signals to the control unit; a power unit, which supplies the high-pressure working fluid to the accumulator by means of a pump; a motor relay for driving the power unit; a fail-safe relay, which cuts off the solenoid valve ground circuit when the fail-safe device is at work; and, an anti-lock brake system indicator light.

Master Cylinder

1. Construction

A tandem master cylinder is adopted for the master cylinder in order to improve safety of the braking system. In addition, a center valve method is introduced so as to match the anti-lock brake system operation.

The master cylinder has one reservoir tank which is connected to the cylinder sections by two small holes. It has two pistons-primary and secondary, which are criss-cross connected with the calipers so that the fluid pressure works separately on each system (front right wheel & rear left wheel, and front left wheel & rear right wheel).

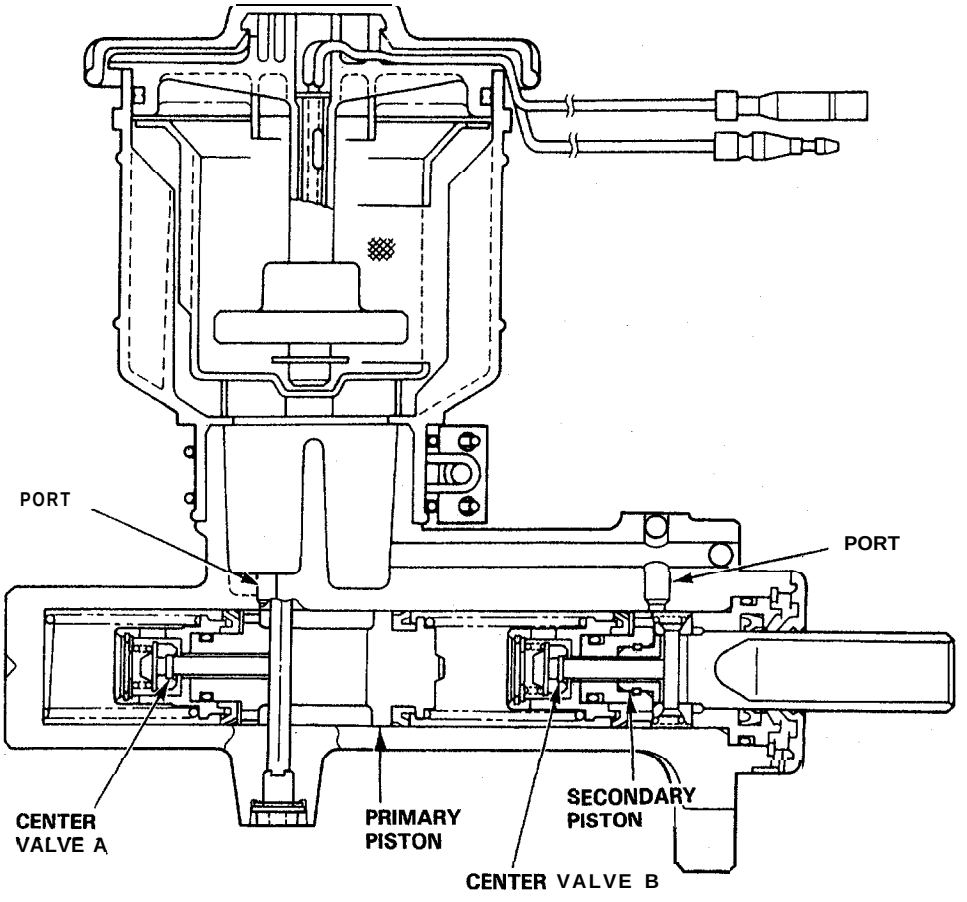
A stop bolt for controlling movement of the primary piston is provided at the side of the master cylinder body.

A reed switch for detecting the brake fluid volume is also provided on the cap of the reservoir tank.

2. Operation

When the brake pedal is depressed, the secondary piston is pushed through the brake booster and the center valve B is closed so that the fluid pressure is generated on the secondary side. At the same time, the primary piston is pushed by the secondary fluid pressure and the center valve A is closed so that braking fluid pressure is generated both on the primary and secondary sides.

When the brake pedal is released, the primary and secondary pistons are returned to the original position by the brake fluid pressure and piston spring.

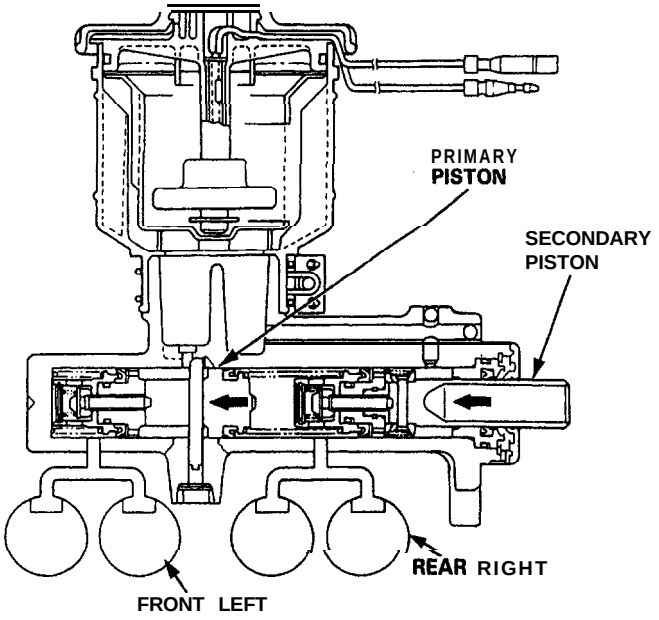


(cont'd)

3. Responses when fluid is leaking

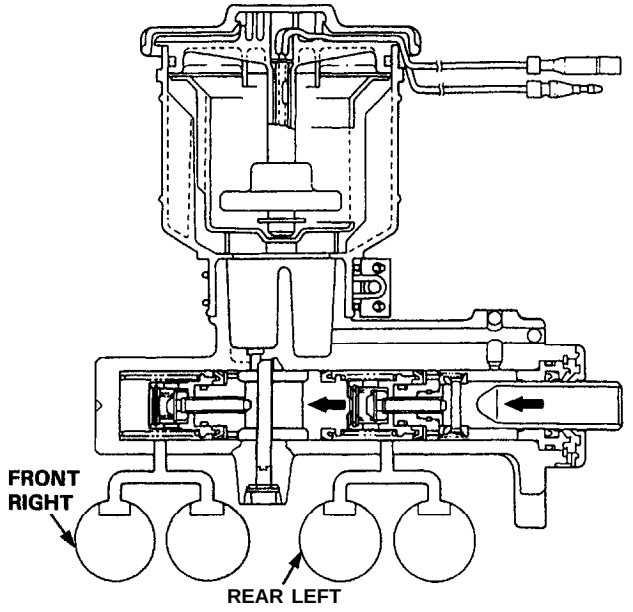
(1) **In case of leaking from the primary system**

Since the fluid pressure on the primary side does not rise, the primary piston is pushed by the fluid pressure of the secondary piston and the tension of the piston spring until the end hits on the cylinder; the braking is performed by the fluid pressure on the secondary side.



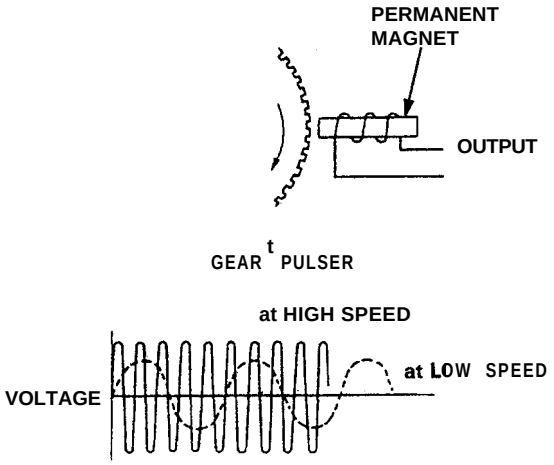
(2) In case of leaking from the secondary system

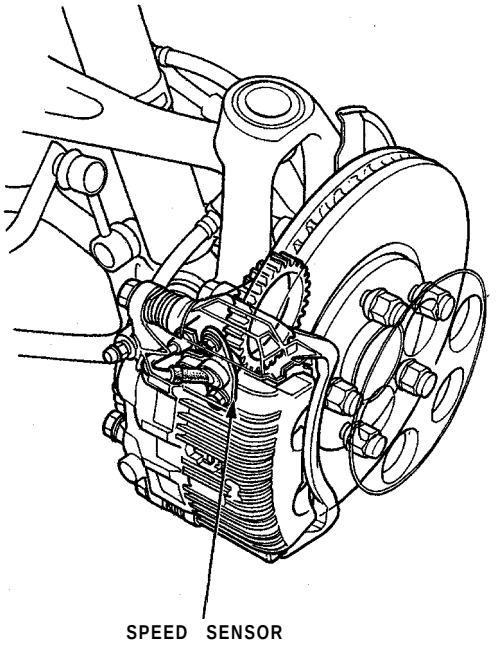
The secondary piston does not produce fluid pressure, keeps moving ahead, hits on the end surface of the primary piston so that the primary piston is pushed under the same condition as an ordinary rod; the **braking** is performed by the fluid pressure on the primary side.



Speed Sensor

The speed sensor is a contactless type and it detects the rotating speeds of a wheel. It is composed of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel (rear wheel: outboard joint of the driveshaft, front: hub bearing unit) turn, the magnetic flux around the coil in the speed sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are inputted into the control unit and the control unit identifies the wheel speeds.





(cont'd)

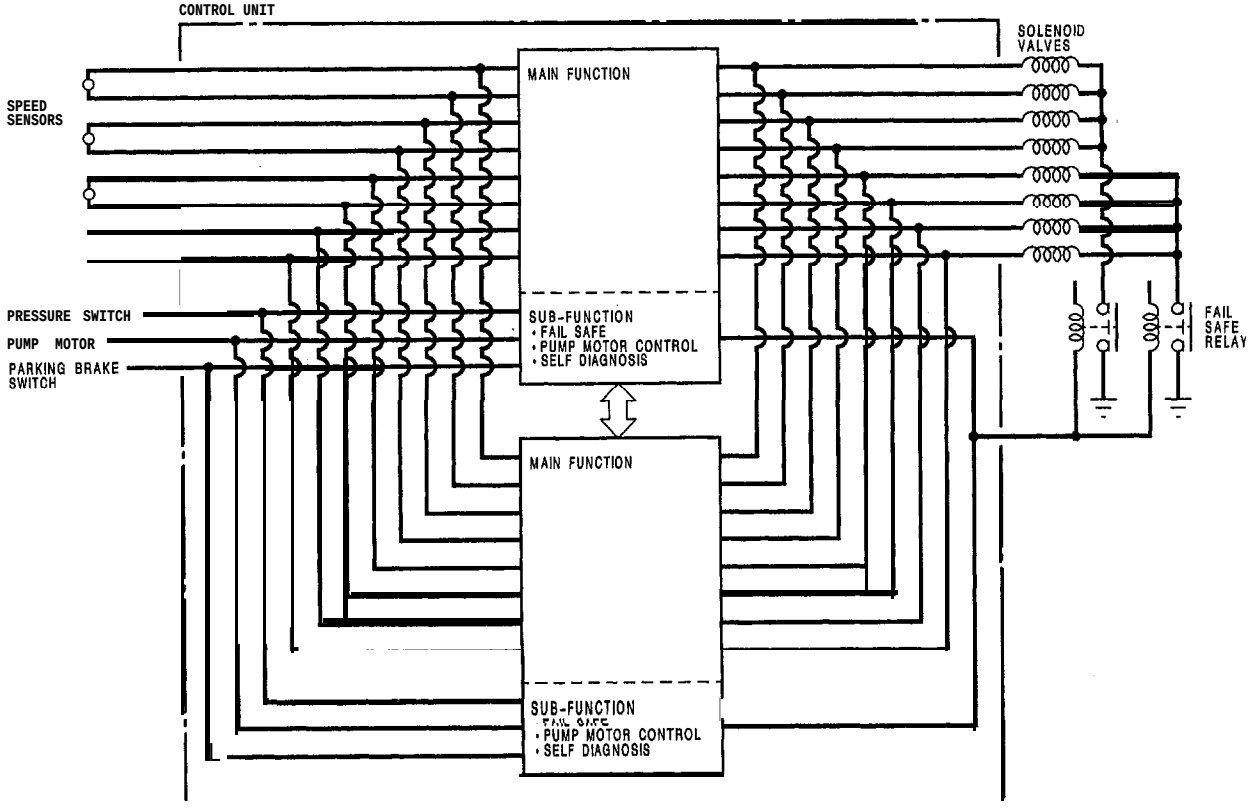
ALB Description

Features/Construction/Operation (cont'd)

Control Unit

The control unit consists of a main function section, which controls the operation of anti-lock brake system, and sub-function, which controls the pump motor and "self-diagnosis."

1. Main Function
   The main function section of the control unit performs calculations on the basis of the signals from each speed sensor and controls the operation of the anti-lock brake system by putting into action the solenoid valves in the modulator unit for each front and rear brake.
2. Sub-Function
   The sub-function section gives driving signals to the pump motor and also gives "self-diagnosis" signals, necessary for backing up the anti-lock brake system.



Self-Diagnostic Function

Since the anti-lock brake system modulates the braking pressure when a wheel is about to lock, regardless of the driver's intention, the system operation and the braking power will be impaired if there is a malfunction in the system. To prevent this possibility, at speeds above 10 km/h (6 mph), the self diagnosis function, monitors the main system functions. When an abnormality is detected, the anti-lock brake system indicator light goes on.

There is also a check mode of the self-diagnosis system itself: when the ignition switch is first turned on, the anti-lock brake system indicator light comes on and stays on for a few seconds after the engine starts, to signify that the self-diagnosis system is functional.

Fail-Safe Function

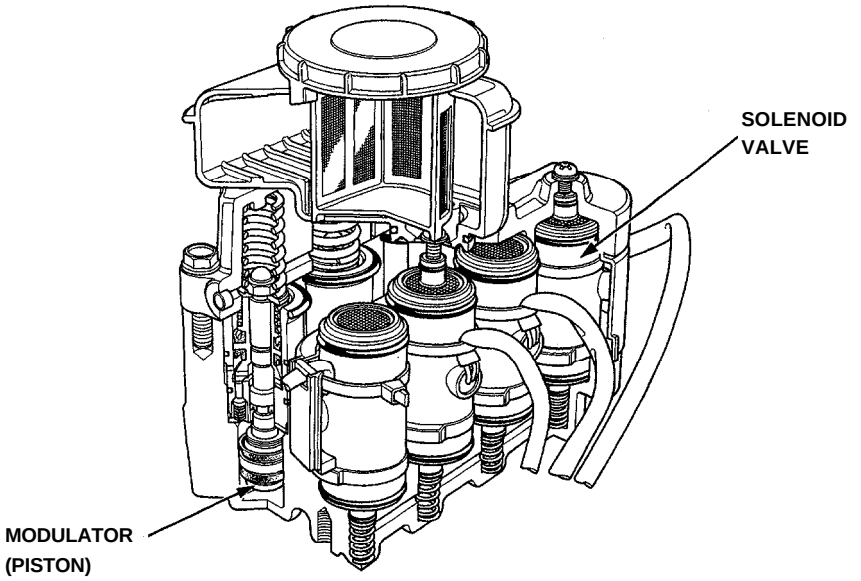
If an abnormality is detected, the control unit turns off the fail-safe relays and motor relay. In this condition the anti-lock brake system is prevented from functioning, yet the basic brake system continues to operate normally.

The Anti-lock Brake System Indicator Light Comes On

1. When the fluid pressure pump runs more than 120 seconds.
2. When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
3. When the rear wheel(s) is (are) locked more than a specified time.
4. When the wheel rotation signal is not transmitted due to faulty wire or sensor.
5. When the operation time of the solenoid valve(s) exceeds a predetermined valve and the control unit finds an open in the solenoid circuit.
6. When the output signals from both main functions in the control unit are not transmitted to the solenoid valve(s).

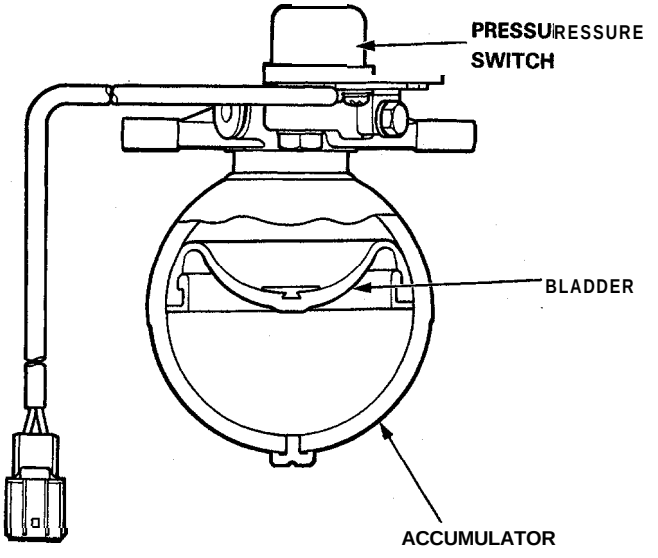
Modulator Unit

Modulators and solenoid valves for each wheel are integrated in the modulator unit.
The modulators for front and rear brakes are of independent construction.
The solenoid valve features quick response (5 ms or less).
The inlet and outlet valves are integrated in the solenoid valve unit.



Accumulator

The accumulator is a pneumatic type which accumulates high-pressure brake fluid fed from the pump incorporated in the power unit. When the anti-lock brake system operates, the accumulator feeds high-pressure brake fluid to the modulator **valve via the inlet side of the solenoid valve.**



(cont'd)

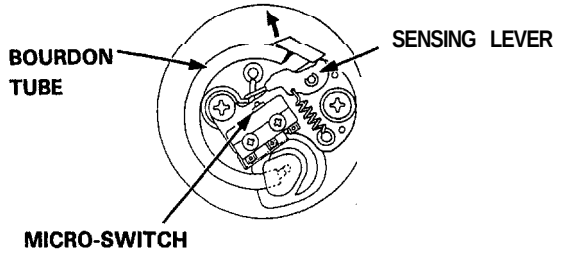
Features/Construction/Operation (cont'd)

Pressure Switch

The pressure switch monitors the pressure accumulation (pressure from the pump) in the accumulator and is turned off when the pressure becomes lower than a prescribed level. When the pressure switch is turned off, the switching signal is sent to the control unit. Upon receiving the signal, the control unit activates the pump motor relay to operate the motor. If the pressure doesn't reach the prescribed value, the system indicator light is turned on.

Operation

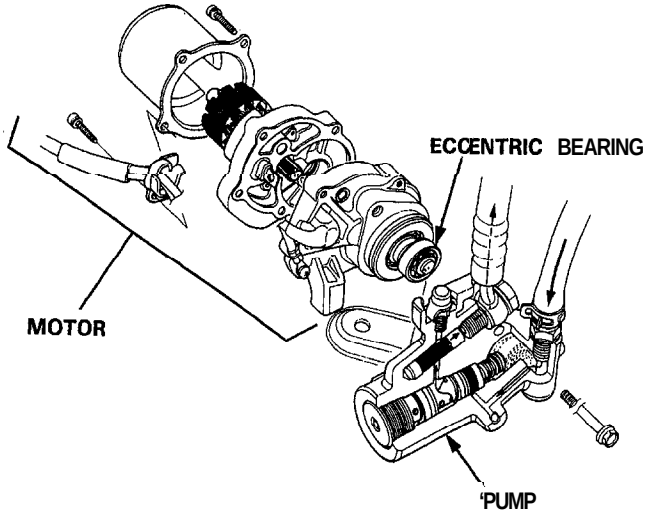
When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outwards. When the free end of the Bourdon tube moves more than the prescribed amount, the micro-switch is activated by the force of the spring attached to the sensing lever. When the pressure in the accumulator decreases due to anti-lock brake system operations, the Bourdon tube moves in the direction opposite to the one described above, and the micro-switch is eventually turned off. Upon receiving this signal, the control unit activates the motor relay to operate the motor.



Power Unit

The power unit is composed of a motor and a plunger-type pump. This unit transmits the revolution of the motor to the plunger by way of an eccentric bearing and supplies high-pressure brake fluid to the accumulator by the effect of the reciprocating movement of the plunger.

When the pressure in the accumulator drops below the prescribed pressure level, the pressure switch gives an OFF-signal. The control unit turns the motor relay ON to start the operation of the pump, upon the reception of this signal and a signal from the wheel sensor that the vehicle is running at a speed greater than 10 km/h. When the pressure in the accumulator attains the prescribed pressure, the control unit turns the motor relay OFF approximately three seconds after the unit receives an ON-signal from the pressure switch. By this, the high-pressure in the accmulator is maintained. The control unit turns the pump off and lights the system indicator light if the accumulator pressure does not reach the prescribed level after the pump has run continuously for 120 seconds.

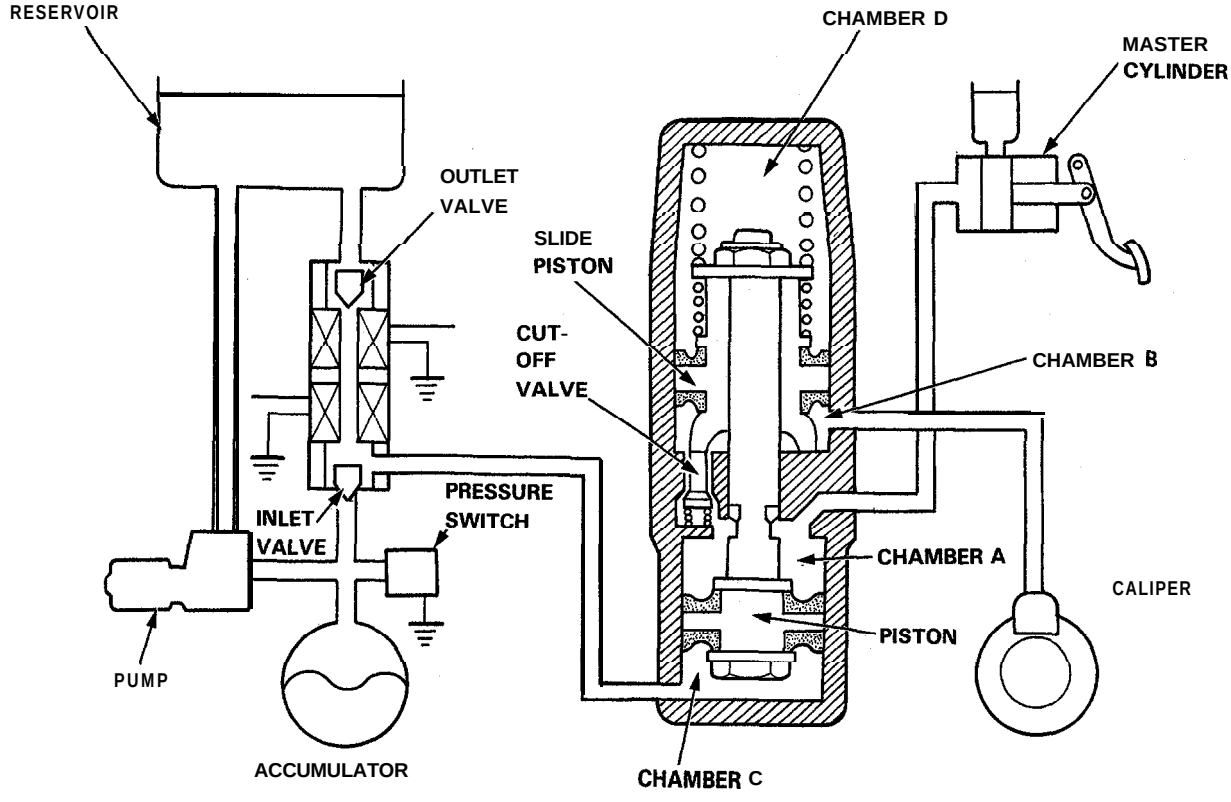


Operation

1. Ordinary Braking Function

In ordinary brake operations, the cut-off out valve in the modulator is open to transmit the hydraulic pressure from the master cylinder to the brake calipers via the chamber A and the chamber B.

The chamber C is connected to the reservoir through the outlet valve which is normally open. It is also connected to the hydraulic pressure source (pump, accumulator, pressure switch, etc.) via the inlet valve which is normally closed. The chamber D serves as an air chamber. Under these conditions, the pressures of the chambers C and D are maintained at about the atmospheric pressure, permitting regular braking operations.



(cont'd)

ALB Description

Features/Construction/Operation (cont'd)

If brake inputs (force excerted on brake pedal) are excessively large and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the outlet valve and opening the inlet valve. As a result, the high pressure is directed into chamber C, the piston is pushed upward, causing ths slide piston to move upward and the cut-off valve to close.

As the cut-off valve closes, the flow from the master cylinder to the caliper is interrupted, the volume of chamber B, which is connected to the caliper, increases, and the fluid pressusre in the caliper declines.

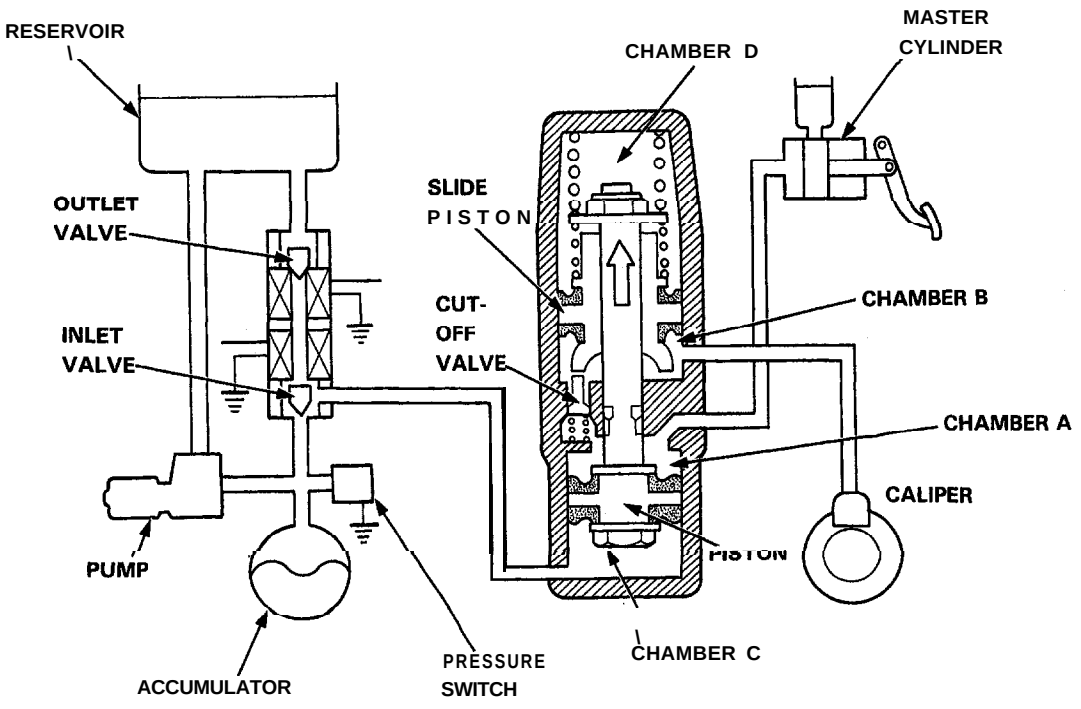
When both of the two valves, inlet and outlet, are closed (when only the outlet valve is activated) the pressure in the caliper is maintained constant.

When the possibility of wheel locking ceases, it is necessary to restore the pressure in the caliper. The solenoid valve is therefore turned off (outlet valve: open, inlet valve closed).

Process	Caliper Pressure	Outlet Valve		Inlet Valve	
		Electric Power	Hydraulic Circuit	Electric Power	Hydraulic Circuit
Caliper pressure declining	Down	O N	Close	ON	Open
Caliper pressure constant	Hold	O N	Close	OFF	Close
Caliper pressure increasing	Up	O F F	Open	OFF	Close

Slide Piston Function

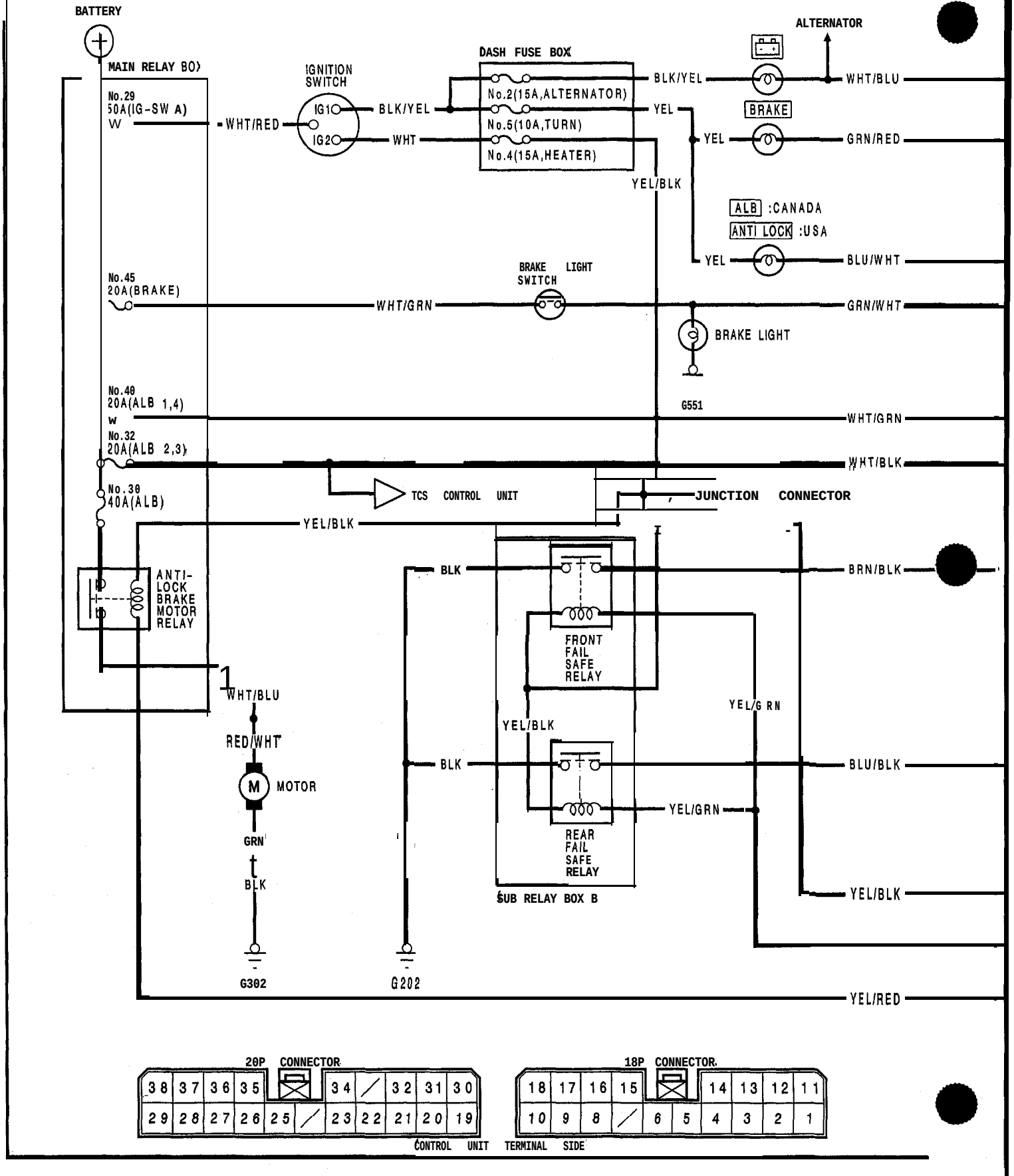
When the car is used on rough roads where the tires sometimes lose adhesion, the anti-lock brake system may function excessively, causing an excessively large volume of brake fluid to flow into the chamber C. As this occurs, the piston is moved excessively, resulting in an abnormal loss of pressure in the chamber B. In order to overcome this problem, the slide piston is kept in the proper position by the spring force to avoid a negative pressure in the chamber B.

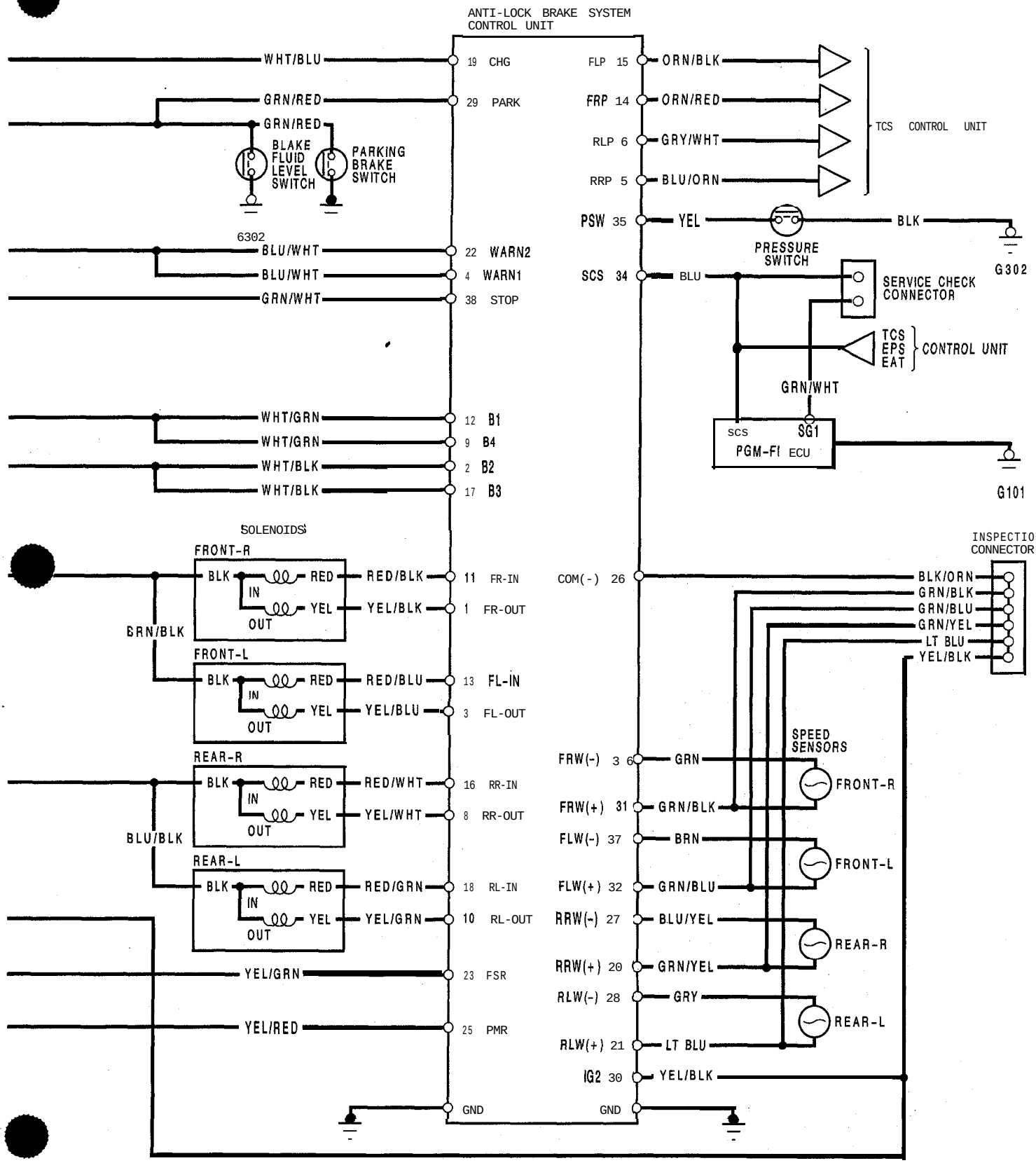


Kickback

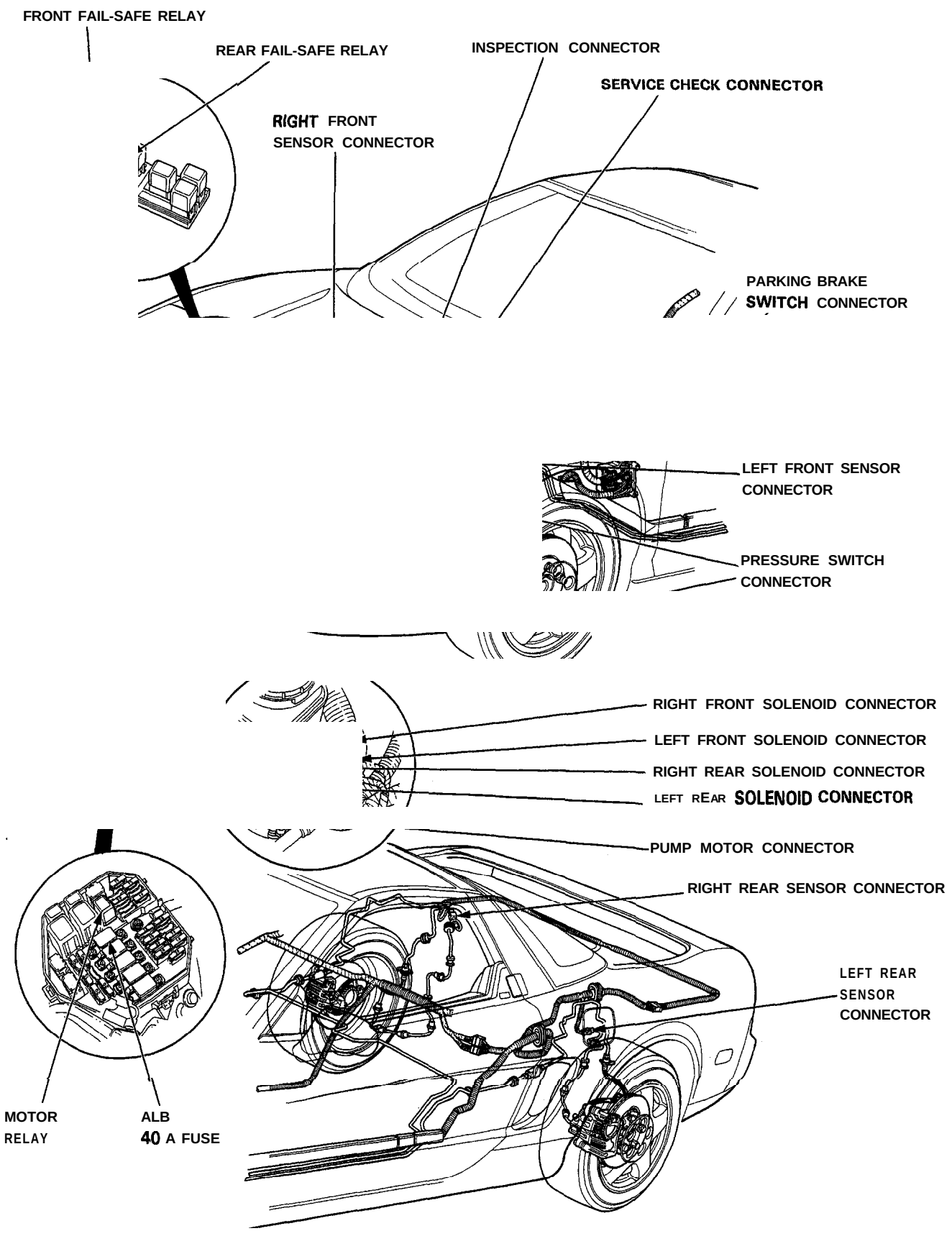
When anti-lock brake system is functioning, the piston moves upward, the volume of chamber B increases, and the fluid pressure on the caliper side is reduced. At the same time, the volume of chamber A is reduced and the brake fluid is returned to the master cylinder. When the brake fluid is pushed back to the master cylinder, the driver can feel the functioning of the anti-lock brake system because the brake pedal is kicked back.

Circuit Diagram




ANTI-LOCK BRAKE SYSTEM CONTROL UNIT
WHT/BLU
19 CHG
GRN/RED
29 PARK
GRN/RED
BLAKE FLUID LEVEL SWITCH
PARKING BRAKE SWITCH
6302
BLU/WHT
22 WARN2
BLU/WHT
4 WARN1
GRN/WHT
38 STOP
WHT/GRN
12 B1
WHT/GRN
9 B4
WHT/BLK
2 B2
WHT/BLK
17 B3
SOLENOIDS
FRONT-R
BLK
RED
IN
YEL
OUT
RED/BLK
11 FR-IN
YEL/BLK
1 FR-OUT
BRN/BLK
FRONT-L
RED/BLU
13 FL-IN
YEL/BLU
3 FL-OUT
REAR-R
RED/WHT
16 RR-IN
YEL/WHT
8 RR-OUT
BLU/BLK
REAR-L
RED/GRN
18 RL-IN
YEL/GRN
10 RL-OUT
YEL/GRN
23 FSR
YEL/RED
25 PMR
GND
FLP 15
ORN/BLK
FRP 14
ORN/RED
RLP 6
GRY/WHT
RRP 5
BLU/ORN
TCS CONTROL UNIT
PSW 35
YEL
PRESSURE SWITCH
BLK
G302
SCS 34
BLU
SERVICE CHECK CONNECTOR
TCS
EPS
EAT
CONTROL UNIT
GRN/WHT
SCS
SG1
PGM-FI ECU
G101
INSPECTION CONNECTOR
COM(-) 26
BLK/ORN
GRN/BLK
GRN/BLU
GRN/YEL
LT BLU
YEL/BLK
SPEED SENSORS
FRW(-) 36
GRN
FRONT-R
FRW(+) 31
GRN/BLK
FLW(-) 37
BRN
FRONT-L
FLW(+) 32
GRN/BLU
RRW(-) 27
BLU/YEL
REAR-R
RRW(+) 20
GRN/YEL
RLW(-) 28
GRY
REAR-L
RLW(+) 21
LT BLU
IG2 30
YEL/BLK
GND

Wiring/Connector Location



ALB Checker

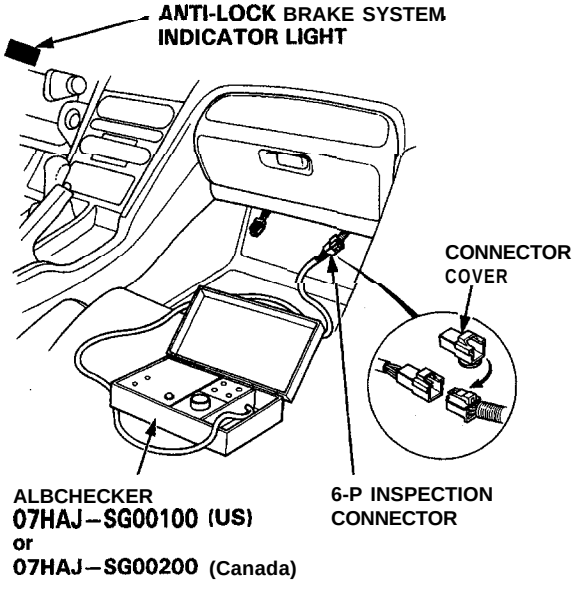
- Function Test

NOTE:

- The ALB checker is designed to confirm proper operation of the anti-lock brake system by simulating each system function and operating condition. Before using the checker, confirm that the anti-lock brake system indicator light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off one second after the engine is started.
- The checker should be used through modes, I-5, to confirm proper operation of the system, in any one of the following situations:
  - After replacing any anti-lock brake system component.
  - After replacing or bleeding the system fluid (0 mode not necessary).
  - After any body or suspension repair that may have affected the sensors or their wiring.
- The procedure for modes I-5 are on this page and 19-42, mode 0 (wheel sensor signal) is on page 19-43.
- Use the following models of the ALB checkers:
  07HAJ-SG00100 (US)
  07HAJ-SG00200 (CANADA)

⚠WARNING **Disconnect** the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover located under the glove box and connect the 6-P inspection connector to the ALB checker.

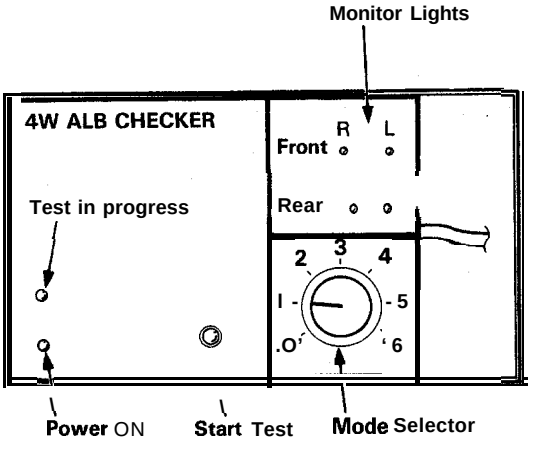


NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

2. Start the engine and release the parking brake.

3. Operate the ALB checker as follows,
   (1) Turn the Mode Selector switch to "1".
   (2) Push the Start Test switch:
   - The test in progress light should come ON.
   - In one or two more seconds, all four monitor lights should come on (If not the checker is faulty).
   - The anti-lock brake system indicator light should not come ON (If it comes on the checker harness to the 6-P connector connection is faulty).

NOTE: When test in progress indicator light ON, don't turn the Mode Selector switch.



(cont'd)

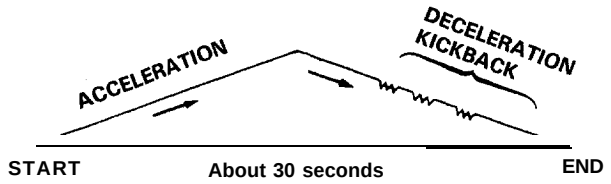
ALB Checker

Function Test (cont'd)

4. **Turn the Mode Selector switch further to "2".**

5. Depress the brake pedal firmly and push the Start Test switch
   The anti-lock brake system indicator light should not go on while the Test in Progress light is ON.
   There should be kickback on the brake pedal. If not **as described, go to troubleshooting, page 19-44.**

   NOTE: The operation sequence simulated by Modes 2, 3, 4 and 5:



6. **Turn the Mode Selector switch to 3, 4 and 5.**
   Perform step 5 for each of the test mode positions.

Mode 1:
Sends the simulated driving signal 0 km/h (0 mph) → **180 km/h (112.5 mph) → 0 km/h** (0 **mph) of** each wheel to the control unit to check the control **unit self diagnosis circuit. There should be NO** kickback.

Mode 2:
Sends the driving signal of each wheel, then sends **the lock signal of the rear left wheel to the control** unit. There should be kickback.

Mode 3:
Sends the driving signal of each wheel, then sends the lock signal of the rear right wheel to the control unit. There should be kickback.

Mode 4:
Sends the driving signal of each wheel, then sends the lock signal of the front left wheel to the control unit. There should be kickback.

Mode 5:
Sends the driving signal of each wheel, then sends **the lock signal of the front right wheel to the control unit. There should be kickback.**

NOTE: If little or no kickback is felt from the brake pedal in modes 2-5, repeat the function test of modes I-5 several times before beginning to troubleshoot other parts of the system.

Mode 6:
Not used on this model.

Inspection points:

1. The anti-lock brake system indicator light goes ON **in mode 1.**
   - **Check the wiring. If it is in good condition, the control unit is faulty.**
     If anti-lock brake system indicator light goes on **120 seconds later but the power unit stops, refer to page 19-47.**

2. **There are no kickback in modes 2 through 5.**
   - **Faulty pressure switch (remains ON)**
   - **Shorted wires**
   - Faulty or disconnected power unit connector
   - **Faulty power unit relay**

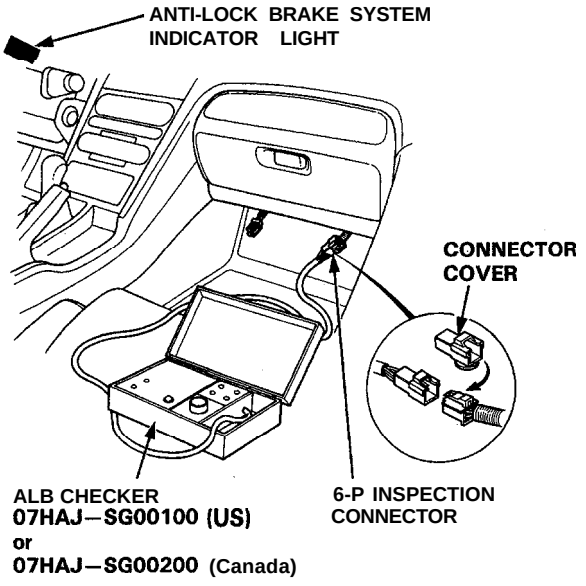
3. **Weak kickback in modes 2 through 5.**
   - **Bleed high pressure circuits.**

4. Power unit stops in mode 1 but it does not stop and **there are no kickback in modes 2 through 5.**
   - **Brake fluid leakage**
   - **Bleed power unit**
   - **Clogged power unit outlet**
   - **Clogged or deteriorated power unit hose**

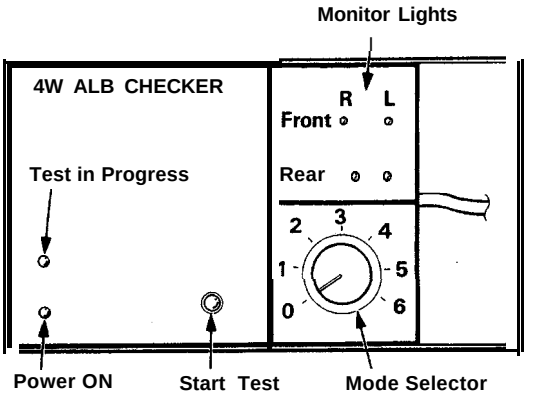
· Wheel Sensor Signal Confirmation

NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

1. Disconnect the 6-P inspection connector from the connector cover located under the glove box and connect the 6-P inspection connector to the ALB checker.



2. Raise the car so that all four wheels are off the ground and support on safety stands (see page 1-6 through 8).
3. Turn the ignition switch ON.
4. Turn the Mode Selector switch to "0".



5. With the transmission in neutral, rotate each wheel briskly (one revolution per second) by hand, and confirm that its respective monitor light on the checker blinks as the wheels rotates.

NOTE:
- Rotating a wheel too slowly will produce only a weak blink of its monitor light that may be difficult to see.
- In bright sunlight, the monitor light may be difficult to see. Perform tests in a shaded area.
- In some instances, it may not be possible to spin the rear wheels fast enough to get a monitor indication, if necessary, start the engine and slowly accelerate and decelerate the rear wheels. The monitor lights should blink indicating a good wheel sensor signal.

If any monitor light fails to blink, check the suspected sensor, its air gap and its wiring/connectors.

Anti-lock Brake System Indicator Light

Temporary Driving Conditions:

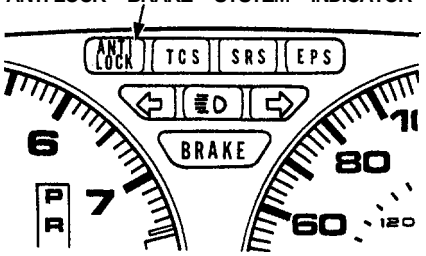
1. The anti-lock brake system indicator light will come on and the control unit memorizes the problem under certain conditions.

   NOTE: Problem codes explained on pages 19-46.

   - The tire(s) adhesion is lost due to excessive cornering speed.
     Problem codes: 5, 5-4, 5-8.
   - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
     Problem code: 4-1, 4-2, 4-4, 4-8.
   - When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
     Problem code: 2.
   - The vehicle is driven on extremely rough road.

   The anti-lock brake system is OK, if the anti-lock brake system indicator light: goes off after the engine is restarted.

ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT



2. If you receive a customer's report that the anti-lock brake system indicator light sometimes comes on, check the system using the ALB checker to confirm whether there is any trouble in the system.
   See page 19-41.

3. The anti-lock brake system indicator light will come on and the control unit will store a problem code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be jump-started. After the battery is sufficiently recharged, the anti-lock system indicator light will work normally after the engine is stopped and restarted.

   However, after recharging the battery, the problem code must be cleared from the control unit's memory by disconnecting the ALB 2.3 (No. 32) fuse for at least 3 seconds.

Anti-lock Brake System Indicator Light Circuit:

CAUTION: Use only the digital multimeter to check the system.

1. The indicator light, does not go on when the ignition switch is turned on.
   Check the following items. If they are OK, check the control unit connectors.
   If not loose or disconnected, install a new control unit and recheck:

   - Blown anti-lock brake system indicator light bulb.
   - Open circuit in YEL wire between No. 5 (10 A) fuse and gauge assembly.
   - Open circuit in BLU/WHT wire between gauge assembly and control unit.
   - Loose component grounding of the control unit to the body.

2. The anti-lock brake system indicator light remains ON or after the engine is started, however the anti-lock brake system indicator light does not blink any code or sub-code. Check the following items:

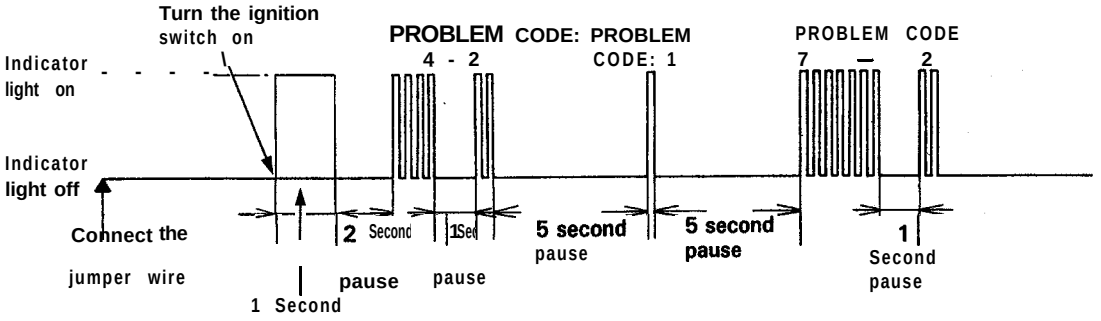
   - Loose or poor connection of the wire harness at the control unit.
   - Faulty ALB 2.3 (No. 32) fuse.
   - Open circuit in WHT/BLK wire between ALB 2.3 (No. 32) fuse and control unit.
   - Open circuit in YEL/BLK wire between fuse No. 4 (15 A) and fail safe relay(s).
   - Open or short circuit in the YEL/GRN wire between fail safe relay(s).
   - Short circuit in BLU/WHT wire between gauge assembly and control unit.
   - Open circuit in WHT/BLU wire between alternator and control unit.

If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.

Comes on and remains on while running:

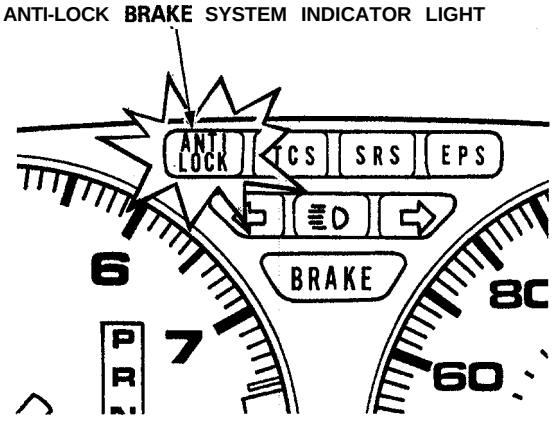
1. **Stop the engine.**
2. Turn the ignition switch on and make sure that the anti-lock brake system indicator light comes on.
3. Restart the engine and check the anti-lock brake system indicator light.
   - **There is no problem in the anti-lock brake system, if the anti-lock brake system indicator light goes off.**
   - **Go to step 4, if the anti-lock brake system indicator light remains on.**
4. **Stop the engine.**
5. Disconnect the service check connector from the connector cover located under the glove box.
   Connect the two terminals of the service check connector with a jumper wire.
6. **Turn the ignition switch on, but do not start the engine.**
7. Record the blinking frequency of the anti-lock brake system indicator lgiht.
   The blinking frequency indicates the problem code.

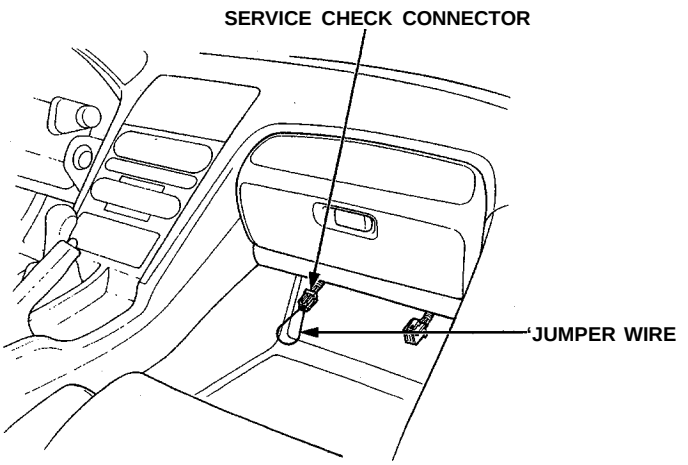
⚠ WARNING **Before starting the engine, disconnect the jumper wire from the service check connector, or else the Check Engine light will stay on when the engine running.**



NOTE:

- **The control unit can indicate three problem codes (one, two or three problems).**
- If the anti-lock brake system indicator light does not light, see Troubleshooting of anti-lock brake system indicator **Light Circuit page 19-44.**
- **If you miscount the blinking frequency, turn the ignition switch off, then turn on to blink the anti-lock brake** system indicator light again.
- **After the repair is completed, disconnect the ALB 2.3 (No. 32) fuse for at least 3 seconds to erase the control** unit's memory. Then turn the ignition key on again and recheck.
- The memory is erased if the connector is disconnected from the control unit or the control unit is removed from **the body.**





Troubleshooting

Symptom-to-System Chart

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
①	—	Hydraulic Controlled Components	—	—	—		19-47	— ALB fuse — Motor relay — Pressure Switch — Accumulator — Modulator	19-71
②	—	Parking brake switch-related problem	—	—	—	—	19-50	Brake fluid level switch BRAKE light	
③	①	Pulser(s)	0				19-71		
	②			0					
	④				0				
	⑧					◯			
④	①	Speed sensor	0				19-51		
	②			0					
	④				0				
	⑧					◯			
⑤	—	Speed sensor(s)			0	0	19-52	— Modulator	
	④				◯				
	⑧					0			
⑥	—		—	—	—	—	19-53 (Function Test)	Front or rear fail-safe relay	
	①	Fail-safe relay —		—		—		Front fail-safe relay	
	④		—	—	—	—		Rear fail-safe relay	
⑦	①	Solenoid related problem (Open or short)	0				19-57		
	②			0				Rear fail-safe relay	
	④				0				
	⑧					0		Front fail-safe relay ALB 1.4 (No. 40) Fuse	

Troubleshooting

Flowcharts

Problem Code 1: Hydraulic Controlled Components.

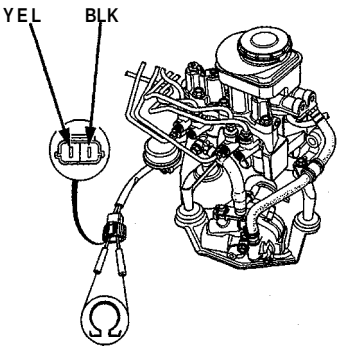
CAUTION: Use only the digital multimeter to check the system.

NOTE:

- The anti-lock brake system indicator light will remain on for about second after the ignition switch has been turned on to show that the system circuit is functioning.
- The anti-lock brake system indicator light does not blink when the following failures occur.
  - The contact points of the motor relay remain closed (the motor runs continuously even after the ignition key is removed).
  - YEL/RED wire is shorted or the control unit is internally shorted (the motor stops when the ignition switch is turned off).

Pre-test steps:

- Check the ALB 40A Fuse.
- Check all brake system hoses and pipes (low and high pressure) for signs of leaking, bending or kinking.
- Check reservoir fluid level, and if necessary, fill to the MAX level.



Disconnect the pressure switch connector and check the continuity between the No. 1 (BLK) and No. 2 (YEL) terminals.

Is there continuity?

YES → Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench. (See page 19-62).

NO

Check the continuity of pressure switch between the No. 1 (BLK) and No. 2 (YEL) terminals.

Is there continuity?

YES → Replace the pressure switch (closed).

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench (see page 19-58).
Jack up the rear of car and support with safety stands, then run the engine in gear above 6 mph (10 km/h).

(To page 19-48)

⚠ WARNING Block front wheels before jacking up rear of car. (See page 1-6 through 8)

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-47)

Does the pump motor run?
- YES → (To page 19-49)
- NO →

Disconnect the 20P connector from the control unit.

Check for continuity between the No. 35 (YEL) terminal and body ground.

Is there continuity?
- YES → Repair short in YEL wire between the control unit and pressure switch.
- NO →

Connect the No. 25 (YEL/RED) terminal to body ground using a jumper wire.
Turn the ignition switch ON.

Does the pump motor run?
- YES → Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.
- NO →

Remove the pump motor relay and check the pump motor relay (page 19-71).

Does it work properly?
- NO → Faulty pump motor relay.
- YES →

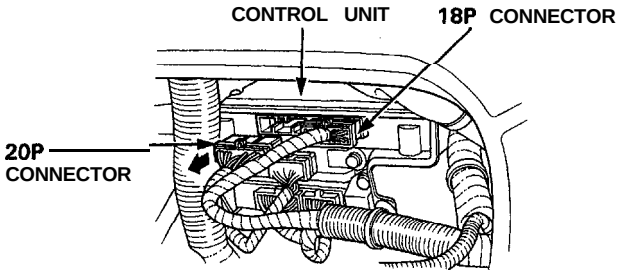
Connect the No. 2 (WHT/BLU) and No. 4 terminals using a jumper wire.

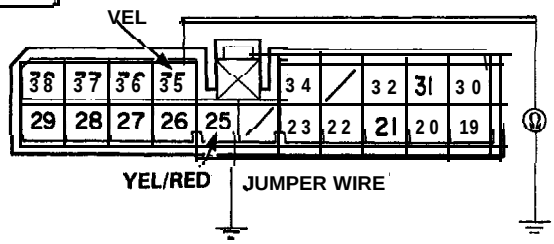
Does the pump motor run?
- NO → (To page 19-50).
- YES →

Check for voltage between the No. 3 (YEL/BLK) terminal (+) and body ground (−).

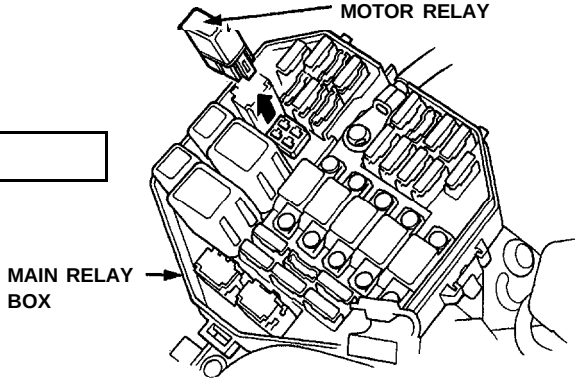
Is there battery voltage?
- NO → Repair open in YEL/BLK wire between the No. 4 fuse and pump motor relay.
- YES →

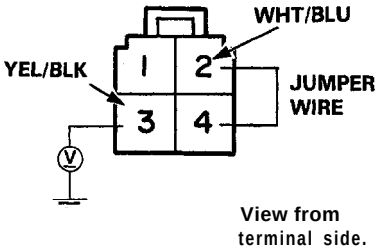
Repair open in YEL/RED wire between the control unit and pump motor relay.





View from control unit terminal side.





View from terminal side.

CAUTION: If the motor runs disconnect the jumper wire immediately.

(From page 19-48)

Does the pump motor run with an increasingly loud, raspy sound?

NO → Pump runs with a constant soft sound:
Bleed air from anti-lock brake system using the procedure on page 19-62 and check the pump sound again.

YES

Does the pump motor stop after about 60 seconds?

NO → Pump stops after about 120 seconds:
faulty pressure switch (open).

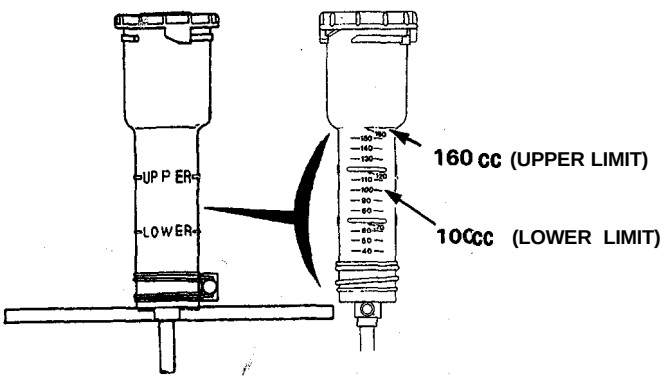
YES

Does the reservoir fluid level go down, and are there no bubbles in the modulator reservoir tank?

NO →
- If level stays the same and there are bubbles in the modulator reservoir tank, check the accumulator fluid quantity by bleeding the high pressure line with the Bleeder T-wrench:
  - If over 160 cc (upper limit), faulty accumulator.
  - If under 100 cc (lower limit), modulator inlet solenoid leak or accumulator leak.
- If level goes up: faulty modulator assembly.

YES

System is OK; recheck pump motor, to confirm no intermittent problem.



NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 minutes for air bubbles to disappear and level to stabilize.

(cont'd)

Flowcharts (cont'd)

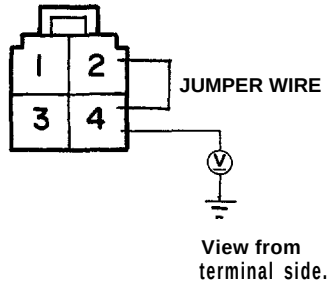
(From page 19-48)

Check for voltage between the No. 4 terminal (+) and body ground (–).

Is there battery voltage?

NO → Faulty main relay box.

YES



View from terminal side.

Check for voltage between the No. 2 (WHT/BLU) terminal (+) of the pump motor and body ground (–).

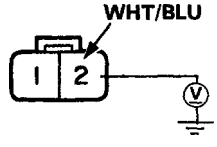
Is there battery voltage?

NO → Repair open in WHT/BLU wire between motor relay and pump motor, or open in BLK wire between pump motor and ground or poor ground (G302).

YES

Faulty pump motor.

HARNESS SIDE CONNECTOR



View from terminal side.

Problem code 2: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

NOTE: Before Troubleshooting Problem Code 2, remove the ALB 2,3 (No. 32) fuse for three seconds to clear the control unit's memory, then test drive the car.

If the anti-lock brake system indicator light stays off, the probability is that the car was driven with the parking brake applied.

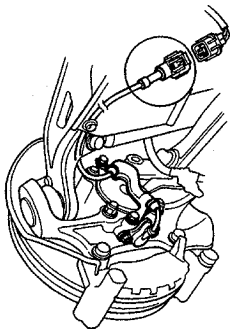
- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED wire is shorted between the BRAKE indicator light and parking brake switch.
- GRN/RED wire is shorted between the BRAKE indicator light and brake fluid level switch.
- The BRAKE indicator light is blown.
- GRN/RED has an open between the BRAKE indicator light and parking brake switch.
- GRN/RED has an open between the parking brake switch and control unit.

Problem Code 4-1 to 4-8: Speed Sensor

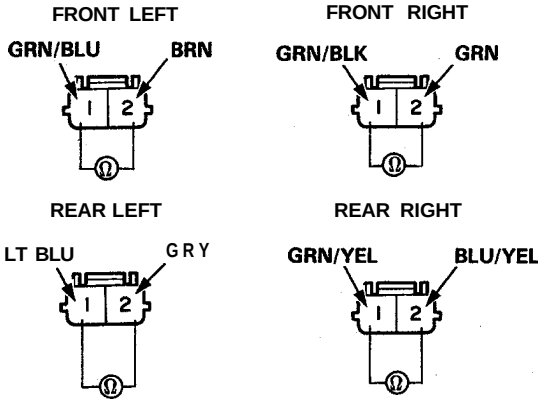
CAUTION: Use only the digital multimeter to check the system.

Disconnect the wire harness from speed sensor.

Check for resistance between the sensor terminals.



SENSOR SIDE CONNECTOR



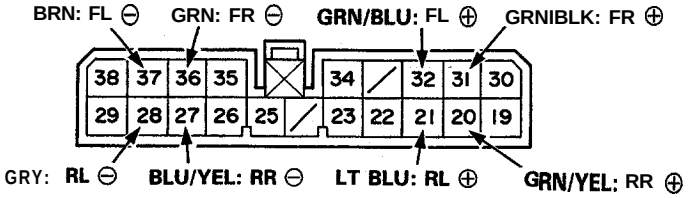
View from terminal side.

Is there 750—1200 Ω? NO → Faulty speed sensor.

YES

Disconnect the 20P connector from the control unit.

Check each wire for continuity between the sensor and control unit:
GRN/BLK: Front Right Positive
GRNIBLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative



View from control unit terminal side.

Is there continuity? NO →
Repair open in sensor wire:
GRNIBLK: Front Right Positive
GRNIBLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Posltive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

YES

Check for continuity to ground.

Is there continuity? YES → Repair short in sensor wire.

NO

Check for loose control unit connecters. If necessary, substitute a known-good control unit and recheck.

(cont'd)

Flowcharts (cont'd)

Problem Code 5 to 5-8: Speed Sensor(s)

CAUTION: Use only the digital multimeter to check the system.

Disconnect the wire harness from speed sensor.

Check for resistance between the sensor terminals.

Is there 750—1200 Ω? — NO → **Faulty speed sensor.**

YES

Disconnect the 20 connector from the control unit.

Check each wire for continuity between the sensor and control unit:
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

Is there continuity? — NO → **Repair open in sensor wire:**
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

YES

Check for continuity to ground.

Is there continuity? — YES → **Repair short in sensor wire.**

NO

Reconnect the 20P connector to the control unit and connectors to the speed sensors.

Connect the ALB checker to the inspection connector.

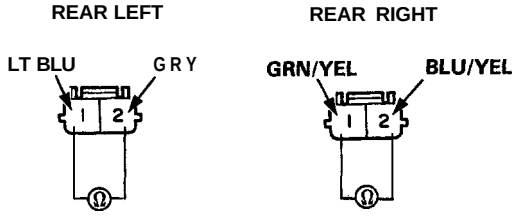
Check for ALB function in MODE 2 and 3.

Does it work properly? — NO → **Faulty modulator.**

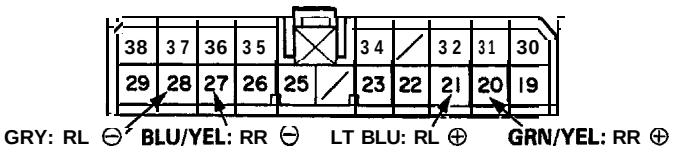
YES

Check for rear brake drag. If OK, substitute a known-good control unit and recheck.

SENSOR SIDE CONNECTOR



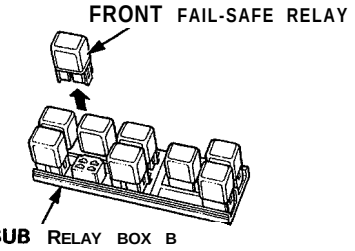
View from terminal side.

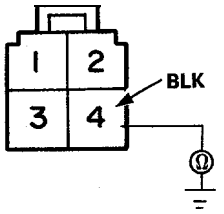


View from control unit terminal side.

Problem Code 6-l : Front Fail-Safe Relay Circuit.

CAUTION: Use only the digital multimeter to check the system.





View from terminal side.

Remove the front fail-safe relay.

Check for relay function (page 19-71).

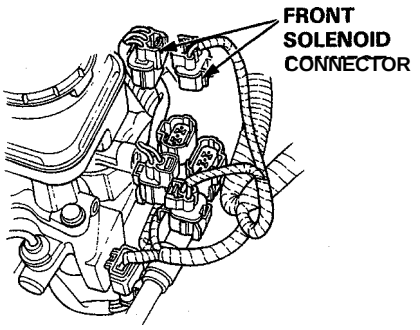
Does it work properly? NO → Faulty front fail-safe relay.

YES

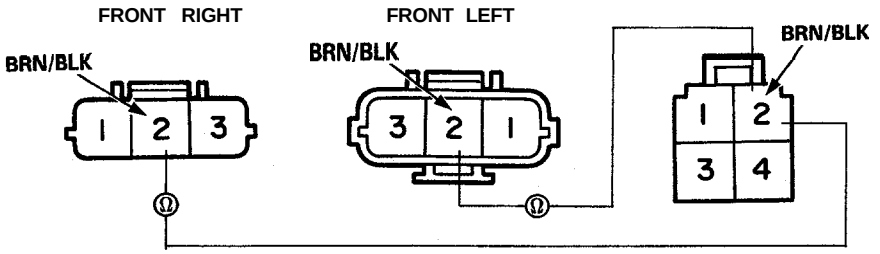
Check for continuity between the No. 4 (BLK) terminal and body ground.

Is there continuity? NO → Repair open in BLK wire between the fail-safe relay and ground or poor ground (G202).

YES



HARNESS SIDE CONNECTOR



View from terminal side.

Disconnect the 3P connectors from the front solenoids.

Check BRN/BLK wire for continuity between the solenoids and the front fail-safe relay.

Is there continuity? NO → Repair open in BRN/BLK wire between the solenoids and the front fail-safe relay.

YES

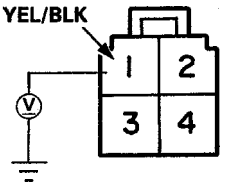
Turn the ignition switch ON.

Check for voltage between the No. 1 (YEL/BLK) terminal (+) and body ground (−).

Is battery voltage available? NO → Repair open in YEL/BLK wire between the fail-safe relay and No. 4 fuse.

YES

Turn the ignition switch OFF.



View from terminal side.

(To page 19-54)

(cont'd)

Flowcharts (cont'd)

(From page 19-53)

Check for resistance between the solenoid terminals:
No. 1 (RED) and No. 2 (BLK): Front Right Inlet
No. 3 (RED) and No. 2 (BLK): Front Left Inlet

Is there 1—3 Ω? NO → Faulty solenoid.

YES

Check for resistance between the solenoid terminals:
No. 3 (YEL) and No. 2 (BLK): Front Right Outlet
No. 1 (YEL) and No. 2 (BLK): Front Left Outlet

Is there 1-3 Ω? NO → Faulty solenoid.

YES

Disconnect the 20P and 18P connector from the control unit.

Check each wire for continuity to ground:
RED/BLK: Front Right Inlet
YELIBLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? YES → Repair short in wire:
RED/BLK: Front Right Inlet
YELIBLK: Front Right Outlet
RED/BLU: Front Left Inlet
YELIBLU: Front Left Outlet

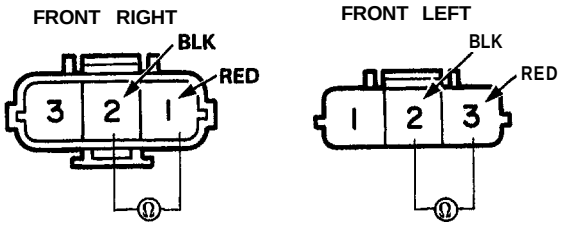
NO

Check YEL/GRN wire for continuity between the front fail-safe relay and control unit.

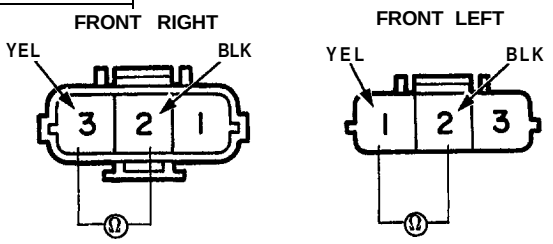
Is there continuity? NO → Repair open in YEL/GRN wire between the front fail-safe relay and control unit.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit end recheck.

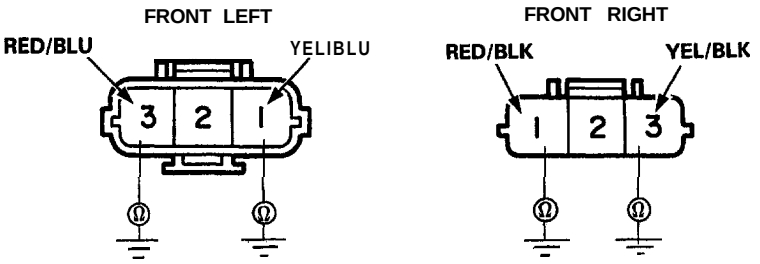


SOLENOID SIDE CONNECTOR
View from terminal side.



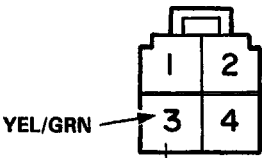
SOLENOID SIDE CONNECTOR
View from terminal side.

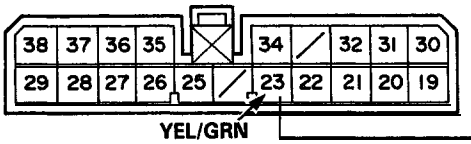
HARNESS SIDE CONNECTOR



View from terminal side.

View from terminal side.

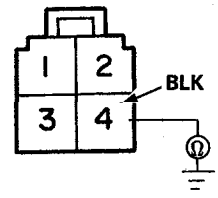




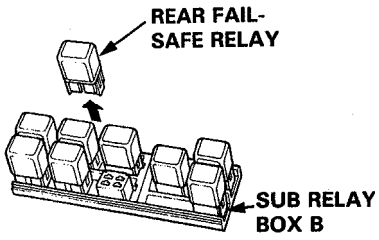
View from control unit terminal side.

Problem Code 6-4: Rear Fail-Safe Relay Circuit

CAUTION: Use only the digital multimeter to check the system.



View from terminal side.



Remove the rear fail-safe relay.

Check for relay function (page 19-71).

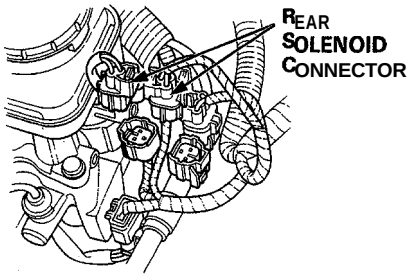
Does it work properly? NO → Faulty rear fail-safe relay.

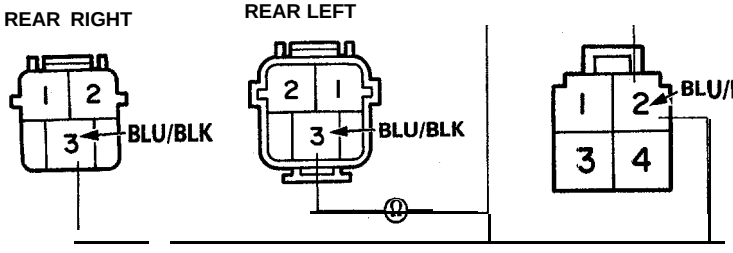
YES

Check for continuity between the No. 4 (BLK) terminal and body ground.

Is there continuity? NO → Repair open in BLK wire between the relay and ground or poor ground (G202).

YES





Disconnect the 3P connectors from the rear solenoids.

Check BLU/BLK wire for continuity between the solenoids and rear fail-safe relay.

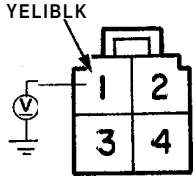
View from terminal side.

Is there continuity? NO → Repair open in BLU/BLK wire between the solenoids and rear fail-safe relay.

YES

Turn the ignition switch ON.

Check for voltage between the No. 1 (YEL/BLK) terminal (+) and body ground (−).



Is battery voltage available? NO → Repair open in YEL/BLK wire between the relay and No. 4 fuse.

View from terminal side.

YES

Turn the ignition switch off.

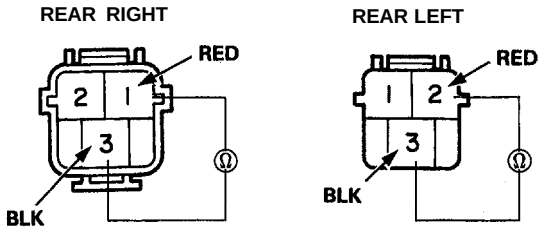
(To page 19-56)

(cont'd)

Flowcharts, (cont'd)

(From page 19-55)

Check for resistance between the solenoid terminals:
No. 1 (RED) and No. 3 (BLK): Rear Right inlet
No. 2 (RED) and No. 3 (BLK): Rear Left Inlet

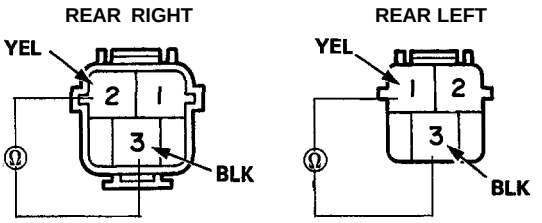


SOLENOID SIDE CONNECTOR
View from terminal side.

Is there 1-3 Ω? NO → Faulty solenold.

YES

Check for resistance between the solenoid terminals:
No. 2 (YEL) and No. 3 (BLK): Rear Right Outlet
No. 1 (YEL) and No. 3 (BLK):: Rear Left Outlet



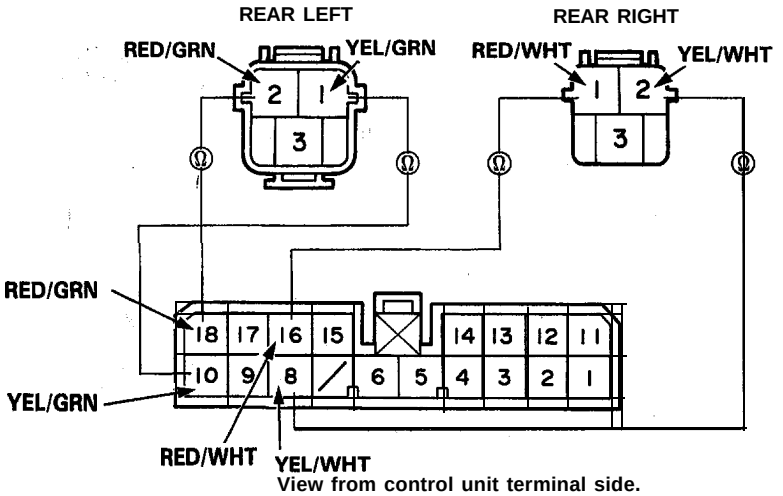
Is there 1-3 Ω? NO → Faulty solenoid.

SOLENOID SIDE CONNECTOR
View from terminal side.

YES

Disconnect the 20P and 18P connectors from the control unit.

Check each wire for continuity between the control unit and rear solenoid:
RED/WHT: Rear Right Inlet
YELIWHT: Rear Right Outlet
RED/GRN: Rear Left Inlet
YEL/GRN: Rear Left Outlet



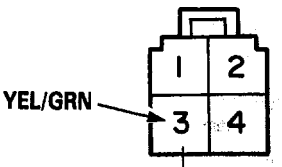
View from control unit terminal side.

Is there continuity? NO → Repair open in wire between the solenoid and control unit:
RED/WHT: Rear Right Inlet
YELIWHT: Rear Right Outlet
RED/GRN: Rear Left Inlet
YELIGRN: Rear Left Outlet

YES

Check YEL/GRN wire for continuity between the rear fail-safe relay and control unit.

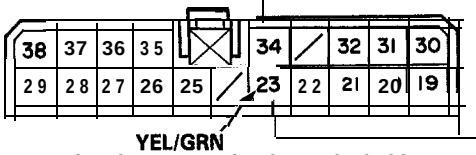
View from terminal side.



Is there continuity? NO → Repair open in YEL/GRN wire between the rear fail-safe relay and control unit.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.



View from control unit terminal side.

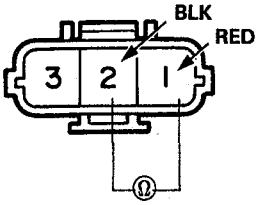
Problem Code 7-1 and 7-2 Front Solenoid Related Problem

CAUTION: Use only the digital multimeter to check the system.

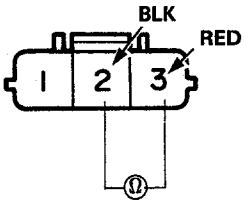
Disconnect the 3P connectors from front solenoids.

Check for resistance between the solenoid terminals:
No. 1 (RED) and No. 2 (BLK): Front Right Inlet
No. 3 (RED) and No. 2 (BLK): Front Left Inlet

FRONT RIGHT



FRONT LEFT



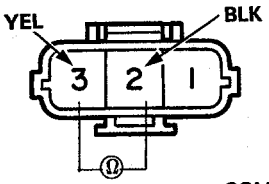
SOLENOID SIDE CONNECTOR
View from terminal side.

Is there 1—3 Ω? NO → Faulty solenoid.

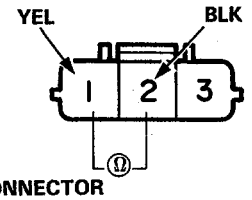
YES

Check for resistance between the solenoid terminals:
No. 3 (YEL) and No. 2 (BLK): Front Right Outlet
No. 1 (YEL) and No. 2 (BLK): Front Left Outlet

FRONT RIGHT



FRONT LEFT



SOLENOID CONNECTOR
View from terminal side.

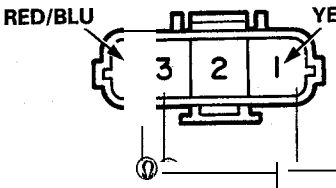
Is there 1-3 Ω? NO → Faulty solenoid.

YES

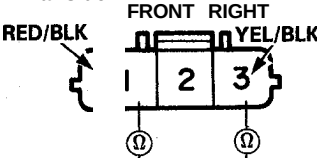
Disconnect the 18P connector from control unit.

Check each wire for continuity between the control unit and front solenoid:
RED/BLK: Front Right Inlet
YELIBLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

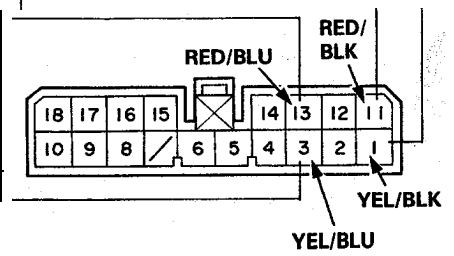
FRONT LEFT



FRONT RIGHT



View from terminal side.

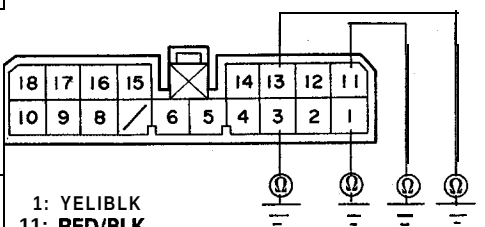


View from control unit terminal side.

Is there continuity? NO → Repair open in wire:
REDIBLK: Front Right Inlet
YELIBLK: Front Right Outlat
REDIBLU: Front Left Inlet
YEL/BLU: Front Left Outlet

YES

Check each wire continuity between control unit and body ground:
RED/BLK: Front Right Inlet
YELIBLK: Front Right Outlet
REDIBLU: Front Left Inlet
YEL/BLU: Front Left Outlet



1: YELIBLK
11: RED/BLK
3: YELIBLU
13: REDIBLU
View from control unit terminal side.

Is there continuity? YES → Repari short in wire:
RED/BLK: Front Right Inlet
YELIBLK: Front Right Outlet
REDIBLU: Front Left Inlet
YEL/BLU: Front Left Outelt

NO

(To page 1 9-58)

(cont'd)

Flowcharts (cont'd)

(From page 19-57)

Remove the front fail-safe relay.

Check for relay function (page 19-63).

Does it work properly?

NO → Faulty front fail-safe relay.

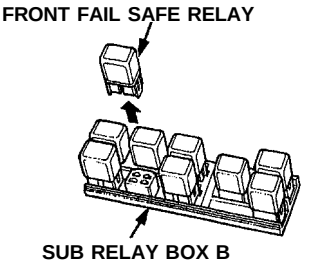
YES

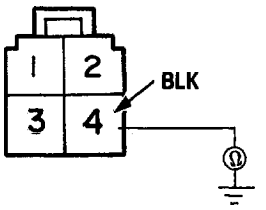
Check for continuity between the No. 4 (BLK) terminal and body ground.

Is there continuity?

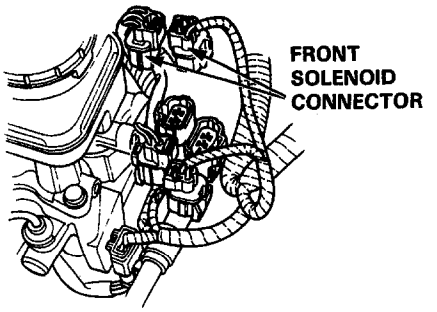
NO → Repair open in BLK wire between the fail-safe relay and ground or poor ground (G202).

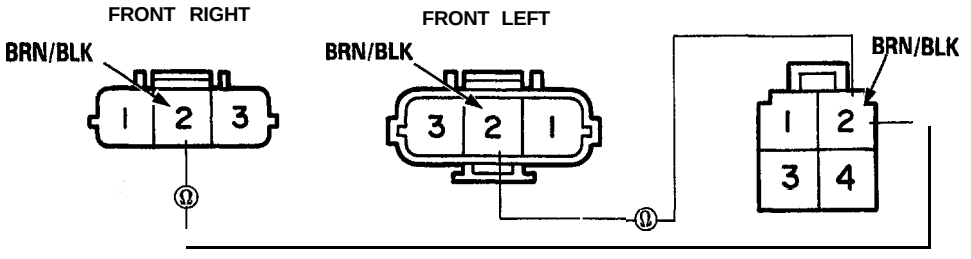
YES





View from terminal side.





View from terminal side.

Check BRN/BLK wire for continuity between the solenoids and front fail-safe relay.

Is there continuity?

NO → Repair open in BRN/BLK wire between the solenoids and front fail-safe relay.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

Problem Code 7-4, 7-8: Rear Solenoid Problem

CAUTION: Use only the digital multimeter to check the system.

Disconnect the 3P connectors from rear solenoid.

Check for resistance between the solenoid terminals:
No. 1 (RED) and No. 3 (BLK): Rear Right Inlet
No. 2 (RED) and No. 3 (BLK): Rear Left Inlet

Is there 1-3 Ω?
- NO → Faulty solenoid.
- YES ↓

Check for resistance between the solenoid terminals:
No. 2 (YEL) and No. 3 (BLK): Rear Right Outlet
No. 1 (YEL) and No. 3 (BLK): Rear Left Outlet

Is there 1-3 Ω?
- NO → Faulty solenoid.

Disconnect the 18P connector from the control unit.

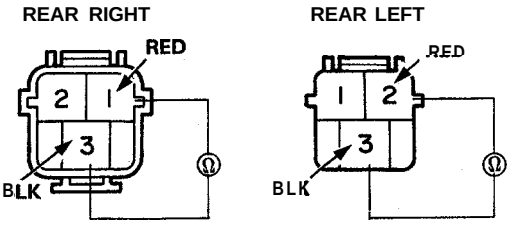
Check each wire for continuity between the control unit and body ground:
RED/WHT: Rear Right Inlet
YEL/WHT: Rear Right Outlet
RED/GRN: Rear Left Inlet
YELIGRN: Rear Left Outlet

Is there continuity?
- NO → Repair open in wire between the rear solenoid and control unit:
  RED/WHT: Rear Right Inlet
  YEL/WHT: Rear Right Outlet
  RED/GRN: Rear Left Inlet
  YEL/GRN: Rear Left Outlet
- YES ↓

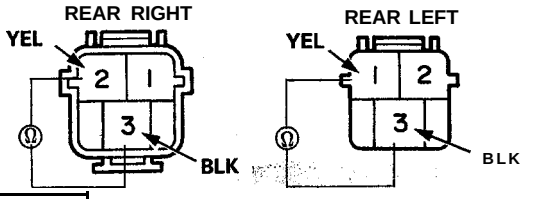
Check each wire for continuity between the control unit and body ground:
REDIWHT: Rear Right Inlet
YEL/WHT: Rear Right Outlet
RED/GRN: Rear Left Inlet
YEL/GRN: Rear Left Outlet

Is there continuity?
- YES → Repair short in wire:
  REDIWHT: Rear Right Inlet
  YELIWHT: Rear Right Outlet
  REDIGRN: Rear Left Inlet
  YEL/GRN: Rear Left Outlet
- NO ↓

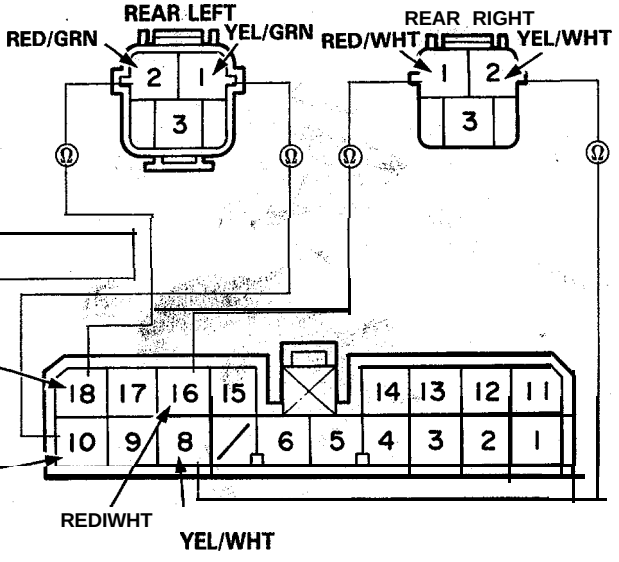
(To page 19-60)



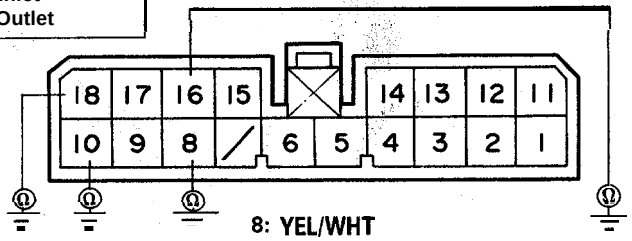
SOLENOID SIDE CONNECTOR
View from terminal side.



SOLENOID SIDE CONNECTOR
View from terminal side.



View from control unit terminal side.



8: YEL/WHT
16: REDIWHT
10: YEL/GRN
18: RED/GRN

View from control unit terminal side.

(cont'd)

– Flowcharts (cont'd)

(From page 19-59)

Remove the rear fail-safe relay.

Check for relay function (page 19-71).

Does it work properly? NO → Faulty the rear fail-safe relay.

YES

Check for continuity between the No. 4 (BLK) terminal body ground.

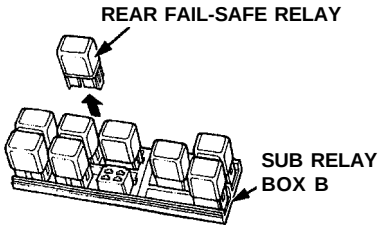
Is there continuity? NO → Repair open in BLK wire between the relay and ground or poor ground (G202).

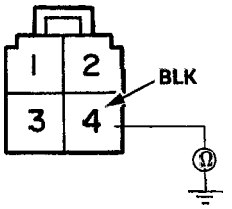
YES

Check BLU/BLK wire for continuity between the slenoids and rear fail-safe relay.

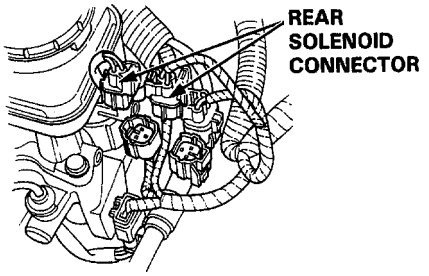
Is there continuity? NO → Repair open In BLU/BLK wire between the solenoids and rear fail-safe relay.

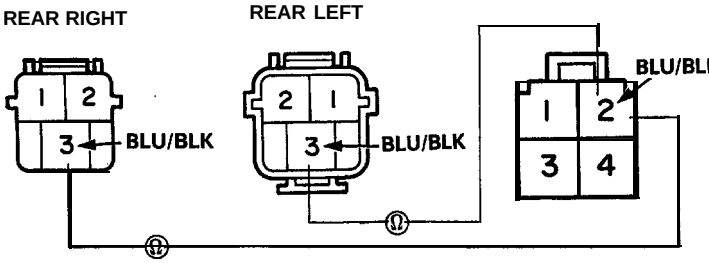
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.





View from terminal side.



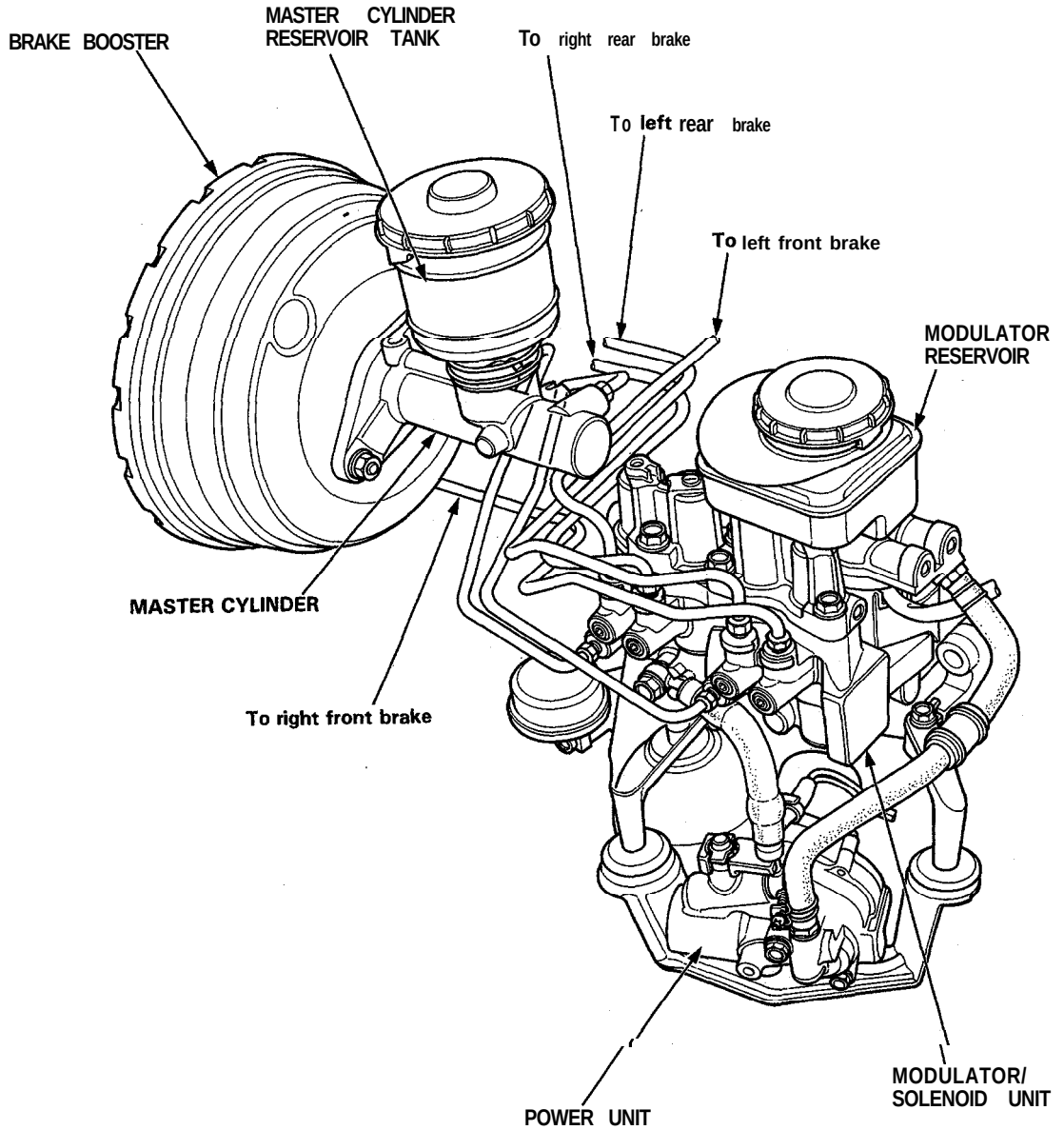


View from terminal side.

Hydraulic System

Hydraulic Connections

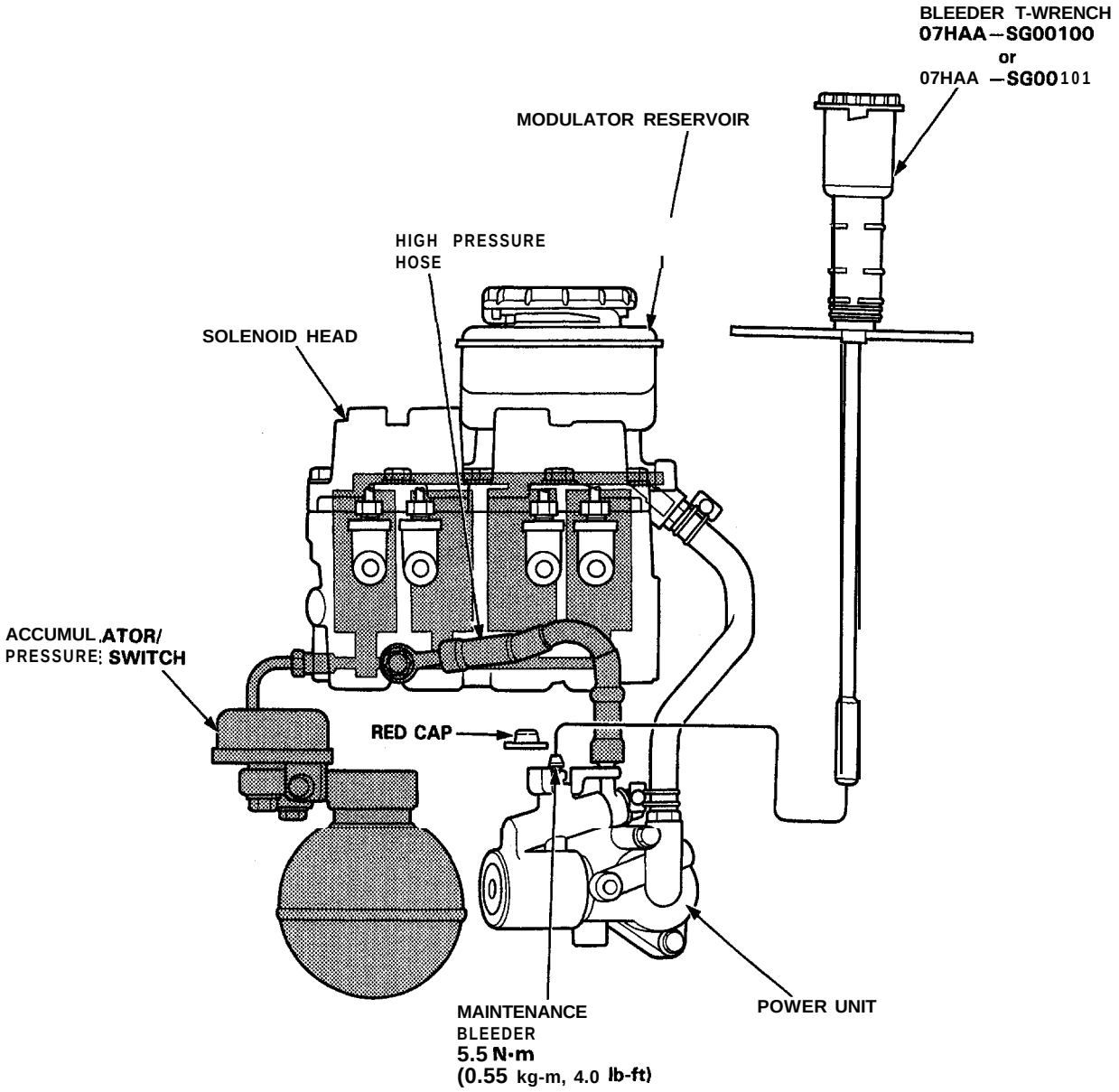
CAUTION: Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.



-'Relieving Accumulator/Line Pressure

⚠WARNING Use the Bleeder T-Wrench before disassembling the parts shaded in the illustration.

1. Drain the brake fluid from the master cylinder and modulator reservoir thoroughly.
2. **Remove the red cap from the bleeder on the top of the power unit.**
3. Install the special tool on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into reservoir **Turn the special tool out one complete turn to drain the brake fluid thoroughly.**
4. Retighten the bleeder screw and discard the fluid.
5. **Reinstall the red cap.**



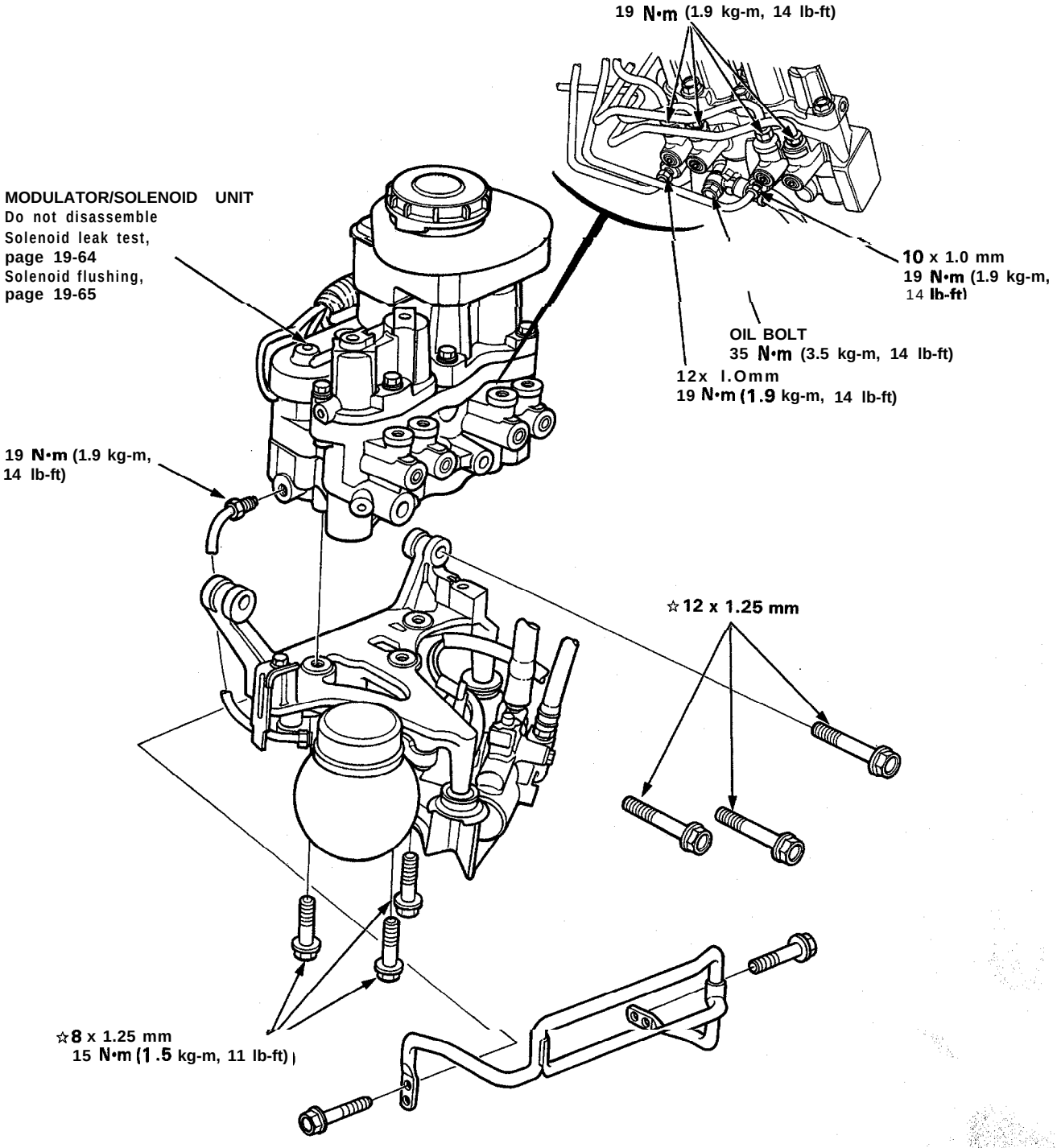
Modulator/Solenoid Unit

Index/Torque

C A U T I O N :

- **Do not damage the brake pipes when removing the spare tire and modulator/solenoid unit.**
- **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.**

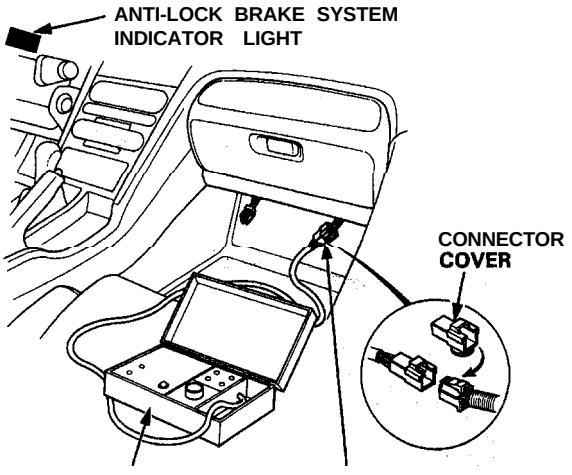
☆ : CORROSION RESISTANT BOLT



Modulator/Solenoid Unit

Solenoid Leak Test

1. Disconnect the 6-P inspection connector (PNK) from the connector cover located under the glove box and connect the inspection connector to the ALB checker.

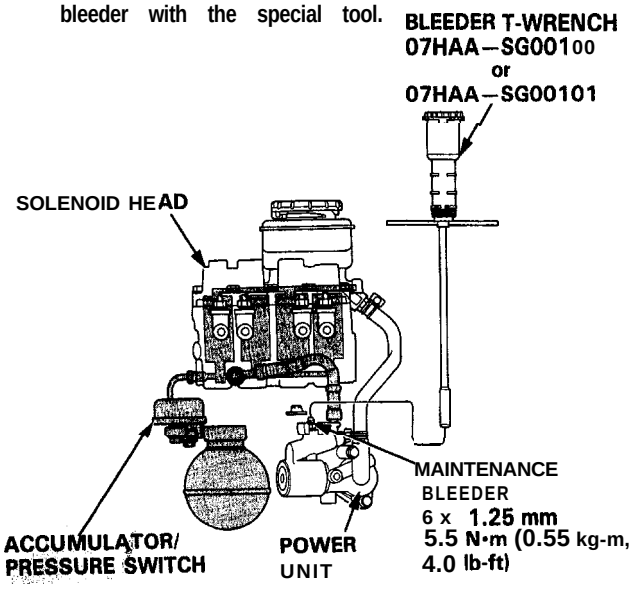


CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models. ,

2. Remove the modulator reservoir filter, then fill the modulator reservoir to the MAX level.

NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

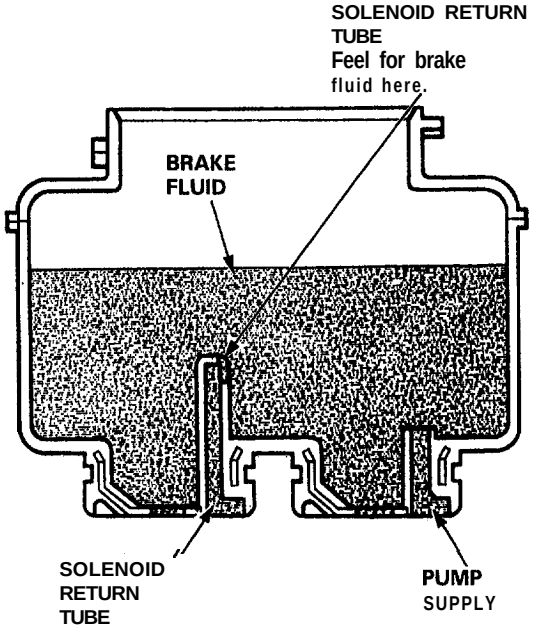
3. Bleed high pressure fluid from the maintenance bleeder with the special tool.



4. Start the engine and release the parking brake.

5. Turn the Mode Selector to 1 and press the Start Test button.

6. While the ALB pump is running, place your finger over the top of the solenoid return tube in the modulator reservoir.



- If you can feel back fluid coming from the return tube, one of the solenoids is leaking. Go to Solenoid Flushing.
- If you can feel brake fluid coming from the return tube, one of the solenoids is leaking. Go to step 7.
- If you can't feel brake fluid coming from the return tube, the solenoids are OK. Reinstall the modulator reservoir filter and refill the reservoir to the MAX level.

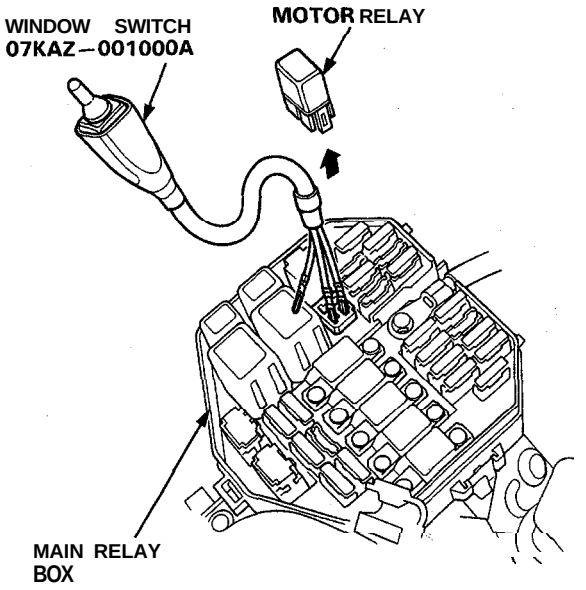
7. Bleed high-pressure fluid from the maintenance bleeder with the special tool, then run through modes 3 and 6 with the ALB checker. Repeat this three or four times.

8. Repeat steps 5 and 6.
   - If the solenoid leakage has stopped, reinstall the modulator reservoir filter and refill the reservoir to the MAX level.
   - If one of the solenoids is still leaking, replace the modulator/solenoid unit.

-Solenoid Flushing

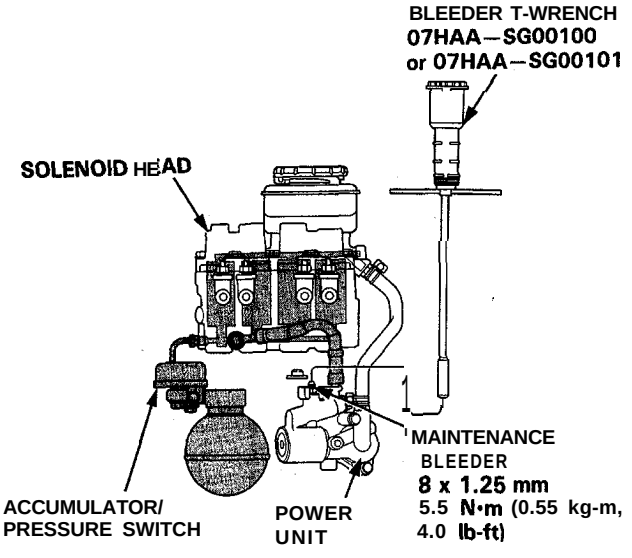
1. Remove the ALB pump relay from the main relay box. (Location: page 19-40)

2. install the auxiliary window switch (07KAZ–001000A) into the two motor relay cavities in the relay box.

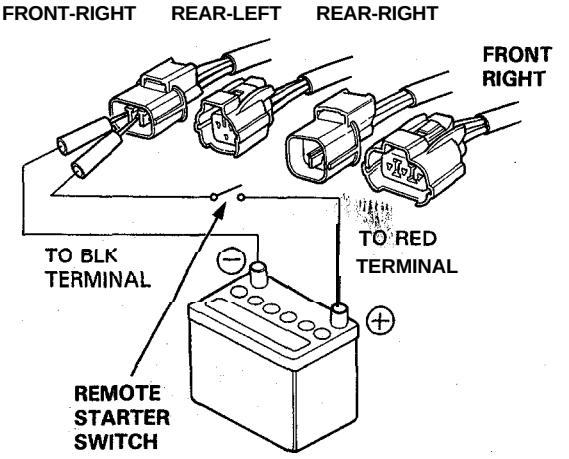


3. Disconnect the four modulator solenoid connectors.

4. Bleed any high-pressure fluid from the maintenance bleeder with the Bleeder T-Wrench, then retighten the bleeder.



5. Connect the RED terminal from one solenoid to the battery positive (+) terminal with a remote starter switch. Connect the BLK terminal from the same solenoid to the battery negative (–) terminal with a jumper lead as shown.



6. Press the auxiliary switch to run the pump. After the pump has run for about five seconds, press and release the remote starter switch three or four times to open and close the solenoid. Continue running the pump for about 30 seconds, then release the auxiliary switch and open and close the solenoid another three or four times.

7. Repeat steps 4-6 for the other two solenoids.

8. Reconnect the solenoids and the pump relay.

9. Connect the ALB Checker and turn the Mode Selector to "1". Start the engine and release the parking brake. Push the Start Test button on' the ALB Checker.

IO. While the ALB pump is running, place your finger over the top of the solenoid return tube in the modulator resorvoir and check for leaks.

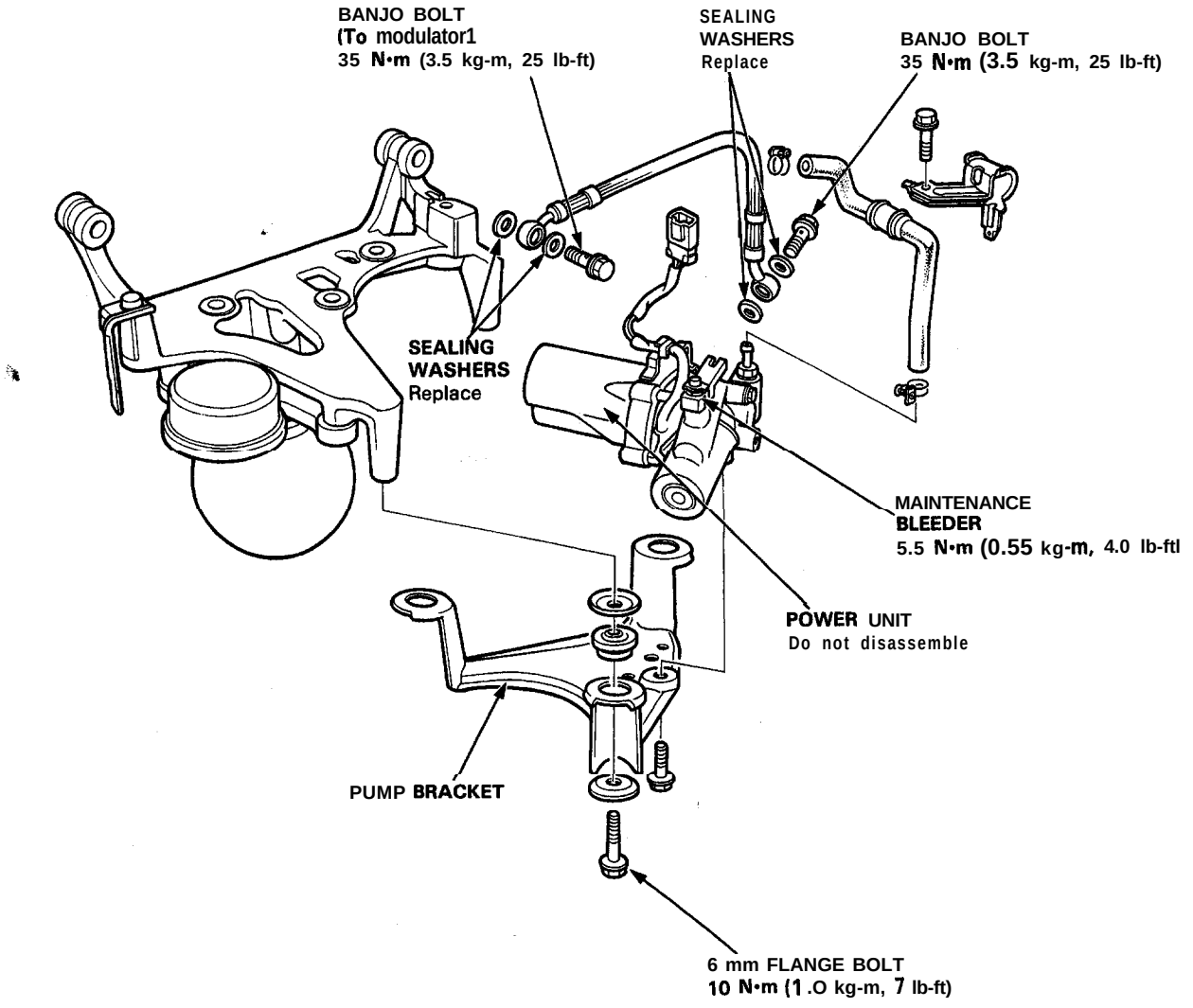
- If a solenoid is still leaking, replace the modulator/solenoid unit.

Power Unit

Torque/Inspection

CAUTION:

- Do not attempt to disassemble the power unit except for those components shown in this illustration.
- 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.
- 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.
- 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.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.



Accumulator/Pressure Switch

Index/Torque

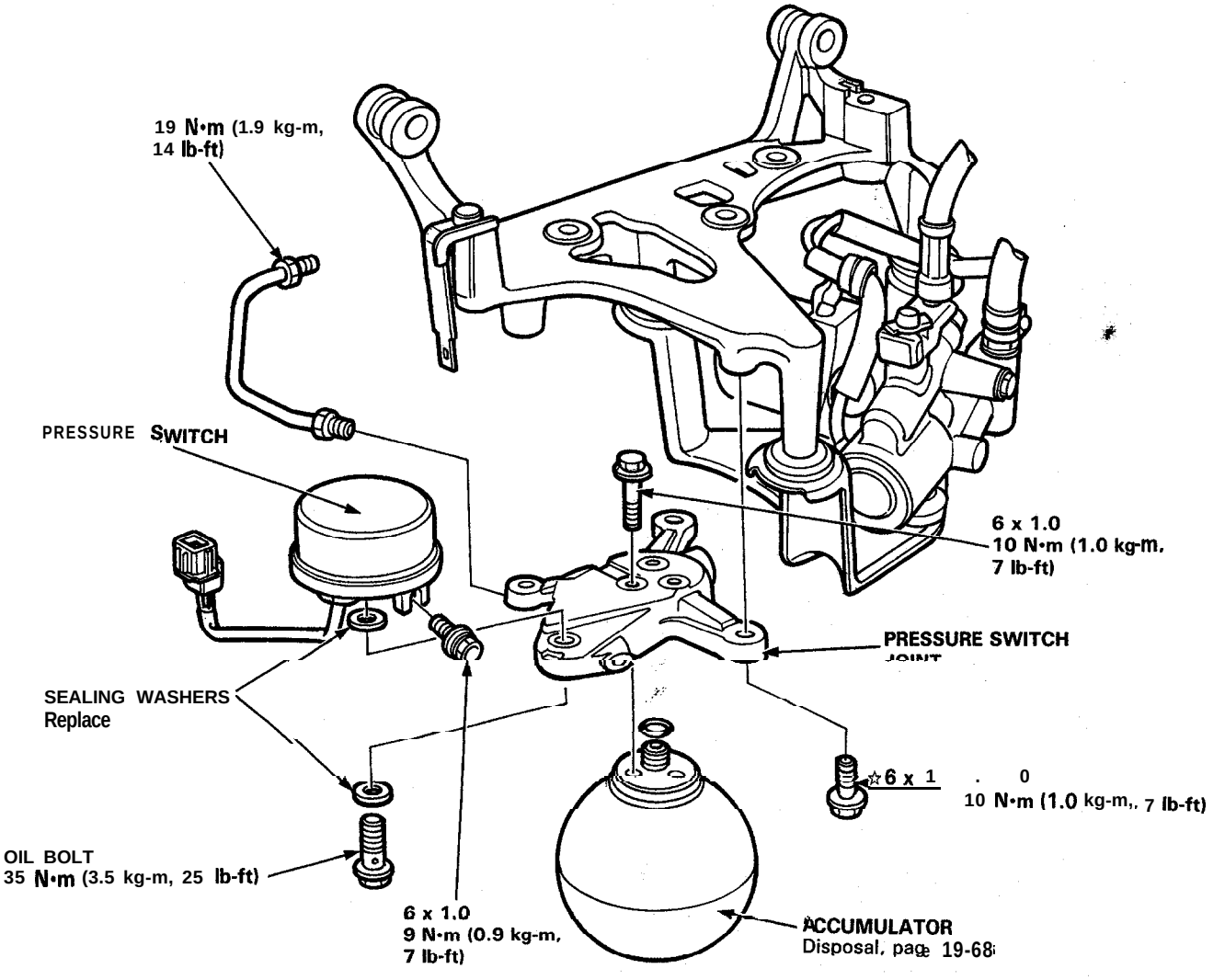
CAUTION:

- 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.
- 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.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Before disassembling the accumulator unit, Bleed the high pressure brake fluid out from the system using the Bleeder T-Wrench. (page 19-62)
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

NOTE: Replace the O-ring with a new one before rassembly.

⚠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.

☆ : CURRENT CORROSION PROTECTION BOLT

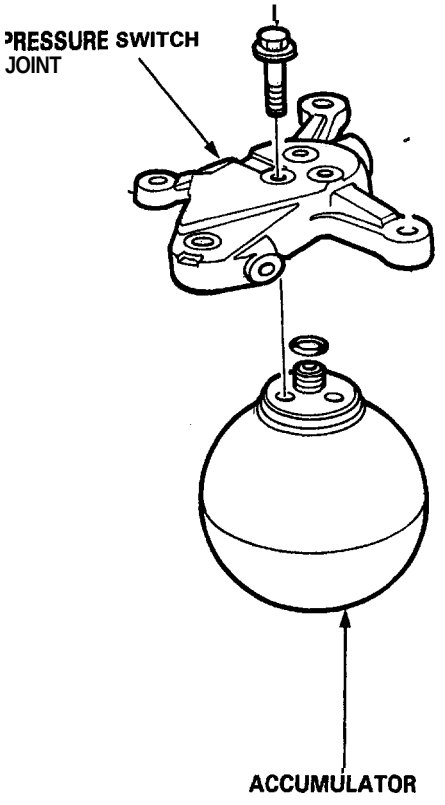


Accumulator/Pressure Switch

Accumulator/Pressure Switch Removal

1. Drain the high pressure brake fluid from the power unit (see page 19-62).
2. Remove three 6 mm flange bolts, then remove the accumulator from the pressure switch joint.

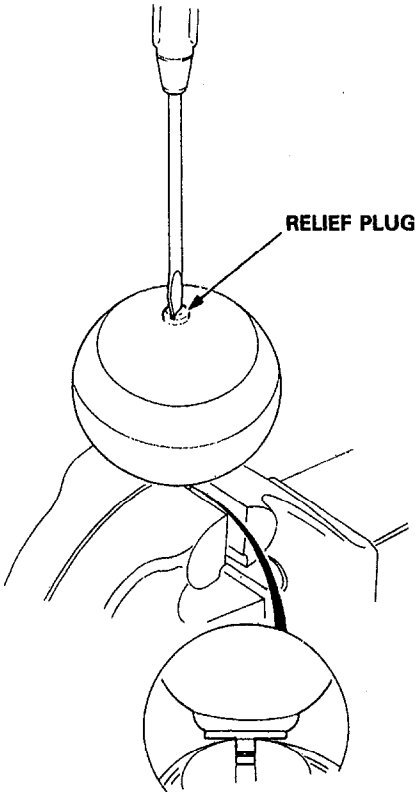
6x l.Omm
10 N•m ll .O kg-m, 7 lb-ft)



Accumulator Disposal

⚠ 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.**

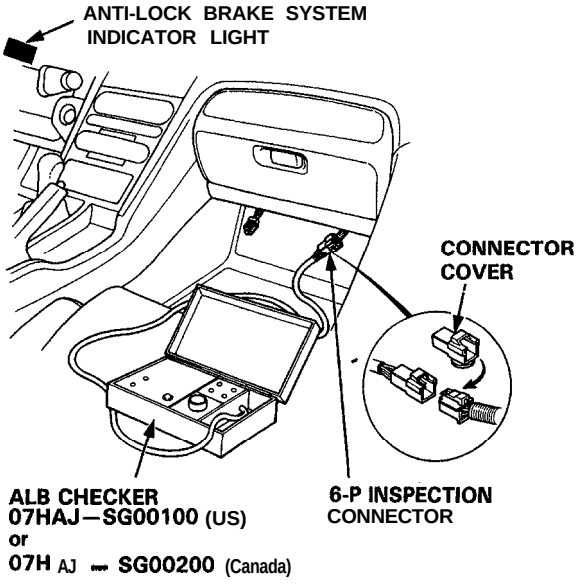
1. Secure the accumulator in a vise so that the relief plug points straight up.
2. **Slowly turn the plug 3-1/2 turns and then wait 3** minutes for all pressure to escape.
3. Remove the plug completely and dispose of the accumulator unit.



Bleeding

-Air Bleeding with ALB Checker

1. Disconnect the 6-P inspection connecotor (PNK) from the connector cover located under the glove box and connect the inspection connector to the ALB checker.

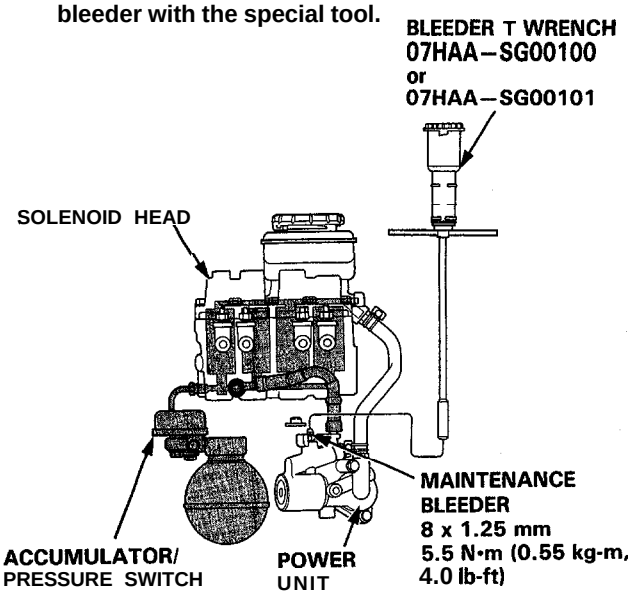


CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

2. Fill the modulator reservoir to the MAX level.

NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

3. Bleed high pressure fluid from the maintenance bleeder with the special tool.

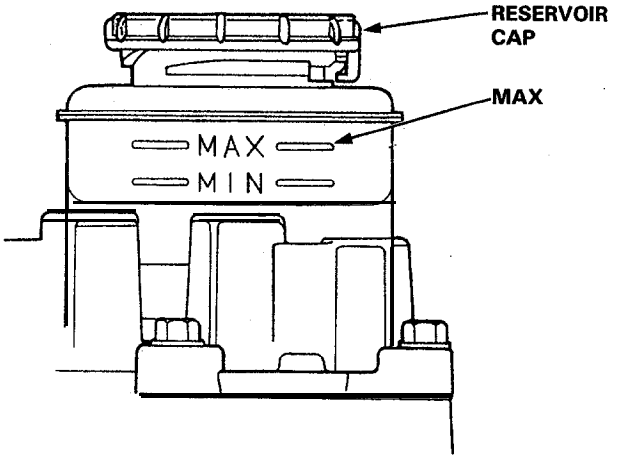


4. Start the engine and release the parking brake.

NOTE: Depress the brake pedal firmly while test in progress light in ON.

5. There should be at least two strong kickbacks. If not, repeat steps 2 through 5, as necessary.

6. Fill the modulator reservoir up to the MAX level.



7. Install the reservoir cap.

8. Check the anti-lock brake system function in all modes by using the AL8 checker.

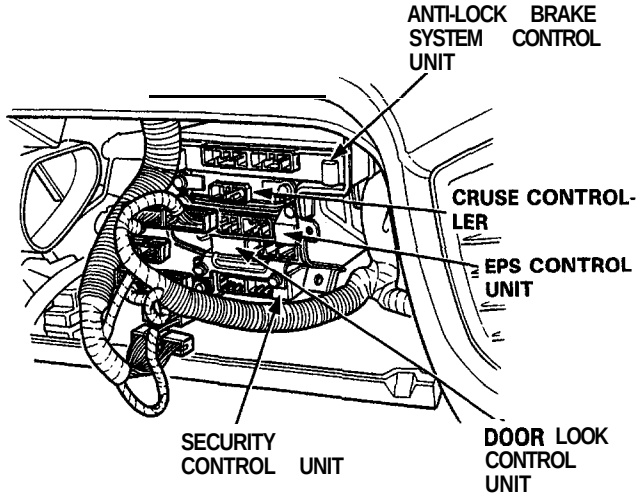
Electronic Components

-Control Unit Replacement

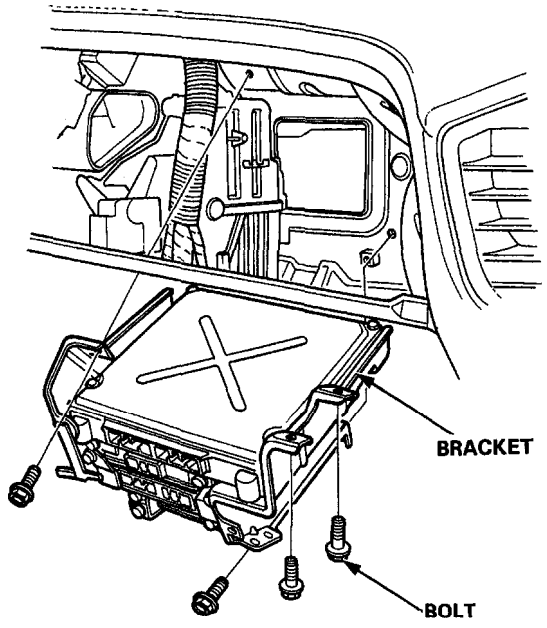
⚠ WARNING **All SRS wire harnesses and connectors** are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the control unit.

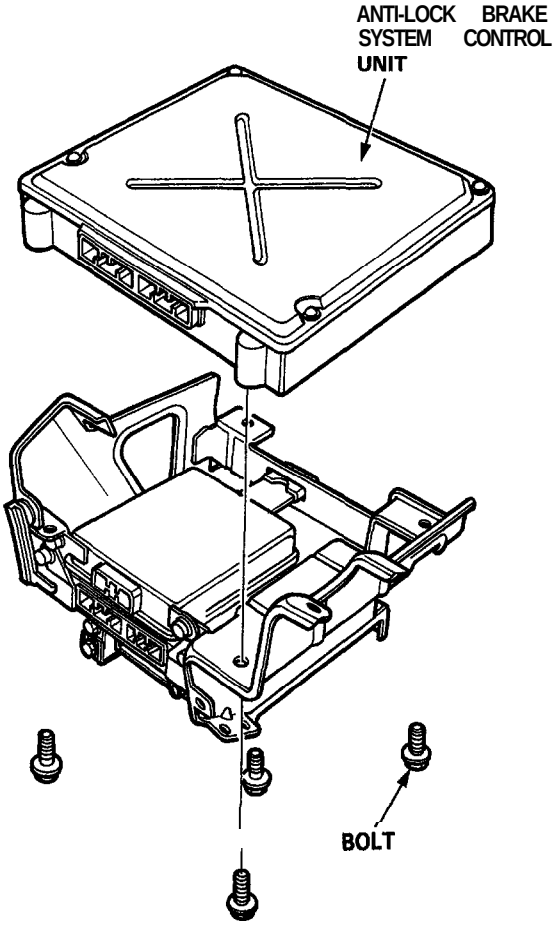
1. Disconnect the connectors from the control units.



2. Remove the four control unit bracket bolts, then remove the bracket with the control units.



3. Remove the control unit from the bracket.

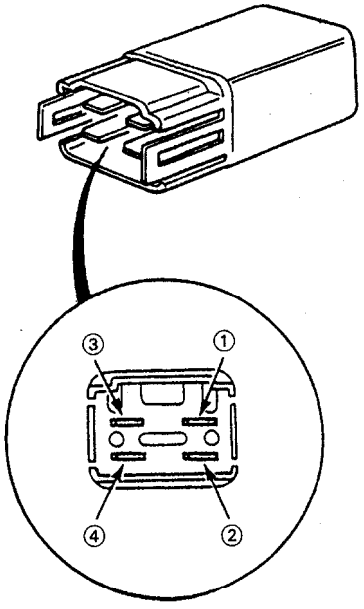


4. Install the new control unit in the reverse order of removal.

NOTE: Check the anti-lock brake system indicator light function by turning the ignition switch on.

- Fail-Safe Relays/Motor Relay Inspection

1. Check for continuity between terminals ③ and ④. There should be no continuity.
2. Connect a 12 V battery across terminals ① and ②. There should be continuity between terminals ③ and ④.

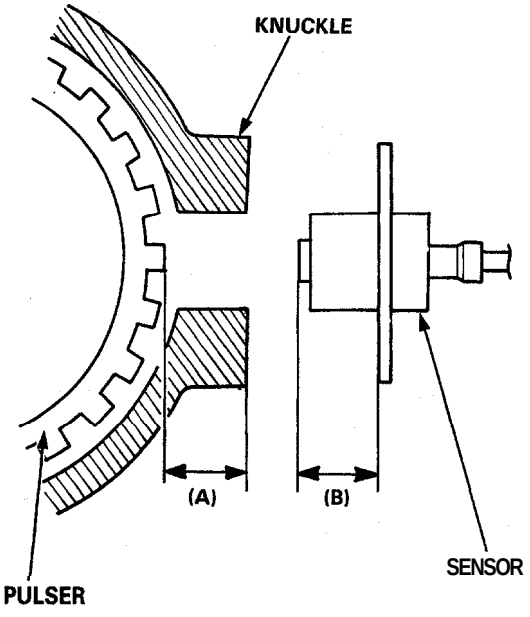


-Inspection

1. Check the pulser for chipped or damaged teeth.
2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

(A) – (B) = Standard: 0.4 – 1 .O mm
(0.016-0.039 in.)

NOTE: If the gap exceeds 1 .O mm (0.039 in.), the probability is a distorted knuckle which should be replaced.

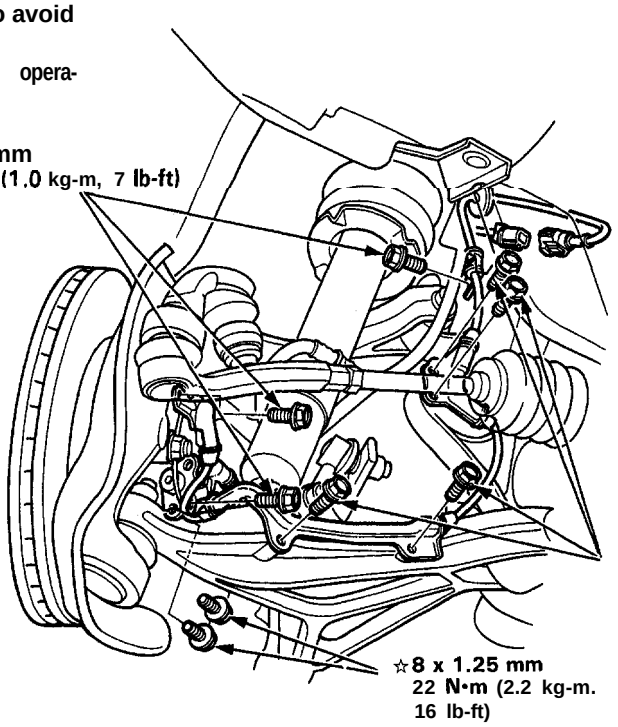


Pulsers/Sensors

-Front Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement confirm proper operation (page 19-43).

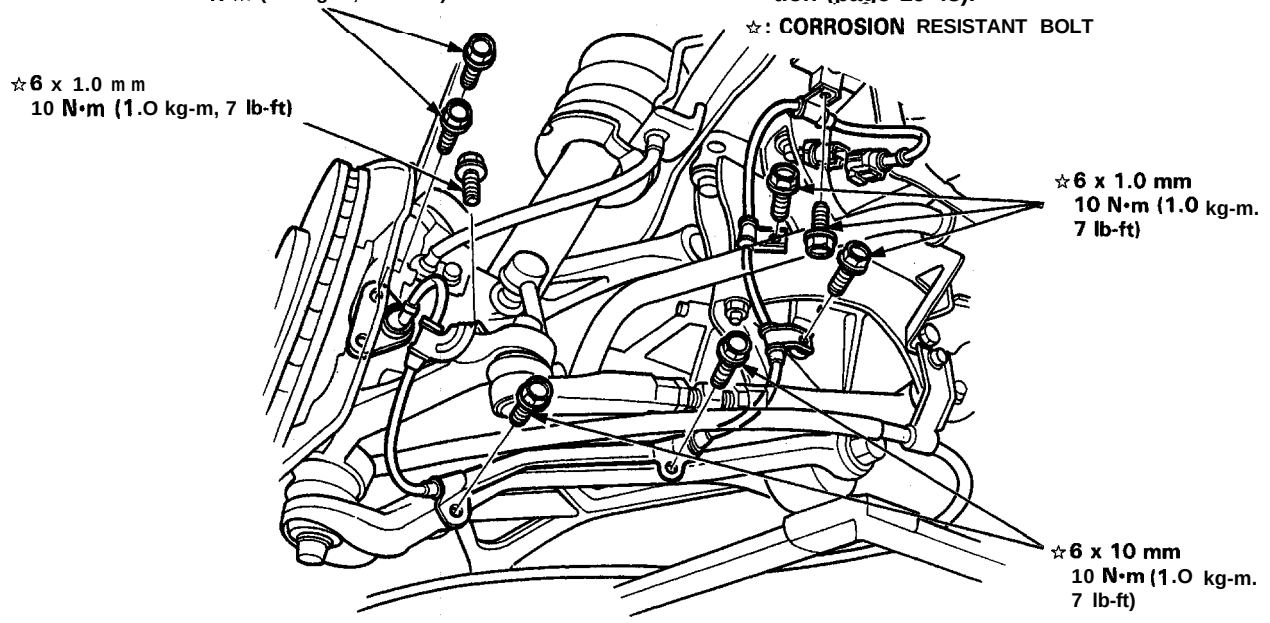
☆: CORROSION RESISTANT BOLT



-Rear Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (page 19-43).

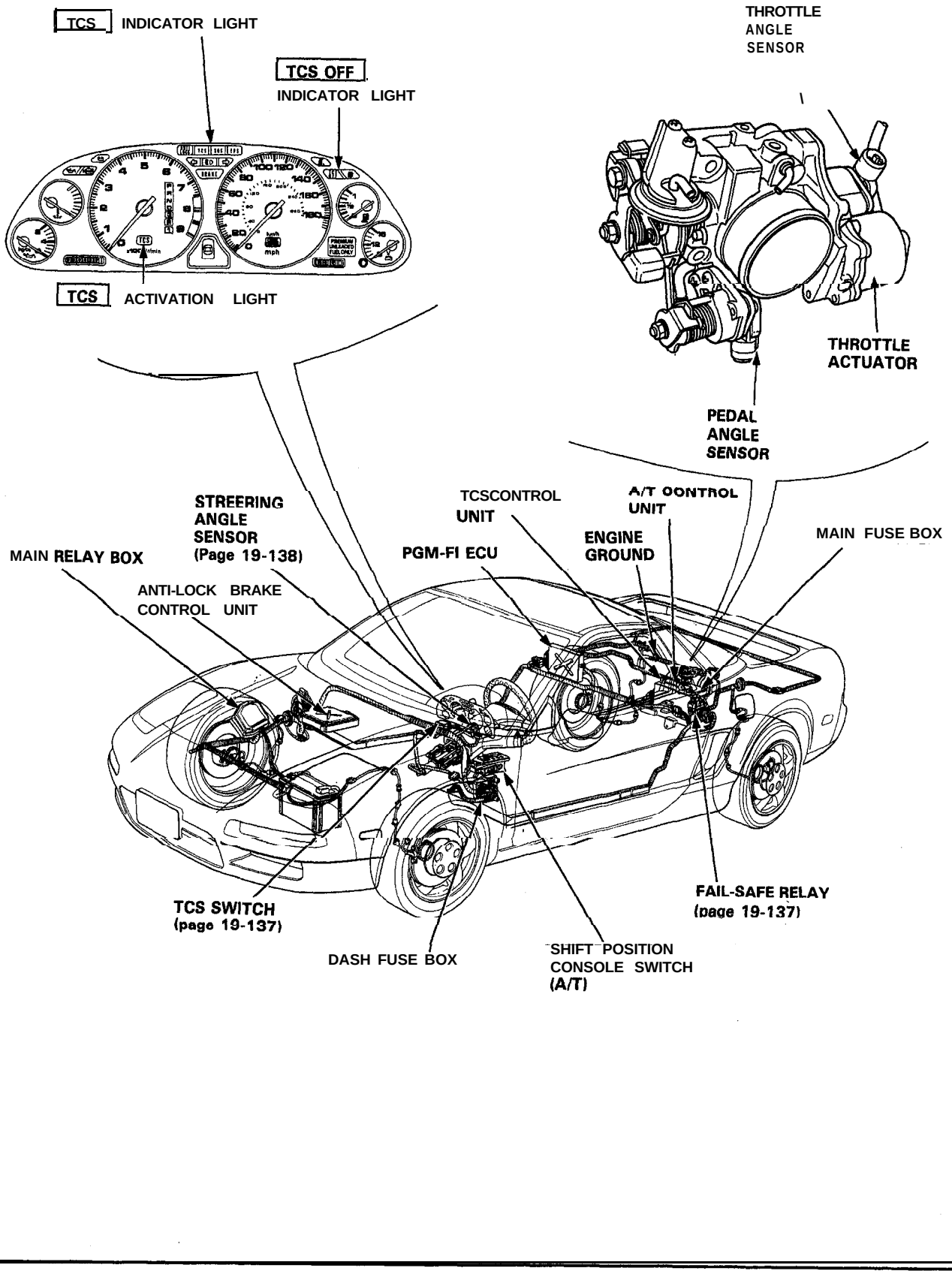
☆: CORROSION RESISTANT BOLT



TCS (Traction Control System)

Component Location Index 19- 74
System Description 19- 75
Outline 19- 75
Construction and Function 19- 76
Circuit Diagram 19- 80
Troubleshooting 19- 82
TCS Switch 19-137
Fail Safe Relay 19-137
Steering Angle Sensor
Replacement 19-138

Component Location Index



System Description

- Outline

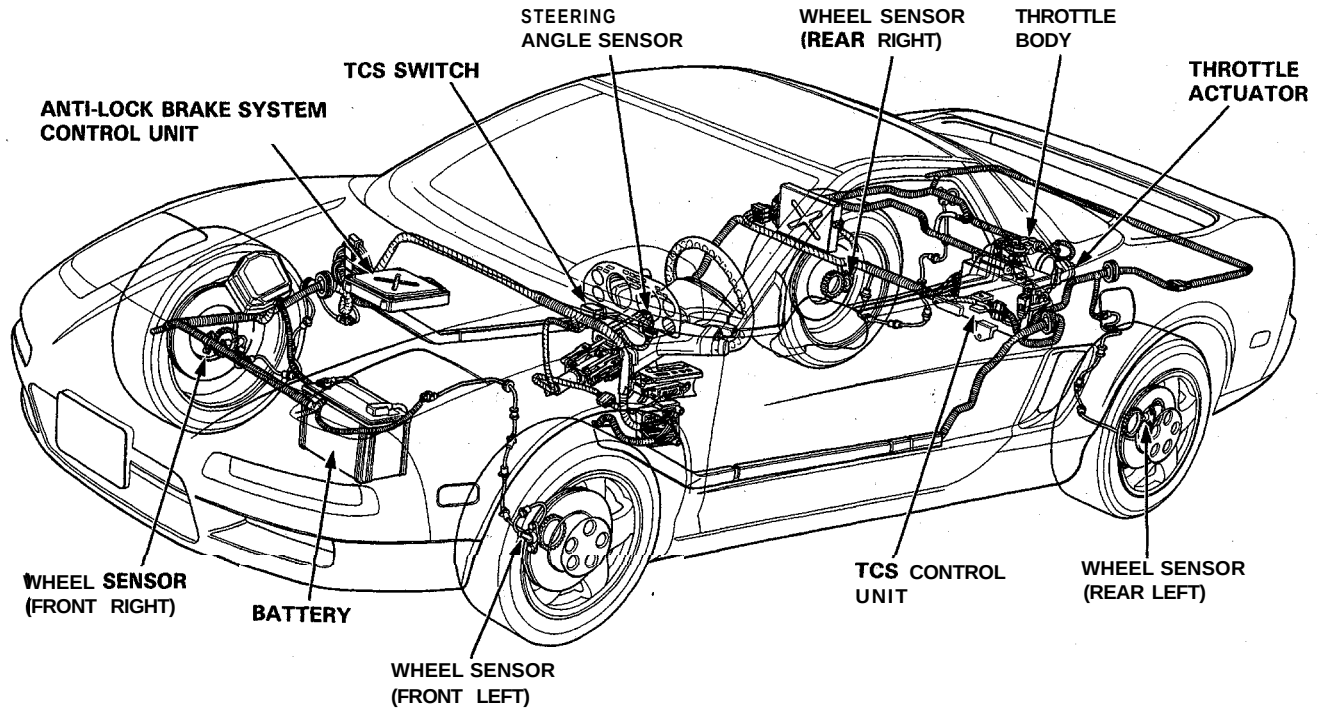
Role of System

The NSX 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 throttle actuator and PGM-FI control unit 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 Anti-lock brake system. The wheel sensors transmit wheel speed signals to the TCS through the Anti-lock brake system control unit.
- Steering angle sensor. The steering angle sensor signals the TCS control unit about the amount of steering angle.
- Throttle actuator. The throttle actuator gets signals from the TCS control unit and closes the throttle valve accordingly.
- TCS control unit. The control unit gets driving condition signals from the sensors and, if necessary, signals the throttle actuator to close the throttle valve and engine control unit (PGM-FI control unit).

TCS Control unit

Acceleration Control:

The TCS control unit gets signals from the wheel sensors about the rotational speed of each wheel. Traction control is activated when the rotational speed of the driving wheels differs from the rotational speed of the driven wheels (i.e., vehicle speed).

Handling Control:

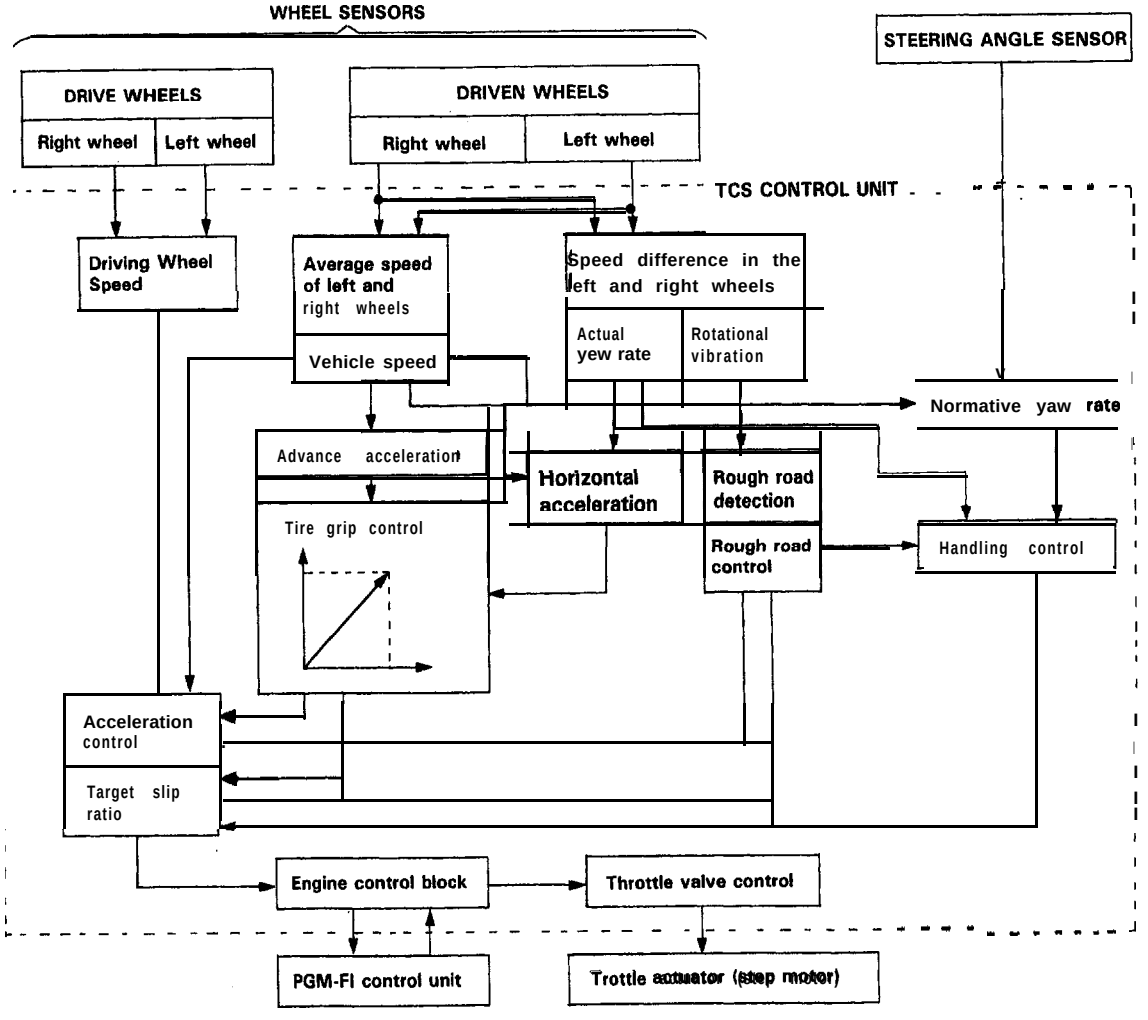
Based on signals about driving wheel and driven wheel rotational speeds, the control unit calculates the car's "yaw" rate (i.e., the turn rate of the car's body). Based on signals from the steering angle sensor, the control unit also calculates **the yaw rate expected by the driver. If the difference between actual and expected yaw rates is substantial-that is, if the direction of the car's body will exceed the driver's expected line -the control unit signals the throttle actuator, which closes the throttle valve, 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 throttle actuator to relax engine power, thus improving acceleration efficiency.

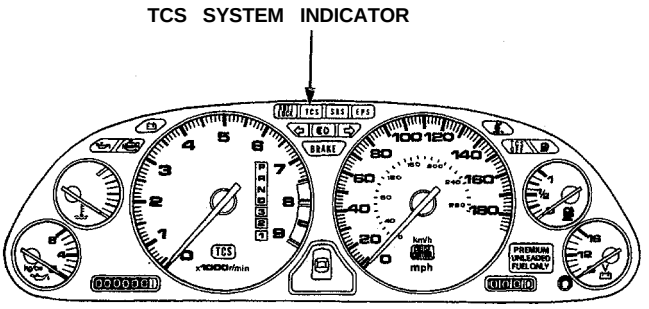
Grip Control:

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 throttle actuator to relax engine power if necessary, thus improving grip.**



Fail-Safe Function:

If the control unit detects an abnormality, it shuts the traction control system off and causes the TCS system **indicator light to come on. However if the abnormality** is detected while the TCS is activated, the control first **establishes the appropriate wheel spin velocity, then** shuts the system down, thus preventing excessive wheel spin.

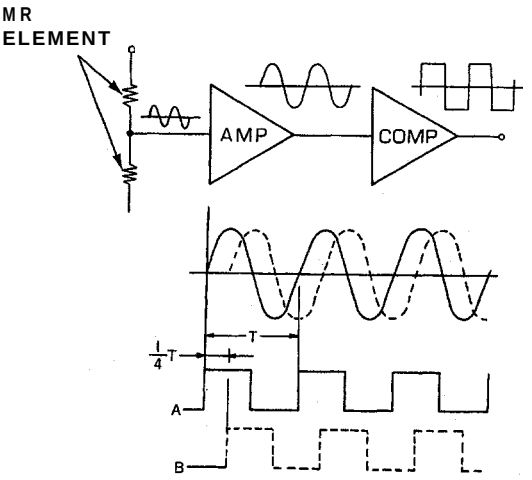


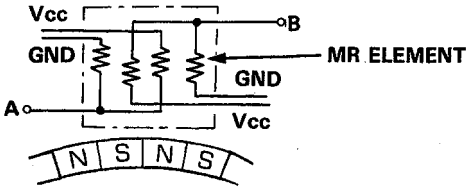
Self-Diagnosis Function:

If the control unit detects an abnormality, it records a "problem code" which can be used to diagnose the problem. The failure code is shown at the TCS system indicator light when the Service Check connector terminals are connected with a jumper wire.

Steering Angle Detection

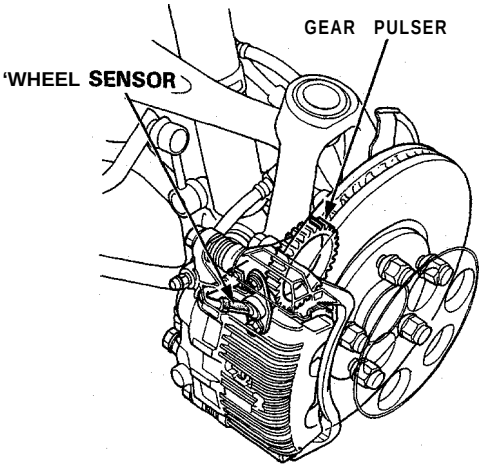
Steering angle is detected by the steering angle sensor, **located on the steering column. The sensor uses two** magnetoresistor elements to determine steering angle and direction of rotation. When the driver turns the steer**ing wheel, a magnet in the steering shaft generates waves in the "MR" elements. These waves are ampli**fied and converted into signals which the control unit can **interpret as angle and direction of turn.**





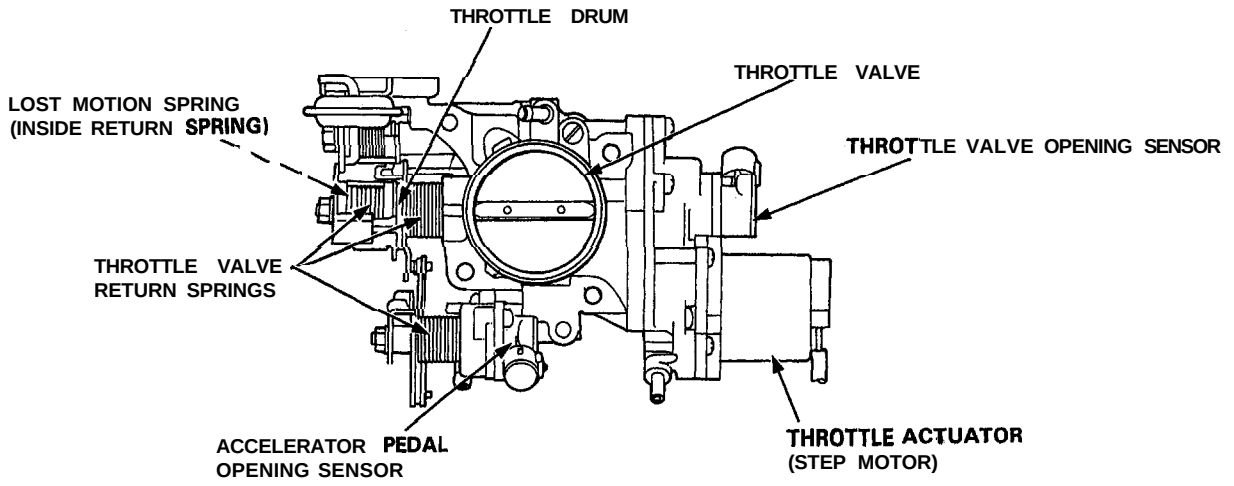
Vehicle Speed Detection

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.

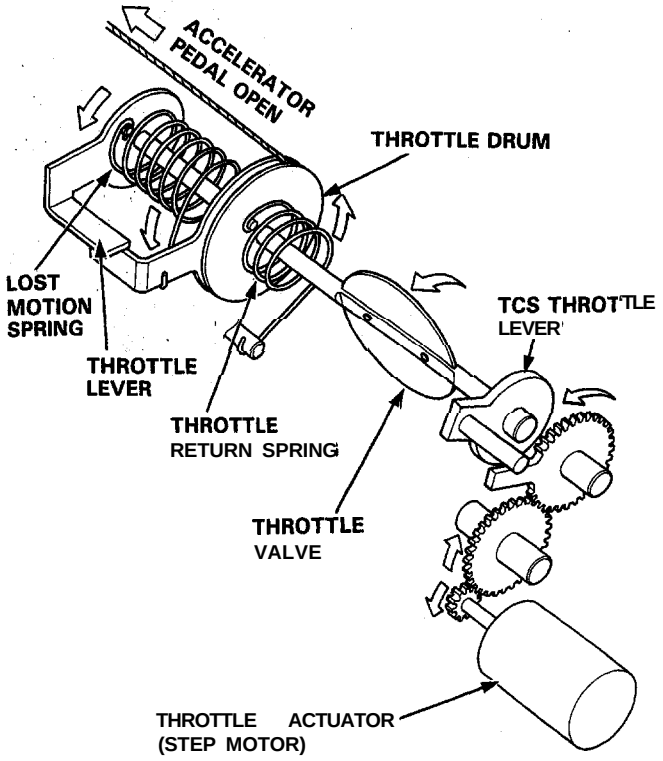


Engine Output Control

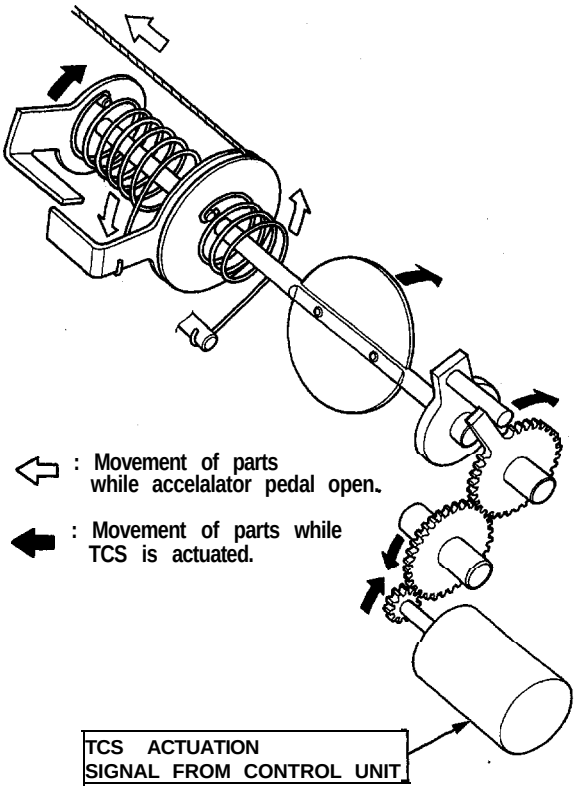
When the TCS is activated, the control unit signals the throttle actuator, located next to the throttle valve. The throttle actuator is linked to the throttle valve through a series of reduction gears. Although the accelerator pedal position is still within the driver's control, the throttle valve is automatically relaxed to achieve optimum traction.



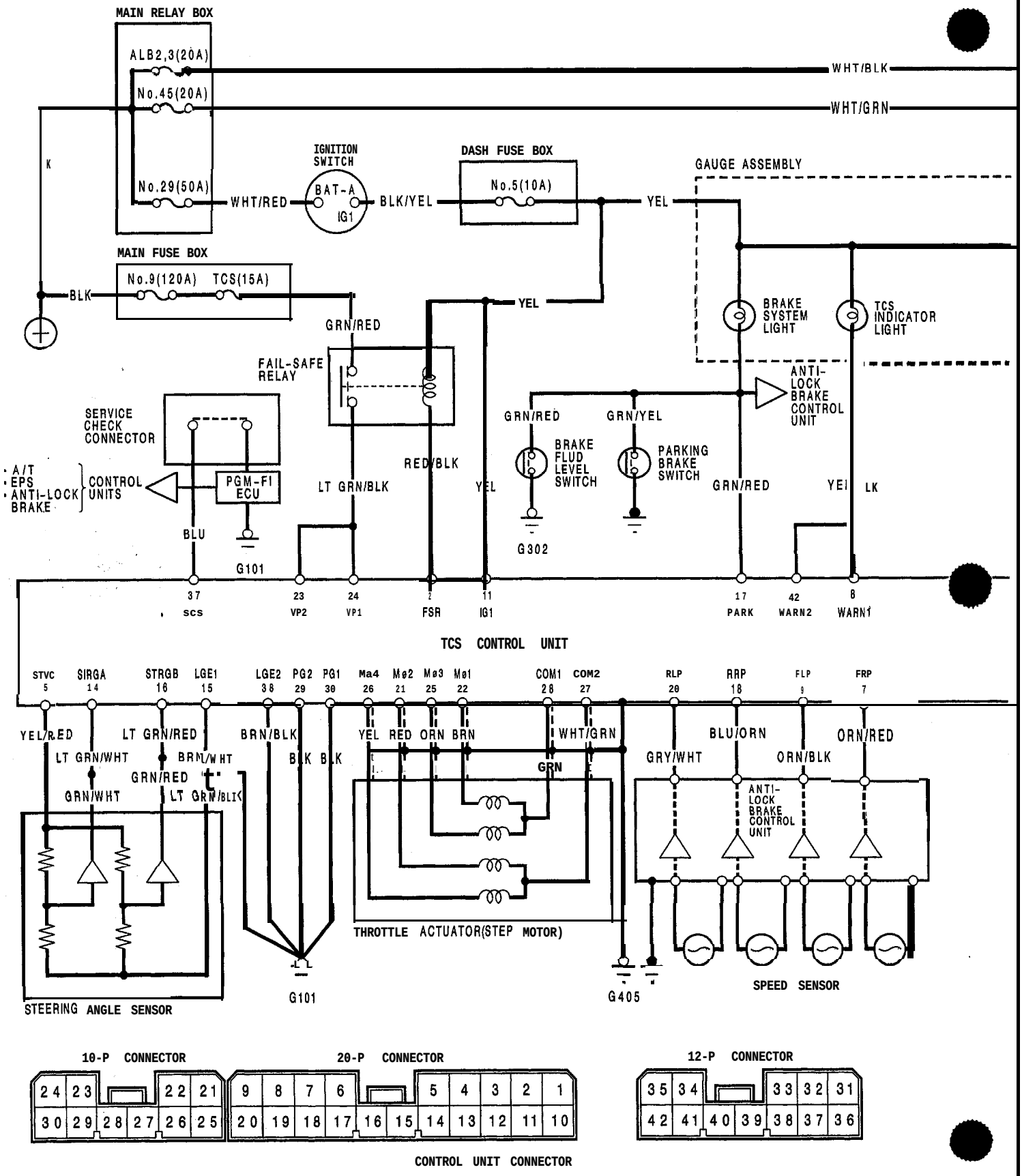
DURING **NORMAL DRIVING:**

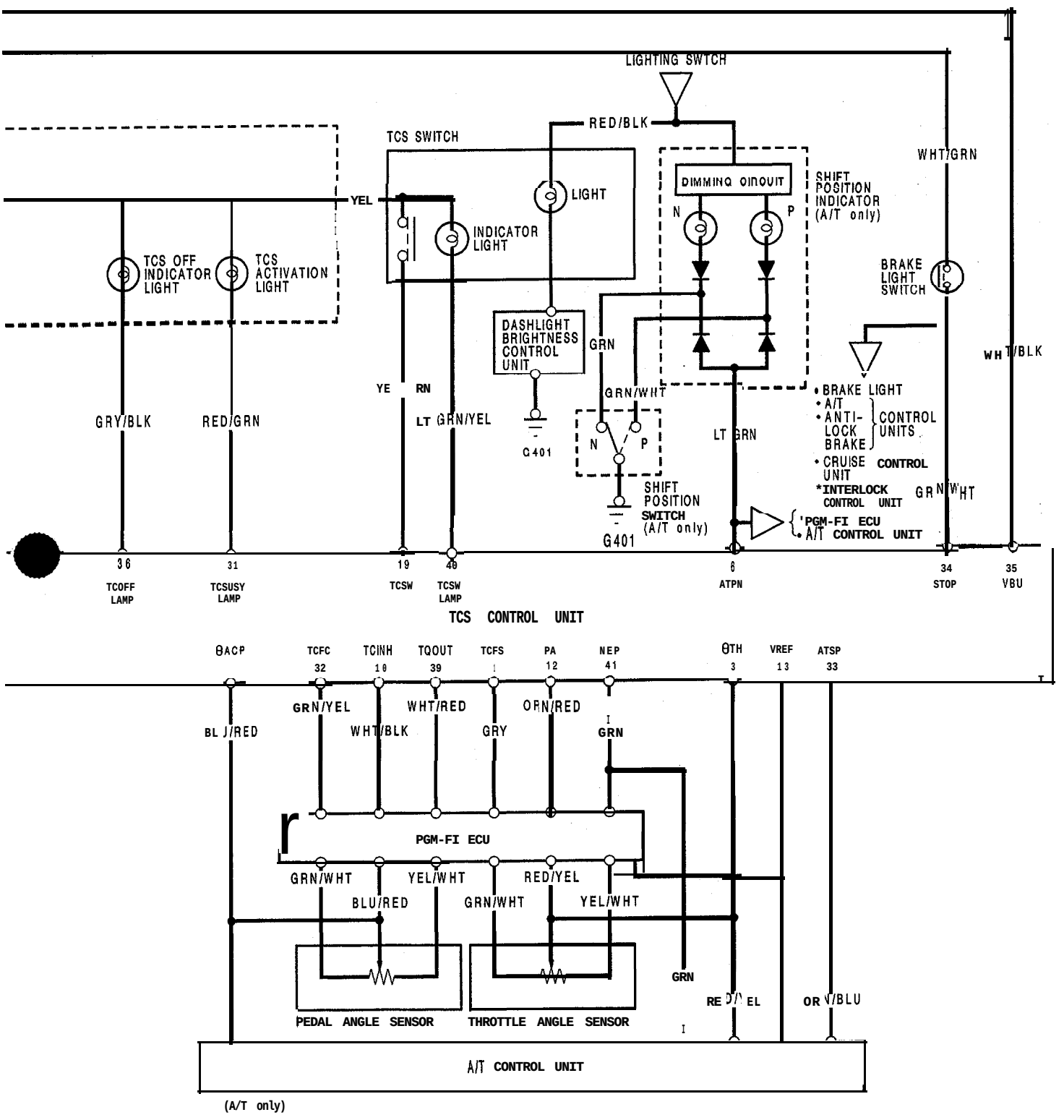


DURING TCS ACTUATION:



Circuit Diagram




LIGHTING SWTCH
RED/BLK
TCS SWITCH
LIGHT
INDICATOR LIGHT
YEL
DIMMING DIN/OUT
SHIFT POSITION INDICATOR (A/T only)
WHT/GRN
TCS OFF INDICATOR LIGHT
TCS ACTIVATION LIGHT
BRAKE LIGHT SWITCH
DASHLIGHT BRIGHTNESS CONTROL UNIT
GRN
WHT/BLK
GRY/BLK
RED/GRN
YE RN
LT GRN/YEL
GRN/WHT
G401
LT GRN
• BRAKE LIGHT
• A/T
• ANTI-LOCK BRAKE
CONTROL UNITS
• CRUISE CONTROL UNIT
*INTERLOCK CONTROL UNIT
GRN/WHT
SHIFT POSITION SWITCH (A/T only)
G401
'PGM-FI ECU
• A/T CONTROL UNIT
36 TCOFF LAMP
31 TCSUSY LAMP
19 TCSW
40 TCSW LAMP
6 ATPN
34 STOP
35 VBU
TCS CONTROL UNIT
θACP
TCFC 32
TCINH 10
TQOUT 39
TCFS
PA 12
NEP 41
θTH 3
VREF 13
ATSP 33
GRN/YEL
WHT/RED
ORN/RED
BLU/RED
WHT/BLK
GRY
GRN
PGM-FI ECU
GRN/WHT
YEL/WHT
RED/YEL
BLU/RED
GRN/WHT
YEL/WHT
GRN
RED/YEL
ORN/BLU
PEDAL ANGLE SENSOR
THROTTLE ANGLE SENSOR
A/T CONTROL UNIT
(A/T only)

Troubleshooting

TCS Indicator Light

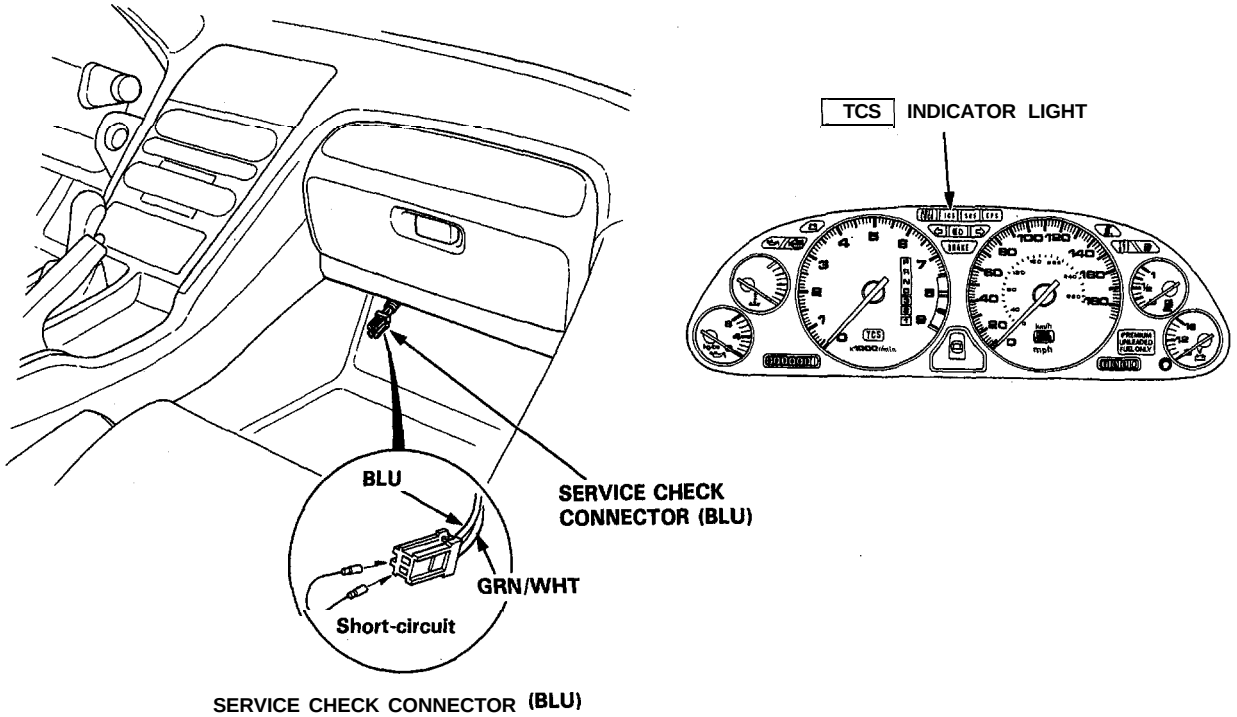
Temporary Driving Conditions: *

1. The TCS indicator light will come on and the control unit memorizes the problem code under certain temporary conditions:
   - **The spare tire is installed, or a tire of the improper size is installed.**
   - **The tire pressures are not correct.**
2. If the TCS indicator light does not come back on after correcting the tire or tire pressure problem. The TCS system is OK.

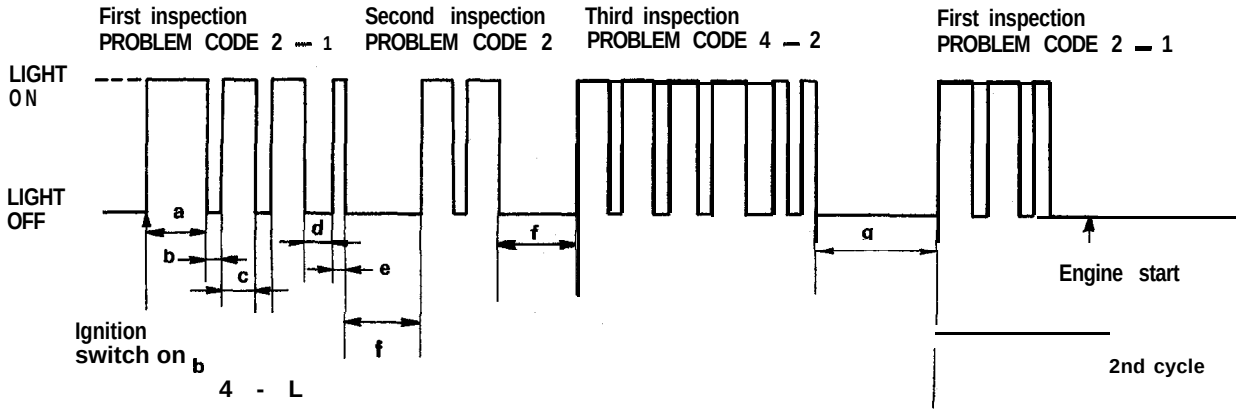
NOTE: Remove the ALB 2.3 (20A) fuse for at least 3 seconds to clear the problem code from the TCS control unit memory.

TCS Problem Code Indication:

1. **Stop the engine.**
2. **Turn the ignition switch on and confirm that the TCS indicator light comes on.**
3. **Turn the ignition switch off.**
4. **Connect the two terminals of the Service Check Connector with a jumper wire.**
5. **Turn the ignition switch on, but do not start the engine.**
6. Record the blinking frequency of the TCS indicator light. The blinking frequency indicates the problem code. Long blinks indicate the main code; short blinks indicate the sub-code.
7. **Refer to the Troubleshooting Guide (page 19-84) for repair information.**



SERVICE CHECK CONNECTOR (BLU)



a: 2.0 sec. c: 1.2 sac. e: 0.3 sec. g: 3.8 sec.
b: 0.5 sec. d: 1.0 sec. f: 2.5 sec.

NOTE:

- The TCS control unit has three memory registers. When a problem occurs, the control unit stores the problem code in the first memory register. If another problem occurs, or the same problem occurs again, the control unit moves the first problem code to the next memory register and stores the second problem code in the first register. If there's a third problem occurrence, the two existing problem codes are moved up one register and the third problem code is stored in the first register. If problems continue to occur, the oldest problem code is moved out of the last register and lost, and the most recent problem code is stored in the first register.
- The TCS indicator light will not come on again after the engine starts unless another problem occurrence is detected. However, there will still be a problem code stored in the control unit's memory.
- After the repair is completed, disconnect the jumper wire from the Service Check connector and remove the ALB 2.3 fuse (20A) from the main relay box for at least 3 seconds to erase the control unit's memory.
- The control unit's memory is erased if the connector is disconnected from the control unit, or if the control unit is removed from the car.

Troubleshooting Guide

Problem Code	System Indicated	Related components: TCS (15A) FUSE	ALB 2.3 (20 A) FUSE	No. 5 (10 A) FUSE	Parking brake switch	Charging System	Fail-safe relay	Throttle body	Throttle actuator	Pedal angle sensor	Throttle angle sensor	Steering angle sensor	PGM-FI ECU	ALB control unit	A/T control unit	Wire harness	TCS control unit
–	The TCS indicator light, TCS OFF indicator light, TCS activation and TCS switch indicator light do not come on for two seconds when the ignition switch is first turned on.		○	○												○	○
–	The TCS OFF indicator light and the TCS activation light do not go off two seconds after the ignition switch is turned on.															○	○
–	The TCS indicator light does not go off after the engine starts.												○			○	○
–	The TCS OFF indicator light does not go off after the engine starts.															○	○
tays on	TCS control unit or battery voltage too low																○
I-2	TCS conrol unit																○
2	Parking brake signal				0											○	○
2-I	Steering angle sensor											○				○	○
3-I	PGM-FI ECU												○			○	○
3-2	NeP Signal (engine speed signal)												○		○	○	○
3-3	Abnormal TQOUT signal												○			0	○
3-4	Abnormal VREF (reference voltage) signal												○		00		○
3-5	Abnormal PA sensor signal												○			0	○
3-6	Abnormal θACP (throttle drum angle sensor)									○			○		t	0	○
3-7	Abnormal θTH (throttle angle sensor)										○		○		○	○	○
4-1	Wheel sensor R. Front													○		○	○
4-2	Wheel sensor L. Front													○		○	○
4-4	Wheel sensor R. Rear													○		○	○
4-8	Wheel sensor L. Rear													○		○	○
4-9	All wheel sensor													○		○	○
5-I	Abnormal fail-safe relay, throttle actuator or throttle body	0					○	○	○							○	○
6-I	A/T control unit														○	○	○

- Troubleshooting Flowchart

The TCS indicator light, TCS OFF indicator light, TCS activation light and the TCS switch indicator light do not come on for two seconds when the ignition switch is first turned on (no bulb check).

NOTE: The TCS indicator light stays on until the engine starts.

Turn the ig nition switch ON.

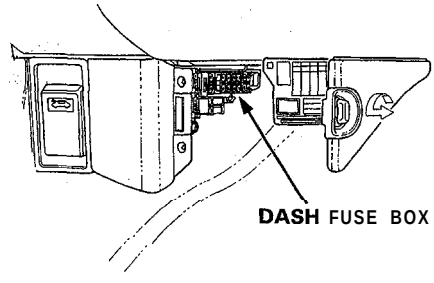
Do the other indicator lights (ALB, Check Engine, SAS, etc.) come on?

YES → (To page 19-86)

NO

Turn the ignition switch OFF.

Check the No. 5 (10A) fuse in the dash fuse box.



Is it normal?

NO → Replace the fuse and recheck.

YES

Repair open in the YEL wire between the dash fuse and gauge assembly.

(cont'd)

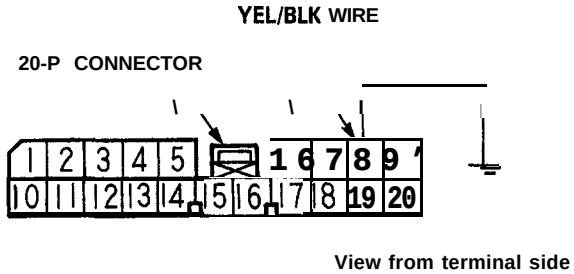
Troubleshooting Flowchart (cont'd)

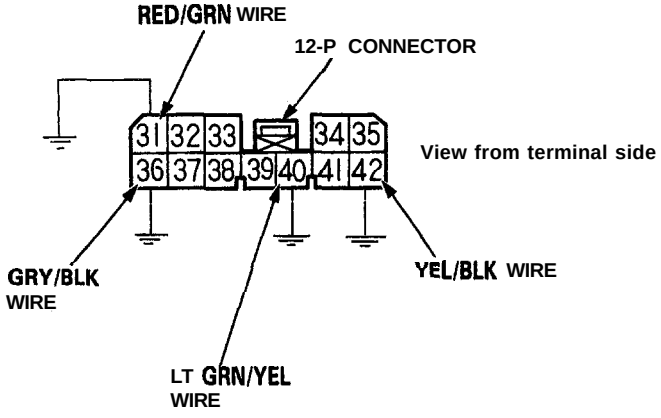
(From page 19-85)

Turn the ignition switch OFF.

Disconnect the 20-P and 12-P connectors from the TCS control unit.

Ground the following terminals individually to the body ground and turn the ignition switch ON. Check the lights:
TCS indicator light: No. 8 or No. 42 terminal
TCS OFF indicator light: No. 36 terminal
TCS activation light: No. 31 terminal
TCS switch indicator light: No. 40 terminal





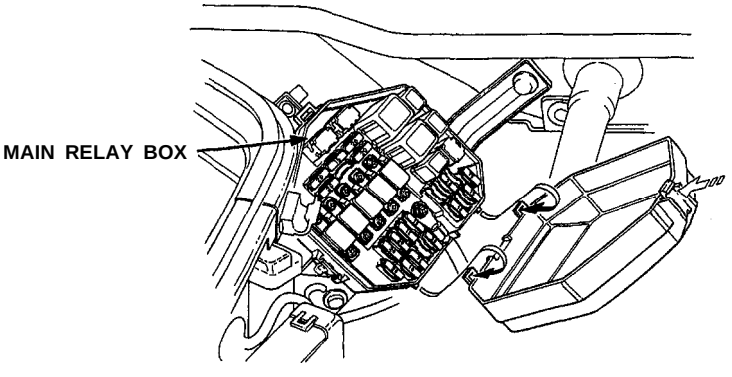
Do all the lights come on?

NO

- Replace defective bulb.
- Repair open in the wire between the TCS control unit and gauge assembly.

YES

Check the AL8 2.3 (20A) fuse in the main relay box.



Is it normal?

NO

Replace the ALB 2.3 (20A) fuse and recheck.

YES

(To page 19-87)

(From page 19-86)

Turn the ignition switch ON.

Measure the voltage between the No. 35 terminal of the 12-P connector and body ground.

Is there battery voltage?

NO → Repair open in the **WHT/BRK** wire between the TCS control unit and main relay box.

YES

Measure the voltage between the No. 11 terminal of the 20-P connector and body ground with the ignition switch ON.

Is there battery voltage?

NO → Repair open in the YEL wire between the TCS control unit and dash fuse box.

YES

Turn the ignition switch OFF.

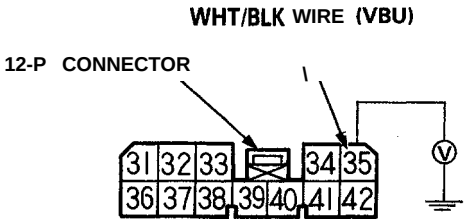
Check for continuity to body ground between the No. 15 terminal of the 20-P connector and No. 38 terminal of the 12-P connector individually.

Is there continuity?

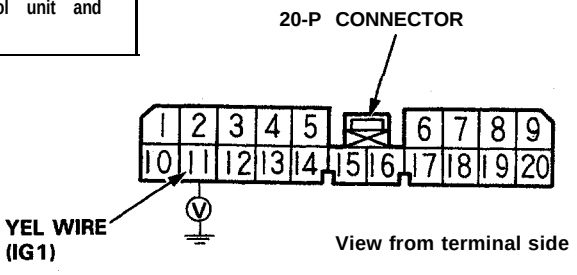
NO →
- Repair open in the BRN/WHT or BRN/BLK wire between the TCS control unit and bodey ground.
- Repair poor ground (G101).

YES

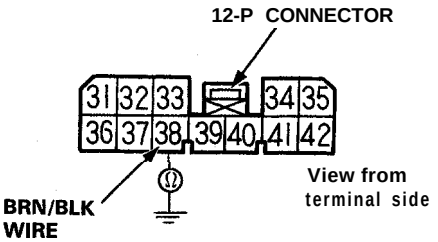
- Check for poor connection or loose wires.
- Substitute known-good TCS control unit and recheck.



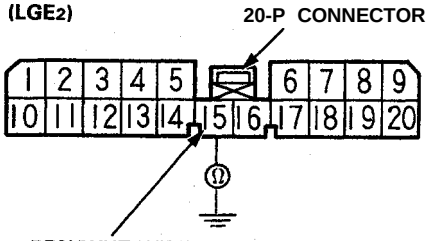
View from terminal side



View from terminal side



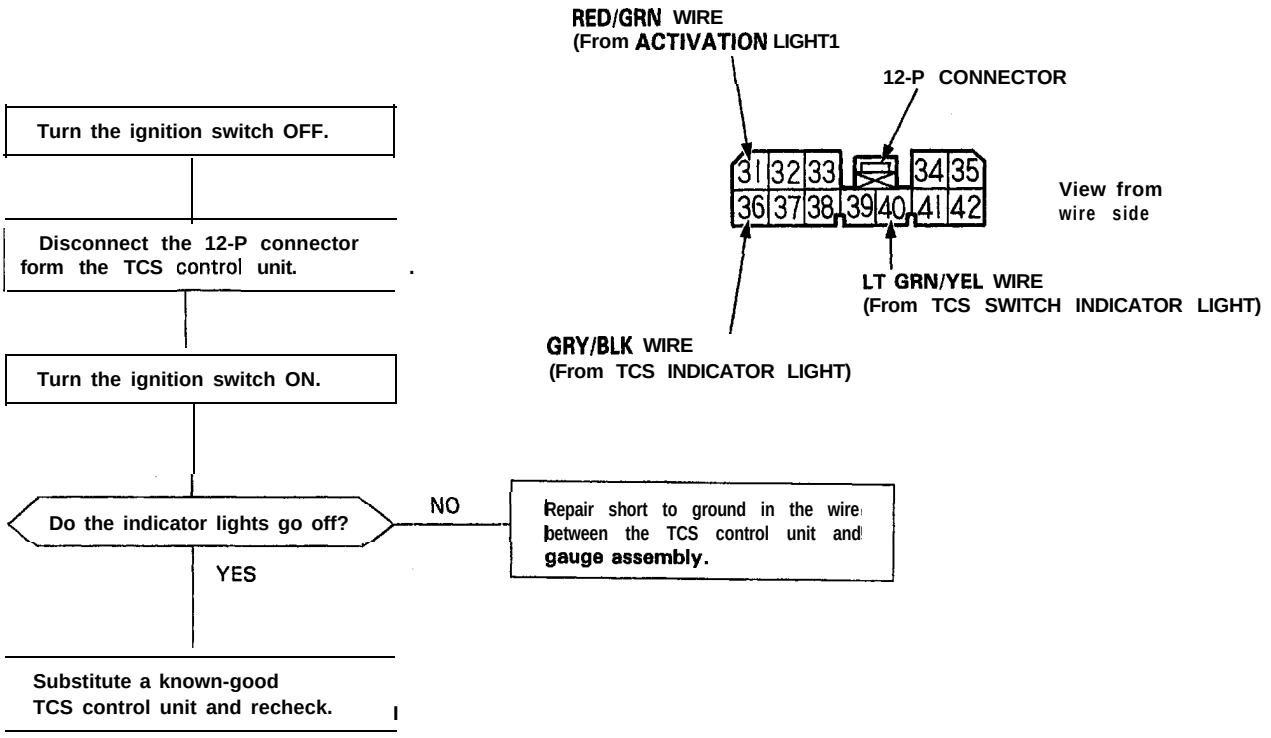
View from terminal side



(cont'd)

· Troubleshooting Flowchart (cont'd)

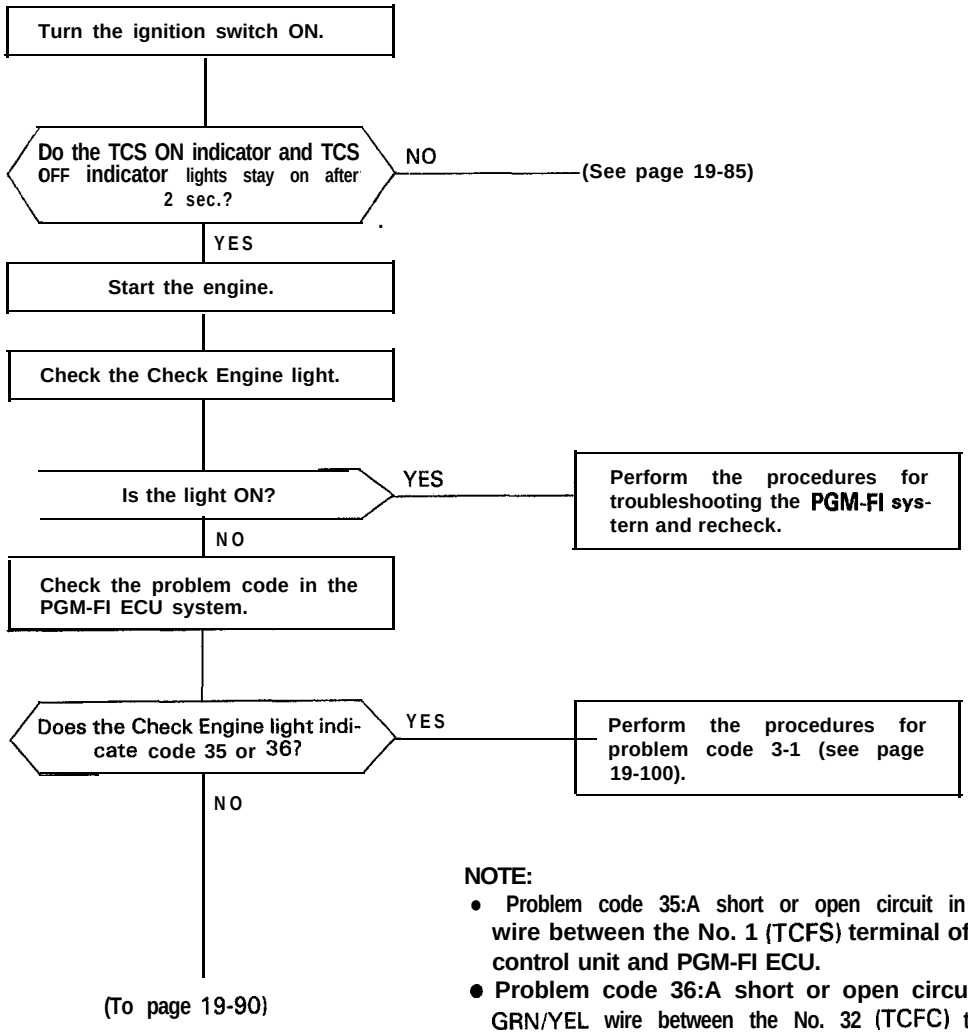
The TCS OFF indicator light and the TCS activation light do not go off two seconds after the ignition switch is turned on.



The TCS indicator light does not go off after the engine starts:

NOTE:

- When the engine starts, a TCS system check is performed. The TCS indicator light will go off if the sytem is normal.
- If the back-up power supply is less than 8V to the TCS control unit (No. 35 terminal), the system check is stopped and TCS indicator light comes on.



NOTE:

- Problem code 35:A short or open circuit in the GRY wire between the No. 1 (TCFS) terminal of the TCS control unit and PGM-FI ECU.
- Problem code 36:A short or open circuit in the GRN/YEL wire between the No. 32 (TCFC) terminal of the TCS control unit and PGM-FI ECU.

(cont'd)

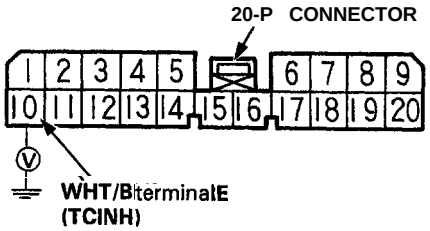
. Troubleshotting Flowchart (cont'd)

(From page 19-89)

Start the engine.

View from side

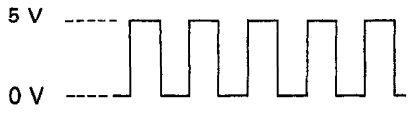
Measure the voltage between the No.10 terminal of the 20-P connector for the TCS control unit and body ground.



NOTE: NOTE:

- Use the 10 V range a similar range in the analog tester.

Confirm that the analog tester pointer swings to approximately 2.5 V.



Is there approximately 2.5 V?

NO — (To page 19-91)

YES

Turn the ignition switch OFF.

Disconnect the 12-P and 20-P connectors from the TCS control unit

Turn the ignition switch ON.

Is the TCS indicator light on?

YES — Repair short to ground in the YEL/BLK wire between the TCS control unit and the gauge assembly.

NO

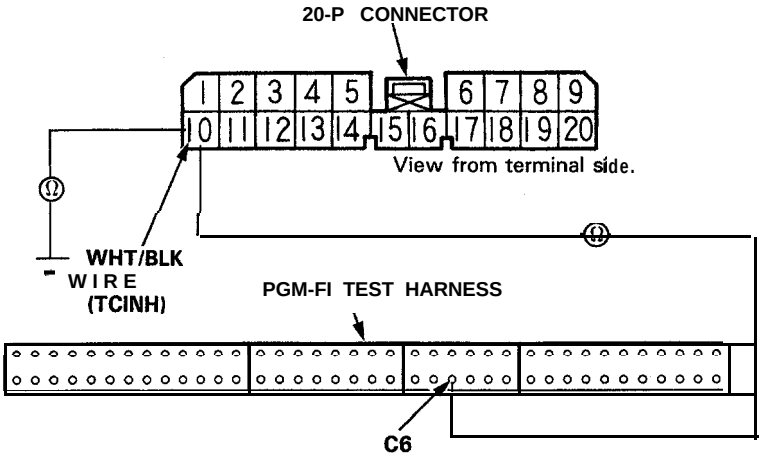
- Check for poor connection or loose wire.
- Substitute known-good TCS control unit and recheck.

(From page 19-90)

Turn the ignition switch OFF.

Disconnect the 12-P connector from the PGM-FI ECU and 20-P connector from the TCS control unit

Check for continuity between the No.10 terminal of the 20-P connector for the TCS control unit and body ground.



Is there continuity?

YES → Repair short to ground in the WHT/BRK wire between the TCS control unit and PGM-FI ECU.

NO

Check for continuity between the No.10 terminal of the 20-P connector and the C6 terminal of the PGM-FI test harness

NOTE: Use the PGM-FI test harness, connect the test harness to the PGM-FI ECU.

Is there continuity?

NO → Repair open in the WHT/BLK wire between the TCS control unit and PGM-FI-ECU.

YES

- Check for poor connection or loose wire.
- Substitute known-good TCS control unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

The TCS OFF indicator light does not go off, after the engine starts.

Turn the ignition switich ON.

Check for problem code in the PGM-FI ECU system

Does the Check Engine light indicate code 35 or 36?

YES → **Perform the procedures for problem code 3-l.**

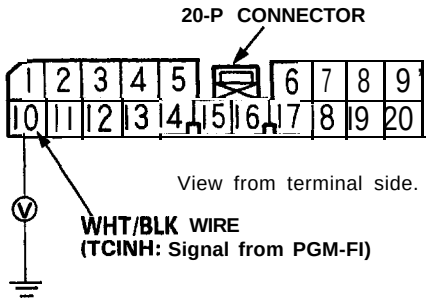
NO

NOTE:
- Problem code 35 (TCFS: short or open circuit)
- Problem code 36 (TCFC: short or open circuit)

Measure the voltage between the No. 10 terminal of the 20-P connector for TCS control unit and body ground.

NOTE:
- Check when engine is warmed up.
- Use the 1 OV **range or a similar range in the analog tester.**

Confirm that the analog tester pointer swings to approximatly 2.5 V.



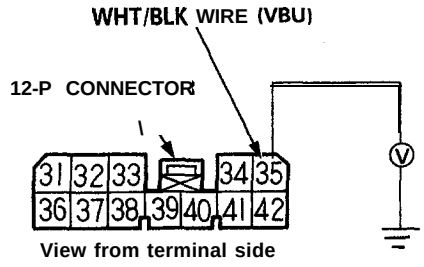
Is there approximately 2.5 V?

NO → Repair open and short circuit in the WHT/BLK wire between the TCS control unit and PGM-FI ECU.

YES

(To page 19-93)

(From page 19-92)



View from terminal side

Measure the voltage between the No. 35 terminal of the 12-P connector for the EPS control unit and body ground.

Is there battery voltage?

NO → See Alternator and Regulator Test *(Section 23).*

YES

- Check for poor connections and loose wires at the TCS control unit.
- Substitute know-good TCS Control unit and recheck.

NOTE: The TCS OFF indicator light comes on if the TCS control unit back-up power (VBU) is more than 18V.

(cont'd)

Troubleshooting Flowchart (cont'd)

Problem codes 1-2 or the TCS indicator light stays on: TCS Control Unit.

NOTE:

- **If the TCS indicator light indicates problem code 1-2, replace the TCS control unit.**
- **If the TCS indicator light stays on, check for a short to body ground in the YEL/BLK wire between the control unit and the TCS indicator light. If the wire is OK, replace the TCS control unit.**

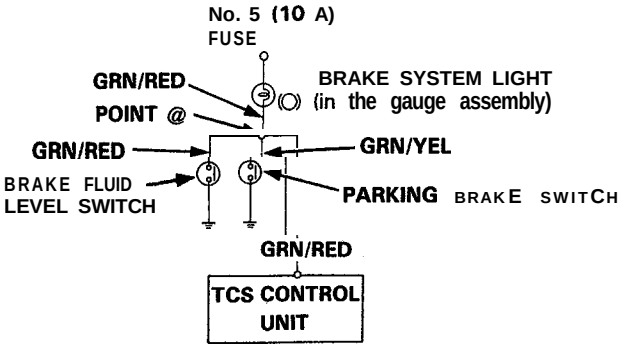
Problem code 2: Parking brake signal

NOTE:

- Before proceeding to the troubleshooting procedure, be sure to perform a running test and check whether the TCS indicator light comes on or not. If the TCS indicator light does not come on, the system is working properly. If the TCS indicator light comes on, make sure the parking brake lever is released.
- **When both of the front wheels are running at 10 km/h (6.2 mph) or over and the parking brake is applied for more than 30 seconds continuously, the TCS control unit will cause the TCS indicator light to come on. When the parking brake switch is turned OFF, the input signal to the TCS control unit becomes high. When the parking switch is turned ON, the input signal to the TCS control unit becomes low. Also, when the wire between the No.5 (10 A) fuse and the TCS control unit is disconnected or cut, the input signal becomes low.**

Release the parking brake lever (switch OFF) and turn the ignition switch ON.

Check the BRAKE system light.



Is the BRAKE system light come on?

YES

- Check for;
  - Parking brake switch test or brake fluid level switch test.
  - A short circuit to ground in the GRN/YEL or GRN/RED wire.

NO

Pull up the parking brake lever (switch ON).

Is the brake system light come on?

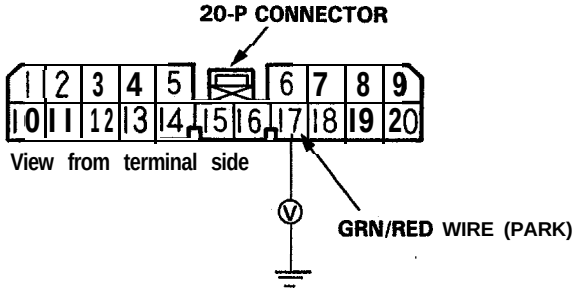
NO

- Replace the BRAKE system bulb.
- Repair open in the GRN/RED wire between the gauge assembly and point. @

YES

Release the parking brake lever (switch OFF) and turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit.



Measure the voltage between the No. 17 terminal of the 20-P connector and body ground when the ignition switch ON.

Is there battery voltage?

NO

Repair open in the GRN/RED wire between the point @ and TCS control unit.

YES

Check for loose TCS control unit connector. If necessary, substitute a known-good TCS control unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Problem code 2-1: Steering angle sensor system.

NOTE: The TCS control unit performs the s-diagr nosis for the steering angle sensor when the average speed of the front two wheels exceeds 16 km/hr. The TCS ndicator light comes on if the yaw rate is generated and the steering angle signal that corresponds to this yaw rate is not input when the steering wheel is turned while there is no input from the STOP (brake light signal) and PARK (Parking brake signal).

Start the engine.

1. Push the TCS switch 3 times within three seconds.

2. Turn the steering wheel slowly from left to right more than 1.5 turns.

3. Push the TCS switch 2 times within 3 seconds.

4. Return the steering wheel to the left side slowly, check the number of times the TCS indicator light flashes after the wheel has moved approximately one turn.

Does the light flash 5 times ?

NO

YES

The tire pressure is incorrect or tires with an incorrect diameter are installed. The steering angle sensor is OK.

Measure the voltage between the No. 1 (+) and No. 5 (–) terminals of the steering angle sensor.

Is there approximately 4.5V?

YES

NO

(To page 19-97)

(To page 19-98)

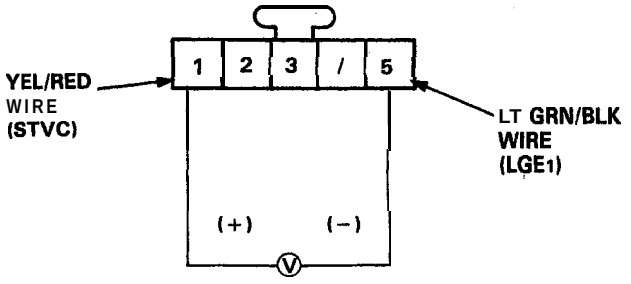
NOTE:
- **Always maintain the same number of rotations.**
- Step 1 to 4 are the steering angle sensor check procedures for actual rehicle operating condition. This will be called the "steering anlge sensor system check" in the following sections.

NOTE:
- Start checking after the steering wheel moves at least **1.5 turns from the right to the left.**
- Turn the steering wheel slowly, no faster than one turn in four seconds.

NOTE: Always maintain the same number of rotations.

NOTE:
- **Start the check from the beginning when the steering wheel moves at least one turn from the left to the right.**
- Turn the steering wheel slowly, no faster than one turn in four seconds.

View from terminal side.



(From page 19-96)

Turn the ignition switch OFF.

Disconnect the 5-P connector from the steering angle sensor.

Check for continuity between the No. 5 terminal and body ground.

Is there continuity?

NO → Repair open in the **LT GRN/BLK** wire between the No. 5 terminal and TCS control unit.

YES

Check for resistance between the No. 1 and No. 5 terminals

NOTE: Use the digital multimeter. Resistance is approximately 40 kΩ.

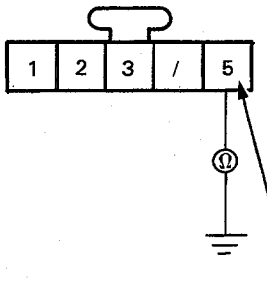
Is there approximately 40 KΩ?

YES →
- Substitute a known-good control unit and recheck.
- Check for poor connections or poor wires.

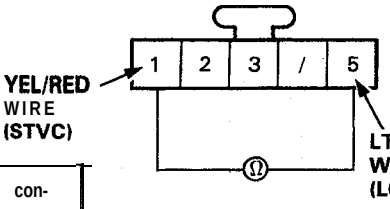
NO

Repair open or short circuit in the **YEL/RED** wire between the No. 1 terminal and TCS control unit.

View from terminal side



View from terminal side



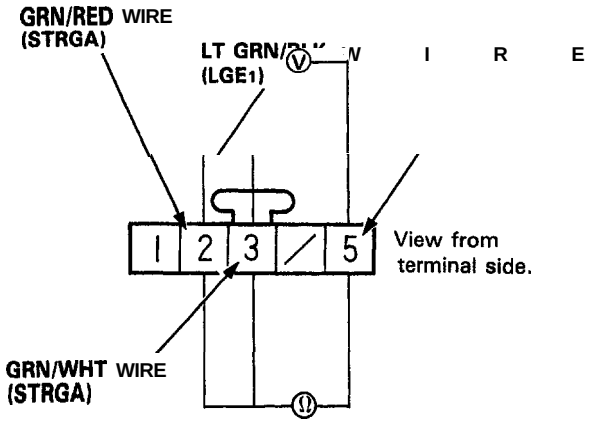
(cont'd)

· Troubleshooting Flowchart (cont'd)

(Form page 19-96)

Connect the voltmeter between the No. 2 (+) and No. 5 (−) terminals of the steering angle sensor.

Turn the steering wheel slowly one revolution.



Does the needle pulse 4.5V→0V→4.5V→0V repeatedly?

NO → Turn the ignition switch OFF.

YES

Connect the voltmeter between the No. 3 (+) and No. 5 (−) terminals of the steering angle sensor.

Turn the steering wheel slowly one revolution.

Does the needle pulse 4.5V→0V→4.5V→0V repeatedly?

NO → Turn the ignition switch OFF.

YES

Check for open or short in the LT GRN/RED and LT GRN/WHT wire between the steering angle sensor and TCS control unit. (Refer to 5 and 6.)

If there is no open or short-circuit, check for poor connections or loose wires. If the connections substitute a known-good TCS control unit and recheck.

Disconnect the 5-P connector from the steering angle sensor.

Check for resistance between the No. 2 and No. 5 terminals

NOTE: Use the digital multimeter. Resistance is approximately 50 kΩ.

is there ∞ or 0 Ω?

YES → (∞) Repair open in the LT GRN/RED (GRN/RED) wire between the No. 2 terminal and TCS contol unit.

YES → (0Ω) Repair short-circuit in the LT GRN/RED (GRN/RED) wire between the No. 2 terminal and TCS control unit.

NO

(To page 19-99)

Disconnect the 5-P connector from the steering angle sensor.

Check for resistance between the No. 3 and No. 5 terminals.

NOTE: Use the digital multimeter. Resistance is approximately 50 kΩ.

Is there ∞ or 0 Ω?

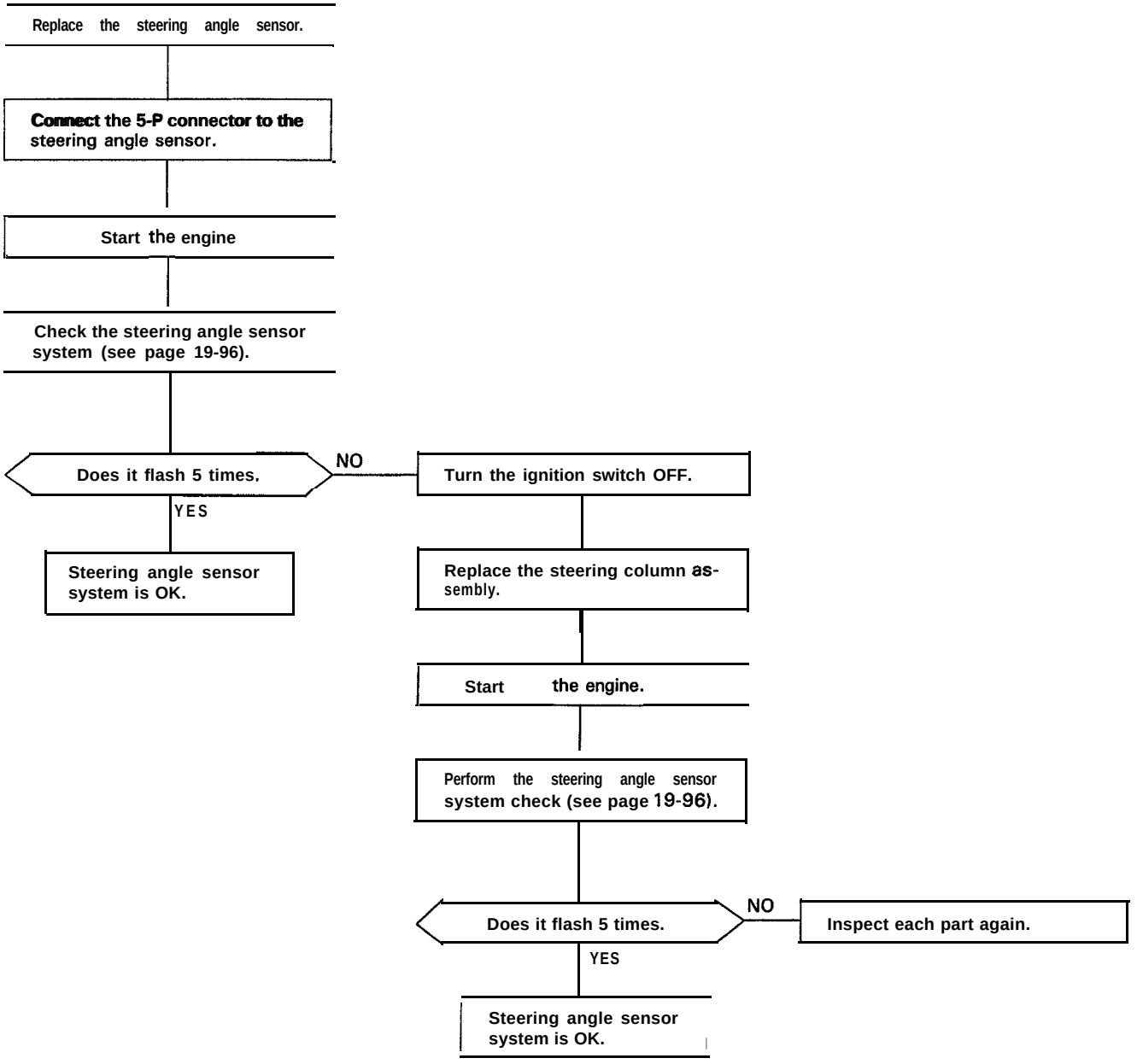
YES → (∞) Repair open in the LT GRN/WHT (GRN/WHT) wire between the No. 3 terminal and TCS control unit.

YES → (0Ω) Repair short-circuit in the LT GRN/WHT (GRN/WHT) wire between the No. 3 terminal and TCS control/unit.

NO

(To pagk 19-99)

(From page 19-98)



(cont'd)

Troubleshooting Flowchart (cont'd)

roblem code 3-1: The PGM-FI system (TCINH, TCFS and TCFC signals).

NOTE: The PGM-FI ECU **outputs the TCINH signal to the TCS control unit when the correct TCFS signal and TCFC signal have been input to it from the TCS control unit.**

Remove the ALB 2.3 (20A) fuse and Clock (7.5 A) fuse for more than 10 seconds to reset the PGM-FI ECU and TCS control unit.

Start the angina.

Check far TCS problem coda.

Is problem code 3-1 indicated? NO → **Intermlttant failure. Check for poor connections or loose wires.**

YES

Check for a PGM-FI problem code.

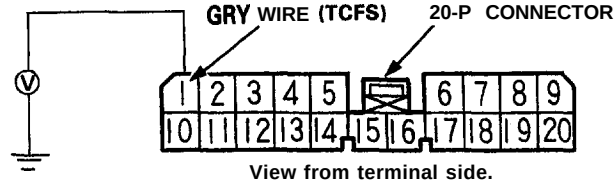
Are problem codas 35 (TCFS open or short-circuit) or 36 (TCFC open or short-circuit) indicated. NO → **Check the TCINH signal if no problem coda is indicated (see page 19-103).**

Perform the PGM-FI troubleshooting procedure if problem codes other than 35 and 36 are indicatad.

(YES

- Check the TCFS signal when PFM-FI system problem code 35 is ndicated. TCFS signal check: (see elow).
- Check the TCFC signal when GM-FI system problem code 36 is ndicated (see page 19-102).

Measure the voltage between the TCS ECU No. 1 terminal and body ground when the ignition switch is turned on.



View from terminal side.

Is there approximately 4.5 V? NO → **Turn the ignition switch OFF.**

YES

Turn the ignition switch OFF.

(To page 19-101)

Disconnect the 20-P connector from the TCS control unit.

(To page 19-101)

(From page 19-101)

Raise the car and support it with safety stands (see section 1).

Start the engine

Shift the transmission into 2nd. and press the accelerator until a vehicle speed greater than 20 km/hr(12 mph) is reached.

Measure the voltage between the TCS control unit No. 1 terminal and the body ground.

Is there OV? (TCS in operation.)

NO

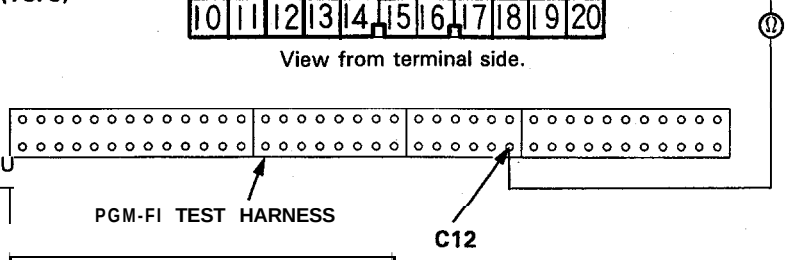
- Substitute a known-good control unit and recheck.
- Check for poor connections or loose wires.

YES

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit and the 12-P connector from the PGM-FI ECU.

Check for continuity in the GRY wire between the TCS control unit and PGM-FI ECU



Is there continuity?

NO

Repair open in the GRY wire between the TCS control unit and PGM-FI ECU.

YES

- Substitute a known-good PGM-FI ECU and recheck.
- Check for poor connections or loose wires.

(From page 19-101)

Check for continuity between the TCS control unit No. 1 terminal and the body ground.

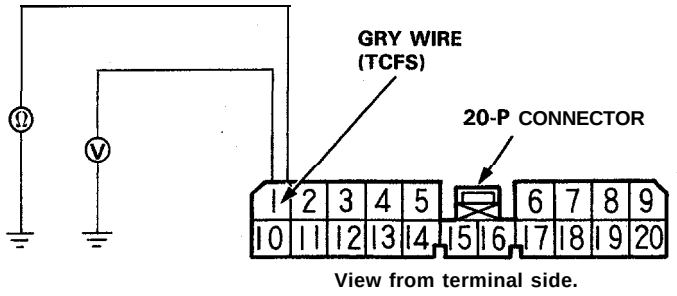
Is there continuity?

NO

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

YES

Repair short in the GRY wire between the TCS control unit and PGM-FI ECU.



NOTE: Use the PGM-FI test harness (see section 11).

(cont'd)

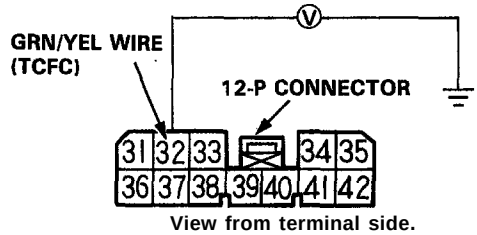
▪ Troubleshooting Flowchart (cont'd)

● TCFC signal check.

Turn the ignition switch ON.

Measure the voltage between the TCS control unit No. 32 terminal and body ground.

NOTE:
- Use the 10 V range or a similar range in the analog tester.
- Confirm that the analog tester needle is swinging at approximately 3.5V.



View from terminal side.

Is there approximately 3.5 V?

NO

YES

Turn the ignition switch OFF.

Disconnect the 12-P connector from the TCS control unit and the 12-P connector from the PGM-FI ECU.

Check for continuity between the TCS control unit No. 32 terminal end body ground.

Is there continuity?

NO

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

YES

Repair short in the **GRN/YEL** wire between the TCS control unit and PGM-FI ECU.

Turn the ignition switch OFF.

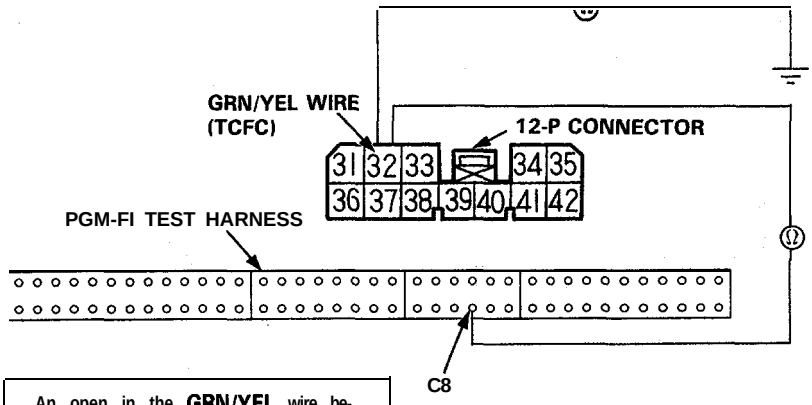
Disconnect the 12-P connector from the TCS control unit and the 12-P connector from the PGM-FI ECU.

Check for continuity in the GRN/YEL wire between the TCS control unit and PGM-FI ECU.

NOTE: Use the PGM-FI test harness, connect the test harness to the PGM-FI ECU (see section 11).

(To page 19-103)

(From page 19-I 02)



Is there continuity?

NO

An open in the **GRN/YEL** wire between the TCS control unit and PGM-FI ECU.

YES

- Substitute a known-good PGM-FI ECU and recheck.
- Check for poor connections or loose wires.

- **TCINH signal check: see blow.**

Start the engine.

Measure the voltage between the TCS control unit No. 10 terminal and body ground.

NOTE: Use the 10 V range or a similar range in the analog tester.

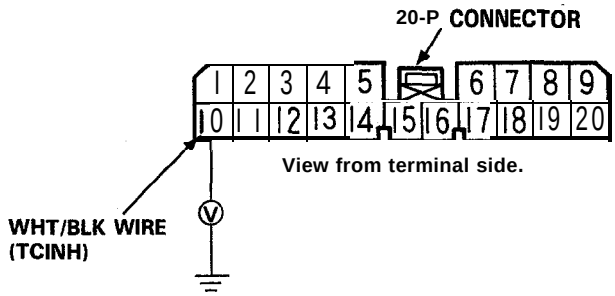
Check if the analog tester needle pulses in small increments in the range below 5 V.

Does the needle pulse in the range approximately 2.5V?

NO

YES

- Substitute a known-known-good ECU and recheck.
- Check for poor connections or loose wires.



(To page 19-I 04)

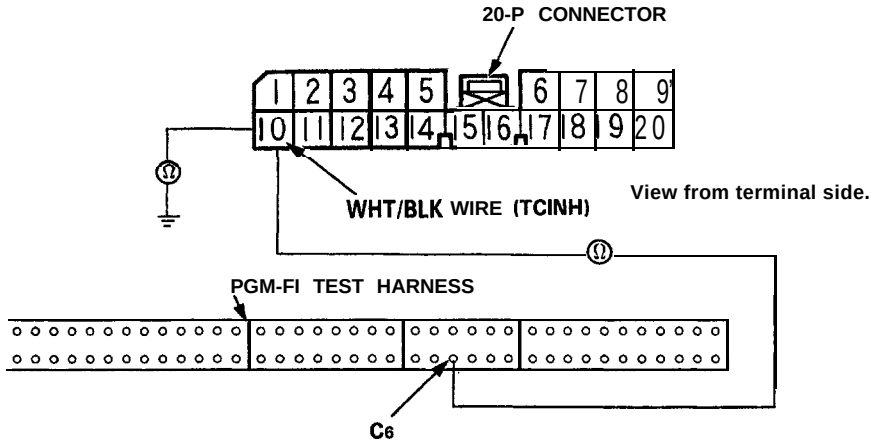
(cont'd)

Trouble shooting Flowchart (cont'd)

(From page 19-I 03)

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit and the 12-P connector from the PGM-FI ECU



Check for open or short in the WHT/BLK wire between the TCS control unit and PGM-FI ECU.

NOTE: Use the PGM-FI test harness (see section 1 1).

Is there an open or short?

YES — Repair open or short in the WHT/BLK wire between the TCS control unit and PGM-FI ECU.

NO

- Substitute a known-good PGM-FI ECU and recheck.
- Check for poor connections or loose wires.

Problem code 3-2: Engine speed signal (NEP).

Remove the ALB 2.3 (20A) fuse for more than 3 seconds to reset TCS control unit.

Start the engine.

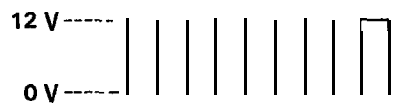
Is problem code 3-2 indicated?

NO → intermittent failure. Check for poor connections or loose wires.

YES

Measure the voltage between the TCS control unit No. 41 terminal and body ground.

NOTE:
- Use the 10 V range or a similar range in the analog tester.
- Check with the engine idling and warmed-up.

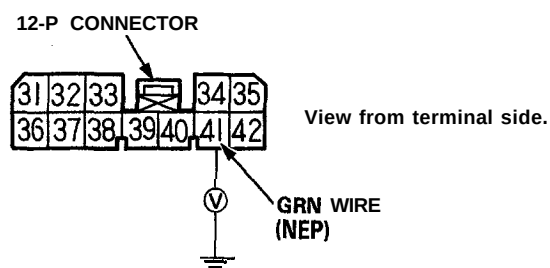


Is there approximately 6.0 V?

NO

YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.



Turn the ignition switch OFF.

Disconnect the 12-P connector from the TCS control unit, the 12-P connector from the PGM-FI ECU and the 26-P connector from the A/T control unit.

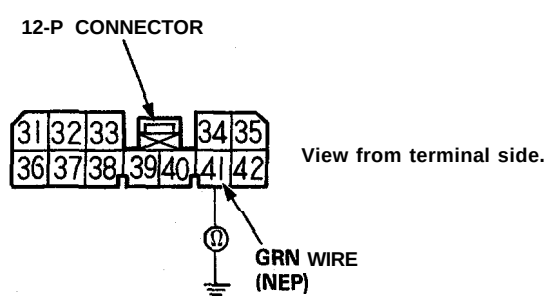
Check for continuity between the TCS control unit No. 41 terminal and body ground.

Is there continuity?

NO

YES

Repair short in the GRN wire between the TCS control unit, PGM-FI ECU and A/T control unit.



(To page 19-106)

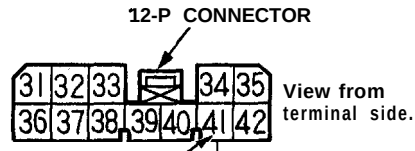
(cont'd)

- Troubleshooting Flowchart (cont'd)

(From page 19-I 05)

Check for continuity in the GRN wire between the TCS control unit and PGM-FI ECU.

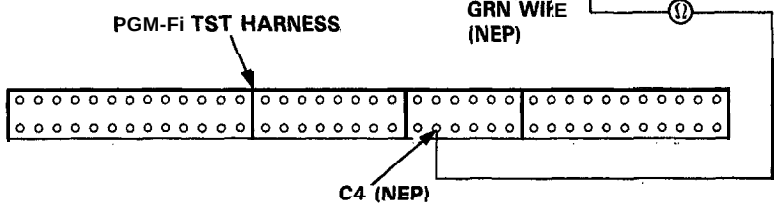
NOTE: Use the PGM-FI test harness (see section 1 1).



Is there continuity?

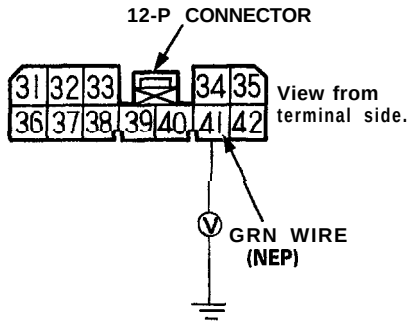
YES

NO



Repair open in the GRN wire between the TCS control unit and PGM-Fi control unit.

Connect the 12-P connector to the PGM-FI ECU.



Start the engine.

Measure the voltage between the TCS control unit No. 41 terminal and body ground.

is there approximately 6.0 V?

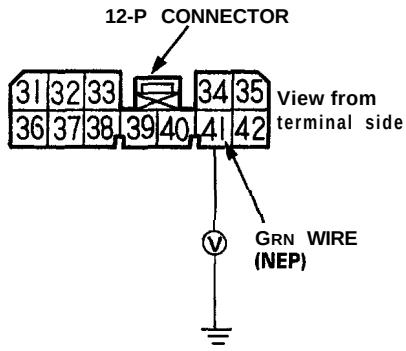
NO

- Substitute a known-good PGM-Fi ECU and recheck.
- Check for poor connections or loose wires.

YES

Turn the ignition switch OFF.

Disconnect the 26-P connector to the A/T control unit.



Start the engine

Measure the voltage between the TCS control unit No. 41 terminal and body ground.

is there approximately 6.0 V?

NO

Substitute a known-good A/T control unit and recheck. (internal short-circuit of the A/T control unit.)

YES

- Substitute a known-good TCS control unit and recheck.
- Cheok for poor connections or loose wires.

Problem code 3-3: The output torque signal (TQ OUT).

Remove the ALB 2.3 (20A) fuse for more than 3 seconds to reset TCS control unit.

Start the engine.

Is problem code 3-3 indicated?

NO → Intermittent failure. Check for poor connections or loose wires.

YES

Start the engine.

Measure the voltage between the TCS control unit No. 39 terminal and body ground.

Is there appproximately 3.3 V?

NO

YES

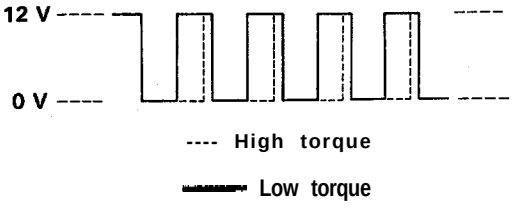
- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

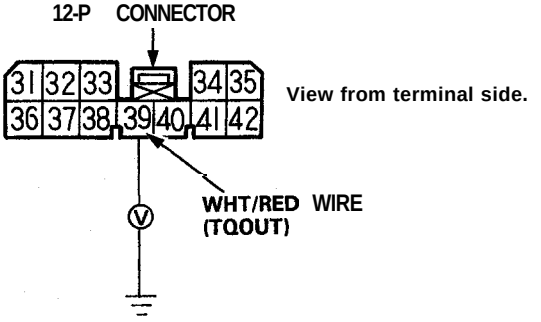
Turn the ignition switch OFF.

(To page 19-108)

NOTE:

- Use the 10 V range or a similar range in the analog tester.
- Check with the engine idling and warmed-up.





(cont'd)

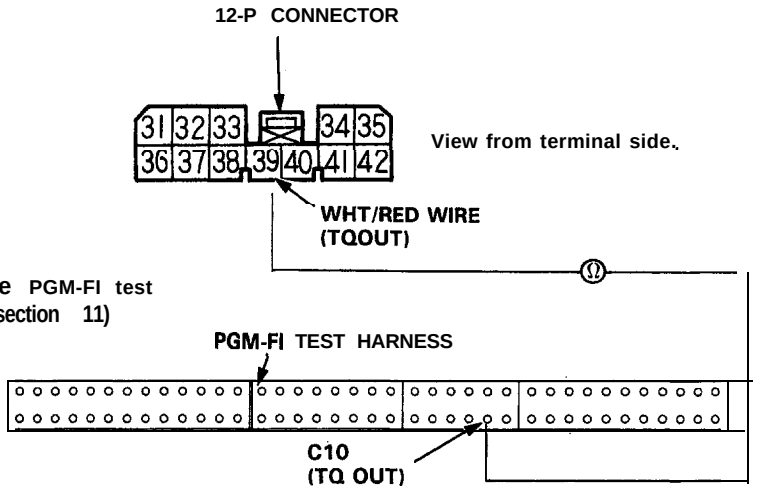
Troubleshooting Flowchart (cont'd)

(From page 19-107)

Disconnect the 12-P connector from the TCS control unit and the 12-P connector form the PGM-FI ECU.

Check for continuity in the WHT/RED wire between the TCS control unit and the PGM-FI ECU.

NOTE: Use the PGM-FI test harness (see section 11)

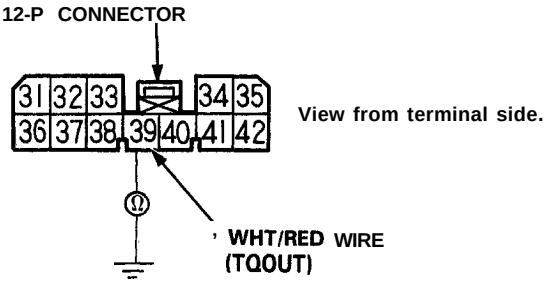


Is there continuity?

YES

NO

Repair open in the **WHT/RED** wire between the TCS control unit and **PGM-FI ECU.**



Check for continuity between the TCS control unit No. 39 connector and body ground.

Is there continuity?

NO

- **Substitute a known-good PGM-FI ECU and recheck.**
- Check for poor **connections** or **loose wires.**

YES

Repair short in the **WHT/RED** wire between the TCS control unit and **the PGM-FI ECU.**

Problem code 3-4: The 5V standard voltage (VREF).

Remove the ALB 2.3 (20A) fuse for more than 3 seconds to reset TCS control unit.

Start the engine

Is problem code 3-4 indicated?

NO

Intermittent failure.
Check for poor connections or loose wires.

YES

Measure the voltage between the TCS control unit No. 13 terminal and body ground.

Is there approximately 5 V?

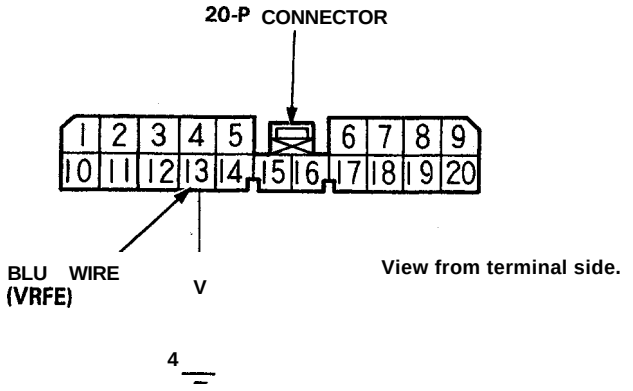
NO

YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

Turn the ignition switch OFF.

(To page 19-110)



(cont'd)

Troubleshooting

▪ Troubleshooting Flowchart (cont'd)

(From page 19-109)

Disconnect the 20-P connector from the TCS control unit, the 22-P connector from the PGM-FI ECU and the 20-P connector from the A/T control unit.

Check for continuity between the TCS control unit No. 13 terminal and body ground,.

Is there continuity?

NO

YES

Repair short in the BLU wire between the TCS control unit, PGM-FI ECU and the A/T control unit.

Check for continuity in the BLU wire between the TCS control unit and PGM-FI ECU.

Is there continuity?

YES

NO

Repair open in the BLU wire between the TCS control unit and PGM-FI ECU.

Connect the 22-P connector to the PGM-FI ECU.

Turn the ignition switch ON.

Measure the voltage between the TCS control unit No. 13 terminal and body ground.

Is there approximately 5 V?

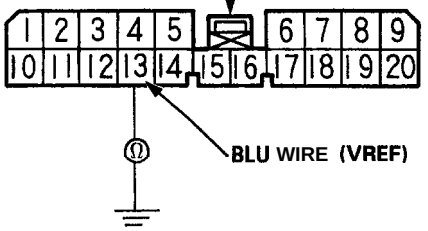
NO

- Substitute a known-good PGM-FI ECU and recheck.
- Check for poor connections or loose wires.

YES

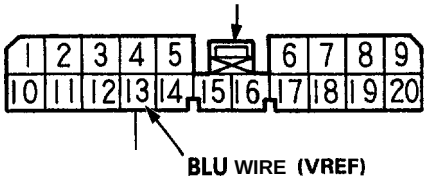
(To page 19-111)

20-P CONNECTOR

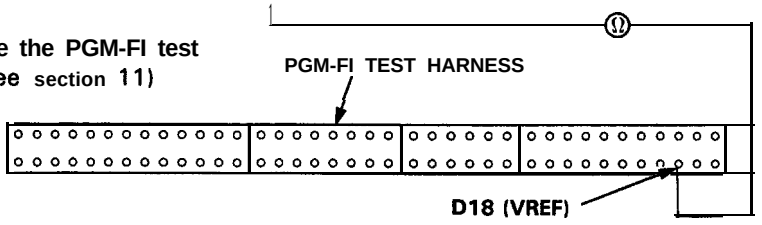


View from terminal side.

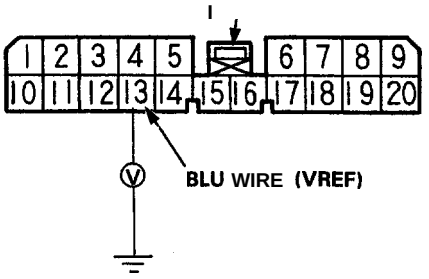
20-P CONNECTOR



NOTE: Use the PGM-FI test harness (see section 11)



20-P CONNECTOR



View from terminal side

(From page 19-110)

Turn the ignition switch OFF.

Connect the 22-P connector to the A/T control unit.

Turn the ignition switch ON.

Measure the voltage between the TCS control unit No. 13 terminal and body ground.

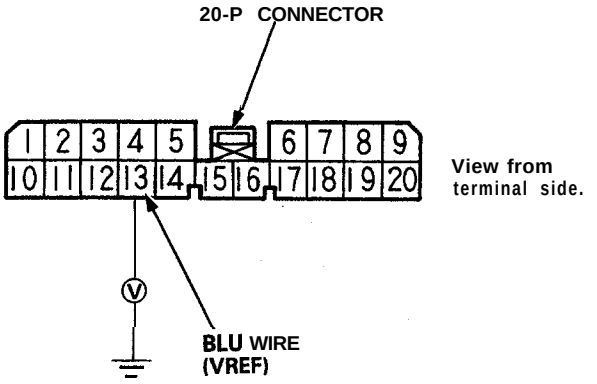
Is there approximately 5 V?

NO

Substitute a known-good AK control unit and recheck. (Internal short-circuit of the A/T control unit.)

YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.



(cont'd)

- Troubleshooting Flowchart (cont'd)

Problem code 3-5: The atmospheric pressure sensor (PA).

Remove the ALB 2.3 (20A) fuse and Clock (7.5A) fuse for more than 10 seconds to reset the PGM-FI ECU and TCS control unit.

Start the engine.

Does the Check Engine light indicate problem code 13? — NO → **Intermittent failure. Check for poor connections or loose wires.**

YES

Does the check engine light indicate problem code 13? — NO

YES

Repair according to the PGM-FI troubleshooting guide.

Measure the voltage between the TCS control unit No. 12 terminal and body ground.

(Is the voltage approximately 2.0 V to 3.0 V? — NO

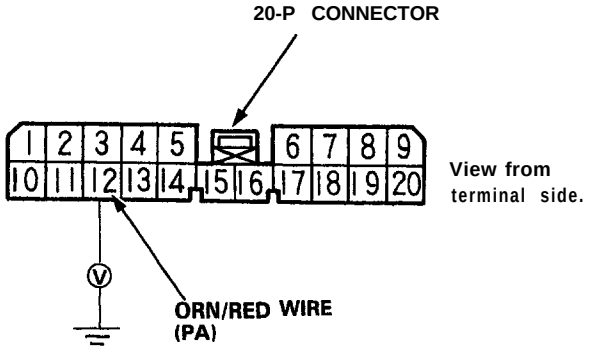
YES

- **Substitute a known-good TCS control unit and recheck.**
- Check for poor connections or **loose wires.**

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit and the 22-P connector from the PGM-FI ECU.

(To page 19-113)



(From page 19-112)

Check for continuity between the TCS control unit No. 12 terminal and body ground.

Is there continuity?

NO

YES

Repair short in the **ORN/RED wire** between the TCS control unit and **PGM-FI ECU**

Check for continuity in the ORN/RED wire between the TCS control unit and PGM-FI ECU.

NOTE: Use the PGM-FI test harness (see section 11).

Is there continuity?

YES

NO

An open in the **ORN/RED** wire between the TCS control unit and PGM-FI ECU.

Connect the 20-P connector to the PGM-FI ECU.

Turn the ignition switch ON.

Measure the voltage between the TCS control unit No. 12 terminal and body ground.

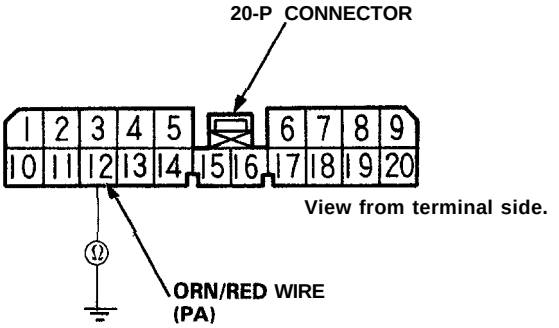
Is the voltage approximately 2.0 V to 3.0 V?

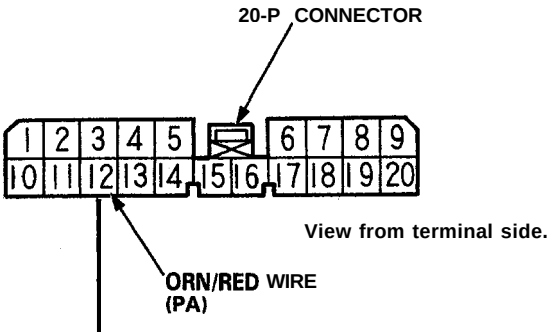
NO

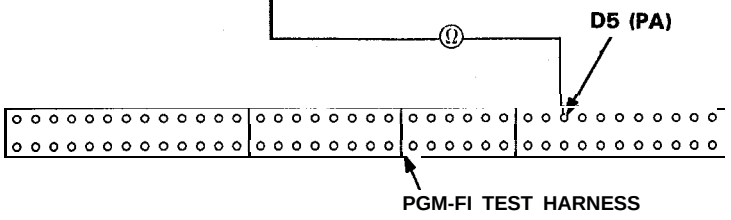
- Substitute a known-good PGM-FI ECU and recheck.
- Check for poor **coonections** or loose wires.

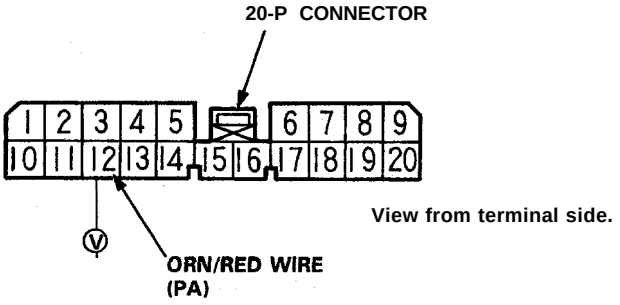
YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.









(cont'd)

- Troubleshooting Flowchart (cont'd)

Problem code 3-6: The pedal angle sensor (θACP).

Remove the **ALB** 2.3 **(20A)** fuse for more than 3 seconds to reset the TCS control unit.

Start the engine.

Is problem code 3-6 indicated?

NO → Intermittent failure. Check for poor connections or loose wires.

YES

Turn the ignition switch OFF.

Disconnect the 3-P connector from the pedal angle sensor.

Turn the ignition switch ON.

Measure the voltage between the No. 1 (+) and No. 3 (−) terminals.

Is there approximately 5V?

NO → Measure the voltage between the No. 1 terminal and body ground.

YES

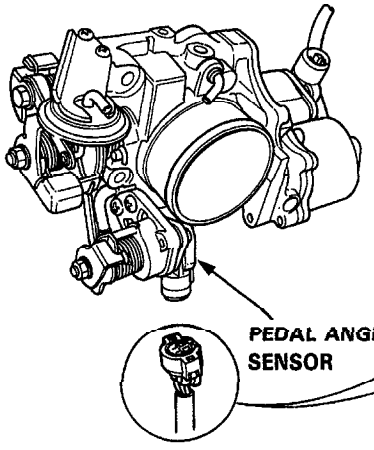
Turn the ignition switch OFF.

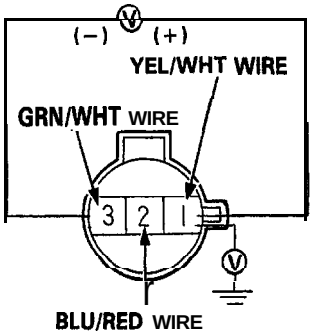
Connect the 3-P connector to the pedal angle sensor.

Turn the ignition switch ON.

When the throttle is completely closed and open, measure the voltage between the TCS control unit No. 4 terminal and body ground.

(To page 19-115)





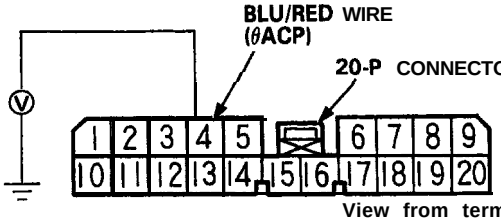
View from terminal side.

Is there approximately 5V?

NO → Check for open or short in the **YEL/WHT** wire between the PGM-FI ECU and pedal angle sensor. If the wire is OK, substitute a known-good PGM-FI ECU and recheck.

YES

Repair open in the GRN/WHT wire between the PGM-FI ECU and the pedal angle sensor.



View from terminal side.

(From page 19-114)

Is there voltage ?
- Approximately 0.5 V when completely closed.
- Approximately 4.5 V when completely open.
- Between the 0.5 V (closed) and 4.5 V (open).

NO

YES

- Substitute a known-good TCS control unit and recheck.

a Check for poor connections or loose wires.

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit, 8-P connector from the PGM-FI ECU, 3-P connector from the pedal angle sensor and the 22-P connector from the A/T control unit.

Check for continuity between the TCS control unit No. 4 terminal and body ground.

Is there continuity?

N

YES

Repair short in the BLU/RED wire between the TCS control unit, PGM-FI ECU, A/T control unit and the pedal angle sensor.

Check for continuity in the BLU/RED wire between the TCS control unit and pedal angle sensor.

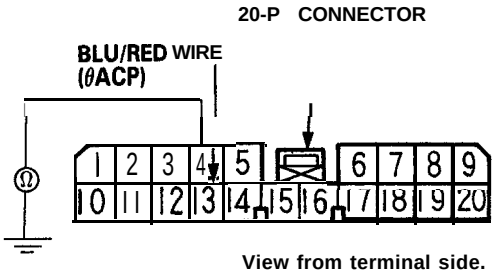
Is there continuity?

NO

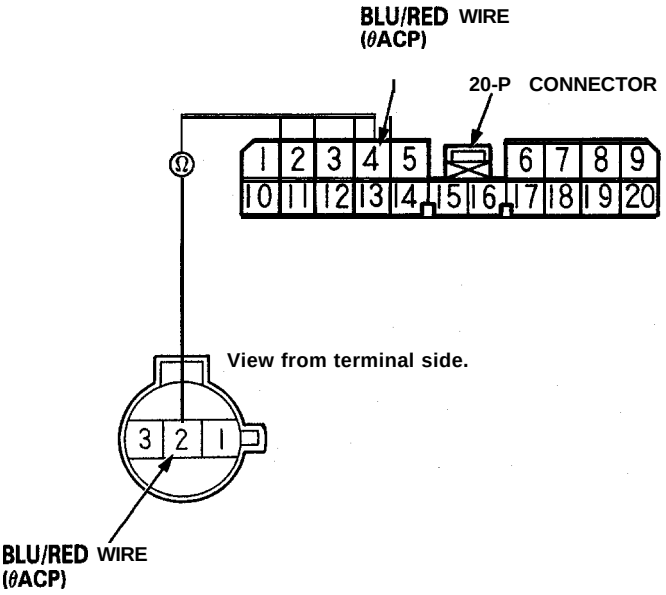
Repair open in the BLU/RED wire between the TCS control unit and pedal angle sensor.

YES

a If OK, replace the pedal angle sensor.
- Check for poor connections or loose wires.



View from terminal side.



View from terminal side.

(cont'd)

Troubleshooting Flowchart (cont'd)

Problem code 3-7: The throttle opening angle sensor (θTH)

NOTE: If the Check Engine light indicates problem code 7 or "D" indicator light indicates problem code 3, refer to the appropriate troubleshooting flowchart.

Remove the ALB 2.3 (20 A) fuse for more than 3 seconds to reset TCS control unit.

Start the engine.

Is problem code 3-7 indicated?

NO → intermittent failure. Check for poor connections or poor wires.

YES

When the throttle is completely closed and open, measure the voltage between the TCS control unit No. 3 terminal and body ground.

Is there voltage?
- Approximately 0.5 V when completely close.
- Approximately 4.5 V when completely open.
- Between the 0.5 V (closed) and 4.5 V (open).

NO

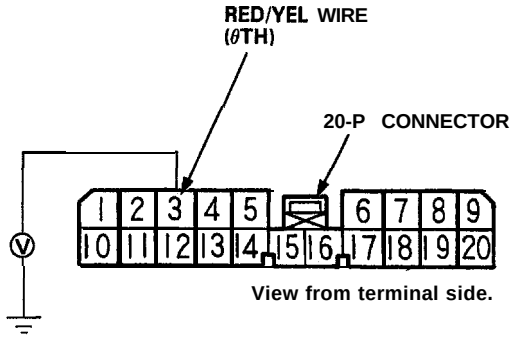
YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit and the 3-P connector from the throttle angle sensor.

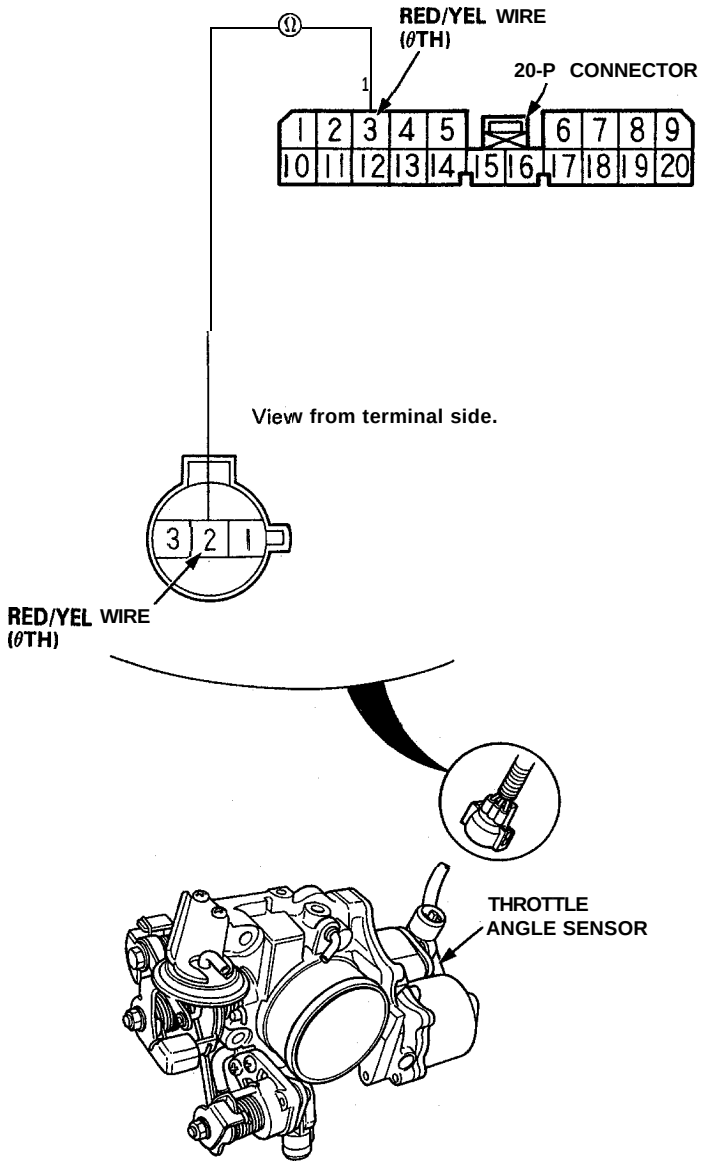
(To page 19-I 17)



View from terminal side.

(from page 19-I 16)

Check for continuity in the RED/YEL wire between the TCS control unit and throttle angle sensor.



Is there continuity?

NO

Repair open in the REDIYEL wire between the TCS control unit and the throttle angle sensor.
(Problem codes are displayed by the PGM-FI and the A/T indicators when there is a short.)

YES

- Substitute a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

(cont'd)

▪ Troubleshooting Flowchart (cont'd)

Problem code 4-1: Wheel sensor R. Front. 4-4: Wheel sensor R. Rear.
4-2: Wheel sensor L. Front 4-8: Wheel sensor L. Rear.

NOTE: The TCS indicator light comes on when the average speed of either the right or left front wheels exceeds 15 km/h (9.3 mph) and the ANTI-LOCK BRAKE control unit signal stops for more than 3 secons.

Remove the ALB 2.3 (20 A) fuse for more than 3 seconds to reset the TCS and Anti-lock brake control units.

Test drive for approximately 3 miles at more than 15 km/h (9.3 mph).

Check the TCS system for a problem code.

Are problem codes 4-1, 4-2, 4-4 and 4-8 indicated?

NO → intermittent failure. Check for poor connections or loose wires.

YES

Check the Anti-lock brake system for a problem code.

Are problem codes 4-1, 4-2, 4-4 and 4-8 indicated?

NO

YES

Perform the repair according to the Anti-lock brake control unit troubleshooting chart.

Measure the voltage between the TCS control unit 20-P connector No. 7, 9, 18 and 20 terminals and body ground.

Make sure that the there is 0 V when the wheel is stopped and approximately 2 V when the wheel is rotated by hand.

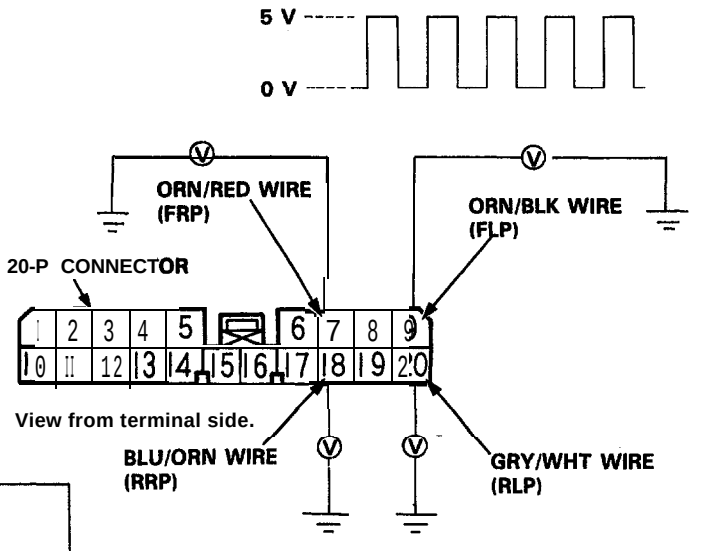
Is there voltage?

ON

YES

- Substitue a known-good TCS control unit and recheck.
- Check for poor connections or loose wires.

NOTE: Use the 10 V range or a similar range in the analog tester.



(To page 19-I 19)

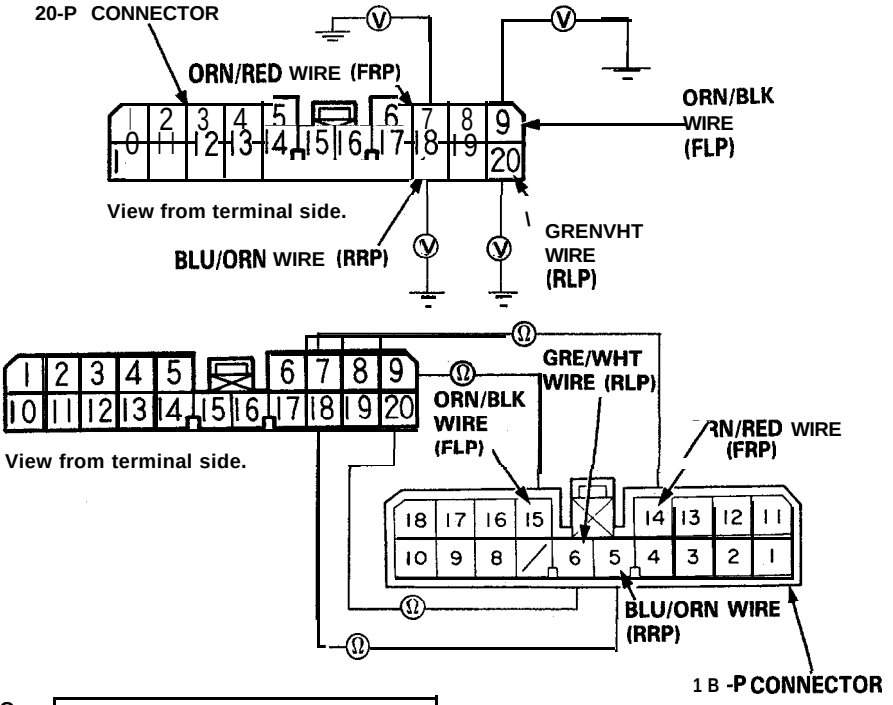
(From page 19-118)

Turn the ignition switch OFF.

Disconnect the 18-P connector from the Anti-lock brake control unit.

Turn the ignition switch ON.

Measure the voltage between the TCS control unit 20-P connector No. 7, 9, 18 and 20 terminals and body ground.



Is there approximately 5 V?

NO

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit.

Check for continuity between the TCS control unit No. 7, 9, 18 and 20 termninals and body ground.

Is there continuity?

NO

- Substitute a known-good control unit and recheck.
- Check for poor connections or loose wires.

YES

Repair short-circuit in the ORN/RED, ORN/BLK, BLU/ORN and GRY/ WHT wires between the TCS control unit and the Anti-lock brake control unit.

YES

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit.

Check for continuity in the ORN/RED, ORN/BLK, BLU/ORN and GRY/WHT wires between the TCS control unit and the Anti-lock brake control unit.

Is there continuity?

YES

- Substitute a known-good ALB control unit and recheck
- Check for poor connections or loose wires.

NO

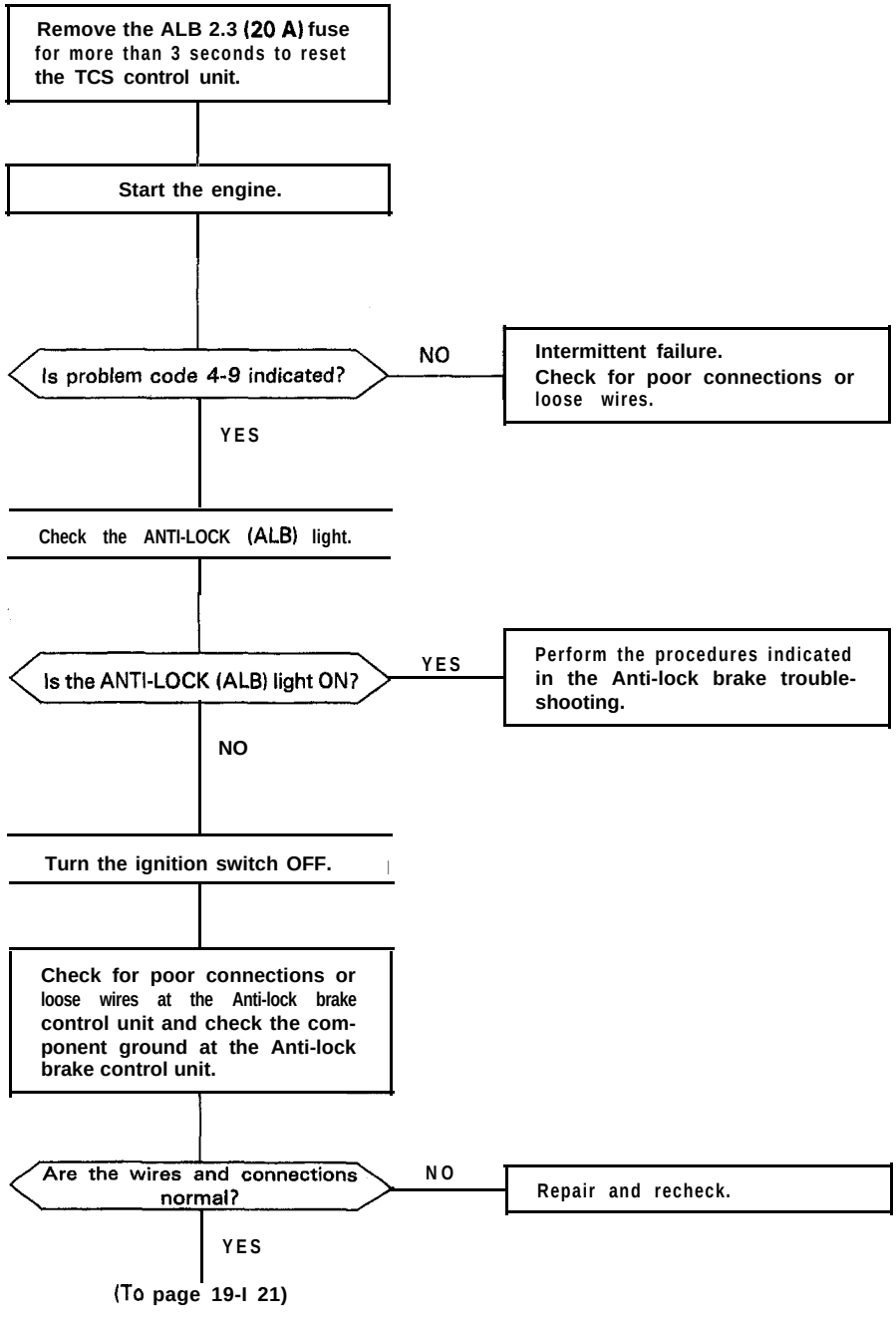
Repair open in the ORN/RED, ORN/ BLK, BLU/ORN and GRY/ WHT wires between the TCS control unit and the Anti-lock brake control unit.

(cont'd)

Troubleshooting Flowchart-(cont'd)

Problem code 4-9: All wheel sensors.

NOTE: The TCS indicator light comes on when the vehicle is stopped and engine is running and signals from all four wheels are disconnected for more than three seconds.



(From page 19-120)

Disconnect the 20-P connector from the TCS control unit and 18-P connector from the Anti-lock brake control unit.

Check for continuity between;
- 20-P connector and 18-P connector
  - No. 7 (ORN/RED) and No. 14 terminals
  - No. 9 (ORN/BLK) and No. 15 terminals
  - No. 18 (BLU/ORN) and No. 5 terminals
  - No. 20 (GRY/WHT) and No. 6 terminals

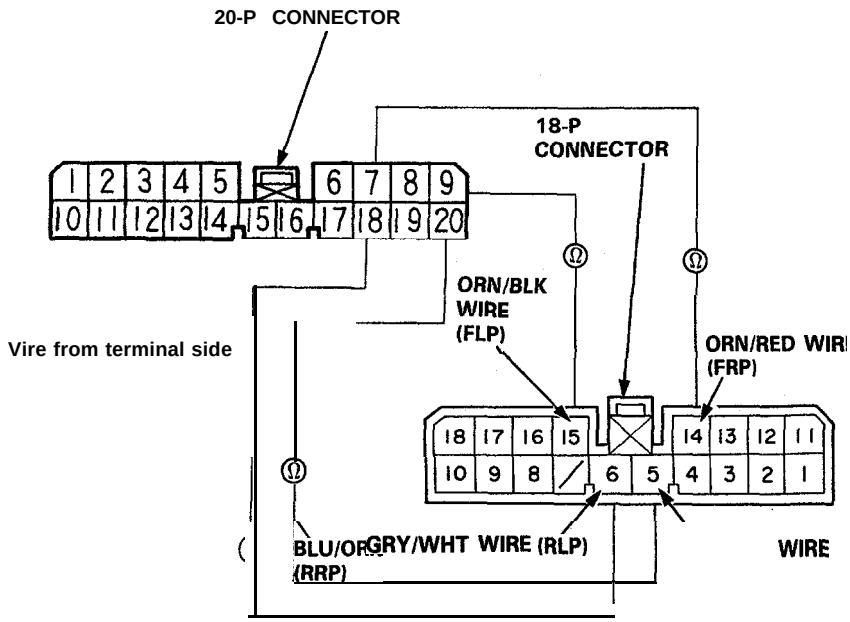
Is there continuity?

YES

- Check for poor connections or loose wires at TCS control unit.
- Substitute known-good TCS control unit and recheck.

No

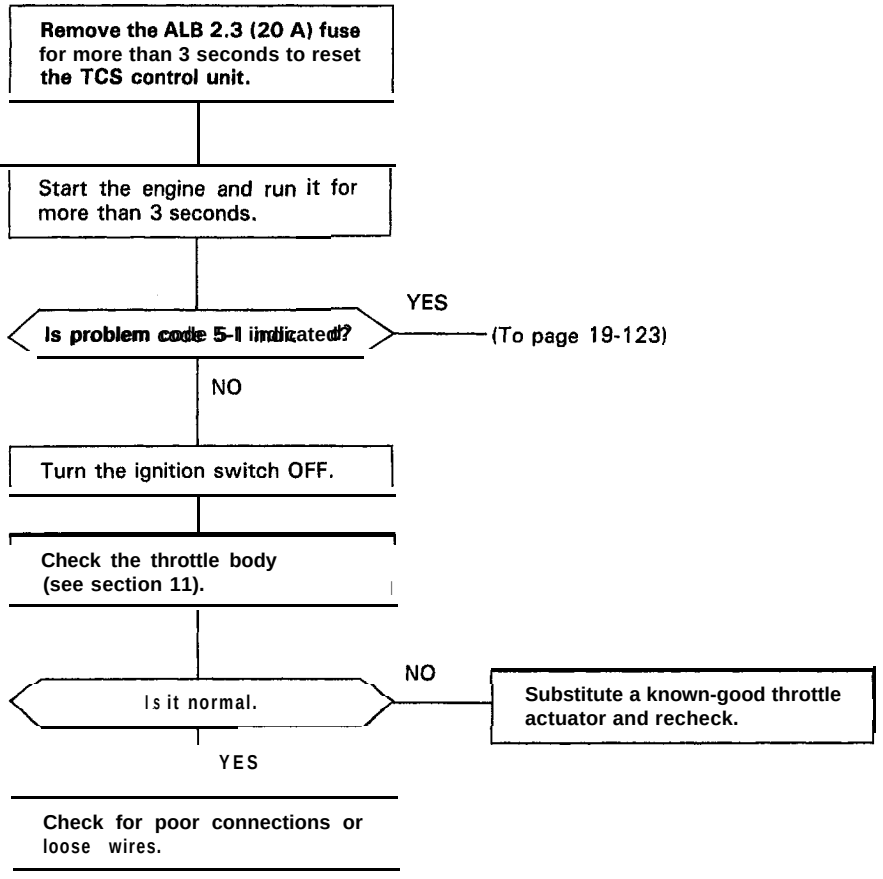
Repair open in the ORN/RED, ORN/BLK, BLU/ORN or GRY/WHT wire between the TCS control unit and ALB control unit.



(cont'd)

Troubleshooting Flowchart (cont'd)

Problem code 5-I : Fail-safe relay system and the throttle actuator system.



(From page 19-122)

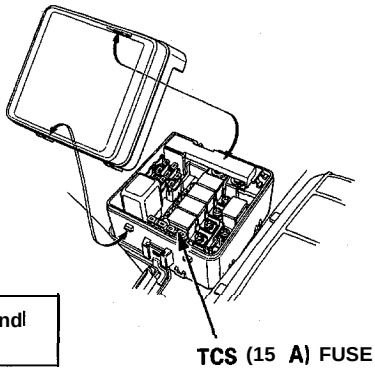
Turn the ignition switch OFF.

Check the TCS (15 A) fuse in the main fuse box.

Is it normal.

NO → Replace the TCS (15 A) fuse and recheck.

YES



Remove the fail-safe relay.

Check the fail-safe relay (see page 19-137).

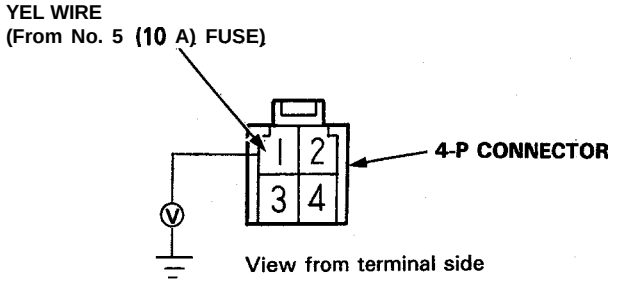
Is it normal.

NO → Replace the fail-sare relay and recheck.

YES

Turn the ignition switch ON.

Measure the voltage between the No. 1 terminal of the 4-P connector for the fail-safe relay and body ground.

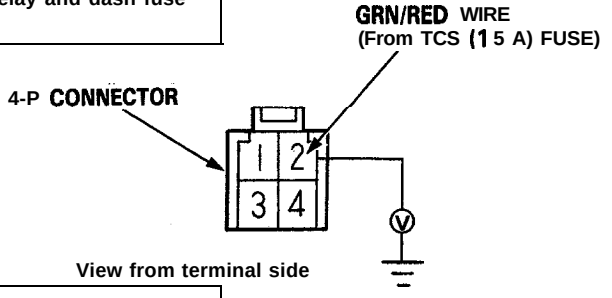


Is there battery voltage?

NO → Repair open the YEL wire between the fail-safe relay and dash fuse box.

YES

Measure the voltage between the No. 2 terminal of the 4-P connector for the fail-safe relay and body ground.



Is there battery voltage?

NO → Repair open the GRN/RED wire between the fail-safe relay and main fuse box.

YES

(To page 19-124)

(cont'd)

Troubleshooting Flowchart (cont'd)

(From page 19-I 23)

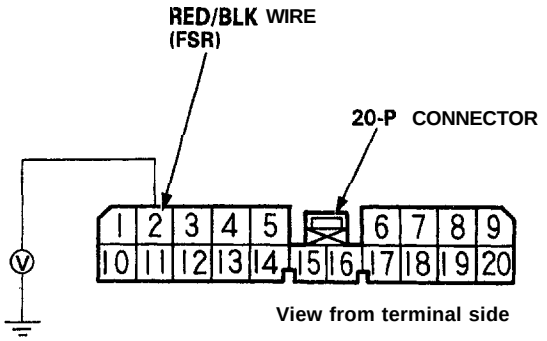
Turn the ignition switch OFF.

Install the fail-safe relay.

Disconnect the 20-P connector from the TCS control unit.

Turn the ignition switch ON.

Measure the voltage between the No.2 (RED/BLK) terminal of the 20-P connector and body ground.



Is there battery voltage?

NO — (To page 19-126)

YES

Turn the ignition switch OFF.

Connect the 20-P connector to the TCS control unit.

(To page 19-I 25)

(From 19-I 24)

Measure the voltage between the No. 2 (RED/BRK) terminal of the 20-P connector and body ground.

Start the engine.

When the TCS indicator light remains ON: is there battery voltage?
When the TCS indicator light remains OFF: is there no voltage?

NO

- Check for poor connections or loose wire.
- Substitute a known-good TCS control unit and recheck.

YES

Measure the voltage between the No. 23, No. 24 terminals of the 1 O-P connector for the TCS control unit and body ground.

Is there battery voltage?

YES — (To page 19-I 27)

NO

Turn the ignition switch OFF.

Disconnect the 1 O-P connector from the TCS control unit and 4-P connector from the fail-safe relay.

Check for continuity between the No. 23, No. 24 terminals of the 10-P connector and No. 4 terminal of the 4-P connector

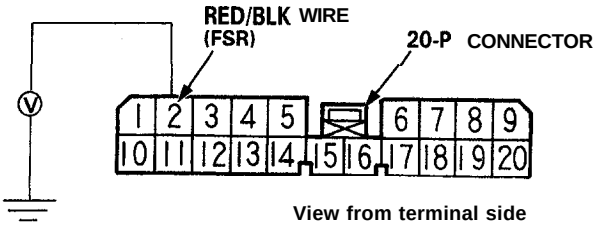
Is there continuity?

YES

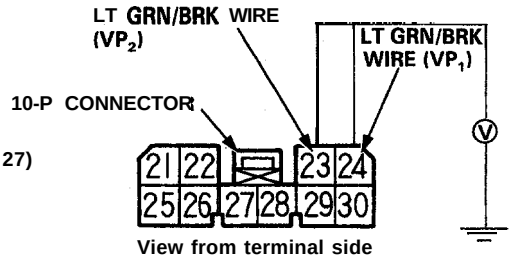
- Check for poor connections or loose wires.
- Substitute a known-good TCS control unit and recheck.

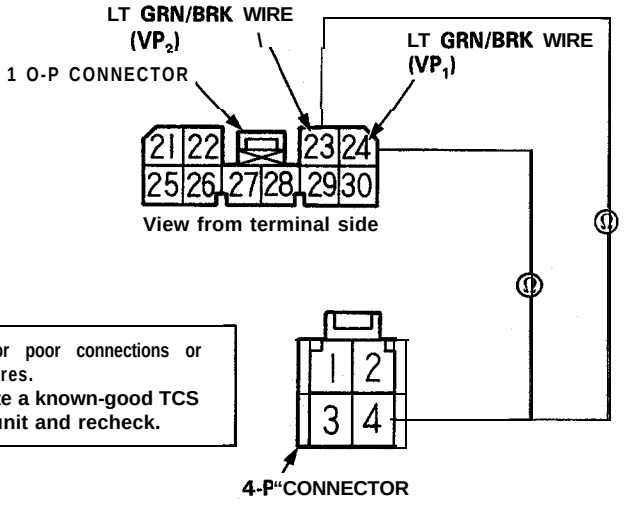
NO

1 Repair open in the LT GRN/BRK wires between the TCS control unit and fail-safe relay.



NOTE: Since there is a capacitor inside the TCS control unit, the battery voltage can be measured if the fail-safe relay system is functioning properly.

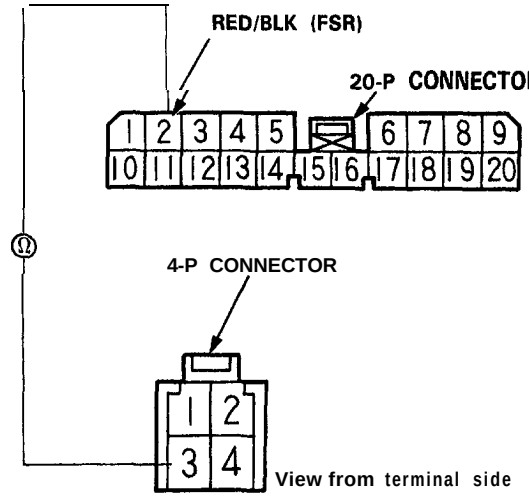




(cont'd)

Troubleshooting Flowchart (cont'd)

(From page 19-124)



Turn the ignition switch OFF.

Disconnect the 4-P connector from the fail-safe relay.

Check for continuity between the No. 2 terminal of the 20-P connector for the TCS control unit and No. 3 of the 4-P connector for the fail-safe relay.

Is there continuity?

NO → Repair open in the **RED/BLK** wire between the TCS control unit and fail-safe relay.

YES

Check for continuity between the No. 2 (RED/BLK) terminal of the 20-P connector and body ground.

Is there continuity?

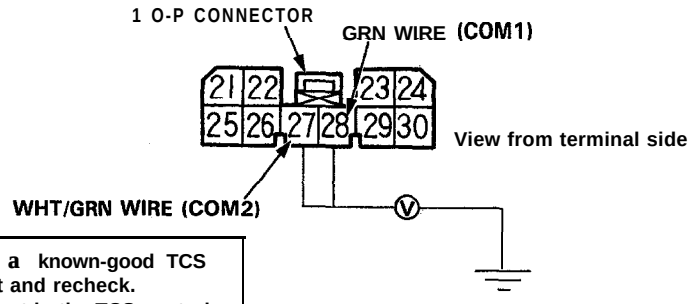
YES → Repair short in the RED/ BRK wire to the body ground.

NO

- Check for poor connections or **loose wires.**
- **Substitute a known-good TCS control unit and recheck.**

(From page 19-I 25)

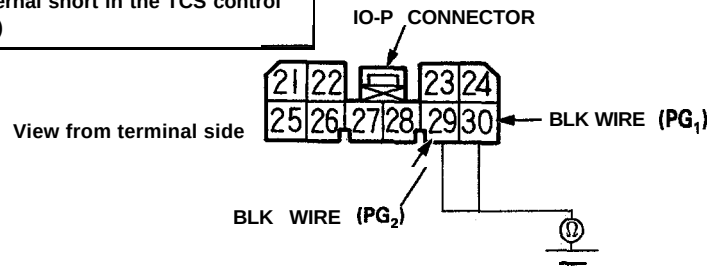
Measure the voltage between the No. 27 (GRN/WHT), the No. 28 (GRN) terminals of the 1 O-P connector for the TCS control unit and body ground.



Is there battery voltage?

YES → **Substitute a** known-good TCS control unit and recheck. (Internal short in the TCS control unit)

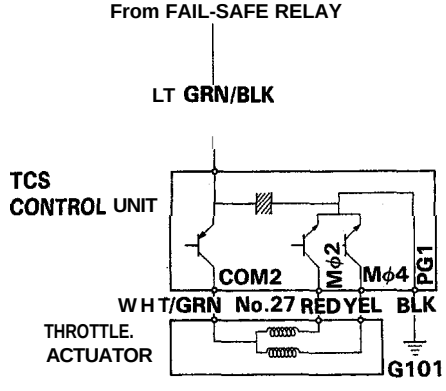
NO

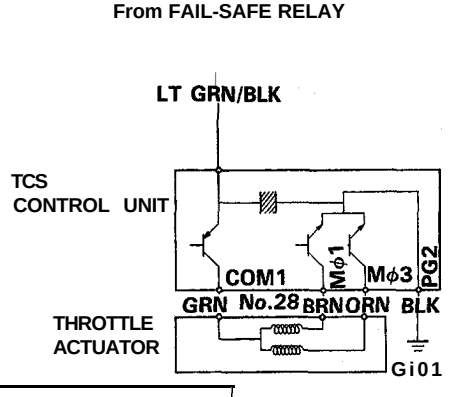


Turn the ignition switch OFF.

Disconnect the 1 O-P connector from the TCS control unit.

Check for continuity between the No. 29 (BLK), the No. 30 (BLK) terminals of the 10-P connector for the TCS control unit and body ground.





Is there continuity?

NO → • Repair open in the BLK wire between the TCS control unit and body ground.
• Poor ground (G101).

