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# INTRODUCTION

## How to Use This Manual

This manual contains service information for the PRELUDE. Separate volumes are published regarding vehicle construction, engine, and transmission; the applicable reference manuals are listed below.

This manual is divided into sections. This first page of each section is marked with a black tab that lines up with one of the thumb index tabs on next page. 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.

## Reference Manuals

Description	Code No.	Remarks	Date Published
PRELUDE Construction and Function	62SF110		Sept. 1987
B20A Engine Maintenance and Repair	62PK100	2.0 l Fuel-Injected Engine and 2.0 l Carbureted Engine	Sept. 1987
D2 Manual Transmission Maintenance and Repair	62PK500	5-speed	Sept. 1987
K4 Hondamatic Transmission Maintenance and Repair	62PK400	4-speed with Lock-up	Sept. 1987

## 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 Motor, might be done, or of the possible hazardous consequences of each conceivable way, nor could Honda Motor investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda Motor, *must satisfy himself thoroughly* 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.

## General Information

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# Chassis and Engine Numbers

## Vehicle Identification Number (Injected)

JHMBA41400C000001

Manufacturer Code \_\_\_\_\_

Vehicle Type \_\_\_\_\_  
M: Passenger Car

Prelude \_\_\_\_\_

Door/Transmission Type \_\_\_\_\_  
1: 2-door/5-speed manual  
2: 2-door/4-speed automatic

Vehicle grade \_\_\_\_\_  
4: 16i, B20A7 (KB, KE, KF, KG, KW)  
Si, B20A7 (KT, KY)  
8: 16i, B20A5 (KZ, KS, KX)  
Si, B20A6 (KQ)

Fixed Code \_\_\_\_\_

Model Year \_\_\_\_\_  
0: 1988

Factory Code \_\_\_\_\_  
C: Saitama Factory Sayama Plant

Serial Number \_\_\_\_\_

## Engine Serial Number

B20A3-1000001

Engine Type \_\_\_\_\_  
B20A3: 2.0 l SOHC Carbureted  
With CATALYTIC CONVERTER:  
KS, KX, KZ  
B20A4: 2.0 l SOHC Carbureted  
With out CATALYTIC CONVERTER:  
European and General models  
B20A5: 2.0 l DOHC Fuel-Injected  
With CATALYTIC CONVERTER:  
KS, KX, KZ  
B20A7: 2.0 l DOHC Fuel-Injected  
With out CATALYTIC CONVERTER:  
European and General models

Model Year \_\_\_\_\_  
1: 1988

Transmission Type \_\_\_\_\_  
0: 5-Speed mnual  
5: 4-Speed automatic  
7: 5-Speed manual with  
CATALYTIC CONVERTER  
9: 4-Speed automatic with-  
CATALYTIC CONVERTER

Serial Number \_\_\_\_\_

## Vehicle Identification Number (Carb.)

JHMBA31300C000001

Manufacturer Code \_\_\_\_\_

Vehicle Type \_\_\_\_\_  
M: Passenger Car

Prelude \_\_\_\_\_

Door/Transmission Type \_\_\_\_\_  
1: 2-door/5-speed manual  
2: 2-door/4-speed automatic

Vehicle grade \_\_\_\_\_  
3: EX, B20A4 (KB, KE, KF, KG, KT,  
7: EX, B20A3 (KG, KS, KX, KY, KZ)

Fixed Code \_\_\_\_\_

Model Year \_\_\_\_\_  
0: 1988

Factory Code \_\_\_\_\_  
C: Sayama Factory

Serial Number \_\_\_\_\_

## Engine Serial Number (KQ)

B20A6-1000001

Engine Type \_\_\_\_\_  
B20A6: 2.0 l DOHC Fuel-Injected  
With CATALYTIC CONVERTER: KQ

Model Year \_\_\_\_\_  
1: 1988

Serial Number \_\_\_\_\_

## Manual Transmission Number

D2J4 - 1000001

Transmission Type \_\_\_\_\_  
D2J4: 2.0 l SOHC Carbureted  
D2J5: 2.0 l DOHC Fuel-Injected  
D2L5: 2.0 l DOHC Fuel-Injected: KX

Serial Number \_\_\_\_\_

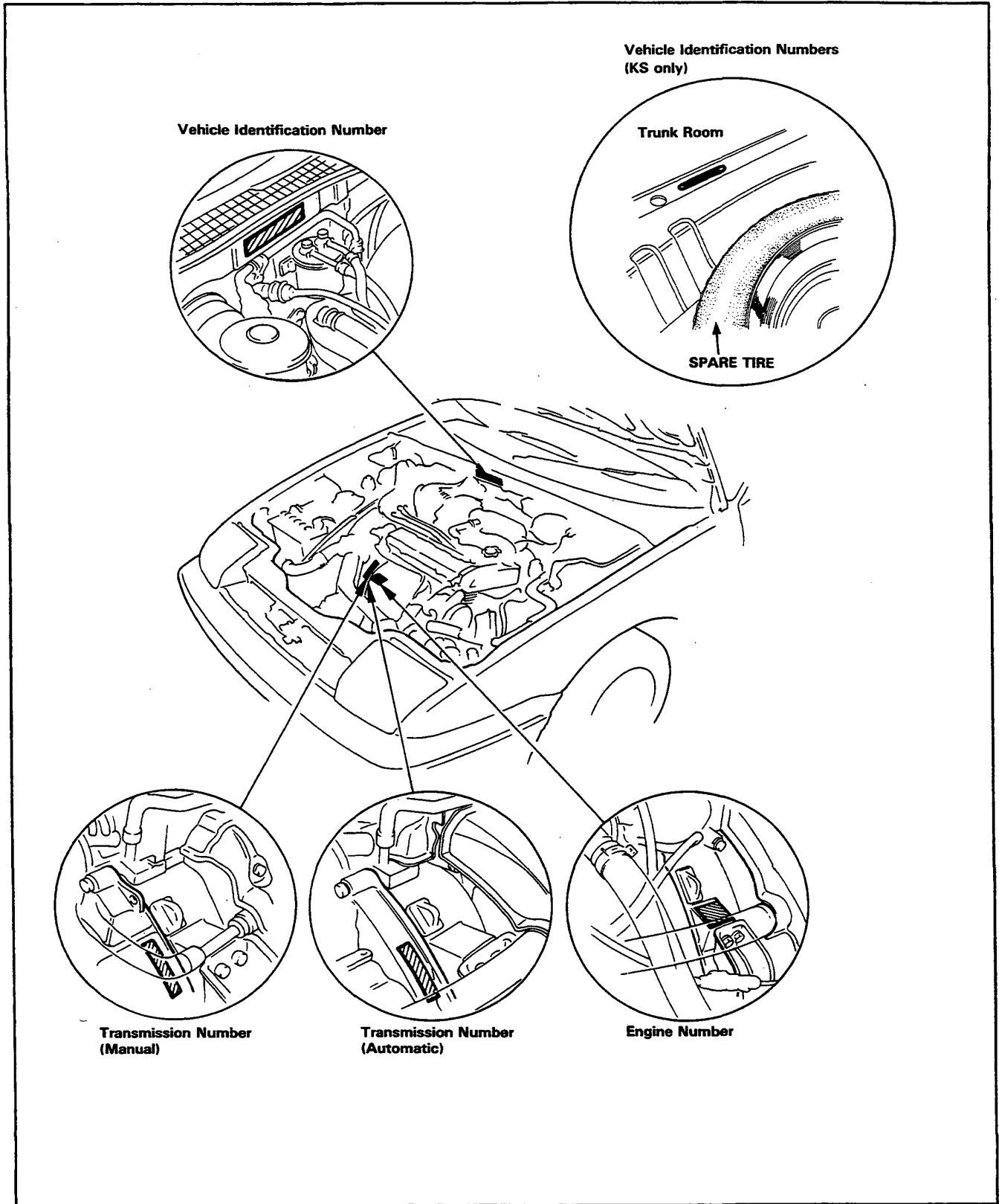
## Automatic Transmission Number

K4 - 1000001

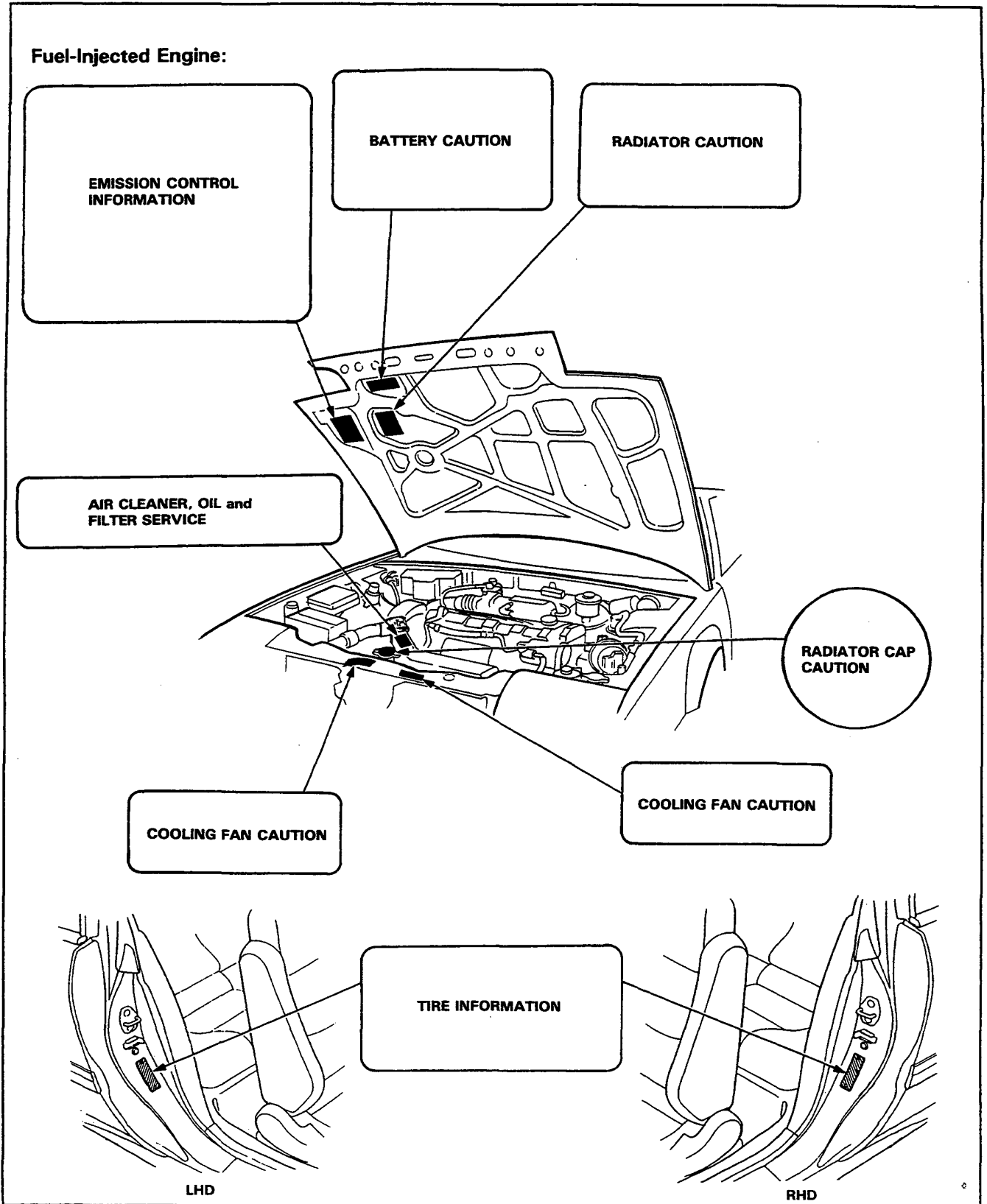
Transmission Type \_\_\_\_\_

Serial Number \_\_\_\_\_

# Identification Number Locations



# Label Locations





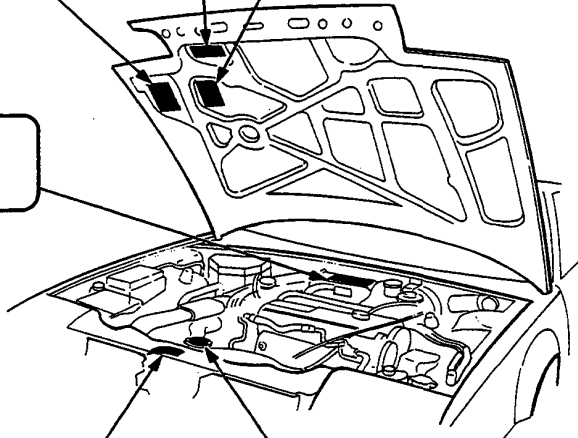
**Carbureted Engine:**

**EMISSION CONTROL  
INFORMATION**

**BATTERY CAUTION**

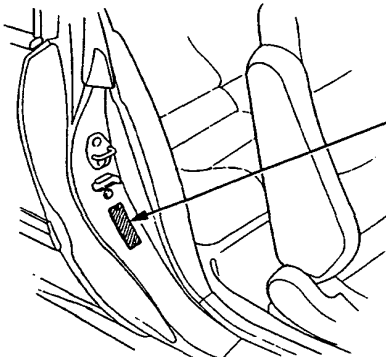
**RADIATOR CAUTION**

**AIR CLEANER, OIL and  
FILTER SERVICE**



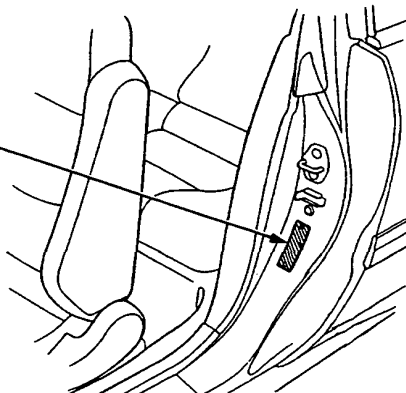
**COOLING FAN CAUTION**

**RADIATOR CAP  
CAUTION**



**LHD**

**TIRE INFORMATION**



**RHD**

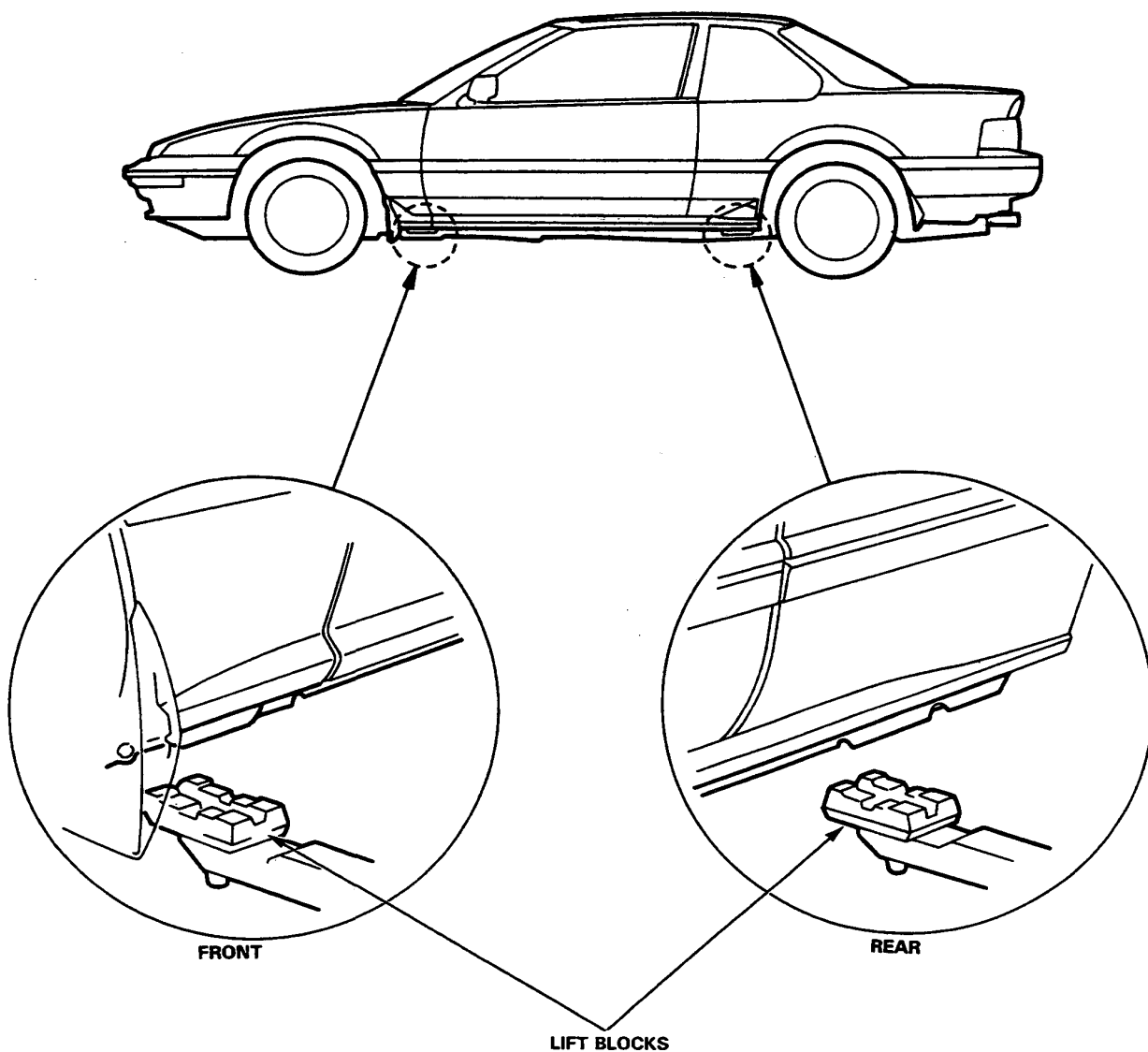
# Lift and Support Points

## Hoist

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

**WARNING** When heavy rear components such as suspension, fuel tank, spare tire and trunk lid/hatch are to be removed, place additional weight in the trunk before hoisting. When substantial weight is removed from the rear of the car, the center of gravity may change and can cause the car to tip forward on the hoist.

NOTE: Since each tire/wheel assembly weighs approximately 13.6 kg (30 lbs), placing the front wheels in the trunk will assist with the weight transfer.



(cont'd)





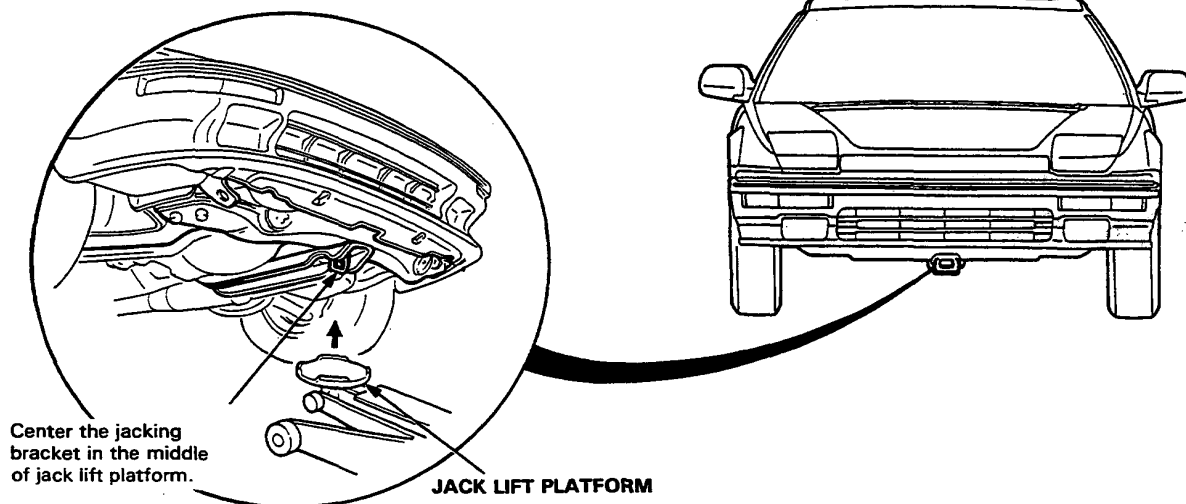
## Floor Jack

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 1-8 so the car will be approximately level, then lower the car onto the stands.

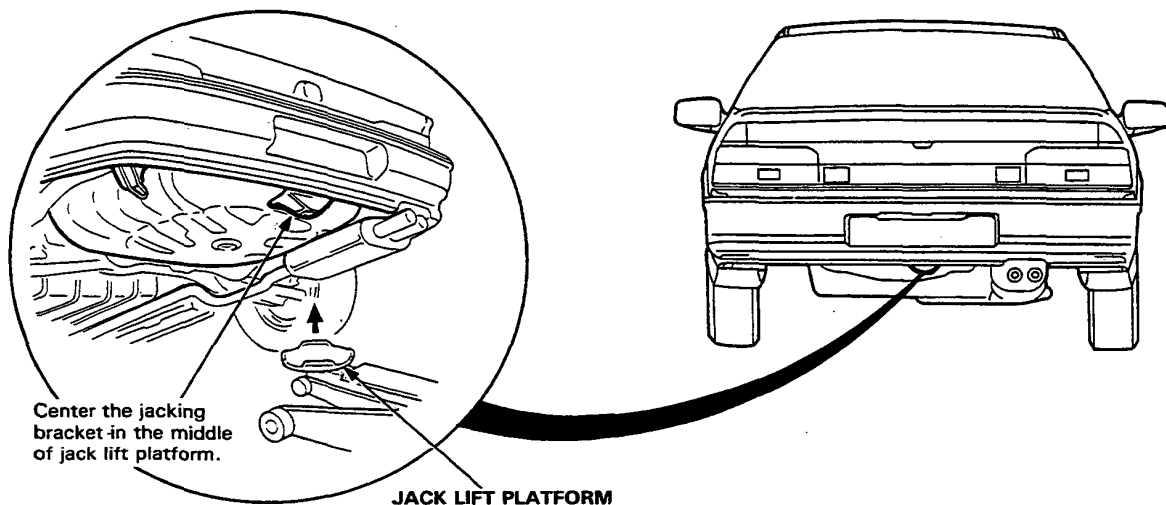
### WARNING

- 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.

### Front

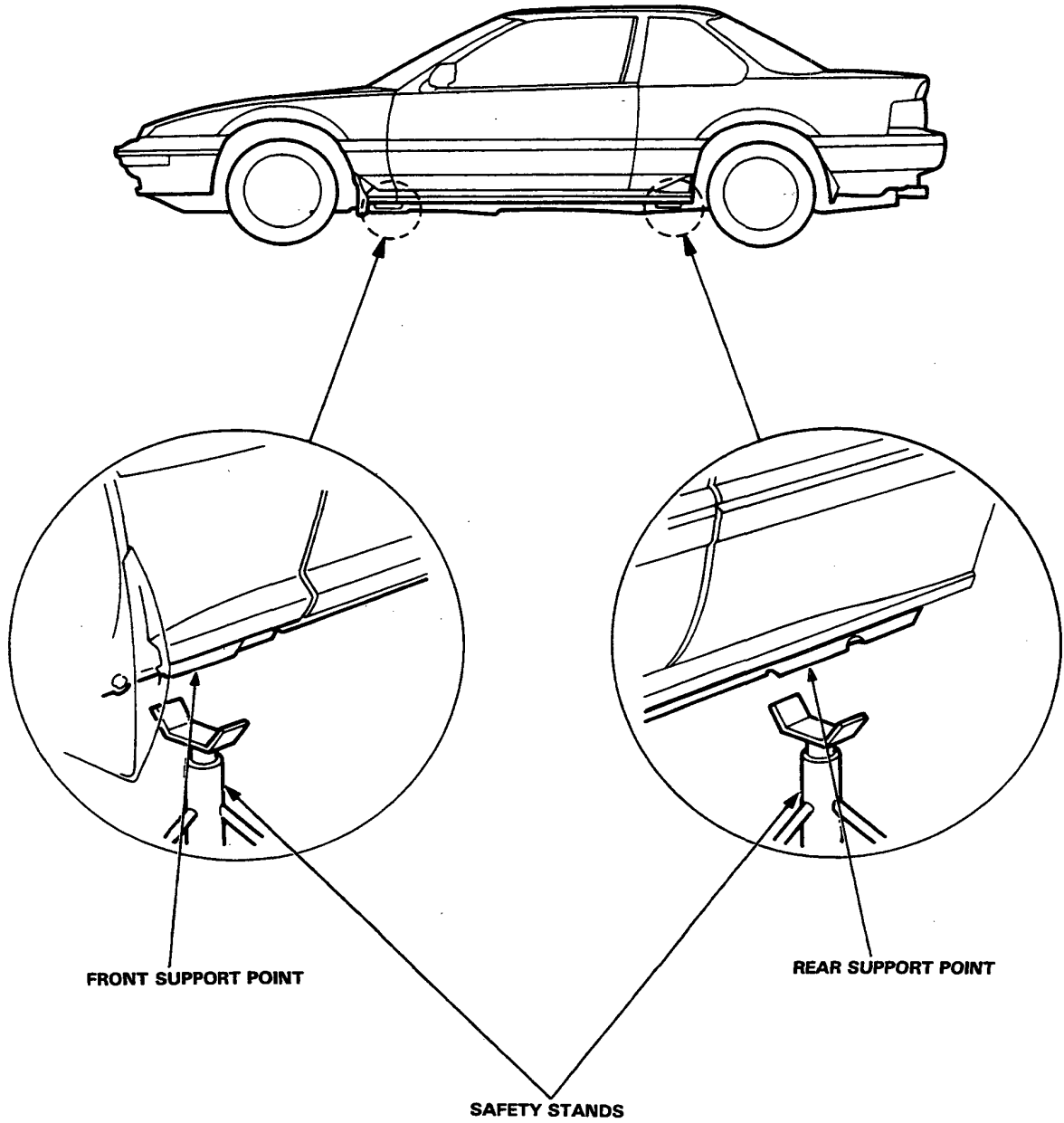


### Rear



# Lift and Support Points (cont'd)

## Safety Stands





# Towing

## Flat Bed Equipment:

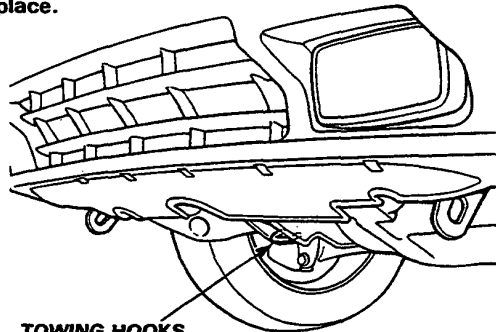
Entire car is winched on a flat bed vehicle. This is the best way of towing your Prelude.

## Wheel Lift Type:

Front or rear of the car is lifted at the wheels and is suitable for your Prelude.

**CAUTION:** If a sling type tow is used, the tow truck driver should position wood spacer blocks between your car's frame and the chains and lift straps to avoid damaging the bumper and the body. Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing.

When towing the 16i (with 4WS) and Si (with 4WS) even with the front wheels off the ground, center the steering and tie the steering wheel in place.



TOWING HOOKS

**Emergency towing with all four wheels on the ground:** Under certain emergency conditions, the car may need to be towed with all four wheels on the ground. If your Prelude is towed with all four wheels on the ground, check local regulations and observe the following precautions:

- Shift the transmission to neutral.
- Release the parking brake.
- Turn the ignition to the "I" position to unlock the steering.
- Do not exceed 55 km/h (35 mph) or tow for distances of more than 80 km (55 miles).

If a frame mount tow bar is used with a four wheel tow:

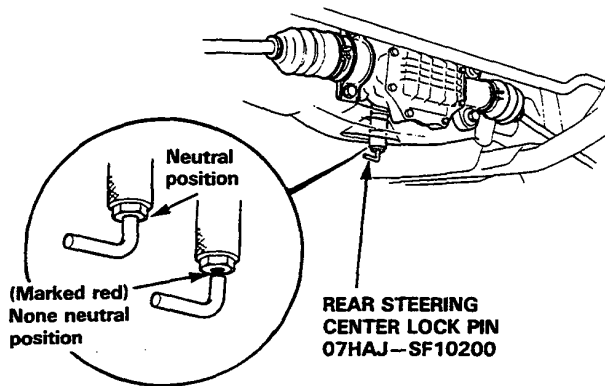
- Do not attach it to the bumper.
- Follow the tow bar manufacturer's instructions.

**WARNING** Never use tow chains or rope to tow a car; your ability to safely control the car may be adversely affected.

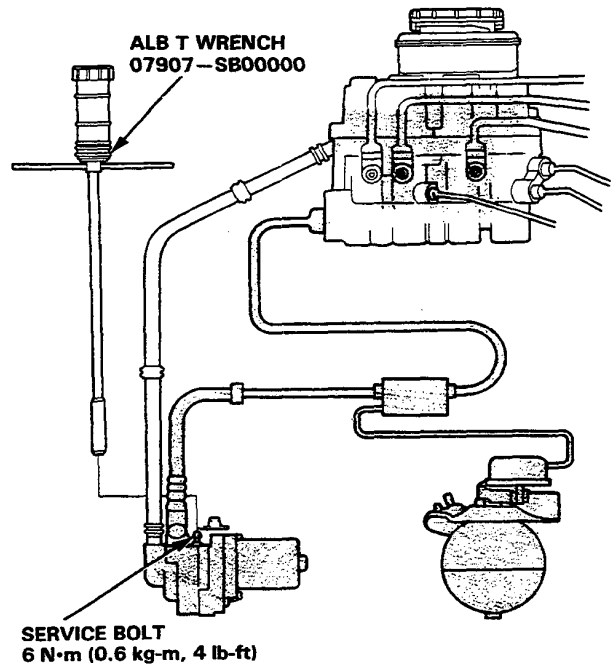
# Preparation of Work

## Special Caution Items For This Car

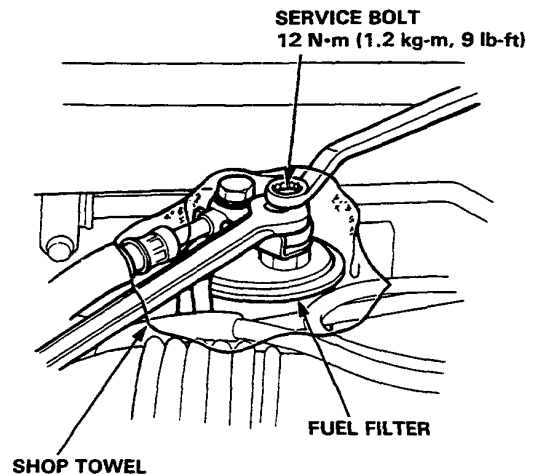
1. 4WS system servicing (with 4WS)
  - Do not disassemble the rear steering gear box.
  - When towing the car even with the front wheels off the ground, center the steering and tie the steering wheel in place.
  - When testing or adjusting the wheel alignment, attach the rear steering center lock pin to the rear steering gear box. Make sure that the rear steering gear box is located at the neutral position.



2. ALB piping system servicing
  - Disassemble the ALB piping system after relieve the high-pressured brake fluid.
  - Otherwise, the high-pressured brake fluid will burst out and it is very dangerous.
  - See section 13 how to relieve the high-pressured brake fluid.

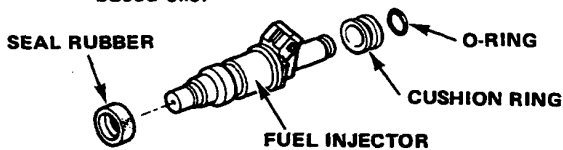


3. Fuel Line Servicing
  - Relieve fuel pressure by loosening the service bolt provided on the top of the fuel filter before disconnecting a fuel hose or a fuel pipe.

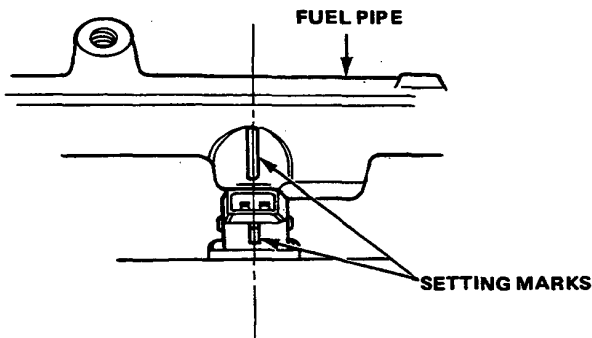




- Be sure to replace washers, O-rings, and seal rubbers with new ones when servicing fuel line parts.
- Always apply oil to the surfaces of O-rings and seal rings before installation. Never use brake fluid, radiator fluid, vegetable oils or alcohol-based oils.



- When assembling the flare joint of the high-pressure fuel line, clean the joint and coat with new engine oil.
- When installing an injector, check the angle of the coupler. The center line of the coupler should align with the setting mark on the injector holder.



#### 4. Inspection 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 in any of the various points in the fuel line.

#### 5. Installation of an amateur radio for cars equipped with PGM-FI.

Care has been taken for the Fuel-Injection, Carburetor, A/T, Cruise control and ALB control units (computer) and its wiring to prevent erroneous operation from external interference, but erroneous operation of the computer may be caused by entry of extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the computer.

- The antenna and the body of the radio must be at least 200 mm (7.9 in.) away from the computer.

The computer locations:

- Fuel-Injection, Carburetor, A/T: Passenger's side front flower panel.
- Cruise control: On the relay bracket, driver's side panel.
- ALB: Under dash center.
- Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the wiring, and when crossing with the wiring is required, execute crossing at a right angle.
- Do not install a radio with a large output (max. 10 W).

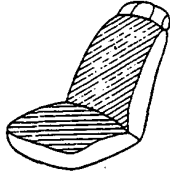
#### 6. Apply liquid gasket to the transmission, oil pump cover, right side cover and water outlet. Use HONDA PARTS NO 08740-99986 as a liquid gasket.

- Check that the mating surfaces are clean and dry before applying liquid gasket. Degrease the mating surfaces if necessary.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not allow liquid gasket to stand for more than 20 minutes before assembly.
- Fill the case with clean engine oil or coolant 30 minutes after assembly.

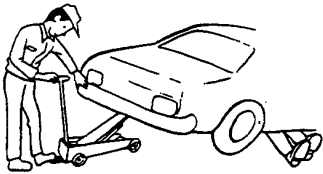
# Preparation of Work

**CAUTION: Observe all safety precautions and notes while working.**

1. Protect all painted surfaces and seats against dirt and scratches with a clean cloth or vinyl cover.



2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Exchange signals as frequently as possible when a work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



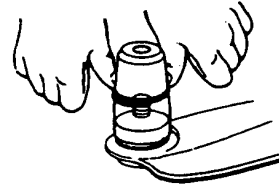
3. Prior to removing or disassembling parts, they must be inspected carefully to isolate the cause for which the service is called for. Observe all safety notes and precautions and follow the proper procedures as described in this manual.



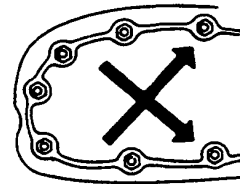
Mark or place all removed parts in order in a parts rack so they can be placed back to their original places or parts from which they were removed or with which they were mated.



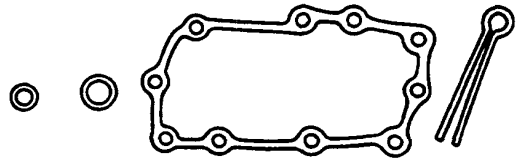
4. Use special tool when use of such a tool is specified.



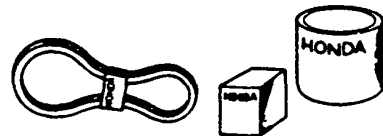
5. Parts must be assembled with the proper looseness or tightness according to the maintenance standards established.
6. When tightening bolts or nuts, begin on center or larger diameter bolts and tighten them in crisscross pattern in two or more steps if necessary.



7. Use new packings, gaskets, O-rings and cotter pins whenever reassembling.

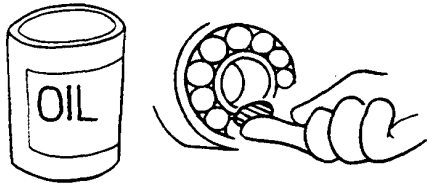


8. Use genuine HONDA parts and lubricants or those equivalent. When parts are to be reused, they must be inspected carefully to make sure they are not damaged or deteriorated and in good usable condition.





9. Coat or fill parts with specified grease where specified grease where specified (Page 4-2). Clean all removed parts in or with solvent upon disassembly.



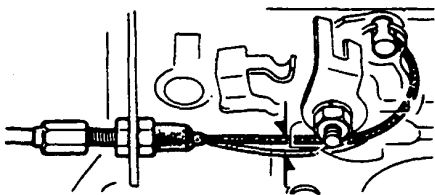
10. Brake fluid and hydraulic components

- When replenishing the system, use extreme care not to allow dust and dirt from entering the inside.
- Do not mix different brands of fluid as they may not be compatible.
- Do not reuse drained brake fluid.
- Brake fluid can cause damage to the painted surfaces. Wipe up spilled fluid at once.
- After disconnecting brake hoses or pipes from the joint, be sure plug the opening to prevent loss of brake fluid.
- Clean all disassembled parts only in clean BRAKE FLUID. Blow open all holes and passages with compressed air.



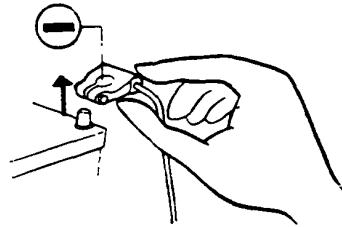
- Keep disassembled parts from air-borne dust and abrasives.
- Check that parts are clean before assembly.

11. Avoid oil or grease getting on rubber parts and tubes.  
12. Upon assembling, check every possible part for proper installation and movement or operation.

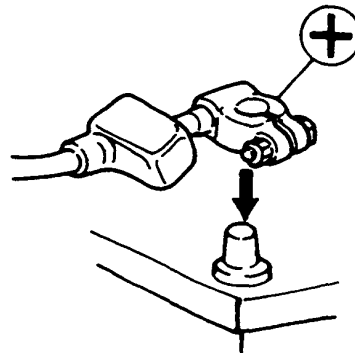


Electrical

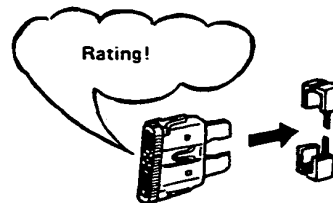
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery starting with the negative (-) terminal.



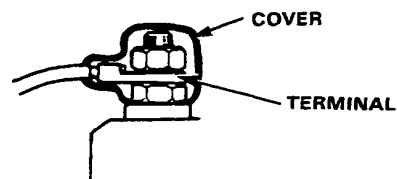
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (-) cable.



- Coat the terminals with clean grease after connecting the battery cables.
- Don't forget to install the terminal cover over the positive battery terminal after connecting.
- Before installing a new fuse, isolate the cause and take corrective measures, particularly when frequent fuse failure occurs.



- Be sure to install the terminal cover over the connections after a wire or wire harness has been connected.

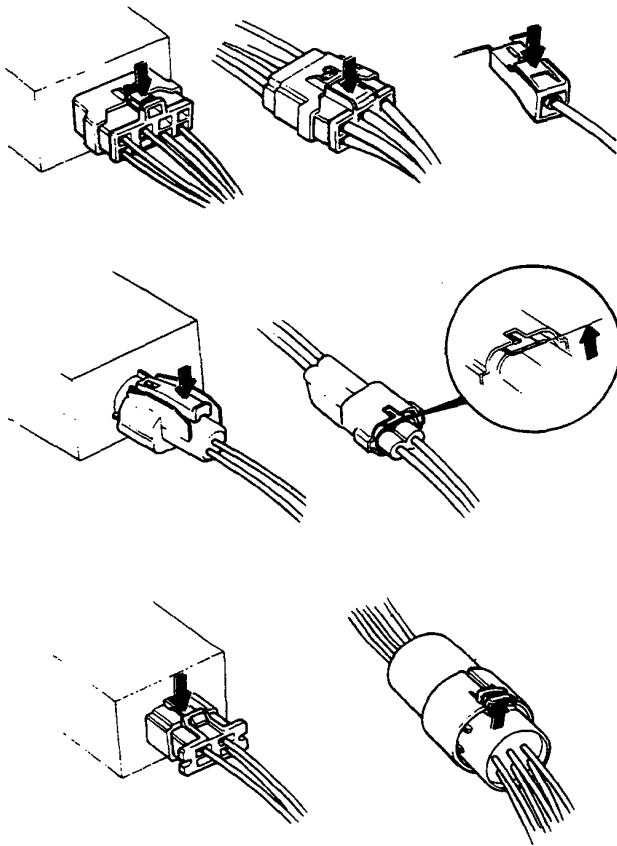


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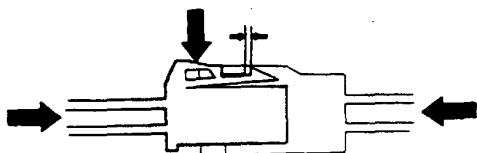
# Preparation of Work

## Electrical (cont'd)

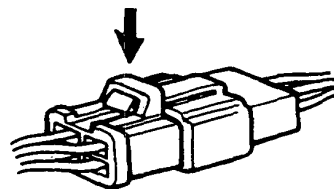
- When removing locking couplers, be sure to disconnect the lock before performing work.
- Couplers may be of two types, those in which the lock is pressed to remove, and those in which the lock is pulled up to remove. Be sure to ascertain the type of locking device before beginning work. The following is a depiction of the means of disconnecting various typical couplers.



- When disconnecting locks, first press in the Coupler Tightly ( to provide clearance to the locking device), then operate the tab fully and remove the coupler in the designated manner.



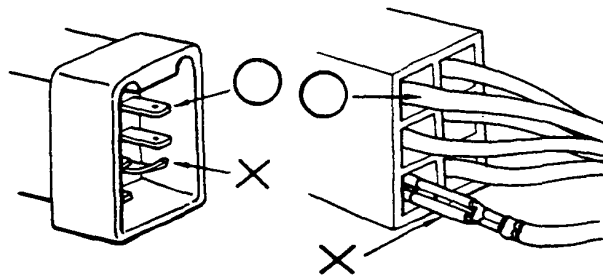
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when re-connecting.



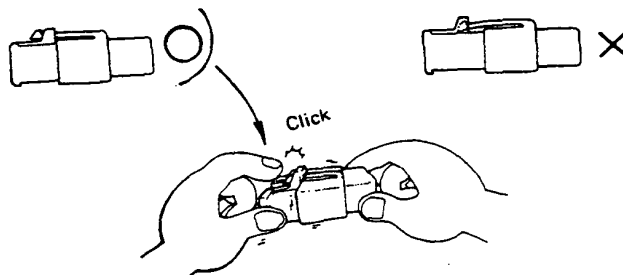
- When disconnecting a coupler, pull it off from the mating coupler by holding on both couplers.
- Never try to disconnect couplers by pulling on their wires.



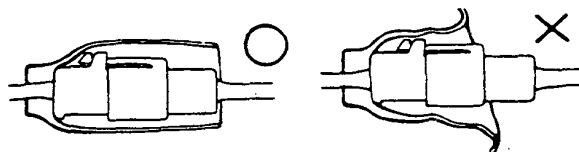
- Before connecting couplers, check to see that the terminals are in place and are not bent or distorted.



- Insert couplers fully until they will no longer go.
- Some couplers have locking tabs that must be aligned and engaged securely.
- Don't use wire harnesses with a loose wire or coupler.



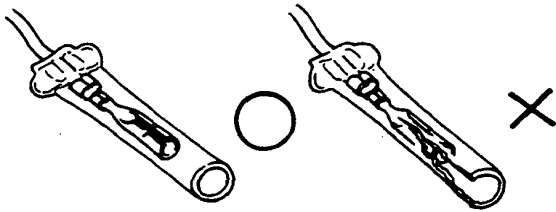
- Place the plastic cover over the mating coupler after reconnecting. Also check that the end is not inverted.



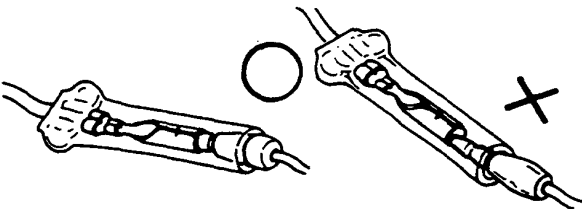




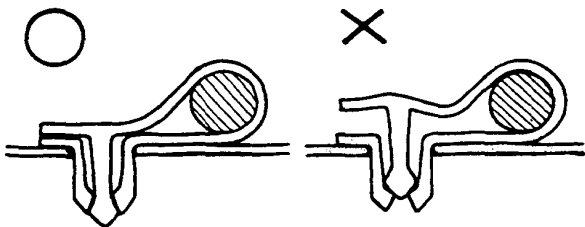
- Before connecting, check each connector cover for breakage. Also make sure that the female connector is tight and not pried open from the previous use.



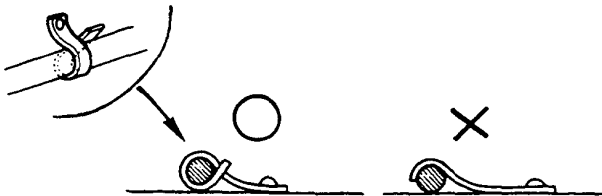
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Don't place the opening of each plastic cover facing up.



- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.



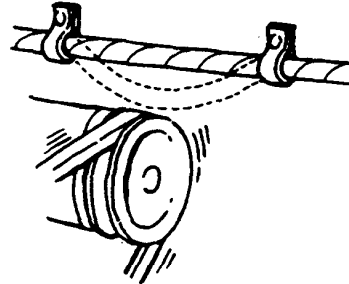
- A loose wire harness or cable can be a hazard to safety. After clamping, check each wire for security in its clamp.



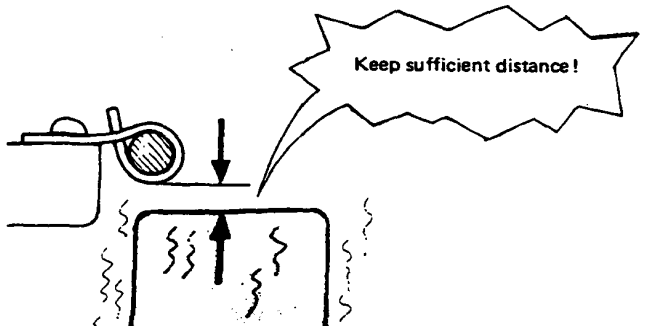
- Do not squeeze wires against the weld or nugget of its clamp when a weld-on clamp is used.



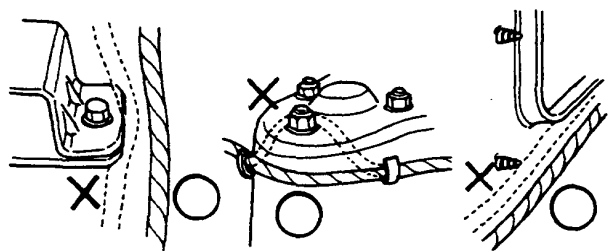
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



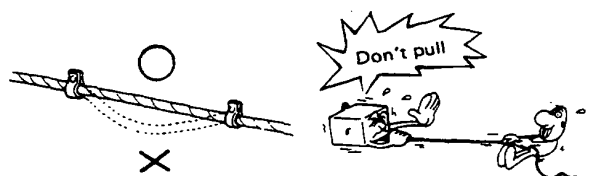
- Always keep a safe distance between wire harnesses and any heated parts.



- 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.

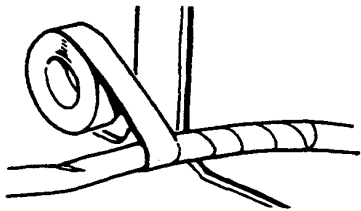


(cont'd)

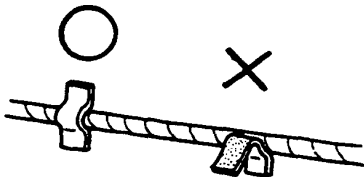
# Preparation of Work

## Electrical (cont'd)

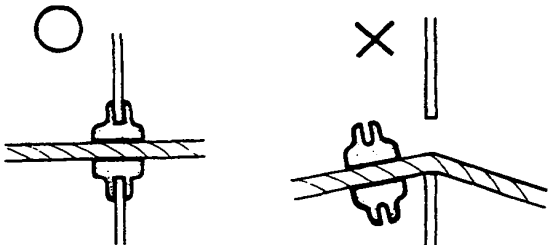
- Protect wires and harnesses with a tape or tube if they are in contact with a sharp edge or corner.



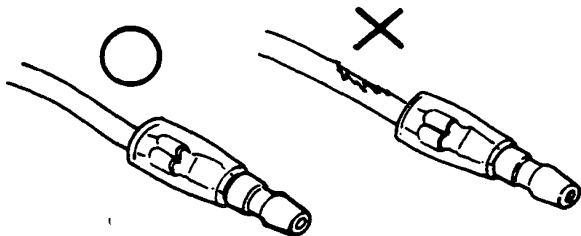
- Clean the attaching surface thoroughly if a plaster is used. Use a spirit wipe if necessary.



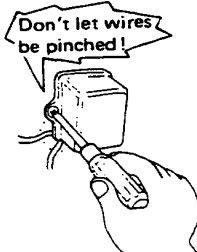
- Seat grommets in their grooves properly.



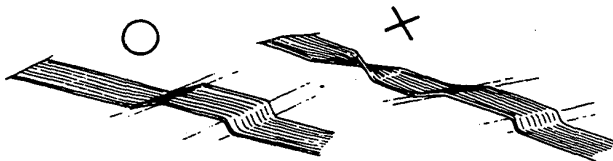
- Do not damage the insulator when connecting a wire.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping with a protective tape or replace with new ones if necessary.



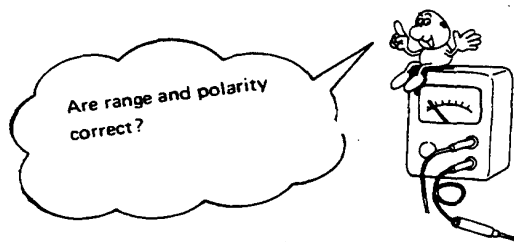
- After installing parts, make sure that wire harnesses are not pinched.



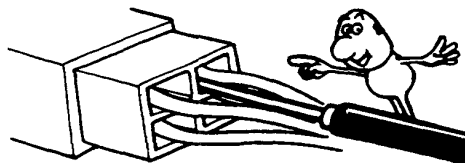
- After routing, check that the wire harnesses are not twisted or kinked.



- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interfered 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.



- Do not throw or let parts fall.



- Rust is the enemy of all finished surfaces. Before connecting connectors and couplers, check the terminals and remove, if any, rust using a fine sand paper or emery cloth.



## Symbol Marks

The following symbols stand for:



:Apply engine oil.



:Apply brake fluid.



:Apply grease.



:Apply DEXRON® II Automatic Transmission Fluid.



: Apply Power Steering Fluid.



:Apply or check vacuum.

## Abbreviation

2WS	Two Wheel Steering
4WS	Four Wheel Steering
A/C	Air Conditioner
ALB	Anti Lock Brake
A/T	Automatic Transmission
ATF	DEXRON® II Automatic Transmission Fluid
ECU	Electronic Control Unit for Fuel-Injection System
EGR	Exhaust Gas Recirculation
EACV	Electronic Air Control Valve
L.	Left Side
LHD	Left Hand Drive
M/T	Manual Transmission
PCV Valve	Positive Crankcase Ventilation Valve
P/S	Power Steering
R.	Right Side
RHD	Right Hand Drive
TDC	Top Dead Center



## **Special Tools**

**Special Tools  
(Common with Other Models) ..... 2-2**

# Special Tools

## Special Tools (Common with Other Models)

### 5. Engine

No.	Tool Number	Description	Q'ty	Remarks
①	07GAF-PH60100	Piston Base Head	1	
②	07GAF-PH60200	Pilot Collar	1	
③	07GAF-PH60300	Piston Pin Base Insert	1	
④	07GAF-PH70100	Pilot Collar	1	
⑤	07406-0030000	Oil Pressure Gauge Adaptor	1	
⑥	07743-0020000	Adjustable Valve Guide Driver	1	
⑦	07746-0010400	Attachment 52 x 55 mm	1	
⑧	07749-0010000	Driver	1	
⑨	07757-PJ10100	Valve Spring Compressor Attachment	1	
⑩	07757-0010000	Valve Spring Compressor	1	
⑪	07924-PD20003	Ring Gear Holder	1	
⑫	07942-SA50000 or 07942-8230000	Valve Guide Driver, 7.0 mm	1	
⑬	07942-6570100 or 07942-6110000	Valve Guide Driver, 6.6 mm	1	
⑭	07943-6890100	Valve Guide Driver Attachment	1	
⑮	07947-SB00100	Seal Driver	1	
⑯	07948-SB00101	Driver Attachment	1	
⑰	07973-PE00302 or 07973-PE00301	Adj. Piston Pin Driver	1	
⑱	07973-6570002	Piston Pin Dis/Assembly Tool Set	1	
⑱-1	07973-6570500	Piston Base	(1)	Component Tool
⑱-2	07973-6570600	Piston Base Spring	(1)	
⑲	07984-SA50000 or 07984-6890101	Valve Guide Reamer, 7.0 mm	1	
⑳	07984-6110000 or 07984-6570101	Valve Guide Reamer, 6.6 mm	1	

### 6. Fuel and Emissions

No.	Tool Number	Description	Q'ty	Remarks
①	07GMJ-ML80100	Inspection Adaptor	1	
②	07HAZ-PJ70000	ECU Check Adaptor A	1	<Carbureted Engine>
③	07HAZ-PJ70100	ECU Check Adaptor B	1	<Carbureted Engine>
④	07401-0010000	Float Level Gauge	1	<Carbureted Engine>
⑤	07406-0040001	Fuel Pressure Gauge	1	<Fuel-Injected Engine>
⑥	07411-0020000	Digital Circuit Tester	1	
⑦	07614-0050100	Fuel Line Clamp	1	<Carbureted Engine>
⑧	07999-PD6000A	System Checker Harness	1	<Fuel-Injected Engine>

### 7. Clutch

No.	Tool Number	Description	Q'ty	Remarks
①	07GAG-PF50100	Clutch Disc Alignment Tool	1	
②	07924-PD20003 or 07924-PD20002	Ring Gear Holder	1	



### 8. Manual Transmission

No.	Tool Number	Description	Q'ty	Remarks
①	07GAD—PG40100	Oil Seal Driver	1	
②	07GAJ—PG20101	Mainshaft Thrust Clearance Inspection Tool	1	
③	07936—6340000	Bearing Puller Set	1	
④	07936—6890101	Bearing Remover Attachment	1	
⑤	07746—0010300	Attachment, 42 x 47 mm	1	
⑥	07746—0010400	Attachment, 52 x 55 mm	1	
⑦	07746—0010500	Attachment, 62 x 68 mm	1	
⑧	07749—0010000	Driver	1	
⑨	07947—SD90100 or 07GAD—PG40100	Oil Seal Driver	1	
⑩	07947—6110500	Oil Seal Driver	1	
⑪	07GAJ—PG20201	Preload Inspection Tool	1	
⑫	07746—0030100	Driver	1	
⑬	07947—SD90100 or 07GAD—PG40100	Oil Seal Driver	1	
⑭	07947—6110500	Oil Seal Driver	1	

### 9. Automatic Transmission

No.	Tool Number	Description	Q'ty	Remarks
①	07GMJ—ML80100	Inspection Adaptor Tool	1	
②	07GAB—PF50100	Mainshaft Holder	1	
③	07GAE—PG40001	Clutch Spring Compressor Set	1	
③-1	07GAE—PG40200	Clutch Spring Compressor Bolt Assembly	(1)	Component Tool
③-2	07HAE—PL50100	Clutch Spring Compressor Attachment	(1)	
③-3	07960—6120100	Clutch Spring Compressor Attachment	(1)	
④	07HAC—PK40100 or 07GAC—PG40100 07GAC—PG40101 07GAC—PG40102	Housing Puller	1	
⑤	07HAF—PK40100	Gear Installer	1	
⑥	07406—0020003 or 07406—0020201	Oil Pressure Gauge Set	1	
⑦	07936—6340000	Bearing Puller Set	1	
⑧	07GAC—PF40210	Bearing Remover Attachment	1	
⑨	07746—0010500	Attachment, 62 x 68 mm	1	
⑩	07749—0010000	Driver	1	
⑪	07947—6340201	Driver Attachment E	1	
⑫	07947—6340500	Bearing Driver Attachment E	1	
⑬	07GAJ—PG20201	Preload Inspection Tool	1	
⑭	07746—0030100	Driver	1	
⑮	07947—SD90100 or 07GAD—PG40100	Oil Seal Driver	1	
⑯	07947—6110500	Oil Seal Driver	1	

# Special Tools

## Special Tools (Common with Other Models)

10. Driveshaft				
No.	Tool Number	Description	Q'ty	Remarks
①	07GAD-SE00100	Oil Seal Driver	1	
②	07746-0010400	Attachment, 52 x 55 mm	1	
③	07746-0010500	Attachment, 62 x 68 mm	1	
④	07746-0040900	Pilot, 40 mm	1	
⑤	07749-0010000	Driver	1	
⑥	07947-SD90200	Oil Seal Driver	1	
⑦	07965-SD90100	Support Base	1	
⑧	07965-SD90200	Support Collar	1	

11. Power Steering (2WS/4WS Community)				
No.	Tool Number	Description	Q'ty	Remarks
①	07GAG-SD40000	P/S Tool Kit	1	
①-1	07GAG-SD40100	Piston Seal Ring Guide	(1)	Component Tool
①-2	07GAG-SD40200	Piston Seal Sizing Tool	(1)	
①-3	07GAG-SD40300	Cylinder End Seal Slider	(1)	
①-4	07GAG-SD40400	End Seal Guide	(1)	
①-5	07GAG-SD40600	Tool Box	(1)	
②	07GAK-SE00100	P/S Pressure Gauge Adaptor Set	1	
②-1	07GAK-SE00110	P/S Joint Adaptor (Pump)	(1)	Component Tool
②-2	07GAK-SE00120	P/S Joint Adaptor (Hose)	(1)	
③	07406-0010200	P/S Pressure Gauge Set	1	
③-1	07406-0010300	Pressure Control Valve	(1)	
③-2	07406-0010400	Pressure Gauge	(1)	
④	07406-0010101	Bypass Tube Joint	1	
⑤	07746-0010300	Attachment, 42 x 47 mm	1	
⑥	07749-0010000	Driver	1	
⑦	07916-SA50001	40 mm Lock Nut Wrench	1	
⑧	07941-6920003	Ball Joint Remover	1	
⑨	07947-6340300	Driver Attachment	1	
⑩	07953-7190000	Collar Driver	1	
⑪	07974-SA50600	Pinion Seal Guide	1	



### 11. Power Steering (4WS Only)

No.	Tool Number	Description	Q'ty	Remarks
①	07HAA-SF10100	Lock Nut Socket 36 x 41 mm	1	Component Tool
②	07HAG-SF10000	4WS Tool Kit	1	
②-1	07HAG-SF10100	Piston Seal Ring Guide	(1)	
②-2	07HAG-SF10200	Piston Seal Ring Sizing Tool	(1)	
②-3	07HAG-SF10300	Pinion Seal Ring Guide	(1)	
②-4	07HAG-SF10400	Pinion Seal Sizing Tool	(1)	
②-5	07HAG-SF10500	Driver Seal Ring Guide	(1)	
②-6	07HAG-SF10600	Tool Box	(1)	
③	07HAJ-SF10100	Rack Adjuster Gauge Holder Set	1	
④	07HAJ-SF10201	Rear Steering Center Lock Pin	1	
⑤	07HAJ-SF10300	Stroke Rod Holder Set	1	
⑥	07HFJ-SF10400	Inspection Adaptor	1	
⑦	07703-0010101	Torx Bit Driver T40	1	
⑧	07746-0010700	Attachment 24 x 26 mm	1	

### 12. Suspension

No.	Tool Number	Description	Q'ty	Remarks
①	07HAF-SF10200	Bearing Supporting Attachment	1	
②	07GAE-SE00101 or 07GAE-SE00100	Spring Compressor	1	
③	07GAF-SE00100	Hub Assembly Pin	1	
④	07GAF-SE00200	Front Assembly Driver Attachment	1	
⑤	07GAF-SE00401	Front Hub Base	1	
⑥	07GAF-SD40700	Hub Dis/Assembly Base	2	
⑦	07GAG-SD40700	Ball Joint Boot Clip Installation Guide	1	
⑧	07HAD-SF10100	Hub Bearing Driver	1	
⑨	07GAK-0010100	Wheel Alignment Gauge Attachment	1	
⑩	07HAF-SF10100	Ball Joint Dis/Assembly Tool Kit	1	
⑩-1	07HAF-SF10110	Ball Joint Remover Base	1	
⑩-2	07HAF-SF10120	Ball Joint Installer Base	1	
⑩-3	07HAF-SF10130	Ball Joint Remover/Installer	1	
⑪	07HAJ-SF10201	Rear Steering Center Lock Pin	1	
⑫	07HGJ-0010000	Toe Inspection Gauge Set	1	
⑬	07703-0010100	Torx T40 Bit	1	
⑭	07746-0010400	Attachment, 52 x 55 mm	1	
⑮	07746-0010500	Attachment, 62 x 68 mm	1	
⑯	07749-0010000	Driver	1	
⑰	07941-6920003	Ball Joint Remover	1	
⑱	07965-SB00000	Ball Joint Dis/Assembly Tool Set	1	
⑱-1	07965-SB00100	Ball Joint Remover Base	1	
⑱-2	07965-SB00200	Ball Joint Installer Base	1	
⑱-3	07965-SB00300	Ball Joint Remover/Installer	1	
⑲	07965-SD90100	Supporting Base	1	
⑳	07965-6920201	Front Hub Dis/Assembly Tool, B	1	
㉑	07974-SA50700	Ball Joint Boot Clip Installation Guide	1	
㉒	07974-SA50800	Ball Joint Boot Clip Installation Guide	1	



# Special Tools

## Special Tools (Common with Other Models)

### 13. Brakes (Conventional Brakes Community)

No.	Tool Number	Description	Q'ty	Remarks
①	07921-0010001	Flare Nut Wrench	1	
②	07510-6340300	Vacuum Joint Tube A	1	
③	07404-5790300	Vacuum Gauge	1	
④	07410-5790500	Tube Joint Adaptor	1	
⑤	07406-5790200	Pressure Gauges	2	
⑥	07410-5790100	Pressure Gauge Attachment	2	
⑦	07510-6340100	Pressure Gauge Joint Pipe	2	
⑧	07749-0010000	Driver	1	
⑨	07947-6890300	Driver Attachment, C	1	
⑩	07GAG-SE00100	Rod Bolt Adjustment Gauge	1	
⑪	07HAE-SG00100	Brake Spring Compressor	1	
⑫	07914-SA50000	Snap Ring Pliers	1	

### 13. Brakes (ALB Only)

No.	Tool Number	Description	Q'ty	Remarks
①	07508-SB00000	ALB Checker	1	
②	07HAJ-SG00300	ALB Checker Adaptor	1	
③	07907-SB00000	ALB T-Wrench	1	
④	07921-0010001	Flair Nut Wrench	1	
⑤	07965-5790300	Cup Guide	1	
⑥	07510-6340300	Vacuum Joint Tube A	1	
⑦	07404-5790300	Vacuum Gauge	1	
⑧	07410-5790500	Vacuum Tube Joint Adaptor	1	
⑨	07406-5790200	Pressure Gauges	2	
⑩	07410-5790100	Pressure Gauge Attachments	2	
⑪	07510-6340100	Pressure Gauge Joint Pipe	1	
⑫	07HAK-SG00110	Pressure Gauge Joint Pipe	1	

### 14. Body

No.	Tool Number	Description	Q'ty	Remarks
①	07GAZ-SE30100	Torsion Rod Assembly Tool	1	

### 15. Heater and Air Conditioner

No.	Tool Number	Description	Q'ty	Remarks
①	07HAF-SF10300	Seal Seat Remover	1	
②	07HAF-SF10400	Seal Remover/Installer	1	

### 16. Electrical

No.	Tool Number	Description	Q'ty	Remarks
①	07GAC-SE00200	Fuel Sender Wrench	1	

## **Specifications**

<b>Standards and Service Limits .....</b>	<b>3-2</b>
<b>Design Specifications .....</b>	<b>3-12</b>
<b>Body Specifications .....</b>	<b>3-17</b>

# Standards and Service Limits

## 5. Engine/Cylinder Head, Valve Train (Fuel-Injected Engine)

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT		
Compression		250 min <sup>-1</sup> (rpm) and wide-open throttle	Nominal Minimum Maximum variation	1,226 kpa (12.5 kg/cm <sup>2</sup> , 178 psi) 932 kpa (9.5 kg/cm <sup>2</sup> , 135 psi) 196 kpa (2 kg/cm <sup>2</sup> , 28 psi)		
Cylinder head		Warpage Height	— 132 (5.20)	0.05 (0.002) 131.8 (5.19)		
Camshaft		End play	0.05–0.15 (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) max.	0.03 (0.001)		
		Cam lobe height	IN EX	33.716 (1.3274) 33.932 (1.3359)	— —	
Valve		Valve clearance	IN EX	0.08–0.12 (0.003–0.005) 0.16–0.20 (0.006–0.008)	— —	
		Valve stem O.D.	IN EX	6.58–6.59 (0.2591–0.2594) 6.55–6.56 (0.2579–0.2583)	6.55 (0.258) 6.52 (0.257)	
		Stem-to-guide clearance	IN EX	0.02–0.05 (0.001–0.002) 0.05–0.08 (0.002–0.003)	0.08 (0.003) 0.11 (0.04)	
		Stem installed height	IN and EX	42.75 (1.683)	43.54 (1.714)	
	Valve seat		Width	IN and EX	1.25–1.55 (0.049–0.061)	2.0 (0.08)
	Valve spring		Free length	Inner Outer	43.50 (1.713) 47.45 (1.868)	42.5 (1.673) 46.45 (1.829)
		Squareness	Inner and Outer	—	1.6 (0.063)	
Valve guide			I.D.	IN and EX	6.61–6.63 (0.260–0.261)	6.65 (0.262)

## 5. Engine/Cylinder Head, Valve Train (Carbureted Engine)

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT		
Compression		250 min <sup>-1</sup> (rpm) and wide-open throttle	Nominal Minimum Maximum variation	1,177 kpa (12.0 kg/cm <sup>2</sup> , 171 psi) 932 kpa (9.5 kg/cm <sup>2</sup> , 135 psi) 196 kpa (2 kg/cm <sup>2</sup> , 28 psi)		
Cylinder head		Warpage Height	— 90 (3.54)	0.05 (0.002) 89.8 (3.54)		
Camshaft		End play	0.05–0.15 (0.002–0.006)	0.5 (0.02)		
		Oil clearance	No. 1,3 and 5 journals No. 2 and 4 journals	0.050–0.089 (0.002–0.004) 0.130–0.169 (0.005–0.007)	0.15 (0.006) 0.23 (0.009)	
		Runout	0.015 (0.0006) max.	0.03 (0.001)		
		Cam lobe height	IN A IN B EX	38.604 (1.5198) 38.858 (1.5298) 38.796 (1.5274)	— — —	
	Valve		Valve clearance	IN EX	0.12–0.17 (0.005–0.007) 0.25–0.30 (0.010–0.012)	— —
		Valve stem O.D.	IN EX	6.58–6.59 (0.2591–0.2594) 6.94–6.95 (0.2732–0.2736)	6.55 (0.258) 6.91 (0.272)	
		Stem-to-guide clearance	IN EX	0.02–0.05 (0.001–0.002) 0.06–0.09 (0.002–0.004)	0.08 (0.003) 0.12 (0.005)	
		Stem installed height	IN EX	48.59 (1.913) 47.66 (1.876)	49.34 (1.943) 48.41 (1.906)	
Valve seat			Width	IN and EX	1.25–1.55 (0.049–0.061)	2.0 (0.08)
Valve spring			Free length	IN EX Inner Outer	48.54 (1.91) 42.42 (1.67) 49.06 (1.93)	47.54 (1.87) 41.42 (1.63) 48.06 (1.89)
		Squareness	Inner and Outer	—	1.75 (0.068)	
	Valve guide		I.D.	IN EX	6.61–6.63 (0.260–0.261) 7.01–7.03 (0.276–0.277)	6.65 (0.262) 7.05 (0.278)
Rocker arm			Arm-to-shaft clearance	0.008–0.054 (0.0003–0.0021)	0.08 (0.003)	

Unit: mm (in.)

**5. Engine/Engine Block (Fuel-Injected Engine)**

MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface	0.07 (0.0028) max.	0.10 (0.004)
	Bore diameter	81.01 – 81.02 (3.1894–3.1898)	81.05 (3.1909)
		81.00–81.01 (3.1890–3.1894)	81.04 (3.1905)
	Bore taper	–	0.05 (0.002)
	Reboring limit	–	0.5 (0.02)
Piston	Skirt O.D. (At 21 mm (0.83 in) from bottom of skirt)	80.98–80.99 (3.1882–3.1886)	80.97 (3.188)
		80.97–80.98 (3.1878–3.1882)	80.96 (3.187)
	Clearance in cylinder	0.02–0.04 (0.0008–0.0016)	0.08 (0.003)
	Piston-to-ring clearance	0.030–0.055 (0.0012–0.0022)	0.13 (0.005)
Piston ring	Ring end gap	Top	0.20–0.35 (0.008–0.014)
		2nd	0.40–0.55 (0.016–0.022)
		Oil	0.20–0.70 (0.008–0.028)
Connecting rod	Pin-to-rod interference	0.013–0.032 (0.0005–0.0013)	–
	Large end bore diameter	Nominal 51 (2.01)	–
	End play installed on crankshaft	0.15–0.30 (0.006–0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	54.976–55.000 (2.1644–2.1654)	–
	Taper/out-of-round, main journal	0.005 (0.0002) max.	0.010 (0.0004)
	Rod journal diameter	47.976–48.000 (1.8888–1.8900)	–
	Taper/out-of-round, rod journal	0.005 (0.0002) max.	0.010 (0.0004)
	End play	0.10–0.35 (0.004–0.014)	0.45 (0.018)
	Runout	0.010 (0.0004) max.	0.015 (0.0006)
Bearings	Main bearing-to-journal	No. 1, 2, 4, and 5 Journals	0.024–0.042 (0.0010–0.0017)
	Oil clearance	No. 3 Journal	0.030–0.048 (0.0012–0.0019)
	Rod bearing-to-journal oil clearance		0.026–0.044 (0.0010–0.0017)

**5. Engine/Engine Block (Carbureted Engine)**

MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface	0.07 (0.0028) max.	0.10 (0.004)
	Bore diameter	81.01 – 81.02 (3.1894–3.1898)	81.05 (3.1909)
		81.00–81.01 (3.1890–3.1894)	81.04 (3.1905)
	Bore taper	–	0.05 (0.002)
	Reboring limit	–	0.5 (0.02)
Piston	Skirt O.D. (At 21 mm (0.83 in) from bottom of skirt)	80.98–80.99 (3.1882–3.1886)	80.97 (3.1878)
		80.97–80.98 (3.1878–3.1882)	80.96 (3.1874)
	Clearance in cylinder	0.02–0.04 (0.0008–0.0016)	0.08 (0.003)
	Piston-to-ring clearance (top and 2nd)	0.030–0.055 (0.0012–0.0022)	0.13 (0.005)
Piston ring	Ring end gap	Top	0.20–0.35 (0.008–0.014)
		2nd	0.40–0.55 (0.016–0.022)
		Oil	0.20–0.70 (0.008–0.020)
Connecting rod	Pin-to-rod interference	0.013–0.032 (0.0005–0.0013)	–
	Large end bore diameter	Nominal 48 (1.89)	–
	End play installed on crankshaft	0.15–0.30 (0.006–0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	54.976–55.000 (2.1644–2.1654)	–
	Taper/out-of-round, main journal	0.005 (0.0002) max.	0.010 (0.0004)
	Rod journal diameter	44.976–45.000 (1.7707–1.7717)	–
	Taper/out-of-round, rod journal	0.005 (0.0002) max.	0.010 (0.0004)
	End play	0.10–0.35 (0.004–0.014)	0.45 (0.018)
	Runout	0.010 (0.0004) max.	0.015 (0.0006)
Bearings	Main bearing-to-journal	No. 1, 2, 4, and 5 Journals	0.024–0.042 (0.0010–0.0017)
	Oil clearance	No. 3 Journal	0.030–0.048 (0.0012–0.0019)
	Rod bearing-to-journal oil clearance		0.026–0.044 (0.0010–0.0017)

(cont'd)

# Standards and Service Limits (cont'd)

○ : Fuel-Injected Engine

● : Carbureted Engine

## 5. Engine/Engine Lubrication

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (U.S. qt., Imp. qt.)	4.8 (5.1, 4.2) After engine disassembly 3.9 (4.1, 3.4) After oil change, including oil filter 3.4 (3.6, 3.0) After oil change, without oil filter	
Oil pump	Displacement	○ 54 ℓ (14.3 U.S. gal., 11.9 Imp. gal.) 5,000 min <sup>-1</sup> (rpm) ● 54 ℓ (14.3 U.S. gal., 11.9 Imp. gal.) 5,500 min <sup>-1</sup> (rpm)	
	Inner-to-outer rotor radial clearance	0.04–0.16 (0.002–0.006)	0.2 (0.008)
	Pump body-to-rotor radial clearance	0.10–0.19 (0.004–0.007)	0.21 (0.008)
	Pump body-to-rotor side clearance	0.02–0.07 (0.001–0.003)	0.12 (0.005)
Relief valve	Pressure setting 80°C (176°F)	Idle	147 kPa (1.5 kg/cm <sup>2</sup> , 21 psi) min.
		3,000 min <sup>-1</sup> (rpm)	520–598 kPa (5.3–6.1 kg/cm <sup>2</sup> , 75–87 psi)

## 5. Engine/Cooling

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
○ Radiator	Capacity (incl. heater) ℓ (U.S. qt., Imp. qt.) (Includes reservoir tank 0.75 (0.79, 0.66))	7.8 (8.2, 6.9)	
● Radiator	Capacity (incl. heater) ℓ (U.S. qt., Imp. qt.) (Includes reservoir tank 0.75 (0.79, 0.66))	Manual 6.8 (7.2, 6.0) Automatic 7.5 (7.9, 6.6)	
Radiator cap	Pressure cap opening pressure	74–103 kPa (0.75–1.05 kg/cm <sup>2</sup> , 11–15 psi)	
Thermostat	Starts to open	82°C ± 2 (180°F ± 3)	86–90°C (187–194°F)
	Full open	95°C (203°F)	100°C (212°F) OPTIONAL
	Valve lift at full open	8 (0.31) max.	8 (0.31) max.
○ Water pump	Gear ratio (crankshaft)	0.89	
	Capacity: ℓ per min/at min <sup>-1</sup> (rpm)	158/6,000 (41.7 U.S. gal., 34.8 Imp. gal.)/6,000 min <sup>-1</sup> (rpm)	
● Water pump	Gear ratio (crankshaft)	1.00	
	Capacity: ℓ per min/at min <sup>-1</sup> (rpm)	145/6,000 (38.3 U.S. gal., 31.9 Imp. gal.)/6,000 min <sup>-1</sup> (rpm)	
Cooling fan	Fan-to-core clearance	26.0 (1.02)	
	Thermoswitch "ON" temperature	87°–93°C (188°–199°F)	
	Thermoswitch "OFF" temperature	83° (181°F) or more (hysteresis 2°C (35°F) or more).	

## 6. Fuel and Emissions

	MEASUREMENT	STANDARD (NEW)
○ Fuel pump	Delivery pressure	250 kPa (2.55 kg/cm <sup>2</sup> , 36 psi)
	Displacement	230 cm <sup>3</sup> /min in 10 seconds
	Relief valve opening pressure	441–588 kPa (4.5–6.0 kg/cm <sup>2</sup> , 64–85 psi)
● Fuel pump	Delivery pressure	15.7–22.6 kPa (0.16–0.23 kg/cm <sup>2</sup> , 2.3–3.3 psi)
	Displacement	760 cm <sup>3</sup> /min at 12 V (46 cu. in./12 V)
○ Pressure regulator	Pressure	230–270 kPa (2.35–2.75 kg/cm <sup>2</sup> , 33–39 psi)
Fuel Tank	Capacity	60 ℓ (15.9 U.S. gal., 13.2 Imp. U.S. gal.)

○ : Fuel-Injected Engine

● : Carbureted Engine

Unit: mm (in.)

## 6. Fuel and Emissions

	MEASUREMENT	STANDARD (NEW)	
Throttle valve body or carburetor	Fast idle min <sup>-1</sup> (rpm)	Manual ○ 1,000–1,800 Automatic ○ 1,000–1,800	● 1,000–2,000 ● 1,000–2,000
	Idle speed min <sup>-1</sup> (rpm) with headlights and cooling fan off	○ Manual Automatic (in gear)	750 ± 50 (with catalytic converter) 800 ± 50 (without catalytic converter)
		● Manual Automatic (in gear)	M/T: 800 ± 50 A/T: 750 ± 50
	Idle CO	0.1%	
	Float level (from gasket)	15–17 (0.59–0.67)	

## 7. Clutch

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height	207 (8.1) to floor	—
	Stroke	135–140 (5.3–5.5)	—
	Pedal play	9–15 (0.4–0.6)	—
	Disengagement height	92 (3.6) min. to floor	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth	1.3 (0.05) min.	0.2 (0.008)
	Surface runout	0.8 (0.03) max.	1.0 (0.04)
	Thickness	8.5–9.2 (0.33–0.36)	6.1 (0.24)
Clutch release bearing holder	I.D.	35.00–35.059 (1.378–1.380)	35.09 (1.381)
	Holder-to-guide sleeve clearance	0.05–0.15 (0.002–0.006)	0.22 (0.009)
Clutch cover	Unevenness of diaphragm spring	0.6 (0.02) max.	0.8 (0.03)

## 8. Manual Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)	1.9 (2.0, 1.7) at oil change 2.0 (2.1, 1.8) at assembly		
Mainshaft	End play	0.14–0.21 (0.006–0.008)	Adjust with a shim.	
	Diameter of needle bearing contact area	27.987–28.000 (1.1018–1.1024)	27.94 (1.100)	
	Diameter of third gear contact area	37.984–38.000 (1.4954–1.4961)	37.93 (1.493)	
	Diameter of ball bearing contact area	27.977–27.990 (1.1015–1.1020)	27.94 (1.100)	
	Runout	0.04 (0.0016) max.	0.10 (0.004)	
Mainshaft third and fourth gears	I.D.	43.009–43.025 (1.6933–1.6939)	43.08 (1.696)	
	End play	0.06–0.21 (0.0024–0.0083)	0.3 (0.012)	
	Thickness	3rd 32.42–32.47 (1.2764–1.2783) 4th 30.92–30.97 (1.2173–1.2193)	32.3 (1.272) 30.8 (1.213)	
Mainshaft fifth gear	I.D.	43.009–43.025 (1.6933–1.6939)	43.08 (1.696)	
	End play	0.06–0.21 (0.0024–0.0083)	0.3 (0.012)	
	Thickness	30.42–30.47 (1.1976–1.1996)	30.3 (1.193)	
Countershaft	End play	0.10–0.35 (0.004–0.014)	0.5 (0.02)	
	Diameter of needle bearing contact area	33.000–33.015 (1.2992–1.2998)	32.95 (1.297)	
	Diameter of ball bearing contact area	24.987–25.000 (0.9837–0.9843)	24.94 (0.982)	
	Diameter of low gear contact area	39.984–40.000 (1.5742–1.5748)	33.93 (1.336)	
	Runout	0.04 (0.0016)	0.10 (0.004)	
Countershaft low gear	I.D.	46.009–46.025 (1.8114–1.8120)	46.08 (1.814)	
	End play	0.03–0.08 (0.0012–0.0031)	Adjust with a shim	
Countershaft second gear	I.D.	50.009–50.025 (1.9689–1.9695)	50.08 (1.972)	
	End play	0.03–0.08 (0.0012–0.0031)	Adjust with a collar.	
	Thickness	32.92–32.97 (1.2961–1.2980)	32.8 (1.291)	
Spacer collar (Countershaft second gear)	I.D.	36.48–36.49 (1.4362–1.4366)	36.5 (1.437)	
	O.D.	43.989–44.000 (1.7318–1.7323)	43.94 (1.730)	
	Length	A	28.98–29.00 (1.1409–1.1417)	—
		B	29.03–29.05 (1.1429–1.1437)	—

(cont'd)

# Standards and Service Limits (cont'd)

## 8. Manual Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Spacer collar (Mainshaft fourth and fifth gears)	I.D.	28.002—28.012 (1.1024—1.1028)	28.06 (1.105)	
	O.D.	34.989—35.000 (1.3775—1.3780)	34.94 (1.376)	
	Length	A	55.95—56.05 (2.2028—2.2067)	—
		B	26.03—26.08 (1.0248—1.0268)	—
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	20.016—20.043 (0.7880—0.7891) 0.036—0.084 (0.0014—0.0033)	20.09 (0.791) 0.16 (0.006)	
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	0.85—1.10 (0.033—0.043)	0.4 (0.016)	
Shift fork	Synchronizer sleeve gear	1,2,3 and 4th	7.95—8.05 (0.313—0.317)	
		5th	5.75—5.85 (0.226—0.230)	
	Fork-to-synchronizer sleeve	1,2,3 and 4th	0.45—0.65 (0.018—0.026)	1.0 (0.04)
		5th	0.45—0.50 (0.018—0.020)	0.8 (0.03)
Reverse shift fork	End gap	13.0—13.3 (0.512—0.524)	—	
	Fork-to-reverse idler gear clearance	0.5—1.1 (0.020—0.043)	1.8 (0.071)	
	Groove width	7.05—7.25 (0.278—0.285)	—	
	Fork-to-fifth/reverse shift piece pin clearance	0.05—0.35 (0.002—0.014)	0.5 (0.02)	
Shift arm	I.D.	15.973—16.000 (0.629—0.630)	—	
	Shift shaft clearance	0.005—0.059	—	
		(0.000197—0.00232)	—	
	Shift fork diameter of contact area	12.9—13.0 (0.508—0.512)	—	
Shift fork clearance	0.2—0.3 (0.0079—0.012)	0.6 (0.024)		
Select lever	Pin size of contact area	8.7—8.8 (0.34—0.35)	—	
	Shaft outer diameter	15.41—15.68 (0.607—0.617)	—	
	Shift arm cover clearance	0.032—0.102 (0.00126—0.00402)	—	
Shift arm lever	O.D.	15.41—15.68 (0.607—0.617)	—	
	Transmission housing clearance	0.027—0.139 (0.00106—0.0055)	—	
Inter lock	Bore diameter	16.0—16.05 (0.630—0.632)	—	
	Shift arm lever clearance	0.032—0.19 (0.00126—0.0075)	—	

○ : Fuel-Injected Engine

● : Carbureted Engine

## 9. Automatic Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)	2.8 (3.0, 2.5) at oil change 6.2 (6.6, 5.5) at assembly	
Hydraulic pressure	Line pressure at 2,000 min <sup>-1</sup> (rpm)	○ 834—883 kpa (8.5—9.0 kg/cm <sup>2</sup> , 121—128 psi) ● 785—834 kpa (8.0—8.5 kg/cm <sup>2</sup> , 14—121 psi)	○ 785 kpa (8.0 kg/cm <sup>2</sup> , 114 psi) ● 736 kpa (7.5 kg/cm <sup>2</sup> , 107 psi)
	4th, 3rd, 2nd clutch pressure at 2,000 min <sup>-1</sup> (rpm)	○ 569—883 kpa (5.8—9.0 kg/cm <sup>2</sup> , 82.5—128 psi) ● 569—834 kpa (5.8—8.5 kg/cm <sup>2</sup> , 82.5—121 psi)	○ 785 kpa (8.0 kg/cm <sup>2</sup> , 114 psi) ● 736 kpa (7.5 kg/cm <sup>2</sup> , 107 psi)
	1st clutch pressure at 2,000 min <sup>-1</sup> (rpm)	○ 834—883 kpa (8.5—9.0 kg/cm <sup>2</sup> , 121—128 psi) ● 785—834 kpa (8.0—8.5 kg/cm <sup>2</sup> , 114—121 psi)	○ 785 kpa (8.0 kg/cm <sup>2</sup> , 114 psi) ● 736 kpa (7.5 kg/cm <sup>2</sup> , 107 psi)
	Throttle pressure B	○ 834—883 kpa (8.5—9.0 kg/cm <sup>2</sup> , 121—128 psi) ● 785—834 kpa (8.0—8.5 kg/cm <sup>2</sup> , 114—121 psi)	○ 785 kpa (8.0 kg/cm <sup>2</sup> , 114 psi) ● 736 kpa (7.5 kg/cm <sup>2</sup> , 107 psi)
Stall speed	Check with car on lever ground	○ 2,700 min <sup>-1</sup> (rpm) ● 2,750 min <sup>-1</sup> (rpm)	○ 2,550—2,850 min <sup>-1</sup> (rpm) ● 2,600—2,900 min <sup>-1</sup> (rpm)
Clutch	Clutch initial clearance	1st	0.65—0.85 (0.026—0.033)
		2nd	0.40—0.60 (0.016—0.024)
		3rd, 4th	0.40—0.60 (0.016—0.024)
	Clutch return spring free length	31.0 (1.22)	29.0 (1.14)
Clutch disc thickness	1.88—2.0 (0.074—0.079)	Until grooves worn out	





# Standards and Service Limits (cont'd)

## 9. Automatic Transmission (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission (cont'd)	Thrust washer thickness (mainshaft 1st gear L side)	1.45—1.50 (0.0571—0.0591)	1.40 (0.0551)	
	Mainshaft 1st gear collar length	24.50—24.55 (0.9646—0.9665)	—	
	Mainshaft 1st gear collar flange thickness	2.5—2.6 (0.098—0.102)	Wear or damage	
	Countershaft reverse gear collar length	12.00—12.10 (0.4724—0.4764)	—	
	Countershaft reverse gear collar flange thickness	2.40—2.60 (0.0945—0.1024)	Wear or damage	
	Countershaft 1st gear collar length	12.00—12.10 (0.4724—0.4764)	—	
	Countershaft 1st gear collar flange thickness	2.4—2.6 (0.095—0.102)	Wear or damage	
	Diameter of countershaft one-way clutch contact area	83.339—83.365 (3.2811—3.2821)	Wear or damage	
	Diameter of parking gear one-way clutch contact area	66.685—66.698 (2.6254—2.6259)	Wear or damage	
	Mainshaft feed pipe			
	O.D. (at 20 mm from end)	8.97—8.98 (0.353—0.354)	8.95 (0.3524)	
	O.D. (mainshaft feed pipe B)	5.97—5.98 (0.2351—0.2354)	5.95 (0.2343)	
	Countershaft feed pipe			
	O.D. (at 20 mm from end)	7.97—7.98 (0.3138—0.3142)	7.95 (0.3130)	
	Mainshaft sealing ring 35 mm thickness	1.980—1.995 (0.0780—0.0785)	1.800 (0.0709)	
	Mainshaft sealing ring 29 mm thickness	1.980—1.995 (0.0780—0.0785)	1.800 (0.0709)	
	Mainshaft bushing I.D.	6.018—6.030 (0.2369—0.2374)	6.045 (0.2380)	
Mainshaft bushing I.D.	9.000—9.015 (0.3543—0.3549)	9.030 (0.3555)		
Countershaft bushing I.D.	8.000—8.015 (0.3150—0.3156)	8.030 (0.3161)		
Mainshaft sealing ring groove width (35 mm and 29 mm)	2.025—2.060 (0.0797—0.0811)	2.080 (0.0819)		
Regulator valve body	Sealing ring contact area diameter	35.000—35.025 (1.3780—1.3789)	35.050 (1.3799)	
Shifting device and parking brake control	Reverse shift fork thickness	5.90—6.00 (0.2323—0.2362)	5.40 (0.2126)	
	Parking brake ratchet pawl	—	Wear or other defect	
	Parking gear	—	Wear or other defect	
	Throttle cam stopper	19.5—19.6 (0.768—0.772)	—	
Servo body	Shift fork shaft bore I.D.	A	14.000—14.005 (0.5512—0.5514)	—
		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 (1.4567—1.4582)	37.045 (1.4585)	
Valve body	Oil pump gear side clearance	0.03—0.05 (0.0012—0.0020)	0.07 (0.0028)	
	Oil pump gear-to-body clearance	Drive: 0.21—0.265	—	
		(0.0083—0.0104)	—	
	Driven: 0.07—0.125	(0.0028—0.0049)	—	
		27.000—27.021 (1.0630—1.0638)	Wear or damage	
	Stator camshaft needle bearing bore I.D. (torque converter side)	29.000—29.013 (1.1417—1.1422)	Wear or damage	
	Stator camshaft needle bearing contact and O.D. (oil pump side)	14.016—14.034 (0.5518—0.5525)	Wear or damage	
Oil pump driven gear I.D.	13.980—13.990 (0.5504—0.5508)	Wear or damage		
Oil pump shaft O.D.				

**9. Differential**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash	0.087—0.146 (0.0034—0.0057)	0.2 (0.0079)
Differential carrier	Pinion shaft bore diameter	18.000—18.018 (0.7087—0.7094)	18.1 (0.71)
	Carrier-to-pinion shaft clearance	0.017—0.047 (0.0007—0.0019)	0.1 (0.004)
	Driveshaft bore diameter	28.005—28.025 (1.1025—1.1033)	—
	Carrier-to-driveshaft clearance	0.025—0.066 (0.0010—0.0026)	0.12 (0.005)
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)	Selection with 8 types of washers
	Pinion gear bore diameter	18.042—18.066 (0.7103—0.7113)	—
	Pinion gear-to-pinion shaft clearance	0.059—0.095 (0.0023—0.0037)	0.15 (0.006)
Differential taper roller bearing	Preload	2.8—4.0 N·m (28—40 kg-m, 24—35 lb-in) at new bearing 2.5—3.7 N·m (25—37 kg-m, 22—32 lb-in) at old bearing	Selection with 18 types of shims

**10. Driveshaft**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right boot As installed	496 (19.5)	—
	Left boot As installed	496 (19.5)	—

**11. Steering**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play Pinion starting torque N·m (kg-m, ft-lb)	10 (0.39) Max. 1.2 (0.12, 0.86)	—
Power steering	The angle of rack-guide-nut loosened locked position Pump pressure with valve closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) kPa (kg/cm <sup>2</sup> , psi)	25° ± 5° (2WS), 35° ± 5° (4WS)  7845—8826 (80—90, 1138—1280)	
	Fluid capacity Reservoir At change	0.5 ℓ (0.53 U.S. qt., 0.44 Imp. qt.) approx 1.7 ℓ (1.8 U.S. qt., 1.5 Imp. qt.)	
Power steering belt	Deflection midway between pulleys load	11—13 (0.43—0.51)/98N (10 kg/22 lb) for used belt 9—11 (0.35—0.43)/98N (10 kg/22 lb) after replacement of belt	
Tie-rod end	Floating load force (maximum load measured at the pin rock at the tip of tie-rod end)	Front Rear 14.6 lbs, (6.6 kg) 14.6 lbs, (6.6 kg)	

# Standards and Service Limits (cont'd)

□: Rear wheel with 4WS

## 12. Suspension

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber		Front 0°00' ± 1°      Rear -0°20' ± 1° (□-0°20' ± 30')	
	Caster		2°20' ± 30'	
	Toe-in		0 ± 2 (0 ± 0.08)	2 ± 2 (0.08 ± 0.08)
	Side slip		0 ± 2 (0 ± 0.08)	IN 2 ± 2 (IN 0.08 ± 0.08)
	Turning angle (MAX.)	Inward wheel Outward wheel	37°20' ± 2° (□5°00' ± 1°) 30°15' ± 2° (□5°20' ± 1°)	
	△ Rear wheel turning angle (when steering wheel angle is at 127°)		□1°30' ± 30'	
Ball joint	Floating load force (Maximum load measured at the pin rock at the tip of tie-rod end)	Front/Upper Front/Lower Rear/Upper Rear/Lower	10.4 lbs. (4.7 kg) 7.9 lbs. (3.6 kg) 7.7 lbs. (3.5 kg) 13.9 lbs. (6.3 kg)	
Wheel	Rim runout	Steel	0-1.0 (0-0.039)	—
	Pitch-circle diameter Offset	Aluminum	0-0.3 (0-0.012) 100 (3.94) 45 (1.77)	—
Wheel bearing	End play	Front	0	0.05
		Rear	0	0.05

△: Maximum steering angle at which front and rear wheel in place.

## 13. Brake

○: Fuel-Injected Engine    ●: Carbureted Engine

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Parking brake lever		Play in stroke 200N (20 kg, 44 lbs)	To be locked when pulled 7-11 notches		
Foot brake pedal	Pedal height	M/T	178 (7.0)	—	
	Free play	H/M	183 (7.2) from floor 1-5 (0.04-0.20)	5 (0.20)	
Master cylinder		Piston-to-push rod clearance	0-0.4 (0-0.016)	—	
Disc brake	Disc thickness	Front	16i, Si* <sup>1</sup> EX	21.0 (0.83) 19.0 (0.75)	19.0 (0.75) 17.0 (0.67)
		Rear		10.0 (0.39)	8.0 (0.31)
	Disc runout	Front/Rear		—	0.1 (0.004)/0.1 (0.004)
	Disc parallelism			—	0.015 (0.0006)
	Pad thickness	Front	16i, Si* <sup>1</sup> EX	11.5 (0.45) 9.0 (0.35)	3.0 (0.12) 3.0 (0.12)
		Rear		8.0 (0.31)	2.0 (0.08)
Brake booster	Characteristics	Vacuum (mm Hg)	Pedal Pressure kg (lbs)	Line Pressure kg/cm <sup>2</sup> (psi)	
		0	20 (44)	○ 11.4 (162)    ● 13.1 (186)	
		300 500	20 (44) 20 (44)	○ 47.8 (680)    ● 54.9 (781)	
				○ 72.3 (1,028)    ● 83.0 (1,180)	

Si\*<sup>1</sup>: KQ, KT, KY only.

O: Fuel-Injected Engine    ●: Carbureted Engine

Unit: mm (in.)

**16. Electrical**

		MEASUREMENT	STANDARD (NEW)	
Ignition coil	Rated voltage		12 Volts	
	Primary winding resistance		1.215–1.485 ohms	
	Secondary winding resistance		9,040–13,560 ohms	
Ignition wire	Resistance		25,000 ohms max.	
Spark plug	Type		See Section 16	
	Gap		1.0–1.1 (0.039–0.043)	
Ignition timing	At idling	○ Manual	15 ± 2° BTDC	
		○ Automatic (in neutral)	15 ± 2° BTDC	
		● Manual	15 ± 2° BTDC (KT, KY) 16 ± 2° BTDC (KB, KE, KF, KG, KW) 20 ± 2° BTDC (KS, KX, KZ)	
		● Automatic (in neutral)	10 ± 2° BTDC (KT, KY) 15 ± 2° BTDC (KS, KX, KZ) 16 ± 2° BTDC (KB, KE, KF, KG, KW)	
Battery	Lighting capacity (20-hour ratio)		50 Ampere Hours	
	Starting capacity (5-second ratio)		8.5 V minimum at 300 Ampere draw	
Alternator	Output		13.5 V/70 A	
	Coil resistance (rotor)		2.8–3.0 ohms	
	Slip ring O.D.		14.4 (0.57)	
	Brush length		10.5 (0.41)	
	Brush spring tension		300–360 g (10.6–12.7 oz)	
Starting motor			1.0 kW (KE, KQ, KT, KY) 1.4 kW (Except KE, KQ, KT, KY)	
		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth		0.4–0.5 (0.016–0.020)	0.15 (0.006)
	Commutator runout		0–0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.		28.0–28.1 (1.102–1.106)	27.5 (1.08)
	Brush length		14.3–14.7 (0.56–0.58)	9.3 (0.37)
	Spring pressure (new)		18.5–23.5 N (1.85–2.35 kg, 4.08–5.18 lb.)	—

# Design Specifications

	ITEMS	METRIC	ENGLISH	NOTE
DIMENSIONS	Overall Length	4,460 mm	175.6 in.	
	Overall Width	1,710 mm	67.3 in.	
	Overall Height	1,295 mm	51.0 in.	
	Wheelbase	2,565 mm	101.0 in.	
	Track F/R	1,480/1,470 mm	58.3/57.9 in.	
	Ground Clearance	145 mm	5.7 in.	
	Seating Capacity Overhang F/R	895/1000 mm	Four 35.2/39.37 in.	Includes bumper
Weight	Engine weight (wet)			
	Carbureted	123 kg	271 lb	
	Fuel-Injected	126 kg	288 lb	
	Curb weight			
	EX 5-M/T	1,085 kg	2,392 lb	KF
		1,080 kg	2,381 lb	KB, KG
		1,060 kg	2,337 lb	Holland
		1,090 kg	2,403 lb	KG with cata., KW
		1,100 kg	2,425 lb	KX, KS, KE
		1,100 kg	2,425 lb	KW with cata.
	EX 4-A/T	1,150 kg	2,535 lb	KY
		1,105 kg	2,436 lb	KF
		1,100 kg	2,425 lb	KB, KG
		1,080 kg	2,381 lb	Holland
		1,110 kg	2,425 lb	KG with cata., KW
	with A/C, ALB	1,144 kg	2,522 lb	KG with cata., KW
		1,120 kg	2,469 lb	KX, KS, KE
		1,120 kg	2,469 lb	KW with cata.
	16i 5-M/T	1,167 kg	2,573 lb	KY
		1,140 kg	2,513 lb	KF
		1,130 kg	2,491 lb	KB, KG
		1,105 kg	2,436 lb	Holland
		1,135 kg	2,502 lb	KG with cata., KW
		1,150 kg	2,535 lb	KX
		1,150 kg	2,535 lb	KS
		1,150 kg	2,535 lb	KW with cata.
		1,145 kg	2,524 lb	KE, KW
	Si 5-M/T	1,140 kg	2,513 lb	KQ
	with 4 WS	1,155 kg	2,546 lb	KQ
	with A/C	1,163 kg	2,564 lb	KQ
	with A/C, 4 WS	1,178 kg	2,597 lb	KQ
		1,202 kg	2,650 lb	KY
16i 4-A/T	1,216 kg	2,680 lb		
	1,160 kg	2,557 lb	KF	
	1,150 kg	2,535 lb	KB, KG	
	1,125 kg	2,480 lb	Holland	
	1,155 kg	2,546 lb	KG with cata., KW	
	1,170 kg	2,579 lb	KX	
	1,170 kg	2,579 lb	KS	
	1,170 kg	2,579 lb	KW with cata.	
	1,165 kg	2,568 lb	KW, KE	
	1,160 kg	2,557 lb	KQ	
Si 4-A/T	1,175 kg	2,590 lb	KQ	
with 4 WS	1,183 kg	2,608 lb	KQ	
with A/C	1,198 kg	2,641 lb	KQ	
with A/C, 4 WS	1,221 kg	2,692 lb	KY	
	1,235 kg	2,723 lb	KY	

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

	ITEMS	METRIC	ENGLISH	NOTE	
Weight	Weight distribution (Fr/Rr)				
	EX 5-M/T	655/430 kg	1,440/948 lb	KF	
		655/425 kg	1,440/937 lb	KB, KG	
		660/430 kg	1,455/948 lb	KG with cata., KW	
		665/435 kg	1,466/959 lb	KX, KE	
		670/430 kg	1,477/948 lb	KW with cata., KS	
	EX 4-A/T	669/451 kg	1,474/994 lb	KY	
		675/430 kg	1,488/948 lb	KF	
		675/425 kg	1,488/937 lb	KB, KG	
		680/430 kg	1,499/948 lb	KG with cata., KW	
		685/435 kg	1,510/959 lb	KX, KE	
		690/430 kg	1,521/948 lb	KW with cata., KS	
	16i 5-M/T	718/449 kg	1,583/990 lb	KY	
		700/440 kg	1,543/970 lb	KF	
		690/435 kg	1,521/959 lb	KB, KG	
		695/440 kg	1,532/970 lb	KG with cata.	
		705/445 kg	1,554/981 lb	KX	
		700/445 kg	1,543/981 lb	KW, KE	
		705/445 kg	1,554/981 lb	KW with cata., KS	
		683/457 kg	1,506/1,008 lb	KQ	
		with 4 WS	688/467 kg	1,516/1,030 lb	KQ
		with A/C	707/456 kg	1,559/1,005 lb	KQ
		with A/C, 4 WS	712/466 kg	1,570/1,027 lb	KQ
			733/469 kg	1,616/1,030 lb	KY
		With 4 WS	738/478 kg	1,627/1,054 lb	KY
	16i 4-A/T		720/440 kg	1,587/970 lb	KF
			710/435 kg	1,565/959 lb	KB/KG
			715/440 kg	1,576/970 lb	KG with cata.
			725/445 kg	1,598/981 lb	KX
			720/445 kg	1,587/981 lb	KW, KE
			725/445 kg	1,598/981 lb	KW with cata., KE
			703/457 kg	1,550/1,047 lb	KQ
		with 4 WS	708/467 kg	1,561/1,030 lb	KQ
	with A/C	727/456 kg	1,603/1,005 lb	KQ	
	with A/C, 4 WS	732/466 kg	1,614/1,027 lb	KQ	
		753/468 kg	1,660/1,032 lb	KY	
	with 4 WS	759/476 kg	1,673/1,049 lb	KY	
	Max. Loaded vehicle weight (ADR)				
	5-M/T	1,505 kg	3,318 lb		
	4-M/T	1,525 kg	3,362 lb		
	Max. Vehicle weight				
	EX	1,580 kg	3,483 lb	KY	
	Si	1,650 kg	3,638 lb	KY	
	Carrying (loading) weight capacity	45 kg	99 lb		

	ITEMS		METRIC		ENGLISH		NOTE	
ENGINE	Type	16i, Si <sup>11</sup> Ex	Water cooled, 4-cycle D.O.H.C. Water cooled, 4-cycle S.O.H.C. 4-cylinder in line, transverse					
	Cylinder Arrangement		81 x 95 mm				3.19 x 3.74 in.	
	Bore and Stroke		1,958 cm <sup>3</sup> (cc)				119 in.	
	Displacement		9.0 (KS, KX, KZ), 9.4 (KQ), 9.5 (KT, KY), 10.5 (KB, KE, KF, KG, KW)					
	Compression Ratio	16i, Si <sup>11</sup> EX	9.1 (KS, KX, KZ), 9.2 (KB, KE, KF, KG, KT, KW, KY)					
	Valve Train	16i, Si <sup>11</sup> EX	4 Valves Per Cylinder, dual overhead camshafts 3 Valves Per Cylinder, single overhead camshaft					
	Lubrication System		Pressure Fed					
	Fuel Required		Unleaded grade gasoline with 91 research octane number or higher. (KS, KQ, KX, KZ) Leaded grade gasoline with 91 research octane number or higher. (KT, KY) Leaded grade gasoline with 98 research octane number or higher. (KB, KE, KF, KG, KW)					
	Engine wet Weight	16i, Si <sup>11</sup> EX	126 kg		278 lb.		Except radiator, transmission	
			123 kg		271 lb.			
STARTER	Type	MITSUBA	Gear reduction					
	Normal output		1.0 kW (KE, KQ, KT, KY)		1.4 kW (Except KE, KQ, KT, KY)			
	Normal voltage		12 V					
	Hour rating		30 seconds					
	Direction of rotation		Clockwise as viewed from gear end					
	Weight	MITSUBA	3.7 kg		8.1 lb.			
TRANSMISSION	Clutch	5-M/T 4-A/T	Single plate dry, diaphragm spring. Torque Converter					
	Transmission	5-M/T 4-A/T	5 speeds forward, 1 speed reverse, constant mesh. 4 speeds forward, 1 speed reverse, constant mesh.					
			5-M/T		4-A/T			
			Except KX 16i	KX 16i	Except KX	KX		
	Primary Reduction		1.000	1.000	1.000	1.000		
	Gear Ratio	I	3.166	3.166	2.529	2.529		
		II	1.857	1.772	1.444	1.392		
		III	1.259	1.222	1.030	1.030		
		IV	0.935	0.935	0.725	0.763		
		V	0.794	0.794	—	—		
	Reverse	3.000	3.000	1.904	1.904			
Final Reduction	5-M/T 16i, Si <sup>11</sup> EX 4-A/T	Single helical gear, 4,062 Single helical gear, 4,187 Single helical gear, 4,066						
Clutch Facing Area		176 cm <sup>2</sup>		27.3 sq. in.				

Si<sup>11</sup>: KQ, KT, KY only.

M/T: Manual Transmission

A/T: Automatic Transmission

	ITEMS		METRIC	ENGLISH	NOTE
AIR CONDITIONER	Cooling Capacity		2,915 Kcal/h	11,566 BTU/h	
	- Conditions:				
	Compressor min <sup>-1</sup> (rpm)			1,800 min <sup>-1</sup> (rpm)	
	Outside air temperature		27.0°C	80.6°F	
	Outside air humidity			50%	
	Condenser air temperature		35°C	95°F	
	Condenser air velocity		4.5 m/sec.		
	Blower capacity		390 cm <sup>3</sup> /h	13,773 cu. ft/h	
	Compressor		Type No. of cylinders Bean displacement Max. min <sup>-1</sup> (rpm) Lubricant/capacity	Rotary type 4-3 130 cc/rev. 7,000 min <sup>-1</sup> (rpm) 140 cc	7.93 cu. in/rev. 4.73 US oz.
Receiver Dryer		With dessicant	Includes fusible safety plug.		
Condenser			Corrugated fin type		
Evaporator			Corrugated fin type		
Blower		Type Motor input Speed control Max. capacity	390 m <sup>3</sup> /h	Sirocco fan 145 W (12 V) 4 position 13,773 cu ft/h	
Temp. Control			Air-mix type		
Comp. Clutch		Type Power consumption		Dry, single plate, V-belt 48 W max. 12 V	
Refrigerant		Type Quantity	0.85 ± 0.05 kg	R-12 1.76 ± 0.11 lbs	
STEERING SYSTEM	Type		Rack and Pinion		
	Overall Ratio		14.9 : 1		
Turns, lock-to-lock			2.84		
Steering Wheel Dia.			370 mm	14.6 in.	
Power Steering Oil Capacity			1.7 lit.	1.8 U.S. qt., 1.5 Imp qt.	
Power Steering Oil			HONDA Genuine Power Steering Fluid P/N 08208-99961		
SUSPENSION SYSTEM	Type, Front/Rear		Independent by double wishbones, coil springs		
Shock Absorber		Front/Rear	Telescopic, hydraulic		
WHEEL ALIGNMENT	Wheel alignment		0°		
	Camber	Front Rear	-0°20'		
	Caster	Front	2°20'		
	Toe-in	Front Rear	0 mm 2 mm	0 in. 0.080 in.	
Kingpin Inclination			9°45'		
BRAKE SYSTEM	Type, Front/Rear		Power assisted self-adjusting ventilated disc		
	Lining Surface Area:	Front/Rear 16i, Si <sup>*1</sup> EX	43.3/21.0 cm <sup>2</sup> 35.8/20.9 cm <sup>2</sup>	6.7/3.3 sq. in. 5.5/3.2 sq. in.	(Pad) (Pad)
	Effective Disc Dia.	Front 16i, Si EX Rear	214 mm 194 mm 208 mm	8.4 in. 7.6 in. 8.2 in.	
Parking Brake Kind and Type			Mechanical actuating, rear two wheel brakes		
TIRES	Front/Rear	16i, Si <sup>*1</sup> EX	195/60VR 14 (Except KQ) 195/60 R14 85V (KQ only) 185/70R 13 85H		
	Spare	16i, Si <sup>*1</sup> , EX 16i, EX 16i EX	185/70R 13 86H (KF, KS, KW, KE only) T135/70D 15 (Except KE with ALB) T135/80R 14 (KE only) T105/70D 14 (Except KE without ALB) T105/80D 13 (Except KE without ALB)		

Si<sup>\*1</sup>: KQ, KT, KY only.

(cont'd)

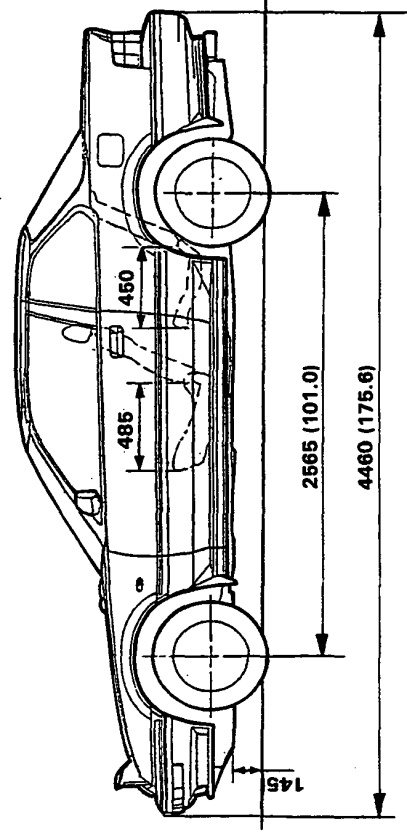
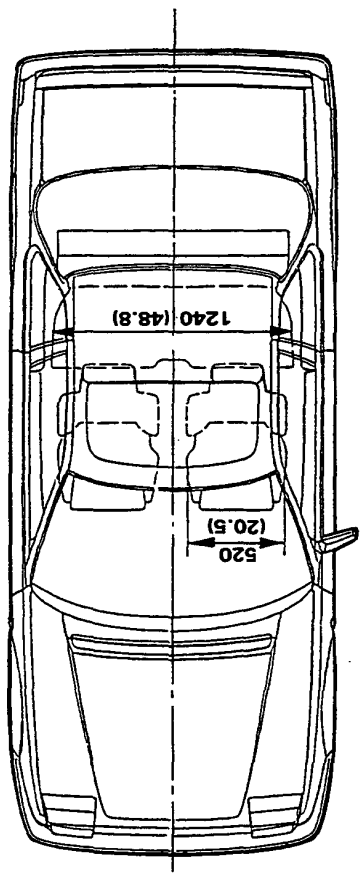
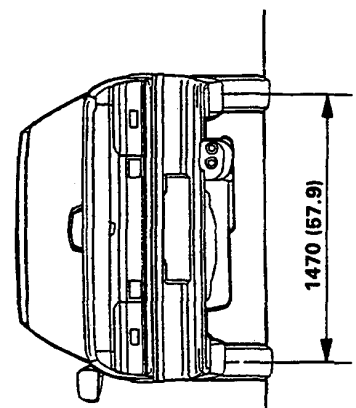
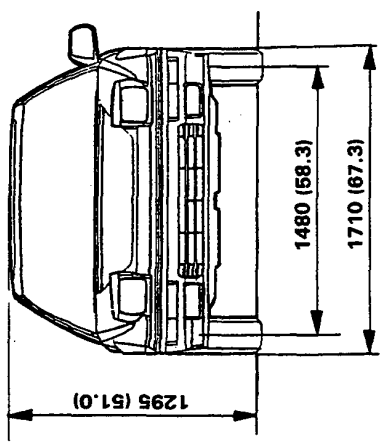


# Design Specifications (cont'd)

	ITEMS	METRIC	ENGLISH	NOTE
ELECTRICAL	Battery	55B: 12 V-47 AH, MF	55D: 12 V-50 AH, MF	KS, KW Austrian Model
	Starter	12 V-1.4 kW		
	Alternator	12 V-70 amps		
	Fuses In the fuse box	7.5 A, 10 A, 15 A, 20 A, 30 A		
	In the relay box	10 A, 15 A, 20 A, 30 A, 40 A, 70 A		
	Headlights High/Low	12 V-65/55 W		
	Day Time Running Lights	12 V-21 W		
	Passing Lights	12 V-21 W		
	Front Turn Signal Lights	12 V-21 W		
	Rear Turn Signal Lights	12 V-21 W		
	Side Turn Signal Lights	12 V-5 W		
	Stop/Taillights	12 V-21/5 W		
	Side Marker Lights	12 V-5 W		
	Back-up Lights	12 V-21 W		
	License Plate Lights	12 V-5 W, 8 W		
	Gauge Lights	12 V-3.4 W, 1.4 W		
	Indicator Lights	12 V-1.2 W, 1.4 W		
	Warning Lights	12 V-1.4 W		
	Glove Box Lights	12 V-3.4 W		
	Dome Light	12 V-8 W		
Trunk Light	12 V-3.4 W			
Fuse Box Light	12 V-3.4 W			
Illumination and Pilot Lights	12 V-1.4 W, 1.2W			
Heater Illumination Lights	0.91 W, 0.56 W, LED			
		12 V-1.4 W		

# Body Specifications

Unit: mm (in.)



## **Maintenance**

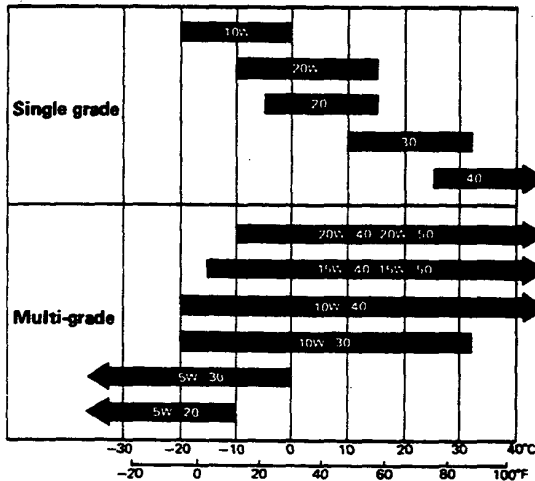
<b>Lubrication Points .....</b>	<b>4-2</b>
<b>Maintenance Schedule .....</b>	<b>4-4</b>



# Lubrication Points

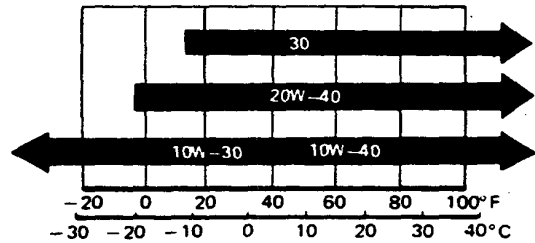
No.	LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: SE or SF SAE Viscosity: See chart below
2	Transmission Manual Automatic	API Service Grade: SE or SF SAE30, 10W-30, 10W-40 or 20W-40 grade oil DEXRON® or DEXRON® II Automatic transmission fluid
3 4	Brake reservoir Clutch reservoir	Brake fluid DOT 3 or DOT 4
5	Steering gearbox (Power)	Honda steering grease P/N 08740-99969
6 7 8 9 10 11 12 13 14 15 16 17 18 19	Steering ball joint Suspension ball joints Steering boot Shift lever pivot (Manual) Steering column bushings Select lever (Automatic) Pedal linkage Brake master cylinder push rod Trunk hinges Door hinges upper and lower Door opening detents Fuel filler lid Engine hood hinges Engine hood latch	Multi-purpose Grease
20	Caliper Piston seal Dust seal Caliper pin Piston	Silicone Grease
21	Power steering reservoir	Honda power steering fluid P/N 08208-99961

Recommended Engine Oil  
(SE or SF Grade Only)

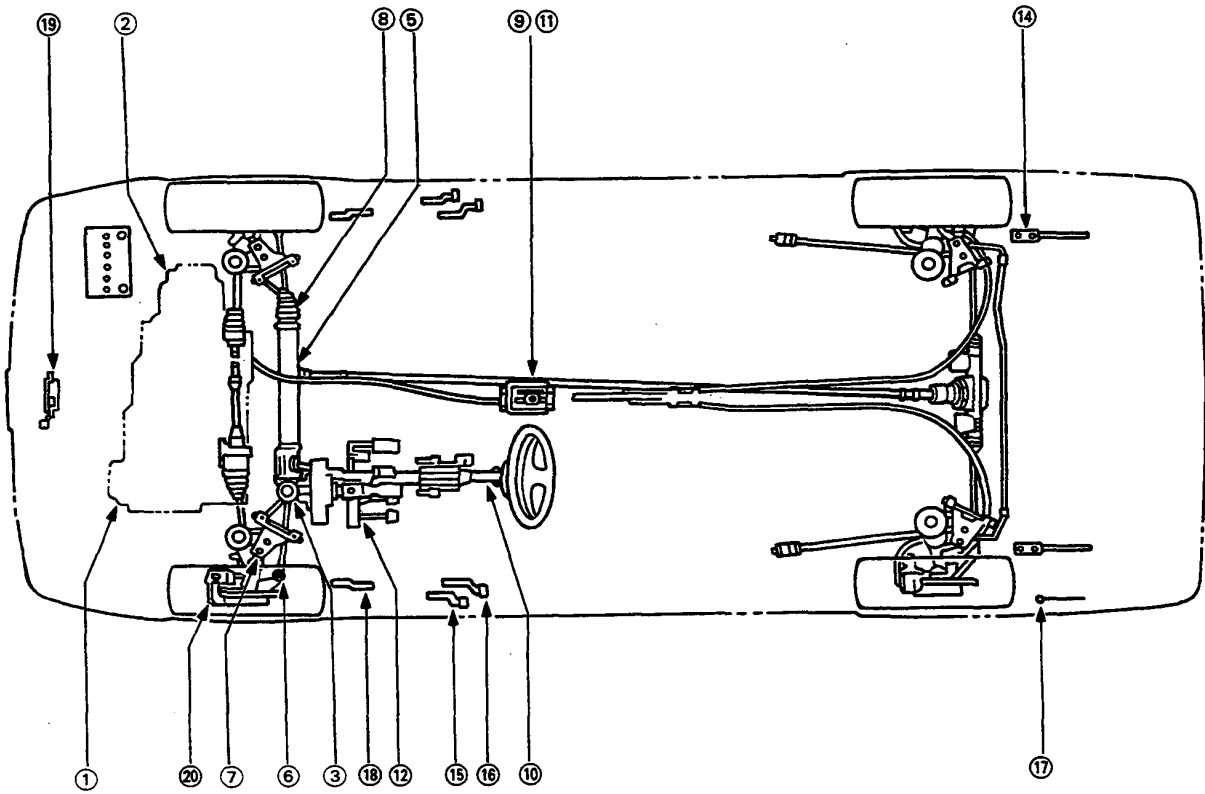


Engine oil viscosity for ambient temperature ranges.

Recommended Manual Transmission Oil



Transmission oil viscosity for ambient temperature ranges.



# Maintenance Schedule

SERVICE AT THE INTERVAL OF LISTED KM (MILES) OR MONTHS, WHICHEVER OCCURS FIRST.						
ITEMS	x 1,000 km	20	40	60	80	100
	x 1,000 miles	12	24	36	48	60
	months	12	24	36	48	60
IDLE SPEED AND IDLE CO	I	I	I	I	I	I
VALVE CLEARANCE	I	I	I	I	I	I
ALTERNATOR DRIVE BELT					I	
■ ENGINE OIL AND OIL FILTER	Replace every 10,000 km (6,000 miles) or 6 months					
■ TRANSMISSION OIL			R		R	
■ RADIATOR COOLANT					R*	
COOLING SYSTEM, HOSES AND CONNECTIONS			I		I	
E.G.R. SYSTEM (For cars using unleaded gasoline) <sup>2</sup>						I
SECONDARY AIR SUPPLY SYSTEM (For carburetor type) <sup>3</sup>						I
AIR CLEANER ELEMENT (Dry type) <sup>4</sup>	R	R	R	R	R	R
AIR CLEANER ELEMENT (Viscous type) <sup>6</sup>			R		R	
FUEL FILTER (Including aux. filter for carburetor type)			R		R	
INTAKE AIR TEMP. CONTROL SYSTEM (For carburetor type)						I
TANK, FUEL LINE AND CONNECTION			I		I	
THROTTLE CONTROL SYSTEM (For carburetor type)			I		I	
CHOKE MECHANISM (For carburetor type)			I		I	
CHOKE OPENER OPERATION (For carburetor type)						I
EVAPORATIVE EMISSION CONTROL SYSTEM <sup>5</sup>						I
IGNITION TIMING AND CONTROL SYSTEM			I		I	
SPARK PLUGS (For cars using leaded gasoline)	R	R	R	R	R	R
SPARK PLUGS (For cars using unleaded gasoline)			R		R	
DISTRIBUTOR CAP AND ROTOR			I		I	
IGNITION WIRING			I		I	
CRANKCASE EMISSION CONTROL SYSTEM			I		I	
BRAKE HOSES AND LINES (Including ALB hoses and pipes for ALB models)	I	I	I	I	I	I
BRAKE FLUID (Including ALB fluid for ALB models)			R		R	
FRONT BRAKE DISCS AND CALIPERS	I	I	I	I	I	I
FRONT BRAKE PADS	Inspect every 10,000 km (6,000 miles) or 6 months					
REAR BRAKE DISCS CALIPERS AND PADS			I		I	
PARKING BRAKES	I	I			I	
EXHAUST PIPE AND MUFFLER	I	I	I	I	I	I
SUSPENSION MOUNTING BOLTS	I	I	I	I	I	I
FRONT WHEEL ALIGNMENT	I	I	I	I	I	I
REAR WHEEL ALIGNMENT (For 4WS model)			I		I	
STEERING OPERATION, TIE ROD ENDS, STEERING GEAR BOX BOOTS, AND CENTER SHAFT FOR 4WS MODEL			I		I	
	Except for 4WS model		I		I	
	For 4WS model		I		I	
ALB HIGH PRESSURE HOSES					R	
ALB OPERATION	I	I			I	
POWER STEERING SYSTEM	I	I	I	I	I	I
POWER STEERING PUMP BELT			I		I	
CATALYTIC CONVERTER HEAT SHIELD (Car equipped with catalytic converter)						I

- R—Replace I—Inspect. After inspection, clean, adjust, repair or replace if necessary
- REMARK: These service intervals assume routine checking and replenishment has been done, as needed, by the customer.
- \*1 Thereafter, replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
- \*2 Except for KQ type
- \*3 Except for cars using leaded gasoline
- \*4 Except for European and KQ types
- \*5 Except for fuel injection type using leaded gasoline
- \*6 For European and KQ types

**CAUTION:** The following items must be serviced more frequently on cars normally used under severe driving conditions. Refer to the chart below for the appropriate maintenance intervals.

- "Severe driving conditions" include:
- A: Repeated short distance driving
  - B: Driving in dusty conditions
  - C: Driving in severe, cold weather
  - D: Driving in areas using road salt or other corrosive materials
  - E: Driving on rough and/or muddy roads
  - F: Towing a trailer

- R—Replace  
I—Inspect. After inspection, clean, adjust, repair or replace if necessary.

Condition	Maintenance item	Maintenance operation	Interval
A, B, F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
F	Transmission oil	R	Every 20,000 Km (12,000 miles) or 12 months
A, B, D, E, F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months
A, B, D, E, F	Rear brakes	I	Every 20,000 km (12,000 miles) or 12 months
B, C, E	Power steering system	I	Every 10,000 km (6,000 miles) or 6 months

## Engine

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## Engine Tune-up

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A/C Compressor Belt Adjustment .....	5-7
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Tailpipe Emissions Inspection .....	5-16
Ignition Timing Inspection and Setting .....	5-16



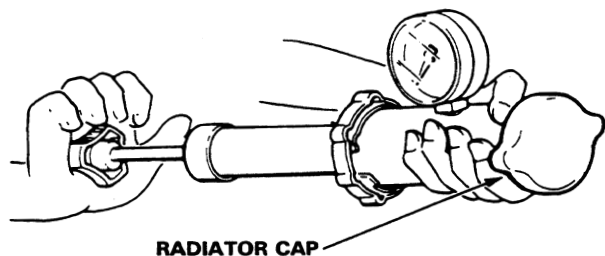


# Engine Tune-up

## Radiator Cap Testing

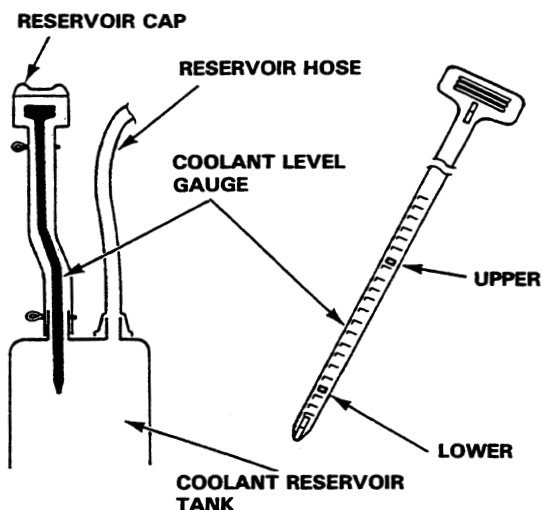
**WARNING** System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.

1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply pressure of 74–103 kPa (0.75–1.05 kg/cm<sup>2</sup>, 11–15 psi).
3. Check for a drop in pressure.
4. If there is a drop in pressure, replace the cap.



## Coolant Level Inspection

1. Make certain that the coolant level indicated on the coolant level gauge is between the upper and lower marks.



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

### NOTE:

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

### CAUTION:

- Do not mix different brand anti-freeze/coolants.
- Do not use a additional rust inhibitors or anti-rust products; they may not be compatible with the recommended coolant.

### Radiator Coolant Refill Capacity:

#### Fuel-Injected Engine:

5 M/T, 4 A/T: 6.1 liters (6.4 U.S.qt., 5.4 Imp.qt.)

#### Carbureted Engine:

5 M/T: 5.2 liters (5.5 U.S.qt., 4.6 Imp.qt.)  
4 A/T: 5.8 liters (6.1 U.S.qt., 5.1 Imp.qt.)  
(including the reservoir tank capacity: 0.75 l (0.79 U.S.qt., 0.66 Imp. qt.))

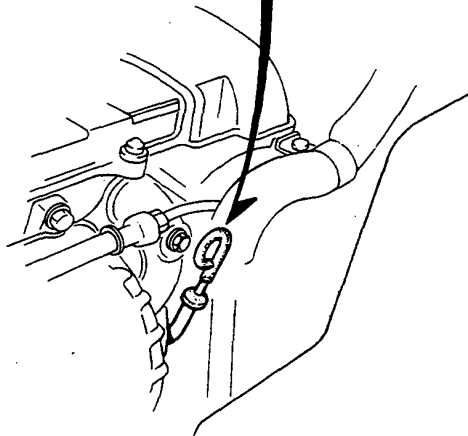
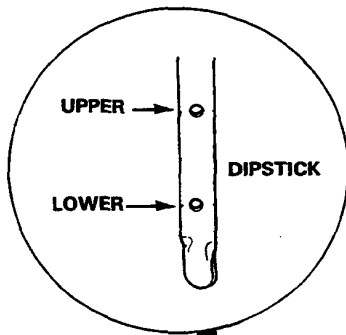
3. See page 5-46 for refilling.



## 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.

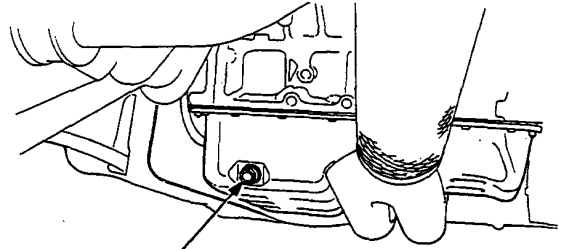
**CAUTION:** Insert the dipstick carefully to avoid bending it.



## Engine Oil Replacement

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

**NOTE:** Remove the filler cap to speed draining.



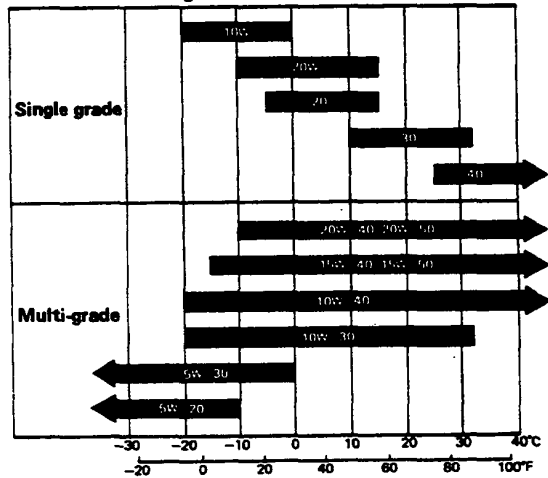
**OIL PAN DRAIN PLUG**  
45 N·m (4.5 kg·m, 33 lb·ft)

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

<b>Capacity</b>	3.4 lit (3.6 U.S. qt., 3.0 Imp. qt.) Exclude Oil filter
	3.9 lit (4.1 U.S. qt., 3.4 Imp. qt.) Adding replaced oil filter
	4.8 lit (5.1 U.S. qt., 4.2 Imp. qt.) Means designed value
<b>Change</b>	Every 10,000 km (6,000 mi.)

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

**Recommended Engine Oil (SE or SF Grade only)**



Expected Ambient Temperature before next oil change

# Engine Tune-up

## Air Cleaner Element Inspection/Replacement

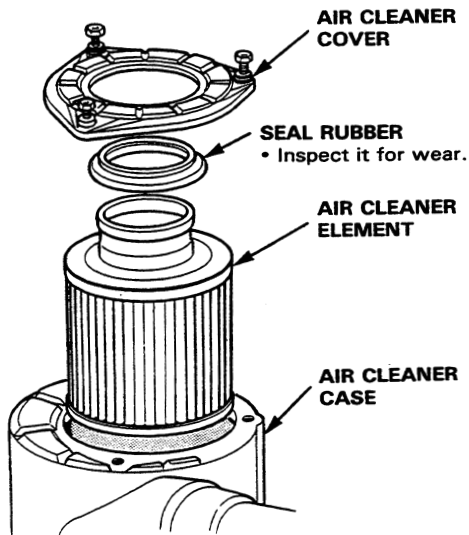
1. Release three bolts and the air cleaner cover.
2. Remove the air cleaner element.
3. Check the air cleaner element for fouling.

**NOTE:** No cleaning is necessary for the air cleaner element, because its filter takes in oil (: viscous type).

**Replace: every two years**

- The air cleaner element should be replaced more frequently on cars normally used under severe driving conditions.

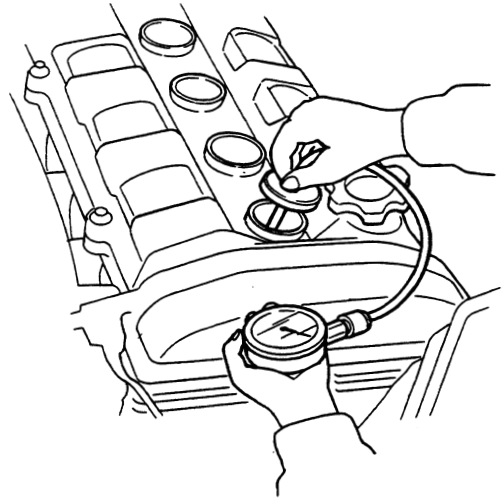
**Fuel-Injected Engine:**



4. Install the air cleaner element in the reverse order of removal.

## Compression Pressure Inspection

1. Before inspection, run the engine until it warms up (radiator fan comes on).
2. Disconnect spark plugs (4).
3. Fit the compression gauge adapter into a plug hole.
  - Measure compression pressure at each cylinder.



**Compression pressure**

**Standard:** 1.117 kPa (12.0 kg/cm<sup>2</sup>, 171 psi)  
at 250 min<sup>-1</sup> (rpm)

**Limit:** 932 kPa (9.5 kg/cm<sup>2</sup>, 135 psi)  
at 250 min<sup>-1</sup> (rpm)

**Difference between cylinders:**  
169 kPa (2.0 kg/cm<sup>2</sup>, 28 psi)

**NOTE:** Use a full charged battery.

4. If compression pressure is low, it is caused by wear or damage of piston rings or head gasket, and improper seated valves.



## Spark Plug Inspection

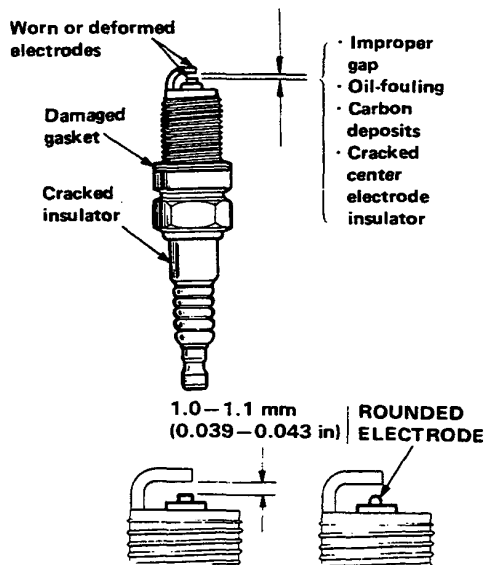
1. Inspect the electrodes and ceramic insulator for:

**Burned or worn electrodes may be caused by:**

- Lean fuel mixture
- Advanced ignition timing
- Loose spark plug
- Plug heat range too high
- Insufficient cooling

**Fouled plug may be caused by:**

- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires



2. Replace the plug if the center electrode is rounded as shown right:

**Fuel-injected engine:**

KX, KQ, KS, KZ	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5EY-N11 (NGK) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3
KG, KE, KB, KF, KT, KW, KY	BCPR6E-11 (NGK) Q20PR-UL11 (ND) Q20PR-U11 (ND)	*1
	Q16PR-UL11 (ND) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	Q22PR-UL11 (ND) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3

**Carbureted engine:**

KG, KE, KB, KF, KT, KW, KY	BCPR6E-11 (NGK) Q20PR-U11 (ND) Q20PR-UL11 (ND)	*1
	BCPR5E-11 (NGK) Q16PR-U11 (ND) Q16PR-UL11 (ND)	*2
	BCPR7E-11 (NGK) Q22PR-U11 (ND) Q22PR-UL11 (ND)	*3
KS, KZ	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5EY-N11 (NGK) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3
KX	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3

NOTE: \*1 For all normal driving.

\*2 For cold climates.

\*3 For hot climates or continuous high speed driving.

3. Adjust the gap with a suitable gapping tool.

**Electrode Gap: 1.0—1.1 mm (0.039—0.043 in)**

4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kg-m, 13 lb-ft).

NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

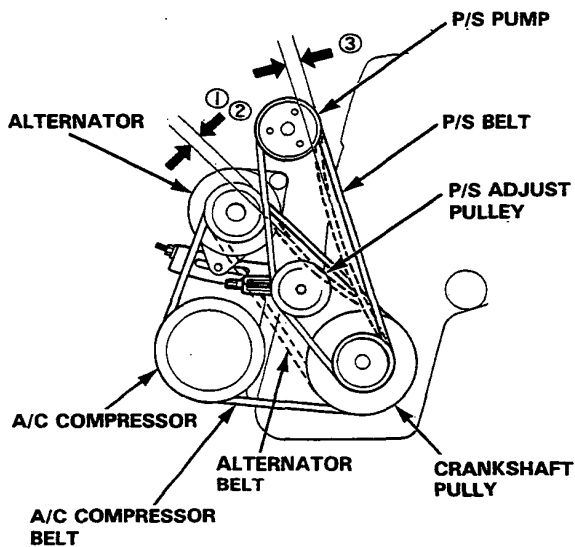
# Engine Tune-up

## Drive Belts Inspection

### Drive Belts Deflection

(When applying a force of 9.8 N (10 kg, 22 lbs))

	Used Belt	New Belt
① Alternator Belt	10–12 mm (0.39–0.47 in)	8–10 mm (0.31–0.39 in)
② A/C Compressor Belt	10–12 mm (0.39–0.47 in)	6–8 mm (0.24–0.31 in)
③ P/S Belt	11–13 mm (0.43–0.51 in)	9–11 mm (0.35–0.43 in)

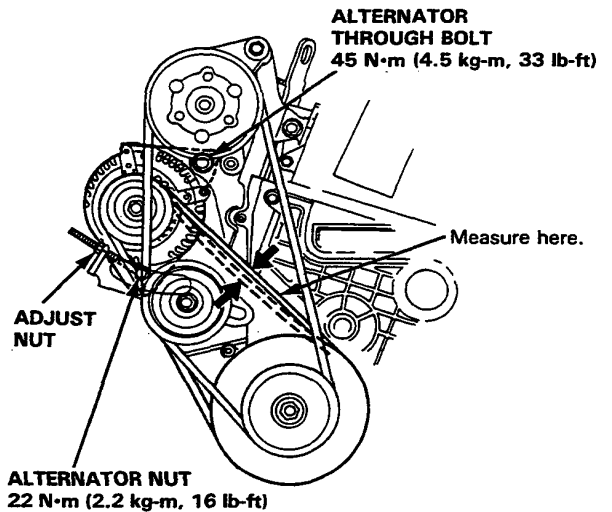


## Alternator Belt Adjustment

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection between the alternator pulley and the crankshaft pulley.

**Deflection: 10–12 mm (0.39–0.47 in.)**

**NOTE:** On a brand-new belt, the deflection should be 8–10 mm (0.31–0.39 in.) when first measured.



2. Loosen the alternator nut and through bolt.
3. Move the alternator by turning the adjust nut to obtain the proper belt tension, then retighten the bolt and nut.
4. Recheck the deflection of the belt.

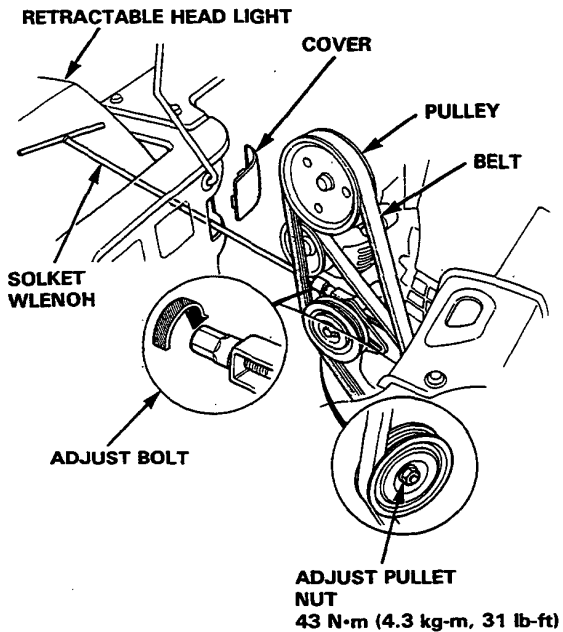


## P/S Pump Belt Adjustment

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection, between the P/S pump pulley and the crankshaft pulley.

**Deflection: 11–13 mm (0.43–0.51 in.).**

**NOTE:** On a brand-new belt, the deflection should be 9–11 mm (0.35–0.43 in.) when first measured.



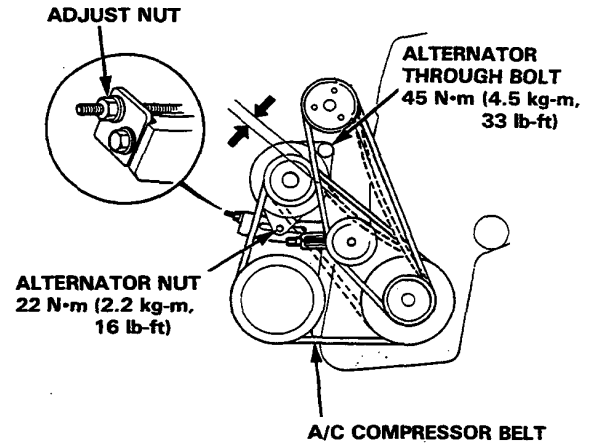
2. Remove the P/S reservoir tank and the cover.
3. Raise up the retractable headlight.
4. Loosen the P/S adjust pulley bolt.
5. Turn the adjust nut to get the proper belt tension, then retighten the bolt and nut.
6. Recheck the deflection of the belt.
7. Install the cover and P/S reservoir tank.

## A/C Compressor Belt Adjustment

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection, between the A/C compressor adjusting pulley and the crankshaft pulley.

**Deflection: 10–12 mm (0.39–0.47 in.).**

**NOTE:** On a brand-new belt, the deflection should be 6–8 mm (0.24–0.31 in.) when first measured.



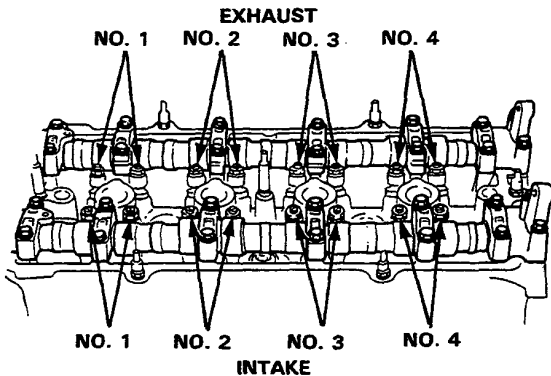
2. Loosen the alternator nut and through bolt.
3. Move the alternator by turning the adjust nut to get the proper belt tension, then retighten the bolt and nut.
4. Recheck the deflection of the belt.

# Valve Clearance Adjustment

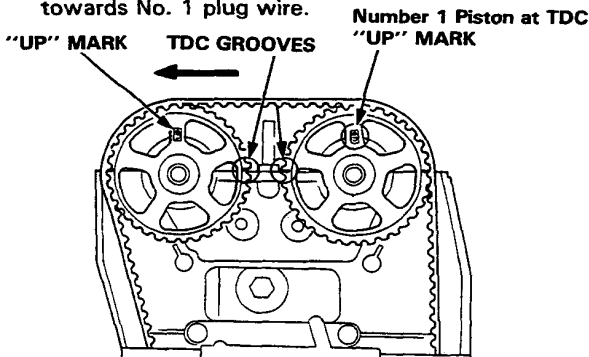
## Fuel-Injected Engine:

NOTE: Valves should be adjusted cold when the cylinder head temperature is less than 38°C (110°F). Adjustment is the same for intake and exhaust valves.

1. Remove the valve cover.

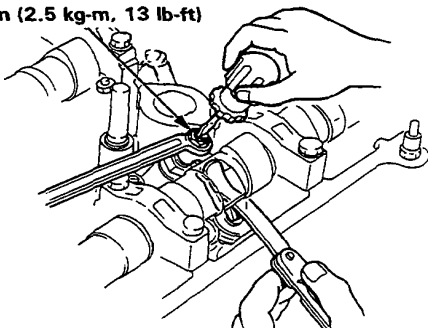


2. Set the No. 1 piston at TDC. "UP" marks in the pulleys should be at top, and the TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.



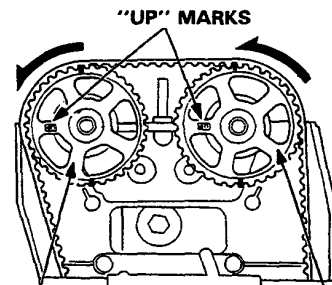
3. Adjust valves on No. 1 cylinder.  
Intake: 0.08–0.12 mm (0.003–0.005 in.)  
Exhaust: 0.16–0.20 mm (0.006–0.008 in.)
4. Loosen locknut and turn adjust screw until feeler gauge slides back and forth with slight amount of drag.

LOCKNUT 7 x 0.75 mm  
25 N·m (2.5 kg·m, 13 lb·ft)



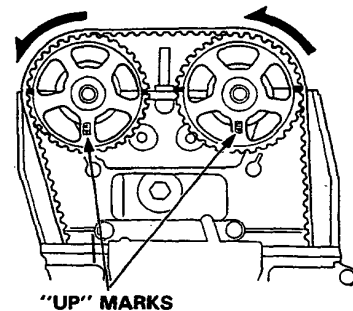
5. Tighten locknut and check clearance again. Repeat adjustment if necessary.
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" marks should be at exhaust side. Distributor rotor should point to No. 3 plug wire. Adjust valves on No. 3 cylinder.

### Number 3 piston at TDC



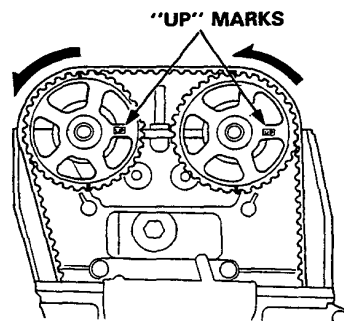
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both "UP" marks should be at bottom and distributor rotor points to No. 4 plug wire. Adjust valves on No. 4 cylinder.

### Number 4 piston at TDC



8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. "UP" marks should be at intake side. Distributor rotor should point to No. 2 plug wire. Adjust valves on No. 2 cylinder.

### Number 2 piston at TDC

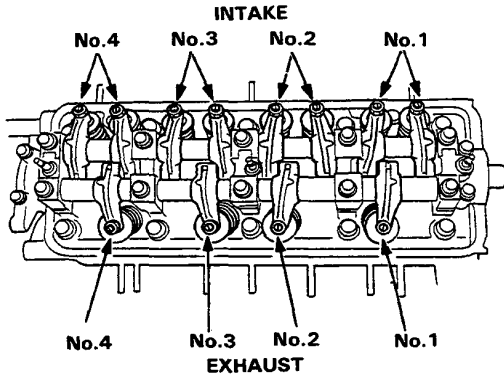




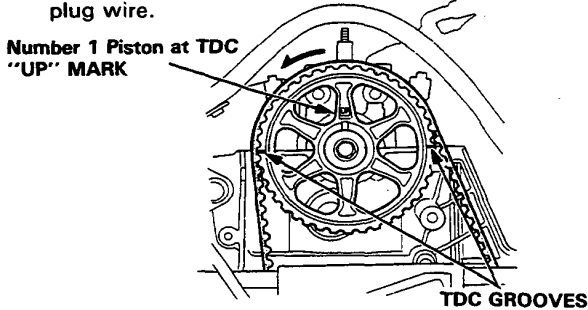
## Carbureted Engine:

NOTE: Valves should be adjusted cold when the cylinder head temperature less than 38°C (100°F). Adjustment is the same for intake and exhaust valves.

1. Remove valve cover.

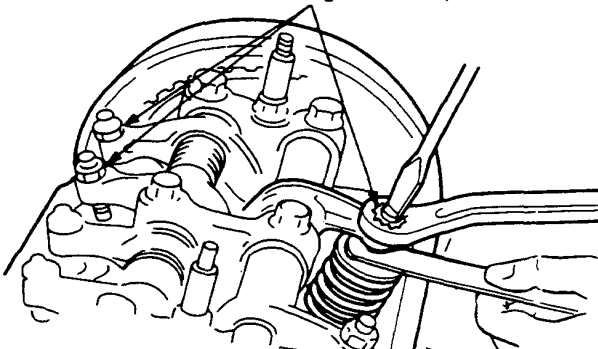


2. Set No.1 piston at TDC. "UP" mark in pulley should be at top, and TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 plug wire.



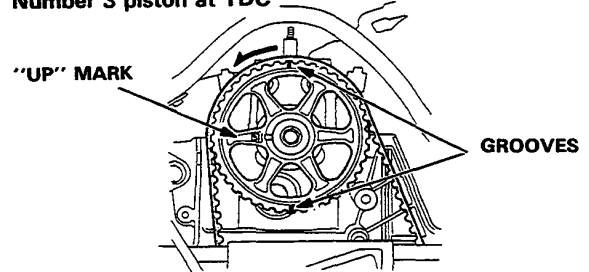
- Adjust valves on No.1 cylinder.  
Intake: 0.12–0.17 mm (0.005–0.007 in.)  
Exhaust: 0.25–0.30 mm (0.010–0.012 in.)
- Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

INTAKE and EXHAUST VALVE  
LOCKNUTS 7 x 0.75 mm  
20 N·m (2.0 kg·m, 14 lb·ft)



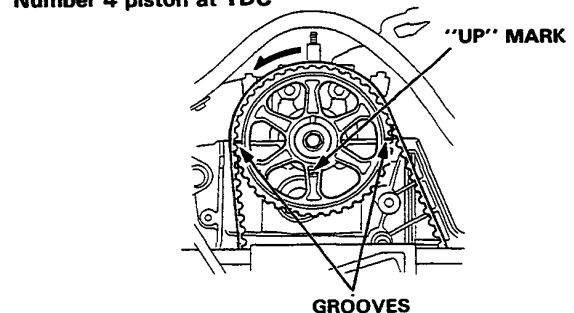
- Tighten locknut and check clearance again. Repeat adjustment if necessary.
- Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" mark should be at exhaust side. Distributor rotor should point to No. 3 plug wire. Adjust valves on No. 3 cylinder.

Number 3 piston at TDC



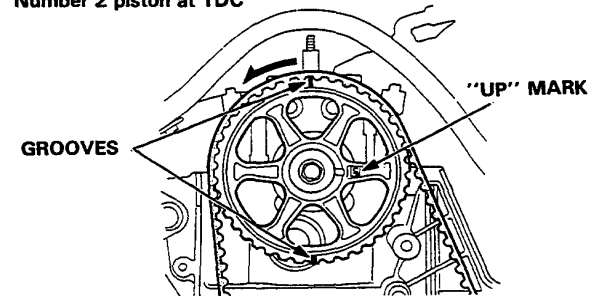
- Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible and distributor rotor points to No.4 plug wire. Adjust valves on No.4 cylinder.

Number 4 piston at TDC



- Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark should be at intake side. Distributor rotor should point to No. 2 plug wire. Adjust valves on No. 2 cylinder.

Number 2 piston at TDC





# Engine Tune-up

## Idle Speed Inspection/Adjustment

**Carbureted Engine:**  
[KS model]

### Inspection/Adjustment

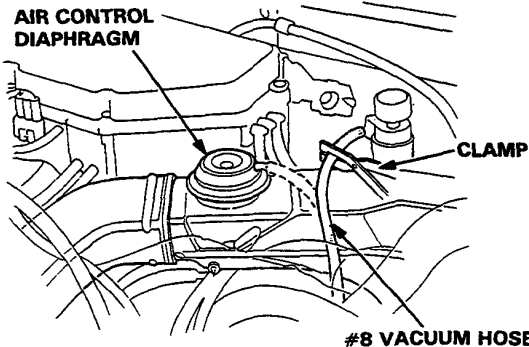
#### Propane Enrichment Method

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

#### NOTE:

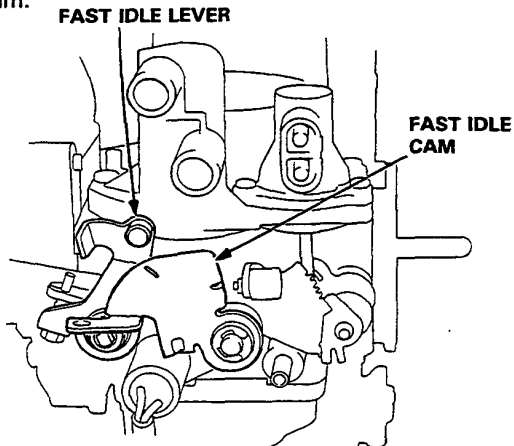
- This procedure requires a propane enrichment kit.
- Check that the carburetors are synchronized properly, self diagnosis indicator before making idle speed and mixture inspections.

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect the #8 vacuum hose from the intake air control diaphragm and clamp the hose end.



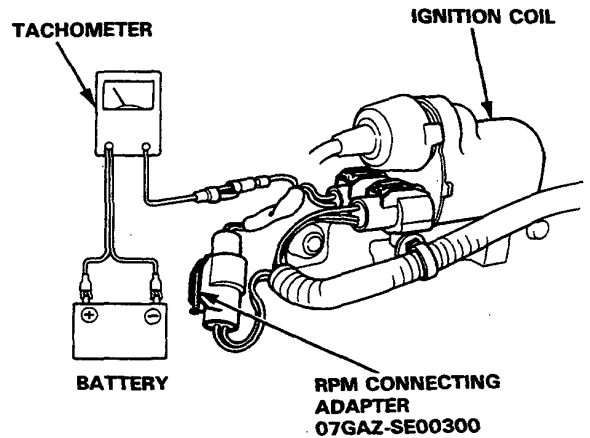
3. Check the fast idle lever.

Fast idle lever should not be seated against fast idle cam.



- If not, replace the left carburetor (page 6-46).

4. Connect a tachometer.



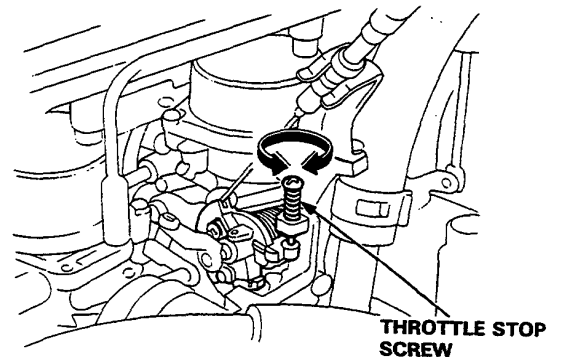
5. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

Idle speed should be:

Manual	800 ±50 min <sup>-1</sup> (rpm)
Automatic	750 ±50 min <sup>-1</sup> (rpm) (except "N" or "P")

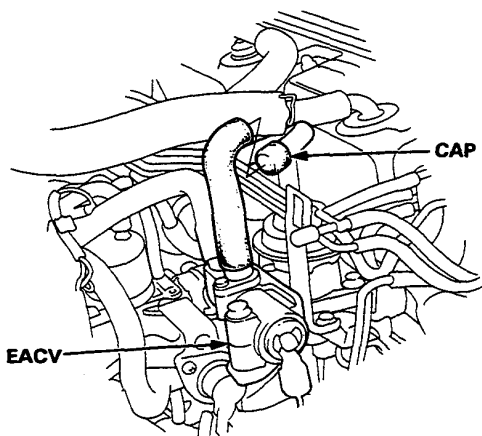
Adjust the idle speed, if necessary, by turning the throttle stop screw.

NOTE: If the idle speed is excessively high, check the throttle control (page 6-72).



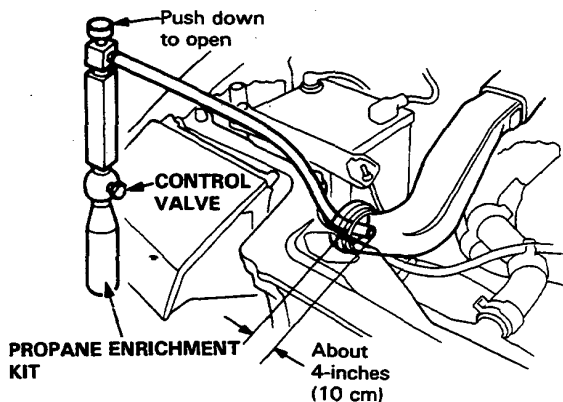


- Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose manifold, then cap the hose end.



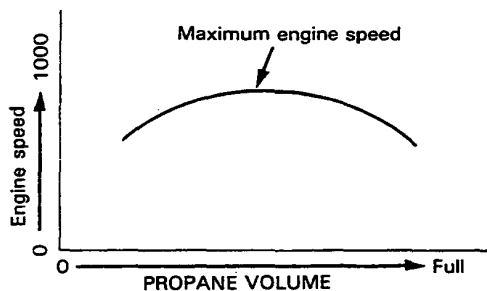
- Disconnect the vacuum hose from the A/C idle boost throttle controller. Disconnect air cleaner intake tube from air intake duct.
- Insert the hose of the propane enrichment kit into the intake tube about 4-inches (10 cm).

NOTE: Check that propane bottle has adequate gas before beginning test.



- With engine idling, depress push button on top of propane device, then slowly open the propane control valve to obtain maximum engine speed. Engine speed should increase as percentage of propane injected goes up.

NOTE: Open the propane control valve slowly; a sudden burst of propane may stall the engine.



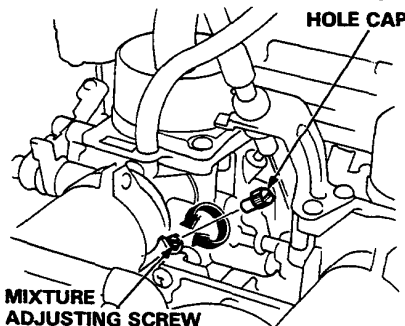
Engine speed increase should be:

M/T:  $170 \pm 20 \text{ min}^{-1} \text{ (rpm)}$

A/T:  $50 \pm 10 \text{ min}^{-1} \text{ (rpm)}$

- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 10.
- If engine speed increases per specification, go to step 11.

- Remove the mixture adjusting screw hole caps, and recheck maximum propane enriched engine speed.



- If the propane enriched speed is too low, mixture is too rich: turn both mixture screws 1/4-turn clockwise and recheck.
- If the propane enriched speed is too high, mixture is too lean: turn both mixture screws 1/4-turn counterclockwise and recheck.

- Reconnect the connector and hose. Close the propane control valve.
- Remove EFI•ECU fuse for 10 seconds to reset control unit and recheck idle speed.

Idle speed should be:

Manual	$800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (except "N" or "P")

- If idle speed is as specified (step 5), go to step 13.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat step 10.

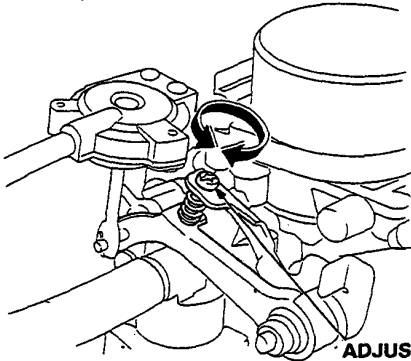
(cont'd)

# Engine Tune-up

## Idle Speed Inspection/Adjustment (cont'd)

### Carbureted Engine:

13. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.
14. Reinstall the mixture adjusting screw hole cap.
15. If equipped with air conditioner, check the idle speed with the A/C on.  
Idle speed should be:  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$



Adjust the idle speed, if necessary, by turning the adjusting screw.

### [Except KS model]

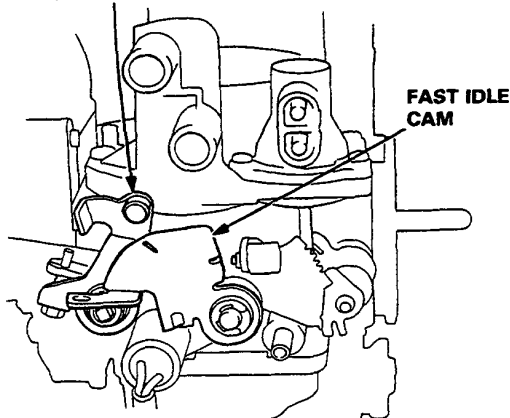
#### CO Meter Method

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

NOTE: Check that the carburetors are synchronized properly, self-diagnosis indicator (KX model) before making idle speed and mixture inspections.

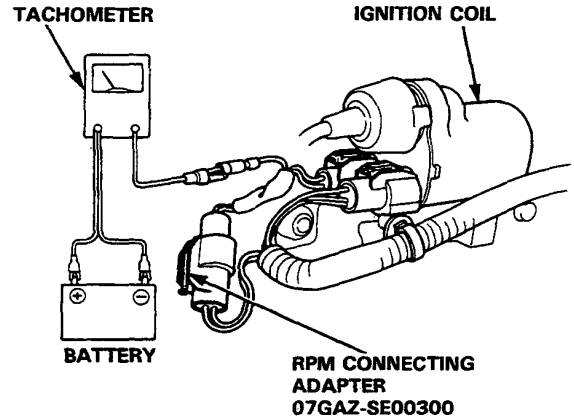
1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Check the fast idle lever.

Fast idle lever should not be seated against fast idle cam. **FAST IDLE LEVER**



- If not, replace the left carburetor (page 6-46).