YES

(To page 19-I 28)

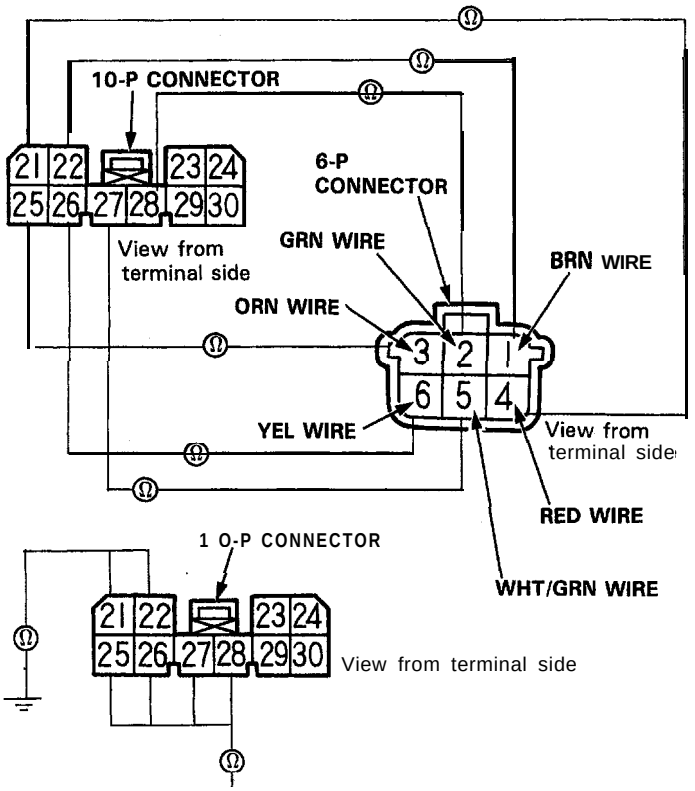
(cont'd)

Troubleshooting Flowchart (cont'd)

(From page 19-127)

Disconnect the 6-P connector from the throttle actuator.

Check for continuity between;
- IO-P connector and 6-P connector
  - No.21 (RED) and No.4 (RED) terminals
  - No.22 (BRN) and No.1 (BRN) terminals
  - No.25 (ORN) and No.3 (ORN) terminals
  - No.26 (YEL) and No.6 (YEL) terminals
  - No.27 (WHT/GRN) and No.5 (WHT/GRN) terminals
  - No.28 (GRN) and No.2 (GRN) terminals
- IO-P connector and body ground
  - No.21 (RED) terminal and body ground
  - No.22 (BRN) terminal and body ground
  - No.25 (ORN) terminal and body ground
  - No.26 (YEL) terminal and body ground
  - No.27 (WHT/GRN) terminal and body ground
  - No.28 (GRN) terminal and body ground

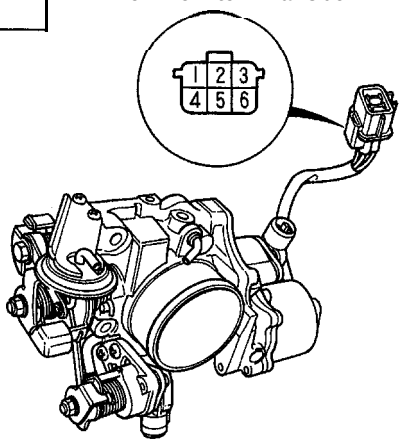


Is there continuity without a short to body ground? — NO → Repair wire between the TCS control unit and throttle actuator that is defective.

YES

Check for continuity (internal short) between the terminals of the 6-P connector;
- No.1, No.3 and No.5 terminals
- No.4, No.6 and No.2 terminals

NOTE: Inspect the single unit throttle actuator.



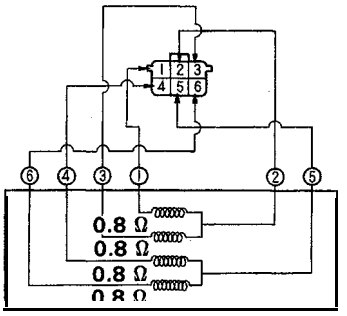
Is there continuity? — YES → Replace the throttle actuator.

NO

(To page 19-129)

(From page 19-128)

Measure resistance between the terminals of the 6-P connector;
- No. 1, No.3 and No.2 terminals
- No.4, No.6 and No.5 terminals



Is there approximately 0.8 Ω? > NO — Replace the throttle actuator.

YES

Check for continuity (short) between the terminals of the 6-P connector and throttle actuator body.

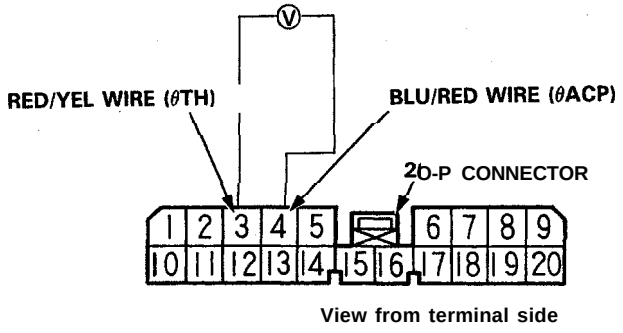
Is there continuity? YES — Replace the throttle actuator.

NO

Connect the 10-P and 20-P connector to the TCS control unit and 6-P connector to the throttle actuator.

Turn the ignition switch ON.

Measure the voltage between the No.3 (RED/YEL), and the No.4 (BLU/RED) terminals of the 20-P connector for the TCS control unit when the accelerator pedal is released.



View from terminal side

Is there more than approximately 0.3 V? YES — Substitute a known-good throttle actuator assembly and recheck.

NO

- Check for poor connections or loose wires.
- Substitute a known-good TCS control unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Problem code 6-1: The A/T shift position signal (ATSP).

Remove the ALB 2.3 (20 A) fuse for more than 3 seconds to reset the TCS control unit.

Raise the car and support it with safety stands (see section 1).

Start the engine.

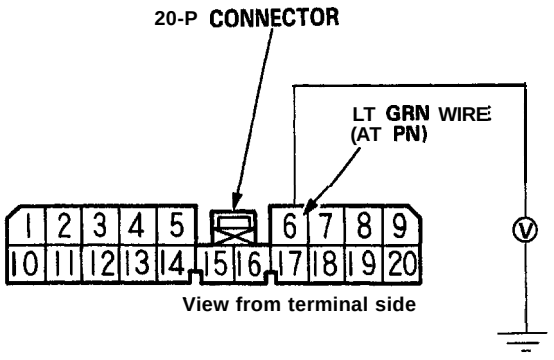
Make sure the TCS OFF indicator light does not come on.

Shift the shift lever [D] range then slowly increase the speed up to 50 km/h (31 mph) and maintain this speed for 30 seconds.

Is problem code 6-1 indicated? YES → (To page 19-132)

NO

Measure the voltage between the No. 6 (LT GRN) terminal of the 20-P connector for TCS control unit and body ground.



When the shift position is ❑ or ❑ : is there no voltage? When the shifts [R], [D], [3], [2] or re battery voltage? YES → Repair poor connections loose wire.

NO

Turn the ignition switch OFF.

(To page 19-131)

(From page 19-130)

Disconnect the 20-P connector from the TCS control unit.

Check for continuity between the No. 6 (LT GRN) terminal of the 20-P connector and body ground.

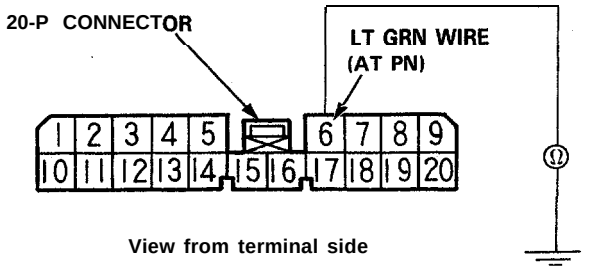
When the shift position is ❑ or ❑ : is there continuity?
When the shift position is R, D, 3, 2 or 1; is there no continuity?

YES

- Check for poor connections or loose wires.
- Substitute a known-good TCS control unit and recheck.

NO

- Repair open or short to ground in the LT GRN wire **between** the TCS control unit and shift position indicator.
- The shift position indicator or shift position console switch is defective.



View from terminal side

(cont'd)

Troubleshooting Flowchart (cont'd)

(From page 19-131)

Check the A/T control system for a problem code.

Is problem code indicated?

YES → Perform the procedures indicated in the A/T troubleshooting.

NO

Start the engine.

Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground when the shift position is 2 or N.

Is there voltage?

NO → (To page IS-I 33)

YES

Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground when the shift position is 1 or R.

Is there approximately 5.0 V?

NO → (To page 19-134)

YES

Turn the ignition switch OFF.

Disconnect the connectors from the A/T control unit.

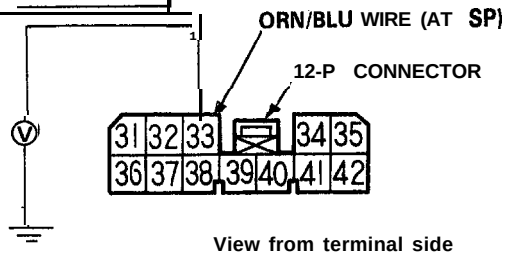
Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground.

Is there voltage?

YES → Substitute a known-good TCS control unit and recheck.

NO

Substitute a known-good A/T control unit and recheck.



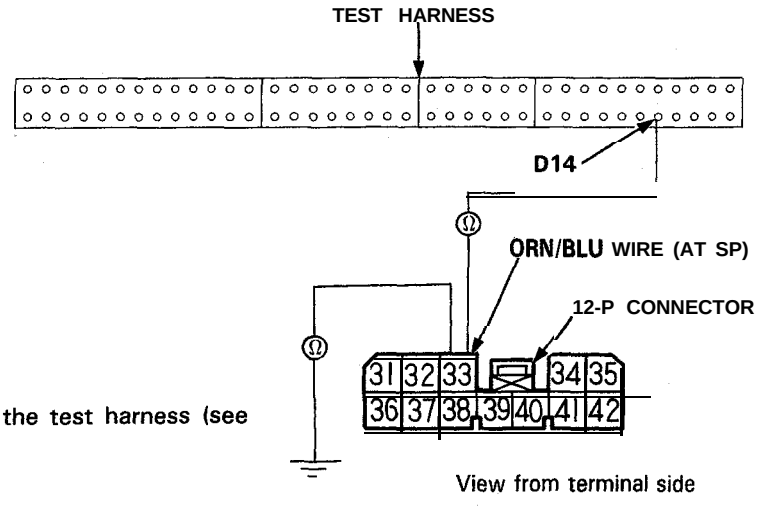
(From page 19-132)

Turn the ignition switch OFF.

Disconnect the 12-P connector from the TCS control unit and 22-P connector from the A/T control unit, then connect the test harness to the 22-P connector.

Check for open or short in the ORN/BLU wire between the No. 33 terminal of the 12-P connector and D14 terminal of the test harness.

NOTE: Use the test harness (see section 14)



Is there an open or short?

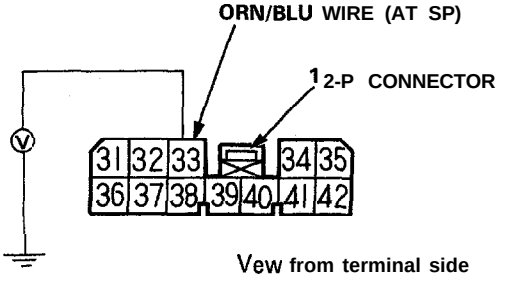
YES → Repair open or short in the ORN/BLU wire.

NO

Reconnect the 22-P connector to the A/T control unit.

Start the engine.

Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground.



Is there voltage?

YES →
- Check for poor connections or loose wire.
- Substitute a known-good TCS control unit and recheck.

NO

- Check for poor connections or loose wires.
- Substitute a known-good A/T control unit and recheck.

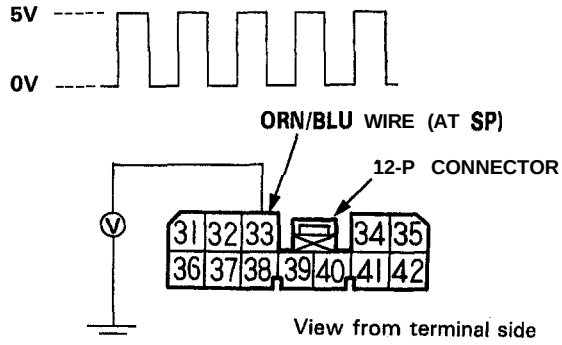
(cont'd)

-Troubleshooting Flowchart (cont'd)

(From page 19-132)

Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground when the shift position is 3 or ❑ in 4th.

NOTE:
- Check when engine is warmed up.
- Use the 10 V range or a similar range in the analog tester.



Is there approximately 2-3 V?

YES
- Check for poor connections or loose wires.
- Substitute a known-good TCS control unit and recheck.

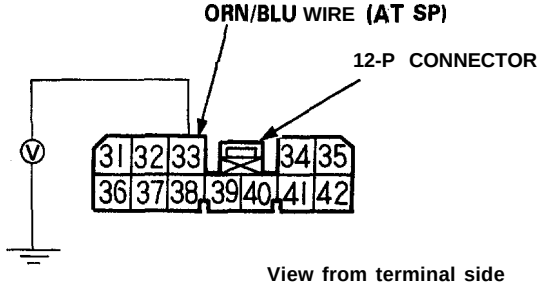
NO

Turn the ignition switch OFF.

Disconnect the 20-P connector from the TCS control unit.

Start the engine.

Measure the voltage between the No. 33 (ORN/BLU) terminal of the 12-P connector for TCS control unit and body ground when the shift position is 3 or ❑ in 4th.



Is there approximately 2-3 V?

YES
- Check for poor connections or loose wires.
- Substitute a known-good TCS control unit and recheck. (internal short In the TCS control unit).

NO

Substitute a known-good A/T control unit and recheck.

Traction Control System Function Method

NOTE: Perform these procedures after the user reports these difficulties and the diagnosis is determined.

Raise the car and support it with safety stands (see section 1).

Check for TCS indicator lights.

NOTE: The TCS activation light, TCS OFF indicator light and TCS switch indicator light will remain on for about 2 seconds after the ignition switch is turned on to show that the system circuit is functioning.

Start the engine.

Press the brake pedal.

Make sure that the TCS indicator lights do not flash or light.

Are the lights normal?

NO → Perform the procedures indicated in the troubleshooting guide.

YES

NOTE: The TCS control unit is defective when the there is TCS activation light flashes abnormallty.

Shift the transmission into 2.

Perform the procedures indicated in the troubleshooting guide.

Press the accelerator pedal all the way down.

Make sure that the speedometer display change to approximatly 20 mph (30 km/h) and the engine speed is 1 ,OOO-2,000 rpm.

Is it normal?

NO → Press the brake pedal and stop the rear wheels.

NOTE: Stop slowly to prevent damage to the suspension.

YES

Turn the ignition switch OFF.

Check if the TCS activation light flashes at the same time.

Measure the voltage between the No. 34 (GRN/WHT) terminal of the 12-P connector for the TCS control unit and body ground.

Does it flash?

NO

Is the voltage 0 V?

NO → Check the wire harness.

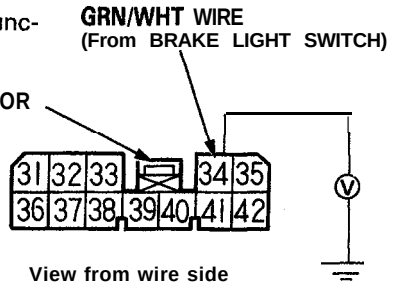
YES

YES

Replace the TCS control unit.

(To page 19-136)

(cont'd)



-Troubleshooting Flowchart (cont'd)

(From page 19-I 35)

Press the brake pedal and stop the rear wheels.

Push the TCS switch one time.

Make sure the TCS OFF indicator light lights and TCS switch indicator light goes off.

Is it normal?

NO

Turn the ignition switch OFF.

Turn the ignition switch ON.

Measure the voltage between the No. 19 (YEL/GRN) terminal of the 20-P connector for the TCS control unit and body ground.

Push and release the TCS switch and make sure that the there is battery voltage when the switch is pushed and there is no voltage when the switch is released.

Is it normal?

NO

- Repair open in the YEL/GRN wire between the TCS ECU and TCS switch.
- Replace the TCS switch.

YES

Replace the TCS control unit.

YES

Shift the transmission into ❑ .

Press the accelerator pedal.

Make sure that the traction control does not operate and the TCS activation light does not flash.

Is it normal?

NO

Replace the TCS control unit.

YES

Press the brake pedal and stop the rear wheels.

Shift the transmission into N .

Preform the steering angle sensor system check (see page 19-96).

Is it normal?

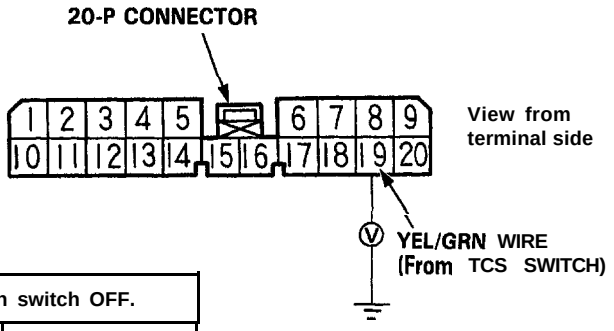
NO

Repair as necessary.

YES

Test drive and return the car to the customer.

NOTE: Stop slowly to prevent damage to the suspension.

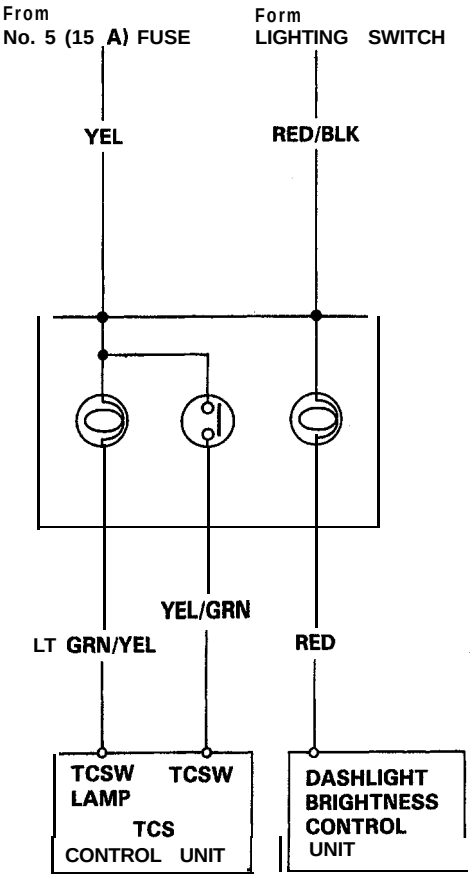


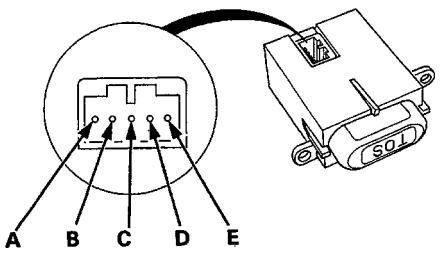
NOTE: Stop slowly to prevent damage to the suspension.

-TCS Switch Test

There should be continuity between the D and E terminals when the switch is pushed and there should be no continuity when the switch is relesed.

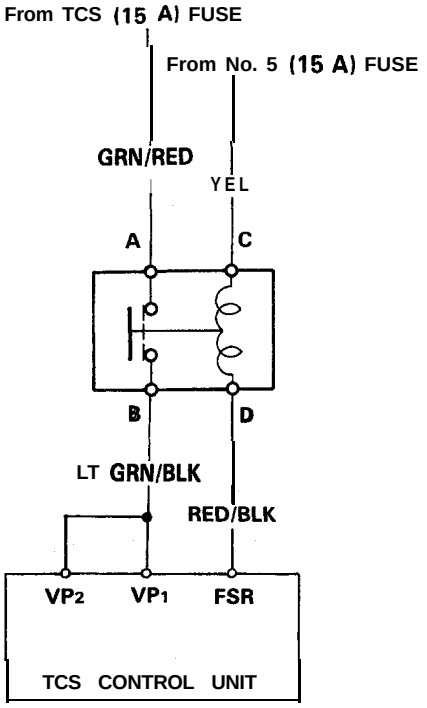
D...C: Indicator light
D...E: Switch
B...A: Light

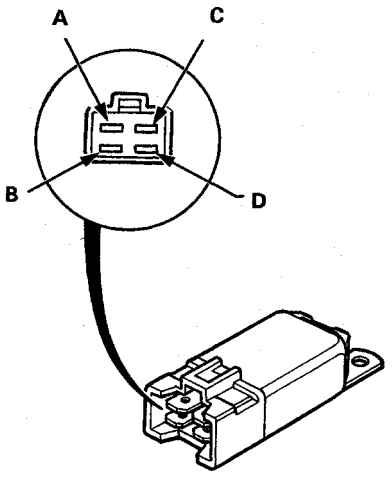




Fail-Safe Relay Test

There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
There should be no continuity between the A and B terminals when the battery is disconnected.

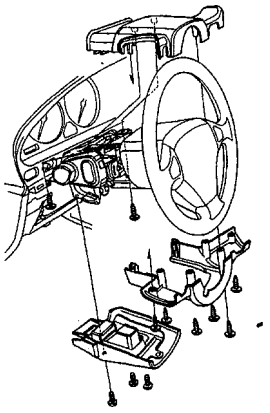




Steering Angle Sensor Replacement

Removal:

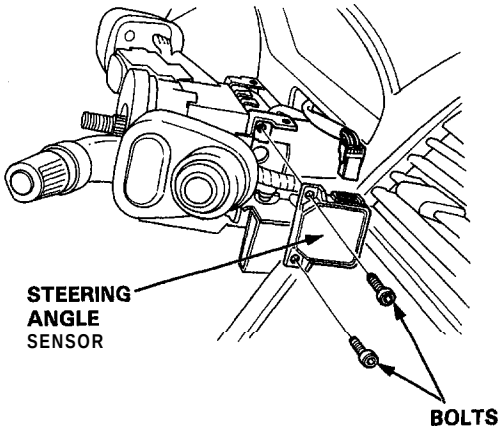
1. Remove the steering column covers.



2. Disconnect the 5-P connector from the steering angle sensor.
3. Remove the steering angle sensor mounting bolts, then remove the steering angle sensor.

   NOTE: Take care not to drop the adjusting shim used between the steering angle sensor and sensor mounting bracket.

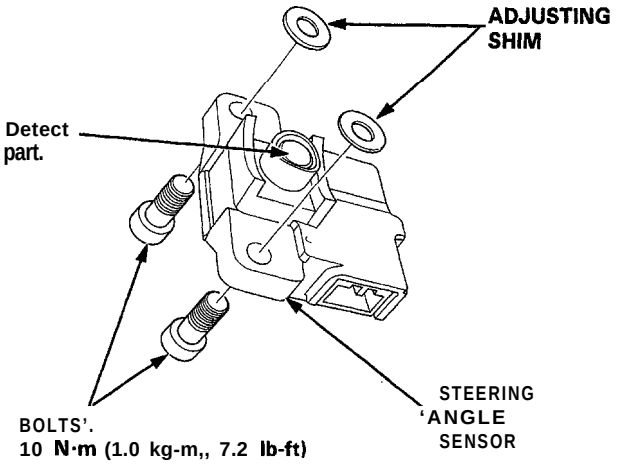
   CAUTION: Handle with care not to damage or drop the steering angle sensor as it is sensitive.



Installation:

1. Install the steering angle sensor by tightening 2 bolts and make sure the adjusting shim is installed properly.

   CAUTION: Do not apply any grease or oil to the adjusting shim.



2. Connect the 5-P connector to the steering angle sensor.
3. Install the steering column covers.
4. Perform the steering angle sensor system check (See page 19-96).
   If there is an abnormalty, check the troubleshooting flowchart (see page 19-96).

   NOTE:
   - There is no need to select (replace) the shim when the steering angle sensor is replaced. Use the original shim.
   - Selection (Replacement) of the adjusting shim (for adjusting the air gap) is required only when the steering column assembly (without the sensor) is replaced.

Selection of the adjusting shim for the steering angle sensor air gap adjustment.

NOTE:

- **The adjustment of the air gap between the steering shaft and the steering angle sensor should be carried out in order to obtain adequate sensor output.**
- **The adjusting shim reference number is stamped on the steering column. Adequate air gap can be kept by selecting the adjusting shim with the reference number**

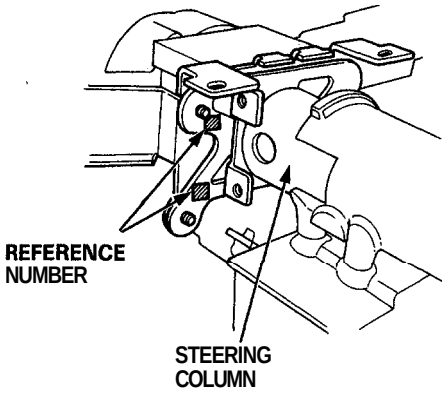
Selection of The Adjusting Shim

Reference Number	Shim (P/N): (Thickness)
1	Not used: (0 mm)
2	A: (0.1 mm)
3	B: (0.2 mm)
4	A + B: (0.3 mm)
5	C: (0.4 mm)
6	A+C: (0.5 mm)
7	B+C: (0.6 mm)
8	D: (0.7 mm)

Adjusting Shim

Parts Number	Thickness	Color
A: 53395-SL0-A01	0.1 mm	Yellow
8: 53396-SL0-A01	0.2 mm	Black
C: 53397-SL0-A01	0.4 mm	Green
D: 53398-SL0-A01	0.7 mm	White

Reference Number Locations



Body

Bumpers
Front Replacement 20-47
Disassembly 20-48
Rear Replacement 20-49
Disassembly 20-50
*Carpet 20-42
*Center Armrest 20-43
Construction 20-2
*Dashboard
Components 20-43
Replacement 20-45
Doors
Index 20-5
Disassembly 20-6
Molding Removal 20-11
Door Removal 20-11
Assembly 20-12
Glass Adjustment 20-13
Position 20-18
Striker Adjustment 20-18
*Frame Repair Chart 20-62
Fuel Filler
Opener/Latch Replacement 20-57
Opener Cable 20-58
Headliner/Interior Trim 20-37
Hood
Replacement/Adjustment 20-51
Opener/Latch Replacement 20-52
Mirrors
Door Mirror Removal 20-19
Mirror Glass Replacement 20-19
Rearview Mirror 20-41
Rear Hatch/Engine Cover
Replacement/Adjustment 20-53
Opener/Latch Replacement 20-57
Opener Cable 20-58
Rear Panel 20-58
Side Window
Molding Retainers 20-20
Weatherstrip 20-20
Rear Pillar Panel 20-20
Seats 20-38
Seat Belts
Replacement 20-39
Inspection 20-40
Child Seat Anchor Plate 20-40
Side Panel
Side Air Scoop 20-59
Side Sill Panel 20-59
Side Step Panel 20-59
Sub-Frame
Front 20-60
Rear 20-61
Trunk
Lid Replacement/Adjustment 20-54
Spoiler/Trim Panels 20-55
Opener/Latch Replacement 20-58
Opener Cable 20-56
Windshield, Rear Window Glass,
Rear Hatch Glass
Index 20-21
Windshield 20-22
Rear Window
Glass 20-26
Molding Replacement 20-30,
Rear Hatch Glass
Glass 20-32
Glass Molding Replacement 20-35

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special caution and tools and should therefore be done by an authorized Acura dealer.

⚠ WARNING

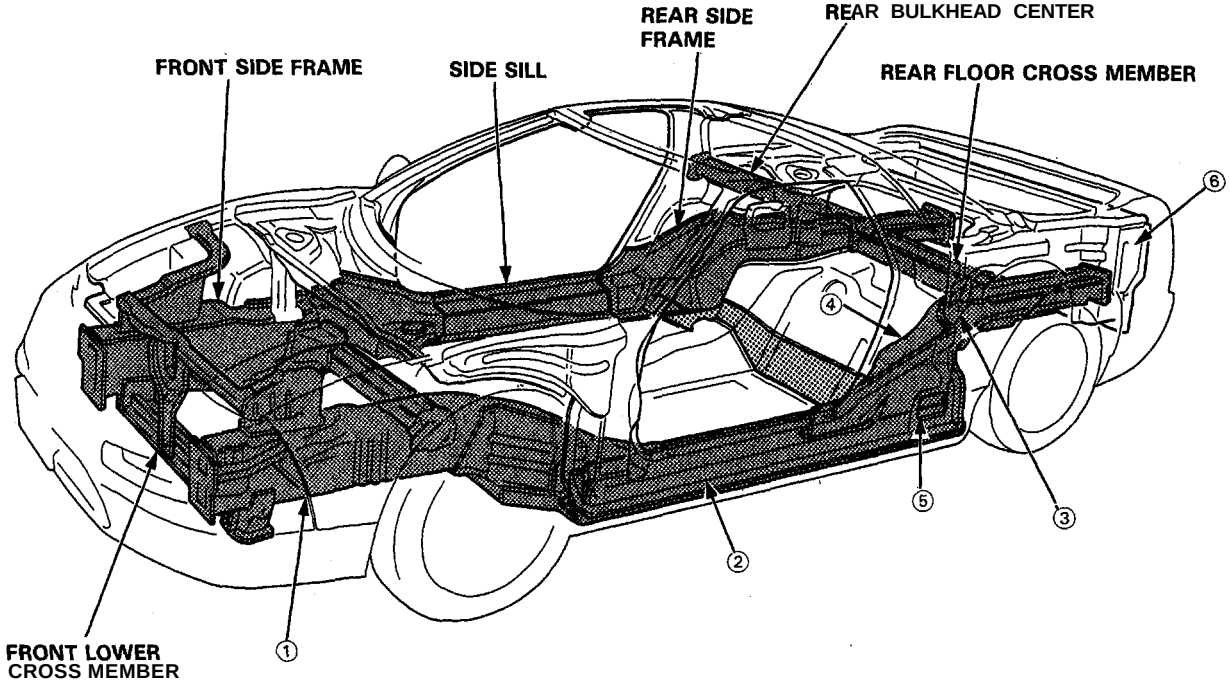
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash and dashboard lower panel. Do not use electrical test equipment on these circuits.

Construction

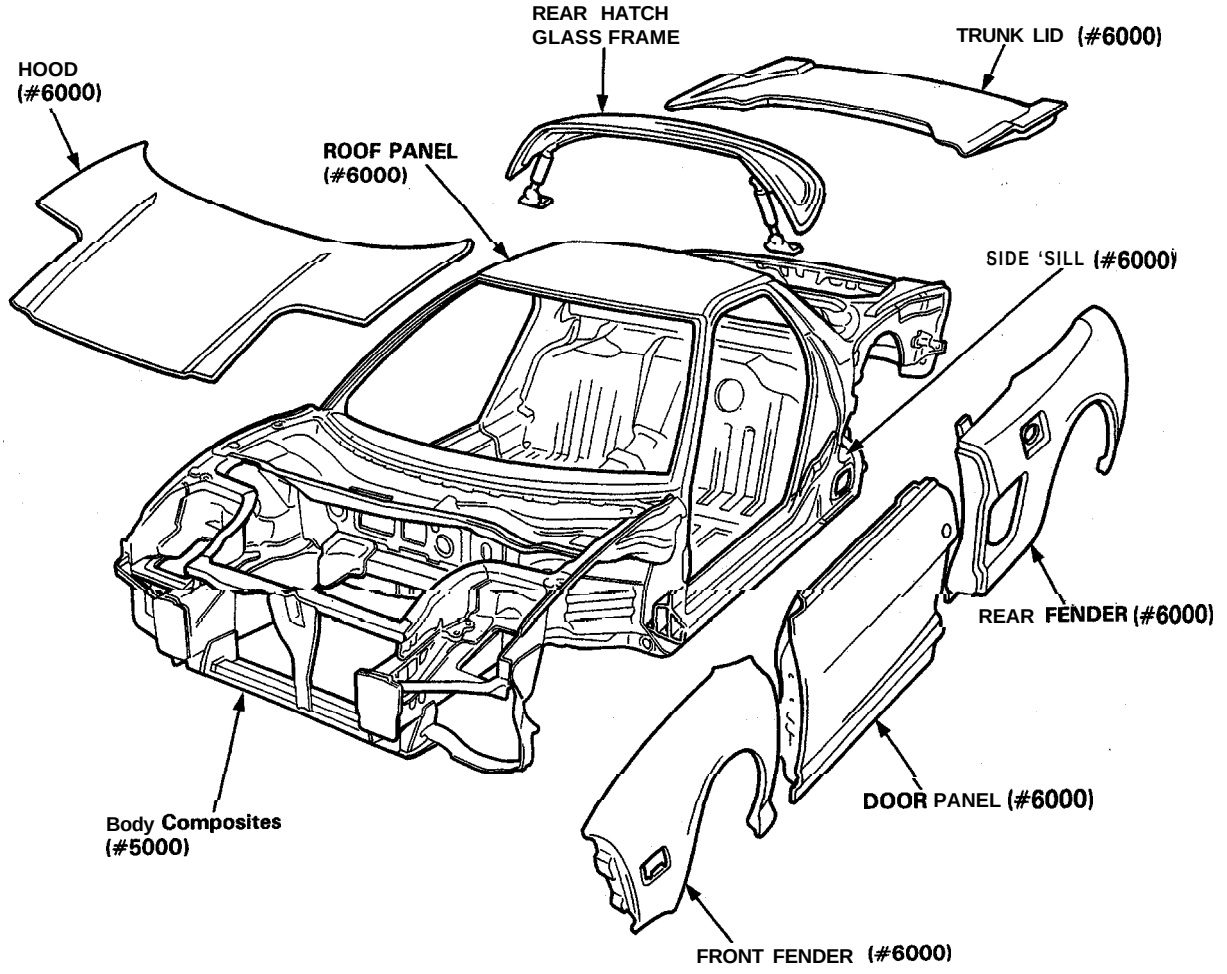
- Features

- Mid-engine car with ground-hugging, full-forward canopy design.
- The lower body is AH-PO for greater resistance to corrosion and collision damage.
- Outer panels, (except the roof) are constructed of individual panels to allow more convenient and economical repairs.
- In considerations of rigidity, surface smoothness and simultaneous body painting, the rear spoiler is made of SMC.

1. Straight-line front side-frame for excellent absorption of front impact energy.
2. Extruded-molded side sills with high strength and rigidity.
3. Lower part of center pillar is designed as flare-type and united solidly to main frame, thus greatly improving rigidity.
4. All main-frame parts are joined smoothly, providing high impact strength and improving body rigidity.
5. Large cross-section rear frame to protect fuel tank in the event of rear impact.
6. Rear fenders are detachable to make minor collision repairs easier.



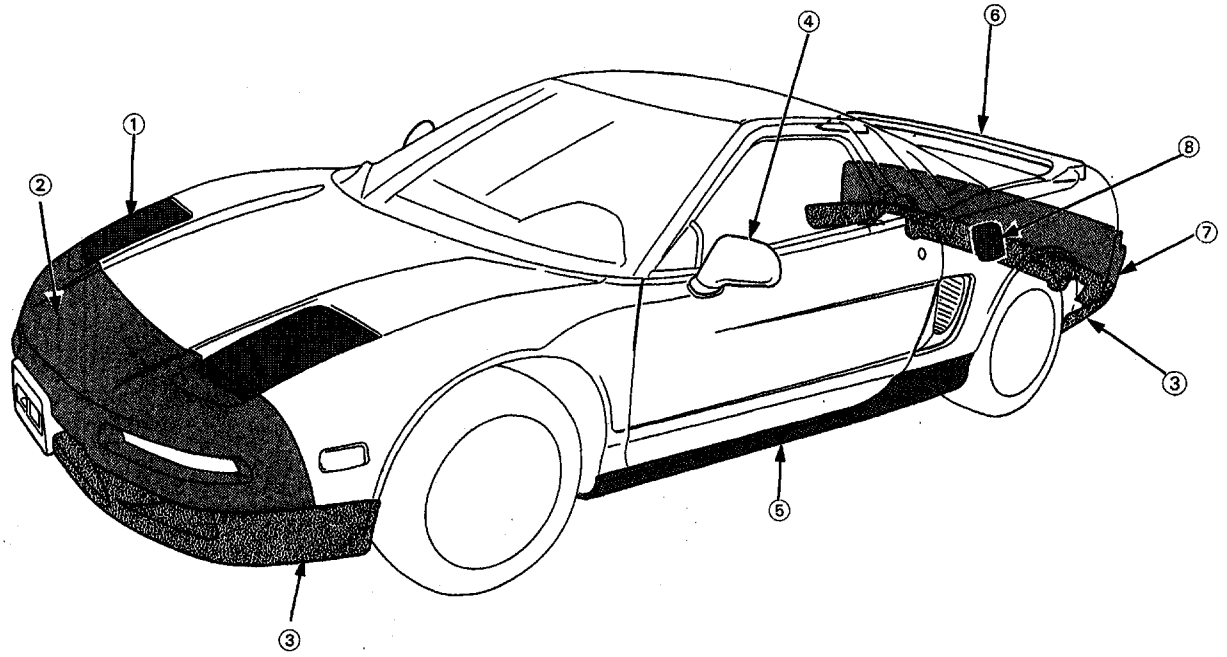
Composition



Types of aluminum alloys for pressings:

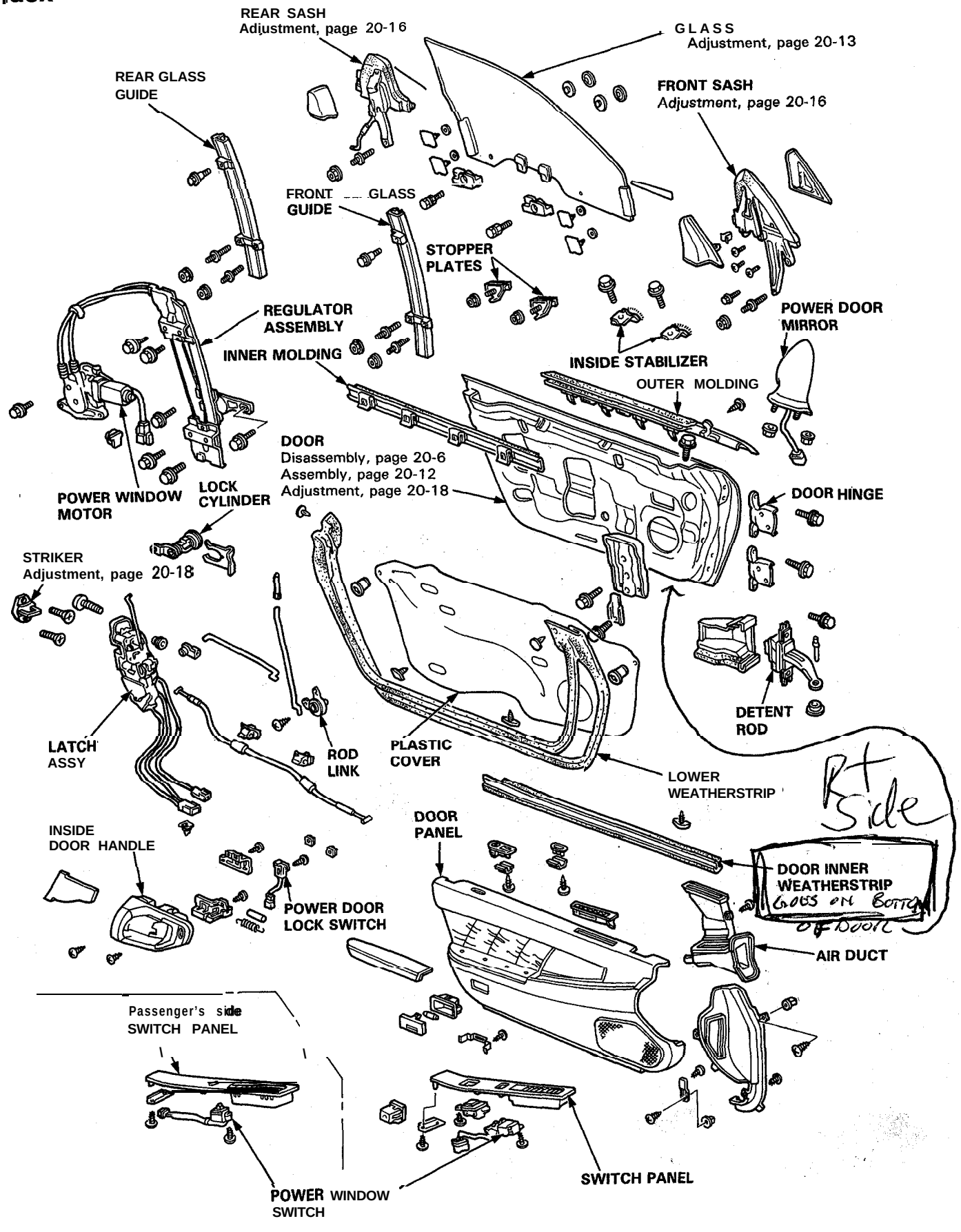
Alloy	Part	Material properties
Non-heat-treated alloys #5000, Aluminum-Magnesium (Al—Mg)	Body composites (HA51 82P—0)	Good corrosion resistance, Weldability and mallability.
Heat-treated #6000, Aluminum-Magnesium-Silicone	Exterior surface skin (HAZ6083P—T4) Roof panel (HAZ6083P—T4) Side sills (HACF60—T5)	Excellent mallability and corrosion resistance (HAZ6083—T4) is particularly resistant to corrosion.

Types and Materials of Exterior Resin Parts



NO.	Part Name	Material	Replacement
①	Headlight lid	HAS-214F 6Nylon PPO alloy	See Section 23
②	Front bumper	BFO-1 Polyester	Page 20-47
③	Front and rear skirts	HRB denatured polypropylene	Pages 20-48, 50
④	Door mirror	ABS acrylic dash styrene	Page 20-19
⑤	Side sill panel	HAS-214B 6nylon PPO alloy	Page 20-59
⑥	Trunk lid spoiler	SMC non- saturated polyester	Page 20-55
⑦	Rear bumper	BFO-1 Polyester	Page 20-49
⑧	Fuel filler lid	HAS-2148 6nylon PPO alloy	Page 20-57

To Donwood or Keith from Mark Rasch

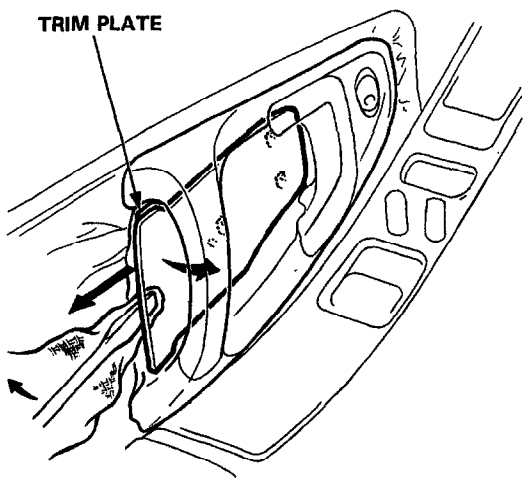


Disassembly

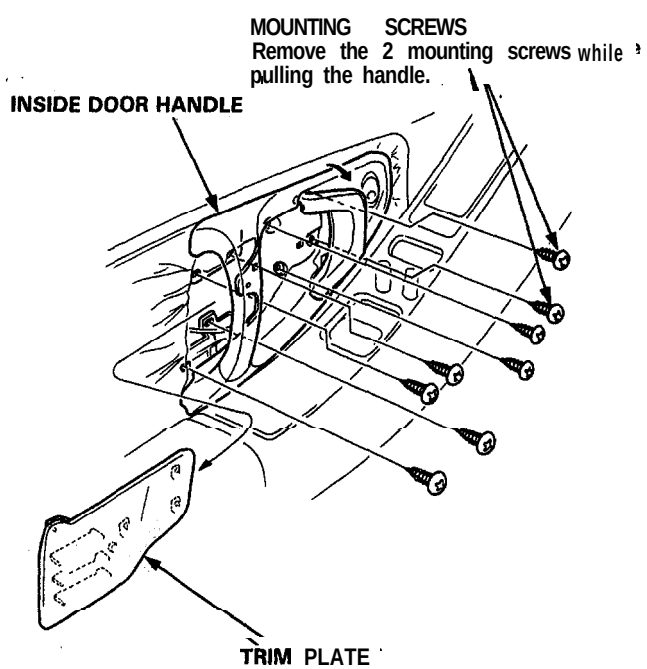
NOTE: Lower the window fully.

1. Carefully pry out the trim plate with a fiat tip screwdriver as shown.

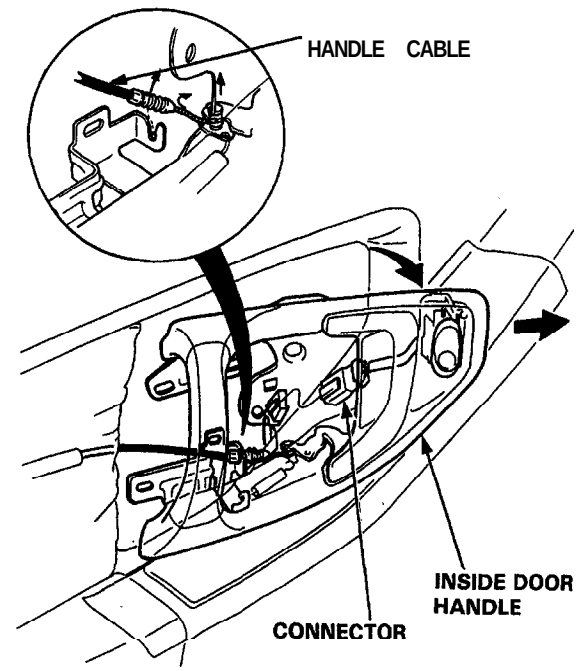
   NOTE: To prevent damage to the trim plate, wrap the end of the screwdriver with a shop towel.



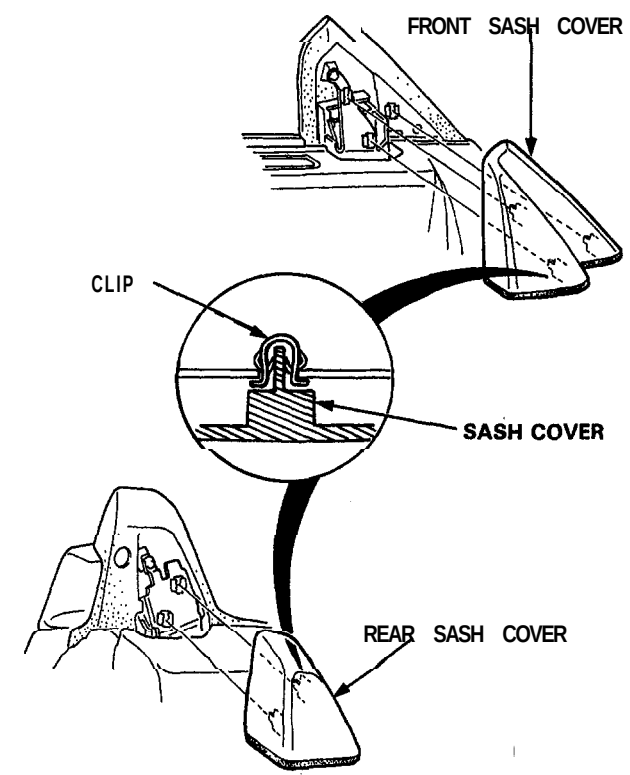
2 Remove the trim plate by pulling it backward and remove the inside door handle screws.



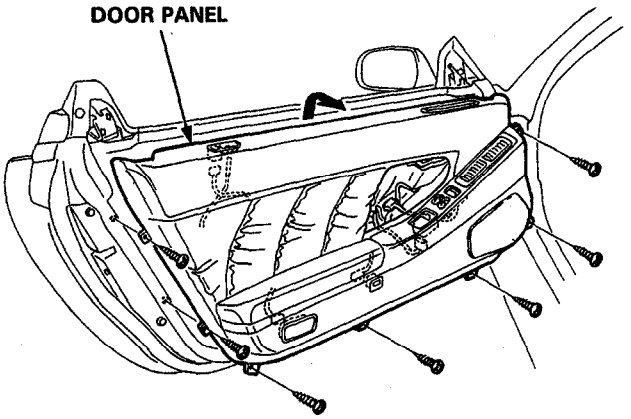
3. Disconnect the connector and the handle cable, then remove the inside door handle by pulling it forward.



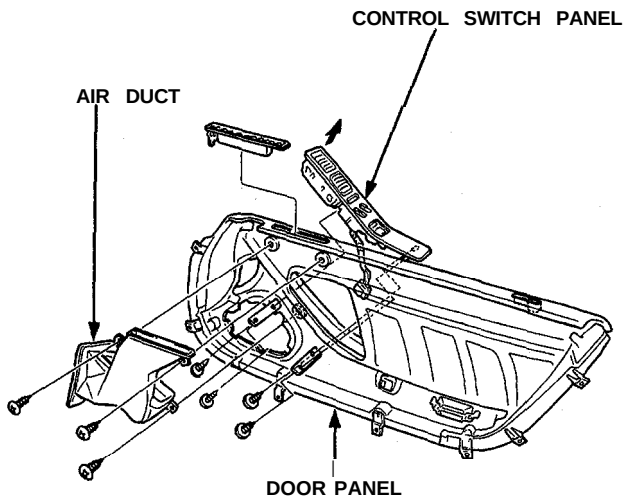
4. Carefully remove the front and rear sash covers.



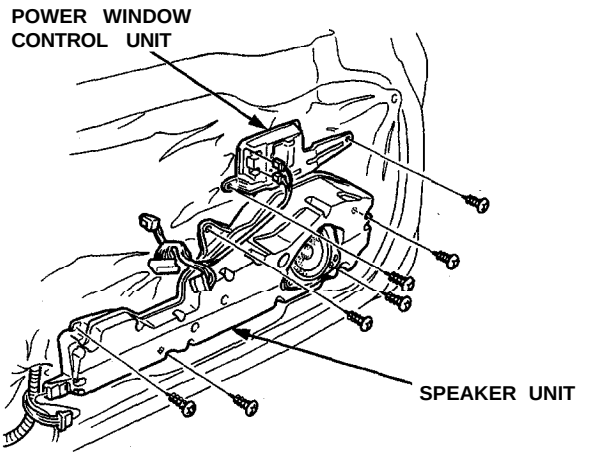
5. Remove the 7 door panel screws. Lift the door panel straight up off the sill.
Disconnect the connectors:
- Trunk lid opener
- Power window/door mirror
- Courtesy light
- Security alarm



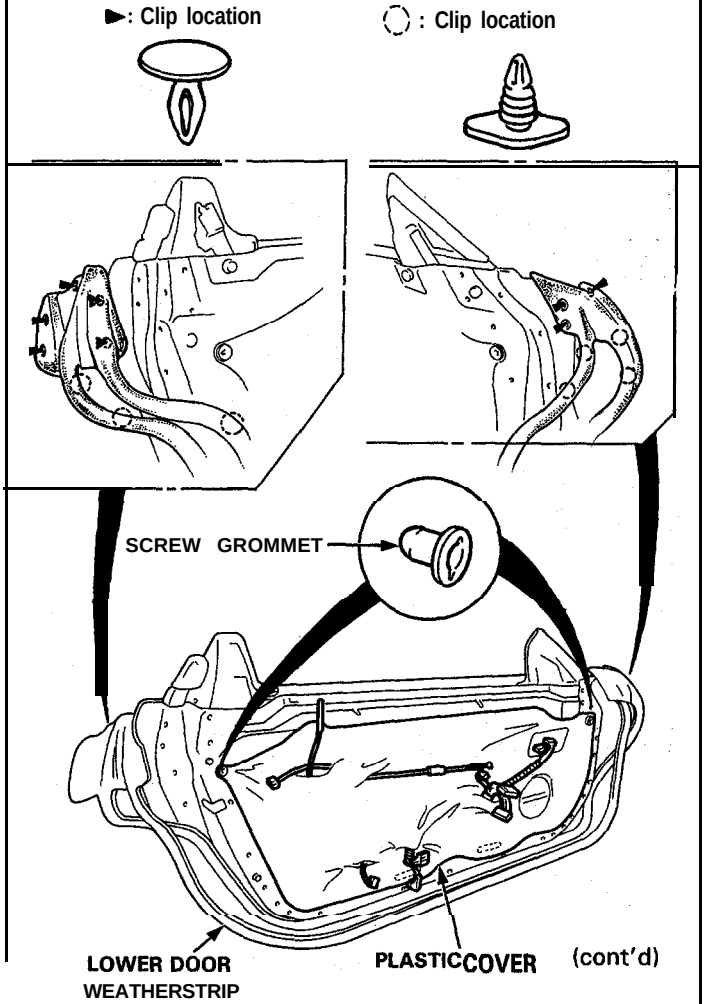
6. Remove the control switch panel and air duct, from the door panel as required.



7. Remove the mounting screws and disconnect the connectors, then remove the power window control unit and speaker.



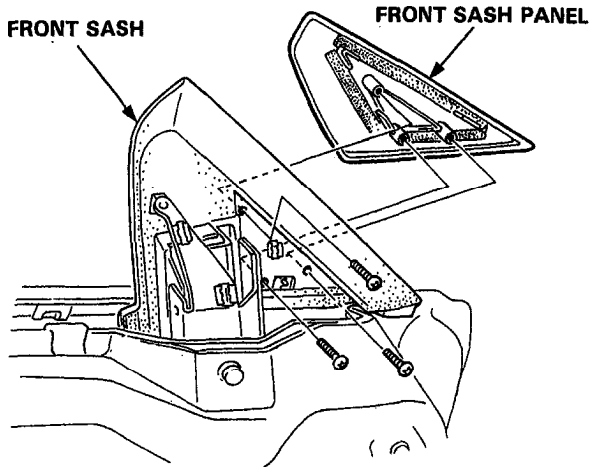
8. Remove the lower door weatherstrip retaining clips, then pull off the lower door weatherstrip.
Remove the screw grommets and carefully remove the plastic cover.



(cont'd)

Disassembly (cont'd)

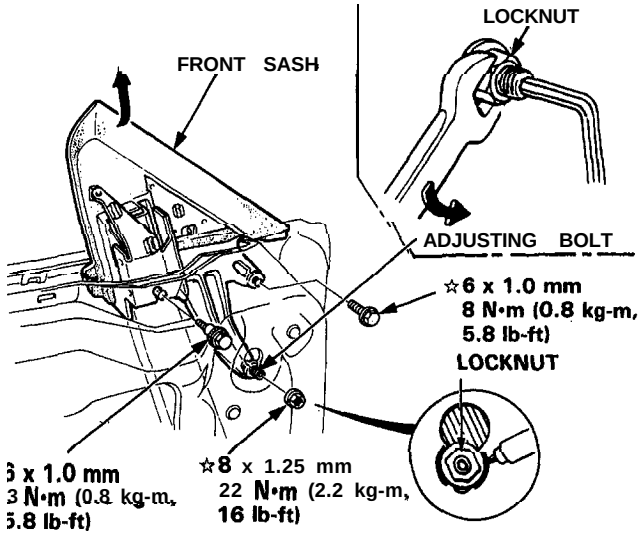
9. Remove the 3 mounting screws, then remove the front sash panel.



IO. Remove the outer molding mounting screw and detach the crips, then remove the outer molding (page 20-I 1).

11. Remove the 2 mounting bolts and locknut, then remove the front sash.

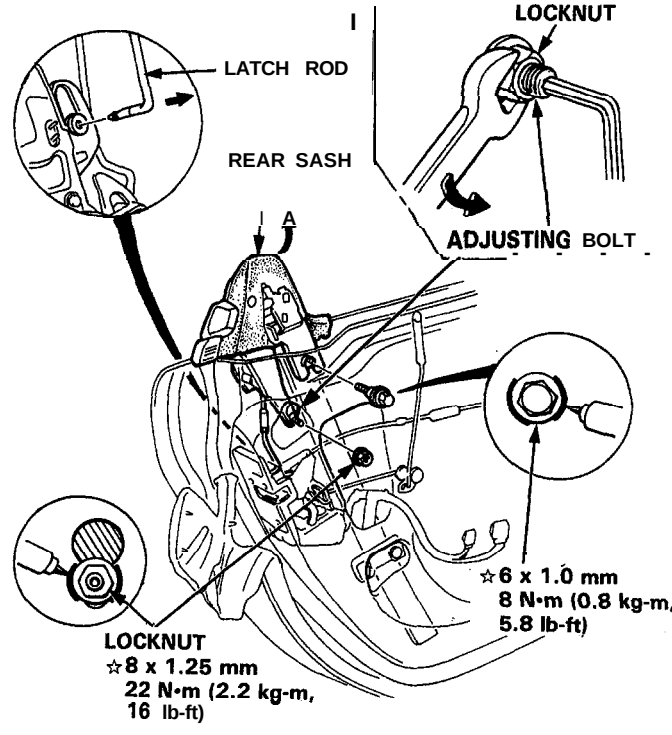
NOTE:
- Hold the adjusting bolt with a hex wrench when removing the locknut.
- Scribe a line around the locknut to show the original adjustment.



☆ : CORROSION RESISTANT BOLT/NUT

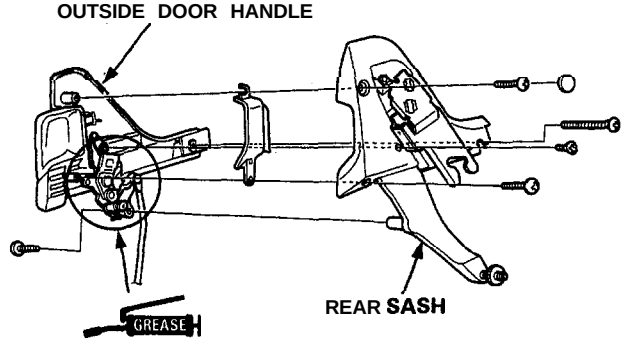
12. Remove the mounting bolt and locknut. Remove the rear sash, then disconnect the latch rod.

NOTE:
- Hold the adjusting bolt with a hex wrench when removing the locknut.
- Scribe a line around the locknut to show the original adjustment.



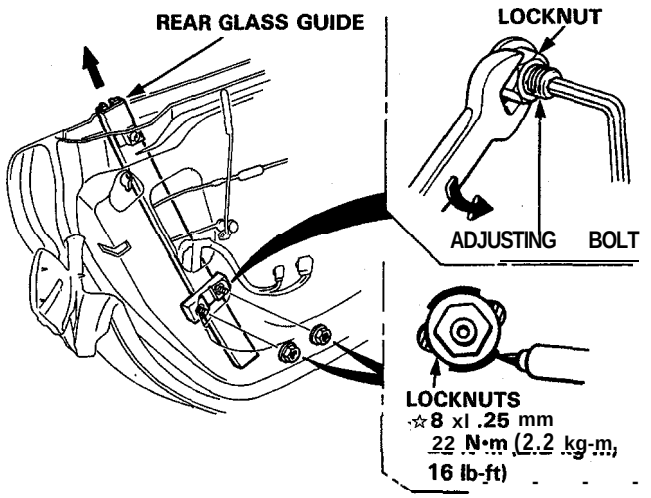
☆ : CORROSION RESISTANT BOLT/NUT

13. To replace the outside door handle, remove the 5 screws from the rear sash.



14. Remove the 2 locknuts, then remove the rear glass guide.

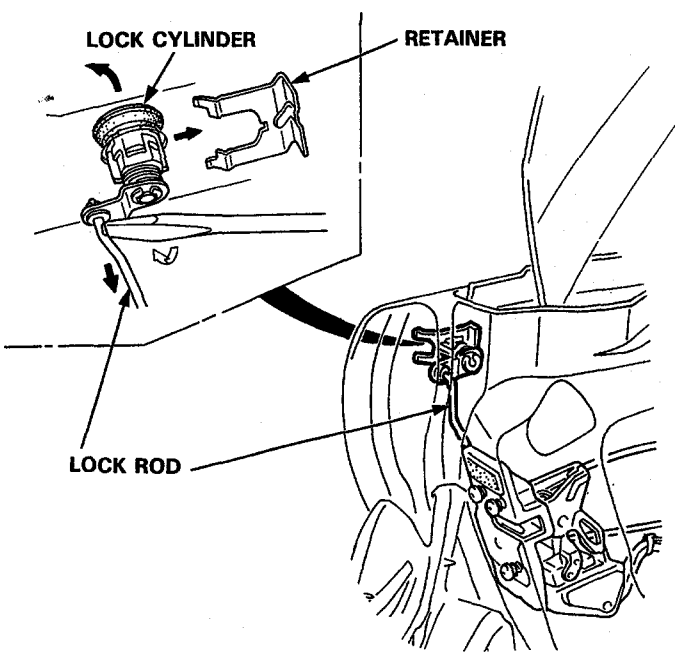
NOTE:
- Hold the adjusting bolt with a hex wrench when removing the locknuts.
- Scribe a line around the locknuts to show the original adjustment.



☆ : CORROSION RESISTANT BOLT/NUT

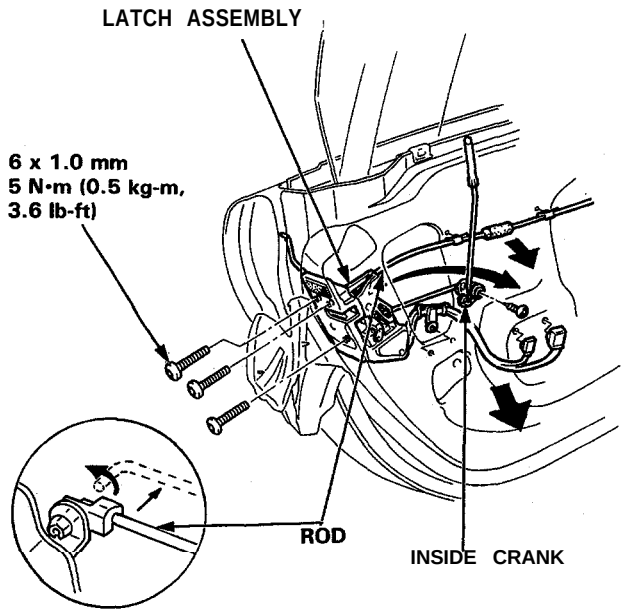
15. Before removing the latch assembly and lock cylinder, raise the window fully by connecting a 12 V battery to the regulator motor (See Section 23).

16. Remove the retainer by sliding it forward. Pry the lock rod out its joint using a flat tip screwdriver, then carefully remove the lock cylinder.



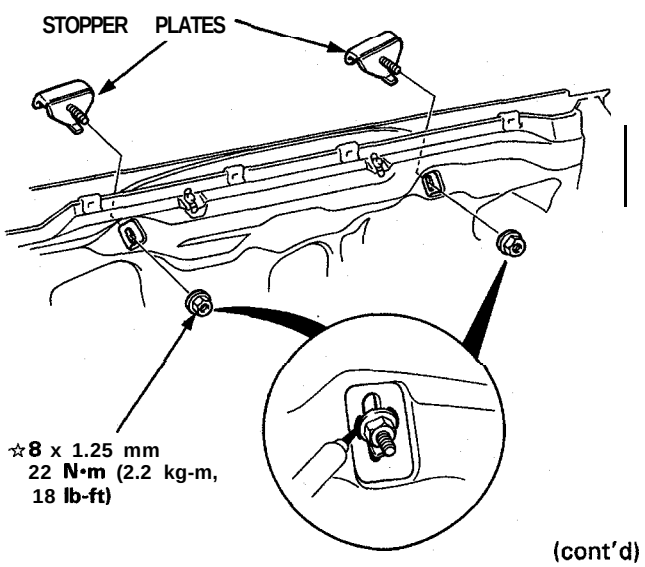
17. Disconnect the rod and remove the inside crank. Remove the cable and harness clips. Remove the mounting screws, then remove the latch assembly through the hole in the door.

NOTE: Take care not to bend the lock rod.



18. Lower the window and remove the mounting nuts, then remove the stopper plates.

NOTE:
- Lower the window by connecting a 12 V battery to the regulator motor (See Section 23).
- Scribe a line around the mounting nuts to show the original adjustment.



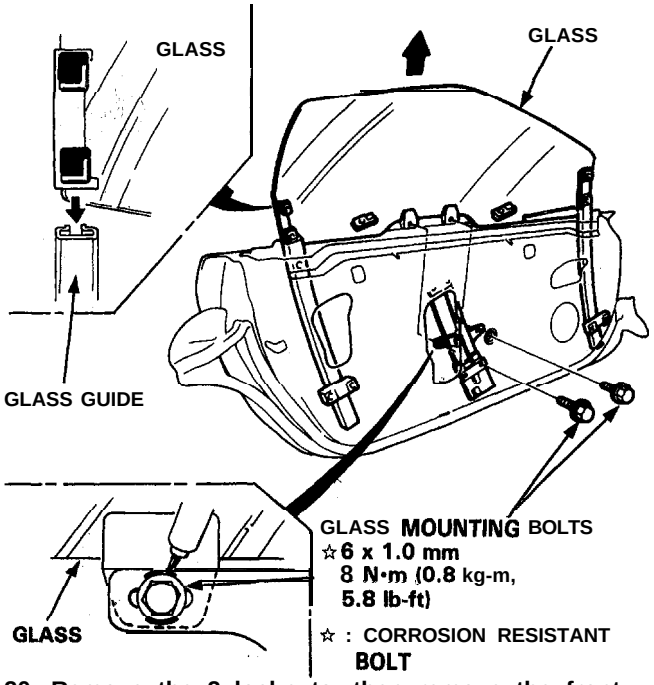
(cont'd)

☆: CORROSION RESISTANT BOLT/NUT

- Disassembly (cont'd)

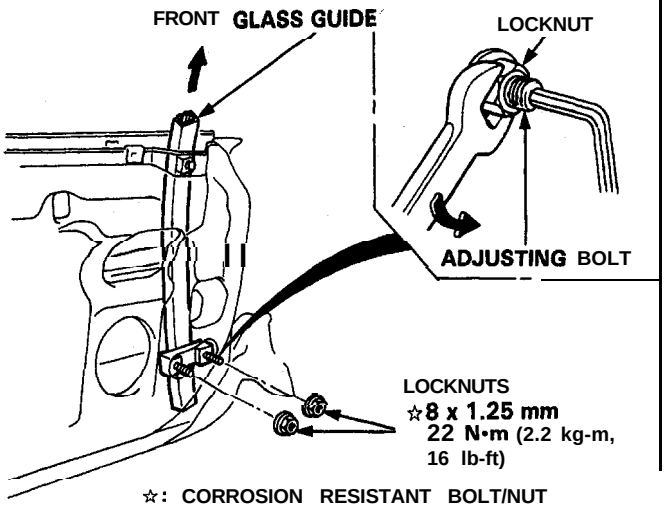
19. Carefully lower the window until you can see its mounting bolts, then remove the bolts. Pull the glass out through the window slot.

NOTE:
- Lower the window by connecting a 12 V battery to the regulator motor (See Section 23).
- Scribe a line around the mounting bolts to show the original adjustment.



20. Remove the 2 locknuts, then remove the front glass guide.

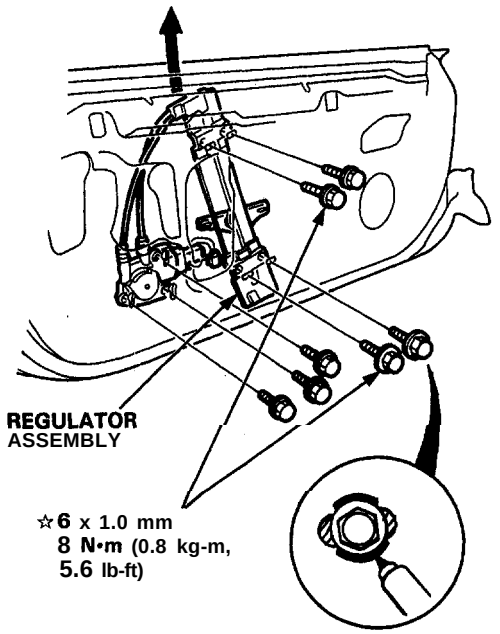
NOTE:
- Hold the adjusting bolt with a hex wrench when removing the locknuts.
- Scribe a line around the locknuts to show the original adjustment.



☆: CORRESPONDING RESISTANT BOLT/NUT

21. Remove the 4 regulator mounting bolts and loosen the 3 motor bolts, then take out the regulator assembly through the window slot.

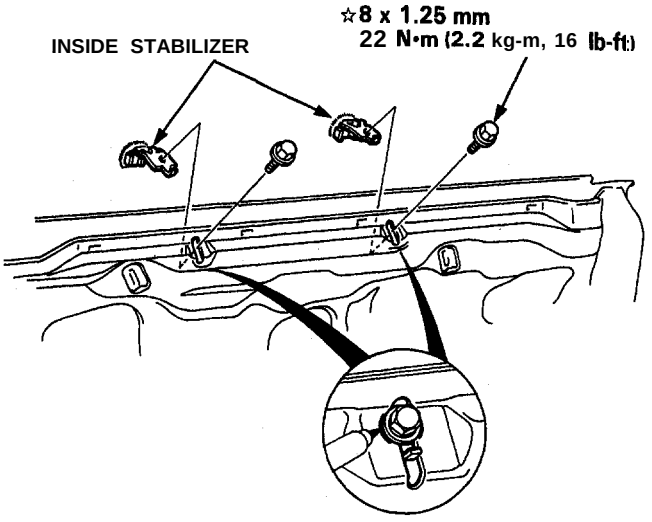
NOTE:
- Scribe a line around the mounting bolts to show the original adjustment.
- Take care not to bend the cable.



☆ : CORRESPONDING RESISTANT BOLT

22. Remove the mounting bolts, then remove the inside stabilizers from the door panel.

NOTE: Scribe a line around the mounting bolts to show the original adjustment.



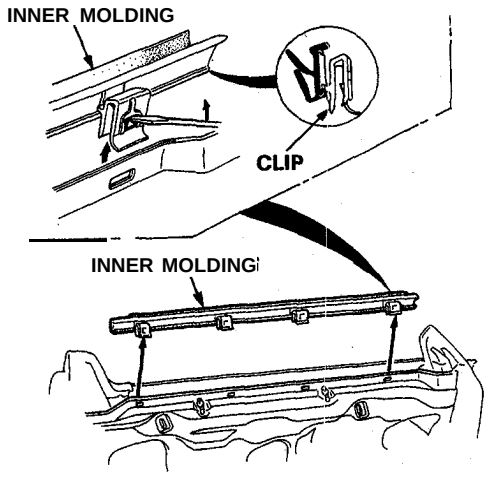
☆: CORRESPONDING RESISTANT BOLT

- Door Molding Removal

NOTE: Lower the window fully.

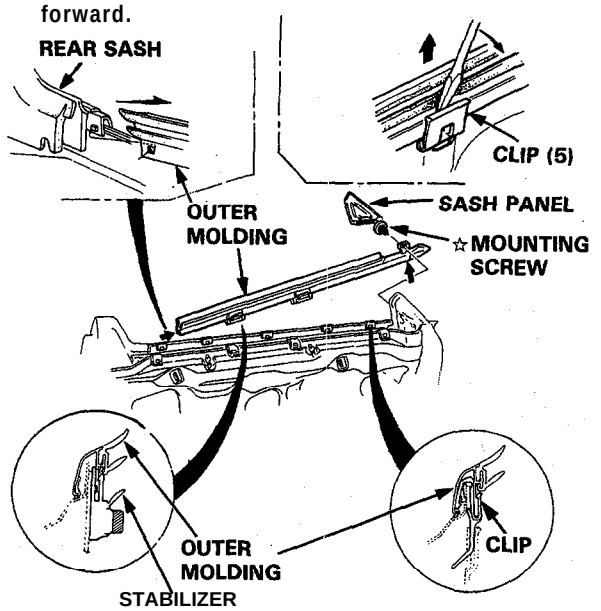
1. Remove: (See pages 20-6, 7)
   - Trim plate
   - Sash covers
   - Inside door handle
   - Door panel
2. Pry the clips out using a flat tip screwdriver, then pull up the moldings.
3. Set the clips on to the molding, 'then install the molding in the reverse order removal.

inner molding:



Outer molding:

NOTE:
- Remove the front sash panel (page 20-8) 'and molding mounting screw.
- Starting at the front and sliding the molding forward.



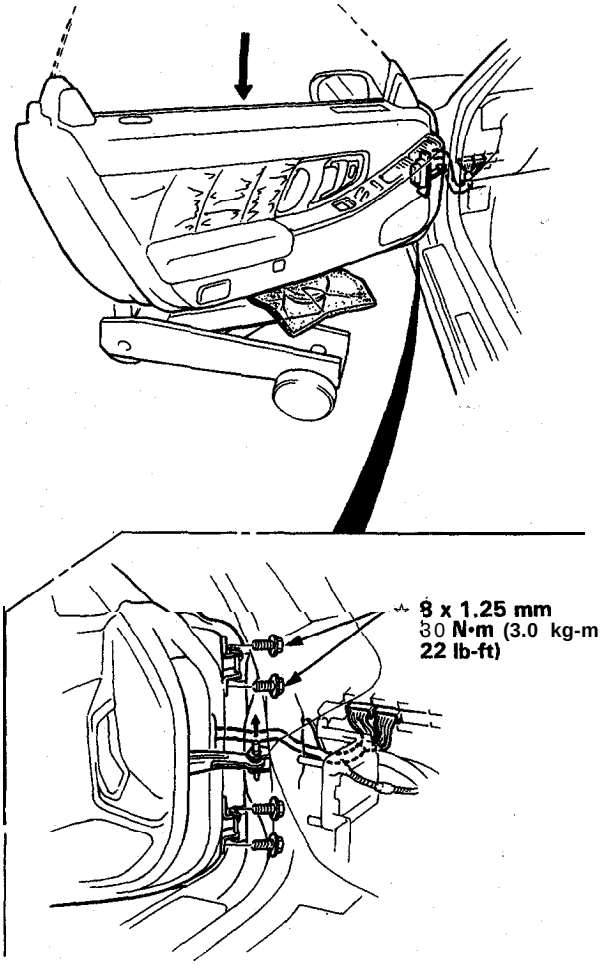
☆: CORROSION RESISTANT SCREW

- Removal

1. Lower the window fully.
2. Remove the seat (page 20-38).
3. Disconnect the door harness connectors.
4. Remove the door assembly by removing the hinge bolts, detent rod pin and pulling out the wire harness.

   CAUTION: Place a shop towel and rubber pad on the jack to prevent damage to the door.

   NOTE: Let an assistant hold the door.



5. Install the door assembly in the reverse order of removal.

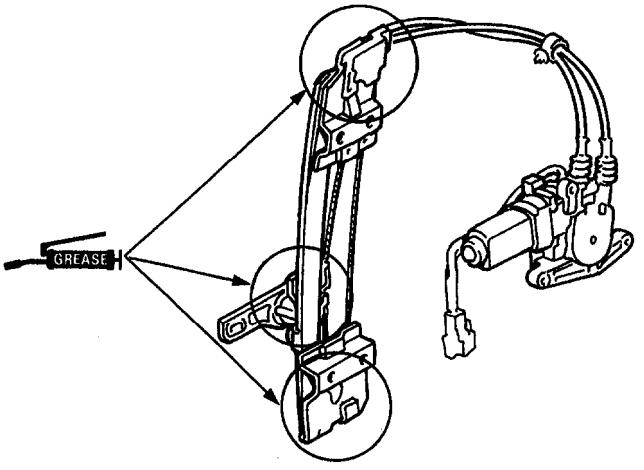
   NOTE: Adjust the door position (page 20-I 8).

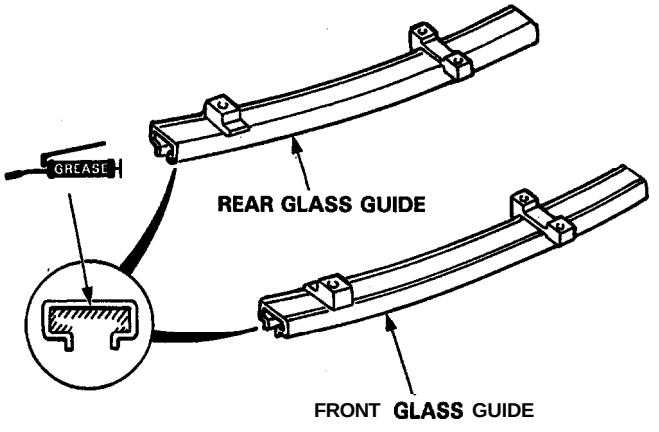
☆ : CORROSION RESISTANT BOLT

Assembly

Assemble the door in the reverse order of disassembly, and also:

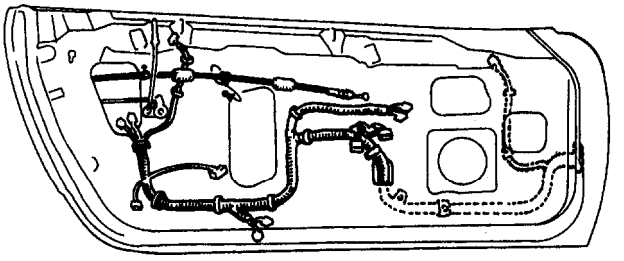
1. **Grease all the sliding surfaces of the window regulator and the glass guides where shown.**





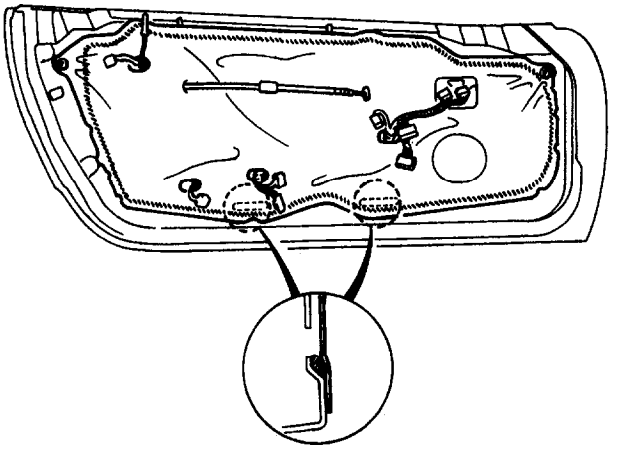
2. **Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and door upper weatherstrip when the glass is closed. Adjust the position of the door glass as necessary (pages 20-I 3 to 17).**

3. **Attach the wire harness correctly on the door.**



NOTE: Make sure the wires are not pinched.

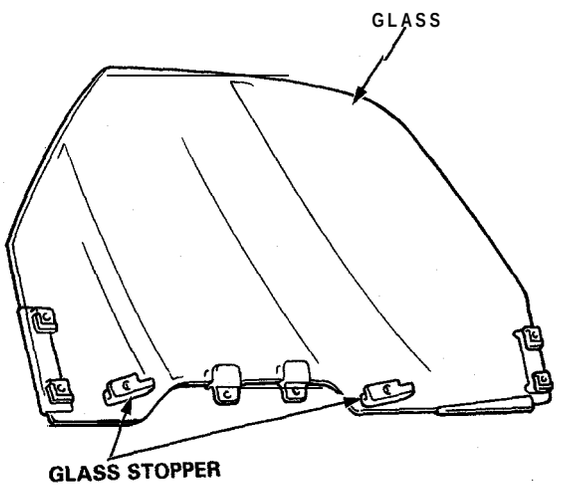
4. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.

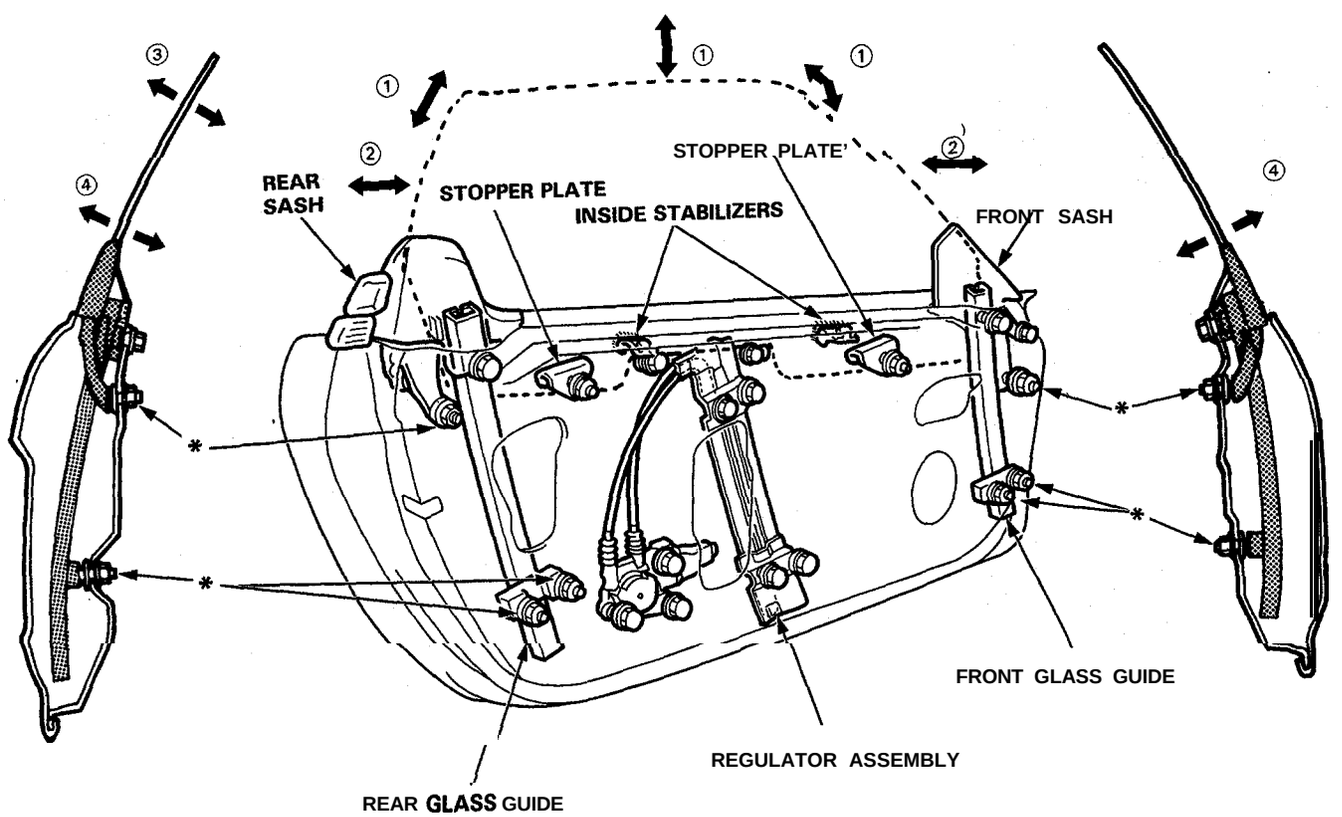


NOTE: Do not fill up with adhesive.

. Glass Adjustment

*: Adjusting bolt locations.





(cont'd)

Glass Adjustment (cont'd)

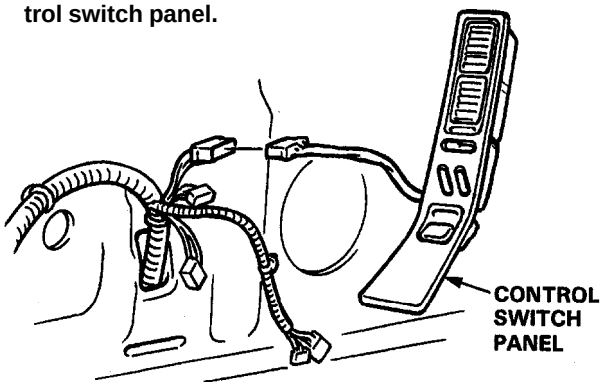
NOTE: Make sure the door position is adjusted properly before adjusting the glass (page 20-I 8).

1. Remove the door trim (page 20-37).
2. Remove the weatherstrip (page 20-20).

   NOTE: Check the weatherstrip for damage or deterioration and replace if necessary.

3. Remove all retainers by removing the attaching screws (page 20-20).
4. Remove the door panel and peel off the plastic cover (pages 20-6, 7).
5. Remove the control switch panel from the door panel (page 20-7).
6. Connect the connector of the control switch panel to the door harness.

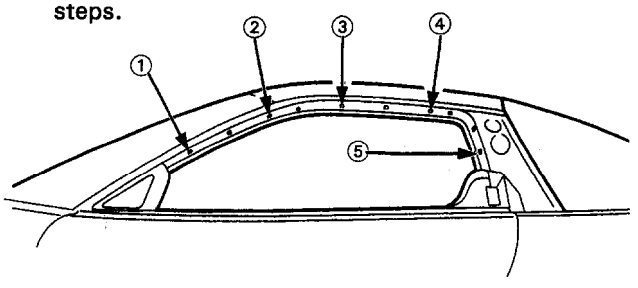
   NOTE: Take care not to scratch or score the control switch panel.



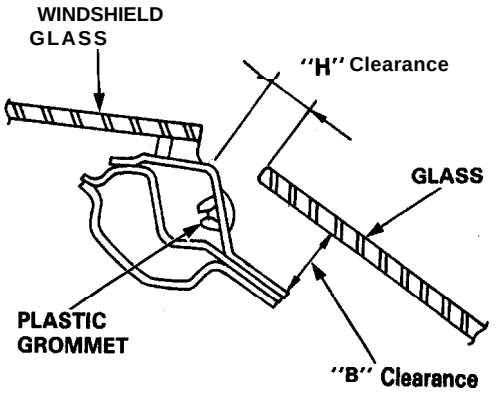
7. Carefully close the door while holding the window glass to prevent it from contacting the body panel.
8. Close the door glass fully.

   NOTE: Check the door fit to the body opening.

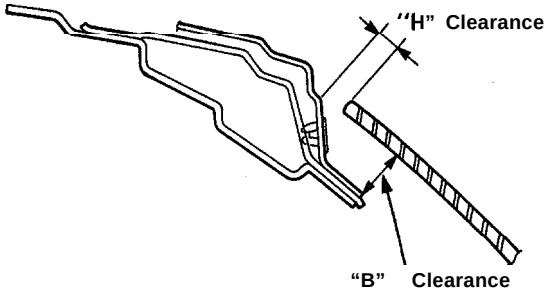
9. Measure and record the clearance "H" and "B" between the glass and body at the locations shown.
10. Adjust the clearance as described in the following steps.



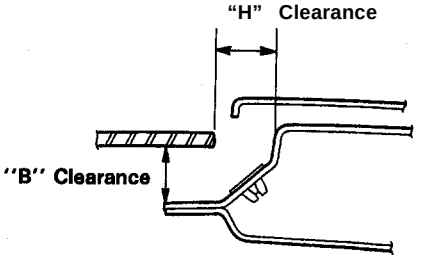
Section: ① – ②



Section: ③ – ④



Section: ⑤



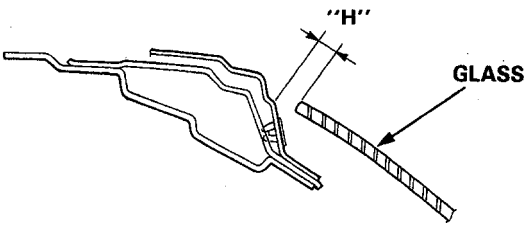
(Standard Clearance)

- Permissible tolerance: ±2 mm (0.08 in.)

Unit: mm (in.)

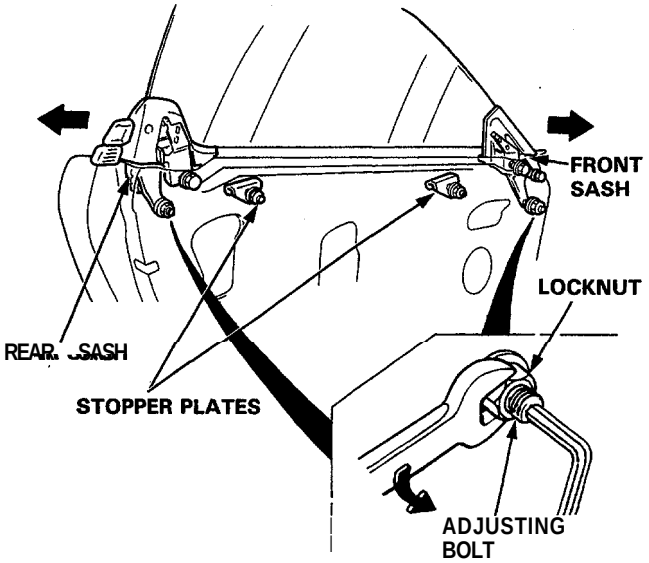
Measuring Point		①	②	③	④	⑤
Clearance	H	12.1 (0.48)	11.8 (0.46)	10.4 (0.41)	10.2 (0.4)	23.7 (0.93)
	B	24.9 (1.0)	22.0 (0.9)	20.9 (0.8)	21.2 (0.83)	35.4 (1.4)

11. Adjustment of Clearance "H".

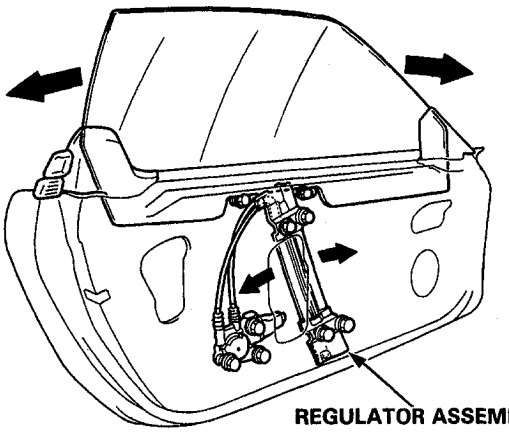


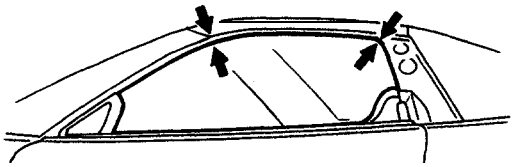
— 1 Loosen the bolts and nuts securing the front sash and rear sash, then move the front sash all the way forward and move the rear sash all the way backward.

NOTE: Hold the adjusting bolts with a hex wrench when loosening the locknuts.



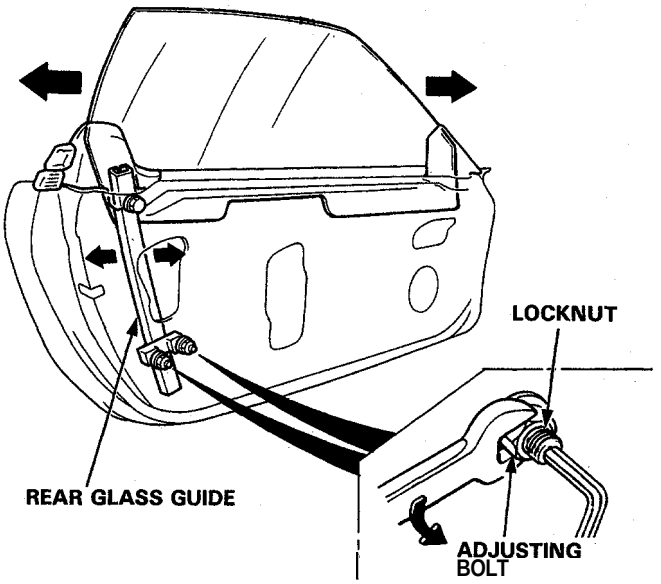
-2 Loosen the 4 bolts securing the regulator assembly and move the regulator fore or aft to align the door glass with the body at the front and center pillars.





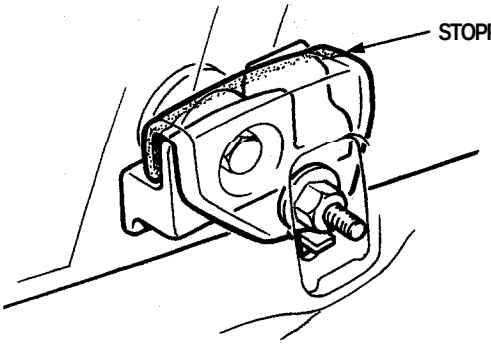
-3 Loosen the nuts securing the rear glass guide and adjust the glass fore and aft by moving the glass guide.

NOTE: Hold the adjusting bolts with a hex wrench when loosening the lower glass guide locknuts.



-4 Loosen the nut securing the stopper plates and adjust so that the clearance "H" at the locations is within the specified value.

NOTE: Check that the stopper plates contacts the glass evenly.

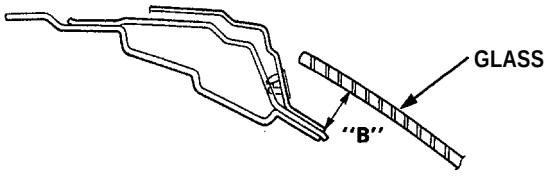


-5 Repeat the steps -2 thru -4 until the clearance "H" is within the specified limits, then retighten the regulator, glass guide, and stopper plates securely.

(cont'd)

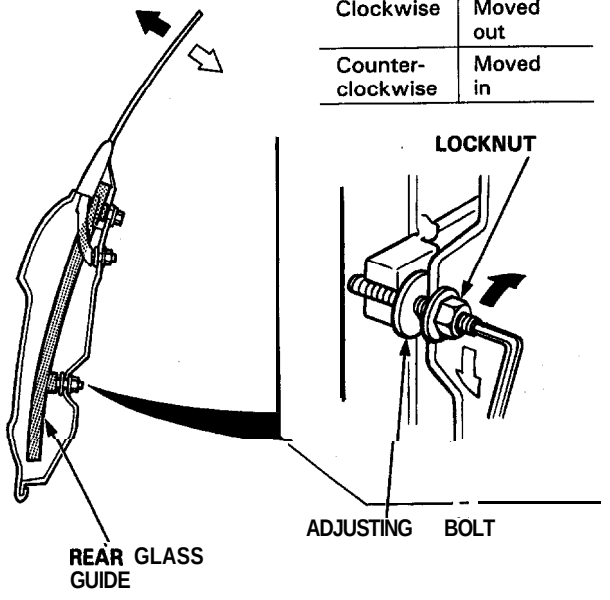
Glass Adjustment (cont'd)

12. Adjust the clearance ''B'' as follows.

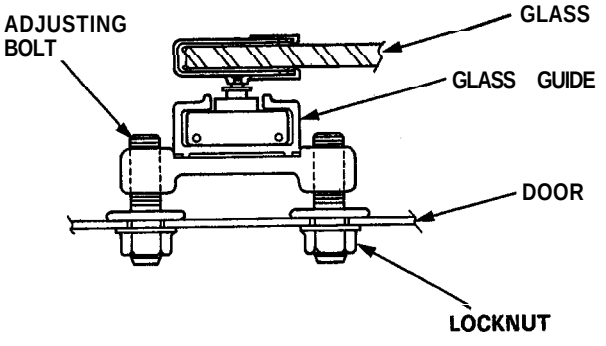


-1 Loosen the bottom glass guide locknuts and turn the adjusting bolts until the clearance "B" is within the specified value.

Adjusting Bolt	Top Edge of Glass
Clockwise	Moved out
Counter-clockwise	Moved in

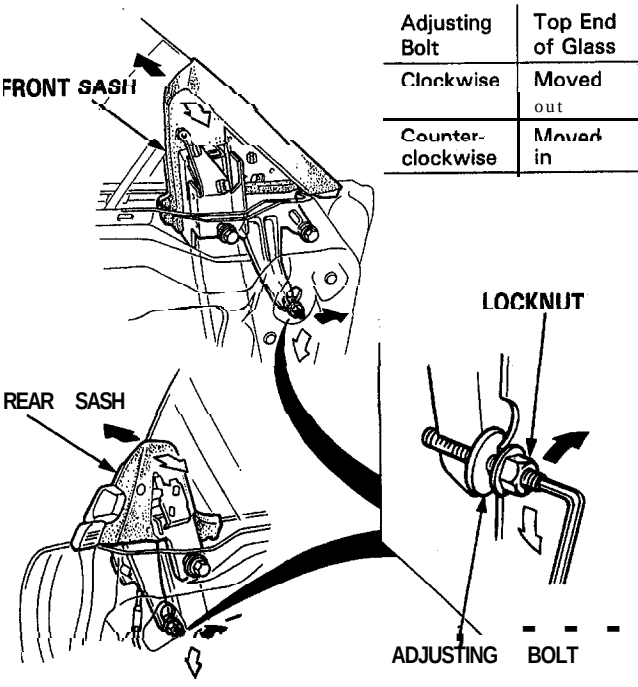


NOTE: Turn the front and rear adjusting bolts the same amount so as to keep the glass guide bracket parallel with the seating surface of the door panel.
After tightening the adjusting bolts, make sure that the ends of the bolts still project out of the locknuts.

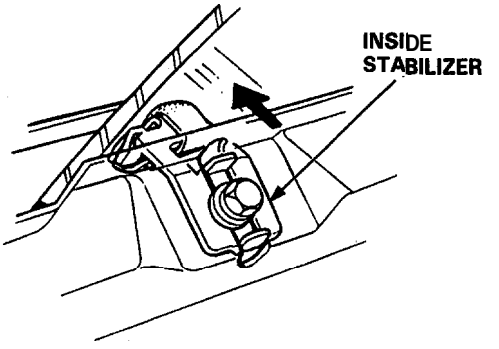


-2 Align the front sash and rear sash with the glass with the adjusting bolts at the bottom of the sashs.

Adjusting Bolt	Top End of Glass
Clockwise	Moved out
Counter-clockwise	Moved in



-3 Adjust and set the front and rear stabilizers in the positions which will ensure correct clearance "B", then retighten the stabilizer bolts securely.



-4 Move the glass up and down to seat it, then measure the clearance "B" at the designated locations.

-5 Align the front sash and rear sash with the glass, then tighten the attaching nut securely.

-6 Again measure the clearance "H" to make sure it is still within the specified limit at the designated locations.

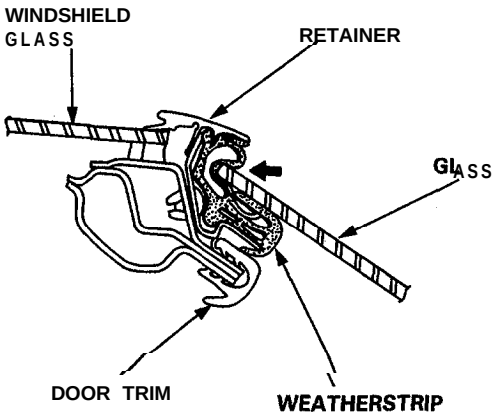
NOTE: Repeat the above steps until the correct clearances are obtained.

13. After the clearances have been adjusted properly, reinstall the weatherstrip.

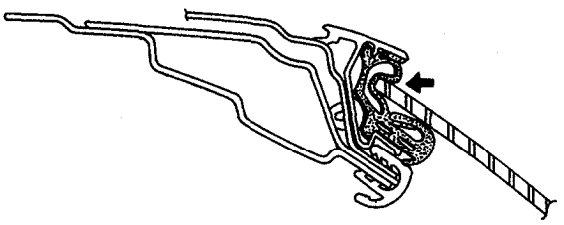
14. Reinstall the door trim.

15. With the door and glass closed fully, check that the weatherstrip is not pinched by the door glass.

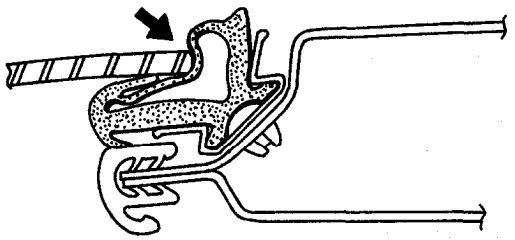
Section: ① – ②



Section: ③ – ④

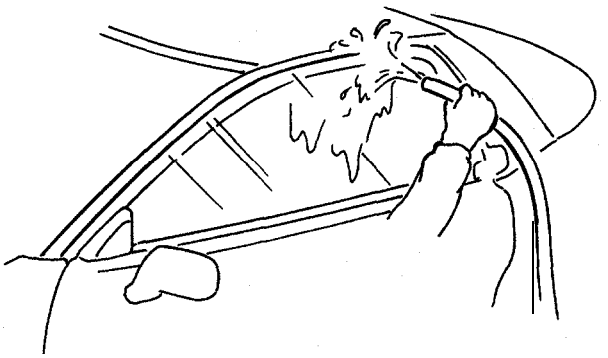


Section: ⑤



16. With the door and glass closed fully, check for water leaks.

NOTE: Do not use high pressure water.



17. install the control switch panel in the door panel.

18. Install the door harness.

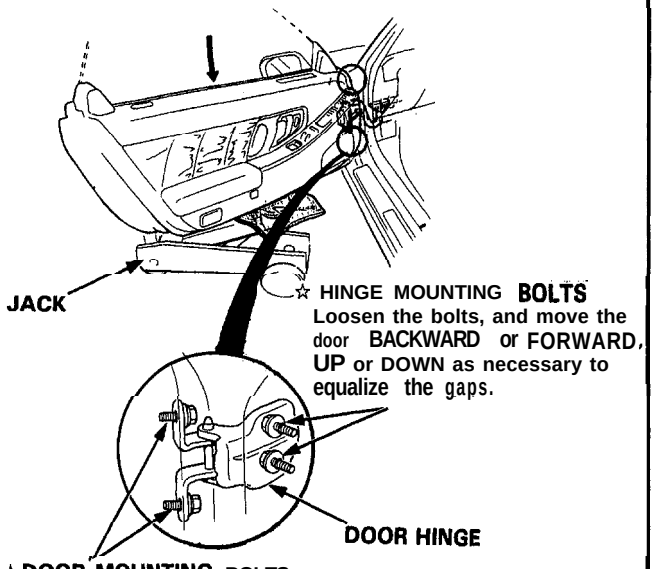
19. Attach the plastic cover, and install the door panel.

20. Check for air leaks.

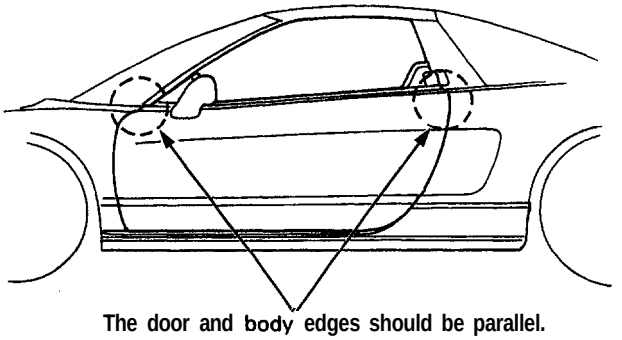
Position Adjustment

After installing the door, check for a flush fit with the body, then check for equal gap between the front and rear, and top 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 the hinge bolts are loosened for adjustment.



☆ : CORROSION RESISTANT BOLT



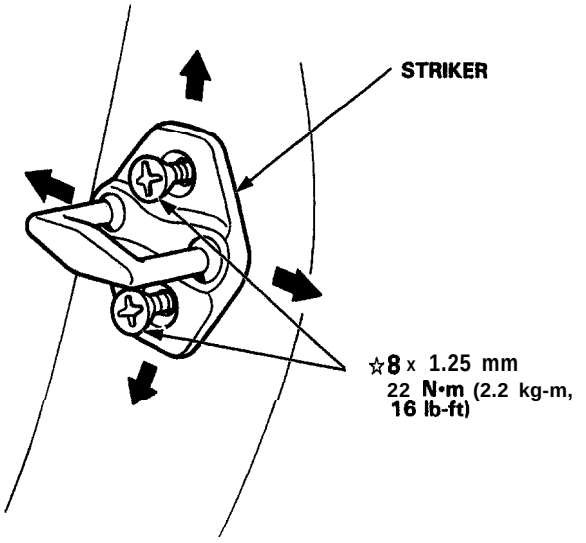
The door and body edges should be parallel.

NOTE: Check for water and air leaks.

Door Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line around the striker plate for reference.
2. Loosen the striker 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 outside handle out and push the door against the body to be sure the striker allows a flush fit.
- Do not tap the striker with a metal hammer to adjust the position.

3. If the door latches properly, tighten the screws and recheck.

NOTE: Replace the striker if it is cracked.

☆ : CORROSION RESISTANT SCREW

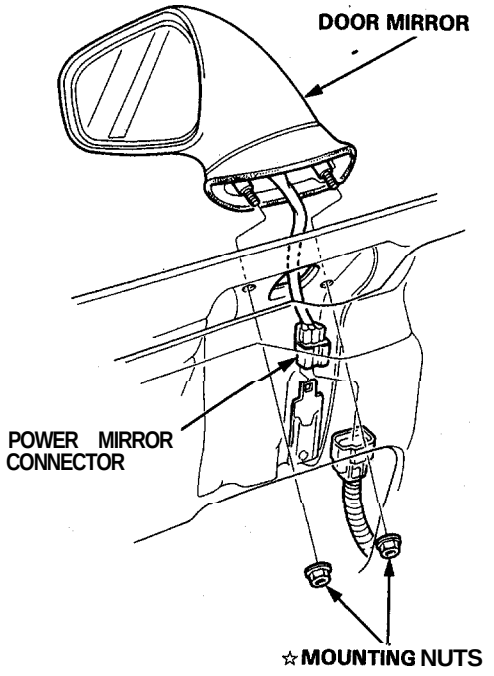
Door Mirror

- Removal

NOTE: Raise the window fully.

1. Remove the door panel and carefully remove the plastic cover (pages 20-6, 7).
2. Disconnect the power mirror connector.
3. Remove the 2 mounting nuts from the hole in the door while holding the mirror.

   NOTE: Do not drop the mounting nuts inside the door.



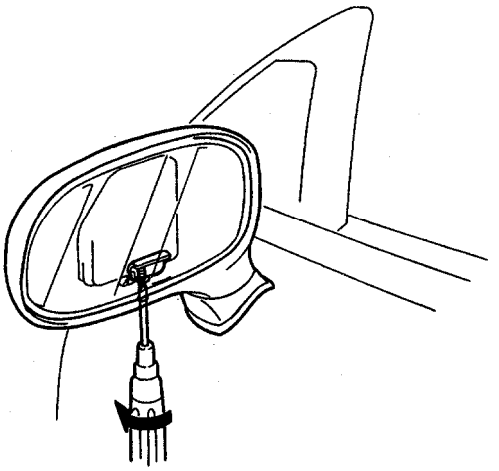
4. Install the door mirror in the reverse order of removal.
5. With the door closed fully, check for water and air leaks.

   NOTE: Do not use high pressure water.

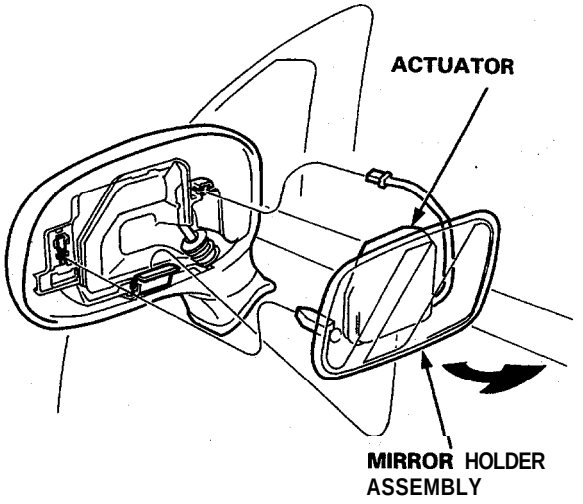
☆: CORROSION RESISTANT NUT

- Mirror Glass Replacement

1. insert a screwdriver in the mirror through the service hole, and loosen the actuator retaining screw.



2. Pull the actuator and glass out from the mirror housing.



3. Install the actuator and glass in the reverse order of removal.

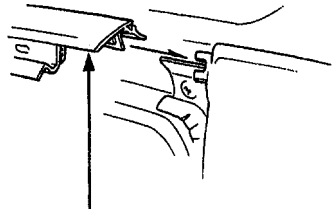
Side Window Molding/Weatherstrip

Replacement

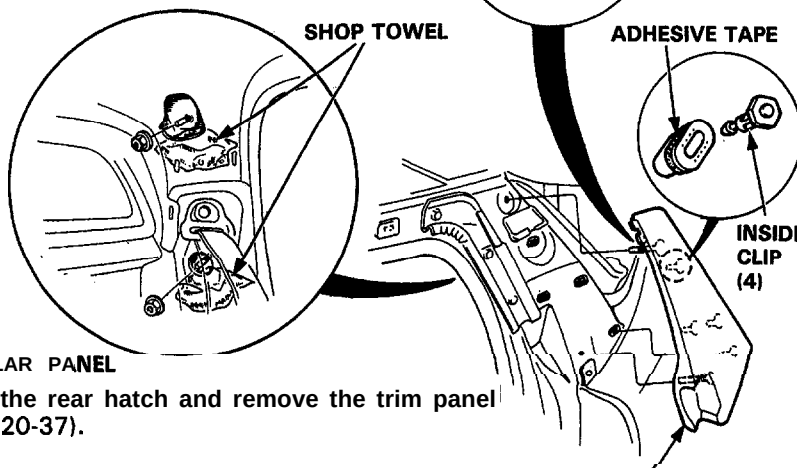
Disassemble in numbered sequence.

CAUTION:
- Wear gloves to remove and install the retainer.
- Take care not to bend the retainer.

NOTE:
- Check the weatherstrip for damage or deterioration and replace if necessary.
- After installing the weatherstrip, check for water and air leaks.
- If necessary: Adjust the position of the door glass (page 20-13).
- If necessary: Replace any damaged clips.

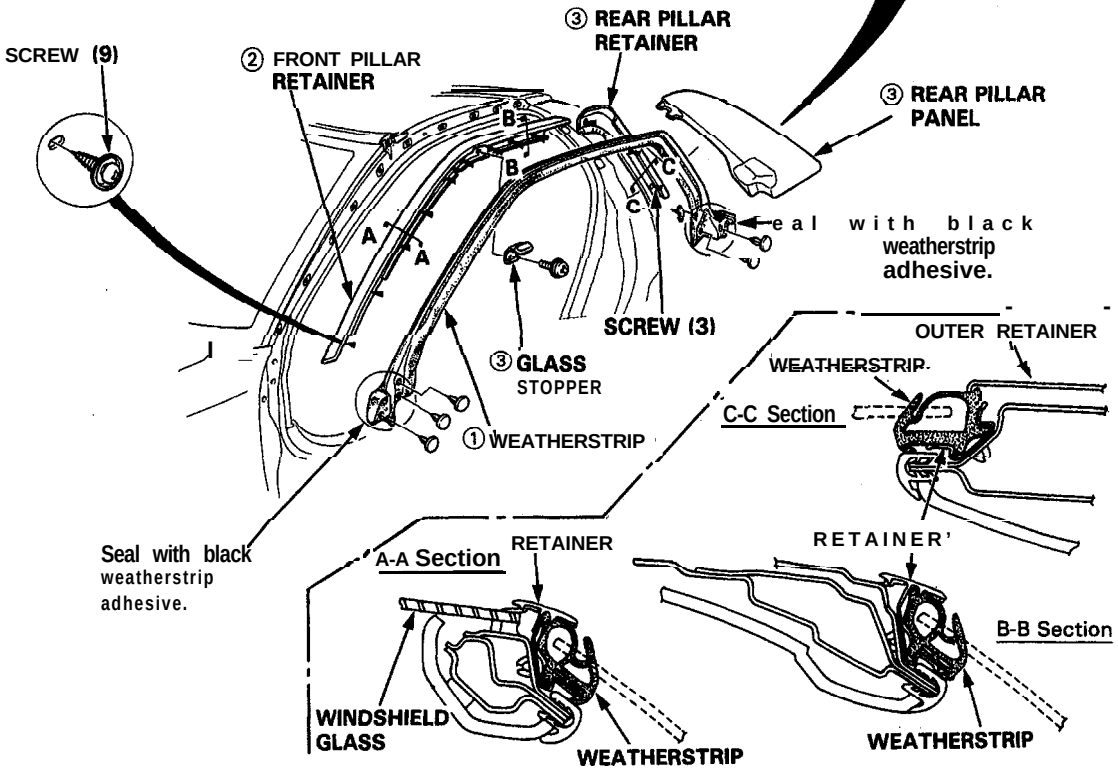


FRONT PILLAR RETAINER



1. Open the rear hatch and remove the trim panel (page 20-37).
2. Remove the 2 mounting nuts from the hole in the body panel and pull the panel out by hand.

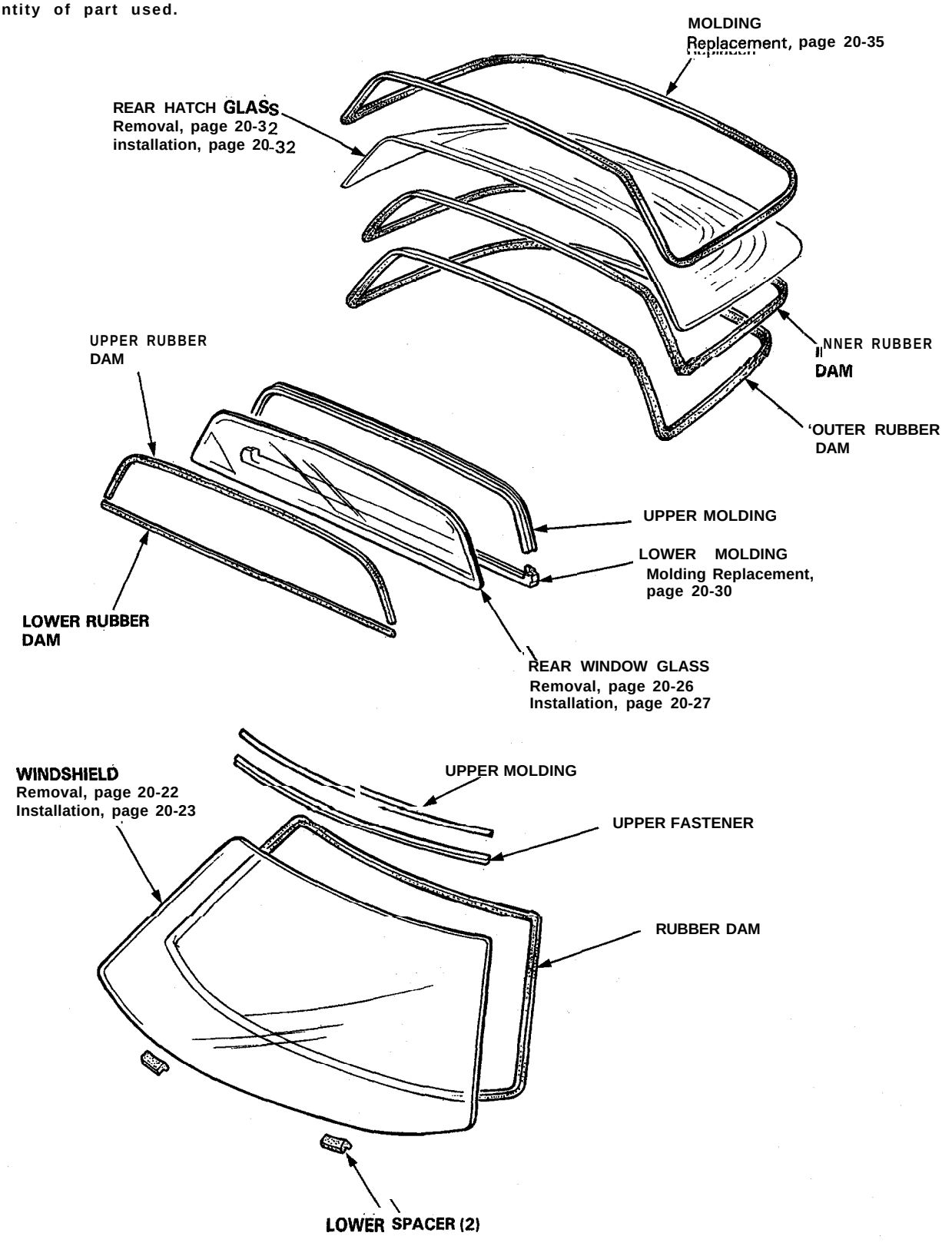
NOTE: Do not drop the nuts inside the body panel.



Windshield, Rear Window Glass, Rear Hatch Glass

Index

( ): Quantity of part used.



Windshield

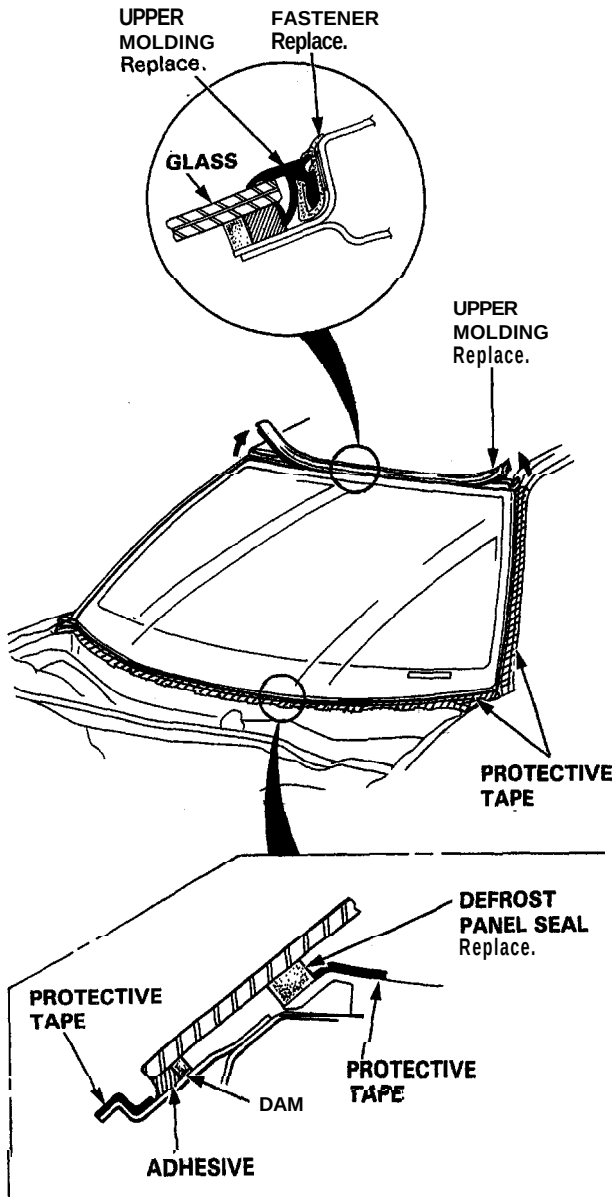
Removal

CAUTION:
- Wear gloves to remove and install the glass.
- Use covers to avoid damaging the interior.

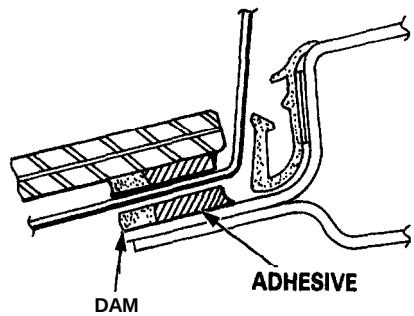
1. To remove the windshield, first remove the:
   - Seats (page 20-38).
   - Rearview mirror (page 20-41).
   - Sun visor.
   - Front pillar retainer (page 20-20).
   - Front wiper and air scoop (See Section 23).
   - Front pillar trim and headliner (page 20-37).

2. Peel off the upper molding.

3. Apply protective tape along the edge of the dashboard and body next to the glass as shown.

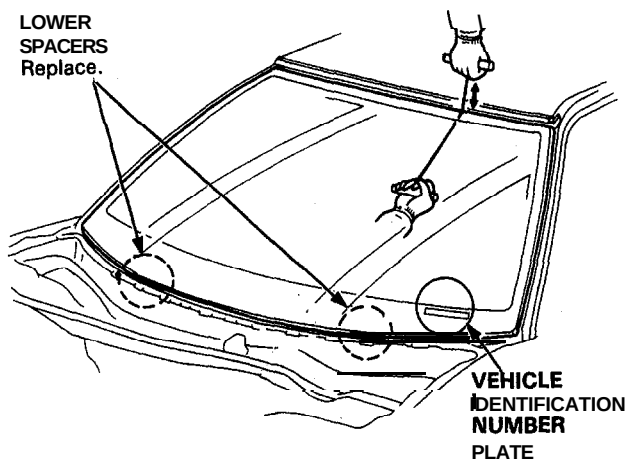


4. Using an awl, make a hole thrugh the windshield adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



5. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire windshield.

CAUTION:
- Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.
- Take care not to damage the vehicle identification number plate.



6. Cut the lower spacers and upper fastener away from the body with a knife; they are cemented in place.

NOTE: Replace the rubber spacers with new ones whenever the windshield has been removed.

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 flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before painting.

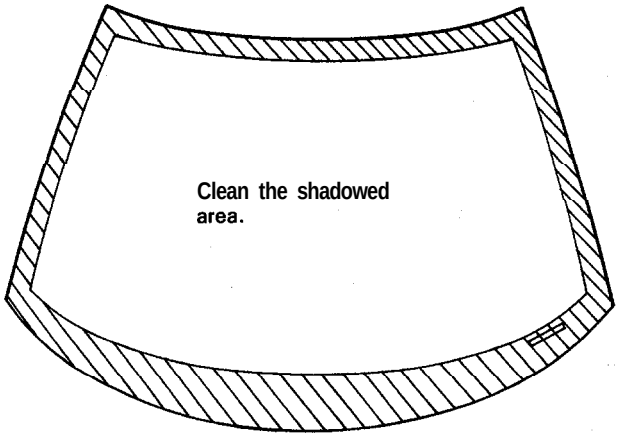
2. Clean the body bonding surface with a sponge dampened in alcohol.

   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

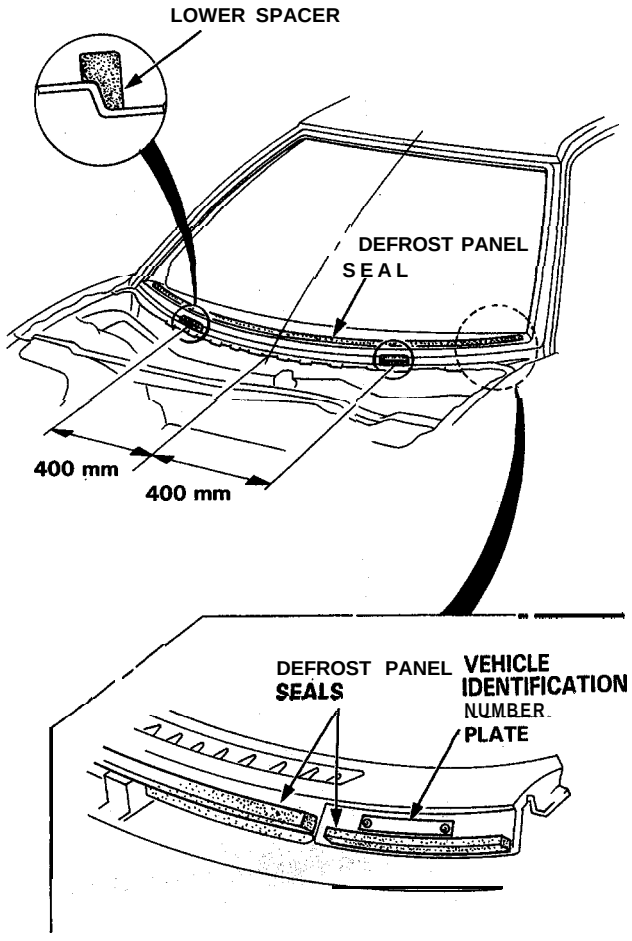
3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

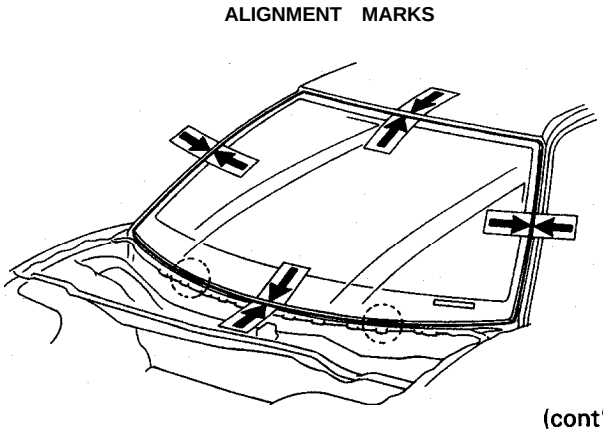
   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



4. Glue the lower spacers and defrost panel seals in place as shown.



5. Set the windshield upright on the spacers, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

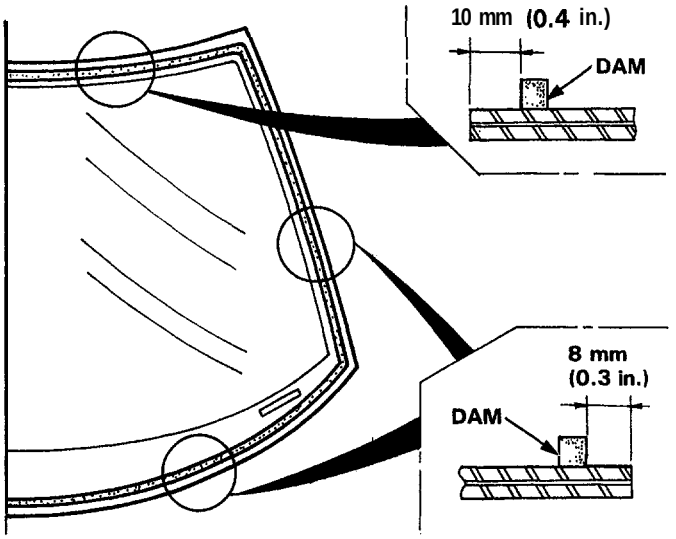


(cont'd)

Installation (cont'd)

6. Glue the rubber dam to the inside face of the windshield as shown to contain the adhesive during installation.

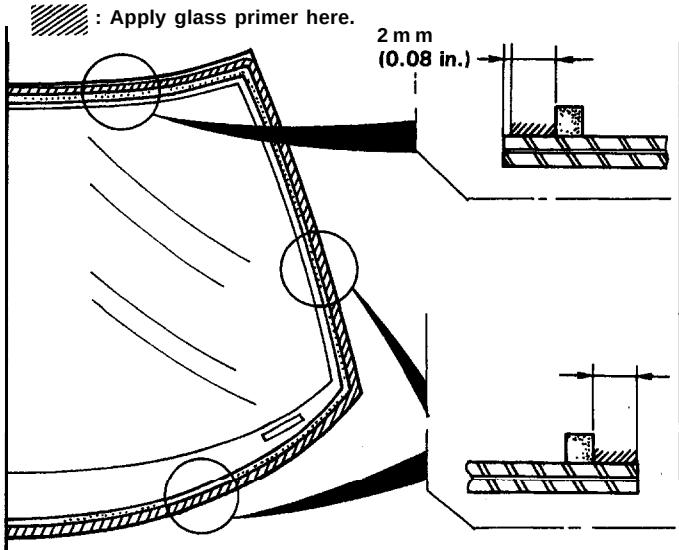
NOTE: Be careful not to touch the glass where adhesive will be applied.



7. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, 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 glass properly, causing a leak after the windshield is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

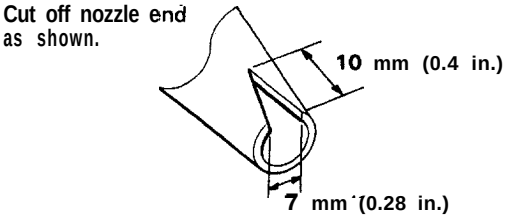
: Apply glass primer here.



8. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

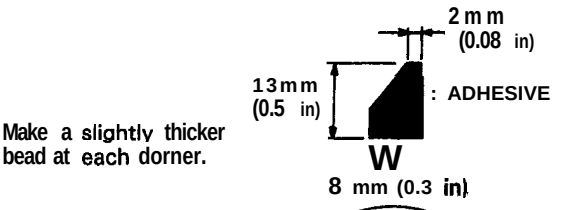
NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

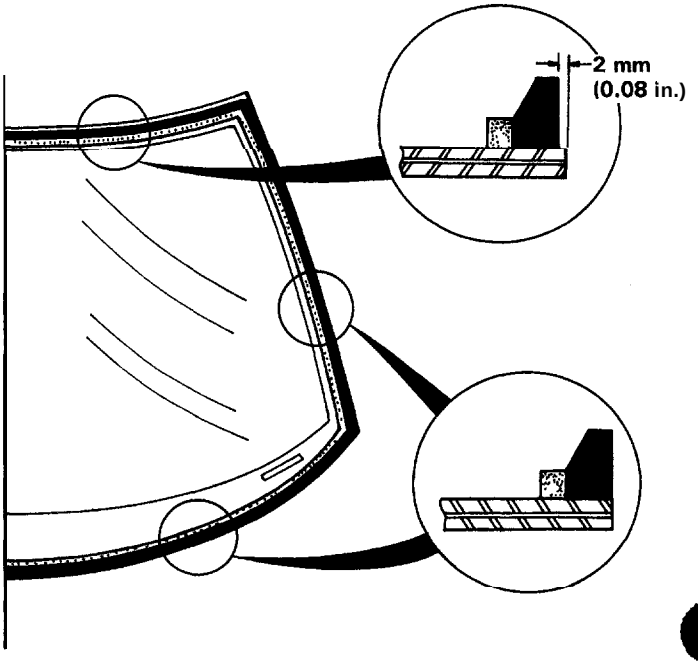
9. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



10. 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 glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



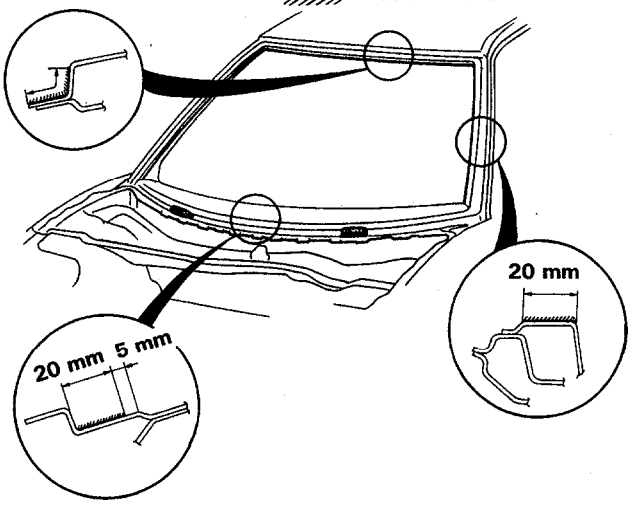


11. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.

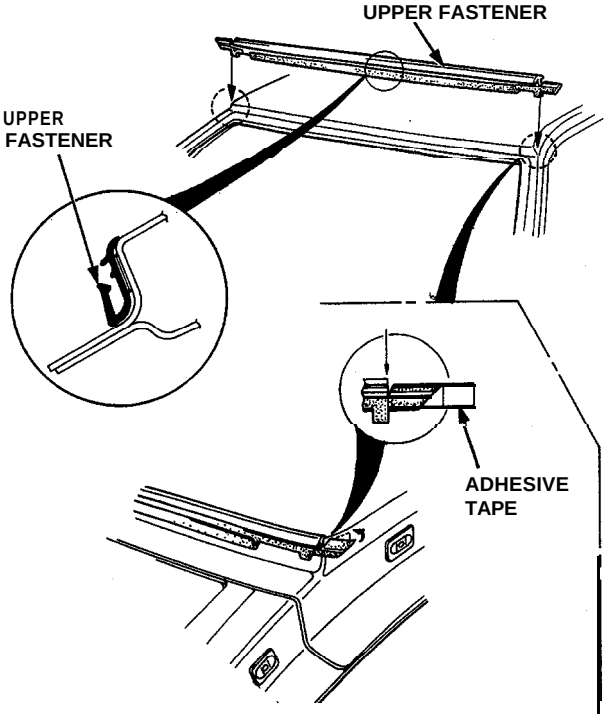
NOTE:

- 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.



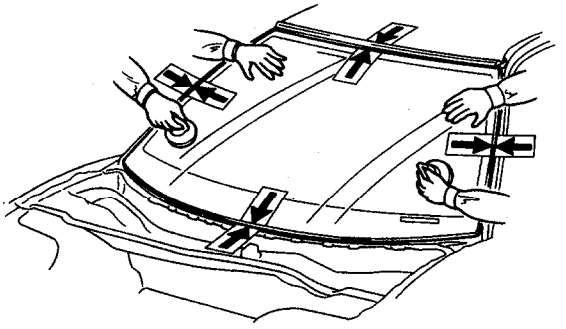
12. Glue the upper fastener to the body as shown.



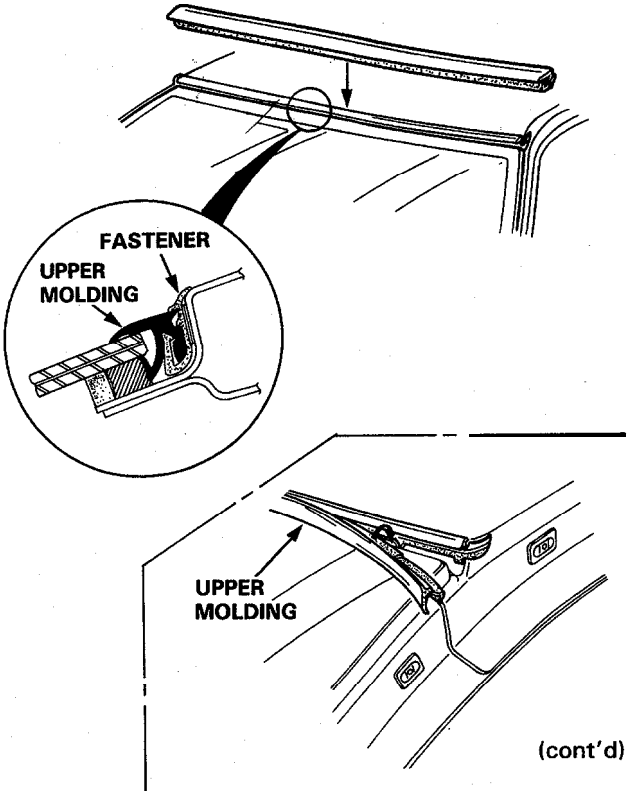
13. Use suction cups to hold the glass over the opening, align it with the marks made in step 5 and set it down on the adhesive. Lightly push on the glass until its edge it fully seated on the adhesive all the way around.

NOTE: Do not close or open the doors until the adhesive is dry.

ALIGNMENT MARKS



14. Install the upper molding.



(cont'd)

Windshield

Installation (cont'd)

15. Let the adhesive dry for at least 1 hour, then spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with urethane windshield adhesive.

NOTE:
- Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.
- Keep the glass dry within the first 1 hour after installation.
- Check that the ends of the molding are set under the air scoop.

16. Reassemble all removed parts.

Rear Window

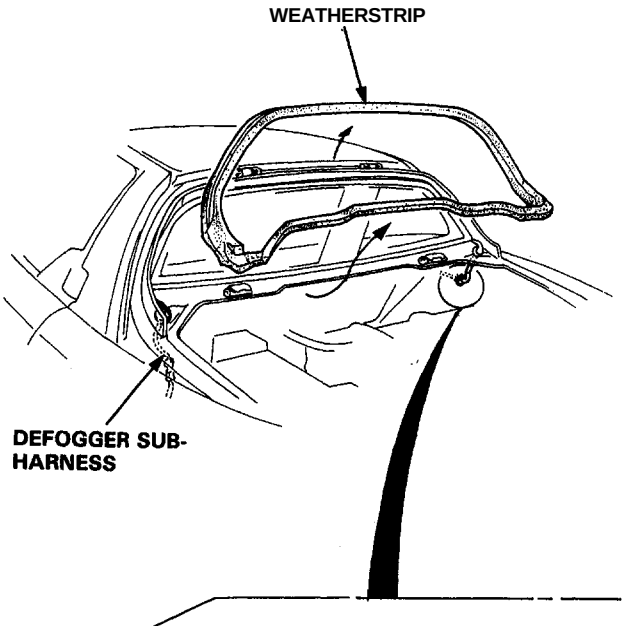
Removal

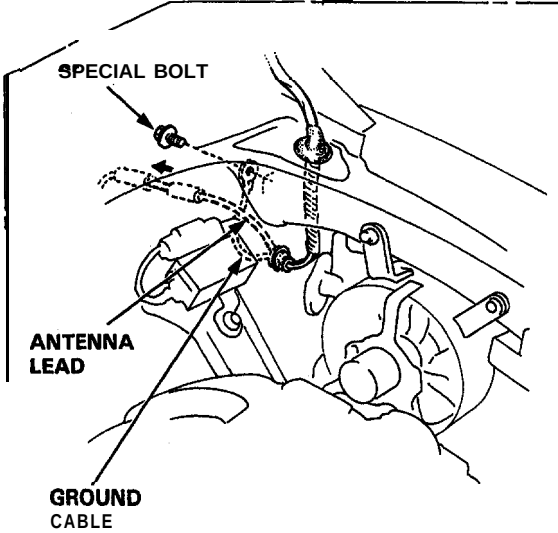
CAUTION:
- Wear gloves to remove and install the glass.

1. To remove the rear glass, first remove:
   - Seats (page 20-38).
   - Rear pillar trim panel (page 20-37).
   - Rear upper trim panel (page 20-37).
   - Rear hatch glass assembly (page 20-53).

2. Remove the weatherstrip.

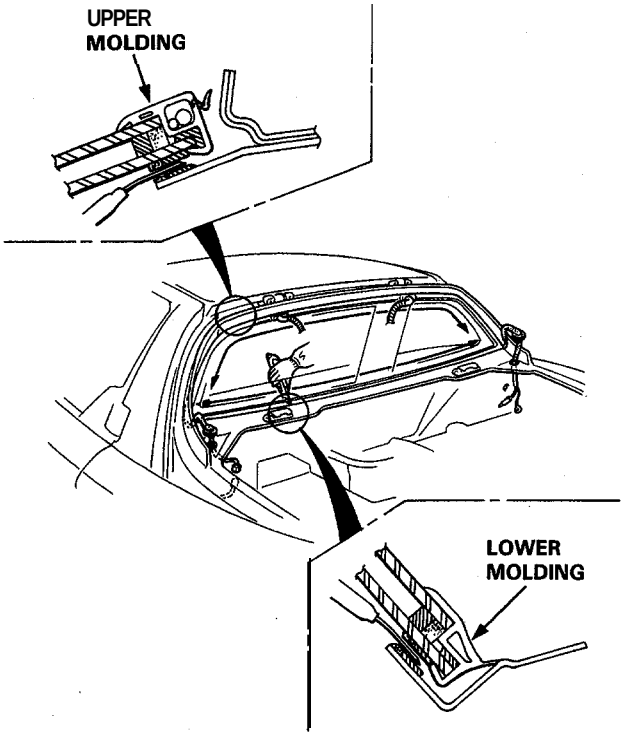
3. Disconnect the rear defogger sub-harness and ground cable/antenna lead, then remove the grommets.





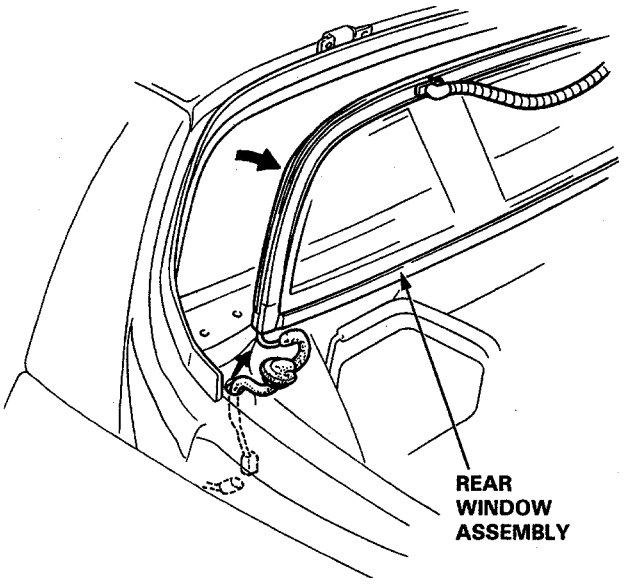
4. Use a knife to cut through the glass adhesive from inside the car, all the way around.

CAUTION: Take care not to scratch or score the rear window molding and body.



5. Remove the rear window from the body.
If necessary, replace the sub-harness and ground cable/antenna lead.

NOTE: Be careful not to damage the wire harness.



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 glass flange.

NOTE:
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before applying primer.

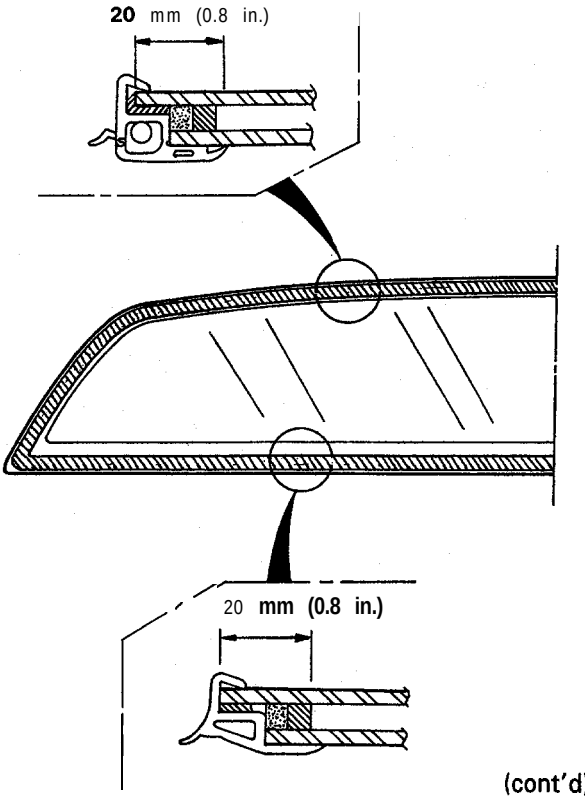
2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass 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 glass on its edges; small chips may later develop into cracks.



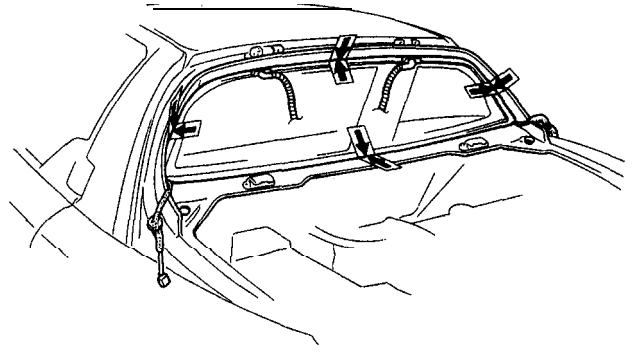
(cont'd)

Rear Window

- Installation (cont'd)

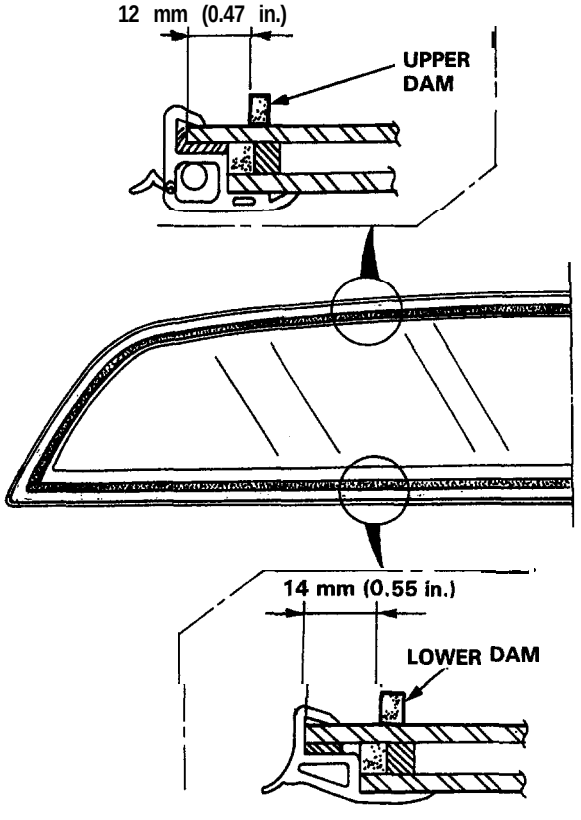
4. Set the glass upright on the body, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

ALIGNMENT MARKS



5. Glue the rubber dams to the inside face of the glass as shown to contain the adhesive during installation.

NOTE: Be careful not to touch the glass where adhesive will be applied.

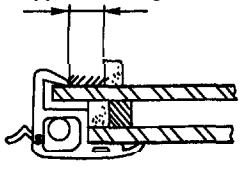


6. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

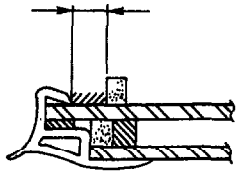
NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

: Apply glass primer here

Upper Molding Section



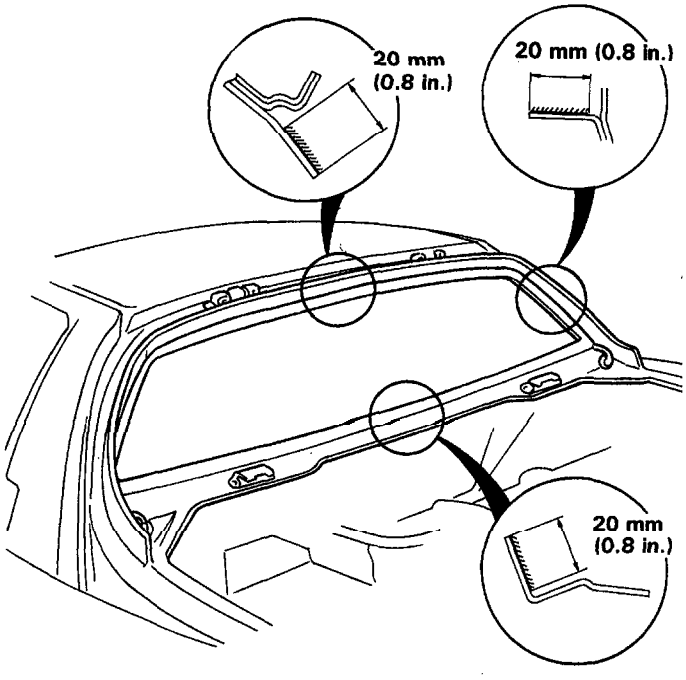
Lower Molding Section



7. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

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

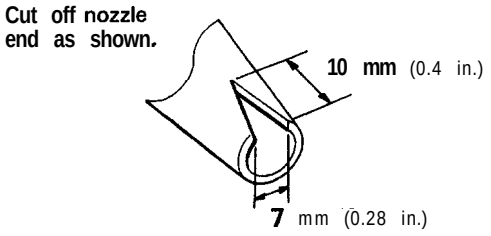


8. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE: Clean the plate with a sponge and alcohol before mixing.

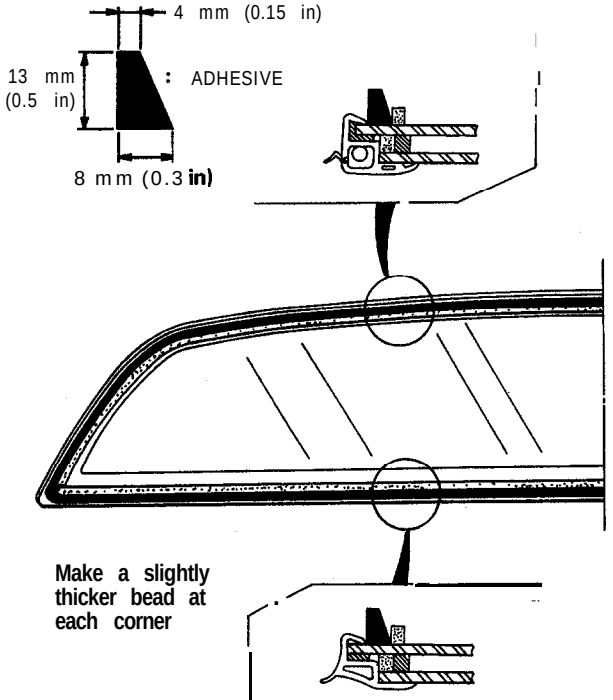
9. Follow the instructions that came with the adhesive.

10. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



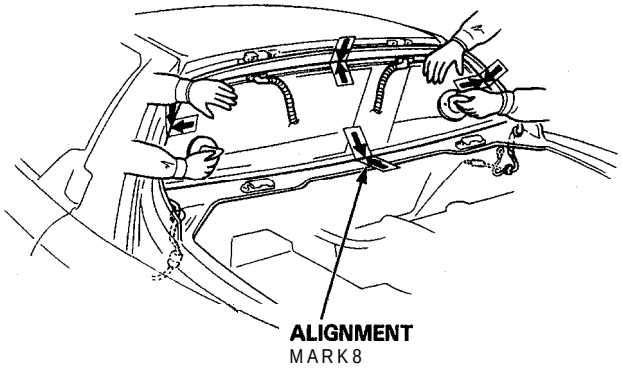
11. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



12. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not close or open the doors until the adhesive is dry.



13. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and, let the glass dry, then seal with sealant.

NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

14. Connect the rear defogger sub-harness and ground cable/antenna lead, then install the grommets.

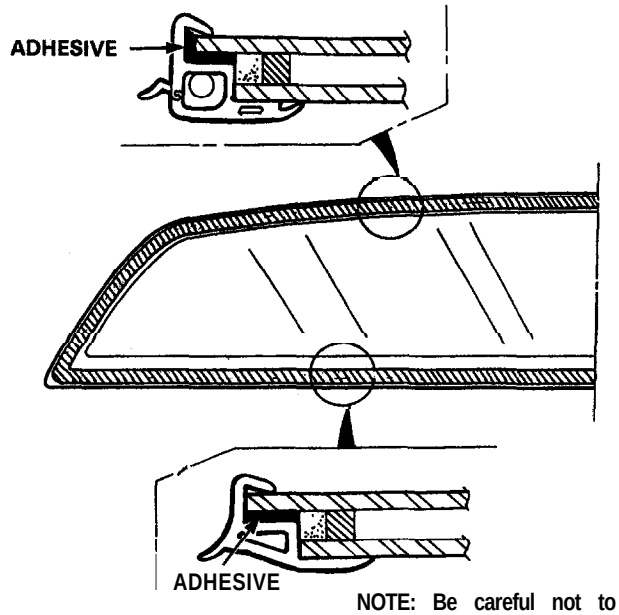
15. Reinstall all remaining removed parts.

Rear Window Molding

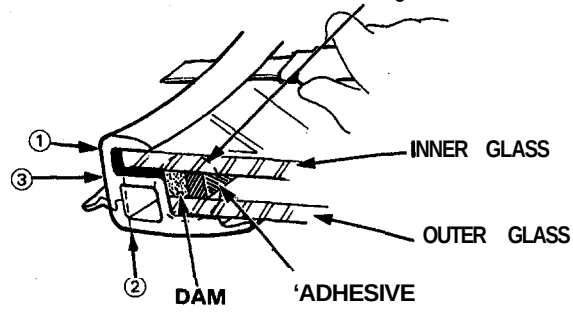
Replacement

1. Remove the rear window and wire harness. (page 20-26).
2. Place the glass on its surface as shown.

   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.
3. With a helper holding the glass, carefully cut off the upper and lower moldings.

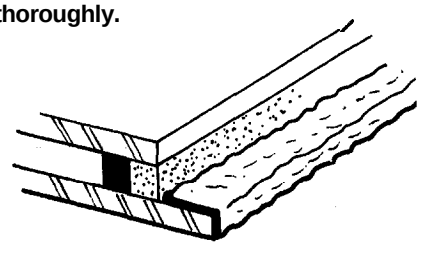


NOTE: Be careful not to cut the adhesive and dam between the inner and outer glass.



4. Scrape all traces of old adhesive from the chamfered edges of the glass.

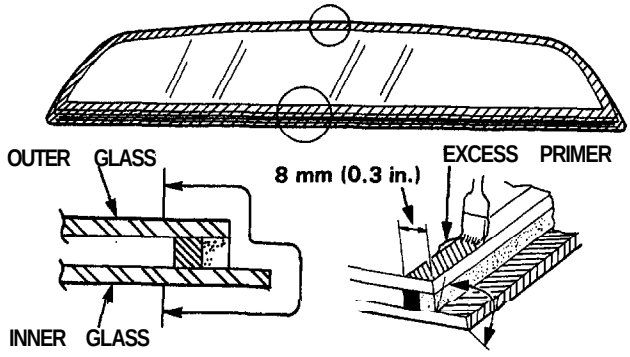
   NOTE: Be sure to scrape all traces of old adhesive thoroughly.



5. Clean the glass surface with alcohol where the new moldings are to be installed.

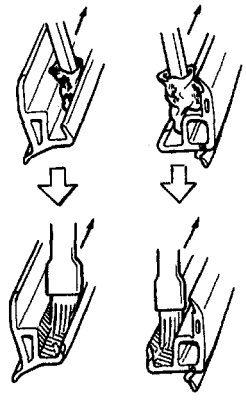
   NOTE: Make sure the surface is kept free of water, oil and grease.
6. With a brush, apply a light coat of glass primer around the edge of the glass.

   NOTE: Scrape off excess glass primer with a putty knife after installing the new moldings.

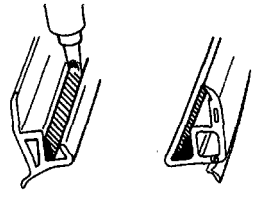


7. Degrease the inner surfaces of the new moldings thoroughly, then apply a light coat of glass primer to the surfaces.

   NOTE:
   - Apply glass primer around the entire groove of the new molding.
   - Do not apply glass primer to the outer surface.

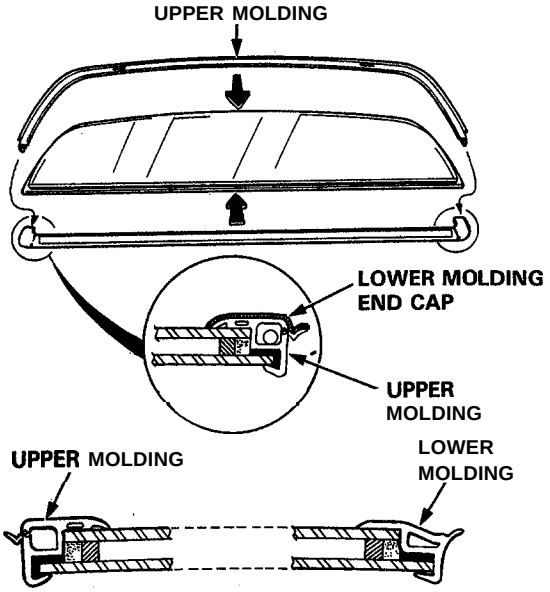


8. Run a bead of adhesive in the molding grooves.



9. Press the moldings into position around the entire edge of the glass.

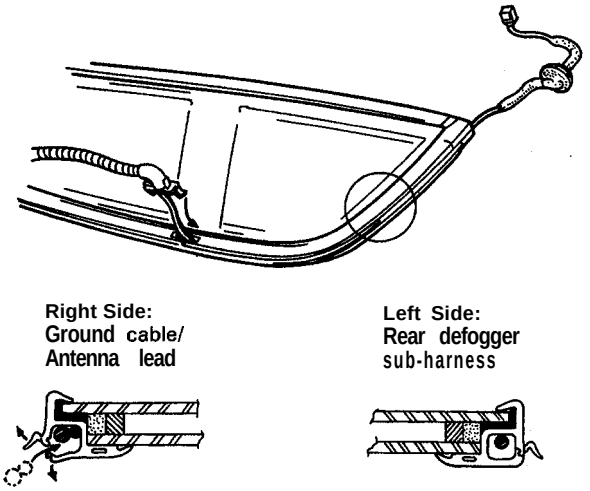
NOTE: Check that the moldings are not wrinkled or lifted away at the corners.



10. Scrape or wipe the excess adhesive off with a putty knife or gauge.

NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface, upper seal, lower fastener or glass.

11. After the adhesive is dry, install the rear defogger sub-harness and ground cable/antenna lead in the upper molding.



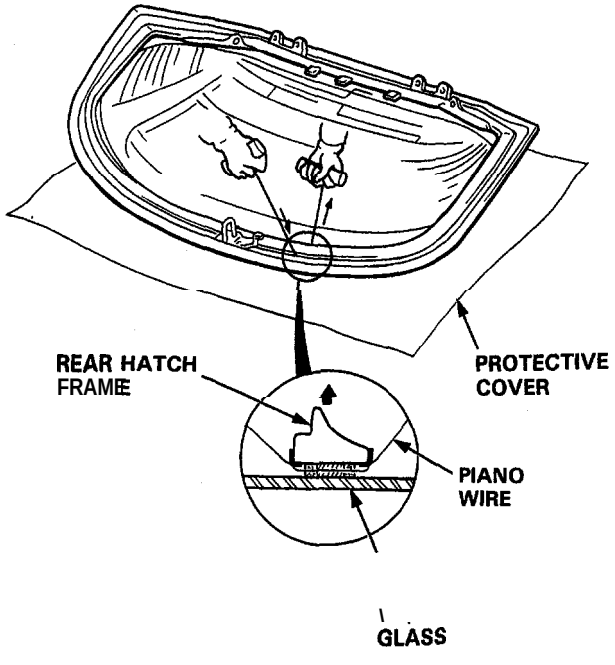
Rear Hatch Glass

Removal

CAUTION:
- Use covers to avoid damaging the body.
- Wear gloves to remove and install the glass.
- Do not damage the defroster grid lines.
- Take care not scratch or score the window molding.

1. Remove the rear hatch from the body (page 20-53).
2. Using an awl, make a hole through the glass adhesive from the inside, at the top of the glass. Push piano wire through the hole and wrap each end around a piece of wood.
3. Apply the protective tape along the edge of the rear hatch frame as shown.
4. With a helper holding the glass, pull the wire back and forth in a sawing motion and carefully cut through the adhesive along the top and the sides of the glass.

   CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the frame.



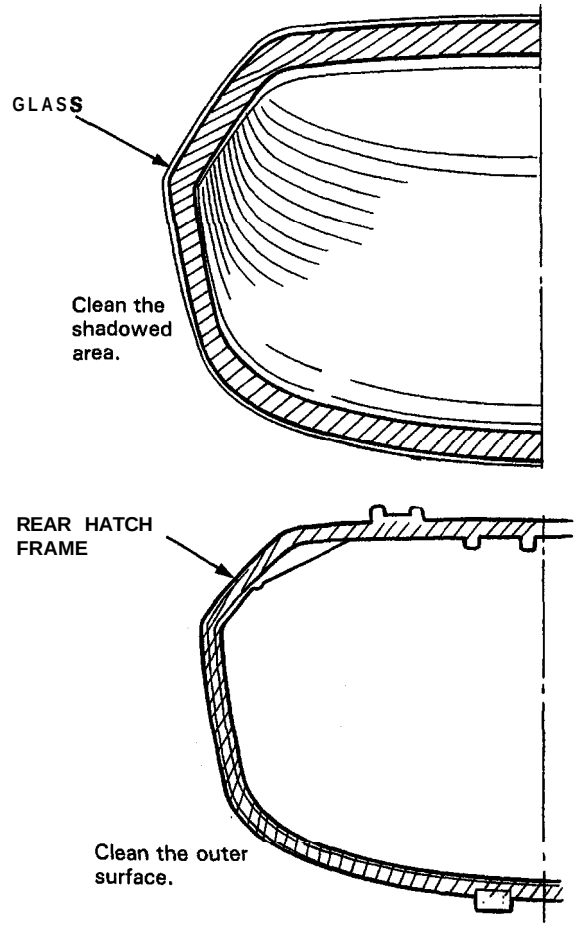
Installation

NOTE:
- Do not scrape down to the painted surface of the hatch frame; damaged paint will interfere with proper bonding.
- Mask off surrounding suufaces before painting.

1. Use a putty knife to scrape off all traces of old adhesive and dams, then clean the rear hatch frame and glass (new) surface with alcohol where new adhesive is to be applied.

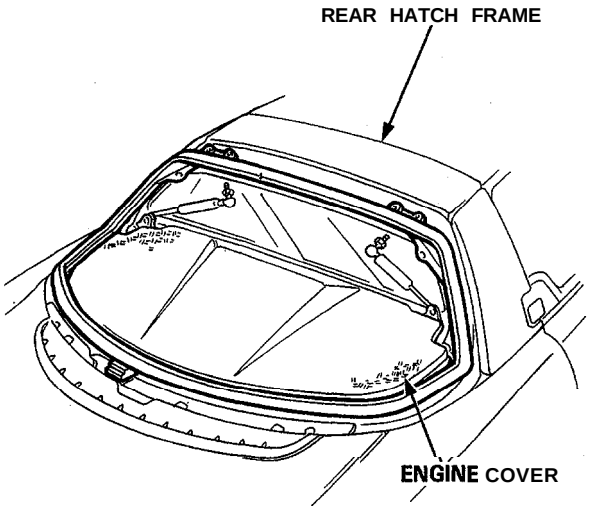
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



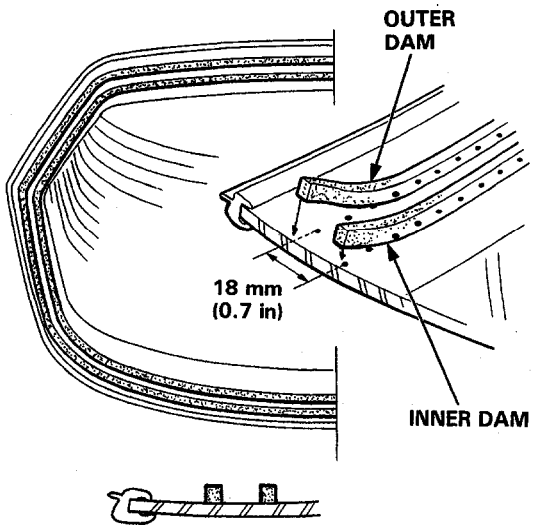
2. **Install the rear hatch frame and adjust it fit to the rear window weather strip and engine cover seal.**

NOTE: Do not install the support struts.



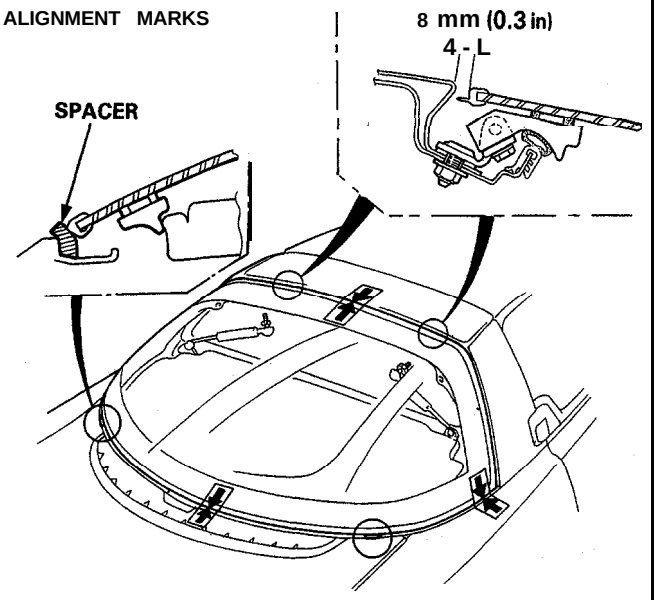
3. **Glue the outer and inner rubber dams to the inside** face of the glass as shown to contain the adhesive during installation.

NOTE:
- **Glue the rubber dams aligning the center of the glueing surface with the printed dots.**
- Be careful not to touch the glass where adhesive will be applied.
- **Mask off surrounding surfaces before applying** primer.



4. Place the glass gently on the rear hatch frame, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

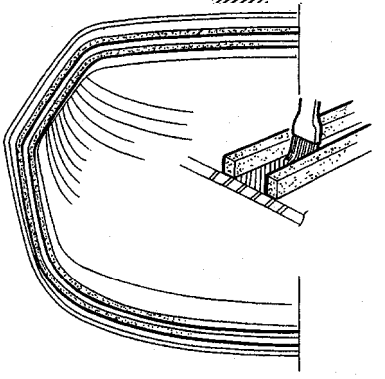
NOTE: Put several spacers between glass and rear hatch air scoop to prevent glass from sliding down.



5. **With a brush, apply a light coat of glass primer of the glass as shown, then lightly wipe it off with** gauze or cheesecloth.

NOTE:
- **Do not apply body primer to the glass, and do not get body and glass primer brush mixed up.**
- **Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to** the glass properly, causing a leak after the glass is installed.
- **Keep water, dust, and abrasive materials away** from the primed surface.

: **Apply** glass primer here.



(cont'd)

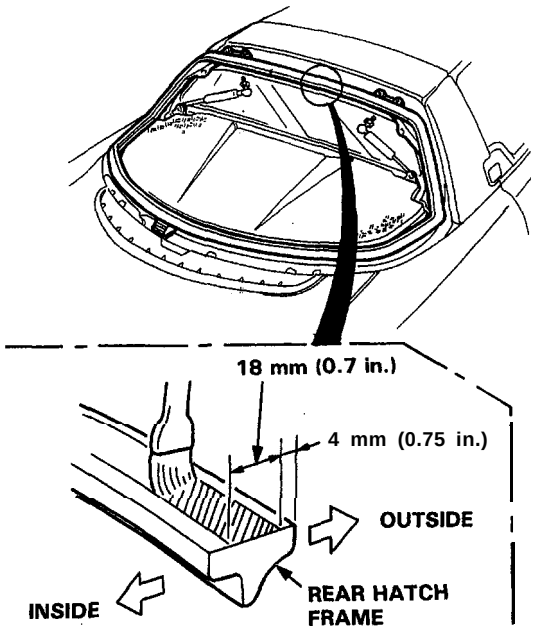
Rear Hatch Glass

Installation (cont'd)

6. With a brush, apply a light coat of body primer to the original adhesive remaining around the rear hatch frame.

NOTE:
- Make sure the surface is kept free of water, oil and grease.
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer brush.
- Never touch the primed surfaces with your hands.

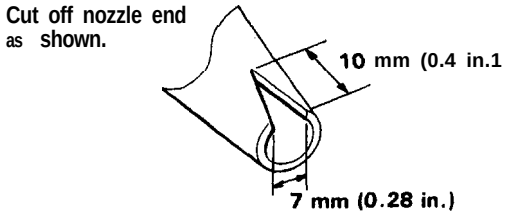
: Apply body primer here.



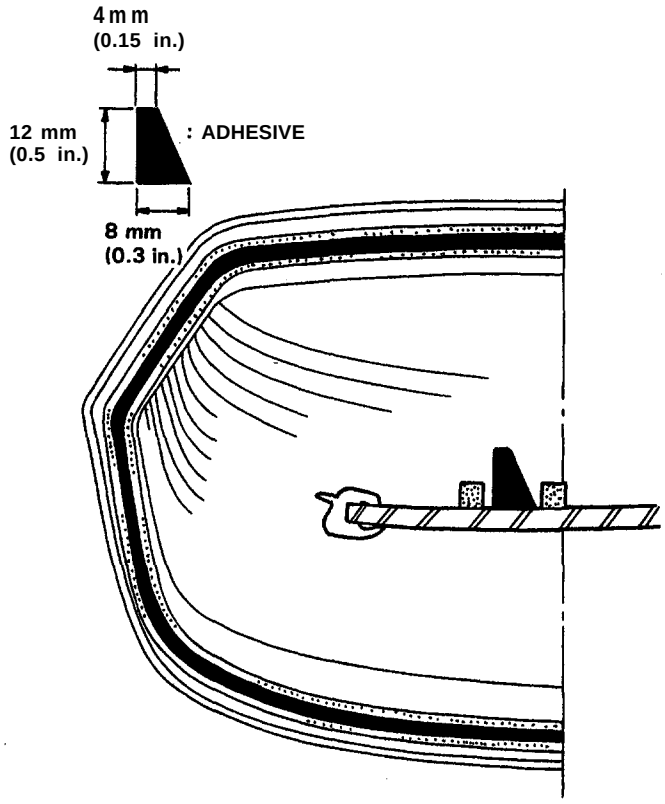
7. Thoroughly mix the adhesive and hardener together on a glass or metal plate.

NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

8. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

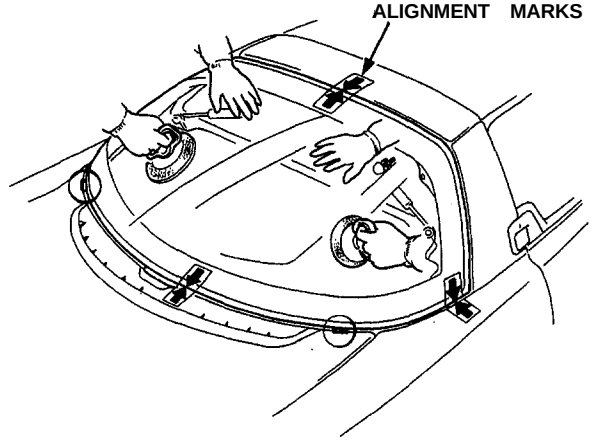


9. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.



10. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass 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.



11. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface or glass.

12. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

13. Remove the spacers.

14. Install the support struts.

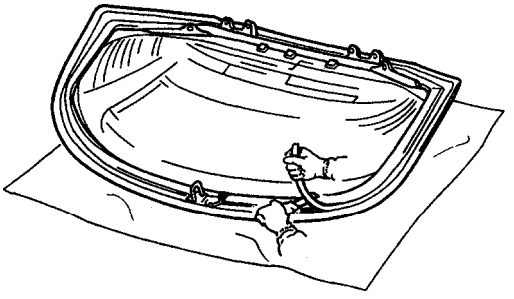
Replacement

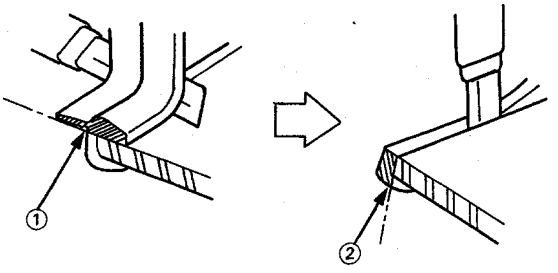
1. Remove the rear hatch (page 20-53).

2. Place the glass on its surface as shown.

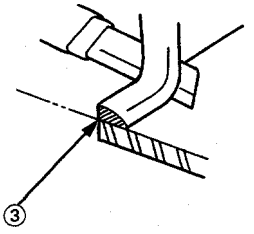
   CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.

3. With a helper holding the glass, carefully cut off the molding.





4. Turn the glass over, then cut the outer side rubber portion ③ of the molding.



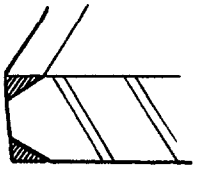
(cont'd)

Rear Hatch Glass Molding

Replacement (cont'd)

5. Scrape all traces of old molding from the chamfered edges of the glass.

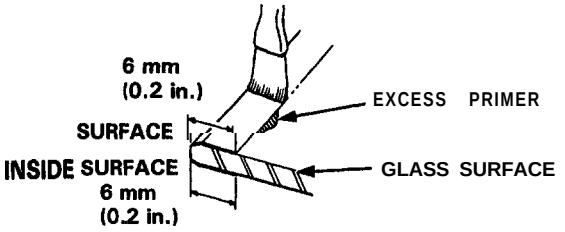
   NOTE: Be sure to scrape all traces of old molding thoroughly.



6. Clean the glass surface with alcohol where new molding is to be installed.

   NOTE: Make sure the surface is kept free of water, oil and grease.

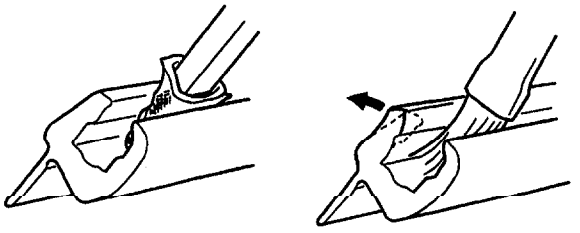
7. With a brush, apply a light coat of glass primer around the edge of the glass.



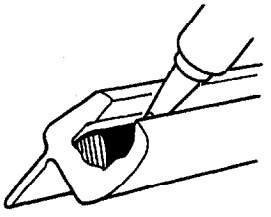
   NOTE: Scrape off excess glass primer with a putty knife after installing the new molding.

8. Degrease the inner surfaces of the new molding thoroughly, then apply a light coat of glass primer to the surfaces.

   NOTE:
   - Apply glass primer around the entire groove of the new molding.
   - Do not apply glass primer to the outer surface.

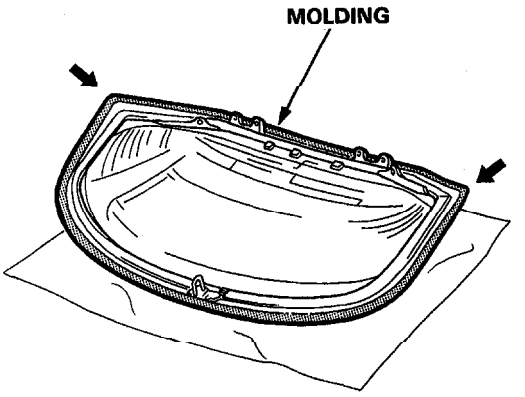


9. Run a bead of adhesive in the groove of the molding.



10. Press the molding into position around the entire edge of the glass.

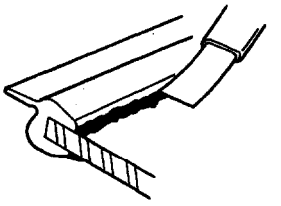
    NOTE: Check that the molding is not wrinkled or lifted away at the corners.



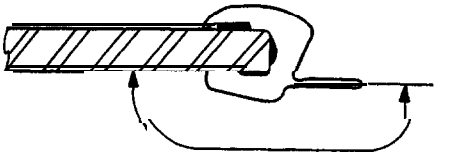
11. Scrape or wipe the excess adhesive off with a putty knife or gauge.

    NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface, upper seal, lower fastener or glass.

(Glass Surface)

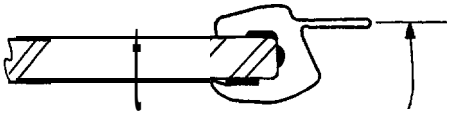


Inside:



Surface to be wiped clean.

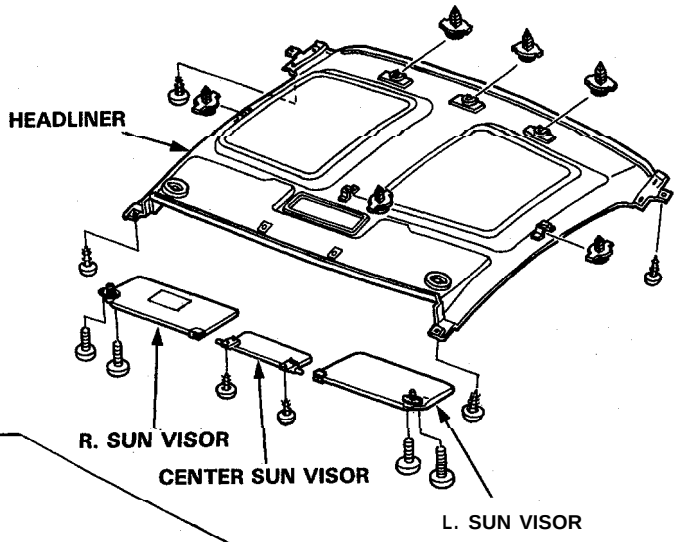
Outside:



Replacement

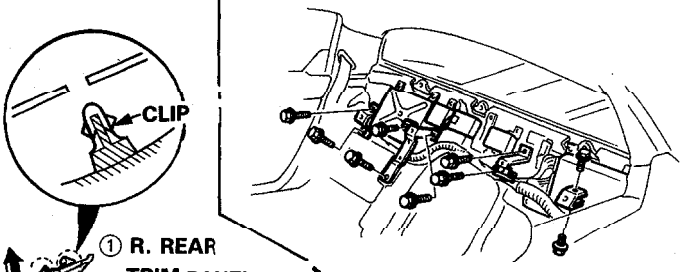
To remove the headliner, first remove:
- Sun visors.
- Rear pillar trim panels.
- Front pillar trim panels.
- Seats (page 20-38).
- Dome light (See Section 23).

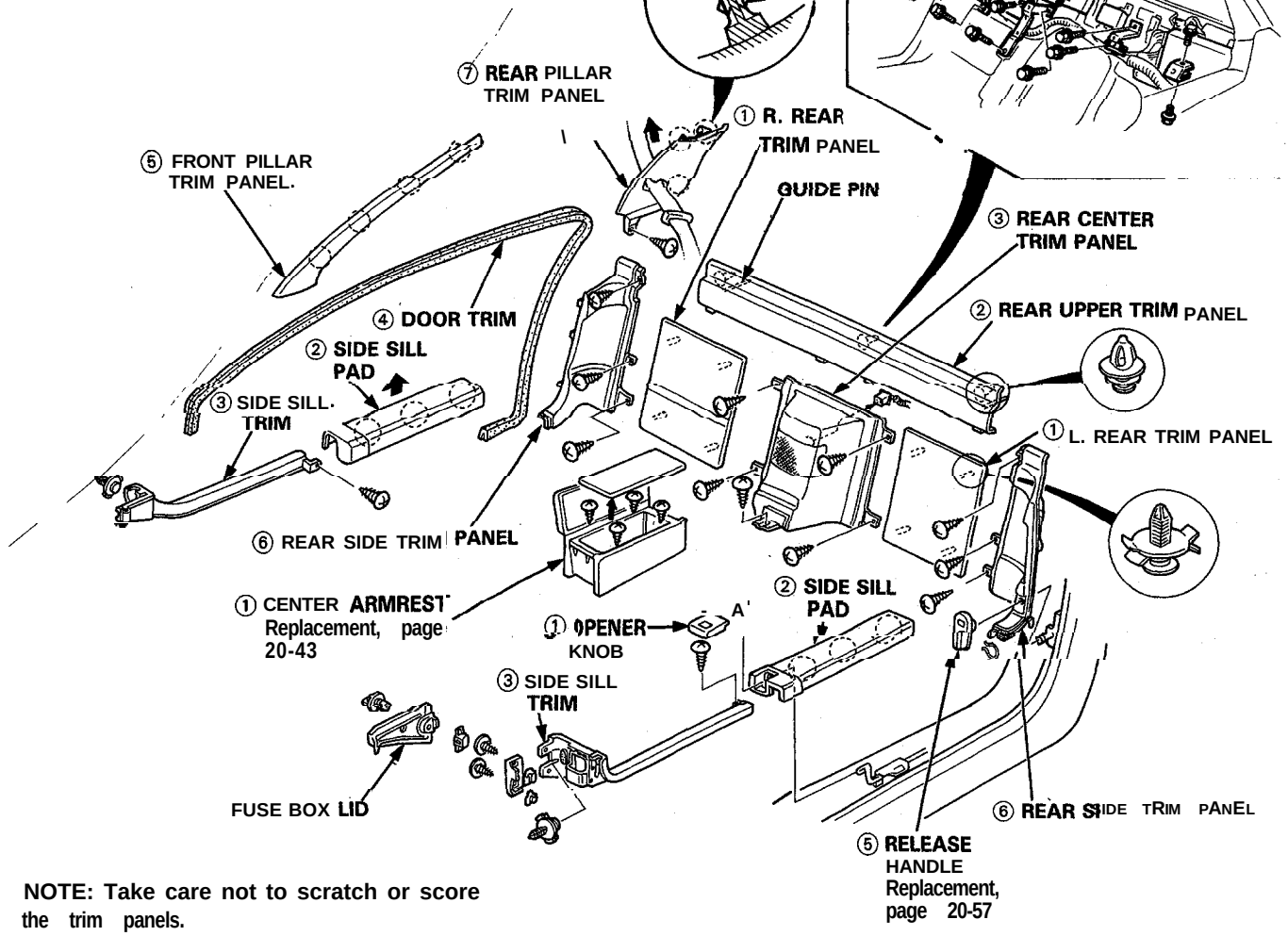
NOTE:
- When installing the headliner, be careful not to fold or bend it. Also, be careful not to scratch the body.
- Check that both sides of the headliner are securely attached to the trim.



Disassemble in numbered sequence.
◌: Clip Locations

NOTE:
- When removing the rear trim panels, take care not to damage the control units and relays.
- Take care not to scratch or score the trim panels.
- If necessary, replace any damaged clips.



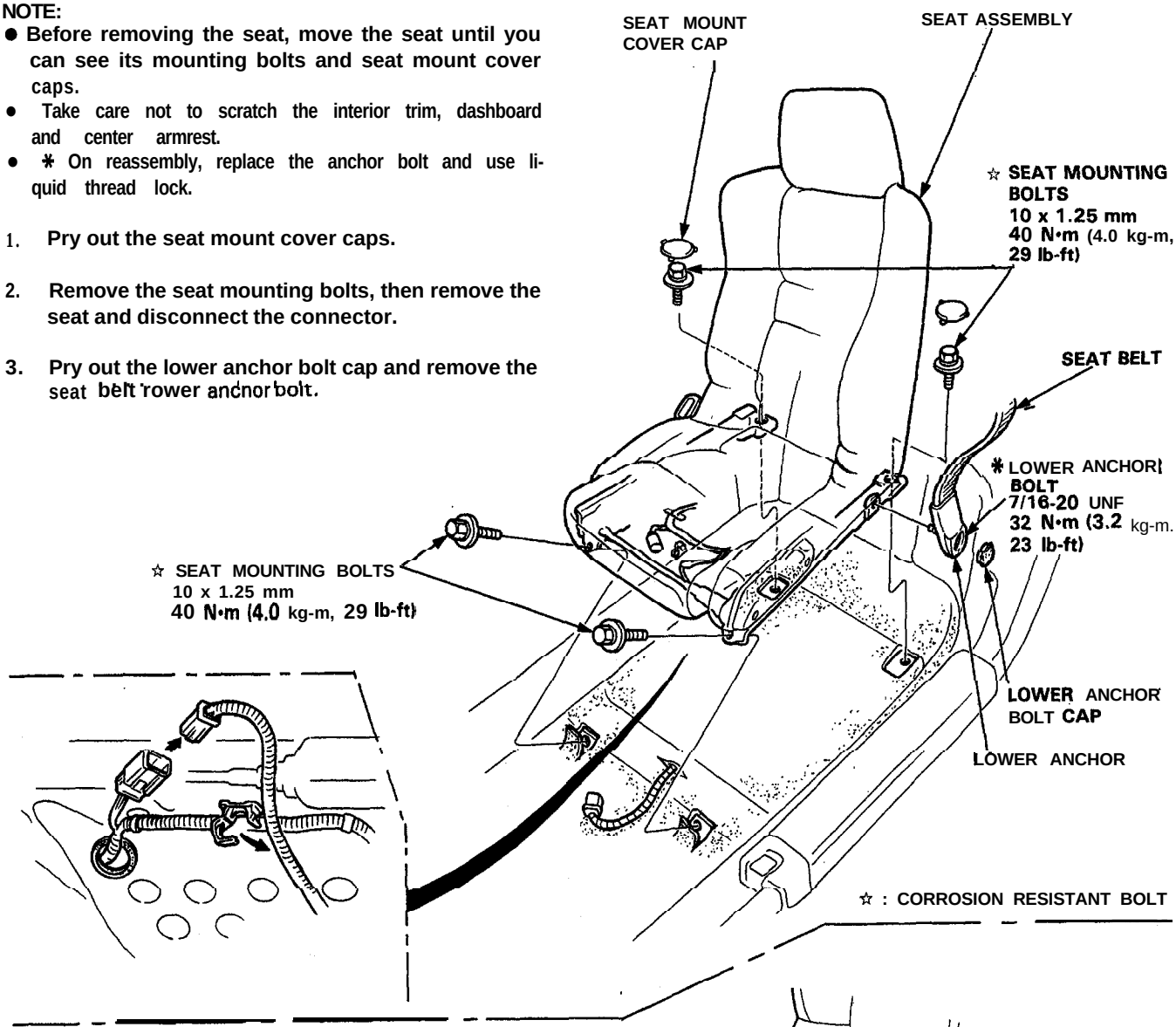


NOTE: Take care not to scratch or score the trim panels.

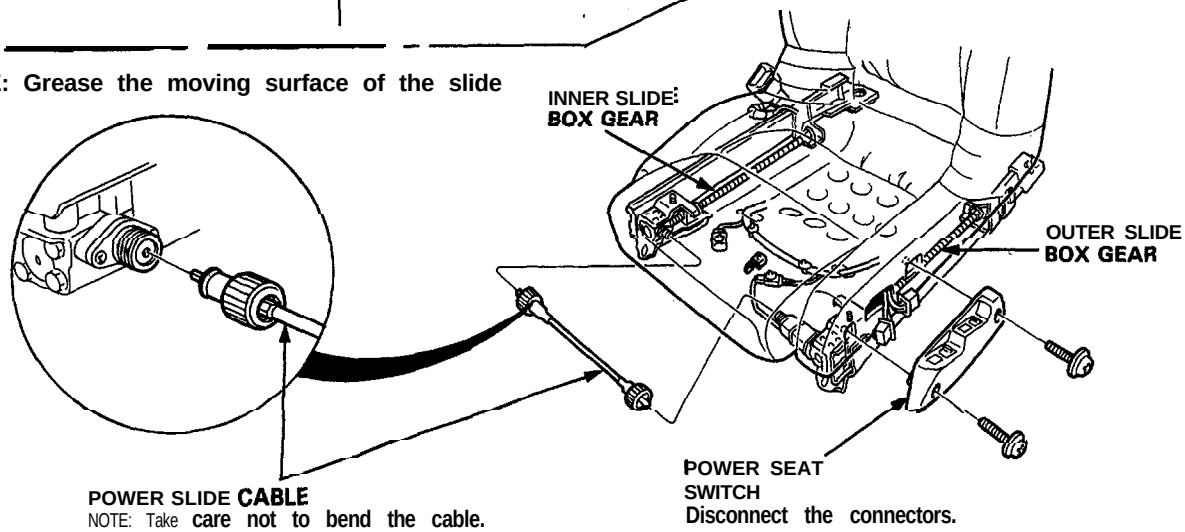
Replacement

NOTE:
- Before removing the seat, move the seat until you can see its mounting bolts and seat mount cover caps.
- Take care not to scratch the interior trim, dashboard and center armrest.
- * On reassembly, replace the anchor bolt and use liquid thread lock.

1. Pry out the seat mount cover caps.
2. Remove the seat mounting bolts, then remove the seat and disconnect the connector.
3. Pry out the lower anchor bolt cap and remove the seat belt lower anchor bolt.



NOTE: Grease the moving surface of the slide gears.

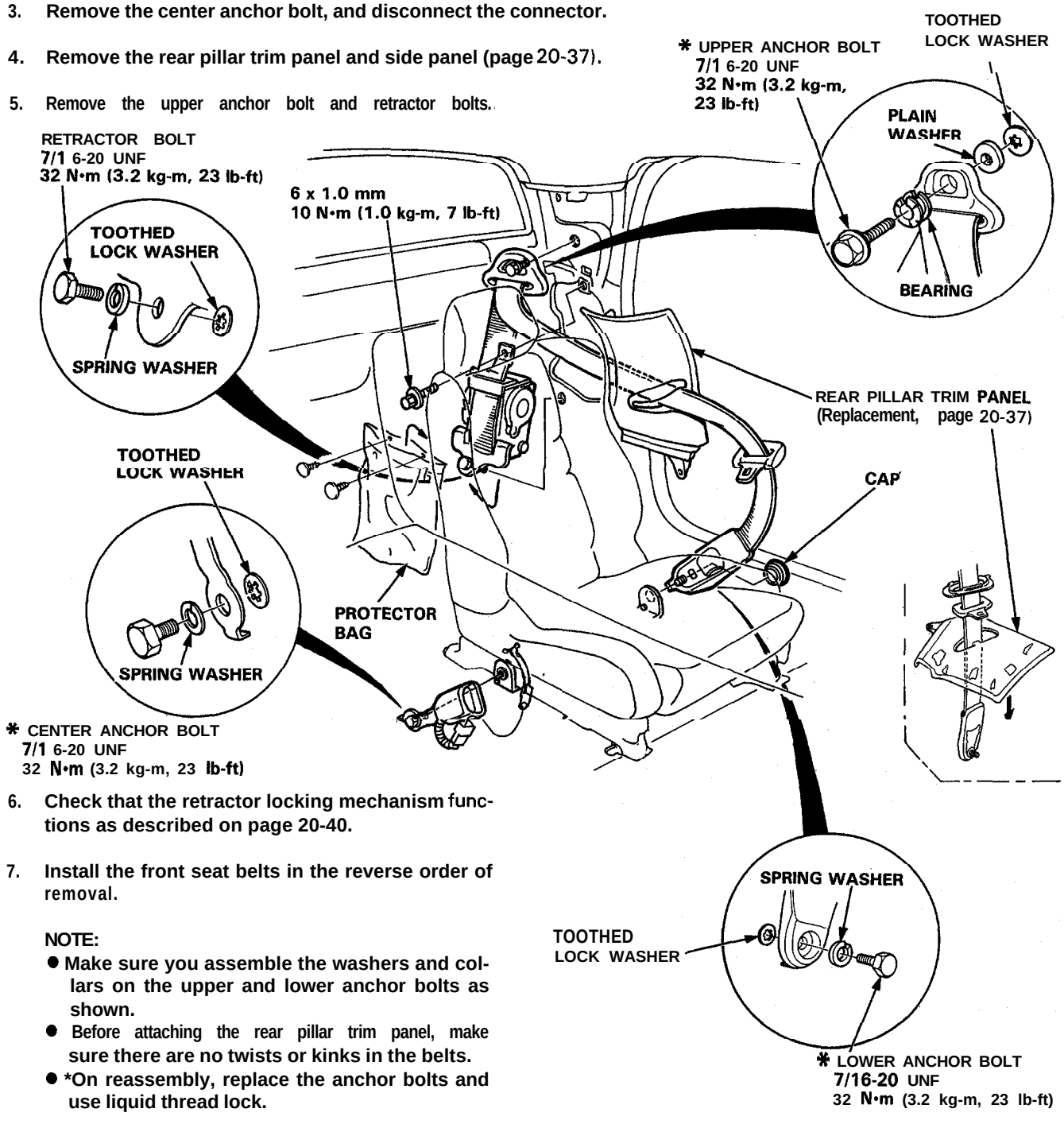


Replacement

CAUTION: Check the seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

NOTE: Remove the anchor bolts with a 17 mm socket or box-end wrench.

1. **To remove the seat belts, first remove the seats (page 20-38).**
   NOTE: Take care not to scratch the interior trim, dashboard and center armrest.
2. **Remove the cap and remove the lower anchor bolt.**
3. **Remove the center anchor bolt, and disconnect the connector.**
4. **Remove the rear pillar trim panel and side panel (page 20-37).**
5. **Remove the upper anchor bolt and retractor bolts.**



6. **Check that the retractor locking mechanism functions as described on page 20-40.**
7. **Install the front seat belts in the reverse order of removal.**

NOTE:

- **Make sure you assemble the washers and collars on the upper and lower anchor bolts as shown.**
- **Before attaching the rear pillar trim panel, make sure there are no twists or kinks in the belts.**
- ***On reassembly, replace the anchor bolts and use liquid thread lock.**

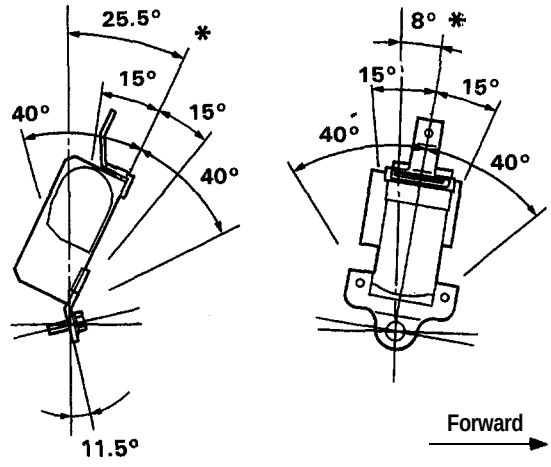
Seat Belts

Inspection

Retractor Inspection

1. With the retractor installed, check that the belt can be pulled out freely.
2. Make sure that the belt does not lock when the retractor is tilted over slowly to 15° from the mounted position. The belt should lock when the retractor is tilted over 40°.

   CAUTION: Do not attempt to disassemble the retractor.



3. Replace the belt with a new one if there is any abnormality.

On the Car Belt Inspection

1. Check that the belt is not twisted or caught on anything.
2. After installing an anchor, check for free movement on its retaining bolt. If necessary, remove the bolt and check that the washers and other parts are not damaged or installed improperly.
3. Check the belts for fouling, damage or discoloration. Clean with a shop towel if fouled.

   CAUTION: Use only soap and water to clean.

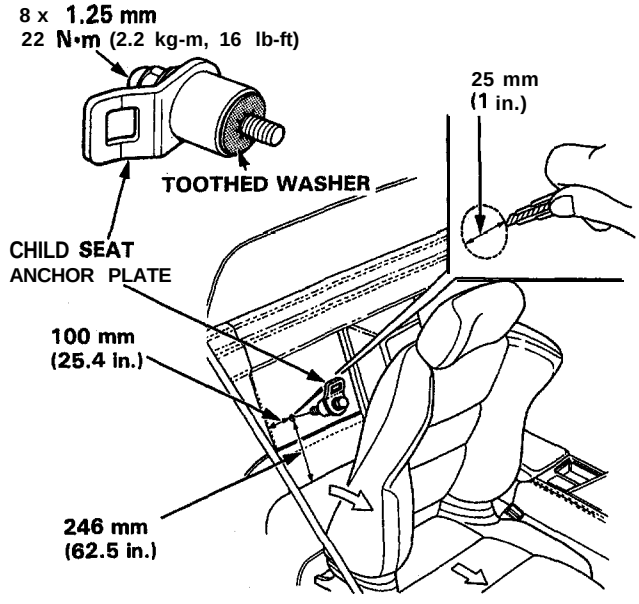
4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
5. Make sure that the belt will retract automatically when released.
6. Replace the belt with a new one if there is any abnormality.

Child Seat Anchor Plate

Attachment point for a child restraint system which uses a top tether. The tether bracket and bolt are available at your Acura dealer. The tether attachment point is located on the panel behind the passenger's seat-back.

1. Adjust the passenger seat fully forward to make room behind the seat-back.
2. Using the dimensions shown, measure and mark the location of the attachment point on the interior panel.
3. Use a razor blade or sharp knife to carefully cut a 1 inch diameter circle at the point you marked. Cut through one layer at a time. You will need to remove two layers to reach the tether attachment.
4. Install the tether bracket and bolt and tighten to: 16 lb-ft (22 N·m)

Make sure to route the tether through the space between the headrest and seat.



NOTE:

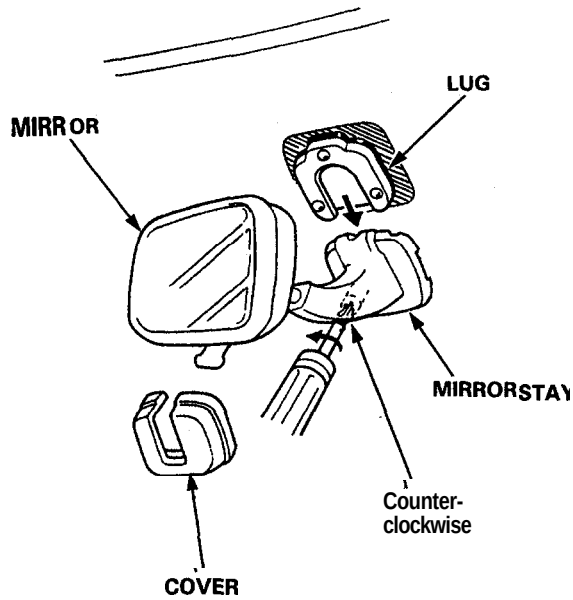
- Do not remove the toothed washer from the child seat anchor plate. Use the child seat anchor plate with the toothed washer attached to it.
- When installing a child seat, follow the instructions of the manufacturer of the child seat.
- Additional anchor plates are available.

⚠ WARNING Do not use the anchor plate for any other purpose, because it is designed exclusively for installation of a child seat.

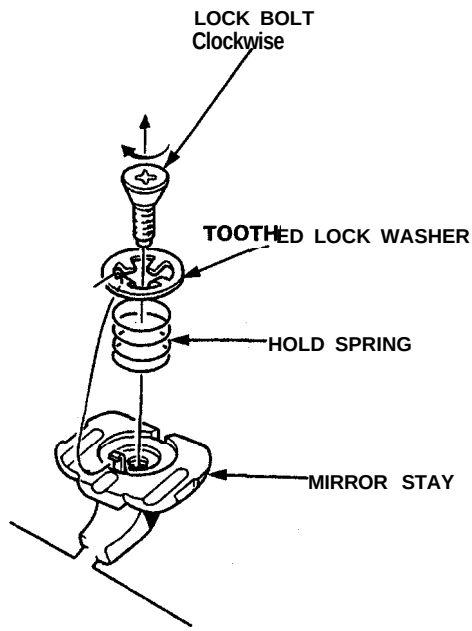
Rearview Mirror

▪ Replacement

1. Carefully remove the cover with a flat ti screwdriver.
2. Loosen the lock bolt, then slide the mirror stay fron the lug.



3. Remove the lock bolt, then remove the toothed lock washer and hold spring from the mirror stay.



.. Installation is the reverse order of removal.

Carpet

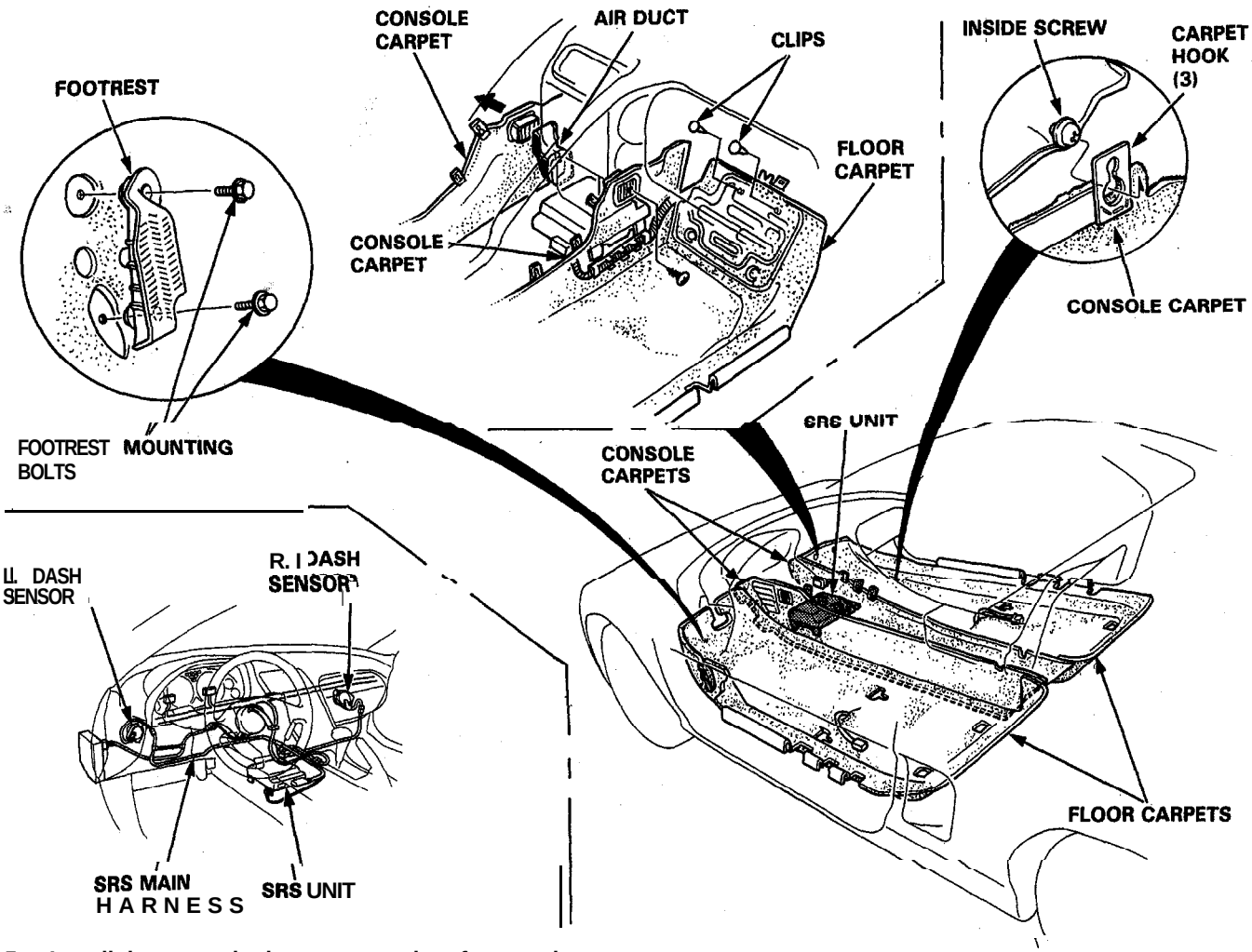
Replacement

SRS wire harness is routed near the carpet.

⚠ WARNING **All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits.**

CAUTION: Be careful not to damage SRS wire harnesses when replacing the carpet.

1. **To remove the carpet, first remove the:**
   - Seats (page 20-38)
   - Footrest
   - Fuse box lid (page 20-37)
   - Side sill trim (page 20-37)
   - Side sill pad (page 20-37)
   - Rear side panel (page 20-37)
   - Center armrest (page 20-37)
   - Center console panel (page 20-43)
2. **Pull up the retainers and carpet clips at the front edge (passenger's side), then remove the floor carpet.**
3. Remove the console carpet attaching screw from the heater unit (passenger's side).
4. Remove the carpet hooks from the dashboard inside screws, then remove the console carpet.



5. **Install the carpet in the reverse order of removal.**

NOTE:
- **Take care not to damage, wrinkle or twist the carpet.**
- **Make sure the console carpet air vent are inserted into the heater unit and air duct.**

Dashboard/Center Armrest

- Component Removal/Installation

SRS wire harnesses are routed near the dashboard.

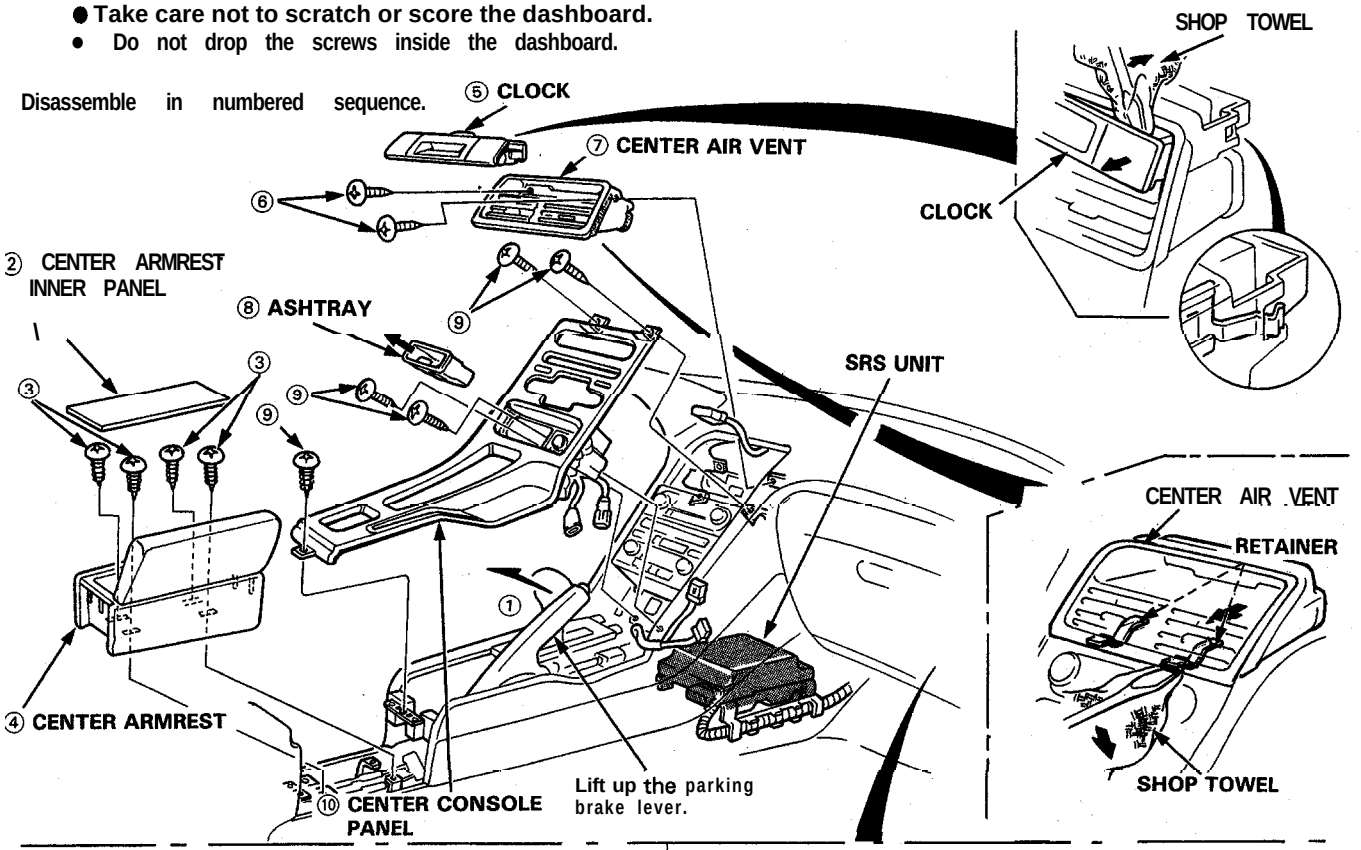
⚠ WARNING **All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits.**

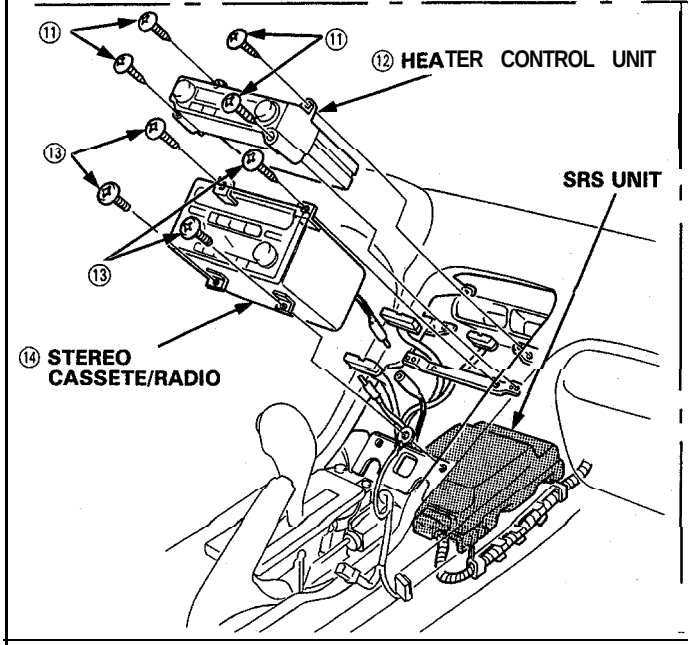
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the dashboard.

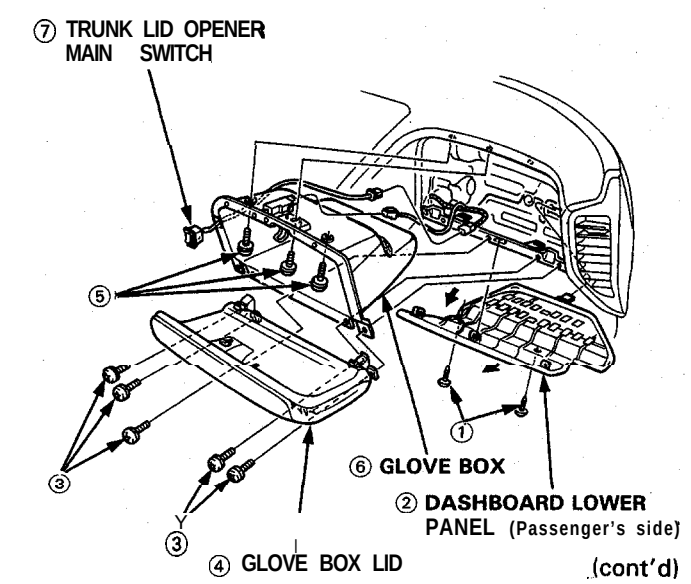
NOTE:

- **Take care not to scratch or score the dashboard.**
- **Do not drop the screws inside the dashboard.**

Disassemble in numbered sequence.







(cont'd)

Dashboard

- Component Removal/Installation (cont'd)

SRS wire harnesses are routed near the steering column.

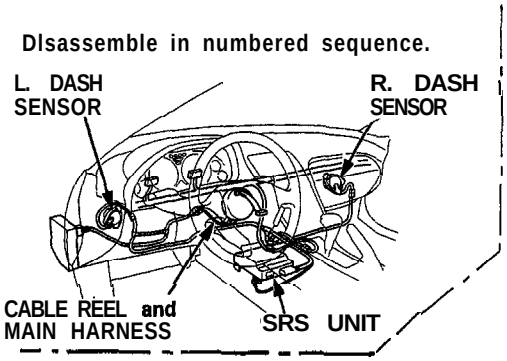
⚠ WARNING **All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits.**

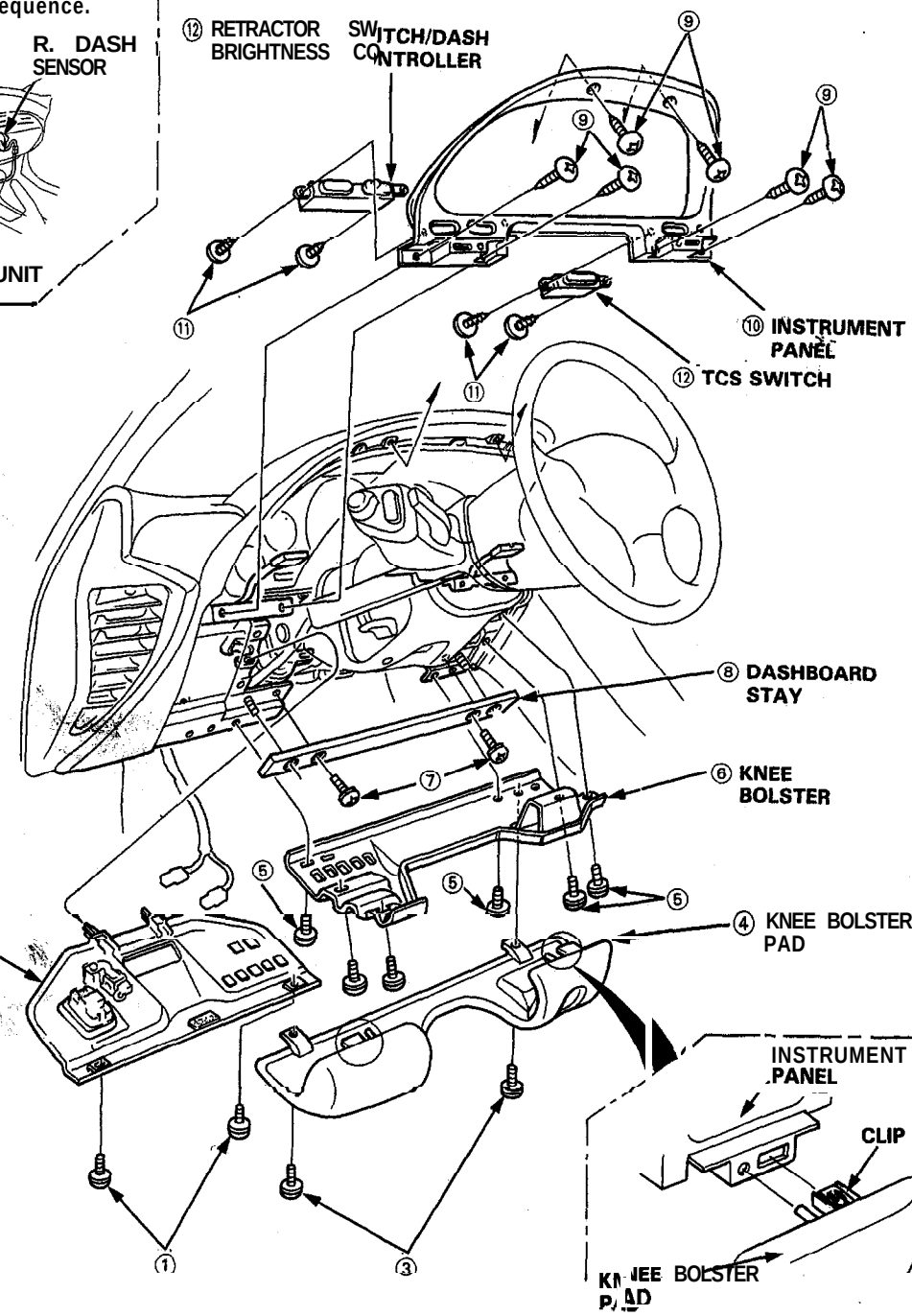
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the steering column.

Driver's Side:

NOTE: Take care not to scratch or score the dashboard and steering column.

Disassemble in numbered sequence.

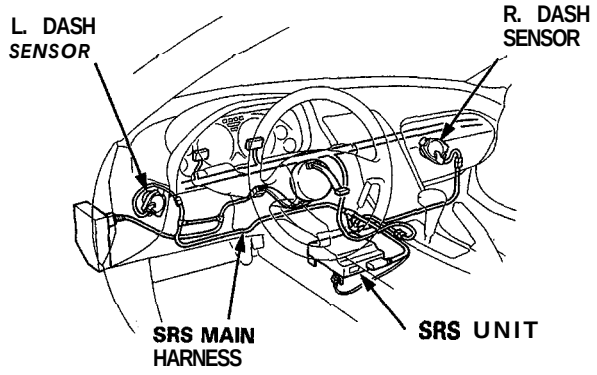




SRS wire harnesses are routed near the dashboard and steering column.

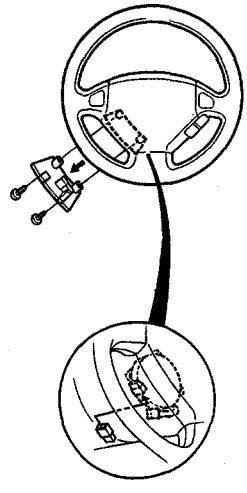
⚠ WARNING **All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits.**

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the dashboard and steering column.



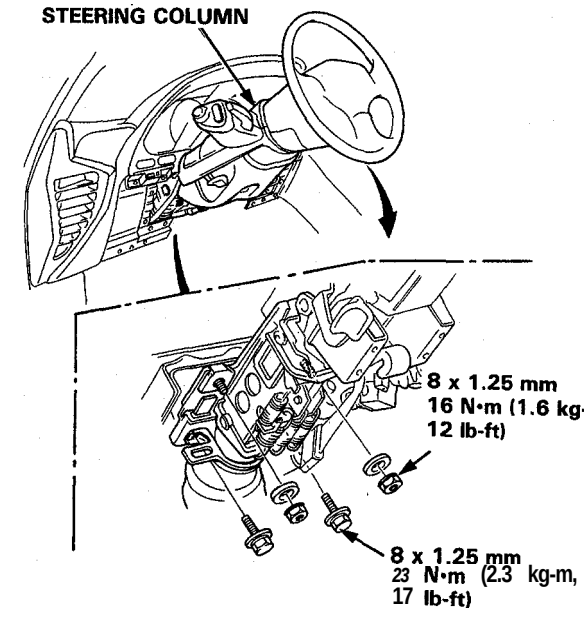
1. **To remove the dashboard, first remove the:**
   - **Seats (page 20-38).**
   - **Dashboard lower. panel (driver's side)**
   - **Knee bolster and pad (page 20-44).**
   - **Dashboard stay (page 20-44).**
   - **Center armrest (page 20-43).**
   - **Clock, center air vent and console panel (page 20-43).**
   - **Heater control unit and stereo cassette/radio (page 20-43).**
   - **Dashboard lower panel (passenger's side).**
   - **Glove box lid and glove box (page 20-43).**

⚠ WARNING **To avoid accidental deployment and possible injury always install the protective short connector on the inflator connector when the harness is disconnected.**



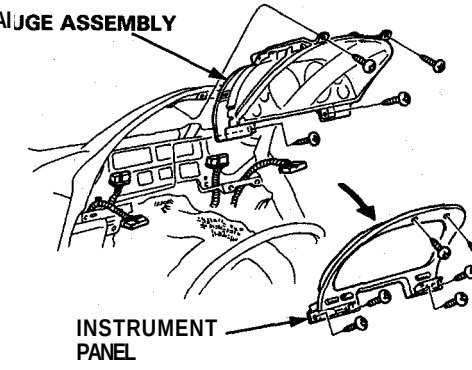
2. **Lower the steering column (See Section 17).**

   NOTE: To prevent damage to the steering column, wrap with a shop towel.

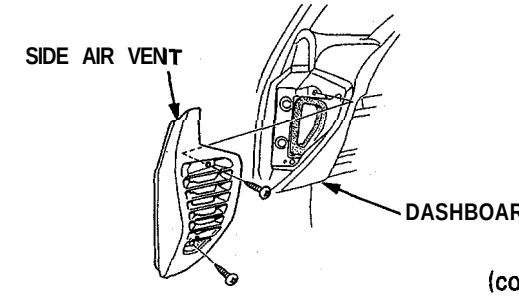


3. **Remove the instrument panel.**

4. **Remove the gauge assembly.**



5. **Remove the attaching screws, then remove the side air vents from each side of the dashboard.**



(cont'd)

Dashboard

Replacement (cont'd)

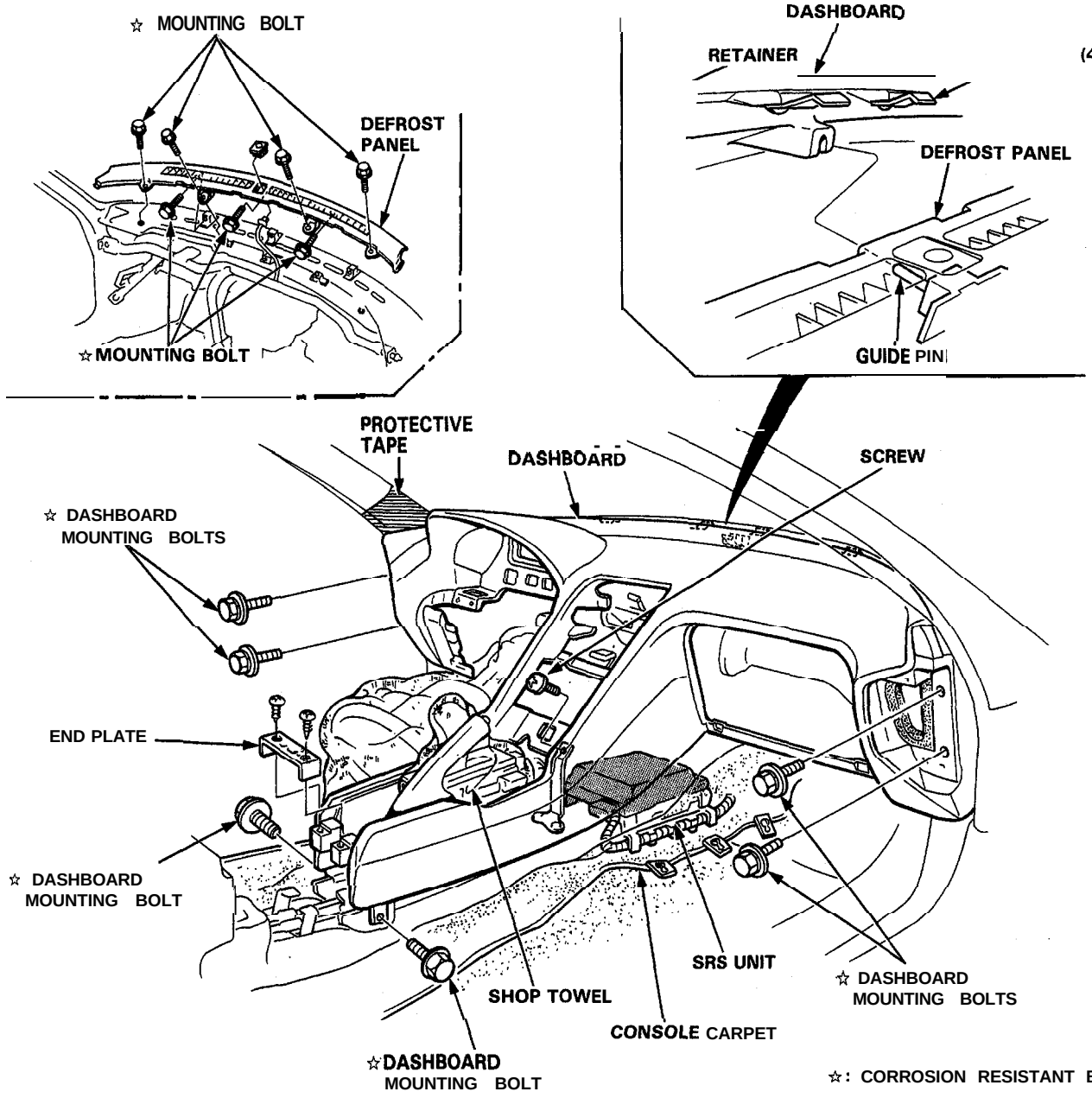
6. **Remove the dashboard end plate and fold the console carpet down (page 20-42).**

7. **Remove the 6 mounting bolts and center screw, then lift and remove the dashboard.**

NOTE:
- **Use protective tape on the bottom of the front pillar trim.**
- **To prevent damage to the change lever (M/T) or selecter lever and indicator panel (A/T), wrap with a shop towel.**

Reassembly NOTE:
- **Make sure the dashboard fits onto the guide pin and defrost panel correctly.**
- **Before tightening the dashboard bolts, make sure the dashboard wires are not pinched.**

If necessary, remove the defrost panel.



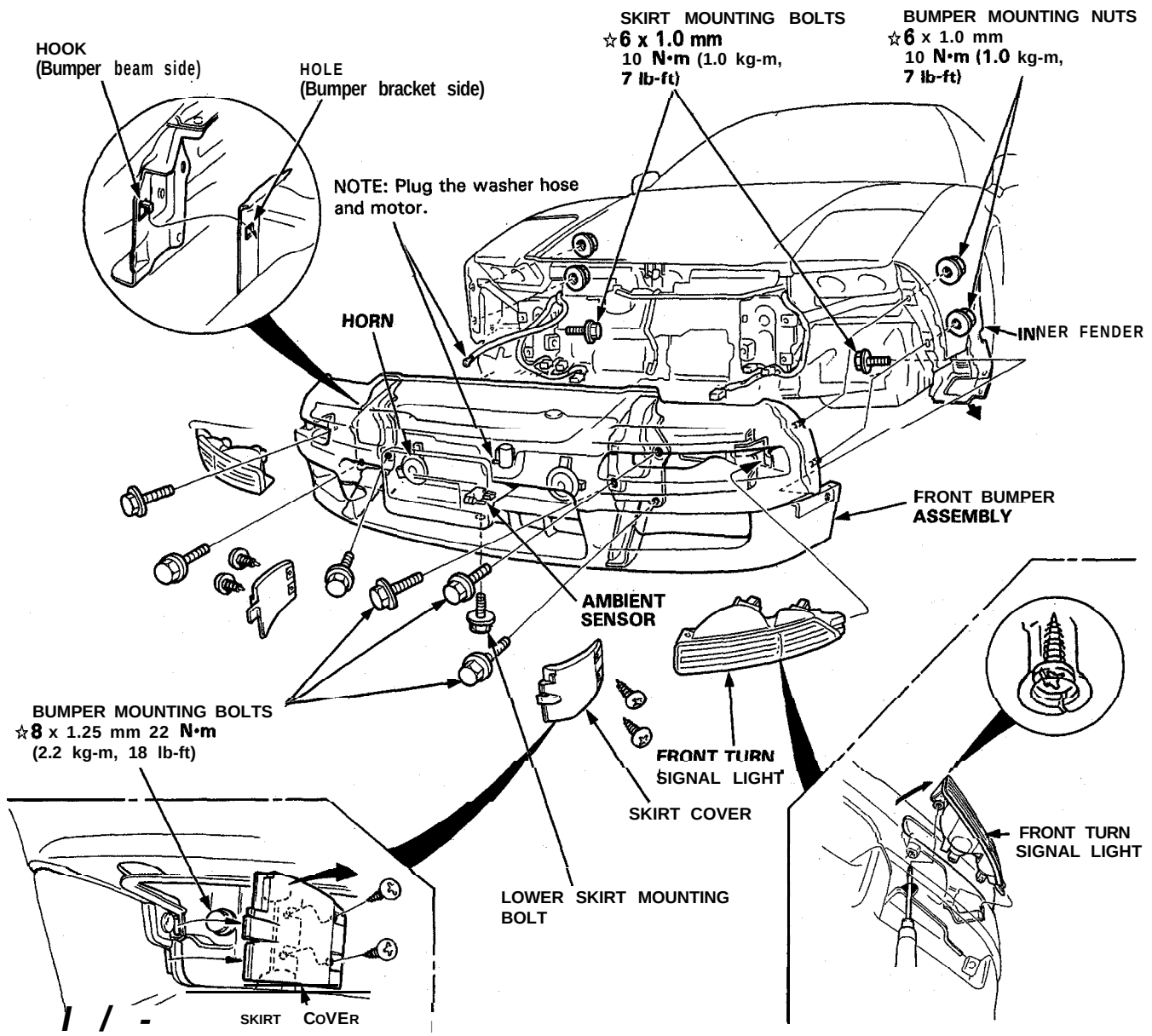
☆: CORROSION RESISTANT BOLT

Front Bumper

Replacement

1. **Loosen the mounting screw, then pull the right and left front turn signal lights out and disconnect the connectors.**
2. **Remove the skirt covers, then remove the 3 bumper mounting bolts on each side, and lower skirt mounting bolt.**
3. Lower the inner fender, then remove the 2 bumper mounting nuts and the skirt mounting bolts from inside the front fender on each side.
4. **Lift and remove the bumper assembly.**

NOTE:
- **Disconnect the washer hose, horn connecters, and ambient sensor connector.**
- **An assistant is helpful when removing the front bumper.**
- **Take care not to scratch the bumper.**

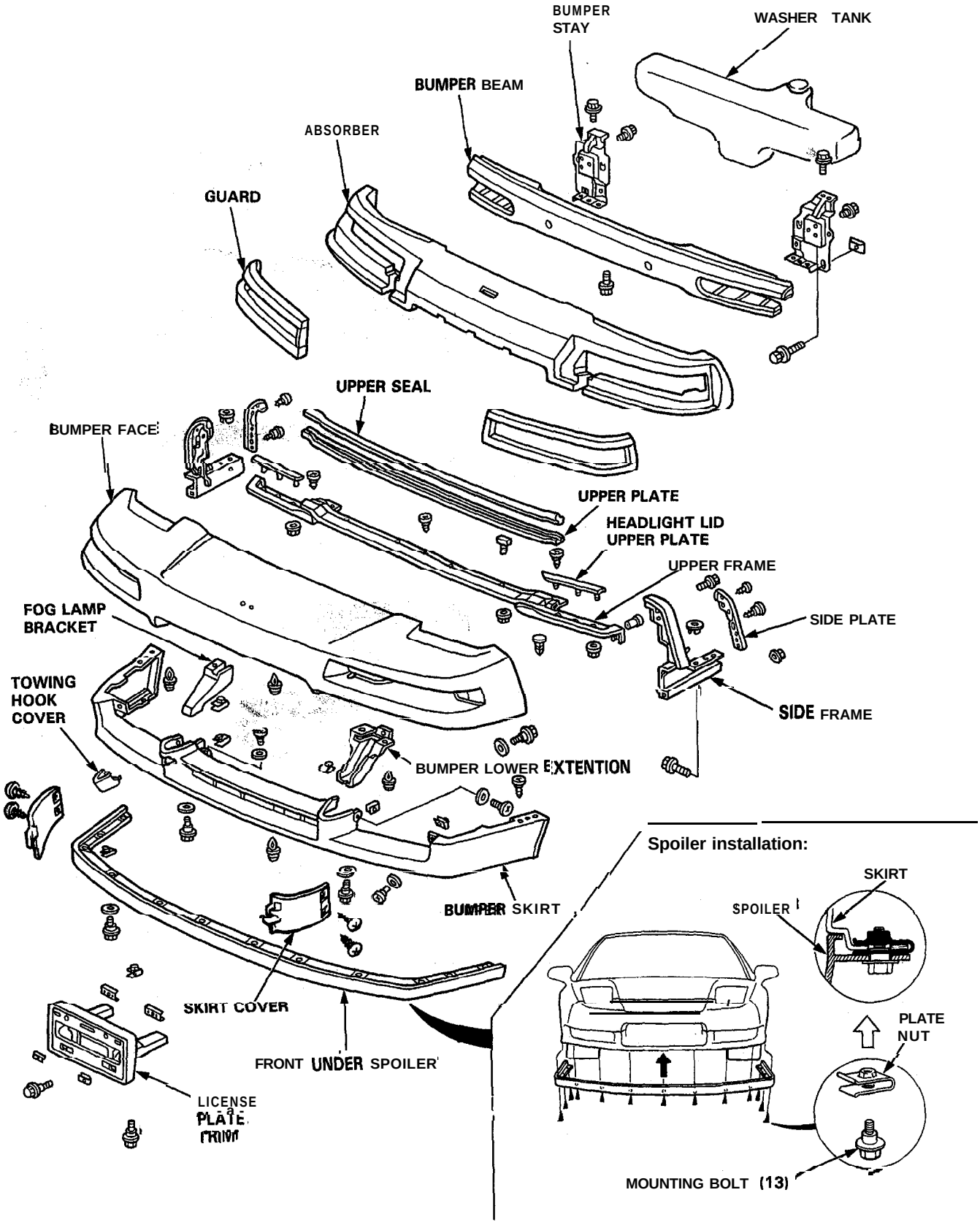


5. To install, insert the bumper beam hooks into the bumper bracket holes, and install parts in the reverse order of removal.

☆: CORROSION RESISTANT BOLT/NUT

Front Bumper

• Disassembly

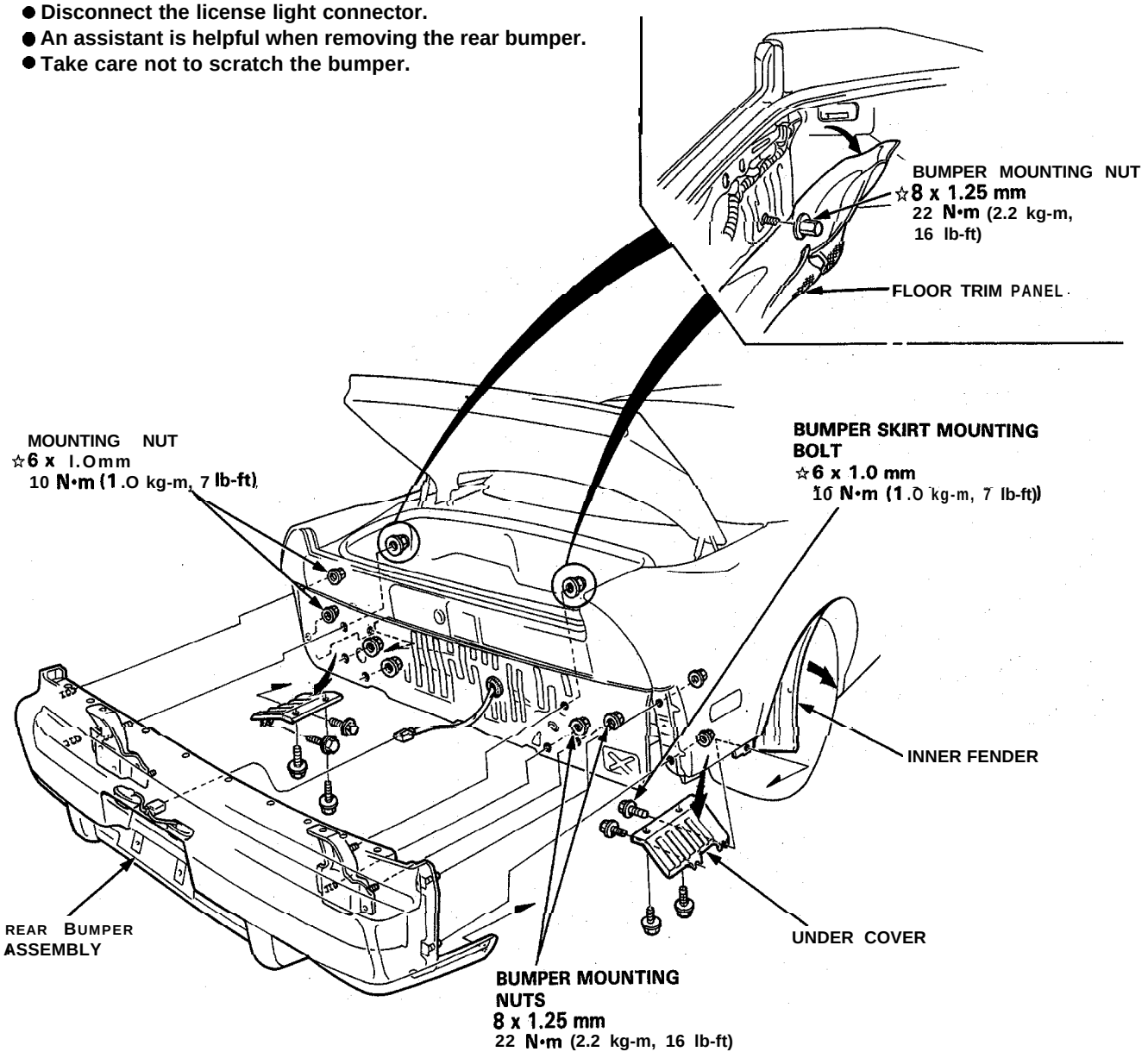


Rear Bumper

Replacement

1. Fold the trunk floor trim panel forward and remove the 2 bumper mounting nuts.
2. Remove the 2 bumper mounting nuts on each side from under the trunk floor.
3. Lower the inner fender.
4. Remove the under covers and skirt mounting bolts from inside the rear fender on each side.
5. Remove the 2 bumper mounting nuts on each side.
6. Remove the bumper assembly by sliding it to the rear.

NOTE:
- Disconnect the license light connector.
- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the bumper.

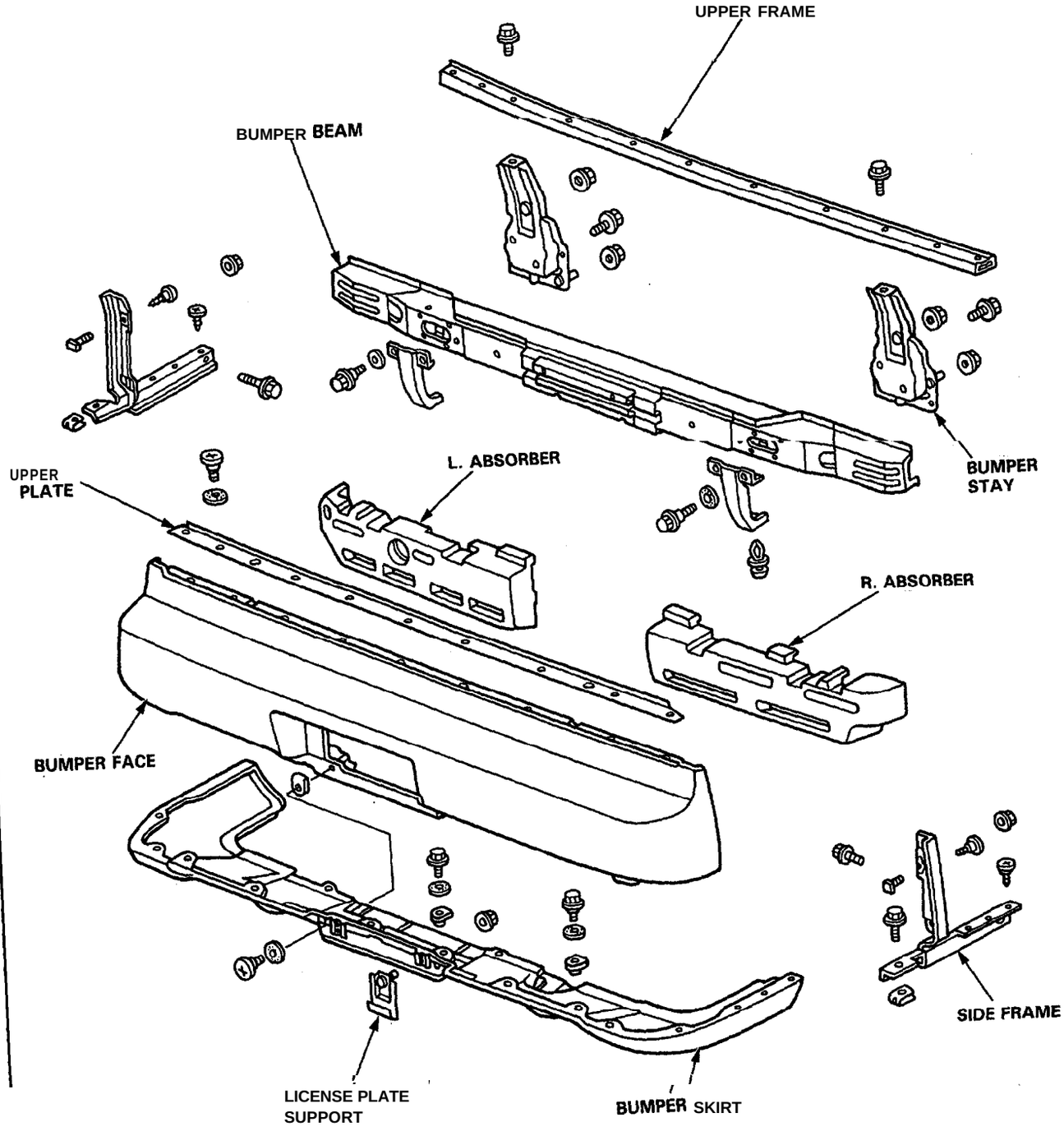


7. Installation is the reverse order of removal.

☆ : CORROSION RESISTANT BOLT/NUT

Rear Bumper

-Disassembly



Hood

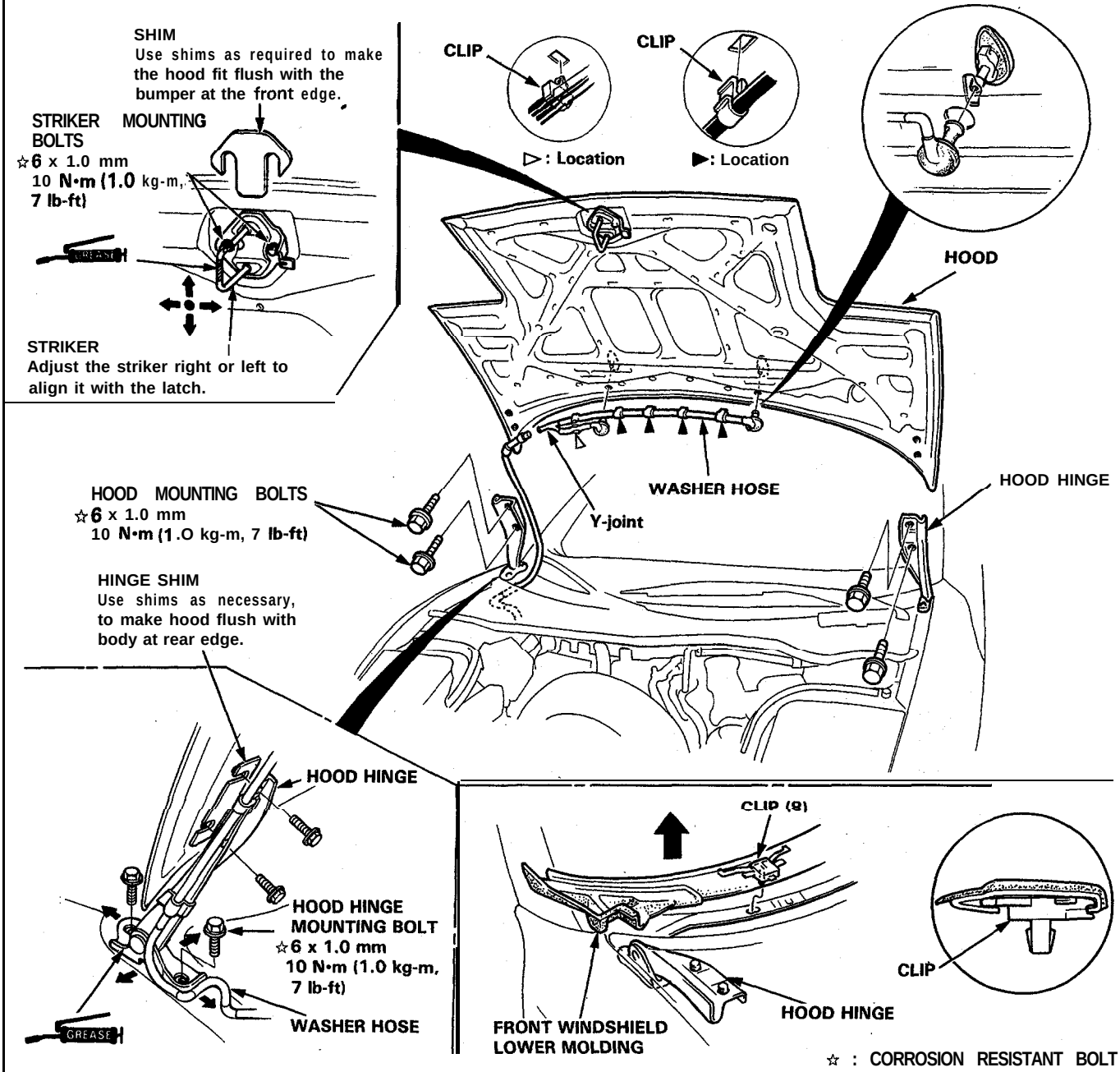
- Replacement/Adjustment

1. Disconnect the windshield washer hose at the Y-joint, then pull it out of the hood.
2. Remove the hood by removing the 2 hood mounting bolts on each side.
3. To remove the hood hinges, remove the front windshield lower molding.

ALIGNMENT

- The hinges can be adjusted right and left as well as fore and aft by using the elongated holes.
- The hinges should be shimmed to adjust the height of the hood at the rear edge.
- Adjust the hood latch to obtain the proper height at the forward edge (page 20-52).

4. Install the new hood. After installing, adjust the hood fit to the opening.



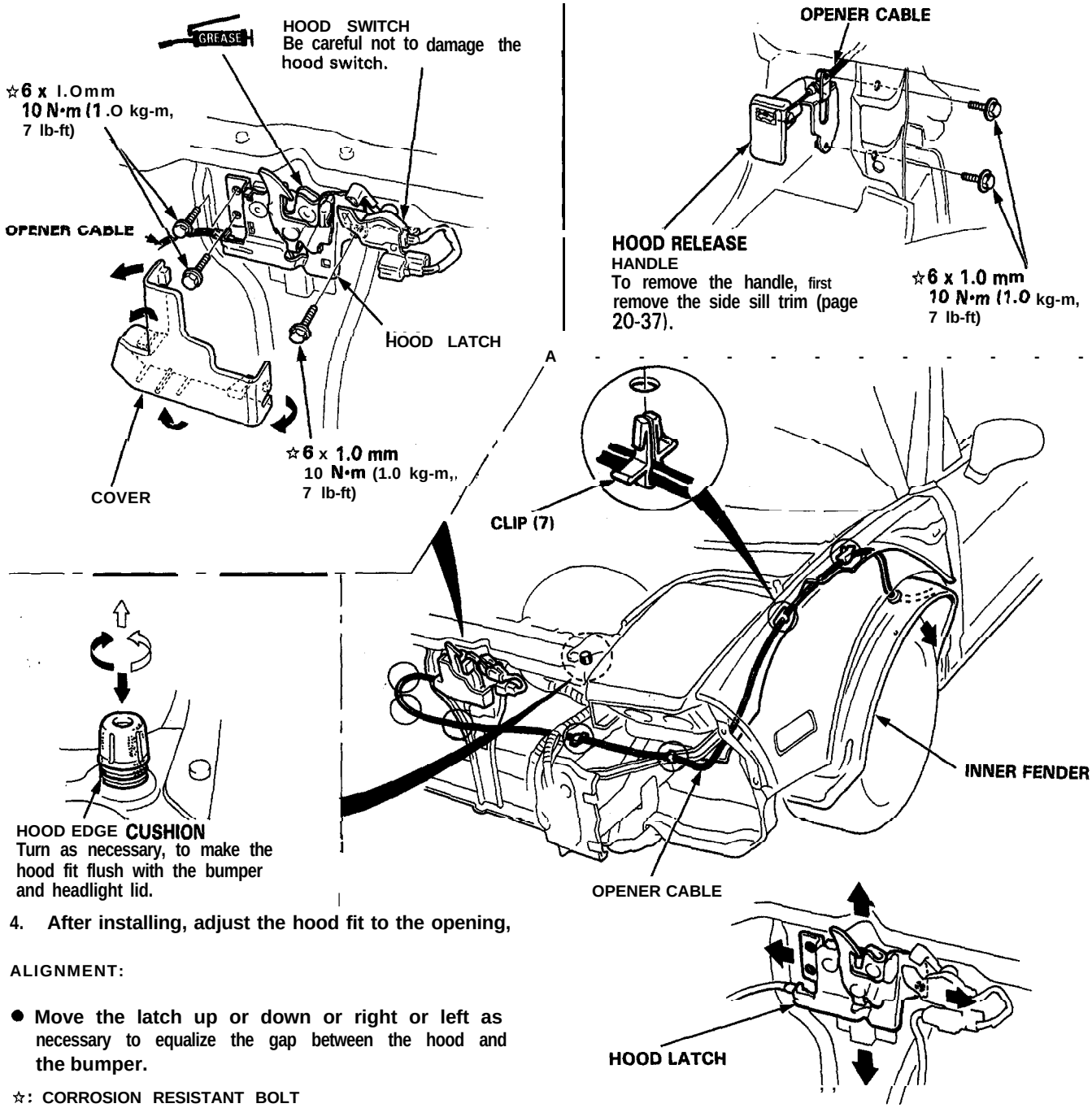
☆ : CORROSION RESISTANT BOLT

Hood

-Opener and Latch Replacement

1. **Remove the bolts, then remove the hood release handle and disconnect the opener cable.**
2. **Remove the 3 mounting bolts and cover, then remove the hood latch and disconnect the opener cable.**
3. **Remove the left side inner fender, then pull out the opener cable.**

NOTE:
- **Before pulling out the opener cable, tie a string to the cable so you can pull it back in later.**
- **Take care not to bend the cable.**



4. **After installing, adjust the hood fit to the opening,**

ALIGNMENT:

- **Move the latch up or down or right or left as necessary to equalize the gap between the hood and the bumper.**

☆: CORROSION RESISTANT BOLT

Rear Hatch/Engine Cover

- Replacement/Adjustment

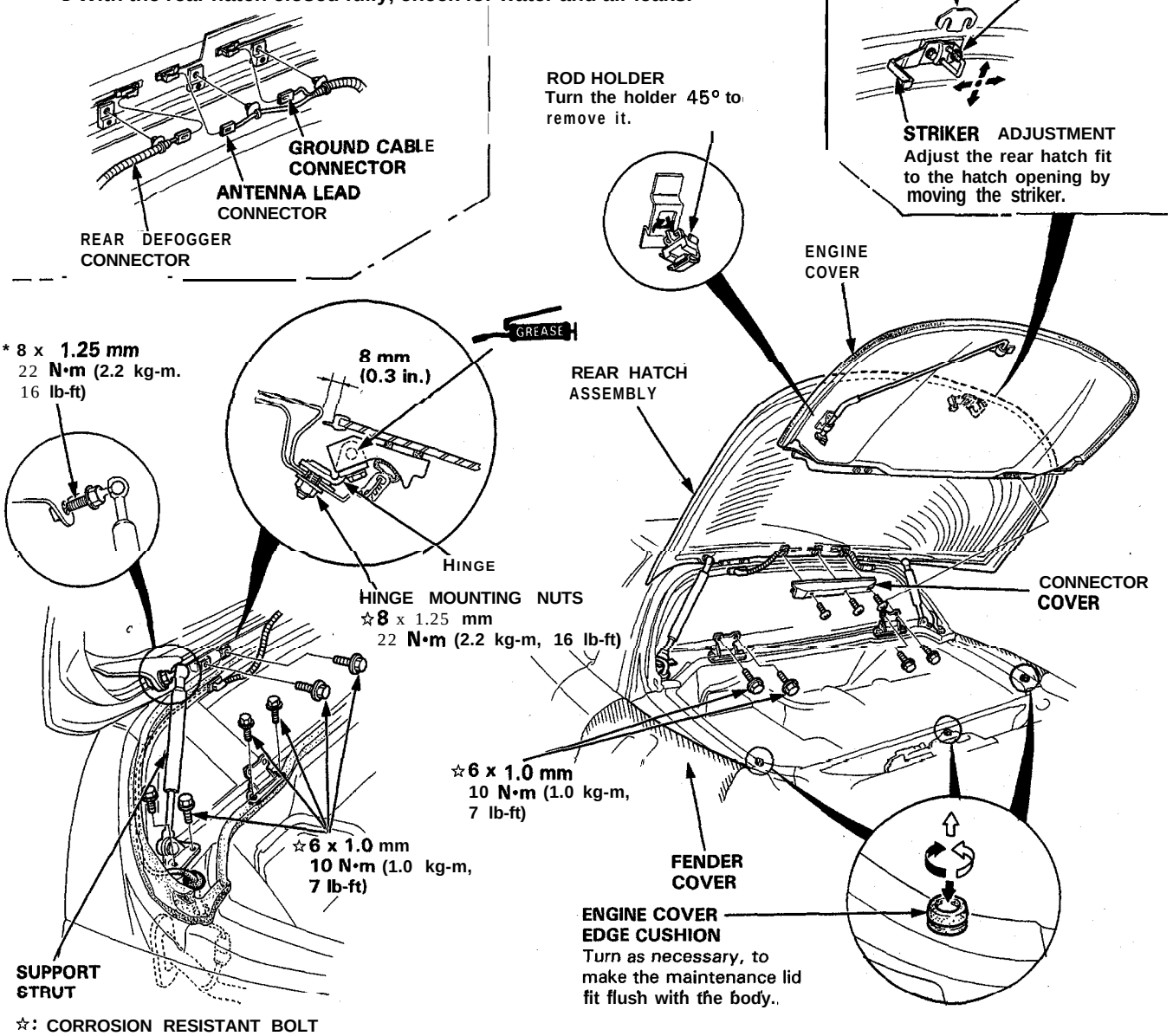
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. **Remove the engine cover.**
2. Remove the harness cover and disconnect the rear defogger and antenna lead connectors.
3. **Remove the rear hatch by removing the support struts mounting bolts and rear hatch mounting bolts.**

   NOTE:
   - **Have an assistant hold the rear hatch when removing the struts.**
   - **Take care not to damage the roof panel and hatch glass.**

4. installation is the reverse order of removal.

   NOTE:
   - **Before tightening the mounting bolts, adjust the rear hatch and striker.**
   - **With the rear hatch closed fully, check for water and air leaks.**



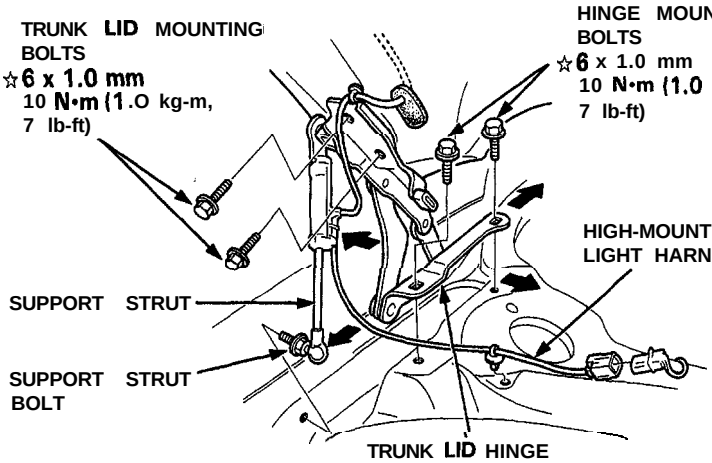
☆: CORROSION RESISTANT BOLT

Trunk Lid

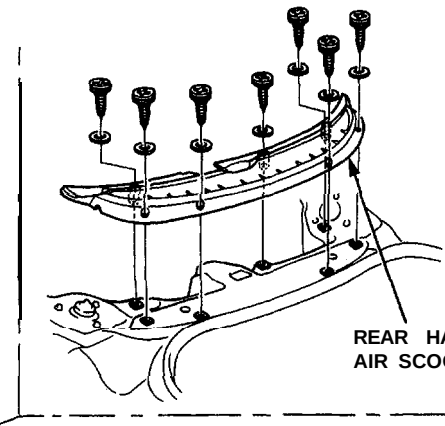
- Replacement/Adjustment

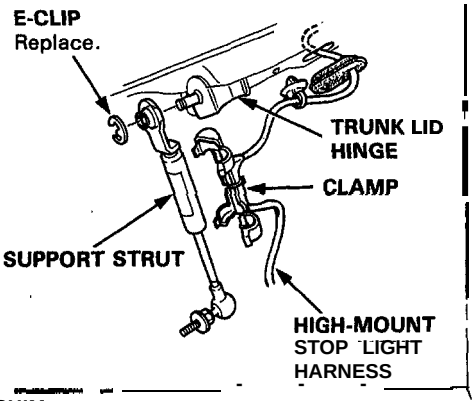
1. Remove the 7 attaching screws, then remove the rear hatch air scoop.
2. Disconnect the high-mount stop light harness connector and remove the harness clamp from the support strut.
3. Remove the trunk lid by removing the 4 mounting bolts.
4. Assemble in the reverse order.

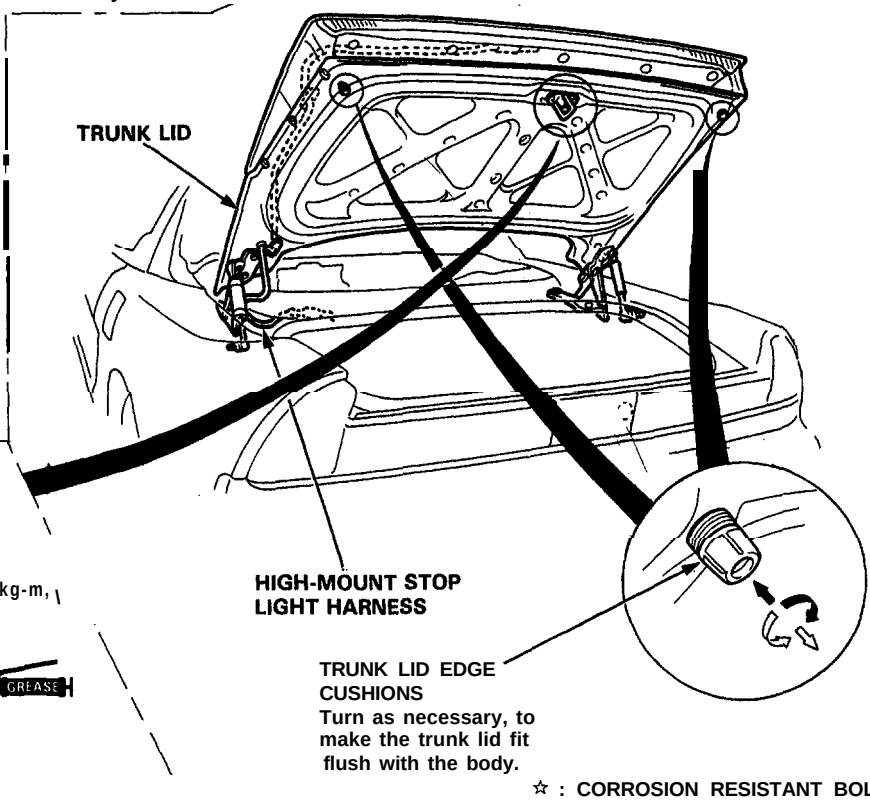
NOTE: Before tightening the bolts, check the adjustments shown below.



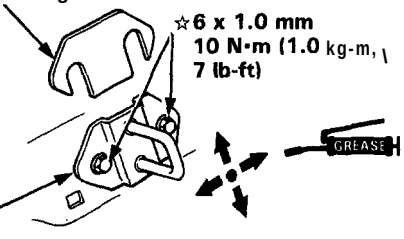
TRUNK LID HINGE
Adjust the hinges fore and aft, and right and left as necessary to equalize the gap between the trunk lid and the body.







SHIM
Use shims as required to make the trunk lid fit flush with the body at the rear edge.



STRIKER
Adjust the strike right or left to align it with the latch.

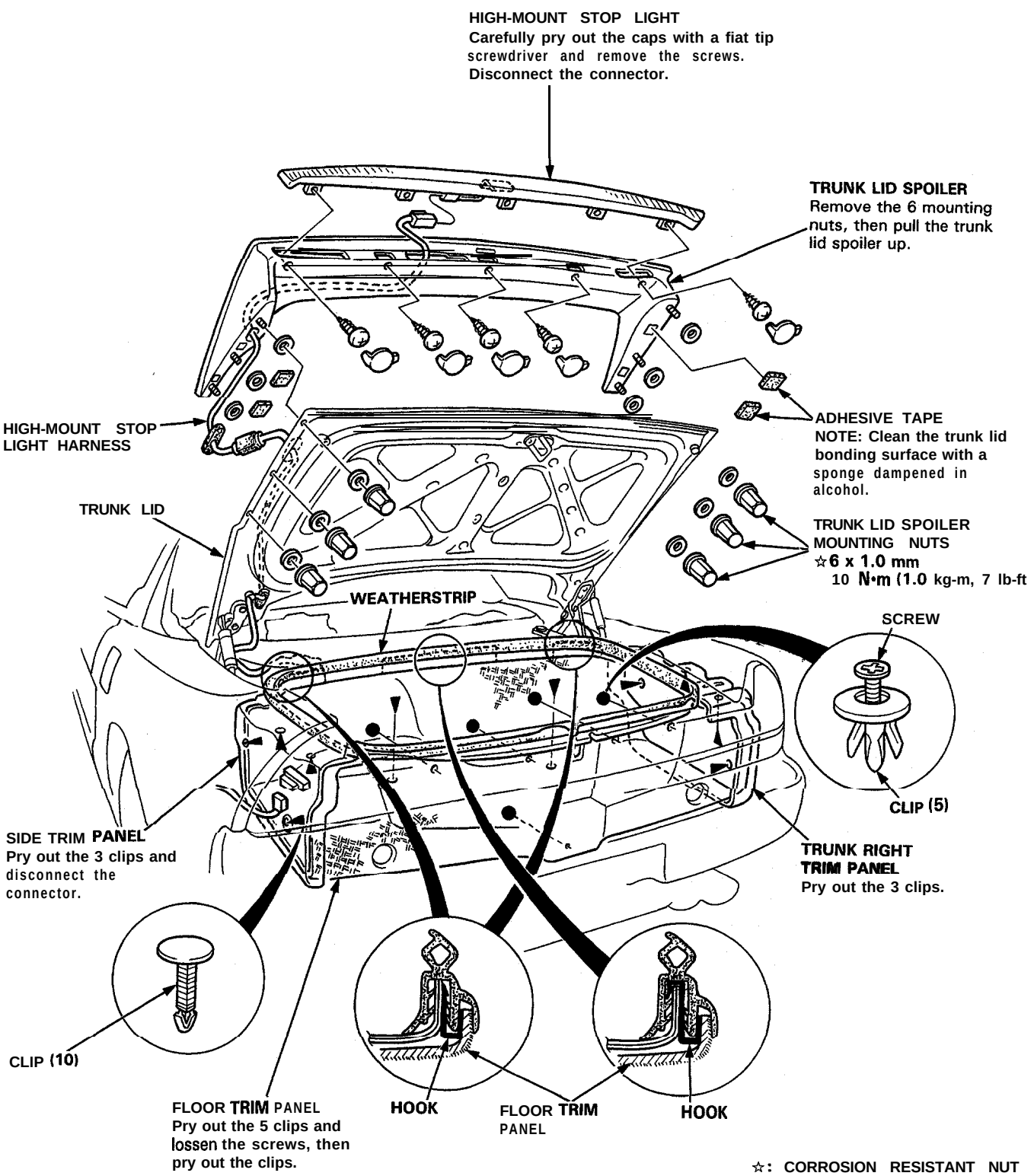
TRUNK LID EDGE CUSHIONS
Turn as necessary, to make the trunk lid fit flush with the body.

☆ : CORROSION RESISTANT BOLT

Trunk Lid Spoiler/Trunk Trim Panel

– Replacement

NOTE:
- Take care not to scratch or score the trunk lid.
- If necessary, replace any damaged clips.



☆: CORROSION RESISTANT NUT

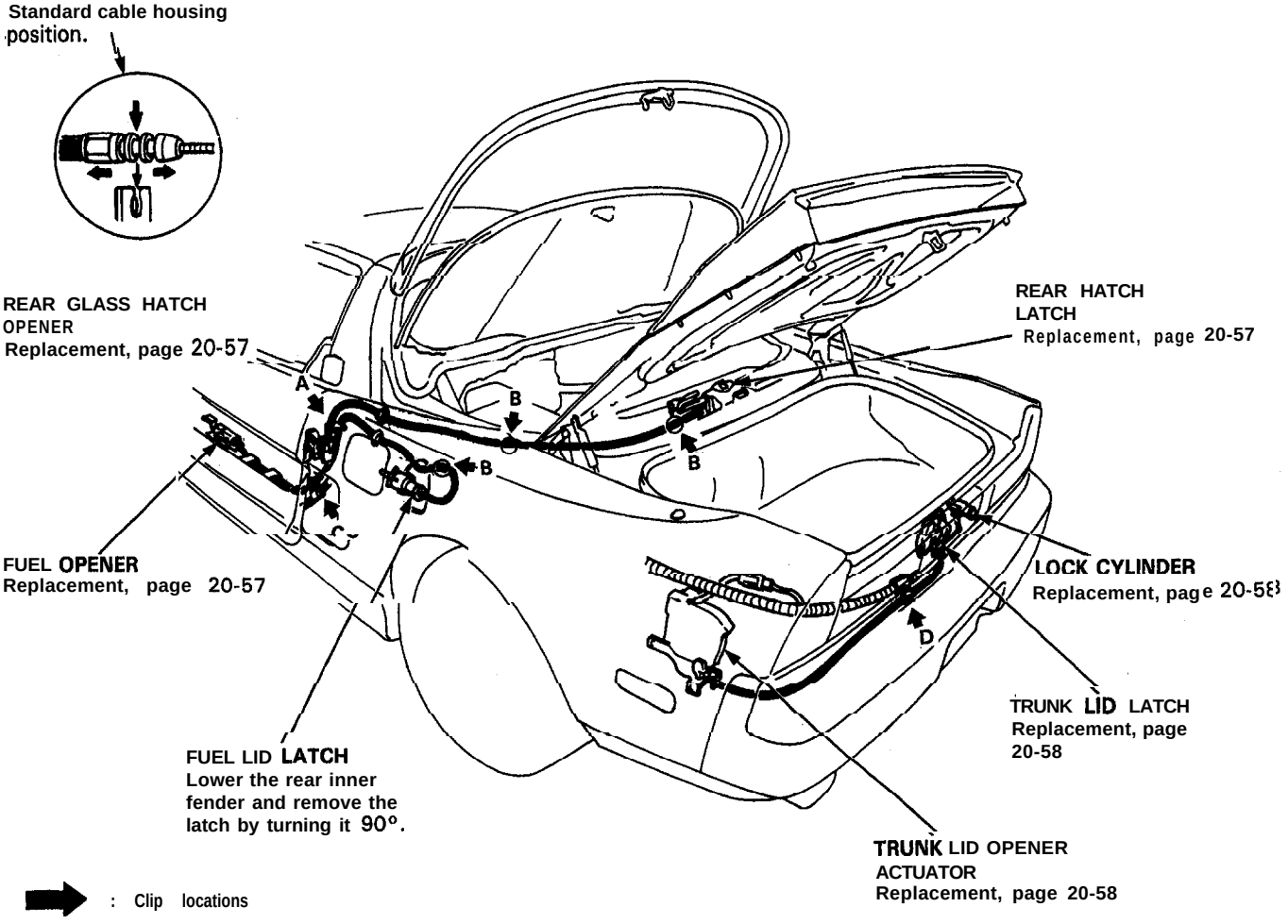
Opener Cables

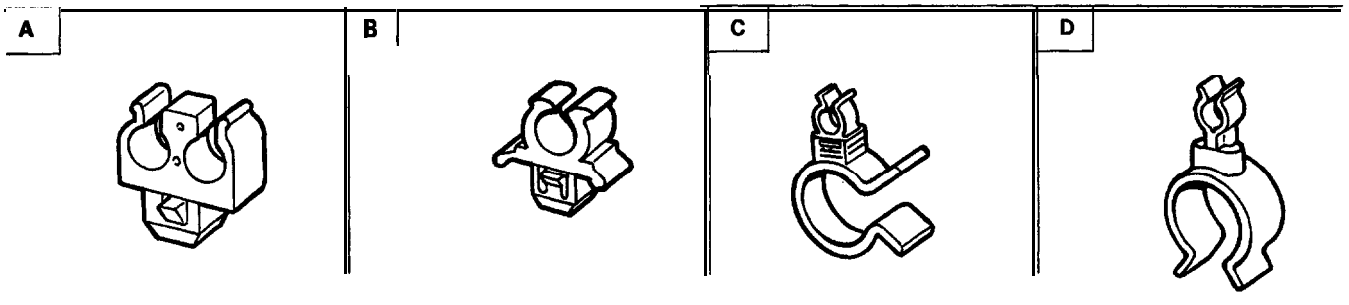
Replacement

1. **Remove the opener and latch, then disconnect the opener cables.**
2. **Remove the fuel lid latch.**
3. **'Remove the opener cables by removing the clips as shown.**

NOTE:

- **Before pulling out the opener cables, tie a string to the cable so you can pull it back in later.**
- **Take care not to bend the cable.**
- **After installing, check that the cables are routed and connected properly.**
- **If necessary, adjust the cable by changing the position of the cable housing.**

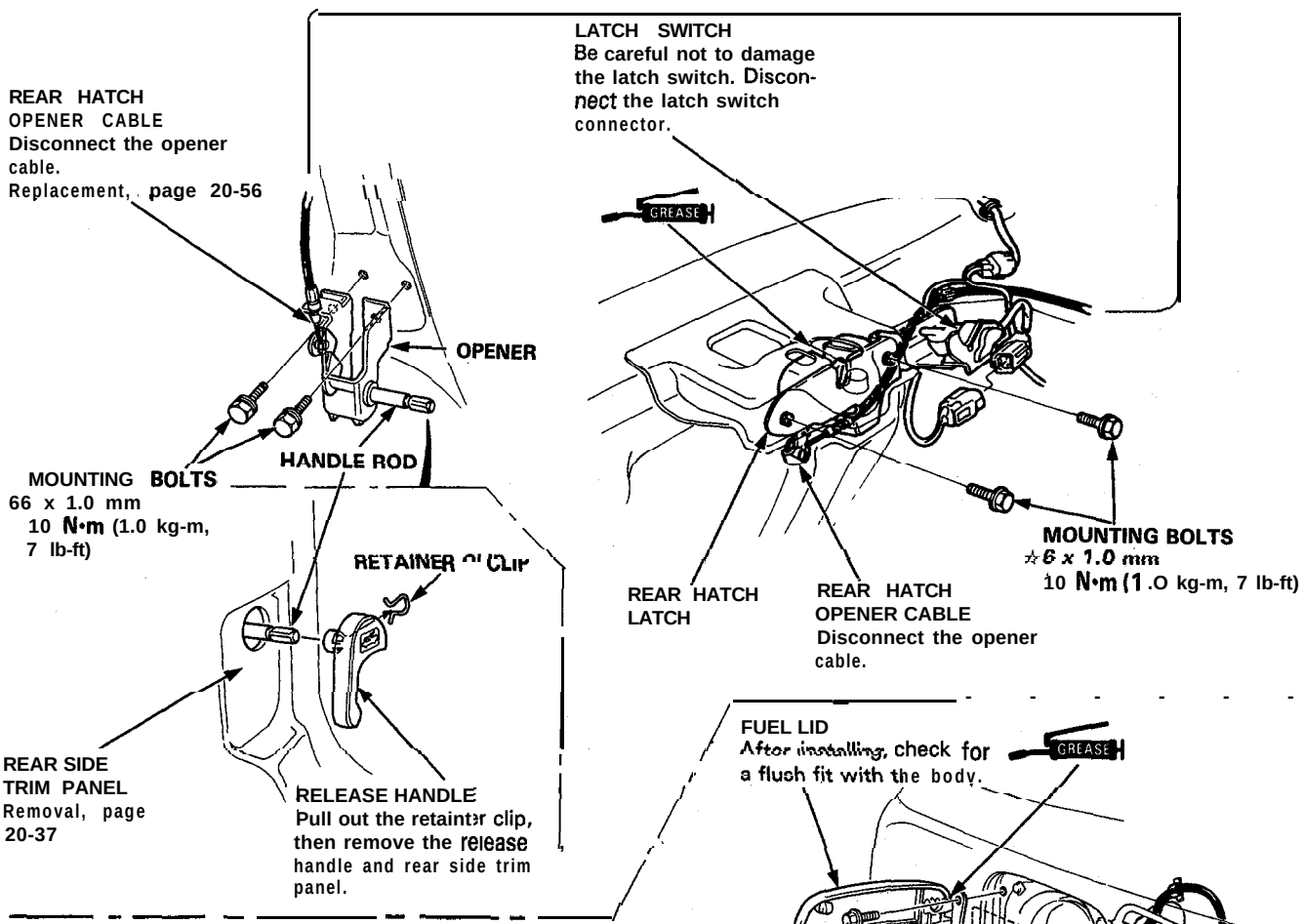


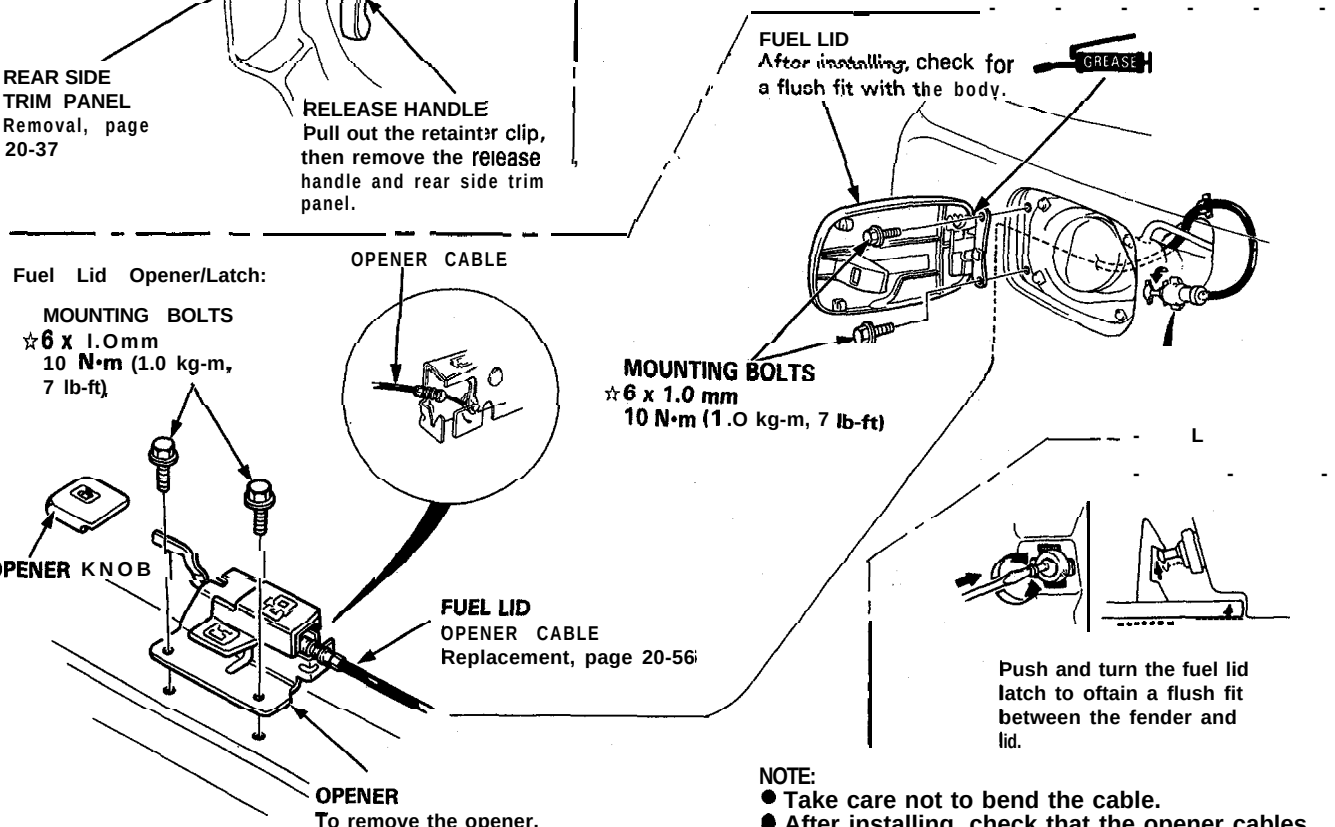


Opener/Latch

Replacement

Rear Hatch Opener/Latch:





NOTE:
- Take care not to bend the cable.
- After installing, check that the opener cables are routed and connected properly.

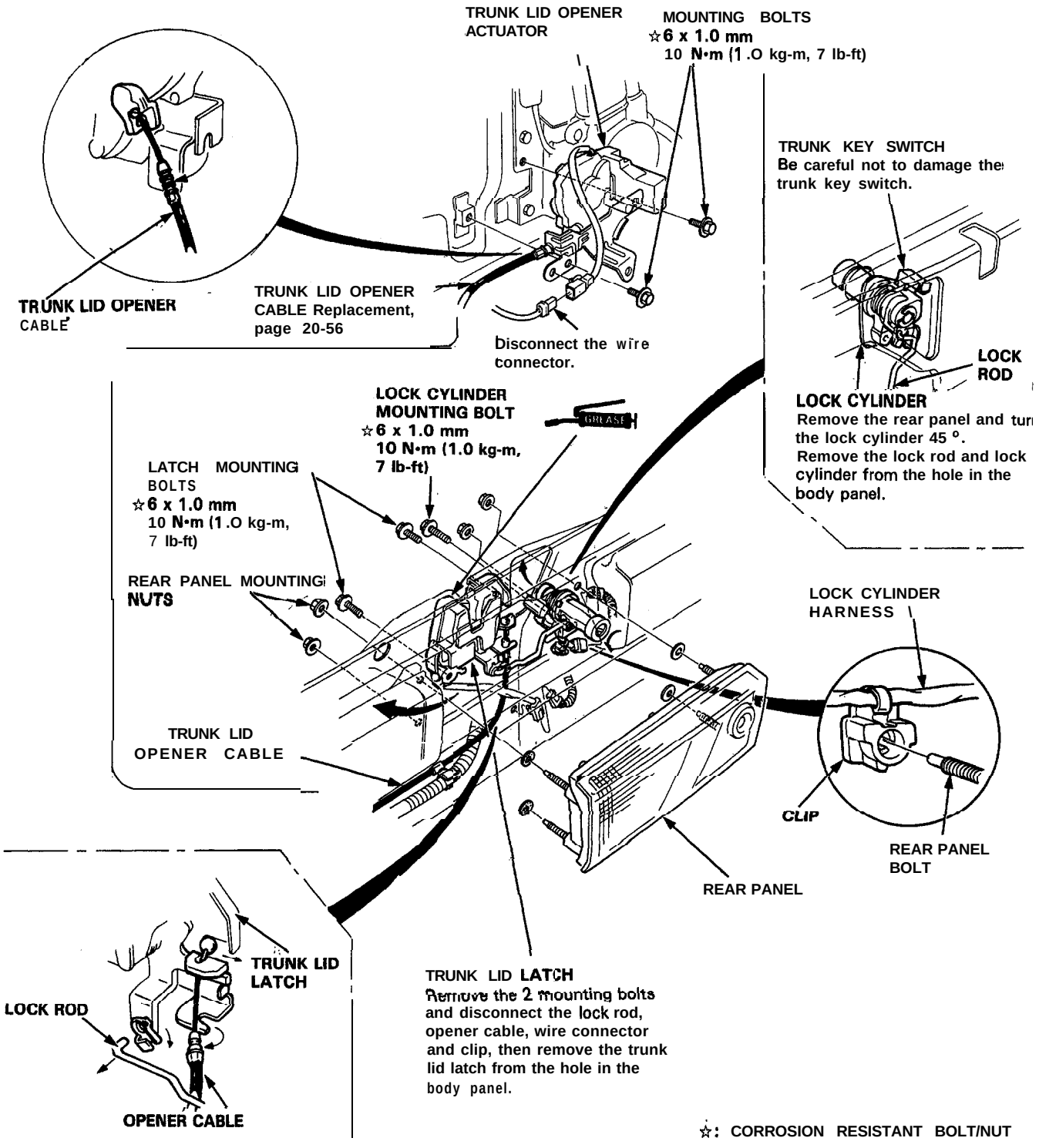
☆ : CORROSION RESISTANT BOLT (cont'd)

Opener/Latch

Replacement (cont'd)

Trunk lid opener/Latch:

NOTE:
- **Take care not to bend the cable.**
- **After installing, check that the opener cables are routed and connected properly.**



☆: CORROSION RESISTANT BOLT/NUT

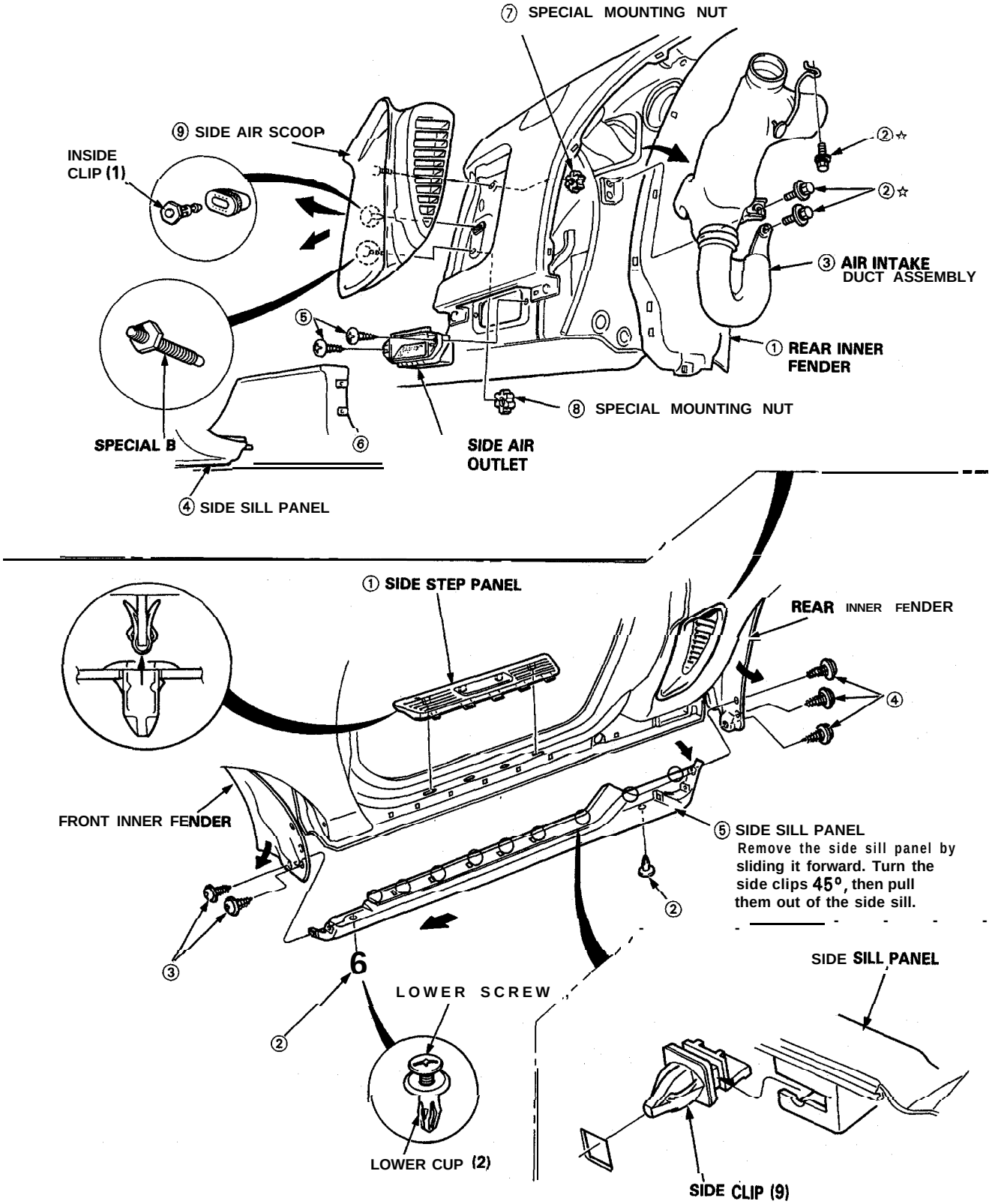
Side Air Scoop/Side Sill Panel/Side Step Panel

Replacement

☆: CORROSION RESISTANT BOLT

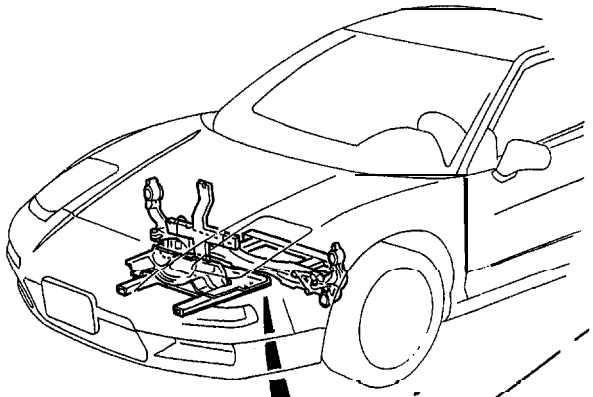
Disassemble in numbered sequence.

NOTE: If necessary, replace any damaged clips.



Front Sub-Frame/Battery, Spare Tire Holder

Sub-frame torque value specifications:



☆10 x 1.25 mm
60 N•m (6.0 kg-m, 43 lb-ft)

☆10 x 1.25
60 N•m (6.0 kg-m, 43 lb-ft)

CROSS BEAM

R. BEAM BRACKET

BODY

☆10x 1.25 mm
39 N•m (3.9 kg-m, 28 lb-ft)

L. BEAM BRACKET

BODY

BODY

☆12 x 1.25 mm
95 N•m (9.5 kg-m, 69 lb-ft)

*10 x 1.25 mm
60 N•m (6.0 kg-m, 43 lb-ft)

☆10 x 1.25 mm
60 N•m (6.0 kg-m, 43 lb-ft)

☆10 x 1.25 mm
39 N•m (3.9 kg-m, 28 lb-ft)

☆6 x 1.0 mm
10 N•m (1.0 kg-m, 71 lb-ft)

SPARE TIRE HOLDER

☆6 x 1.0mm
10 N•m (1.0 kg-m, 71 lb-ft)

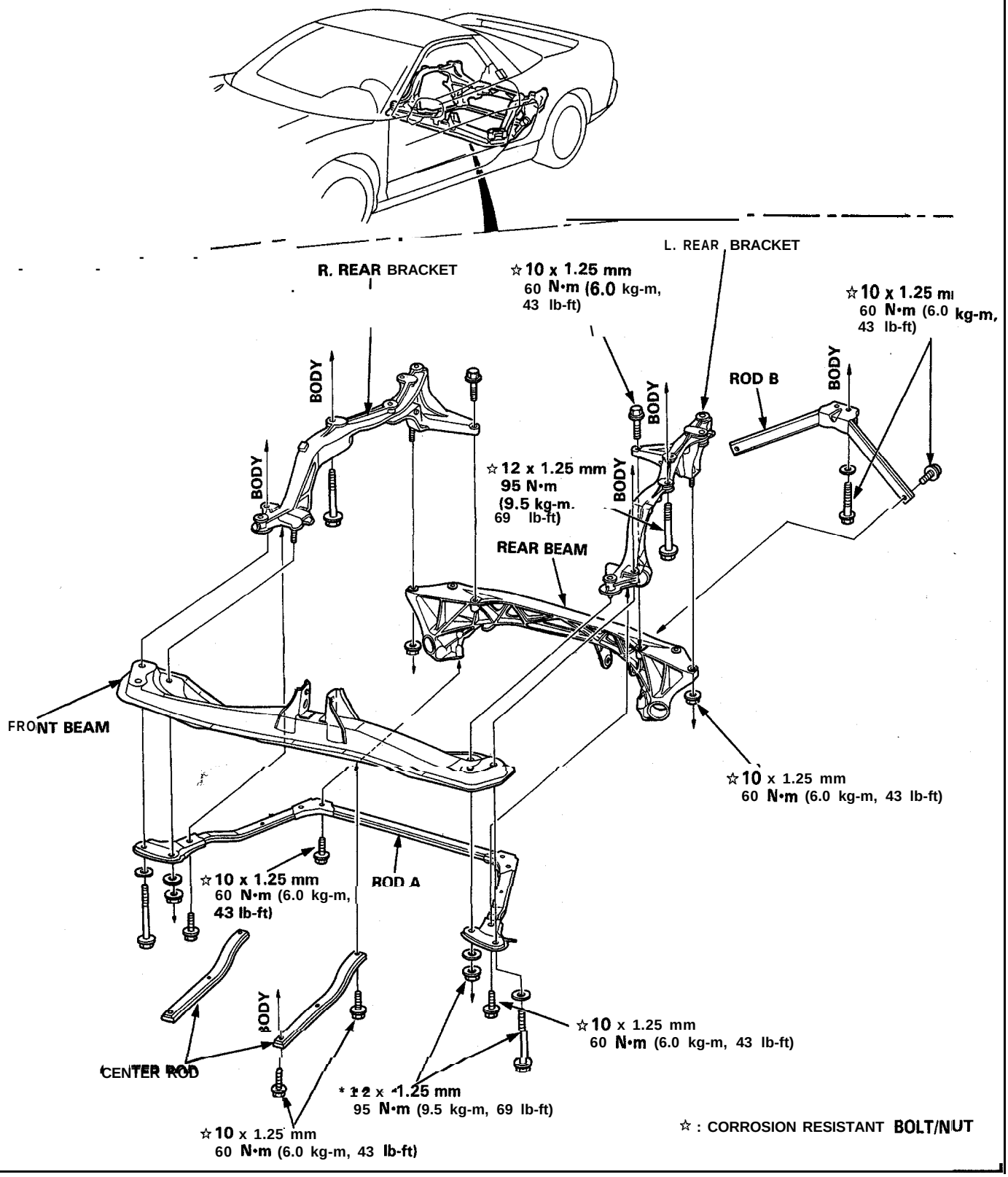
BATTERY HOLDER

☆8 x 1.25 mm
25 N•m (2.5 kg-m, 18 lb-ft)

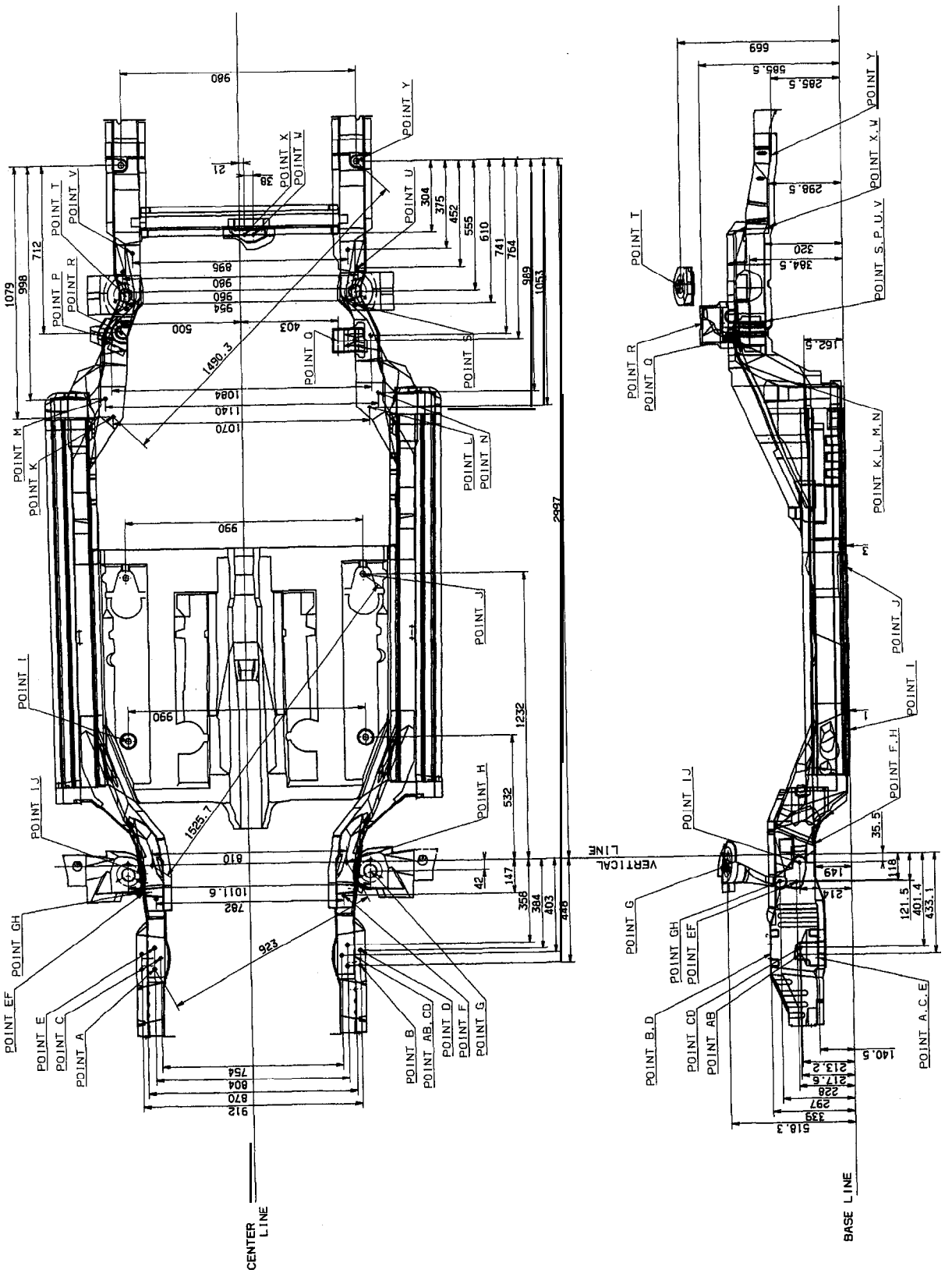
☆ : CORROSION RESISTANT BOLT/NUT

Rear Sub-Frame

Sub-frame Torque Value Specifications:



Frame Repair Chart

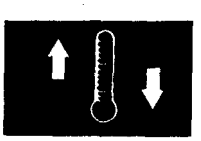


Automatic Climate Control

Special Tools 22- 2
Illustrated Index 22- 3
Heater-Evaporator Door Positions . . 22- 4
Description 22- 6
*Wiring/Connector Location 22- 9
Circuit Diagram 22-10
Troubleshooting
Self-diagnosis Indicators 22- 12
Function Selection and Operation Check 22-13
Symptom-to-Components Chart. 22-14
Control Unit Signals..... 22-I 5
Troubleshooting Flowchart.. ..... 22-I 6
Blower
Replacement 22-63
Recirculation Control Motor
Replacement 22-64
A/C Service Tips and Precautions . . 22-65
*Heater-Evaporator Assembly
Replacement 22-66
Coolant Temperature Sensor
Removal 22-68
Evaporator Temperature Sensor
Removal 22-68
Vent Door Control Motor
Replacement 22-69
Mode Control Motor
Replacement 22-69
Air Mix Control Motor
Replacement 22-70
Heater-Evaporator Unit
Disassembly/Reassembly 22-7 1
"DEF" Door Adjustment 22-72
"HEAT" Door Adjustment 22-72
Condenser
Description 22-73
Condenser Assembly
Replacement 22-74
Disassembly/Reassembly 22-75
Compressor
Description 22-76
Replacement 22-77
Compressor Belt Adjustment 22-79
Clutch Inspection 22-80
Clutch Overhaul 22-8 1
Relief Valve Replacement 22-82
Component Removal/Replacement
*Climate Control Unit 22-84
*In-car Temperature Sensor 22-85
Ambient Temperature Sensor ... 22-86
Sunlight Sensor 22-86
Component Tests
In-car Temperature Sensor 22-87
Ambient Temperature Sensor ... 22-87
Coolant Temperature Sensor 22-88
Evaporataor Temperature Sensor 22-88
Sunlight Sensor 22-89
Recirculation Control Motor 22-89
Air Mix Control Motor 22-90
Vent Door Control Motor 22-90
Mode Control Motor 22-9 1
Aspirator Fan 22-9 1
Relay 22-92
Control Unit Adjustment 22-92
A/C System Service
Discharge 22-93
Evacuation 22-93
Leak Test 22-94
Charging Procedure 22-95
Performance Test 22-96
Pressure Test 22-98

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

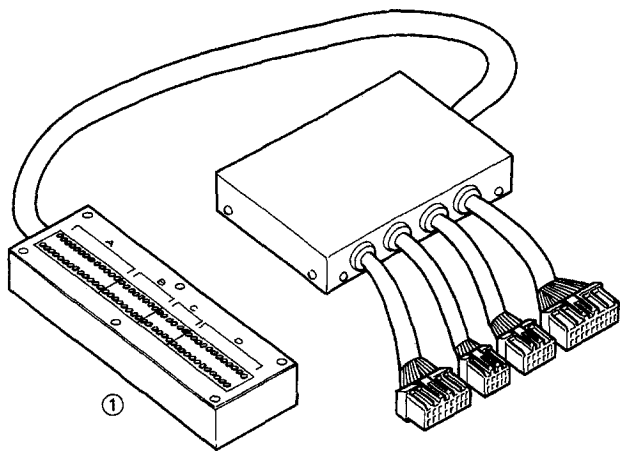
The NSX includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools and should therefore be done by an authorized Acura dealer.

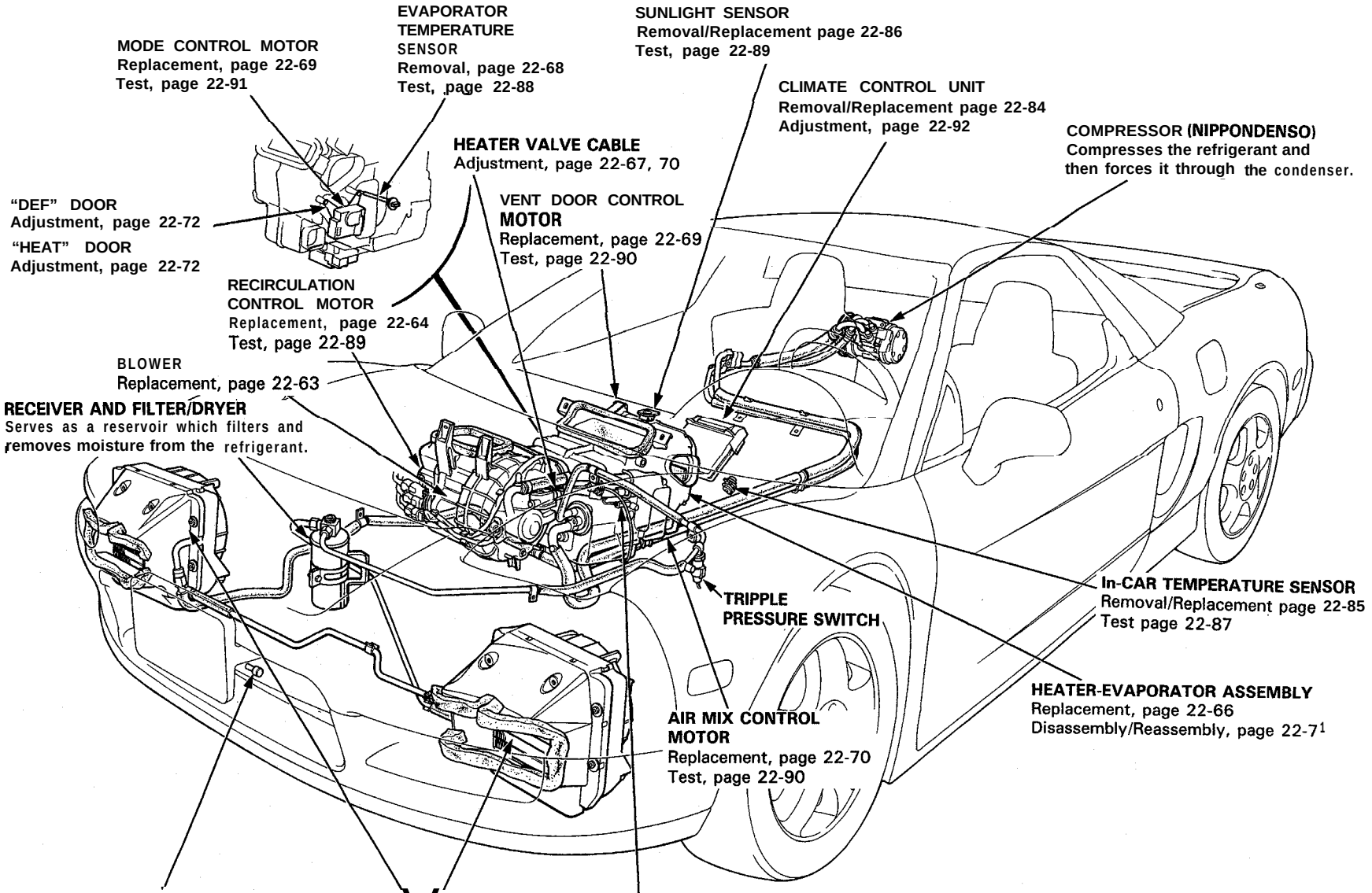


⚠ WARNING

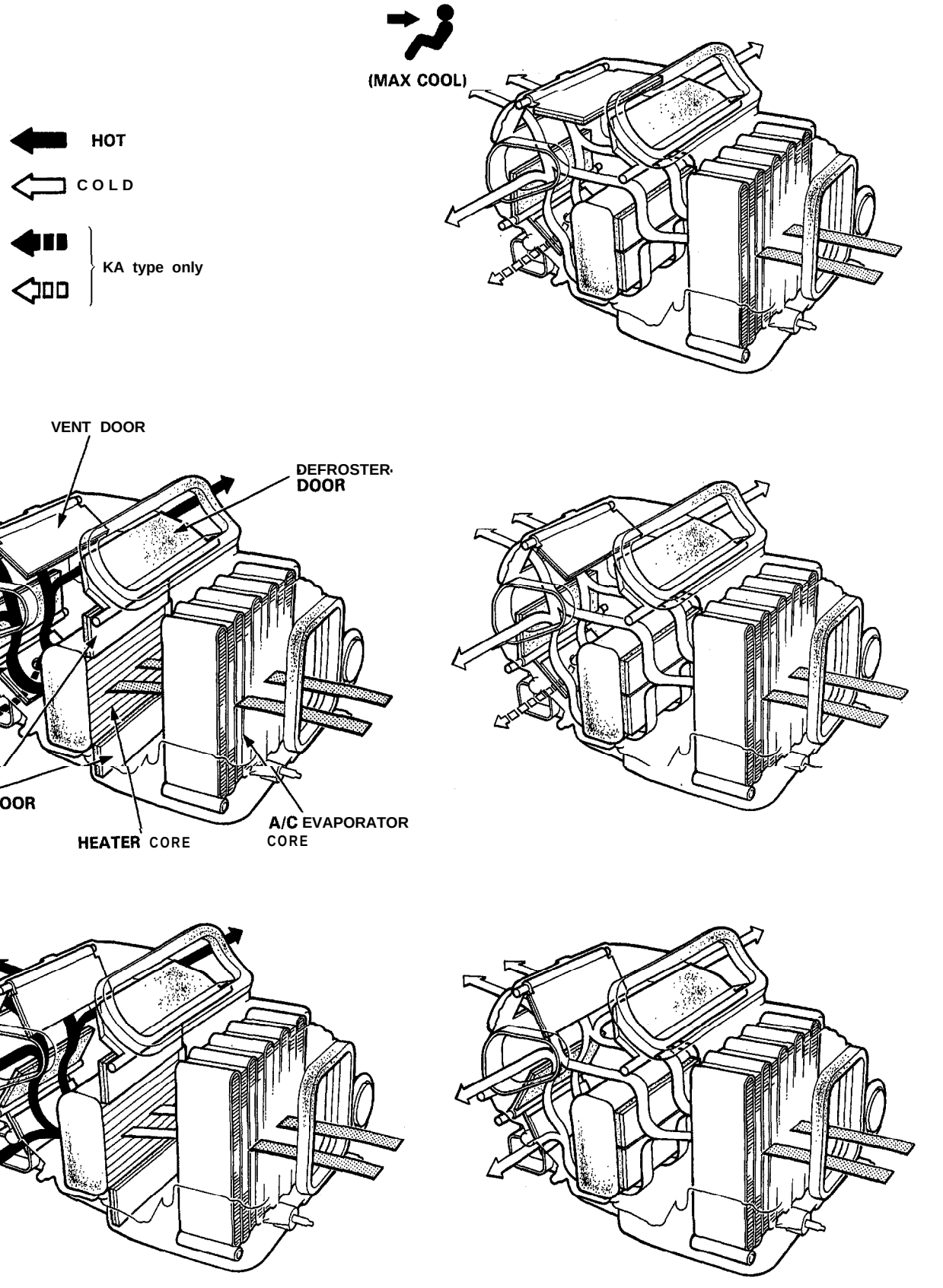
- **To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.**
- **All SRS selectrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.**

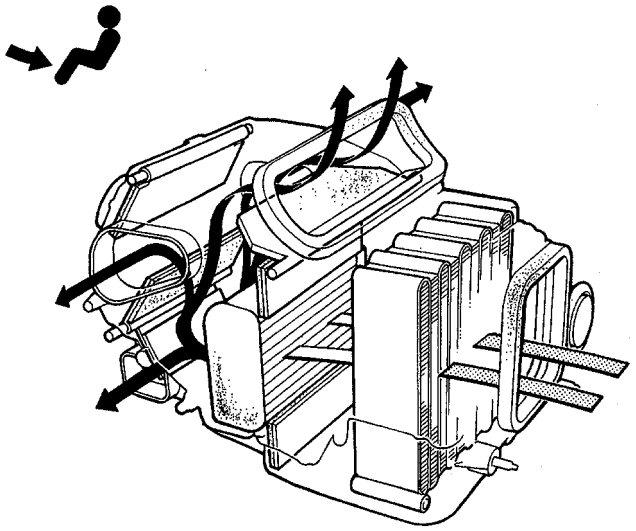
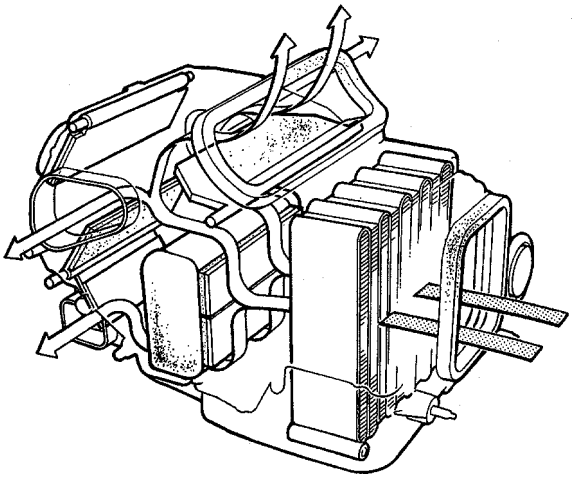
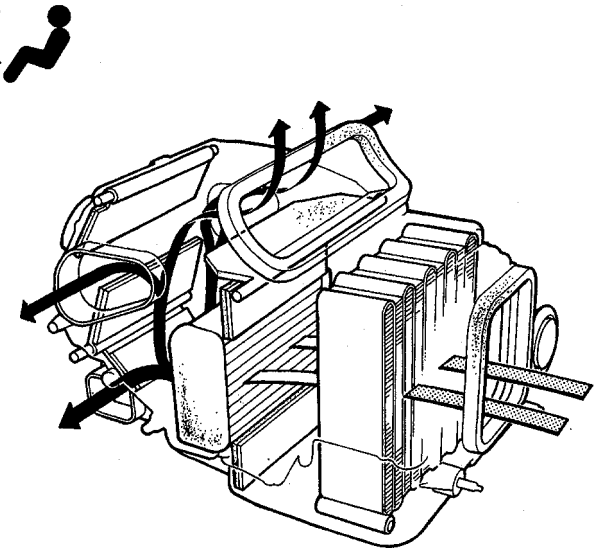
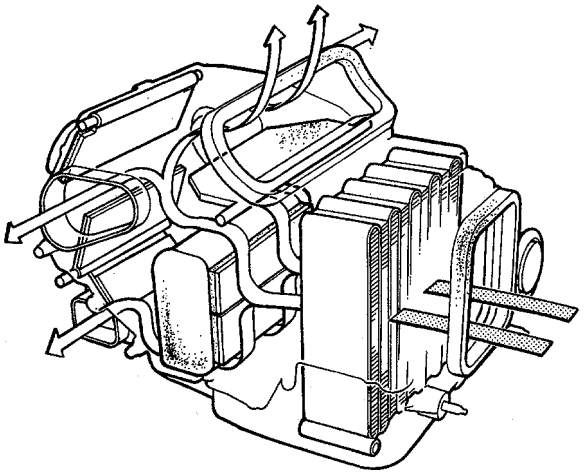
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07LAJ–PT301OA	ECU Test Harness	1	22-57, 58

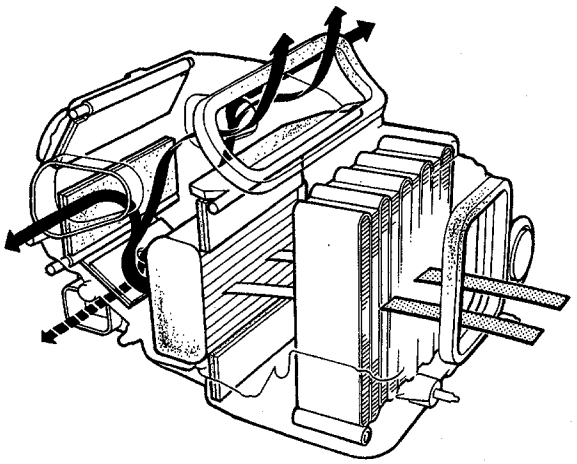
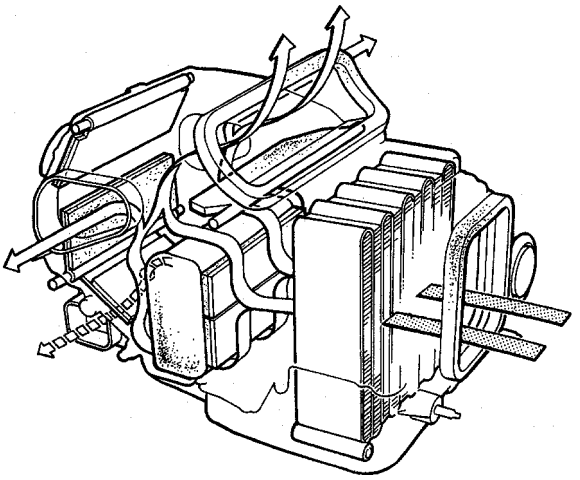



MODE CONTROL MOTOR
Replacement, page 22-69
Test, page 22-91
EVAPORATOR TEMPERATURE SENSOR
Removal, page 22-68
Test, page 22-88
SUNLIGHT SENSOR
Removal/Replacement page 22-86
Test, page 22-89
CLIMATE CONTROL UNIT
Removal/Replacement page 22-84
Adjustment, page 22-92
COMPRESSOR (NIPPONDENSO)
Compresses the refrigerant and then forces it through the condenser.
HEATER VALVE CABLE
Adjustment, page 22-67, 70
"DEF" DOOR
Adjustment, page 22-72
"HEAT" DOOR
Adjustment, page 22-72
VENT DOOR CONTROL MOTOR
Replacement, page 22-69
Test, page 22-90
RECIRCULATION CONTROL MOTOR
Replacement, page 22-64
Test, page 22-89
BLOWER
Replacement, page 22-63
RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.
TRIPPLE PRESSURE SWITCH
In-CAR TEMPERATURE SENSOR
Removal/Replacement page 22-85
Test page 22-87
HEATER-EVAPORATOR ASSEMBLY
Replacement, page 22-66
Disassembly/Reassembly, page 22-71
AIR MIX CONTROL MOTOR
Replacement, page 22-70
Test, page 22-90
AMBIENT TEMPERATURE SENSOR
Removal/Replacement page 22-86
Test page 22-87
DUAL CONDENSER
Dissipates the heat which was absorbed by the refrigerant.
Replacement, page 22-74
Disassembly/Reassembly, page 22-76
COOLANT TEMPERATURE SENSOR
Removal 22-68
Test page 22-88

Heater-Evaporator Door Position



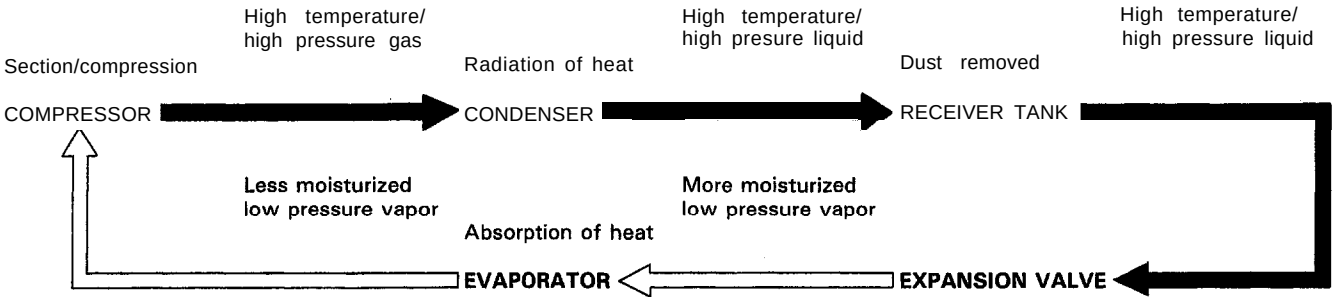





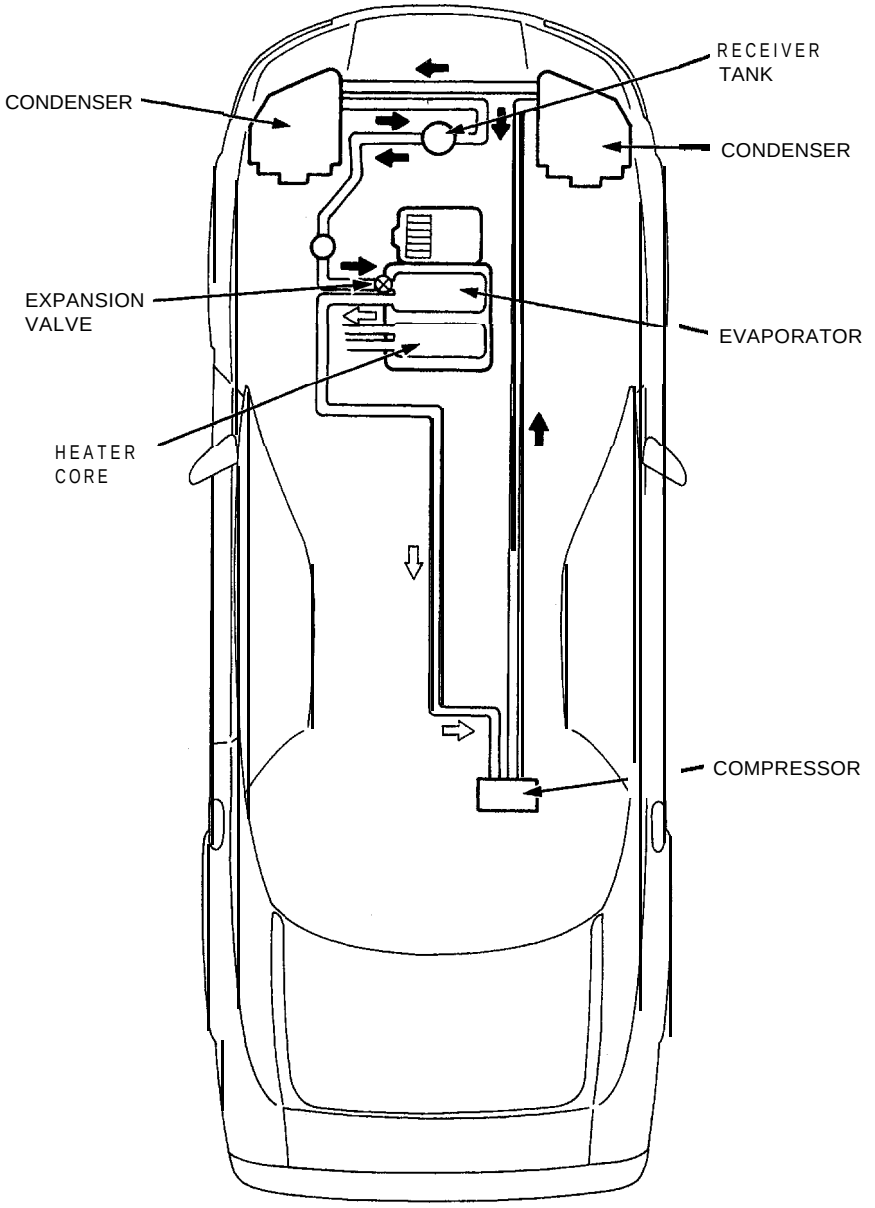



Description

Outline

The air conditioner provides the cooled air into the passenger compartment via the route shown below.





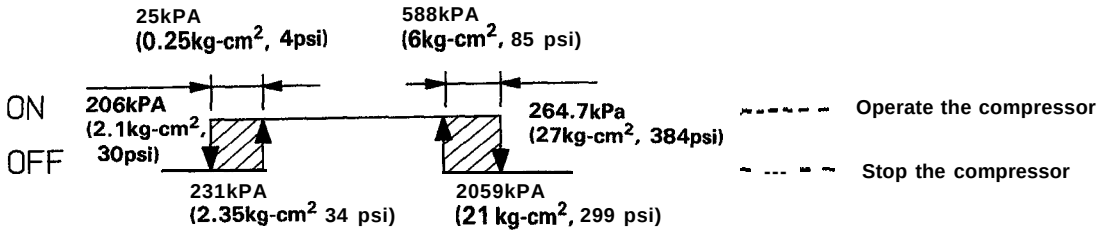
Tripple Pressure Switch

Construction

The tripple pressure switch consists of pressure switch A (Hi-Low pressure switch) and pressure switch B (middle pressure switch).

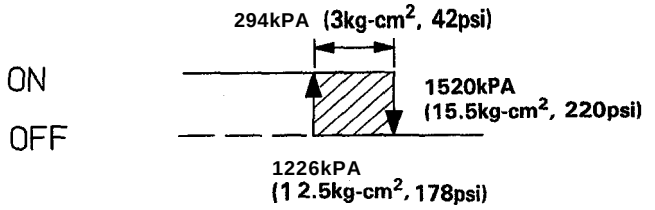
- **Hi-Low pressure switch**

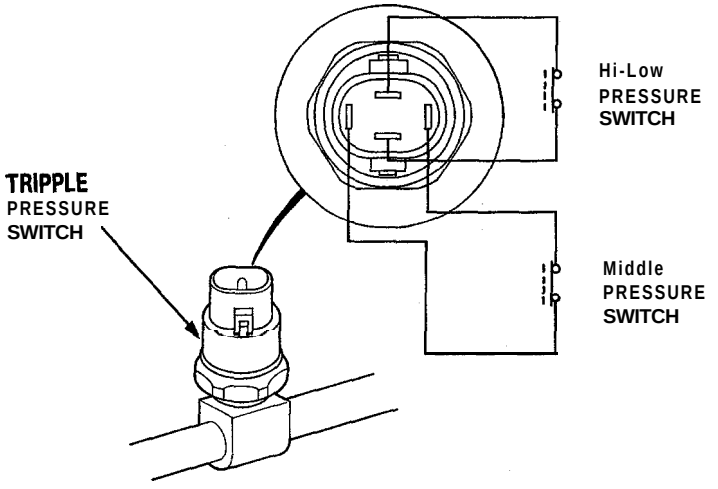
  If the refrigerant pressure becomes too high (due to blockage) or too low (due to leakagae), the tripple pressure switch sends a signal to the cooling fan control unit to prevent the compressor from operating.



- Middle pressure switch

  If the refrigerant pressure goes above or below 1520 kpa (15.5kg-cm², 220 psi), the tripple pressure switch sends a signal to the PGM-FI ECU, then the PGM-FI ECU operates the idle control.





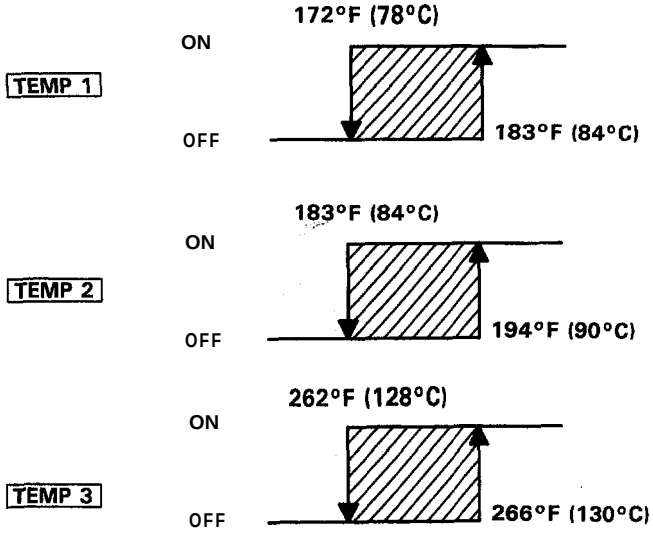
Description

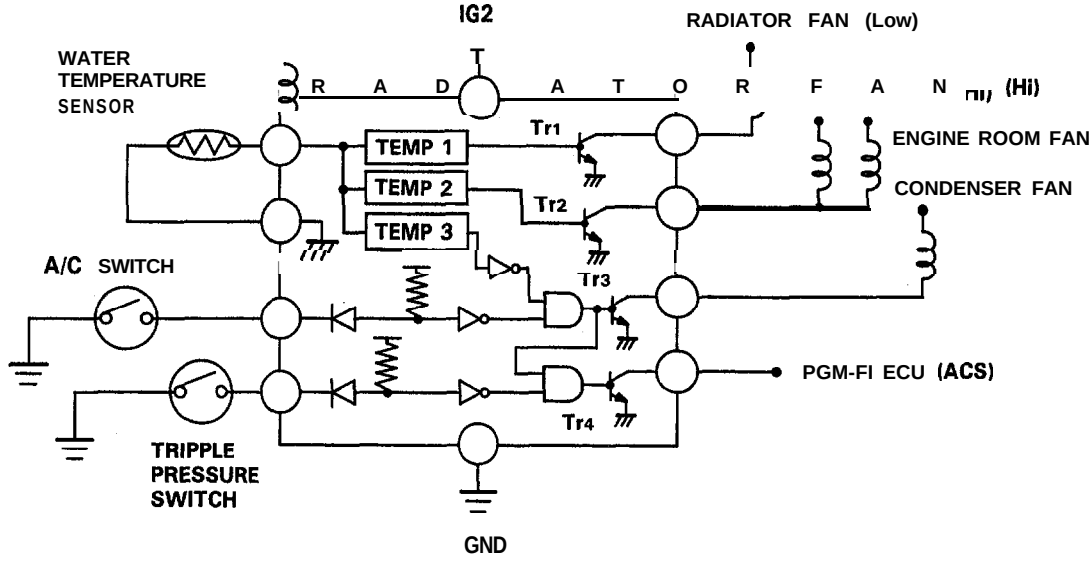
Cooling Fan Control Unit

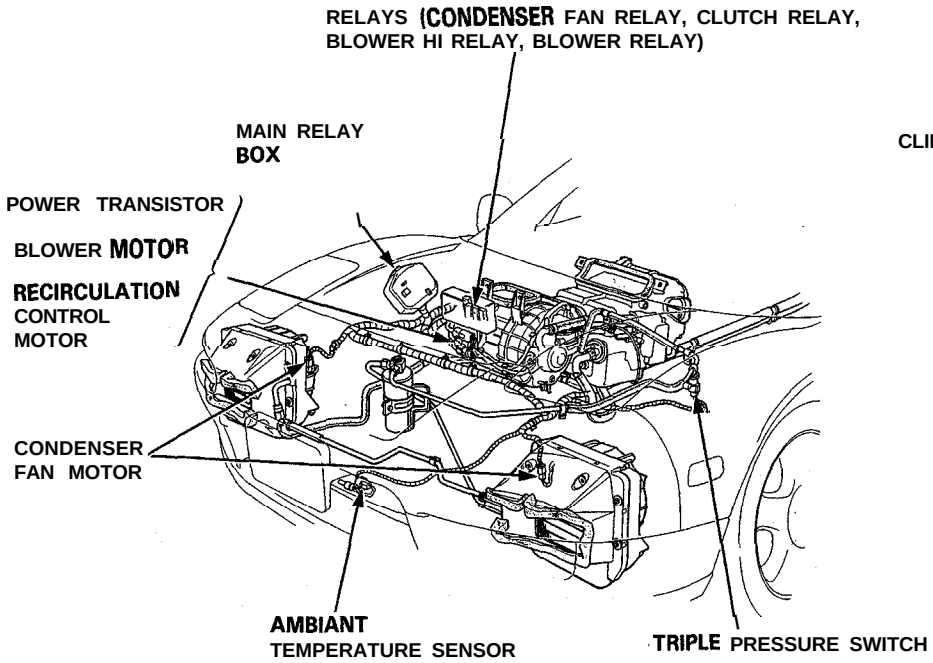
Constraction

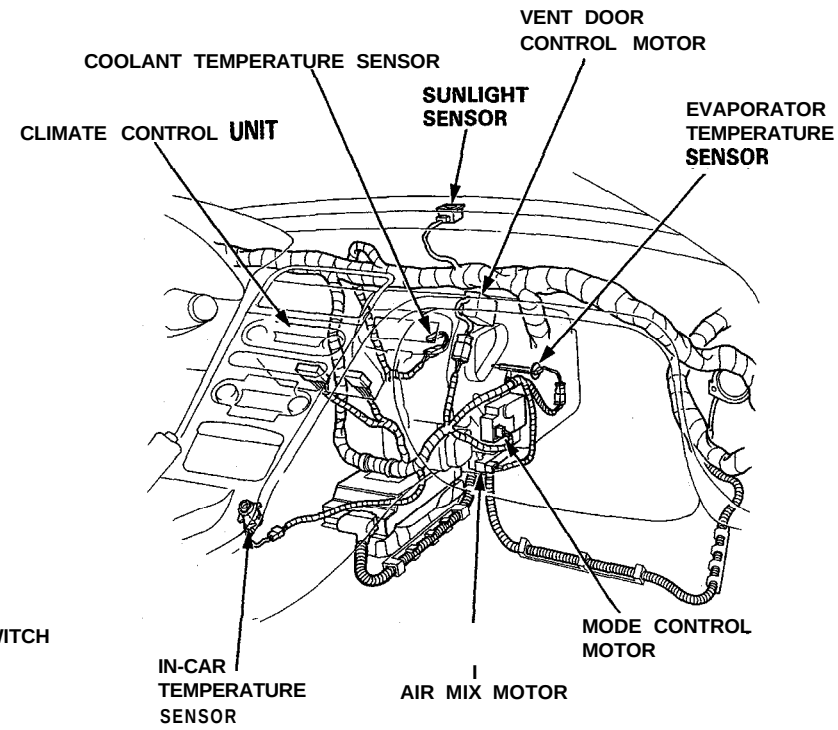
The cooling fan control unit performs calculations on the basis of signals from the water temperature sensor and controls the operation of radiator fan speed (Hi-Low), engine compartment fan, condenser fan and A/C system.

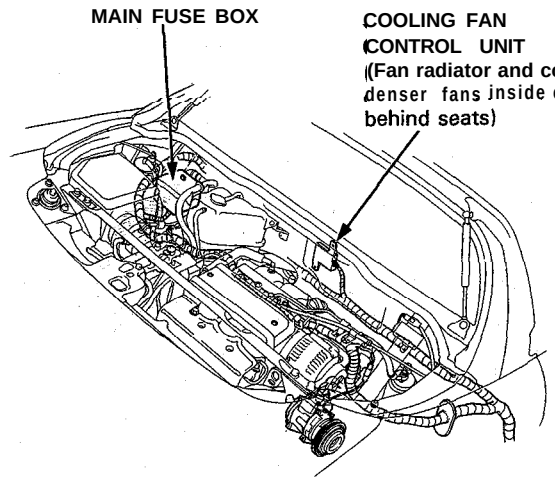
- **TEMP 1:** When radiator coolant temperature is above 183°F (84°C), the control unit operates Tr_1 ON and radiator fan at low speed.
- **TEMP 2:** When radiator coolant temperature is above 194°F (90°C), the control unit operates Tr_2 ON, radiator fan at high speed and engine compartment fan.
- **TEMP 3:** When radiator coolant temperature is above 266°F (130°C), the control unit operates Tr_3 OFF and stops the condenser fan. Then it operates Tr_4 OFF and stops the compressor.











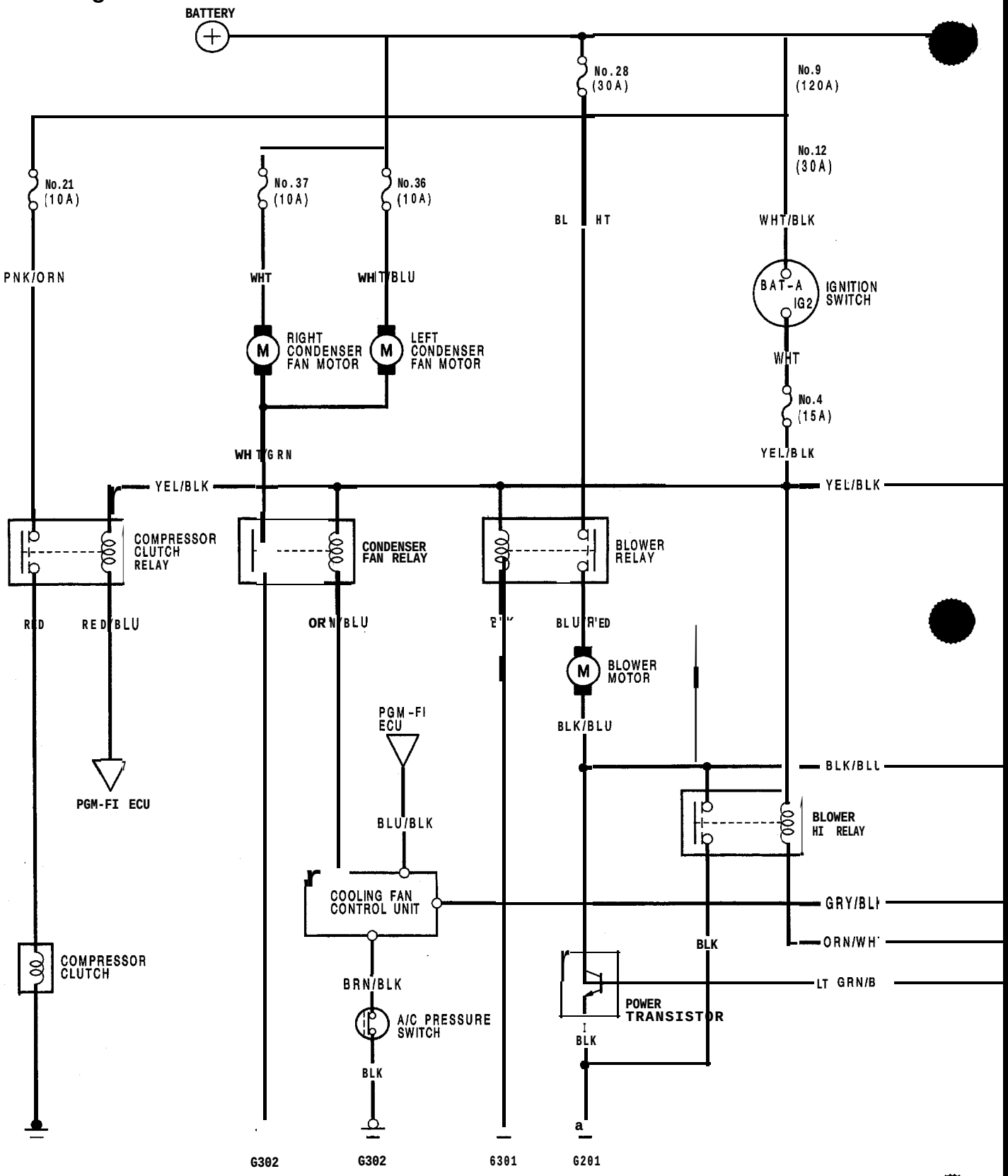
SRS wire harness is routed near the air conditioner harness.

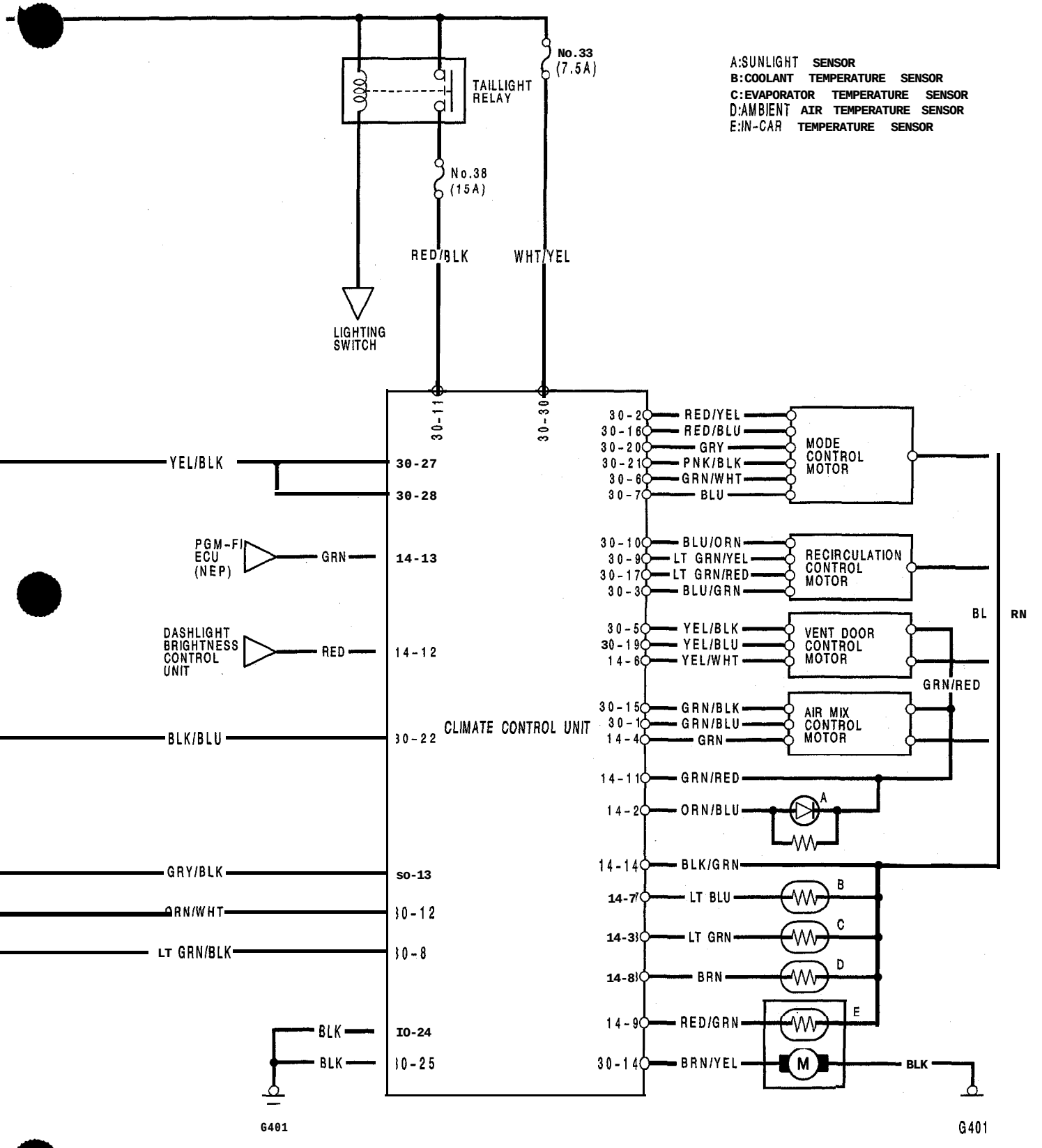
WARNING **All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.**

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the air conditioner harness.

Circuit Diagram

▪ Circuit Diagram



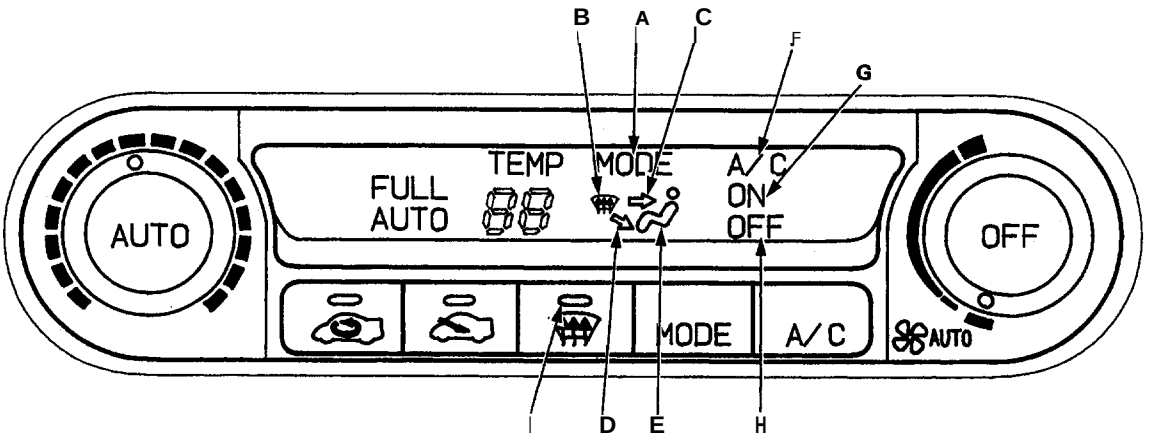

A:SUNLIGHT SENSOR
B:COOLANT TEMPERATURE SENSOR
C:EVAPORATOR TEMPERATURE SENSOR
D:AMBIENT AIR TEMPERATURE SENSOR
E:IN-CAR TEMPERATURE SENSOR
No.33 (7.5A)
TAILLIGHT RELAY
No.38 (15A)
RED/BLK
WHT/YEL
LIGHTING SWITCH
30-11
30-30
YEL/BLK
30-27
30-28
PGM-FI ECU (NEP)
GRN
14-13
DASHLIGHT BRIGHTNESS CONTROL UNIT
RED
14-12
BLK/BLU
30-22
CLIMATE CONTROL UNIT
GRY/BLK
so-13
ORN/WHT
30-12
LT GRN/BLK
30-8
BLK
IO-24
BLK
30-25
G401
30-2 RED/YEL
30-16 RED/BLU
30-20 GRY
30-21 PNK/BLK
30-6 GRN/WHT
30-7 BLU
MODE CONTROL MOTOR
30-10 BLU/ORN
30-9 LT GRN/YEL
30-17 LT GRN/RED
30-3 BLU/GRN
RECIRCULATION CONTROL MOTOR
30-5 YEL/BLK
30-19 YEL/BLU
14-6 YEL/WHT
VENT DOOR CONTROL MOTOR
BL
RN
GRN/RED
30-15 GRN/BLK
30-1 GRN/BLU
14-4 GRN
AIR MIX CONTROL MOTOR
14-11 GRN/RED
14-2 ORN/BLU
A
14-14 BLK/GRN
14-7 LT BLU
B
14-3 LT GRN
C
14-8 BRN
D
14-9 RED/GRN
E
30-14 BRN/YEL
M
BLK
G401

Troubleshouting

- Self -diagnosis Circuit Check

The Automatic Climate Control System has a built-in self-diagnosis feature. To run it, turn the ignition switch ON and turn the FAN switch to AUTO position. Wait for at least one minute on each TEMP display 18°C (64°F), 32°C (90°F). Then, push both the AUTO and OFF buttons on the control unit at the same time. Any problems in circuits "A" through ''I'' listed below will be indicated by the respective indicator coming on.

The climate control unit does not memorize which self-diagnosis indicator lights comes on. If you turn the ignition switch **OFF, the indicator light memory will be lost.**



	INDICATOR	COMPONENT WITH PROBLEM	POSSIBLE CAUSE	Refer to PAGE
A	MODE	IN-CAR TEMPERATURE SENSOR	Open or short circuit	22-I 6
B		AMBIANT TEMPERATURE SENSOR	Open or short circuit	22-I 8
C		SUNLIGHT SENSOR	Open or short circuit	22-20
D		COOLANT TEMPERATURE SENSOR	Open or short circuit	22-22
E		EVAPORATOR TEMPERATURE SENSOR	Open or short circuit	22-24
F	A/C	AIR MIX CONTROL MOTOR	Open or short circuit Air mix door stuck	22-26
G	ON (A/C)	MODE CONTROL MOTOR	Open position signal circuit Mode door stuck	22-30
H	OFF (A/C)	RECIRCULATION CONTROL MOTOR	Open position signal circuit	22-32
I	LED on defroster button	VENT DOOR CONTROL MOTOR	Open or short circuit Vent door stuck	22-34

Function Selection and Operation Check

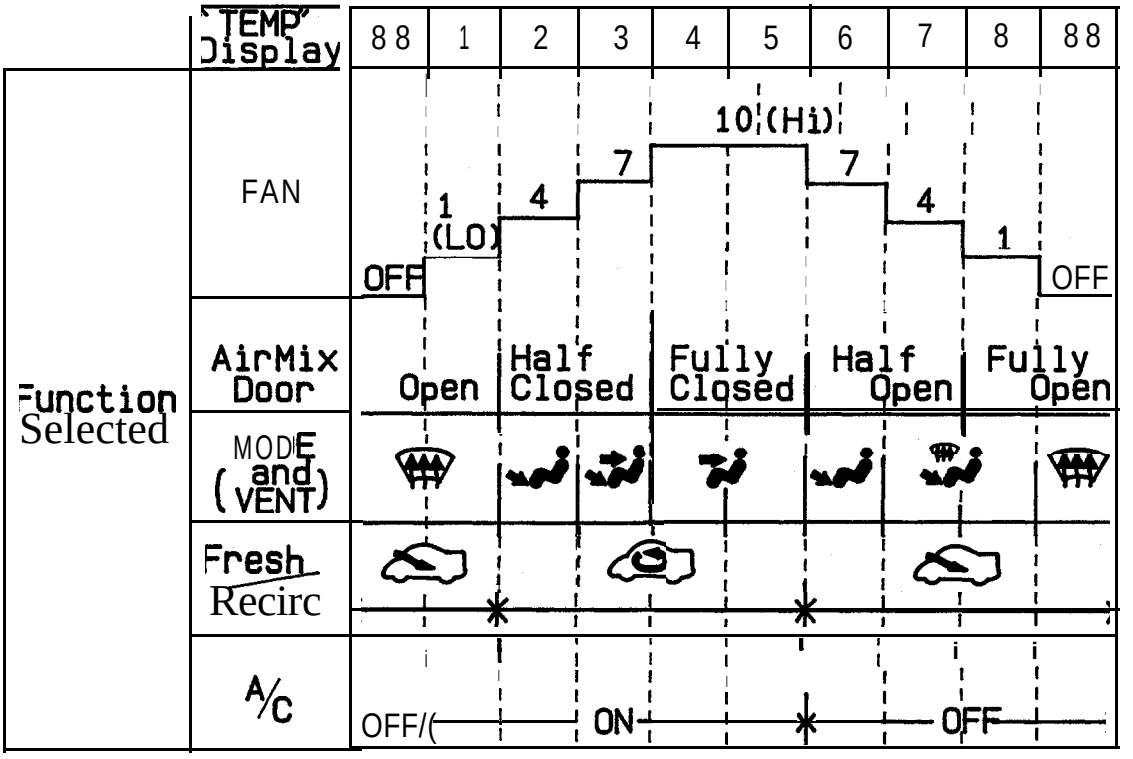
This check will quickly and automatically select and operate all functions of the climate control system, in the combinations and sequence shown below. It may help clarify a problem, or identify one that didn't shown up when you ran the self-diagnosis circuit check.

Turn the FAN switch to AUTO, then push in both the MODE and AUTO buttons and hold them in while you start the engine. The control unit will then automatically run the check in eight steps one step every 5 seconds.

To stop at one of those steps, push the MODE button; to continue, push it again for each step after that.

Pushing the OFF button or turning the ignition OFF, will turn off the check.

Check the temperature, volume, and source of this air flow, and compare it to what the chart shows it should be.



Troubleshooting

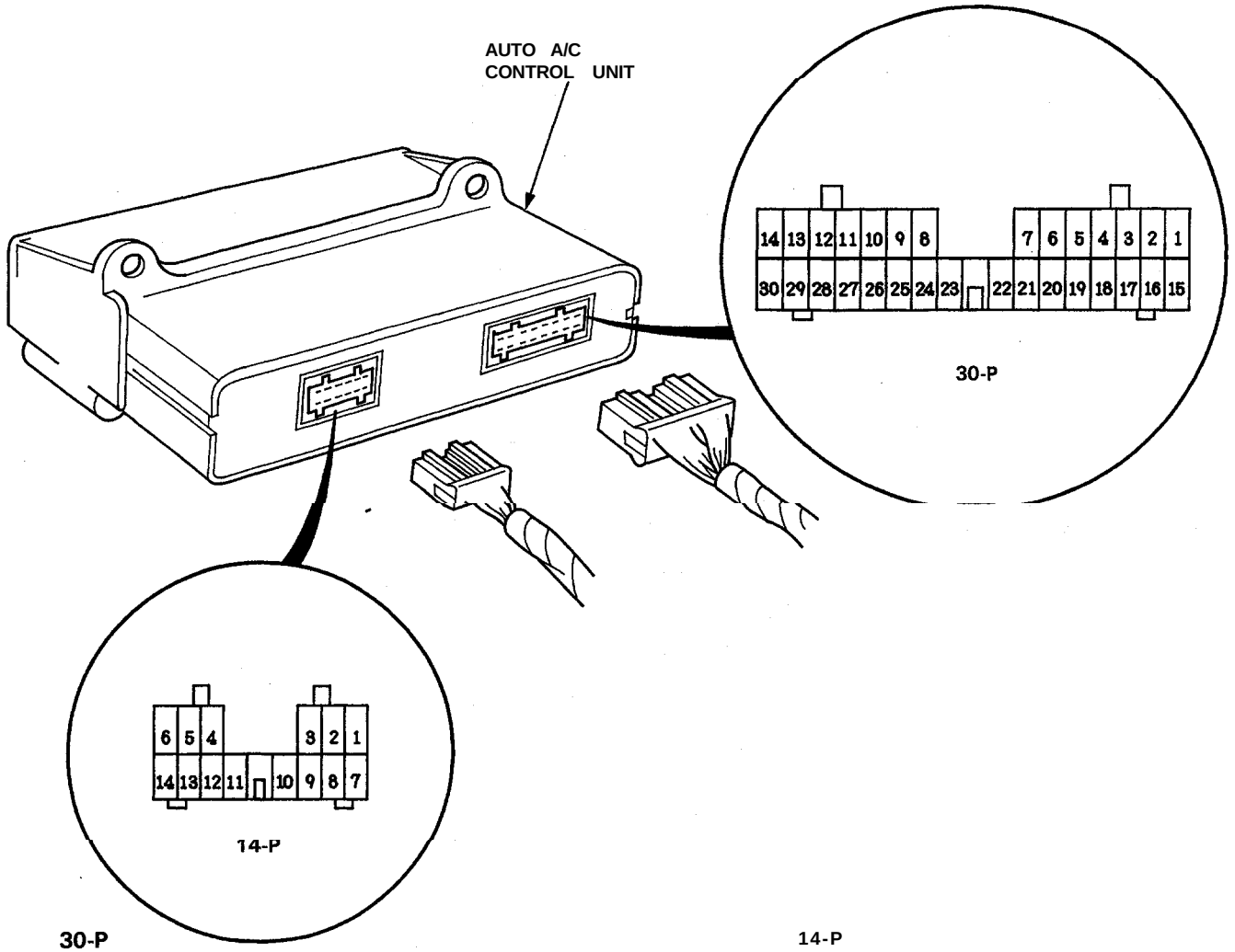
Symptom-to-Components Chart

Use this chart if the self-diagnosis checks don't identify any cause for the symptom.
Across each row in the chart, the potential sources of a symptom are ranked in the order they should be inspected in, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the component is OK, try component ②, etc.

PAGE / SYSTEM / SYMPTOM	POWER CIRCUITS TO CLIMATE CONTROL UNIT	IN-CAR TEMPERATURE SENSOR	AMBIENT TEMPERATURE SENSOR	SUNLIGHT SENSOR	COOLANT TEMPERATURE SENSOR	EVAPORATOR TEMPERATURE SENSOR	AIR MIX CONTROL MOTOR	MODE CONTROL MOTOR	RECIRCULATION CONTROL MOTOR	VENT DOOR CONTROL MOTOR	BLOWER MOTOR	SLOWER SPEED CONTROLS	A/C SYSTEM	A/C CONDENSER FAN	A/C COMPRESSOR
	22-38	23-16	22-18	22-20	22-22	22-24	22-26	22-30	22-32	22-34	22-40	22-46	22-50	22-52	22-56
Climate control system does not work at all.	①														
No air from blower.	①				②						③				
No cold air from blower.		①	②			③									
No hot air from blower.		②					①								
Actual temperature is different from set temperature.	②	③	①												
Blower motor does not run.											①				
Blower motor speed does not change.					②	③						①			
Compressor clutch does not engage. and the condenser fan does not run. — If coolant temperature is above 130°C;															
Compressor clutch does not engage. and the condenser fan does not run. — If coolant temperature is below 130°C;													①		
Condenser fan does not run, but the compressor runs normally.														①	
Compressor clutch does not engage. but the condenser fan runs normally.			②			③									①

*Cool down coolant, and recheck.

Control Unit Signals



30-P

No.	Signal	No.	Signal
1	Air Mix Motor COLD ⊕	11	Small Light
2	VENT (mode)	12	Blower High Relay
3	Fresh Position Signal	13	A/C Signal
4		14	Asperator Fan
5	Vent Motor CLOSE ⊕	15	Air Mix Motor HOT ⊕
6	MODE 3	16	DEF
7	MODE 4	17	Recirc. Position Signal
8	Power Transistor Base	18	
9	RECIRC. ⊕	19	Vent Motor OPEN ⊕
10	FRESH ⊕	20	MODE 1

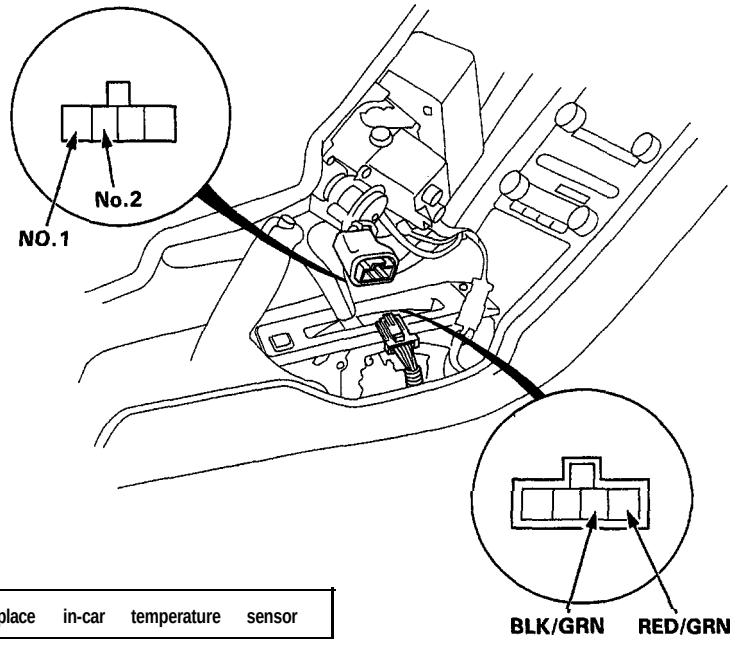
14-P

No.	Signal	No.	Signal	No.	Signal
21	MODE 2	1		11	+5 V
22	Blower Feedback	2	Sunlight Sensor	12	Illumination Control
23		3	Evaporator Temperature Sensor	13	Engine Revolution Pulse
24	GND	4	Air Mix Motor Potential	14	Signal GND
25	GND	5			
26		6	Vent Motor Potential		
27	IG2	7	Coolant temperature Sensor		
28	IG2	8	Ambient Temperature Sensor		
29		9	In-car Temperature Sensor		
30	+B	10			

- In-car Temperature Sensor

Self-diagnosis indicator lilght A comes on: Indicates a problem in the in-car temperature sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The in-car temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the temperature inside the car increases.



Problem in the in-car temperature sensor circuit.

Remove the center console panel (page 22-84), then disconnect the 4-P connector from the in-car temperature sensor.

Measure resistance between the No. 1 terminal and No.2 terminal in the sensor half of the connector.

Is there I-1 2kΩ?

NO → Replace in-car temperature sensor

YES

Turn the ignition switch ON.

Measure voltage between the RED/GRN wire (+) terminal in the other half of the connector and body ground.

Is there approx. 5V?

NO → Turn the ignition switch OFF.

YES

Measure voltagbe between the RED/GRN wire (+) terminal and the BLK/GRN wire (−) terminal.

A

(To page 22-I 7)

Remove the climate control unit (page 22-84). Leave the wire connected.

Turn the ignition switch ON.

B

(To page 22-I 7)

(From page 22-I 6)

A

Is there approx. 5 V?

NO

Repair open in BLK/GRN wire between control unit and in-car temperature sensor.

YES

Remove the control unit (page 2284). Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

(From page 22-16)

B

From the back of the 14-P connector, measure voltage between No.9 (+) terminal and No.14 (−) terminal.

< Is there approx. 5 V?

YES

Repair open in RED/GRN wire between control unit (No.9) and in-car temperature sensor.

NO

Disconnect the 14-P connector from the climate control unit.

Check for continuity between No.9 terminal and body ground.

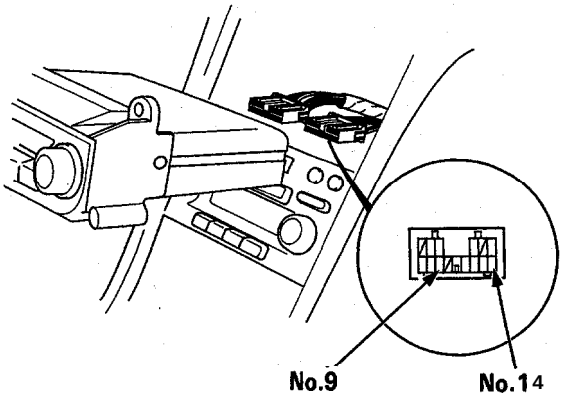
Is there continuity?

YES

Repair short in RED/GRN wire between control unit (No.9) and in-car temperature sensor.

NO

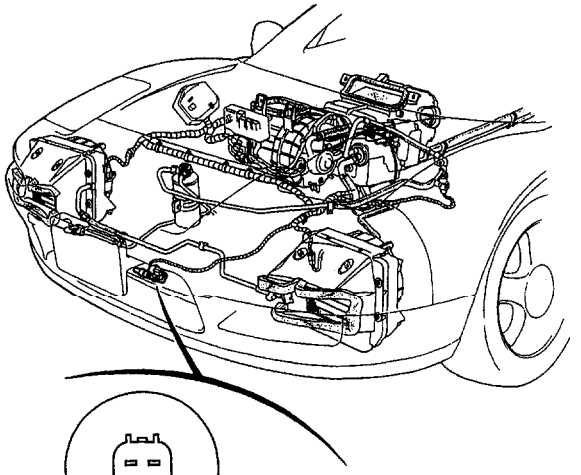
Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

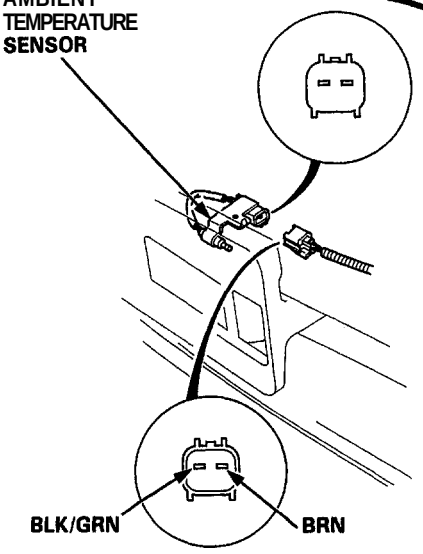


Ambient Temperature Sensor

Self-diagonis indicator light B comes on: Indicates a problem in the ambient temperature sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The ambient temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the temperature outside the car increases.





Problem in the ambient temperature sensor circuit.

Turn the ignition switch OFF.

Disconnect the 2-P connector from the ambient temperature sensor behind the front grille.

Measure resistance between the 2 terminals in the temperature sensor half of the connector.

Is there 1-7 kΩ?

NO → Replace ambient temperature sensor.

YES

Turn the ignition switch ON.

Measure voltage between BRN wire (+) terminal in the half of the connector and body ground.

Is there approx. 5V?

NO → Turn the ignition switch OFF. → B

YES → A

(To page 22-19)

(To page 22-19)

(From page 22-18)

A

Measure voltage between the BRN wire (+) terminal and the BLK/GRN wire (−) terminal.

Is there approx. 5 V?

NO

Repair open in **BLK/GRN wire between control unit and ambient temperature sensor.**

YES

Remove the control unit (page 22-84). Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

(From page 22-I 8)

B

Remove the climate control unit (page 22-84). Leave the wire connected.

From the back of the 14-P connector, measure voltage between No.8 (+) terminal and No.14 (−) terminal.

Is there approx. 5 V?

YES

Repair open in BRN (No.81 wire between control unit and ambient temperature sensor.

NO

Disconnect the 14-P connector from the climate control unit.

Check for continuity between No.8 terminal and body ground.

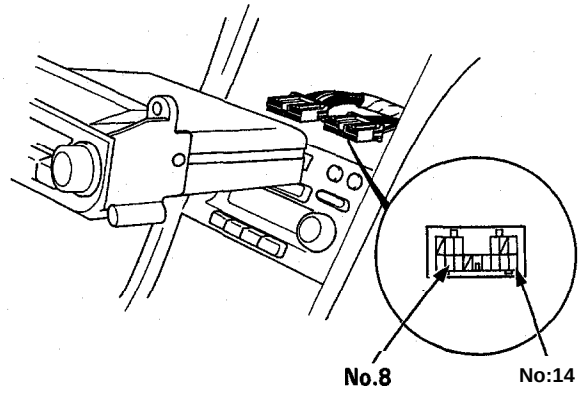
Is there continuity?

YES

Repair short in BRN (No.8) wire between control unit and ambient temperature sensor.

NO

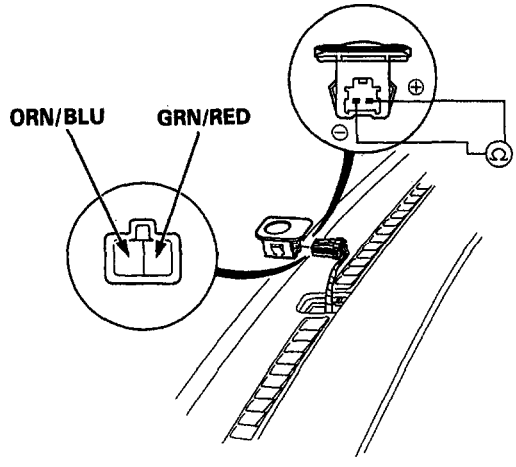
Substitute a known-good control unit and recheck. If **symptom/indication goes away, replace the original control unit.**



Sunlight Sensor

Self-diagnosis indicator light C comes on: Indicates a problem in the sunlight sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The sunlight sensor is a light sensitive, variable resistance diode. The resistance of the diode increases as the intensity of the light increases.



Problem in the sunlight sensor circuit.

Disconnect the 2-P connector from the sunlight sensor.

Measure resistance between the 2 terminals in the sunlight sensor as shown.

Is there approx. 7.5 kg? NO → Replace sunlight sensor.

YES

Turn the ignition switch ON.

Measure voltage between GRN/RED wire (+) terminal in the connector and body ground.

Is there approx. 5 V? NO

YES

Turn the ignition switch OFF.

Remove the climate control unit (page 22-84). Leave the wire connected.

Turn the ignition switch ON.

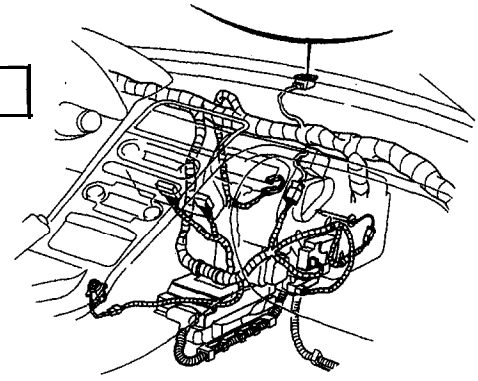
Measure voltage between GRN/RED wire (+) terminal and ORN/BLU wire (−) terminal.

A

To page 22-21

B

To page 22-21



From page 22-20

A

Is there approx. 5 V?

NO

Repair open in ORN/BLU (—) wire between control unit and sunlight sensor.

YES

Remove the control unit (page 22-84). Substitute a known-good control unit and recheck. If symptomlindication goes away, replace the original control unit.

From page 22-20

B

From the back of the 14-P connector, measure voltage between No.1 1 (+) terminal and No.2 (−) terminal.

Is there approx. 5 V?

YES

Repair open in GRN/RED (No.11) wire between control unit and sunlight sensor.

NO

Disconnect the 14-P connector from the climate control unit.

Check for continuity between No. 11 terminal and body ground.

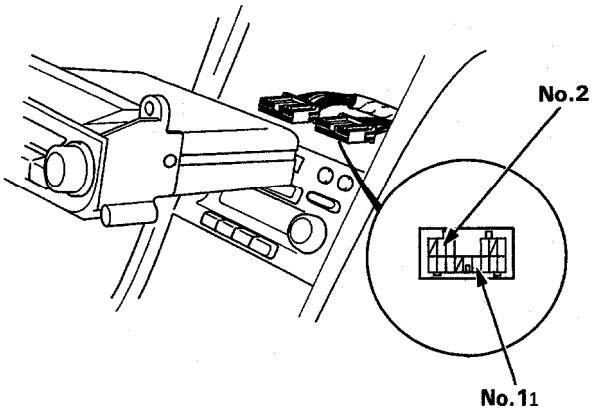
Is there continuity?

YES

Repair short in GRN/RED (No.11) wire between control unit and sunlight sensor.

NO

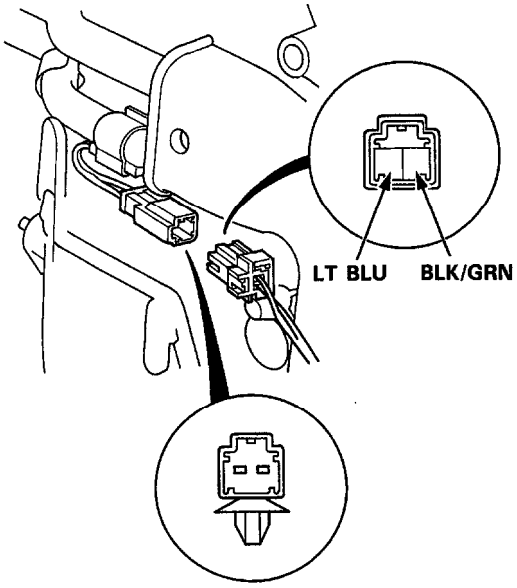
Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

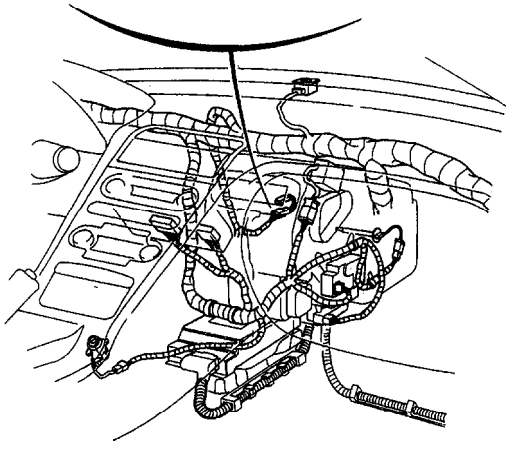


Coolant Temperature Sensor

Self-diagnosis indicator light D comes on: Indicates a problem in the coolant temperature sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The coolant temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermister decreases as the coolant temperature increases.





Problem in the coolant temperature sensor circuit.

Disconnect the 2-P connector from the coolant temperature sensor.

Measure resistance between the 2 terminals in the temperature sensor half of the connector.

Is there 5 ~ 30 kg? NO → Replace coolant temperature sensor.

YES

Turn the ignition switch ON.

Measure voltage between LT BLU wire (+) terminal in the other half of the connector and body ground.

Is there approx. 5 V? NO → Turn the ignition switch OFF.

YES

Remove the climate control unit (page 22-84). Leave the wire connected.

Turn the ignition switch ON.

Measure voltage between LT BLU wire (+) terminal and BLK/GRN wire (−) terminal.

A

To page 22-23

B

To page 22-23

(From page 22-22)

A

Is there approx. 5 V?

NO → **Repair open in BLK/GRN (−) wire between** control unit and coolant **temperature sensor.**

YES

Remove the control unit (page 22-84). Substitute a known-good control unit and recheck. If symptom/indication goes away. replace the original control unit.

(From page 22-22)

B

From the back of the 14-P connector, measure voltage between No.7 (+) terminal and No.14 (−) terminal.

Is there approx. 5 V?

YES → **Repair open in LT BLU (No.7) wire between control unit and coolant temperature sensor.**

NO

Disconnect 14-P connector from the control unit.

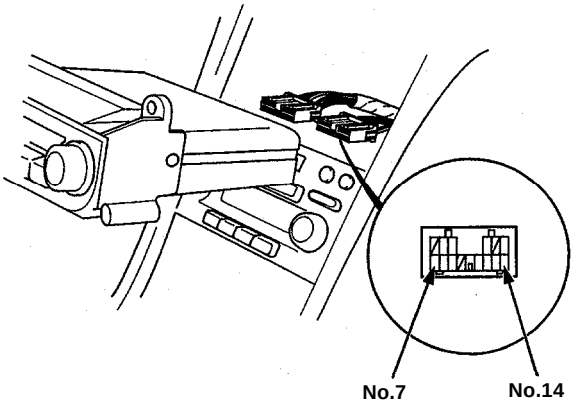
Check for continuity between No.7 terminal and body ground.

Is there continuity?

YES → **Repair short in LT BLU (No.7) wire between control unit and coolant temperature sensor.**

NO

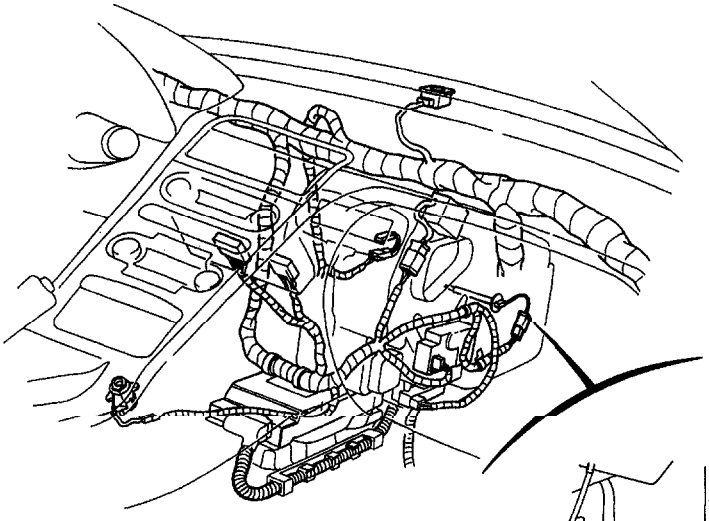
Substitute a known-good control unit and recheck. If **symptom/indication** goes away, replace the original control unit.

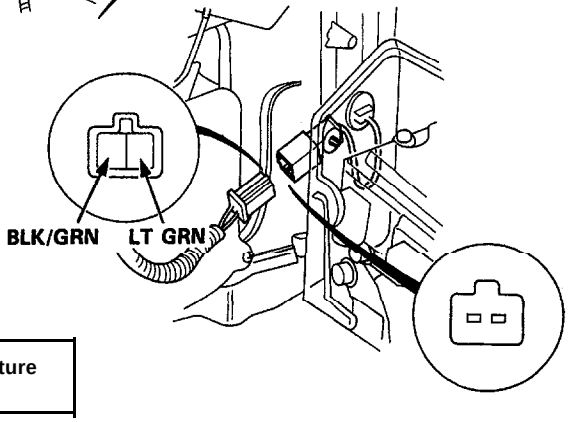


▪ Evaporator Temperature Sensor

Self-diagnosis indicator light E comes on: Indicates a problem in the evaporator sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The evaporator temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the evaporator outlet air temperature increases.





Problem in the evaporator temperature sensor circuit.

Disconnect the 2-P connector from the evaporator temperature sensor.

Measure resistance between the 2 terminals in the temperature sensor half of the connector.

Is there 2-6 kΩ?

NO → Replace evaporator temperature sensor.

YES

Turn the ignition switch ON.

Measure voltage between LT GRN wire (+) terminal in the other half of the connector and body ground.

Is there approx. 5 V?

NO → Turn the ignition switch OFF.

Remove the climate control unit (page 22-84). Leave the wire connected.

Turn the ignition switch ON.

B

To page 22-25

YES

Measure voltage between LT GRN wire (+) terminal and BLK/GRN wire (−) terminal.

A

To page 22-25

From page 22-24

A

Is there approx. 5 V?

NO

Repair open in BLK/GRN (−) wire between control unit and evaporator temperature sensor.

YES

Remove the control unit (page 22-841.
Substitute a know-good control unit and recheck. if **symptom/indication** goes away, replace the original control unit.

From page 22-24

B

From the back of the 14-P connector, measure voltage between No.3 (+) terminal and No. 14 (−) terminal.

Is there approx. 5 V?

YES

Repair open in LT GRN wire between control unit **(No.3)** and evaporator temperature sensor.

NO

Disconnect 14-P connector from the control unit.

Check for continuity between No.3 terminal and body ground.

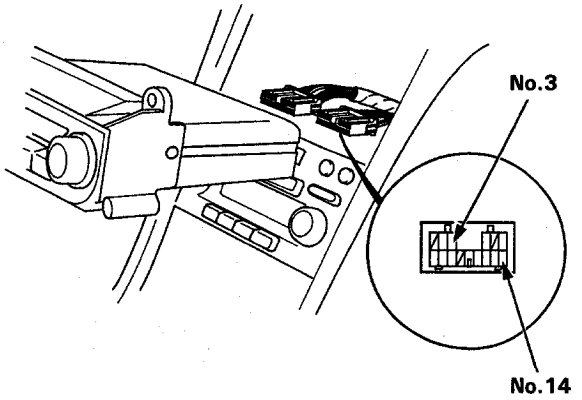
Is there continuity?

YES

Repair short in LT GRN wire between control unit **(No.3)** and evaporator temperature sensor.

NO

Substitute a know-good control unit and recheck. If **symptom/indication** goes away, replace the original control unit.



Air Mix Control Motor

Self-diagnosis indicator light F comes on: Indicates a problem in the air mix control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The air mix control motor regulates the mixture to cold/hot air according to output from the control unit.

Problem in the air mix control motor circuit

Turn the ignition switch OFF.

Make sure all wires in the air mix control motor connector are securely attached. Make sure the linkage is free of obstructions.

Remove the climate control unit (page 22-84) Leave the wire connected.

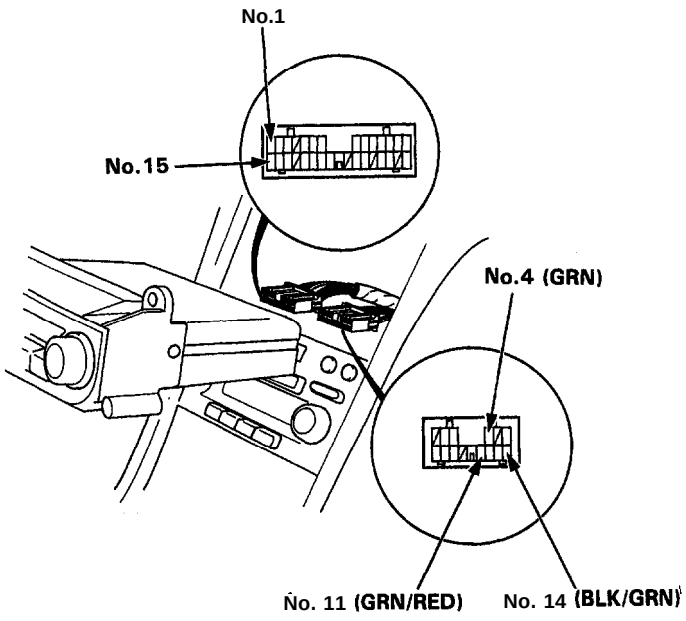
Turn the ignition switch ON.
Set the temperature control dial at TEMP display 18, then measure battery voltage between the No. 15 terminal and body ground when turning temperature control dial at TEMP display 32. After, measure battery voltage between the No.1 terminal and body ground when turning temperature control dial at TEMP display 18.

Is there battery voltage?

NO → Substitute a known-good control unit and recheck.
If symptom/indication goes away, replace the original control unit.

YES

To page 22-27



From page 22-26

Turn the ignition switch OFF.

Disconnect the 6-P connector from the air mix control motor.

Turn the ignition switch ON.
Set the temperature control dial at TEMP display 18, then measure battery voltage between the GRN/BLK terminal and body ground when turning temperature control dial at TEMP display 32. After, measure battery voltage between the GRN/BLU terminal and body ground when turning temperature control dial at TEMP display 18.

Is there battery voltage?

NO → **Repair** open in the **GRN/BLK** or **GRN/BLU** wires between the air mix control motor and the control unit.

YES

Turn the ignition switch OFF. Disconnect the 30-P connector from the control unit.

Check for continuity between GRN/BLK or GRN/BLU terminals and body ground.

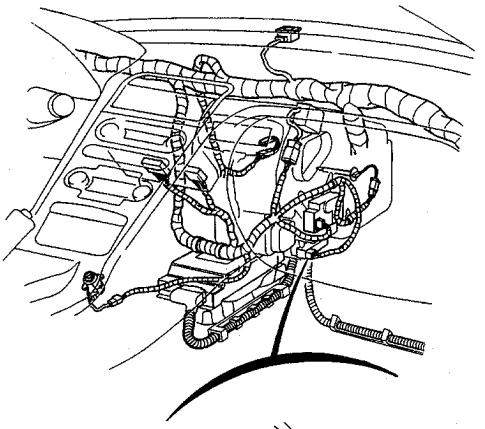
Is there continuity?

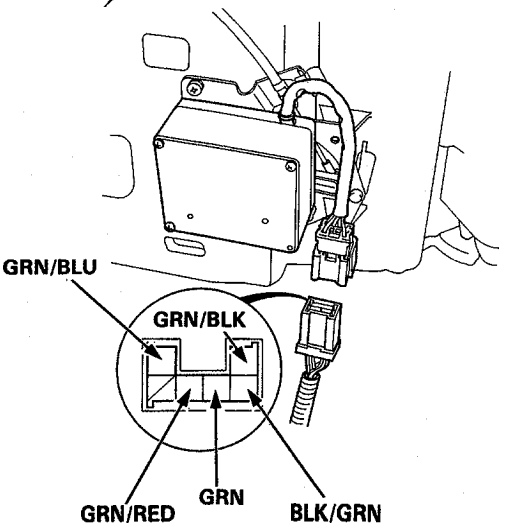
YES → Repair short in the **GRN/BLK** or **GRN/BLU** wires between the air mix control motor and the control unit.

NO

Reconnect the 30-P connector.

To page 22-28.





(cont'd)

- Air Mix Control Motor (cont'd)

From page 22-27

From the back of the 14-P connector at the control unit, measure voltage between the No. 11 and body ground.

Is there approx. 5 V

NO → Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

YES

Measure voltage between the GRN/RED terminal and body ground.

Is there approx. 5 V

NO → Repair open in the GRN/RED wire between the air mix control motor and control unit.

YES

Turn the ignition switch OFF.

Disconnect the 14-P connector from the control unit.

Check each wires for continuity:
- GRN wire
- BLK/GRN wire

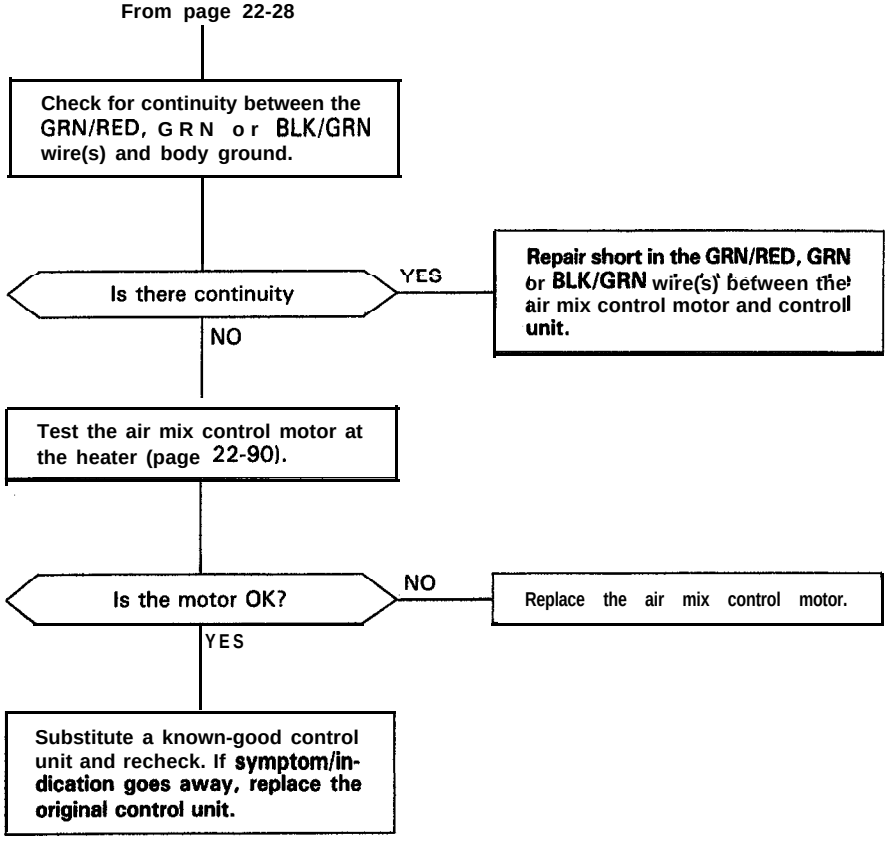
< Is there continuity?

NO → Repair open in the GRN or BLK/GRN wire(s) between the air mix control motor and control unit.

YES

To page 22-29

From page 22-28



- Mode Control Motor

Self-diagnosis indicator light G comes on: indicates a problem in the mode control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The mode control motor controls the outlet air direction and volume adcording to output from the control unit.

Problem in the mode control motor circuit.

Turn the ignition switch OFF.

Make sure all wires in the mode control motor connector are securely attached. Make sure the linkage is free of obstructions.

Remove the climate control unit (page 22-84).

Disconnect the both connectors from the climate control unit.

Connect battery power to the No. 16 terminal of the 30-P connector, and connect the No. 2 terminal to body ground. The mode control motor should run. If it doesn't, try reversing the connections.

Does the motor run?

NO → Test the mode control motor at the heater (page 22-91).

YES

At the heater disconnect the 7-P connector from mode control motor.

Check each wires for continuity:
- GRY wire
- PNK/BLK wire
- GRN/WHT wire
- BLU wire
- BLK/GRN wire

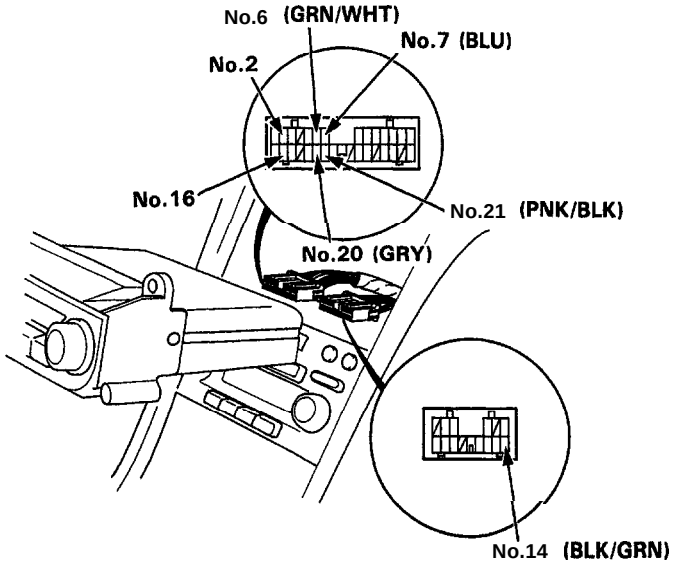
To page 22-31

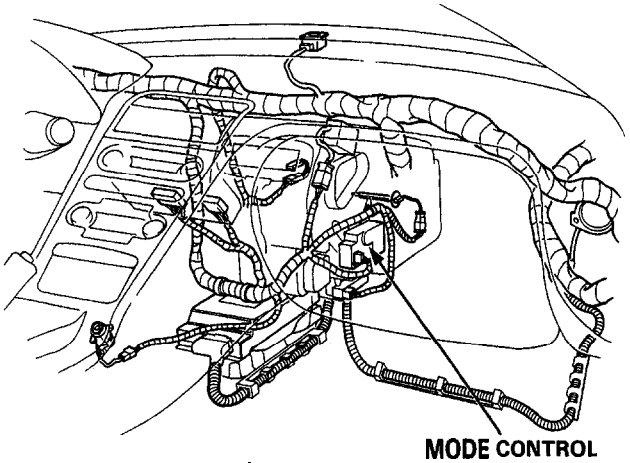
Is the motor OK?

NO → Replace the motor. If the mode control door is stuck, repair it.

YES

Repair any open in the wire(s) between the motor and the control unit.





From page 22-30

Is there continuity?
NO → Repair any open in the **wire(s)** between the mode control motor and climate control unit.
YES

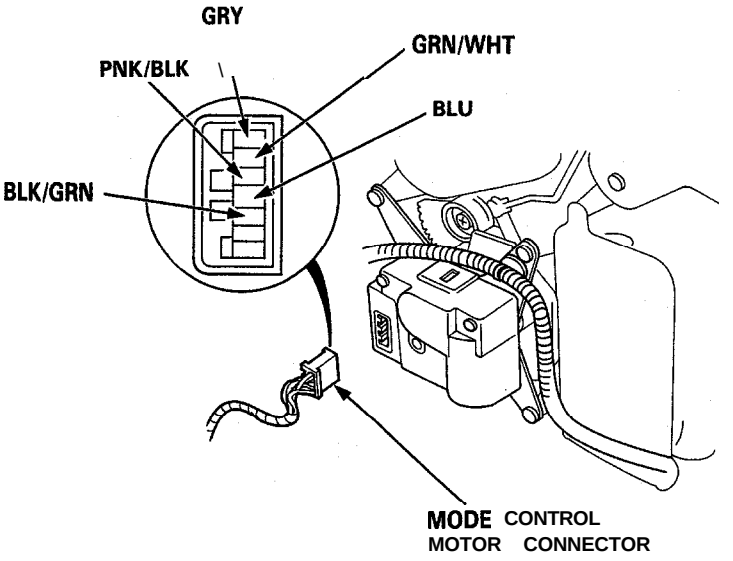
Check for continuity between each wires and body ground.

Is there continuity?
YES → Repair short in the **wire(s)** between the mode control motor and control unit.
NO

Test the mode control motor (page 22-91)

Is the motor OK?
NO → **Replace the motor. If the mode control door is stuck, repair it.**
YES

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



Recirculation Control Motor

Self-diagnosis indicator light H comes on: Indicates a problem in the recirculation control motor circuit. Use a digital multimeter (KS-AHM32-003) to check it.

The recirculation control motor regulates the fresh/recirc door according to output from the control unit.

Problem in the recirculation control motor circuit.

Turn the ignition switch OFF.

Make sure all wires in the recirculation control motor connector are securely attached. Make sure the linkage is free of obstructions.

Remove the climate control unit (page 22-84).

Disconnect the both connectors from the climate control unit.

Open the hood. Disconnect the 8-P connector from recirculation control motor at the blower.

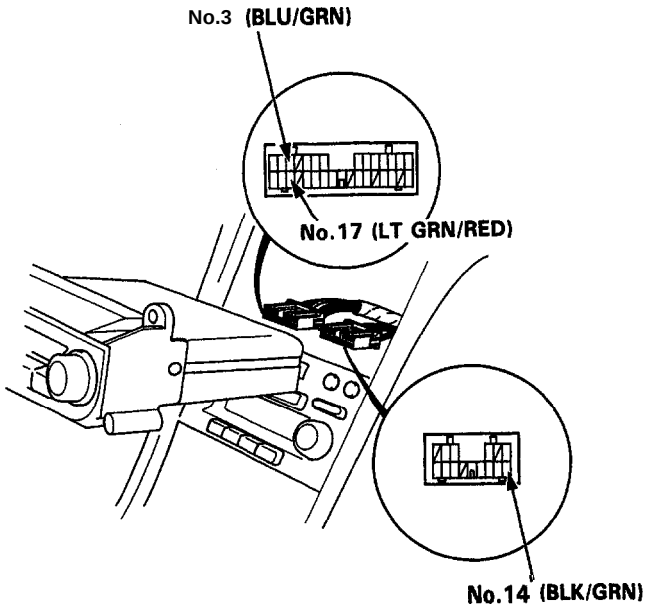
Check each wires for continuity:
- BLU/GRN wire
- LT GRN/RED wire
- BLK/GRN wire
- LT GRN/YEL wire
- BLU/ORN wire

Is there continuity?

NO → Repair any open in the wire(s) between the reclrc. motor and climate control unit.

YES

To page' 22-33



From page 22-32

Check for continuity between the each wires and body ground.

Is there continuity? — YES → Repair any short in wire(s) between the recirc. motor and control unit.

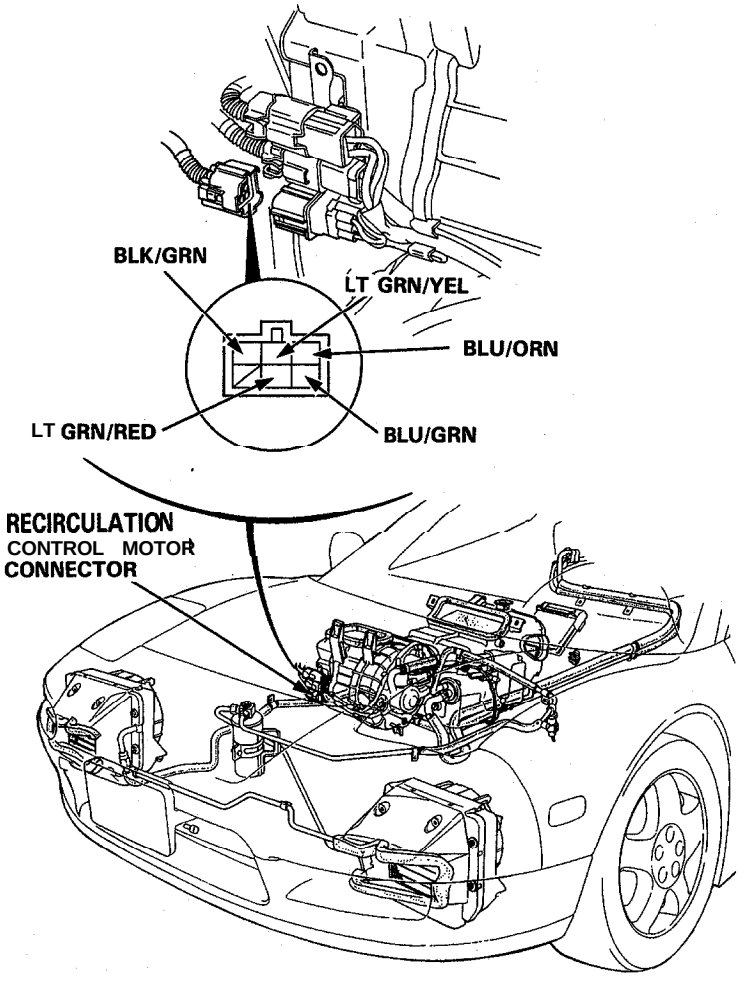
NO

Test the recirculation control motor at the blower (page 22-89).

Is the motor OK? — NO → Replace the motor.

YES

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



- Vent Door Control Motor

Self-diagnosis indicator light I comes on: Indicates a problem in the vent door control motor circuit. Use a digital multimeter (KS-AHM32-03) to check it.

The vent door control motor regulates the vent door according to output from the control unit.

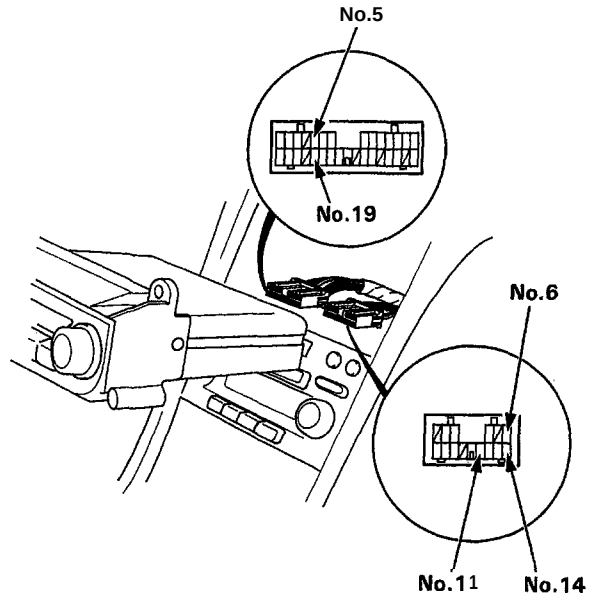
Problem in the vent door control motor circuit.

Turn the ignition switch OFF.

Make sure all wires in the vent door control motor connector are securely attached. Make sure the linkage is free of obstructions.

Remove the climate control unit (page 22-84). Leave the wire connected.

Turn the ignition switch ON. Set the temperature control dial at **TEMP display 18, then measure** battery voltage between No.5 terminal and body ground when turning temperature control dial at **TEMP display 32. After, measure battery voltage between No. 19 terminal and body ground when** turning temperature control dial at **TEMP display 18.**



Is there battery voltage?

NO

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

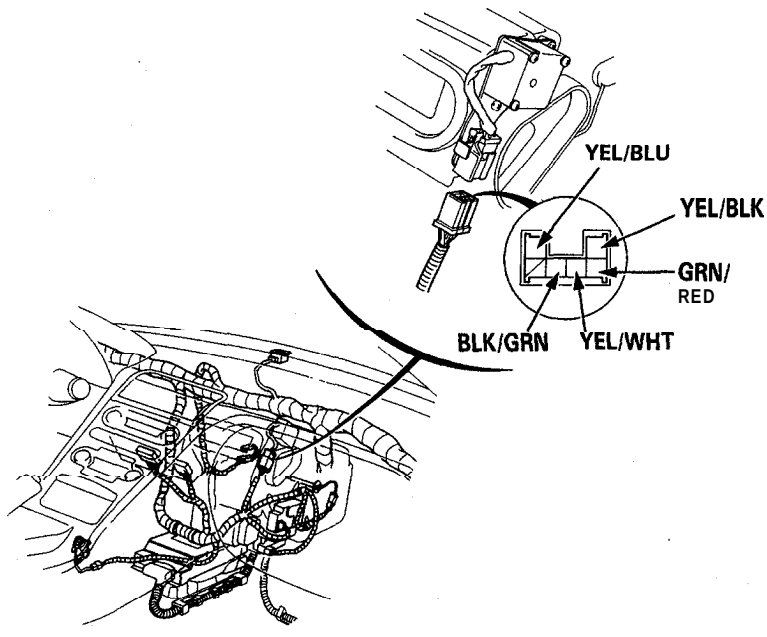
To page 22-35

(From page 22-34)

Turn the ignition switch OFF.

Disconnect the 6-P connector from the vent door control motor.

Turn the ignition switch ON.
Set the temperature control dial at TEMP display 18, then measure battery voltage between the YEL/BLK terminal and body ground when turning the temperature control dial at TEMP display 32.
After, measure battery voltage between the YEL/BLU terminal and body ground when turning the temperature control dial at TEMP display 18.



Is there battery voltage?

NO → Repair open in YEL/BLK or YEL/BLU wires between the vent door control motor and control unit.

YES

Turn the ignition switch OFF.
Disconnect the 14-P connector from the control unit.

Check for continuity between YEL/BLK or YEL/BLU terminals and body grond.

Is there continuity?

YES → Repair short in the YEL/BLK or YEL/BLU wires between the vent door control motor and control unit.

NO

Reconnect the 14-P connector.

To page 22-36

(cont'd)

- Vent Door Control Motor (cont'd)

From page 22-35

From the back of the 14-P connector at the control unit, measure voltage between the No. 11 and body ground.

Is there approx. 5V

NO → Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.

YES

Measure voltage between the GRN/RED terminal and body ground.

Is there approx. 5V

NO → Repair open in the GRN/RED wire between the vent door control motor and control unit.

YES

Turn the ignition switch OFF.

Disconnect the 14-P connector from the control unit.

Check each wires for continuity:
- YEL/WHT wire
- BLK/GRN wire

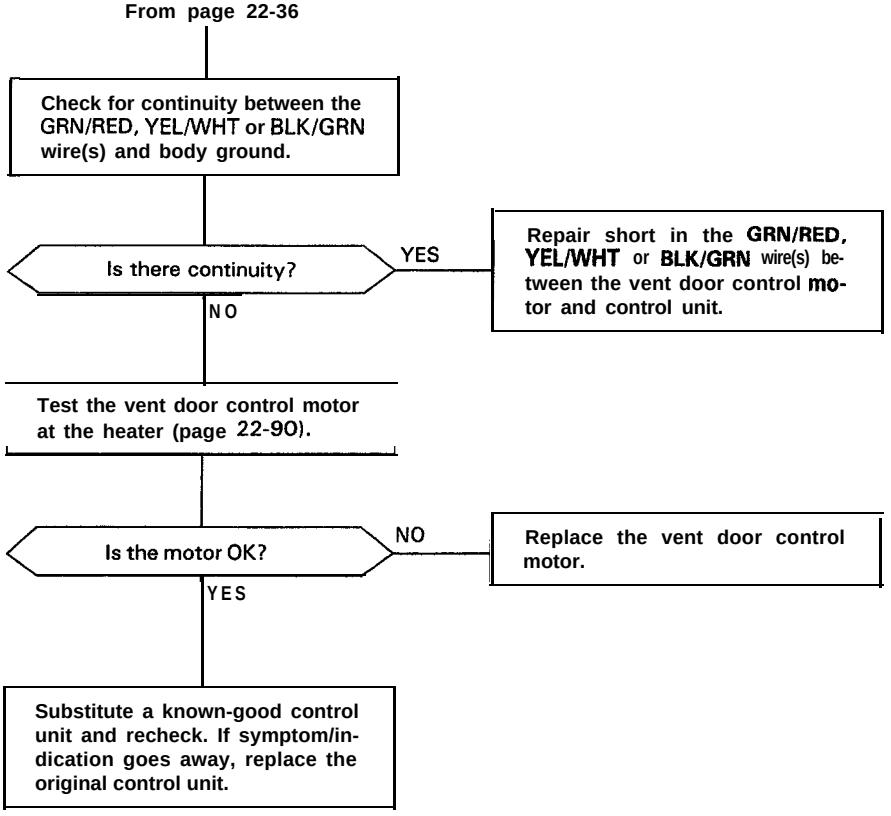
Is there continuity?

NO → Repair open in the YEL/WHT or BLK/GRN wire(s) between the vent door control motor and control unit.

YES

To page 22-37

From page 22-36



- Power Circuits to A/C Control Unit

First, check for blown No.33 (7.5A) and No.4 (15A) fuses.

No heater and A/C in either manual or AUTO modes.

Remove the climate control unit (page 22-84).

Disconnect the 30-P connector from the climate control unit.

Turn the ignition switch ON.

Measure voltage between the No.30 (WHT/YEL) terminal and body ground.

Is there battery voltage?

NO → Repair open in WHT/YEL (No.301 wire between the control unit and No.33 (7.5 A) fuse.

YES

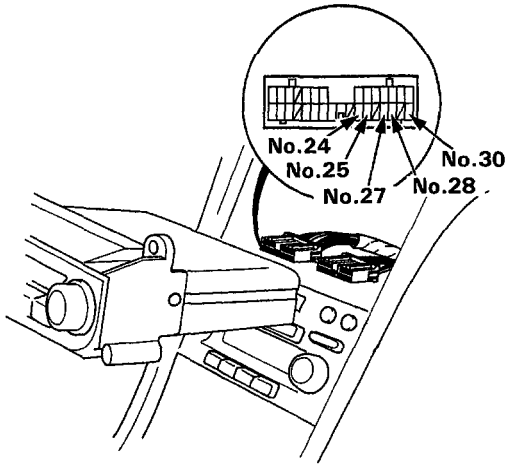
Measure voltage between:
- No.28 (YEL/BLK) terminal and body ground.
- No.27 (YEL/BLK) *terminal* and body ground.

Is there battery voltage?

NO → Repair open in YEL/BLK (No.27 or No.281 wire between the control unit and No.4 (15A) fuse.

YES

To page 22-39



From page 22-38

Check for continuity between:
- No.25 (BLK) and body ground.
- No.24 (BLK) and body ground.

Is there continuity?

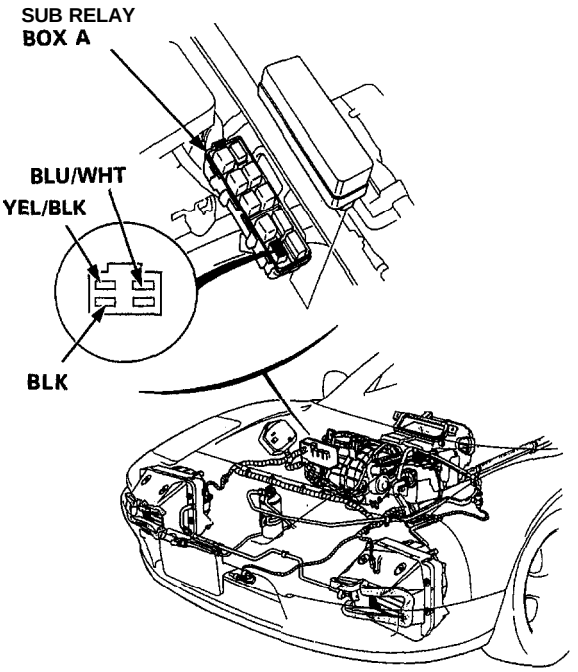
NO → Repair open BLK (No.24 or No.251 wire between the control unit and body ground. If wires are OK, check for poor ground at G401.

YES

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

Blower Motor

First, check for blown No.28(30A) and No.4(15A) fuse



Blower motor does not run at all.

Open the hood, then remove the cover from sub relay box A and remove the blower relay.

Turn the ignition switch ON.

Measure voltage between the BLU/WHT wire terminal (+) and body ground (−).

Is there battery voltage?

NO → Repair open in **BLU/WHT** wire between the No.28 **(30A)** fuse and blower relay.

YES

Measure voltage between the YEL/BLK wire terminal (+) and body ground (−).

Is there battery voltage?

NO → **Repair open in YEL/BLK wire between blower relay and No.4 (15 A) fuse.**

YES

To page 22-41

From page 22-40

Test the blower relay: Connect battery power to relay terminal C, then connect terminal D to body ground. There should be continuity between terminals A and B with power connected, no continuity with power disconnected.

Is the relay OK? NO → Replace the blower relay.

YES

Check for continuity between the BLK wire terminal and body ground

Is there continuity? NO → Repair open in BLK wire between the blower relay and body ground. If wire is OK, check for poor ground at 0301.

YES

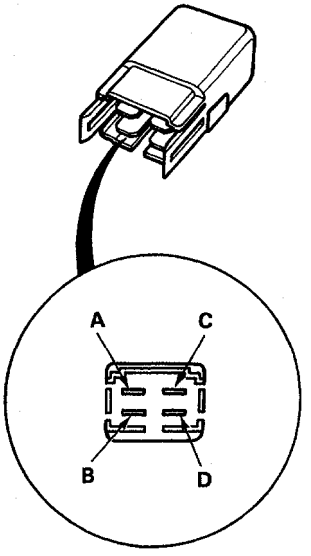
Turn the ignition switch OFF.

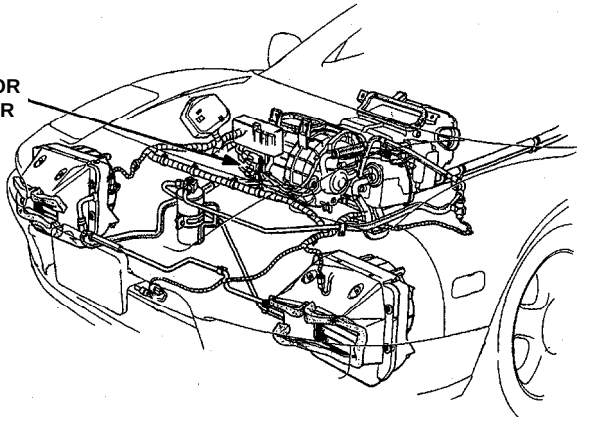
Reinstall the blower relay.

Disconnect the 2-P connector from the blower motor.

Turn the ignition switch ON.

To page 22-42





(cont'd)

Blower Motor (cont'd)

From page 22-41

Measure voltage between the BLU/RED wire terminal (+) and body ground (−).

Is there battery voltage?

NO → Repair open in BLU/RED wire between blower motor and blower relay

YES

Inspect the blower motor.

NOTE: Connect the battery power to the BLU/RED wire terminal and connect the BLK/BLU wire terminal to body ground. The blower motor should runs.

Does the blower motor run?

NO → Replace the blower motor.

YES

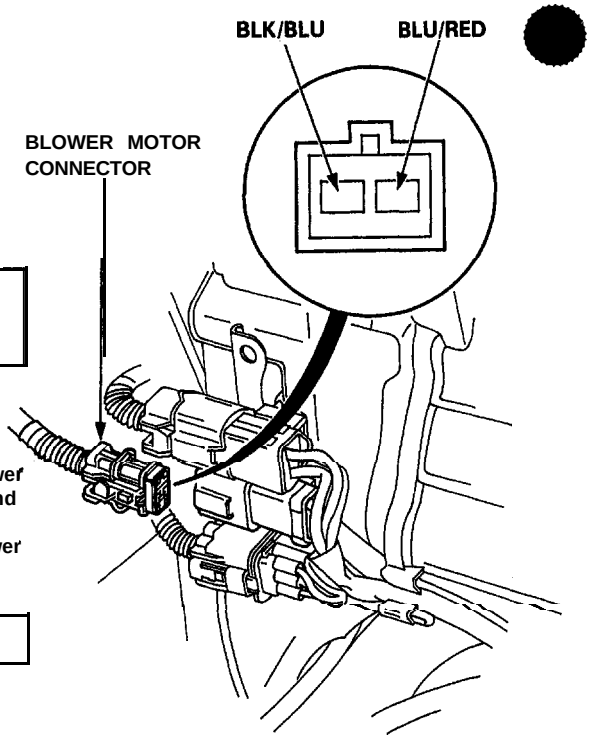
Turn the ignition switch OFF.

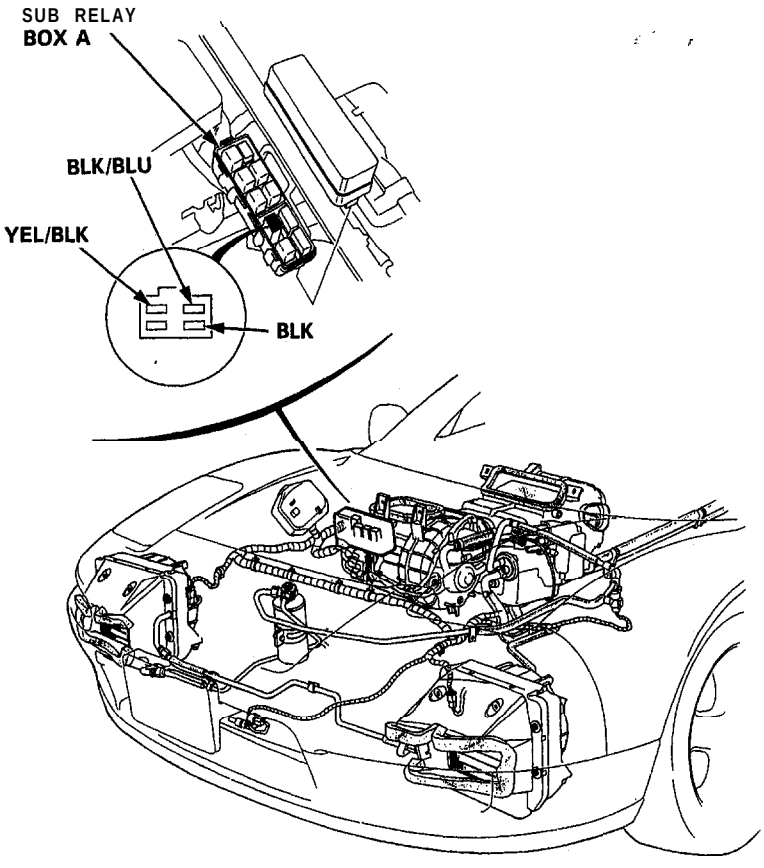
Reconnect the connector to the blower motor.

Remove the blower high relay from the sub relay box A.

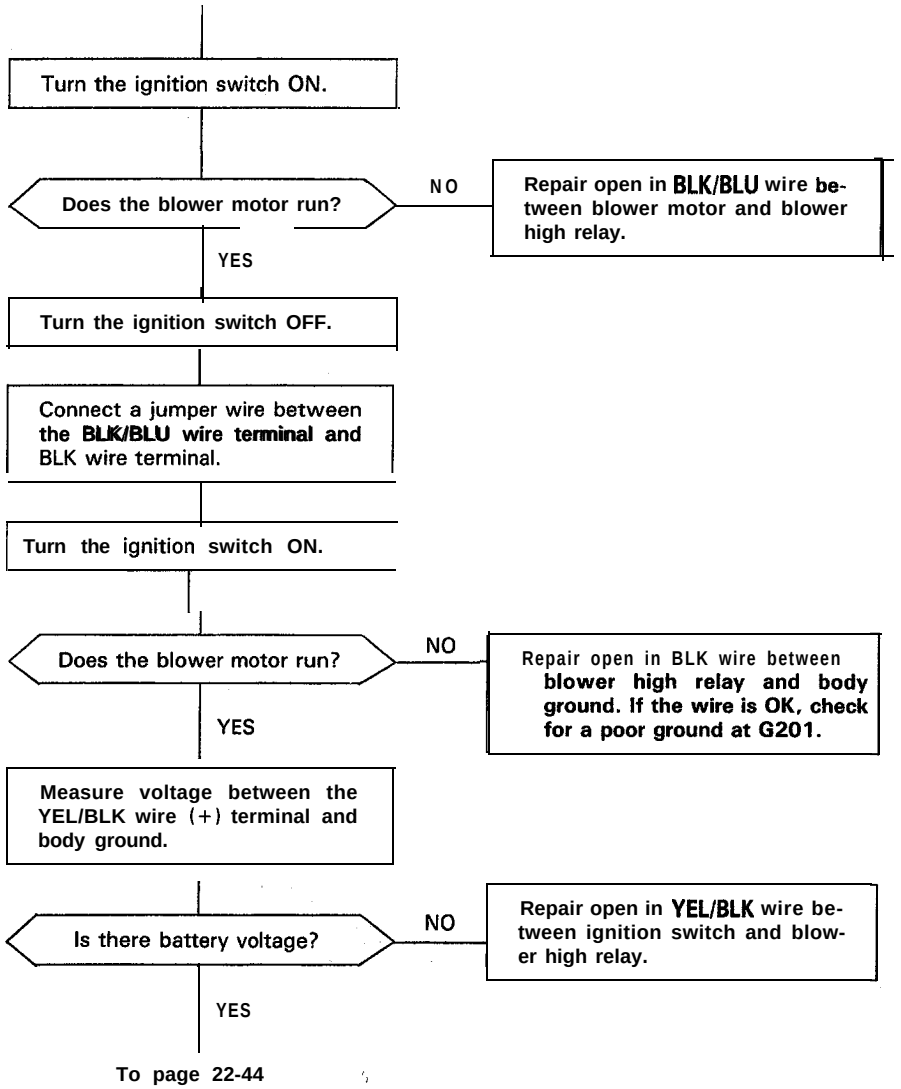
Connect a jumper wire between the BLK/BLU wire terminal (+) and body ground.

To page 22-43





From page 22-42



To page 22-44

(cont'd)

. Blower Motor (cont'd)

From page 22-43

Test the blower high relay: Connect battery power to relay terminal C, then connect terminal D to body ground. There should be continuity between terminals A and B with power connected, no continuity with power disconnected.

Is the relay OK?

NO → Replace the blower high relay.

YES

Turn the ignition switch OFF.

Reinstall the blower high relay.

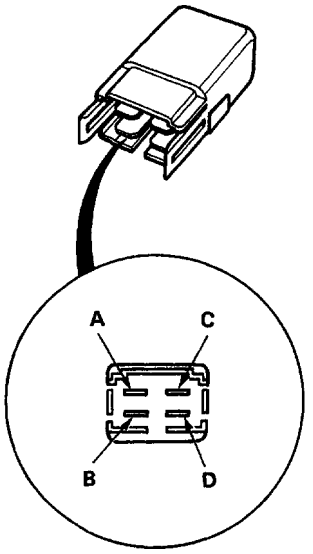
Remove the climate control unit (page 22-84).

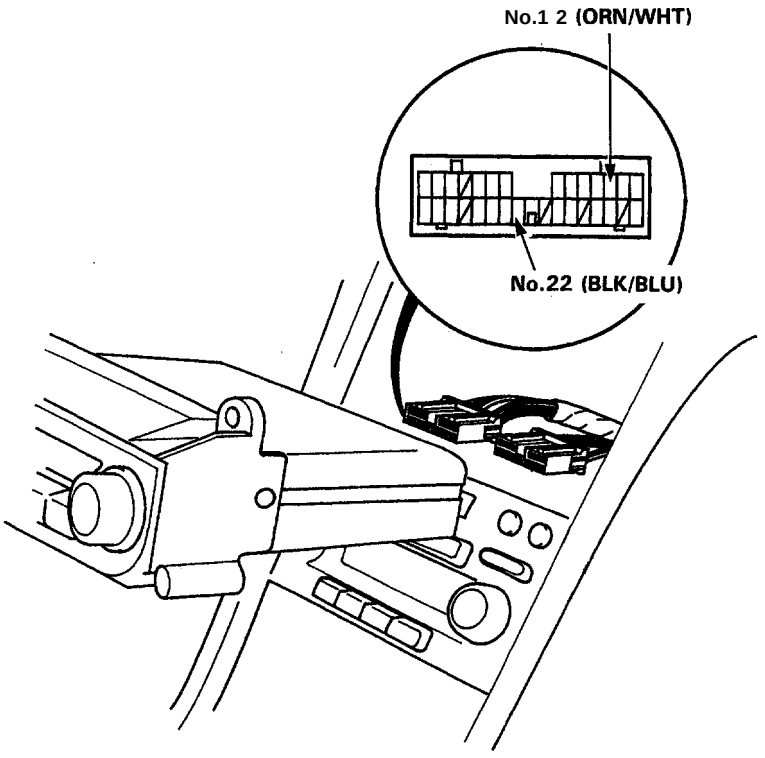
Disconnect the 30-P connector from the climate control unit.

Connect a jumper wire between the ORN/WHT wire terminal and body ground.

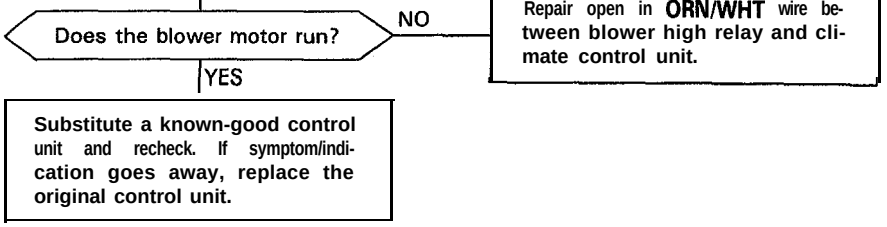
Turn the ignition switch ON.

To page 22-45





From page 22-44



Blower Speed Controls

Blower motor speed does not change.

Open the hood disconnect the 3-P power transistor connector from the blower harness connector.

Connect a voltmeter between the LT GRN/BLK wire terminal and body ground.

Turn the FAN switch OFF.

Is the voltage low? NO

YES

Turn the FAN switch to the middle of its range.

Is the voltage high? NO

YES

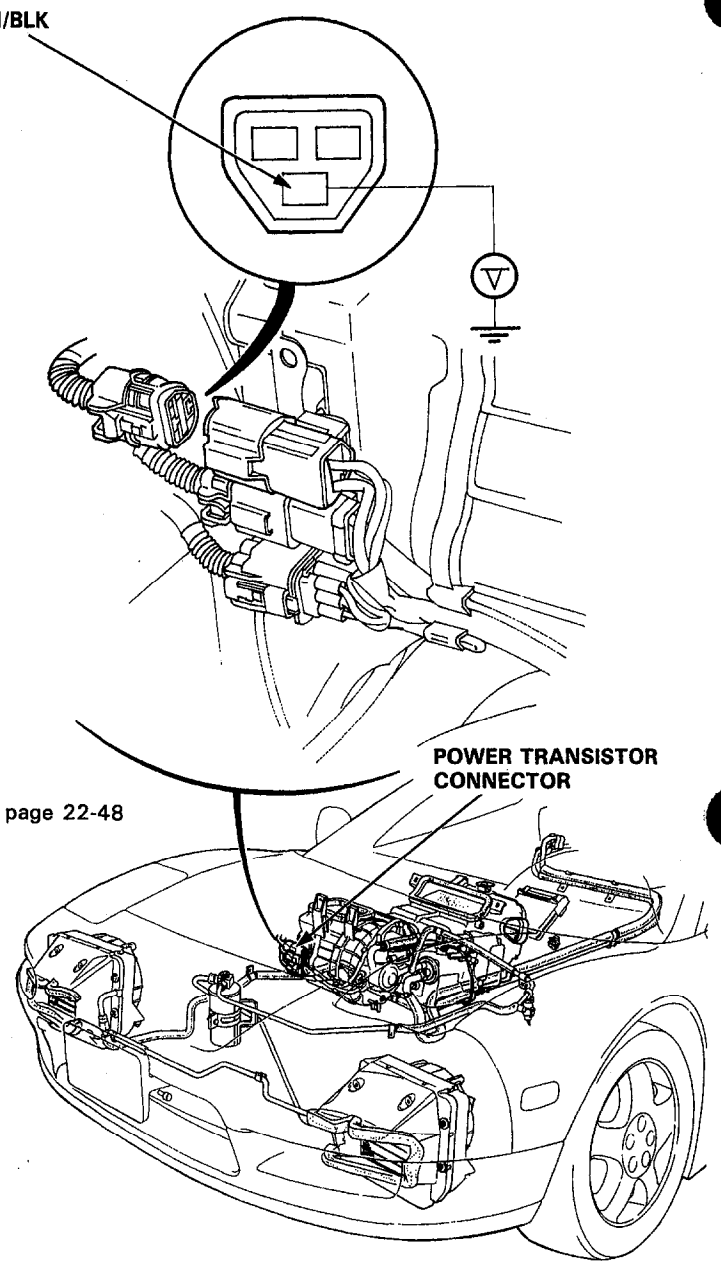
Disconnect the voltmeter and reconnect the 3-P connector to the power transistor.

B

To page 22-47

A

To page 22-48



From page 22-46

B

Connect a jumper wire between the BLK/BLU wire terminal and the BLK wire terminal.

Does blower motor run?

NO — See troubleshooting, page 22-40

YES

Disconnect the 30-P connector from the control unit and the 2-P connector from the blower motor.

Check for continuity in the BLK/BLU wire.

Is there continuity?

NO — Repar open in the BLK/BLU wire between the blower motor and control unit.

YES

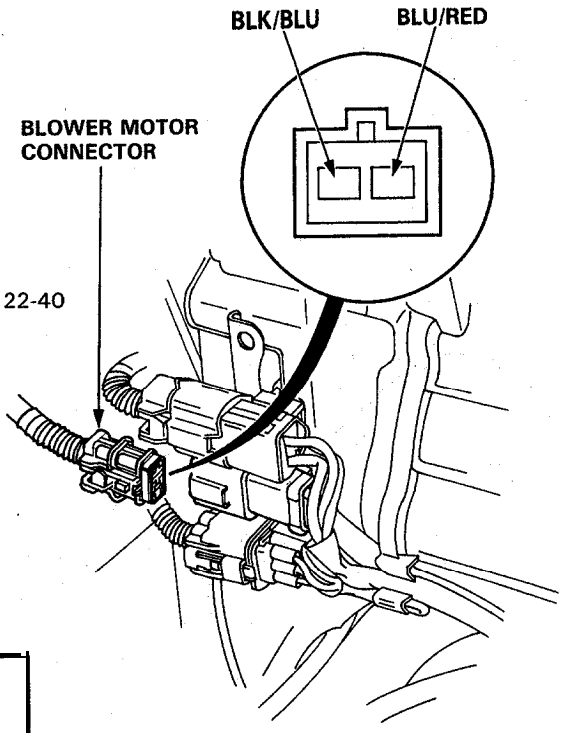
Check for continuity between the BLK/BLU terminal and body ground.

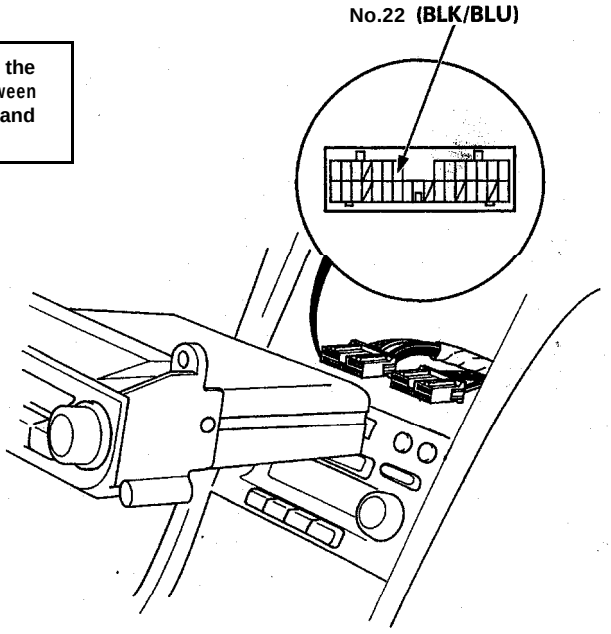
Is there continuity?

YES — Repair short in the BLK/BLU wire between the blower motor and control unit.

NO

Replace the power transistor.





(cont'd)

Blower Speed Controls (cont'd)

From page 22-46

A

Remove the climate control unit (page 22-84).

Disconnect the 30-P connector from the climate control unit.

Check for continuity in the LT GRN/BLK wire.

Is there continuity?

NO → Repair open in the LT GRN/BLK wire between the power transistor and control unit.

YES

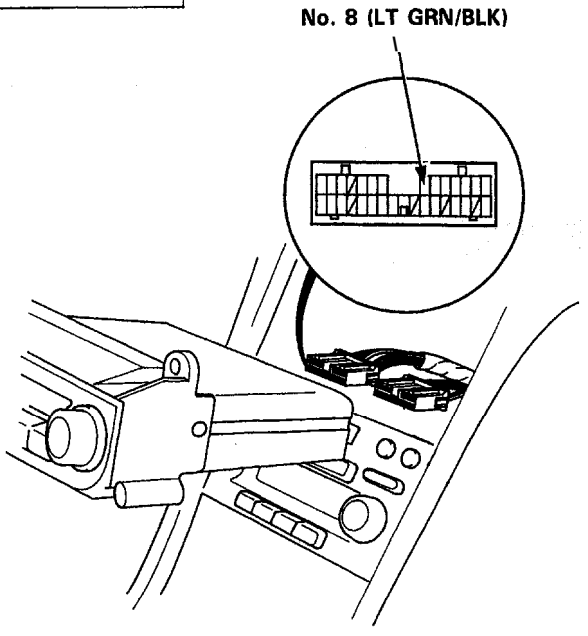
Check for continuity between the No.8 (LT GRN/BLK) wire terminal and body ground.

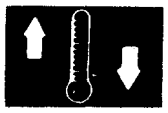
Is there continuity?

YES → Repair short in LT GRN/BLK wire between the power transistor and control unit.

NO

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





A/C System

First, check for blown fuses: No. 4 (15 A), No. 36 (10 A), No. 37 (10 A), No. 21 (10 A).

A/C system does not work (compressor and condenser fans).

Remove the climate control unit (page 22-84).

Disconnect the 30-P connector from climate control unit.

Turn the ignition switch ON.

Measure voltage between the No. 13 (GRY/BLK) terminal (+) and body ground (-).

Is there battery voltage?

NO — To page 22-51

YES

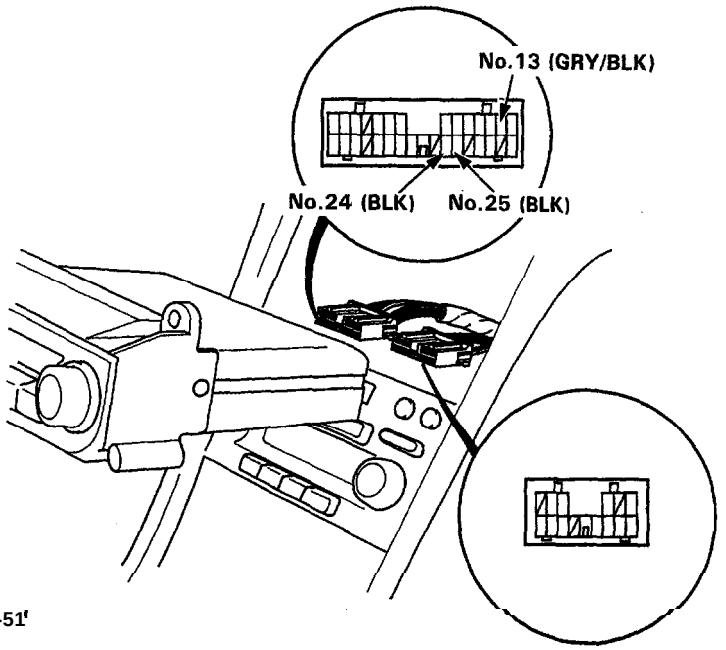
Check for continuity between;
- No.25 (BLK) terminal and body ground.
- No.24 (BLK) terminal and body ground.

Is there continuity?

NO — Repair open in one of the two BLK wires between the climate control unit and body ground. If the wires are OK, check for a poor ground at 6401.

YES

Substitute a known-good climate control unit and recheck. If symptomlindication goes away, replace original control unit.



From page 22-50

Turn the ignition switch OFF.

Disconnect the 12-P connector from cooling fan control unit.

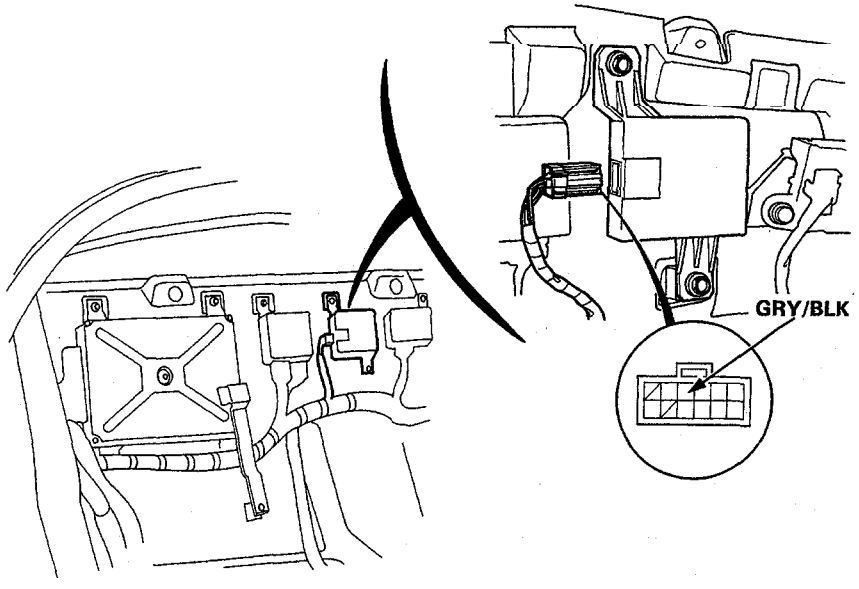
Check for continuity in the GRY/BLK wire between the fan control unit and the climate control unit.

Is there continuity?

NO → **Repair open in the GRY/BLK wire between the cooling fan control unit and climate control unit.**

YES

Substitute a known-good cooling fan control unit and recheck. If symptom/indication goes away, replace the original control unit.



-Condenser Fan

First, check for blown fuses: No. 4 (15 A), No.36 (10 A), No. 37 (10 A).

One or both condenser fans does not run at all.

Open the hood, then remove the cover from sub relay box A and remove the condenser fan relay.

Using a jumper wire, connect the WHT/GRN wire terminal to body ground.

Do both condenser fans run?

NO → A

To page 22-55

YES

Connect a jumper wire between the WHT/GRN wire terminal and BLK wire terminal.

Do both condenser fans run?

NO

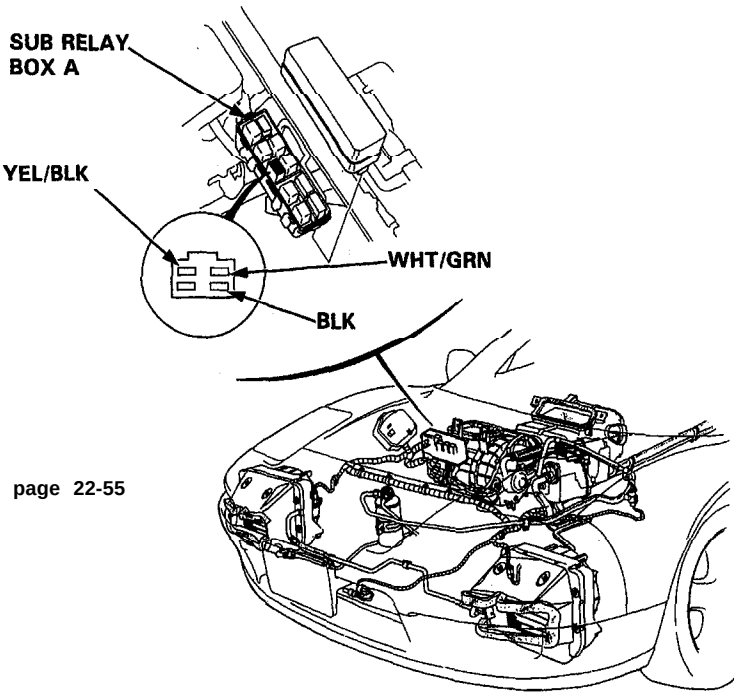
Repair open in the BLK wire between the condenser fan relay and body ground. If the wire is OK, check for a poor ground at G302.

YES

Turn the ignition switch ON.

B

To page 22-53



From page 22-52

B

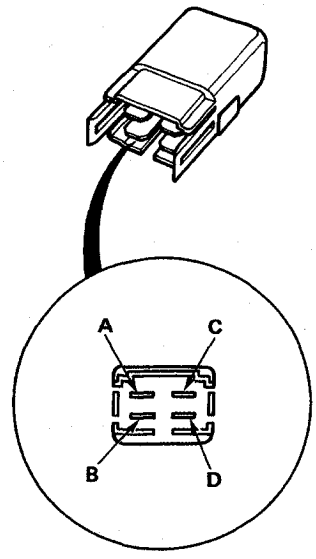
Measure the voltage between the YEL/BLK wire terminal (+) and body ground (−).

Is there battery voltage?

NO → Repair open in the YEL/BLK wire between the No. 4 fuse (15 A) and condenser fan relay.

YES

Test the condenser fan relay: Connect battery power to relay terminal C, then connect terminal D to body ground. There should be continuity between terminals A and B with power connected, no continuity with power disconnected.



Is the relay OK?

NO → Replace the condenser fan relay.

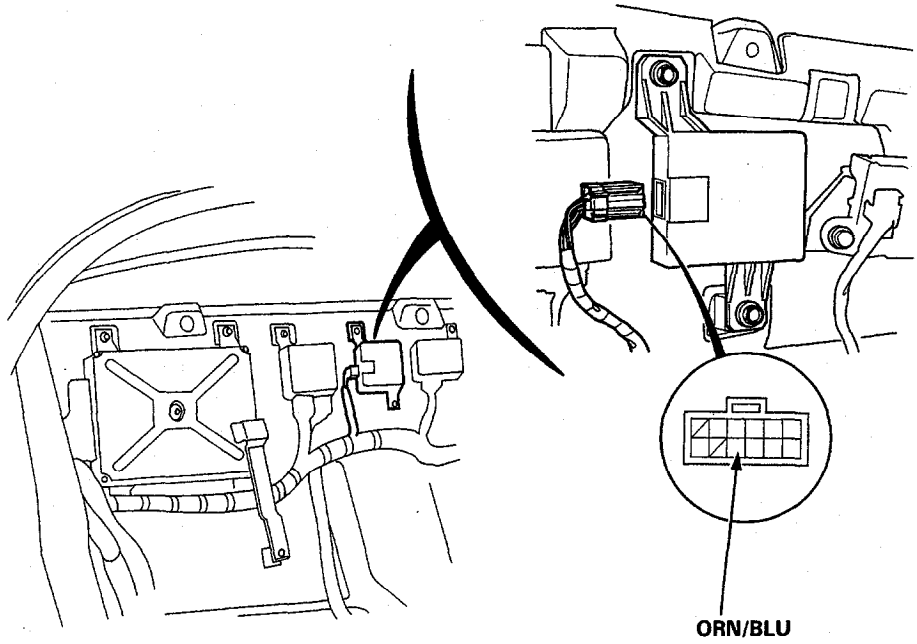
YES

Turn the ignition switch OFF, and reinstall the condenser fan relay.

Disconnect the 12-P connector from the cooling fan control unit.

Turn the ignition switch ON.

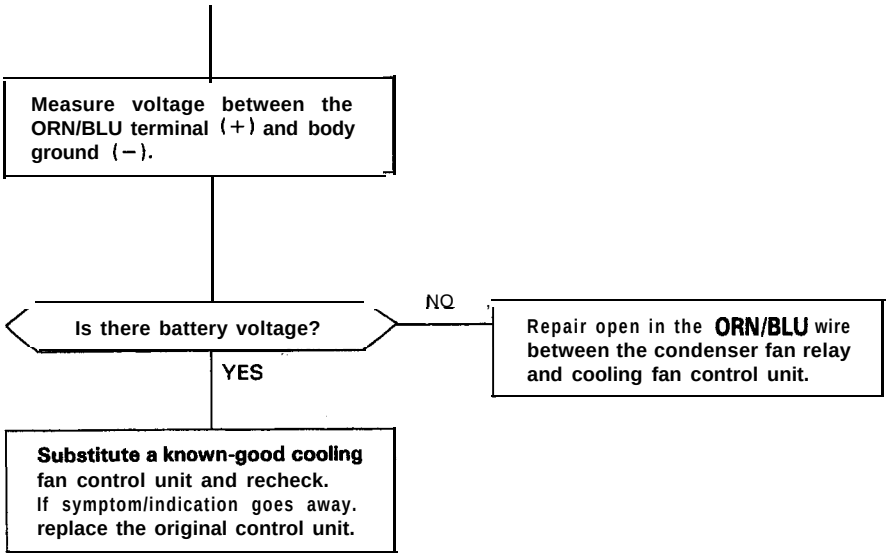
To page 22-54



(cont'd)

- Condenser (cont'd)

From page 22-53



From page 22-52

V[A]

Disconnect the 2-P connector from inoperative condenser fan(s).

Measure voltage:
Right fan: WHT wire terminal and body ground.
Left fan: WHT/BLU wire terminal and body ground.

Is there battery voltage at terminals to right and left fans?

NO → Repair open in WHT wire between the No. 37 fuse (10 A) and the right fan, or in the WHT/BLU wire between the No. 36 fuse (10A) and the left fan.

YES

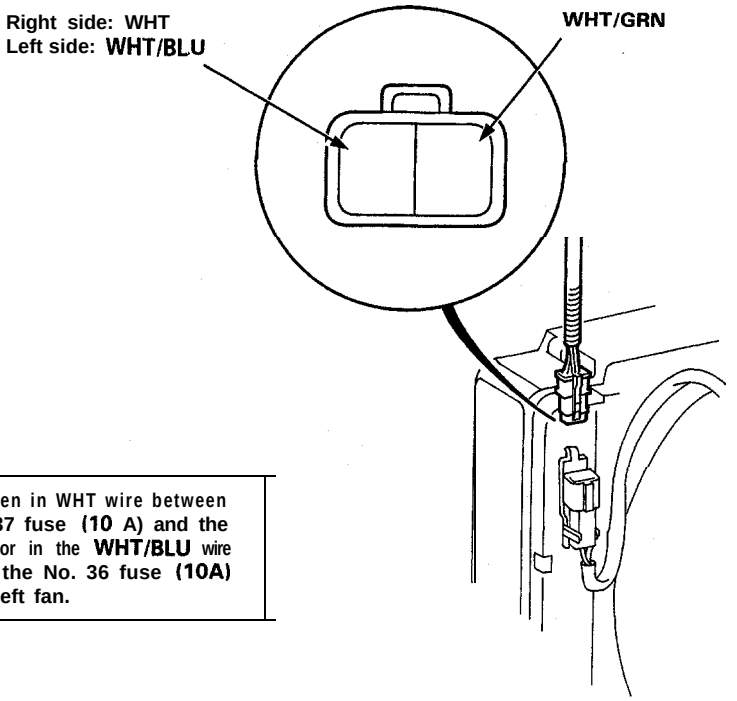
Test both condenser fan motors. Connect battery power to the WHT and WHT/BLU wire terminals and connect the WHT/GRN terminal to body ground. Both fans should run.

Does the fan motor(s) OK?

NO → Replace the faulty fan motor.

YES

Repair open in the WHT/GRN wire between the condenser fan motor and condenser fan relay.



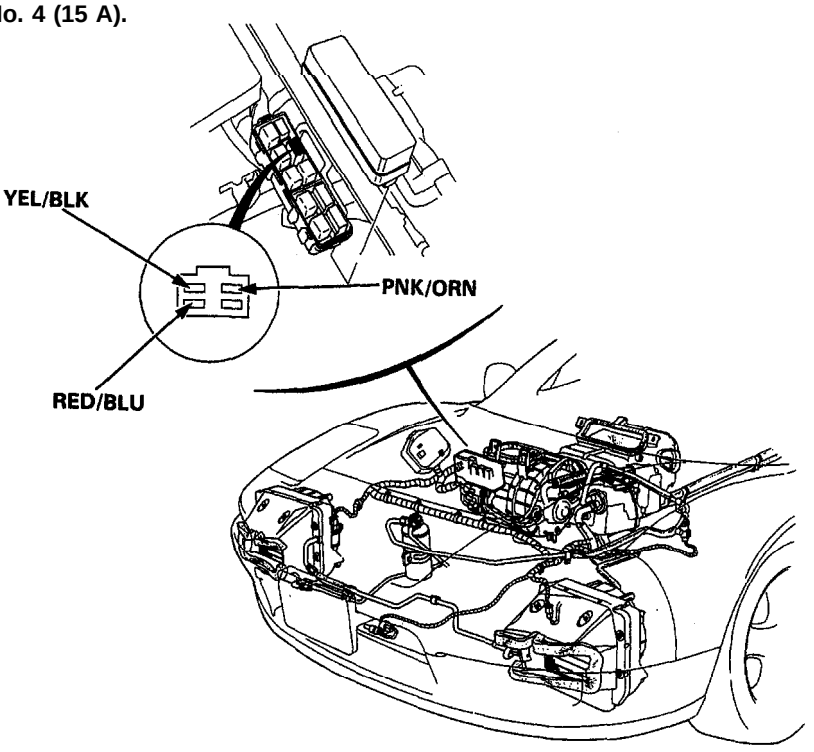
A/C Compressor

First, check for blown fuses: No. 21 (IO A), No. 4 (15 A).

Compressor clutch does not engage. When AIC is turned on with engine running.

Remove the compressor clutch relay from sub relay box A.

Measure voltage between the PNK/ORN wire terminal (+) and body ground (−).



Is there battery voltage?

NO → Repair open in the PNK/ORN wire between the No. 21 (10 A) fuse and compressor clutch relay.

YES

Turn the ignition switch ON.

Measure voltage between the YEL/BLK wire terminal (+) and body ground (−).

Is there battery voltage?

NO → Repair open in the YEL/BLK wire between the No. 4 (15 A) fuse and compressor clutch relay.

YES

To page 22-57

From page 22-56

Test the compressor clutch relay: Connect battery power to relay terminal C, then connect terminal D to body ground. There should be continuity between terminals A and B with power connected, no power with power disconnected.

Is the relay OK?

NO → Replace the compressor clutch relay.

YES

Turn the ignition switch OFF.

Reinstall the compressor clutch relay.

Remove the panel from behind the passenger seat. Disconnect the 4 connectors from PGM-FI-ECU. Connect teh ECU test harness connectors to the ECU.

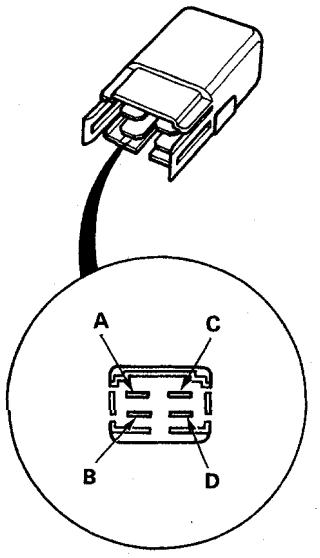
Turn the ignition switch ON.

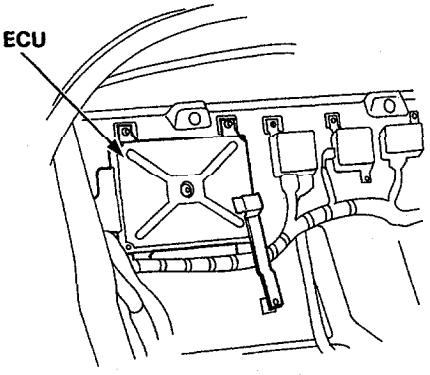
Measure battery voltage between test harness terminal A15 and body ground.

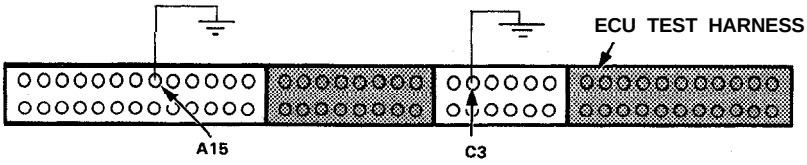
Is there battery voltage?

NO → Repair open in the RED/BLU wire between the compressor clutch relay and PGM-FI-ECU.

YES







To page 22-58

(cont'd)

- A/C Compressor (cont'd)

From page 22-57

Start the engine and connect a jumper wire between test harness terminal AI 5 and body ground.

Does compressor clutch engage?

NO → Turn the ignition switch OFF.

B

To page 22-61

YES

Using a jumper wire, connect C3 test harness terminal to body ground.

Does compressor clutch engage?

NO → Substitute a known-good PGM-FI-ECU and recheck. If symptom/indication goes away, replace the original ECU.

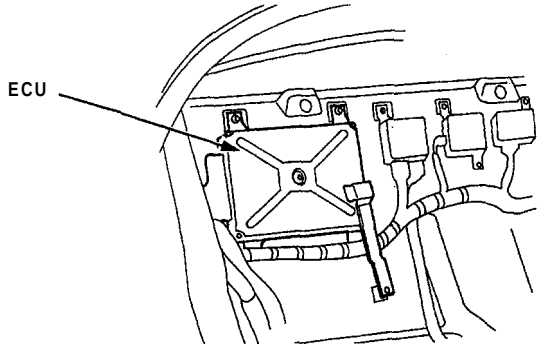
YES

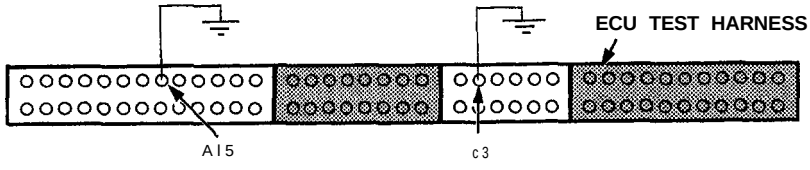
Turn the ignition switch OFF.

A

A

To page 22-59





From page 22-58

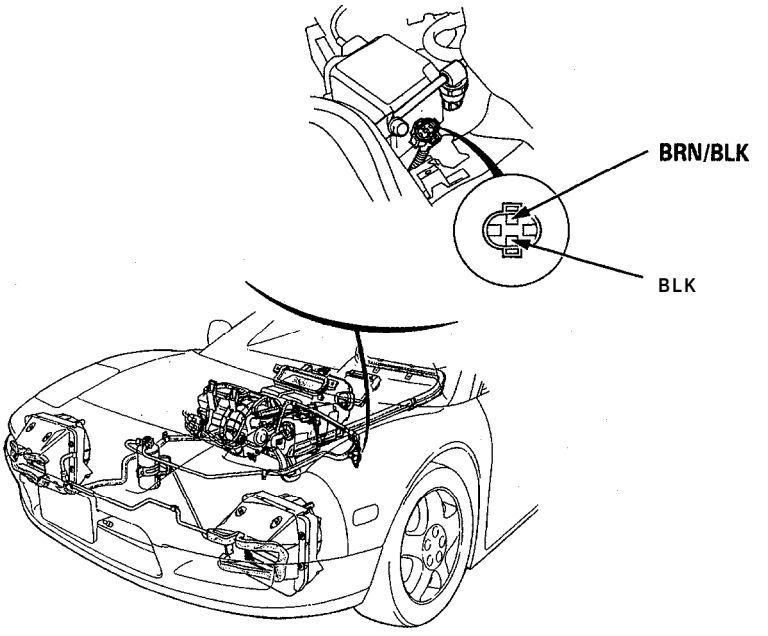
A

Disconnect the test harness, and reconnect the connectors to the ECU.

Disconnect the 4-P connector from the pressure switch.

Connect a jumper wire between BRN/BLK wire terminal and BLK wire terminal.

Start the engine



Does compressor clutch engage?

YES → Check refrigerant pressure. If pressure good, replace AIC pressure switch.

NO

Turn the ignition switch OFF.

Check for continuity between the BLK wire terminal and body ground.

Is there continuity?

NO → Repair open in the BLK wire between the pressure switch and body ground or poor ground (G302).

YES

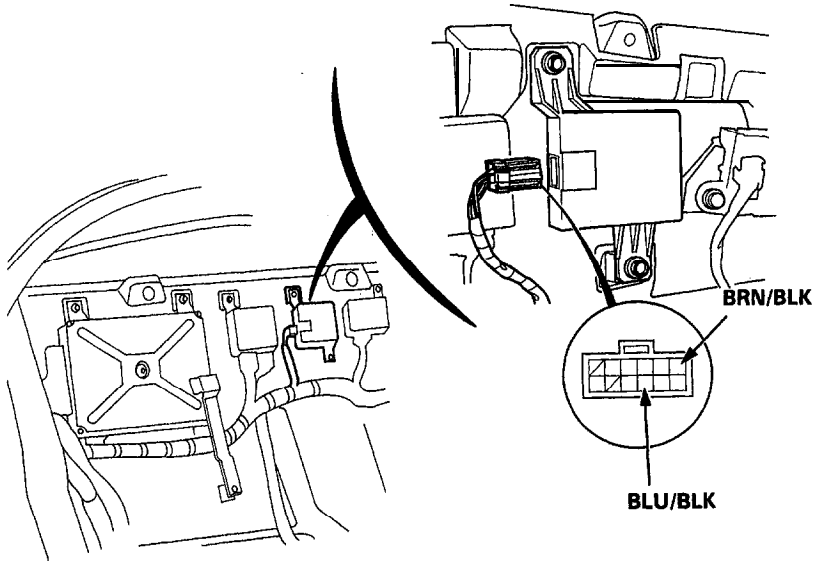
To page 22-60

(cont'd)

A/C Compressor (cont'd)

From page 22-59

Remove the panel behind the seats, and disconnect the 12-P connector from the cooling fan control unit.



Check for continuity of BRN/BLK wire between the cooling fan control unit and pressure switch.

Is there continuity?

NO → Repair open in the BRN/BLK wire between the cooling fan control unit and pressure switch.

YES

Connect a jumper wire between the BLU/BLK wire terminal and body ground.

Start the engine.

Does compressor clutch engage?

NO → Repair open in the BLU/BLK wire between PGM-FI-ECU and cooling fan control unit.

YES

Substitute a known-good cooling fan control unit and recheck. If symptom/indication goes away, replace the original control unit.

From page 22-58

B

Disconnect the connector from compressor.

Turn the ignition switch ON.

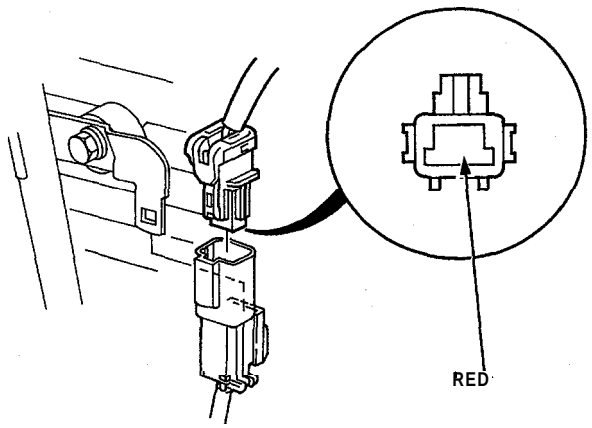
Measure voltage between the RED wire terminal (+) and body ground (−).

Is there battery voltage?

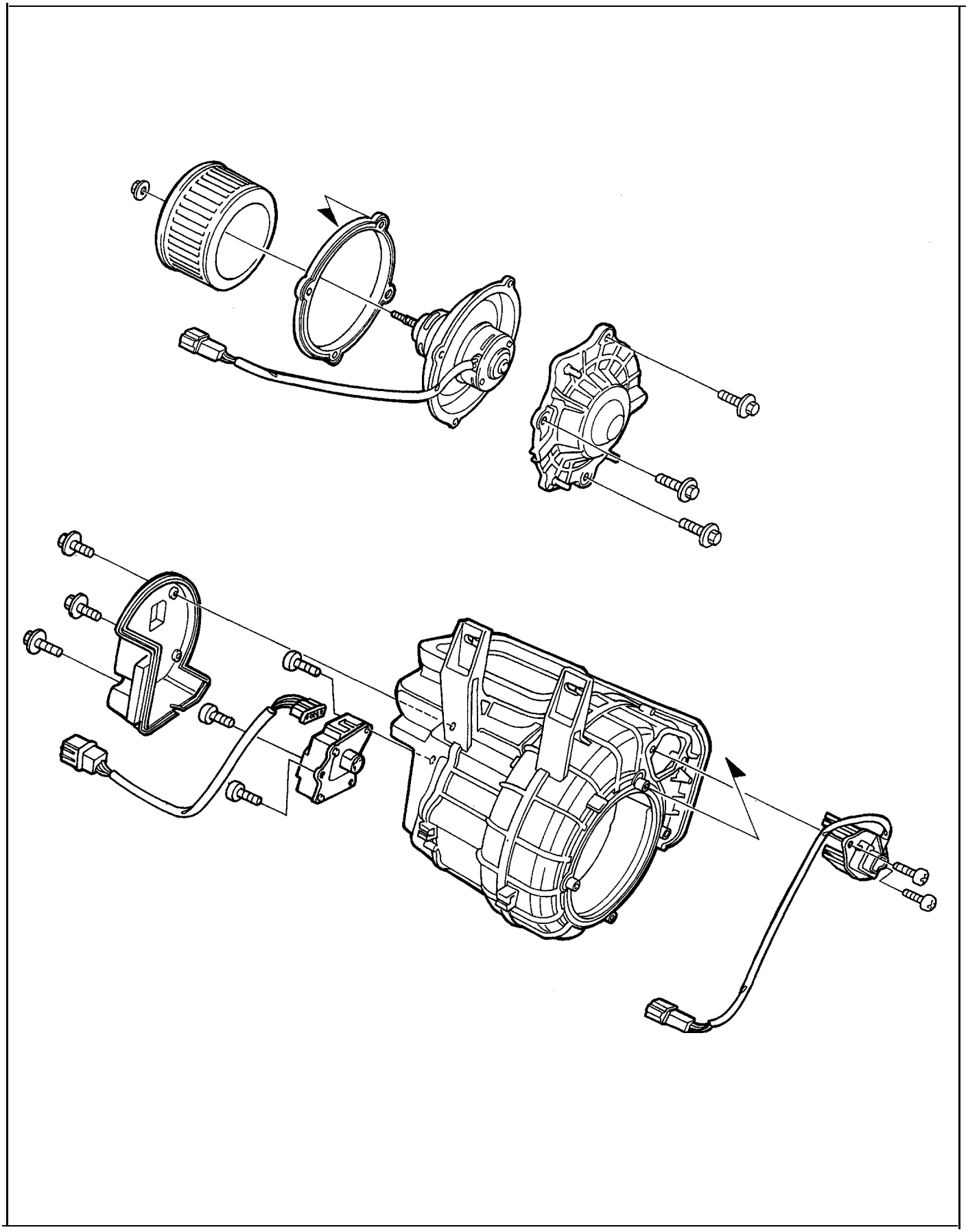
NO → Repair open in the RED wire between the compressor clutch relay and compressor.

YES

Replace the compressor clutch.

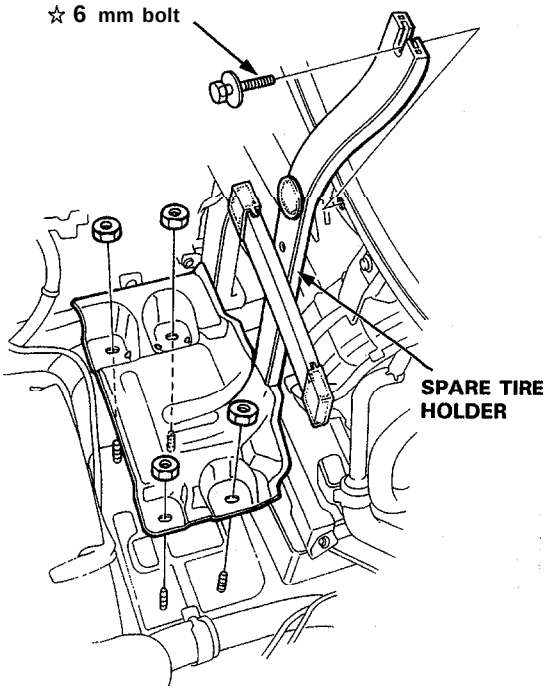


Blower

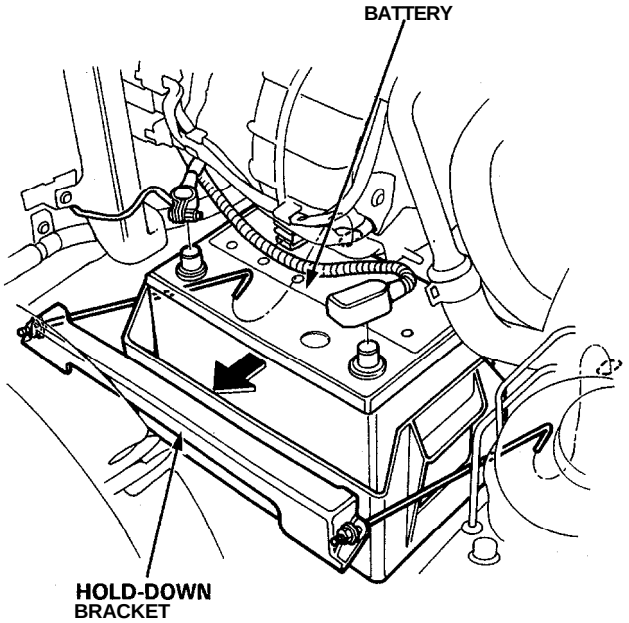


-Replacement

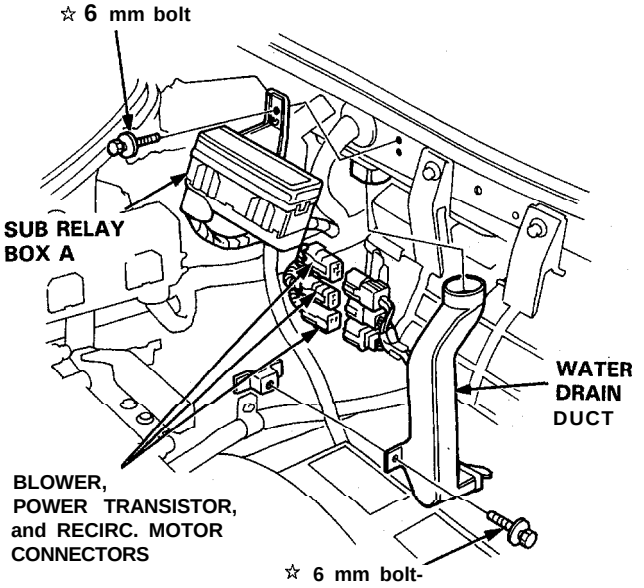
1. Remove the spare tire (refer to Owner's manual).
2. Remove the spare tire holder.
   ☆ CORROSION RESISTANT BOLT



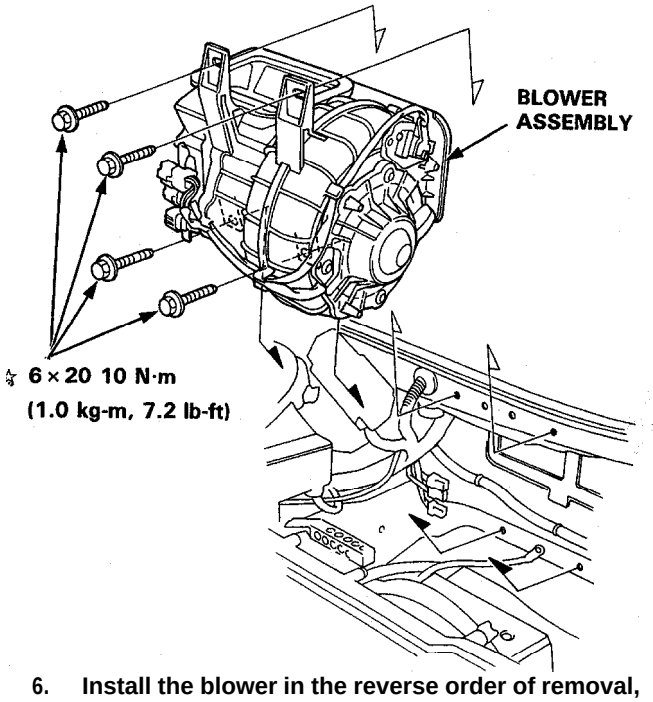
3. Disconnect the battery cables, loosen the hold-down bracket nuts, and remove the hold-down bracket. Then, remove the battery.



4. Remove the sub relay box A and the water drain duct. Disconnect the connectors from the blower motor, power transistor and recirculation control motor.
   ☆ CORROSION RESISTANT BOLT



5. Remove the blower mounting bolts, then remove the blower.
   ☆ CORROSION RESISTANT BOLT

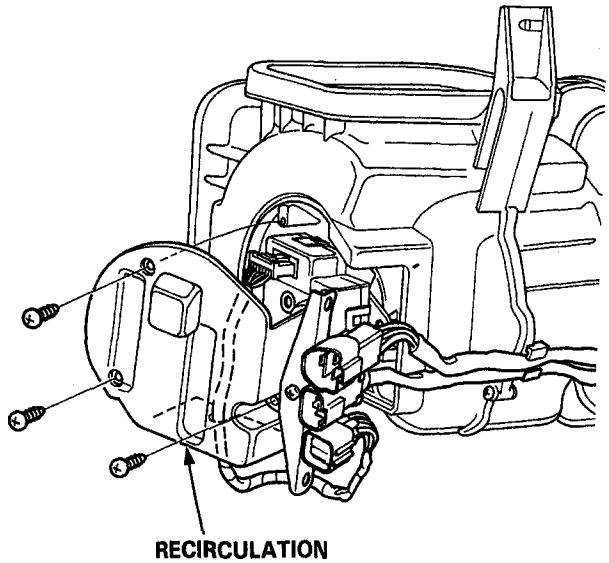


6. Install the blower in the reverse order of removal, then make sure it runs and doesn't leak any air.

Recirculation Control Motor

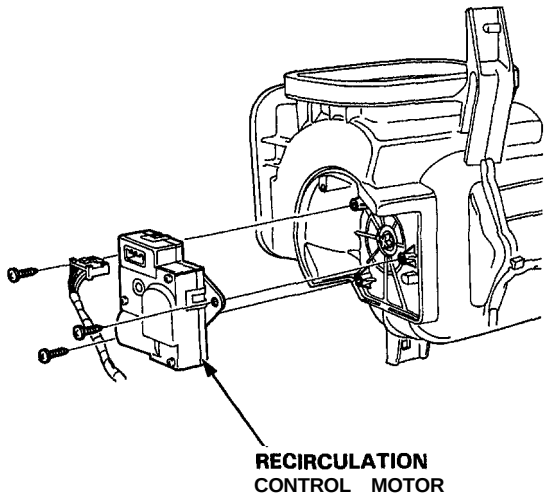
Replacement

1. Remove the blower (previous page).
2. Remove the recirculation control motor cover from the blower (3 screws).



RECIRCULATION CONTROL MOTOR COVER

3. Remove the recirculation control motor (1 connector and 3 screws).



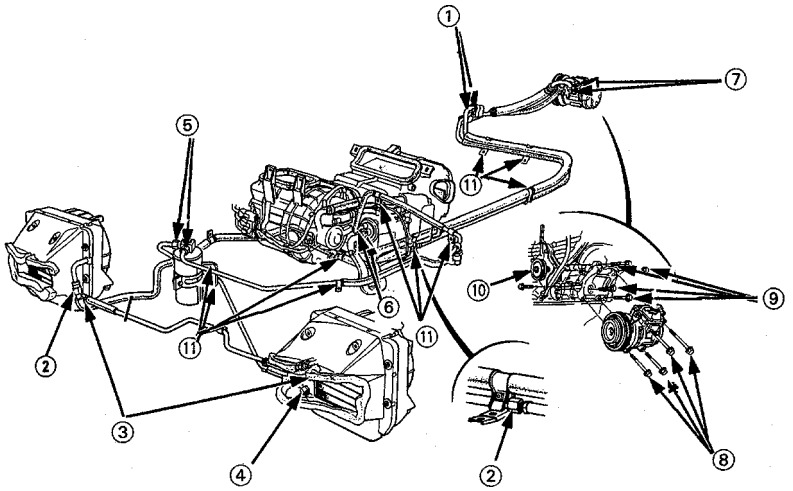
RECIRCULATION CONTROL MOTOR

4. Install the recirculation control motor in the reverse order of removal. Apply battery voltage (page 22-89) and watch the door movement.
   Make sure that the recirculation door moves smoothly without binding.
   Make sure the motor doesn't pull the door too far.

A/C Service Tips and Precautions

1. Always disconnect the negative cable from the battery whenever replacing air conditioner 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 refrigerant recovery system; don't release refrigerant into the atmosphare.
6. And refrigerant oil after replacing the following parts:

Condenser	10 cc (1/3 fl oz)
Evaporator	10 cc (1/3 fl oz)
Line or hose	20 cc (2/3 fl oz)
Receiver	10 cc (1/3 fl oz)
Compressor	On compressor replacement, subtract the volume of oil drained from the removed compressor from 80 cc (2 2/3 fl oz), and drain the calculated volume of oil from the new compressor: 80 cc (2 2/3 fl oz) – Volume of oil from removed compressor = Volume to drain from new compressor.



Don't overtighten fittings; you could damage them. Leaks are caused by faulty O-rings, overtightening won't stop them.
☆ CORROSION RESISTANT BOLT

① Suction hose and discharge hose to A/C lines ..... 22 N·m (2.2 kg-m, 16 lb-ft)
② Discharge line C (both side) ..... 23 N·m (2.3 kg-m, 17 lb-ft)
③ Condenser line A (both side) ..... 23 N·m (2.3 kg-m, 17 lb-ft)
④ Condenser line C to left side condenser ..... 14 N·m (1.4 kg-m, 10 lb-ft)
⑤ Receiver-dryer ..... 14 N·m (1.4 kg-m, 10 lb-ft)
⑥ Receiver line and suction line to heater assembly ..... 22 N·m (2.2 kg-m, 16 lb-ft)
⑦ Compressor hose mounting bolts ..... 22 N·m (2.2 kg-m, 16 lb-ft)
⑧ Compressor mounting bolts ..... 25 N·m (2.5 kg-m, 18 lb-ft)
⑨ Compressor bracket mounting bolts ..... 50 N·m (4.5 kg-m, 36 lb-ft)
⑩ Idler pulley center nut ..... 45 N·m (4.5 kg-m, 32.5 lb-ft)
⑪ ☆ 6 mm bolt ..... 10 N·m (1.0 kg-m, 7.2 lb-ft)

⚠ WARNING

When handling refrigerant (R-12):
- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
  - Do not rub your eyes or skin.
  - Splash large quantities of cool water in your eyes or on your skin.
  - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).
- Do not handle or discharge refrigerant in an enclosed area near an open flame; it may ignite and produce a poisonous gas.
- The ozone is fragile layer surrounding the earth which acts as a shield against the sun's ultraviolet radiation. Chlorine from chemicals called chlorofluorocarbons (CFCs) destroy the ozone in the stratosphere. Automotive air conditioning systems currently use chlorofluorocarbons as the refrigerant. Auto air conditioning service equipment has been developed to minimize the release of CFCs to the atmosphere. All service procedures should be performed using this equipment and the manufactuer's instructions.

Heater-Evaporator Unit

Replacement

SRS wire harness is routed near the heater.

⚠WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the heater.

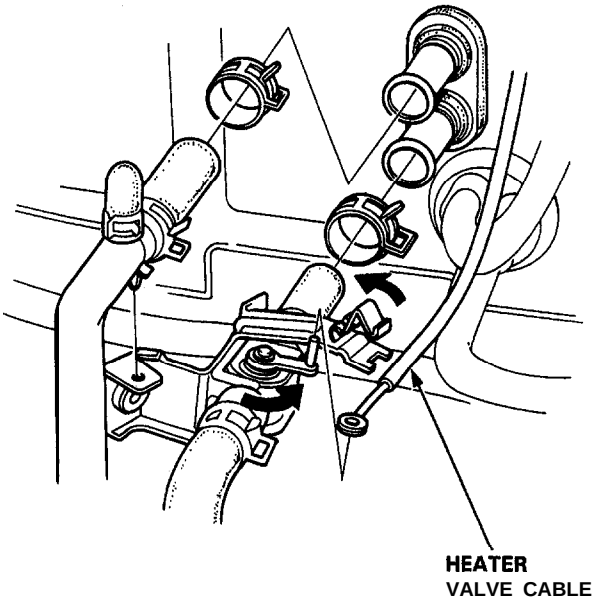
1. **Remove the blower (page 22-63).**
2. When the engine is cool, drain the coolant from the radiator (Section 10).

⚠WARNING

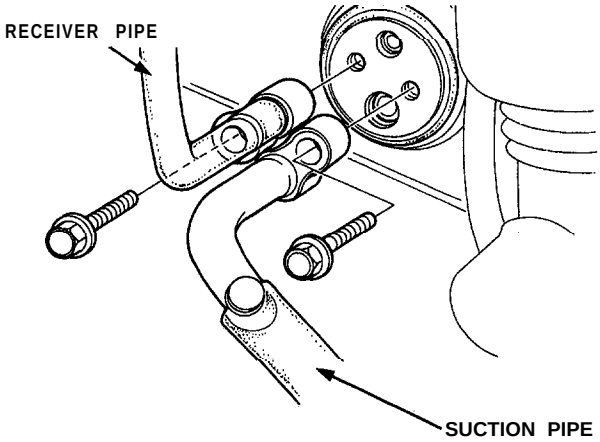
- **Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.**
- **Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes, even after the engine is turned off.**

CAUTION: Radiator coolant will damage paint. Quickly rinse any spilled coolant off painted surfaces.

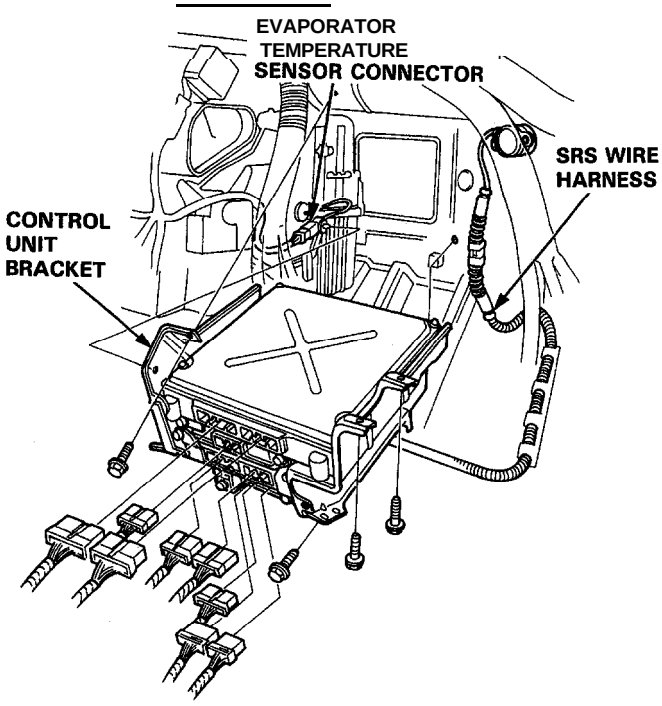
3. Disconnect the heater hoses at the heater. Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.
4. **Disconnect the heater valve cable from the heater valve.**



5. **Remove all refrigerant from the A/C system with a refrigerant recovery system. (page 22-93).**
6. Disconnect the receiver line and the suction line from the evaporator.
   Cap the open fittings immediately to keep moisture out of the system.



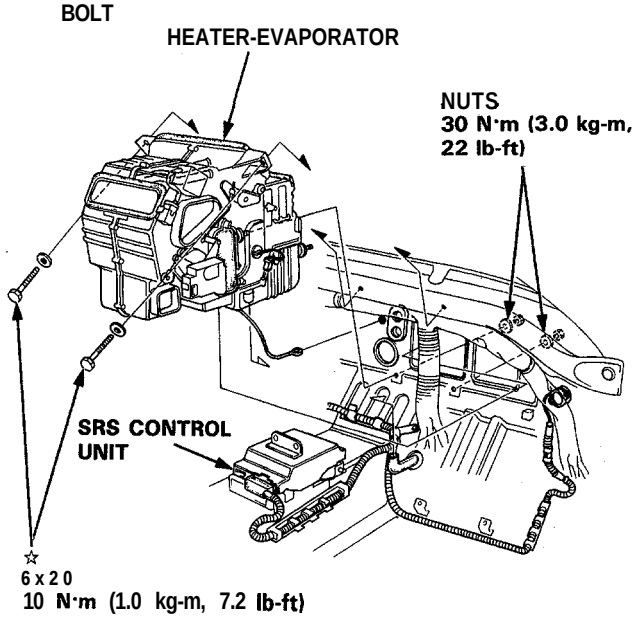
7. **Remove the dashboard (Section 20).**
8. **Remove the heater duct.**
9. **Remove the mounting bolts(4) and disconnect the connectors from control units and evaporator temperature sensor connector from the control unit bracket, then remove the control unit bracket.**



10. **Remove the enclosure woofer.**

11. Disconnect the connectors from all the actuators and sensors attached to the heater-evaporator.

12. Remove the mounting bolts(2-under the dash) and nuts(2-under the hood), then remove the heater-evaporator through the passenger door.

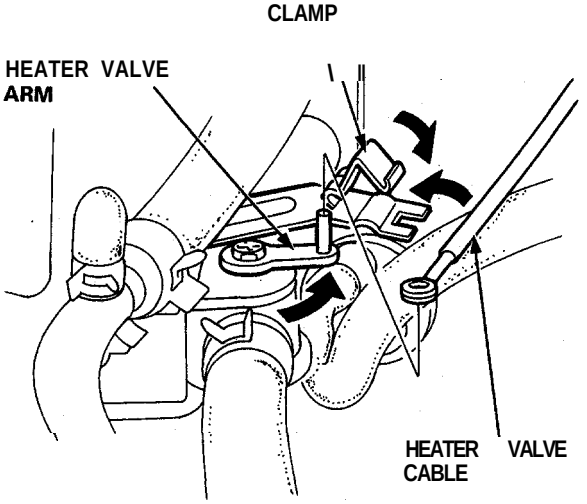


13. Install in the reverse order of removal, and:
    - Apply sealant to the A/C line grommets.
    - Do not interchange the inlet and outlet heater hoses. Make sure that the hose clamps are tight.

14 Fill the radiator and reservoir tank with the proper coolant mixture. Bleed the air from the cooling system (Section IO).

CAUTION: Follow the sequence described in the air bleed procedure. If you don't, you may leave air in the system which could damage the engine.

15. If necessary, adjust the heater valve cable:
    - Set the air mix control motor at COLD position (page 22-90).
    - Connect the end of the cable to the heater valve arm.
    - Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the other end move the arm on the air mix motor. Then snap the clamp down over the cable housing.



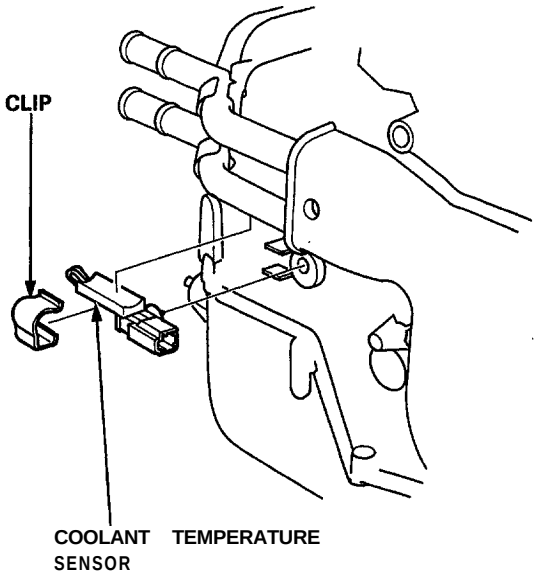
16. Turn the blower on and make sure that there is no air leakage.

17. Charge the system (page 22-93~95) and test Performance (page 22-96).

Coolant Temperature Sensor

- Removal

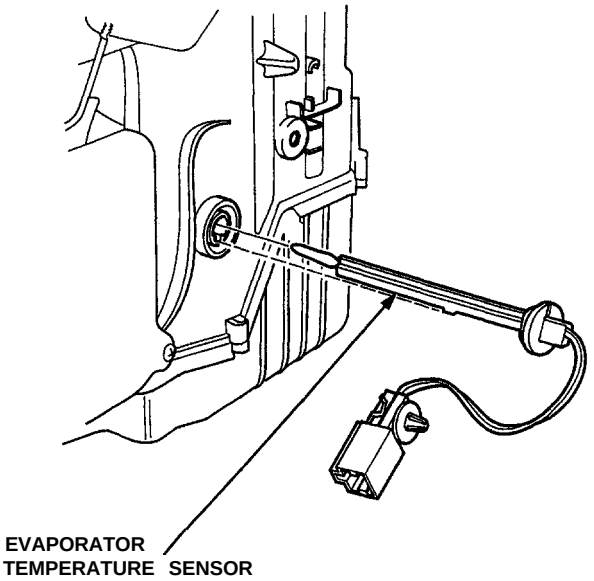
Disconnect the connector, and remove the coolant temperature sensor clip and the sensor.



Evaporator Temperature Sensor.

— Removal

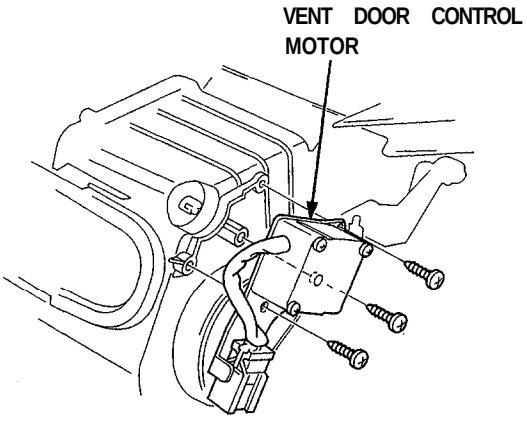
Give the evaporator temperature sensor a quarter turn and then pull out it.



Vent Door Control Motor

Replacement

1. Remove the mounting screws, then remove the vent door control motor.



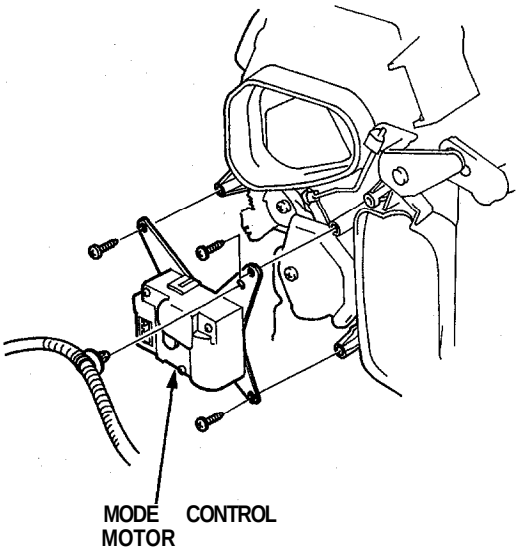
2 Install the vent door control motor in the reverse order of removal. Then apply battery voltage (page 22-90) and watch the door move.

- Make sure that the vent door moves smoothly without binding.
- Make sure the motor doesn't pull the vent door too far.

Mode Control Motor

Replacement

1. Remove the mounting screws, then remove th mode control motor.



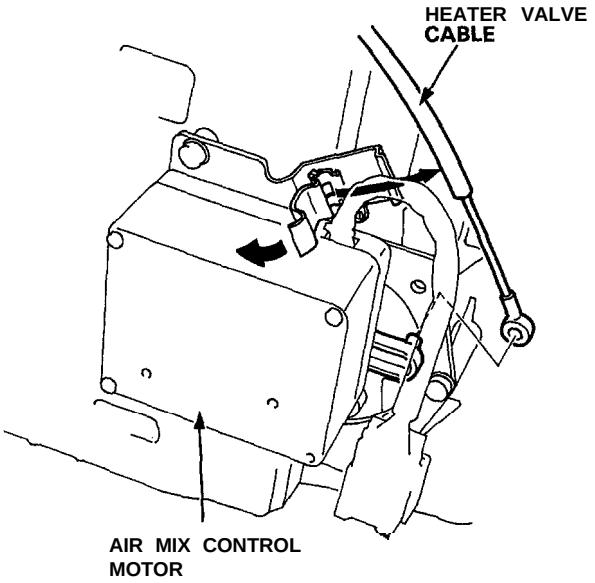
2. install the mode control motor in the reverse order of removal. Then apply battery voltage (page 22-91) and watch the doors move.

- Make sure that the HEAT and DEF doors moves smoothly without binding.
- Make sure the motor doesn't pull the HEAT and DEF doors too far.

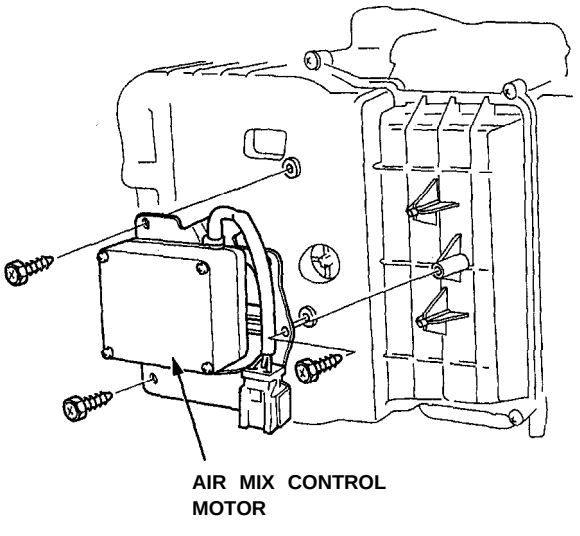
Air Mix Control Motor

Replacement

1. Disconnect the heater valve cable from the air mix control motor.



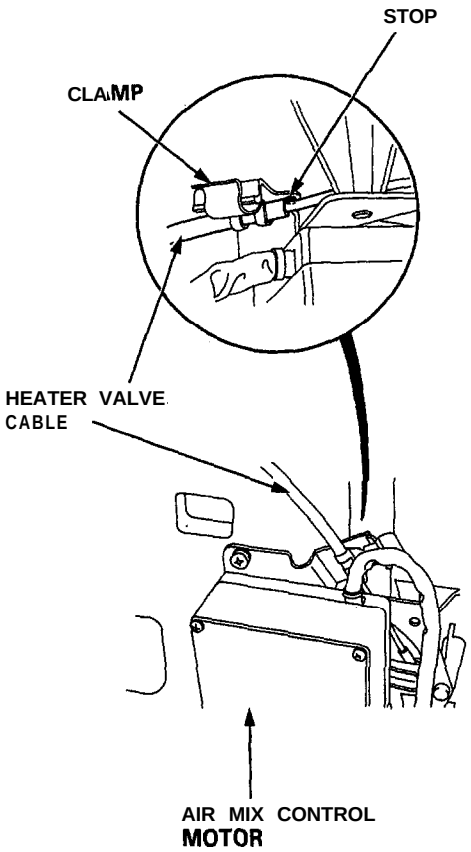
2. Remove the air mix control motor (3 screws, 1 connector).



3. Install the air mix control motor in the reverse order of removal. Then apply battery voltage (page 22-90) and watch the door move.

   Make sure that the air mix door moves smoothly without binding.
   Make sure the motor doesn't pull the air mix door too far.

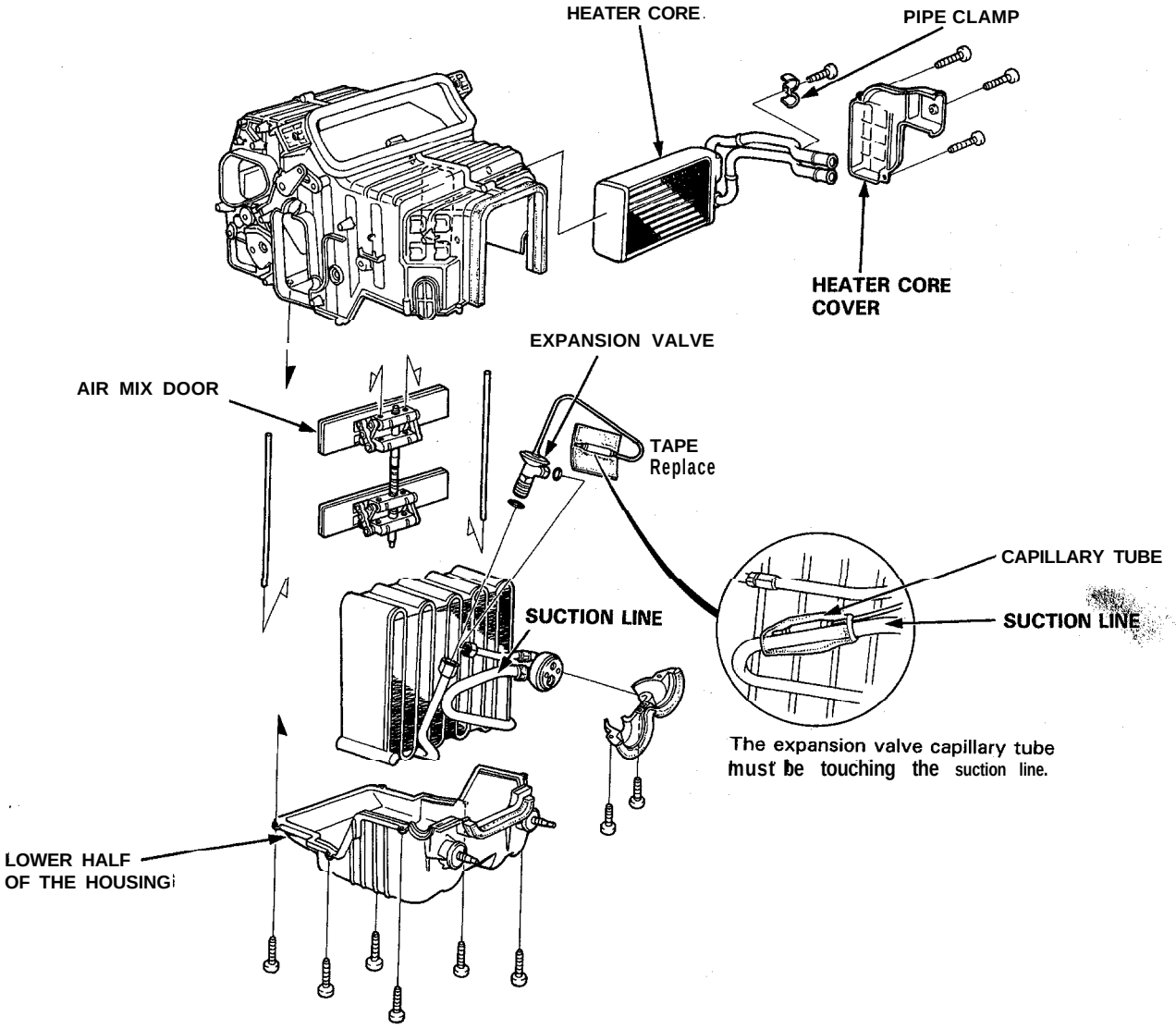
4. If necessary, to adjust the heater valve cable;
   - Set the air mix control motor at COLD position (page 22-90).
   - Hold the end of the cable housing against the stop on the cable. Then snap the clamp down over the housing.
   - After adjusting the cable, make sure that the air mix control motor still moves smoothly without binding.



Heater-Evaporator Unit

-Disassembly/Reassembly

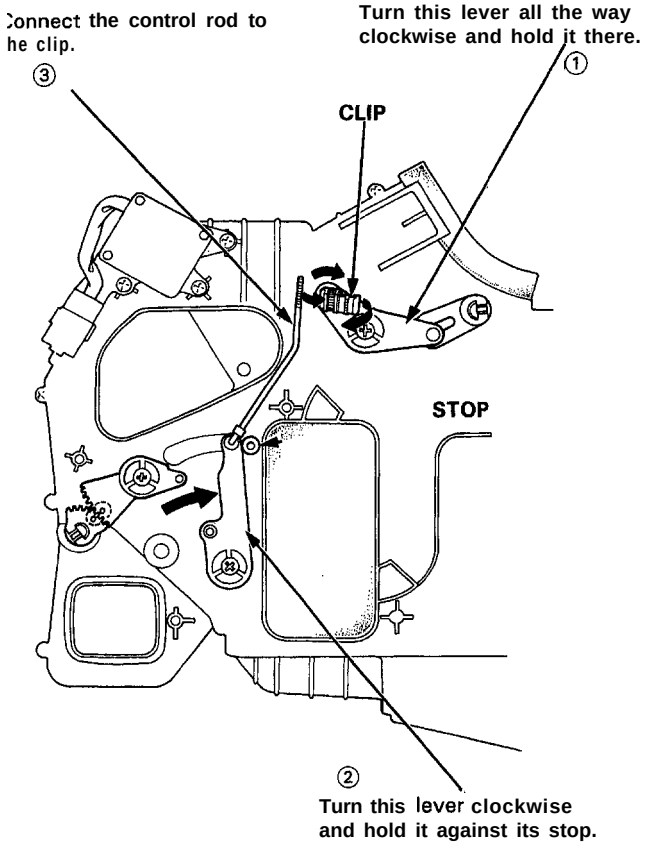
1. **Remove the heater core cover, remove the pipe clamp, then pull out the heater core.**
2. **Remove the lower half of the housing, then remove the evaporater.**
3. **Remove the expansion valve if necessary.**



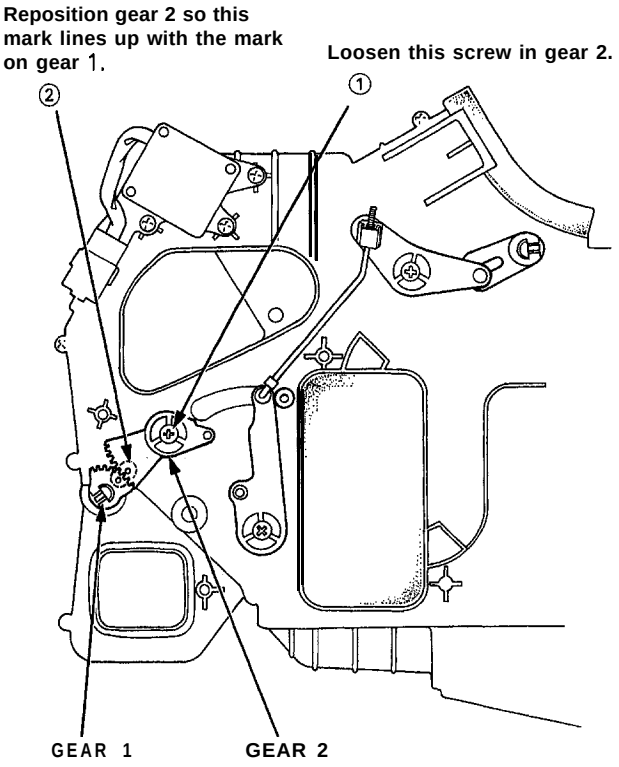
4. **Assemble the heater-evaporator unit in the reverse order of disassembly. Hold the expansion valve capillary tube down against the suction line, and wrap it with tape to hold it there.**

Heater-Evaporator Unit

"DEF" Door Adjustment



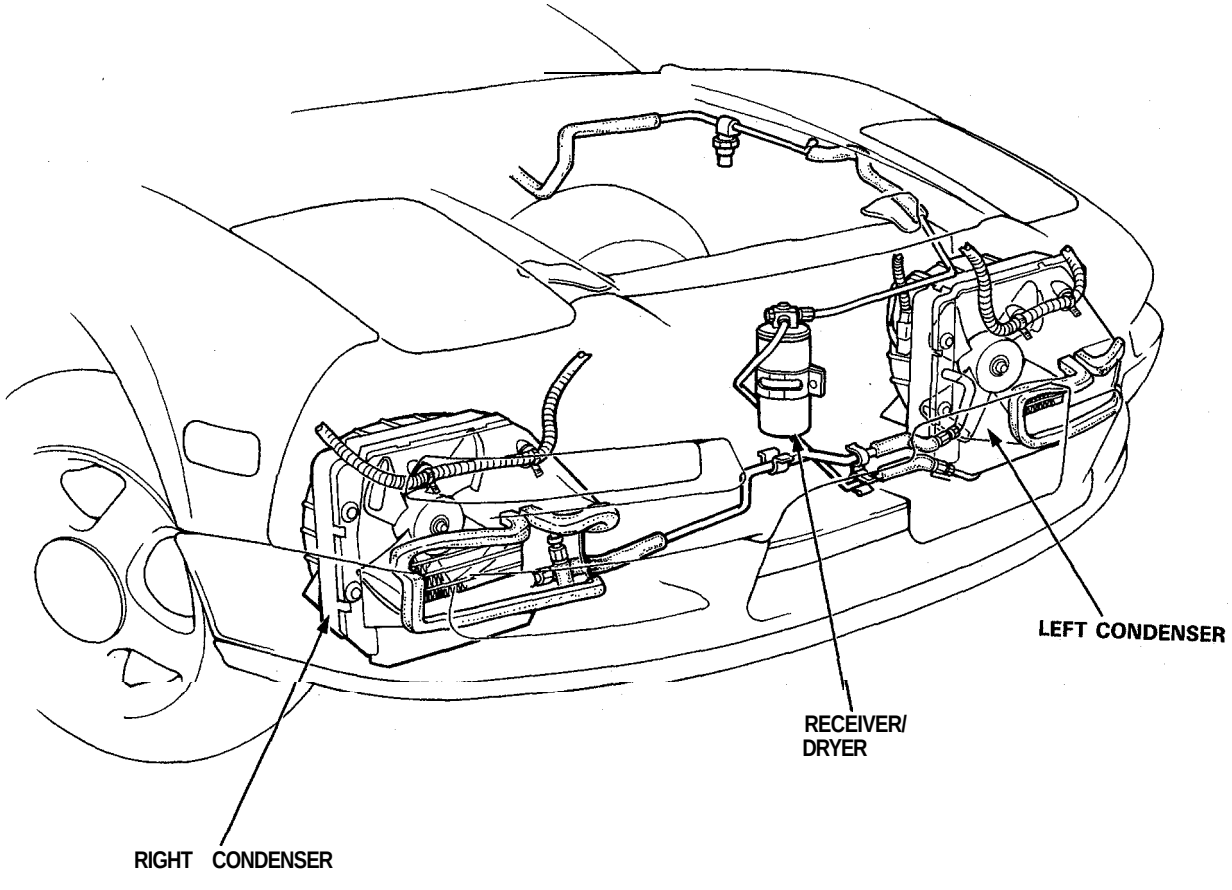
"HEAT" Door Adjustment



Condenser

- Description

Dual condensers are mounted behind the right and left side of the front bumper as shown. The cooling efficiency of parallel-dual condensers is as good as or better than a single condenser mounted in front of radiator.

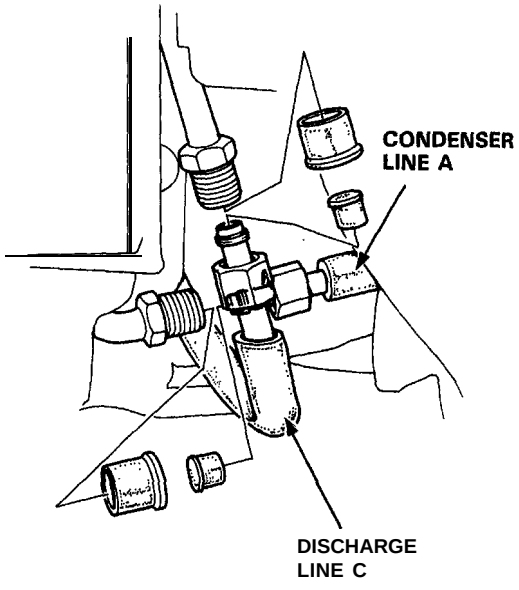


Condenser Assembly

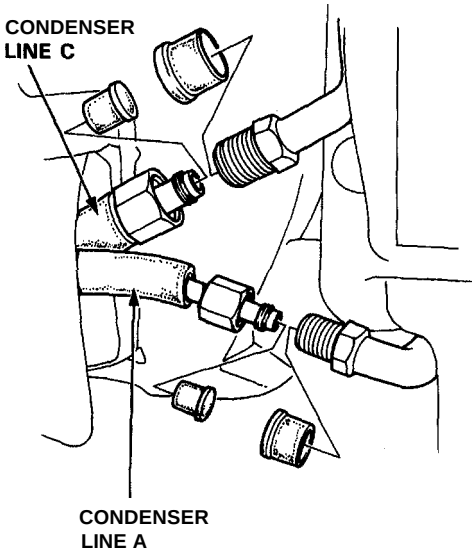
Replacement

1. Disconnect the battery negative terminal.
2. Use a refrigerant recovery system to discharge the refrigerant (page 22-93).
3. Disconnect the discharge line and the condenser lines from the condenser.
   Cap the open fittings immediately to keep moisture and dirt out of system.

(Right Condenser)



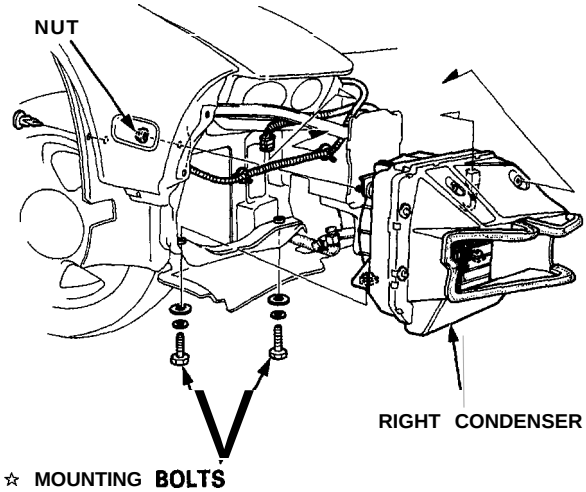
(Left Condenser)



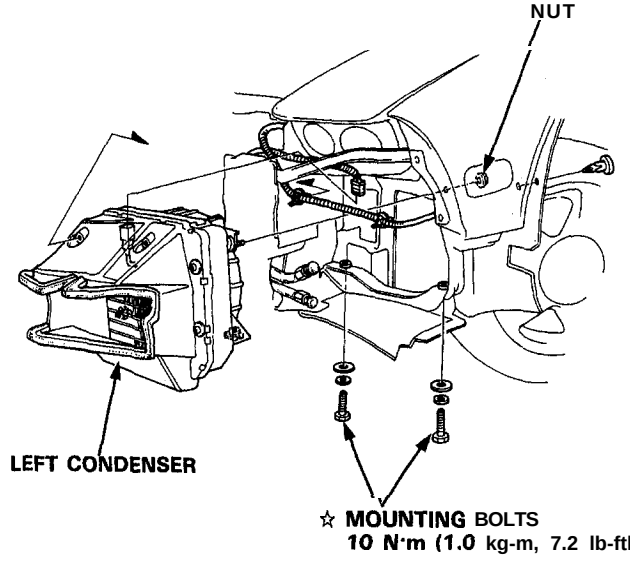
4. Disconnect the connector from the condenser fan motor, remove the mounting bolts(2) and nut, then remove the condenser.

☆: CORROSION RESISTANT BOLT

(Right Condenser)



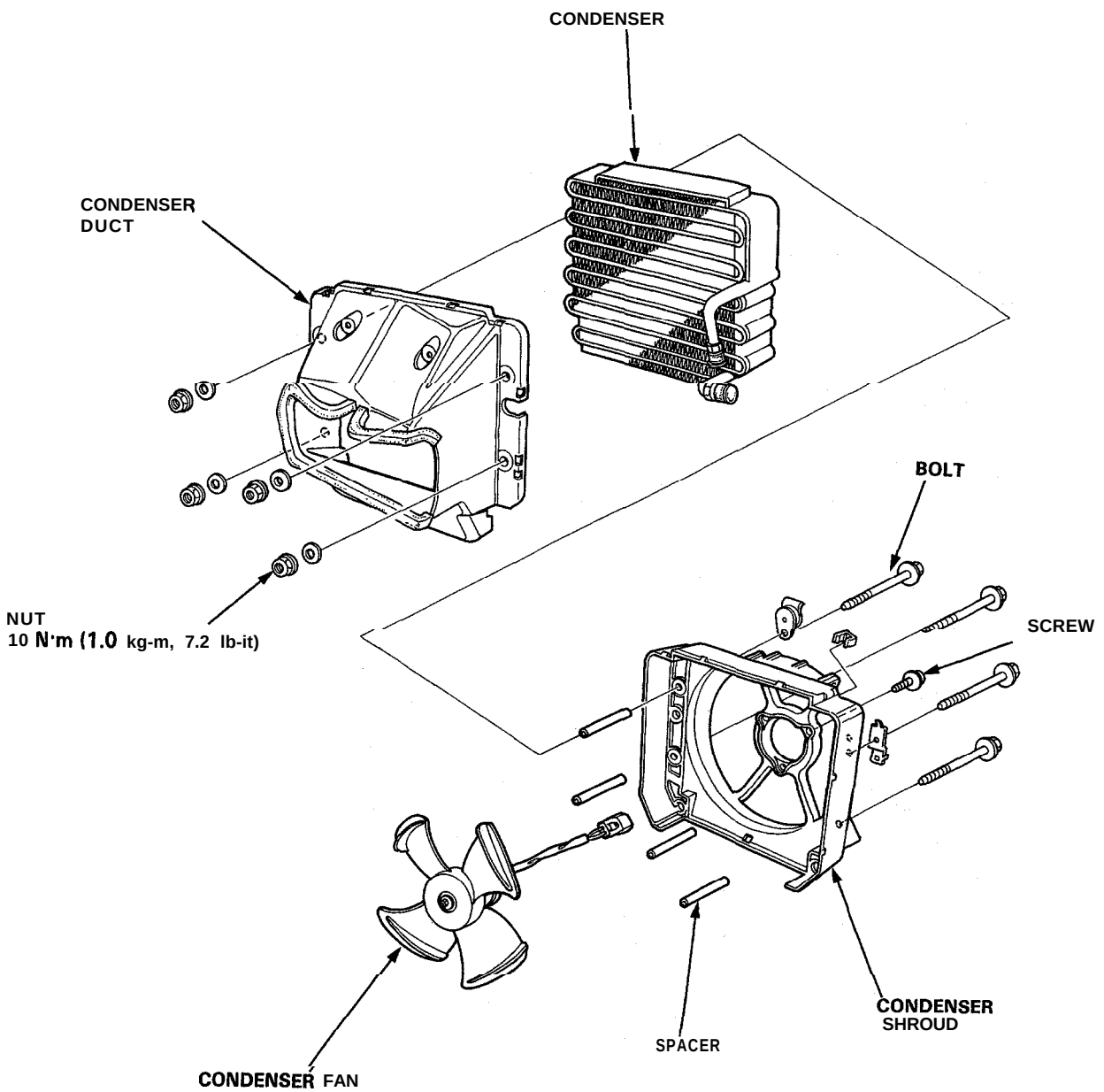
(Left Condenser)



5. Install the condenser in the reverse order of removal;
   - Replace O-rings with new ones each fitting.
   - Charge the system (page 22-93~95) and test its performance (page 22-96).

Disassembly/Reassembly

1. Remove the bolts and nuts (4). Then separate the condenser duct from the shroud, and remove the condenser.
2. Remove the fan mounting screws (3), then remove the fan from the shroud.

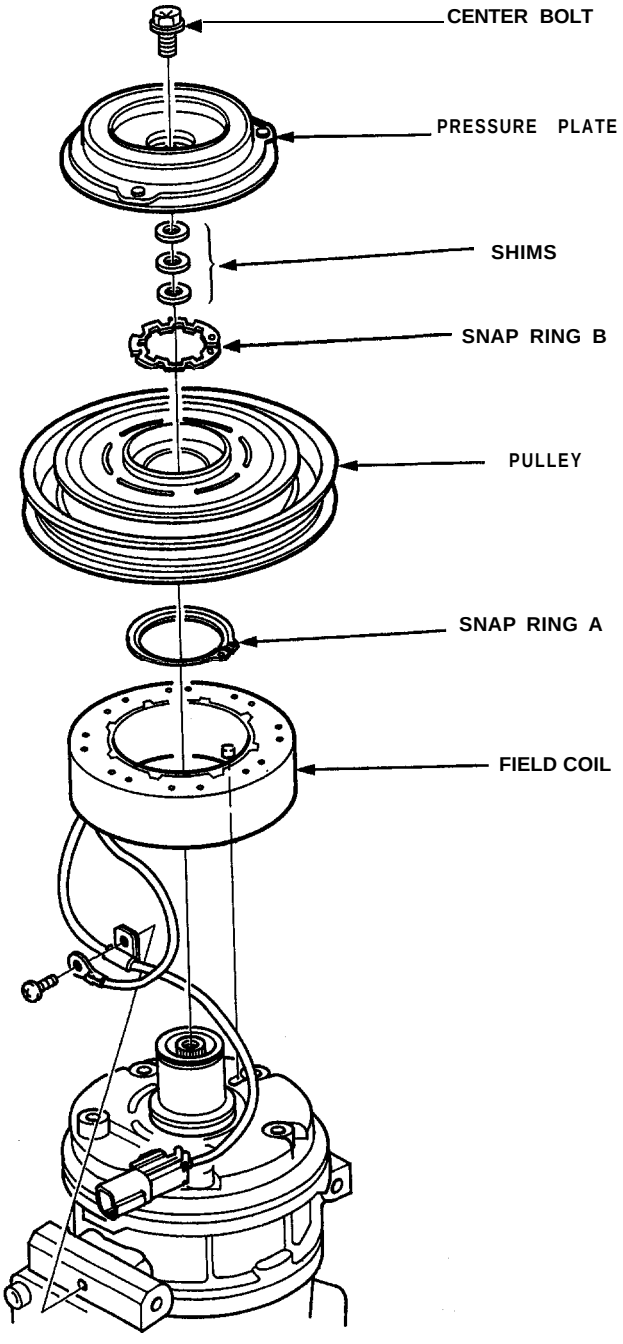


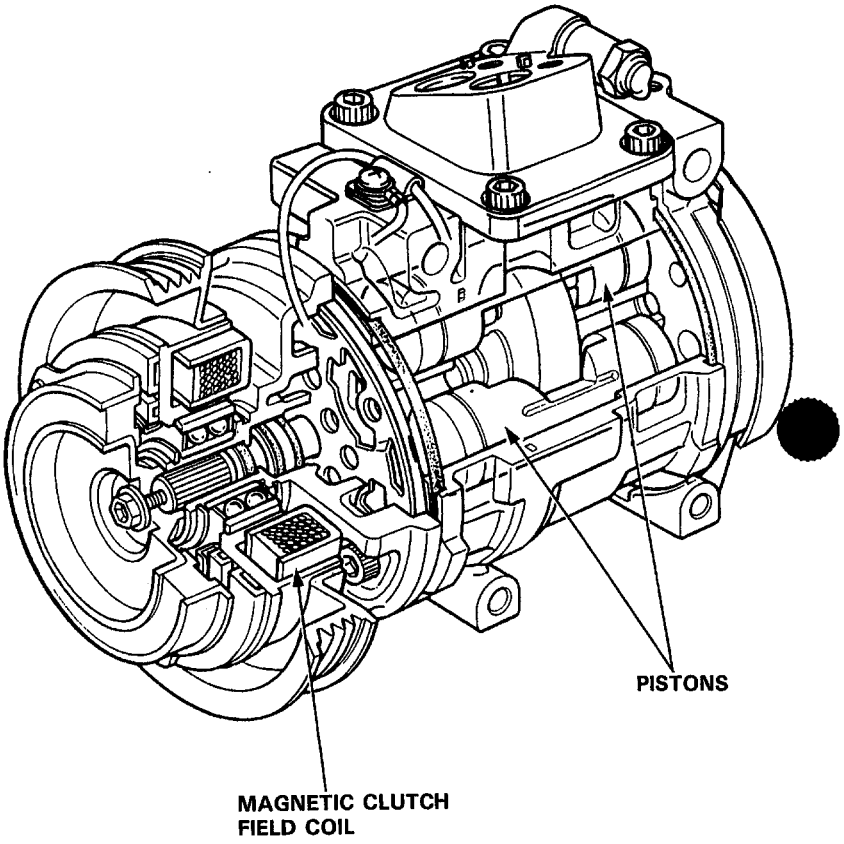
3. Assemble the condenser in the reverse order.
   Be careful not to damage the tabs on the condenser shroud when you attach it to the air intake duct.

Compressor

Description

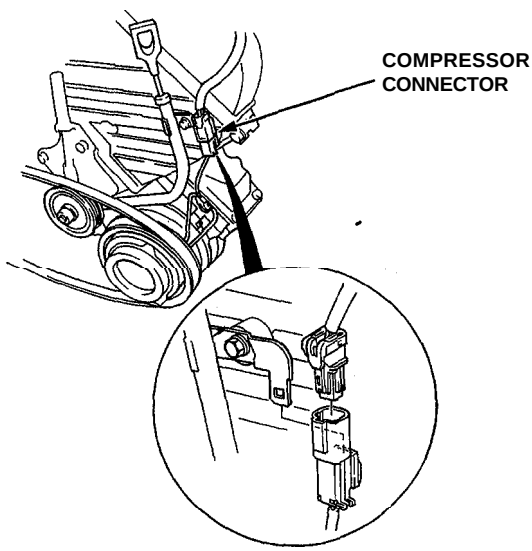
This compressor is a Nippondenso piston type. A revolving inclined disc drives the surrounding 10 reciprocating pistons. thus compressing the refrigerant.
As the inclined disc revolved, it pushes the pistons, protected by a ceramic shoe,



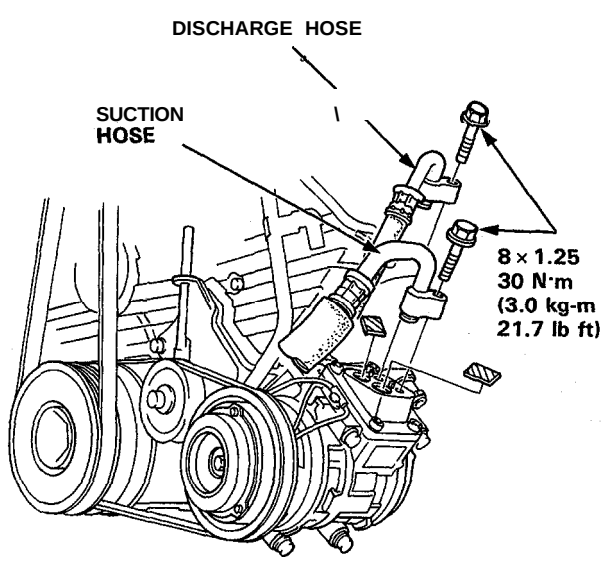


-Replacement

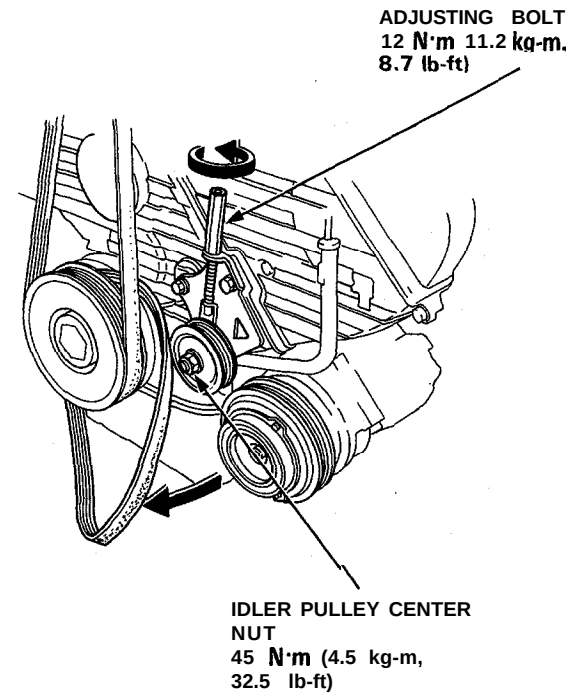
1. If the compressor still works, run the engine at idle for a few minutes with the A/C on, then shut the engine off and disconnect the negative cable from the battery.
2. Use a refrigerant recovery system to discharge the refrigerant from the system (page 22-93).
3. Disconnect the compressor connector.



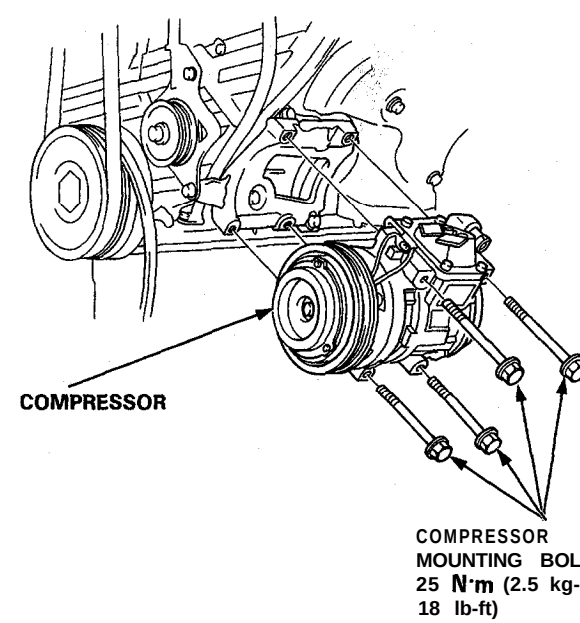
4. Raise the car on a hoist. Make sure it's properly supported (Section 1).
5. Remove the front beam (Section 5).
6. Disconnect the suction and discharge hoses from the compressor. Cap the open fittings immediately to keep moisture and dirt out of the system.



7. Loosen the idler pulley center nut and adjusting bolt, then remove the belt from compressor.



8. Remove the four compressor mounting bolts and compressor.

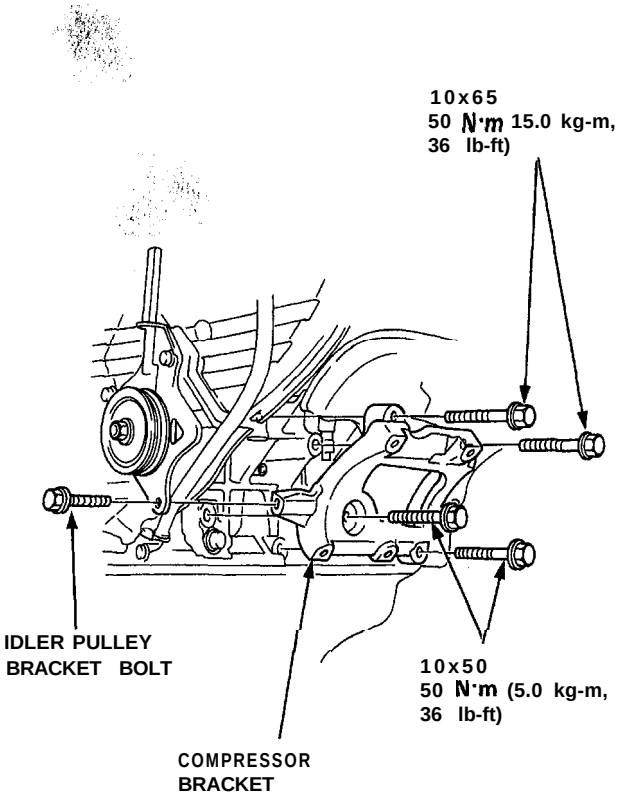


(cont'd)

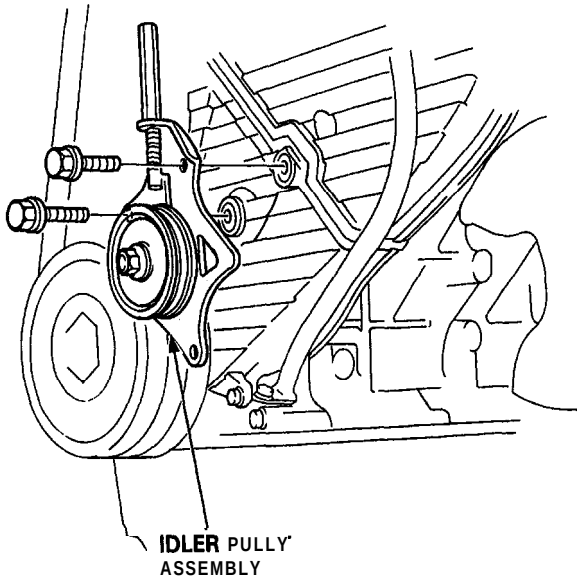
Compressor

– Replacement (cont'd)

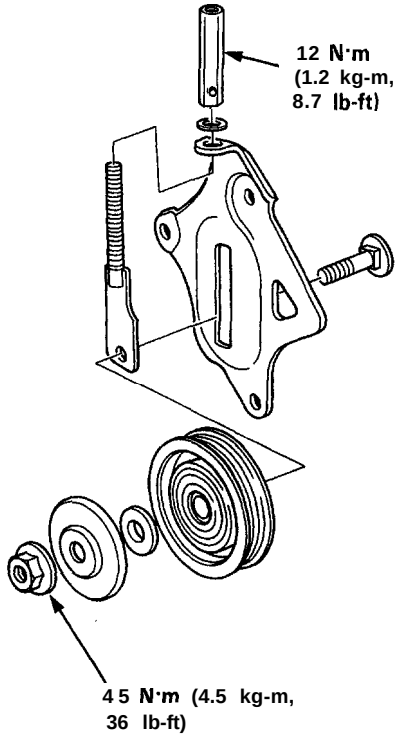
9. If necessary, remove the compressor bracket (4 bolts, plus 1 from the idler pully bracket).



10. If necessary remove the idler pulley (2 more bolts).



● 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.



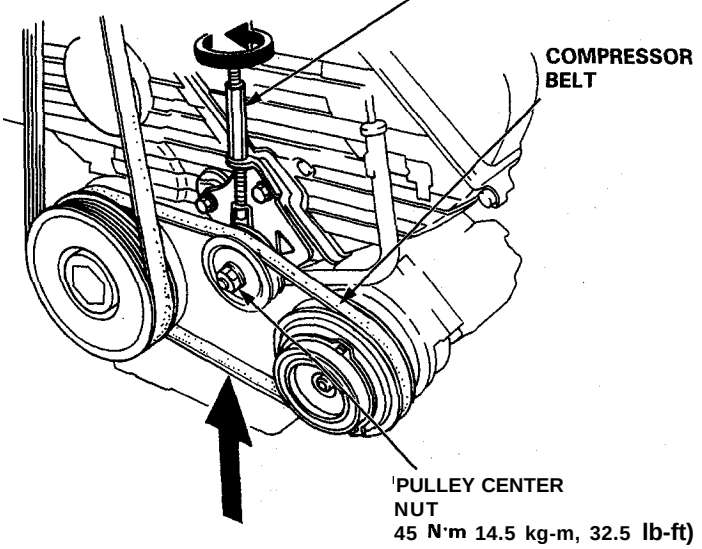
11. Install in the reverse order of removal.
If you're installing a new compressor, drain all the refrigerant oil out of the old compressor and measure its volume. Subtract the volume of old oil from 80 CC (2 1/3 floz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
12. Adjust the compressor belt (page 22-79).
After adjusting the belt, tighten the pully center nut. Then tighten the adjusting bolt securely.
13. Charge the system (page 22-93~95).
14. Test system performance (page 22-96).

– Compressor Belt Adjustment

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

NOTE: Check for belt damage. If necessary, replace the belt.

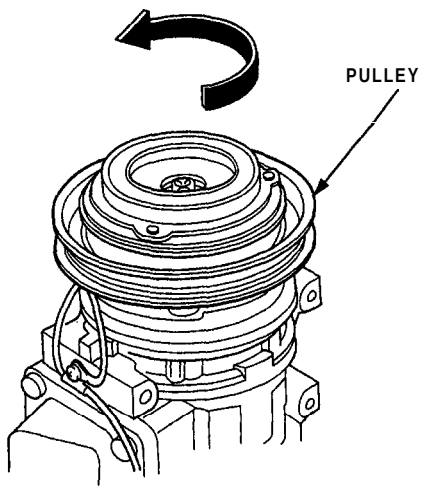
Belt tension [mm/10 kg]	
New belt	Used belt
7–9	12–14



Compressor

Clutch Inspection

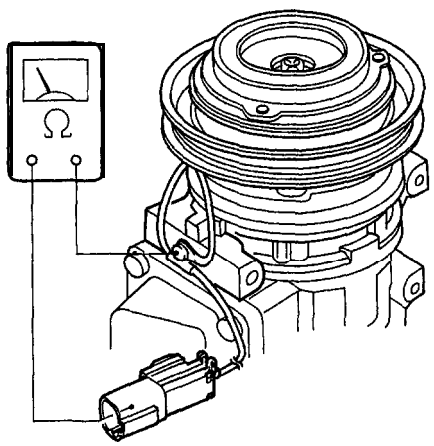
1. **Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.**



2. **Check resistance of the field coil:**

   Field Coil Resistance: 3.6f0.2 ohm at 20°C (68°F)

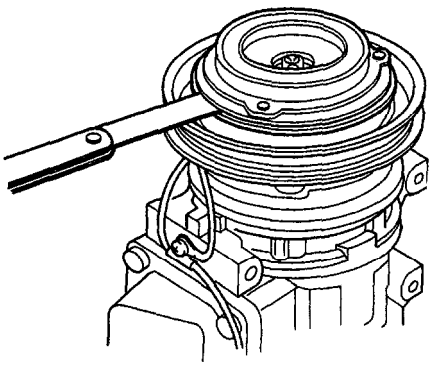
   If resistance is not within specifications, replace the coil.



3. Measure the clearance between the pulley and 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 the next page.

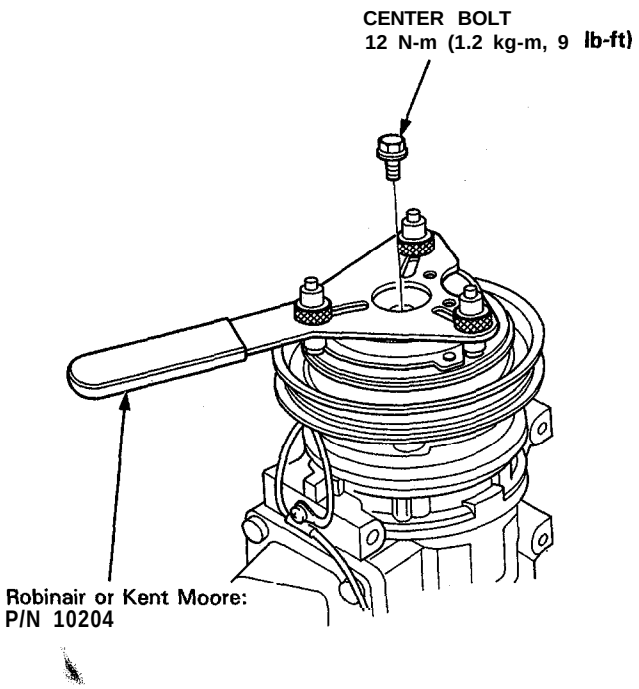
   CLEARANCE: 0.5 ± 0.15 (0.020 ± 0.006 in)

   NOTE: The shims are available in three sizes: 0.1 mm, 0.2 mm and 0.5 mm of thickness.

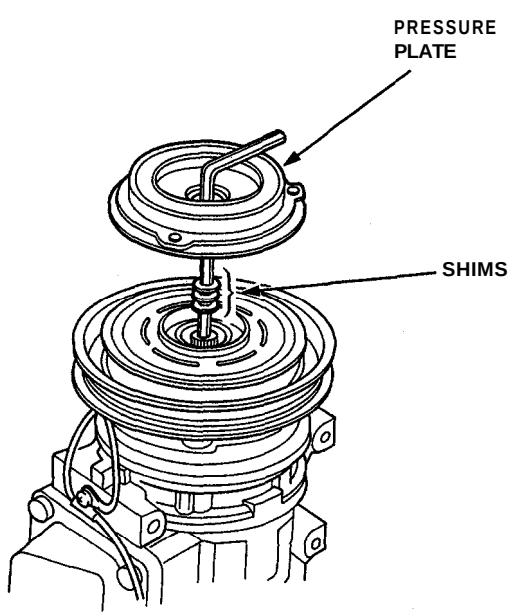


Clutch Overhaul

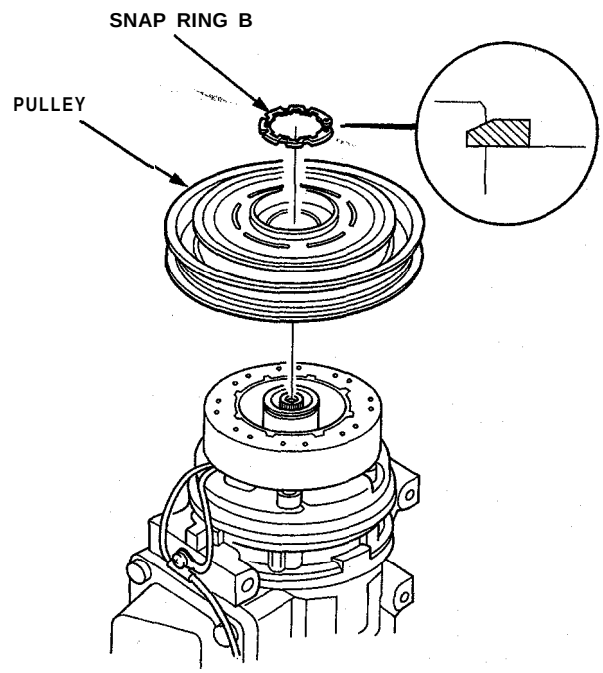
1. Remove the center bolt.



2. Remove the pressure plate and shim(s) taking care not to lose the shims.



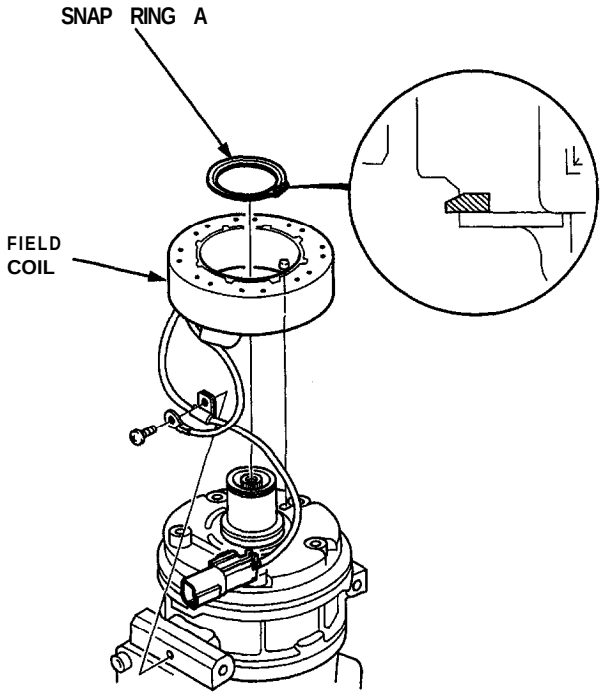
3. Use circlip pliers to remove snap ring B, then remove the pulley.



(cont'd)

Clutch Overhaul (cont'd)

4. Remove snap ring A and the field coil.

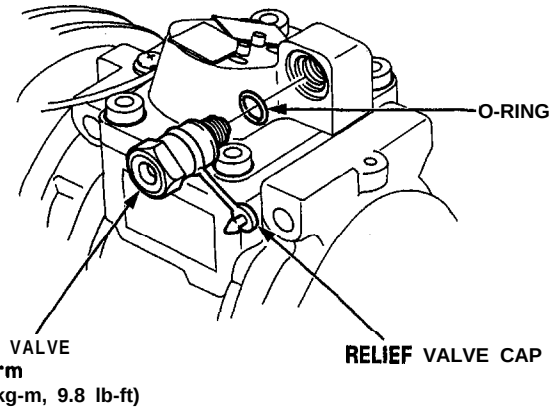


5. Install parts in the reverse order of removal, and:

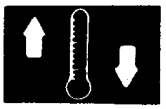
- Install the field coil with the wire side facing UP (see above).
- Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
- Check the pulley bearings for excessive play.
- Make sure the circlip fits in its groove properly.
- Apply locking agent to the threads on the center bolt.
- Make sure that the pulley turns smoothly, after it's reassembled.

Relief Valve Replacement

1. Remove the relief valve and O-ring. Don't let any compressor oil run out.



2. Clean off the mating surface.
3. Apply compressor oil to the O-ring.
4. Install and tighten the relief valve.
5. Charge the system and check for leaks, then push the cap into the valve.



– Climate Control Unit

SRS wire harness is routed near the console.

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

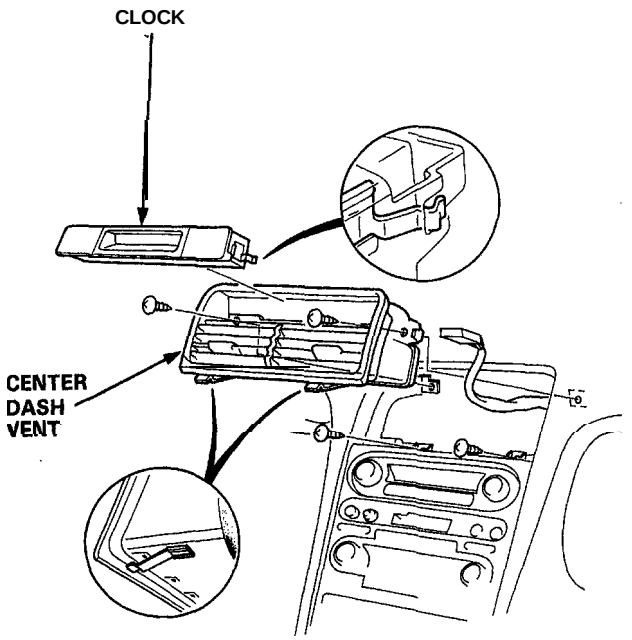
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the console.

1. Carefully pry the clock out of the dash and disconnect it.

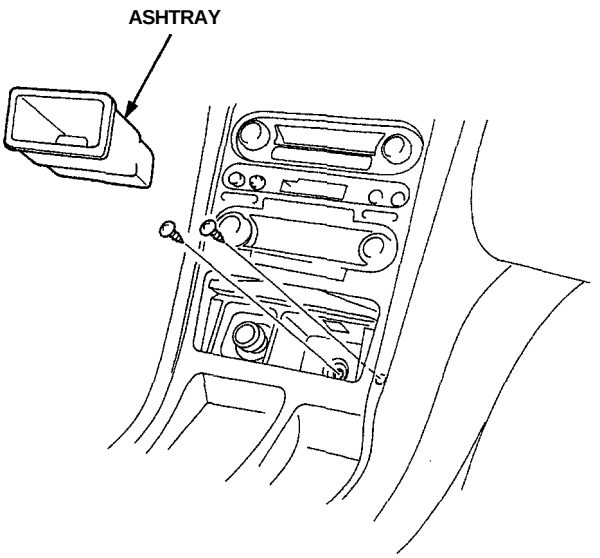
   CAUTION: Be careful not to damage the center console panel and the dashboard.

2. Remove the center dash vent (2 screws).

3. Remove the 2 screws from the top of the console panel.

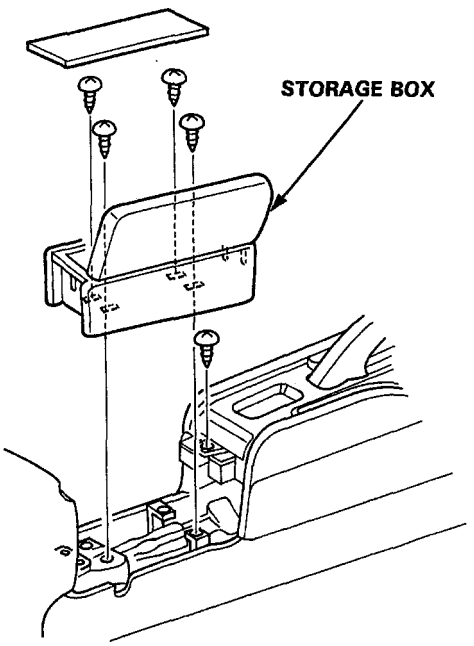


4. Remove the ashtray (lift up on the door to pop it out), then remove the 2 screws behind it.

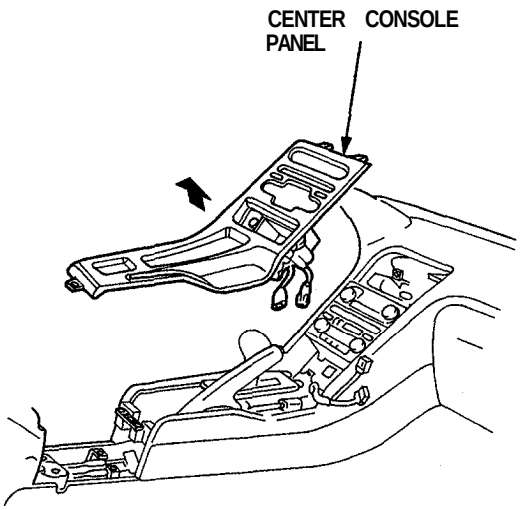


5. Remove the console storage box (lift out the bottom panel and remove 4 screws).

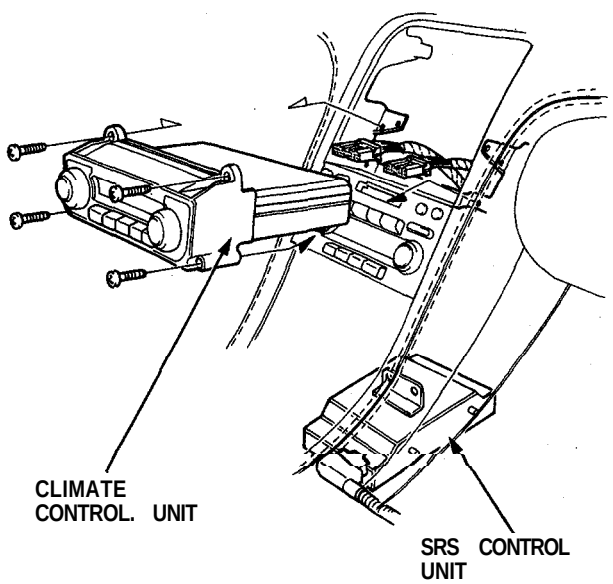
6. Remove the screw from the end of the console panel.



7. Pull the parking brake handle all the way up, iift the panel and disconnect the 2 connectors from it, then **carefully lift the panel off past the shift lever.** Remove the center console panel.



8. **Remove the screws (4), then pull out the control unit, disconnect its connectors and remove it** from the dashboard.



In-car Temperature Sensor

The in-car temperature sensor assembly includes a small **fan (aspirator fan) to draw air past the sensor.**

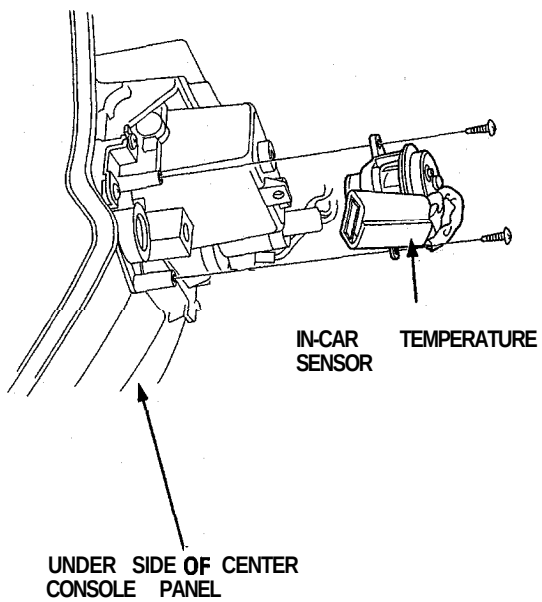
SRS wire harness is routed near the console.

WARNING **All SRS wire harnesses and connectors** are colored yellow. Do not use electrical test equipment on these circuit.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the console.

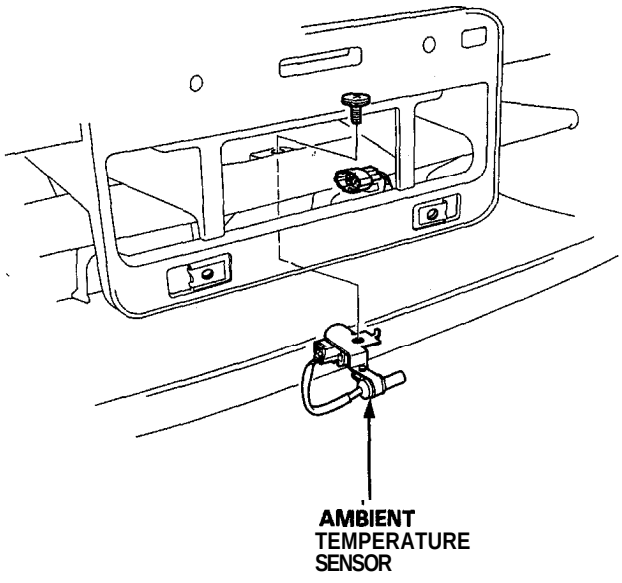
1. **Remove the center console panel as described in** step 1 — 7 in the first column (Climate Control Unit).

2. **Remove the mounting screws (2) and remove the** in-car temperature sensor from the under side of the console panel.
   Be careful not to damage the console panel.



-Ambient Temperature Sensor

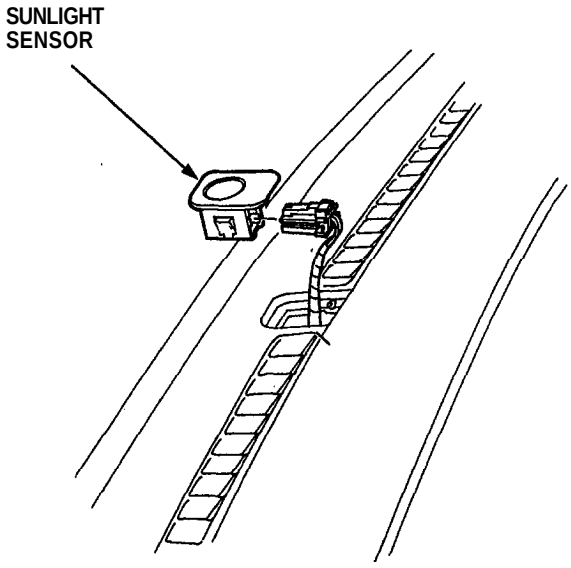
Remove the screw, disconnect the wire harness and then remove the ambient temperature sensor. Be careful not to damage the front grille and front bumper.



Sunlight Sensor

With a small screwdriver, carefully pry the sunlight sensor out of the dashboard and disconnect its wire harness.

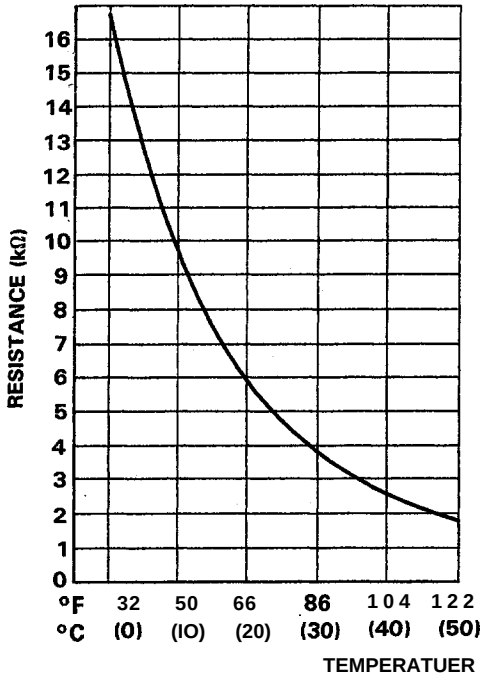
Protect the dashboard; cover it with a shop towel before you pry against it.



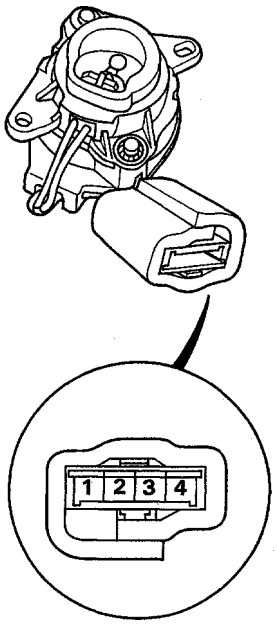
Component Tests

In-car Temperature Sensor

Compare the resistance reading between No. 1 and No. 2 terminals of the in-car temperature sensor with specifications shown in the following graph: It should be within specification.

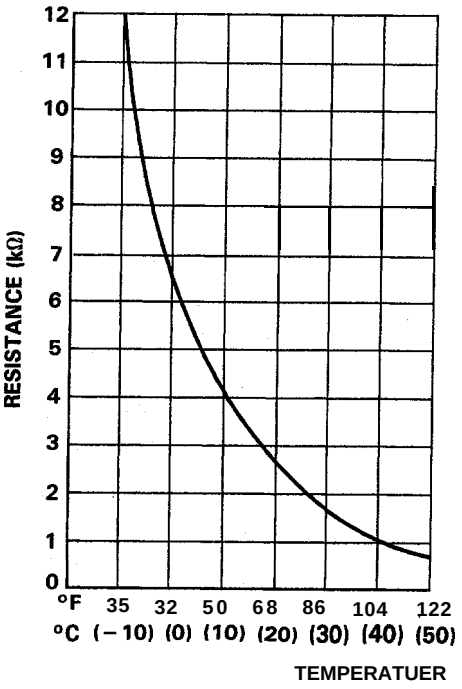


CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.

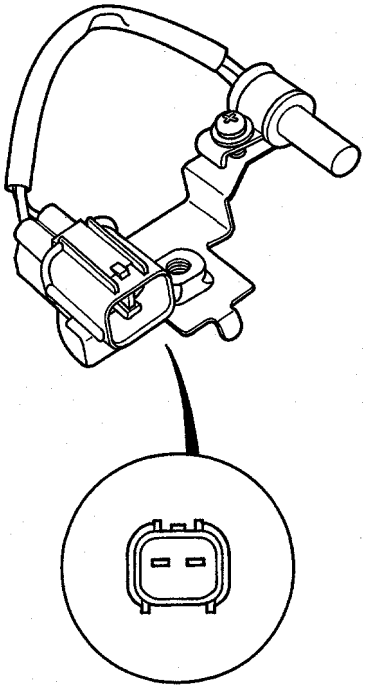


Ambient Temperature Sensor

Compare the resistance reading between terminals of the ambient temperature sensor with specificatoins shown in the following graph: It should be within specification.



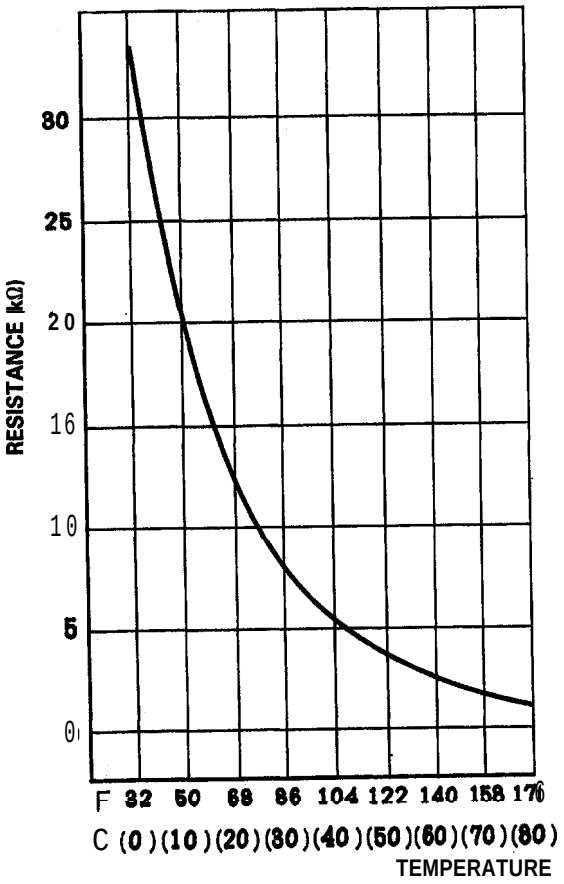
CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



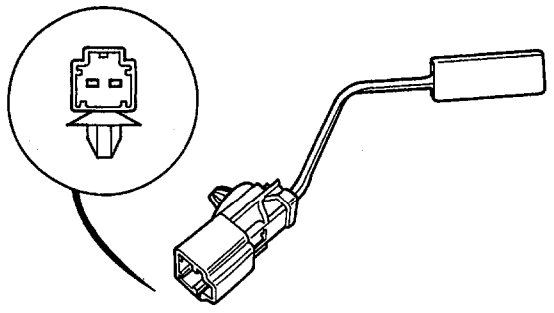
Component Tests

Coolant Temperature sensor

Compare the resistance reading between terminals of the coolant temperature sensor with specifications shown in the following graph: It should be within specification.

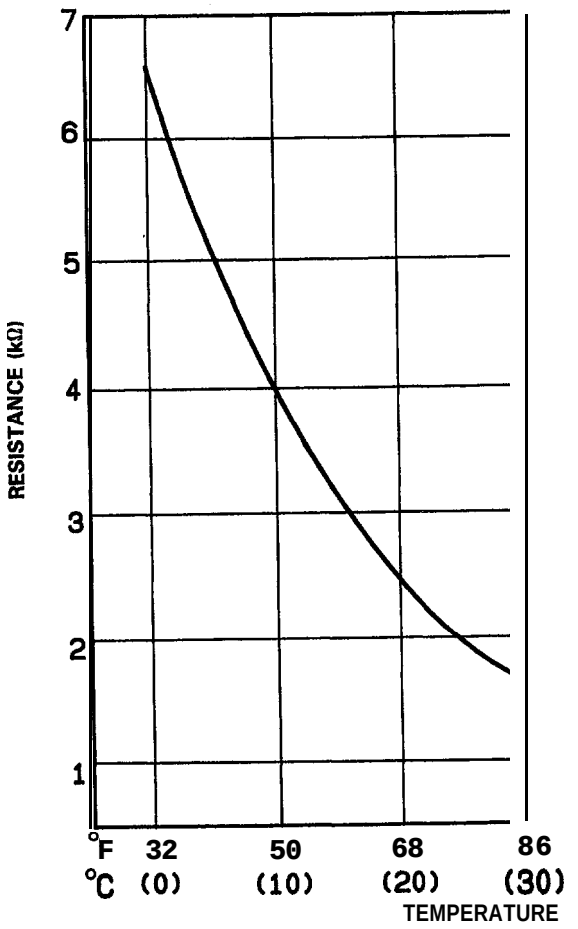


CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.

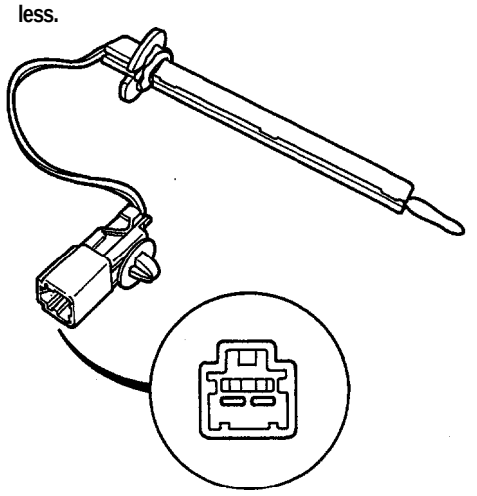


Evaporator Temperature Sensor

Compare the resistance reading between terminals of the evaporator temperature sensor with specification shown in the following graph: It should be within specification.



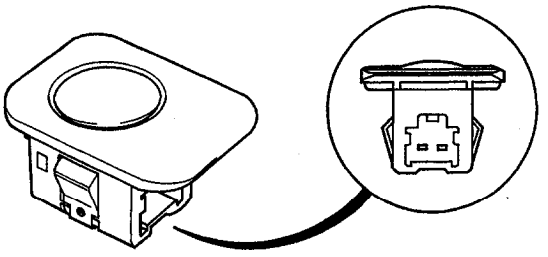
CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



Sunlight Sensor

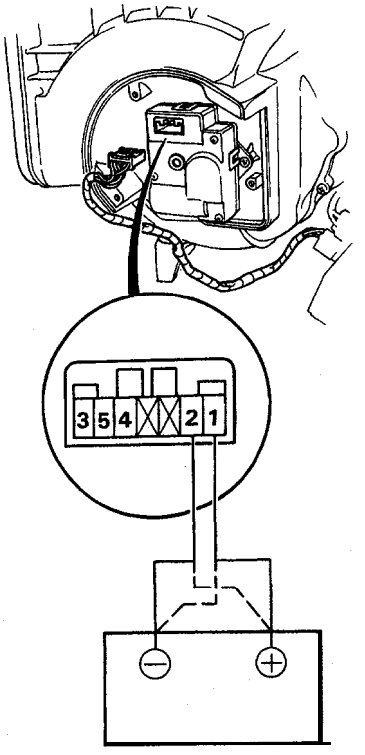
Measure the voltage between the terminals with the sensor out of direct sunlight.

- With the connector connected (probe the back of it): 1.4±0.2 V
- With the connector disconnected: 0.1 ~ 0.2 V



Recirculation Control Motor

1. Connect battery power to No. 1 terminal of the recirculation control motor, and connect to the No. 2 terminal to ground.
   The motor should run. If it doesn't, reverse the connections; the motor should then run.



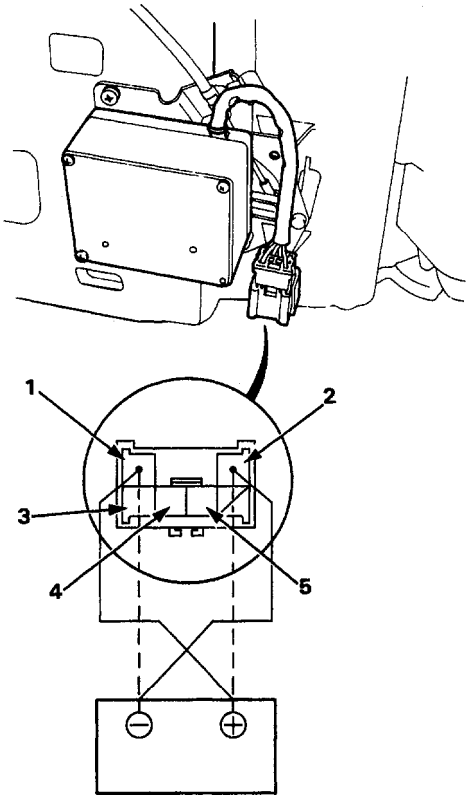
2. Check for continuity between the terminals of the recirculation control motor according to this table.

Terminal / Position	3	4	5
	○—○		
	○		○

Component Tests

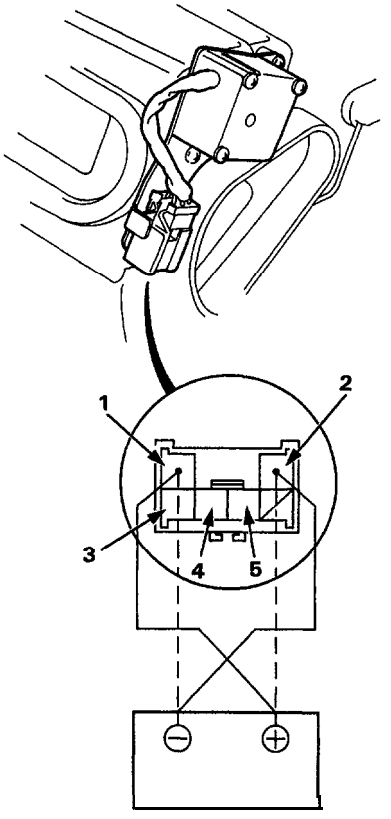
Air Mix Control Motor

- Connect battery power to the No. 1 terminal of the air mix control motor, and connect to the No. 2 terminal to ground; the air mix control motor should run, and stop at HOT.
  If it doesn't, reverse the connections: then the motor should run, and stop at COLD.
- Apply 5 V between the No. 3 terminal and the No. 5 terminal, then measure the voltage between the No. 3 terminal and the No. 4 terminal. The reading should be;
  4.7 ±0.7 V at HOT position.
  0.3 ±0.7 V at COLD pçosition.



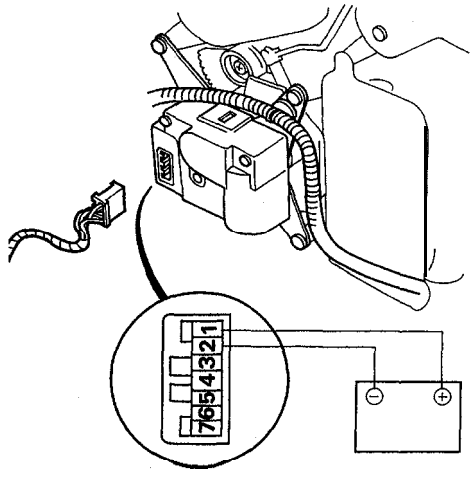
Vent Door Control Motor

1. Connect battery power to the No. 1 terminal of the vent door control motor, and connect to the No. 2 terminal to ground; the vent door control motor should run, and stop at CLOSE.
   If it doesn't, reverse the connections; then the motor should run, and stop at OPEN.
2. Apply 5 V between the No. 3 terminal and the No. 5 terminal, then measure the voltage between the No. 4 and the No. 5 terminals.
   The reading should be;
   4.7 ±0.7 V at OPEN position.
   0.3 ±0.7 V at CLOSE positon.

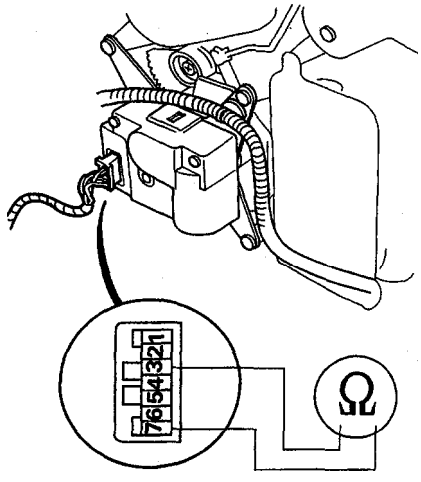


Mode Control Motor

1. Connect battery power to the No. 1 terminal of the mode control motor, and connect to the No. 2 terminal to ground. The motor should run, and stop at VENT.
   If it doesn't reverse the connectinos; the motor should run, and stop at DEF.



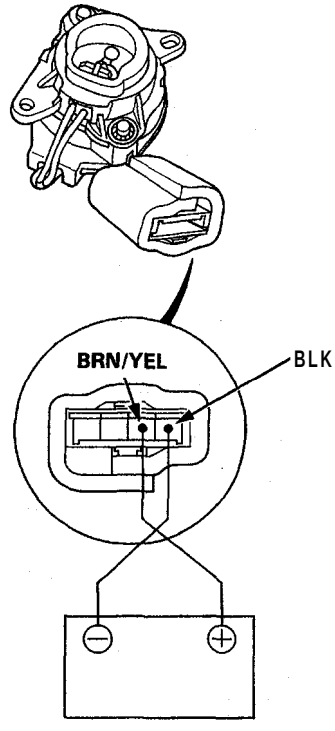
2. Plug the connector back in to the motor. Then operate the MODE switch on the control panel, and in each mode probe the back of the connector to check for continuity between terminals according to the table.



Terminal / LED symbol	3	4	5	6	7
	○				○
	○		○		
	○			○	
	○	○			
	○	○	○	○	

Aspirator Fan

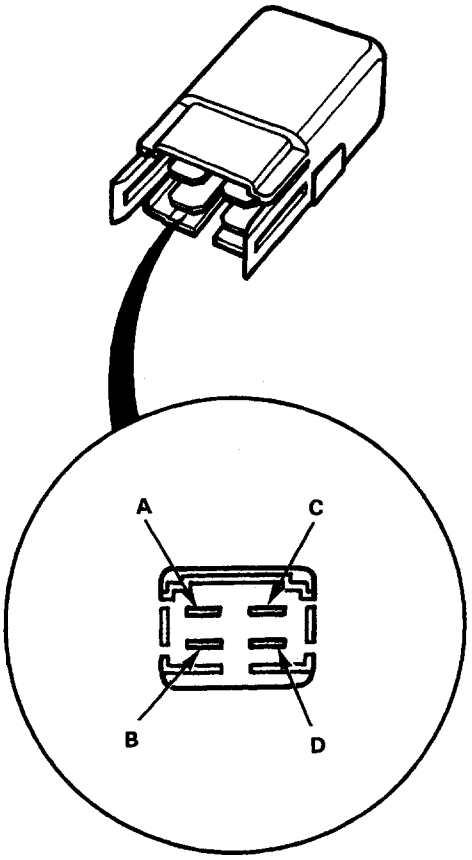
Connect battery power to the BRN/YEL terminal of the connector, and connect the BLK terminal to ground. The fan should run.

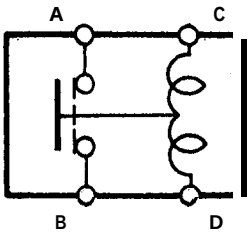


Component Tests

Relay

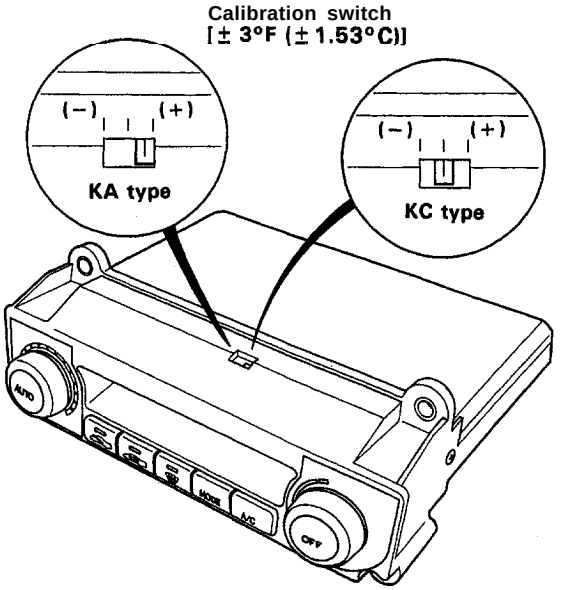
There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
There should be no continuity when the battery is disconnected.





Control Unit Adjustment

The calibration switch can raise or lower the set temperature by ±3°F (1.5°C) in relation to the digitally-displayed temperature.



A/C System Service

Discharge

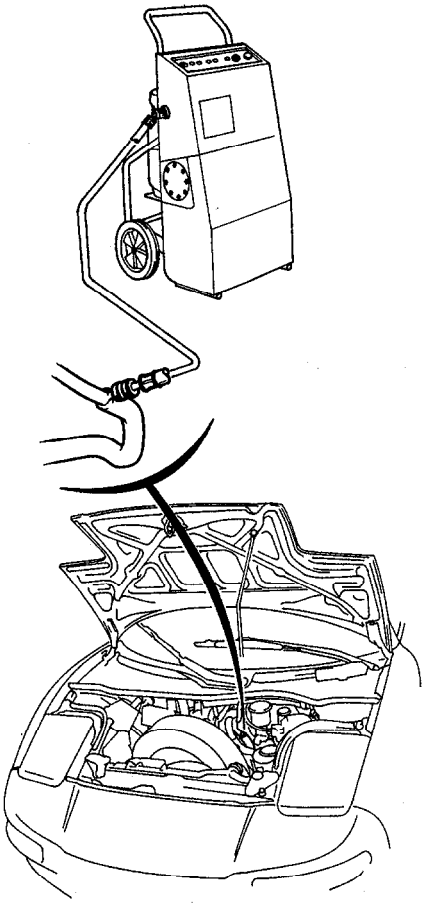
⚠ WARNING

- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.**

1. Connect a Refrigerant Recovery System to the A/C system.

2. Operate the Refrigerant Recovery System according to the manufacturer's instractions.
   IMPORTANT: Do not vent refrigerant to the atmosphere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (R-12) may damage the earth's ozone layer.
   Always use UL-listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

Refrigerant Recovery/Recycling System.