3. Connect a tachometer.



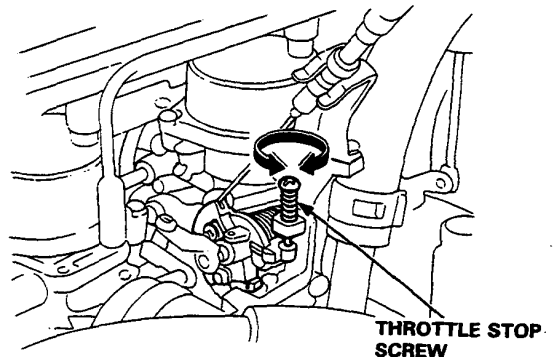
4. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

Idle Speed should be:

Manual	$800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (except N or P)

Adjust the idle speed, if necessary, by turning the throttle stop screw.

NOTE: If the idle speed is excessively high, check the dashpot system (page 6-72).



5. Calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures. Insert exhaust gas sampling probe into the tailpipe at least 40 cm.



6. Check specification for idle CO with cooling fan, air conditioner OFF and headlights OFF.

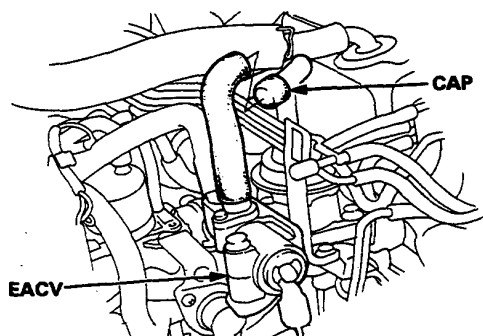
**Specified CO % :**

**KX model: 0.1 %**

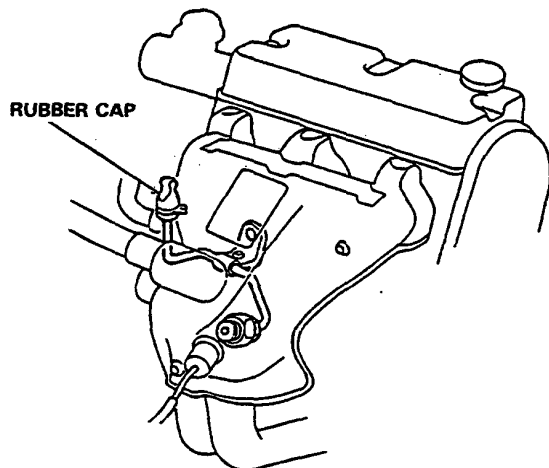
**Except KX model:  $1 \pm 1$  %**

- If idle CO is as specified, go to step 14.
- If not, go to step 7 through 13.

7. KX model;  
Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose manifold, then cap the hose end.



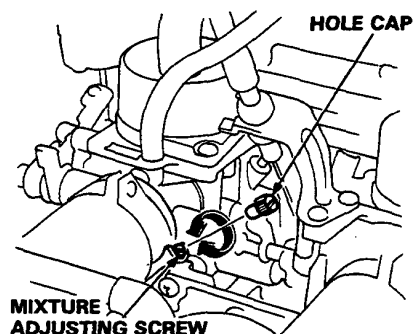
8. Remove the rubber cap from the gas pipe.



9. Check specification for idle CO.

**Specified CO % :  $2.0 \pm 1.0$  %**

- If not within specification, remove mixture adjusting screw hole plug and adjust by turning both mixture adjusting screws to obtain proper CO reading.



- Turning both mixture adjusting screws

clockwise: CO reading decreases  
counterclockwise: CO reading increases

Readjust idle speed if necessary, and recheck idle CO.

10. KX model;  
Reconnect the connector and hose.  
Remove EFI. ECU fuse for 10 seconds to reset control unit.
11. KX model;  
Recheck idle CO.

**Specified CO % : 0.1 %**

- If idle CO is as specified (step 6), go to step 11.
- If not, check the self-diagnosis indicator (page 11-90). If not, replace the EACV, then repeat step 6.

12. Recheck idle speed.

**Idle speed should be:**

Manual	$800 \pm 50 \text{ min}^{-1}$ (rpm)
Automatic	$750 \pm 50 \text{ min}^{-1}$ (rpm) (except "N" or "P")

(cont'd)

# Engine Tune-up

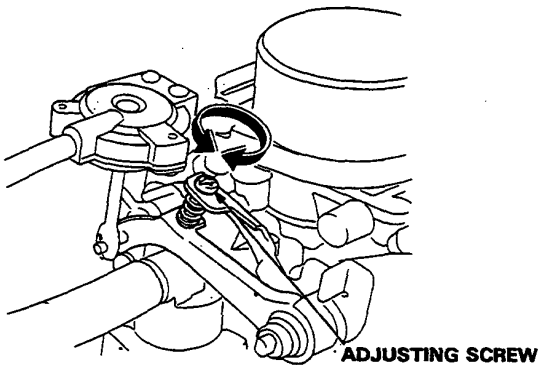
## Idle Speed Inspection/Adjustment (cont'd)

### Carbureted Engine:

- If idle speed is as specified (step 4), go to step 13.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat step 6.

13. Reinstall the mixture adjusting screw hole cap.
14. If equipped with air conditioner, check the idle speed with the A/C on.

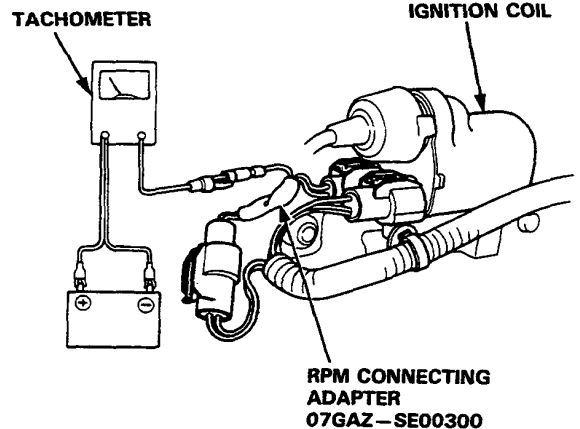
Idle speed should be :  $750 \pm 50 \text{ min}^{-1}$  (rpm)



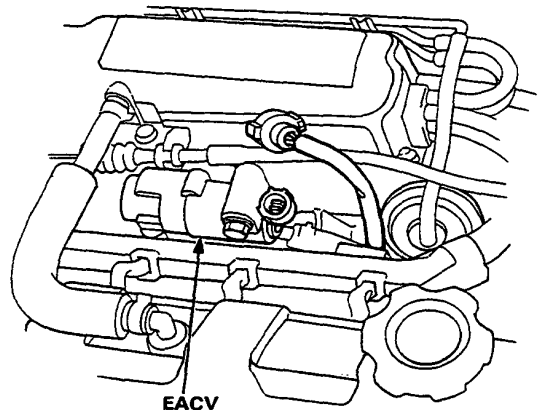
Adjust the idle speed, if necessary, by turning the adjusting screw.

### Fuel-Injected Engine:

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.



3. Disconnect the 2P connector from the EACV.



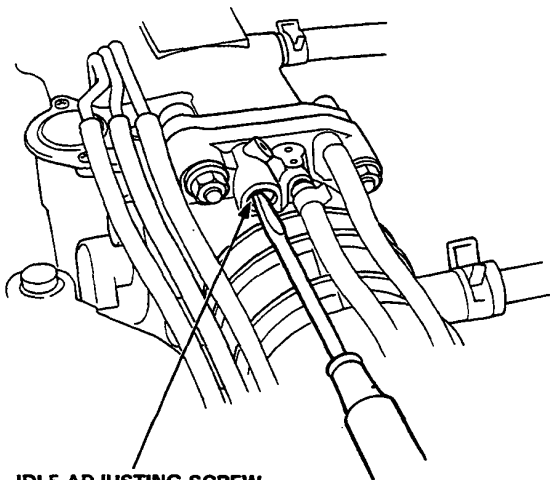
4. Set the steering in the straight forward position, and check idling in no-load conditions in which the headlights, blower fan, rear defroster, cooling fan, and air conditioner are not operating.

Idle speed should be:

- KX, KS, KZ, KQ  
M/T  $650 \pm 50 \text{ min}^{-1}$  (rpm)  
A/T  $650 \pm 50 \text{ min}^{-1}$  (rpm) in **N** or **P**
- Other models  
M/T  $700 \pm 50 \text{ min}^{-1}$  (rpm)  
A/T  $700 \pm 50 \text{ min}^{-1}$  (rpm)



Adjust the idle speed, if necessary, by turning the adjusting screw on the top of the throttle body.



**IDLE ADJUSTING SCREW**

5. Reconnect the 2P connector on the EACV, then remove CLOCK (10 A) fuse in the underhood relay box for 10 second to reset ECU.
6. Set the steering in the straight forward position 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:**

- KX, KS, KZ, KQ  
M/T  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$  in **N** or **P**
  - Other models  
M/T  $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
7. Idle the engine in the following conditions for one minute, then check the idle speed.
    - With headlights (Hi) and rear window defogger ON.
    - While the steering wheel is turning.
    - If applicable, with Automatic transmission models when shifted in gear (except **N** or **P**)

**Idle should remain stable at:**

- KX, KS, KZ, KQ  
 $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
- Other models  
 $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

8. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

**Idle should remain stable at:**

- KX, KS, KZ, KQ  
 $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
- Other models  
 $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

NOTE: If the idle speed is not within specifications, see Symptom-to-Sub System Chart on page 6-175.

# Engine Tune-up

## Tailpipe Emissions Inspection

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

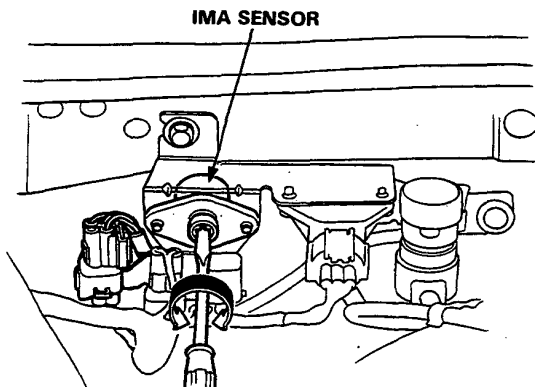
1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 11-180).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

### Specified CO%:

KX, KS, KZ: 0.1% maximum

Other models:  $1.0 \pm 1.0\%$

- If unable to obtain this reading:  
On KX, KS, KZ, see ECU troubleshooting (page 6-134).  
On other models, adjust by turning the adjusting screw of the IMA sensor.

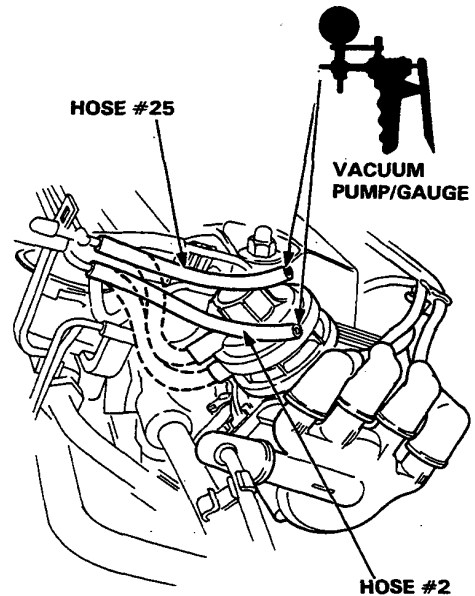


— If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

## Ignition Timing Inspection and Setting

### Carbureted Engine:

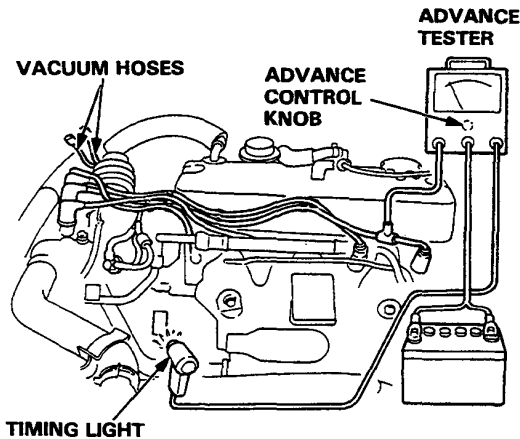
1. Disconnect the vacuum hoses from the vacuum advance diaphragm, then connect the vacuum pump/gauges to the vacuum hoses.



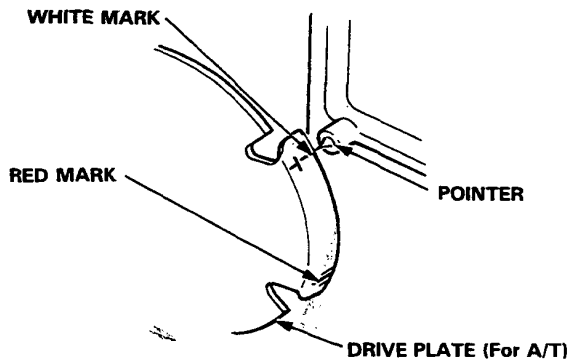
2. Start the engine and let it idle.
3. When the engine is cool (coolant temperature is below 140°F), check each hose for vacuum. The #2 and #25 hoses should have vacuum.
  - If the #2 hose has no vacuum, check the #2 hose of proper connection, cracks, blockage or disconnected hose.
  - If the #25 hose has no vacuum, check the #24 and #25 hoses for proper connections, cracks, blockage or disconnected hoses, and the check valve is not clogged.  
If the #24 and #25 hoses, and the check valve have no problem, replace the thermostatic valve and recheck the #25 hose for vacuum.
4. Connect the vacuum hoses to the vacuum advance diaphragm and allow the engine to warm up. (cooling fan comes on).



5. Disconnect the #25 hose from the vacuum advance diaphragm and connect the vacuum pump/gauge to the #25 hose.
6. Check the #25 hose for vacuum.  
The #25 hose should have no vacuum.
  - If the #25 hose has vacuum, replace the ther-mo-valve and recheck it.
7. Disconnect the vacuum hoses from the vacuum advance diaphragm and plug them.
8. Connect a timing light and an advance tester, and remove the rubber cap from the inspection window of the cylinder block.



9. While the engine idles, point a timing light toward the flywheel (for M/T), or the drive plate (for A/T).
10. Align the timing mark (White) on the flywheel (for M/T) or the drive plate (for A/T) to the pointer by turning the advance control knob of the advance tester.

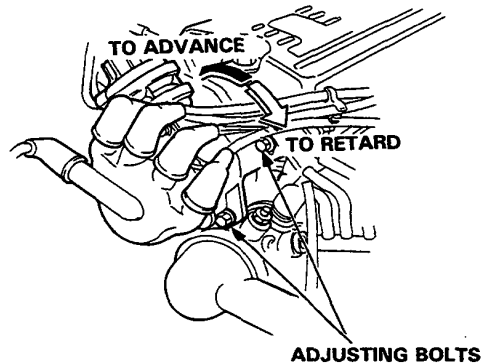


11. Read initial timing when timing mark (white) is aligned to the pointer.

**Initial Timing**

- **Manual Transmission [at 800±50 min<sup>-1</sup> (rpm) in neutral]**  
KX, KS, KT, KY, KZ models: 4° BTDC  
KG, KE, KB, KF, KW models: 10° BTDC
- **Automatic Transmission [at 750±50 min<sup>-1</sup> (rpm) in neutral]**  
KX, KS, KT, KY, KZ models: 4° BTDC  
KG, KE, KB, KF, KW models: 10° BTDC

12. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing clockwise to retard the timing, or counterclockwise to advance the timing.



13. Tighten the distributor adjusting bolts, then recheck the timing.



# Engine Tune-up

## Ignition Timing Inspection and Setting

### Carbureted Engine:

14. Connect the vacuum hoses to the vacuum advance diaphragm and inspect ignition timing at idle.

#### Ignition Timing

- **Manual Transmission** [at  $800 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]

KT, KY models:  $15 \pm 2^\circ$  BTDC (Red)  
KG, KE, KB, KF, KW models:  $16 \pm 2^\circ$  BTDC (Red)  
KX, KS, KZ models:  $20 \pm 2^\circ$  BTDC (Red)

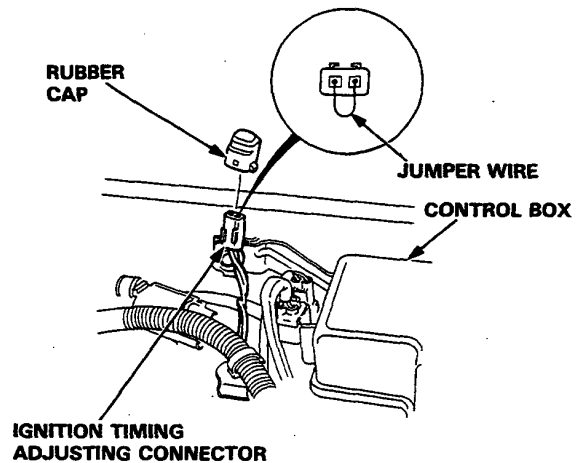
- **Automatic Transmission** [at  $750 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]

KT, KY models:  $10 \pm 2^\circ$  BTDC (Red)  
KG, KE, KB, KF, KW models:  $16 \pm 2^\circ$  BTDC (Red)  
KX, KS, KZ models:  $15 \pm 2^\circ$  BTDC (Red)

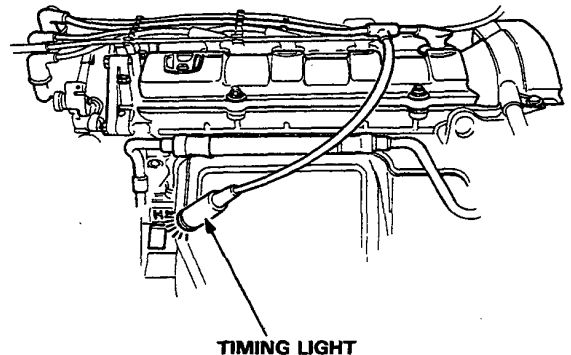
If advance is not as specified, check the vacuum advance diaphragm and distributor advance mechanism.

### Fuel-Injected Engine:

1. Remove the rubber cap from the inspection window of the cylinder block.
2. Start the engine and allow it to warm up (cooling fan comes on).
3. Remove the rubber cap (BLK) from the ignition timing adjusting connector located behind the ignition coil and connect the BRN and GRN/WHT terminals with a jumper wire.



4. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).

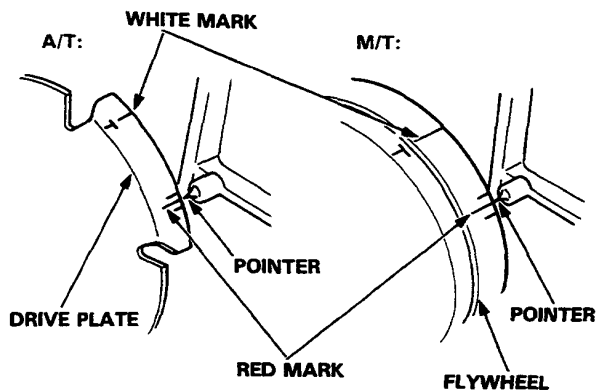




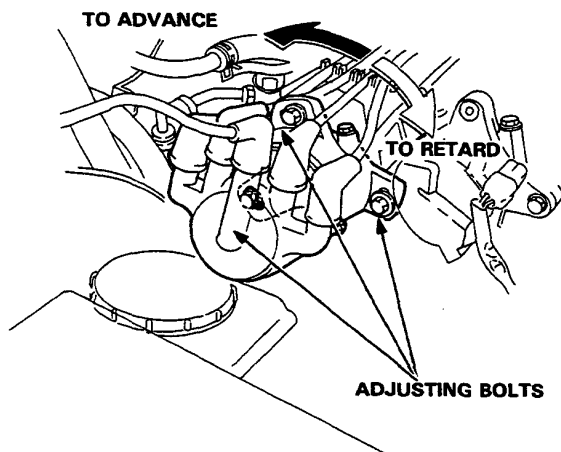
5. Adjust ignition timing, if necessary, to the following specifications:

#### Ignition Timing

- Manual: All models:  
15 ± 2° BTDC (RED)  
at 750 ± 50 min<sup>-1</sup> (rpm) in neutral
- Automatic: All models:  
15 ± 2° BTDC (RED)  
at 750 ± 50 min<sup>-1</sup> (rpm) in neutral



6. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing counterclockwise to advance the timing, or clockwise to retard the timing.



7. Tighten the adjusting bolts and recheck the timing.
8. Remove the jumper wire and install the rubber caps to the inspection window and adjusting connector.

## Timing Belt

### Fuel-Injected Engine

Illustrated Index .....	5-22
Inspection .....	5-23
Tension Adjustment .....	5-23
Replacement .....	5-24
Positioning Timing Belt .....	5-26

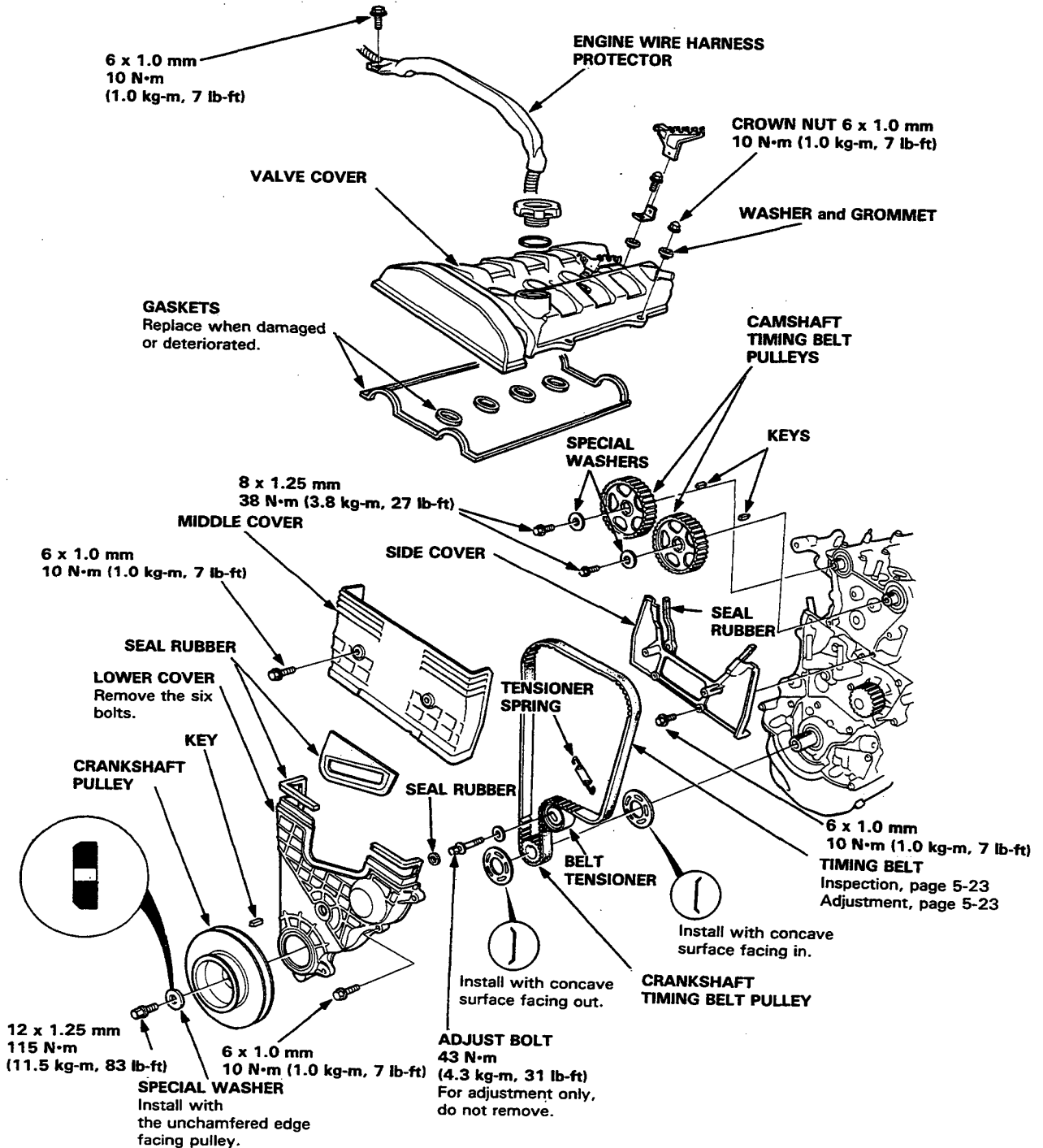


# Timing Belt

## Illustrated Index

### NOTE:

- Refer to next page for positioning crank and pulley before installing belt.
- Refer to page 5-6, for alternator belt adjustment.
- Refer to page 5-7, for P/S pump belt adjustment.
- Refer to page 5-7, for A/C compressor belt adjustment.
- Mark direction of rotation before removing.



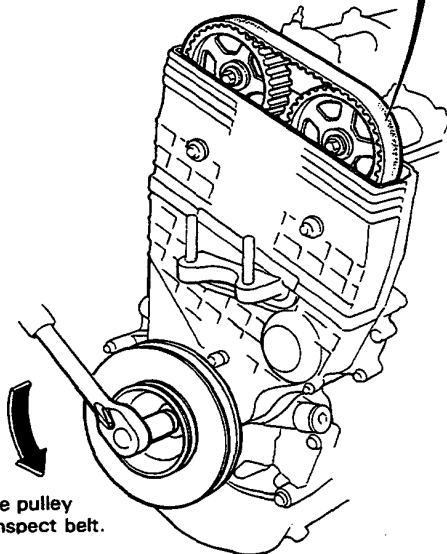
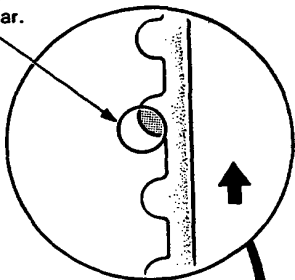


## Inspection

### NOTE:

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

Inspect this area for wear.



Rotate pulley and inspect belt.

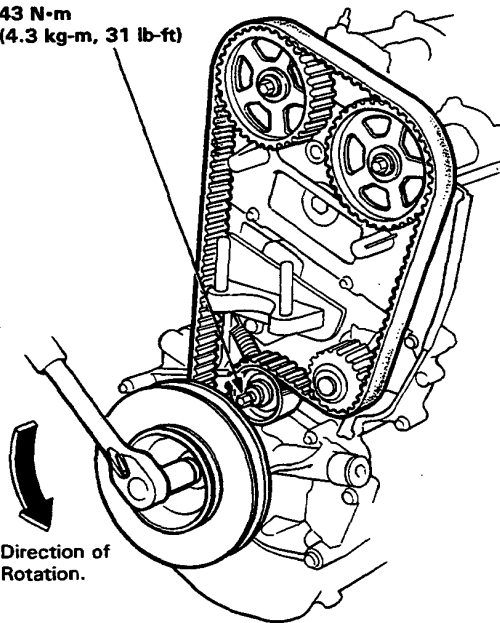
## Tension Adjustment

**CAUTION:** Always adjust timing belt tension with the engine cold.

NOTE: Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment:

1. Set the No. 1 piston at TDC.
2. Loosen adjust bolt.

**ADJUST BOLT**  
43 N·m  
(4.3 kg·m, 31 lb-ft)



Direction of Rotation.

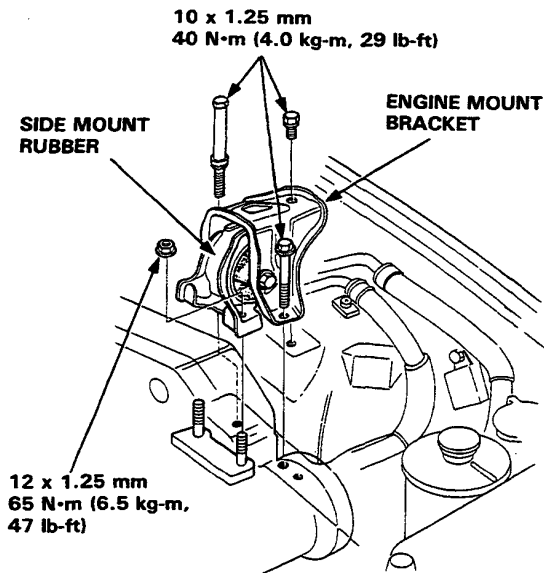
3. Rotate crankshaft counterclockwise 3-teeth on camshaft pulley to create tension on timing belt.
4. Tighten adjust bolt.
5. If pulley bolt broke loose while turning crank, re-torque it to 115 N·m (11.5 kg·m, 83 lb-ft).

NOTE: Put transmission in gear and set parking brake before retorquing pulley bolt.

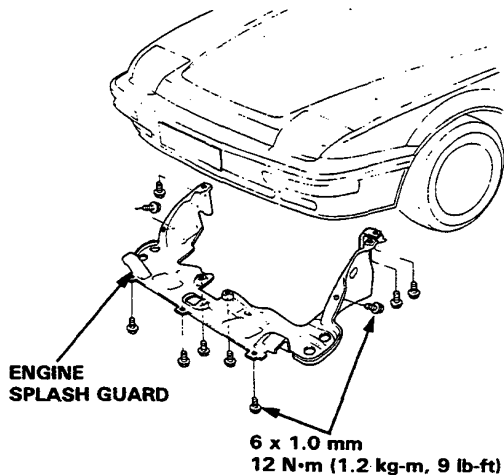
# Timing Belt

## Replacement

1. Remove the engine support bolts and nuts, then remove the side mount rubber and side mount bracket.



2. Remove the engine splash guard.

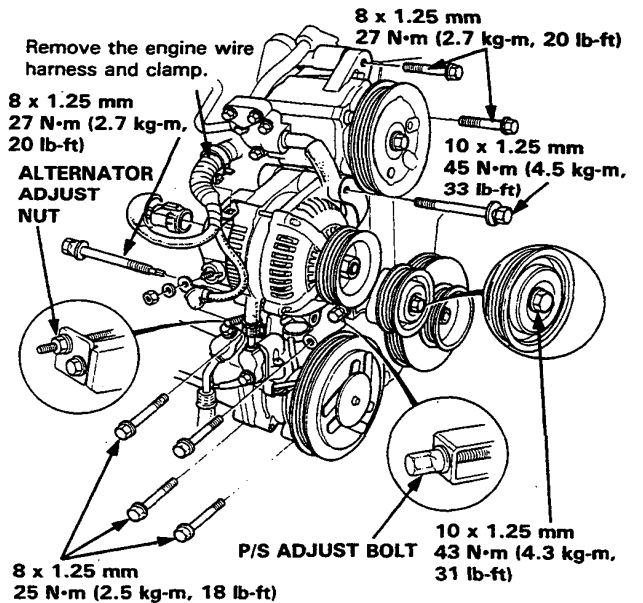
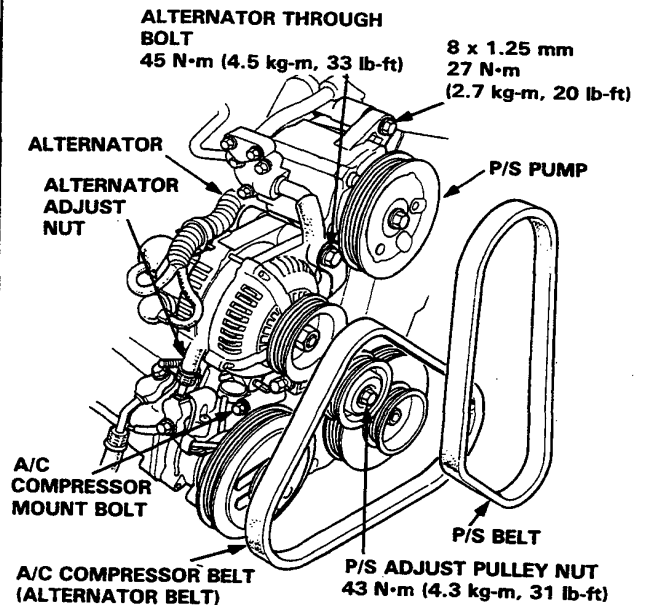


3. Remove the power steering (P/S) pump adjust pulley nut and the adjust bolt, then remove the adjust pulley, P/S pump and the belt.

4. Remove the alternator through bolt, mount bolt and the adjust nut, then remove the alternator and the belt.

### On cars with air conditioning (A/C):

Remove the A/C compressor mount bolts, then remove the A/C compressor and the belt.



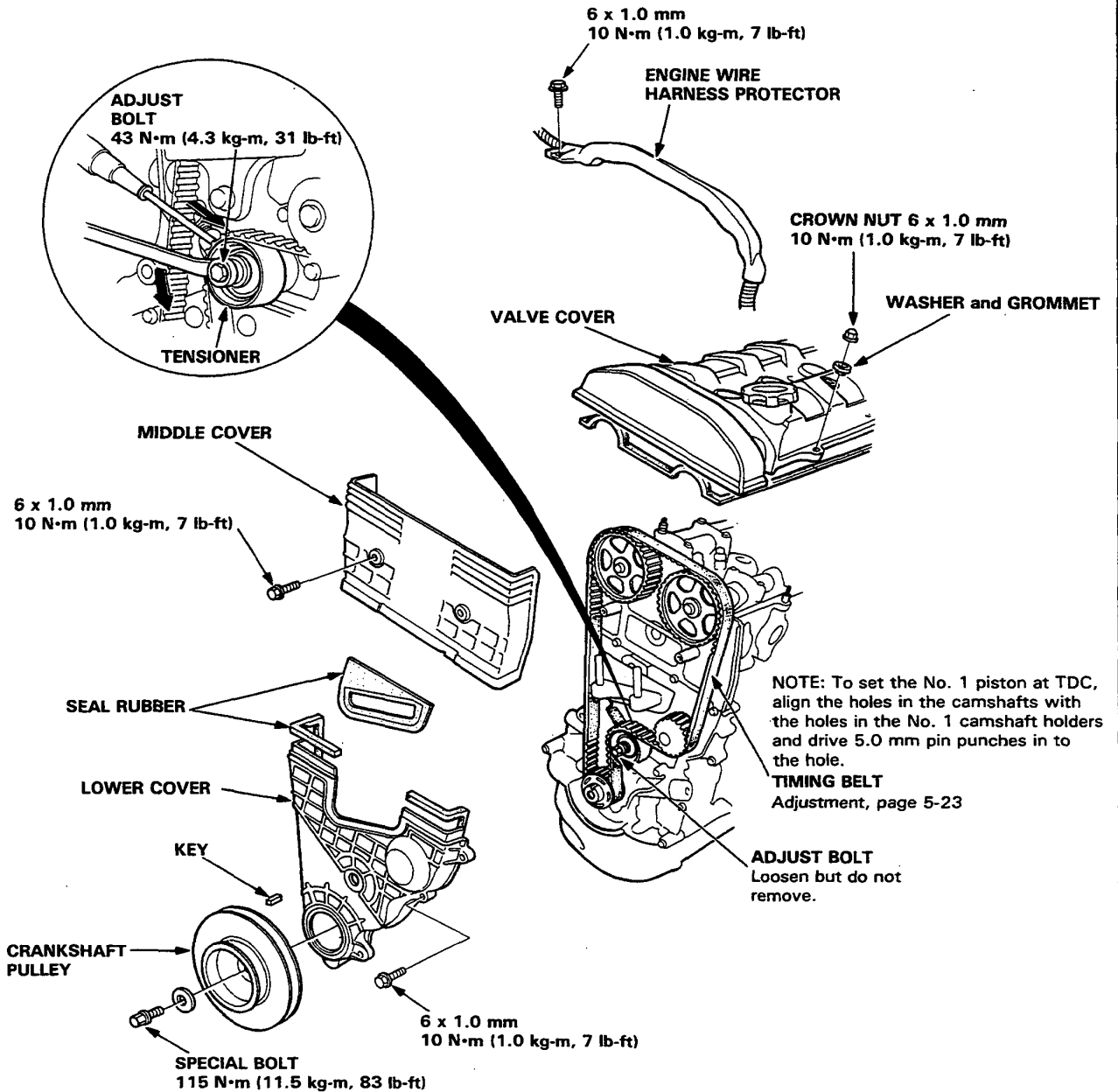
5. After installation, adjust the tension of each belt.

See page 5-6 for alternator belt tension adjustment.

See page 5-7 for (P/S) pump belt tension adjustment.



6. Remove the ignition wire from the valve cover.
7. Remove the engine wire harness protector from the cylinder head cover.
8. Remove the valve cover.
9. Remove the special bolt, then remove crankshaft pulley.
10. Remove the timing belt middle cover and the lower cover.
11. Loosen the adjust bolt, then remove the timing belt.

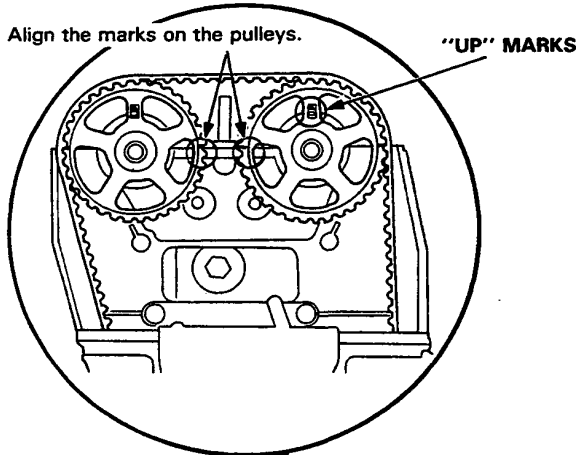


12. Install in the reverse order of removal; adjust the valve timing (page 5-26).
13. Carry out timing belt tension adjustment (page 5-23).

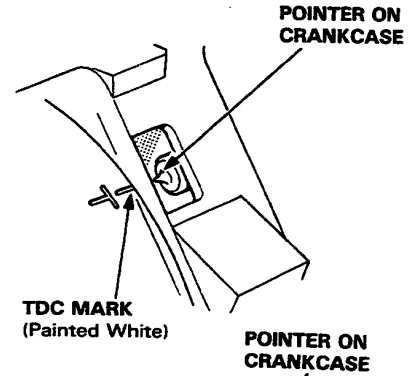
# Timing Belt

## Positioning Crankshaft Before Installing Timing Belt

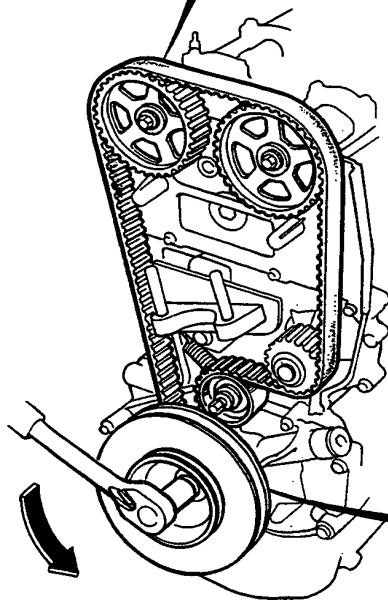
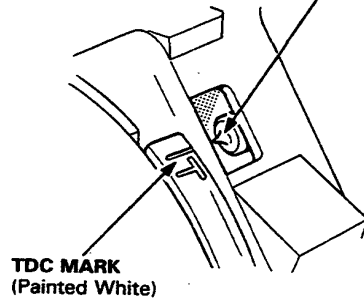
**NOTE:** Install the timing belt with the No. 1 piston at TDC (Top Dead Center) on the compression stroke.



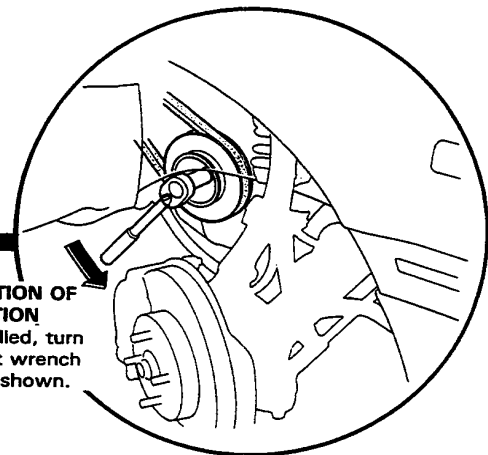
**MANUAL TRANSMISSION:**



**AUTOMATIC TRANSMISSION:**



**DIRECTION OF ROTATION**  
With engine installed, turn crank with socket wrench and extension as shown.





## **Timing Belt**

### **Carbureted Engine**

<b>Illustrated Index .....</b>	<b>5-28</b>
<b>Inspection .....</b>	<b>5-29</b>
<b>Tension Adjustment .....</b>	<b>5-29</b>
<b>Replacement .....</b>	<b>5-30</b>
<b>Positioning Timing Belt .....</b>	<b>5-32</b>

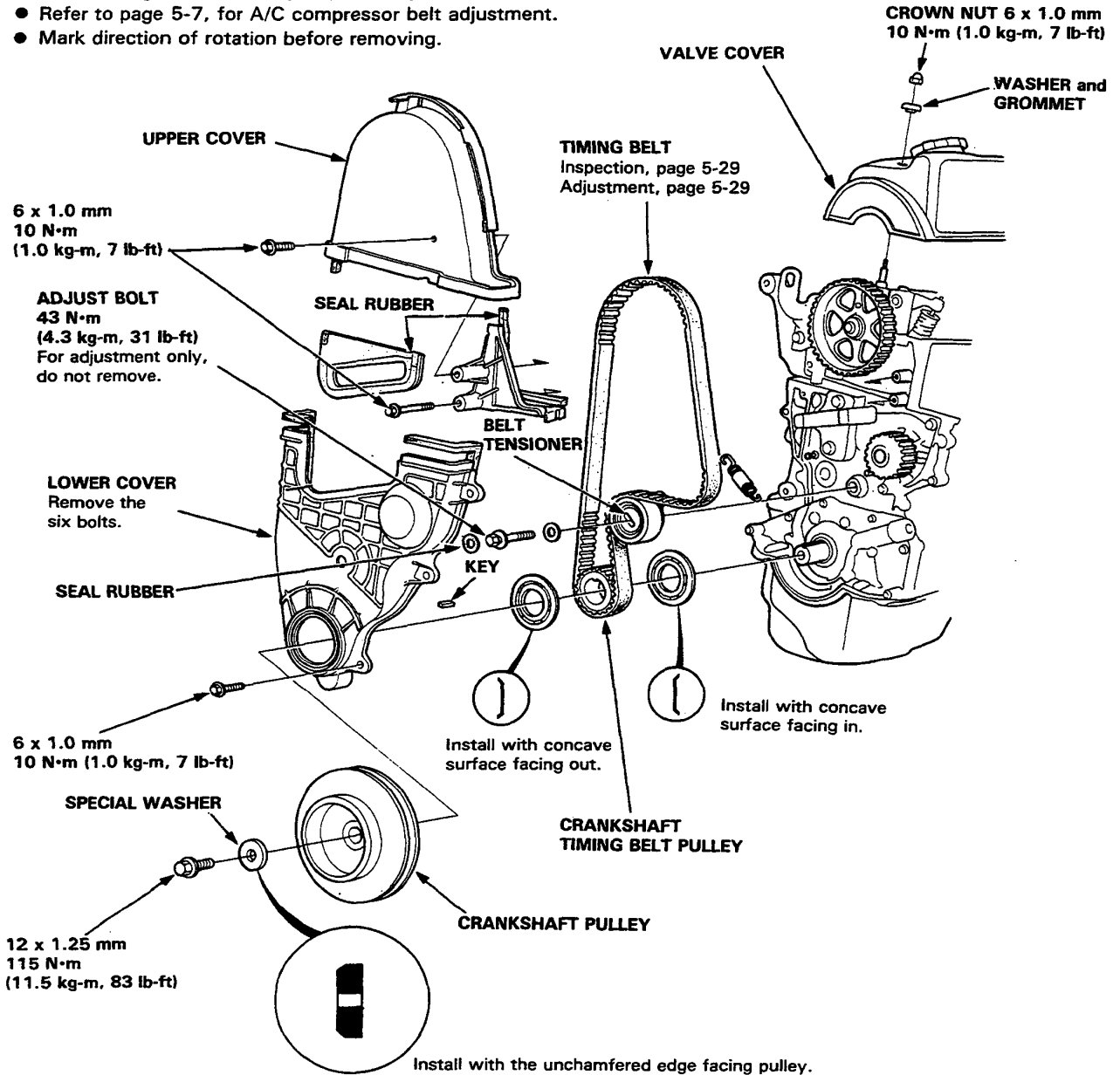


# Timing Belt

## Illustrated Index

### NOTE:

- Refer to next page for positioning crank and pulley before installing belt.
- Refer to page 5-6, for alternator belt adjustment.
- Refer to page 5-7, for P/S pump belt adjustment.
- Refer to page 5-7, for A/C compressor belt adjustment.
- Mark direction of rotation before removing.

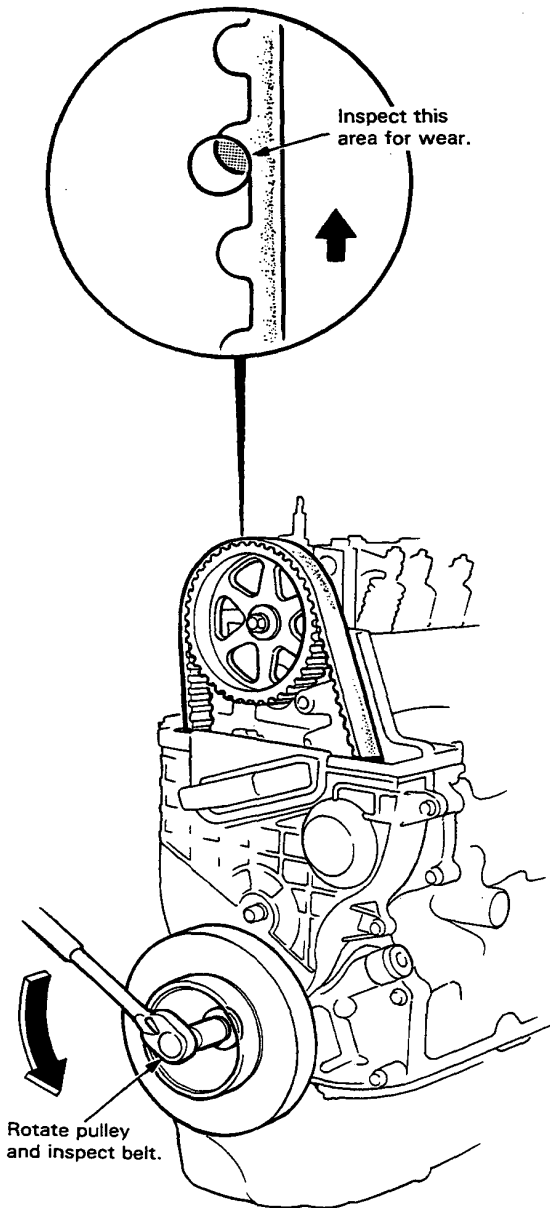




## Inspection

### NOTE:

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



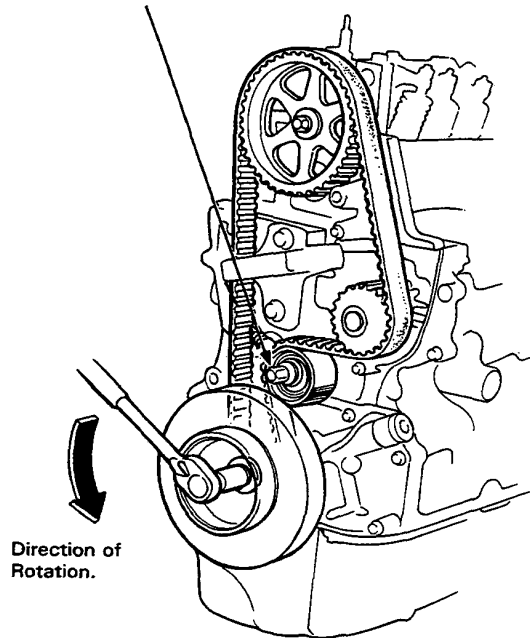
## Tension Adjustment

**CAUTION:** Always adjust timing belt tension with the engine cold.

NOTE: Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment:

1. Set the No. 1 piston at TDC.
2. Loosen adjust bolt.

**ADJUST BOLT**  
43 N·m  
(4.3 kg-m, 31 lb-ft)



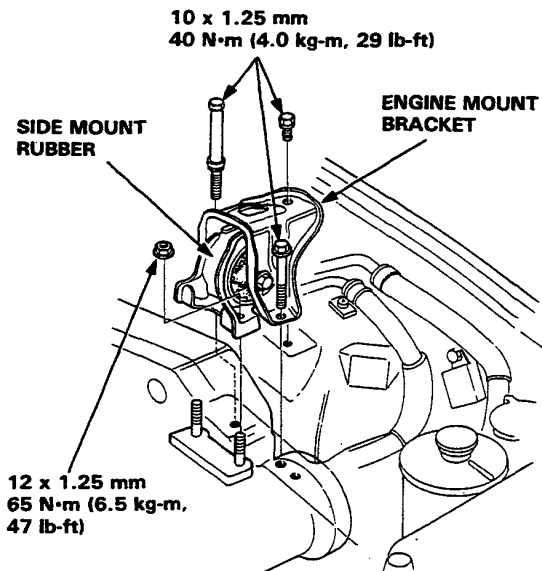
3. Rotate crankshaft counterclockwise 3-teeth on camshaft pulley to create tension on timing belt.
4. Tighten adjust bolt.
5. If pulley bolt broke loose while turning crank, re-torque it to 115 N·m (11.5 kg-m, 83 lb-ft).

NOTE: Put transmission in gear and set parking brake before retorquing pulley bolt.

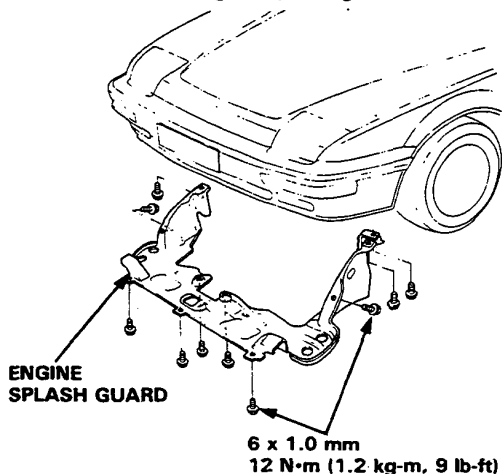
# Timing Belt

## Replacement

1. Remove the engine support bolts and nuts, then remove the side mount rubber and side mount bracket.



2. Remove the engine splash guard.

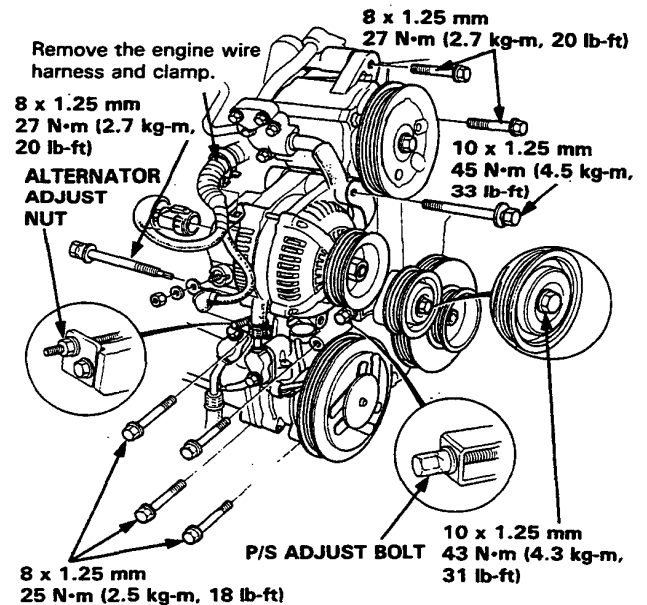
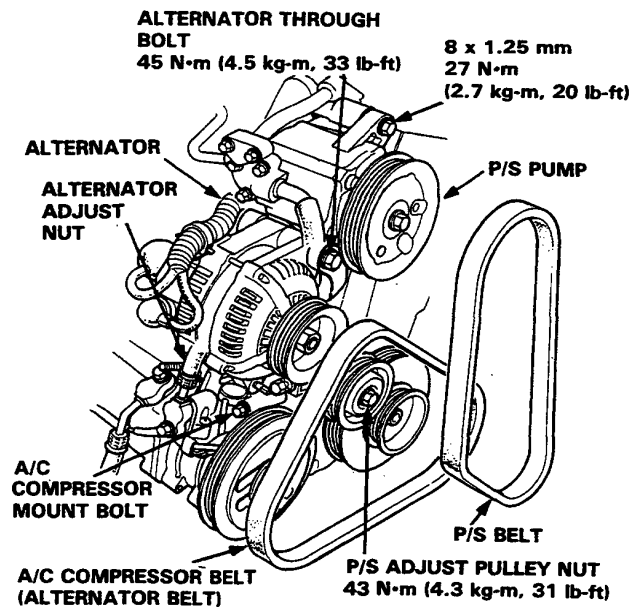


3. Remove the power steering (P/S) pump adjust pulley nut and the adjust bolt, then remove the adjust pulley, P/S pump and the belt.

4. Remove the alternator through bolt, mount bolt and the adjust nut, then remove the alternator and the belt.

### On cars with air conditioning (A/C):

Remove the A/C compressor mount bolts, then remove the A/C compressor and the belt.



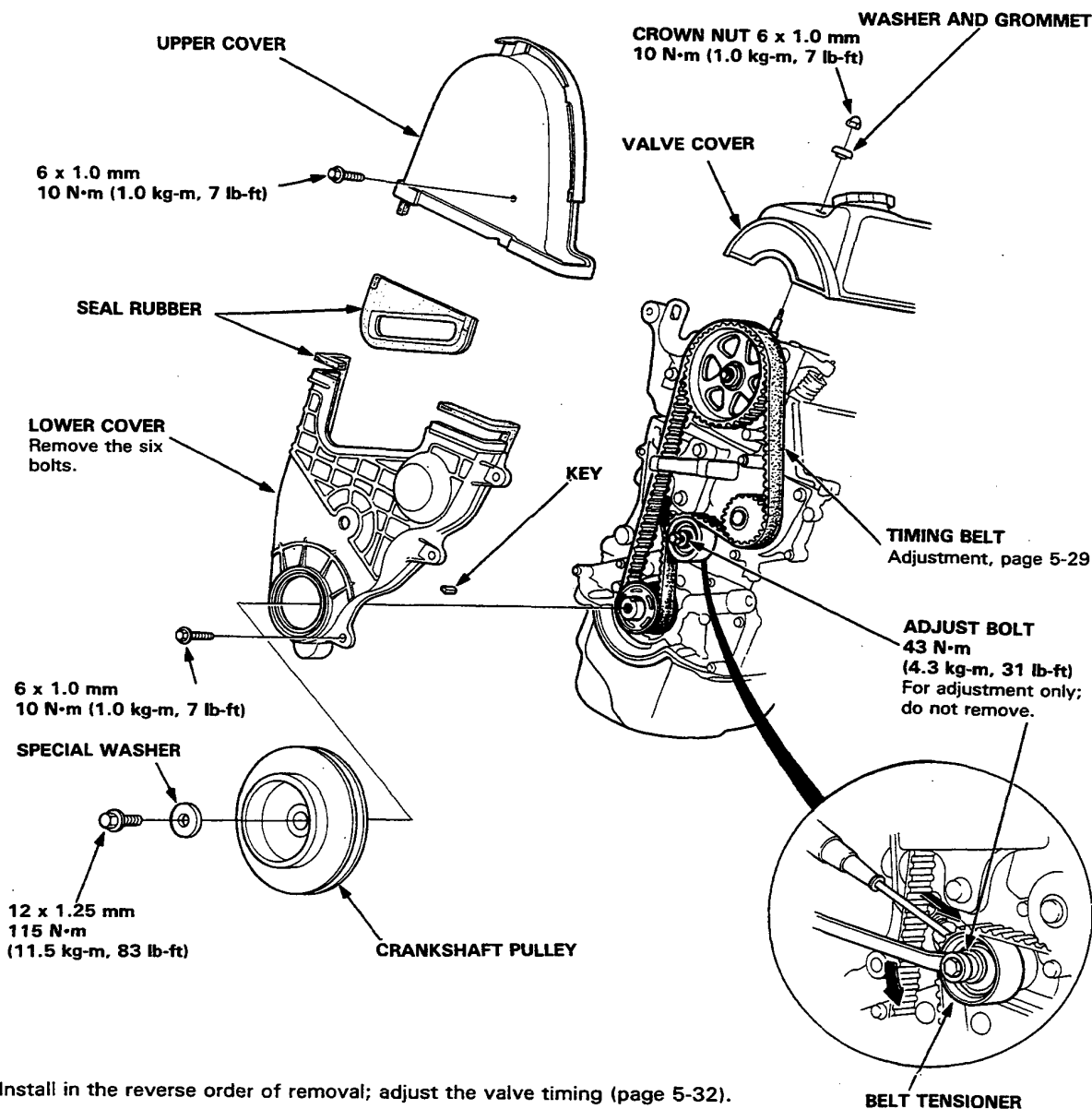
5. After installation, adjust the tension of each belt.

See page 5-29 for alternator belt tension adjustment.

See page 5-7 for (P/S) pump belt tension adjustment.



6. Remove the valve cover.
7. Remove the special bolt, then remove crankshaft pulley.
8. Remove the timing belt upper cover and the lower cover.
9. Loosen the adjust bolt, then remove the timing belt.

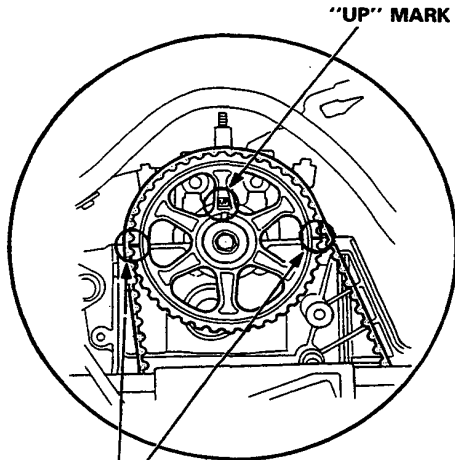


10. Install in the reverse order of removal; adjust the valve timing (page 5-32).
11. Carry out timing belt tension adjustment (page 5-29).

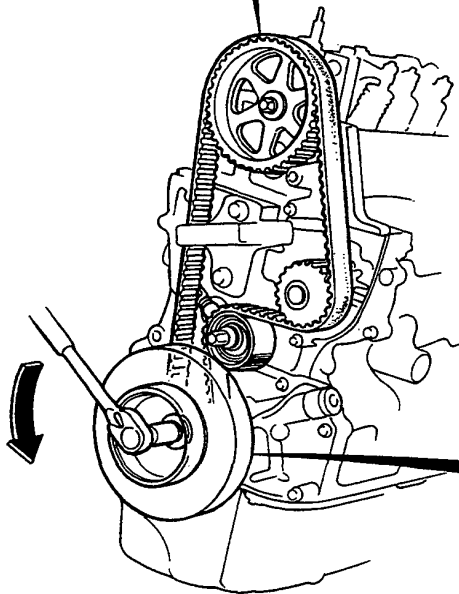
# Timing Belt

## Positioning Crankshaft Before Installing Timing Belt

NOTE: Install the timing belt with the No. 1 piston at TDC (Top Dead Center) of the compression stroke.



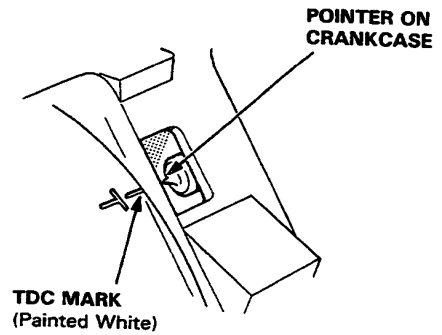
Timing mark aligned with the valve cover surface.



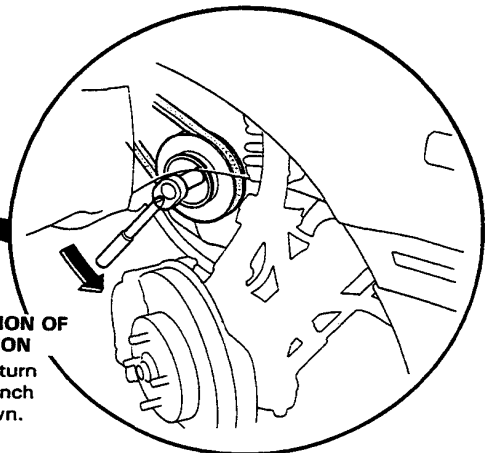
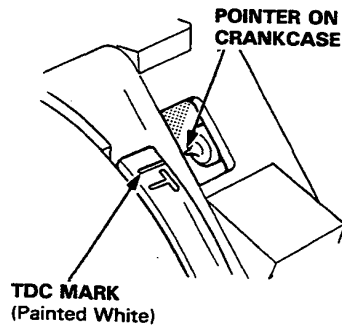
**DIRECTION OF ROTATION**

With engine installed, turn crank with socket wrench and extension as shown.

**MANUAL TRANSMISSION:**



**AUTOMATIC TRANSMISSION:**



## **Cylinder Head/Valve Train**

### **Fuel-Injected Engine**

<b>Illustrated Index .....</b>	<b>5-34</b>
<b>Cylinder Head Removal .....</b>	<b>5-36</b>
<b>Cylinder Head Installation .....</b>	<b>5-38</b>

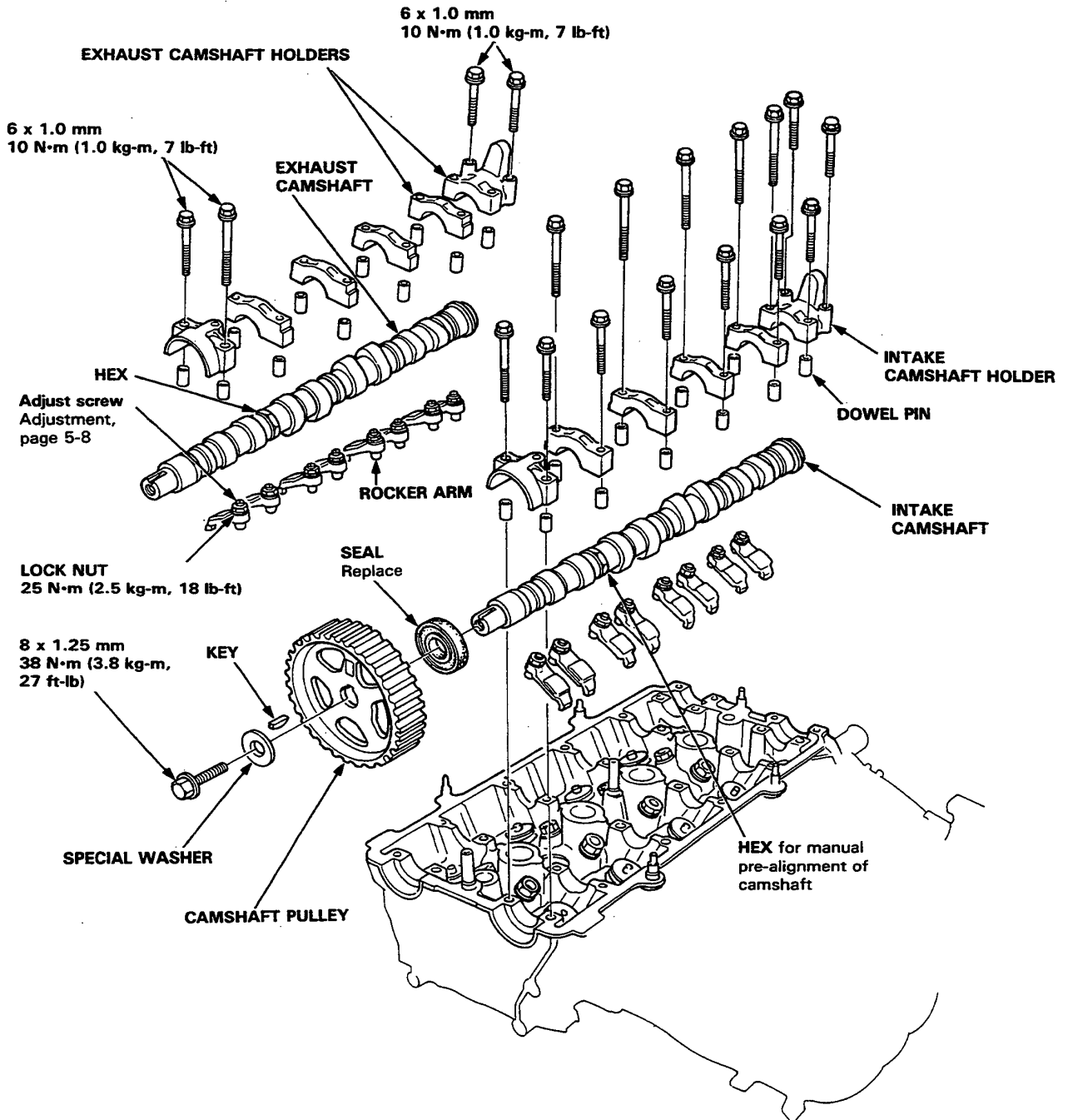


# Cylinder Head/Valve Train

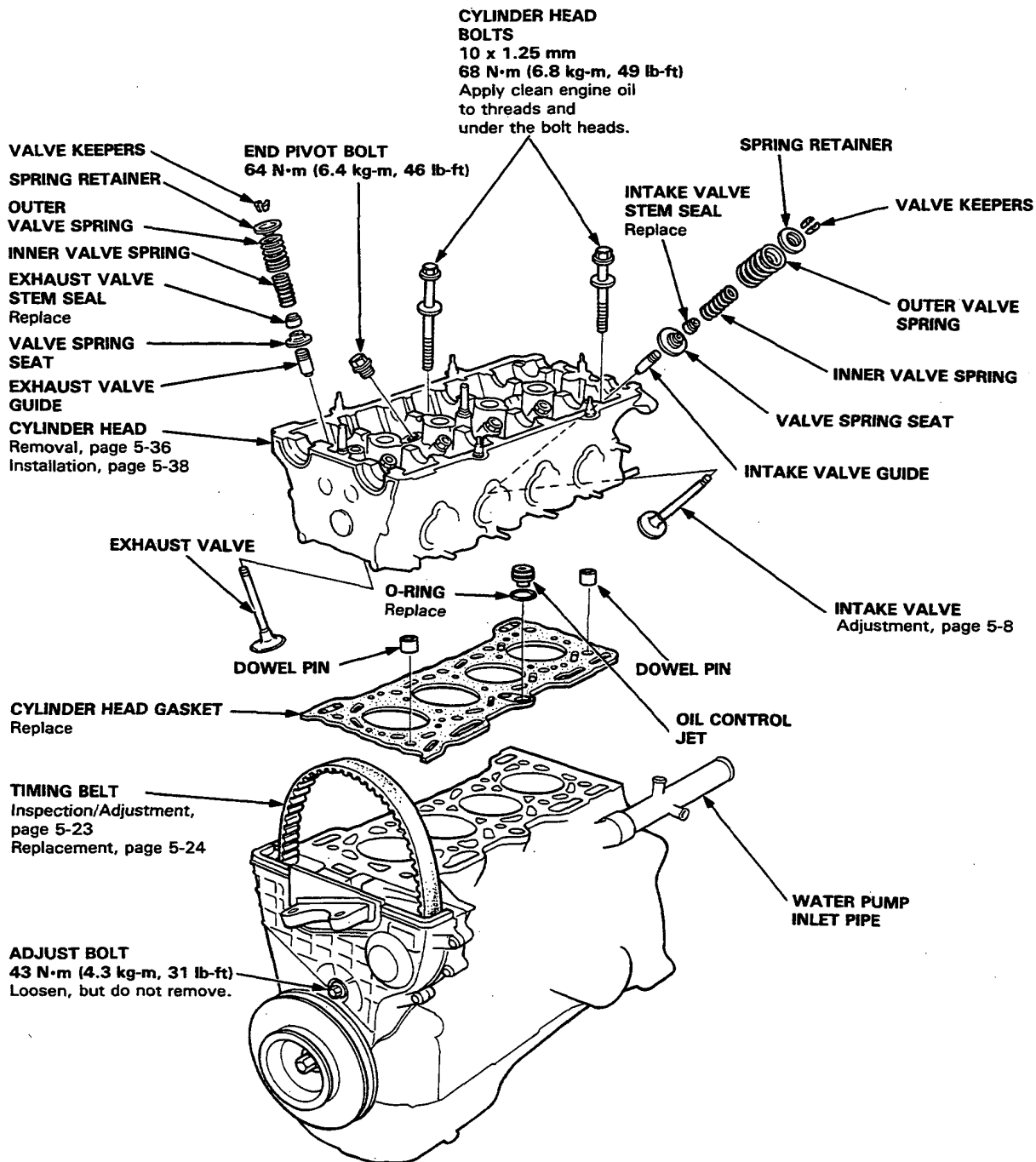
## Illustrated Index

**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 whenever reassembling.







# Cylinder Head

## Removal (engine removal not required)

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

**NOTE:**

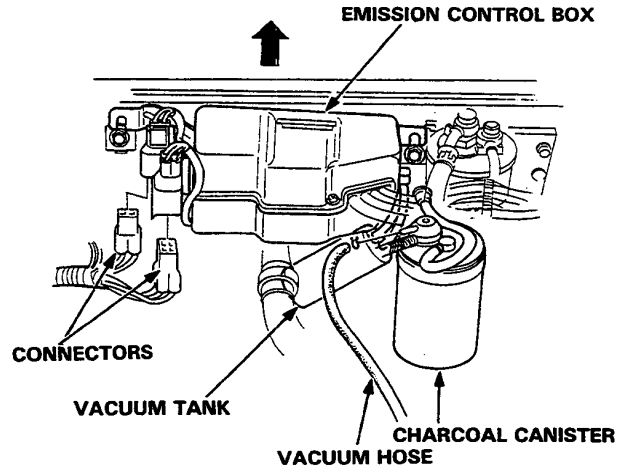
- Inspect the timing belt before removing the cylinder head.
- Turn the flywheel so that the No. 1 cylinder is at top-dead-center (page 5-26).
- Mark all emissions hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the cooling system (See 5-64).
3. Remove the brake booster vacuum hose from the intake manifold (page 5-49).
4. Remove the engine secondary ground cable from the valve cover.
5. Disconnect the radio condenser connector, ignition coil wire (page 5-48).
6. Remove the air cleaner cover.
7. Relieve fuel pressure. (See Section 6).

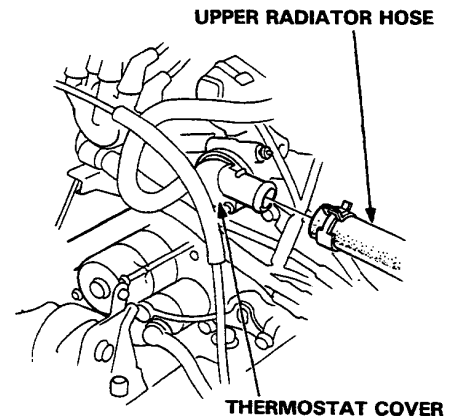
**WARNING** Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

8. Disconnect the fuel hose and fuel return hose.
9. Remove the air intake hose and resonator hose (page 5-47).
10. Disconnect the throttle cable at the throttle body (page 5-47).
11. Disconnect the throttle control cable at the throttle body. (A/T only)
12. Disconnect the charcoal canister hose at the throttle valve.
13. Disconnect the engine wire harness connectors from the cylinder head.
  - Four injector connectors
  - EACV connector
  - TA sensor connector
  - Fuel Injector resistor connector
  - Throttle angle sensor connector
  - TDC/CRANK sensor connector
  - EGR valve lift sensor connector
  - Shift control solenoid valve connector (A/T only)
  - Lock up control solenoid valve connector (A/T only)
  - Two back up light connectors (M/T only)
  - Two oxygen sensor connectors
  - Two TW sensor connectors
  - Coolant temperature gauge sending unit connector
  - Coolant temperature switch connector
  - CYL sensor connector
  - Ground terminals at the fuel pipe
  - A/T speed pulser connector
  - Engine oil pressure switch connector
  - Alternator connector and terminal

14. Remove the emission control box and vacuum tank, then disconnect two connectors. Do not remove the emission hoses.



15. Remove the upper radiator hose from the thermostat cover.

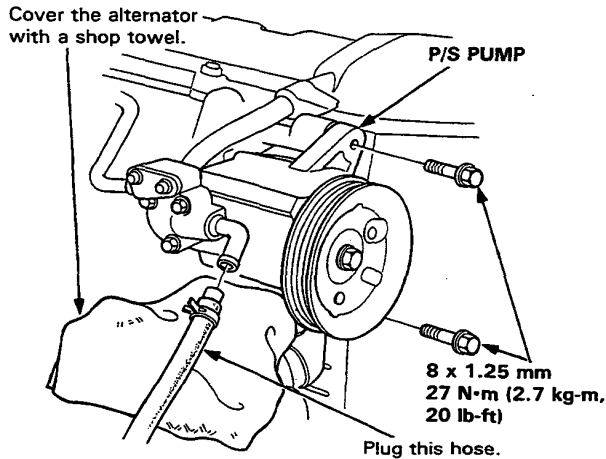


16. Remove the heater hose from the cylinder head.
17. Remove the water bypass hoses from the water pump inlet pipe.

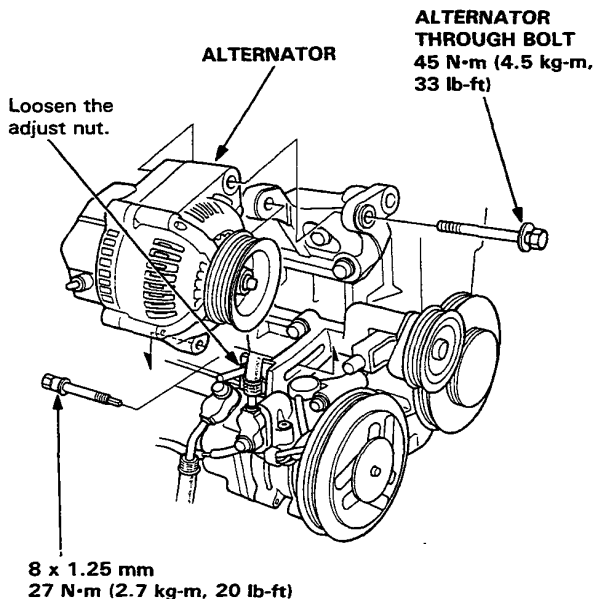


18. Remove the power steering belt and the alternator belt (page 5-24).
19. Disconnect the inlet hose of the power steering pump, then remove the power steering pump from the cylinder head.

**CAUTION:** When the hose is disconnected, fluid will flow out. Cover the alternator with a shop towel.

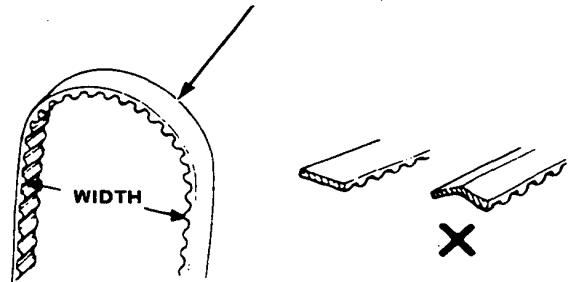


20. Remove the alternator.



21. Remove the intake manifold bracket (page 5-56).
22. Remove the exhaust manifold bracket, then remove the header pipe (page 5-58).
23. Remove the ignition wire, then remove the distributor.
24. Remove the CYL sensor.
25. Remove the valve cover.
26. Remove the timing belt middle cover.
27. Remove the crankshaft pulley, then remove the timing belt lower cover.
28. Loosen the timing belt adjust bolt, then remove the timing belt.

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



29. Remove the camshaft holders, camshafts and rocker arms.
30. Remove the cylinder head.
31. Remove the exhaust manifold shroud and EGR pipe, then remove the exhaust manifold from the cylinder head.
32. Remove the intake manifold from the cylinder head.

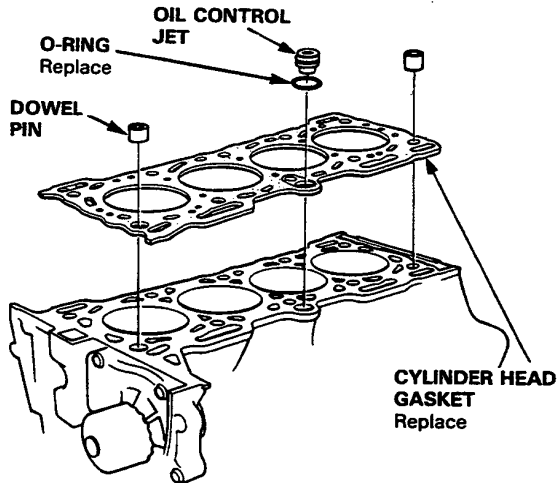
# Cylinder Head

## Installation

1. Install the cylinder head in reverse order of removal:

- Always use a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on timing belt pulley should be at the top.

NOTE: Cylinder head dowel pins and oil control jet must be aligned.

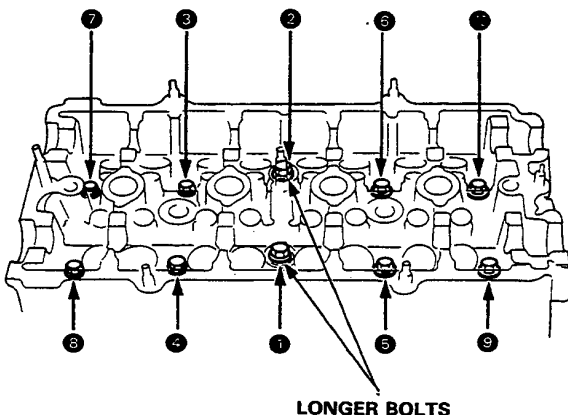


2. Tighten cylinder head bolts in two steps. In the first step tighten all bolts, in sequence, to about 30 N·m (3.0 kg·m, 22 lb-ft); in the final step tighten, in same sequence, to 68 N·m (6.8 kg·m, 49 lb-ft)

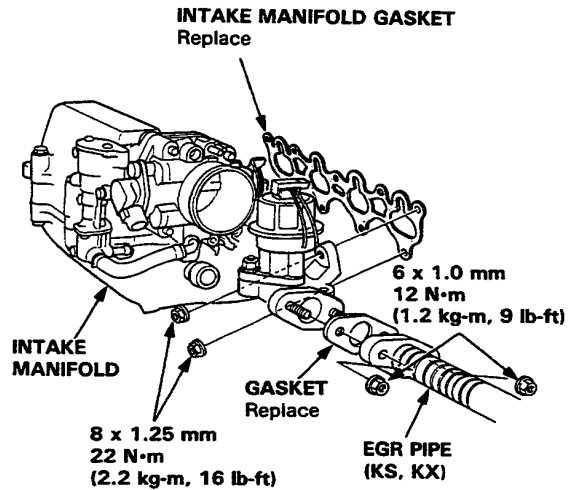
NOTE:

- Apply engine oil to the cylinder head bolts and the washers.
- Use the longer bolts at the position No. 1 and No. 2 as shown.

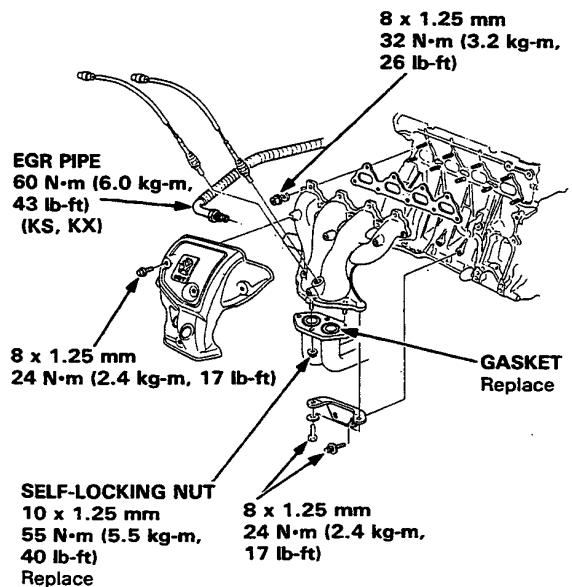
### CYLINDER HEAD BOLTS TORQUE SEQUENCE



3. Install the intake manifold and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nuts.



4. Install the exhaust manifold and bracket.



## **Cylinder Head/Valve Train**

### **Carbureted Engine**

<b>Illustrated Index .....</b>	<b>5-40</b>
<b>Cylinder Head Removal .....</b>	<b>5-42</b>
<b>Cylinder Head Installation .....</b>	<b>5-44</b>

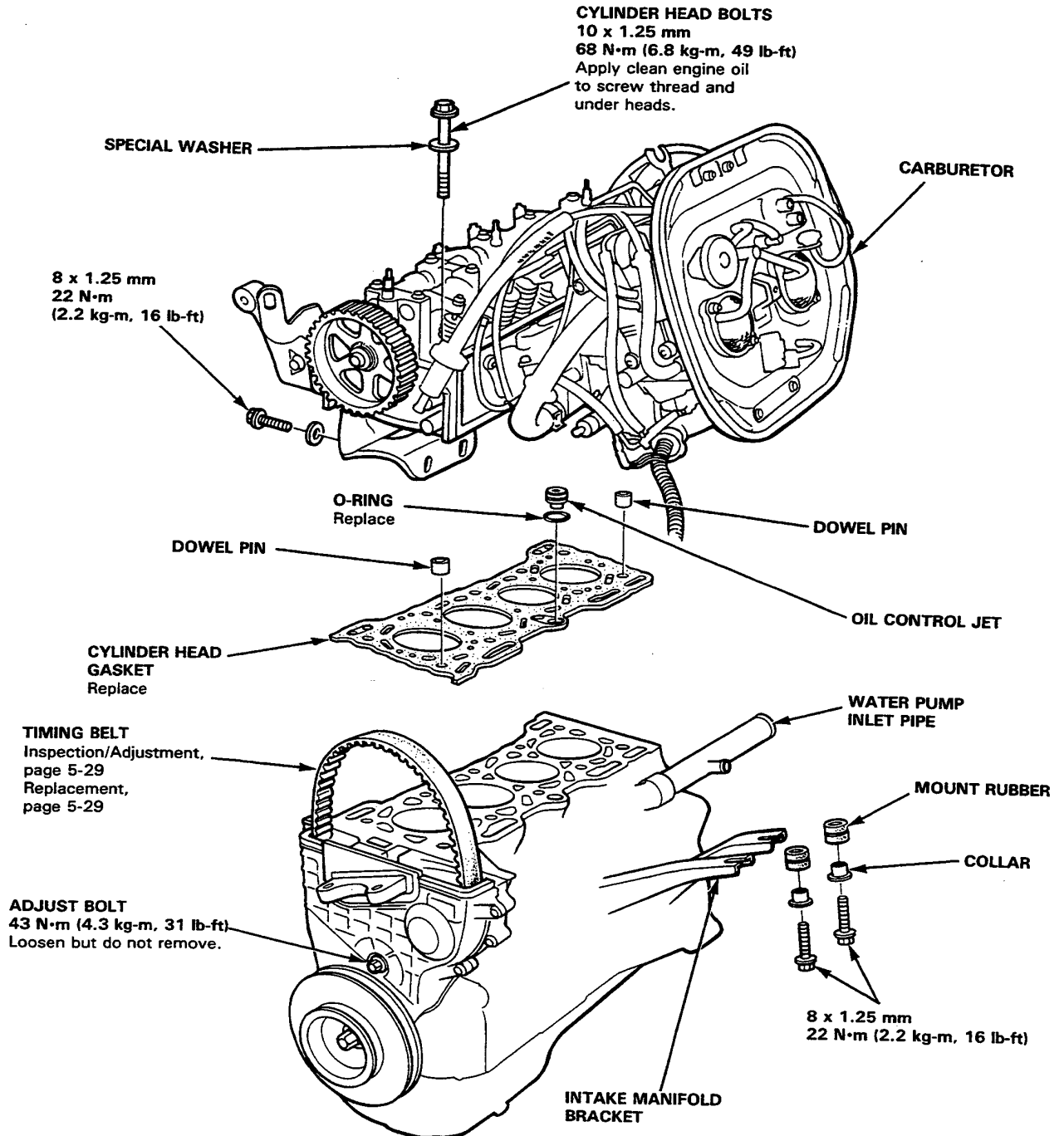


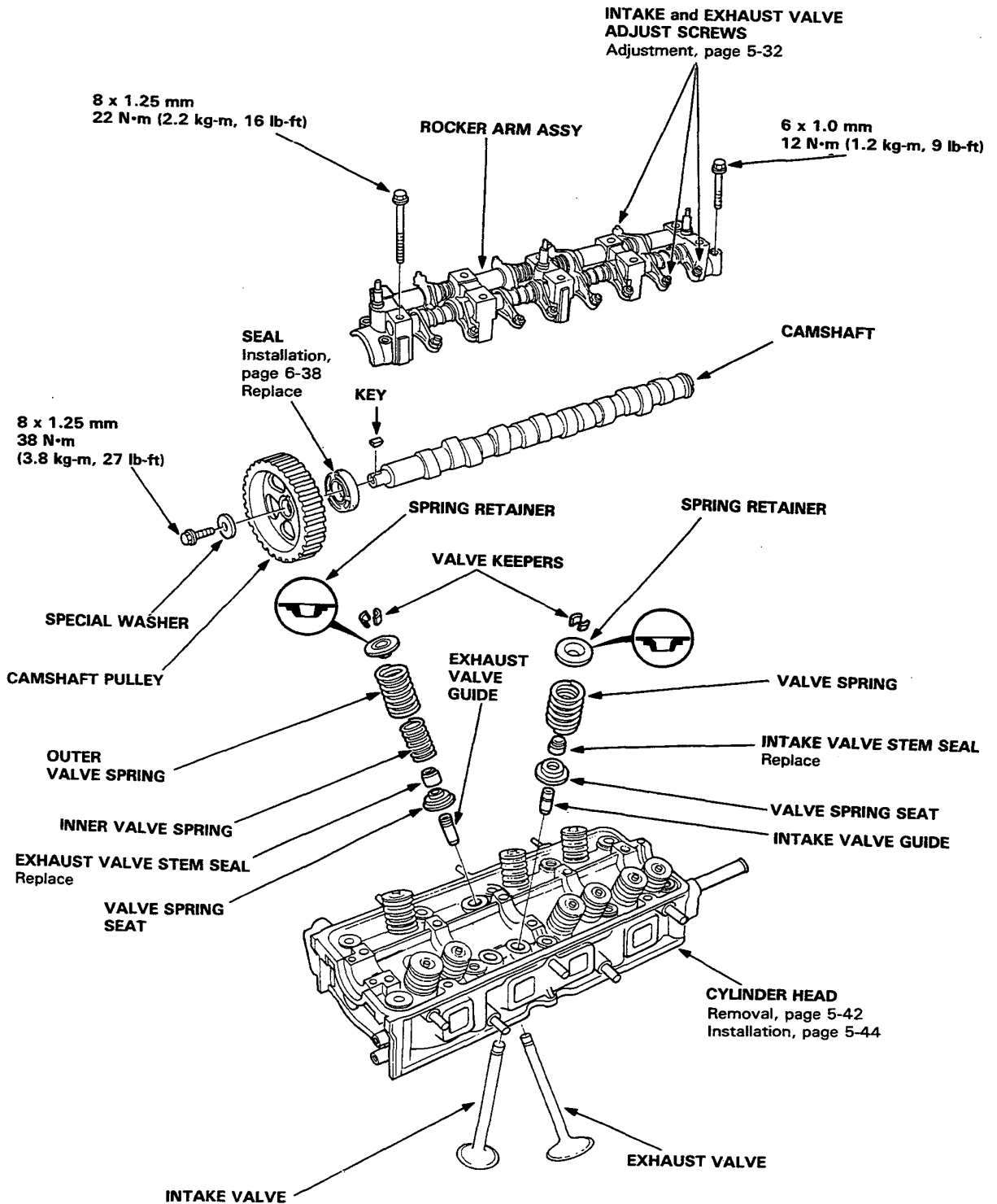
# Cylinder Head/Valve Train

## 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 whenever reassembling.





# Cylinder Head

## Removal (engine removal not required)

**CAUTION:** To avoid damaging the cylinder head, 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 head.
- Turn the flywheel so that the No. 1 cylinder is at top-dead-center (page 5-32).
- Mark all emissions hoses before disconnecting them.

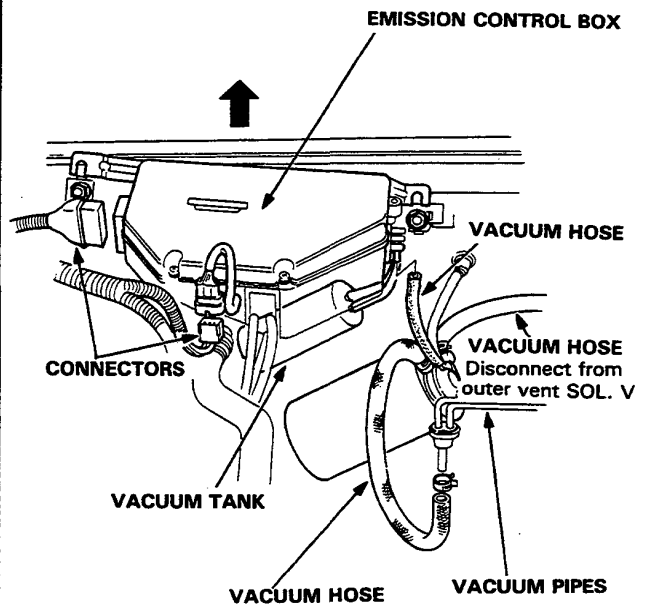
1. Disconnect the negative terminal from the battery.
2. Drain the cooling system (See page 5-64).
3. Remove the brake booster vacuum hose from the tubing manifold (page 5-49).
4. Remove the engine secondary ground cable from the valve cover.
5. Disconnect the radio condenser connector, ignition coil wire and ignition primary connector (page 5-48).
6. Remove the air cleaner cover.
7. Remove the fuel tube from the fuel filter.

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

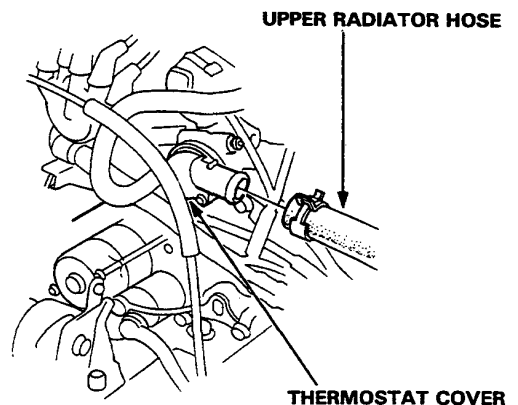
8. Remove the throttle cable from the carburetor.
9. Disconnect the engine wire harness connectors from the cylinder head.
  - Shift control solenoid valve connector (A/T only)
  - Lock-up control solenoid valve connector (A/T only)
  - Back-up light switch connectors (M/T only)
  - Oxygen sensor connector
  - Ground terminals at the fuel pipe
  - TW sensor connector
  - Coolant temperature gauge sending unit connector
  - A/T speed pulser connector (A/T only)
  - Throttle angle sensor connector (A/T only)
  - TA sensor connector
  - Air leak solenoid valve connector
  - Inner vent solenoid valve connector
  - EACV connector
  - Engine oil pressure connector
  - R. primary slow mixture cut-off solenoid valve connector
  - L. primary slow mixture cut-off solenoid valve connector
  - Air vent cut-off solenoid valve connector
  - Alternator connector and terminal

10. Remove the emission control box and vacuum tank, then disconnect two connectors. Do not remove the emission hoses.

11. Disconnect the charcoal canister vacuum hoses.



12. Remove the upper radiator hose from the thermostat cover.



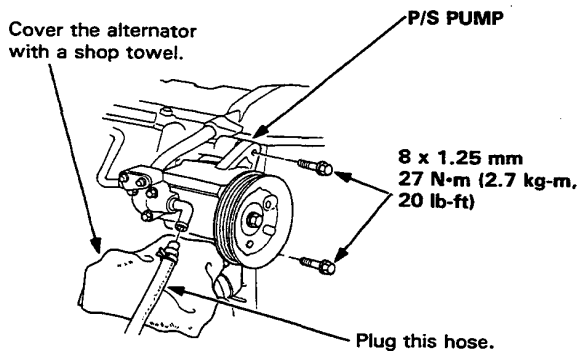
13. Remove the heater hose from the cylinder head.



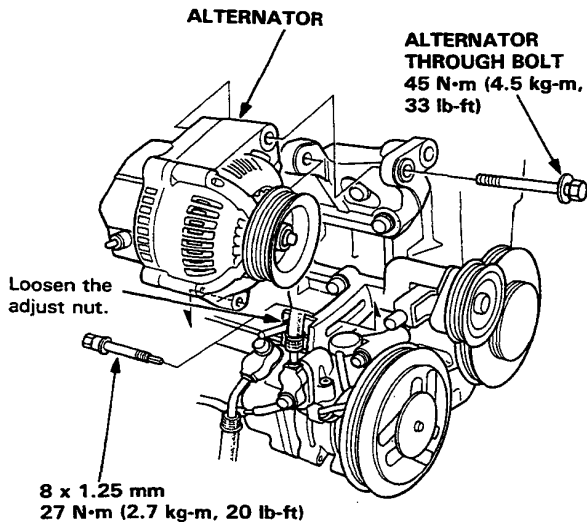


14. Remove the water bypass hoses from the water pump inlet pipe.
15. Remove the power steering belt and the alternator belt (page 5-30).
16. Disconnect the inlet hose of the power steering (P/S) pump, then remove the P/S pump from the cylinder head.

**CAUTION:** When the hose is disconnected, fluid will flow out. Cover the alternator with a shop towel.



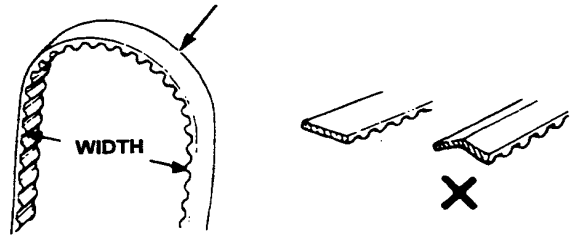
17. Remove the alternator.



18. Remove the intake manifold bracket (page 5-57).
19. Remove the exhaust manifold bracket, and then remove the header pipe (page 5-59).
20. Remove the valve cover.

21. Remove the timing belt upper cover.
22. Remove the crankshaft pulley, then remove the timing belt lower cover.
23. Loosen the timing belt adjust bolt, then remove the timing belt.

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



24. Remove the cylinder head bolts, then remove the cylinder head.
25. Remove the EGR pipe and air suction pipe from the intake and exhaust manifolds.
26. Remove the exhaust manifold shroud, then remove the exhaust manifold from the cylinder head.
27. Remove the intake manifold from the cylinder head.

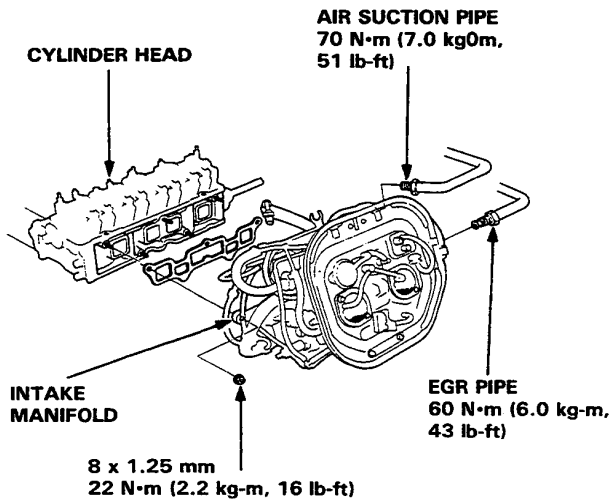
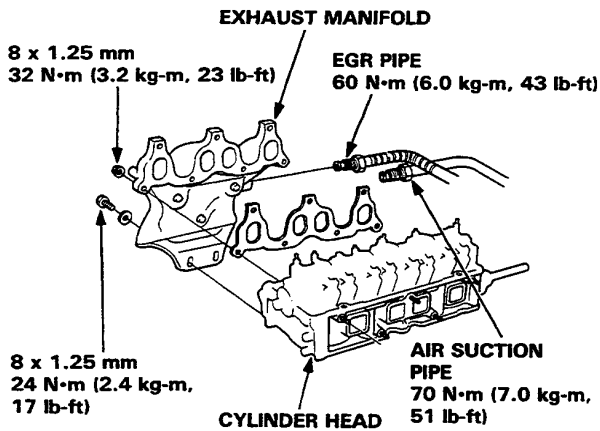
# Cylinder Head

## Installation

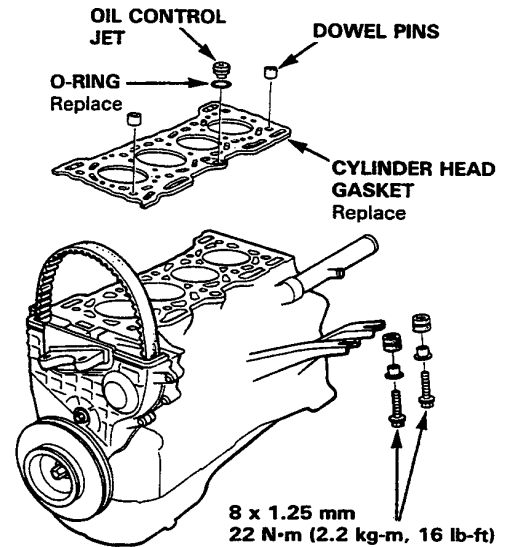
1. Install the cylinder head in reverse order of removal:

- Always use a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on timing belt pulley should be at the top.

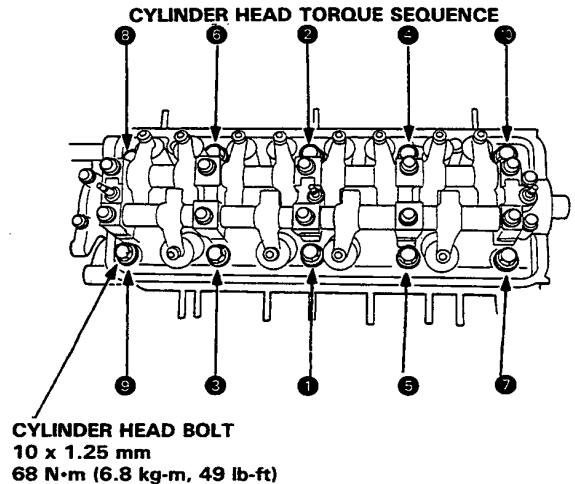
2. Install the intake and exhaust manifolds and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nuts.



3. Cylinder head dowel pins and oil control jet must be aligned.



4. Install the bolts that secure the intake manifold to its bracket but do not tighten them yet.
5. Position the cam correctly (page 5-32).
6. Tighten cylinder head bolts in two steps. In the first step tighten all bolts and nuts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 68 N·m (6.8 kg-m, 49 lb-ft).



7. Install the header pipe on the exhaust manifold. Tighten the bolts for the intake manifold bracket.
8. Install the header pipe on its bracket.
9. After the installation, check that the tubes, hoses and connectors are installed correctly.
10. Adjust the valve timing (page 5-9).

# Engine Removal/Installation



# Engine Removal/Installation

## WARNING

- Make sure jacks and safety stands are placed properly (pages 1-6 thru 8), and hoist brackets are attached to correct positions on the engine (page 5-52).
- Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.

**CAUTION:** Use fender covers to avoid damaging painted surfaces.

## WARNING

Use care when removing radiator cap and when draining radiator, engine and transmission, to avoid scalding by hot coolant or oil.

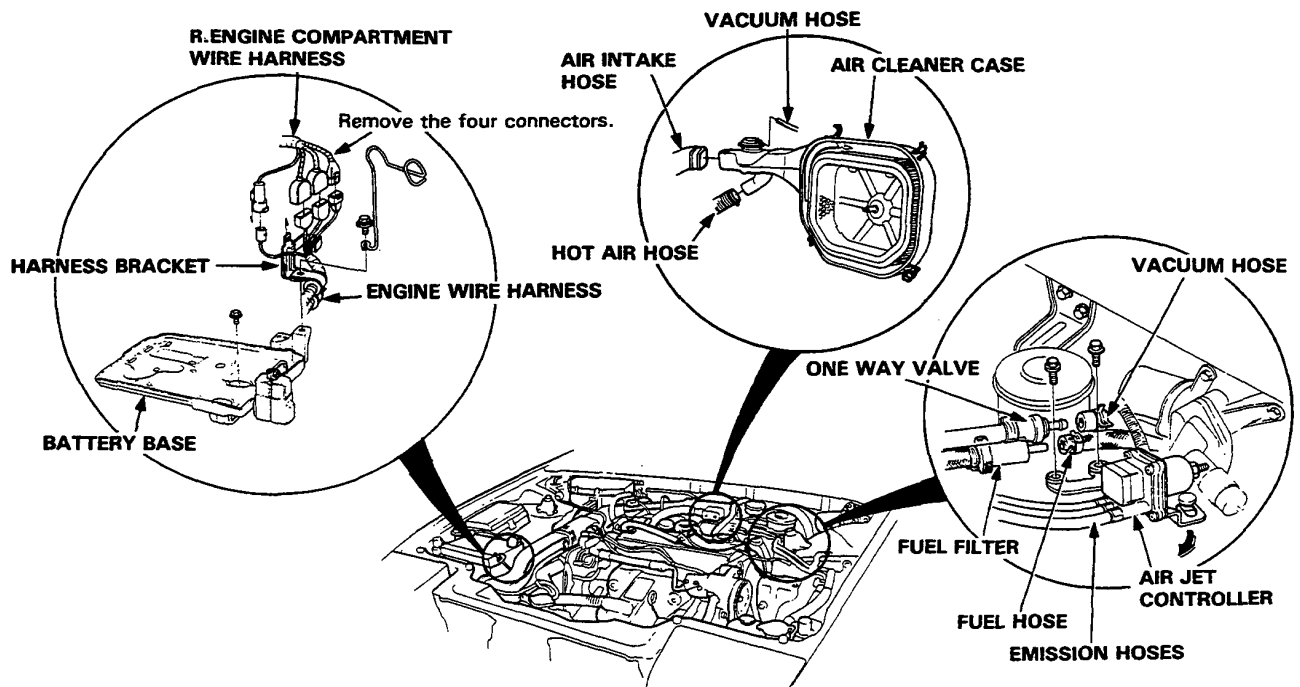
1. Disconnect the battery negative terminal first, then the positive terminal.
2. Unbolt the hood brackets and remove the hood after removing the washer hose.

**CAUTION:** Use care when storing the hood to avoid damaging the paint.

3. Remove the drain plug to drain engine oil.
  - Remove the filler cap to speed draining.

**CAUTION:** After draining the engine oil, always replace drain washers with new ones.

## Carbureted Engine:



4. Drain transmission oil.
  - Use a 3/8" drive socket wrench to remove the drain plug.
  - Remove the level gauge or filler bolt to speed draining.
5. Loosen the drain plug to drain coolant from the radiator.
  - Remove the radiator cap to speed draining.

**Carbureted Engine (Fuel-Injected Engine, go to step 11.)**

6. Remove the battery and battery base.
7. Remove the air intake hose and air cleaner case.
8. Disconnect the fuel hose at the fuel filter.
  - **WARNING** Do not smoke while working on fuel system. Keep open flame or spark away from work area.
9. Disconnect the brake booster vacuum hose at the one way valve.
10. Remove the air jet controller.
  - Do not disconnect the emission hoses.



**Fuel-Injected Engine (Carbureted Engine, go to step 16)**

- 11. Remove the battery and the battery base.
- 12. Remove the air intake hose air cleaner and resonator hose as an assembly.
- 13. Remove the battery wire from the relay box.
- 14. Relieve fuel pressure.

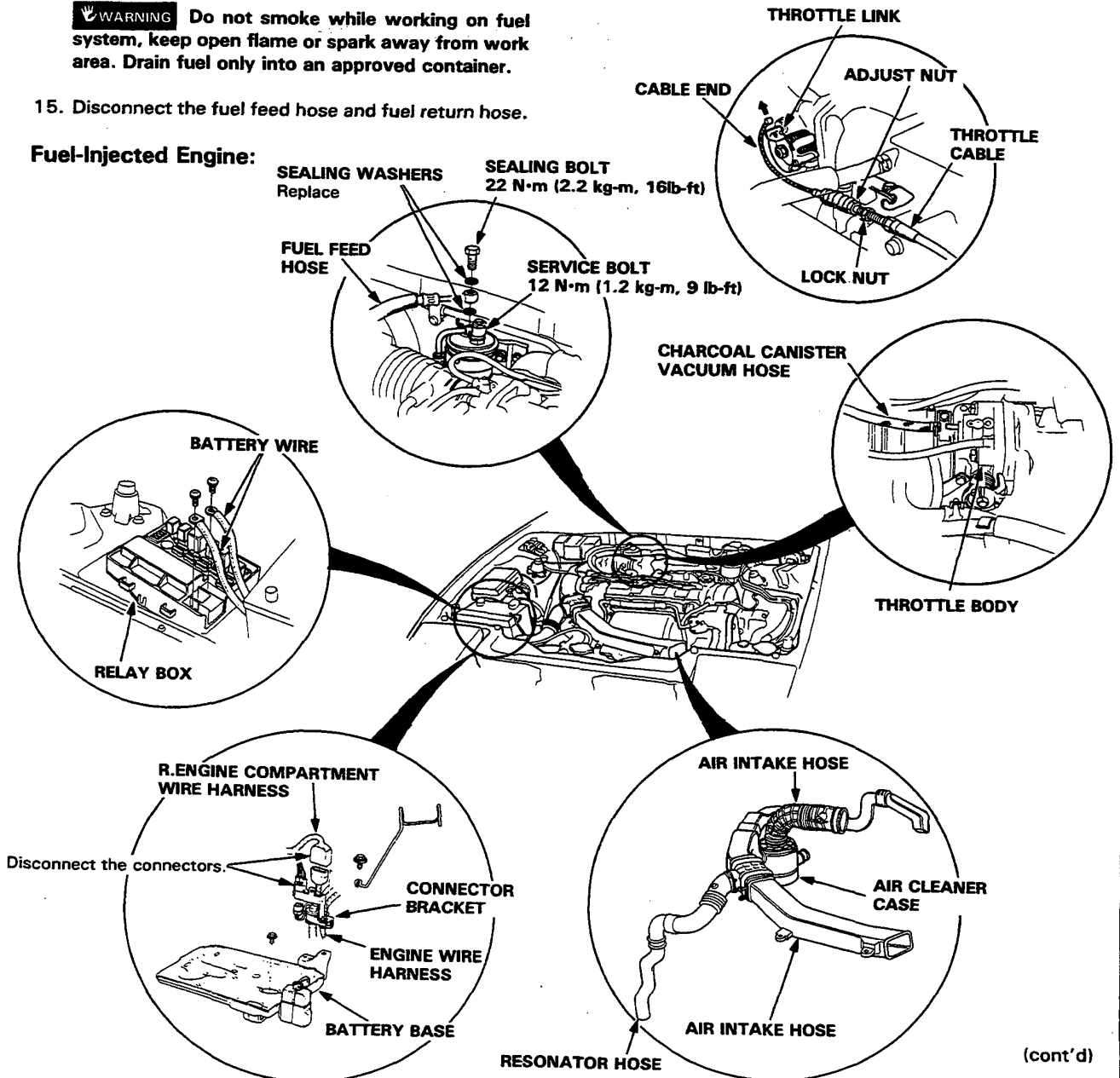
**WARNING** Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

- 15. Disconnect the fuel feed hose and fuel return hose.

- 16. Disconnect the charcoal canister vacuum hose at the throttle valve.
- 17. Disconnect the throttle cable at the throttle body or carburetor.

**NOTE:** Take care not to bend the cable when removing it. Do not use pliers to remove the cable from the linkage. Always replace a kinked cable with a new one.

**Fuel-Injected Engine:**



(cont'd)

# Engine Removal/Installation

(cont'd)

18. Disconnect the ignition coil wire, radio noise condenser ground wire and ignition primary connector (Carbureted Engine only), then remove the distributor.

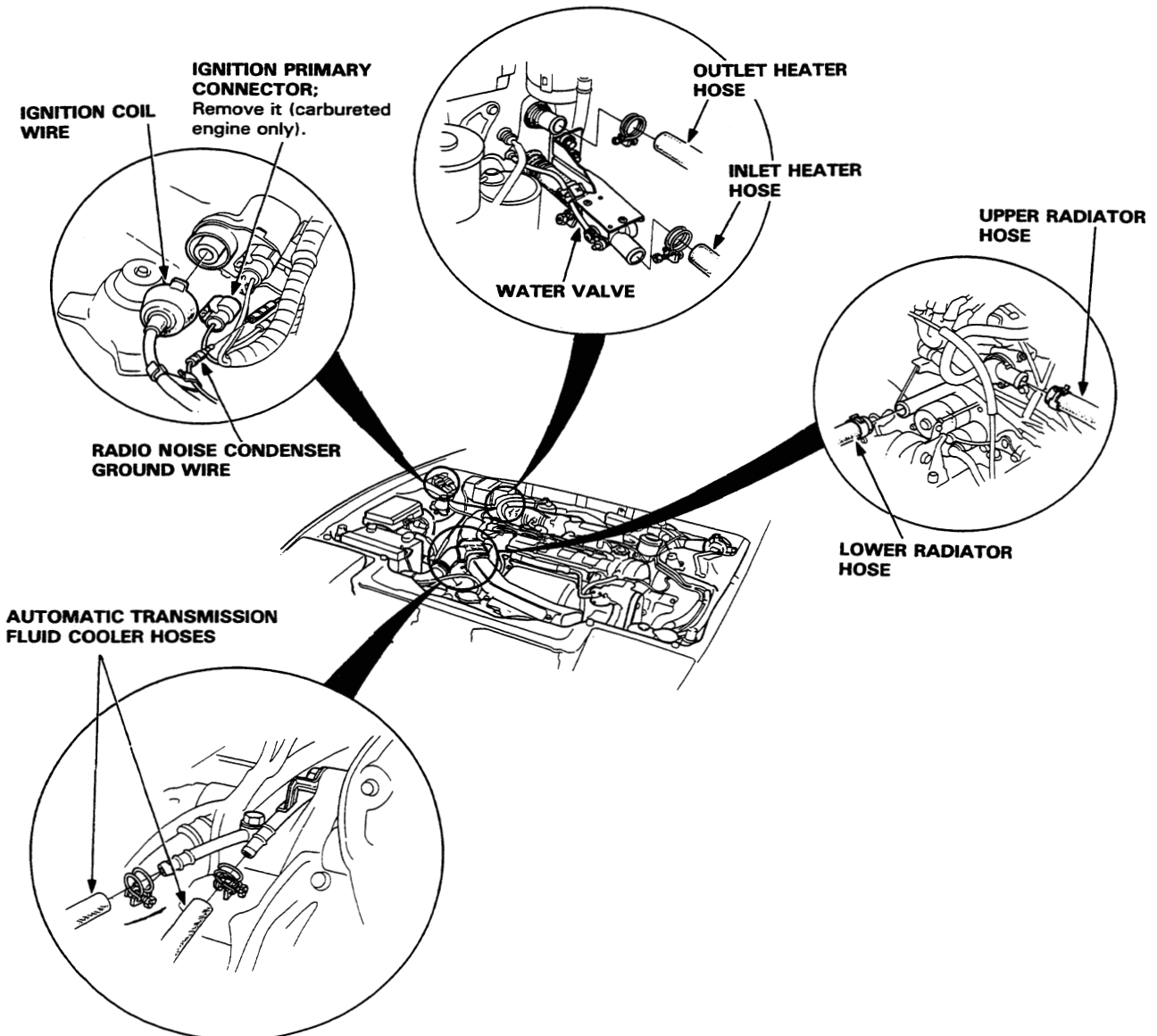
19. Disconnect the upper and lower radiator hoses.

20. Disconnect the inlet and outlet heater hoses.

21. Disconnect the automatic transmission fluid (ATF) cooler hoses (A/T).

- Plug the ATF cooler hoses.

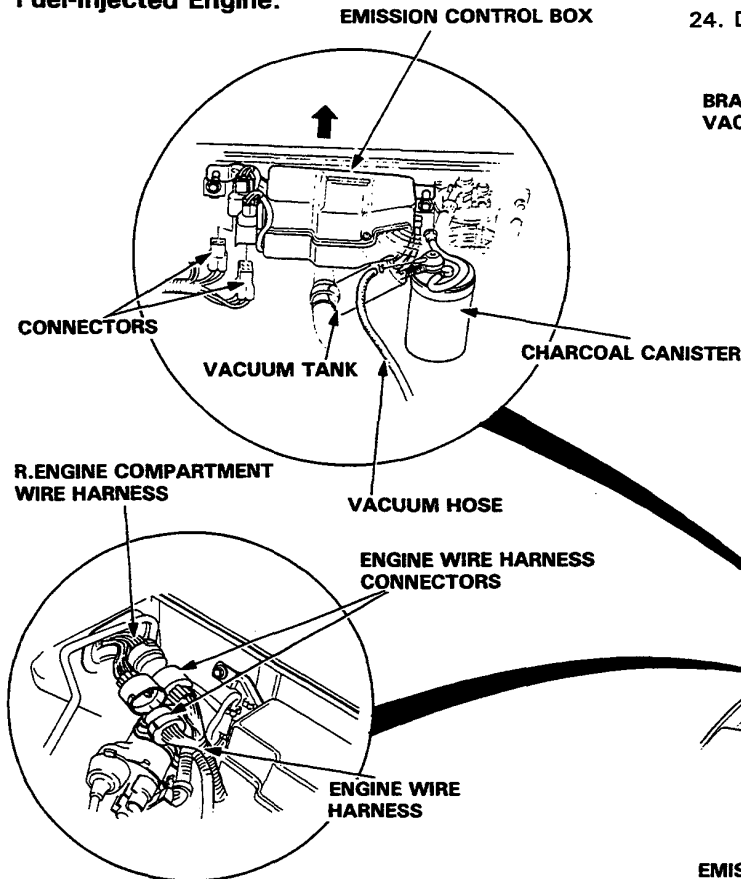
Fuel-Injected Engine shown; Carbureted Engine similar:





22. Disconnect the engine wire harness connectors from R. engine compartment wire harness (Fuel-Injected Engine only).

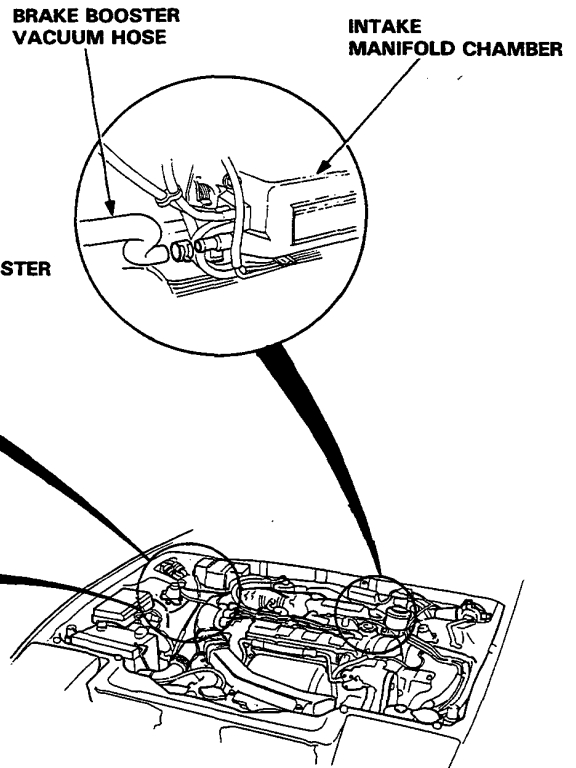
**Fuel-Injected Engine:**



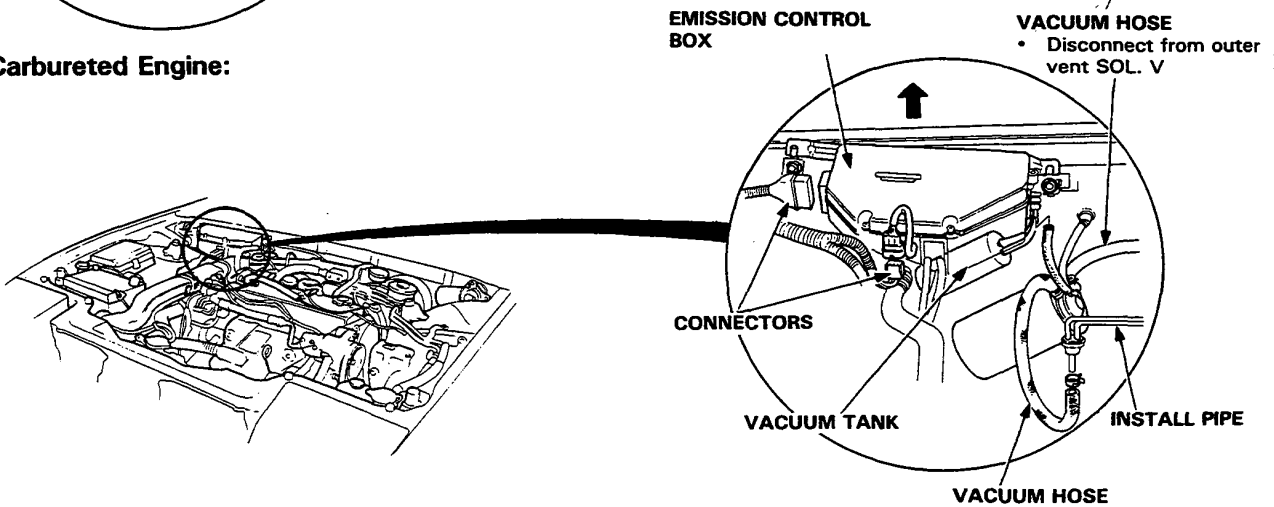
23. Disconnect the two connectors, then remove the emission control box and vacuum tank.

- Don't disconnect the vacuum hoses.

24. Disconnect the brake booster vacuum hose.



**Carbureted Engine:**



(cont'd)

# Engine Removal/Installation

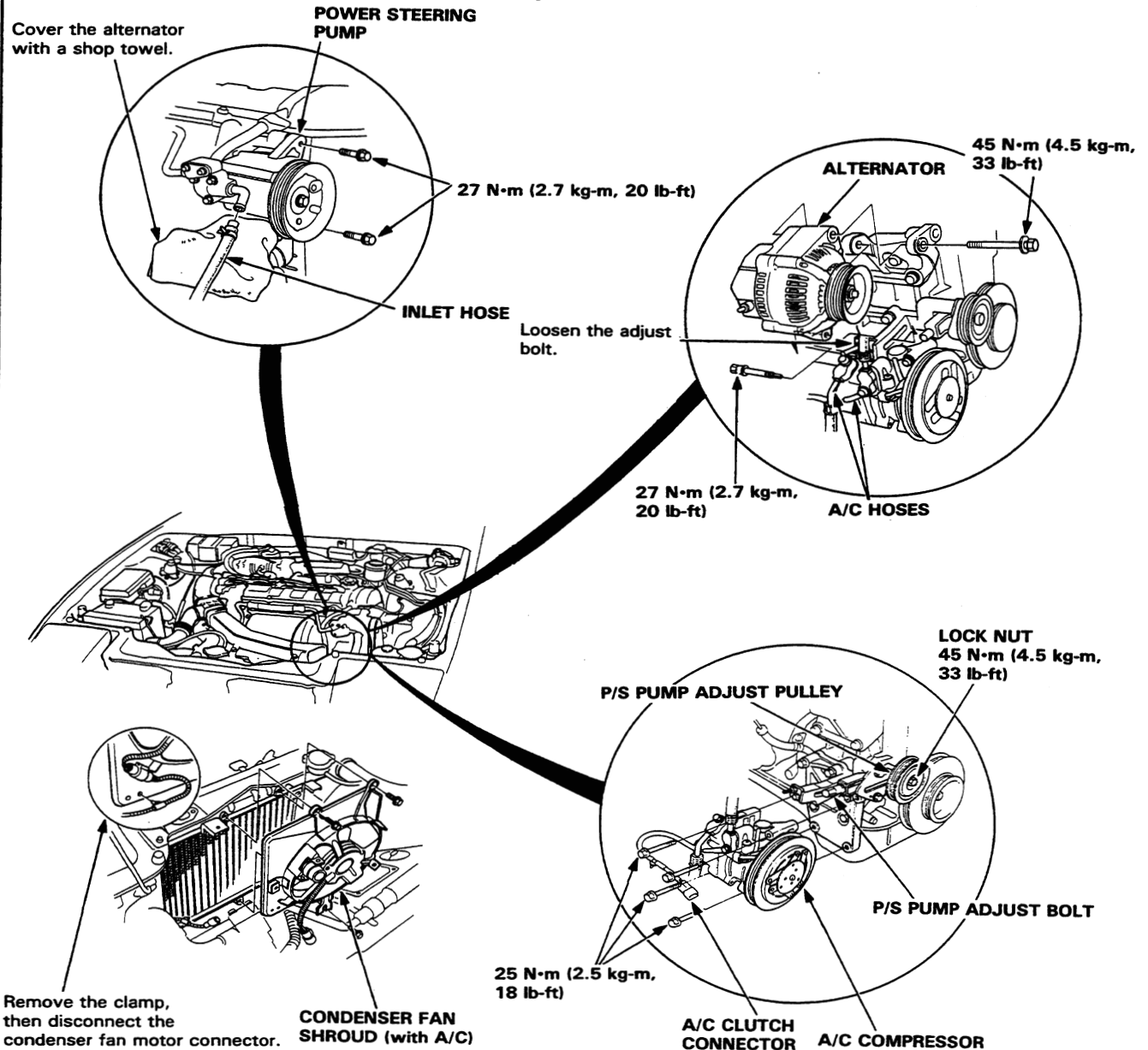
(cont'd)

25. Remove the power steering (P/S) pump belt and alternator belt (5-24).
26. Disconnect the inlet hose and remove the power steering pump.

**CAUTION:** When the hose is disconnected, fluid will flow out. Cover the alternator with a shop towel.

27. Remove the alternator.
  28. Remove the condenser fan shroud.
  29. Remove the air conditioning (A/C) compressor, then mount compressor on the front beam (with A/C).
- Do not disconnect the A/C hoses.

Fuel-Injected Engine shown; Carbureted Engine similar:



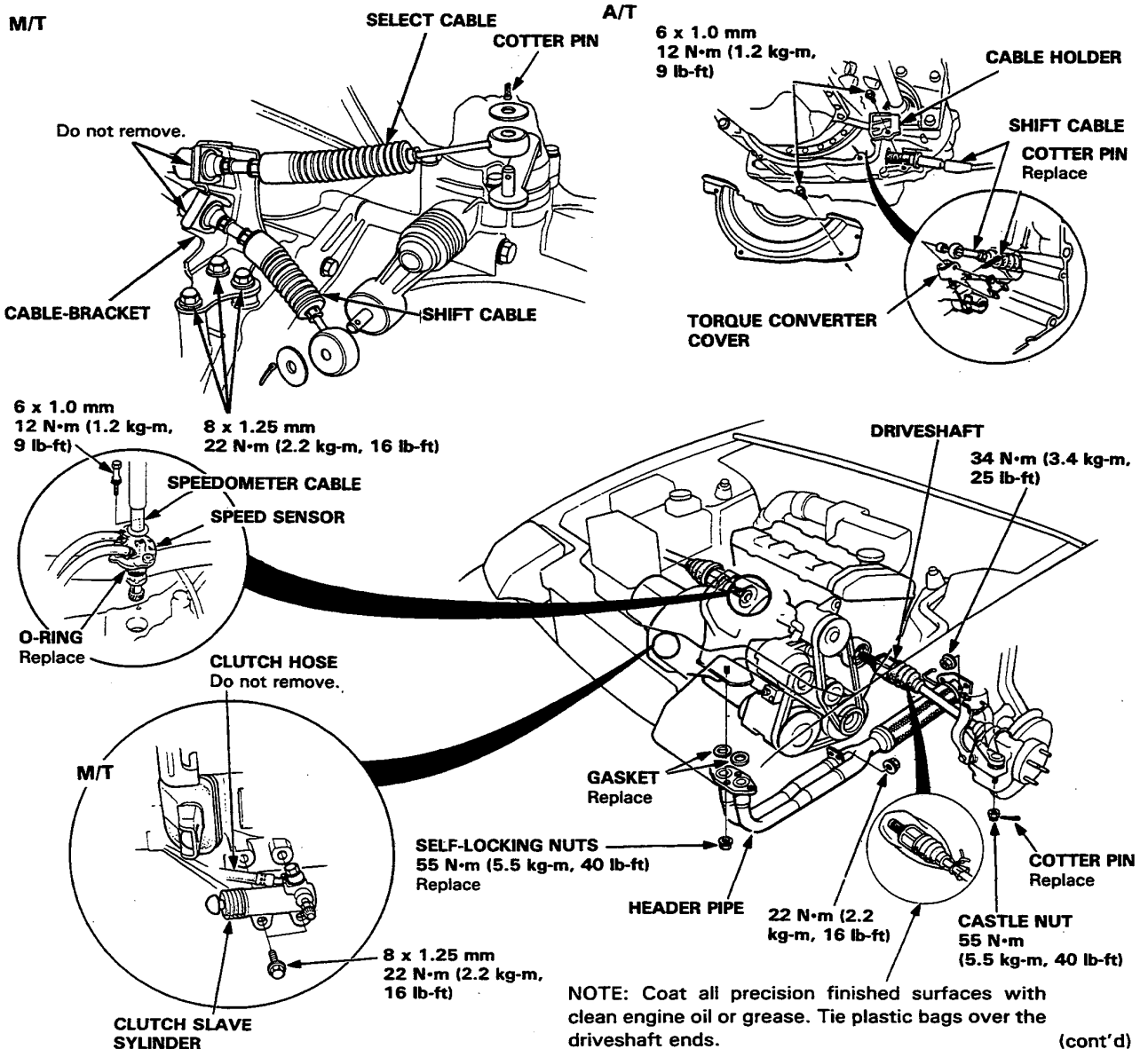




30. Disconnect the shift cable and select cable from the transmission, then remove the cable bracket (M/T).
31. Remove the automatic transmission shift cable from the transmission (A/T).
32. Remove the transmission ground wire.
33. Remove left axle and half shaft.
34. Remove clutch slave cylinder.  
NOTE: Do not disconnect hose from the slave cylinder.

35. Remove speed sensor and speedometer cable.  
NOTE:
  - Take care not to bend the cable when removing it. Do not use pliers to remove the cable. Always replace a kinked cable with a new one.
  - On reassembly, check the cable adjustment (See Section 13 for M/T and Section 14 for A/T).

**Fuel-Injected Engine shown; Carbureted Engine similar:**



# Engine Removal/Installation

(cont'd)

36. Attach a chain hoist to the engine block and raise the hoist just enough to remove slack from chain.
37. Remove the rear engine mount bolt, then remove the mount bracket.
38. Remove the front engine mount bolt.

**NOTE:** Front and rear engine mount bolts are special bolts. Replace the bolts once they are loosened.

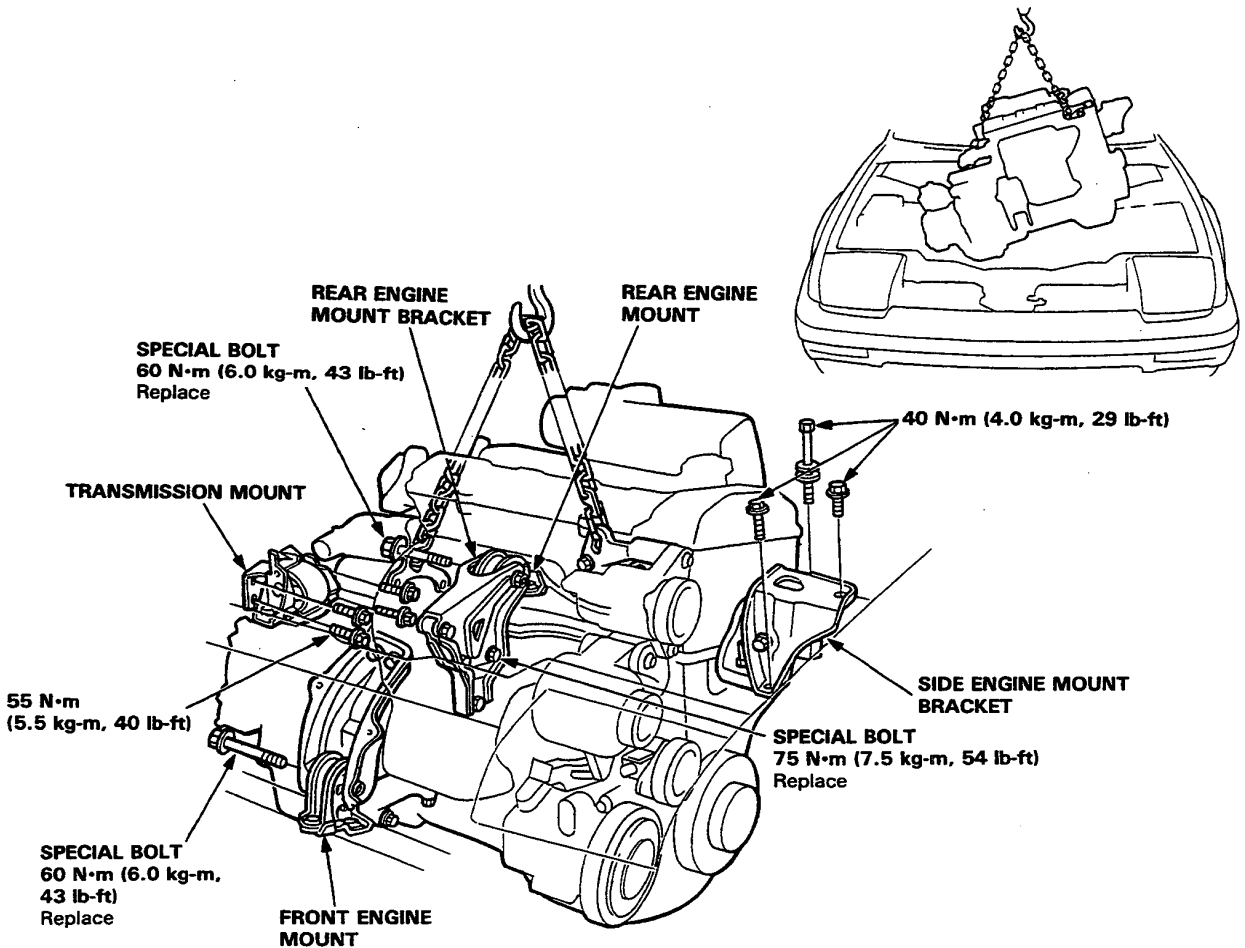
39. Remove the side engine mount bracket bolts.
40. Remove the transmission mount bolt.

41. Check that wires and tubes are completely removed from the engine, and lift the engine slowly with the chain.
42. Tilt the engine, then hoist it out of the engine compartment.

**CAUTION:** Use care to avoid damaging the body.

**WARNING** Do not crawl under the car when hoisting the engine.

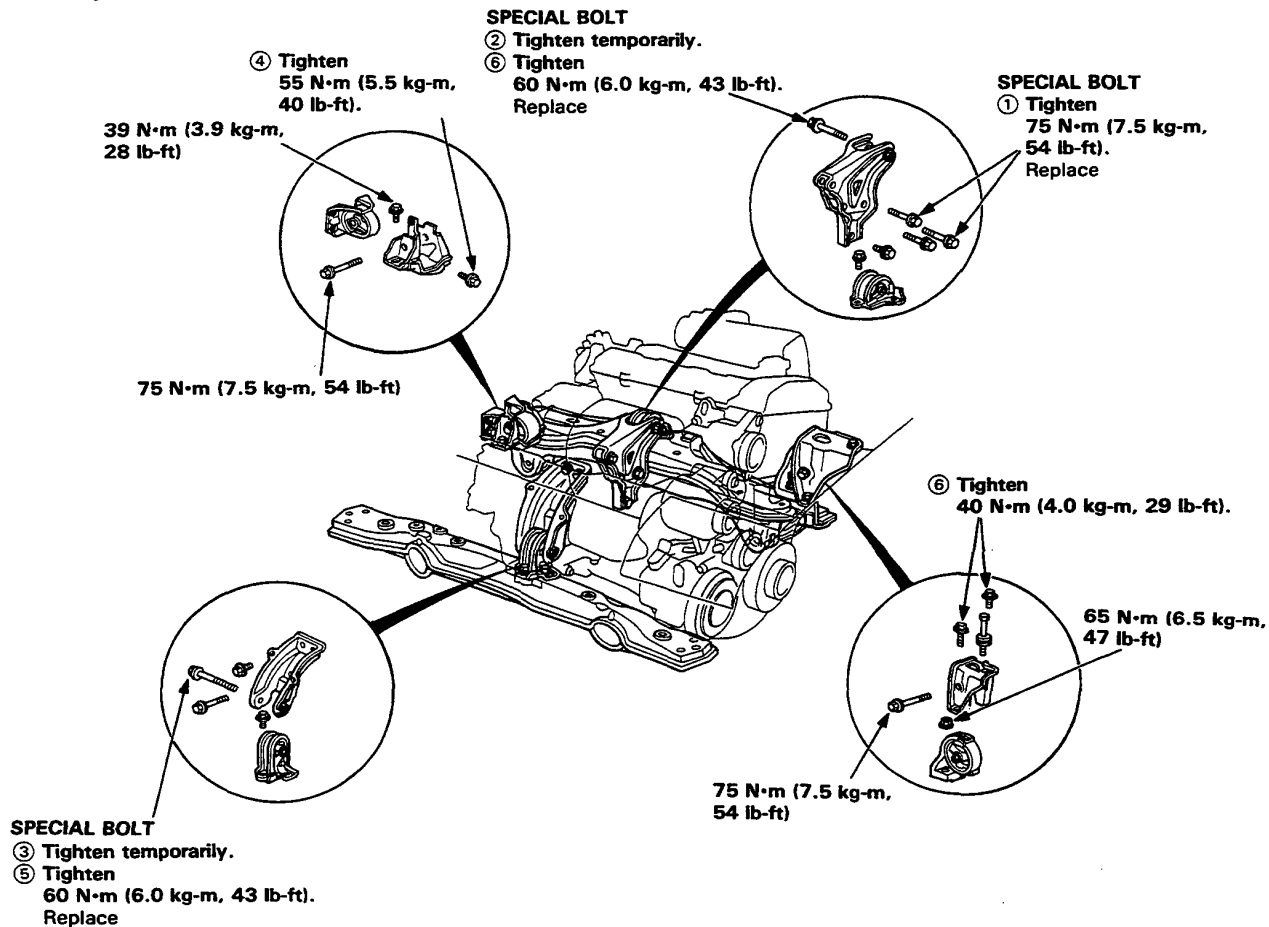
**Fuel-Injected Engine shown; Carbureted Engine similar:**





NOTE: For proper suppression of noise and vibration, and maximum bushing life, tighten the bolts in the sequence shown with the bushings centered in their mounts.

**Fuel-Injected Engine shown; Carbureted Engine similar:**



43. Install the engine in the reverse order of removal. After the engine is in place:

- Torque engine mount bolts in sequence shown.

**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.

- Check that the spring clip on the end of each driveshaft clicks into the differential.

**CAUTION:** Use new spring clips on installation.

- Bleed air from the cooling system at the bleed bolt with the heater valve open.

- Adjust the throttle cable tension.
- Adjust the alternator belt and power steering pump belt tension.
- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Install the A/C compressor, connect the wiring and V-belt (with A/C).
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.

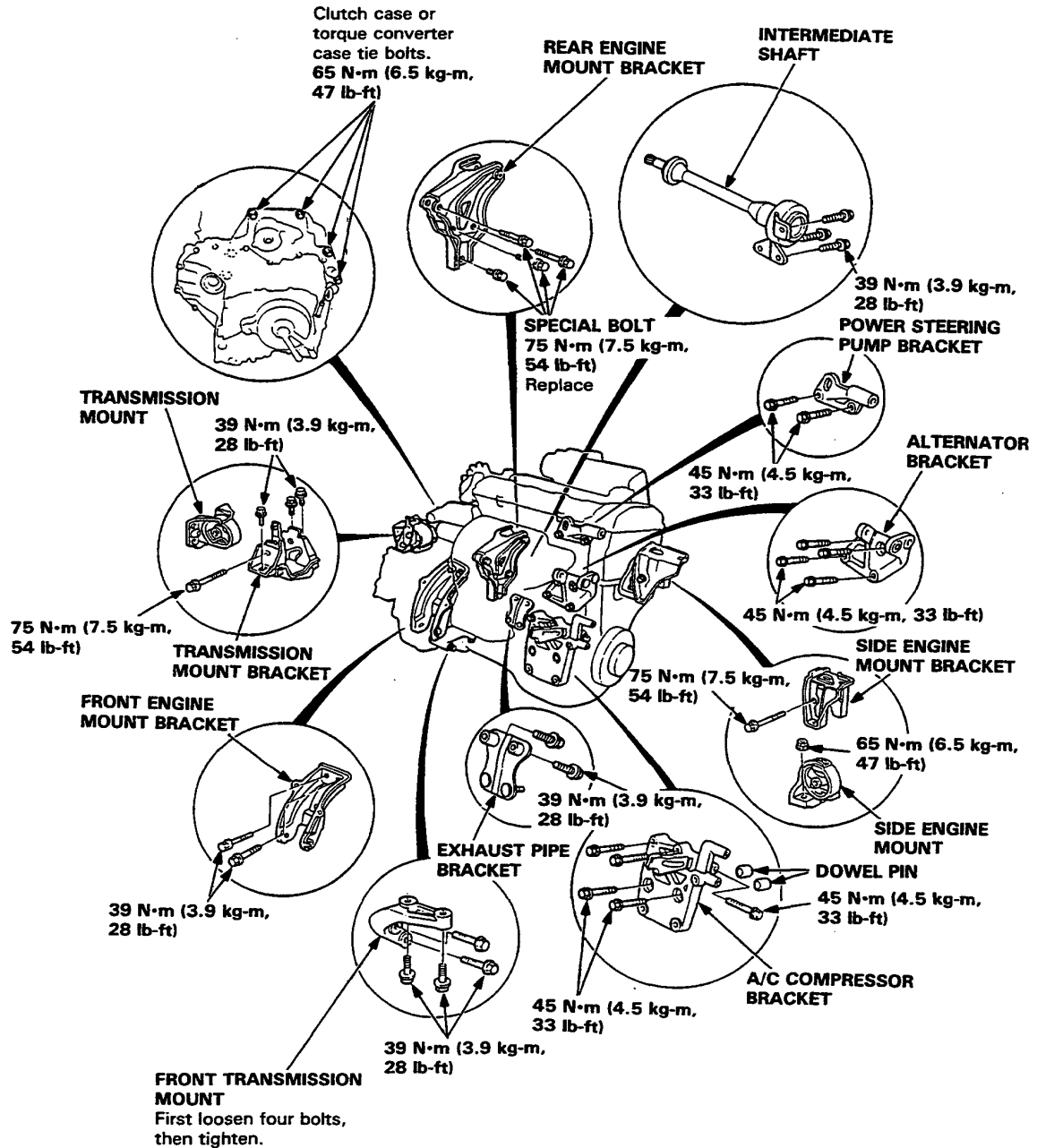
(cont'd)

# Engine Removal/Installation

(cont'd)

NOTE: For proper suppression of noise and vibration, and maximum bushing life, tighten the bolts to the torque mentioned below.

Fuel-Injected Engine Shown; Carbureted Engine similar:



## **Intake Manifold/Exhaust System**

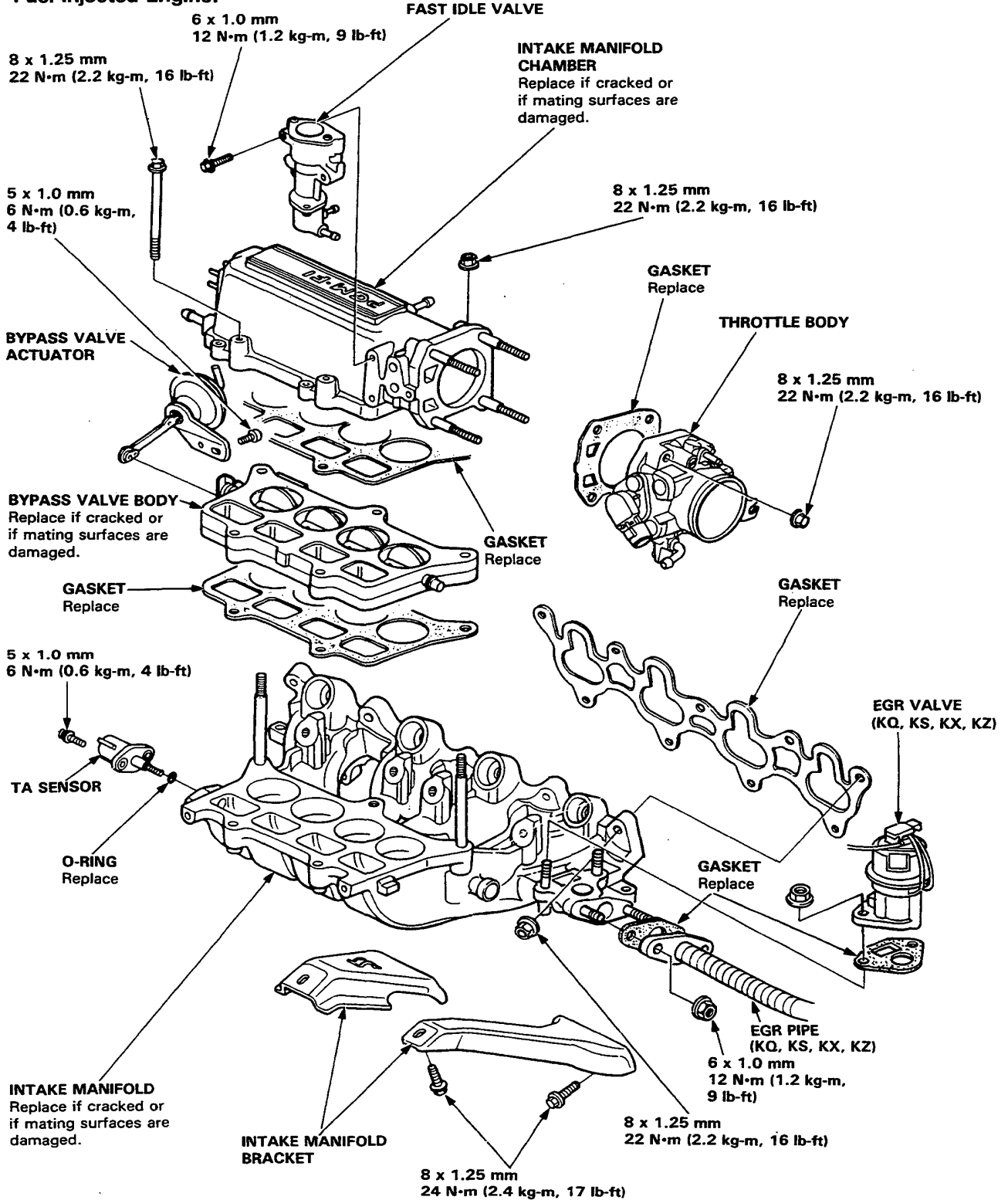
<b>Intake Manifold .....</b>	<b>5-56</b>
<b>Exhaust Manifold .....</b>	<b>5-58</b>
<b>Exhaust Pipe and Muffler .....</b>	<b>5-60</b>



# Intake Manifold

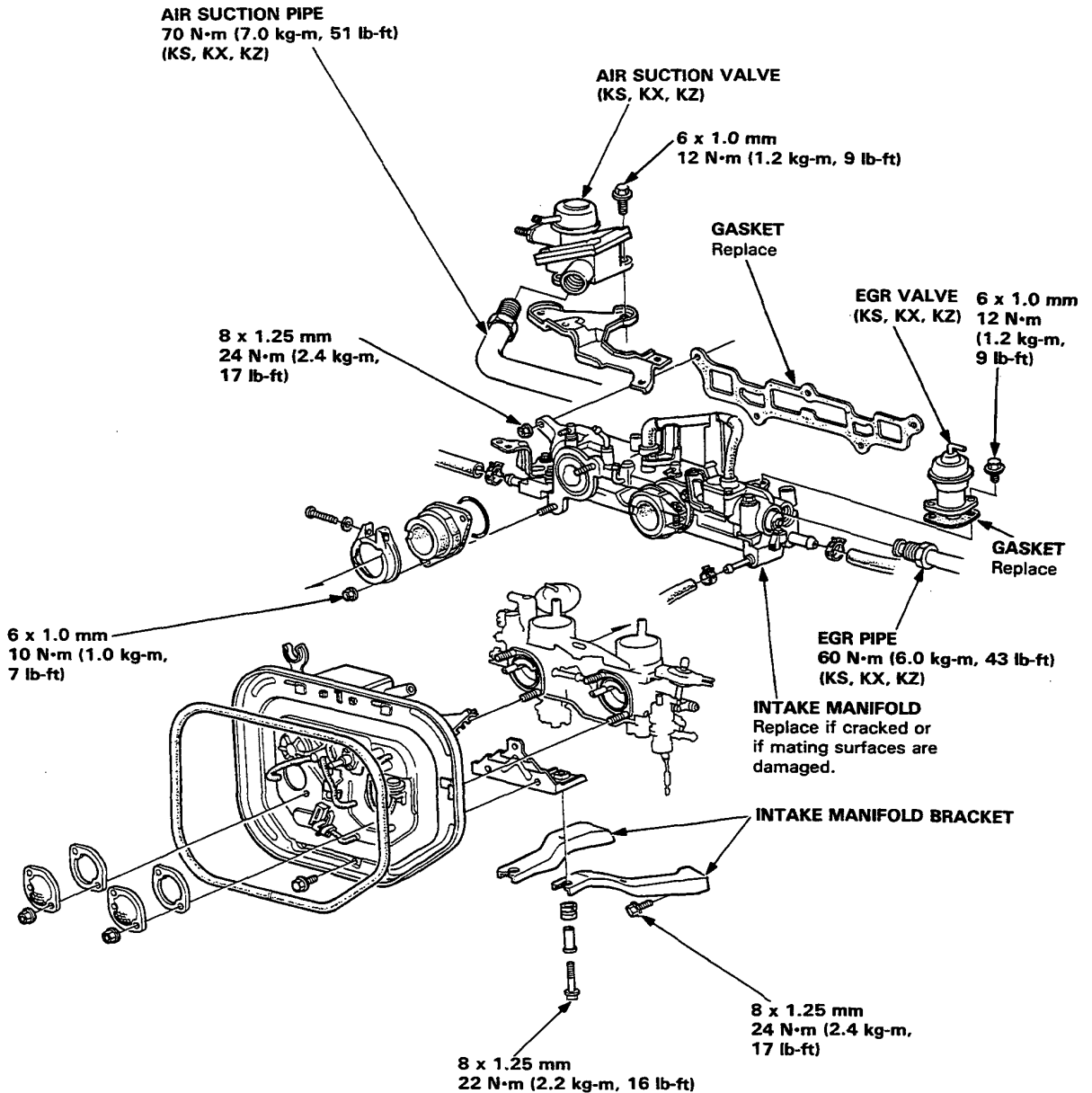
## Illustrated Index

### Fuel-Injected Engine:





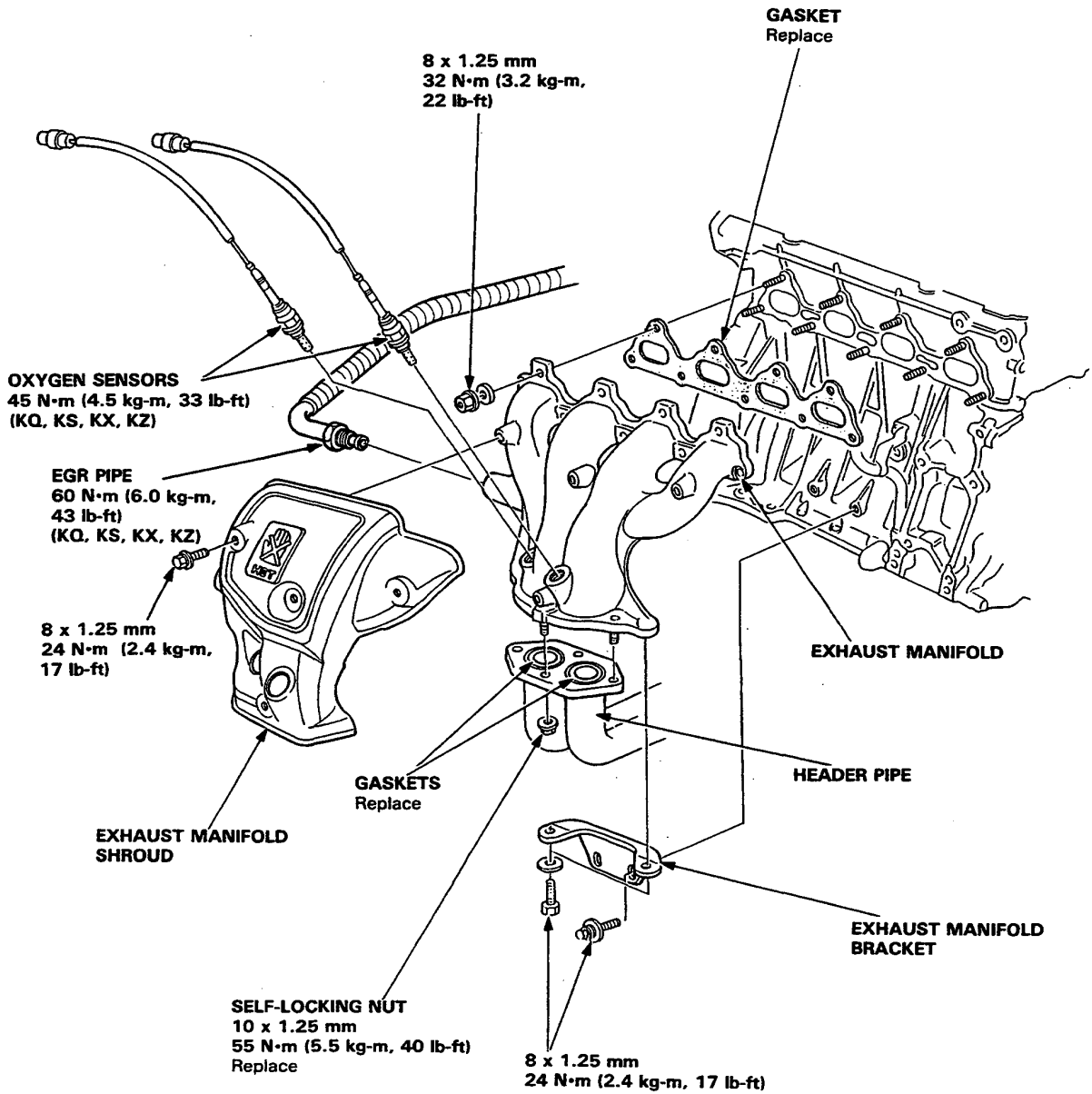
## Carbureted Engine:



# Exhaust Manifold

## Illustrated Index

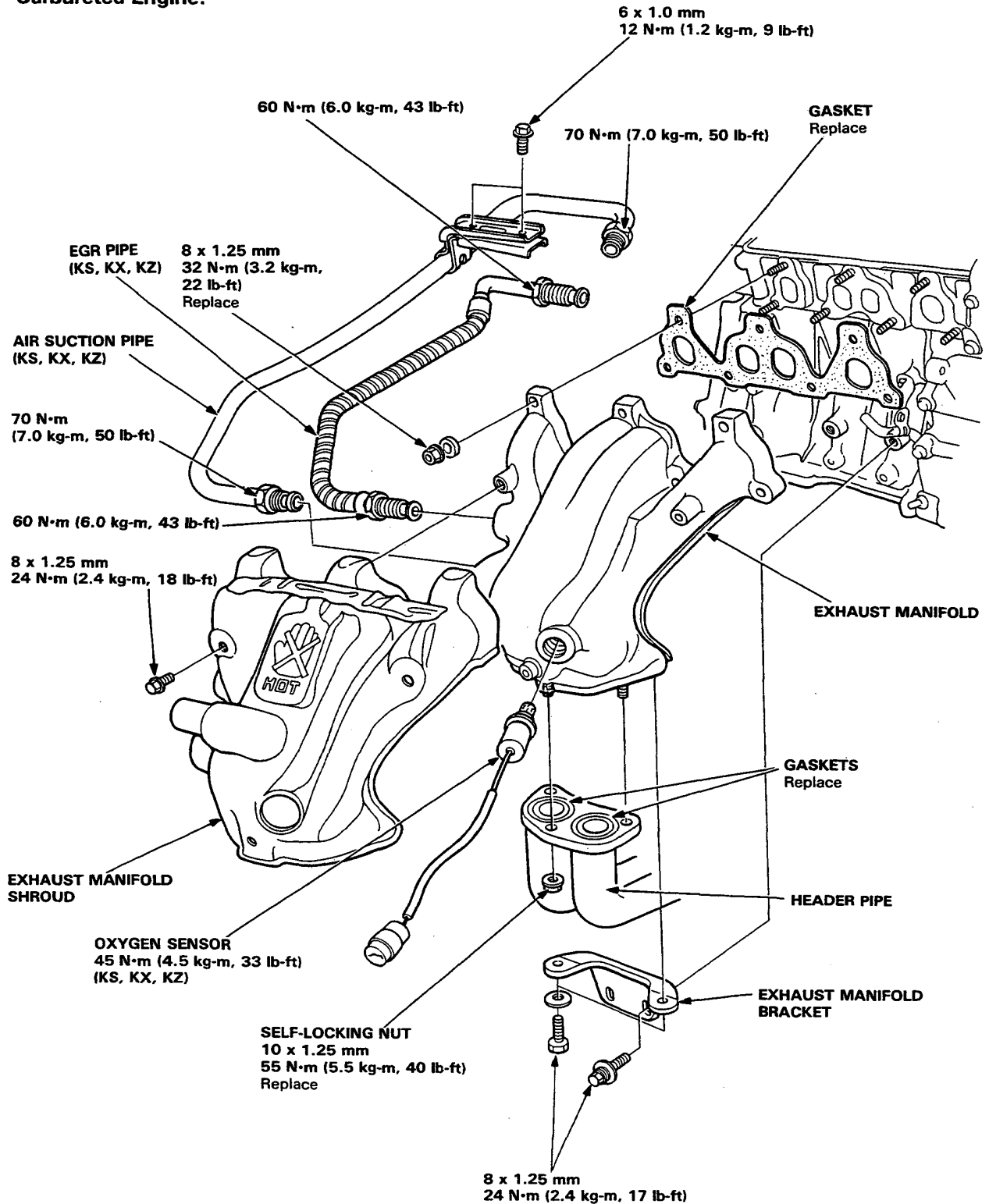
Fuel-Injected Engine:







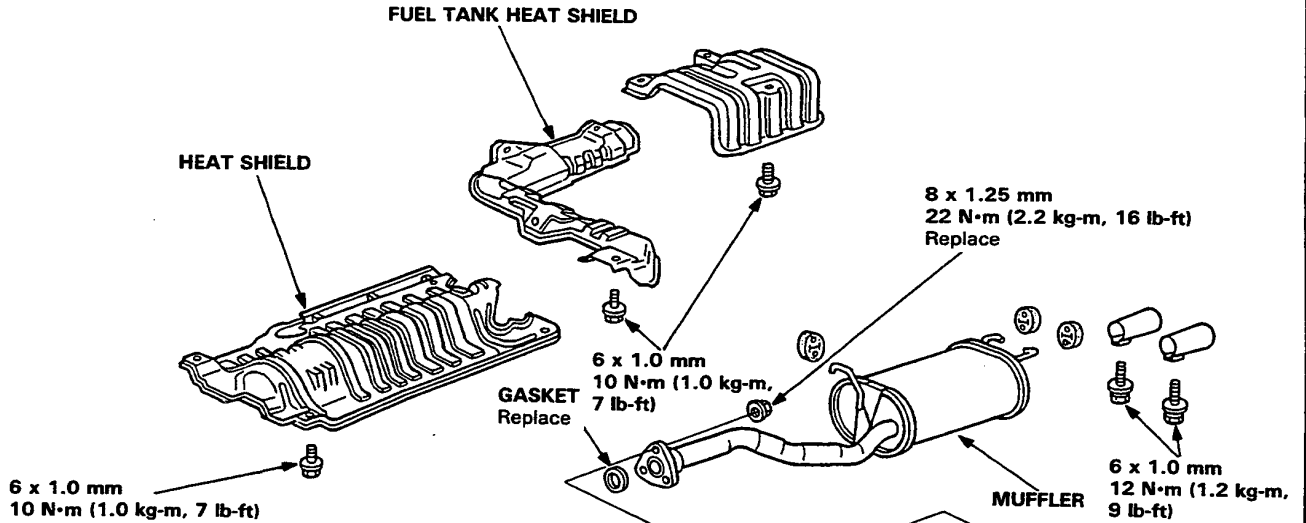
## Carbureted Engine:



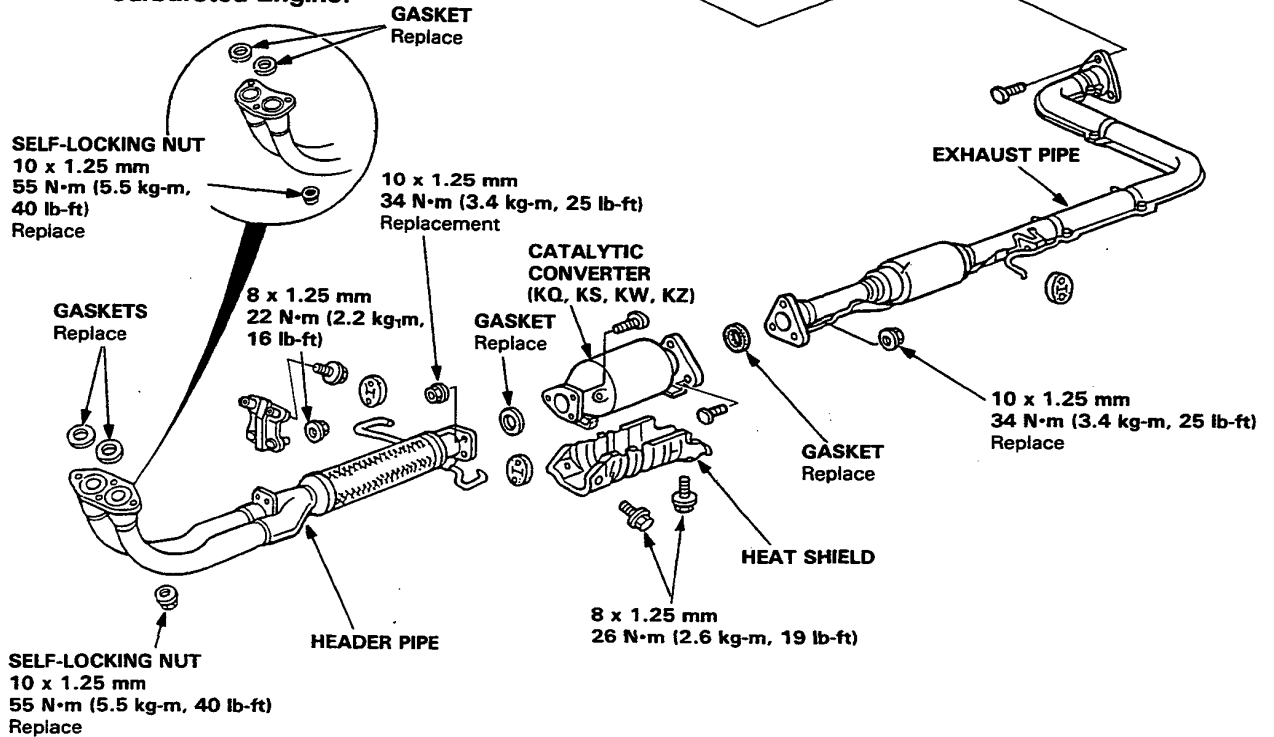
# Exhaust Pipe and Muffler

## Replacement

### Fuel-Injected Engine:



### Carbureted Engine:



## Cooling

### Radiator

Replacement .....	5-62
Refilling and Bleeding .....	5-64
Cap Testing .....	5-65
Radiator Testing .....	5-65

### Thermostat

Replacement .....	5-66
-------------------	------



# Radiator

## Replacement

### Fuel-Injected Engine:

**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 (Incl. heater, and reservoir tank):  
5 M/T, 4 A/T: 7.8 liters (8.2 U.S. qt., 6.9 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 whenever reassembling.