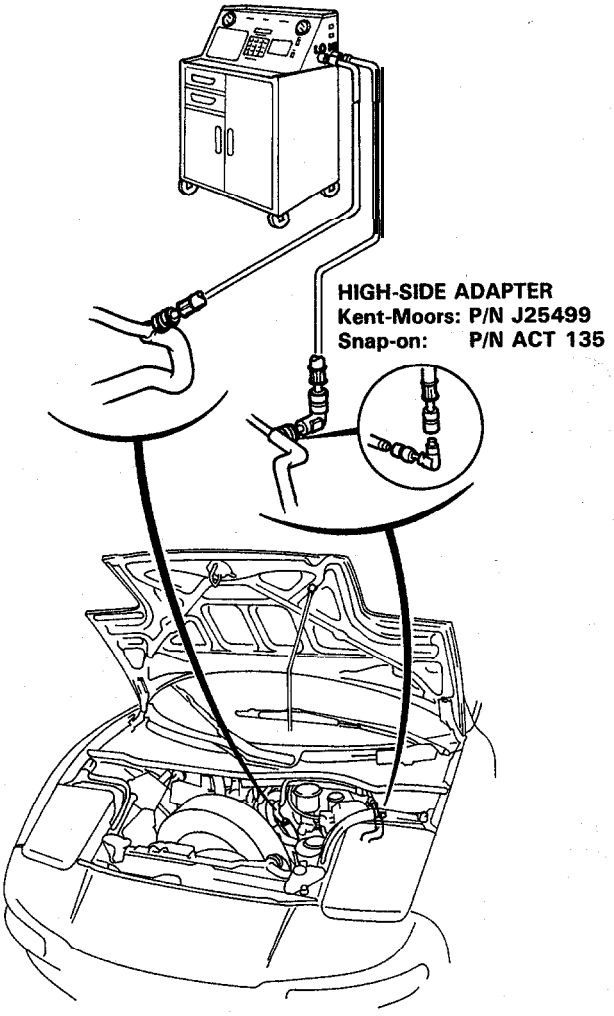


Evacuation

1. **When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the** receiver/dryer should be replaced).

2. Attach an Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.

   NOTE: If low pressure does not reach more than 700 **mm hg (27 in-Hg) in 15 minutes, there is probably** a leak in the system. Partially charge the system and **check for leaks (see Leak Test).**



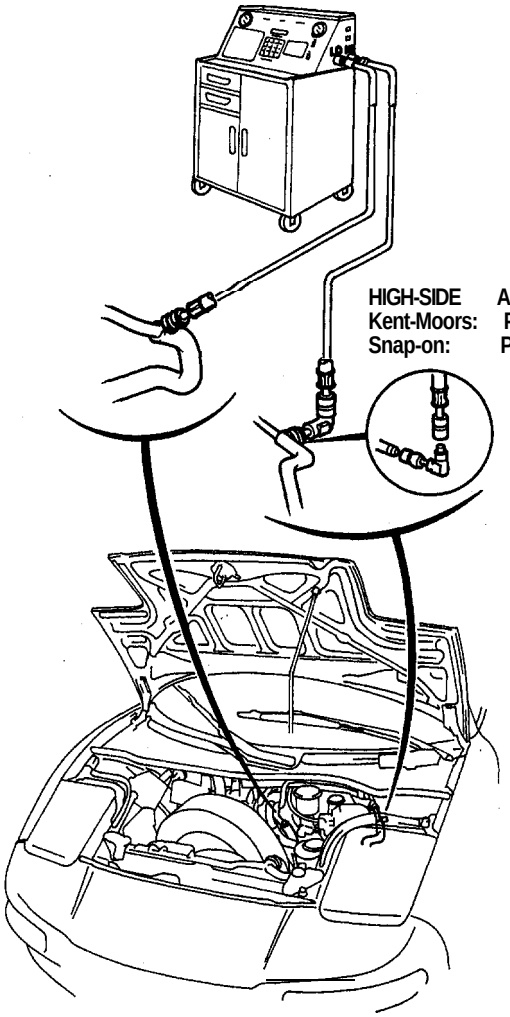
Leak Test

⚠ WARNING When handling refrigerant (R-12):

- **Always wear eye protection.**
- Do not let refrigerant get on your skin or in your eyes. **If it does:**
  - **Do not rub your eyes or skin.**
  - Splash large quantities of cool water in your eyes **or on your skin.**
  - Rush to a physician or hospital for immediate treatment. **Do not attempt to treat it yourself.**
- **Keep away from open flame. Refrigerant, although** non-flammable, will produce poisonous gas if burned.
- Work in well-ventilated area. Refrigerant evaporates **quickly, and can force all the air out of a small, enclosed area.**

IMPORTANT: Do not vent refrigerant to the atmosphere. **The chlorofluorocarbons (CFCs) used in conventional** refrigerant (R-12) may damage the earth's ozone layer. **Always use UL listed, refrigerant recovery/recycling** equipment to extract the refrigerant before you open an **A/C system to make repairs.**
Follow the equipment manufacturer's instructions.

1. Attach an Air Conditioning Service Station as shown.
2. **Open high pressure valve to charge the system to about 100 kPa (14 psi), then close the supply valve.**
3. **Check the system for leaks using a leak detector.**
4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), discharge **the system according to the Discharge Procedure on page 22-93.**
5. After checking and repairing leaks, the system must **be evacuated (see System Evacuation on page 22-93).**



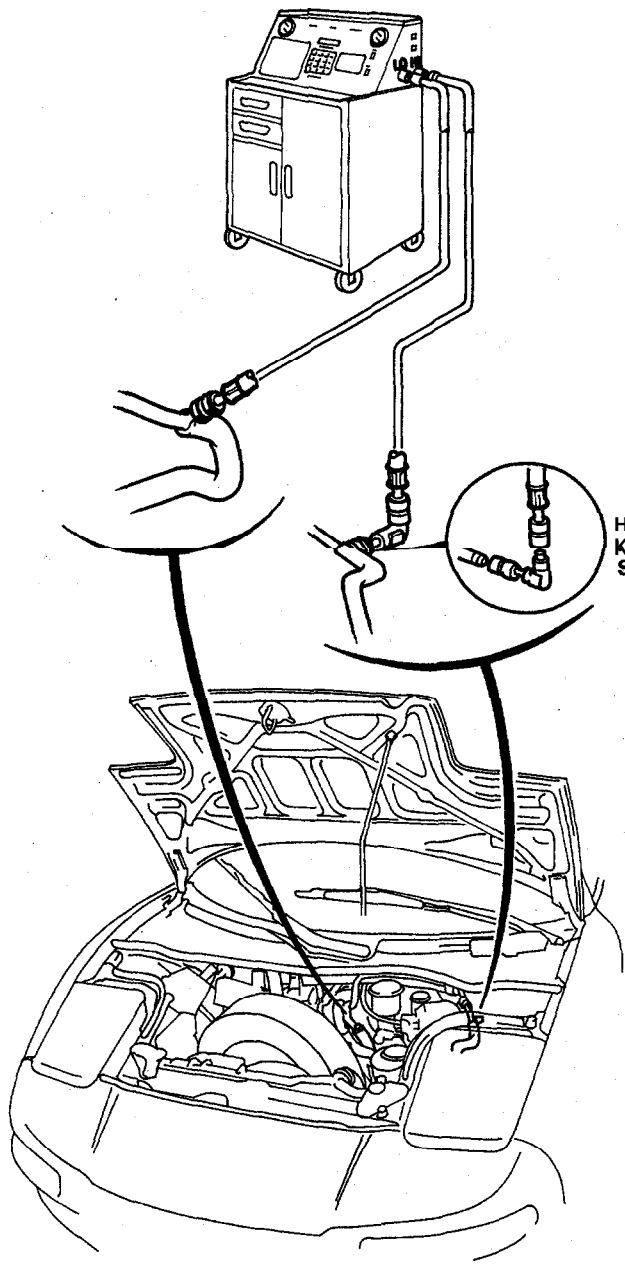
Charging Procedures

Refrigerant capacity: 900-950 g (32–34 oz)

⚠WARNING Always wear eye protection when charging the system.

CAUTION: Do not overcharge the system; the compressor will be damaged.

Attach an Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.



Performance Test

The performance test will help determine if the air conditioning system is operating within specifications.

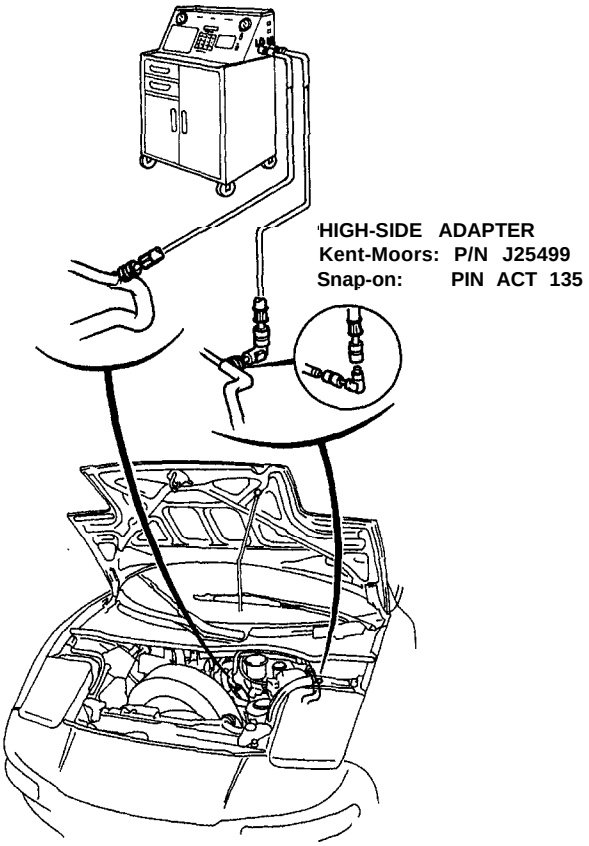
1. Connect the hoses as shown.

2. Insert a thermometer in the vent outlet. Determine the relative humidity and air temperature by calling the local weather information line.

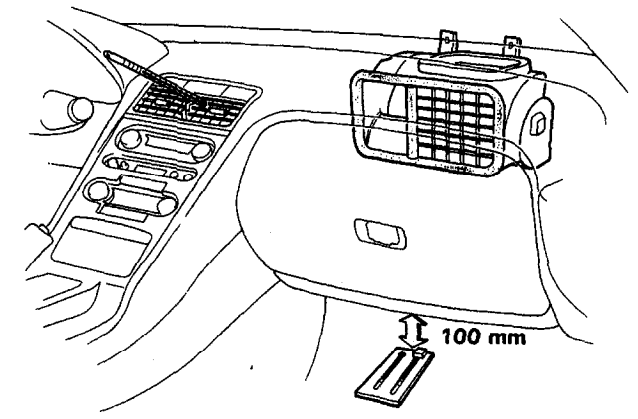
3. Test conditions:
   - Avoid direct sunlight.
   - Open engine cover.
   - Open front doors.
   - Set the temperature control dial to max cold and push the VENT and fresh air buttons.
   - Turn the fan switch to MAX.
   - Run the engine at 1,500 RPM.
   - No driver or passengers in vehicle.

4. After running the air conditioning for 10 minutes under the above conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.

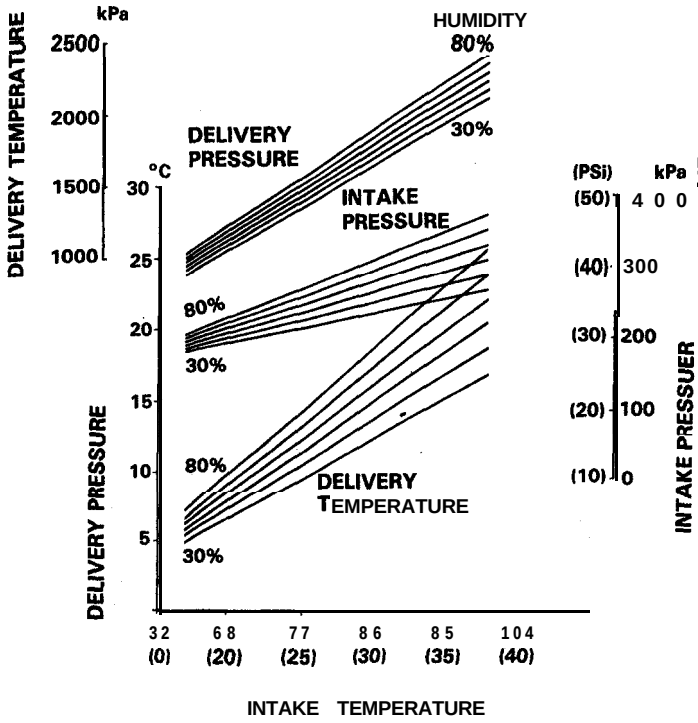
5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature fair temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level. (10% above and 10% below the humidity level)
   - From each point, draw a horizontal line across to 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.



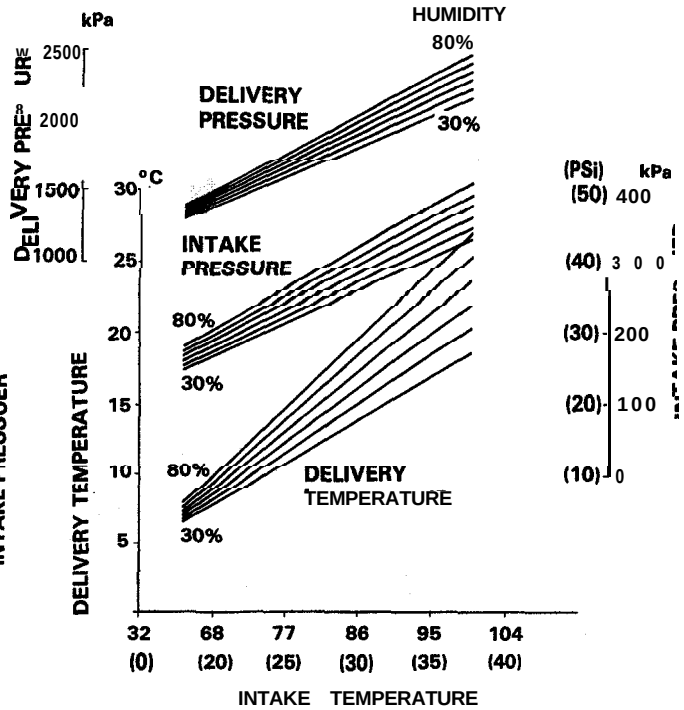
HIGH-SIDE ADAPTER
Kent-Moors: P/N J25499
Snap-on: PIN ACT 135



(Without fog lamp)



(With fog lamp)



Pressure Test

NOTE: Performance Test on page 22-96.

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually	Air in system	Evacuate system: then recharge Evacuation: page 22-93 Recharging: page 22-95
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	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
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	insufficient refrigerant in system	• Check for leak • Charge system
	High and low pressures are balanced soon after stopping compressor	• Faulty compressor discharge or inlet valve • Faulty compressor seal	Replace compressor
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	• Faulty expansion valve	Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant	Check for leaks. Charge as required.
	Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum	• Frozen expansion valve • Faulty expansion valve	Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	• Expansion valve open too long • Loose expansion valve	Repair or Replace.
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	• Faulty gasket • Faulty high pressure valve • Foreign particle stuck in high pressure vlave	Replace 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
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
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 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 compressor

Electrical

Special Tools 23-2

How to Use This Section

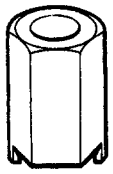
Troubleshooting Precautions 23-3
Five-step Troubleshooting 23-8
Schematic Symbols 23-9
Wire Color Codes 23-9
Relays and Control Unit Locations
Front Compartment 23-10
Dashboard 23-11
Dashboard, Door and Floor 23-12
Rear Bulkhead 23-13
Engine Compartment 23-14

Index to Circuits and Systems

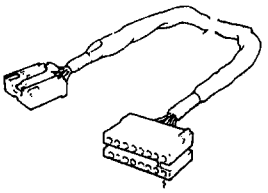
Air Conditioner ..... Section 21
Alternator 23-100
Antenna, Power 23-235
Anti-Lock Brake System (ALB) ..... Section 19
Automatic Transmission
Control System ..... Section 14
Battery 23-67
Blower Controls ..... Section 21
Charging system 23-99
Cigarette. Lighter 23-226
Clock 23-224
Cooling Fan Control 23-112
* Cruise Control 23-290
Defogger, Rear Window 23-274
Fuel Pump ..... Section 11
* Fuse Box 23-47
Fuel Injection Sysrwm ..... Section 11
* Gauges
Circuit Diagram 23-124
Coolant Temperature
Gauge 23-136
Fuel Gauge 23-134
Oil Pressure Gauge 23-137
Speedometer 23-123
Tachometer 23-123
Grounds
Distribution 23-67
Locations 23-15
* Heater Controls ..... Section 21
* Horns 23-239
* Ignition Switch 23-72
Ignition System 23-88
Ignition Timing Control 23-91
Indicator
* High Beam Indicator 23-130
*Safety Indicator 23-145
* Shift Lever Position Indicator 23-152
* Turn Signal Indicator 23-209
Integrated Control Unit 23-158
Interlock System 23-140
Lights, Exterior
Back-up Lights 23-200
Brake Lights 23-203
Daytime Running Lights (CANADA) 23-190
Front Side Marker Lights 23-191
Hazard Lights 23-209
Headlights 23-187
Brake Lights 23-203
License Plate Lights 23-193
Position Lights 23-191
Rear Side Marker Lights 23-193
Taillights 23-192
Turn Signal Lights 23-191
Lights, Interior
Courtesy Lights 23-195
Dashlight Brightness
Control 23-216
Dome Light 23-195
Entry Light Timer 23-221
Glove Box Light 23-194
Trunk Light 23-195
* Lighting System 23-168
Locks, Power 23-253
Mirrors, Power 23-248
Opener, Trunk 23-245
Power Distribution 23-50
Electrical Power Steering (EPS) ..... Section 11
Main Relay 80x 23-47
Relay Locations 23-10
Seats, Power 23-270
Security Alarm System 23-304
Spark Plugs 23-96
Starting System 23-75
* Stereo Sound System 23-229
Side Marker/Turn Signal/Hazard
Flasher System 23-209
Washer, Windshield 23-281
Windows, Power 23-261
Wipers, Windshield 23-281
* Wires, Harnesses and Connectors
Wire Color Codes 23-9
Wire Harness Routing 23-15
Wiring Diagrams 23-350

Special Tools

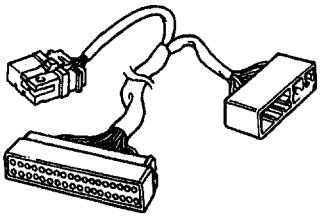
Ref. No.	Tool Number	Discription	Q'ty	Page Reference
①	07JAA-001 000B	Antenna Nut Wrench	1	23-236
②	07MAZ-SL00500	SRS Test Harness-A	1	23-329
③	07LAZ-SL40200	SRS Test Harness B	1	23-33 1
④	07LAZ-SL40300	SRS Test Harness C	1	23-334
⑤	07LAZ-SL40400	SRS Test Harness D	1	23-33 1
⑥	07HAZ-SG00500	Deployment Tool	1	23-340
⑦	KS-AHM-32-003	Digital Multimeter	1	23-78



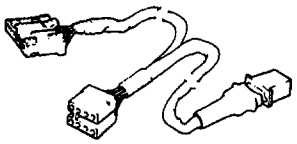
①



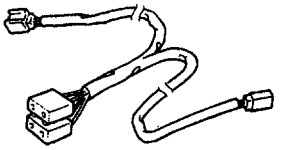
②



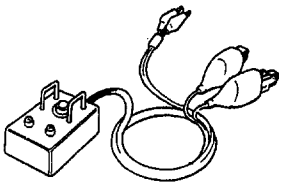
③



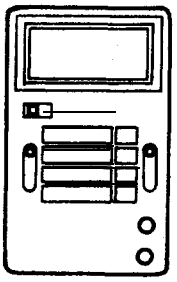
④



⑤



⑥



⑦

Troubleshooting

-Troubleshooting Precautions

Before Troubleshooting

- Check the main fuse and the fuse box.
- Check the battery for damage, 'state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

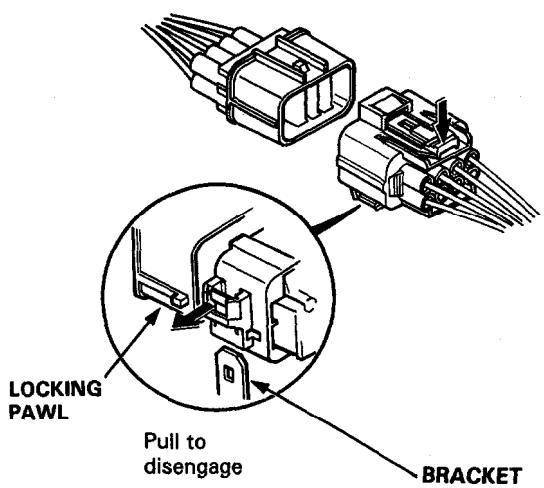
- Do not quick-charge a battery unless the battery ground cable has been disconnected, or you will damage the alternator diodes.
- Do not attempt to crank the engine with the battery ground cable connected incompletely or you will severely damage the wiring.

While You're Working

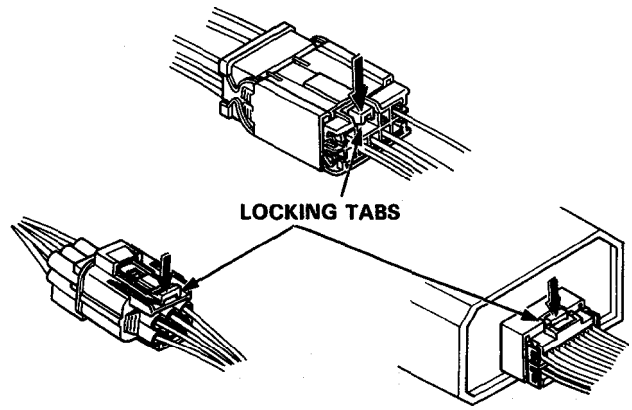
- Make sure connectors are clean, and have no loose pins or receptacles.
- Make sure multiple pin connectors are packed with grease (except watertight connectors).

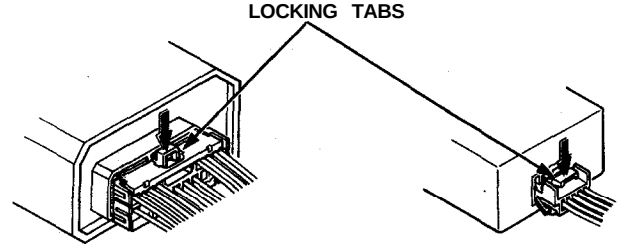
Since new type connectors are used, connection and disconnection of them should be done paying attention to the following precautions.

- Because all the connectors except terminal of 1-P are equipped with push-down type locks, unlock them first before disconnecting the connectors.
- On the connectors installed on the bracket a pull type lock is equipped between the bracket and the connector.
  Some connectors of this type can not' be disconnected unless they are removed from their brackets. When disconnecting, check their shapes.
- On the bracket mounted connector with dual locks, remove the connector from the bracket before disconnecting.



- Push the locking tab to disconnect.

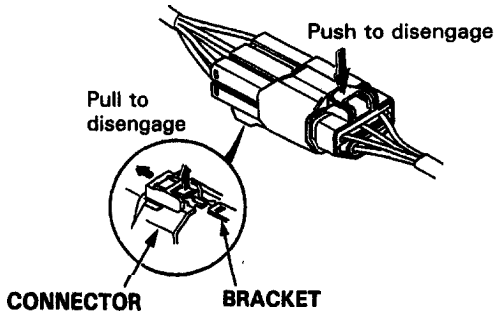




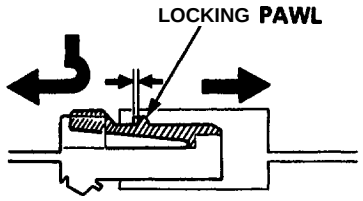
(cont'd)

-Troubleshooting Precautions (cont'd)

- Pull the locking tab to remove the connector from the bracket.

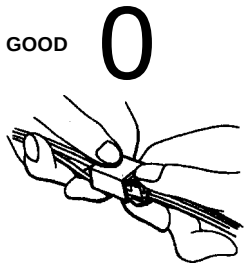


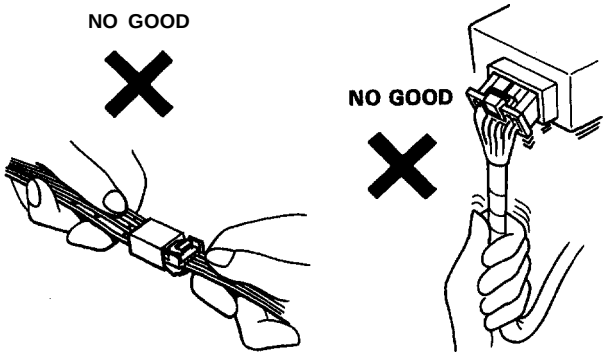
- When disconnecting locks, first press in the connector tightly (to provide clearance to the locking device), then operate the tab fully and remove the connector in the designated manner.



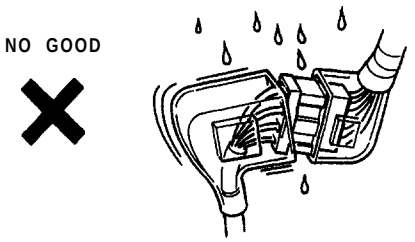
- When disconnecting a connector, pull it off from the mating connector by holding on both connectors.

- Never try to disconnect connectors by pulling on their wires.

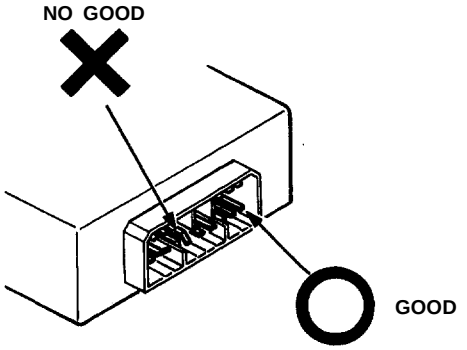




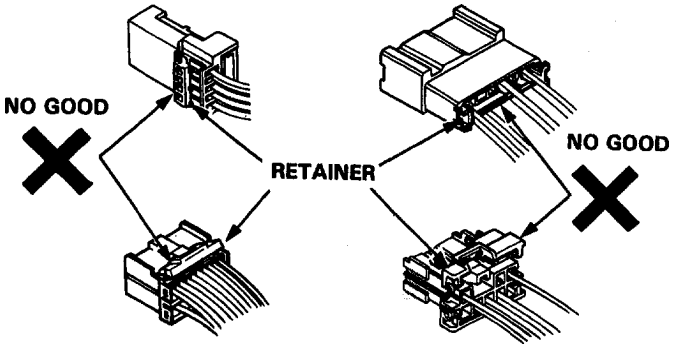
- Place the plastic cover over the mating connector after reconnecting. Also check that the cover is not distorted.



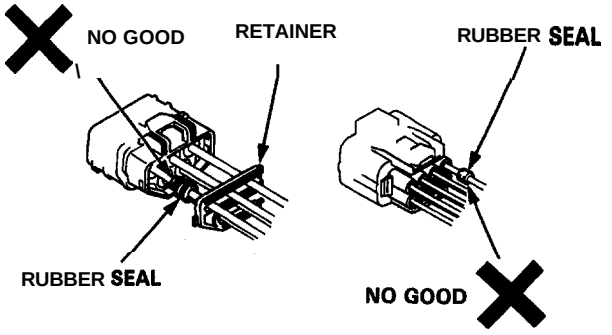
- Before connecting connectors, check to see that the terminals are in place and not bent or distorted.



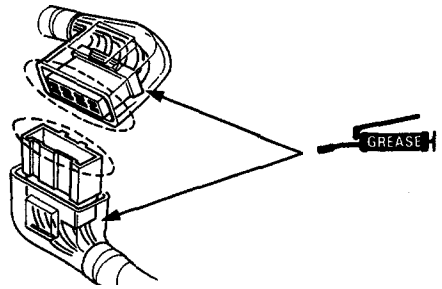
- Check for loose retainer and rubber seals.
  The illustration shows examples of terminal and seal abnormality.



- Example of waterproof connector:



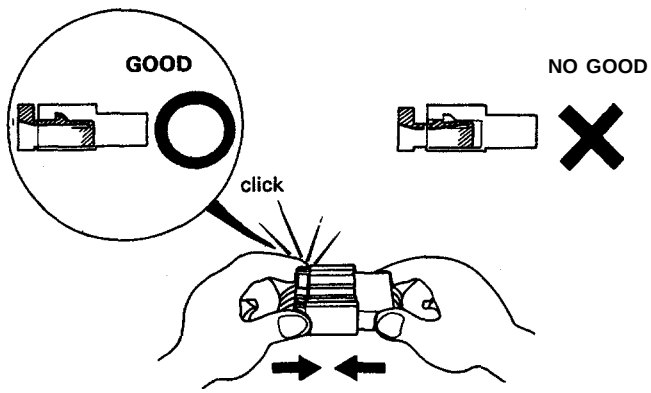
- For the connector which uses insulation grease, clean the connector then apply grease if the grease is insufficient or contaminated.



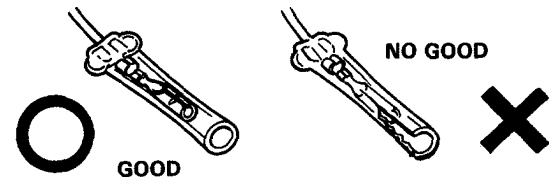
- Insert the connector tightly and make sure it is securely locked.
- Check all the wire harnesses are connected.
- There are two types of locking tab: one that you have to push and the other you should not touch when connecting the connector. Check the shape of the locking tab before connecting.
- The locking tab having a taper end should not be touched when connecting.

- The locking tab with an angle end should be pushed when connecting.

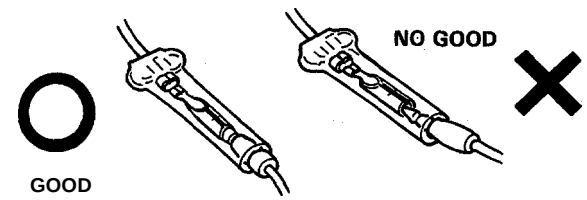
- Insert connectors fully until they will no longer go.
- The connectors must be aligned and engaged securely.
- Do not use wire harnesses with a loose wire or connector.



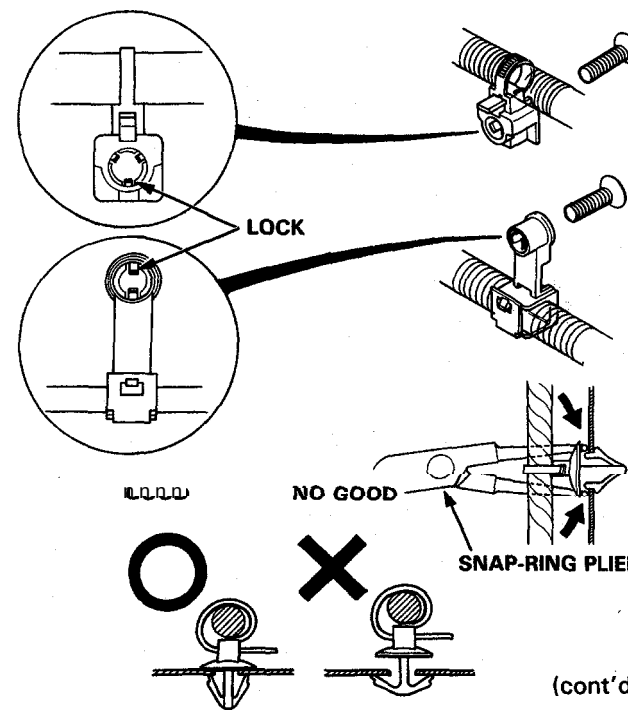
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover faces down.

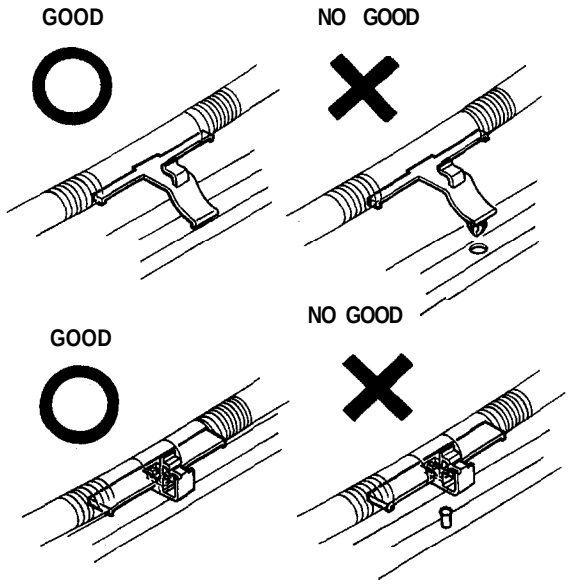


- Secure wires and wire harness to the frame with their respective wire bands at the designated locations.
  Position the wiring in the bands so that only the insulated surfaces contact the wires or harnesses.
- Remove with care not to damage the lock.



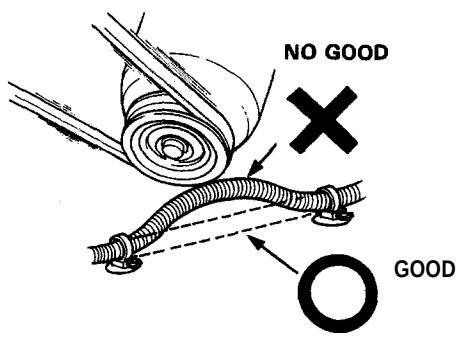
(cont'd)

Troubleshooting Precautions (cont'd)

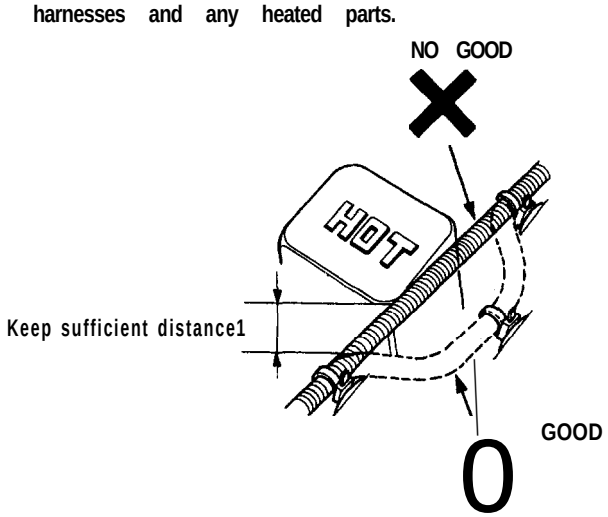


After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.

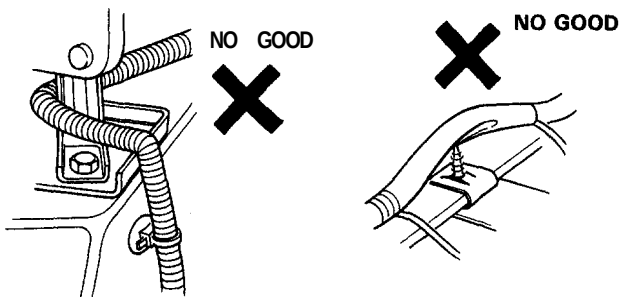
Keep wire harnesses away from the exhaust pipes and other hot parts.



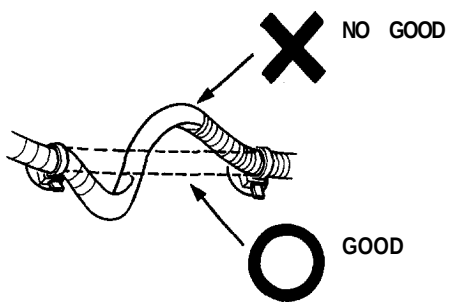
- Always keep a safe distance between wire harnesses and any heated parts.



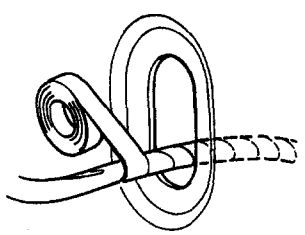
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



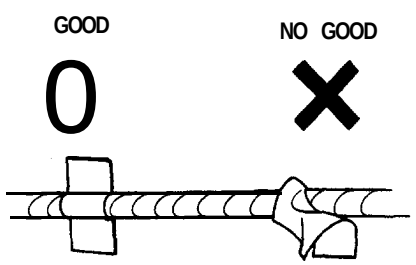
- Route harnesses so they are not pulled taut or slackened excessively.



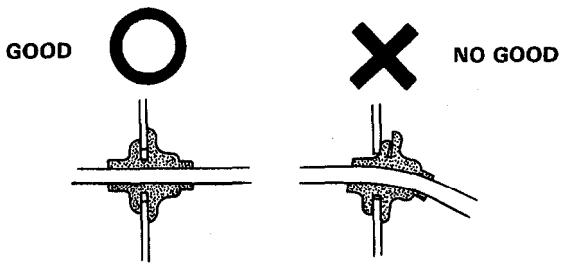
- Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



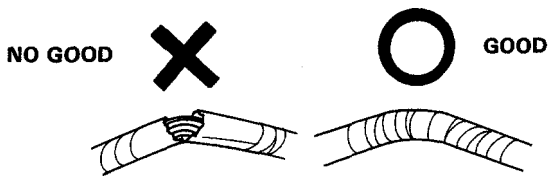
- Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.



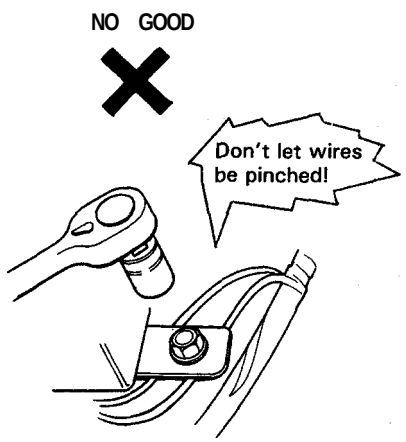
- Seat grommets in their grooves properly.



- Do not damage the insulation when connecting a wire.
- Do not use wires or harnesses with a broken insulation.
  Repair by wrapping with protective tape or replace with new ones if necessary.

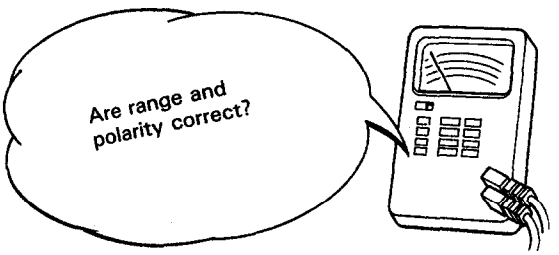


- After installing parts, make sure that wire harnesses are not pinched.

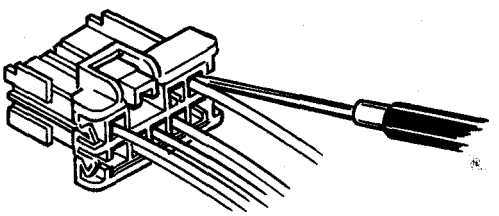


- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interfering with adjacent or surrounding parts in all steering positions.

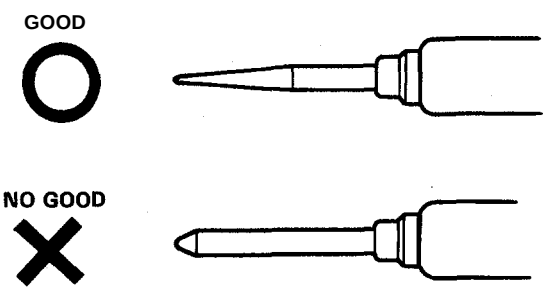
- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



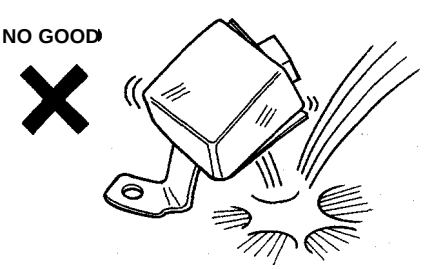
- Always insert the probe of the tester from the wire harness side (except waterproof connector).



- Make sure to use the probe with a tapered tip.



- Do not drop parts.



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.

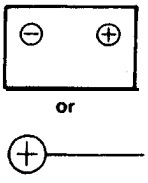
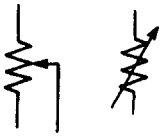
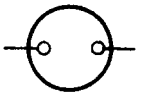
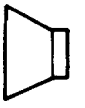
3. **Isolate The Problem By Testing The Circuit**
   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

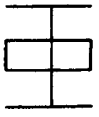
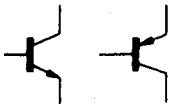
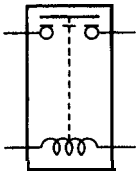
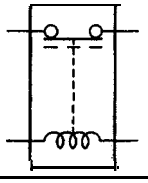
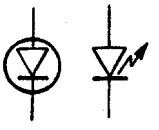
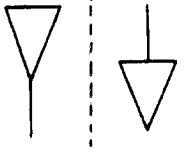
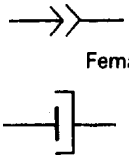
4. **Fix The Problem**
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

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 that fuse. Make sure no new problems turn up and the original problem does not recur.

How to Use This Section

Schematic Symbols

BATTERY	GROUND		FUSE	COIL. SOLENOID	CIGARETTE LIGHTER
	Ground terminal	Component ground			
RESISTOR	VARIABLE RESISTOR	THERMISTOR	IGNITION SWITCH	BULB	HEATER
					
MOTOR	PUMP	CIRCUIT BREAKER	HORN	DIODE	SPEAKER, BUZZER
					

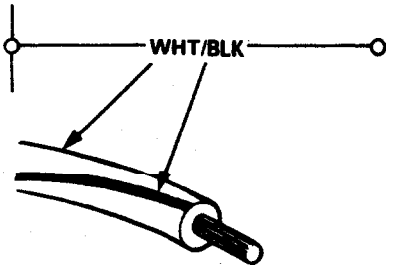
ANTENNA		TRANSISTOR (Tr)
Mast	Window 	
RELAY (In normal condition)		CONDENSER
Normal open relay 	Normal closed relay 	
SWITCH (In normal condition)		LUMINOUS DIODE (LED)
Normal open switch	Normal closed switch	
CONNECTION	CONNECTOR	REED SWITCH
Input output 	Male Female 	

-Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics.

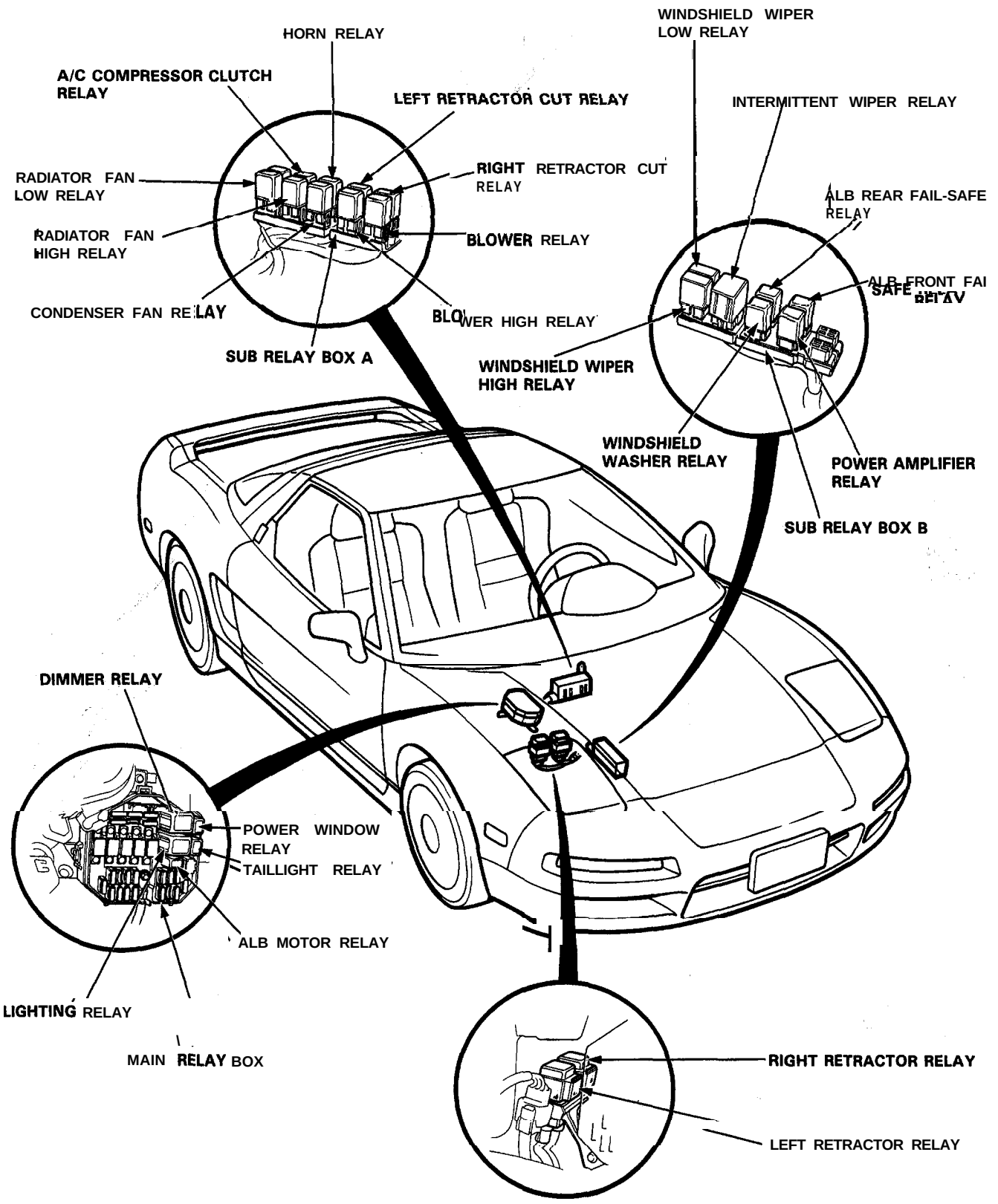
WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Borwn
GRY	Gray
PUP	Purple
LT BLU	Light Blue
LT GRN	Light Green

Wire insulator has one color or one color with another color stripe. The second color is the stripe.

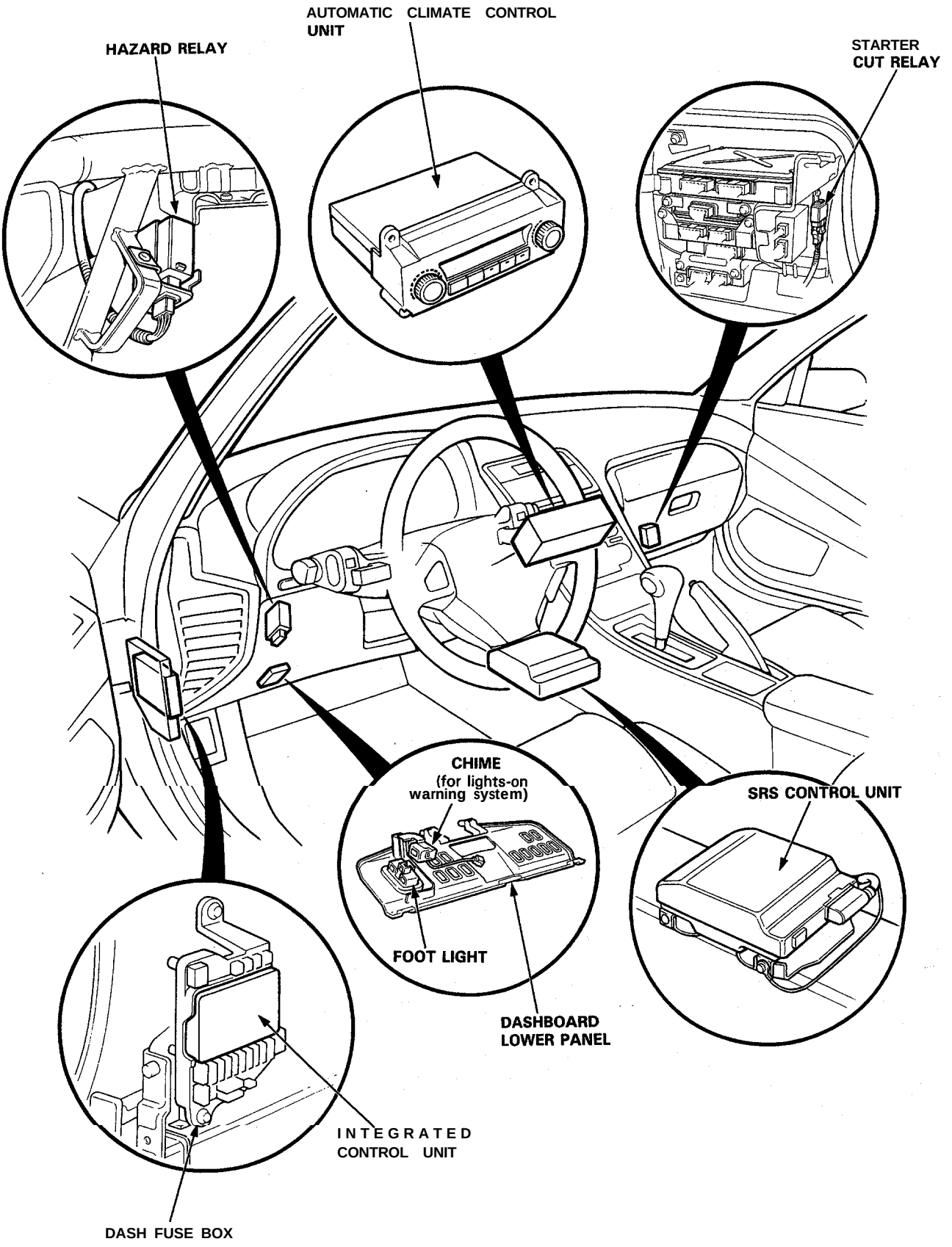


Relay and Control Unit Locations

- Front compartment

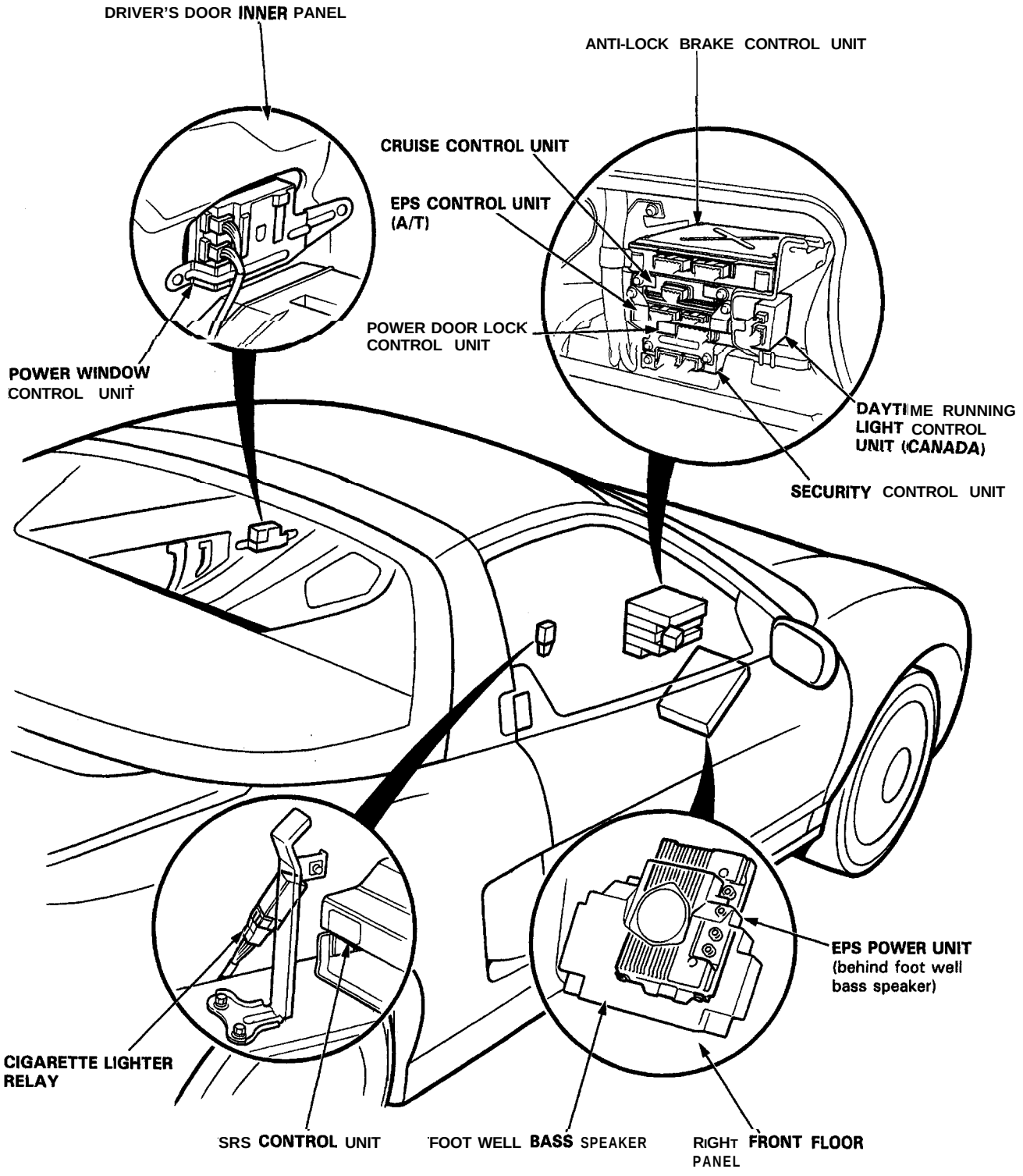


. Dashboard

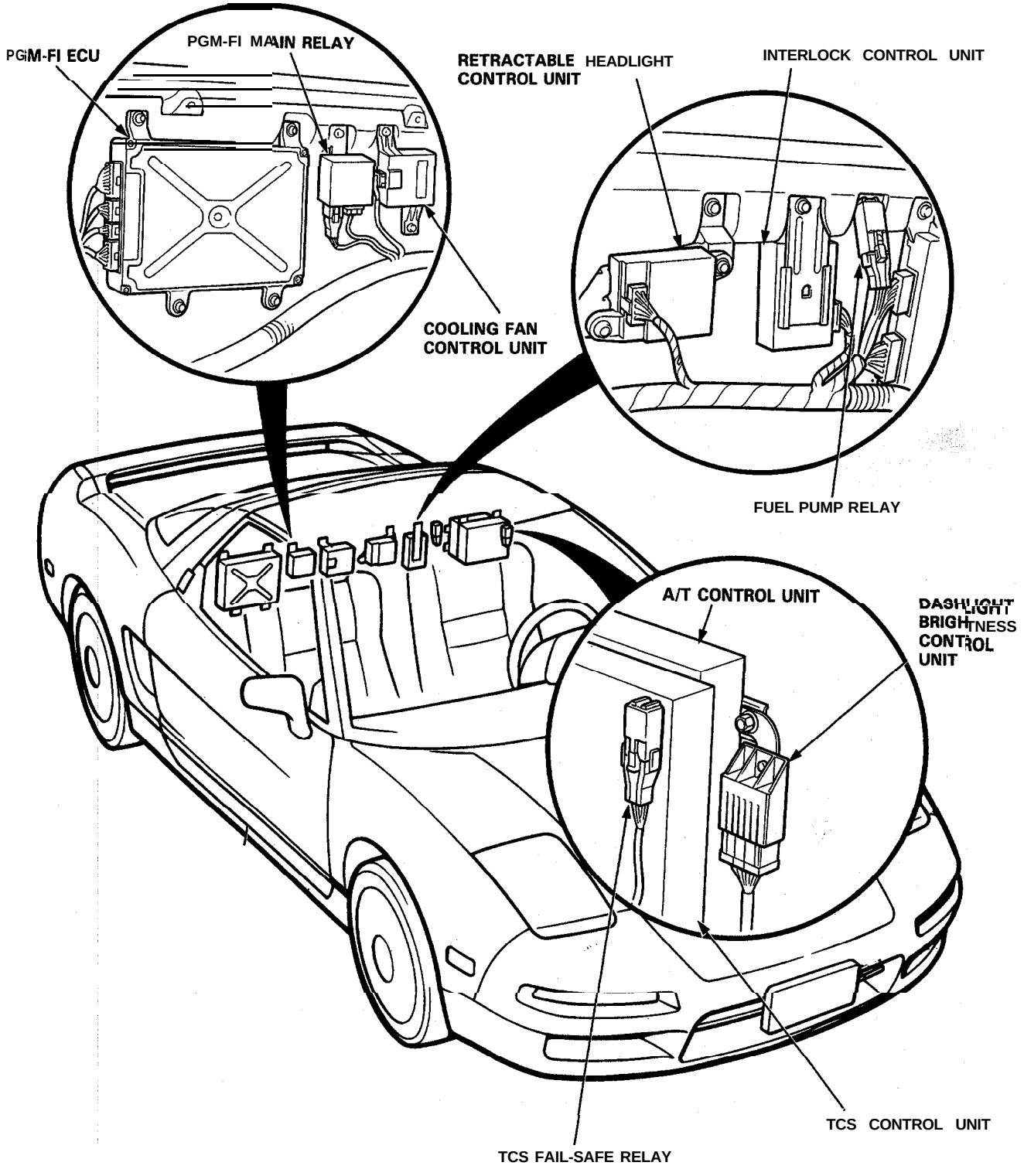

AUTOMATIC CLIMATE CONTROL UNIT
HAZARD RELAY
STARTER CUT RELAY
CHIME (for lights-on warning system)
SRS CONTROL UNIT
FOOT LIGHT
DASHBOARD LOWER PANEL
INTEGRATED CONTROL UNIT
DASH FUSE BOX

Relay and Control Unit Locations

Dashboard, Door and Floor

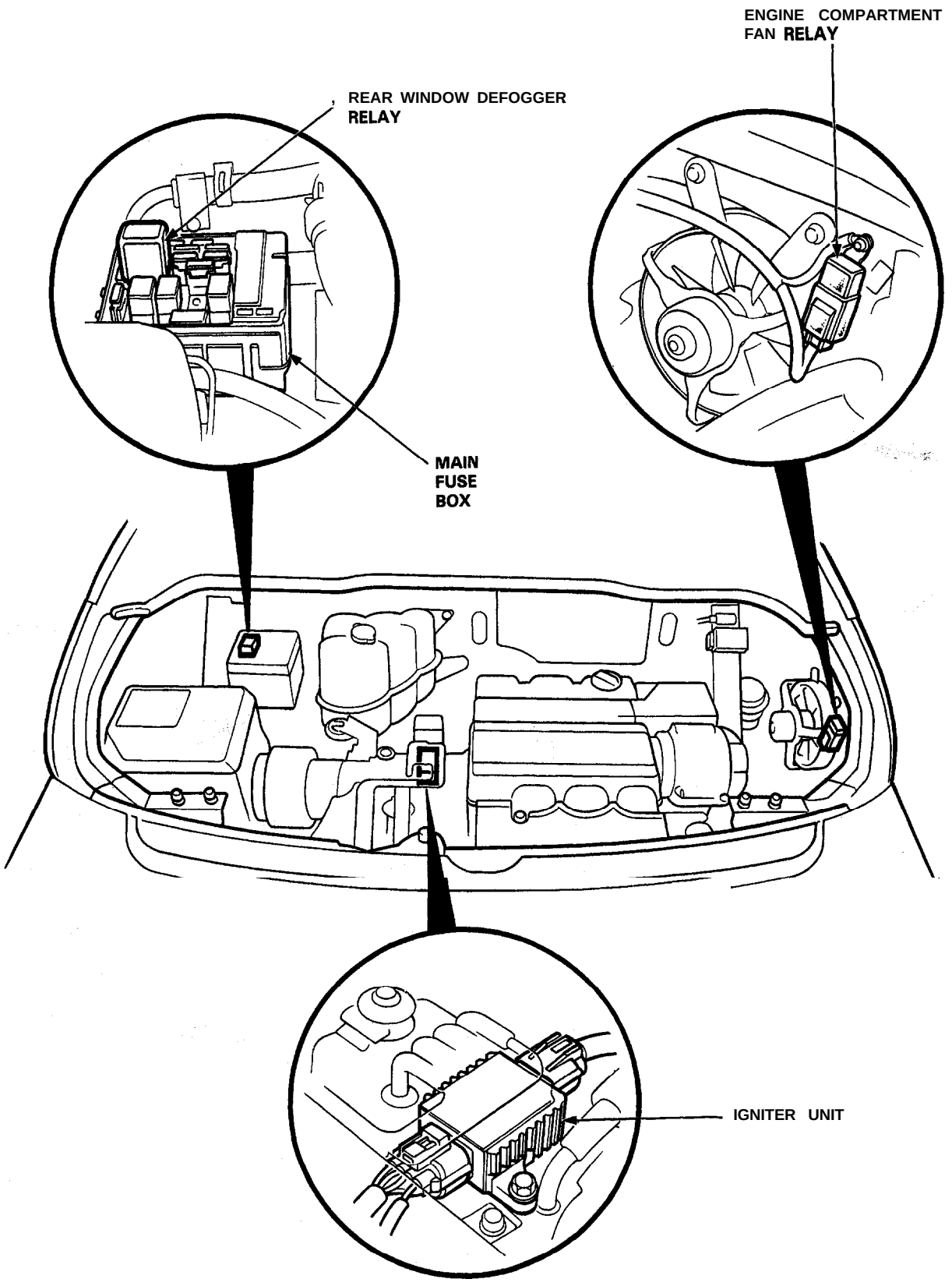


- Rear Bulkhead



Relay and Control Unit Locations

Engine Compartment



Connector and Wire Harness Routing

How to Identify Connectors:
Identifying numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors, "G" for ground terminals or "T" for non-ground terminals.

Location / Harness	Engine Compartment	Front compartment	Dashboard	Others (Floor, Door, Trunk, Roof, Side)
Starter Cable	T1 and T3	T2 and ⊕		
Battery Ground Wire		⊖ G1		
Engine Ground Wire A	T5 G2			
Engine Ground Wire B	T6 G2			
EPS Ground Wire		T7 G4		
Engine Wire Harness	CI01 thru CI61 T101 and T103 G101 thru G103			
Knock Sensor Sub Harness	CI71 thru CI73			
Front Compartment Wire Harness		C201 thru C222 C225 thru C250 C301 thru C321 T201 thru T208 G201 and G202 G301 and G302		
Right Retractor Sub Harness		C281 thru C283		
Left Retractor Sub Harness		C381 thru C383		
Floor Wire Harness			C401 thru C471 G401 and G402	C472 thru C508 G403 thru G405
Side Wire Harness				C521 thru C545
Rear Wire Harness				C551 thru C564 G551
Trunk Wire Harness				C581 and C582
Trunk Sub Wire Harness				C591 and C592
Driver's Door Wire Harness				C601 thru C615
Passenger's Door Wire Harness				C651 thru C660
SRS Main Wire Harness				C701 thru C706 G701
Roof Wire				C751 and C752
Fuel Tank Wires				C771 thru C773
Driver's Power Seat Wire Harness				C781 thru C786
Passenger's Power Seat Wire Harness				C791 thru C795
Hatch Wires				C801 thru C803 G801
Rear Window Deffoger Wire				C811 and C812
Main Fuse Box	c921			
Dash Fuse Box			C901 thru C907 C910 thru C913	
Main Relay Box		C934 thru C941		

starter Cable

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
T1 T2 T3		Left side of engine compartment Right side of front compartment area Right side of engine compartment	To Main fuse box To Main relay box To Starter motor	
⊕		Battery	To Battery positive terminal	

Battery Ground Wire

G1		Middle of front compartment area	To Body ground, via battery ground wire	
⊖		Battery	To Battery negative terminal	

Engine Ground Wire A

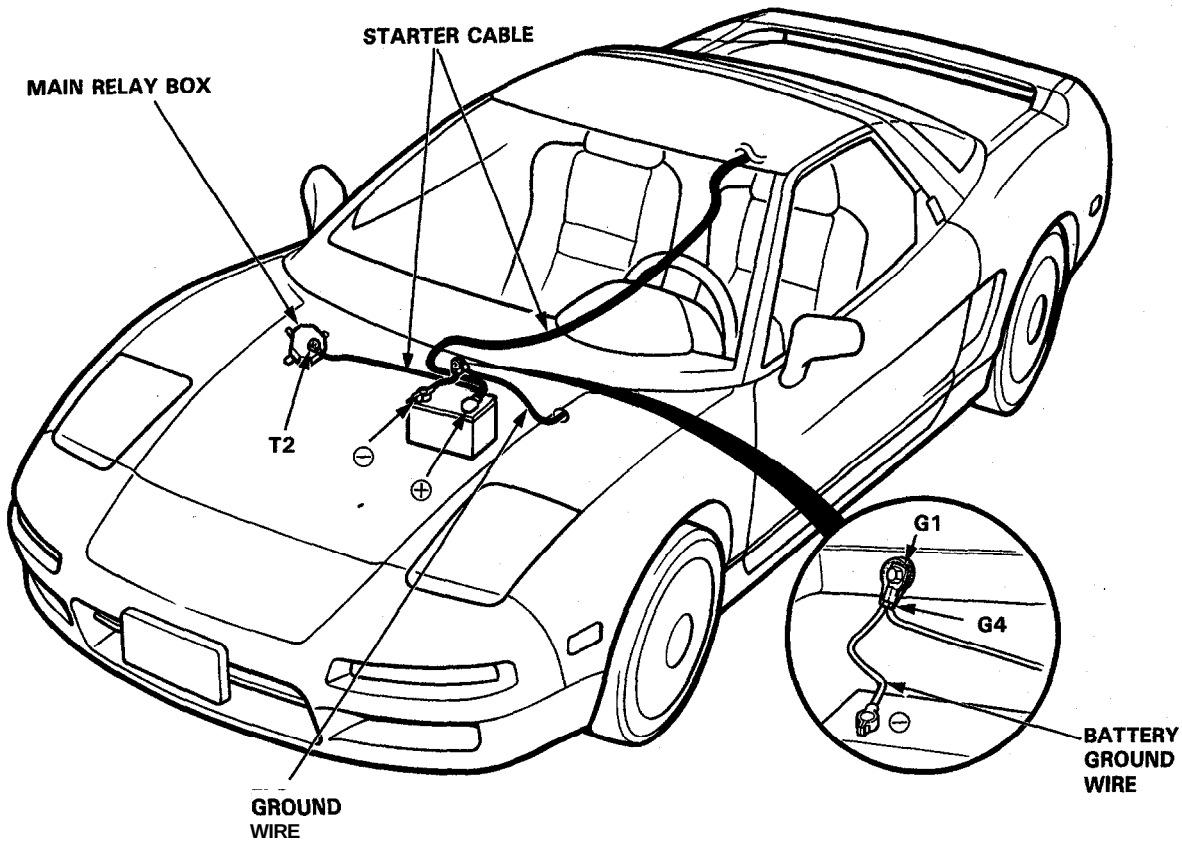
T5		Middle of engine compartment	To Transmission housing	
G2		Left side of engine compartment	To Body ground, via engine ground wire A	

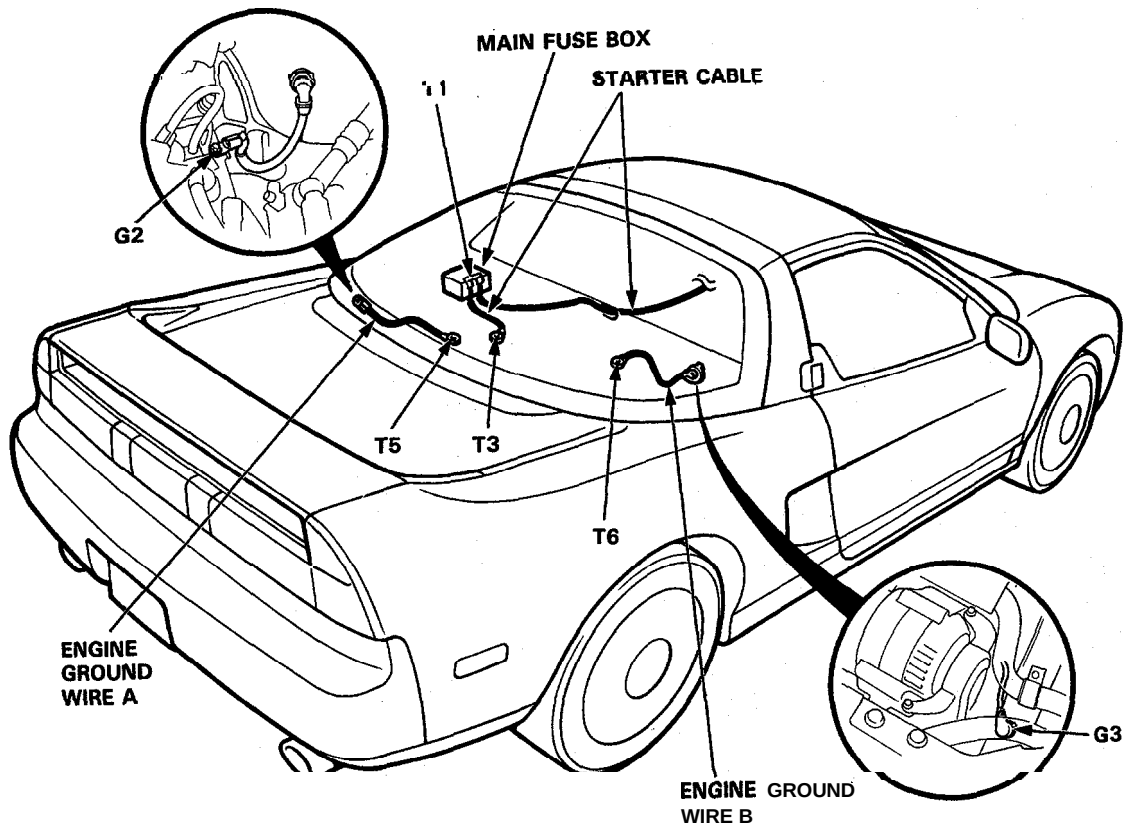
Engine Ground Wire B

T6		Right front corner of engine compartment	To Front head cover	
G3		Right front corner of engine compartment	To Body ground, via engine ground wire B	

EPS Ground Wire

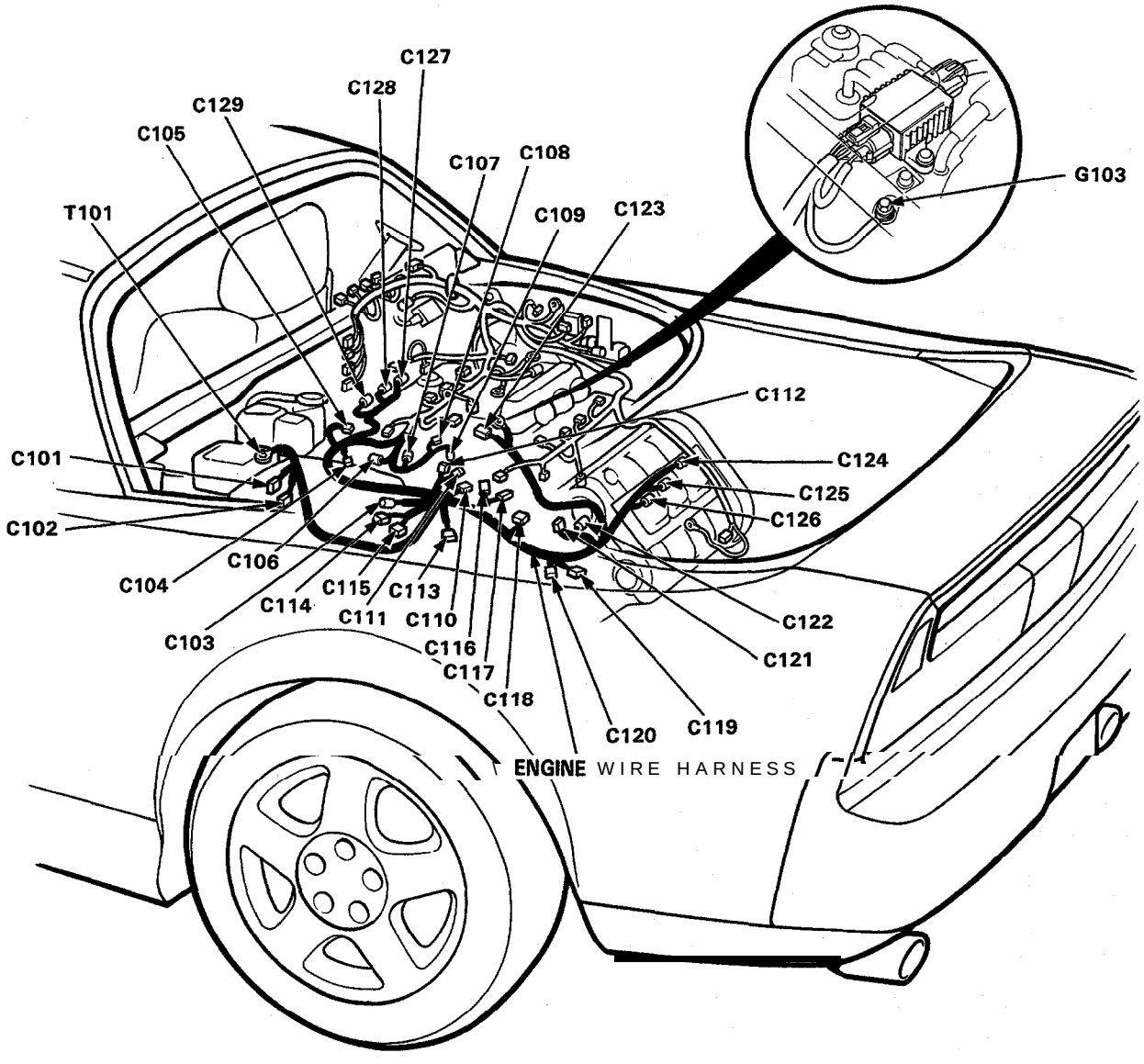
T7		Center front compartment ander area	To EPS Gearbox	
G4		Center front compartment ander area	To Body ground, via EPS ground wire	


STARTER CABLE
MAIN RELAY BOX
T2
G1
G4
BATTERY GROUND WIRE
GROUND WIRE


MAIN FUSE BOX
STARTER CABLE
T1
G2
T5
T3
T6
ENGINE GROUND WIRE A
G3
ENGINE GROUND WIRE B

Engine Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C101	14	Left side of engine compartment	To Side wire harness (C530)	A/T
C101	6	Left side of engine compartment	To Side wire harness (C530)	M/T
CI02	2	Left side of engine compartment	To Side wire harness (C531)	
CI03	1	Engine compartment	To Starter solenoid	
CI04	2	Engine compartment	To Engine oil pressure sensor	
CI05	1	Engine compartment	To Radio noise condenser	
CI06	2	Engine	To Front oil pressure switch B	
CI07	2	Engine compartment	To Front spool solenoid valve	
CI08	2	Engine	To Coolant temperature sensor (TW)	
CI09	1	Engine compartment	To Coolant temperature gauge sender	
CI10	2	Engine compartment	To Back-up light switch	M/T
CI11	3	Engine compartment	To NM speed pulser	A/T
C112	2	Engine compartment	To Lock-up control solenoid valve	A/T
C113	3	Engine compartment	To Neutral switch	M/T
C114	2	Engine compartment	To Shift control solenoid valve	A/T
C115	3	Engine compartment	To Linear solenoid valve	A/T
C116	3	Engine compartment	To Accel pedal sensor	
C117	2	Engine compartment	To Radiator coolant temperature sensor (TW)	
CI18	8	Engine compartment	To Jumper connector	
CI19	3	Engine compartment	To Speed sensor	
C120	2	Engine compartment	To NC speed pulser	A/T
C121	2	Engine compartment	To Rear spool solenoid valve	
C122	2	Engine	To Rear engine oil pressure switch B	
CI23	8	Engine	To Igniter	Rear
CI24	2	Engine	To No.1 Ignition coil	
CI25	2	Engine	To No.2 Ignition coil	
CI26	2	Engine	To No.3 Ignition coil	
CI27	2	Engine	To No.4 Ignition coil	
CI28	2	Engine	To No.5 Ignition coil	
C129	2	Engine	To No.6 Ignition coil	
T101		Left side of engine compartment	To Main fuse box	
G103		Engine compartment	To Engine ground via engine wire harness	


C127
C128
C129
C105
C107
C108
T101
C109
C123
G103
C112
C101
C124
C125
C102
C126
C106
C104
C115
C113
C114
C111
C110
C122
C103
C116
C121
C117
C118
C120
C119
ENGINE WIRE HARNESS

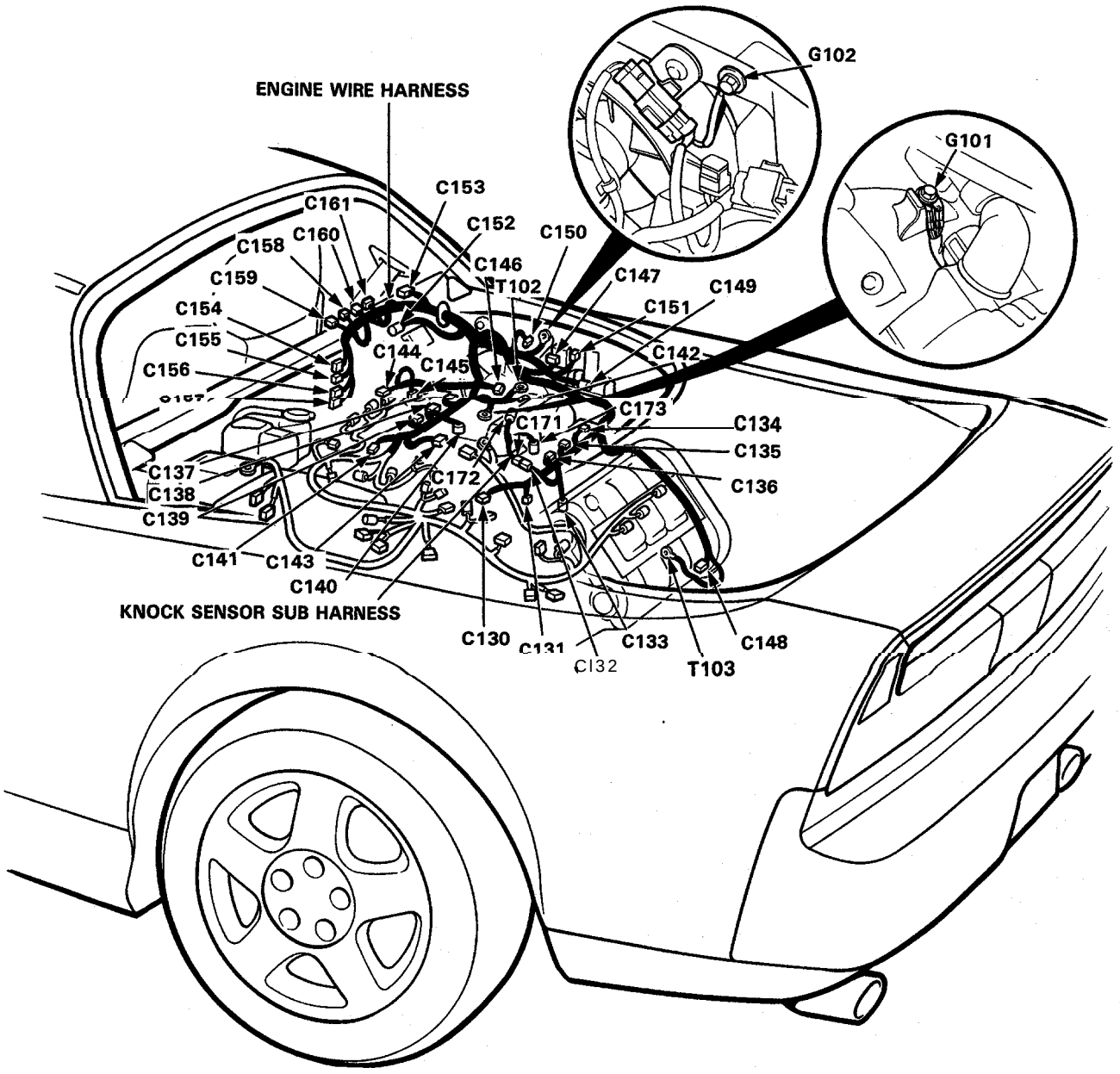
(cont'd)

Engine Wire Harness (Cont'd)

Connector or 'erminal Number	Number of pins	Location	Where the Wires Go	Remark
C130	3	Left side of engine compartment	To Throttle angle sensor	
C131	6	Left side of engine compartment	To Throttle motor	
C132	3	Left side of engine compartment	To Knock sensor sub harness (C 171)	
C133	2	Middle of engine	To EACV	
C134	2	Middle of engine	To No.1 Fuel injector	
C135	2	Middle of engine	To No.2 Fuel injector	
C136	2	Middle of engine	To No.3 Fuel injector	
C137	2	Middle of engine	To No.4 Fuel injector	
C138	2	Middle of engine	To No.5 Fuel injector	
C139	2	Middle of engine	To No.6 Fuel injector	
C140	2	Middle of engine	To intake air temperature sensor	
C141	3	Middle of engine	To EGR valve lift sensor	
C142	4	Middle of engine	To Voltage regulator	
C143	6	Middle of engine	To igniter	Front
C144	4	Right corner of front engine	To Front oxygen sensor	
C145	1	Right corner of front engine	To A/C compresor clutch	
C146	8	Middle of engine	To CRANK/CYL sensor	
C147	4	Right side of engine compartment	To Engine compartment fan relay	
C148	4	Right corner rear engine compartment	To Rear oxygen sensor	
C149	8	Right side of engine compartment	To Engine compartment fan resister	
C150	2	Right side of engine compartment	To Engine compartment fan	
C151	2	Right side of engine compartment	To ignition Ne service connector	
C152	2	Right front engine compartment	To Fuel pump resister	
C153	20	Right bulkhead	To Junction connector	
C154	26	Middle of behind middle of bulkhead	To PGM-Fi ECU	
C155	16	Middle of behind middle of bulkhead	To PGM-FI ECU	
C156	12	Middle of behind middle of bulkhead	To PGM-Fi ECU	
C157	22	Middle of behind middle of bulkhead	To PGM-Fi ECU	
C158	16	Behind right side of bulkhead	To Floor wire harness (C476)	
C159	8	Behind right side of bulkhead	To Floor wire harness (C475)	
C160	18	Behind right side of bulkhead	To Floor wire harness (C477)	
C161	20	Behind right side of bulkhead	To Floor wire harness (C478)	
T102		Middle of engine compartment	To Alternator	
T103		Engine rear cylinder head cover	To Oil pressure switch	
G101		Right middle of engine	To Engine ground, via engine wire harness	
G102		Right side of engine compartment	To Body ground, via engine wire harness	

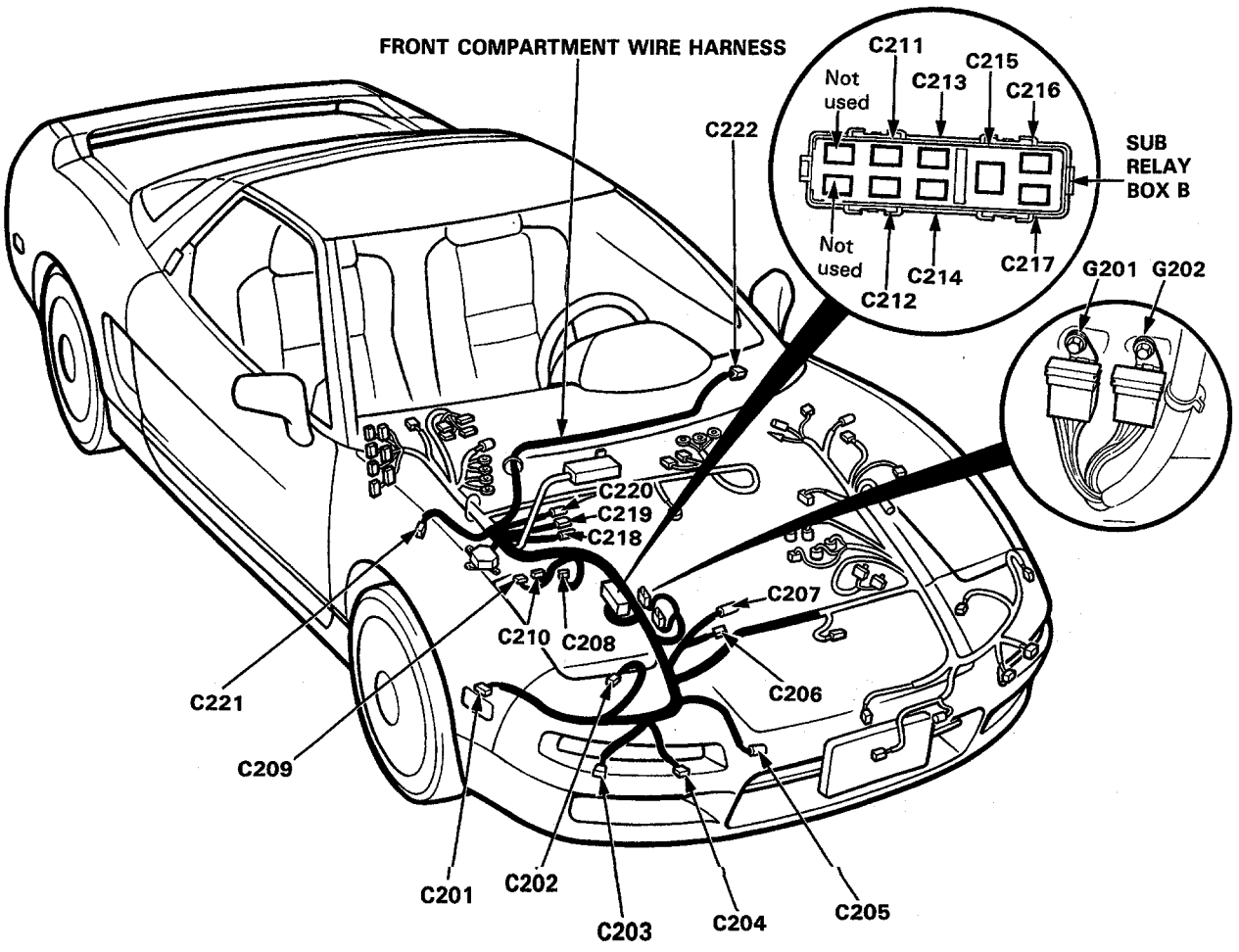
Knock Sensor Sub Harness

C171	3	Middle of engine	To Engine wire harness (C132)	
C172	2	Middle of engine	To Front knock sensor	
C173	2	Middle of engine	To Rear knock sensor	


G102
G101
ENGINE WIRE HARNESS
C153
C161
C152
C150
C160
C158
C146
C159
T102
C147
C149
C154
C151
C155
C144
C142
C156
C145
C173
C171
C134
C135
C137
C172
C136
C138
C139
C141
C143
C140
KNOCK SENSOR SUB HARNESS
C130
C131
C132
C133
C148
T103

Front Compartment Wire Herness

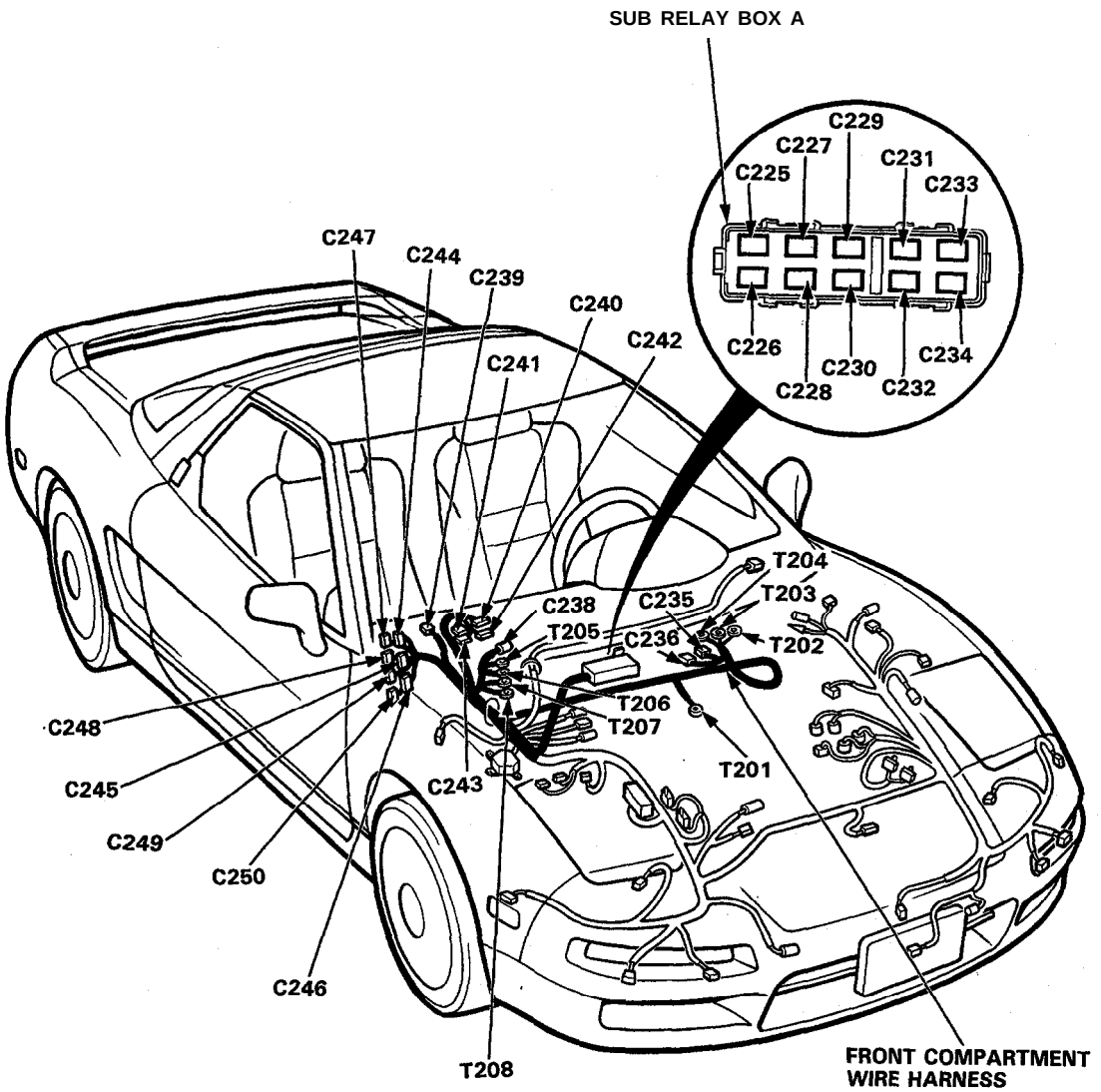
Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C201	2	Right front corner of front compartment area	To R. Front side marker	
C202	2	Behind Right front bumper	To R. Condenser fan motor	
C203	2	Behind Right front bumper	To R. Front position light	
C204	2	Behind Right front bumper	To.R. Front turn signal light	
C205	2	Behind Right front bumper	To. R. Horn	
C206	2	Front end of front compartment area	To Radiator fan motor	
C207	3	Front end of front compartment area	To Radiator fan resister	
C208	14	Right side of front compartment area	To R. Retractor sub harness (C281)	
C209	6	Behind Right headlight	To R. Retractor relay	
C210	6	Behind Right headlight	To L. Retractor relay	
c211	4	Sub relay box B	To Power amplifier relay	
c212	4	Sub relay box B	To Anti-lock brake Front fail-safe relay	
C213	4	Sub relay box B	To Washer motor relay	
C214	4	Sub relay box B	To Anti-lock brake Rear fail-safe relay	
c215	5	Sub relay box B	To Intermittent wiper relay	
C216	4	Sub relay box B	To Windshield wiper high relay	
C217	4	Sub relay box B	To Windshield wiper low relay	
C218	6	Behind spare tire	To Recirculation control motor	
c219	2	Behind spare tire	To Blower motor	
C220	3	Behind spare tire	To Power transistor	
c221	2	Right front compartment area	To R. Front anti-lock brake speed sensor	
c222	5	Under air scoop	To Windshild wiper motor	
G201		Right side of front compartment area	To Body ground, via front compartment wire harness	
G202		Right side of front compartment area	To Body ground, via front compartment wire harness	


FRONT COMPARTMENT WIRE HARNESS
C222
C211
Not used
C213
C215
C216
SUB RELAY BOX B
Not used
C212
C214
C217
G201
G202
C220
C219
C218
C207
C210
C208
C206
C221
C209
C201
C202
C203
C204
C205

(cont'd)

Front Compartment Wire Harness (Cont'd)

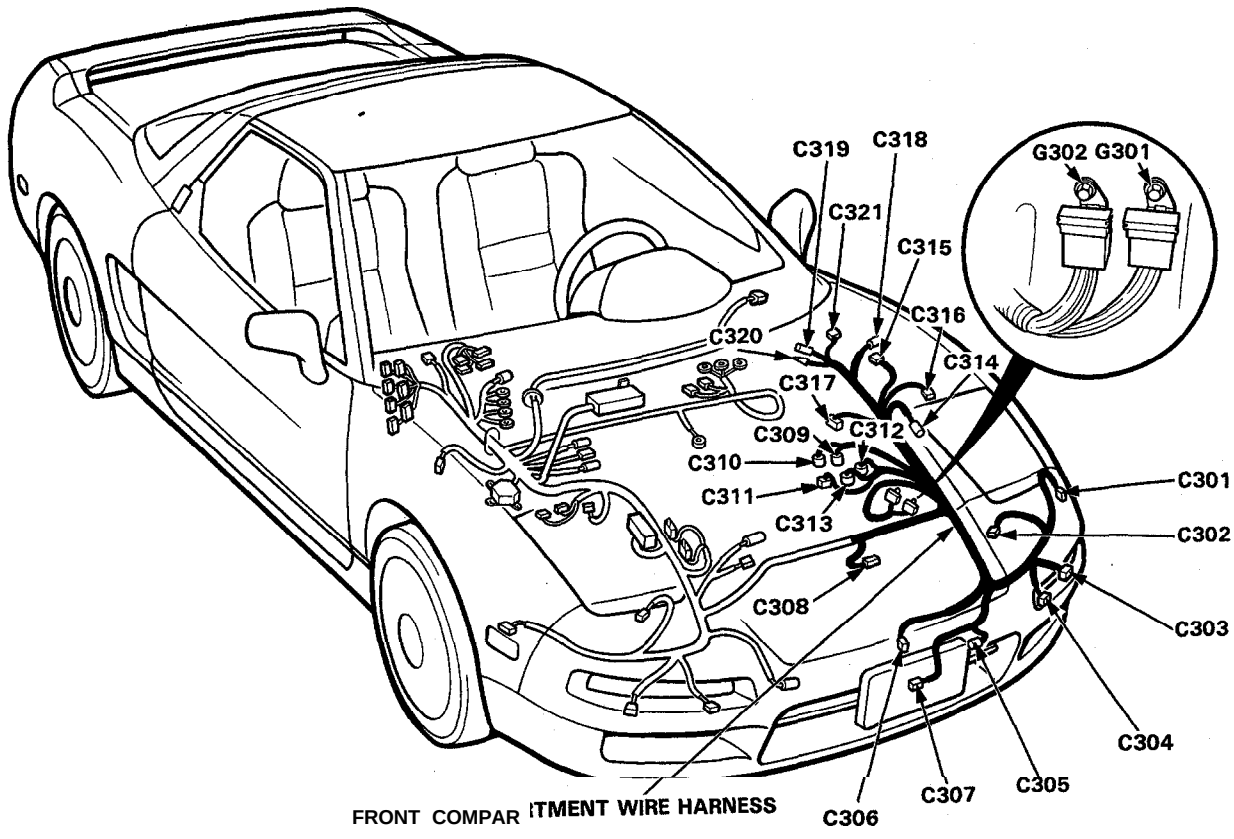
Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C225	4	Sub relay box A	To Junction connector	
C226	4	Sub relay box A	To Radiator fan low relay	
C227	4	Sub relay box A	To A/C compressor clutch relay	
C228	4	Sub relay box A	To Radiator fan high relay	
c229	4	Sub relay box A	To Horn relay	
C230	4	Sub relay box A	To Condenser fan relay	
C231	4	Sub relay box A	To L. Retractor cut relay	
C232	4	Sub relay box A	To Blower high relay	
C233	4	Sub relay box A	To R. Retractor cut relay	
C234	4	Sub relay box A	To Blower relay	
C235	4	Rear under front compartment area	To EPS Tach generator	EPS
C236	6	Rear under front compartment area	To EPS Torque sensor	EPS
C237	20	Behind right kick panel	To Jaunction connector	
C238	14	Right front floor	To Power unit	EPS
C239	6	Right under dash	To Anti-lock brake inspection connector	
C240	20	Right under dash	To Anti-lock brake control unit	
C241	18	Right under dash	To Anti-lock brake control unit	
C242	18	Right under dash	To EPS control unit	
C243	12	Right under dash	To EPS control unit	
C244	20	Behind right kick panel	To Floor wire harness (C468)	
C245	18	Behind right kick panel	To Floor wire harness (C469)	
C246	16	Behind right kick panel	To Floor wire harness (C470)	
C247	14	Behind right kick panel	To Floor wire harness (C466)	
C248	12	Behind right kick panel	To Floor wire harness (C465)	
C249	10	Behind right kick panel	To Floor wire harness (C464)	
C250	7	Behind right kick panel	To Floor wire harness (C467)	
T201		Battery	To Battery negative terminal	EPS
T202		Rear under front compartment area	To Gearbox	EPS
T203		Rear under front compartment area	To Gearbox	EPS
T204		Rear under front compartment area	To Gearbox	EPS
T205		Right front floor	To Power unit	EPS
T206		Right front floor	To Power unit	EPS
T207		Right front floor	To Power unit	EPS
T208		Right front floor	To Power unit	EPS


SUB RELAY BOX A
C229
C227
C231
C225
C233
C247
C244
C239
C240
C242
C241
C226
C230
C234
C228
C232
T204
T203
C238
C235
T205
C236
T202
T206
T207
C248
T201
C245
C243
C249
C250
C246
T208
FRONT COMPARTMENT
WIRE HARNESS

(cont'd)

Front Comoartment Wire Harness (Cont'd)

Connector and 'erminal Number	Number of pins	Location	Where the Wires Go	Remark
C301	2	Left front compartment area	To L. Front side marker	
C302	2	Left behind front bumper	To L. Condenser fan motor	
C303	2	Left behind front bumper	To L. Front position light	
c 304	2	Left behind front bumper	To L. Front turn signal light	
C305	2	Left behind front bumper	To L. Horn	
C306	2	Behind middle of front bumper	To Front washer motor	
C307	2	Behind middle of front bumper	To Ambient sensor	
C308	2	Middle of front compartment area	To Hood switch	
C309	3	Left front compartment area	To Anti-lock brake left front solenoid	
C310	3	Left front compartment area	To Anti-lock brake left rear solenoid	
c311	2	Lefr f ront compartment area	To Anti-lock brake motor	
C312	3	Left front compartment area	To Anti-lock brake right front solenoid	
c313	3	Left front compartment area	To Anti-lock brake right rear solenoid	
c314	14	Left front compartment area	To Retractor sub harness (C381)	
c315	4	Left front compartment area	To Auto cruise actuator	
C316	2	Left front compartment area	To Security horn	
c317	2	Left front compartment area	To Anti-lock brake pressure switch	
C318	4	Left front compartment area	To A/C pressure switch	
c319	1	Left rear front compartment area	To Brake fluid level switch (+)	
C320	1	Left rear front compartment area	To Brake fluid level switch (–)	
C321	2	Left rear front compartment area	To L. Front anti-lock brake speed sensor	
G301		Left front compartment area	To Body ground, via front compartment harness	
G302		Left front compartment area	To Body ground, via front compartment harness	



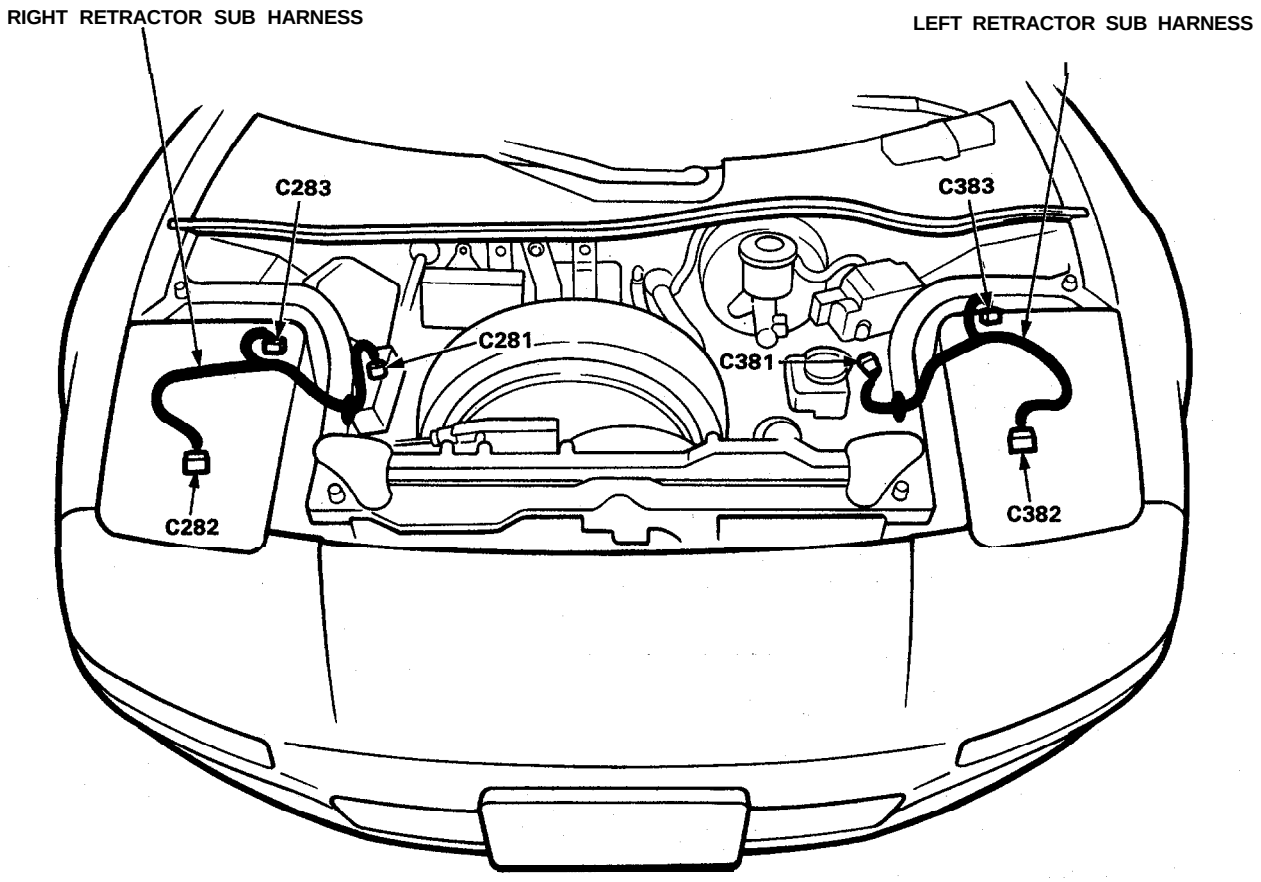
FRONT COMPARTMENT WIRE HARNESS

Right Retractor Sub Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C281	14	Right front compartment area	To Front compartment wire harness (C208)	
C282	6	Behind Right headlight	To Right headlight	
C283	6	Right front compartment area	To Right retractor motor	

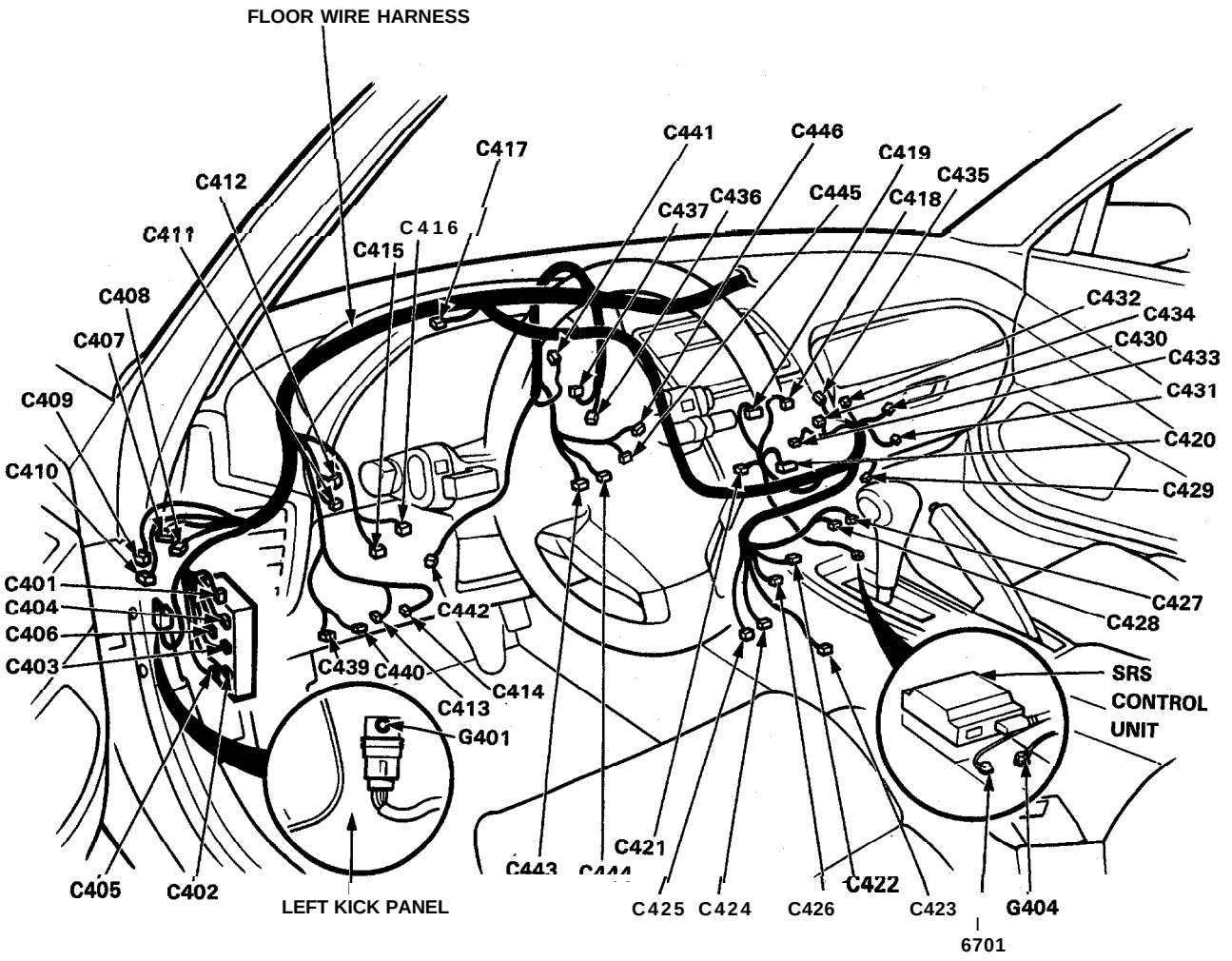
Left Retractor Sub Harness

C381	14	Left front compartment area	To Front compartment wire harness (C314)	
C382	6	Behind Left headlight	To Left headlight	
C383	6	Left front compartment area	To Left retractor motor	


RIGHT RETRACTOR SUB HARNESS
LEFT RETRACTOR SUB HARNESS
C283
C383
C281
C381
C282
C382

Floor Wire Harness

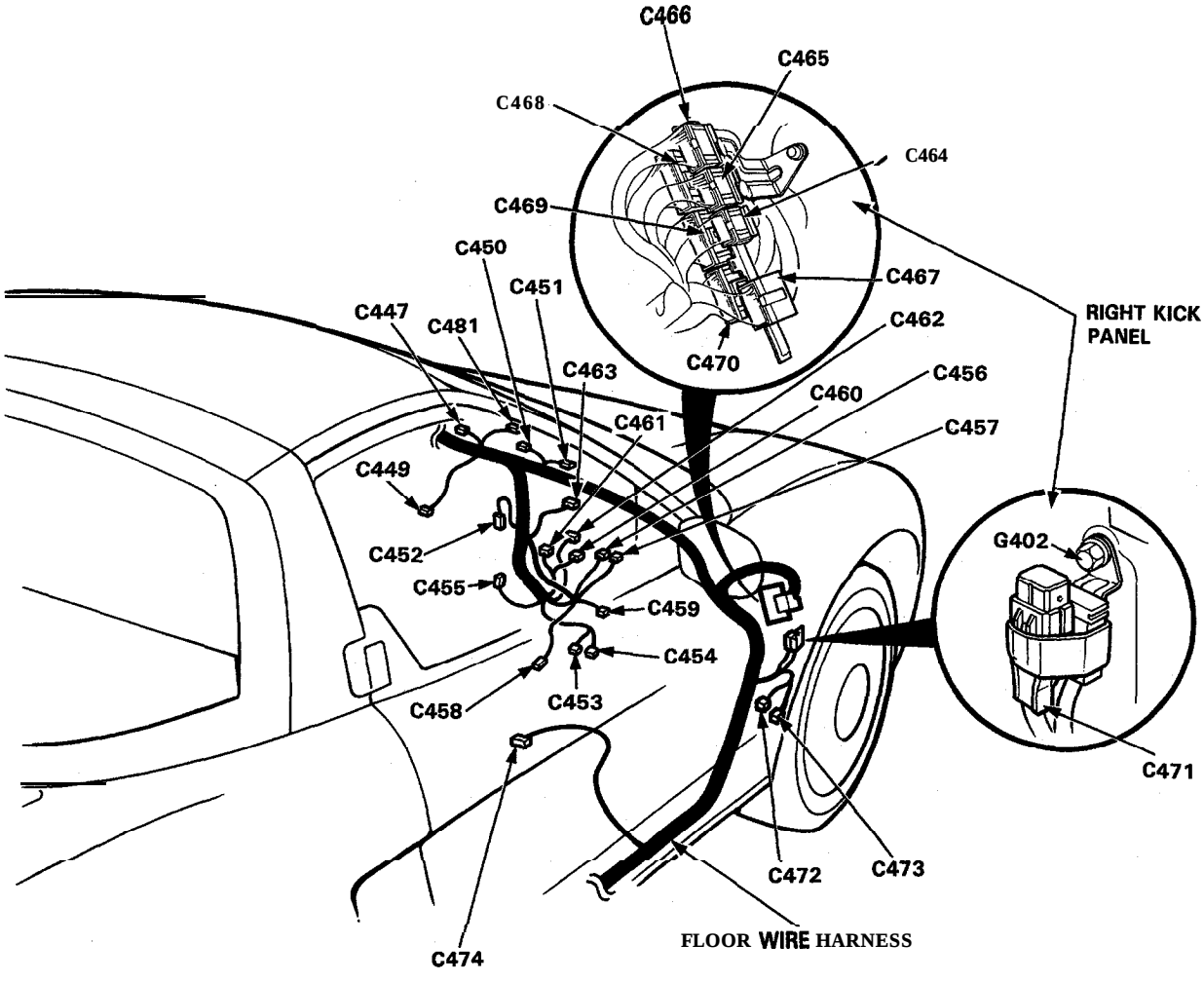
Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C401	16	Behind left kick panel	To Integrated control unit	
C402	12	Behind left kick panel	To Dash fuse box (C904)	
C403	14	Behind left kick panel	To Dash fuse box (C901)	
C404	16	Behind left kick panel	To Dash fuse box (C902)	
C405	5	Behind left kick panel	To Dash fuse box (C905)	
C406	16	Behind left kick panel	To Dash fuse box (C903)	
C407	20	Behind left kick panel	To Side wire harness (C523)	
C408	2	Behind left kick panel	To Side wire harness (C524)	
C409	18	Behind left kick panel	To Driver's door wire harness (C601)	
C410	14	Behind left kick panel	To Driver's door wire harness (C602)	
c411	10	Behind instrument kick panel	To Retractor switch/Dashlight brightness controller	
C412	30	Behind gauge	To Gauge assembly	
c413	2	Left under dash	To Foot light	
c414	2	Left under dash	To Chime (lights-on warning)	
c415	6	Left under dash	To Turn signal/Hazard relay	
C416	16	Left under dash	To Combination switch (lighting & turn)	
c417	20	Behind gauge	To Junction connector	
C418	14	Under middle of dash	To Automatic climate control unit	
c419	30	Under middle of dash	To Automatic climate control unit	
C420	16	Under middle of dash	To Stereo radio/cassette player	
C421	2	Under middle of dash		
C422	4	Under center console	To Cigarette lighter relay	
C423	2	Under center console	To Shift position console light	A/T
C424	2	Under center console	To Shift position console switch	A/T
C425	12	Under center console	To Shift position console switch	A K
C426	3	Under center console	To Shift lock solenoid	A/T
C427	4	Under middle of dash	To In car temperature sensor	A/C
C428	3	Under middle of dash	To Cigarette lighter	
c429	4	Under right dash	To SRS main wire harness (C701)	
C430	2	Under right dash	To Glove box light	
c431	2	Behind glove box	To Trunk opener main switch	
C432	7	Right under dash	To Function contol motor	A/C
c433	6	Under middle of dash	To Air mix motor	A/C
c434	2	Under middle of dash	To Evaporator temperature sensor	A/C
c435	6	Under middle of dash	To Ventilation control motor	AIC
C436	5	Behind instrument panel	To TCS off switch	
c437	30	Behind gauges	To Gauge assembly	
G401		Behind left kick panel	To Body ground, via floor wire harness	
G404		Middle of floor	To Body ground, via floor wire harness	


FLOOR WIRE HARNESS
C417
C441
C446
C419
C435
C412
C437
C436
C445
C418
C411
C416
C415
C408
C432
C434
C407
C430
C433
C409
C431
C420
C410
C429
C401
C427
C404
C442
C428
C406
C439
C440
C414
SRS
CONTROL
UNIT
C403
C413
G401
C421
C443
C444
C405
C402
LEFT KICK PANEL
C425
C424
C426
C422
C423
G404
6701

(cont'd)

Floor Wire Harness (cont'd)
NOTE: See page 23-31 for illustrations of C439 thru C446 connector locations.

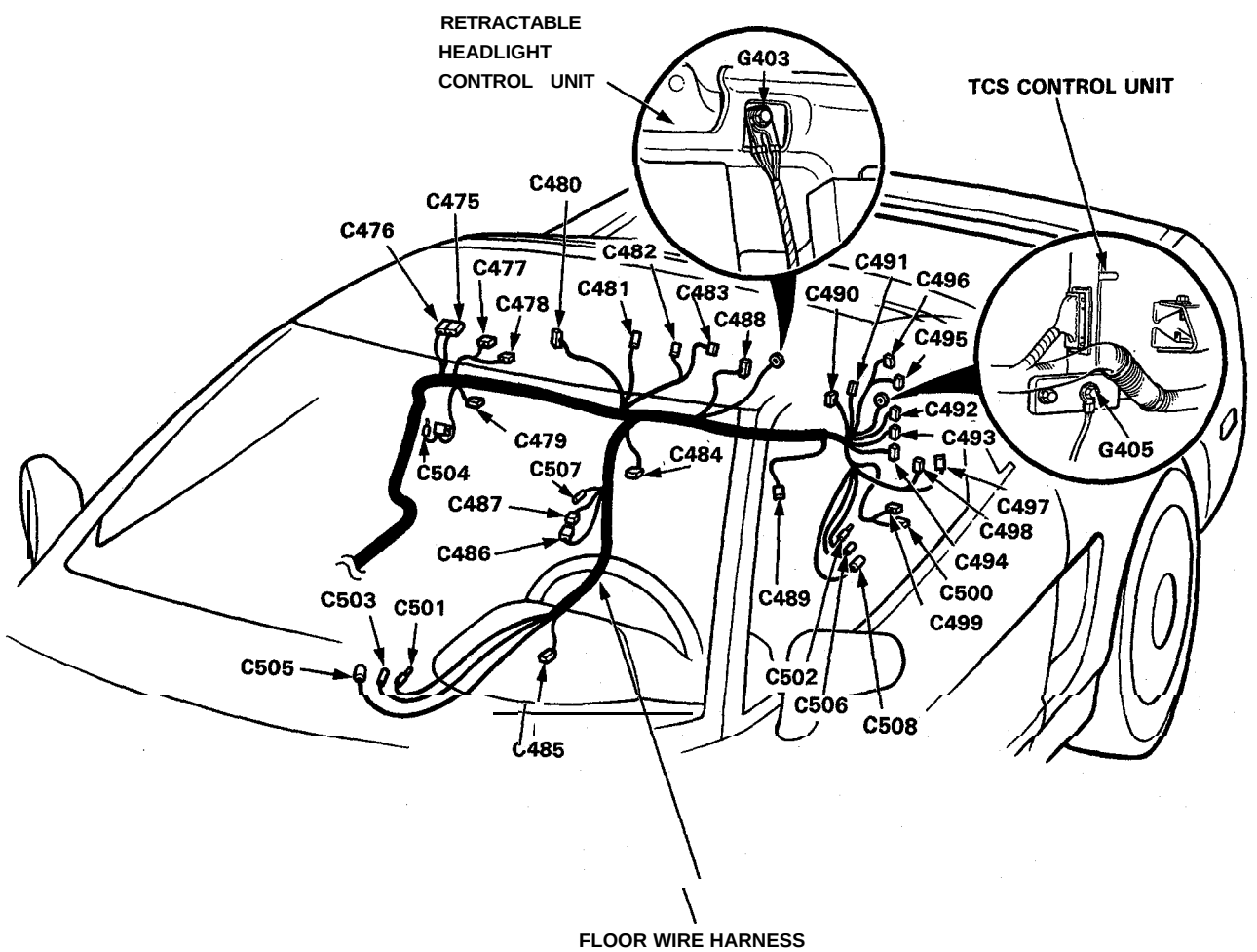
Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
c439	3	Left under dash	To Clutch switch (cruise control)	M/T
C440	2	Left under dash	To Clutch interlock switch	M/T
c441	2	Left under dash	To Water temperature sensor	A/C
C442	4	Left under dash	To Brake light switch	
c443	4	Left under dash	To Cruise control main switch	
c444	18	Left under dash	To Combination switch (windshield wiper and hazard)	
c445	8	Left under dash	To Ignition key switch/key interlock solenoid	
C446	7	Left under dash	To Ignition switch	
c447	20	Behind center dash	To Junction connector	
C448	2	Behind center dash	To Sunlight sensor	A/C
c449	4	Center under dash	To Clock	
C450	20	Behind right dash	To Junction connector	
c451	18	Behind right dash	To Junction connector	
C452	8	Right under dash	To Keyless door lock contol unit	OPTION
c453	6	Right under dash	To Foot well bass speaker	
c454	2	Right under dash	To Foot well bass speaker	
c455	4	Center under dash	To Starter cut relay	
C456	4	Right under dash	To Daytime running light control unit	CANADA
c457	8	Right under dash	To Daytime running light control unit	CANADA
C458	2	Right under dash	To Service check connector	
c459	2	Right under dash		
C460	16	Right under dash	To Security control unit	
C461	22	Right under dash	To Security control unit	
C462	18	Right under dash	To Power door lock control unit	
C463	14	Right under dash	To Cruise control unit	
C464	10	Behind right kick panel	To Front compartment wire harness (C249)	
C465	12	Behind right kick panel	To Front compartment wire harness (C248)	
C486	14	Behind right kick panel	To Front compartment wire harness (C247)	
C467	7	Behind right kick panel	To Front compartment wire harness (C250)	
C468	20	Behind right kick panel	To Front compartment wire harness (C244)	
C469	18	Behind right kick panel	To Front compartment wire harness (C245)	
C470	16	Behind right kick panel	To Front compartment wire harness (C246)	
c471	4	Behind right kick panel	To Junction connector	
C472	14	Behind right kick panel	To Passenger's door wire harness (C651)	
c473	10	Behind right kick panel	To Passenger's door wire harness (C652)	
c474	4	Under passenger's seat	To Passenger's power seat wire harness (C781)	
G402		Behind right kick panel	To Body ground, via floor wire harness	


C466
C465
C468
C464
C469
C450
C451
C467
C447
C481
C462
C470
C463
C456
C460
C461
C457
C449
C452
C455
C459
C454
C458
C453
C474
C472
C473
C471
G402
RIGHT KICK PANEL
FLOOR WIRE HARNESS

(cont'd)

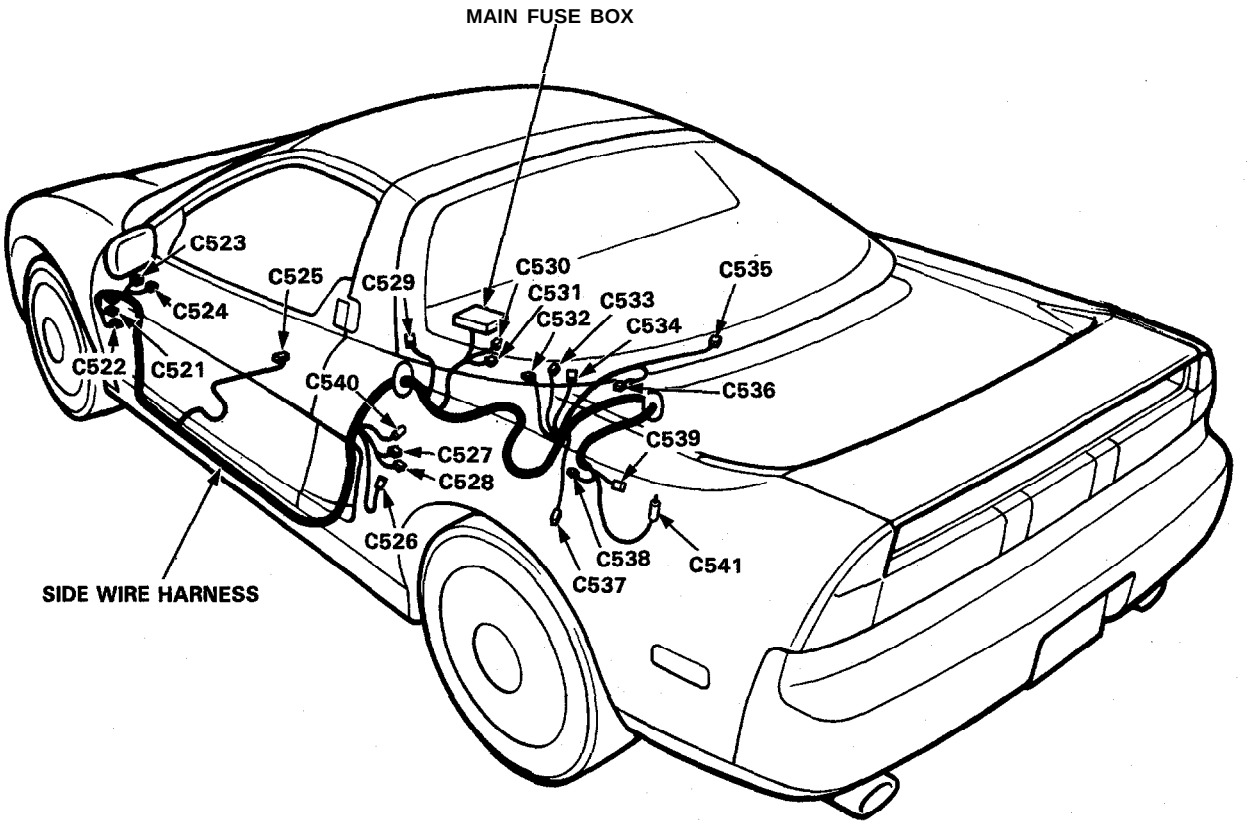
Floor Wire Harness (cont'd)

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C475	8	Right rear bulkhead	To Engine wire harness (C 159)	
C476	16	Right rear bulkhead	To Engine wire harness (Cl 58)	
C477	18	Right rear bulkhead	To Engine wire harness (C160)	
C478	20	Right rear bulkhead	To Engine wire harness (Cl 61)	
C479	20	Right rear bulkhead	To Junction connector	
C480	8	Right rear bulkhead	To PGM-FI ECU	
C481	4	Right rear bulkhead	To PGM-FI main relay	
C482	8	Right rear bulkhead	To PGM-FI main relay	
C483	12	Right rear bulkhead	To Cooling fan control unit	
C484	2	Center bulkhead	To Rear speaker	
C485	2	Center floor	To Parking brake switch	
C486	4	Center floor	To C487 connector	
C486	4	Center floor	To Car telephone system	OPTION
C487	4	Center floor	To C486 connector	
C487	4	Center floor	To Car telephone system	OPTION
C488	18	Left rear bulkhead	To Retractable headlight control unit	
C489	6	Left rear bulkhead	To Fuel tank wires (C771)	
C490	8	Left rear bulkhead	To Interlock control unit	A/T
C491	4	Left rear bulkhead	To Fuel pump relay	
C492	10	Left rear bulkhead	To TCS control unit	
C493	12	Left rear bulkhead	To TCS control unit	
C494	20	Left rear bulkhead	To TCS control unit	
C495	22	Left rear bulkhead	To A/T control unit	
C496	26	Left rear bulkhead	To A/T control unit	
C497	7	Left rear bulkhead	To Dashlight brigtness control unit	
C498	4	Left rear bulkhead	To TCS fail-safe relay	
C499	12	Left rear bulkhead	To Side wire harness (C528)	
C500	20	Left rear bulkhead	To Side wire harness (C527)	
C501		Center floor	To Stereo radio/cassette player	
C502		Left rear bulkhead	To Side wire harness (C540)	
C503		Center floor	To Stereo radio/cassette player	
C504		Right rear bulkhead	To Hatch wires (C802)	
C505		Center floor	To Compact disc system	OPTION
C 506		Left rear bulkhead	To Side wire harness	OPTION
C507		Center floor	To Car telephone system	OPTION
C508		Left rear bulkhead	To Side wire harness	OPTION
G403		Left rear bulkhead	To Body ground, via floor wire harness	
G405		Left rear bulkhead	To Body ground,via TCS control unit	


RETRACTABLE
HEADLIGHT
CONTROL UNIT
G403
TCS CONTROL UNIT
C475
C480
C476
C482
C477
C491
C496
C481
C483
C490
C478
C488
C495
C492
C479
C493
C504
C507
C484
G405
C497
C487
C498
C486
C494
C503
C501
C489
C500
C499
C505
C502
C506
C508
C485
FLOOR WIRE HARNESS

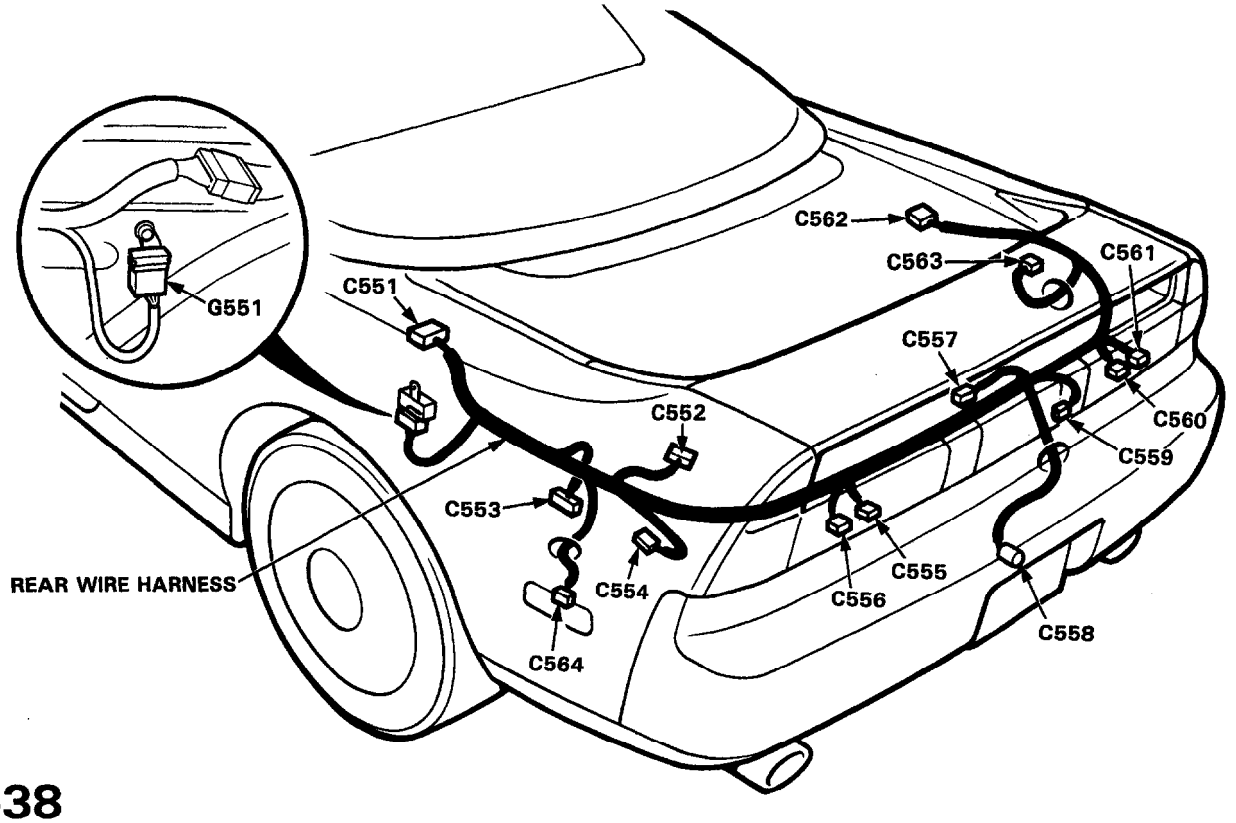
Side Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C521	20	Behind left kick panel	To Dash fuse box (C906)	
C522	2	Behind left kick panel	To Dash fuse box (C907)	
C523	20	Behind left kick panel	To Floor wire harness (C407)	
C524	2	Behind left kick panel	To Floor wire harness (C408)	
C525	6	Under driver's seat	To Driver's power seat wire harness (C791)	
C526	2	Left rear bulkhead	To Roof wire harness (C751)	
C527	20	Left rear bulkhead	To Floor wire harness (C500)	
C528	12	Left rear bulkhead	To Floor wire harness (C499)	
c529		Left rear window	To Rear defogger wire (C811)	
C530	14	Left front engine compartment	To Engine wire harness (C101)	A/T
C530	6	Left front engine compartment	To Engine wire harness (CI 01)	M/T
c531	2	Left front engine compartment	To Engine wire harness (C102)	
C532	6	Left front engine compartment	To Emission control box	
c533	3	Left front engine compartment	To Emission control box	
c534	3	Left front engine compartment	To Emission control box	
c535	2	Center engine compartment	To Engine hood switch	
C536	2	Center engine compartment	To Trunk wire harness (C581)	
c537	2	Left engine compartment	To L. Rear anti-lock brake speed sensor	
C538	4	Left trunk area	To Car telephone system	OPTIC)N
c539	20	Left trunk area	To Rear wire harness (C551)	
C540		Left rear bulkhead	To Floor wire harness (C502)	
c541		Left trunk area	To Power antenna motor	


MAIN FUSE BOX
C523
C525
C529
C530
C531
C533
C535
C524
C532
C534
C522
C521
C540
C536
C539
C527
C528
C526
C538
C541
C537
SIDE WIRE HARNESS

Rear Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
c551	20	Left quarter panel area	To Side wire harness (C539)	
C552	3	Left trunk area	To Trunk light	
c553	4	Left trunk area	To Power antenna motor	
c554	2	Left trunk area	To Trunk opener solenoid	
c555	8	Left trunk area	To L. Taillight assembly	
C556	2	Left trunk area	To L. Rear turn signal light	
c557	3	Center trunk area	To Trunk latch switch	
C558	4	Center trunk area	To License plate lights	
c559	2	Center trunk area	To Security trunk key cylinder switch	
C 560	8	Right trunk area	To R. Taillight assembly	
C561	2	Right trunk area	To R. Rear turn signal light	
C562	2	Right quarter panel area	To R. Rear anti-lock brake speed sensor	
C563	2	Right trunk area	To R. Rear side marker	
C564	2	Left trunk area	To L. Rear side marker	
G551		Left quarter panel area	To Body ground, via rear wire harness	

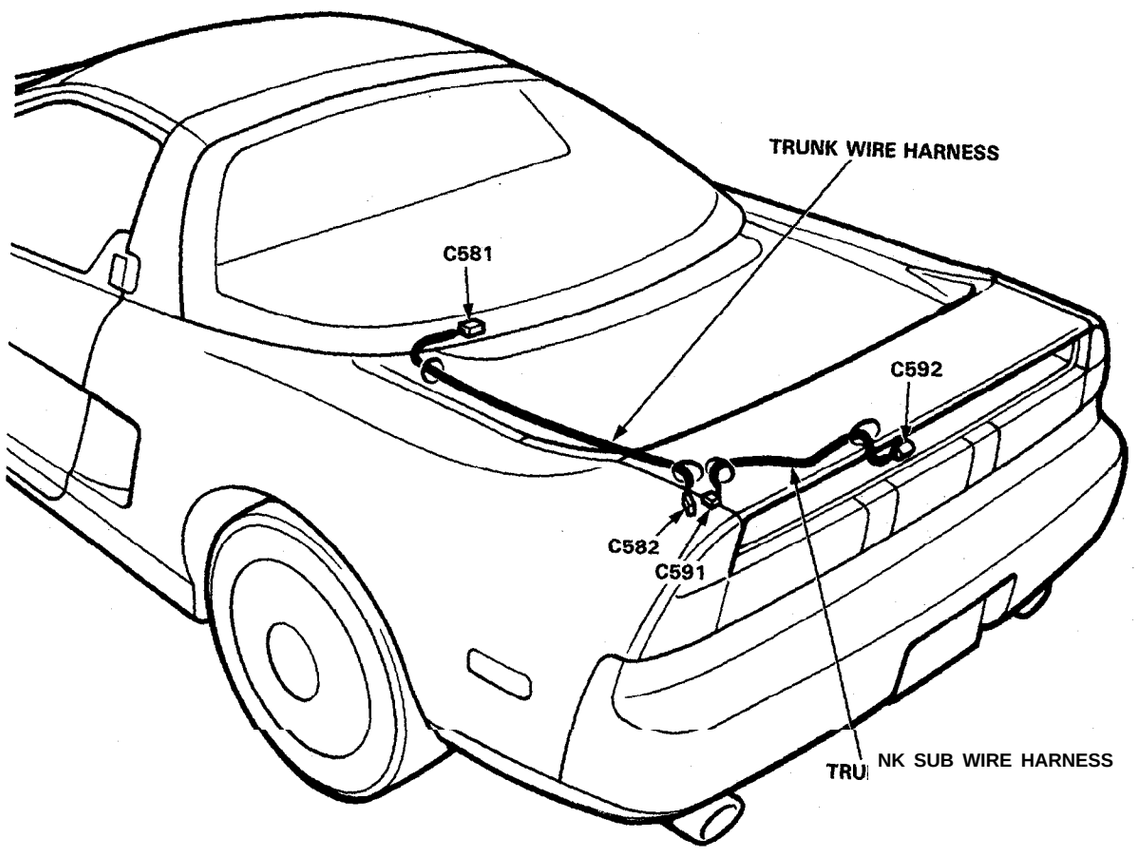


Trunk Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C581	2	Left front trunk area	To Side wire harness (C536)	
C582	2	Above center trunk area	To Trunk sub wire harness (C591)	

Trunk Sub Wire Harness

c591	2	Above center trunk area	To Trunk wire harness (C582)	
c592	2	Above center trunk area	To High mount brake light	



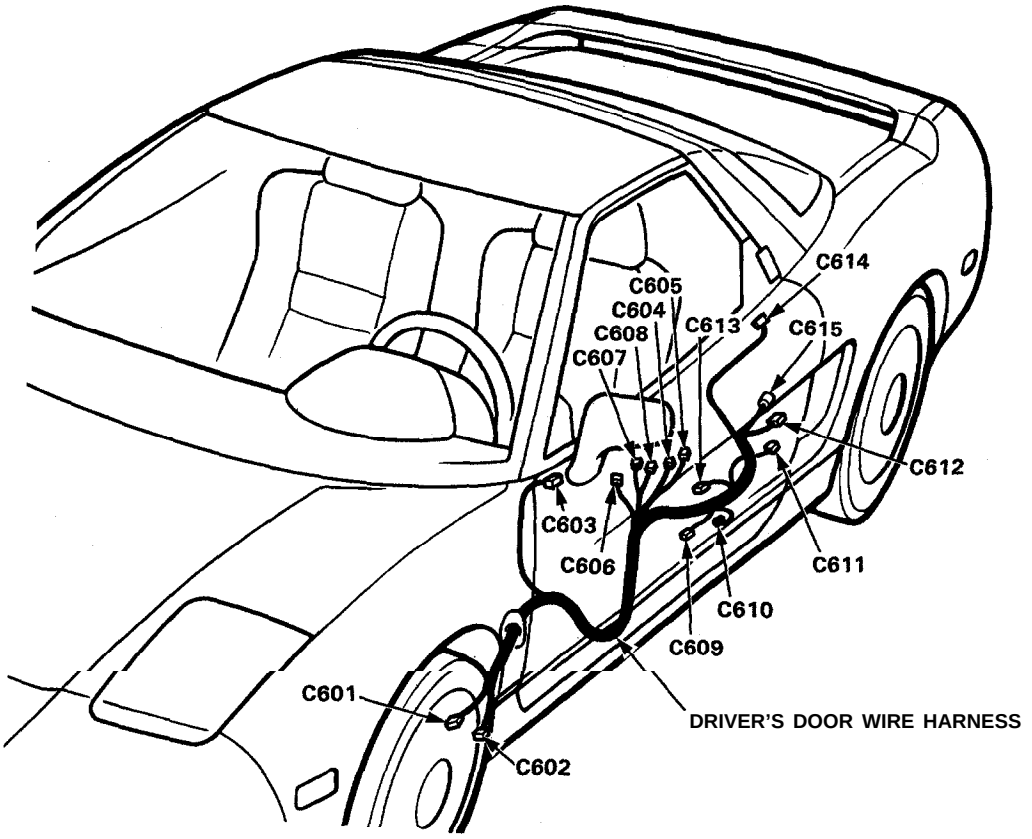
Connector and Wire Harness Routing

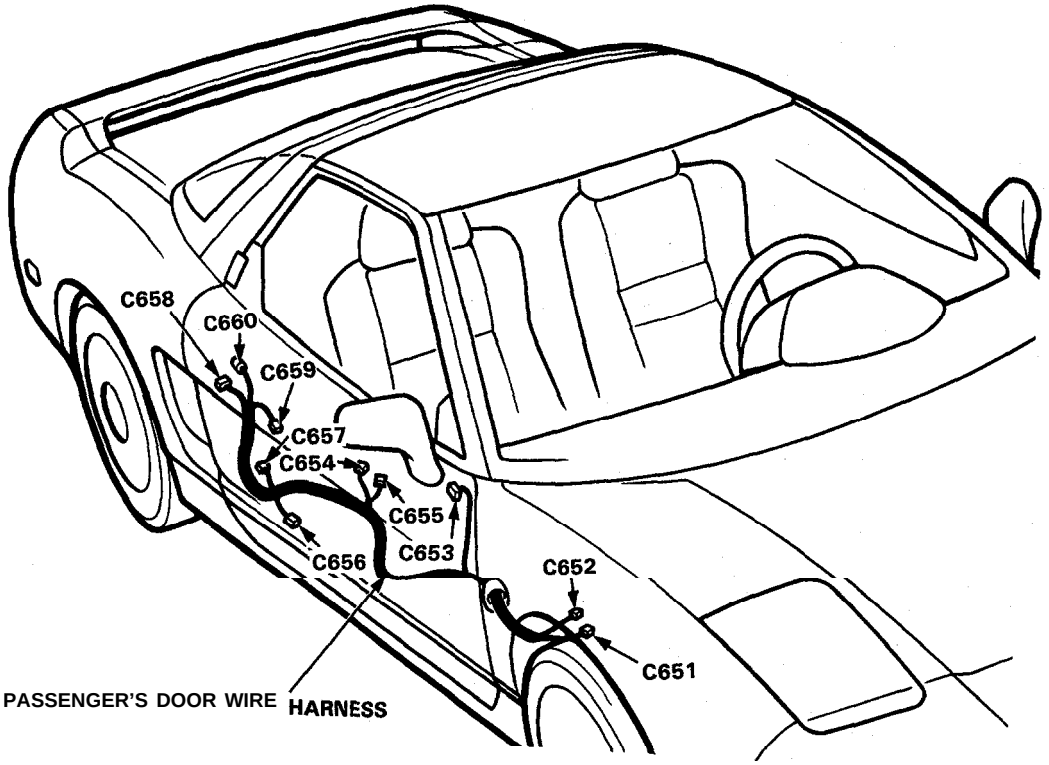
Driver's Door Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C601	18	Behind left kick panel	To Floor wire harness (C409)	
C602	14	Behind left kick panel	To Floor wire harness (C410)	
C603	3	Left door	To Left power door mirror	
C604	12	Left door	To Driver's power window switch	
C605	10	Left door	To Power door mirror switch	
C606	6	Left door	To Power window control unit	
C607	4	Left door	To Power window control unit	
C608	3	Left door	To Driver's door lock switch	
C609	5	Left door	To Left front speaker	
C610	2	Left door	To Trunk opener switch	
C611	3	Left door	To Driver's door courtesy light	
C612	8	Left door	To Driver's door key cylinder switch and door lock motor	
C613	4	Left door	To Driver's door power window motor	
C614	5	Left door	To Security indicator	
C615	2	Left door	To Driver's door switch	

Passanger's Door Wire Harness

C651	14	Behind right kick panel	To Floor wire harness (C472)	
C652	10	Behind right kick panel	To Floor wire harness (C473)	
C653	3	Right door	To Right power door mirror	
C654	8	Right door	To Passenger's power window switch	
C655	3	Right door	To Passenger's door lock switch	
C656	5	Right door	To Right front speaker	
C657	3	Right door	To Passenger's door courtesy light	
C658	8	Right door	To Passenger's door key cylinder switch and door lock motor	
C659	2	Right door	To Passenger's door power window motor	
C602	2	Right door	To Passenger's door switch	


C605
C604
C608
C607
C613
C614
C615
C612
C603
C606
C611
C610
C609
C601
C602
DRIVER'S DOOR WIRE HARNESS

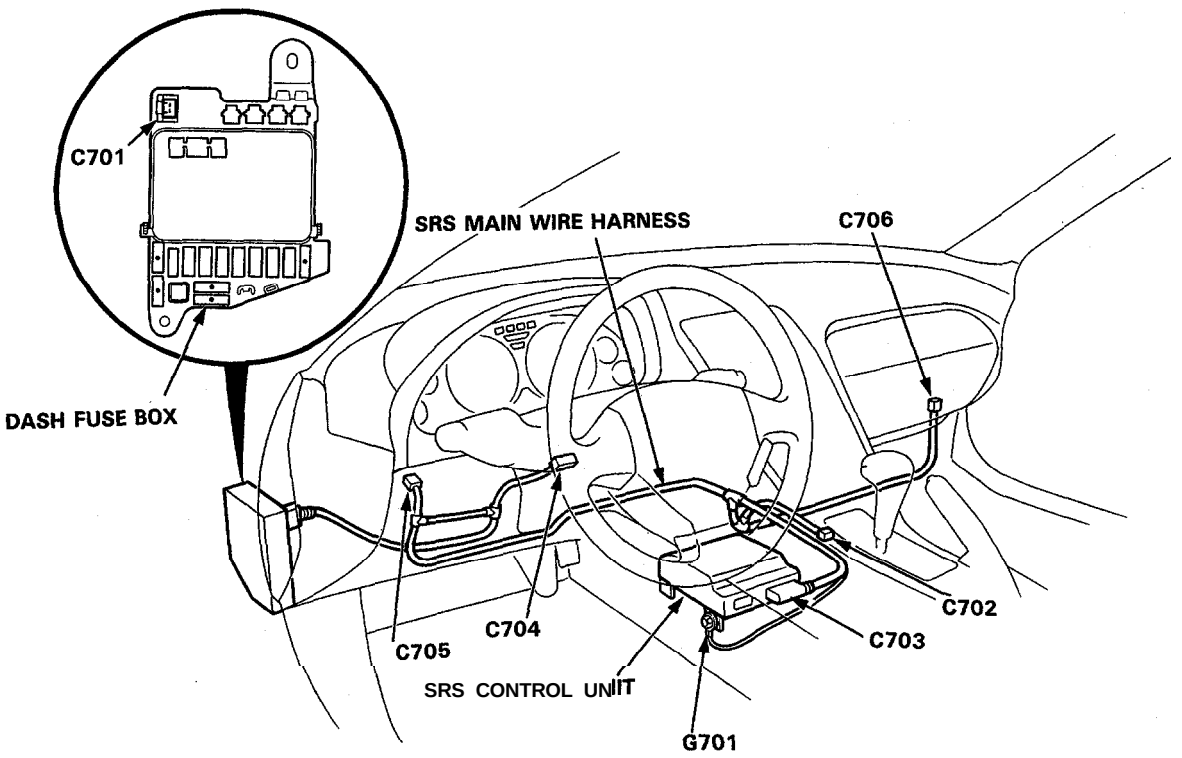

C658
C660
C659
C657
C654
C655
C656
C653
C652
C651
PASSENGER'S DOOR WIRE HARNESS

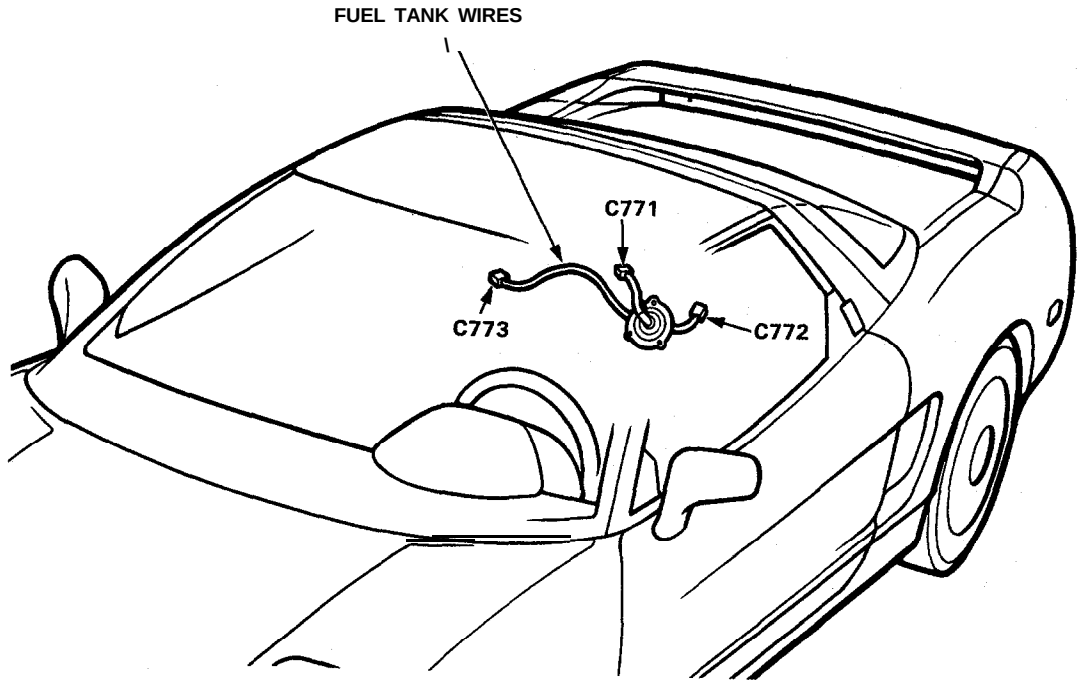
SRS Main Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C701	2	Behind left kick panel	To Dash fuse box (C908)	
C702	4	Right under dash	To Floor wire harness (C429)	
C703	18	Center under dash	To SRS control unit	
C704	6	Left under dash	To Cable reel	
C705	2	Left under dash	To Left dash sensor	
C706	2	Right under dash	To Right dash sensor	
G701		Center floor	To Body ground, via floor wire harness	

Fuel Tank Wires

c771	6	Left rear bulkhead	To Floor wire harness (C489)	
C772	3	Fuel tank area	To Fuel gauge sending unit	
c773	2	Fuel tank area	To Fuel pump	


C701
DASH FUSE BOX
SRS MAIN WIRE HARNESS
C706
C705
C704
C703
C702
SRS CONTROL UNIT
G701

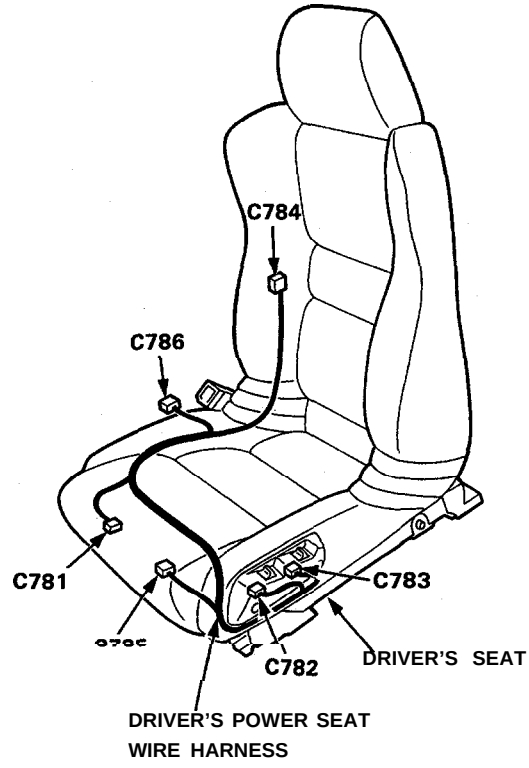

FUEL TANK WIRES
C771
C773
C772

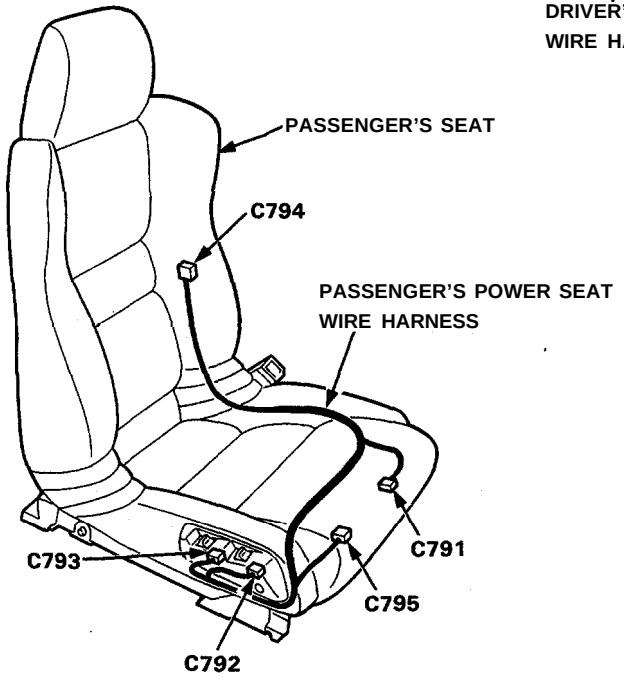
Driver's Power Seat Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C781	6	Under driver's seat	To Side wire harness (C525)	
C782	5	Left driver's seat	To Power seat sliding switch	
C783	5	Left driver's seat	To Power seat reclining switch	
C784	2	Right driver's seat back	To Power seat reclining motor	
C785	2	Under driver's seat	To Power seat sliding motor	
C786	2	Right driver's seat	To Belt switch	

Passenger's Power Seat Wire Harness

c791	4	Under passenger's seat	To Floor wire harness (C474)	
c792	5	Right passenger's seat	To Power seat sliding switch	
c793	5	Right passenger's seat	To Power seat reclining switch	
c794	2	Left passenger's seat back	To Power seat reclining motor	
c795	2	Under passenger's seat	To Power seat sliding motor	


C784
C786
C781
C783
C782
DRIVER'S SEAT
DRIVER'S POWER SEAT
WIRE HARNESS


PASSENGER'S SEAT
C794
PASSENGER'S POWER SEAT
WIRE HARNESS
C793
C791
C795
C792

Connector and Wire Harness Routing

Roof Wire

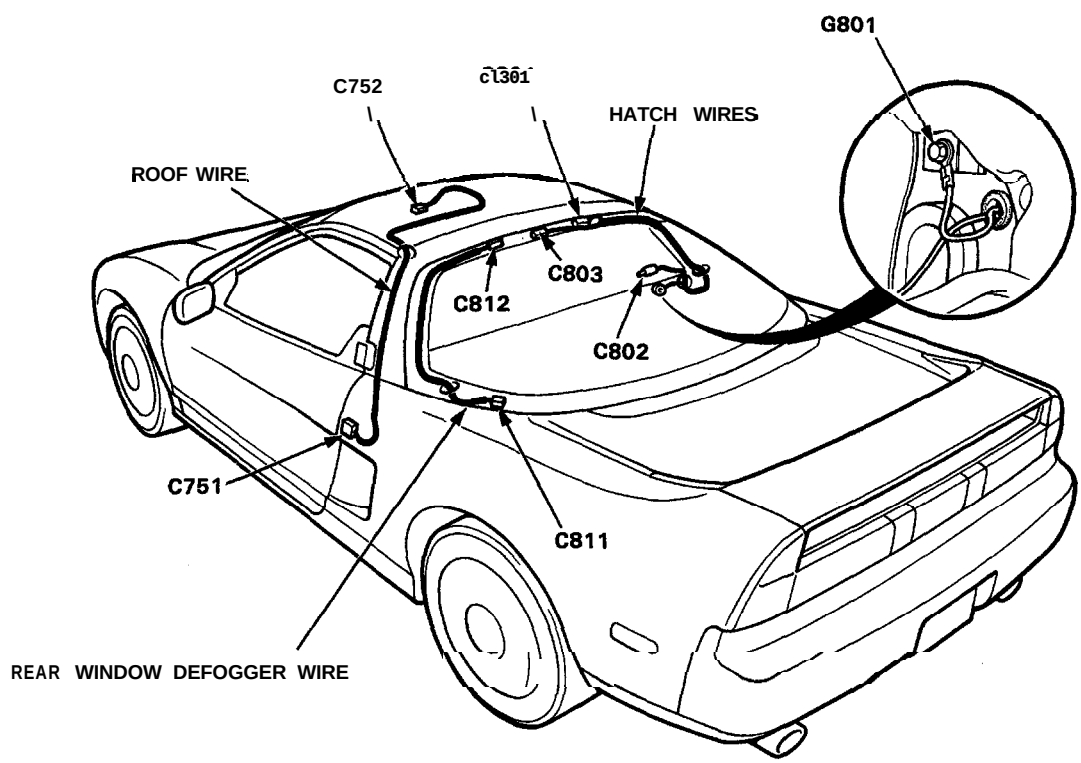
Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
c751	2	Left front engine compartment	To Side wire harness (C526)	
C752		Roof area	To Dome light	

Rear Window Defogger Wire

C811	1	Left front engine compartment	To Side wire harness (C529)	
C812	1	Rear window area	To Rear window defogger (+)	

Hatch Wires

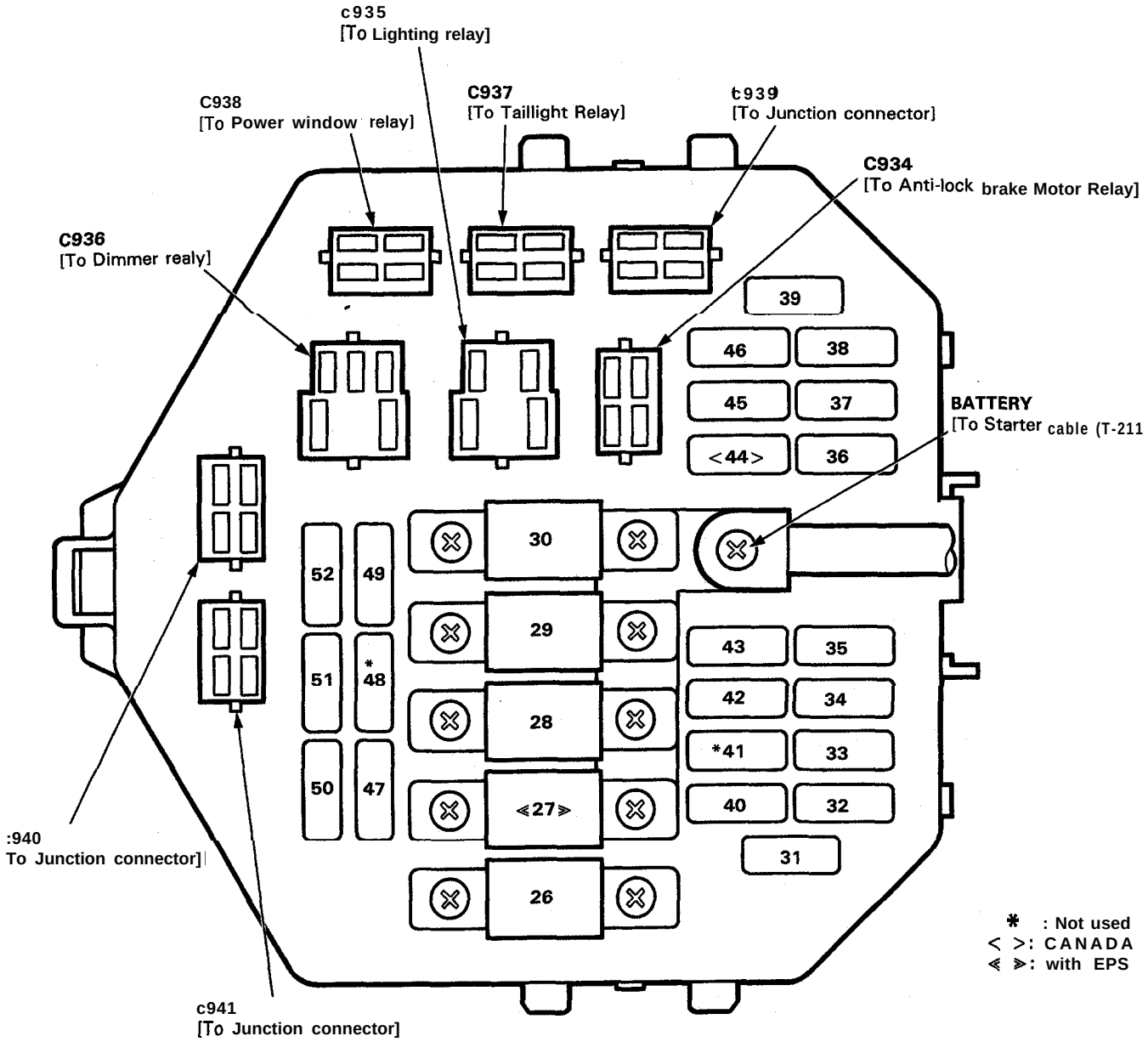
C801	1	Rear window area	To Rear window defogger (−)	
C802	1	Right rear bulkhead	To Floor wire harness (C504)	
C803	1	Rear window area	To Rear window glass antenna	
G801		Right engine compartment	To Body ground, via hatch wires	



Fuses

-Main Relay Box

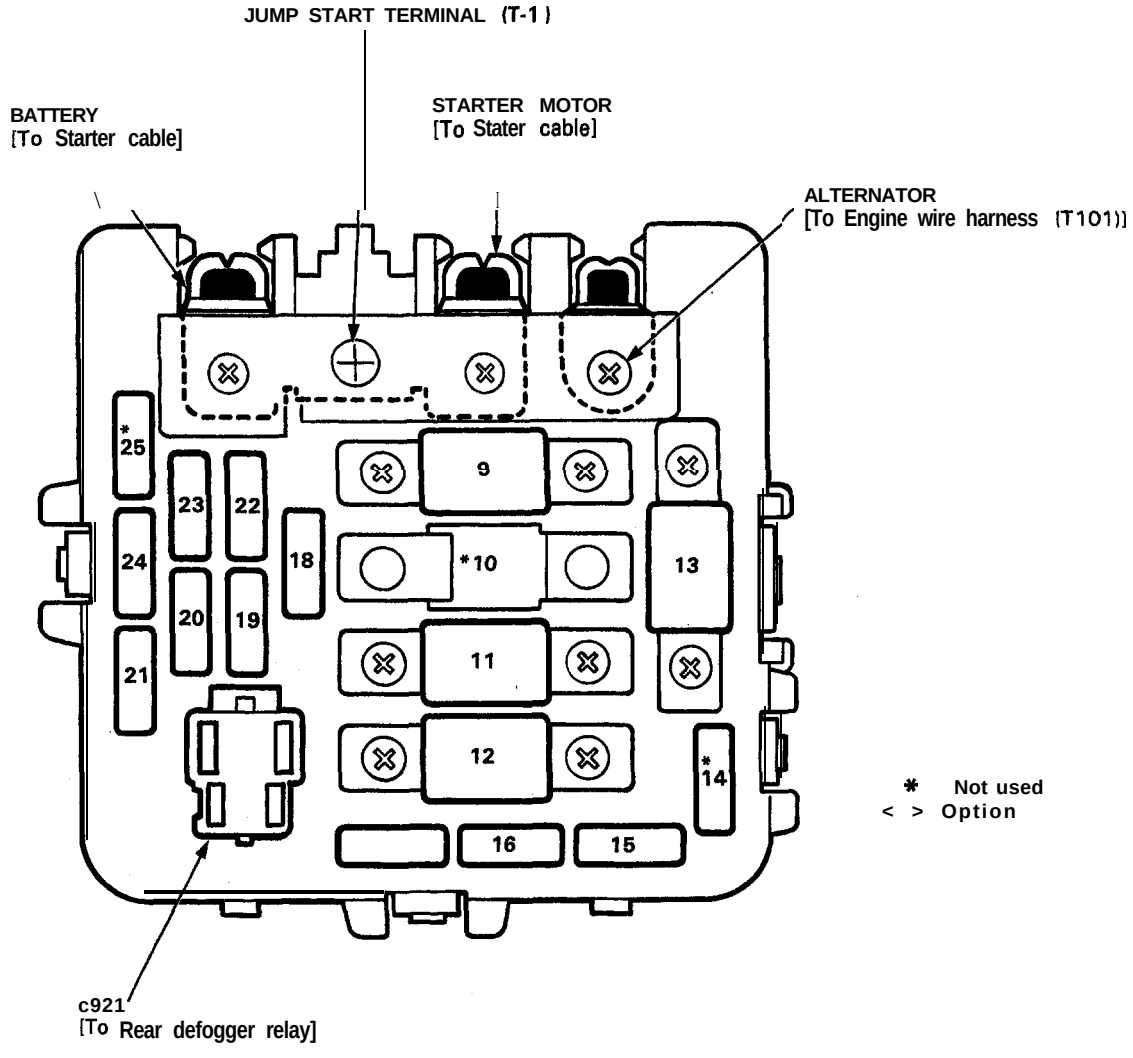
NOTE: Main relay box is located in the front compartment, right side.



Fuses

-Main Fuse Box

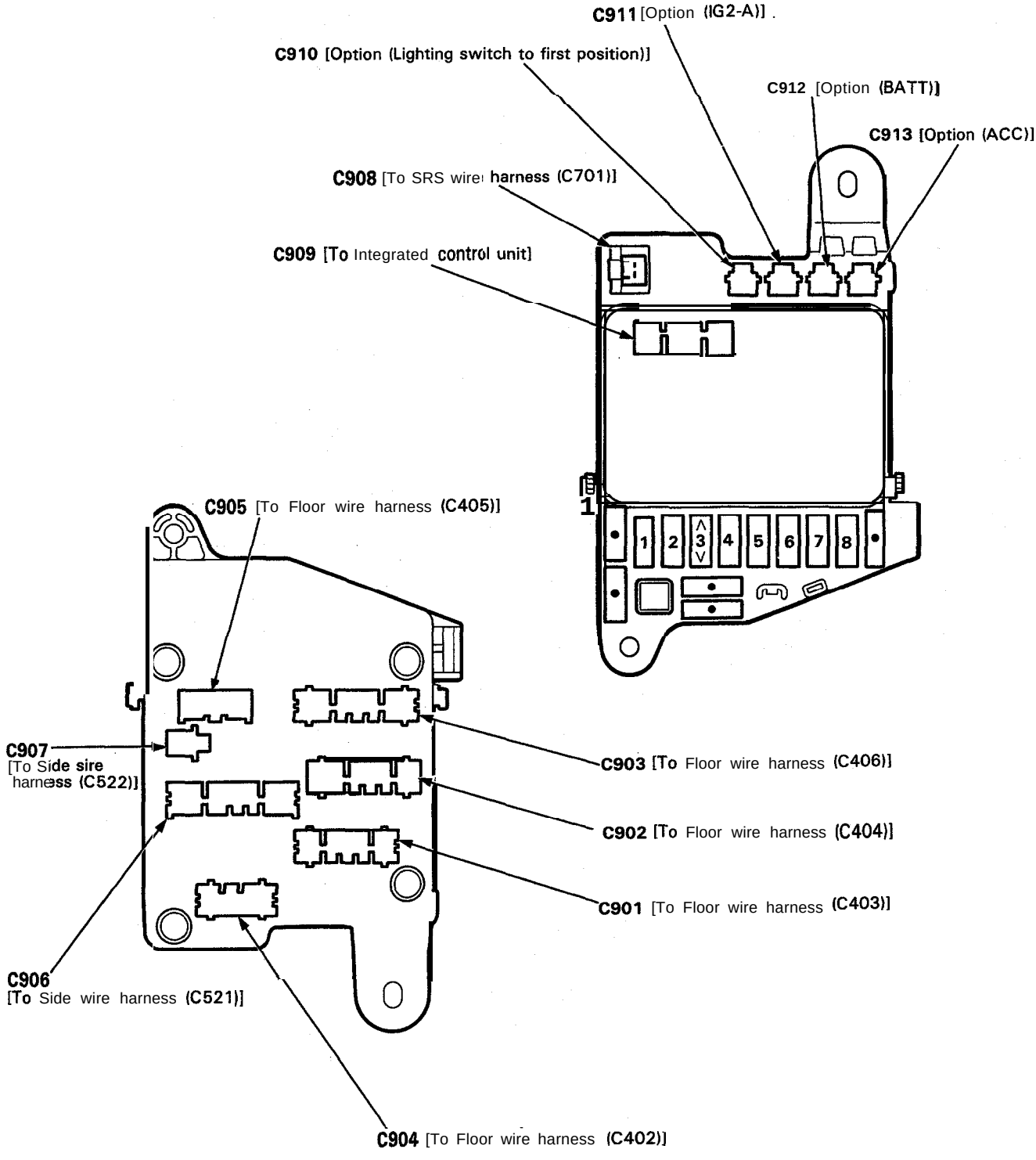
NOTE: Main fuse box is located in the engine compartement, left side.



-Dash Fuse Box

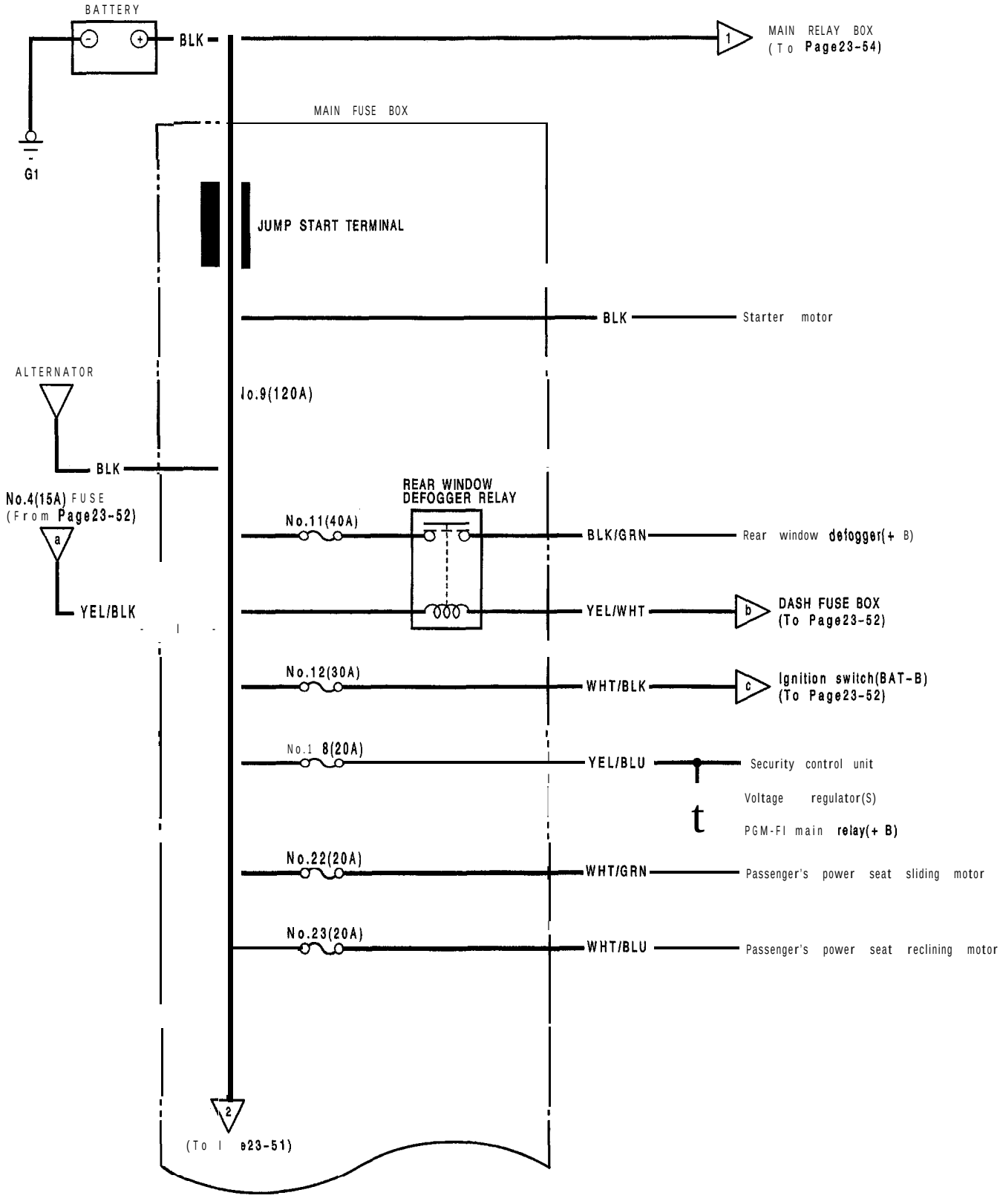
NOTE: Dash fuse box is located behind left kick panel.

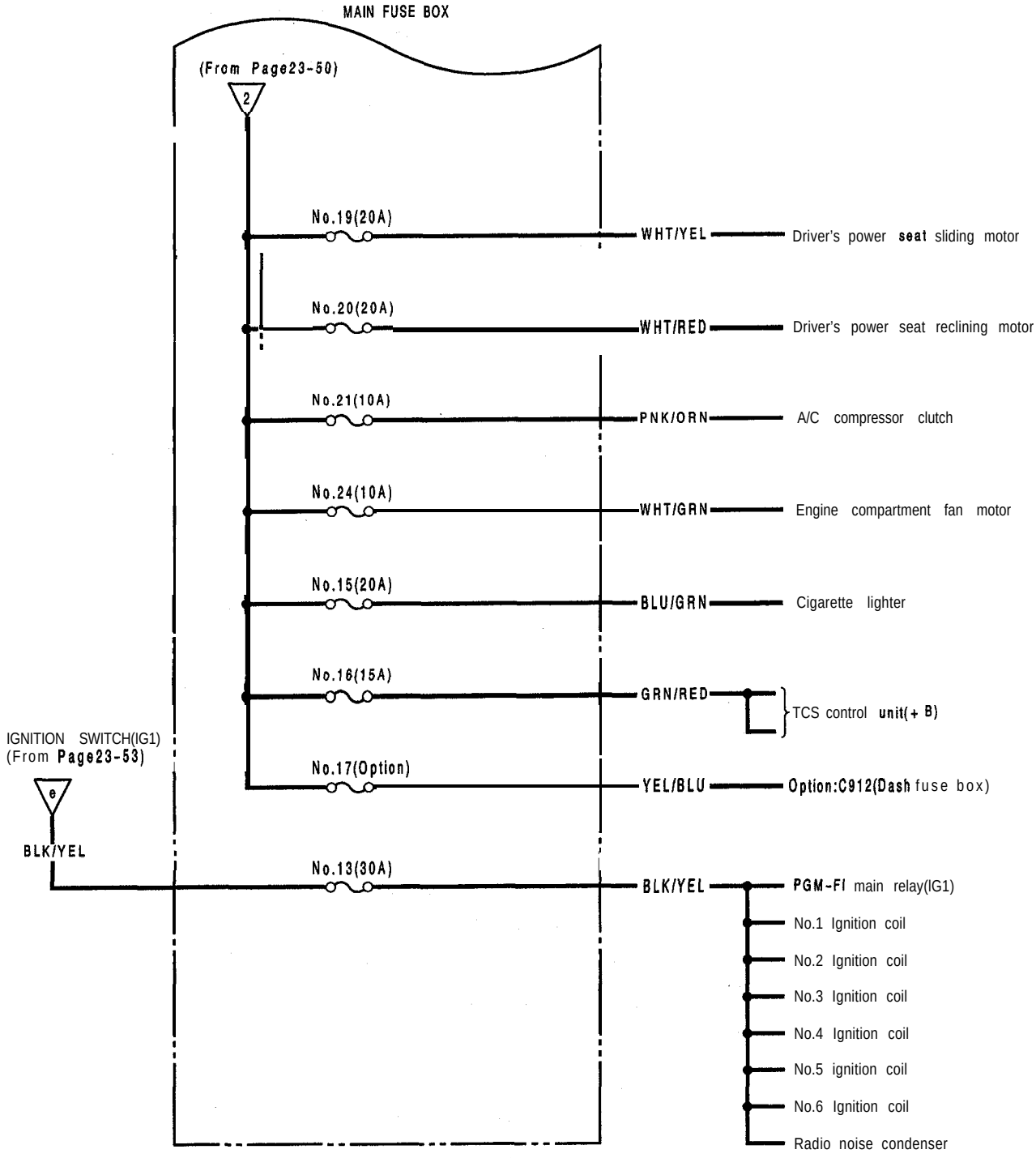
● : Spare fuse
< > : CANADA



Power Distribution

Circuit Identification

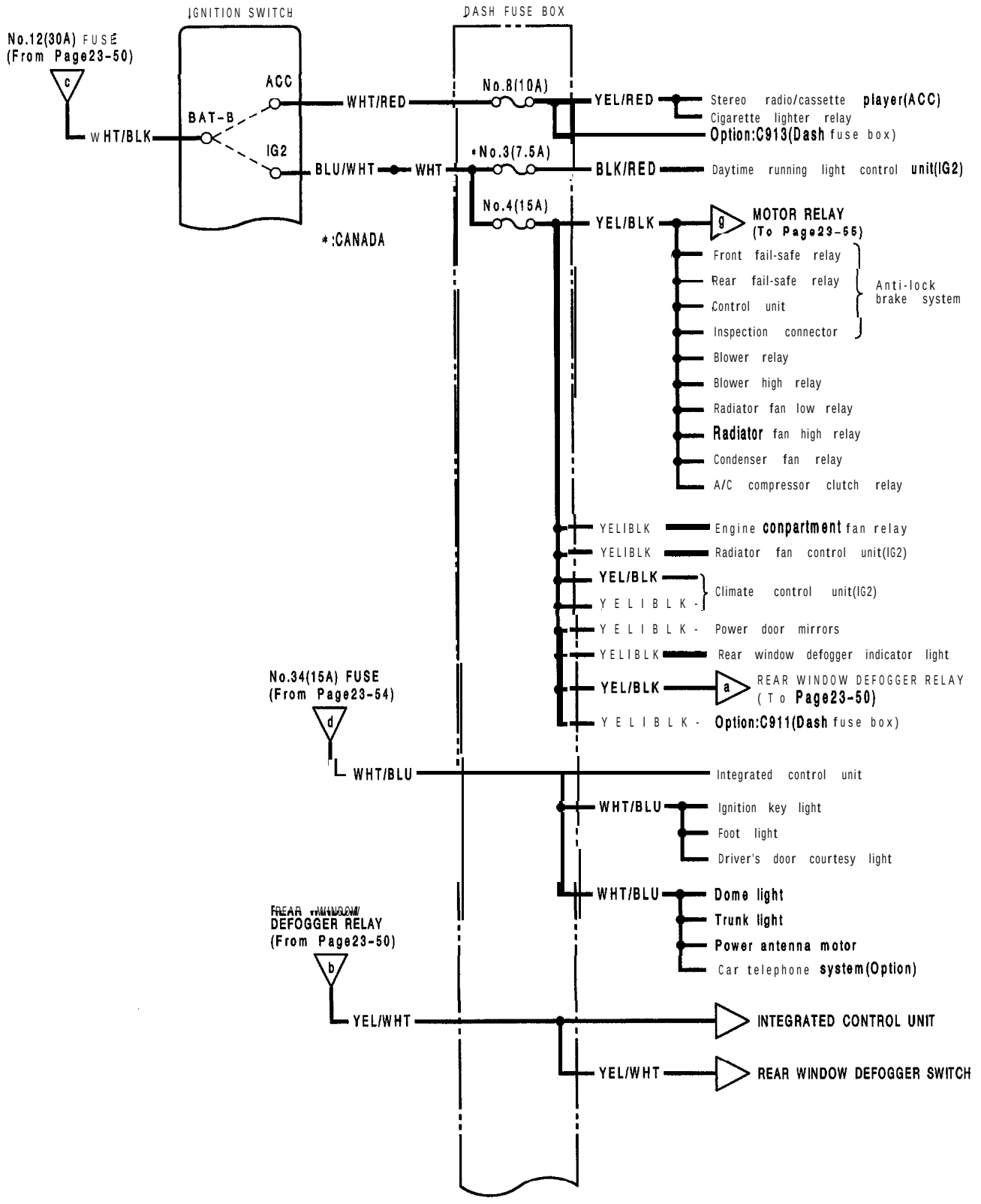


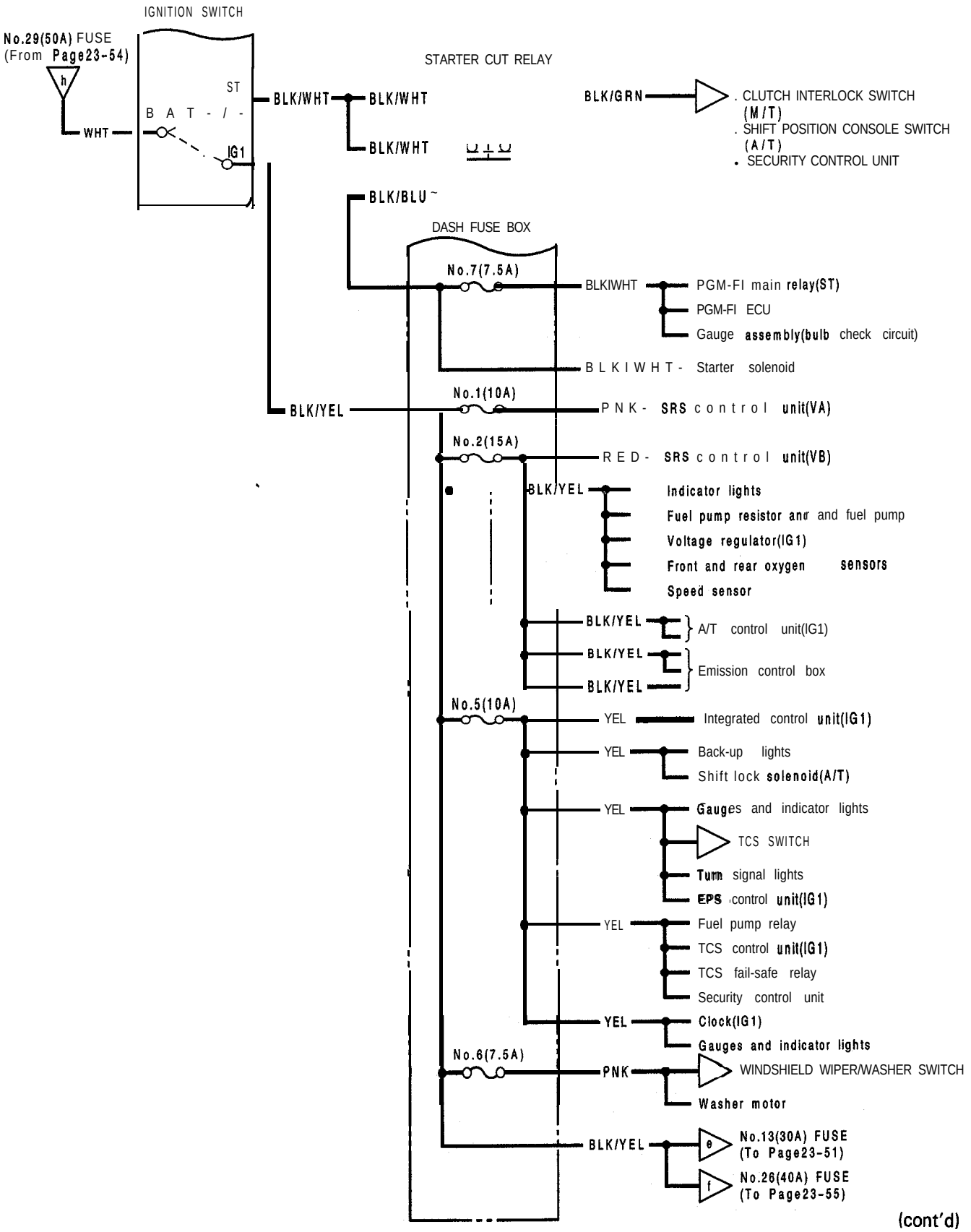

MAIN FUSE BOX
(From Page23-50)
2
No.19(20A)
WHT/YEL
Driver's power seat sliding motor
No.20(20A)
WHT/RED
Driver's power seat reclining motor
No.21(10A)
PNK/ORN
A/C compressor clutch
No.24(10A)
WHT/GRN
Engine compartment fan motor
No.15(20A)
BLU/GRN
Cigarette lighter
No.16(15A)
GRN/RED
TCS control unit(+ B)
IGNITION SWITCH(IG1)
(From Page23-53)
e
No.17(Option)
YEL/BLU
Option:C912(Dash fuse box)
BLK/YEL
No.13(30A)
BLK/YEL
PGM-FI main relay(IG1)
No.1 Ignition coil
No.2 Ignition coil
No.3 Ignition coil
No.4 Ignition coil
No.5 ignition coil
No.6 Ignition coil
Radio noise condenser

(cont'd)

Power Distribution

Circuit Identification (cont'd)

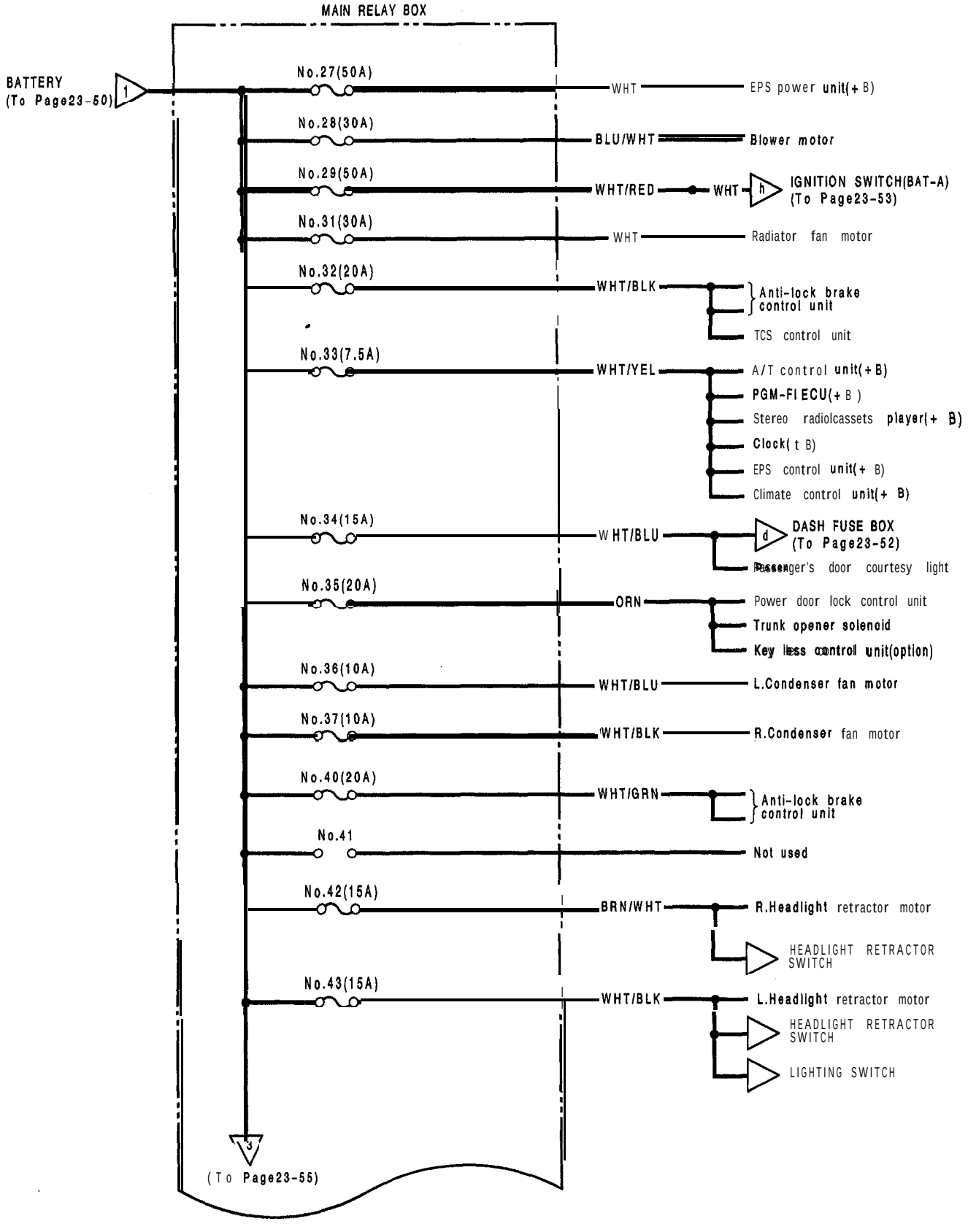


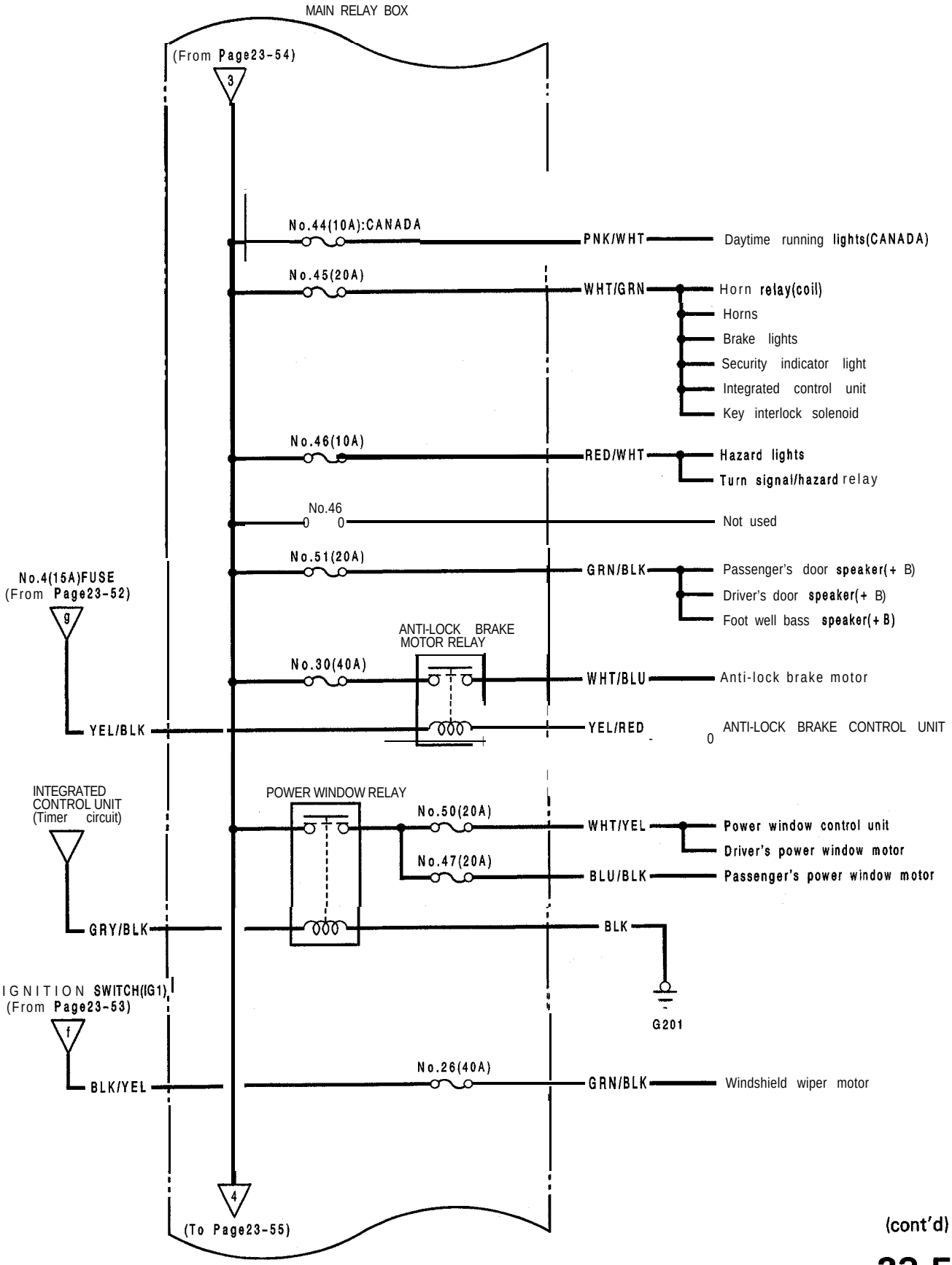

IGNITION SWITCH
No.29(50A) FUSE
(From Page23-54)
h
WHT
ST
B A T - / -
IG1
STARTER CUT RELAY
BLK/WHT
BLK/WHT
BLK/WHT
BLK/GRN
. CLUTCH INTERLOCK SWITCH (M/T)
. SHIFT POSITION CONSOLE SWITCH (A/T)
. SECURITY CONTROL UNIT
BLK/BLU
DASH FUSE BOX
No.7(7.5A)
BLKIWHT
PGM-FI main relay(ST)
PGM-FI ECU
Gauge assembly(bulb check circuit)
B L K I W H T - Starter solenoid
BLK/YEL
No.1(10A)
P N K - SRS c o n t r o l unit(VA)
No.2(15A)
R E D - SRS c o n t r o l unit(VB)
BLK/YEL
Indicator lights
Fuel pump resistor and and fuel pump
Voltage regulator(IG1)
Front and rear oxygen sensors
Speed sensor
BLK/YEL
BLK/YEL
BLK/YEL
A/T control unit(IG1)
Emission control box
No.5(10A)
YEL
Integrated control unit(IG1)
YEL
Back-up lights
Shift lock solenoid(A/T)
YEL
Gauges and indicator lights
TCS SWITCH
Turn signal lights
EPS control unit(IG1)
YEL
Fuel pump relay
TCS control unit(IG1)
TCS fail-safe relay
Security control unit
YEL
Clock(IG1)
Gauges and indicator lights
No.6(7.5A)
PNK
WINDSHIELD WIPER/WASHER SWITCH
Washer motor
BLK/YEL
e
No.13(30A) FUSE
(To Page23-51)
f
No.26(40A) FUSE
(To Page23-55)

(cont'd)

Power Distribution

Circuit Identification (cont'd)

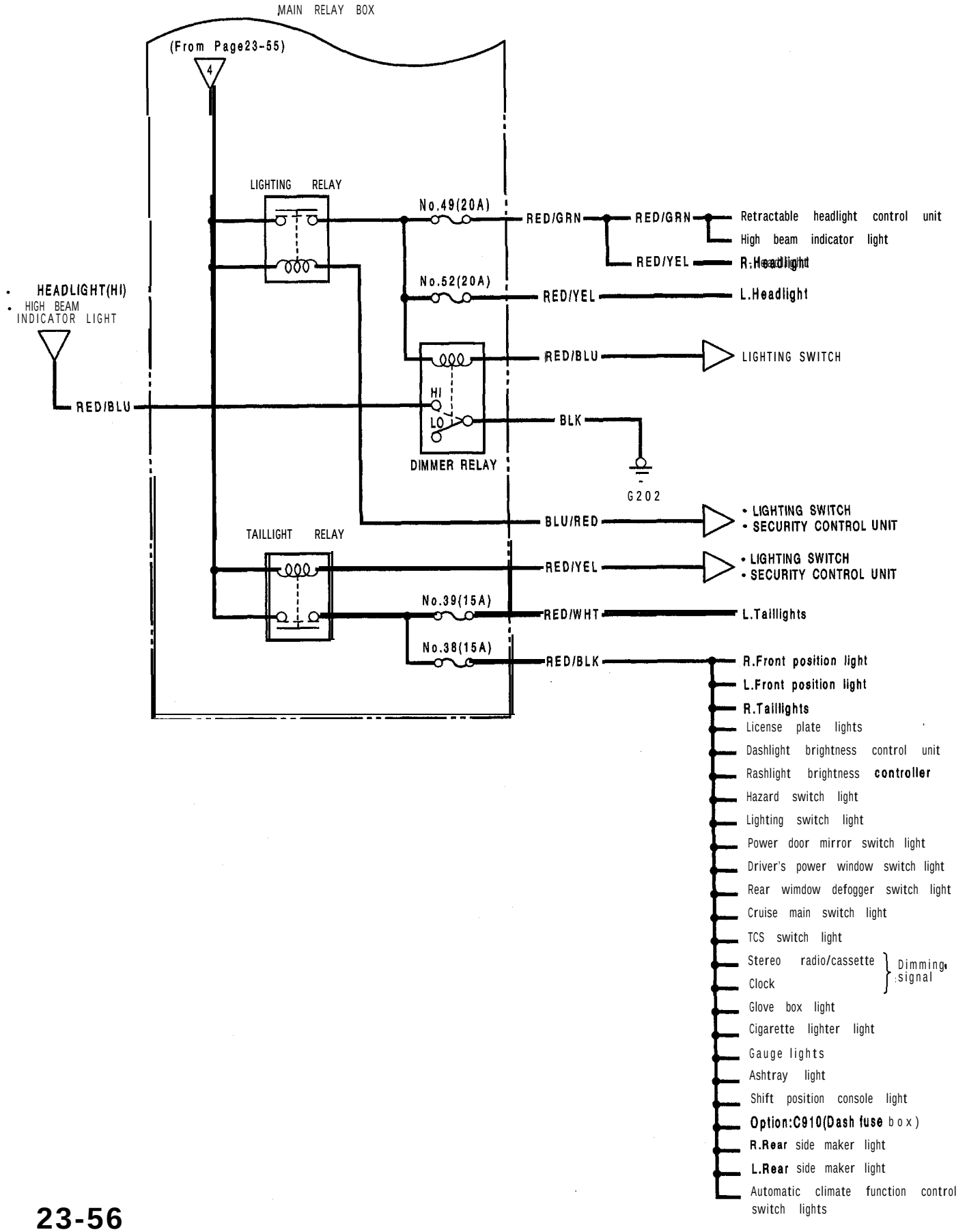



MAIN RELAY BOX
(From Page23-54)
3
No.44(10A):CANADA
PNK/WHT
Daytime running lights(CANADA)
No.45(20A)
WHT/GRN
Horn relay(coil)
Horns
Brake lights
Security indicator light
Integrated control unit
Key interlock solenoid
No.46(10A)
RED/WHT
Hazard lights
Turn signal/hazard relay
No.46
Not used
No.51(20A)
GRN/BLK
Passenger's door speaker(+ B)
Driver's door speaker(+ B)
Foot well bass speaker(+ B)
No.4(15A)FUSE
(From Page23-52)
9
ANTI-LOCK BRAKE
MOTOR RELAY
No.30(40A)
WHT/BLU
Anti-lock brake motor
YEL/BLK
YEL/RED
ANTI-LOCK BRAKE CONTROL UNIT
INTEGRATED
CONTROL UNIT
(Timer circuit)
POWER WINDOW RELAY
No.50(20A)
WHT/YEL
Power window control unit
Driver's power window motor
No.47(20A)
BLU/BLK
Passenger's power window motor
GRY/BLK
BLK
G201
IGNITION SWITCH(IG1)
(From Page23-53)
f
No.26(40A)
BLK/YEL
GRN/BLK
Windshield wiper motor
4
(To Page23-55)

(cont'd)

Power Distribution

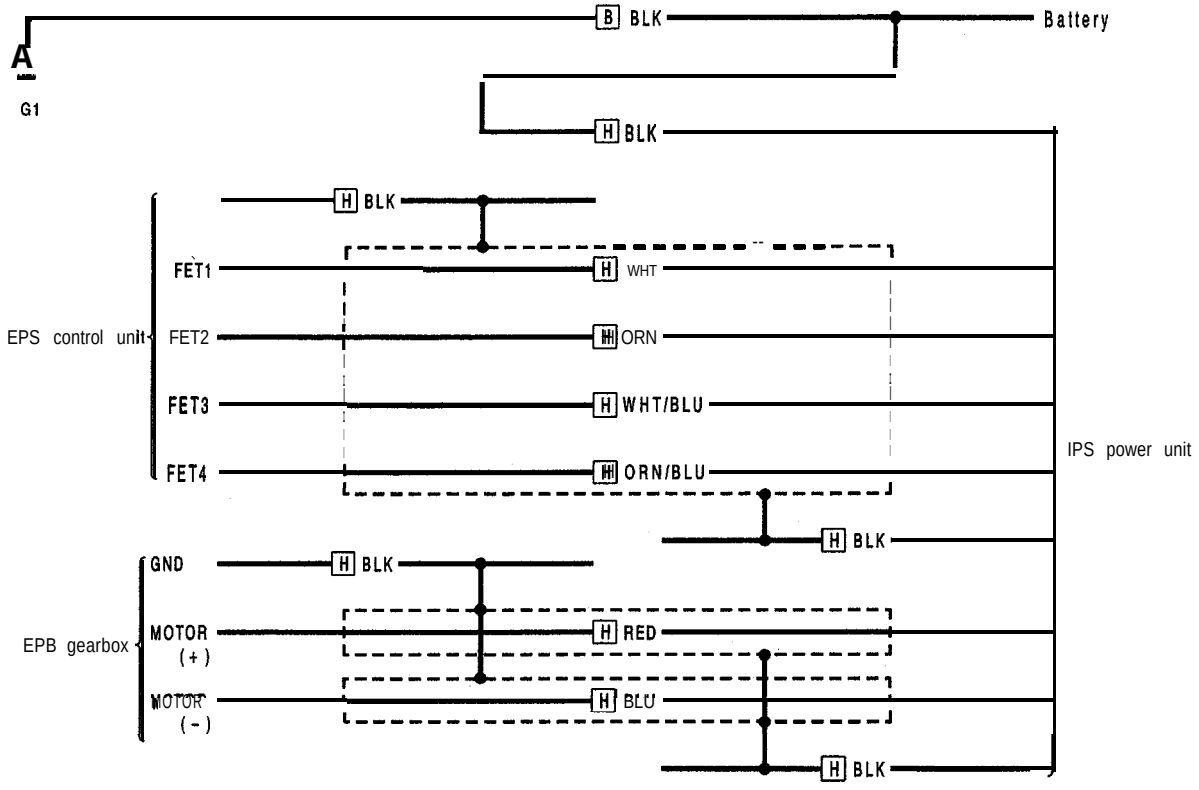
Circuit Identification (cont'd)

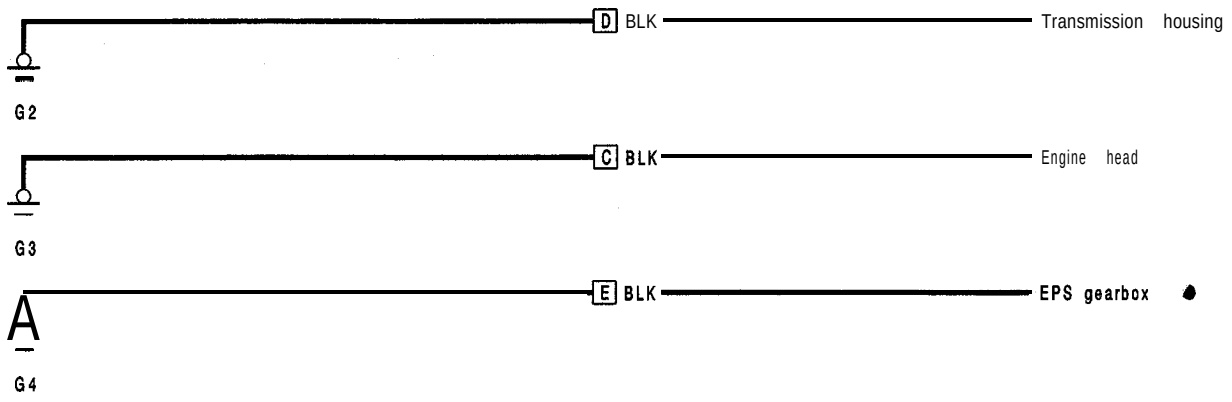


Ground Distribution

Circuit Identification

NOTE: See page 23-17 for illustrated ground locations.





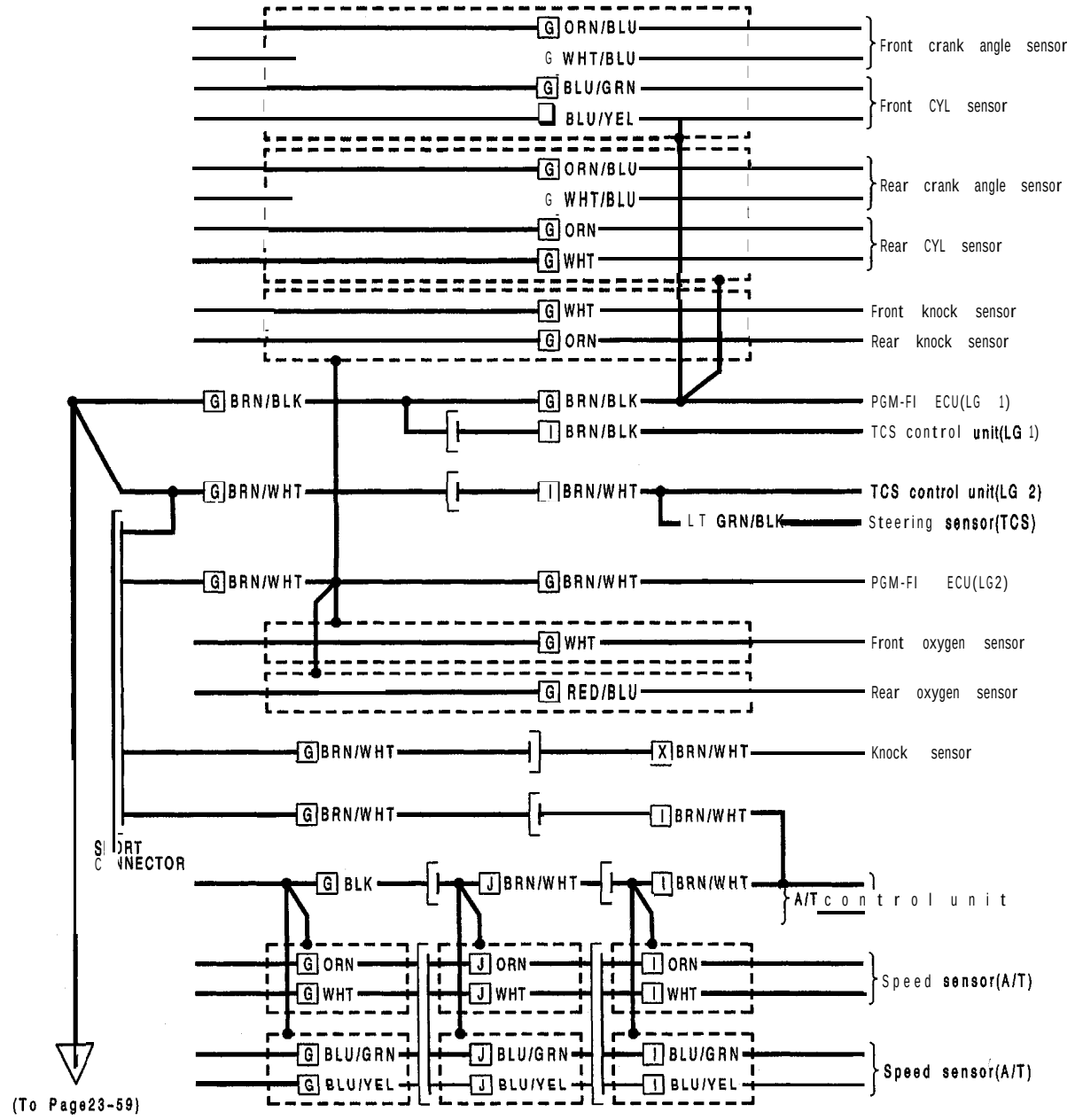
: Battery ground wire
: Engine ground wire B
: Engine ground wire A
: EPS ground wire
: Front compartment wire harness

--------- : Shielded wire

(cont'd)

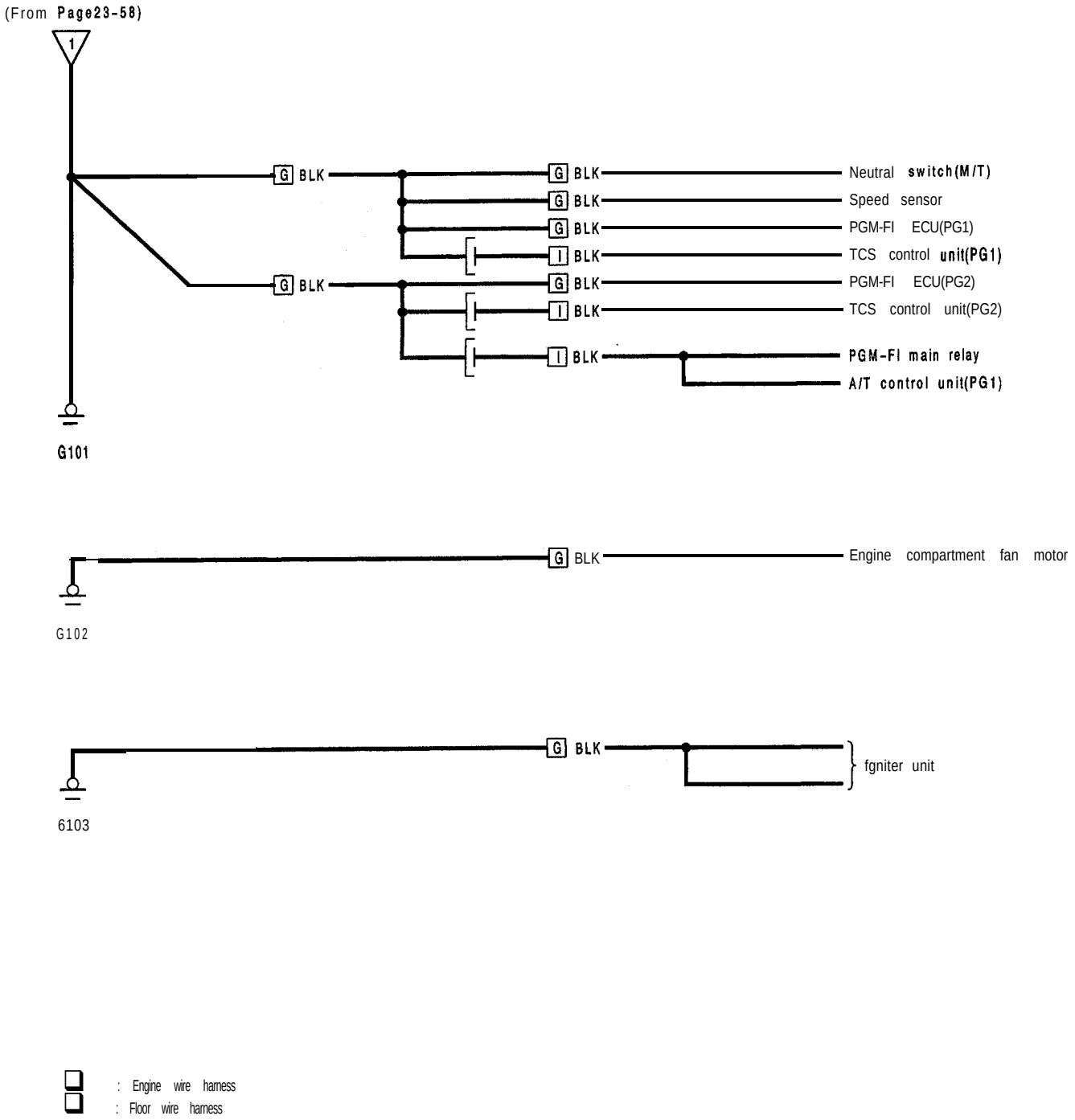
Ground Distribution

Circuit Identification (cont'd)



: Engine wire harness
: Floor wire harness
J : Side wire harness
: Knock sensor harness
--------- : Shielded wire

NOTE: See page 23-19 and 21 for illustrated ground locatons.



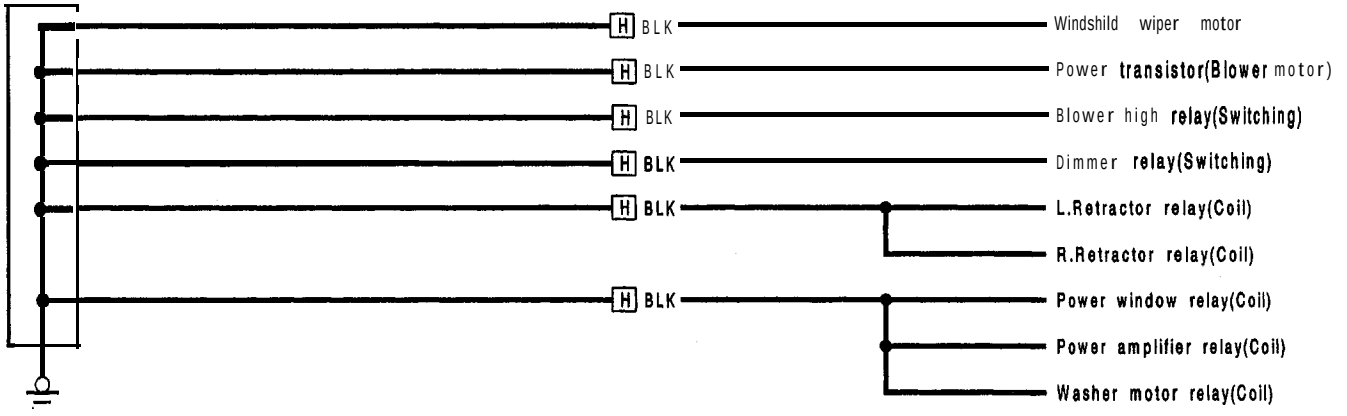
: Engine wire harness
: Floor wire harness

(cont'd)

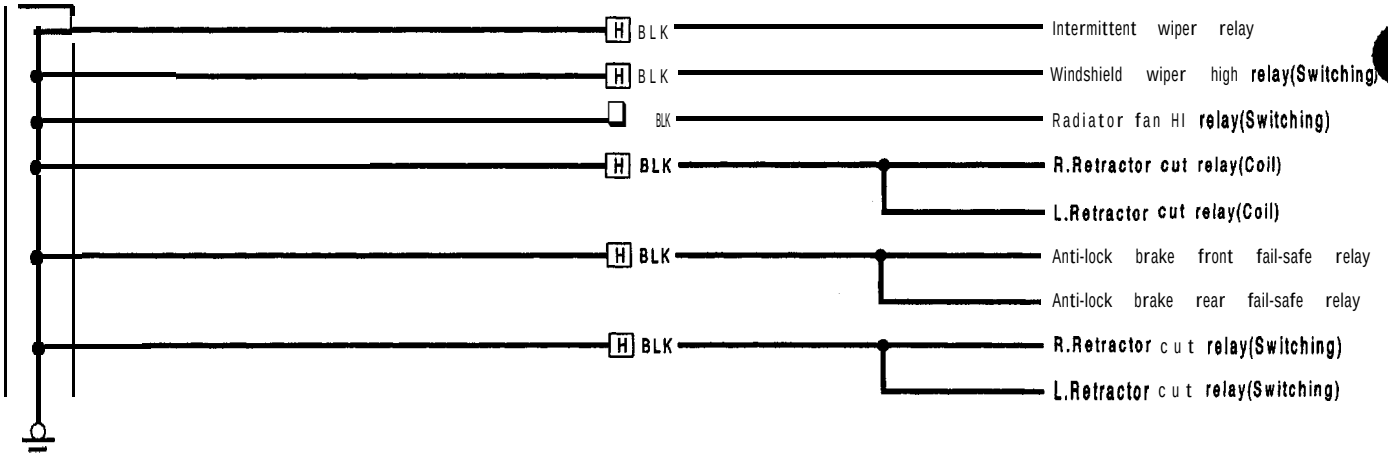
Ground Distribution

Circuit Identification (cont'd)

NOTE: See page 23-23 for illustrated ground locations.



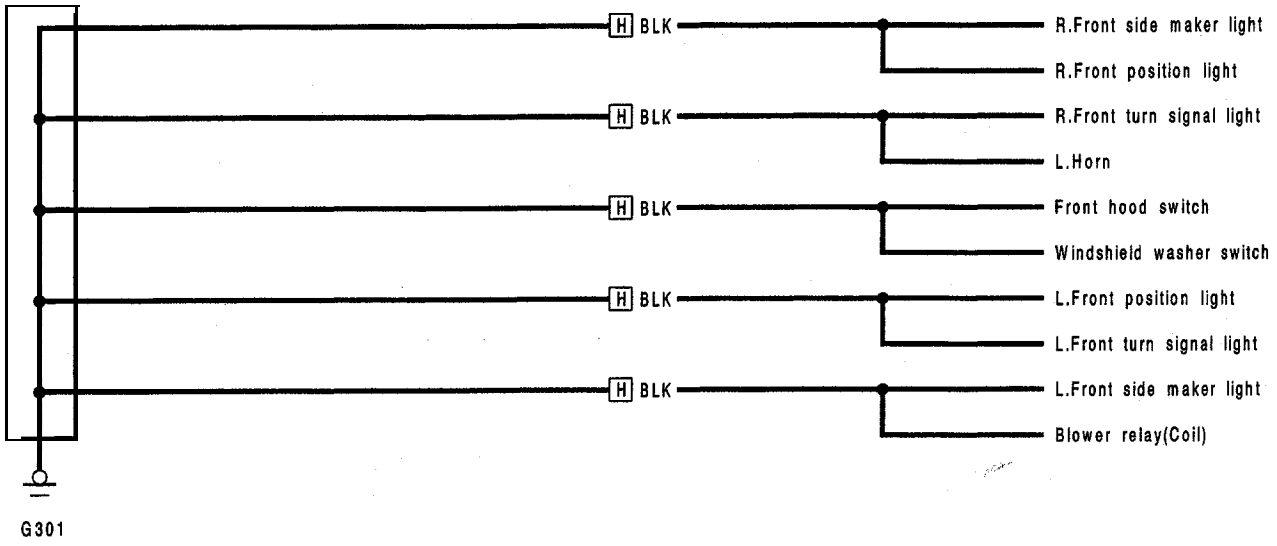
G201

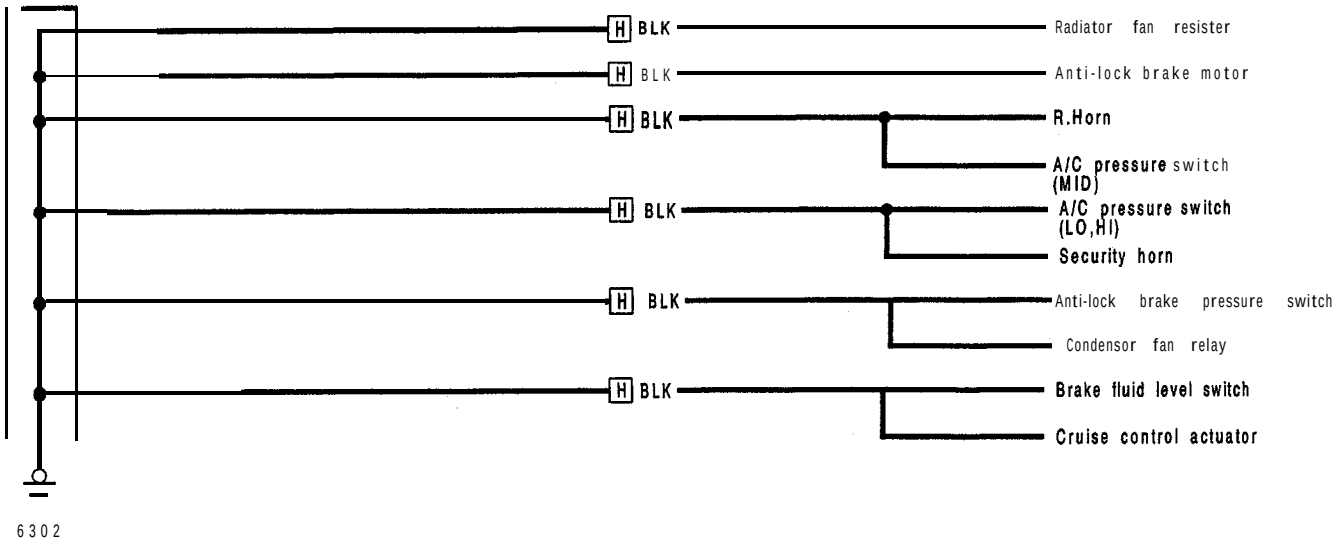


6202

: Engine wire harness
: Front compartment wire harness

NOTE: See page 23-27 for illustrated ground locations.



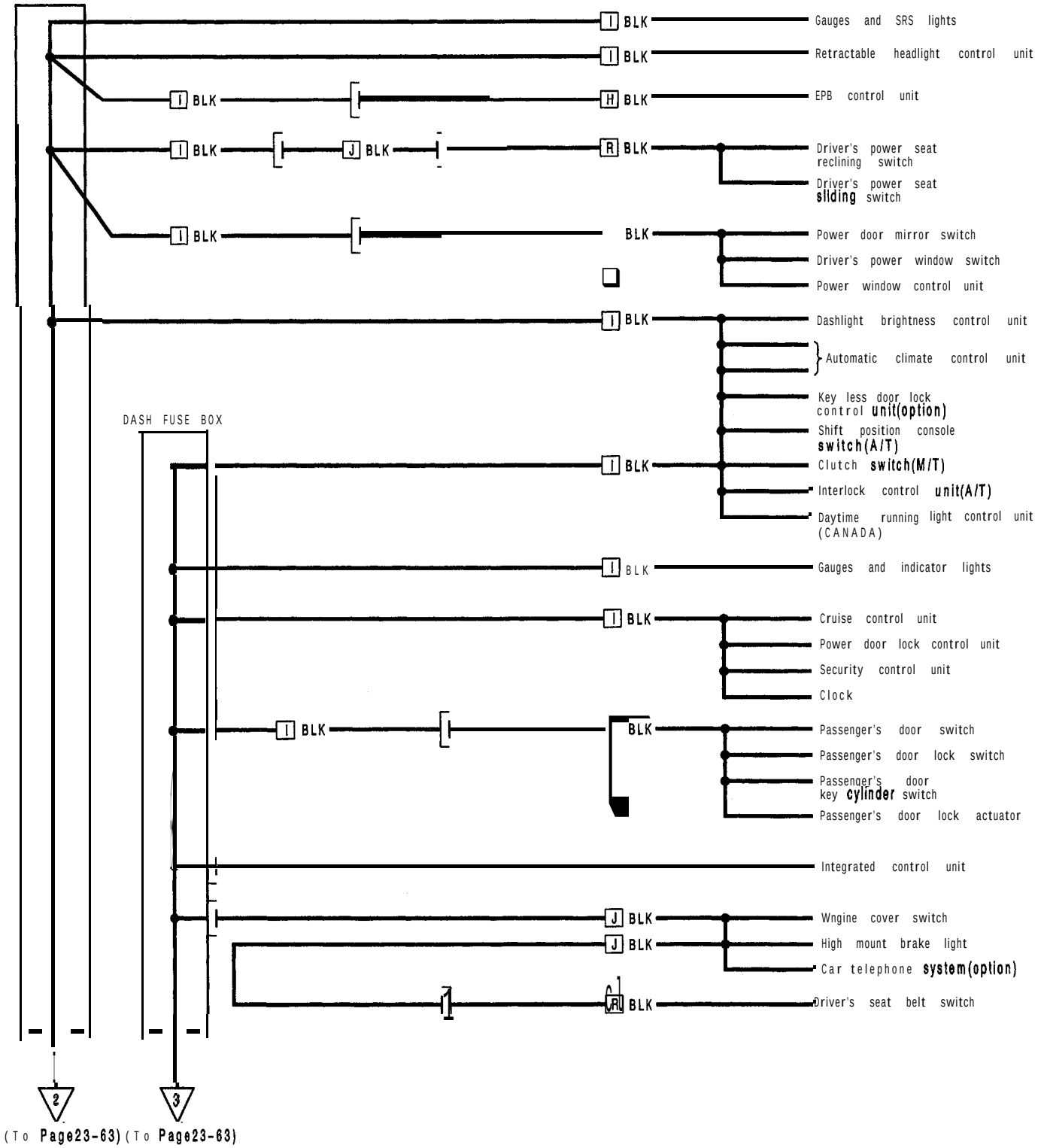


❑ : Front compartment wire harness

(cont'd)

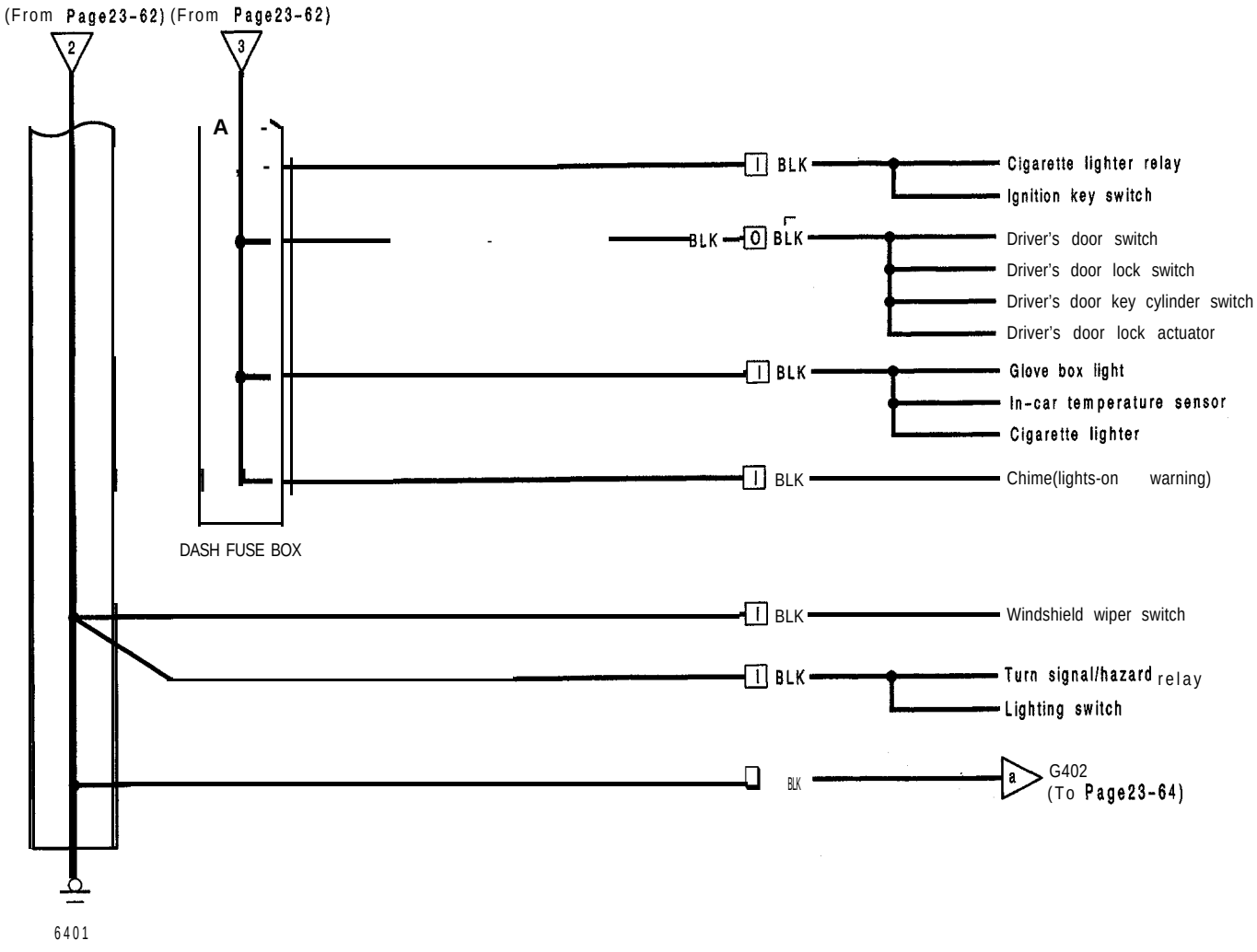
Ground Distribution

Circuit Identification (cont'd)



: Front compartment wire harness
: Floor wire harness
J : Side wire harness
: Driver's door wire harness
: Passenger's door wire harness
: Driver's power seat wire harness

NOTE: See page 23-31 for illustrated ground locations.



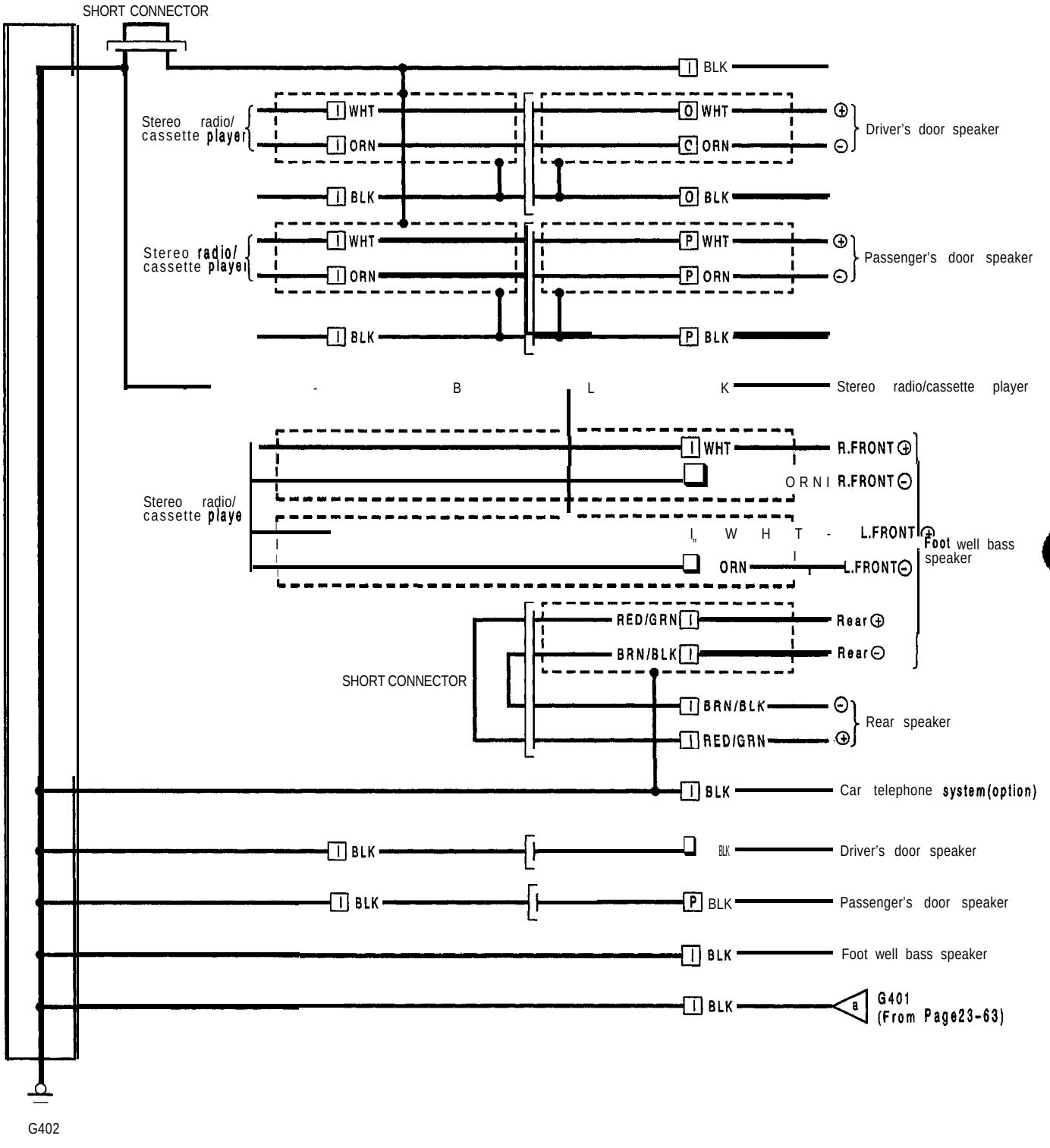
: Floor wire harness
: Driver's door wire harness

(cont'd)

Ground Distribution

Circuit Identification (cont'd)

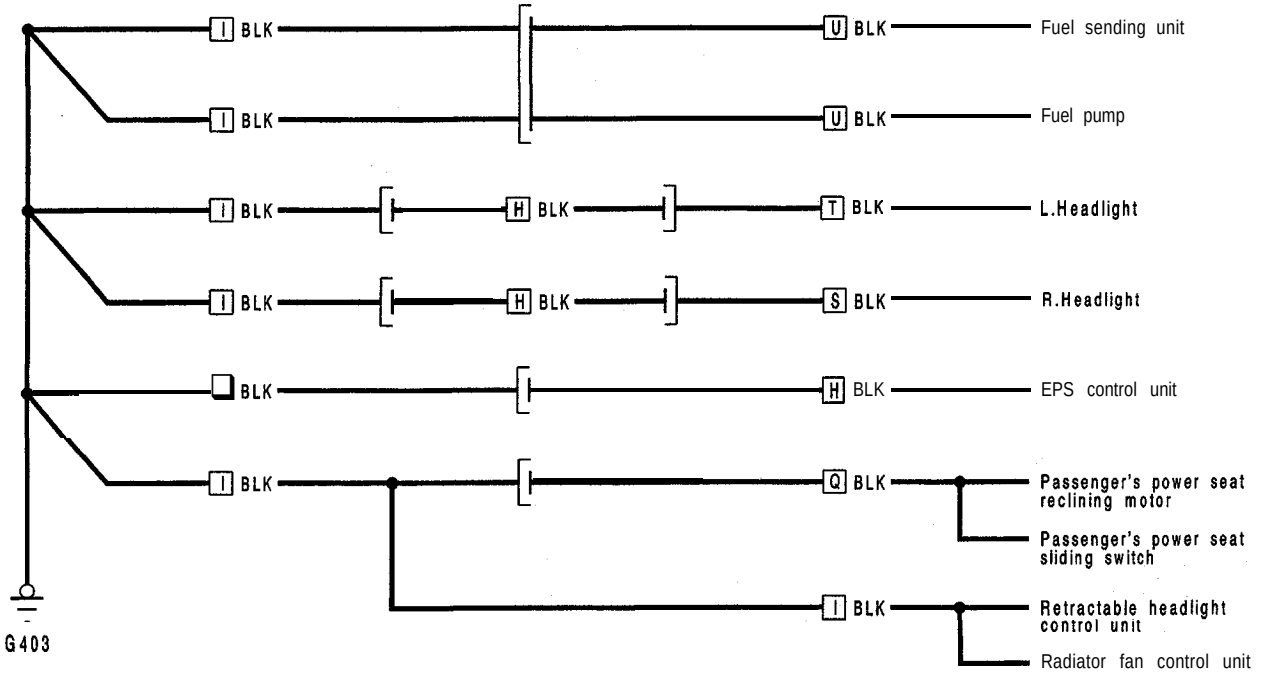
NOTE: See page 23-33 for illustrated ground locations.

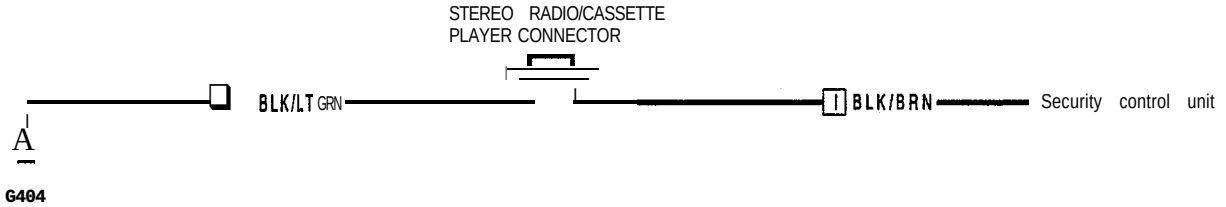


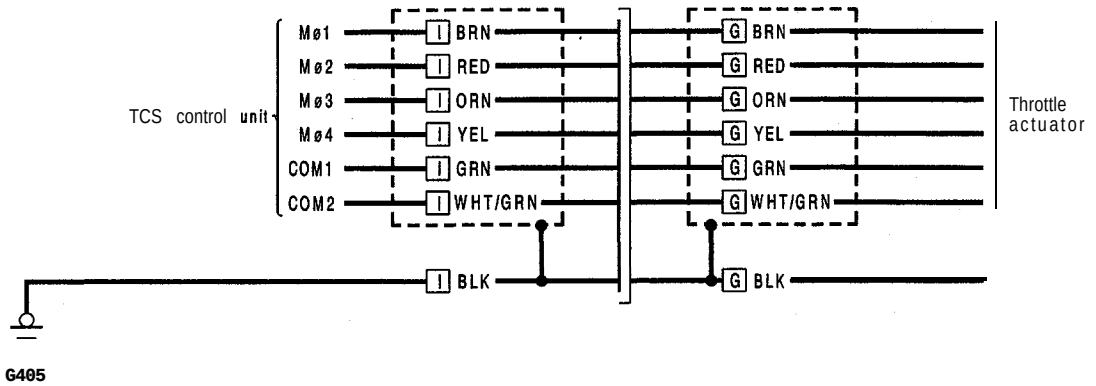
: Floor wire harness
: Driver's door wire harness
: Passenger's door wire harness

------- : Shielded wire

NOTE: See page 23-31 thru 33 for illustrated ground locations.







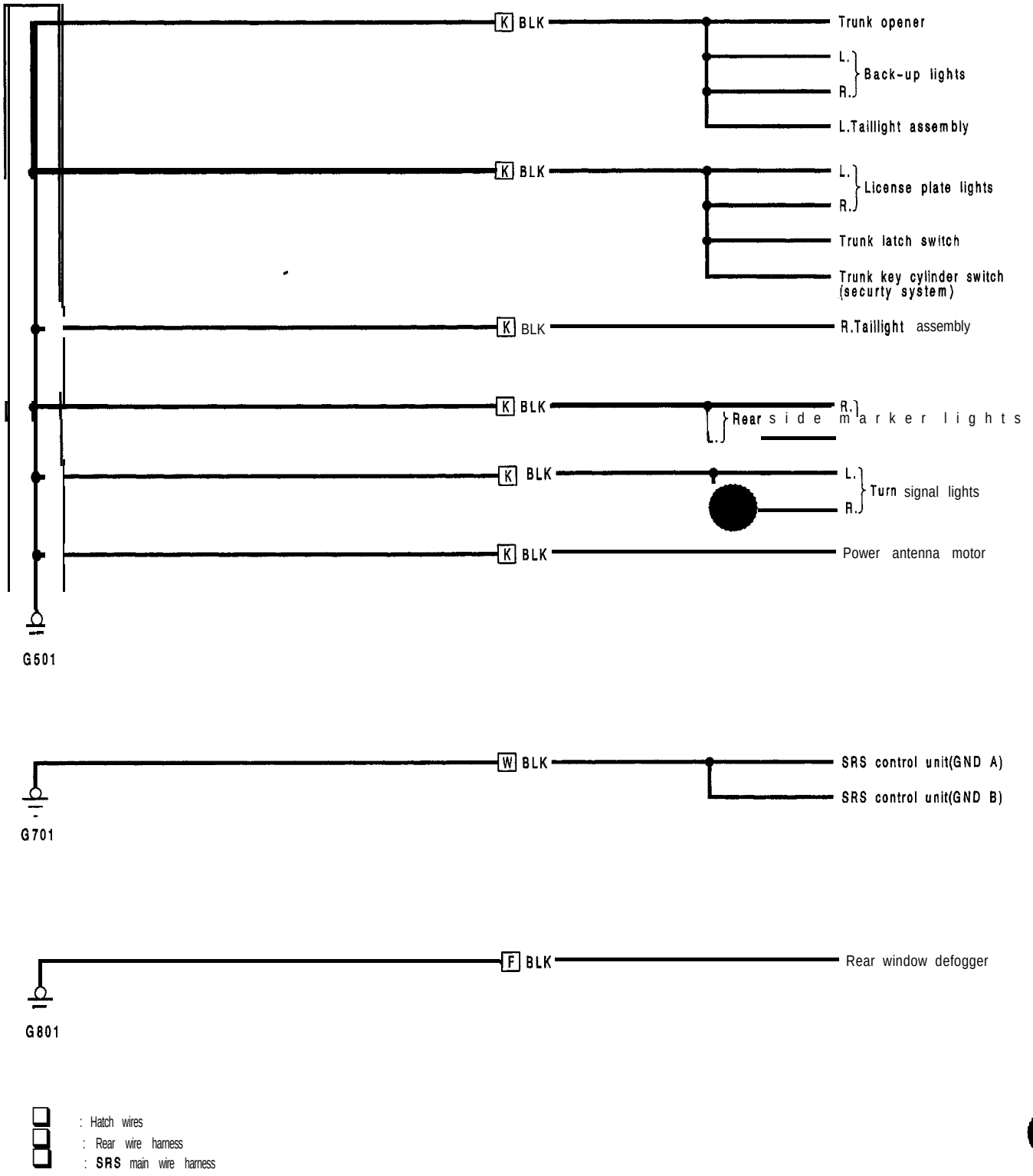
: Engine wire harness
: Front compartment wire harness
: Floor wire harness
: Passenger's power seat wire harness
: R.Retractor headlight wire harness
: L.Retractor headlight wire harness
: Fuel tank wires

(cont'd)

Ground Distribution

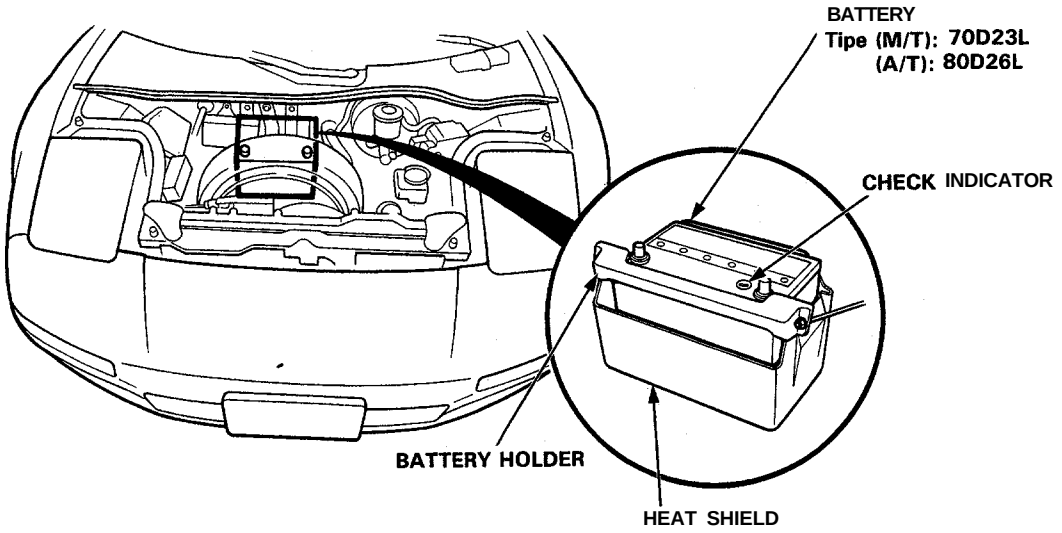
Circuit Indentification (cont'd)

NOTE: See page 23-38, 43 and 46 for illustrated ground locations.



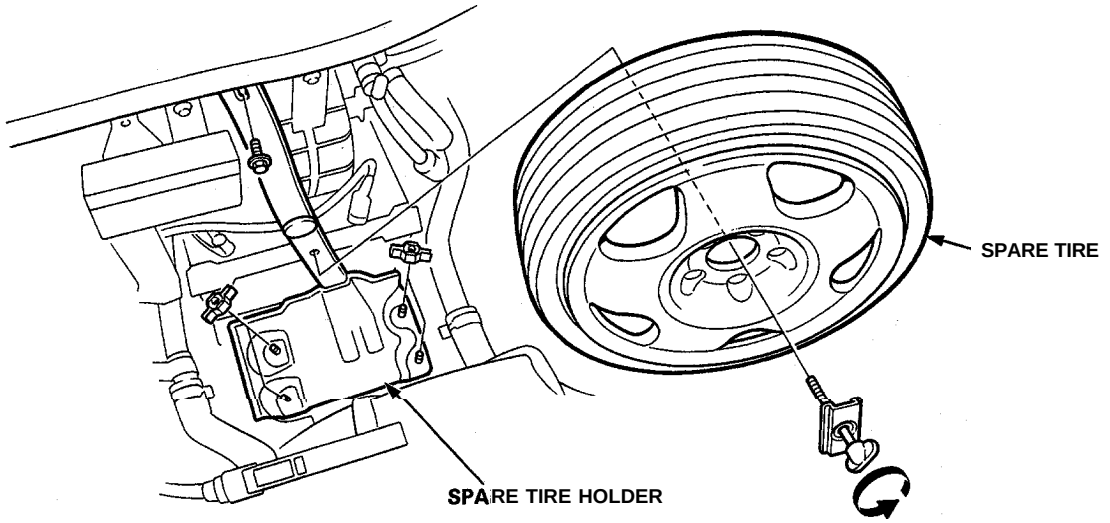
Battery .

Component Location Index



Replacement

1. Remove the spare tire and the spare tire holder.
2. **Disconnect both the negative cable and positive cable from the battery.**
3. **Remove the battery holder, then take out the battery.**



Battery

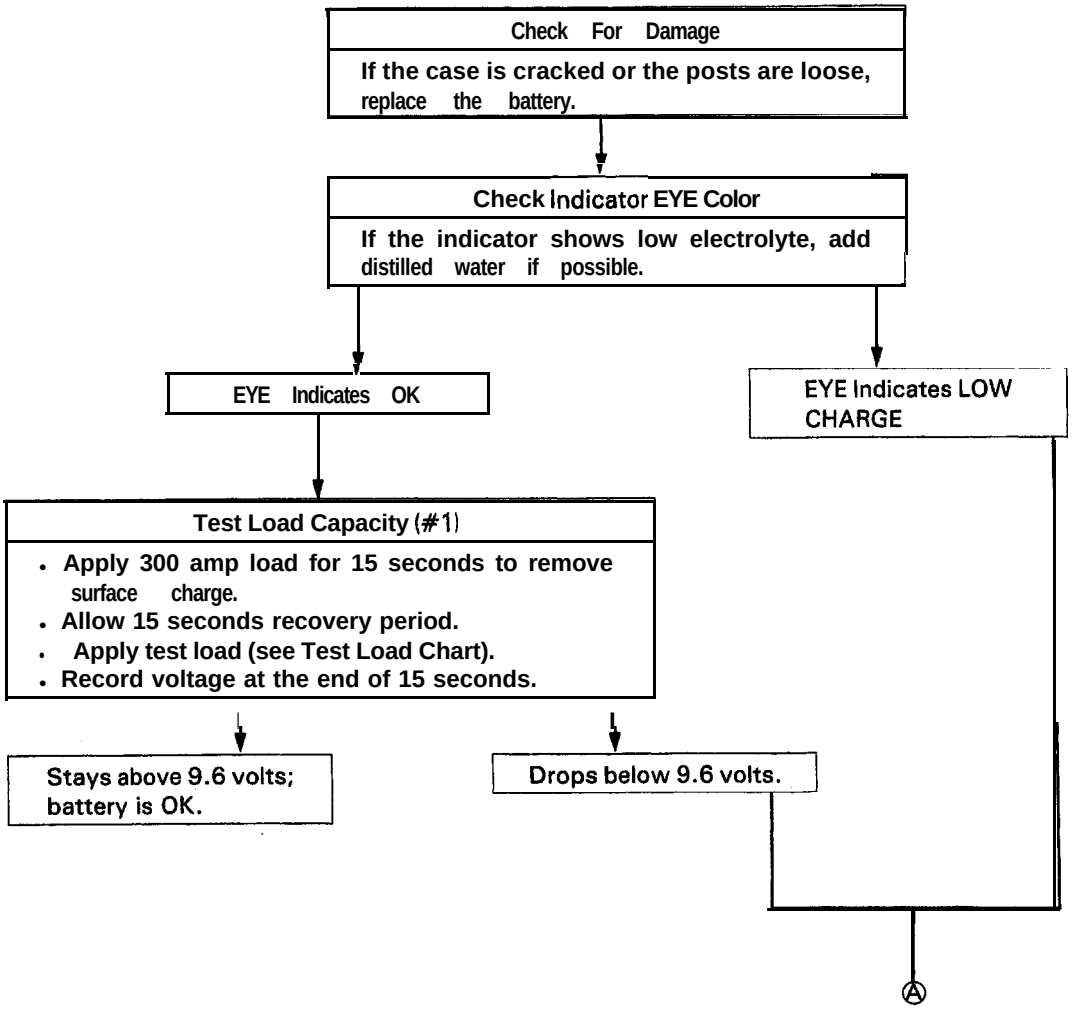
Test

⚠ WARNING

- **Batterv 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.**

If you're using a computerized battery tester, follow the test procedure provided with it. If you don't have a computerized tester, follow this conventional test produre:

To get accurate results, the temperature of the electrolyte must be between 21 °C (70°F) and 38°C (100°F).



Ⓐ

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 3 hours, the battery is no good; replace it.

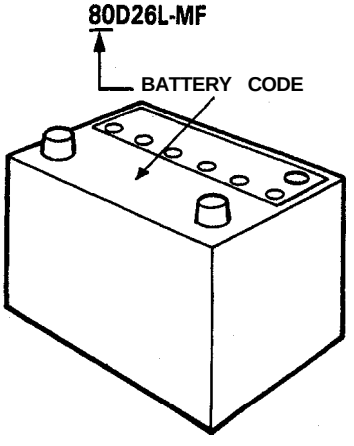
Write down how long battery was charged here: ☐ hrs. charged.

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.



LOAD TEST 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:**

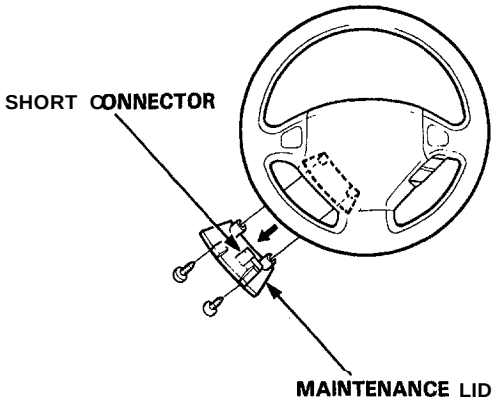
BATTERY CODE	COLD CRANKING AMPS (CCA)	LOAD (amps)
80	550	270
70	440	220

Dash Fuse Box

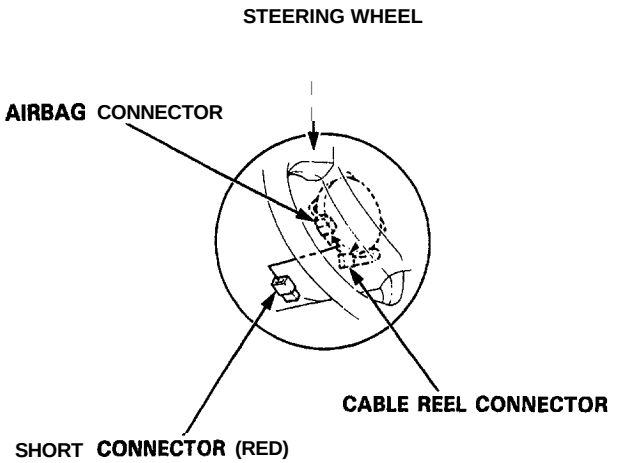
Removal/Installation

CAUTION;
- Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.
- Always keep the short connector on the airbag connector when the harness is disconnected.

Removal:
1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the maintenance lid A below the airbag, then remove the short connector.



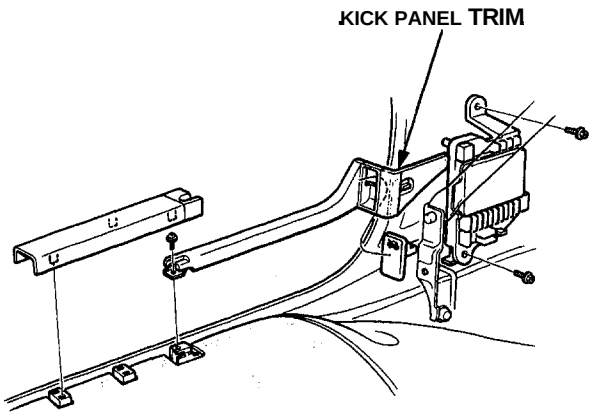
3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector to the airbag side of the connector.

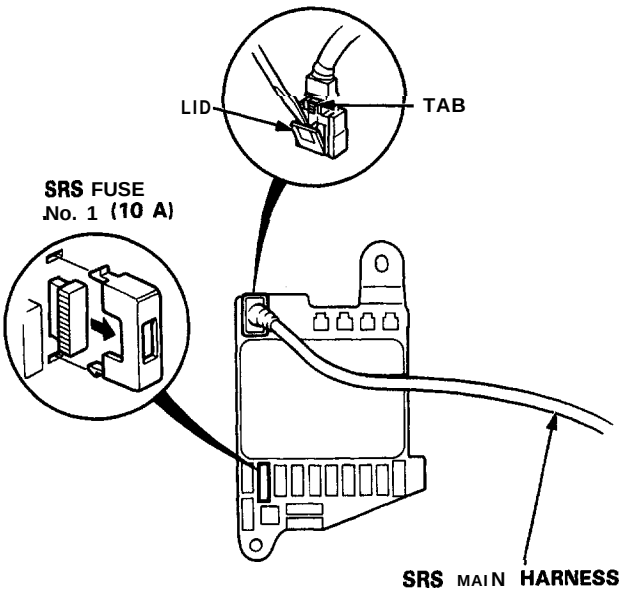


5. Remove the door sill molding.
6. Remove the kick panel trim pieces, as necessary.
7. Remove the fuse box mounting bolts.
8. Disconnect the fuse box connectors.

   NOTE: The SRS main harness connector is double locked. To remove it, first lift the connector lid with a thin screwdriver, then press the connector tab down and pull the connector out.

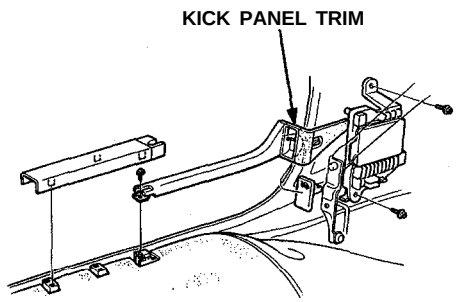
9. Take out the fuse box.





Installation:

1. **Install the dash fuse box.**

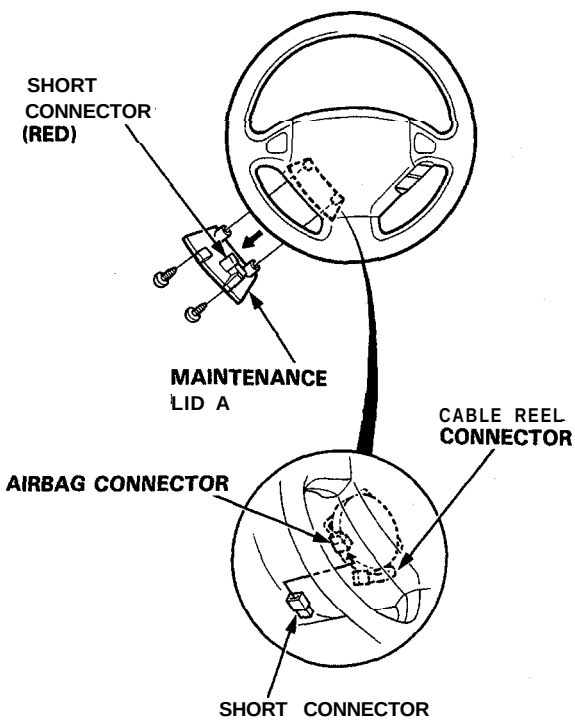


2. **Connect the connectors to the dash fuse box.**

   NOTE: To reinstall the SRS main harness connector, push it into position until it clicks, then close the connector lid.

3. Install the kick panel trim pieces.

4. **Disconnect the short connector from the airbag.**



5. Connect the airbag 2-P connector and cable reel 2-P connector.

6. **Attach the short connector to the lid A and attach to the steering wheel.**

7. Connect both the negative cable and positive cable **to the battery.**

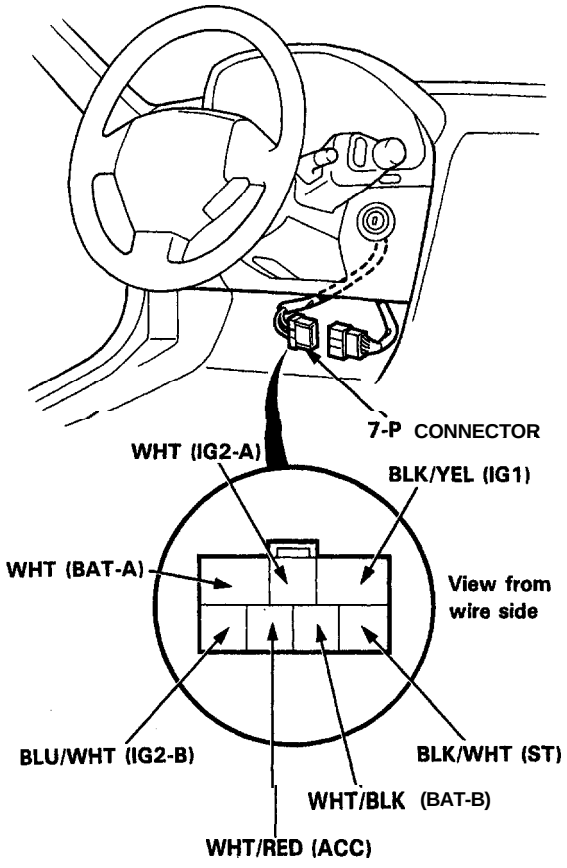
8. **After installing the dash fuse box, confirm that all** systems work properly.

Ignition Switch

Test

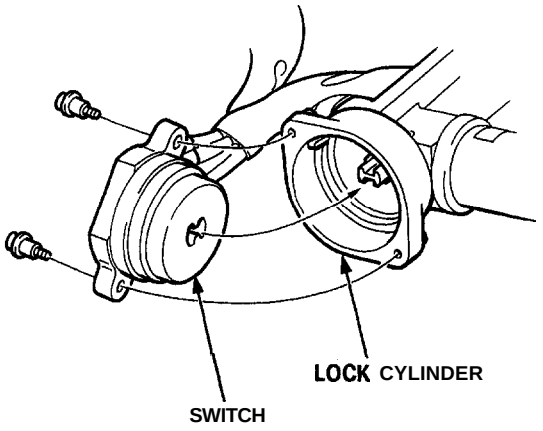
1. Remove the dashboard lower panel. (See page 23-I 28)
2. Disconnect the 7-P connector from the floor wire harness.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	WHT/ RED (ACC)	WHT/ BLK (BAT-B)	BLU/ WHT (IG2-B)	WHT (BAT-A)	BLK/ YEL (IG1)	WHT (IG2-A)	BLK/ WHT (ST)
0							
I	o—o						
II	o—	—o		o—		—o	
III				o—			—o



Electrical Switch Replacement

1. Remove the dashboard lower panel. (See page 23-I 28)
2. Disconnect the 7-P connector from the floor wire harness.
3. Insert the key and turn it to "0".
4. Remove the 2 screws and replace the switch.

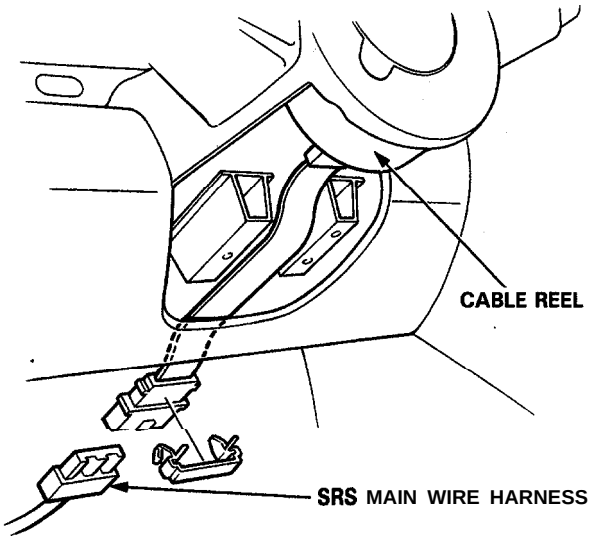


Steering Lock Replacement

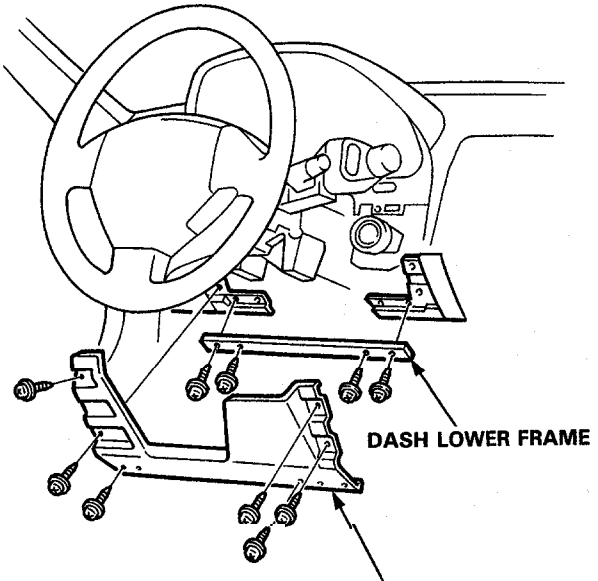
SRS wire harness is routed near the steering lock assembly.

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not electrical test equipment on these circuit.

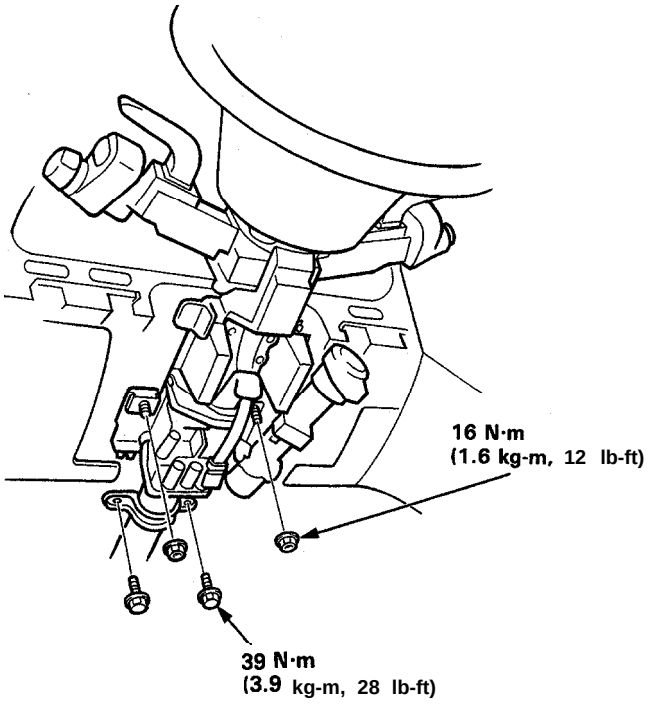
CAUTION: Be careful not to damage the SRS wire harness when servicing the steering lock.



1. Remove the dashboard lower and center panels.
2. **Remove the steering column covers.**
3. Remove the knee bolster and dash lower frame.
4. **Disconnect the 7-P and 6-P connectors.**



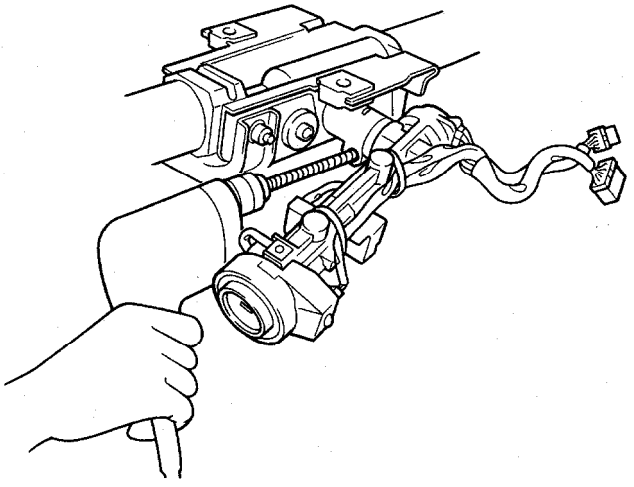
4. **Remove the column holder mount bolts.**
5. **Remove the mounting nuts.**



6. Lower the steering column assy.
7. Center punch each of the shear bolts and drill their **heads off with a 3/16 in. drill bit.**

CAUTION: Do not damage the switch body when removing the shear bolt head.

8. **Remove the shear bolts from the switch body.**



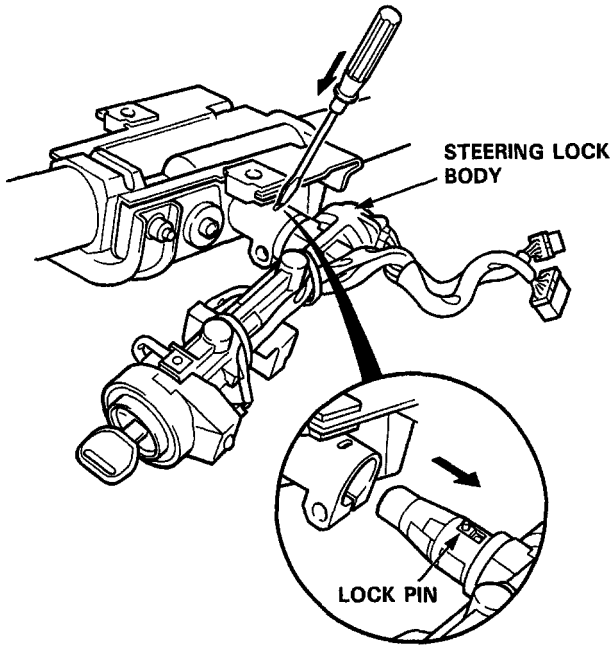
NOTE: The illustration shows A/T.

(cont'd)

Steering Lock Replacement (cont'd)

9. Insert the key and turn it to ''1''.

   NOTE: The illustration shows A/T.



10. Push the lock pin and pull out the steering lock assembly.

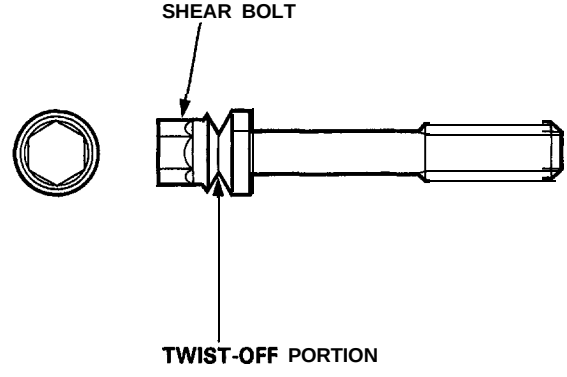
11. Turn the key to the ''1'', push the pin and insert the steering lock assembly into the steering column until the clicks into place.

12. Loosely tighten the new shear bolt.

    NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.

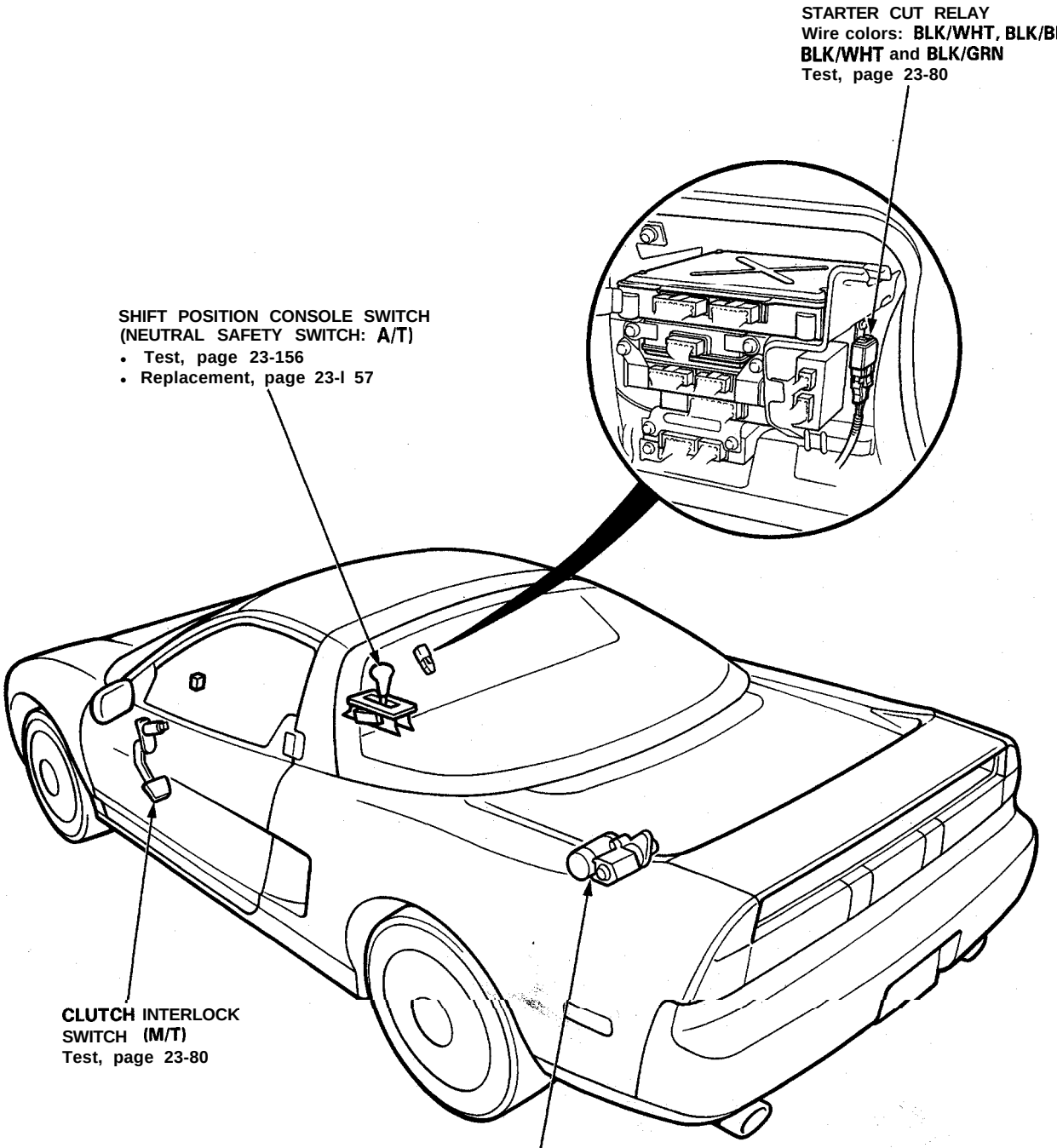
13. Insert the ignition key and check for proper operation of the steering wheel lock and that ignition key turns freely.

14. Tighten the shear bolts until the hex heads twist off.



Starting System

Component Location Index



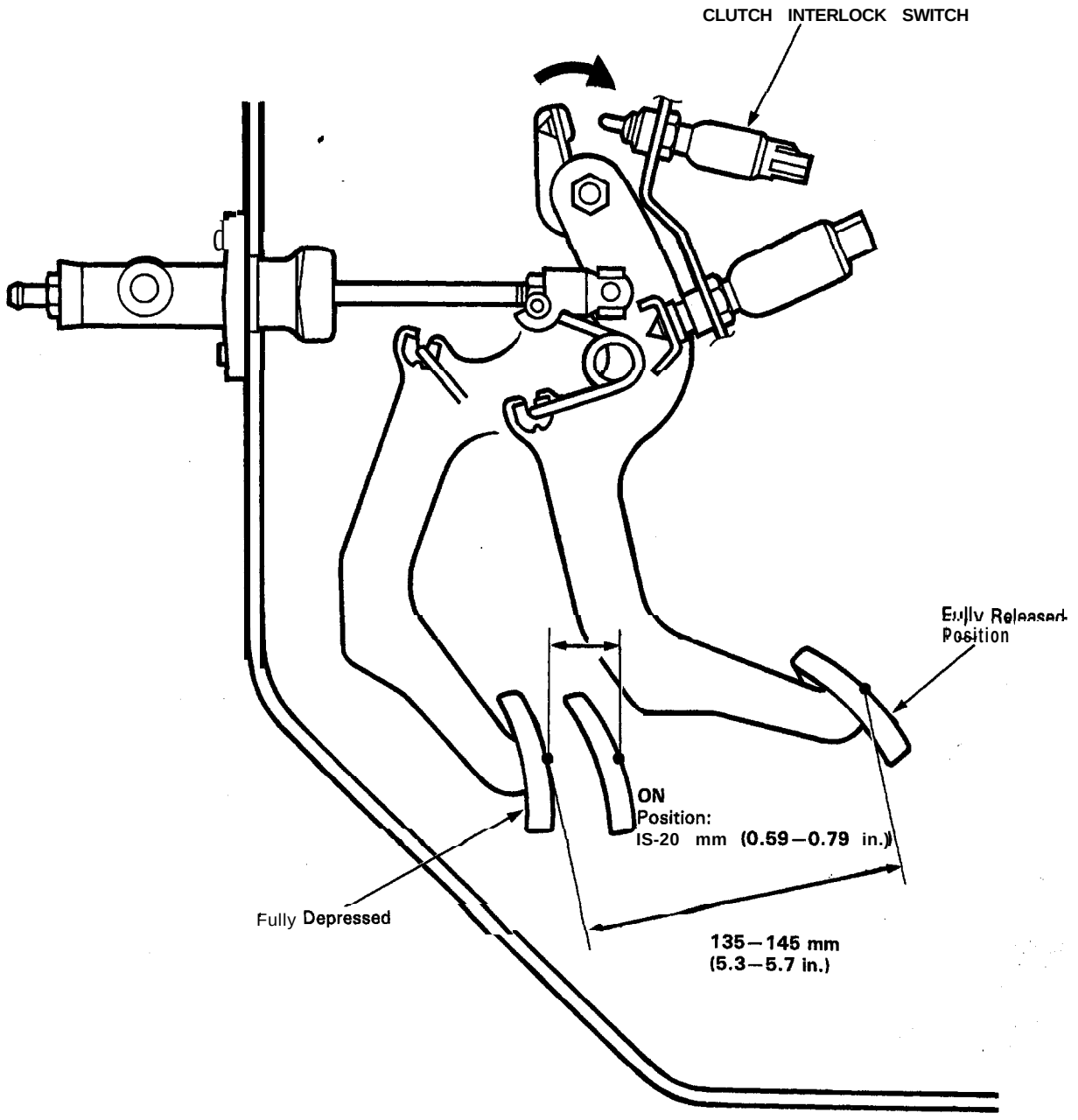
Starting System

Description

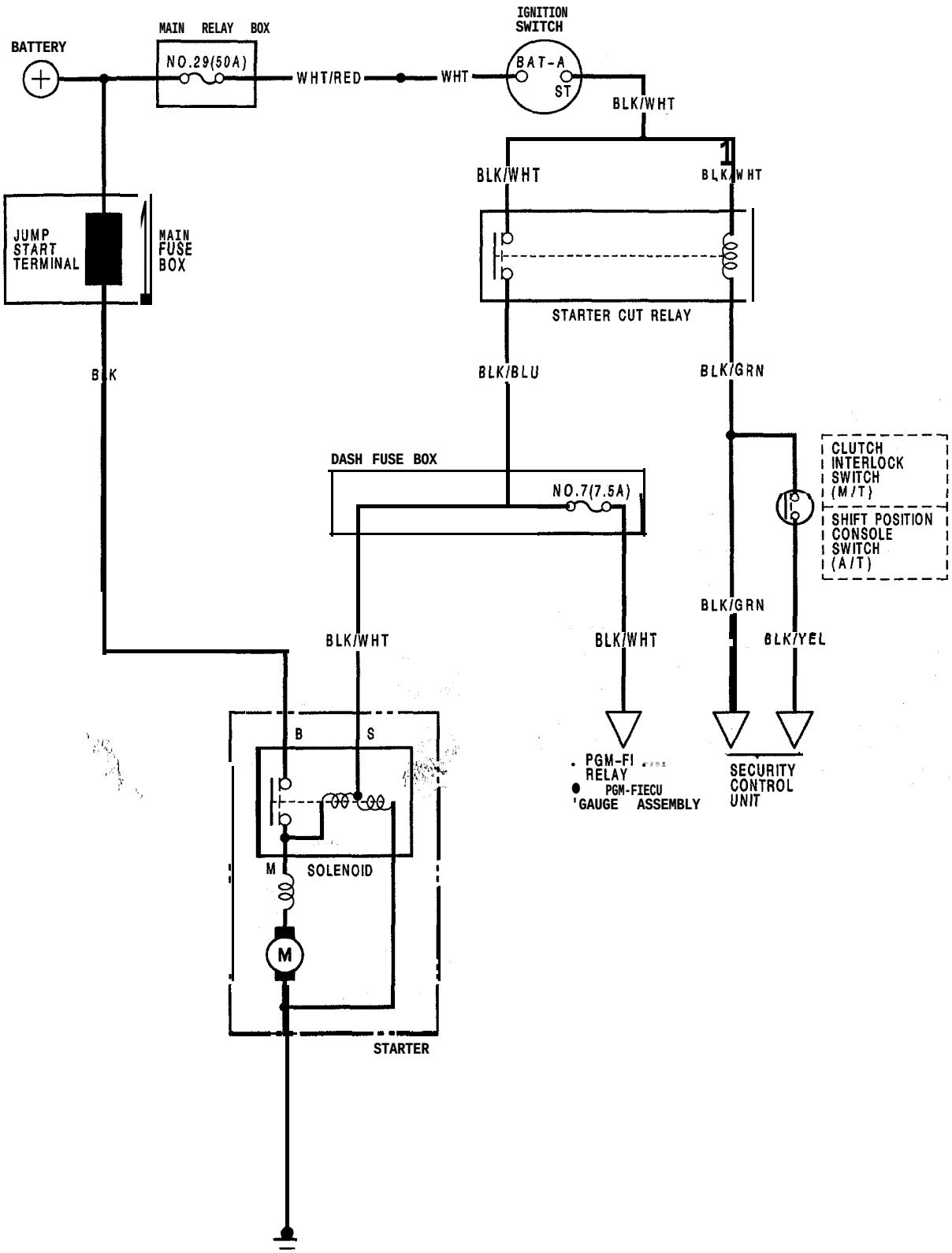
Starter interlock System (M/T only):
The starter interlock system prevents the engine from starting unless the clutch pedal is fully depressed.

The clutch interlock switch turns on at the position where the clutch disengages: 15-20 mm (0.59-0.79 in) from fully depressed position.

NOTE: Full stroke of clutch pedal is 135-145 mm (5.3-5.7 in) from fully released position.



Circuit Diagram



Starter Test

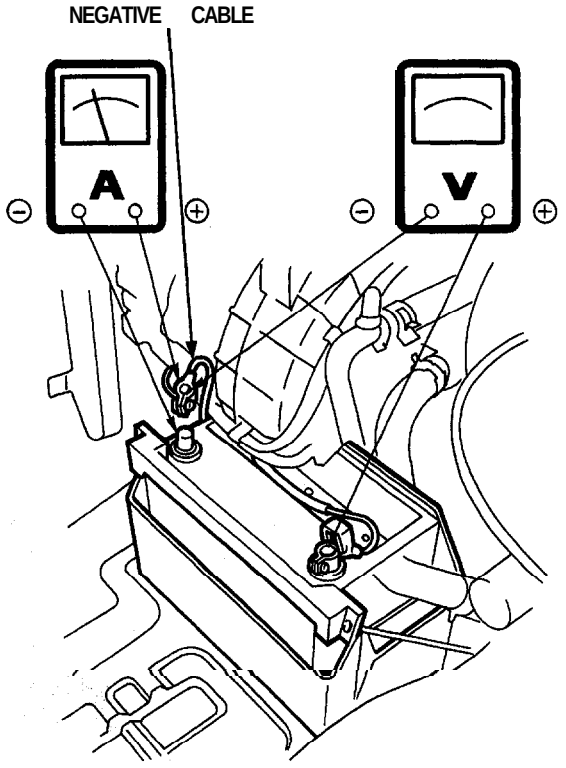
NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

Recommended Procedure:

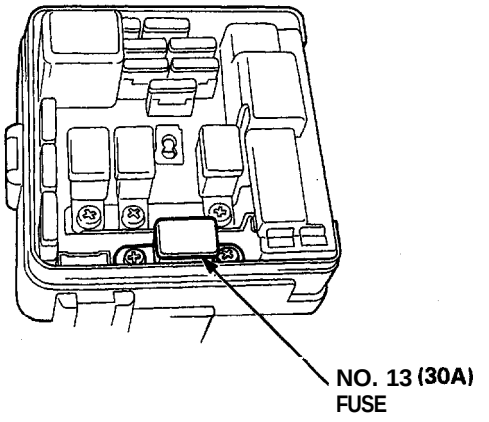
Use a starter system tester.
Connect and operate the equipment in accordance with manufacturer's instrucions.
Test and trobleshoot as described.

Alternate Procedure:

- Use the following equipment:
  - Ammeter, O-400A
  - Voltmeter, 0-20V (accurate within 0.1 volt)
  - Tachometer, O-1200 rpm
- Hook up voltmeter and ammeter as shown.

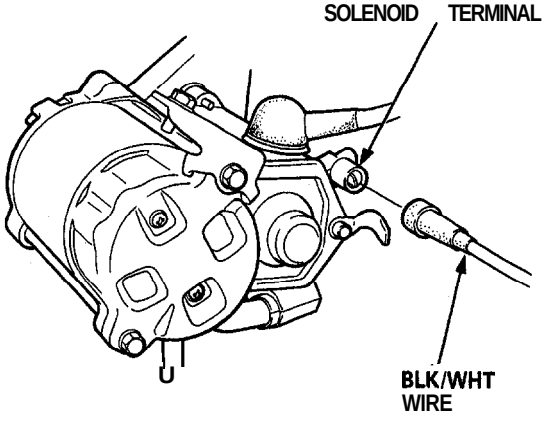


1. Disconnect the No. 13 (30A) fuse from the main fuse box.



2. Check the starter engagement:
   Press the clutch pedal all the way (M/T only), and turn the ignition switch to "Start." The starter should crank the engine.
   NOTE: On cars equipped with manual transmission, the engine will not crank unless the clutch pedal is fully depressed.

- If the starter still does not crank the engine, check the battery, battery positive cable, ground and the wire connections for looseness or corrosion.
- Test again.
  If the starter still does not crank the engine, bypass the ignition switch circuit as follows:
  Unplug the connector (BLK/WHT wire) from the starter. 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 the starter and diagnose its internal problems.

– If the starter cranks the engine, check for an open in the BLK/WHT wire circuit between the starter and ignition switch, and connectors. Check the ignition switch.
On cars with automatic transmission, check the shift position console switch (neutral safety switch) and connector.
On cars with manual transmission, check the starter relay, clutch interlock switch and connectors.

NOTE: Check the No. 29 (50A) fuse and the starter cut relay, and investigate the security alarm system.

3. Check for wear or damage:
The starter should crank the engine smoothly and steadily.

If the starter engages, but cranks the engine erratically, remove the starter motor. Inspect the starter, drive gear and flywheel ring gear for damage.
Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

4. Check cranking voltage and current draw:
Voltage should be no less than 8.5 volts.
Current should be no more than 350 amperes.

If voltage is too low, or current draw too high, check for:

- Battery fully charged.
- Open circuit in starter armature commutator segments.
- Starter armature dragging.
- Shorted armature winding.
- Excessive drag in engine.

5. Check cranking rpm:
Engine speed during cranking should be above 100 rpm.

- 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.

6. Check the starter disengagement:
Press the clutch pedal all the way (M/T only), turn the ignition switch to "Start" and release to "Run." The starter drive gear should disengage from the flywheel ring gear.

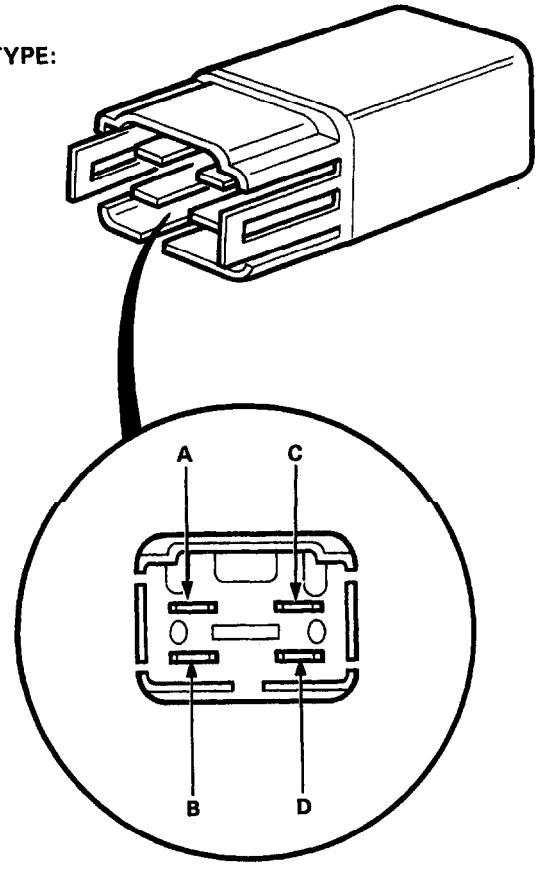
If the drive gear hangs up on the flywheel ring gear, check for:

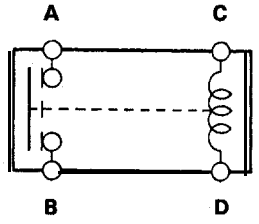
- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirt or damaged overuning clutch.

Starter Cut Relay Test

1. Remove the glove box (See section 20).
2. Disconnect the 4-P connector from the starter cut relay.
   (Wire colors of 4-P connector: BLK/GRN, BLK/WHT, BLK/BLU and BLK/WHT)
3. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

A-TYPE:

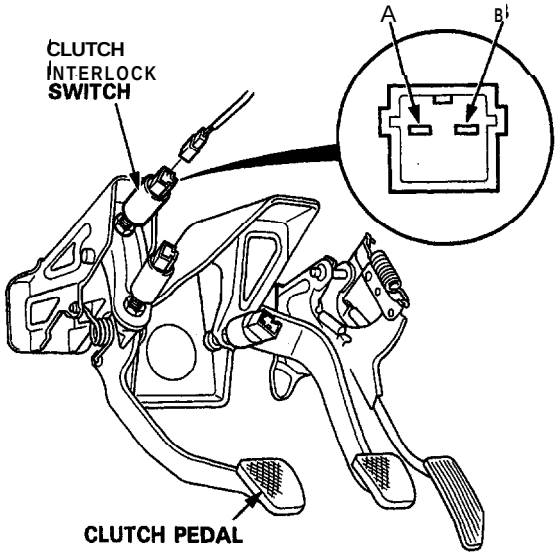




Clutch Interlock Switch Test (M/T)

1. Remove the dashboard lower panel and knee bolster, then disconnect the 2-P connector from the switch.
2. Check for continuity between the terminals according to the table.

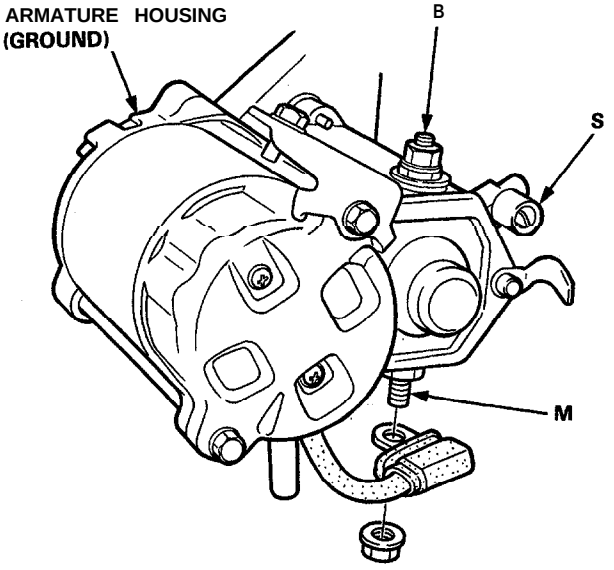
Terminal / Clutch Pedal	A	B
RELEASED		
PUSHED		

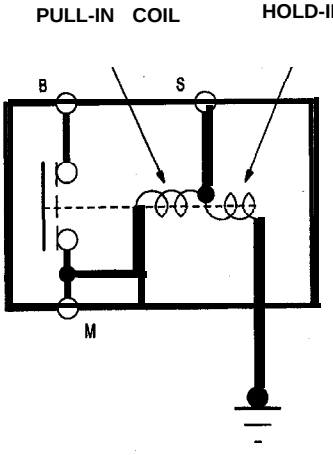


3. If necessary, replace the switch or adjust the switch position (see section 12).

Starter Solenoid Test

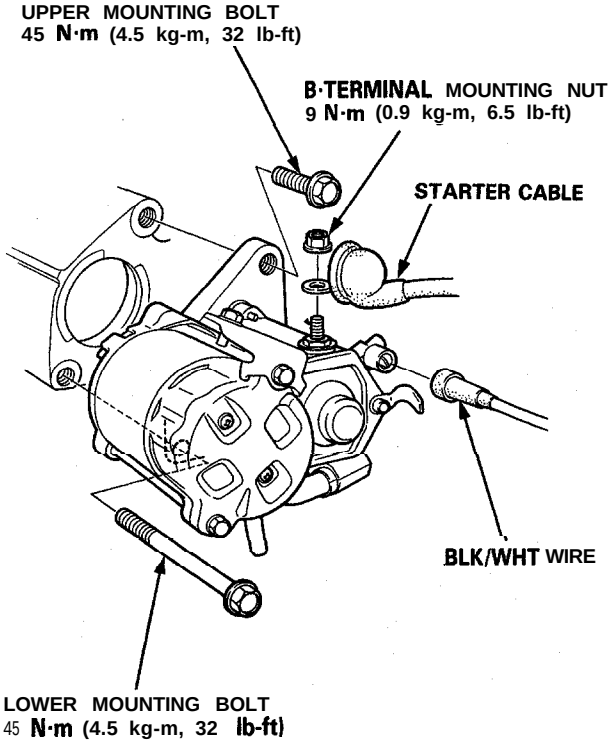
1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground).
   Coil is OK if there is continuity.
2. Check the pull-in coil for continuity between the S and M terminals.
   Coil is OK if there is continuity.





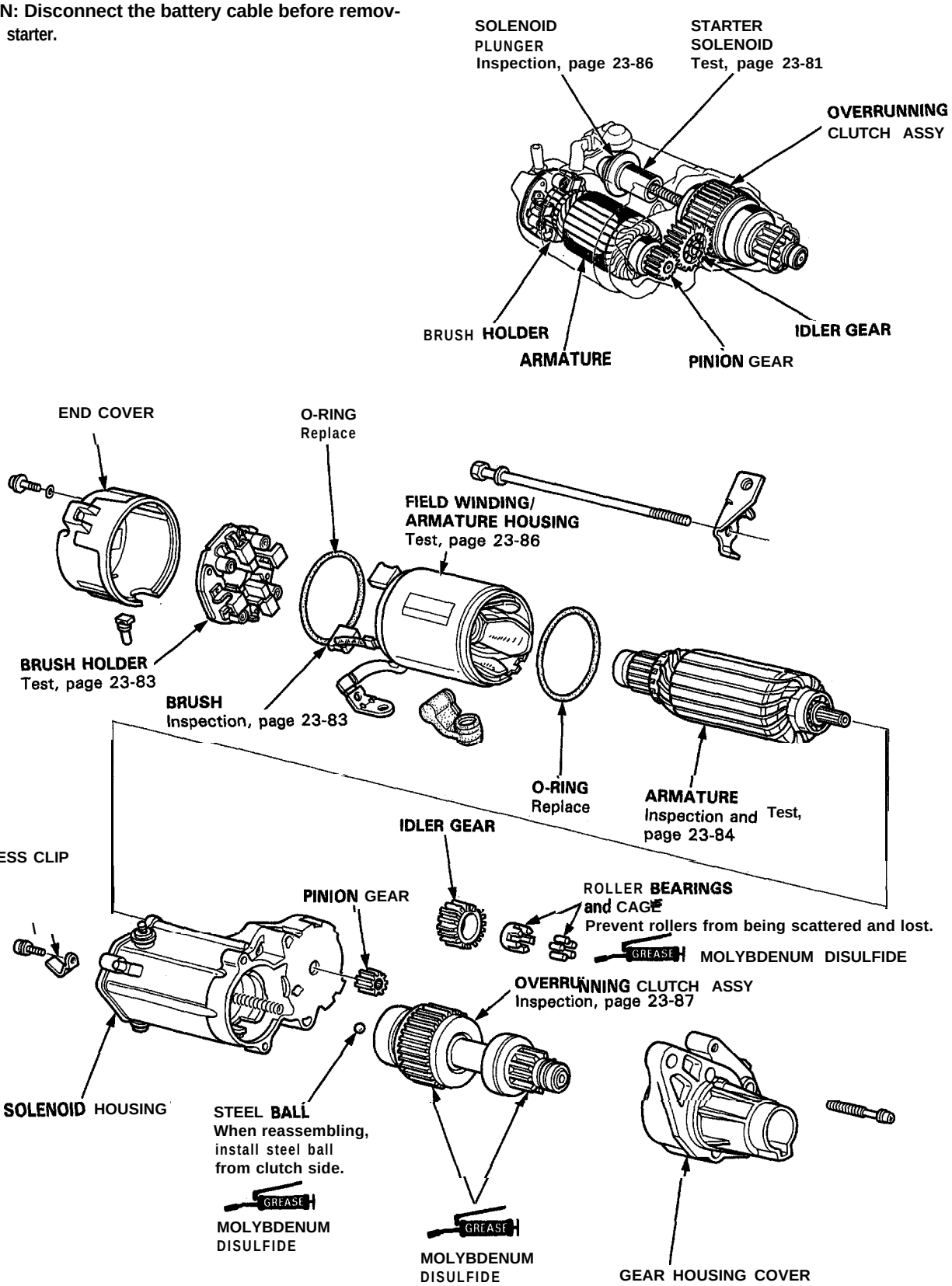
Starter Replacement

1. Disconnect the battery negative (–) cable.
2. Remove the engine wire harness from the harness clip on the starter motor.
3. Disconnect the starter cable from the B terminal on the solenoid, and the BLK/WHT wire from the S terminal.
4. Remove the 2 bolts holding the starter, and remove the starter.



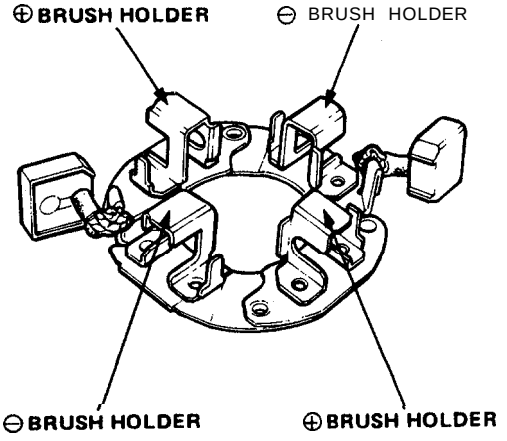
Starter Overhaul

CAUTION: Disconnect the battery cable before removing the starter.



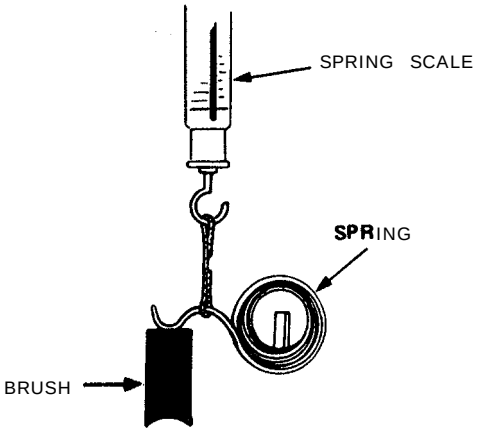
Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.
   If continuity exists, 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: 19-24 N (1.9-2.4 kg, 4.2-5.3 lb)

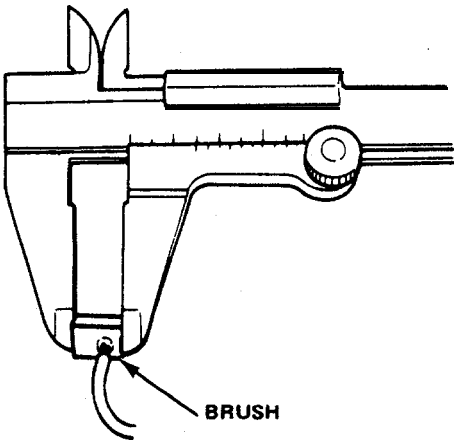


Starter Brush Inspection

Measure the brush length. If not within the service limit, replace the armature housing and brush holder assembly.

Brush Length

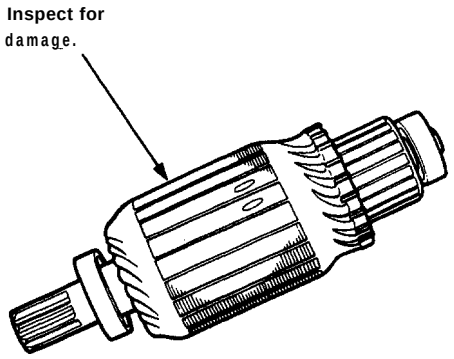
Standard (New): 15.0– 15.5 mm (0.59-0.61 in)
Service Limit : 10.0 mm (0.39 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sand paper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.

Armature Inspection and Test

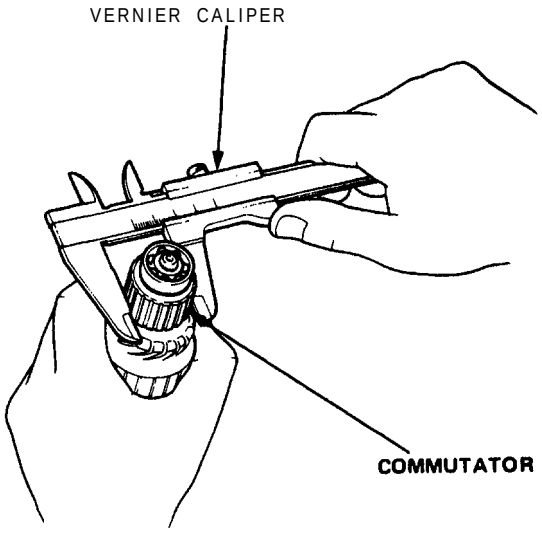
1. **Inspect the armature for wear or damage due to** contact with the field coil magnets.



2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

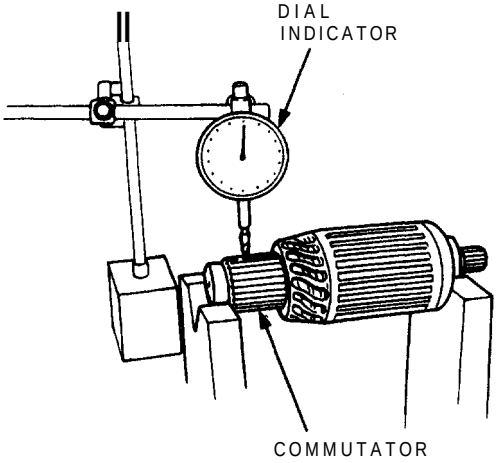
Commutator Diameter

Standard (New): 29.9-30.0 mm (1.177–1.181 in)
Service Limit : 29.0 mm (1.14 in)



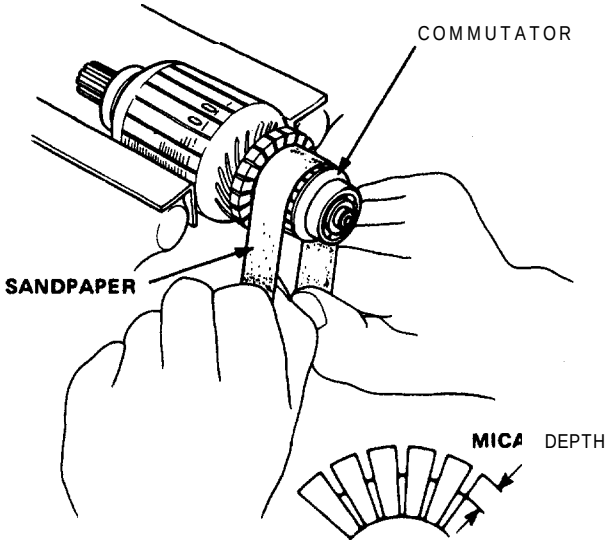
Commutator **Runout**

Standard (New): O-0.02 mm (O-0.0008 in)
Service Limit : 0.04 mm (0.0016 in)



3. **If the commutator runout and diameter are within limits, check the commutator for damage or for** carbon dust or brass chips between the segments.

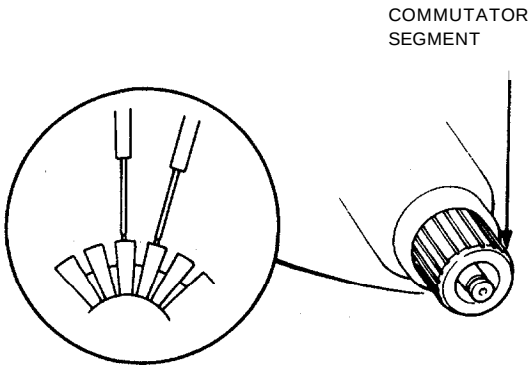
4. **If surface is dirty, recondition it with a #500 or #600** sandpaper. Then, check mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth.



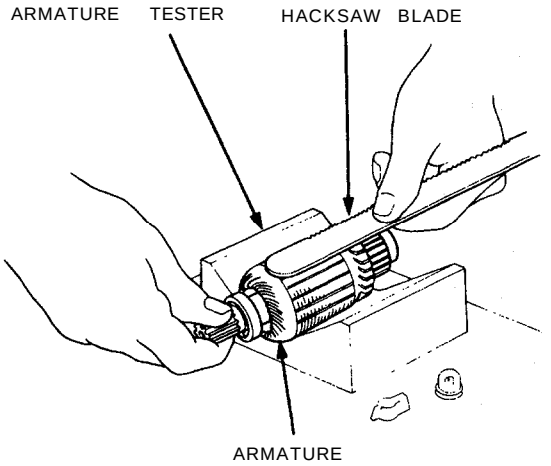
Commutator Mica Depth

Standard (New): 0.5-0.8 mm (0.019-0.031 in)
Service Limit : 0.2 mm (0.008 in)

5. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.

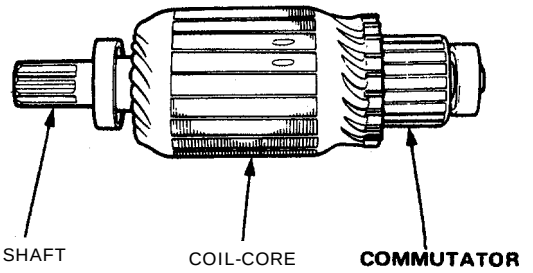


6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



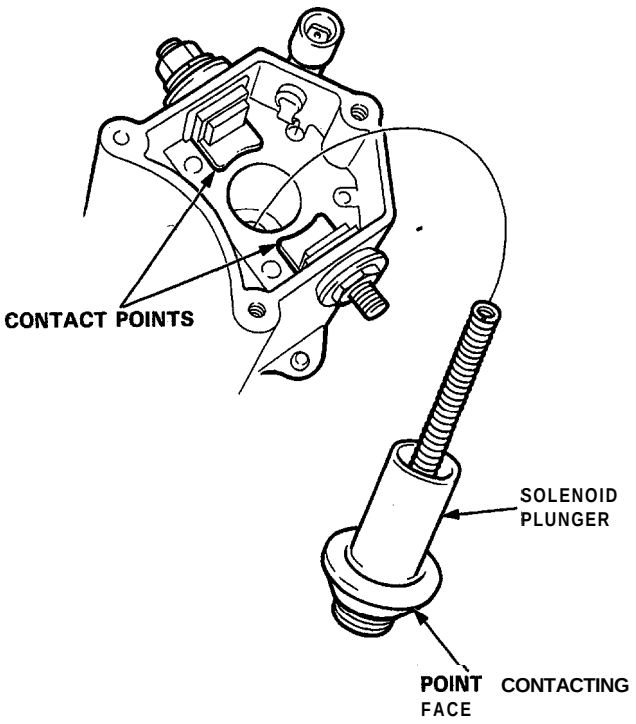
If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

7. With an ohmmeter, check that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



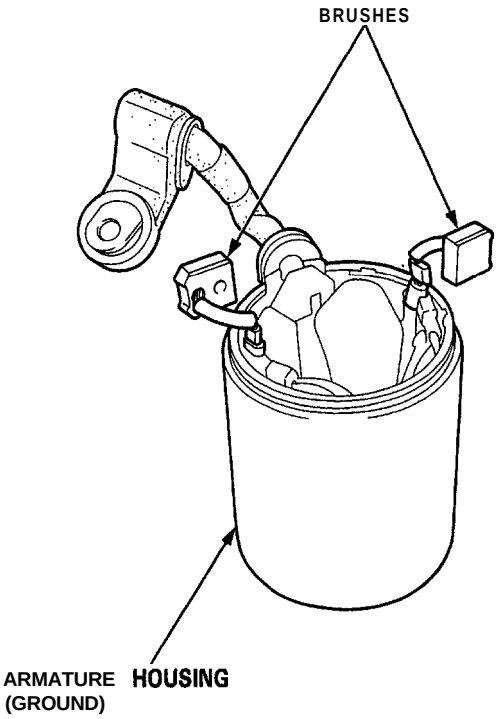
Solenoid Plunger Inspection

Check the contact points, and the face of the starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recordition with a strip of # 500 or # 600 sandpaper.



Starter Field Winding Test

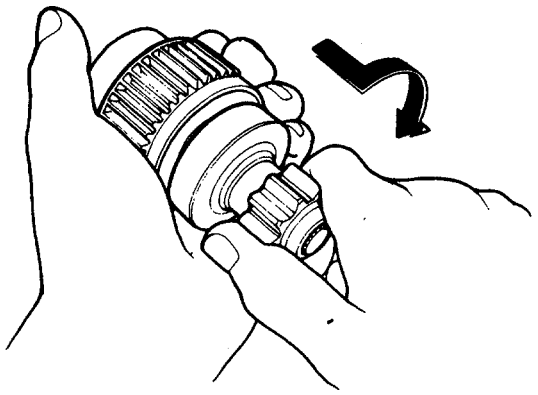
1. Check for continuity between the brushes. If there's no continuity, replace the armature housing.
2. Check for continuity between each brush and the armature housing (ground).
   If continuity exists, replace the armature housing.



Overrunning Clutch Inspection

Move the overrunning clutch along the shaft.

If it doesn't move freely, or if the clutch slips when the armature is rotated while holding the drive gear, replace the clutch assembly.



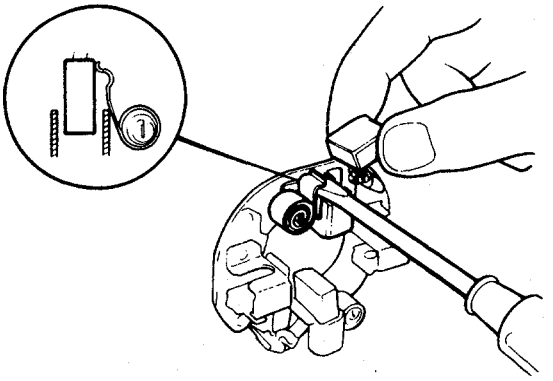
If the gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

NOTE: Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

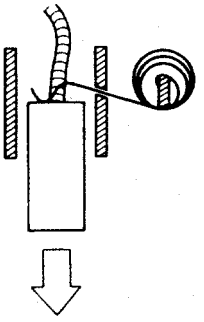
Starter Reassembly

Reassemble the starter in the reverse order of disassembly.

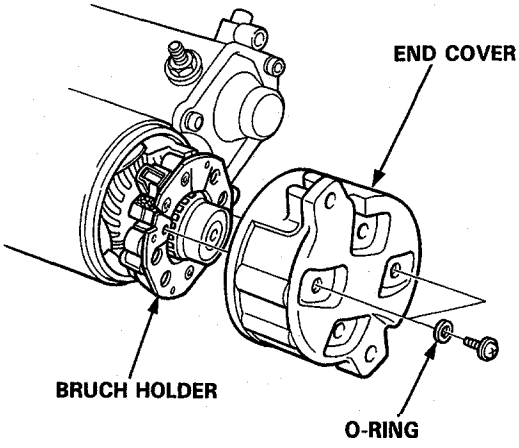
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



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.

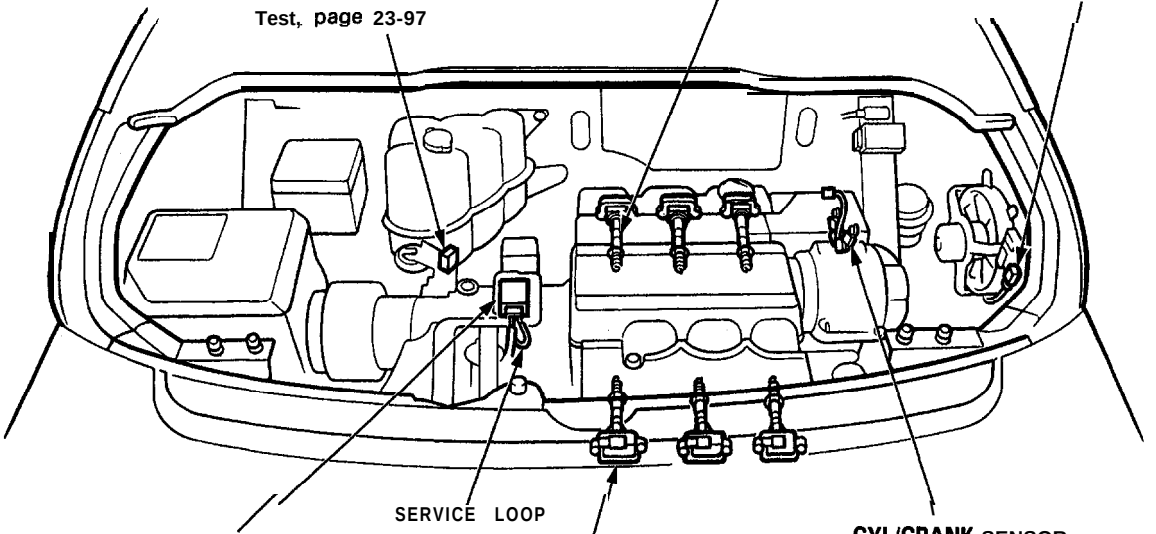


3. Install the end cover on the brush holder.



Component Location Index

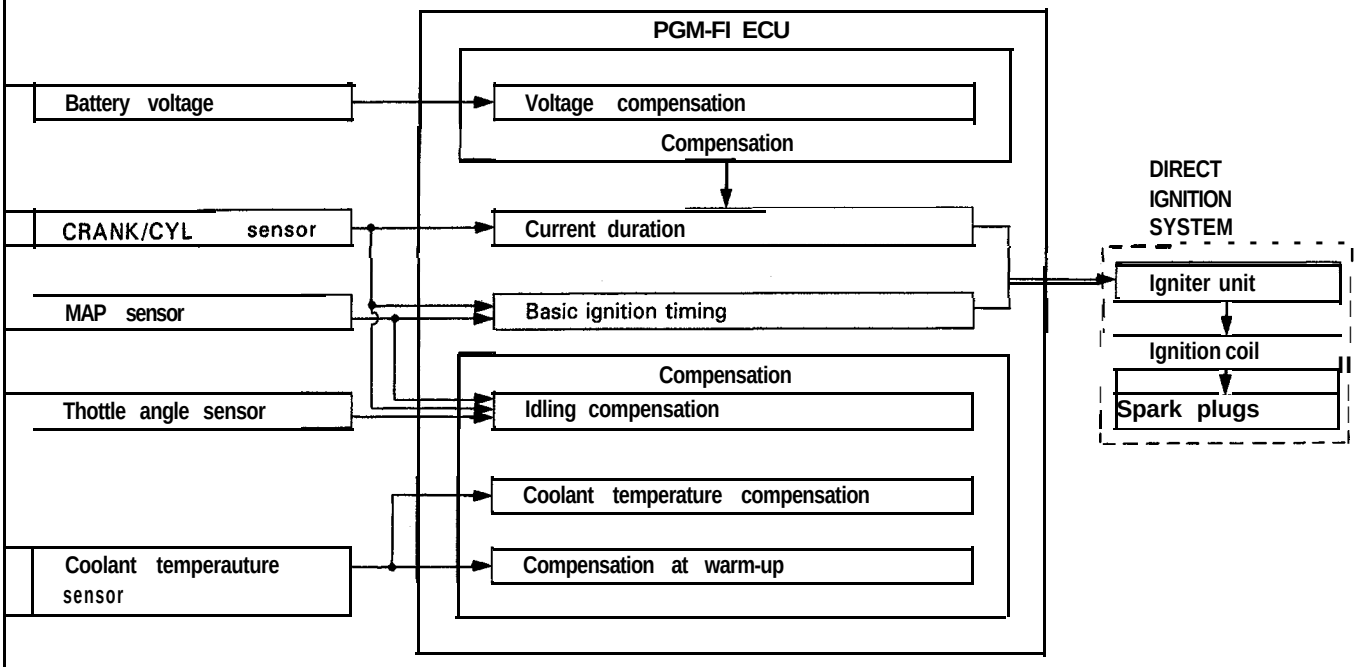
IGNITION TIMING CONTROL SYSTEM
- **Troubleshooting, section 11**
- **Inspection and setting, page 23-91**
- **Description, page 23-89**



Description

ignition Timing Control:

The programmed ignition (PGM-IG) employed in this engine provides optimum control of ignition timing by determining the optimum timing using a microcomputer in response to engine speed and vacuum pressure in the intake manifold, which are transmitted by signals from CRANK/CYL sensor, throttle angle sensor, coolant temperature sensor and MAP sensor. This system, not dependent on a governor or vacuum diaphragm, is capable of setting lead angles with complicated characteristics which cannot be provided by conventional governors.



Basic Control

Determination of ignition timing/current duration:

The control unit has stored within it the optimum basic ignition timing for operating conditions based upon engine speed and intake manifold pressure. With compensation by signals from sensors, the system determines optimum timing for ambient conditions and sends voltage pulses to the igniter unit.

Compensation of ignition timing:

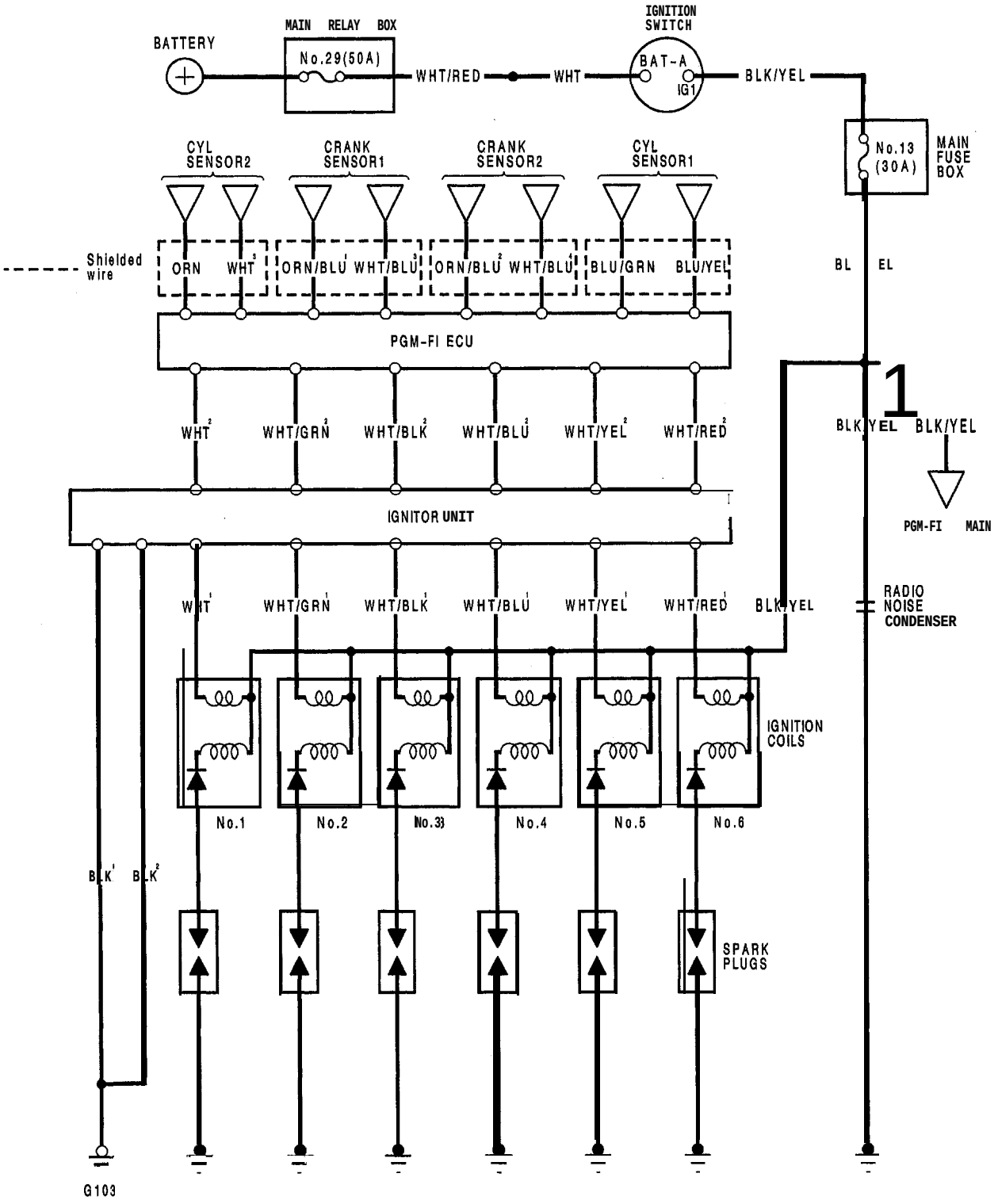
Compensation Item	Related Sensor and Information	Description
Iding	CRANK/CYL sensor MAP sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.
Compensation at warm-up	Coolant temperature sensor	Lag angle is adjusted in accordance with the warming up conditions to bring about a good balance between operating performance and exhaust gas level.
Coolant temperature compensation	Coolant temperature sensor	Compensation for lead angle at low coolant temperature and lag angle at high coolant temperature.

Control at Start

Ignition timing is fixed at BTDC 15° for cranking. The cranking is detected by the CYL sensor (cranking revolution) and starter signal.

Circuit Diagram

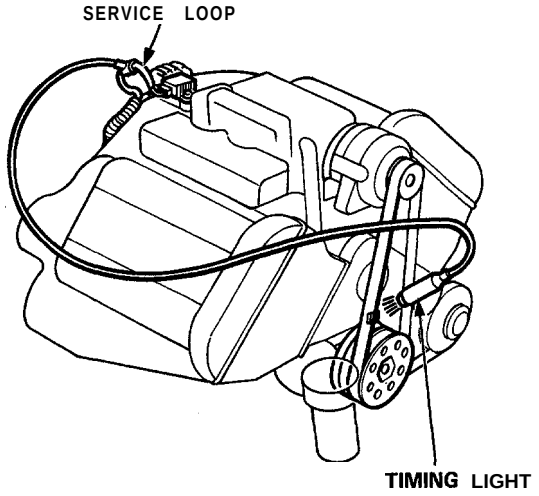
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example WHT^1 and WHT^2 are not the same).



- Ignition Timing Inspection and Setting

1. Start the engine and allow it to warm up (cooling fan comes on).

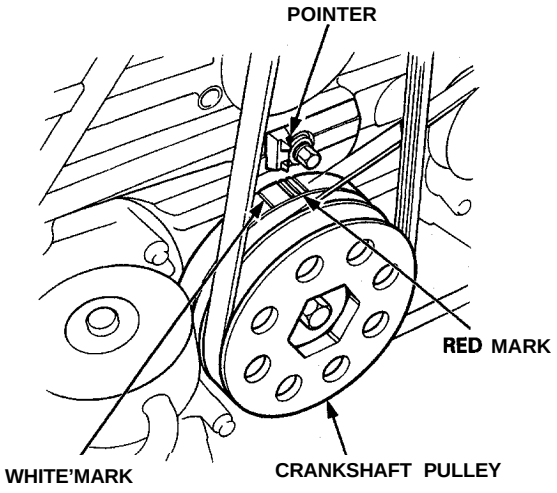
2. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the timing belt cover.



3. Inspect ignition timing at idle.

   Ignition Timing: 15° ± 2° BTDC (RED)

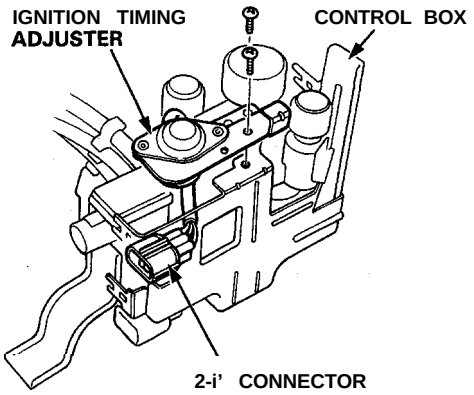
   - Manual Trasmission [at BOO ± 50 min^{-1} (rpm) in neutral]
   - Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]



4. Adjust ignition timing, if necessary, by turning the adjusting screw on the ignition timing adjuster in control box.

5. Remove the control box cover.

6. Remove the 2 screws from the control box then disconnect the 3-P connector from the ignition timing adjuster.

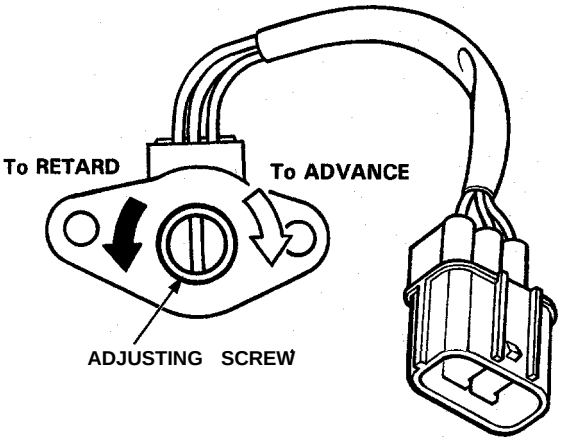


7. Remove the ignition timing adjuster from the control box.

8. Drill the 2 rivets off with a 3/16 in. drill bit, then separate the stay cover from the adjuster.

   CAUTION: Do not damage the adjuster when removing the rivets.

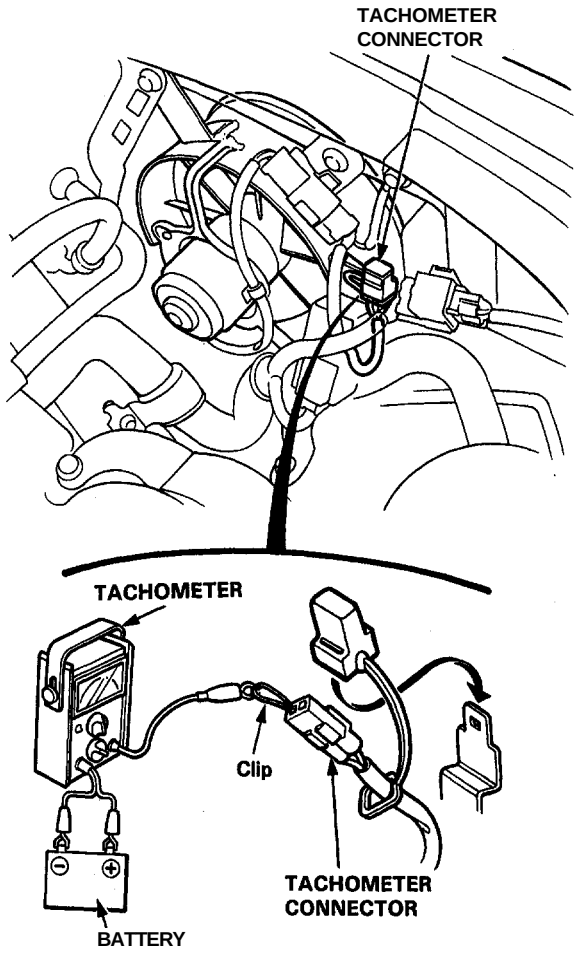
   - Re-connect the adjuster to the car, start the engine, and turn the adjusting screw counterclockwise to retard the timing, or clockwise to advance it, as necessary.



9. After adjusting, reinstall the stay cover to the ignition timing adjuster with new rivets, then reinstall the adjuster to the control box.

- Idle Speed Inspection

1. Start the engine and allow it to warm up (cooling fan comes on).
2. Connect a tachometer to the tachometer connector.



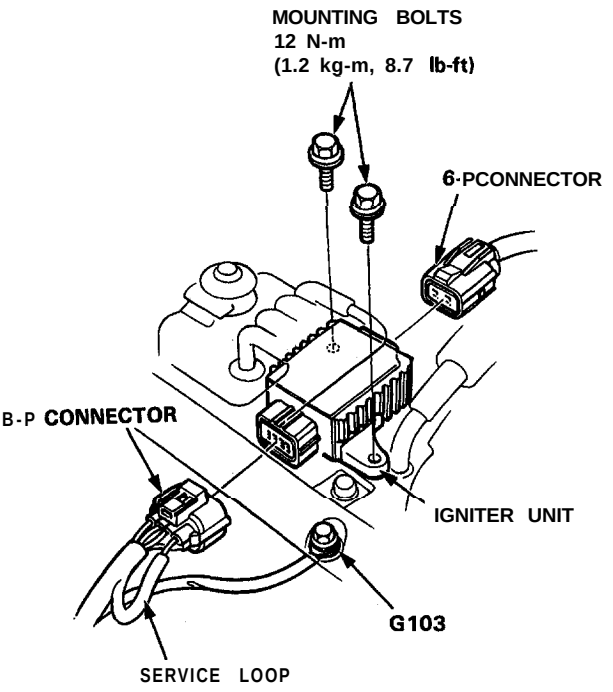
Idle speed:
M/T: 800 ± 50 min⁻¹ (rpm) in neutral
AK: 750 ± 50 min⁻¹ (rpm) in gear

3. Ajust the idle speed, if necessary, see section 1 1.

- Igniter Unit Replacement

1. Disconnect the 8-P and 6-P connectors from the igniter unit.
2. Remove the 2 mounting bolts from the igniter unit.
3. Pry or slide the igniter unit pull out of the front side.

CAUTION: Be careful not to damage the vacuum hose when removing igniter unit.

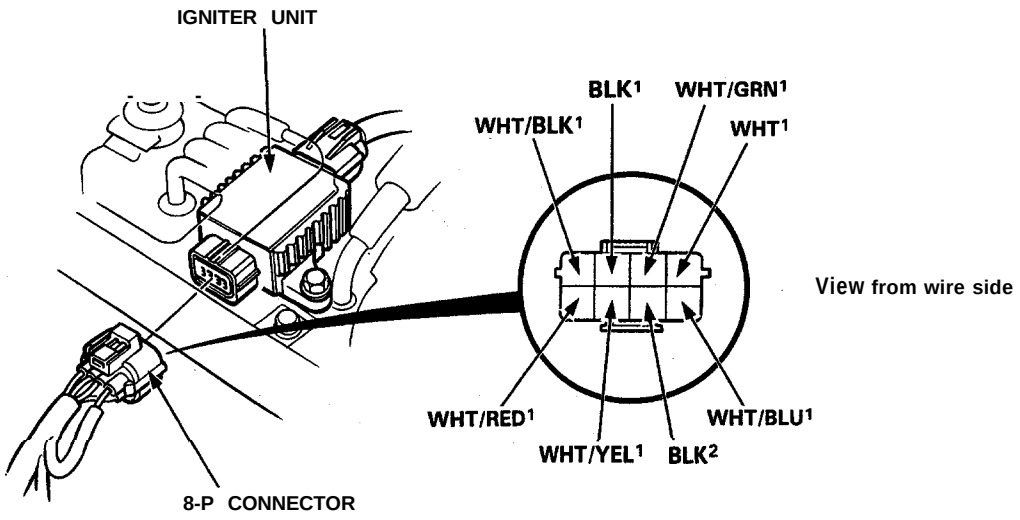


Igniter Unit Input Test

Disconnect the 8-P connector from the igniter unit. Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the igniter unit

NOTE:

- See section 11 when self-diagnostic indicator blinks.
- Perfrom an input test on the igniter unit after finishing the fundamental tests for the ignition system and fuel emission system.
- The tachometer should operated nomally.



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK¹	Under all conditions.	Check for continuity to ground There should be continuity.	• Poor ground (G403). • An open in the wire.
2	BLK²			
3	WHT'	Ignition switch "ON".	Check for voltage to ground: There should be battery voltage.	• Blown NO 13 (30 A) fuse. • Faulty ignition coil. • An open in the wire.
4	WHT/GRN¹			
5	WHT/BLK¹			
6	WHT/BLU¹			
7	WHT/YEL¹			
8	WHT/RED			

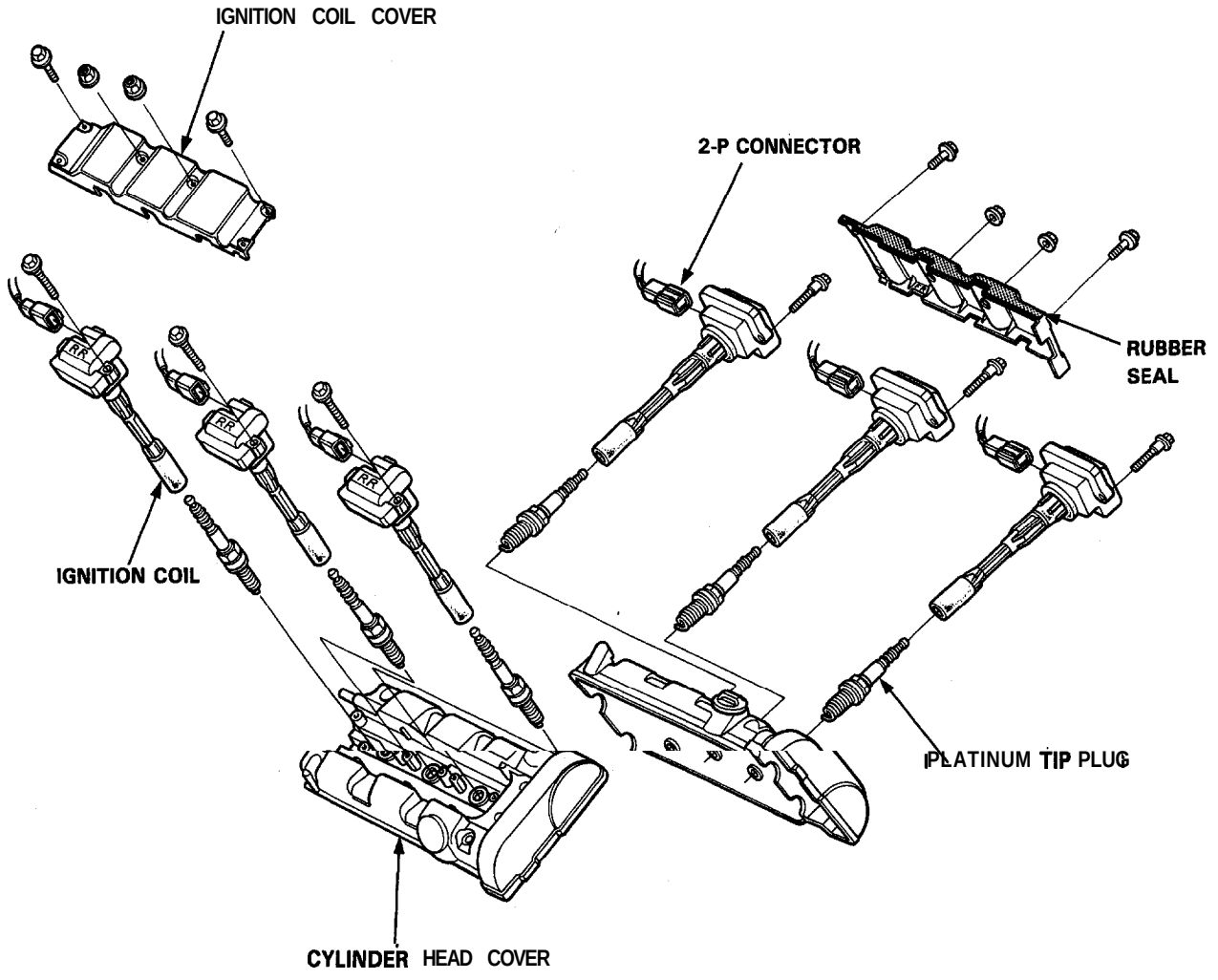
Ignition System

Ignition coil/plug Removal

CAUTION:
Ignition coils and plugs can become very hot in use, do not touch them: handle the ignition coils and plugs carefully.

1. Remove the ignition coil covers.
2. Disconnect the 2-P connectors from the ignition coils.
3. Remove the ignition coils.
4. Remove the plugs.

NOTE:
Different ignition coils and ignition coil covers are used for the front side and rear side. Be sure to use corrent ones when mounting them.



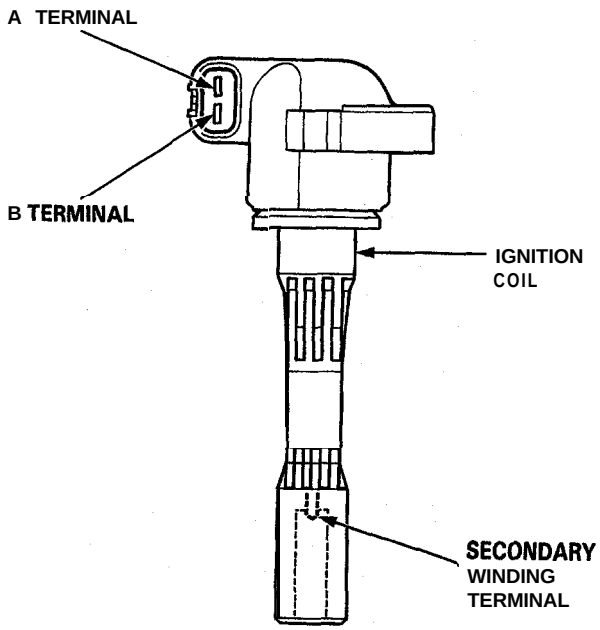
- Ignition Coil Test

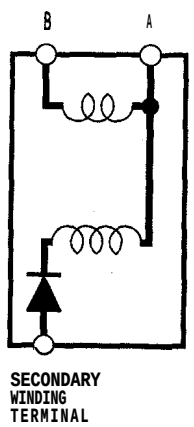
1. With the Ignition switch OFF, remove the ignition coil.

2. 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 25°C (77°F)

   Primary Winding Resistance
   (between the A and B terminals):
   0.9–1.1 ohms

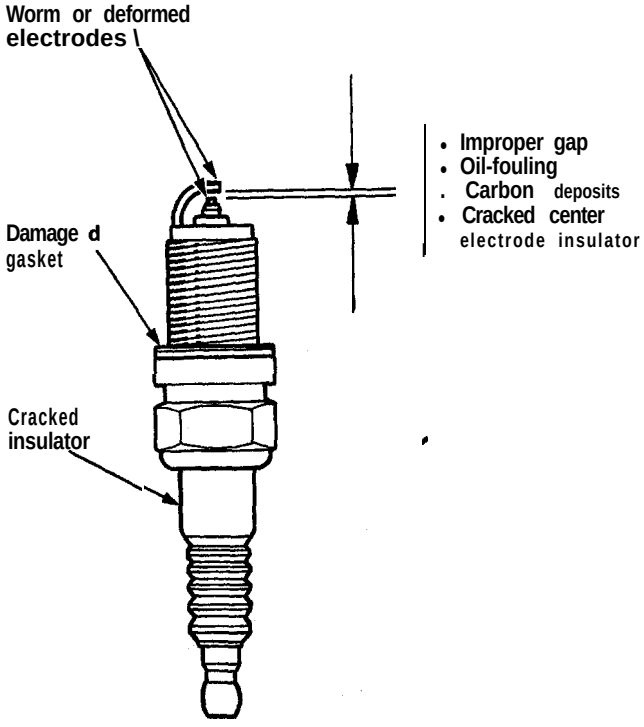
   - If primary winding resistance is OK, substitute a known-good ignition coil and check the system operation.
     If the system is normal, replace the orginal ignition coil.





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

2. If the electrode is contaminated with accumulated objects or dirt, clean the electrode using the plug cleaner.

CAUTION: The plug cleaner should be used with the air pressure of lees then 6 kg/cm² (85 PSI) and for less than 20 seconds.

3. Replace the plug if the center electrode is rounded as shown below:

NOTE: Do not use spark plugs other than those listed below, because these plugs are a new type (ISO standard).

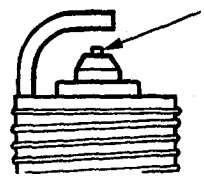
These marks are sealed on the air cleaner cover.

Spark plug:

PFR6G-11 (NGK) PK20PR-L11 (ND)	For all normal driving
PFR7G-11 (NGK) PK22PR-L11 (ND)	For hot climates or continuous high speed driving.

4. Make sure that the 1.3 mm (0.051 in.) plug gauge does not go into the gap for the platinum tip plug. If the gauge goes into the gap, do not attempt to adjust but replace the plug with new bne.

Electrode Gap: 1 .1 mm (0.043 in.)



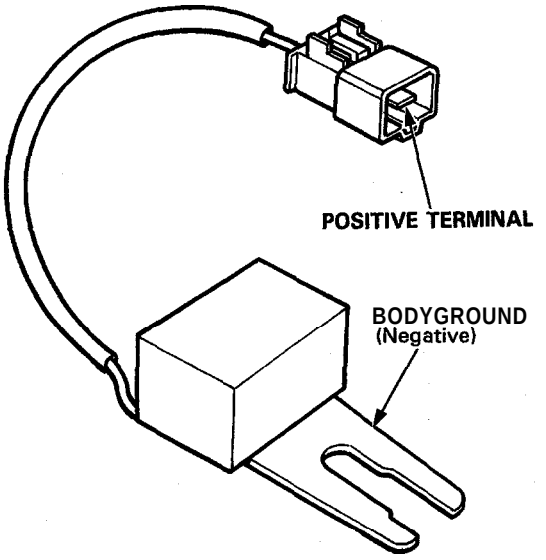
Platinum tip plug:
Check and confirm that the 1.3 mm (0.051 in) plug gauge does not go into the gap.

5. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1 .8 kg-m, 13 lb-ft).

- Radio Noise Condenser Capacity - Test

1. Use a commercially available condenser tester. Connect the tester probes and measure the condenser capacity.

   Condenser capacity: 0.47 ± 0.09 microfarads (μF)

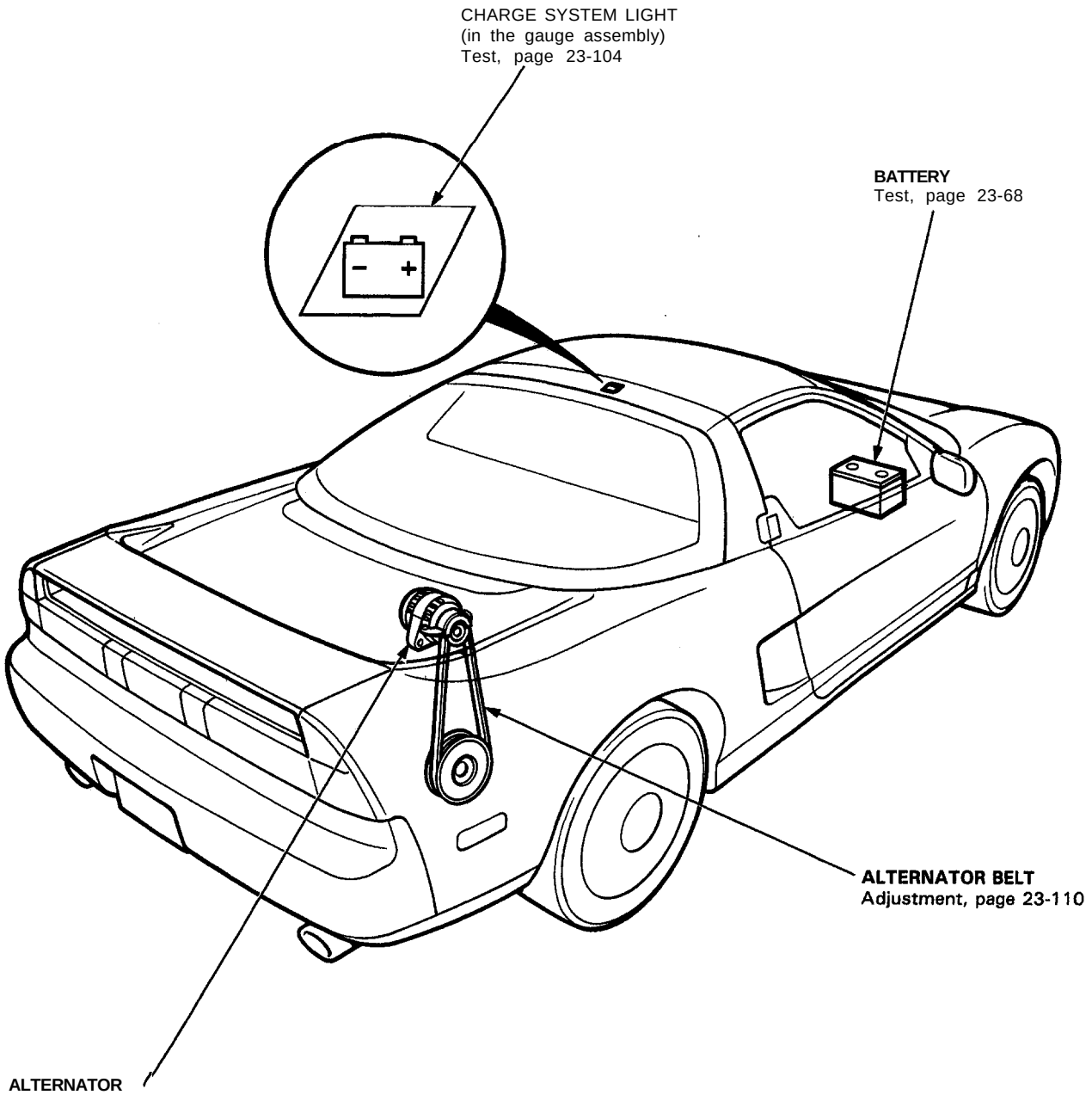


   NOTE: The radio noise condenser is intended to reduce ignition noise. However, condenser failure may cause the engine to stop running.

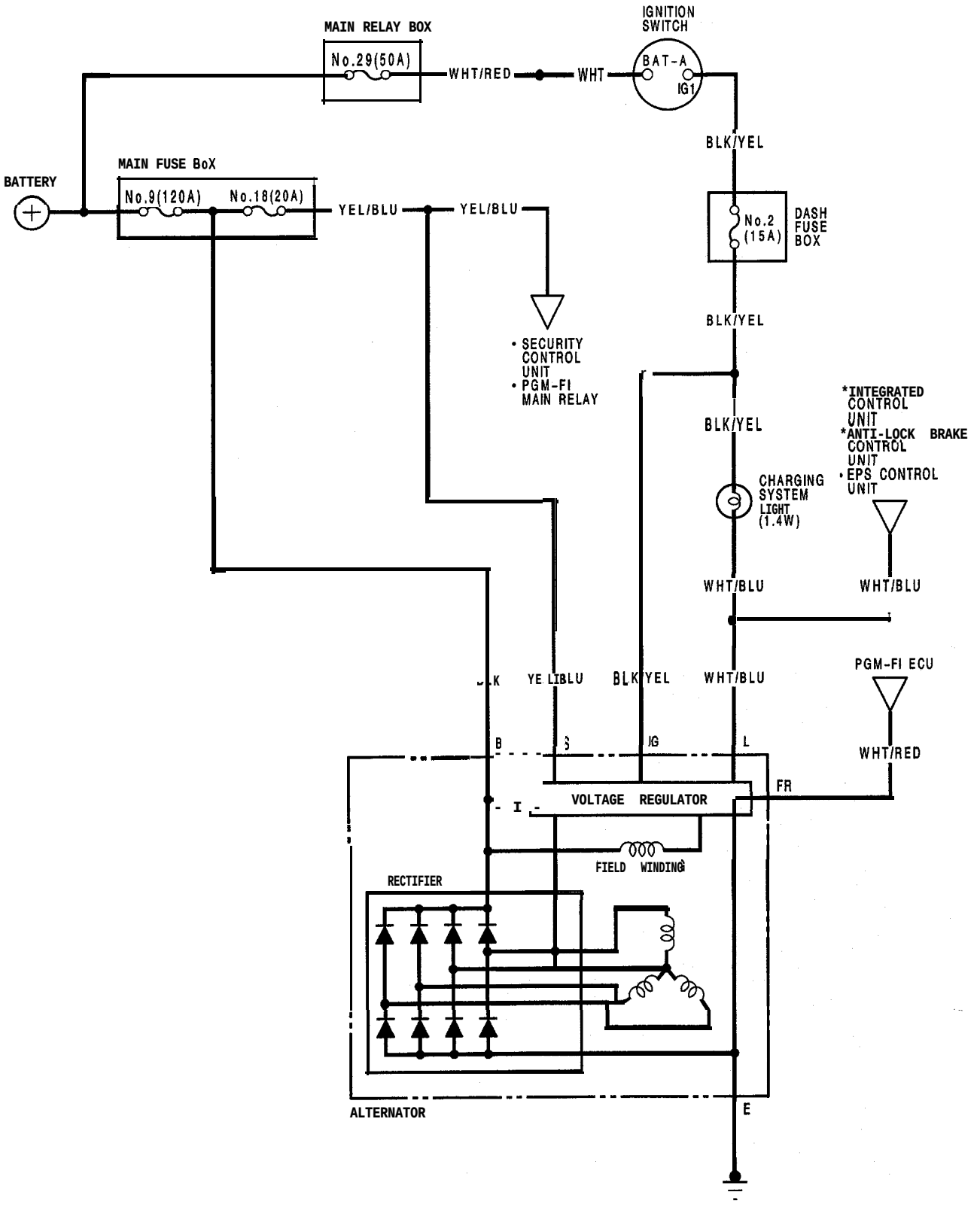
2. **If not within the specifications, replace the radio** noise condenser.

Charging System

– Component Location Index



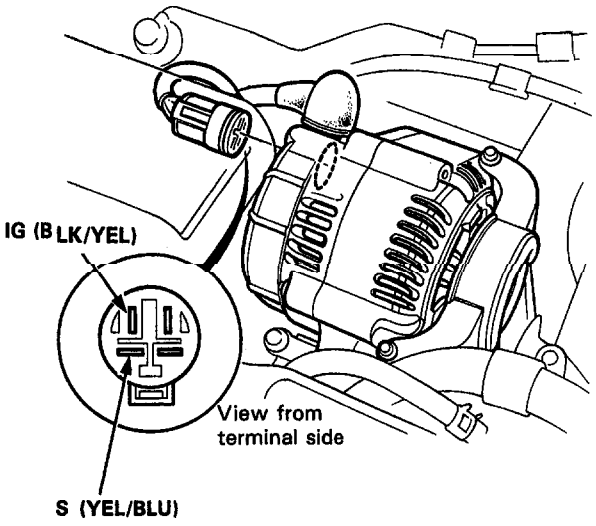
- Circuit Diagram



Alternator and Regulator Test

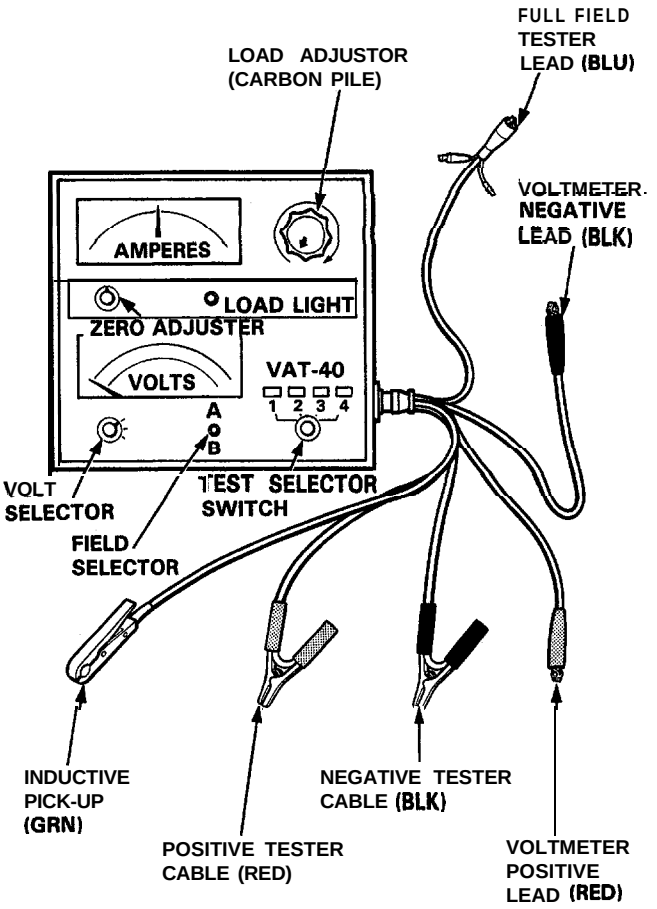
1. First make sure you have a good battery, and that the alternator belt is tight and in good condition. Also make sure the connections at the alternator and main fuses are good. Next, check the No. 2 (15 A) fuse in the dash fuse box and the No. 18 (20 A) fuse in the main fuse box. (if blown, the charge system light will come on even if the system's working properly.)

2. Disconnect the 4-P connector from the alternator. With the ignition switch on, there should be battery voltage between the IG (BLK/YEL) terminal and body ground, and between the S (YEL/BLU) terminal and body ground.



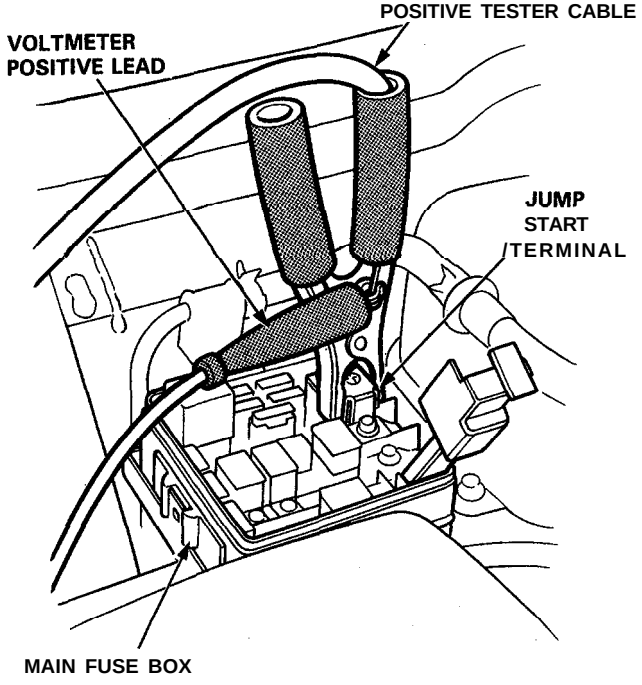
- If there is no voltage, check for:
  - Blown No. 2 (15 A) fuse in the dash fuse box or No. 18 (20 A) fuse in the main fuse box.
  - An open in the BLK/YEL wire between the dash fuse box and the voltage regulator, or the YEL/BLU wire between the main fuse box and the voltage regulator.
- If there is battery voltage, go to step 3.

NOTE: Test use the SUN VAT-40 (or equivalent).

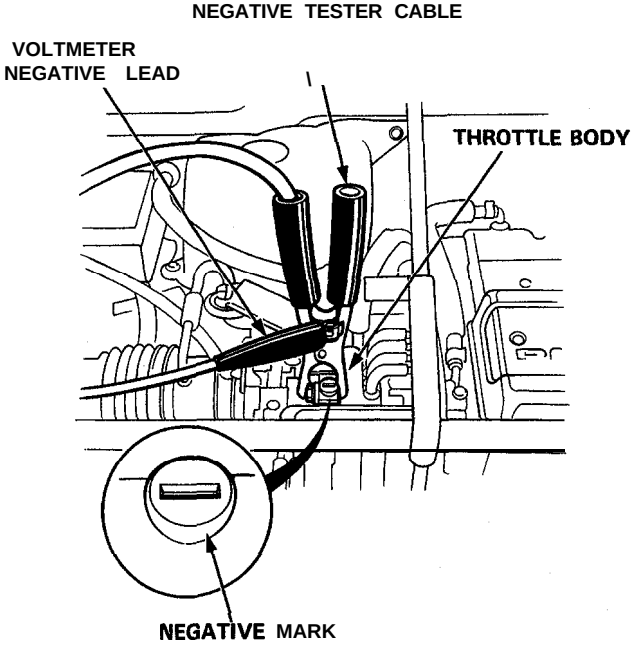


3. Following the illustrations instructions, connect the SUN VAT-40 (or equivalent) and turn the test selector switch to the "STARTING (No. 1)" position.

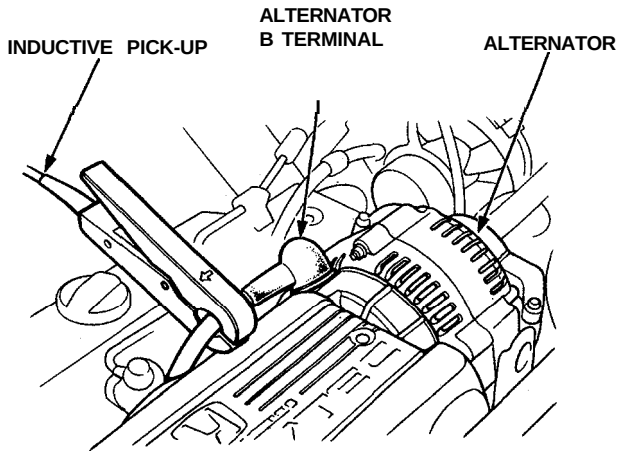
Positive tester cable, voltmeter positive lead:
Attach the positive tester cable and the voltmeter positive lead to the jump start terminal at the main fuse box.



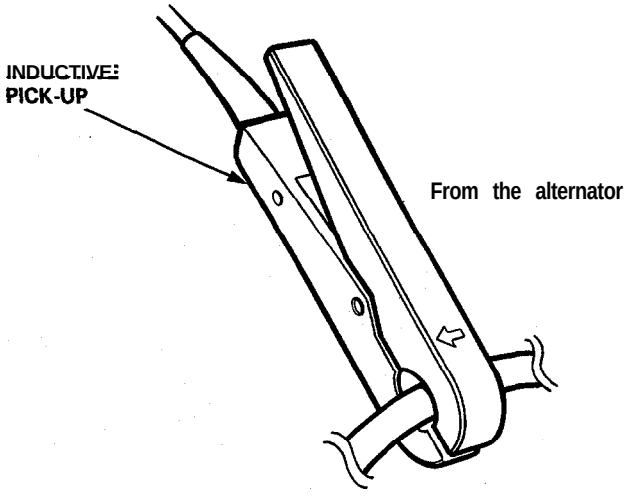
Negative tester cable, voltmeter negative lead:
Attach the negative tester cable and the voltmeter negative lead to the top of throttle body.



Inductive pick-up:
Attach the inductive pick-up to the B terminal at the alternator.



NOTE: The arrow is pointing opposite direction from the alternator B terminal.

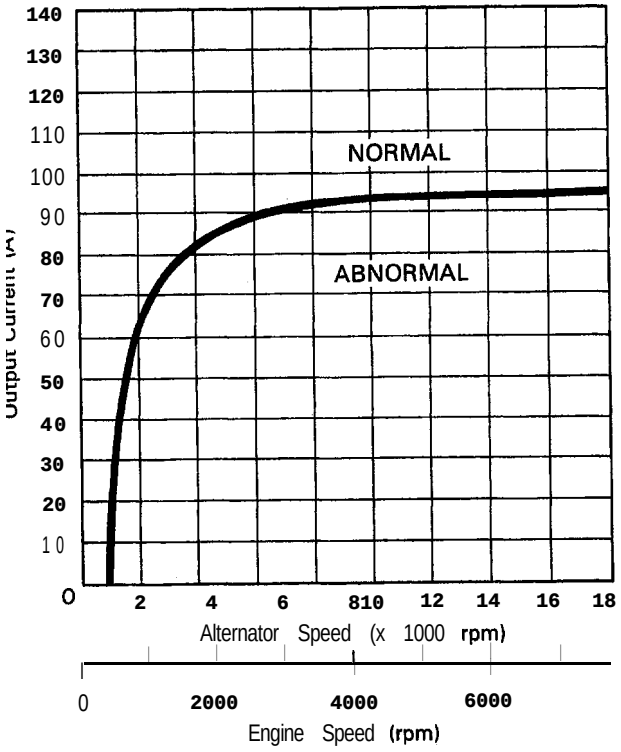


(cont'd)

Alternator and Regulator Test (cont'd)

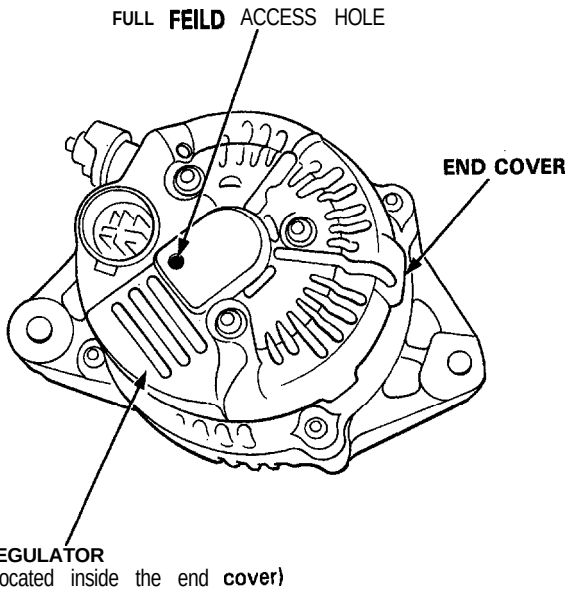
4. Start the engine. Turn off all accessories, move the selector switch to the "CHARGING (No. 2)" position.

5. Raise engine speed to 2,000 rpm and hold (make sure cooling fans are off).
   Apply a "load" with the carbon pile, so the voltage drops to no less than 12 volts.
   Check the maximum amperage reading and compare with the chart below.



- If amperage is "NORMAL" the system is OK: Proceed to the Charge System Light Test (see page 23-103).
- If amperage is "ABNORMAL" go to step 6.

6. Stop the engine. Perform full field test:
   Insert the full field tester lead into the full field access hole at the back of the alternator.

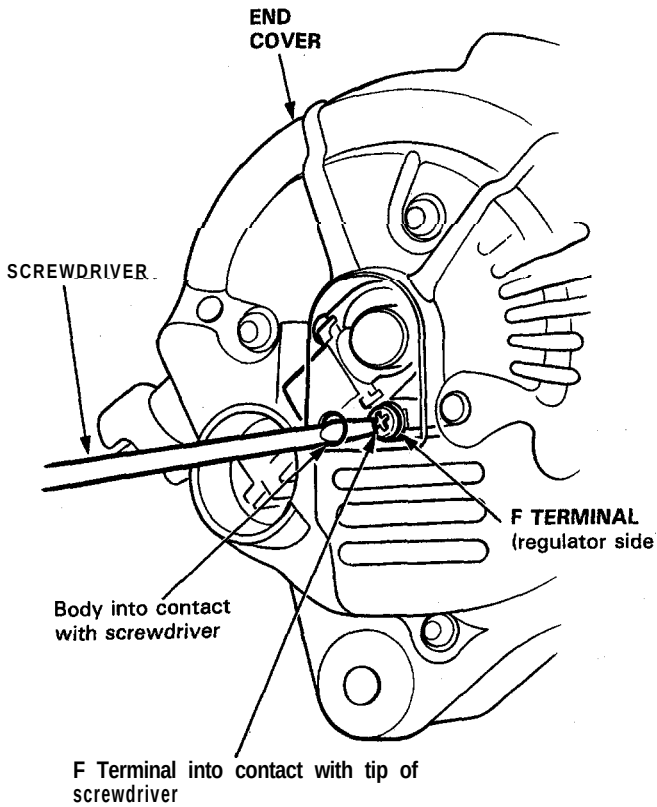


7. Move the test selector switch to the "STARTING (No. I)" position.

8. Start the engine. Raise engine speed to 2,000 rpm and hold (make sure cooling fans are off).

9. Switch the field selector to the "A (Ground)" position momentarily and check amperage reading.

NOTE: As an alternative, use a screwdriver and an ammeter to full field the alternator.



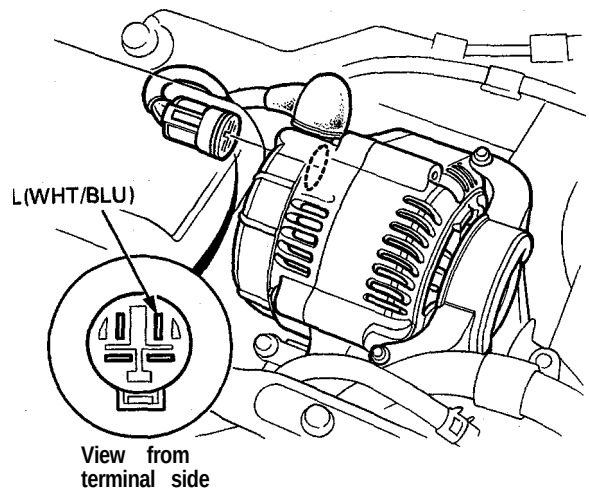
CAUTION: The voltage will rise quickly when the alternator is full fielded. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.

- If the amperage is within specification, replace the regulator.
- If the amperage is not within specification, replace the alternator.

Charge System Light Test

NOTE: Before testing, check the wire harness connection, alternator belt tension, No. 2 (15 A) fuse in the dash fuse box and No. 18 (20 A) fuse in the main fuse box.

1. Turn the ignition switch on. The charge system light should come on.
   If it does not come on, disconnect the alternator connector and short the pin of the L(WHT/BLU) terminal to ground.



- If the light still does not come on, check for:
  - Bad bulb.
  - An open in the WHT/BLU wire between the light and voltage regulator.
  - An open in the BLK/YEL wire between the light and the dash fuse box, or the dash fuse box and the ignition switch.
- If the light comes on, check the alternator and regulator (see page 23-100).

2. Start the engine and let it idle. The charge system light should go off.
   If it stays on this time, check the YEL/BLU wire between the main fuse box and the alternator.
   If the fuse and wire are OK, check the alternator and regulator (see page 23-100).
   If the system is charging, proceed as follows.

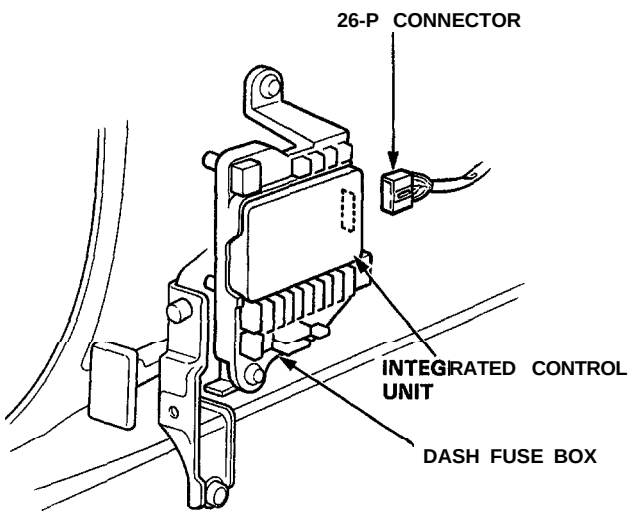
(cont'd)

- Charging System Light Test (cont'd)

3. Remove the door sill molding and cowl lining pieces.

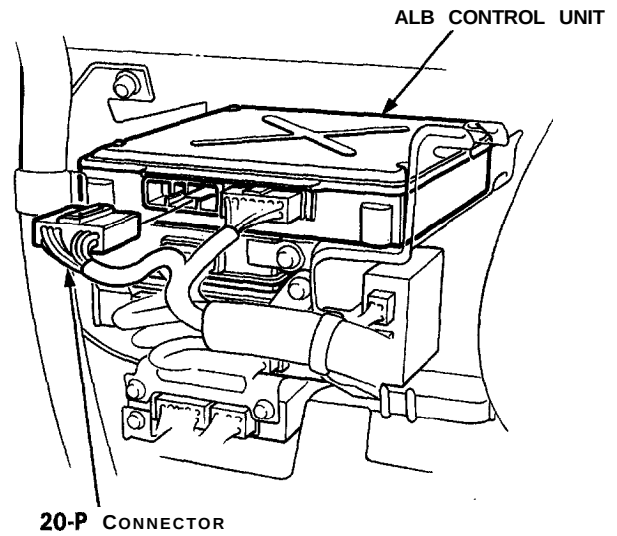
4. Remove the 26-P connector from the integrated control unit on the dash fuse box.
   With the engine running, the charge system light should go off.

   NOTE: Don't disconnect all of the connectors from the dash fuse box.



- If the light goes off, there is a short in the integrated control unit.
- If the light does not go off, there is a short to ground in the WHT/BLU wire between the light and the control unit.

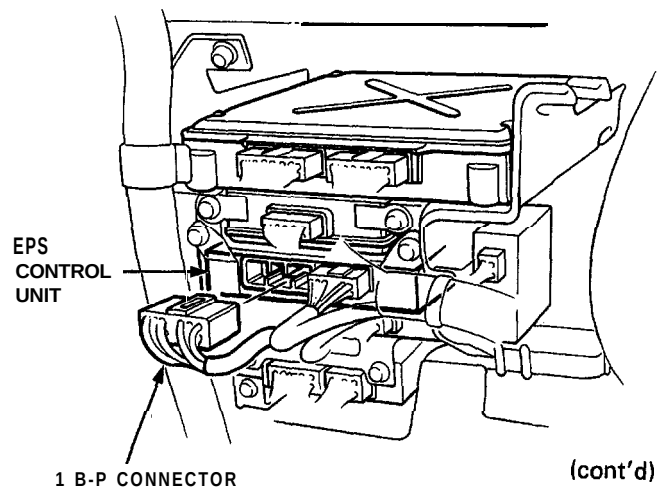
5. Remove the glove box (See section 20) and disconnect the 20-P connector from the ALB control unit.
   With the engine running, the charge system light should go off.



- If the light goes off, there is a short in the ALB control unit.
- If the light does not go out, there is a short to ground in the WHT/BLU wire between the light and the ALB control unit.

A/T:

6. Disconnect the 18-P connector from the EPS control unit. With the engine running, the charge light should go off.

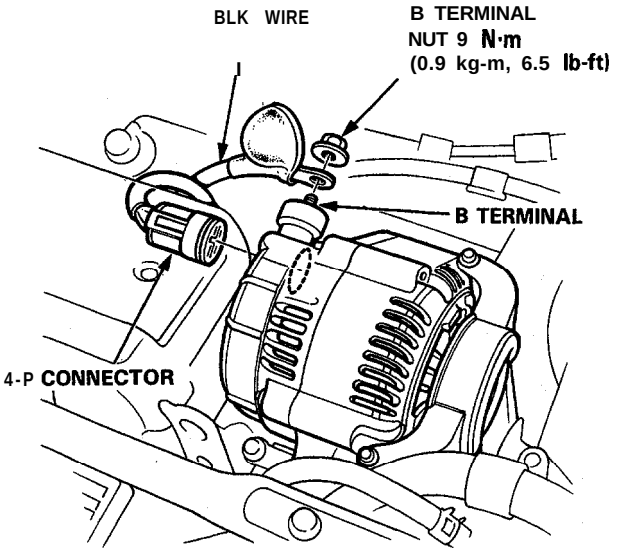


(cont'd)

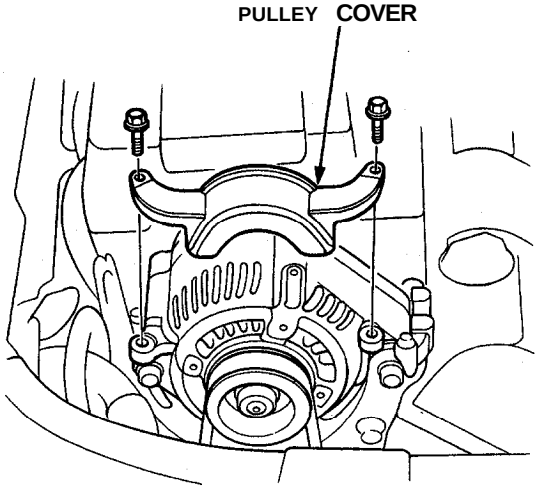
- If the light goes off, there is a short in the EPS control unit.
- If the light does not go off, there is a short to ground in the WHT/BLU wire between the charge system light and the EPS control unit.

Alternator Replacement

1. Disconnect the ground wire from the battery negative (–) post.
2. Disconnect the 4-P connector from the alternator.
3. Remove the terminal nut and the BLK wire from the B terminal.



4. Remove the pulley cover from the alternator.

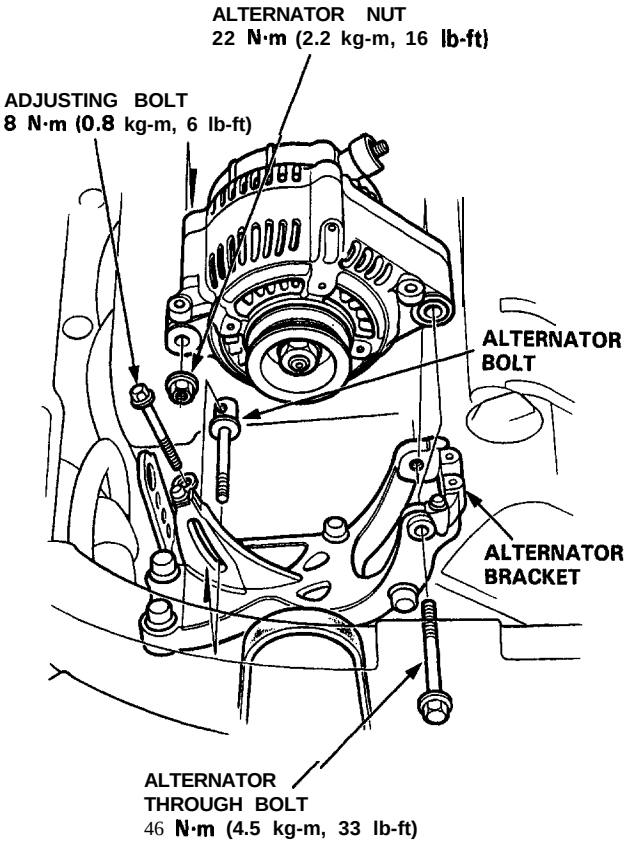


(cont'd)

Alternator Replacement (cont'd)

5. Remove the alternator nut, and loosen the through bolt and adjusting bolt, then remove the belt from the pulley.

6. Remove the adjusting bolt and through bolt, then alternator from the bracket.



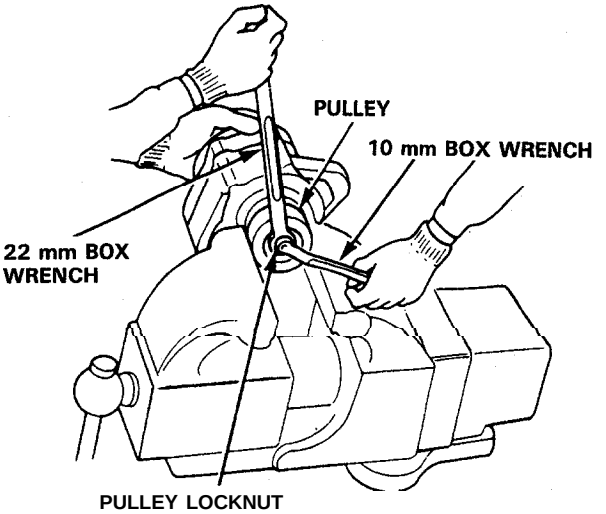
7. Alternator installation is the reverse order of removal.

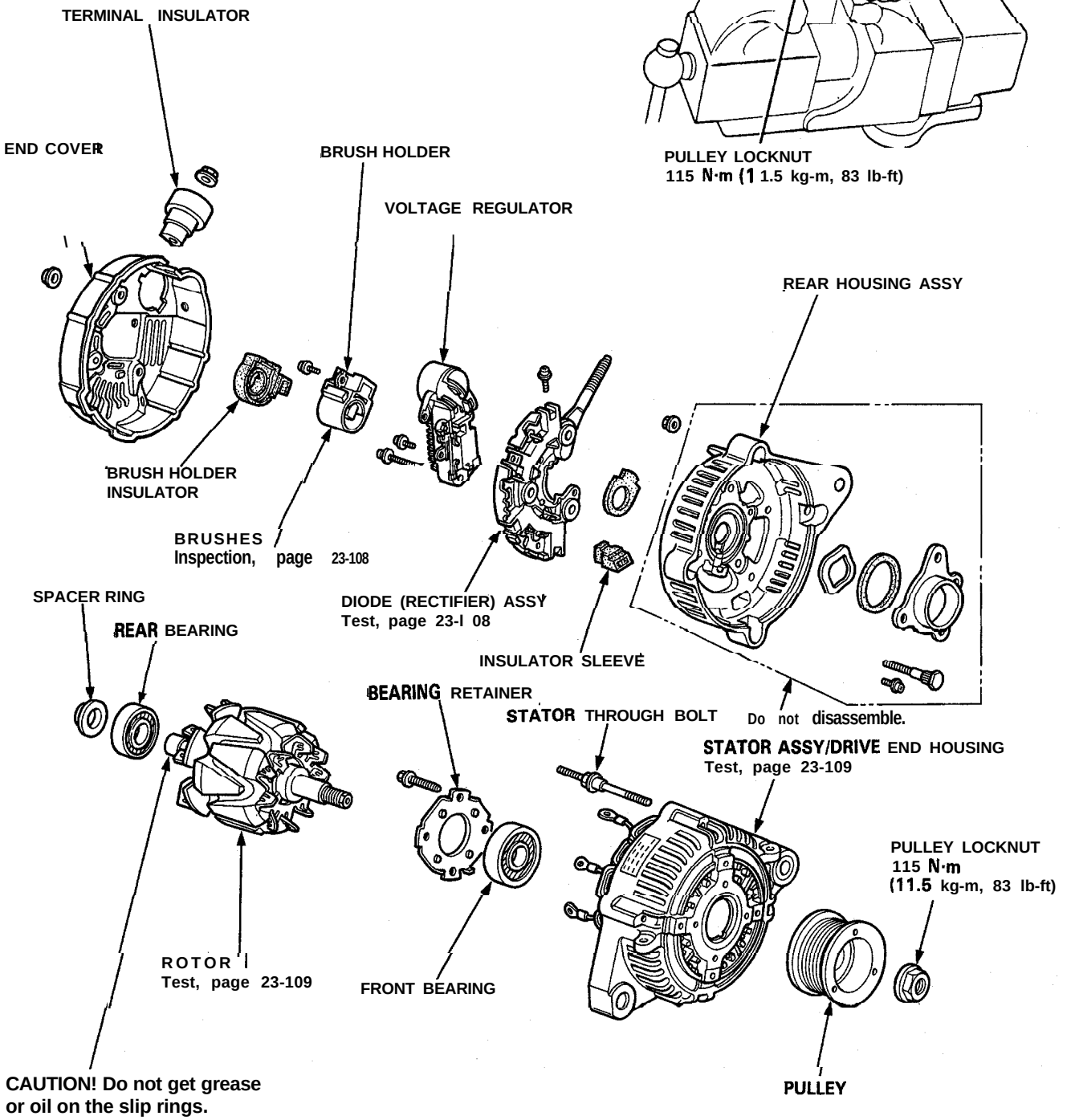
NOTE: Adjust the alternator belt tension after installing (See page 23-I 10).

Alternator Overhaul

NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use 10 mm and 22 mm box wrenches to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.



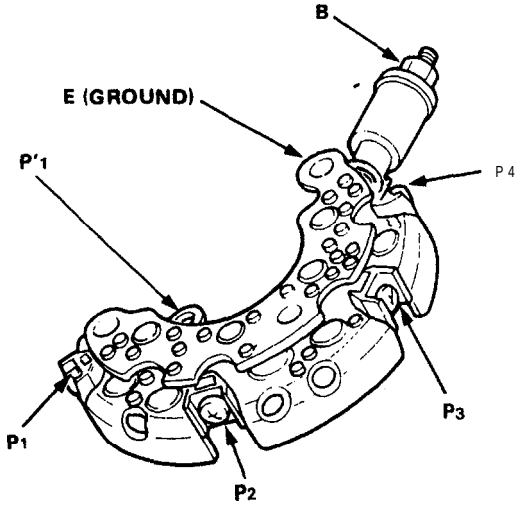


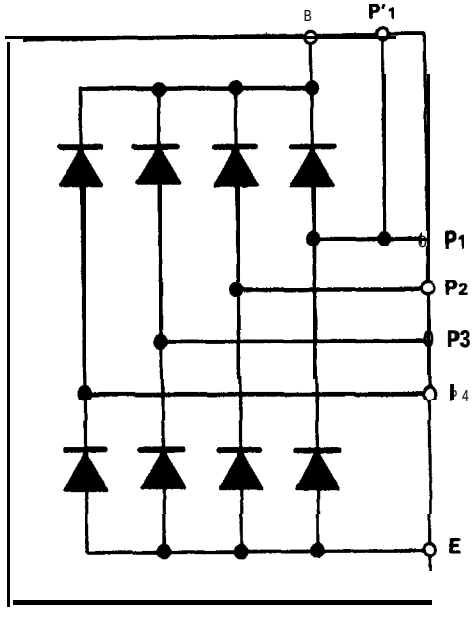
Rectifier Test

NOTE:

- The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of eight diodes (4 pairs), each diode must be tested for continuity in both directions; a total of 16 checks.
- Use an ohmeter capable of checking diodes.

1. Check for continuity in each direction, between the B and P (of each diode pair) terminals, and between the E (ground) and P (of each diode pair) terminals. All diodes should have continuity in only one direction.



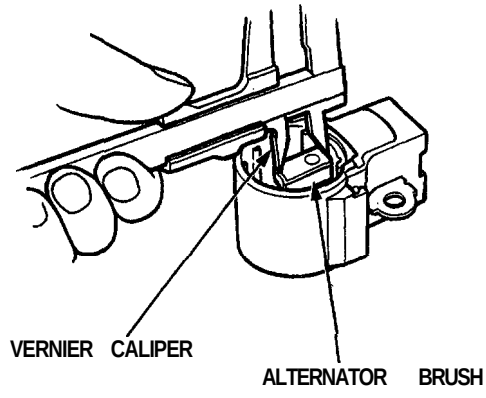


2. If any of the 8 diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

Alternator Brush Inspection

1. Remove the end cover, then take out the brush holder by removing its 2 screws.
2. Measure length of the brushes with a vernier caliper.

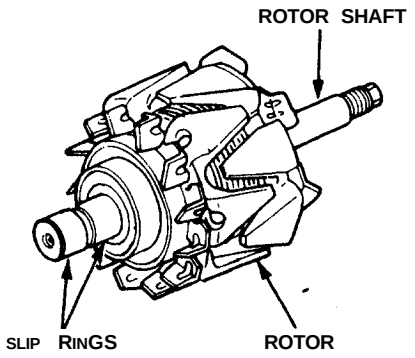
Alternator Brush Length:
Standard : 10.5 mm (0.41 in)
Service Limit: 1.5 mm (0.06 in)



If the brushes are not inside the service limit, replace the brushe holder assembly.

Rotor Slip Ring Test

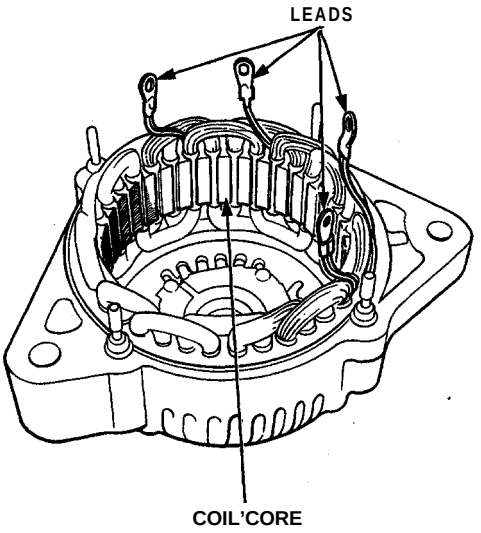
1. Check that there is continuity between the slip rings.
2. Check that there is no continuity between the rings and the rotor or rotor shaft.



3. If the rotor fails either continuity check, replace it.

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 stator.

Alternator Belt Adjustment

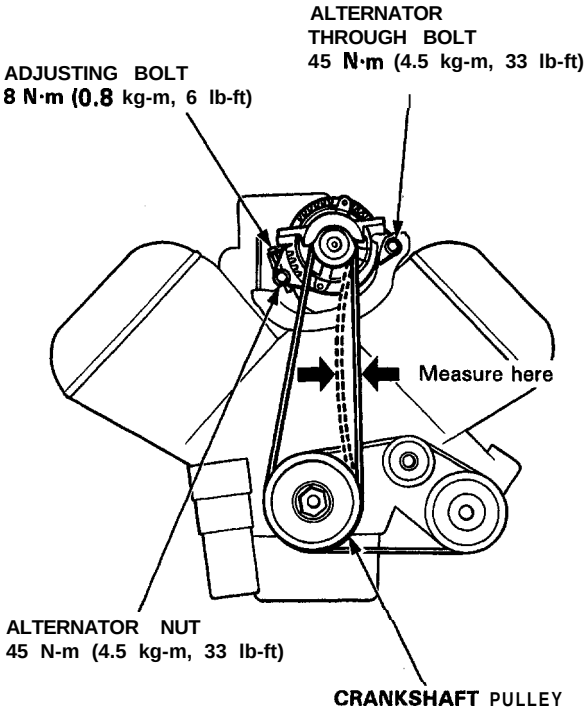
Deflection method:

Apply a force of 98 N (IO kg, 22 lb) and measure the deflection between the alternator and crankshaft pulley.

Deflection: 12 — 14 mm (0.47 — 0.55 in)

NOTE:

- **On a brand - new belt, the deflection should be 7 — 9 mm (0.28 — 0.35 in) when first measured.**
- **If there are cracks or any damage evident on the belt, replace it with a new one.**



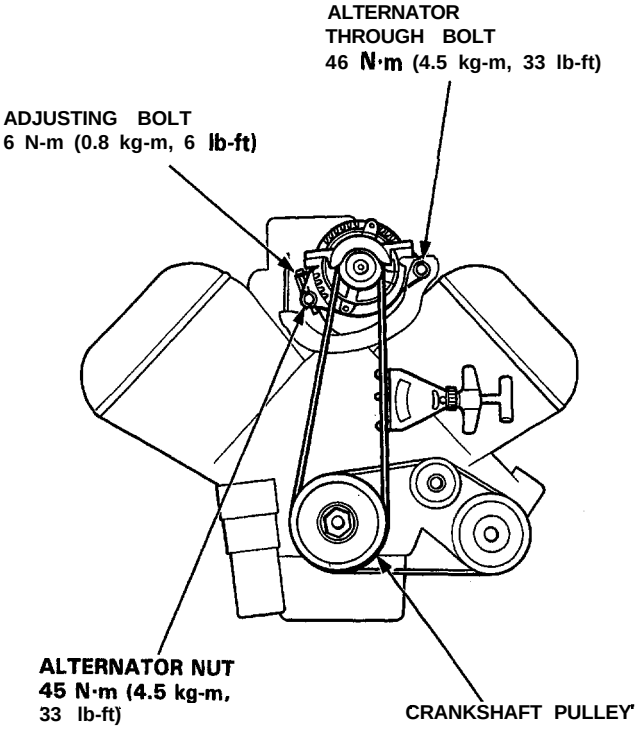
Tension gauge method:

Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension: 392 — 492 N (40 — 50 kg, 88 — 121 lb)

NOTE:

- **On a brand-new belt, the tension should be 784 — 882 N (80 — 90 kg, 176 — 198 lb) when first measured.**
- **See the instruction for the belt tension gauge.**
- **If there are cracks or any damage evident on the belt, replace it with a new one.**

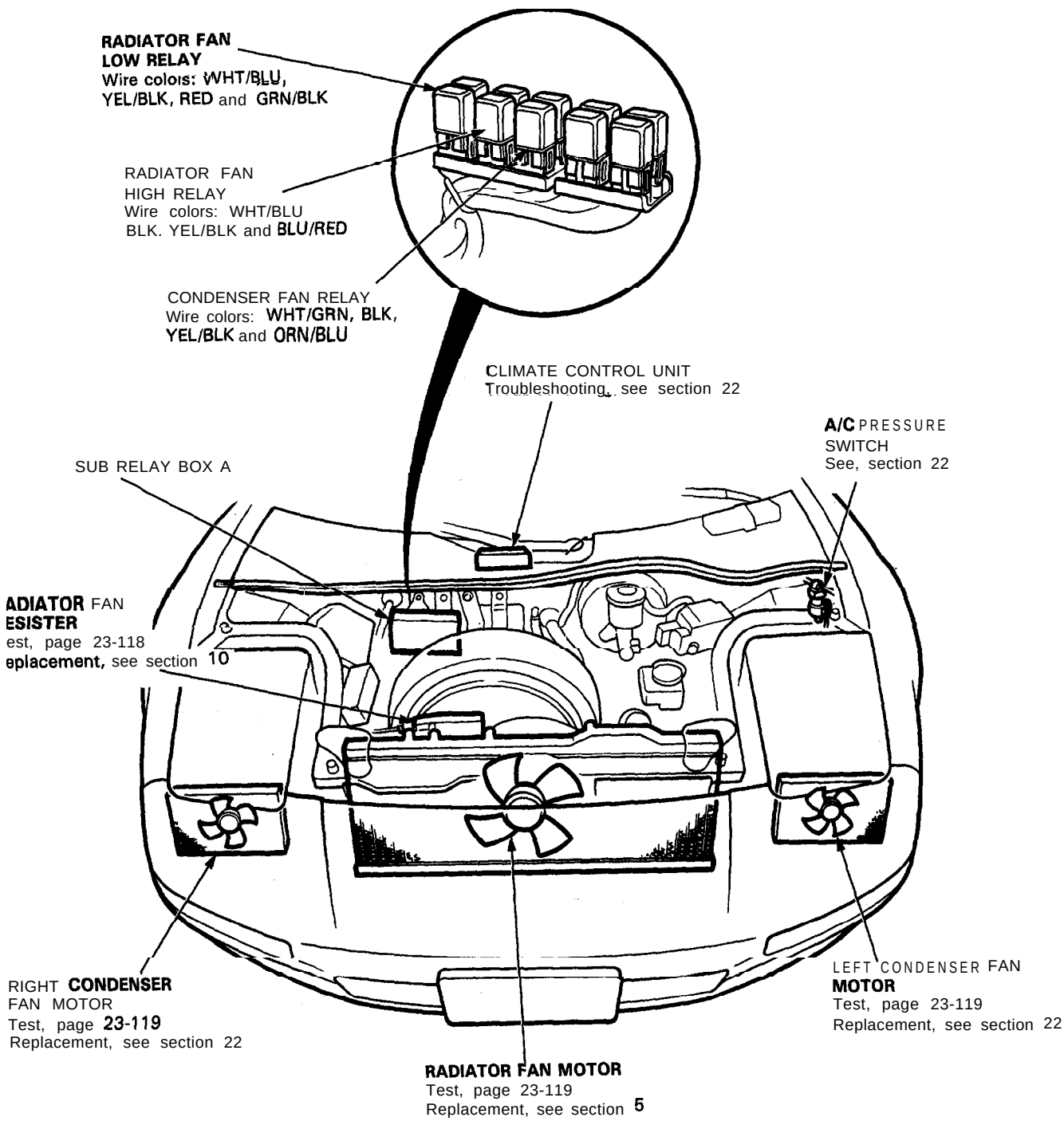


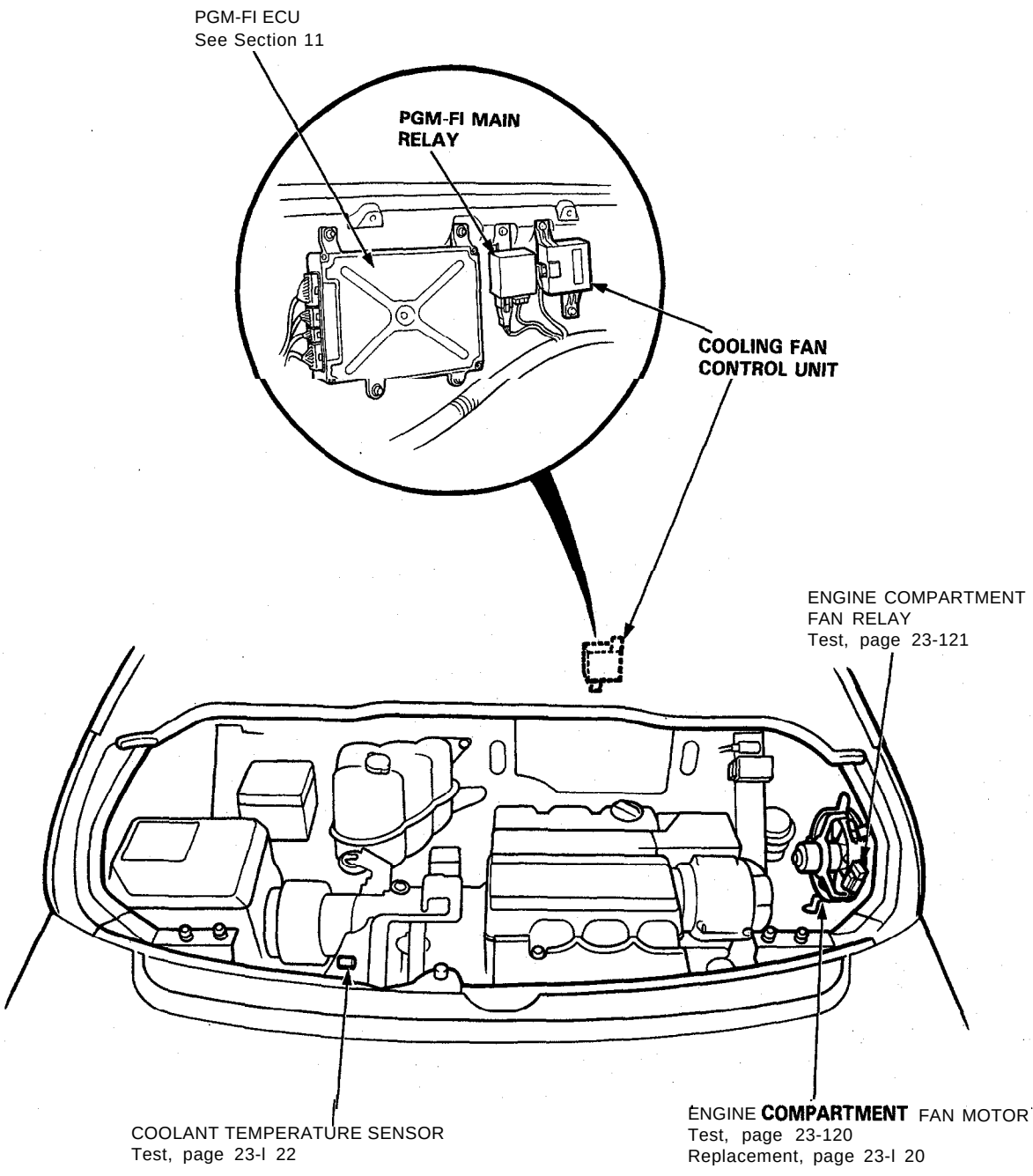
If adjustment is necessary:

1. **Loosen the alternator nut and through bolt.**
2. **Move the alternator by turning the adjusting bolt to obtain the proper belt tension, then retighten the bolt and nut.**
3. **Recheck the deflection of the belt.**

Cooling Fan Control

Component Location Index

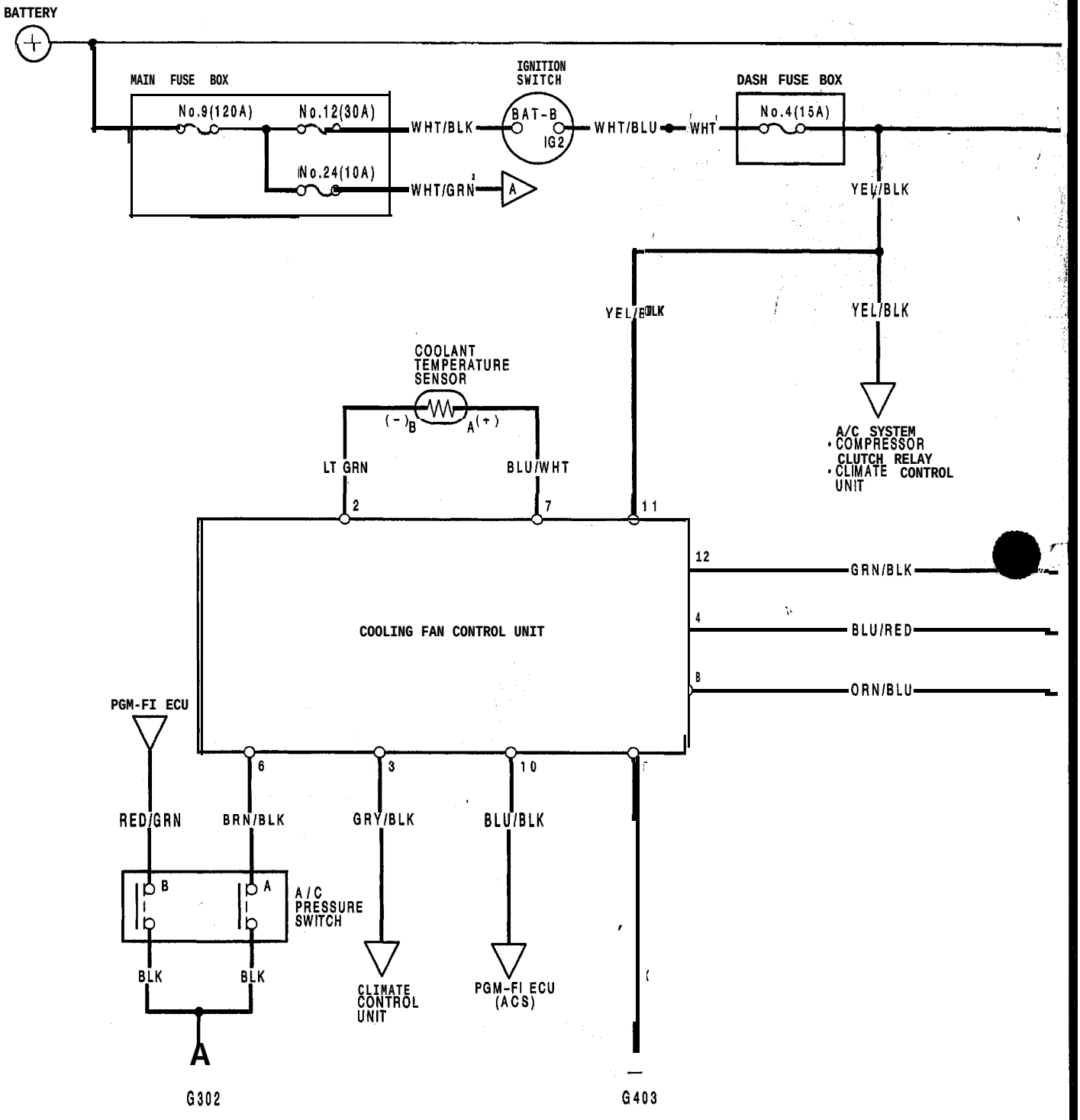



PGM-FI ECU
See Section 11
PGM-FI MAIN RELAY
COOLING FAN CONTROL UNIT
ENGINE COMPARTMENT FAN RELAY
Test, page 23-121
COOLANT TEMPERATURE SENSOR
Test, page 23-l 22
ENGINE COMPARTMENT FAN MOTOR
Test, page 23-120
Replacement, page 23-l 20

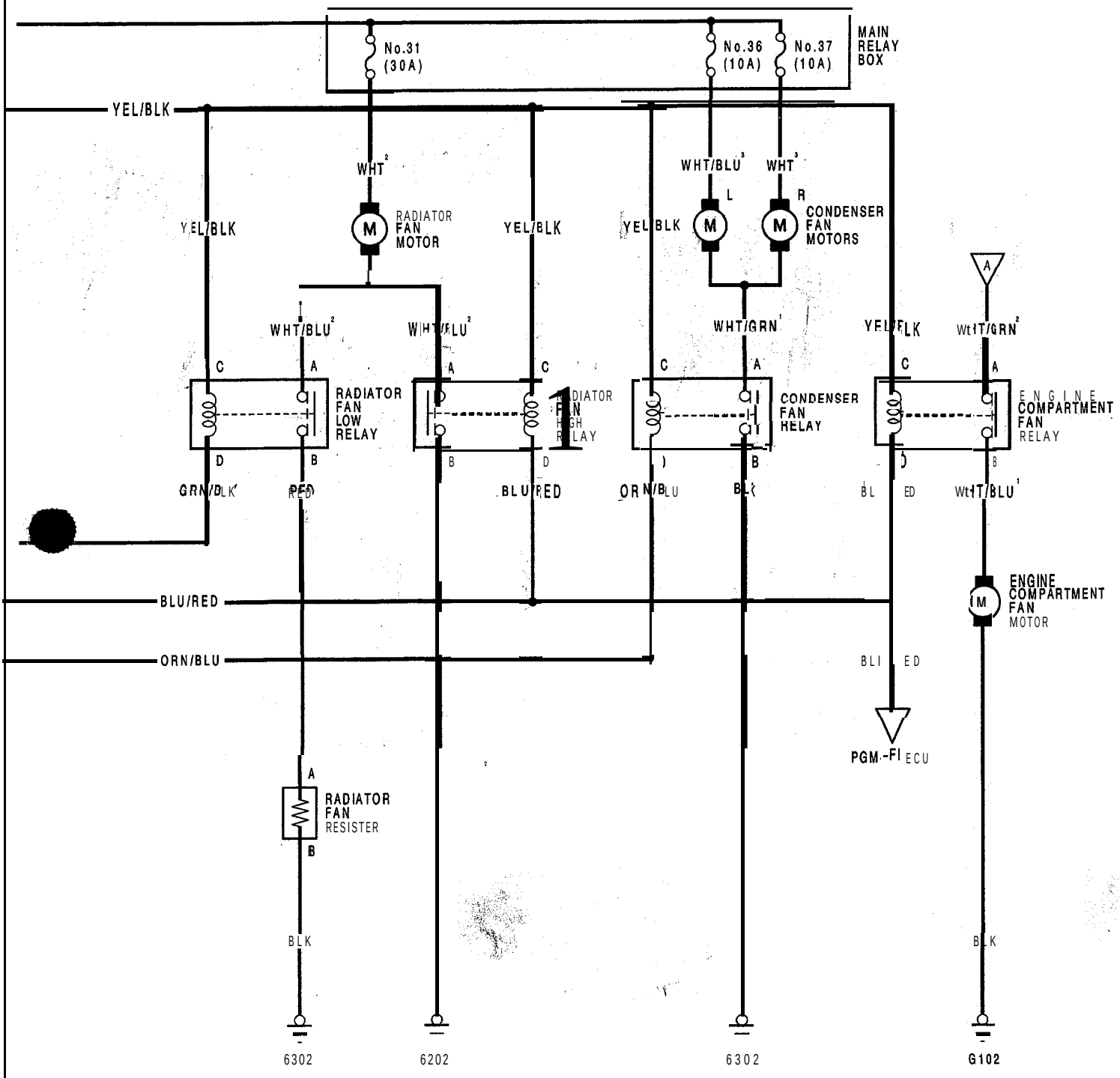
Cooling Fan Control

· Circuit Diagram

'NOTE Several different wires have the same color. They have-been given a number suffix to distinguish them (for example WHT' and WHT^2 are not the same).



A/C PRESSURE SWITCH
A (HI, LO): ON between 210 kpa (2.1 kg/cm², 30 psi) and 2700 kpa (27 kg/cm², 384 psi)
B (MID): ON below 1250 kpa (1 2.5 kg/cm², 178 psi)


No.31 (30A)
No.36 (10A)
No.37 (10A)
MAIN RELAY BOX
YEL/BLK
WHT
WHT/BLU
WHT
RADIATOR FAN MOTOR
L
R
CONDENSER FAN MOTORS
WHT/BLU
WHT/BLU
WHT/GRN
YEL/BLK
WHT/GRN
RADIATOR FAN LOW RELAY
RADIATOR FAN HIGH RELAY
CONDENSER FAN RELAY
ENGINE COMPARTMENT FAN RELAY
GRN/BLK
RED
BLU/RED
ORN/BLU
BLU/RED
ORN/BLU
ENGINE COMPARTMENT FAN MOTOR
PGM-FI ECU
RADIATOR FAN RESISTER
BLK
BLK
6302
6202
6302
G102

Cooling Fan Control

- Discription

Fan control system:

The cooling fan system is comprised of radiator fan, condenser fan (left, right), engine compartment fan, radiator fan low relay radiator fan high relay, condenser fan relay, engine room fan relay, radiator fan resistor, coolant temperature **sensor, A/C pressure switch, cooling fan control unit, climate control unit and PGM-FI ECU.**

The fan control unit controls the operation of the radiator fan and condenser fan.
It uses inputs from the coolant temperature sensor and A/C pressure switch (A and B) on the A/C system to determine **when the fans should run and at what speed.**
Additionally the temperature switch shuts down the A/C system if the coolant temperature exceeds 130°C (266°F).
If the pressure in the A/C system is higher than normal, pressure switch A closes and the fans will run at high speed only. **See the A/C section for description and specification of that funciton.**

Function / Operating Condition	ON	OFF
At low speed	84°C (183°F)	78°C (172°F)
At high speed	90°C (194°F)	84°C (183°F)
A/C cut	130°C (266°F)	128°C (262°F)

Fans operating condiiton:

Operating condition / Fans	At low speed	At high speed
Radiator fan motor	ON	ON
Engine compartment fan motor	OFF	ON

Troubleshooting

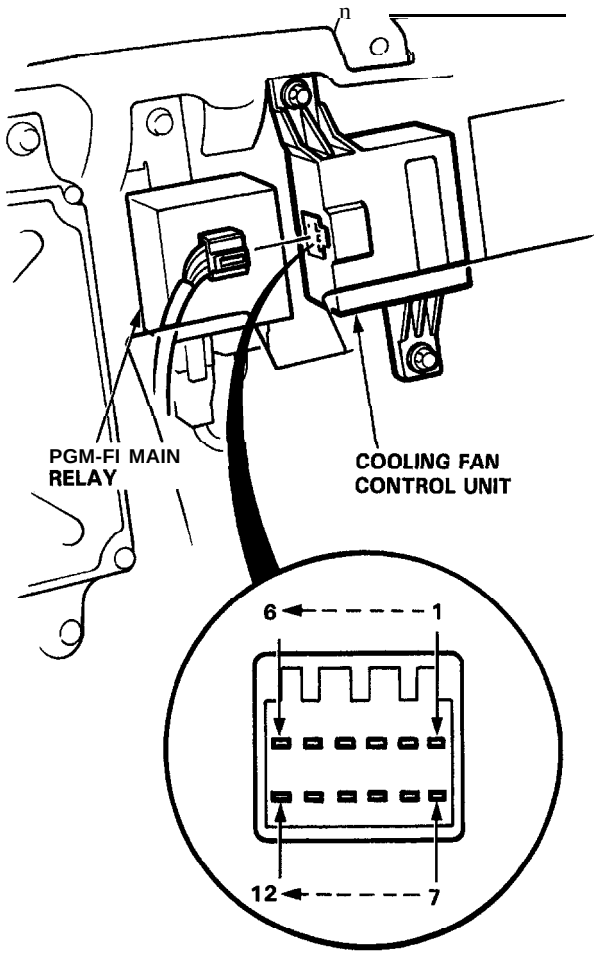
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom		Blown No. 31 (30A), No. 37 (10A) or No. 51 (10A) fuse (in the main reldy box)	Blown No. 24 (10A) fuse (in the main fuse box)	Blown No. 4 (15A) fuse (in the dash fuse box)	Relay	Resistor	Coolant temerature sensor	Radiator fan motor	Engine compartment fan motor	Condenser fan motors	* A/C and PGM-FI systems	Faulty fan control unit	Faulty A/C pressure switch	Poor ground	Open circuit in wires or loose or disconnected terminals
Only one fan operates (with engine and A/C ON).		1	2					3	4	5					WHT[2], WHT/BLU[2], WHT[3], WHT/BLU[3], WHT/GRN[1], WHT/GRN[2], or WHT/BLU[1]
Fans do not rotate.	Under all conditions.			1			2					3		G403	YEL/BLK, BLU/WHT or LT GRN
	At low speed	1			3	2	4					5		G302 or G403	YEL/BLK, WHT[2], WHT/BLU[2], RED, GRN/BLK, BLUNVHT or LT GRN
	At high speed.	1	4		2		3					5		G102, G202 or G403	YEL/BLK, WHT/BLU[2] BLU/RED, WHT/GRN[2] WHT/BLU[1], BLU/WHT or LT GRN
Compressor cluch does not engage as necessary.											1	3	2	G302 or G403	GRY/BLK, BLU/BLK, BRN/BLK, BLU/WHT or LT GRN

*** : Refer to section 22 for A/C pressure inspection of the A/C system**

Cooling Fan Control

Control Unit Terminals



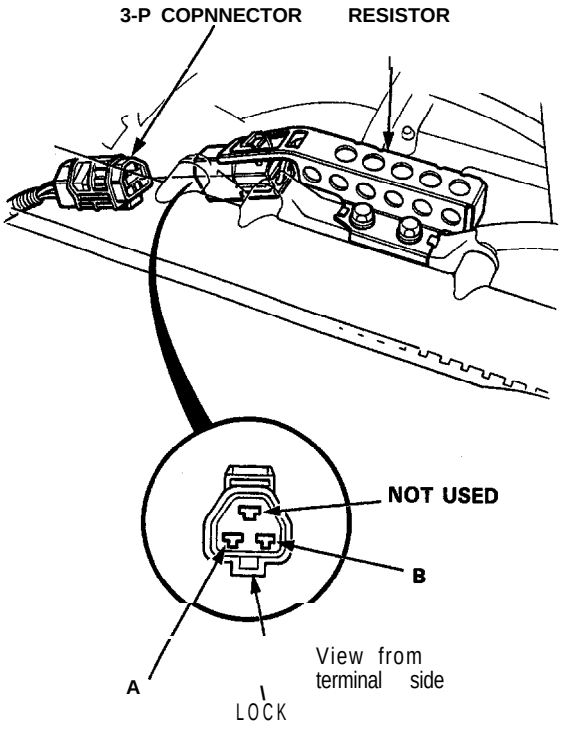
Terminal	Wire	Destination
1		Not used
2	LT GRN	Coolant temperature sensor ⊖
3	GRY/BLK	Climate control unit
4	BLU/RED	Radiator fan high and engine room fan relays coil ⊖
5	BLK	Ground (G403)
6	BRN/BLK	A/C pressure switch A
7	BLU/WHT	Coolant temperature sensor ⊕
8		Not used
9	ORN/BLU	Condenser fan relay coil ⊖
10	BLU/BLK	PGM-FI ECU (ACS)
11	YEL/BLK	IG2 (power supply)
12	GRN/BLK	Radiator fan low relay coil ⊖

Resistor Test

1. Disconnect the 3-P connector from the resistor.
2. Using an ohmmeter, measure resistance between the A and B termianls. Replace the resistor if the resistance is not within specifications.

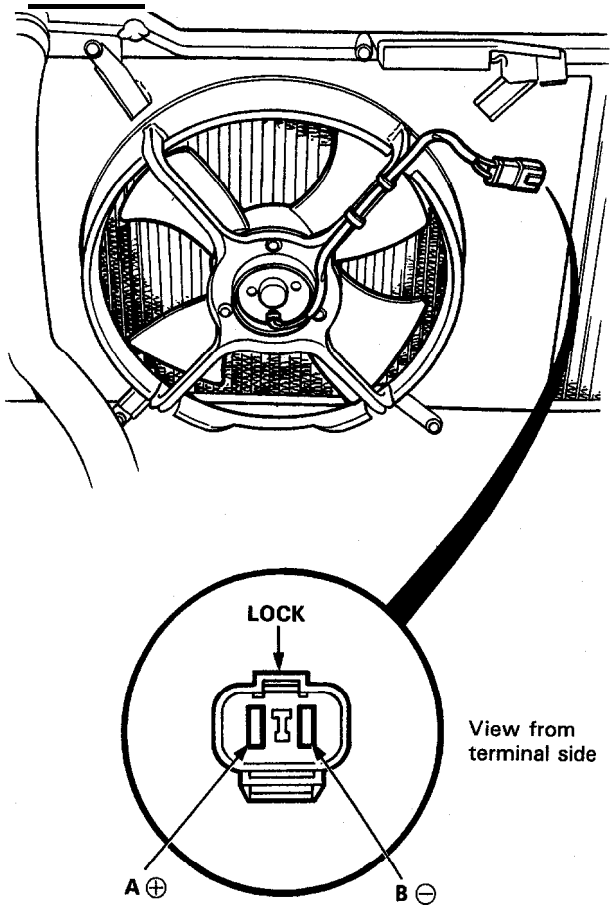
NOTE: Resistance will vary with the resistor temperature; specifications are at 20°C (70°F)

Radiator Fan Resistor
Resistance: 0.54–0.66 ohms



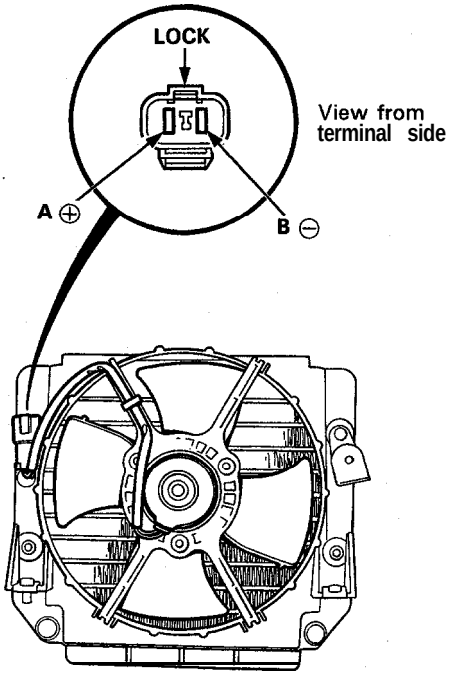
Radiator Fan Motor Test

1. Disconnect the 2-P connector from the radiator fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B termianal.
3. If the motor fails to run smoothly, replace it.



Condenser Fan Motor Test

1. Disconnect the 2-P connector from the radiator fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

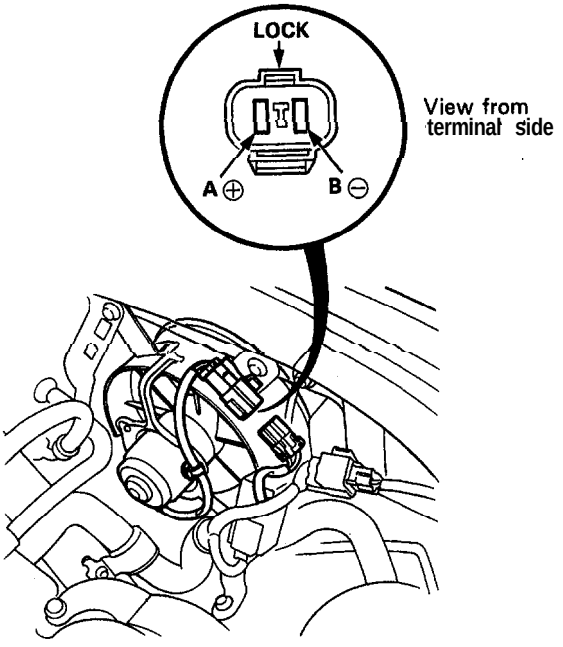


NOTE: The illustration shows right condenser.

Cooling Fan Control

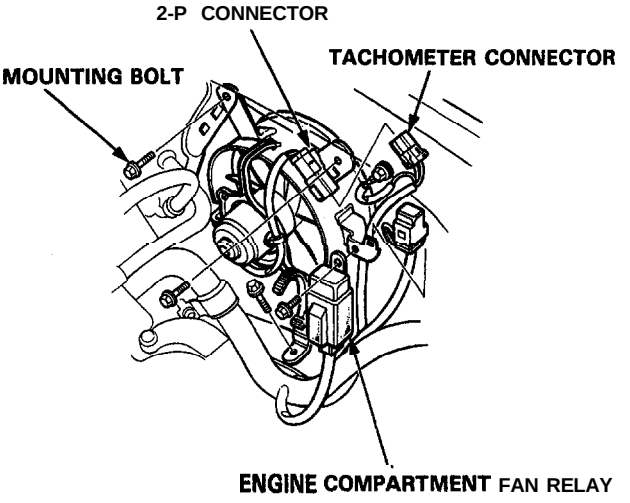
Engine Compartment Fan Motor Test

1. Disconnect the 2-P connector from the engine compartment fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.



Engine Compartment Fan Motor Replacement

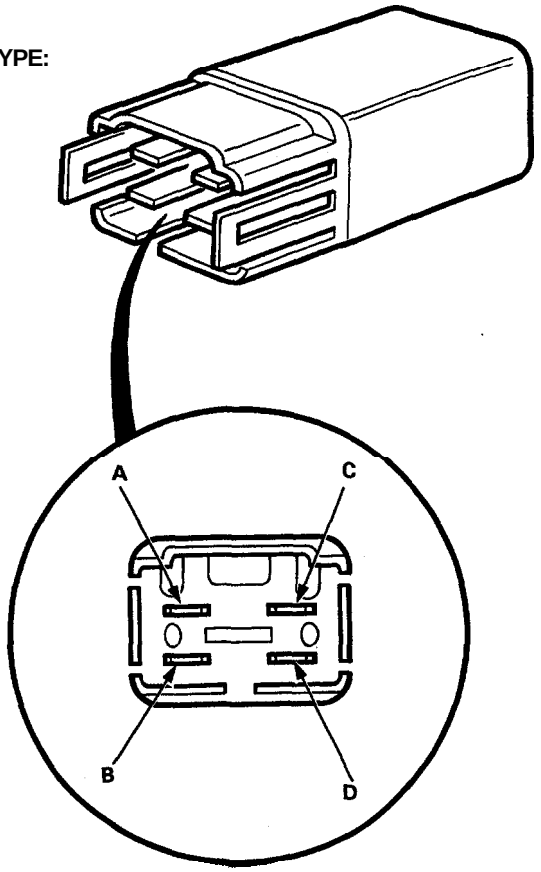
1. Disconnect the 2-P connector from the engine compartment fan motor.
2. Remove the engine compartment fan motor relay, tachometer connector and engine wire harness from the engine compartment fan stay.
3. Remove the 3 mounting bolts.

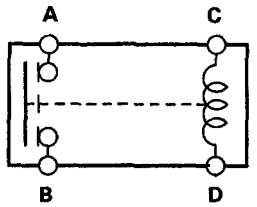


Relay Test

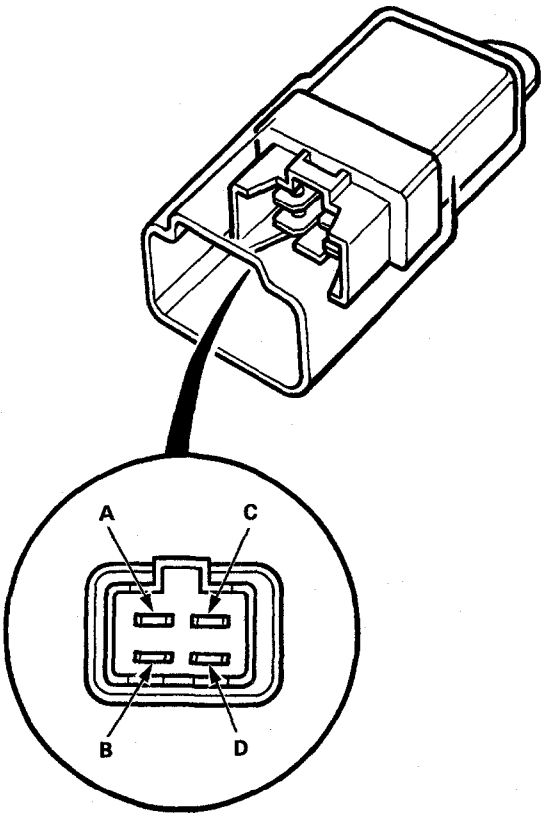
There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
There should be no continuity when the battery is disconnected.

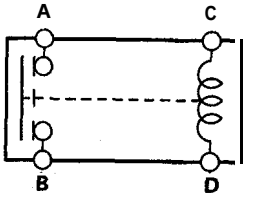
A-TYPE:





B-TYPE:





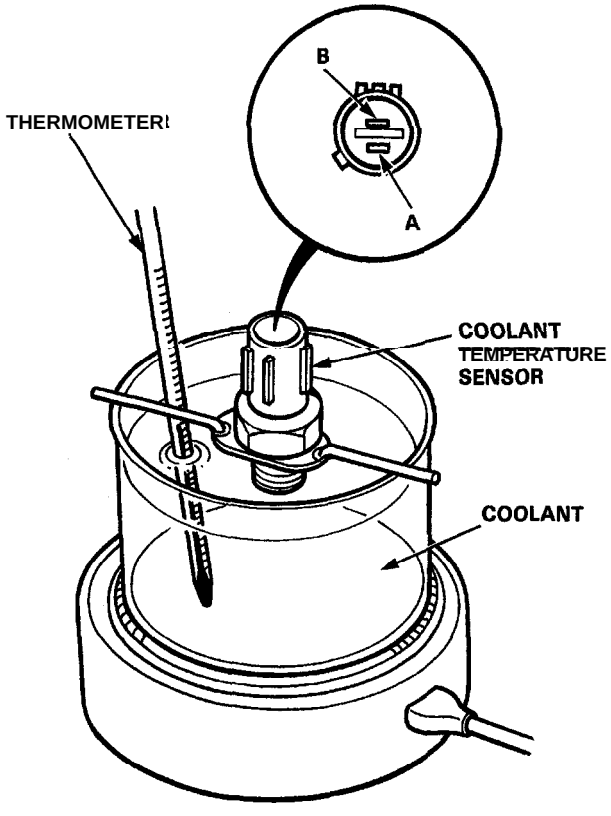
Cooling Fan Control

Coolant Temperature Sensor Test

NOTE: Bleed air of the cooling system after installing the coolant temperature sensor (see section 10).

CAUTION: Failure to comply with the bleeding procedure could cause imperfect bleeding, which may result in severe engine damage.

1. Remove the coolant temperature sensor from the thermostat housing.
2. Suspend the coolant temperature sensor in a container of coolant as shown.



3. Heat the coolant and check coolant temperature with a thermometer (see table below).
4. Measure the resistance between the A and B terminals according to the table.

Temperature	84° (183°F)	90° (194°F)	108° (226°F)	110° (230°F)
Resistance (KΩ)	1.047—1.255	0.872—1.024	0.519—0.573	0.489—0.541

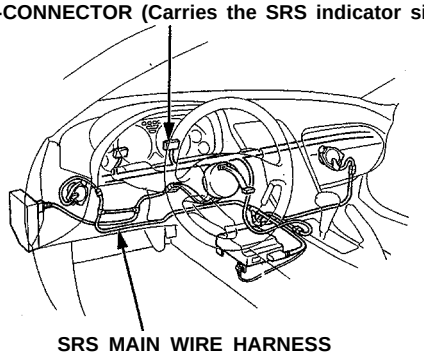
5. If unable to obtain the above readings, replace the temperature switch.

Gauge Assembly

Gauge/Indicator Location Index

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the gauge assembly.



SPEEDOMETER:
indicates 60 mdh [60 km/h] at 1.026 [637] rpm of the speed sensor.

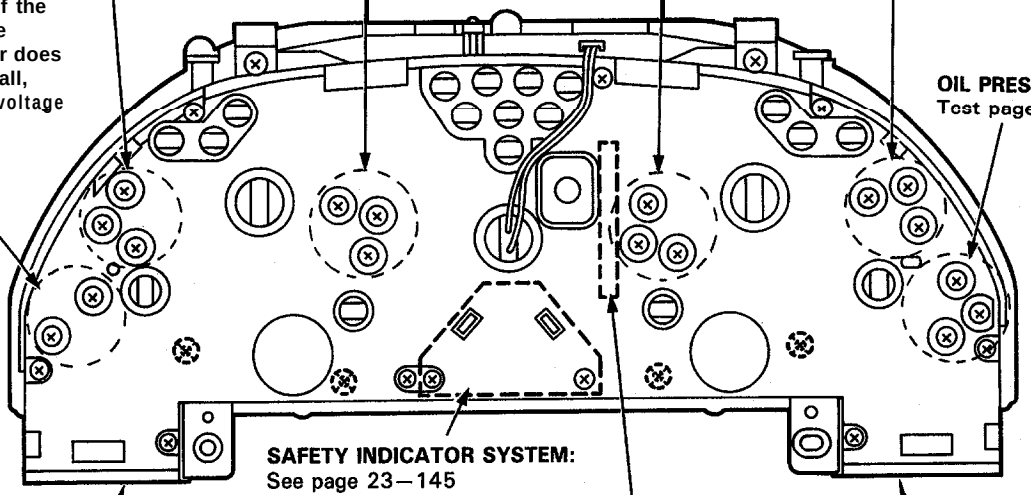
FUEL GAUGE:
- Gauge Test, page 23—134
- Sending Unit Test, page 23-135

TACHOMETER:
Indicates 100r/min at 300 pulses per minute of the igniter unit.

COOLANT TEMPERATURE GAUGE:
- Gauge Test, page 23-136
- Sender Test, page 23-136

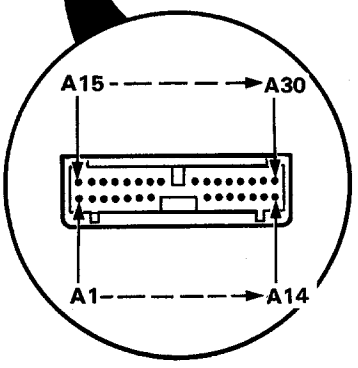
VOLTAGE METER:
The No.5 (15A) fuse and other gauges are OK, but if the pointer of the voltage meter does not move at all, replace the voltage meter.

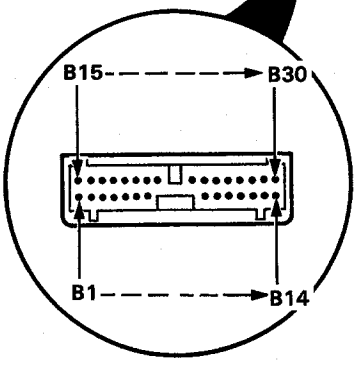
OIL PRESSURE GAUGE:
Test page 23-137



SAFETY INDICATOR SYSTEM:
See page 23—145

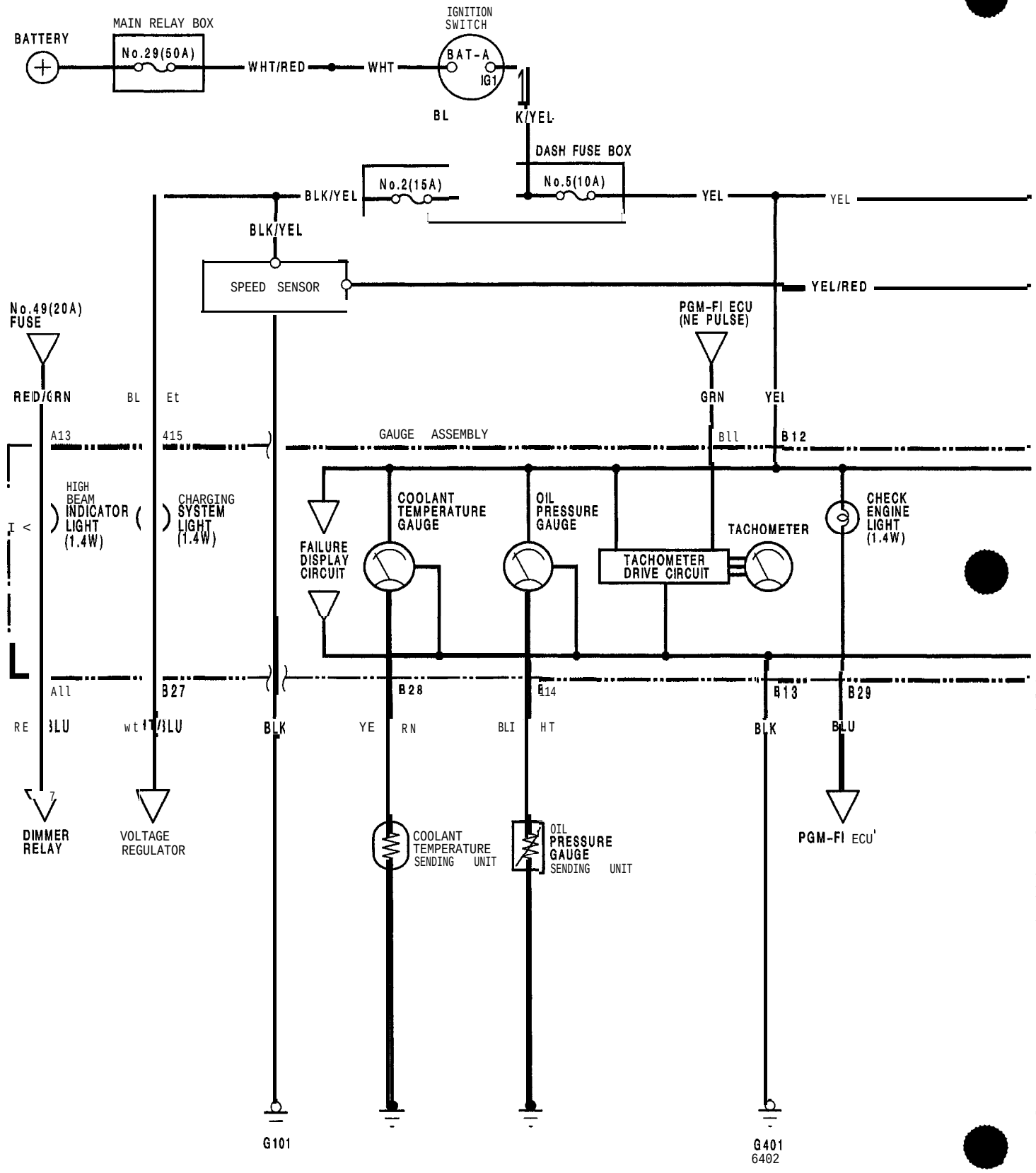
SHIFT LEVER POSITION INDICATOR:
See page 23-I 52

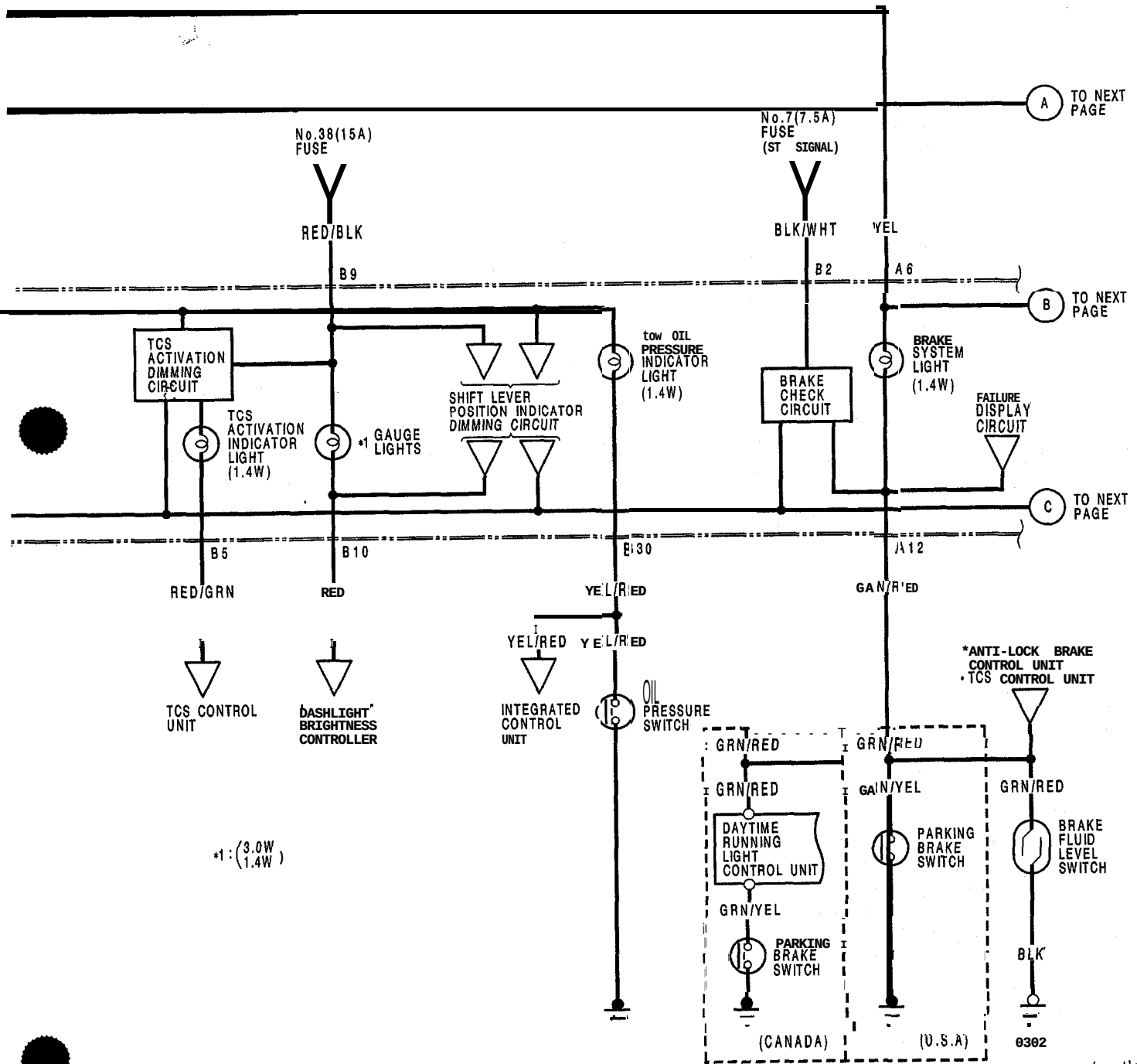




Gauge Assembly

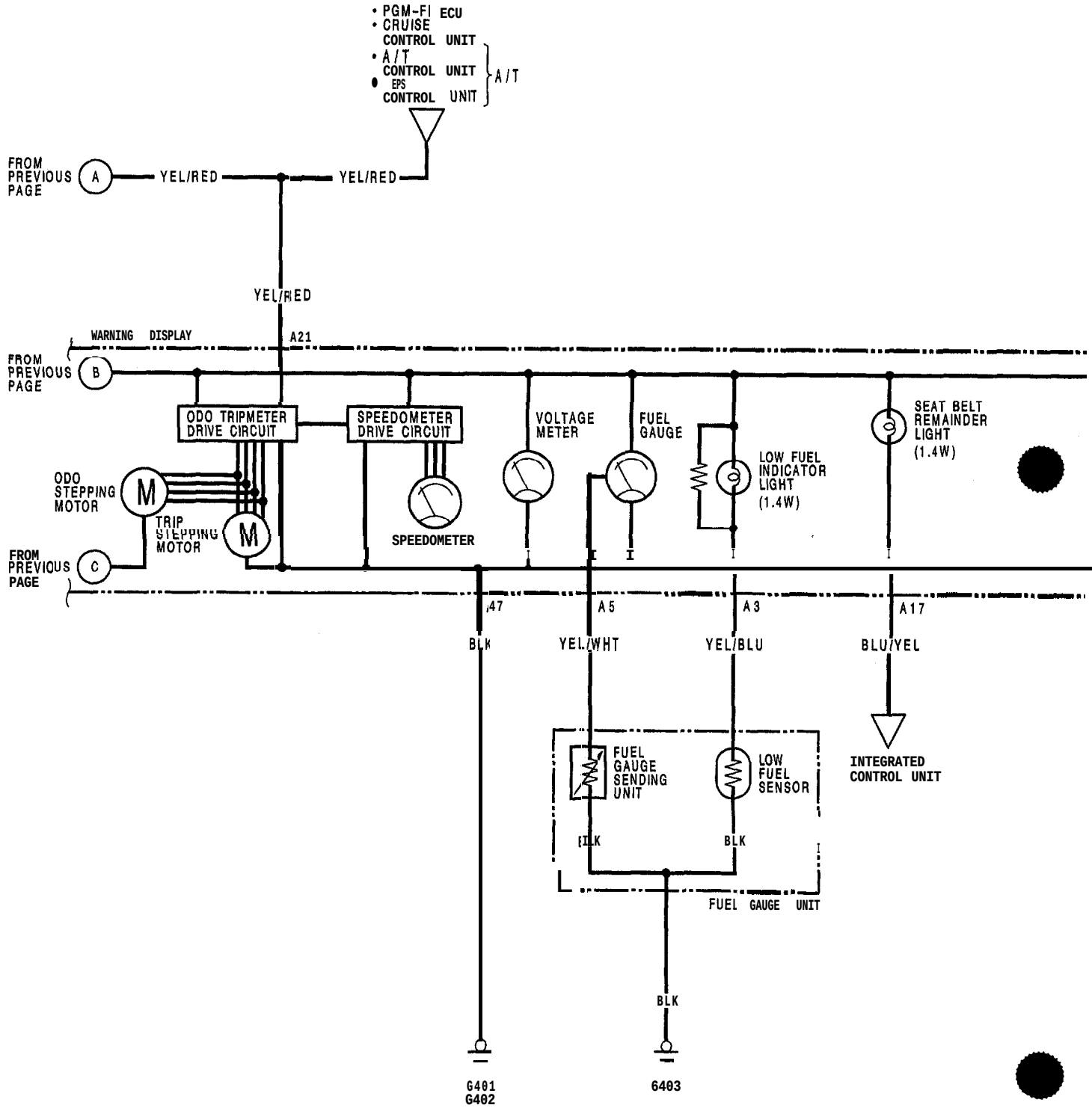
- Circuit diagram

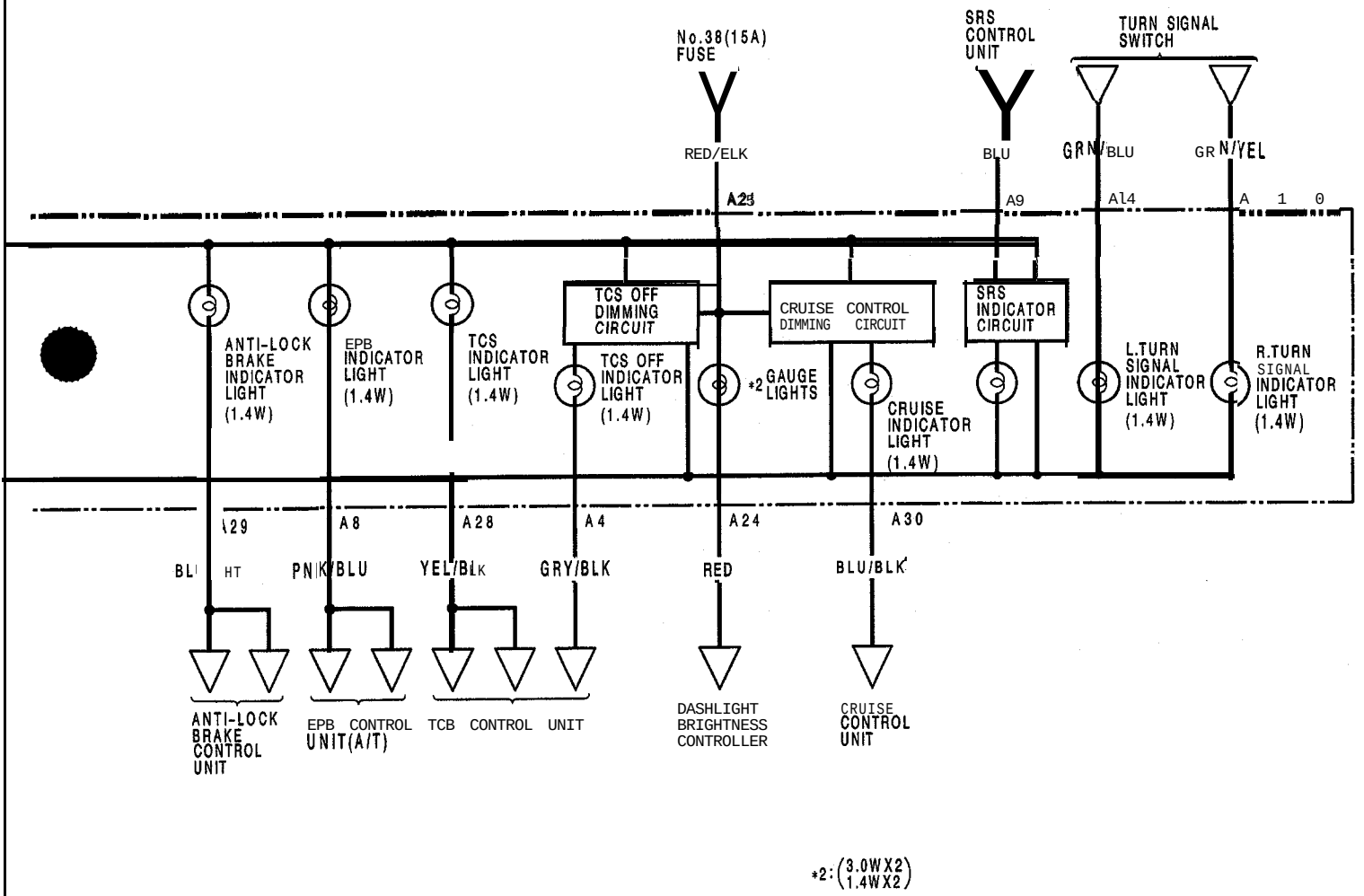



A
TO NEXT PAGE
No.38(15A) FUSE
No.7(7.5A) FUSE (ST SIGNAL)
RED/BLK
BLK/WHT
YEL
B9
B2
A6
B
TO NEXT PAGE
TCS ACTIVATION DIMMING CIRCUIT
TCS ACTIVATION INDICATOR LIGHT (1.4W)
*1 GAUGE LIGHTS
SHIFT LEVER POSITION INDICATOR DIMMING CIRCUIT
tow OIL PRESSURE INDICATOR LIGHT (1.4W)
BRAKE CHECK CIRCUIT
BRAKE SYSTEM LIGHT (1.4W)
FAILURE DISPLAY CIRCUIT
C
TO NEXT PAGE
B5
B10
B30
A12
RED/GRN
RED
YEL/RED
GRN/RED
YEL/RED
YEL/RED
TCS CONTROL UNIT
DASHLIGHT BRIGHTNESS CONTROLLER
INTEGRATED CONTROL UNIT
OIL PRESSURE SWITCH
*ANTI-LOCK BRAKE CONTROL UNIT
TCS CONTROL UNIT
GRN/RED
GRN/RED
GRN/RED
GRN/YEL
GRN/YEL
DAYTIME RUNNING LIGHT CONTROL UNIT
PARKING BRAKE SWITCH
PARKING BRAKE SWITCH
BRAKE FLUID LEVEL SWITCH
GRN/YEL
BLK
(CANADA)
(U.S.A)
0302
*1 : (3.0W / 1.4W)

(cont'd)

Circuit Diagram (cont'd)



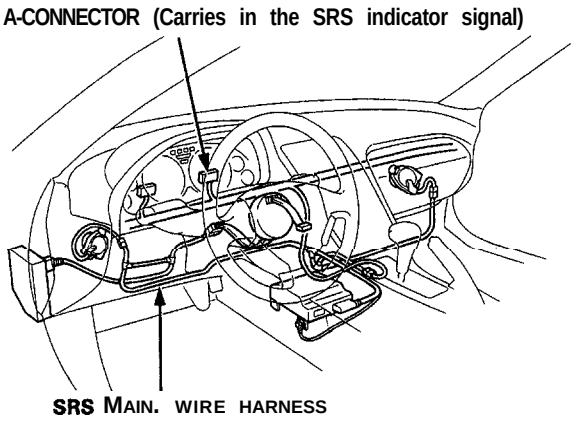

No.38(15A) FUSE
SRS CONTROL UNIT
TURN SIGNAL SWITCH
RED/ELK
BLU
GRN/BLU
GRN/YEL
A25
A9
A14
A10
ANTI-LOCK BRAKE INDICATOR LIGHT (1.4W)
EPB INDICATOR LIGHT (1.4W)
TCS INDICATOR LIGHT (1.4W)
TCS OFF DIMMING CIRCUIT
TCS OFF INDICATOR LIGHT (1.4W)
*2 GAUGE LIGHTS
CRUISE CONTROL DIMMING CIRCUIT
CRUISE INDICATOR LIGHT (1.4W)
SRS INDICATOR CIRCUIT
L.TURN SIGNAL INDICATOR LIGHT (1.4W)
R.TURN SIGNAL INDICATOR LIGHT (1.4W)
A29
A8
A28
A4
A24
A30
BLU/BLK
PNK/BLU
YEL/BLK
GRY/BLK
RED
BLU/BLK
ANTI-LOCK BRAKE CONTROL UNIT
EPB CONTROL UNIT(A/T)
TCB CONTROL UNIT
DASHLIGHT BRIGHTNESS CONTROLLER
CRUISE CONTROL UNIT
*2: (3.0WX2) (1.4WX2)

Gauge Assembly

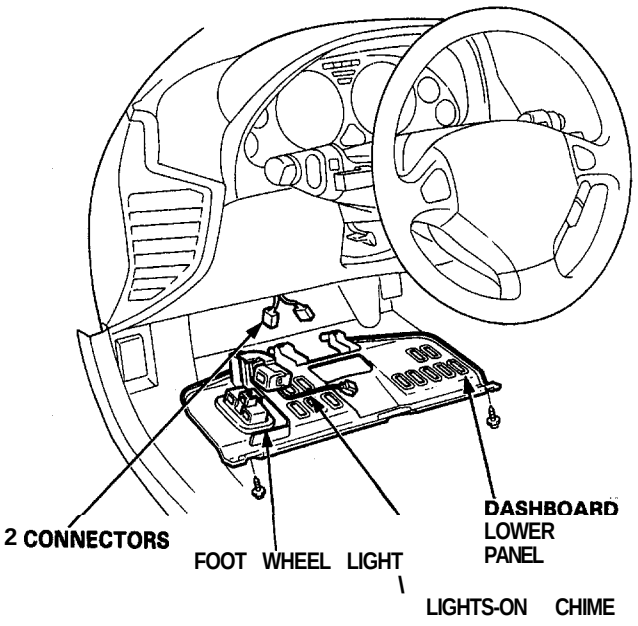
- Removal

CAUTION:

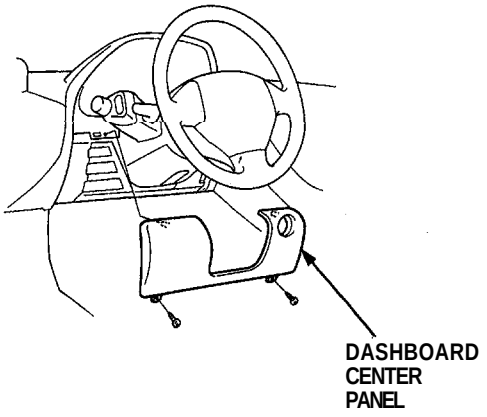
- All SRS electrical wiring harnesses are covered with yellow outer insulaton.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.
- After installation of the gauge assembly, recheck the operation of the SRS Indicator light.



1. Remove the dashboard lower panel and disconnect the two connectors from the floor wire harness.

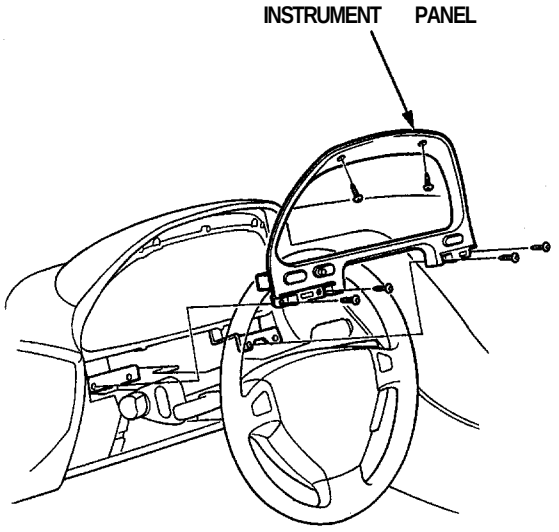


2. Remove the 2 screws, then remove the dashboard center panel from the dashboard.

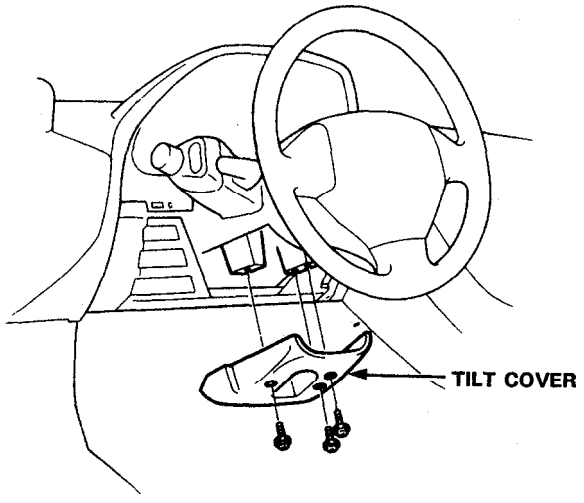


3. Disconnect the TCS switch and the retractor switch connectors.

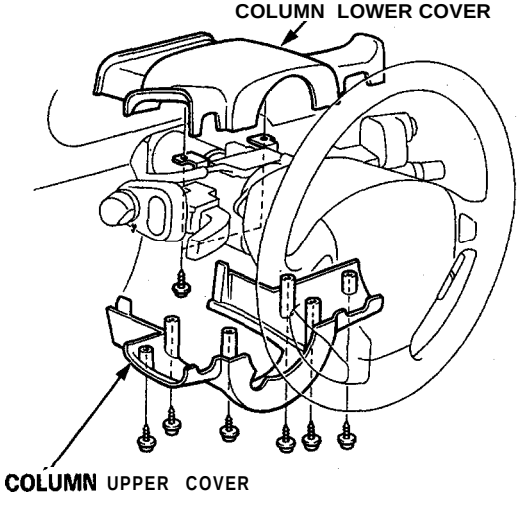
4. Remove the 6 screws, then remove the instrument panel from the dashboard.



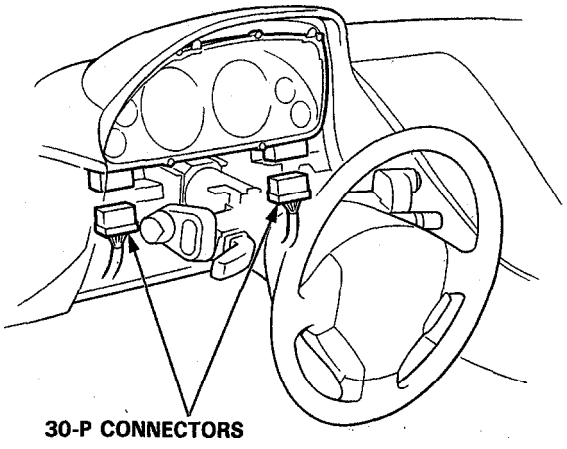
5. Remove the 2 screws, then remove the tilt cover from the steering column.



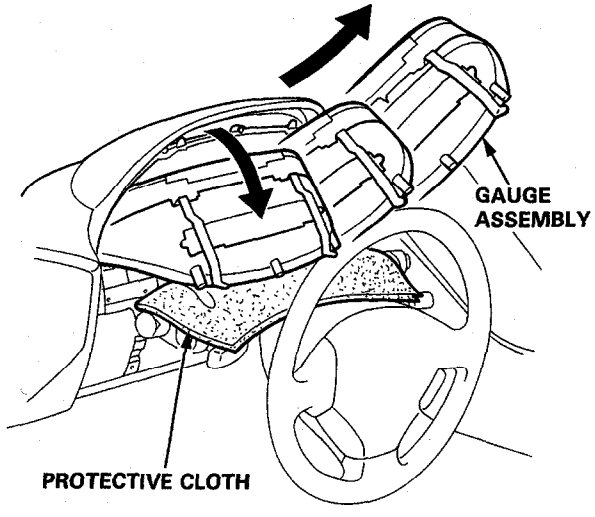
6. Remove the 8 screws, then remove the steering column upper and lower covers.



7. Disconnect the 30-P connectors from both sides from the gauge assembly.

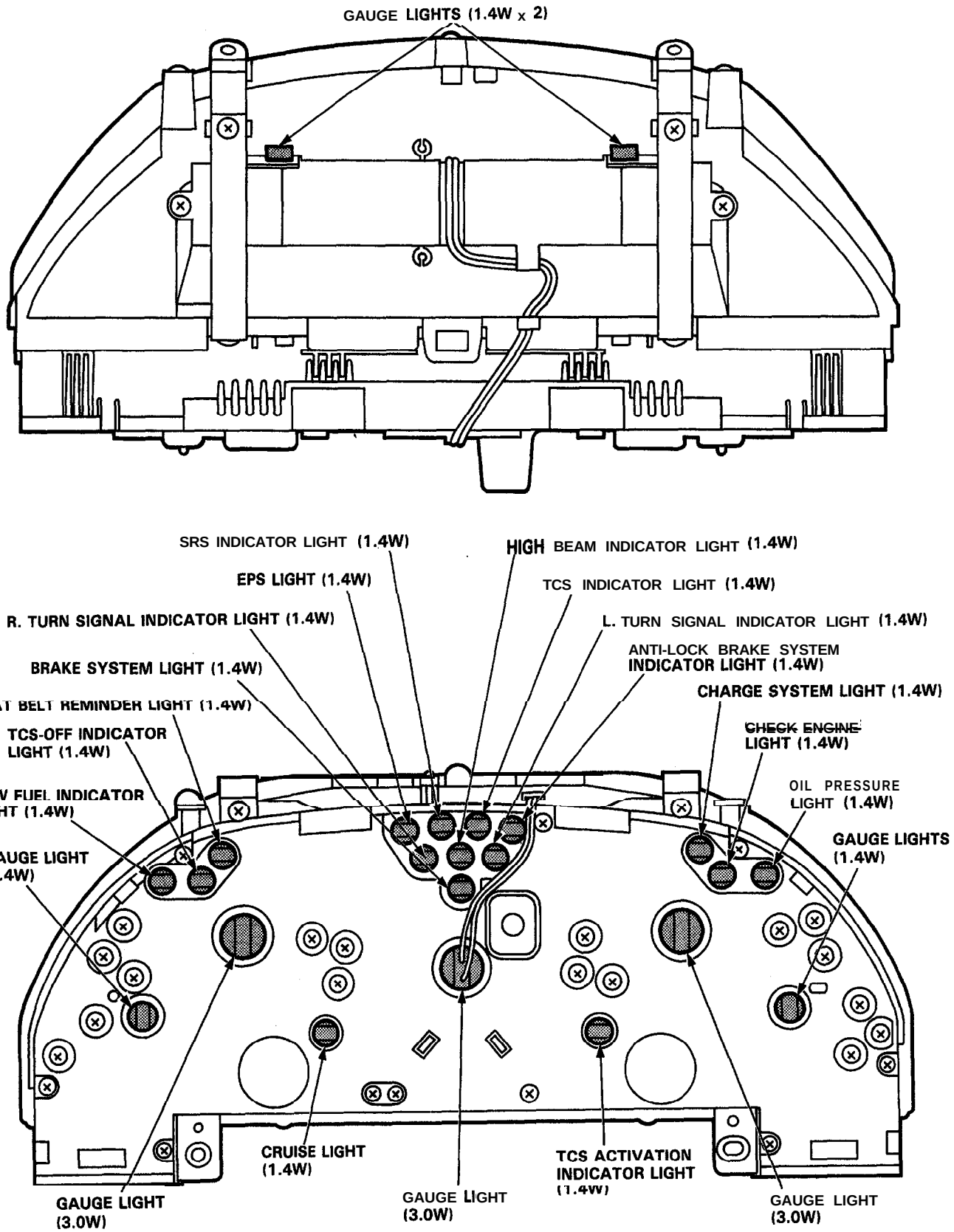


8. Use a protective cloth on the combination switch to prevent scratching the gauge assembly. Remove the 4 screws, then take out the gauge assembly as shown.



Gauge Assembly

-Bulb Locations

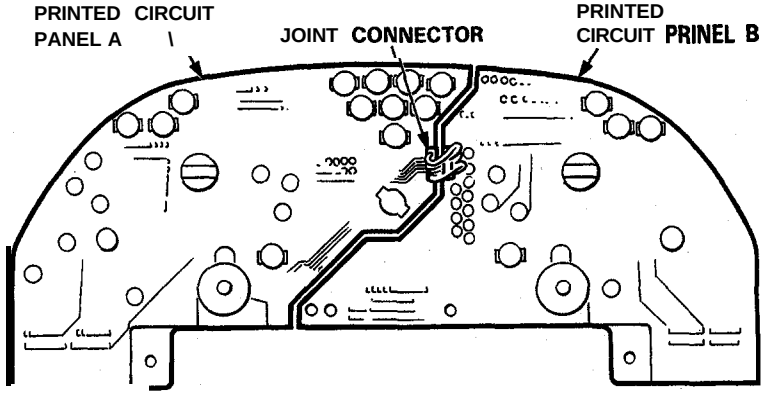


Speedo/Tripmeter/Odometer

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown No. 5 (10A)fuse (in the dash fuse box)	Speedometer	Odometer	Tripmeter	Printed circuit panel A	Printed circuit panel B	Speed sensor input test	Speed sensor is not in stalled correctly	Undone joint connector	Poor ground	Open circuit in wires or loose or disconnected terminals
Speedomter operates, but deflection error is great.					2			1			
Odometer and tripmeter operate, but speedometer does not operate.		1			2						
Speedometer and tripmeter operate, but odometer does not operate.			2		4	3			1		
Speedometer and odometer operate, but tripmeter does not operate.				1	2						
Speedometer operates, but odometer and tripmeter do not operate.					1						
Speedometer, odometer and tripmeter do not operate.	1				3		2			G401 G402	YEL

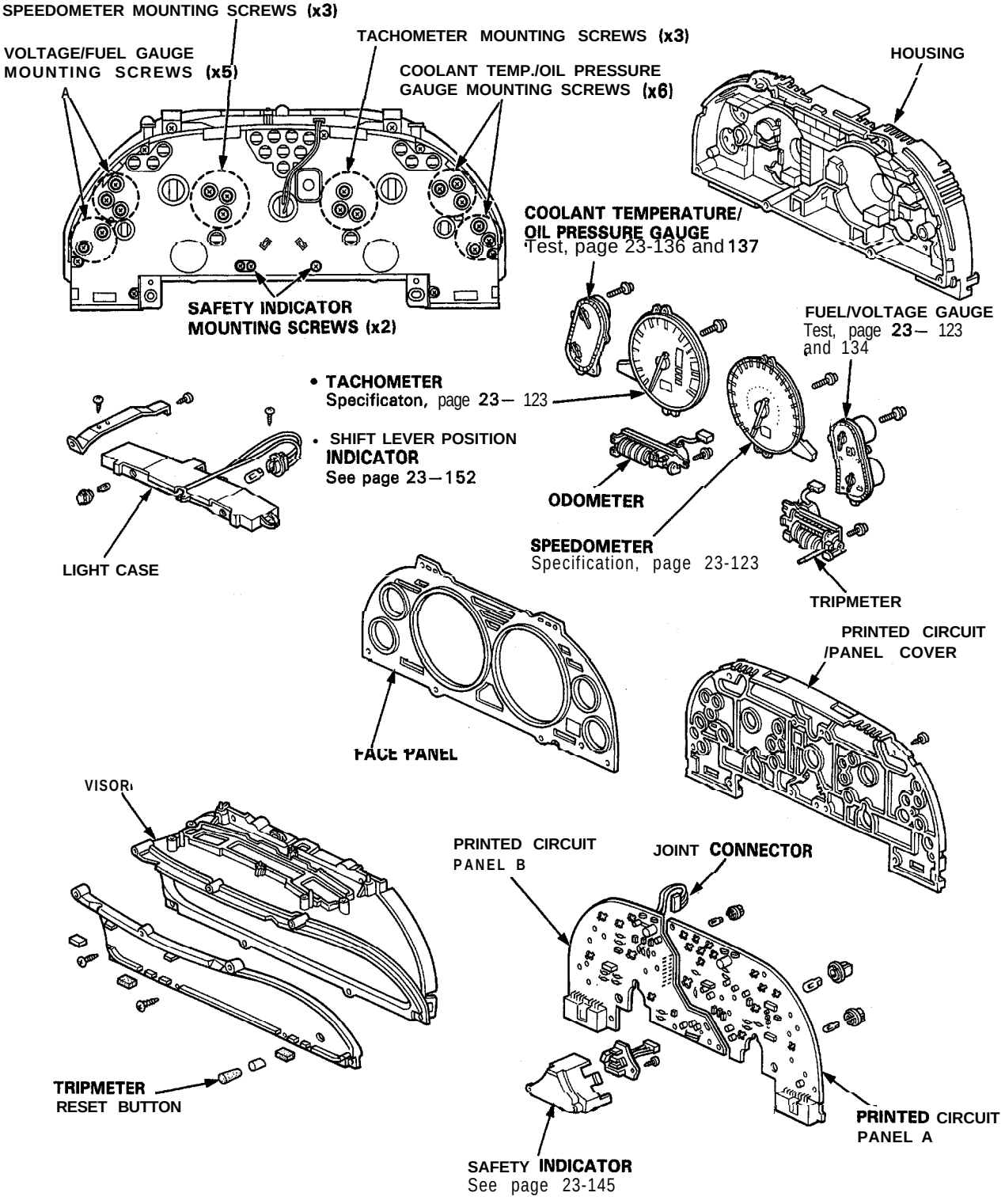


View from the back of the gauge assembly.

Gauge Assembly

– Disassembly

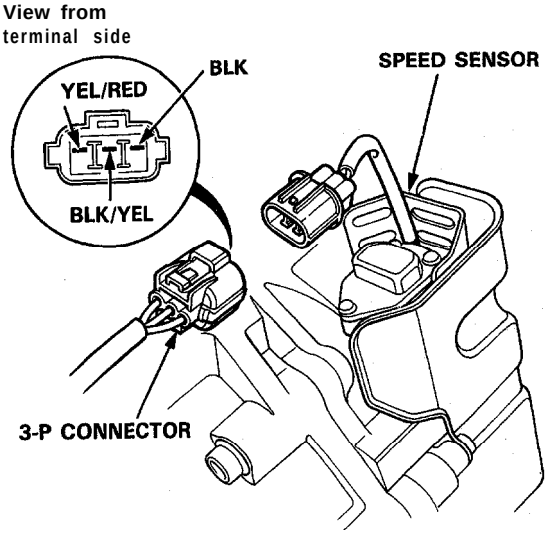
NOTE:
- Handle the terminals and printed circuit panels carefully to avoid damaging them.
- If replacement is required, replace the speedometer, tripmeter and printed circuit panel A as a unit.
- If replacement is required, replace the tachometer, odo meter and printed circuit panel B as a unit.



-Speed Sensor Input Test

NOTE: Check the No. 2 (1 5 A) fuse in the dash fuse box, before tesing.

1. Disconnect the 3-P connector from the speed sensor.



2. Check for continuity between the BLK terminal and the body ground.
   There should continuity.
   - If there is no continuity, check for:
     - An open in the BLK wire.
     - Poor ground (G101)
   - If there is continuity, go to step 3.

3. Check for voltage between the BLK/YEL terminal and the body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for an open in the BLK/YEL wire.
   - If there is battery voltge, go to step 4.

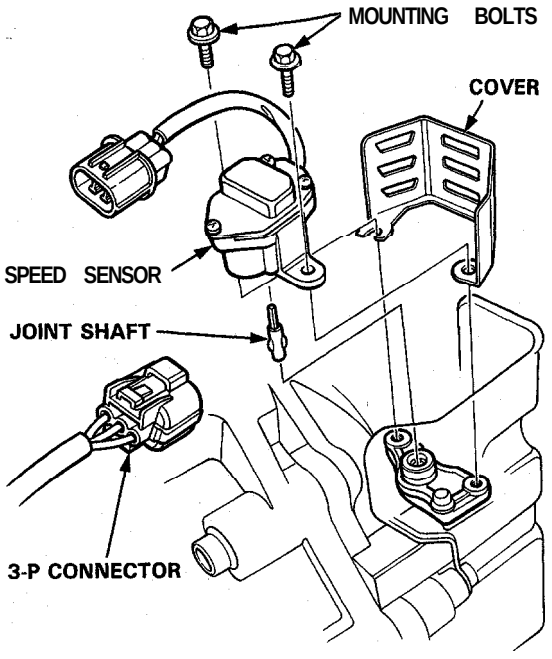
4. Check for voltage between the YEL/RED terminal and body ground with the ignition switch ON.
   There should be approximately 5 V.
   - If there is no voltage, check for:
     - Defective gauge assembly, check for the A21 terminal of the A connector. (See page 23— 123)
   - If there is approximately 5 V, go to step 5.

5. If all continuity and voltage tests are normal, but the speedometer and the odo/tripmeter do not operate, replace the speed sensor.

-Replacement

1. Disconnect the 3-P connector from the speed sensor.

2. Remove the mounting bolts and the speed sensor, then take out the speed sensor assembly.



3. Install in the reverse order of removal.
   NOTE: Be careful not to lose the joint shaft, because it is a tiny part.

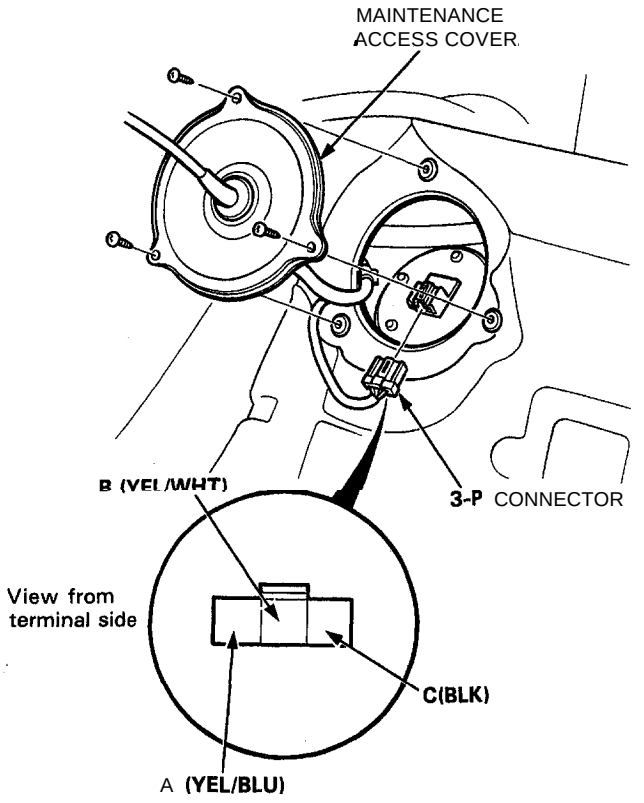
Fuel Gauge

Gauge Test

NOTE:
- Refer to page 23— 126 for wiring description of the fuel gauge system circuit.
- Check the No.5 (IO A) fuse in the dash fuse box before testing.

1. Remove the maintenance access cover.

2. Disconnect the 3-P connector from the fuel gauge sending unit.



3. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the C (BLK) terminal, then turn the ignition switch ON. There should be between 5 and BV.

- If the voltage is as specified, go to step 4.
- If the voltage is not as specified, check for:
  - An open in the YEL, YEL/WHT or BLK wire.
  - Poor ground (G403)

4. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and C (BLK) terminals.

Turn the ignition switch ON.
Check that the pointer of the fuel gauge starts moving toward "F" mark.

CAUTION: Turn the ignition switch OFF before the pinter reaches "F" mark on the gauge dial. Failure to turn the ignition switch OFF before the pointer reaches the "F" mark may cause damage to the fuel gauge.

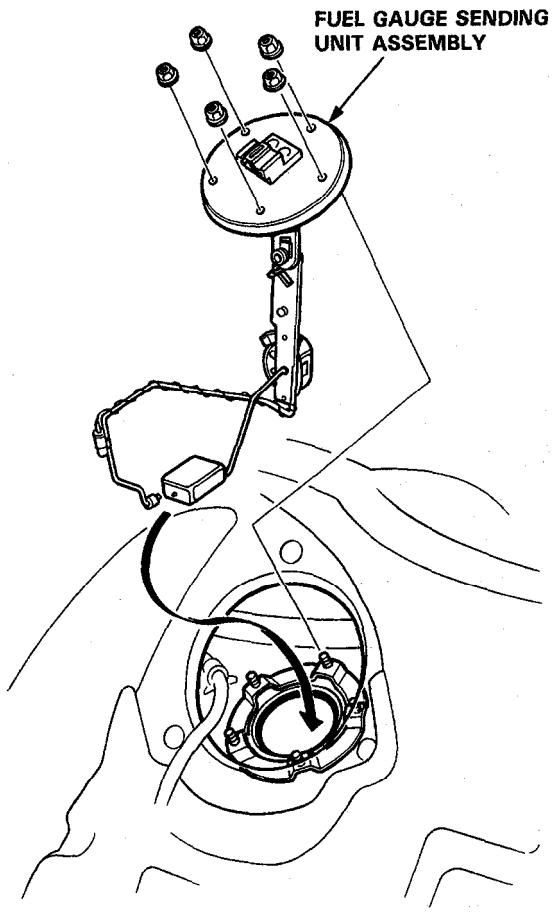
NOTE: The fuel gauge is a bobbin (cross coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

- If the pointer of the fuel gauge does not swing at all, replace the gauge.
- Inspect the fuel gauge sending unit if the gauge is OK.

Sending Unit Test

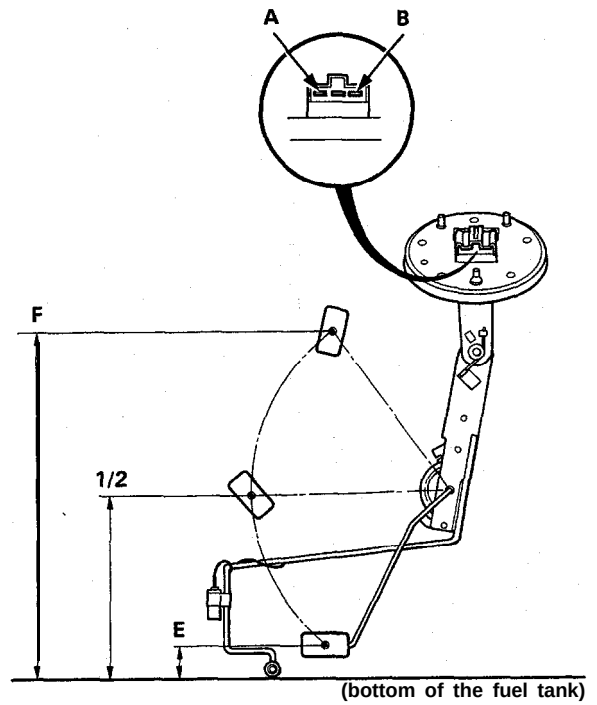
WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Remove the maintenace access cover.
2. With the ignition switch OFF, disconnect the 3-P connector from the fuel gauge sending unit.
3. Remove the 5 nuts, then take out the fuel gauge sending unit assembly from the fuel tank.



4. Measure the resistance between the A and B terminals at E (EMPTY), 'I/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	112	F
Resistance (Ω)	105-I 10	25.5–39.5	2 - 5



E	1/2	F
25.0mm (0.98in)	144mm (5.67in)	275mm (10.8in)

5. If unable to obtain the above readings, replace the fuel gauge sending unit.

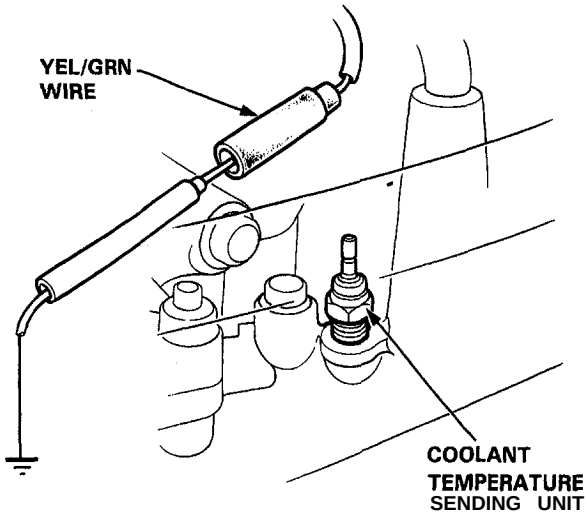
Coolant Temperature Gauge

Gauge Test

NOTE:

- Refer to page 23-I 24 for wiring description of the coolant temperature gauge circuit.
- Check the No. 5 (IO A) fuse in the dash fuse box before testing.

1. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature gauge sender and ground it with a jumper wire.



2. Turn the ignition switch ON.
   Check that the pointer of the coolant temperature gauge starts moving toward "H" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "H" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

   - If the pointer of the gauge does not swing at all, check for:
     - An open in the YEL or YEL/GRN wire.

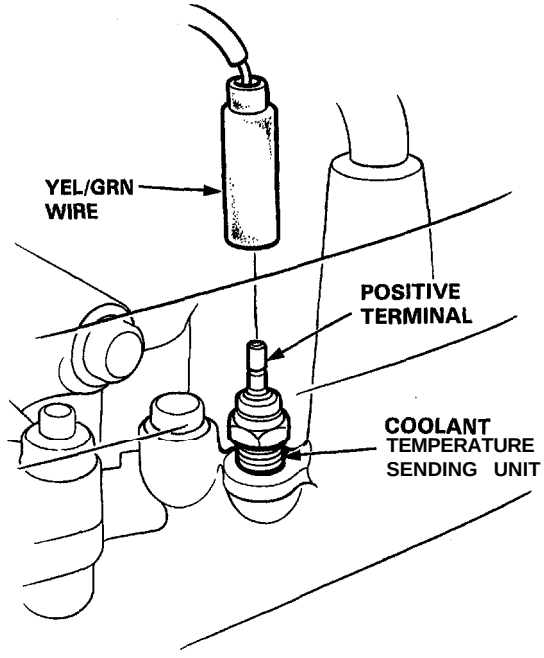
       Repalce the coolant temperature gauge if the fuse and wiring are normal.

   - Inspect the gauge sender if the gauge is OK.

Sending Unit Test

1. Disconnect the YEL/GRN wire from the sender.

2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



3. Check the temperature of the coolant.

4. Run the engine and measure the change in resistance with the enigne at operating temperature (Cooling fan comes on).

Temperature	56°C (133°F) ["C" mark]	85°C (185°F)— 100°C (212°F)
Resistance (Ω)	142	49-32

5. If obtained readings are substantially different from specifications above, replace the gauge sender.

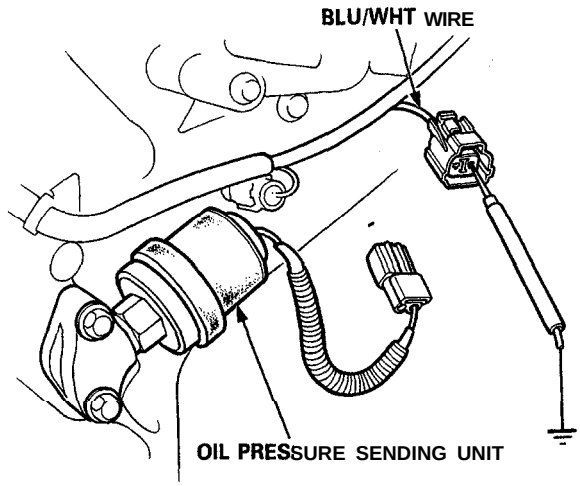
Oil pressure gauge

-Gauge Test

NOTE:

- Refer to page 23-124 for wiring description of the coolant temperature gauge circuit.
- Check the No.5 (IO A) fuse in the dash fuse box before testing.

1. Make sure the ignition switch is OFF, then disconnect the 2-P connector from the oil pressure sending unit and ground it with a jumper wire.



2. Turn the ignition switch ON.
   Check that the pointer of the oil pressure gauge starts moving toward "8" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "8" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

   - If the pointer of the gauge does not swing at all, check for:
     - An open in the YEL or BLU/WHT wire.

       Replace the oil pressure gauge if the fuse and wiring are normal.

   - Inspect the engine oil pressure if the gauge is OK.

3. Chcek the oil pressure of the engine (See section 8).

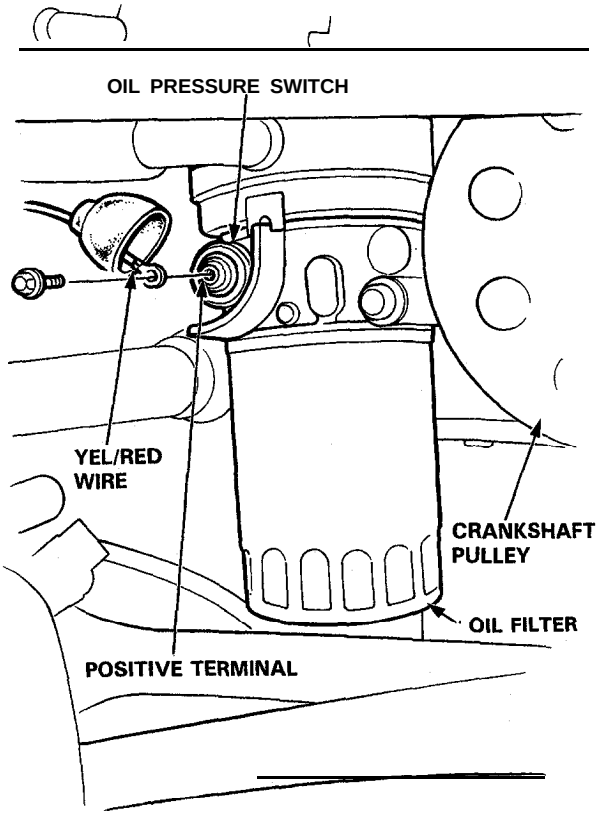
   - Replace the oil pressure sending unit if the engine oil pressure is OK.

Oil pressure Warning System

- Oil Pressure Switch Test

1. Raise the car and place safety stands in the proper locations (See section 1).
2. Remove the right rear tire.
3. Remove the YEL/RED wire from the oil pressure switch.

   There should be continuity between the positive terminal and the engine (ground) with the engine stopped. There should be no continuity when the engine runs.

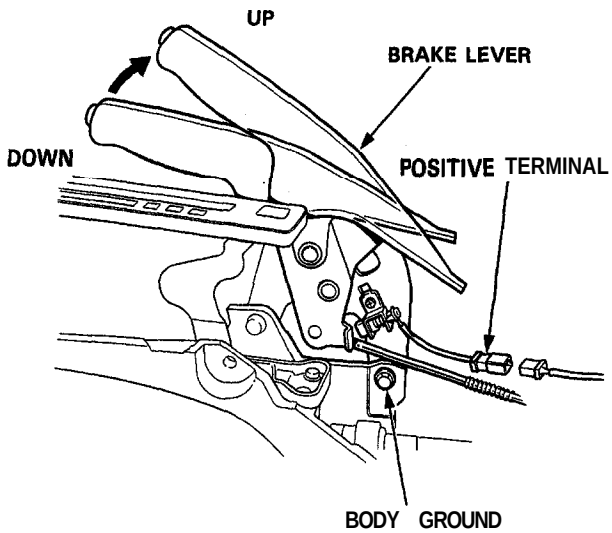


4. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level is correct (see section 8).

Brake Warning System

-Parking Brake Switch Test

1. Remove the center console and disconnect the connector from the switch.
2. There should be continuity between the positive terminal and body ground with the brake lever up. There should be no continuity with the brake lever down.

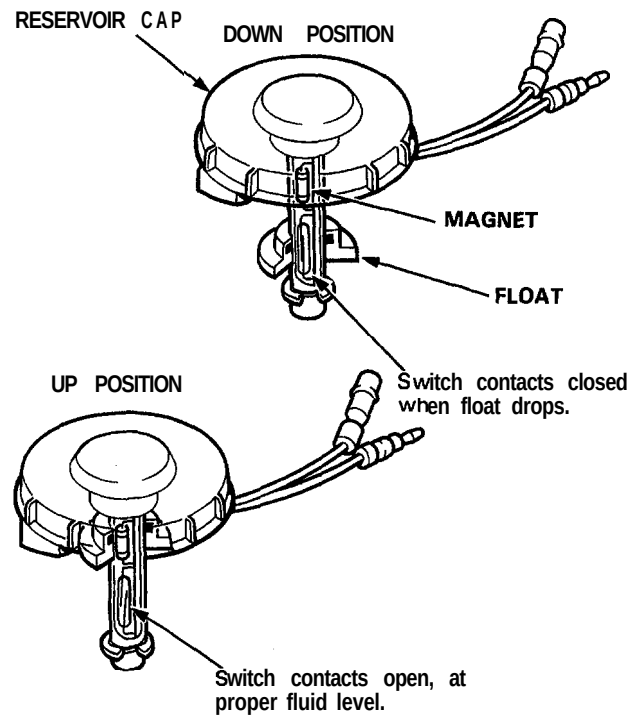


NOTE: CANADA only

If the parking brake switch is OK but the brake warning system does not function, perform input test for daytime running light control unit (see page 23-176)

-Brake Fluid Level Switch Test

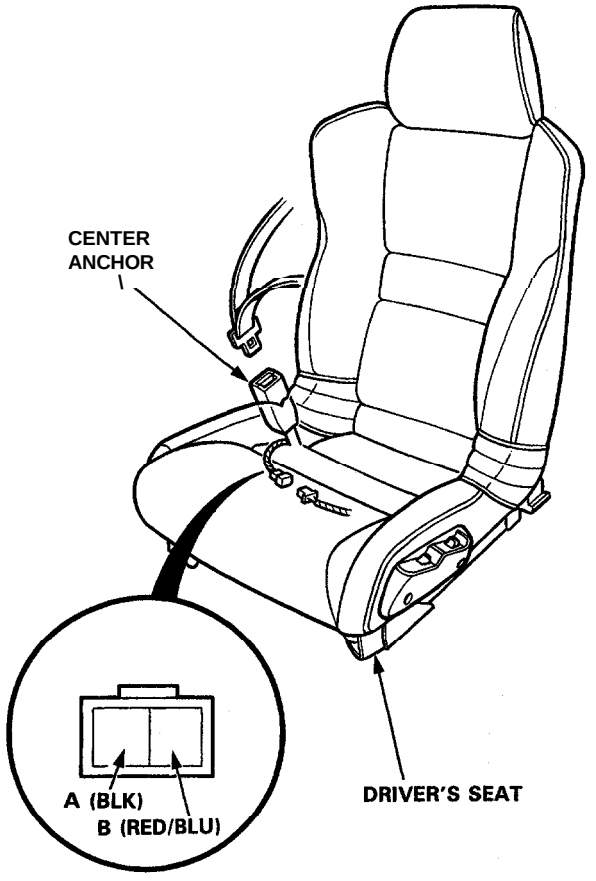
1. Remove the reservoir cap. Check that the float moves up and down freely.
   Replace the reservoir cap assembly if the float does not move freely.
2. Check for continuity between the terminals with the float up and down.
   There should be continuity with the float and no continuity with the float up.
   Replace the reservoir cap assembly if necessary.



Seat Belt Reminder System

Seat Belt Switch Test

1. Slide the driver's seat forward until the seat belt center anchor bolt is accessible, then disconnect the 2-P connector from the seat belt switch.
2. There should be continuity between the A and B terminals when the driver's seat belt is not buckled. There should be no continuity when the driver's seat belt is buckled.



View from wire side

Low Fuel Indicator System

Indicator Light Test

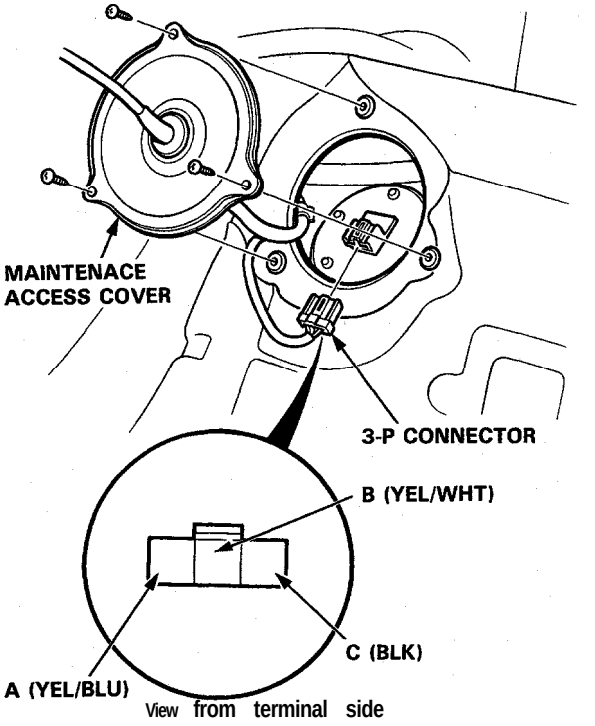
NOTE: Refer to page 23-I 26 for wiring description of the low fuel indicator circuit.

1. Park car on level ground.

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

2. Drain fuel tank into an approved container. Then install the drain bolt with a new washer.
3. Add less than 11 ℓ (2.4 U.S.Gal, 2.9 Imp. Gal) of fuel and turn the ignition switch on. The low fuel Indicator light should come on within 4 minutes.
4. Then add one more gallon of fuel [approx. 4 ℓ (1.1 U.S. Gal, 0.9 Imp. Gal)] The light should go out within 4 minutes.

   - If the light did not come on in step 3, remove the maintanace access cover and disconnect the 3-P connector from the fuel gauge sending unit. Connect the A (YEL/BLU) teminal to the C (BLK) terminal with a jumper wire.
     - If the light comes on, the problem is either the sending unit or its ground.
     - If the light does not come on, the problem is an open in the YEL/BLU wire to the gauge assembly, no power to the gauge or bad bulb.



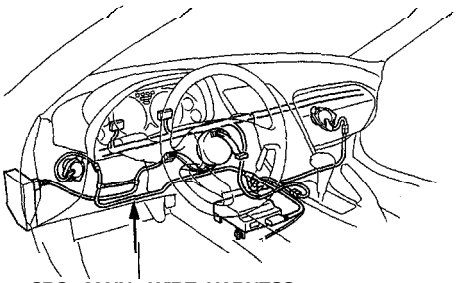
View from terminal side

Interlock System

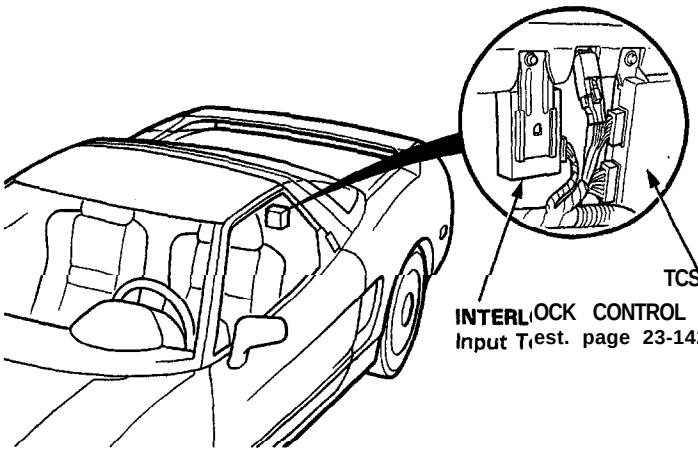
Compornent Location Index

WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuit.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the interlock system.



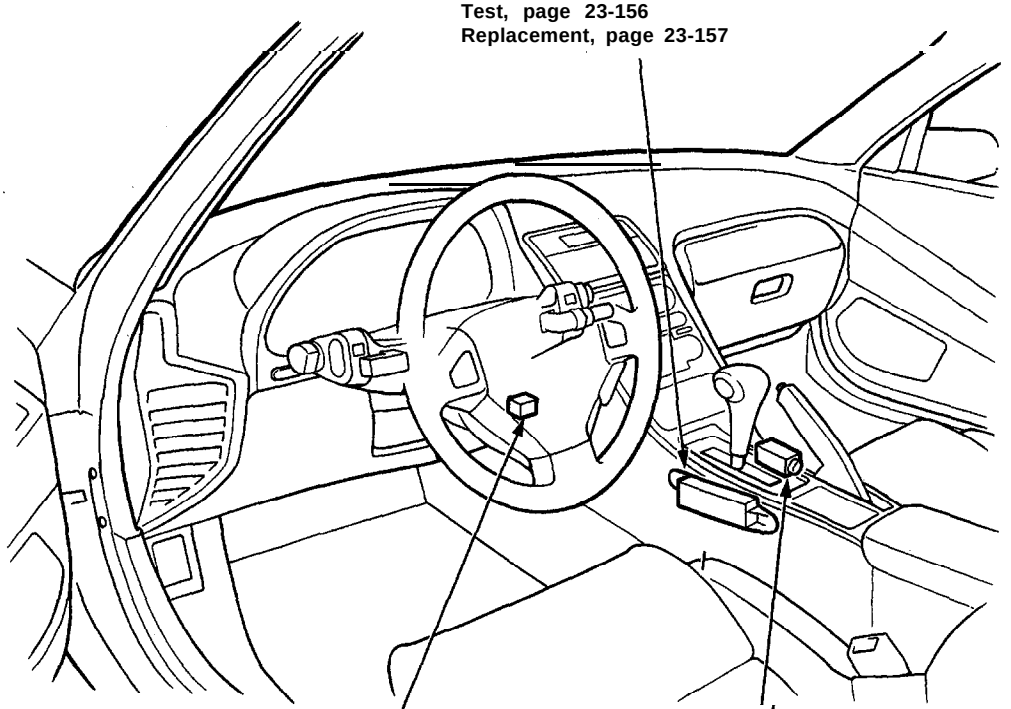
SRS MAIN WIRE HARNESS



TCS CONTROL UNIT

INTERLOCK CONTROL UNIT,
Input Test. page 23-142

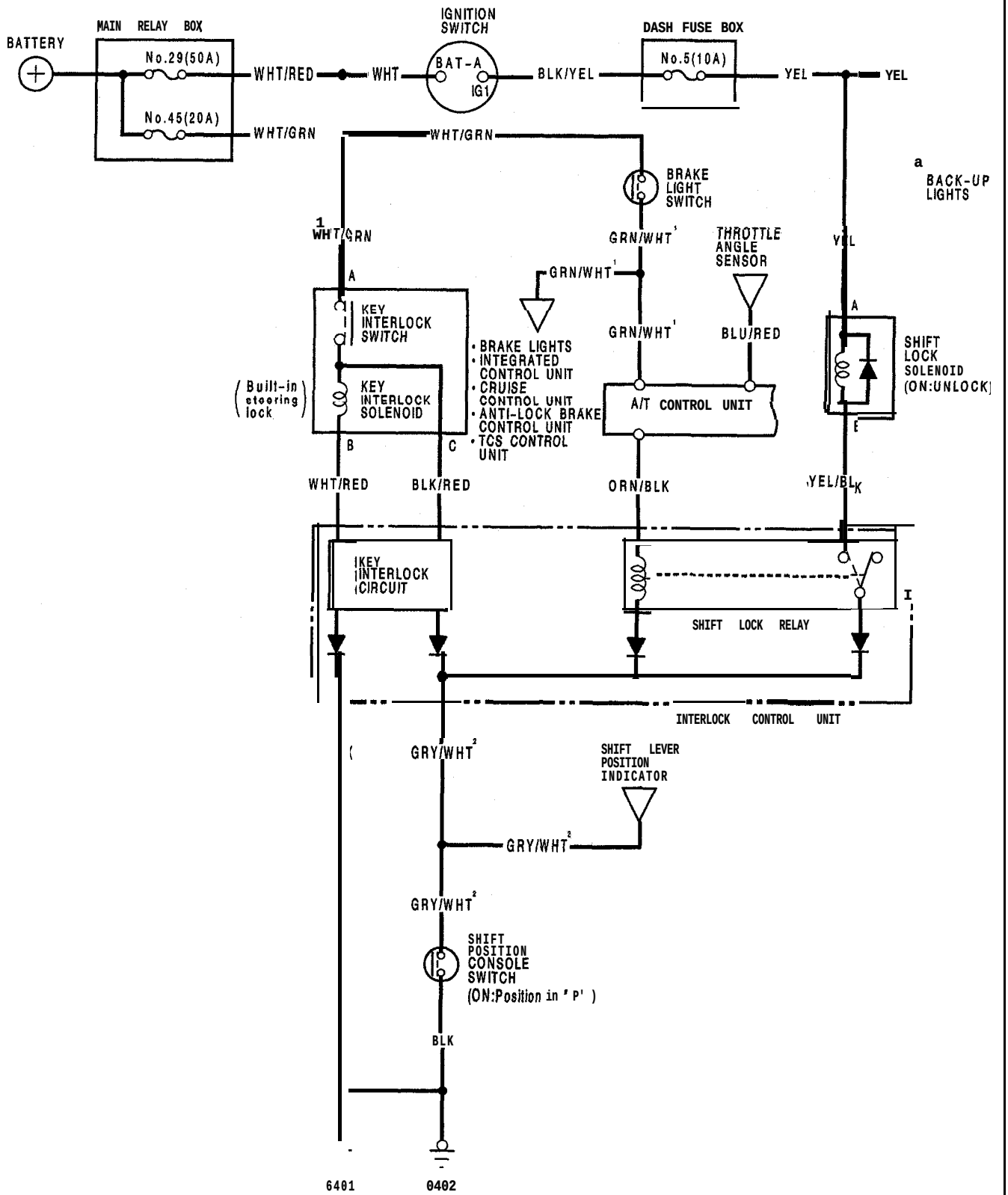
SHIFT POSITION CONSOLE SWITCH
Test, page 23-156
Replacement, page 23-157



KEY INTERLOCK, SOLENOID
and KEY INTERLOCK SWITCH
(in the steering lock assembly)
Test, page 23-143

SHIFT LOCK SOLENOID
Test, page 23-144
Replacement, page 23-144

Circuit Diagram

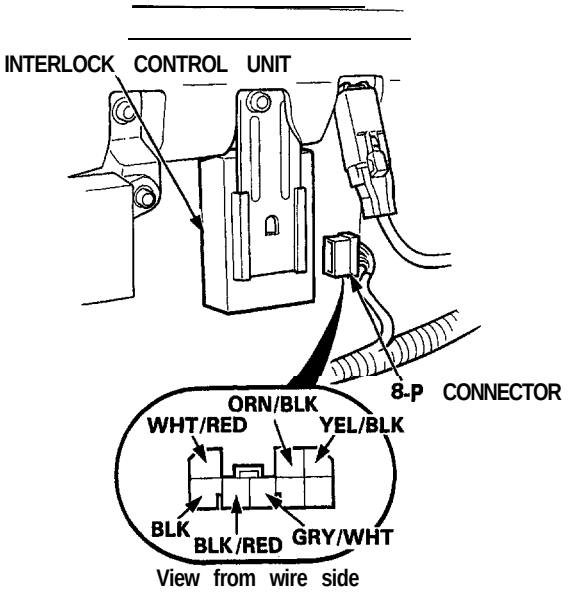


Interlock System

-Control Unit Input Test

Disconnect the 8-P connector from the control unit.
Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, substitute the control unit with a known-good one. If the system is OK, replace the control unit.

NOTE: If the shift lock solenoid clicks when the ignition switch is ON and the brake pedal is pushed (the shift lever is in the P position), the shift lock system is electronically normal. If the shift lever cannot be shifted from P position, see page 23-l 56 and section 14.



Shift Lock System:

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	ORN/BLK	Ignition switch ON. Brake pedal pushed.	Check for voltage to ground: should be battery voltage.	• Blown No. 45 (20 A) fuse. • Faulty brake light switch. • Faulty throttle angle sensor. • Faulty A/T control unit. • An open in the wire.
		Ignition switch ON. Step on the brake pedal and the accelerator at the same time.	Check for voltage to ground: should not be battery voltage.	
2	GRY/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch. • Poor ground (G401, G402). • An open in the wire.
3	YEL/BLK	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10 A) fuse. • Faulty shift lock solenoid. • An open in the wire.

Key Interlock System:

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	GRN/WHT[2]	Shift lever position in P.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch. • Poor ground (G401, G402). • An open in the wire.
3	WHT/RED	Ignition switch turned to ACC and the key pushed in.	Check for voltage to ground: should be battery voltage.	• Blown No. 45 (20 A) fuse. • Faulty steering lock assembly (key interlock solenoid). • An open in the wire.
4	BLK/RED	Ignition switch turned to ACC and the key pushed in.	Check for voltage to ground: should be battery voltage.	• Blown No. 45 (20 A) fuse. • Faulty steering lock assembly (key interlock solenoid). • An open in the wire.

-Key Interlock Solenoid Test

1. Remove the dashboard lower panel and center panel.

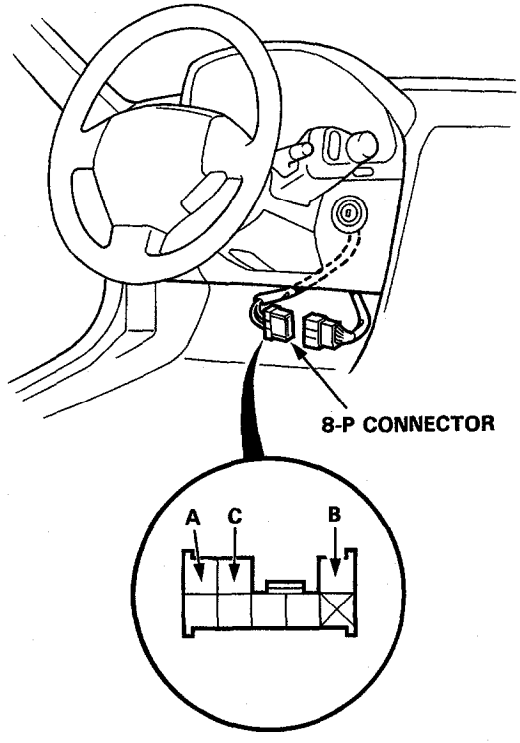
2. Disconnect the 8-P connector from the floor wire harness.

3. Check for continuity between the terminal in each switch position according to the table.

Position \ Terminal		A	B	C
Ignition switch ACC	Key pushed in.	C	O	O
	Key released.		o	4

4. Check that the key cannot be removed when the battery is connected to the A and C terminals.

   - If the key cannot be removed, the key interlock solenoid is OK.
   - If the key can be removed, replace the steering lock assembly (key interlock solenoid is not available separately).



View from wire side

Interlock System

Shift Lock Solenoid Test/Replacement

Test:

1. Remove the console, then disconnect the 3-P connector of the shift lock solenoid from the dashboard wire harness.

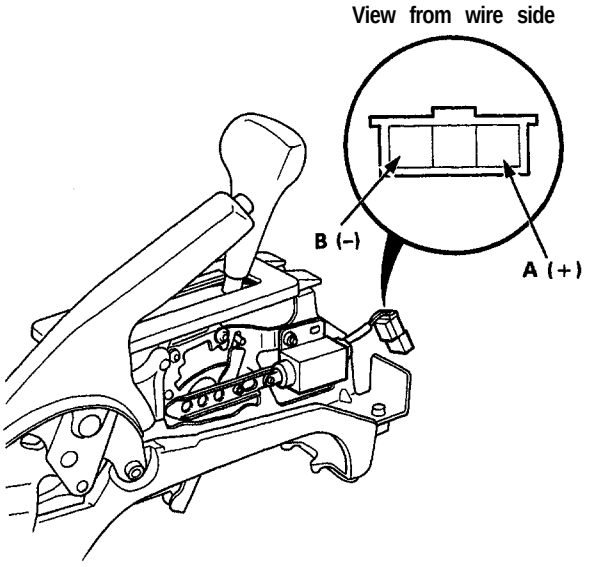
NOTE:

- Do not connect the battery terminals to wrong polarities because a diode is inside the solenoid.

2. Connect the battery positive to the A terminal and negative to the B terminal momentarily. Check the solenoid operation. If does not operate, replace it.

NOTE:

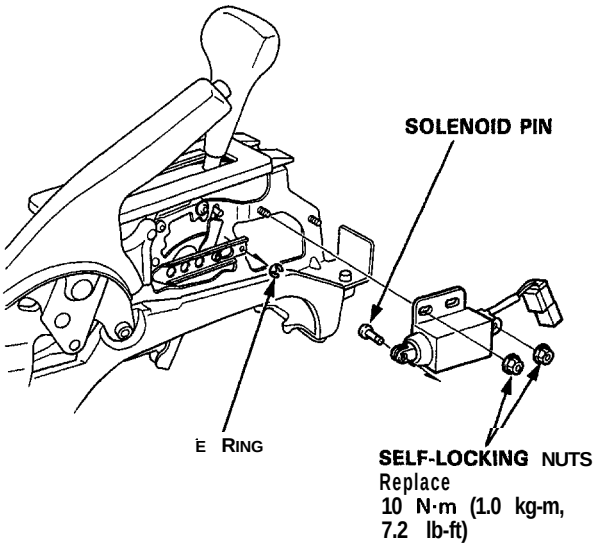
- When the shift lock solenoid is ON, check that there is clearance of 2.5 ± 0.5 mm (0.098 ± 0.02 in) between the top of shift lock lever and lock pin groove (see clearance check on this page).
  When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.
- If not, adjust the position of shift lock solenoid.



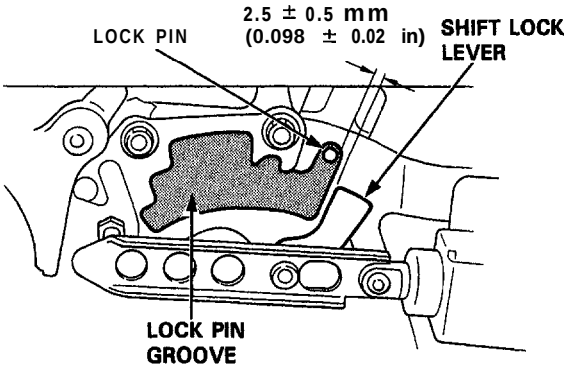
Replacement:

1. Remove the E ring and the solenoid pin.

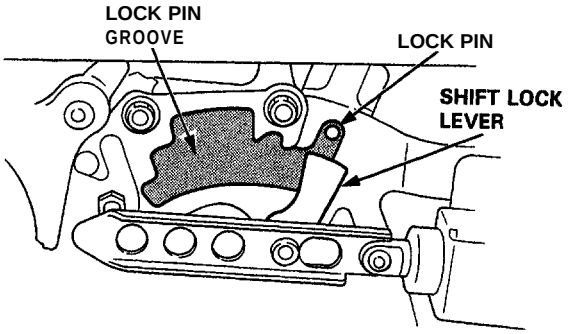
2. Remove the self-looking nuts and shift lock solenoid.



3. Install the shift lock solenoid in the reverse order of removal and adjust the position of shift lock solenoid.
   - When the shift lock solenoid is ON, check that there is a clearance of 2.5 ± 0.5 mm (0.098 ± 0.02 in.) between the top of shift lock lever and the lock pin groove, then tighten the self-locking nuts.
     NOTE: Use brand-new self-locking nuts.



- When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.
  NOTE: Test for the solenoid operation after assembling.

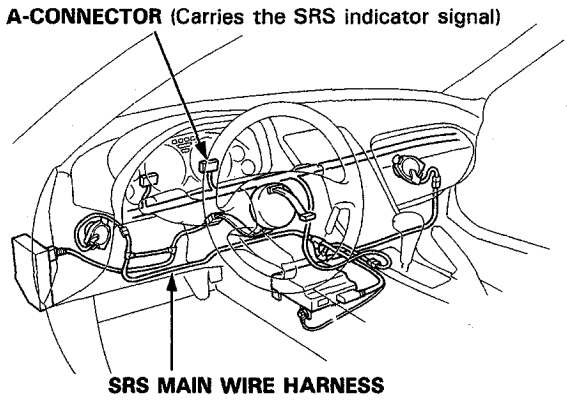


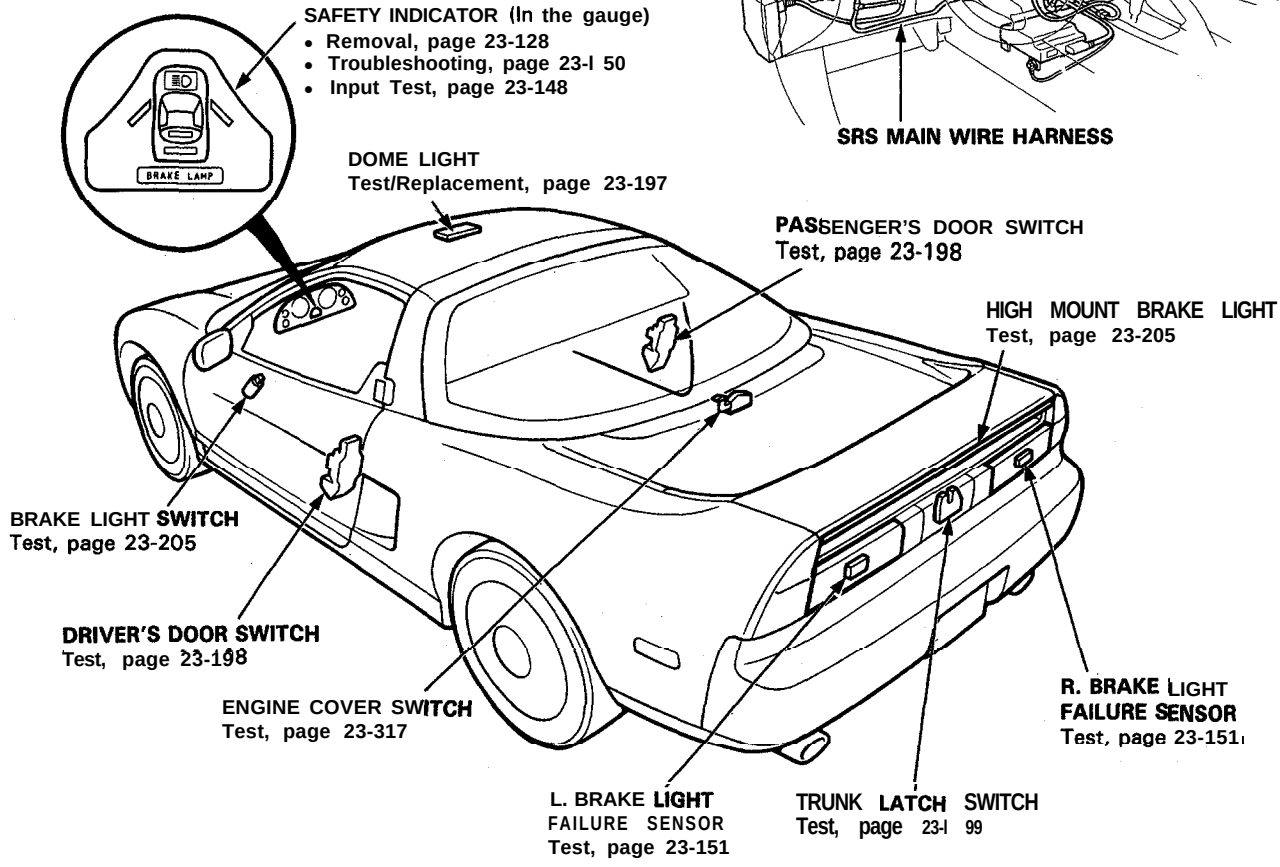
Safety Indicator

Component Location Index

WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the safety indicator system.





Description

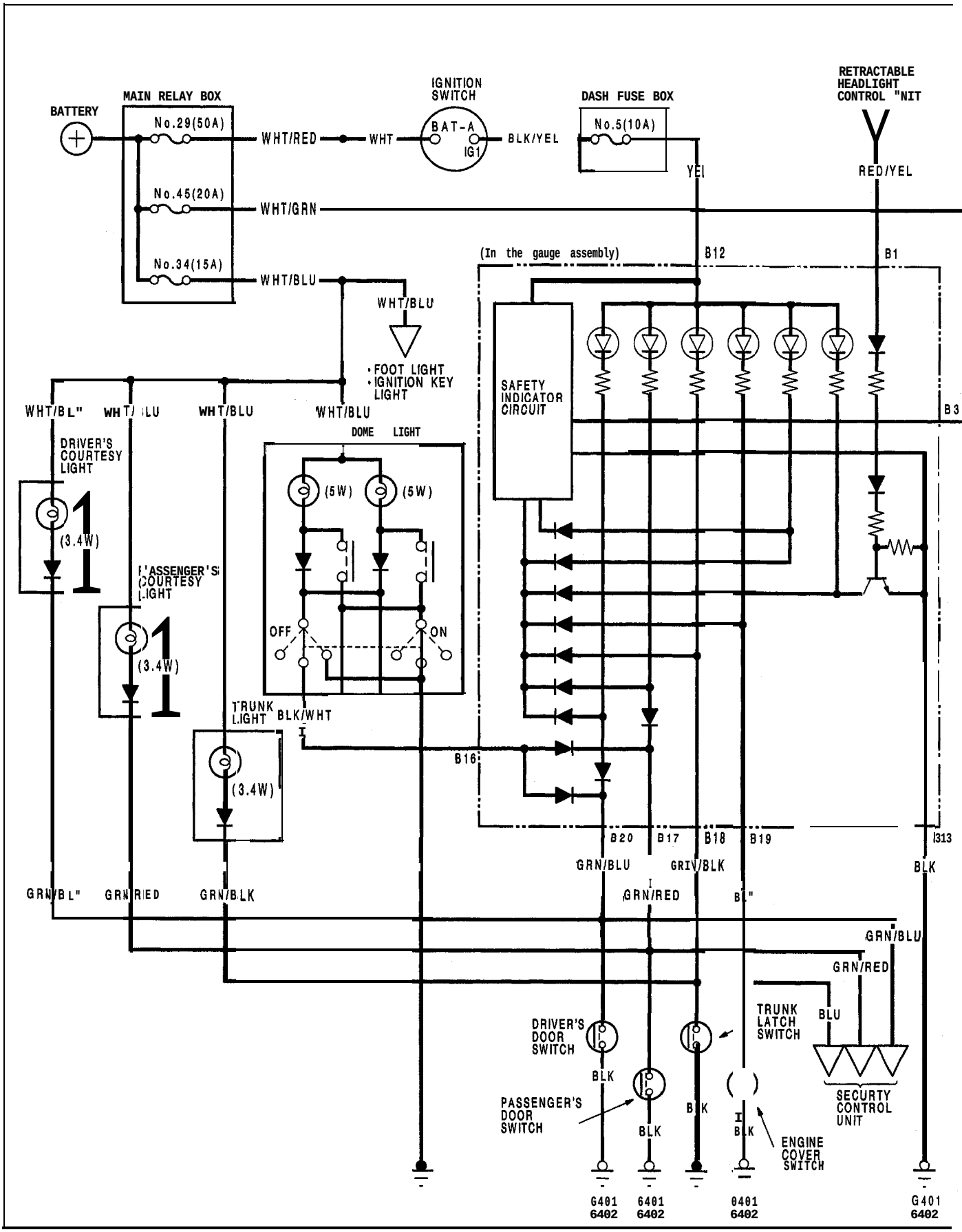
Safety Indicator System:

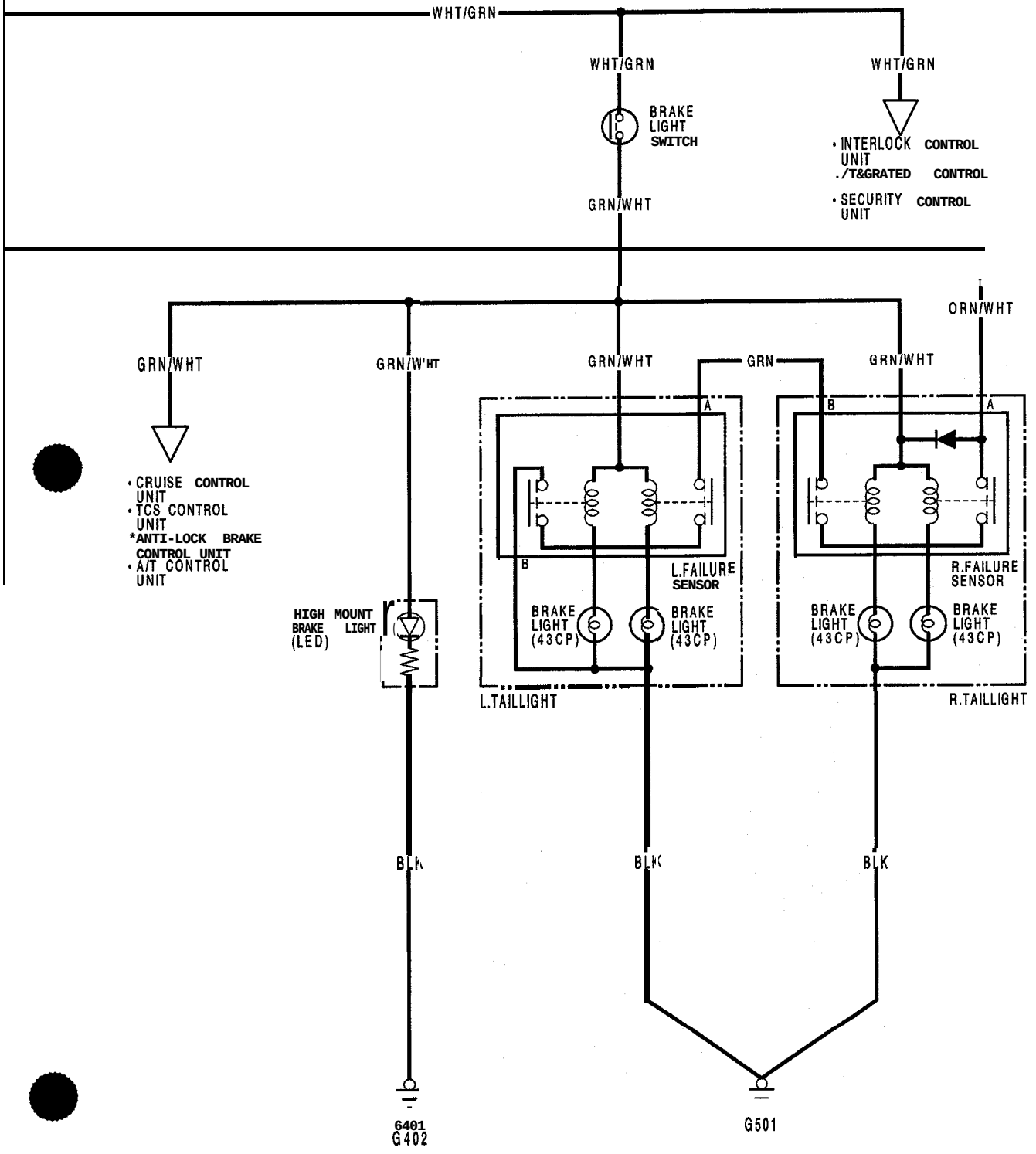
LED's are used to indicate when the turnk lid or a door is not fully closed, or when a brake light is faulty. the LED's will remain ON for about 2 seconds after the ignition switch has been turned ON to show that the system circuit is funcitoning.

Brake Light Bulb Failure Indicator:

If all brake light bulbs are OK, the Indicator light stays off because the ORN/WHT wire is constantly being grounded by the two brake light failure sensors connected in series. With the brake light off, the ground is provided through the diode, the failure sensor relay coil and bulb filaments to ground. With the brake light on, all 4 relays, (2 in the left sensor, 2 in the right sensor) connected in series, supply ground. If any of the 4 bulbs is not working, the chain is broken and **the ORN/WHT wire is not being grounded. The Indicator light comes on.**

Safety Indicator




WHT/GRN
WHT/GRN
WHT/GRN
BRAKE LIGHT SWITCH
• INTERLOCK CONTROL UNIT
./T&GRATED CONTROL
• SECURITY CONTROL UNIT
GRN/WHT
ORN/WHT
GRN/WHT
GRN/W'HT
GRN/WHT
GRN
GRN/WHT
• CRUISE CONTROL UNIT
• TCS CONTROL UNIT
*ANTI-LOCK BRAKE CONTROL UNIT
• A/T CONTROL UNIT
HIGH MOUNT BRAKE LIGHT (LED)
A
B
B
A
L.FAILURE SENSOR
R.FAILURE SENSOR
BRAKE LIGHT (43CP)
BRAKE LIGHT (43CP)
BRAKE LIGHT (43CP)
BRAKE LIGHT (43CP)
L.TAILLIGHT
R.TAILLIGHT
BLK
BLK
BLK
6401
G402
G501

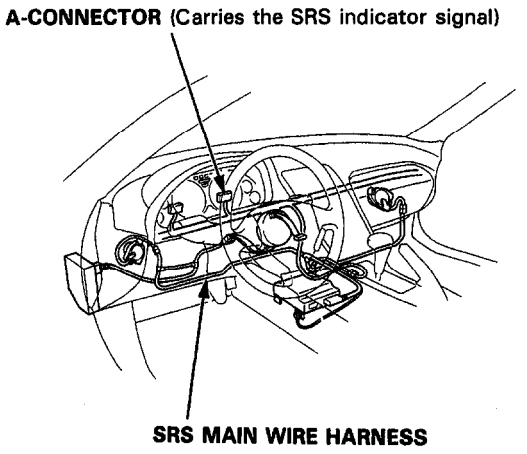
Safety Indicator

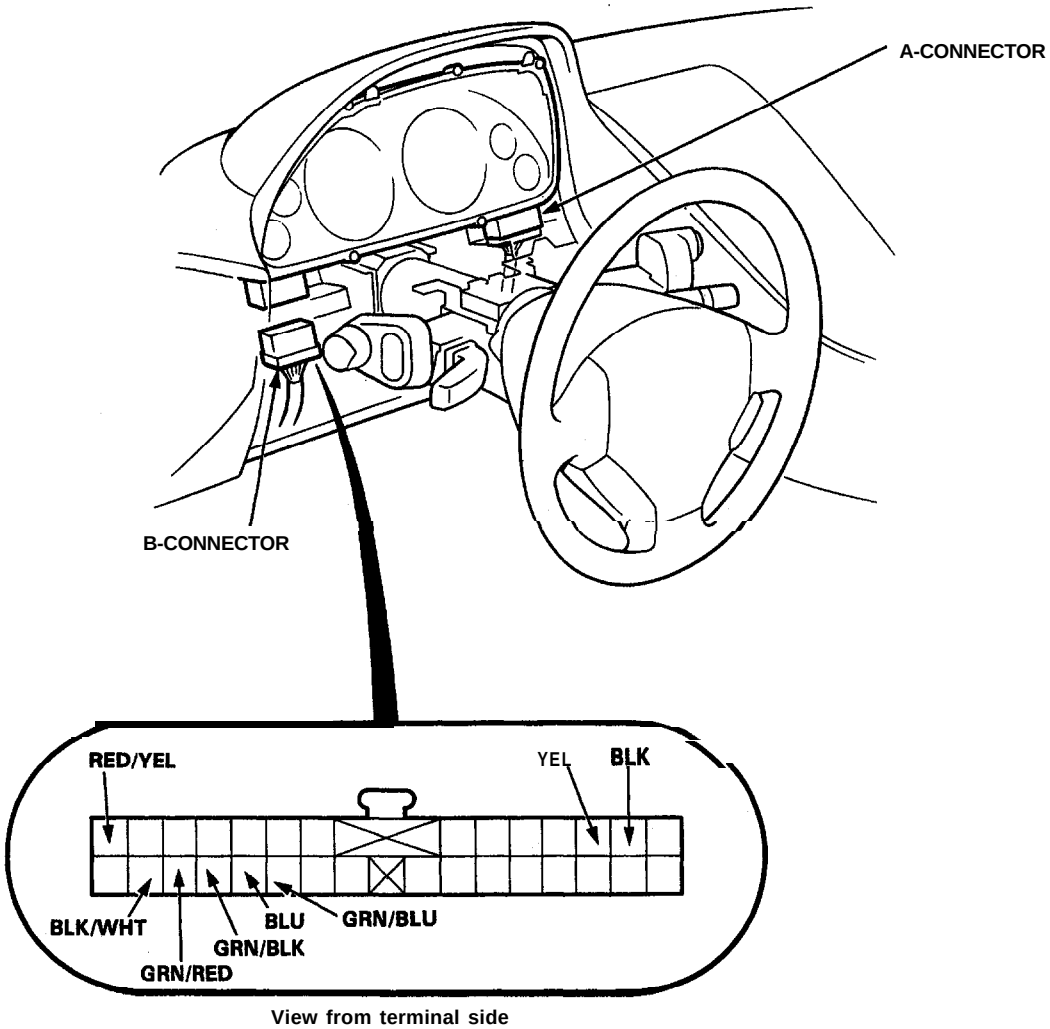
Indicator Input Test

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the safety indicator system.

Remove the dashboard lower panel, center panel and instrument panel. Disconnect the B-connector (30-P) from the gauge assembly.
(See page 23-128)
Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the safety indicator.





View from terminal side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, 402) • An open in the wire.
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10 A) fuse. • An open in the wire.
3	ORN/WHT	Brake pedal pushed.	Check for continuity to ground: should be continuity with the pedal pushed.	• Blown No. 45 (20 A) fuse. • Faulty brake light switch. • Blown brake light bulbs. • Faulty brake light failure sensors. • Poor ground (G501). • An open in the ORN/WHT or GRN/WHT wire.
4	BLU	Engine cover opened.	Check for continuity to ground: should be continuity.	• Faulty engine cover switch. • An open in the wire.
5	GRN/BLK	Trunk lid opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.34 (15 A) fuse.	• Faulty trunk latch switch. • An open in the wire.
8	RED/BLK and RED	Lighting switch ON and dashlight brightness control dial in full bright.	Check for voltage between RED/BLK (+) and RED (−) terminals: should be battery boltage.	• Faulty dashlight brightness control system. • An open in the wire.
7	GRN/BLU	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15 A) fuse.	• Faulty door switch. • An open in the wire.
	GRN/RED	Passenger's door opened.		
8	BLK/WHT	Dome light switch in MIDDLE position.	Connect to ground: Dome light should come on.	• Blown No. 34 (15 A) fuse. • Faulty dome light. • An open in the WHT/BLU or BLK/WHT wire.
9	RED/YEL	Dissconnected the 14-P connector of retractor sub harness left or right.	* Connect the battery voltage to BLU/RED teminal (R. retractor) or BLU teminal (L. retractor), after about 4 seconds should be battery voltage.	• Faulty retractable headlight control unit. • Frozen, stuck, or improperly installed retractor likage.

*: Terminal is floor wire harness side.

Safety Indicator

• Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

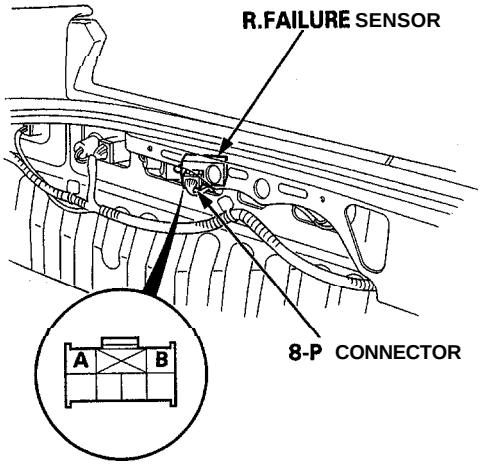
Item to be inspected / Symptom	Blown No. 5 (10 A) fuse (in the dash fuse box)	Blown No. 34 (15 A) fuse (in the dash fuse box)	Safety indicator input	Safety indicator (diodes)	Blown bulb	Brake light failure sensor	Door switch	Trunk latch switch	Retractable headlight controll unit (See page 23-174)	Poor ground	Open circuit in wires or loose or disconnected terminals
No indicators operate.	1		2							G401 G402	YEL
Indicator panel illumination not lit with lighting switch ON.					1						RED/BLK or RED
Indicator lights fail to come on when ignition switch is turned to ON.			1								
Door warning lights not lit with doors opened.			2				1				GRN/BLU or GRN/RED
Trunk warning light not lit with trunk lid opened.		1	3					2			GRN/BLK
Brake Indicator light not lit with blown brake light bulb.			1								ORN/WHT or GRN
Brake Indicator light remains on with good brake light bulbs.			2			1				G501	
Dome light not on with door opened (When switch position is in MIDDLE).				1							BLK/WHT
Retractor motor Indicator light remains on with good retractor motor.			1						2		
Retractor motor Indicator light not lit with faulty retractor motor (Stuck by foreign matter)			1						2		RED/YEL

-Brake Light Failure Sensor Test

1. First make sure the brake lights come on when the brake pedal is pressed.

   - If none of the brake lights come on, check the brake light circuit (See page 23-204).
   - 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 all the brake lights come on, go to step 2.

2. Open the trunk lid and remove the trim panel that covers the right taillight. Make sure the BRAKE LAMP of the safety indicator does not come on when the A(WHT/GRN) terminal of the 8-P connector is grounded and the ignition switch is turned OFF to ON.



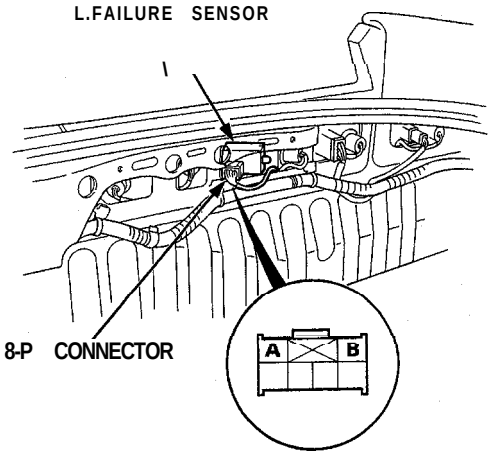
View from wire side

   - If the BRAKE LAMP comes on, check for an open in the A(WHT/GRN) wire between the safety indicator, the right failure sensor and whether the safety indicator circuit has a problem.
   - If the BRAKE LAMP does not come on, go to step 3.

3. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the B(GRN) terminal of the 8-P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP comes on, replace the right failure sensor.
   - If the BRAKE LAMP does not come on, go to step 4.

4. Remove the rear trim panel that covers the left taillight. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the A(GRN) terminal of the 8-P connector grounded and the brake pedal pressed.



View from wire side

   - If the BRAKE LAMP comes on, there is an open in the A(GRN) wire between the left failure sensor and the right failure sensor.
   - If the BRAKE LAMP does not come on, go to step 5.

5. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the B(BLK) terminal of the 8-P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP comes on, replace the left failure sensor.
   - If the BRAKE LAMP does not come on, check for an open in the B(BLK) wire between the left failure sensor and ground, and check whether the G501 terminal is poor.

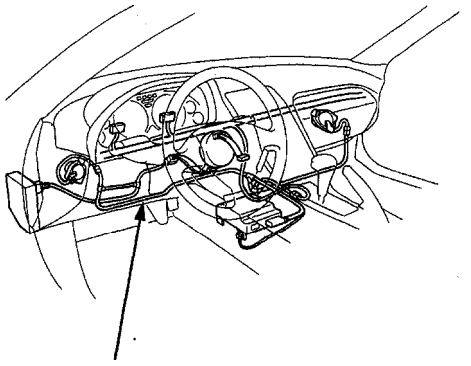
Shift Lever Position Indicator

Component Location Index

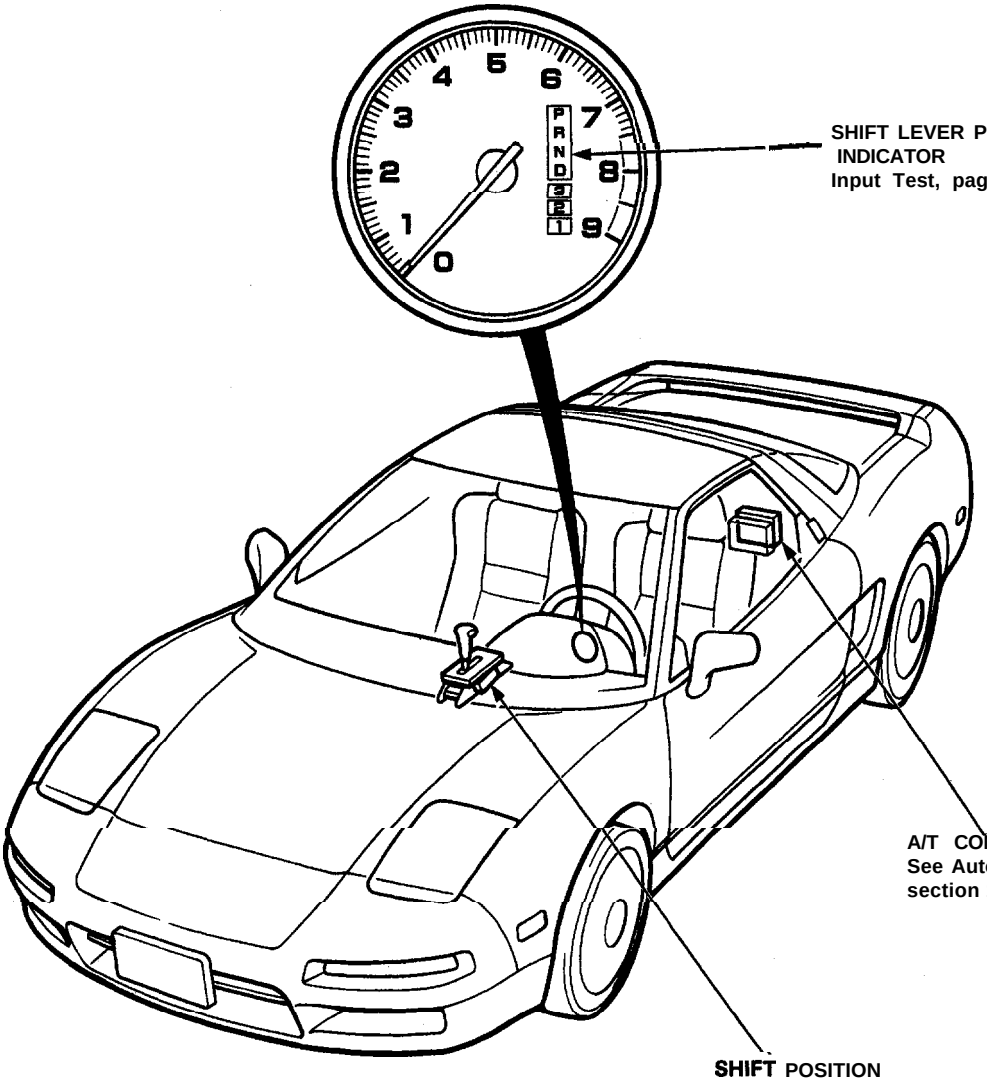
WARNING All SRS **wire** harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS **wire** harnesses when servicing the shift lever position indicator.

- **GAUGE ASSEMBLY**
  Removal, page 23-I 28
  Disassembly, pages 23-132
- **INTERLOCK SYSTEM**
  See page, 23-140
- **A/T CONTROL SYSTEM**
  See Automatic Transmission, section 14



SRS MAIN WIRE HARNESS

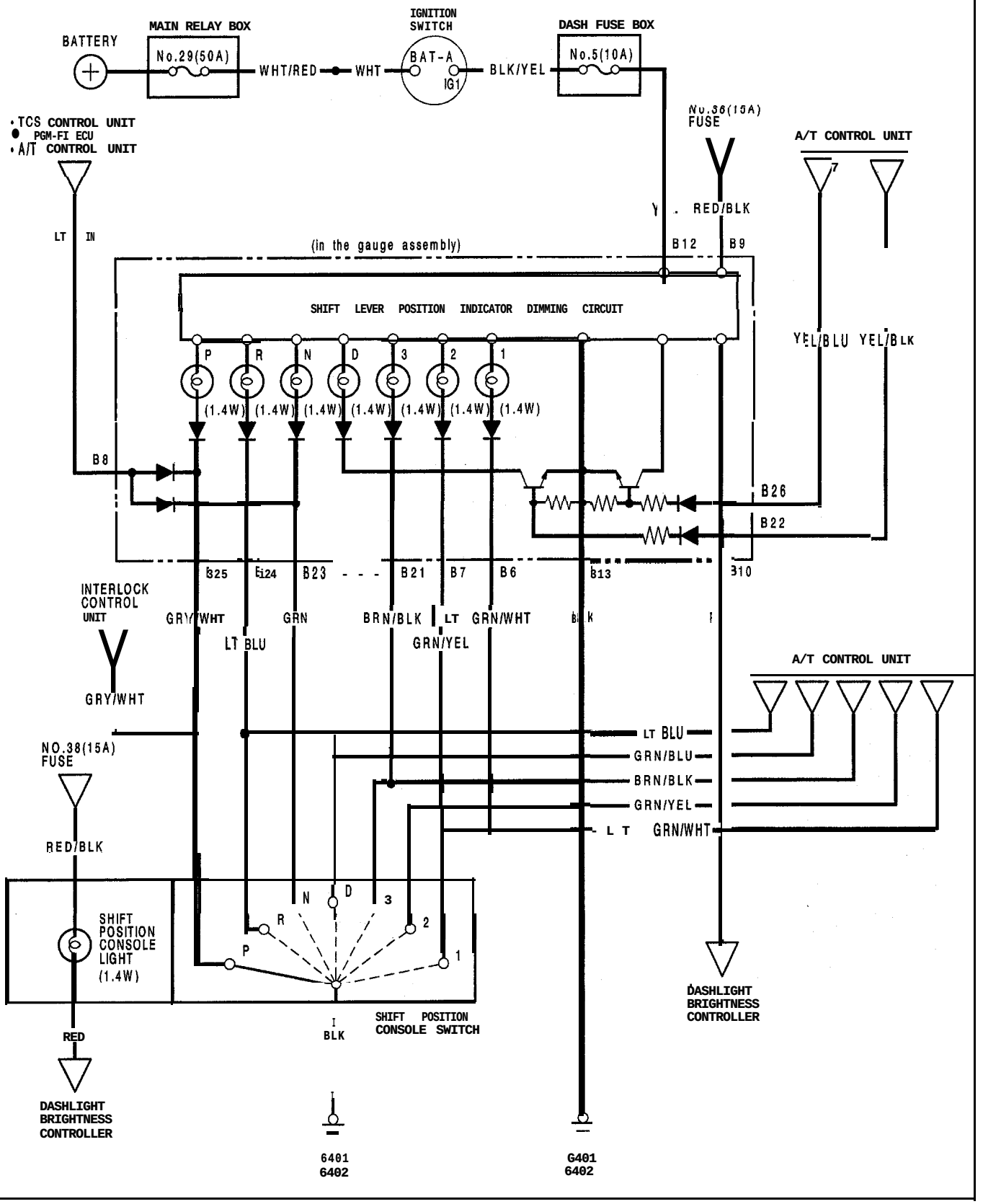


SHIFT LEVER POSITION INDICATOR
Input Test, page 23-154

A/T CONTROL UNIT
See Automatic Transmission section 14

SHIFT POSITION CONSOLE SWITCH
Test, page 23-I 58
Replacement, page 23-I 57

Circuit Diagram



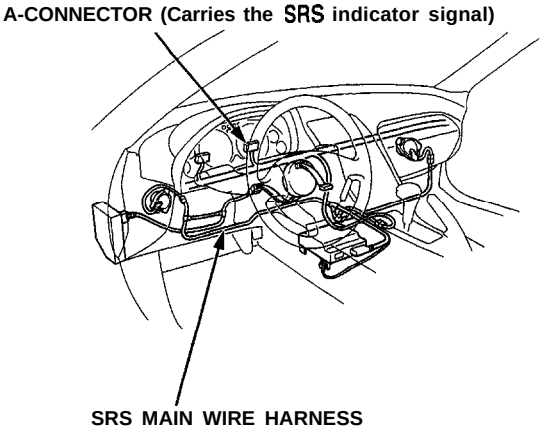
Shift Lever Position Indicator

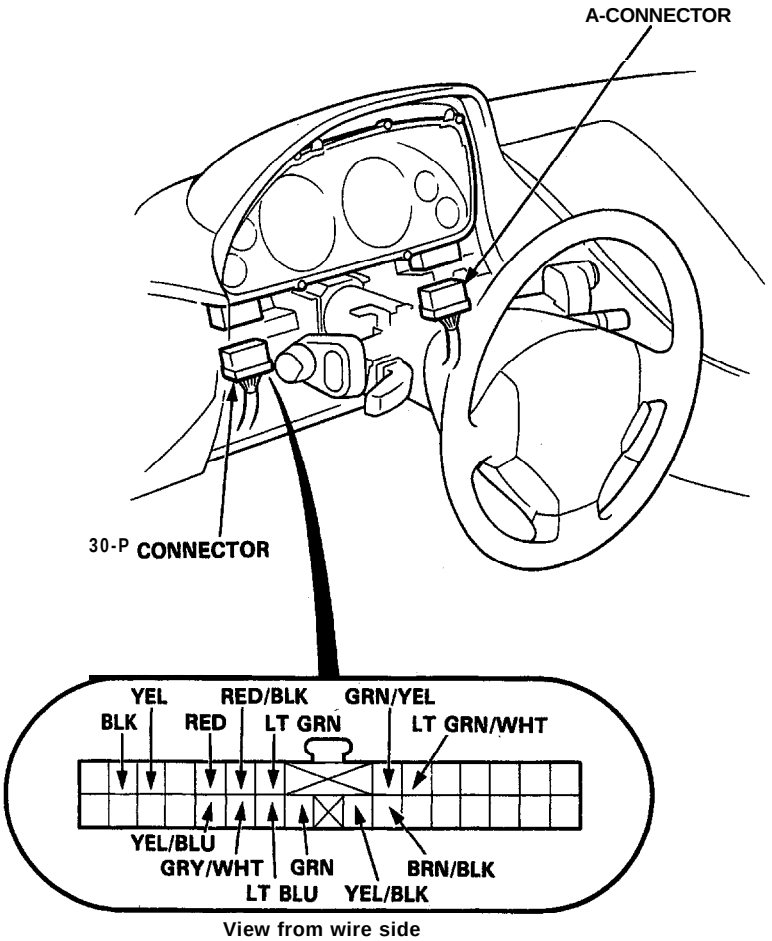
Indicator Input Test

WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when performing the Indicator input test.

Remove the gauge assembly from the dashboard and disconnect the 30-P connector from the gauge assembly. Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the main printed circuit panel, speedometer, tachometer and odo/tripmeter.





View from wire side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10 A) fuse. • An open in the wire.
3	GRY/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch • Poor ground (G401, G402). • An open in the wire.
	LT BLU	Shift lever position in R.		
	GRN	Shift lever position in N.		
	BRN/BLK	Shift lever position in 3.		
	GRN/YEL	Shift lever positon in 2.		
	LT GRN/WHT	Shift lever position in 1.		
4	GRN/BLU	Shift lever position in D.	Check for continuity to ground: should be continuity.	• Faulty shift position console switch. • Faulty A/T control system. • Poor ground (G401, G402). • An open in the wire.
5	RED/BLK and RED	Lighting switch ON and dashlight brightness control dial on full bright.	Check for voltage between RED/BLK and RED terminals: should be battery voltage.	• Faulty dashlight brightness control system. • An open in the wire.
6	YEL/BLK	Ignition switch ON, shift lever positon in 2 or 3 and D switch ON.	Check for voltage to ground: should be about 5 V.	• Faulty D switch. • Faulty shift position consle switch. • Faulty A/T control system. • An open in the wire.
7	YEL/BLU	Ignition switch ON, shift lever position in 2 or 3 and D switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty D switch. • Faulty shift position console switch. • Faulty A/T control system. • An open in the wire.
8	LT GRN	Ignition switch ON.	Check for voltage to ground: should be about 5 V.	• Faulty PGM-FI ECU and A/T control unit. • An open in the wire.

Shift Lever Position Indicator

-Shift Position Console Switch Test

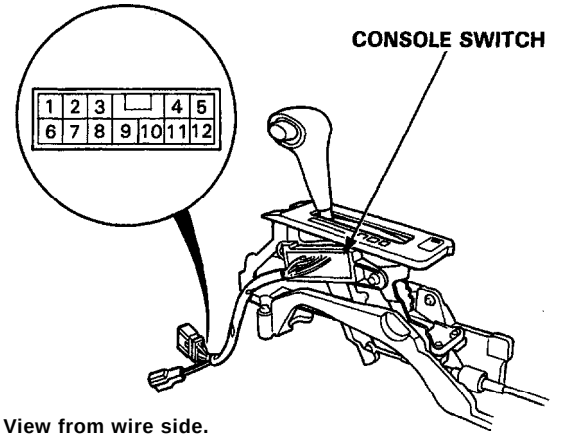
CAUTION:

- All SRS electrical wiring harness& are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

1. Remove the console, then disconnect the 12-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each switch position according to the table.

NOTE:

- Move the lever back and forth without touching the push button at each switch position, and check for continuity within a range of free play of the shift lever.
- If there's no continuity within the range of free play, adjust the installation position of the console switch.



View from wire side.

Shift Position Console Switch

Back-up Light Switch

Neutral Safety Switch

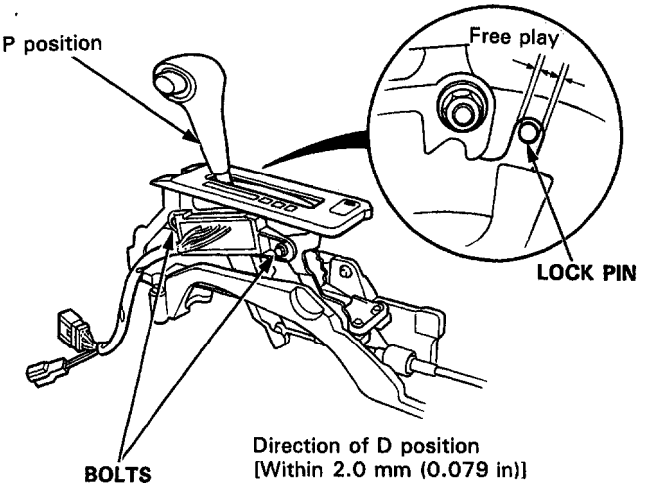
Terminal / Position	8	1	2	3	4	5	6	7	11	9	10	13	14
1	○				○								
2	○			○		○							
3	○		○			○							
D	○	○				○							
N	○						○					○	○
R	0							0		0	3		
P	○								0			0	0

Adjustment:

1. Shift to the "P" position, then loosen the bolts.
2. Slide the switch in the direction of D position [within 2.0 mm (0.079 in)] so that there is continuity between No. 8 and No. 11 terminals (within the range of free play of the shift lever).
3. Recheck for continuity between each of the terminals.

NOTE:

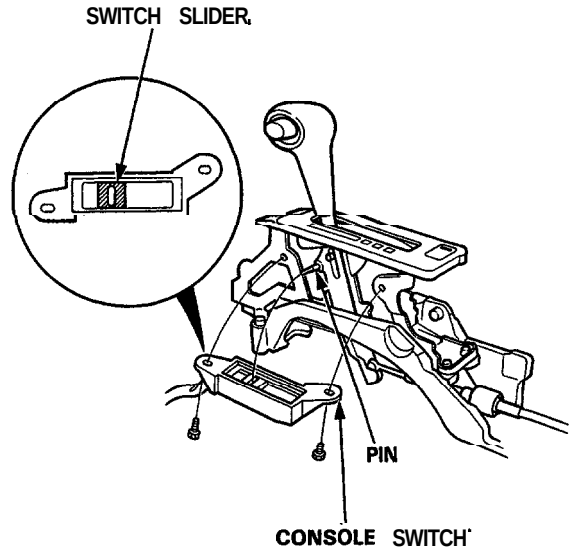
- If adjustment is not possible, check for damage to the shift lever detent and/or bracket.
  If there is no damage, replace the console switch.
- The engine should start when the shift lever is in N position (within the range of free play).



Shift Position Console Switch Replacement

CAUTION:
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

1. Remove the console, then disconnect the 12-P and 2-P connectors from the console switch.
2. Remove the 2 console switch mounting bolts.

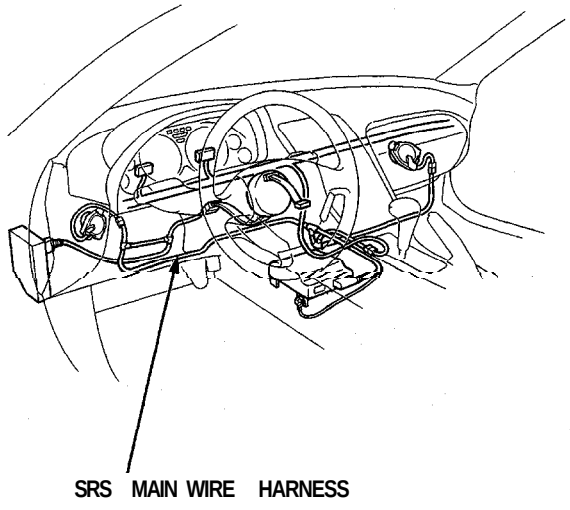


3. Position the switch slider to "Neutral" as shown above.
4. Shift the select lever to "Neutral", then slip the console switch into position.
5. Attach the switch with the 2 bolts.
6. Test the console switch in the P and N positions. (see page 23-I 56)

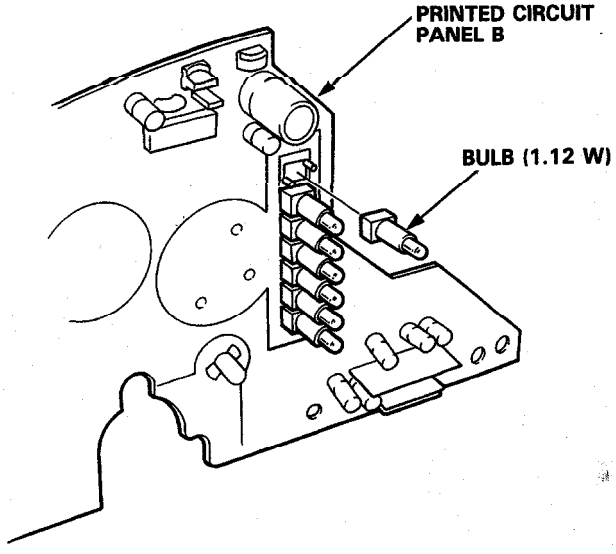
   NOTE: The engine should start when the shift lever is in the N position (within the range of free play).
7. Connect the 12-P and 2-P connectors, clamp the harness and install the console.

Bulb Replacement

CAUTION:
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly, if there is an open circuit or damage to the wiring.



1. Remove the gauge assembly (See page 23-128).
2. Disassemble the gauge assembly (See page 23-I 32).
3. Remove the bulb.

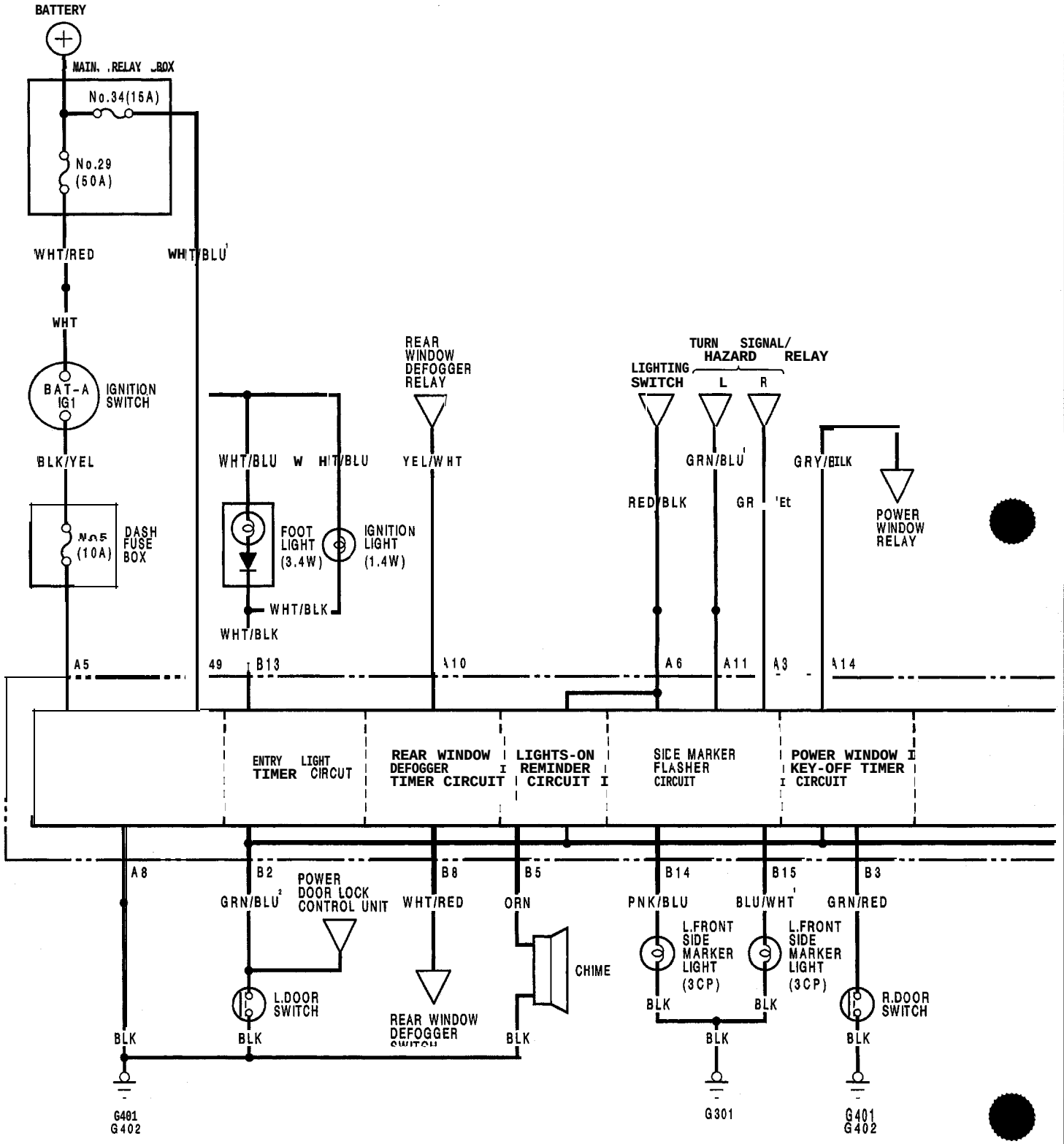


4. Installation is in the reverse order of removal.

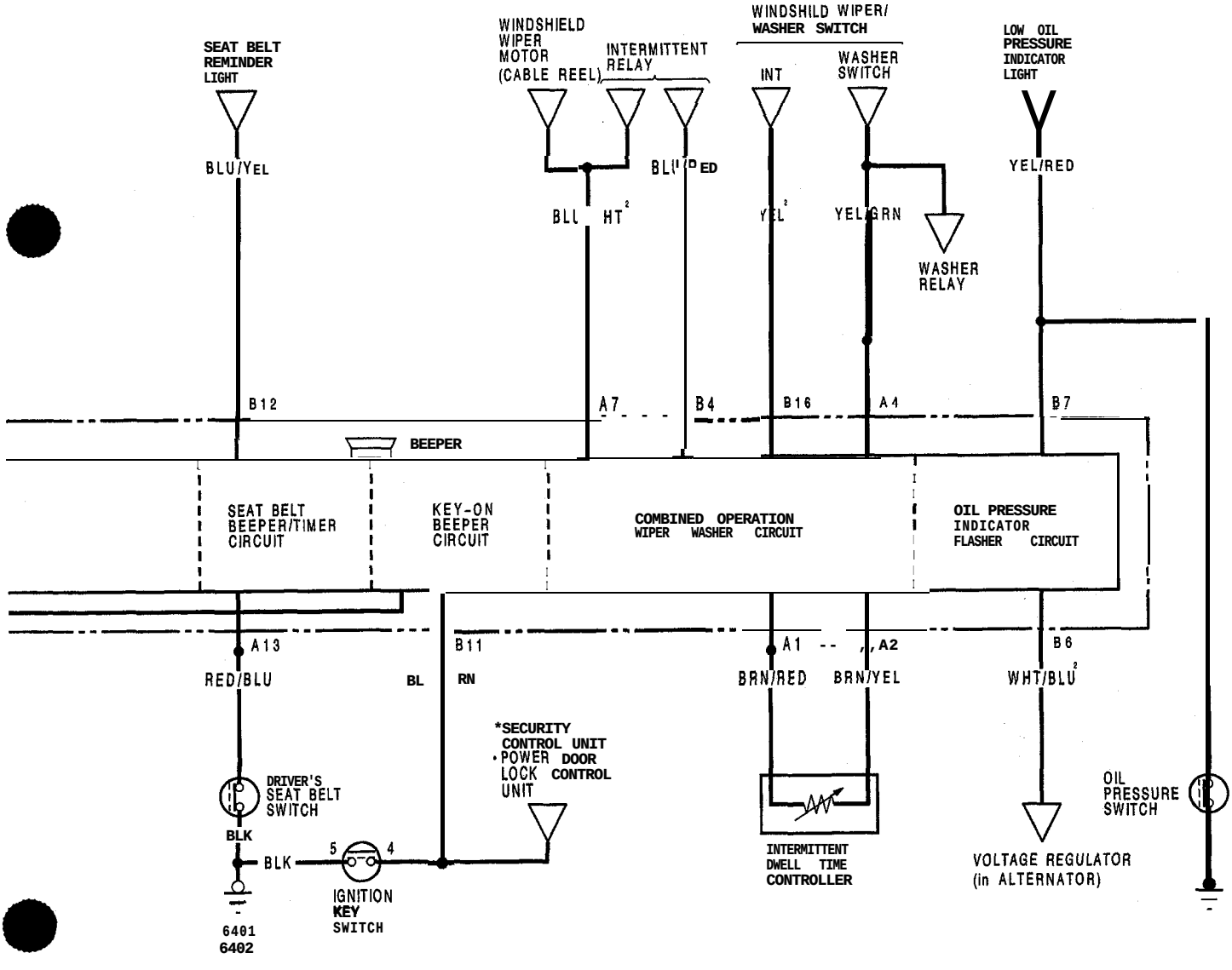
Integrated Control Unit

-Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL' and YEL^2 are not the same).



Description:
A multi-function control unit located on the left side kick panel integrates the functions of the entry light timer, key-on reminder, light-on reminder, seat belt reminder, oil pressure light, side marker light flasher, power window key-off timer and rear window defogger timer onto one circuit board, sharing common circuit functions.