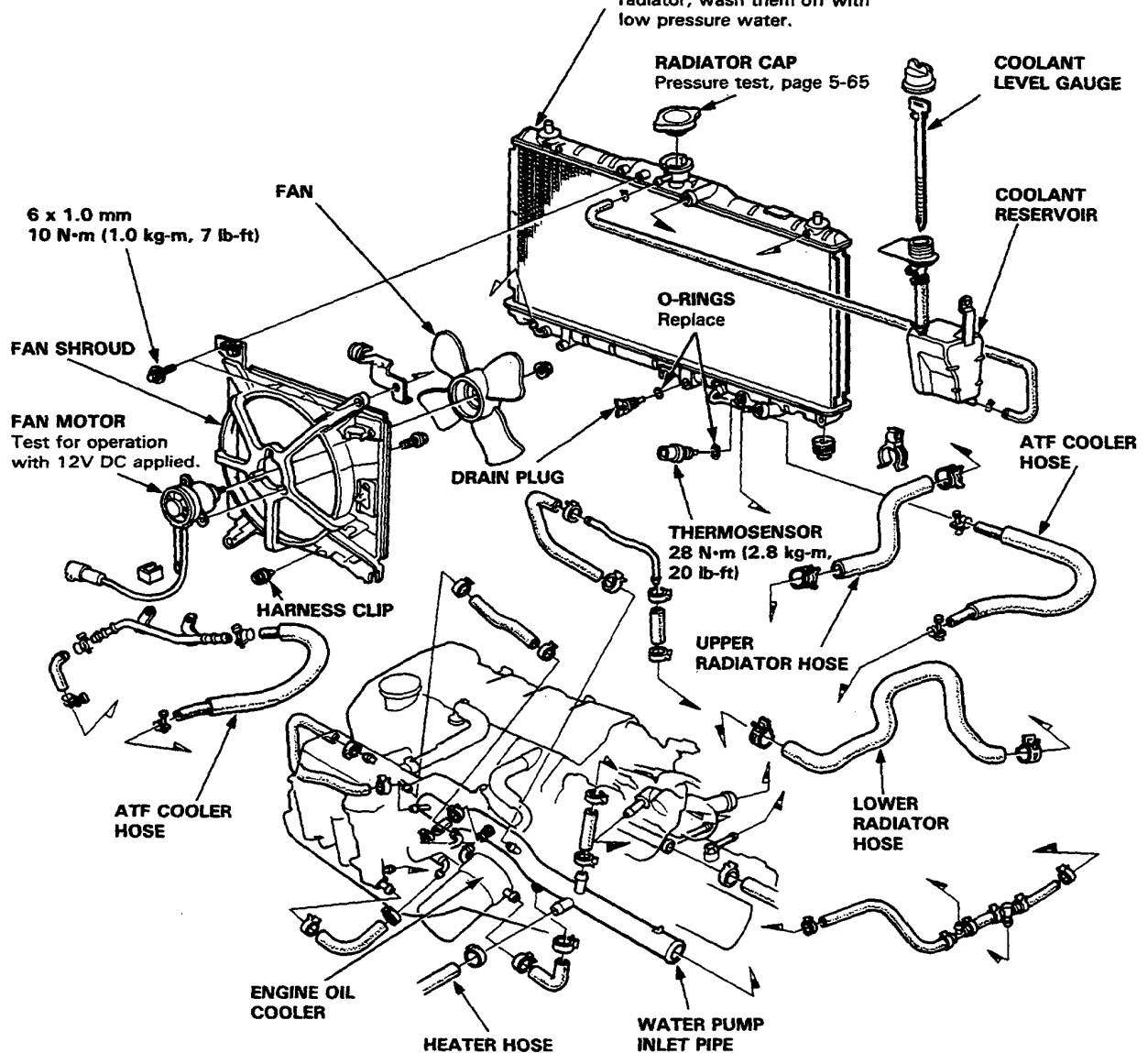
### RADIATOR

Refilling, page 5-64

Leak test, page 5-65

Inspect soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging radiator, wash them off with low pressure water.





## Carbureted Engine:

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

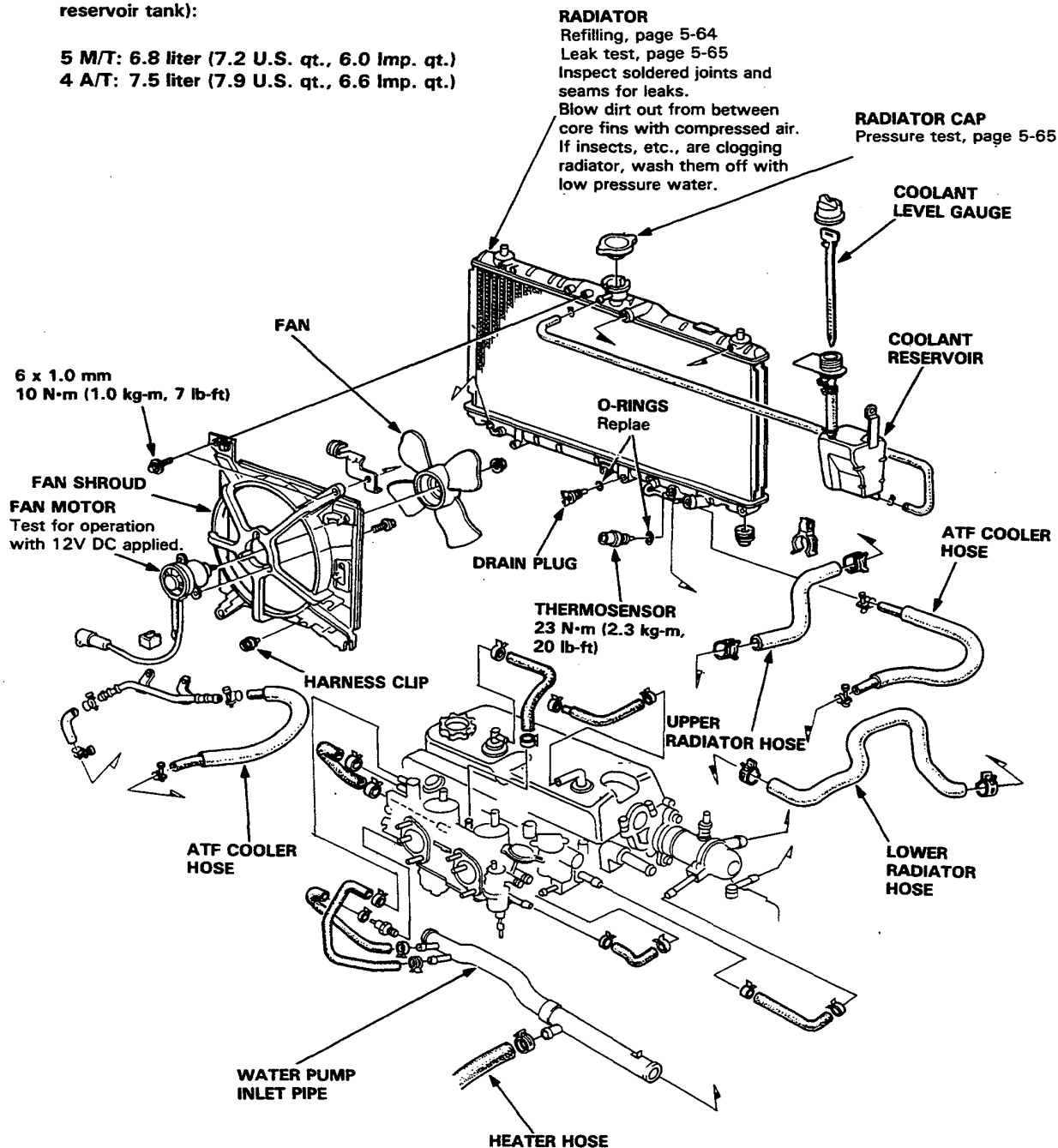
Total Cooling System Capacity (Incl. heater, and reservoir tank):

5 M/T: 6.8 liter (7.2 U.S. qt., 6.0 Imp. qt.)

4 A/T: 7.5 liter (7.9 U.S. qt., 6.6 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 whenever reassembling.



# Radiator

## Refilling and Bleeding

1. Set the heater temperature lever to maximum heat.
2. When the radiator is cool, remove the radiator cap and drain plug, and drain the radiator.
3. Reinstall the radiator drain plug and tighten it securely.
4. Remove, drain and reinstall the reserve tank. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with coolant.
5. Mix the recommended anti-freeze with an equal amount of water, in a clean container.

### NOTE:

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

### CAUTION:

- Do not mix different brand anti-freeze/coolants.
- Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the recommended coolant.

### Radiator Coolant Refill Capacity:

#### Fuel-Injected Engine:

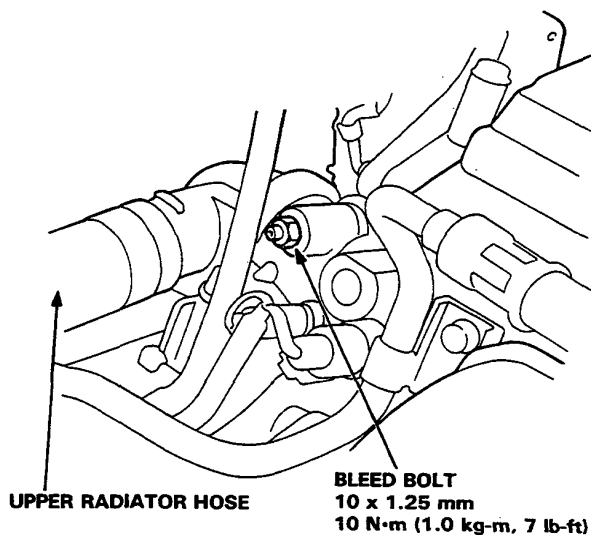
5 M/T, 4 A/T: 6.1 liters (6.4 U.S. qt., 5.4 Imp. qt.)

#### Carbureted Engine:

5 M/T: 5.2 liters (5.5 U.S. qt., 4.6 Imp. qt.)

4 A/T: 5.8 liters (6.1 U.S. qt., 5.1 Imp. qt.)

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

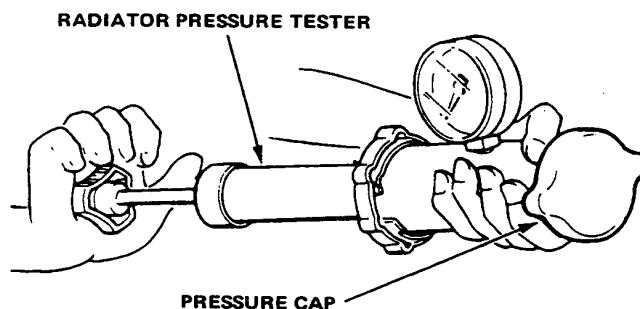


7. With the radiator cap off, start the engine and let it run until warmed up (fan goes on at least twice). Then, if necessary add more coolant mix to bring the level back up to the bottom of the filler neck.
8. Put the radiator cap on, then run the engine again and check for leaks.



## Cap Testing

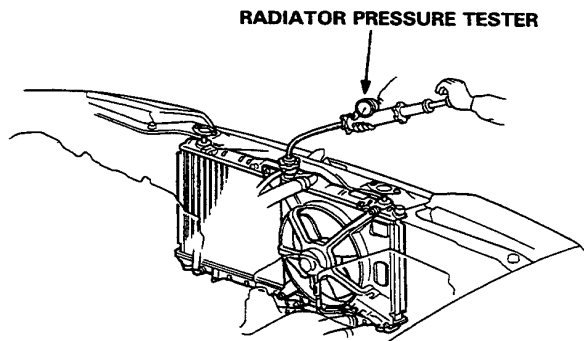
1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply a pressure of 74–103 kPa (0.75–1.05 kg/cm<sup>2</sup>, 11–15 psi).
3. Check for a drop in pressure.



## Radiator Testing

1. Wait until the engine is cool, then carefully remove the pressure cap and fill the radiator with coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 74–103 kPa (0.75–1.05 kg/cm<sup>2</sup>, 11–15 psi).
3. Inspect for coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the pressure cap.

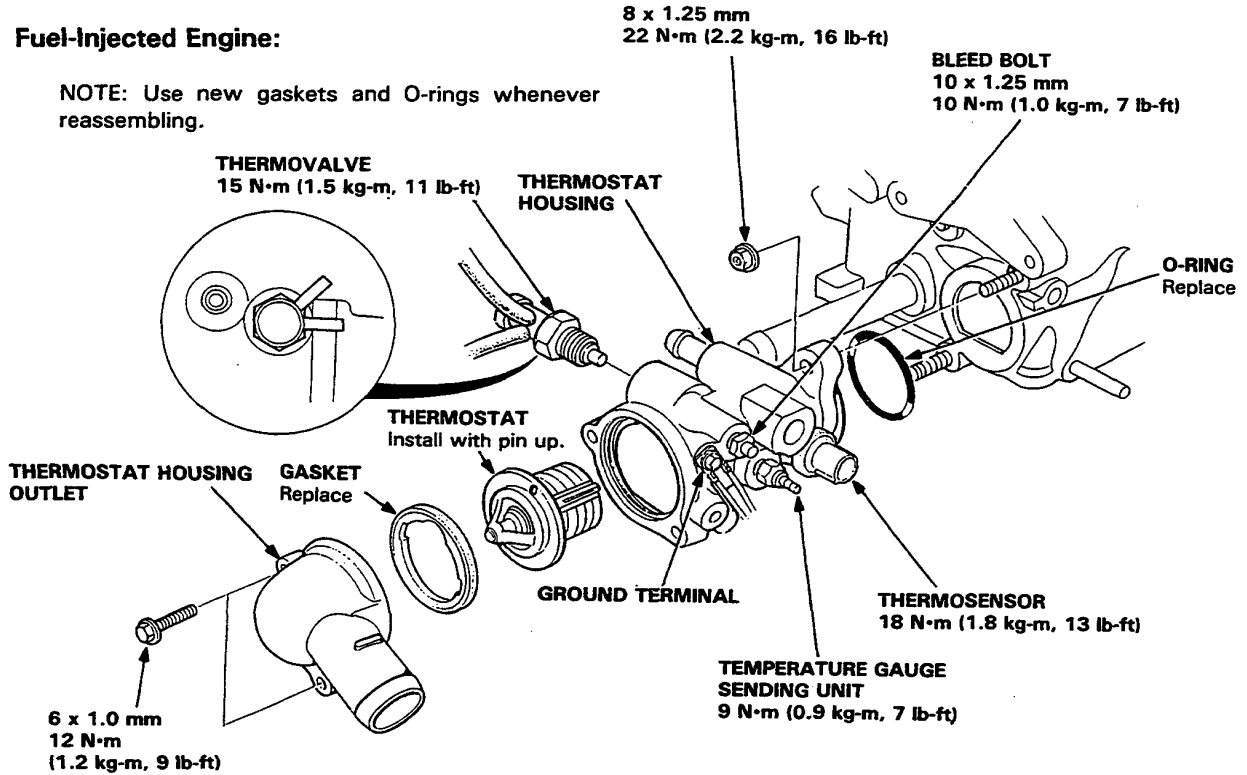
**NOTE:** Check for engine oil in coolant and/or coolant in engine oil.



# Thermostat Replacement

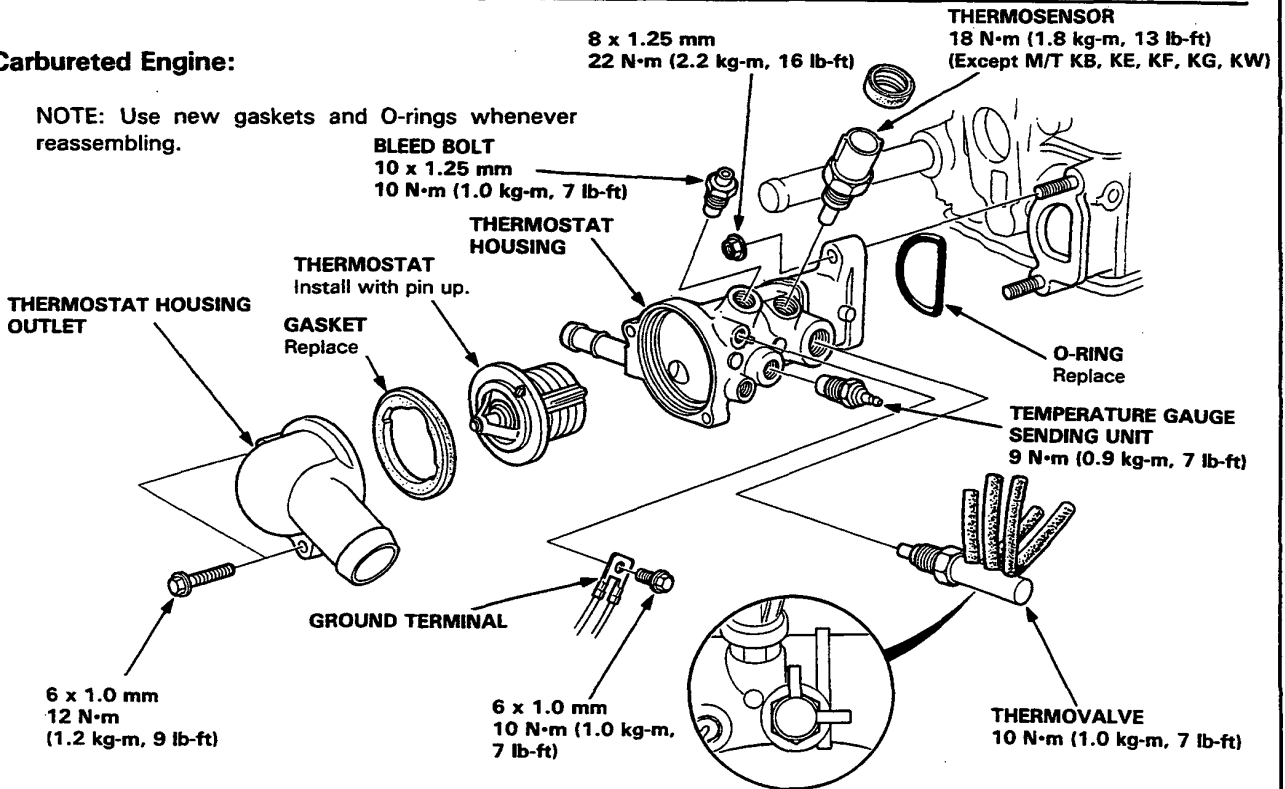
## Fuel-Injected Engine:

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



## Carbureted Engine:

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





## **Fuel and Emissions**

<b>Carbureted Engine .....</b>	<b>6-1</b>
<b>Fuel-Injected Engine .....</b>	<b>6-119</b>



## Fuel and Emissions (Carbureted Engine)

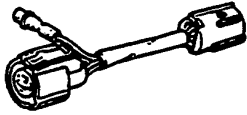
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Fuel Cut-off Relay .....	6-54	Sensor .....	6-107
Fuel Tank .....	6-55	EACV .....	6-109
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		Ground .....	6-112
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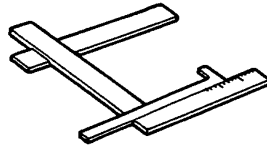
# Special Tools

## Special Tools

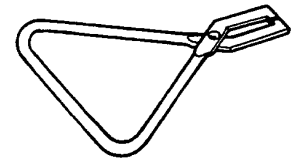
Ref. No	Tool Number	Description	Q'ty	Remarks
①	07GAZ-SE00300	R.P.M. Connecting Adaptor	1	
②	07401-0010000	Float Level Gauge	1	
③	07614-0050100	Fuel Line Clamp	1	
④	07HAZ-PJ70000	ECU Check Adaptor A	1	
⑤	07HAZ-PJ70100	ECU Check Adaptor B	1	
⑥	07411-0020000	Digital Circuit Tester	1	
⑦	07GMJ-ML80100	Inspection Adaptor	1	



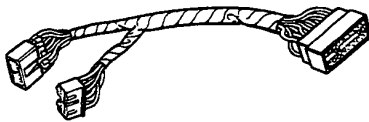
①



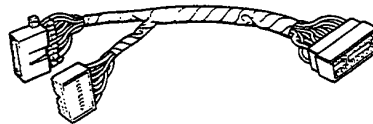
②



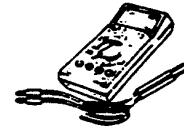
③



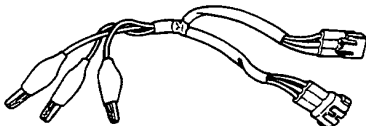
④



⑤



⑥



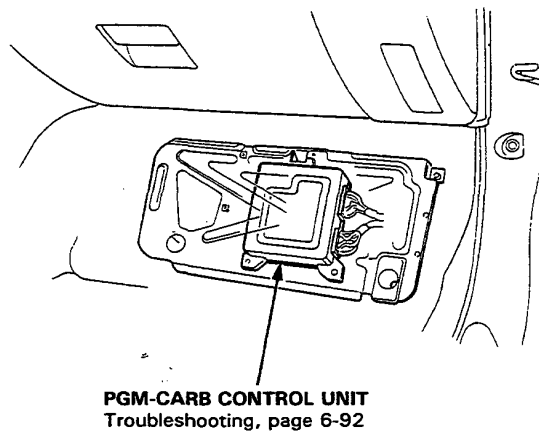
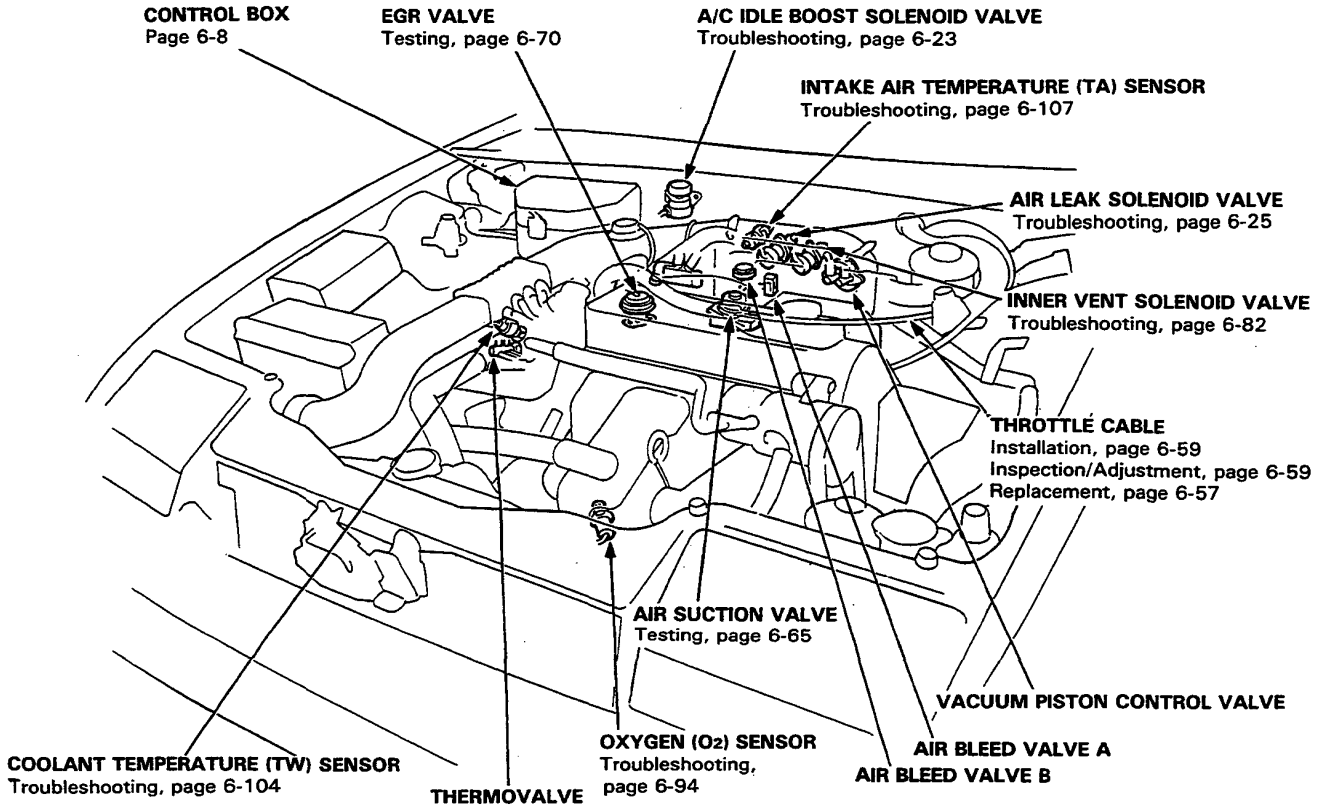
⑦

# Component Locations



## Index

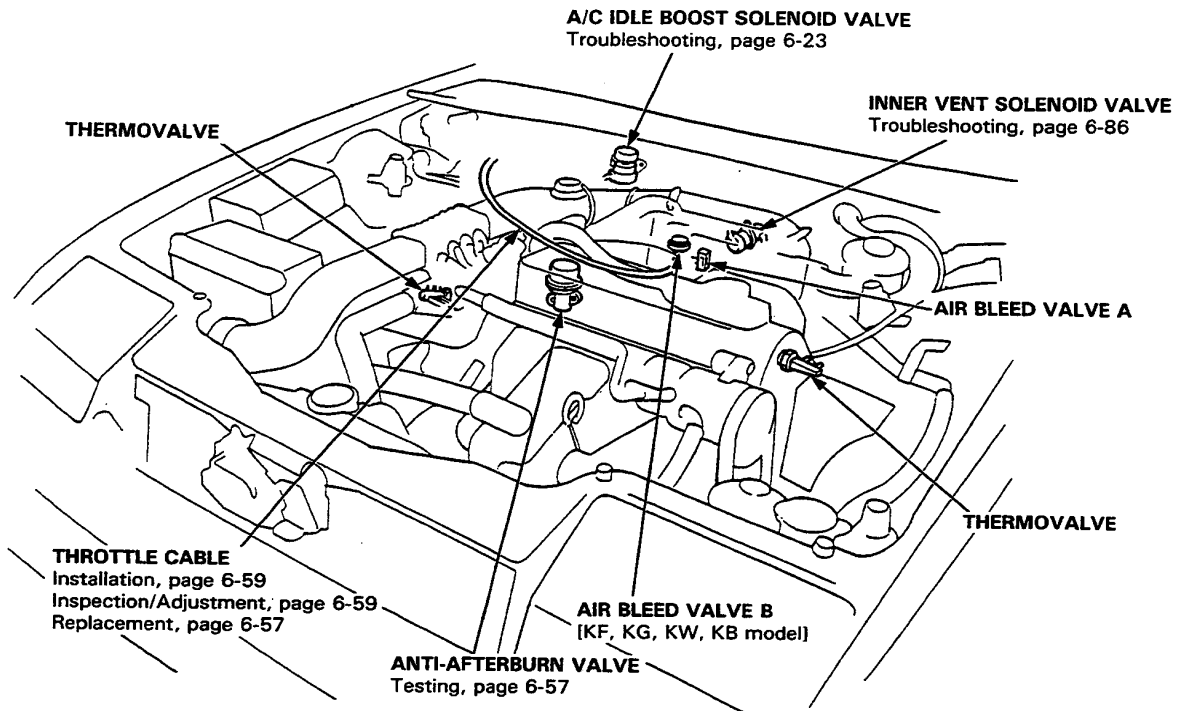
[KX, KS, KZ model]



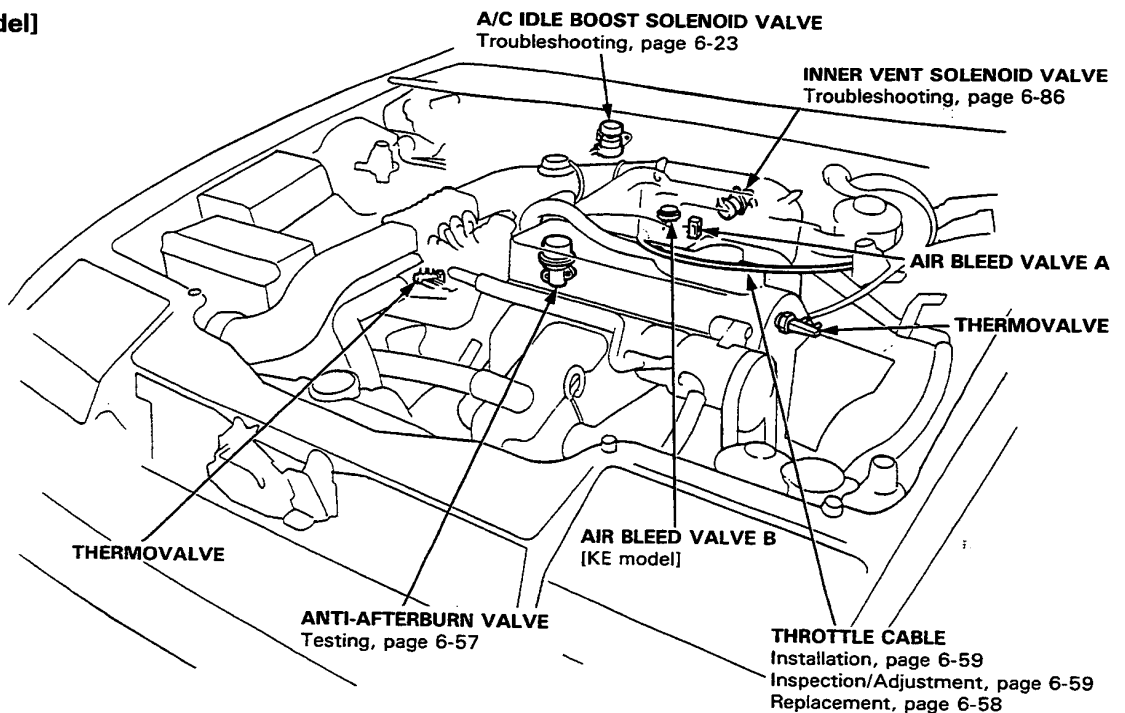
# Component Locations

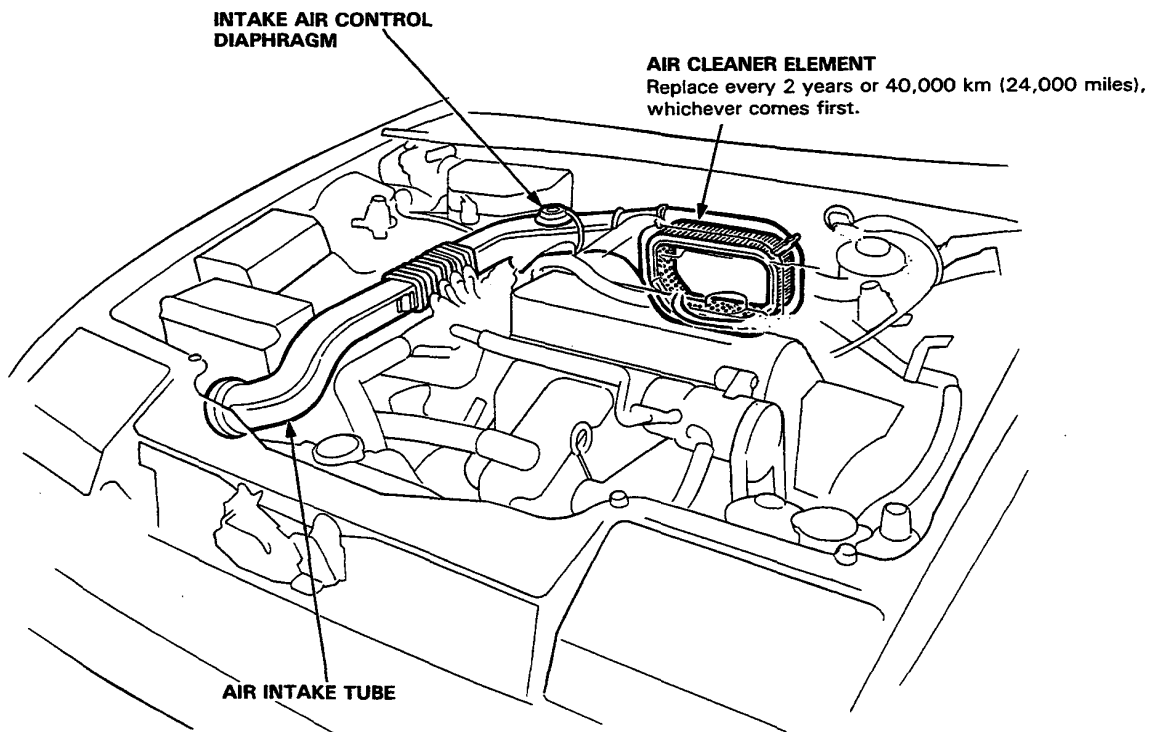
## Index

[KF, KG, KW, KB, KY model]



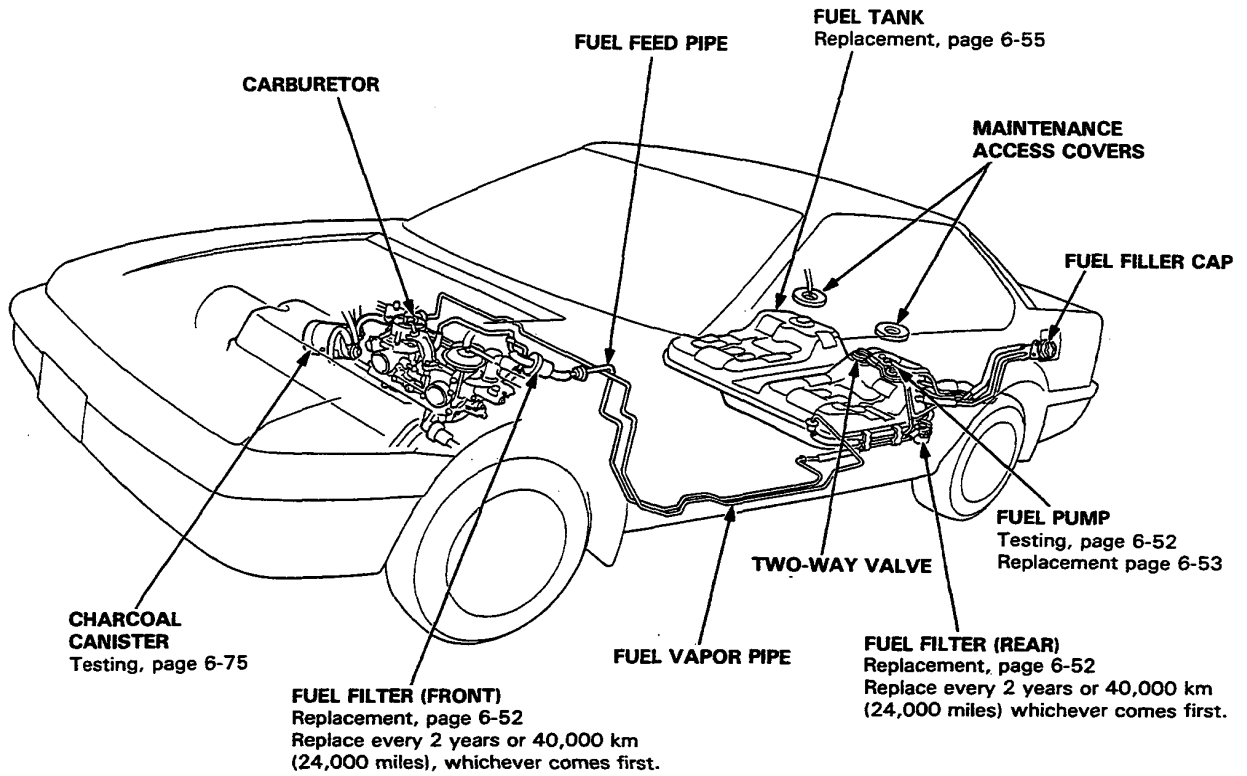
[KE, KT model]



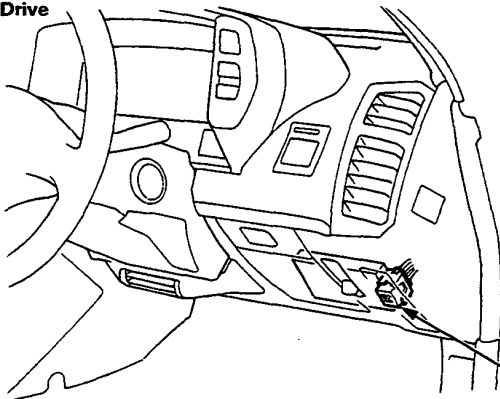


# Component Locations

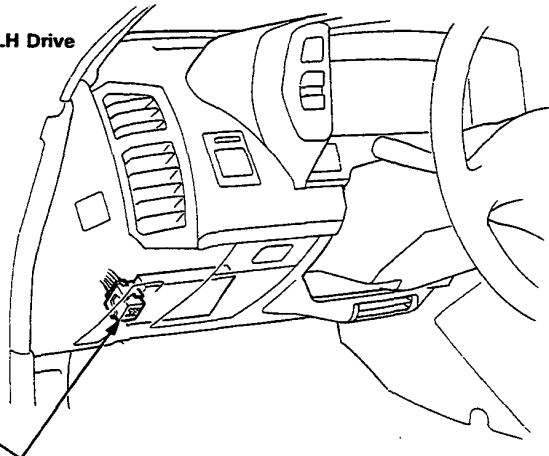
## Index



RH Drive



LH Drive



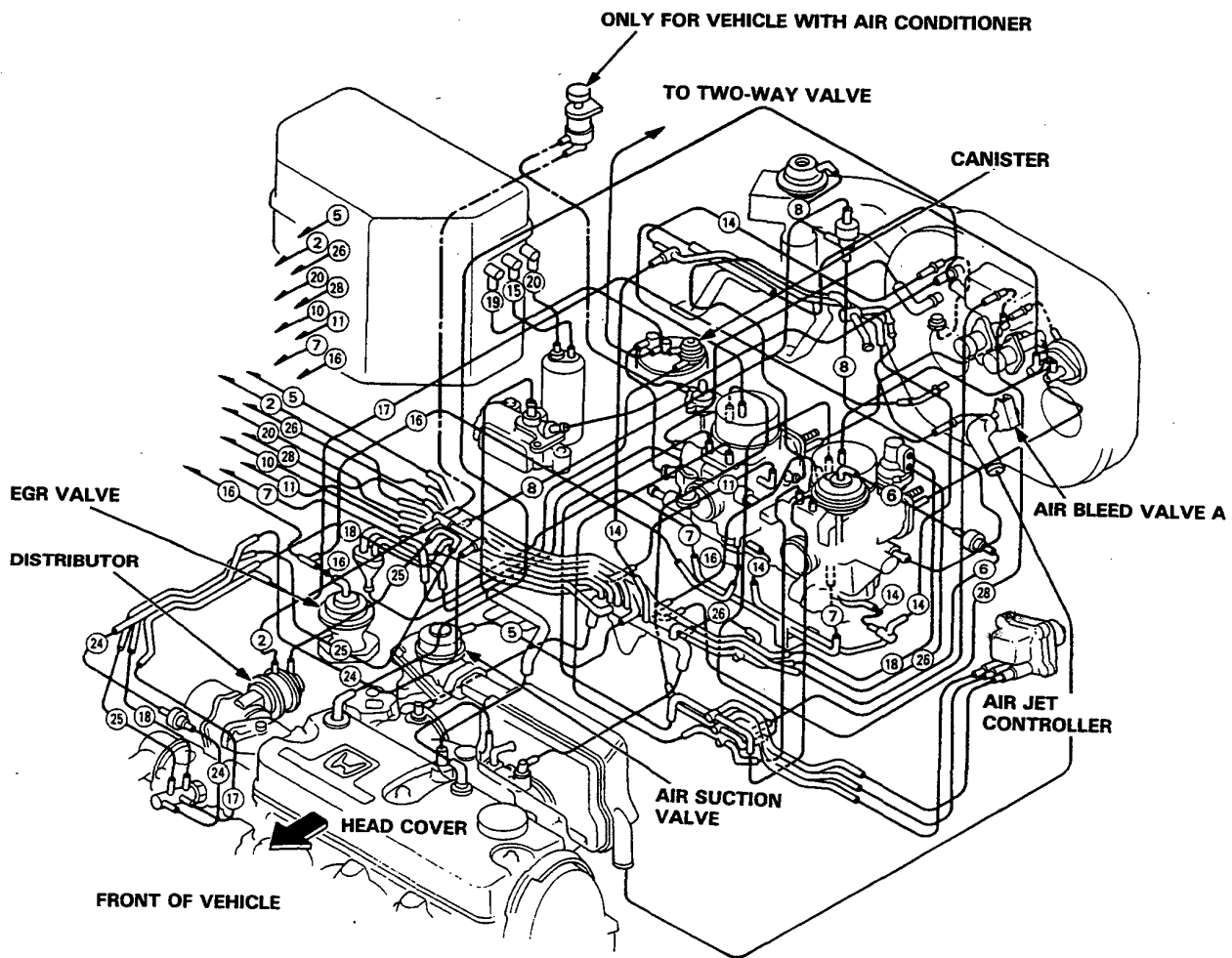
**FUEL CUT-OFF RELAY**  
Testing, page 6-54

# System Description

## Vacuum Connections



[KX, KS, KZ model]



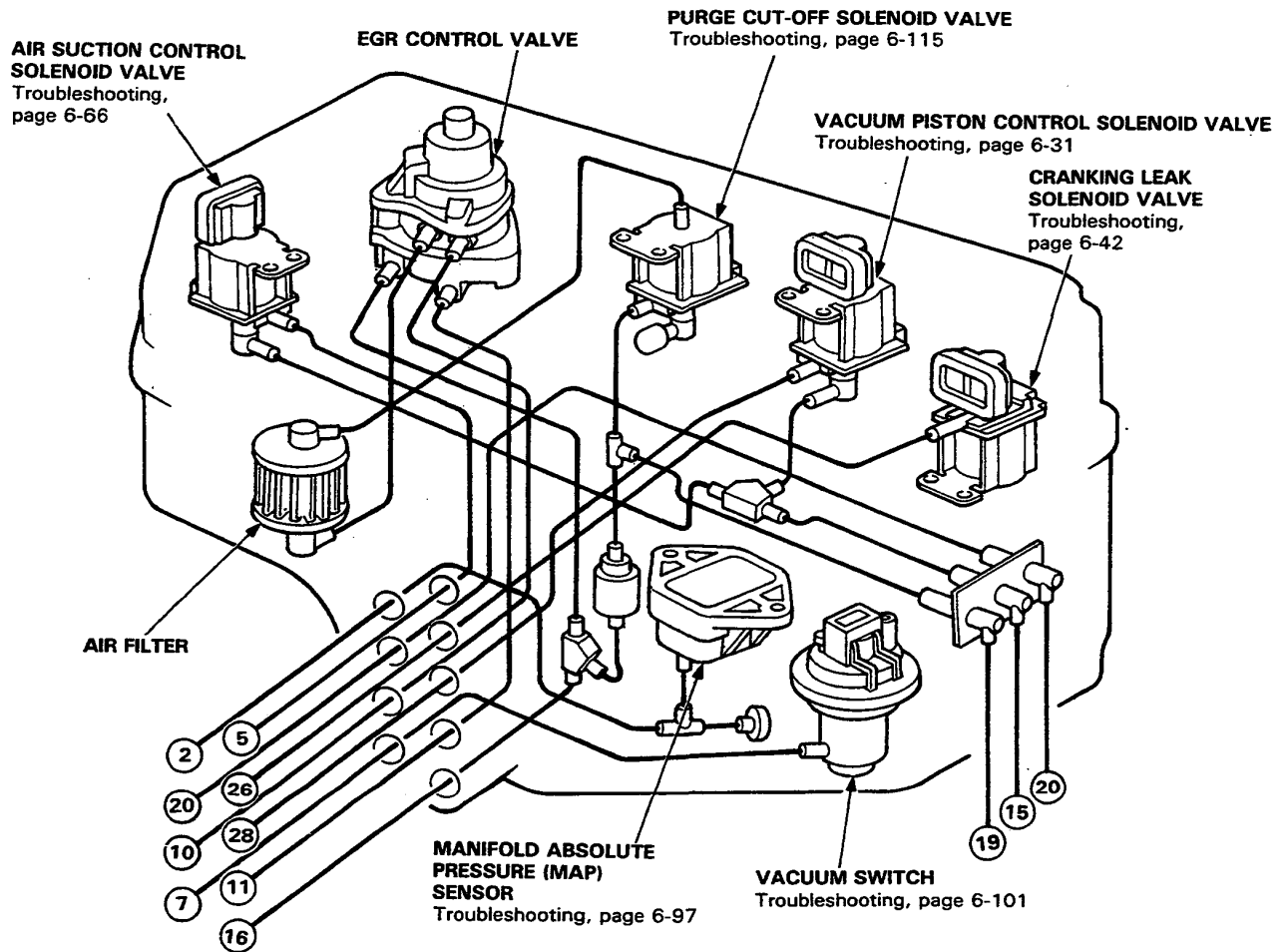
(cont'd)



# System Description

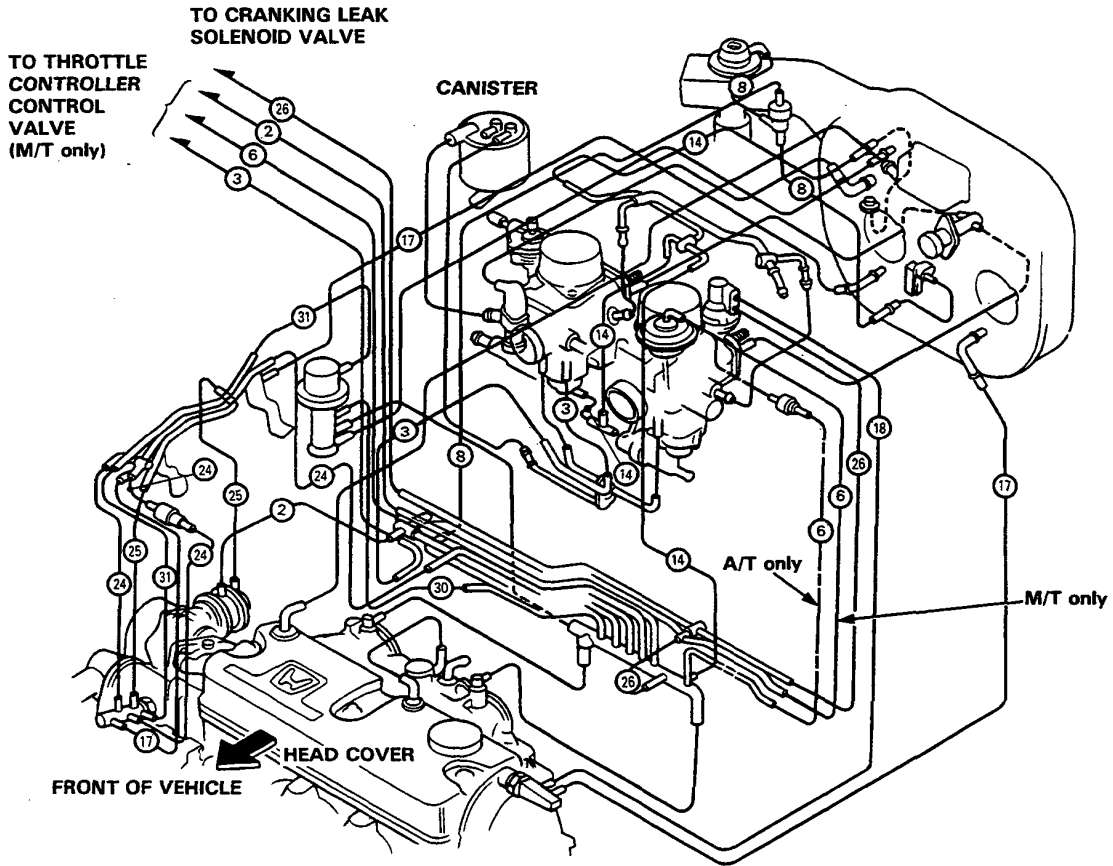
## Vacuum Connections (cont'd)

### Control Box





[KF, KG, KW, KB model]

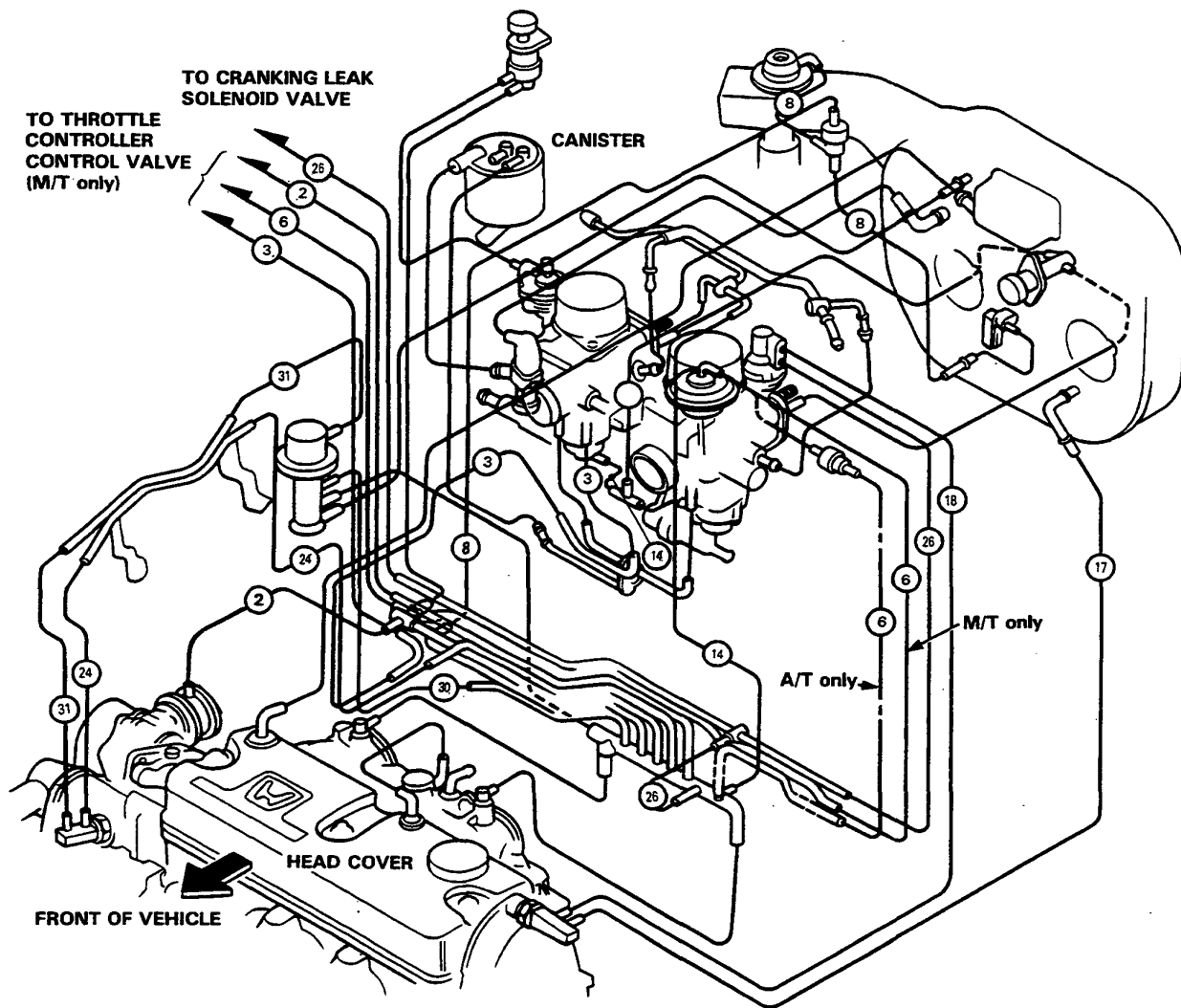


(cont'd)

# System Description

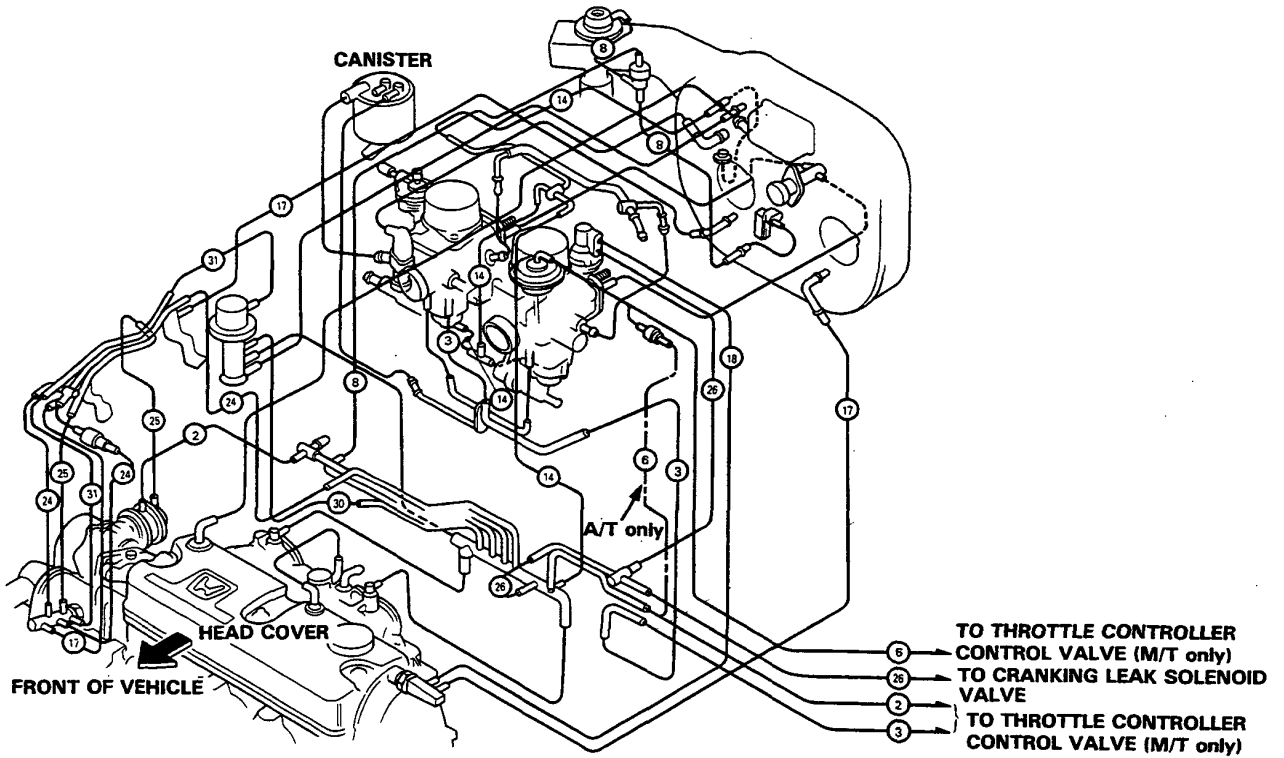
## Vacuum Connections (cont'd)

[KY model]





[KE model]



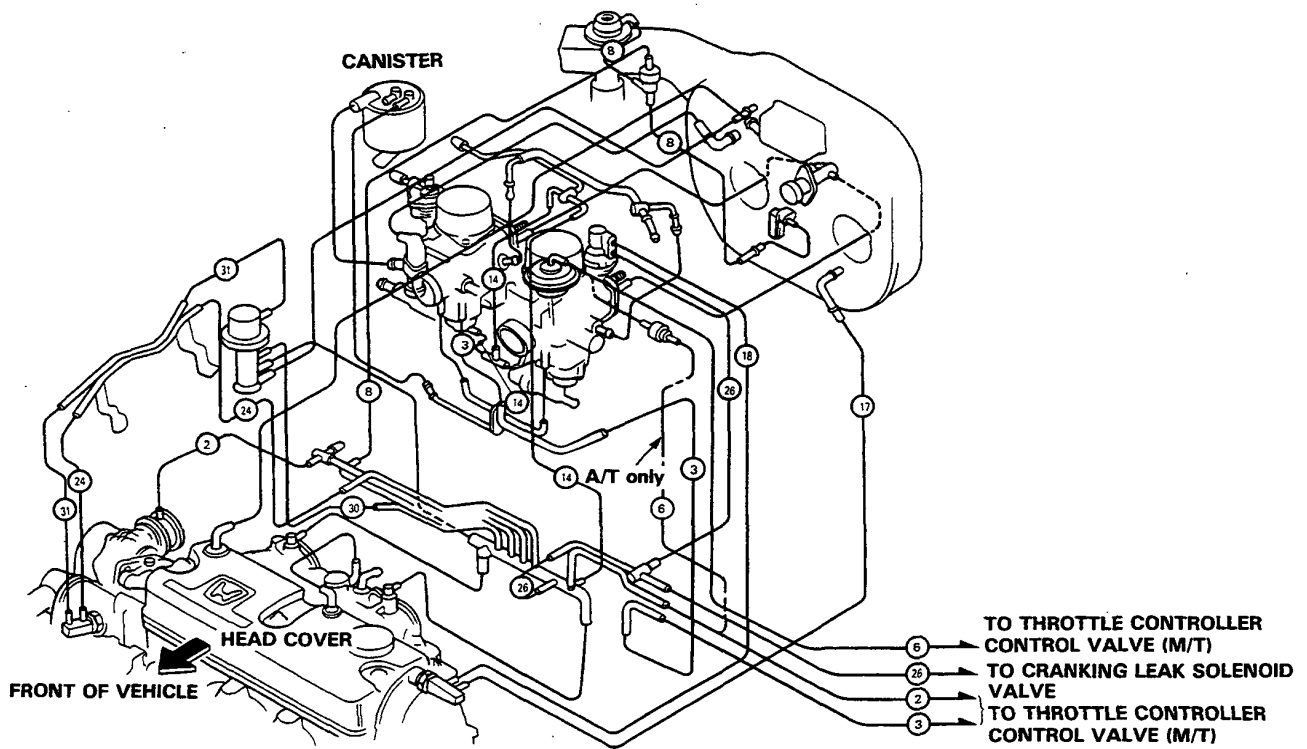
(cont'd)

# System Description

## Vacuum Connections (cont'd)

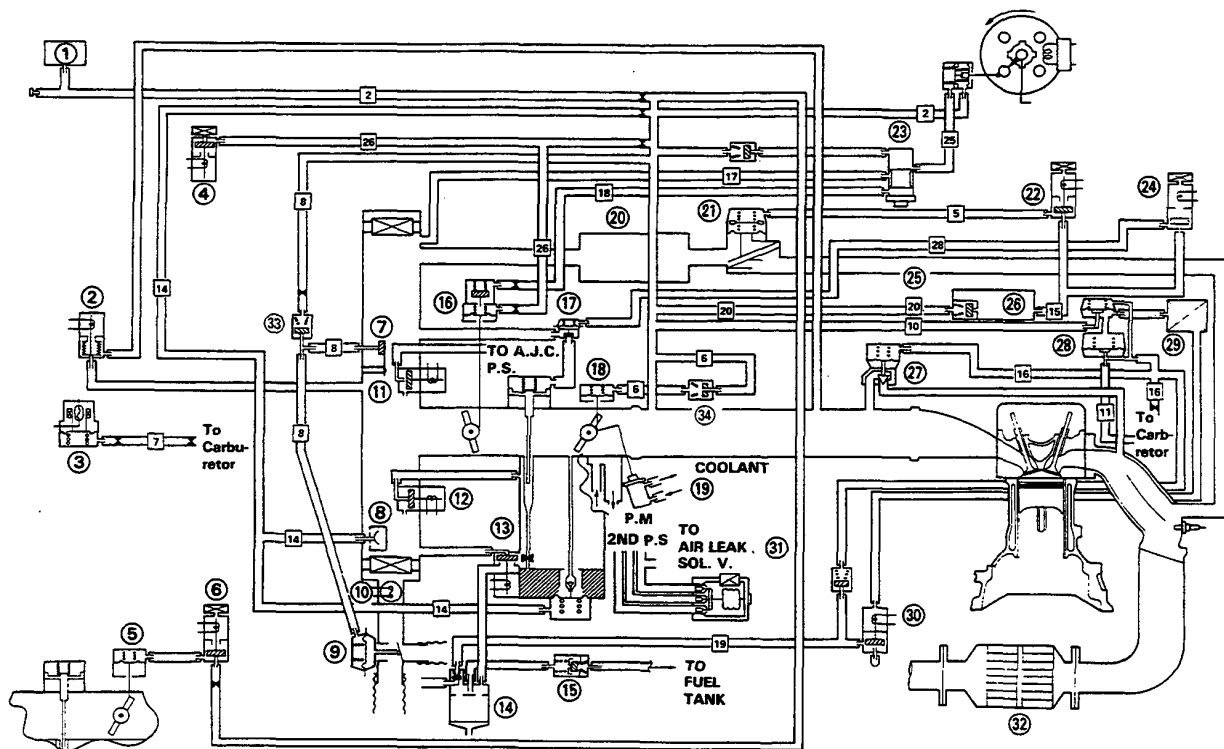
---

[KT model]





[KX, KS, KZ model]



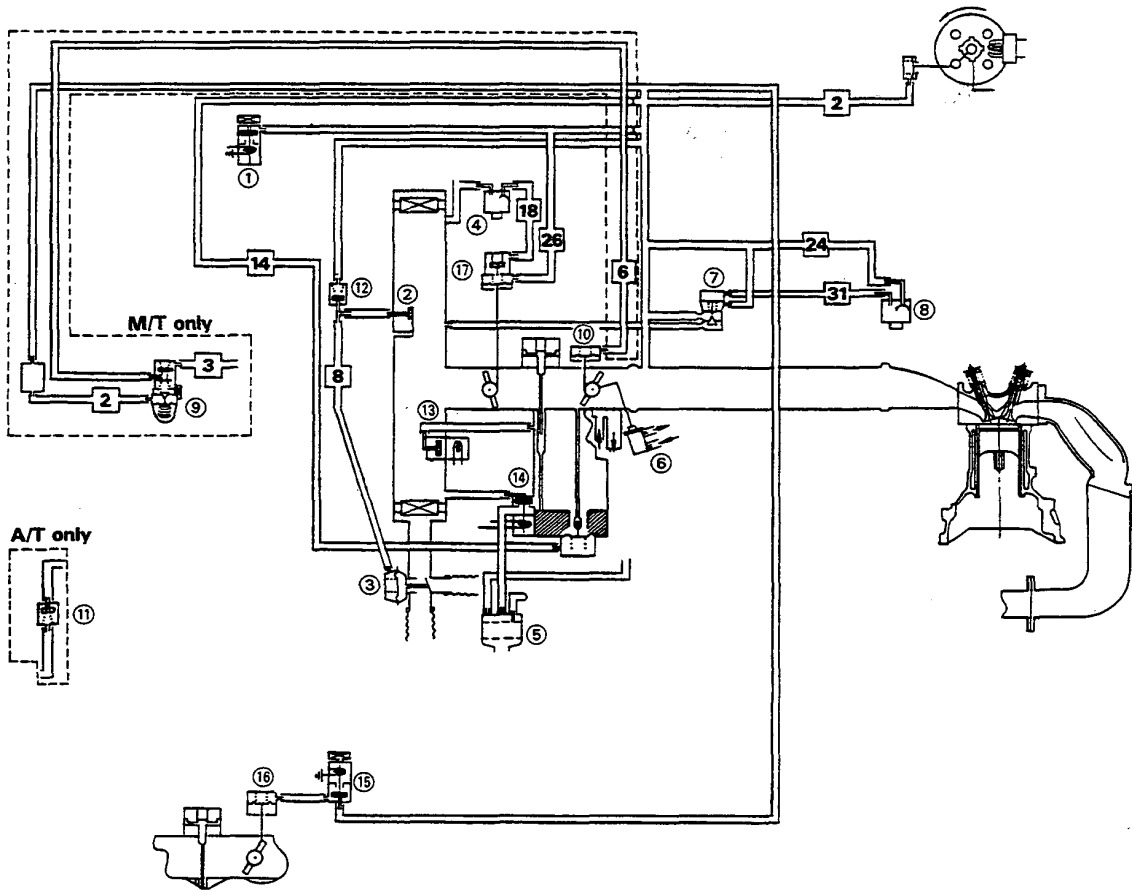
- ① MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ② EACV
- ③ VACUUM SWITCH
- ④ CRANKING LEAK SOLENOID VALVE
- ⑤ IDLE BOOST THROTTLE CONTROLLER
- ⑥ A/C IDLE BOOST SOLENOID VALVE
- ⑦ AIR BLEED VALVE A
- ⑧ AIR BLEED VALVE B
- ⑨ AIR CONTROL DIAPHRAGM
- ⑩ INTAKE AIR TEMPERATURE (TA) SENSOR
- ⑪ AIR LEAK SOLENOID VALVE
- ⑫ INNER VENT SOLENOID VALVE
- ⑬ AIR VENT CUT-OFF SOLENOID VALVE
- ⑭ CANISTER
- ⑮ TWO-WAY VALVE
- ⑯ CHOKE OPENER
- ⑰ VACUUM PISTON CONTROL VALVE
- ⑱ THROTTLE CONTROLLER
- ⑲ THERMOWAX VALVE
- ⑳ SILENCER

- ㉑ AIR SUCTION VALVE
- ㉒ AIR SUCTION CONTROL SOLENOID VALVE
- ㉓ THERMOVALVE
- ㉔ VACUUM PISTON CONTROL SOLENOID VALVE
- ㉕ CHECK VALVE C
- ㉖ AIR CHAMBER
- ㉗ EGR VALVE
- ㉘ EGR CONTROL VALVE
- ㉙ AIR FILTER
- ㉚ PURGE CUT-OFF SOLENOID VALVE
- ㉛ AIR JET CONTROLLER
- ㉜ CATALYTIC CONVERTER
- ㉝ CHECK VALVE A
- ㉞ CHECK VALVE C

# System Description

## Vacuum Connections (cont'd)

[KY, KT model]

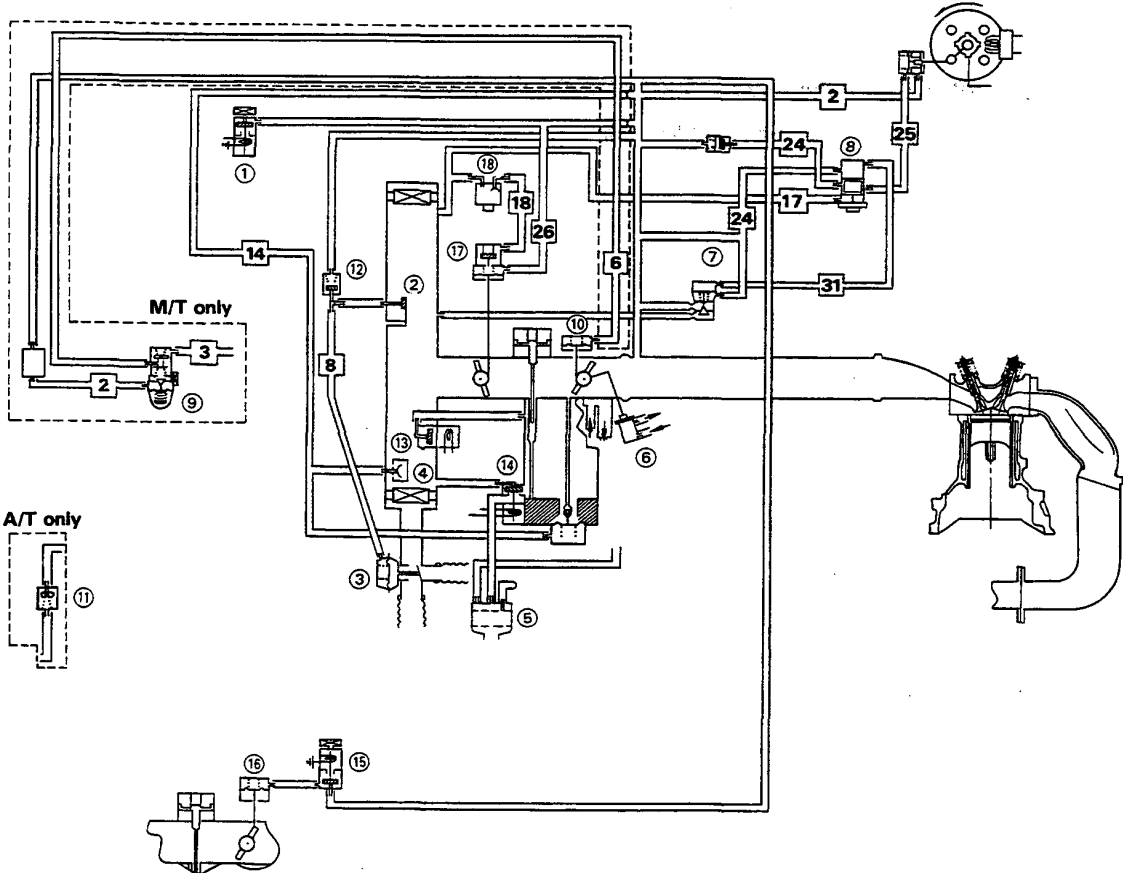


- ① CRANKING LEAK SOLENOID VALVE
- ② AIR BLEED VALVE A
- ③ AIR CONTROL DIAPHRAGM
- ④ THERMOVALVE
- ⑤ CANISTER
- ⑥ THERMOWAX VALVE
- ⑦ ANTI-AFTERBURN VALVE
- ⑧ THERMOVALVE

- ⑨ THROTTLE CONTROLLER CONTROL VALVE
- ⑩ THROTTLE CONTROLLER
- ⑪ CHECK VALVE C
- ⑫ CHECK VALVE A
- ⑬ INNER VENT SOLENOID VALVE
- ⑭ AIR VENT CUT-OFF SOLENOID VALVE
- ⑮ A/C IDLE BOOST SOLENOID VALVE
- ⑯ IDLE BOOST THROTTLE CONTROLLER
- ⑰ CHOKE OPENER



[KF, KG, KW, KB, KE model]



- ① CRANKING LEAK SOLENOID VALVE
- ② AIR LEAK SOLENOID VALVE
- ③ AIR CONTROL DIAPHRAGM
- ④ AIR BLEED VALVE B
- ⑤ CANISTER
- ⑥ THERMOWAX VALVE
- ⑦ ANTI-AFTERBURN VALVE
- ⑧ THERMOVALVE
- ⑨ THROTTLE CONTROLLER CONTROL VALVE

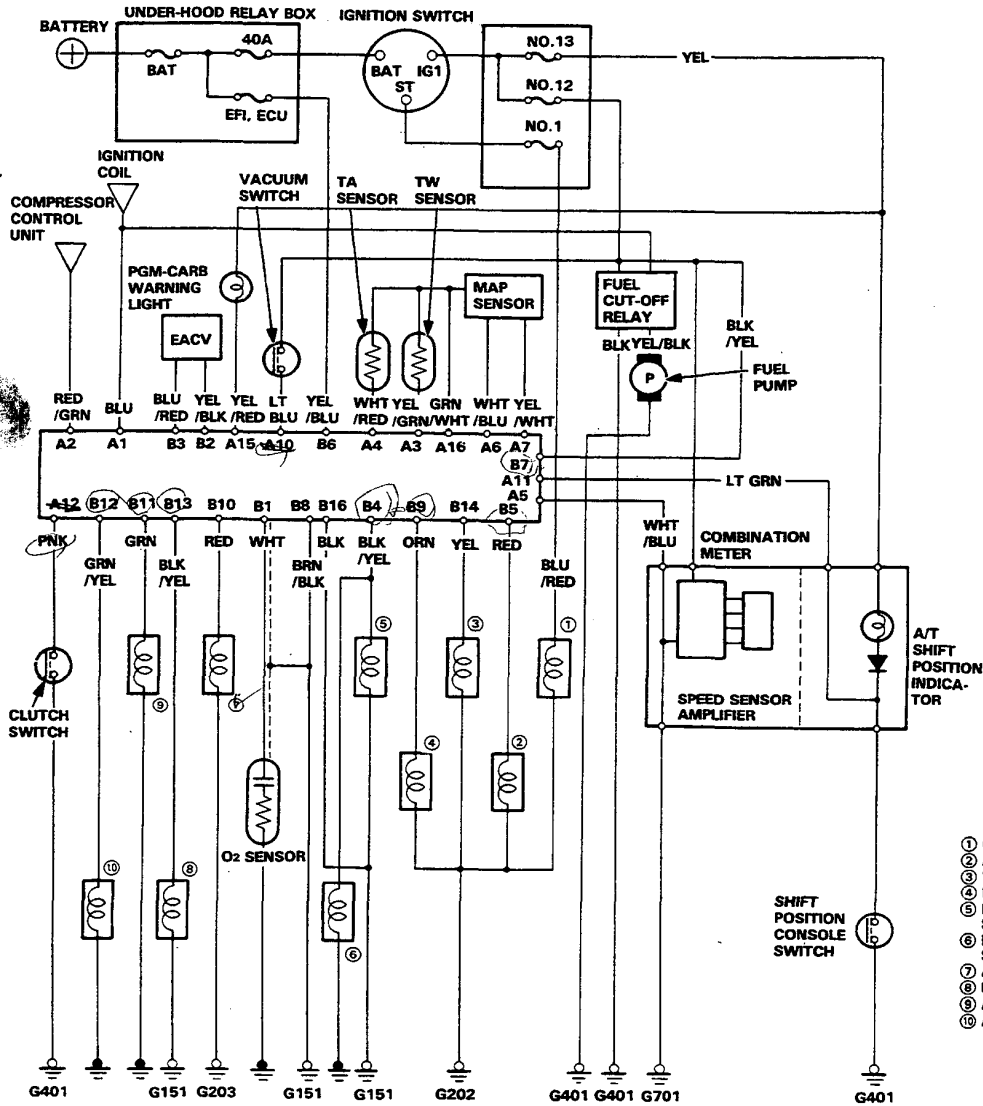
- ⑩ THROTTLE CONTROLLER
- ⑪ CHECK VALVE C
- ⑫ CHECK VALVE A
- ⑬ INNER VENT SOLENOID VALVE
- ⑭ AIR VENT CUT-OFF SOLENOID VALVE
- ⑮ A/C IDLE BOOST SOLENOID VALVE
- ⑯ IDLE BOOST SOLENOID VALVE
- ⑰ CHOKE OPENER
- ⑱ THERMOVALVE



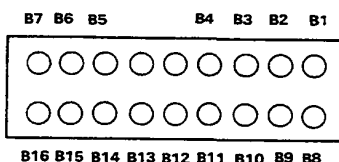
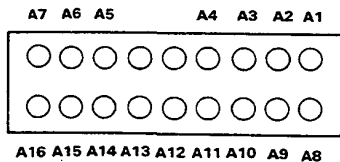
# System Description

## Electrical Connections

[KX, KS, KZ model]

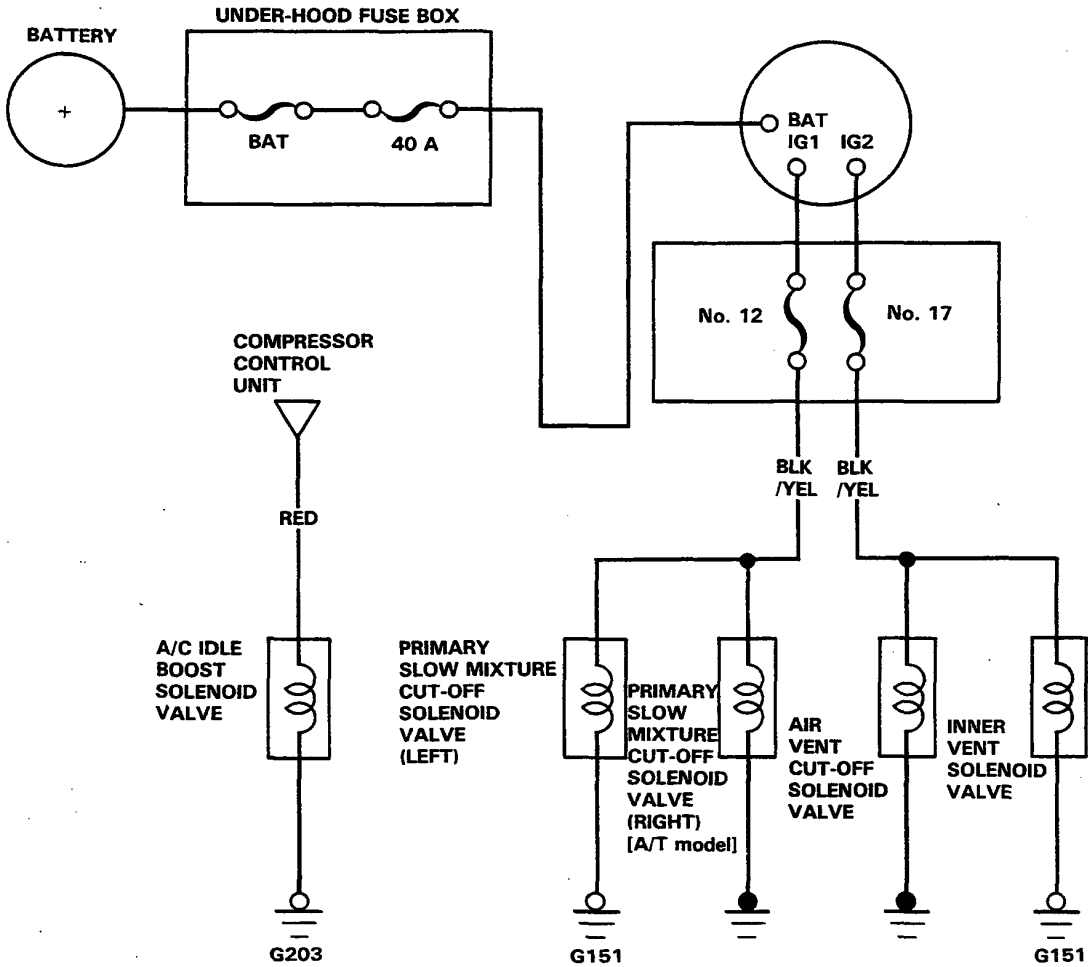


- ① CRANKING LEAK SOLENOID VALVE
- ② AIR SUCTION CONTROL SOLENOID VALVE
- ③ VACUUM PISTON CONTROL SOLENOID VALVE
- ④ PURGE CUT-OFF SOLENOID VALVE
- ⑤ PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE (LEFT)
- ⑥ PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE (RIGHT)
- ⑦ A/C IDLE BOOST SOLENOID VALVE
- ⑧ INNER VENT SOLENOID VALVE
- ⑨ AIR LEAK SOLENOID VALVE
- ⑩ AIR VENT CUT-OFF SOLENOID VALVE





[Except KX, KS, KZ model]



# Carburetor

## Symptom-to-System Chart

[KX, KS, KZ model]

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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the warning light and the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 6-18 and 6-19.

PAGE		SYSTEM	CARBURETOR			
			IDLE SPEED/ MIXTURE	A/C IDLE BOOST	AUTOMATIC CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF (INNER VENT) SOLENOID VALVE
SYMPTOM			33	22	39	82, 84
ENGINE WON'T START						①
DIFFICULT TO START ENGINE	WHEN COLD				①	②
	WHEN WARM					②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION				①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③		
	WHEN WARM ENGINE SPEED TOO LOW	①	①			
	ROUGH IDLE/ FLUCTUATION	①	③			②
FREQUENT STALLING	WHILE WARMING UP			②	①	
	AFTER WARMING UP	①		②		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING				②	①
	LOSS OFF POWER					②
	AFTERBURN	②				
	HESITATION/SURGE					



CARBURETOR					FUEL SUPPLY	AIR INTAKE	EMISSION CONTROLS
POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	SLOW AIR JET CONTROL	VACUUM PISTON CONTROL	ACCELERATOR PUMP			
37	27	25	30	—	51	56	61
	②	②			①		③
	①			②			③
	①	②					③
	②						③
							③
		②					②
		③					②
	①						③
	①	①					③
			②		③		③
③			①	③	②	①	①
						②	①
				②		②	①

# Carburetor

## Symptom-to-Sub System Chart

[Except KS, KX, KZ model]

**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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the warning light and the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 6-20 and 6-21.

PAGE		SYSTEM	CARBURETOR			
			IDLE SPEED/ MIXTURE	A/C IDLE BOOST	AUTOMATIC CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF (INNER VENT) SOLENOID VALVE
SYMPTOM			33	22	39	86, 88
ENGINE WON'T START						①
DIFFICULT TO START ENGINE	WHEN COLD				①	②
	WHEN WARM					②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION				①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③		
	WHEN WARM ENGINE SPEED TOO LOW	①	①			
	ROUGH IDLE/ FLUCTUATION	①	③			②
FREQUENT STALLING	WHILE WARMING UP			②	①	
	AFTER WARMING UP	①	②			②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING				②	①
	LOSS OFF POWER					②
	AFTERBURN	②				
	HESITATION/SURGE					



CARBURETOR			FUEL SUPPLY	AIR INTAKE	EMISSION CONTROLS
POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	ACCELERATOR PUMP			
37	29	—	51	56	62
	②		①		③
	①	②			③
	①				③
	②				③
					③
					②
					②
	①				③
	①				③
			③		③
③		③	②	①	①
				②	①
		③		②	①

# Carburetor

## Idle Control System (A/C only)

### Testing

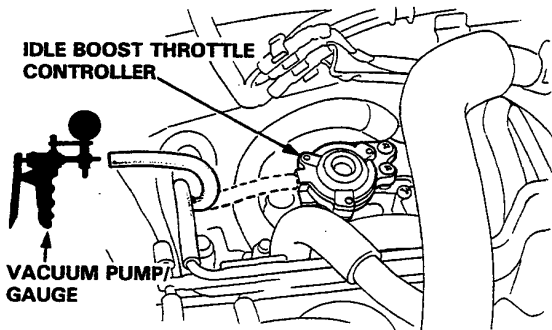
1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Check the idle speed with headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

Idle speed should be:

Manual	800 $\pm$ 50 min <sup>-1</sup> (rpm)
Automatic	750 $\pm$ 50 min <sup>-1</sup> (rpm) (except "N" or "P")

- If OK, go to step 4.
  - If not, go to step 3.
3. Disconnect the vacuum hose from the idle boost throttle controller and check the vacuum.

There should be no vacuum.



- If there is no vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
- If there is vacuum, go to troubleshooting (page 6-23).

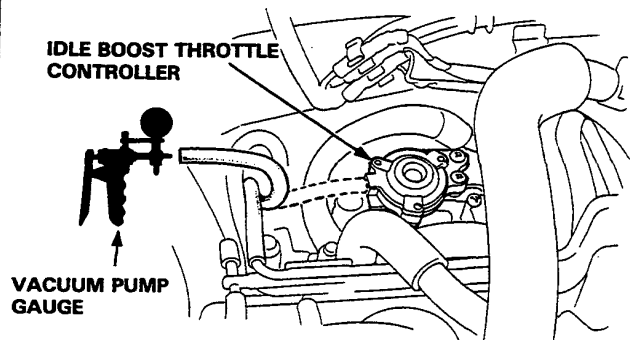
4. Check the idle speed with the A/C on.

Idle speed should be:

Manual	800 $\pm$ 50 min <sup>-1</sup> (rpm)
Automatic	750 $\pm$ 50 min <sup>-1</sup> (rpm) (except "N" or "P")

- If not, disconnect the vacuum hose from the idle boost throttle controller and check the vacuum.

There should be vacuum.



- If there is vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
- If there is no vacuum, go to troubleshooting (page 6-23).



### Troubleshooting Flow Chart A/C Idle Boost Solenoid Valve

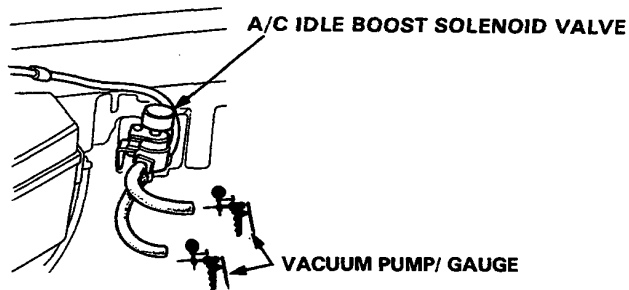
Inspection of A/C Idle Boost Solenoid Valve

Disconnect the lower vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum pump.

Disconnect the upper vacuum hose of the solenoid valve from the idle boost throttle controller and connect a vacuum gauge.

Start the engine.

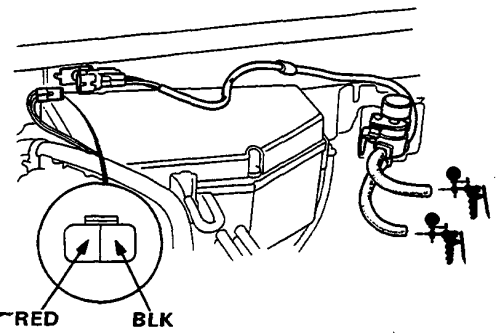
Apply vacuum.



Does solenoid valve hold vacuum?

NO  
Disconnect the 2P connector near the solenoid valve.

Measure voltage between RED (+) terminal and BLK (-) terminal on the wire harness.



Turn the A/C switch ON.

Apply vacuum.

Is there voltage?

YES  
KX, KS, KZ model:  
Check the self-diagnosis indicator (page 6-90).  
If OK, check the input troubleshooting (page 6-111).  
Except KX, KS, KZ model:  
See section 15.

NO  
Replace the solenoid valve.

(To page 6-24)

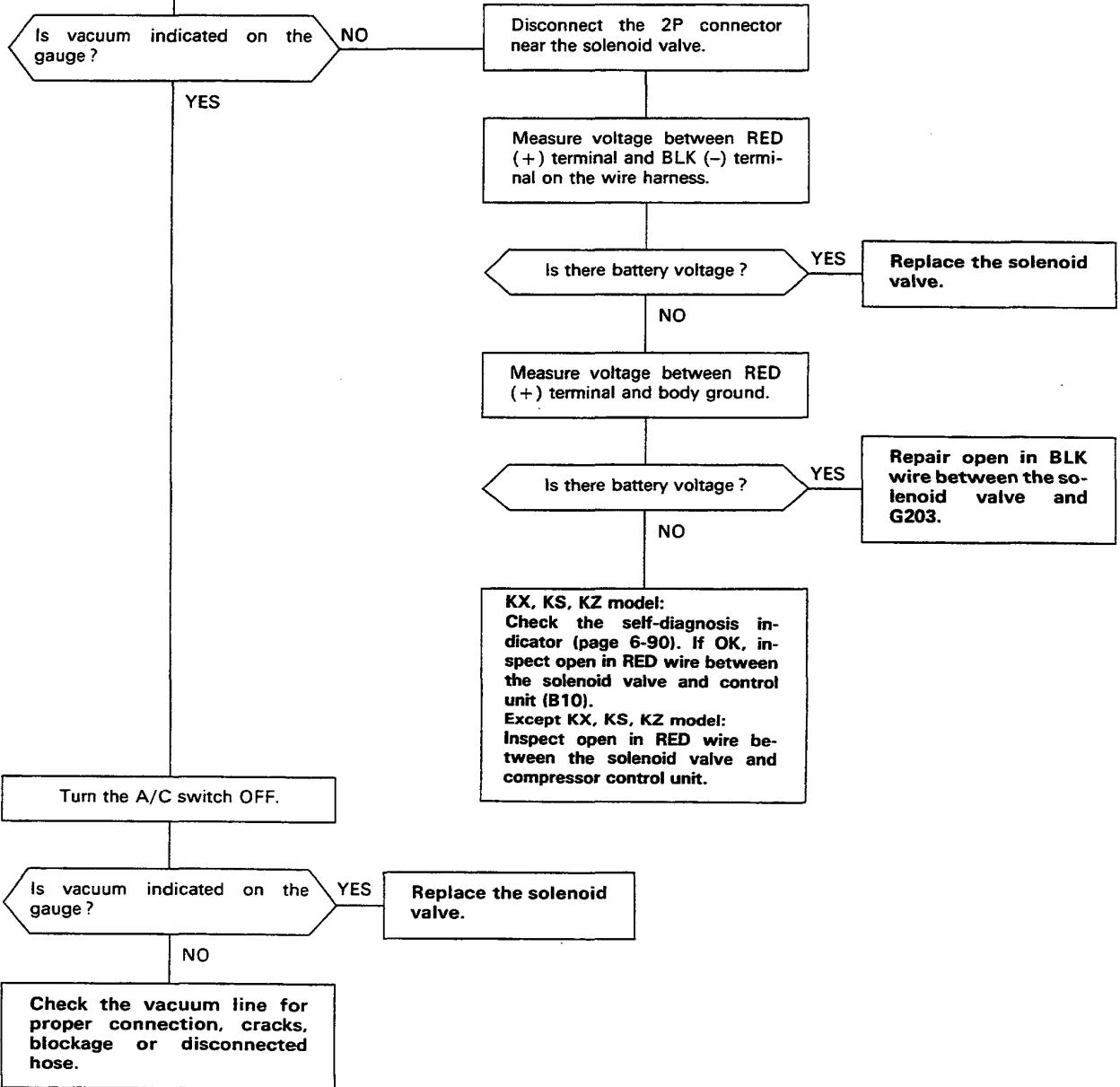
(cont'd)



# Carburetor

## Idle Control System (A/C only) (cont'd)

(From page 6-23)





# Slow Air Jet Control System

[KX, KS, KZ model]

## Troubleshooting Flow Chart Air Leak Solenoid Valve

Inspection of Air Leak Solenoid Valve

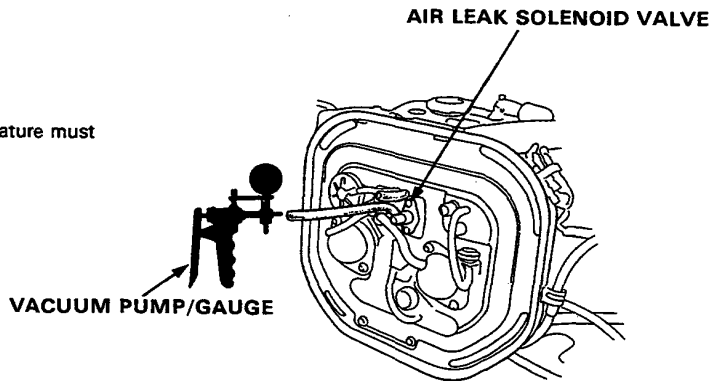
Remove the air cleaner cover and filter element.

Disconnect the vacuum hose and connect a vacuum pump.

NOTE: Intake air temperature must be below 70°C (158°).

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply 100 mmHg (4 in.Hg) vacuum to the hose.



Does solenoid valve hold vacuum?

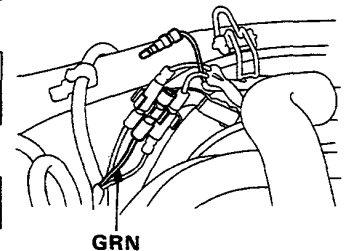
NO

Turn the ignition switch OFF.

YES

Disconnect the GRN connector near the air cleaner.

Start the engine.



Measure voltage between GRN (+) and body ground.

Is there battery voltage?

NO

Check the self-diagnosis indicator (page 6-90). If OK, repair open in GRN wire between the solenoid valve and control unit (B11).

YES

Replace the solenoid valve.

Warm up the engine.

NOTE: If the intake air temperature is below 70° C (158° F), warm the TA sensor with a dryer.

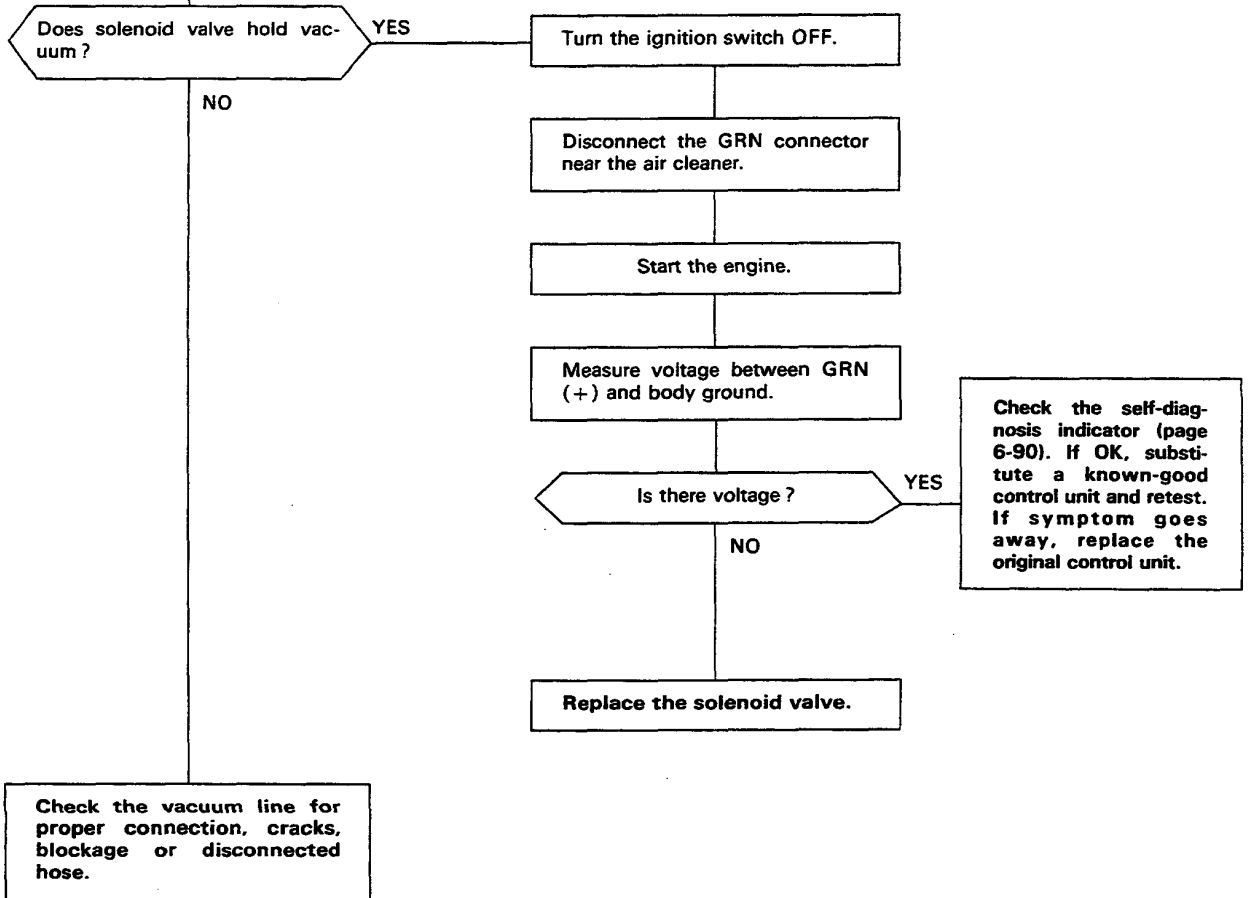
(page 11-26)

(cont'd)

# Caburetor

## Slow Air Jet Control System (cont'd)

(page 6-25)





# Primary Slow Mixture Cut-off Solenoid Valve

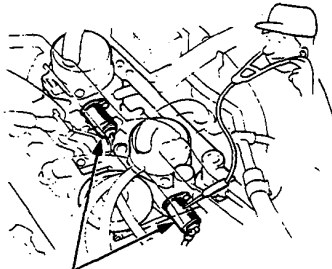
[KX, KS, KZ model]

## Troubleshooting Flow Chart Primary Slow Mixture Cut-off Solenoid Valve

Inspection of Primary Slow Mixture Cut-off Solenoid Valve

Turn the ignition switch ON.

Check the clicking sound of each solenoid valve by means of a stethoscope.



**PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE**

Does the solenoid valve click?

NO

Turn the ignition switch OFF.

YES

Connect the ECU check adaptor B between the control unit and connector (page 6-91).

Turn the ignition switch ON.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Measure voltage between B4 (+) terminal and B16 (-) terminal.

Is there battery voltage?

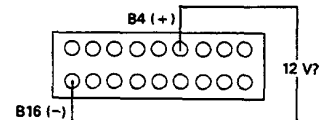
YES

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

**WARNING** Block rear wheels before jacking up front of car.

Place the transmission in second or "2" and accelerate, then suddenly release the throttle.

Check the self-diagnosis indicator (page 6-90). If OK, check the input troubleshooting (page 6-111).



Repair open or short in BLK/YEL wire between the solenoid valve and control unit (B4).

If OK:  
right solenoid valve: replace the solenoid valve.

left solenoid valve: inspect open in BLK wire between the solenoid valve and G151, and replace the solenoid valve.

(page 6-28)

(cont'd)

# Carburetor

## Primary Slow Mixture Cut-off Solenoid Valve (cont'd)

(page 6-27)

Check for the clicking sound of each solenoid valve by means of a stethoscope during deceleration above 20 km/h and 4,000 min<sup>-1</sup> (rpm).

Does the solenoid valve click?

NO

Turn the ignition switch OFF.

Connect the ECU check adaptor B between the control unit and connector (page 6-91).

Start the engine.

Measure voltage between B4 (+) terminal and B16 (-) terminal during deceleration above 20 km/h and 4,000 min<sup>-1</sup> (rpm).

Is there no voltage for a moment?

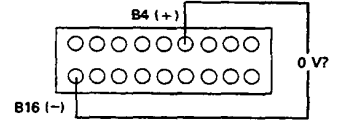
NO

Check the self-diagnosis indicator (page 6-90). If OK, check the input troubleshooting (page 6-111).

YES

Replace the solenoid valve.

Solenoid valve is OK.



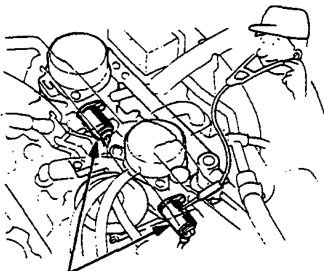


[Except KX, KS, KZ model]

Inspection of Primary Slow Mixture Cut-off Solenoid Valve

Turn the ignition switch ON.

Check the clicking sound of each solenoid valve by means of a stethoscope.



PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE

Does the solenoid valve click ?

NO

Turn the ignition switch OFF.

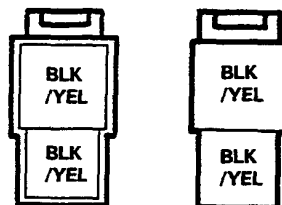
Disconnect the 2P connector on the primary slow mixture cut-off solenoid valve.

Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal and body ground at the 2P connector.

Is there battery voltage ?

YES



Repair open or short in BLK/YEL wire between the solenoid valve and the 2P connector.  
If OK;  
Right solenoid valve (A/T only): replace the solenoid valve.  
Left solenoid valve: inspect open in BLK wire between the solenoid valve and G151, and replace the solenoid valve.

NO

Repair open or short in BLK/YEL wire between the ignition switch and the 2P connector as well as No. 12 fuse.

YES

Solenoid valve is OK.

# Carburetor

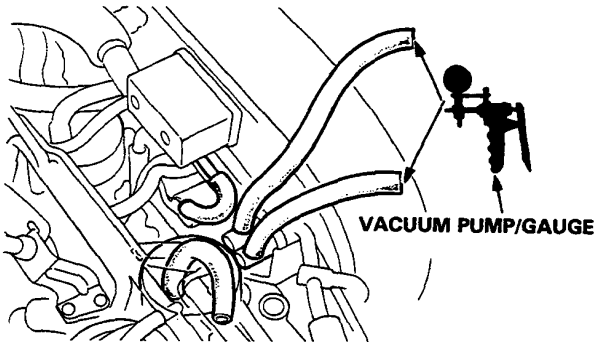
## Vacuum Piston Control System

[KX, KS, KZ model]

### Testing

1. Disconnect the vacuum hose from the carburetor and connect a vacuum pump.

It should hold vacuum.



- If it does not hold vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the vacuum piston control valve.

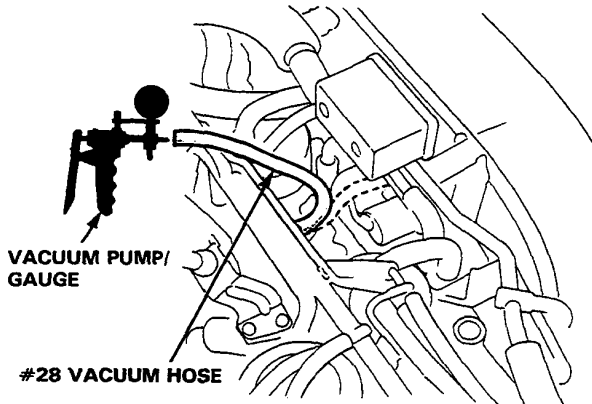
2. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
3. Check for vacuum.

It should not hold vacuum.

- If it holds vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, and go to step 4.
- If it does not hold vacuum, go to step 5.

4. Disconnect the #28 vacuum hose from the air cleaner and connect a vacuum pump.

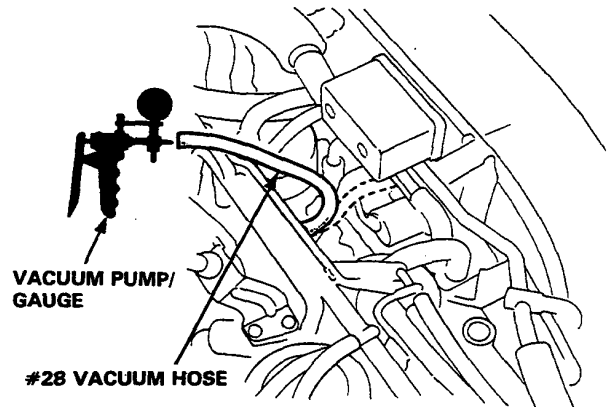
There should be vacuum.



- If there is vacuum, replace the vacuum piston control valve.
- If there is no vacuum, go to troubleshooting (page 6-31).

5. Disconnect the #28 vacuum hose from the air cleaner and connect a vacuum pump. Raise engine speed to 3,000 min<sup>-1</sup> (rpm) and close the throttle suddenly, then check vacuum.

There should be no vacuum for a moment.



- If there is vacuum, go to troubleshooting (page 6-31).



## Troubleshooting Flow Chart Vacuum Piston Control Solenoid Valve

Inspection of Vacuum Piston Control Solenoid Valve

Remove the control box and open the control box lid.

Disconnect the lower vacuum hose of the solenoid valve from the 3-way joint and connect a vacuum pump.

Disconnect the #28 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Turn the ignition switch OFF.

Disconnect the 8P connector on the control box.

Start the engine.

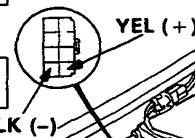
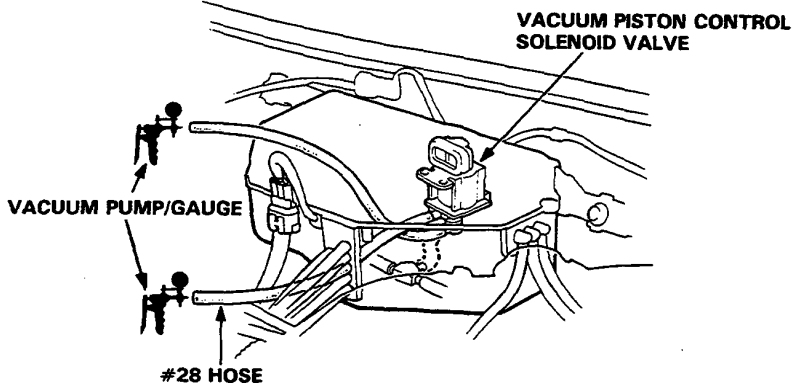
Measure voltage between YEL (+) terminal and BLK (-) terminal on the wire harness.

Is there battery voltage?

YES

Replace the solenoid valve.

NO



(page 6-32)

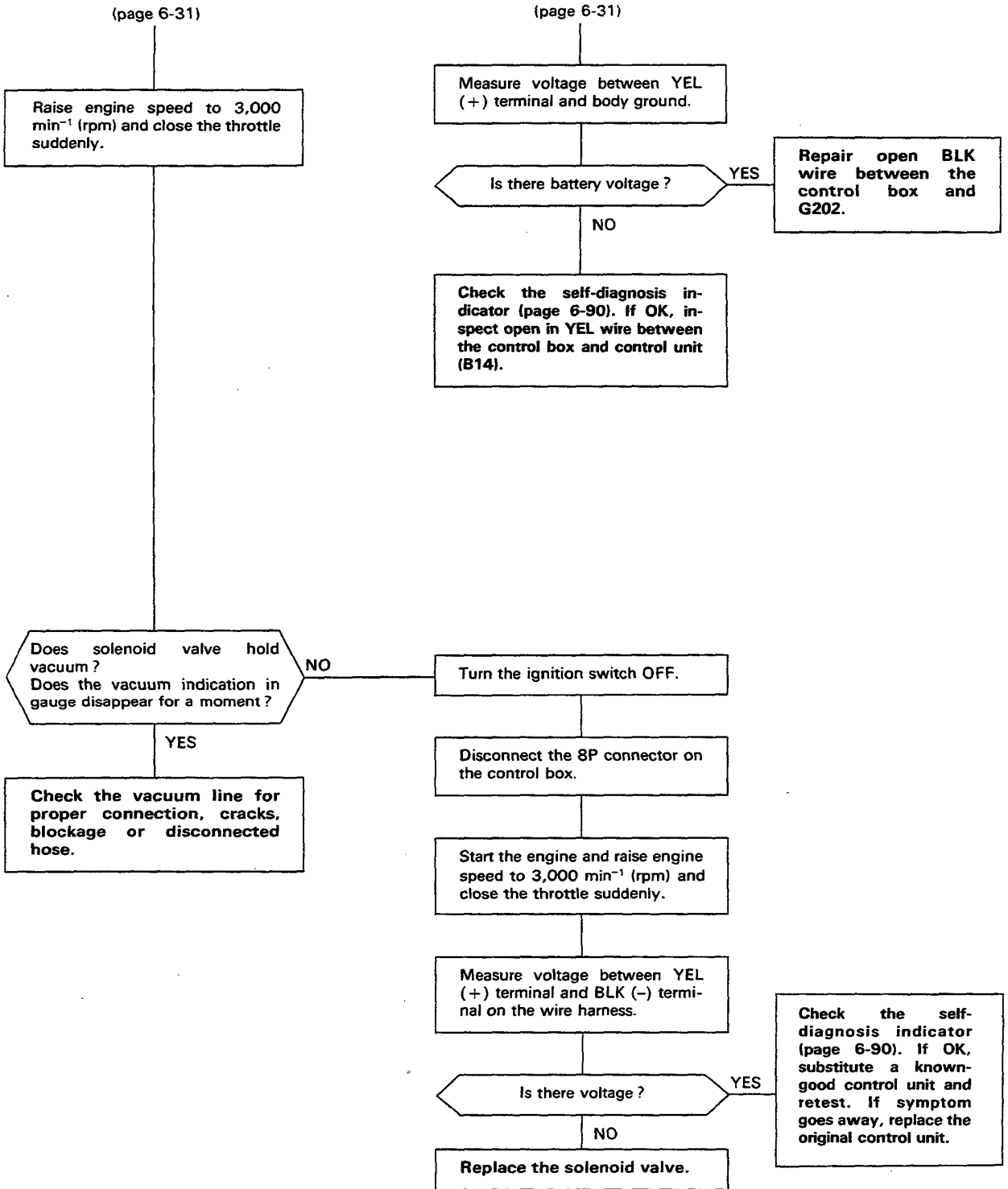
(page 6-32)

(cont'd)



# Carburetor

## Vacuum Piston Control System (cont'd)





## Idle Speed/Mixture

[KS model]

### Inspection/Adjustment

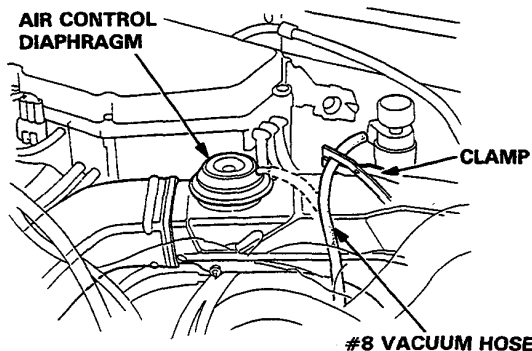
#### Propane Enrichment Method

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

#### NOTE:

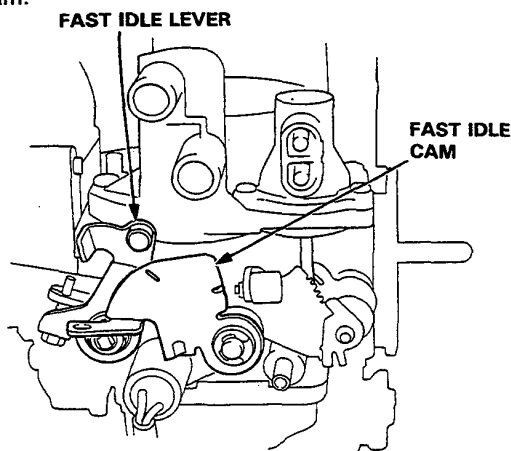
- This procedure requires a propane enrichment kit.
- Check that the carburetors are synchronized properly, self diagnosis indicator before making idle speed and mixture inspections.

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect the #8 vacuum hose from the intake air control diaphragm and clamp the hose end.



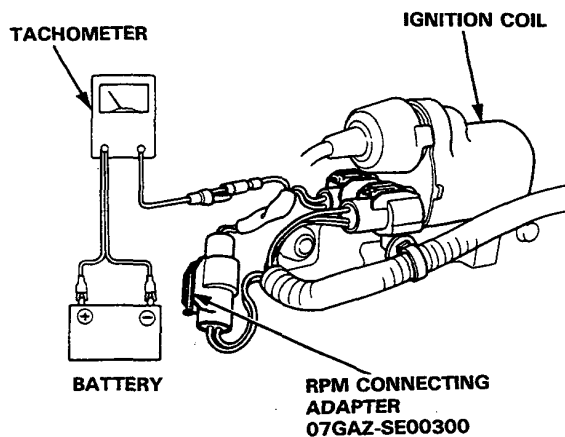
3. Check the fast idle lever.

Fast idle lever should not be seated against fast idle cam.



- If not, replace the left carburetor (page 6-46).

4. Connect a tachometer.



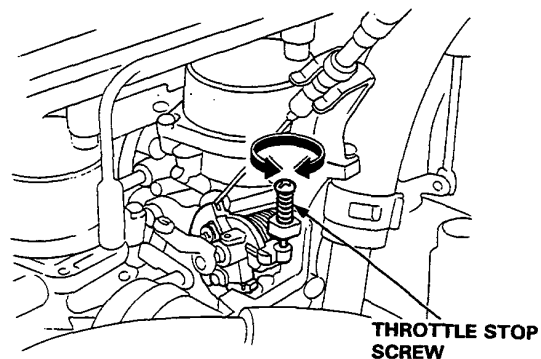
5. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

#### Idle speed should be:

Manual	800 ±50 min <sup>-1</sup> (rpm)
Automatic	750 ±50 min <sup>-1</sup> (rpm) (except "N" or "P")

Adjust the idle speed, if necessary, by turning the throttle stop screw.

NOTE: If the idle speed is excessively high, check the throttle control (page 6-72).

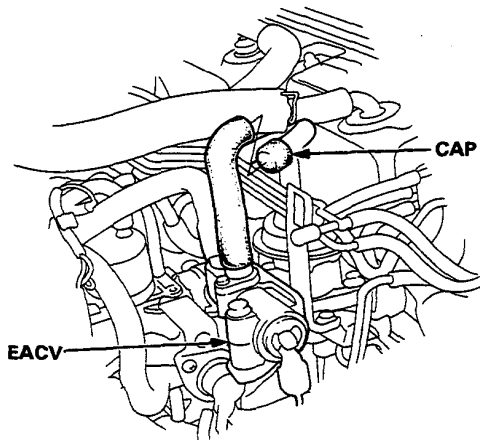


(cont'd)

# Carburetor

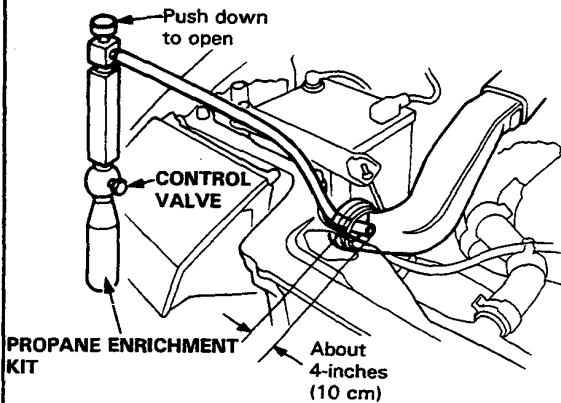
## Idle Speed/Mixture (cont'd)

- Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose manifold, then cap the hose end.



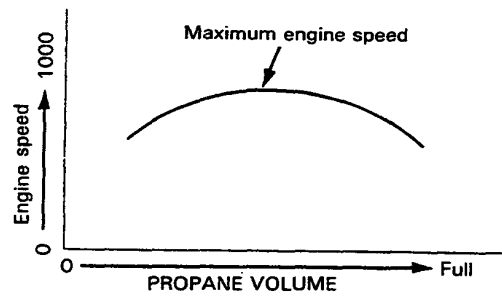
- Disconnect the vacuum hose from the A/C idle boost throttle controller. Disconnect air cleaner intake tube from air intake duct.
- Insert the hose of the propane enrichment kit into the intake tube about 4-inches (10 cm).

NOTE: Check that propane bottle has adequate gas before beginning test.



- With engine idling, depress push button on top of propane device, then slowly open the propane control valve to obtain maximum engine speed. Engine speed should increase as percentage of propane injected goes up.

NOTE: Open the propane control valve slowly; a sudden burst of propane may stall the engine.



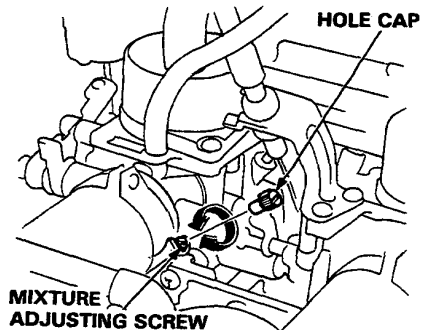
Engine speed increase should be:

M/T:  $170 \pm 20 \text{ min}^{-1} \text{ (rpm)}$

A/T:  $50 \pm 10 \text{ min}^{-1} \text{ (rpm)}$

- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 10.
- If engine speed increases per specification, go to step 11.

- Remove the mixture adjusting screw hole caps, and recheck maximum propane enriched engine speed.



- If the propane enriched speed is too low, mixture is too rich: turn both mixture screws 1/4-turn clockwise and recheck.
- If the propane enriched speed is too high, mixture is too lean: turn both mixture screws 1/4-turn counterclockwise and recheck.

- Reconnect the connector and hose. Close the propane control valve.
- Remove EFI-ECU fuse for 10 seconds to reset control unit and recheck idle speed.

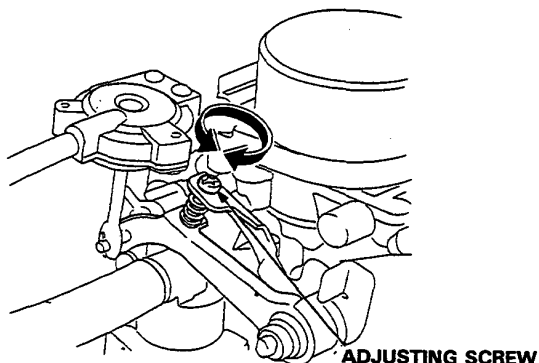
Idle speed should be:

Manual	$800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (except "N" or "P")

- If idle speed is as specified (step 5), go to step 13.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat step 10.



13. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.
14. Reinstall the mixture adjusting screw hole cap.
15. If equipped with air conditioner, check the idle speed with the A/C on.  
Idle speed should be:  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$



Adjust the idle speed, if necessary, by turning the adjusting screw.

**[Except KS model]**

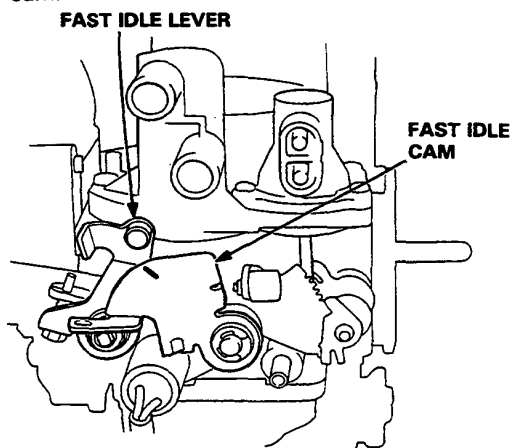
**CO Meter Method**

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

NOTE: Check that the carburetors are synchronized properly, self-diagnosis indicator (KX model) before making idle speed and mixture inspections.

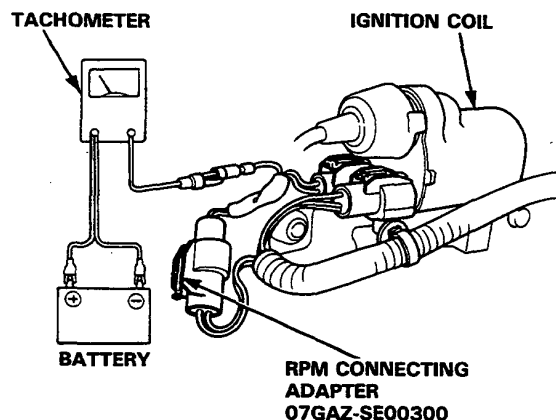
1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Check the fast idle lever.

Fast idle lever should not be seated against fast idle cam.



- If not, replace the left carburetor (page 6-46).

3. Connect a tachometer.



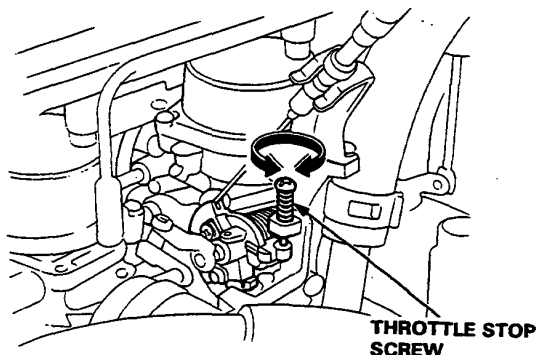
4. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

Idle Speed should be:

Manual	$800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (except N or P)

Adjust the idle speed, if necessary, by turning the throttle stop screw.

NOTE: If the idle speed is excessively high, check the dashpot system (page 6-72).



5. Calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures. Insert exhaust gas sampling probe into the tailpipe at least 40 cm.

(cont'd)

# Carburetor

## Idle Speed/Mixture (cont'd)

6. Check specification for idle CO with cooling fan, air conditioner OFF and headlights OFF.

**Specified CO % :**

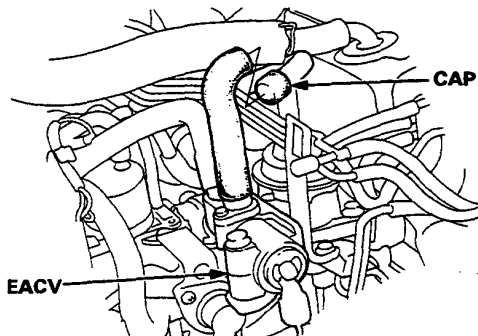
**KX model: 0.1 %**

**Except KX model:  $1 \pm 1$  %**

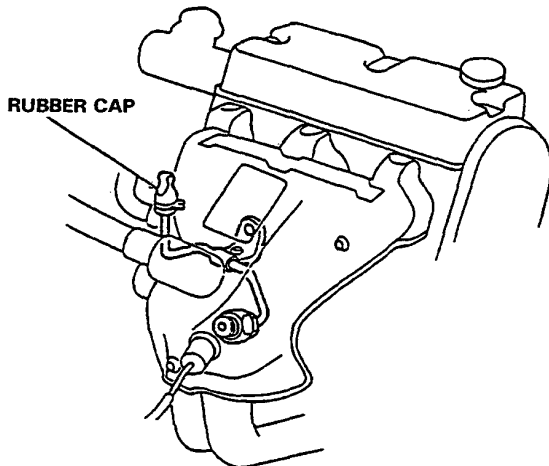
- If idle CO is as specified, go to step 14.
- If not, go to step 7 through 13.

7. KX model;

Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose manifold, then cap the hose end.



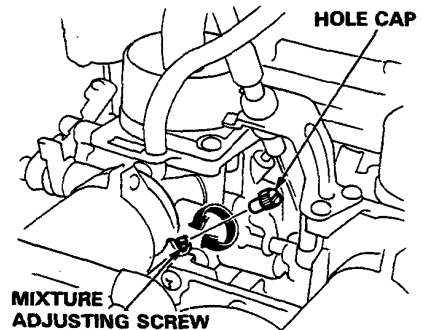
8. Remove the rubber cap from the gas pipe.



9. Check specification for idle CO.

**Specified CO % :  $2.0 \pm 1.0$  %**

- If not within specification, remove mixture adjusting screw hole plug and adjust by turning both mixture adjusting screws to obtain proper CO reading.



— Turning both mixture adjusting screws

clockwise: CO reading decreases  
counterclockwise: CO reading increases

Readjust idle speed if necessary, and recheck idle CO.

10. KX model;

Reconnect the connector and hose.

Remove EFI. ECU fuse for 10 seconds to reset control unit.

11. KX model:

Recheck idle CO.

**Specified CO % : 0.1 %**

- If idle CO is as specified (step 6), go to step 11.
- If not, check the self-diagnosis indicator (page 11-90). If not, replace the EACV, then repeat step 6.

12. Recheck idle speed.

**Idle speed should be:**

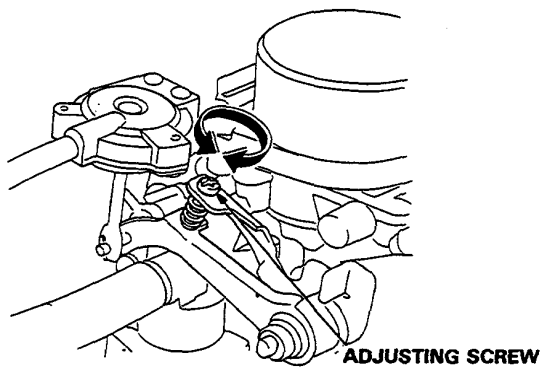
Manual	$800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (except "N" or "P")



- If idle speed is as specified (step 4), go to step 13.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat step 6.

13. Reinstall the mixture adjusting screw hole cap.
14. If equipped with air conditioner, check the idle speed with the A/C on.

Idle speed should be :  $750 \pm 50 \text{ min}^{-1}$  (rpm)



Adjust the idle speed, if necessary, by turning the adjusting screw.

## Power Valve

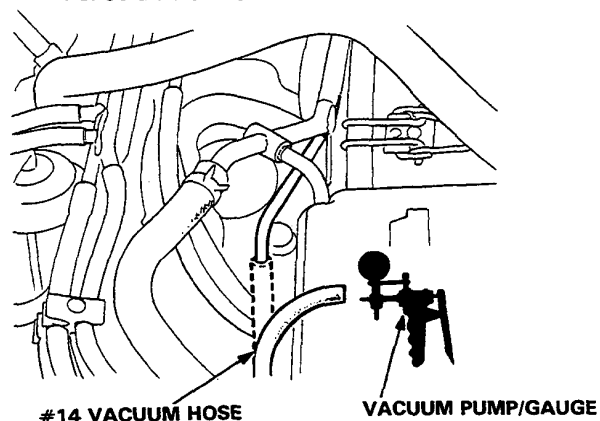
[Except KY, KT model]

### Testing (COLD ENGINE)

NOTE: Intake air temperature must be below  $20.5^{\circ}\text{C}$  ( $68.5^{\circ}\text{F}$ )

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum.

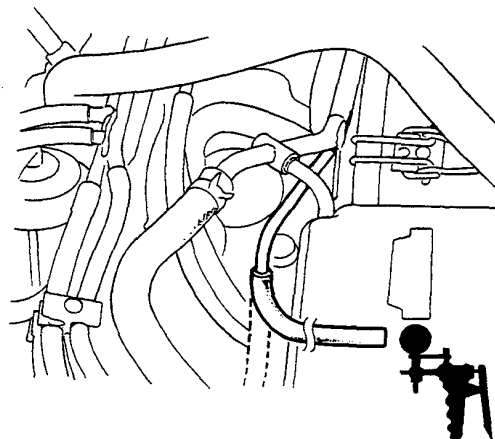
If should hold vacuum.



- If it does not hold vacuum, replace the diaphragm and retest (page 6-46).

2. Start the engine and disconnect the #14 vacuum hose from the vacuum hose manifold, and connect a vacuum pump.

There should be vacuum.



- If there is no vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the air bleed valve B.

(cont'd)

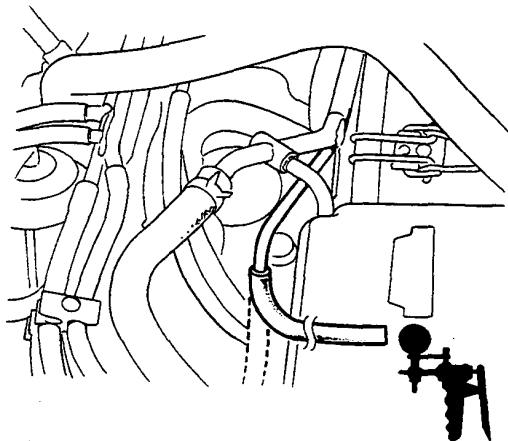
# Carburetor

## Power Valve (cont'd)

### Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump.

There should be no vacuum.



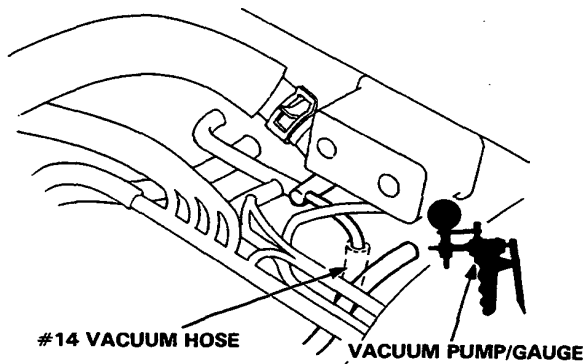
- If there is vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the air bleed valve B.

### [KY, KT model]

### Testing (HOT ENGINE)

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum.

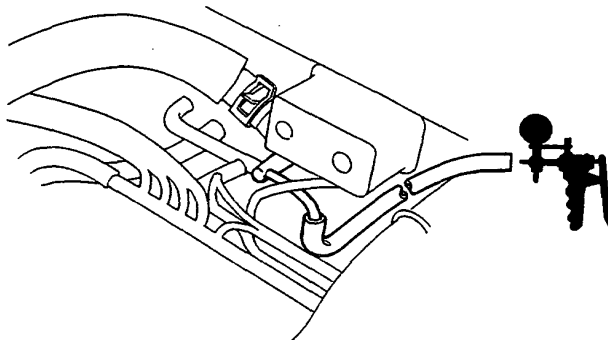
It should hold vacuum.



- If it does not hold vacuum, replace the diaphragm and retest (page 6-46).

2. Start the engine and warm up to normal operating temperature (cooling fan comes on).
3. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump.

There should be vacuum.



- If there is vacuum, check the vacuum hose for proper connection, cracks, blockage or disconnected hose.



## Float Level

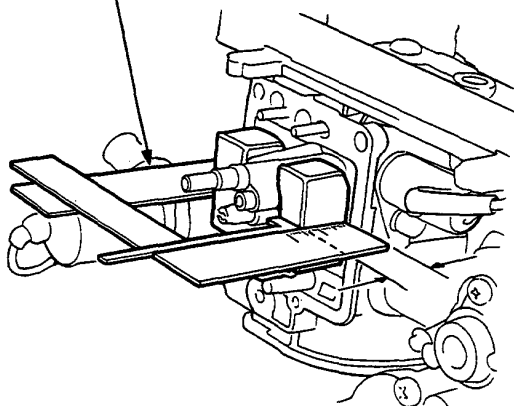
### Inspection

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

1. Remove the carburetors (page 6-46).
2. Remove the float chambers.
3. Using the float level gauge, measure the float level with the float tip lightly contacting the float valve and the carburetor float chamber surface inclined about 30° from vertical.

Float Level:  $16 \pm 1$  mm ( $0.6 \pm 0.04$  in.)

FLOAT LEVEL GAUGE  
07401-0010000



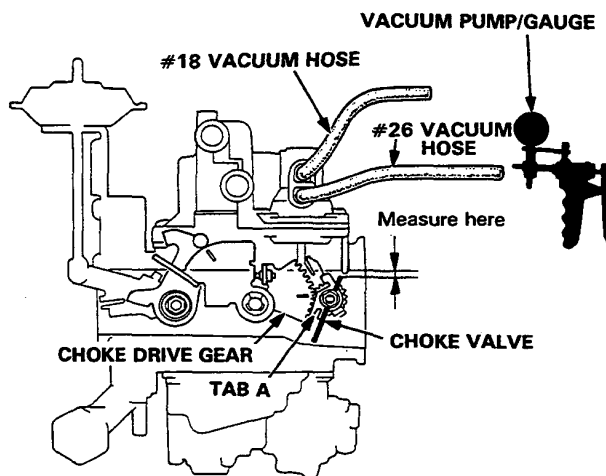
## Choke Linkage

### Adjustment

1. Remove the carburetor (page 6-46).
2. Disconnect the #18 vacuum hose from the choke opener and leave open to atmosphere. Disconnect the #26 vacuum hose and connect a vacuum pump. Apply at least 200 mm Hg (8 in. Hg).

NOTE: If vacuum drops below 200 mm Hg (8 in. Hg), slowly reapply vacuum until you can maintain the highest level without losing vacuum.

3. Turn the choke drive gear clockwise and measure the clearance between the choke valve and the casting.



1st Stage Clearance;  
 $0.90 \pm 0.08$  mm ( $0.035 \pm 0.003$  in.)

Adjust clearance by bending Tab A.

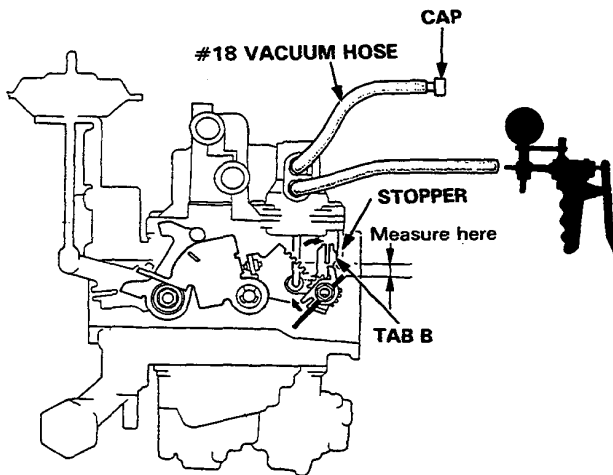
(cont'd)



# Carburetor

## Choke Linkage (cont'd)

4. Cap the end of the #18 vacuum hose and apply vacuum.
5. Turn the choke drive lever clockwise until Tab B seats against the stopper, and measure clearance between the choke valve and casting.



### 2nd Stage Clearance;

[KS, KX, KZ model]

M/T:  $2.35 \pm 0.14$  mm ( $0.093 \pm 0.006$  in.)

A/T:  $2.65 \pm 0.15$  mm ( $0.104 \pm 0.006$  in.)

[KY, KT, KF, KG, KW, KB, KE model]

$1.94 \pm 0.12$  mm ( $0.076 \pm 0.005$  in.)

Adjust clearance by bending Tab B.

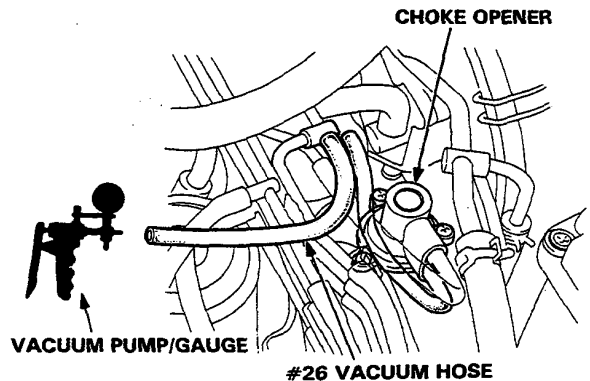
If the clearance can not adjust, replace the left carburetor (page 6-46).

## Choke Opener

### Testing (COLD ENGINE)

NOTE: Engine coolant temperature must be below  $15^{\circ}\text{C}$  ( $59^{\circ}\text{F}$ )

1. Disconnect the #26 vacuum hose from the choke opener and connect a vacuum pump.

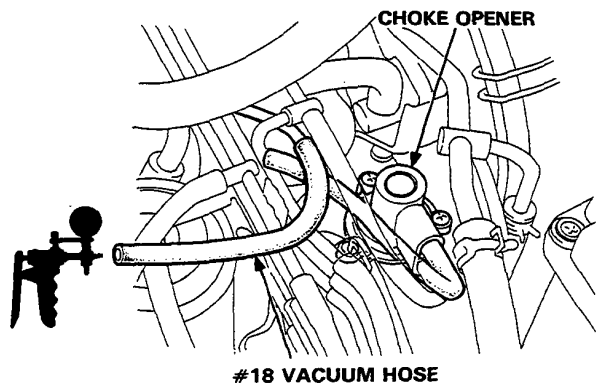


2. Check the vacuum with the ignition switch turn to START position.

There should be no vacuum when the ignition switch turn to START position.

- If not, go to troubleshooting (page 6-46).

3. Start the engine and disconnect the #18 vacuum hose from the choke opener, then connect a vacuum pump.



It should not hold vacuum.

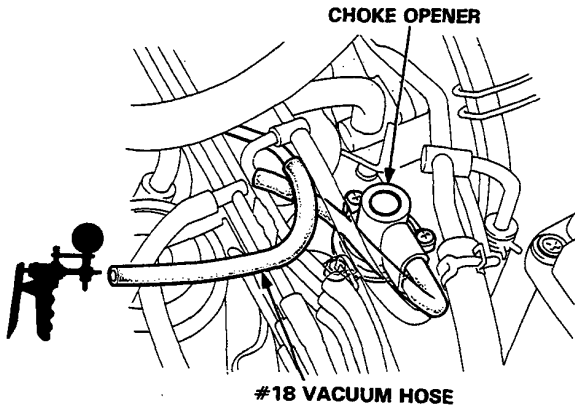
- If it holds vacuum, check the #18 vacuum hose for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve and retest.



## Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect the #18 vacuum hose from the choke opener and connect a vacuum pump.

It should hold vacuum.



- If it does not hold vacuum, check the #18 vacuum hose for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermostatic valve and retest.

(cont'd)

# Carburetor

## Choke Opener (cont'd)

### Troubleshooting Flow Chart Cranking Leak Solenoid Valve

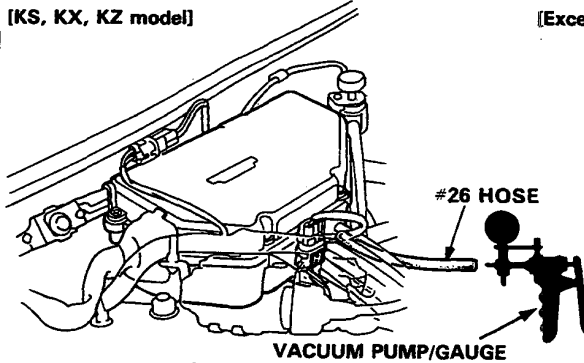
Inspection of Cranking Leak Solenoid Valve

Disconnect #26 vacuum hose from the vacuum hose manifold.

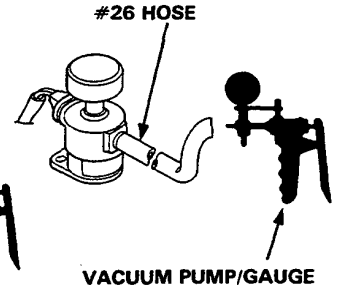
Connect vacuum pump and apply vacuum.

Turn the ignition switch to the START position.

[KS, KX, KZ model]



[Except KS, KX, KZ model]



Does vacuum remain steady?

YES

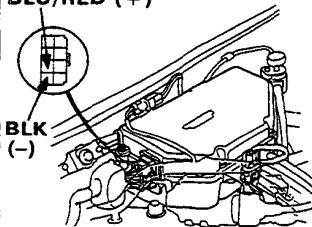
Turn the ignition switch OFF.

NO

[KS, KX, KZ model]

BLU/RED (+)

BLK (-)

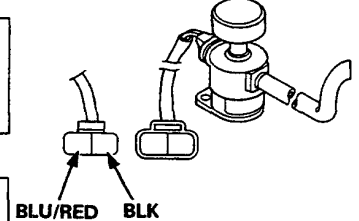


Disconnect the 8P connector on the control box.

[Except KS, KX, KZ model]

Measure voltage between BLU/RED (+) terminal and BLK (-) terminal on the wire harness.

Turn the ignition switch to the START position.



Is there battery voltage?

YES

Replace the solenoid valve.

NO

Measure voltage between BLU/RED (+) terminal and body ground in the START position.

Is there battery voltage?

YES

Repair open in BLK wire between the control box and G202.

NO

Inspect open in BLU/RED wire between the control box and ignition switch as well as No.1 fuse.

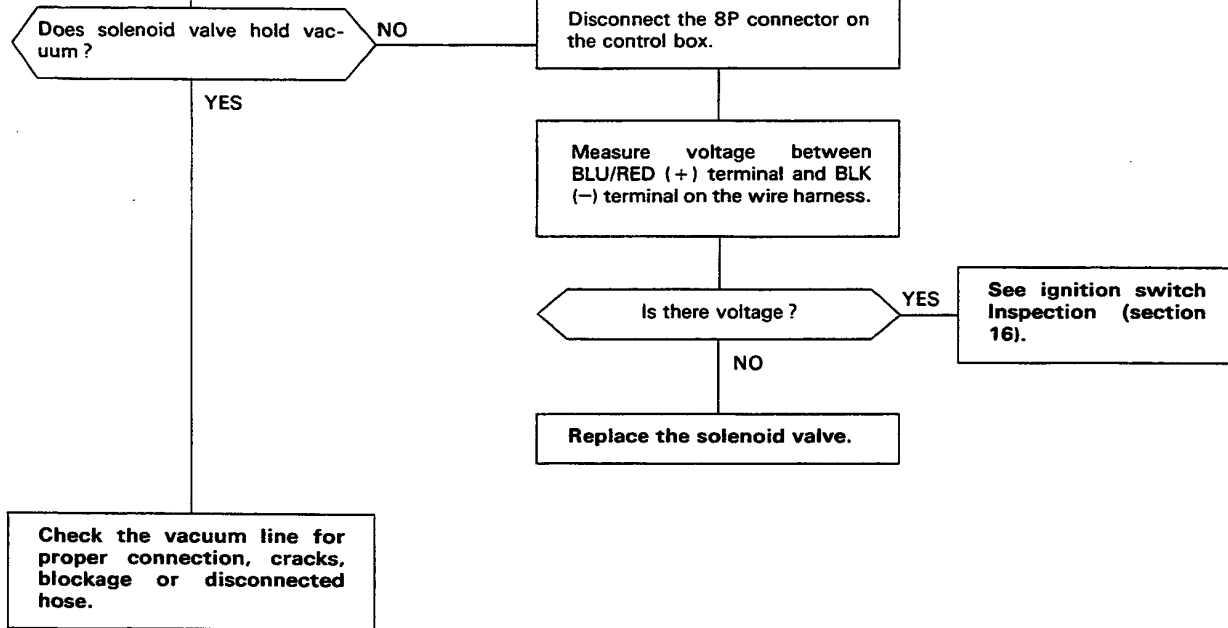
Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply vacuum

(To page 6-43)



(From page 6-42)



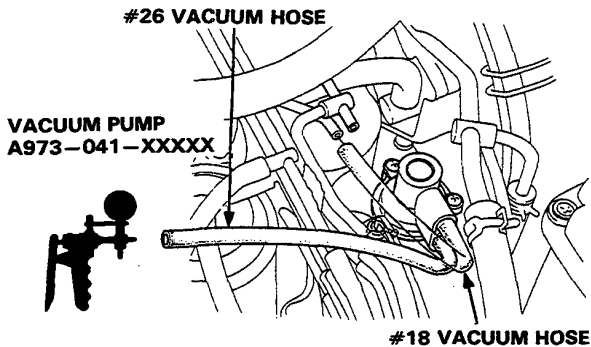
(cont'd)

# Carburetor

## Choke Opener (cont'd)

### Choke Opener Diaphragm Testing

1. Disconnect the #18 vacuum hose from the vacuum hose manifold.
2. Disconnect the #26 vacuum hose from the vacuum hose manifold and connect a vacuum pump.



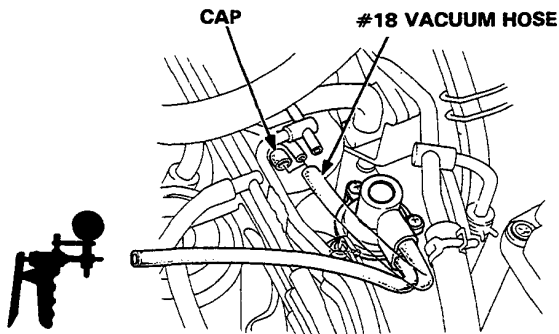
3. Apply vacuum.

Vacuum should stabilize at 100 to 200 mm Hg (4 to 8 in. Hg) and it should pull the opener rod.

- If not, check the linkage for signs of mechanical binding and replace the left carburetor (page 6-46).

4. Cap the end of the #18 vacuum hose and apply vacuum.

It should pull the opener rod.

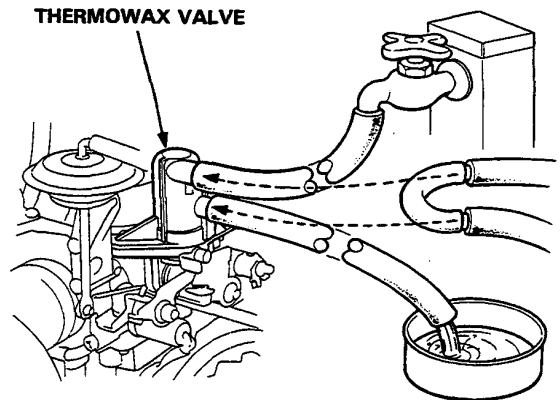


- If not, replace the left carburetor (page 11-46).

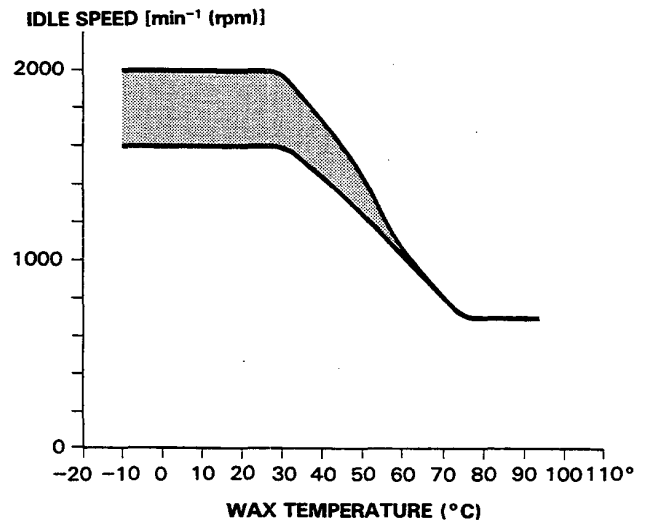
## Fast Idle

### Inspection/Adjustment

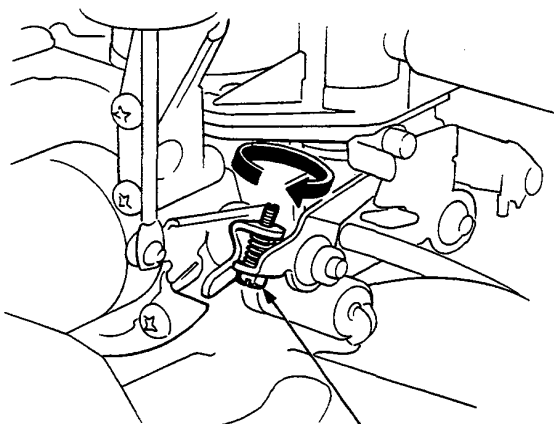
1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Stop the engine.
3. Disconnect both coolant hoses from the thermowax valve and cap the end of hoses.
4. Apply cold water and cool down the wax.



5. Connect a tachometer and check the idle speed.



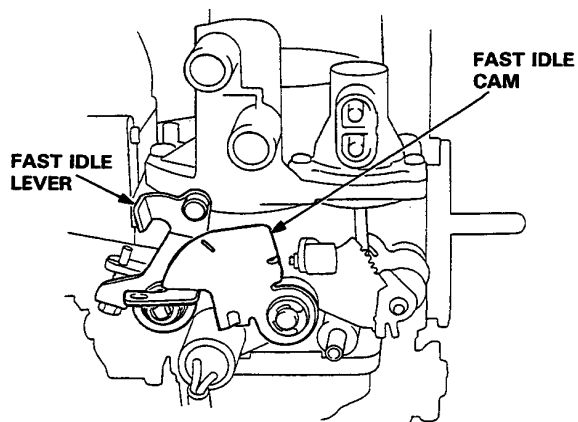
Adjust the idle speed, if necessary, by turning the fast idle adjusting screw.



**FAST IDLE ADJUSTING  
SCREW**

- If not, replace the left carburetor (page 6-46).
6. Reinstall both coolant hose.
  7. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
  8. Check the fast idle lever.

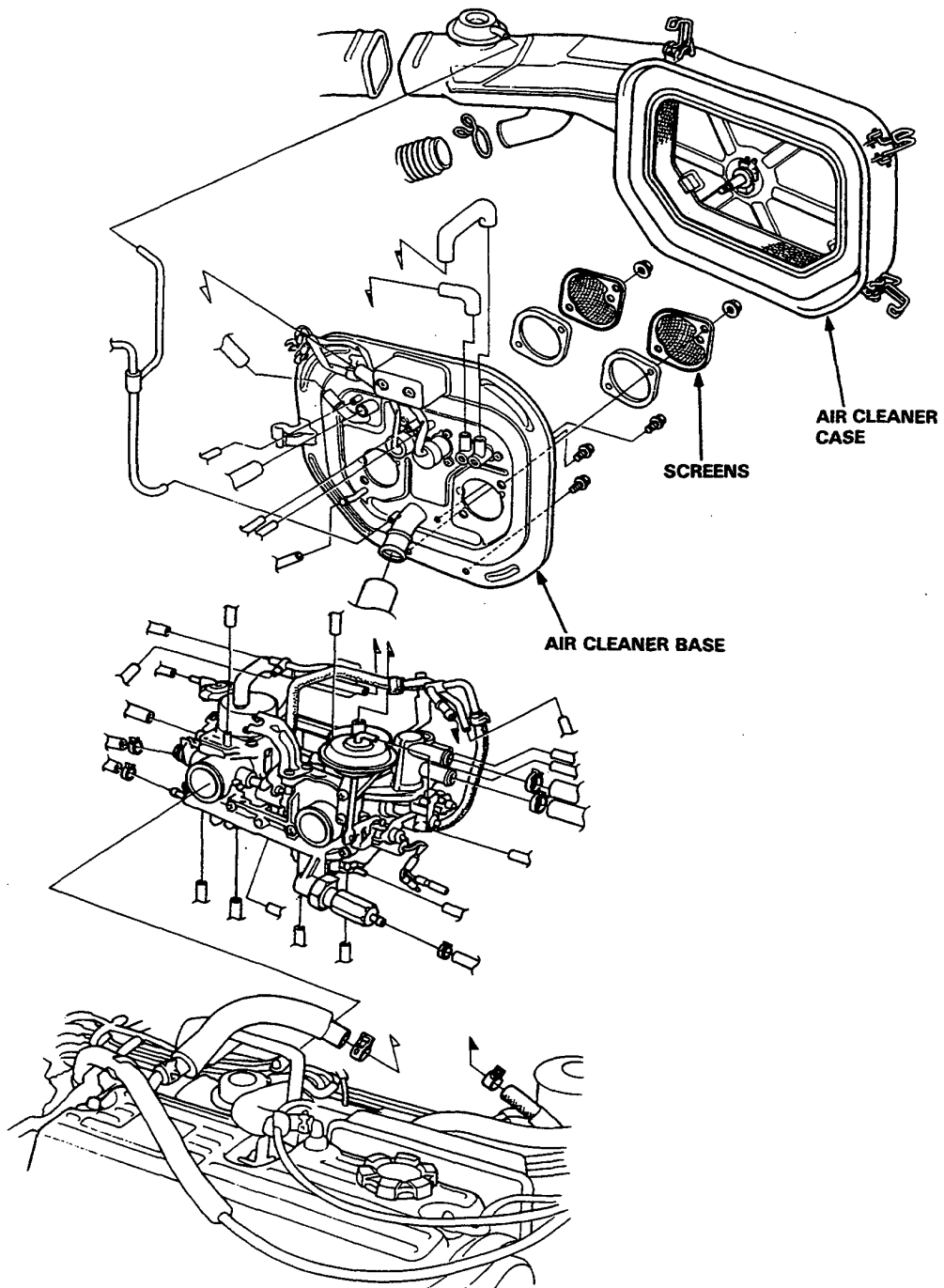
Fast idle lever should not be seated against fast idle cam.



- If not, replace the left carburetor (page 6-46).

# Carburetor

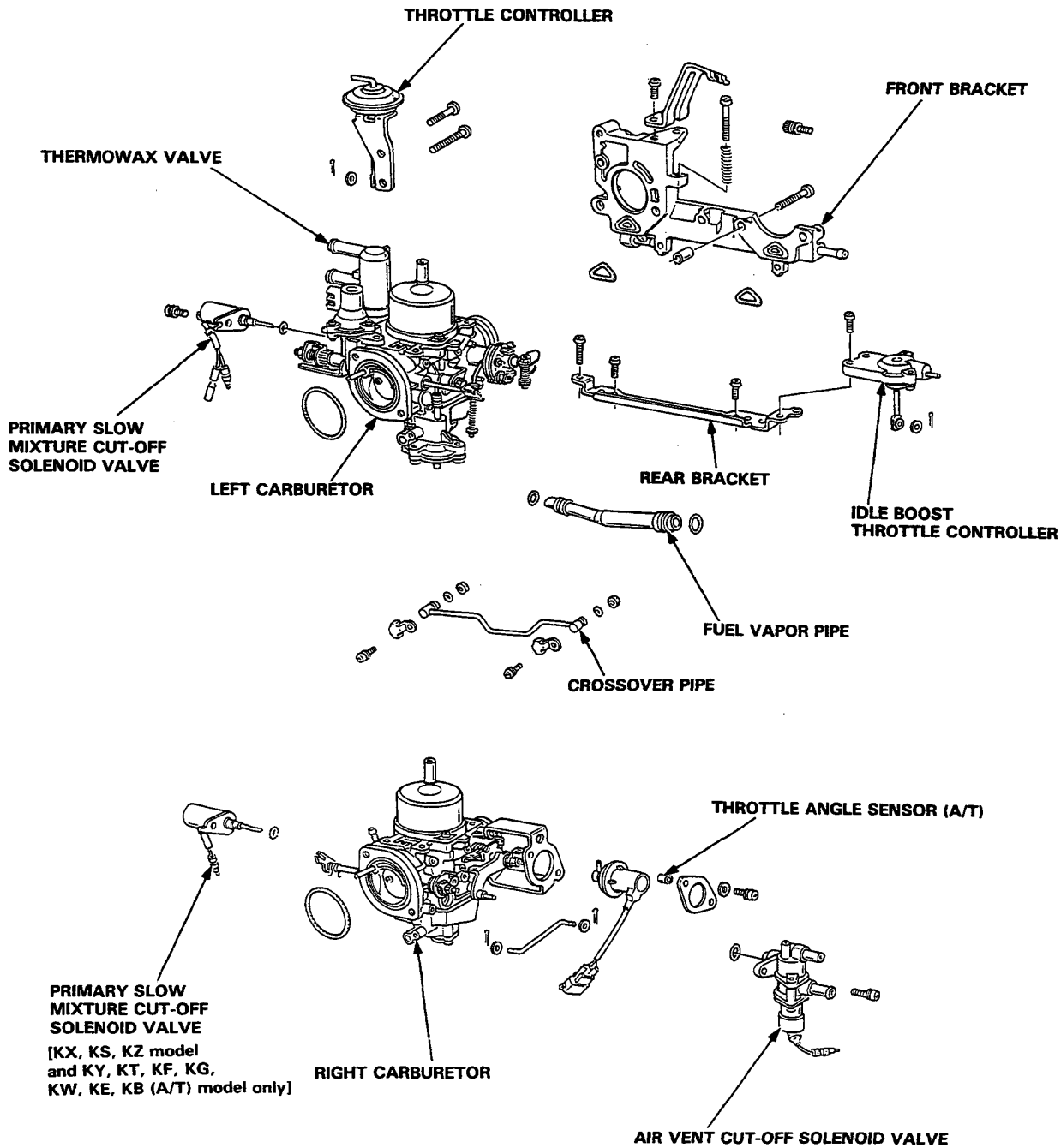
## Removal





## Replacement

**WARNING** Do not smoke while working on fuel system. Keep any open flame away from your work area. Drain fuel in to an approved container.

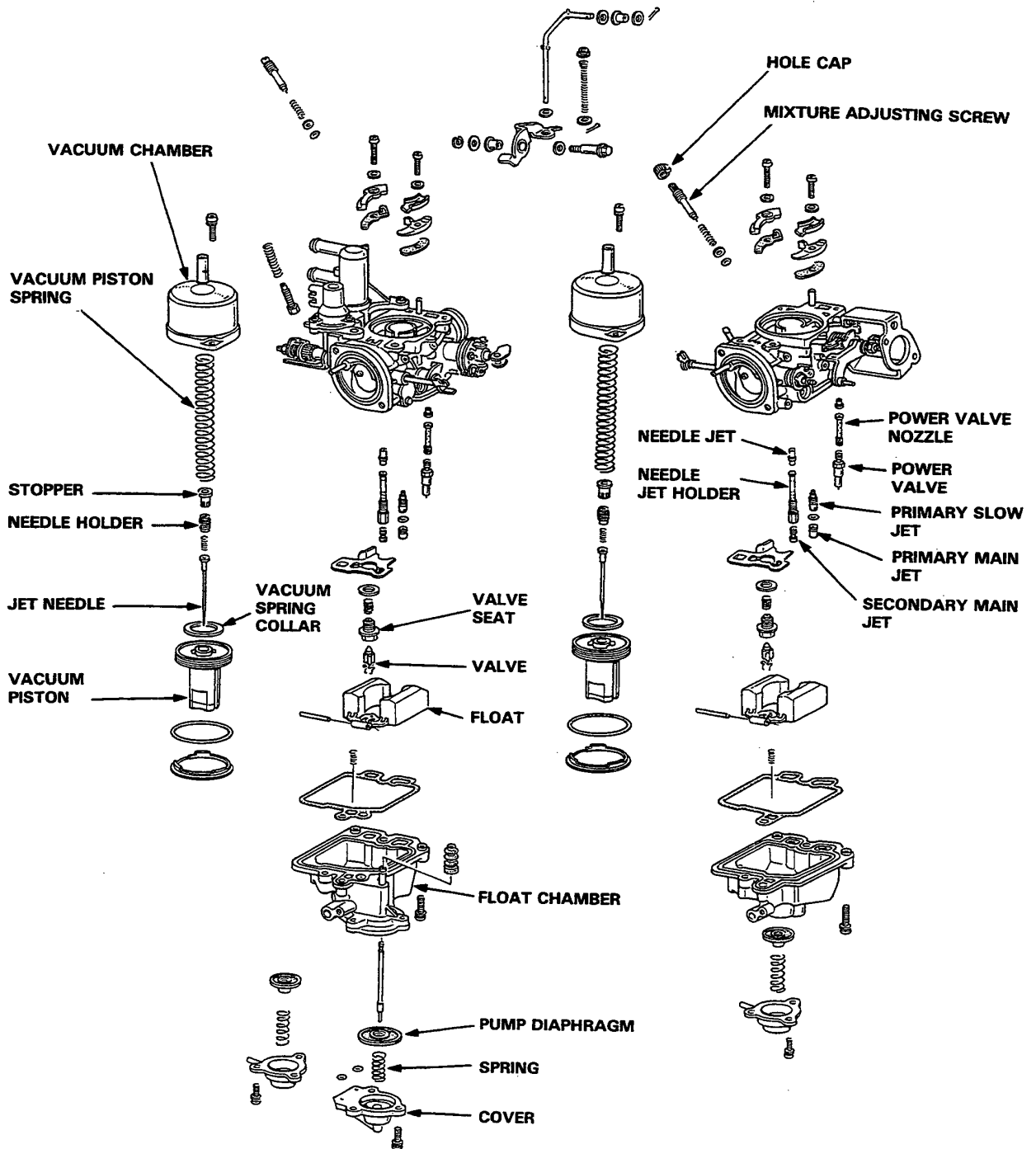


(cont'd)



# Carburetor

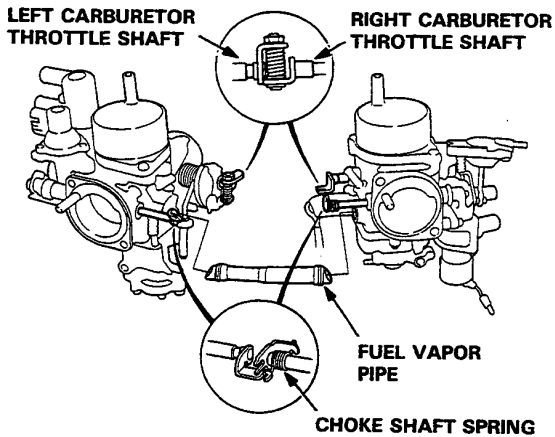
## Replacement (cont'd)





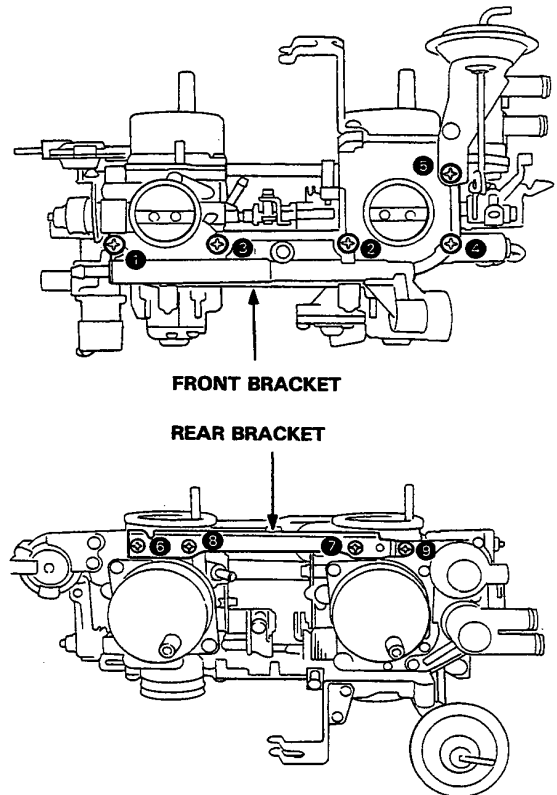
## Reassembly

1. Insert the right carburetor's throttle shaft end (forked), between the washers on the left carburetor's throttle shaft end.
2. Install new O-rings on the fuel vapor pipe, then install it.
3. Set the left and right carburetors up.



4. Connect the choke shaft spring.
  5. Install the rear bracket but don't tighten its screws yet.
  6. Install the front bracket, with new gaskets, but don't tighten its screws yet.
- CAUTION:** Make sure the screw length is correct or you may damage the carburetors.
7. Check that the choke and throttle shafts move smoothly without binding.

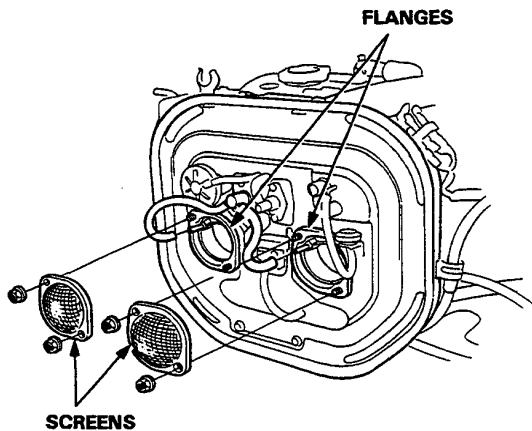
8. Tighten the screws in the sequence shown.



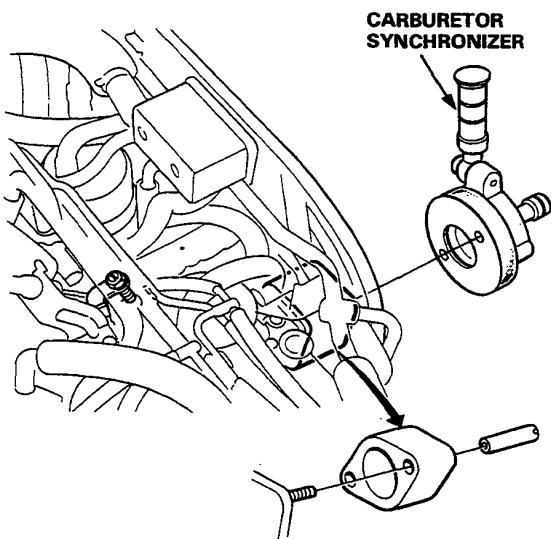
# Carburetor

## Synchronization

1. Remove the air cleaner cover and element.
2. Remove the air intake screens and air intake flanges.



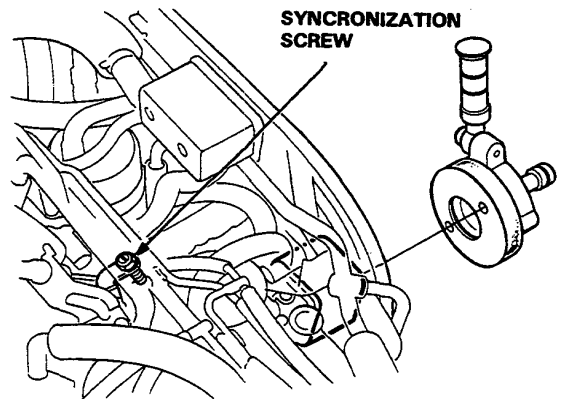
3. Install synchronization spacers and torque the nuts to 5 N·m (0.5 kg·m, 3.6 lb·ft).



4. Connect a tachometer, start the engine and allow it to reach its normal operating temperature; the cooling fan will come on.

5. Measure the air flow through both adapters using the carburetor synchronizer.

- If the flow rates are identical, remove the synchronizer, adapters and reinstall the remaining parts in the reverse order of disassembly.
- If the air flow rates are different, loosen the adjusting screw lock nut and adjust as necessary. The adjusting screw only affects the right carburetor; turning the screw clockwise decreases air flow and counterclockwise increases air flow. If the flow rates can't be balanced, check for air leaks or carbon build-up on a throttle valve.



6. Tighten the adjusting screw lock nut and recheck the flow rates. Adjust as necessary.
7. Remove the carburetor synchronizer, adapters, and reinstall the remaining parts in the reverse order of disassembly.

# Fuel Supply System



## Symptom-to-sub System Chart

**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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the warning light and the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE		SYSTEM	FUEL FILTERS	FUEL PUMP	FUEL CUT-OFF RELAY	FUEL TANK	CONTAMINATED FUEL
SYMPTOM			52	52	54	55	*
ENGINE WON'T START			③	①	②		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①				①
	LOSS OF POWER		①				①

\* Fuel with dirt, water or a high percentage of alcohol is considered contaminated.

# Fuel Supply System

## Fuel Filters

### Replacement

Replace both front and rear filters at every 2 years or 40,000 km (24,000 miles) whichever comes first.

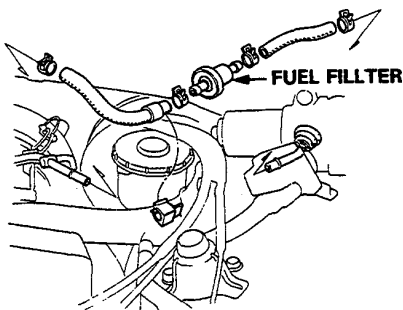
**WARNING** Do not smoke while working on the fuel system. Keep open flame away from work area.

#### Front

1. Use fuel line clamps to pinch off the fuel lines.
2. Disconnect the fuel lines and remove the fuel filter.

**CAUTION:** When disconnecting the fuel lines, slide back the clamps then twist the lines as you pull, to avoid damaging them.

3. Install the new fuel filter.
4. Remove the fuel line clamps.

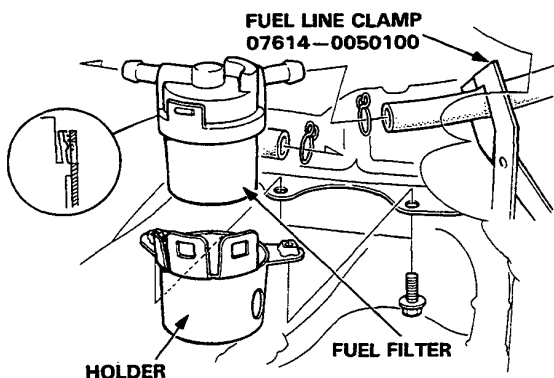


#### Rear

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clamps to the fuel lines and disconnect the lines from the filter.

**CAUTION:** To avoid damaging the fuel lines when disconnecting, slide back the clamps then twist the lines as you pull.

4. Install in the reverse order of removal.



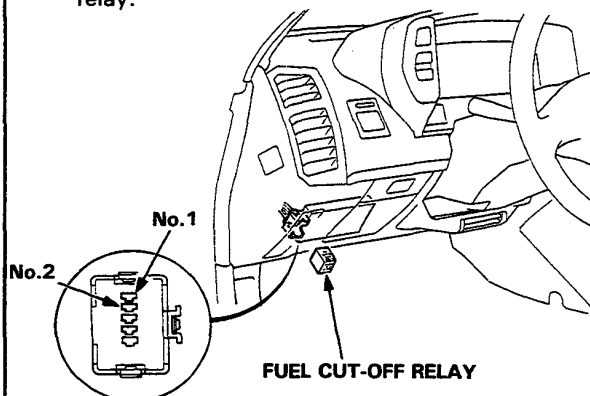
## Fuel Pump

### Testing

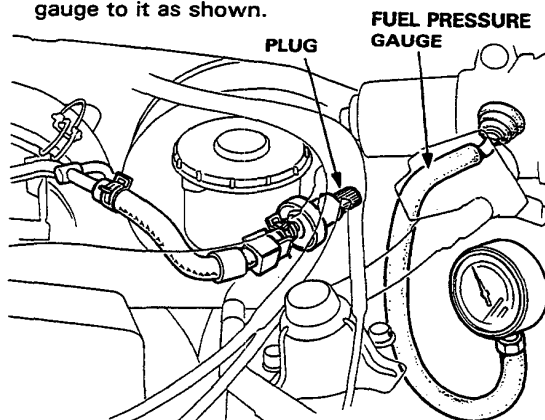
**WARNING** Do not smoke during the test. Keep any open flame away from your work area.

**NOTE:** Check for a clogged fuel filter and or fuel line before checking fuel pump pressure.

1. Remove the dashboard under cover and the fuel cut-off relay from the fuse box.
2. Connect the No.1 terminal to the No.2 terminal located at the fuse box side of the fuel cut-off relay.



3. Disconnect the fuel line at the fuel filter in the engine compartment, and connect a pressure gauge to it as shown.



4. Turn ignition ON until pressure stabilizes, then turn key off.

Pressure should be 11.8–17.7 kPa (1.7–2.6 psi).

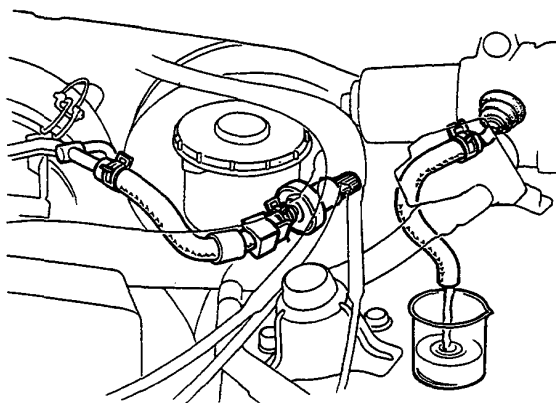
- If gauge shows at least 11.8 kPa (1.7 psi) go on to step 5.
- If gauge shows less than 11.8 kPa (1.7 psi), replace pump and retest.



5. Remove pressure gauge and hold a graduated container under the hose.
6. Turn ignition ON for 60 seconds, then turn ignition OFF and measure amount of fuel flow.

Fuel flow should be 825 cm<sup>3</sup> (27.9 oz.)—1,090 cm<sup>3</sup> (36.9 oz.) in 60 seconds.

- If fuel flow is within specification, reconnect cut-off relay and fuel hose.
- If fuel flow is less than 825 cm<sup>3</sup> (27.9 oz.) or more than 1,090 cm<sup>3</sup> (36.9 oz.), check the fuel cut-off relay (page 6-54).



## Replacement

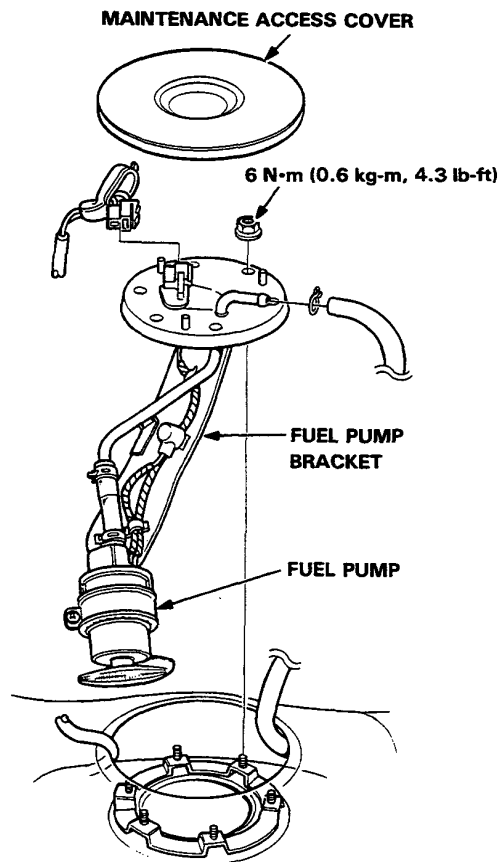
**WARNING** Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Remove the left maintenance access cover in the luggage area.
2. Disconnect the fuel lines and connector.
3. Remove the fuel pump mounting bolts.
4. Remove the fuel pump from the fuel tank.

**NOTE:** If it is hard to remove, slide the fuel tank down by loosening the fuel tank mounting nuts.

5. Install the fuel pump in the reverse order of removal.

**NOTE:** When installing the maintenance access cover, make sure the seal is in place.



# Fuel Supply System

## Fuel Cut-off Relay

### Testing

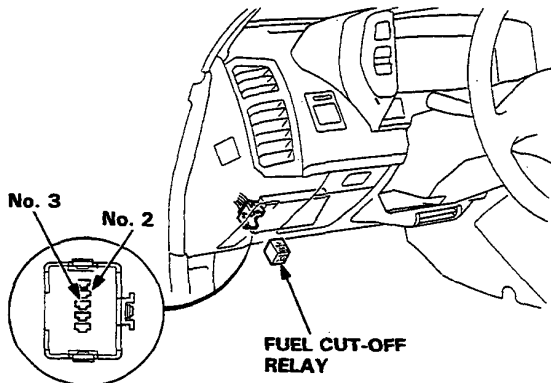
1. With the ignition switch off, remove the dashboard under cover.
2. Remove the fuel cut-off relay.
3. Check for continuity between the No.3 terminal and body ground.

Continuity should exist.

● If there is no continuity, check the BLK wire between the fuel cut-off relay and G401.

4. Attach the positive probe of the voltmeter to the No.2 terminal and the negative probe to the No.3 terminal. Then turn the ignition switch ON.

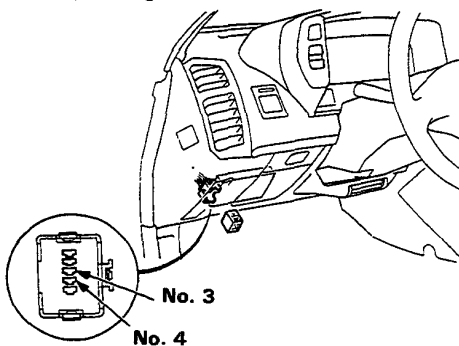
Battery voltage should be available.



● If there is no voltage, check the BLK/YEL wire from the ignition switch and fuel cut-off relay as well as No. 12 fuse.

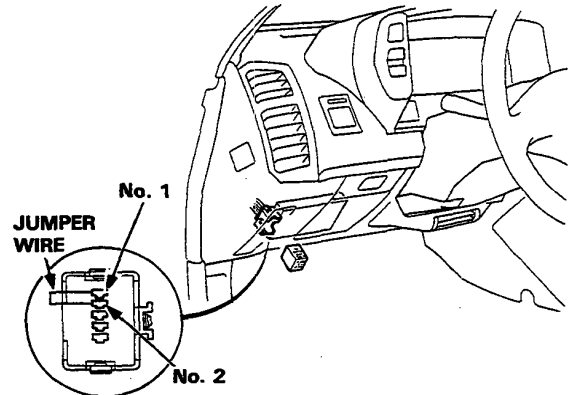
5. Turn the ignition switch OFF. Attach the positive probe of the voltmeter to the No.4 terminal and the negative probe to the No.3 terminal. Then turn the ignition switch ON.

Battery voltage should be available.



● If there is no voltage, check the BLU wire from the ignition coil and fuel cut-off relay.

6. Turn the ignition switch OFF. Connect a jumper wire between the No.1 terminal and the No.2 terminal.

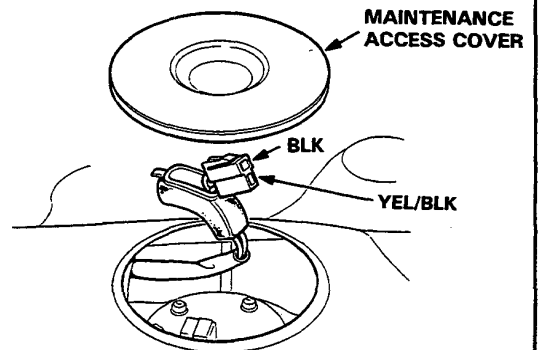


7. Turn the ignition switch ON.

The fuel pump should run.

● If the fuel pump does not run, remove the left maintenance access cover in the luggage area and disconnect the 2P connector. Attach the positive probe of the voltmeter to YEL/BLK terminal and negative probe to body ground.

Battery should be available.



– If OK, check BLK wire between the fuel pump and G401 and replace the fuel pump.

– If not, check YEL/BLK wire between the fuel cut-off relay and fuel pump.

If the wires are OK, replace the fuel cut-off relay and retest.



## Fuel Tank

### Replacement



**WARNING** Do not smoke while working on fuel system. Keep open flame away from area.

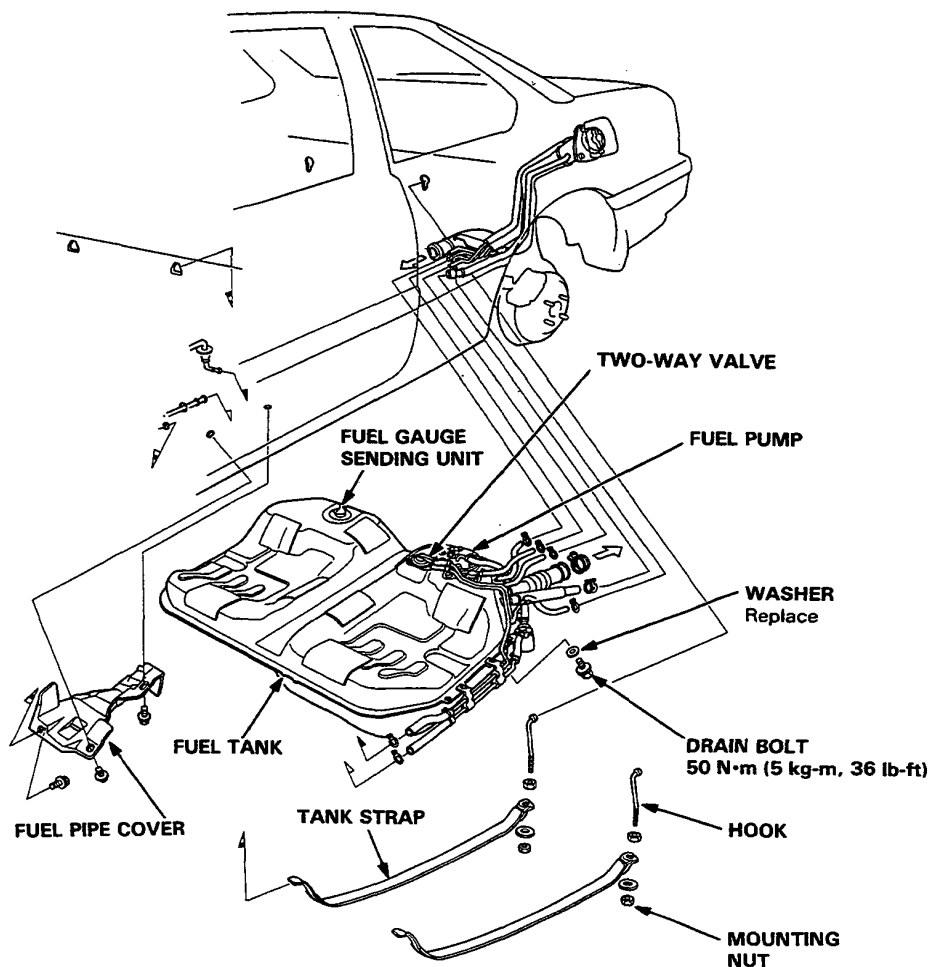
1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the fuel gauge sending unit and fuel pump connectors.
4. Disconnect the hoses.

**CAUTION:** When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.

5. Place a jack, or other support, under the tank.
6. Remove the strap nuts and let the straps fall free.
7. Remove the fuel tank.

**NOTE:** The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.

8. Install a new washer on the drain bolt, then install parts in the reverse order of removal.





# Air Intake System

## Symptom-to-Sub System Chart

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**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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the warning light and the self-diagnosis indicator, valve clearance, air cleaner, PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE	SYSTEM	THROTTLE CABLE	AIR INTAKE CONTROL
		57	60
SYMPTOM			
LOSS OF POWER			①
AFTERBURN			①
HESITATION/SURGE			①

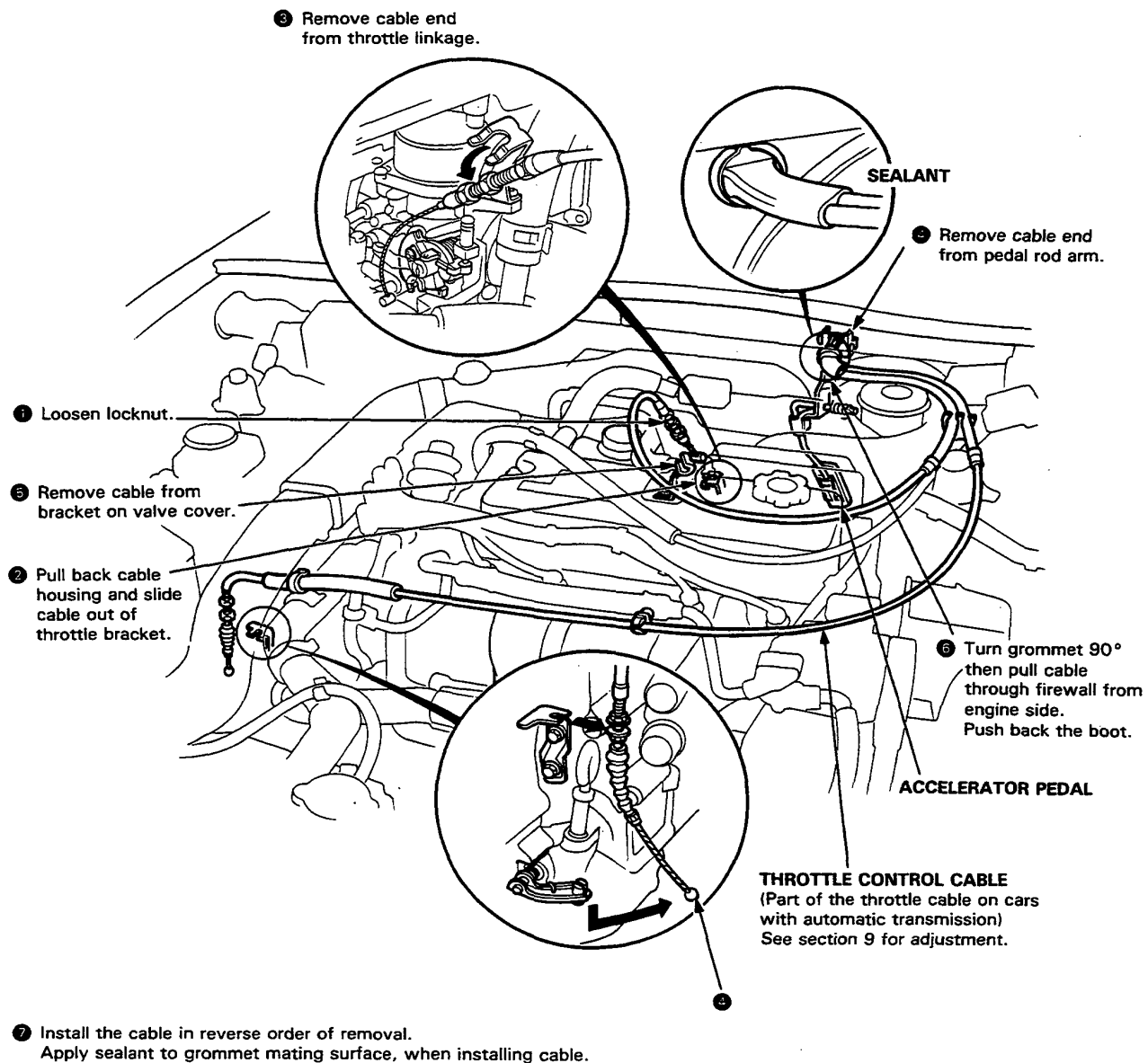
# Air Intake System



## Throttle Cable

### L.H. Drive: Replacement

NOTE: Detach cable in the numbered sequence shown.



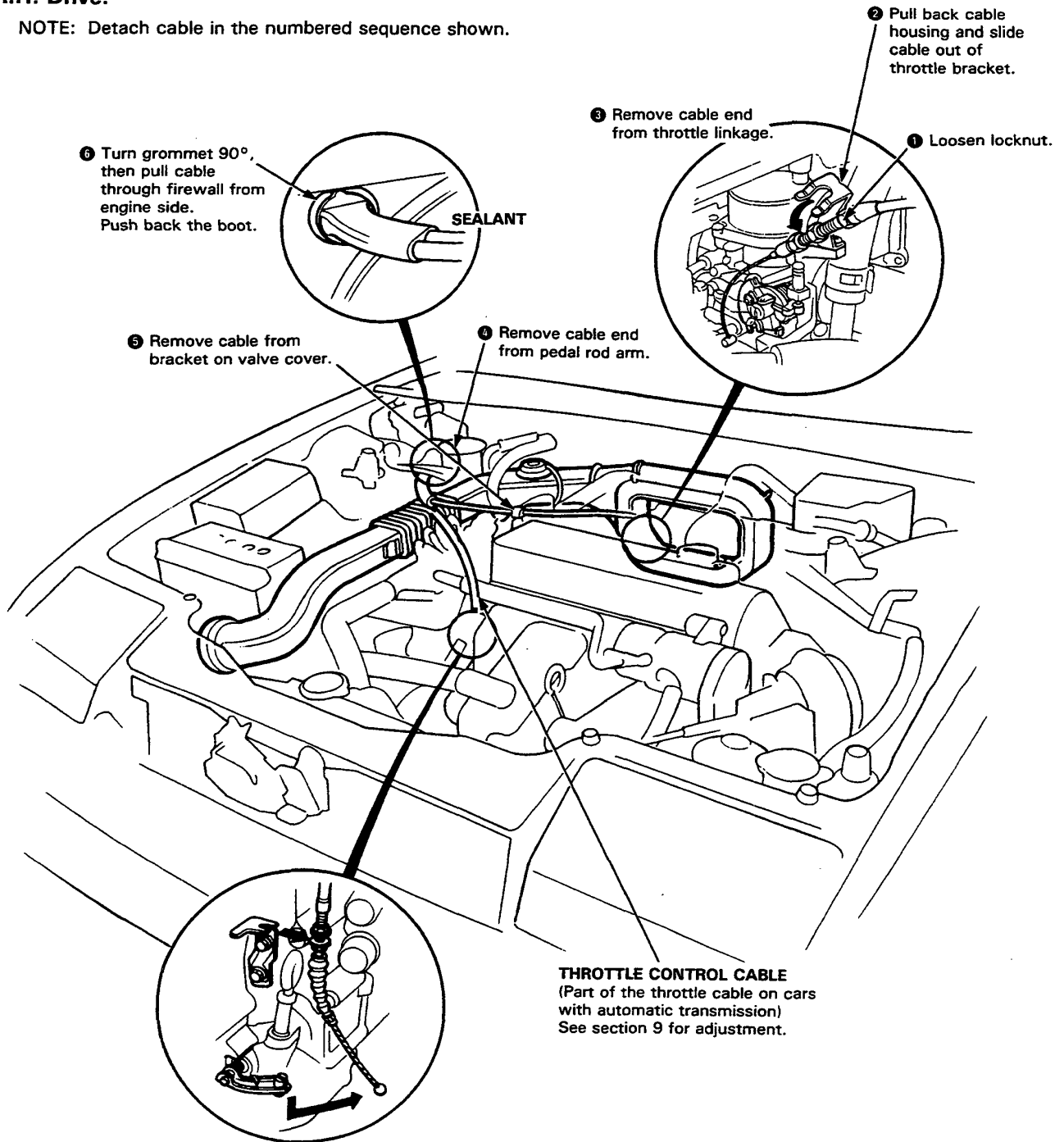
(cont'd)

# Air Intake System

## Throttle Cable (cont'd)

### R.H. Drive:

NOTE: Detach cable in the numbered sequence shown.

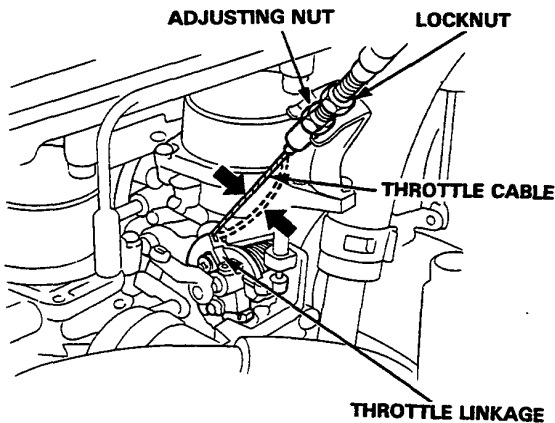


- ⑦ Install the cable in reverse order of removal.  
Apply sealant to grommet mating surface, when installing cable.



### Inspection/Adjustment

- 1 Warm up the engine to normal operating temperature (the cooling fan comes on).
2. Check that throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Start the engine and check cable free-play at throttle linkage at idle. Cable deflection should be 4–10 mm (3/16–3/8)



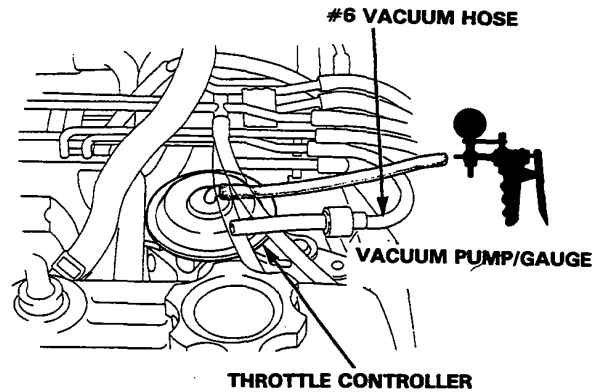
4. If deflection is not within specs, loosen locknut and turn adjusting nut until you can deflect cable as specified. Then tighten locknut.
5. With cable properly adjusted, check throttle valve to be sure it opens fully when you push accelerator pedal to the floor.

**CAUTION:** Check throttle valve to be sure it returns to idle position whenever you release accelerator.

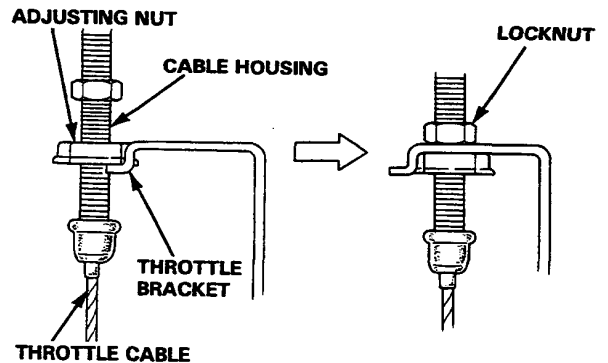
### Installation

KS, KX, KZ model and  
KY, KT, KF, KG, KW, KE, KB (A/T) model;

1. Disconnect the #6 vacuum hose from the throttle controller and connect a vacuum pump to the controller, the apply vacuum.



2. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the throttle bracket.
3. Warm up the engine to normal operating temperature (the cooling fan comes on).
4. Remove the cable housing from the throttle bracket, set the adjusting nut on the throttle bracket. Adjust the adjusting nut so that its free play is 0 mm.
5. Remove the cable housing from the throttle bracket, reset the adjusting nut and tighten the locknut.



KS, KX, KZ model and  
KY, KT, KF, KG, KW, KE, KB (A/T) model;

6. Disconnect the vacuum pump and connect the #6 vacuum hose.

# Air Intake System

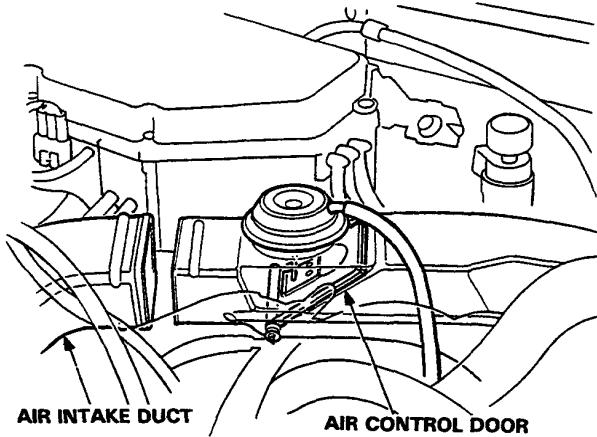
## Intake Air Control System

### Testing (COLD ENGINE)

NOTE: Intake air temperature must be below 25°C (77°F)

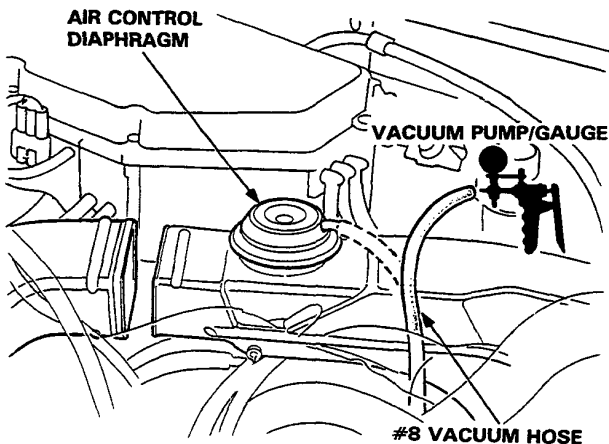
1. Disconnect the air intake duct and start the engine.

The air control door should rise.



- If not, disconnect the #8 vacuum hose from the air control diaphragm, and connect a vacuum pump.

There should be vacuum.

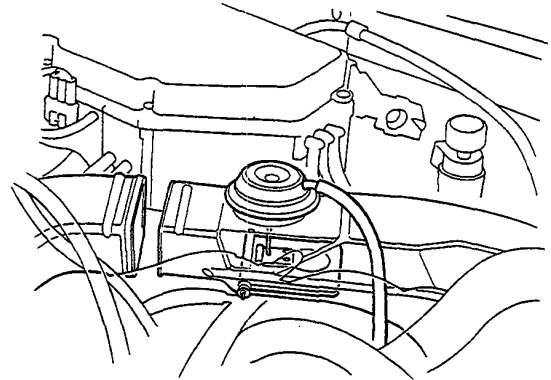


- If there is vacuum, replace the air control diaphragm and retest.
- If there is no vacuum, check the #8 vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the air bleed valve A.

### Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).

The air control door should be down.



- If not, disconnect the #8 vacuum hose from the air control diaphragm, and connect a vacuum pump.

There should be no vacuum.

- If there is no vacuum, replace the air control diaphragm and retest.
- If there is vacuum, replace the air bleed valve A and retest.

# Emission Control System



## Symptom-to-sub System Chart

[KS, KX, KZ model]

**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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the warning light and the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE		SYSTEM	FEEDBACK CONTROL	THROTTLE CONTROL	EGR	EVAPORATIVE CONTROL	AIR INJECTION
SYMPTOM			64	72	70	75	68
ENGINE WON'T START			①				
DIFFICULT TO START ENGINE	WHEN COLD		①		②		
	WHEN WARM		①	②			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION		①	②	②		
	WHEN WARM ENGINE SPEED TOO HIGH			①			
	WHEN WARM ENGINE SPEED TOO LOW		①				
	ROUGH IDLE/ FLUCTUATION		①		②		
FREQUENT STALLING	WHILE WARMING UP		①		②		
	AFTER WARMING UP		①		②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING						
	LOSS OFF POWER		①				
	AFTERBURN		①	②			②
	HESITATION/SURGE		①		②		

# Emission Control System

## Symptom-to-sub System Chart

[Except KX, KS, KZ model]

PAGE	SYSTEM	THROTTLE CONTROL	EVAPORATIVE CONTROL	MIXTURE CONTROL
SYMPTOM		73	79	68
ENGINE WON'T START		②	①	③
DIFFICULT TO START ENGINE	WHEN COLD	②	①	③
	WHEN WARM	②	①	③
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION	①		②
	WHEN WARM ENGINE SPEED TOO HIGH	②	①	
	WHEN WARM ENGINE SPEED TOO LOW	②	①	③
	ROUGH IDLE/ FLUCTUATION	②	①	③
FREQUENT STALLING	WHILE WARMING UP	②	①	③
	AFTER WARMING UP	②	①	③
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①	
	LOSS OFF POWER		①	
	AFTERBURN	①	②	①
	HESITATION/SURGE		①	②



## Tailpipe Emissions

### Inspection

**NOTE:** It is not possible to use a CO meter to adjust the idle mixture; the effect of the catalytic converter prevents accurate tracking of such small changes in air-fuel ratio.

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

1. Follow steps the propane enrichment method.
2. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
3. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

#### Specified CO %:

KS, KX, KZ model: 0.1% maximum

Except KS, KX, KZ model:  $1.0 \pm 1.0\%$

## Catalytic Converter

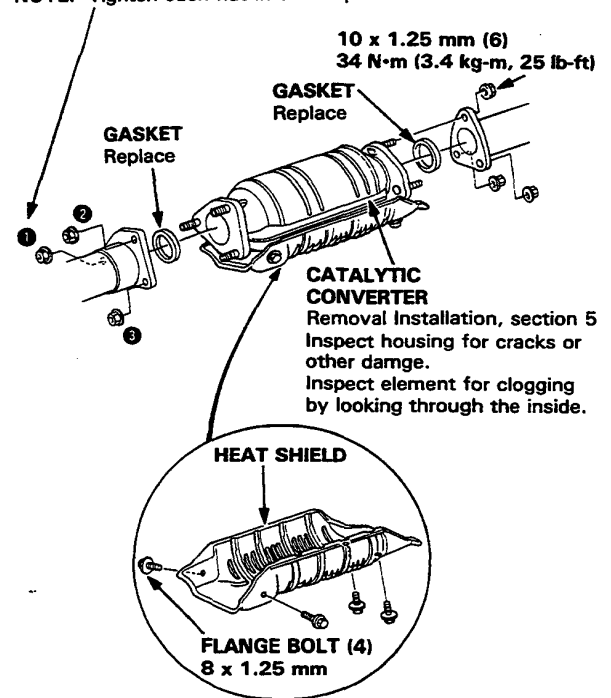
**Carbureted Engine: KX, KS, KZ**

**Fuel-Injected Engine: KX, KS, KZ, KQ**

### 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 more than 50% of the visible area is damaged or plugged.

**NOTE:** Tighten each nut in the sequence shown below.





# Emission Control System

## Feedback Control

[KX, KS, KZ model]

### Troubleshooting Flow Chart EACV

Inspection of EACV.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Disconnect the EACV hose from the air cleaner.

Raise the engine speed to 3,500  $\text{min}^{-1}$  (rpm).

Is there vacuum ?

YES

Check the self-diagnosis indicator (page 6-90). If OK, replace the EACV and retest.

NO

Raise the engine speed to 3,500  $\text{min}^{-1}$  (rpm) and close the throttle suddenly.

Is there vacuum ?

NO

Check the self-diagnosis indicator (page 6-90).

YES

Is warning light on ?  
Does LED indicate code 14 ?

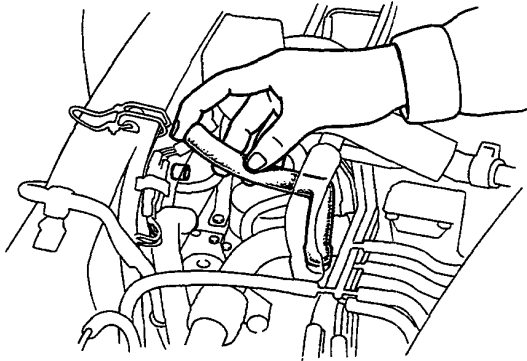
YES

Go to EACV troubleshooting flow chart (page 6-109).

NO

Check the hose for proper connection, cracks, blockage or disconnected hose. If OK, replace the EACV and retest.

EACV is OK.





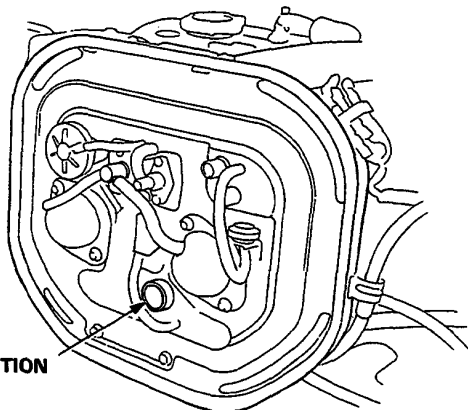
## Air Injection Control

[KX, KS, KZ model]

### Testing (HOT ENGINE)

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Remove the air cleaner cover and filter.
3. Start the engine and check for a bubbling noise from the air suction port at idle.

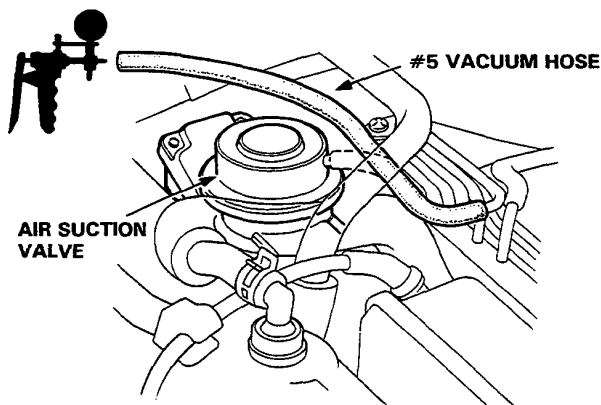
A bubbling noise should not be heard.



- If bubbling noise is heard, disconnect the #5 vacuum hose from the air suction valve and connect a vacuum pump.

There should be no vacuum.

### VACUUM PUMP/GAUGE



- If there is no vacuum, replace air suction valve and retest.
- If there is vacuum, go to troubleshooting (page 6-66).

4. Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

**WARNING** Block rear wheels before jacking up front of car.

5. Place the shift or selector lever in second or 2 position and accelerate above 20 km/h, then release the throttle and check for a bubbling noise from the air suction port.

A bubbling noise should be heard.

- If bubbling noise is not heard, disconnect the #5 vacuum hose from the air suction valve and connect a vacuum pump.

There should be vacuum.

- If there is vacuum, replace the air suction valve and retest.
- If there is no vacuum, go to troubleshooting (page 6-66).

(cont'd)

# Emission Control System

## Air Injection Control (cont'd)

### Troubleshooting Flow Chart Air Suction Control Solenoid Valve

#### Inspection of Air Suction Control Solenoid Valve

Remove the control box and open the control box lid.

Disconnect the lower vacuum hose of the solenoid valve from the 3-way joint and connect a vacuum pump.

Disconnect the #5 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply vacuum.

Does solenoid valve hold vacuum?

YES

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stand.

Place the shift or selector (lever in second or "2" and accelerate above 20 km/h, then release the throttle.

(page 6-67)

NO

Turn the ignition switch OFF.

Disconnect the 8P connector on the control box.

**WARNING** Block rear wheels before jacking up front of car.

Start the engine.

Measure voltage between RED (+) terminal and BLK (-) terminal on the wire harness.

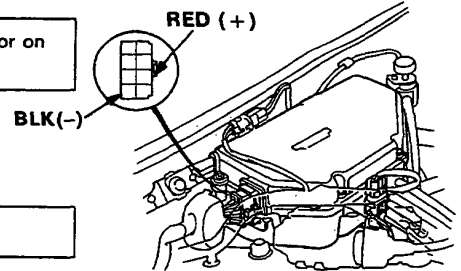
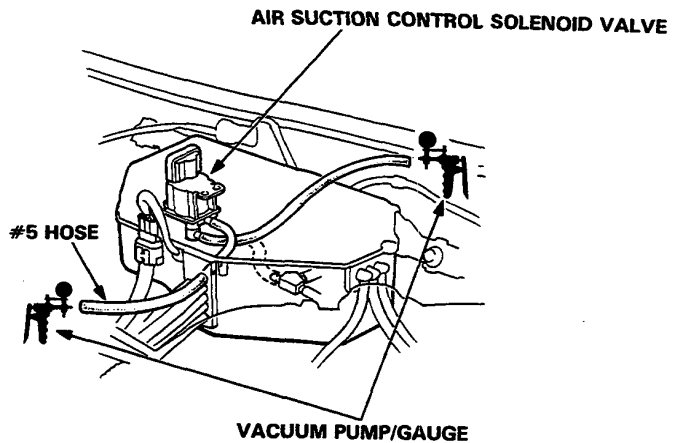
Is there voltage?

NO

Replace the solenoid valve.

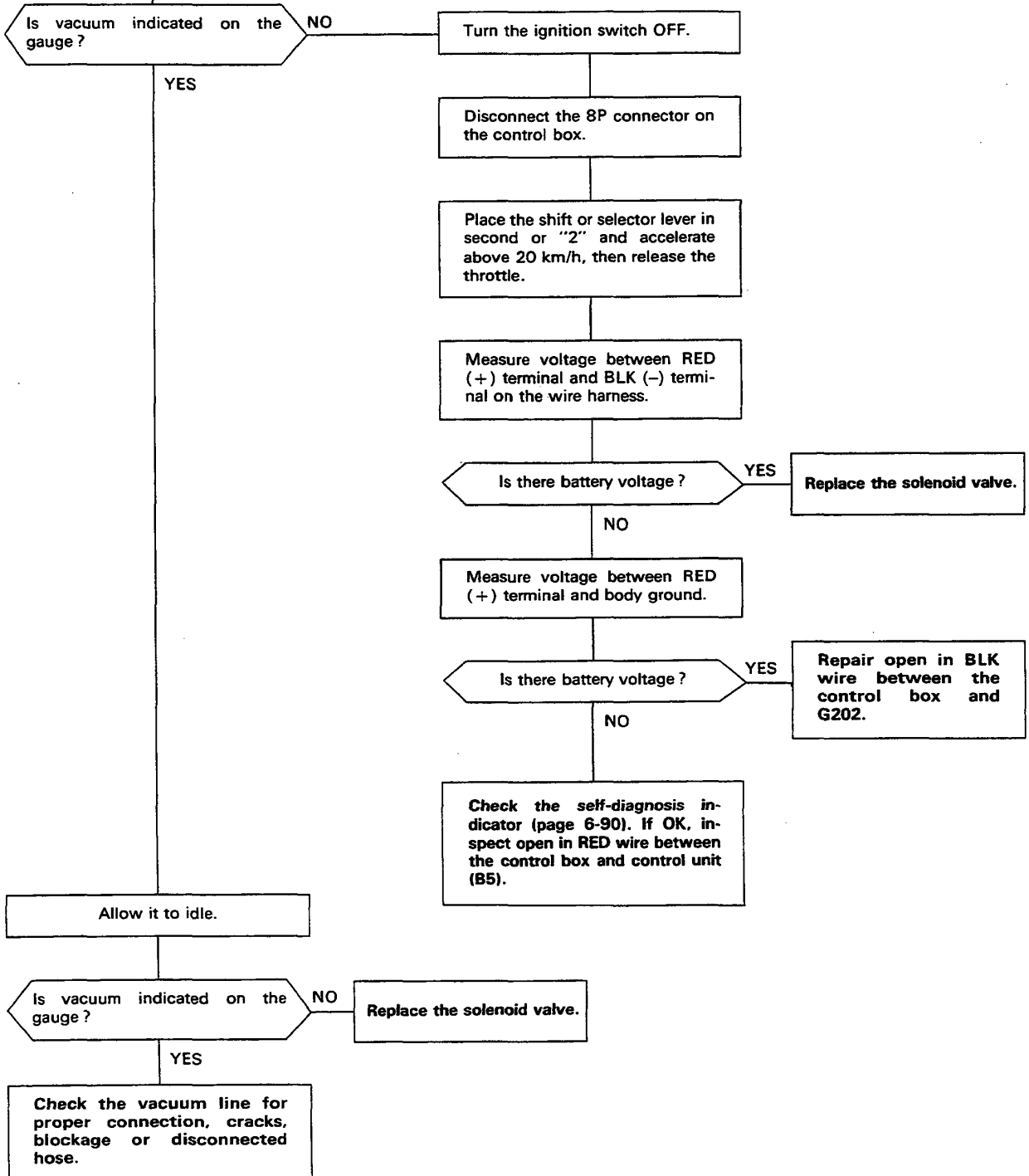
YES

Check the self-diagnosis indicator (page 6-90). If OK, substitute a known-good control unit and retest. If symptom goes away, replace the original control unit.





(page 6-66)



# Emission Control System

## Mixture Control

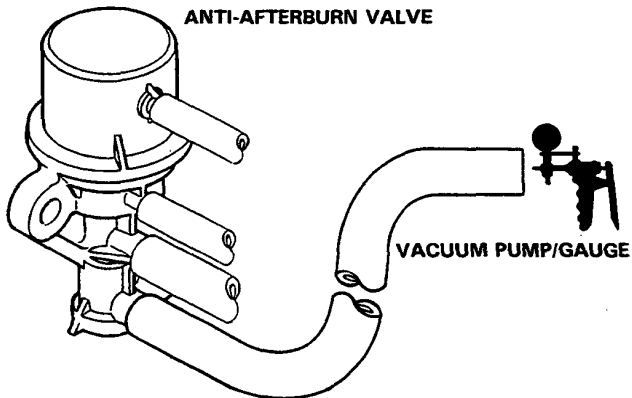
[Except KX, KS, KZ model]

### Testing (COLD ENGINE)

NOTE: The engine coolant temperature must be below 90°C (194°F).

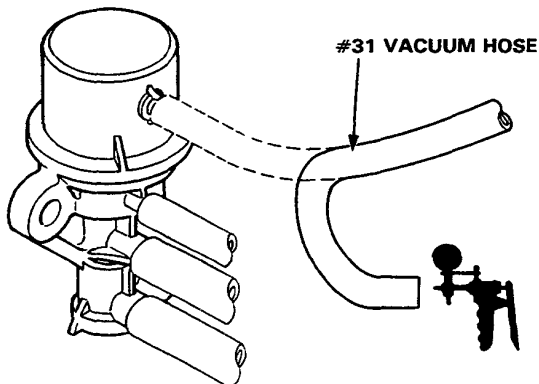
1. Disconnect the vacuum hose from the air cleaner and connect vacuum pump.
2. Start the engine and check the vacuum.

There should be no vacuum.



- If there is no vacuum, go to hot engine test.
- If there is vacuum, disconnect the #31 vacuum hose from the anti-afterburn valve and check the vacuum.

There should be vacuum.

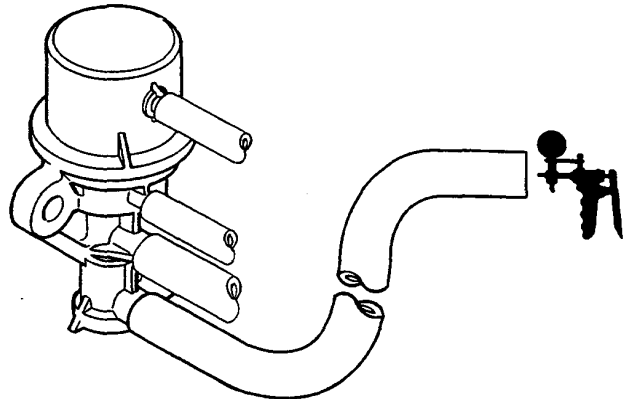


- If there is no vacuum, check the #31 vacuum hose for proper connection, cracks, brockage or disconnected hose, and replace the thermo-valve.
- If there is vacuum, replace the anti-afterburn valve and retest.

### Testing (HOT ENGINE)

1. Disconnect the vacuum hose from the air cleaner and connect vacuum pump.
2. Start the engine and warm it up to normal operating temperature (cooling fan comes on).
3. Check the vacuum.

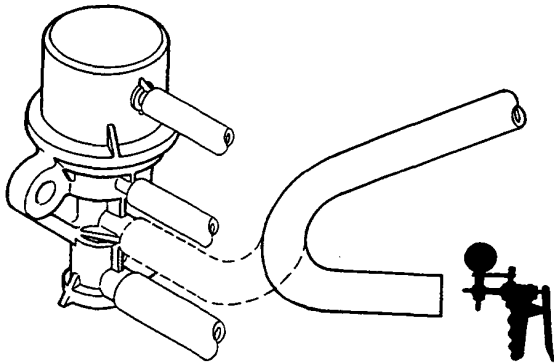
There should be vacuum.



- If there is no vacuum, go to step 4.

4. Disconnect the vacuum hose from the anti-afterburn valve and check the vacuum.

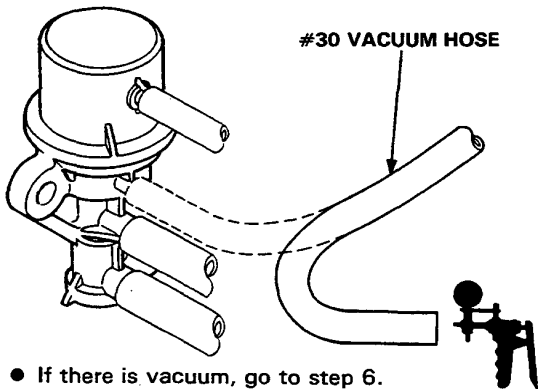
There should be vacuum.



- If there is vacuum, go to step 5.
- If there is no vacuum, check the hose for proper connection, cracks, blockage or disconnected hose.

5. Disconnect the #30 vacuum hose from the anti-afterburn valve and check the vacuum.

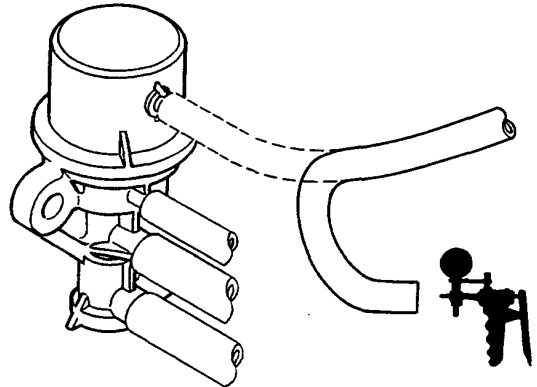
There should be vacuum.



- If there is vacuum, go to step 6.
- If there is no vacuum, check the #30 vacuum hose for proper connection, cracks, blockage or disconnected hose.

6. Disconnect the #31 vacuum hose from the anti-afterburn valve and check the vacuum.

There should be no vacuum.



- If there is vacuum, replace the thermovalve and retest.
- If there is no vacuum, replace the anti-afterburn valve and retest.

# Emission Control System

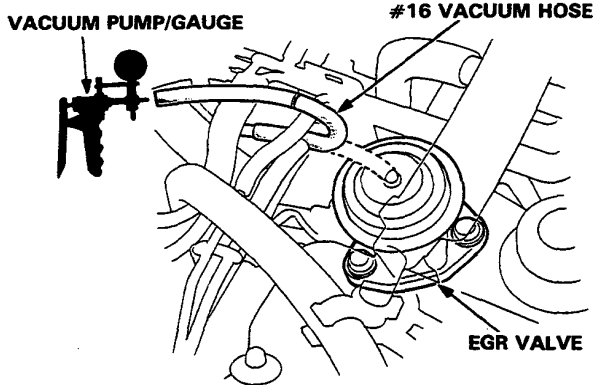
## EGR

[KX, KS, KZ model]

### Testing (COLD ENGINE)

NOTE: The engine coolant temperature must be below 63°C (145.4 °F)

1. Disconnect the #16 vacuum hose from the EGR valve and connect a vacuum pump to the hose.



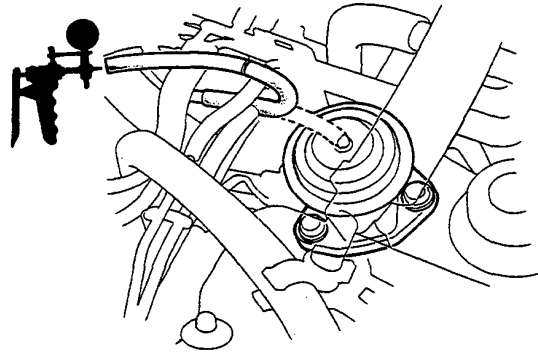
2. Start the engine and raise the engine speed to 3,000 min<sup>-1</sup> (rpm).

There should be no vacuum.

- If there is no vacuum, go on to the hot engine test (next column).
- If there is vacuum, go to troubleshooting (page 6-77).

### Testing (HOT ENGINE)

1. Disconnect the #16 vacuum hose from the EGR valve and connect a vacuum pump to the hose.

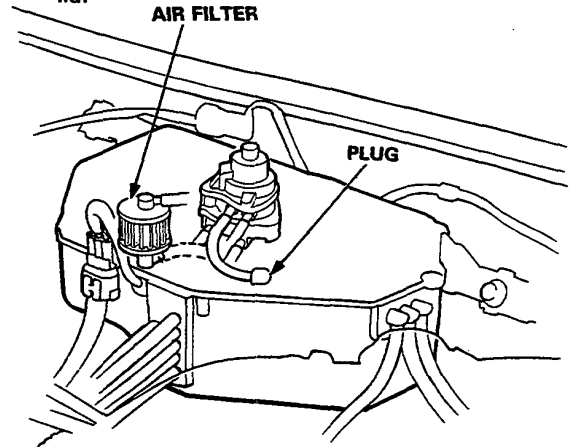


2. Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Vacuum should be as shown below:

	Condition	Vacuum at EGR hose
1	Idle	No
2	3,000 min <sup>-1</sup> (rpm)	Yes, 2–6" Hg
3	3,000 min <sup>-1</sup> (rpm) with blocked vacuum bleed	Yes, Less than 2" Hg
4	Rapid acceleration	Yes, 2–6" Hg
5	Deceleration	No

3. Remove the control box and open the control box lid.

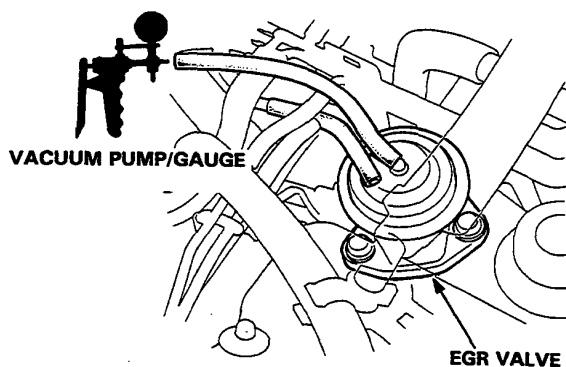




- If vacuum is available at idle (condition 1) check the vacuum hoses for proper routing and connections, then check for correct idle speed and idle mixture, and make adjustment as necessary.
- If there is no vacuum in conditions 2 and 4, go to troubleshooting (page 6-77).
- If vacuum is more than 2" Hg in condition 3, replace the EGR control valve and check the vacuum hoses for proper routing and connections.

### EGR Valve Test

1. Start engine and allow to idle.
2. Disconnect vacuum hose from EGR valve and connect a vacuum pump to EGR valve.



3. Apply 150 mm Hg (6 in. Hg) vacuum to EGR Valve. Vacuum should remain steady and engine should die.
  - If vacuum remains steady and engine dies, EGR valve is working properly. Remove the vacuum pump and reconnect EGR vacuum hose; test is complete.
  - If vacuum does not remain steady and engine does not die, replace EGR valve and retest.
  - If vacuum remains steady but engine does not die: Remove EGR valve; check EGR valve and manifold for blockage, clean or replace as necessary and retest.



# Emission Control System

## Throttle Control

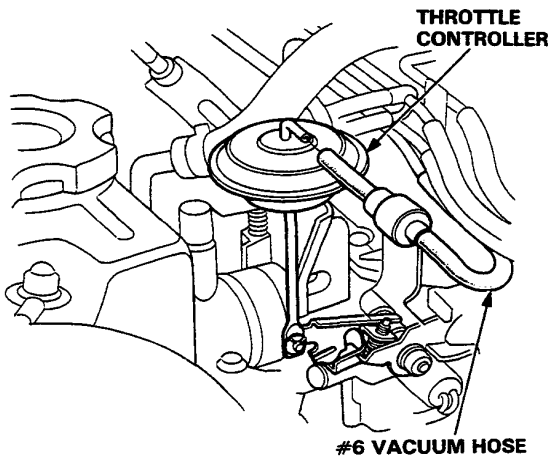
[KX, KS, KZ model and KF, KG, KW, KB, KE, KY, KT (A/T) model]

### Testing (HOT ENGINE)

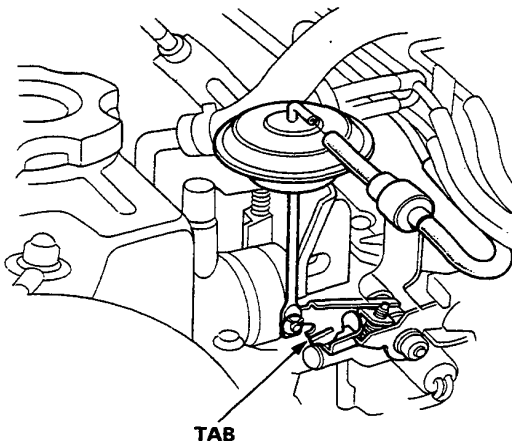
1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect the #6 vacuum hose from the throttle controller and check the engine speed.

Engine speed should be:

Manual	$2,200 \pm 500 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$1,900 \pm 500 \text{ min}^{-1} \text{ (rpm)}$

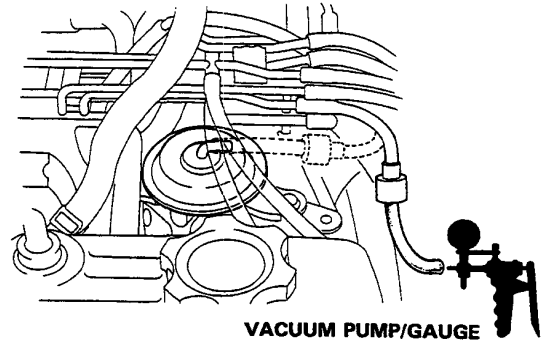


- If the engine speed is excessively high, adjust the engine speed by bending TAB.



- If the engine speed does not change, connect a vacuum pump to the #6 vacuum hose and check vacuum.

There should be vacuum.



- If there is no vacuum, check the #6 vacuum hose for proper connection cracks, blockage or disconnected hose and replace the check valve.
- If there is vacuum, replace the throttle controller and retest.

3. Reconnect the #6 vacuum hose and check the idle speed.

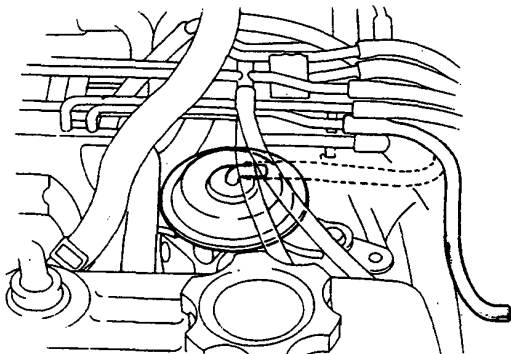
Idle speed should be within specification (page 6-33).



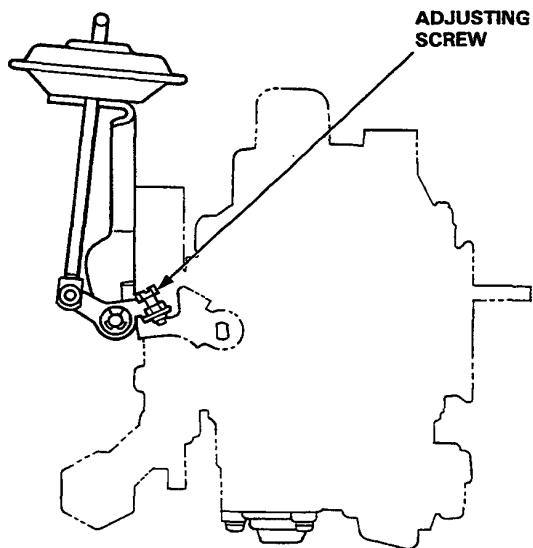
### [Other model]

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Disconnect vacuum hose #6 from the throttle controller, connect a vacuum pump to the controller and apply 400 mmHg (16 in. Hg) vacuum.

Engine speed should rise to 1,500–2,500  $\text{min}^{-1}$  (rpm) with in 1 minute.

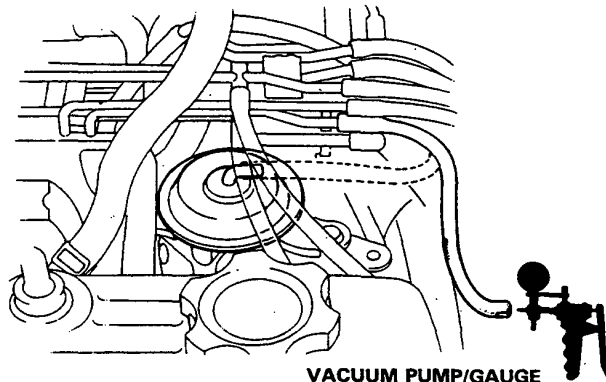


- If the engine speed is excessively high, adjust the engine speed by turning adjusting screw.



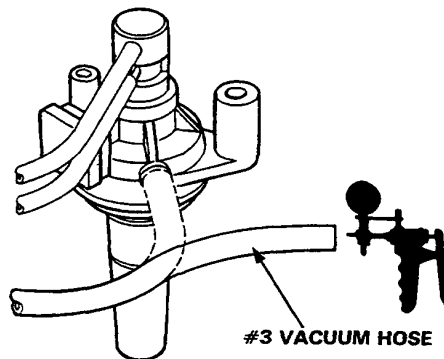
- If the engine speed does not change, connect a vacuum pump to the #6 vacuum hose. Raise the engine speed to 3,500  $\text{min}^{-1}$  (rpm) and close the throttle suddenly, then check vacuum.

There should be vacuum.



- If there is vacuum, replace the throttle controller and retest.
- If there is no vacuum, check the #6 vacuum hose for proper connection, cracks, blockage or disconnected hose, and disconnected the #3 vacuum hose from the throttle controller control valve. Check the vacuum.

There should be vacuum.



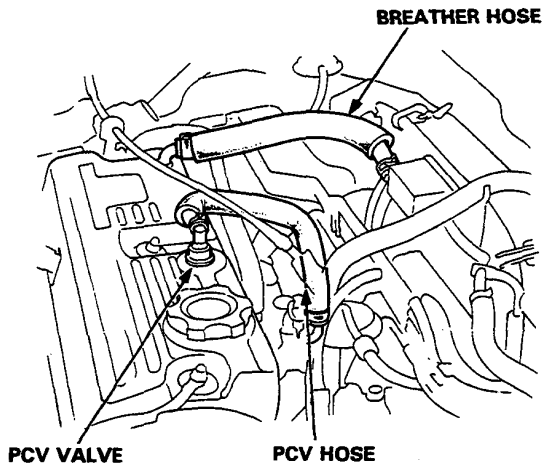
- If there is vacuum, check the #3 vacuum hose for proper connection, cracks, blockage or disconnected hose, and replace the throttle controller control valve.
3. Reconnect the #6 vacuum hose and check the idle speed. Idle speed should be within specification (page 6-33).

# Emission Control System

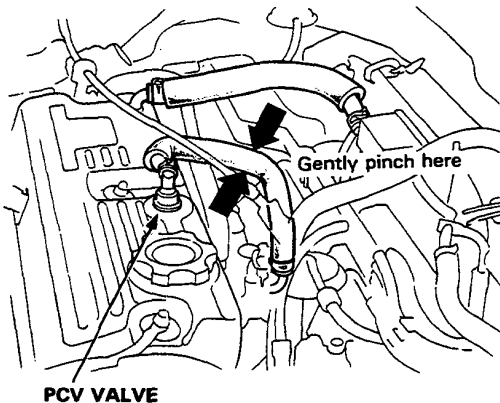
## Positive Crankcase Ventilation

### PCV Valve Test

1. Check the crankcase ventilation hoses and connections for leaks, cracks or clogging.



2. At idling, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.

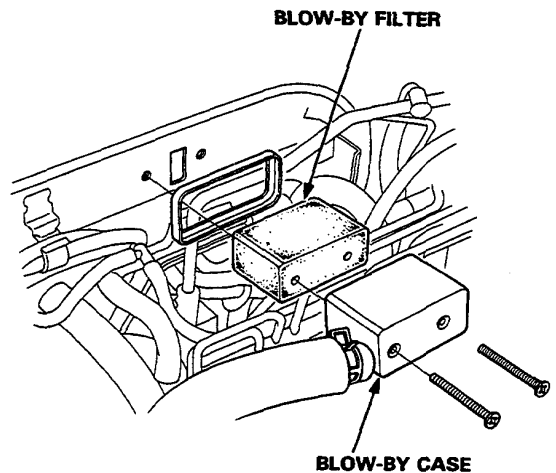


- If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

### Blow-by Filter Test

Inspect the condition of the blow-by filter.

- Replace the filter in the following instances:
  - When the filter is stuck fast and oil is dripping or seeping through.
  - When the filter is covered with dust and dirt so that clogging is evident.





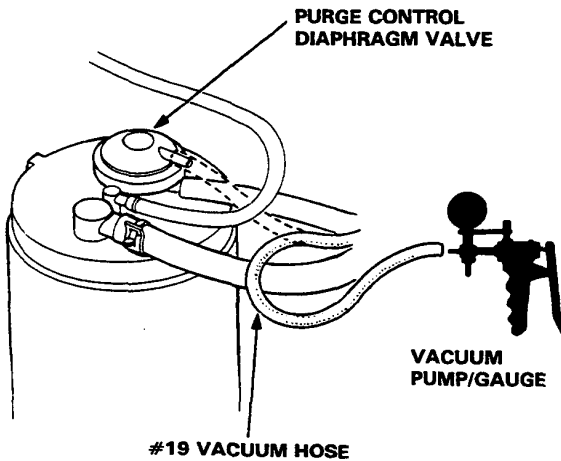
## Evaporative Emission Controls

[KX, KS, KZ model]

### Testing (COLD ENGINE)

NOTE: Engine coolant temperature must be below 63°C (145°F)

1. Disconnect the #19 vacuum hose at purge control diaphragm valve and connect vacuum pump/gauge to the hose.



2. Start the engine and allow to idle.

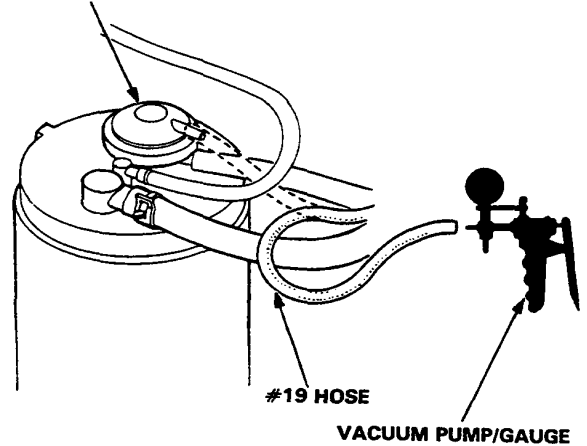
There should be no vacuum.

- If there is no vacuum, go to hot engine test (next column).
- If there is vacuum, go to troubleshooting (page 6-77).

### Testing (HOT ENGINE)

1. Disconnect the #19 vacuum hose at the purge control diaphragm valve and connect a vacuum pump/gauge to the hose.

PURGE CONTROL DIAPHRAGM VALVE



2. Start the engine and warm up to normal operating temperature (the cooling fan comes on). Raise engine speed to 3,500 min<sup>-1</sup> (rpm).

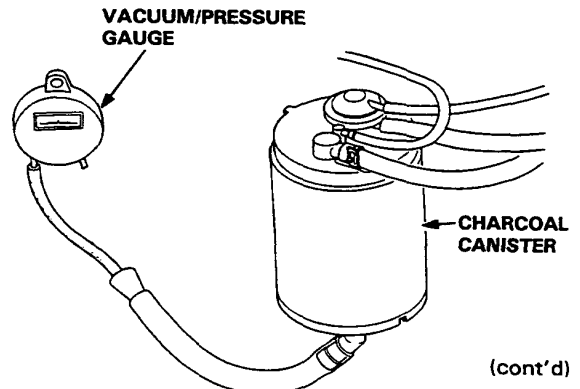
There should be vacuum.

- If there is vacuum, go to step 3.
- If there is no vacuum, go to troubleshooting (page 6-77).

3. Disconnect a vacuum pump/gauge and reconnect hose.

4. Remove fuel filler cap.

5. Remove the canister purge air hose from frame and connect hose to a vacuum gauge as shown.



(cont'd)

# Emission Control System

## Evaporative Emission Controls (cont'd)

6. Raise engine speed to 3,500 min<sup>-1</sup> (rpm).

Vacuum should appear on the gauge within 1 minute.

- If vacuum appears on the gauge in 1 minute, remove the gauge and go on to step 8.
- If no vacuum, disconnect the vacuum gauge and reinstall the fuel filler cap.

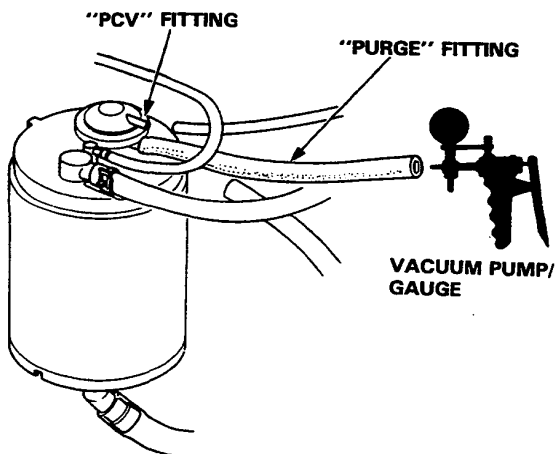
7. Remove the charcoal canister and check for signs of damage.

- If damaged, replace the canister.
- If OK, go on to step 8.

8. Stop the engine. Disconnect the hose from the canister PCV fitting.

Connect a vacuum pump to the canister PURGE fitting as shown, and apply vacuum.

Vacuum should remain steady.



- If vacuum remains steady, go on to step 7.
- If vacuum drops, replace the canister and retest.

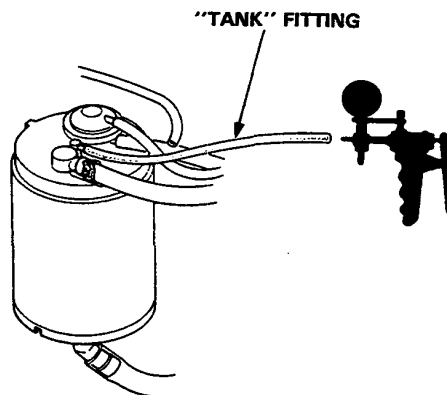
9. Restart the engine. Reconnect the hose to the canister PCV fitting.

PURGE side vacuum should drop to zero.

- If PURGE side vacuum does not drop to zero, replace the canister and retest.

10. Connect a vacuum pump to TANK fitting as shown, and apply vacuum.

If should not hold vacuum.



- If it does not hold vacuum, reinstall fuel filler cap and canister; test is complete.
- If it holds vacuum, replace canister and retest.



## Troubleshooting Flow Chart Purge Cut-off Solenoid Valve

Inspection of Purge Cut-off Solenoid Valve

Remove the control box and open the control box lid.

Disconnect the upper vacuum hose of the solenoid valve from the 3-way joint, and connect a vacuum pump.

Start the engine.

NOTE: Engine coolant temperature must be below 63° C (145° F)

Apply vacuum.

Does solenoid valve hold vacuum?

YES

Turn the ignition switch OFF.

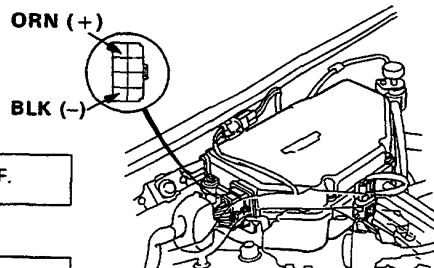
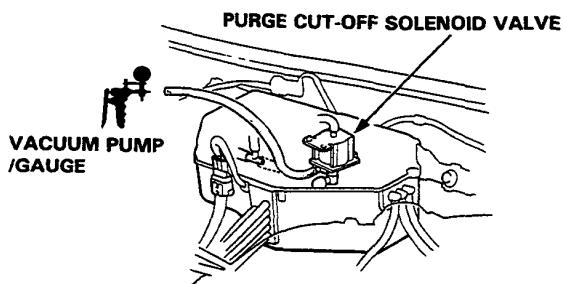
Disconnect the 8P connector on the control box.

Start the engine.

NO

(page 6-78)

(page 6-78)



# Emission Control System

## Evaporative Emission Controls (cont'd)

(page 6-77)

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

Apply vacuum.

Does solenoid valve hold vacuum?

YES

Check the vacuum line for proper connection, cracks, blockage or disconnected hose.

NO

Turn the ignition switch OFF.

Disconnect the 8P connector on the control box.

Start the engine.

Measure voltage between ORN (+) terminal and BLK (-) terminal on the wire harness.

Is there battery voltage?

YES

Replace the solenoid valve.

NO

Measure voltage between ORN (+) terminal and body ground.

Is there battery voltage?

YES

Repair open in BLK wire between the control box and G202.

NO

Check the warning light and the self-diagnosis indicator (page 6-90). If OK, inspect open in ORN wire between the control box and control unit (B9).

(page 6-77)

Measure voltage between ORN (+) terminal and BLK (-) terminal on the R. engine compartment wire harness.

Is there voltage?

YES

Check the warning light and the self-diagnosis indicator (page 6-12). If OK, substitute a known-good control unit and retest. If symptom goes away, replace the original control unit.

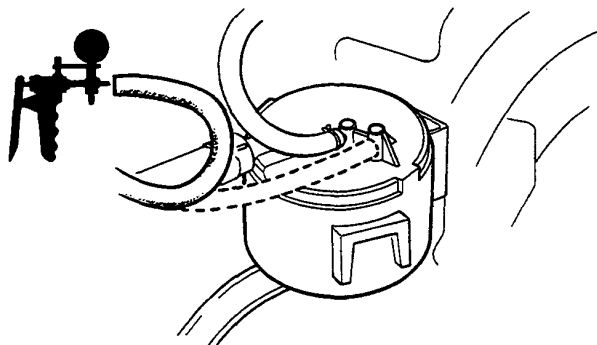
NO

Replace the solenoid valve.



**[Except KX, KS, KZ model]**

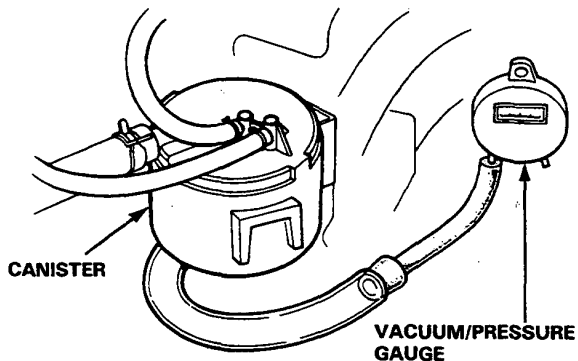
1. Disconnect vacuum hose at the charcoal canister, connect a vacuum pump/gauge to hose.



2. Start the engine and raise speed to 3,500 min<sup>-1</sup> (rpm).

There should be vacuum.

- If vacuum is available, go on to step 3.
  - If vacuum is not available, check the vacuum line.
3. Disconnect a vacuum pump/gauge and reconnect hose. Remove fuel filler cap.
  4. Remove canister purge air hose from frame and connect hose to a vacuum gauge as shown.

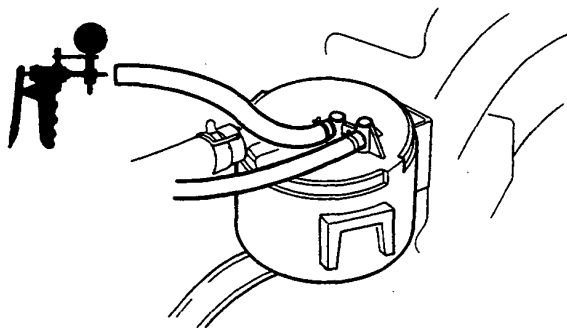


5. Raise engine speed to 3,500 min<sup>-1</sup> (rpm). Vacuum should appear on gauge within 1 minute.
- If vacuum appears on gauge in 1 minute, remove gauge and go on to step 7.
  - If no vacuum, disconnect a vacuum pump/gauge and go on to step 6.

6. Remove charcoal canister and check for signs of damage or defects.

- If defective, replace the charcoal canister.
- If OK, except KY model: test is complete. KY model: go on to step 7.

7. KY model: Connect vacuum pump/gauge to TANK fitting as shown, and apply vacuum.



- If vacuum does not remain steady, test is complete.
- If vacuum remains steady, replace the charcoal canister.

(cont'd)



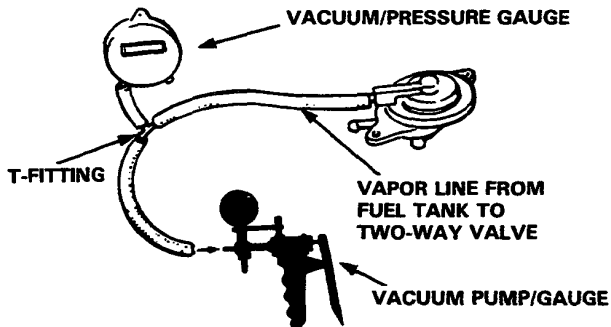
# Emission Control System

## Evaporative Emission Controls (cont'd)

[KX, KS, KZ, KY model]

### Two-Way Valve

1. Remove the filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.

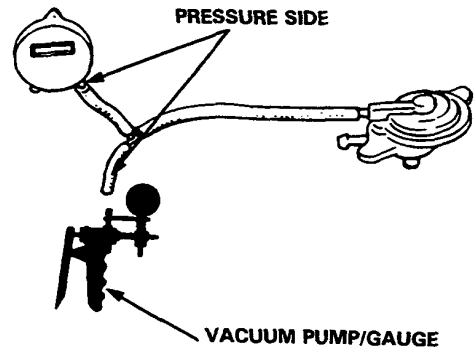


3. Slowly draw a vacuum while watching the gauge.

Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in.Hg).

- If vacuum stabilizes momentarily (two-way valve opens) between 5 and 15 mmHg (0.2 and 0.6 in.Hg), go on to Step 4.
- If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in.Hg) or above 15 mmHg (0.6 in.Hg), install new valve and re-test.

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.

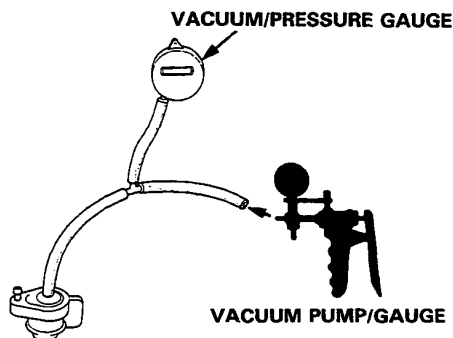
Pressure should stabilize at 10 to 35 mmHg (0.4 to 1.4 in.Hg).

- 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 re-test.



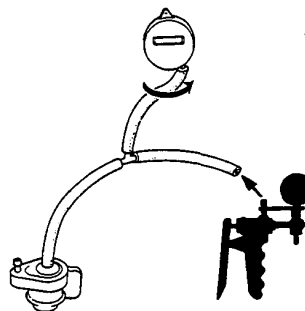
### [Other model]

1. Remove the fuel filler cap.
2. Remove the vapor line from the canister or frame, and connect to a T-fitting from the vacuum gauge and the vacuum pump as shown.



3. Slowly draw a vacuum while watching the gauge. Vacuum should stabilize at 15 to 30 mmHg (0.6 to 1.2 in. Hg).
  - If vacuum stabilizes momentarily (Two-way Valve opens) between 15 and 30 mmHg (0.6 and 1.2 in.Hg), go on step 4.
  - If vacuum stabilizes (valve opens) below 15 mmHg or above 30 mmHg (1.2 in.Hg), install 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 5 to 15 mmHg (0.2 to 0.6 in.Hg).
  - If pressure momentarily stabilizes (Valve opens) at 5 to 15 mmHg (0.2 to 0.6 in.Hg), the valve is OK.
  - If pressure stabilizes below 5 mmHg (0.2 in.Hg) or above 15 mmHg (0.6 in.Hg), install a new valve and re-test.

# Emission Control System

## Evaporative Emission Controls (cont'd)

[KX, KS, KZ model]

Troubleshooting Flow Chart Inner Vent Solenoid Valve

Inspection of Inner Solenoid Valve

Remove the air cleaner cover and filter element.

Disconnect two vacuum hose from the carburetor and connect a vacuum pump.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply vacuum.

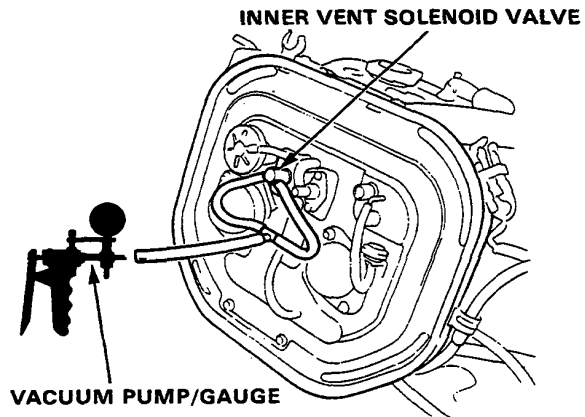
Does solenoid valve hold vacuum?

NO

Stop the engine.

Apply vacuum.

(page 6-83)



Turn the ignition switch OFF.

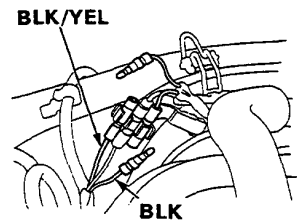
Disconnect the BLK/YEL connector and BLK connector near the air cleaner.

Start the engine.

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

Is there battery voltage?

NO



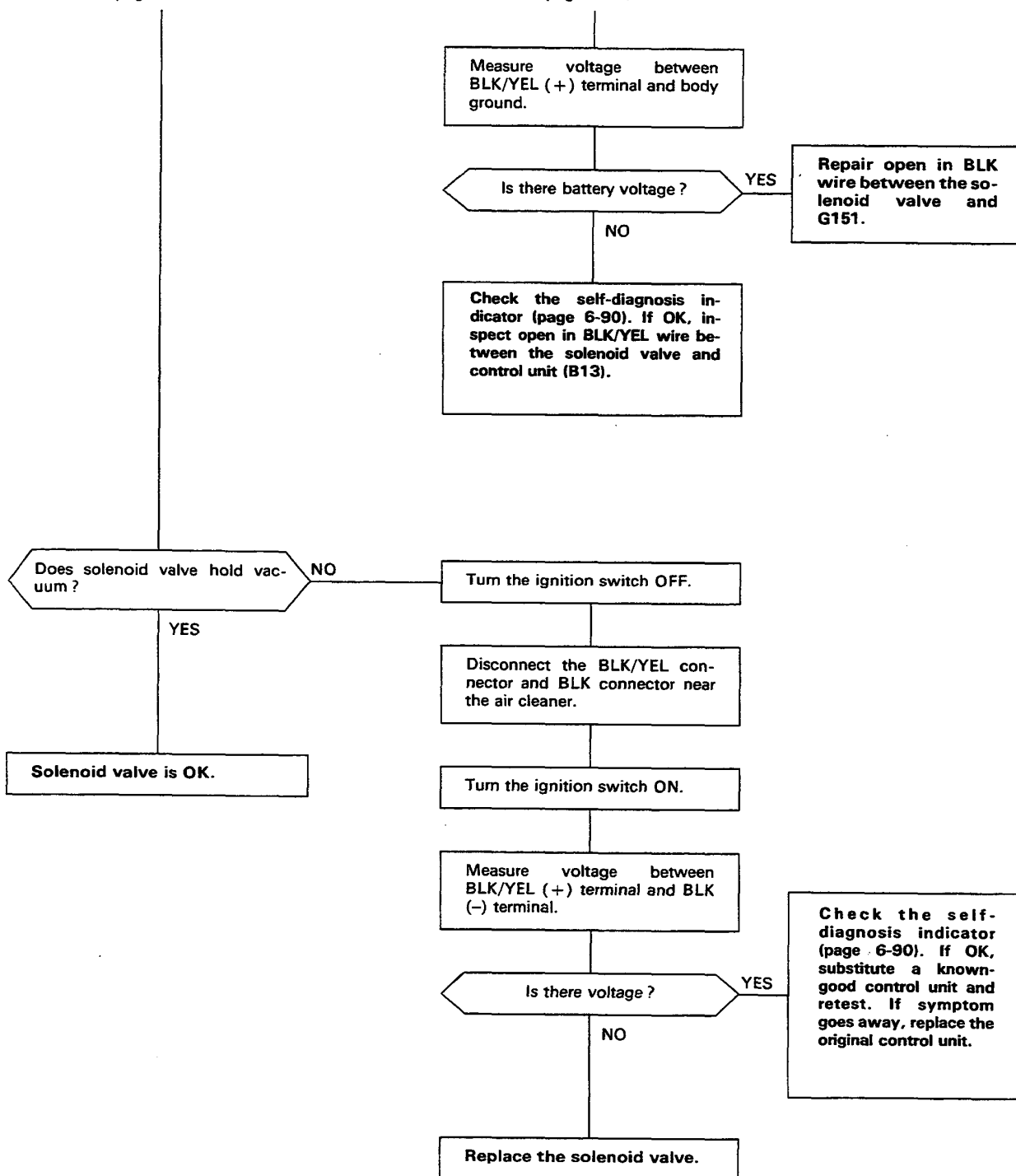
Replace the solenoid valve.

(page 6-83)



(page 6-82)

(page 6-82)



(cont'd)

# Emission Control System

## Evaporative Emission Controls (cont'd)

[KX, KS, KZ model]

### Troubleshooting Flow Chart Air Vent Cut-off Solenoid Valve

Inspection of Air Vent Cut-off Solenoid Valve.

Disconnect the upper hose of the solenoid valve from the air cleaner and connect a vacuum pump.

Disconnect the lower hose of the solenoid valve.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Apply vacuum.

Does solenoid valve hold vacuum?

YES

Turn the ignition switch OFF.

Connect the ECU check adaptor B between the control unit and connector (page 6-91).

Start the engine.

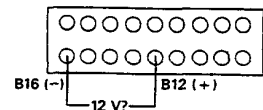
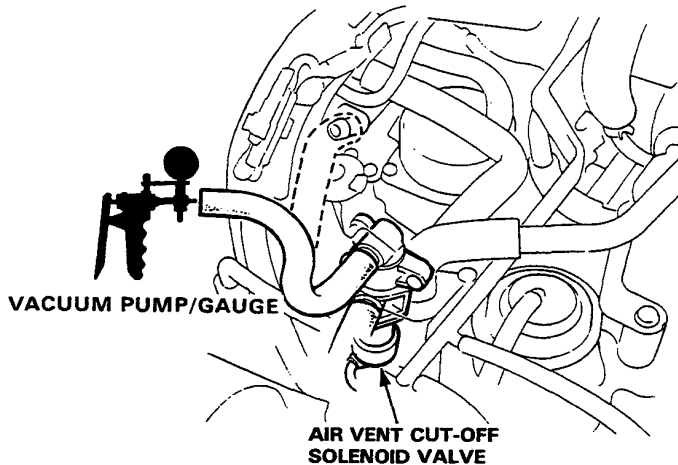
Measure voltage between B12 (+) terminal and B16(-) terminal.

Stop the engine.

Apply vacuum.

(page 6-85)

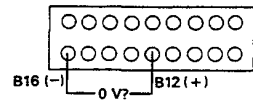
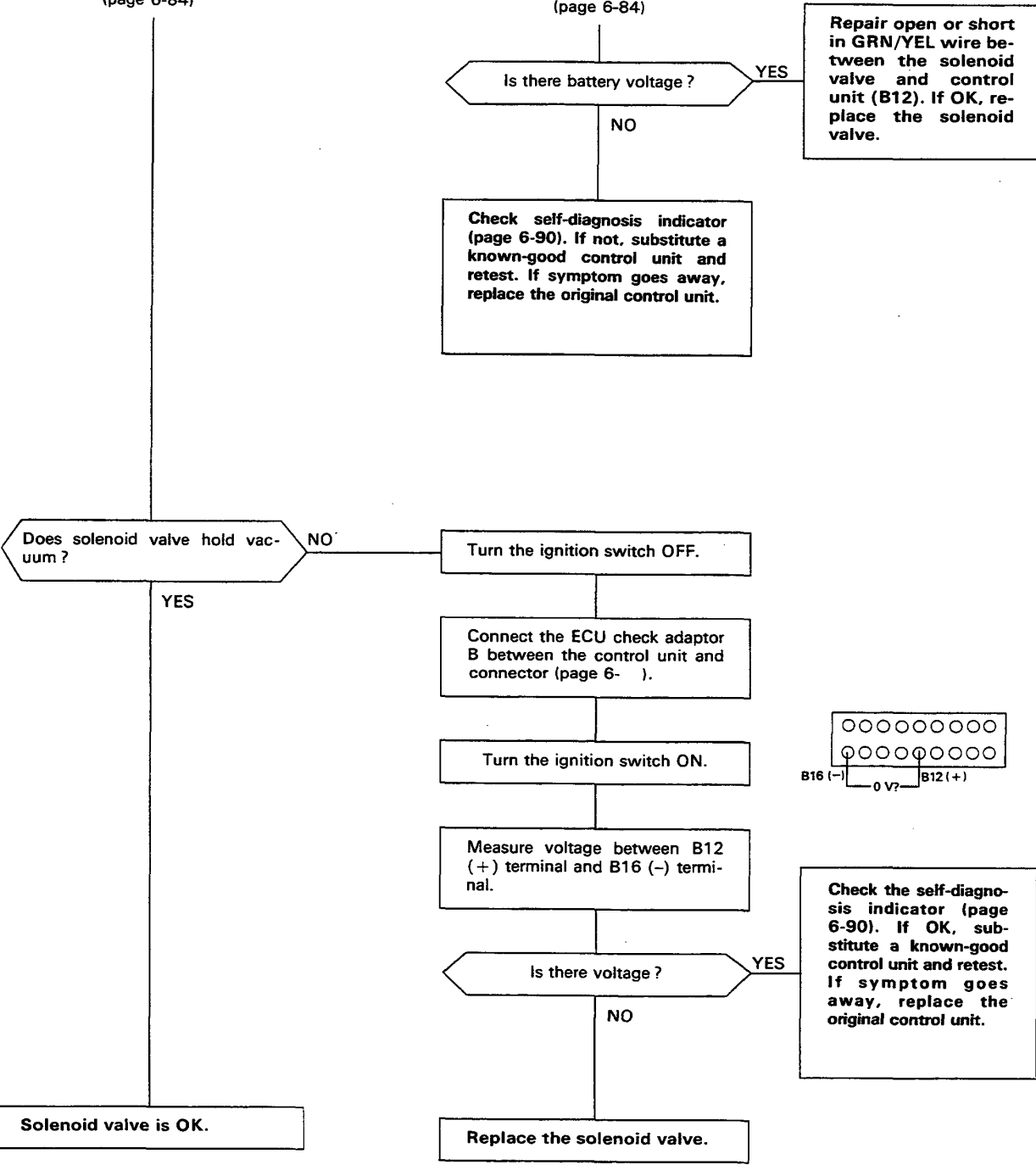
(page 6-85)





(page 6-84)

(page 6-84)



(cont'd)

# Emission Control System

## Evaporative Emission Controls (cont'd)

[Except KX, KS, KZ model]

### Troubleshooting Flow Chart

### Inner Vent Solenoid Valve

Inspection of Inner Solenoid Valve

Remove the air cleaner cover and filter element.

Disconnect two vacuum hose from the carburetor and connect a vacuum pump.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Replace the solenoid valve.

YES

Start the engine.

Apply vacuum.

Does solenoid valve hold vacuum?

YES

Turn the ignition switch OFF.

NO

Solenoid valve is OK.

Disconnect the BLK/YEL connector and BLK connector near the air cleaner.

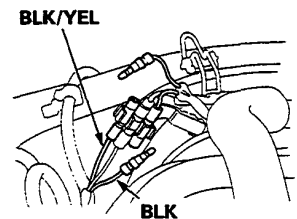
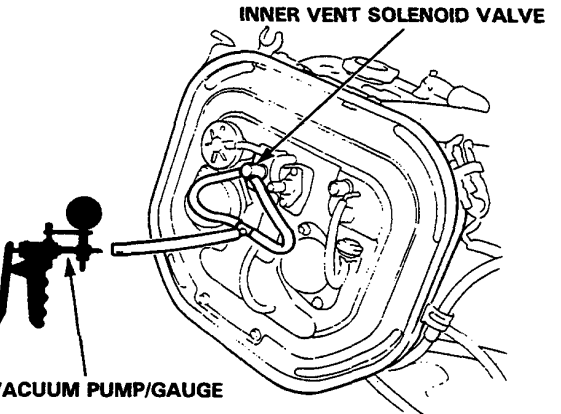
Start the engine.

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

Is there voltage?

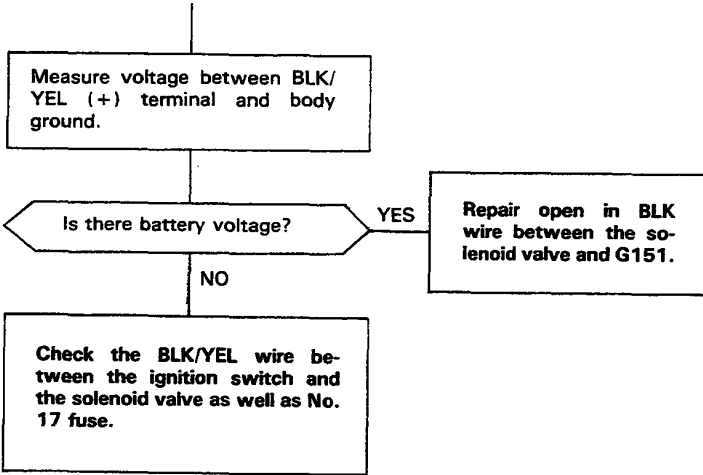
YES

Replace the solenoid valve.





(page 6-86)



(cont'd)



# Emission Control System

## Evaporative Emission Controls (cont'd)

[Except KX, KS, KZ model]

Troubleshooting Flow Chart      Air Vent Cut-off Solenoid Valve

Inspection of Air Vent Cut-off Solenoid Valve.

Disconnect the upper hose of the solenoid valve from the air cleaner and connect a vacuum pump.

Disconnect the lower hose of the solenoid valve.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Replace the solenoid valve.

YES

Start the engine.

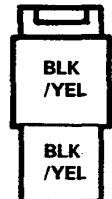
Apply vacuum.

Does solenoid valve hold vacuum?

YES

Turn the ignition switch OFF.

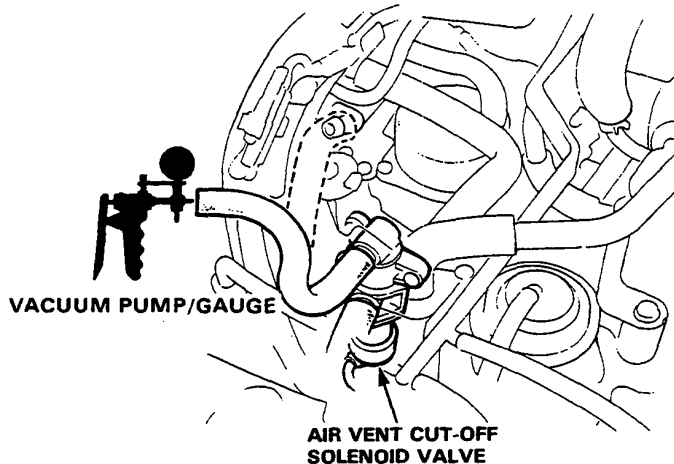
Disconnect the 2P connector on the air vent cut-off solenoid valve.



NO

Solenoid valve is OK.

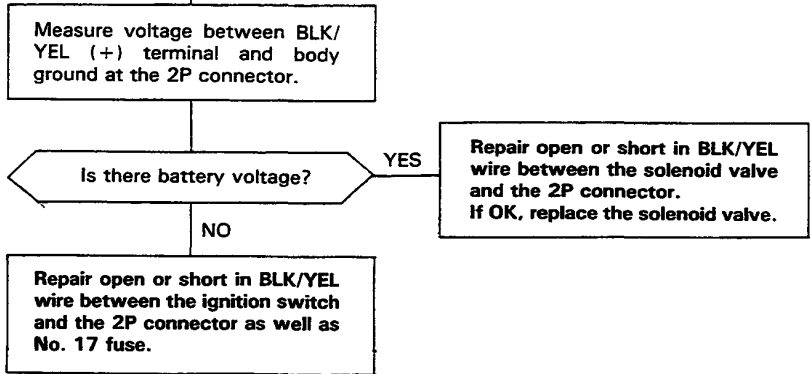
Start the engine.



(page 6-89).

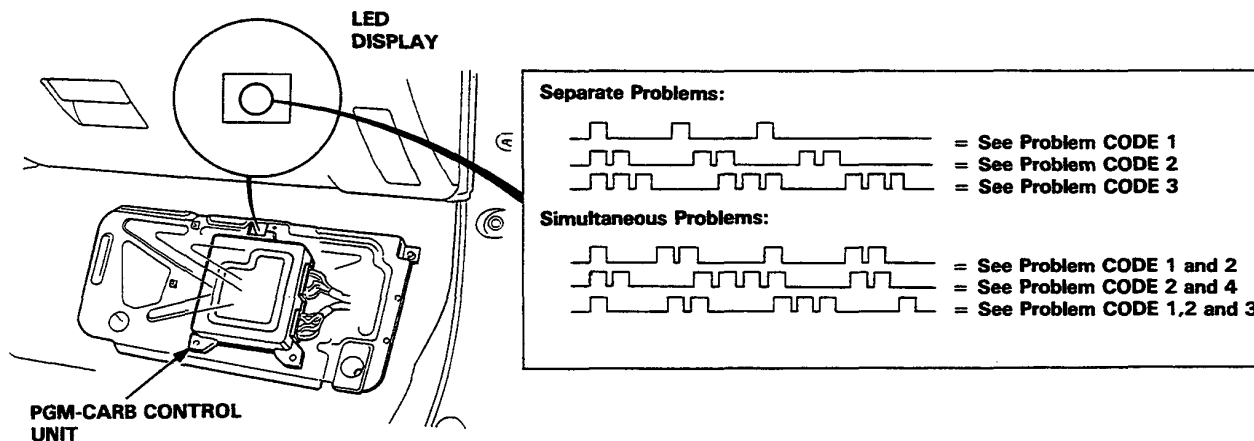


(page 6-88).



# Self-Diagnostic Procedures [KX, KS, KZ model]

Turn the ignition on, pull down the passenger's side carpet inspection flap from under the dashboard and observe the LED DISPLAY on the top of the control unit. The LED indicates a system failure code by its blinking frequency. The control unit LED can indicate any number of simultaneous component problems by blinking separate codes, one after another.

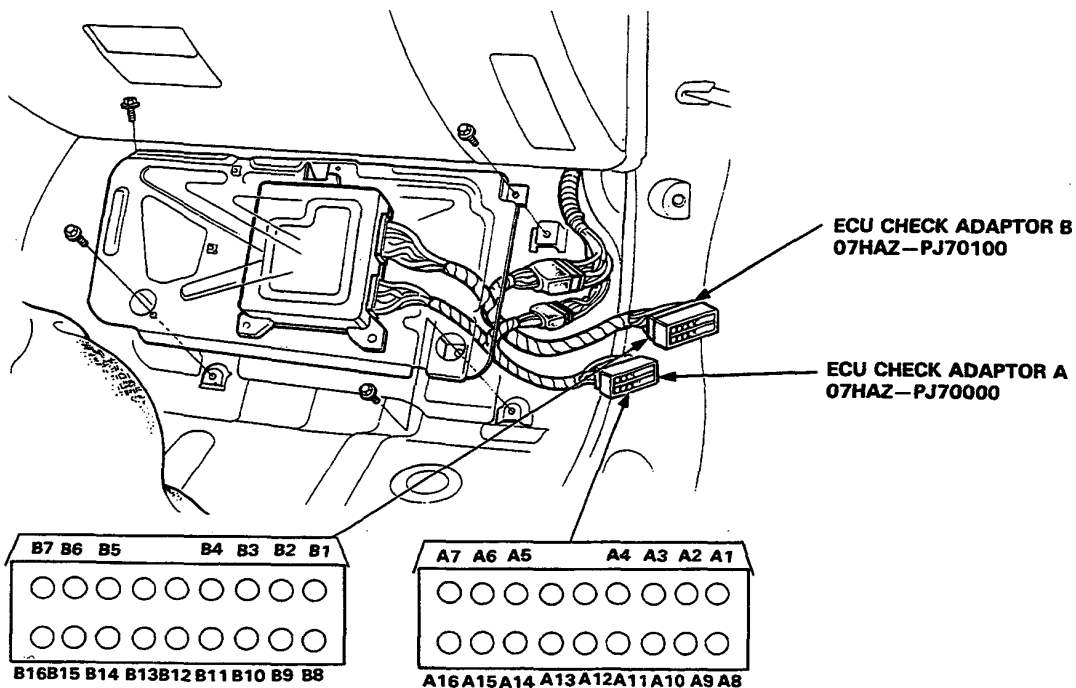


SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
1	OXYGEN CONTENT	6-94
2	VEHICLE SPEED PULSER	6-96
3	MANIFOLD ABSOLUTE PRESSURE	6-97
4	VACUUM SWITCH SIGNAL	6-101
5	MANIFOLD ABSOLUTE PRESSURE	6-99
6	COOLANT TEMPERATURE	6-104
8	IGNITION COIL SIGNAL	6-106
10	INTAKE AIR TEMPERATURE	6-107
14	ELECTRONIC AIR CONTROL	6-109

If CODE 7, 9, 11, 12, 13 (or more than 14), count the number of blinks again; if the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original control unit. The control unit LED 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.



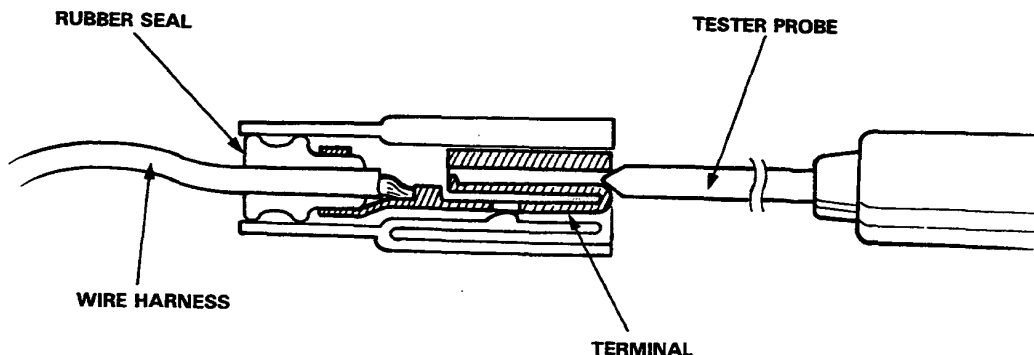
If the inspection for a particular failure code requires the system checker harness, remove the right door sill molding, the small cover on the right kick panel, and pull the carpet back to expose the control unit. Unbolt the control unit bracket. Connect the ECU check adaptor. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



TERMINAL LOCATION

**CAUTION:**

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the ECU check adaptor, 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 [KX, KS, KZ model]

## How to Read Flow Charts

A flow chart 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 flow chart.

### **ACTION**

Asks you to do something; perform a test, set up a condition, etc.

### **DECISION**

Asks you about the result of an action by giving an "answer" and asking did you get the same answer: Yes or No.

### **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 several times 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.
- "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. In simple electronics, this usually means something won't work at all. In complex electronics (like electronic control units), 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 check adaptor, check the ECU check adaptor connections before proceeding.



SELF-DIAGNOSIS INDICATOR BLINKS	POSSIBLE CAUSE	PAGE
①	<ul style="list-style-type: none"><li>• Spark plug mis-fire</li><li>• Short or open circuit in O<sub>2</sub> sensor circuit</li><li>• Faulty O<sub>2</sub> sensor</li><li>• Carburetor</li></ul>	6-94
②	<ul style="list-style-type: none"><li>• Faulty speed sensor</li><li>• Short circuit in combination meter or speed sensor wire</li><li>• Disconnected speedometer circuit</li></ul>	6-96
③	<ul style="list-style-type: none"><li>• Short or open circuit in MAP sensor wire</li><li>• Faulty MAP sensor</li></ul>	6-97
④	<ul style="list-style-type: none"><li>• Faulty vacuum switch</li><li>• Short or open circuit in vacuum switch wire</li><li>• Disconnected vacuum switch piping</li></ul>	6-101
⑤	<ul style="list-style-type: none"><li>• Disconnected MAP sensor piping</li></ul>	6-99
⑥	<ul style="list-style-type: none"><li>• Open or short circuit in TW sensor wire</li><li>• Faulty TW sensor</li></ul>	6-104
⑧	<ul style="list-style-type: none"><li>• Open or short circuit in ignition coil wire</li></ul>	6-106
⑩	<ul style="list-style-type: none"><li>• Open or short circuit in TA sensor wire</li><li>• Faulty TA sensor</li></ul>	6-107
⑭	<ul style="list-style-type: none"><li>• Open or short circuit in EACV wire</li></ul>	6-109

\* CODE 7, 9, 11, 12, 13 or exceeds 14: count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original control unit.

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — Oxygen Sensor



Self-diagnosis LED blinks once: A problem in the Oxygen (O<sub>2</sub>) Sensor circuit.

LED indicates CODE 1

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

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

Does LED indicate CODE 1?

NO

Intermittent failure  
(test drive may be necessary.)

YES

Inspect fuel pressure at the fuel filter (page 6-52).

Is pressure as specified?

NO

Repair fuel supply system (page 6-51 thru. 6-55).

YES

Disconnect wire harness from indicated O<sub>2</sub> sensor.

Warm up engine to normal operating temperature again, then open the throttle wide open then close it.

Measure voltage between the connector terminal and body ground.

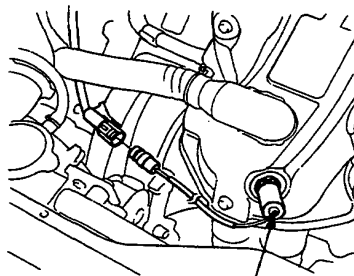
Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

NO

Replace O<sub>2</sub> sensor.

YES

(To page 6-95)



O<sub>2</sub> SENSOR  
45N.m (4.5 kg-m, 331b-ft)



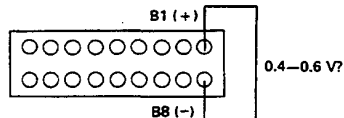
(From Page 6-94)

Stop engine.

Connect the ECU check adaptor B between the control unit and connector (page 6-91).

Restart and warm up engine to normal operating temperature, then open the throttle wide open then close it.

Measure voltage between B1 (+) terminal and B8 (-) terminal.



Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

NO

Repair open or short in WHT wire between control unit (B1) and the O<sub>2</sub> sensor.

YES

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



# PGM-CARB Control Unit [KX, KS, KZ model]

## Troubleshooting Flow Chart — Vehicle Speed Sensor



Self-diagnosis LED indicator blinks two times: A problem in the Vehicle Speed Sensor circuit.

LED indicates CODE 2.

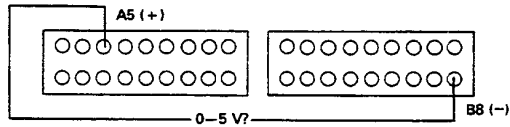
Connect the ECU check adaptor A and B between the control unit and connector (page 6-91).

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

**WARNING** Block rear wheels before jacking up front of car.

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between A5 (+) terminal and B8 (-) terminal.



Does voltage pulse 0V and 5V?

NO

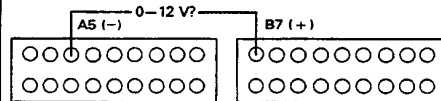
YES

Turn the ignition switch OFF.

Disconnect A and B connector from the control unit only, not the wire harness.

Turn the ignition switch ON.

Substitute a known-good control unit and recheck. If prescribed voltage is now available replace the original control unit.



Slowly rotate left front wheel and measure voltage between B7 (+) terminal and A5 (-) terminal.

Does voltage pulse 0V and 12V?

NO

YES

Substitute a known-good control unit and recheck. If prescribed voltage is now available replace the original control unit.

- Repair open or short in WHT/BLU wire between control unit (A5) and the speed sensor.  
- Faulty speed sensor.



# Troubleshooting Flow Chart — MAP Sensor

**3** Self-diagnosis LED indicator blinks three times: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.

**5** Self-diagnosis LED indicator blinks five times: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.

**3**

— Engine is warm and running.  
— LED indicates CODE 3.

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Start the engine and allow to idle.

Does LED indicate CODE 3 ?

NO Intermittent failure (test drive may be necessary.)

YES

Turn the ignition switch OFF.

Connect the inspection adaptor between the MAP sensor and wire harness.

Turn the ignition switch ON.

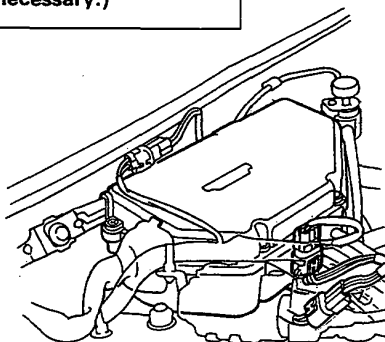
Measure voltage between RED (+) terminal and GRN (-) terminal.

Is there approx. 5V ?

YES

Measure voltage between WHT (+) terminal and GRN (-) terminal.

(To page 6-98)



INSPECTION ADAPTOR 07GMJ-ML80100

Measure voltage between RED (+) terminal and body ground.

Is there approx. 5V ?

NO

Turn the ignition switch OFF.

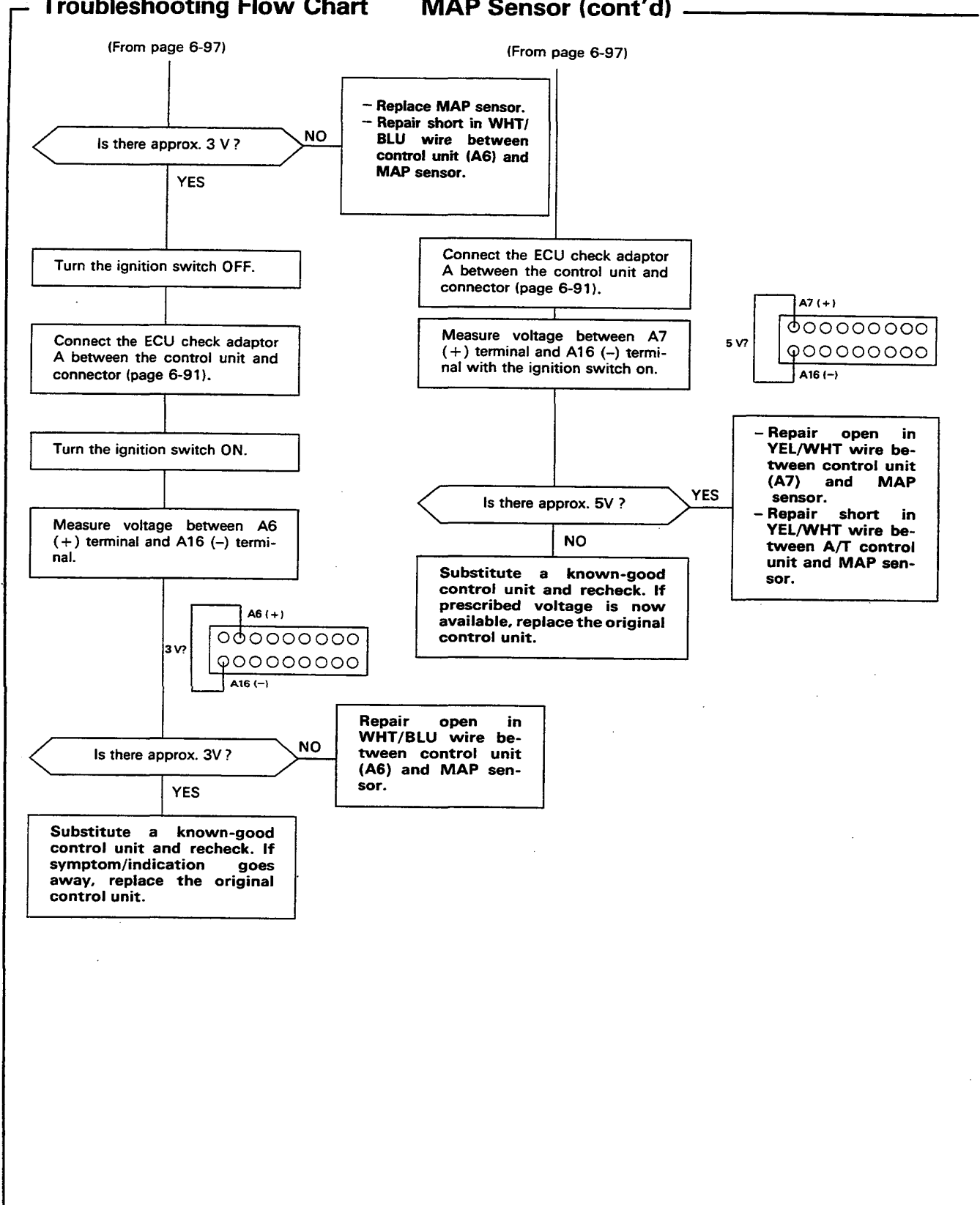
(To page 6-98)

Repair open in GRN/WHT wire between control unit (A16) and MAP sensor.

(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart MAP Sensor (cont'd)





LED indicates CODE 5.

Turn the ignition switch OFF.

Remove EFI,ECU fuse in the under-hood relay box for 10 seconds to reset control unit

Start engine and keep engine rpm at idle.

Does LED indicate CODE 5 ?

NO

Intermittent failure  
(test drive may be necessary.)

YES

Stop engine.

Remove #2 hose from the vacuum hose manifold and connect a T. fitting from a vacuum gauge between the vacuum hose manifold and the MAP sensor.

Start engine.

Is there vacuum ?

NO

Repair as necessary.

YES

Connect a vacuum pump to #2 hose and apply vacuum.

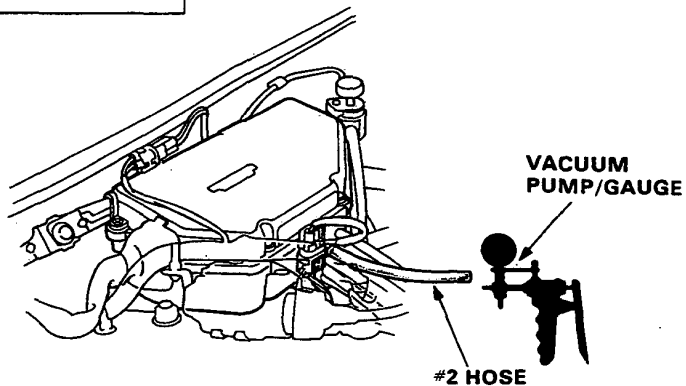
Does it hold vacuum ?

NO

Replace #2 hose.

YES

(To page 6-100)



(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — MAP Sensor (cont'd)

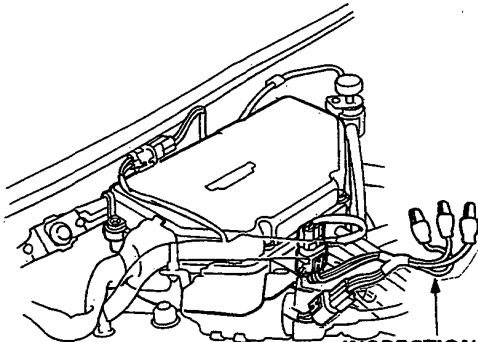
(From page 6-99)

Stop engine.

Connect the inspection adaptor between the MAP sensor and wire harness.

Turn the ignition switch ON.

Measure voltage between WHT (+) terminal and GRN (-) terminal.



INSPECTION ADAPTOR  
07GMJ-ML80100

Is there approx. 3V?

NO

Replace MAP sensor.

YES

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



# Troubleshooting Flow Chart — Vacuum Switch

Self-diagnosis LED indicator blinks four times: A problem in the vacuum switch.

– Engine is warm and running.  
– LED indicates CODE 4.

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Start the engine and allow to idle.

Does LED indicates CODE 4 ?  
NO Intermittent failure (test drive may be necessary.)

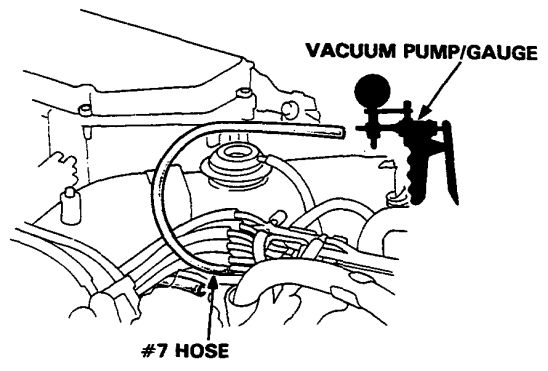
Turn the ignition switch OFF.

Remove #7 hose from the vacuum hose manifold and connect a T. fitting from a vacuum gauge between the vacuum hose manifold and the vacuum switch.

Start engine and raise engine speed to 3,500 min<sup>-1</sup> (rpm).

Is there vacuum ?  
NO Repair as necessary.

Start engine.



(To page 6-102)

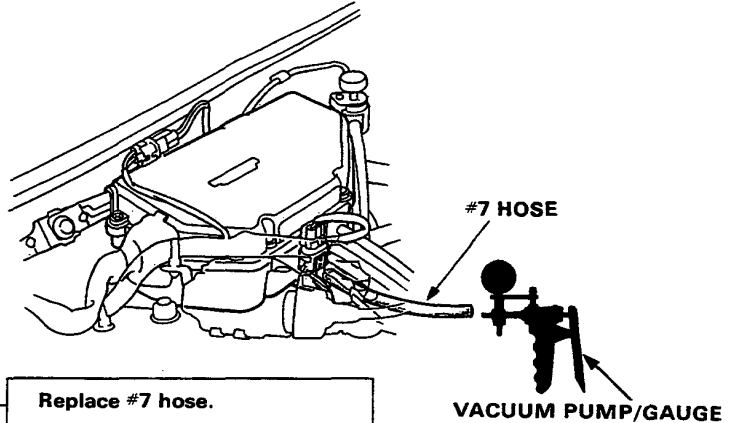
(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chat — Vacuum Switch (cont'd)

(From page 6-101)

Connect a vacuum pump to #7 hose and apply vacuum.



Does it hold vacuum?

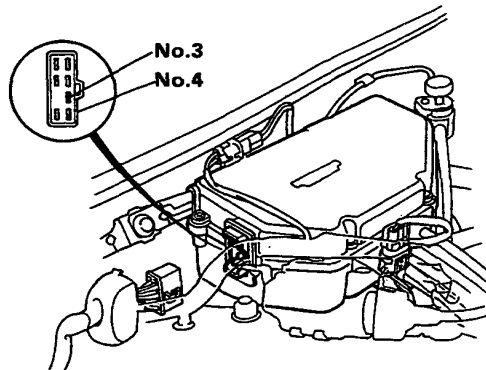
NO

Replace #7 hose.

YES

Disconnect the 8p connector on the control box.

Measure resistance between No.3 terminal and No.4 terminal on the control box.



Does continuity exist?

NO

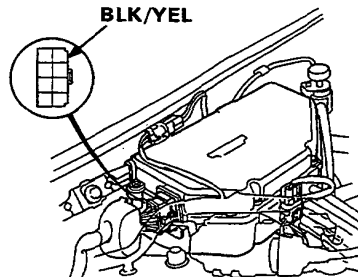
Replace vacuum switch.

YES

Reconnect the vacuum hose.

Turn the ignition switch ON.

Measure voltage between BLK/YEL terminal and body ground on the wire harness.



Is there battery voltage?

NO

Inspect No. 12 fuse.

YES

Turn the ignition switch OFF.

Is No. 12 fuse OK?

NO

Replace fuse.

YES

Reconnect the 8p connector to the control box.

Repair open BLK/YEL wire between No. 12 fuse and control box.

(To page 6-103)



(From page 6-102)

Connect the ECU check adaptor A and B between the control unit and connector (page 6-91).

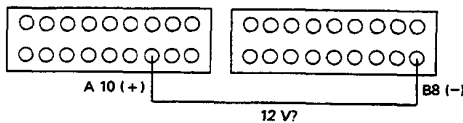
Turn the ignition switch ON.

Measure voltage between A10 (+) terminal and B8 (-) terminal.

Is there battery voltage?

YES

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



NO  
Repair open in LT BLU wire between control unit (A10) and vacuum switch.



# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — TW Sensor

 Self-diagnosis LED indicator blinks six times: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

LED indicates CODE 6.

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 6 ?

NO Intermittent failure. (test drive may be necessary.)

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

Disconnect the 2P connector on the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400Ω ?

NO Replace TW sensor.

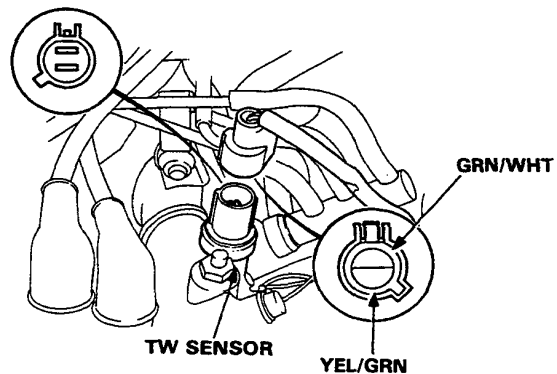
YES  
Measure voltage between YEL/GRN (+) terminal and body ground.

Is there approx. 5V ?

NO Turn the ignition switch OFF.

YES  
(To page 6-105)

Connect the ECU check adaptor A between the control unit and connector (page 6-91).





(From page 6-104)

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

Is there approx. 5V?

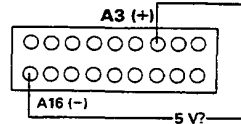
NO

Repair open in GRN/WHT wire between control unit (A16) and TW sensor.

YES

Substitute a known-good control unit and recheck. If symptom/indiction goes away, replace the original control unit.

(From page 6-104)



Turn the ignition switch ON.

Measure voltage between A3 (+) terminal and A16 (-) terminal.

Is there approx. 5V?

YES

Repair open in YEL/GRN wire between control unit (A3) and TW sensor.

NO

Disconnect A connector from the wire harness only, not the control unit.

Measure voltage between A3 (+) terminal and A16 (-) terminal.

Is there approx. 5V?

YES

- Repair short in YEL/GRN wire between control unit (A3) and TW sensor.  
- Repair short in YEL/GRN wire between A/T control unit and TW sensor.

NO

Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — Ignition Coil Signal



Self-diagnosis LED indicator blinks eight times: A problem in the ignition coil signal circuit.

LED indicates CODE 8.

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 8 ?

NO

Intermittent failure  
(test drive may be necessary.)

YES

Start the engine.

Connect the ECU check adaptor A and B between the control unit and connector (page 6-91)

Measure voltage between A1 (+) terminal and B8 (+) terminal.

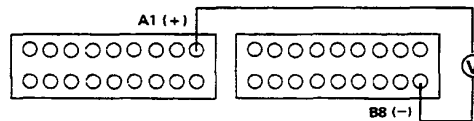
Is there voltage ?

NO

Repair short or open  
BLU wire between  
control unit (A1) and  
ignition coil.

YES

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





## Troubleshooting Flow Chart — TA Sensor



Self-diagnosis LED indicator blinks ten times: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.

LED indicates CODE 10

Turn the ignition switch OFF.

Remove EFI, ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 10 ?

NO

Intermittent failure  
(test drive may be necessary.)

YES

Disconnect the 2P connector on the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1—4 k $\Omega$  ?

NO

Replace TA sensor.

YES

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

Is there approx. 5V ?

NO

Turn the ignition switch OFF.

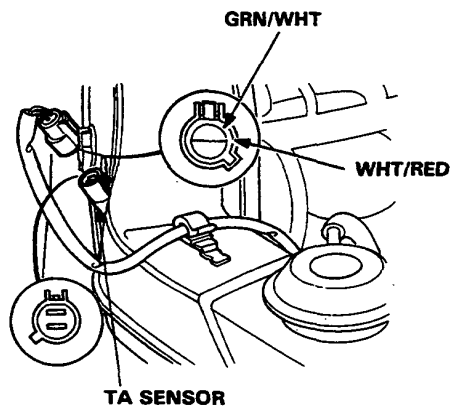
YES

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

Connect the ECU check adaptor A between the control unit and connector (page 6-91).

(To page 6-108)

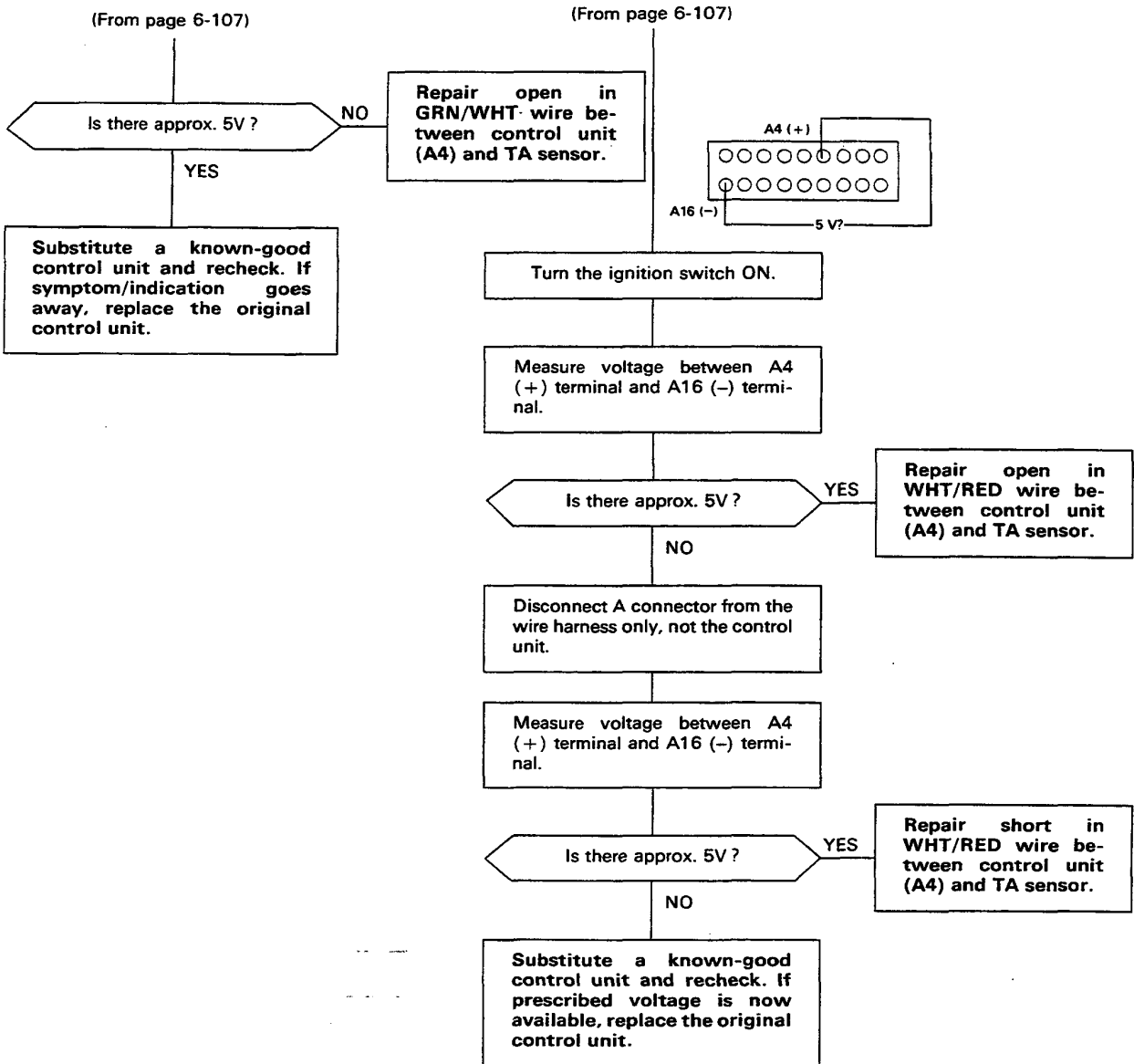
(To page 6-108)



(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — TA Sensor (cont'd)





## Troubleshooting Flow Chart — EACV



Self-diagnosis LED indicator blinks fourteen times: A problem in the Electronic Air Control Valve (EACV) circuit.

- Engine is running.
- LED indicates CODE 14.

Turn the ignition switch OFF.

Remove EFI; ECU fuse in the under-hood relay box for 10 seconds to reset control unit.

Start engine.

Does LED indicates CODE 14 ?

NO

Intermittent failure  
(test driving may be necessary.)

YES

Stop engine.

Disconnect the 2P connector on the EACV.

Measure resistance between the 2 terminals on the EACV.

Is there 8—15Ω ?

NO

Replace EACV.

YES

Check for continuity to body ground on each terminal on the EACV.

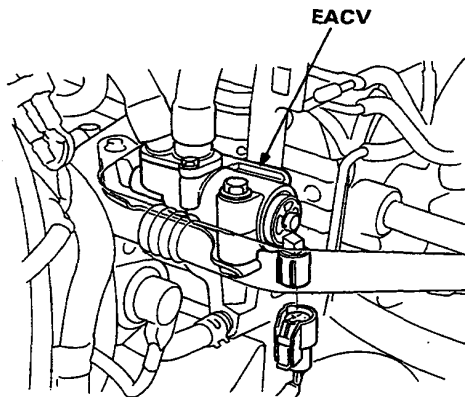
Does continuity exist ?

YES

Replace EACV.

NO

(To page 6-110)



(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Troubleshooting Flow Chart — EACV (cont'd)

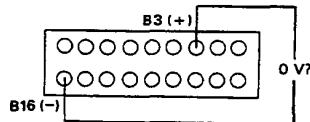
(From page 6-109)

Reconnect the 2P connector to EACV.

Connect the ECU check adaptor B between the control unit and connector (page 6-91).

Start the engine.

Measure voltage between B3 (+) terminal and B16 (-) terminal.



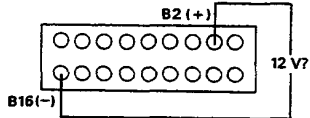
Is there voltage ?

NO

Substitute a known- good control unit and recheck. If prescribed voltage is now available replace the original control unit.

YES

Measure voltage between B2 (+) terminal and B16 (-) terminal.



Is there battery voltage ?

NO

Substitute a known-good control unit and recheck. If prescribed voltage is now available replace the original control unit.

YES

Repair open in BLU/RED wire between control unit (B3) and EACV or YEL/BLK wire between control unit (B2) and EACV.



## Input Troubleshooting

---

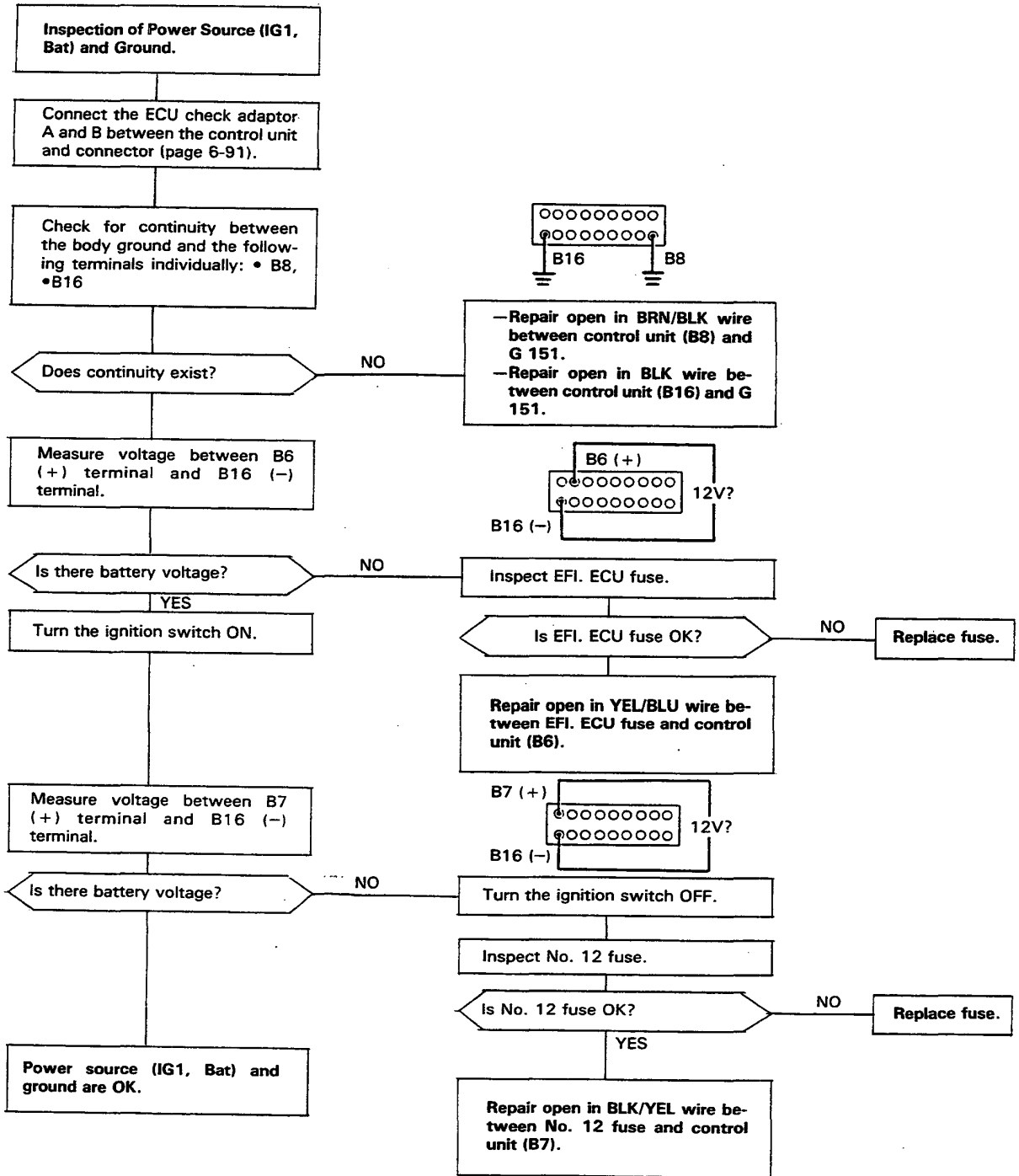
If there is no voltage from the control unit when there should be voltage or if there is voltage from the unit when there shouldn't be voltage, inspect as follows and if no defects can be found, replace the control unit and re-test.

PROBLEMATIC CIRCUIT	REFER TO CHECK:		CHECK
A/C Idle Boost Solenoid Valve	M/T	1, 2, 4	1. Inspect the power source (IG1, Bat) and ground (page 6-112). 2. Inspect the clutch switch signal (page 6-113). 3. Inspect the A/T shift position signal (page 6-115). 4. Inspect the air conditioning signal (page 6-117).
	A/T	1, 3, 4	
Primary Slow Mixture Cut-off Solenoid Valve	M/T	1, 2	
	A/T	1, 3	



# PGM-CARB Control System [KX, KS, KZ model]

## Input Troubleshooting Flow Chart — Power Source (IG1, Bat) and Ground





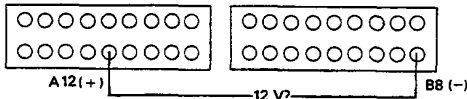
# Input Troubleshooting Flow Chart — Clutch Switch Signal (M/T only)

Inspection of clutch switch signal

Connect the ECU check adaptor A and B between the control unit and connector (page 6-91).

Turn the ignition switch ON.

Measure voltage between A12 (+) terminal and B8 (-) terminal.



Is there battery voltage?

YES

NO

Turn the ignition switch OFF.

Disconnect the 2P connector on the clutch switch.

Check for continuity between the 2 terminals on the clutch switch.

Does continuity exist?

YES

Replace the clutch switch.

NO

Turn the ignition switch ON.

Measure voltage between PNK (+) terminal and body ground.

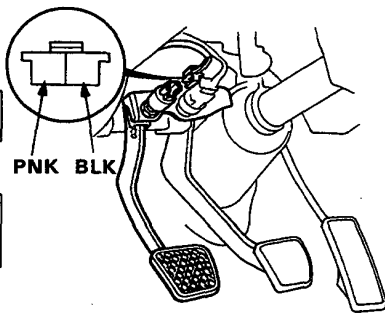
Is there battery voltage?

NO

Repair open in PNK wire between control unit (A12) and the clutch switch.

YES

Repair open in BLK wire between the clutch switch and G401.



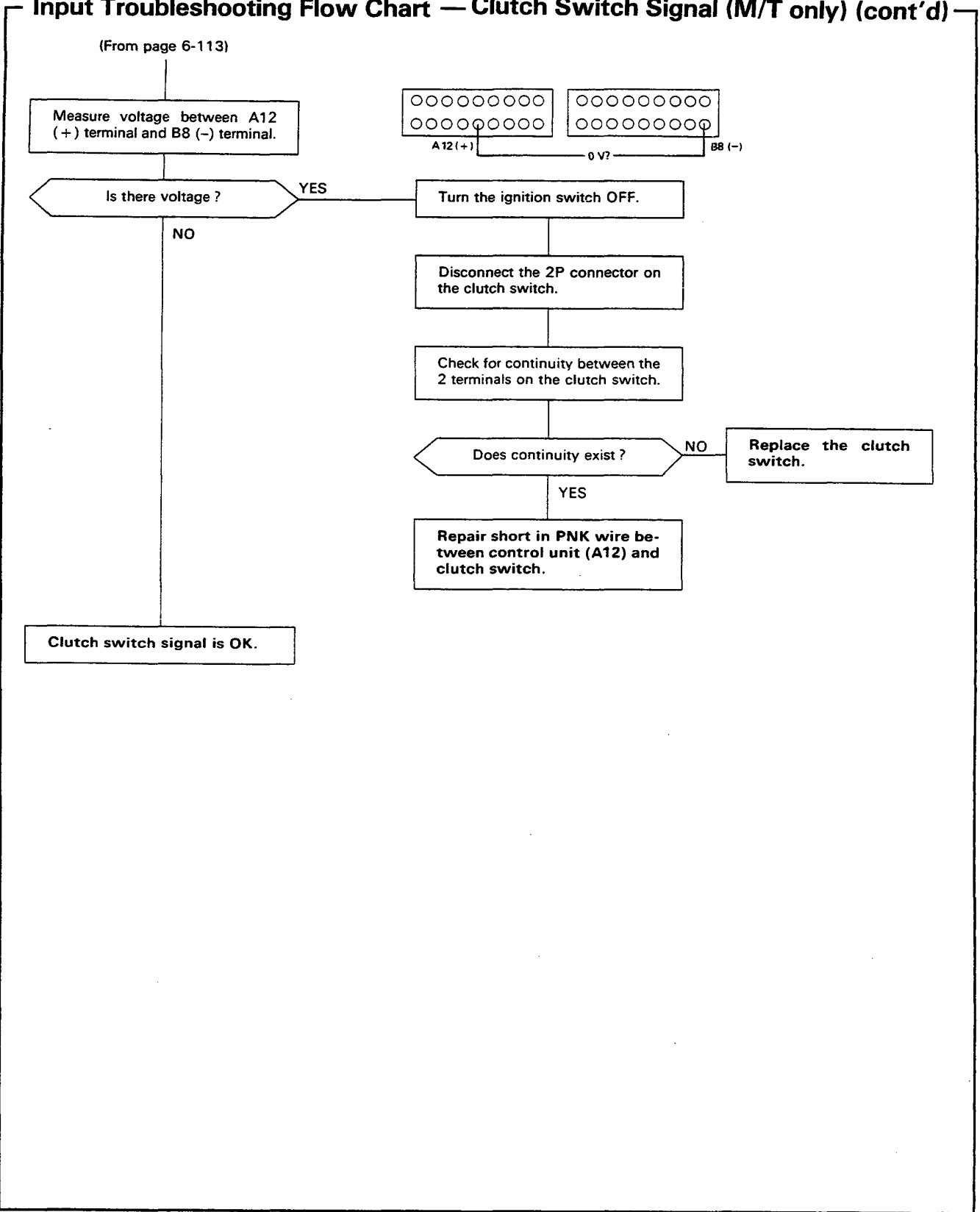
Depress the clutch pedal.

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(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Input Troubleshooting Flow Chart — Clutch Switch Signal (M/T only) (cont'd)





# Input Troubleshooting Flow Chart — A/T Shift Position Signal (A/T only)

**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

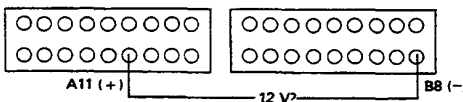
See A/T shift position Indicator Inspection (section 16).

YES

Turn the ignition switch OFF.

Connect the ECU check adaptor A and B between the control unit and connector (page 6-91). But disconnect A connector from the wire harness only, not the control unit.

Turn the ignition switch ON.



Measure voltage between A11 (+) terminal and B8 (-) terminal.

Is there battery voltage?

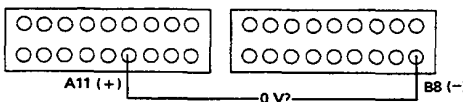
NO

Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.

YES

Reconnect A connector to the wire harness.

Measure voltage between A11 (+) terminal and B8 (-) terminal in Neutral position.



(To page 6-116)

(cont'd)

# PGM-CARB Control System [KX, KS, KZ model]

## Input Troubleshooting Flow Chart – A/T Shift Position Signal (A/T only) (cont'd)

(From page 6-115)

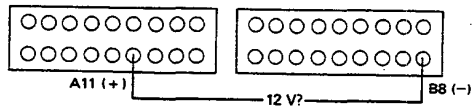
Is there voltage?

YES

- Repair open in LT GRN wire between control unit (A11) and combination meter.
- Repair open in the GRN wire between the combination meter and A/T shift position switch.

NO

Measure voltage between A11 (+) terminal and B8 (-) terminal in all other shift positions except neutral.



Is there battery voltage?

NO

Repair short in LT GRN wire between combination meter and control unit (A11).

YES

A/T shift position signal is OK



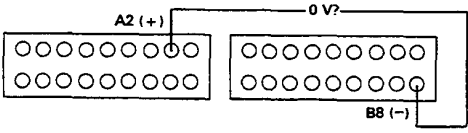
# Input Troubleshooting Flow Chart — Air Conditioning Signal

Inspection of Air Conditioning Signal.

Connect the ECU check adaptor A and B between the control unit and connector (page 6-91).

Start the engine.

Measure voltage between A2 (+) terminal and B8 (-) terminal.



Is there voltage?

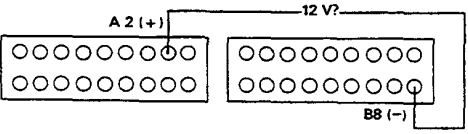
Repair short in RED/GRN wire between control unit (A2) and compressor control unit. If OK, see air conditioner inspection (section 15).

Turn the A/C switch ON.

Does A/C operate?

See Air Conditioner Inspection (section 15).

Measure voltage between A2 (+) terminal and B8 (-) terminal.



Is there battery voltage?

Repair open in RED/GRN wire between control unit (A2) and compressor control unit. If OK, see air conditioner inspection (section 15).

Air Conditioning Signal is OK.