Integrated Control Unit

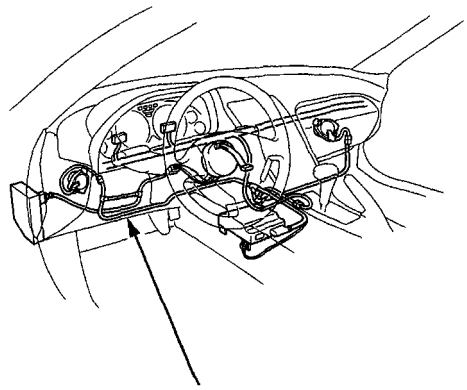
— Input Test

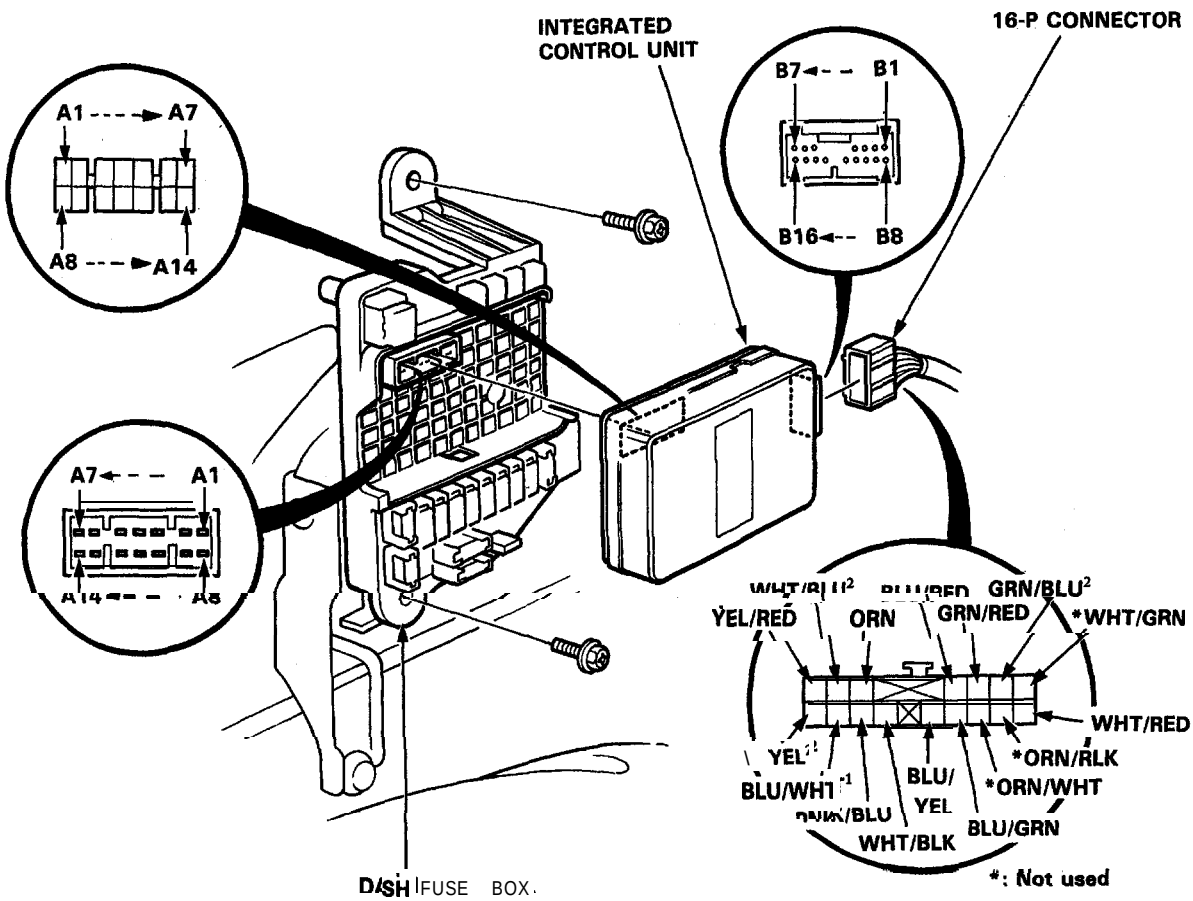
CAUTION:

- All **SRS** electrical wiring harnesses are covered with **yellow outer insulation.**
- Replace the entire affected **SRS** harness assembly if there is an open circuit or damage to the wiring.

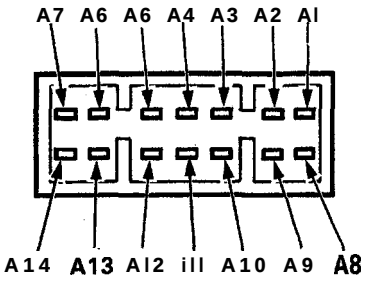
Remove the left side kick panel cover, and the dash relay holder from the bracket, to disconnect the 16-P connector from the integrated control unit.
Remove the integrated control unit from the dash fuse box.
Make the following input tests at the harness pins.
If all tests prove OK, yet the system still falls to work, replace the control unit.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL^1 and YEL^2 are not the same).

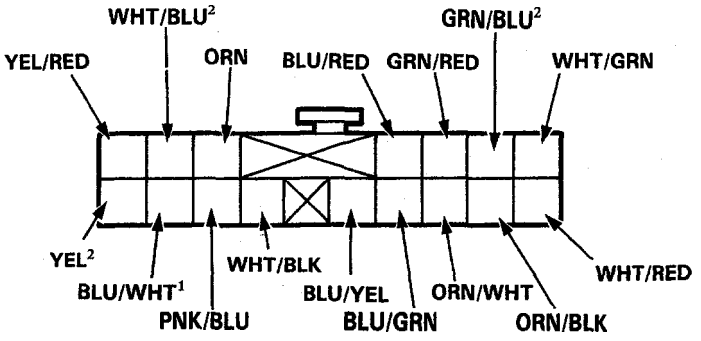




View from wire side



View from terminal side



View from wire side

Entry Light Timer System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	WHT/BLK	Under all conditions.	Connect to ground: Ignition key and foot lights should come on.	• Blown bulb or No. 34 (15A) fuse. • An open in the wire.
4	GRN/BLU[2]	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	• Faulty left door switch. • An open in the wire.

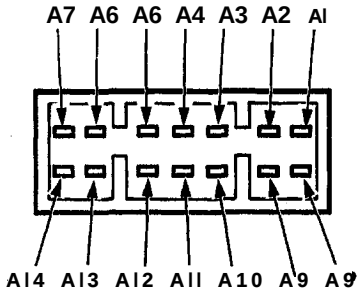
Key-on Riminder System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	GRN/BLU[2]	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	• Faulty left door switch. • An open in the wire.
4	BLU/GRN	Key inserted into the ignition switch.	Check for continuity to ground: should be continuity.	• Faulty ignition key switch. • Poor ground (G401, G402). • An open in the wire.

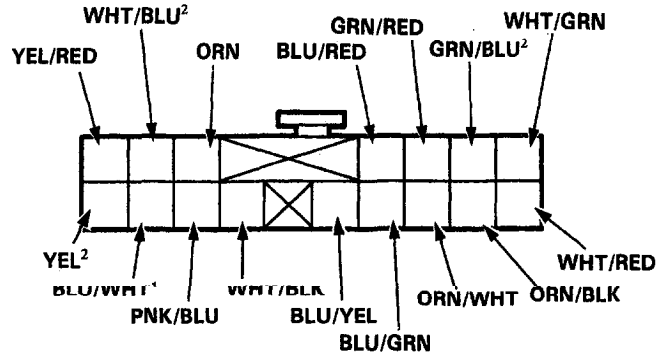
(cont'd)

Integrated Control Unit

Input Test (cont'd)



View from terminal side



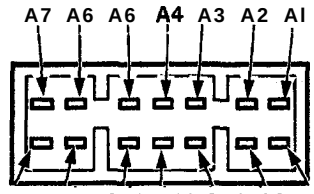
View from wire side

Lights-on Riminder System:

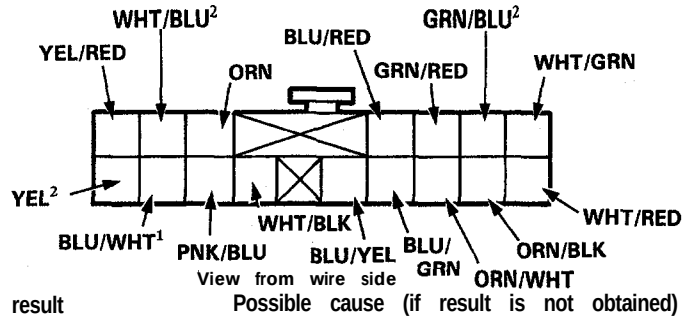
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	ignition switch ON. A5		Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50 A) fuse. • An open in the wire.
4	GRN/BLU²	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	• Faulty left door switch. • An open in the wire.
5	A6	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 38 (15) fuse. • Faulty lighting switch. • An open in the wire. • Faulty taillight relay.
6	ORN	Connect the A9 terminal to the ORN terminal.	Check chime operation: Chime should activate each time the battery is connected.	• Faulty chime. • An open in the wire.

Seat Belt Reminder System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50A) fuse. • An open in the wire.
4	BLU/YEL	Ignition switch ON.	Connect to ground: Seat belt warning light should come on.	• Blown No. 5 (10A) fuse. • Blown bulb. • An open in the wire.'
5	A13	Driver's seat belt not buckled.	Check for continuity to ground: should be continuity.	• Faulty seat belt switch. • Poor ground (G401, G402). • An open in the wire.



Rear Window Defogger Timer System:
View from terminal side



View from wire side

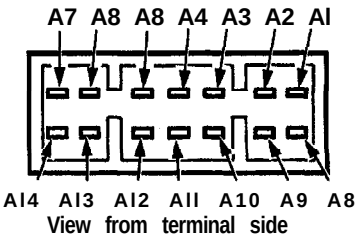
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50 A) fuse. • An open in the wire.
4	WHT/RED	Defogger switch pushed.	Check for continuity to ground: should be continuity as the switch is pushed.	• Faulty defogger switch. • Poor ground (G401, G402). • An open in the wire.
5	A10	Ignition switch ON.	Connect to ground: Rear window defogger should work and the defogger switch indicator light should come on.	• Blown No. 4 (15 A) fuse. • Faulty defogger relay. • Blown bulb. • An open in the wire.

Oil Pressure Indicator System:

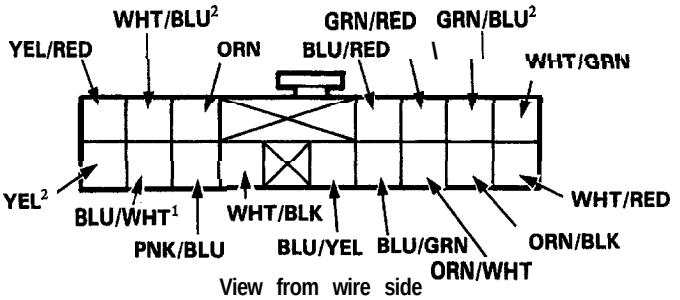
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50A) fuse. • An open in the wire.
4	WHT/BLU2	Engine running.	Check for voltage to ground: should be battery voltage.	• Faulty charging system. • An open in the wire.
5	YEL/RED	Ignition switch OFF	Check for continuity to ground: should be continuity.	• Faulty oil pressure switch. • An open in the wire.
		Ignition switch ON.	Check light operation. If the light does not come on, attach the YEL/RED terminal to ground: Light should come on as the ignition switch is turned ON.	• Blown bulb. • An open in the wire.
		Start the engine.	Check for voltage to ground: should be battery voltage.	• Insufficient oil. • Improper lubricaiton. • Faulty oil pressure switch.

Integrated Control Unit

Input Test (cont'd)



View from terminal side



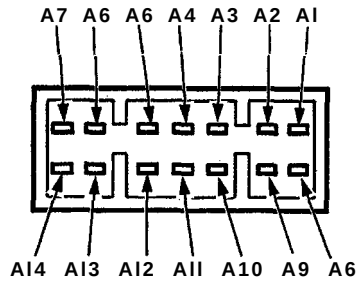
View from wire side

Side Marker Light Flasher System:

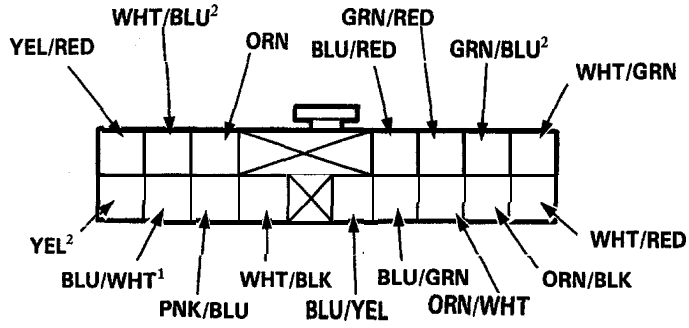
No.	Terminal	Test condition	Test: desired result	Possible cause (If result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50 A) fuse. • An open in the wire.
4	A6	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 38 (15A) fuse. • Faulty lighting switch. • An open in the wire.
5	A11	Ignition switch ON and turn signal switch in left position.	Check for voltage to ground: should be battery voltage.	• Blown No. 46 (10A) fuse. • Faulty turn signal system. • An open in the wire.
6	A3	Ignition switch ON and turn signal switch in right position.		
7	PNK/BLU	Connect the A9 terminal to the PNK/BLU (or BLU/WHT) terminal	Check marker light operation: left (or right) front side marker light should come on.	• Blown bulb. • Poor ground (G301). • An open in the wire.
8	BLU/WHT			

Power Window key-off Timer System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) or No. 29 (50A) fuse. • An open in the wire.
4	GRN/BLU	Left door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 38 (15A) fuse.	• Faulty door switch. • An open in the wire.
5	GRN/RED	Right door opened.		
6	A14	Connect the A9 terminal to the A14 terminal.	Check window operation: Power windows should operate.	• Faulty power window relay. • Poor ground (G201). • An open in the wire.



View from terminal side



View from wire side

Wiper System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 34 (15A) fuse. • An open in the wire.
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) *or No. 29* (50 A) fuse. • An open in the wire.
4	BLU/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 26 (40A) fuse. • Faulty intermittent relay. • An open in the wire.
5	YEL[2]	Ignition switch ON. and wiper switch INT.	Check for voltage to ground: should be battery voltage.	• Blown No. 6 (7.5A) fuse. • Faulty wiper switch. • An open in the wire.
6	A4	ignition switch ON and washer switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 6 (7.5A) fuse. • Faulty washer switch. • An open in the wire.
7	AI and A2	Intermittent dwell time control ring turned.	Check for resistance between the AI and A2 terminals: should vary from 0 to 25,000 ohms as the ring is turned.	• Faulty intermittent dwell time controller. • An open in the wire.
8	A7	Ignition switch ON, wiper switch OFF	Check for voltage to ground: should be battery voltage.	• Faulty wiper motor (automatic-stop circuit). • An open in the wire.

Lights-on Reminder System

-Description

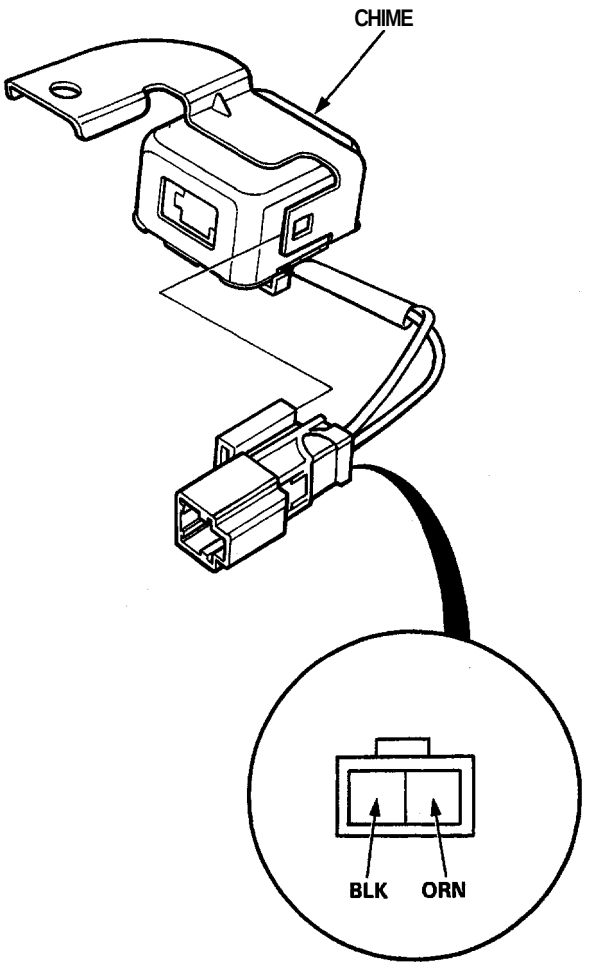
NOTE: Refer to page 23-158 for wiring description of the lights-on reminder circuit, and page 23-162 for the input test of the circuit.

When the ignition key is turned to "0" position and removed, with the lights on, voltage is applied to the reminder circuit on the integrated control unit. When you open the driver's door, the circuit senses ground through the closed door switch.

With voltage at the ''A6'' terminal, ground at the "B2" terminal and no voltage at the ''A5'' terminal, the chime is activated to remind the driver to turn off the lights.

-Chime Test

1. Remove the dashboad lower panel, then disconnect the 2-P connector from the foot light.
2. Disconnect the 2-P connector from the floor wire harness.
3. Test chime operation by connecting battery positive to the ORN terminal, and negative to the BLK terminal, and cycling the power on-off repeatedly.
4. If the chime fails to sound every time power is cycled, replace it.



View from wire side

Key-on Reminder System

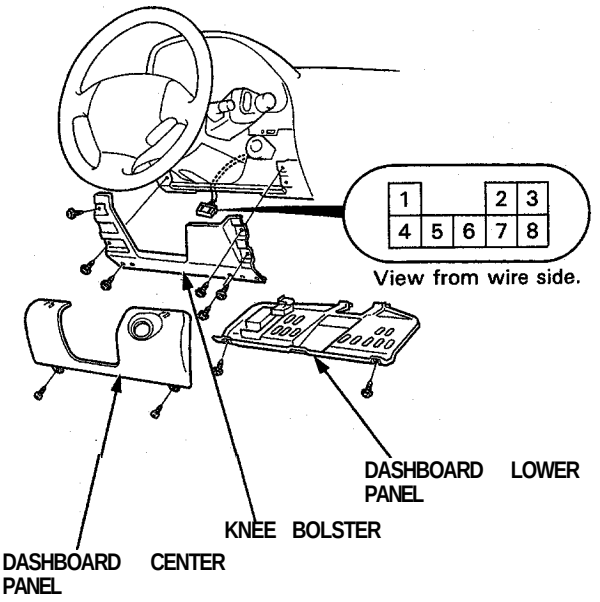
Description

NOTE: Refer to page 23-I 58 for wiring description of the key-on beeper circuit, and page 23-I 60 for input test of the beeper circuit.

When the ignition key is not removed, the key-on 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 thee "Al 1" and "B2" terminals, the beeper sounds.

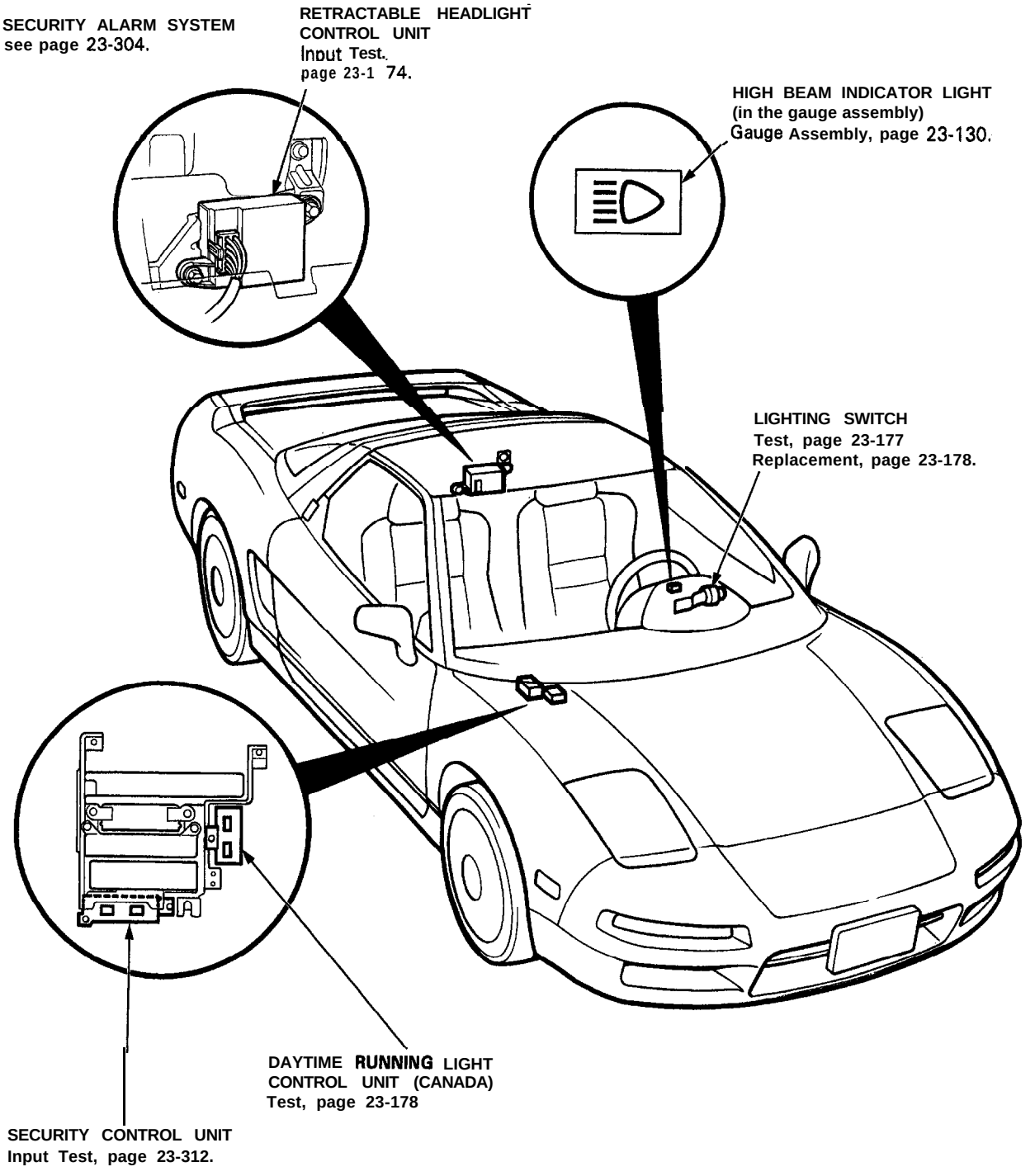
-Ignition Key Switch Test

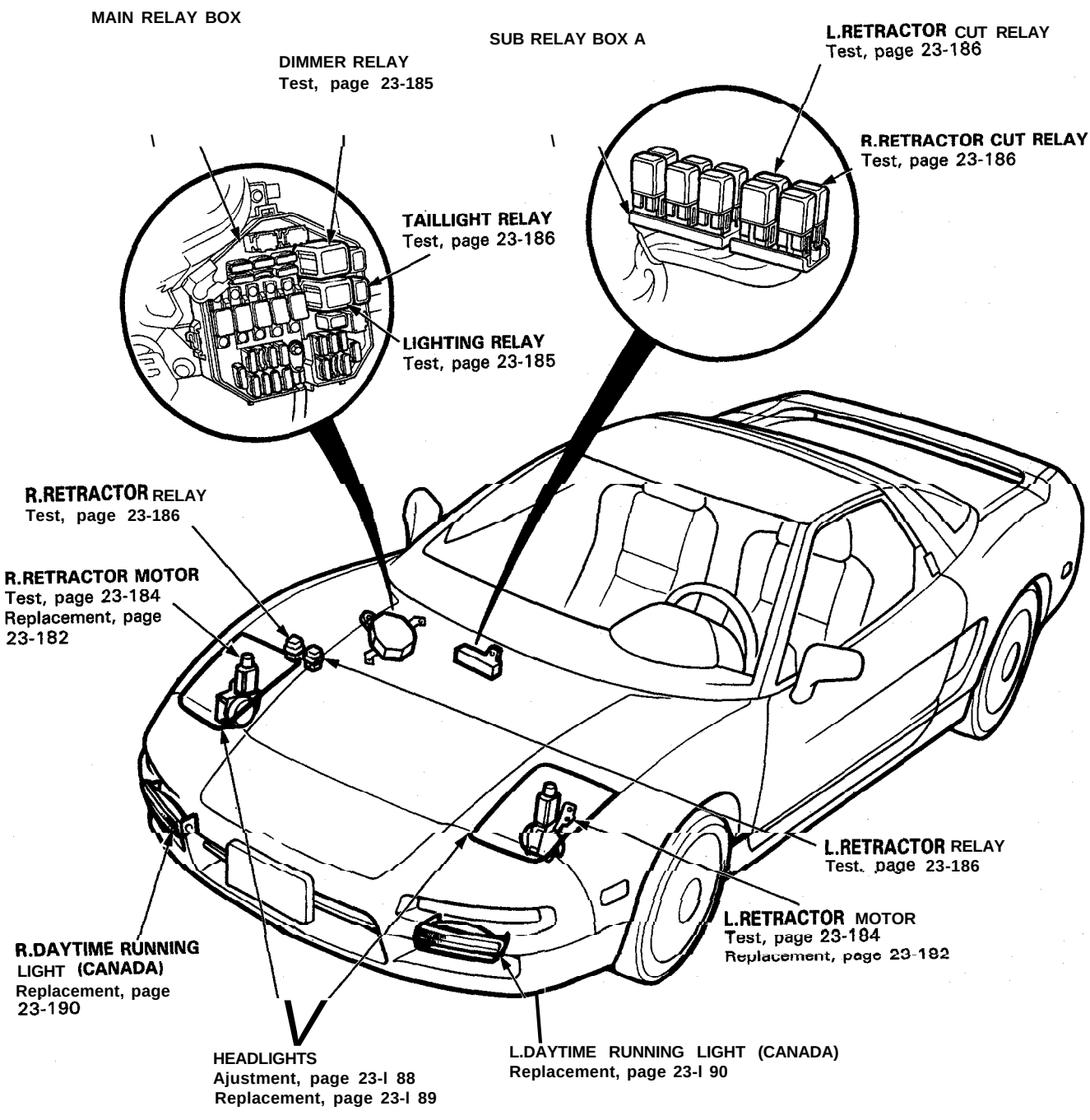
1. Remove the dashboad lower panel and dashboard center panel.
2. If necessary, remove the knee bolster.
3. Disconnect the 8-P connector from the floor wire harness.
4. There should be continuity between the No. 8 and No. 7 terminal when the ignition key is inserted into the ignition key cylinder.
   There should be no continuity when the ignition key is removed.



Lighting System

Component Location Index

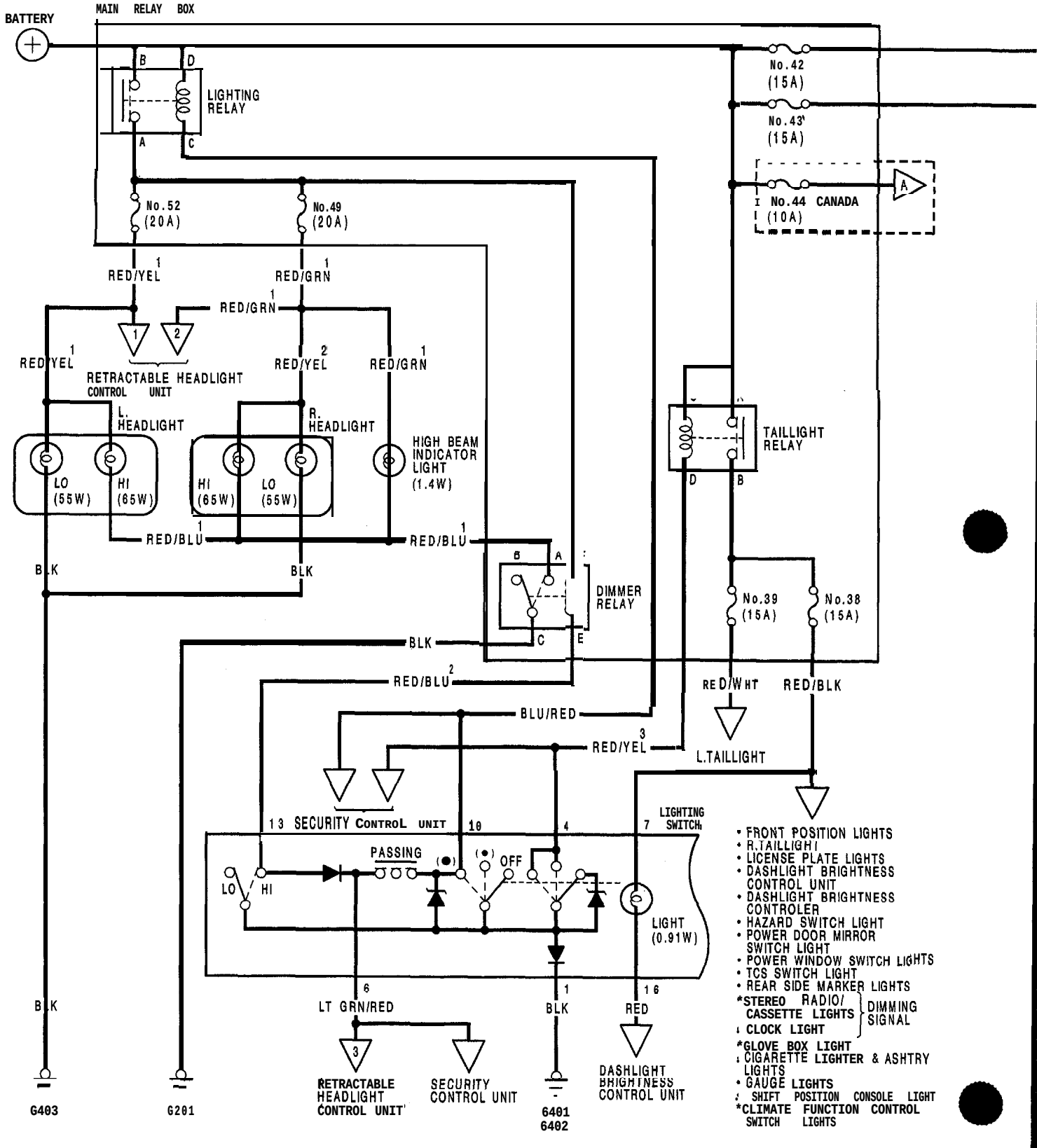


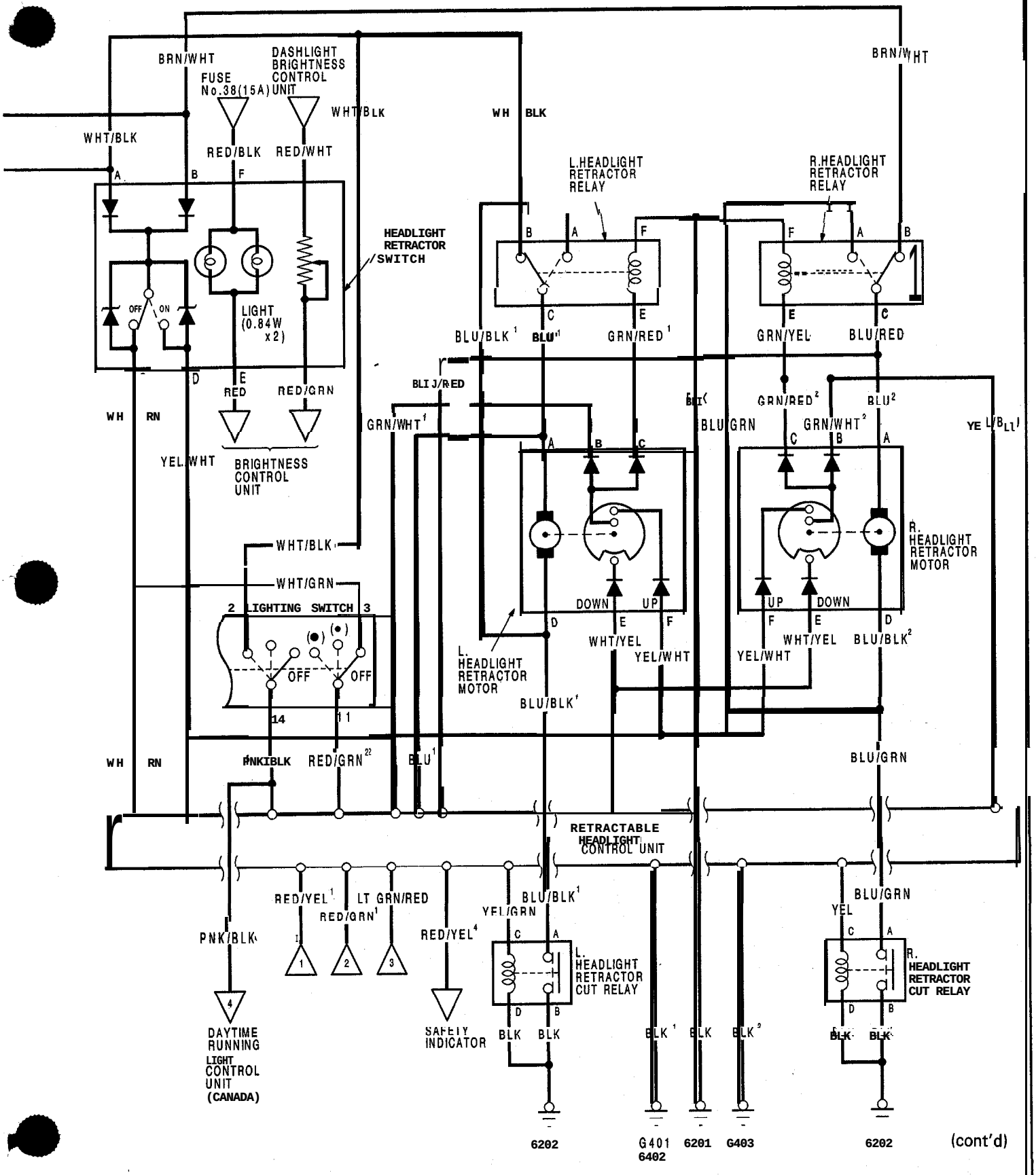

MAIN RELAY BOX
SUB RELAY BOX A
DIMMER RELAY
Test, page 23-185
L.RETRACTOR CUT RELAY
Test, page 23-186
R.RETRACTOR CUT RELAY
Test, page 23-186
TAILLIGHT RELAY
Test, page 23-186
LIGHTING RELAY
Test, page 23-185
R.RETRACTOR RELAY
Test, page 23-186
R.RETRACTOR MOTOR
Test, page 23-184
Replacement, page 23-182
L.RETRACTOR RELAY
Test, page 23-186
L.RETRACTOR MOTOR
Test, page 23-184
Replacement, page 23-182
R.DAYTIME RUNNING LIGHT (CANADA)
Replacement, page 23-190
HEADLIGHTS
Ajustment, page 23-I 88
Replacement, page 23-I 89
L.DAYTIME RUNNING LIGHT (CANADA)
Replacement, page 23-I 90

Lighting System

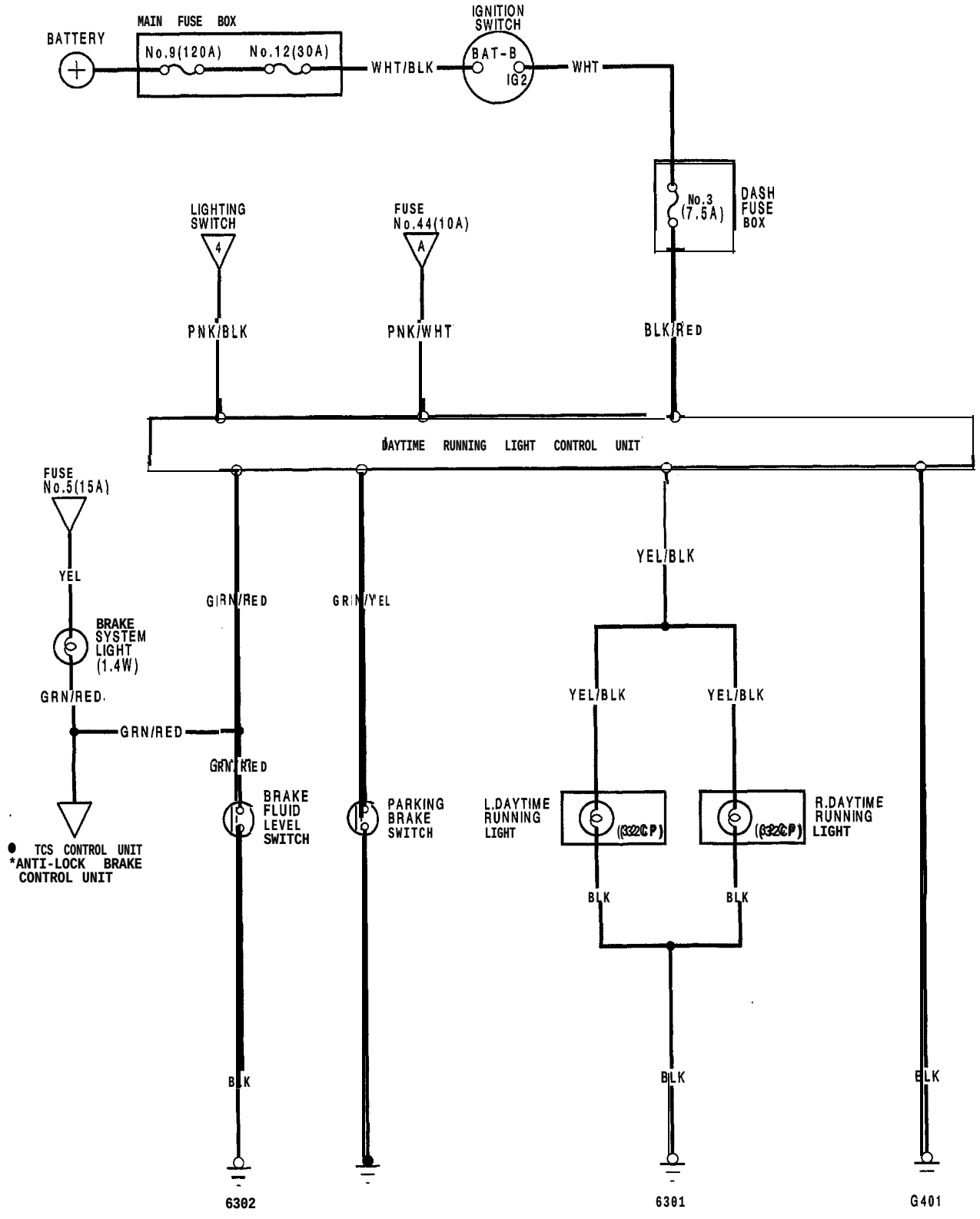
-Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU' and BLU² are not the same).



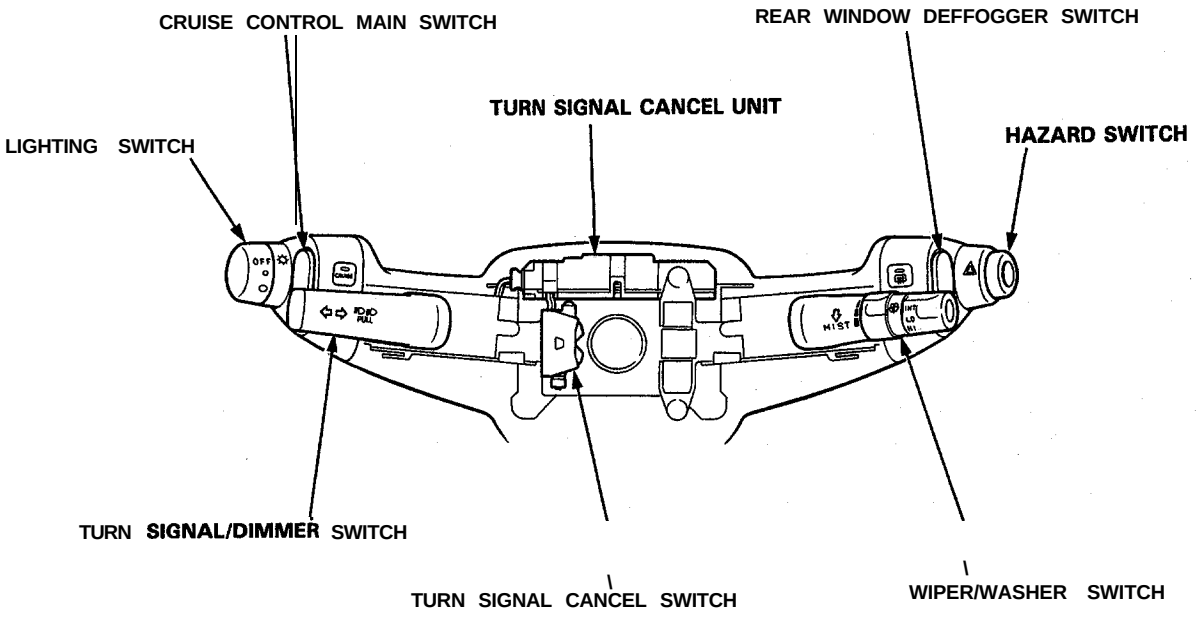

BRN/WHT
DASHLIGHT BRIGHTNESS CONTROL UNIT
FUSE No.38(15A)
WHT/BLK
WHT/BLK
RED/BLK
RED/WHT
WH BLK
L.HEADLIGHT RETRACTOR RELAY
R.HEADLIGHT RETRACTOR RELAY
HEADLIGHT RETRACTOR SWITCH
OFF
ON
LIGHT (0.84W x2)
BLU/BLK 1
BLU 1
GRN/RED 1
GRN/YEL
BLU/RED
RED
RED/GRN
BLU/RED
GRN/WHT 1
BLU GRN
GRN/RED 2
BLU 2
GRN/WHT 2
YEL/BLU
YEL/WHT
BRIGHTNESS CONTROL UNIT
WHT/BLK
WHT/GRN
2 LIGHTING SWITCH 3
OFF
OFF
14
11
DOWN
UP
UP
DOWN
WHT/YEL
YEL/WHT
WHT/YEL
BLU/BLK 2
L. HEADLIGHT RETRACTOR MOTOR
BLU/BLK 1
R. HEADLIGHT RETRACTOR MOTOR
PNK/BLK
RED/GRN 22
BLU 1
BLU/GRN
RETRACTABLE HEADLIGHT CONTROL UNIT
RED/YEL 1
LT GRN/RED
RED/GRN 1
RED/YEL 4
YEL/GRN
BLU/BLK 1
BLU/GRN
YEL
PNK/BLK
L. HEADLIGHT RETRACTOR CUT RELAY
R. HEADLIGHT RETRACTOR CUT RELAY
DAYTIME RUNNING LIGHT CONTROL UNIT (CANADA)
SAFETY INDICATOR
BLK
BLK
BLK 1
BLK
BLK 2
BLK
BLK
6202
G401
6402
6201
G403
6202
(cont'd)

Circuit Diagram <CANADA> cont'd



Description

The combination switch system is comprised of 7 switches, and the turn signal cancel unit.

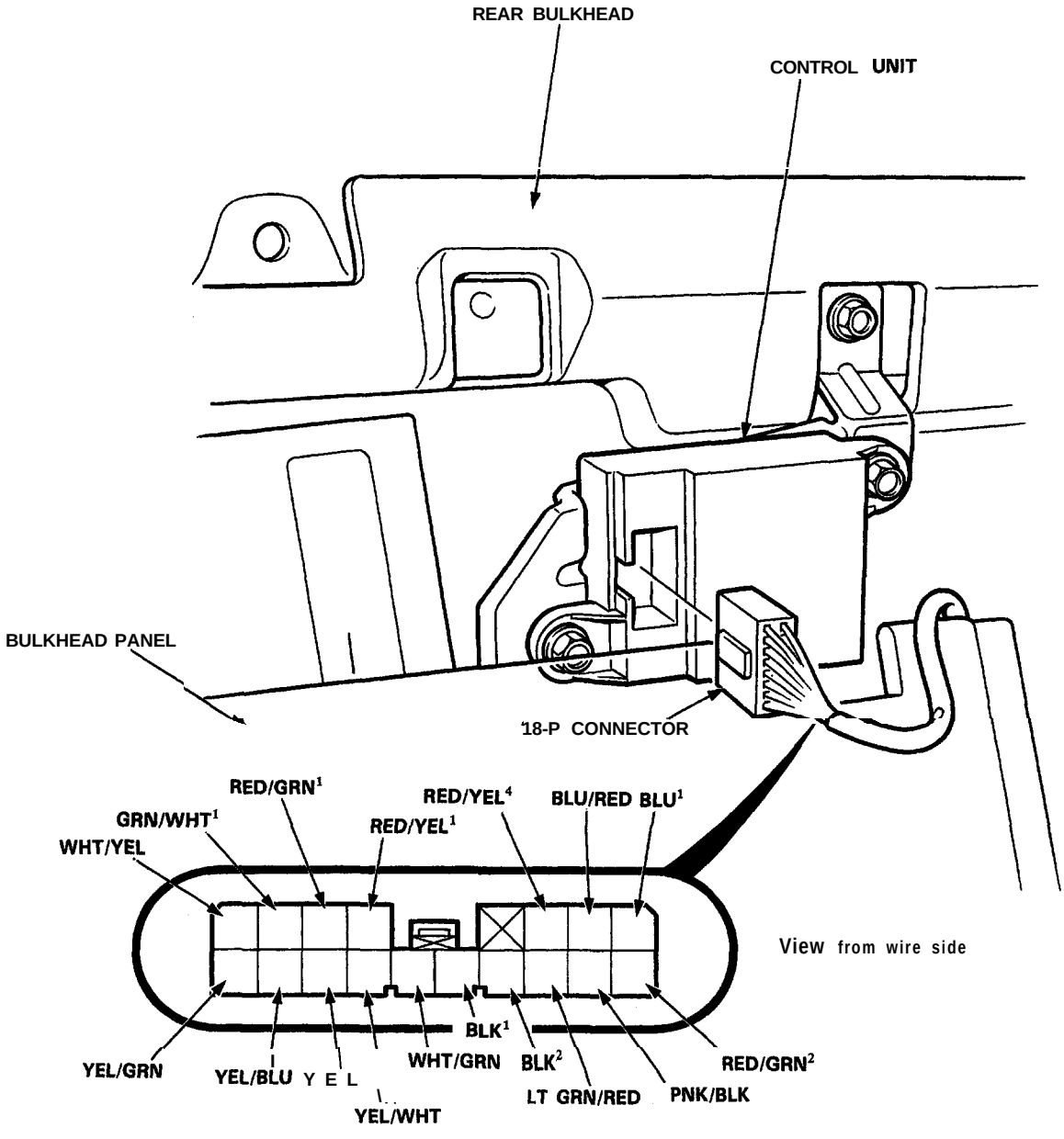


-Retractable Headlight Control Unit Input Test

Remove the bulkhead panels and disconnect the 18-P connector from the control unit.
Make the following input tests at the harness pins.

NOTE:

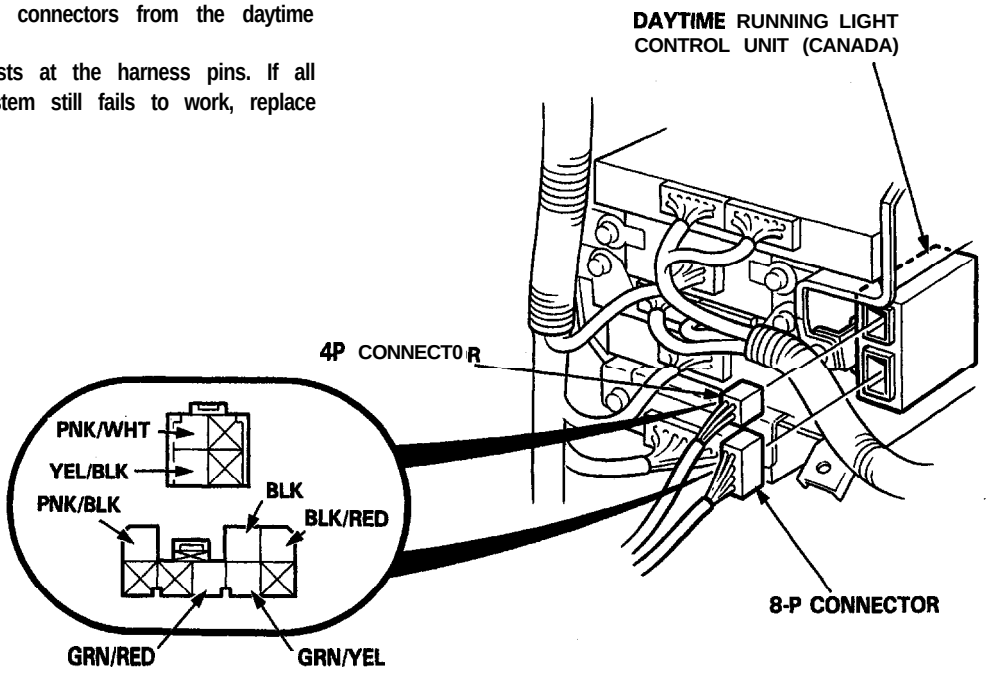
- Recheck the connections between the 13-P connector and control unit. then replace the control unit if all input tests prove OK.
- Several different wires have the same color. They have been given a number suffix to distinguish them (for example RED/YEL[1] and RED/YEL[4] are not the same).



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK[1]	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401). • An open in the wire.
	BLK[2]			• Poor ground (G403). • An open in the wire.
2	RED/GRN[2]	Lighting switch OFF and retractor switch OFF.	Check for voltage to ground: should be battery voltage.	• Blown No. 42 (15 A) and No. 43 (15 A) fuses. • Faulty retractor switch or lighting switch. • An open in the wire.
3	WHT/GRN	Retractor switch OFF.	Check for voltage to ground: should be battery voltage.	• Blown No. 42 (15 A) and No. 43 (15 A) fuses. • Faulty retractor switch. • An open in the wire.
4	YEL/WHT	Retractor switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty retractor switch. • An open in the wire.
5	PNK/BLK	Lighting switch " • ". (headlights on)	Check for voltage to ground: should be battery voltage.	• Blown No. 43 (15 A) fuse. • Faulty lighting switch. • An open in the wire.
6	RED/YEL[1]	Lighting switch " • ". (headlights on)	Check for voltage to ground: should be battery voltage.	• Faulty lighting relay or lighting switch. • Blown No. 52 (20 A) fuse. • An open in the wire.
	RED/GRN[1]			• Faulty lighting relay or lighting switch. • Blown No. 49 (20 A) fuse. • An open in the wire.
7	LT GRN/ RED	Passing switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty lighting relay or dimmer relays. • Blown No. 49 (20 A) and No. 52 (20 A) fuses. • Faulty lighting switch. • An open in the wire.
B	BLU/RED	Retractor motor stationary.	Check for voltage to ground: should be battery voltage.	• Blown No. 42 (15 A) fuse. • Faulty R. retractor relay. • An open in the wire.
	BLU'			• Blown No. 43 (15 A) fuse. • Faulty L. retractor relay. • An open in the wire.
9	YEL	Under all conditions.	Check for continuity to ground: should be continuity.	• Faulty R. retractor cut relay. • Poor ground (G202). • An open in the wire.
	YEL/GRN			• Faulty L. retractor cut relay. • Poor ground (G202). • An open in the wire.

Daytime Running Light Control Unit Input Test

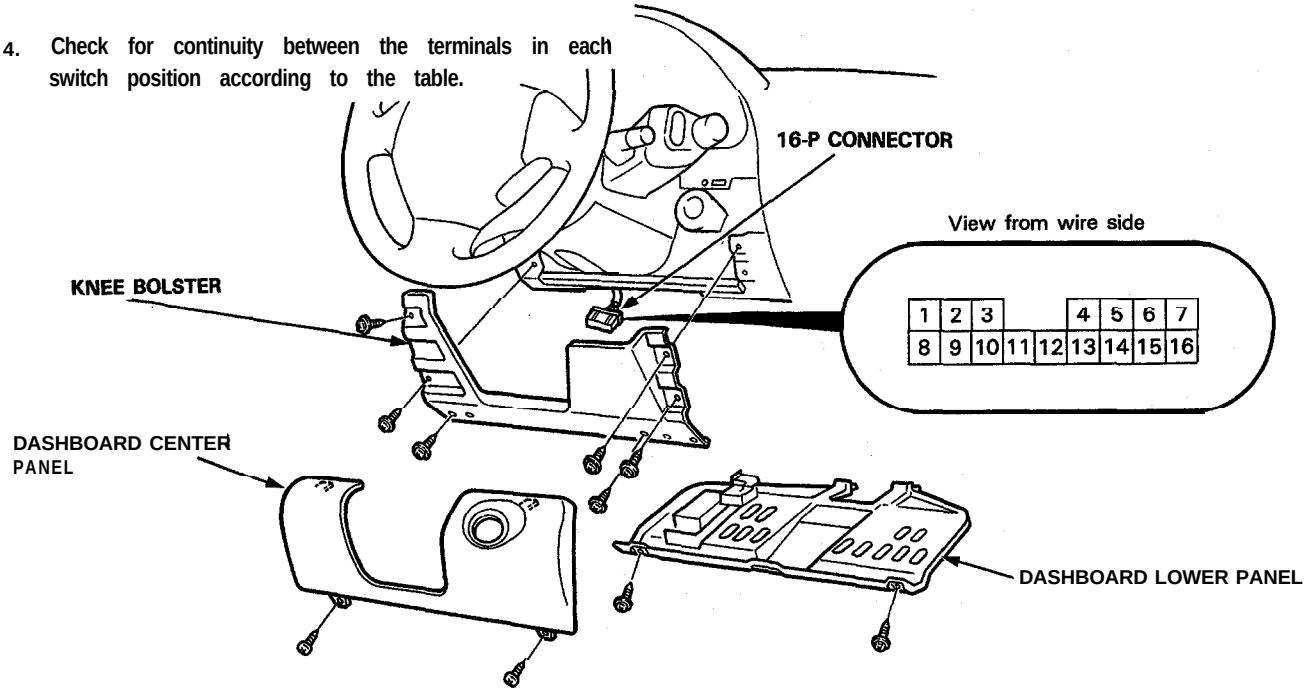
Remove the glove box lower panel and glove box.
Disconnect the 8-P and 4-P connectors from the daytime running light control unit.
Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the control unit.



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401) • An open in the wire.
2	PNK/WHT	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 44 (10A) fuse. • An open in the wire.
3	BLK/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 3 (7.5A) fuse. • An open in the wire.
4	PNK/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 43 (15A) fuse. • Faulty lighting switch. • An open in the wire.
5	YEL/BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Blown daytime running light bulbs. • Poor ground (G301). • An open in the wire.
6	GRN/RED	Ignition switch ON.	Connect to ground: Brake light bulb failure light should come on.	• Blown No. 5 (10 A) fuse. • Blown bulb. • An open in the wire.
7	GRNNEL	Parking brake switch ON (parking brake lever up).	Check for continuity to ground: should be continuity.	• Faulty parking brake switch. • An open in the wire.

Lighting/Turn Signal Switch Test

1. Remove the dashboard lower panel and dashboard center panel.
2. If necessary, remove the knee bolster.
3. Disconnect the 16-P connector from the floor wire harness.
4. Check for continuity between the terminals in each switch position according to the table.



Lighting/Dimmer/Passing Switch

Position \ Terminal		1		4	6	7		10	13	16
Lighting switch	OFF				●		●	●	●	
	•	●	●							
	●	●	●					●		
Dimmer switch	LOW	●	●					●		
	HIGH	●	●	●					●	
Passing switch	OFF				●		●		●	
	ON				●		●	●		

Turn Signal Switch

Position \ Terminal	5		8	9
R	○	▶	○	
NEUTRAL				
L	○	▶		○

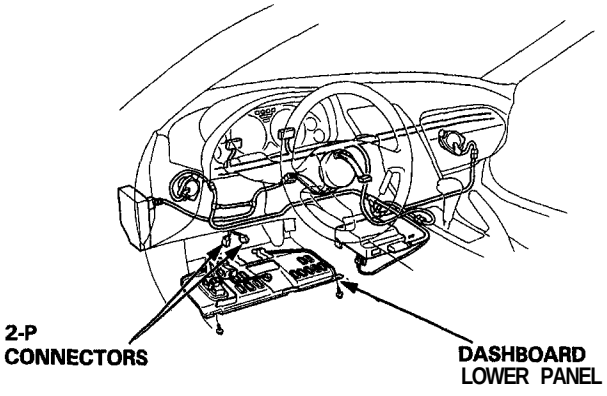
Lighting System

-Lighting Switch Replacement

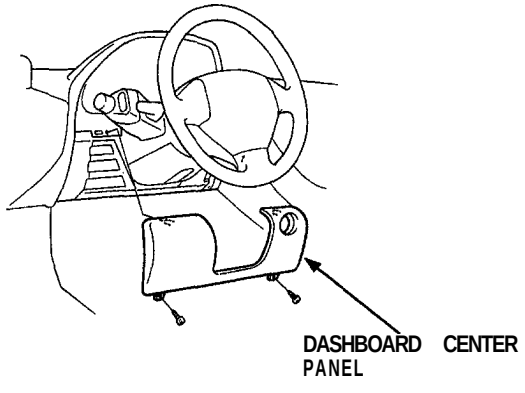
⚠ WARNING **All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.**

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the lighting system.

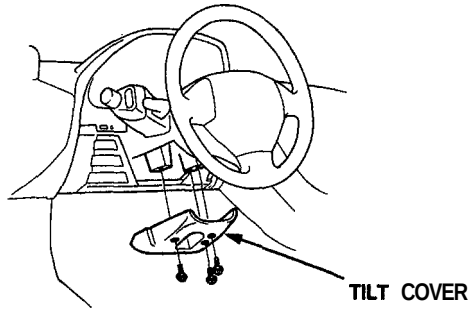
1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



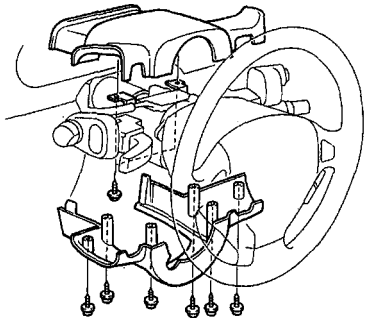
2. Remove the dashboard center panel.



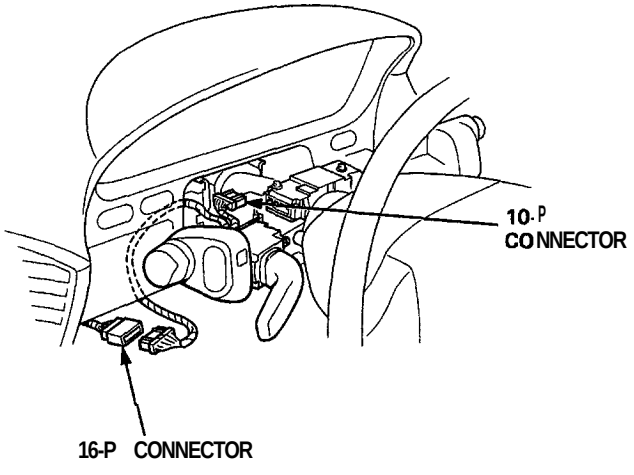
3. Remove the tilt cover.



4. Remove the steering column lower cover and upper cover.

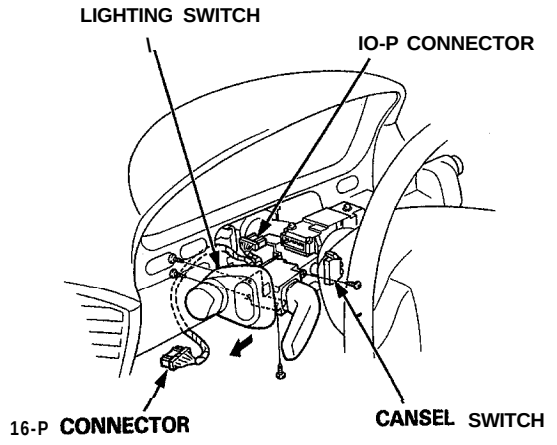


5. Disconnect the 16-P connector and 10-P connector.

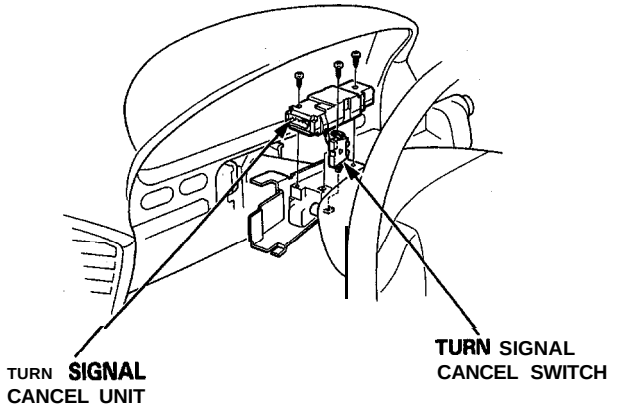


6. Remove the 4 screws from the lighting switch.

7. Disconnect the 1 O-P connector from the cancel unit, then remove the lighting switch.



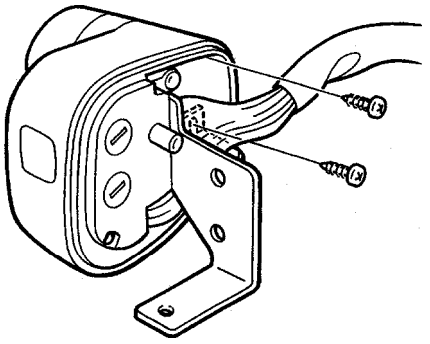
8. If necessary, remove the cancel unit and cancel switch.



Lighting Switch Light Bulb Replacement

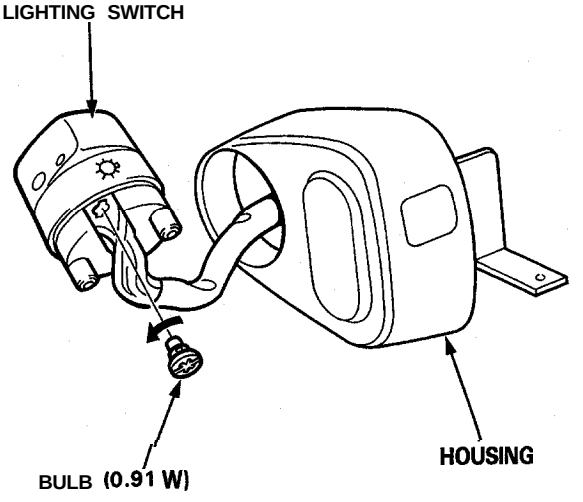
1. Remove the steering coloumn covers.

2. Remove the 2 screws.



3. Slide the lighting switch out of the housing as shown.

4. Remove the bulb from the lighting switch by turning the bulb 45°.

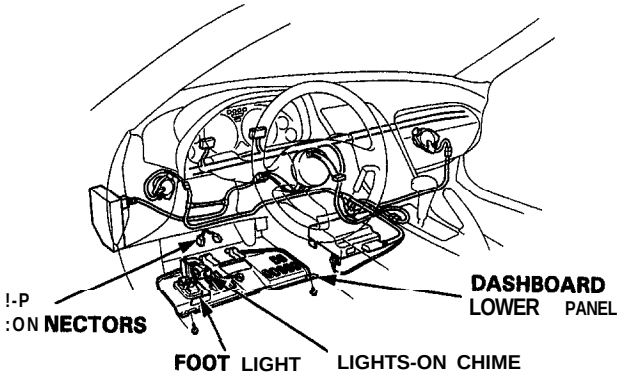


-Retractor Switch Removal

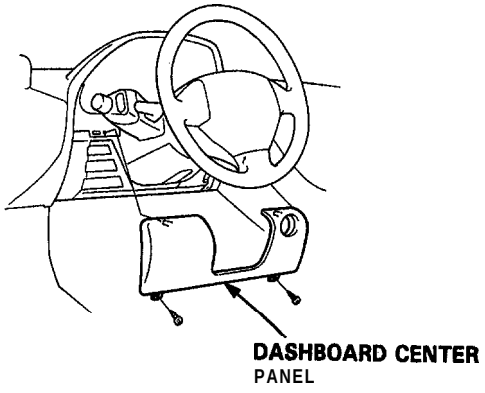
WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the lighting system.

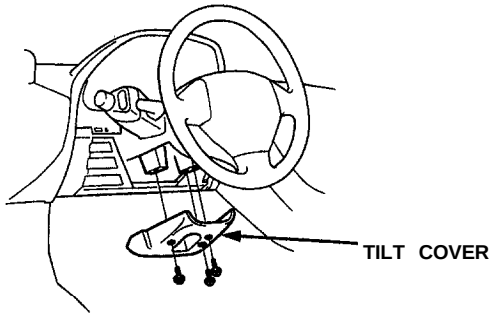
1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



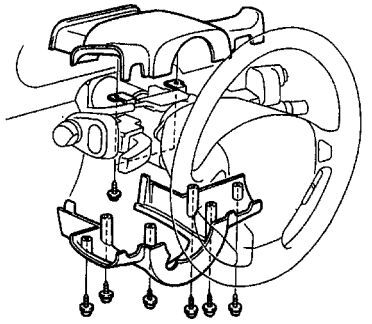
2. Remove the dashboard center panel.



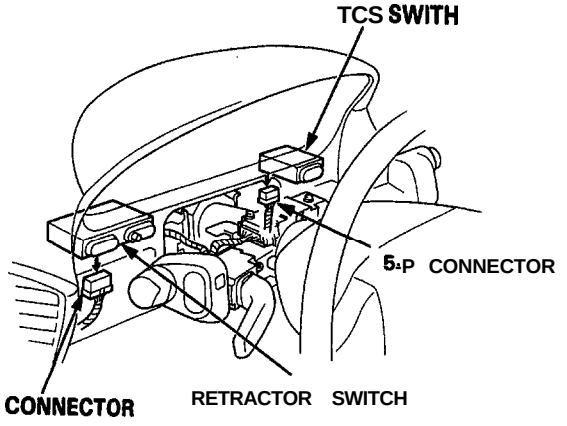
3. Remove the tilt cover.



4. Remove the steering column lower cover and upper cover.

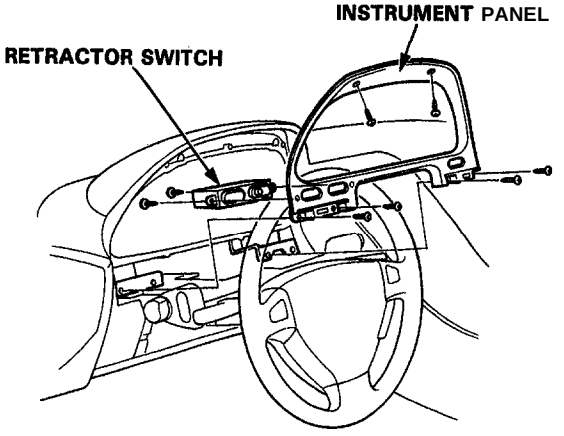


5. Disconnect the 5-P and IO-P connectors from the each switch.



6. Remove the 6 screws, then remove the instrument panel from the dashboard.

7. Remove the retractor switch from the instrument panel.



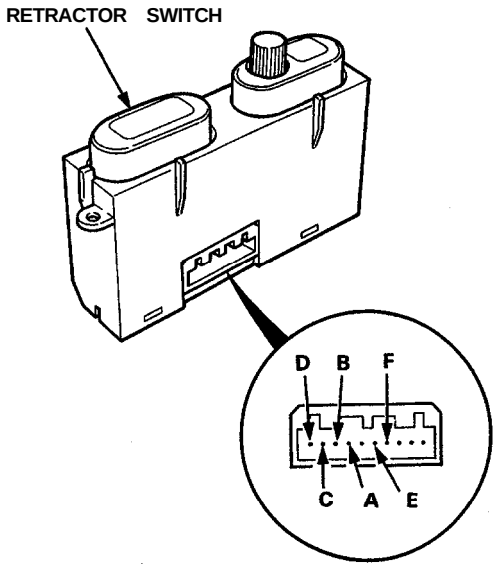
Retractor Switch Test

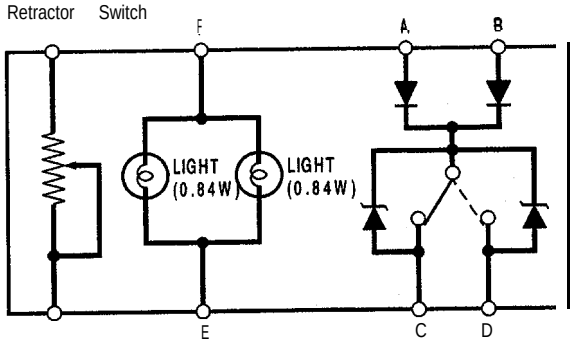
1. Remove the retractor switch.
2. Check for continuity between the terminals in each switch position according to the table.

Retractor Switch

Terminal / Position	A		B		C	D
OFF						
ON						

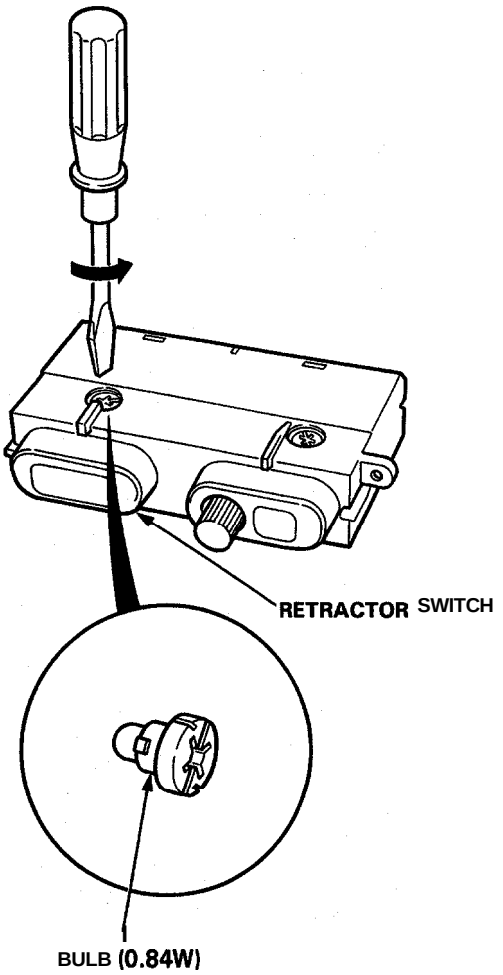
Switch lights terminals: F and E





Retractor Switch Light Bulb Replacement

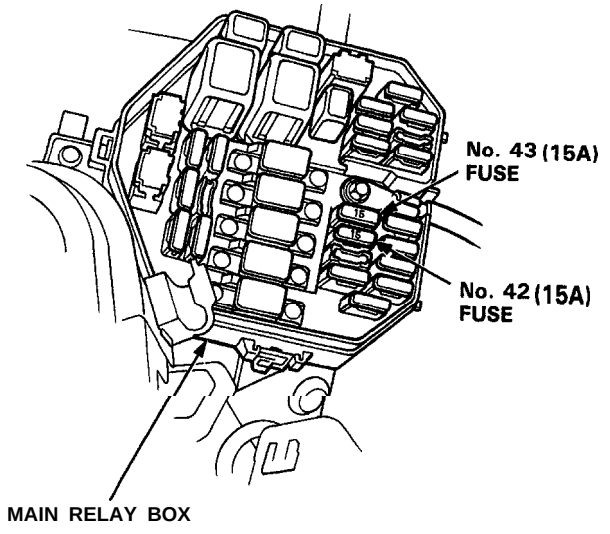
1. Remove the retractor switch.
2. Turn the socket 45° counterclockwise to remove it.



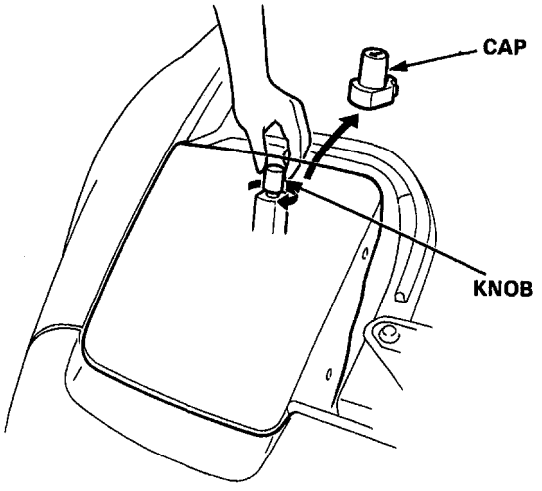
Retractor Motor Replacement

CAUTION:
- Halogen headlights can 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 headlights with the lights on.

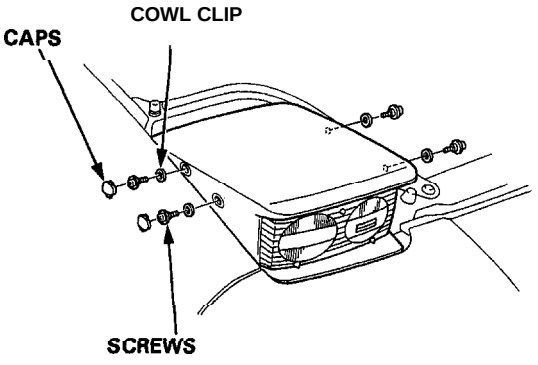
1. Remove the No. 42 (15 A, R. Retractor motor) and No. 43 (15A, L. Retractor motor) fuses in the main relay box.



2. Turn the knob clockwise to raise the headlight.

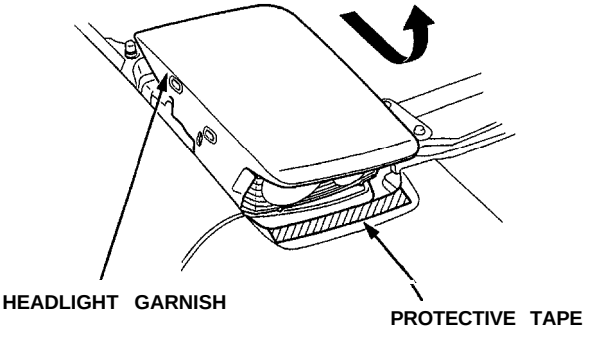


3. Remove the 2 caps and 4 screws and cowl clips.



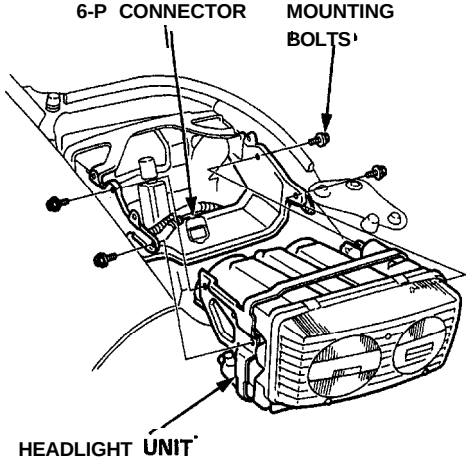
4. Slide the headlight garnish upward to remove it.

NOTE: Be careful not to damage the front bumper or the headlight garnish when upward to remove it.



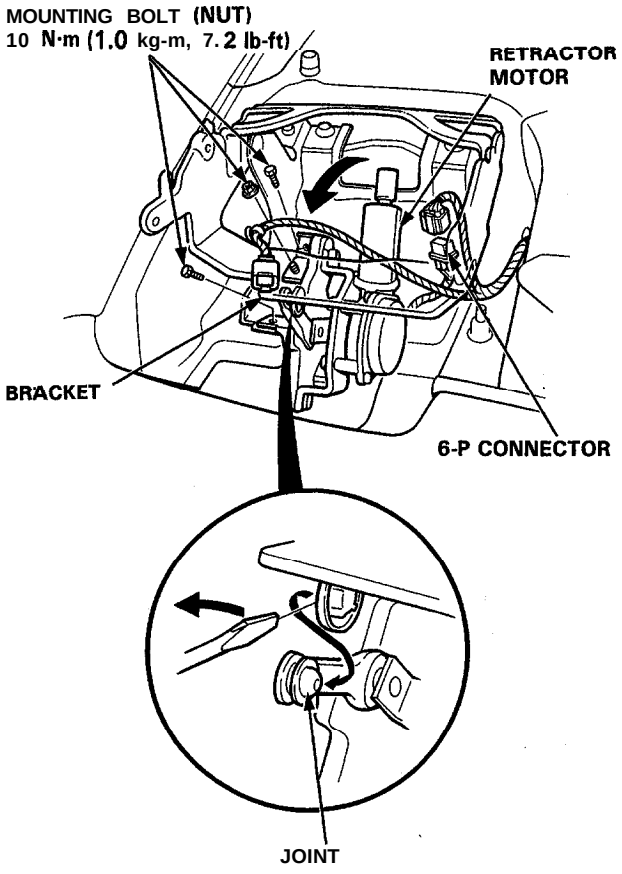
5. Disconnect the 6-P connector from the headlight unit.

6. Remove the 4 mounting bolts, then remove the unit.



7. Disconnect the 6-P connector.

8. Remove the 2 mounting bolts and the mounting nut.



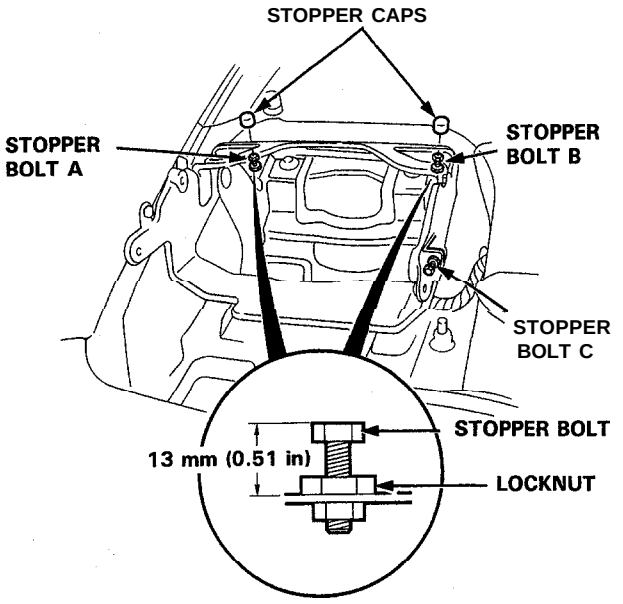
9. Pry the retractor linkage off the motor arm.

10. Pull out the retractor motor.

11. Install in the reverse order of the removal, and:
- Make sure there is no interference between the wire harness and linkage.
- Coat the joint with grease and make sure the linkage moves smoothly.

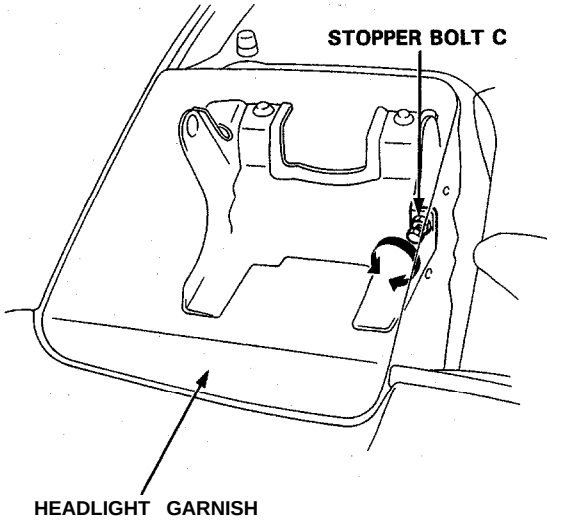
-Adjustment

1. Remove the stopper caps.



2. Adjust the stopper bolt A and B.

3. Adjust the stopper bolt C fore or aft until the headlight garnish fits flush with the front fender when the headlights are closed.

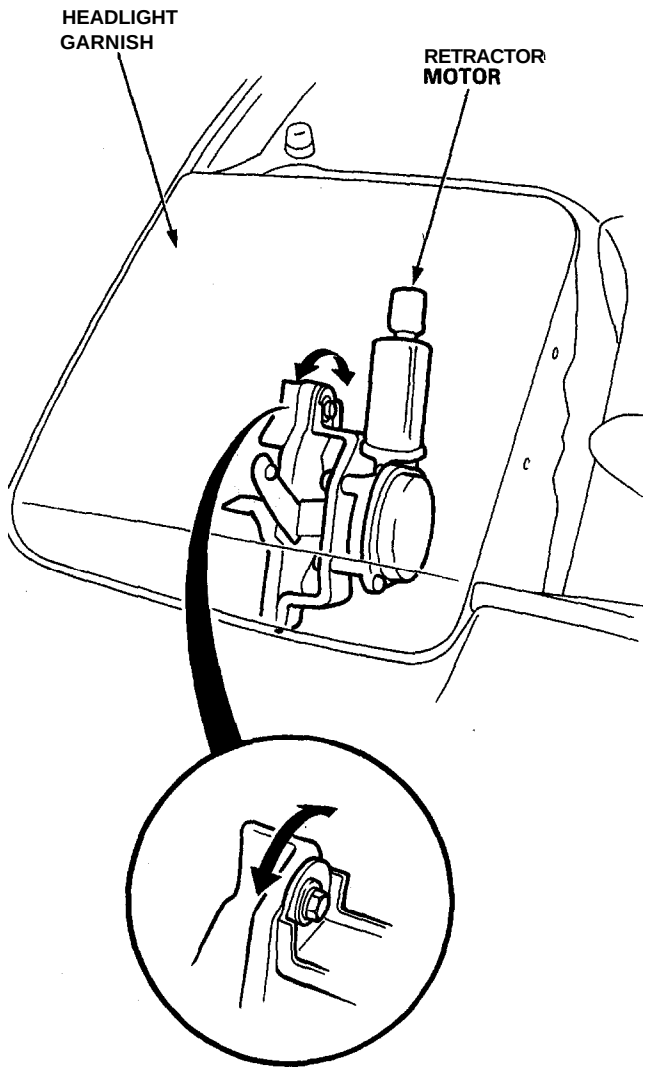


(cont'd)

-Adjustment (cont'd)

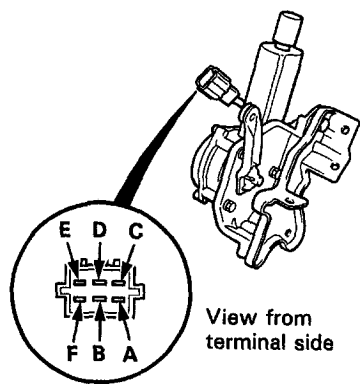
4. Adjust the retractor motor fore or aft until the headlight garnish fits flush with the front fender when the headlight are closed.

   NOTE: Be careful not to damage the headlight garnish.



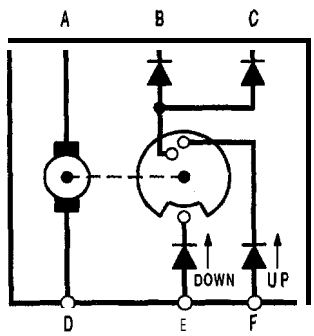
- Retractor Motor Test

1. Remove the retractor motor.
2. Test motor operation by connecting battery positive wire to the A terminal and negative to the D terminal. The motor should run continuously.
3. If the motor fails to run smoothly, replace it.



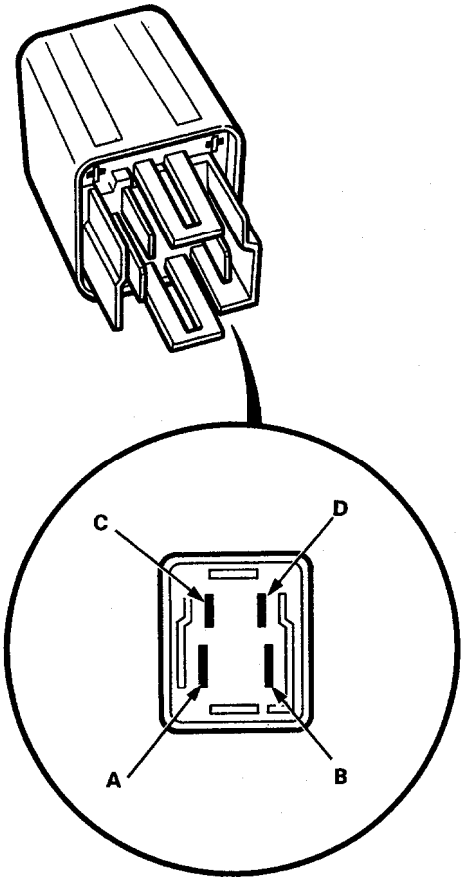
4. Disconnect the power supply and check for continuity between the terminals according to the table while turning the knob clockwise, as shown above.

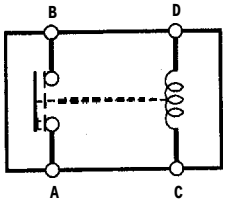
Terminal / Position	B	C			E	F
At closed position	○		○			○
At opened position	○		○		○	



Lighting Relay Test

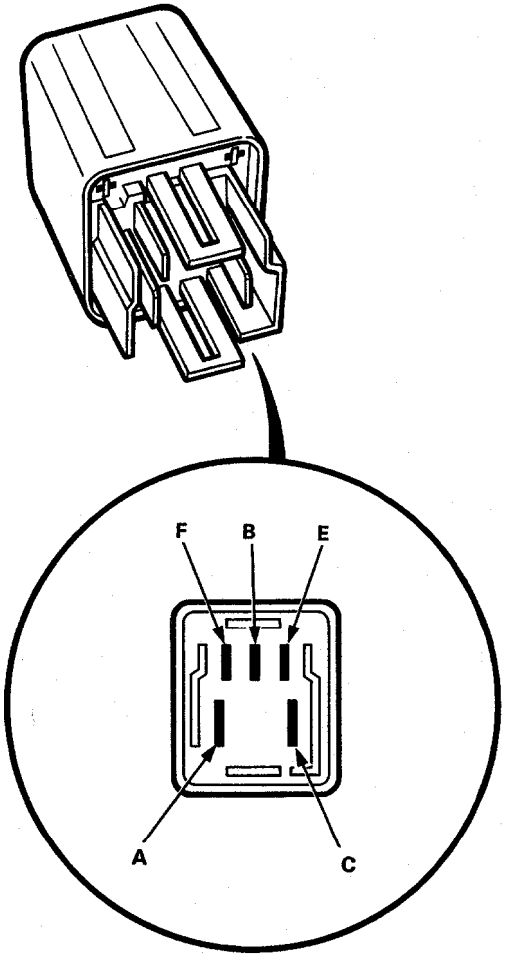
1. Remove the lighting relay from the main relay box.
2. There should be continuity between the C and D terminals.
3. There should be continuity between the A and B terminals when the battery is connected to C and D terminals.
   There should be no continuity when the battery is disconnected.

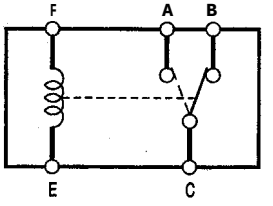




Dimmer Relay Test

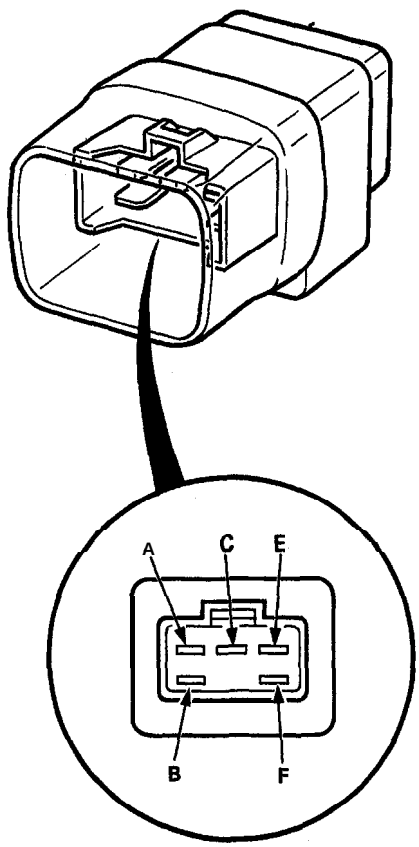
1. Remove the dimmer relay from the main relay box.
2. There should be continuity between the F and E terminals and between the B and C terminals.
3. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   There should be no continuity when the battery is disconnected.

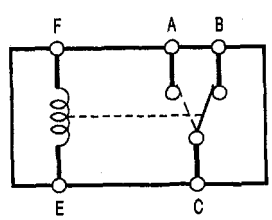




-Retractor Relay Test

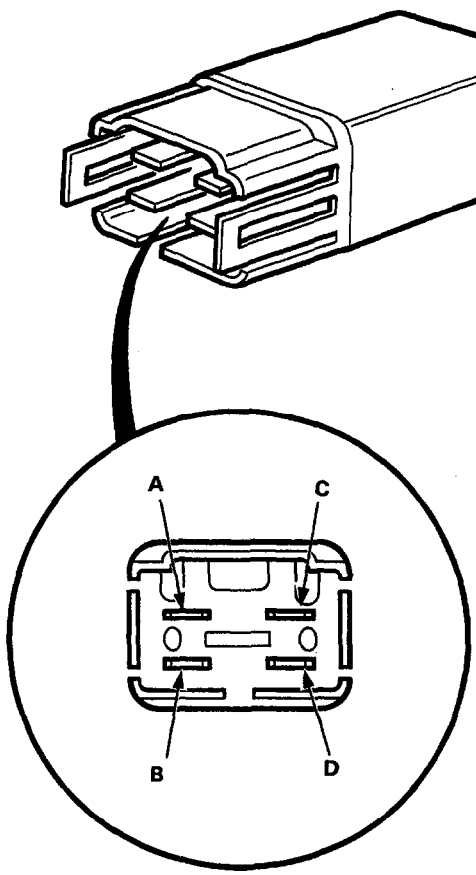
1. Remove the retractor relay (located in the right side of the front compartment area).
2. There should be continuity between the E and F terminals and between the B and C terminals.
3. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   There should be no continuity when the battery is disconnected.

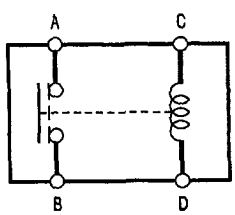




- Retractor Cut/Taillight Relay Test

1. Remove the retractor cut relay from sub relay box A.
2. There should be continuity between the C and D terminals.
3. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

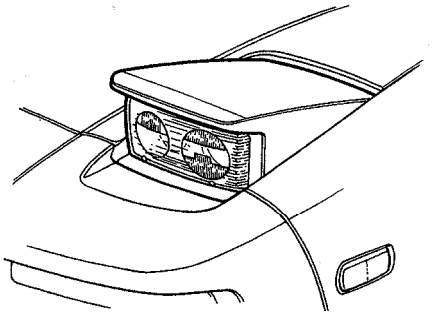


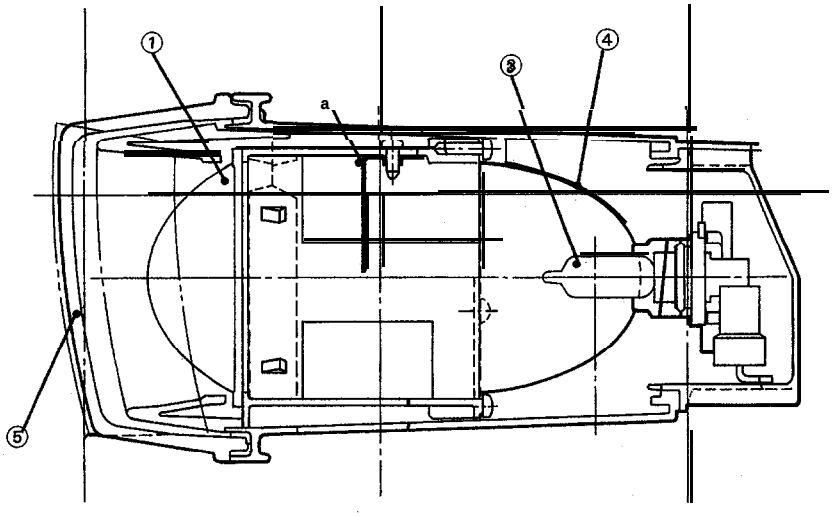


Headlights

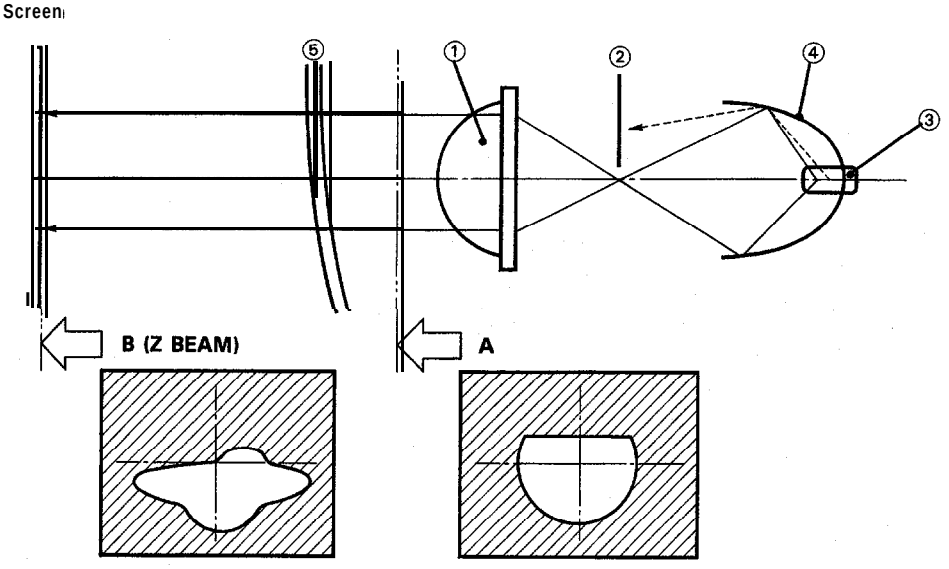
Description

The light first forms a basic pattern A after being interrupted by the interrupter plate and passed through the convex lense. The interrupter plate determines the form. The outer lense distributes the light into the pattern B.





① CONVEX LENSE
② INTERRUPTER PLATE
③ BULB
④ REFLECTOR
⑤ OUTER LENSE

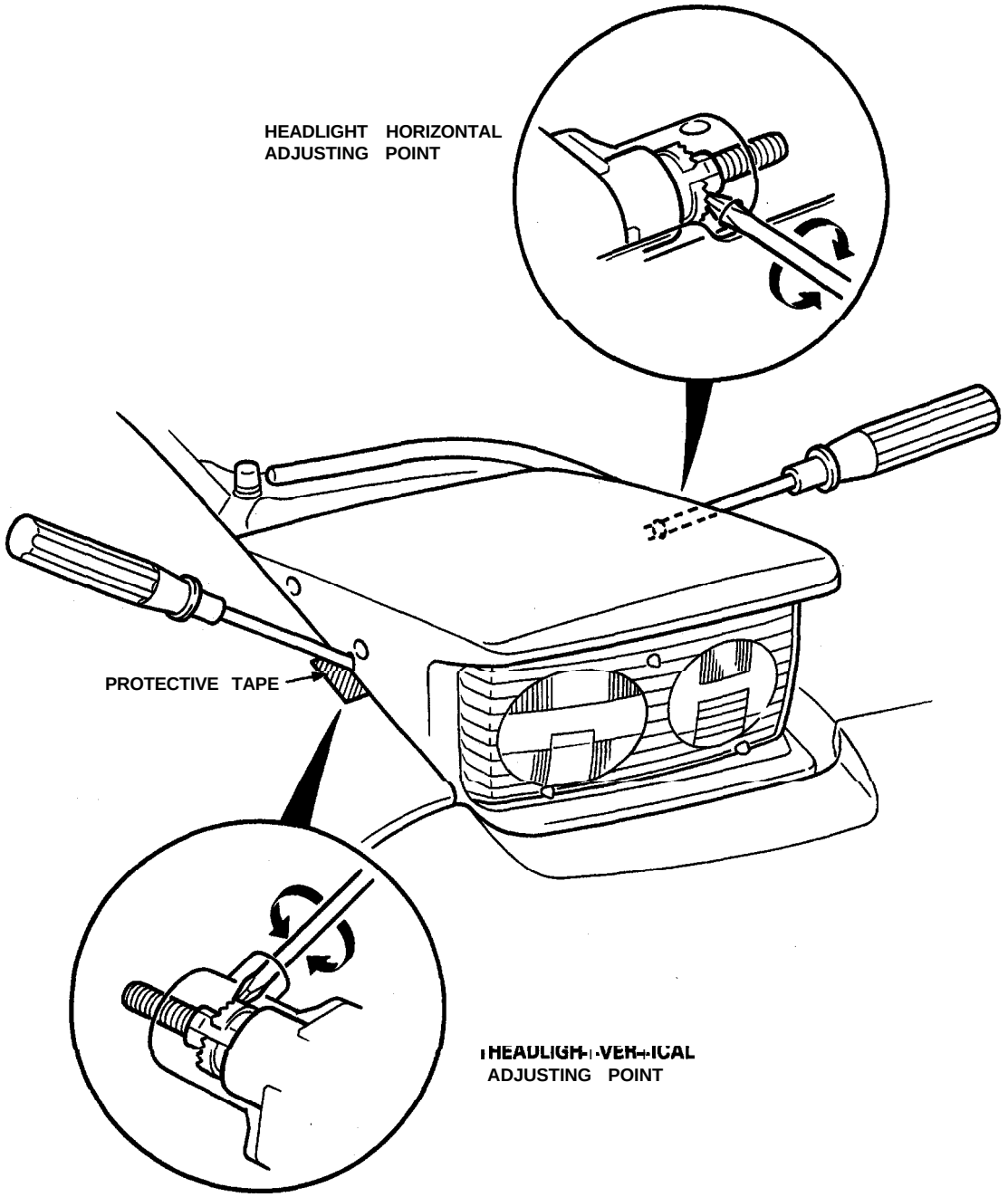


Headlights

Adjustment

Adjust the beadlights to local requirements.

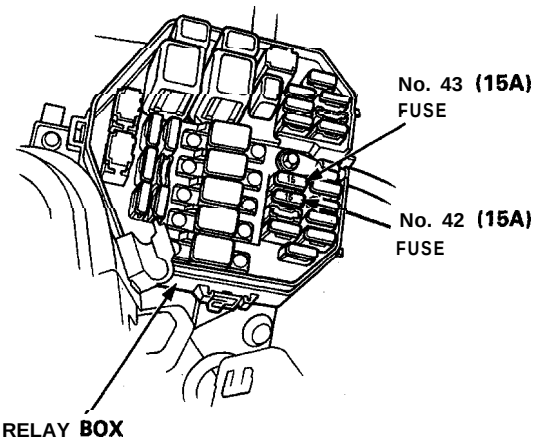
NOTE: Be careful not to damage the front fender or the headlight garnish when adjusting.



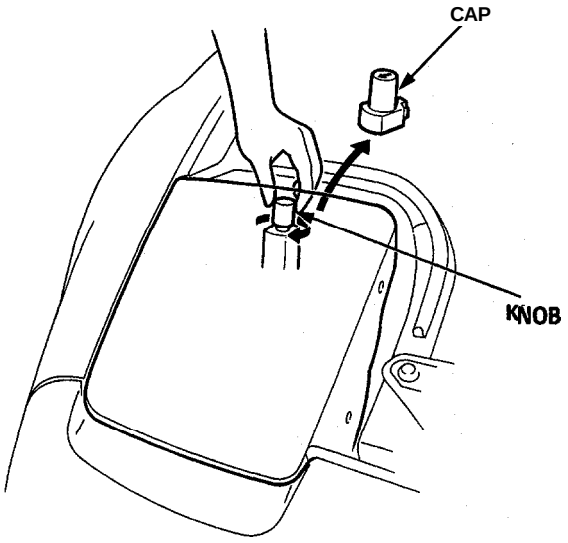
Headlight Replacement

CAUTION:
- Halogen headlights can 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.

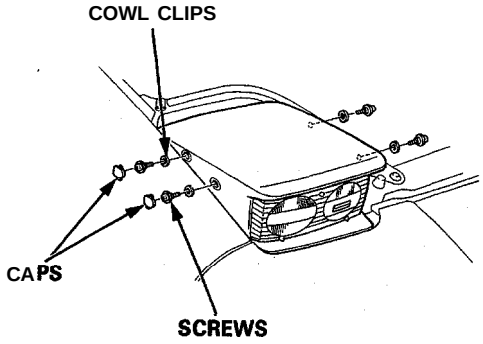
1. Remove the No. 42 (15 A, R. Retractor motor) and No. 43 (15A, L. Retractor motor) fuses in the main relay box.



2. Turn the knob clockwise to raise the headlight.

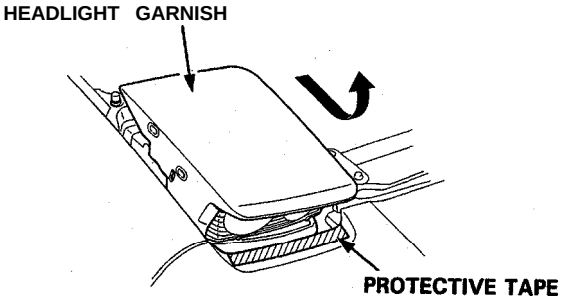


3. Remove the 2 caps and 4 screws and cowl clips.



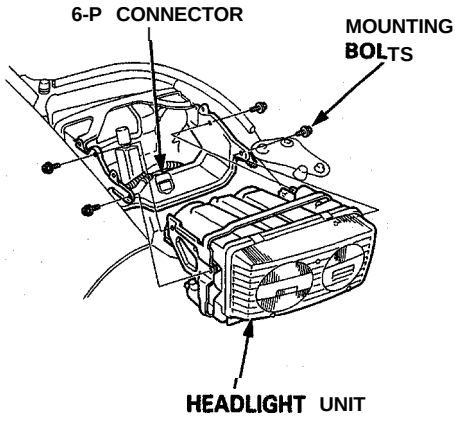
4. Slide the headlight garnish upward to remove it.

NOTE: Be careful not to damage the front bumper or the headlight garnish when removing it.



5. Disconnect the 6-P connector from thee headlight unit.

6. Remove the 4 mounting bolts, then remove the unit.



7. After installing the unit, adjust the headlights to local requirements.

Headlights

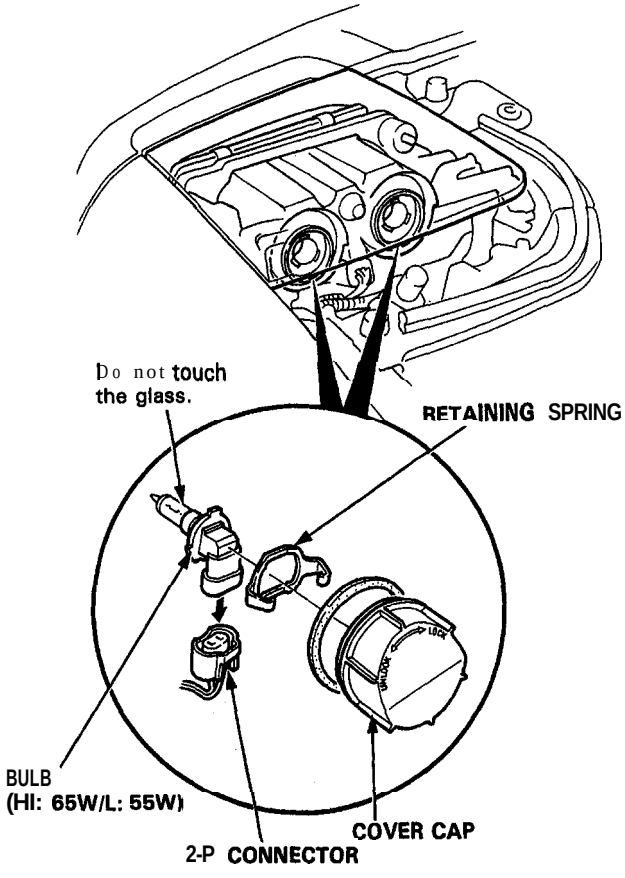
Bulb Replacement

CAUTION:

- Halogen headlights can 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.

1. Remove the cover cap.
2. Disconnect the 2-P connector, then remove the retaining spring and bulb.

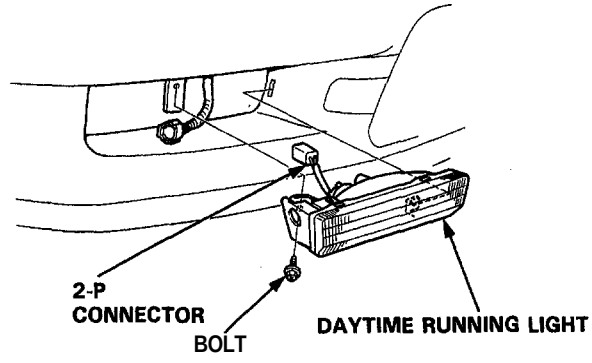
NOTE: If necessary, remove the headlight garnish.

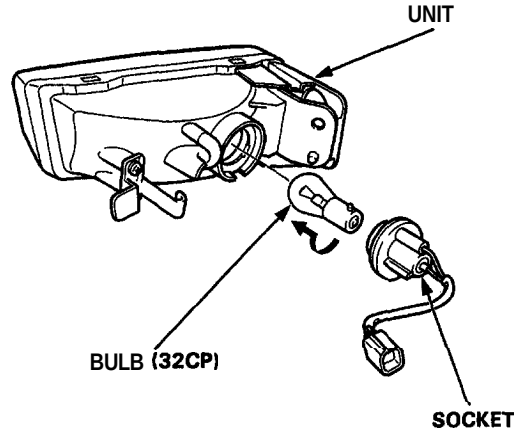


Daytime Running Lights (CANADA)

Replacement

1. Remove the bolt and pull out the daytime running light, then disconnect the 2-P connector.



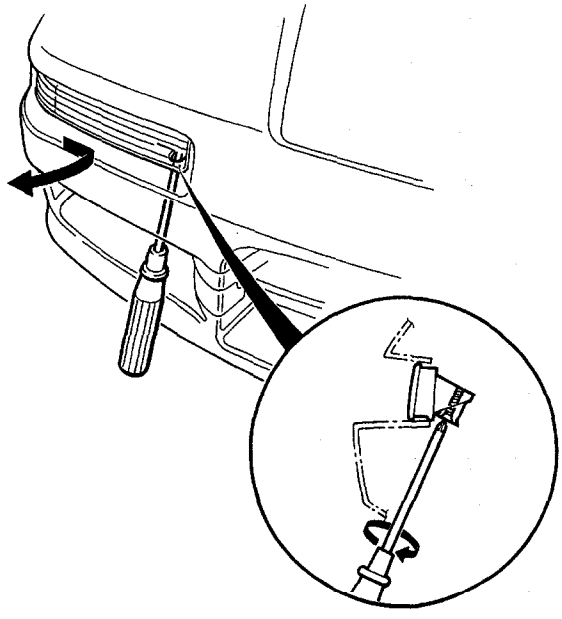


2. If necessary, remove the bulb.

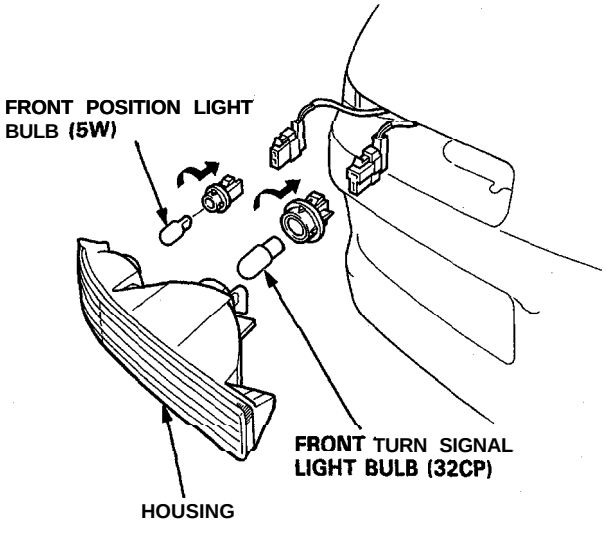
Front Turn Signal/Front Position Lights

Replacement

1. Remove the screw and pull out the light assembly from the front bumper.



2. Disconnect the 2-P connectors from the bulb sockets.
3. Turn the bulb socket 45° counterclockwise to remove it from the housing.

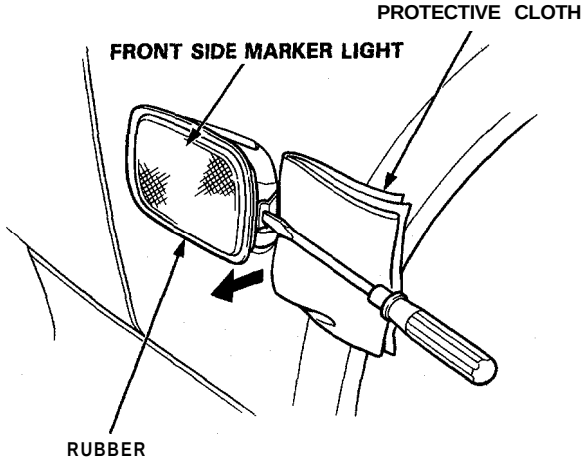


Front Side Marker Lights

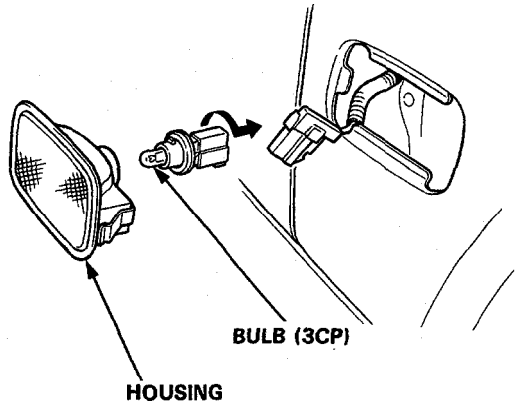
Replacement

1. Carefully pry out the front side marker light from the front fender.

   NOTE: Be carefully not to damage the front side marker light or the front fender when prying out the front side marker light.



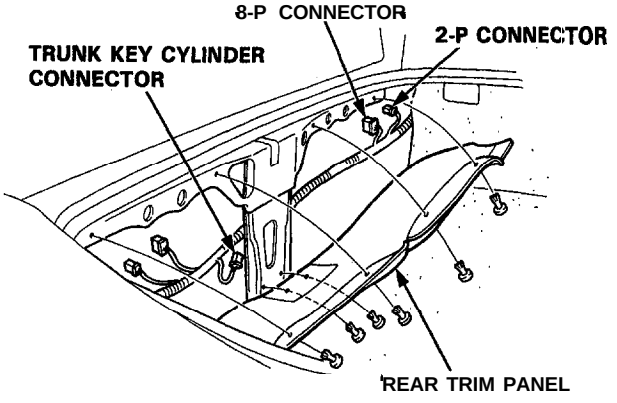
2. Disconnect the 2-P connector from the front side marker light.
3. Turn the bulb socket 45° counterclockwise to remove it from the housing.



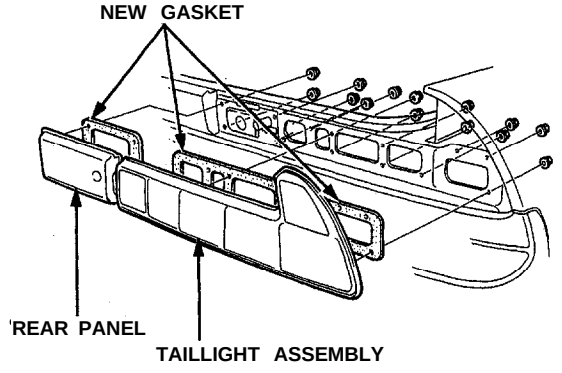
Taillights

Replacement

1. Open the trunk-lid and remove the rear trim panel.
2. Disconnect the 8-P connector and 2-P connector from the taillight assembly.
3. Disconnect the 2-P connector from the trunk key cylinder switch.



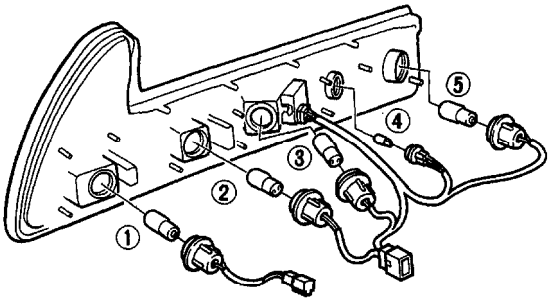
4. Remove the 4 mounting nuts and rear panel, then remove the 10 mounting nuts and the taillight assembly.



NOTE:
- inspect the gasket; replace if it is distorted or overly compressed.
- Make sure that there is no weter leakage in the taillights, after installing the taillights.

Bulb Replacement

1. Open the trunk lid and rear trim panel.
2. Turn the socket 45° counterclockwise to remove it from the taillight housing.



① : TURN SIGNAL LIGHT BULB (45CP)
② BRAKE LIGHT/TAILLIGHT
③ BULBS (43CP/3CP)
④ : TAILLIGHT BULB (3CP)
⑤ : BACK-UP LIGHT BULB (45Cp)

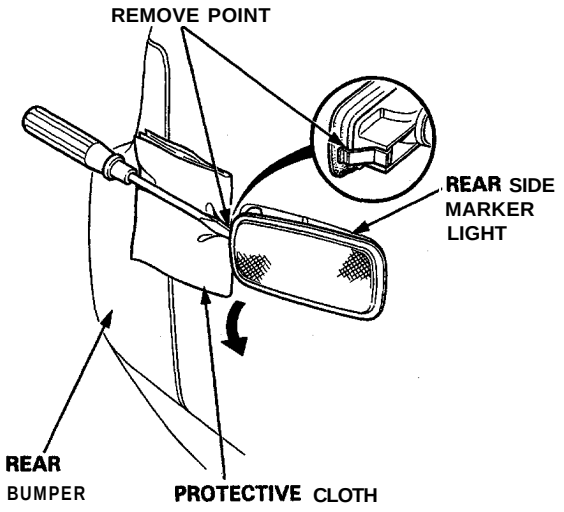
3. Remove the bulbs from the socket.

Rear Side Marker Lights

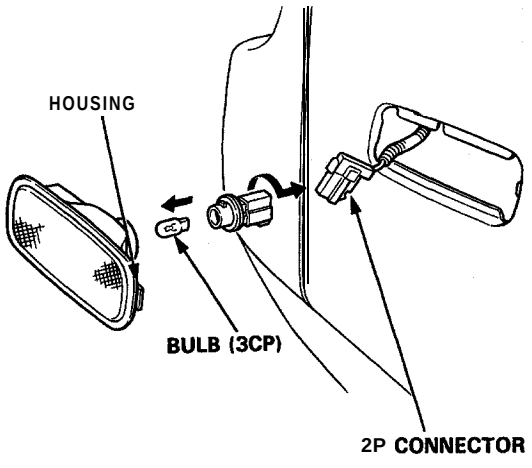
Replacement

1. Carefully pry out the rear side marker light from the rear fender.

   NOTE: Be carefully not to damage the rear side marker light or the rear fender when prying out the rear side marker light.



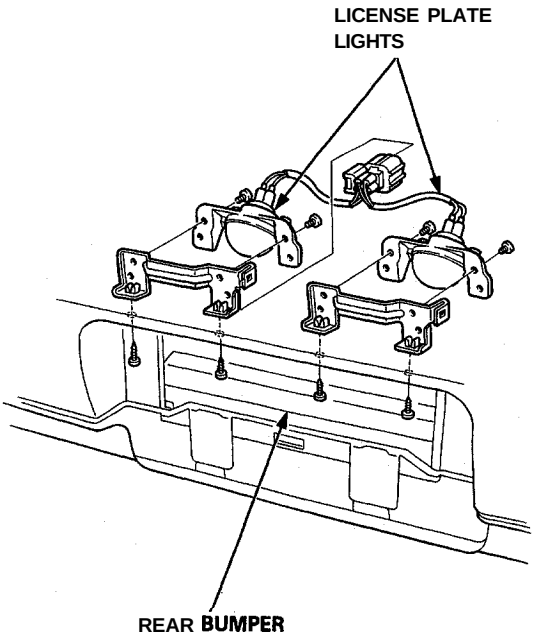
2. Disconnect the 2-P connector from the rear side marker light.
3. Turn the bulb socket 45° counterclockwise to remove it from the rear side marker light.



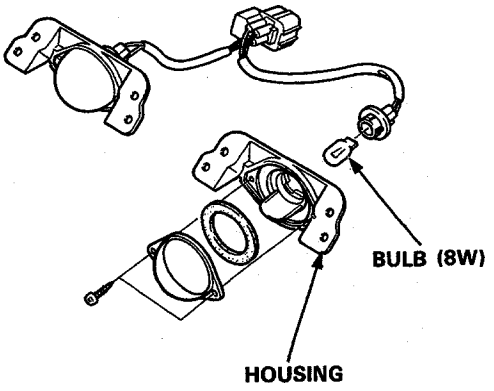
License Plate Lights

Replacement

1. Remove the 8 screws and disconnect the 4-P connector.



2. Turn the bulb socket 45° counterclockwise to remove it from the housing.

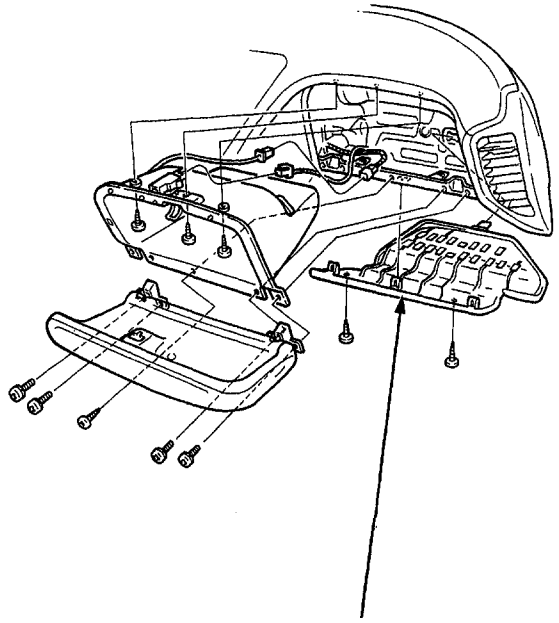


3. If necessary, separate the lens from the housing by removing the 2 screws.

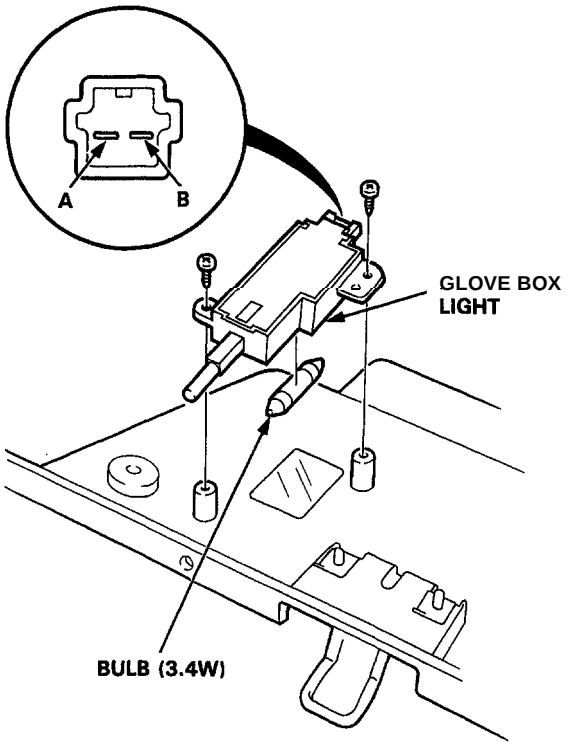
Glove Box Light

Replacement/Test

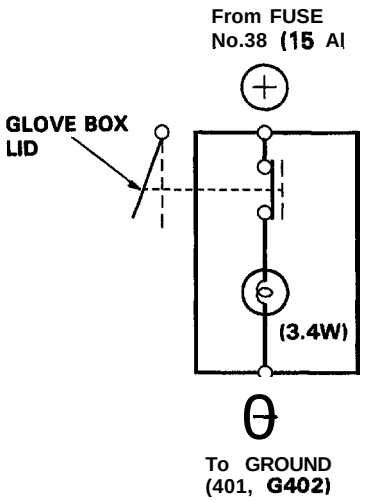
1. Remove the glove box lower panel.
2. Remove the 8 screws then pull out the glove box.
3. Disconnect the 2-P connectors then remove the glove box.



4. Remove the 2 screws from the glove box light.

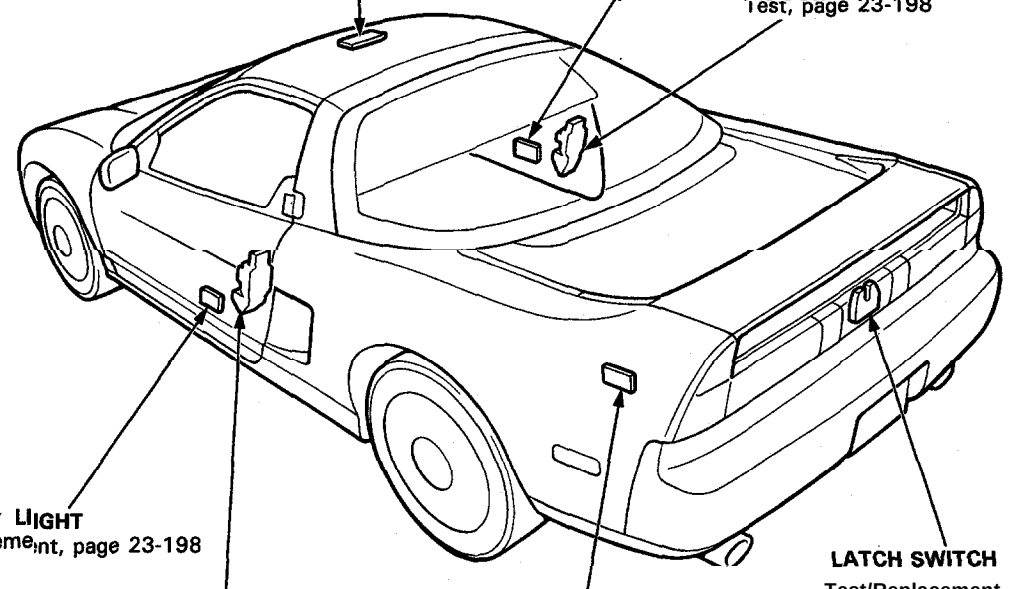


5. Theres should be continuity between the A terminal and B terminal with a bulb installed. There should be no continuity when the switch is pushed.



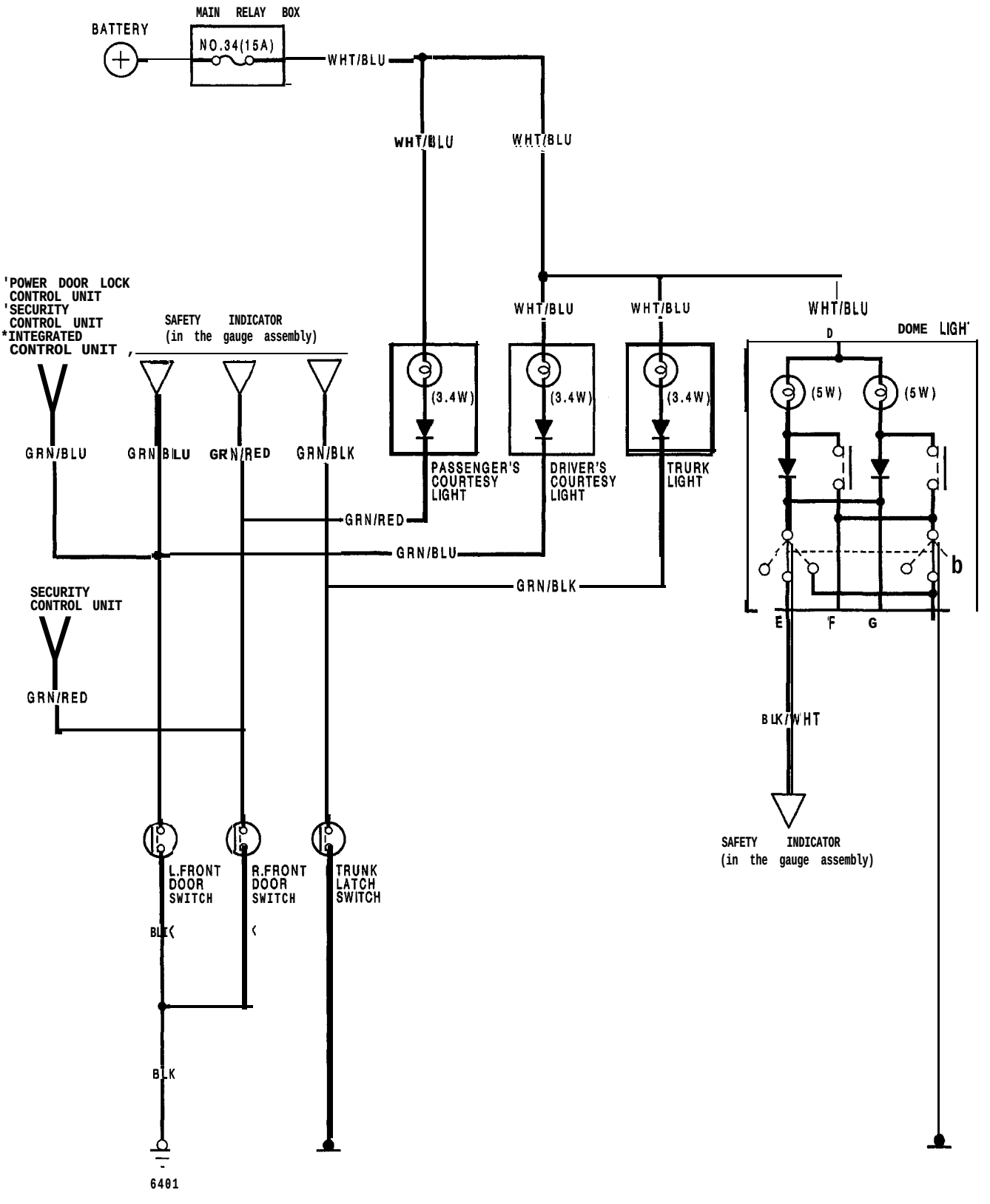
Dome/Courtesy/Trunk Lights

· Component Location Index



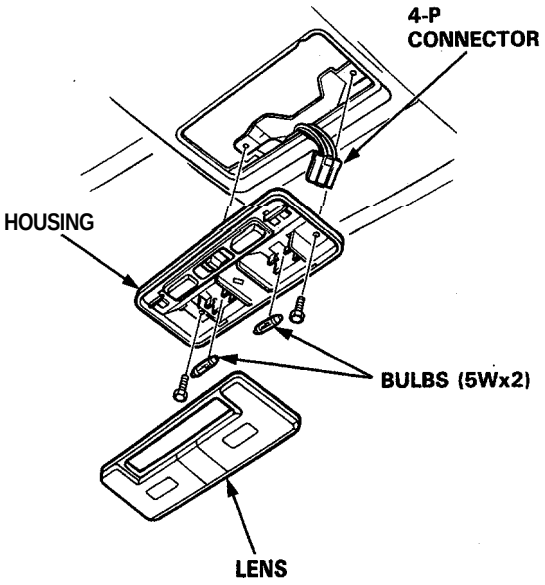
Dome/Courtesy/Trunk Lights

Circuit Diagram



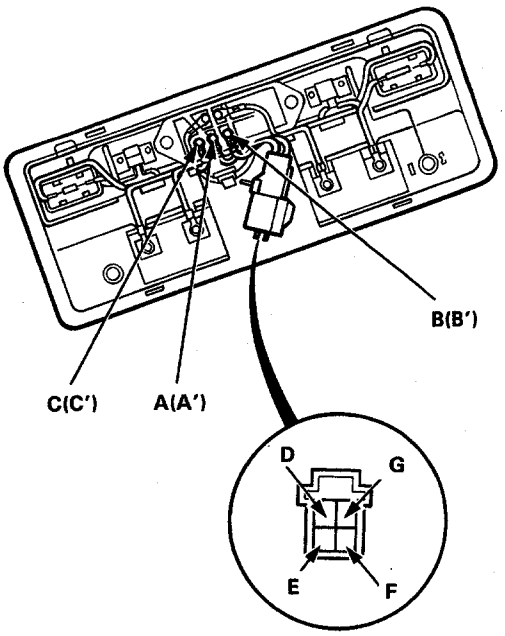
Dome Light Test/Replacement

1. **Turn the light switch OFF.**
2. **Pry off the lens.**
3. **Remove the 2 bolts and the housing.**
4. Disconnect the 4-P connector from the housing.

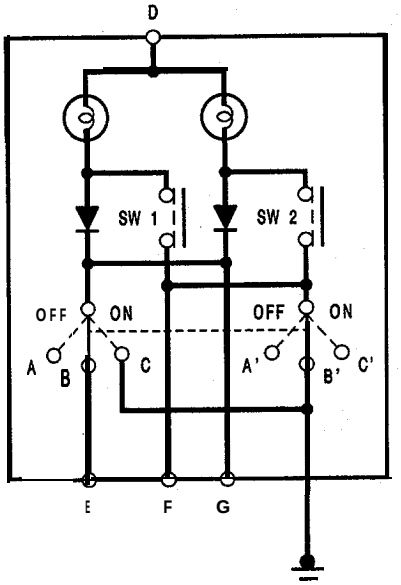


5. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		A (A')	B (B')	C (C')	D	E	F	G
OFF		○		○	○			○
DOOR			○	○	○	○		○
ON				○	○			○
SW 1	ON				○		○	
	OFF							
SW 2	ON				○		○	
	OFF							



View from terminal side



AT MOUNTING BOLTS

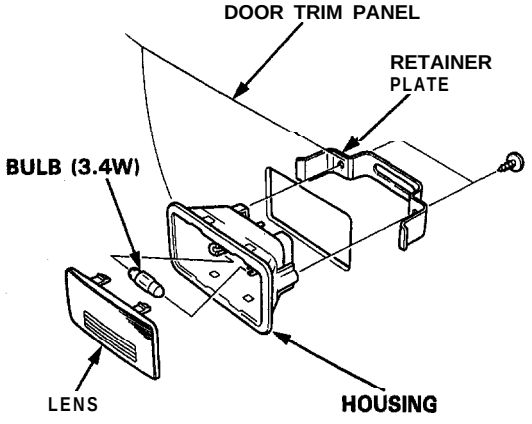
Dome/Courtesy/Trunk Lights

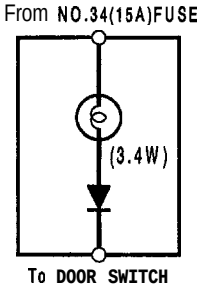
- Courtesy Light Test/Replacement -

NOTE: The bulb or lens alone can be replaced without having to remove the door trim panel.

1. Remove the door trim panel.
2. Remove the 2 screws and the retainer plate to remove the light from behind the door trim panel.
3. Make sure that the bulb is in good condition. Check for continuity between the terminals.

   NOTE: Do not connect the tester probes in the wrong polarity because there is a diode inside the courtesy light.

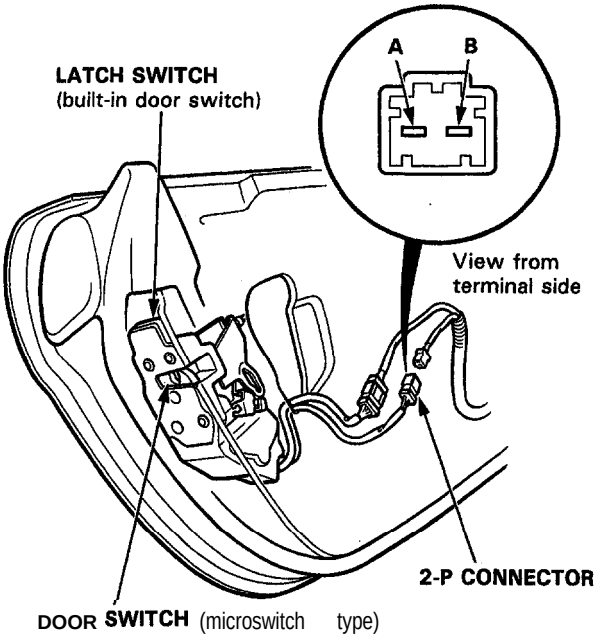




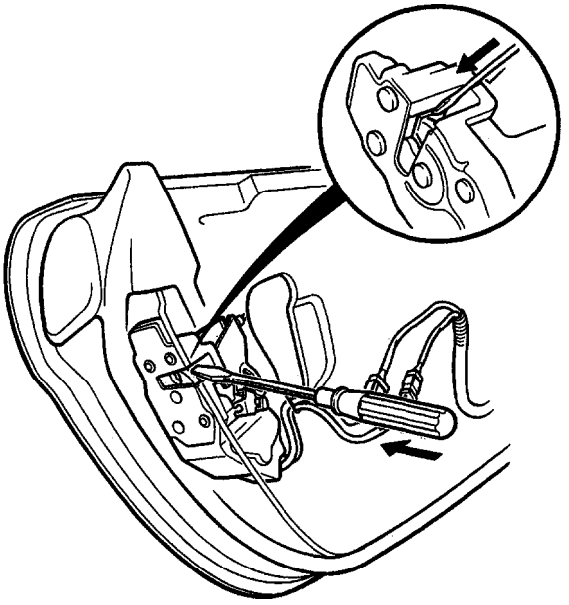
- Door Switch Test

NOTE: Be careful not to damage the door trim panel when remove it.

1. Remove the door trim panel.
2. Disconnect the 2-P connector from the door switch.



3. There should be continuity between the A terminal and B terminal with the switch released [door opened).
4. There should be no continuity with the switch pushed (door closed).

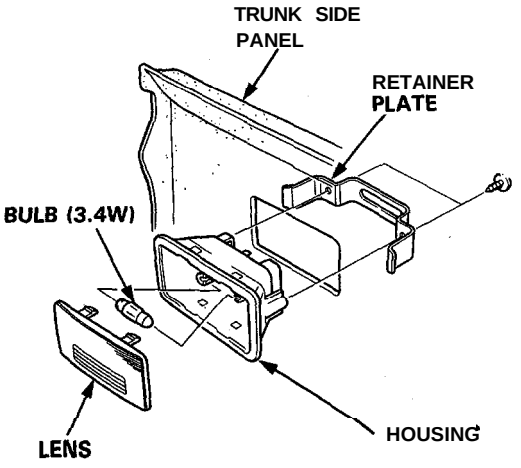


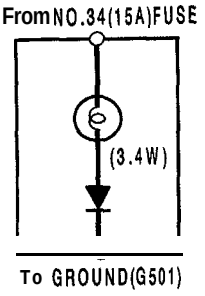
Trunk Light Test/Replacement

NOTE: The bulb or lens alone can be replaced without having to remove the trunk side trim panel.

1. Remove the trunk side trim panel.
2. Disconnect the 3-P connector from the housing.
3. Remove the 2 screws and the retainer plate to remove the light from the trunk side trim panel.
4. Make sure that the bulb is in good condition. Check for continuity between the terminals.

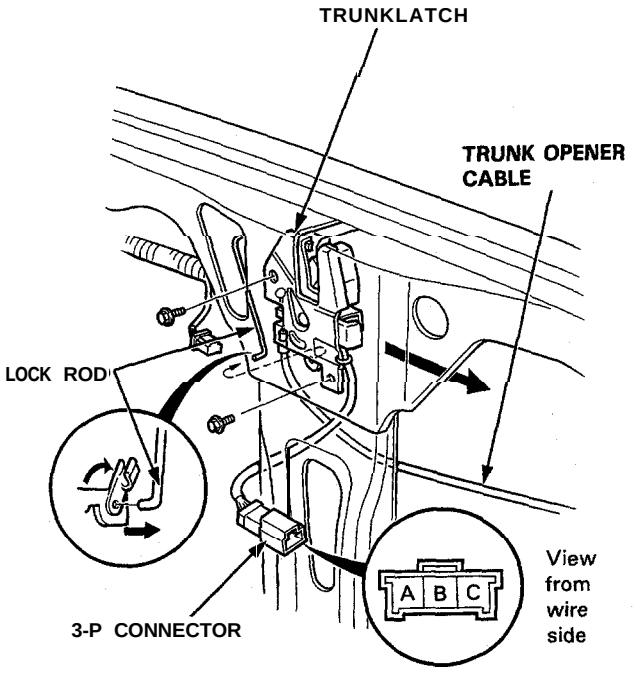
   NOTE: Do not connect the tester probes in the wrong polarity because there is a diode inside the trunk light.





Latch Switch Test/Replacement

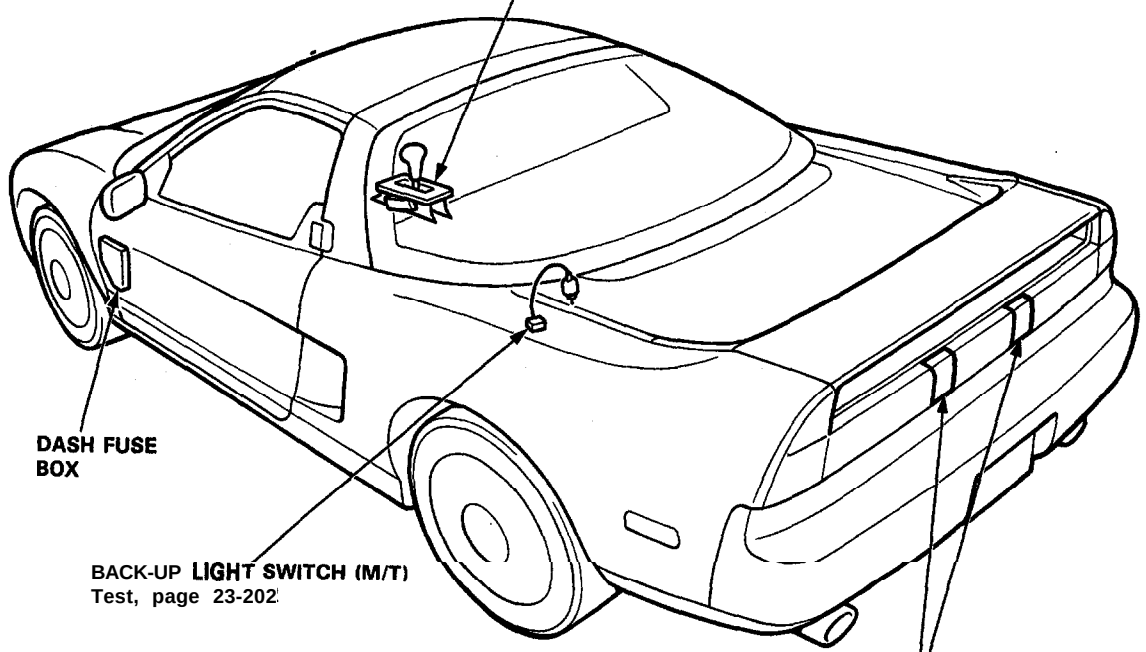
1. Open the trunk lid and remove the trunk rear trim panel.
2. Disconnect the 3-P connector from the trunk latch.
3. There should be continuity between the A terminal and body ground. Theree should be continuity when the latch is open position.



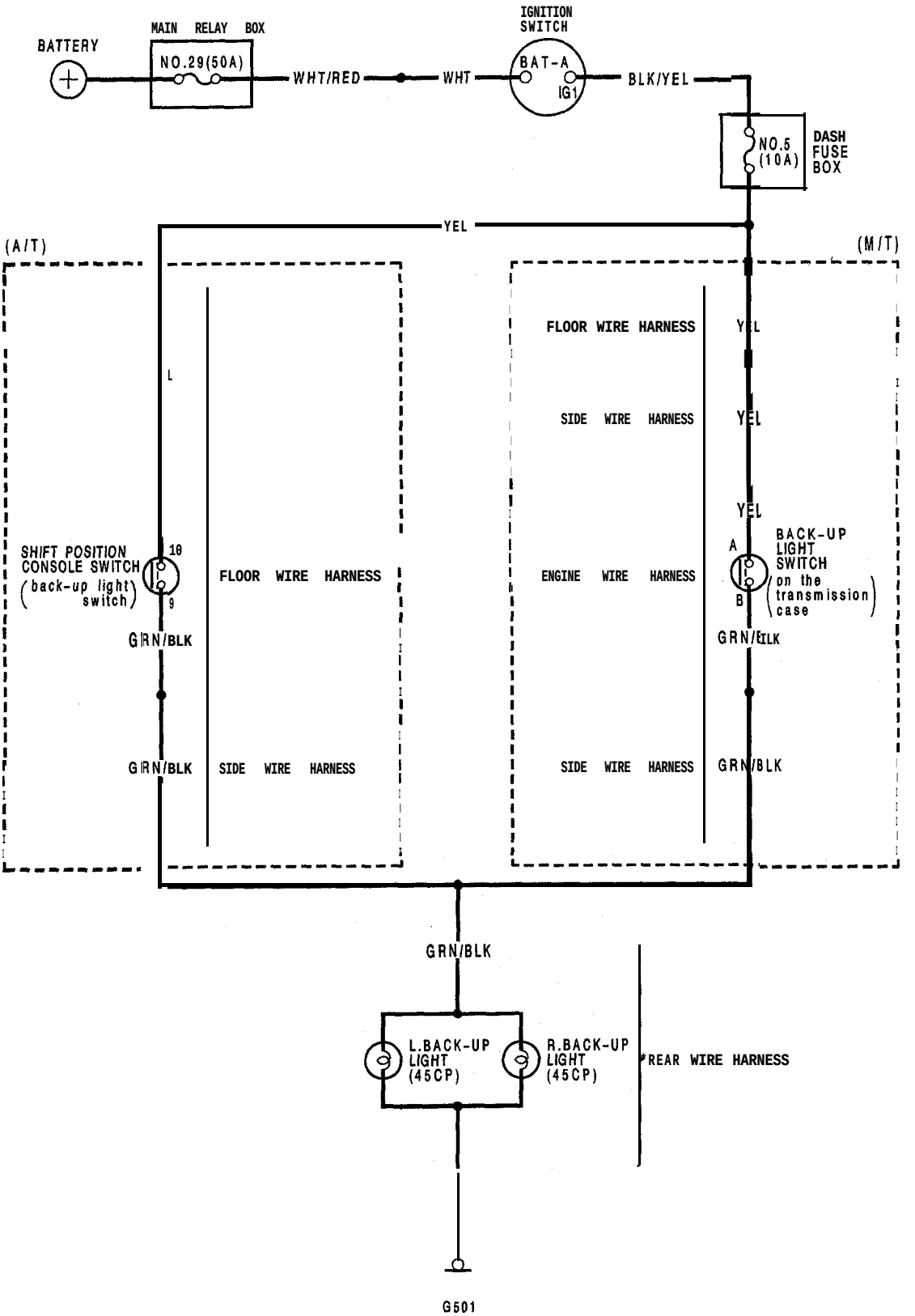
4. If necessary, disconnect the lock rod from the latch, then remove the 2 bolts to pull out the latch from the trunk rear panel.
5. Disconnect the trunk opener cable from the latch.

Back-up Lights

Component Location Index



- Circuit Diagram



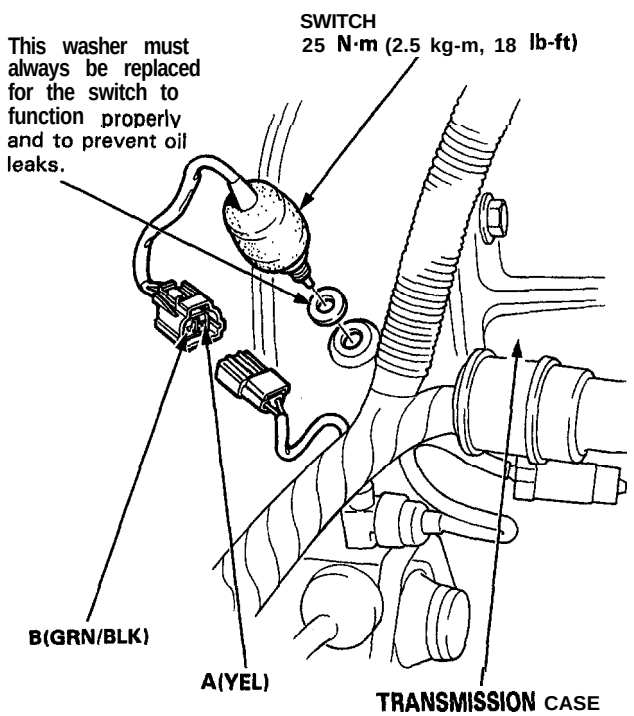
Back-up Lights

Test

Manual Transmission:

NOTE: Check the No. 5 (10 A) fuse in the dash fuse box before testing.

1. Test the back-up light switch by placing the select lever in reverse and turning the ignition switch to ON.
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 connector from the back-up light switch.



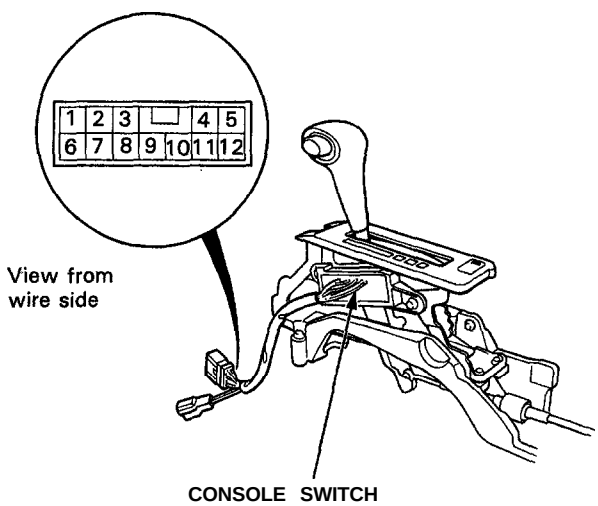
4. Check for continuity between the A and B wires with the switch installed in the transmission case. There should be continuity as the select lever engages "R".
   - If there is no continuity, replace the switch.
   - If there is continuity, but the back-up lights do not go on, inspect for:
     - Poor ground (G501).
     - An open in the YEL or GRN/BLK wire.

Automatic Transmission:

NOTE: Check the No. 5 (10 A) fuse in the dash fuse box before testing.

1. Test the back-up light switch by shifting the select lever to "R" and turning the ignition switch ON.
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, remove the center console, then disconnect the 12-P connector from the shift position console switch (back-up light switch).

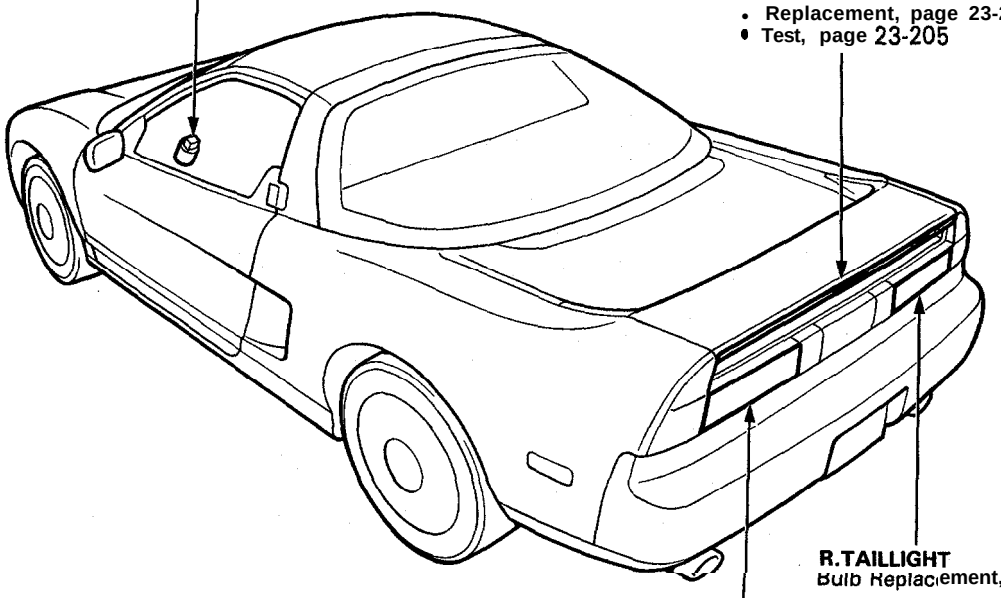
   CAUTION: Do not damage the yellow-covered SRS wiring.



4. Check for continuity between No. 9 and No. 10 terminals. Move the lever back and forth without touching the push button at the "R" 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 installation position of the console switch (see page 23-I 56).
   - If there is continuity, but the back-up lights do not go on, inspect for:
     - An open in the YEL or GRN/BLK wire.

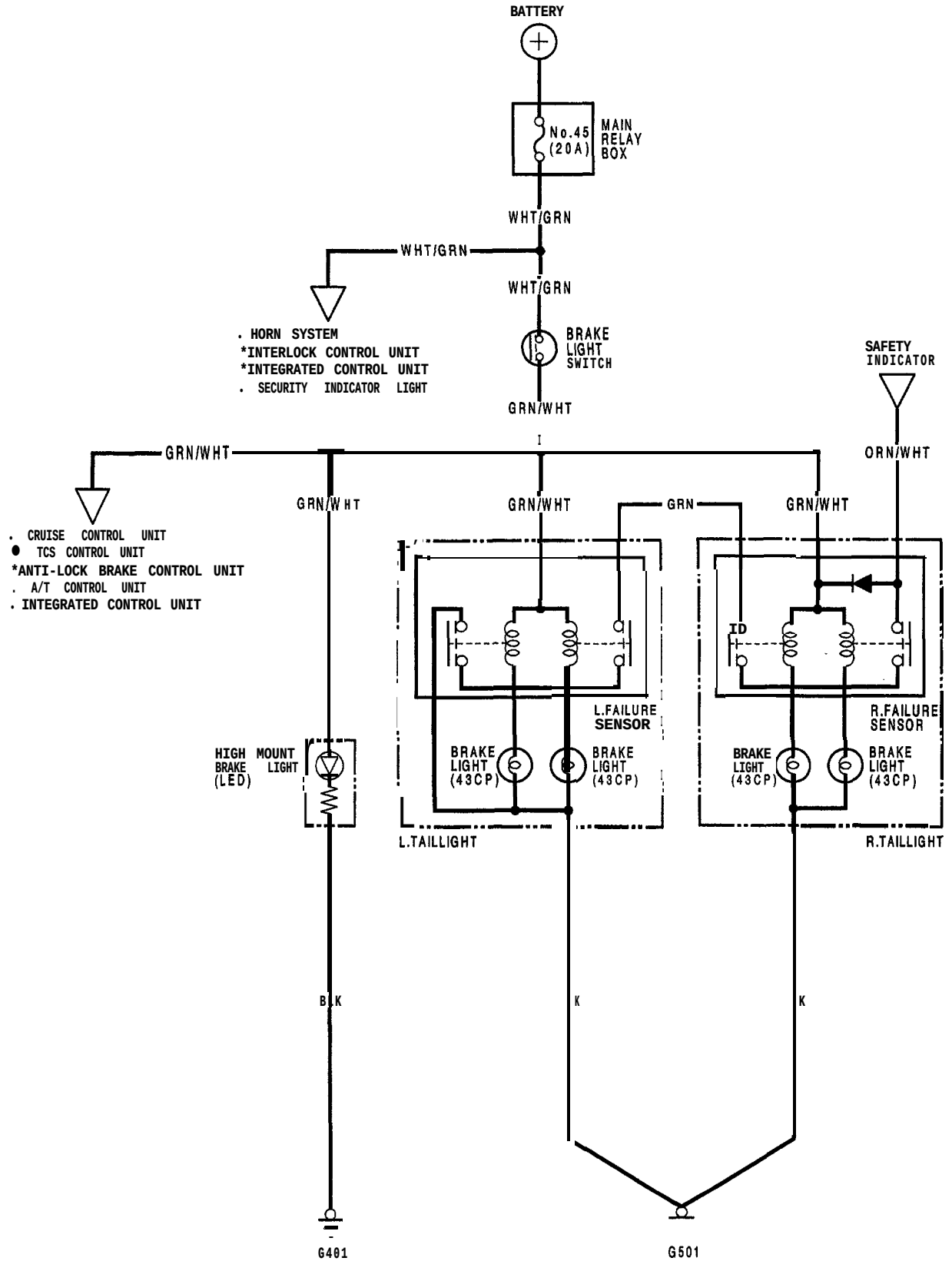
Brake Lights

Conponent Location Index



Brake Lights

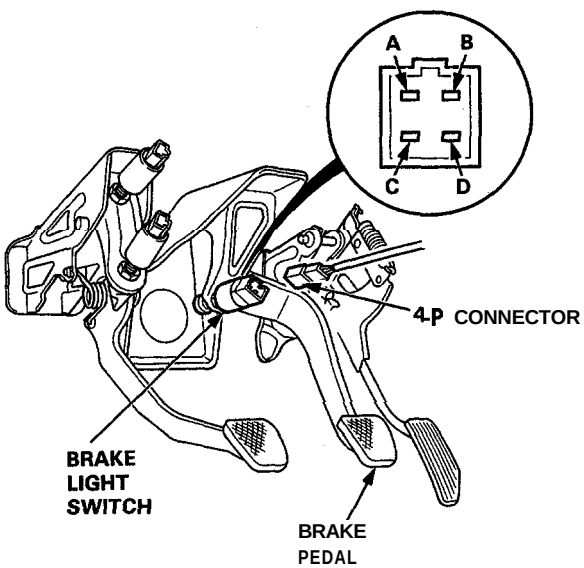
· Circuit Diagram



Brake Light Switch Test

1. If the brake lights do not go on, check the No. 45 (20A) fuse in the main relay box, and the brake light bulbs in the taillight assembly, and the LED in the high mount brake light.

2. If the fuse and bulbs are OK, disconnect the 4-P connector from the brake light switch.



3. Check for continuity between the B and C terminals. There should be continuity with the brake pedal pushed.

   - If there is no continuity, replace the switch or adjust pedal height (see section 19).

   - If there is continuity, but the brake lights do not go on, inspect for:

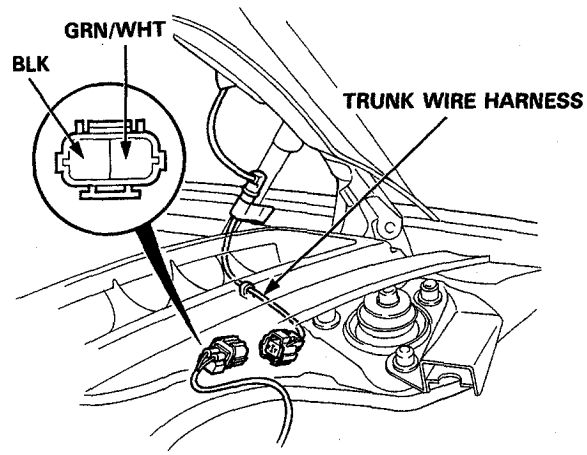
   — Poor ground (G401, G501).
   — An open is the WHT/GRN or GRN/WHT wire.
   — Faulty brake light failure sensors (see page 23-151).

High Mount Brake Light Test

1. Open the trunk lid and engine cover.

2. Disconnect the 2-P connector from the trunk wire harness.

View from terminal side



3. Connect voltmeter positive probe to the GRN/WHT terminal, negative probe to BLK terminal.
   When the brake pedal is pushed, check for voltage between GRN/WHT and BLK terminals. There should be voltage.
   - If there is no voltage, check for:
   — Blown No. 45 (20 A) fuse in the main relay box.
   — An open in th GRN/WHT or BLK wire.
   — Faulty brake light switch.
   - If there is battery voltage, go to step 4.

4. Connect battery positive to GRN/WHT terminal, negative to BLK terminal.
   Check go on all the LEDs of the high mount brake light.

   - If the high mount brake light does not go on, check for an open in the wires in the trunk lid. If the wires in the trunk lid are OK, replace the high mount brake light.

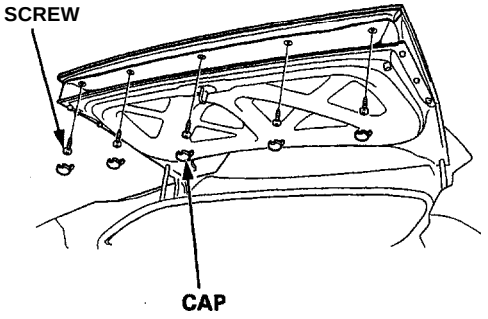
5. If some of the high mount brake light LEDs do not go on, replace the high mount brake light assembly.

Brake Lights

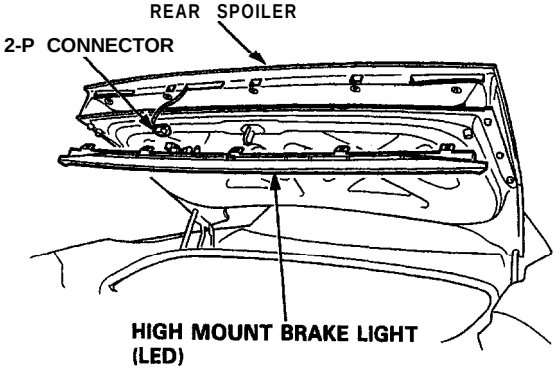
High Brake Light LED Replacement

CAUTION: Be careful not to damage the high mount brake light. rear spoiler and trunk lid.

1. **Open the trunk lid.**
2. Remove the cpas and 5 screws from the rear spoiler.



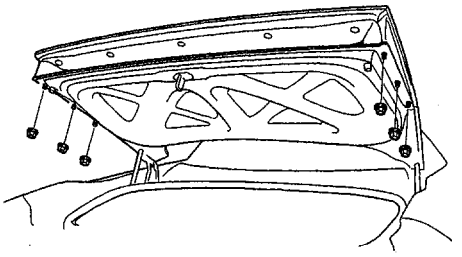
3. **Carefully pull out the high mount brake light from the rear spoiler, then disconnect the 2-P connector from the high mount brake light.**



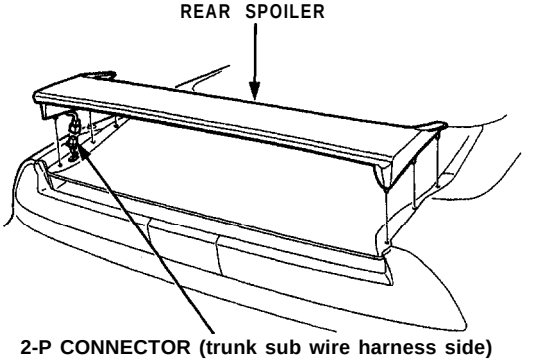
Rear Spoiler Replacement

CAUTION: Be careful not to damage the high mount brake light, rear spoiler and trun lid.

1. **Open the trunk lid.**
2. **Remove the 6 mounting nuts.**



3. Carefully pull out the spoiler assembly from the rear **trunk lid.**
4. **Disconnect the 2-P connector from the trunk sub** wire harness.

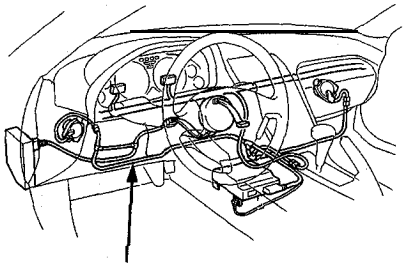


Side Marker/Turn Signal/Hazard Flasher System

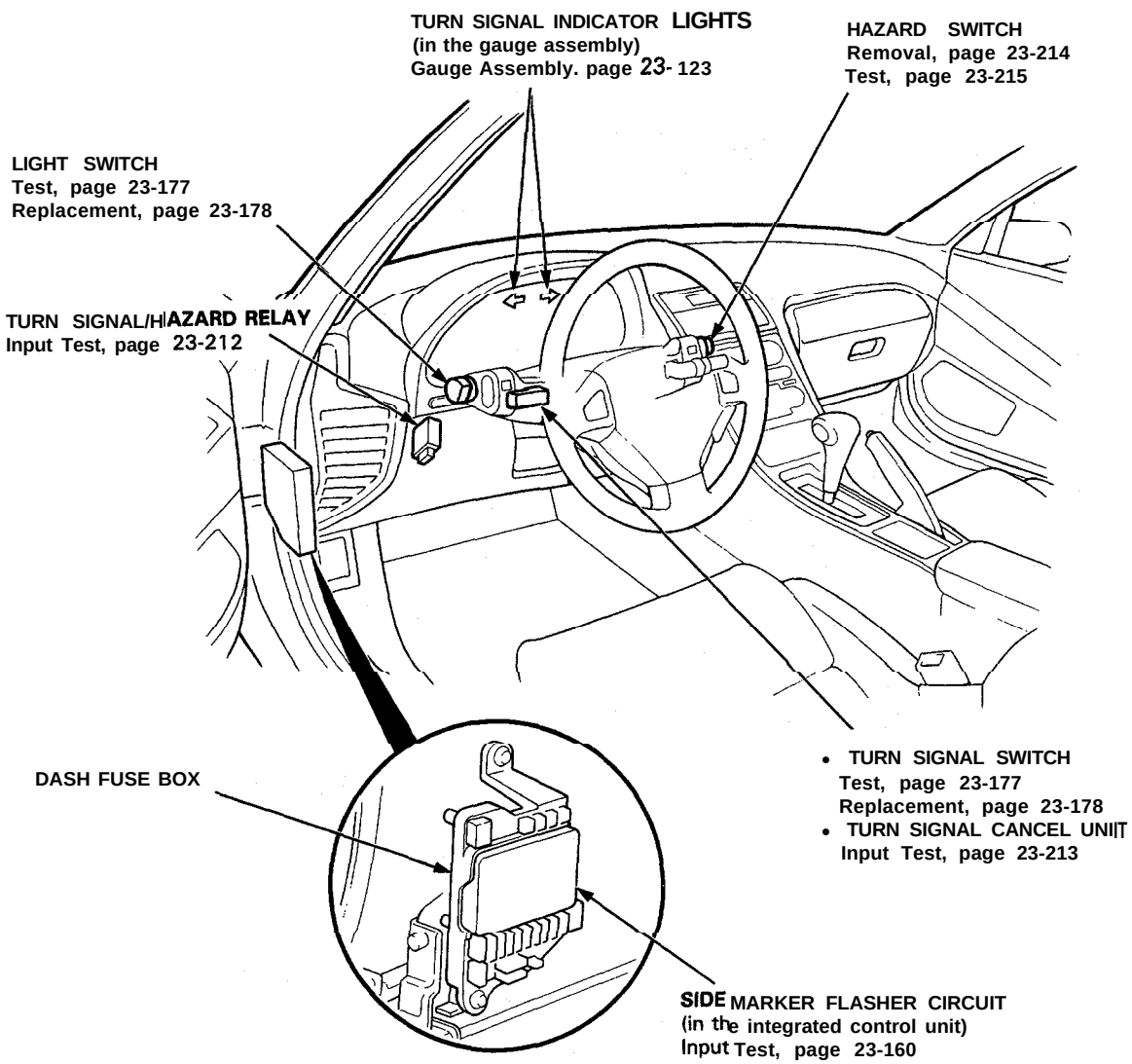
Component Location Index

WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the flasher system.

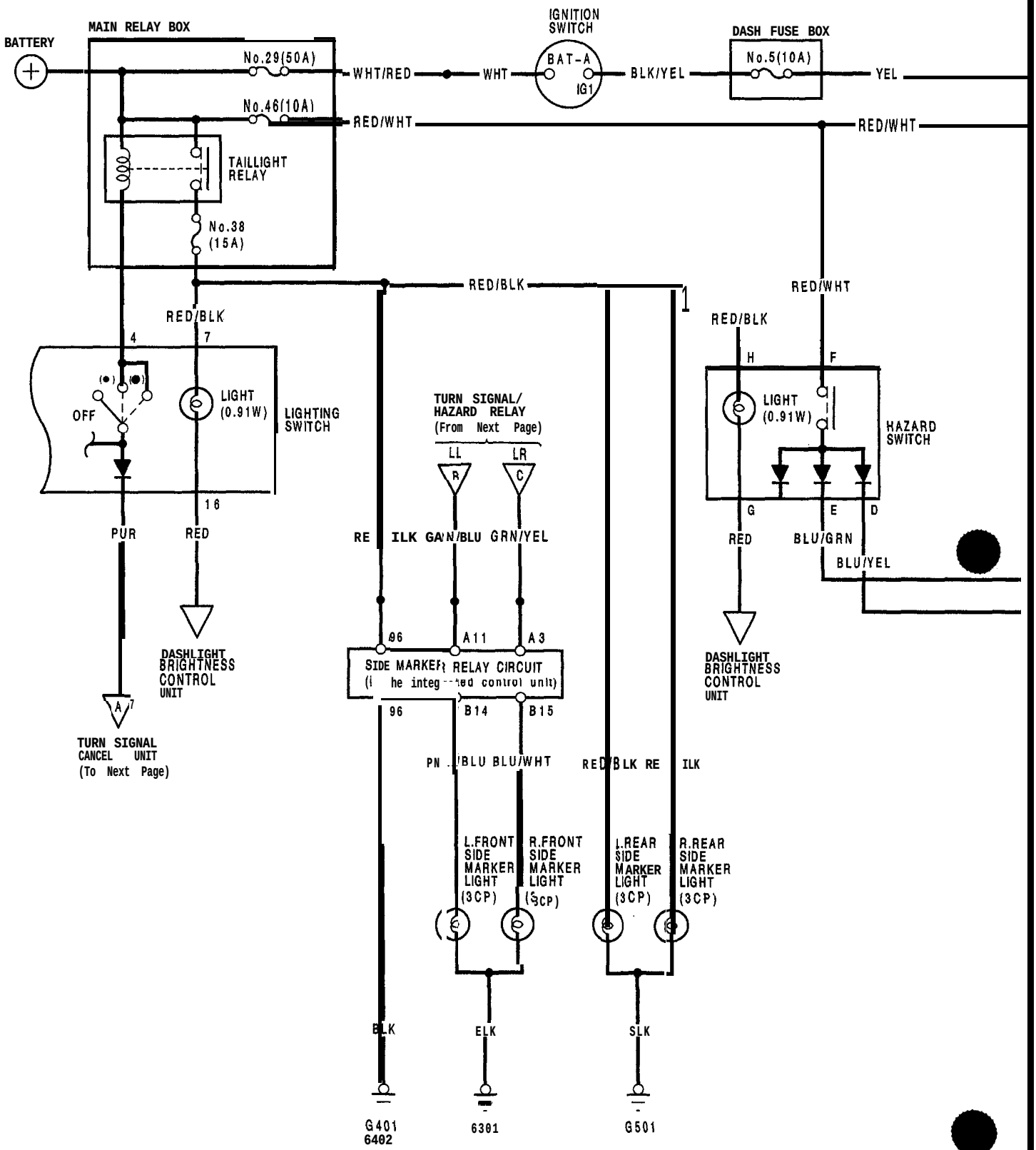


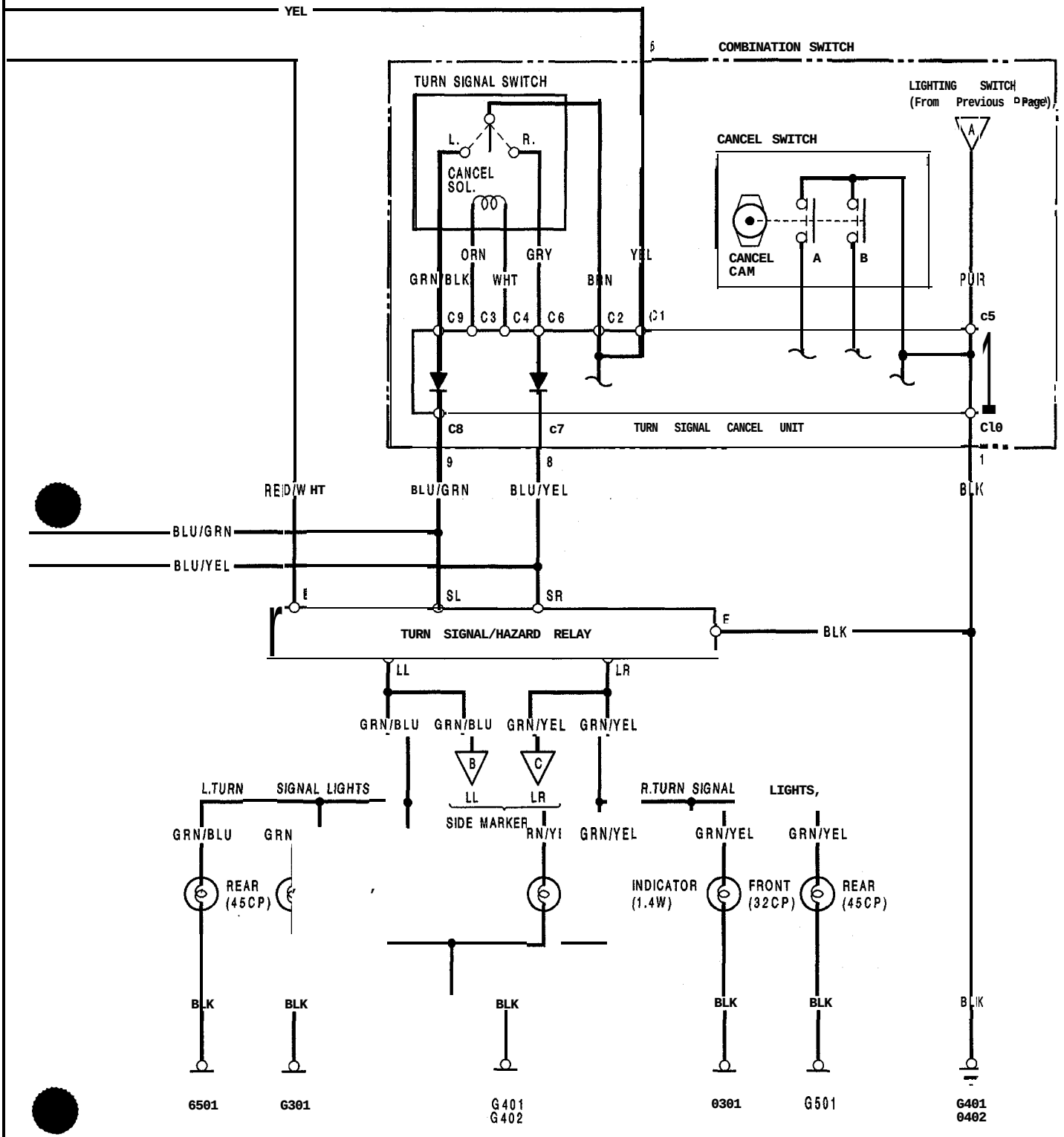
SRS MAIN WIRE HARNESS



Side Marker/Turn Signal/Hazard Flasher System

– Circuit Diagram



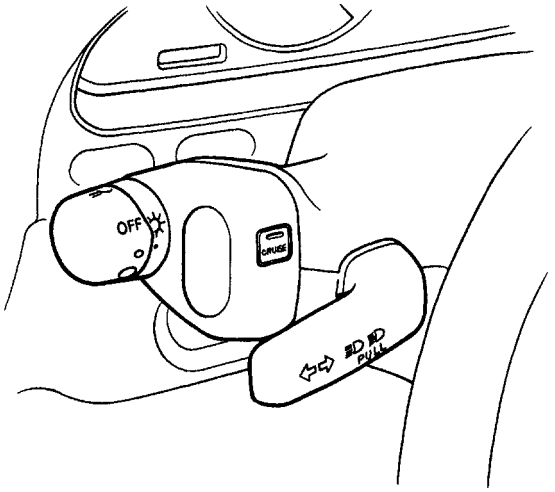

YEL
COMBINATION SWITCH
TURN SIGNAL SWITCH
L.
R.
CANCEL SOL.
LIGHTING SWITCH (From Previous Page)
CANCEL SWITCH
CANCEL CAM
A
B
ORN
GRY
YEL
GRN/BLK
WHT
BRN
PUR
C9
C3
C4
C6
C2
C1
c5
C8
c7
TURN SIGNAL CANCEL UNIT
C10
9
8
1
RED/WHT
BLU/GRN
BLU/YEL
BLK
BLU/GRN
BLU/YEL
E
SL
SR
F
TURN SIGNAL/HAZARD RELAY
BLK
LL
LR
GRN/BLU
GRN/BLU
GRN/YEL
GRN/YEL
B
C
L.TURN SIGNAL LIGHTS
LL
LR
SIDE MARKER
R.TURN SIGNAL LIGHTS,
GRN/BLU
GRN
GRN/YEL
GRN/YEL
GRN/YEL
REAR (45CP)
INDICATOR (1.4W)
FRONT (32CP)
REAR (45CP)
BLK
BLK
BLK
BLK
BLK
BLK
BLK
6501
G301
G401
G402
0301
G501
G401
0402

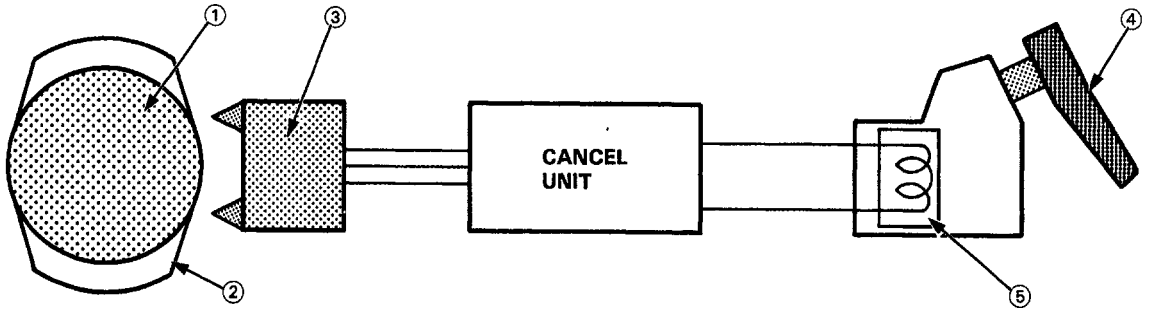
Side Marker/Turn Signal/Hazard Flasher System

-Description

To cope with dimentional requirements for the airbag components and to offer better operational feel, the turn signal lever and the cancel mechanism are separated mechanically, and connected electrically instead.

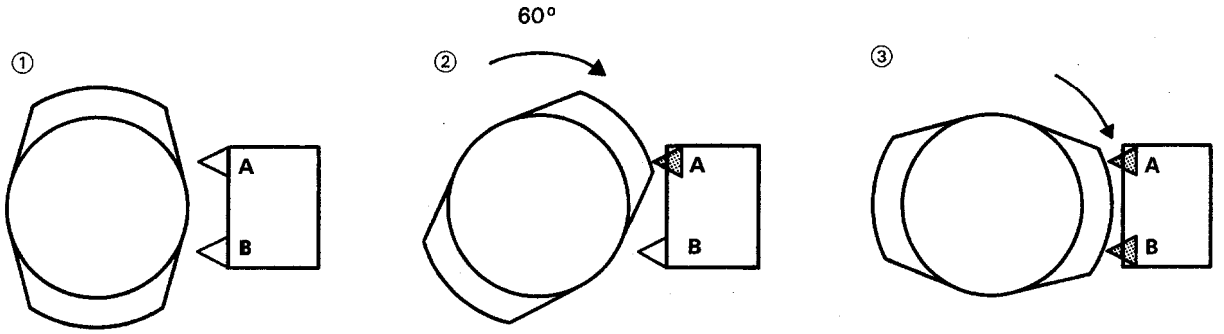
The system cancels the turn signals electrically, by means of a solenoid, when a turn is accomplished. To monitor the steering, a sensor mechanism which consists of cancel cams on the steering shaft and a switch, is used.





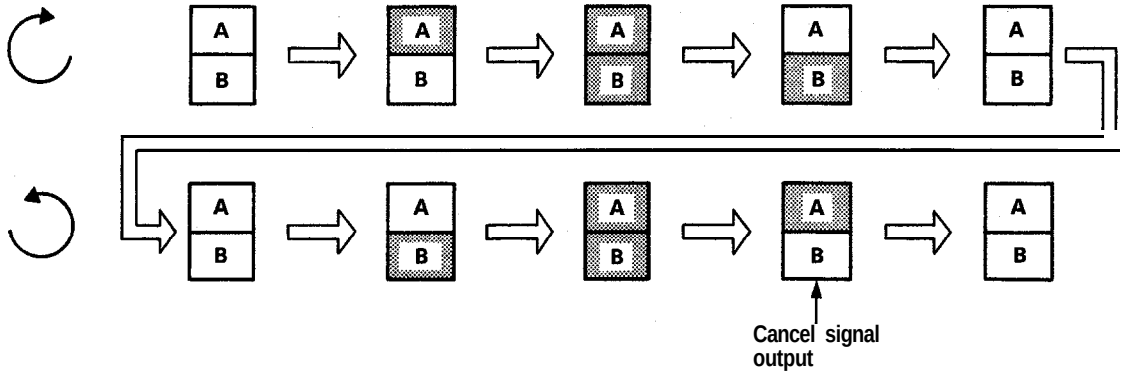
① Steering shaft
② Cancel cam
③ Cancel switch
④ Turn signal lever
⑤ Solenoid

① Around the steering shaft, a cam plate is installed. Beside it, a pair of switches (A and B) are installed.
@When the steering is turned in direction of the arrow, switch A turns on first.
③ Then switch B turns on.

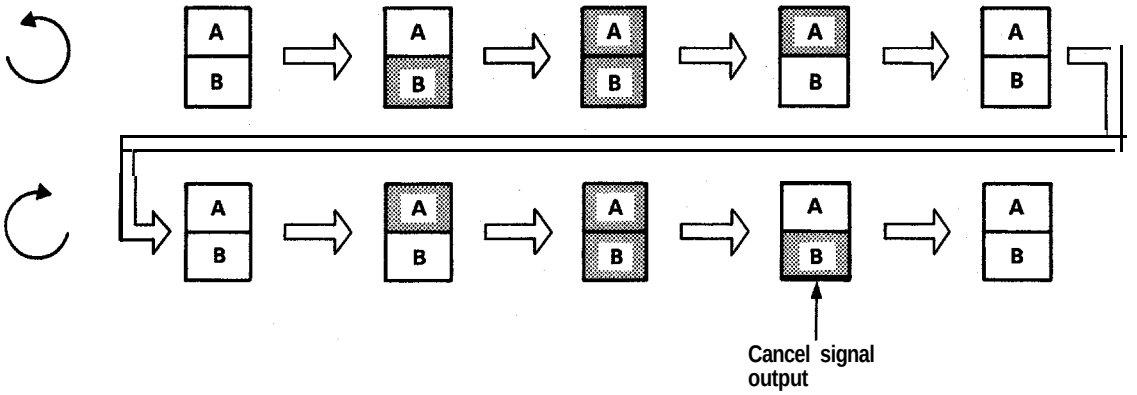


By this pattern, steering rotation is monitored.

R. turn signal



L. turn signal



Side Marker/Turn Signal/Hazard Flash System

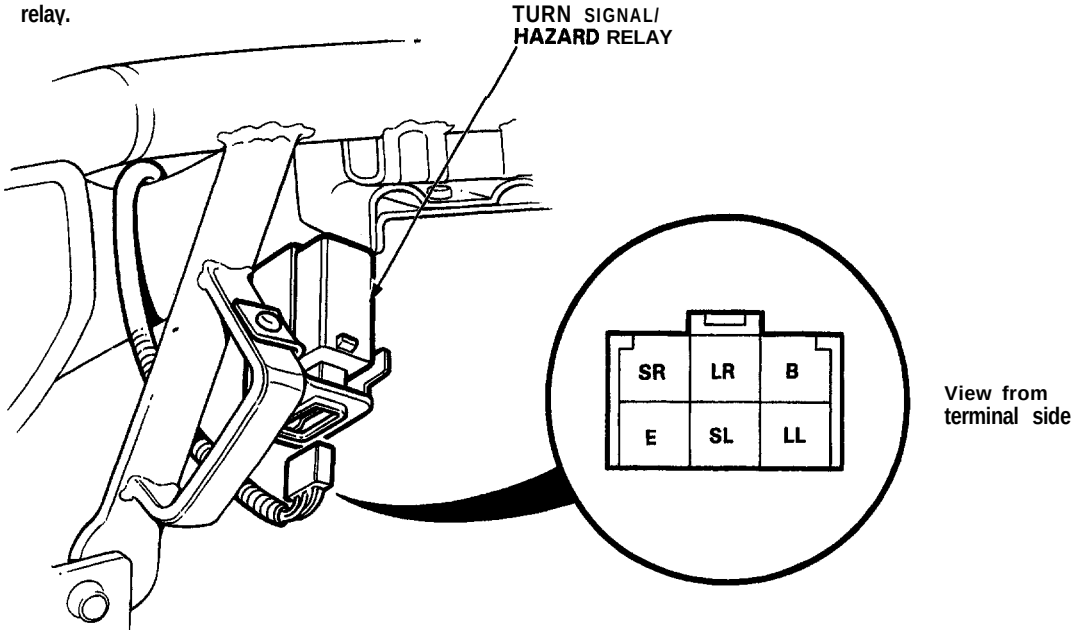
-Turn Signal/Hazard Relay Input Test

Remove the dashboard lower panel.

Remove the turn signal/hazard relay from the left kick panel then disconnect the 6-P connector.

Make the following input tests at the 6-P connector terminals.

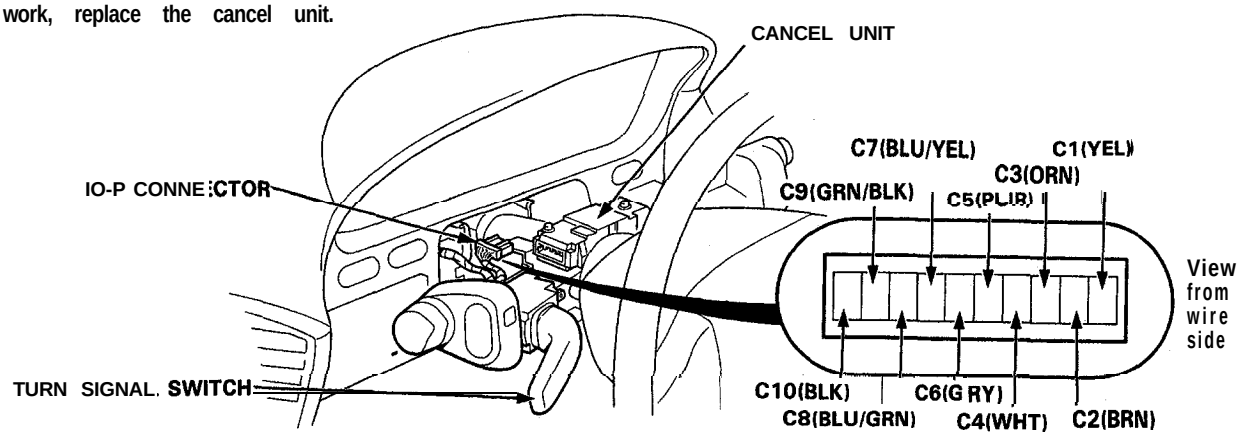
If all tests prove OK, but the relay fails to work, replace the turn signal/hazard relay.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	E	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402) • An open in the BLK wire
2	B	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 46 (10A) fuse. • An open in the RED/WHT wire.
3	SR	Ignition switch ON and turn signal switch in R.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) fuse. • Faulty turn signal switch or cancel unit. • An open in the YEL, BLU/GRN, or BLU/YEL wire.
	SL	Ignition switch ON and turn signal switch in L.		
4	SR	Hazard switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty hazard switch. • An open in the RED/WHT, BLU/GRN or BLU/YEL wire.
	SL			
5	LR	Connect the B terminal to the LR terminal.	R. turn signal lights should come on as the battery is connected.	• Blown bulb. * Faulty side marker relay circuit. • Poor ground (G301, G401, G402, G501) • An open in the GRN/YEL or BLU/WHT wire.
6	LL	Connect the B terminal to the LL terminal.	L. turn signal lights should come on as the battery is connected.	• Blown bulb. . Faulty side marker relay circuit. • Poor ground (G301, G401, G402, G501). • An open in the GRN/BLU or PNK/BLU wire.

-Cancel Unit Input Test

Remove the steering column covers.
Disconnect the 10-P connector from the cancel unit.
Make the following input tests at the 1 O-P connector terminals.
If all tests prove OK, but the turn signal lights fails to work, replace the cancel unit.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	CI0 (BLK)	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402) • An open in the wire.
2	CI (YEL)	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) fuse. • An open in the wire.
3	c5 (PUR)	Lighting switch (•)	Check for voltage to ground: should be battery voltage.	• Faulty lighting switch or taillight relay. • An open in the wire.
4	c2 (BRN) C6 (GRY)	Turn signal switch (R.)	Check for continuity between the C2 and C6 terminals: should' be continuity.	• Faulty turn signal switch. • An open in the wire.
5	c2 (BRN) C9 (GRN/BLK)	Turn signal switch (L.)	Check for continuity between the C2 and C9 terminals: should be continuity.	• Faulty turn signal switch. • An open in the wire.
6	c3 (ORN) c4 (WHT)	Under all conditions.	Check for continuity between the C3 and C4 terminals: should be continuity.	• Faulty turn signal switch solenoid. • An open in the wire.
7	c7 (BUL/YEL)	Connect the CI terminal to the C7 terminal then ignition switch ON.	R. turn signal lights should come on as the battery connected.	• Blown bulb. * Faulty turn signal/hazard relay. • Poor ground (G301, G401, G403, G501) • An open in the wire.
	C8 (BLU/GRN)	Connect the CI terminal to the C8 terminal then ignition switch ON.	L. turn signal lights should come on as the battery connected.	• Blown bulb. * Faulty turn signal/hazard relay. • Poor ground (G301, G401, G402, G501). • An open in the wire.

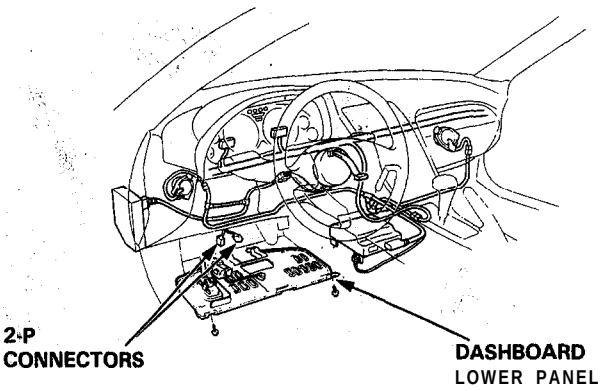
Side Maker/Turn Signal/Hazard Flasher System

-Hazard Switch Removal

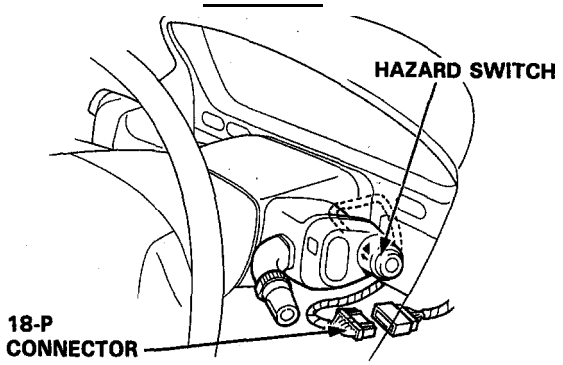
⚠ WARNING **All SRS wire harnesses and connectors are colored yellow. Do not use electtical test equipment on these circuits.**

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the lighting system.

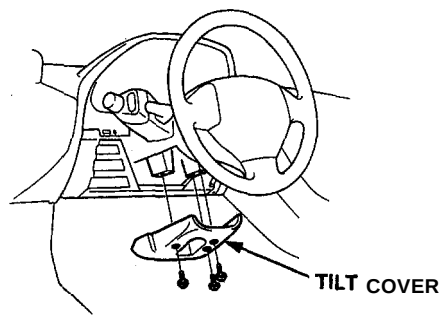
1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



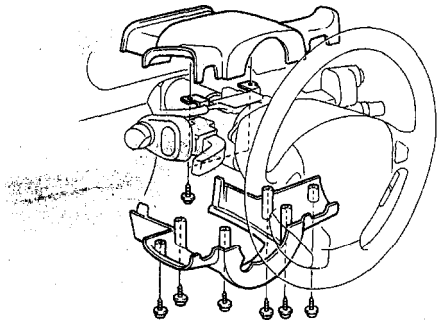
2. Disconnect the 18-P connector from floor wire harness.



3. Remove the tilt cover.

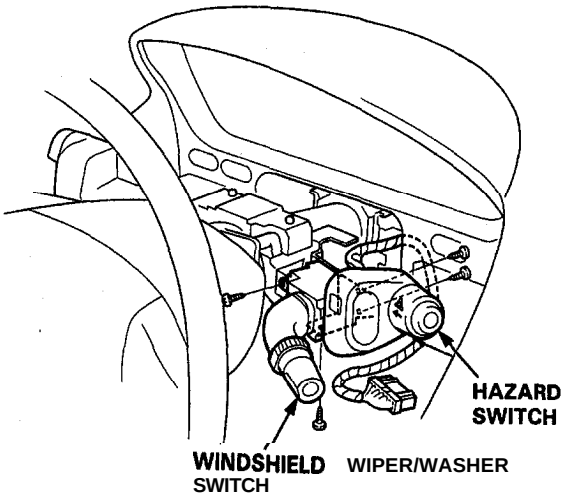


4. Remove the steering column lower cover and upper cover.



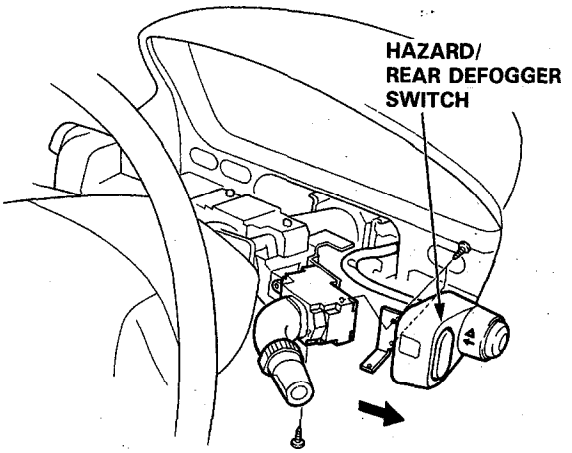
NOTE: Be careful not to damage steering column covers.

5. Remove the 4 screws then remove the hazard switch and wiper/washer switch assembly.

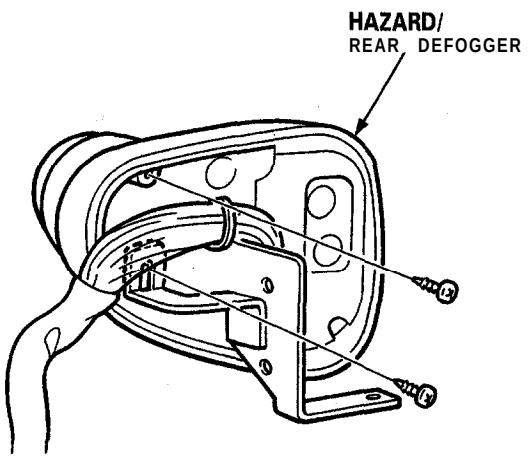


Hazard Switch Light Bulb Replacement

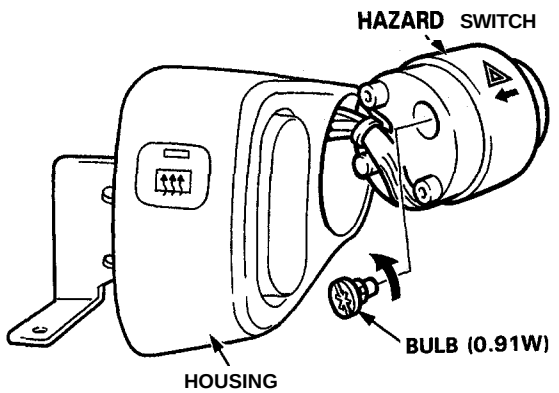
1. Remove the steering column covers.
2. Remove the 3 screws.



3. Remove the 2 screws.

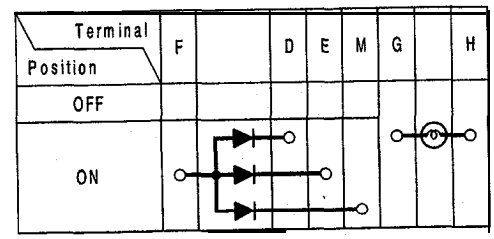


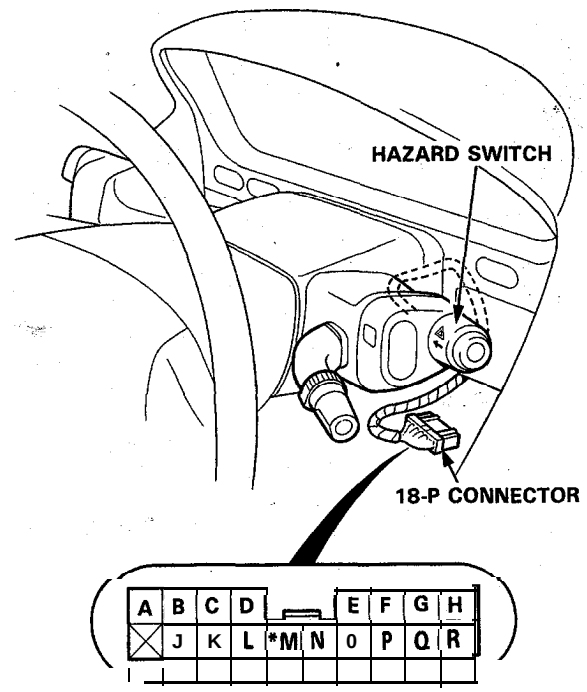
4. Side the hazard switch out of the housing as shown.
5. Remove the bulb from the hazard switch by turning the bulb 45°.



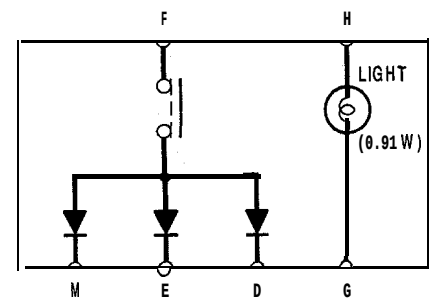
'Hazard Switch Test

1. Remove the dashboard lower panel (see page 23-214).
2. Disconnect the 18-P connector from the floor wire harness.
3. Check for continuity between the terminals in each switch position according to the table.



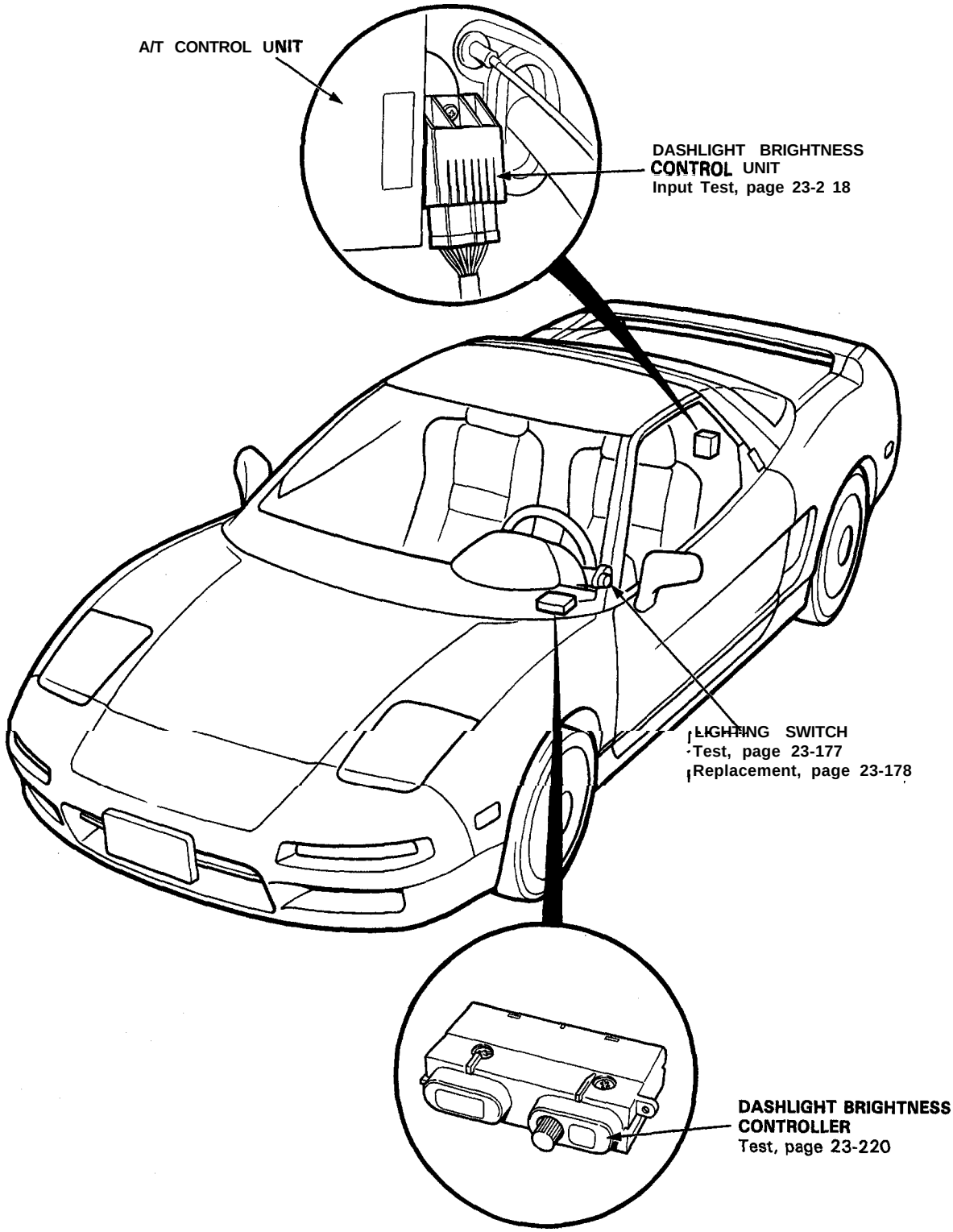


View from wire side *M: Not used

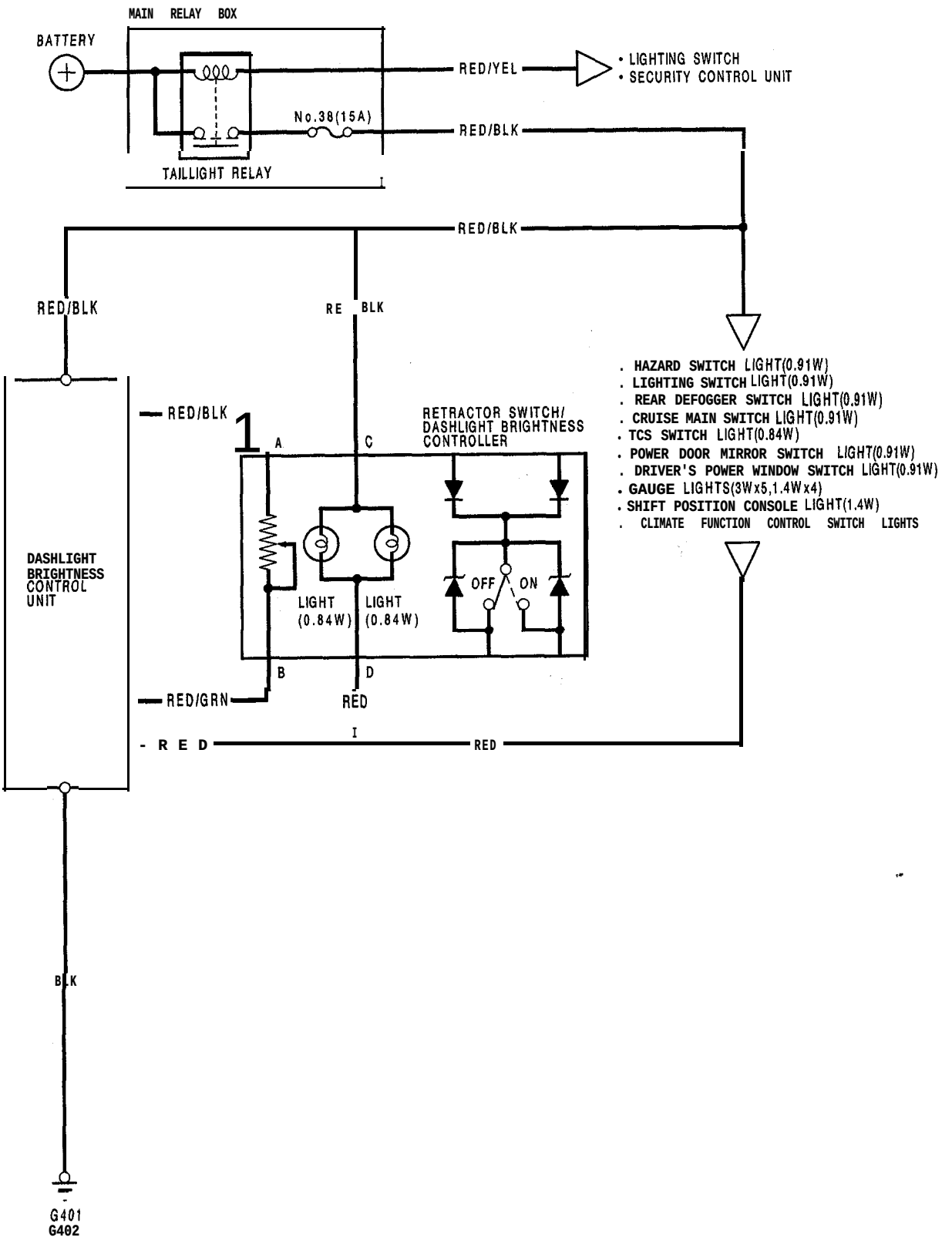


Dashlight Brightness Control

Component Location Index



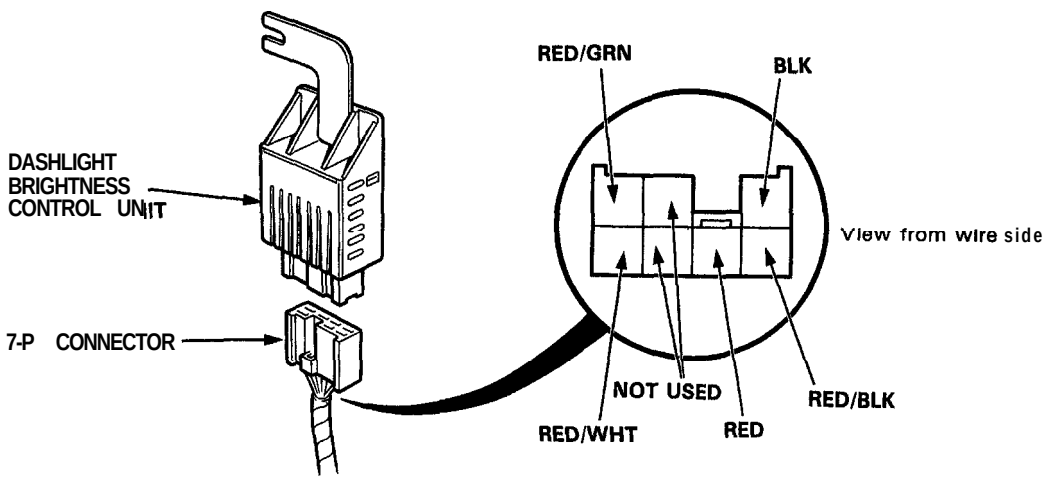
Circuit Diagram



Dashlight Brightness Control

-Control Unit Input Test

Disconnect the 7-P connector from the control unit.
Make the following input tests at the harness pins.
If all tests prove OK, yet the dashlights still cannot be controlled, check the connector for a good connection. If OK, substitute a known-good control unit and recheck.



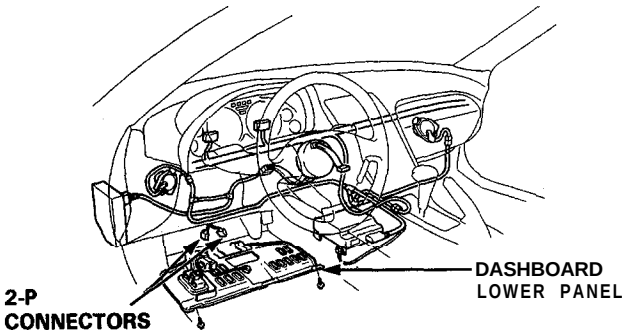
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402) • An open in the wire.
2	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 38 (15A) fuse. • Faulty taillight relay. • Faulty lighting switch. • An open in the wire.
3	RED	Lighting switch ON.	Attach to ground: dashlights should come on full bright.	• An open in the RED/BLK or RED wire.
4	RED/GRN and RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/GRN and RED/WHT terminals: should vary from 0 to 24,000 ohms as the dial is rotated.	• Faulty controller. • An open in the wire.

Controller Removal

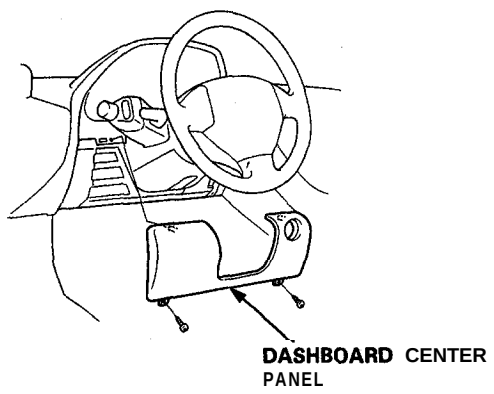
WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful no to damage the SRS wire harnesses when servicing the lighting system.

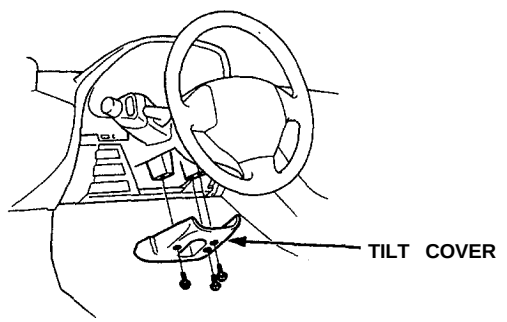
1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



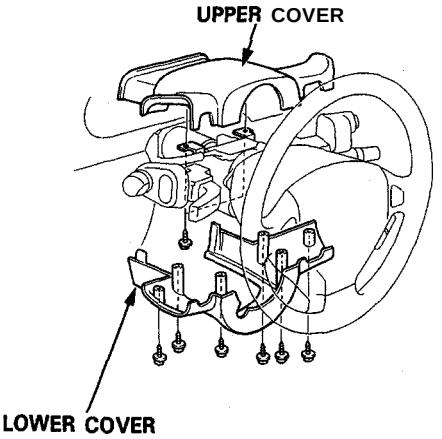
2. Remove the dashboard center panel.



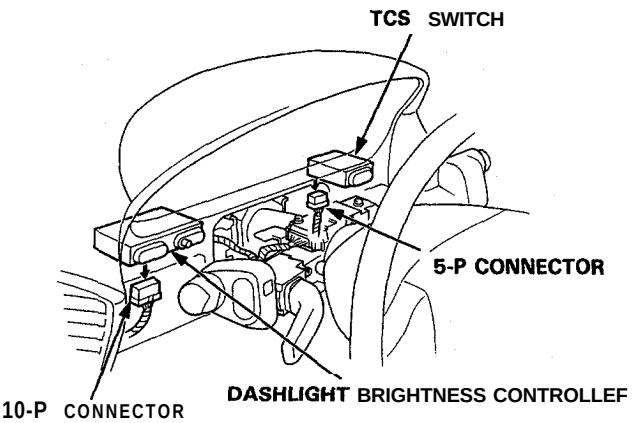
3. Remove the tilt cover.



4. Remove the steering column lower cover and upper cover.



5. Disconnect the TCS switch connector and dashlight brightness controller connector.



6. Remove the 6 screws, then remove the instrument panel from the dashboard.

7. Remove the dashlight brightness controller from the instrument panel.

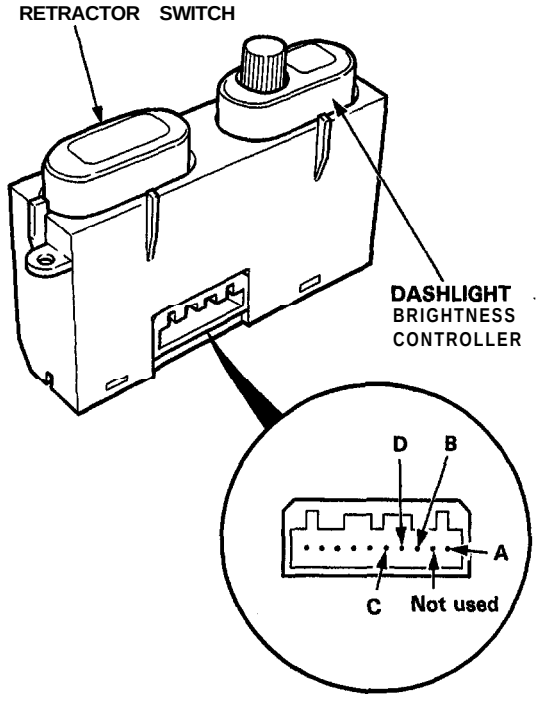
Dashlight Brightness Control

Controller Test

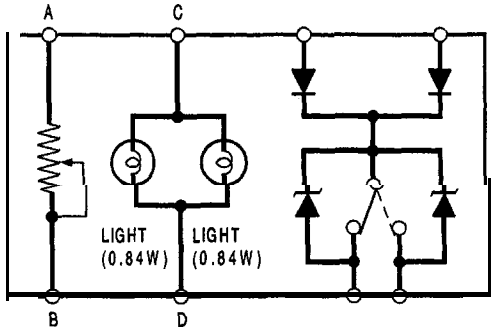
1. Remove the dashlight brightness controller from the instrument panel.
2. Measure resistance between A and B terminals while rotating the adjusting dial.

   Resistance should vary from 0 to 24,000 ohms as the dial is rotated.

   NOTE: Resistance will vary slightly with temperature.

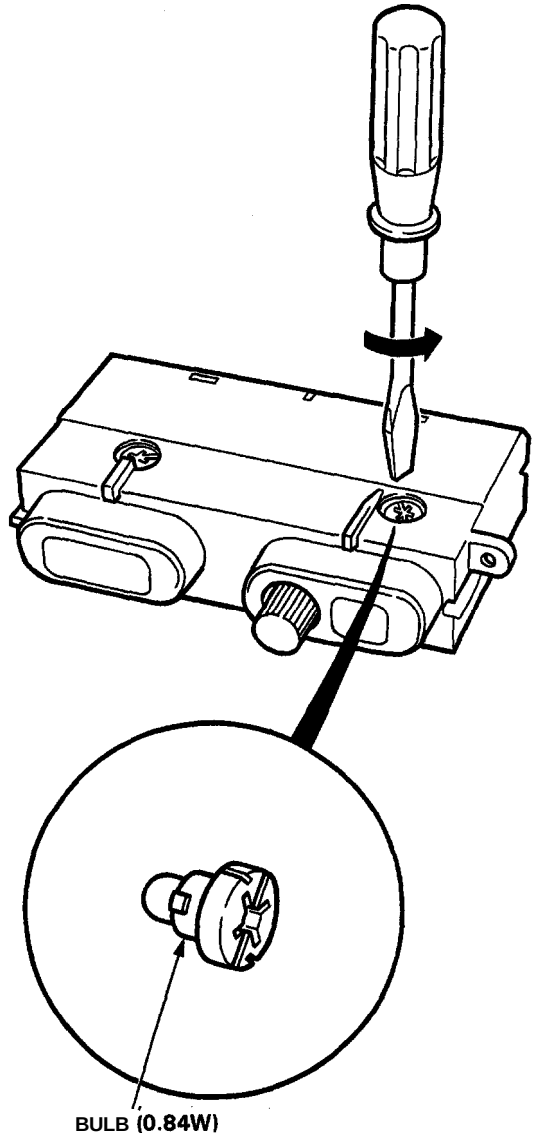


Dashlight brightness controller



Controller Light Bulb Replacement

1. Remove the dashlight brightness controller.
2. Turn the socket 45° counterclockwise to remove it.



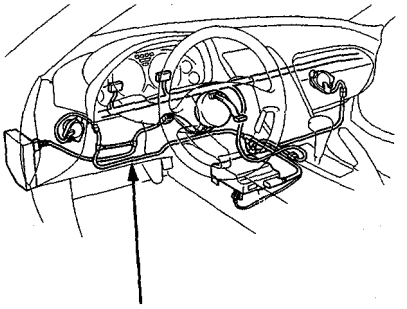
Entry Light Timer System

Component Location Index

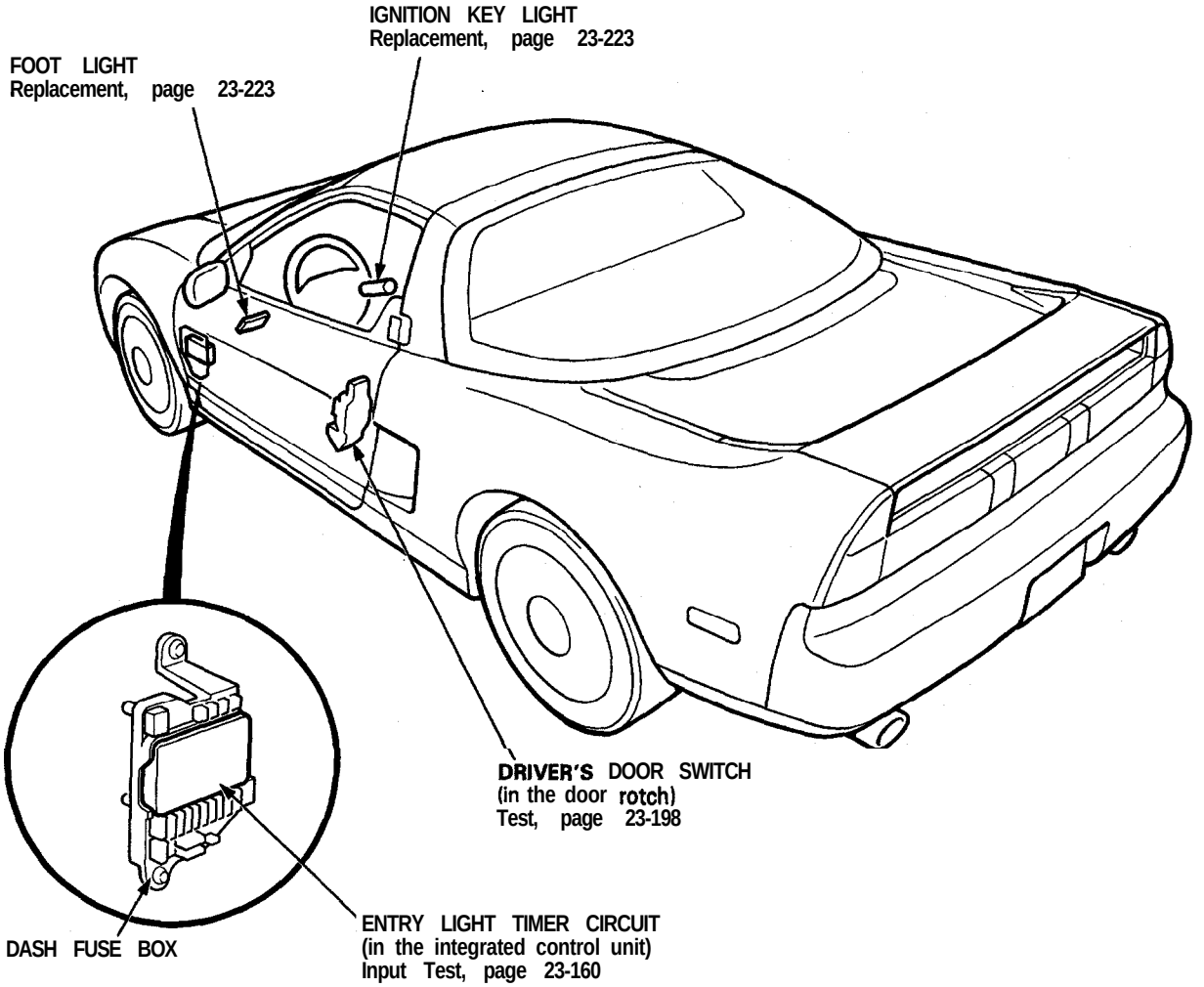
⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the entry light timer system.

Description: If the driver's door has been opened by the outer handle, a foot light and a light at the ignition switch go on and stay on for about 8 seconds after the driver's door is closed.

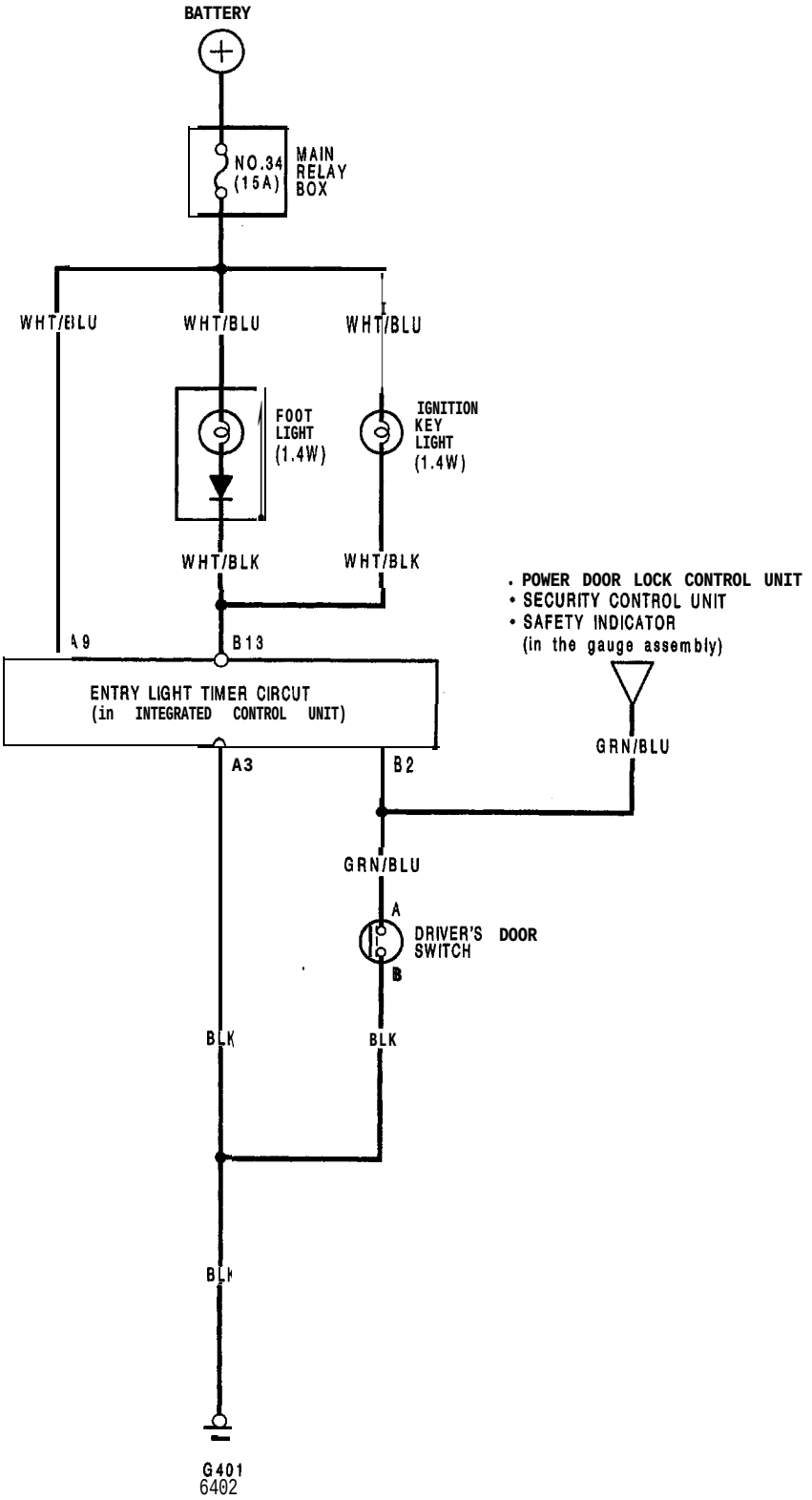


SRS MAIN WIRE HARNESS



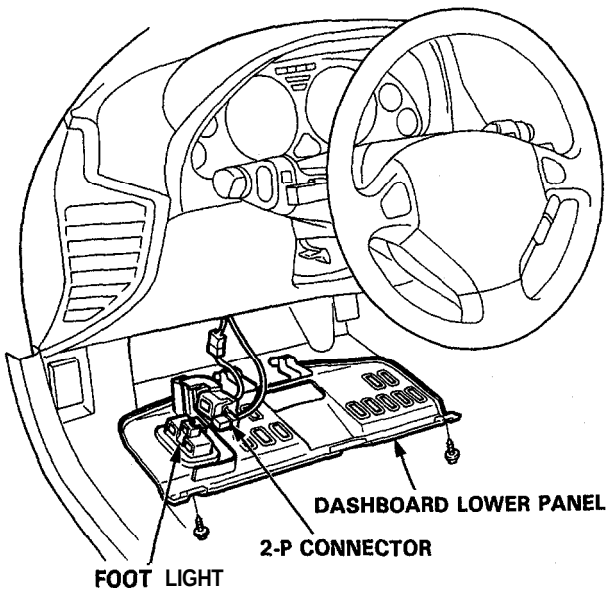
Entry Light Timer System

Circuit Diagram

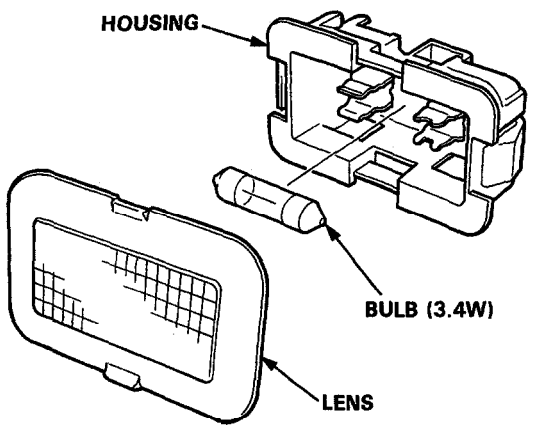


-Foot Light Replacement

1. Remove the dashboard lower panel.
2. Disconnect the 2-P connector from the foot light.
3. Push out the foot light from the dashboard lower panel.

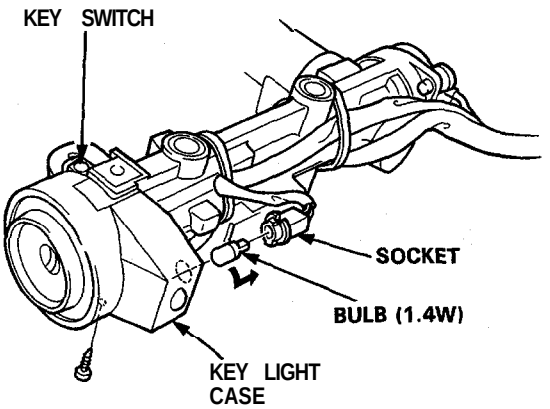


4. Remove the foot light bulb.



- Ignition Key Light Replacement

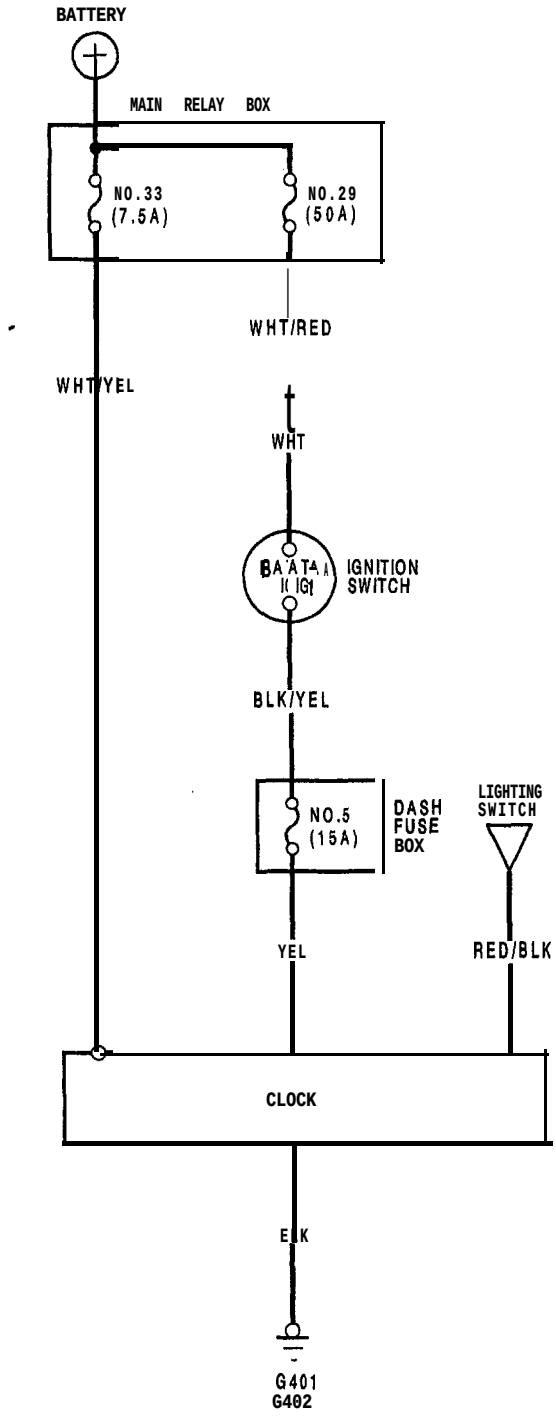
1. Remove the dashboard lower panel.
2. Remove the dashboard center panel.
3. Remove the bulb/socket from the key light case by turning the socket 45°.



4. Remove the key light case from the key cylinder by removing the attaching screw.

Clock

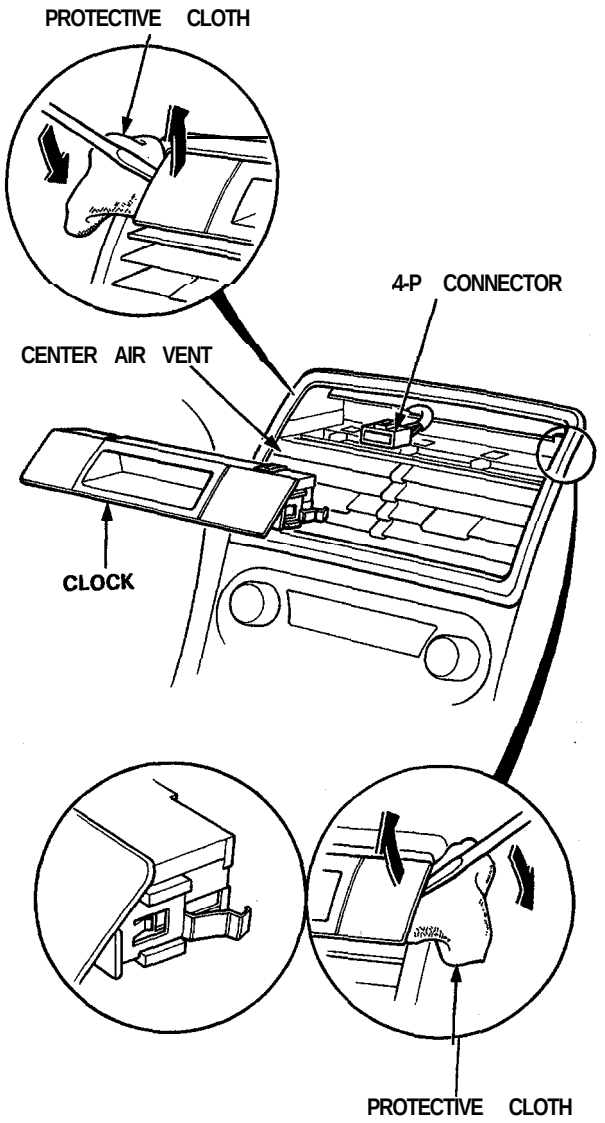
Circuit Diagram



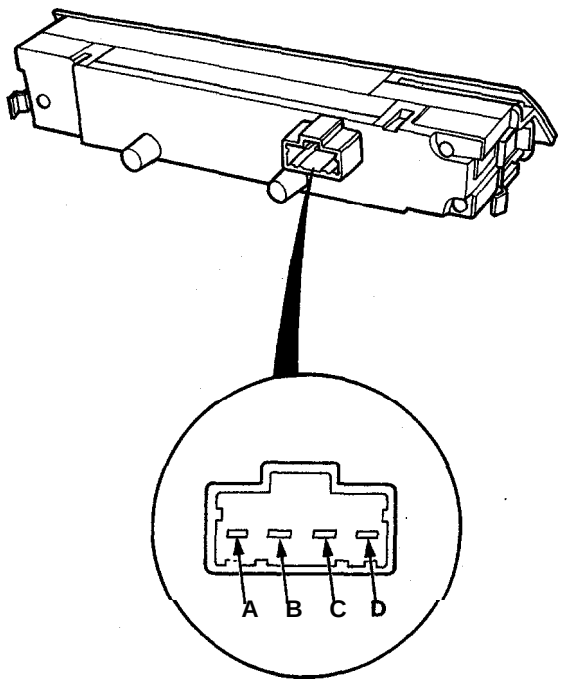
Removal

CAUTION: Be careful not to damage the center air vent or clock.

1. Remove the clock as shown.
2. Disconnect the 4-P connector from the clock.



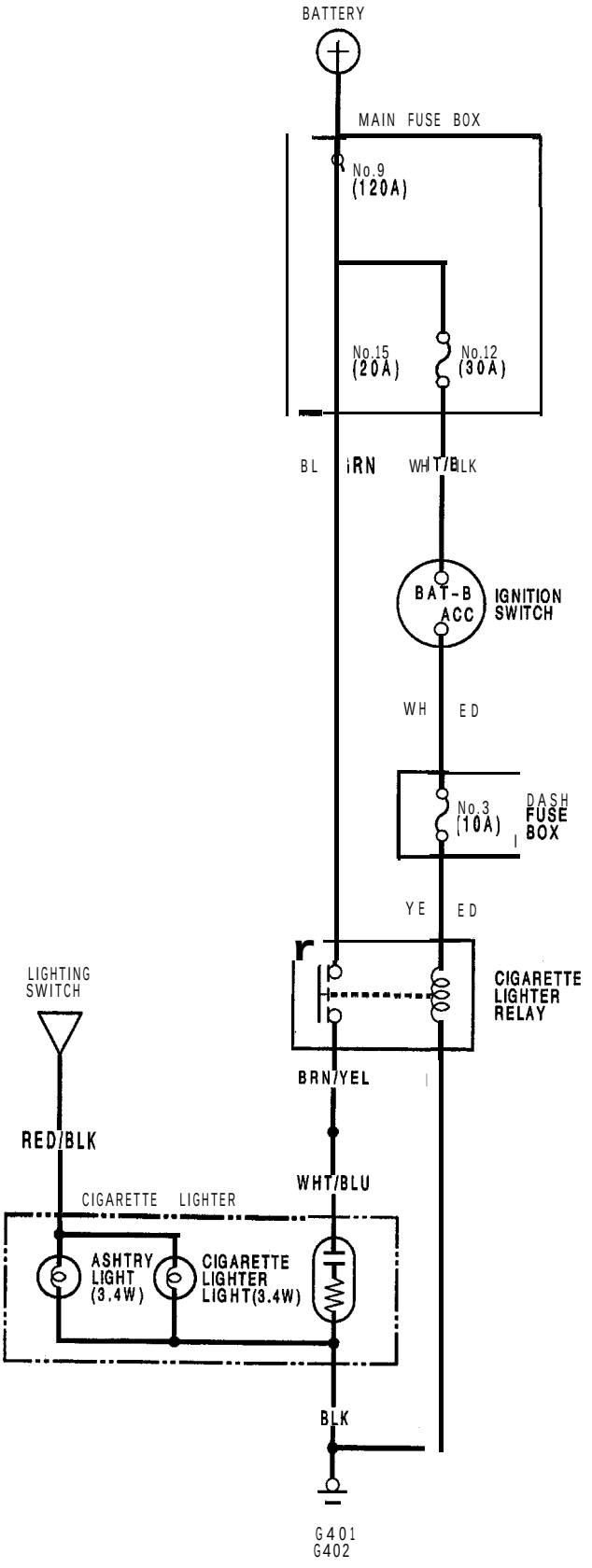
Terminals



Terminal	Wire	Destination
A	BLK	Ground
B	RED/BLK	Light-on signal
C	WHT/YEL	Constant power (Time memory)
D	YEL	IGI (Main clock power supply)

Cigarette Lighter

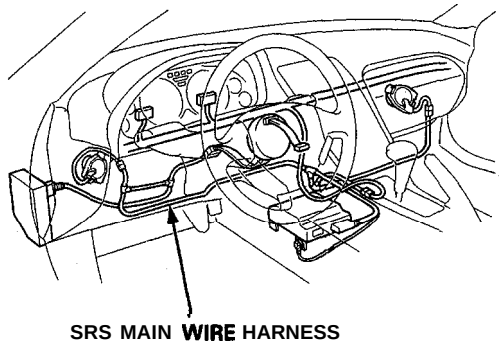
Circuit Diagram



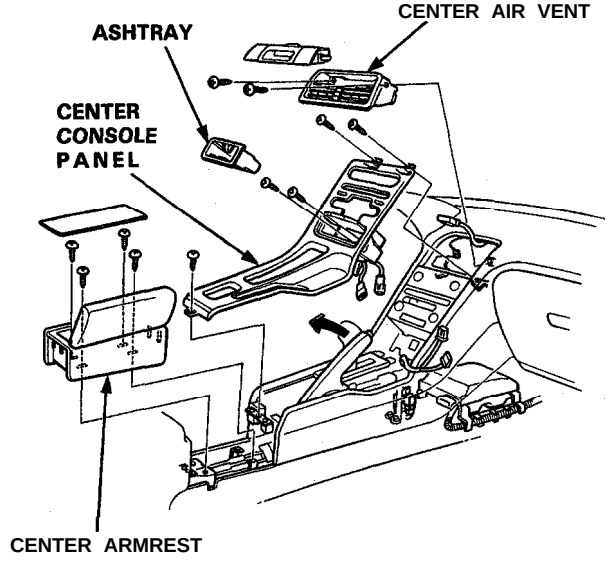
Replacement

⚠ WARNING Ail SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

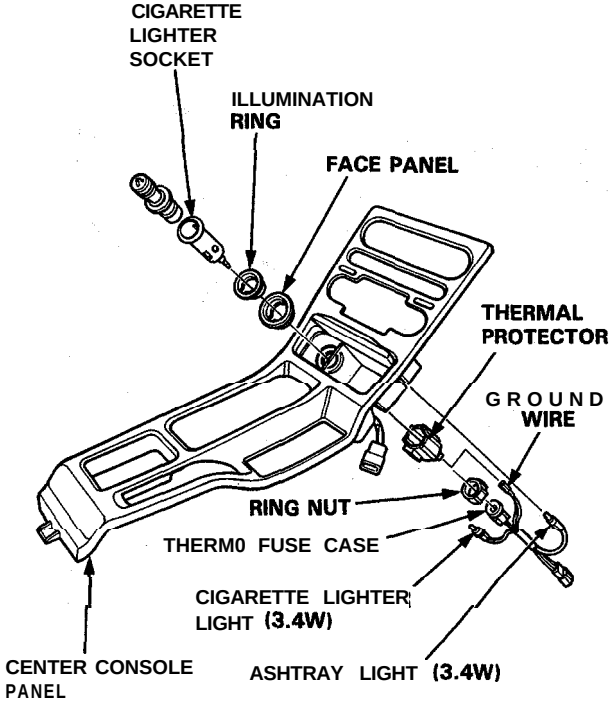
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the cigarette lighter.



1. Remove the clock (see page 23-225).
2. Remove the 2 screws, then remove the center air vent.
3. Remove the 4 screws, then remove the center armrest.
4. Take out the ashtray.
5. Remove the 5 screws and center console panel, then disconnect the 3-P connector and 4-P conenctor from the floor wire harness.

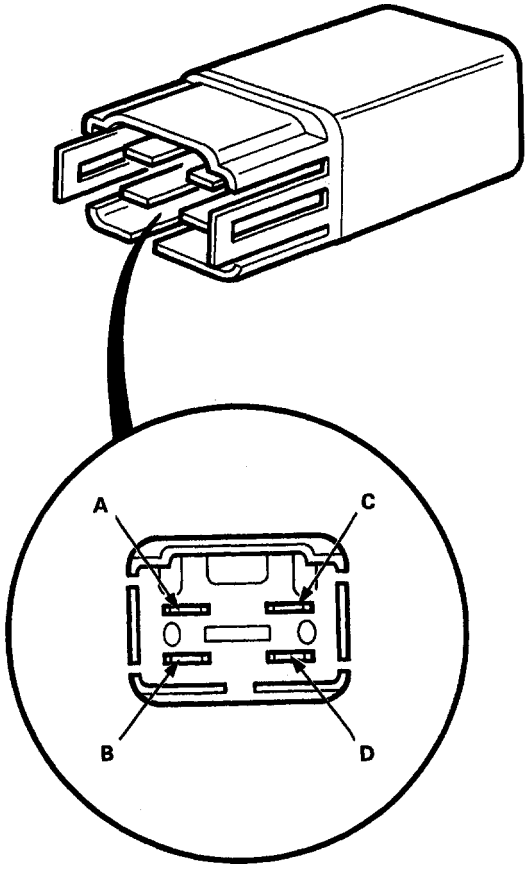


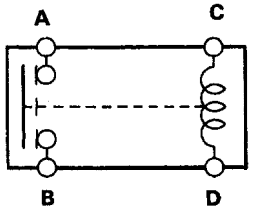
6. Disconnect the thermo fuse case from the socket end.
7. Remove the ring nut and separate the cigarette lighter socket from the thermal protector.
8. When installing the cigarette lighter, align each lug on the face panel, illumination ring and cigarette lighter socket with the groove of the hole, then position the bulb case on the thermal protector between the stoppers of the center console panel.
9. Make sure that the ground wire, bulb socket and thermo fuse case are seated to the cigarette lighter assembly.



- Relay Test

1. **Remove the glove box (see section 20).**
2. **Disconnect the 4-P connector from the cigarette lighter relay. (Wire colors of 4-P conneclor: BLU/GRN, YEL/RED, BRN/YEL, BLK)**
3. **There should be continuity between the A and B terminals when the battery is conencted to the C and D terminals.**
   there should be no continuity when the battery is disconencted.



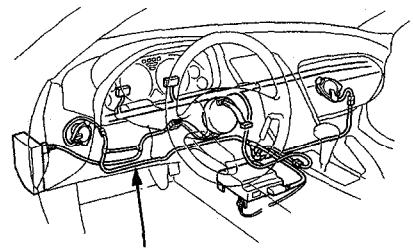


Stereo Sound System

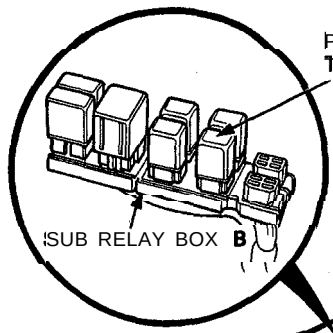
- Component Location Index

⚠ WARNING **All SRS wire harnesses- and connectors are colored yellow. Do not use electrical test equipment on these circuits.**

CAUTION: Be careful not to damage the SRS wire harness when servicing the stereo sound system.



SRS MAIN WIRE HARNESS



POWER AMPLIFIER RELAY
Test, page 23-234

SUB RELAY BOX B

STEREO RADIO/CASSETTE PLAYER
- Removal, page 23-232
- Terminals, page 23-234

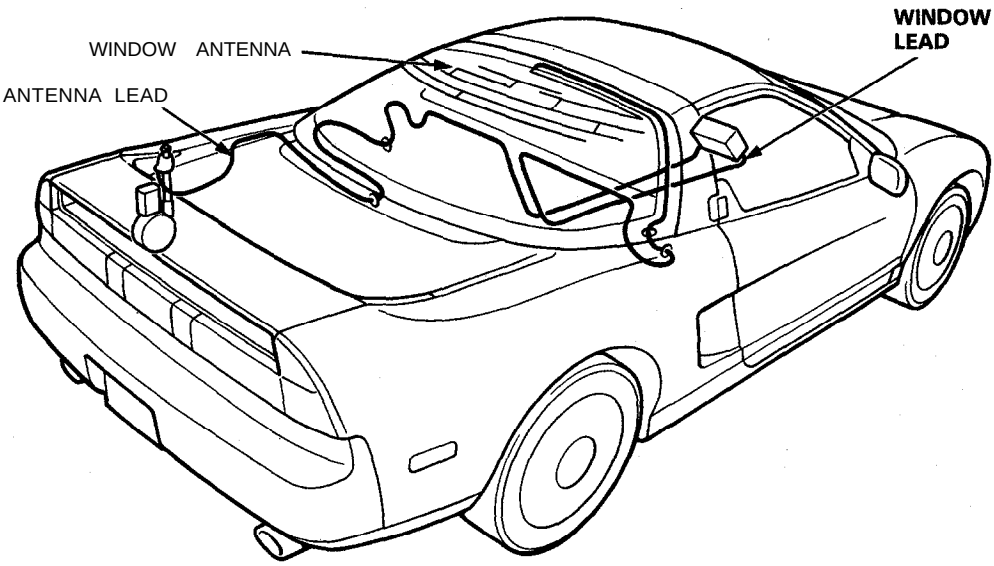
FOOT WHEEL BASS SPEAKER
Replacement, page 23-238

PASSENGER'S DOOR SPEAKER
Replacement, page 23-237

DRIVER'S DOOR SPEAKER
Replacement, page 23-237

REAR SPEAKER
Replacement, page 23-238

POWER ANTENNA MOTOR
- Test, page 23-235
- Replacement, page 23-237



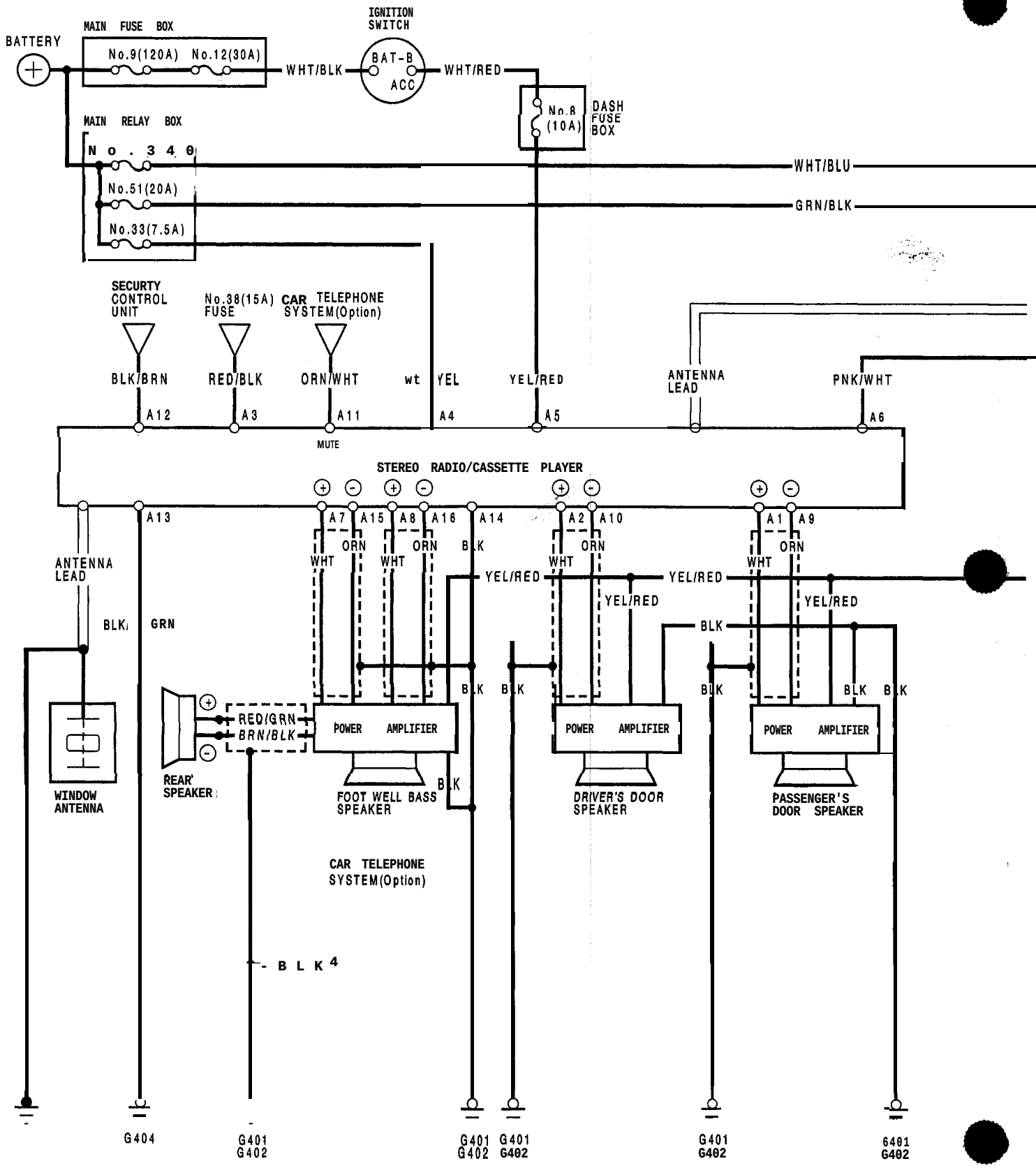
WINDOW ANTENNA

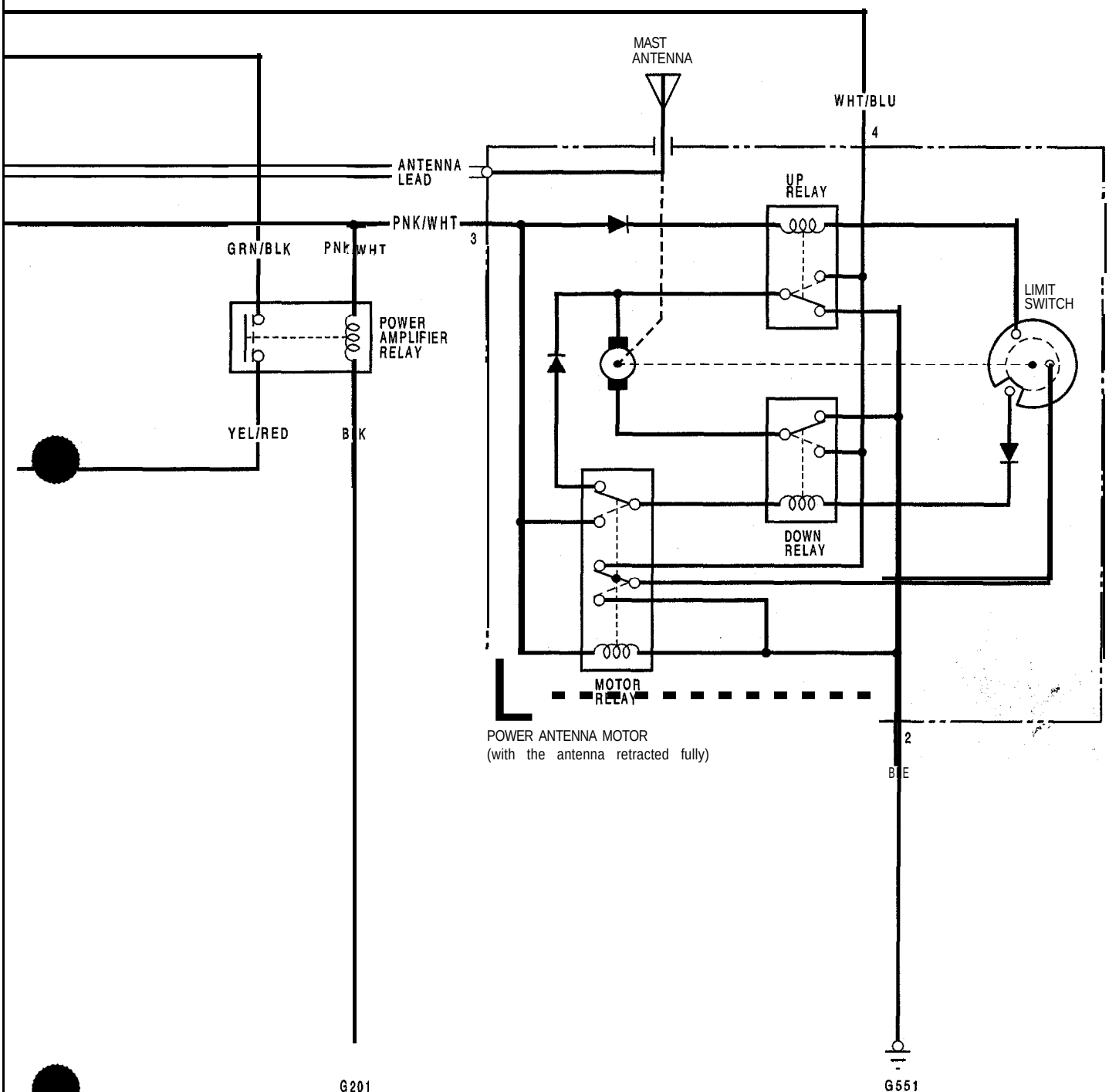
MAST ANTENNA LEAD

WINDOW ANTENNA **LEAD**

Stereo Sound System

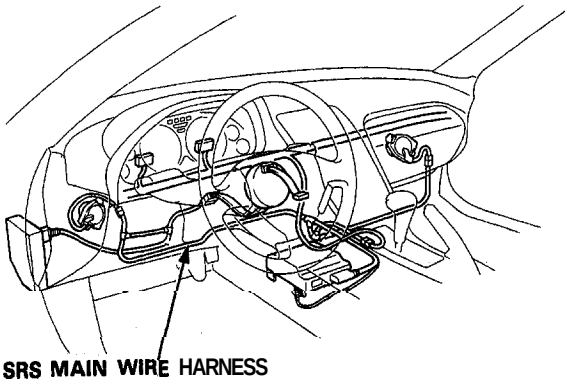
Circuit Diagram



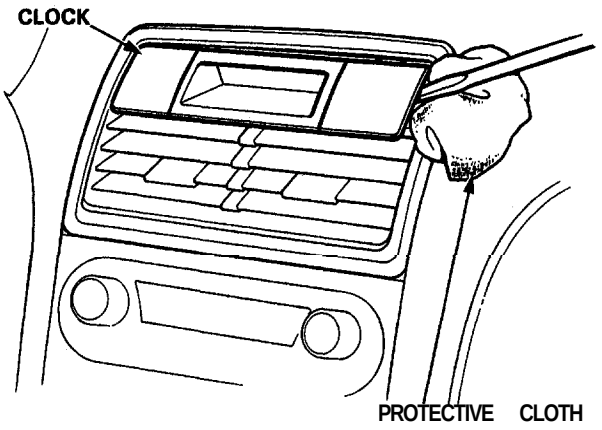

MAST
ANTENNA
WHT/BLU
4
ANTENNA
LEAD
PNK/WHT
3
GRN/BLK
PNK/WHT
POWER
AMPLIFIER
RELAY
YEL/RED
BLK
UP
RELAY
LIMIT
SWITCH
DOWN
RELAY
MOTOR
RELAY
POWER ANTENNA MOTOR
(with the antenna retracted fully)
2
BLK
G201
G551

Unit Removal

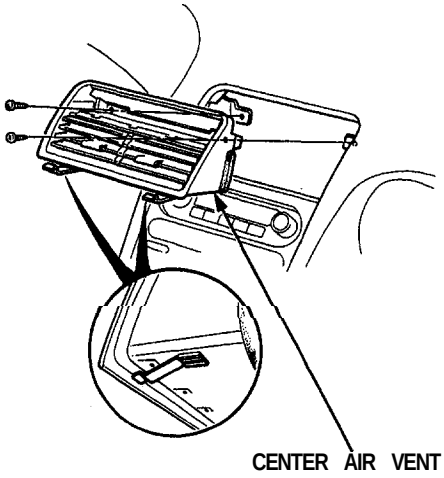
CAUTION:
- All SRS electrical wiring harnesses are covered with yellow outer insutation.
- Replace the entire affected **SRS** harness assembly if there is an open circuit or damage to the wiring.



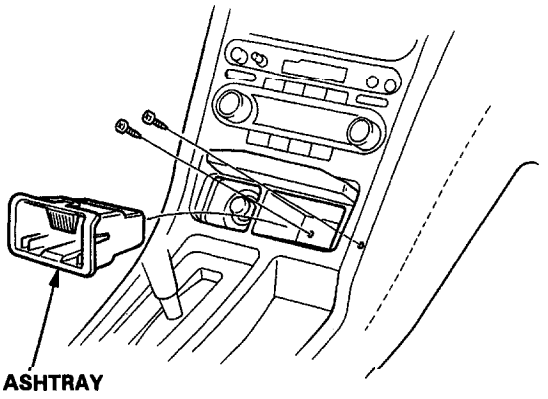
1. Remove the clock.



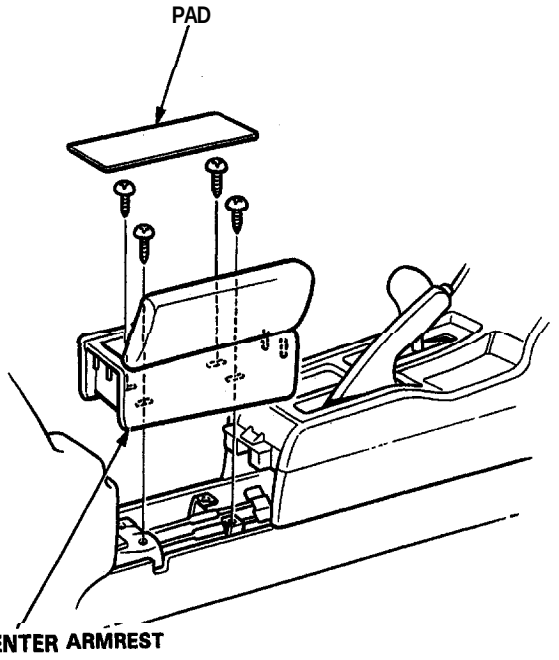
2. Remove the 2 screws, then remove the center air vent.



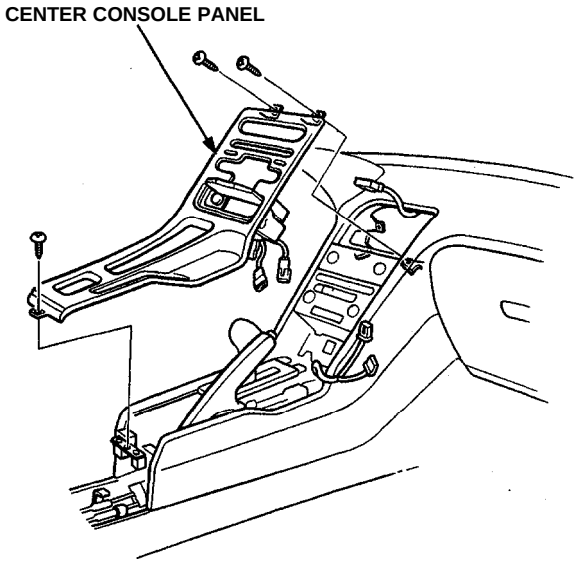
3. Take out the ashtray. Remove the 2 screws under the ashtray.



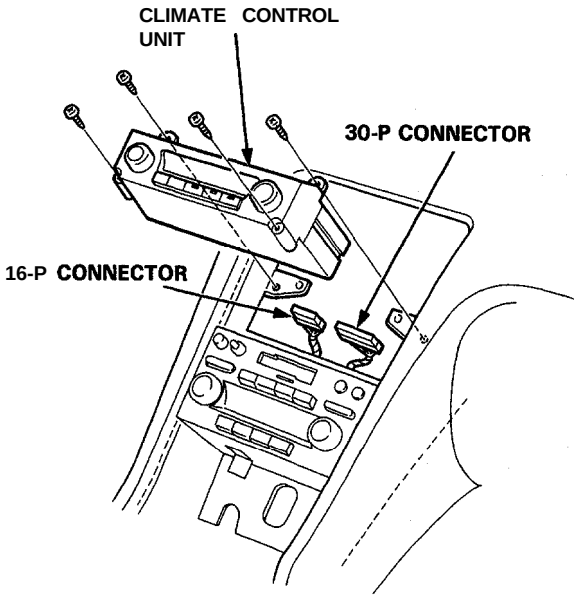
4. Remove the 4 screws, then remove the center armrest.



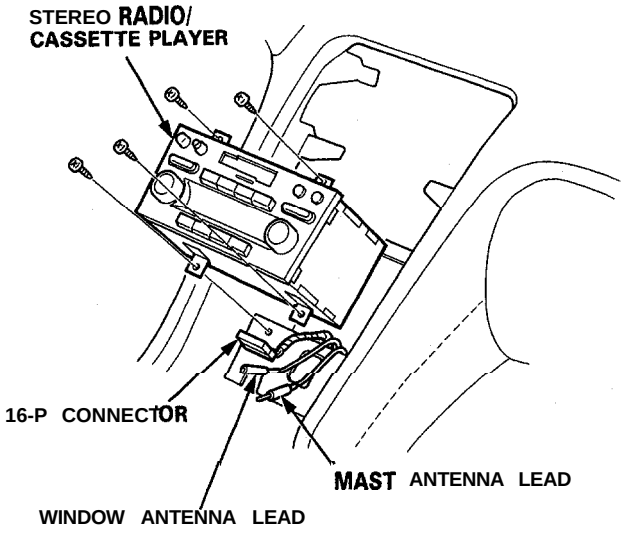
5. Remove the 3 screws and center console panel, then disconnect the 3-P connector and 4-P connector from the floor wire harness.



6. Remove the 4 screws, then disconnect the 14-P and 30-P connectors from the floor wire harness. Take out the climate control unit.

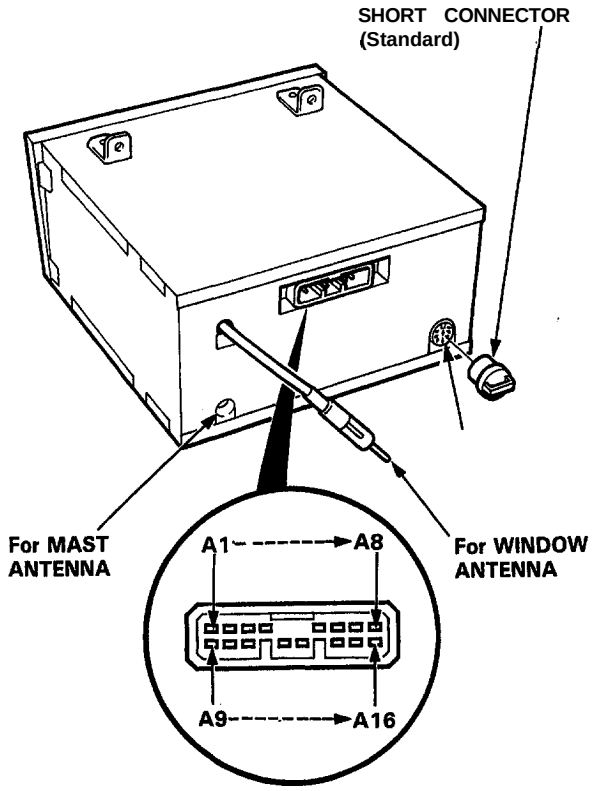


7. Remove the 4 screws, then disconnect the 16-P connector, mast antenna lead and window antenna lead. Take out the stereo radio/cassette player.



Stereo Sound System

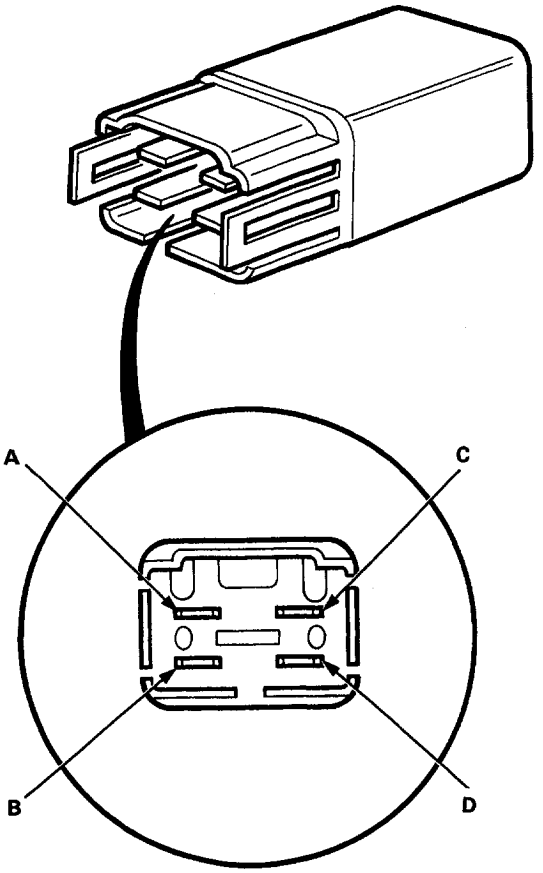
Unit Terminals

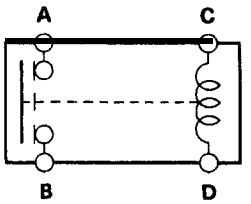


Terminal	Wire	Destination
AI	WHT	Passenger's door speaker amplifier ⊕
A2	WHT	Driver's door speaker amplifier ⊕
A3	RED/BLK	Light-on signal
A4	WHT/YEL	Constant power (Tuning memory)
A5	YEL/RED	ACC (Main stereo power supply)
A 6	PNK/WHT	Radio switched power (To antenna and relay)
A7	WHT	Foot well bass speaker (Driver's ⊕)
A6	WHT	Foot well bass speaker (Passenger's ⊕)
A9	ORN	Passenger's door speaker amplifier ⊖
A10	ORN	Drivers door speaker amplifier ⊖
AI 1	ORN/WHT	Telephone mute signal
AI 2	BLK/BRN	Security (IN)
AI3	BLK/LT GRN	Security (OUT)
AI4	BLK	Ground (G401, 402)
AI 5	ORN	Foot well bass speaker (Driver's ⊖)
AI6	ORN	Foot well bass speaker (Passenger's ⊖)

-Power Amplifier Relay Test

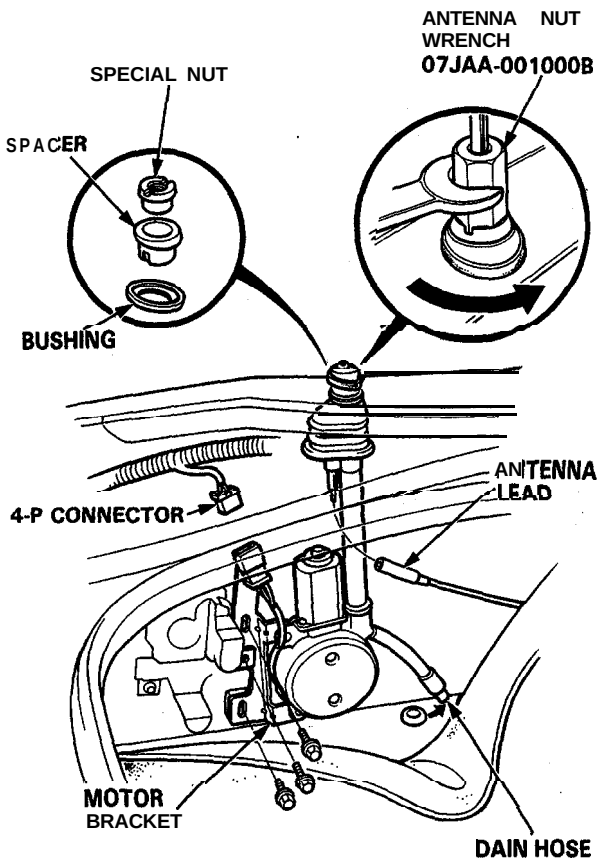
1. Remove the power amplifier relay from the sub relay box B.
2. There sould be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.





Power Antenna Motor Replacement

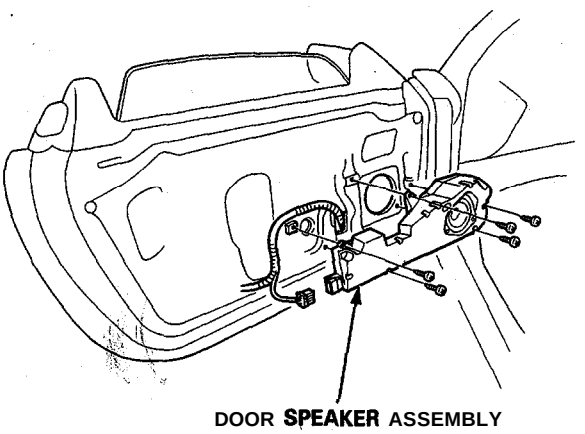
1. Open the trunk lid and remove the side trim panel.
2. Disconnect the 4-P connector and antenna lead from the motor, then remove the special nut and 3 mounting nuts to take out the motor.



3. install in reverse order of removal.
   NOTE: Tighten the special nut, then tighten 2 mounting nuts to motor bracket.

Front Speaker Replacement

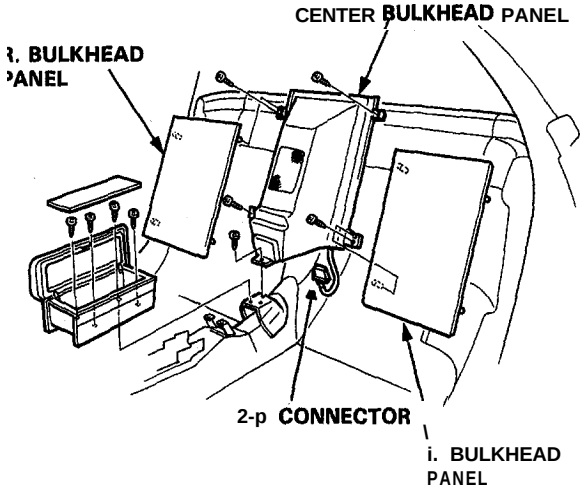
1. Remove the door trim panel (see section 20).
2. Remove the door speaker assembly from the door panel by removing the 5 screws.



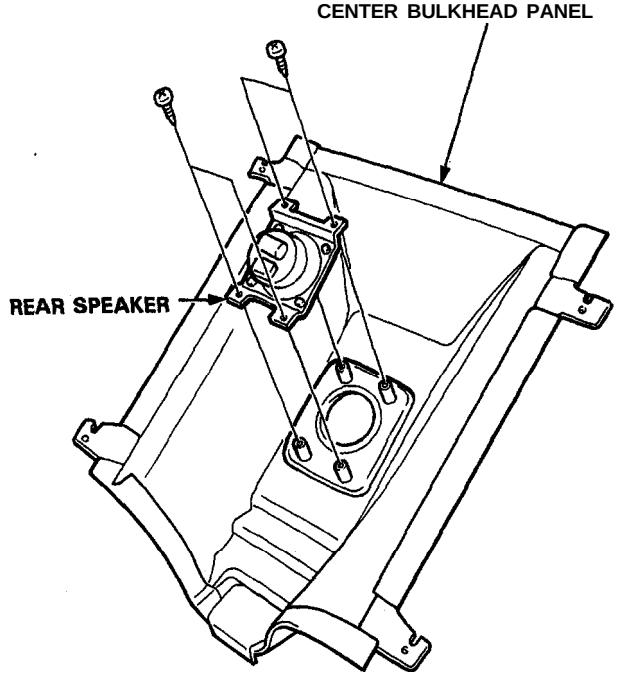
Stereo Sound System

Rear Speaker Replacement

1. Remove the center armrest and upper bulkhead panel (See section 20).
2. Remove the bulkhead panels.
3. Remove the 5 screws, then disconnect the 2-P connector from the floor wire harness.

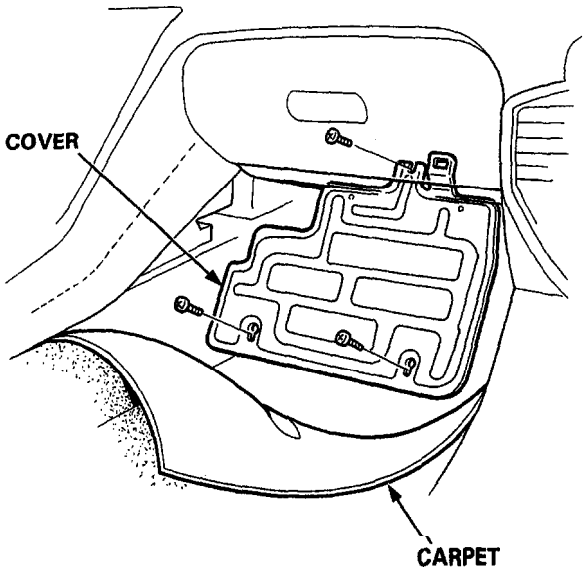


4. Remove the 4 screws, then take the rear speaker out of the center bulkhead panel.

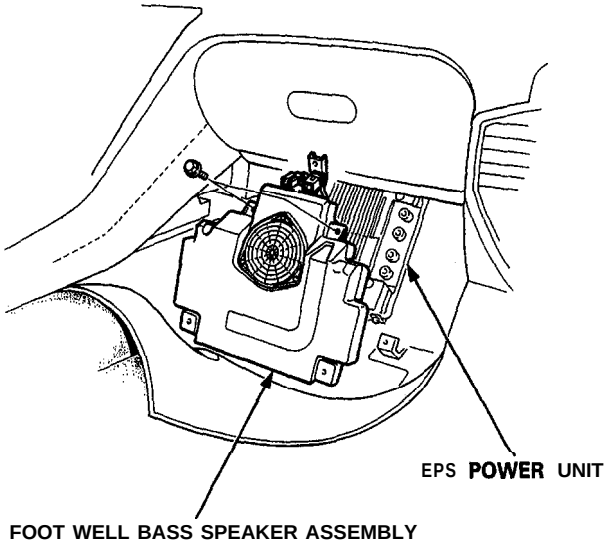


Foot Well Bass Speaker Replacement

1. Pull the right front floor carpet back.
2. Remove the foot well bass speaker cover.



3. Disconnect the 2-P and 6-P connectors, then remove the 2 bolts from the EPS power unit. Remove the foot well bass speaker assembly.

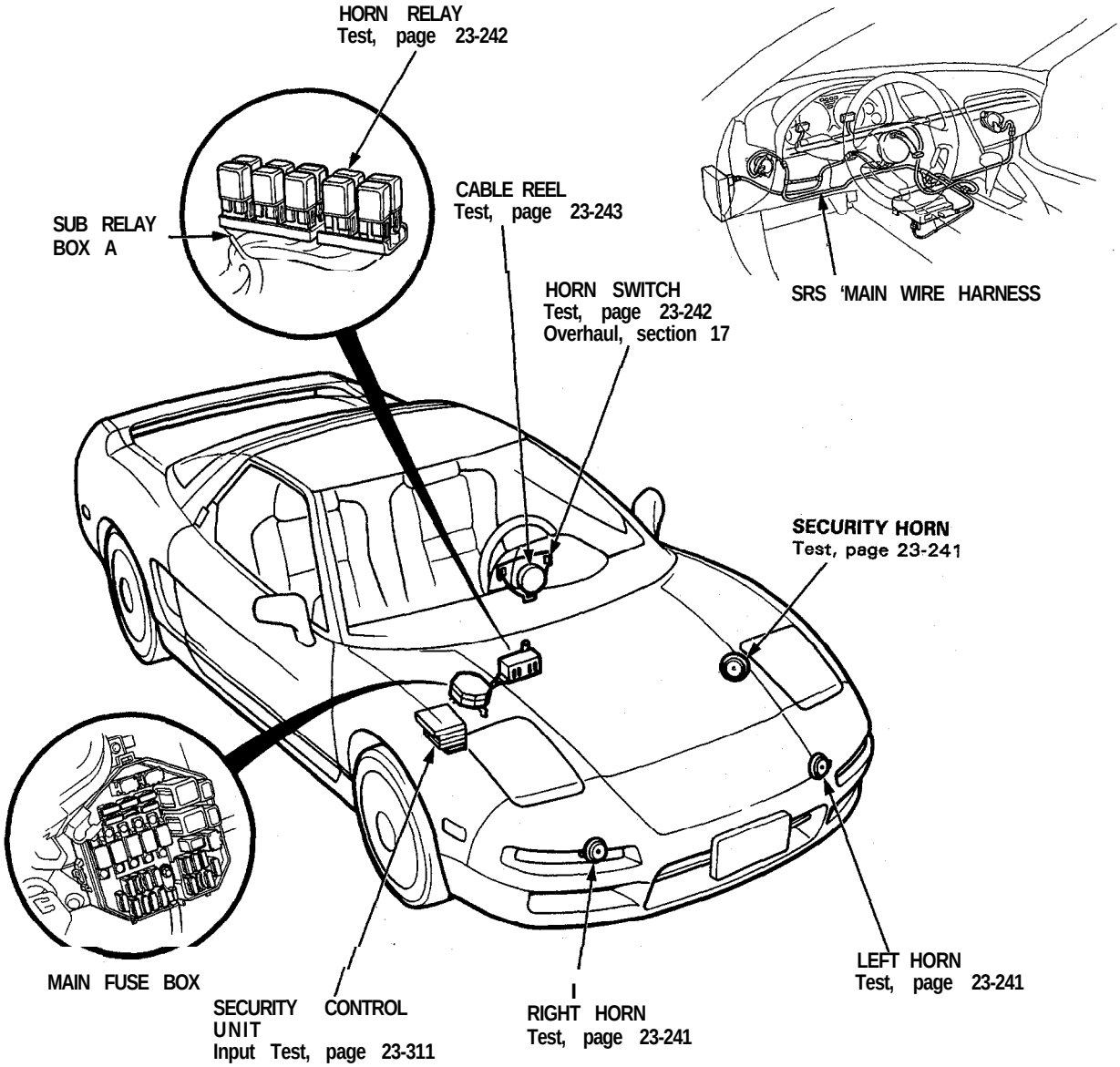


Component Location Index

SRS wire harness is routed near the horns and related parts (SRS wire harness locations, page 23-323).

WARNING All SRS wire harnesses and connections are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the horn system.



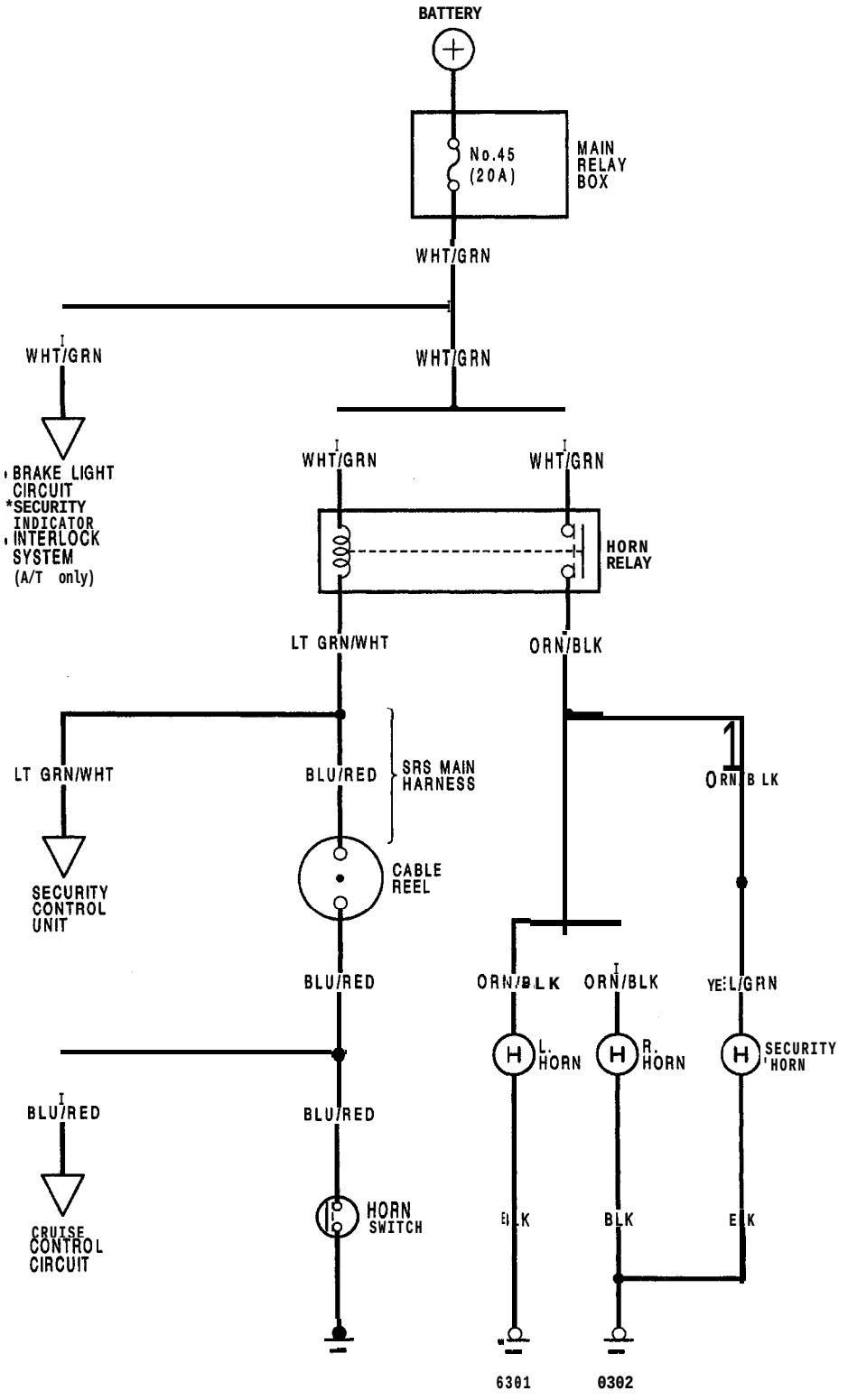
Description

Security Alarm System:

The security alarm system is an anti-theft alarm system. If someone tries to open the trunk, hood or either door without the ignition key, the security control unit senses a signal from the sensors and activates relays to flash the headlights and sound the horn for about two minutes.