## Fuel and Emissions (Fuel-Injected Engine)

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### Emission Control System

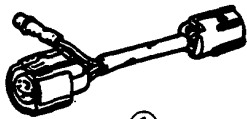
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# Special Tools

## Special Tools

Ref. No	Tool Number	Description	Q'ty	Remarks
①	07GAZ—SE00300	R.P.M. Connecting Adaptor	1	
②	07406—0040001	Fuel Pressure Gauge Set	1	
②-1	07406—0040100	Pressure Gauge	(1)	
②-2	07406—0040201	Hose Assy	(1)	
③	07999—PD6000A	System Checker Harness	1	
④	07411—0020000	Digital Circuit Tester	1	
⑤	07GMJ—ML80100	Inspection Adaptor	1	



①



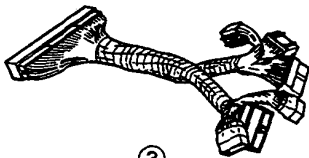
②



②-1



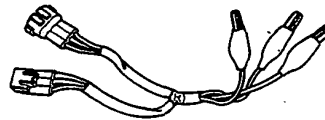
②-2



③



④



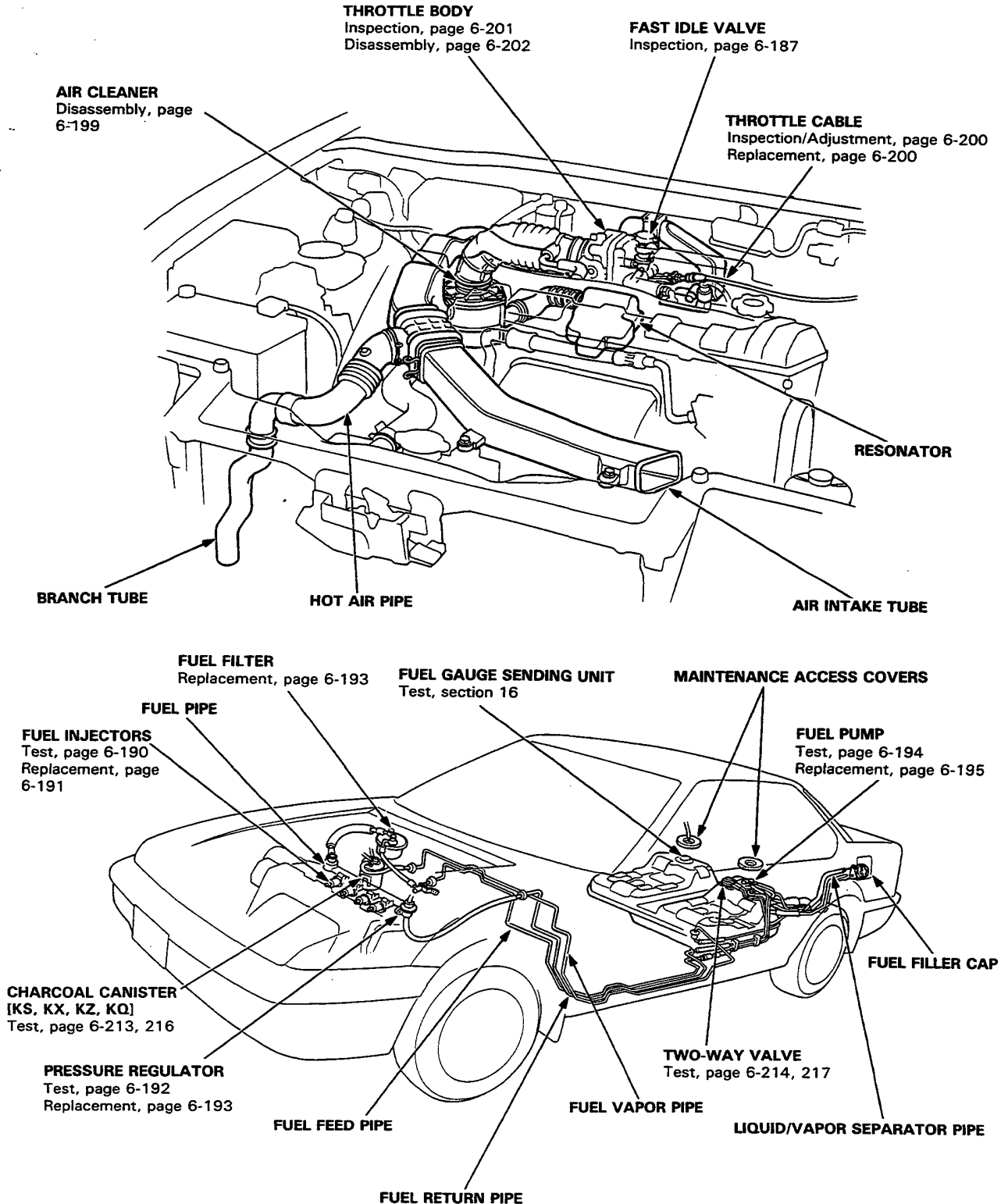
⑤



# Component Locations



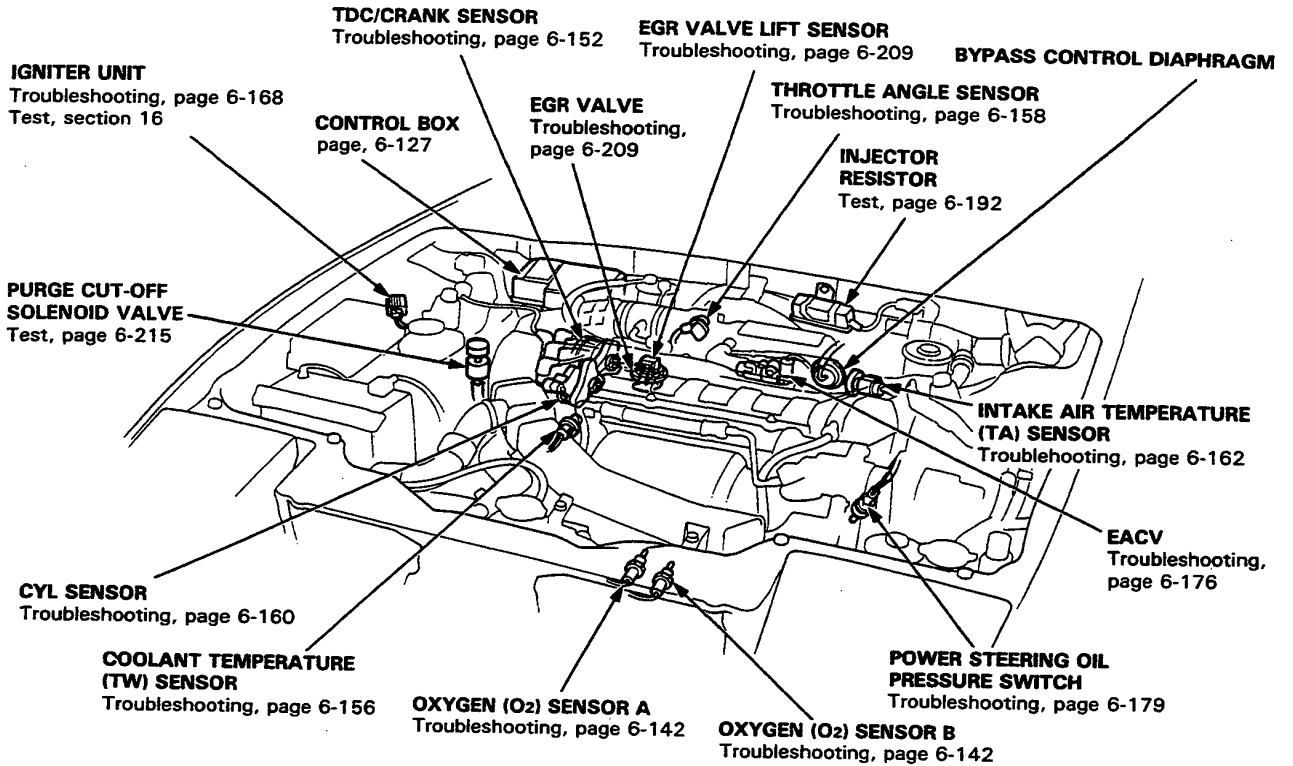
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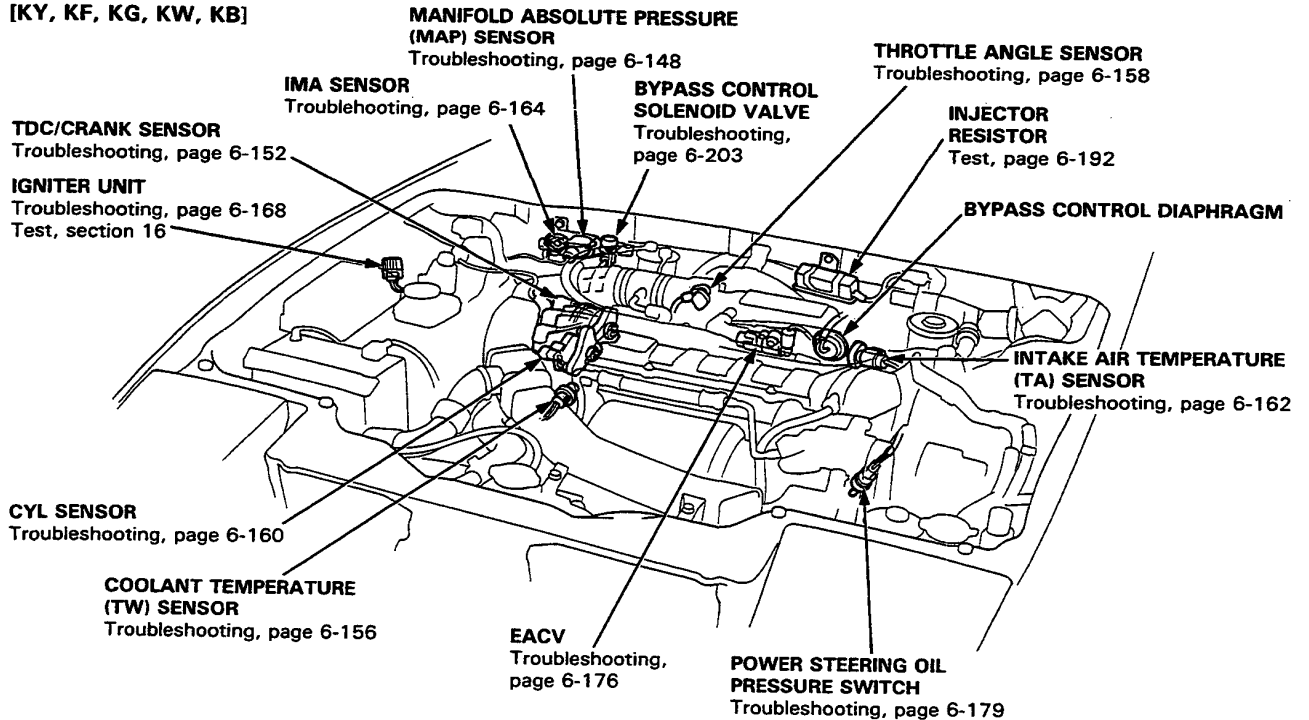
# Component Locations

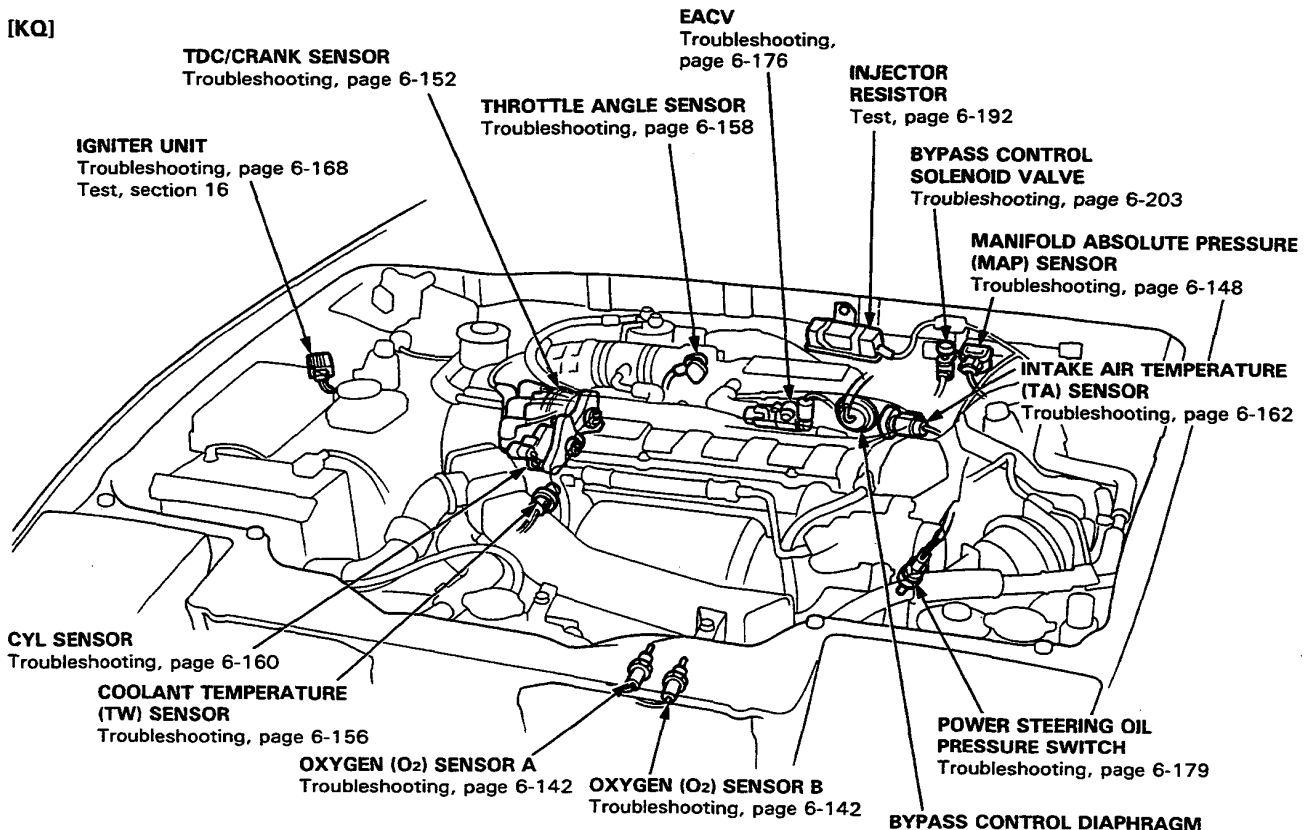
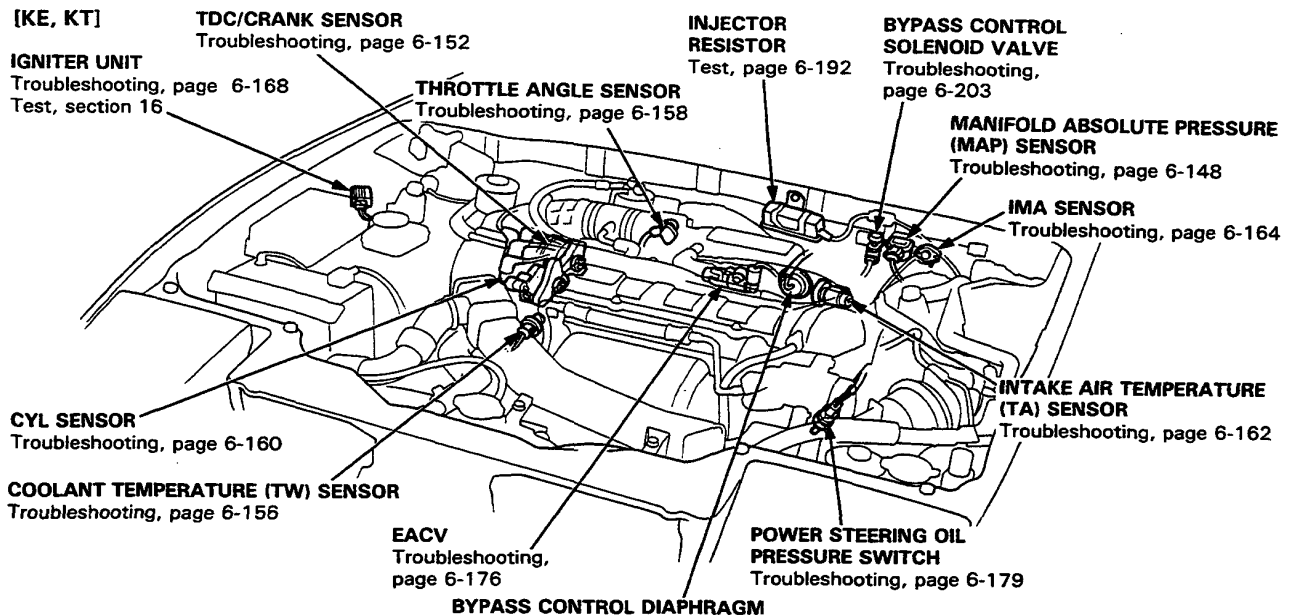
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[KX, KS, KZ]



[KY, KF, KG, KW, KB]





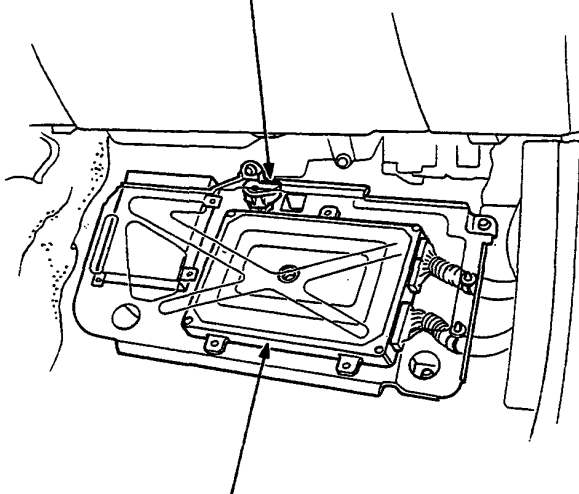
# Component Locations

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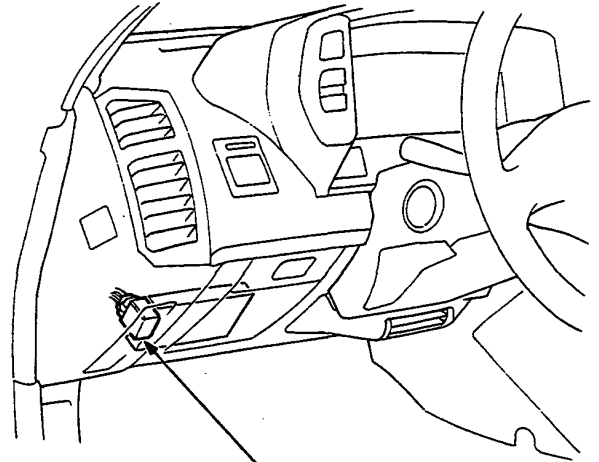
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[L.H. Drive]

**ATMOSPHERIC PRESSURE (PA) SENSOR**  
Troubleshooting, page 6-166



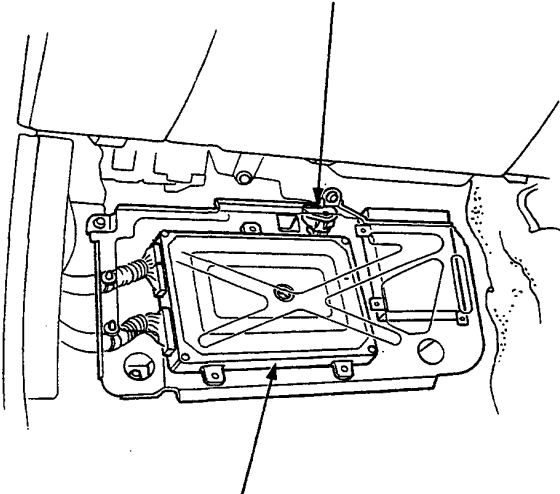
**ELECTRONIC CONTROL UNIT (ECU)**  
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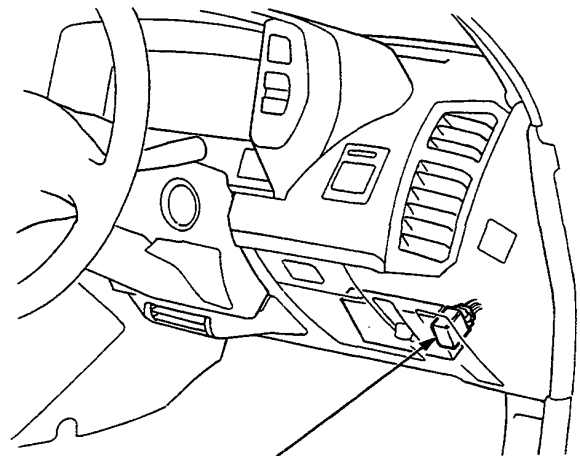
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[R.H. Drive]

**ATMOSPHERIC PRESSURE (PA) SENSOR**  
Troubleshooting, page 6-166



**ELECTRONIC CONTROL UNIT (ECU)**  
Troubleshooting, page 6-139

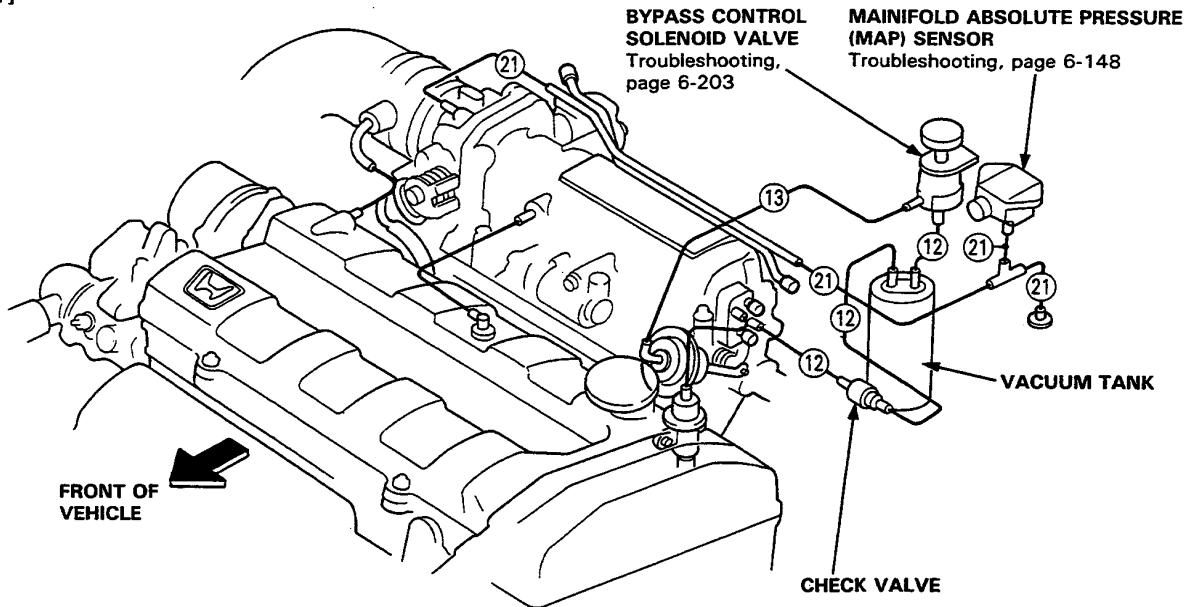


**MAIN RELAY**  
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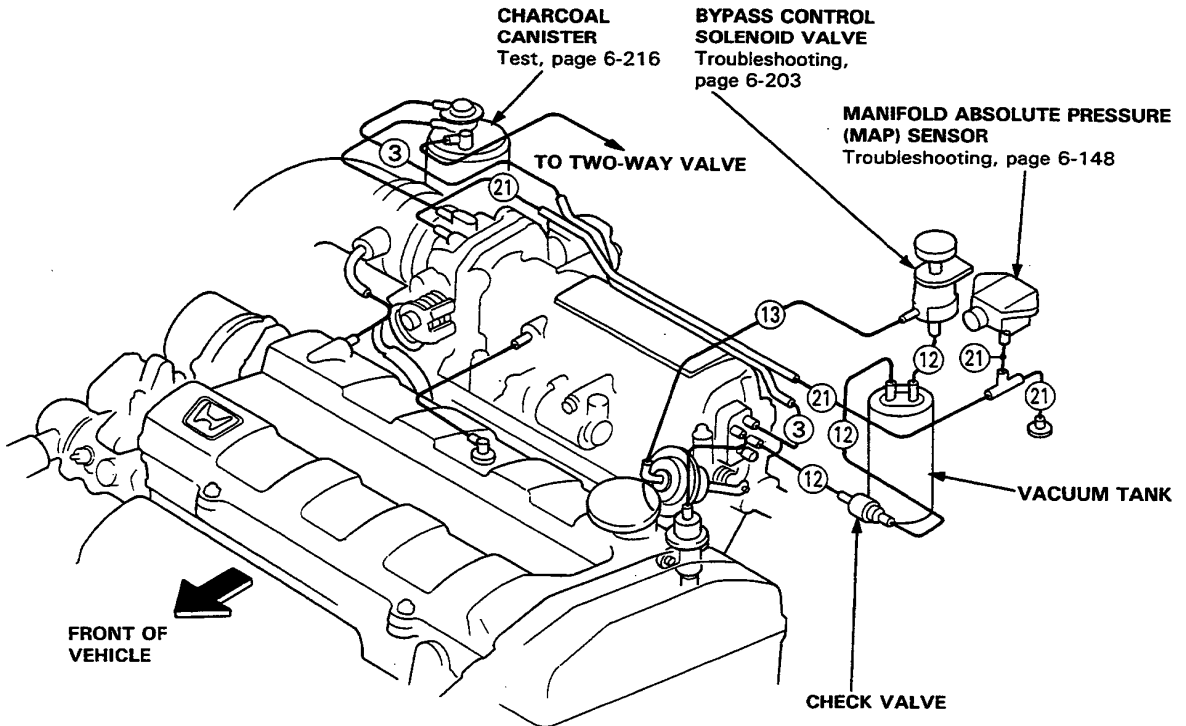
# Vacuum Connections



[KE, KT]

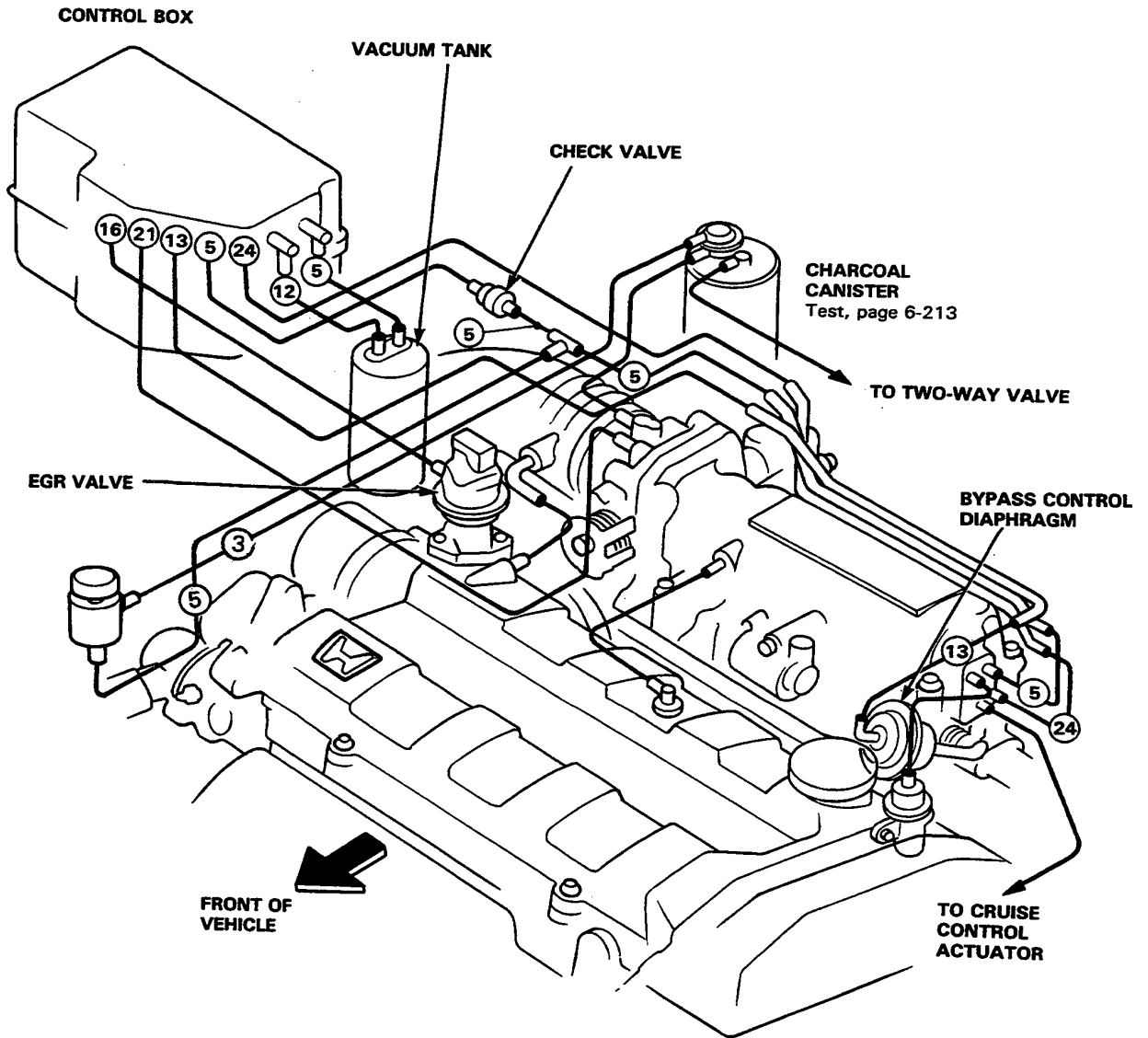


[KQ]



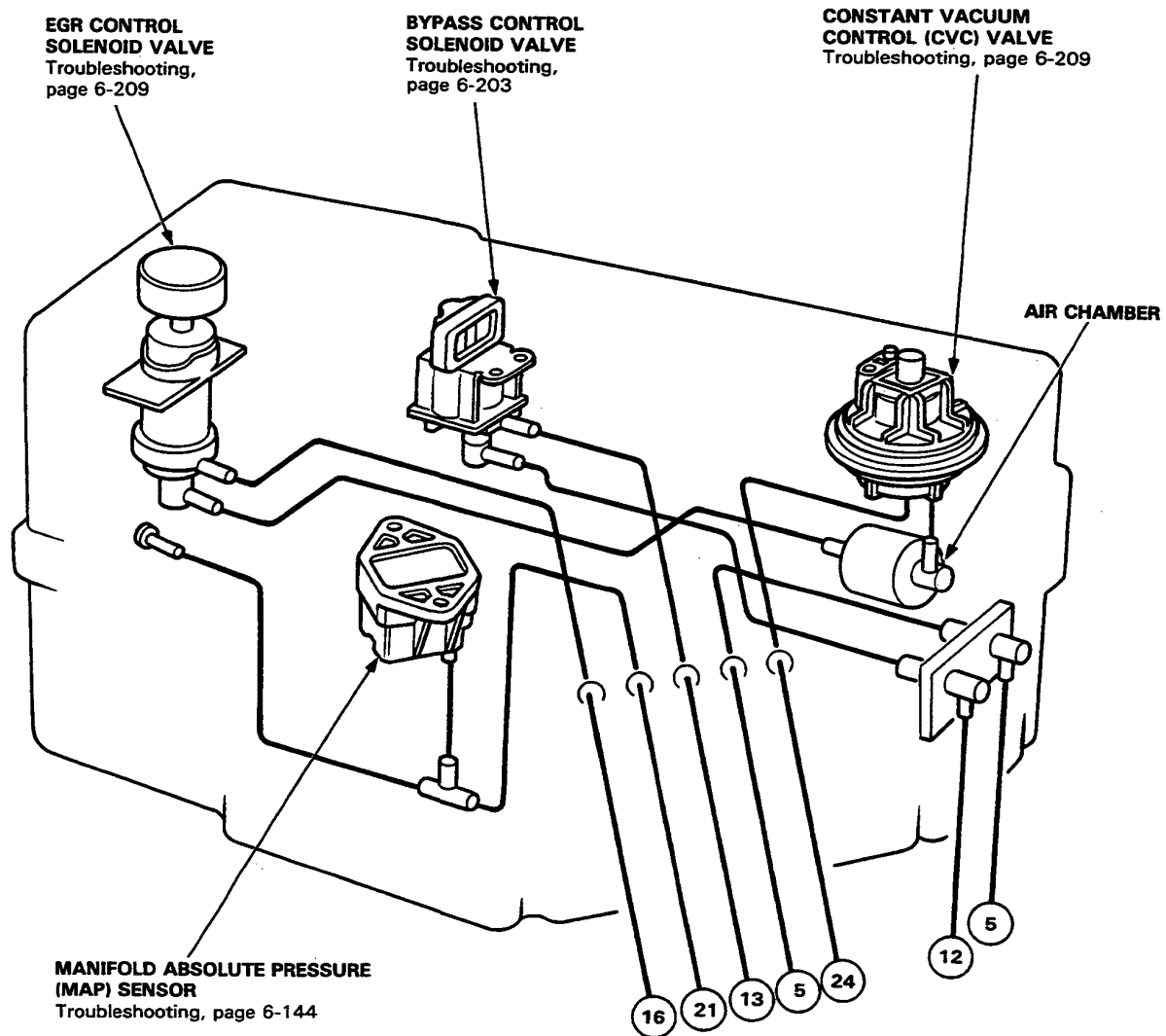
# Vacuum Connections

[KX, KS, KZ]





## Control Box



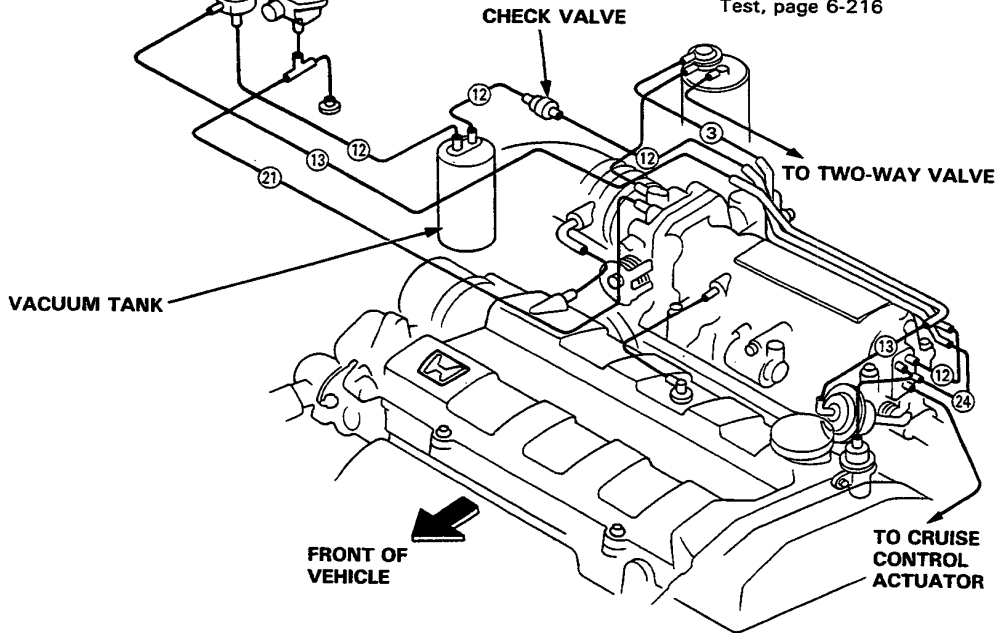
# Vacuum Connections

[KY]

**BYPASS CONTROL SOLENOID VALVE**  
Troubleshooting, page 6-203

**MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR**  
Troubleshooting, page 6-148

**CHARCOAL CANISTER**  
Test, page 6-216

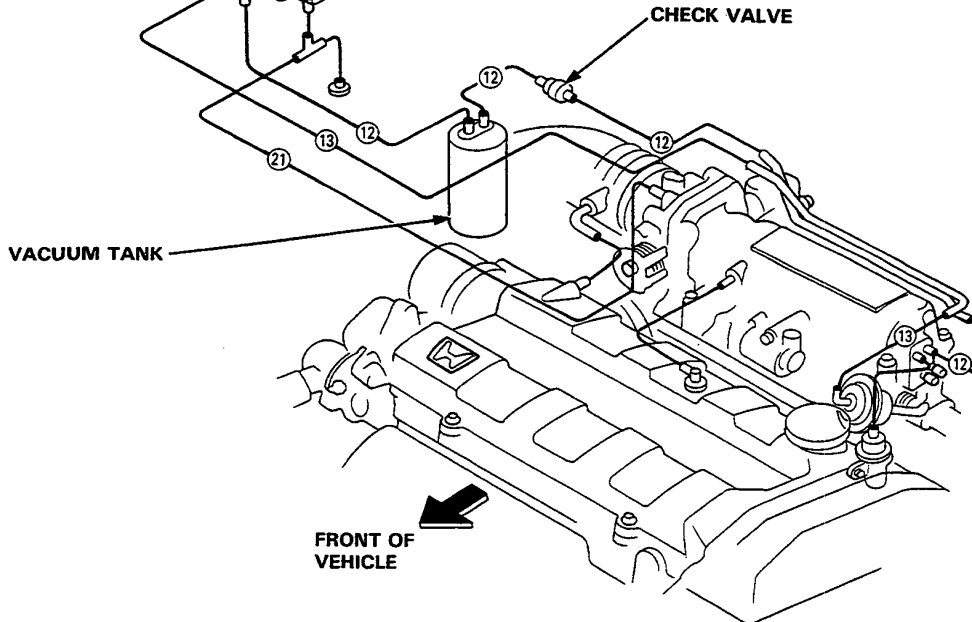


[KF, KG, KW, KB]

**BYPASS CONTROL SOLENOID VALVE**  
Troubleshooting, page 6-203

**MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR**  
Troubleshooting, page 6-148

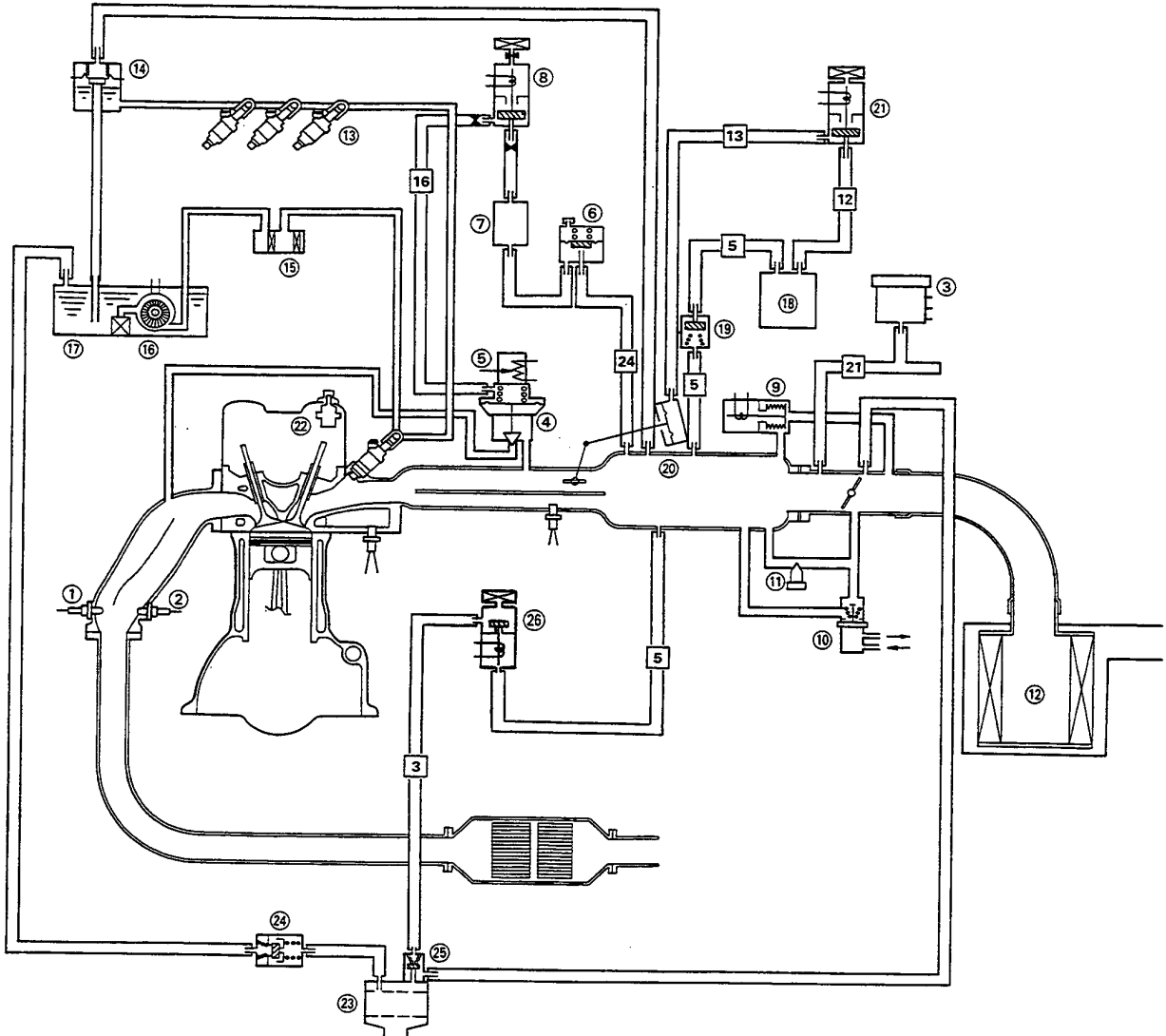
**CHECK VALVE**







[KX, KS, KZ]

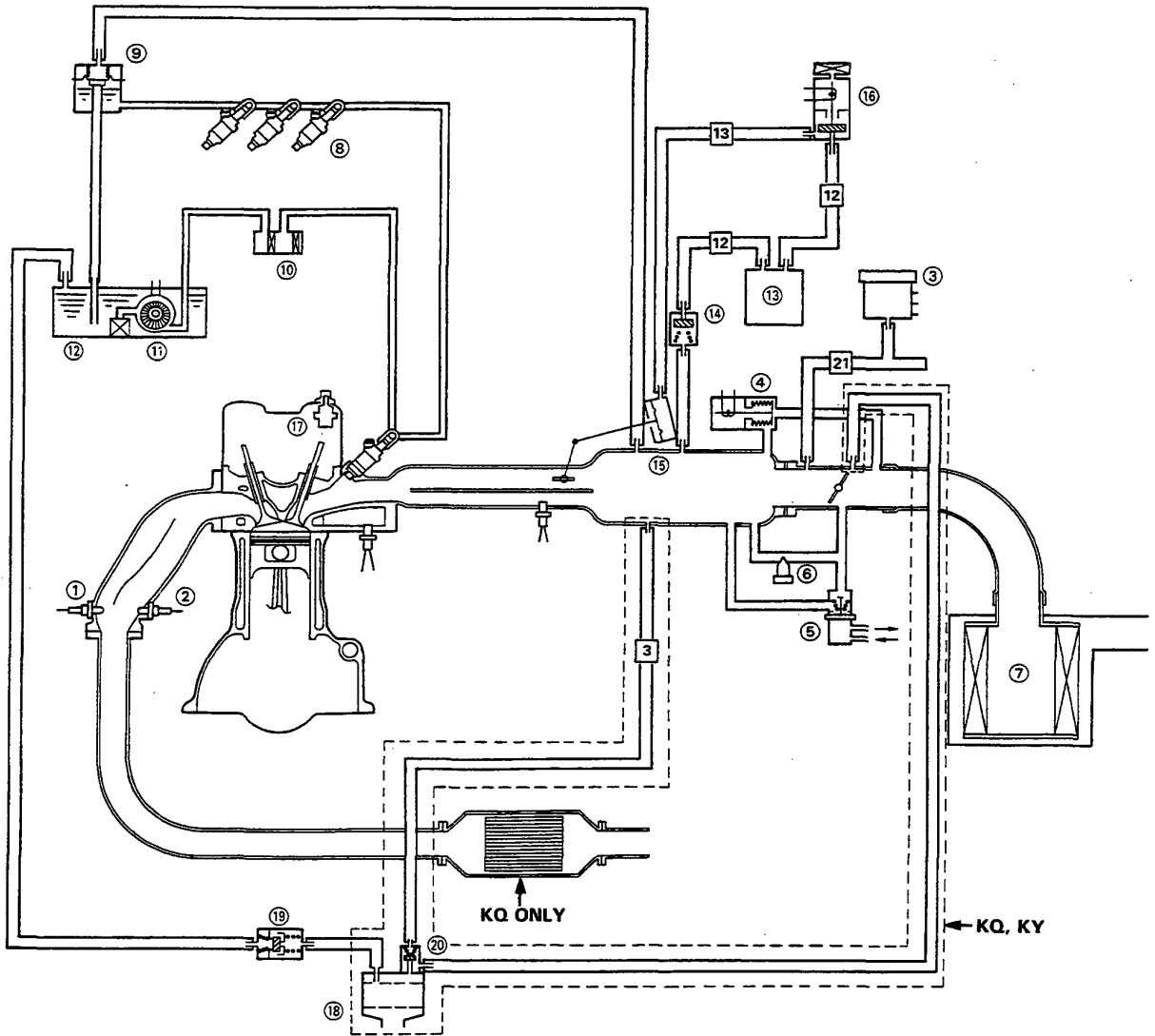


- ① OXYGEN (O<sub>2</sub>) SENSOR A
- ② OXYGEN (O<sub>2</sub>) SENSOR B
- ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ④ EGR VALVE
- ⑤ EGR VALVE LIFT SENSOR
- ⑥ CONSTANT VACUUM CONTROL (CVC) VALVE
- ⑦ AIR CHAMBER
- ⑧ EGR CONTROL SOLENOID VALVE
- ⑨ ELECTRONIC AIR CONTROL VALVE (EACV)
- ⑩ FAST IDLE VALVE
- ⑪ IDLE ADJUSTING SCREW
- ⑫ AIR CLEANER
- ⑬ FUEL INJECTOR

- ⑭ PRESSURE REGULATOR
- ⑮ FUEL FILTER
- ⑯ FUEL PUMP
- ⑰ FUEL TANK
- ⑱ VACUUM TANK
- ⑲ CHECK VALVE
- ⑳ BYPASS CONTROL DIAPHRAGM
- ㉑ BYPASS CONTROL SOLENOID VALVE
- ㉒ PCV VALVE
- ㉓ CHARCOAL CANISTER
- ㉔ TWO-WAY VALVE
- ㉕ PURGE CONTROL DIAPHRAGM VALVE
- ㉖ PURGE CUT-OFF SOLENOID VALVE

# Vacuum Connections

[Except KX, KS, KZ]



- ① OXYGEN (O<sub>2</sub>) SENSOR A (KQ ONLY)
- ② OXYGEN (O<sub>2</sub>) SENSOR B (KQ ONLY)
- ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ④ ELECTRONIC AIR CONTROL VALVE (EACV)
- ⑤ FAST IDLE VALVE
- ⑥ IDLE ADJUSTING SCREW
- ⑦ AIR CLEANER
- ⑧ FUEL INJECTOR
- ⑨ PRESSURE REGULATOR
- ⑩ FUEL FILTER

- ⑪ FUEL PUMP
- ⑫ FUEL TANK
- ⑬ VACUUM TANK
- ⑭ CHECK VALVE
- ⑮ BYPASS CONTROL DIAPHRAGM
- ⑯ BYPASS CONTROL SOLENOID VALVE
- ⑰ PCV VALVE
- ⑱ CHARCOAL CANISTER (KQ, KY)
- ⑲ TWO-WAY VALVE
- ⑳ PURGE CONTROL DIAPHRAGM VALVE (KQ, KY)

# Electrical Connections

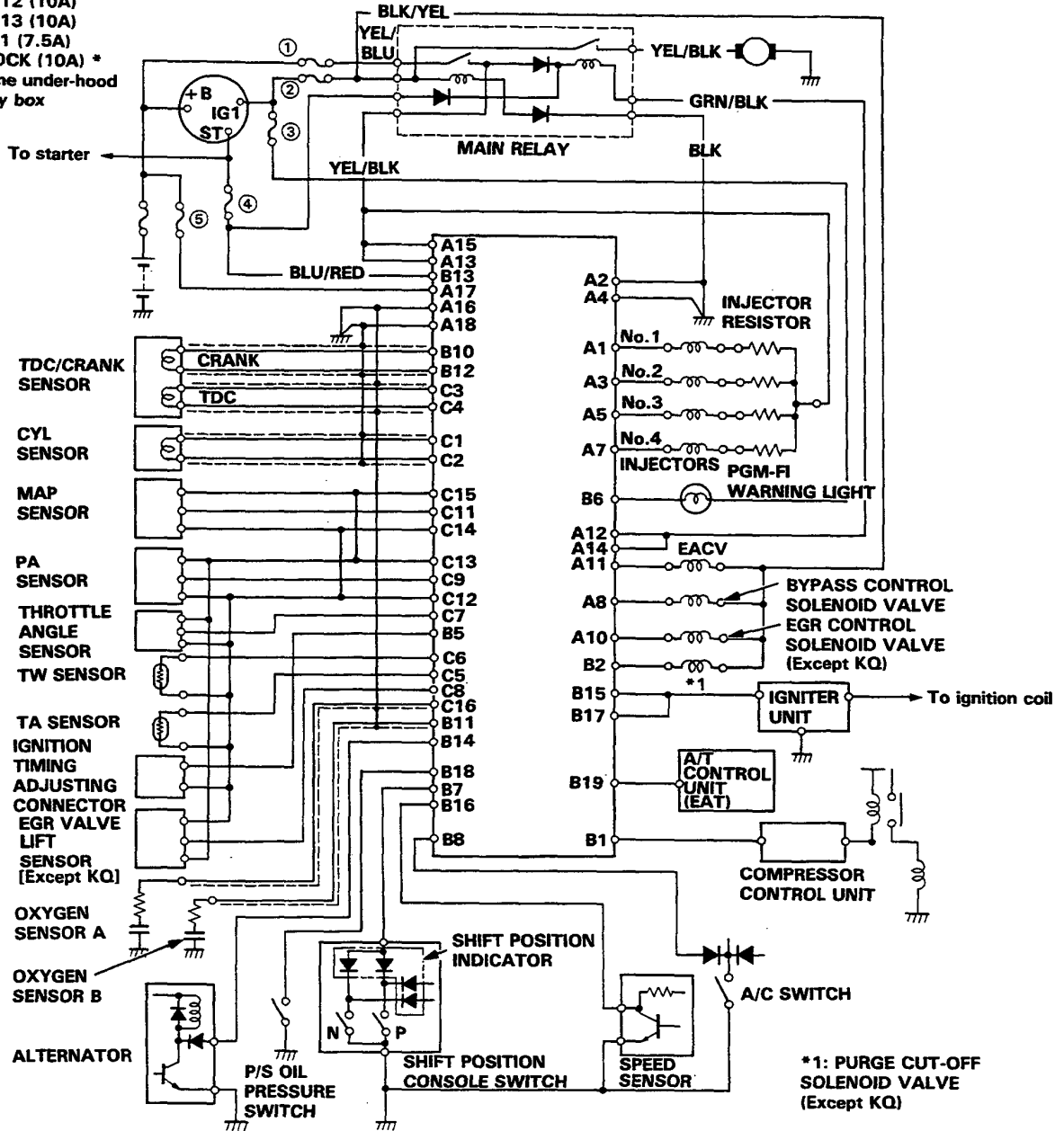


[KX, KS, KZ, KQ]

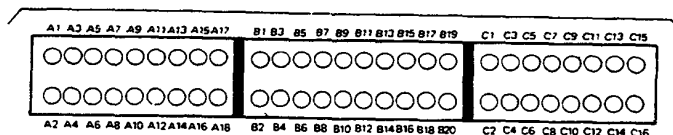
## FUSES

- ① EFI ECU (10A) \*
- ② No.12 (10A)
- ③ No.13 (10A)
- ④ No.1 (7.5A)
- ⑤ CLOCK (10A) \*

\*: In the under-hood relay box



\*1: PURGE CUT-OFF SOLENOID VALVE (Except KQ)



TERMINAL LOCATION

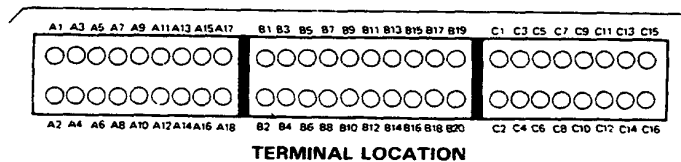
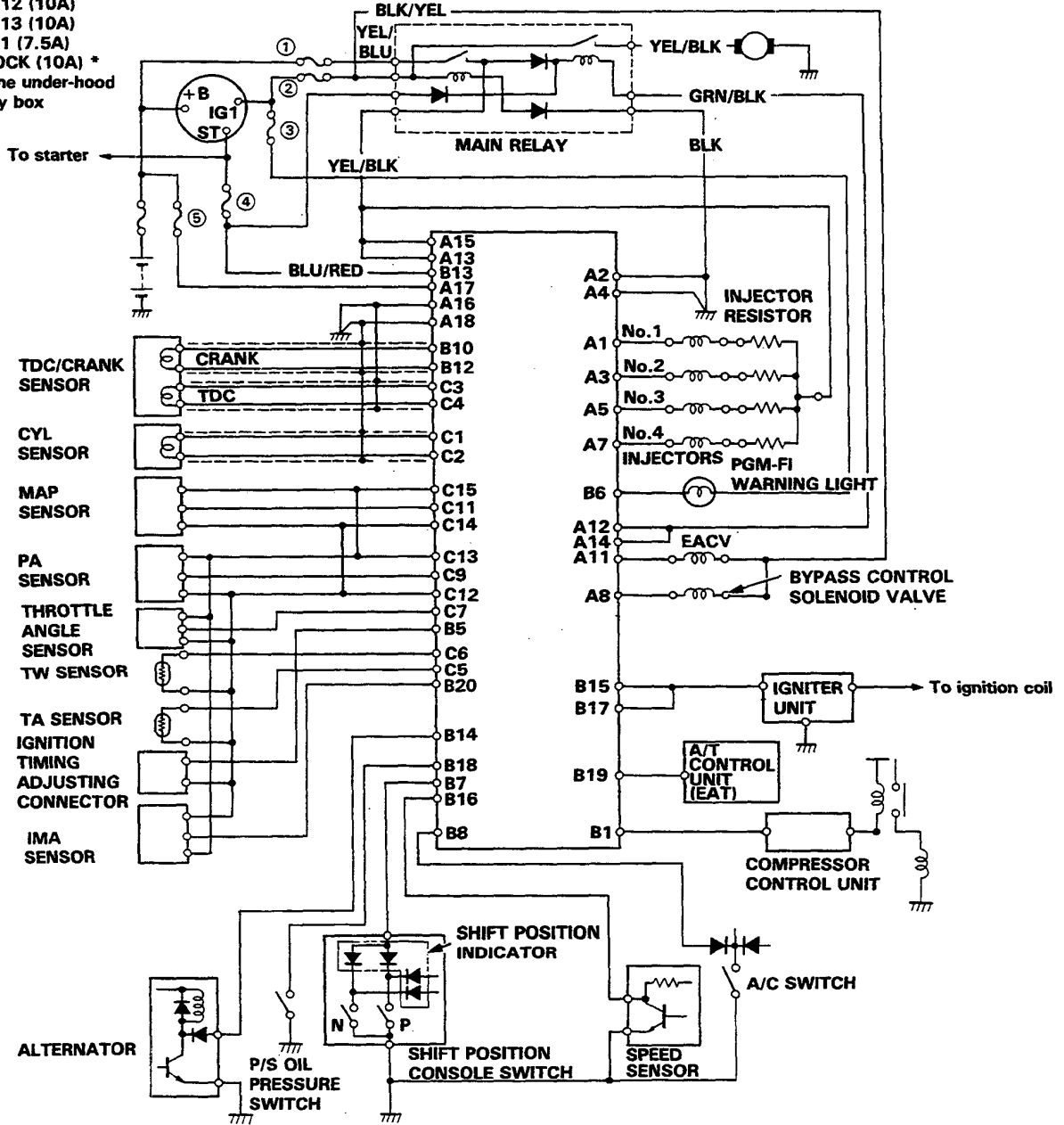
# Electrical Connections

[Except KX, KS, KZ, KQ]

## FUSES

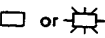
















- ① EFI ECU (10A) \*
- ② No.12 (10A)
- ③ No.13 (10A)
- ④ No.1 (7.5A)
- ⑤ CLOCK (10A) \*

\*: In the under-hood relay box



# Symptom-to-System Chart

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 *1	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	CYL SENSOR	INTAKE AIR TEMPERATURE SENSOR
SYMPTOM		139	142	144, 148	152	156	158	160	162
PGM-FI WARNING LIGHT TURNS ON		 or 							
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		① or 	① or ② 	③ or ⑤ 	④ or ⑧ 	⑥ 	⑦ 	⑨ 	⑩ 
ENGINE WON'T START		③							
DIFFICULT TO START ENGINE WHEN COLD		(BU)				①			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFIC	(BU)				②	③	③	③
	ROUGH IDLE	(BU)	③	②			③		③
	WHEN WARM RPM TOO HIGH	(BU)							
	WHEN WARM RPM TOO LOW	(BU)							
FREQUENT STALLING	WHILE WARMING UP	(BU)		②		③	③		
	AFTER WARMING UP	(BU)		②			②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	(BU)	③	②			③	③	
	FAILS EMISSION TEST	(BU)	②	①					
	LOSS OF POWER	(BU)		③					

\* CODE 16, or exceeds 17: 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 PGM-FI warning 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.

\*1: KX, KS, KZ, KQ    \*2: Except KX, KS, KZ, KQ    \*3: KX, KS, KZ

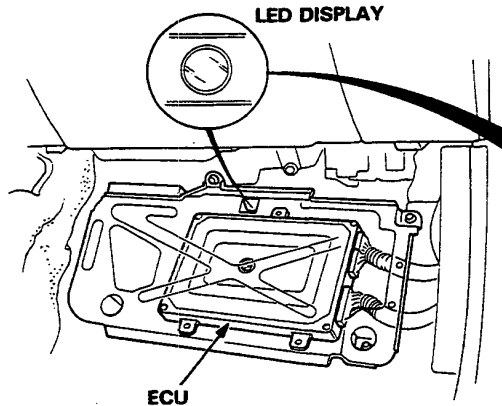


PGM-FI				IDLE CONTROL		FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL	
IMA SENSOR *2	ATMO-SPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS			EGR *3 CONTROL SYSTEM	OTHER EMISSION CONTROLS
164	166	168	170	176	175	188	198	209	207
		②				①			
				②	③	③			
	③				①				
③	③			①		③		③	③
					①		②		③
				①	③		②		
				①	③	③	②	③	
				②		③		①	
			③			①			
								②	②
						①	③	③	②

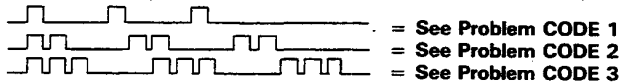
# Troubleshooting Procedures

When the PGM-FI warning light has been reported on, turn the ignition on, pull down the passenger's side carpet inspection flap from under the dashboard and observe the LED on the top of the ECU. The LED indicates a system failure code by blinking frequency.

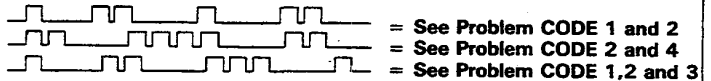
The ECU LED can indicate any number of simultaneous component problems by blinking separate codes, one after another.



### Separate Problems:



### Simultaneous Problems:



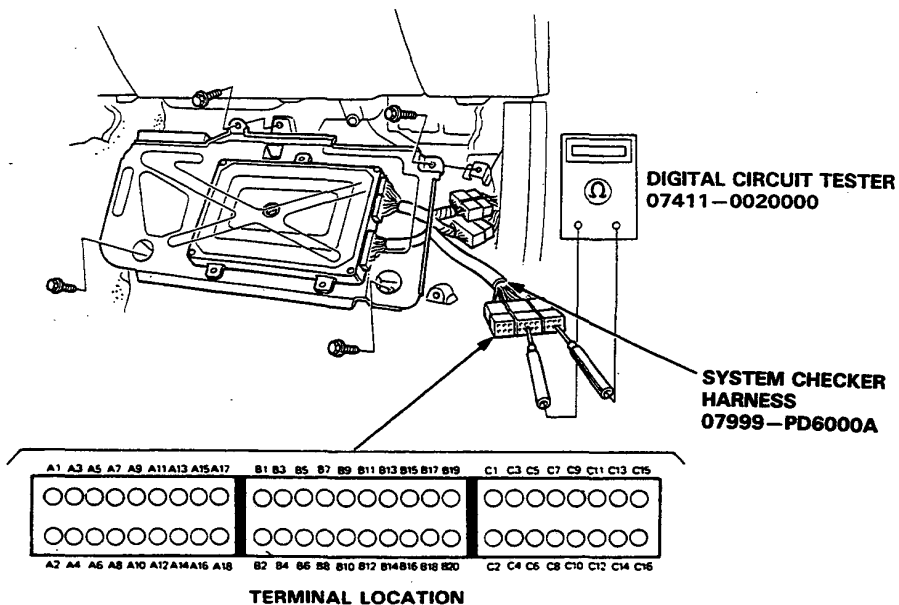
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	6-139
1	OXYGEN CONTENT A	6-142
2	OXYGEN CONTENT B	6-142
3	MANIFOLD ABSOLUTE PRESSURE	6-144, 148
5		6-146, 150
4	CRANK ANGLE	6-152
6	COOLANT TEMPERATURE	6-156
7	THROTTLE ANGLE	6-158
8	TDC POSITION	6-154
9	No.1 CYLINDER POSITION	6-160
10	INTAKE AIR TEMPERATURE	6-162
11	IMA	6-164
12	EXHAUST GAS RECIRCULATION SYSTEM	6-209
13	ATMOSPHERIC PRESSURE	6-166
14	ELECTRONIC IDLE CONTROL	6-176
15	IGNITION OUTPUT SIGNAL	6-168
17	VEHICLE SPEED SENSOR	6-170

If CODE 16, or more than 17, 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.

The PGM-FI dash warning light and ECU LED 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.

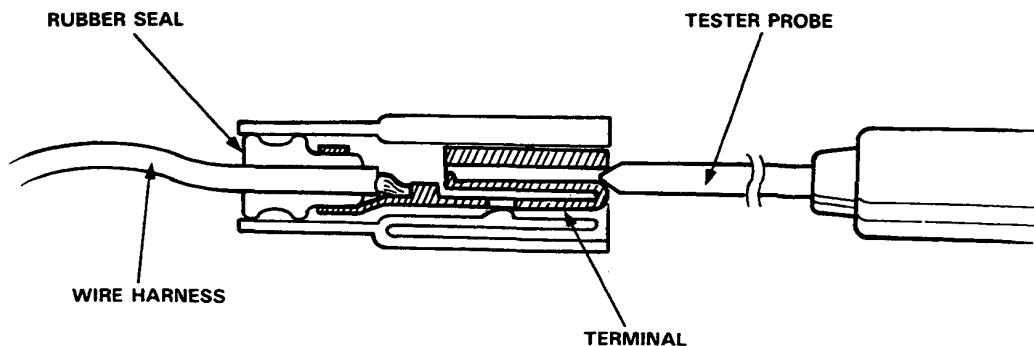


If the inspection for a particular failure code requires the system checker harness, remove the passenger's door sill molding, the small cover on the kick panel, and pull the carpet back to expose the ECU. Unbolt the ECU bracket. Connect the system checker harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



**CAUTION :**

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the system checker 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.



(cont'd)



# Troubleshooting Procedures

A flow chart 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 flow chart.

## **ACTION**

Asks you to do something; perform a test, set up a condition, etc.

## **DECISION**

Asks you about the result of an action by giving an "answer" and asking did you get the same answer: Yes or No.

## **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 several times 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.
- "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. 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 system checker harness, check the checker harness connections before proceeding.



# Troubleshooting Flow Chart — ECU

PGM-FI warning light isn't on for 2 seconds after ignition is first turned on.

Is oil pressure warning light on ?

NO

Inspect No. 13 fuse.

YES

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

Connect B6 terminal to body ground.

Turn the ignition switch ON.

Is PGM-FI warning light on ?

NO

- Replace warning light bulb.  
- Repair open in YEL/RED wire between ECU (B6) and combination meter.

YES

Connect the following terminals individually to B6: • A2, • A4

Is PGM-FI warning light on ?

NO

- Repair open in BLK wire between ECU (A2) and G101.  
- Repair open in BLK wire between ECU (A4) and G101.

YES

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

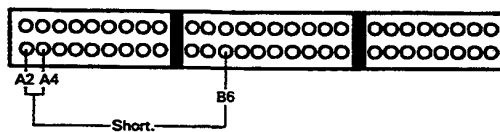
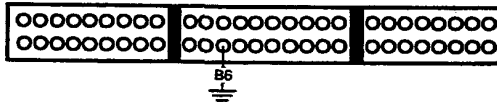
Is No. 13 fuse OK ?

NO

Replace fuse.

YES

Repair open in YEL wire between No. 13 fuse and combination meter.



(cont'd)

# PGM-FI Control System

## Troubleshooting Flow Chart — ECU (cont'd)

- PGM-FI warning light is on.  
- LED doesn't blink.

Connect the system checker harness between the ECU and connector (page 6-137). But disconnect "B" connector from ECU only, not the wire harness.

Turn the ignition switch ON.

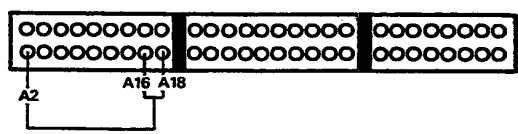
Does PGM-FI warning light remain on?

**YES**  
Repair short to ground in YEL/RED wire between ECU (B6) and combination meter.

**NO**

Reconnect "B" connector to ECU.

Connect following terminals individually to A2: ● A16, ● A18.

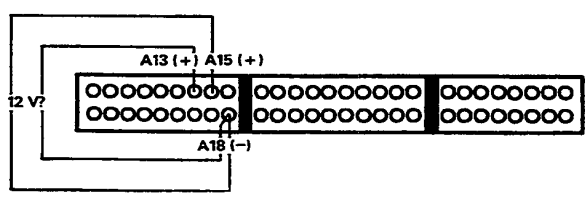


Is PGM-FI warning light on?

**NO**  
- Repair open in BLK/RED wire between ECU (A18) and G101.  
- Repair open in BRN/BLK wire between ECU (A16) and G101.

**YES**

Measure voltage between A13 (+), A15 (+) terminals and A18 (-) terminal.

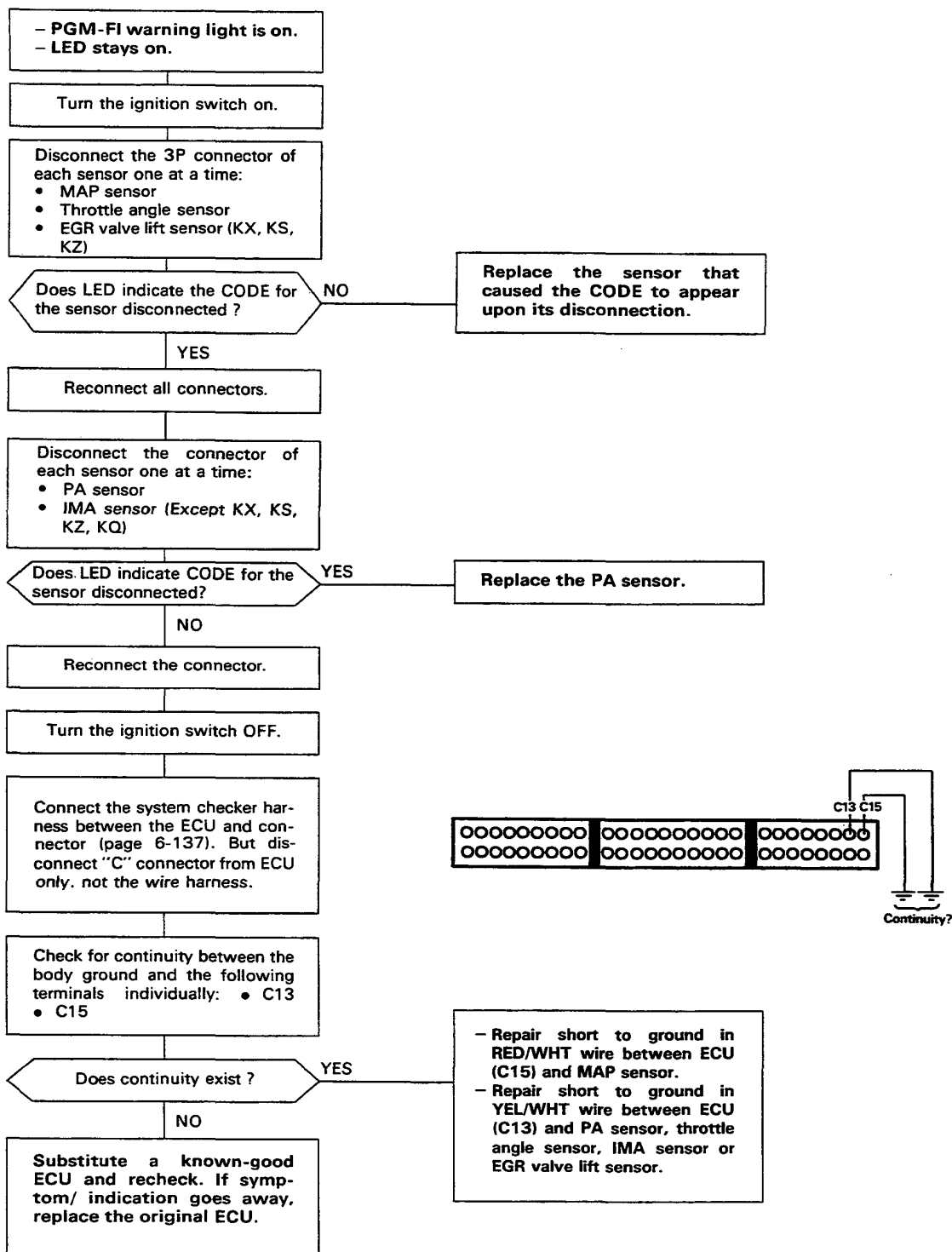


Is there battery voltage?

**NO**  
- Repair open in YEL/BLK wire between ECU (A13, A15) and main relay.  
- Check main relay and wiring connectors at main relay (page 6-195)

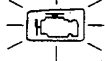
**YES**

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

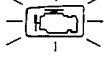


# PGM-FI Control System

## Troubleshooting Flow Chart — Oxygen Sensors [KX, KS, KZ, KQ]



Self-diagnosis LED blinks once: A problem in the Oxygen (O<sub>2</sub>) Sensor A circuit.



Self-diagnosis LED blinks twice: A problem in the Oxygen (O<sub>2</sub>) Sensor B circuit.



or



- PGM-FI warning light has been reported on.  
- LED indicates CODE 1 (O<sub>2</sub> sensor A) or CODE 2 (O<sub>2</sub> sensor B).

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Inspect pressure regulator (page 6-192).

Is it normal ?

NO

Replace the pressure regulator (page 6-193).

YES

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

Hold engine at 1500 min<sup>-1</sup> (rpm) for 15 minutes.  
NOTE: Do not close throttle completely during this time.

Is PGM-FI warning light on ?  
Does LED indicate CODE 1 or 2 ?

NO

Intermittent failure (test drive may be necessary).

YES

(To page 6-143)



(From Page 6-142)

Disconnect engine wire harness from indicated O<sub>2</sub> sensor.

Warm up engine to normal operating temperature again, then open the throttle wide open then close it.

Measure voltage between the connector terminal and body ground.

Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

NO

Replace O<sub>2</sub> sensor.

YES

Stop engine.

Connect the system checker harness between the ECU and connector (page 6-137).

Restart and warm up engine to normal operating temperature, then open the throttle wide open then close it.

Measure voltage between:

- O<sub>2</sub> sensor A  
C16 (+) and A18(-) terminals
- O<sub>2</sub> sensor B  
B11 (+) and A18 (-) terminals

Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

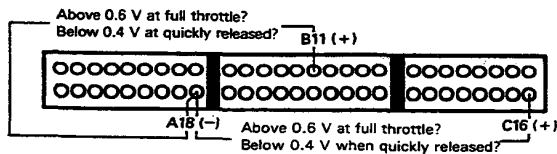
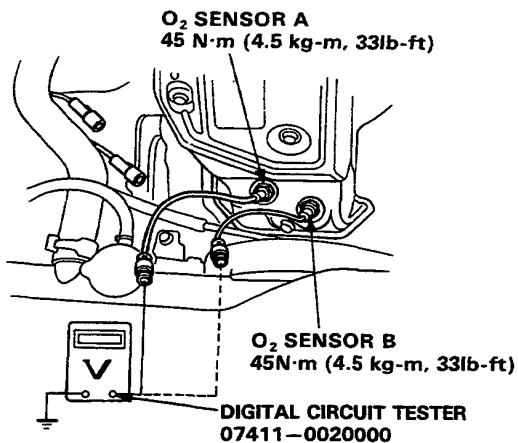
NO

Repair wire between ECU and O<sub>2</sub> sensor for short or open:

- O<sub>2</sub> sensor A  
WHT wire to C16
- O<sub>2</sub> sensor B  
RED/BLU wire to B11.

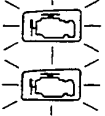
YES

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



# PGM-FI Control System

## Troubleshooting Flow Chart — MAP Sensor [KX, KS, KZ]



Self-diagnosis LED indicator blinks three times: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.



Self-diagnosis LED indicator blinks five times: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.



- Engine is warm and running.  
- PGM-FI warning light is on.  
- LED indicates CODE 3.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start the engine and allow to idle.

Is PGM-FI warning light on?  
Does LED indicate CODE 3?

NO

Intermittent failure  
(test drive may be necessary).

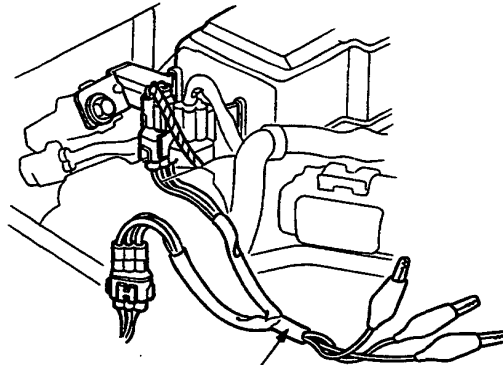
YES

Turn the ignition switch OFF.

Connect the inspection adaptor between the MAP sensor and wire harness.

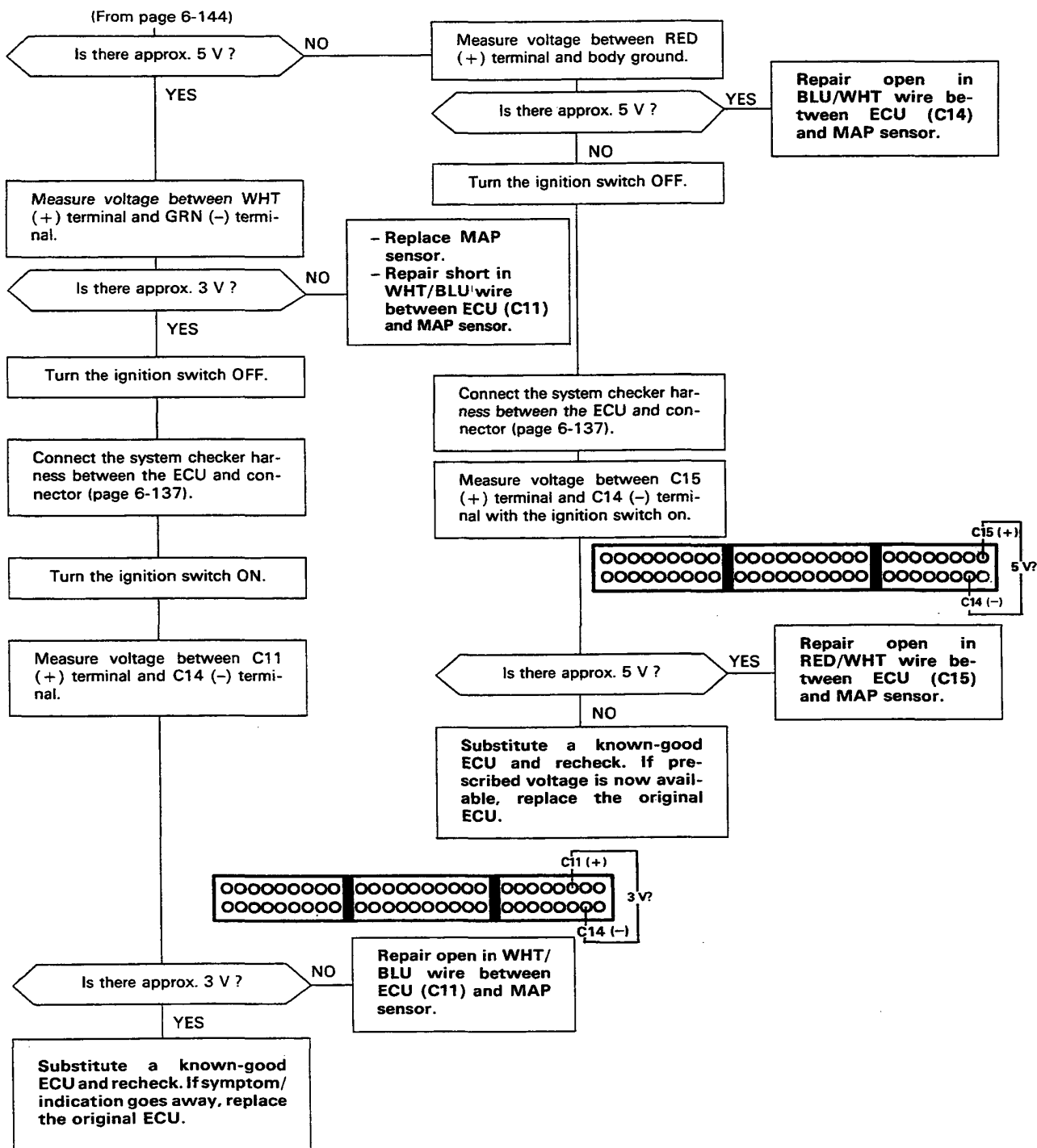
Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (-) terminal.



INSPECTION ADAPTOR  
07GMJ-ML80100

(To page 6-145)

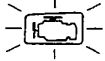


(cont'd)



# PGM-FI Control System

## Troubleshooting Flow Chart — MAP Sensor [KX, KS, KZ] (cont'd)



- PGM-FI warning light has been reported on.  
- LED indicates CODE 5.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine and keep engine rpm at idle.

Is PGM-FI warning light on?  
Does LED indicate CODE 5?

NO

Intermittent failure  
(test drive may be necessary).

YES

Stop engine.

Remove #21 hose from the vacuum hose manifold and connect a T. fitting from a vacuum gauge between the throttle body and the MAP sensor.

Start engine.

Is there vacuum?

NO

- Repair #21 hose.  
- Replace MAP sensor.

YES

Connect vacuum pump to #21 hose and apply vacuum.

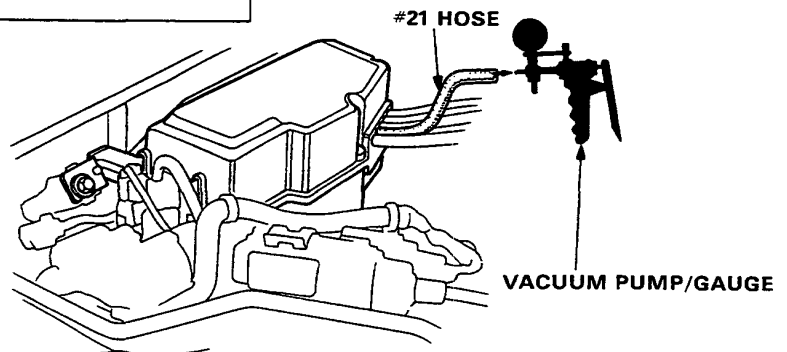
Does it hold vacuum?

NO

Replace #21 hose.

YES

(To page 6-147)





(From page 6-146)

Stop engine.

Connect the inspection adaptor between the MAP sensor and wire harness.

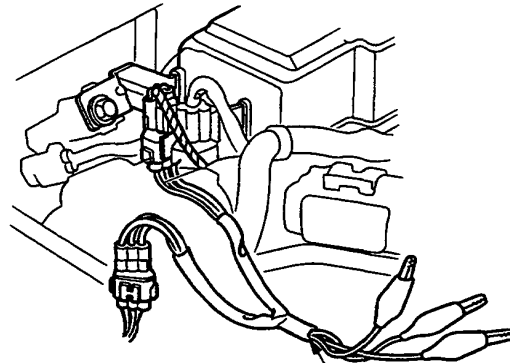
Turn the ignition switch ON.

Measure voltage between WHT (+) terminal and GRN (-) terminal.

Is there approx. 3V ?

NO  
Replace MAP sensor.

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



INSPECTION ADAPTOR  
07GMJ-ML80100

# PGM-FI Control System

## Troubleshooting Flow Chart — MAP Sensor [Except KX, KS, KZ]



Self-diagnosis LED indicator blinks three times: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.



Self-diagnosis LED indicator blinks five times: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.



— Engine is warm and running.  
— PGM-FI warning light is on.  
— LED indicates CODE 3.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start the engine and allow to idle.

Is PGM-FI warning light on ?  
Does LED indicate CODE 3 ?

NO

Intermittent failure (test drive may be necessary).

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

Measure voltage between RED/WHT (+) terminal and BLU/WHT (-) terminal.

Is there approx. 5 V ?

NO

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

YES

(To page 6-149)

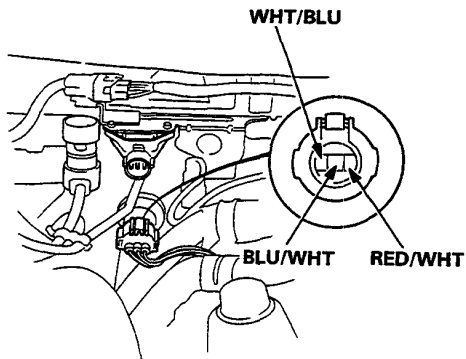
Is there approx. 5 V ?

YES

Repair open in BLU/WHT wire between ECU (C14) and MAP sensor.

NO

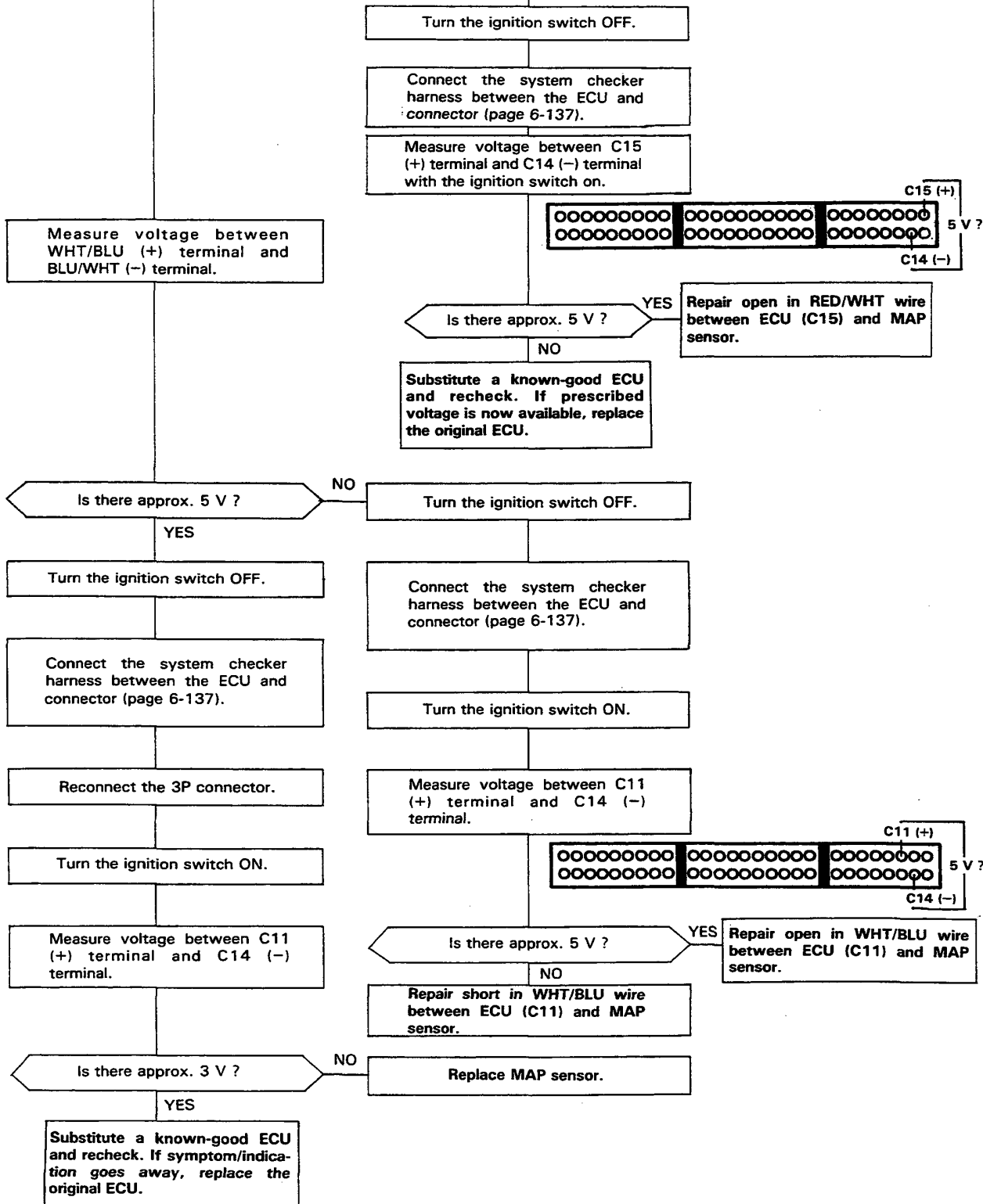
(To page 6-149)





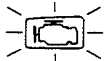
(From page 6-148)

(From page 6-148)



# PGM-FI Control System

## Troubleshooting Flow Chart — MAP Sensor [Except KX, KS, KZ] (cont'd) —



- PGM-FI warning light has been reported on.  
- LED indicates CODE 5.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine and keep engine rpm at idle.

Is PGM-FI warning light on?  
Does LED indicate CODE 5?

NO

Intermittent failure  
(test drive may be necessary).

YES

Stop engine.

Remove #21 hose from the vacuum hose manifold and connect a T. fitting from a vacuum gauge between the throttle body and the MAP sensor.

Start engine.

Is there vacuum?

NO

- Repair #21 hose.  
- Replace MAP sensor.

YES

Connect vacuum pump to #21 hose and apply vacuum.

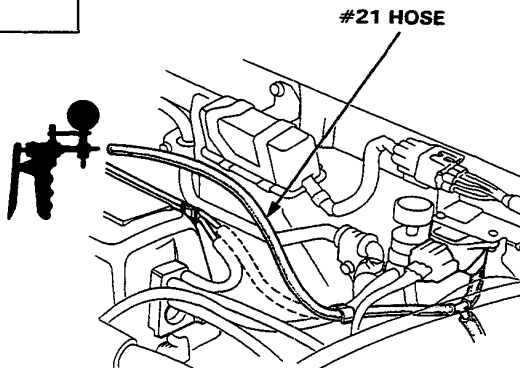
Does it hold vacuum?

NO

Replace #21 hose.

YES

(To page 6-151)





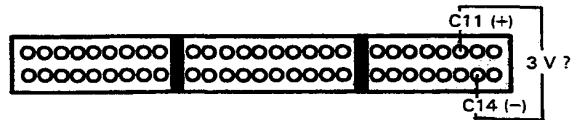
(From page 6-150)

Stop engine.

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Measure voltage between C11 (+) terminal and C14 (-) terminal.



Is there approx. 3 V ?

NO

Replace MAP sensor.

YES

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

# PGM-FI Control System

## Troubleshooting Flow Chart — TDC/CRANK Sensor



Self-diagnosis LED indicator blinks four times: A problem in the CRANK circuit of the TDC/CRANK Sensor.



Self-diagnosis LED indicator blinks eight times: A problem in the TDC circuit of the TDC/CRANK Sensor.



- PGM-FI warning light has been reported on.  
- LED indicates CODE 4.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is PGM-FI warning light on?  
Does LED indicate CODE 4?

NO

Intermittent failure  
(test drive may be necessary).

YES

Stop engine.

Disconnect the 4P connector from the TDC/CRANK sensor.

Measure resistance between C terminal and D terminal.

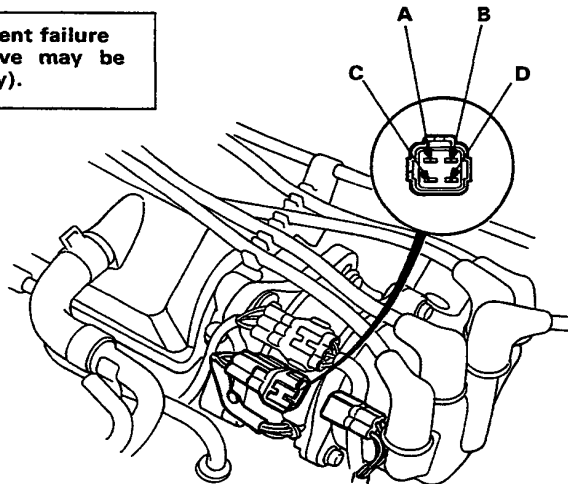
Is there 700-1,000  $\Omega$ ?

NO

Overhaul TDC/CRANK sensor (page 6-172).

YES

(To page 6-153)





(From page 6-152)

Check for continuity to body ground on C terminal and D terminal individually.

Does continuity exist ?

YES

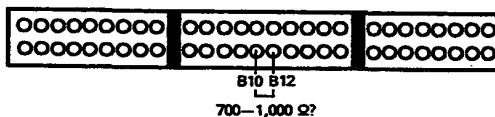
Overhaul TDC/CRANK sensor (page 6-172).

NO

Reconnect the connector.

Connect the system checker harness only to the wire harness, but not to the ECU (page 6-137).

Measure resistance between B10 terminal and B12 terminal.



Is there 700-1,000 Ω ?

NO

Repair open in BLU/YEL and/or BLU/GRN wires.

YES

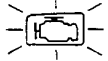
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

(cont'd)



# PGM-FI Control System

## Troubleshooting Flow Chart — TDC/CRANK sensor (cont'd)



-PGM-FI warning light has been reported on.  
-LED indicates CODE 8.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is PGM-FI warning light on?  
Does LED indicate CODE 8?

NO

Intermittent failure  
(test drive may be necessary).

YES

Stop engine.

Disconnect the 4P connector from the TDC/CRANK sensor.

Measure resistance between A terminal and B terminal.

Is there 700—1,000  $\Omega$ ?

NO

Overhaul TDC/CRANK sensor (page 6-172).

YES

Check for continuity to body ground on A terminal and B terminal individually.

Does continuity exist?

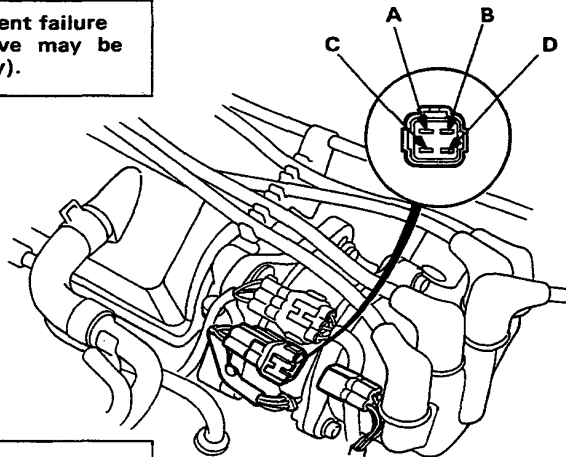
YES

Overhaul TDC/CRANK sensor (page 6-172).

NO

Reconnect the connector.

(To page 6-155)

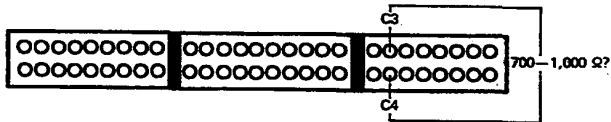




(From page 6-154)

Connect the system checker harness only to the wire harness but not to the ECU (page 6-137).

Measure resistance between C3 terminal and C4 terminal.



Is there 700 — 1,000  $\Omega$  ?

NO

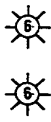
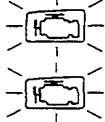
Repair open in ORN/BLU and/or WHT/BLU wires.

YES

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

# PGM-FI Control System

## Troubleshooting Flow Chart — TW Sensor



Self-diagnosis LED indicator blinks six times: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

-PGM-FI warning light is on.  
-LED indicates CODE 6.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is PGM-FI warning light on?  
Does LED indicate CODE 6?

NO

Intermittent failure.  
(test drive may be necessary).

YES

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

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

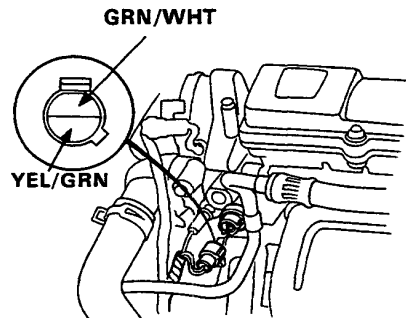
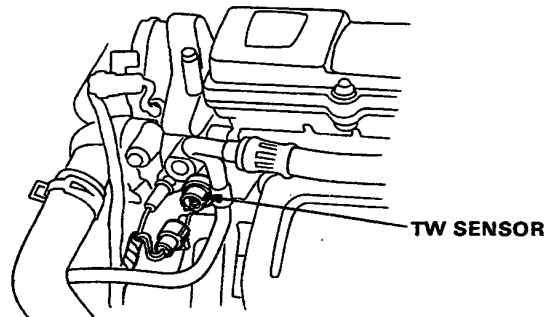
Is there 200—400  $\Omega$ ?

NO

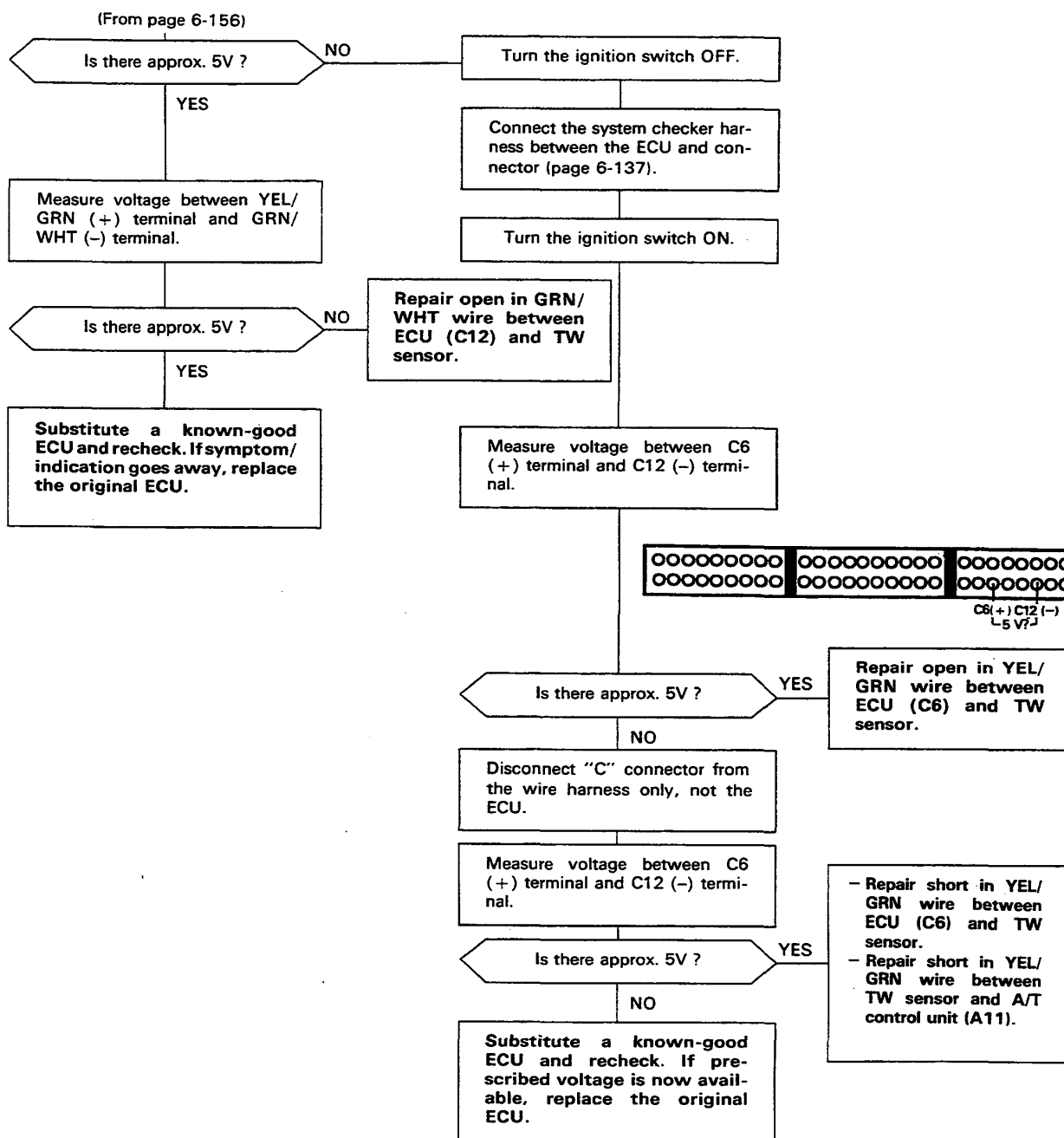
Replace TW sensor.

YES

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

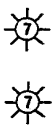
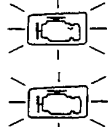


(To page 6-157)



# PGM-FI Control System

## Troubleshooting Flow Chart — Throttle Angle Sensor



Self-diagnosis LED indicator blinks seven times: Most likely a problem in the Throttle Angle Sensor circuit.

- Engine is running  
- PGM-FI warning light is on  
- LED indicates CODE 7

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is PGM-FI warning light on ?  
Does LED indicate CODE 7 ?

NO

Intermittent failure.  
(test drive may be necessary).

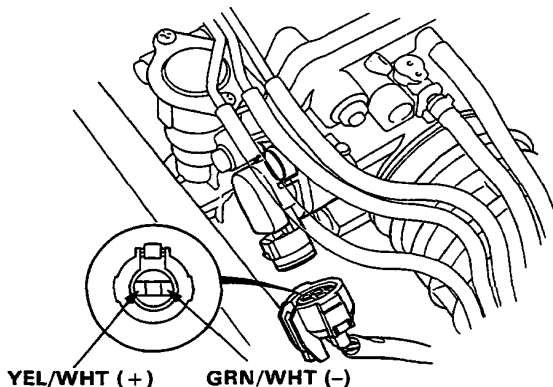
YES

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.



Is there approx. 5V ?

NO

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

YES

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the system checker harness between the ECU and connector (page 6-137).

(To page 6-159)

Is there approx. 5V ?

YES

Repair open in GRN/  
WHT wire between  
ECU (C12) and throttle  
angle sensor.

NO

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

(To page 6-159)



(From page 6-158)

Turn the ignition switch ON.

Measure voltage between C7(+) terminal and C12(-) terminal.

Is voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?

YES

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

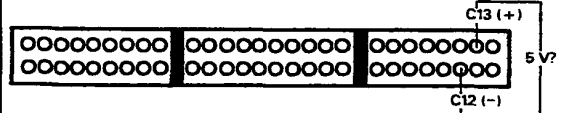
NO

- Replace throttle angle sensor.
- Repair open or short in RED/YEL wire between ECU (C7) and throttle angle sensor.
- Repair short in RED/YEL wire between throttle angle sensor and A/T control unit (A16).

(From page 6-158)

Turn the ignition switch ON.

Measure voltage between C13(+) terminal and C12(-) terminal.



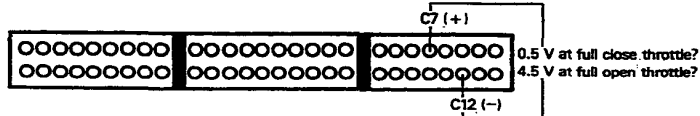
Is there approx. 5V?

YES

Repair open in YEL/WHT wire between ECU(C13) and throttle angle sensor.

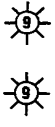
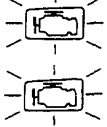
NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.



# PGM-FI Control System

## Troubleshooting Flow Chart — CYL Sensor



Self-diagnosis LED indicator blinks nine times: A problem in the CYL sensor.

- PGM-FI warning light has been reported on.
- LED indicates CODE 9.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is PGM-FI warning light on?  
Does LED indicate CODE 9?

NO

Intermittent failure  
(test drive may be necessary).

YES

Stop engine.

Disconnect the 2P connector from the CYL sensor.

Measure resistance between 2 terminals on the CYL sensor.

Is there 700—1,000  $\Omega$ ?

NO

Replace CYL sensor  
(page 6-173).

YES

Check for continuity to body ground on the 2 terminals individually.

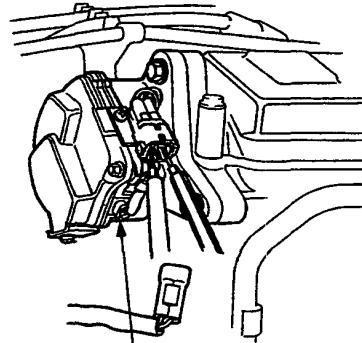
Does continuity exist?

YES

Replace CYL sensor  
(page 6-173).

NO

(To page 6-161)



CYL SENSOR



(From page 6-160)

Reconnect the connector.

Connect the system checker harness only to the wire harness, but not to the ECU (page 6-137).

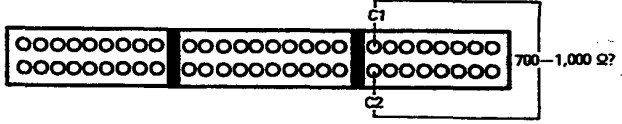
Measure resistance between C1 terminal and C2 terminal.

Is there 700 — 1,000  $\Omega$  ?

NO Repair open in ORN and/or WHT wires.

YES

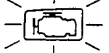
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.





# PGM-FI Control System

## Troubleshooting Flow Chart — TA Sensor



Self-diagnosis LED indicator blinks ten times: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.



- PGM-FI warning light is on.
- LED indicates CODE 10

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is PGM-FI warning light on?  
Does LED indicate CODE 10?

NO

Intermittent failure  
(test drive may be necessary).

YES

Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1-4 k $\Omega$ ?

NO

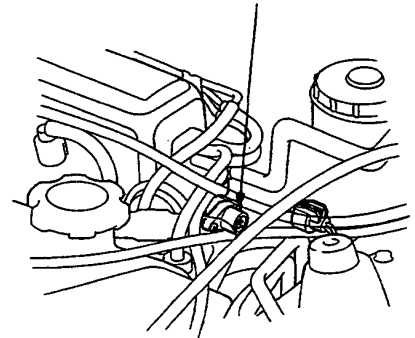
Replace TA sensor.

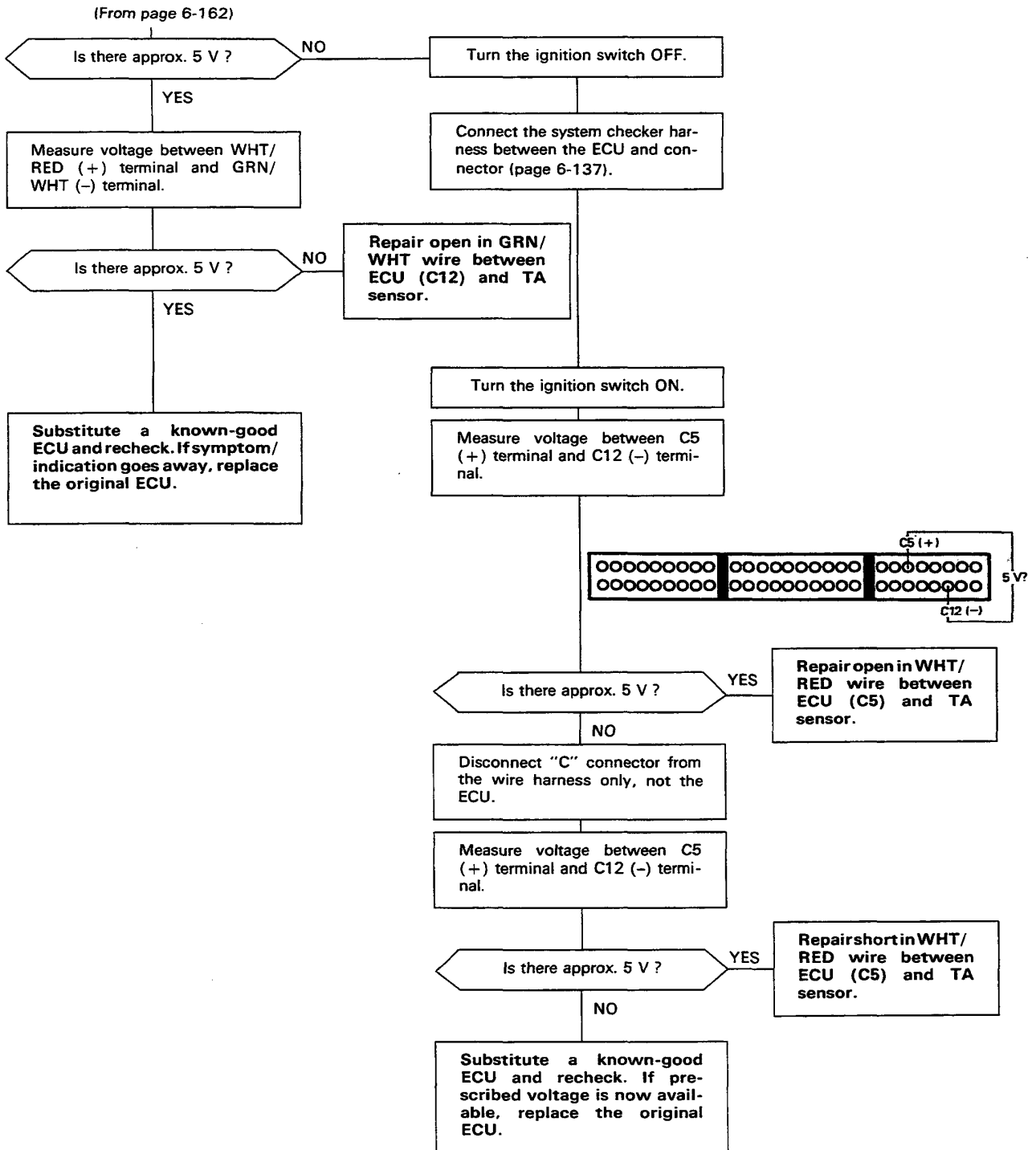
YES

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

(To page 6-163)

TA SENSOR





# PGM-FI Control System

## Troubleshooting Flow Chart — IMA Sensor



Self-diagnosis LED indicator blinks eleven times: Most likely a problem in the IMA Sensor circuit.

— PGM-FI warning light is on.  
— LED indicates CODE 11

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is PGM-FI warning light on?  
Does LED indicate CODE 11?

NO

Intermittent failure  
(test drive may be necessary).

YES

Turn the ignition switch OFF.

Disconnect the 4P connector from the IMA sensor.

Measure resistance between YEL/WHT terminal and GRN/WHT terminal on IMA sensor harness.

Is there 4–6 k $\Omega$ ?

NO

Replace IMA sensor.

YES

Measure resistance between YEL/WHT and BRN terminals and between GRN/WHT and BRN terminals.

Does the sum of the two resistance checks equal 4–6 k $\Omega$ ?

NO

Replace IMA sensor.

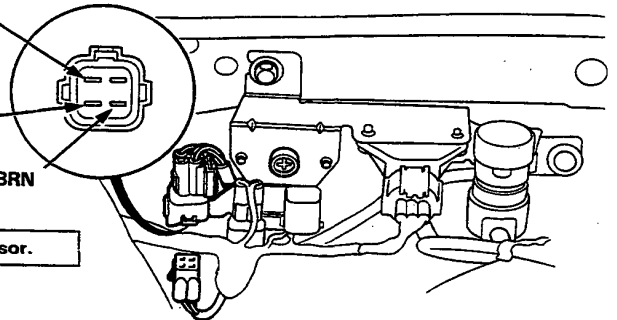
YES

(To page 6-165)

YEL/WHT

GRN/WHT

BRN





(From page 6-164)

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (-) terminal on the wire harness.

Is there approx. 5 V ?

YES

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Measure voltage between B20 (+) terminal and C12 (-) terminal.

Is voltage 0.5–4.5 V ?

YES

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

NO

Repair open or short in BRN wire between ECU (B20) and IMA sensor.

Is there approx. 5 V ?

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Repair open in YEL/WHT wire between ECU (C13) and IMA sensor.

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

Is there approx. 5 V ?

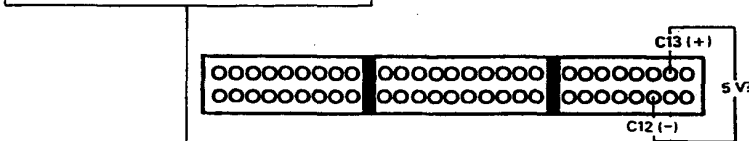
NO

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Measure voltage between B20 (+) terminal and C12 (-) terminal.



Is there approx. 5 V ?

YES

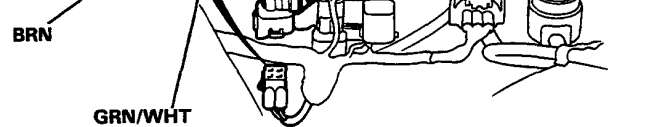
Repair open in YEL/WHT wire between ECU (C13) and IMA sensor.

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

Is there approx. 5 V ?

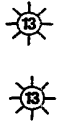
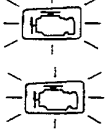
YES

Repair open in GRN/WHT wire between ECU (C12) and IMA sensor.



# PGM-FI Control System

## Troubleshooting Flow Chart — PA Sensor



Self-diagnosis LED indicator blinks thirteen times: A problem in the Atmospheric Pressure (PA) Sensor circuit.

- PGM-FI warning light is on.  
- LED indicates CODE 13.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is PGM-FI warning light on?  
Does LED indicate CODE 13?

NO  
Intermittent failure (test drive may be necessary).

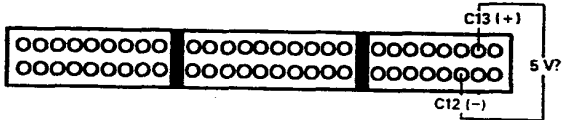
YES

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Measure voltage between C13 (+) terminal and C12 (-) terminal.

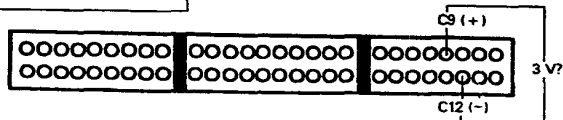


Is there approx. 5V?

NO  
Substitute a known-good ECU and re-check. If prescribed voltage is now available replace the original ECU.

YES

Measure voltage between C9 (+) terminal and C12 (-) terminal.



Is there approx. 3V?

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

NO

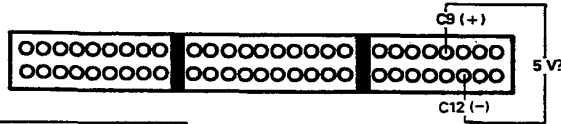
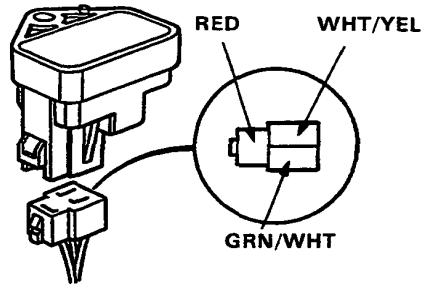
(To page 6-167)



(From page 6-166)

Disconnect the 3P connector from PA sensor.

Measure voltage between C9 (+) terminal and C12 (-) terminal.



Is there approx. 5V ?

NO

Repair short in RED wire between ECU (C9) and PA sensor.

YES

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

Is there approx. 5V ?

NO

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

Is there approx. 5V ?

NO

Repair open in WHT/YEL wire between ECU (C13) and PA sensor.

YES

YES

Repair open in GRN/WHT wire between ECU (C12) and the sensor.

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

Is there approx. 5V ?

NO

Repair open in RED wire between ECU (C9) and PA sensor.

YES

Replace PA sensor.

# PGM-FI Control System

## Troubleshooting Flow Chart — Ignition Output Signal



Self-diagnosis LED indicator blinks fifteen times: A problem in the Ignition Output Signal circuit.

- PGM-FI warning light is on.  
- LED indicates CODE 15.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is PGM-FI warning light on?  
Does LED indicate CODE 15?

NO

Intermittent failure  
(test drive may be necessary).

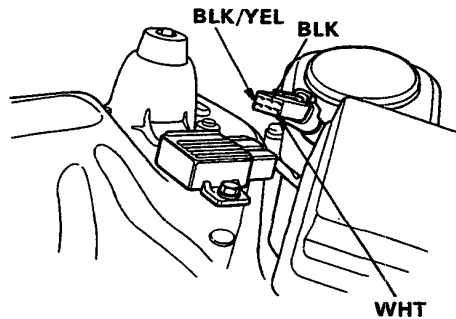
YES

Turn the ignition switch OFF.

Disconnect the 6P connector on the igniter unit.

Turn the ignition switch ON.

Measure voltage between the BLU (+) terminal and BLK (-) terminal.



Is there battery voltage?

NO

Measure voltage between the BLU (+) terminal and body ground.

YES

Measure voltage between the BLK/YEL (+) terminal and BLK (-) terminal on the 6P connector.

Is there battery voltage?

NO

Repair open in BLU wire.

YES

Repair open in BLK wire between the igniter unit and G203 (L.H. Drive) or G202 (R.H. Drive).

Is there battery voltage?

NO

Repair open in the BLK/YEL wire between the igniter unit and ignition switch.

YES

Turn the ignition switch OFF.

(To page 6-169)



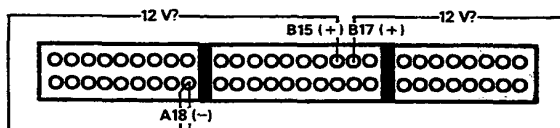
(From page 6-168)

Connect the system checker harness between the ECU and connector (page 6-137).

Reconnect the 6P connector on the igniter unit.

Turn the ignition switch ON.

Measure voltage individually between B15(+), B17(+) terminals and A18(-) terminal.



Is there battery voltage ?

NO

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

YES

Disconnect the 6P connector on the igniter unit and the system checker harness only to the ECU.

Check for continuity of WHT wire between the ECU and the igniter unit.

Does continuity exist ?

NO

Repair open in WHT wire.

YES

Check for continuity to body ground on WHT wire on the 6P connector.

Does continuity exist ?

NO

Replace the igniter unit.

YES

Repair short in the WHT wire. And then replace the igniter unit (Igniter unit may be broken in this case).



# PGM-FI Control System

## Troubleshooting Flow Chart — Vehicle Speed Sensor



Self-diagnosis LED indicator blinks seventeen times: A problem in the Vehicle Speed Sensor circuit.

- PGM-FI warning light is on.  
- LED indicates CODE 17.

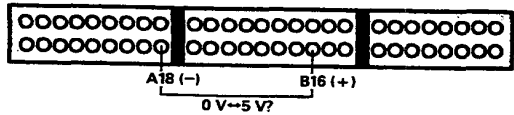
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

**WARNING** Block rear wheels before jacking up front of car.

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between B16 (+) terminal and A18 (-) terminal.



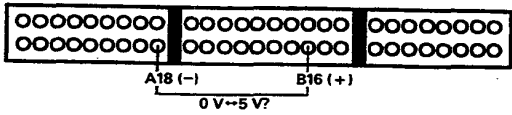
Does voltage pulse 0V and 5V? **NO**

Turn the ignition switch OFF.

Disconnect the connectors from the ECU only, not the wire harness.

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between B16 (+) terminal and A18 (-) terminal.

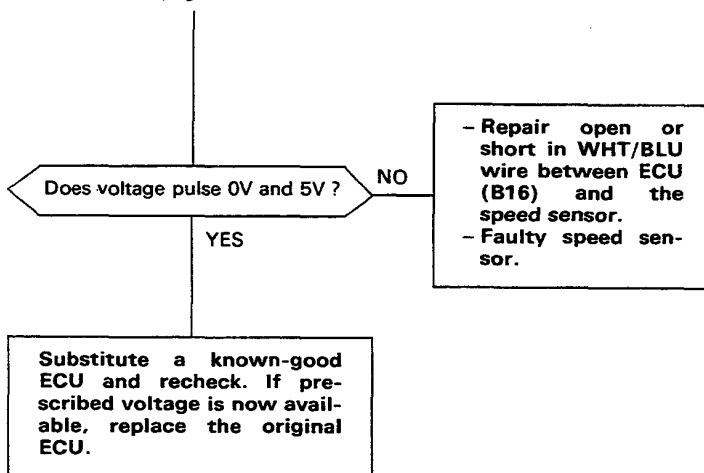


**YES**  
Substitute a known-good ECU and recheck. If prescribed voltage is now available replace the original ECU.

(To page 6-171)



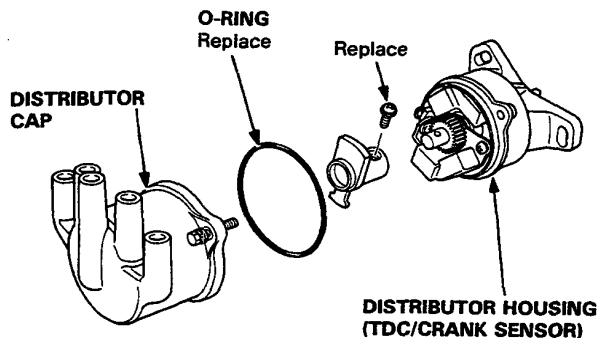
(From page 6-170).



# PGM-FI Control System

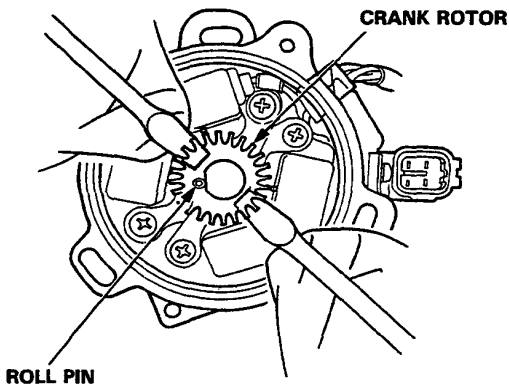
## TDC/CRANK Sensor Replacement

1. Remove the distributor (section 16).
2. Remove the distributor cap from the distributor housing (TDC/CRANK sensor).

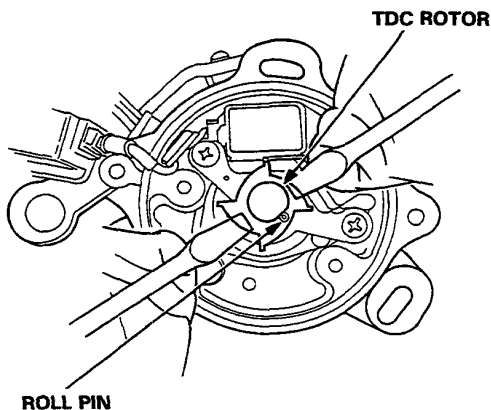


3. Carefully pry up the TDC and CRANK rotors by using two screwdrivers as shown. Do not damage the rotors.

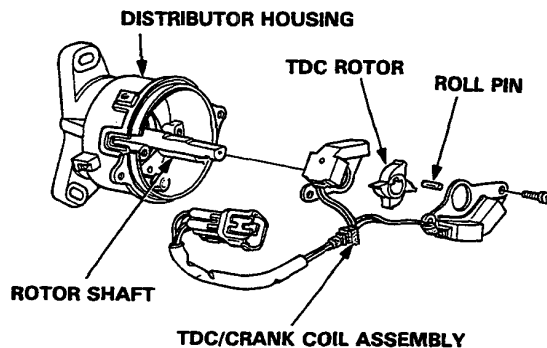
### <CRANK ROTOR>



### <TDC ROTOR>

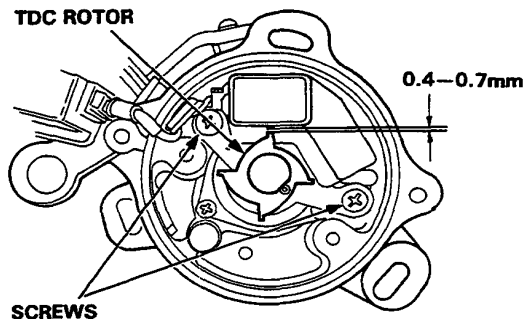


4. Remove the TDC/CRANK coil assembly.

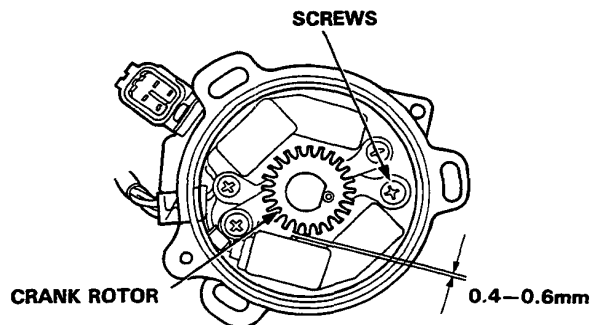


5. Install a new TDC/CRANK coil assembly on the distributor housing.
6. Install the TDC and CRANK rotors as shown.

### <TDC ROTOR>



### <CRANK ROTOR>



NOTE: Install the rotors with their part numbers facing up.

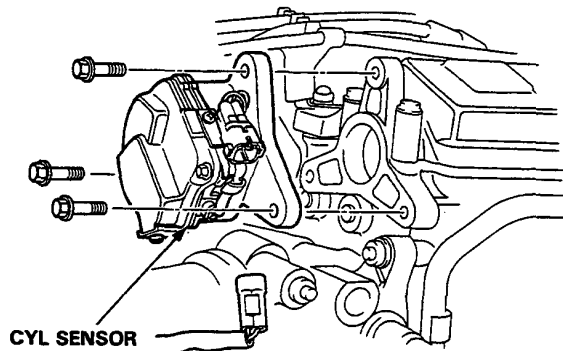
7. Install the distributor cap to the distributor housing.
8. Install the distributor (section 16).



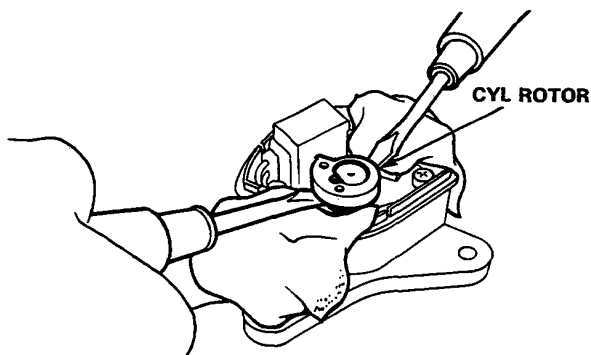
## CYL Sensor Overhaul

### Disassembly:

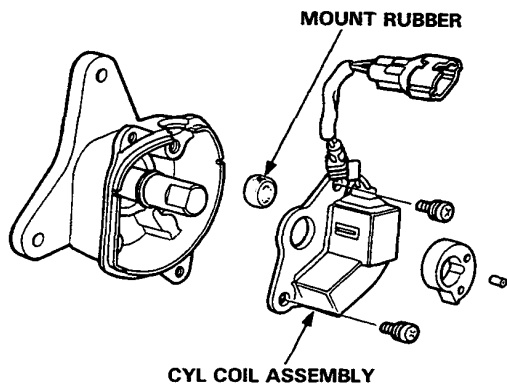
1. Remove the CYL sensor from the engine.



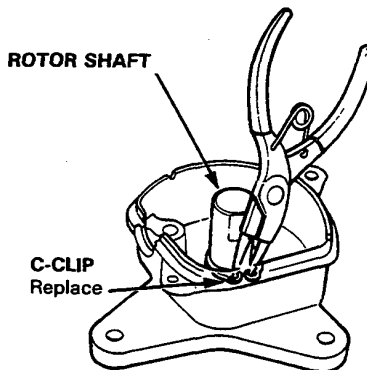
2. Carefully pry up the CYL rotor by using two screwdrivers as shown. Do not damage the CYL rotor.



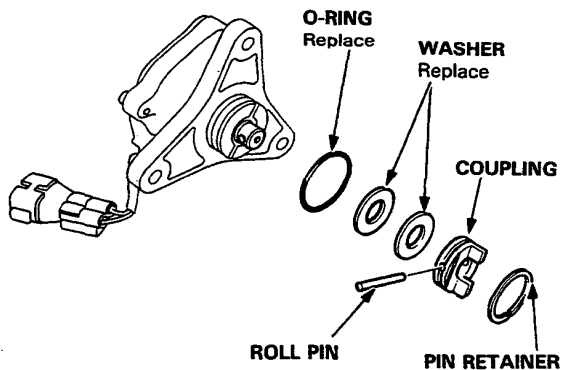
3. Pull the CYL coil assembly and mount rubber out from the sensor housing by removing the screws.



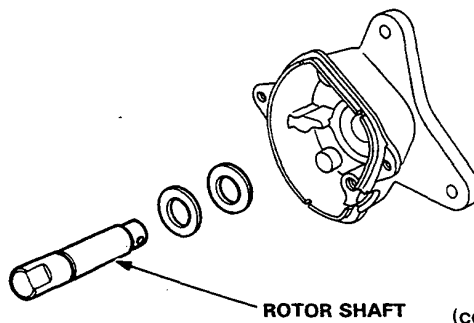
6. Remove the C-clip.



7. Slide off the pin retainer being careful not to stretch it.
8. Separate the coupling from the shaft by removing the roll pin as shown.



9. Remove the rotor shaft.



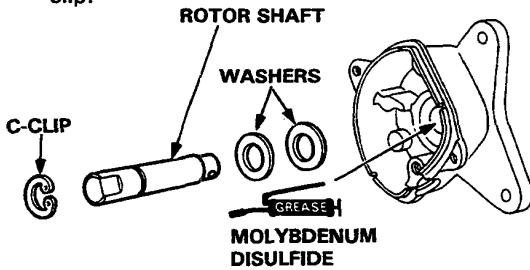
(cont'd)

# PGM-FI Control System

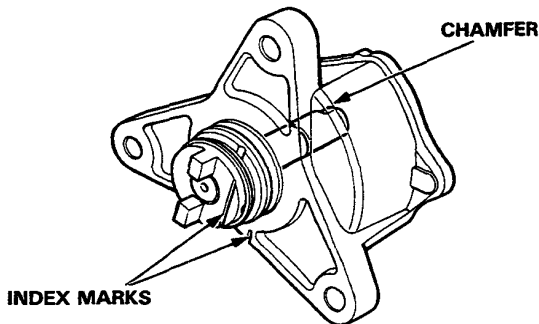
## CYL Sensor Overhaul (cont'd)

### Reassembly:

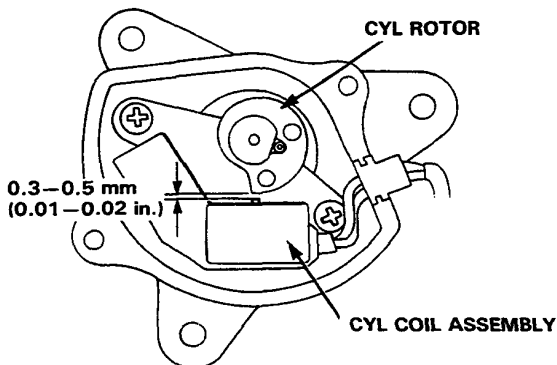
1. Apply molybdenum disulfide grease to the sensor housing, install the washers on the rotor shaft, then install it in the sensor housing. Install a new C-clip.



2. Install the coupling with its index mark facing in the direction shown, install the pin, and install the pin retainer.

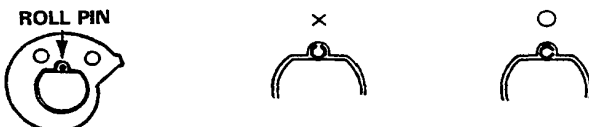


3. Install the mount rubber, then install the CYL coil assembly and the CYL rotor. Adjust the air gap to 0.3–0.5 mm (0.01–0.02 in.).



### NOTE:

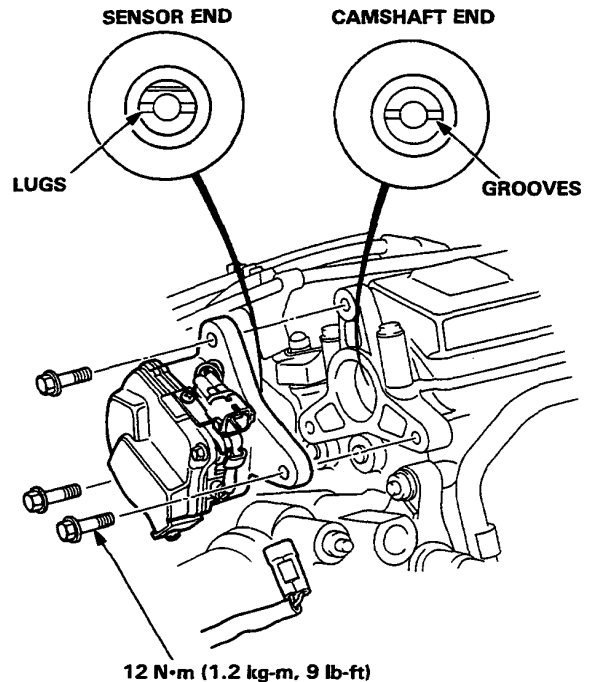
- Install the rotor with the part number facing up.
- Install the roll pin so that it faces as shown below.



### Installation:

1. Install a new O-ring on the sensor housing.
2. Slip the sensor into the position.

NOTE: The lugs on the end of the sensor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the sensor 180° out of time.



12 N·m (1.2 kg-m, 9 lb-ft)

# Idle Control System

## Symptom-to-Sub System Chart



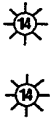
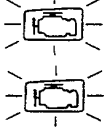
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection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

PAGE		SUB SYSTEM	IDLE ADJUSTING SCREW	ELECTRONIC AIR CONTROL VALVE	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL	P/S OIL PRESSURE SIGNAL	FAST IDLE VALVE	HOSES AND CONNECTIONS
SYMPTOM			186	176	180	182	184	179	187	*
DIFFICULT TO START ENGINE WHEN COLD									①	
WHEN COLD	Fast idle speed is not as specified (1,100—1,900 min <sup>-1</sup> , rpm)			②					①	
WHEN WARM ENGINE SPEED TOO HIGH	Idle speed is above specified rpm	②	②						②	①
WHEN WARM ENGINE SPEED TOO LOW	Idle speed is below specified rpm	②	①							②
	Idle speed does not increase after initial start up.		①							
	Idle speed drops when blipping throttle with electrical load		②		①					
	On models with automatic transmission, the idle speed drops in gear		②				①			
	Idle speed drops when steering wheel is turning		②					①		
	Idle speed drops when air conditioner is ON.		②	①						
FREQUENT STALLING WHILE WARMING UP									①	

- \* — If bypass passages are blocked, a low idle speed will result.
- If hoses or bypass passages are leaking, a high idle speed will result.

# Idle Control System

## Troubleshooting Flow Chart — EACV



Self-diagnosis LED indicator blinks fourteen times: A problem in the Electronic Air Control Valve (EACV) circuit.

- Engine is running.  
- PGM-FI warning light is on.  
- LED indicates CODE 14.

Turn the ignition switch OFF.

Remove CLOCK fuse in the under hood relay box for 10 seconds to reset ECU.

Start engine.

Is PGM-FI warning light on?  
Does LED indicate CODE 14?

NO

Intermittent failure  
(test driving may be necessary)

YES

Stop engine.

Disconnect the 2P connector from the EACV.

Measure resistance between the 2 terminals on the EACV.

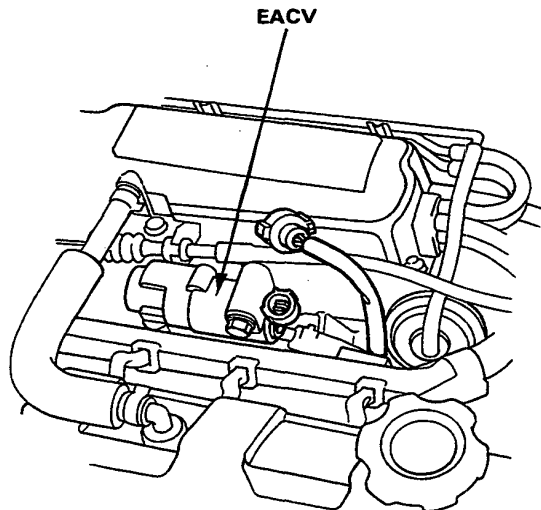
Is there 8—15Ω?

NO

Replace EACV.

YES

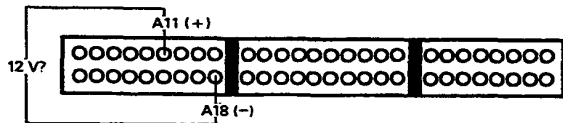
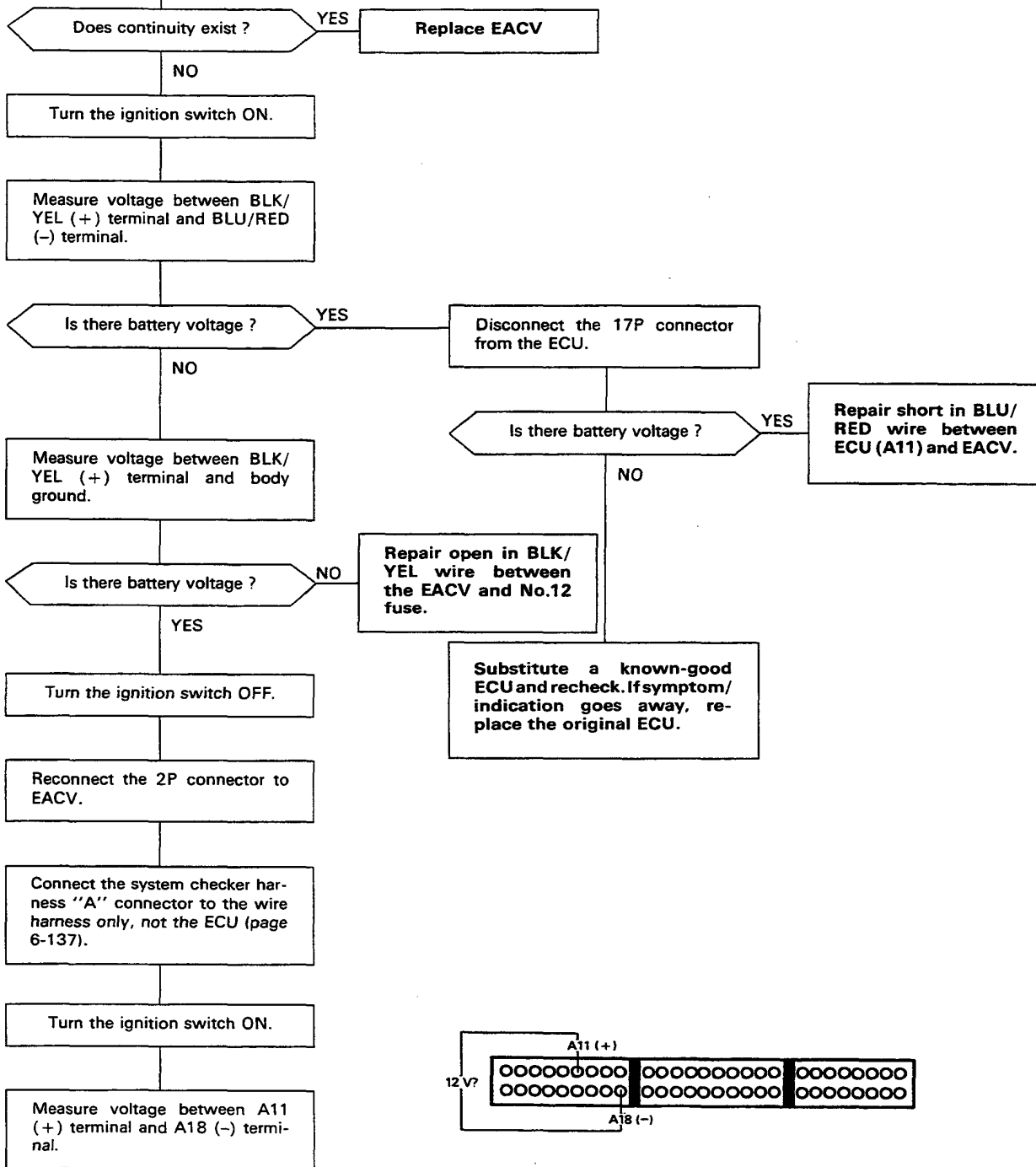
Check for continuity to body ground on each terminal on the EACV.



(To page 6-177)



(From page 6-176)



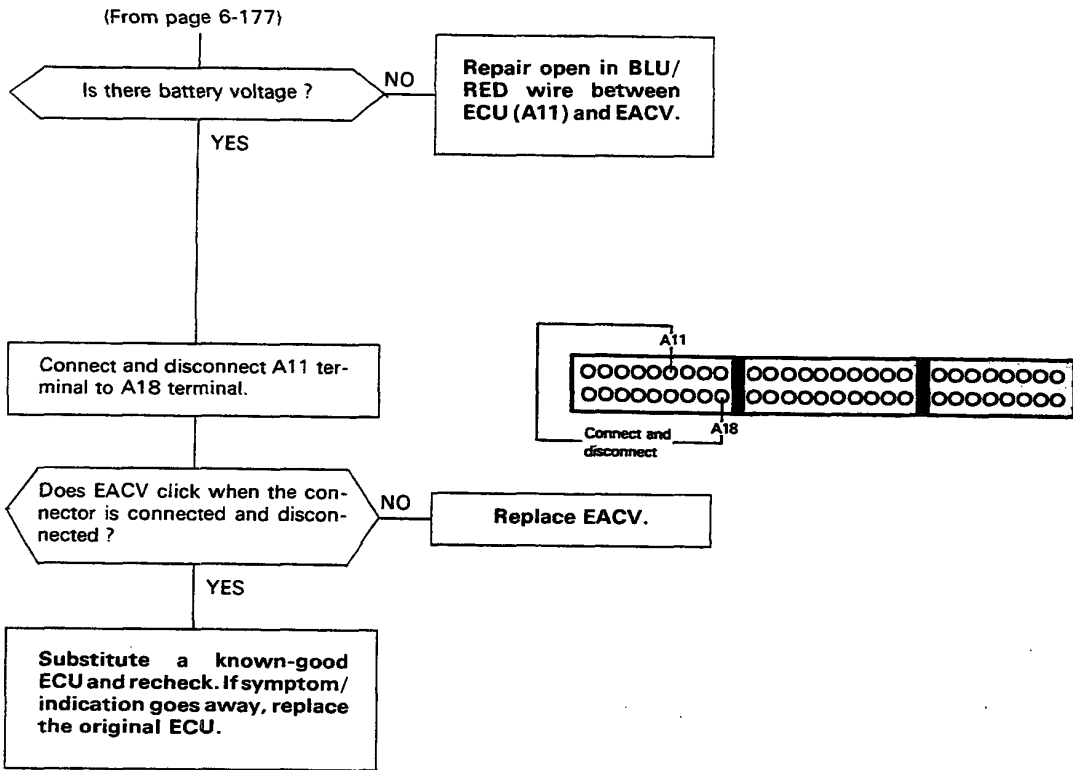
(To page 6-178)

(cont'd)



# Idle Control System

## Troubleshooting Flow Chart — EACV (cont'd)





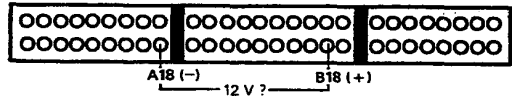
# Troubleshooting Flow Chart — P/S Oil Pressure Signal

**Inspection of P/S Oil Pressure Signal**

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.

Measure voltage between B18 (+) terminal and A18 (-) terminal.



Is there battery voltage ?

YES

Disconnect the 2P connector on the P/S oil pressure switch.

Connect BLU/RED terminal to BLK terminal.

Is there battery voltage ?

NO

Replace P/S oil pressure switch.

YES

Repair open in BLU/RED wire between ECU (B18) and P/S oil pressure switch or BLK wire between P/S oil pressure switch and G301.

NO

Start engine.

Turn steering wheel slowly.

Measure voltage between B18 (+) terminal and A18 (-) terminal while steering wheel is turning.

Is there battery voltage ?

NO

Disconnect "B" connector from the wire harness only, not the ECU.

Is there battery voltage ?

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Reconnect "B" connector to the wire harness and disconnect 2P connector on the P/S oil pressure switch.

YES

P/S oil pressure signal is OK.

Is there battery voltage ?

YES

Replace P/S oil pressure switch.

NO

Repair short in BLU/RED wire between ECU (B18) and the P/S oil pressure switch.

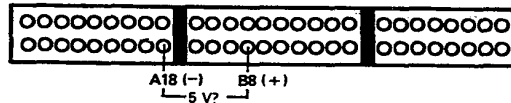
# Idle Control System

## Troubleshooting Flow Chart — Air Conditioning Signal

Inspection of Air Conditioning Signal.

Connect the system checker harness between the ECU and connector (page 6-137). But disconnect "B" connector from the wire harness only, not the ECU.

Turn the ignition switch ON.



Measure voltage between B8 (+) terminal and A18 (-) terminal.

Is there approx. 5 V ?

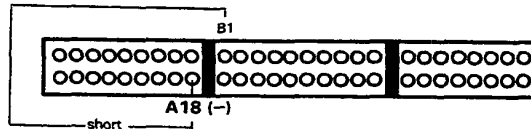
NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Reconnect "B" connector to the wire harness.

Connect B1 terminal to A18 terminal.

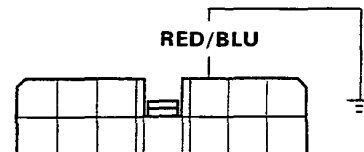


Does A/C operate ?

NO

Connect the RED/BLU terminal of the 13P connector on the compressor control unit to body ground.

YES



Does A/C operate ?

NO

See Air conditioner inspection (section 15).

YES

Repair open in RED/BLU wire between ECU (B1) and compressor control unit.

Start engine.

Blower switch ON.

(To page 6-181)



(From page 6-180)

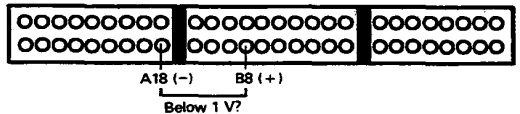
A/C switch ON.

Does A/C operate ?

NO  
See Air conditioner inspection (section 15).

YES

Measure voltage between B8 (+) terminal and A18 (-) terminal.



Is voltage below 1 V ?

NO  
Repair open in Red/GRN wire between ECU (B8) and A/C switch.

YES

Air conditioning signal is OK.

# Idle Control System

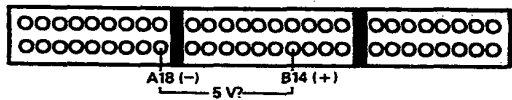
## Troubleshooting Flow Chart — Alternator FR Signal

Inspection of Alternator FR signal.

Connect the system checker harness between the ECU and connector (page 6-137). But disconnect "B" connector from the wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B14 (+) terminal and A18 (-) terminal.



Is there approx. 5V ?

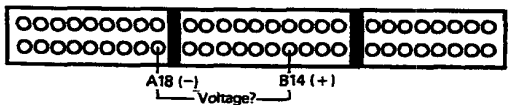
Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Turn the ignition switch OFF.

Reconnect "B" connector to the wire harness.

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

Measure voltage between B14 (+) terminal and A18 (-) terminal.



Does the voltage decrease when headlight and rear defogger are turned on ?

Stop engine.

Alternator FR signal is OK.

(To page 6-183)

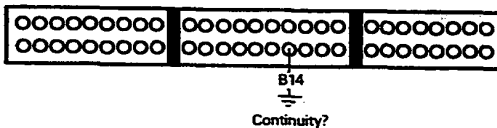


(From page 6-182)

Disconnect "B" connector from ECU only, not the wire harness.

Disconnect the negative battery cable from the battery.

Check for continuity between B14 terminal and body ground.



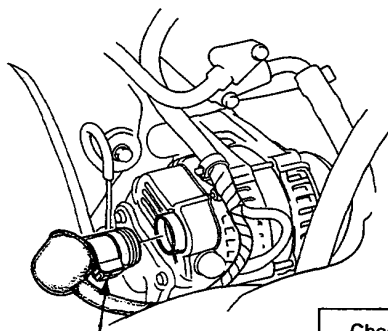
Does continuity exist ?

YES

Disconnect GRN connector from the alternator.

NO

Disconnect GRN connector from the alternator.



GRN CONNECTOR

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

NO

See Alternator Inspection (section 16).

YES

Repair short in WHT/RED wire between ECU (B14) and alternator.

Connect WHT/RED wire to body ground.

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

YES

See Alternator Inspection (section 16).

NO

Repair open in WHT/RED wire between ECU (B14) and alternator.

# Idle Control System

## Troubleshooting Flow Chart — A/T Shift Position Signal

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 (section 16).

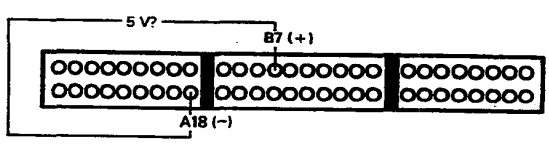
**YES**

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137). But disconnect "B" connector from the wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A18 (-) terminal.

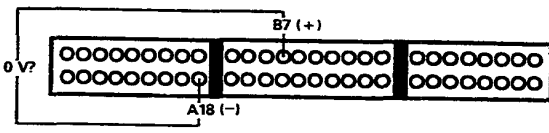


Is there approx. 5 V? **NO**

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

**YES**

Reconnect "B" connector to the wire harness.

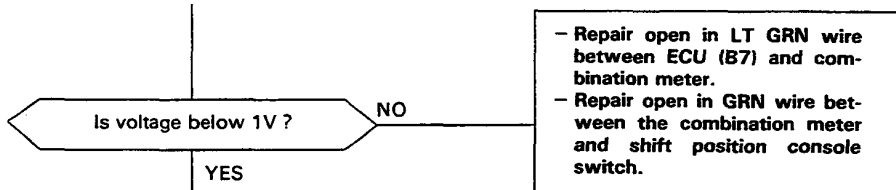


Measure voltage between B7 (+) terminal and A18 (-) terminal in Neutral position.

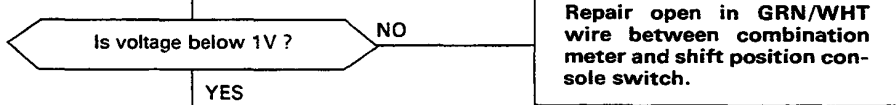
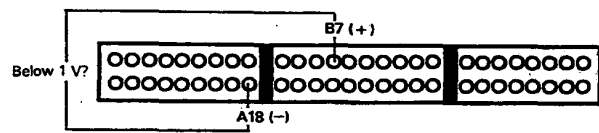
(To page 6-185)



(From page 6-184)



Measure voltage between B7 (+) terminal and A18 (-) terminal in Park position.



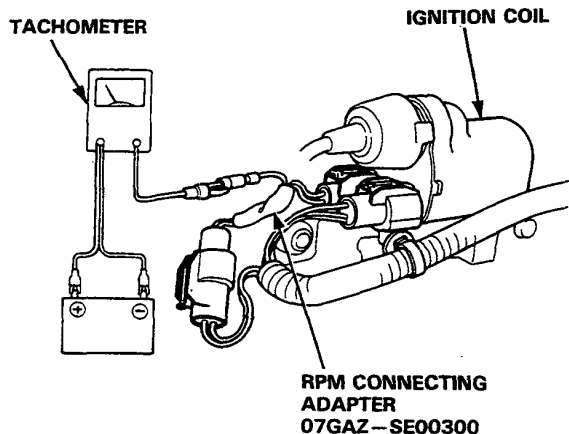
A/T shift position signal is OK.



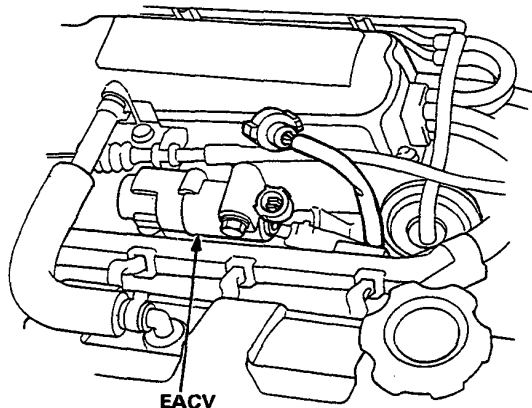
# Idle Speed

## Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.



3. Disconnect the 2P connector from the EACV.

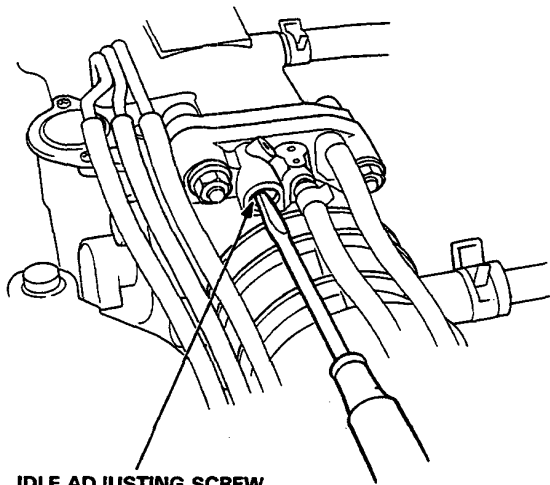


4. Set the steering in the straight forward position, and check idling in no-load conditions in which the headlights, blower fan, rear defroster, cooling fan, and air conditioner are not operating.

### Idle speed should be:

- **KX, KS, KZ, KQ**  
M/T  $650 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $650 \pm 50 \text{ min}^{-1} \text{ (rpm)}$  in **N** or **P**
- **Other models**  
M/T  $700 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $700 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

Adjust the idle speed, if necessary, by turning the adjusting screw on the top of the throttle body.



5. Reconnect the 2P connector on the EACV, then remove CLOCK (10 A) fuse in the underhood relay box for 10 second to reset ECU.
6. Set the steering in the straight forward position 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:

- **KX, KS, KZ, KQ**  
M/T  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$  in **N** or **P**
- **Other models**  
M/T  $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$   
A/T  $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

7. Idle the engine in the following conditions for one minute, then check the idle speed.

- With headlights (Hi) and rear window defogger ON.
- While the steering wheel is turning.
- If applicable, with Automatic transmission models when shifted in gear (except **N** or **P**)

### Idle should remain stable at:

- **KX, KS, KZ, KQ**  
 $750 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
- **Other models**  
 $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$



## Fast Idle Control

- Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

Idle should remain stable at:

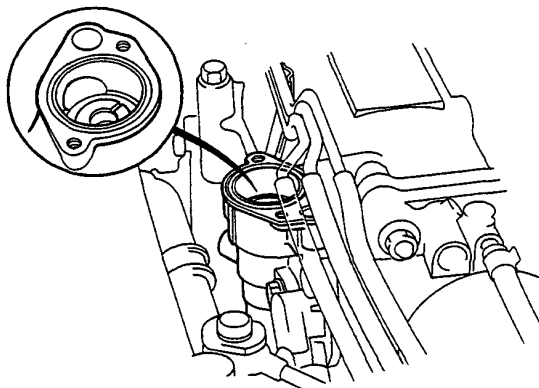
- **KX, KS, KZ, KQ**  
**750 ± 50 min<sup>-1</sup> (rpm)**
- **Other models**  
**800 ± 50 min<sup>-1</sup> (rpm)**

NOTE: If the idle speed is not within specifications, see Symptom-to-Sub System Chart on page 6-175.

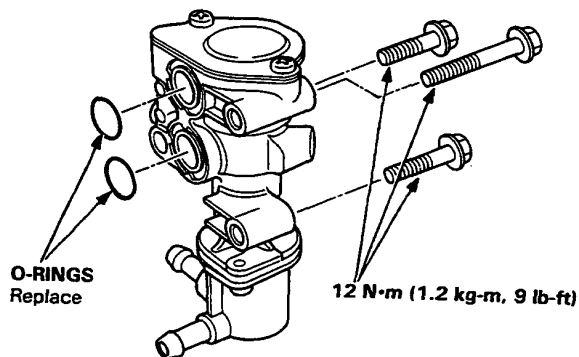
### Inspection

NOTE: The fast idle valve is factory adjusted; it should not be disassembled.

- Start the engine.
- Remove the cover of the fast idle valve.
- 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.



- Warm up the engine (cooling fan comes on).
- Check that the valve is completely closed. If not, an air suction sound can be heard in the valve seat area.
  - If any suction is heard, the valve is leaking. Replace the fast idle valve and recheck.

# Fuel Supply System

## Symptom-to-Sub System Chart

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	FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	FUEL TANK	CONTAMINATED FUEL
	SYMPTOM	190	192	192	193	194	195	197	*
	ENGINE WON'T START	⑤	③		④	①	②		
	FREQUENT STALLING				②	①			②
POOR PERFORM-ANS	MISFIRE	①	②						③
	LOSS OF POWER				①				②

\* Fuel with dirt, water or a high percentage of alcohol is considered contaminated.

# Fuel Pressure

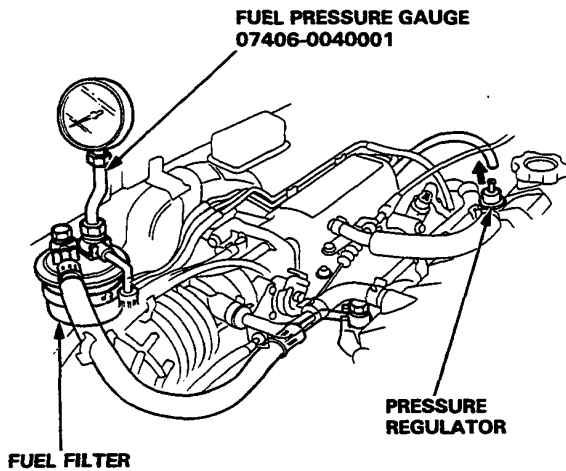


## Inspection

1. Relieve fuel pressure.
2. Remove the service bolt on the top of 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:**

**240–279 kPa (2.45–2.85 kg/cm<sup>2</sup>, 35–41 psi)**



- If the fuel pressure is not as specified, first check the fuel pump (page 6-194). 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 6-192).
- If the pressure is lower than specified, inspect for:
  - Clogged fuel filter
  - Pressure regulator failure (page 6-192).
  - Leakage in the fuel line.

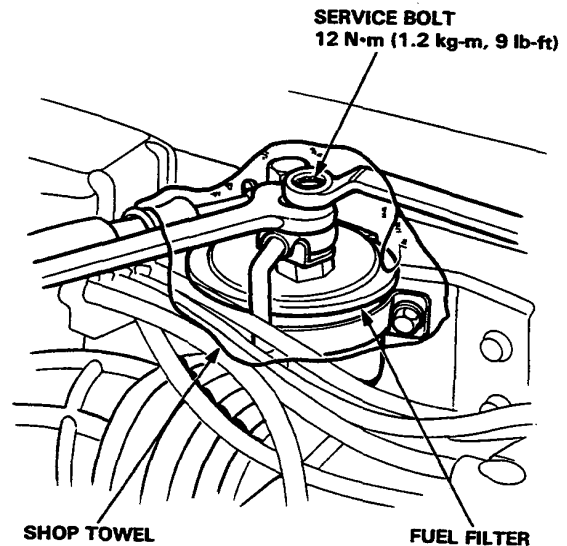
## Relieving

### 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. Use a box end wrench on the 6 mm service bolt at top of the fuel filter, while holding the special banjo bolt with another wrench.
3. Place a rag or shop towel over the 6 mm service bolt.
4. 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.

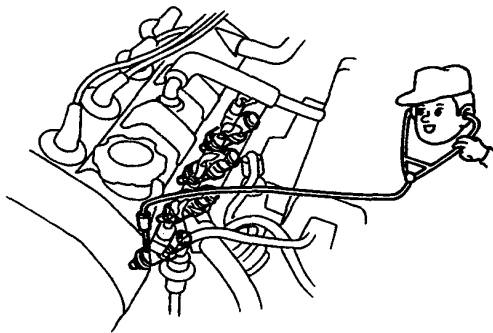
# Fuel Injectors

## Test

NOTE: Check the following items before testing idle speed, ignition timing and idle CO %

### If the engine will run:

1. With the engine idling, disconnect each injector connector individually and inspect the change in the idling speed.
  - If the idle speed drop is almost the same for each cylinder, the injectors are normal.
  - If the idle speed or quality remains the same when you disconnect a particular injector, replace the injector and re-test.
2. Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



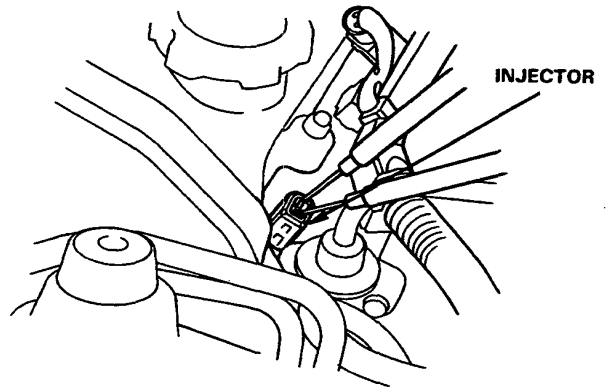
- If any injector fails to make the typical clicking sound, check the sound again after replacing the injector.
- If clicking sound is still absent, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the Yellow/Black wire between the main relay and the resistor.
  - Whether the resistor is open or corroded (page 6-192).
  - Whether there is any short-circuiting, wire breakage or poor connection in the Red/Black wire between the resistor and the injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

If all is OK, check the ECU (page 6-134).

### If the engine cannot be started:

1. Remove the connector of the injector, and measure the resistance between the 2 terminals of the injector.

Resistance should be: 1.5–2.5  $\Omega$



- If the resistance is not as specified, replace the injector.
- If the resistance is as specified, check the fuel pressure (page 6-60).
- If the fuel pressure is as specified, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the Yellow/Black wire between the main relay and the resistor.
  - Whether the resistor is open or corroded (page 6-192).
  - Whether there is any short-circuiting, wire breakage, or poor connection in the Red/Black wire between the resistor and the injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

If all is OK, check the ECU (page 6-134).



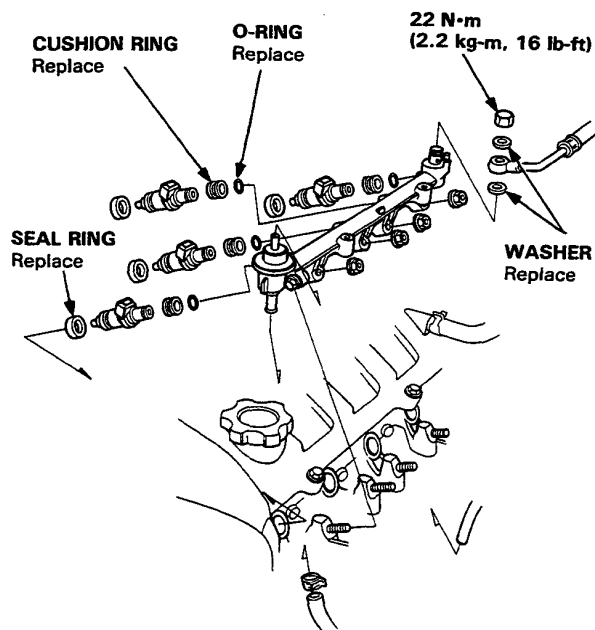
## Replacement

**WARNING** Do not smoke during the work. Keep open flames away from your work area.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Relieve fuel pressure (page 6-189).
3. Disconnect the connectors from the injectors.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

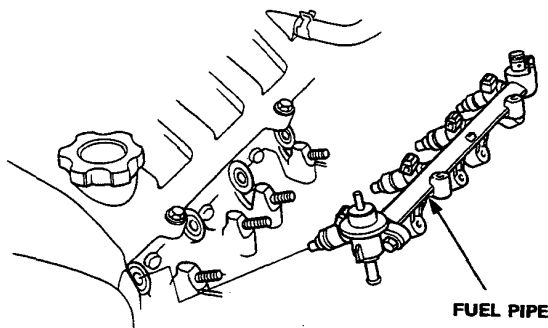
**NOTE:** Place a rag or shop towel over the hoses before disconnecting them.

5. Disconnect the fuel hose from the fuel pipe.
6. Remove the EACV from the intake manifold.
7. Loosen the retainer nuts on the fuel pipe and harness holder.
8. Disconnect the fuel pipe.
9. Remove the injectors from the intake manifold.

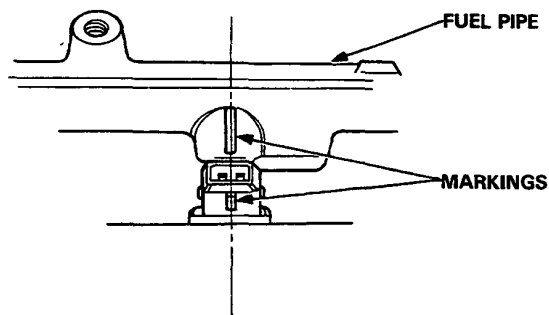


10. Slide new cushion rings onto the injectors.
11. Coat new O-rings with clean engine oil and put them on the injectors.
12. Insert the injectors into the fuel pipe first.
13. Coat new seal rings with clean engine oil and press them into the intake manifold.
14. Install the injectors and fuel pipe assembly 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.



15. Align the center line on the connector with the mark on the fuel pipe.



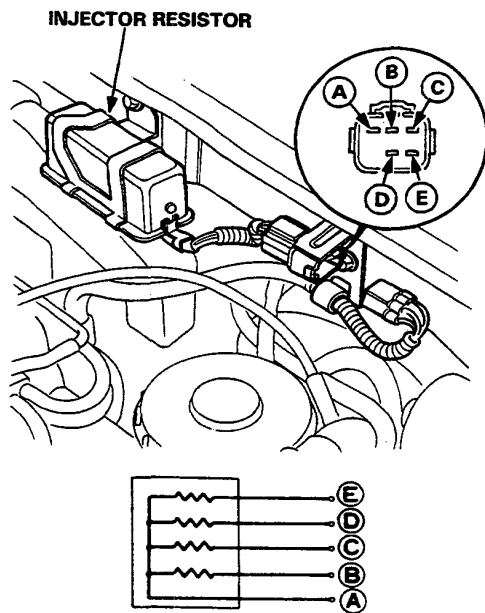
16. Install and tighten the retainer nuts.
17. Connect the vacuum hose and fuel return hose to the pressure regulator.
18. Install the connectors on the injectors.
19. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

# Injector Resistor

## Test

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (E, D, C and B) and the Power terminal (A).

Resistance should be: 5–7  $\Omega$



- Replace the resistor with a new one if any of the resistance are outside of the specification.

# Pressure Regulator

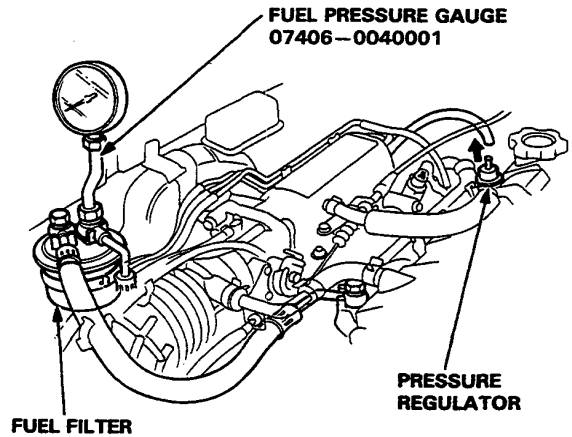
## Test

**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 6-189).

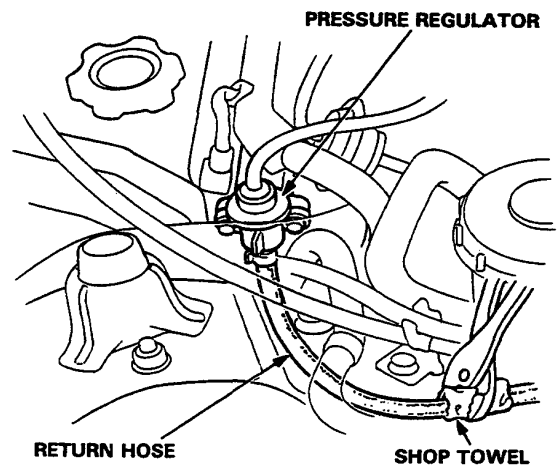
Pressure should be:

240–279 kPa (2.45–2.85 kg/cm<sup>2</sup>, 35–41 psi)  
(with the regulator vacuum hose disconnected)



2. Check that the fuel pressure rose when the vacuum hose from the regulator was disconnected.

- If the fuel pressure did not rise, check whether it rises when the return hose is lightly pinched.



- If the pressure does not rise, replace the regulator and retest.

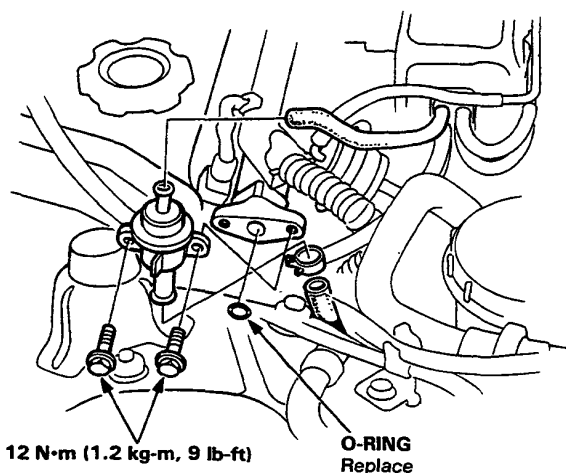


# Fuel Filter

## Replacement

**WARNING** Do not smoke while working on fuel system. Keep open flame away from work area.

1. Disconnect the negative terminal of the battery.
2. Place a shop towel under the pressure regulator, then relieve fuel pressure (page 6-189).
3. Disconnect the vacuum hose and fuel return hose.
4. Remove the two 6 mm retainer bolts.



### NOTE:

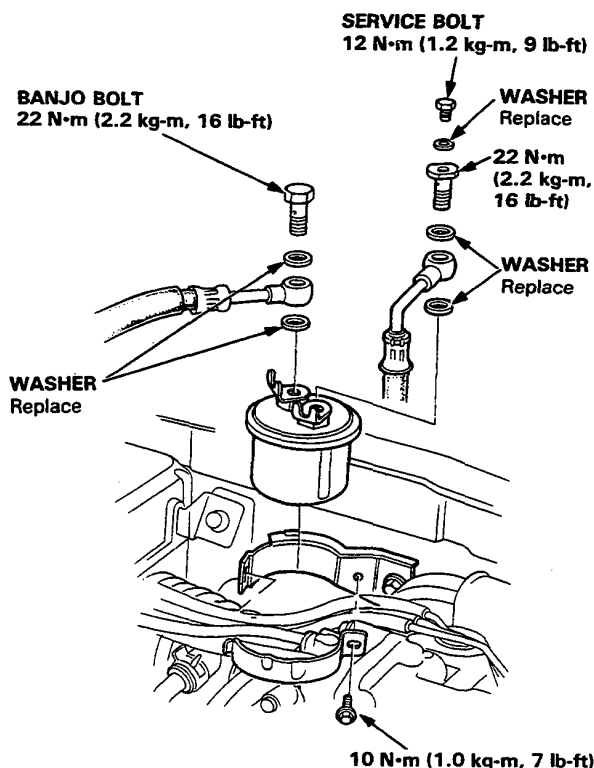
- Replace the O-ring.
- When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

## Replacement

**WARNING** Do not smoke while working on fuel system. Keep open flame away from work area.

The filter should be replaced: every 2 years or 24,000 miles (40,000 km), whichever comes first or whenever the fuel pressure drops below the specified value (240–279 kpa, 2.45–2.85 kg/cm<sup>2</sup>, 35–41 psi with the vacuum pressure hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Disconnect the battery cable from the negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (page 6-189).
4. Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.
5. Remove the fuel filter clamp and fuel filter.
6. When assembling, use new washers, as shown.



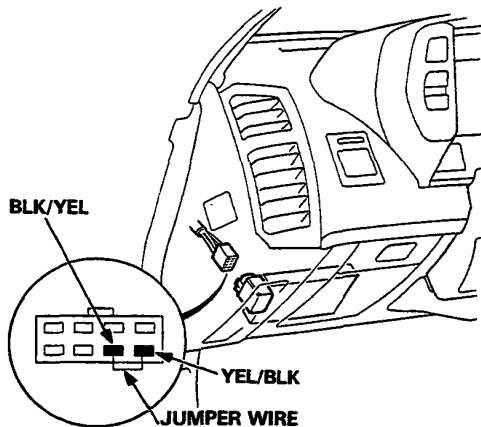


# Fuel Pump

## Test

**WARNING** Do not smoke during the test. Keep open flame away from your work area.

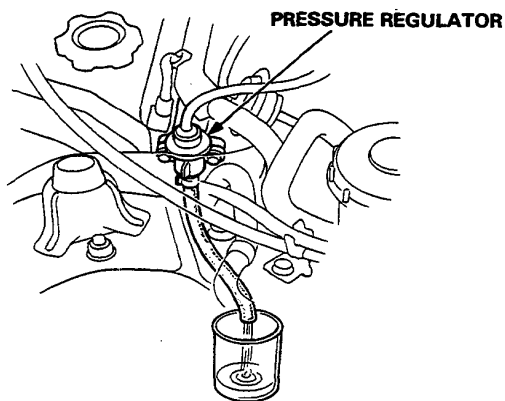
1. With the ignition switch OFF, disconnect the connector from the main relay.
2. Connect the BLK/YEL wire and YEL/BLK wire with a jumper wire.



3. Relieve fuel pressure as described on page 6-189 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:

230 cm<sup>3</sup> (7.8 oz) min. in 10 seconds at 12 V



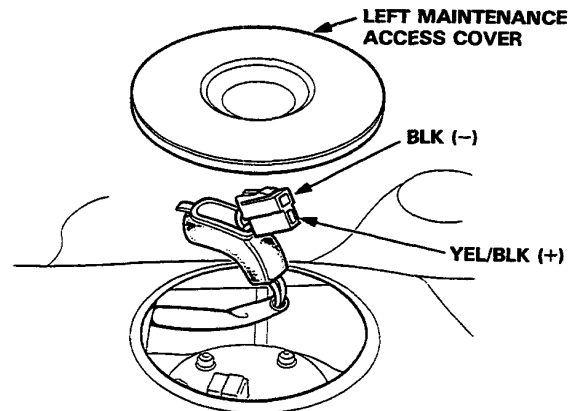
- If fuel flow is less than 230 cm<sup>3</sup> (7.8 oz), or there is no fuel flow, check for:
  - Clogged fuel filter.
  - Clogged fuel line.
  - Pressure regulator failure (page 6-192).

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel filler port with the fuel filler cap removed. If the pump does not make noise, check as follows:

1. Remove the left maintenance access cover in the luggage area.
2. Disconnect the connector.

**CAUTION:** Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (Positive probe to the YEL/BLK wire, negative probe to the BLK wire).



- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness (page 6-195).

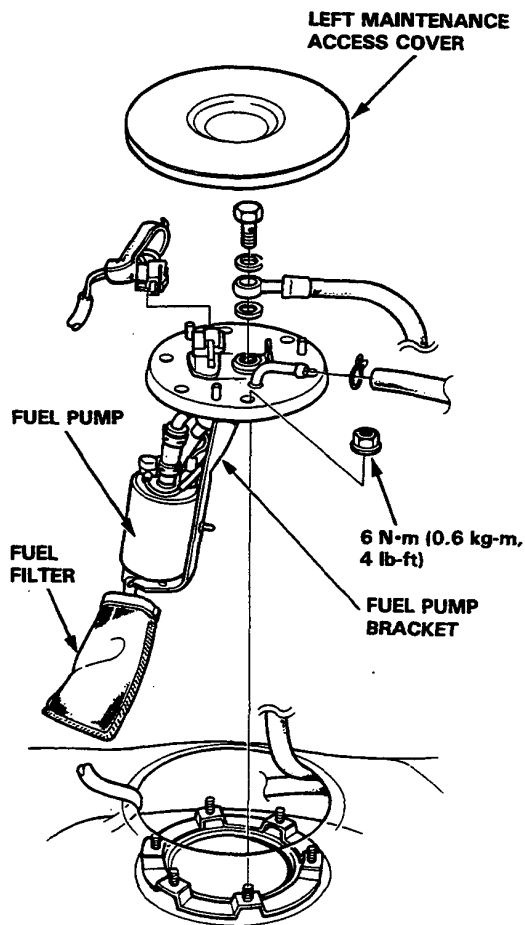


# Main Relay

## Replacement

**WARNING** Do not smoke while working on fuel system. Keep open flames away from your work area.

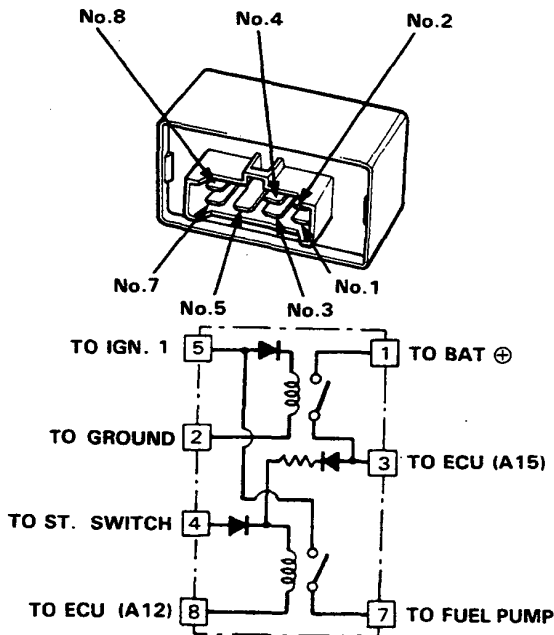
1. Relieve fuel pressure (page 6-189).
2. Remove the left maintenance access cover in the luggage area.
3. Disconnect the fuel lines and connector.
4. Remove the fuel pump mounting nuts.
5. Remove the fuel pump from the fuel tank.



## Test

1. Remove the main relay, near the under-dash fuse box.
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, replace the relay and retest.



3. Attach the battery positive terminal to the No. 5 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.

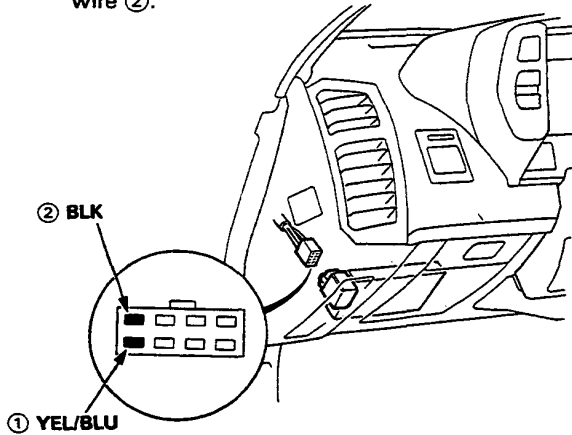
4. Attach the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.

- If there is continuity, the relay is OK; If the fuel pump still does not work, go to Harness Test in the next column.
- If there is no continuity, replace the relay and retest.

# Main Relay

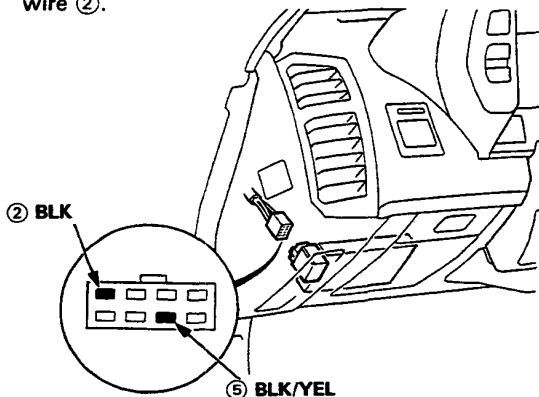
## Harness Test

1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay connector.
3. Check for continuity between the BLK wire ② in the connector and body ground.
4. Attach the positive probe of voltmeter to the YEL/BLU wire ① and the negative probe to the BLK wire ②.



Battery voltage should be available.

- If there is no voltage, check the wiring between the battery and the main relay as well as EFI ECU fuse (10A) in the under-hood relay box.
5. Attach the positive probe of voltmeter to the BLK/YEL wire ⑤ and the negative probe to the BLK wire ②.

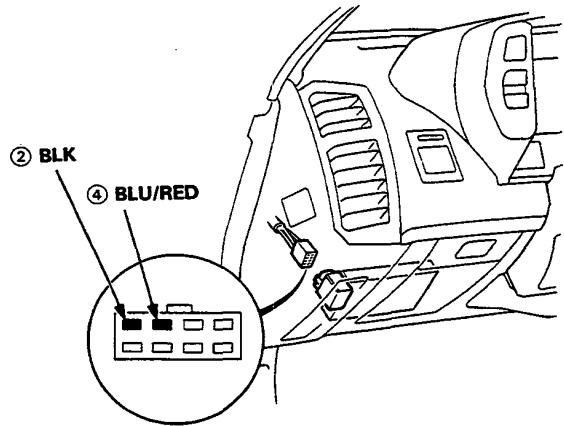


6. Turn the ignition switch ON.

Battery voltage should be available.

- If there is no voltage, check the wiring from the ignition switch and the main relay as well as No. 12 (10A) fuse.

7. Attach the positive probe of voltmeter to the BLU/RED wire ④ and the negative probe to the BLK wire ②.

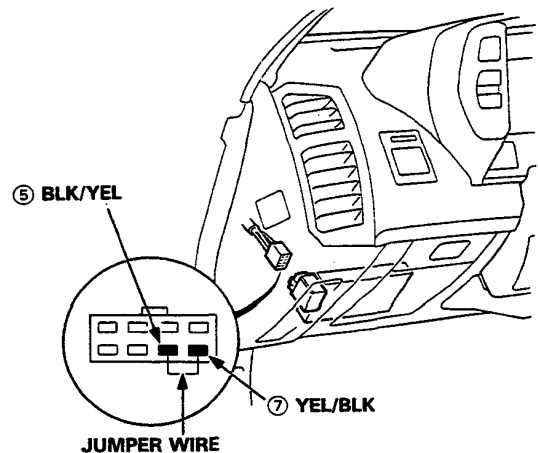


8. Turn the ignition switch to START position.

Battery voltage should be available.

- If there is no voltage, check the wiring between the ignition switch and main relay as well as No. 1 (7.5A) fuse.

9. Connect a jumper wire between the BLK/YEL wire ⑤ and YEL/BLK wire ⑦.



10. Turn the ignition switch ON.

The fuel pump should work.

- If the fuel pump does not work, check the wiring between the main relay and fuel pump, and the wiring from the fuel pump to the ground (BLK wire).

# Fuel Tank



## Replacement



**WARNING** Do not smoke while working on fuel system. Keep open flame away from work area.

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove both maintenance access covers in the luggage area.
4. Disconnect the connectors from the fuel gauge sending unit and the fuel pump, then remove the fuel feed line.
5. Disconnect the hoses.

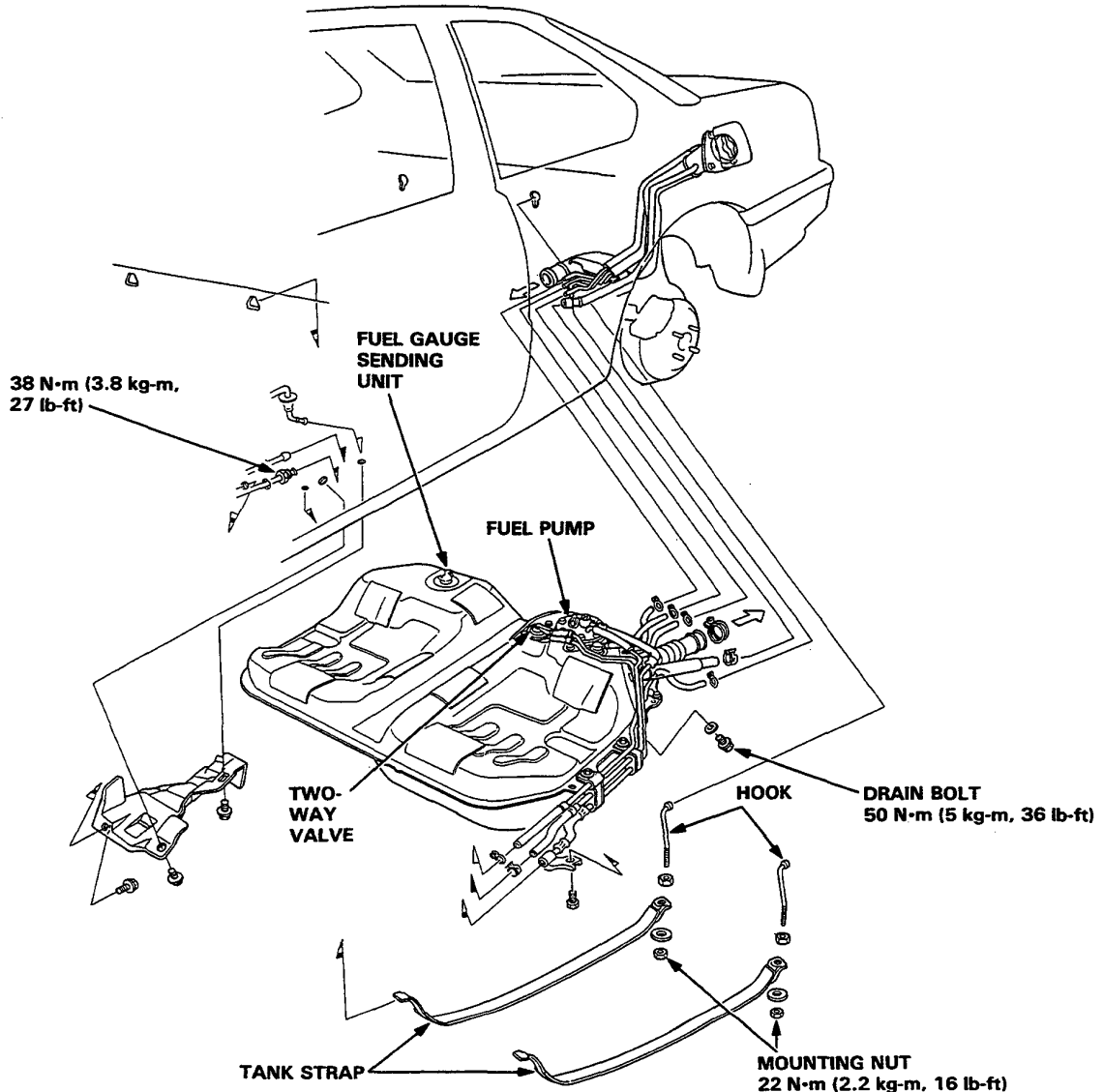
### CAUTION:

- When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.
- Clean the flared joint of high pressure hoses thoroughly before reconnecting them.

6. Place a jack, or other support, under the tank.
7. Remove the strap nuts and let the straps fall free.
8. Remove the fuel tank.

**NOTE:** The tank may have stuck on the undercoat applied to its mount. To remove, carefully pry it off the mount.

9. Install a new washer on the drain bolt, then install parts in the reverse order of removal.



# Air Intake System

## Symptom-to-Sub System Chart

---

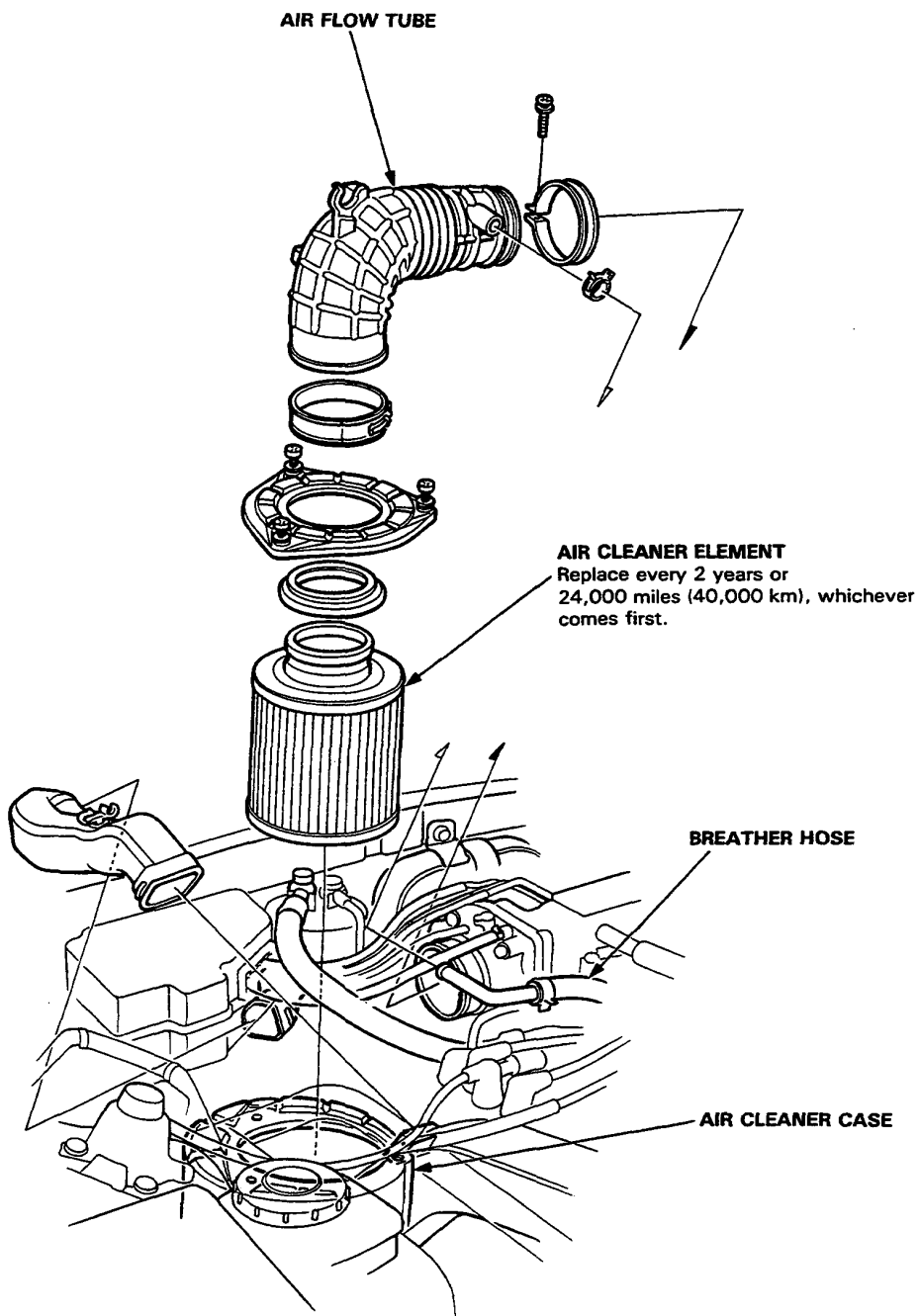
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection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

PAGE		SUB SYSTEM	THROTTLE CABLE	THROTTLE BODY	BYPASS CONTROL SYSTEM
SYMPTOM			200	201	203
IRREGULAR IDLING	WHEN WARM IDLE SPEED OUT OF SPECIFIED		②	①	
FREQUENT STALLING WHILE WARMING UP			①		
POOR PERFORMANCE	LOSS OF POWER		②	②	①

# Air Cleaner



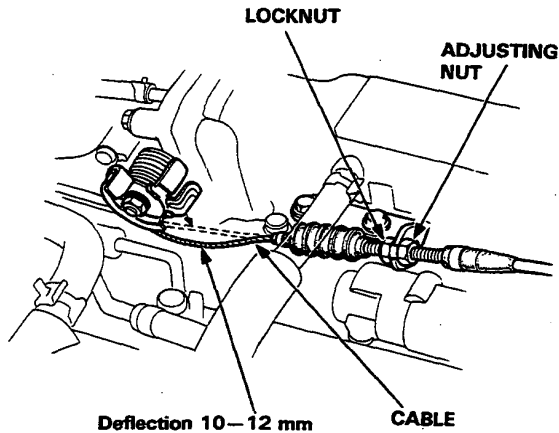
## Air Cleaner Element Replacement



# Throttle Cable

## Inspection/Adjustment

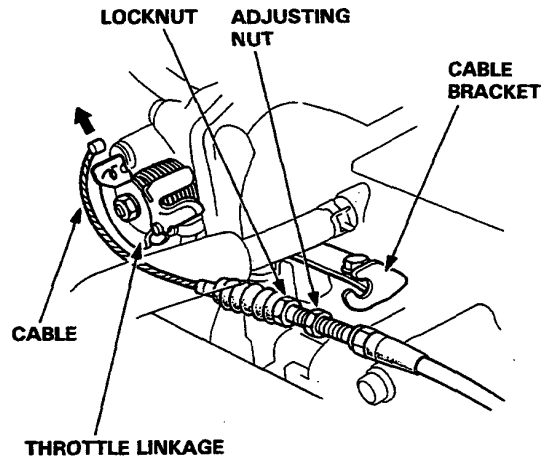
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10–12 mm (0.39–0.47 in.)



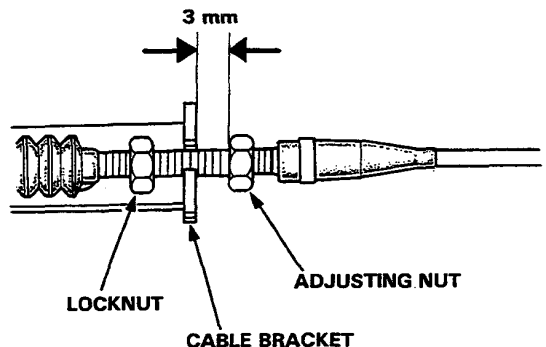
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

## Replacement

1. Loosen the locknut and remove the throttle cable from the cable bracket.
2. Remove the cable from the throttle linkage.



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 10–12 mm (0.39–0.47 in.). If not, see Inspection/Adjustment.



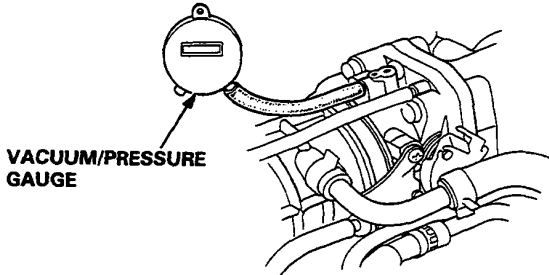
# Throttle Body



## Inspection [KX, KS, KZ, KQ, KY]

**CAUTION:** Do not adjust the throttle stop screw since it can not be reset except at the factory.

1. Start the engine and allow 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.



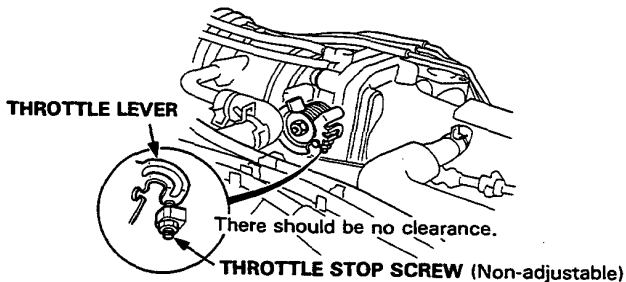
3. Allow the engine to idle and check that the gauge indicates no vacuum.
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.

- If the gauge indicates no vacuum, check the canister port. If the canister 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.

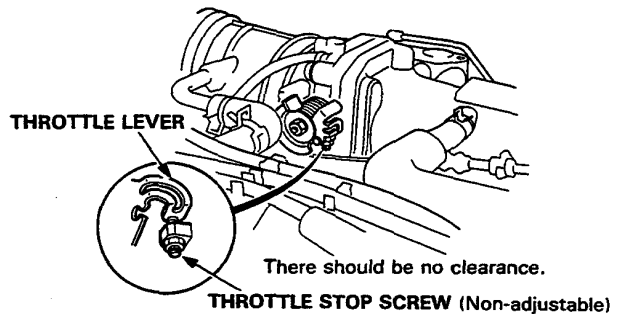
## Inspection [KF, KG, KW, KB, KE, KT]

**CAUTION:** Do not adjust the throttle stop screw since it can not be reset except at the factory.

1. 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.

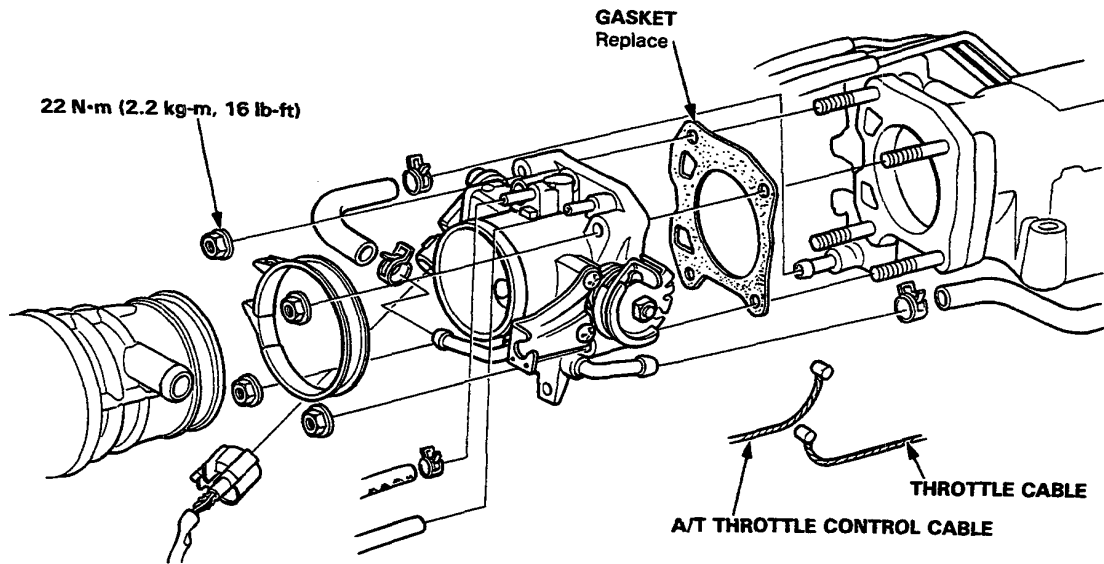


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.



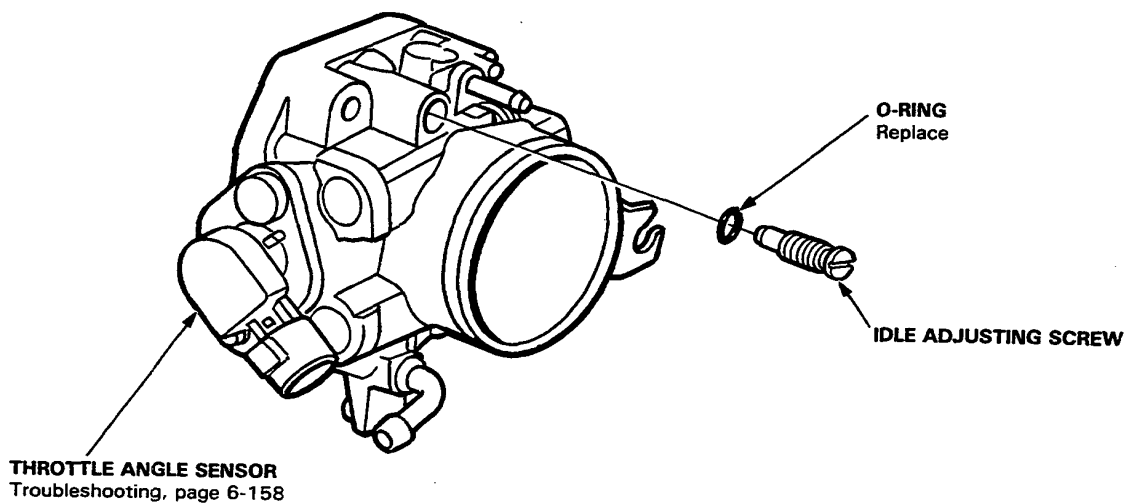
# Throttle Body

## Disassembly



### CAUTION:

- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (page 6-200), and A/T throttle control cable (section 9) for cars with A/T.



# Bypass Control System

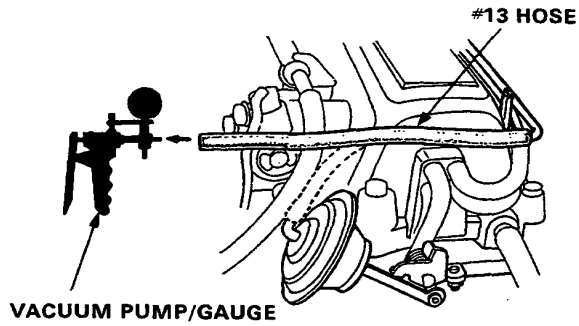


## Troubleshooting Flow Chart

Inspection of Bypass Control System

Start engine and allow to idle.

Remove #13 vacuum hose from the bypass control diaphragm and connect vacuum gauge to the hose.



Is there vacuum ?

NO

Remove #12 vacuum hose from the vacuum tank, then check for vacuum at the tank.

Is there vacuum ?

NO

Repair the blockage or vacuum leak between the vacuum tank and the intake manifold.

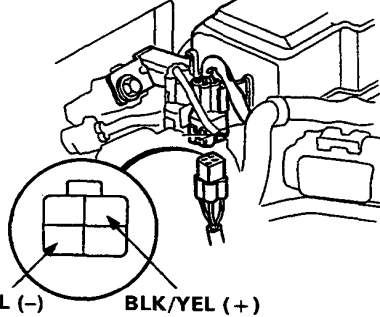
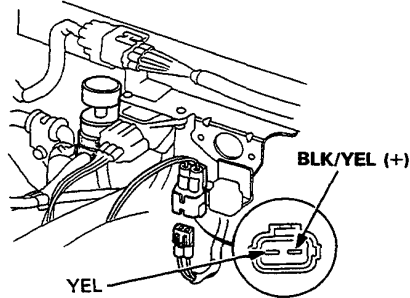
YES

Disconnect the connector.

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

[KX, KS, KZ]

[Except KX, KS, KZ]



Is there battery voltage ?

YES

Replace the bypass control solenoid valve.

NO

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

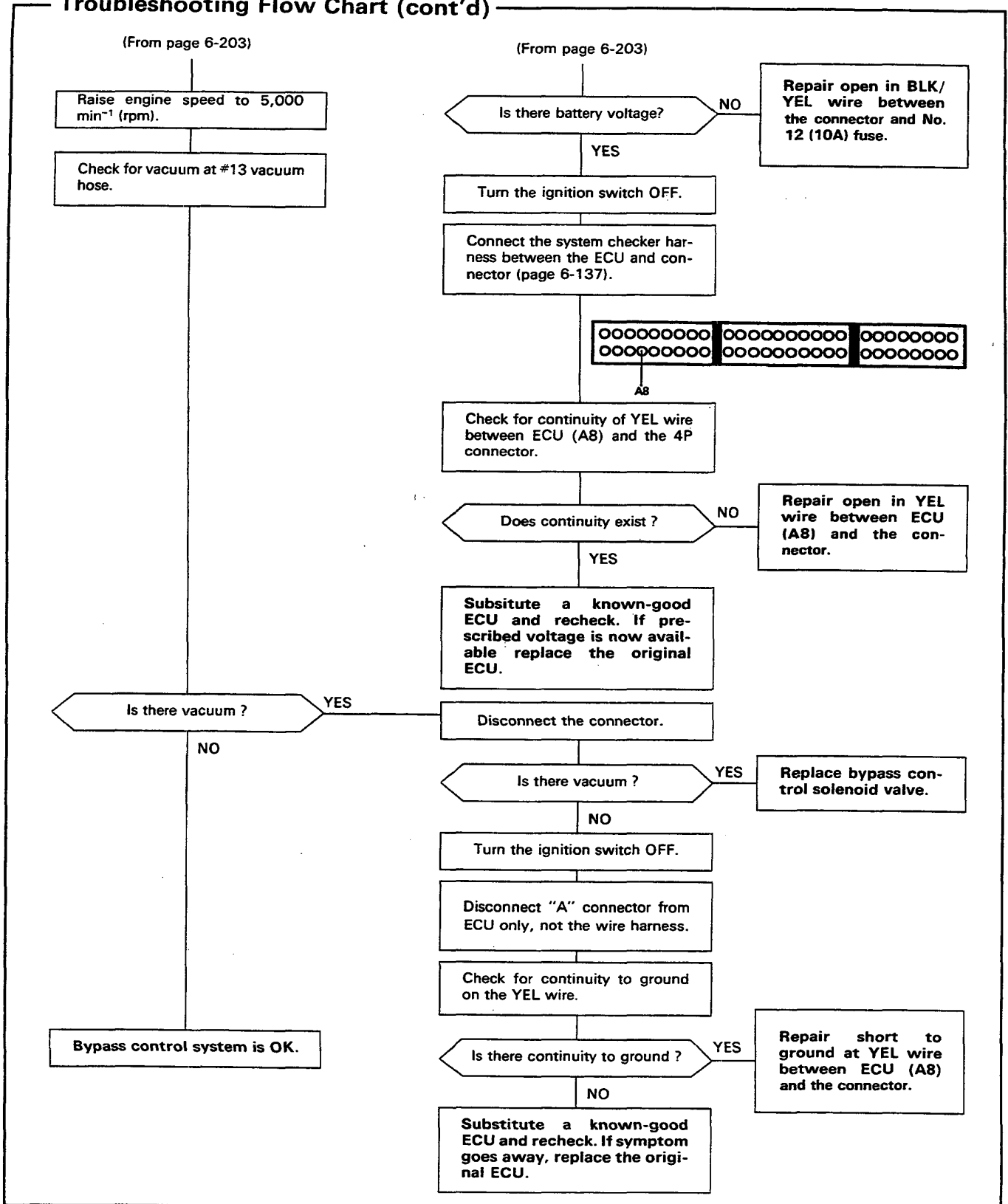
(To page 6-204)

(To page 6-204)

(cont'd)

# Bypass Control System

## Troubleshooting Flow Chart (cont'd)

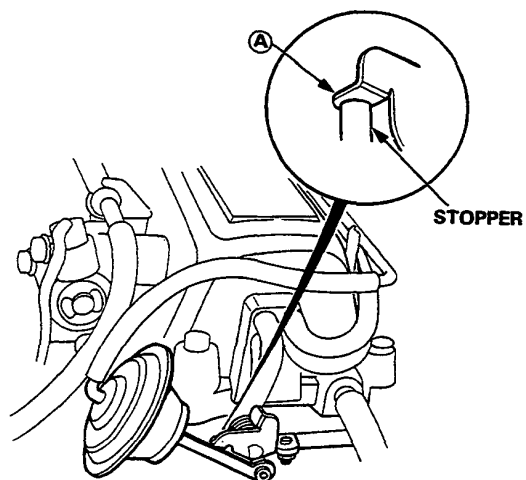




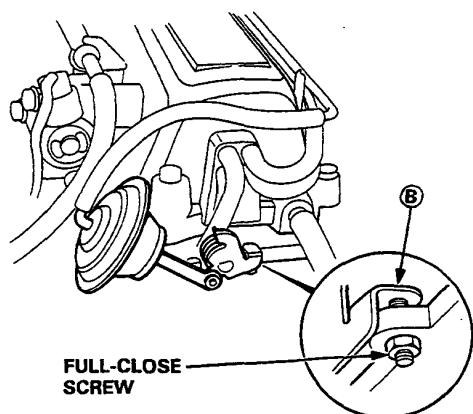
## Bypass Valve Test

**CAUTION:** Do not adjust the bypass valve full-close screw. It was preset at the factory.

1. Check the bypass valve shaft for binding or sticking.
2. Check the bypass valve for smooth movement.
3. Check that **(A)** of the bypass valve is in close contact with the stopper when the bypass valve is fully open.



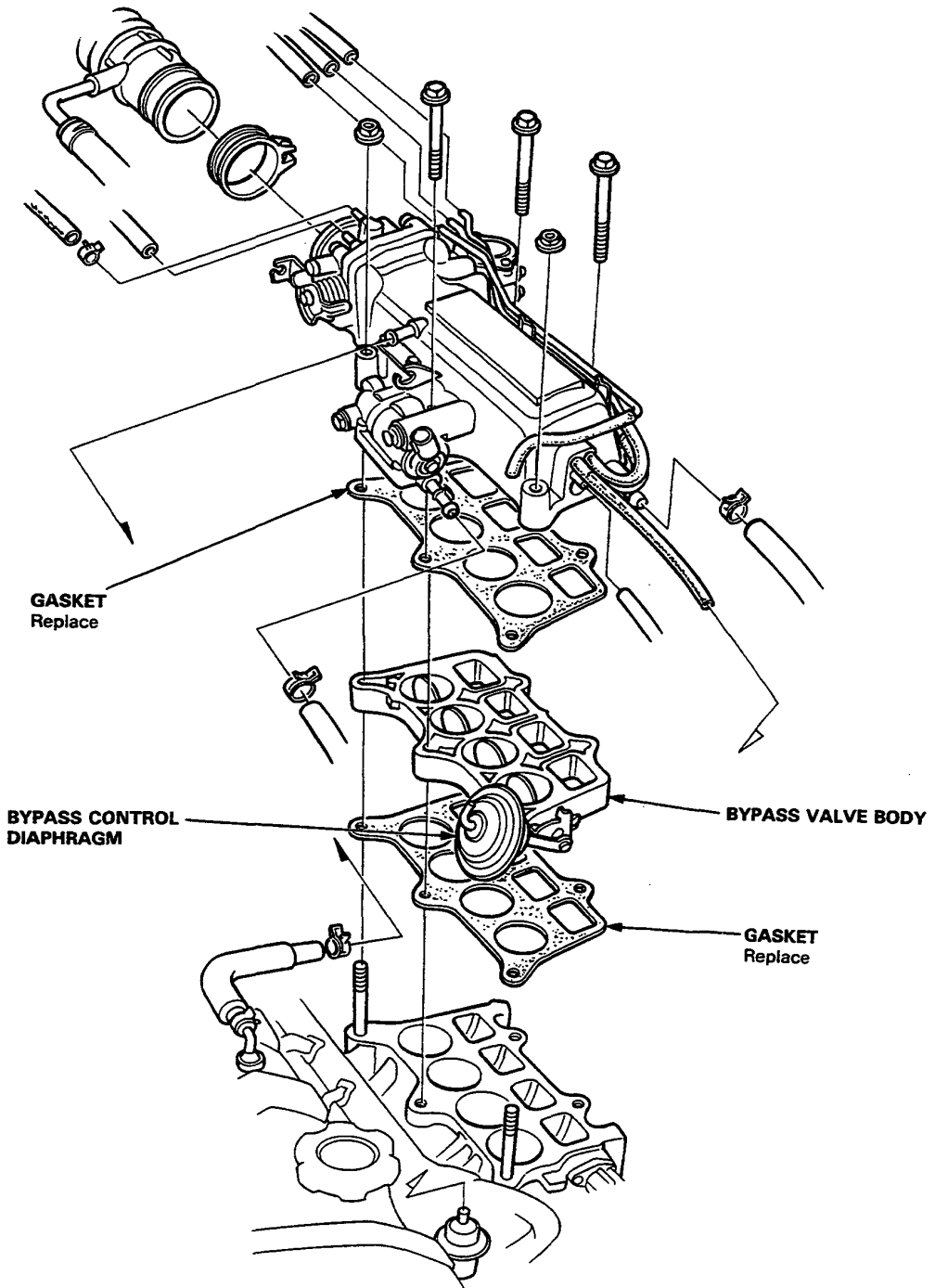
4. Check that **(B)** of the bypass valve is in close contact with the full-close screw when the valve is fully closed.



- 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 bypass valve (page 6-206).

# Bypass Control System

## Bypass Valve Body Disassembly



# Emission Control System



## Symptom-to-Sub System Chart

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 system 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	CATALYTIC CONVERTER	EGR SYSTEM [KX, KS, KZ]	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
	SYMPTOM	63	209	208	213, 216
IRREGULAR IDLING	ROUGH IDLE		①	②	
	WHEN WARM ENGINE SPEED TOO HIGH			①	
FREQUENT STALLING			①		
POOR PERFORMANCE	FAILS EMISSION TEST	①	①		②
	LOSS OF POWER	①	②		

# Tailpipe Emission

## Inspection

**WARNING** Do not smoke during this procedure. Keep any open flame away from your work area.

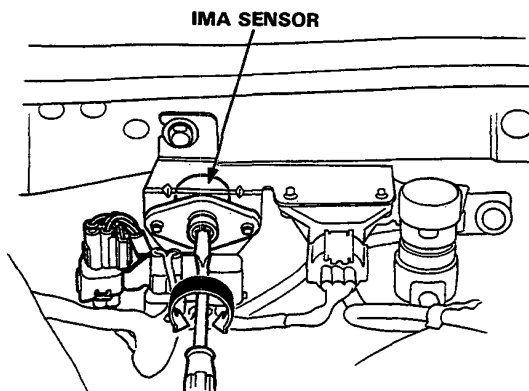
1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 11-180).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

### Specified CO%:

**KX, KS, KZ: 0.1% maximum**

**Other models:  $1.0 \pm 1.0\%$**

- If unable to obtain this reading;  
On KX, KS, KZ, see ECU troubleshooting (page 6-134).  
On other models, adjust by turning the adjusting screw of the IMA sensor.

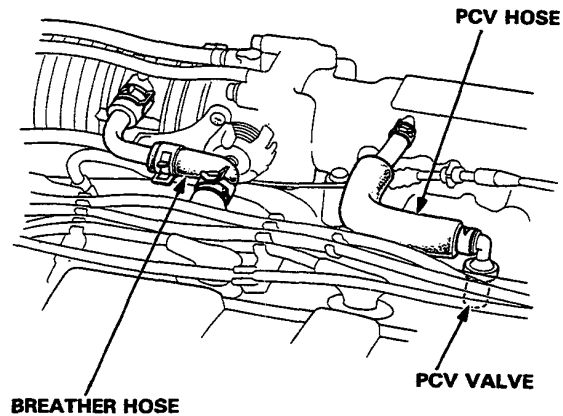


— If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

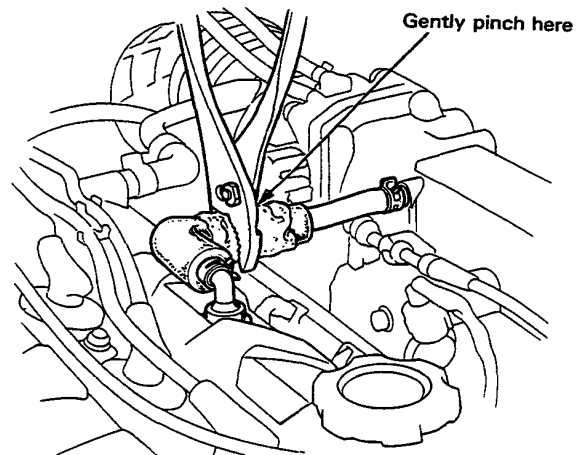
# Positive Crankcase Ventilation System

## Inspection

1. Check the crankcase ventilation hoses and connections for leaks and clogging.



2. At idling, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.



- If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

# Exhaust Gas Recirculation System [KX, KS, KZ]



## Troubleshooting Flow Chart — EGR System



Self diagnosis indicator blinks twelve times. Most likely a problem in the Exhaust Gas Recirculation (EGR) system.



-PGM-FI Warning light has been reported on.  
-LED indicates CODE 12.

Verify that all connectors between the EGR valve lift sensor and the PGM-FI ECU are securely connected.

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

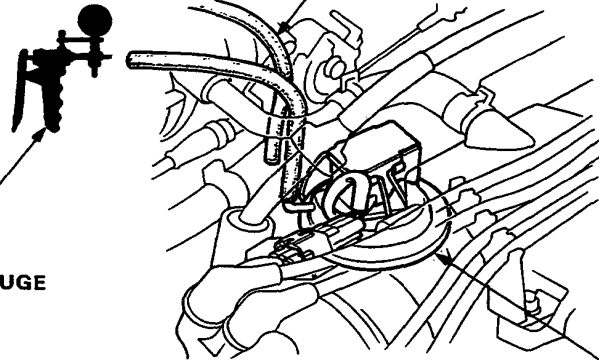
Disconnect 16 hose from EGR valve.

Connect a vacuum pump to EGR valve and apply vacuum.

VACUUM PUMP/GAUGE

#16 HOSE

EGR VALVE



Does EGR valve hold vacuum?  
Did engine stall?

NO

Replace EGR valve.

YES

Disconnect #24 hose from the vacuum hose manifold and connect a vacuum gauge to the hose.

Restart engine and check for vacuum.

Is there vacuum?

NO

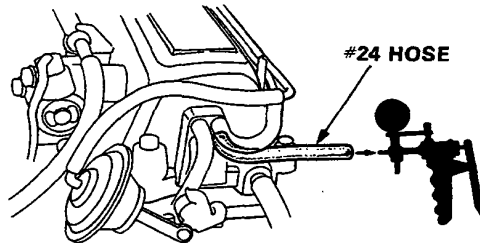
Repair blockage at port or pinch in the #24 hose.

YES

Reconnect #24 hose.

(To page 6-210)

#24 HOSE



(cont'd)

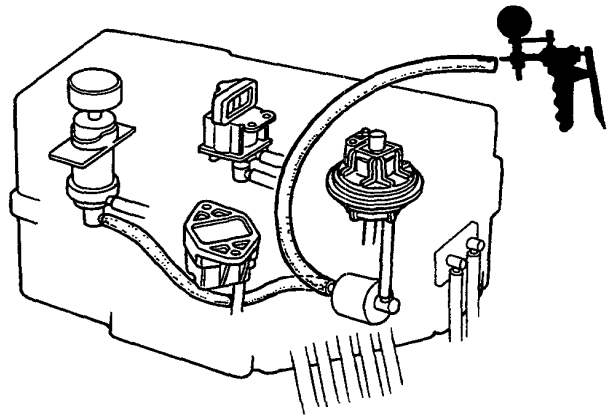


# Exhaust Gas Recirculation System [KX, KS, KZ]

## Troubleshooting Flow Chart — EGR System (cont'd)

(From page 6-209)

Open the control box lid, disconnect the vacuum hose between the air chamber and EGR control solenoid valve from the air chamber, and connect vacuum gauge to the air chamber and check for vacuum.



Is there approx. 200 mm Hg (8 in. Hg)

NO

Replace CVC valve.

YES

Reconnect the vacuum hose between the air chamber and EGR control solenoid valve.

Connect vacuum gauge to the #16 vacuum hose and check for vacuum.

Is there approx. 200 mm Hg (8 in. Hg)

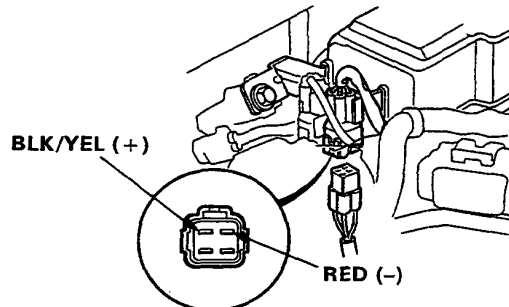
YES

Inspect short in RED wire between ECU (A10) and EGR control solenoid valve. If wire is OK, replace the solenoid valve.

NO

Disconnect the 4P connector on the control box.

Connect the battery positive terminal to the BLK/YEL terminal and the negative terminal to the RED terminal.



Is there vacuum approx. 200 mm Hg (8 in. Hg)

NO

Replace EGR control solenoid valve.

YES

(To page 6-211)



(From page 6-210)

Measure voltage between BLK/YEL (+) terminal on the R. engine compartment wire harness and body ground.

Is there battery voltage ?

NO

Repair open in BLK/YEL wire between the solenoid valve and No. 12 fuse.

YES

Turn the ignition switch OFF.

Connect the inspection adaptor between the EGR valve lift sensor and engine wire harness.

Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (-) terminal.

Is there approx. 5V ?

NO

Measure voltage between RED (+) terminal and body ground.

Is there approx. 5V ?

YES

Repair open in GRN/WHT wire between ECU (C12) and the sensor.

YES

Measure voltage between WHT (+) terminal and GRN (-) terminal.

Is there approx. 1V ?

NO

-Replace EGR valve.  
-Repair short in YEL wire between ECU (C8) and EGR valve lift sensor.

NO

YES

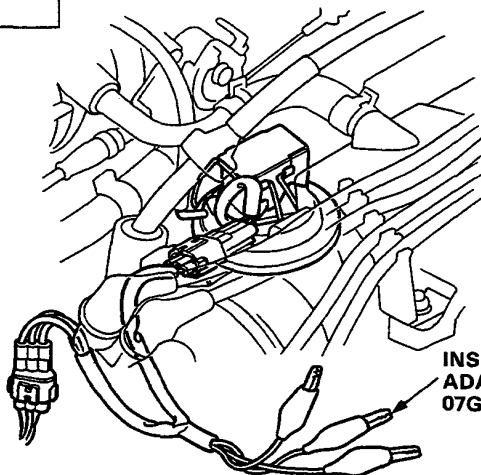
Turn the ignition switch OFF.

Turn the ignition switch OFF.

Connect the system checker harness between the ECU and connector (page 6-137).

Connect the system checker harness between the ECU and connector (page 6-137).

Turn the ignition switch ON.



INSPECTION ADAPTOR 07GMJ-ML80100

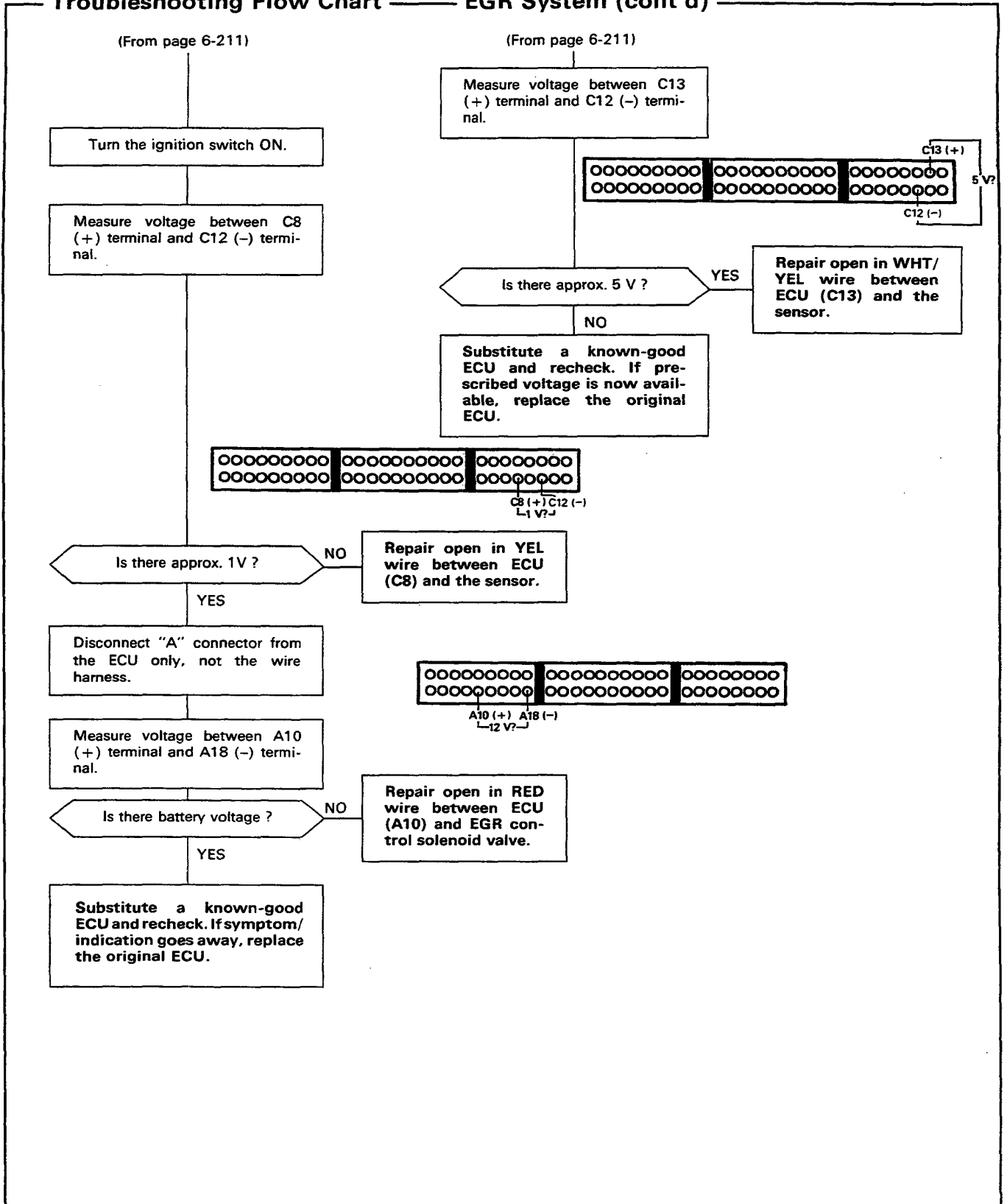
(To page 6-212)

(To page 6-212)

(cont'd)

# Exhaust Gas Recirculation System [KX, KS, KZ]

## Troubleshooting Flow Chart — EGR System (cont'd)



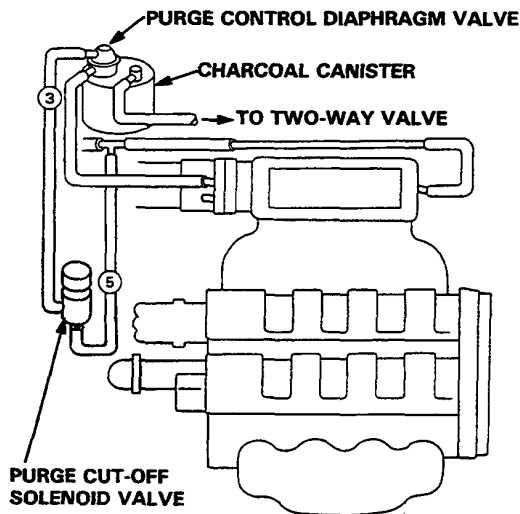
# Evaporative Emission Controls [KX, KS, KZ]



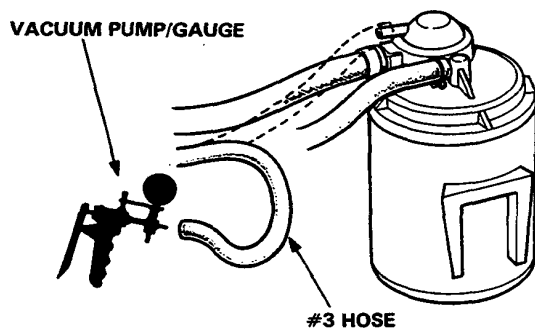
## Test

### COLD ENGINE

1. Check the vacuum line for proper connection, cracks, blockage or disconnected hose.



2. Disconnect #3 hose at the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.



3. Start the engine and allow to idle.

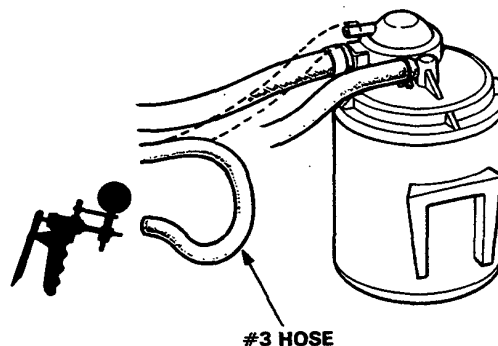
NOTE: Engine coolant temperature must be below 70°C (158°F).

Vacuum should not be available.

- If there is vacuum, go to purge cut-off solenoid valve test II (page 6-215).

### HOT ENGINE

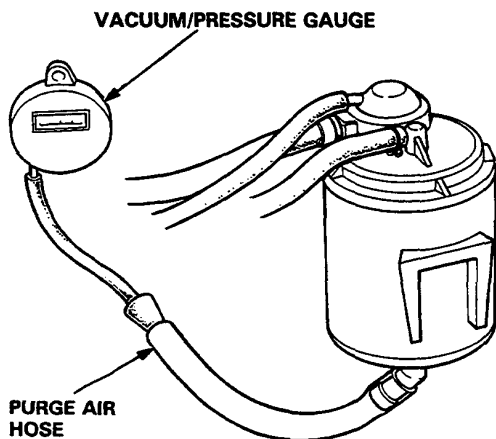
1. Disconnect the #3 hose at the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.
2. Warm up the engine to normal operating temperature (cooling fan comes on).



There should be vacuum at idle, once the engine is warm.

- If there is no vacuum, go to purge cut-off solenoid valve test I (page 6-215).

3. Disconnect vacuum gauge and reconnect the hose.
4. Remove fuel filler cap.
5. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



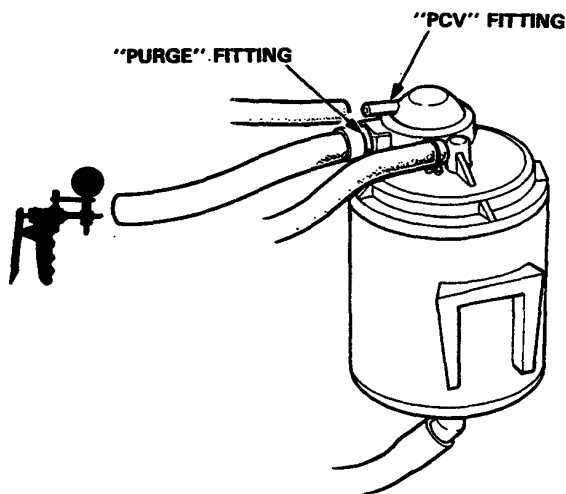
(cont'd)

# Evaporative Emission Controls [KX, KS, KZ]

## Test (cont'd)

6. Raise engine speed to 3,500 min<sup>-1</sup> (rpm)  
Vacuum should appear on gauge within 1 minute.
  - If vacuum appears on gauge in 1 minute, remove gauge, test is complete.
  - If no vacuum, disconnect vacuum gauge and re-install fuel filler cap.
7. Remove charcoal canister and check for signs of damage or defects.
  - If defective, replace canister.
8. Stop engine. Disconnect upper vacuum hose from canister "PCV" fitting.  
Connect a vacuum pump to canister "purge" fitting as shown, and apply vacuum.

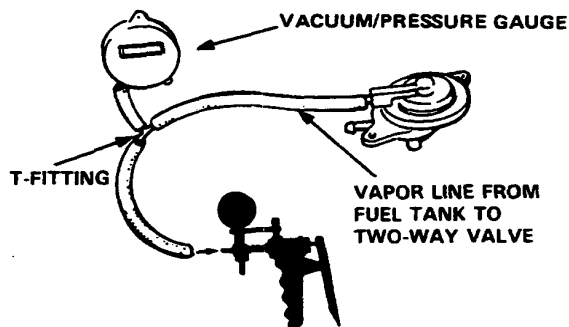
Vacuum should remain steady.



- If vacuum drops, replace canister and retest.
9. Restart engine. Reconnect hose to canister "PCV" fitting.  
"PURGE" side vacuum should drop to zero.
    - If "PURGE" side vacuum does not drop to zero, replace the canister and retest.

## Two-Way Valve

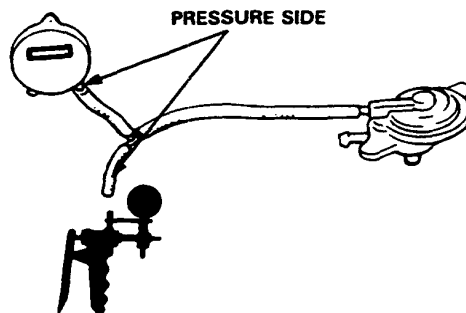
1. Remove the fuel filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Slowly apply vacuum while watching the gauge.

Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in. Hg).

- If vacuum stabilize (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install 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).

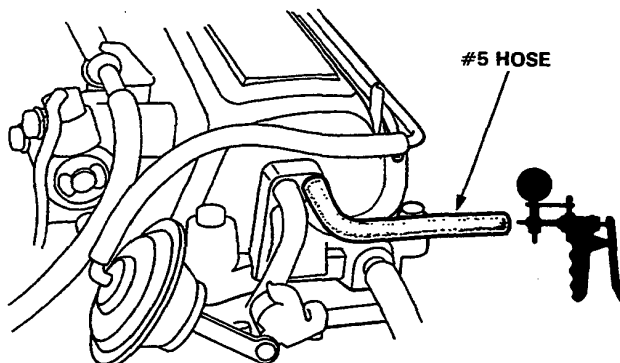
- If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the valve is OK.
- If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new valve and retest.



## Solenoid Valve Test

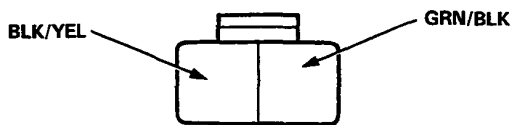
### Test I:

1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Disconnect #5 hose from the vacuum hose manifold and connect a vacuum gauge to the hose.



- If there is no vacuum, repair blockage at port or pinch in the #5 hose.

3. Disconnect the 2P connector from the purge cut-off solenoid valve and measure voltage between BLK/YEL (+) terminal and GRN/BLK (-) terminal.



- If there is voltage, replace the purge cut-off solenoid valve and retest.
- If there is no voltage, measure voltage between BLK/YEL (+) terminal and body ground.
  - If there is no voltage, repair open in BLK/YEL wire between No. 12 fuse and the 2P connector.
  - If there is voltage, inspect open in GRN/BLK wire between the ECU (B2) and the 2P connector. If the wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

### Test II:

NOTE: Engine coolant temperature must be below 70°C (158°F).

1. Start the engine and allow to idle.
2. Disconnect the 2P connector from the purge cut-off solenoid valve and measure voltage between BLK/YEL (+) terminal and GRN/BLK (-) terminal.

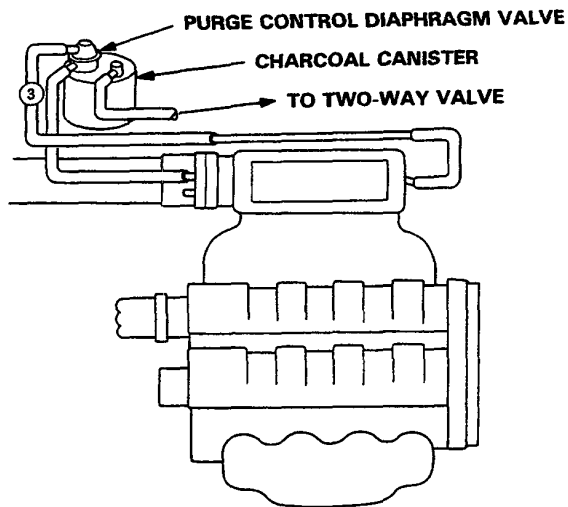


- If there is no voltage, replace the purge cut-off solenoid valve and retest.
- If there is voltage, inspect short in GRN/BLK wire between ECU (B2) and the 2P connector. If the wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

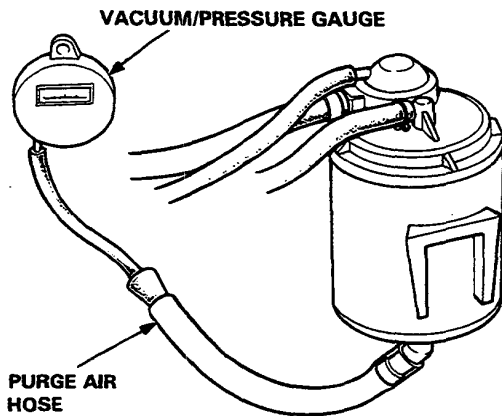
# Evaporative Emission Controls [KQ, KY]

## Test

1. Check the vacuum line for proper connection, cracks, blockage or disconnected hose.

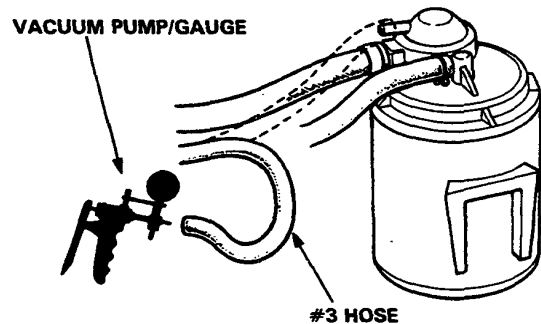


2. Remove fuel filler cap.
3. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



Raise engine speed to 3,500 min<sup>-1</sup> (rpm).  
Vacuum should appear on gauge within 1 minute.

- If vacuum appears on gauge in 1 minute, remove gauge, test is complete.
- If no vacuum, disconnect #3 hose from the purge control diaphragm valve and connect a vacuum gauge to the hose.



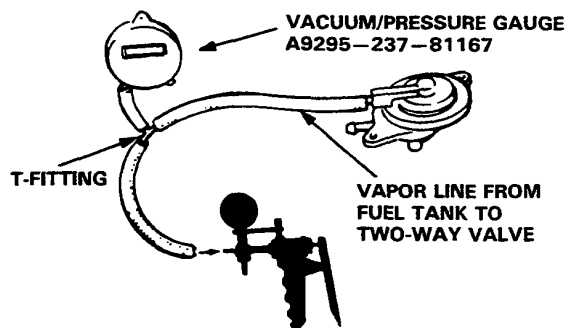
There should be vacuum at idle.

- If there is vacuum, replace the canister and retest.



## Two-Way Valve

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.

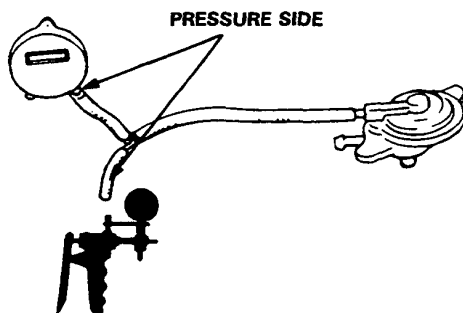


3. Slowly apply a vacuum while watching the gauge.

Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in.Hg).

- If vacuum stabilize (valve opens) below 5 mmHg (0.2 in.Hg) or above 15 mmHg (0.6 in.Hg), install 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.



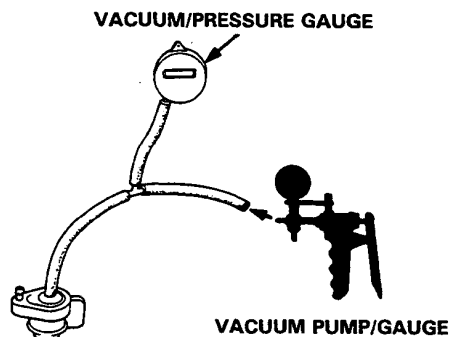
5. Slowly pressurize the vapor line while watching the gauge.

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.

## 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.

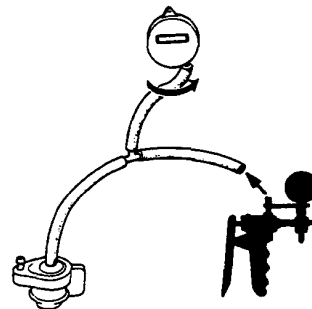


3. Slowly apply a vacuum while watching the gauge.

Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in.Hg).

- If vacuum stabilizes (valve opens) out of above range, install new valve and re-test.

4. Move 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 momentarily at 10 to 25 mmHg (0.4 to 1.0 in.Hg).

- If pressure stabilizes momentarily (valve opens) at 10 to 25 mmHg (0.4 to 1.0 in.Hg), the valve is OK.
- If pressure stabilizes below 10 mmHg (0.4 in.Hg) or above 25 mmHg (1.0 in.Hg), install new valve and re-test.



## **Clutch**

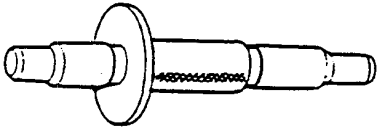
<b>Tool .....</b>	<b>7-2</b>
<b>Illustrated Index .....</b>	<b>7-3</b>
<b>Pedal Free Play .....</b>	<b>7-4</b>
<b>Clutch Master Cylinder .....</b>	<b>7-5</b>
<b>Slave Cylinder .....</b>	<b>7-8</b>
<b>Release Bearing and Release Fork .....</b>	<b>7-10</b>
<b>Pressure Plate .....</b>	<b>7-11</b>
<b>Clutch Disc .....</b>	<b>7-12</b>
<b>Flywheel .....</b>	<b>7-13</b>
<b>Flywheel and Clutch Disc .....</b>	<b>7-13</b>



# Tools

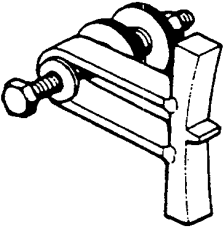
## Tools

No.	TOOL NUMBER	DESCRIPTION	
①	07GAG-PF50100	Clutch Disc Alignment Tool	
②	07924-PD20003	Ring Gear Holder	



A technical drawing of a clutch disc alignment tool. It consists of a long, cylindrical shaft with a threaded section in the middle. A large, flat circular disc is mounted on the left end of the shaft. The right end of the shaft is tapered and has a small diameter section.

①



A technical drawing of a ring gear holder. It is a complex, multi-part tool with a central threaded hole. It has several rectangular blocks and a handle-like structure. A bolt is shown passing through the central hole.

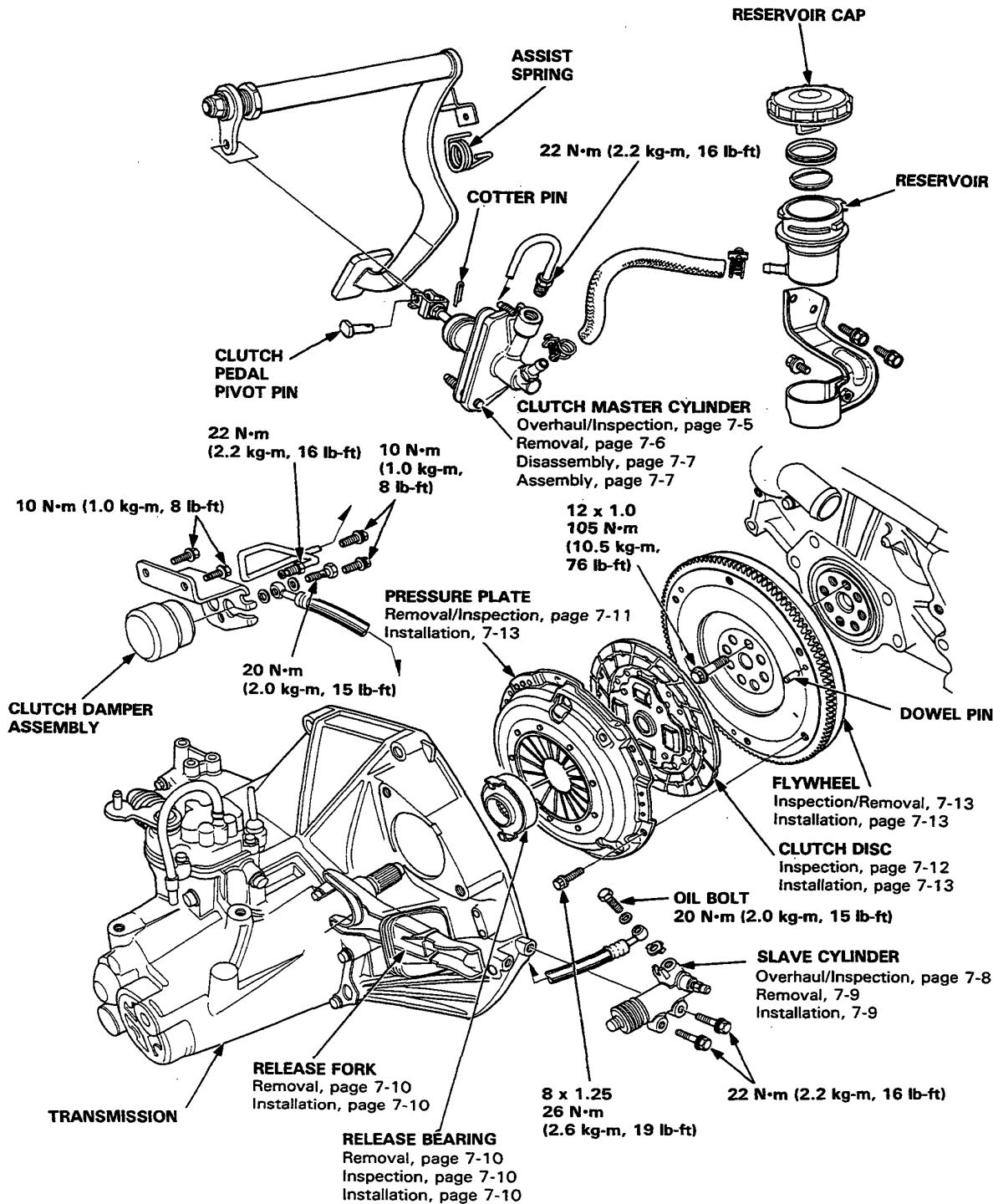
②

# Clutch

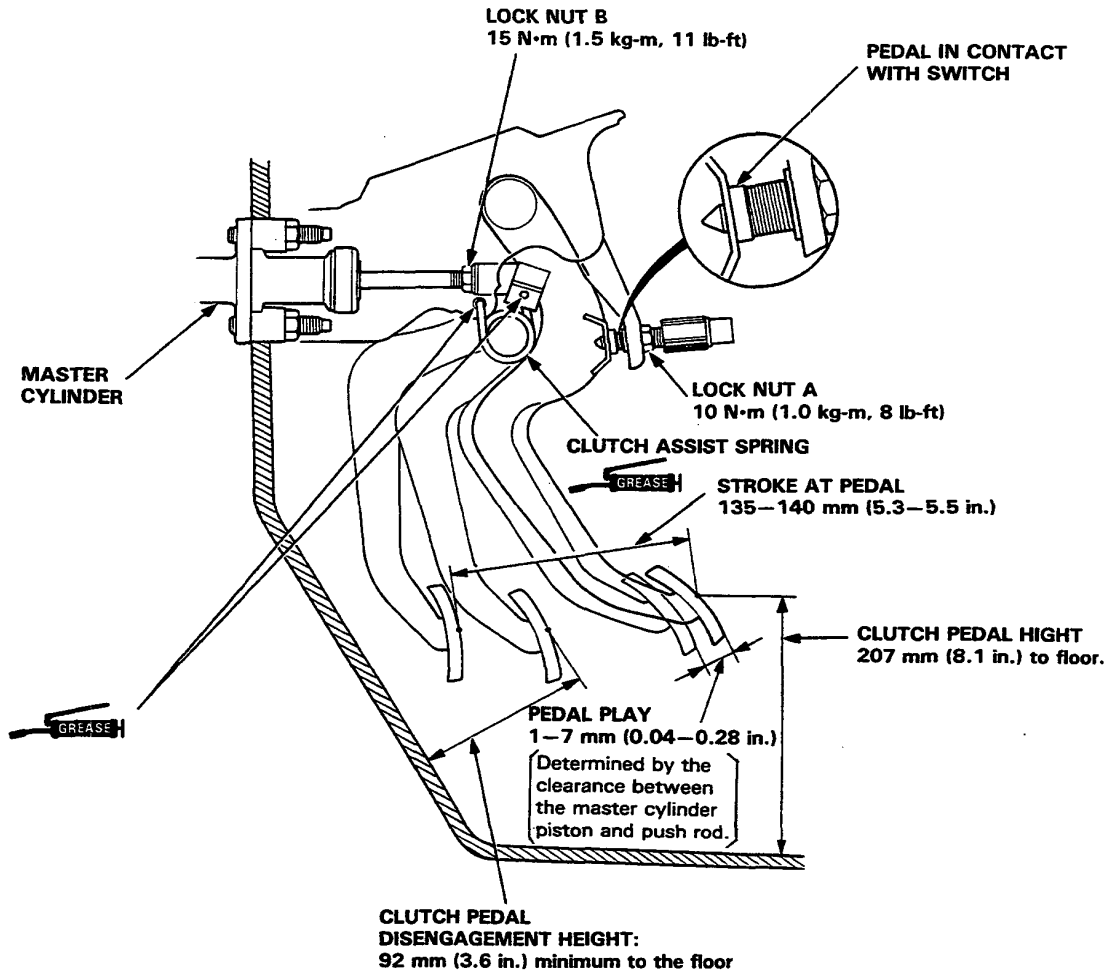
## Illustrated Index



NOTE: Whenever the transmission is removed, release bearing sliding surface should be cleaned and greased.



## Pedal Free Play



### NOTE:

- The clutch is self-adjusting to compensate for wear.
- Total clutch pedal free play is 9–15 mm (0.35–0.59 in).

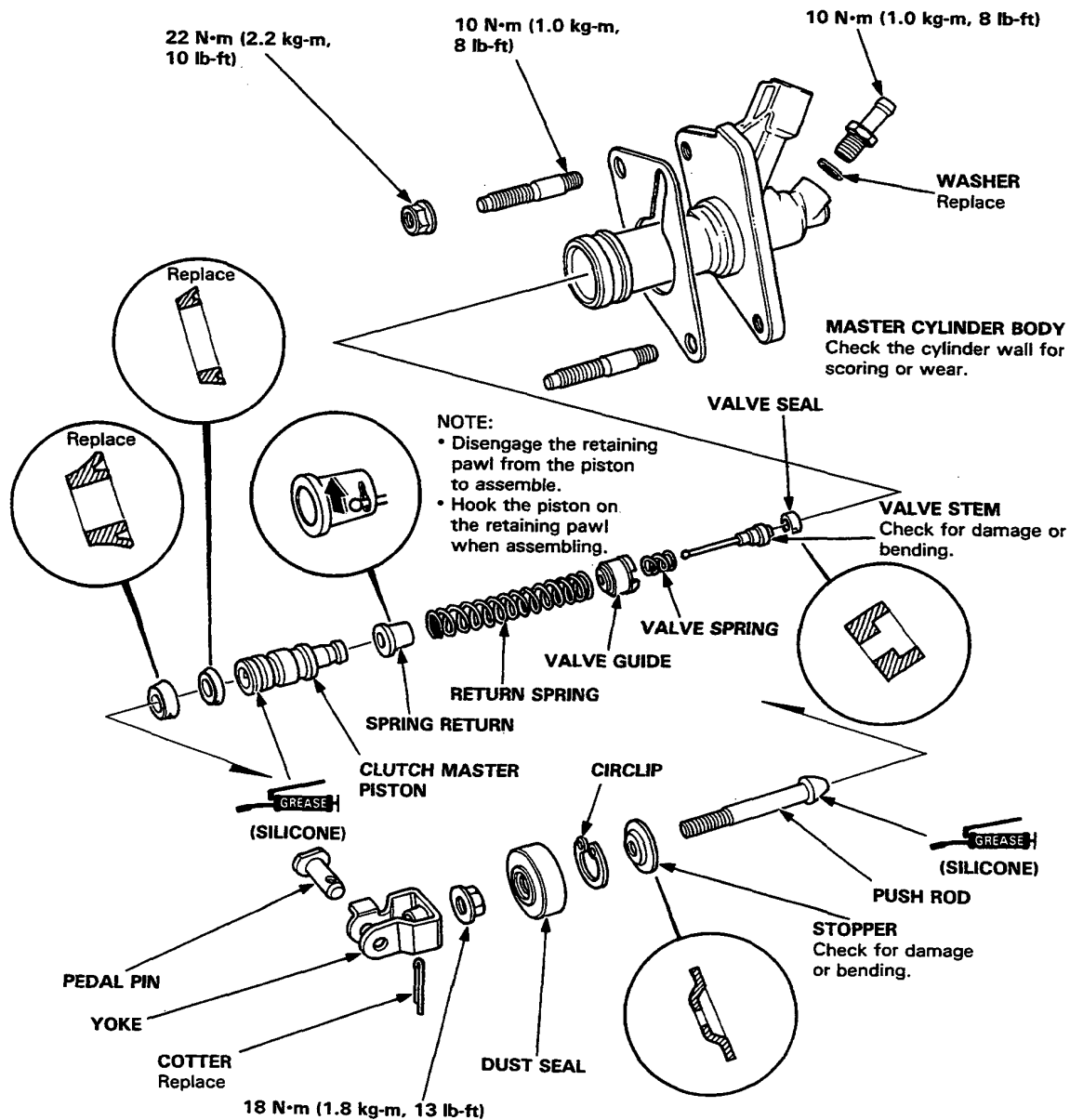
**CAUTION:** If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, resulting in slipping clutch or other faulty clutch operation.

1. Loosen lock nut A, and back off the pedal switch until it no longer touches the clutch pedal.
2. Loosen lock nut B, and turn the push rod in or out to get the specified stroke and height at the clutch pedal.
3. Tighten lock nut B.
4. Screw in the clutch pedal switch until it contacts the clutch pedal.
5. Turn the switch in further 1/4–1/2 turn.
6. Tighten the lock nut A.



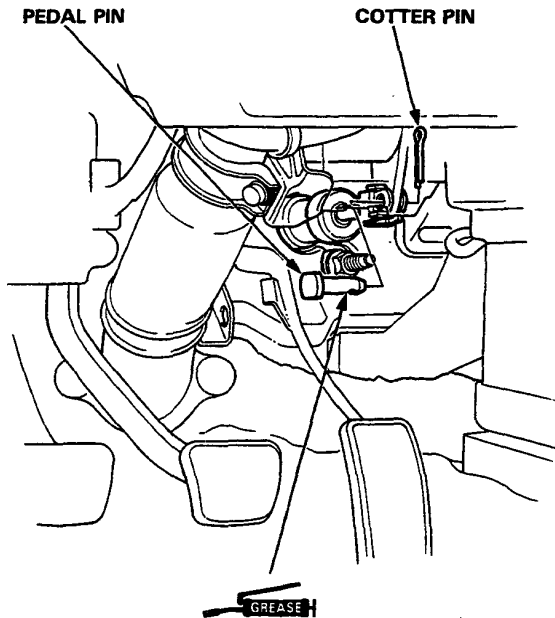
# Clutch Master Cylinder

## Overhaul/Inspection



## Removal

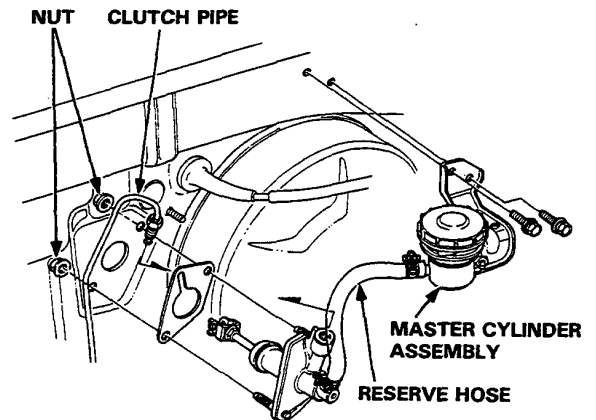
1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.
3. Remove the clutch pipe and reserve 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 reserve hose with a shop rag to prevent fluid from flowing out of the clutch pipe and reserve hose after disconnecting.



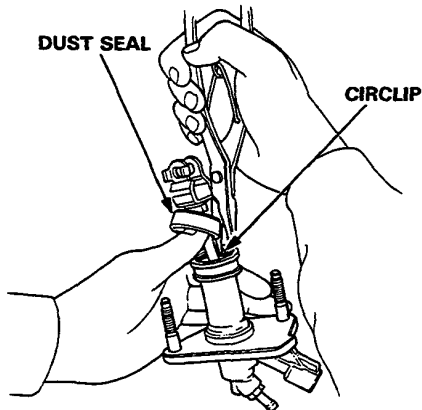
# Clutch Master Cylinder



## Disassembly

**CAUTION:** Avoid spilling brake fluid on paint as it may damage the finish.

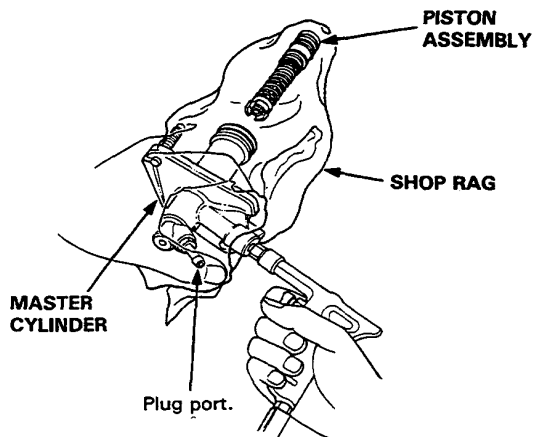
1. Remove the dust seal from the master cylinder.



2. Pry the circlip off the master cylinder.
3. Carefully remove the piston by applying air pressure through the clutch line hole.

### CAUTION:

- Hold a shop rag 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 rag to prevent fluid from coming out.
- Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.

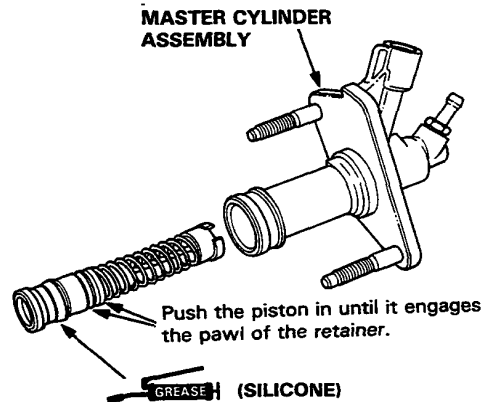


## Assembly

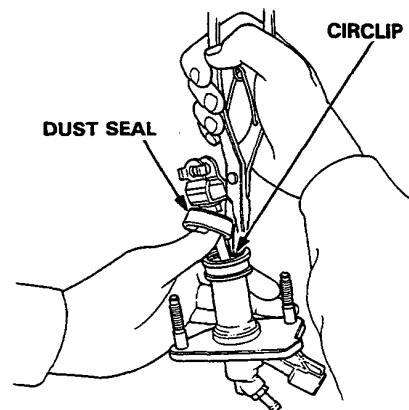
### CAUTION:

- 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 7-5).



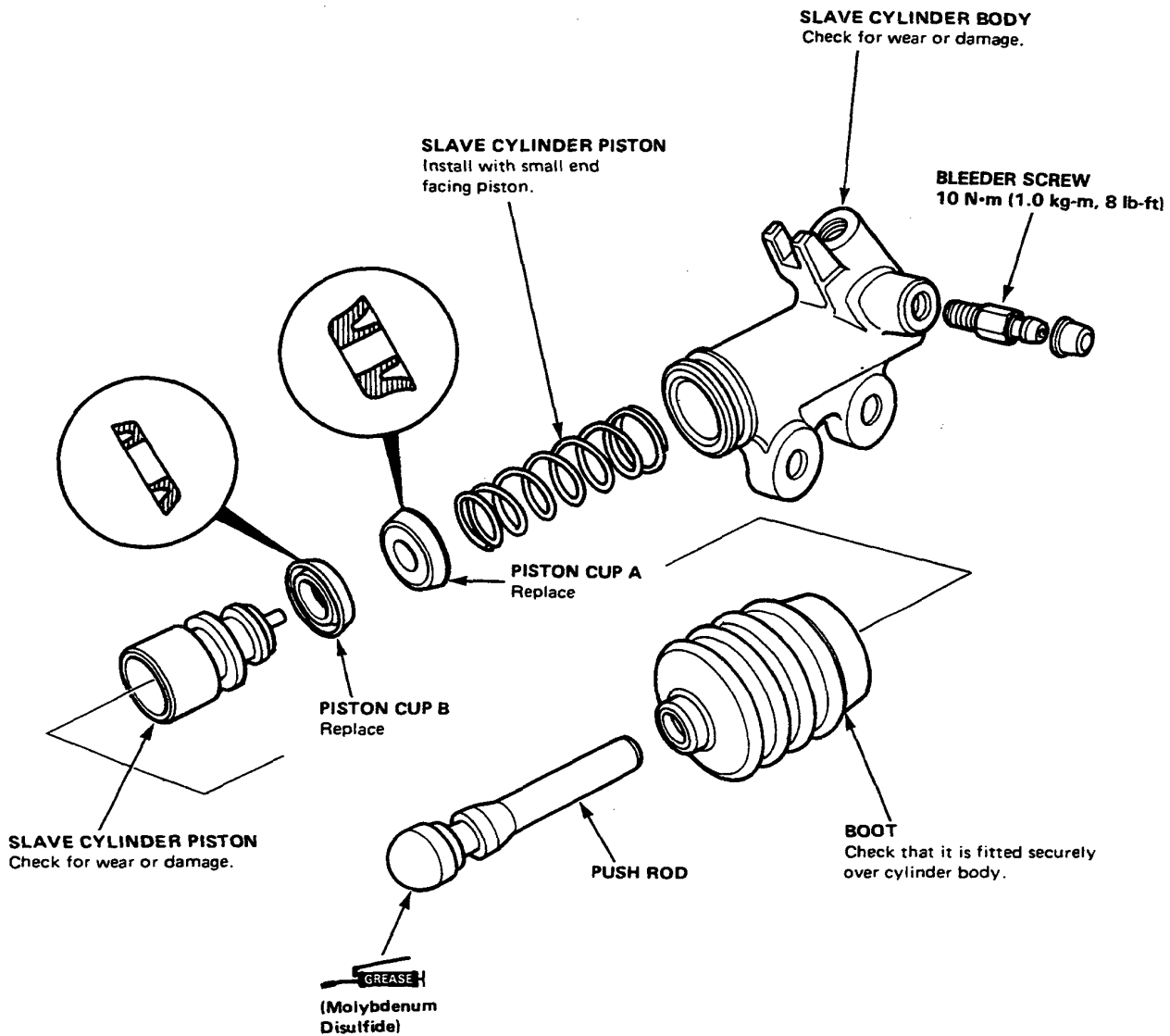
2. Slide the piston assembly into the master cylinder.
3. Install the circlip in the groove of the master cylinder.



4. Install the dust seal.

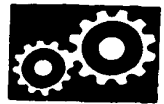
# Slave Cylinder

## Overhaul/Inspection





# Slave Cylinder



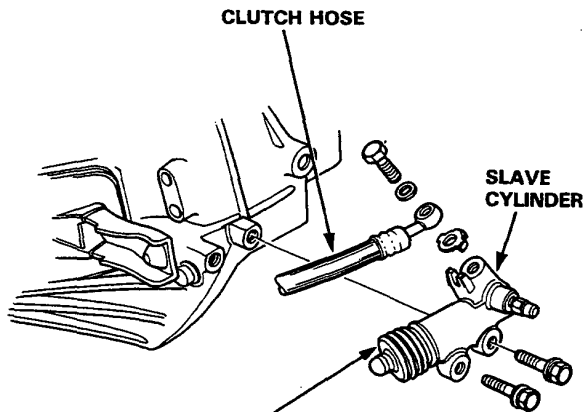
## Removal

1. Disconnect the clutch hose 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 hose with a shop rag to prevent brake fluid from coming out.

2. Remove the slave cylinder from the clutch case.

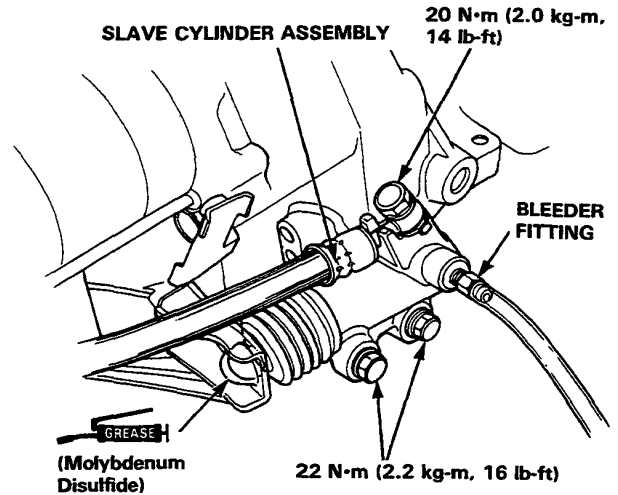


### BOOT

Remove and check for signs of leaking or deterioration

## Installation

1. Install the slave cylinder assembly on the clutch case.



2. Bleed the clutch hydraulic system:

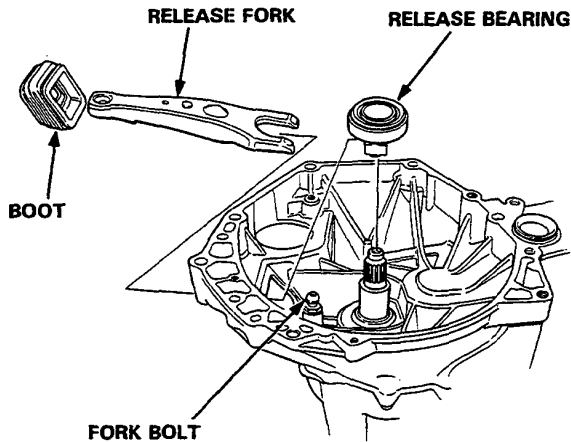
- Attach a hose to the bleeder fitting and suspend the hose in a container of brake fluid.
- Make sure there is an adequate supply of fluid at the master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
- Re-fill the master cylinder fluid when done.

# Release Bearing and Release Fork

## Removal

**NOTE:** Remove the slave cylinder with the clutch pipe still connected.

1. Remove the boot from the clutch case, and remove the release fork and bearing.

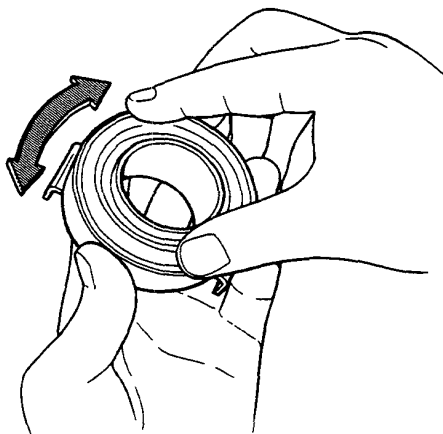


2. To remove the boot, first remove the damper from the release fork.

## Inspection

1. Check the release bearing for play by spinning it by hand.

**CAUTION:** The bearing is packed with grease. Do not wash it in solvent.

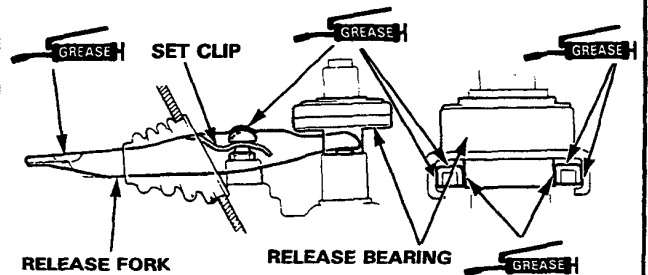
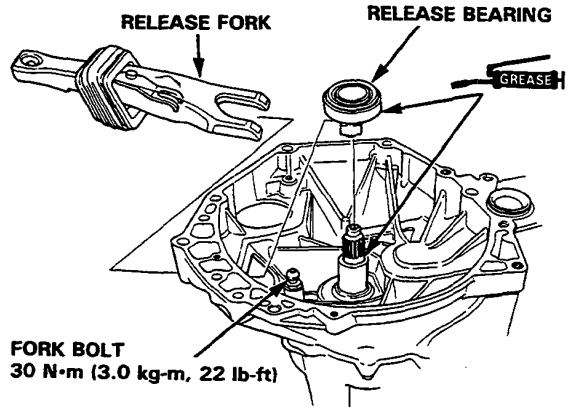


2. Replace the bearing with a new one if there is excessive play.

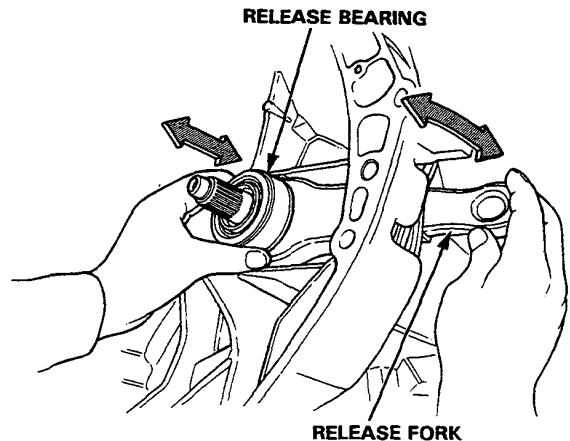
## Installation

1. Slide the release fork between the release bearing pawls, and install the set clip on the fork bolt.

**CAUTION:** Use only molybdenum disulfide grease in this step (Molykote M77).



2. Install the boot, being sure that there is no clearance: release fork-to-boot, and boot-to-clutch case.
3. Move the release fork right and left to make sure that the fork fits properly against the bearing, and that the bearing slides smoothly.



# Pressure Plate



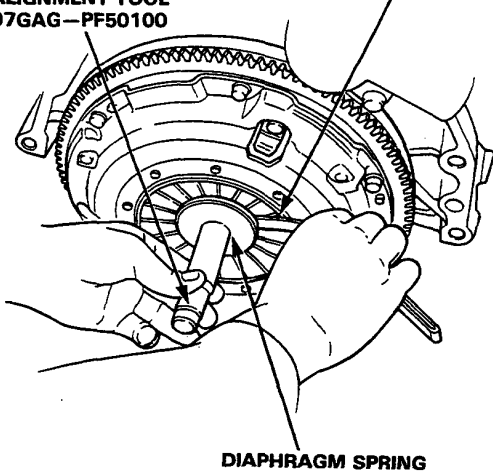
## Removal/Inspection

1. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.
2. Check the diaphragm spring fingers for height using the Clutch Disc Alignment Tool and feeler gauge.

**Standard (New):** 0.6 mm (0.02 in.) Min.  
**Service Limit:** 0.8 mm (0.03 in.) Max.

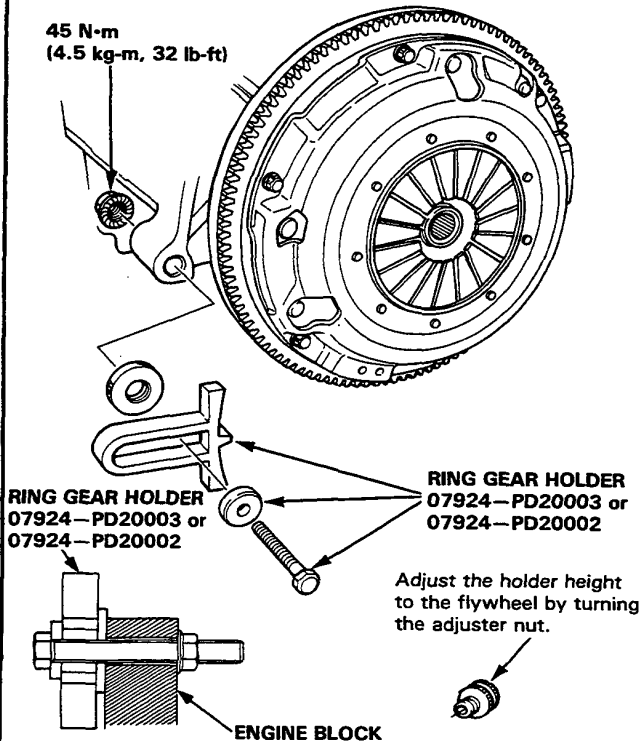
**CLUTCH DISC ALIGNMENT TOOL**  
07GAG-PF50100

**FEELER GAUGE**



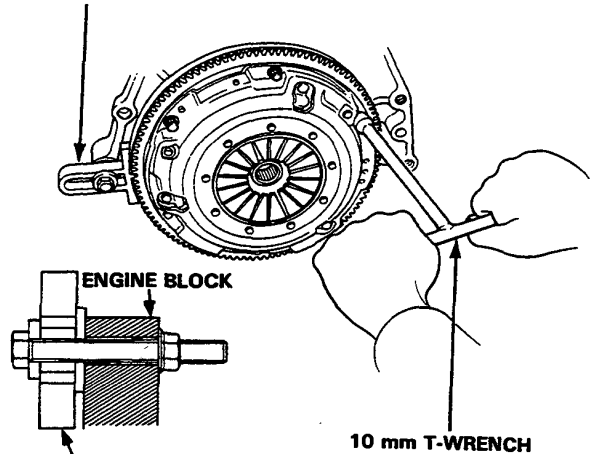
3. Install the Ring Gear Holder.

**45 N·m**  
**(4.5 kg·m, 32 lb-ft)**



4. To prevent warping, unscrew the pressure plate mounting bolts two turns at a time in a crisscross pattern using a 10 mm T-wrench, then remove the pressure plate and clutch disc.

**RING GEAR HOLDER**  
07924-PD20003 or  
07924-PD20002

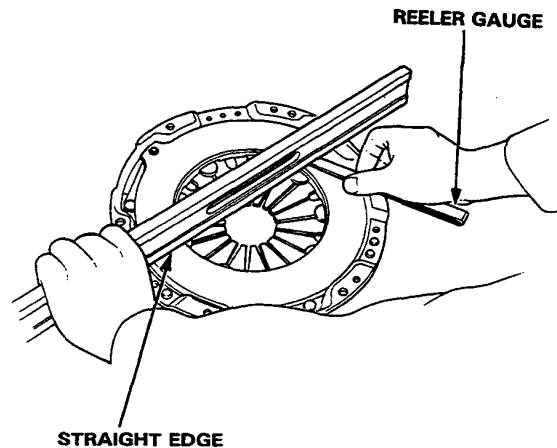


**RING GEAR HOLDER**  
07924-PD20003 or 07924-PD20002

5. Inspect the pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

**Standard (New):** 0.03 mm (0.001 in.) Min.  
**Service Limit:** 0.15 mm (0.006 in.) Max.

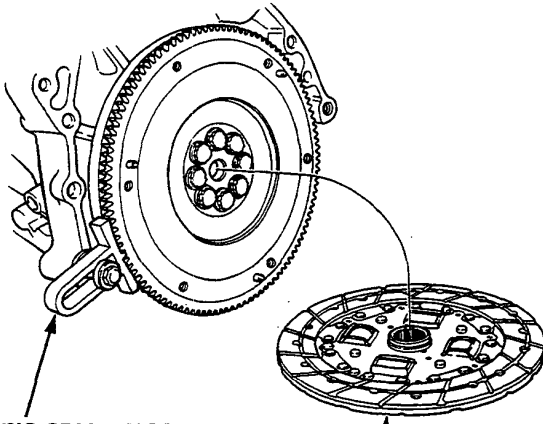
Measure across pressure plate.



# Clutch Disc

## Inspection

1. Remove the clutch disc.
2. Inspect lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.



**RING GEAR HOLDER**  
07924-PD20003 or  
07924-PD20002

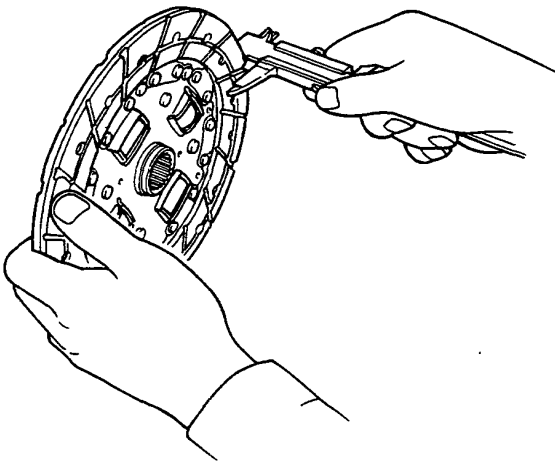
**CLUTCH DISC**

3. Measure the clutch disc thickness.

### Clutch Disc Thickness:

**Standard (New): 8.5–9.2 mm (0.33–0.36 in.)**

**Service Limit: 6.1 mm (0.24 in.)**

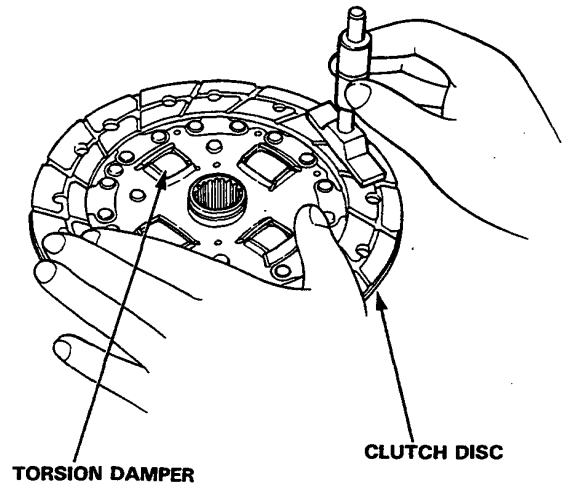


4. Check for loose rubber torsion dampers. Replace the clutch disc if any are loose.
5. Measure the depth from the lining surface to the rivets, on both sides.

### Rivet Depth:

**Standard (New): 1.3 mm (0.051 in.) min.**

**Service Limit: 0.2 mm (0.008 in.)**



**TORSION DAMPER**

**CLUTCH DISC**

# Flywheel

# Flywheel and Clutch Disc

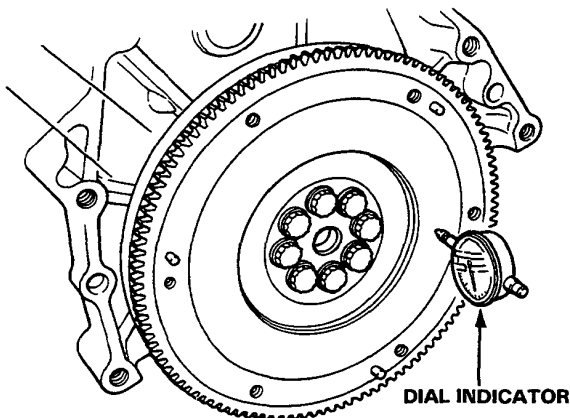


## Inspection/Removal

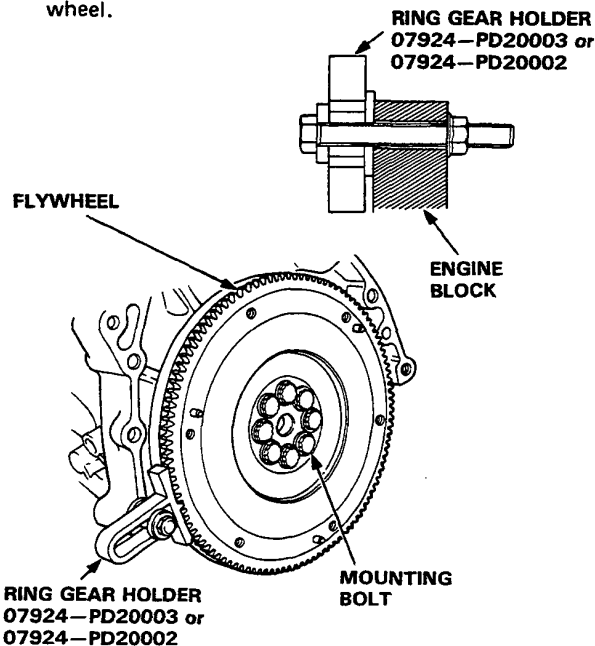
1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push flywheel toward engine to take up the crankshaft thrust washer clearance.

NOTE: The runout can be measured with engine installed.

Standard (New): 0.05 mm (0.002 in.) max.  
Service Limit: 0.15 mm (0.006 in.)



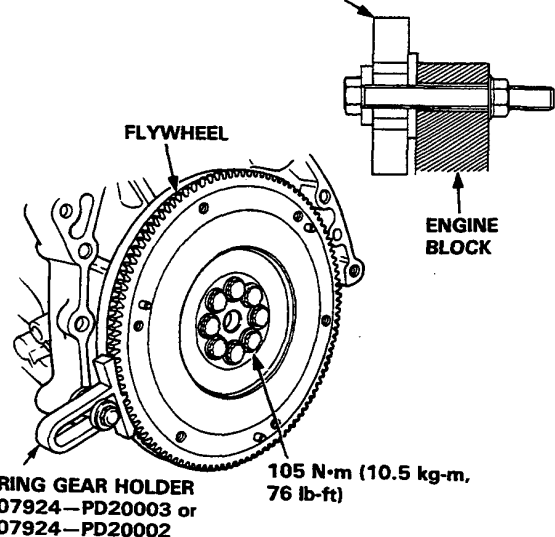
4. Remove the eight flywheel mounting bolts and flywheel.



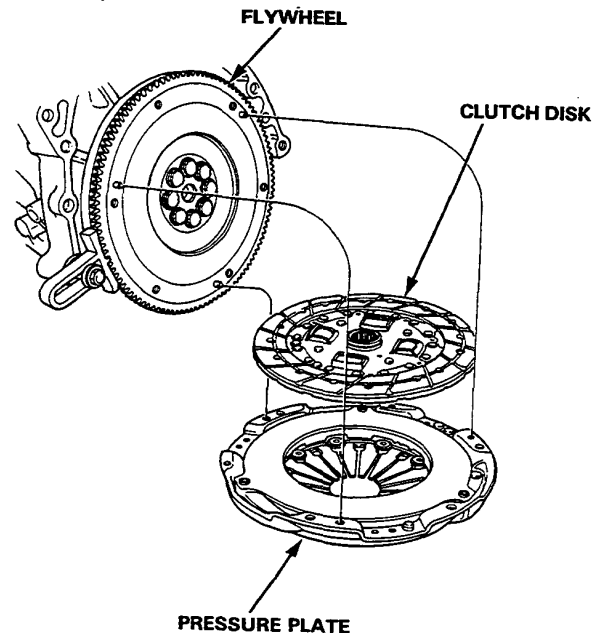
## Installation

1. Align the hole in flywheel with the crankshaft dowel pin and assemble. Install the bolts only finger tight.
2. Install the Ring Gear Holder, then torque the flywheel bolts in a crisscross pattern, as shown.

RING GEAR HOLDER  
07924-PD20003 or 07924-PD20002



3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.



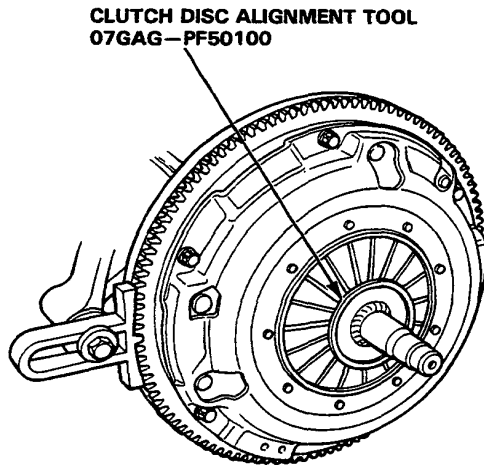
4. Install the attaching bolts finger tight.

(cont'd)

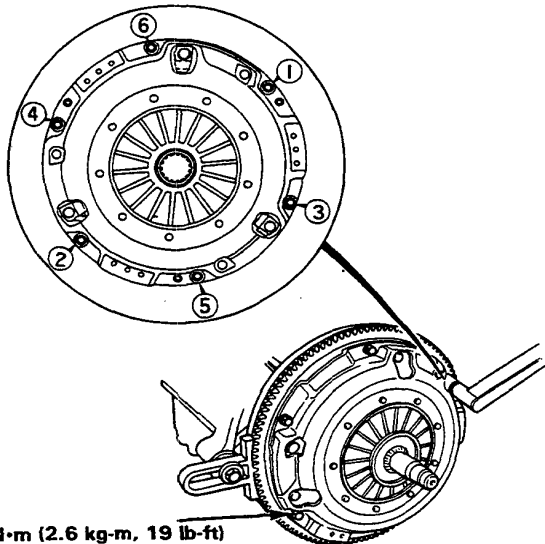
# Flywheel and Clutch Disc

## Installation

5. Insert the Clutch Disc Alignment Tool in the splined hole in the clutch disc.



6. Torque the bolts in a crisscross pattern as shown. Tighten them two turns at a time to prevent warping the diaphragm spring.

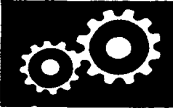


26 N·m (2.6 kg-m, 19 lb-ft)

7. Remove the Alignment Tool and Ring Gear Holder.

## **Manual Transmission**

<b>Transmission Oil .....</b>	<b>8-2</b>
<b>Back-up Light Switch .....</b>	<b>8-2</b>
<b>Gearshift Mechanism .....</b>	<b>8-3</b>
<b>Shift Arm Cover Assembly .....</b>	<b>8-5</b>
<b>Shift Arm Lever .....</b>	<b>8-7</b>
<b>Transmission .....</b>	<b>8-8</b>

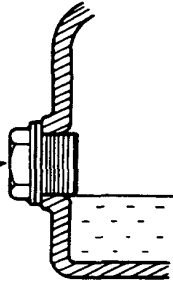


# Maintenance

## Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

**OIL FILLER PLUG**  
45 N·m (4.5 kg-m, 33 lb-ft)



## Oil Change

Use only SAE 10W-30 or 10W-40 oil rated SF grade

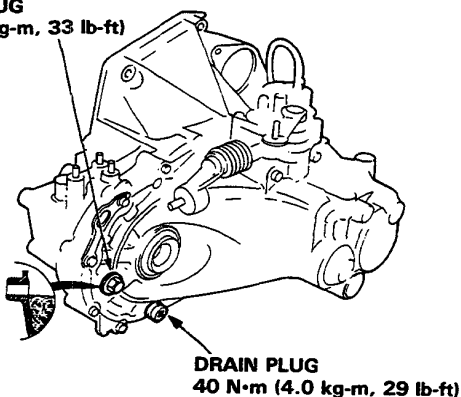
1. With transmission oil at operating temperature, engine OFF, and car on level ground, remove drain plug and drain transmission.
2. Reinstall drain plug with new washer, and refill to proper level.

**NOTE:** Drain plug washer should be replaced at every oil change.

## Oil Capacity

- 1.9 l (2.0 U.S. qt.) after drain.
- 2.0 l (2.1 U.S. qt.) after overhaul.

**OIL FILLER PLUG**  
45 N·m (4.5 kg-m, 33 lb-ft)



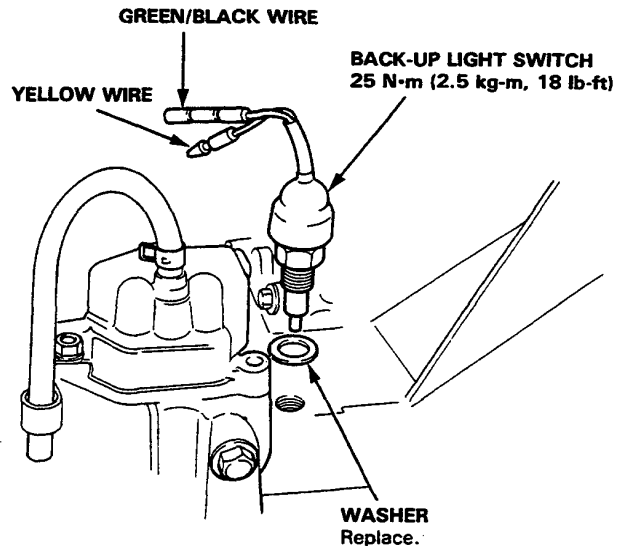
**DRAIN PLUG**  
40 N·m (4.0 kg-m, 29 lb-ft)

# Back-up Light Switch

## Replacement

**NOTE:** Check the switch see Section 16.

1. Disconnect the back-up light switch wire connectors.
2. Remove the back-up light switch.



3. Install the new washer and back-up light switch.



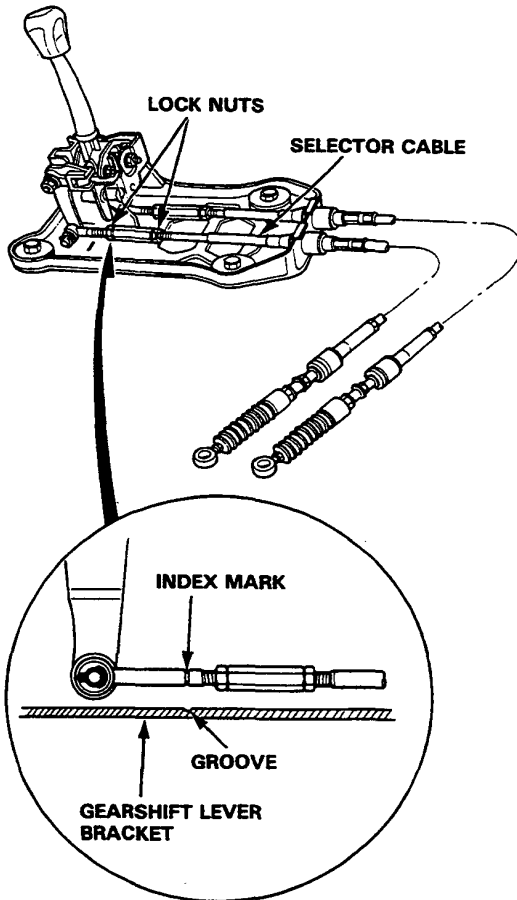
# Gearshift Mechanism



## Cable Adjustment

### Select Cable

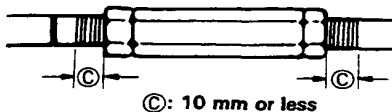
1. Remove the console.
2. With the transmission in neutral, check that the groove in the lever bracket is aligned with the index mark on the selector cable.



3. If the index mark is not aligned with the groove in the cable, loosen the lock nuts and turn the adjuster as necessary.

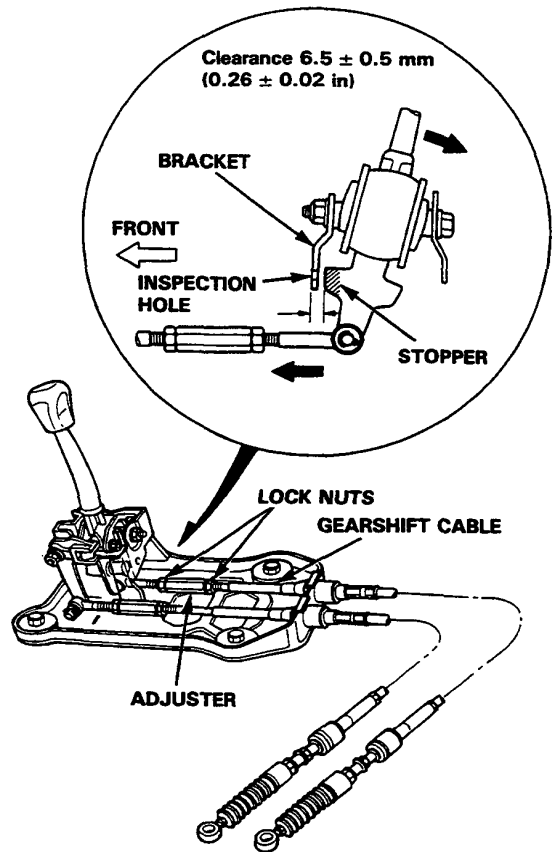
### NOTE:

- After adjustment, check operation of the gearshift lever.
- Also check that the threads (C) of the cables do not extend out of the cable adjuster by more than 10 mm (0.4 in.).



### Gearshift Cable

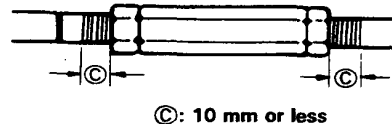
1. Remove the console.
2. Place the transmission in 4th gear.
3. Measure the clearance between the gearshift lever bracket and stopper while pushing the lever forward.



4. If the clearance is outside specifications, loosen the lock nuts and turn the adjuster in or out until the correct clearance is obtained.

### NOTE:

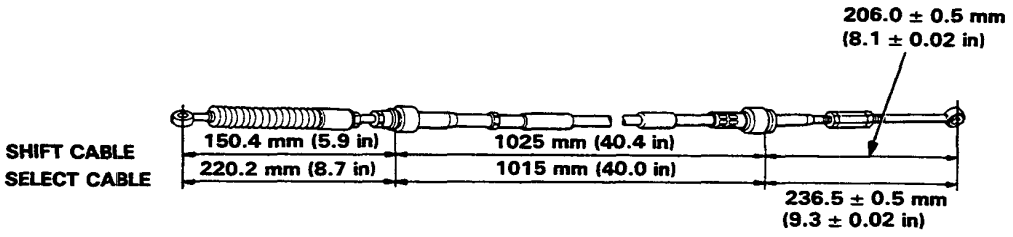
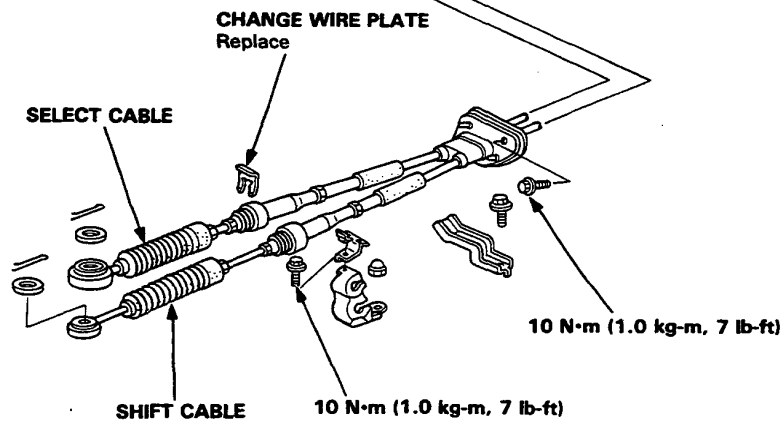
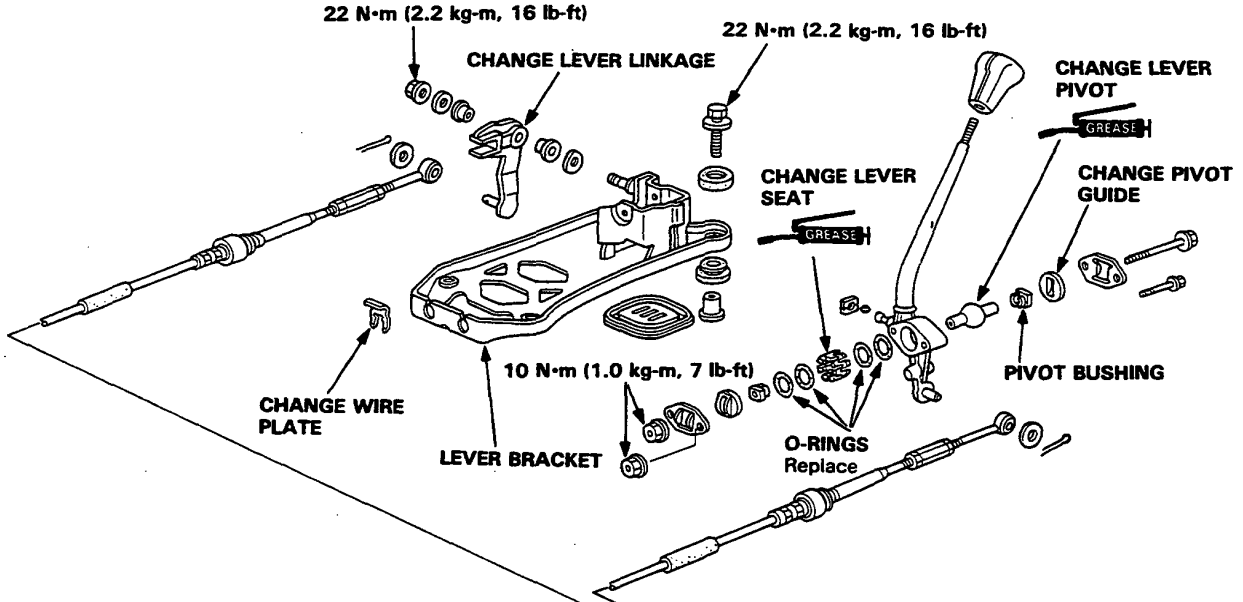
- After adjustment, check operation of the gearshift lever.
- Also check that the threads (C) of the cables do not extend out of the cable adjuster by more than 10 mm (0.4 in.).



# Gearshift Mechanism

## Gearshift Mechanism Overhaul

NOTE: Inspect rubber parts for wear or damage when disassembling.



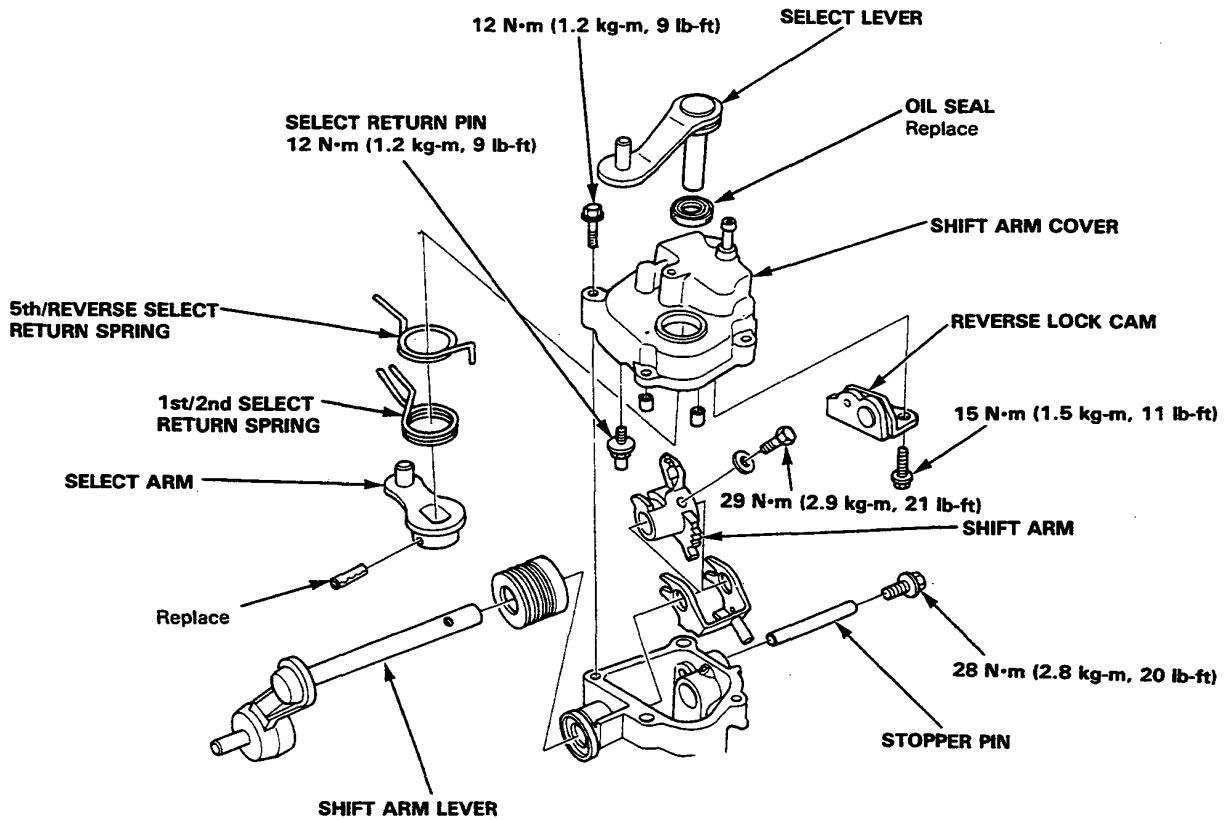
# Shift Arm Cover Assembly



## Index

### NOTE:

- The shift arm cover can be removed and installed with the transmission in the car.
- Lubricate all moving and sliding surfaces with grease.



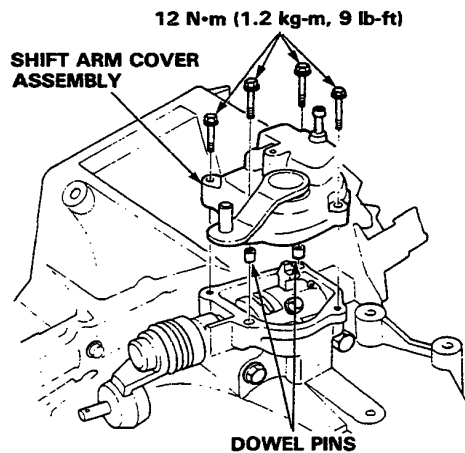
# Shift Arm Cover Assembly

## Replacement

**NOTE:** During replacement, apply a sealing compound on the sealing surface between the shift arm cover assembly and the transmission case.

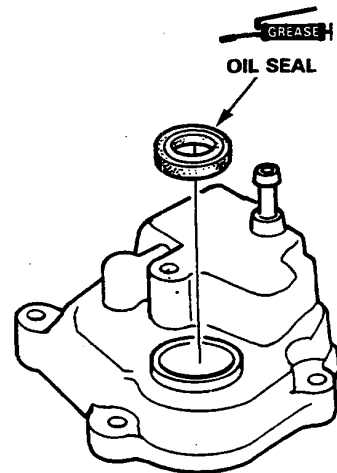
### CAUTION:

- Use Three Bond 1216 as a sealing compound.
- Remove all dirt and oil from the sealing surface.
- Apply the sealing compound on the central part of the sealing surface.
- Seal the entire circumference of the bolt hole to prevent oil leakage.
- When the sealing surface has remained untouched for more than 20 minutes after application of the sealing compound, do not replace the parts without sealing the surface again.
- Refill the oil after 30 minutes after replacement.

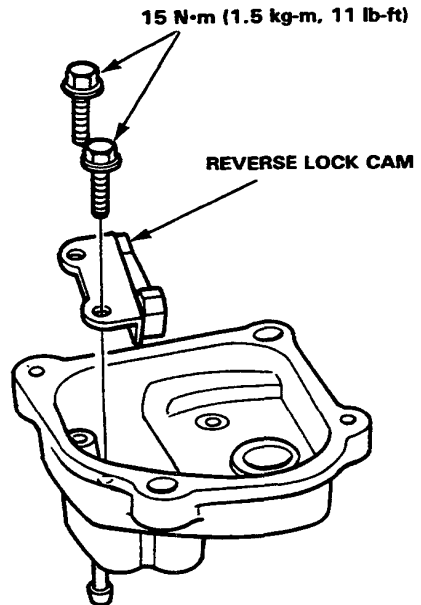


## Reassembly

1. Install the oil seal in the shift arm cover.



2. Fix the reverse lock cam.

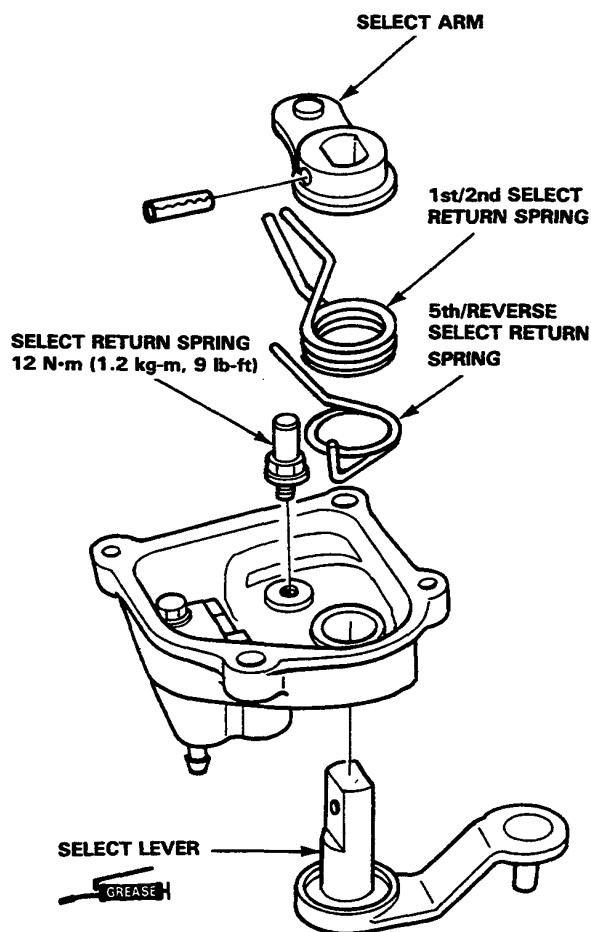




# Shift Arm Lever

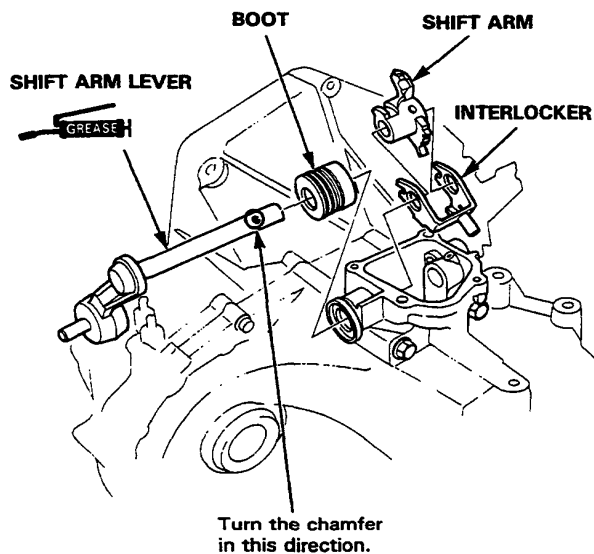
## Reassembly

3. Insert the select lever into the select arm then, press the spring pin into the select arm and lever with pliers.

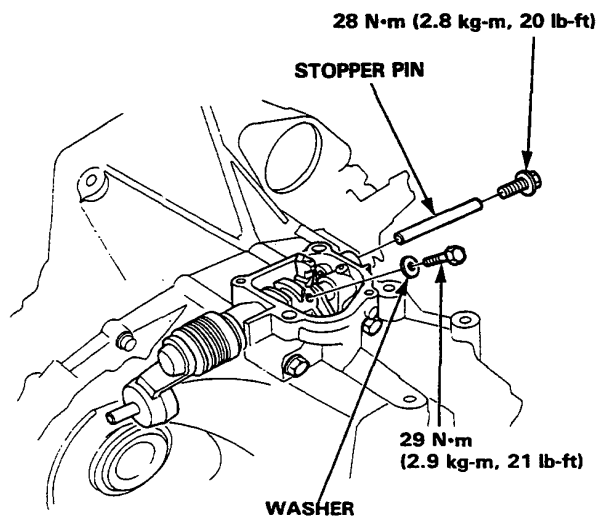


NOTE: During reassembly, grease all sliding parts.

1. Insert the shift arm into the interlock.
2. Place the boot onto the shift arm lever.
3. Insert the shift lever through the shift arm and interlock.



4. Insert the stopper pin into the interlock, then tighten the flange bolt.
5. Align shift arm and shift arm lever holes, then insert and tighten the 8 mm bolt.



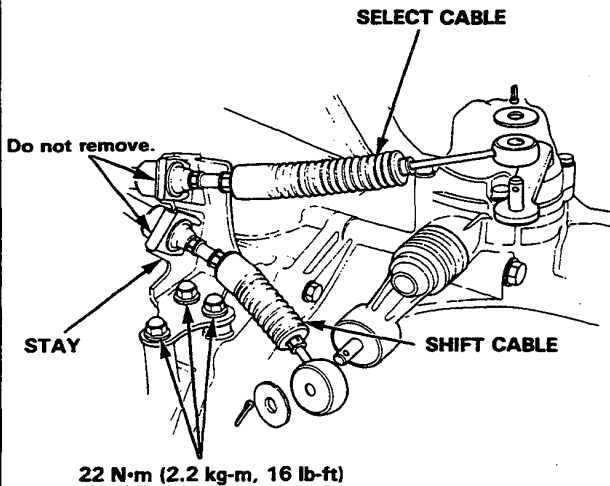
# Transmission Assembly

## Removal

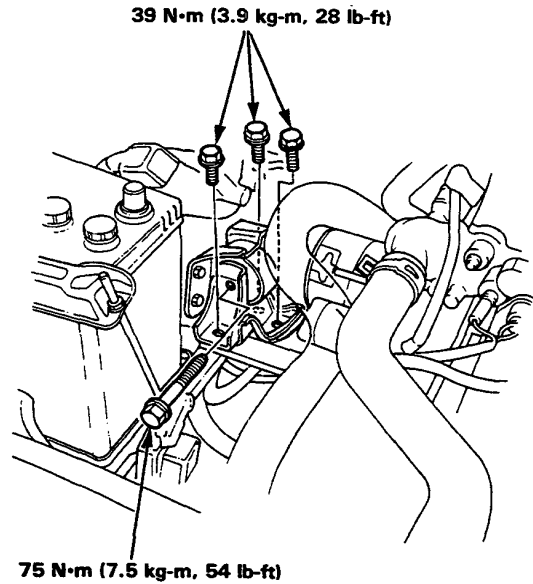
1. Disconnect the ground cable at the battery and the transmission.
2. Disconnect the wiring for:
  - Starter motor.
  - Back-up light switch
3. Remove the air cleaner case (PGM-FI only).
4. Remove the power steering speed sensor from the transmission without removing the power steering hoses.
5. Remove the shift cable and the select cable from the top cover of the transmission. Remove the mounting bolt from the cable stay.

### NOTE:

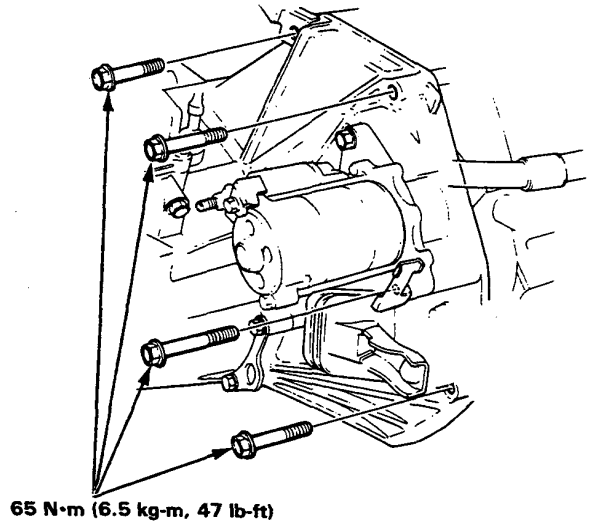
Do not bend or kink the cable more than necessary. Remove both cables and the stay together.



6. Remove the upper transmission mounting bracket.

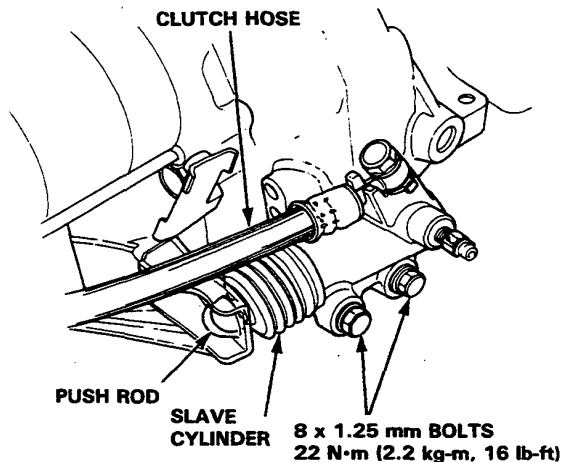


7. Remove the 4 transmission-to-block attachment bolts that must be removed from the engine compartment.

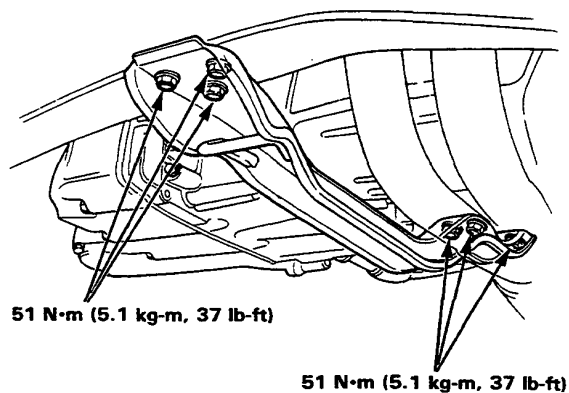




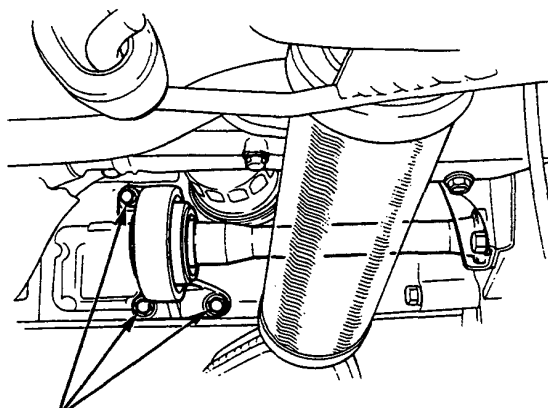
8. Raise the vehicle from reinforced lift points.
9. Remove both front wheels.
10. Remove the undercarriage splash shield.
11. Drain transmission oil.
12. Remove the clutch slave cylinder.



13. Remove the center beam.

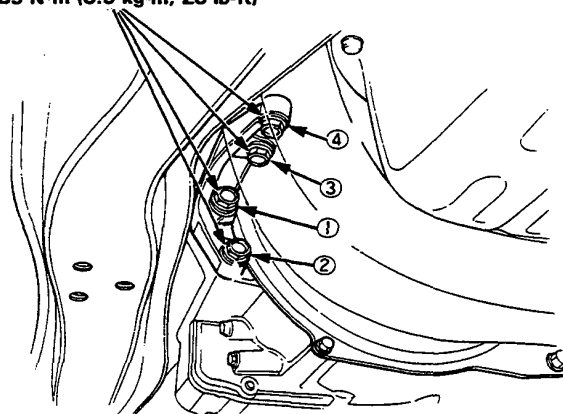


14. Remove the right radius rod completely.
15. Remove right and left drive shaft.
16. Remove the left half shaft.



17. Remove the engine stiffener.

**39 N·m (3.9 kg-m, 28 lb-ft)**

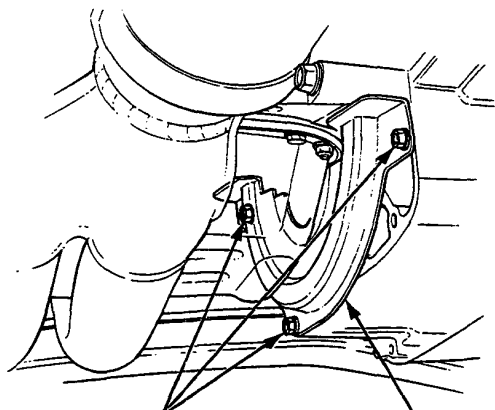


(cont'd)

# Transmission

## Removal (cont'd)

18. Remove the clutch cover.



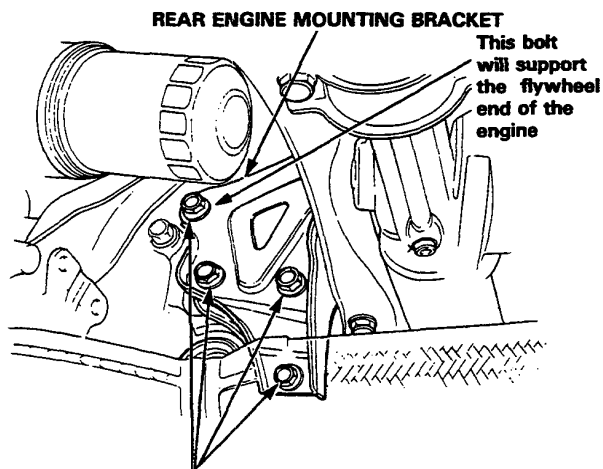
12 N·m (1.2 kg-m, 9 lb-ft)

CLUTCH COVER

19. Support transmission with an appropriate jack.

20. Remove the 3 lower bolts from the rear engine mounting bracket.

Loosen but do not remove the top bolt. This bolt will support the weight of the engine.



REAR ENGINE MOUNTING BRACKET

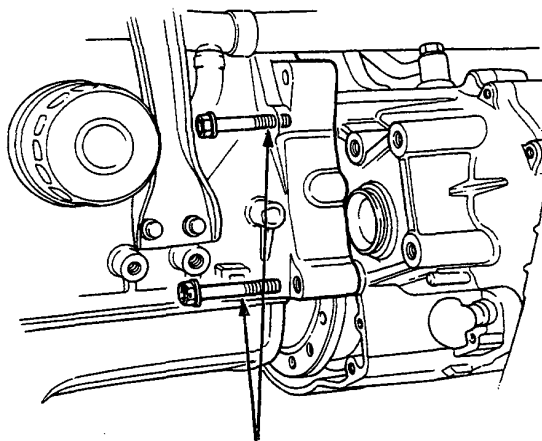
This bolt will support the flywheel end of the engine

SPECIAL BOLTS

75 N·m (7.5 kg-m, 54 lb-ft)

Replae

21. Remove the 2 remaining engine-to-transmission mounting bolts.



12 x 1.25 mm BOLTS

65 N·m (6.5 kg-m, 47 lb-ft)

Replace

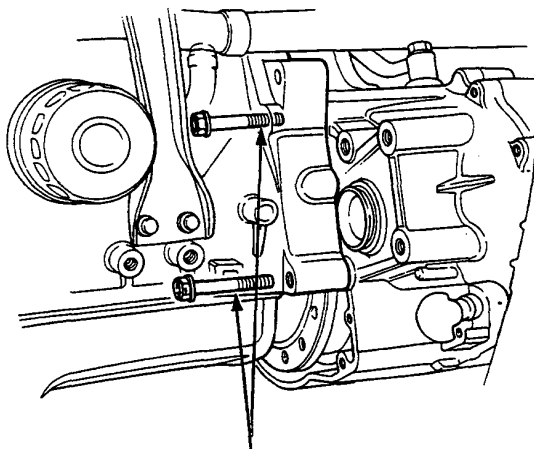
22. With the transmission on an appropriate jack, disengage the in put shaft from the clutch disc.





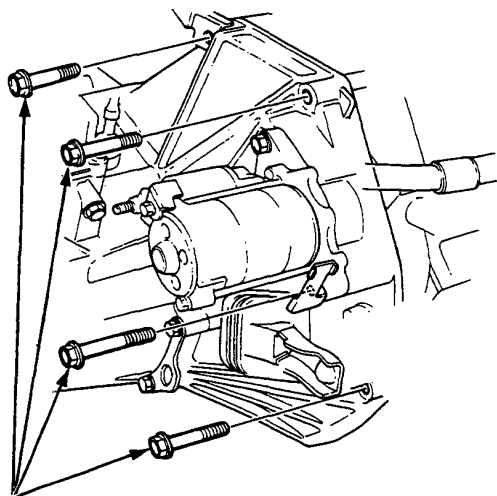
## Installation

1. Attach the 14 mm dowel pin to the transmission.
2. Support the transmission with a jack or by some other means.
3. Tighten the transmission mount bolt on the engine side.



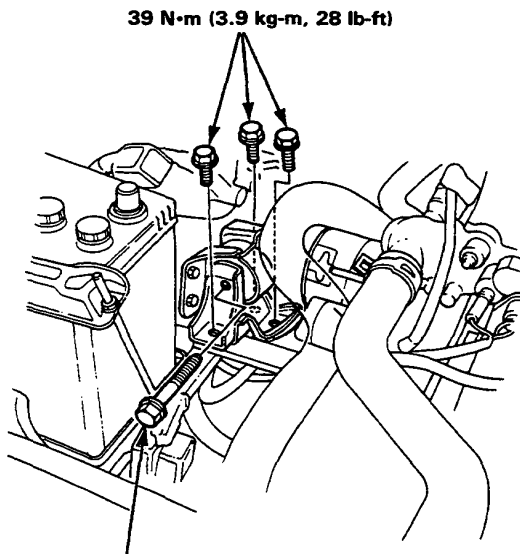
12 x 1.25 mm BOLT  
65 N·m (6.5 kg-m, 47 lb-ft)  
Replace

4. Tighten the transmission mount bolt on the transmission side.



12 x 1.25 mm BOLT  
65 N·m (6.5 kg-m, 47 lb-ft)

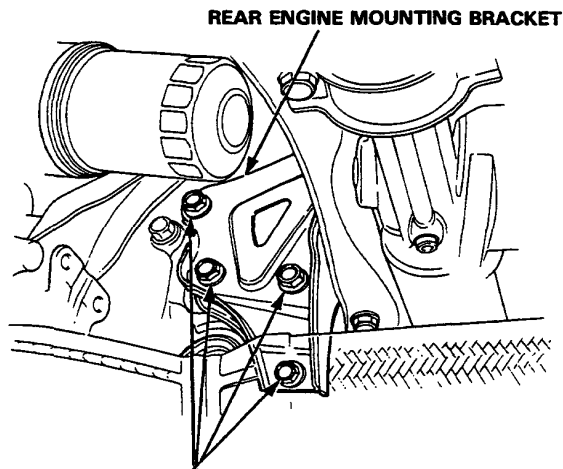
5. Attach the transmission mounting bracket.



39 N·m (3.9 kg-m, 28 lb-ft)

75 N·m (7.5 kg-m, 54 lb-ft)

6. Attach the transmission fixing bolt to the rear engine mounting bracket and tighten it.



REAR ENGINE MOUNTING BRACKET

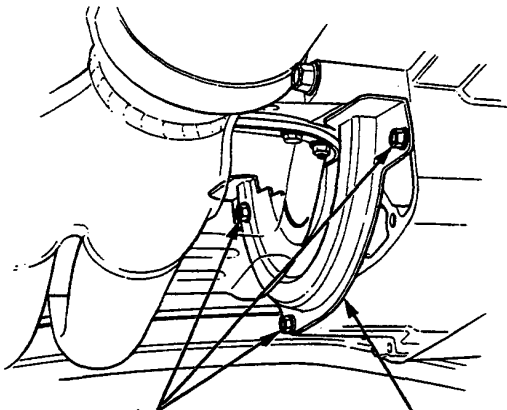
SPECIAL BOLTS  
75 N·m (7.5 kg-m, 54 lb-ft)  
Replace

(cont'd)

# Transmission

## Installation (cont'd)

7. Attach the clutch cover.



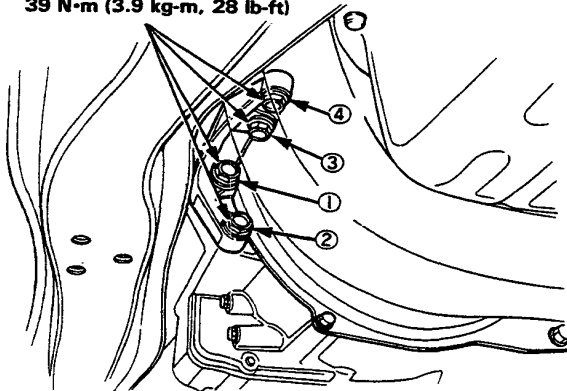
12 N·m (1.2 kg-m, 9 lb-ft)

CLUTCH COVER

8. Attach the engine stiffener.

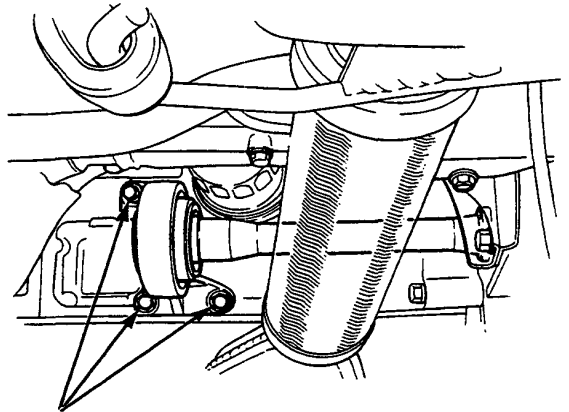
NOTE: Tighten bolts ① to ④ in order to torque specified below.

39 N·m (3.9 kg-m, 28 lb-ft)



9. Attach the intermediate shaft.

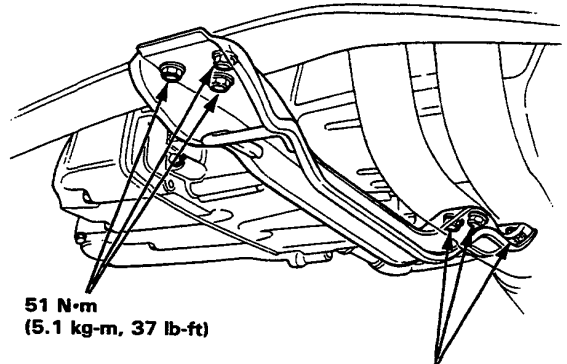
10. Attach the right and left drive shaft.



10 x 1.25 mm BOLT

39 N·m (3.9 kg-m, 28 lb-ft)

11. Attach the center beam.

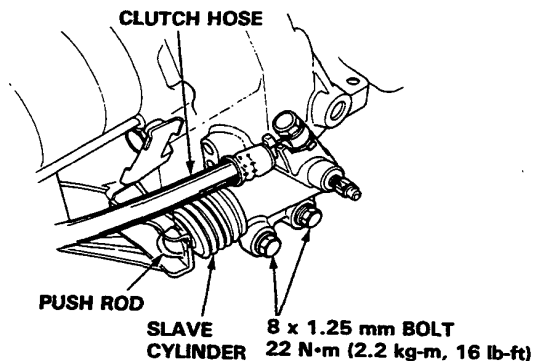


51 N·m  
(5.1 kg-m, 37 lb-ft)

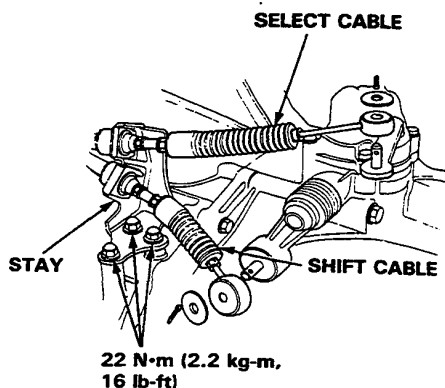
51 N·m  
(5.1 kg-m, 37 lb-ft)



12. Attach the clutch slave cylinder with the clutch hose and push rod.



13. Attach the transmission side shift cable and select cable to the shift arm lever and to select lever respectively.
14. Connect the back-up light switch coupler.
15. Attach the right and left front damper forks.
16. Attach the speed sensor assembly.
17. Attach the air cleaner case.
18. Connect the starter motor cable and the ground cable.
19. Connect the battery wire through the positive terminal.
20. Attach the front wheels.
21. Refill transmission with oil.



22. Check and adjust the following items after reassembly.

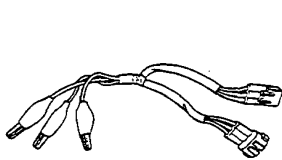
- 1. Transmission has been refilled.
- 2. The clip at the tip of the drive shaft is completely inserted into the groove of the differential or intermediate shaft.
- 3. Clutch free play.
- 4. Shift the change to check, by the change lever, if the gears are properly enmeshed.

# AUTOMATIC TRANSMISSION

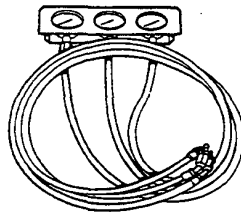
<b>Special Tools</b> .....	<b>9-1</b>	<b>Hydraulic System</b>	
<b>Description</b> .....	<b>9-2</b>	<b>Symptom-to-Component Chart</b> .....	<b>9-40</b>
<b>Component Locations</b> .....	<b>9-4</b>	<b>Road Testing</b> .....	<b>9-42</b>
<b>Circuit Diagram</b> .....	<b>9-8</b>	<b>Pressure Testing</b> .....	<b>9-46</b>
<b>Troubleshooting Procedures</b> .....	<b>9-12</b>	<b>Stall Speed</b> .....	<b>9-49</b>
<b>Electrical System</b>		<b>Fluid Level</b> .....	<b>9-50</b>
<b>Symptom-to-Component Chart</b> .....	<b>9-14</b>	<b>Transmission Removal</b> .....	<b>9-51</b>
<b>Troubleshooting Flow Charts</b> .....	<b>9-16</b>	<b>Transmission Installation</b> .....	<b>9-54</b>
<b>Throttle Angle Sensor</b> .....	<b>9-36</b>	<b>Shift Indicator Light</b> .....	<b>9-56</b>
<b>A/T Speed Pulser</b> .....	<b>9-37</b>	<b>Shift Indicator Panel</b> .....	<b>9-56</b>
<b>Lock-up Control Solenoid Valve</b>		<b>Gearshift Selector</b> .....	<b>9-57</b>
<b>A/B</b> .....	<b>9-38</b>	<b>Shift Cable</b> .....	<b>9-58</b>
<b>Shift Control Solenoid Valve A/B</b> .....	<b>9-39</b>	<b>Throttle Control Cable Bracket</b> .....	<b>9-59</b>
<b>S<sub>4</sub> Switch</b> .....	<b>9-39</b>	<b>Throttle Control Cable</b> .....	<b>9-59</b>

## Special Tools

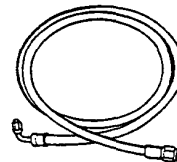
Ref. No.	Tool Number	Description	Remarks
①	07GMJ-ML80100	Inspection Adaptor	Carburated engine only
②	07406-0020003	Oil Pressure gauge Set	
②-1	07406-0020201	Oil Pressure gauge hose	Component Tool
③	07998-SA50000	Accelerator Pedal weight Set	Carburated engine only
③-1	07998-SA50200	Accelerator Pedal weight Sub Adaptor 0.5 kg-m	
③-2	07998-SA50100	Accelerator Pedal weight Main Adaptor 1.0 kg-m	
④	07HAJ-PK40100	AT throttle gauge	Carburated engine only



①



②



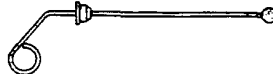
②-1



③-1



③-2



④

③



# Description

The Automatic Transmission is a combination of a 3-element torque converter and dual-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 speed 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 two parallel shafts, the mainshaft and countershaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).

The countershaft includes 3rd clutch and gears for 3rd, and 4th, Reverse and 1st.

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 are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide

**[S]**, **[D]**, **[2]** and **[R]**.

## **Electronic Control**

The electronic control system consists of an automatic control unit, sensors, and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

The A/T control unit is located below the dash under the carpet on the passenger's side of the car.

## **HYDRAULIC CONTROL**

The valve assembly includes the main valve body, secondary valve body, servo valve body, regulator valve body and lock-up timing valve 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, cooler relief valve, orifice control valve, lock-up shift valve, lock-up timing valve, 2nd kickdown valve and oil pump gears.

The secondary valve body includes the clutch pressure control valve, 3rd kickdown valve, modulator valve, throttle valve B and the 2nd orifice control valve.

The servo valve body contains the accumulator pistons and throttle valve A. The regulator valve body contains pressure regulator valve and lock-up control valve. Fluid from the regulator passes through the manual valve to the various control valves.

The lock-up timing valve body contains a pressure relief valve and torque converter check valve. The 1st, 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 **[S]** or **[D]**, 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 mechanism.

The lock-up shift valve 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.



## GEAR SELECTION

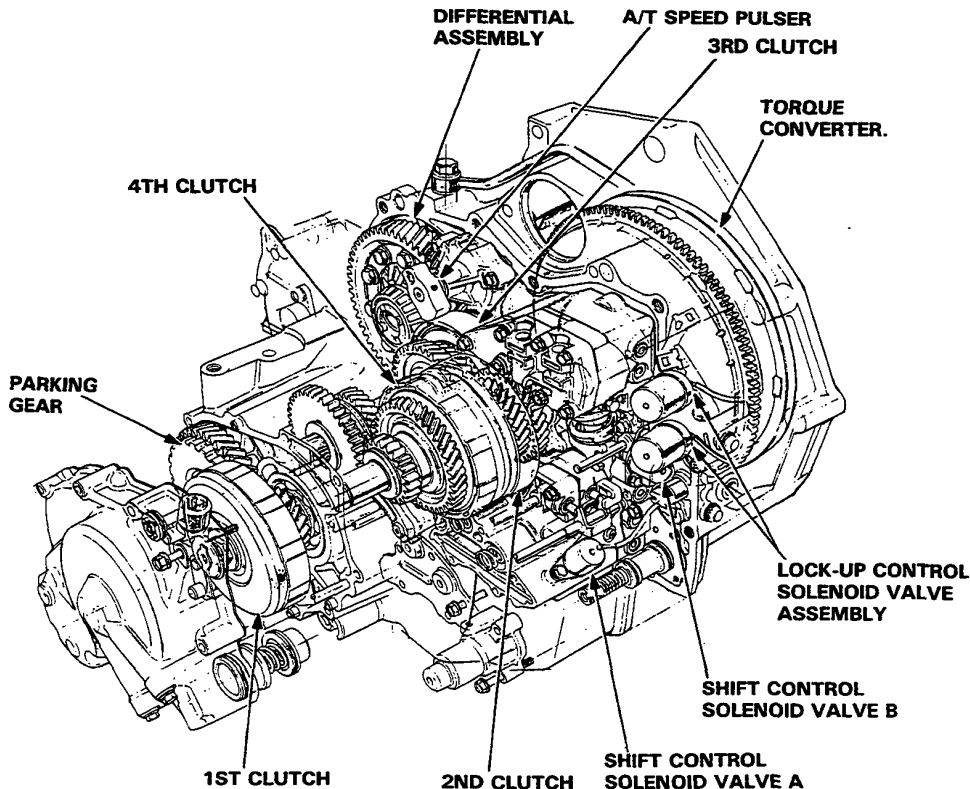
The selector lever has six positions: **P** PARK, **R** REVERSE, **N** NEUTRAL, **D** 1st through 4th gear ranges, **S** 1st through 3rd and then 4th (**S4 ON**) gear ranges, and **2** 2nd gear.