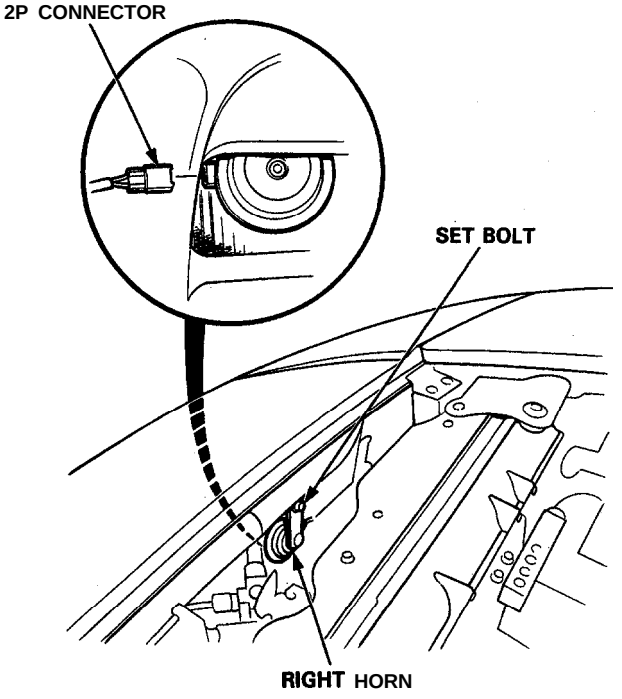
Horns

Circuit Diagram

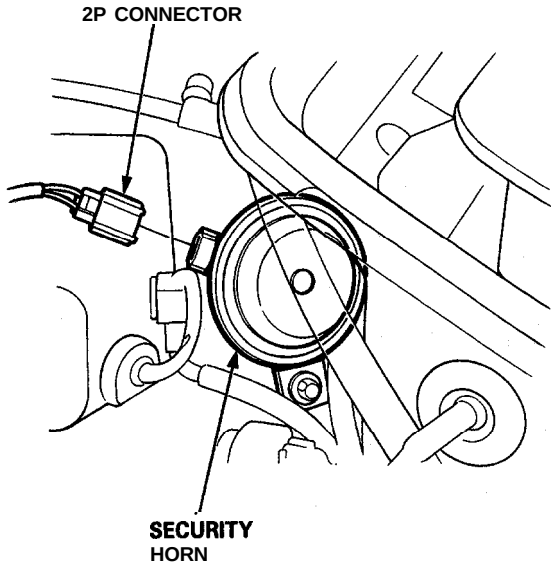


Horn Test

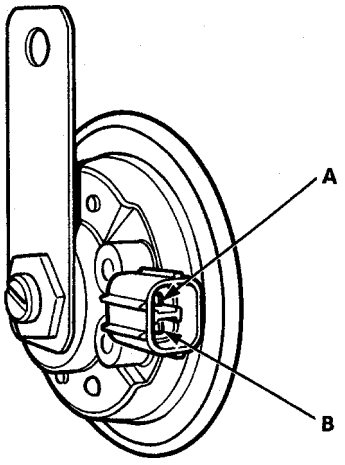
1. Disconnect the 2P connector from the horn.
2. Remove the right and left horns.



Security Horn:



3. Test the horn by connecting battery voltage to the A and B terminals. The horn should sound.

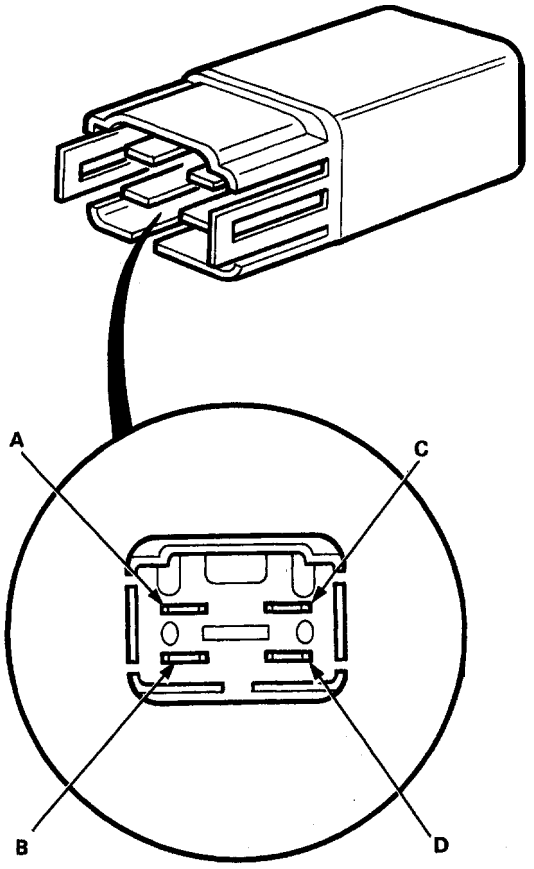


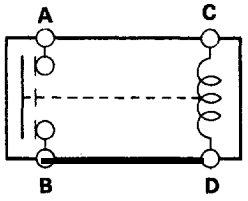
4. If the horn fails to sound replace it.

Horns

Relay Test

1. Open the hood and remove the horn relay from sub relay box A.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



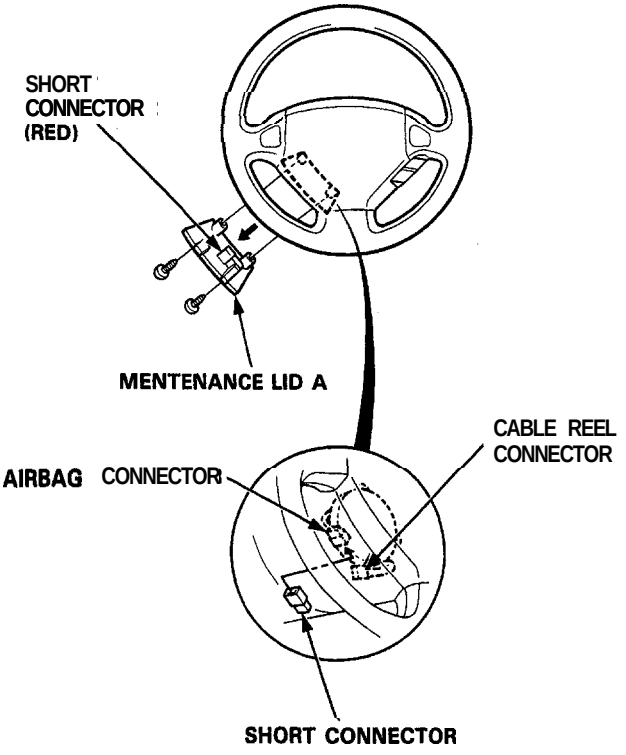


Switch Test

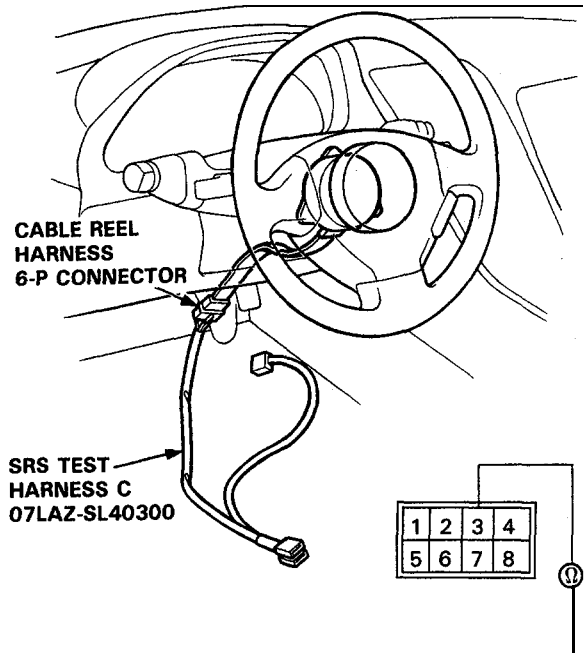
WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:
- 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.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassembly or tamper with the airbag assembly.

1. Disconnect the battery negative terminal and then disconnect the positive terminal.
2. Make sure the wheels are aligned straight forward.
3. Remove the dashboard lower panel.
4. Remove the steering wheel maintenance lid A, and disconnect the cable reel harness and airbag assembly 2P connector. Connect the short connector (Red) to the airbag connector.



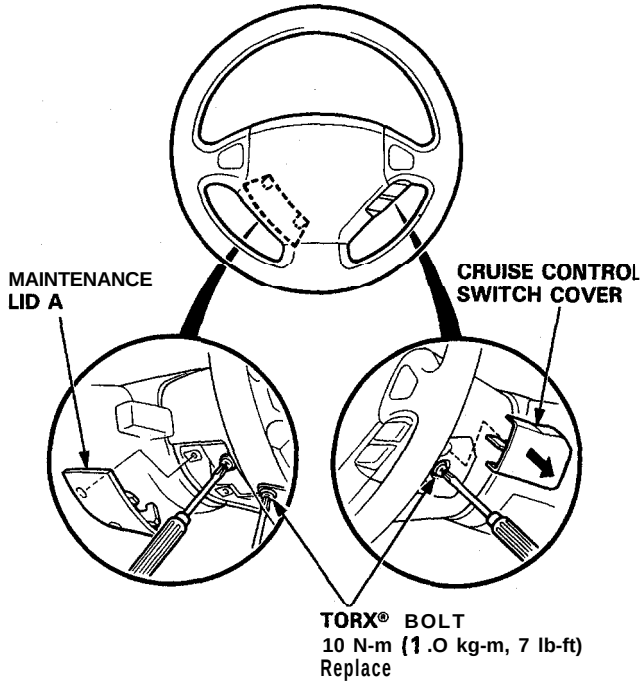
5. Disconnect the cable reel harness and main harness's 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.



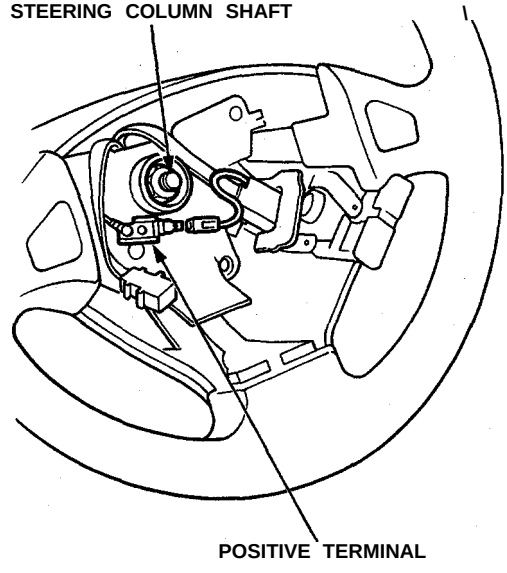
6. Check for countinuity between the No. 3 terminal and body ground with the horn switch pressed.
There should be continuity.

- If there is continuity, the horn switch is OK.
- If there is no coutinuity, go to step 7.

7. Remove the TORX® bolts using TORX® T30 bit, then remove the airbag assembly.



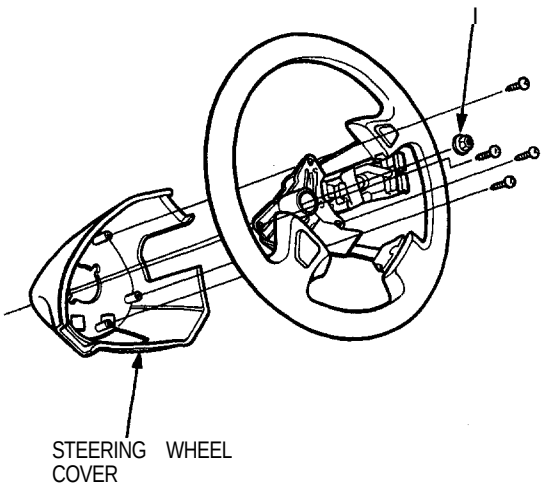
8. Check for continuity between the horn positive terminal and the steering column shaft with the horn switch pressed.
There should be no continuity.



(cont'd)

Switch Test (cont'd)

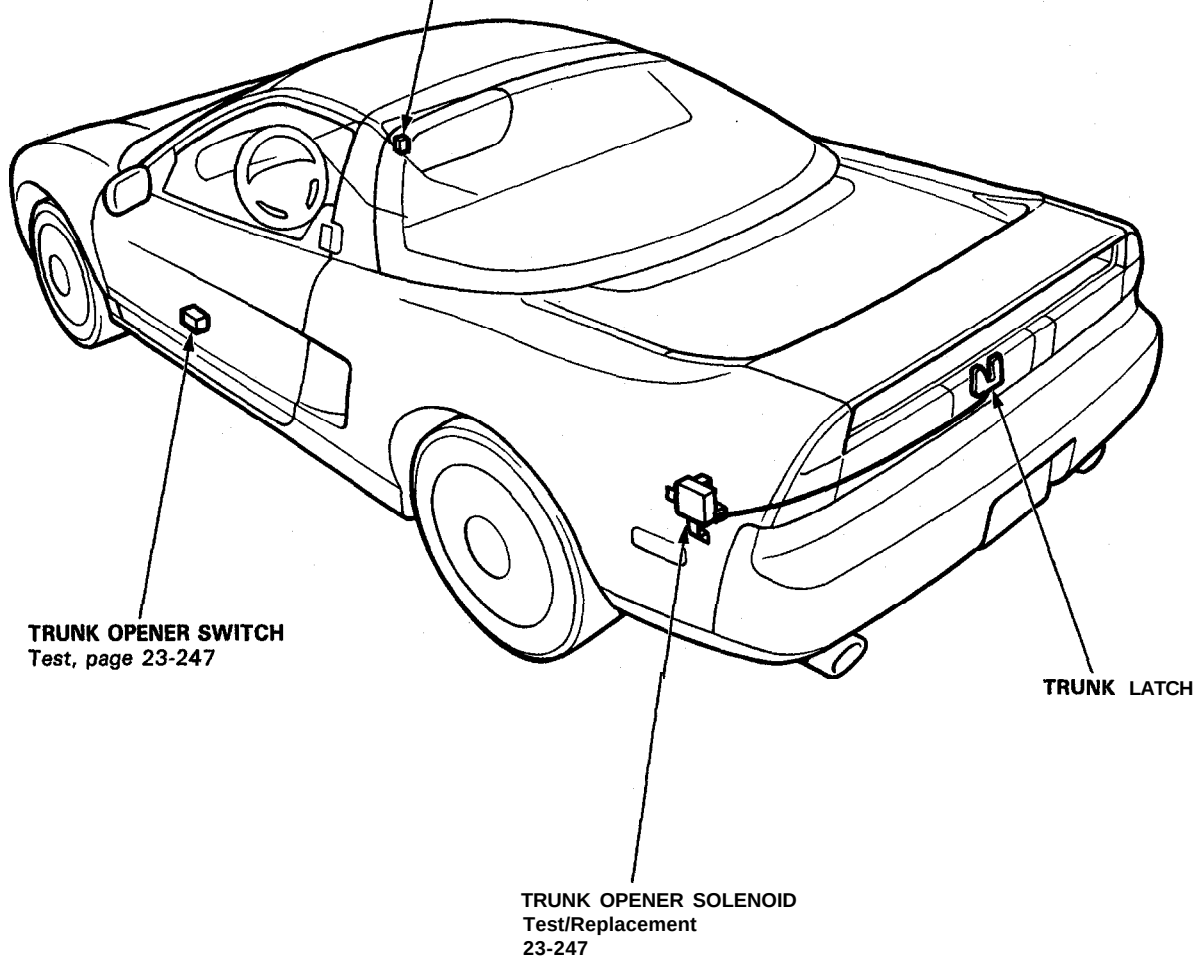
- If there is continuity, replace the cable reel.
- If there is no continuity, remove the nut and the 4 screws then remove the steering wheel cover. Replace the horn switch.



9. Install the steering wheel (Section 17).

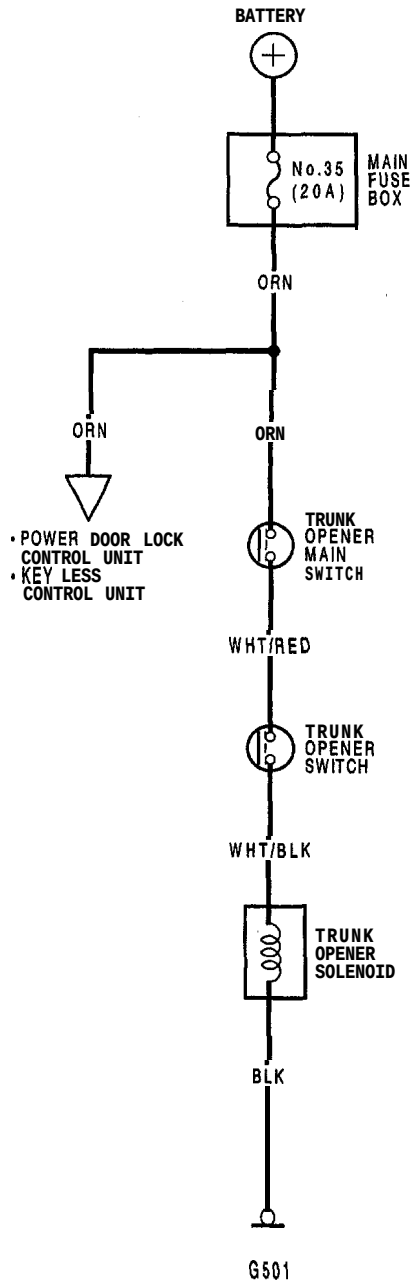
Trunk Opener

Component Location Index



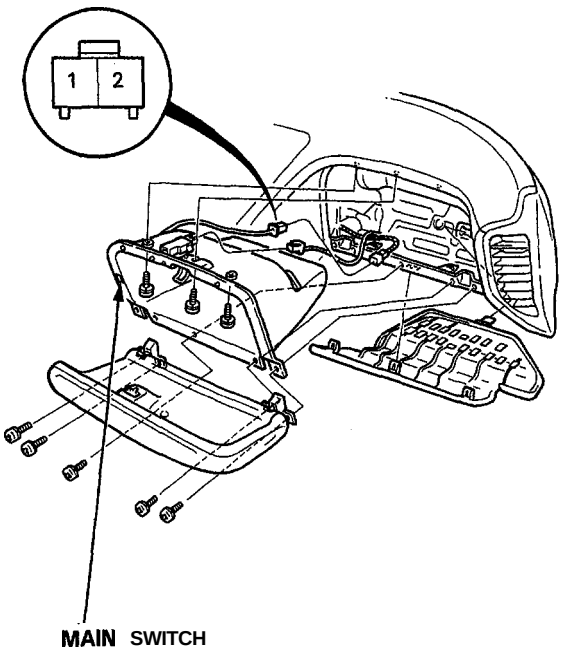
Trunk Opener

Circuit Diagram

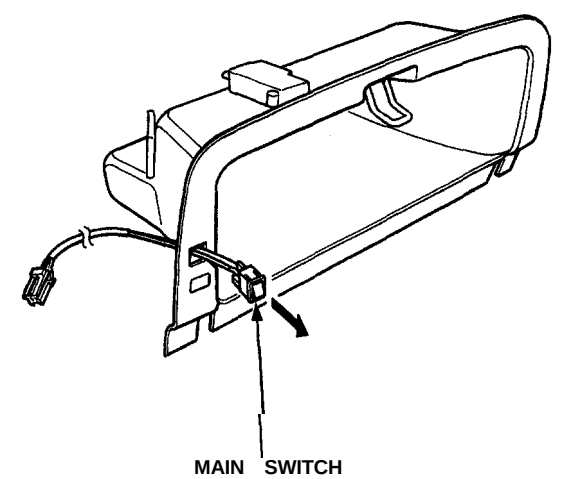


Main Switch Test

1. Remove the glove box to disconnect the 2-P connector from the switch.
2. There should be coutinuity between the No. 1 terminal and No. 2 terminal with the main switch ON. There should be no continuity with the main switch OFF.

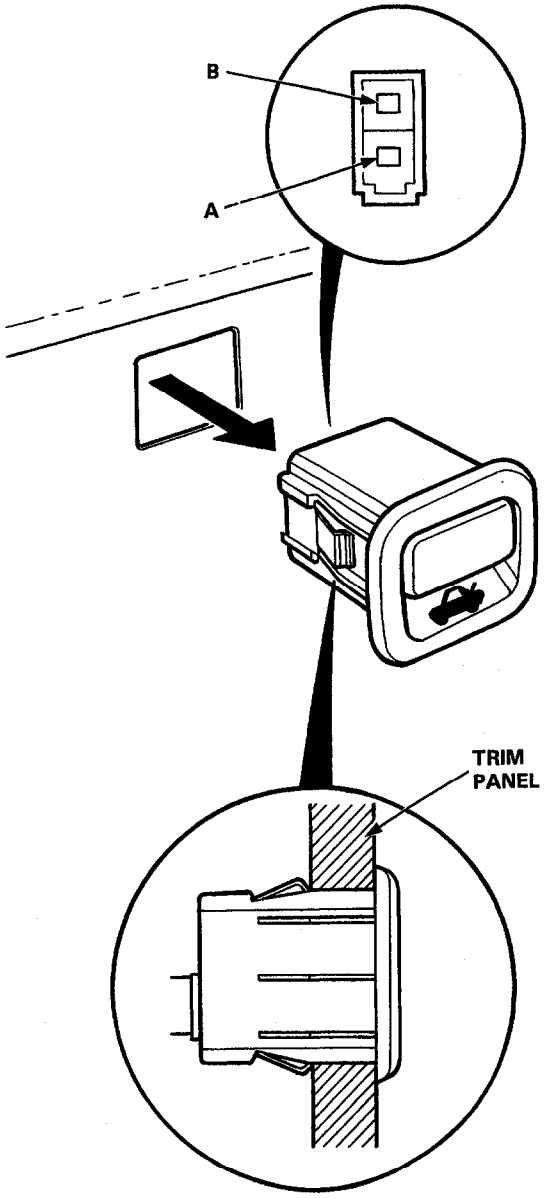


3. If necessary, replace the switch.



Opener Switch Test

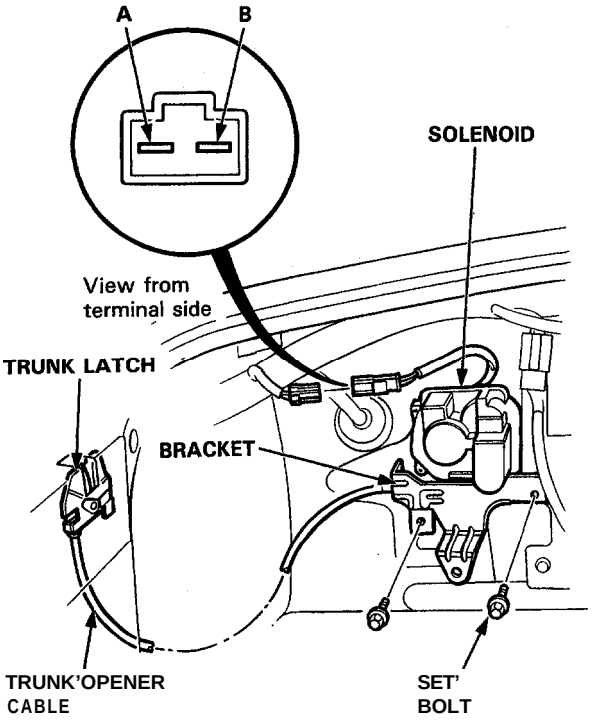
1. Remove the door trim panel, then push out the switch from the door trim panel as shown.



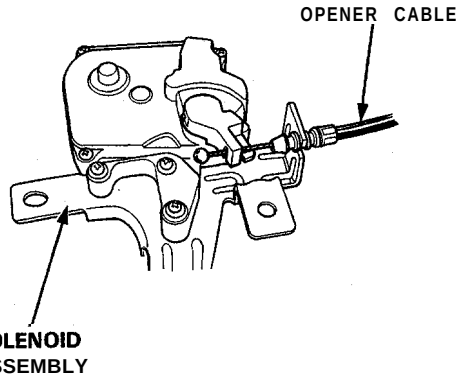
2. There should be continuity between the A and B terminals when the switch is pushed.
   There should be no continuity when the switch is released.

Solenoid Test/Replacement

1. Open the trunk lid and remove the trunk side trim panel.
2. Disconnect the Z-P connector from the solenoid.
3. Test the solenoid operation by connecting battery voltage to the A and B terminals momentarily.

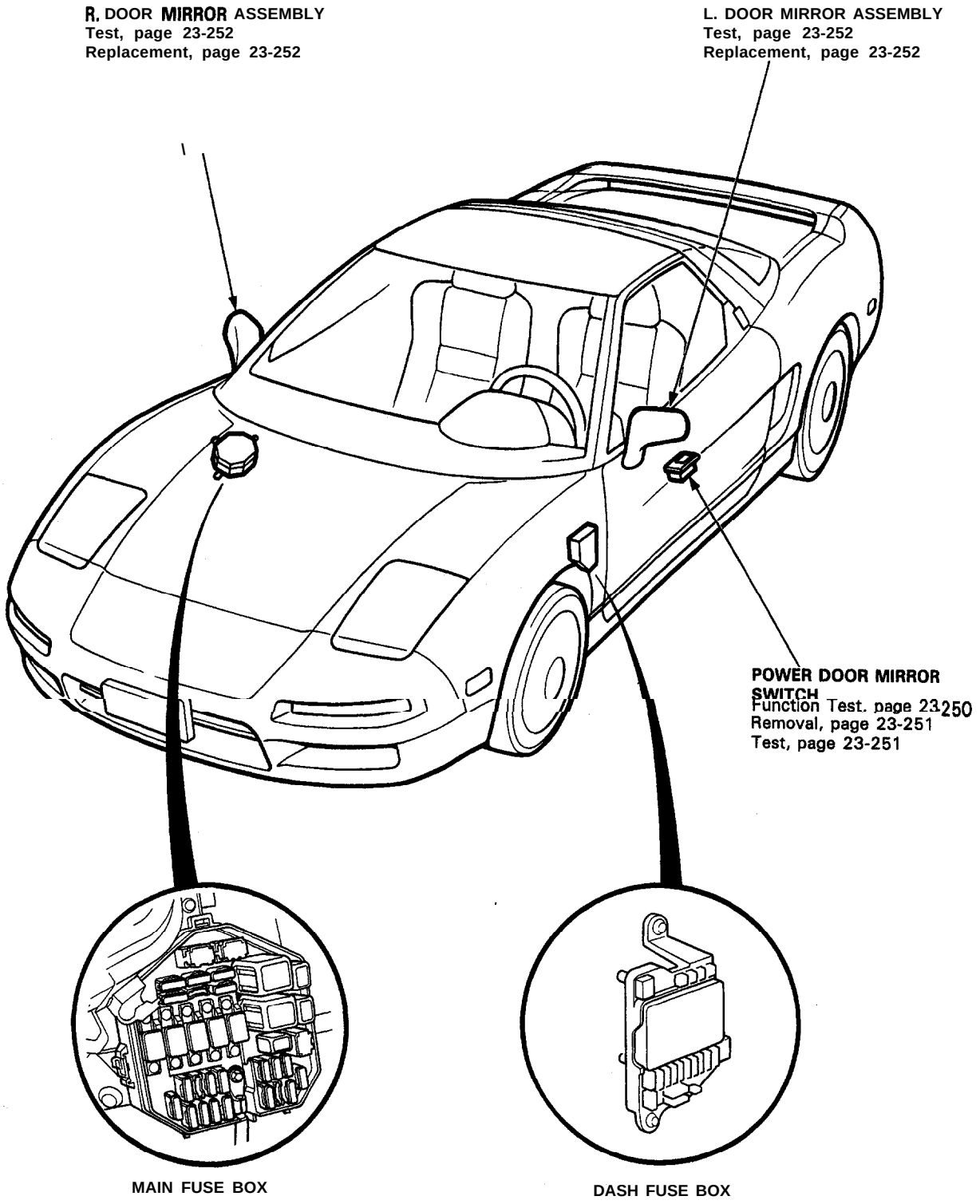


4. If necessary, remove the 2 bolts, then disconect the trunk opener cable from the solenoid assembly.

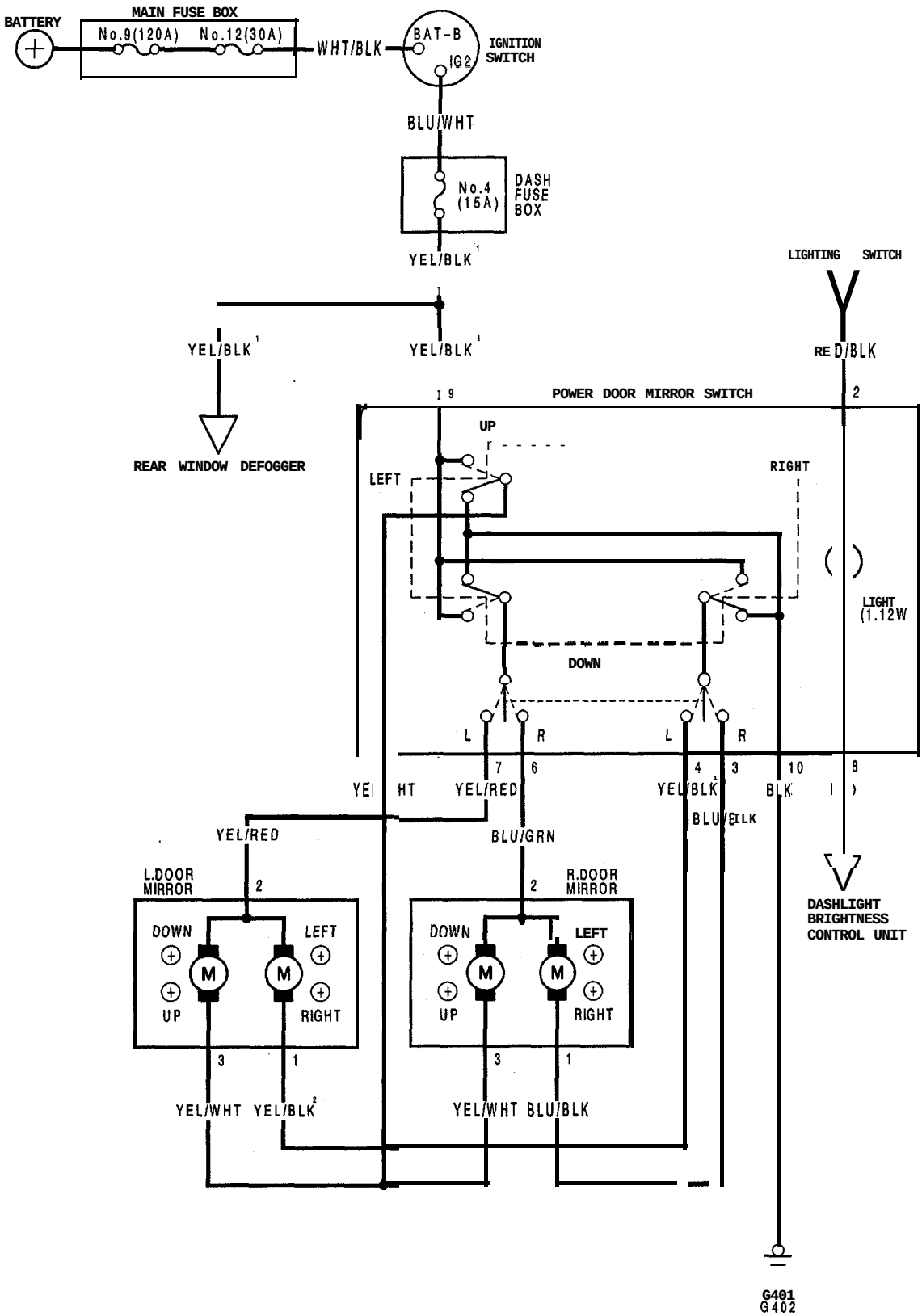


Power Door Mirrors

- Component Location Index



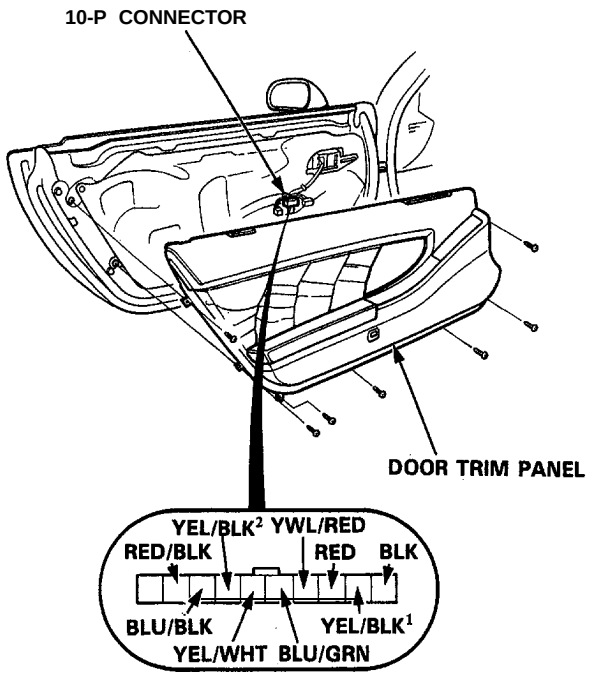
Circuit Diagram



Power Door Mirrors

· Function Test

NOTE: Before testing, remove the left door trim panel, then disconnect all of the connectors from the door trim panel.



View from wire side

Mirror Test:

NOTE: Check the No. 4 (15A) fuse in the dash fuse box before testing.

One or both inoperative:

1. **Check for voltage between the YEL/BLK[1] terminal and body ground with the ignition switch ON.**
   There should be battery voltage.

   - **If there is no voltage, check for an open in the YEL/BLK[1] wire.**

   - **If there is battery voltage, go to step 2.**

2. Check for continuity between the BLK teminal and body ground.
   There should be continuity.

   - **If there is no continuity, check for:**
     - **An open in the BLK wire.**
     - **Poor ground (G401).**

Left inoperative:

Connect the YEL/BLK[1] terminal to the YEL/RED terminal and the YEL/WHT (or YEL/BLK[2]) terminal to the body ground with jumper wires.

The left mirror should tilt down (or swing left) when the ignitin switch is turned ON.

- If the mirror does not tilt down (or does not swing left), **remove the left door trim panel and check for open in the YEL/WHT (or YEL/BLK[2]) wire between the left door mirror and switch.**
  If the wire is OK, check the left door mirror.

- If the mirror neither tilts down nor swings left, repair **the YEL/RED wire.**

- **If the mirror operates properly, check the mirror switch.**

Right inoperative:

Connect the YEL/BLK[1] terminal to the BLU/GRN terminal and the YEL/WHT (or BLU/BLK) teminal to the body ground with jumper wires.

The right mirror should tilt down (or swing left) when the ignition switch is turned ON.

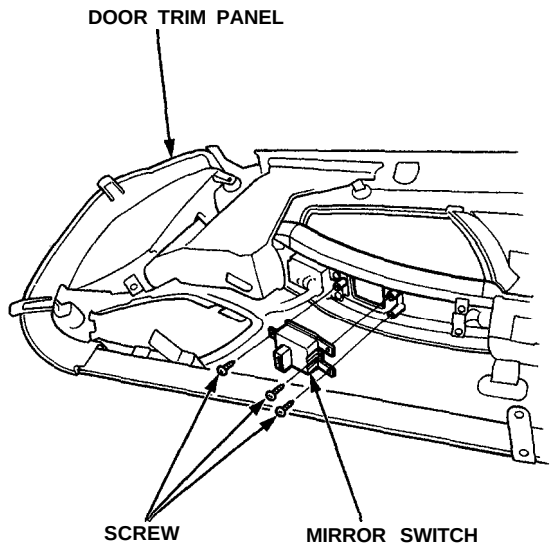
- If the mirror does not tilt down (or does not swing left), remove the right door trim panel and check for open **in the YEL/WHT or BLU/BLK) wire between the right door mirror and the switch.**
  If the wire is OK, check the right door mirror.

- If the mirror neither tilts down nor swings left, repair **the BLU/GRN wire.**

- **If the mirror operates properly, check the mirror switch.**

Switch Removal

1. Remove the left door trim panel, then disconnect all of the connectors from the door trim panel (see section 20).
2. Remove the 3 screws, then remove the mirror switch from the armrest.

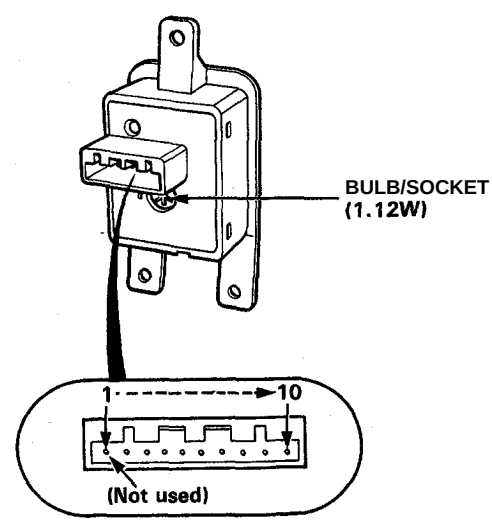


Switch Test

1. Remove the power door mirror switch from the armrest.
2. **Check for continuity between the terminal in each switch position according to the table.**

Mirror Switch

	Terminal / Position	3	4	5	6	7	9	10	2		8
R	OFF	C	-	-	O	-	-	O	———	O	
	UP			O	———			O			
	DOWN	O	———			O	———	O			
	LEFT			O	———	O	———	O			
	RIGHT	O	———				O				
L	OFF		O	———	O	———		O	O	———	O
	UP			O	———		O				
	DOWN		O	———		O	———	O			
	LEFT			O	———	O	———	O			
	RIGHT		O	———			O				



Power Door Mirrors

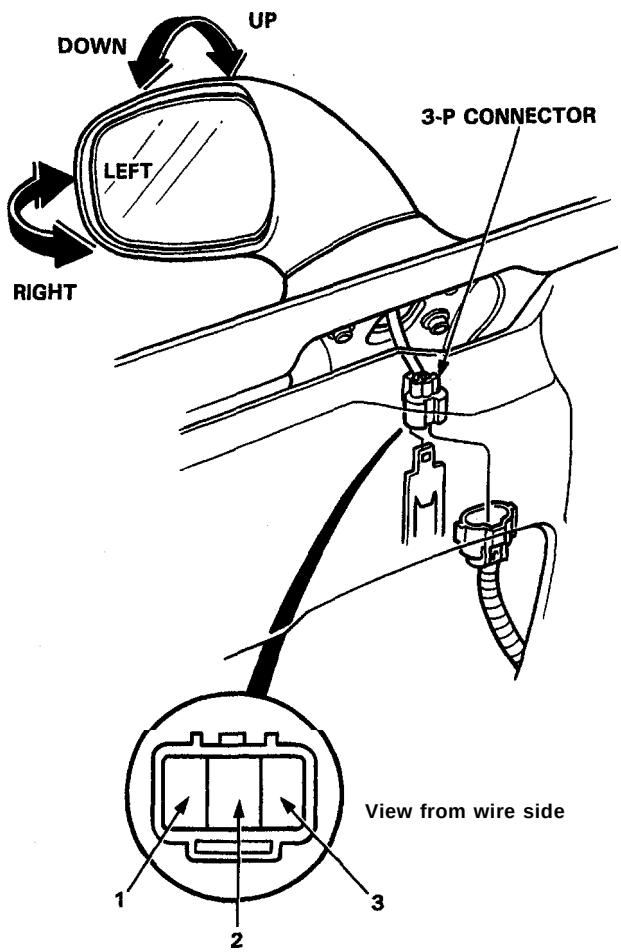
Door Mirror Test

1. Remove the door trim panel and carefully remove the plastic cover (see section 20).

2. Disconnect the power mirror 3-P connector.

3. Test actuator operation:
   - TILT UP: Connect battery positive to the No. 3 terminal and negative to the No. 2 terminal.
   - TILT DOWN: Connect battery positive to the No. 2 terminal and negative to the No. 3 terminal.
   - SWING LEFT: Connect battery positive to the No. 2 terminal and negative to the No. 1 terminal.
   - SWING RIGHT: Connect battery positive to the No. 1 terminal and negative to the No. 2 terminal.

4. If the mirror fails to operate properly, replace it.

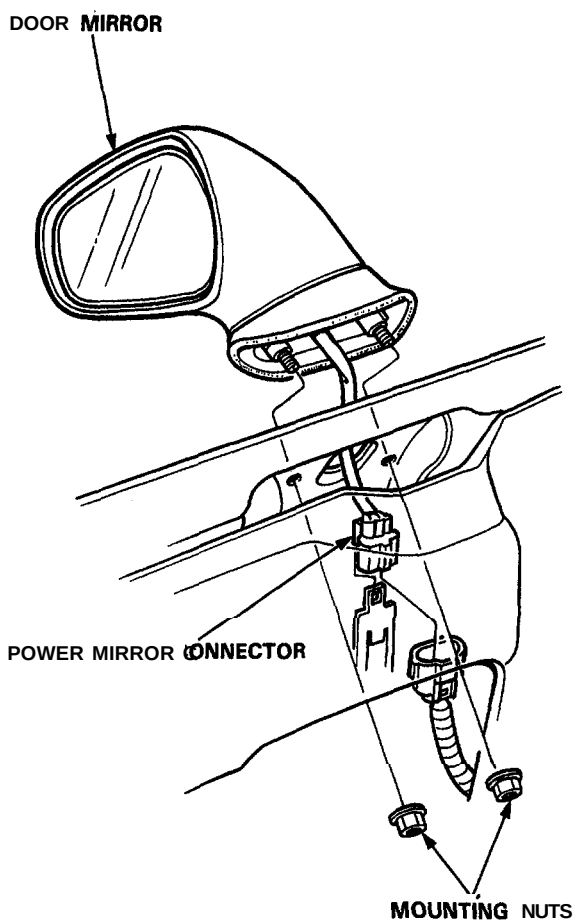


Door Mirror Replacement

1. Remove the door trim panel and carefully remove the plastic cover (see section 20).

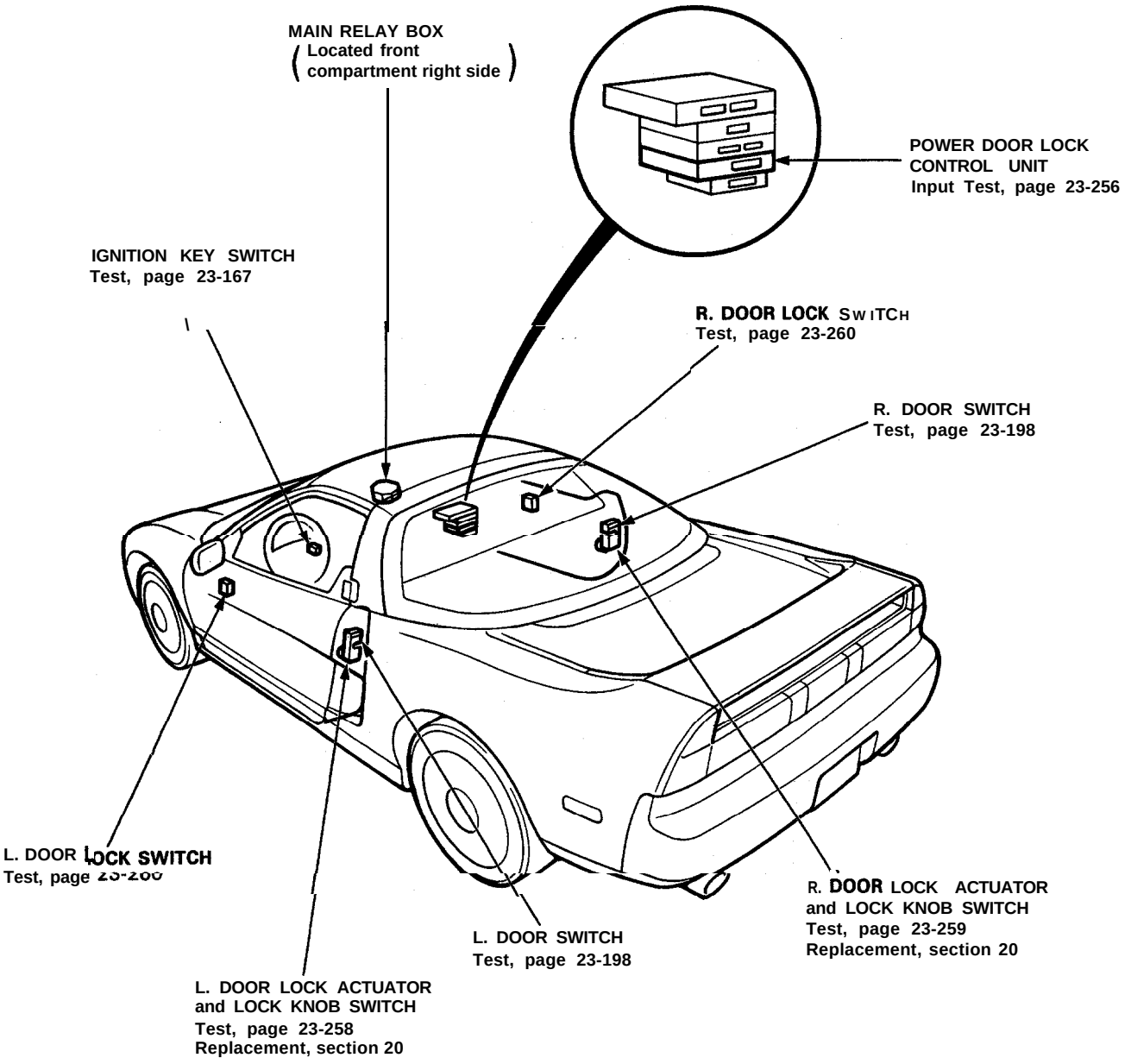
2. Disconnect the power mirror 3-P connector.

3. Remove the 2 mounting nuts while holding the mirror.



Power Door Locks

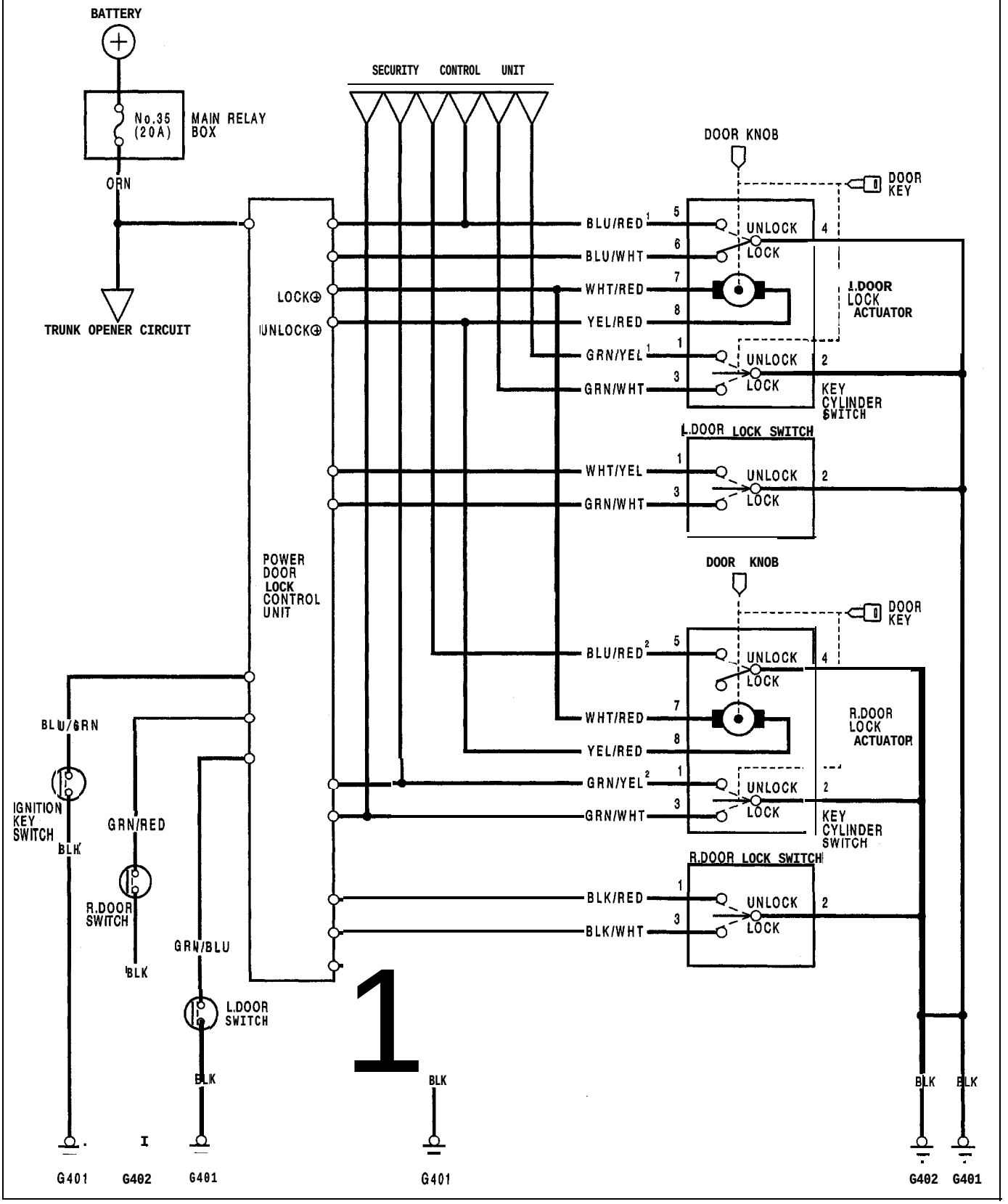
Component Location Index



Power Door Locks

· Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN/YEL[1] and GRN/YEL[2], BLU/RED[1] and BLU/RED[2] are not the same).



Troubleshooting

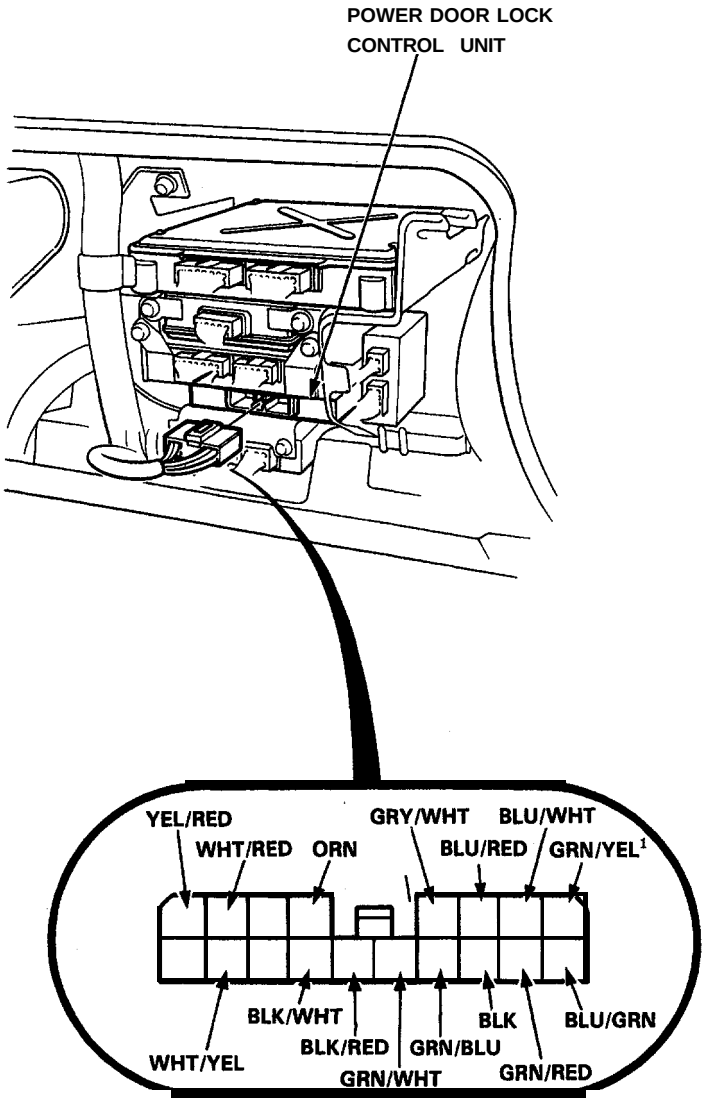
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom / Item to be inspected		Blown No. 35 (20A) fuse (in the main relay box)	Disconnected or obstructed door lock rod/linkage	L. Door lock knob switch (in the left door lock actuator)	Ignition key switch	L. Door switch	L. Door lock actuator	R. Door lock actuator	L. Door lock switch	R. Door lock switch	Control unit input	Poor ground	Open circuit in wires or loose or disconnected terminals
Power door lock system doesn't operate at all.		1									2	G401 G402	ORN
Doors don't lock or unlock with the left door lock switch.	Both doors								1		2	G401 G402	WHT/YEL or YEL/RED
	Either door		1				2				3		WHT/RED, or YEL/RED
Doors don't lock or unlock with the right door lock switch.	Both doors									1	2		BLK/RED or BLK/WHT
	Either door		1				2				3		WHT/RED or YEL/RED
Doors don't lock or unlock with the left door lock knob.	Both door			1							2	G401 G402	BLU/WHT or BLU/RED
	Either door		1				2				3		WHT/RED or YEL/RED
The door is not supposed to be locked, but it is locked. (When the ignition key is inserted and the door is opened.)					1	2					3	G401 G402	BLU/GRN or GRN/BLU

Control Unit Input Test

Remove the glove box, then disconnect the 18-P connector from the control unit.
Make the following input tests at the harness pins.

NOTE: • Recheck the connections between the 18-P connector and the control unit, then replace the control unit if all input tests prove OK.



View from wire side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, 402) • An open in the wire.
2	ORN	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 35 (20A) fuse. • An open in the wire.
3	GRN/WHT	Left door lock switch in LOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty left door lock switch. • Poor ground (G401, 402). • An open in the wire.
	WHT/YEL	Left door lock switch in UNLOCK.		
4	BLK/WHT	Right door lock switch in LOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty right door lock switch. • Poor ground (G401, 402). • An open in the wire.
	BLK/RED	Right door lock switch in UNLOCK.		
5	BLU/WHT	Left door lock knob in LOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty left door lock actuator. • Poor ground (G401, 402). • An open in the wire.
	BLU/RED[1]	Left door lock knob in UNLOCK.		
6	GRY/WHT	Right door lock key cylinder switch in LOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty right door lock actuator. • Poor ground (G402). • An open in the wire.
	GRN/YEL[2]	Right door lock key cylinder switch in UNLOCK.		
7	GRN/BLU	Left door opened.	Check for voltage to ground: should be 1 V or less.	• Faulty left or Right door switch. • An open in the wire.
	GRN/RED	Right door opened.		
8	BLU/GRN	Ignition key is inserted into the ignitin switch.	Check for voltage to ground: should be 1 V or less.	• Faulty ignition key switch. • Poor ground (G401, 402). • An open in the wire.
9	WHT/RED and YEL/RED	Connect the ORN terminal to the WHT/RED terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: Left (or right) door should lock as the battery is connected momentarily.	• Faulty actuator. • An open in the wire.
		Connect the ORN terminall to the YEL/RED terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: Left (or right) door should unlock as the battery is connected momentarily.	

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Power Door Locks

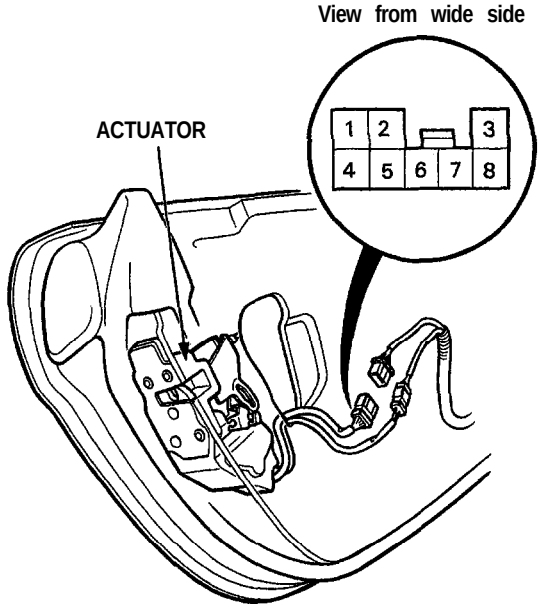
▪ Left Door Actuator Test

1. Remove the door trim panel.
2. Disconnect the 8-P connector of the actuator.
3. Test actuator operation:

   LOCK: With battery positive connected to the No. 7 terminal, connect negative to the No. 8 terminal momentarily.

   UNLOCK: With battery positive connected to the No. 8 terminal, connect negative to the No. 7 terminal momentarily.

   CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.



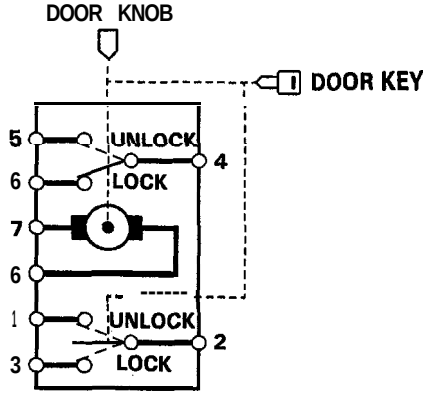
4. If the actuator fails to operate properly, replace it.
5. Check for continuity between the terminals in each switch position according to the table.

<KEY CYLINDER SWITCH>

Terminal / Position	1	2	3
UNLOCK	0	0	
NEUTRAL			
LOCK			0

<DOOR LOCK KNOB SWITCH>

Terminasl / Position	4	5	6
LOCK	0		0
UNLOCK			



· Right Door Actuator Test

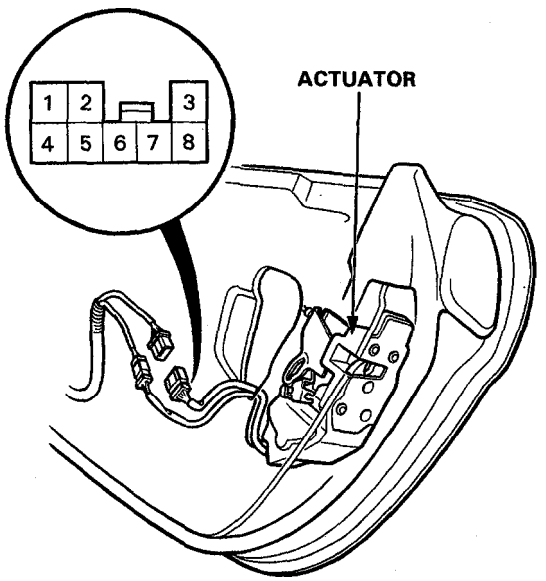
1. **Remove the door trim panel.**
2. Disconnect the 4-P connector of the actuator.
3. **Test actuator operation:**

   LOCK: With battery positive connected to the No. 7 terminal, connect negative to the No. 8 terminal momentarily.

   UNLOCK: With battery positive connected to the No. 8 terminal, connect negative to the No. 7 terminal momentarily.

   CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

View from wide side



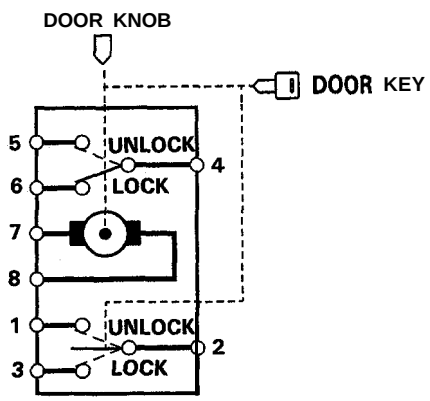
4. If the actuator fails to operate properly, replace it.
5. Check for continuity between the terminals in each switch position according to the table.

<KEY CYLINDER SWITCH>

Terminal / Position	1	2	3
UNLOCK	○	○	
NEUTRAL			
LOCK		○	○

<DOOR LOCK KNOB SWITCH>

Terminesl / Position	4	5
LOCK	○	
UNLOCK	○	○

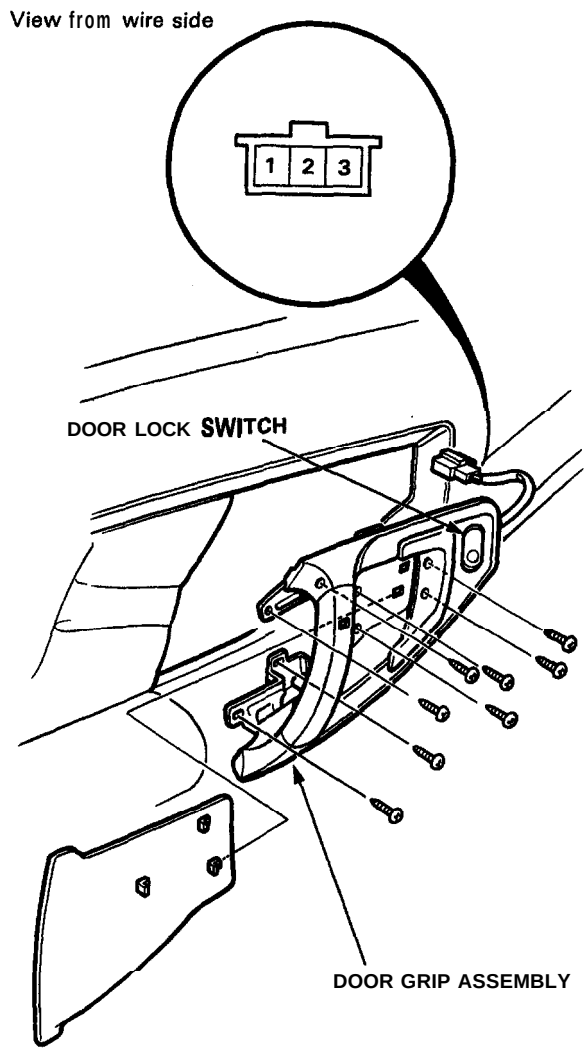


Power Door Locks

Door Lock Switch Test

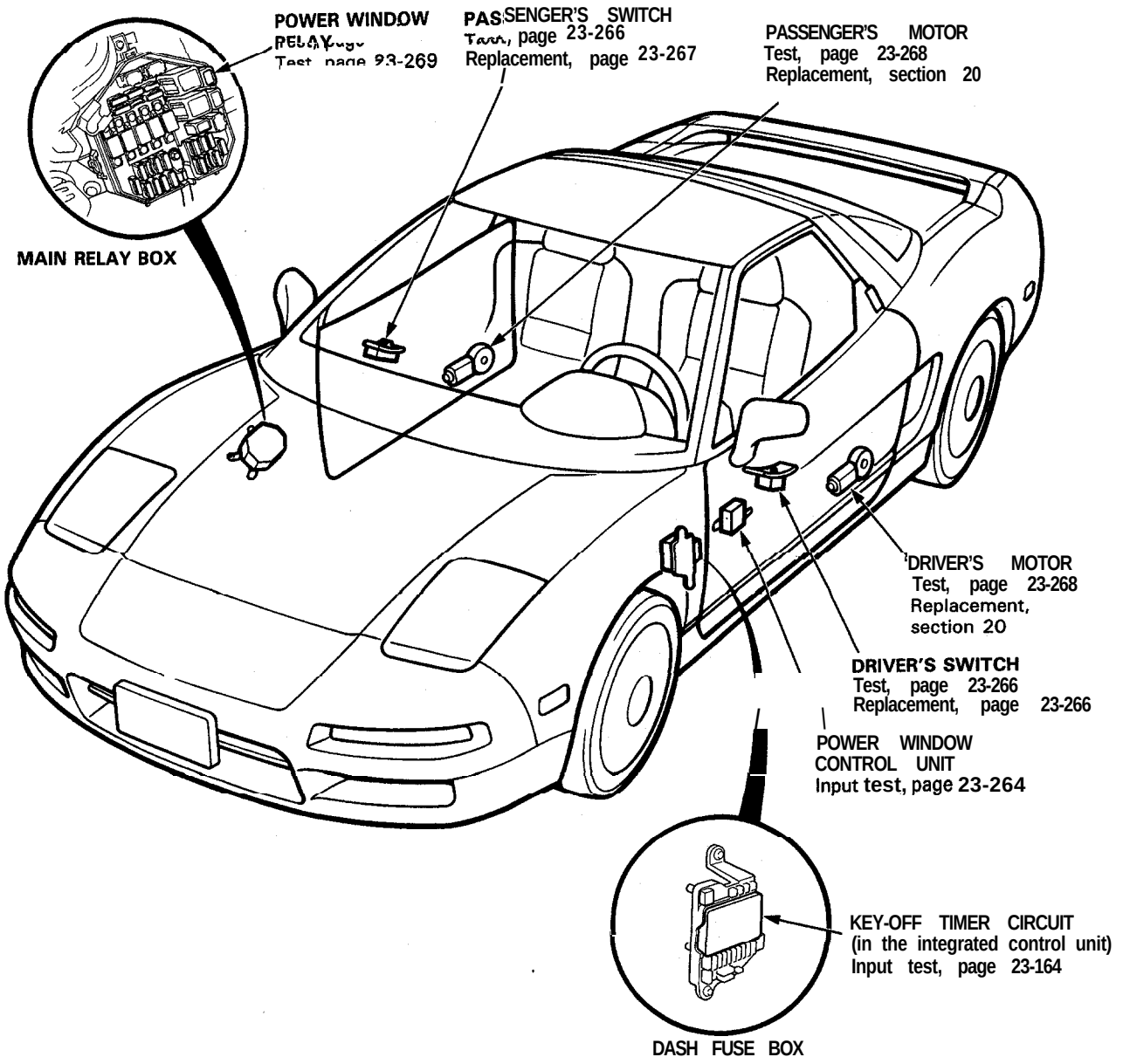
1. Remove the door grip assembly.
2. Disconnect the 3-P connector of the switch.
3. Check for continuity between the terminals in each switch position according to the tables.

Terminal / Position	1	2	3
UNLOCK		○—○	
OFF			
LOCK	○—○		



Power Windows

Conponent Location Index



Description

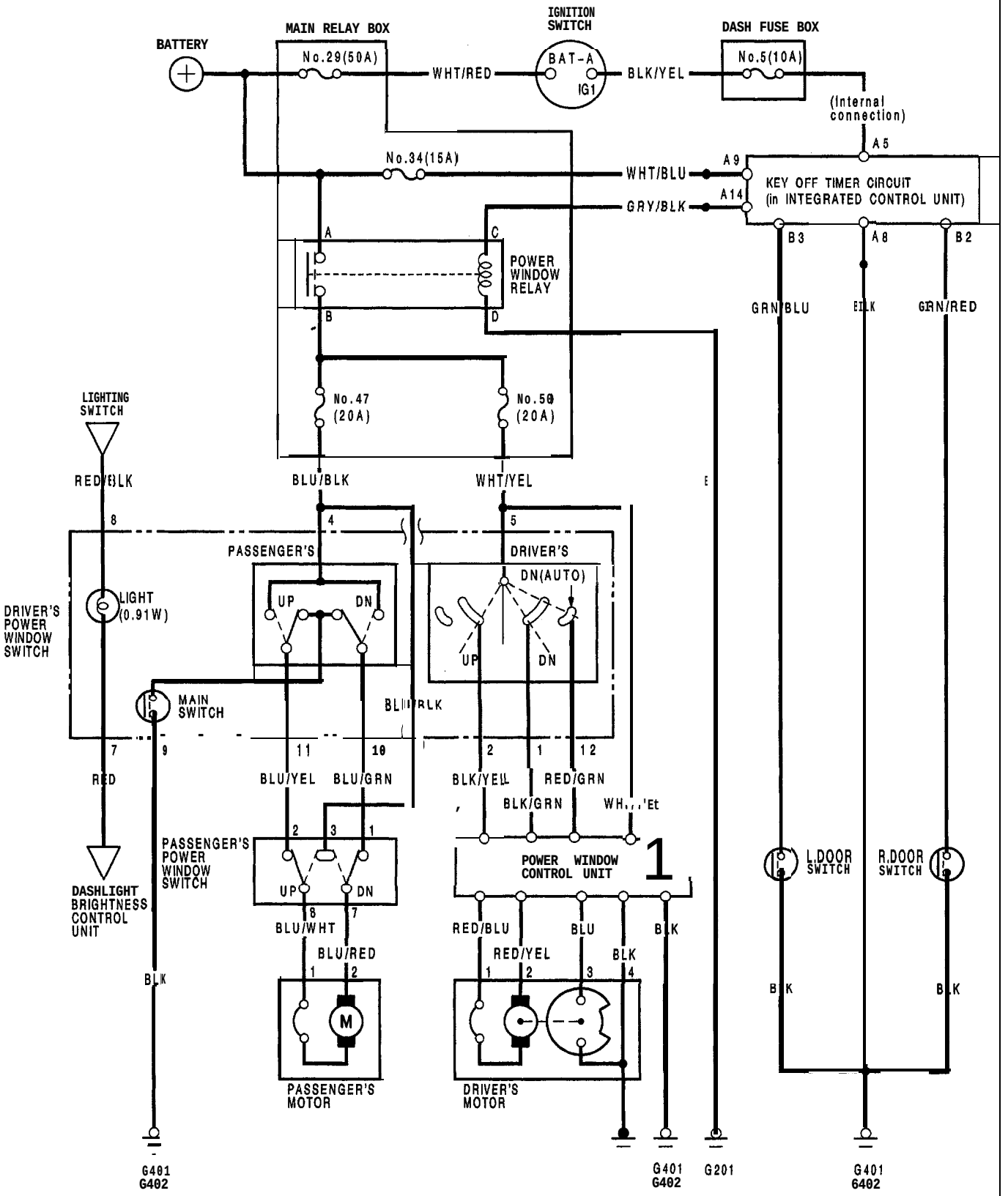
Power Window Key-off Timer Operation:

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 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

-Circuit Diagram

NOTE: "DN" in the switch circuit denotes DOWN.



NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown No. 5 (10A) fuse (in the dash fuse box)	Blown No. 34 (15A) fuse in the main relay box	Blown No. 47 (20A) fuse in the main relay box	Blown No. 50 (20A) fuse in the main relay box	Power window relay	Control unit input	Driver's switch	Passenger's switch	Driver's motor	Pulser (in driver's motor)	Passenger's motor	Window regulator	Key-off timer circuit (in the integrated control unit)	Poor ground	Open circuit in wires or loose or disconnected terminals
Both windows do not oprate.	1				2								3	G201	YEL
Driver's window does not operate in any position.				1		4	2		3			5		G401 G402	WHTNEL
Driver's window does not operate in AUTO.						3	1			2					RED/GRN or BLU
Passenger's window does not operate.			1				2	3			4	5		G401 G402	BLU/BLK, BLUNEL, BLUIGRN, BLU/RED, or BLU/WHT
Both windows do not operate within minutes after the ignition switch is OFF.	1	2				3							4	G401 G402	WHT/BLU or GRN/RED

Power Windows

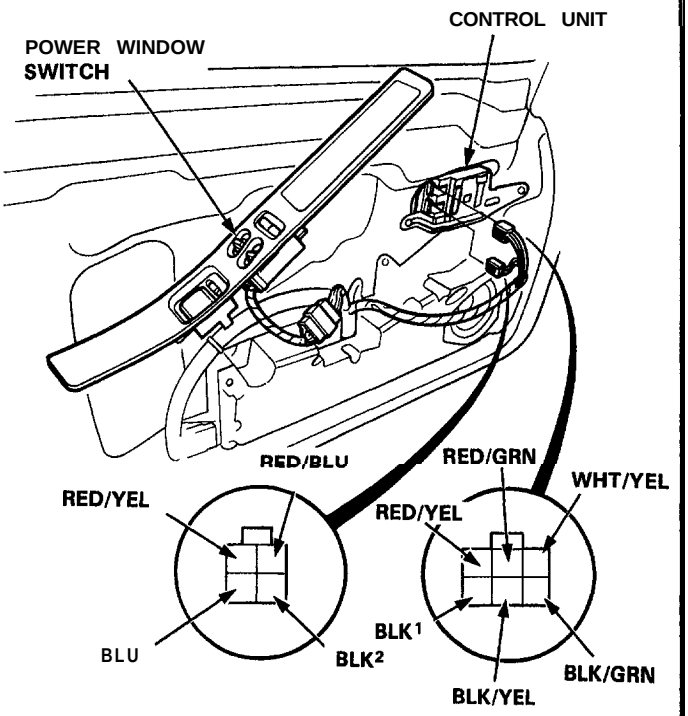
-Control Unit Input Test

NOTE: The control unit only controls the driver's door window.

Remove the driver's door trim panel and disconnect the 4-P and 6-P connectors from the control unit.
Make sure the following input tests at the harness pins.

NOTE:

- To test the unit, keep the driver's switch connector connected with the door wire harness.
- Recheck the connections between the 4-P and 6-P connectors, and the control unit, then replace the control unit if all input tests prove OK.

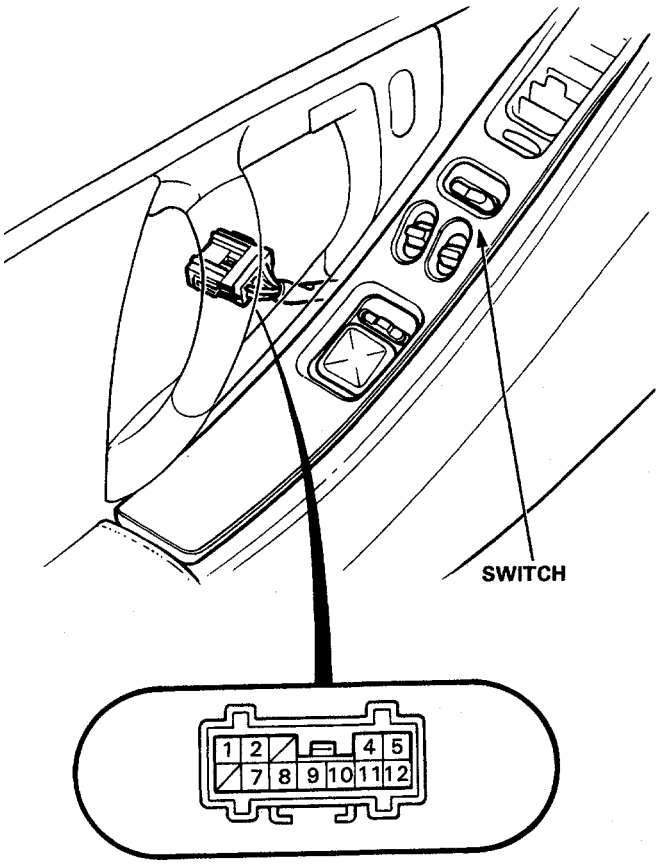


View from wire side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK'	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, 402). • An open in the wire.
2	WHTNEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 50 (20A) fuse. • Faulty power window relay. • Faulty key-off timer system. • Poor ground (G201). • An open in the wire.
3	BLKNEL	Ignition switch ON and driver's switch UP.	Check for voltage to ground: should be battery voltage as the switch is turned.	• Faulty driver's switch. • An open in the wire.
4	BLK/GRN	Ignition switch ON and driver's switch DOWN.		
5	RED/GRN	Ignition switch ON and driver's switch DOWN (AUTO).		
6	BLU and BLK2	Connect the WHTNEL terminal to the RED/BLU terminal, and the BLK terminal to the REDNEL terminal.	Check for resistance between the BLU and BLK terminals: should indicate between 20-50 ohms as the motor runs.	• Faulty pulser. • Faulty driver's motor. • An open in the wire.

· Driver's Switch Test

1. **Remove the door trim panel. (see section 20)**
2. Check for continuity between the terminals in each switch position according to the tables.



View from wire side

Driver's Switch

Position \ Terminal	2	5	1	12
UP	○—○			
OFF				
DOWN		○—○		
DOWN (AUTO)		○—○	○	○

Passenger's Switch

Position	Main Switch	4	11	9	10
UP	ON	○—○		○—○	
	OFF	○—○			
OFF	ON		○—○	○	○
	OFF		○—○	○	○
DOWN	ON	○	○—○	○	○
	OFF	○	○	○	○

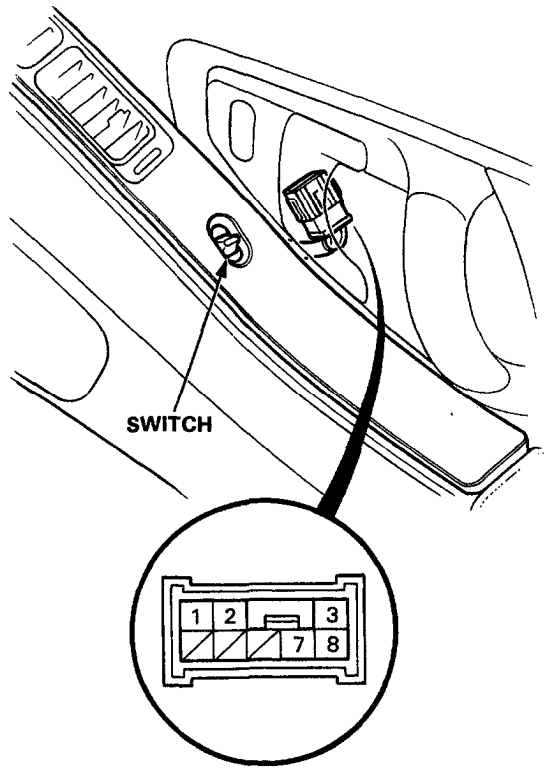
Switch Light

8		7
○	n	○

Power Windows

- Passenger's Switch Test

1. **Remove the door trim panel (see section 20).**
2. **Check for continuity between the terminals in each switch position according to** the table.

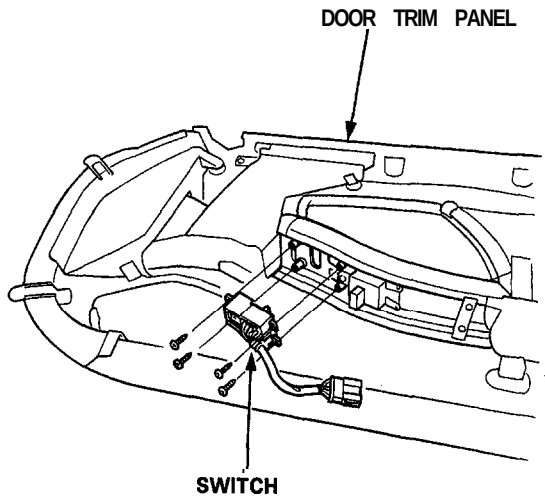


View from wire side

Terminal / Position	3	8	1	2	7
UP	○	○			
			○	○	○
OFF			○	○	○
		○	○	○	
DOWN	○				○
		○		○	

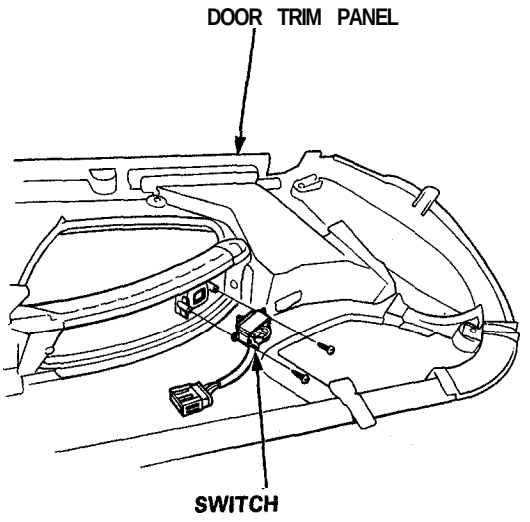
Driver's Switch Replacement

1. **Remove the door trim panel (see section 20).**
2. **Remove the 4 screws, then remove the power window switch from the door panel.**



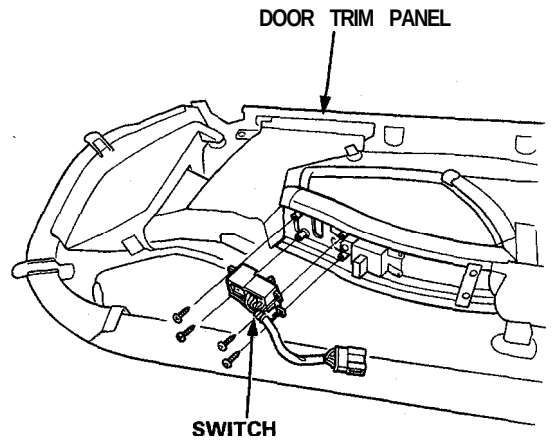
- Passenger's Switch Replacement -

1. Remove the door trim panel (see section 20).
2. Remove the 2 screws, then remove the power window switch from the door trim panel.

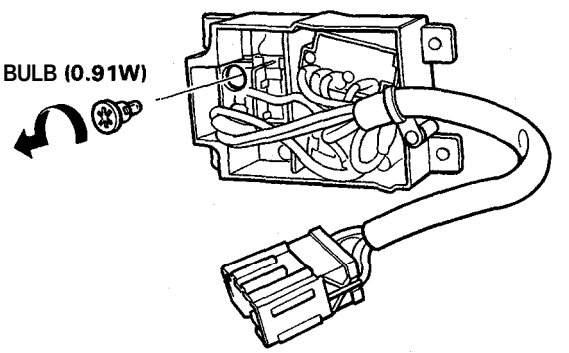


-Switch Light Bulb Replacement —

1. Remove the door trim panel (see section 20).
2. Remove the 4 screws, then remove the power window switch from the door trim panel.



3. Remove the power window switch bulb.

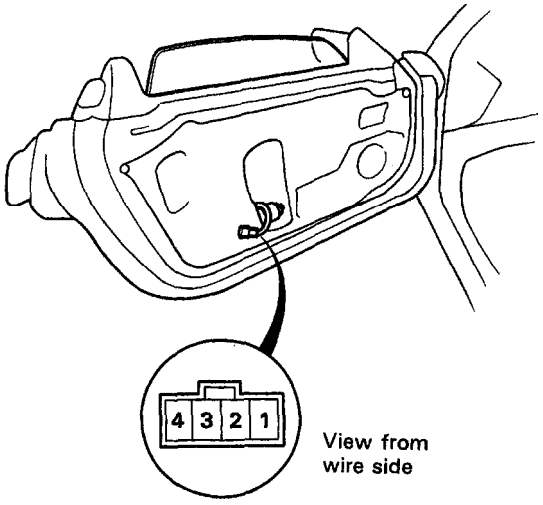


Driver's Motor Test

Motor Test:

1. **Remove the door trim panel (see section 20).**
2. **Disconnect the 4-P connector from the driver's motor.**
3. Test motor operation by connecting battery voltage **to the No. 1 and No. 2 terminals.**
   Test the motor in each direction, by switching the leads from the battery.

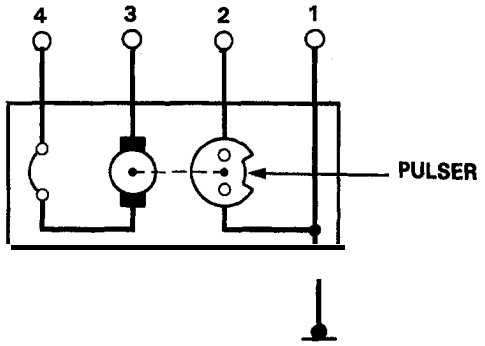
   CAUTION: When a motor stops running, disconnected battery terminal immediately.
4. **If the motor does not run, replace it.**



Pulser Test:

Using an analog ohmmeter, running the motor by connecting battery voltage to the No. 1 and No. 2 terminals, check for needle movement when connecting the test leads to the No. 3 and No. 4 terminals.

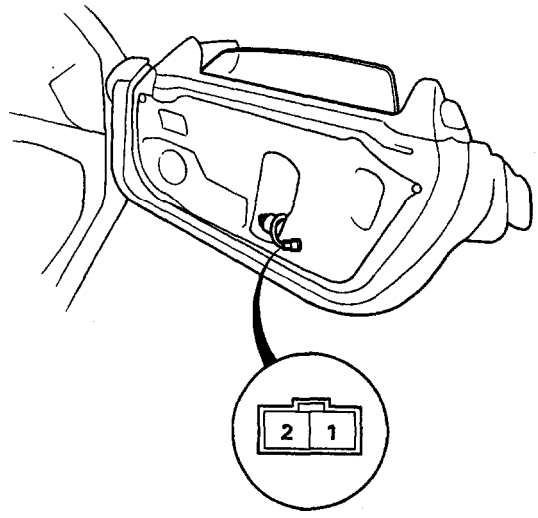
The analog ohmmeter needle should move back and forth alternately.



Passenger's Motor Test

1. **Remove the door trim panel (see section 20).**
2. **Disconnect the 2-P connector from the motor.**
3. Test motor operation by connecting battery voltalge **to the No. 1 and No. 2 terminals.**
   Test the motor in each direction, by switching the leads from the battery.

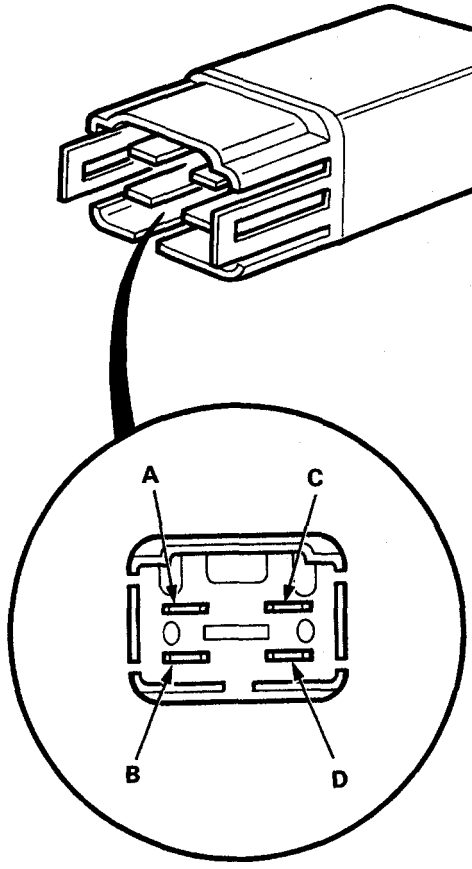
   CAUTION: When a motor stops running, disconnected battery terminal immediately.
4. **If the motor does not run, replace it.**

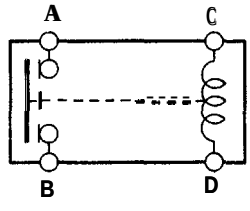


View from wire side

– Relay Test

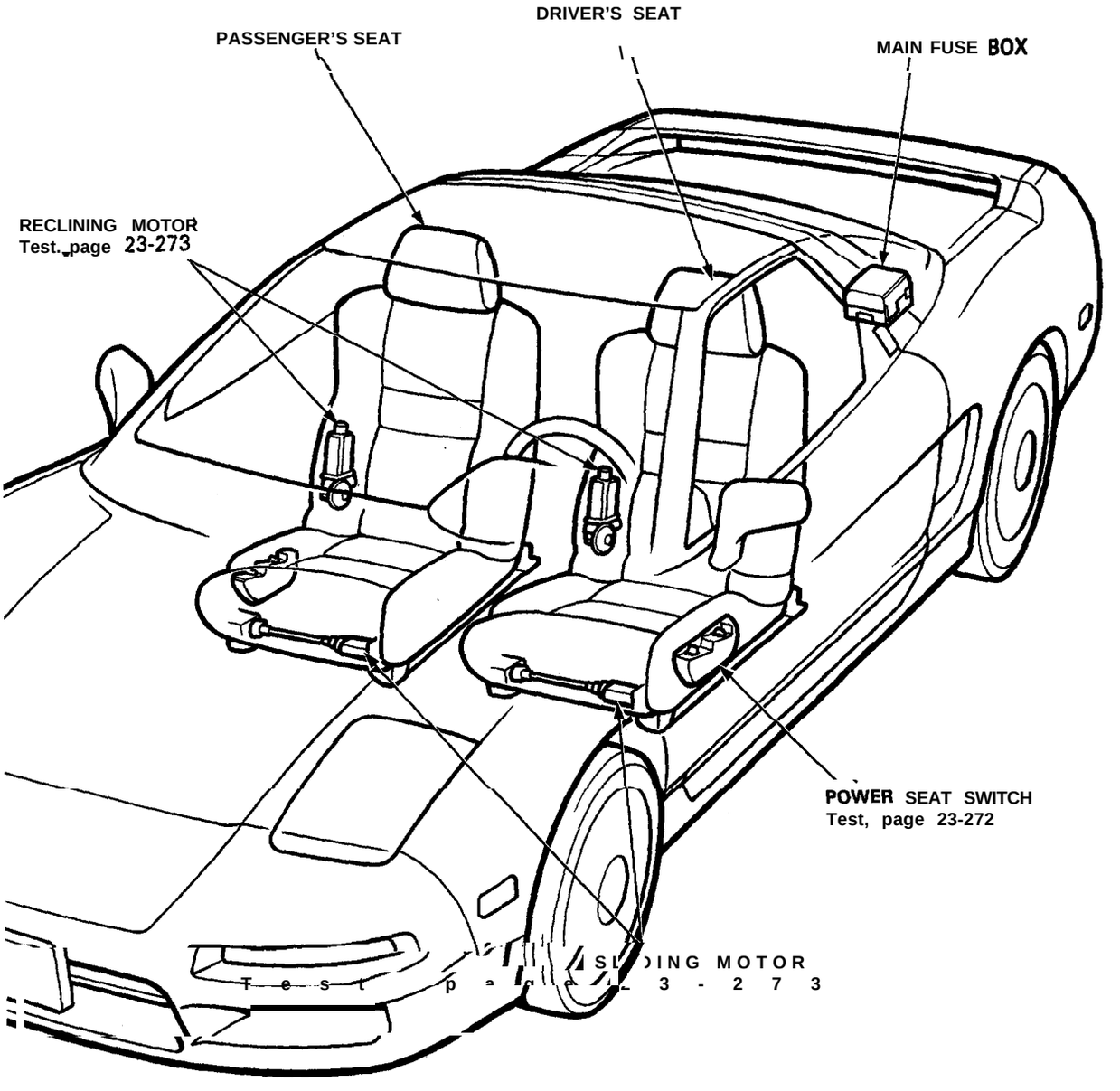
1. Remove the power window relay in the main relay box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



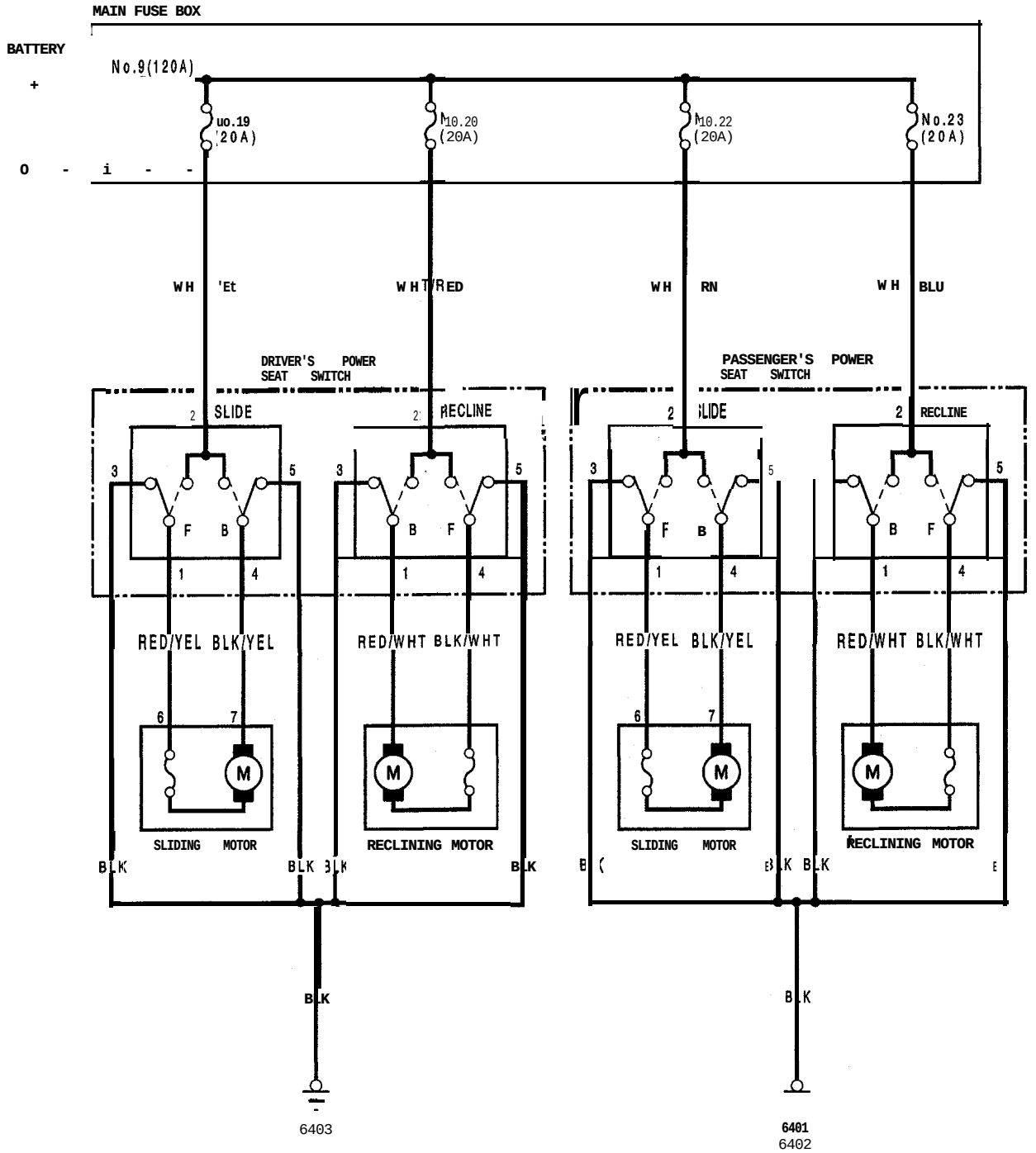


Power Seats

Component Location Index



-Circuit Diagram



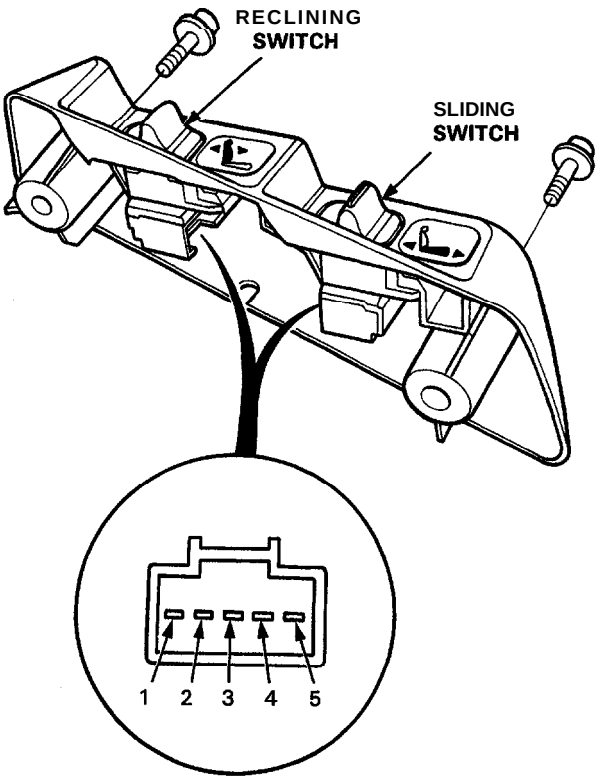
F: FORWARD
B: BACKWARD

-Seat Switch Test

CAUTION: Be careful not to damage the seats, the interior trim or the body.

1. Remove the 2 screws, then remove the power seat switch from the power seat.
2. Disconnect the 5-P connectors from the power seat each switch.
3. Check for continuity between the terminals in each switch position according to the table.

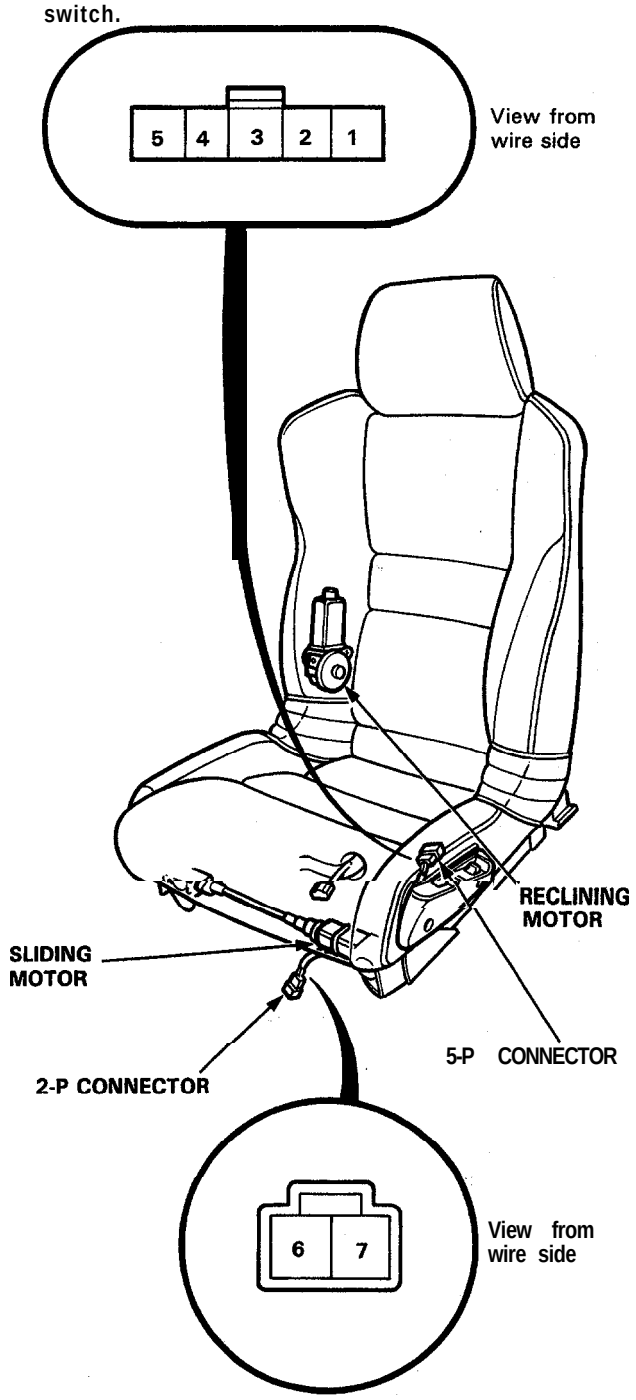
Position \ Terminal		3	5	4	2	1
SLIDE	FORWARD		○—○		○—○	
	NEUTRAL	○—○			○—○	
	BACKWARD	○—○		○—○		
RECLINE	FORWARD	○—○		○—○		
	NEUTRAL	○—○			○—○	
	BACKWARD		○—○		○—○	



-Motor Test

CAUTION: Be careful not to damage the seats, the interior trim or the body.

1. **Remove the power seat, then disconnect the 2-P** connector from the sliding motor.
2. Remove the 2 screws then remove the power seat **switch from the power seat.**
3. **Disconnect the 5-P connector from the reclining** switch.



4. Test motor operation.

CAUTION: When the motor stops running, disconnect a battery terminal immediately.

FORWARD SLIDING: Connect battery positive to the No. **6 terminal and negative to the No.** 7 terminal.

BACKWARD SLIDING: Connect battery positive to the No. **7 terminal and negative to the No.** 6 terminal.

FORWARD RECLINE: Connect battery positive to the No. **4 terminal and negative to the No.** 1 terminal.

BACKWARD RECLINE: Connect battery positive to the No. **1 terminal and negative to the No.** 4 terminal.

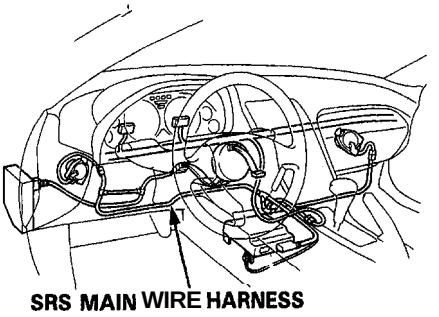
NOTE: When a motor does not run, reverse the battery terminal connection. If the motor still does not **run, the motor or the wire harness is defective.**

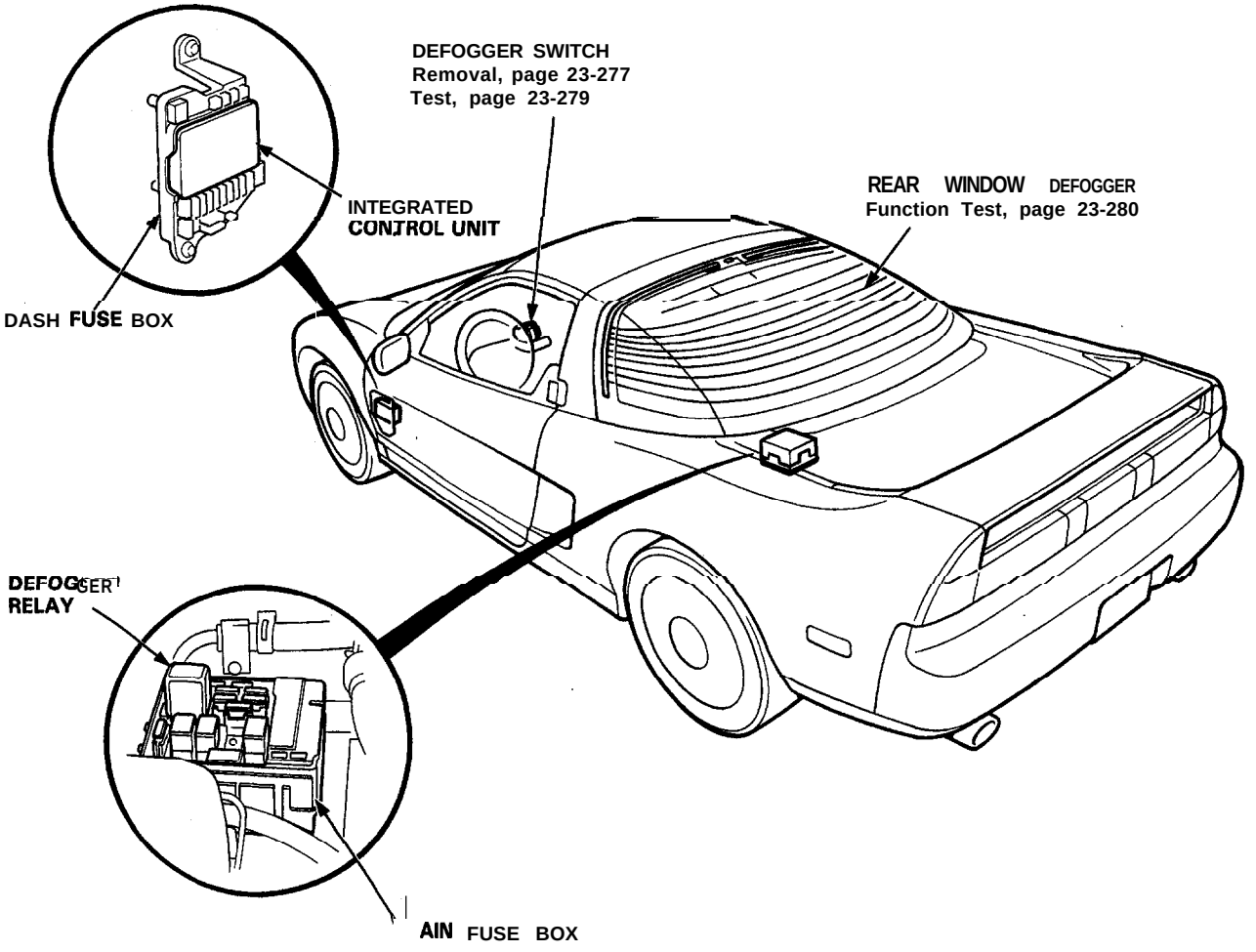
Rear Window Defogger

-Component Location Index

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the rear window defogger system.





-Description

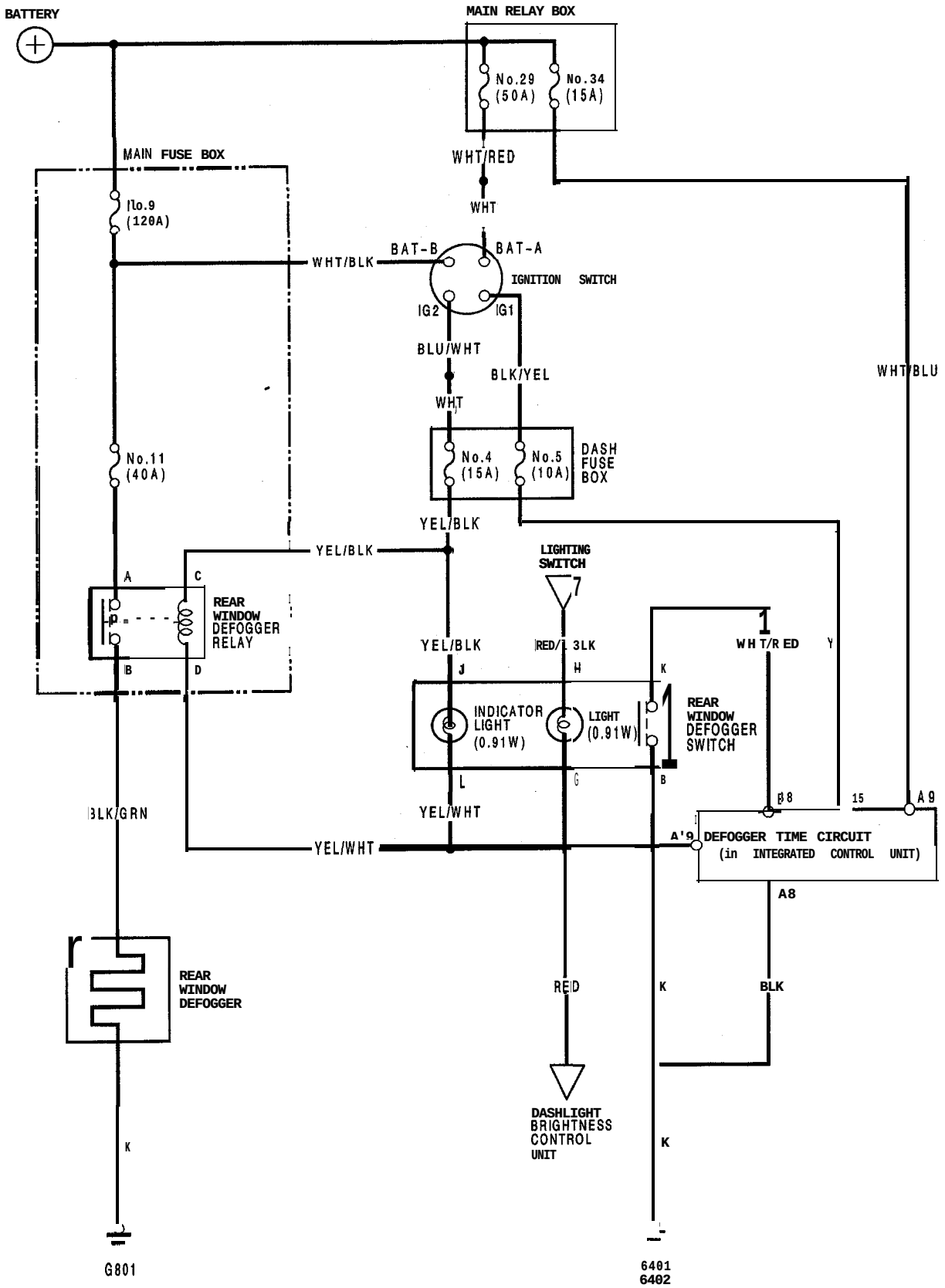
Function:

The rear window defogger is controlled by the integrated control unit.

When the defogger switch in the combination switch is pushed, it sends a signai to the defogger timer in the integrated control unit and the defogger stays on for 25 minutes or unitl the ignition switch is switched off.

The indicator light in the switch shows when the defogger is on.

-Circuit Diagram



Rear Window Defogger

-Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

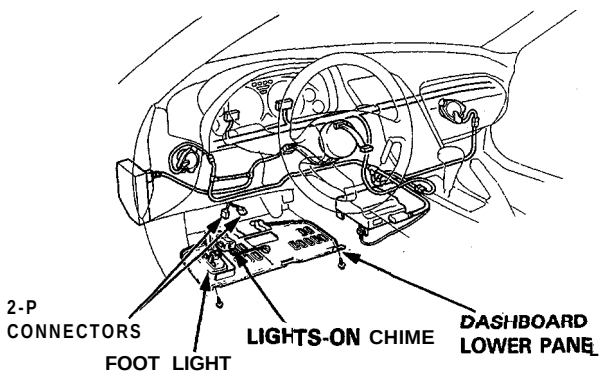
Symptom \ item to be inspected	Blown indicator light bulb	Blown No 4 (15A) fuse (in the dash fuse box)	Defogger timer circuit input (in the integrated control unit)	Blown No. 5 (10A) fuse (in the dash fuse box)	Blown No. 11 (40A) fuse (in the main fuse box)	Function test	Defogger relay	Broken defogger wire	Poor ground	Open circuit in wires, loose or disconnected terminal
Defogger operates, but indicator light does not go on.	1									YEL/BLK or YEL/WHT
Defogger does not operate and indicator light does not go on.		1	3	2					3401	YEL or YELIWHT
Defogger does not operate, but indicator light goes on.					1	2	3	4	3801	YEL/WHT, YEL/BLK, BLK/GRN
Operate time is too long or too short (Normal operation time is 25 minutes).			1							WHT/RED or BLK

Switch Removal

WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

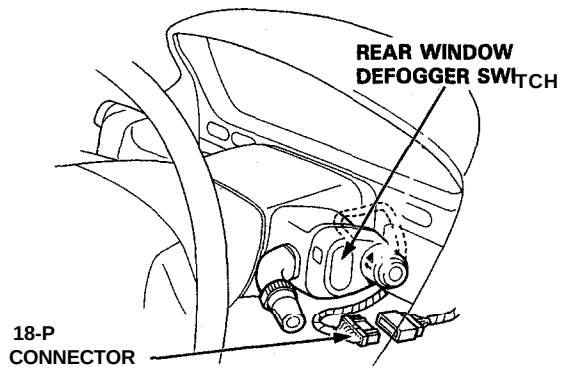
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the rear window defogger system.

1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.

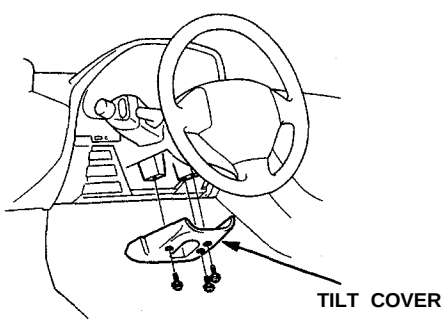


2. Disconnect the 18-P connector from the floor wire harness.

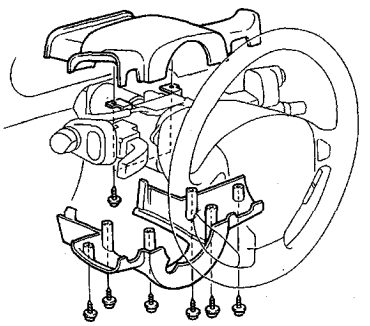
CAUTION: Be careful not to damage SRS wire.



3. Remove the tilt cover.

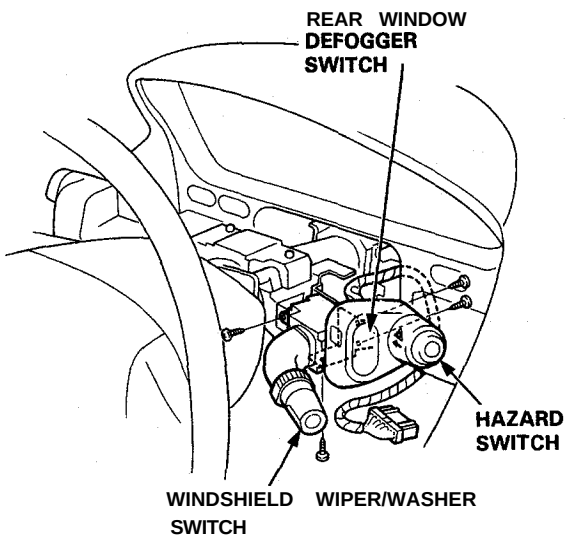


4. Remove the steering column lower cover and upper cover.



NOTE: Be careful not to damage steering column covers.

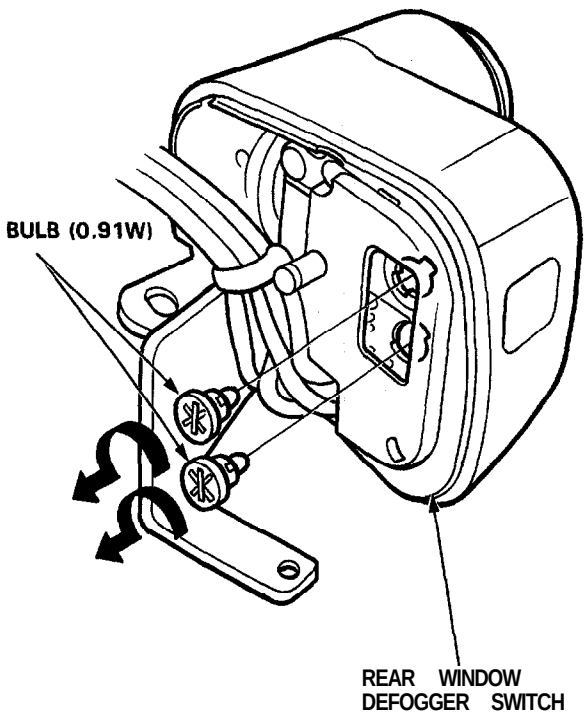
5. Remove the 4 screws, then remove the rear window defogger switch and wiper/washer switch assembly.



Rear Window Defogger

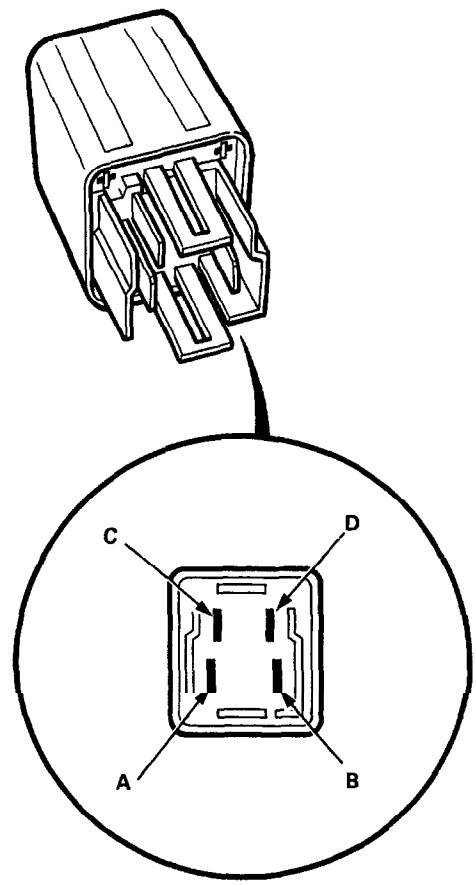
-Switch Light Bulb Replacement

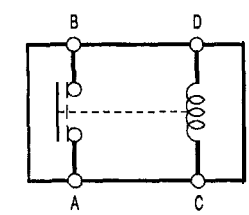
1. Remove the steering column lower and upper cover.
2. Remove the 3 screws from the combination switch.
3. Remove the rear window defogger switch.
4. Remove the rear window defogger switch bulb.



-Relay Test

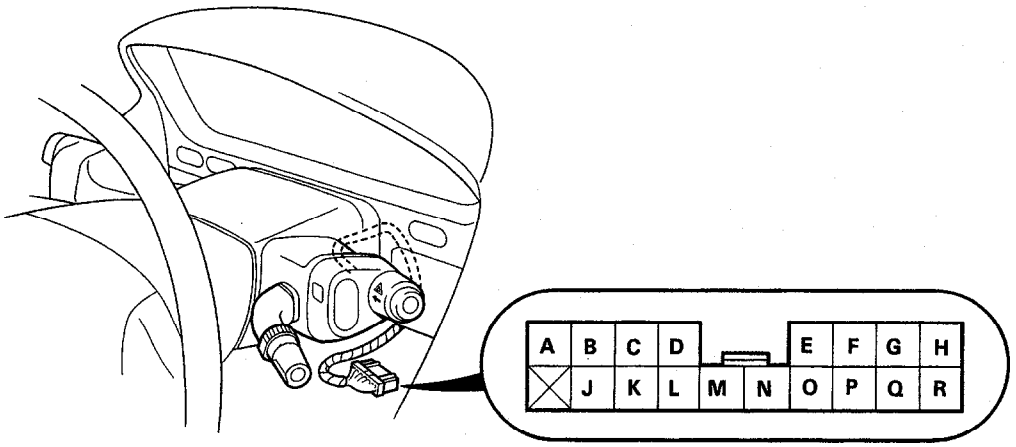
1. Remove the defogger relay in the main fuse box.
2. There should be continuity between the C and D terminals.
3. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.





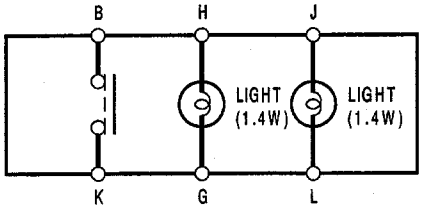
-Switch Test

1. Remove the dashboard lower panel.
2. If necessaly, remove the knee bolster.
3. Disconnect the 18-P connector from the floor wire harness.
4. Check for continuity between the terminals in each switch position according to the table.



View from wire side

Terminal / Position	B	K	H		G	J		L
PUSHED								
RELEASED								

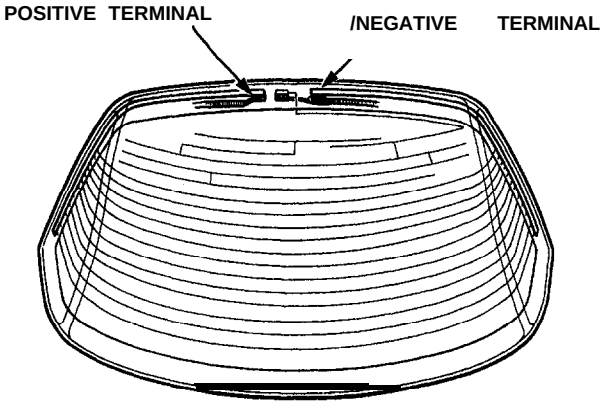


Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe end.

1. Check for voltage between the positive terminal and body ground with the ignition switch and the 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 no continuity, check for open in the defogger ground wire.

3. Connect the voltmeter positive probe to the middle of each defogger wire, and the negative probe to the negative terminal.
   The should be approximately 6 V with the ignition switch and the defogger switch ON.

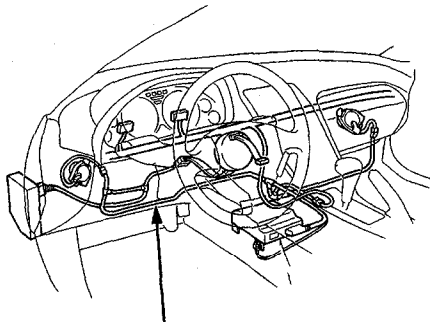
   - If the voltage is as specified, the defogger wire is OK.
   - If there is battery voltage, the defogger wire is broken in the negative side.
   - If there is no voltage the defogger wire is broken in the positive side.

Wipers/Washers

-Component Location Index

⚠ WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

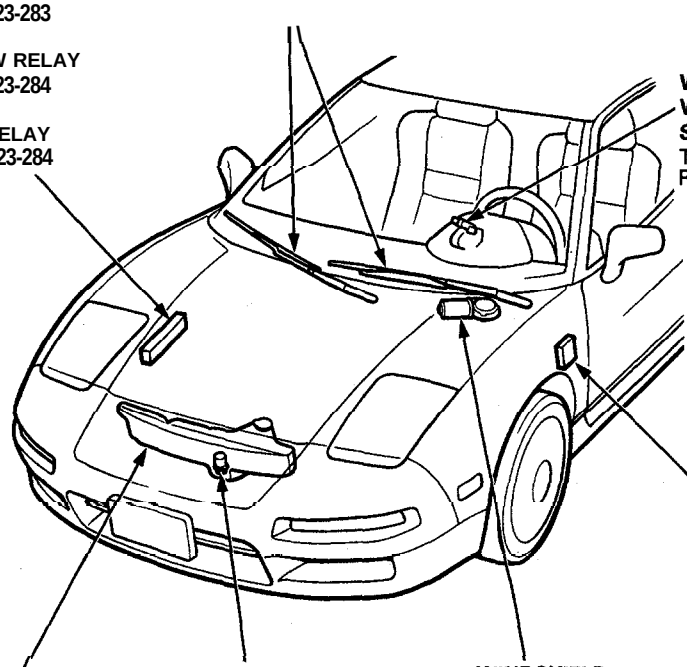
CAUTION: Be careful not to damage the SRS wire harnesses when servicing the wiper/washer system.



SRS MAIN WIRE HARNESS

SUB RELAY BOX B
- WIPER INTERMITTENT RELAY
  Test, page 23-283
- WIPER LOW RELAY
  Test, page 23-284
- WASHER RELAY
  Test, page 23-284

WINDSHIELD WIPER ARMS/BLADES
Replacement, page 23-285



WINDSHIELD WIPER/WASHER SWITCH
Test, page 23-288
Replacement 23-286

INTEGRATED CONTROL UNIT
Test, page 23-165

WASHER FLUID RESERVOIR
Replacement, page 23-289

WINDSHIELD WASHER MOTOR
Test, page 23-289

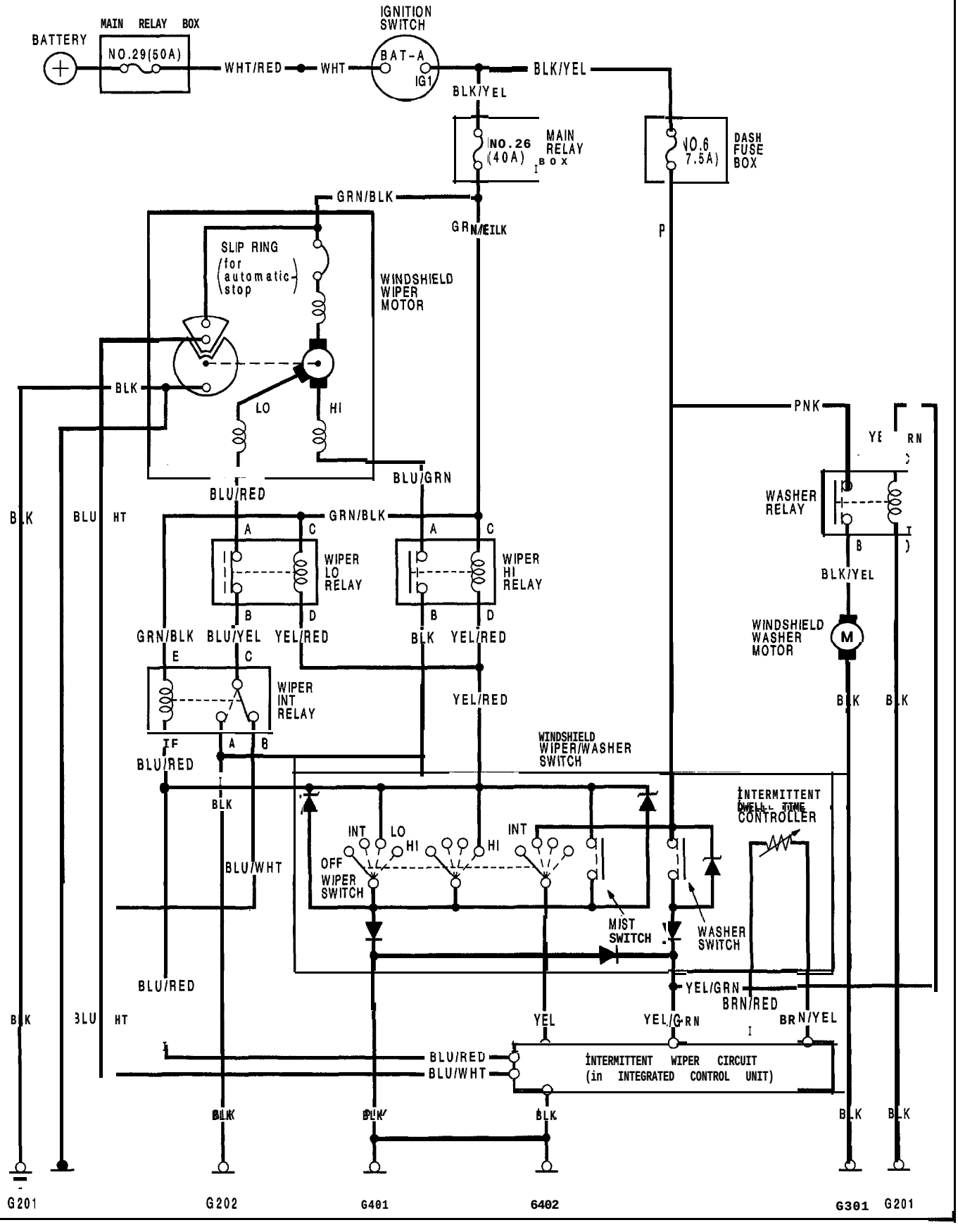
WINDSHIELD WIPER MOTOR
Test, page 23-285
Replacement, page 23-286

-Description

The system is equipped with an intermittent relay, a low relay and a high relay.
The wiper operation of INT and LO position is controlled by the intermittent wiper circuit (incorporated in the integrated control unit).

Wipers/Washers

-Circuit Diagram



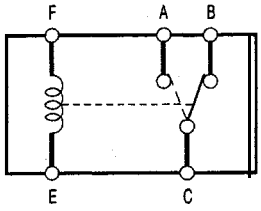
-Troubleshooting

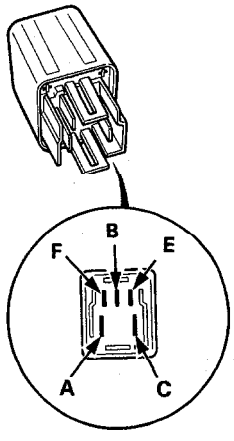
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 26 (40A) fuse (in the main relay box)	Blown No. 6 (7.5A) fuse (in the dash fuse box)	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	Intermittent wiper relay	Wiper low relay	Wiper high relay	Washer relay	Intermittent wiper circuit (in the integrated control unit)	Combined operation with wiper/washer (in the integrated control unit)	Insufficient washer fluid in reservoir	Disconnected blocked washer hose or clogged outlet	Disconnected wiper linkages	Intermittent dwell time controller	Poor ground	Open circuit in wires or loose or disconnected terminals
Wipers do not operate.	In all position s	1		4		2											3		G201	GRN/BLK
	In INT			1		4			2	3			5						G202	BLU/WHT
	In LO			1		4			2	3			5						G202	BLU/RED
	In HI			1		3					2								G401	BLU/GRN
	In MIST				1						2								G401	YEL/RED
Blades do not return to park position when wipers are turned OFF.				2		1			3	4										BLU/WHT
Erratic intermittent cycle or wipers do not operate intermittently.									1				3					2		BLU/RED, BRN/RED or BRNNEL
Little or no washer fluid is pumped.			2				6	4				5			1	3			G201 G301	PINK or YEL/GRN
Wipers do not operate simultaneously with washer.														1						BLU/RED

- Intermittent Relay Test

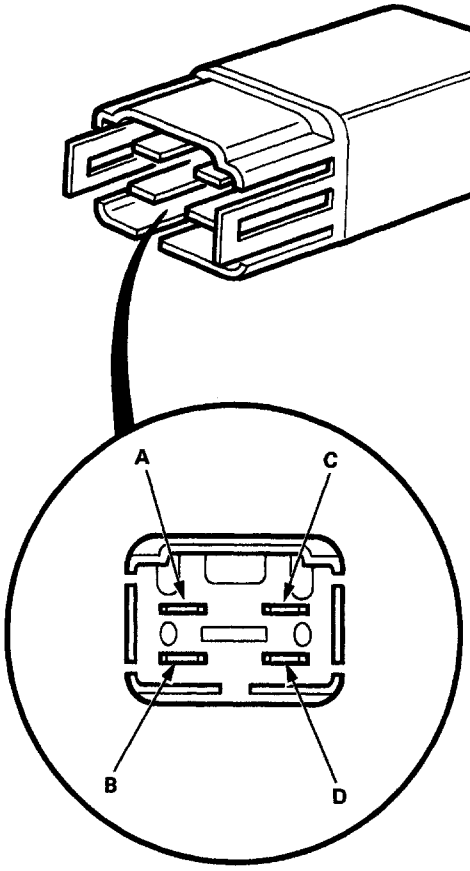
1. Remove the wiper intermittent relay from sub relay box B.
2. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   The should be continuity between the B and C terminals when the battery is disconnected.

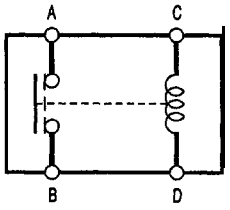




-High Relay/Washer Relay Test

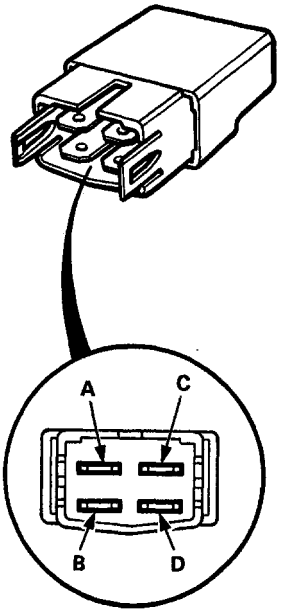
1. Remove the wiper high relay or the washer relay from sub relay box B.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

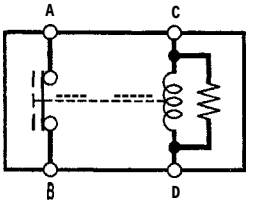




-Low Relay Test

1. **Remove the wiper low relay from sub relay box B.**
2. **There should be no continuity between the A and B terminals when the battery is connected to the C and D terminals.**
   There should be continuity when the battery is disconnected.

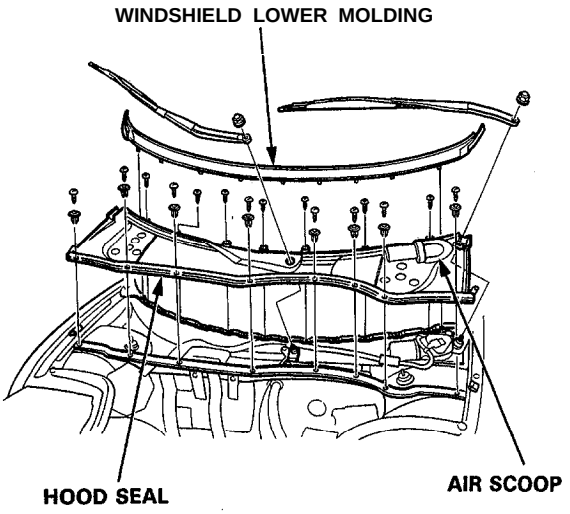




-Windshield Wiper Motor Test

1. Open the hood and remove the cap nuts and the wiper arms.
   NOTE: Carefully remove the wiper arms so that they do not touch the hood.

2. Remove the windshield lower molding, hood seal and air scoop by prying off the trim clips and removing the screws.

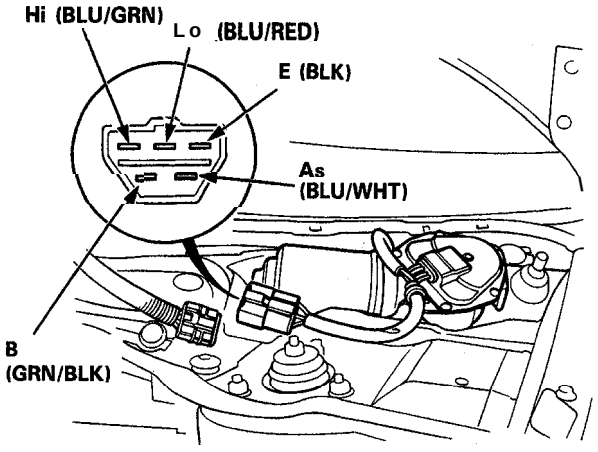


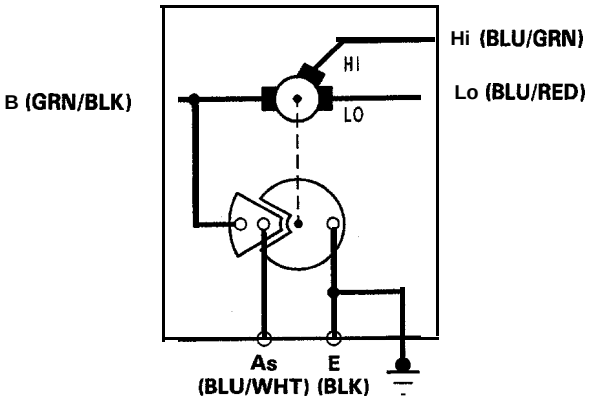
3. Disconnect the 5-P connector from the wiper motor assembly.

4. Test motor operation:

   LOW SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Lo (BLU/RED) terminal.
   HIGH SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Hi (BLU/GRN) terminal.

5. If the motor fails to run smoothly, replace it.





6. Reconnect the 5-P connector to the wiper motor assembly.

7. Connect an analog voltmeter, between the As (BLU/WHT) and the E (BLK) terminals. Run the motor by turning the wiper switch is turned ON (Lo or Hi position).

   Voltmeter should indicate 0 V-more than 4 V alternately.

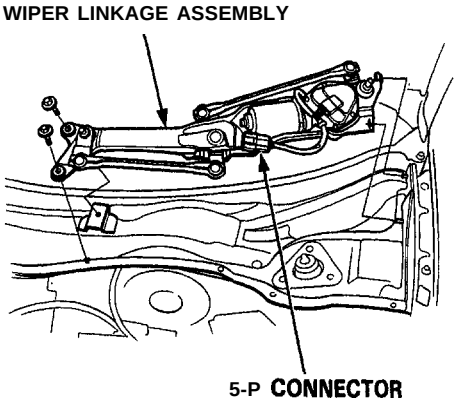
-Windshield Wiper Motor Replacement

1. Open the hood and remove the cap nuts and the wiper arms.

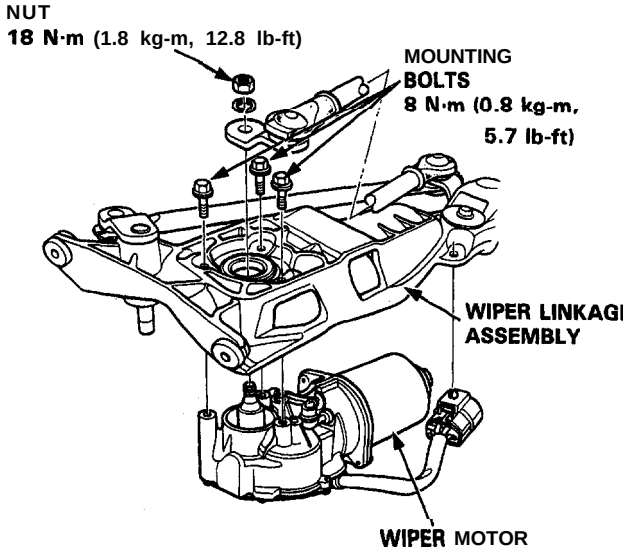
   NOTE: Carefully remove the wiper arms so that they do not touch the hood.

2. Remove the windshield lower molding, hood seal and air scoop by prying off the trim clips and removing the screws. (see page 23-285).

3. Disconnect the 5-P connector from the wiper motor assembly, then remove the 2 mounting bolts and the wiper linkage assembly.



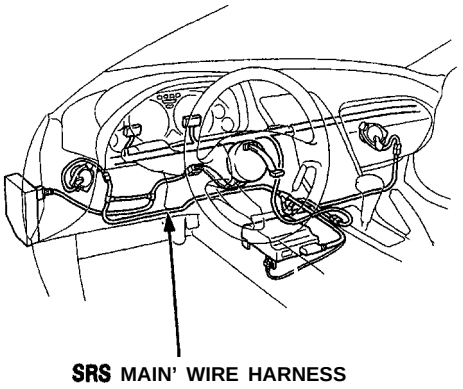
4. Remove the 3 mounting bolts and 1 nut from the wiper linkage assembly to remove the wiper motor assembly.



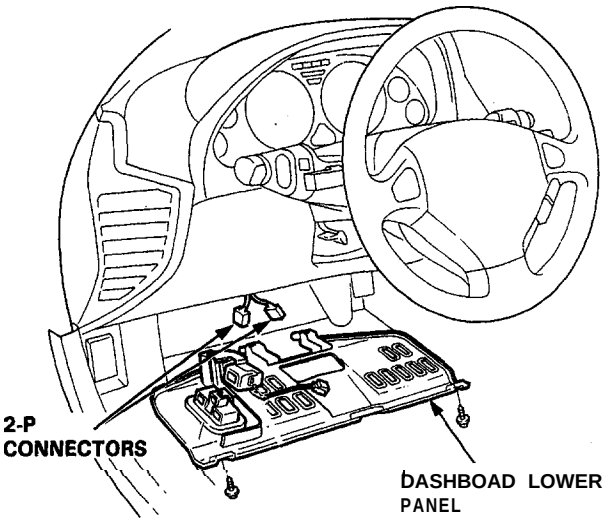
5. Install the wiper motor assembly in the reverse order of removal.

-Wiper/Washer Switch Replacement -

CAUTION:
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

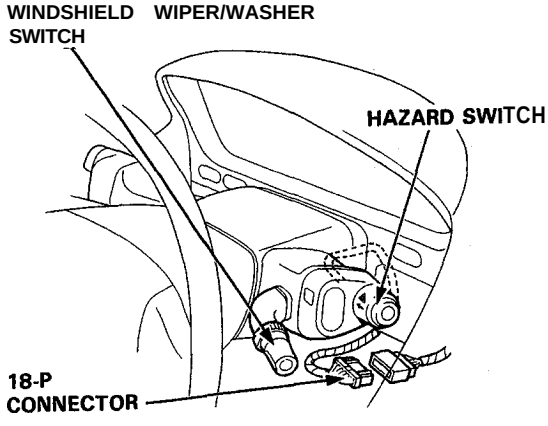


1. Remove the dashboad lower panel and disconnect the 2-P connectors from the floor wire harness.

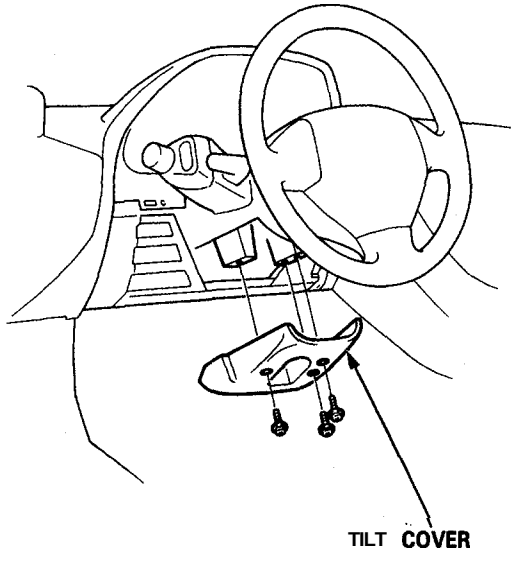


2. Disconnect the 18-P connector from the floor wire harness.

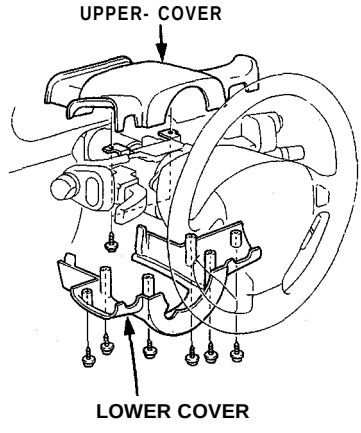
CAUTION: Be careful not to damage the SRS wires.



3. Remove the tilt cover.

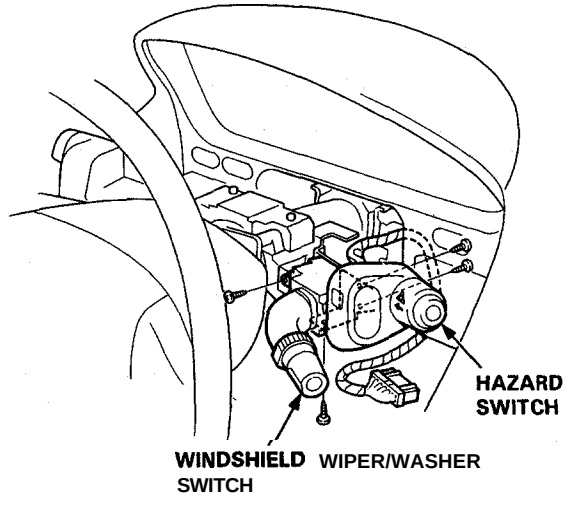


4. Remove the steering column lower cover and upper cover.



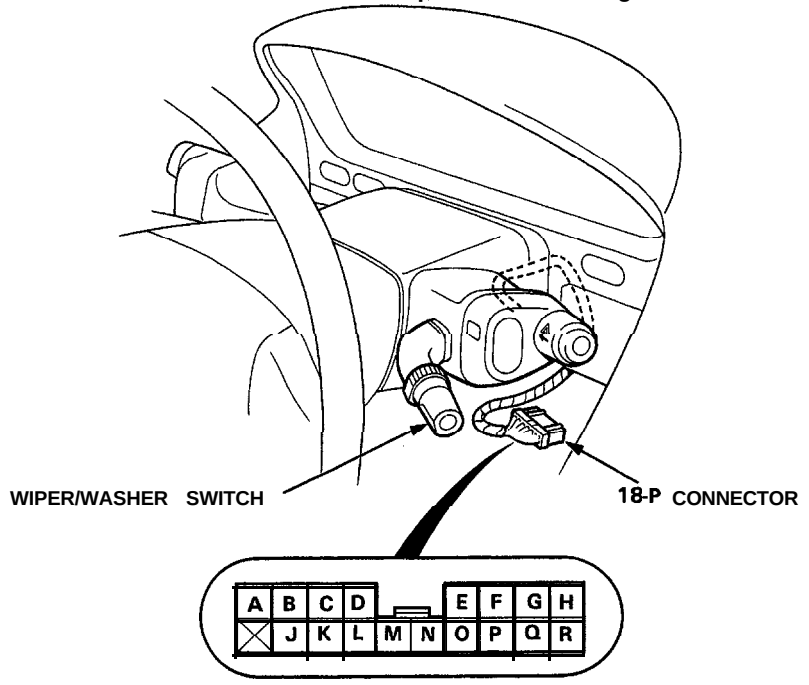
NOTE: Be careful not to damage the steering column covers.

5. Remove the 4 screws, then remove the hazard switch and wiper/washer switch assembly.

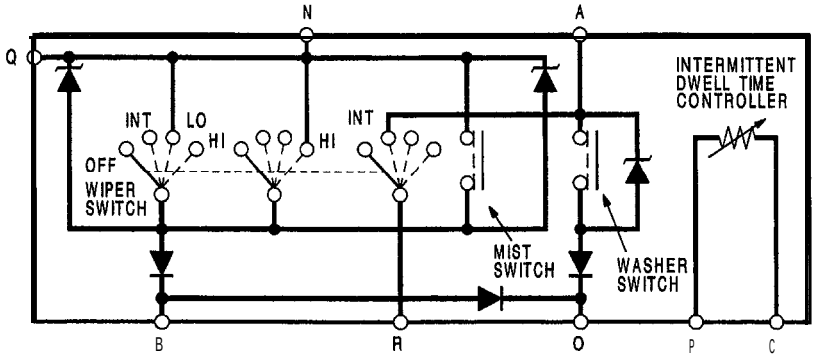


Wiper/Washer Switch Test

1. Remove the dashboard lower panel (see page 23-128).
2. Disconnect the 18-P connector from the floor wire harness.
3. Check for continuity between the terminals in each switch position according to the table.



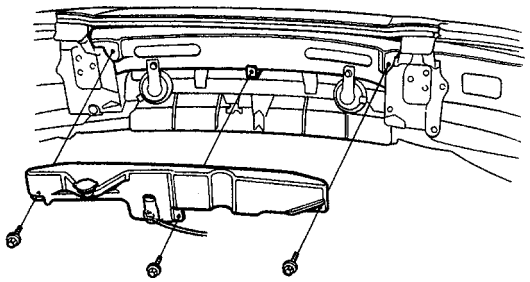
View from wire side



Terminal / Positoin	A	B	C		N		O	P	Q	R
INT	O									O
LO		O							O	
HI		O			O					
Mist switch ' ON'										
Washer switch ' ON'										
Intermittent dwell time controller turned			O			0-25KΩ		O		

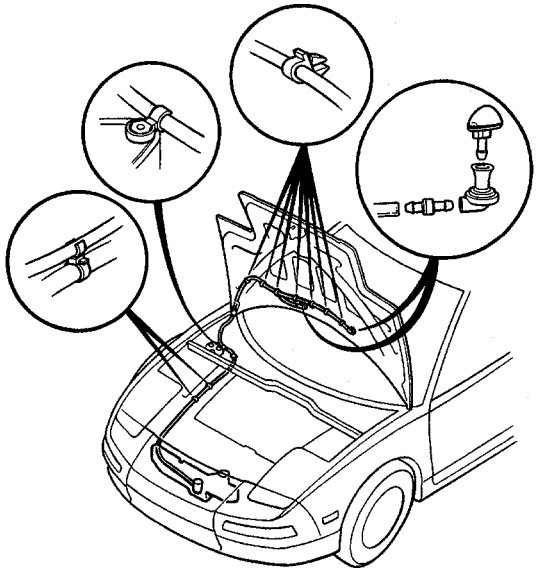
Washer Replacement

1. Disconnect the hose and the 2-P connectors from the washer motor.
2. Remove the bumper, then remove the washer reservoir by removing the 3 mounting bolts.
3. Remove the washer nozzles.



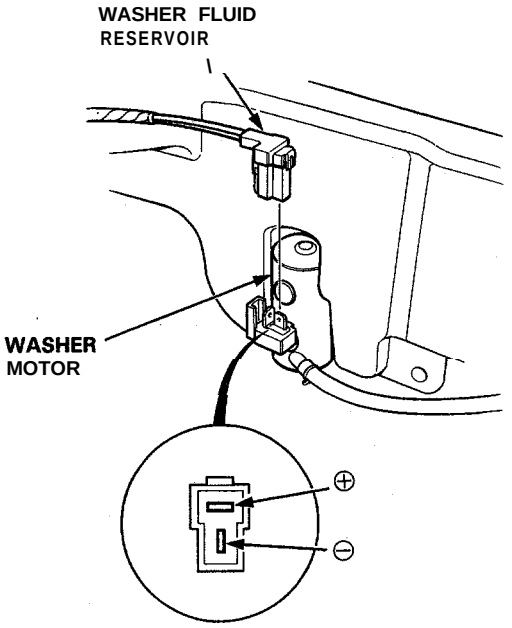
NOTE:

- Clamp the hose at the front harness.
  - Take care not to pinch hoses during reinstallation.
- Install the grommets firmly.
  - After installation, adjust the washer nozzles.



Washer Motor Test

1. Disconnect the 2-P connector from the washer motor and remove the front bumper.
2. Test the washer motor operation by connecting the battery positive to the ⊕ terminal and the negative to the ⊖ terminal.



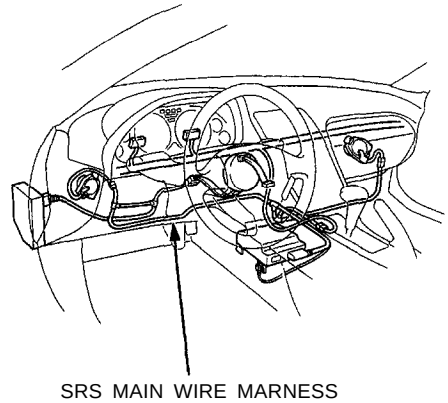
- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

Cruise Control

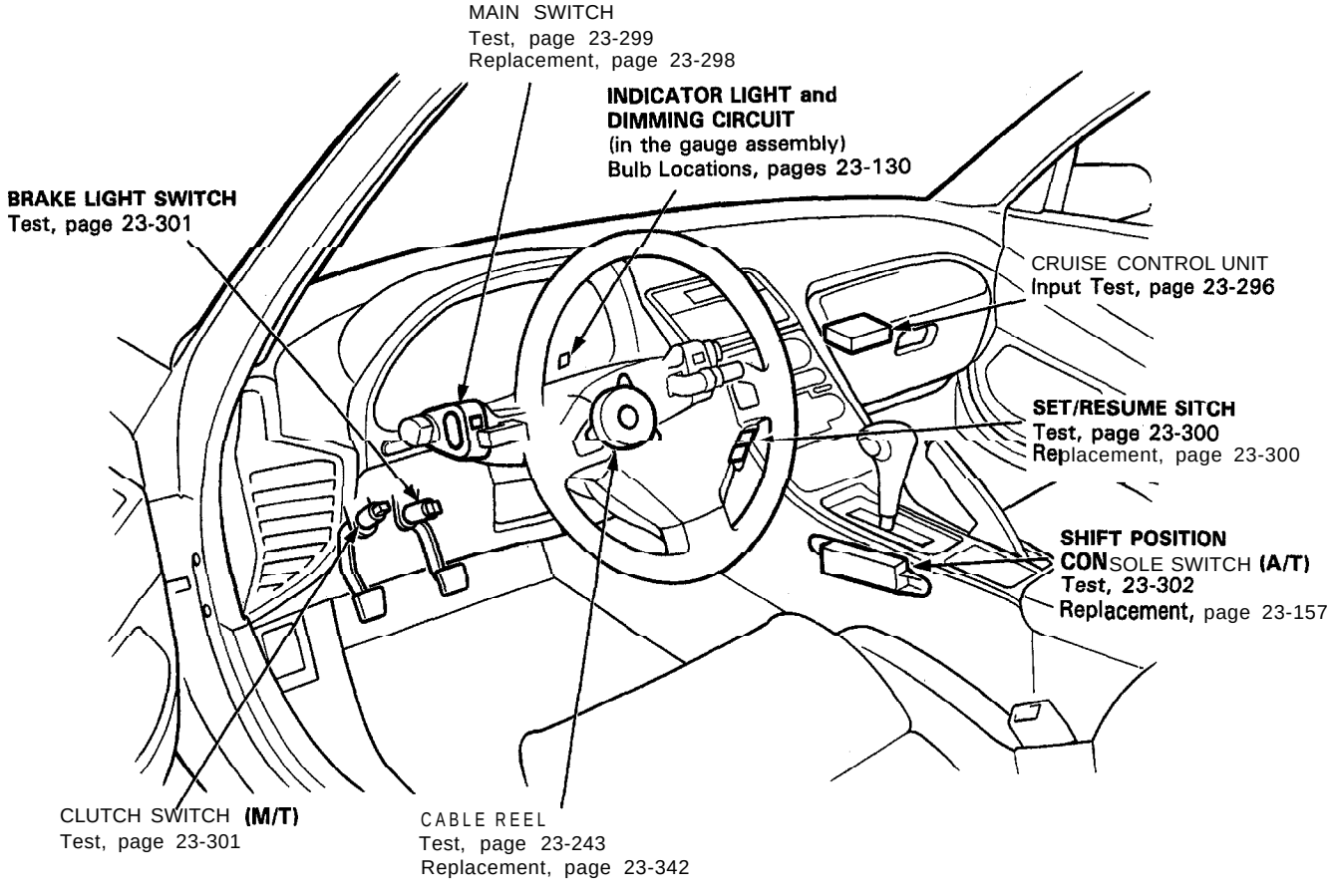
Component Location Index

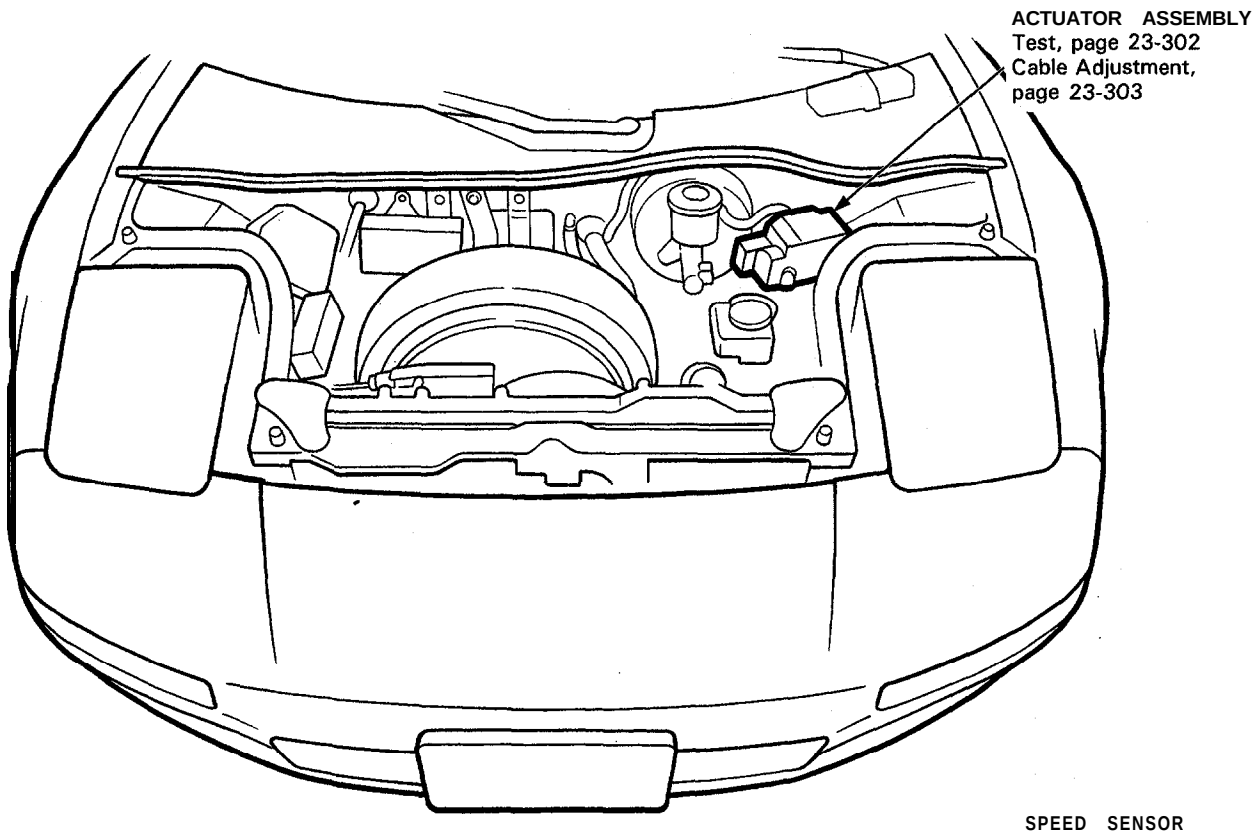
⚠ WARNING All SRS wire harnesses and connectors **are colored yellow.** Do not use electrical test equipement on these circuits.

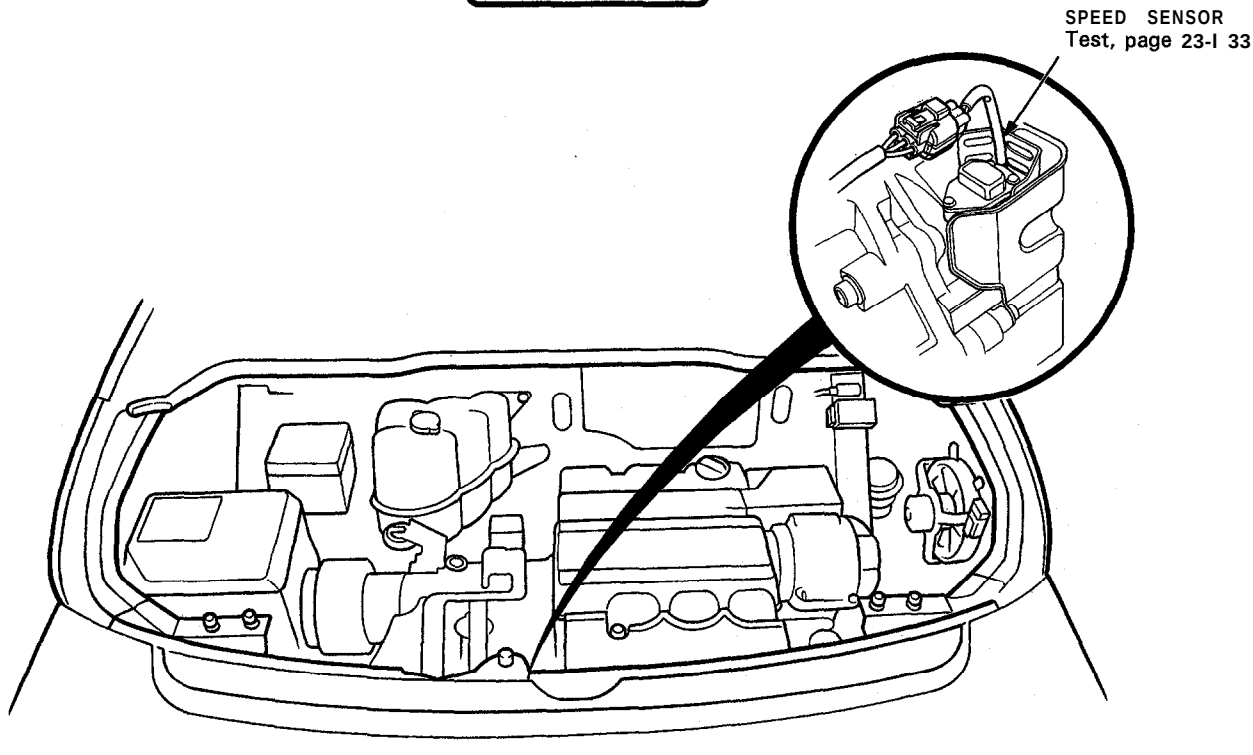
CAUTION: Be **carefull** not to damage the SRS wire harnesses when servicing the cruise control system.



SRS MAIN WIRE MARNESS




ACTUATOR ASSEMBLY
Test, page 23-302
Cable Adjustment,
page 23-303


SPEED SENSOR
Test, page 23-I 33

Cruise Control

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 switch. It receives information about operating conditions from the brake switch, PGM-FI ECU, speed sensor, the clutch switch (with manual transmission), or the shift lever position switch (with automatic transmission). 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.

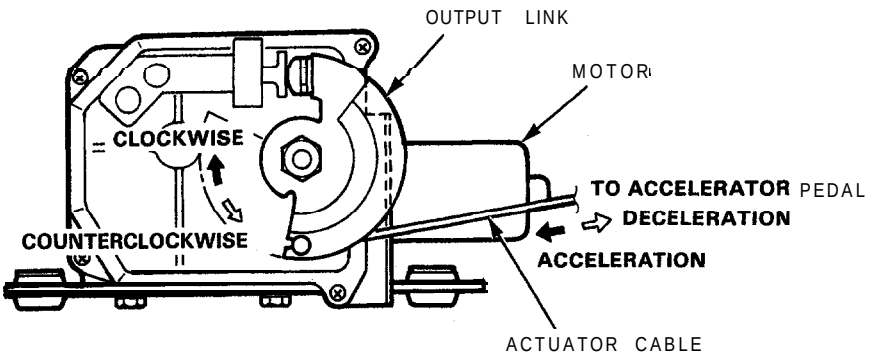
The brake switch releases the system's control of the throttle at the instant the driver depresses the brake pedal. The switch sends an electronic signal to the control unit when the brake pedal is depressed; the control unit responds by allowing the throttle to close. The clutch switch (manual transmission) or the shift lever position switch (automatic transmission) 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 30 mph (45 kph). To set, 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 input and, in turn, will actuate the cruise control actuator. When the set switch is depressed and the cruise control system is on, the "cruise control" on indicator in the gauge assembly will light up. You can cancel the cruise control system 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, clutch switch, or gear selector switch and vehicle speed is still above 30 mph, press the resume switch. With the resume switch depressed and the set memory retained, the vehicle automatically returns to the previous set speed.

For gradual acceleation 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 input 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 input to the control unit causing the vehicle to coast until the desired speed is reached. When the desired speed is reached, release the set switch. This will reprogram the system for the new speed.

The electrically operated actuator controls the throttle position the same as a vacuum operated actuator. The magnetic clutch is part of the safety system and controls acceleration or deceleration.

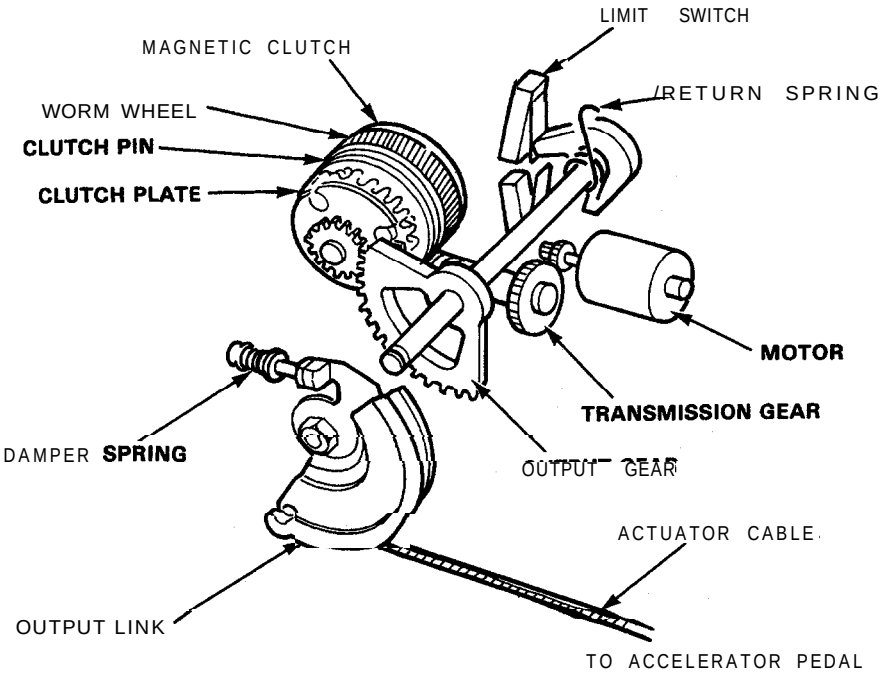


Acceleration

The motor actuates; then power is transmitted to the magnetic clutch by the transmission gear and the worm wheel. The magnetic clutch is rotated and magnetized. The magnetic clutch attracts the clutch plate, then 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.

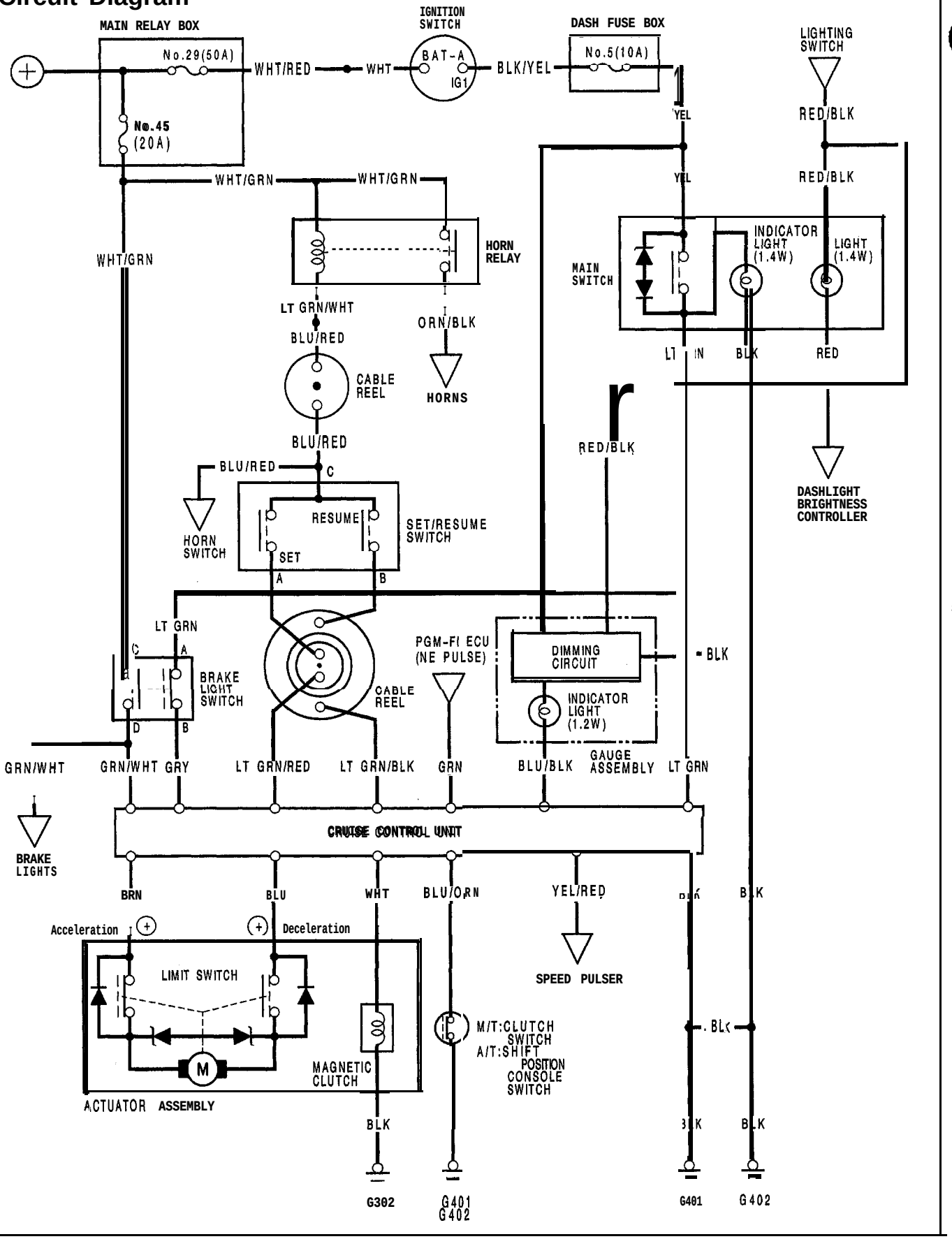
Deceleration

The motor rotates in the 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

-Circuit Diagram



Troubleshooting

NOTE:

- The numbers in the table show the troubleshooting sequence.
- **Before troubleshooting.**
  - Check the No. 5 (10A) fuse in the dash fuse box, and the No. 29 (50A), No. 45 (20A) fuses in the main relay box,
  - **Check that the horns sound.**
  - **Check the tachomater for proper operation.**

Items to be inspected. / Symptom	Main switch	SET/RESUME switch	Brake light switch/adjustment	Clutch switch/adjustment (M/T)	Shift lever position switch (A/T)	PGM-FI ECU (NE PULSE)	Dimming circuit in gauges	Actuator and cable deflection	Control unit	Poor ground	Open circuit in wires or loose or disconnected terminals
Cruise control can't be set.	2	3	4	5					1	G302 G401 G402	BLU/RED, LT GRN/RED, GRN, YEL, LT GRN, GRY, BRN, BLU, WHT, BLU/ORN or YEL/RED
Cruise control can be set, but indicator light does not go on.							2		1	G401 G402	YEL or BLU/BLK
Cruise speed 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 clutch pedal is pushed (M/T).				1					2		
Set speed not cancelled when shift lever is moved to N (A/T).					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		

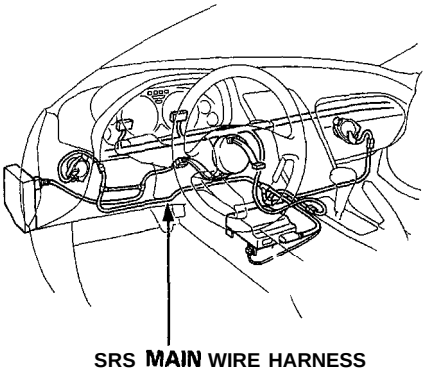
-Control Unit Input Test

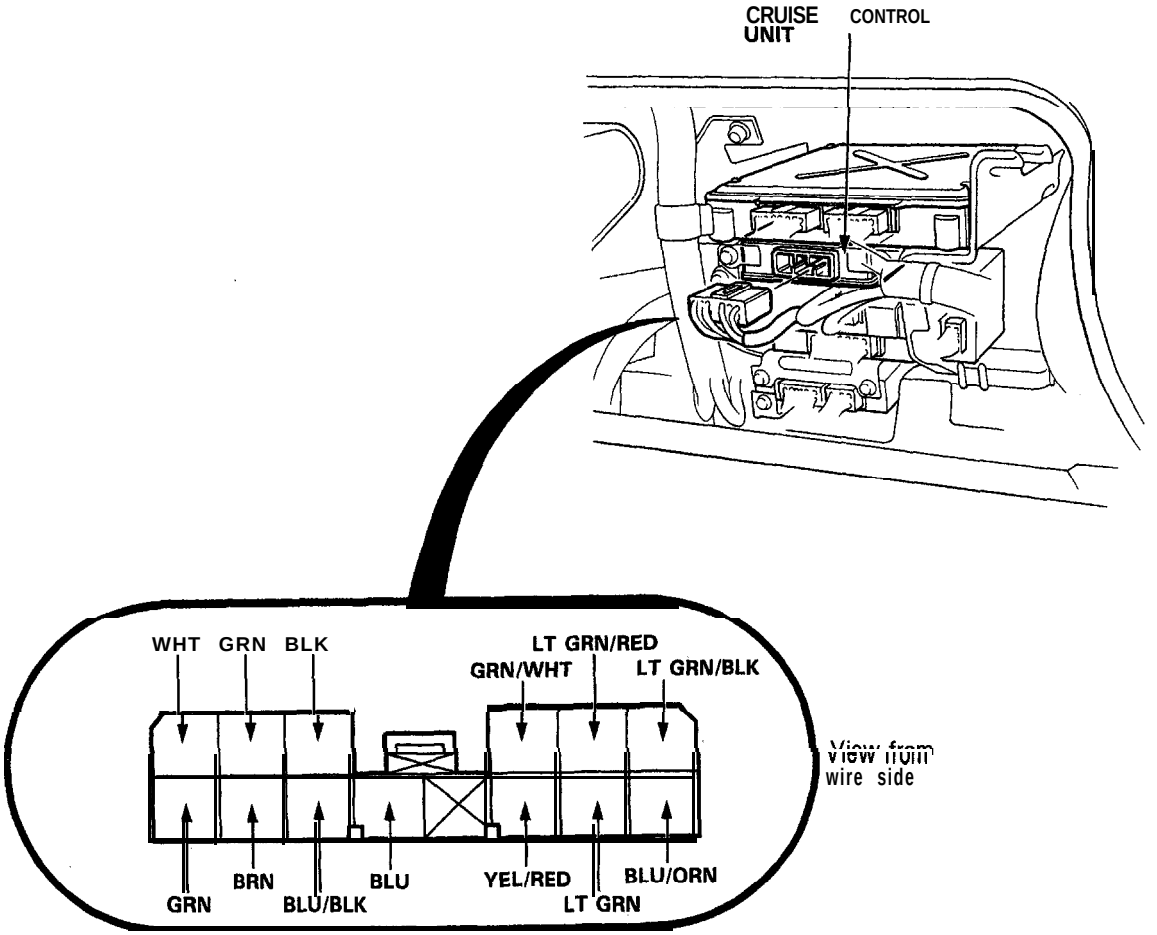
CAUTION:

- ALL SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

Remove the glove box, then disconnect the 14-P connector from the control unit. Make the following tests at harness pins:

NOTE: Recheck the connections between the 14-P connector and the control unit, then replace the control unit if all input tests prove OK.





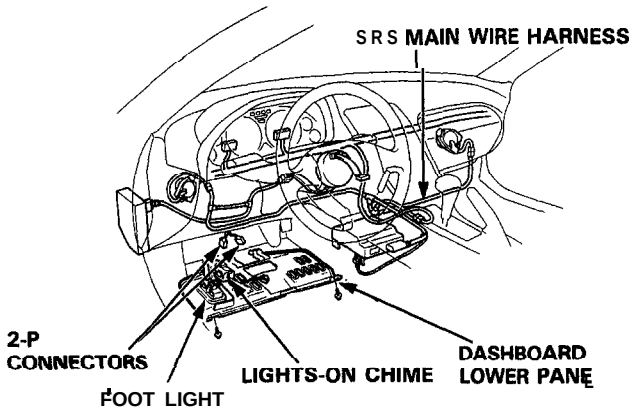
No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	LT GRN	Ignition switch ON and main switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) fuse. • Faulty main switch. • An open in the LT GRN or YEL wire.
3	LT GRN/ BLK	RESUME button pushed.	Ground each terminal: Horns should sound as the switch is pushed.	• Blown No. 45 (20A) fuse. • Faulty SET/RESUME switch. • Faulty cable reel. • An open in the WHT/GRN, BLUIRED, LT GRN/BLK or LT GRN/RED wire.
4	LT GRNI RED	SET button pushed.		
5	BLU/ORN	M/T: Clutch pedal pushed. A/T: Shift lever in 2, 3 or D.	Check for continuity to ground: should be continuity.	• Faulty or misadjusted clutch switch (M/T). • Faulty shift position console switch (A/T). • Poor ground (G401, G402). • An open in the wire.
6	GRN	Start the engine.	Check for voltage to ground: should be battery voltage.	• Faulty ignition system or PGM-FI ECU. • An open in the wire.
7	YEL/RED	Ignition switch ON and main switch ON. Raise the rear of the car rotate one wheel slowly.	Check for voltage between the LT GRN ⊕ and YEL/RED ⊖ terminals: should be 0-5-O-5 V repeatedly.	• Faulty speed sensor. • An open in the wire.
8	GRY	Ignition switch ON, main switch ON and brake pedal pushed, then released.	Check for voltage to ground: should be 0 V with the pedal pushed and battery voltage with the pedal released.	• Faulty brake light switch. • An open in the GRY or LT GRN wire.
9	GRN/WHT	Brake pedal pushed, then relelased.	Check for voltage to ground: should be battery voltage with the pedal pushed, and 0 V with the pedal released.	• Faulty brake light switch. • An open in the wire.
10	BLU/BLK	Ignition switch ON.	Attach to ground: Indicator light in the gauge assembly comes on.	• Blown bulb. • Blown No. 5 (10A) fuse. • Faulty dimming circuit in the gauge assembly. • An open in the wire.
11	BRN	Connect the battery positive to the BRN terminal and negative to the BLU terminal.	Check the operation of the actuator motor: should be able to hear motor.	• Faulty actuator. • An open in the wire
12	BLU			
13	WHT	Connect the battery positive to the BRN/ WHT terminal and negative to ground.	Check the operation of the magnetic clutch: clutch should click and output link should be locked.	• Faulty actuator. • An open in the wire. • Poor ground (G302).

Main Switch Replacement

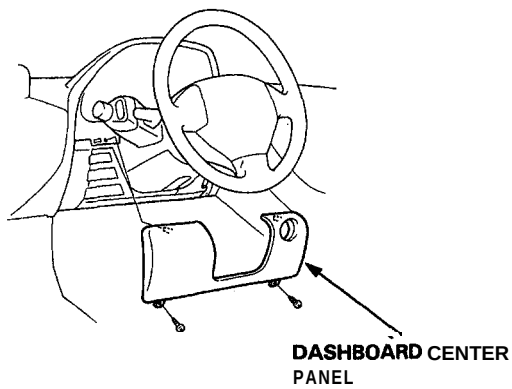
WARNING **All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipemnt on these circuits.**

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the lighting system.

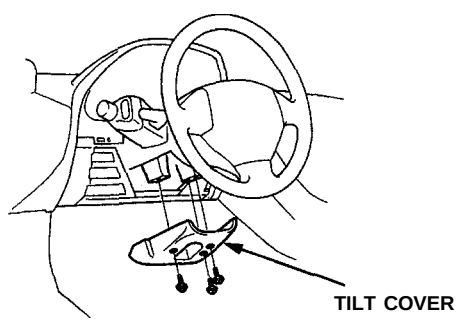
1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



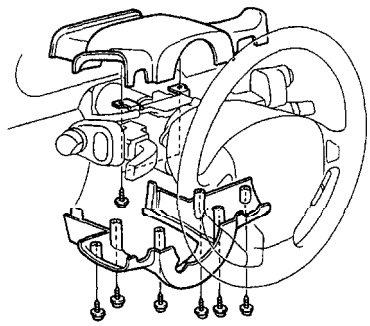
2. Remove the dashboard center panel.



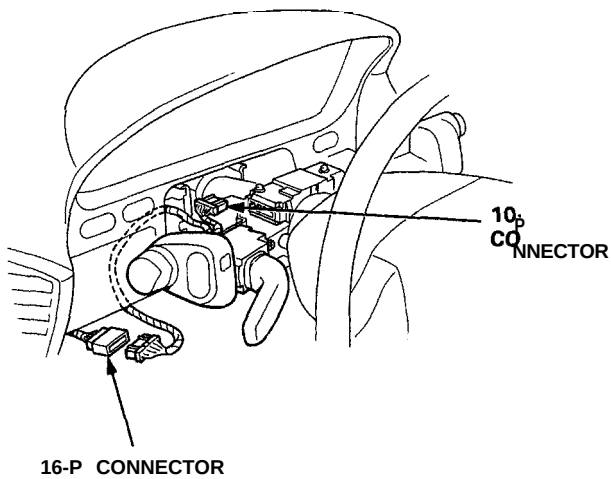
3. Remove the tilt cover.



4. Remove the steering column lower cover and upper cover.



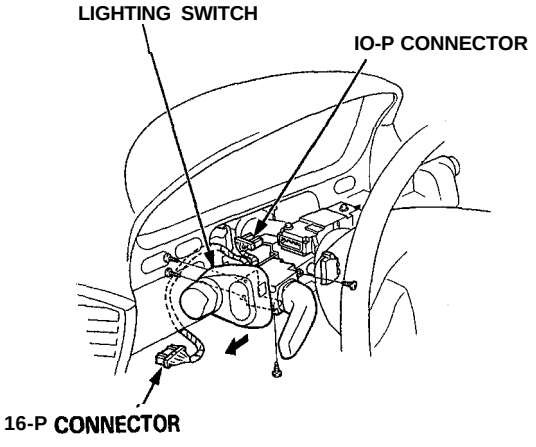
5. Disconnect the 16-P connector and the 10-P connector.



CAUTION: Be careful not to damage the SRS wires.

CAUTION: Be careful not to damage the SRS wires.

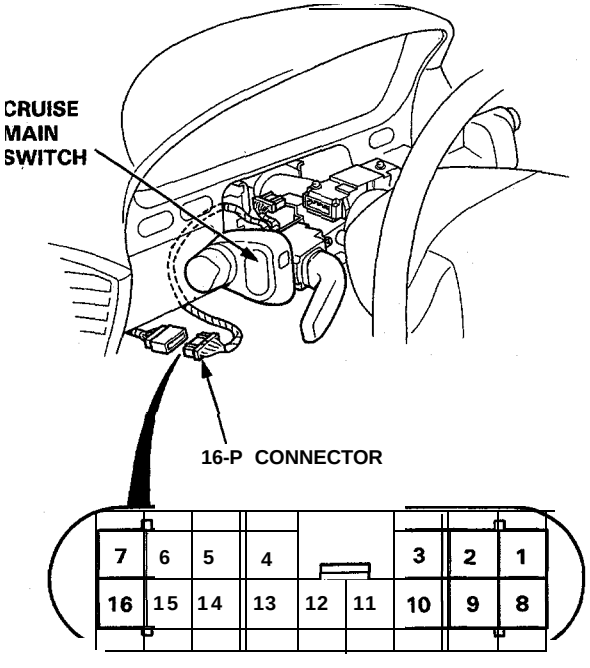
6. **Remove the 4 screws from the lighting switch.**
7. **Remove the lighting switch (main switch).**

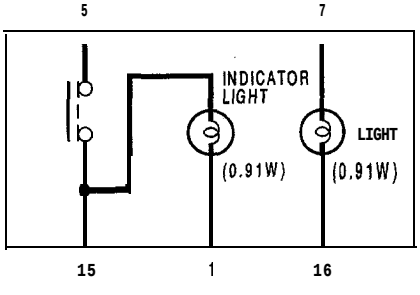


-Main Switch Test

1. Remove the dashboard lower panel and dashboard center panel.
2. If nesessary, remove the knee bolster.
3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	5	15		1	7		16
OFF		o		o	o		o
ON	o	o		o	o		o

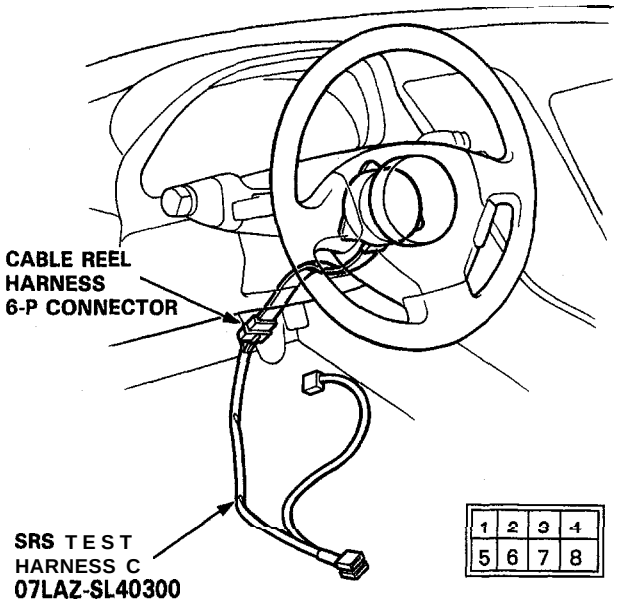




- SET/RESUME Switch Test

CAUTION: Disconnect both the negative and positive battery cables. Connect the short connector to the airbag assembly (see page 23-324).

1. Disconnect the cable reel harness and main harness 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.

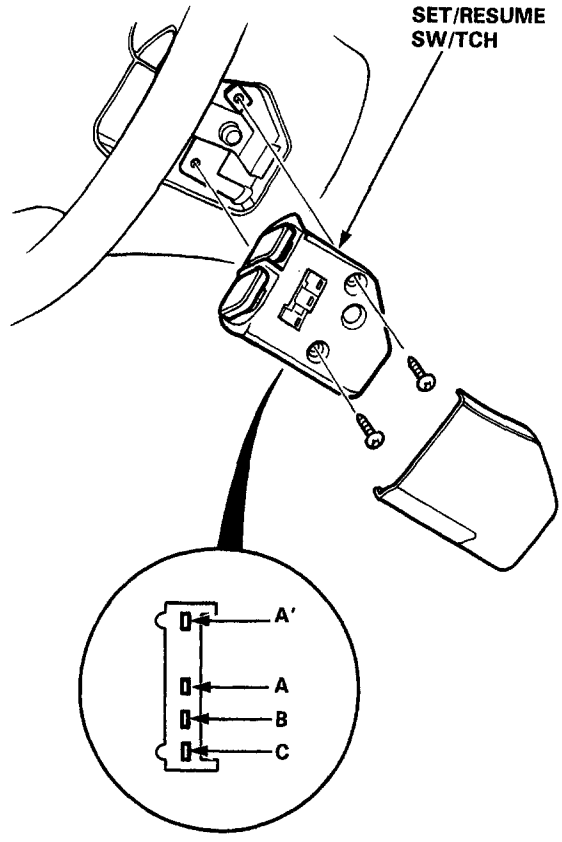


2. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	3 (BLU/RED)	2 (LT GRN/RED)	1 (LT GRN/BLK)
SET (ON)	○	○	
RESUME (ON)	○		○

- If there is no continuity, check the cable reel.
- If OK, go to step 3.

3. Remove the switch cover from the SET/RESUME switch, then separate the SET/RESUME switch by removing the 2 screws.



4. Check for continuity between the terminals in each switch position according to the tables.

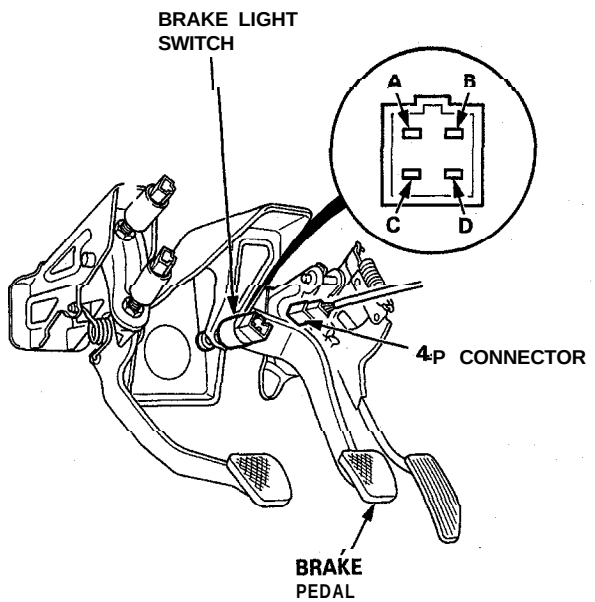
Position \ Terminal	A or A'	B	C
SET (ON)	0		0
RESUME (ON)	0	0	

- If there is no continuity, replace the switch.

Brake Light Switch Test

1. Disconnect the 4-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal / Brake pedal	A	B	C	D
RELEASED	0	—0		
PUSHED			○	—0

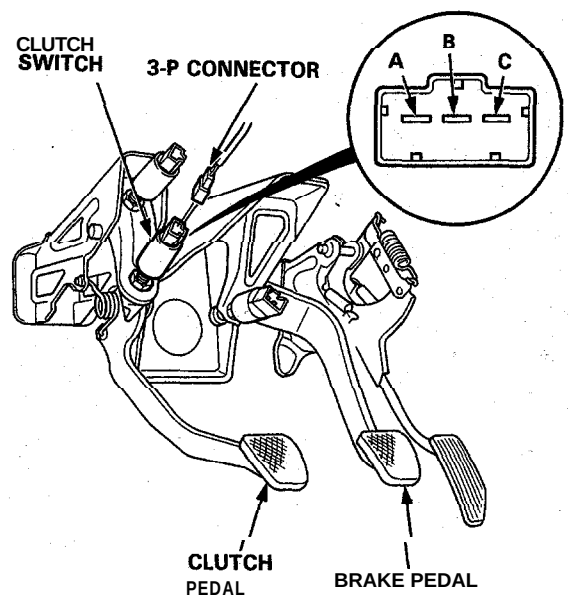


3. If necessary, replace the switch or adjust pedal height (see section 12).

Clutch Switch Test

1. Disconnect the 3-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal / Clutch pedal	B	C
RELEASED	○	—○
PUSHED		

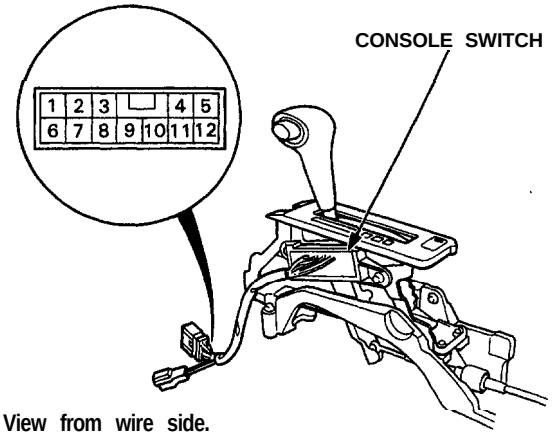


3. If necessary, replace the switch or adjust pedal height (see selection 12).

Shift Position Console Switch Test

1. Remove the front console, then disconnect the 12-P connector from the console switch.
2. Check for continuity between the terminals in each switch position according to the table.

NOTE:
- Move the lever back and forth without touching the push knob at each 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 installation positin of the console switch (see page 23-l 56).



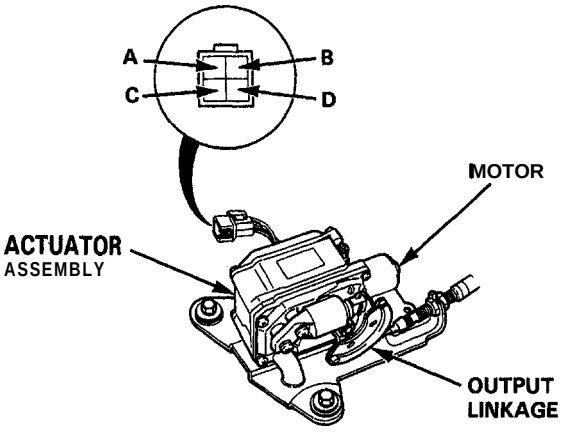
View from wire side.

Shift Position Switch (for cruise control)

Terminal / Position	5	8
1		
2	0	0
3	0	0
D	0	○
N		
R		
P		

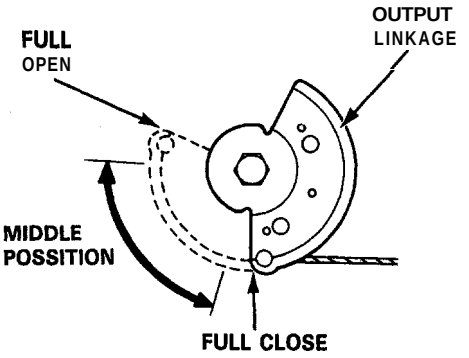
Actuator Assembly Test

1. Disconnect 4-P connector from the actuator.
2. Check the output linkage moves smoothly.
3. Connect the battery positive to the D terminal and negative to the A terminal.
4. Check for a clinking sound from the magnetic clutch and that the output linkage is locked. You should be able to hear the motor.
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 polarities		Output linkage position		
⊕	⊖	FULL CLOSE	MIDDLE POSITION	FULL OPEN
C Terminal	8 Terminal	The motor opreates	The motor operates	The motor stops
B Terminal	C Terminal	The motor stops	The motor operates	The motor operates

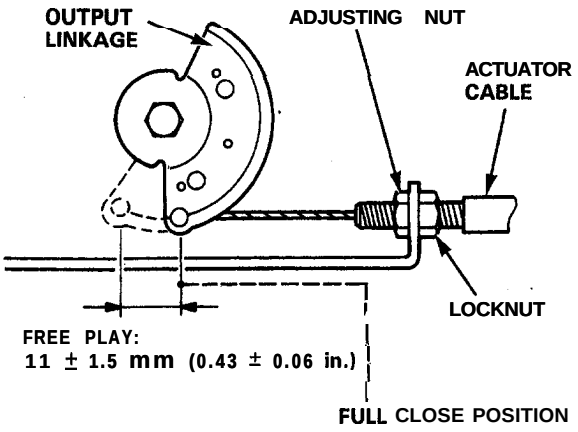


Actuator Cable Adjustment

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 cooling fan comes on twice).

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 full close 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 (Section 1 I), then recheck the output linkage free play.

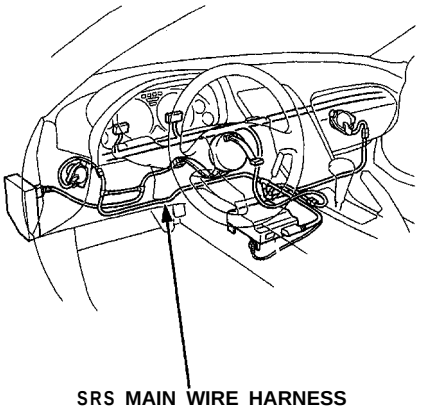
5. Retighten the locknut and recheck the free play.

Security Alarm System

· Component Location Index

CAUTION:

- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.



SRS MAIN WIRE HARNESS

R. REAR SIDE MARKER LIGHT
Replacement, page 23-193

IGNITION SWITCH
Test, page 23-72

IGNITION KEY SWITCH
Test, page 23-318

HORN RELAY
Test, page 23-242

R. DOOR KEY CYLINDER SWITCH
Test, page 23-315
Replacement, section 20

SUB RELAY BOX A

BATTERY
Test, page 23-68

R. DOOR LOCK KNOB and DOOR SWITCH
Test, page 23-315 and 198

SECURITY HORN
Test, page 23-241

SECURITY CONTROL UNIT
Input Test, page 23-311

L. HEADLIGHT
Replacement, page 23-189

DIMMER RELAY
Test, page 23-185

TAILLIGHT RELAY
Test, page 23-186

MAIN RELAY BOX

RETRACTOR RELAYS
Test, page 23-186

L. FRONT POSITION LIGHT
Replacement, page 23-191

LEFT (LOW) HORN
Test, page 23-241

R. HEADLIGHT
Replacement, page 23-189

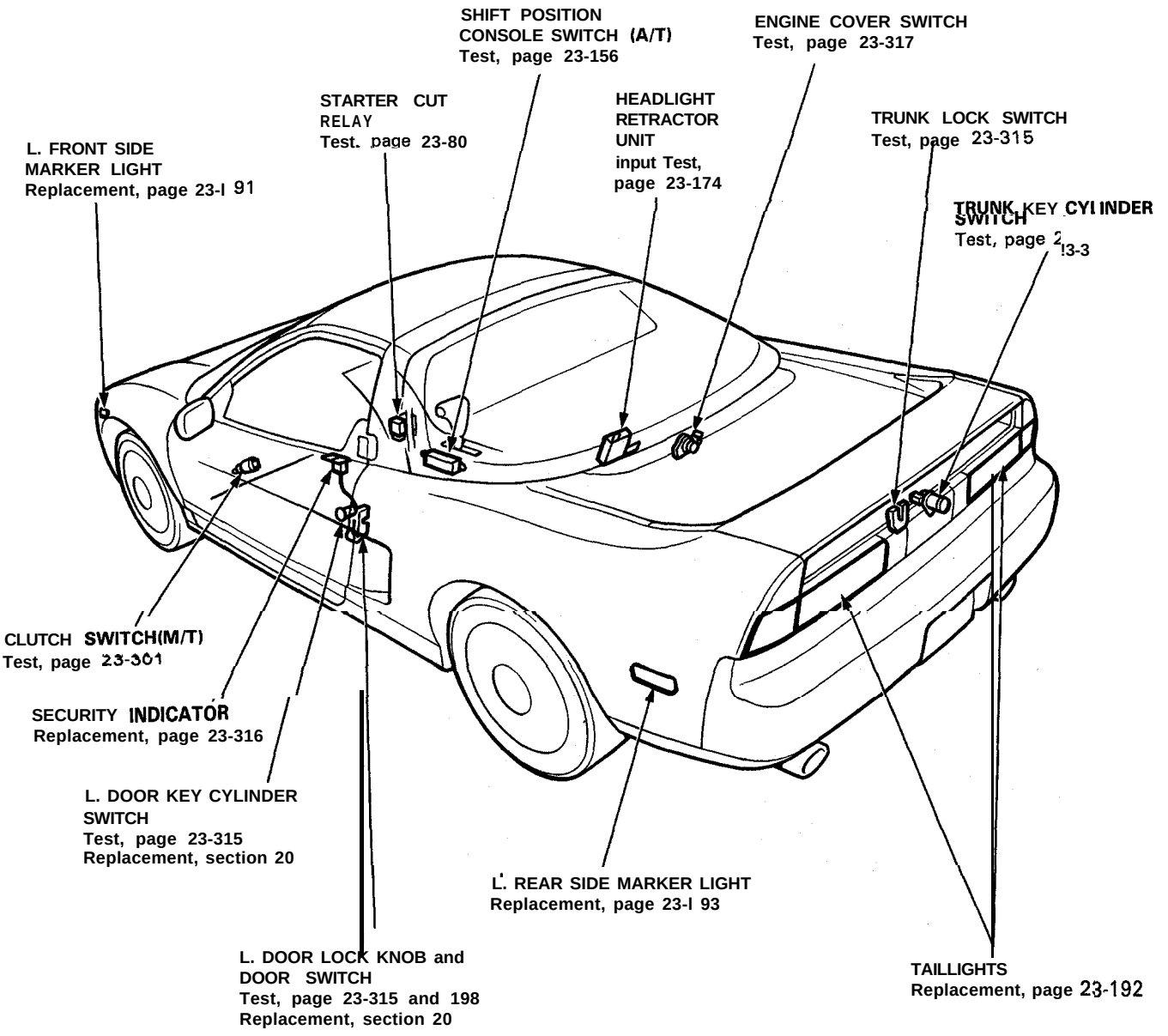
HOOD SWITCH
Test, page 23-317

LIGHTING/RELAY
Test, page 23-185

RIGHT (HIGH) HORN
Test, page 23-241

R. FRONT SIDE MARKER LIGHT
Replacement, page 23-191

R. FRONT POSITION LIGHT
Replacement, page 23-191


SHIFT POSITION CONSOLE SWITCH (A/T) Test, page 23-156
ENGINE COVER SWITCH Test, page 23-317
STARTER CUT RELAY Test. page 23-80
HEADLIGHT RETRACTOR UNIT input Test, page 23-174
TRUNK LOCK SWITCH Test, page 23-315
L. FRONT SIDE MARKER LIGHT Replacement, page 23-I 91
TRUNK KEY CYLINDER SWITCH Test, page 2 13-3
CLUTCH SWITCH(M/T) Test, page 23-301
SECURITY INDICATOR Replacement, page 23-316
L. DOOR KEY CYLINDER SWITCH Test, page 23-315 Replacement, section 20
L. REAR SIDE MARKER LIGHT Replacement, page 23-I 93
L. DOOR LOCK KNOB and DOOR SWITCH Test, page 23-315 and 198 Replacement, section 20
TAILLIGHTS Replacement, page 23-192

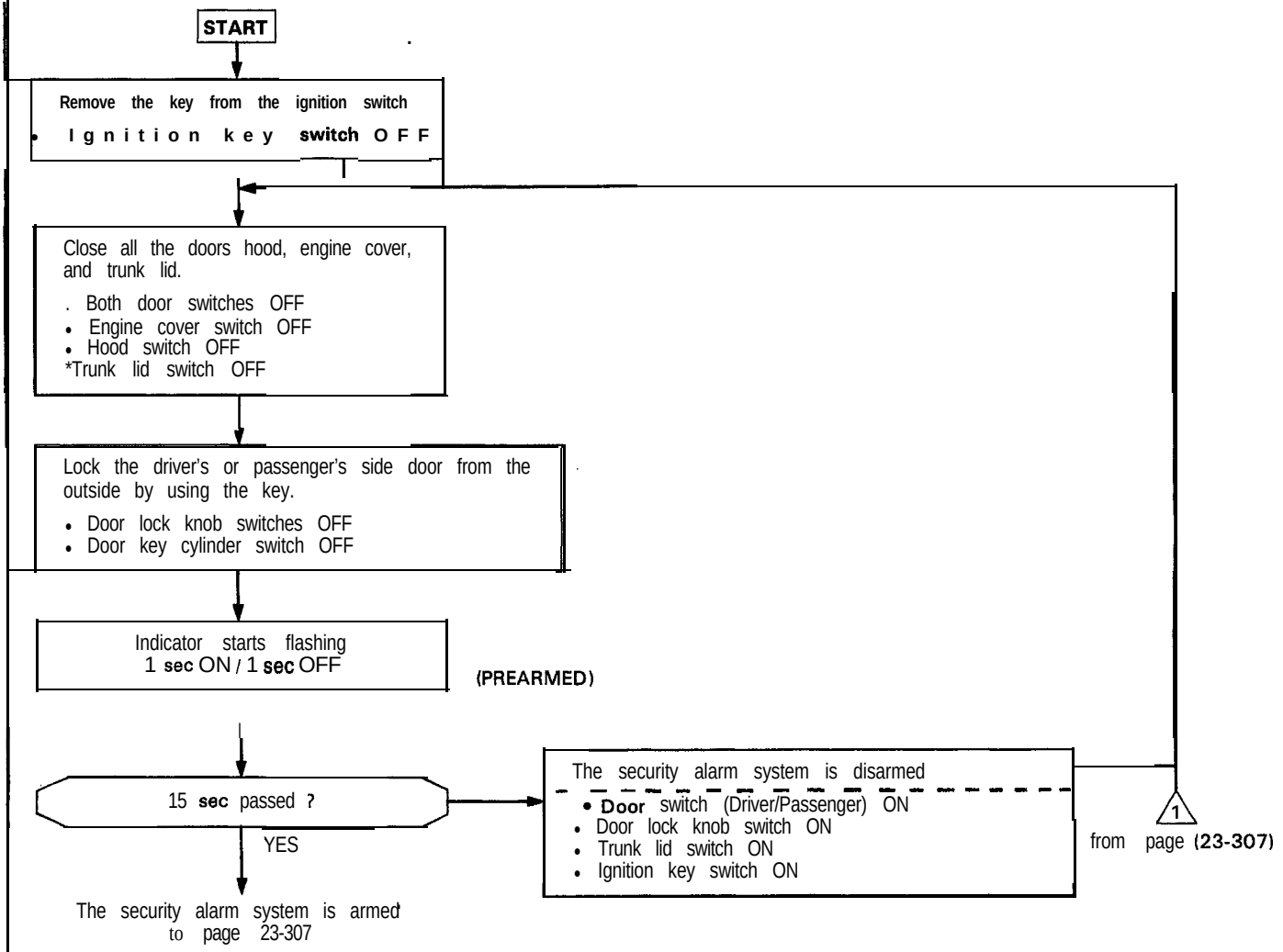
Security Alarm System

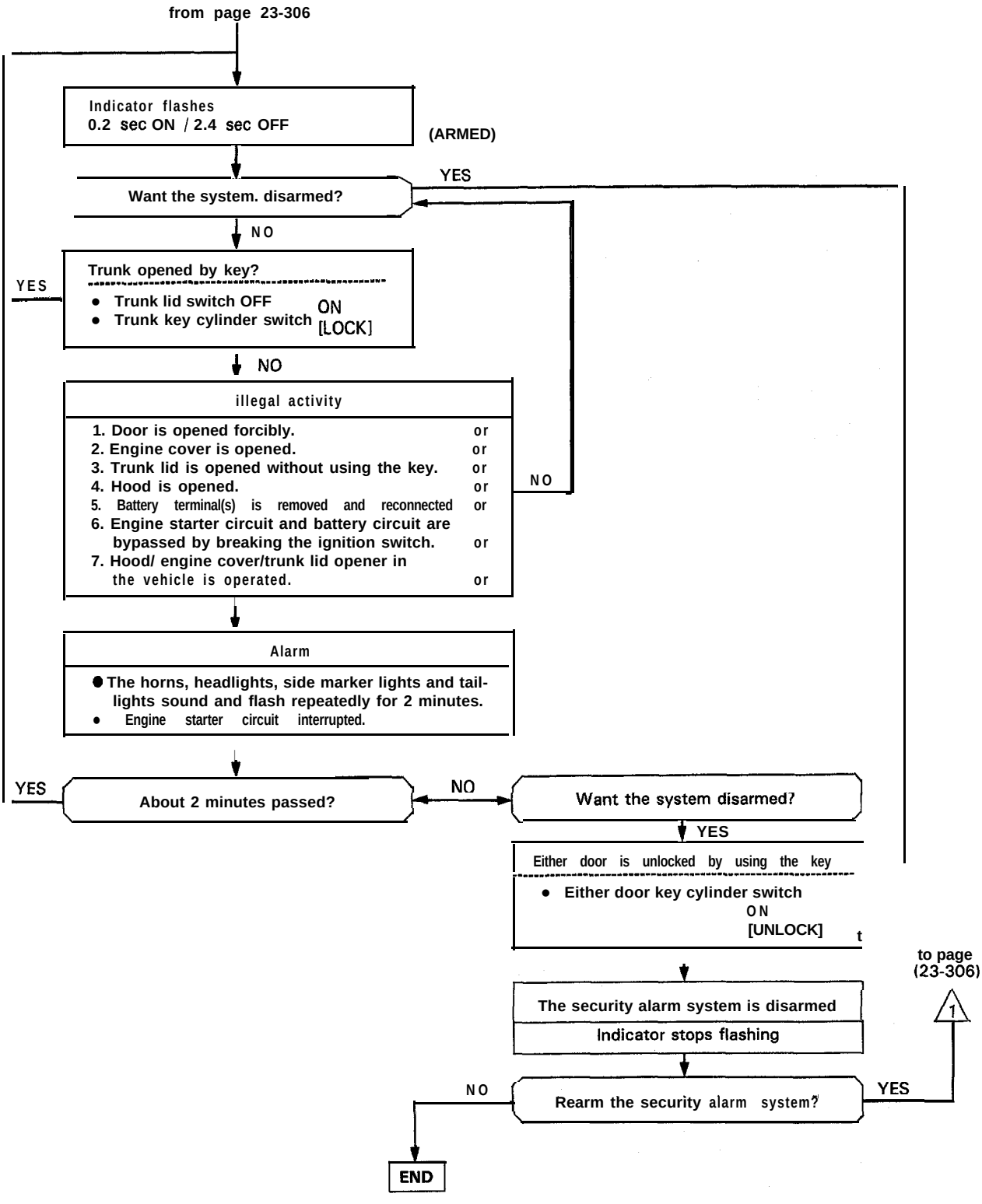
-Description

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 trim panel will flash after the doors are properly locked.
If any of the following conditions occur, the horns will sound, the headlights will pop up and flash, and the side marker lights, position lights and taillights will flash for about 2 minutes, or until the system is disarmed by unlocking either door from the outside keylock with the key.

① Door is opened forcibly.
② Engine cover is opened.
③ Trunk lid is opened without using the key.
④ Hood is opened.
⑤ Battery terminal(s) are removed and reconnected.
⑥ Engine starter circuit and battery circuit are bypassed by breaking the ignition switch.
⑦ Hood/engine cover/trunk lid opener in the vehicle is operated.

Flowchart of the security alarm system operation:

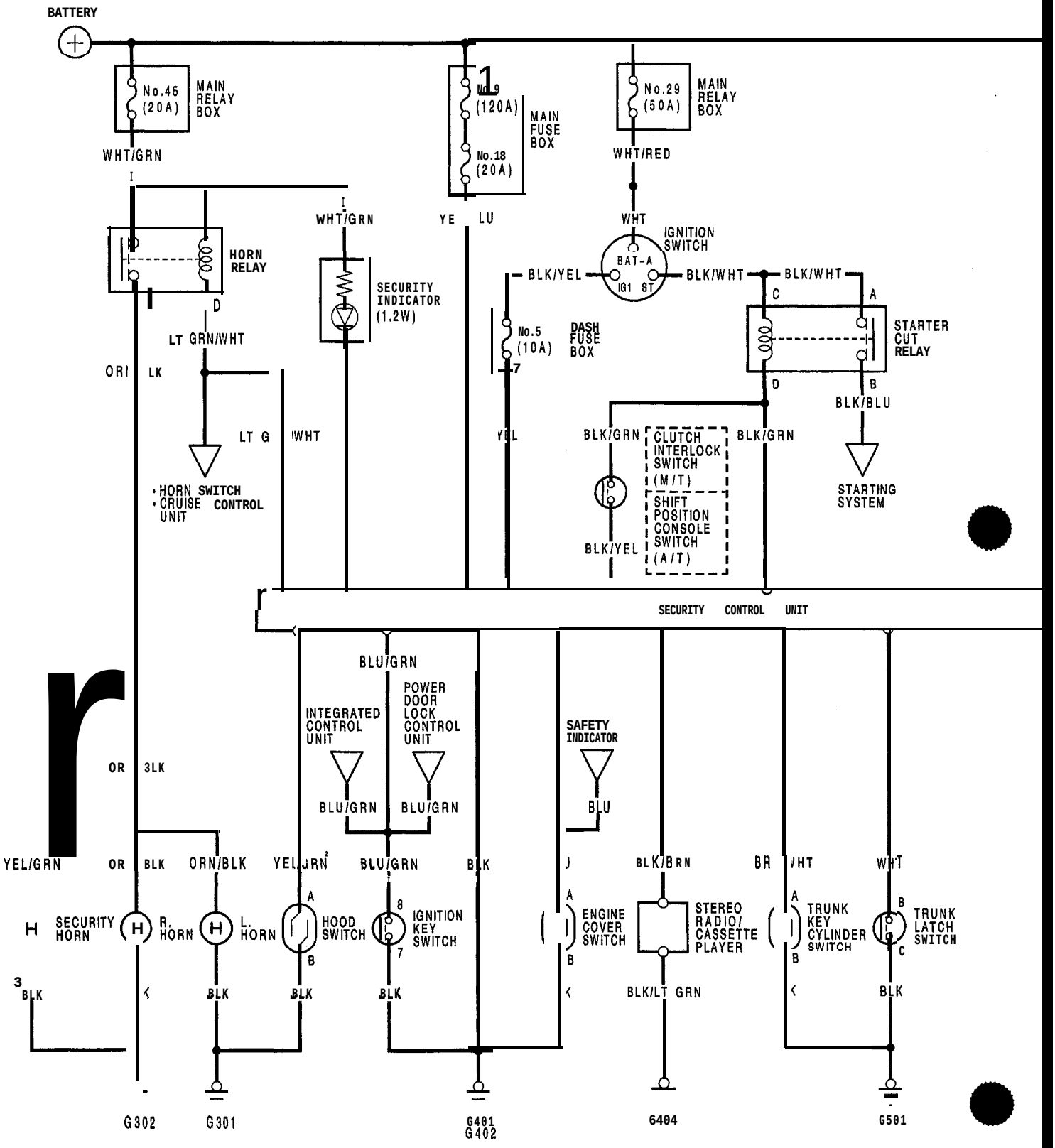


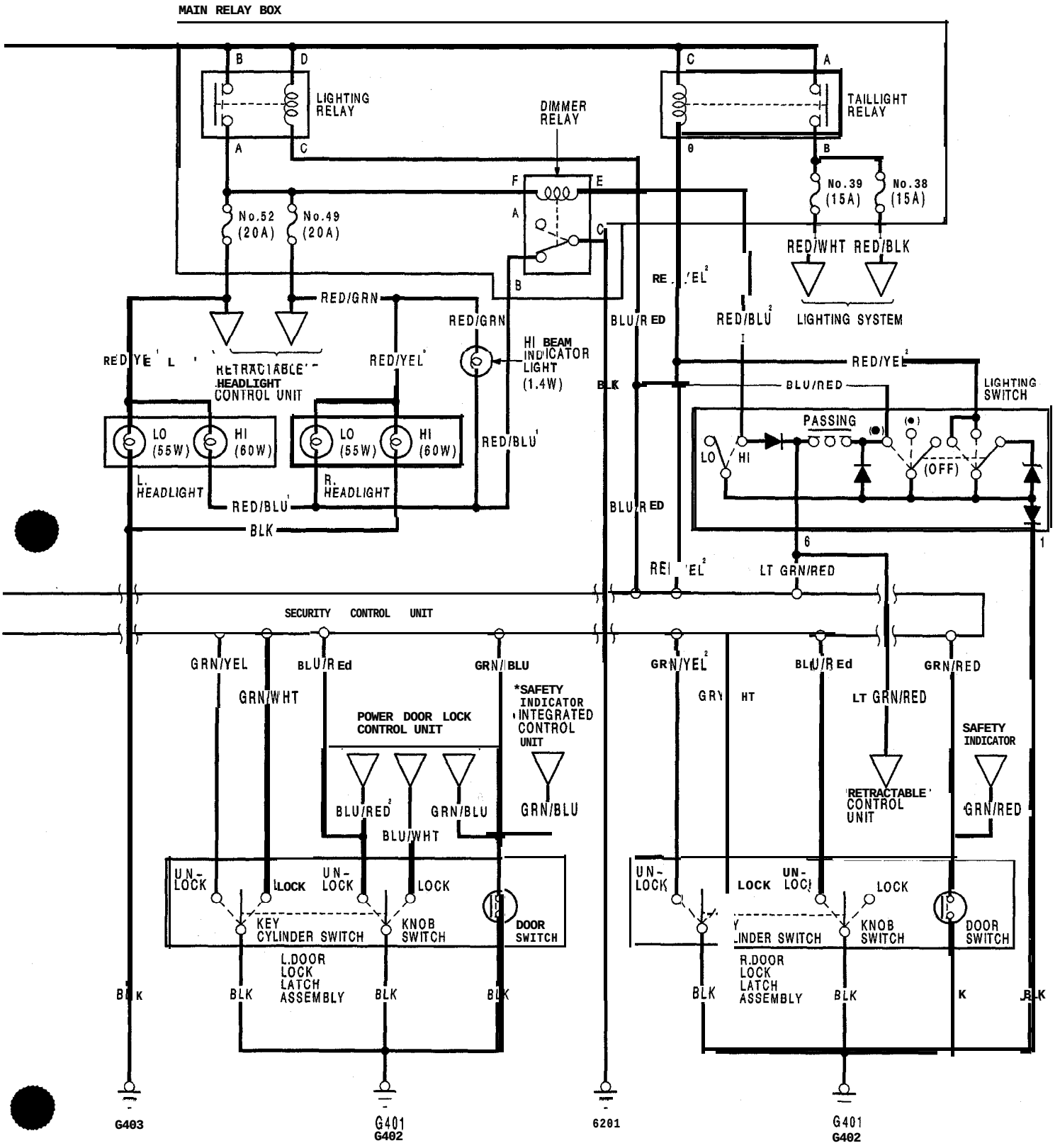

from page 23-306
Indicator flashes
0.2 sec ON / 2.4 sec OFF
(ARMED)
Want the system. disarmed?
YES
NO
Trunk opened by key?
YES
• Trunk lid switch OFF
• Trunk key cylinder switch ON [LOCK]
NO
illegal activity
1. Door is opened forcibly. or
2. Engine cover is opened. or
3. Trunk lid is opened without using the key. or
4. Hood is opened. or
5. Battery terminal(s) is removed and reconnected or
6. Engine starter circuit and battery circuit are bypassed by breaking the ignition switch. or
7. Hood/ engine cover/trunk lid opener in the vehicle is operated. or
NO
Alarm
● The horns, headlights, side marker lights and tail-lights sound and flash repeatedly for 2 minutes.
• Engine starter circuit interrupted.
YES
About 2 minutes passed?
NO
Want the system disarmed?
YES
Either door is unlocked by using the key
• Either door key cylinder switch ON [UNLOCK]
t
to page (23-306)
1
The security alarm system is disarmed
Indicator stops flashing
NO
Rearm the security alarm system?
YES
END

Security Alarm System

Circuit Diagram

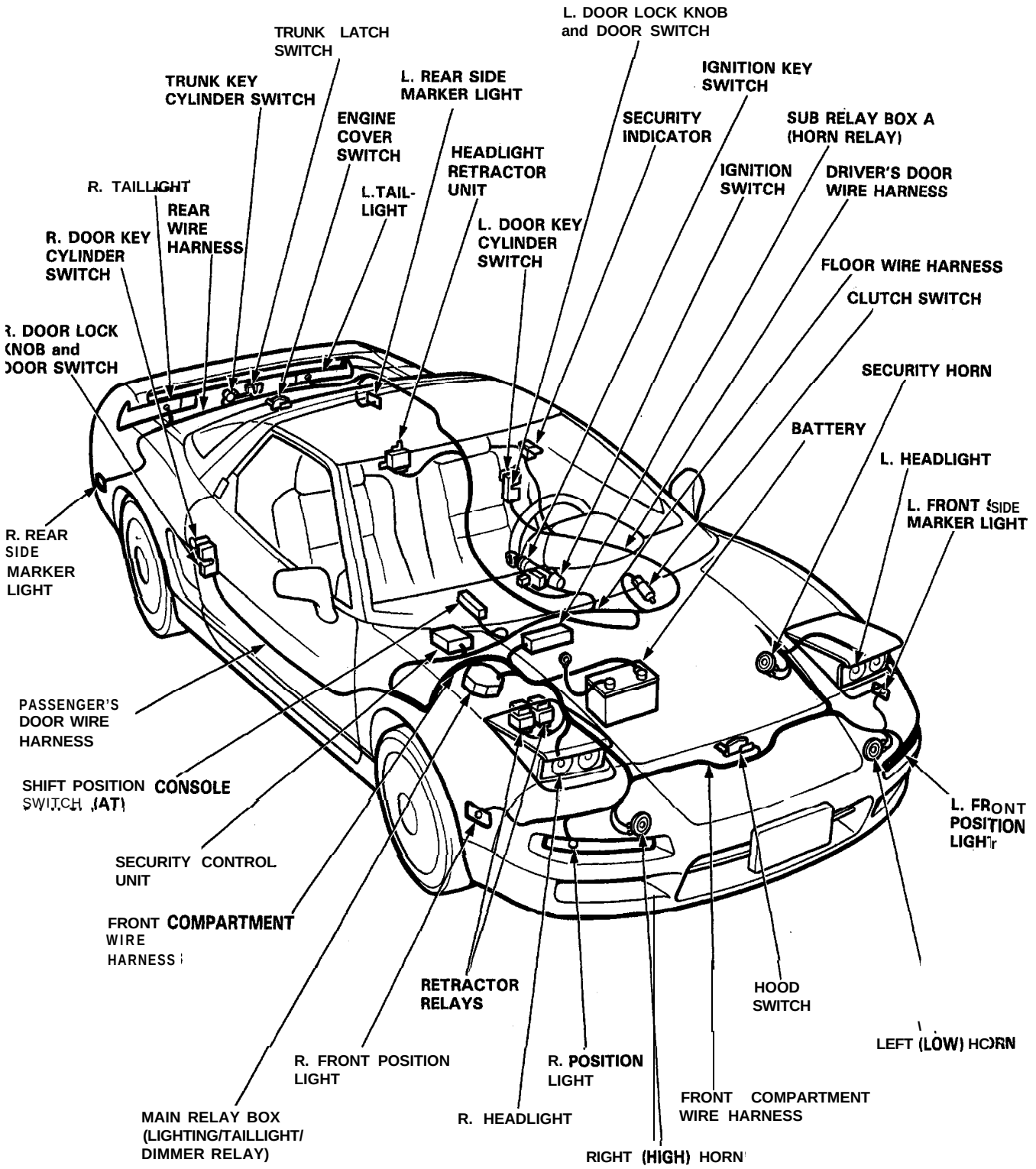
NOTE: Several different wires have the same color. Thev have been given a number suffix to distinguish them (for example YEL/GRN[1] and YEL/GRN[2] are not the same).




MAIN RELAY BOX
LIGHTING RELAY
DIMMER RELAY
TAILLIGHT RELAY
No.52 (20A)
No.49 (20A)
No.39 (15A)
No.38 (15A)
RED/WHT
RED/BLK
LIGHTING SYSTEM
RED/GRN
RED/YEL
RED/BLU
BLU/RED
HI BEAM INDICATOR LIGHT (1.4W)
RETRACTABLE HEADLIGHT CONTROL UNIT
LO (55W)
HI (60W)
L. HEADLIGHT
R. HEADLIGHT
BLK
LIGHTING SWITCH
PASSING
LO
HI
(OFF)
LT GRN/RED
SECURITY CONTROL UNIT
GRN/YEL
GRN/WHT
BLU/RED
GRN/BLU
*SAFETY INDICATOR INTEGRATED CONTROL UNIT
POWER DOOR LOCK CONTROL UNIT
BLU/WHT
SAFETY INDICATOR
RETRACTABLE CONTROL UNIT
GRN/RED
UN-LOCK
LOCK
KEY CYLINDER SWITCH
KNOB SWITCH
DOOR SWITCH
L.DOOR LOCK LATCH ASSEMBLY
R.DOOR LOCK LATCH ASSEMBLY
G403
G401
G402
6201

Security Alarm System

- Wiring Locations



NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom		Blown No. 8 (20A) fuse in the main fuse box	Blown No. 5 (10A) fuse in the main fuse box	Blown No. 45 (20A) fuse in the main relay box	Faulty indicator light (LED)	Horn circuit	Starting system	A/T: Shift position console switch M/T: Clutch interlock switch	Lighting system	Door key switch	Ignition key switch	Trunk key switch	Trunk latch switch	Hood switch	Engine cover switch	Door switch	Control unit input	Poor ground	
Security alarm can't be set (and indicator light does not flash).		1	2	3	4						5							G401 5402 or G404	YEL/BLU, YEL, WHT/GRN, GRN or BLU/GRN
Starting ststem is not operated.							1	2									3	G401 G402 or 3404	BLK/WHT, BLK/GRN or BLK/YEL
Security alarm can be set, but alarm not operated when the trunk, hood or either door is unlocked without the key.	Horn alarm			1		2											3		NHTIGRN, ORN/BLK, YEL/GRN[1] or LT GRN/WHT
	Headlight alarm								1								2		LT GRN/RED, BLU/RED[1] or RED/YEL
	Both alarms																1		
Alarm not cancelled when the door keylock is unlocked with the key.										1							2	3401 3402 or 3404	GRN/YEL[1], GRN/YEL[2], BLU/RED[2] or BLU/RED[3]
Alarm not cancelled when the key is inserted the ignition switch.			1								2						3		YEL
Alarm not cancelled when the trunk lid is opened with the key.												1	2				3	3501	BRN/WHT or WHT
Alarm not operated when the hood is opened.														1			2	3301	YEL/GRN[2]
Alarm not operated when the engine cover is opened.															1		2	3401 3402	BLU
Alarm not operated when the doors is opened.																1	2	3401 3402	GRN/BLU or GRN/RED

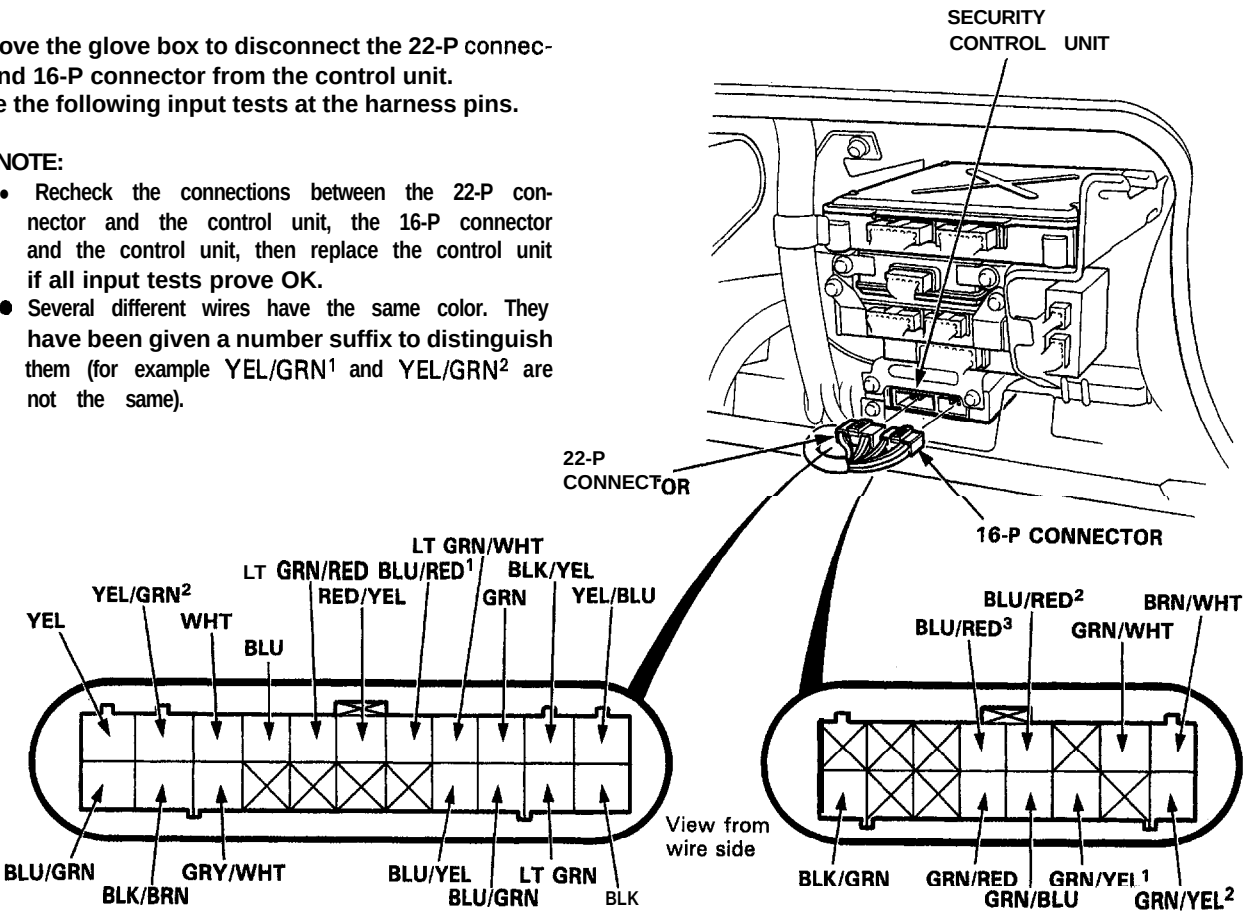
Security Alarm System

- Control Unit Input Test

Remove the glove box to disconnect the 22-P connector and 16-P connector from the control unit.
Make the following input tests at the harness pins.

NOTE:

- Recheck the connections between the 22-P connector and the control unit, the 16-P connector and the control unit, then replace the control unit if all input tests prove OK.
- Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL/GRN[1] and YEL/GRN[2] are not the same).



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	YEL/BLU	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No. 18 (20A) fuse. • An open in the wire.
3	GRN	Under all conditions.	Connect to ground: security indicator should come on.	• Blown No. 45 (20A) fuse. • Faulty security indicator. • An open in the wire.
4	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 5 (10A) fuse. • An open in the wire.
5	BLK/GRN	Ignition switch START.	Check for voltage to ground: should be battery voltage.	• Faulty starter cut relay. • An open in the wire.
6	BLK/YEL	Ignition switch START and; Clutch pedal pushed (M/T), Shift position P (A/T).	Attach to ground: Starter should crank the engine.	• Blown No. 29 (50A) fuse. • Faulty starting system. • Faulty starter cut relay. • Faulty clutch interlock switch (M/T, A/T) • An open in the wire.
7	LT GRN/WHT	Under all conditions.	Attach to ground: All horns should sound.	• Blown No. 45 (20A) fuse. • Faulty horn relay. • Faulty either horn. • Poor ground (G201 or G203). • An open in the wire.

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
8	BLU/RED	Under all conditions.	Attach to ground: headlights should come on.	• Faulty lighting relay. • Faulty lighting system. • An open in the wire.
9	RED/YEL	Under all conditions.	Connect to ground: Taillights should come on.	• Faulty taillight relay. • Fautly taillight system. • An open in the wire.
10	LT GRN/ RED	Passing swich ON.	Check for voltage to ground: should be battery voltage.	• Faulty passig switch. • Faulty dimmer relay. • Faulty lighting relay. • An open in the wire.

Reconnect the 22-P and 16-P connectors to the control unit.

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
11	YEL/GRN[2]	Hood opened.	Check for voltage to ground: should be 1 V or less.	• Faulty hood switch. Misadjusted hood switch. Poor ground (G301). • An open in the wire.
		Hood closed.	Check for voltage to ground: should be 5 V or more.	
12	BLU/GRN	Ignition key is inserted into the ignition switch.	Check for voltage to ground: should be 1 V or less.	• Faulty ignition key switch. • Poor ground (G401, G402). • An open in the wire.
		Ignition key is removed from the ignition switch.	Check for voltage to ground: should be 5 V or more.	
13	BLU	Engine cover opened.	Check for voltageto ground: should be 1 V or less.	• Faulty engine cover switch. • Misadjusted engine cover switch. • Poor ground (G401, G402). • An open in the wire.
		Engine cover closed.	Check for voltage to ground: should be 5 V or more.	
14	BLK/BRN or BLK/ LT GRN	Under all conditions.	Check for voltage to ground: should be 1 V or less.	• Poor ground (G404). • An open in the wire.
15	BRN/WHT	Trunk key in UNLOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty trunk key. • Poor ground (G501). • An open in the wire.
16	WHT	Trunk lid opened.	Check for voltage to ground: should be 1 V or less.	• Faulty trunk latch switch. Misadjusted trunk latch switch. • Poor ground (G501). • An open in the wrie.
		Trunk lid closed.	Check for voltage to ground: should be 5 V or more.	

(cont'd)

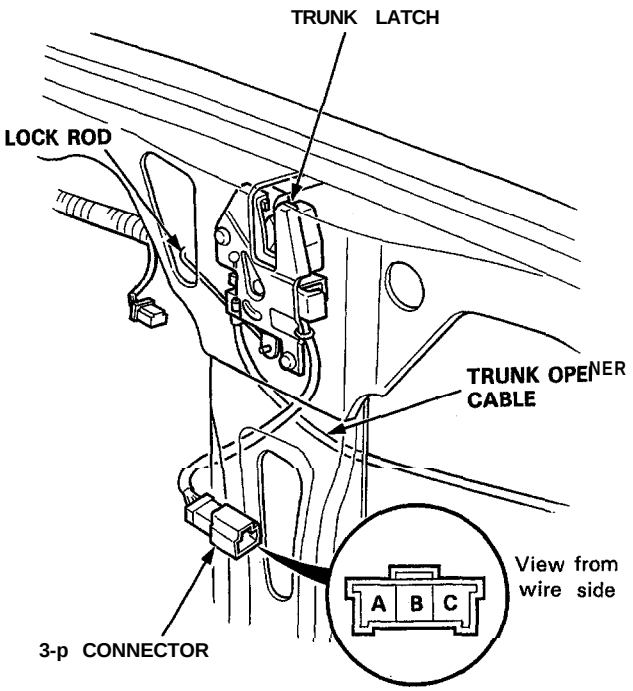
Security Alarm System

Control Unit Input Test (cont'd)

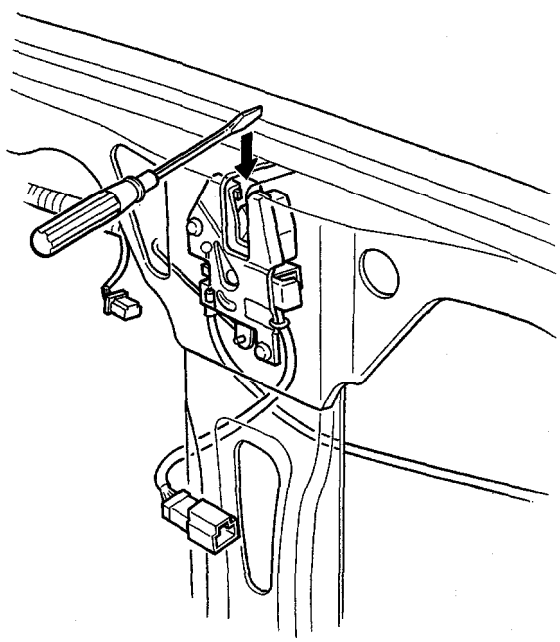
No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
17	GRN/BLU	Left door opened.	Check for voltage to ground: when the door is oppened, there should be 1 V or less, and when the door is closed, there should be 5 V or more.	• Faulty right door switch. • An open in the wire.
		Left door closed.		
18	GRN/RED	Right door opened.		
		Right door closed.		
19	GRNNEL'	Left door key in UNLOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty left or right door key switch. • Poor ground (G401, G402). • An open in the wire.
2 0	GRN/YEL[2]	Right door key in UNLOCK		
21	GRN/WHT	Left door key in LOCK.	Check for voltage to ground: should be 1 V or less, as the door keylock is turned in LOCK	• Faulty left or right door key switch. • Poor ground (G401, G402). • An open in the wire.
22	GRY/WHT	Right door key in LOCK.		
2 3	BLU/RED[2]	Left door lock knob in UNLOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty left door lock knob switch. (built in the actuator). • Poor ground (G401, G402). • An open in the wire.
2 4	BLU/RED[3]	Right door lock knob in UNLOCK.	Check for voltage to ground: should be 1 V or less.	• Faulty right door lock knob switch. (built in the actuator). • Poor ground (G401, G402). • An open in the wire.

Trunk Latch Switch Test

1. Open the trunk lid and remove the trunk rear trim panel.
2. Disconnect the 3-P connector from the trunk latch.
3. There should be continuity between the B and C terminals with the trunk lid opened.



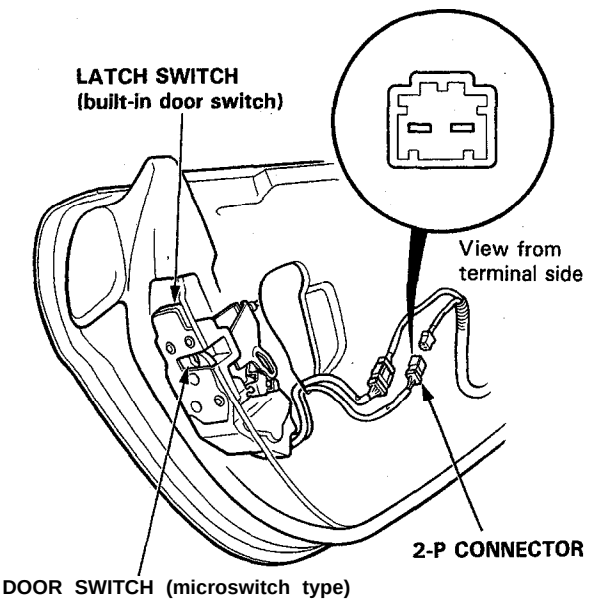
4. There should be no continuity with the trunk latch in LOCK (trunk lid closed) position.



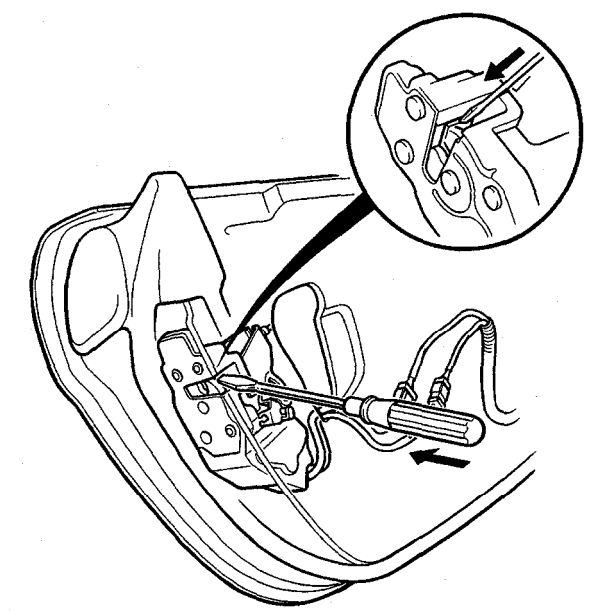
Door Switch Test

NOTE: Be careful not to damage the door trim panel when remove it.

1. Remove the door trim panel (See section 20).
2. Disconnect the 2-P connector from the door switch.

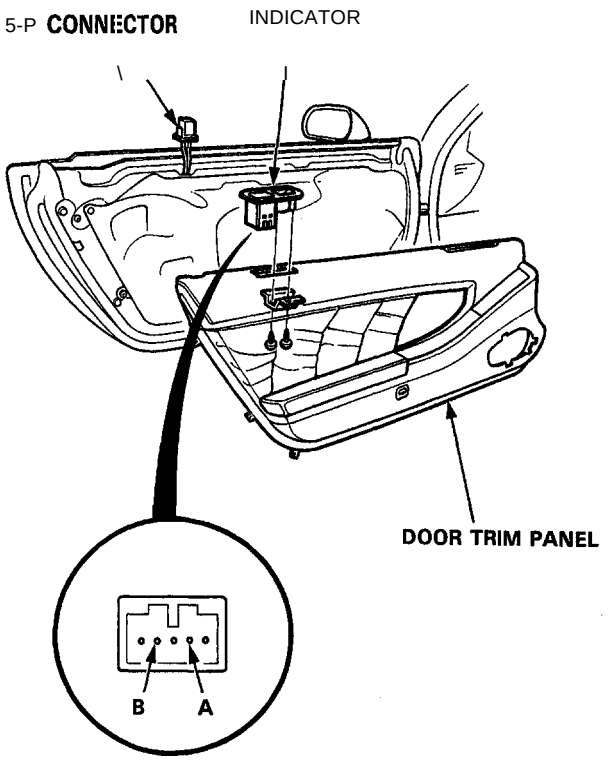


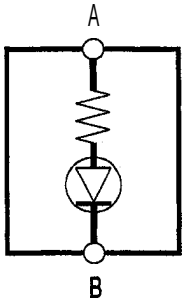
3. There should be continuity between the A terminal and B terminal with the door opened.
4. There should be no continuity with the switch pushed (door closed).



indicator Replacement

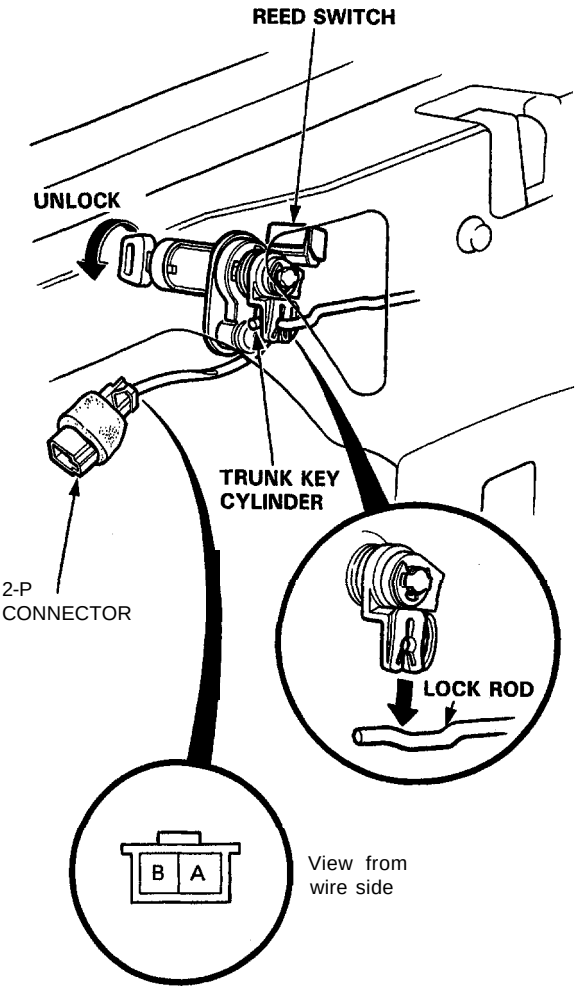
1. Remove the door trim panel (see section 20).
2. Remove the 2 screws from the indicator.
3. Remove the indicator from the door trim panel.





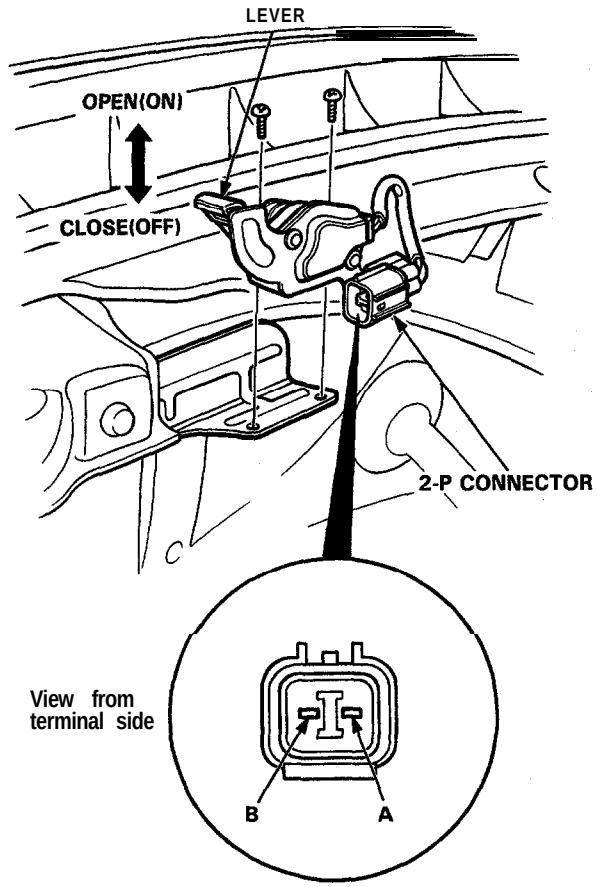
Trunk Key Cylinder Switch Test

1. Open the trunk lid and remove the trunk rear trim panel.
2. Disconnect the 2-P connector from the trunk key cylinder switch.
3. There should be continuity between the A and B terminals when the trunk keylock is turned to UNLOCK with the key.
   There should be no continuity when the keylock is released.



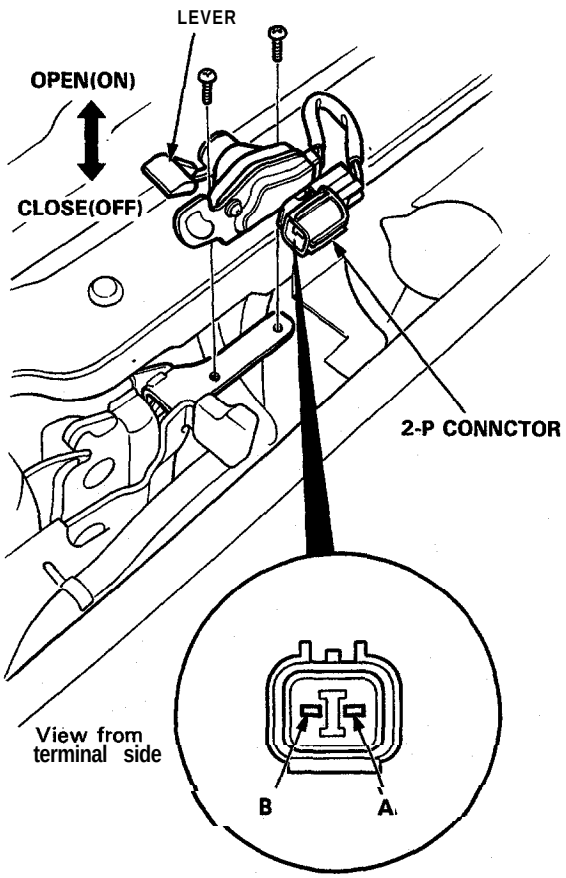
-Engine Cover Switch Test

1. Open the engine cover.
2. Disconnect the 2-P connector from the engine cover switch.
3. There should be continuity between the A and B terminals with the lever released (cover opened). There should be no continuity with the lever pushed down (cover closed).



-Hood Switch Test

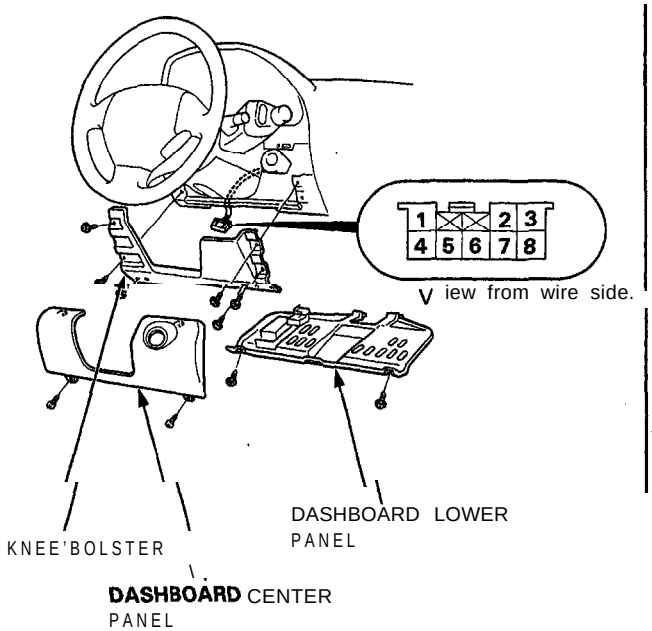
1. Open the hood.
2. Disconnect the 2-P connector from the hood switch.
3. There should be continuity between the A and B terminals with the lever released (hood opened). There should be no continuity with the lever pushed down (hood closesd).



Security Alarm System

Ignition Key Switch Test

1. Remove the dashboard lower panel and dashboard center panel.
2. If necessary, remove the knee bolster.
3. **Disconnect the 8-P connector from the floor wire harness.**
4. **There should be continuity between the No. 8 and No. 7 terminals when the ignition key is inserted into the ignition key cylinder.**
   There should be no continuity when the ignition key is removed.



Supplemental Restraint System (SRS)

Component Location Index 23-320
Description 23-32 1
Circuit Diagram 23-322
Wiring Locations 23-323
Troubleshooting 23-324
Airbag Assembly
- Removal 23-338
- Installation 23-339
- Disposal 23-340

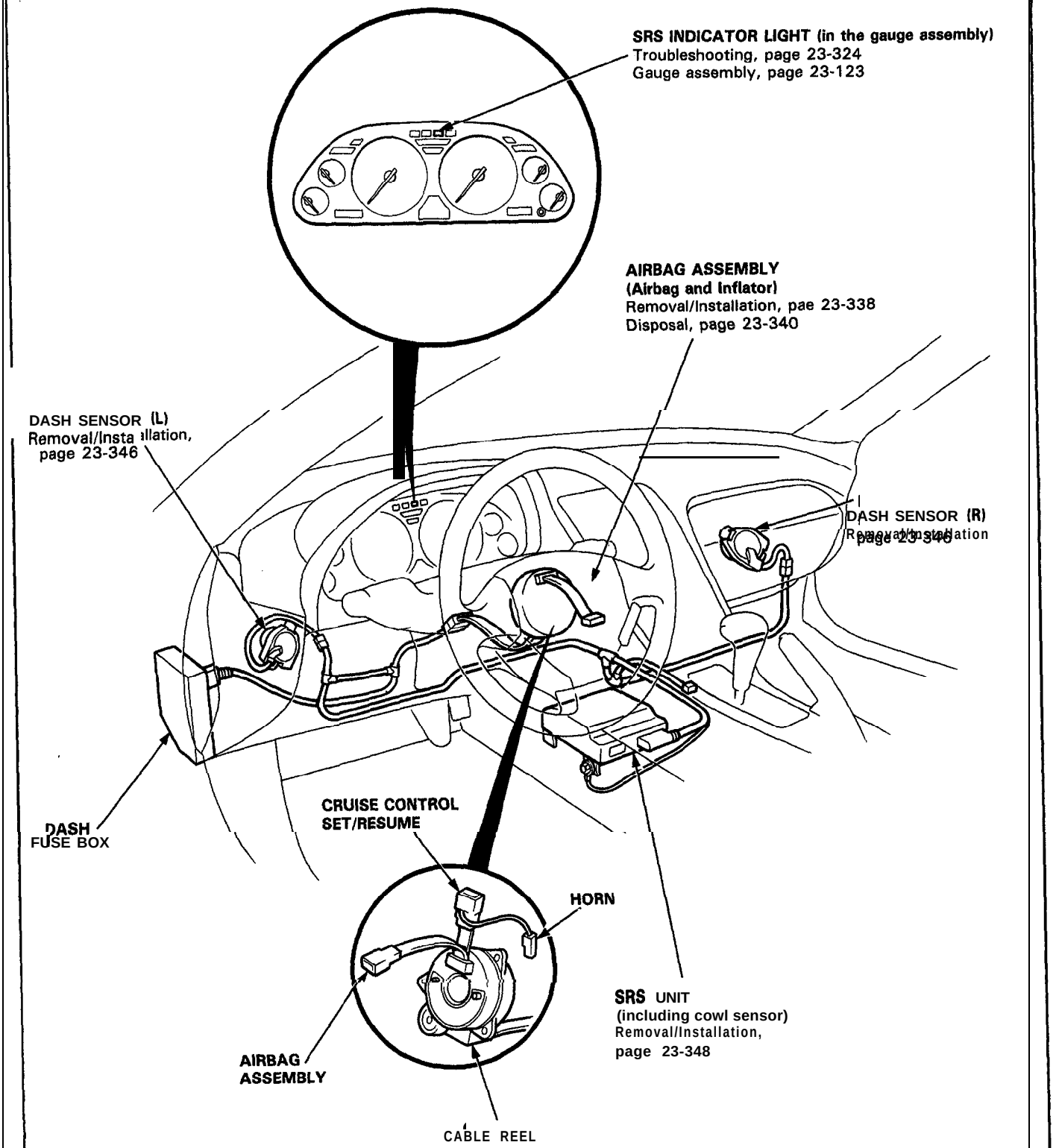
Cable Reel
- Removal 23-342
- Installation 23-344

Dash Sensor
- Removal 23-346
- Installation 23-347

SRS Unit
- Removal 23-348
- Installation 23-349

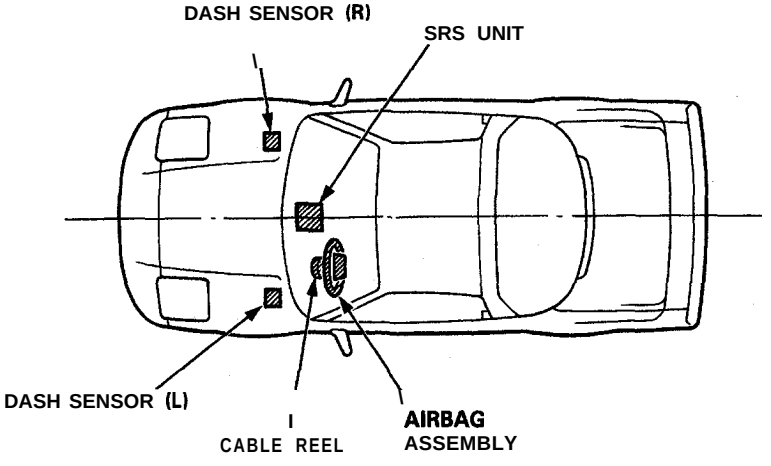
Supplemental Restraint System (SRS)

Component Location Index



Description

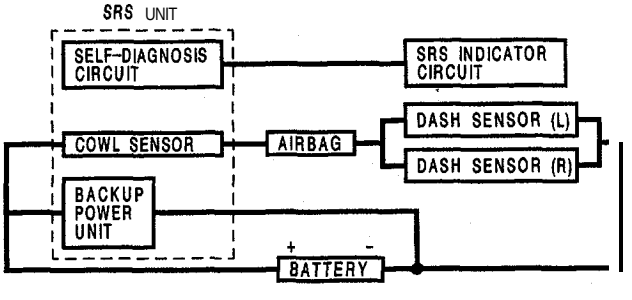
The SRS is a safety device which, when used in conjunction with the seat belt, is designed to protect the driver by operating only when the car receives a frontal impact exceeding a certain set limit.
The system is composed of left and right dash sensors, the SRS unit (includes cowl sensor), the cable reel and airbag assembly.



OPERATION:
As shown in the diagram below, the left and right dash sensors are connected in parallel. The parallel sets of sensors are connected in series by the airbag inflator circuit and the car battery. In addition, a backup power unit is connected in parallel with the car battery. The backup power unit and the cowl sensor are located inside the SRS unit.

The SRS operational sequence is as follows:
(1) Cowl sensor activates and one or both dash sensors activate.
(2) Electrical energy is supplied to the airbag inflator by the battery, or the backup power unit if the battery voltage is too low.
(3) Airbag deployment.

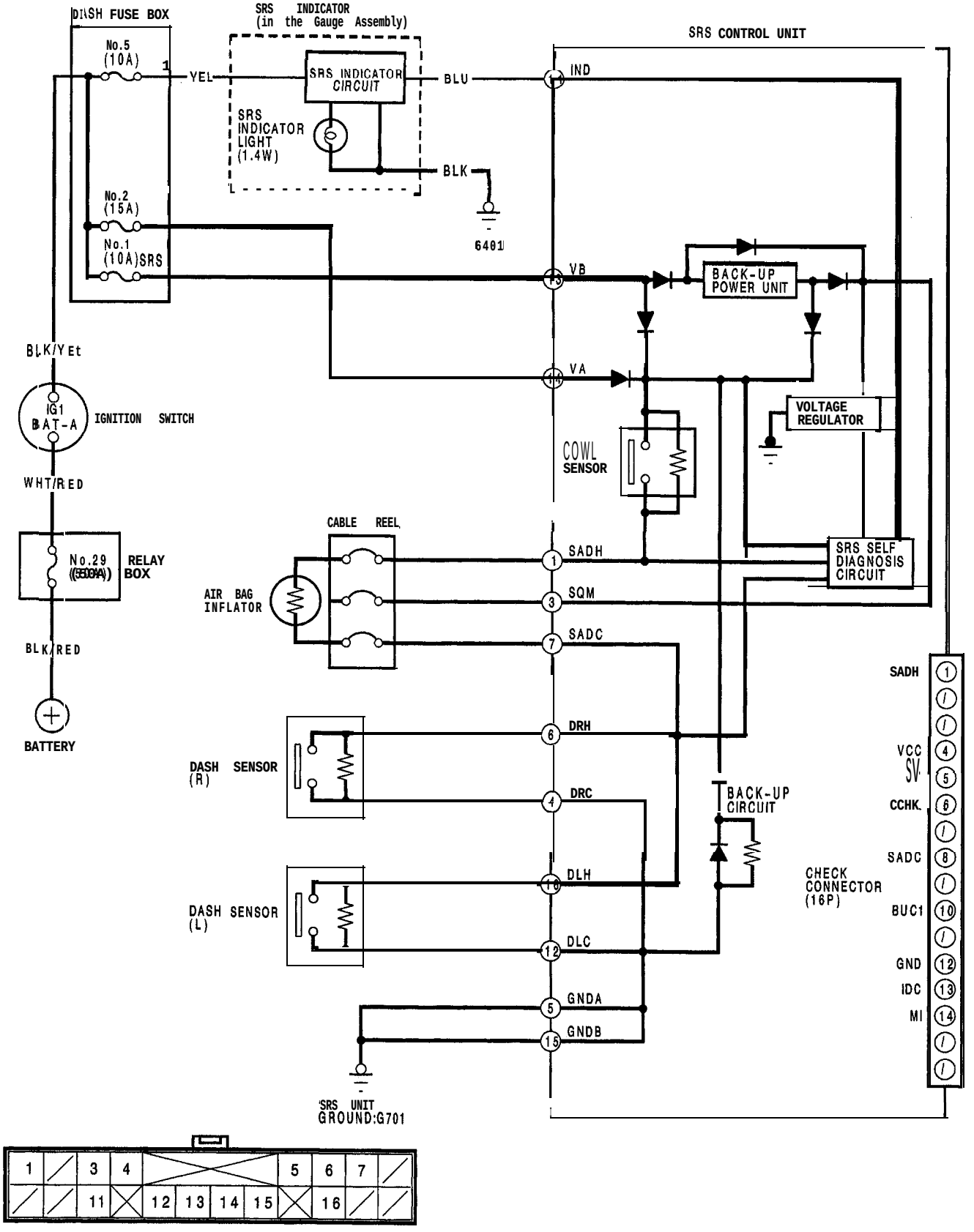
At least the cowl and one dash sensor must be activated simultaneously for at least 0.002 seconds in order for the airbag to be deployed.



Self-diagnosis system
A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON, the SRS warning light comes on and goes out after about 6 seconds if the system is operating normally. If the light does not light, or does not go out after 6 seconds, or if it comes on while dirving, this indicates an abnormality in the system. It must be inspected and repaired as soon as possible.

Supplemental Restraint System (SRS)

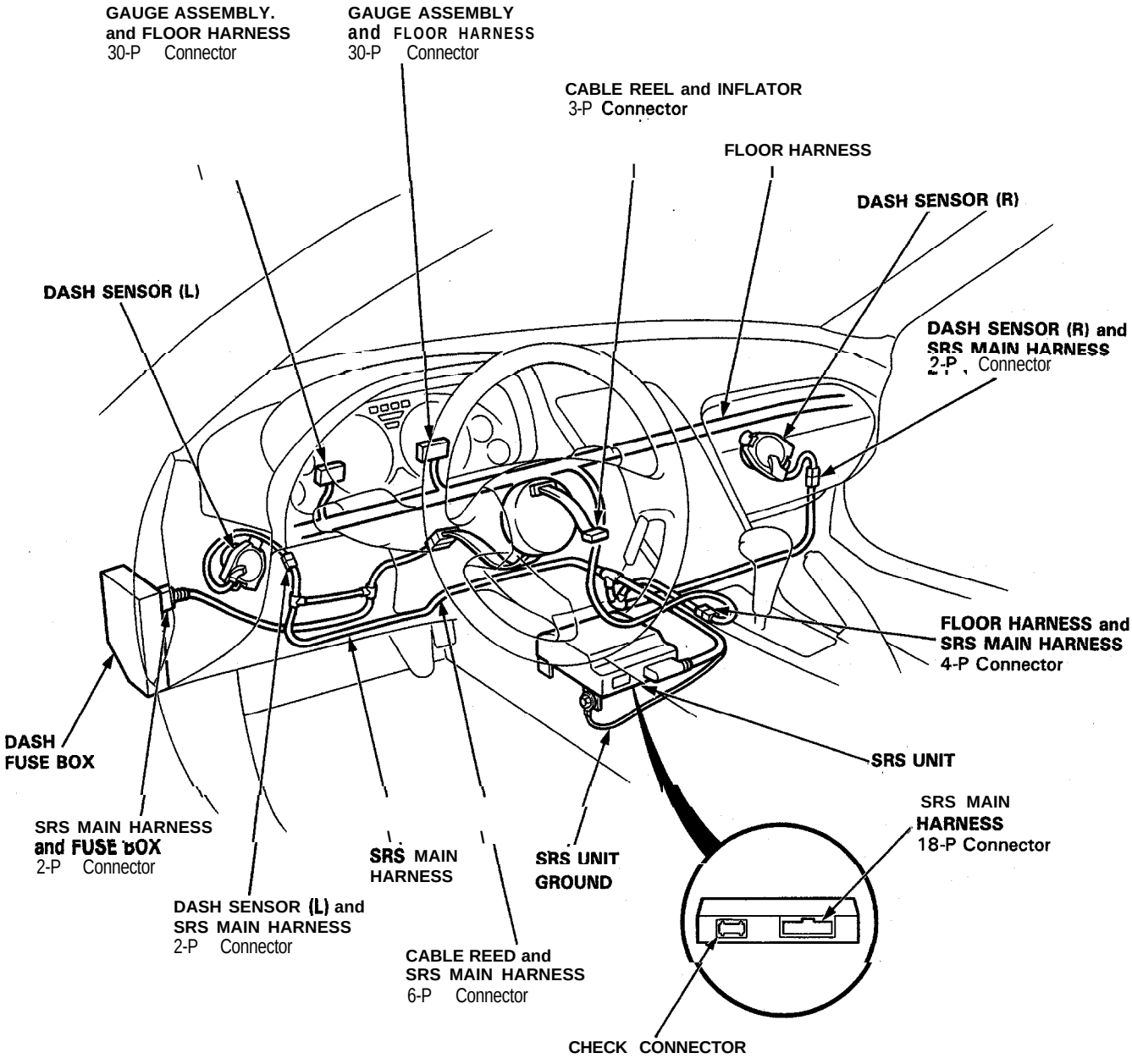
. Circuit Diagram



Wiring Locations

CAUTION:
Make sure all SRS ground locations are clean and grounds are securely attached.

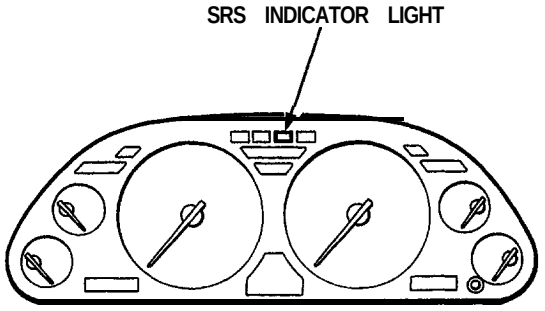
NOTE:
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open cirucit or damage to the wiring.



Troubleshooting

Self-diagnosis Function

The SRS unit includes a self-diagnosis function. If there is a failure in the sensors, SRS unit, inflator, or their circuits, the SRS light in the instrument panel goes ON.



As a system check the SRS light also comes on when the ignition is first turned to the II position. if the light goes off after approximately 6 seconds the system is OK.

If the SRS light remains on (or fails to come on the system check mode) one of the SRS components (or the wiring/connectors in-between) is faulty.

Troubleshooting precautions

- When attaching any of the test harnesses, push the connectors straight-in unit they are secure; do not bend the connector pins.
- Always use the test harness. Do not use test probes directly on component connector pins or wires; you may damage them or the control unit.
- Always keep the short connector on the airbag connector when the harness is disconnected.

SRS Indicator light troubleshooting

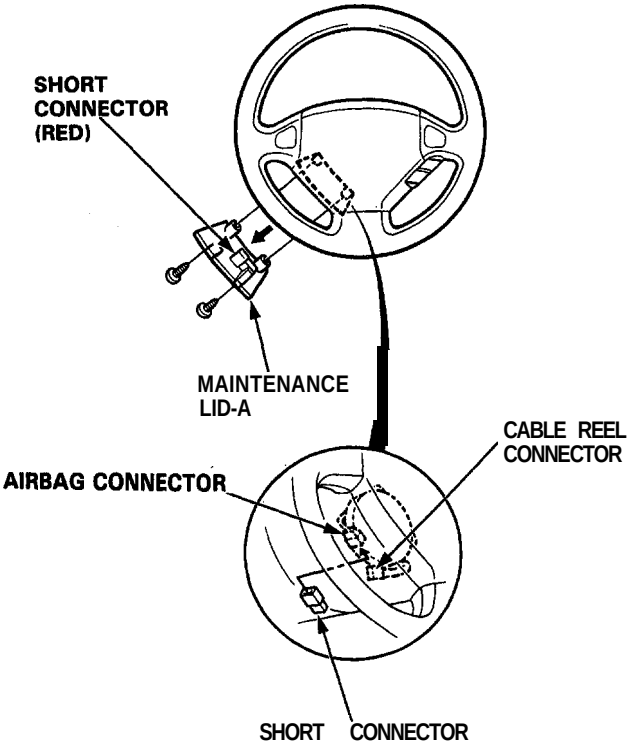
Possible conditions:

1. SRS light does not come on at ail — see page 23-326.
2. SRS light stays on constantly — see page 23-330.
3. SRS light comes on in combination with a failure of another electrical system (brake indicator, engine check light etc.). Check for damage/corrosion at the dash fuse box.

NOTE:

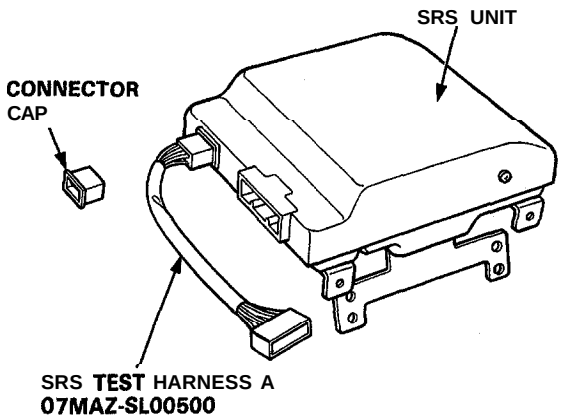
- Before starting the applicable troubleshooting, check the condition of ail SRS connectors and ground points.
- if the fault is not found after completing the applicable troubleshooting, substitute a known-good SRS unit and check whether the light indication goes away.

CAUTION: Disconnect both the negative and positive battery cables. Connect the short connector to the airbag assembly.



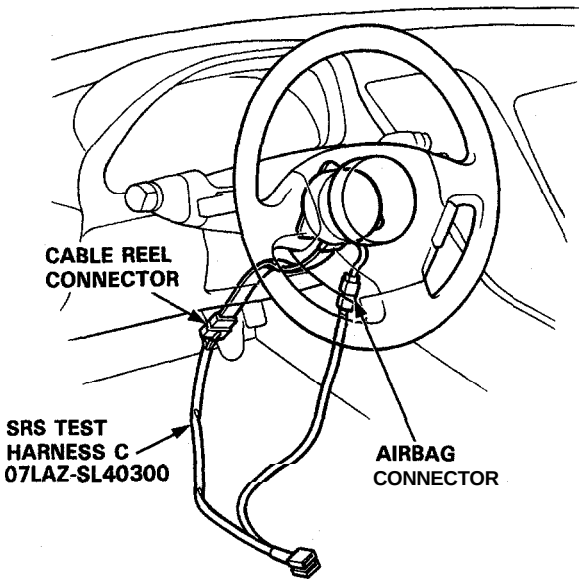
-Test Harness Attachment

SRS test harness A



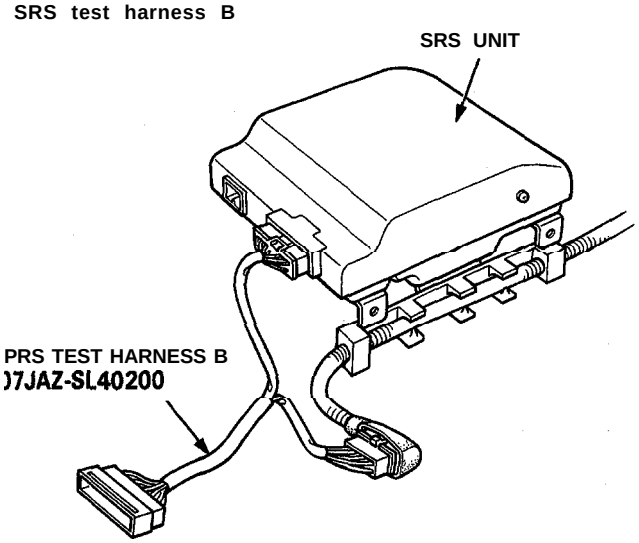
12		3	4	5	6	7	8
9	10	11	12	13	14	15	16

SRS test harness C



1	2	3	4
5	6	7	8

SRS test harness B

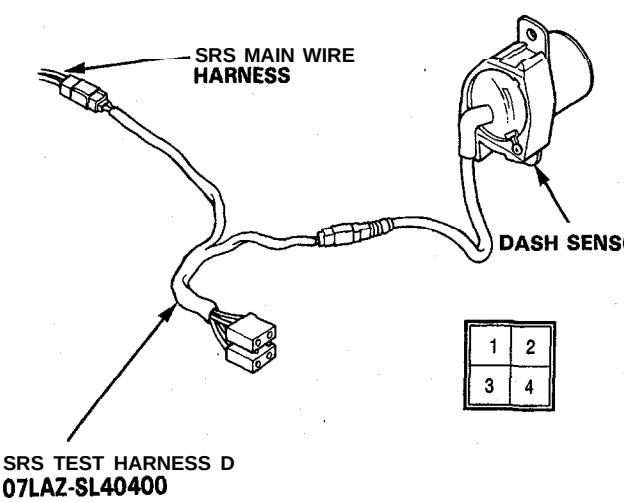


A-SIDE (SRS UNIT SIDE)

A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

B-SIDE (WIRE HARNESS SIDE)

SRS test harness D



1	2
3	4

(Cont'd)

The SRS Indicator Does Not Light

CAUTION:
- **Use only the dIgital multimeter (KS-AHM-32-003) to check the system.**

Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the airbag assembly (see page 23-324).

Connect the battery positive terminal and then connect the negative terminal.

Turn the ignition switch ON

Is another indicator light (TCS, ALB etc.) ON. (in the dash panel)

NO → inspect No. 5 fuse

Is No. 5 fuse OK?

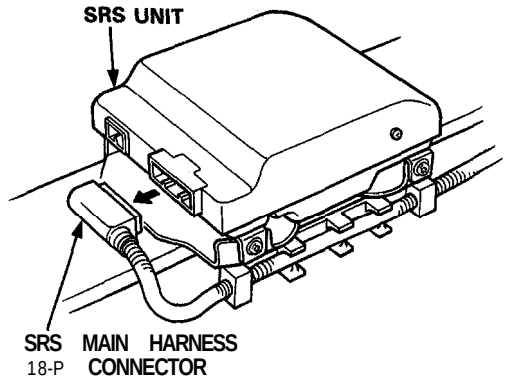
NO → Replace fuse.

YES → Repair open in floor harness between the No. 5 fuse and gauge assembly.

YES

Turn the ignition switch OFF.

Disconnect the SRS main harness 18-P connector from the SRS control unit.



Turn the ignition switch ON.

Is SRS indicator light comes on?

YES → The SRS unit assembly faulty.

NO

Turn the ignition switch OFF

(To page 23-327)

(From page 23-326)

Disconnect the SRS main wire harness 4-P connector from the floor wire harness.

Turn the ignition switch ON.

Is SRS indicator light ON ?

YES → The SRS main harness is faulty.

NO

Turn the ignition switch OFF.

Remove the gauge assembly then inspect the SRS indicator light bulb.

Is the SRS indicator light bulb OK?

NO → Replace the indicator light bulb.

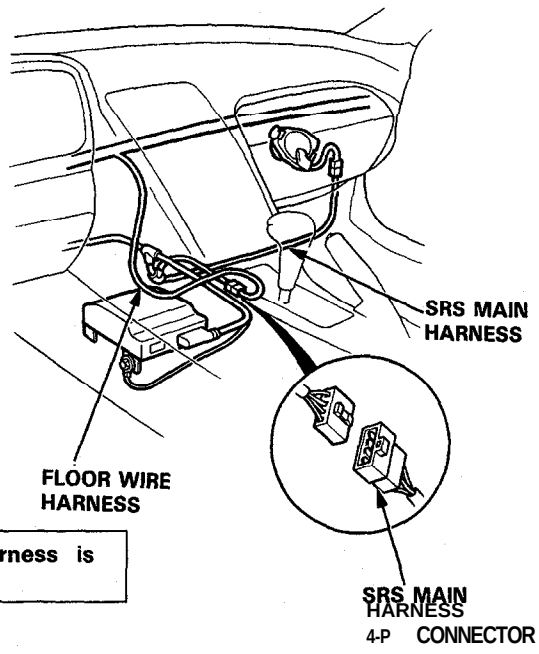
YES

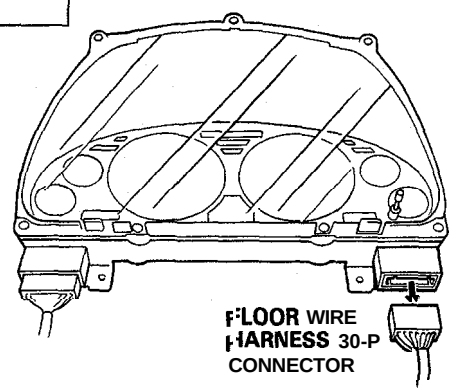
Connect a voltmeter between the No. 9 terminal of the 30P connector and body ground.

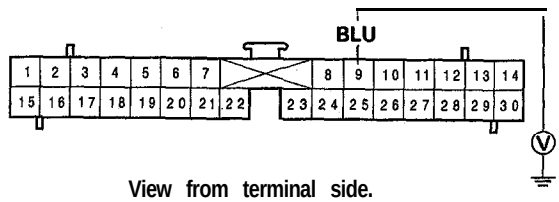
Turn the ignition switch ON.

Measure the voltage between the No. 9 terminal and body ground.

(To page 23-328)







View from terminal side.

(cont'd)

(From page 23-327)

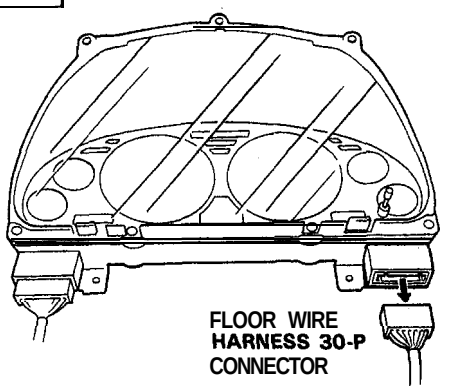
Is there less than 4V for 6 seconds after ignition is first turned on.

NO → Repair short in No. 9 terminal (BLU wire) of the floor wire harness.

YES

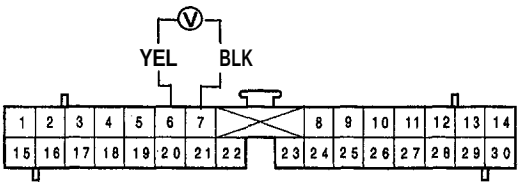
Turn the ignition switch OFF

Connect the voltmeter between the No. 6 terminal (+) and the No. 7 terminal (−) of the floor harness's 30P connector.



Turn the ignition switch ON.

Measure the voltage between the No. 6 terminal and the No. 7 terminal.



View from terminal side

Is there battery voltage?

NO → Check for continuity between the No. 7 terminal and body ground.

YES

Turn the ignition switch OFF.

Does continuity exist?

NO → Repair open in the No. 7 terminal (BLK wire) between the gauge assembly and body ground or poor ground (G401).

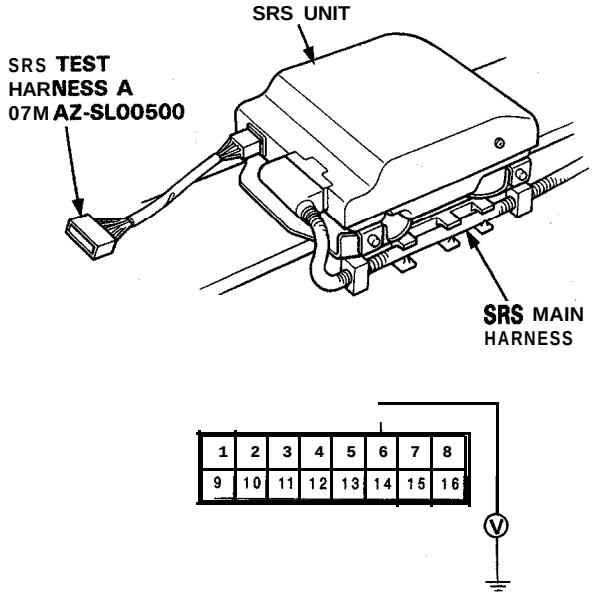
YES → Repair open in the No. 6 terminal (YEL wire) of the floor wire harness.

(To page 23-329)

(From page 23-328)

Reconnect each connector to the gauge assembly and SRS unit then connect the SRS test harness A to the SRS unit.

Measure the voltage between the No. 6 terminal and body ground for 6 seconds after ignition is first turned on.



Is there more than 9V?

YES → SRS indicator unit is faulty.

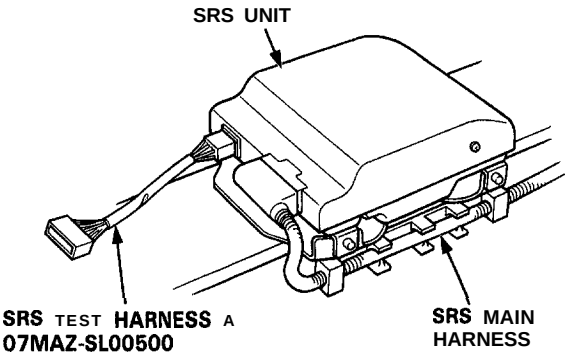
NO → SRS unit assembly is faulty.

(Cont'd)

SRS Indicator Light Stays On Continuously

Connect test harness A to the SRS unit and check voltages (to ground) according to the chart below.

NOTE:
- Turn the Ignition switch ON.
- Voltages in the chart assume an original "battery voltage" of approximately 12V.
- A significantly discharged battery (less than 12V) will result in differeent and possibly false readings.
- Do not connect the short connector to the airbag connector when checking these voltages.