Position	Description
<b>P</b> PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
<b>R</b> REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
<b>N</b> NEUTRAL	All clutches released.
<b>D</b> DRIVE	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in 2nd, 3rd and 4th when the transmission is in <b>D</b> and <b>S</b> .
<b>S</b> SPORTS (1 through 3, or S4 ON)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd, then 3rd ( <b>S</b> ), and then 4th ( <b>S4 ON</b> ) depending on vehicle speed and throttle position. Downshifts through lower gears on deceleration to stop.
<b>2</b> SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.

Starting is possible only in **P** and **N** through use of a slide-type, neutral-safety switch.

## POSITION INDICATOR

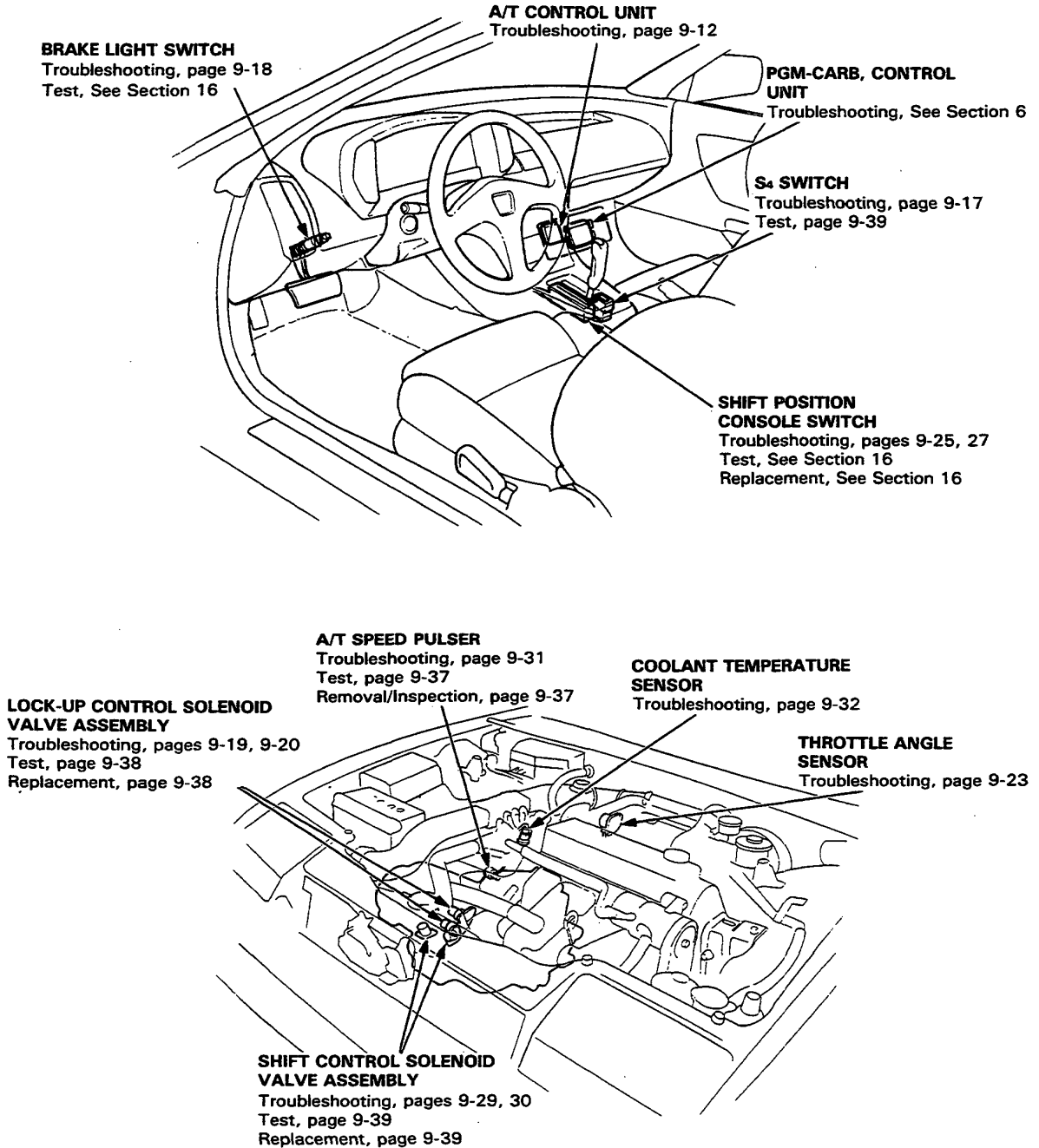
A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.



# Component Locations

## Carbureted engine:

LHD:





RHD:

**PGM-CARB, CONTROL UNIT**

Troubleshooting, See Section 6

**A/T CONTROL UNIT**

Troubleshooting, page 9-12

**BRAKE LIGHT SWITCH**

Troubleshooting, page 9-18  
Test, See Section 16

**S<sub>4</sub> SWITCH**

Troubleshooting, page 9-17  
Test, See page 9-39

**SHIFT POSITION  
CONSOLE SWITCH**

Troubleshooting, pages 9-25, 27  
Test, See Section 16  
Replacement, See Section 16

**A/T SPEED PULSER**

Troubleshooting, page 9-31  
Test, page 9-37  
Removal/Inspection, page 9-37

**COOLANT TEMPERATURE  
SENSOR**

Troubleshooting, page 9-32

**LOCK-UP CONTROL SOLENOID  
VALVE ASSEMBLY**

Troubleshooting, pages 9-19, 20  
Test, page 9-38  
Replacement, page 9-38

**THROTTLE ANGLE  
SENSOR**

Troubleshooting, page 9-23

**SHIFT CONTROL SOLENOID  
VALVE ASSEMBLY**

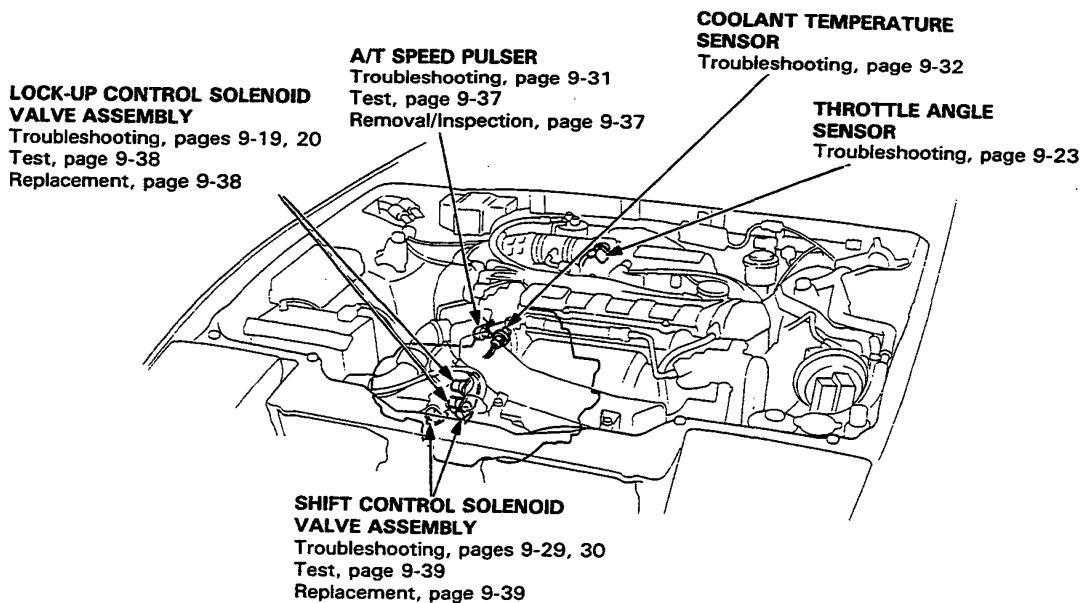
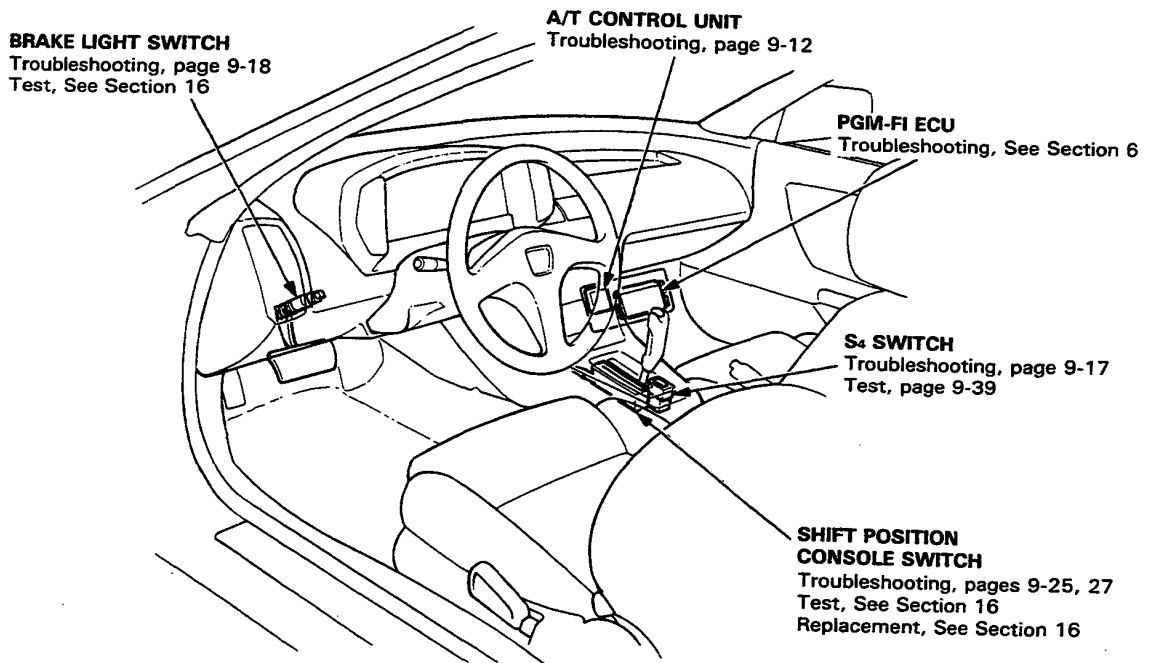
Troubleshooting, pages 9-29, 30  
Test, page 9-39  
Replacement, page 9-39



# Component Locations

## Fuel-Injected engine:

LHD:





RHD:

**PGM-FI ECU**  
Troubleshooting, See Section 6

**A/T CONTROL UNIT**  
Troubleshooting, page 9-12

**BRAKE LIGHT SWITCH**  
Troubleshooting, page 9-18  
Test, See Section 16

**S<sub>4</sub> SWITCH**  
Troubleshooting, page 9-17  
Test, page 9-39

**SHIFT POSITION  
CONSOLE SWITCH**  
Troubleshooting, pages 9-25, 27  
Test, See Section 16  
Replacement, See Section 16

**A/T SPEED PULSER**  
Troubleshooting, page 9-31  
Test, page 9-37  
Removal/Inspection, page 9-37

**LOCK-UP CONTROL SOLENOID  
VALVE ASSEMBLY**  
Troubleshooting, pages 9-19, 20  
Test, page 9-38  
Replacement, page 9-38

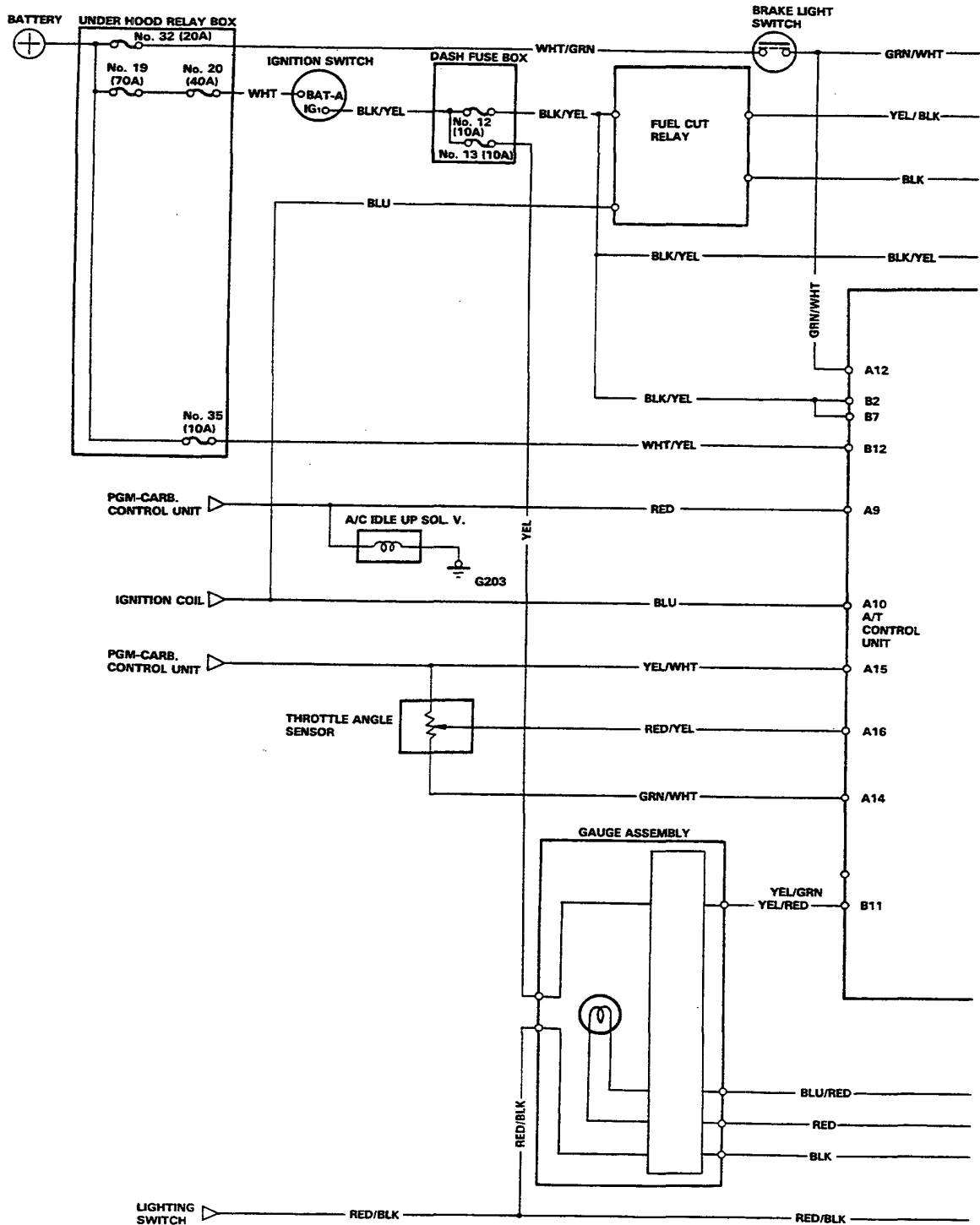
**COOLANT TEMPERATURE  
SENSOR**  
Troubleshooting, page 9-32

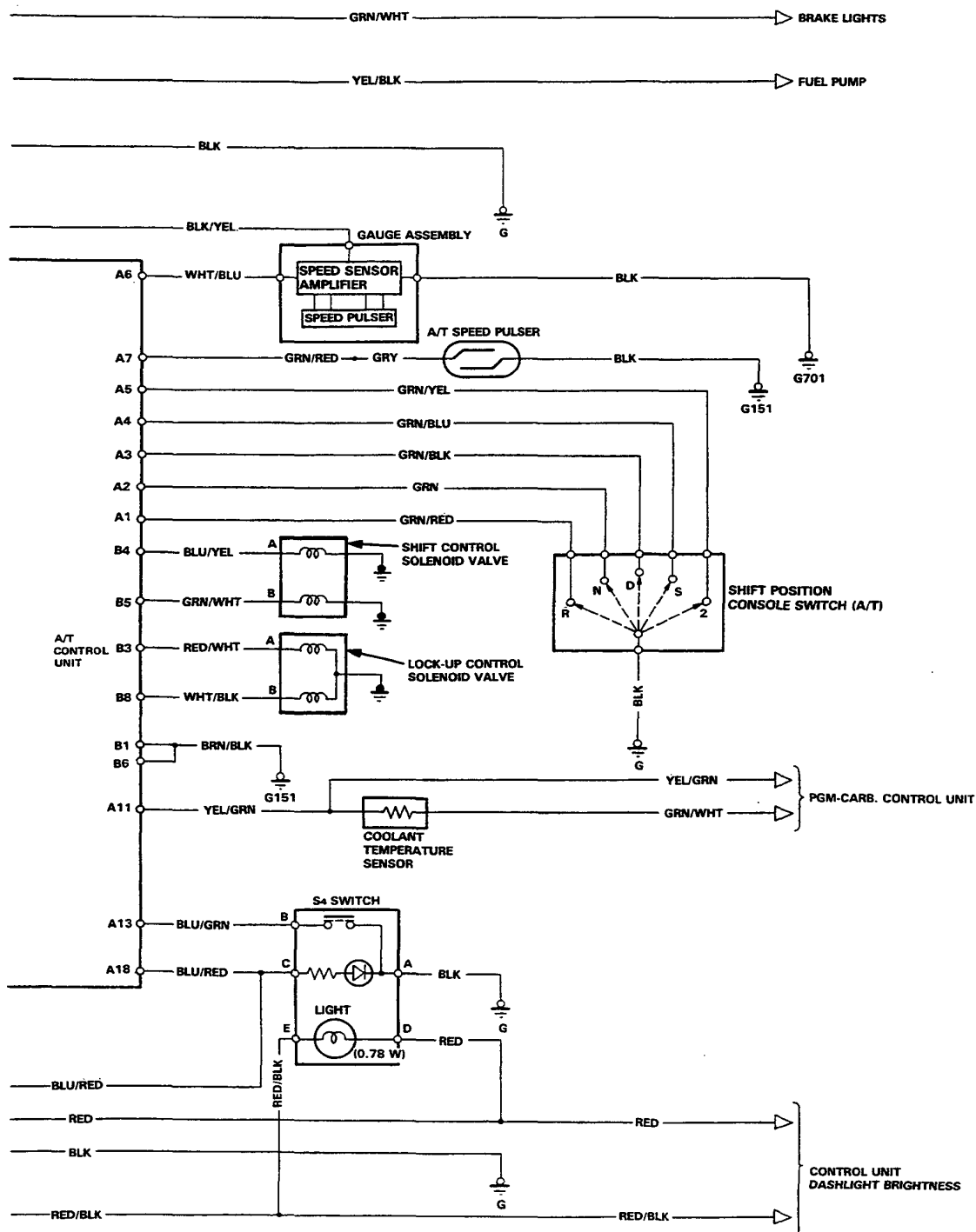
**THROTTLE ANGLE  
SENSOR**  
Troubleshooting, page 9-23

**SHIFT CONTROL SOLENOID  
VALVE ASSEMBLY**  
Troubleshooting, pages 9-29, 30  
Test, page 9-39  
Replacement, page 9-39

# Circuit Diagram

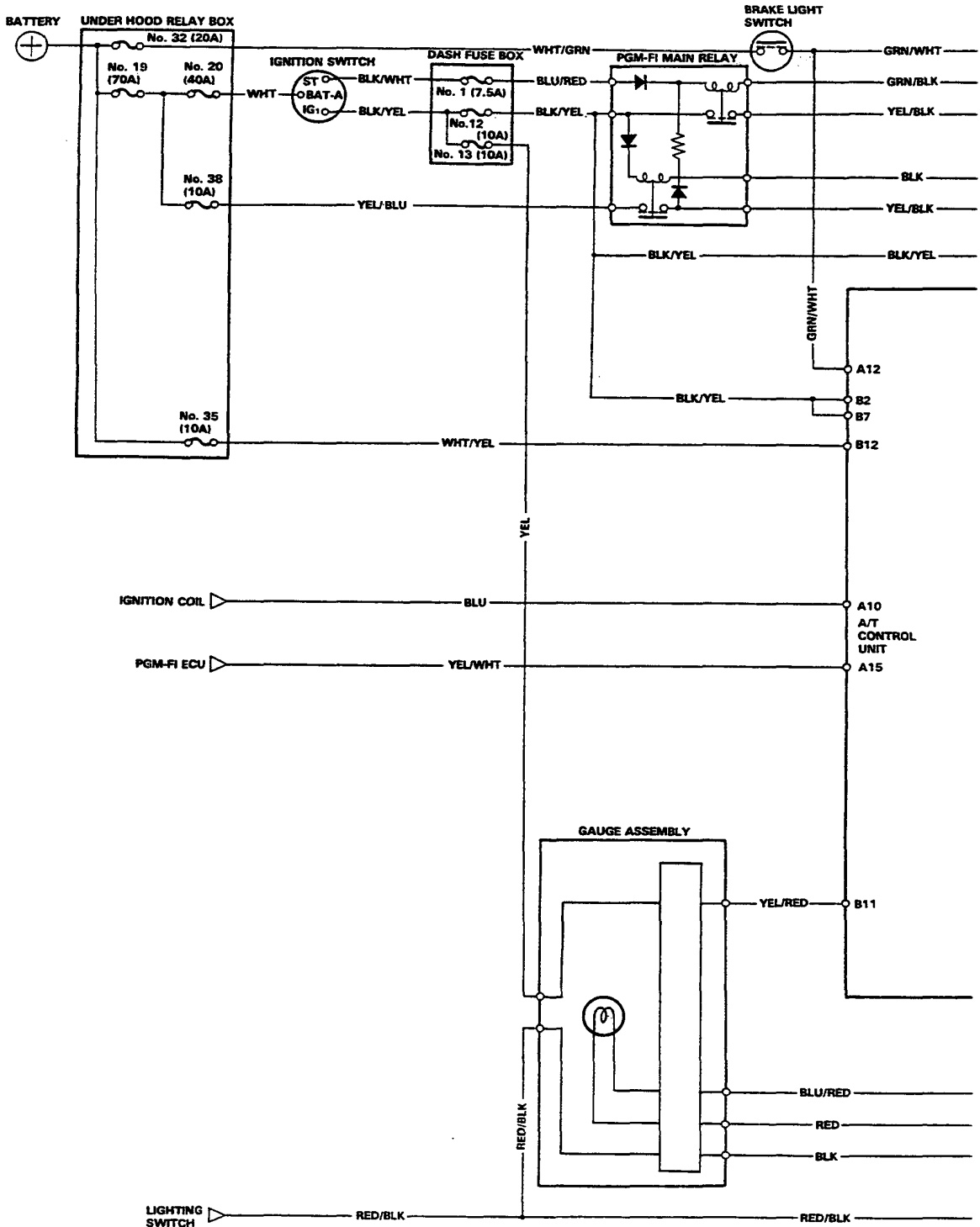
Carbureted engine:

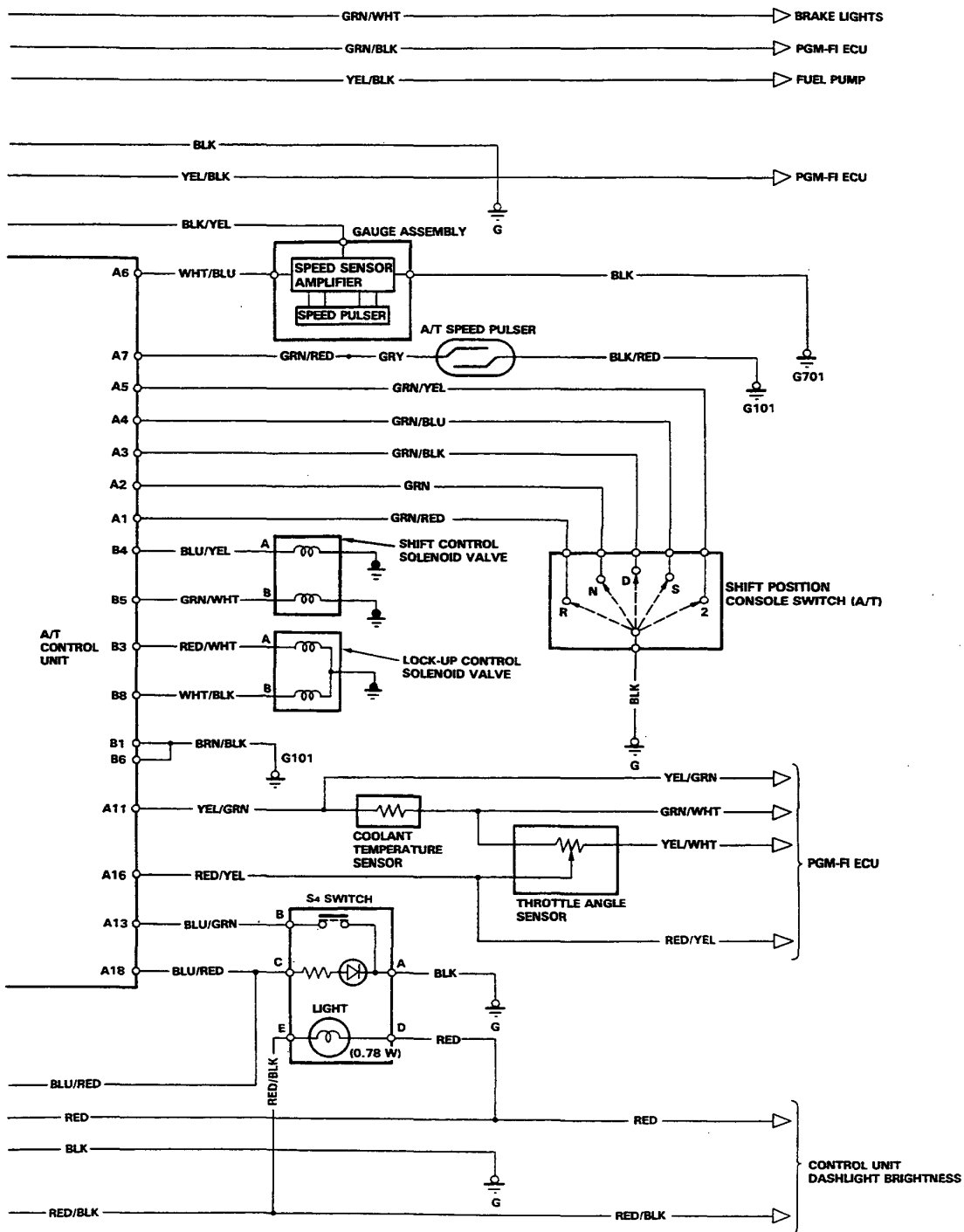




# Circuit Diagram

Fuel-injected engine:

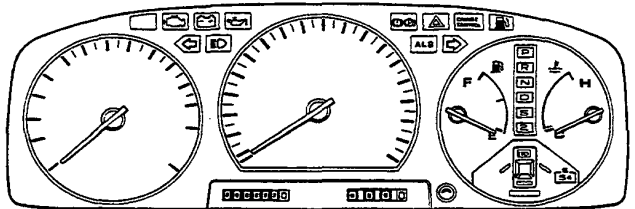
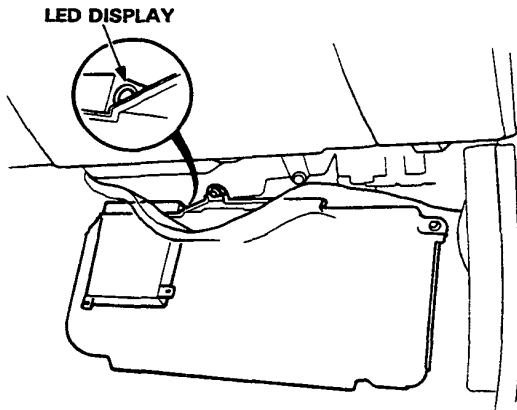




# Troubleshooting Procedures

The A/T Control Unit has a built-in self-diagnosis function. The S indicator light in the gauge assembly and LED display on the A/T control unit blink when the A/T control unit senses an abnormality in the input or output systems. The number of blinks from the LED display varies according to the problem, which can be diagnosed by counting the number of blinks.

For problem diagnosis count the number of blinks from the LED display as shown on the Symptom-to-Component Chart on page 9-14. If no abnormality is found from your inspection, refer to the hydraulic system Symptom-to-Component Chart on page 9-40.



When the ignition switch is turned ON, the S indicator light comes on for about two seconds regardless of whether there is a problem. The S indicator light will also come on when in S mode.

If there is a system problem, the S indicator light will come on and continue to blink until the ignition key is turned OFF. When the ignition key is turned ON again, the S indicator light will not blink again for the original problem. But if the A/T control unit senses the original abnormality again with ignition switch ON, the S indicator light will blink again for the original problem. Therefore, even though the S indicator light does not come on when turning the ignition key ON, check the LED display for automatic transmission problem diagnosis.

Since the LED problem code is retained in memory, it will blink again whenever the ignition key is turned on. If the LED problem code is not memorized, check the following causes:

- Check the EFI ECU fuse (10A) in the under-hood relay box.
- Check for an open circuit in the WHT/YEL wire between the EFI ECU fuse (10A) and A/T control unit B12 terminal.

After making repair, disconnect the EFI ECU fuse (10A) in the under-hood relay box for more than ten seconds to reset LED display memory.

# Symptom-to-Component Chart

## Electrical System

Number of LED display blinks	S indicator light	Symptom	Probable Cause	Ref. page
1	Blinks	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> <li>Lock-up-clutch does not disengage.</li> <li>Frequent engine stalling.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected lock-up control solenoid valve A connector</li> <li>Open or short in lock-up control solenoid valve A wire</li> <li>Faulty lock-up control solenoid valve A</li> </ul>	9-19
2	Blinks	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected lock-up control solenoid valve B connector</li> <li>Open or short in lock-up control solenoid valve B wire</li> <li>Faulty lock-up control solenoid valve B</li> </ul>	9-20
3	Blinks or OFF	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected throttle angle sensor connector</li> <li>Open short in throttle angle sensor wire</li> <li>Faulty throttle angle sensor</li> </ul>	9-21 9-23
4	Blinks	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected speed pulser connector</li> <li>Open or short in speed pulser wire</li> <li>Faulty speed pulser</li> </ul>	9-24
5	Blinks	<ul style="list-style-type: none"> <li>Fails to shift other than 2nd ↔ 4th gear.</li> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Short in shift position console switch wire</li> <li>Faulty shift position console switch</li> </ul>	9-25
6	OFF	<ul style="list-style-type: none"> <li>Fails to shift other than 2nd ↔ 4th gear.</li> <li>Lock-up clutch does not engage.</li> <li>Lock-up clutch engages and disengages alternately.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected shift position console switch connector</li> <li>Open in shift position console switch wire</li> <li>Faulty shift position console switch.</li> </ul>	9-27
7	Blinks	<ul style="list-style-type: none"> <li>Fails to shift other than 1st ↔ 4th, 2nd ↔ 4th, or 2nd ↔ 3rd gears.</li> <li>Fails to shift (stuck in 4th gear).</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected shift control solenoid valve A connector</li> <li>Open or short in shift control solenoid valve A wire</li> <li>Faulty shift control solenoid valve A</li> </ul>	9-29
8	Blinks	<ul style="list-style-type: none"> <li>Fails to shift (stuck in 1st gear or 4th gear).</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected shift control solenoid valve B connector</li> <li>Open or short in shift control solenoid valve B wire</li> <li>Faulty shift control solenoid valve B</li> </ul>	9-30
9	Blinks	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected A/T speed pulser</li> <li>Open or short in A/T speed pulser wire</li> <li>Faulty A/T speed pulser</li> </ul>	9-31
10	Blinks	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected coolant temperature sensor connector</li> <li>Open or short in coolant temperature sensor wire</li> <li>Faulty coolant temperature sensor</li> </ul>	9-32 9-33
11	OFF	<ul style="list-style-type: none"> <li>Lock-up clutch does not engage.</li> </ul>	<ul style="list-style-type: none"> <li>Disconnected ignition coil connector</li> <li>Open or short in ignition coil wire</li> <li>Faulty ignition coil</li> </ul>	9-34

### NOTE:

- If a customer describes the symptoms for codes 3, 6 or 11, yet the LED is not blinking, it will be necessary to recreate the symptom by test driving, and then checking the LED with the ignition STILL ON.
- If the LED display blinks 12 or more times, the control unit is faulty.





If the self-diagnosis LED indicator does not blink, perform an inspection according to the table listed below.

Symptom	INSPECTION		Probable Cause	Ref. page
	Carbureted engine	Fuel-injected engine		
<ul style="list-style-type: none"> <li>• S<sub>3</sub> indicator light does not come on with the ignition switch ON (S indicator light should come on for about 2 sec.).</li> <li>• Fails to shift (stuck in 4th gear).</li> </ul>	①	①	<ul style="list-style-type: none"> <li>① • Loosely or poorly connected power line to control unit or disconnected control unit ground wire</li> <li>• Open or short in S indicator light wire</li> <li>• Blown S indicator light bulb</li> </ul>	9-16
<ul style="list-style-type: none"> <li>• S<sub>4</sub> won't engage.</li> </ul>	②	②	<ul style="list-style-type: none"> <li>② • Open or short in S<sub>4</sub> switch wire</li> <li>• Faulty S<sub>4</sub> switch</li> </ul>	9-17
<ul style="list-style-type: none"> <li>• At first, you step on the brake pedal with shift lever in N range, then fails to shift from 2nd to 1st gear when releasing brake pedal with shift lever shifted in S or D range from N range.</li> </ul>	③	③	<ul style="list-style-type: none"> <li>③ • Open or short in brake light switch wire</li> </ul>	9-18
<ul style="list-style-type: none"> <li>• Lock-up clutch turns ON and turns OFF alternately.</li> </ul>	④		<ul style="list-style-type: none"> <li>④ • Faulty A/C idle up solenoid valve driving signal.</li> </ul>	9-35
<ul style="list-style-type: none"> <li>• Lock-up clutch does not engage.</li> </ul>	④			

# Electrical Troubleshooting

## Troubleshooting Flow Chart

**S indicator light does not come on with the ignition switch ON. (It should come on for about 2 sec.)**

Disconnect the 12 P connector from the control unit.

Check for continuity between the B1 (BRN/BLK) terminal and body ground, and between the B6 (BRN/BLK) terminal and body ground.

Is there continuity? NO

Repair open in BRN/BLK wire between the B1 terminal and G101/G151 and/or between the B6 terminal and G101/G151.

Turn the ignition switch ON.

Measure voltage between the B2 (BLK/YEL) and B1 (BRN/BLK) terminals, and between the B7 (BLK/YEL) and B1 terminals.

Is there battery voltage? NO

Repair open or short in BLK/YEL wire between the B2/B7 terminal and the dash fuse box.

Turn the ignition switch OFF.

Measure resistance between the B11 (YEL/RED) and B1 (BRN/BLK) terminals.

Is the resistance more than 100  $\Omega$ ? NO

Repair Short in YEL/RED wire between the B11 terminal and the gauge assembly.

Connect the 12P connector to the control unit.

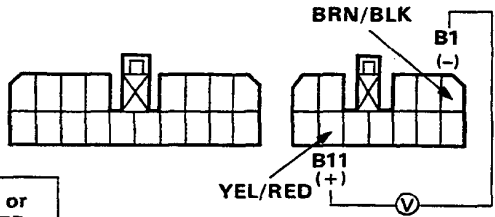
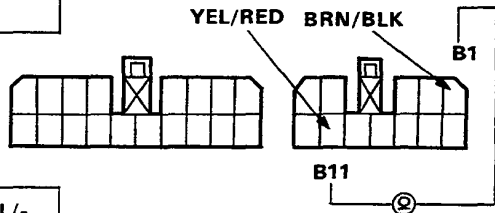
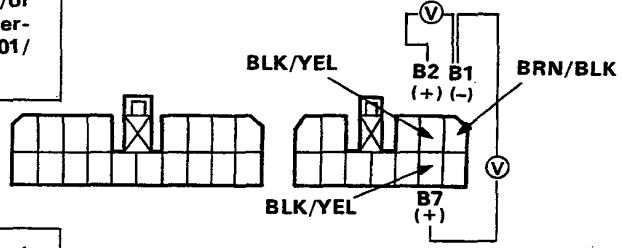
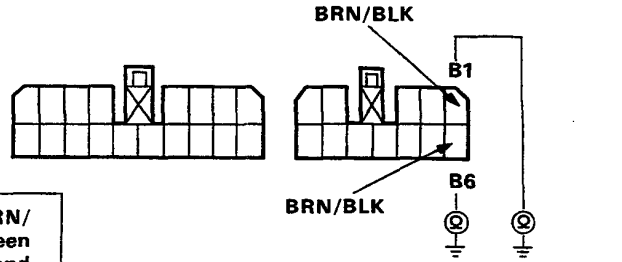
Turn the ignition switch ON. Be sure that the voltage is available for 2 sec. between the B11 (YEL/RED) terminal and B1 (BRN/BLK) terminals.

Is the voltage 6-12 V? YES

Check for open or short in YEL/RED wire between the B11 terminal and the gauge assembly. If wire is OK, check the S Indicator Light Bulb and the Safety Indicator Circuit.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.





**S<sub>4</sub> won't engage.**

Disconnect the 18P and 12P connectors from the control unit.

Check for continuity between the A13 (BLU/GRN) and B1 (BRN/BLK) terminals.

Is there continuity? YES

Check for short in BLU/GRN wire between the A13 terminal and the S<sub>4</sub> switch. If wire is OK, check the S<sub>4</sub> Switch (page 9-39).

NO

Check for continuity between the A13 (BLU/GRN) and B1 (BRN/BLK) terminals while pressing the S<sub>4</sub> switch.

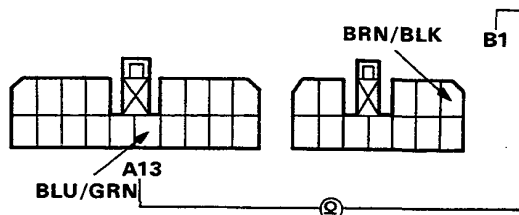
Is there continuity? NO

Check for open in BLU/GRN wire between the A13 terminal and the S<sub>4</sub> switch. If wire is OK, check the S<sub>4</sub> Switch (page 9-39).

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.



(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

Fails to shift from 2nd to first on releasing the brake pedal when stopped in D or S.

Depress the brake pedal and check that the brake lights come on.

Do the lights come on?

NO

Repair the Brake Light Circuit (Section 16).

YES

Disconnect the 18P and 12P connectors from the control unit.

Depress the brake pedal.

Measure the voltage between the A12 (GRN/WHT) and B1 (BRN/BLK) terminals.

Is there battery voltage?

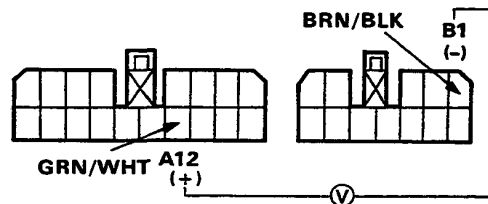
NO

Repair open in GRN/WHT wire between the A12 and the brake light switch.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.





Self-diagnosis LED indicator blinks once.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B3 (RED/WHT) and B1 (BRN/BLK) terminals.

Is there voltage?

YES

NO

Turn the ignition switch OFF.

Measure the resistance between the B3 (RED/WHT) and B1 (BRN/BLK) terminals.

Is the resistance 14-30Ω?

NO

YES

Disconnect the 2P connector from the lock-up control solenoid valves assembly.

Check for continuity between the B3 (RED/WHT) and B1 (BRN/BLK) terminals.

Is there continuity?

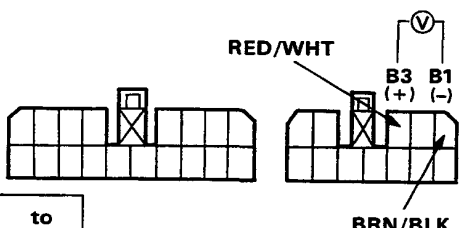
YES

NO

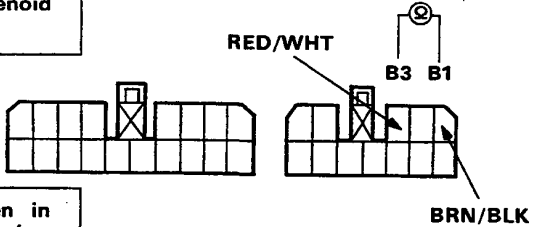
Connect the 2P connector to the lock-up control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

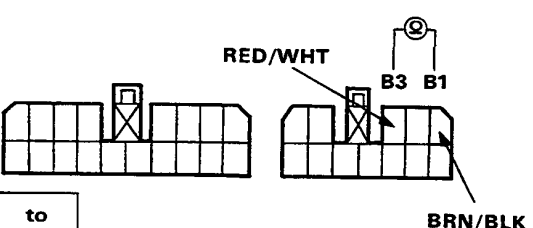
View from wire side.



Repair short to power source in RED/WHT wire between the B3 terminal and the lock-up control solenoid valve A.



Check for open in RED/WHT wire between the B3 terminal and the lock-up control solenoid valve A. If wire is OK, check the Lock-up Control Solenoid Valve A (page 9-38).



Repair short to ground in RED/WHT wire between the B3 terminal and the lock-up control solenoid valve A.

(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

Self-diagnosis LED indicator blinks twice.

Disconnect the 12P connector from the control unit.

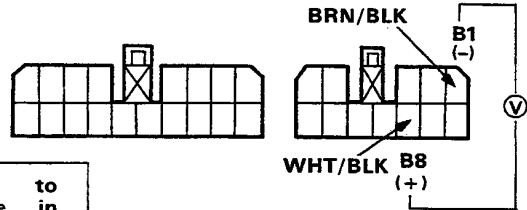
Turn the ignition switch ON.

Measure the voltage between the B8 (WHT/BLK) and B1 (BRN/BLK) terminals.

Is there voltage? YES

Repair short to power source in WHT/BLK wire between the B8 terminal and the lock-up control solenoid valve B.

View from wire side.



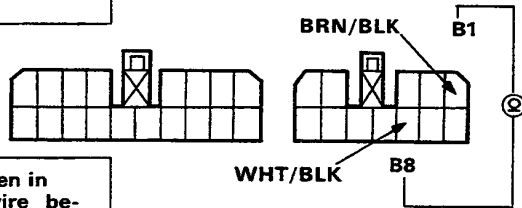
NO

Turn the ignition switch OFF.

Measure the resistance between the B8 (WHT/BLK) and B1 (BRN/BLK) terminals.

Is the resistance 14-30 Ω? NO

Check for open in WHT/BLK wire between the B8 terminal and the lock-up control solenoid valve B. If wire is OK, check the Lock-up Control Solenoid Valve B (page 9-38).



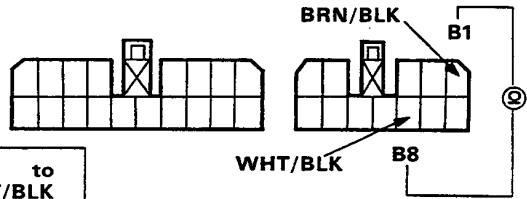
YES

Disconnect the 2P connector from the lock-up control solenoid valves assembly.

Check for continuity between the B8 (WHT/BLK) and B1 (BRN/BLK) terminals.

Is there continuity? YES

Repair short to ground in WHT/BLK wire between the B8 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.



Self-diagnosis LED indicator blinks three times. (Carbureted engine)

Turn the ignition switch ON.

Check whether the PGM-CARB. LED display blinks (section 6).

Does the LED blink?

YES

Repair the PGM-CARB. system (section 6).

NO

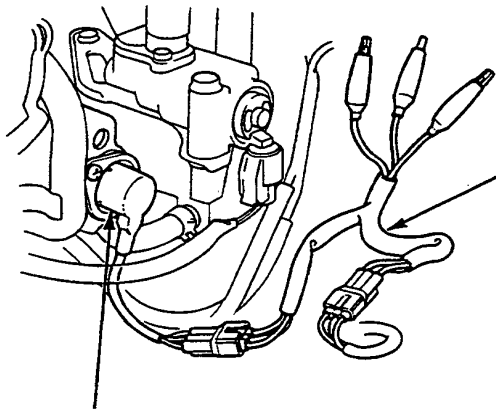
Turn the ignition switch OFF.

**WARNING**  
Throttle angle sensor is very near hot engine components

Connect the inspection adaptor between the throttle angle sensor and the engine wire harness.

Start the engine and warm it up to normal operating temperature.

Measure the voltage between the red clip (+) and green clip (-) of the adaptor.



INSPECTION ADAPTOR 07GMJ-ML80100

THROTTLE ANGLE SENSOR

Stop the engine and turn the ignition switch ON.

Is the voltage 4.50—5.50 V?

NO

Measure the voltage between the red clip (+) and body ground.

YES

Start the engine.

Is the voltage 4.50—5.50 V?

NO

Repair open or short circuit in YEL/WHT wire between the A15 terminal of the A/T control unit and the throttle angle sensor, and between the throttle angle sensor and the A7 terminal of the PGM-CARB. control unit.

YES

Repair open in GRN/WHT wire between the A14 terminal and the throttle angle sensor.

When the throttle valve opening is at idle angle, measure the voltage between the white clip (+) and the green clip (-) of the adaptor.

(To page 9-22)

(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

(From page 9-21)

Is the voltage 0.40–0.57 V? \*

NO

Check for short in RED/YEL wire between the A16 terminal and the throttle angle sensor. If wire is OK, check the throttle angle sensor (page 9-36).

YES

Stop the engine and turn the ignition switch ON.

When the throttle valve is fully opened, measure the voltage between the white clip (+) and the green clip (-).

Is the voltage 3.80–4.66 V? \*

NO

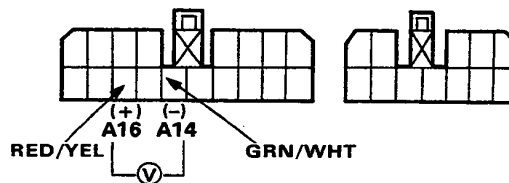
Check the throttle angle sensor (page 9-36).

YES

Start the engine.

When the throttle valve opening is at idle angle, measure the voltage between the A16 (RED/YEL) and A14 (GRN/WHT) terminals.

View from wire side.



Is the voltage 0.40–0.57 V? \*

NO

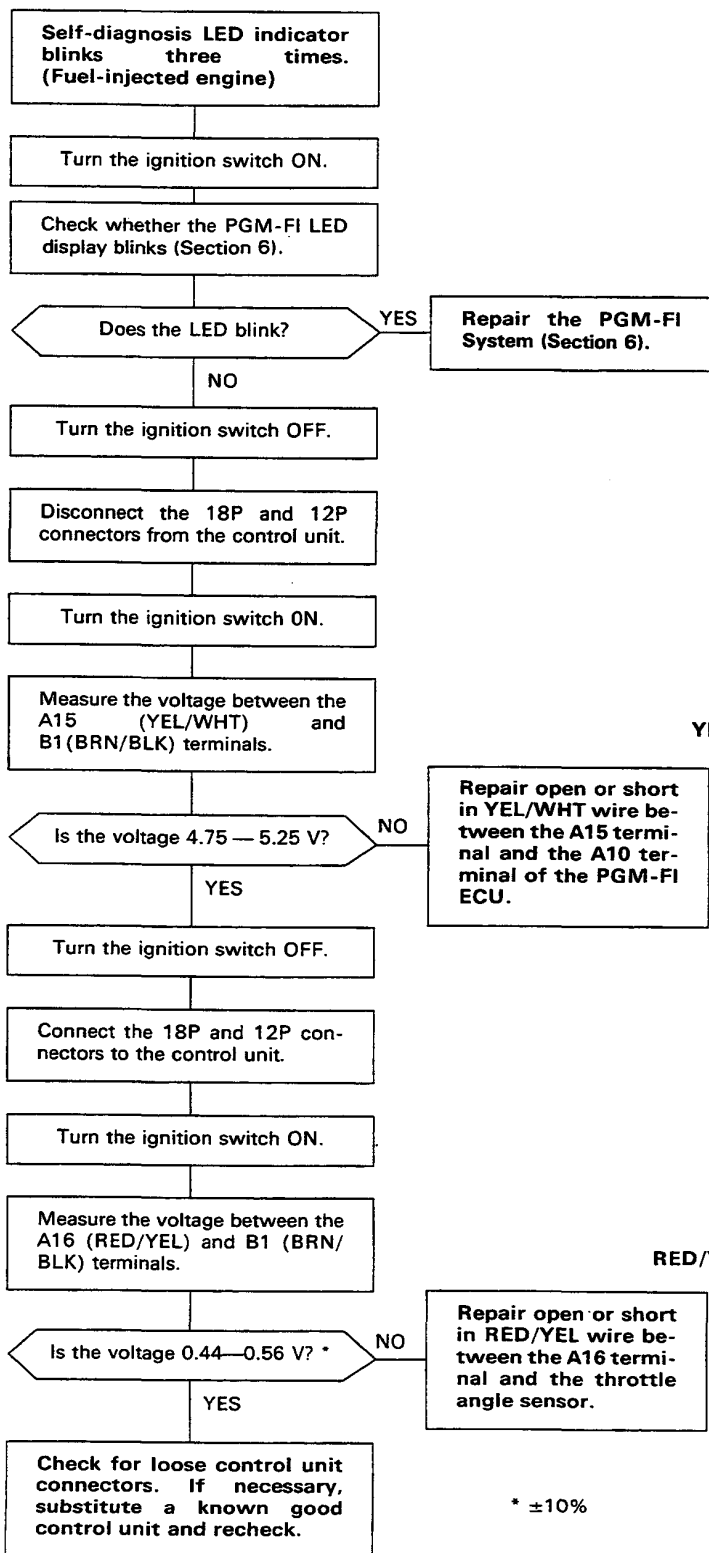
Repair open in RED/YEL wire between the A16 terminal and the throttle angle sensor.

YES

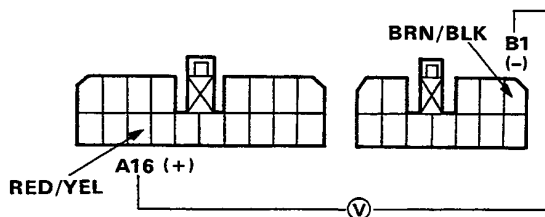
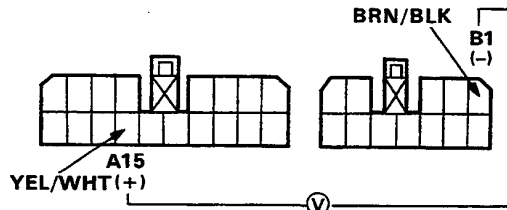
Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

\*  $\pm 10\%$





View from wire side.



(cont'd)

# Electrical Troubleshooting

## Troubleshooting (cont'd)

Self-diagnosis LED indicator blinks four times.

Jack up the front of the car and block one wheel.

**WARNING**

- Set the parking brake securely and block the rear wheels.
- Jack up the front of the car and support with a rigid rack.

Turn the ignition switch ON and shift transmission to N.

Rotate the front wheel and measure the voltage between the A6 (WHT/BLU) and B1 (BRN/BLK) terminals.

Does the voltage 0 — 5 V appear alternately?

NO

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Rotate the front wheel and check for voltage between the B1 (BRN/BLK) and A6 (WHT/BLU) terminals.

Does the voltage 0 — 5 V appear alternately?

NO

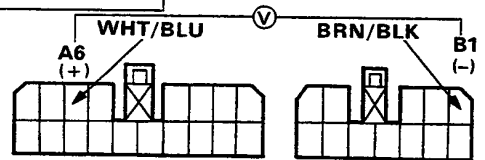
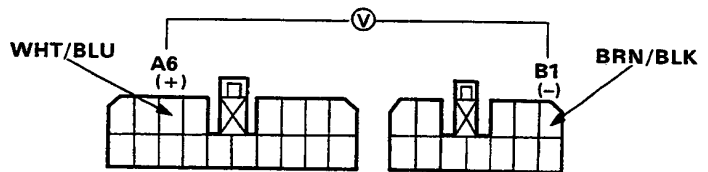
Check for short or open in WHT/BLU wire between the A6 terminal and the gauge assembly. If wire is OK, check the Speed Pulser (Section 16, Cruise Control).

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

Substitute a known good control unit and recheck.

View from wire side.





Self-diagnosis LED indicator blinks five times.

Check the shift lever position indicator in gauge for operation.

Does it operate properly?

NO  
Repair the Shift Lever Position Indicator Circuit (Section 16).

YES

Turn the ignition switch ON.

Shift to other than R position.

Measure the voltage between the A1 (GRN/RED) and B1 (BRN/BLK) terminals.

Is there battery voltage?

NO  
Check for short in GRN/RED wire between the A1 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 N position.

Measure the voltage between the A2 (GRN) and B1 (BRN/BLK) terminals.

Is there battery voltage?

NO  
Check for short in GRN wire between the A2 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES

Shift to other than D position.

Measure the voltage between the A3 (GRN/BLK) and B1 (BRN/BLK) terminals.

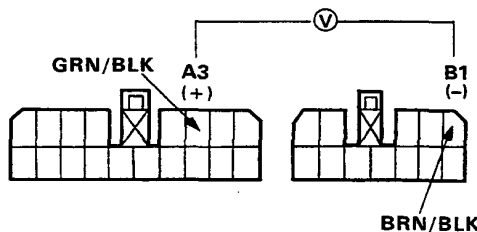
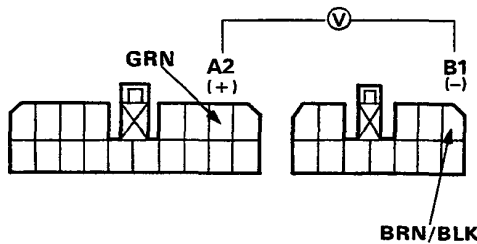
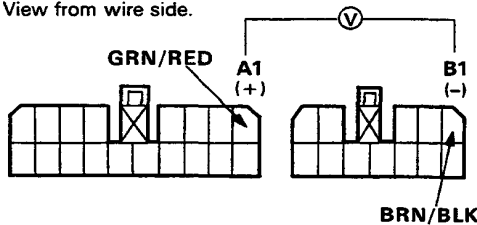
Is there battery voltage?

NO  
Check for short in GRN/BLK wire between the A3 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES

(To page 9-26)

View from wire side.



(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

(From page 9-25)

Shift to other than S position.

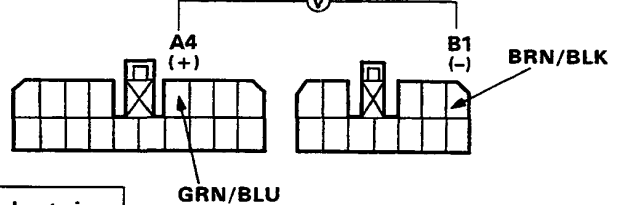
Measure the voltage between the A4 (GRN/BLU) and B1 (BRN/BLK) terminals.

Is there battery voltage?

NO

YES

View from wire side.



Check for short in GRN/BLU wire between the A4 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

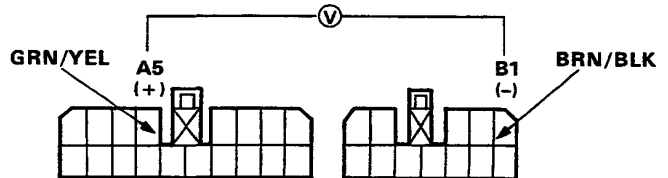
Shift to other than 2 position.

Measure the voltage between the A5 (GRN/YEL) and B1 (BRN/BLK) terminals.

Is there battery voltage?

NO

YES



Check for short in GRN/YEL wire between the A5 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

Substitute a known good control unit and recheck.



Self-diagnosis LED indicator blinks six times.

Turn the ignition switch ON.

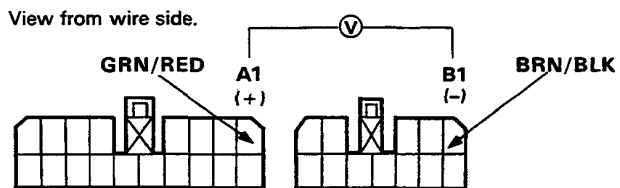
Check the shift lever position indicator in gauge for operation.

Does it operate properly? **NO** → Repair the Shift Lever Position Indicator Circuit (Section 16).

Shift to R position.

Measure the voltage between the A1 (GRN/RED) and B1 (BRN/BLK) terminals.

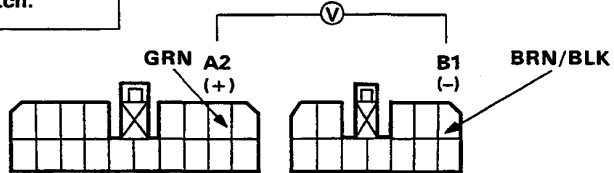
Is there voltage? **YES** → Repair open in GRN/RED wire between the A1 terminal and the shift position console switch.



Shift to N position.

Measure the voltage between the A2 (GRN) and B1 (BRN/BLK) terminals.

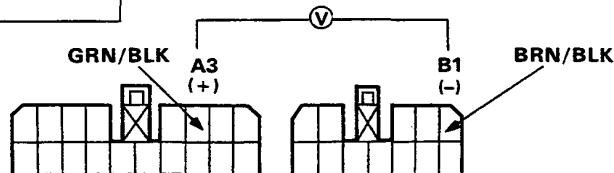
Is there voltage? **YES** → Repair open in GRN wire between the A2 terminal and the shift position console switch.



Shift to D position.

Measure the voltage between the A3 (GRN/BLK) and B1 (BRN/BLK) terminals.

Is there voltage? **YES** → Repair open in GRN/BLK wire between the A3 terminal and the shift position console switch.



(To page 9-28)

(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

(From page 9-27)

Shift to S position.

Measure the voltage between the A4 (GRN/BLU) and B1 (BRN/BLK) terminals.

Is there voltage?

YES

Repair open in GRN/BLU wire between the A4 terminal and the shift position console switch.

NO

Shift to 2 position.

Measure the voltage between the A5 (GRN/YEL) and B1 (BRN/BLK) terminals.

Is there voltage?

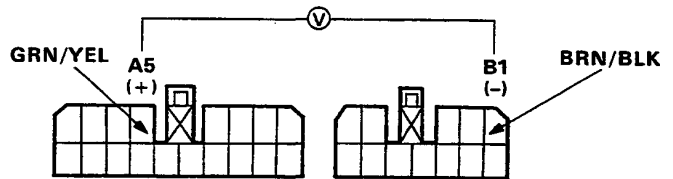
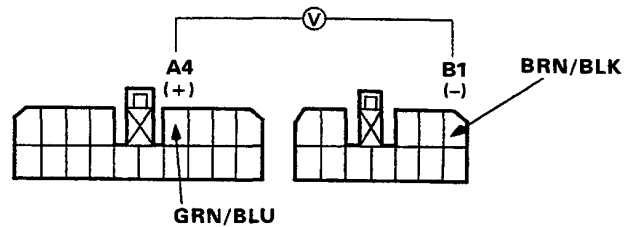
YES

Repair open in GRN/YEL wire between the A5 terminal and the shift position console switch.

NO

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.





Self-diagnosis LED indicator blinks seven times.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B4 (BLU/YEL) and B1 (BRN/BLK) terminals.

Is there voltage? YES

Repair short to power source in BLU/YEL wire between the B4 terminal and the shift control solenoid valve A.

NO  
Turn the ignition switch OFF.

Measure the resistance between the B4 (BLU/YEL) and B1 (BRN/BLK) terminals.

Is the resistance 12-24  $\Omega$ ? NO

Check for open in BLU/YEL wire between the B4 terminal and the shift control solenoid valve A. If wire is OK, check the Shift Control Solenoid Valve A (page 9-39).

YES  
Disconnect the 2P connector from the shift control solenoid valves assembly.

Check for continuity between the B4 (BLU/YEL) and B1 (BRN/BLK) terminals.

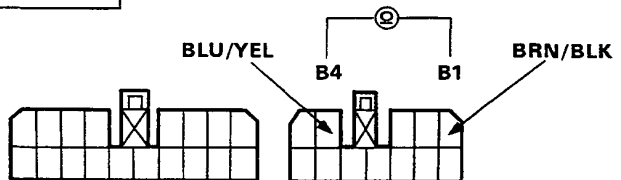
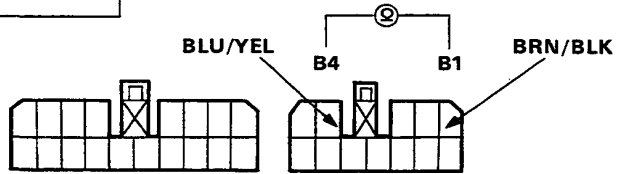
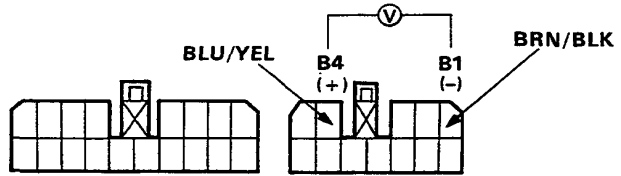
Is there continuity? YES

Repair short to ground in BLU/YEL wire between the B4 terminal and the shift control solenoid valve A.

NO  
Connect the 2P connector to the shift control solenoid valves assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.



(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

Self-diagnosis LED indicator blinks eight times.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B5 (GRN/WHT) and B1 (BRN/BLK) terminals.

Is there voltage? YES

Repair short to power source in GRN/WHT wire between the B5 terminal and the shift control solenoid valve B.

NO

Turn the ignition switch OFF.

Measure the resistance between the B5 (GRN/WHT) and B1 (BRN/BLK) terminals.

Is the resistance 12-24  $\Omega$ ? NO

Check for open in GRN/WHT wire between the B5 terminal and the shift control solenoid valve B. If wire is OK, check the Shift Control Solenoid Valve B (page 9-39).

YES

Disconnect the 2P connector from the shift control solenoid valves assembly.

Check for continuity between the B5 (GRN/WHT) and B1 (BRN/BLK) terminals.

Is there continuity? YES

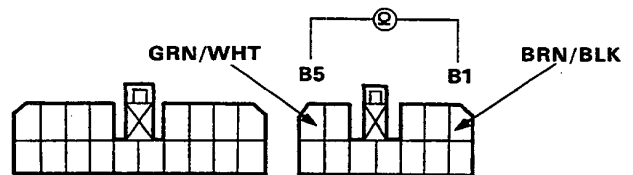
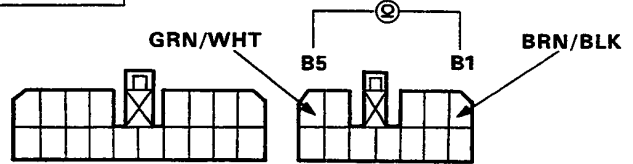
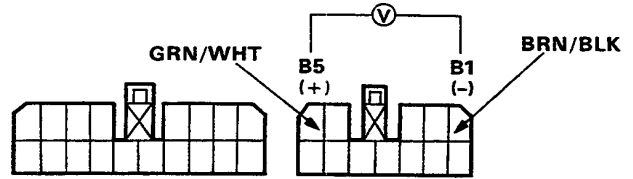
Repair short to ground in GRN/WHT wire between the B5 terminal and the shift control solenoid valve B.

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.

View from wire side.







Self-diagnosis LED indicator blinks nine times.

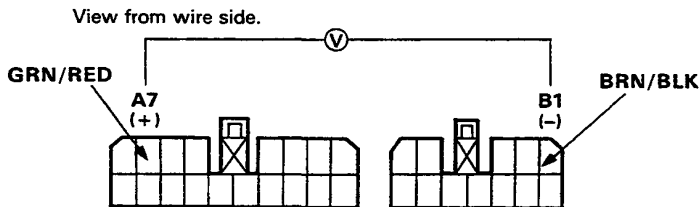
Jack up the front of the car.

**WARNING**

- Set the parking brake securely and block the rear wheels.
- Jack up the front of the car and support with a rigid rack.

Turn the ignition switch ON.

Rotate the front wheels and measure the voltage between the A7 (GRN/RED) and B1 (BRN/BLK) terminals.



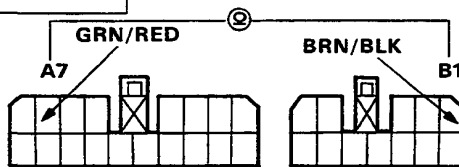
Do 0 and approx. 5 V appear alternately?

NO

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Rotate the front wheels and check for continuity between the A7 (GRN/RED) and B1 (BRN/BLK) terminals.



Do continuity and infinity alternately appear?

NO

Check for open or short in GRN/RED wire between the A7 terminal and the A/T speed pulser. If wire is OK, check the A/T Speed Pulser (page 9-37).

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

Substitute a known good control unit and recheck.

YES

(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

Self-diagnosis LED indicator blinks ten times. (Carbureted engine)

Turn the ignition switch ON.

Check whether the PGM-CARB. LED display blinks (section 6).

Does the LED blink?

NO

Repair the PGM-CARB. System (section 6).

YES

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A15 (YEL/WHT) and B1 (BRN/BLK) terminals.

Is the voltage 4.50 — 5.50 V?

NO

Repair open or short in YEL/WHT wire between the A15 terminal and the A7 terminal of the PGM-CARB. CONTROL UNIT.

YES

Turn the ignition switch OFF.

Connect the 18P and 12P connectors to the control unit.

Start the engine and warm it up to normal operating temperature.

Measure the voltage between the A11 (YEL/GRN) and B1 (BRN/BLK) terminals.

Is the voltage 0.70 — 1.60 V?

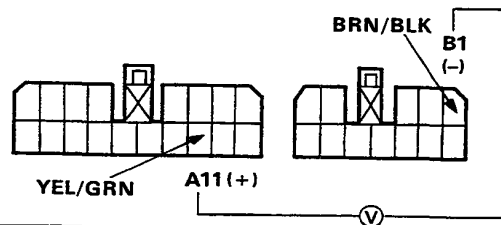
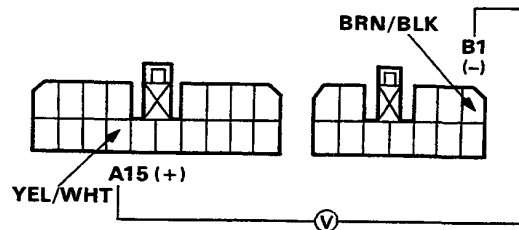
NO

Repair open or short in YEL/GRN wire between the A11 terminal and the coolant temperature sensor.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit.

View from wire side.





Self-diagnosis LED indicator blinks ten times. (Fuel-injected engine)

Turn the ignition switch ON.

Check whether the PGM-FI LED display blinks (section 6).

Does the LED blink?

NO  
Repair the PGM-FI System (section 6).

YES

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A15 (YEL/WHT) and B1 (BRN/BLK) terminals.

Is the voltage 4.75 — 5.25 V?

NO  
Repair open or short in YEL/WHT wire between the A15 terminal and the A10 terminal of the PGM-FI ECU.

YES

Turn the ignition switch OFF.

Connect the 18P and 12P connectors to the control unit.

Start the engine and warm it up to normal operating temperature.

Measure the voltage between the A11 (YEL/GRN) and B1 (BRN/BLK) terminals.

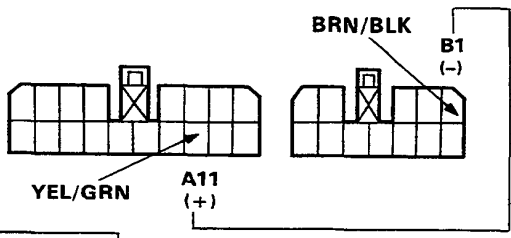
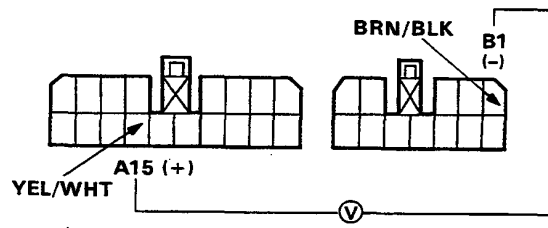
Is the voltage 0.50 — 1.20 V?

NO  
Repair open or short in YEL/GRN wire between the A11 terminal and the coolant temperature sensor.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit.

View from wire side.



(cont'd)

# Electrical Troubleshooting

## Troubleshooting Flow Chart (cont'd)

Self-diagnosis LED indicator blinks eleven times.

Disconnect the 18P and 12P connectors from the control unit.

Start the engine.

Measure the voltage between the A10 (BLU) and B1 (BRN/BLK) terminals.

Is there battery voltage?

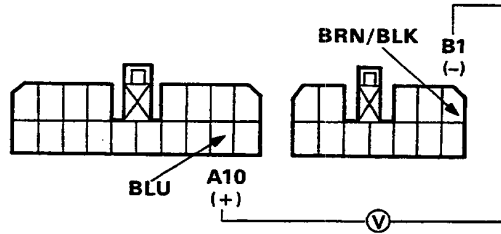
NO

Repair open or short in BLU wire between the A10 terminal and the ignition coil.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.





**A/C IDLE BOOST solenoid valve driving signal inspection (Carbureted engine)**

Start the engine and warm it up to normal operating temperature.

Disconnect the 18P and 12P connectors from the control unit.

Turn on the air conditioner.

Measure the voltage between the A9 (RED) and B1 (BRN/BLK) terminals when the air conditioner is operating (air compressor is ON).

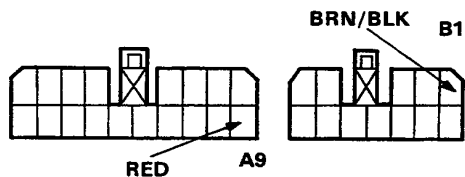
Is there battery voltage?

NO

YES

Driving signal is normal.

View from wire side.



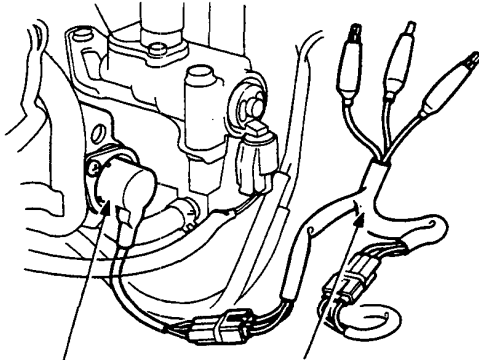
Check for open circuit in RED wire between the A9 terminal and the B10 terminal of the PGM-CARB. control unit. If wire is OK, check the PGM-CARB. control unit (section 6).

# Throttle Angle Sensor

## Test/Adjustment

**NOTE:** Adjustment for the throttle angle sensor of the fuel injected engine is not required.

1. Connect the inspection adaptor between the throttle angle sensor and the engine wire harness.

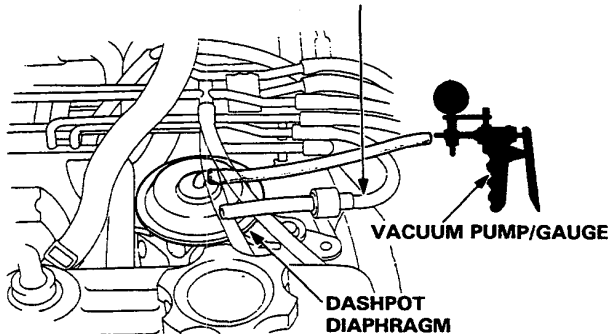


THROTTLE ANGLE SENSOR

INSPECTION ADAPTOR  
07GMJ-ML80100

2. Start the engine and warm it up to normal operating temperature.
3. Stop the engine and turn the ignition switch ON.
4. Measure the voltage between the red clip (+) and green clip (-) of the adaptor.
5. Connect the vacuum pump/gauge to the dashpot diaphragm, and apply vacuum (KS, KQ, KZ, KX model only).

NO. 6 VACUUM HOSE



VACUUM PUMP/GAUGE

DASHPOT  
DIAPHRAGM

6. When the throttle valve opening is at idle angle, measure the voltage between the white clip (+) and the green clip (-) of the adaptor.

**STANDARD:** 0.48—0.52 V  $\pm 10\%$  (when the voltage between the red clip and green clip of the adaptor is 5.0 V  $\pm 10\%$ .)

- Reinstall the throttle angle sensor adjusting its position if the voltage is out of specification.

7. When the throttle valve is fully opened, measure the voltage between the white clip (+) and the green clip (-) of the adaptor.

**STANDARD:** 3.80—4.66 V (when the voltage between the red clip and green clip of the adaptor is 5.0 V.)

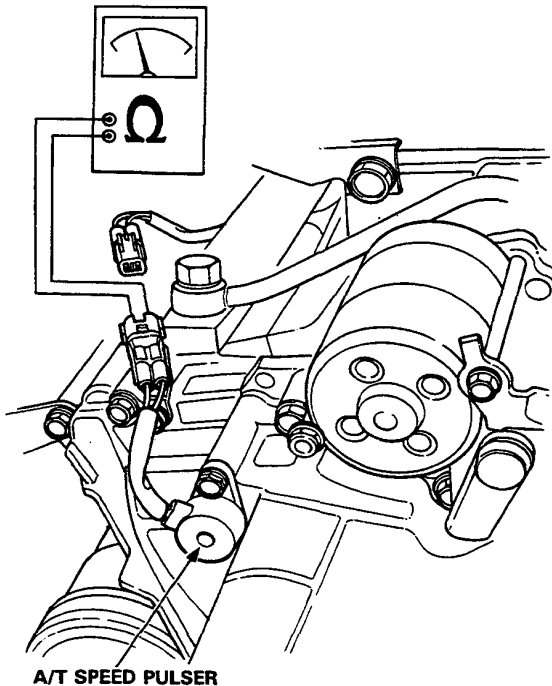
- Reinstall the throttle angle sensor adjusting its position if the voltage is out of specification, and repeat the test from step 6.

# A/T Speed Pulsar



## Test

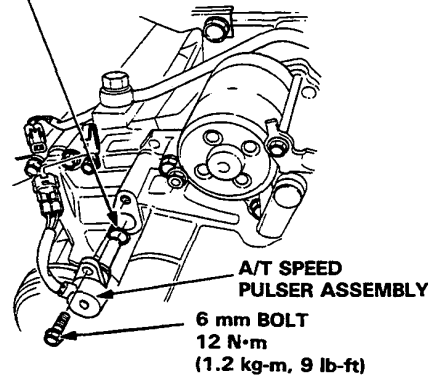
1. Apply the parking brake, block the rear wheels and jack up the front of the car.
2. Disconnect the A/T speed pulser 2P connector.
3. Rotate the front wheels and be sure that continuity and no continuity appear alternately between the two terminals.



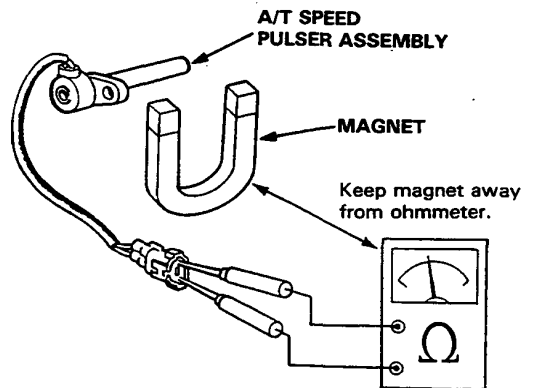
## Removal/Inspection

1. Remove the 6 mm bolt from the transmission housing and remove the A/T speed pulser assembly.

O-RING  
Replace.



2. Bring a magnet close to the A/T speed pulser assembly and check for continuity.



A/T speed pulser assembly is in good condition if there is:

- Continuity with a magnet close to the pulser assembly.
- No continuity with a magnet away from the pulser assembly.

If the A/T speed pulser is normal, go to Rotor Disassembly/Inspection.

3. Replace the O-ring with a new one before reassembling the A/T speed pulser.

**CAUTION:** Carefully inspect the A/T speed pulser before installing. Do not install it that shows signs of being dropped or improperly handled.

# Lock-up Control Solenoid Valve A/B

## Test

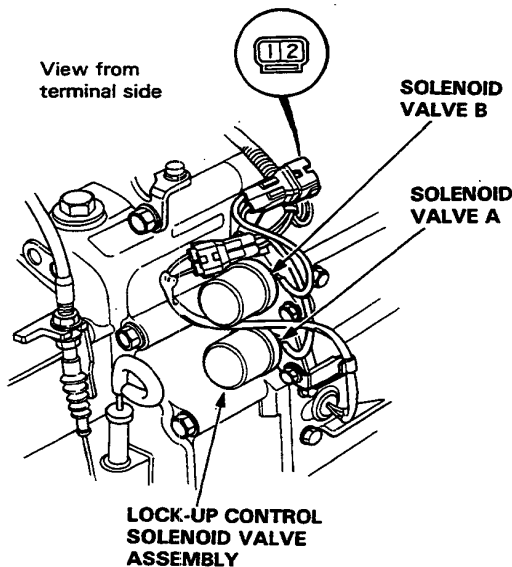
NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the lock-up control solenoid valve A/B.

NOTE: Do not remove the lock-up control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the lock-up control solenoid valve connector and body ground and between the No. 2 terminal (SOL. V B) and body ground.

STANDARD: 14–30  $\Omega$



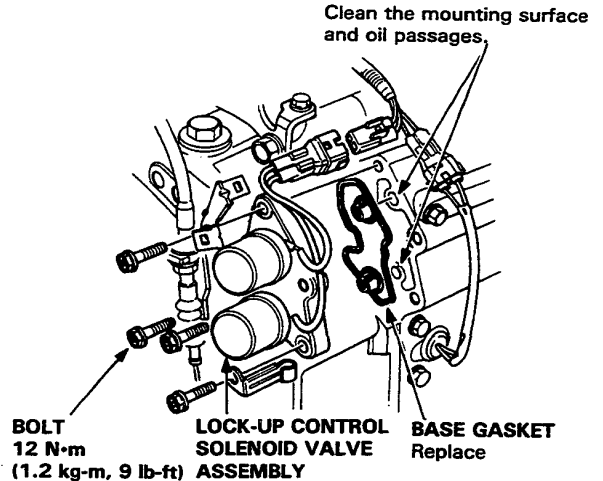
3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
4. Connect the No.1 terminal of the lock-up control solenoid valve connector to the battery positive terminal and No. 2 terminal to the battery positive terminal.  
A clicking sound should be heard each time the connection is made.
5. If not, check for continuity between the harness and body ground.
6. Replace the lock-up control solenoid valve assembly if there is continuity between the harness and body ground.

## Replacement

1. Remove the four 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.

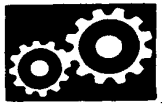
2. Check the lock-up control solenoid valve oil passages for dust or dirt and replace as an assembly, if necessary.



3. Clean the mounting surface and oil passages of the lock-up control solenoid valve assembly and install a new base gasket.
4. Check the connector for rust, dirt or oil and reconnect it securely.



# Shift Control Solenoid Valve A/B S<sub>4</sub> Switch



## Test

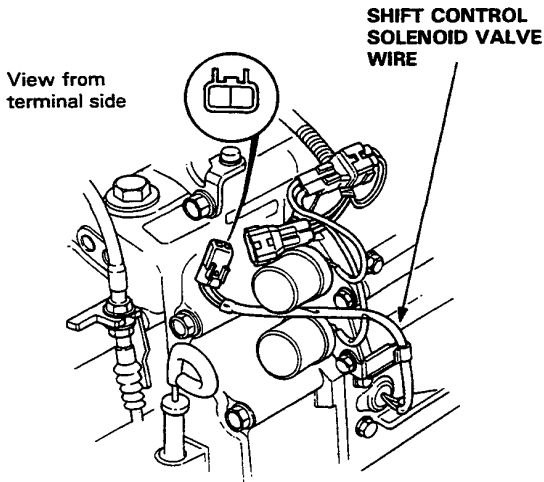
NOTE: Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the shift control solenoid valve A/B.

NOTE: Do not remove the shift control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the solenoid valve connector and body ground and between the No.2 terminal (SOL. V B) and body ground.

STANDARD: 12–24 Ω

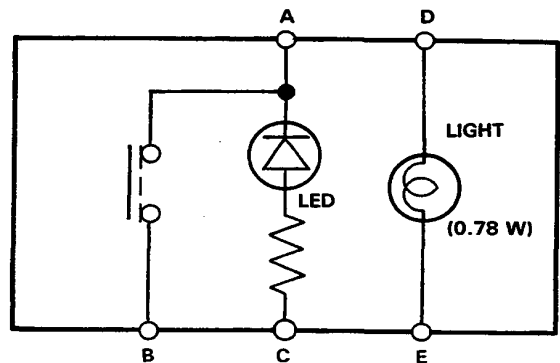
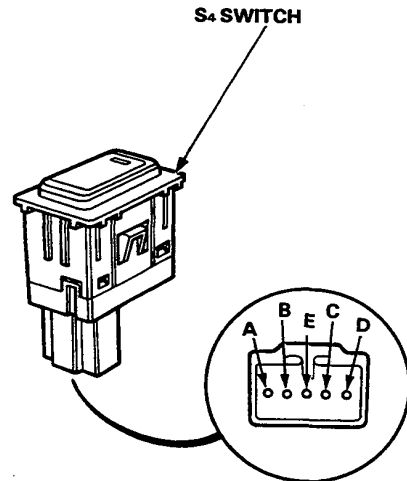


3. Replace the shift control solenoid valve assembly if the resistance is out of specification.
4. Connect the No.1 terminal of the solenoid valve connector to the battery positive terminal and the No.2 terminal to the battery positive terminal. A clicking sound should be heard each time the connection is made.
5. If not check for continuity between the harness and body ground.
6. Replace the shift control solenoid valve assembly if there is continuity between the harness and body ground.

## Test

1. Remove the center console.
2. Disconnect the switch connector and remove the S<sub>4</sub> switch.
3. Check for continuity between the terminals by pressing and releasing the switch button according to the table below.

TERMINAL	B	A	C	D	E
POSITION					
PRESS	○	○		○	○
RELEASE				○	○



# Symptom-to-Component Chart

## Hydraulic System

PROBLEM	REFER TO
Engine runs, but car does not move in any gear	1,3,4,5,18,23,24,25,27
Car moves in 2, but not in S or D.	6,10,12,18,40
Car moves in S or D, but not in 2.	7,13,18,40
Car moves in S, D, or 2, but not in R.	9,11,15,18,26,28,40,55
Poor acceleration	
Engine races when starting off in S: — Stall rpm high in S, D and 2	1,3,18,24,25,40,46
— Stall rpm high in S and D	10,12,18
— Stall rpm high in 2	13,18
— Stall rpm normal	2
— Stall rpm low	16,56
Excessive idle vibration	3,23,56
Shift-up speed is too fast, or slow.	55
Jumps from 1st to 3rd in S.	55
Jumps from 1st to 4th in D.	55
Shift-up point too early/late: — 1st to 2nd, 2nd to 3rd, 3rd to 4th	55
— 1st to 2nd	55
— 2nd to 3rd	55
— 3rd to 4th	55
Harsh upshift from 1st to 2nd	13,31,22,28,34,36,39,40,41,51,55
Harsh upshift from 2nd to 3rd	14,31,22,29,34,37,39,40,41,42,52,55
Harsh upshift from 3rd to 4th	15,31,22,30,34,38,39,40,41,43,51,55
Harsh downshift from 2nd to 1st	13,31,22,28,34,36,39,40,41,51,55
Harsh downshift from 3rd to 2nd	14,31,22,29,34,37,39,40,41,44,52,55
Harsh downshift from 4th to 3rd	15,31,22,30,32,38,39,40,41,45,51,55
Engine races when shifting from 2nd to 3rd	14,17,22,29,34,37,39,40,41,42,52,55
Engine races when shifting from 3rd to 4th (Shift point OK)	15,17,22,30,34,38,39,40,41,43,51,55

	PROBABLE CAUSE
1	ATF level too low
2	ATF level too high
3	Oil pump seized, gear damaged, foreign material suck in gear
4	Mainshaft damaged
5	Final gear and countershaft worn/damaged
6	1st gears worn/damaged
7	2nd gears worn/damaged
8	3rd gears worn/damaged
9	4th gears worn/damaged
10	Countershaft one-way clutch seized/damaged
11	Reverse gears worn/damaged
12	1st clutch faulty a. Clutch piston stuck b. Foreign material stuck in clutch check valve c. Clutch O-ring worn/damaged d. Clutch disc worn e. Clutch feed pipe/O-ring worn/damaged
13	2nd clutch faulty a. Clutch piston stuck b. Foreign material stuck in clutch check valve c. Clutch O-ring worn/damaged d. Clutch disc worn e. Clutch seal ring seized/damaged
14	3rd clutch faulty a. Clutch piston stuck b. Foreign material stuck in clutch check valve c. Clutch O-ring worn/damaged d. Clutch disc worn e. Clutch feed pipe/O-ring worn/damaged
15	4th clutch faulty a. Clutch piston stuck b. Foreign material stuck in clutch check valve c. Clutch O-ring worn/damaged d. Clutch disc worn e. Clutch feed pipe/O-ring worn/damaged
16	Torque converter one-way clutch seized
17	Transmission throttle control cable misadjusted
18	Control cable misadjusted, cut or damaged
19	Mainshaft/countershaft ball bearing damaged
20	Needle bearing seized
21	Washers/collars seized
22	Clutch clearance incorrect
23	Drive plate faulty or transmission assy improperly installed
24	Regulator valve stuck or spring weak/damaged
25	Oil filter clogged



PROBLEM	REFER TO
Excessive shock when shifting from 2nd to 3rd	14,17,22,29, 34,37,39,40, 41,42,52,55
Excessive shock when shifting from 3rd to 4th (Shift piont OK)	15,17,22,30, 34,38,39,40, 41,43,51,55
Car creeps forward in N. (Shift cable adjusted properly.)	2,12,13,14, 15,20,21,22
Excessive time lag from N to S/D (Shift cable adjusted properly.)	12,40,41
Excessive time lag from N to R (Shift cable adjusted properly.)	15,26,28
– Abnormal noise in all gears, neutral and park	3,4,19
– Vibration in all gears	23
– Harsh to shift	18,27
– Car has only 4th gear	55
– Transmission has no park	18,27
– Stall rpm is high, but clutch pressure OK in all positions	46
Harsh shift to lock-up clutch	47,50,53,55
Vibration in lock-up mode	48,49,54,55
Lock-up clutch does not engage.	46,47,48,49, 50,53,54,55

	PROBABLE CAUSE
26	Servo shaft stuck
27	Manual valve faulty or roller out of place
28	1–2 shift valve faulty
29	2–3 shift valve faulty
30	3–4 shift valve faulty
31	Modulator valve faulty
32	Throttle valve A faulty
34	Throttle valve B faulty
35	1st accumulator faulty
36	2nd accumulator faulty
37	3rd accumulator faulty
38	4th accumulator faulty
39	Clutch pressure control valve faulty
40	Foreign material stuck in separator orifice
41	Foreign material stuck in check ball
42	2nd orifice control faulty
43	3rd orifice control faulty
44	4–2 kickdown valve faulty
45	4–3 kickdown valve faulty
46	Torque converter check valve faulty
47	Lock-up shift valve faulty
48	Lock-up timing valve B faulty
49	Lock-up control valve faulty
50	Lock-up piston in torque converter faulty
51	Shift control solenoid valve A faulty
52	Shift control solenoid valve B faulty
53	Lock-up control solenoid valve A faulty
54	Lock-up control solenoid valve B faulty
55	Electrical system faulty
56	Engine lacks power

# Road Test

NOTE: After transmission is installed.

- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.
- Release the accelerator pedal and check both inner control cables to be sure they have slight play.

Warm up the engine to operating temperature.

## **D** and **S** Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector to **D** while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.
3. Apply parking brake and block the wheels. Start the engine, then move the selector **S** while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

KF, KG, KW, KB, KE, KY, KT model:

(Carburetor)

- Upshift

		<b>D</b>	1st-2nd	2nd-3rd	3rd-4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h		12-16	27-32	44-50	16-20
	mph		7-10	17-20	27-31	10-12
7/16 throttle Acceleration from a stop	km/h		32-38	56-63	74-84	98-102
	mph		20-24	35-39	46-52	61-63
Full-throttle Acceleration from a stop	km/h		53-60	99-106	147-155	132-136
	mph		33-37	62-66	91-96	82-85

		<b>S</b> (with S <sub>4</sub> switch in operation)	1st-2nd	2nd-3rd	3rd-4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h		18-22	40-45	46-52	23-27
	mph		11-14	25-28	29-32	14-17
7/16 throttle Acceleration from a stop	km/h		37-43	66-73	104-114	121-125
	mph		23-27	41-45	65-71	75-78
Full-throttle Acceleration from a stop	km/h		53-60	99-106	147-155	132-136
	mph		33-37	62-66	91-96	82-85

- Downshift

		<b>D</b>	LC.OFF	4th-3rd	3rd-2nd	2nd-1st
1/12 throttle Coasting or braking to a stop	km/h		14-18	28-33	—	10-14
	mph		9-11	17-21	—	6-9
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h		87-91	—	—	—
	mph		54-57	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h		129-133	124-133	82-91	38-46
	mph		80-83	77-83	51-57	24-29

		<b>S</b> (with S <sub>4</sub> switch in operation)	LC.OFF	4th-3rd	3rd-2nd	2nd-1st
1/12 throttle Coasting or braking to a stop	km/h		21-25	33-38	—	13-17
	mph		13-16	21-24	—	8-11
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h		98-102	—	—	—
	mph		61-63	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h		129-133	124-133	82-91	38-46
	mph		80-83	77-83	51-57	24-29



(PGM-FI)

• Upshift

**D**

		1st–2nd	2nd–3rd	3rd–4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	12–16	27–32	44–50	16–20
	mph	7–10	17–20	27–31	10–12
7/16 throttle Acceleration from a stop	km/h	27–33	51–58	72–82	98–102
	mph	17–21	32–36	45–51	61–63
Full-throttle Acceleration from a stop	km/h	59–66	103–110	157–165	135–139
	mph	37–41	64–68	98–103	84–86

**S** (with S<sub>4</sub> switch in operation)

		1st–2nd	2nd–3rd	3rd–4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	18–22	28–33	45–51	23–27
	mph	11–14	17–21	28–32	14–17
7/16 throttle Acceleration from a stop	km/h	37–43	71–78	104–114	120–124
	mph	23–27	44–48	65–71	75–77
Full-throttle Acceleration from a stop	km/h	59–66	103–110	157–165	135–139
	mph	37–41	64–68	98–103	84–86

• Downshift

**D**

		LC.OFF	4th–3rd	3rd–2nd	2nd–1st
1/12 throttle Coasting or braking to a stop	km/h	14–18	28–33	—	10–14
	mph	9–11	17–21	—	6–9
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	87–91	—	—	—
	mph	54–57	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	131–135	126–135	82–91	42–50
	mph	81–84	78–84	51–57	26–31

**S** (with S<sub>4</sub> switch in operation)

		LC.OFF	4th–3rd	3rd–2nd	2nd–1st
1/12 throttle Coasting or braking to a stop	km/h	21–25	33–38	—	13–17
	mph	13–16	21–24	—	8–11
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	98–102	—	—	—
	mph	61–63	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	131–135	126–135	82–91	42–50
	mph	81–84	78–84	51–57	26–31

(cont'd)

# Road Test

KS, KQ, KZ, KX model:  
(Carburetor)

• Upshift

**D**

		1st-2nd	2nd-3rd	3rd-4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	17-21	33-38	43-49	22-26
	mph	11-13	21-24	27-30	14-16
7/16 throttle Acceleration from a stop	km/h	28-34	56-63	86-96	96-100
	mph	17-21	35-39	53-60	60-62
Full-throttle Acceleration from a stop	km/h	53-60	99-106	148-156	132-136
	mph	33-37	62-66	92-97	82-85

**S** (with S<sub>4</sub> switch in operation)

		1st-2nd	2nd-3rd	3rd-4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	17-21	35-40	59-65	37-41
	mph	11-13	22-25	37-40	23-25
7/16 throttle Acceleration from a stop	km/h	28-34	65-72	105-115	115-119
	mph	17-21	40-45	65-71	71-74
Full-throttle Acceleration from a stop	km/h	53-60	99-106	148-156	132-136
	mph	33-37	62-66	92-97	82-85

• Downshift

**D**

		LC.OFF	4th-3rd	3rd-2nd	2nd-1st
1/12 throttle Coasting or braking to a stop	km/h	20-24	—	29-34	8-12
	mph	12-15	—	18-21	5-7
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	73-77	—	—	—
	mph	45-48	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	129-133	124-133	82-91	38-46
	mph	80-83	77-83	51-57	24-29

**S** (with S<sub>4</sub> switch in operation)

		LC.OFF	4th-3rd	3rd-2nd	2nd-1st
1/12 throttle Coasting or braking to a stop	km/h	34-38	—	29-34	13-12
	mph	21-24	—	18-21	5-7
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	84-88	—	—	—
	mph	52-55	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	129-133	124-133	82-91	38-46
	mph	80-83	77-83	51-57	24-29



(PGM-FI)

• **Upshift**

**D**

		1st–2nd	2nd–3rd	3rd–4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	17–21	33–38	50–56	22–26
	mph	11–13	21–24	31–35	14–16
7/16 throttle Acceleration from a stop	km/h	28–34	56–63	86–96	97–101
	mph	17–21	35–39	53–60	60–63
Full-throttle Acceleration from a stop	km/h	61–68	102–109	158–166	135–139
	mph	38–42	63–68	98–103	84–86

**S** (with S<sub>4</sub> switch in operation)

		1st–2nd	2nd–3rd	3rd–4th	LC.ON
1/12 throttle Coasting down-hill from a stop	km/h	17–21	38–43	59–65	37–41
	mph	11–13	24–27	37–40	23–25
7/16 throttle Acceleration from a stop	km/h	28–34	65–72	105–115	114–118
	mph	17–21	40–45	65–71	71–73
Full-throttle Acceleration from a stop	km/h	61–68	102–109	158–166	135–139
	mph	38–42	63–68	98–103	84–86

• **Downshift**

**D**

		LC.OFF	4th–3rd	3rd–2nd	2nd–1st
1/12 throttle Coasting or braking to a stop	km/h	20–24	—	29–34	8–12
	mph	12–15	—	18–21	5–7
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	77–81	—	—	—
	mph	48–50	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	131–135	126–135	82–91	42–50
	mph	81–84	78–84	51–57	26–31

**S** (with S<sub>4</sub> switch in operation)

		LC.OFF	4th–3rd	3rd–2nd	2nd–1st
1/12 throttle Coasting or braking to a stop	km/h	34–38	—	29–34	8–12
	mph	21–24	—	18–21	5–7
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	84–88	—	—	—
	mph	52–55	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	131–135	126–135	82–91	42–50
	mph	81–84	78–84	51–57	26–31

**CAUTION:** Do not shift from **D** or **S** to **2** at speeds over 100 km/h (62.5 mph); you may damage the transmission.

**2** (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

**R** (Reverse)

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

**P** (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake; the car should not move.

# Pressure

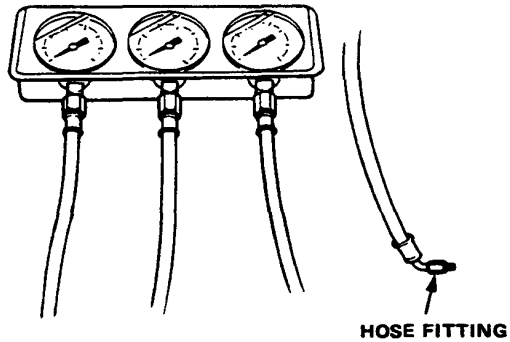
## Testing

**CAUTION:** Before testing, be sure transmission is filled to proper level.

**NOTE:**

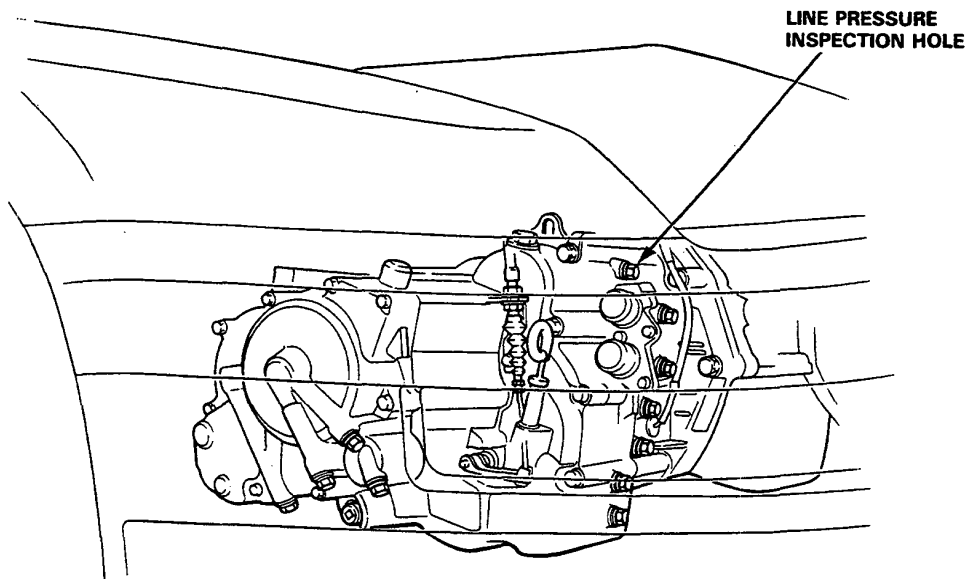
- Stop engine when attaching hoses for pressure tests.  
Torque hose fitting to 18 N·m (1.8 kg-m, 12 lb-ft).
- Do not reuse aluminum washers.

**GAUGE SET 07406-0020003**  
(includes pressure hose set 07406-0020201)



**Line Pressure Measurement**

- Set the parking brake securely.
- Jack up the front of the car and support it with a rigid rack.
- Run the engine at 2,000 min<sup>-1</sup> (rpm).



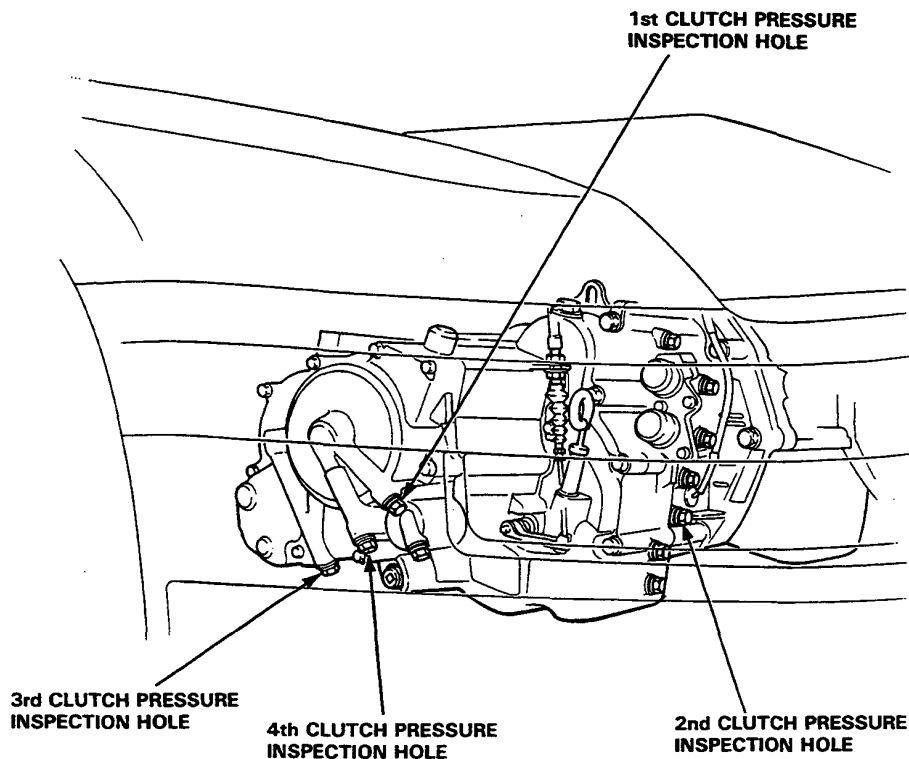
PRESSURE	SELECTOR POSITION	PROBABLE CAUSE	FLUID PRESSURE			
			PGM-FI		Carburetor	
			Standard	Service limit	Standard	Service limit
Line	<b>N</b> or <b>P</b>	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	834-883 kPa (8.5-9.0 kg/cm <sup>2</sup> , 121-128 psi)	785 kPa (8.0 kg/cm <sup>2</sup> , 114 psi)	785-834 kPa (8.0-8.5 kg/cm <sup>2</sup> , 114-121 psi)	736 kPa (7.5 kg/cm <sup>2</sup> , 107 psi)





### Clutch Pressure Measurement

- Set the parking brake securely and block the wheels.
- Jack up the front of the car and support it with a rigid rack.
- Run the engine at 2,000 min<sup>-1</sup> (rpm).



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE kPa (kg/cm <sup>2</sup> , psi)					
				PGM-FI		CARBURETOR			
				Standard	Service limit	Standard	Service limit		
1st Clutch	[S] or [D]	No or low 1st pressure	1st Clutch	834–883 (8.5–9.0, 121–128)	785 (8.0, 114)	785–834 (8.0–8.5, 114–121)	736 (7.5, 107)		
2nd Clutch	[2]	No or low 2nd pressure	2nd Clutch	569 – 883 (5.8, 9.0, 128)	520 (5.3, 75) (Close)	569 – 834 (5.8, 8.5, 121)	520 (5.3, 75) (Close)		
3rd Clutch	[S]	No or low 3rd pressure	3rd Clutch	82	785 (8.0, 114) (3/8 below)	82	785 (8.0, 114) (below)		
4th Clutch	[S] (with S4 switch in operation or [D])	No or low 4th pressure	4th Clutch	Throttle control lever fully closed	Throttle control lever opened 3/8 or more	Enclosed in parenthesis are throttle control lever opening angles	Throttle control lever fully closed	Throttle control lever 3/8 opened or more	Enclosed in parenthesis are throttle control lever opening angles
	[R]		Servo valve						

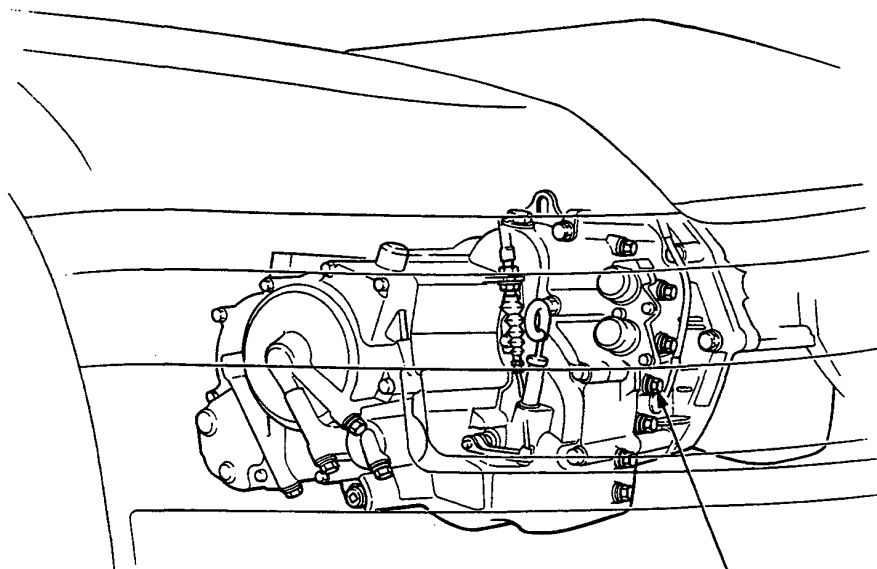
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# Pressure

## Testing (cont'd)

### Throttle B Pressure Measurement

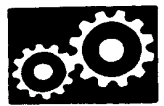
- Set the parking brake securely and block the wheels.
- Run the engine at 1,000 min<sup>-1</sup> (rpm).
- Disconnect the throttle control cable from the throttle lever and set the control lever in full throttle position.



**THROTTLE B PRESSURE  
MEASUREMENT HOLE**

PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE kPa (kg/cm <sup>2</sup> , psi)			
				PGM-FI		CARBURETOR	
				Standard	Service limit	Standard	Service limit
Throttle B	<b>S</b> or <b>D</b>	No (or low) Throttle B pressure	Throttle valve B	0 (close) 834–883 (8.5–9.0, 121–128) (fully opened) Enclosed in parenthesis are throttle control lever opening angles.	— 785 (8.0, 114) (fully opened) Enclosed in parenthesis are throttle control lever opening angles.	0 (close) 785–834 (8.0–8.5, 114–121) (fully opened) Enclosed in parenthesis are throttle control lever opening angles.	— 686 (7.0, 100) (fully opened) Enclosed in parenthesis are throttle control lever opening angles.

# 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 rising the engine speed.
- Be sure to remove the pressure gauge before testing stall speed.

1. Engage parking brake and block the front wheels.
2. Connect safety chains to both front two hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start the engine.
4. After the engine has warmed up to normal operating temperature, shift into **[2]**.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat same test in **[D]**, **[S]**, and **[R]**.

Stall speed in **[D]**, **[S]**, **[2]** and **[R]** must be the same, and must also be within limits:

### NOTE:

Stall speed test must be made only for checking the cause of trouble.

### Stall Speed RPM:

(Carbureted Engine)

Standard: 2,600 min<sup>-1</sup> (rpm)

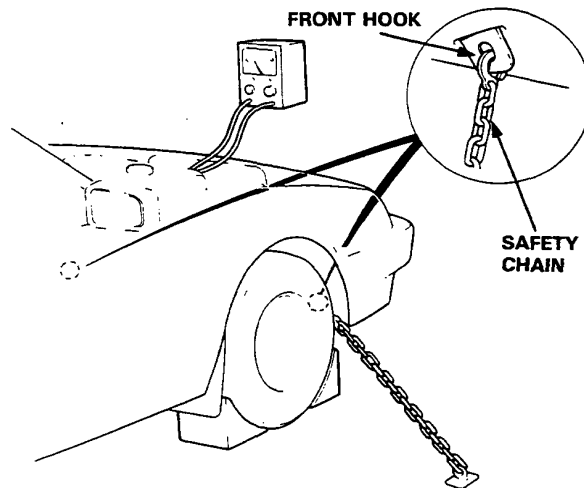
Service Limit: 2,450–2,750 min<sup>-1</sup> (rpm)

(Fuel Injected Engine)

Standard: 2,550 min<sup>-1</sup> (rpm)

Service Limit: 2,400–2,700 min<sup>-1</sup> (rpm)

TROUBLE	PROBABLE CAUSE
Stall rpm high in <b>[D]</b> , <b>[S]</b> , <b>[2]</b> & <b>[R]</b>	<ul style="list-style-type: none"> <li>• Low fluid level or oil pump output.</li> <li>• Clogged oil strainer.</li> <li>• Pressure regulator valve stuck closed.</li> <li>• Slipping clutch.</li> </ul>
Stall rpm high in <b>[R]</b>	<ul style="list-style-type: none"> <li>• Slippage of 4th clutch</li> </ul>
Stall rpm high in <b>[2]</b>	<ul style="list-style-type: none"> <li>• Slippage of 2nd clutch</li> </ul>
Stall rpm high in <b>[D]</b> & <b>[S]</b>	<ul style="list-style-type: none"> <li>• Slippage of 1st clutch or 1st gear one-way clutch</li> </ul>
Stall rpm low in <b>[D]</b> , <b>[S]</b> , <b>[2]</b> & <b>[R]</b>	<ul style="list-style-type: none"> <li>• Engine output low</li> <li>• Torque converter one-way clutch slipping</li> </ul>



# 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 DEXRON-type automatic transmission fluid.

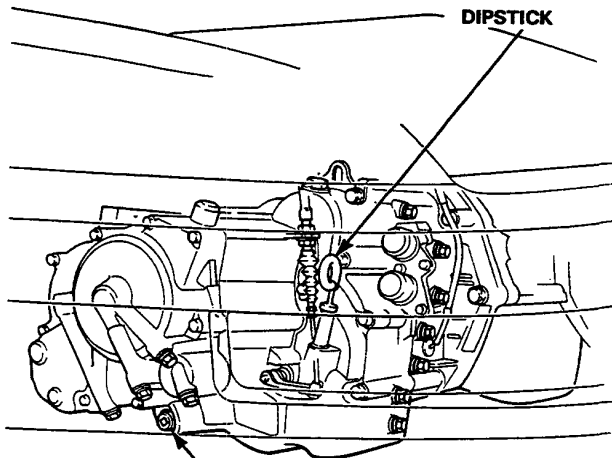
### Changing

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.

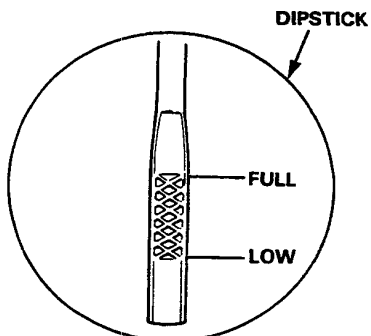
#### Automatic transmission Capacity:

2.8 l (3.0 U.S. qts. 2.5 Imp. qt) at change

6.2 l (6.6 U.S. qts. 5.5 Imp. qt) after overhaul



**DRAIN PLUG**  
40 N·m (4.0 kg·m, 29 lb·ft)



# Transmission

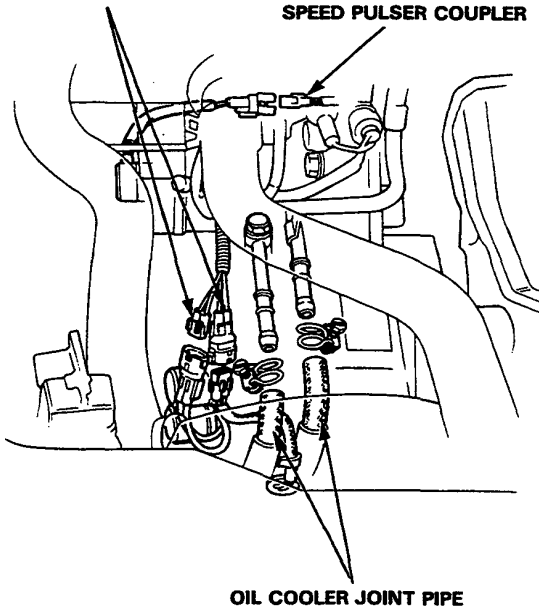


## Removal

1. Disconnect the ground cable at the battery and the transmission.
2. Disconnect the wiring for:
  - Starter motor
  - Lock-up control solenoids
  - Shift control solenoids
  - Speed pulser
3. Remove the air cleaner case (PGM-FI only).
4. Remove the power steering speed sensor from the transmission without removing the power steering hoses.
5. Disconnect the throttle control cable at the transmission bracket.
6. Disconnect the oil cooler hoses at the joint pipes.

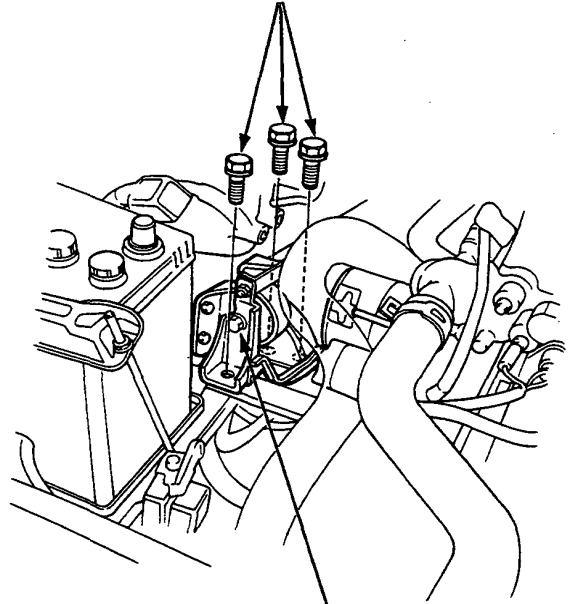
SOLENOID COUPLER

SPEED PULSER COUPLER



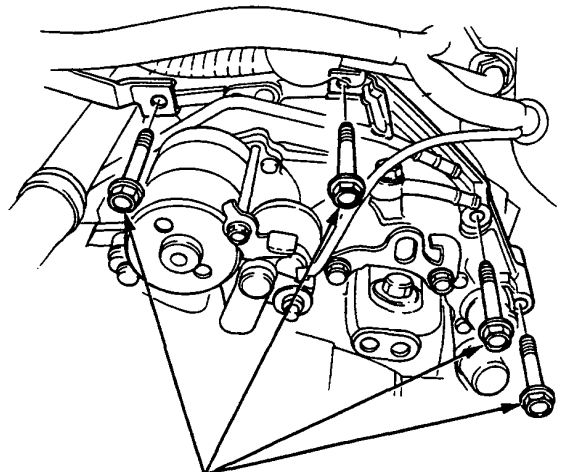
7. Remove the upper transmission mounting bracket.

39 N·m (3.9 kg-m, 28 lb-ft)



75 N·m (7.5 kg-m, 54 lb-ft)  
Remove this bolt if required.

8. Remove the transmission and block attachment bolt that must be removed from the engine compartment.



12 x 1.25 mm BOLTS  
65 N·m (6.5 kg-m, 47 lb-ft)

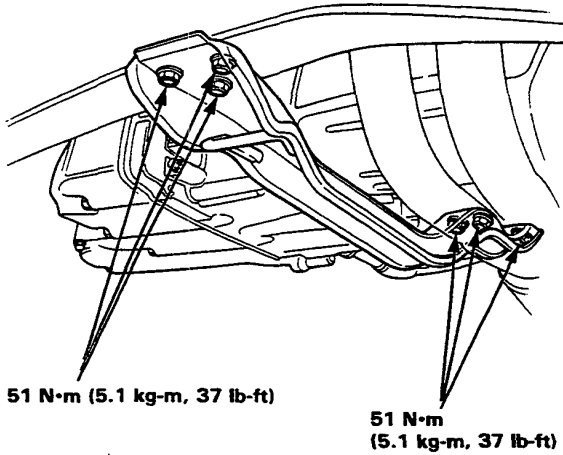
9. Raise vehicle at the reinforced lift points.
10. Remove both front wheels.

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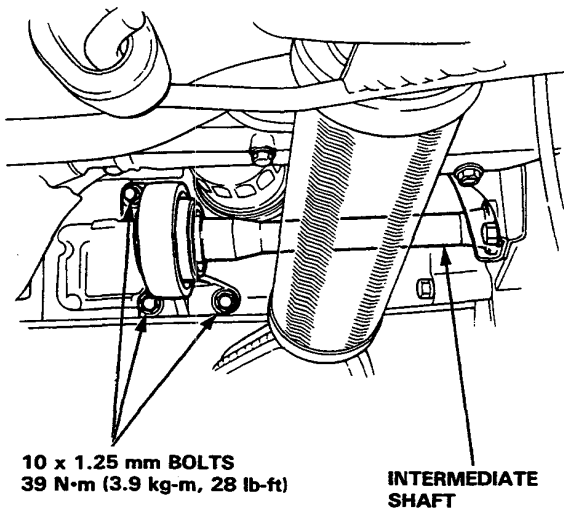
# Transmission

## Removal (cont'd)

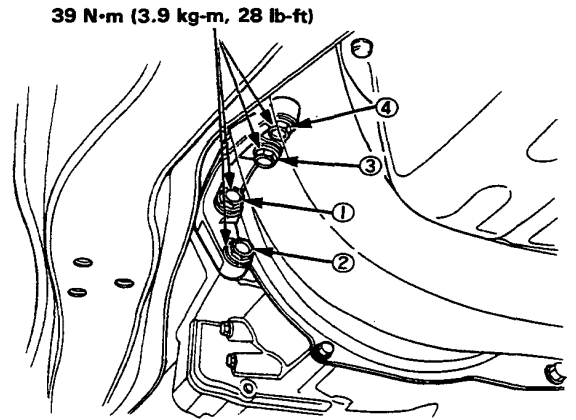
11. Remove the undercarriage splash shield.
12. Drain transmission oil.
13. Remove the center beam.



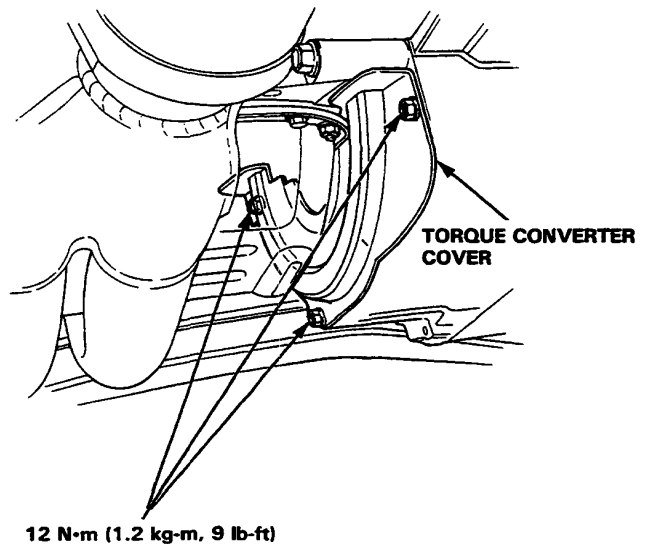
14. Remove the right radius rod completely.
15. Remove the right and left drive shafts.
16. Remove the left half shaft.



17. Remove the engine stiffener.

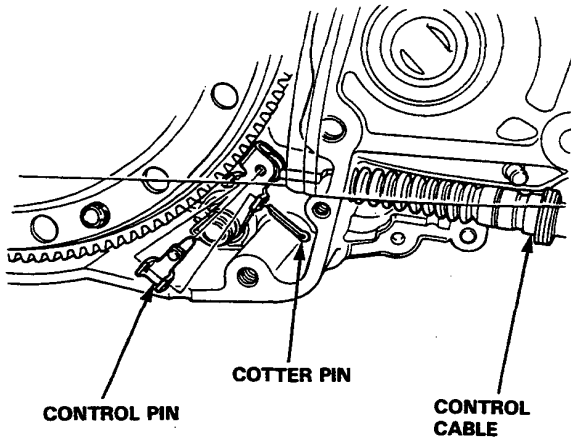


18. Remove the torque converter cover.

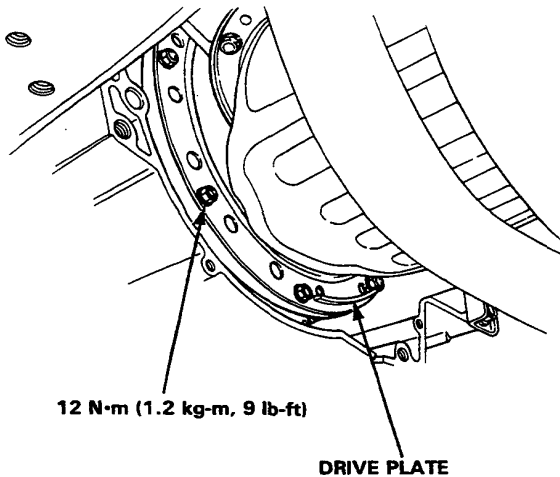




19. Remove the shift cable from the transmission.

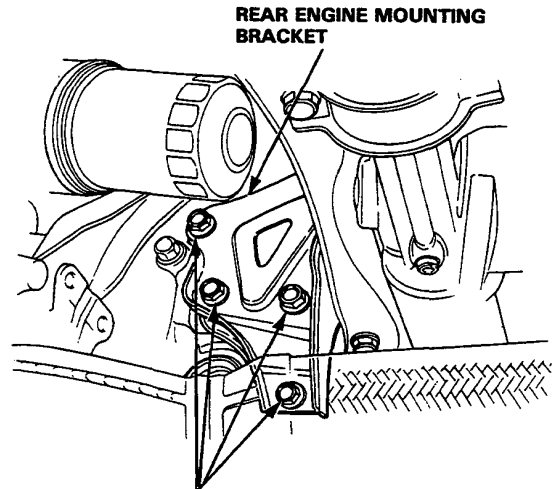


20. Remove the bolts from the drive plate.



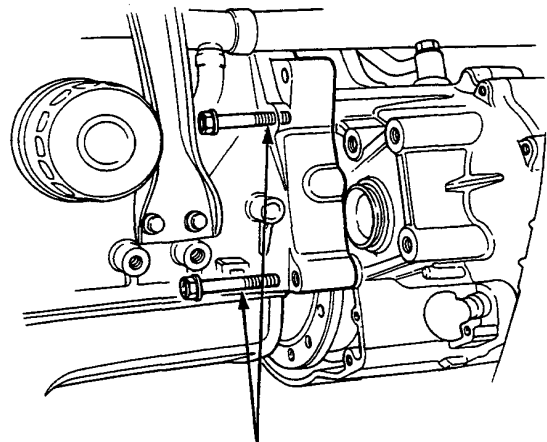
21. Support transmission with an appropriate jack.

22. Remove the lower bolt from the rear engine mounting bracket. Loosen but do not remove the top bolt. This bolt will support the weight of the engine.



**SPECIAL BOLTS**  
75 N·m (7.5 kg·m, 54 lb-ft)  
Replace

23. Remove the remaining engine to transmission mounting bolts.

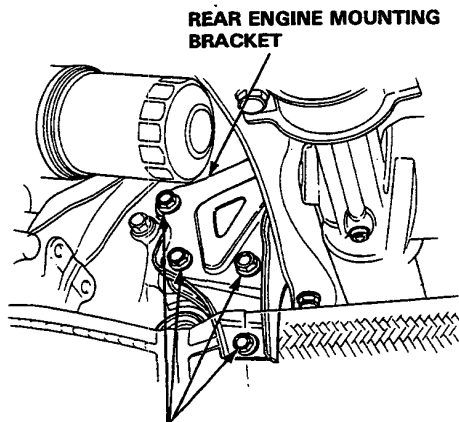


24. Place the transmission on an appropriate jack and separate the transmission from the engine block. Disengage the two 14 mm dowel pins and lower the transmission.

# Transmission

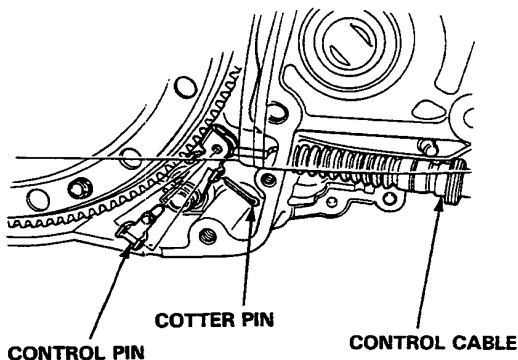
## Installation

1. Place the transmission on the transmission jack and raise to the engine level.
2. Secure the transmission to the engine with the mounting bolts.
3. Attach the torque converter to the drive plate with mounting bolts, and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate the crank as necessary to tighten bolts to 1/2 torque, then final torque, in a crisscross pattern. Check for free rotation after tightening the last bolt.
4. Install the transmission to the rear engine mount bracket with mounting bolts.

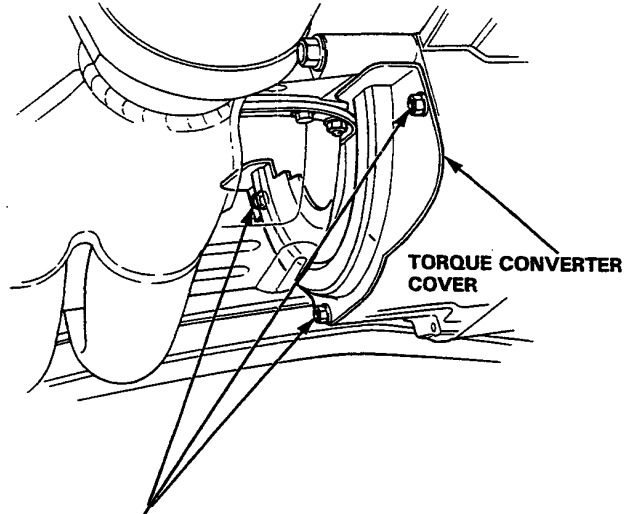


**SPECIAL BOLTS**  
75 N·m (7.5 kg-m, 54 lb-ft)  
Replace

5. Install the shift control cable and fasten in with the control pin and the split pin.



6. Install the torque converter covers.
7. Install the cable holder.

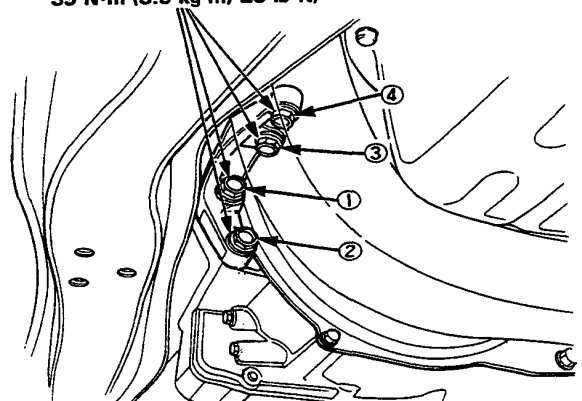


12 N·m (1.2 kg-m, 9 lb-ft)

8. Install the engine stiffener.

**NOTE:** Tighten bolts 1 to 4 in order to torque specified below.

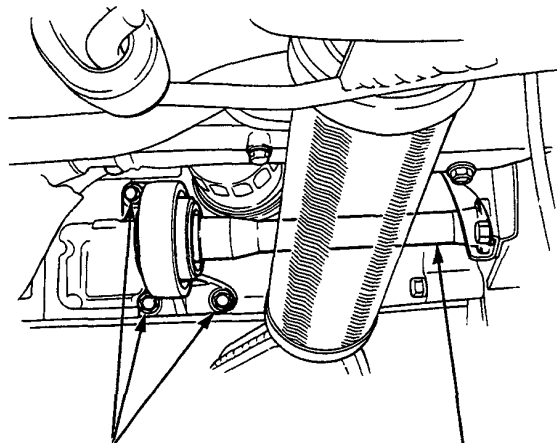
39 N·m (3.9 kg-m, 28 lb-ft)







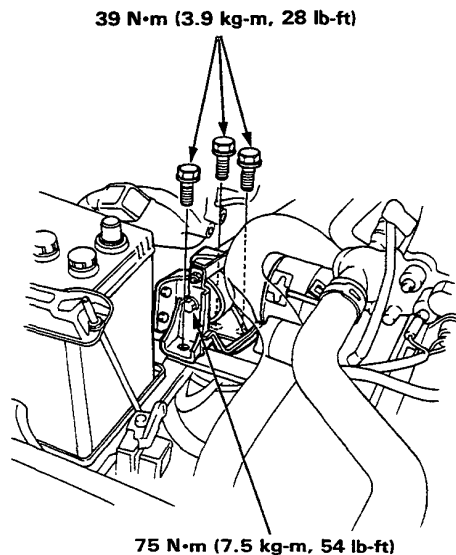
9. Install the intermediate shaft.
10. Install the right and left drive shaft.



**10 x 1.25 BOLT**  
**39 N·m (3.9 kg-m, 28 lb-ft)**

**INTERMEDIATE SHAFT**

11. Install the center beam.
12. Install the right and left front damper fork.
13. Install the radius rod on the transmission side.
14. Install the transmission mounting bracket.

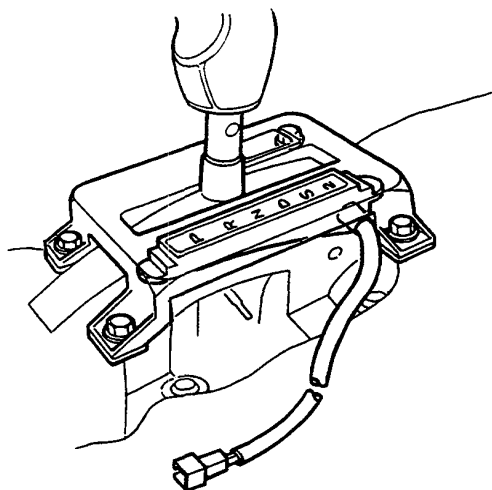


15. Connect the lock-up control solenoid valve connector, the shift control solenoid valve coupler and connector of the speed pulser.
16. Connect the oil cooler inlet and outlet hoses.
17. Connect the throttle control cable to the throttle control lever.
18. Install the speed sensor assembly.
19. Install the air cleaner case.
20. Refill the transmission with ATF.
21. Connect the starter and ground cables.
22. Connect the battery positive (+) and negative (-) cables to the battery.
23. Start the engine, set the parking brake, and shift the transmission through all gears three times. Check for proper control cable adjustment.
24. Let the engine reach operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
25. Road test as described on page 9-42.

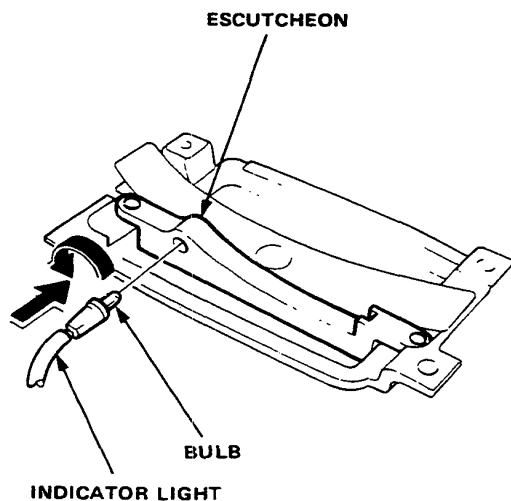
## Shift Indicator Light

### Check and Installation

1. Check for continuity between indicator light connector terminals as shown. If there is no continuity, check for a burned out bulb or open circuit.



2. Install the indicator bulb in the bulb housing. Insert the bulb housing into the slot in the escutcheon, then turn 90° to bulb housing.

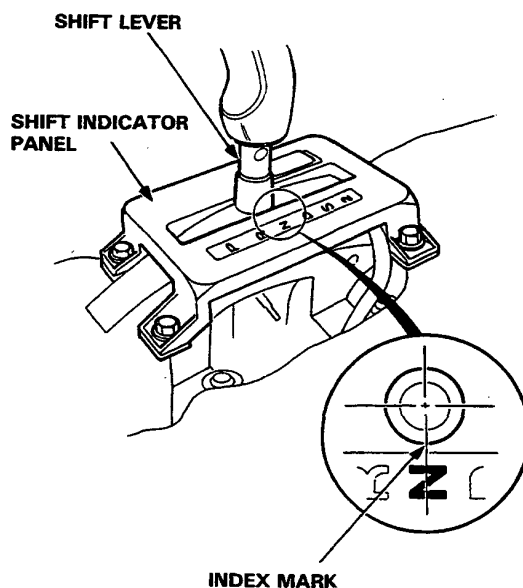


## Shift Indicator Panel

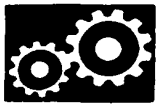
### Adjustment

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 panel mounting screws and adjust by moving the panel.

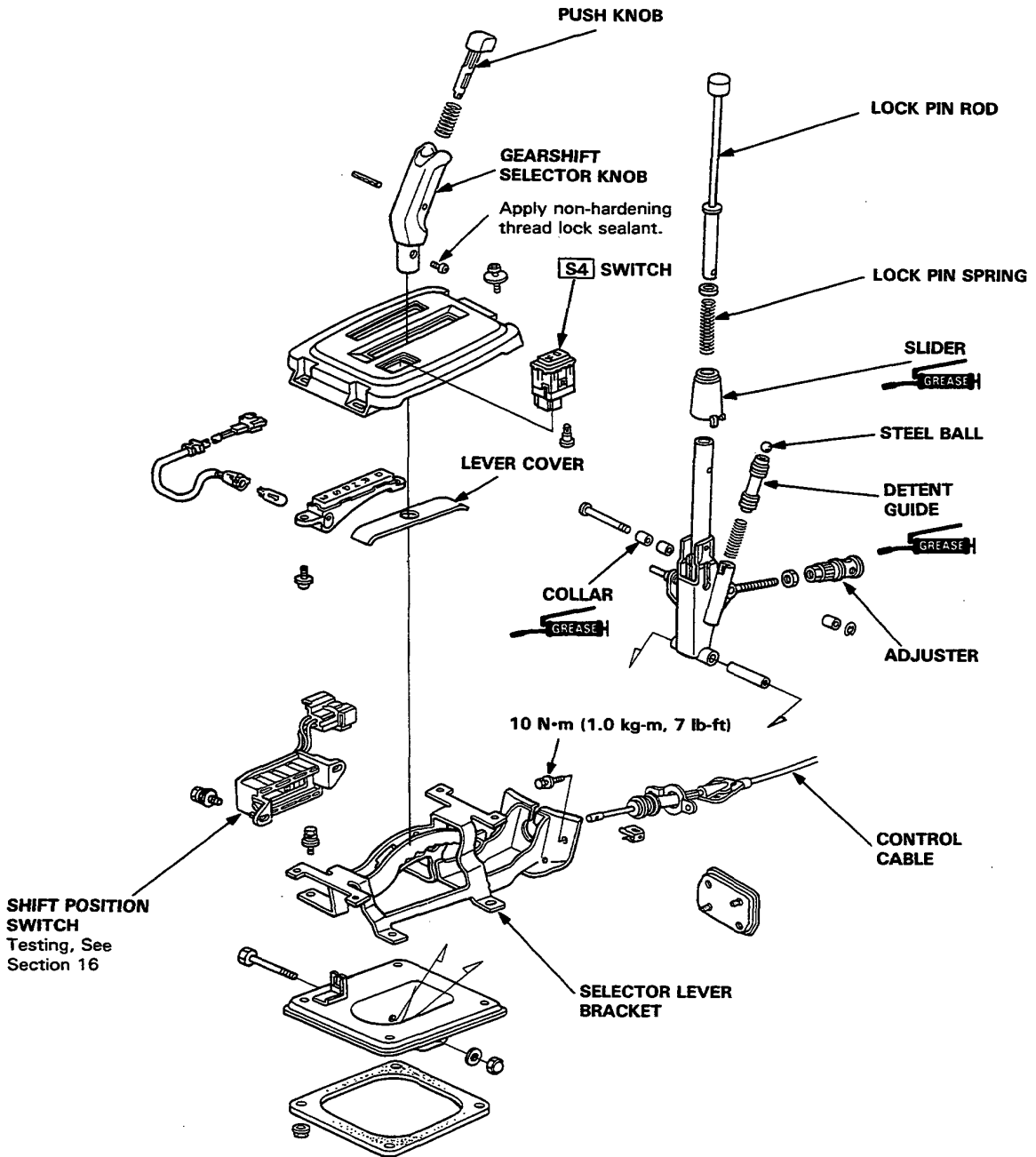
NOTE: Whenever the escutcheon is removed for indicator bulb replacement etc., reinstall the panel as described above.



# Gearshift Selector



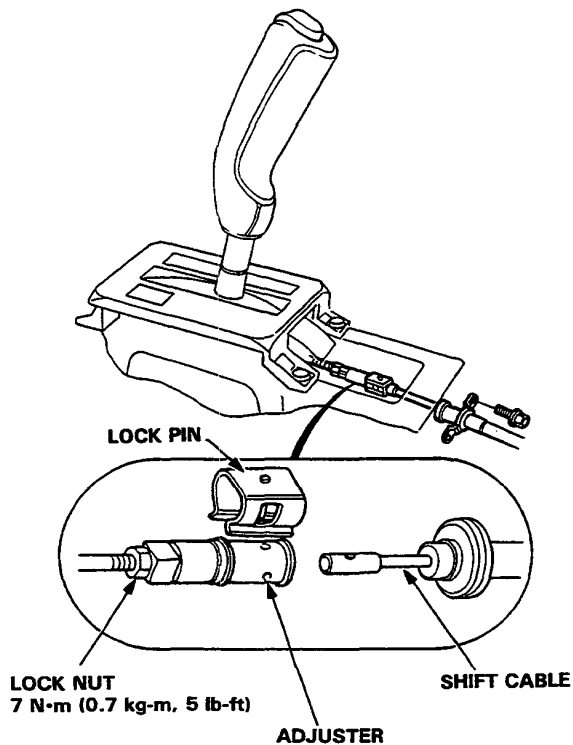
## Disassembly/Reassembly



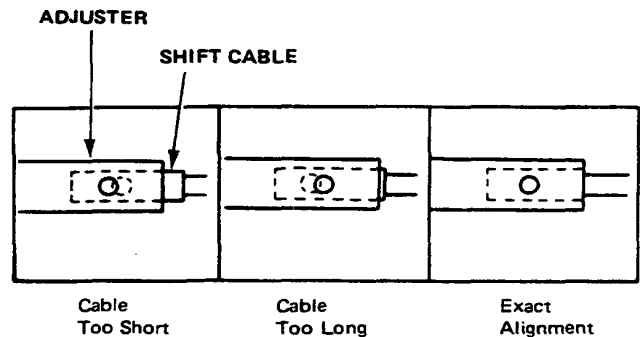
# Shift Cable

## Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting on pages 9-40 and 41.
2. With the engine off, remove the console.
3. Shift to Reverse, then remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



**NOTE:** There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the lock nut on shift cable and adjust as required.
6. Tighten the lock nut.
7. Install the lock pin on the adjuster.

**NOTE:** If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on pages 9-40 and 41.

# Throttle Control Cable Bracket



# Throttle Control Cable

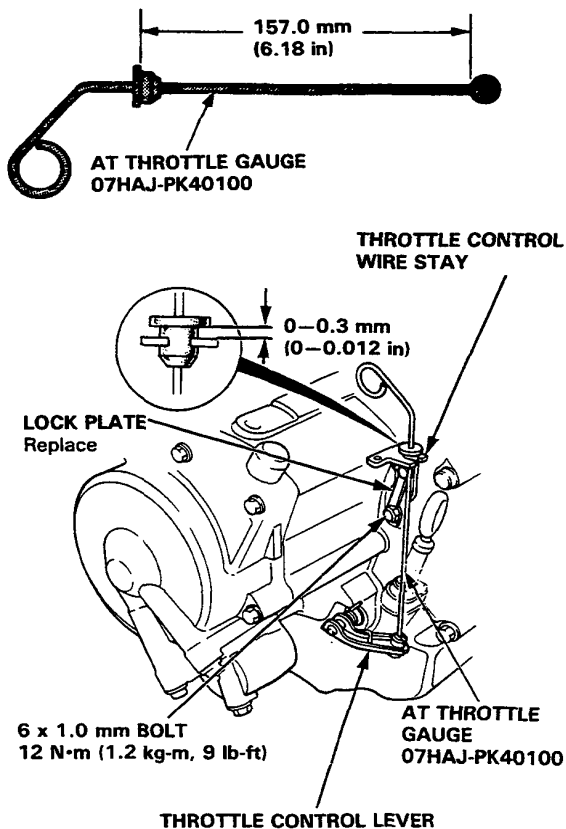
## Adjustment (Carbureted Engine)

1. Disconnect the throttle control cable from the throttle control lever.
2. Bend down the lock tabs of the lock plate and remove the two 6 mm bolts to free the bracket.
3. Loosely install a new lock plate.
4. Position the special tool between the throttle control lever and the bracket as shown.

NOTE: The special tool is designed so that the distance between the lever and the bracket is 157.0 mm (6.18 in.) when it is installed.

5. Position the bracket so that there is no binding between the bracket and the special tool (tolerance 0 to + 0.3 mm). Then tighten the two 6 mm bolts, bend up the lock plate tabs against the bolts heads.

**CAUTION:** Make sure the control lever doesn't get pulled toward the bracket side as you tighten the bolts.



## Adjustment/Inspection (Carbureted Engine)

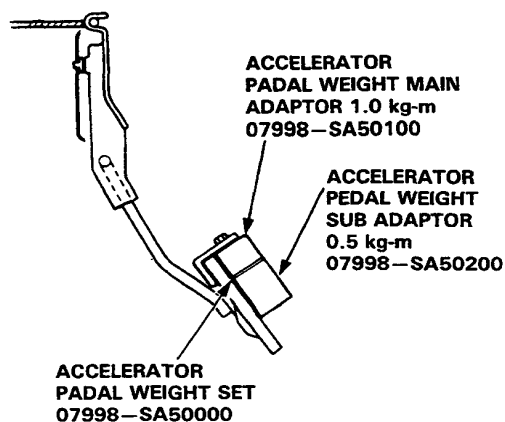
NOTE: Perform the following inspections before adjusting the throttle control cable.

- The carburetor throttle cable play is correct. See Fuel Section.
- The engine is warmed-up to operating temperature.

NOTE: The cooling fan should come on twice or more.

- The idle speed is correct. (See Section 6).
- The automatic choke operation is correct. See "Throttle Control Cable Bracket Adjustment."
- The distance between the throttle control lever and the throttle control bracket is correct. See "Throttle Control Cable Bracket Adjustment."

1. Disconnect the vacuum tube from the dash pot, connect the vacuum pump and keep vacuum applied. (page 9-36). This simulates a normal operating amount of pull by the dash pot as if the engine were running.
2. Attach a weight of about 1.5 kg (3 lbs) to the accelerator pedal. Raise the pedal, then release it, this will allow the weight to remove the normal free play from the throttle cable.

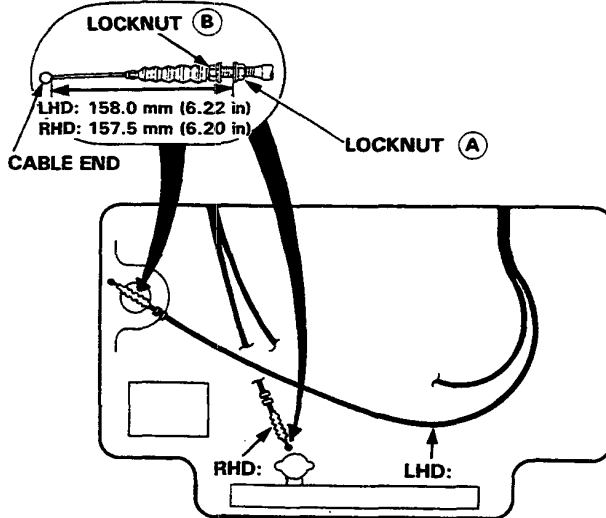


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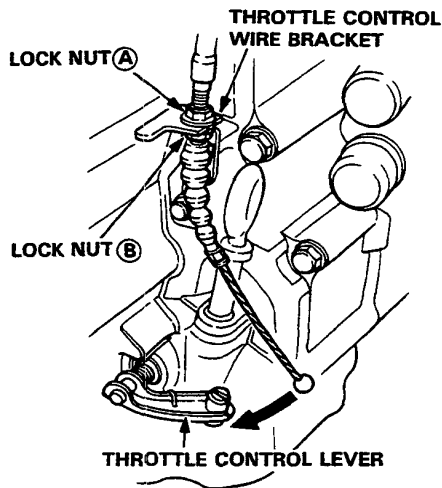
# Throttle Control Cable

## Adjustment/Inspection (Carbureted Engine)

3. Secure the throttle control cable with clamps as shown.
4. Lay the end of the throttle control cable on the shock tower.
5. Adjust the distance between the throttle control cable end and nut (A) to 158.0 mm (6.22 in) (LHD)/157.5 mm (6.20 in) (RHD).



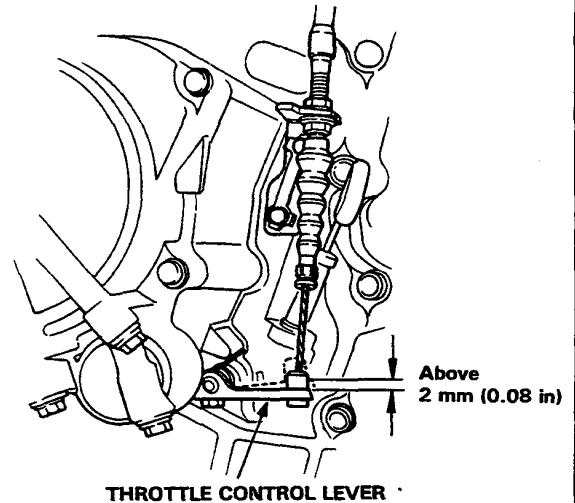
6. Insert the end of throttle control cable in the groove of the throttle control lever.



7. Insert the throttle control cable in the bracket and secure with locknut (B).

NOTE: Make sure the cable is not kinked or twisted.

8. Check that the cable moves freely by depressing the accelerator.
9. Remove the weight on the accelerator pedal and push the pedal to make sure that there is the specified play at the throttle control lever.



10. Start the engine and check the synchronization between the carburetor and the throttle control cable.

NOTE: The throttle control lever should start to move as engine speed increases.

- If the throttle control lever moves before engine speed increases, turn the cable locknut A counter clockwise and tighten locknut B.
- If the throttle control lever moves after engine speed increases, loosen locknut B, turn locknut A clockwise and tighten the locknut B.

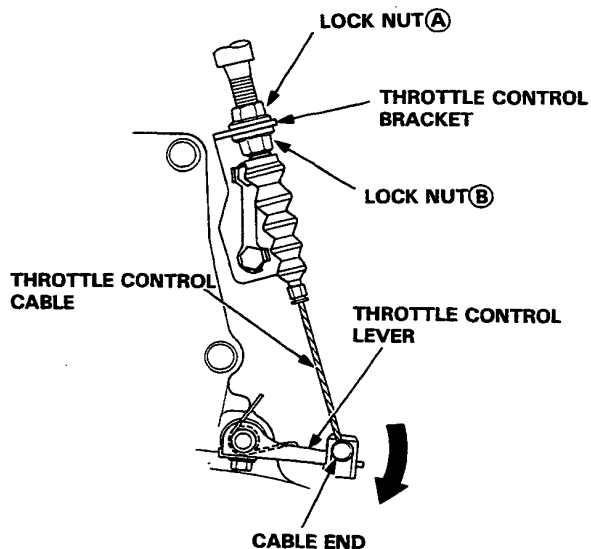
(cont'd)



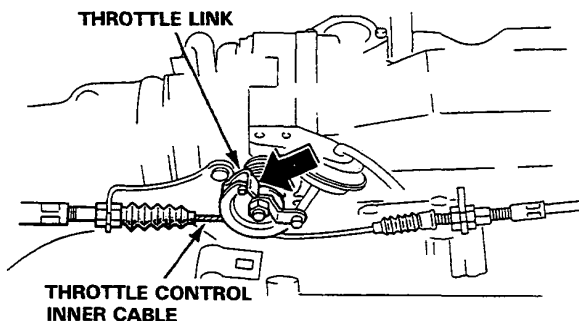
# Throttle Control Cable

## Adjustment/Inspection (cont'd) (Fuel-Injected Engine)

1. Loosen locknuts (A) and (B) on the throttle control cable.
2. Press down as shown on the throttle control lever until it stops.



3. While pressing down on the throttle control lever, pull on the throttle link to check the amount of throttle control cable free play.



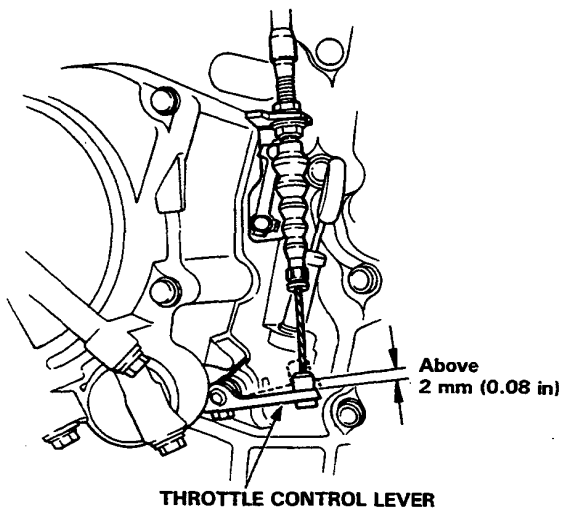
Remove all throttle control cable free play by gradually turning lock nut "A."

Until no movement can be felt in the throttle link, while continuing to press down on the throttle control lever, pull open the throttle link. The control lever should begin to move at precisely the same time as the link.

**NOTE:** Correct "Fine Tune" adjustment of the throttle control cable is critical for proper operation of the transmission and lock-up torque convertor.

4. Check the following items before starting the engine:

Depress the accelerator to the floor. While depressed, check that there is play in the throttle control lever.



- Check that the cable moves freely by depressing the accelerator.

## **Driveshafts**

**Special Tools ..... 10-2**

### **Driveshafts**

**Removal ..... 10-3**

**Disassembly/Inspection ..... 10-4**

**Reassembly ..... 10-5**

### **Intermediate Shaft**

**Replacement ..... 10-6**

**Disassembly ..... 10-6**

**Inspection ..... 10-7**

**Reassembly ..... 10-8**

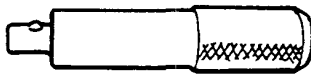




# Special Tools

## Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07749-0010000	Driver	1	
②	07746-0040900	Pilot, 40 mm	1	
③	07965-SD90100	Support Base	1	
④	07746-0010400	Attachment 52 x 55 mm	1	
⑤	07746-0010500	Attachment 62 x 68 mm	1	
⑥	07GAD-SE00100	Oil Seal Driver	1	
⑦	07965-SD90200	Support Collar	1	
⑧	07947-SD90200	Oil Seal Driver	1	



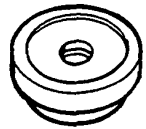
①



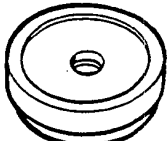
②



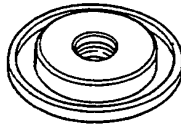
③



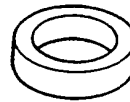
④



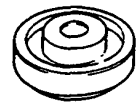
⑤



⑥



⑦



⑧

# Driveshafts



## Removal

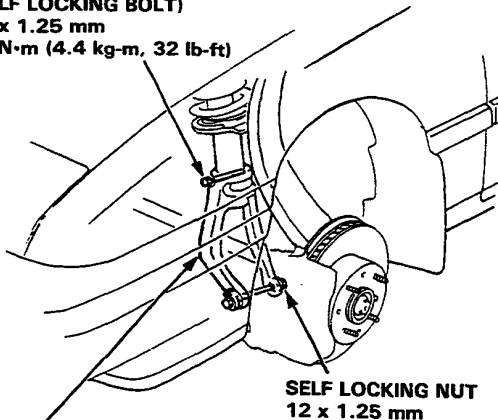
1. Loosen the front wheel lug nuts.
2. Raise the front end of the car and place safety stands in the proper locations. Remove the front wheels.
3. Drain the transmission oil.

**NOTE:** It is not necessary to drain the transmission oil when the left driveshaft is removed.

4. Raise the locking tab on the spindle nut and remove it with a 36 mm (1-7/16 in.) socket wrench.
5. Remove the damper fork bolt and damper pinch bolt. Remove the damper fork.

### DAMPER PINCH BOLT (SELF LOCKING BOLT)

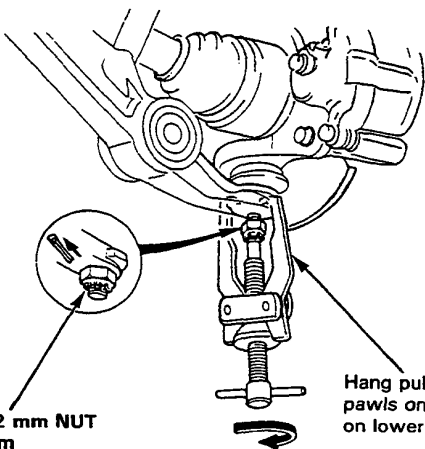
10 x 1.25 mm  
44 N·m (4.4 kg-m, 32 lb-ft)



DAMPER FORK

**SELF LOCKING NUT**  
12 x 1.25 mm  
65 N·m (6.5 kg-m, 47 lb-ft)  
Replace.

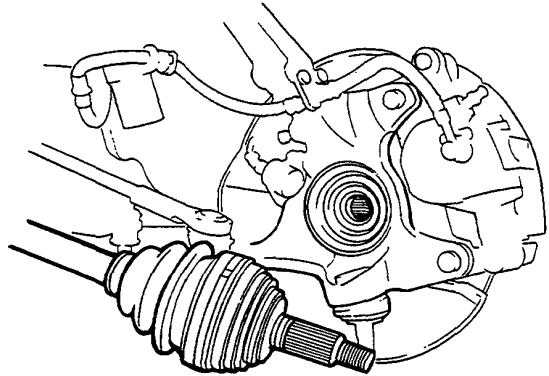
6. Remove the knuckle-to-lower arm castle nut, and separate the lower arm from the knuckle using a commercially available bearing puller.



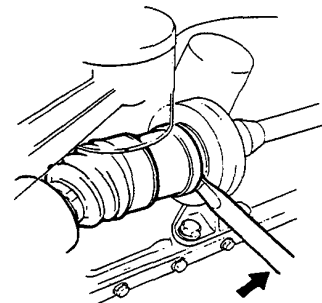
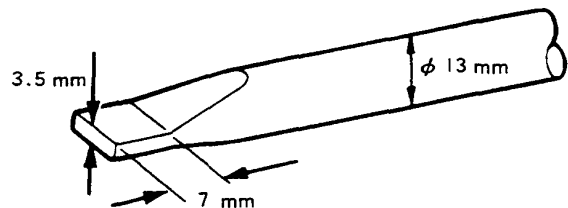
14 x 2 mm NUT  
75 N·m  
(7.5 kg-m, 54 lb-ft)

Hang puller  
pawls on lugs  
on lower arm.

7. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer.



8. Pry the driveshaft assembly with a screwdriver as shown to force the set ring at the driveshaft end past the groove.
9. Pull the inboard joint and remove the driveshaft and CV joint out of the differential case 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.

# Driveshaft

## Disassembly/Inspection

### NOTE:

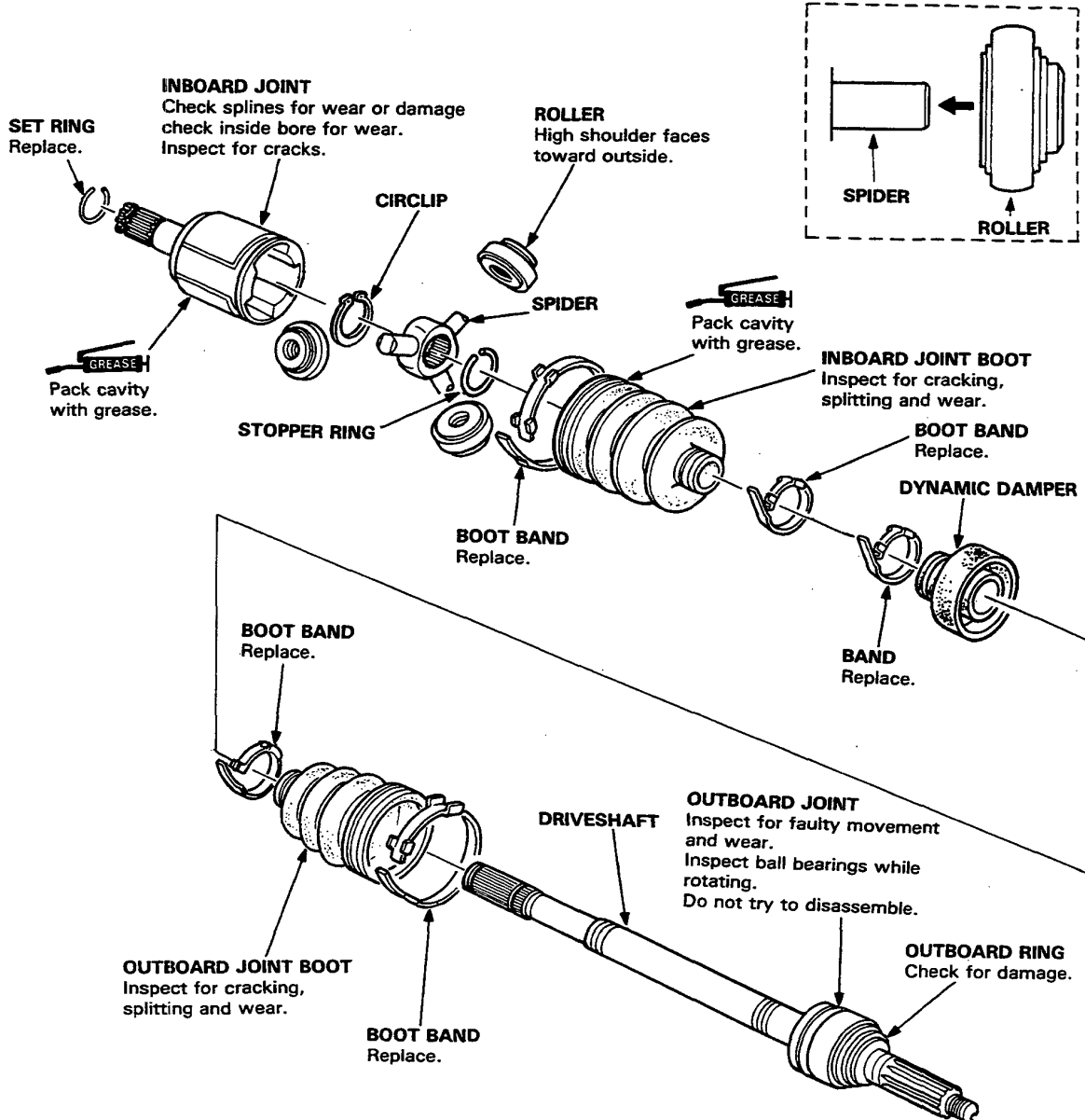
- Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.
- The inboard joint must be removed to replace the boots.

**GREASE** Thoroughly pack the inboard joint and both joint boots with high quality molybdenum disulfide grease when reassembling.

### Grease Quantity:

Inboard Joint: 100–110 g

Outboard Joint: 90–100 g





## Reassembly

1. Install the outboard boot, dynamic damper and inboard boot to the drive shaft.

**NOTE:** Install the dynamic damper with band groove towards the inboard joint.

2. Install the stopper ring into the driveshaft groove.
3. Install the spider on the driveshaft and secure with the circlip.
4. Install the rollers to the spider with their high shoulders facing outward.

**CAUTION:** Reinstall the rollers to their original positions on the spider.

5. Pack the boots and joints with molybdenum disulfide grease.

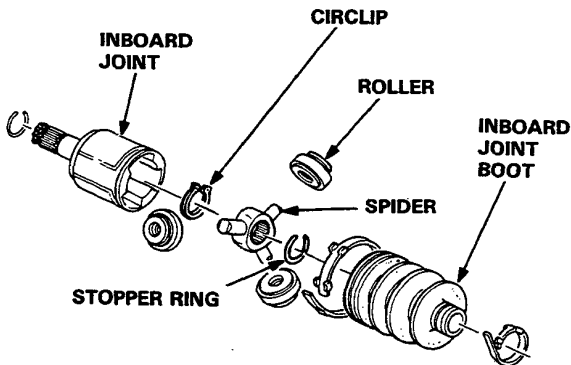
**Grease quantity:**

**Inboard joint: 100–110 g**

**Outboard joint: 90–100 g**

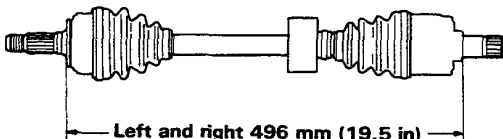
6. Install the driveshaft on the inboard joint.