1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No / Failure mode	① SADH	④ VCC	⑤ SV	⑥ CCHK1	⑧ SADC	⑩ BUC1	⑫ GND	⑬ IDC	⑭ MI
Normal	5.1-6.9	4.0-5.5	10.0-14.0	9.06-14.0	5.1-6.9	o- 2.0	O-2.0	10.0~ 14.0	9.0-14.0
A Cowl sensor open, or dash sensor short	0~2.0	4.0~5.5	10.0~14.0	9.0~14.0	0~2.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
9 Cowl sensor short, or dash sensor open.	10.0~14.0	4.0~5.5	10.0~14.0	9.0~14.0	10.0~14.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
C One dash sensor open	7.0~9.0	4.0~5.5	10.0~14.0	9.0~14.0	7.0~9.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
D Inflator or cable reel open.	10.0~14.0	4.0~5.5	10.0~14.0	9.0~14.0	0~2.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
E SRS fuse (No. 1) open.	5.1~6.9	0~1.0	0~2.0	9.0~14.0	5.1~6.9	0~6.9	0~2.0	4.0~9.0	9.0~14.0
F SRS indicator wire harness short. (open.)	5.1~6.9	4.0~5.5	10.0~14.0	9.0~14.0	5.1~6.9	0~2.0	0~2.0	0 (10.0~14.0)	9.0~14.0
G SRS unit ground and SRS unit mounting bolts (GND) open.	7.0~16.0	7.0~16.0	7.0~16.0	7.0~16.0	7.0~16.0	7.0~16.0	7.0~16.0	4.0~9.0	7.0~16.0

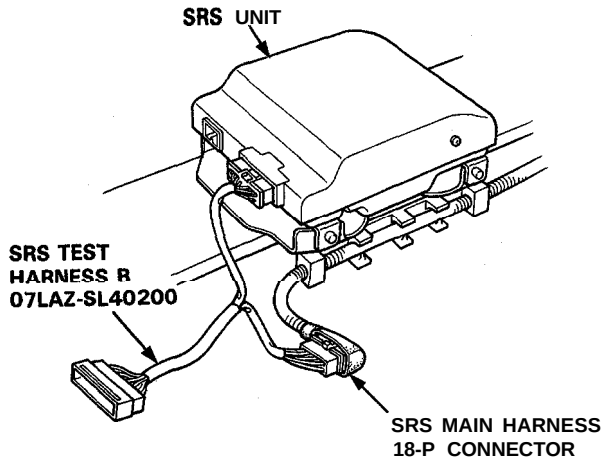
- If output signal is not in accordance with the chart first check the contact condition of each connector and terminal of the SRS system.
- If contact condition is OK, substitute a known-good control unit and perform troubleshooting again.

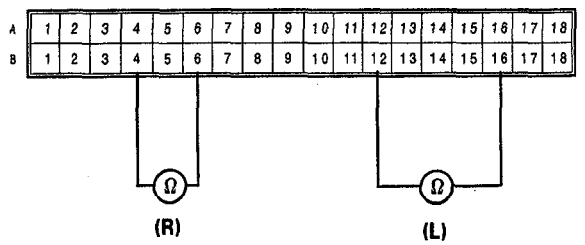
Mode A: Cowl sensor open, or dash sensor short.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the airbag assembly (See page 23-324).

1. Connect the SRS test harness B between the SRS unit and SRS main harness 18-P conector.

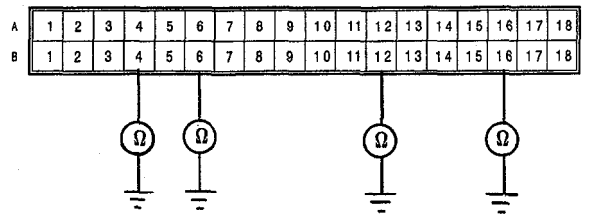
2. Reconnect the battery cables then check the resistance between the left dash sensor terminals B 12 and B 16, and between the right dash sensor terminals B4 and B6.





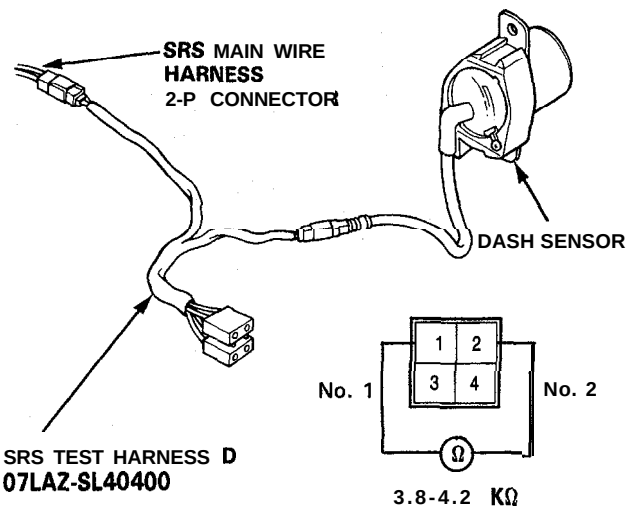
- If resistance is more than 3.8 – 4.2 KΩ for either sensor, go to step 3.
- If resistance is less than 3.8-4.2 KΩ for either sensor, go to step 4.

3. Check to make sure there is no continuity between body ground and each terminal of both dash sensors.



- If there is no continuity the SRS unit is faulty. Substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.
- If there is continuity at any of the terminals, go to step 5.

4. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector. Check the resistance between the No. 1 terminal and No. 2 terminal.



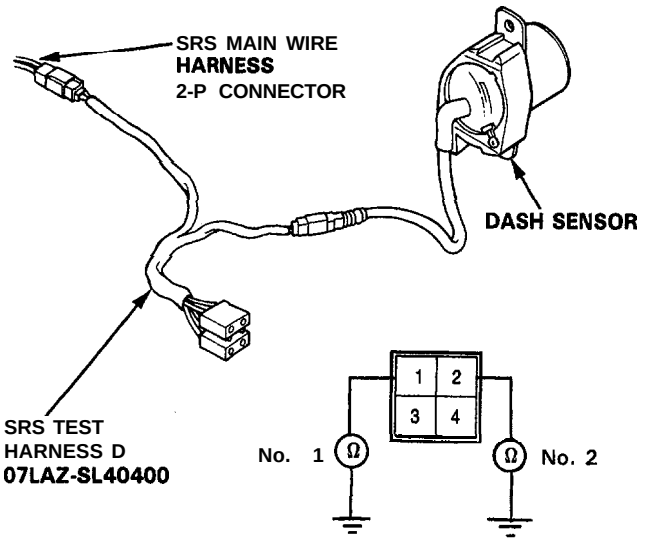
NOTE: The left and right sensors cannot be checked at the same time.

(cont'd)

- If resistance is less than 3.8 – 4.2 KΩ the respective dash sensor is faulty, replace the dash sensor and recheck the voltages according to the chart on page 23-330.

- If resistance is more than 3.8-4.2 KΩ, replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

5. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector.
Check to make sure there is no continuity between the No. 1 terminal and body ground, and between the No. 2 terminal and body ground.



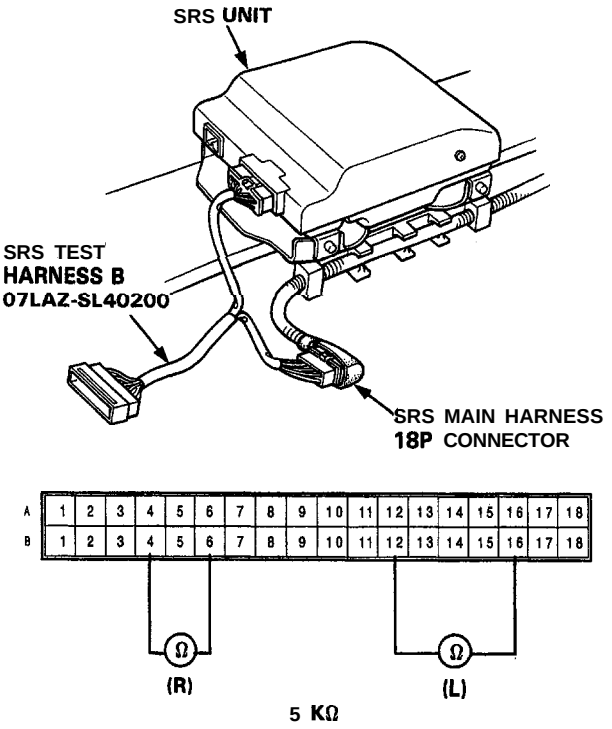
- If there is continuity, the dash sensor is faulty: replace and recheck the voltages according to the chart on page 23-330.

- If there is no continuity, replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

Mode B: Cowl sensor short, or dash sensor open.
Mode C: One dash sensor open.

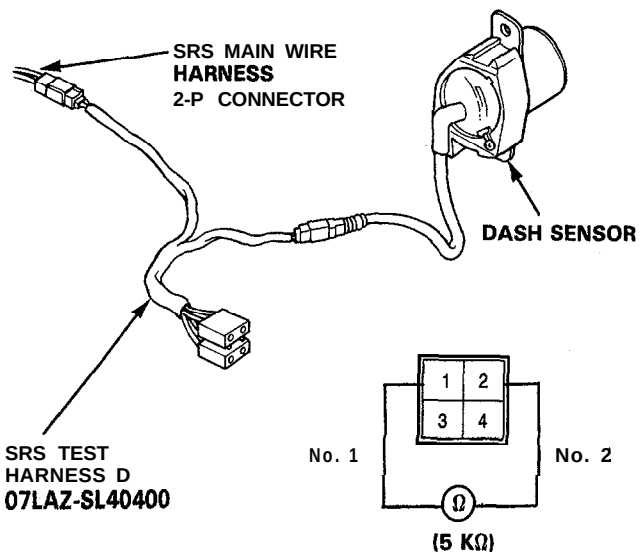
CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal.
Connect the short connector to the airbag assembly.

1. Connect the SRS test harness B between the SRS unit and SRS main harness 18-P conector.
Check the resistance between the left dash sensor terminals B 12 and B 16, and between the right dash sensor terminals B4 and B6.



- If resistance is more than 5 KΩ, go to step 2.
- If resistance is less than 5 Kg, the SRS unit is faulty, substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.

2. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector. Check the resistance between the No. 1 terminal and No. 2 terminal.

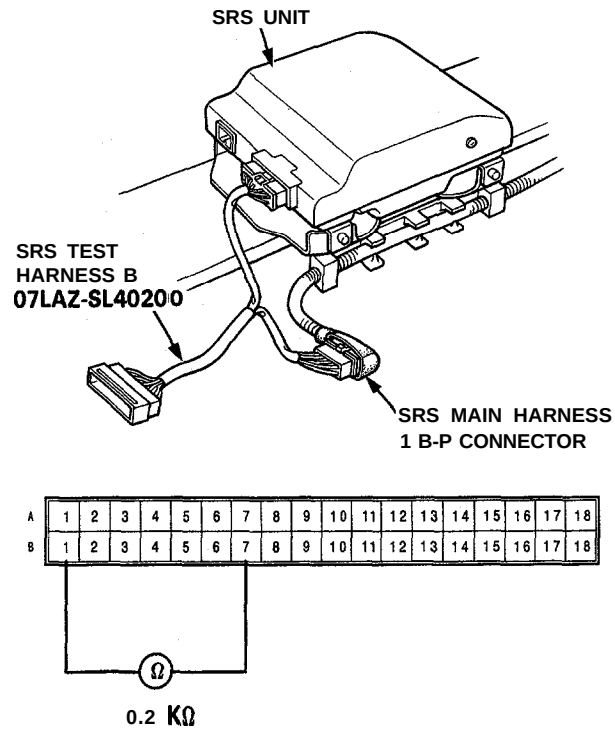


- If resistance is more than 5 KΩ, the dash sensor is faulty: replace and recheck the voltages according to the chart on page 23-330.
- If resistance is less than 5 KΩ, the SRS main wire harness is faulty: replace the SRS main wire harness and recheck the voltages according to the chart on 'page 23-330.

Mode D: Airbag inflator or cable reel open.

1. Disconnect the battery negative terminal and then disconnect the positive terminal.

2. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector. Measure the resistance between the B 1 and the B7 terminal.



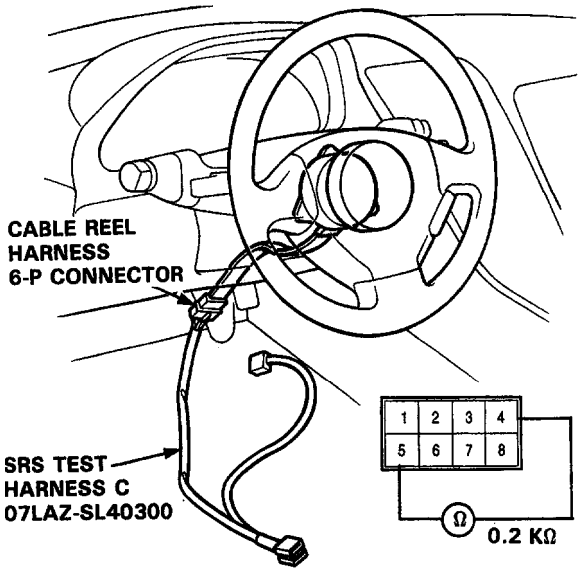
- If resistance is more than 0.2 KΩ, go to step 3.
- If resistance is less than 0.2 KΩ, the SRS unit is faulty, substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.

3. Disconnect the cable reel harness and main harness's 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.

4. Measure the resistance between the No. 4 terminal and the No. 5 terminal.

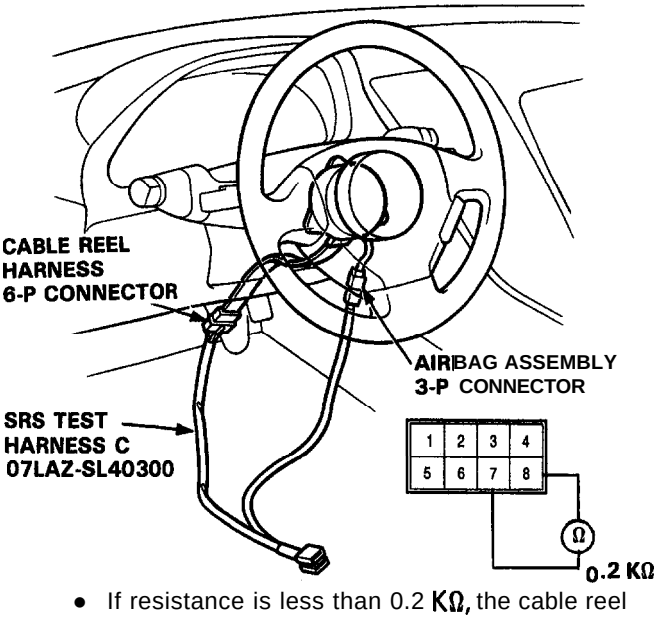
(cont'd)

Troubleshooting (cont'd)



- If resistance is more than 0.2 KΩ, go to step 5.
- If resistance is less than 0.2 KΩ, the SRS main harness is faulty: replace the SRS main harness and recheck the voltages according to the chart on page 23-330.

5. Disconnect the airbag assembly and cable reel harness 3-P connector, and connect SRS test harness C to the airbag assembly harness's 3-P connector. Measure the resistance between terminals No. 7 and No. 8.

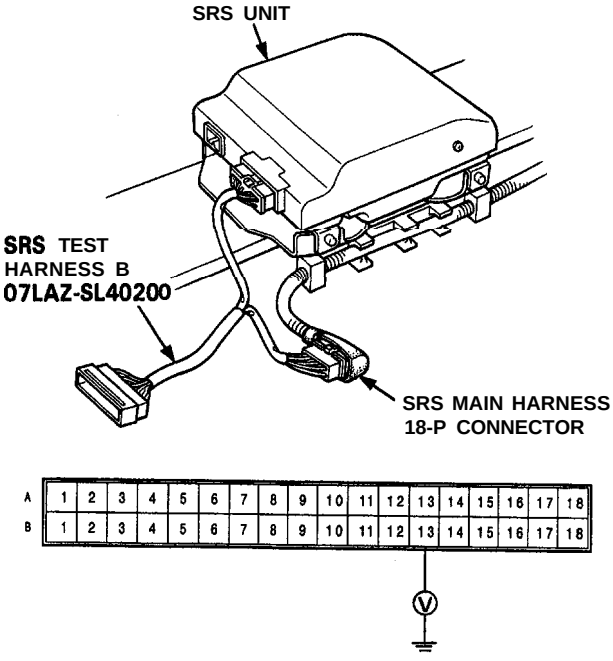


- If resistance is less than 0.2 KΩ, the cable reel is faulty: replace the cable reel and recheck the voltages according to the chart on page 23-330.
- If resistance is more than 0.2 KΩ, the inflator is faulty: replace the airbag assembly and recheck the voltages according to the chart on page 23-330.

Mode E: SRS No. 1 fuse open.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the airbag assembly (See page 23-324).

1. Connect the SRS test harness B between the SRS unit and SRS main harness 18-P connector.
2. Reconnect the battery positive terminal and negative terminal.
3. Measure the voltage between the B 13 terminal and body ground with the ignition switch ON.

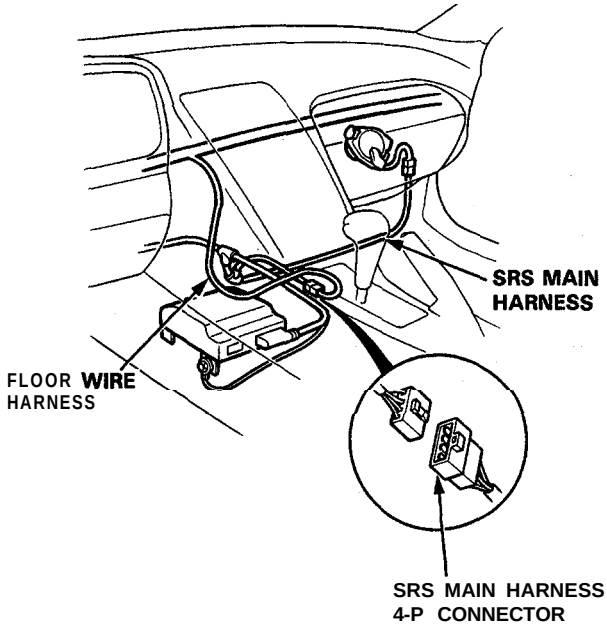


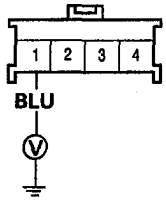
- If there is battery voltage, the SRS unit is faulty; replace and recheck the voltages according to the chart on page 23-330.
- If less than battery voltage, the main harness is faulty; replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

Mode F: SRS indicator wire harness open or short.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the airbag assembly (See page 23-324).

1. Reconnect the battery positive terminal and negative terminal.
2. Disconnect the SRS main harness's 4-P connector from the floor wire harness.
3. Measure the voltage between the No. 1 terminal and body ground on the SRS main harness 4-P connector side, with the ignition switch ON.

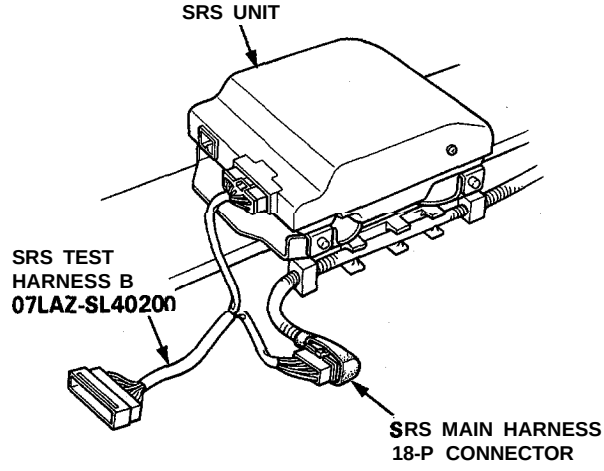


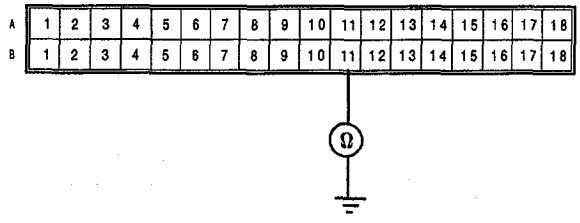


View from terminal side

- If voltage is less than 9 V, go to step 4.
- If voltage is more than 9 V, go to step 6.

4. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector. Check for continuity between the B1 1 terminal and body ground.

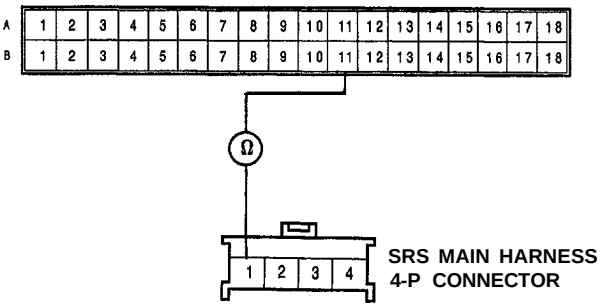




- If there is continuity, the SRS main harness is faulty: replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.
- If there is no continuity, go to step 5.

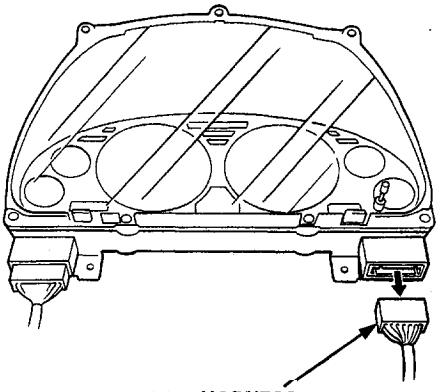
(cont'd)

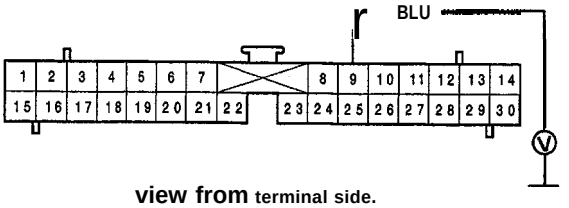
5. Check for continuity between the B11 terminal of the SRS test harness B and No. 1 terminal of the SRS main harness's 4-P connector.



- If there is continuity, the SRS unit is faulty; replace and recheck the voltages according to the chart on page 23-330.
- If there is no continuity, the SRS main harness is faulty; replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

6. Connect the SRS main harness's 4-P connector to the floor harness, then disconnect the floor harness's 30-P connector from the gauge assembly, and measure the voltage between the No. 9 terminal and body ground with ignition switch on.





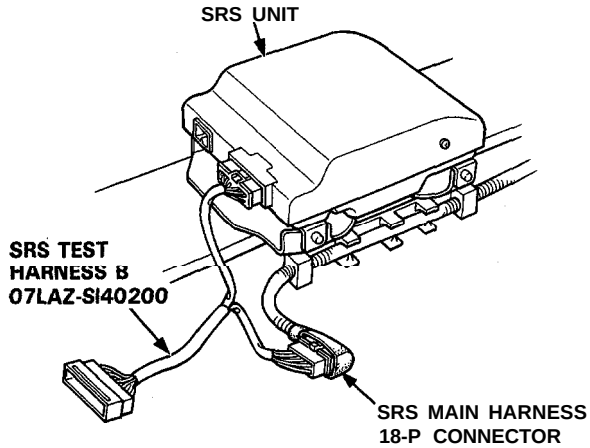
view from terminal side.

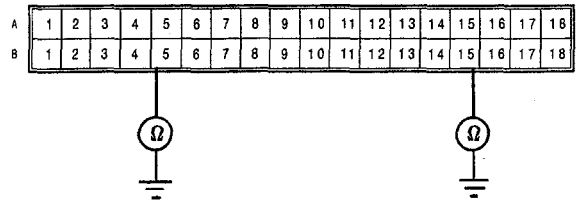
- If voltage is less than 9 V, the floor wire harness is faulty; repair open or short in BLU wire of the floor wire harness and recheck the voltages according to the chart on page 23-330.
- If voltage is more than 9 V, the SRS indicater circuit is faulty (in the gauge assembly); replace the gauge assembly and recheck the voltages according to the chart on page 23-330.

Mode G: SRS unit ground and component ground open.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the airbag assembly. (See page 23-324).

1. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector.
2. Check for continuity between the B5, B15 terminal and body ground.





- **If there is continuity, the SRS unit is faulty;** replace and recheck the voltages according to the **chart on page 23-330.**
- If there is no continuity, the SRS unit ground, the control unit component grounds or the main harness is faulty; check the ground (check wire and **control unit mounting bolts.) and, if necessary, replace the main harness and recheck the voltages according to the chart on page** 23-330.

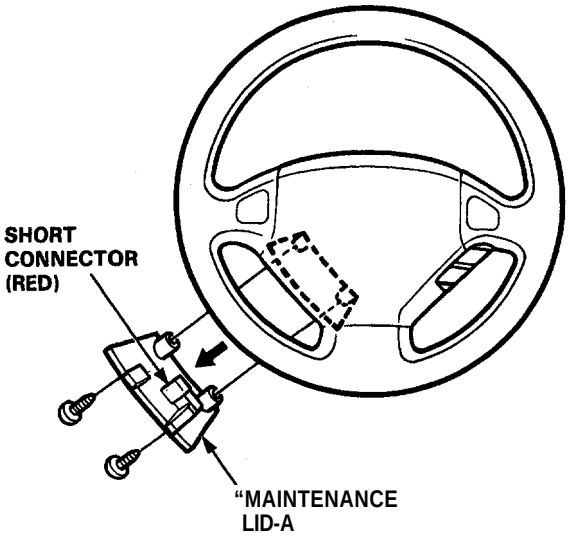
- Airbag Assembly Removal

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.

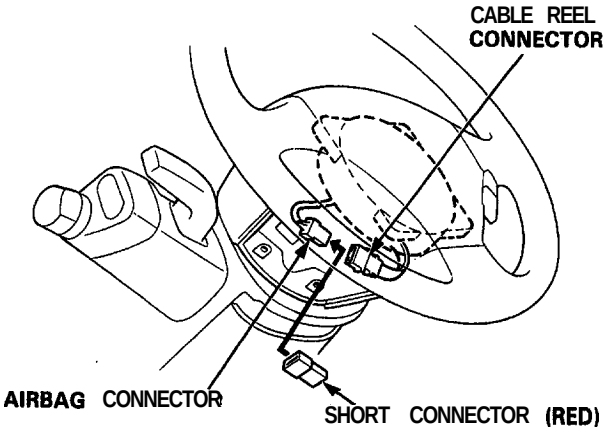
CAUTION:

- Do not install used SRS parts from another car. When repairing, use only new SRS parts.
- Carefully inspect the airbag assembly before installing. Do not install an airbag assembly that shows signs of being dropped or improperly handied, such as dents, cracks or deformation.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassemble or tamper with the airbag assembly.

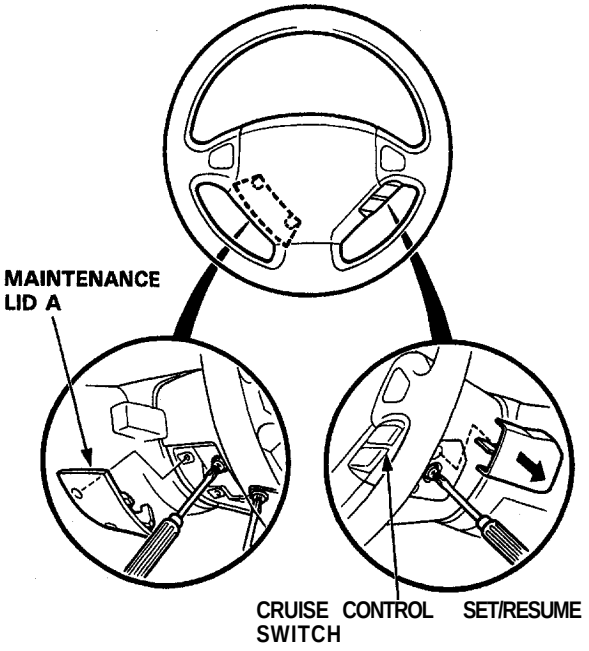
1. Disconnect the battery negative terminal, then disconnect the positive terminal.
2. Remove the maintenance lid A below the airbag, then remove the short connector.



3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector to the airbag side of the connector.



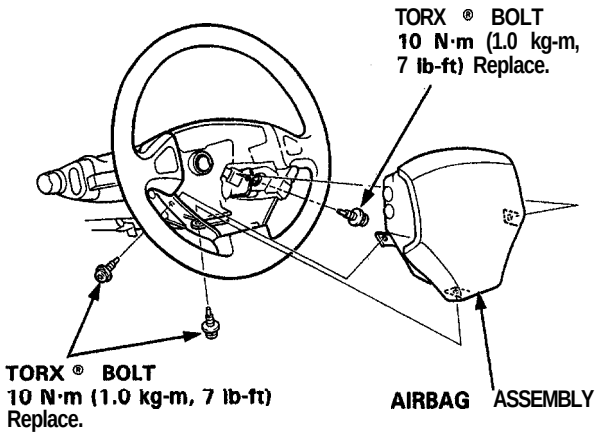
5. Remove the 3 TORX® bolts using TORX® T30 bit, then remove the airbag assembly.



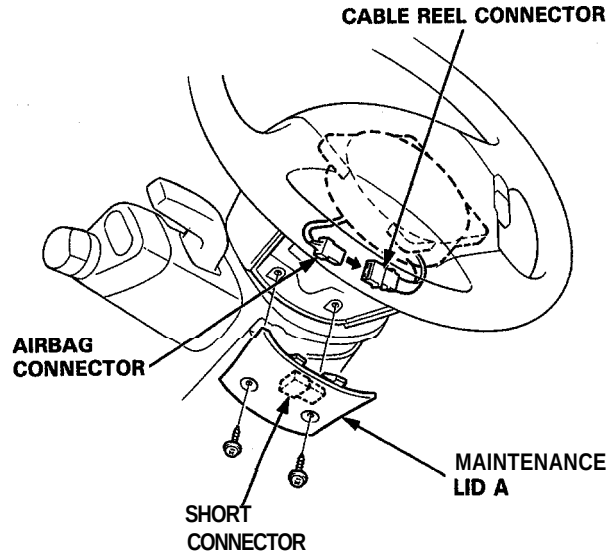
- Airbag Assembly Installation

CAUTION:
- Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.
- Be sure the battery cables are disconnected.

1. Place the airbag assembly on the steering wheel, and secure it with new TORX ® bolts.



2. Disconnect the short connector from the airbag connector.



3. Connect the airbag 3-P connector and cable reel 3-P connector.
4. Attach the short connector to lid A, then reinstall the lid on the steering wheel.
5. Connect the battery positive terminal and then connect the negative terminal.
6. After installing the airbag assembly, confirm proper system opration:
   - Turn on the ignition to II: the instrument panel SRS indicator light should go on for about 6 seconds and then go off.
   - Confirm operation of horn buttons.
   - a Confirm operation of cruise control set/resume switch.

- Airbag Assembly Disposal

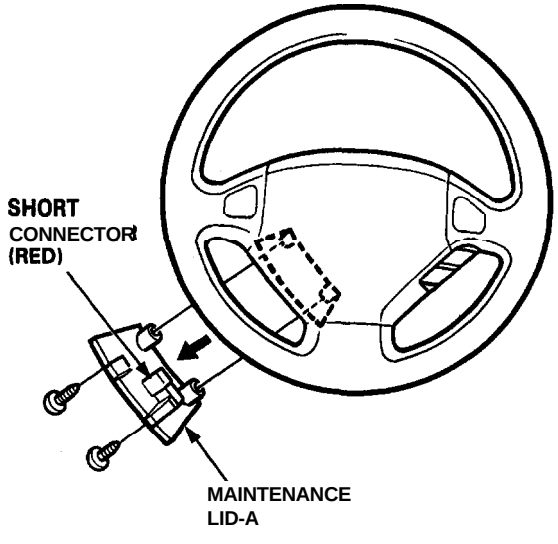
Before scrapping any airbag assembly (including one in a whole car to be scrapped) the airbag must be deployed. If the car is still within the warranty period, before deploying the airbag, the Acura District Service Manager must give approval and/or special instructions.
Only after the airbag is already deployed (as the result of vehicle collision, for example) can the normal scrapping procedure be done.
If the airbag appears intact (not deployed) it should be treated with extreme caution.
Follow the procedure, described below.

Airbag Deployment: In-Car

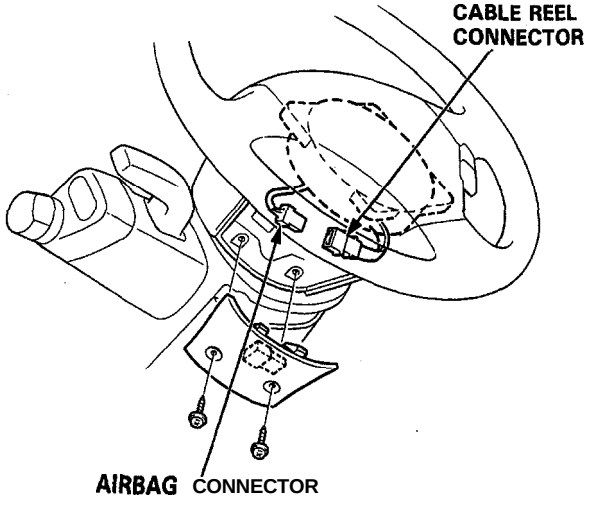
NOTE: If an SRS car containing an intact airbag is to be entirely scrapped, the airbag should be deployed while still in the car.
It should not be considered a salvageable part and should never be installed in another car.

⚠ WARNING Confirm that the airbag assembly is securely attached to the steering wheel; otherwise. severe personal injury could result during airbag deployment.

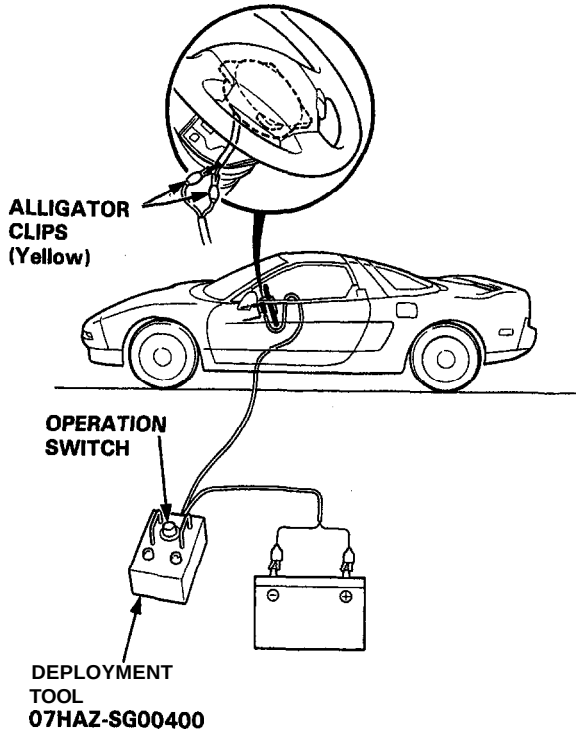
1. Disconnect both the negative cable and positive cable from the battery.
2. Confirm that the special tool is functioning properly by following the check procedure on the label of the tool set box, or on page 23-341.
3. Remove the maintenance lid A, below the airbag assembly.



4. Disconnect the connector between the airbag and cable reel.



5. Cut off the airbag connector and connect the special tool alligator clips to the airbag. Place the special tool approximately thirty feet away from the airbag.



6. Connect a 12 volt battery to the tool:
   - If the green light on the tool goes on, the airbag igniter circuit is defective and cannot be deployed. Go to Damaged Airbag Special Procedure.
   - If the red light on the tool goes on, the airbag is ready to be deployed.

7. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audibe and visible – a loud noise and rapid inflation of the bag, followed by slow deflation of the bag until it hangs loosely).

   - If audible/visible deployment happens and the green light on the tool goes on, continue with this procedure.
   - If deployment does not happen, yet the green light goes ON, the airbag igniter is defective and cannot be deployed.
     Go to Damaged Airbag Special Procedure.

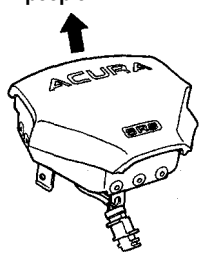
   ⚠ WARNING During deployment, the airbag assembly can become hot enough to burn you.
   Wait thirty minutes after deployment before touching the assembly.

8. Dispose of the complete airbag assembly.
   No part of it can be reused.

Airbag Deployment: Out-of-car.

NOTE: If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed as follows:

⚠ WARNING Position the airbag assembly face up, outdoors on flat ground at least thirty feed from any obstacles or people.



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool box label of the Tool Box.
2. Disconnect the short connector from the airbag harness.
   Follow the remaining steps 5,6,7 and 8 of the in-car deployment procedure.

Damaged Airbag Special Procedure.

⚠ WARNING If an airbag assembly 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 car, follow the removal procedure on page 23-338.
2. In all cases, make sure a short connector is properly attached to the airbag assembly harness.
3. Package the airbag assembly using exactly the same packaging that a new replacement airbag assembly came in.
4. Make the outside of th box "DAMAGED AIRBAG-NOT DEPLOYED" so it does not get confused with your parts stock.
   If applicable, also note on the box the VIN of the car from which it was removed.
5. Contact your ACURA District Service Manager for the method and address to return it to ACURA 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 tool is OK; red means tool is faulty.
3. Disconnect the battery and the yellow clips.

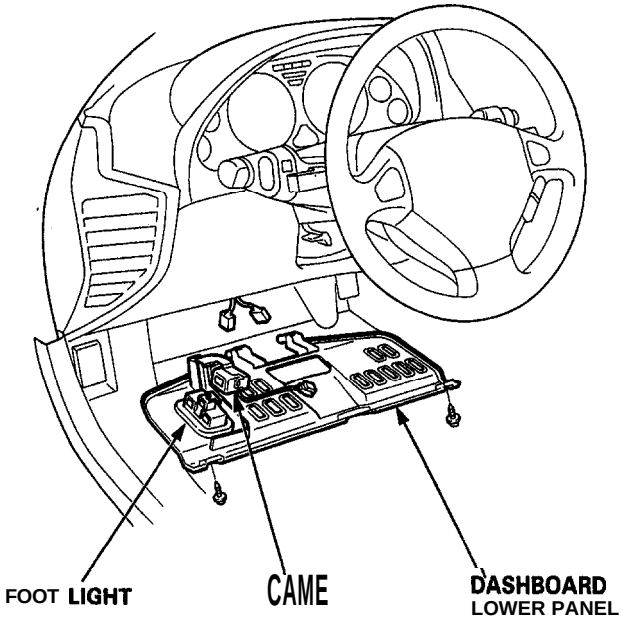
-Cable Reel Removal

⚠ 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.**

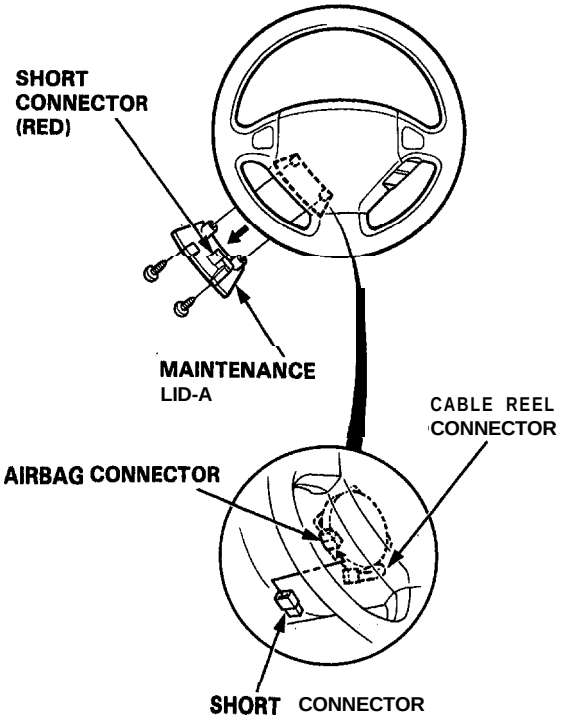
CAUTION:

- 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.
- **Always keep the short connector on the airbag** connector when the harness is disconnected.
- Do not disassemble or tamper with the **airbag** assembly.

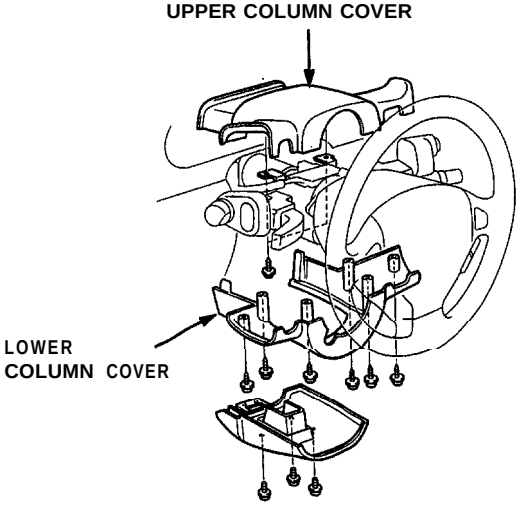
1. Disconnect the battery negative terminal, then disconnect the positive terminal.
2. Make sure the wheels are aligned straight forward.
3. Remove the dashboard lower panel then disconnect the foot light connector and lights-on chime connector from the dashboard lower panel.



4. Remove the steering wheel maintenance lid A, and disconnect the cable reel harness and airbag assembly 3-P connector. Connect the short connector to the airbag assembly.

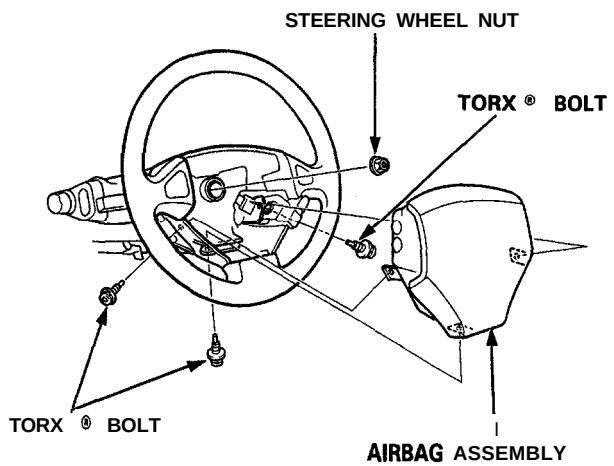


5. Remove the upper and lower column covers.

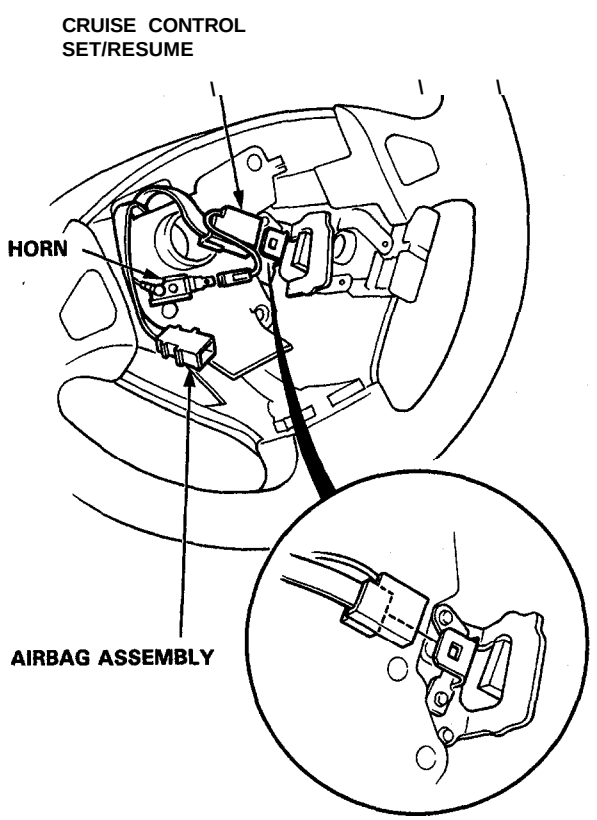


6. Disconnect the connector between the cable reel and main harness.

7. Remove the airbag assembly from the steering wheel, then remove the steering wheel nut.

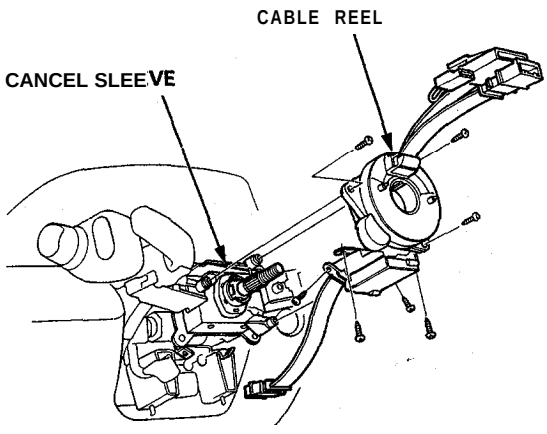


8. Disconnect the connectors from the horn and cruise control set/resume switches then remove the airbag connector from its clips.



9. Remove the steering wheel from the column.

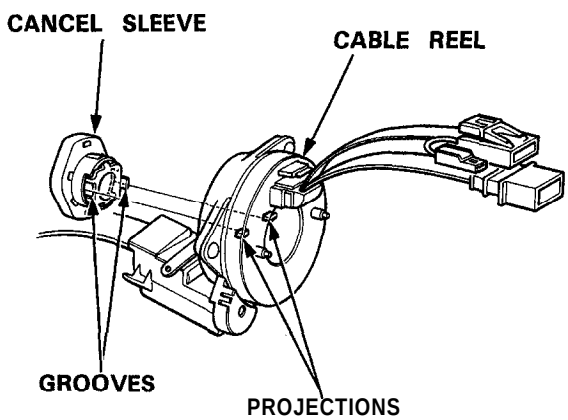
10. Remove the cable reel and cancel sleeve.



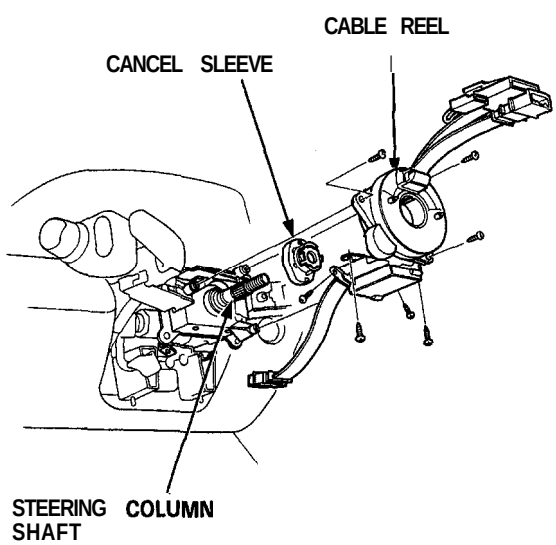
-Cable Reel Installation

CAUTION:
- Before installing the steering wheel, the front wheels should be aligned straight forward.
- Be sure to install the harness wires so that they are not pinched or interfering with other car 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 tierods, not by removing and repositioning the steering wheel.

1. Align the cancel sleeve grooves with the cable reel projections.

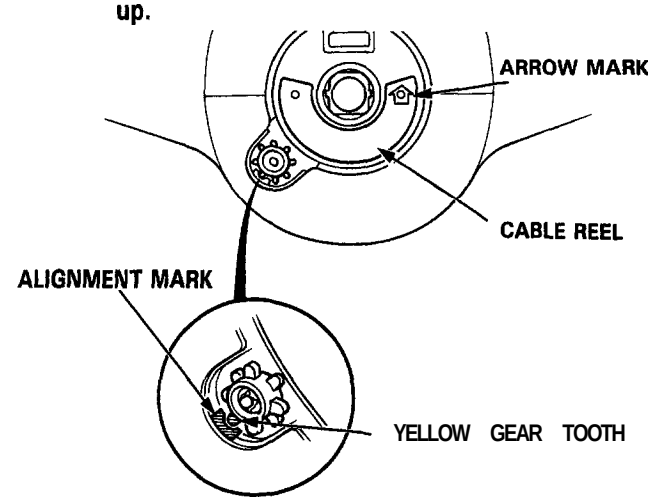


2. Carefully install the cable reel and the cancel sleeve to the steering column shaft.



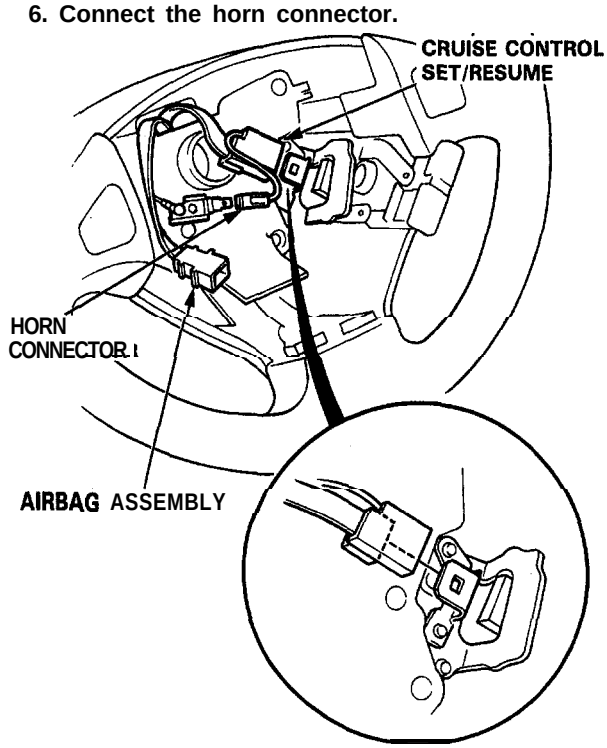
3. Install the steering column upper and lower covers.

4. Center the cable reel.
   Do this by first rotating the cable reel clockwise until it stops.
   Then rotate it counterclockwise (approximately two turns) until:
   - The yellow gear tooth lines up with the mark on the cover.
   - The arrow on the cable reel label points straight up.



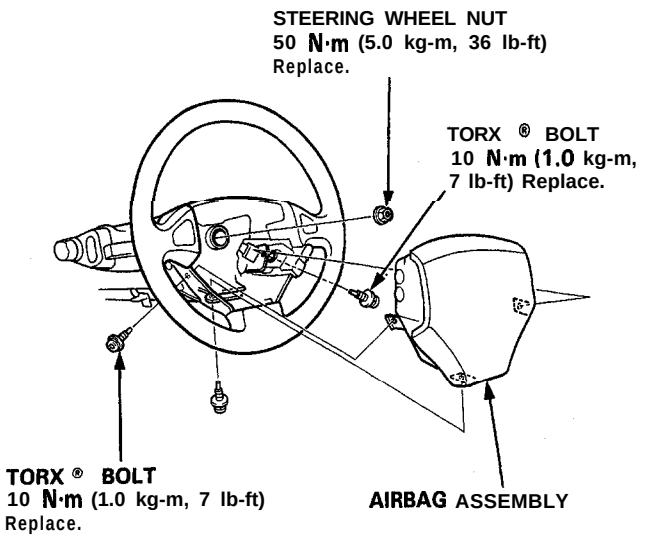
5. Install the steering wheel and insert the cruise control set/resume 4-P connector and airbag connector to the steering wheel clips.

6. Connect the horn connector.



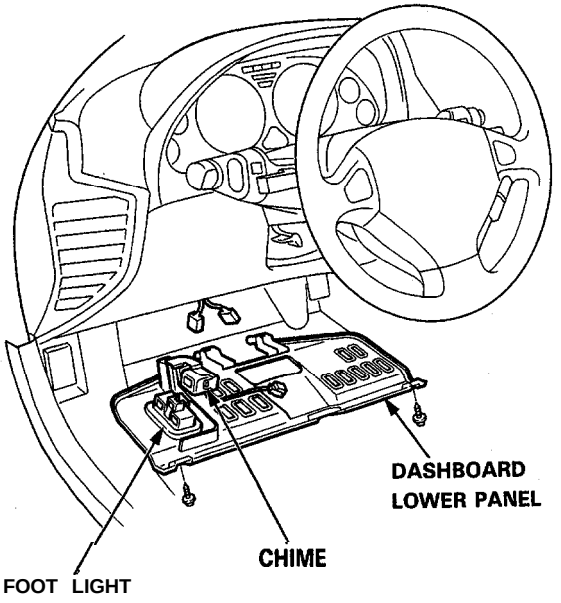
7. Install the steering wheel nut.

8. Install the airbag assembly.



9. Connect the harness from the cable reel to the SRS main harness below the pedal bracket.

10. Connect the foot light harness and lights-on chime to the dashboard lower panel, then install the lower panel.

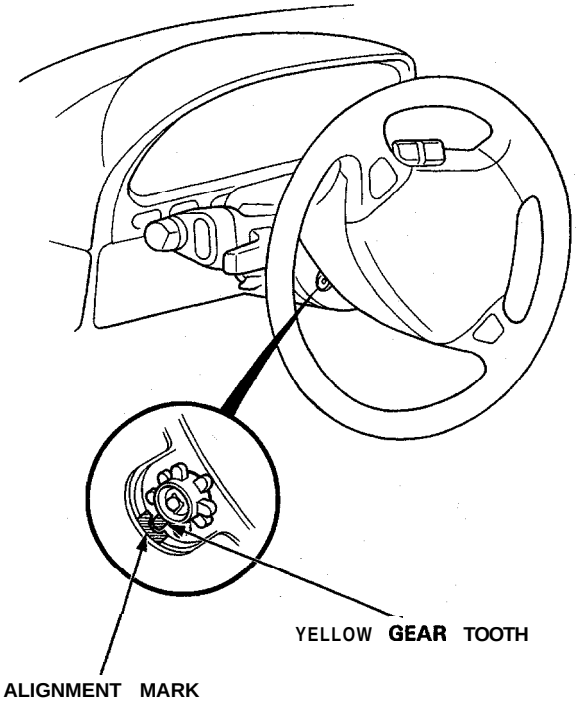


11. Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.

NOTE: Attach the short connector to lid A, then install the lid.

12. Connect the battery positive terminal, then connect the negative terminal.

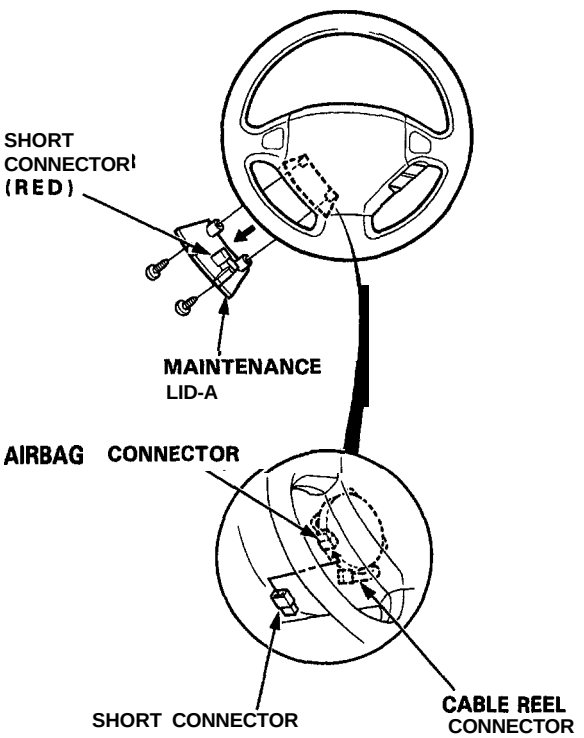
13. After installing the cable reel, confirm proper system operation:
- Turn on the ignition to II; the instrument panel SRS light should go on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of the lighting and wiper switches.
- Confirm operation of cruise control set/resume switch.
- Rotate the steering wheel counterclockwise until the yellow gear tooth lines up with the slot on the cover.



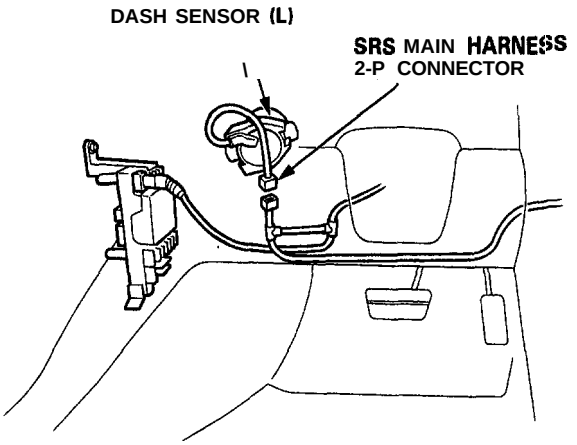
Dash Sensors Removal

CAUTION:
- Do not damage the sensor wiring.
- Do not install used SRS parts from another car, When repairing: use only new SRS parts.
- Carefully inspect the front sensors for signs of being dropped or improperly handled, such as dents, cracks or deformation.

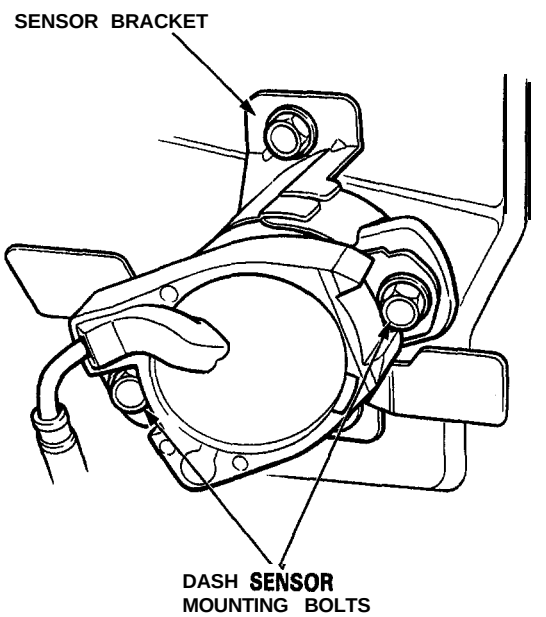
1. Disconnect the battery negative terminal, then disconnect the positive terminal.
2. Remove the maintenance lid A below the airbag, then remove the short connector.



3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector to the airbag side of the connector.
5. Remove the dashboard lower panel.
6. Pull back the carpeting and disconnect the connector between the dash sensor and SRS main harness.



7. Remove the 2 dash sensor mounting bolts from the sensor bracket, then remove the dash sensor

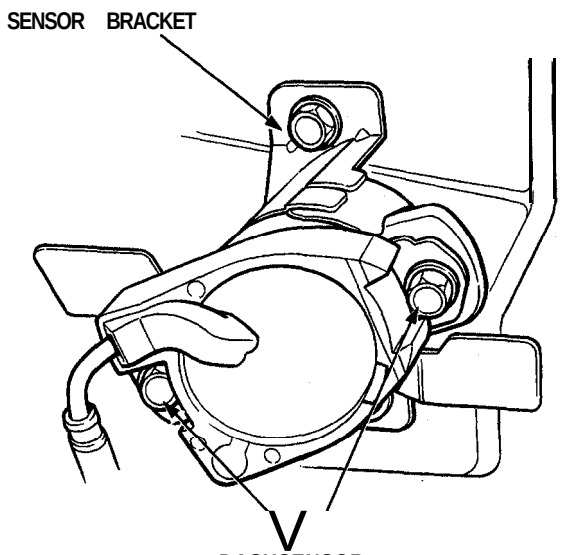


-Dash Sensors Installation

CAUTION:

- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.
- Replace a sensor if there are any signs of dents, cracks or deformation.
- For the SRS to function properly, the right and left sensors must be installed on the proper sides.

1. Be sure the battery cables are disconnected.
2. install the sensor and sensor harness.



NOTE: Make sure the sensor is installed securely.

3. Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.

NOTE: Reinstall the short connecter, then put the maintenance lid A back in position.

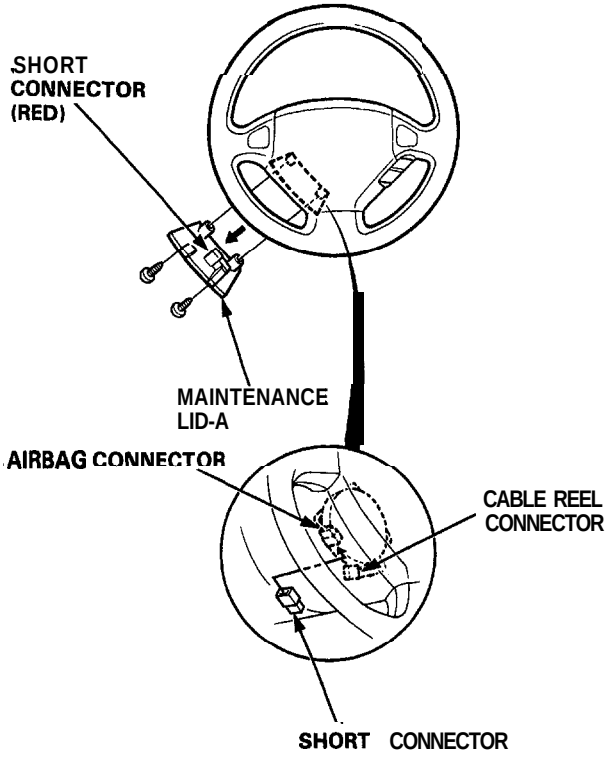
4. Connect the battery positive terminal, then connect the negative terminal.
5. After installing the dash sensor, confirm proper system operation.

- Turn on the ignition to II: the instrument panel SRS indicator light should go on for about 6 seconds and then go off.

SRS Unit Assembly Removal

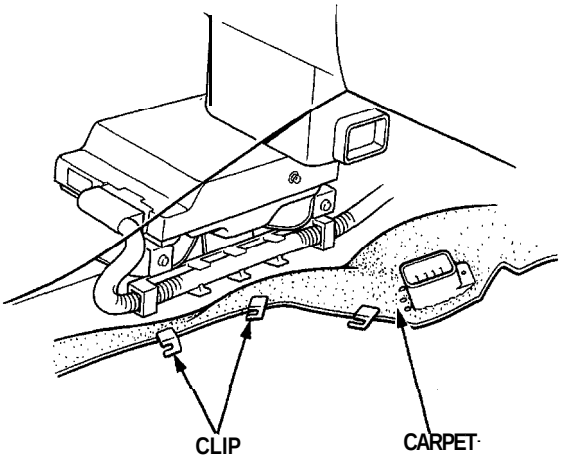
CAUTION:
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not damage the pins of connectors.
- No serviceable parts inside.
- Do not disassemble or tamper.
- Store in a clean, dry area.
- Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

1. Disconnect the battery negative terminal, then disconnect the positive terminal.
2. Remove the maintenance lid A below the airbag, then remove the short connector.

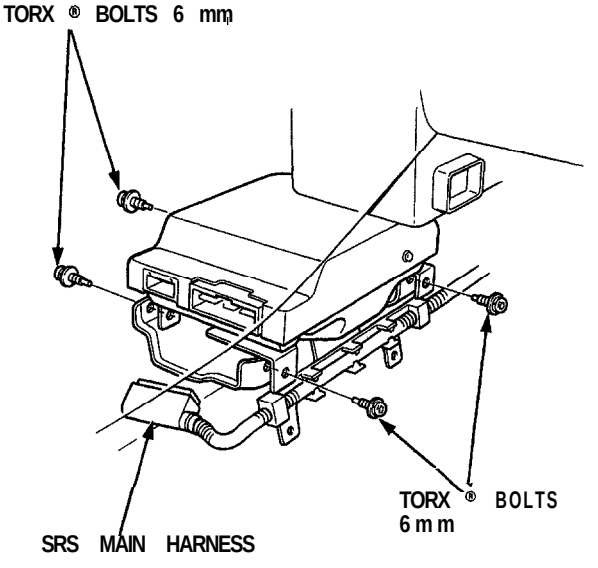


3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector to the airbag side of the connector.
5. Pull down the carpeting from the front console.

FRONT CONSOLE



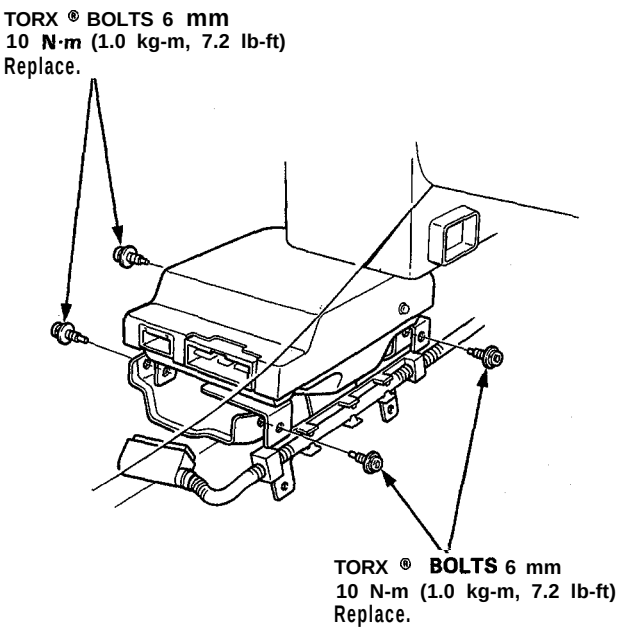
6. Disconnect the SRS unit connector, then unclip the SRS main harness from the holders.
7. Remove the SRS unit mounting bolts (4).
8. Pull out the SRS unit from the passenger's side.



· SRS Unit Assembly Installation

CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.

1. **Install the SRS unit.**



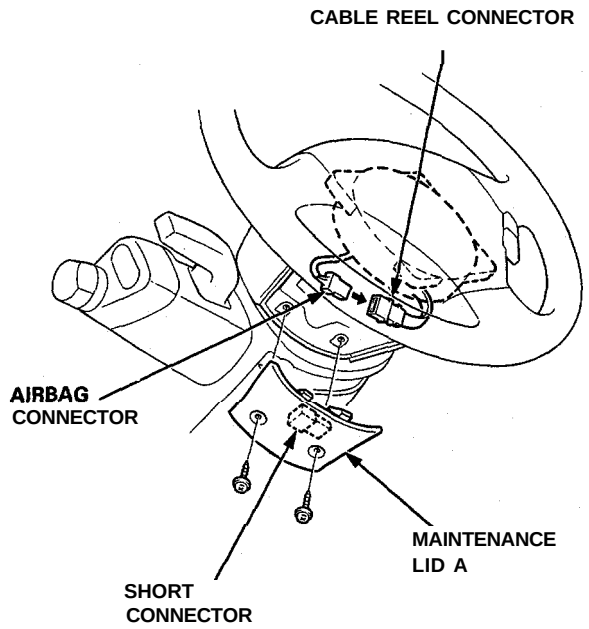
2. Clip the SRS main harness into the harness holder, then connect it to the SRS unit.

   NOTE: To reinstall a connector, push it into position until it clicks.

3. **install the carpet.**

4. Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.

   NOTE: Attach the short connector to lid A, then install the lid.



5. Connect the battery positive terminal, then connect the negative terminal.

6. After installing the airbag assembly, confirm proper system operation:

   - **Turn on the ignition to II: the instrument panel** SRS indicator light should go on for about 6 seconds and then go off.

Wiring Diagrams

Index

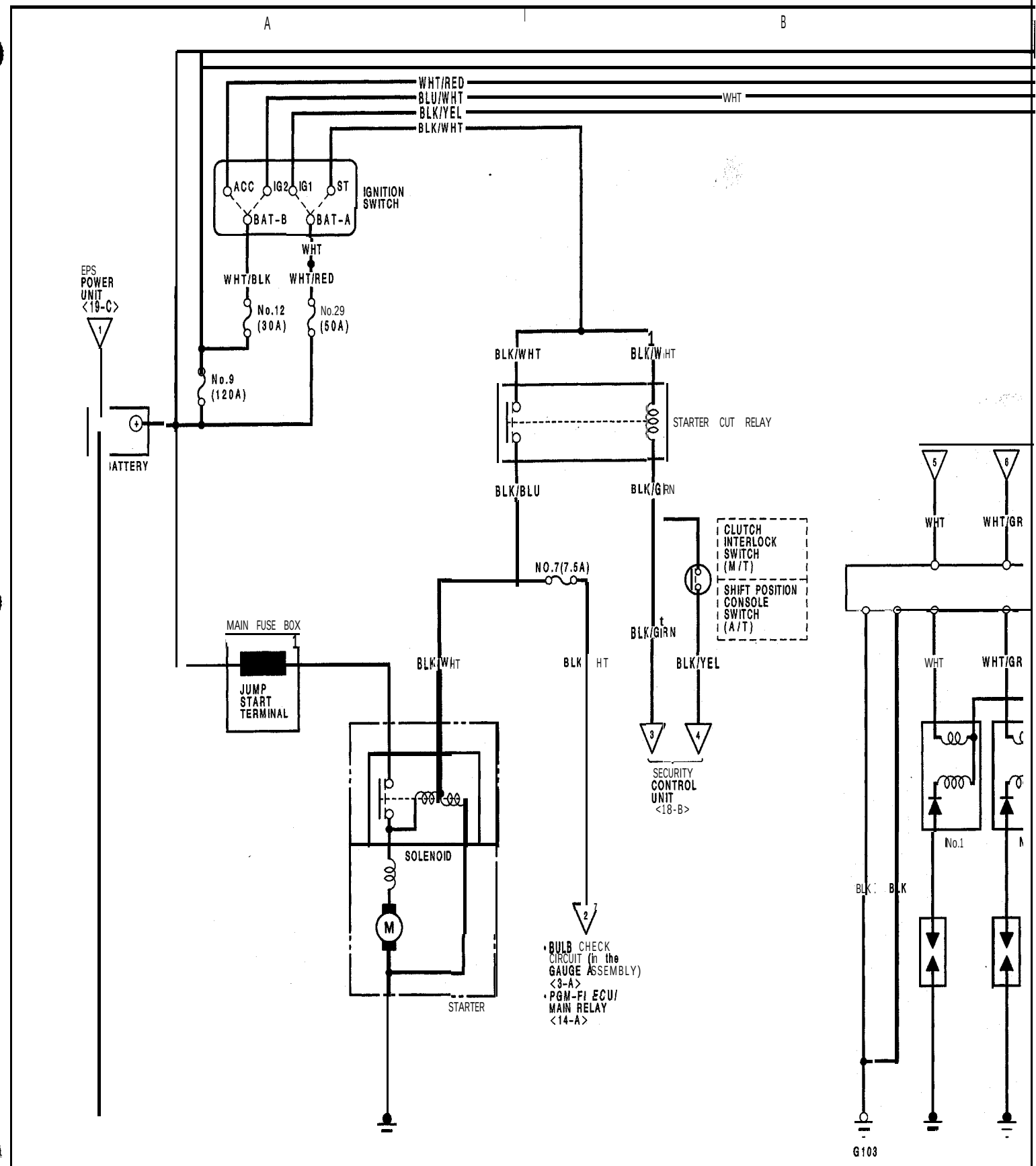
Air Conditioner 20
Anti-lock Brake System 17
Automatic Transmission Control System 16
Battery 1
Blower Controls 20
Charging System 1
Cigarette Lighter 10
Clock 9
Cooling Fan Control 2
Cruise Control 13
Defogger, Rear Window 12
Electric Power Steering (EPS) 19
Fuel Injection System 14
Gauges 2
Heater Control 20
Horns 10
Ignition Switch 1
Ignition System 1
Indicator
- Brake Warning 3
- Key-on Reminder 6
- Lights-on Reminder 6
- Low Fuel Indicator 3
- Oil Pressure Warning 3
- Safety Indicator 4
- Seat Belt Reminder 3
- Shift Lever Position Indicator 5

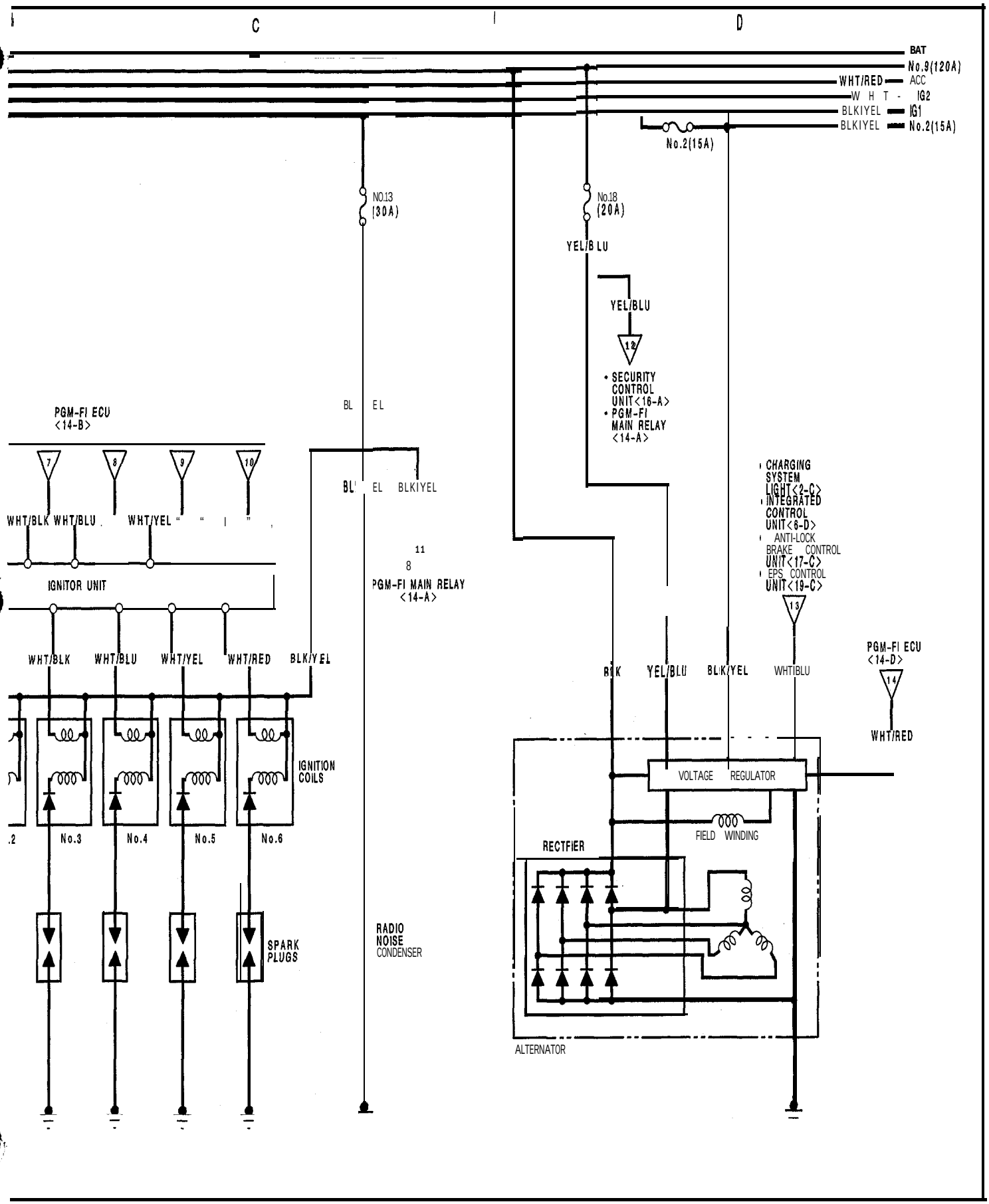
Integrated Control Unit 6
Interlock System 5
Lights, Exterior
- Back-up Lights 9
- Brake lights 4
- Front Side Marker Lights 6
- Daytime Running Lights 7
- Hazard Lights 9
- Headlights 7
- License Plate Lights 8
- Rear Side Marker Lights 8
- Taillights 8
- Turn Signal Lights 9

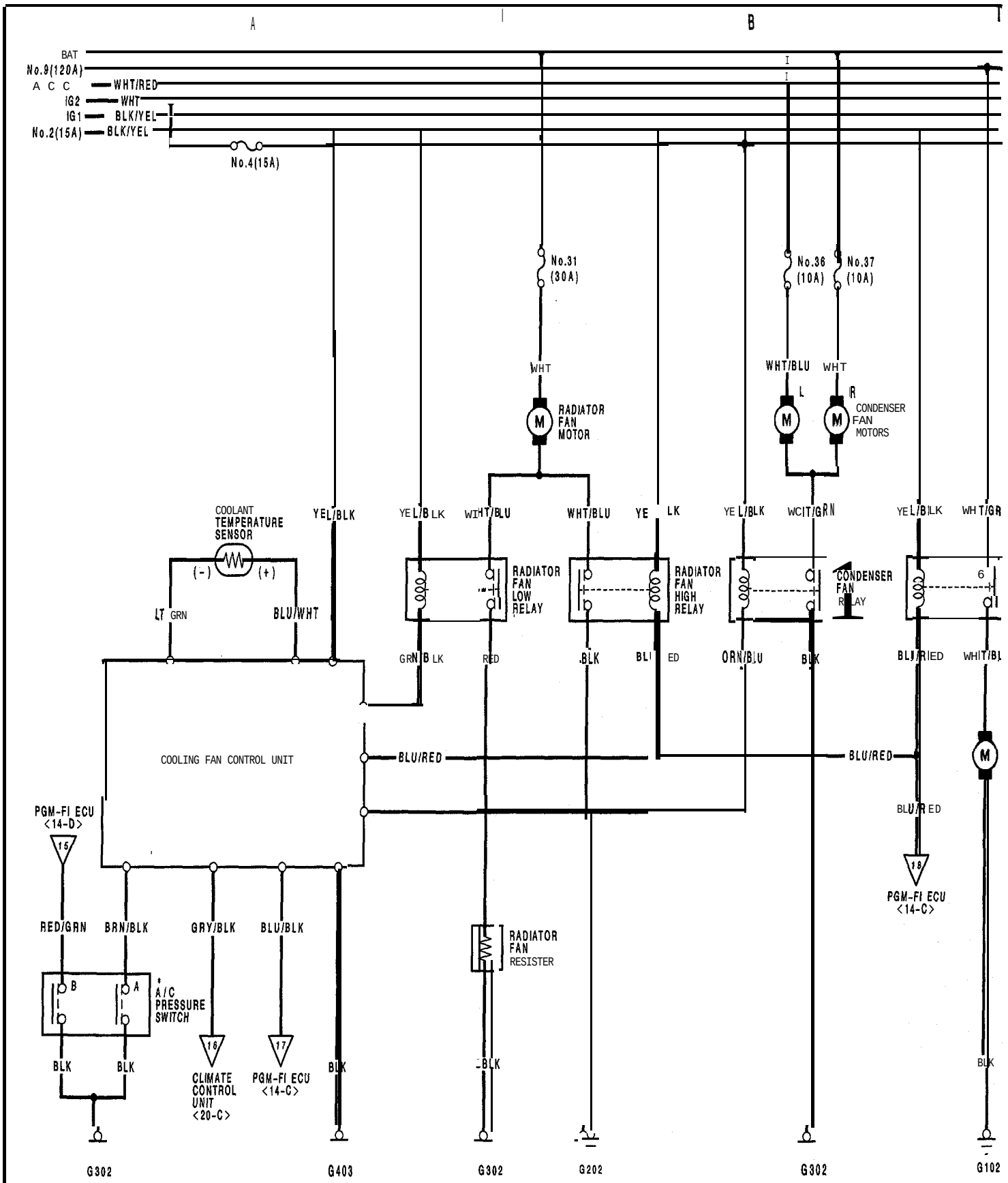
Lights, Interior
- Ashtray Lights 10
- Courtesy Lights 4
- Dashlight Brightness Control 8
- Dome Light 4
- Entry Light Timer 6
- Foot Light 6
- Glove Box Light 8
- Ignition Key Light 6
- Trunk Light 4

Lighting System .....
Locks, Power 11
Mirrors, Power 11
Opener, Trunk 11
Seat, Power 12
Security Alarm System 16
Starting System 1
Stereo Sound System 10
Supplemental Restraint System (SRS) 20
Side Marker/Turn Signal/Hazard
- Flasher System 9

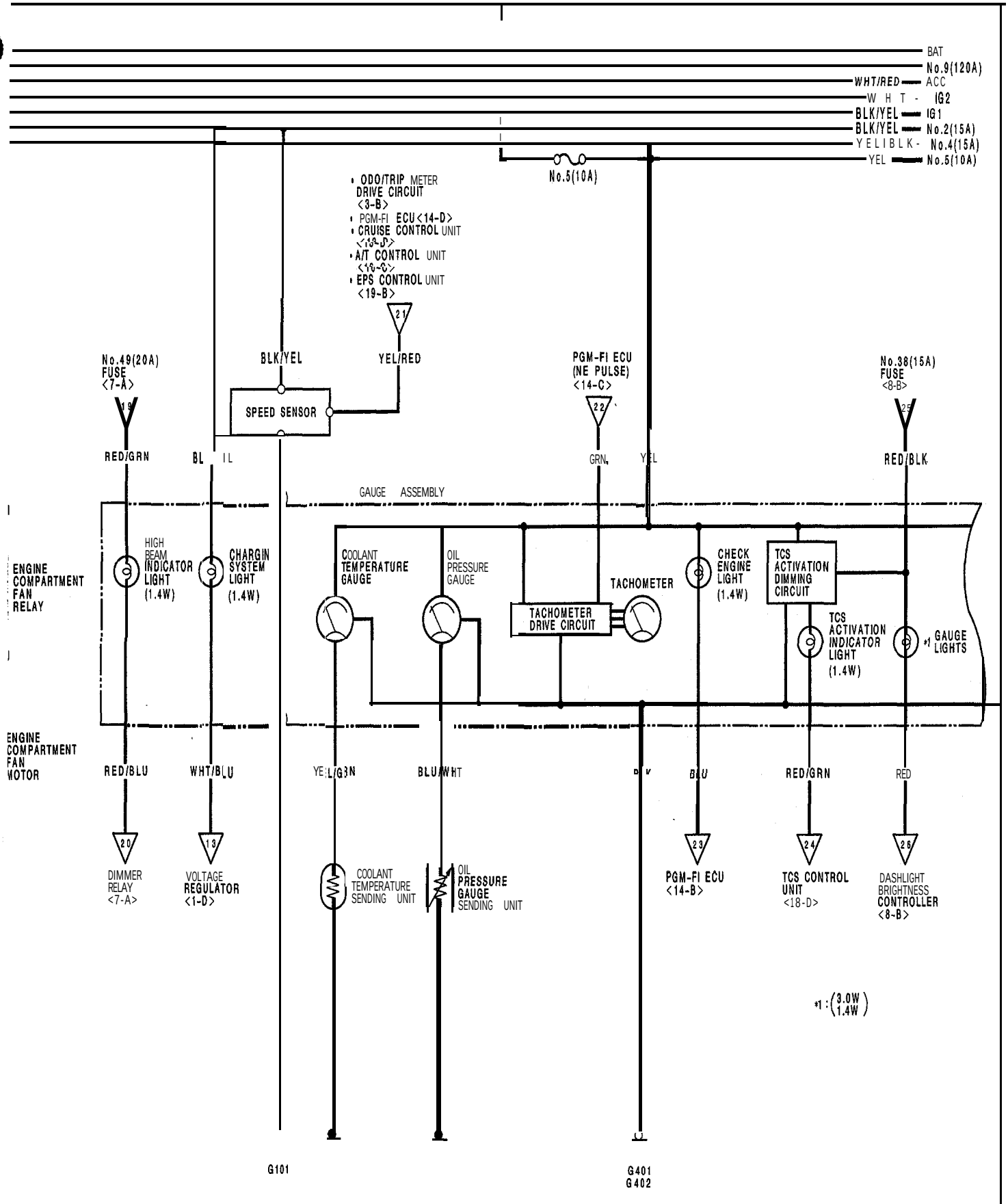
Traction Control System (TCS) 18
Washer, Windshield 13
Windows, Power 12
Wipers, Windshield 13

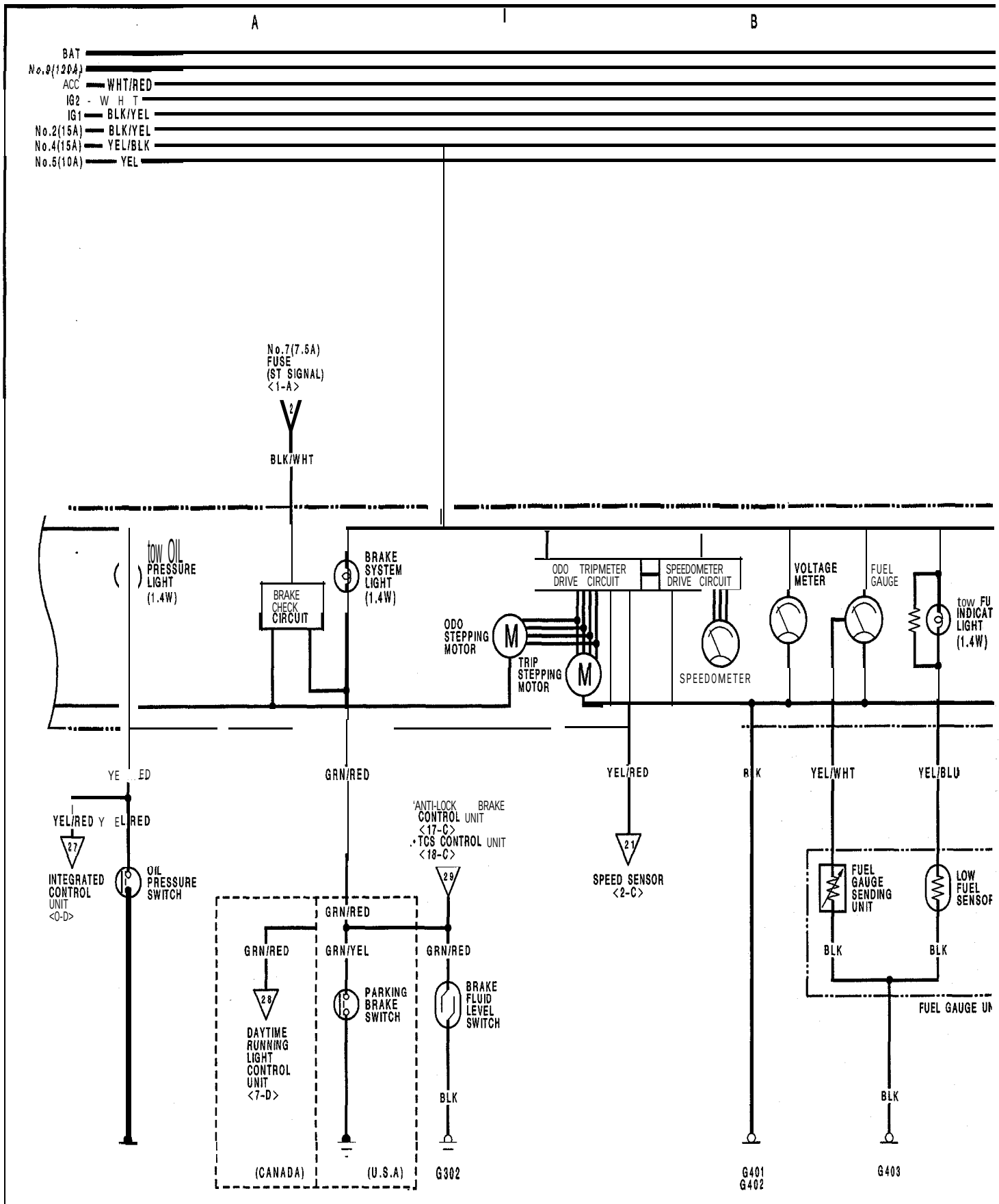

A
B
WHT/RED
BLU/WHT
BLK/YEL
BLK/WHT
WHT
ACC
IG2
IG1
ST
IGNITION SWITCH
BAT-B
BAT-A
WHT
WHT/BLK
WHT/RED
No.12 (30A)
No.29 (50A)
No.9 (120A)
EPS POWER UNIT <19-C>
BATTERY
BLK/WHT
BLK/WHT
STARTER CUT RELAY
BLK/BLU
BLK/GRN
CLUTCH INTERLOCK SWITCH (M/T)
SHIFT POSITION CONSOLE SWITCH (A/T)
NO.7(7.5A)
BLK/GRN
MAIN FUSE BOX
JUMP START TERMINAL
BLK/WHT
BLK/YEL
SECURITY CONTROL UNIT <18-B>
SOLENOID
M
STARTER
BULB CHECK CIRCUIT (in the GAUGE ASSEMBLY) <3-A>
PGM-FI ECU/ MAIN RELAY <14-A>
WHT
WHT/GR
WHT
WHT/GR
No.1
BLK
BLK
G103


C
D
BAT
No.9(120A)
WHT/RED
ACC
W H T -
IG2
BLKIYEL
IG1
BLKIYEL
No.2(15A)
No.2(15A)
NO.13
(30A)
No.18
(20A)
YEL/B LU
YEL/BLU
12
• SECURITY CONTROL UNIT<16-A>
• PGM-FI MAIN RELAY <14-A>
PGM-FI ECU
<14-B>
7
8
9
10
WHT/BLK
WHT/BLU
WHT/YEL
BL EL
BL EL BLKIYEL
11
8
PGM-FI MAIN RELAY
<14-A>
CHARGING SYSTEM LIGHT<2-C>
INTEGRATED CONTROL UNIT<6-D>
ANTI-LOCK BRAKE CONTROL UNIT<17-C>
EPS CONTROL UNIT<19-C>
13
IGNITOR UNIT
WHT/BLK
WHT/BLU
WHT/YEL
WHT/RED
BLK/YEL
BLK
YEL/BLU
BLK/YEL
WHTIBLU
PGM-FI ECU
<14-D>
14
WHT/RED
IGNITION COILS
.2
No.3
No.4
No.5
No.6
VOLTAGE REGULATOR
FIELD WINDING
RECTFIER
SPARK PLUGS
RADIO NOISE CONDENSER
ALTERNATOR



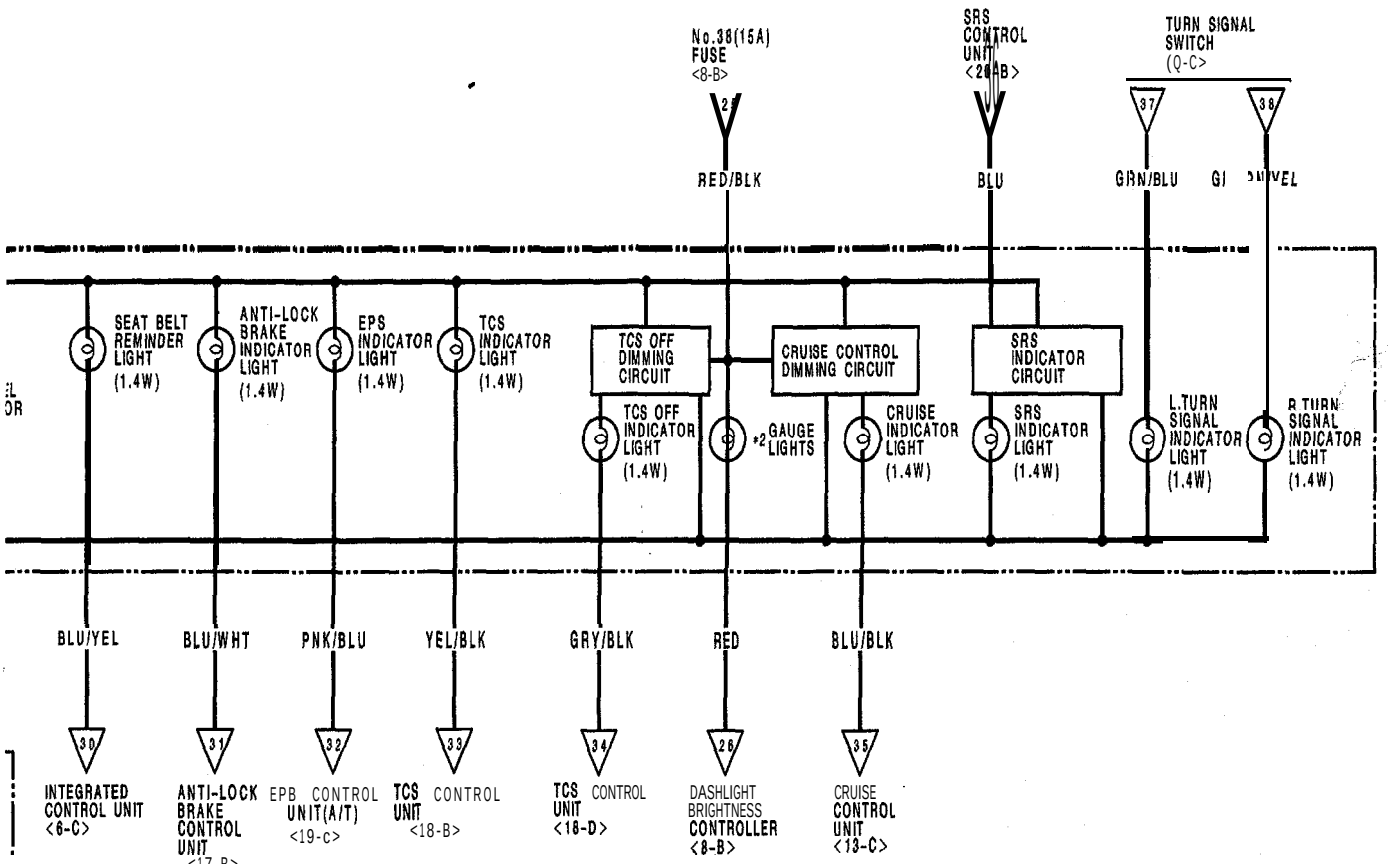
* A/C PRESSURE SWITCH
A(HI,LO)ON between 210kpa(2.1kg/cm,30psi) and 2700kpa(27kg/cm,384psi)
B(MID):ON below 1250kpa(12.5kg/cm,178psi)

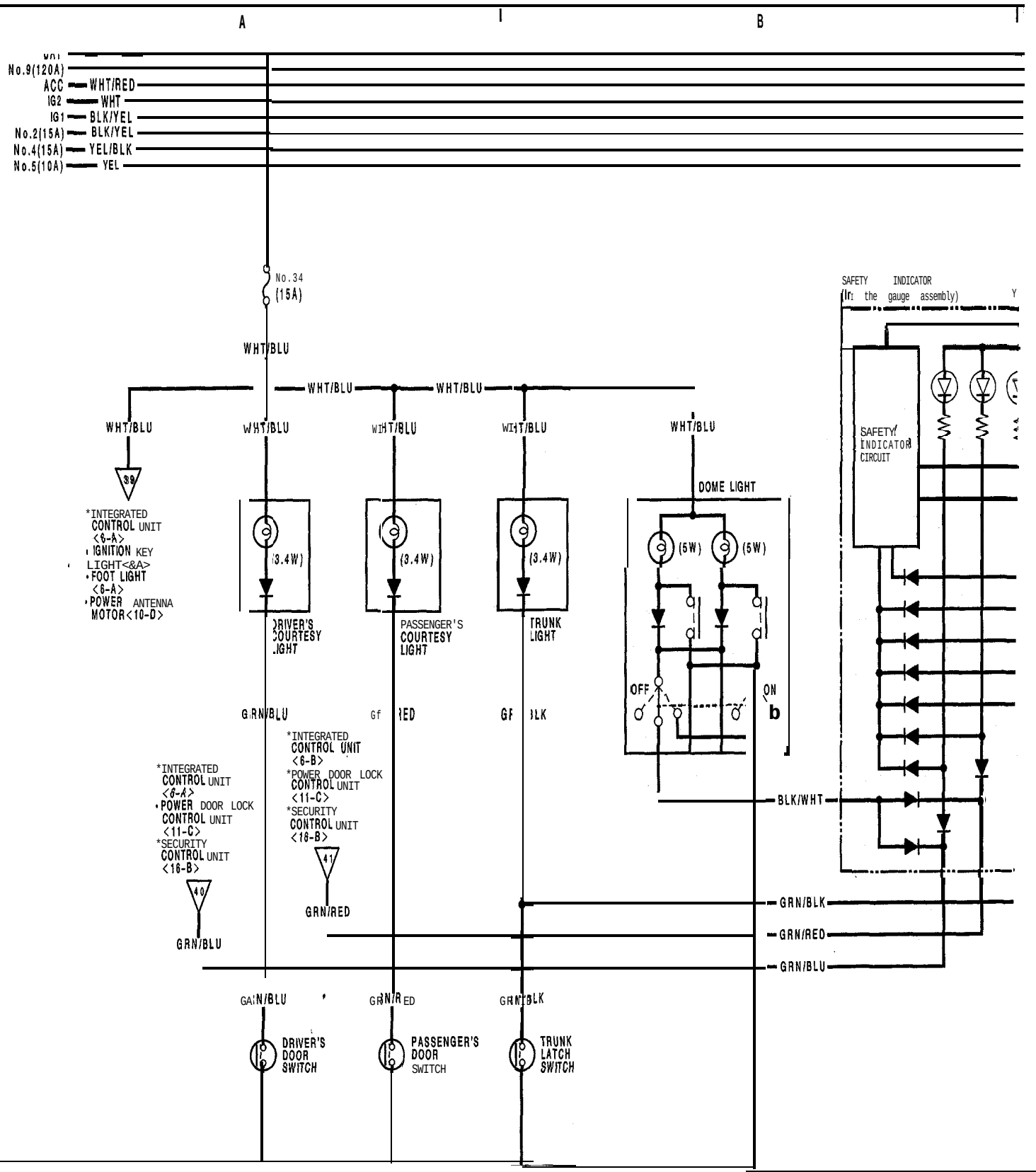

BAT
No.9(120A)
WHT/RED ACC
WHT IG2
BLK/YEL IG1
BLK/YEL No.2(15A)
YEL/BLK No.4(15A)
YEL No.5(10A)
No.5(10A)
ODO/TRIP METER DRIVE CIRCUIT <3-B>
PGM-FI ECU <14-D>
CRUISE CONTROL UNIT
A/T CONTROL UNIT
EPS CONTROL UNIT <19-B>
21
No.49(20A) FUSE <7-A>
19
BLK/YEL
YEL/RED
SPEED SENSOR
PGM-FI ECU (NE PULSE) <14-C>
22
No.38(15A) FUSE <8-B>
25
RED/GRN
BL IL
GRN YEL
RED/BLK
GAUGE ASSEMBLY
ENGINE COMPARTMENT FAN RELAY
HIGH BEAM INDICATOR LIGHT (1.4W)
CHARGIN SYSTEM LIGHT (1.4W)
COOLANT TEMPERATURE GAUGE
OIL PRESSURE GAUGE
TACHOMETER
TACHOMETER DRIVE CIRCUIT
CHECK ENGINE LIGHT (1.4W)
TCS ACTIVATION DIMMING CIRCUIT
TCS ACTIVATION INDICATOR LIGHT (1.4W)
*1 GAUGE LIGHTS
ENGINE COMPARTMENT FAN MOTOR
RED/BLU
WHT/BLU
YEL/GRN
BLU/WHT
BLU
RED/GRN
RED
20
13
23
24
26
DIMMER RELAY <7-A>
VOLTAGE REGULATOR <1-D>
COOLANT TEMPERATURE SENDING UNIT
OIL PRESSURE GAUGE SENDING UNIT
PGM-FI ECU <14-B>
TCS CONTROL UNIT <18-D>
DASHLIGHT BRIGHTNESS CONTROLLER <8-B>
*1 : (3.0W / 1.4W)
G101
G401
G402


3
A
B
BAT
No.9(120A)
ACC
WHT/RED
IG2
WHT
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.7(7.5A)
FUSE
(ST SIGNAL)
<1-A>
BLK/WHT
OIL
PRESSURE
LIGHT
(1.4W)
BRAKE
CHECK
CIRCUIT
BRAKE
SYSTEM
LIGHT
(1.4W)
ODO TRIPMETER
DRIVE CIRCUIT
SPEEDOMETER
DRIVE CIRCUIT
VOLTAGE
METER
FUEL
GAUGE
ODO
STEPPING
MOTOR
TRIP
STEPPING
MOTOR
SPEEDOMETER
YEL/RED
GRN/RED
YEL/RED
BLK
YEL/WHT
YEL/BLU
YEL/RED
INTEGRATED
CONTROL
UNIT
<0-D>
OIL
PRESSURE
SWITCH
'ANTI-LOCK BRAKE
CONTROL UNIT
<17-C>
TCS CONTROL UNIT
<18-C>
SPEED SENSOR
<2-C>
FUEL
GAUGE
SENDING
UNIT
LOW
FUEL
SENSOR
BLK
BLK
GRN/RED
GRN/RED
GRN/YEL
GRN/RED
DAYTIME
RUNNING
LIGHT
CONTROL
UNIT
<7-D>
PARKING
BRAKE
SWITCH
BRAKE
FLUID
LEVEL
SWITCH
BLK
BLK
(CANADA)
(U.S.A)
G302
G401
G402
G403

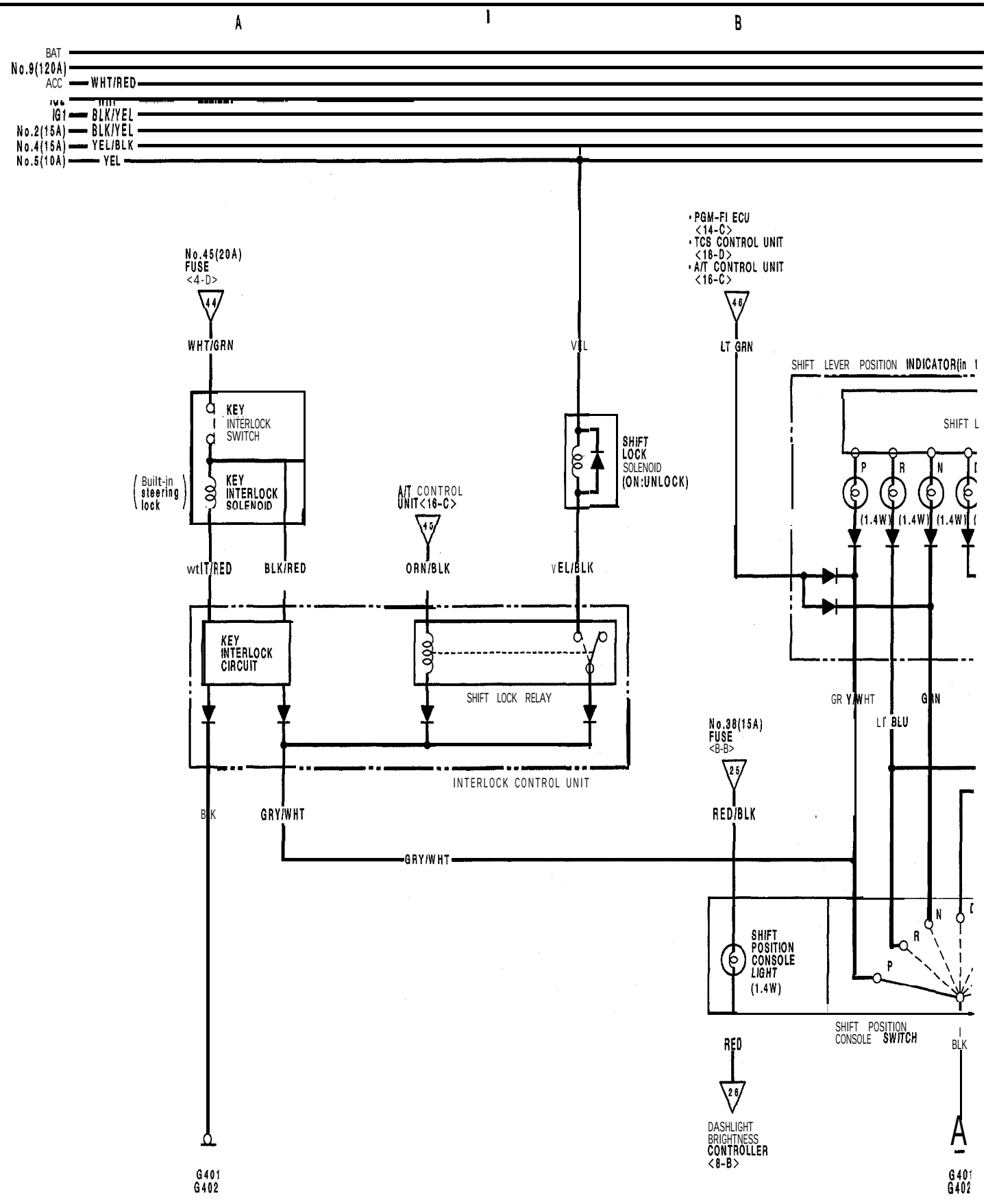
C D

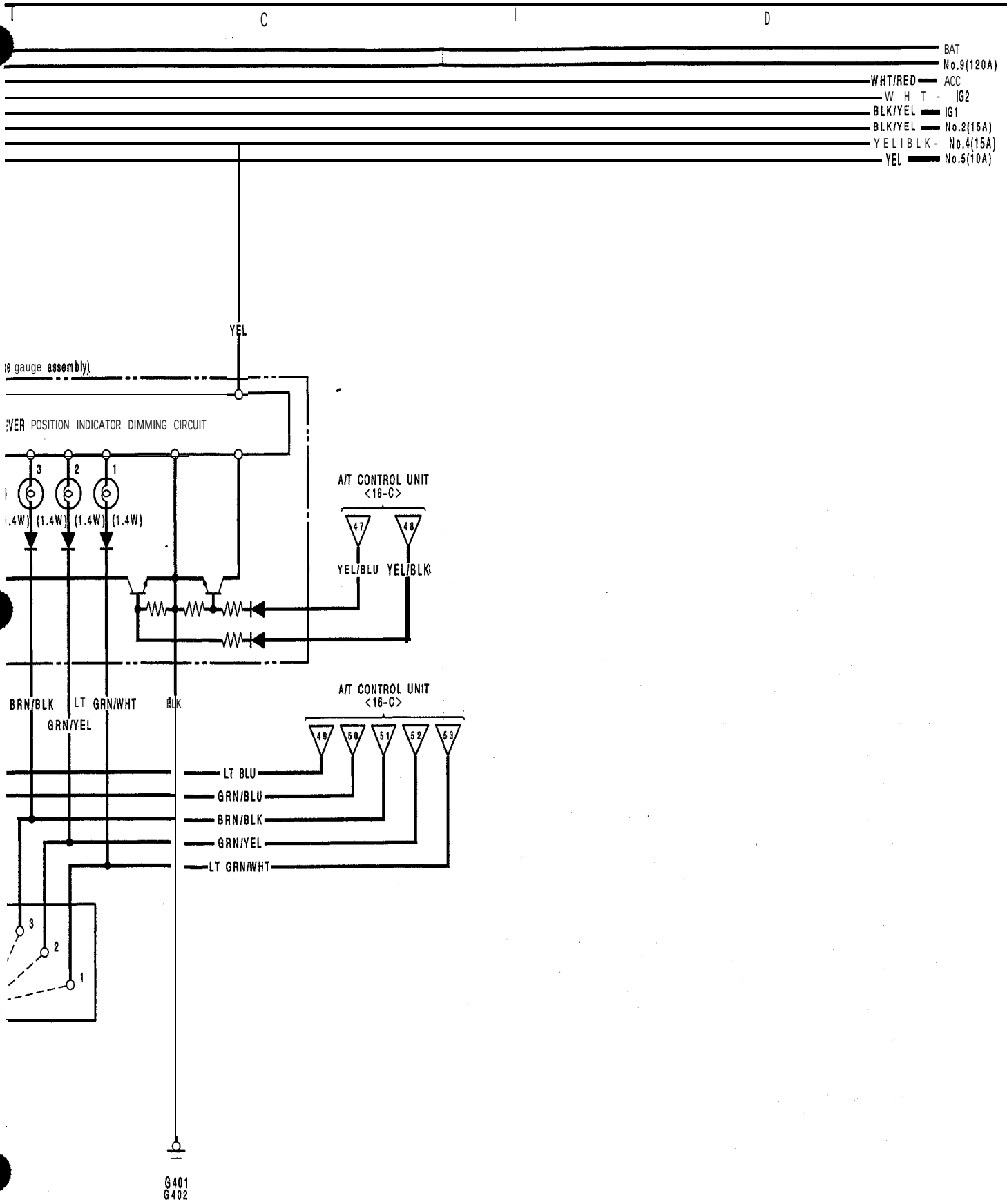
No.9(120A)
WHT/RED — ACC
W H T - IG2
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
Y E L - No.5(10A)

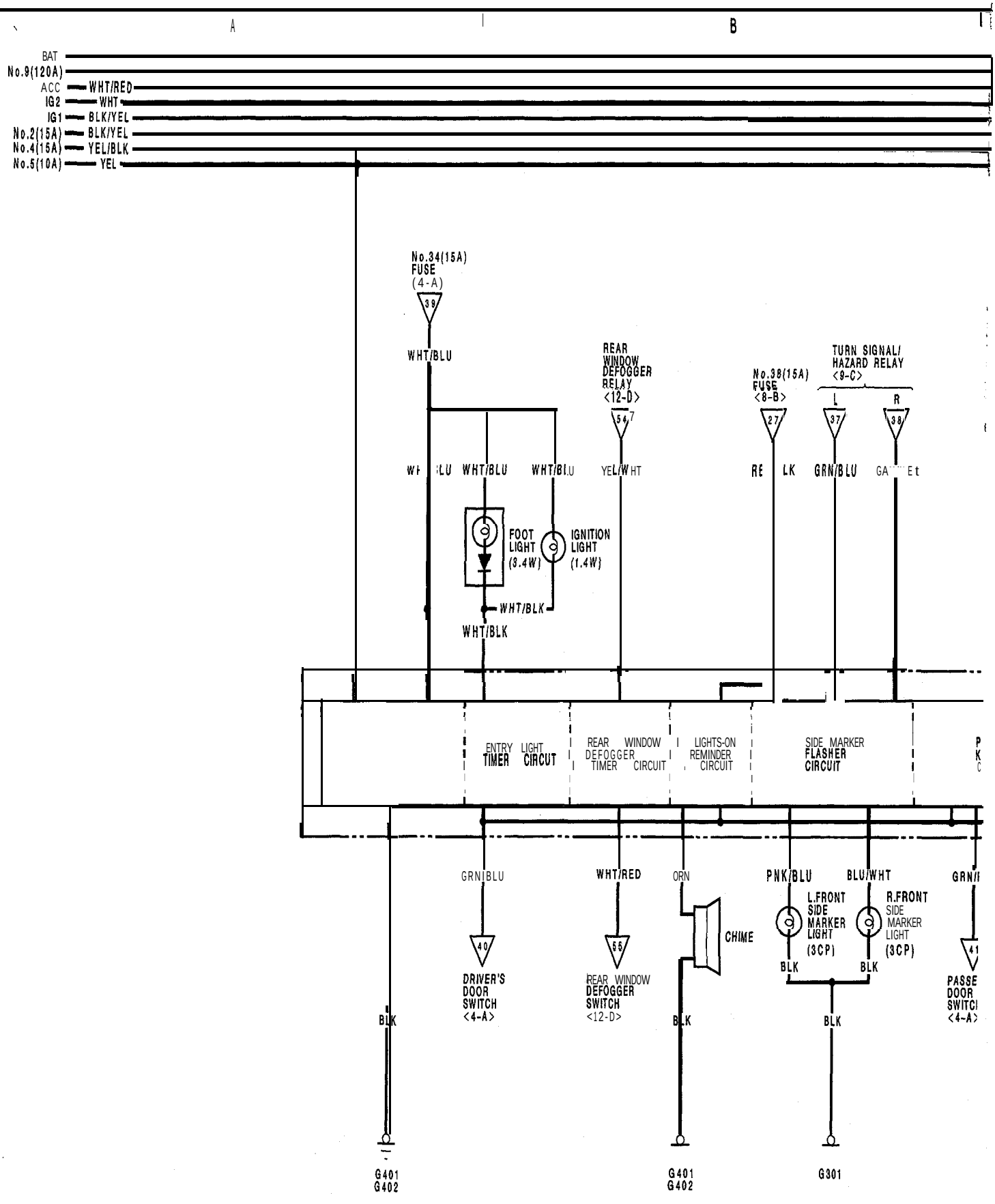




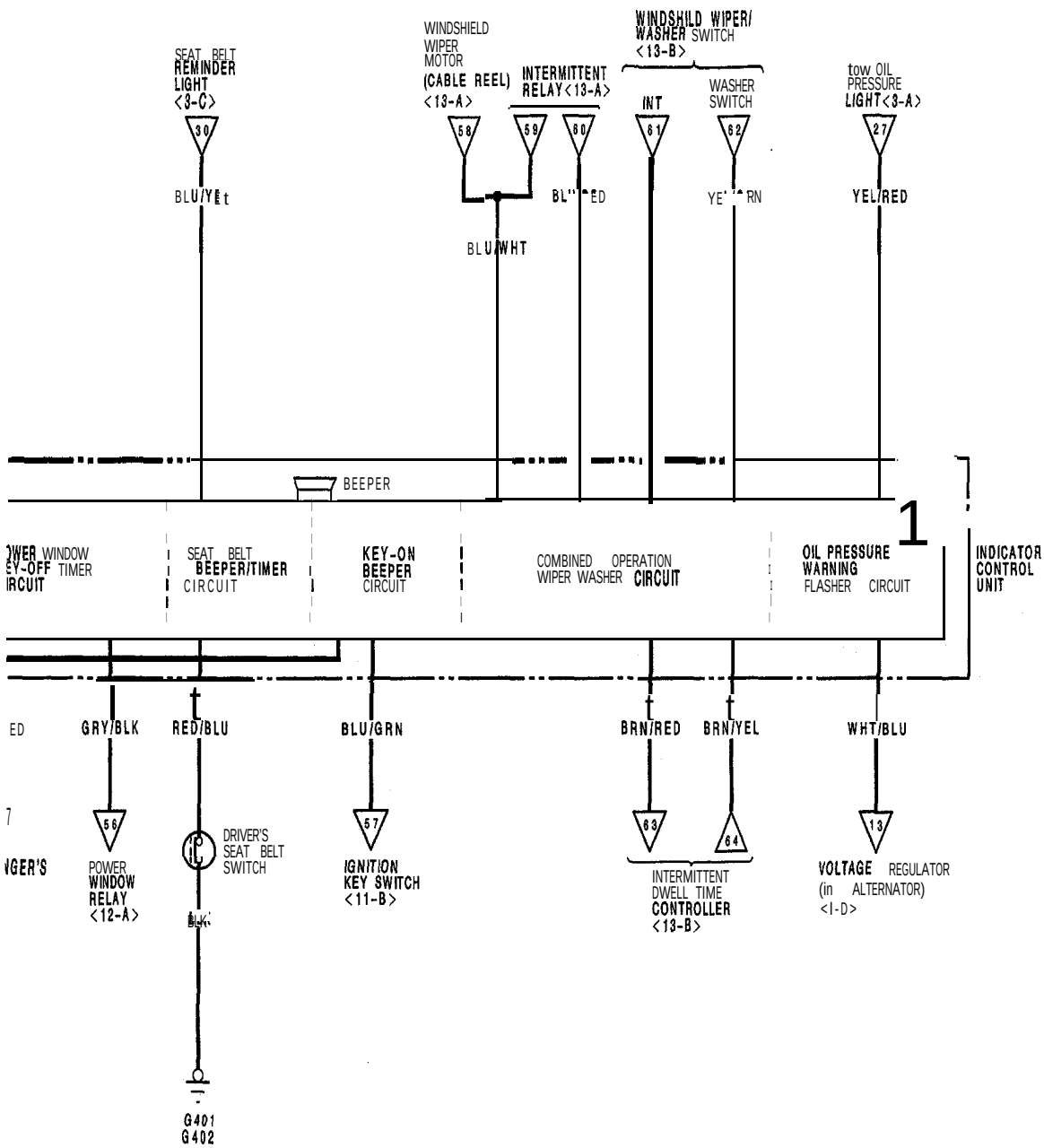
BAT
No.9(120A)
WHT/RED- ACC
WHT - IG2

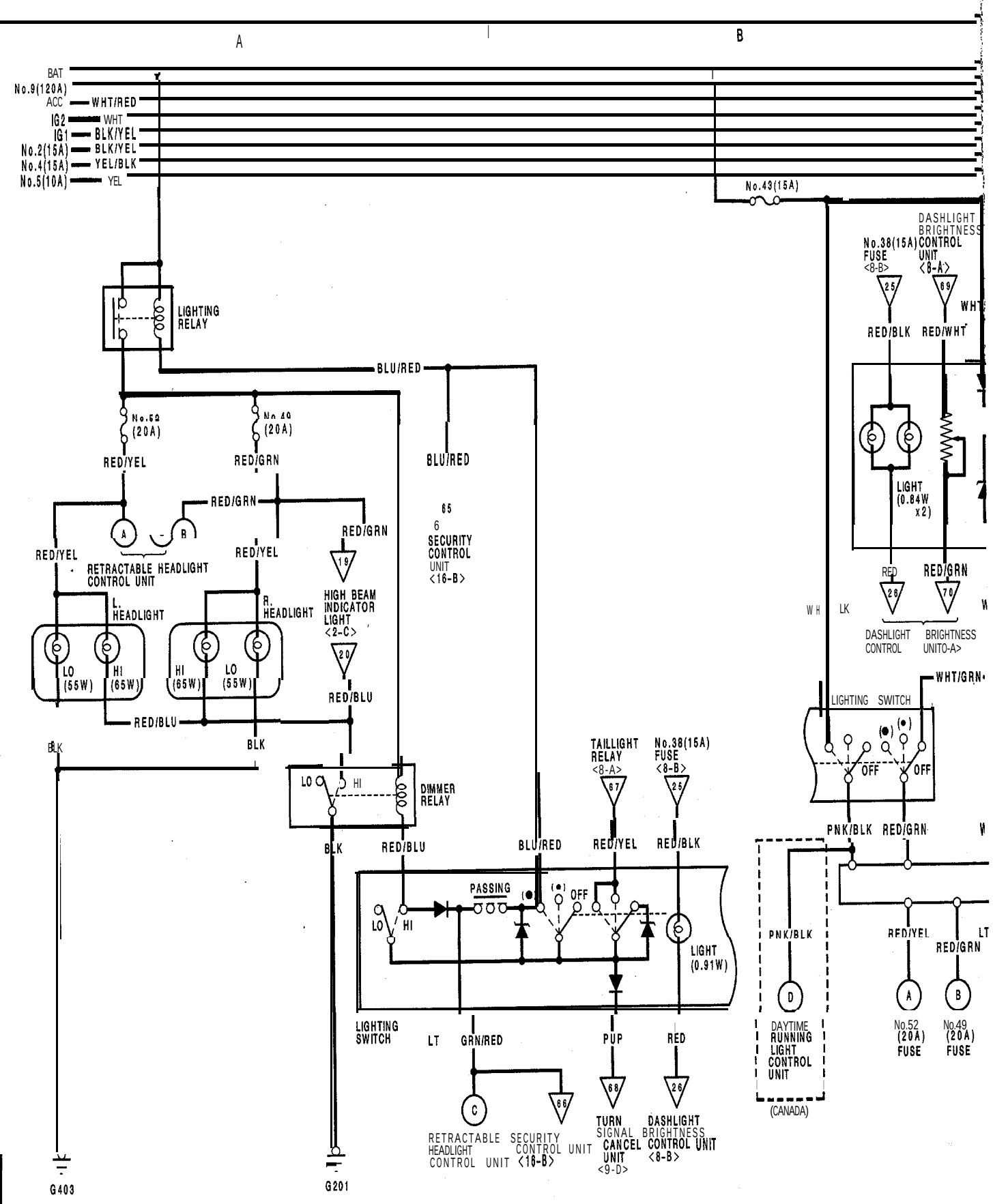

A
B
BAT
No.9(120A)
ACC
WHT/RED
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.45(20A)
FUSE
<4-D>
44
WHT/GRN
KEY
INTERLOCK
SWITCH
KEY
INTERLOCK
SOLENOID
Built-in
steering
lock
wt/RED
BLK/RED
KEY
INTERLOCK
CIRCUIT
A/T CONTROL
UNIT<16-C>
45
ORN/BLK
SHIFT
LOCK
SOLENOID
(ON:UNLOCK)
YEL/BLK
SHIFT LOCK RELAY
INTERLOCK CONTROL UNIT
BLK
GRY/WHT
G401
G402
• PGM-FI ECU
<14-C>
• TCS CONTROL UNIT
<18-D>
• A/T CONTROL UNIT
<16-C>
46
LT GRN
SHIFT LEVER POSITION INDICATOR(in
SHIFT L
P
R
N
(1.4W)
(1.4W)
(1.4W)
GRY/WHT
GRN
LT BLU
No.38(15A)
FUSE
<B-B>
25
RED/BLK
GRY/WHT
SHIFT
POSITION
CONSOLE
LIGHT
(1.4W)
SHIFT POSITION
CONSOLE SWITCH
RED
26
DASHLIGHT
BRIGHTNESS
CONTROLLER
<8-B>
BLK
A
G401
G402

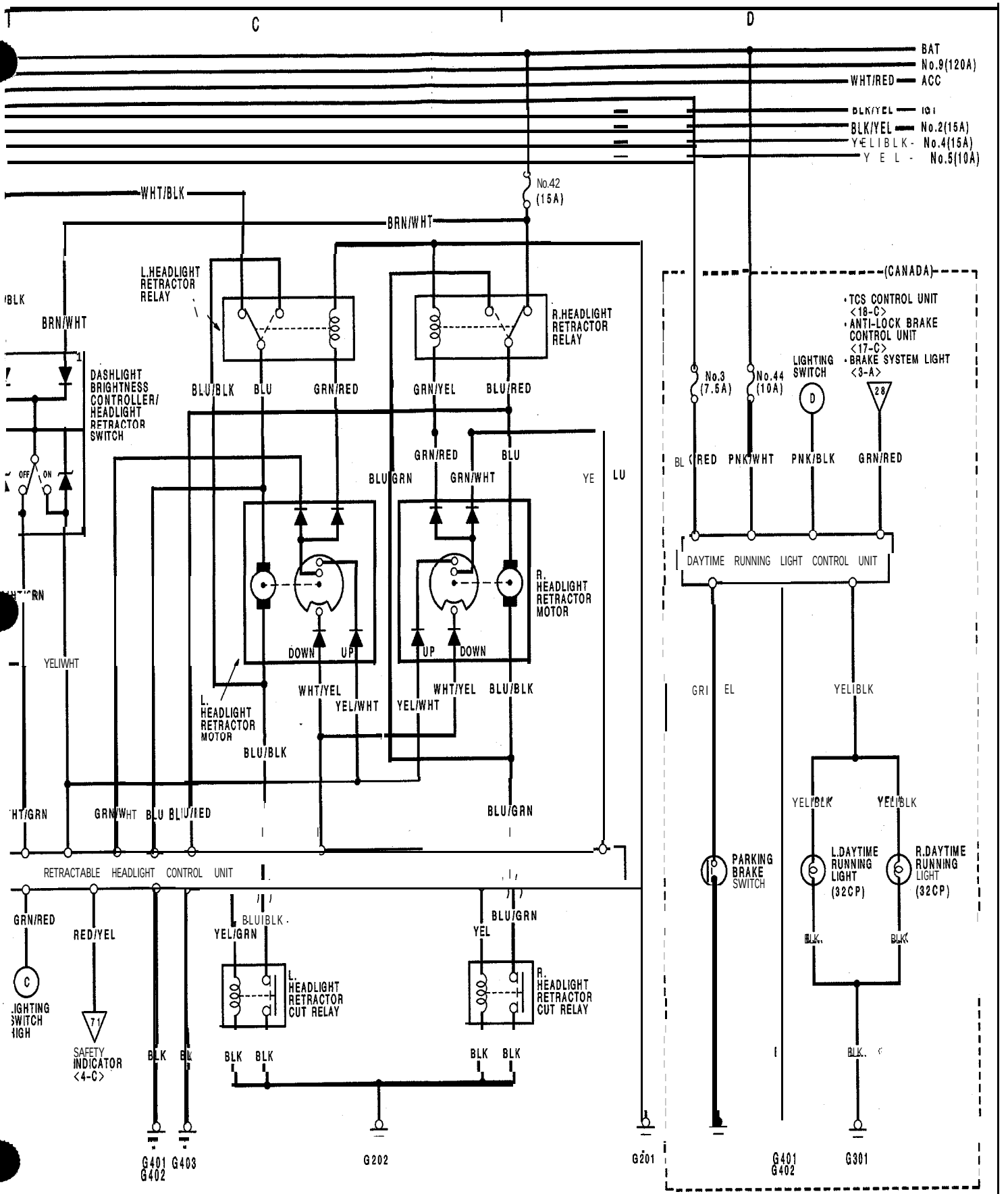

BAT
No.9(120A)
WHT/RED ACC
WHT IG2
BLK/YEL IG1
BLK/YEL No.2(15A)
YEL/BLK No.4(15A)
YEL No.5(10A)
YEL
ıe gauge assembly)
:VER POSITION INDICATOR DIMMING CIRCUIT
3
2
1
.4W) (1.4W) (1.4W) (1.4W)
A/T CONTROL UNIT
<16-C>
47
48
YEL/BLU YEL/BLK
BRN/BLK
LT GRN/WHT
BLK
GRN/YEL
A/T CONTROL UNIT
<16-C>
49
50
51
52
53
LT BLU
GRN/BLU
BRN/BLK
GRN/YEL
LT GRN/WHT
3
2
1
G401
G402

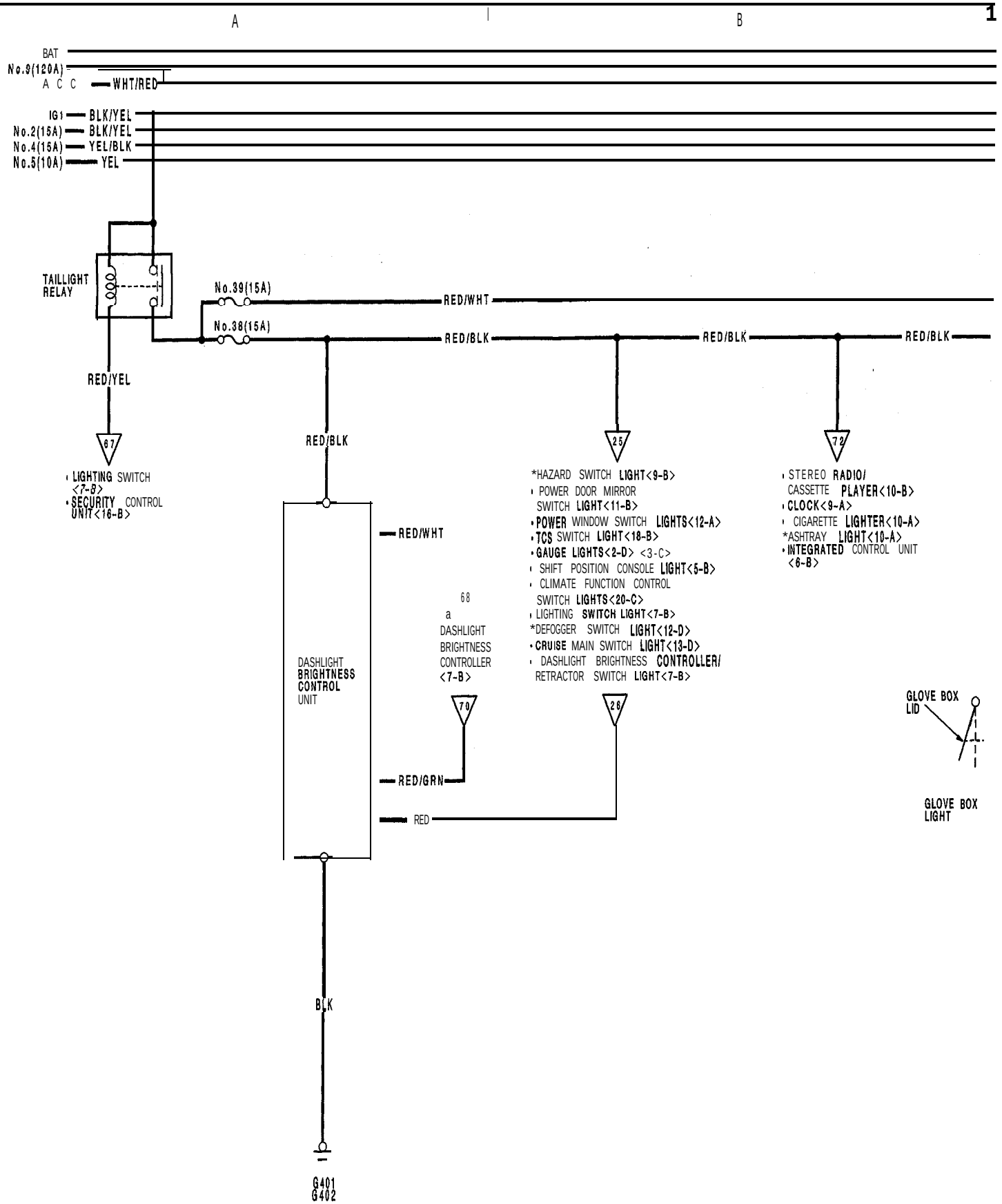

A
B
BAT
No.9(120A)
ACC
WHT/RED
IG2
WHT
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.34(15A) FUSE (4-A)
38
WHT/BLU
REAR WINDOW DEFOGGER RELAY <12-D>
54
TURN SIGNAL/ HAZARD RELAY <9-C>
No.38(15A) FUSE <8-B>
27
L
37
R
38
WHT/BLU
WHT/BLU
YEL/WHT
RED
GRN/BLU
FOOT LIGHT (3.4W)
IGNITION LIGHT (1.4W)
WHT/BLK
WHT/BLK
ENTRY LIGHT TIMER CIRCUT
REAR WINDOW DEFOGGER TIMER CIRCUIT
LIGHTS-ON REMINDER CIRCUIT
SIDE MARKER FLASHER CIRCUIT
GRN/BLU
WHT/RED
ORN
PNK/BLU
BLU/WHT
CHIME
L.FRONT SIDE MARKER LIGHT (3CP)
R.FRONT SIDE MARKER LIGHT (3CP)
40
DRIVER'S DOOR SWITCH <4-A>
56
REAR WINDOW DEFOGGER SWITCH <12-D>
BLK
BLK
BLK
BLK
BLK
G401
G402
G401
G402
G301

BAT
No.9(120A)
WHT/RED — ACC
WHT — IG2
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)



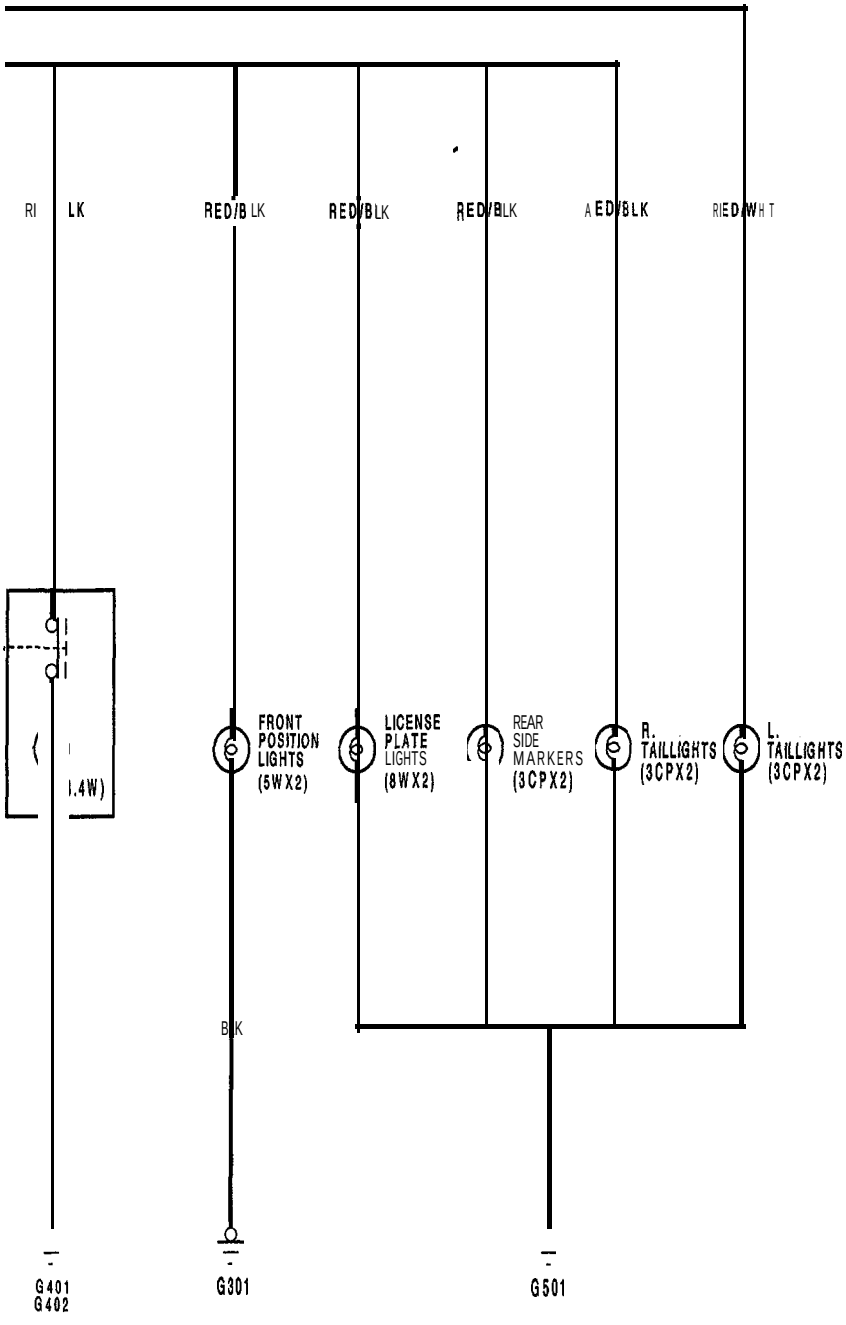

A
B
BAT
No.9(120A)
ACC
WHT/RED
IG2
WHT
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.43(15A)
DASHLIGHT BRIGHTNESS CONTROL UNIT <8-A>
No.38(15A) FUSE <8-B>
LIGHTING RELAY
BLU/RED
No.52 (20A)
No.49 (20A)
RED/YEL
RED/GRN
RED/BLK
RED/WHT
LIGHT (0.84W x2)
RETRACTABLE HEADLIGHT CONTROL UNIT
L. HEADLIGHT
R. HEADLIGHT
LO (55W)
HI (65W)
HIGH BEAM INDICATOR LIGHT <2-C>
SECURITY CONTROL UNIT <16-B>
DASHLIGHT CONTROL
BRIGHTNESS UNITO-A>
LIGHTING SWITCH
WHT/GRN
OFF
RED/BLU
BLK
DIMMER RELAY
LO
HI
TAILLIGHT RELAY <8-A>
PNK/BLK
PASSING
LIGHT (0.91W)
LT GRN/RED
PUP
RED
RETRACTABLE HEADLIGHT CONTROL UNIT
SECURITY CONTROL UNIT <16-B>
TURN SIGNAL CANCEL UNIT <9-D>
DASHLIGHT BRIGHTNESS CONTROL UNIT <8-B>
DAYTIME RUNNING LIGHT CONTROL UNIT
(CANADA)
G403
G201

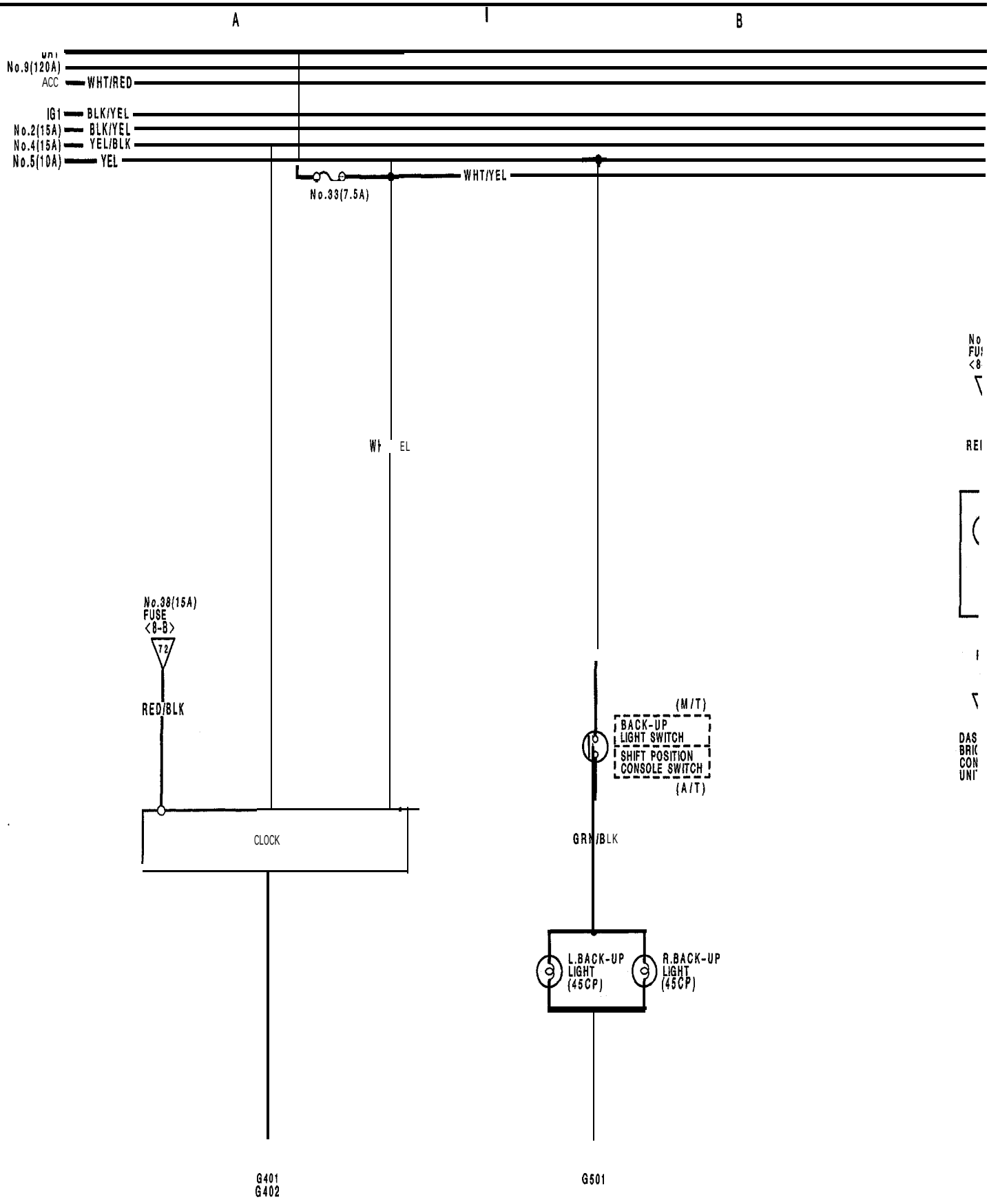

C
D
BAT
No.9(120A)
WHT/RED ACC
BLK/YEL IGI
BLK/YEL No.2(15A)
YEL/BLK No.4(15A)
YEL No.5(10A)
No.42 (15A)
WHT/BLK
BRN/WHT
L.HEADLIGHT RETRACTOR RELAY
R.HEADLIGHT RETRACTOR RELAY
DASHLIGHT BRIGHTNESS CONTROLLER/ HEADLIGHT RETRACTOR SWITCH
OFF ON
BLU/BLK BLU GRN/RED GRN/YEL BLU/RED
GRN/RED BLU
BLU/GRN GRN/WHT
R. HEADLIGHT RETRACTOR MOTOR
DOWN UP
UP DOWN
L. HEADLIGHT RETRACTOR MOTOR
YEL/WHT
WHT/YEL YEL/WHT
WHT/YEL BLU/BLK
BLU/BLK
BLU/GRN
GRN/WHT BLU BLU/RED
RETRACTABLE HEADLIGHT CONTROL UNIT
GRN/RED
RED/YEL
BLU/BLK
YEL/GRN
L. HEADLIGHT RETRACTOR CUT RELAY
BLU/GRN
YEL
R. HEADLIGHT RETRACTOR CUT RELAY
SAFETY INDICATOR <4-C>
BLK BLK BLK BLK BLK BLK
G401 G402
G403
G202
G201
(CANADA)
• TCS CONTROL UNIT <18-C>
• ANTI-LOCK BRAKE CONTROL UNIT <17-C>
• BRAKE SYSTEM LIGHT <3-A>
No.3 (7.5A)
No.44 (10A)
LIGHTING SWITCH
PNK/WHT PNK/BLK GRN/RED
DAYTIME RUNNING LIGHT CONTROL UNIT
YEL/BLK
PARKING BRAKE SWITCH
L.DAYTIME RUNNING LIGHT (32CP)
R.DAYTIME RUNNING LIGHT (32CP)
G401 G402
G301

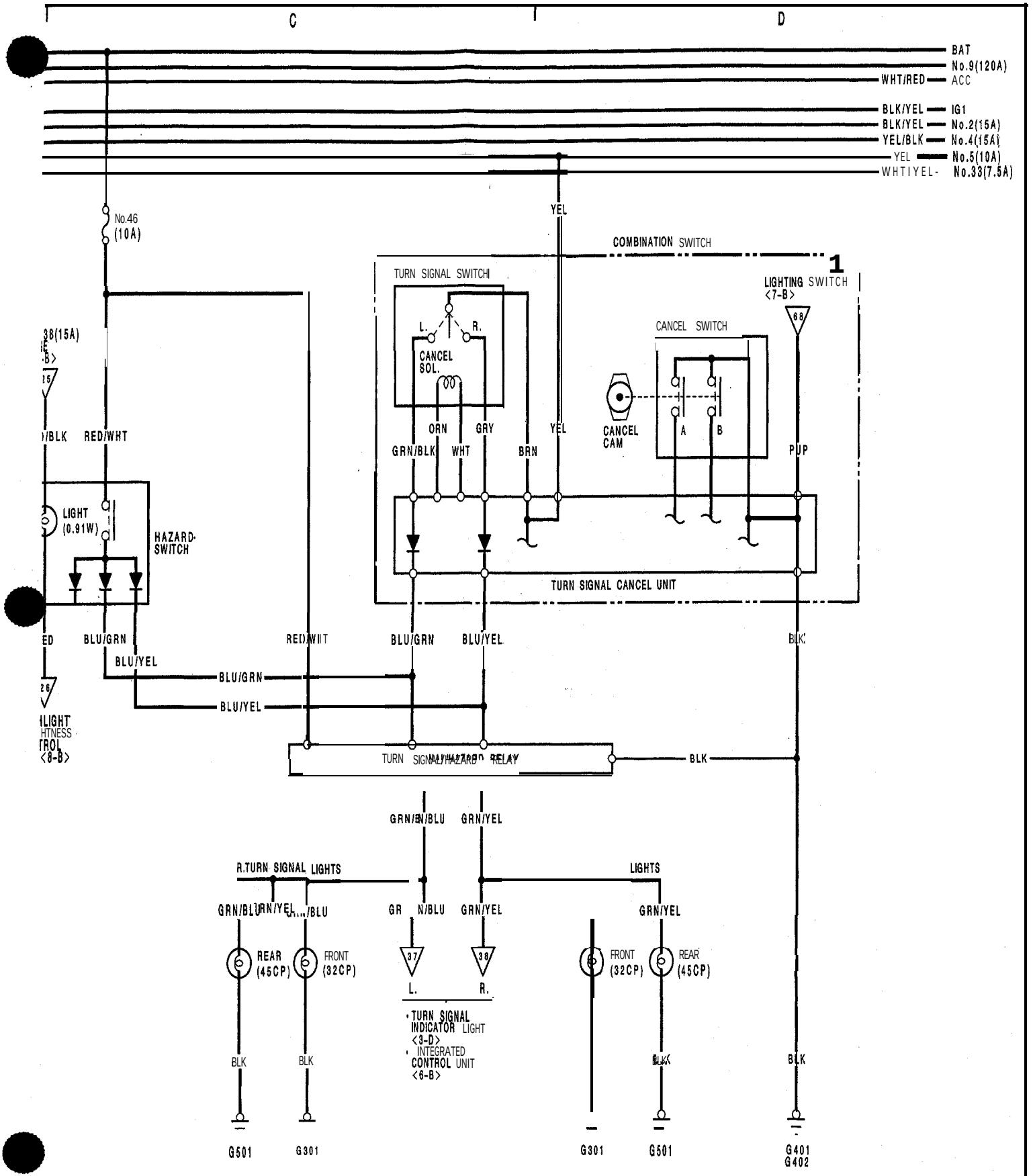

A
B
BAT
No.9(120A)
A C C
WHT/RED
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
TAILLIGHT RELAY
No.39(15A)
RED/WHT
No.38(15A)
RED/BLK
RED/BLK
RED/BLK
RED/YEL
67
LIGHTING SWITCH <7-B>
SECURITY CONTROL UNIT<16-B>
RED/BLK
RED/WHT
DASHLIGHT BRIGHTNESS CONTROL UNIT
68
DASHLIGHT BRIGHTNESS CONTROLLER <7-B>
70
RED/GRN
RED
25
*HAZARD SWITCH LIGHT<9-B>
POWER DOOR MIRROR SWITCH LIGHT<11-B>
POWER WINDOW SWITCH LIGHTS<12-A>
TCS SWITCH LIGHT<18-B>
GAUGE LIGHTS<2-D> <3-C>
SHIFT POSITION CONSOLE LIGHT<5-B>
CLIMATE FUNCTION CONTROL SWITCH LIGHTS<20-C>
LIGHTING SWITCH LIGHT<7-B>
*DEFOGGER SWITCH LIGHT<12-D>
CRUISE MAIN SWITCH LIGHT<13-D>
DASHLIGHT BRIGHTNESS CONTROLLER/ RETRACTOR SWITCH LIGHT<7-B>
26
72
STEREO RADIO/ CASSETTE PLAYER<10-B>
CLOCK<9-A>
CIGARETTE LIGHTER<10-A>
*ASHTRAY LIGHT<10-A>
INTEGRATED CONTROL UNIT <6-B>
GLOVE BOX LID
GLOVE BOX LIGHT
BLK
G401
G402

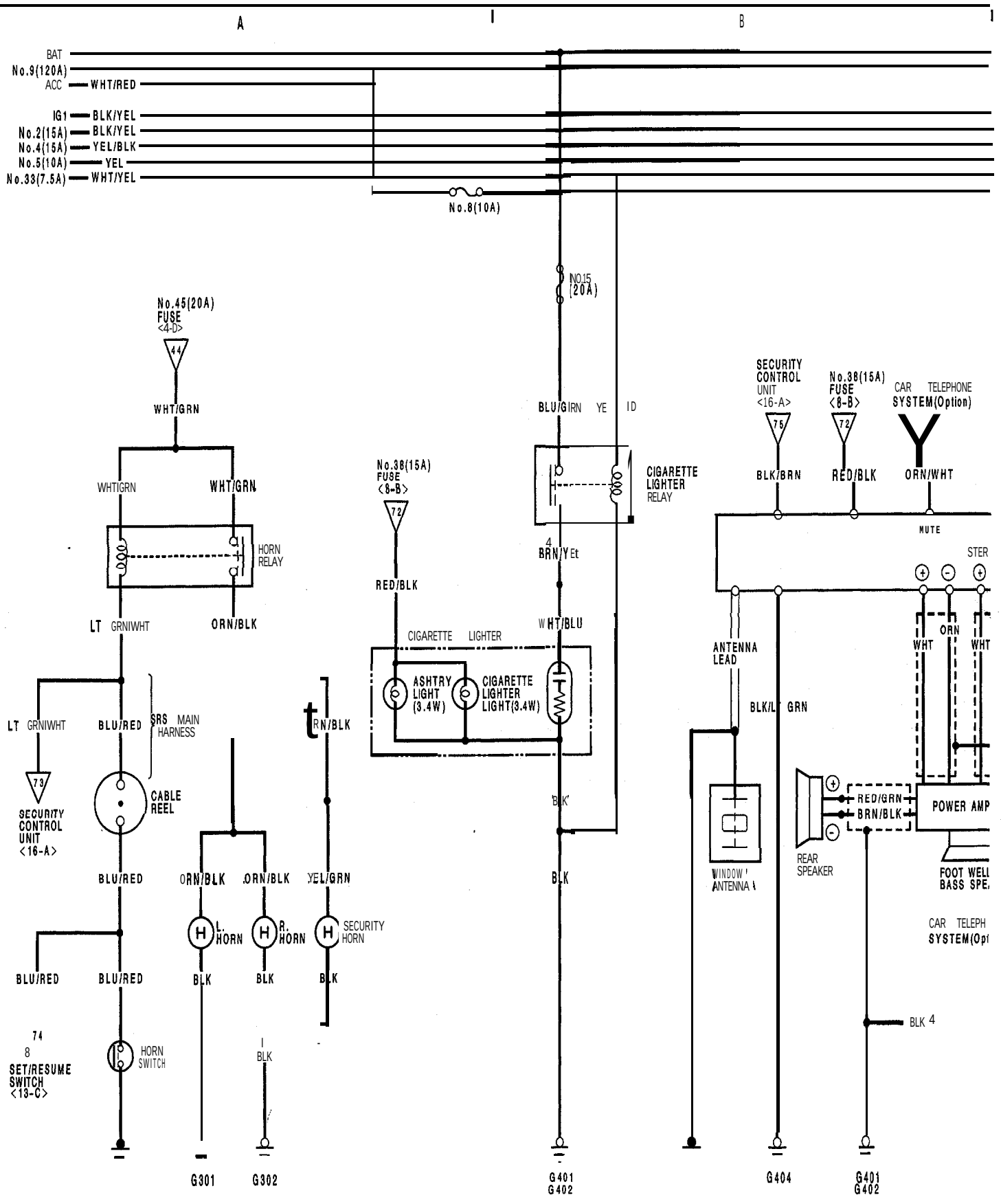
C I D

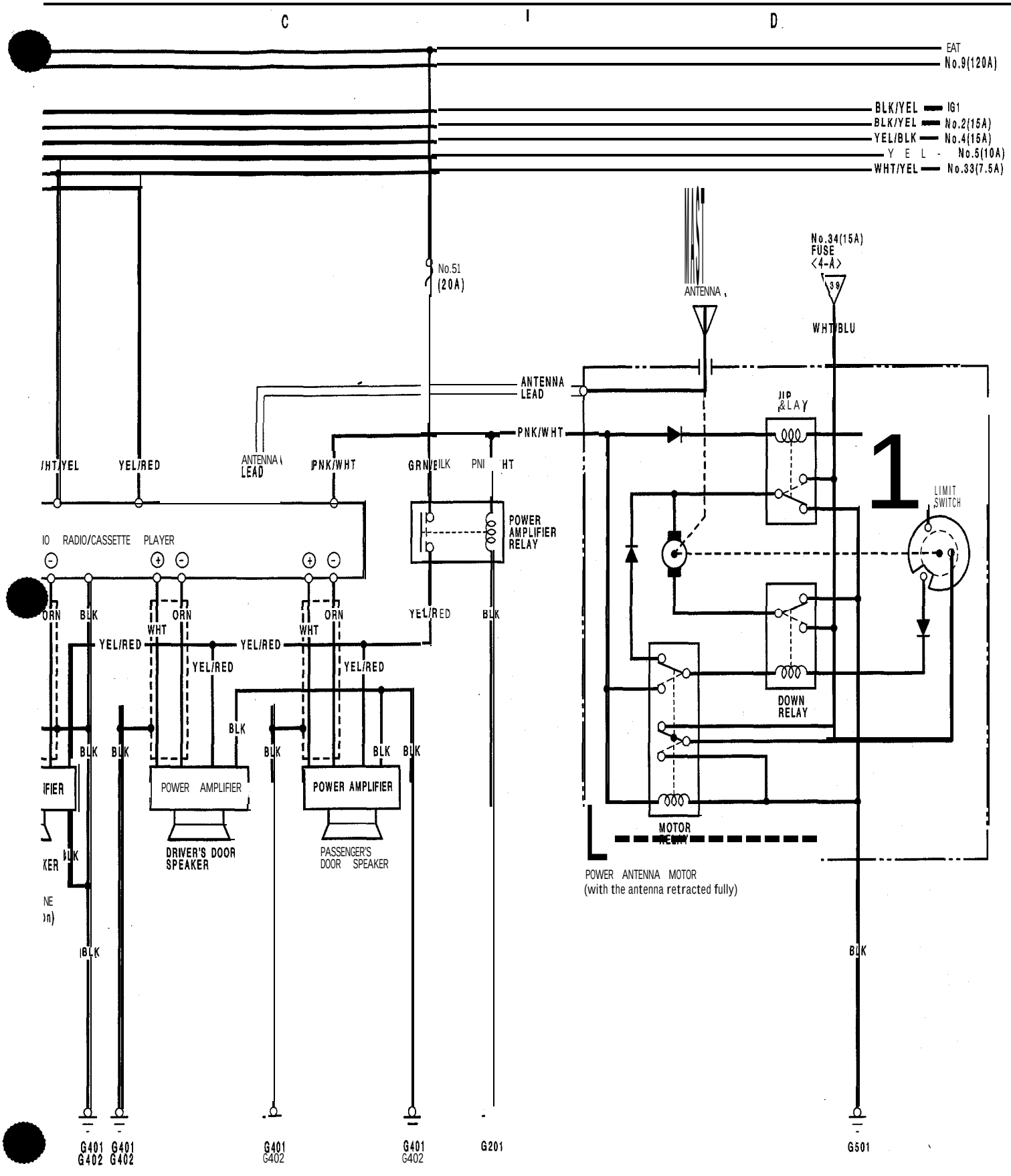
BAT
No.9(120A)
WHT/RED — ACC
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)

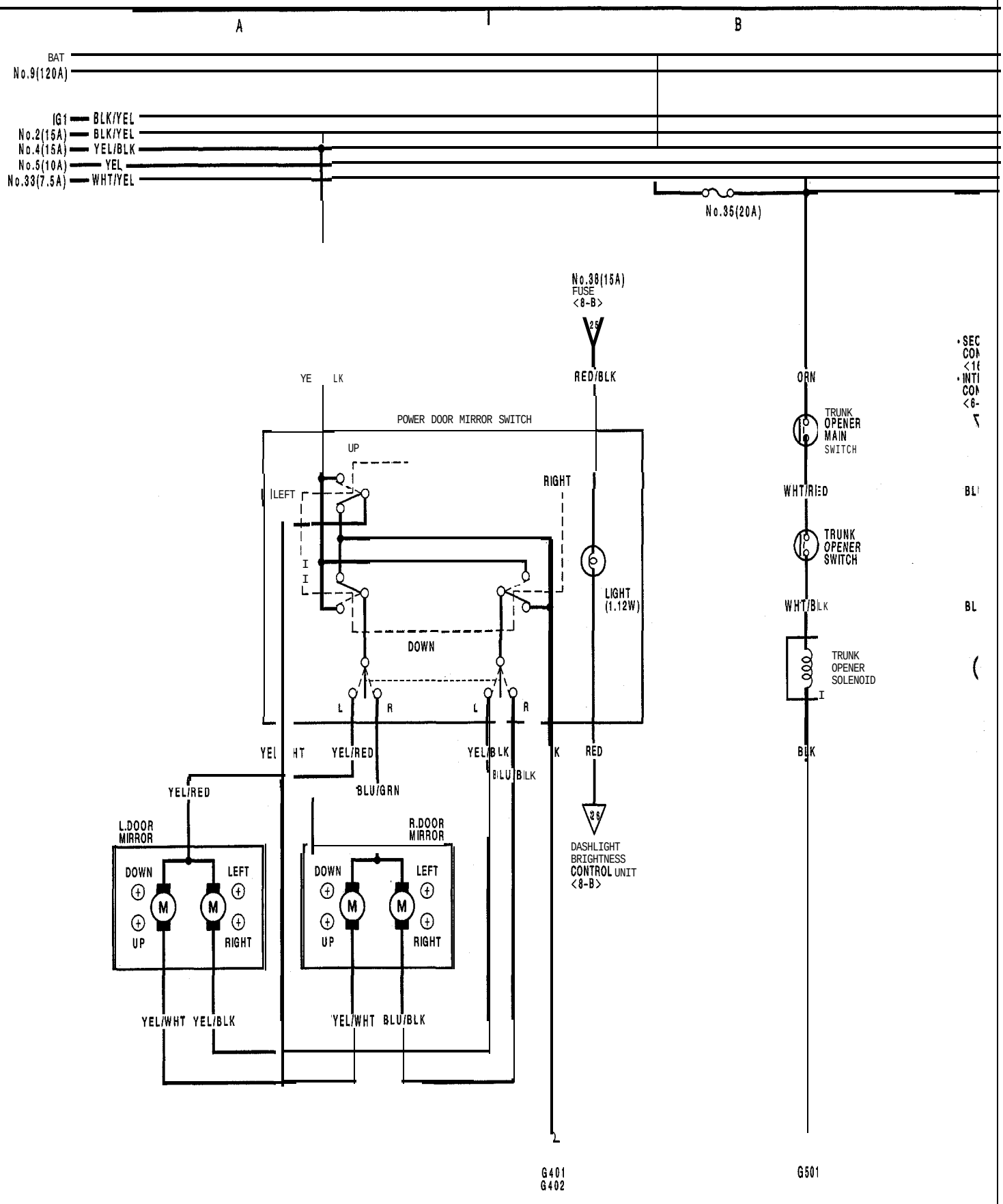



A
B
No.9(120A)
ACC
WHT/RED
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
WHT
EL
No.38(15A)
FUSE
<B-5>
72
RED/BLK
CLOCK
(M/T)
BACK-UP
LIGHT SWITCH
SHIFT POSITION
CONSOLE SWITCH
(A/T)
GRN/BLK
L.BACK-UP
LIGHT
(45CP)
R.BACK-UP
LIGHT
(45CP)
G401
G402
G501


C
D
BAT
No.9(120A)
WHT/RED ACC
BLK/YEL IG1
BLK/YEL No.2(15A)
YEL/BLK No.4(15A)
YEL No.5(10A)
WHT/YEL No.33(7.5A)
No.46 (10A)
YEL
COMBINATION SWITCH
1
TURN SIGNAL SWITCH
LIGHTING SWITCH <7-B>
L.
R.
CANCEL SOL.
CANCEL SWITCH
CANCEL CAM
A
B
ORN
GRY
YEL
GRN/BLK
WHT
BRN
PUP
LIGHT (0.91W)
HAZARD SWITCH
TURN SIGNAL CANCEL UNIT
BLU/GRN
BLU/YEL
RED/WHT
BLK
TURN SIGNAL/HAZARD RELAY
GRN/BLU
GRN/YEL
R.TURN SIGNAL LIGHTS
LIGHTS
REAR (45CP)
FRONT (32CP)
37
38
L.
R.
• TURN SIGNAL INDICATOR LIGHT <3-D>
• INTEGRATED CONTROL UNIT <6-B>
G501
G301
G401
G402


A
B
BAT
No.9(120A)
ACC
WHT/RED
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
No.8(10A)
No.15 (20A)
No.45(20A) FUSE <4-D>
44
WHT/GRN
WHTIGRN
WHT/GRN
HORN RELAY
LT GRNIWHT
ORN/BLK
No.38(15A) FUSE <8-B>
72
RED/BLK
BLU/GIRN
YE
ID
CIGARETTE LIGHTER RELAY
4
BRN/YEt
WHT/BLU
CIGARETTE LIGHTER
ASHTRY LIGHT (3.4W)
CIGARETTE LIGHTER LIGHT(3.4W)
LT GRNIWHT
BLU/RED
SRS MAIN HARNESS
73
SECURITY CONTROL UNIT <16-A>
CABLE REEL
BLU/RED
ORN/BLK
ORN/BLK
YEL/GRN
L. HORN
R. HORN
SECURITY HORN
BLU/RED
BLU/RED
BLK
BLK
BLK
74
8
SET/RESUME SWITCH <13-C>
HORN SWITCH
BLK
G301
G302
G401
G402
SECURITY CONTROL UNIT <16-A>
75
BLK/BRN
No.38(15A) FUSE <8-B>
72
RED/BLK
CAR TELEPHONE SYSTEM(Option)
ORN/WHT
MUTE
STER
ANTENNA LEAD
BLK/L
GRN
WHT
ORN
WHT
RED/GRN
BRN/BLK
POWER AMP
REAR SPEAKER
WINDOW ANTENNA
FOOT WELL BASS SPE
CAR TELEPH SYSTEM(Opt
BLK 4
G404
G401
G402

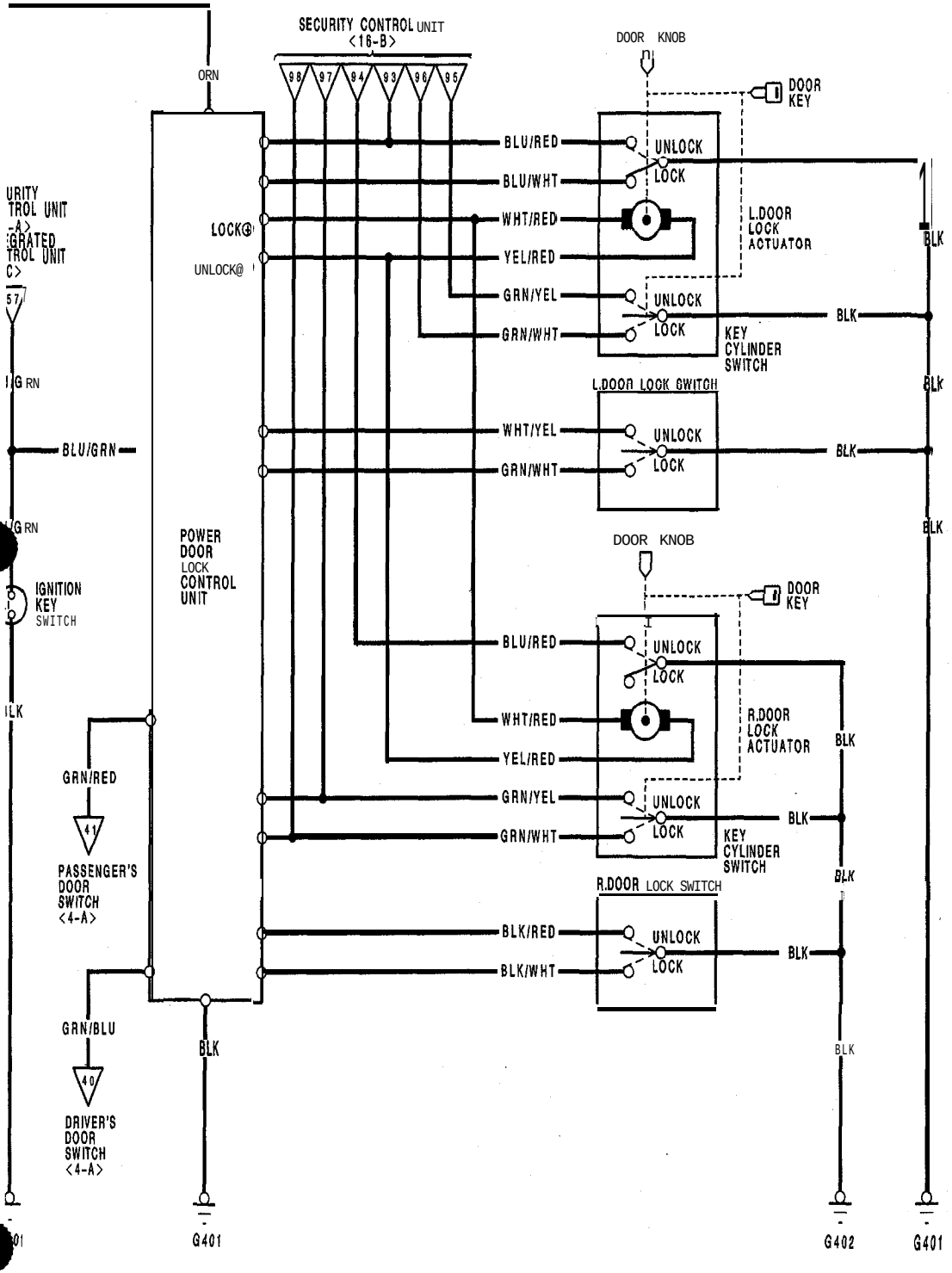

EAT
No.9(120A)
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)
WHT/YEL — No.33(7.5A)
No.51
(20A)
ANTENNA
No.34(15A)
FUSE
WHT/BLU
ANTENNA LEAD
PNK/WHT
GRN/BLK
POWER AMPLIFIER RELAY
RADIO/CASSETTE PLAYER
YEL/RED
BLK
ORN
WHT
POWER AMPLIFIER
DRIVER'S DOOR SPEAKER
PASSENGER'S DOOR SPEAKER
LIMIT SWITCH
DOWN RELAY
MOTOR
POWER ANTENNA MOTOR
(with the antenna retracted fully)
G401
G402
G201
G501

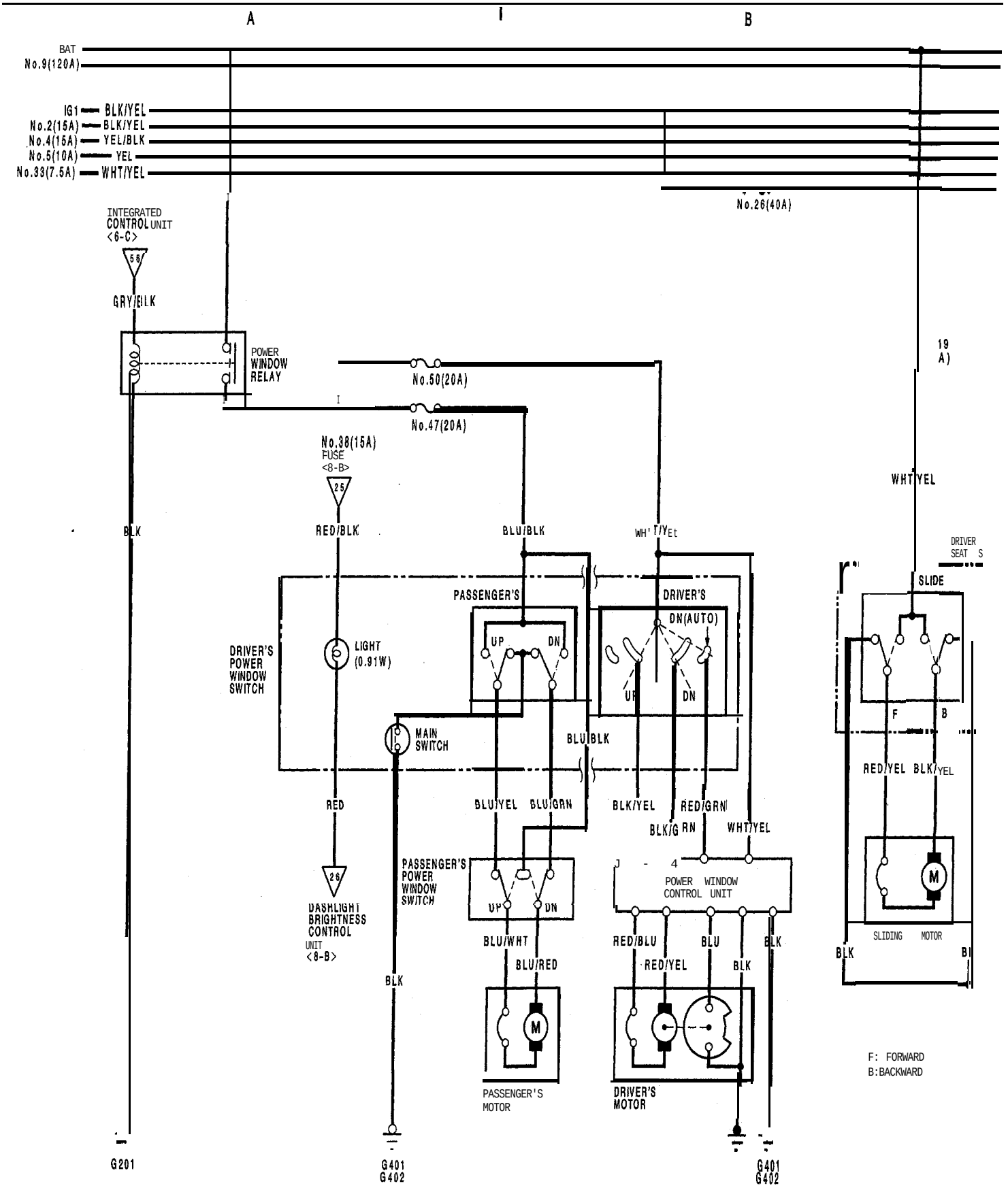

A
B
BAT
No.9(120A)
IG1 BLK/YEL
No.2(15A) BLK/YEL
No.4(15A) YEL/BLK
No.5(10A) YEL
No.33(7.5A) WHT/YEL
No.35(20A)
No.38(15A)
FUSE
<8-B>
RED/BLK
ORN
POWER DOOR MIRROR SWITCH
UP
LEFT
RIGHT
DOWN
LIGHT
(1.12W)
TRUNK
OPENER
MAIN
SWITCH
WHT/RED
TRUNK
OPENER
SWITCH
WHT/BLK
TRUNK
OPENER
SOLENOID
BLK
YEL/RED
BLU/GRN
YEL/BLK
BLU/BLK
RED
L.DOOR
MIRROR
R.DOOR
MIRROR
DOWN
LEFT
UP
RIGHT
YEL/WHT YEL/BLK
YEL/WHT BLU/BLK
DASHLIGHT
BRIGHTNESS
CONTROL UNIT
<8-B>
G401
G402
G501

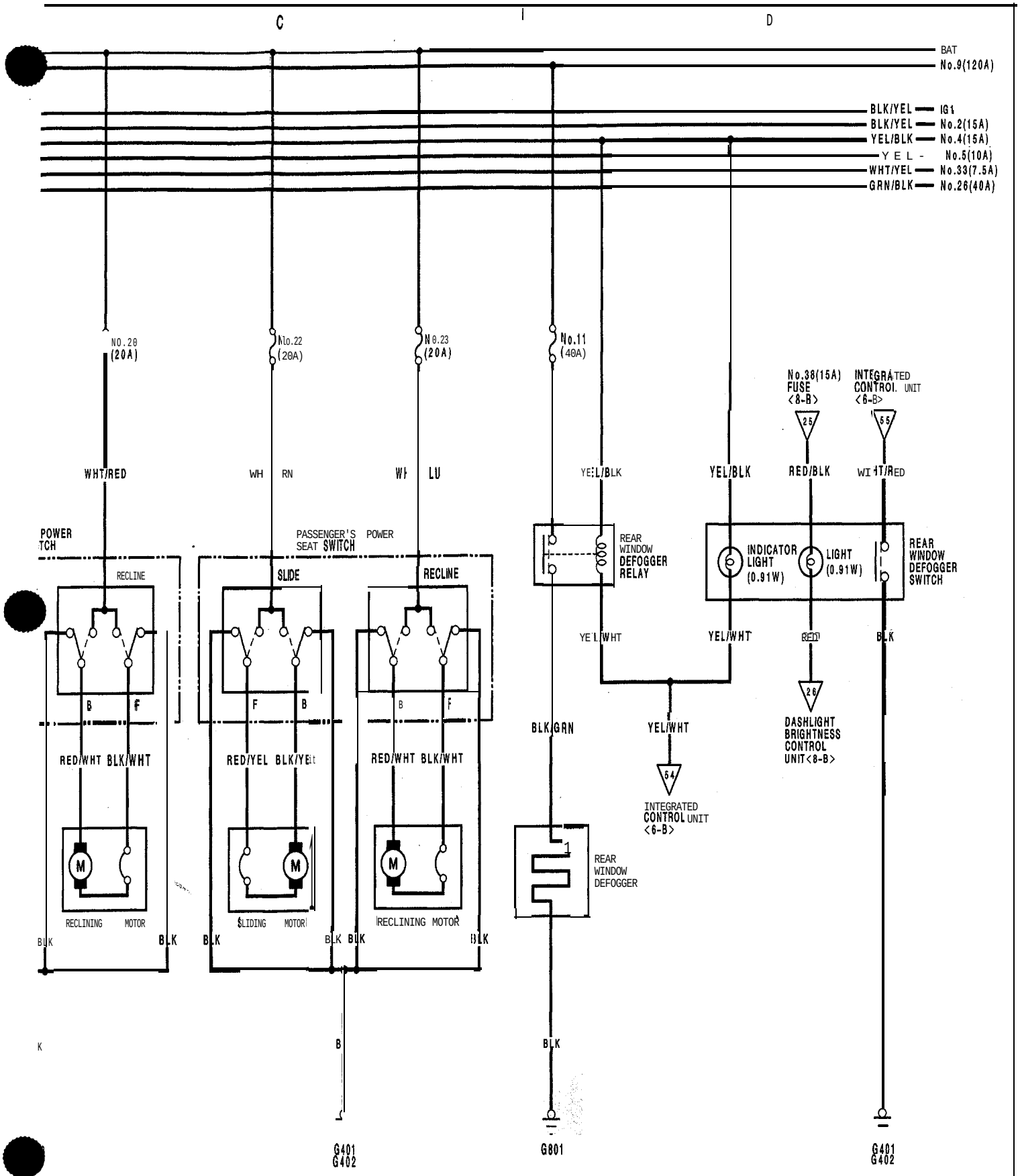
C D

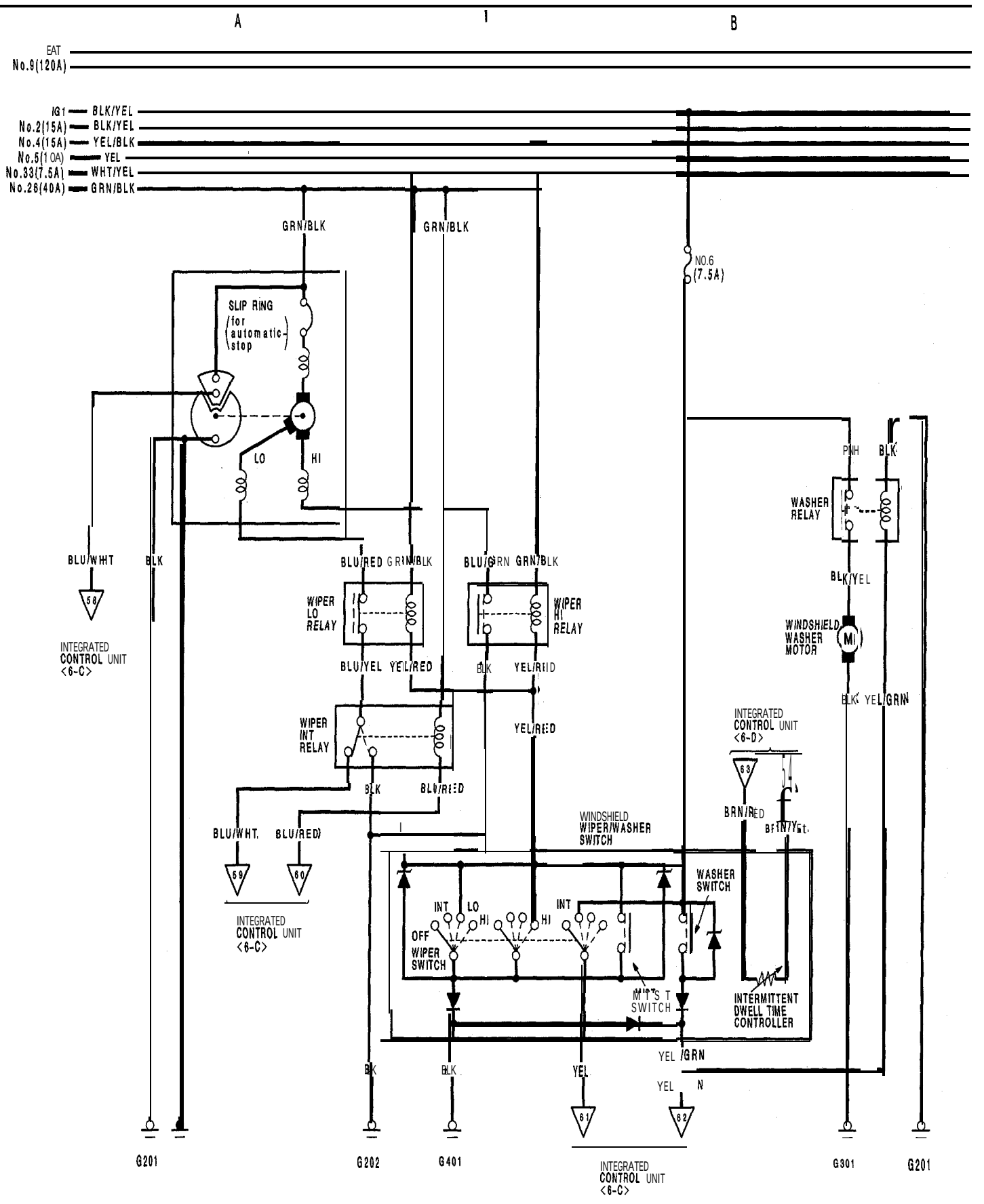
BAT
No.9(120A)

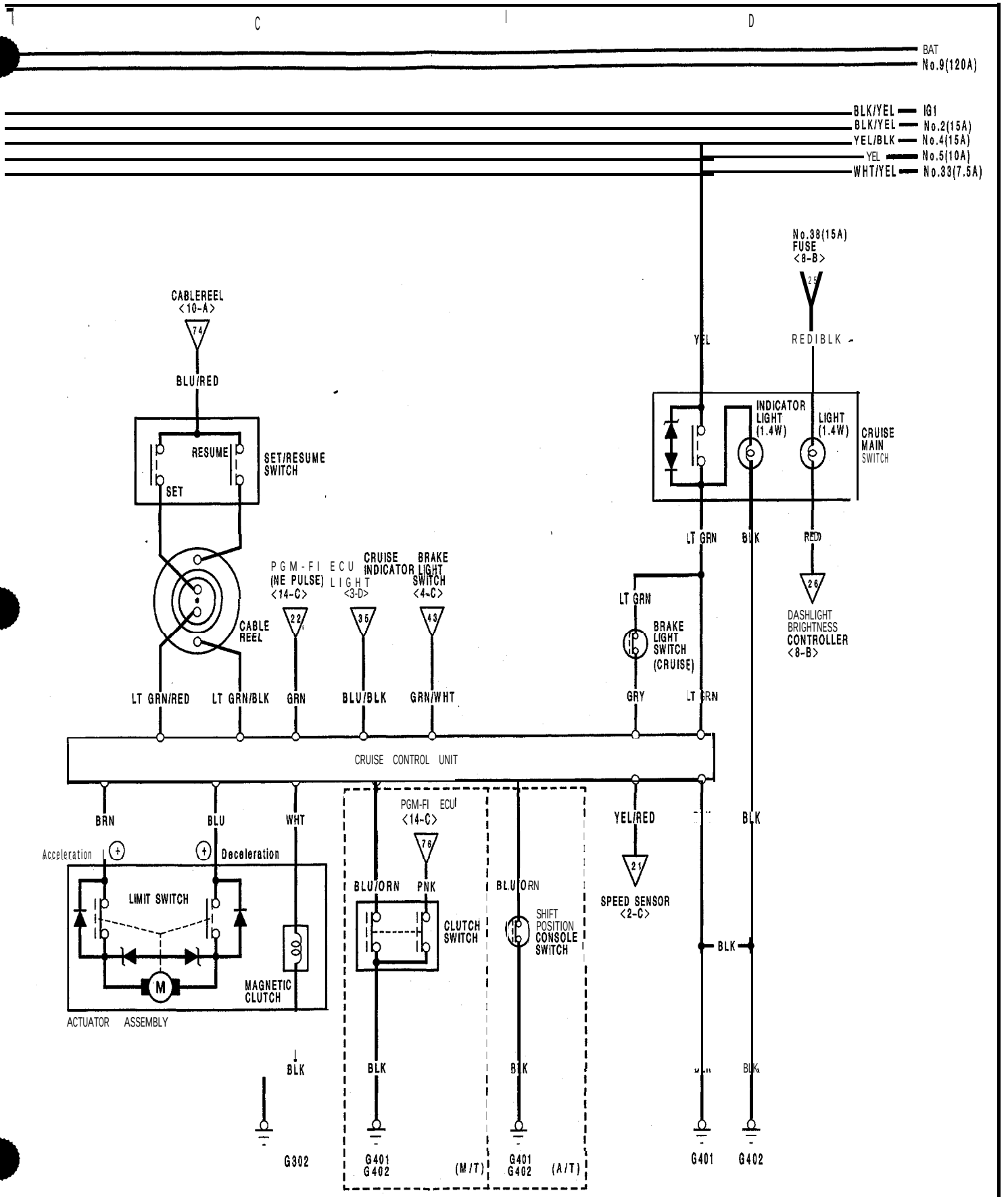
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)
WHT/YEL — No.33(7.5A)

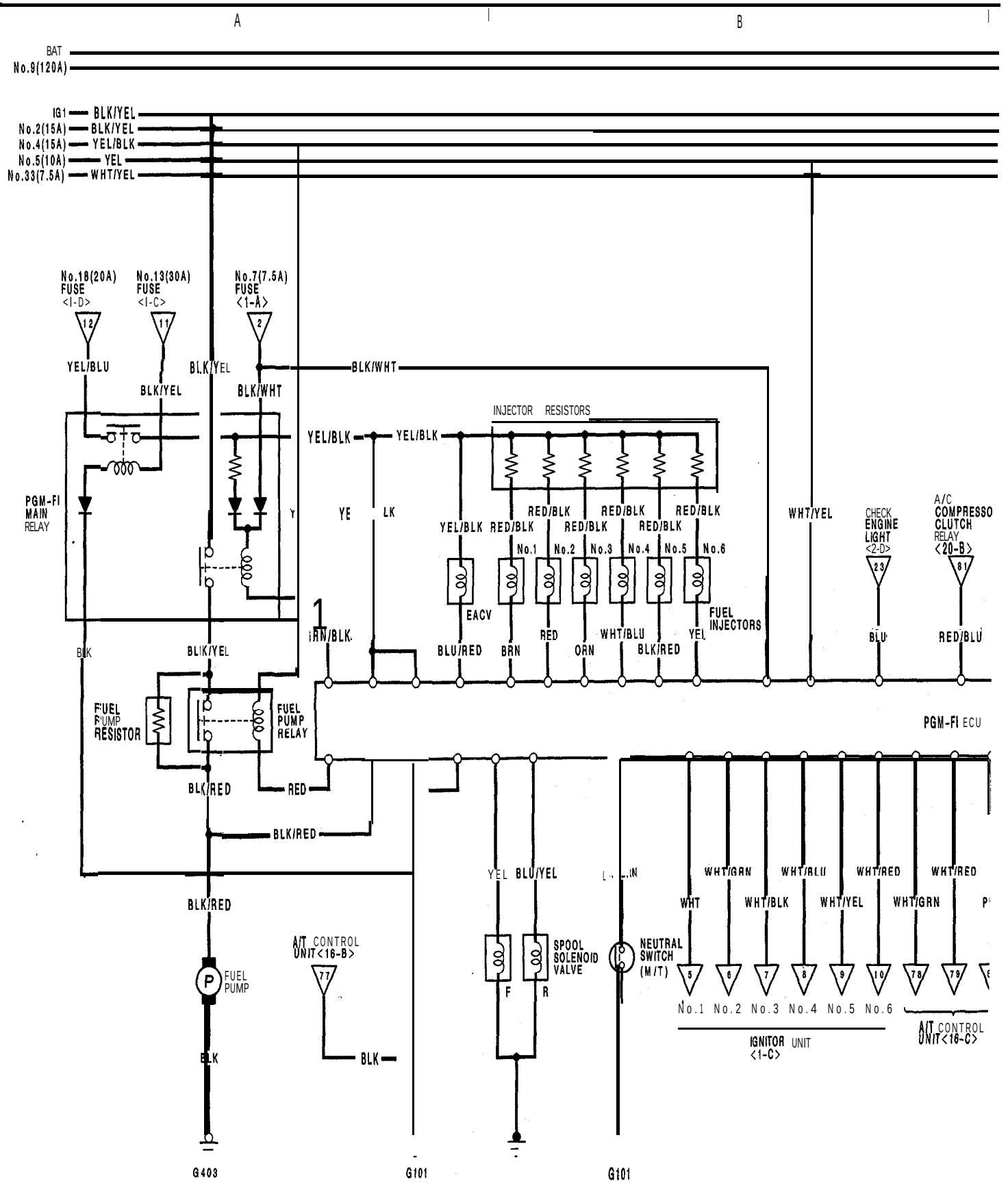


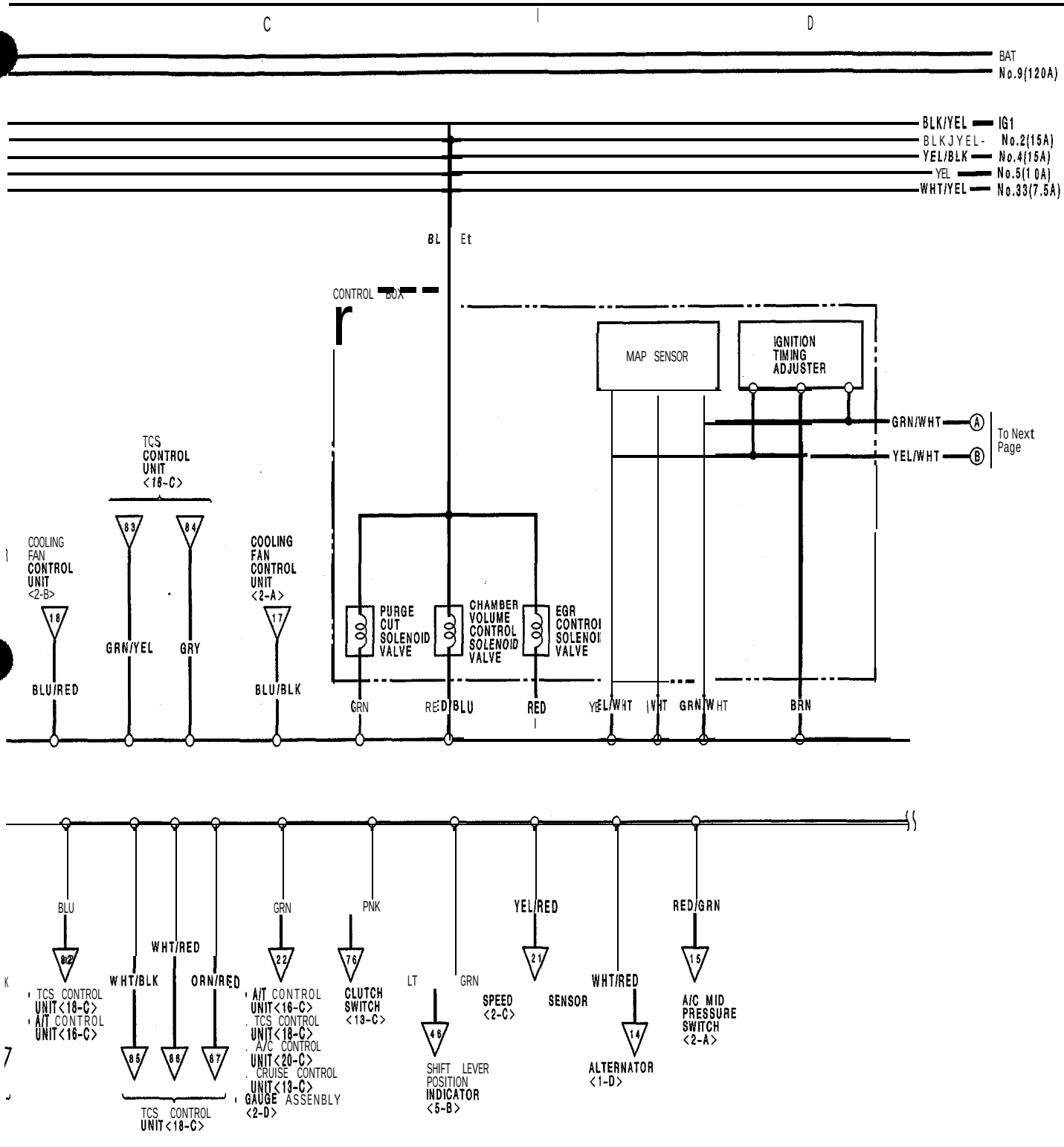

A
B
BAT
No.9(120A)
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
No.26(40A)
INTEGRATED CONTROL UNIT <6-C>
56
GRY/BLK
POWER WINDOW RELAY
No.50(20A)
No.47(20A)
No.38(15A) FUSE <8-B>
25
RED/BLK
BLK
BLU/BLK
WHT/YEL
DRIVER'S POWER WINDOW SWITCH
LIGHT (0.91W)
PASSENGER'S
DRIVER'S
UP
DN
DN(AUTO)
MAIN SWITCH
RED
26
DASHLIGHT BRIGHTNESS CONTROL UNIT <8-B>
BLU/YEL
BLU/GRN
BLK/YEL
RED/GRN
BLK/GRN
WHT/YEL
PASSENGER'S POWER WINDOW SWITCH
POWER WINDOW CONTROL UNIT
BLU/WHT
BLU/RED
RED/BLU
BLU
BLK
RED/YEL
PASSENGER'S MOTOR
DRIVER'S MOTOR
G201
G401
G402
DRIVER SEAT S
SLIDE
F
B
RED/YEL
BLK/YEL
SLIDING MOTOR
F: FORWARD
B:BACKWARD

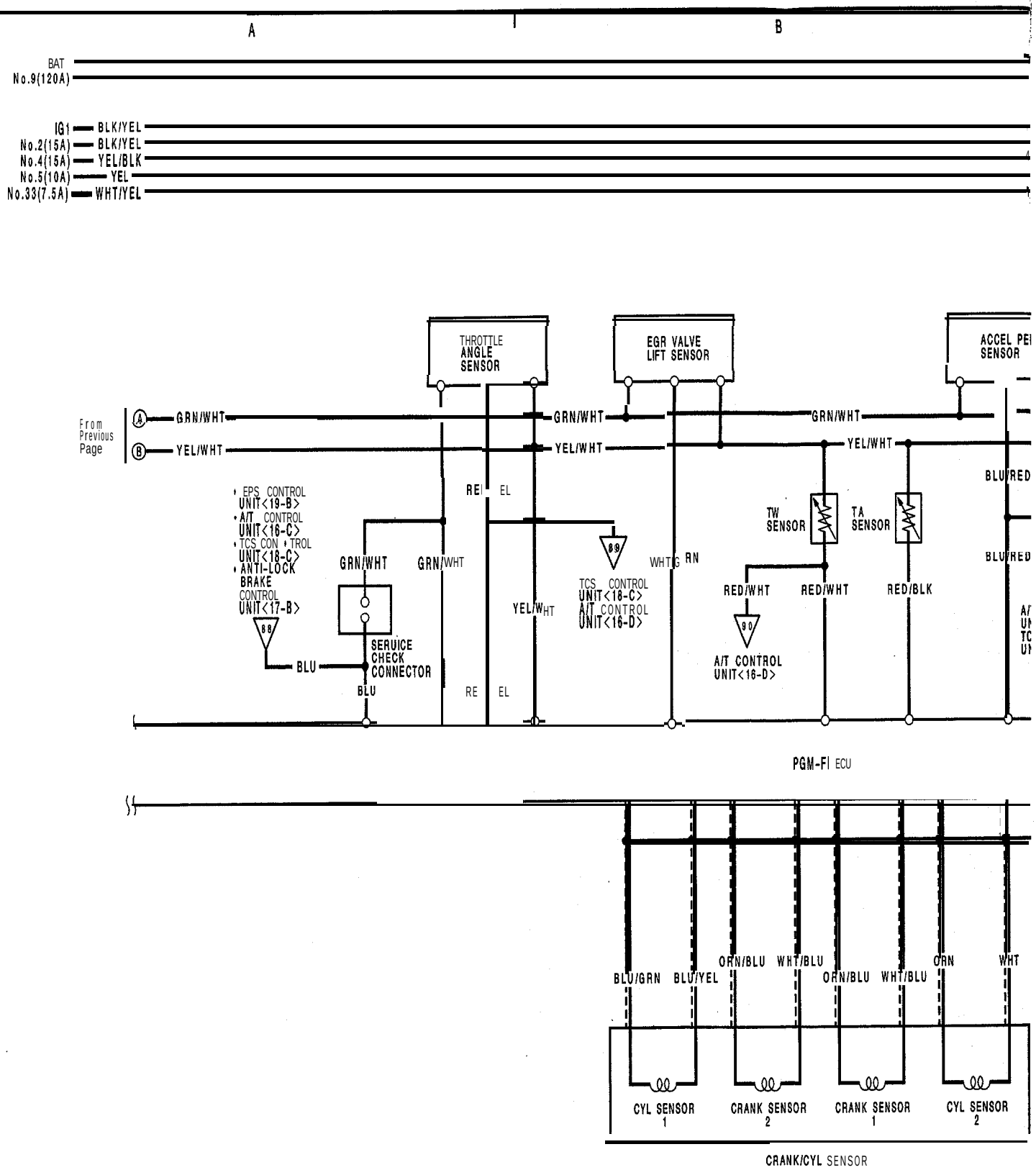

C
D
BAT
No.9(120A)
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)
WHT/YEL — No.33(7.5A)
GRN/BLK — No.26(40A)
NO.20 (20A)
No.22 (20A)
No.23 (20A)
No.11 (40A)
No.38(15A) FUSE <8-B>
INTEGRATED CONTROL UNIT <6-B>
WHT/RED
YEL/BLK
YEL/BLK
RED/BLK
WHT/RED
POWER SEAT SWITCH
PASSENGER'S POWER SEAT SWITCH
RECLINE
SLIDE
RECLINE
REAR WINDOW DEFOGGER RELAY
INDICATOR LIGHT (0.91W)
LIGHT (0.91W)
REAR WINDOW DEFOGGER SWITCH
YEL/WHT
YEL/WHT
RED
BLK
RED/WHT BLK/WHT
RED/YEL BLK/YEL
RED/WHT BLK/WHT
BLK/GRN
YEL/WHT
DASHLIGHT BRIGHTNESS CONTROL UNIT <8-B>
INTEGRATED CONTROL UNIT <6-B>
REAR WINDOW DEFOGGER
RECLINING MOTOR
SLIDING MOTOR
RECLINING MOTOR
G401
G402
G801
G401
G402

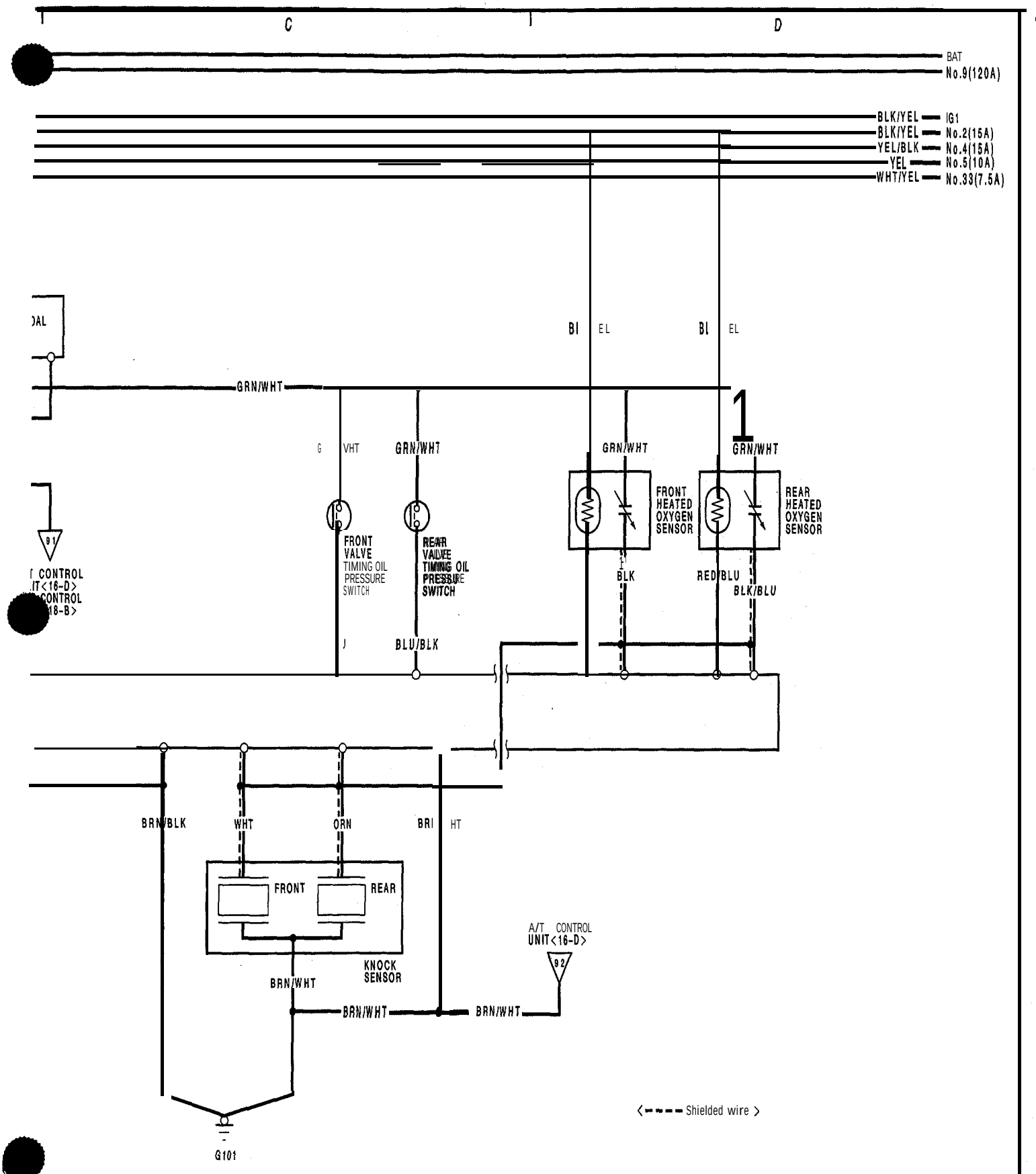

A
1
B
EAT
No.9(120A)
IG1 BLK/YEL
No.2(15A) BLK/YEL
No.4(15A) YEL/BLK
No.5(10A) YEL
No.33(7.5A) WHT/YEL
No.26(40A) GRN/BLK
GRN/BLK
GRN/BLK
NO.6
(7.5A)
SLIP RING
(for automatic stop)
LO
HI
BLU/WHT
BLK
58
INTEGRATED CONTROL UNIT <6-C>
BLU/RED
GRN/BLK
BLU/GRN
GRN/BLK
WIPER LO RELAY
WIPER HI RELAY
BLU/YEL
YEL/RED
BLK
YEL/RED
WIPER INT RELAY
YEL/RED
BLK
BLU/RED
BLU/WHT.
BLU/RED
59
60
INTEGRATED CONTROL UNIT <6-C>
WINDSHIELD WIPER/WASHER SWITCH
WASHER SWITCH
INT
LO
HI
INT
HI
OFF
WIPER SWITCH
MIST SWITCH
INTERMITTENT DWELL TIME CONTROLLER
YEL/GRN
BLK
BLK
YEL
YEL
61
62
INTEGRATED CONTROL UNIT <6-C>
PNK
BLK
WASHER RELAY
BLK/YEL
WINDSHIELD WASHER MOTOR
M
BLK
YEL/GRN
INTEGRATED CONTROL UNIT <6-D>
63
BRN/RED
BRN/YEL
G201
G202
G401
G301
G201

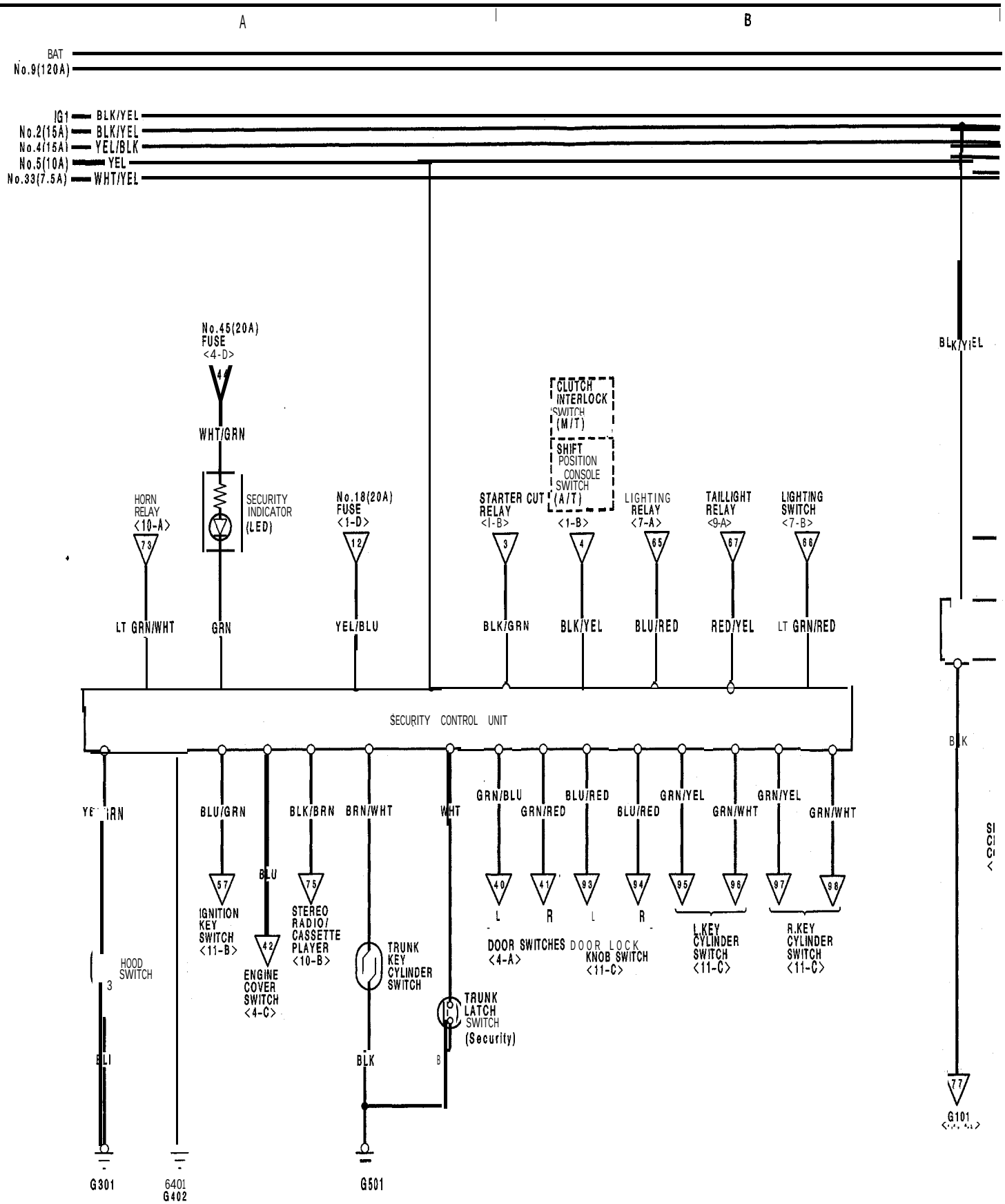

BAT
No.9(120A)
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)
WHT/YEL — No.33(7.5A)
No.38(15A) FUSE <8-B>
CABLEREEL <10-A>
74
BLU/RED
RESUME
SET
SET/RESUME SWITCH
CABLE REEL
YEL
REDIBLK
INDICATOR LIGHT (1.4W)
LIGHT (1.4W)
CRUISE MAIN SWITCH
LT GRN
BLK
RED
PGM-FI ECU (NE PULSE) <14-C>
CRUISE INDICATOR LIGHT <3-D>
BRAKE LIGHT SWITCH <4-C>
22
35
43
LT GRN
BRAKE LIGHT SWITCH (CRUISE)
26
DASHLIGHT BRIGHTNESS CONTROLLER <8-B>
LT GRN/RED
LT GRN/BLK
GRN
BLU/BLK
GRN/WHT
GRY
LT GRN
CRUISE CONTROL UNIT
BRN
BLU
WHT
Acceleration
Deceleration
LIMIT SWITCH
M
MAGNETIC CLUTCH
ACTUATOR ASSEMBLY
PGM-FI ECU <14-C>
76
BLU/ORN
PNK
CLUTCH SWITCH
BLU/ORN
SHIFT POSITION CONSOLE SWITCH
YEL/RED
21
SPEED SENSOR <2-C>
BLK
BLK
BLK
BLK
BLK
G302
G401 G402
(M/T)
G401 G402
(A/T)
G401
G402

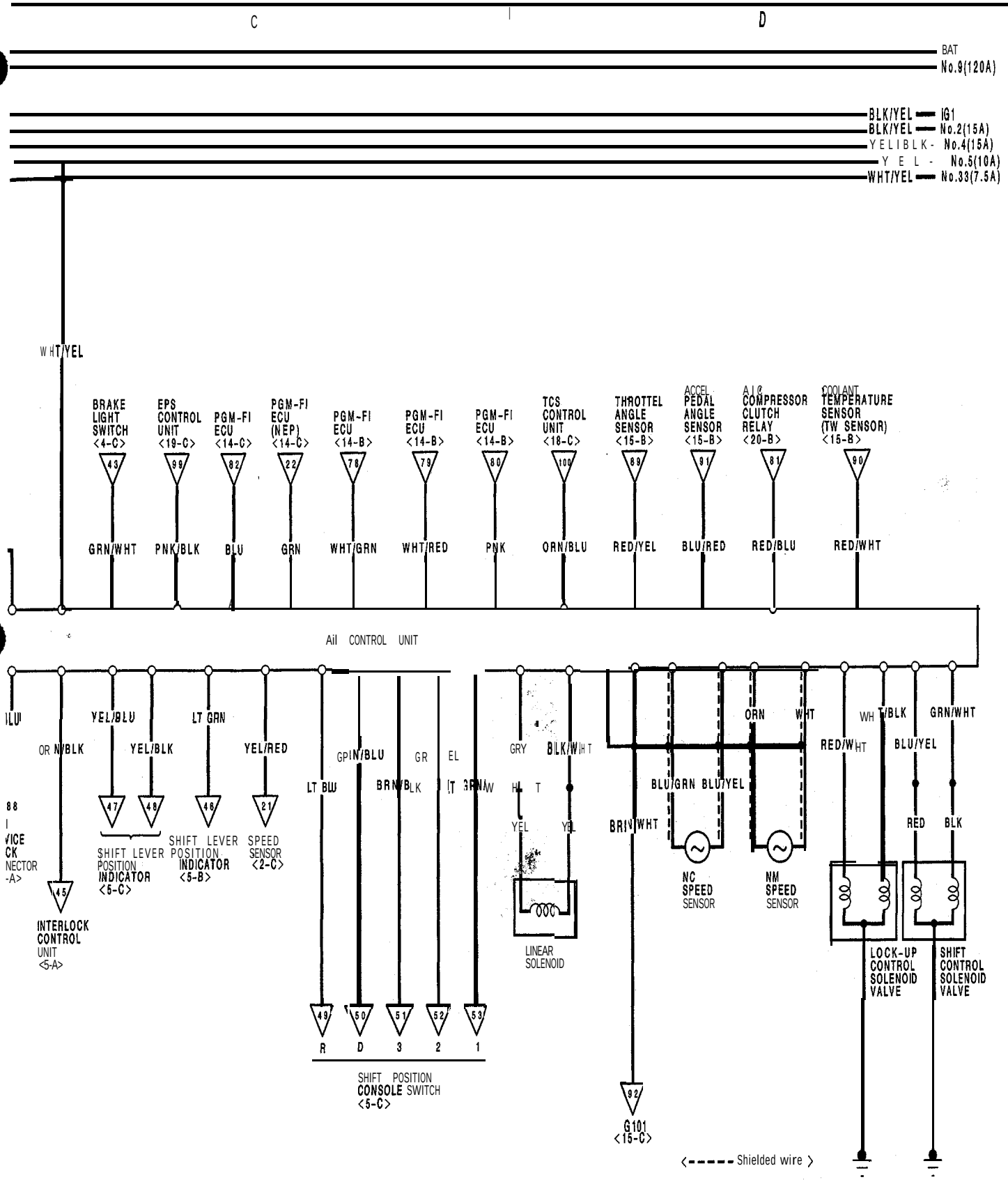

A
B
BAT
No.9(120A)
IG1 BLK/YEL
No.2(15A) BLK/YEL
No.4(15A) YEL/BLK
No.5(10A) YEL
No.33(7.5A) WHT/YEL
No.18(20A) FUSE <1-D>
No.13(30A) FUSE <1-C>
No.7(7.5A) FUSE <1-A>
YEL/BLU
BLK/YEL
BLK/WHT
PGM-FI MAIN RELAY
INJECTOR RESISTORS
YEL/BLK
RED/BLK
No.1
No.2
No.3
No.4
No.5
No.6
EACV
FUEL INJECTORS
BLU/RED
BRN
RED
ORN
WHT/BLU
BLK/RED
YEL
WHT/YEL
CHECK ENGINE LIGHT <2-D>
A/C COMPRESSO CLUTCH RELAY <20-B>
BLU
RED/BLU
BRN/BLK
BLK
FUEL PUMP RESISTOR
FUEL PUMP RELAY
PGM-FI ECU
FUEL PUMP
A/T CONTROL UNIT <16-B>
SPOOL SOLENOID VALVE
F
R
YEL
BLU/YEL
NEUTRAL SWITCH (M/T)
WHT
WHT/GRN
WHT/BLK
WHT/YEL
WHT/RED
IGNITOR UNIT <1-C>
A/T CONTROL UNIT <16-C>
G403
G101
G101

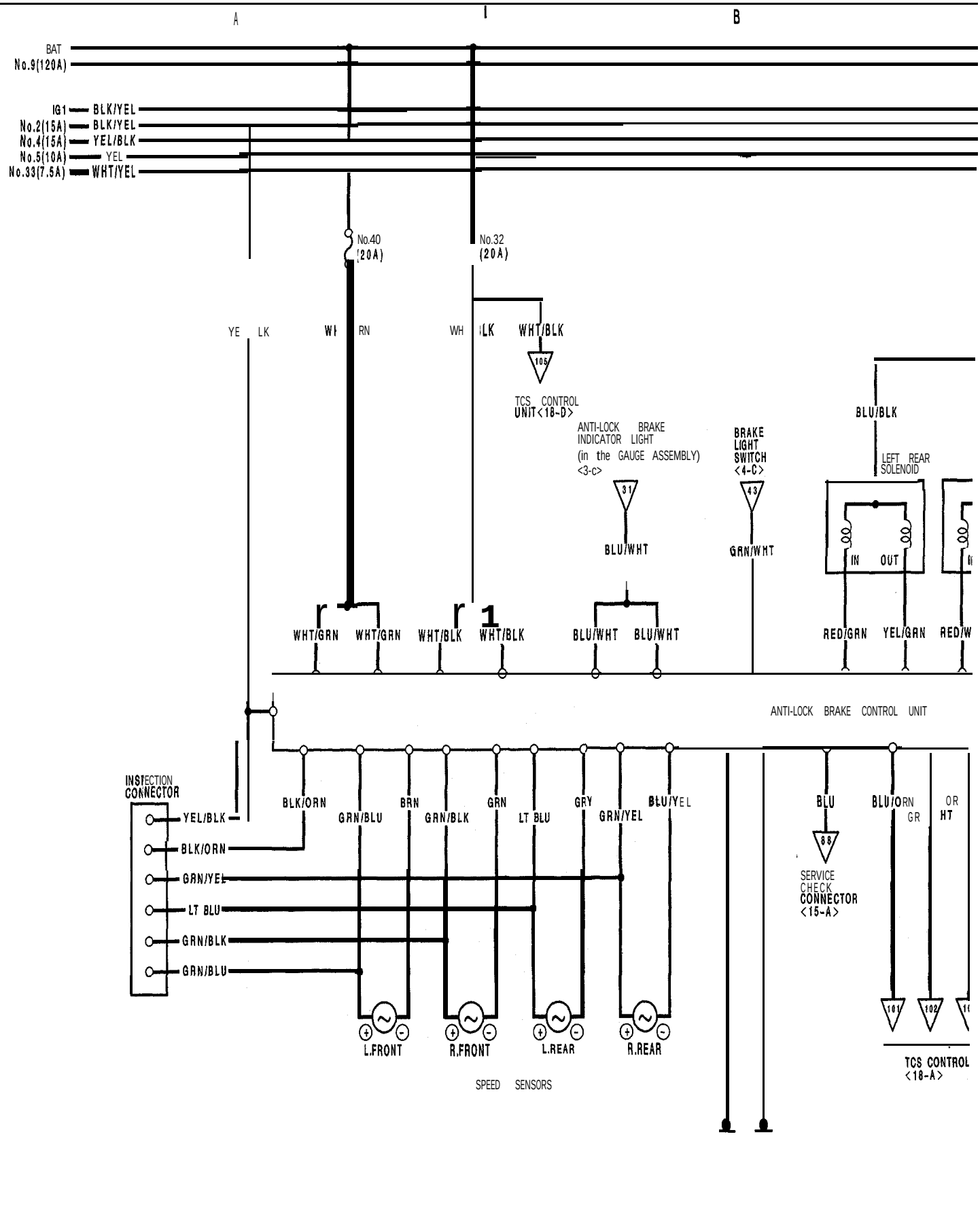

C
D
BAT
No.9(120A)
BLK/YEL
IG1
BLK/YEL
No.2(15A)
YEL/BLK
No.4(15A)
YEL
No.5(10A)
WHT/YEL
No.33(7.5A)
CONTROL BOX
MAP SENSOR
IGNITION TIMING ADJUSTER
GRN/WHT
YEL/WHT
To Next Page
TCS CONTROL UNIT <18-C>
COOLING FAN CONTROL UNIT <2-B>
COOLING FAN CONTROL UNIT <2-A>
PURGE CUT SOLENOID VALVE
CHAMBER VOLUME CONTROL SOLENOID VALVE
EGR CONTROL SOLENOID VALVE
BLU/RED
GRN/YEL
GRY
BLU/BLK
GRN
RED/BLU
RED
YEL/WHT
WHT
GRN/WHT
BRN
BLU
WHT/RED
GRN
PNK
YEL/RED
RED/GRN
WHT/BLK
ORN/RED
LT GRN
WHT/RED
TCS CONTROL UNIT <18-C>
A/T CONTROL UNIT <16-C>
CLUTCH SWITCH <13-C>
SPEED SENSOR <2-C>
A/C MID PRESSURE SWITCH <2-A>
TCS CONTROL UNIT <18-C>
A/T CONTROL UNIT <16-C>
TCS CONTROL UNIT <18-C>
A/C CONTROL UNIT <20-C>
CRUISE CONTROL UNIT <13-C>
GAUGE ASSENBLY <2-D>
SHIFT LEVER POSITION INDICATOR <5-B>
ALTERNATOR <1-D>

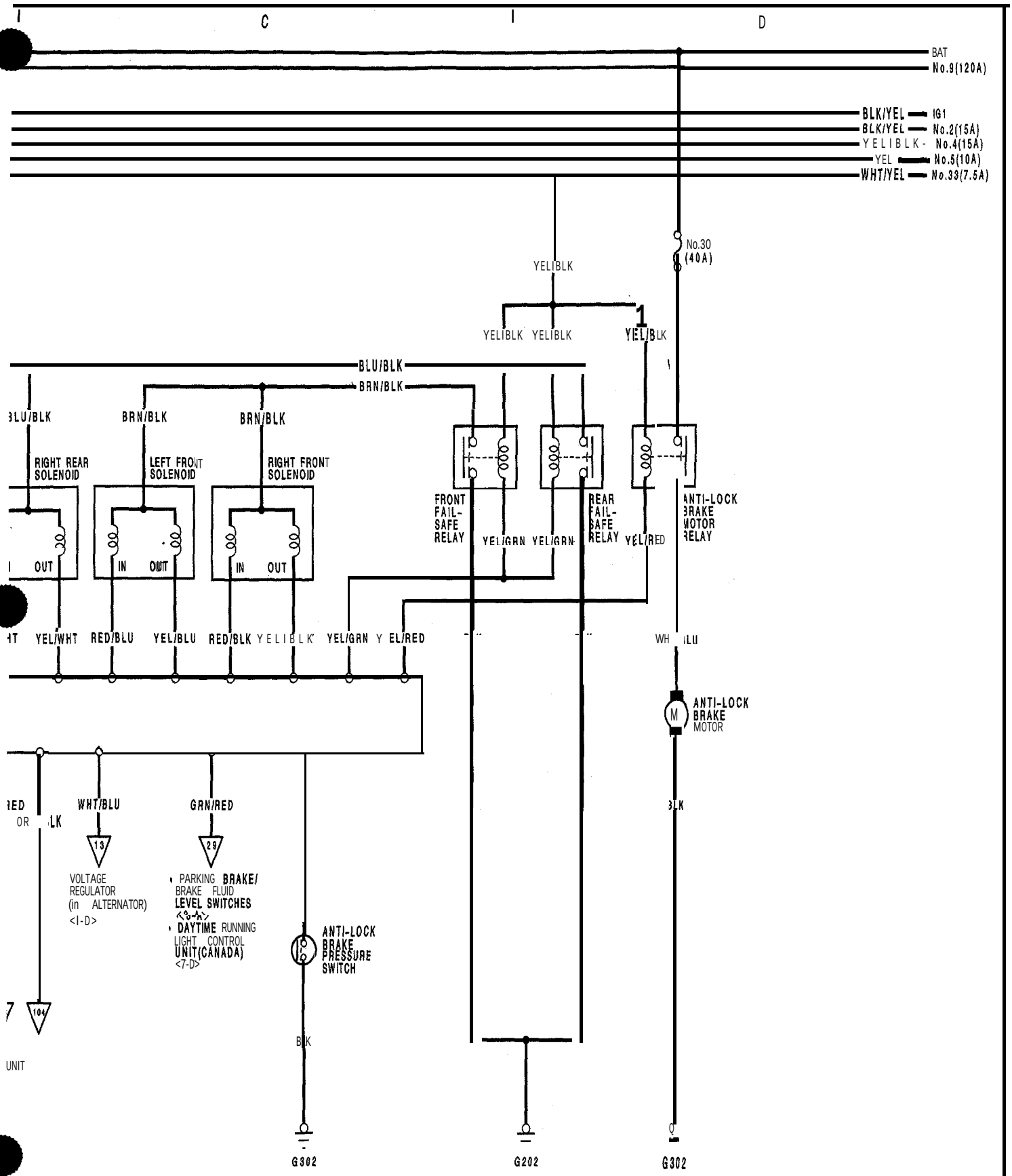

A
B
BAT
No.9(120A)
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
THROTTLE ANGLE SENSOR
EGR VALVE LIFT SENSOR
ACCEL PE SENSOR
From Previous Page
GRN/WHT
YEL/WHT
EPS CONTROL UNIT<19-B>
A/T CONTROL UNIT<16-C>
TCS CON TROL UNIT<18-C>
ANTI-LOCK BRAKE CONTROL UNIT<17-B>
SERVICE CHECK CONNECTOR
BLU
TCS CONTROL UNIT<18-C>
A/T CONTROL UNIT<16-D>
TW SENSOR
TA SENSOR
RED/WHT
RED/BLK
BLU/RED
A/T CONTROL UNIT<16-D>
PGM-FI ECU
BLU/GRN
BLU/YEL
ORN/BLU
WHT/BLU
ORN
WHT
CYL SENSOR 1
CRANK SENSOR 2
CRANK SENSOR 1
CYL SENSOR 2
CRANK/CYL SENSOR

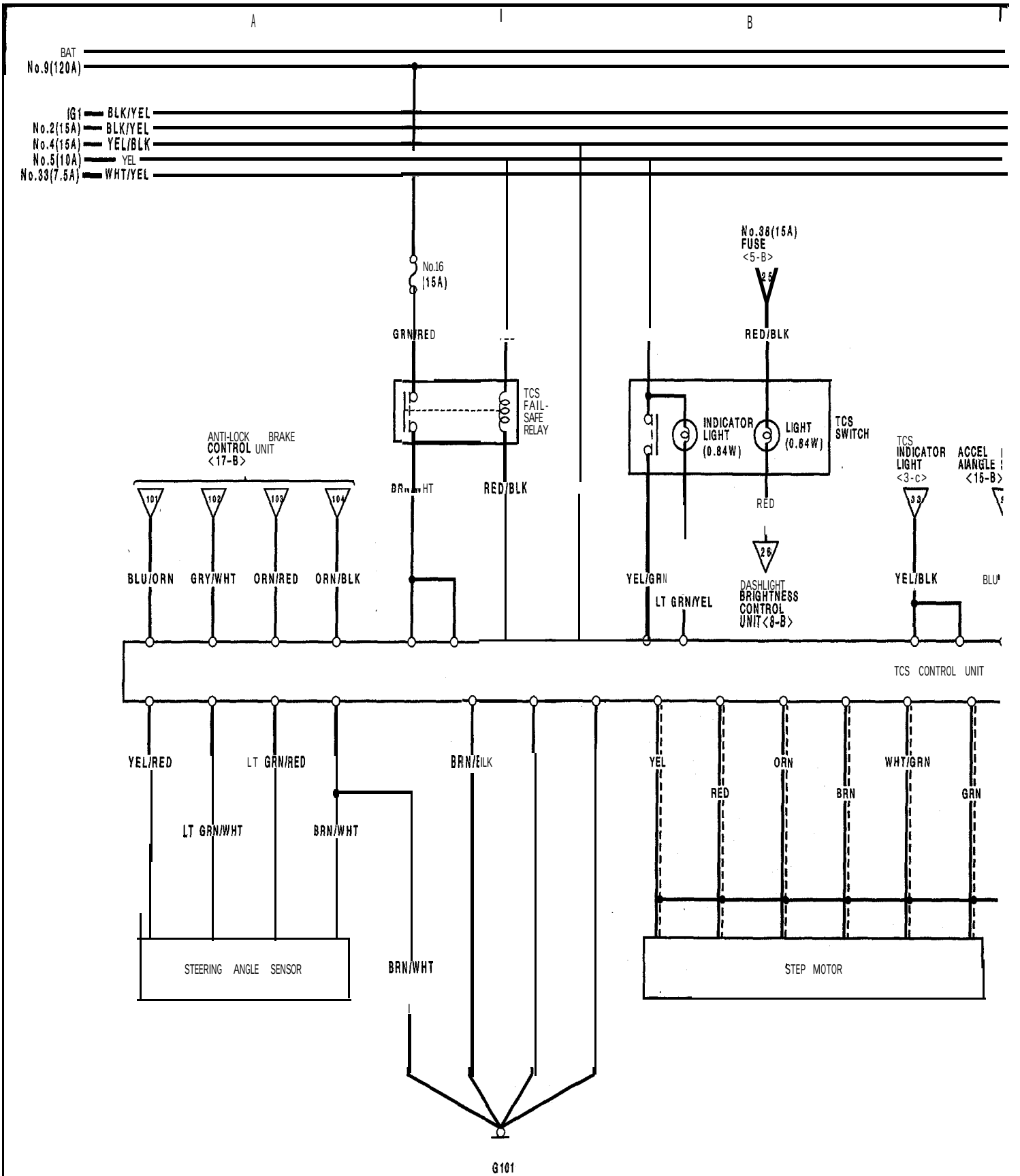

C
D
BAT
No.9(120A)
BLK/YEL
IG1
BLK/YEL
No.2(15A)
YEL/BLK
No.4(15A)
YEL
No.5(10A)
WHT/YEL
No.33(7.5A)
BI EL
BI EL
GRN/WHT
1
G VHT
GRN/WHT
GRN/WHT
GRN/WHT
FRONT HEATED OXYGEN SENSOR
REAR HEATED OXYGEN SENSOR
FRONT VALVE TIMING OIL PRESSURE SWITCH
REAR VALVE TIMING OIL PRESSURE SWITCH
BLK
RED/BLU
BLK/BLU
BLU/BLK
BRN/BLK
WHT
ORN
BRI HT
FRONT
REAR
KNOCK SENSOR
BRN/WHT
BRN/WHT
BRN/WHT
A/T CONTROL UNIT<16-D>
92
Shielded wire
G101

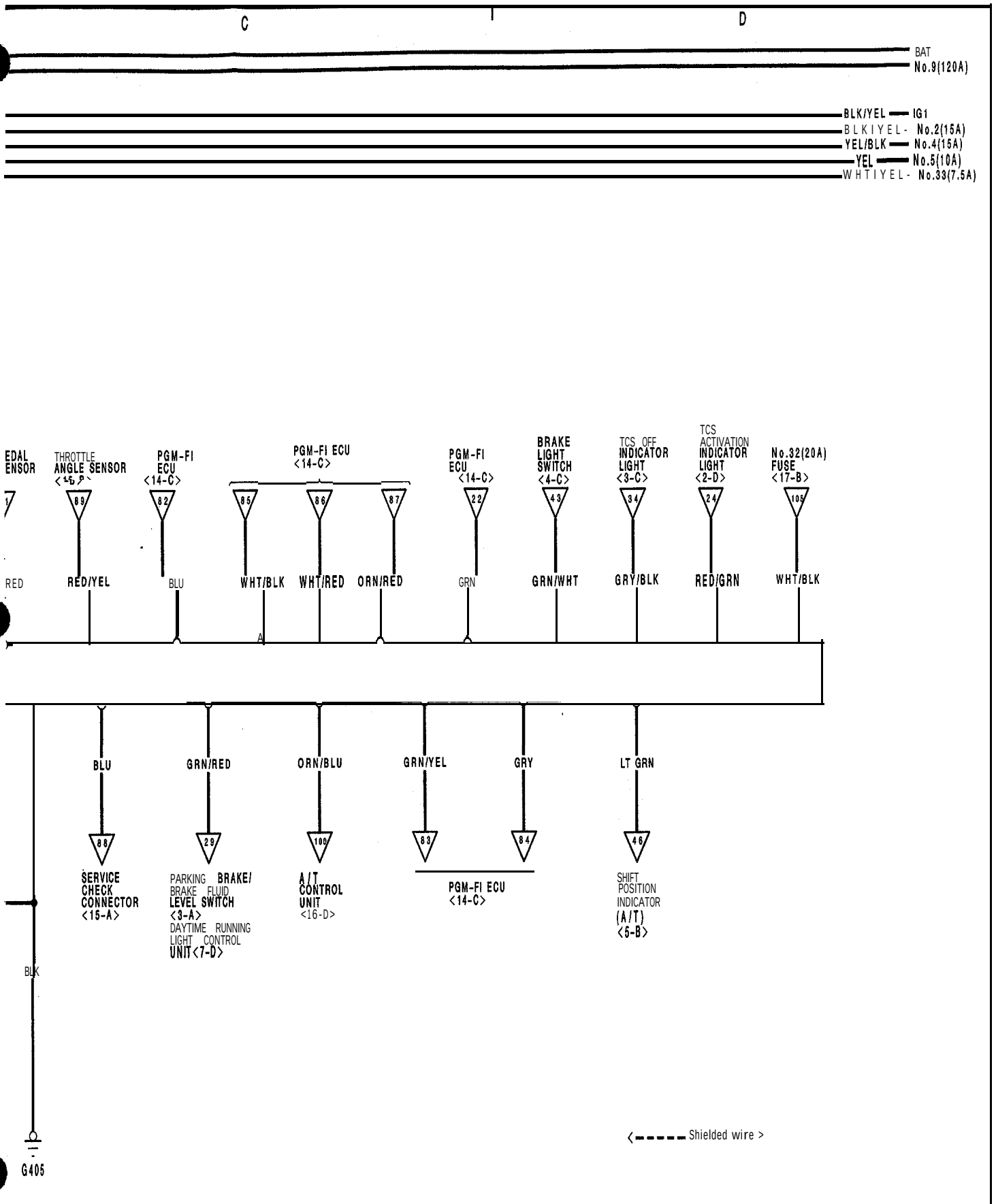

A
B
BAT
No.9(120A)
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
No.45(20A) FUSE <4-D>
WHT/GRN
HORN RELAY <10-A>
SECURITY INDICATOR (LED)
No.18(20A) FUSE <1-D>
CLUTCH INTERLOCK SWITCH (M/T)
SHIFT POSITION CONSOLE SWITCH (A/T)
STARTER CUT RELAY <1-B>
LIGHTING RELAY <7-A>
TAILLIGHT RELAY <9-A>
LIGHTING SWITCH <7-B>
LT GRN/WHT
GRN
YEL/BLU
BLK/GRN
BLK/YEL
BLU/RED
RED/YEL
LT GRN/RED
SECURITY CONTROL UNIT
BLU/GRN
BLK/BRN
BRN/WHT
WHT
GRN/BLU
GRN/RED
BLU/RED
BLU/RED
GRN/YEL
GRN/WHT
GRN/YEL
GRN/WHT
IGNITION KEY SWITCH <11-B>
STEREO RADIO/ CASSETTE PLAYER <10-B>
ENGINE COVER SWITCH <4-C>
HOOD SWITCH
TRUNK KEY CYLINDER SWITCH
TRUNK LATCH SWITCH (Security)
DOOR SWITCHES <4-A>
DOOR LOCK KNOB SWITCH <11-C>
L KEY CYLINDER SWITCH <11-C>
R.KEY CYLINDER SWITCH <11-C>
BLK
G301
G402
G501
G101

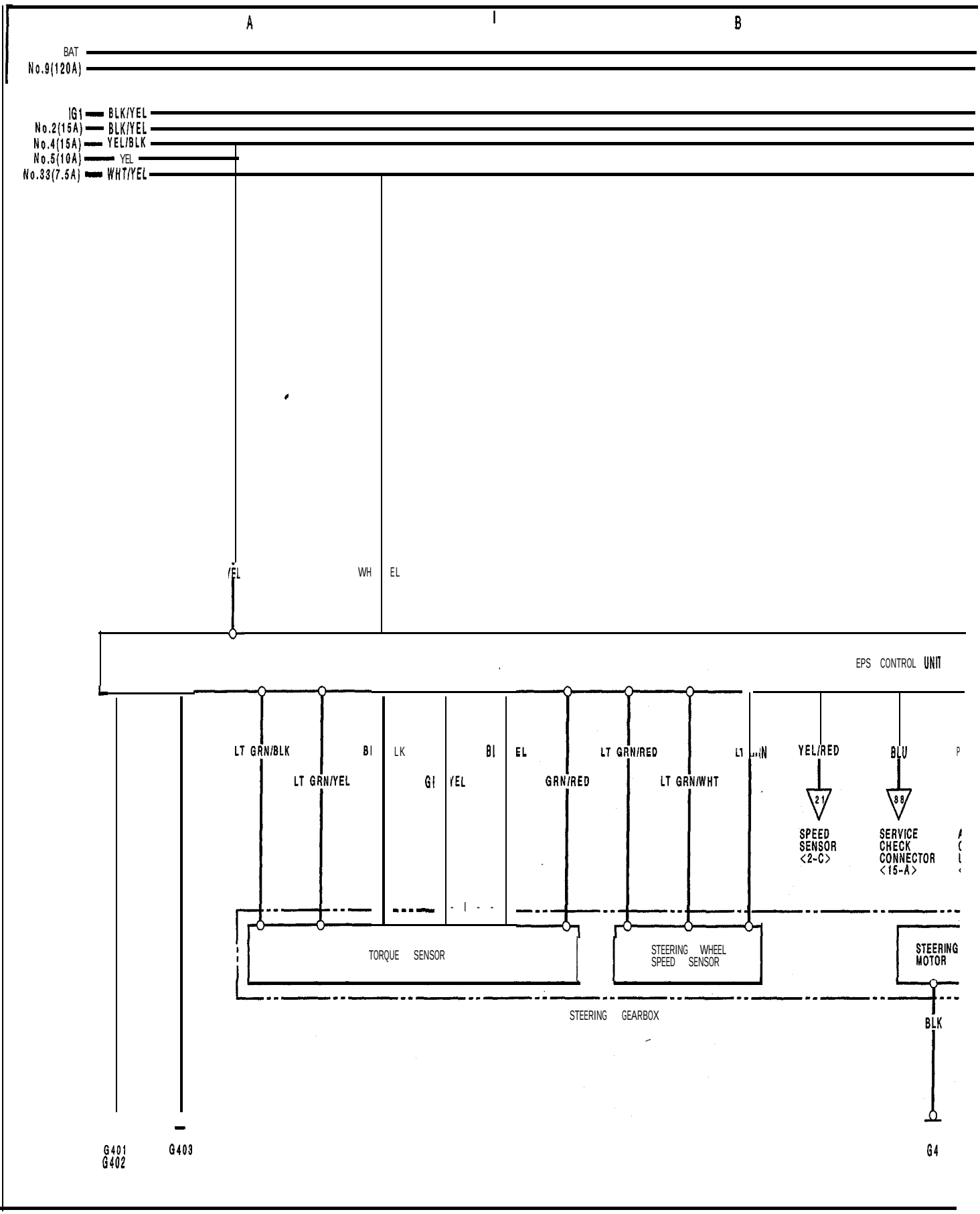

C
D
BAT
No.9(120A)
BLK/YEL
IG1
BLK/YEL
No.2(15A)
YELIBLK-
No.4(15A)
YEL-
No.5(10A)
WHT/YEL
No.33(7.5A)
WHT/YEL
BRAKE LIGHT SWITCH <4-C>
EPS CONTROL UNIT <19-C>
PGM-FI ECU <14-C>
PGM-FI ECU (NEP) <14-C>
PGM-FI ECU <14-B>
PGM-FI ECU <14-B>
PGM-FI ECU <14-B>
TCS CONTROL UNIT <18-C>
THROTTEL ANGLE SENSOR <15-B>
ACCEL PEDAL ANGLE SENSOR <15-B>
A/C COMPRESSOR CLUTCH RELAY <20-B>
COOLANT TEMPERATURE SENSOR (TW SENSOR) <15-B>
GRN/WHT
PNK/BLK
BLU
GRN
WHT/GRN
WHT/RED
PNK
ORN/BLU
RED/YEL
BLU/RED
RED/BLU
RED/WHT
Ail CONTROL UNIT
YEL/BLU
YEL/BLK
LT GRN
YEL/RED
SHIFT LEVER POSITION INDICATOR <5-C>
SHIFT LEVER POSITION INDICATOR <5-B>
SPEED SENSOR <2-C>
INTERLOCK CONTROL UNIT <5-A>
LT BLU
BRN/BLK
GRY
BLK/WHT
YEL
LINEAR SOLENOID
BRN/WHT
BLU/GRN
BLU/YEL
NC SPEED SENSOR
NM SPEED SENSOR
ORN
WHT
RED/WHT
BLU/YEL
GRN/WHT
RED
BLK
LOCK-UP CONTROL SOLENOID VALVE
SHIFT CONTROL SOLENOID VALVE
R
D
3
2
1
SHIFT POSITION CONSOLE SWITCH <5-C>
G101 <15-C>
Shielded wire

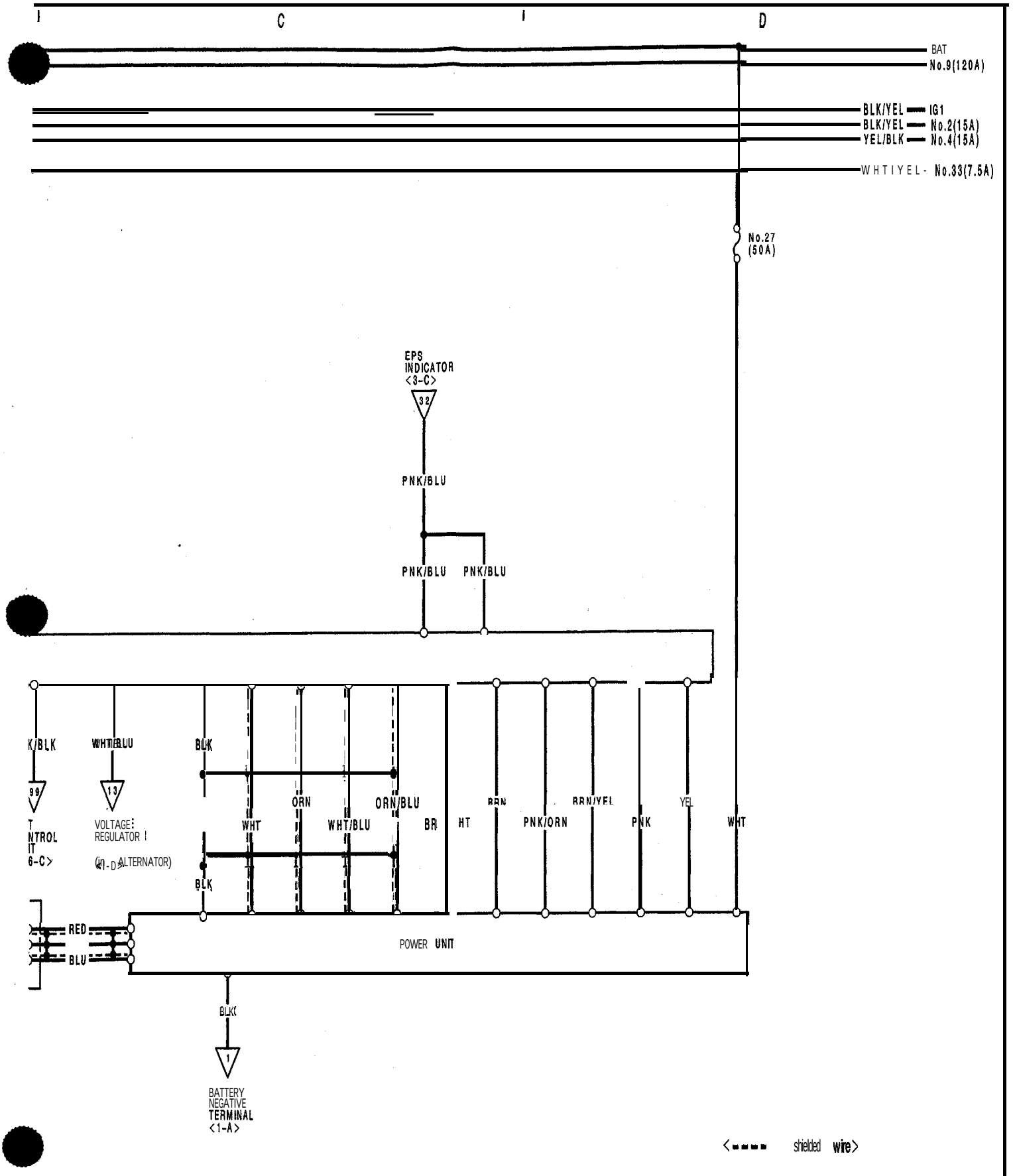

A
I
B
BAT
No.9(120A)
IG1 BLK/YEL
No.2(15A) BLK/YEL
No.4(15A) YEL/BLK
No.5(10A) YEL
No.33(7.5A) WHT/YEL
No.40 (20A)
No.32 (20A)
WHT/BLK
105
TCS CONTROL UNIT<18-D>
ANTI-LOCK BRAKE INDICATOR LIGHT (in the GAUGE ASSEMBLY) <3-c>
31
BLU/WHT
BRAKE LIGHT SWITCH <4-C>
43
GRN/WHT
BLU/BLK
LEFT REAR SOLENOID
IN
OUT
WHT/GRN
WHT/GRN
WHT/BLK
WHT/BLK
BLU/WHT
BLU/WHT
RED/GRN
YEL/GRN
ANTI-LOCK BRAKE CONTROL UNIT
INSPECTION CONNECTOR
YEL/BLK
BLK/ORN
GRN/YEL
LT BLU
GRN/BLK
GRN/BLU
BLK/ORN
GRN/BLU
BRN
GRN/BLK
GRN
LT BLU
GRY
GRN/YEL
BLU/YEL
L.FRONT
R.FRONT
L.REAR
R.REAR
SPEED SENSORS
BLU
88
SERVICE CHECK CONNECTOR <15-A>
BLU/ORN
101
102
TCS CONTROL <18-A>

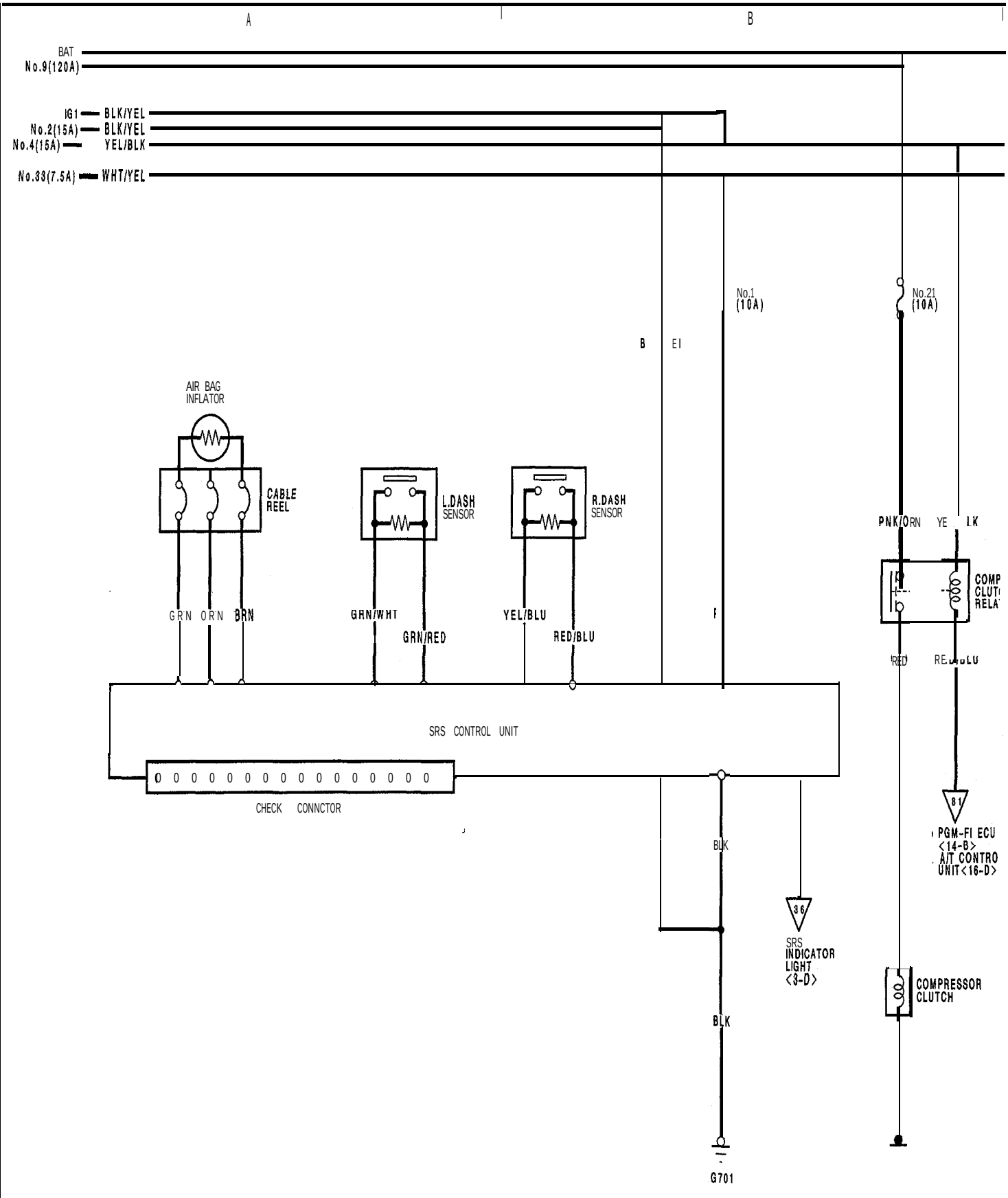

C
D
BAT
No.9(120A)
BLK/YEL
IG1
BLK/YEL
No.2(15A)
YELIBLK
No.4(15A)
YEL
No.5(10A)
WHT/YEL
No.33(7.5A)
No.30
(40A)
YELIBLK
YELIBLK YELIBLK
YEL/BLK
BLU/BLK
BRN/BLK
BRN/BLK
BRN/BLK
RIGHT REAR SOLENOID
LEFT FRONT SOLENOID
RIGHT FRONT SOLENOID
OUT
IN OUT
IN OUT
FRONT FAIL-SAFE RELAY
REAR FAIL-SAFE RELAY
ANTI-LOCK BRAKE MOTOR RELAY
YEL/GRN YEL/GRN
YEL/RED
YEL/WHT
RED/BLU
YEL/BLU
RED/BLK
YELIBLK
YEL/GRN
YEL/RED
WHT/BLU
ANTI-LOCK BRAKE MOTOR
WHT/BLU
GRN/RED
13
29
VOLTAGE REGULATOR (in ALTERNATOR) <I-D>
PARKING BRAKE/ BRAKE FLUID LEVEL SWITCHES
DAYTIME RUNNING LIGHT CONTROL UNIT(CANADA) <7-D>
ANTI-LOCK BRAKE PRESSURE SWITCH
104
UNIT
BLK
G302
G202
G302

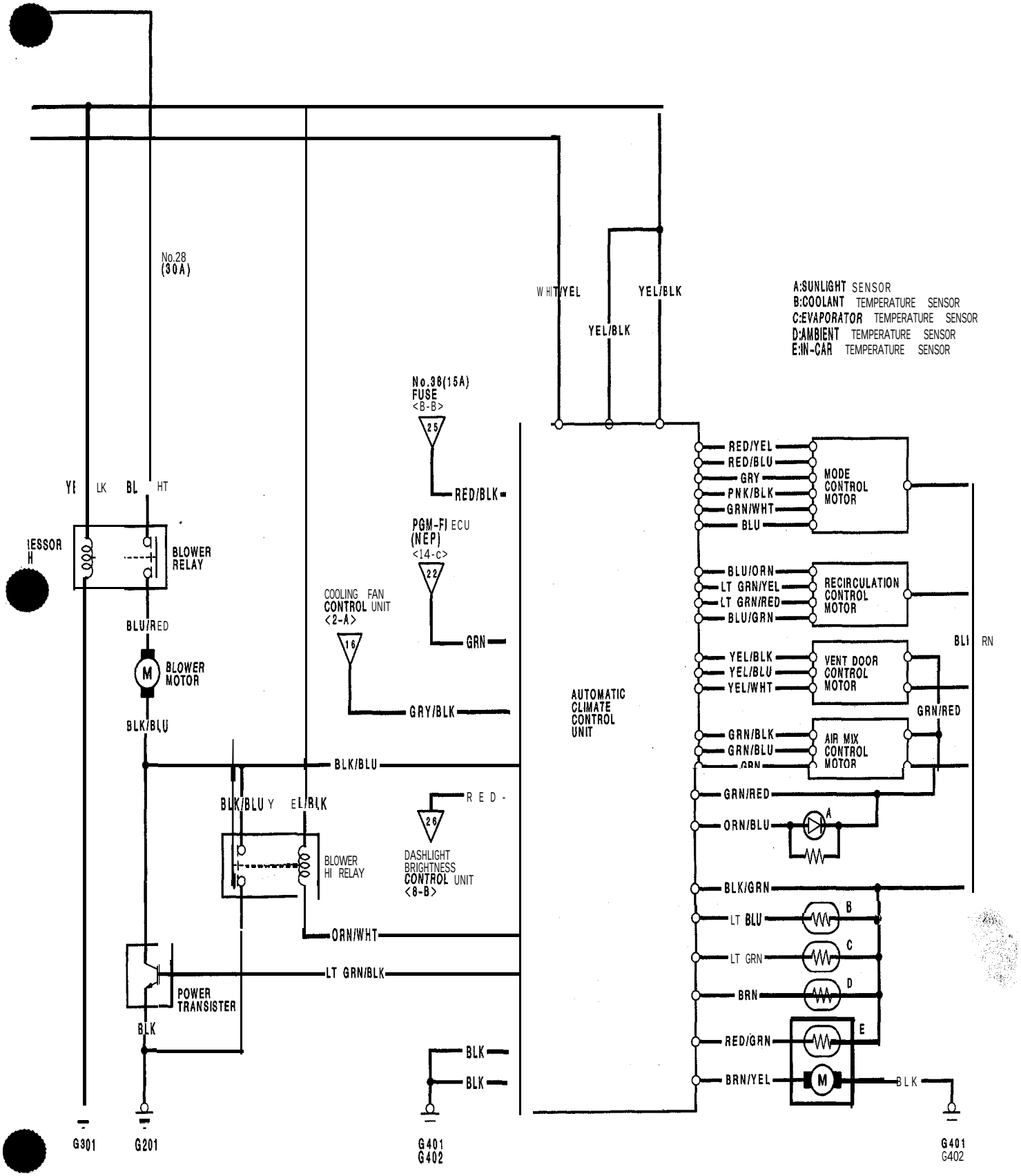

A
B
BAT
No.9(120A)
IG1 BLK/YEL
No.2(15A) BLK/YEL
No.4(15A) YEL/BLK
No.5(10A) YEL
No.33(7.5A) WHT/YEL
No.16
(15A)
GRN/RED
No.38(15A)
FUSE
<5-B>
RED/BLK
TCS
FAIL-
SAFE
RELAY
INDICATOR
LIGHT
(0.84W)
LIGHT
(0.84W)
TCS
SWITCH
ANTI-LOCK BRAKE
CONTROL UNIT
<17-B>
TCS
INDICATOR
LIGHT
<3-C>
ACCEL
AIANGLE
<15-B>
RED
BLU/ORN
GRY/WHT
ORN/RED
ORN/BLK
YEL/GRN
LT GRN/YEL
DASHLIGHT
BRIGHTNESS
CONTROL
UNIT<8-B>
YEL/BLK
TCS CONTROL UNIT
YEL/RED
LT GRN/RED
BRN/BLK
YEL
ORN
WHT/GRN
RED
BRN
GRN
LT GRN/WHT
BRN/WHT
STEERING ANGLE SENSOR
BRN/WHT
STEP MOTOR
G101


C
D
BAT
No.9(120A)
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
YEL — No.5(10A)
WHT/YEL — No.33(7.5A)
EDAL ENSOR
THROTTLE ANGLE SENSOR <15-B>
PGM-FI ECU <14-C>
PGM-FI ECU <14-C>
PGM-FI ECU <14-C>
BRAKE LIGHT SWITCH <4-C>
TCS OFF INDICATOR LIGHT <3-C>
TCS ACTIVATION INDICATOR LIGHT <2-D>
No.32(20A) FUSE <17-B>
89
82
85
86
87
22
43
34
24
105
RED
RED/YEL
BLU
WHT/BLK
WHT/RED
ORN/RED
GRN
GRN/WHT
GRY/BLK
RED/GRN
WHT/BLK
A
BLU
GRN/RED
ORN/BLU
GRN/YEL
GRY
LT GRN
88
29
100
83
84
46
SERVICE CHECK CONNECTOR <15-A>
PARKING BRAKE/ BRAKE FLUID LEVEL SWITCH <3-A>
DAYTIME RUNNING LIGHT CONTROL UNIT <7-D>
A/T CONTROL UNIT <16-D>
PGM-FI ECU <14-C>
SHIFT POSITION INDICATOR (A/T) <5-B>
BLK
G405
< ----- Shielded wire >

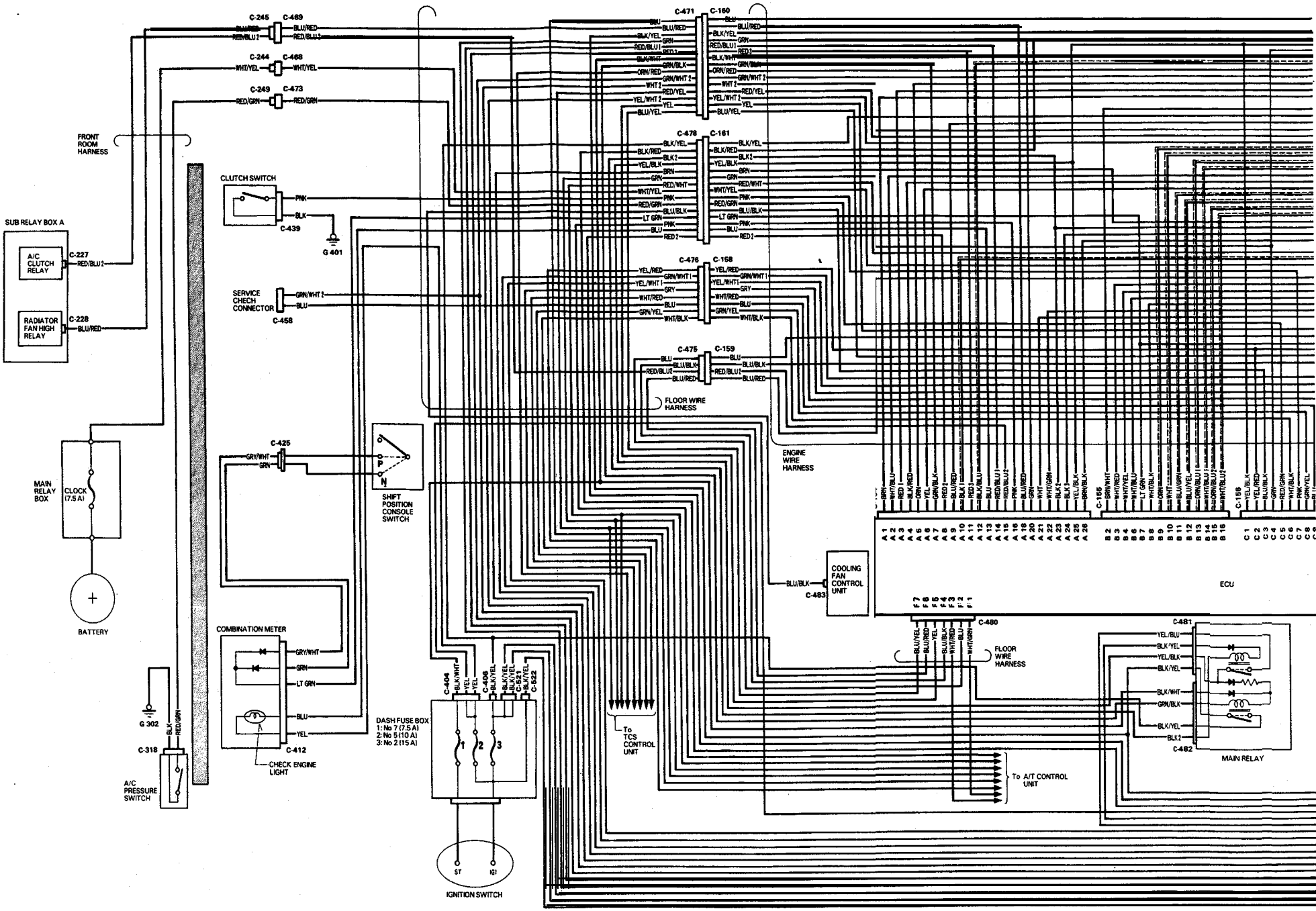

A
I
B
BAT
No.9(120A)
IG1
BLK/YEL
No.2(15A)
BLK/YEL
No.4(15A)
YEL/BLK
No.5(10A)
YEL
No.33(7.5A)
WHT/YEL
EPS CONTROL UNIT
LT GRN/BLK
LT GRN/YEL
LK
YEL
GRN/RED
LT GRN/RED
LT GRN/WHT
YEL/RED
BLU
21
88
SPEED SENSOR <2-C>
SERVICE CHECK CONNECTOR <15-A>
TORQUE SENSOR
STEERING WHEEL SPEED SENSOR
STEERING MOTOR
STEERING GEARBOX
BLK
G401
G402
G403
G4

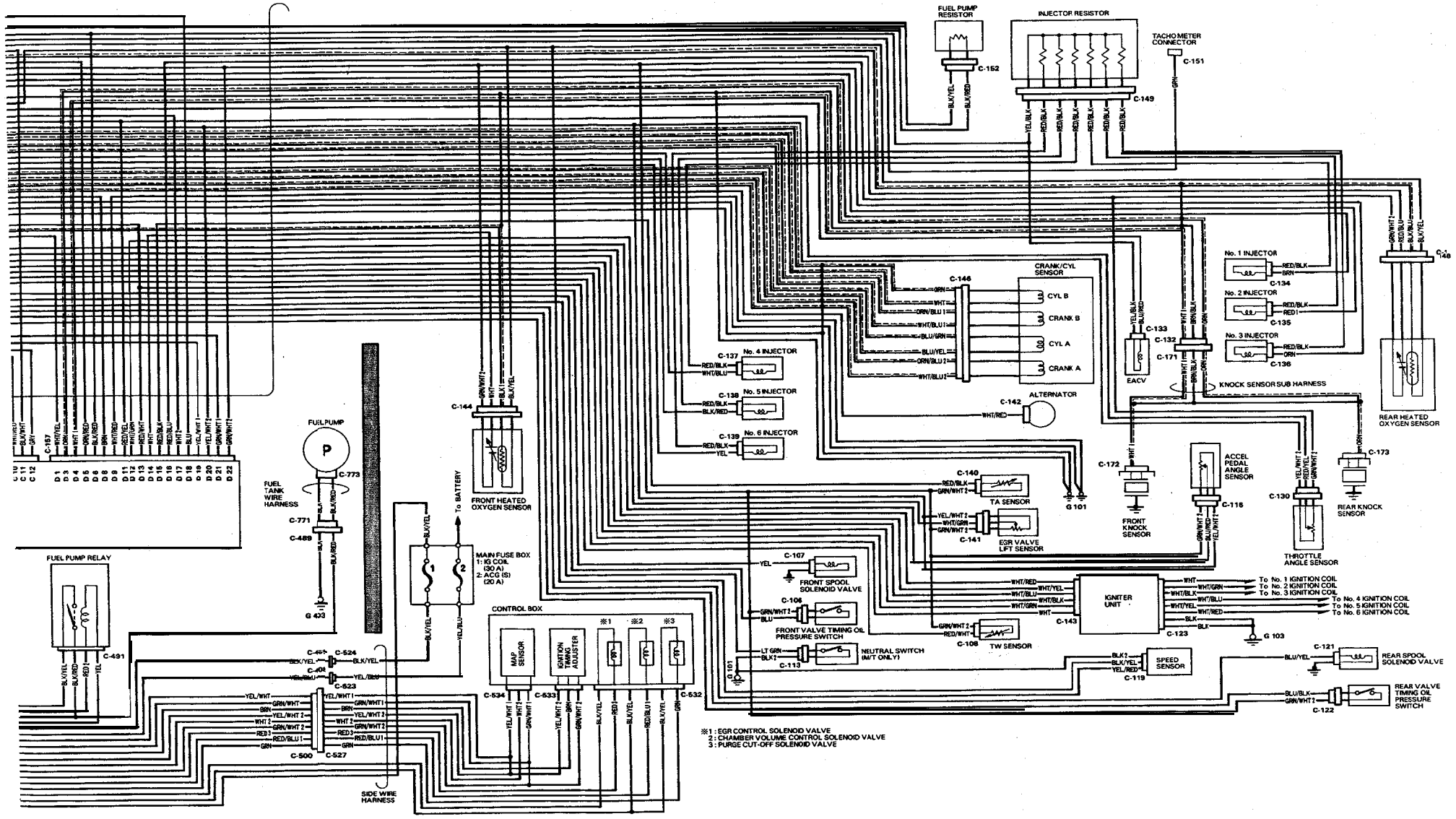

I
C
I
D
BAT
No.9(120A)
BLK/YEL — IG1
BLK/YEL — No.2(15A)
YEL/BLK — No.4(15A)
WHT/YEL — No.33(7.5A)
No.27
(50A)
EPS
INDICATOR
<3-C>
32
PNK/BLU
PNK/BLU
PNK/BLU
K/BLK
99
T
NTROL
IT
6-C>
WHT/BLU
13
VOLTAGE
REGULATOR
(IN D ALTERNATOR)
BLK
WHT
ORN
WHT/BLU
ORN/BLU
BR
HT
BRN
PNK/ORN
BRN/YEL
PNK
YEL
WHT
BLK
RED
BLU
POWER UNIT
BLK
1
BATTERY
NEGATIVE
TERMINAL
<1-A>
<----- shielded wire>


A
B
BAT
No.9(120A)
IG1
No.2(15A)
No.4(15A)
BLK/YEL
BLK/YEL
YEL/BLK
No.33(7.5A)
WHT/YEL
No.1
(10A)
No.21
(10A)
B
EI
AIR BAG
INFLATOR
CABLE
REEL
L.DASH
SENSOR
R.DASH
SENSOR
GRN ORN BRN
GRN/WHT
GRN/RED
YEL/BLU
RED/BLU
F
PNK/ORN
YE LK
IRED
SRS CONTROL UNIT
CHECK CONNCTOR
BLK
BLK
G701
36
SRS
INDICATOR
LIGHT
<3-D>
81
PGM-FI ECU
<14-B>
A/T CONTRO
UNIT<16-D>
COMPRESSOR
CLUTCH

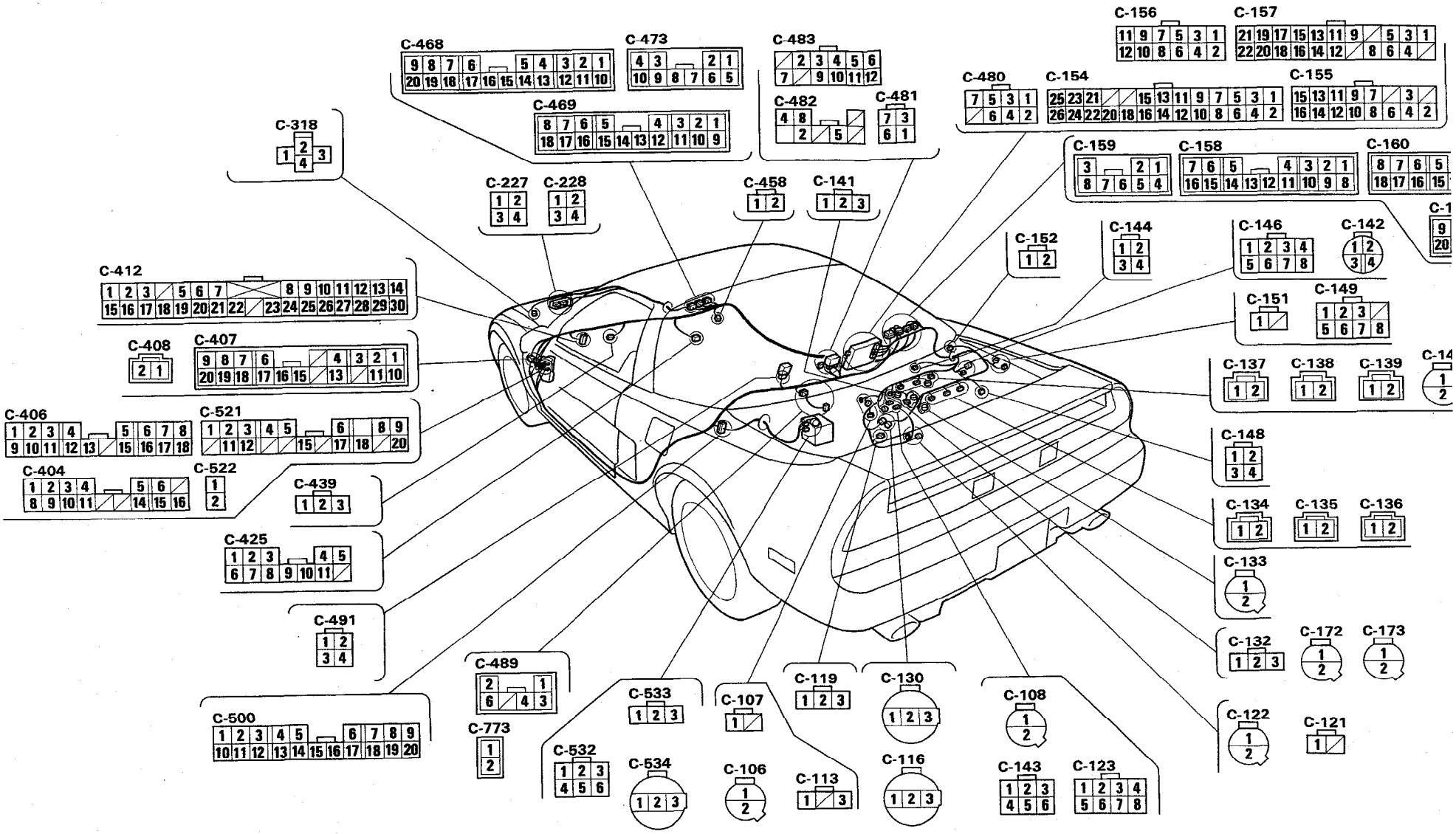

No.28
(30A)
WHT/YEL
YEL/BLK
YEL/BLK
A:SUNLIGHT SENSOR
B:COOLANT TEMPERATURE SENSOR
C:EVAPORATOR TEMPERATURE SENSOR
D:AMBIENT TEMPERATURE SENSOR
E:IN-CAR TEMPERATURE SENSOR
No.38(15A)
FUSE
<B-B>
25
RED/BLK
PGM-FI ECU
(NEP)
<14-C>
22
GRN
COOLING FAN
CONTROL UNIT
<2-A>
16
GRY/BLK
BLOWER
RELAY
BLU/RED
BLOWER
MOTOR
BLK/BLU
BLK/BLU
BLK/BLU
YEL/BLK
BLOWER
HI RELAY
RED
26
DASHLIGHT
BRIGHTNESS
CONTROL UNIT
<8-B>
ORN/WHT
LT GRN/BLK
POWER
TRANSISTER
BLK
BLK
BLK
G301
G201
G401
G402
AUTOMATIC
CLIMATE
CONTROL
UNIT
RED/YEL
RED/BLU
GRY
PNK/BLK
GRN/WHT
BLU
MODE
CONTROL
MOTOR
BLU/ORN
LT GRN/YEL
LT GRN/RED
BLU/GRN
RECIRCULATION
CONTROL
MOTOR
YEL/BLK
YEL/BLU
YEL/WHT
VENT DOOR
CONTROL
MOTOR
GRN/RED
GRN/BLK
GRN/BLU
AIR MIX
CONTROL
MOTOR
GRN/RED
ORN/BLU
A
BLK/GRN
LT BLU
B
LT GRN
C
BRN
D
RED/GRN
E
BRN/YEL
BLK
G401
G402

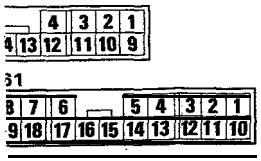
Fuel-Injected System Diagram




FUEL PUMP RESISTOR
C-152
INJECTOR RESISTOR
C-149
TACHOMETER CONNECTOR
C-151
CRANK/CYL SENSOR
C-146
CYL B
CRANK B
CYL A
CRANK A
No. 1 INJECTOR
C-134
No. 2 INJECTOR
C-135
No. 3 INJECTOR
C-136
C-133
C-132
C-171
EACV
KNOCK SENSOR SUB HARNESS
REAR HEATED OXYGEN SENSOR
C-137
No. 4 INJECTOR
C-138
No. 5 INJECTOR
C-139
No. 6 INJECTOR
C-142
ALTERNATOR
C-144
FRONT HEATED OXYGEN SENSOR
FUEL PUMP
C-773
FUEL TANK WIRE HARNESS
C-771
C-489
G 403
To BATTERY
MAIN FUSE BOX
1: IG COIL (30 A)
2: ACG (S) (20 A)
FUEL PUMP RELAY
C-491
C-140
TA SENSOR
C-141
EGR VALVE LIFT SENSOR
G 101
C-172
FRONT KNOCK SENSOR
ACCEL PEDAL ANGLE SENSOR
C-116
C-130
THROTTLE ANGLE SENSOR
C-173
REAR KNOCK SENSOR
C-107
FRONT SPOOL SOLENOID VALVE
C-106
FRONT VALVE TIMING OIL PRESSURE SWITCH
C-113
NEUTRAL SWITCH (M/T ONLY)
C-108
TW SENSOR
IGNITER UNIT
C-143
C-123
To No. 1 IGNITION COIL
To No. 2 IGNITION COIL
To No. 3 IGNITION COIL
To No. 4 IGNITION COIL
To No. 5 IGNITION COIL
To No. 6 IGNITION COIL
G 103
SPEED SENSOR
C-119
C-121
REAR SPOOL SOLENOID VALVE
C-122
REAR VALVE TIMING OIL PRESSURE SWITCH
CONTROL BOX
MAP SENSOR
IGNITION TIMING ADJUSTER
※1
※2
※3
C-534
C-533
C-532
C-524
C-523
C-500
C-527
SIDE WIRE HARNESS
※1 : EGR CONTROL SOLENOID VALVE
2 : CHAMBER VOLUME CONTROL SOLENOID VALVE
3 : PURGE CUT-OFF SOLENOID VALVE

Fuel-Injected System Connectors





C106

①	GRN/WHT²
②	BLU

C107

①	YEL
2	—

C108

①	GRN/WHT²
②	RED/WHT

C113 (M/T)

①	LT GRN
2	—
③	BLK

C116

①	GRN/WHT²
②	BLU/RED
③	YEL/WHT²

C119

①	YEL/RED
②	BLK/YEL
③	BLK²

C121

①	BLU/YEL
2	—

C122

①	GRN/WHT²
②	BLU/BLK

C123

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

C130

①	GRN/WHT²
②	RED/YEL
③	YEL/WHT²

C132

①	ORN²
②	BRN/WHT
③	WHT¹

C133

①	BLU/RED
②	YEL/BLK

C134

①	RED/BLK
②	BRN

C135

①	RED/BLK
②	RED¹

C136

①	RED/BLK
②	ORN

C137

①	RED/BLK
②	WHT/BLU

C138

①	RED/BLK
②	BLK/RED

C139

①	RED/BLK
②	YEL

C140

①	GRN/WHT²
②	RED/BLK

C141

①	YEL/WHT²
②	WHT/GRN
③	GRN/WHT²

C142

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

C143

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

C144

①	GRN/WHT²
②	WHT
③	BLK¹
④	BLK/YEL

C146

①	ORN/BLU¹
②	WHT/BLU¹
③	WHT/BLU²
④	ORN/BLU²
⑤	BLU/GRN
⑥	BLU/YEL
⑦	WHT
⑧	ORN

C148

①	GRN/WHT²
②	RED/BLU
③	BLK/BLU
④	BLK/YEL

C149

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

C151

①	GRN
2	—

C152

①	BLK/RED
②	BLK/YEL

C154 (ECU-A)

①	BRN	⑭	RED/BLU¹
②	WHT/BLU	⑮	RED/BLU²
③	RED¹	⑯	PNK
④	BLK/RED	17	—
⑤	ORN	⑱	BLU/RED
⑥	YEL	19	—
⑦	GRN/BLK	⑳	GRN
⑧	RED²	㉑	WHT
⑨	BLU/RED	㉒	WHT/GRN
⑩	BLK¹	㉓	BLK²
⑪	RED³	㉔	BLK³
⑫	BLK/BLU	㉕	YEL/BLK
⑬	BLU	㉖	BRN/BLK

C155 (ECU-B)

1	—	⑨	ORN
②	BRN/WHT	⑩	WHT
③	WHT/RED	⑪	BLU/GRN
④	WHT/YEL	⑫	BLU/YEL
5	—	⑬	ORN/BLU¹
⑥	WHT/BLU	⑭	WHT/BLU¹
⑦	LT GRN	⑮	ORN/BLU²
⑧	WHT/BLK	⑯	WHT/BLU²

C156 (ECU-C)

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

C157 (ECU-D)

①	WHT/YEL	⑫	WHT/GRN
2	—	⑬	RED/WHT
③	ORN	⑭	WHT
④	WHT¹	⑮	RED/BLK
⑤	ORN/RED	⑯	RED/BLU
⑥	BLK/RED	⑰	WHT²
7	—	⑱	BLU
⑧	BRN	⑲	YEL/WHT¹
⑨	WHT/RED	⑳	YEL/WHT²
10	—	㉑	GRN/WHT¹
⑪	RED/YEL	㉒	GRN/WHT²

C158

1	YEL	⑨	WHT/BLK
2	BRN	⑩	GRN/YEL
③	GRN/WHT¹	11	BRN/BLK
④	YEL/WHT¹	⑫	GRY
5	RED	13	BLK
⑥	YEL/RED	14	GRN
7	WHT/GRN	15	ORN
⑧	WHT/RED	⑯	BLU

C159

1	BRN/WHT	5	RED
②	RED/BLU²	⑥	BLU/BLK
3	BLK	⑦	BLU
④	BLU/RED	8	YEL/BLK

C160

①	BLU/YEL	⑩	RED³
②	RED/YEL	⑪	WHT²
③	YEL	⑫	GRN
④	ORN/RED	⑬	BLU/RED
⑤	RED/BLU¹	⑭	GRN/WHT²
6	YEL/RED	⑮	YEL/WHT²
⑦	BLK/YEL	16	YEL/GRN
⑧	GRN/BLK	⑰	BLU
9	BLK	⑱	BLK/WHT

C161

①	LT GRN	⑪	GRN
2	BRN/WHT	⑫	PNK
③	PNK	⑬	BRN
④	BLK/YEL	⑭	BLU/BLK
⑤	YEL/BLK	⑮	BLU
⑥	RED²	⑯	RED/GRN
⑦	BLK/RED	17	WHT/GRN
⑧	BLK³	⑱	WHT/YEL
⑨	YEL/BLU	19	WHT/BLU
⑩	RED/WHT	20	BLU/WHT

C172

①	WHT¹
2	—

C173

①	ORN
2	—

C227

1	YEL/BLK
2	PNK/ORN
③	RED/BLU²
4	RED

C228

1	YEL/BLK
2	WHT/BLU
③	BLU/RED
4	BLK

C318

1	BLK
2	BRN/BLK
③	RED/GRN
④	BLK

C404

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

C406

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

C407

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

C408

①	BLK/YEL
2	WHT/BLK

C412

1	RED/YEL	16	BLK/WHT
2	BLK/WHT	17	GRN/RED
3	ORN/WHT	18	GRN/BLK
4	—	19	BLU
5	RED/GRN	20	GRN/BLU
6	LT GRN/WHT	21	BRN/BLK
7	GRN/YEL	22	YEL/BLK
⑧	LT GRN	㉓	GRN
9	RED/BLK	24	LT BLU
10	RED	25	GRY/WHT
11	GRN	26	YEL/BLU
⑫	YEL	27	WHT/BLU
13	BLK	28	YEL/GRN
14	BLU/WHT	㉙	BLU
15	ORN/BLK	30	YEL/RED

C425

1	GRN/BLU	7	LT BLU
2	BRN/BLK	8	BLK
3	GRN/YEL	9	GRN/BLK
4	LT GRN/WHT	10	YEL
5	BLU/ORN	⑪	GRY/WHT
⑥	GRN	12	—

C439

①	BLK
2	BLU/ORN
③	PNK

C458

①	BLK
②	GRN/WHT²

C468

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

C469

1	RED/WHT	⑩	BLU/RED
2	YEL/WHT	11	GRN/BLK
3	BLU/WHT	12	ORN/BLU
4	BLU	13	GRN/WHT
5	RED	14	GRY
6	BRN/BLK	15	LT BLU
7	BLK	16	ORN/RED
⑧	RED/BLU²	17	ORN/BLK
⑨	GRY/WHT	18	YEL/RED

C473

1	WHT/BLK	6	LT GRN/WHT
2	WHT	7	PNK/BLK
3	YEL/BLK	8	BLU/BLK
4	BLU/WHT	9	GRN/RED
5	ORN	⑩	RED/GRN

C480 (ECU-F)

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

C481, C482

①	YEL/BLU
②	BLK²
③	YEL/BLK
④	BLK/WHT
⑤	BLK/YEL
⑥	BLK/YEL
⑦	BLK/YEL
⑧	GRN/BLK

C483

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

C489

1	YEL/BLU
②	BLK
3	BLK
4	YEL/WHT
5	—
⑥	BLK/RED

C491

①	YEL
②	BLK/YEL
③	RED²
④	BLK/RED

C500

1	LT BLU	11	BLU/GRN
2	BLU/WHT	12	WHT/GRN
3	WHT/BLU	13	RED/BLU¹
④	GRN	14	GRN/WHT¹
⑤	YEL/WHT²	15	YEL/WHT¹
6	GRN/RED	16	WHT²
⑦	BRN	17	GRN/WHT²
⑧	RED³	18	WHT/GRN
9	GRN/YEL	19	LT GRN
10	GRY	20	BLU/YEL

C521

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

C2

①	BLK/YEL
2	BLK/WHT

C532

①	BLK/YEL
②	BLK/YEL
③	BLK/YEL
④	RED/BLU¹
⑤	GRN
⑥	RED³

C533

①	GRN/WHT²
②	BRN
③	YEL/WHT²

C534

①	WHT²
②	GRN/WHT¹
③	YEL/WHT¹

C773

①	BLK
②	BLK/RED

NOTE: Several different wires have the same color.
They have been given a number suffix to distinguish them (*for example* YEL/BLK¹ and YEL/BLK² are not the same).

○: Related to PGM-FI SYSTEM *: CANADA