**CAUTION:** Hold the driveshaft assembly so the inboard joint points up, to prevent it from falling off.



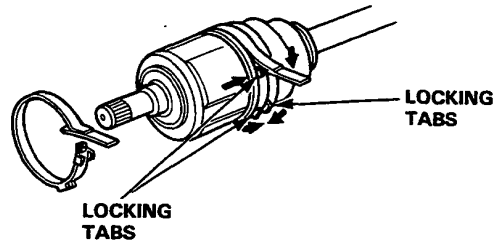
7. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

**NOTE:** The ends of boots seat in the groove of the driveshaft and joint.

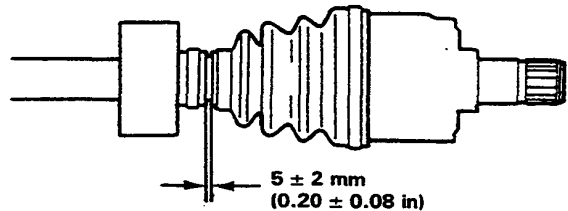


8. Install new boot bands on the boot and bend both sets of locking tabs.

9. Lightly tap on the doubled-over portions to reduce their height.



10. Position the dynamic damper as shown below.



11. Install a new dynamic damper band and bend down both sets of locking tabs.

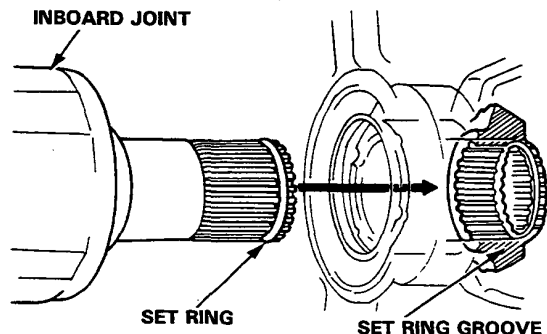
12. Lightly tap on the doubled-over portion to reduce its height.

13. Install a new set ring in the driveshaft groove.

14. Install the inboard end of the driveshaft into the differential.

### CAUTION:

- Always use a new set ring whenever the driveshaft is being installed.
- Make sure the driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential or intermediate shaft.

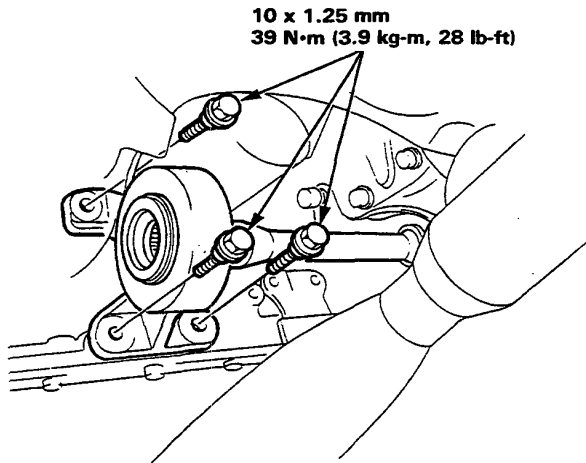


15. Refill the transmission.

# Intermediate Shaft

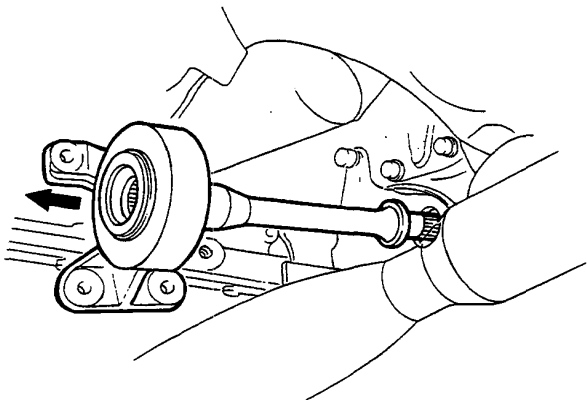
## Replacement

1. Drain oil from the transmission.
2. Remove the three 10 mm bolts.



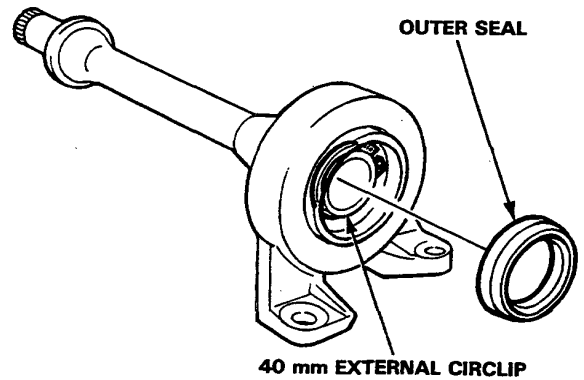
3. Remove the intermediate shaft from the differential.

**CAUTION:** To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential.

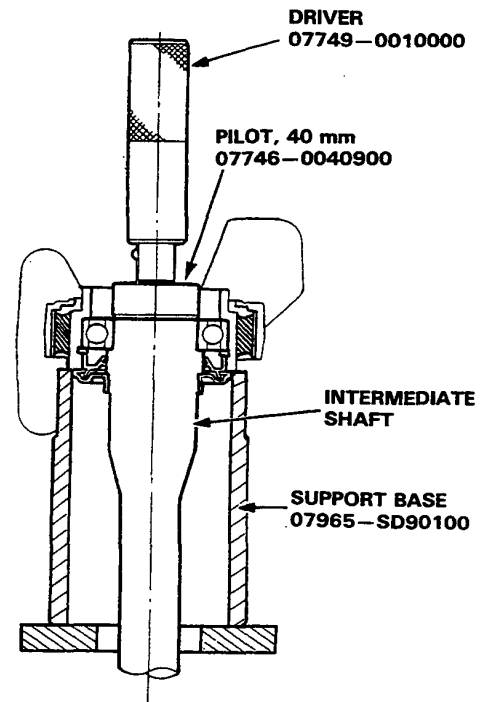


## Disassembly

1. Remove the intermediate shaft outer seal.
2. Remove the 40 mm external circlip.

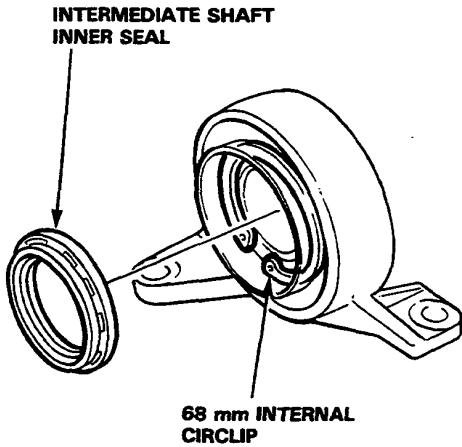


3. Press the intermediate shaft out of the shaft bearing.

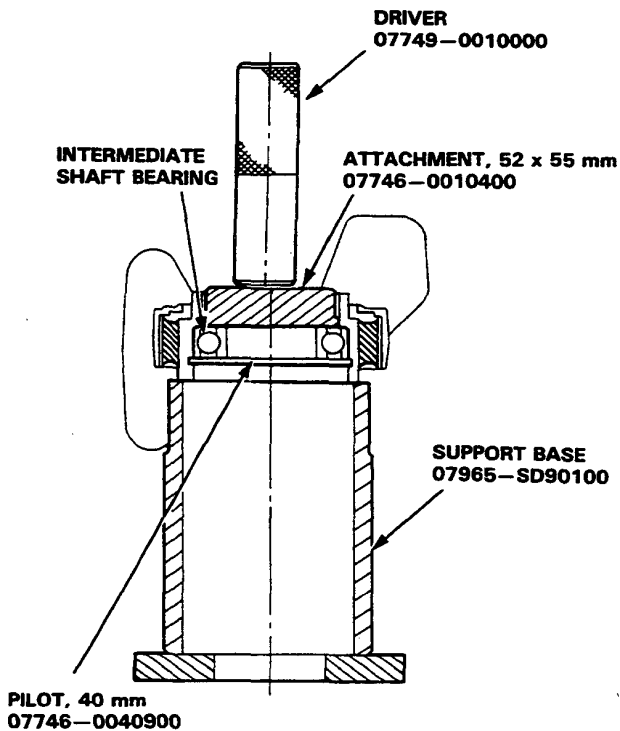




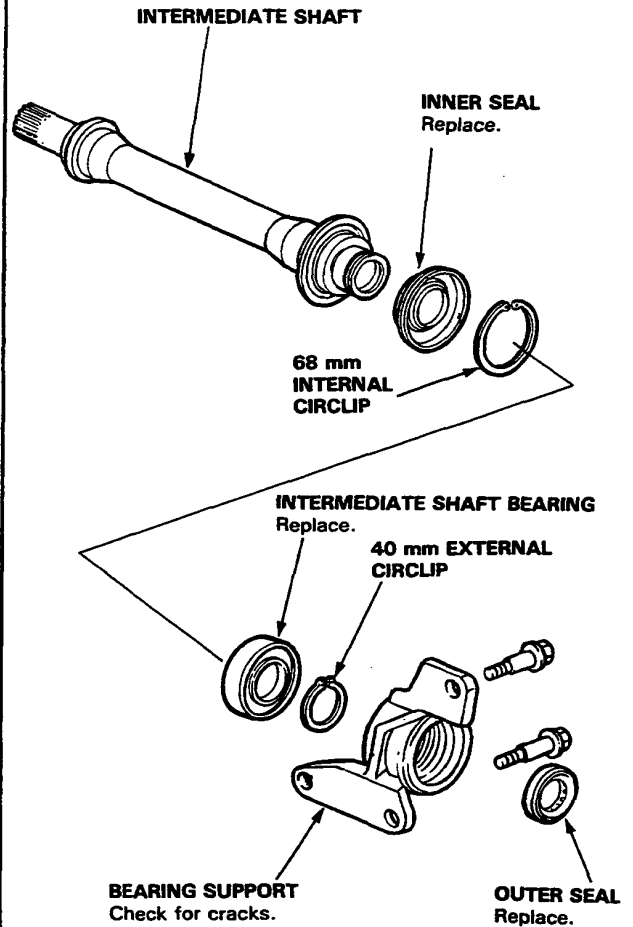
4. Remove the intermediate shaft inner seal.
5. Remove the 68 mm internal circlip.



6. Press the intermediate shaft bearing out of the bearing support.



## Inspection

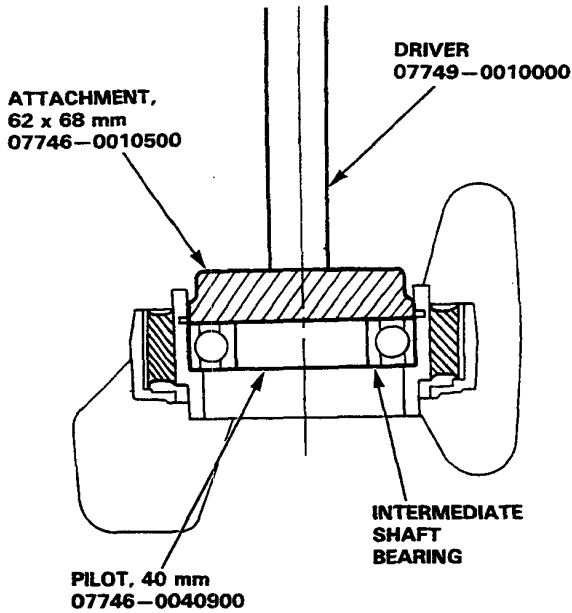


**CAUTION:** Be careful not to damage the rubber on the bearing support while installation.

# Intermediate Shaft

## Reassembly

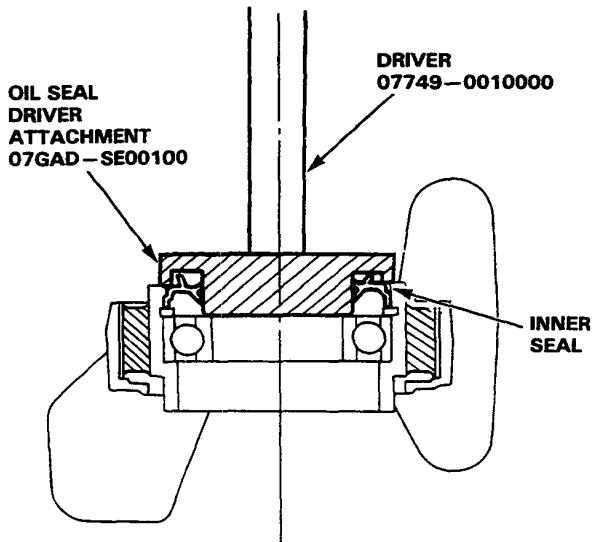
1. Press the intermediate shaft bearing into the bearing support.



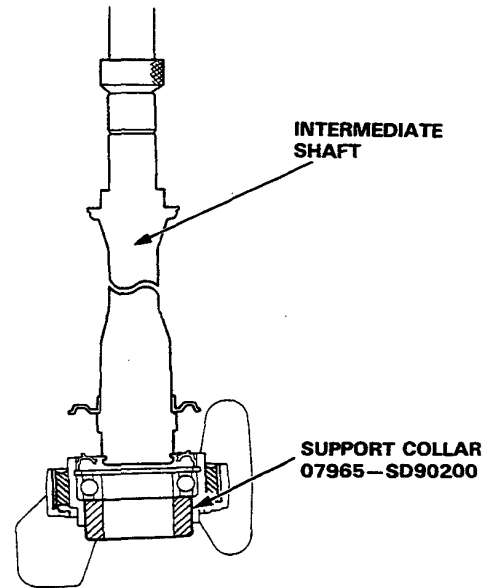
2. Seat the 68 mm circlip in the groove of the bearing support.

**CAUTION:** Install the circlip with the tapered end facing out.

3. Press the intermediate shaft inner seal into the bearing support.



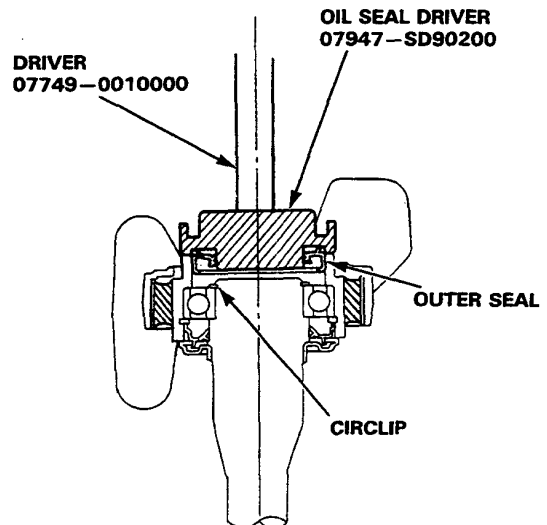
4. Press the intermediate shaft into the shaft bearing.



5. Seat the 40 mm external circlip in the groove of the intermediate shaft.

**CAUTION:** Install the circlip with the tapered end facing out.

6. Press the outer seal into the bearing support.



## Power Steering

Special Tools .....	11-2	Steering Pump	
Component Location		Illustrated Index .....	11-26
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Rear Wheel Turning Angle Inspection (4WS) .....	11-22	Function Inspection .....	11-87
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Lock Cylinder Replacement .....	11-25		
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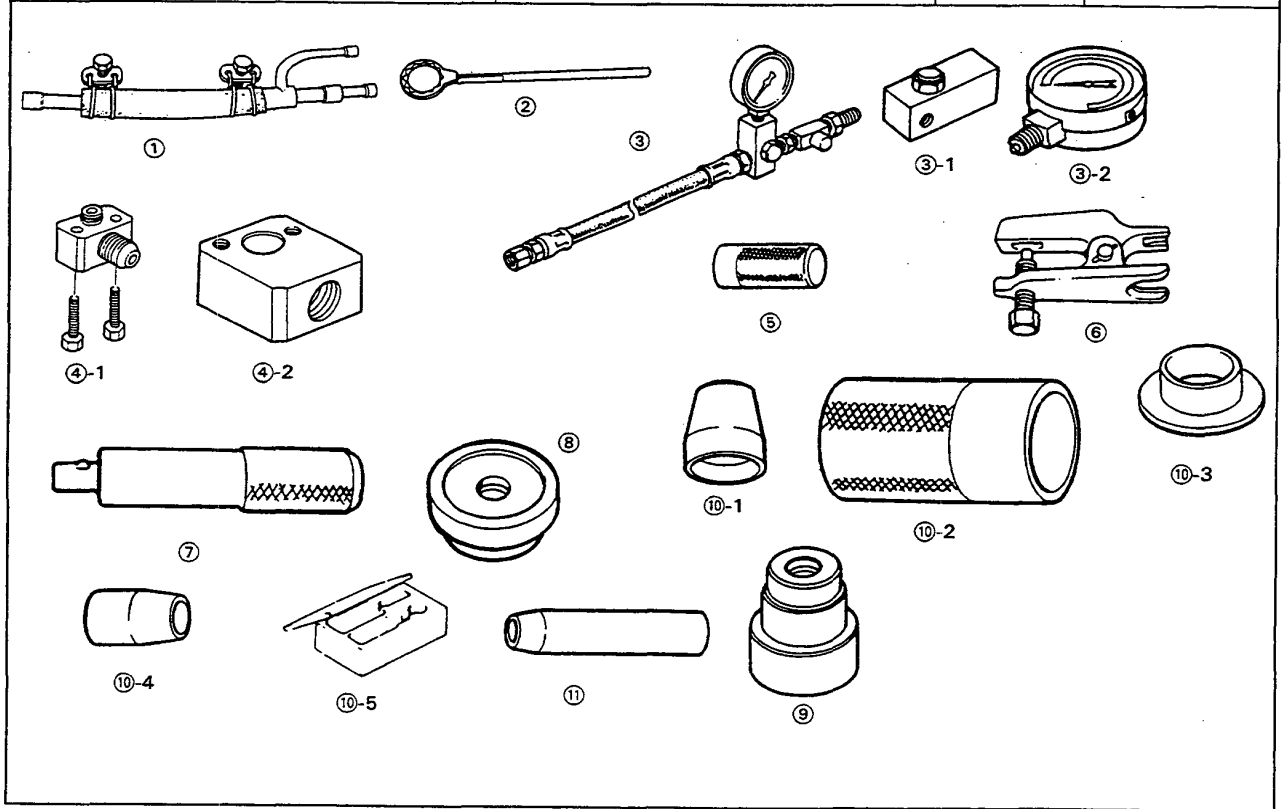




# Special Tools

## Special Tools

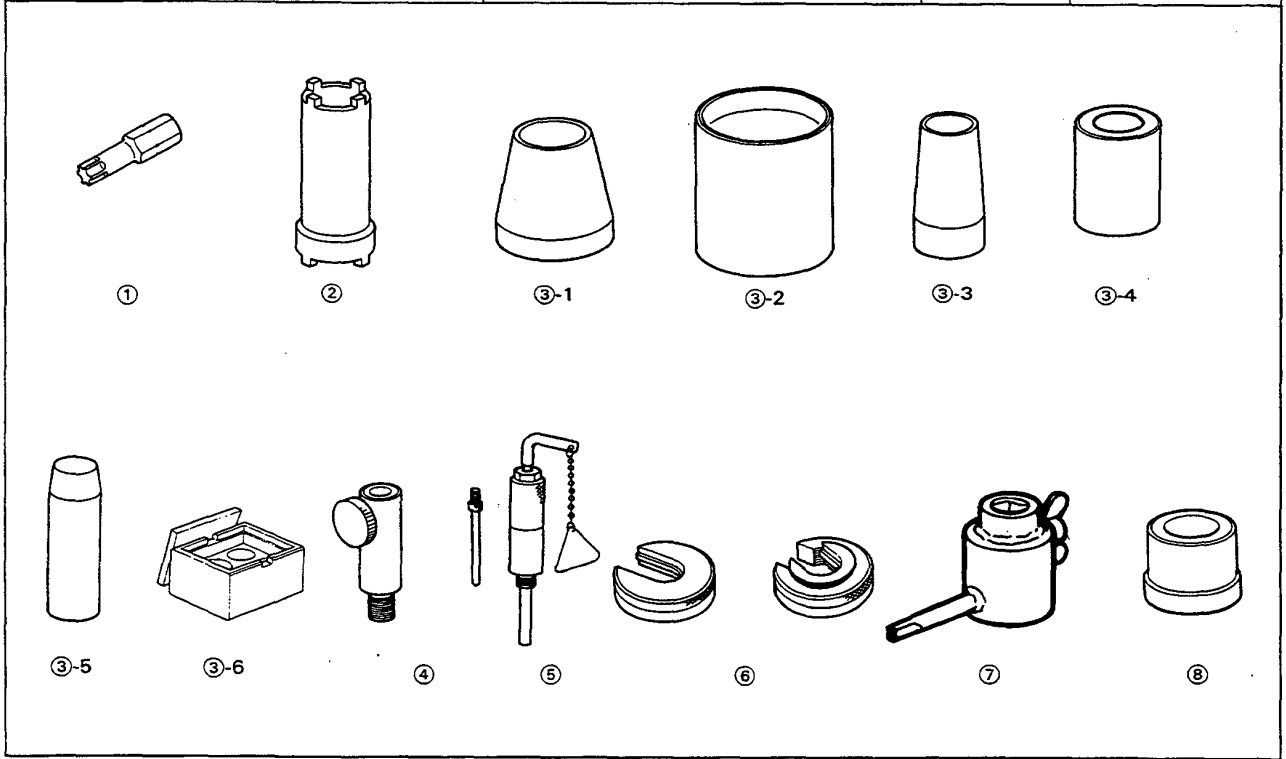
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07406-0010101	Bypass Tube Joint	1	
②	07916-SA50001	40 mm Lock Nut Wrench	1	
③	07406-0010200	P/S Pressure Gauge Set	1	
③-1	07406-0010300	Pressure Control Valve	1	
③-2	07406-0010400	Pressure Gauge	1	
④	07GAK-SE00100	P/S Pressure Gauge Adapter Set	1	
④-1	07GAK-SE00110	P/S Joint Adapter (Hose)	1	
④-2	07GAK-SE00120	P/S Joint Adapter (Pump)	1	
⑤	07953-7190000	Collar Driver	1	
⑥	07941-6920003	Ball Joint Remover	1	
⑦	07749-0010000	Driver	1	
⑧	07746-0010300	Attachment 42 x 47 mm	1	
⑨	07947-6340300	Driver Attachment	1	
⑩	07GAG-SD40000	P/S Tool Kit	1	
⑩-1	07GAG-SD40100	Piston Seal Ring Guide	1	
⑩-2	07GAG-SD40200	Piston Seal Sizing Tool	1	
⑩-3	07GAG-SD40300	Cylinder End Seal Slider	1	
⑩-4	07GAG-SD40400	End Seal Guide	1	
⑩-5	07GAG-SD40600	Tool Box	1	
⑪	07974-SA50600	Pinion Seal Guide	1	





**Special (4WS only)**

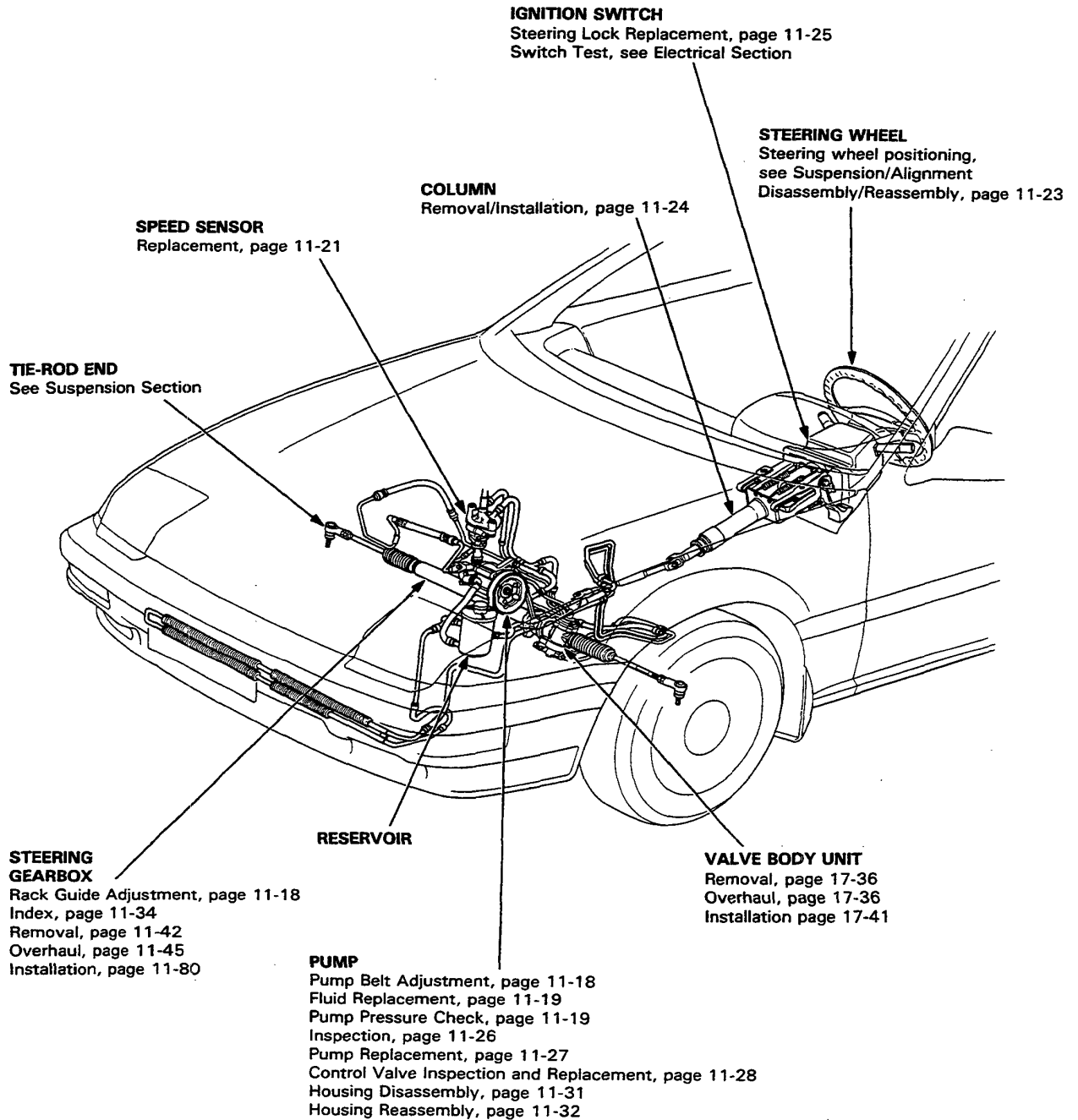
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07703-0010101	Torx Bit Driver T40	1	
②	07HAA-SF10100	Lock Nut Socket 36 x 41 mm	1	
③	07HAG-SF10000	4WS Tool Kit	1	
③-1	07HAG-SF10100	Piston Seal Ring Guide	1	
③-2	07HAG-SF10200	Piston Seal Ring Sizing Tool	1	
③-3	07HAG-SF10300	Pinion Seal Ring Guide	1	
③-4	07HAG-SF10400	Pinion Seal Ring Sizing Tool	1	
③-5	07HAG-SF10500	Driven Seal Ring Guide	1	
③-6	07HAG-SF10600	Tool Box	1	
④	07HAJ-SF10100	Rack Adjuster Gauge Holder Set	1	
⑤	07HAJ-SF10201	Rear Steering Center Lock Pin	1	
⑥	07HAJ-SF10300	Stroke Rod Holder Set	1	
⑦	07HFJ-SF10400	Inspection Adaptor	1	
⑧	07746-0010700	Attachment 24 x 26 mm	1	



# Component Location (2WS)

## Index

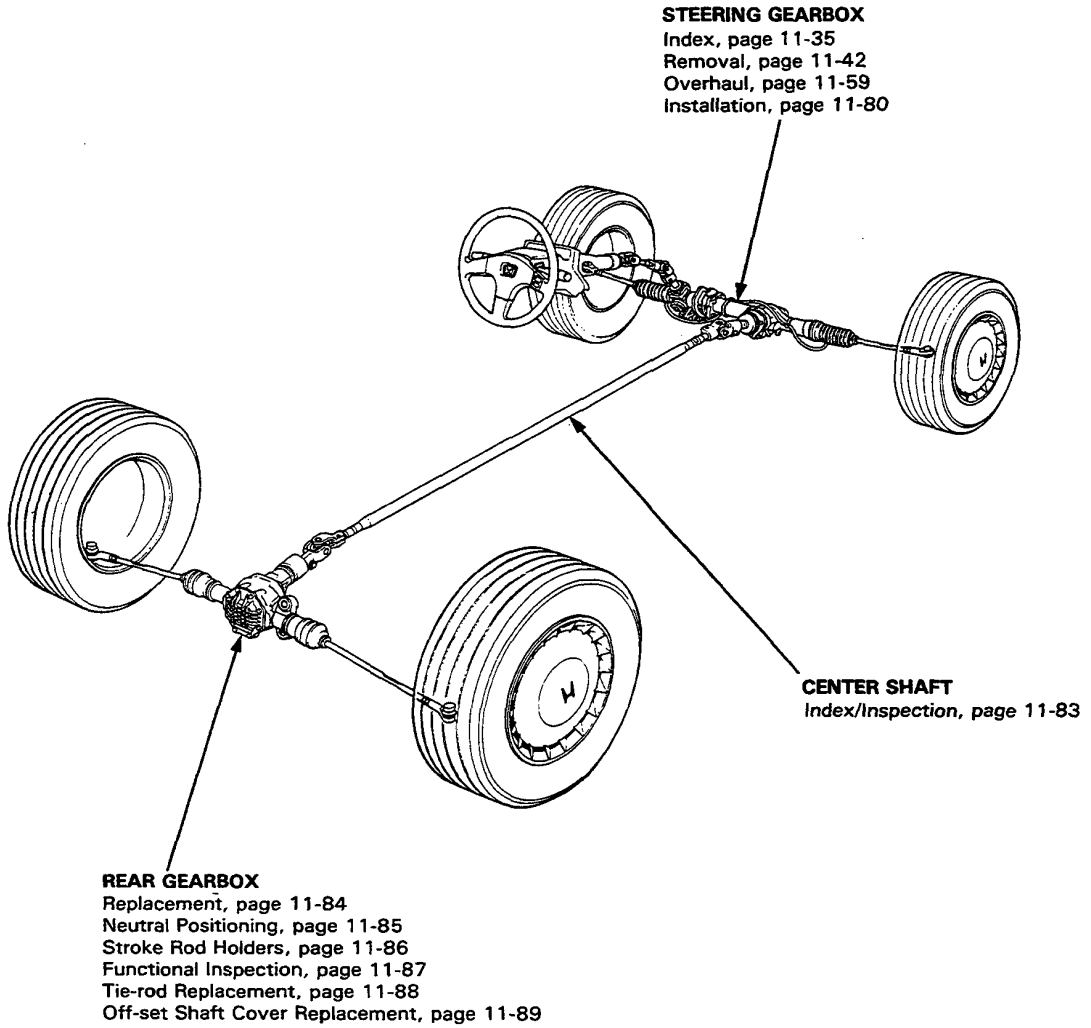
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# Component Location (4WS)



Index

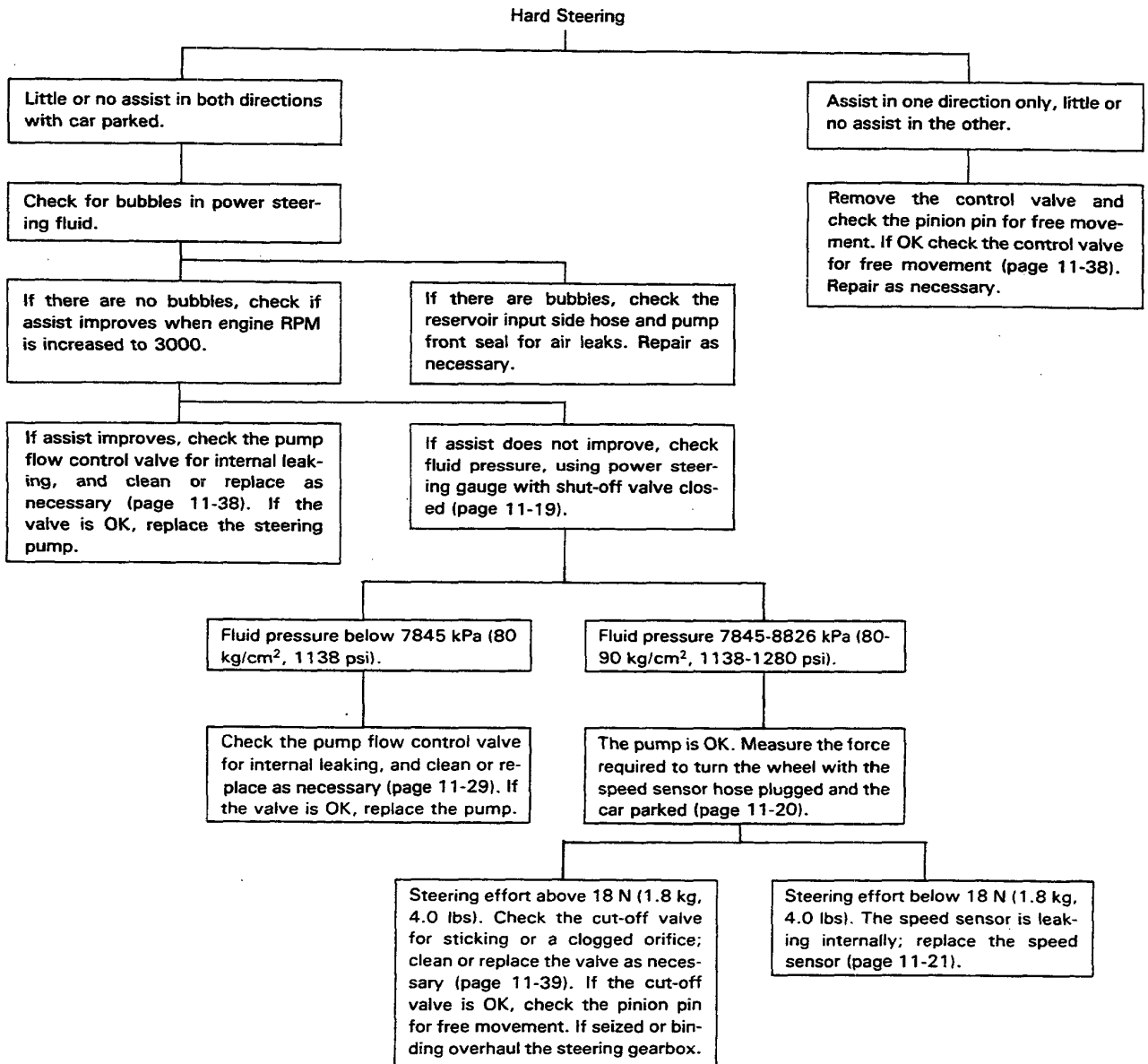


# Troubleshooting (2WS)

## General Troubleshooting

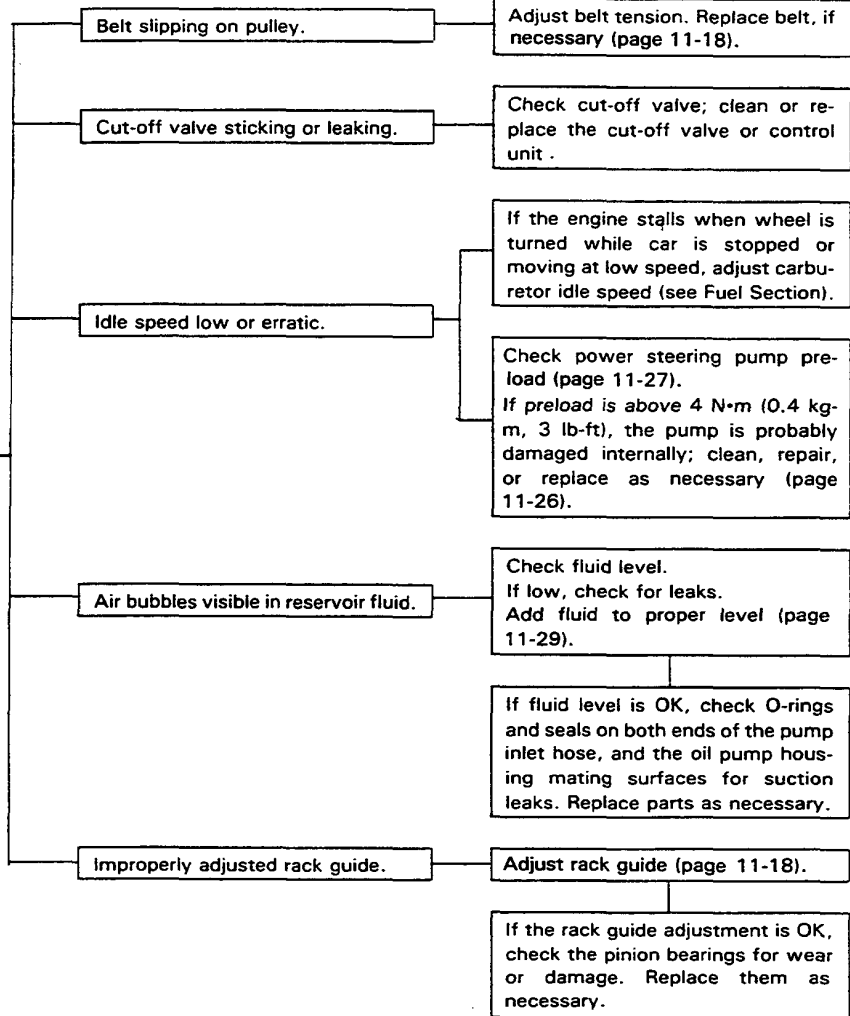
Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?





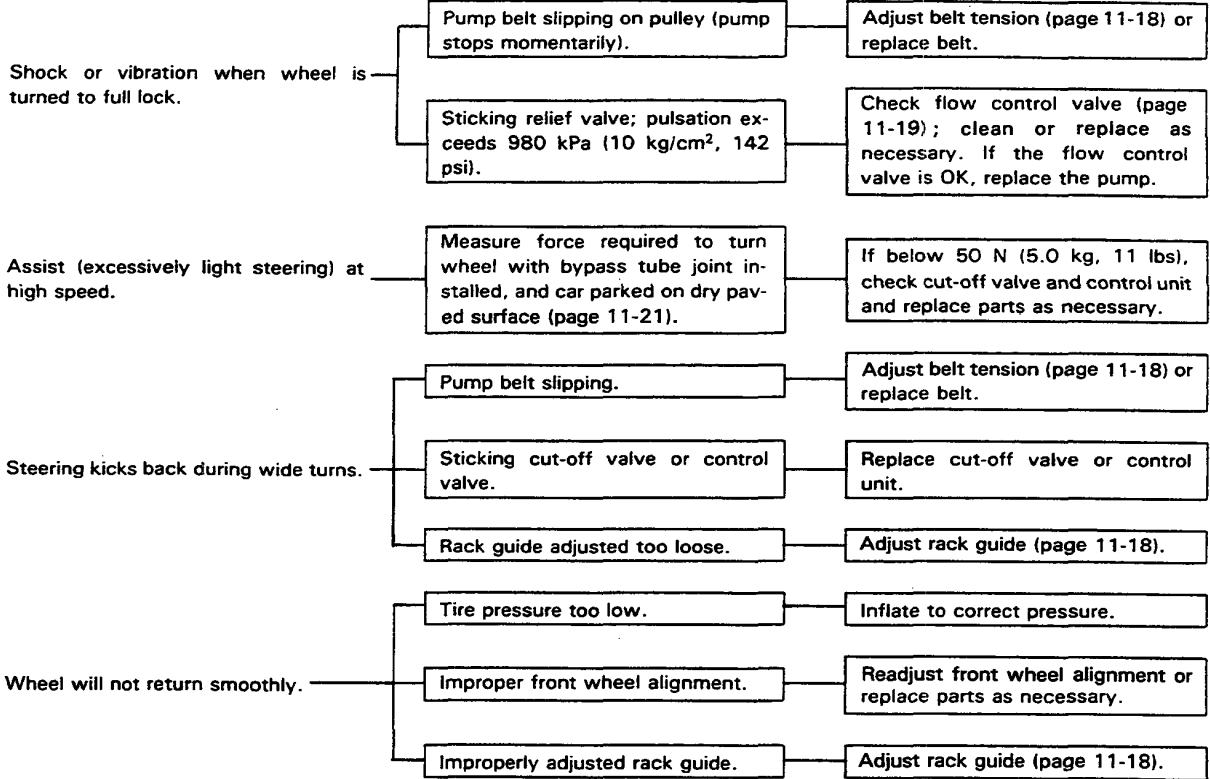
Uneven or rough steering.



(cont'd)

# Troubleshooting (2WS)

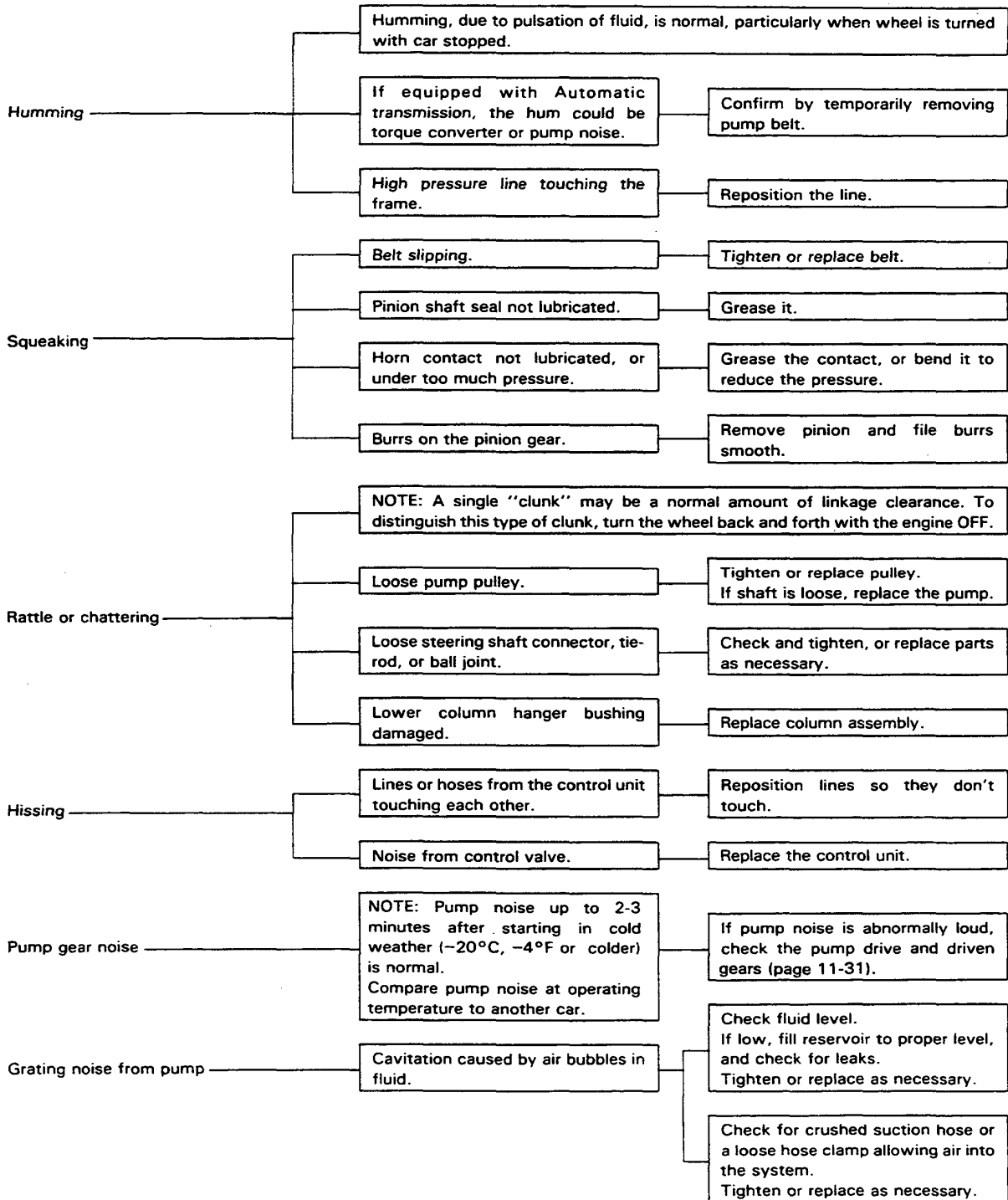
## General Troubleshooting (cont'd)





# Noise and Vibration

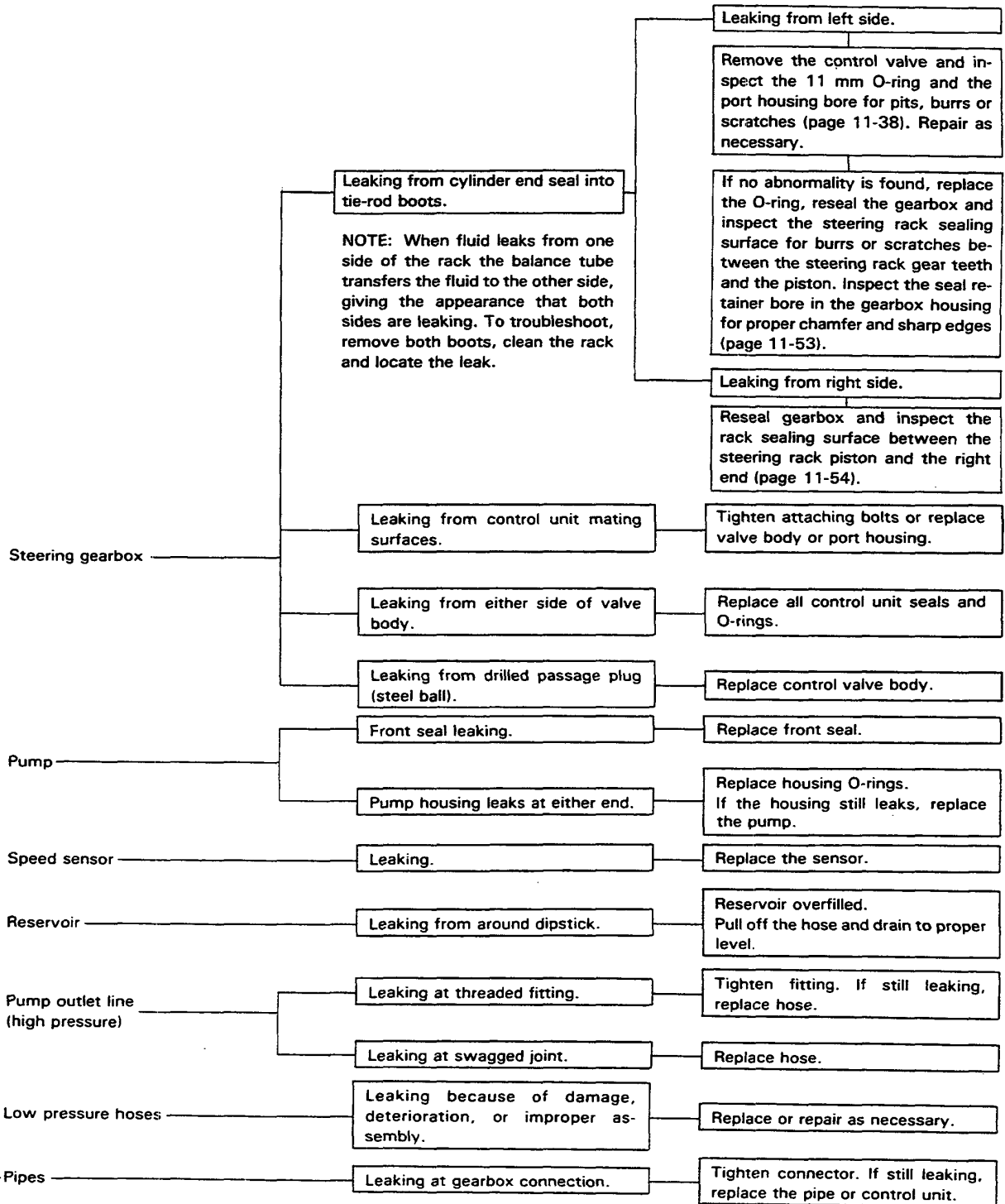
NOTE: Pump noise in first 2–3 minutes after starting in cold weather (– 20°C, – 4°F or colder) is normal.





# Troubleshooting (2WS)

## Fluid Leaks



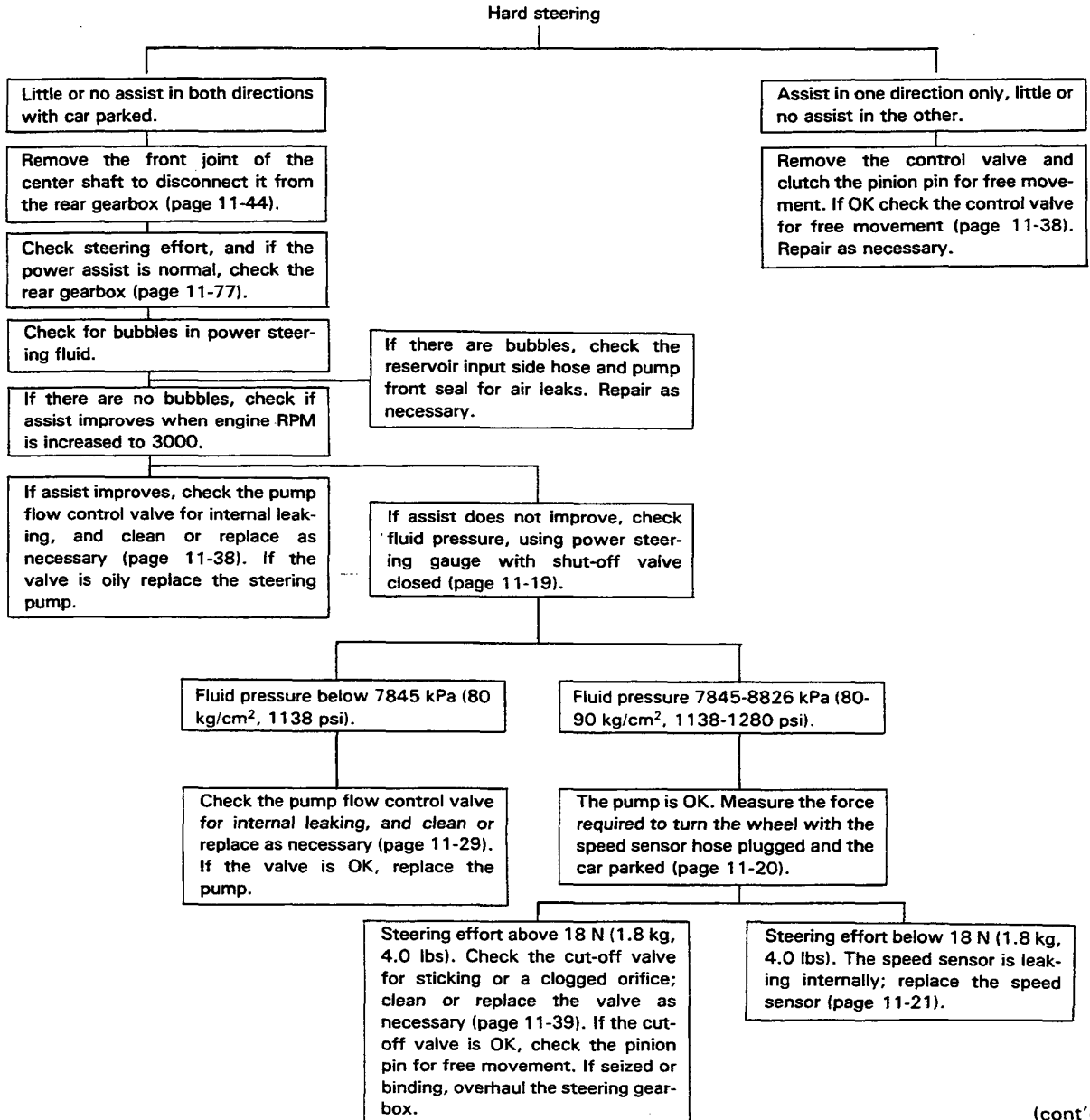


# Troubleshooting (4WS)

## General Troubleshooting

Check the following before you begin:

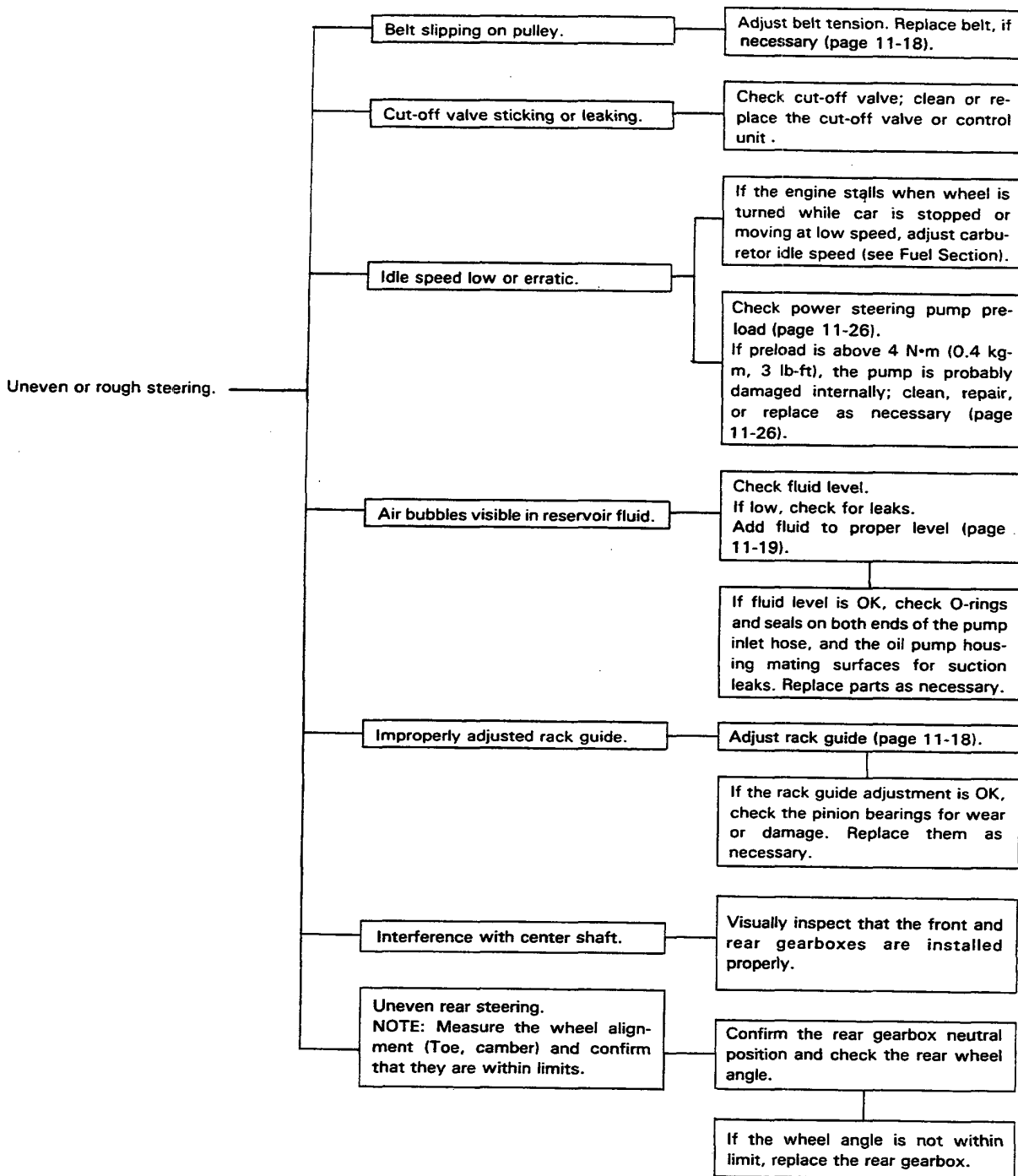
- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?
- Is the steering system damaged?
- Is there oil leakage?



(cont'd)

# Troubleshooting (4WS)

## General Troubleshooting (cont'd)





Shock or vibration when wheel is turned to full lock.

Pump belt slipping on pulley (pump stops momentarily).

Adjust belt tension (page 11-18) or replace belt.

Sticking relief valve; pulsation exceeds 980 kPa (10 kg/cm<sup>2</sup>, 142 psi).

Check flow control valve (page 11-30); clean or replace as necessary. If the flow control valve is OK, replace the pump.

Assist (excessively light steering) at high speed.

Measure force required to turn wheel with bypass tube joint installed, and car parked on dry paved surface (page 11-21).

If below 50 N (5.0 kg, 11 lbs), check cut-off valve and control unit and replace parts as necessary.

Check the installation of the front/rear gearboxes and center shaft.

If installation is OK, perform a function check of the rear gearbox (page 11-87).

If defective, replace the rear gearbox (page 11-83).

Check installation of the front/rear gearboxes.

If the torque of the mounting bolts is normal, perform a function check of rear gearbox (page 11-87).

If defective, replace the rear gearbox assembly (page 11-84).

Steering kicks back during wide turns.

Pump belt slipping.

Adjust belt tension (page 11-18) or replace belt.

Sticking cut-off valve or control valve.

Replace cut-off valve or control unit.

Rack guide adjusted too loose.

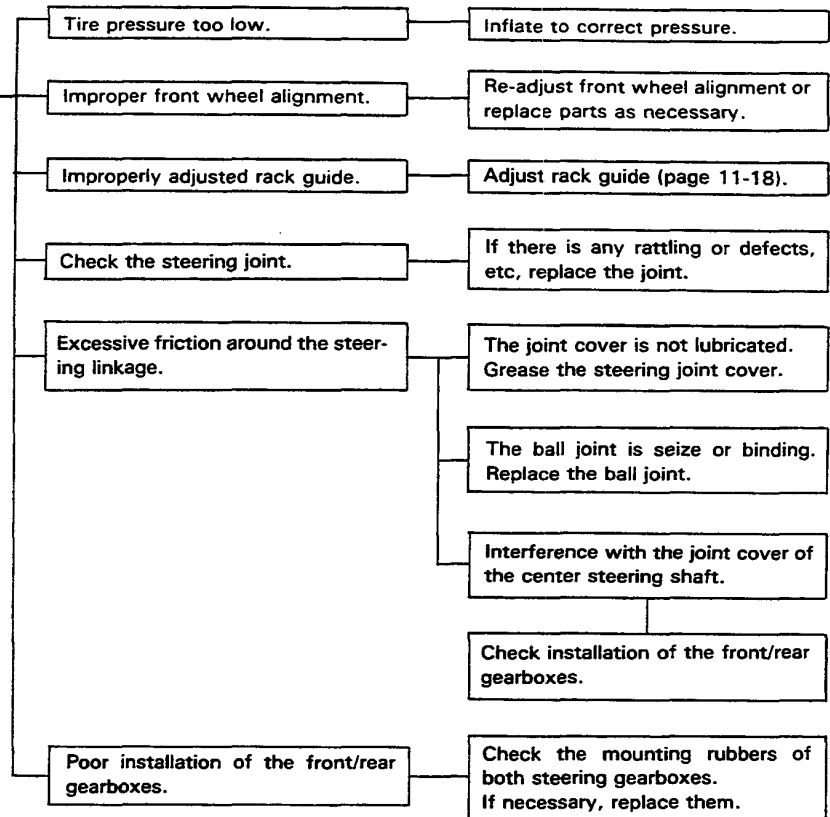
Adjust rack guide (page 11-18).

(cont'd)

# Troubleshooting (4WS)

## General Troubleshooting (cont'd)

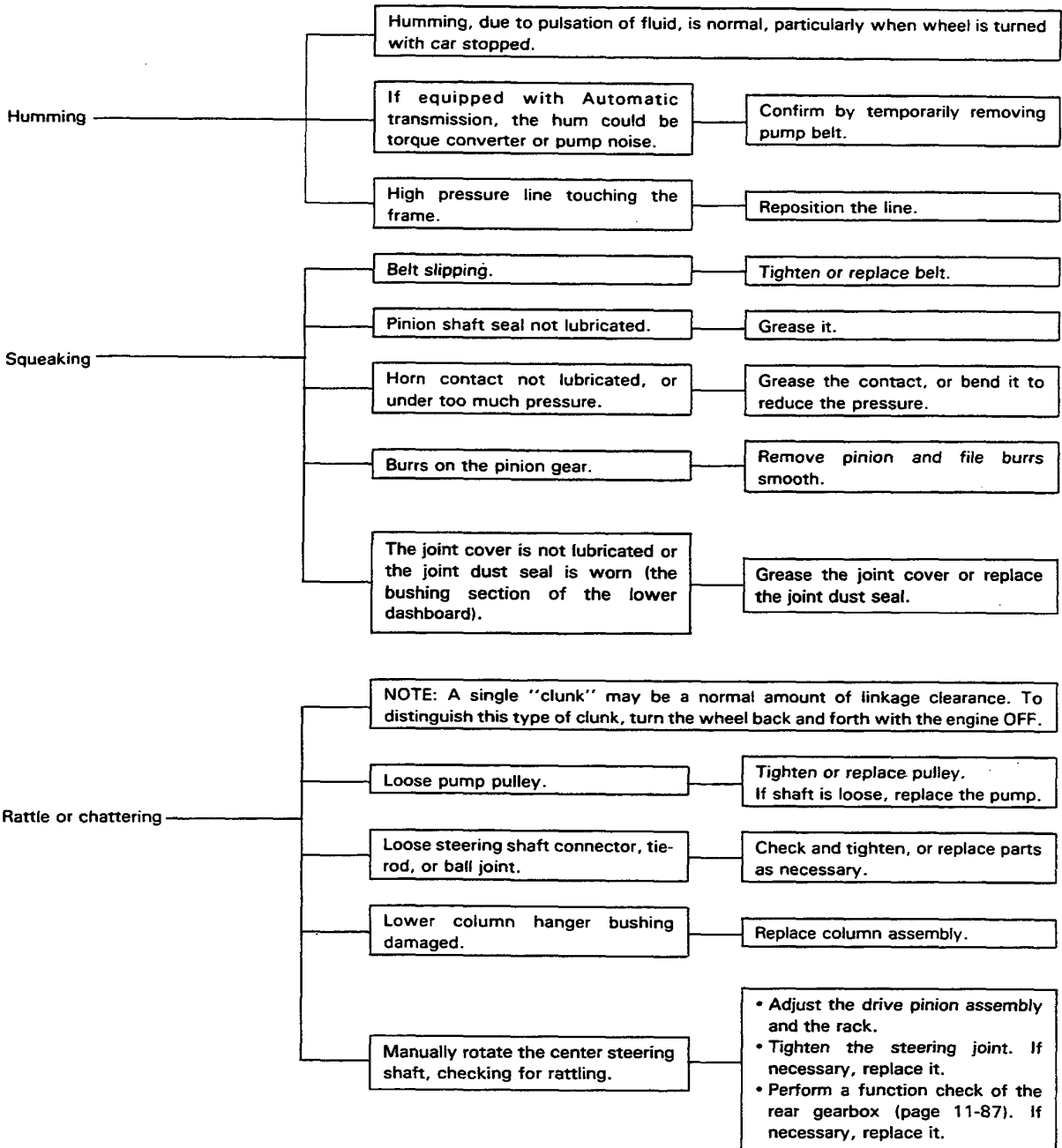
Wheel will not return smoothly.





# Noise and Vibration

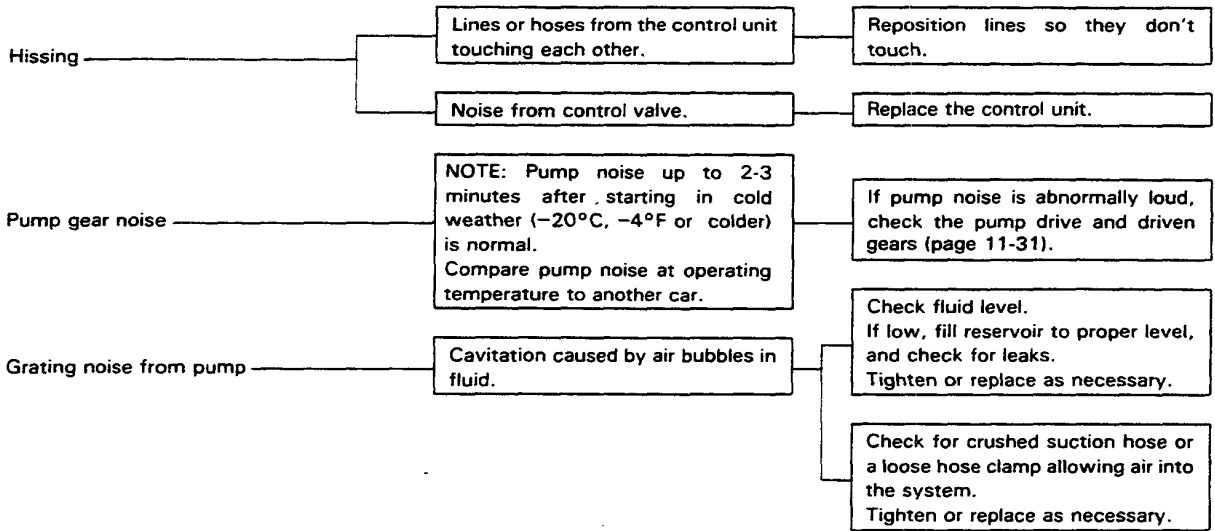
NOTE: Pump noise in first 2–3 minutes after starting in cold weather (– 20°C, – 4°F or colder) is normal.



(cont'd)

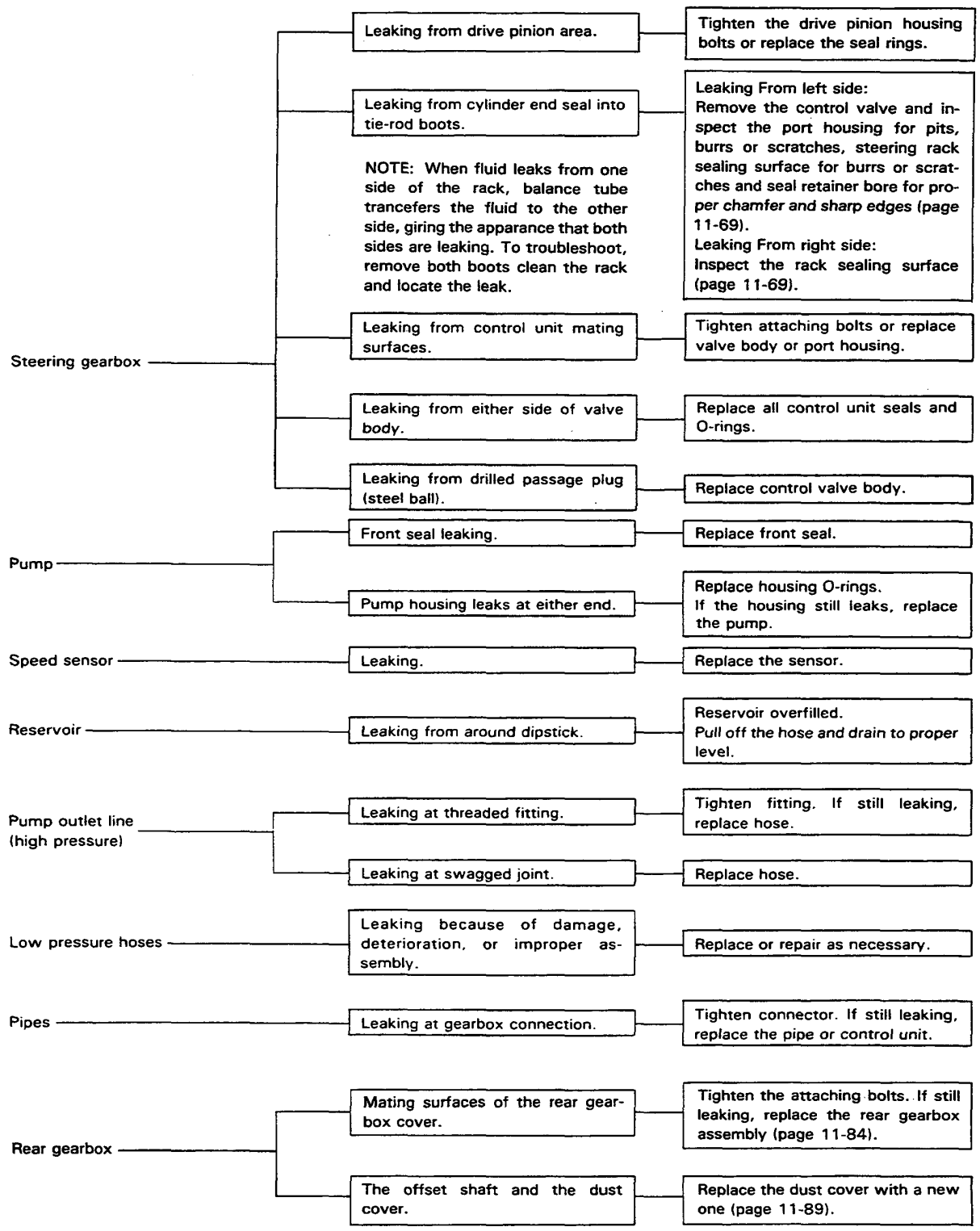
# Troubleshooting (4WS)

## Noise and Vibration (cont'd)





# Fluid Leaks





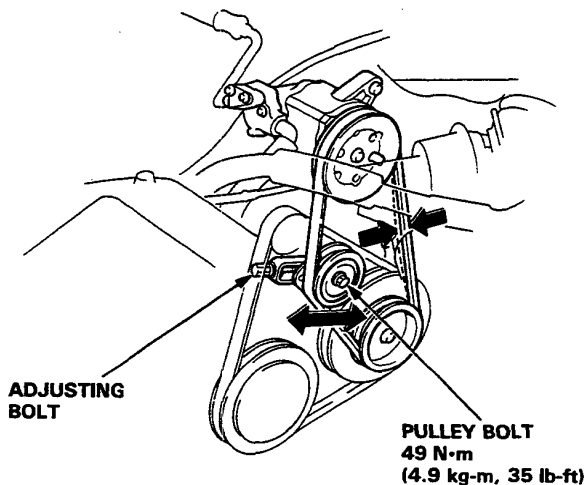
# Maintenance

## Pump Belt Adjustment

A properly adjusted belt should deflect about 11–13 mm (0.43–0.51 in.) when you push on it mid-way between the pulleys with a force of about 98N (10 kg, 22 lbs).

**NOTE:** On a brand new belt, the deflection should be 9–11 mm (0.35–0.43 in.) when first measured.

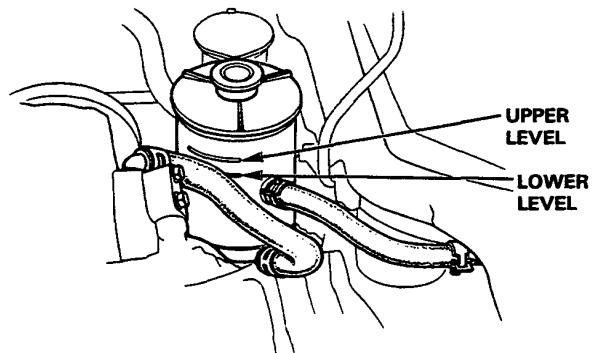
1. Loosen the pulley bolt and turn the adjusting bolt to get proper tension, then retighten the pulley bolt.
2. Start the engine and turn the steering wheel from lock-to-lock several times, then recheck the belt tension.



## Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

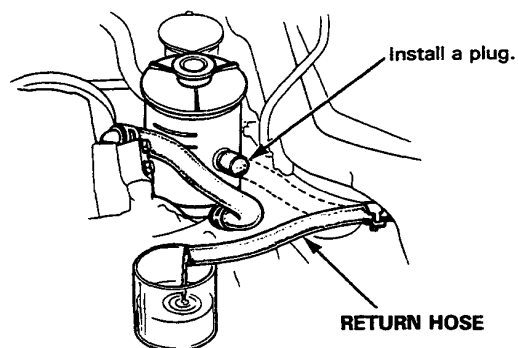
**CAUTION:** Use only **GENUINE HONDA** Power Steering Fluid. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.



### Fluid Replacement

**CAPACITY:** 1.7 l (1.8 US qt) at change

1. Disconnect the return hose from the gearbox at the reservoir, and put the end in a suitable container.
2. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.



3. Refit the return hose on the reservoir.
4. Fill the reservoir to the upper level mark.
5. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
6. Recheck the fluid level and add some if necessary.

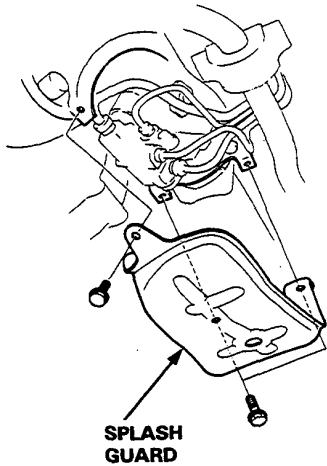
**CAUTION:** Do not fill the reservoir beyond the upper level mark.

# On-Car Checks

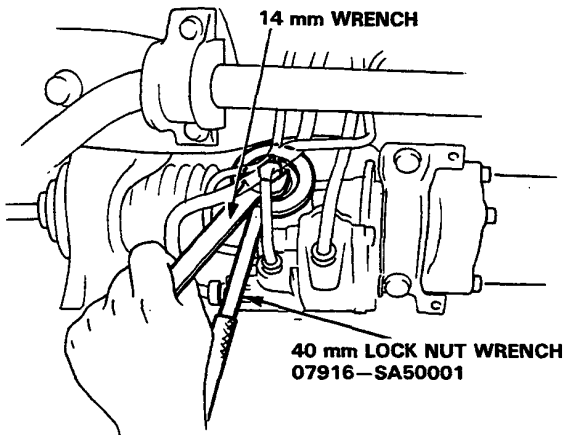


## Rack Guide Adjustment

1. Remove the splash guard.



2. Loosen the lock nut on the rack guide screw with the special wrench as shown.



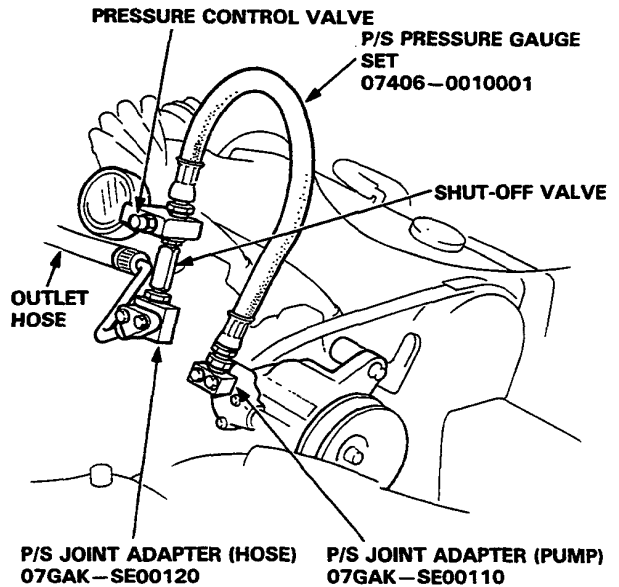
3. Tighten the guide screw until it compresses the spring and seats against the guide, then loosen it. Retighten it to about:  
2WS: 3 N·m (0.3 kg-m, 2 lb-ft)  
4WS: 4 N·m (0.4 kg-m, 3 lb-ft)  
Then back it off about:  
2WS:  $25^\circ \pm 5^\circ$   
4WS:  $35^\circ \pm 5^\circ$   
Tighten the lock nut to about 25 N·m (2.5 kg-m, 18 ft-lb) while preventing the guide screw from turning.
4. Check the steering effort as described on page 11-20.

## Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

**NOTE:** First check the power steering fluid level and pump belt tension.

1. Disconnect the outlet hose from the pump outlet fitting, and install the pump joint adaptor on the outlet.
2. Install the hose joint adaptor to the outlet hose.
3. Install the power steering pressure gauge between the pump and pump joint adaptors as shown.



4. Open the shut-off valve fully.
5. Open the pressure control valve fully.

(cont'd)

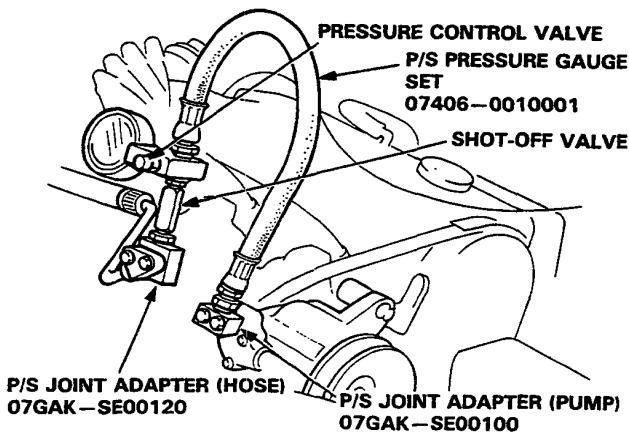
# On-Car Checks

## Pump Pressure Check (cont'd)

6. Start the engine and let it idle.
7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
8. Close the shut-off valve, then, close the pressure control valve gradually until the pressure gauge needle is stable. Read pressure.
9. Immediately open the shut-off valve fully.

**CAUTION:** Do not keep the shut-off valve closed more than 5 seconds or the pump could be damaged by over-heating.

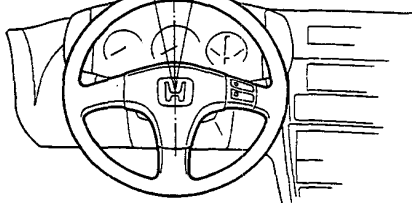
If the pump is in good condition, the gauge should read at least 7845–8826 kPa (80–90 kg/cm<sup>2</sup>, 1138–1280 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



## Steering Wheel Rotational Play

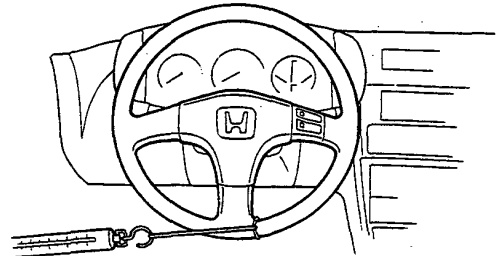
1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.

0–10 mm (0–0.4 in)      Service Limit: 10 mm (0.4 in.)



## Assist Check with Car Parked

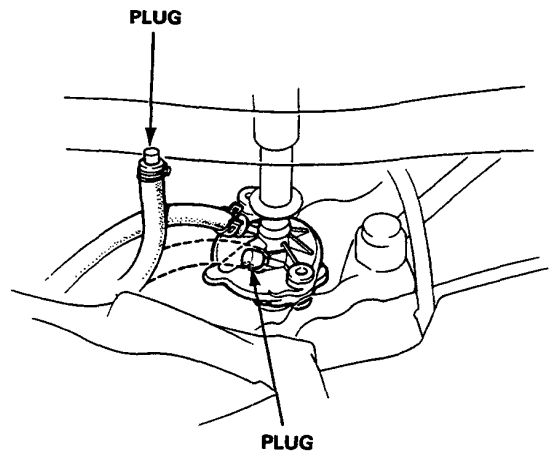
1. Check the power steering fluid level and pump belt tension.
2. Start the engine, allow to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



The scale should read no more than 18 N (1.8 kg, 4 lb).

If it reads more, go on step 4.

4. Stop the engine. Disconnect the hose from the speed sensor and plug the hose and the sensor fitting as shown.

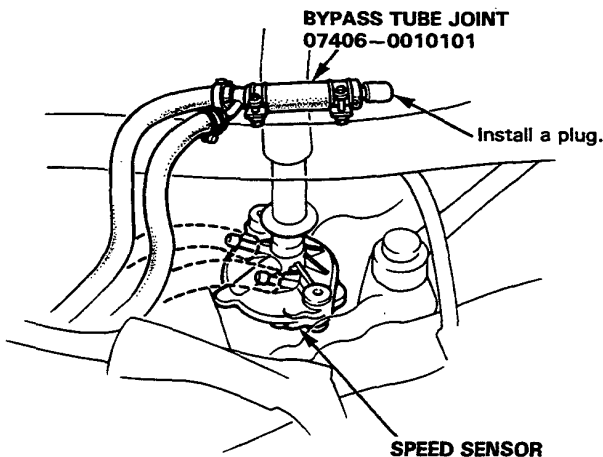


5. Start the engine and let it idle.
  - If the reading is now 18 N (1.8 kg, 4 lbs) or less, replace the speed sensor, see page 17-29.
  - If the reading is still more than 18 N (1.8 kg, 4 lbs), check the gearbox and pump.

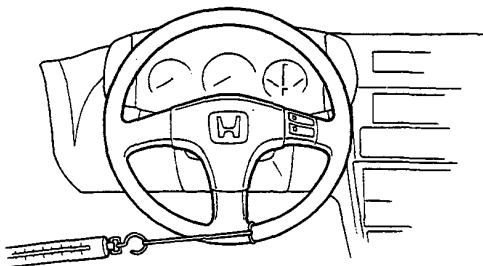


## Assist Check

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, let it warm up to normal temperature, and turn the steering wheel lock-to-lock a few times to warm up the fluid.
3. Stop the engine. To simulate speeds above 50 km/h (30 mph), disconnect the hoses from the speed sensor and connect them to the Bypass Tube Joint.



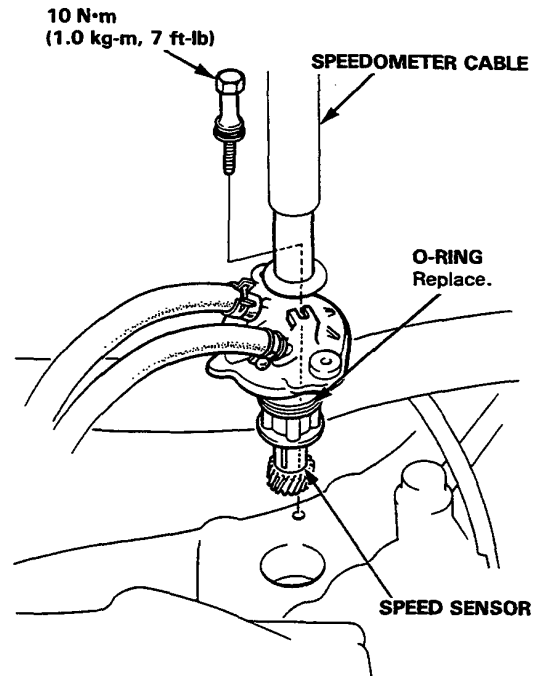
4. Attach the spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



- If the scale reads a normal 50 N (5.0 kg, 11 lbs), or more, the assist at high speeds is being caused by reduced speed sensor output. Replace the sensor.
- If the scale reads less than 50 N (5.0 kg, 11 lbs), the sensor is OK, and the problem is in the sensor feed line, the pump, or the control unit. See if the feed line is pinched or bent then check pump.

## Speed Sensor Replacement

1. Remove the speed sensor mounting bolt and pull the speed sensor from the transmission housing.



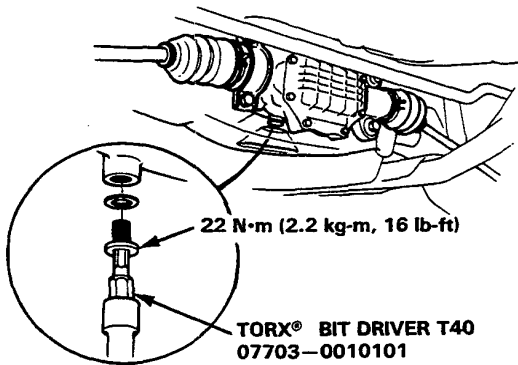
2. Pull up the speedometer cable boot, remove the clip, and pull out the speedometer cable.
3. Disconnect the speed sensor hoses and plug the fittings.
4. After installing a new sensor, turn the steering wheel lock-to-lock with the engine idling to bleed air from the system.
5. Check the reservoir and add fluid if necessary.

# On-Car Checks

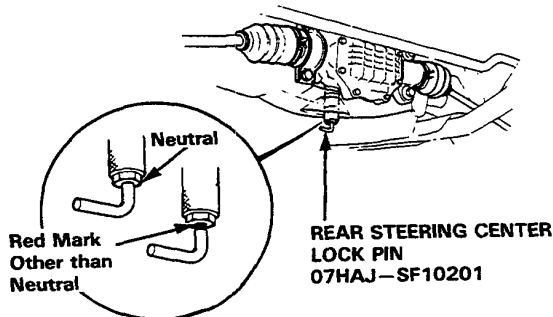
## 4WS Steering Gearbox Centering

**NOTE:** Use the following procedure after reassembling/replacing the steering gearbox components, or in preparing to solve customer complaints of mis-adjusted steering wheel angle.

1. Center the steering and steering wheel "by sight."
  2. Install the Center Lock Pin in the rear steering gearbox.
- Raise the rear of the car and support on safety stands in proper locations.
  - Remove the gearbox cap bolt using a Special Tool.

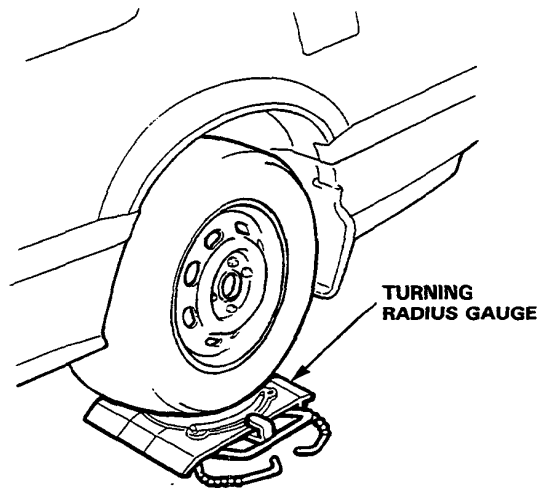


3. Turn the steering wheel right or left slightly until the Center Lock Pin seats fully.
- The red mark on the pin should not be visible.
  - Do not turn the steering wheel quickly when the Center Lock Pin is seated and do not force past the locking point after the Pin is seated, or the Pin may be damaged.



## Rear Wheel Turning Angle Inspection (4WS)

1. Set the turning radius gauges at the rear wheels.
2. Apply the brake turn the steering wheel 127° to right and check the rear wheel  
Turning angle: 1° 30' ± 30'
3. Turn the steering back to center, apply the brake and turn the steering wheel 127° to the left. Check the rear wheel turning angle again:  
1° 30' ± 30'
4. Apply the brake and turn the steering wheel right and left to full lock.
5. At both left and right full lock, the rear wheel max turning angle should be:  
Wheel pointing inward : 5°00' ± 1°  
Wheel pointing outward : 5°20' ± 1°



6. If not as specified, see Alignment, page 18-3. If not correctable by re-alignment, the rear steering gearbox may need to be replaced.

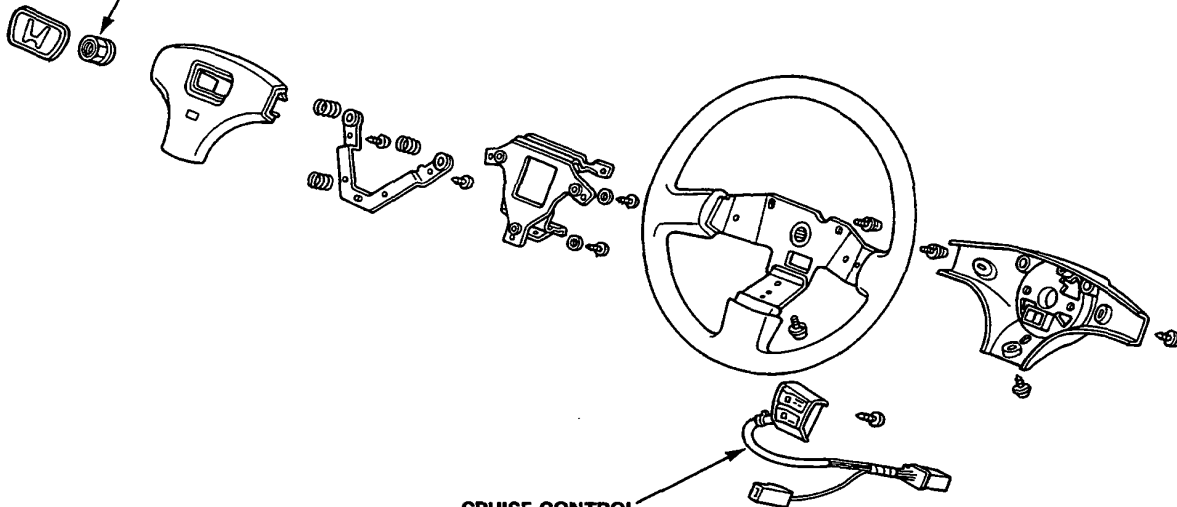


# Steering Wheel

## Disassembly/Reassembly

With cruise control

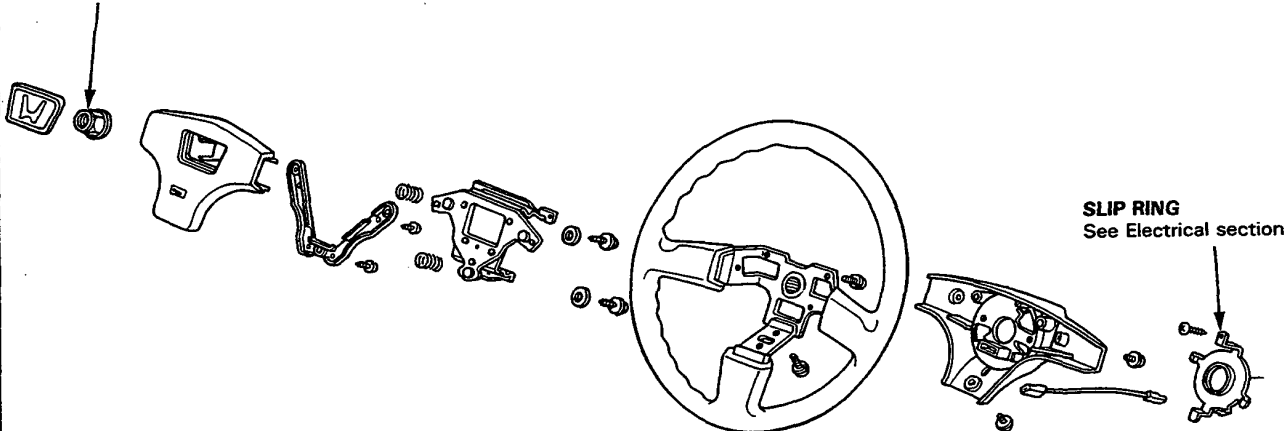
50 N·m (5.0 kg-m, 36 lb-ft)  
Replace.



CRUISE CONTROL  
SWITCH  
See Electrical section

Without cruise control

50 N·m (5.0 kg-m, 36 lb-ft)  
Replace.

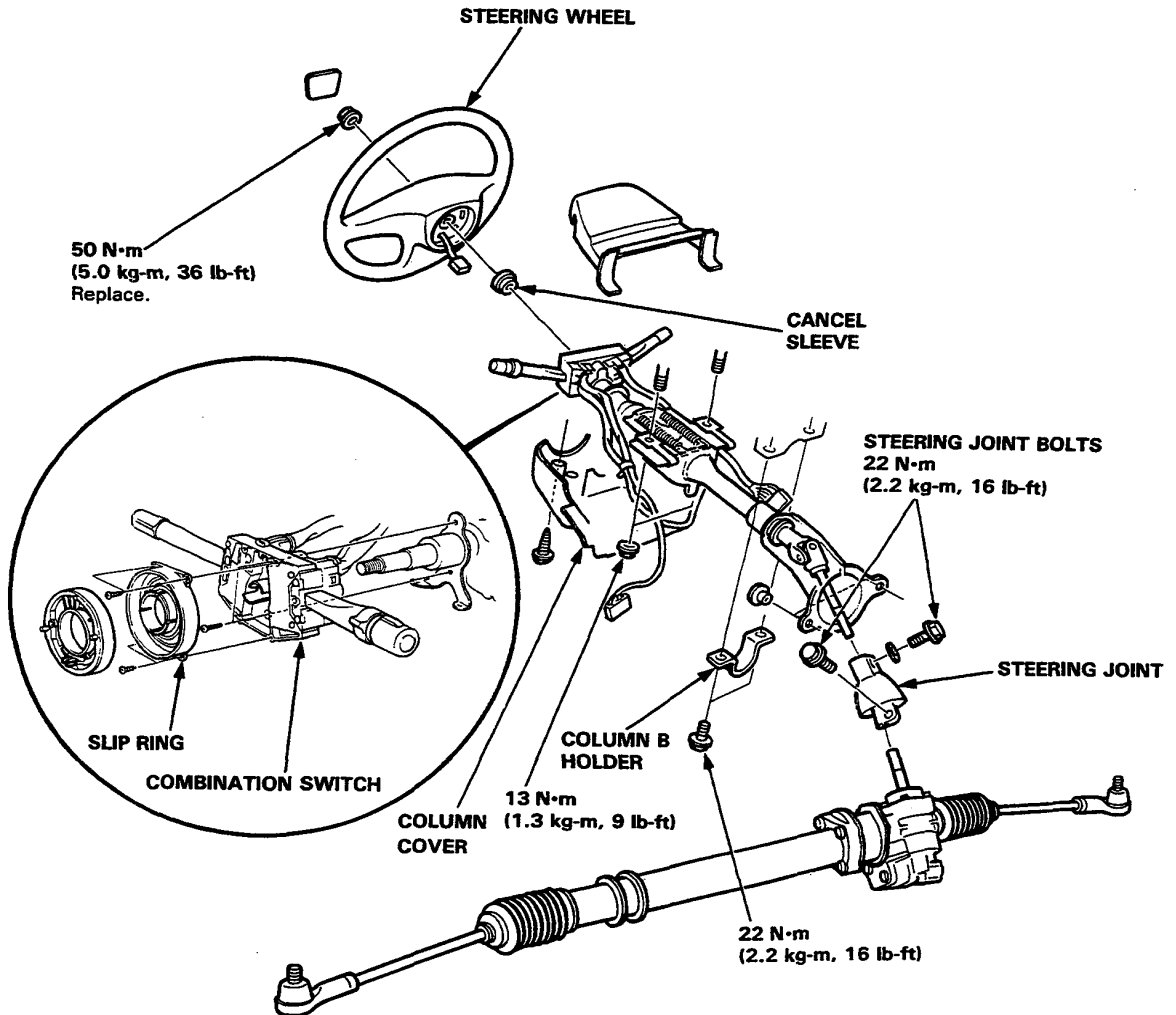


SLIP RING  
See Electrical section

# Column

## Removal/Installation

1. Remove the steering wheel.
2. Remove the cover panel under the steering column.
3. Remove the steering joint cover.
4. Remove the steering joint bolt, and move the joint toward the column.
5. Remove the column B holder.
6. Remove the bolts attaching the steering column.
7. Remove the column cover.
8. Remove the turn signal cancel sleeve.
9. Disconnect each wire connector, and remove the slip ring assembly and the combination switch assembly.
10. Installation is in the reverse order of removal.



NOTE: LH Drive shown, RH Drive is similar

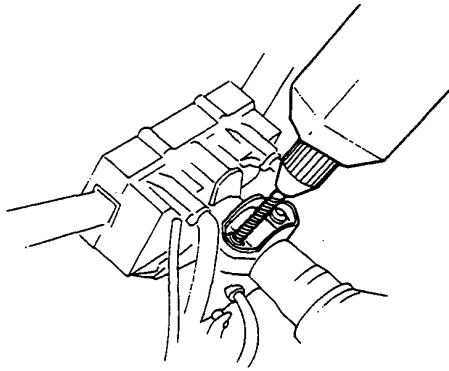
**CAUTION:** Before tightening the steering joint bolts, pull up the steering joint to make sure that all parts are properly seated.



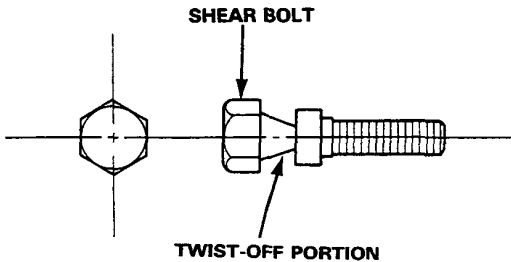
# Steering Lock

## Lock Replacement

1. Remove the steering column covers.
  2. Disconnect the ignition switch connector.
  3. Center punch each of 2 shear bolts and drill their heads off with a 3/8 in. drill bit.
- CAUTION: Do not damage the switch body when removing the shear bolt heads.**
4. Remove the shear bolts from the switch body.

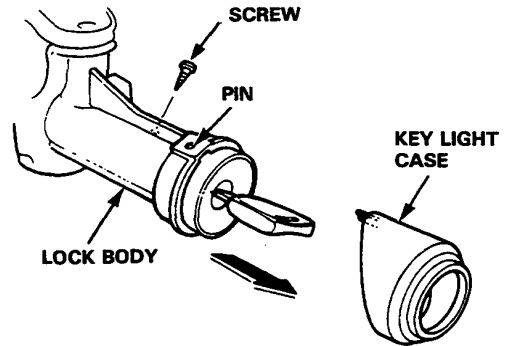


5. Install the new ignition switch without the key inserted.
  6. Loosely tighten the new shear bolts.
- NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.**
7. Insert the ignition key and check for proper operation of the steering wheel lock and that the ignition key turns freely.
  8. Tighten the shear bolts until the hex heads twist off.

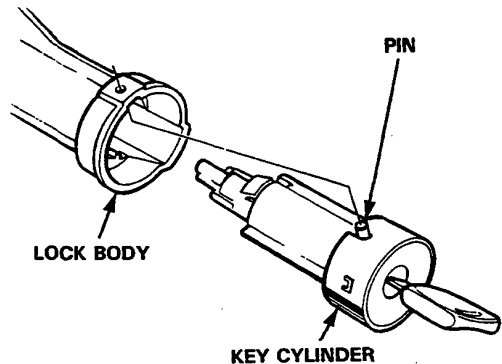


## Lock Cylinder Replacement

1. Remove the ignition switch.
2. Remove the key light case from the lock body.
3. Turn the ignition key to "I".
4. Push the pin in and remove the lock cylinder from the lock body.



5. Turn the key to "0" and align the lock cylinder with the lock body.
6. Turn the key almost to "I" and insert the lock cylinder until the pin touches the body.
7. Turn the key to "I", push the pin and insert the lock cylinder into the lock body until the pin clicks into place.



8. Install the ignition switch.

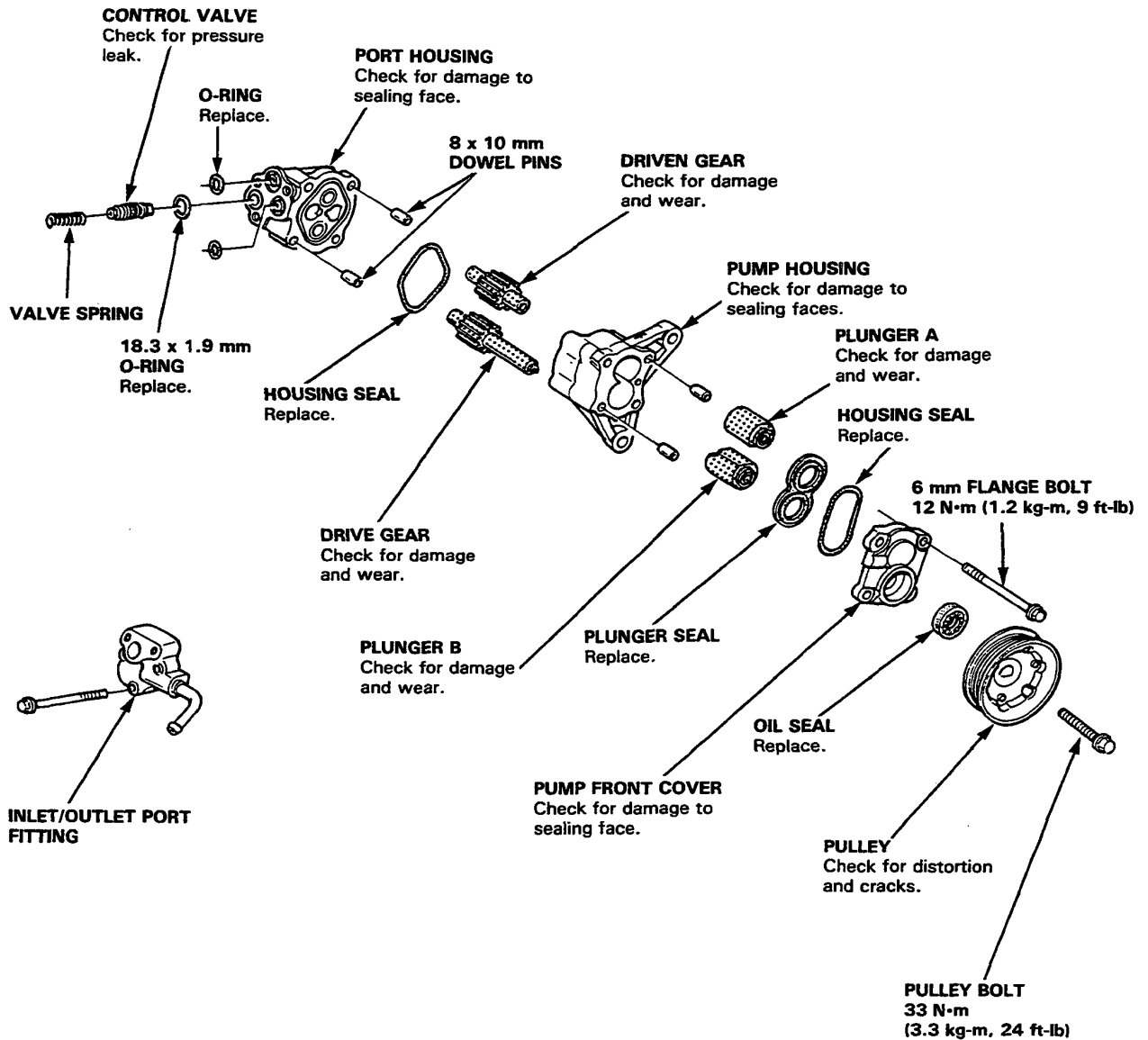


# Steering Pump

## Illustrated Index

**CAUTION:** Pump components are made of aluminum. Be careful not to damage them when servicing.

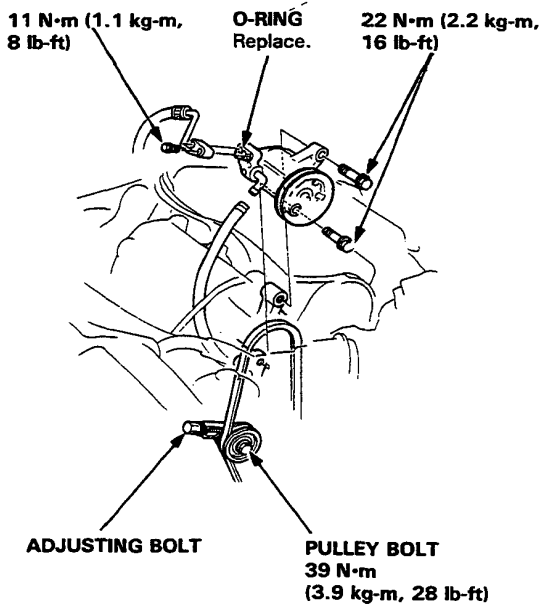
- Clean all of the disassembled parts thoroughly.
- Replace all O-rings and seals. Do not dip new O-rings and seals in solvent; coat O-rings with steering grease before installation, and make sure they stay in place during reassembly.
- The shaded parts are selectively fitted, and should not be disassembled except to replace seals. If any one of them is faulty, replace the whole pump as an assembly.





## Replacement

1. Drain the fluid from the system (page 11-18).
2. Disconnect the inlet and outlet hoses from the pump and plug them.
3. Loosen the pulley bolt.
4. Remove the pump belt by loosening the adjusting bolt.
5. Remove the two 8 mm bolts, then remove the pump.

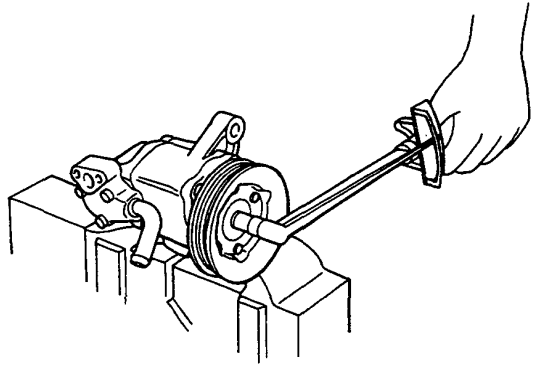


6. Install the pump.
7. Connect the inlet and outlet hoses to the pump.
8. Install and adjust the belt.
9. Fill the reservoir with new fluid to the UPPER LEVEL on the reservoir.
10. Start the engine and let it run at fast idle while turning the steering wheel lock-to-lock several times to bleed air from the system.
11. Check the reservoir and add fluid if necessary.

## Preload Inspection

Check the pump preload with a torque wrench after overhauling a pump or installing a replacement pump.

**Preload: 4 N·m (0.4 kg-m, 3 lb-ft) max.**

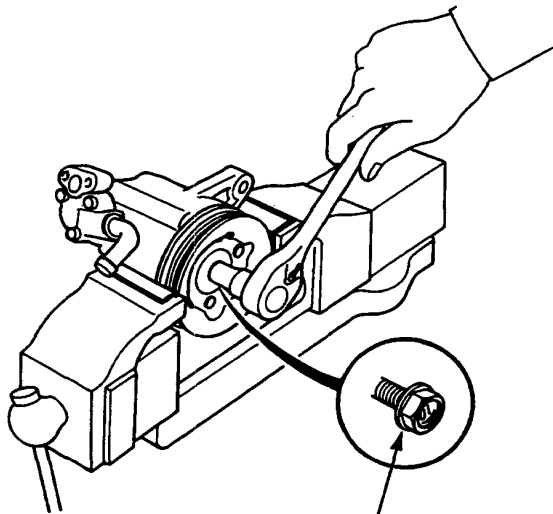


# Steering Pump

## Pulley Replacement

1. Hold the pulley using a vice with soft jaws as shown.
2. Remove the pulley bolt and pulley.

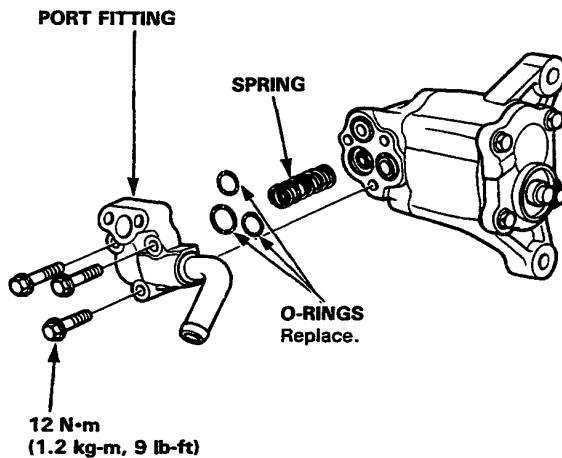
**CAUTION:** Pulley bolt has left hand threads.



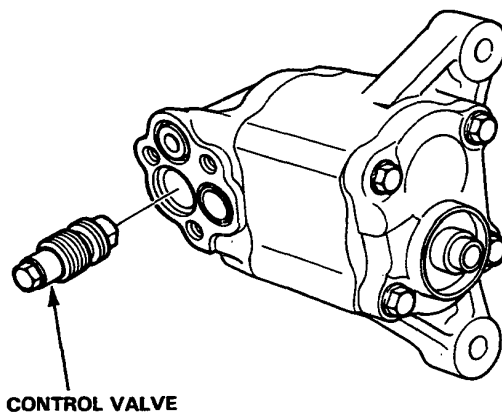
**PULLEY BOLT**  
33 N·m  
(3.3 kg-m, 24 lb-ft)

## Control Valve Inspection and Replacement

1. Remove the three 6 mm bolts, then remove the port fitting.
2. Remove the valve spring and O-rings.

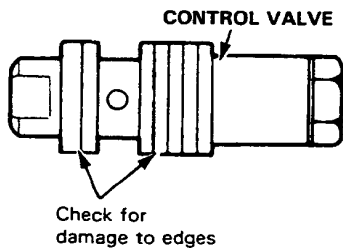


3. Remove the control valve from the pump housing.



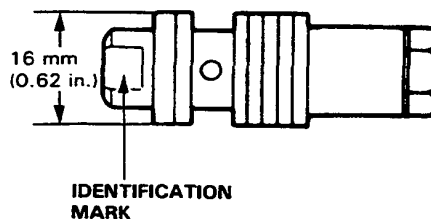


4. Check for wear, burrs, and other damage to the edges of the grooves in the valve.

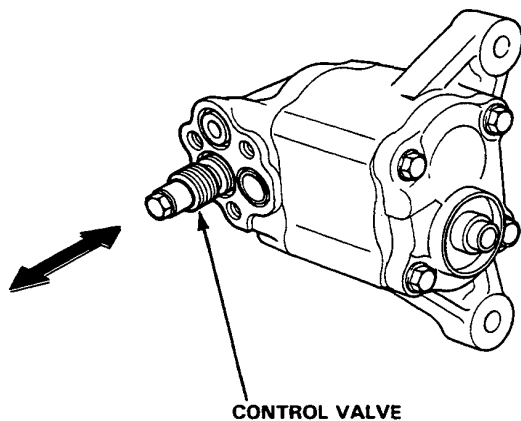


- If OK, go on to step 7, if not, replace the valve:

NOTE: The original valve was selected for a precise fit in the pump housing bore, so make sure the new one has the same identification mark.



5. Slip the valve back in the pump and check that it moves in and out smoothly.



Mark	Part Number	Part Name	Outside Diameter mm(in)
A	56350-PC1 -O10	CONTROL VALVE A	15.995-16.000 (0.6297-0.6299)
Without mark	56360-PC1 -O10	CONTROL VALVE B	16.000-16.006 (0.6299-0.6302)

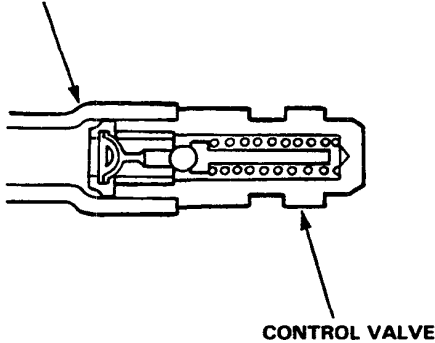
(cont'd)

# Steering Pump

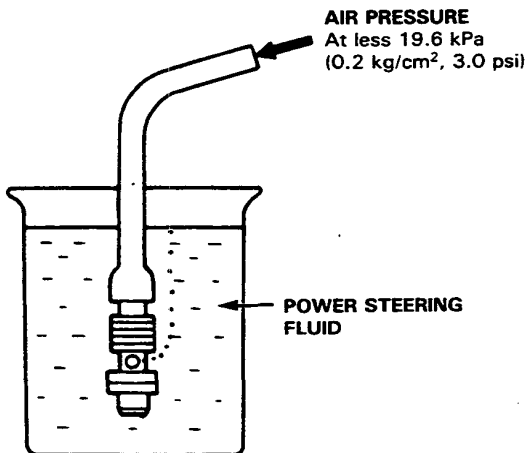
## Control Valve Inspection and Replacement (cont'd)

6. Attach a hose to the end of the valve as shown.

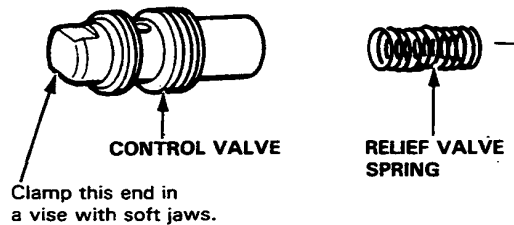
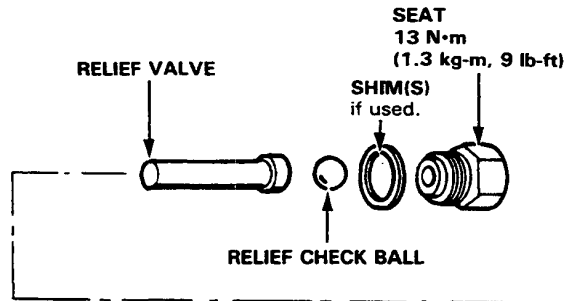
**HOSE**  
9.5 mm ID (0.374 in)  
(The power steering  
return hose is recommended)



7. Then submerge the valve in a container of power steering fluid and blow on the hose. If air bubbles leak through the valve, replace or repair it as follows.



8. Clamp the bottom end of the valve in a vise with soft jaws.
9. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.



10. Clean all the parts in solvent, dry them off, then reassemble and retest the valve.

**NOTE:** If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

11. Install the control valve in the reverse order of removal.

- Apply steering grease (P/N 08740-99969) to new O-rings.
- Coat the control valve with power steering fluid then install it and its spring.

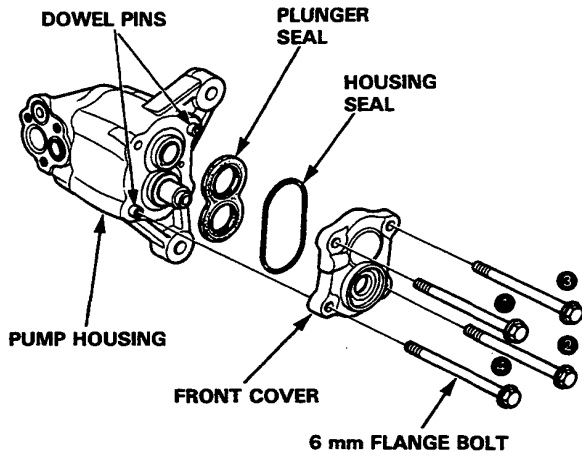


## Housing Disassembly

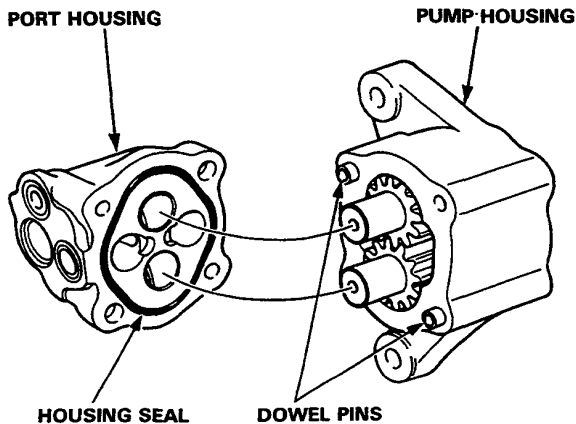
**CAUTION:** The pump components are made of aluminum. Be careful not to damage them when servicing.

1. Remove the pump from car (page 11-27), and remove the pulley (page 11-27) and pump front cover.

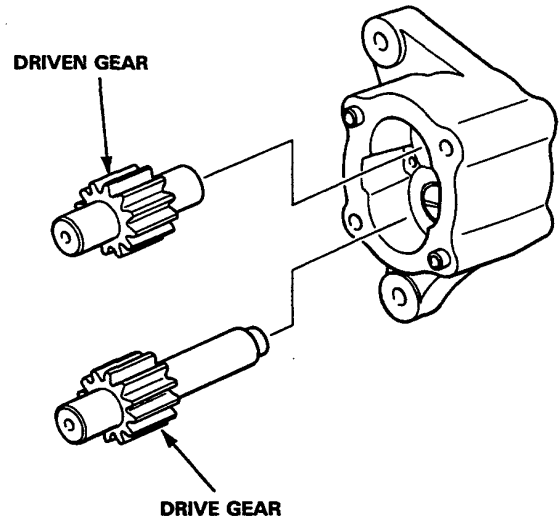
**NOTE:** Remove the front cover bolts in the sequence shown.



2. Remove the housing seal from the front cover.
3. Remove the dowel pins and plunger seal from the pump housing.
4. Separate the port housing from the pump housing.



5. Remove the dowel pins from the pump housing and remove the housing seal from the port housing.
6. Remove the pump drive and driven gears from the housing.



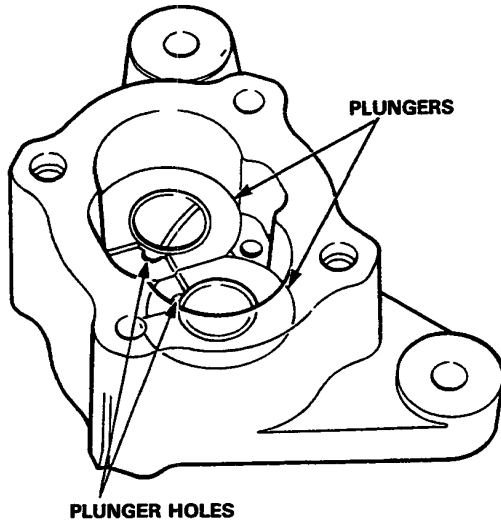
7. Remove the plungers.
8. Pry the oil seal out from the front cover.



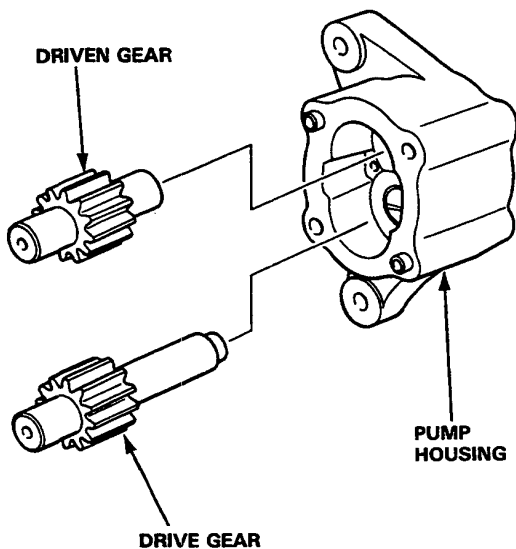
# Steering Pump

## Housing Reassembly

1. Coat the outer surfaces of the plungers with power steering fluid, then install them in the pump housing. Make sure the plunger holes are positioned as shown.



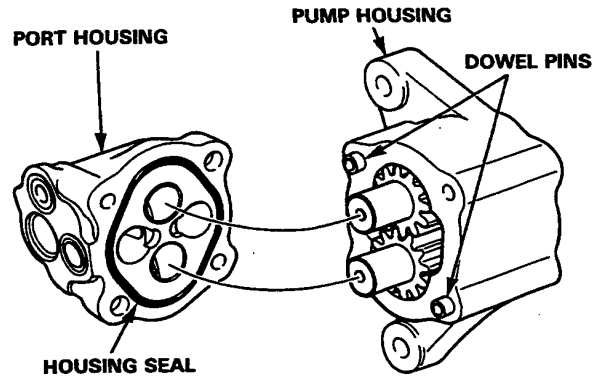
2. Coat the inside of the plungers with power steering fluid.
3. Install the pump drive and driven gears in the pump housing.



4. Coat the bushings on the port housing with power steering fluid.
5. Install the dowel pins in the pump housing, then install the new housing seal in the port housing.

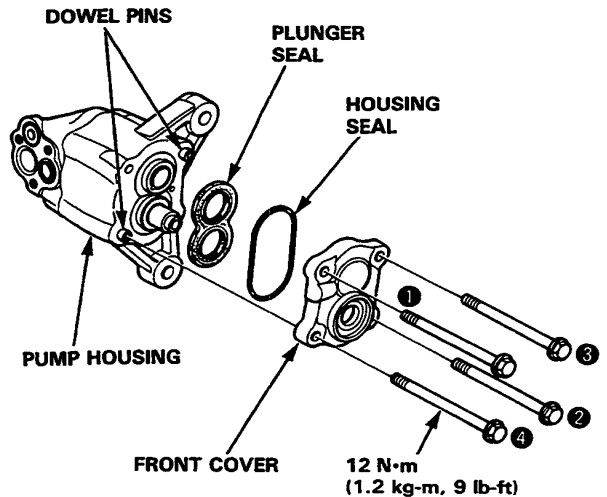
NOTE: Coat the new housing seal with grease.

6. Install the port housing on the pump housing.



7. Grease the new plunger seal and install it over the plungers.
8. Install the dowel pins.
9. Fill the groove of the pump housing with steering grease and install the new housing seal in the pump housing.
10. Install the pump front cover.

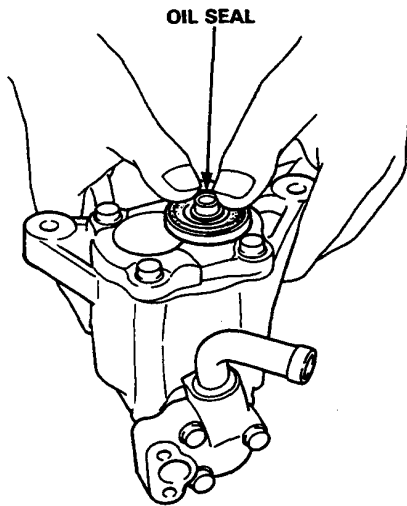
NOTE: Tighten the front cover bolts in the order shown.



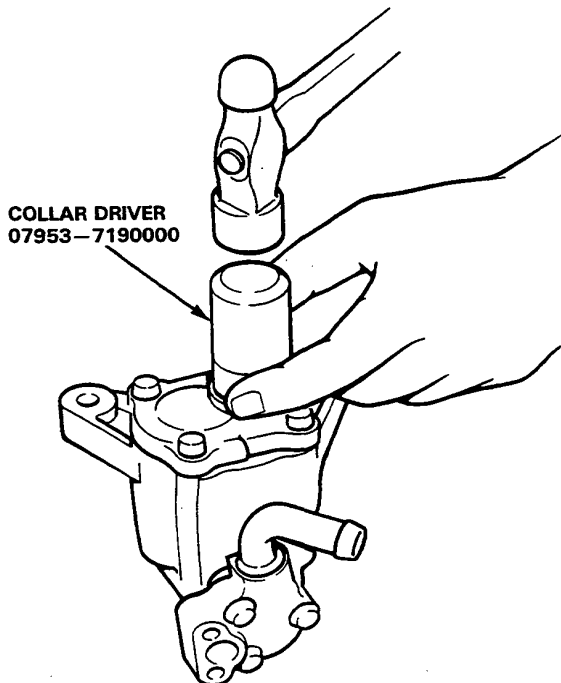


11. Loosely install the new oil seal in the pump front cover.

NOTE: The oil seal spring may come out of position if the oil seal is not installed squarely.



12. Install the new oil seal in the pump front cover; get it started by hand, then use the collar driver to push it in the rest of the way.





# Steering Gearbox

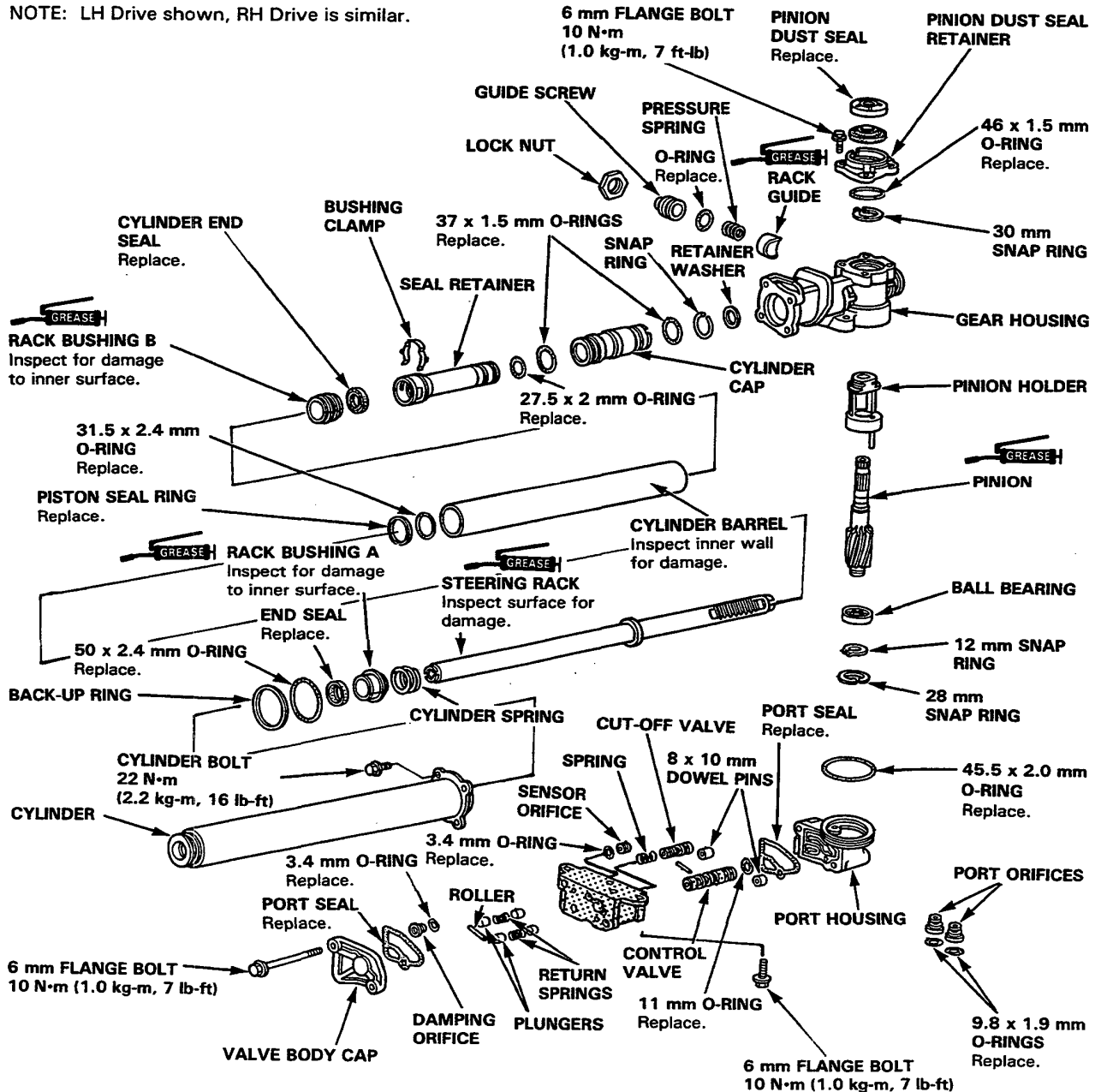
## Illustrated Index (2WS)

### CAUTION:

- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Always replace O-rings and seals.
- Replace parts with damaged sliding surfaces.
- Do not dip seals and O-rings in solvent; coat O-rings with grease, make sure they stay in position during reassembly, and use the appropriate special tools to install them where necessary.
- The shaded parts (valve body, control valve, cut-off valve) are a matched set; if the valve body is faulty, replace the complete valve body unit.

-  **STEERING GREASE** ..... Part Number 08740-99969

NOTE: LH Drive shown, RH Drive is similar.






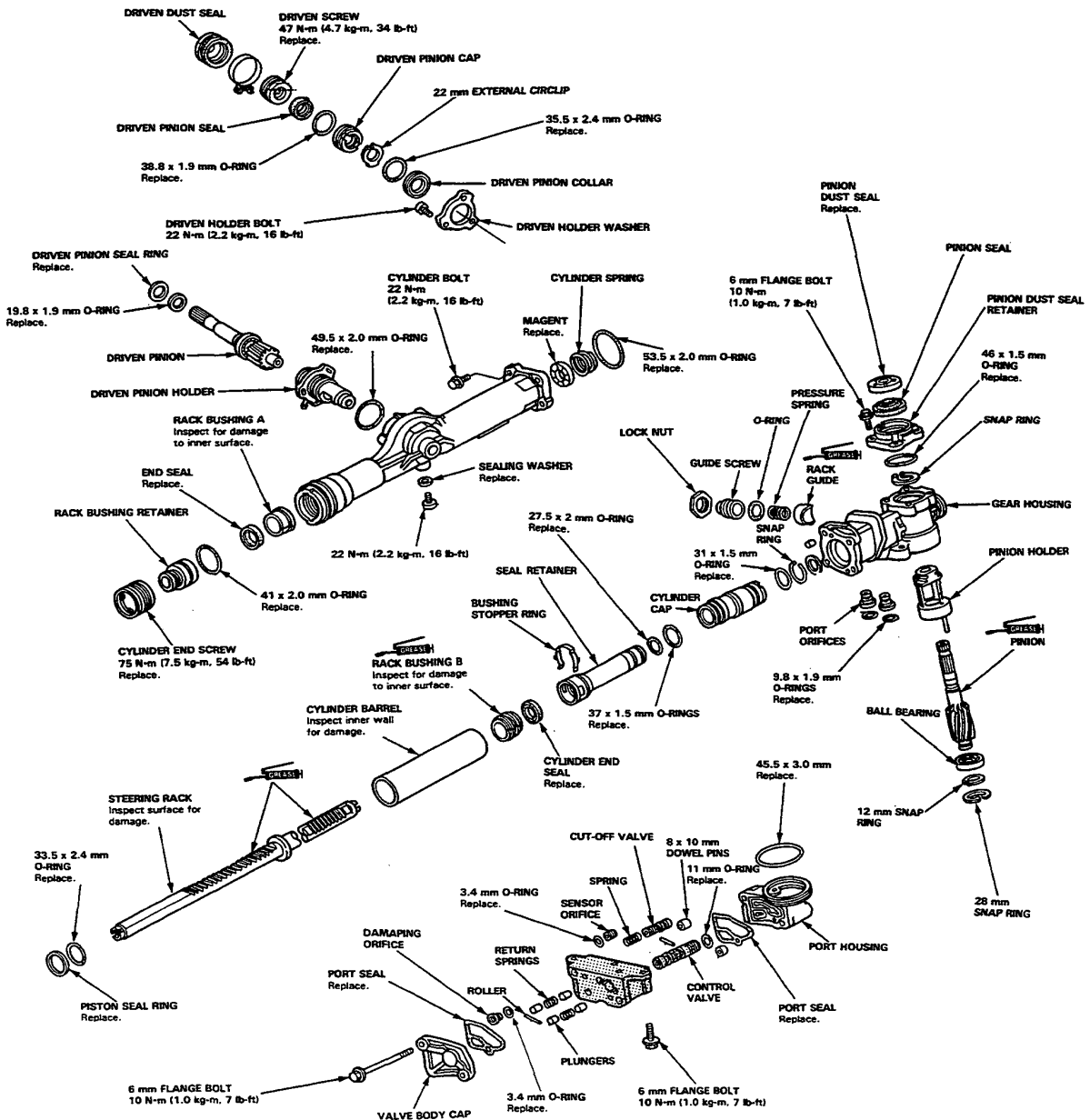
# Illustrated Index (4WS)

## CAUTION:

- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Always replace O-rings and seals.
- Replace parts with damaged sliding surfaces.
- Do not dip seals and O-rings in solvent; coat O-rings with grease, make sure they stay in position during reassembly, and use the appropriate special tools to installation them where necessary.
- The shaded parts (valve body, control valve, cut-off valve) are a matched set; if the valve body is faulty, replace the complete valve body unit.

-  **STEERING GREASE** ..... Part Number 08740-99969

NOTE: LH Drive shown, RH Drive is similar.



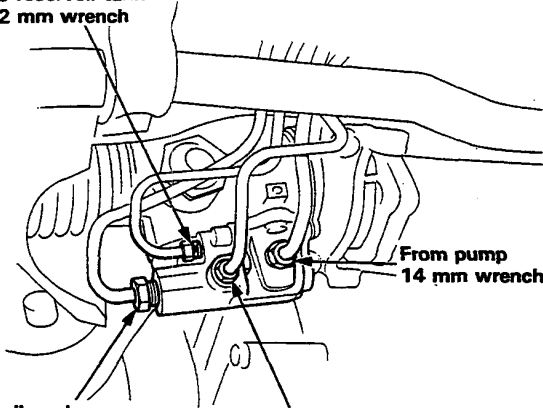
# Steering Gearbox

## Valve Body Unit Overhaul

### Removal:

1. Drain the power steering fluid (page 11-19).
2. Remove the gearbox shield.
3. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gearbox. Blow dry with compressed air.
4. Using flare nut wrenches, disconnect the four lines from the control unit.

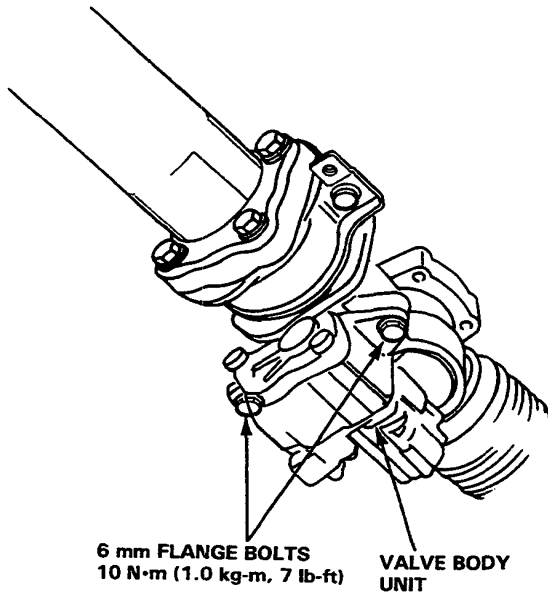
To reservoir tank  
12 mm wrench



To oil cooler  
17 mm wrench

To speed sensor  
12 mm wrench

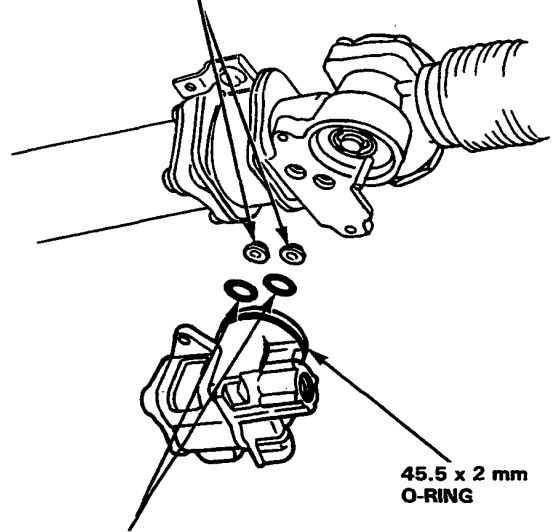
5. Remove the two 6 mm flange bolts and remove the valve body unit from the gear box.



### Disassembly:

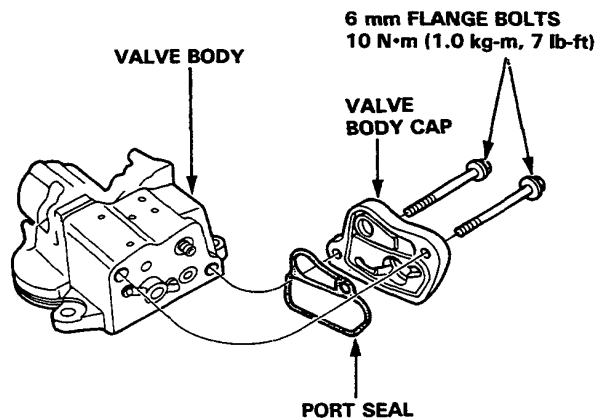
6. Remove the O-rings and port orifices from the gear box.
7. Remove the O-ring from the valve body unit.

PORT ORIFICES



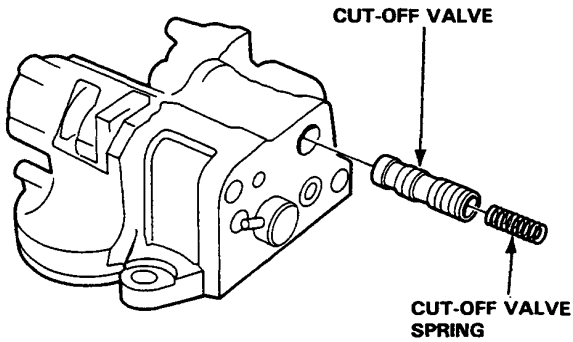
9.8 x 1.9 mm O-RINGS

8. Remove the two 6 mm flange bolts, and remove the cap from the valve body.
9. Remove the port seal from the cap.



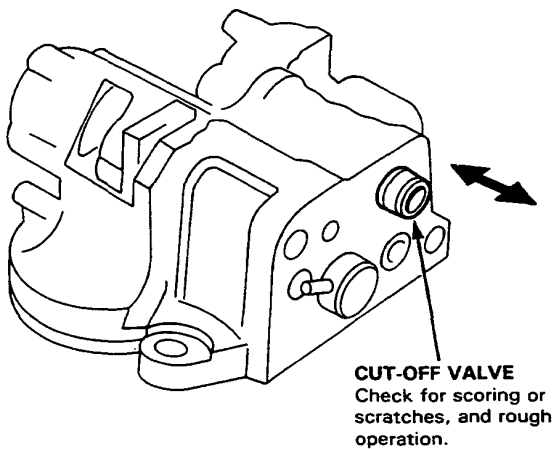


10. Remove the cut-off valve and spring from the valve body.



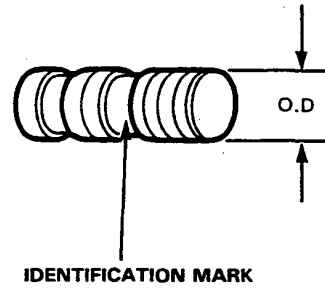
11. Check the cut-off valve:

- Inspect its surface for scoring or scratches.
- Slip it back into the valve body, and make sure it slides smoothly without drag and without side play.



**NOTE:**

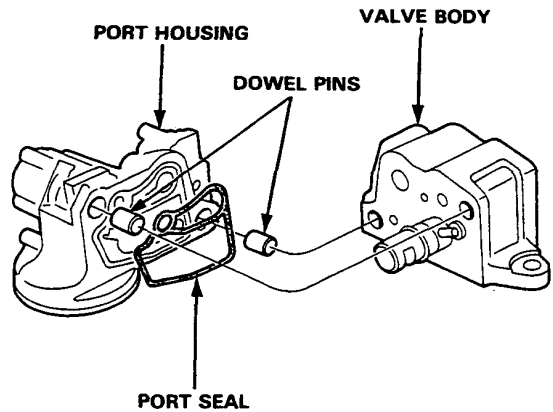
- The cut-off valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same identification mark on it.
- If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.



Identification mark	Outside diameter	Part number
A	10.000–10.005 mm (0.3937–0.3939 in.)	53650–SEO–950
B	9.995–10.000 mm (0.3935–0.3937 in.)	53651–SEO–950
C	9.990–9.995 mm (0.3933–0.3935 in.)	53652–SEO–950

12. Separate the valve body and port housing.

13. Remove the port seal and dowel pins from the port housing.



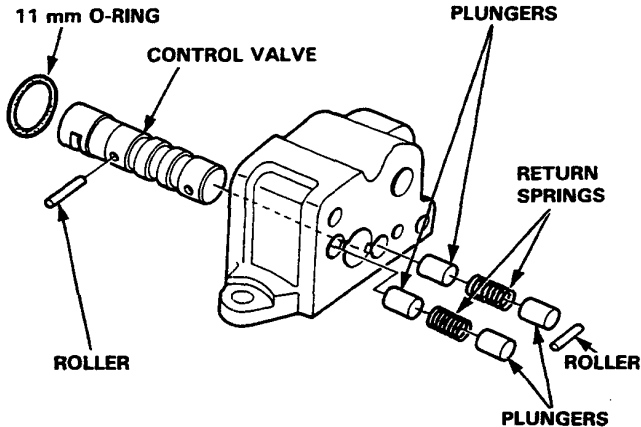
(cont'd)

# Steering Gearbox

## Valve Body Unit Overhaul (cont'd)

14. Remove the rollers from the control valve by pushing the valve out one side of the valve body, and then the other.

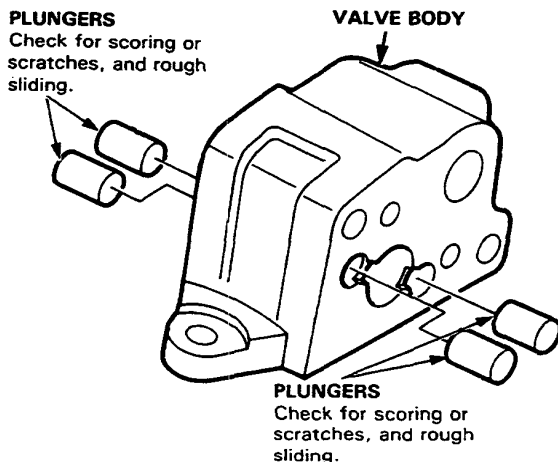
NOTE: When removing the rollers, hold the plungers with your fingers to keep them from popping out.



15. Remove the plungers, return springs and control valve from the valve body.
16. Remove the 11 mm O-ring from the control valve.
17. Check the plungers.

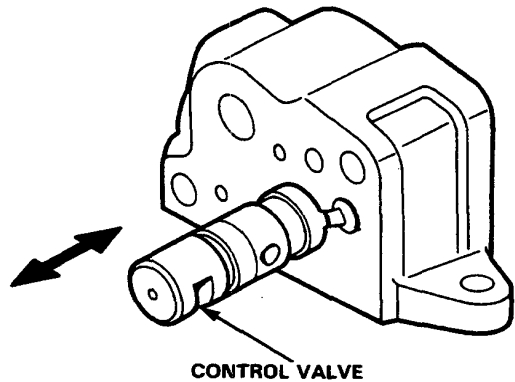
- Inspect their surface for scoring or scratches.
- Slip each plunger into the valve body, and make sure it slides smoothly, without drag or side play. If any plunger is damaged, replace it.

NOTE: If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.



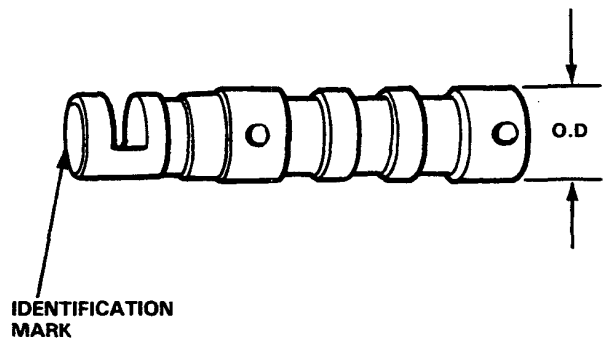
18. Check the control valve.

- Inspect its surface for scoring or scratches.
- Slip it into the valve body, and make sure it slides smoothly, without drag or side play.



NOTE:

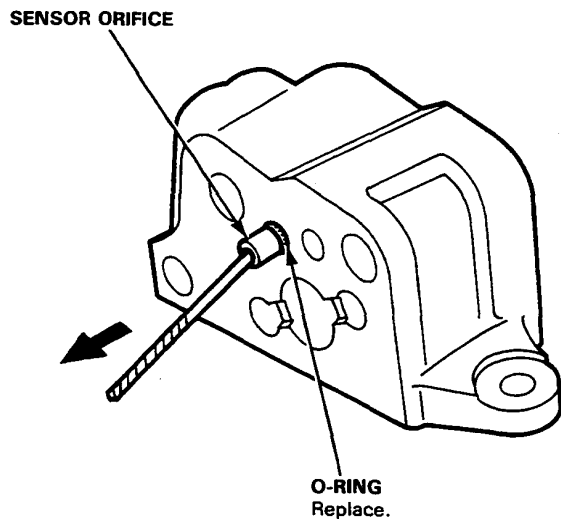
- The control valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same identification mark on it.
- If the valve body is damaged, replace all three parts (valve body, control valve and cut-off valve) as a set.



Identification mark	Outside Diameter	Part Number
X	13.998 – 14.003 mm (0.5511 – 0.5513 in.)	53646 – SE0 – 952
Y	13.993 – 13.998 mm (0.5509 – 0.5511 in.)	53647 – SE0 – 952
Z	13.988 – 13.993 mm (0.5507 – 0.5509 in.)	53648 – SE0 – 952

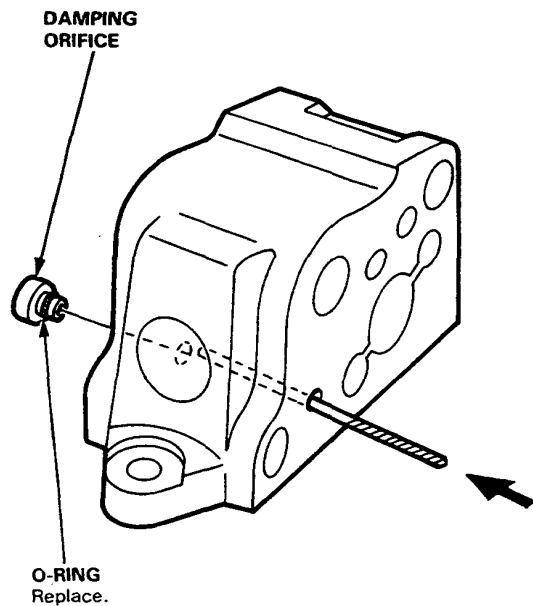


19. Using a 1.5 mm (1/16") drill bit, remove the sensor orifice and O-ring.



20. Using a 1.5 mm (1/16") drill bit, push the damping orifice and O-ring out of the valve body.

**CAUTION:** Grind the shank end of the drill bit flat before using.




# Steering Gearbox

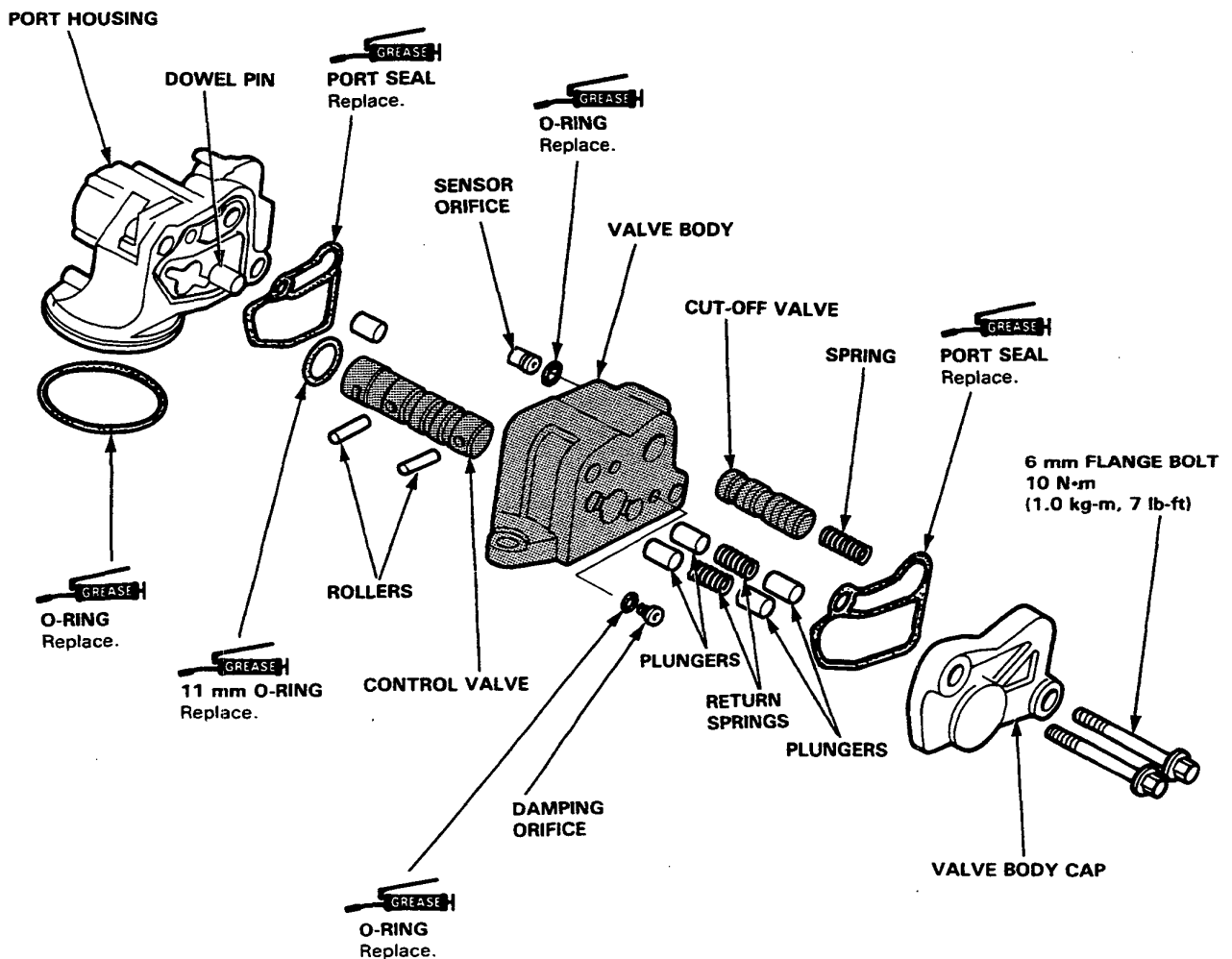
## Valve Body Unit Overhaul (cont'd)

### Assembly:

1. Thoroughly clean the disassembled parts shown below.
2. Coat the plungers, cut-off valve and reaction control valve surfaces with power steering fluid.
3. Reassemble the parts in reverse order of disassembly.

### CAUTION:

- Replace the O-rings and seals with new ones.
- Do not dip the O-rings and seals in solvent.
- Apply grease in the port seal grooves to keep the seals in place.
- Apply grease to the 45.5 x 2 mm and 11 mm O-rings to keep them in place in the valve ports.
-  STEERING GREASE.....Part Number 08740-99969

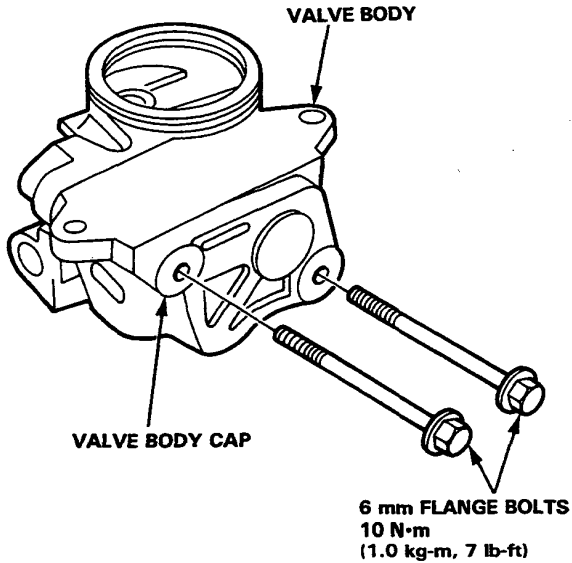


NOTE: If the Valve Body is damaged, it must be replaced as a set, with the Cut-off Valve and Control Valve (shaded parts).

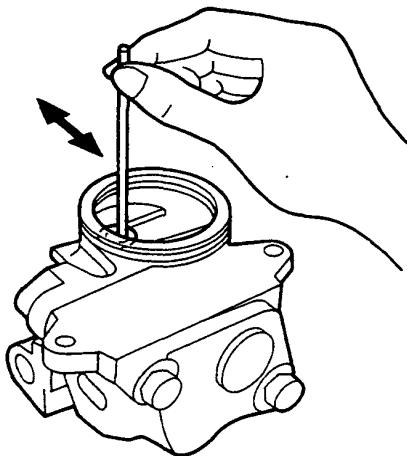


4. Install and tighten the 6 mm flange bolts in the control valve body unit.

**CAUTION:** Make sure the mating surface of the valve body and cap are flush at the upper side.

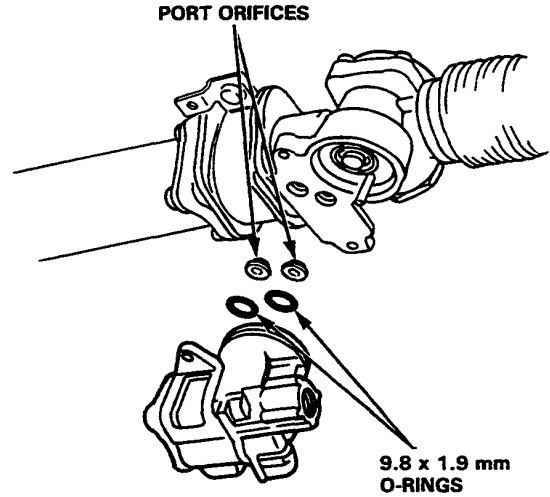


5. Make sure the control valve moves smoothly, and returns to neutral position.



**Installation:**

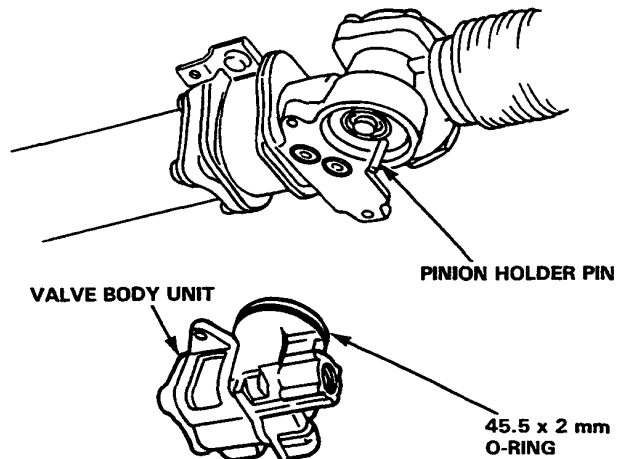
6. Coat the 9.8 x 1.9 mm O-rings with grease, and install them together with orifices.



7. Install the valve body unit on the gear housing with the two 6 mm bolts.

**CAUTION:**

- When installing, be careful not to hit the pinion holder pin.
- Make sure the O-rings are in place and not pinched.



(cont'd)

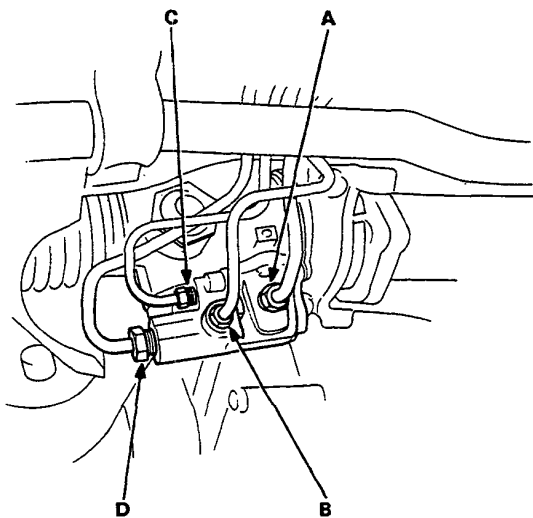


# Steering Gearbox

## Valve Body Unit Overhaul (cont'd)

8. Connect the four lines to the control unit, using flare nut wrenches.

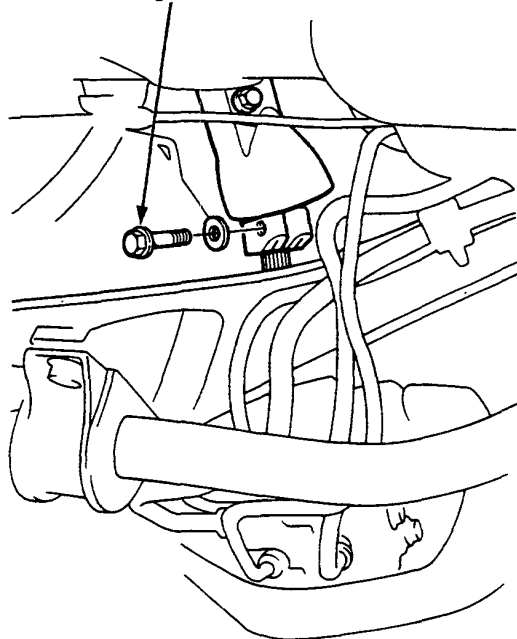
- A: From pump: 14 mm wrench  
38 N·m (3.8 kg-m, 28 lb-ft)
- B: To speed sensor: 12 mm wrench  
13 N·m (1.3 kg-m, 9 lb-ft)
- C: To reservoir: 12 mm wrench  
13 N·m (1.3 kg-m, 9 lb-ft)
- D: To oil cooler: 17 mm wrench  
29 N·m (2.9 kg-m, 20 lb-ft)



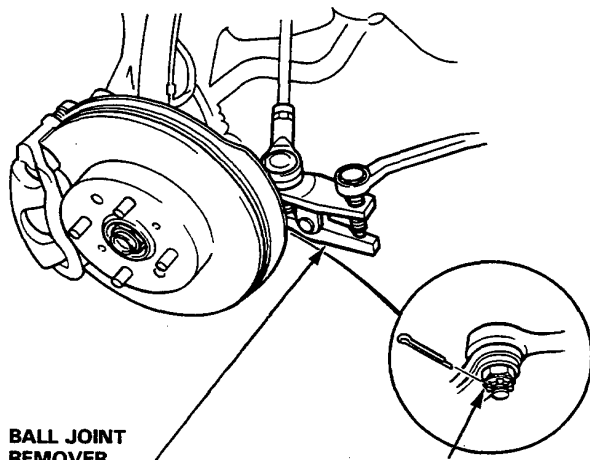
## Removal

1. Disconnect the steering joint from the gearbox.

22 N·m (2.2 kg-m, 16 lb-ft)



2. Raise the front of car and support on safety stands in the proper locations.
3. Remove the front wheels.
4. Disconnect the tie rods from steering knuckles using the special tool shown.



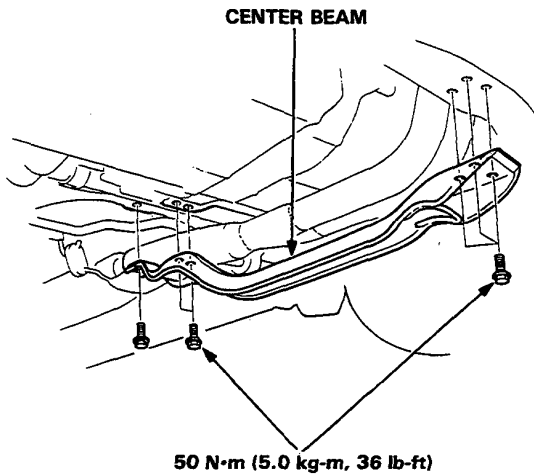
**BALL JOINT  
REMOVER  
07941-6920003**

44 N·m (4.4 kg-m, 32 lb-ft)

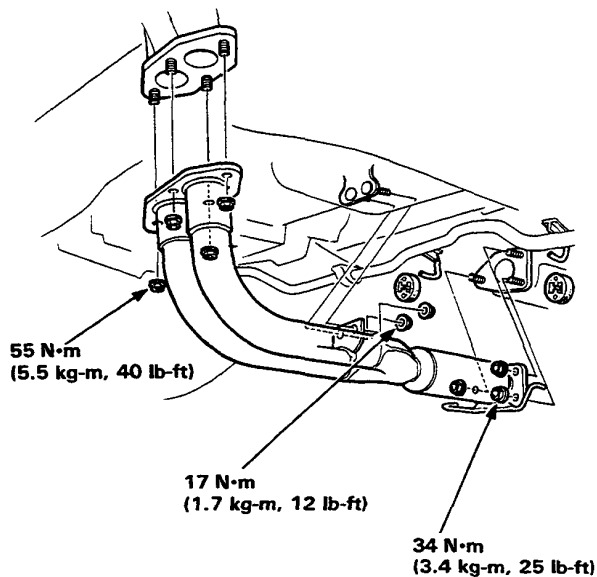


5. Remove the center beam bolts and center beam.

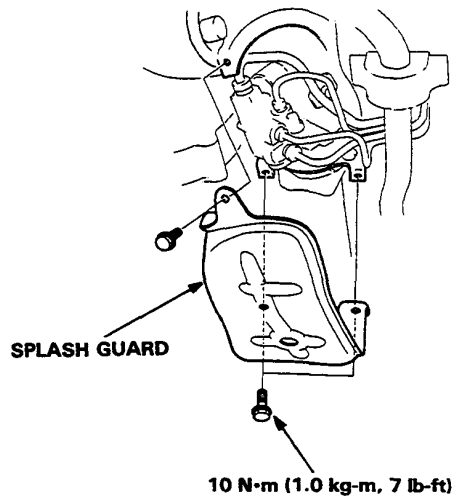
NOTE: Replace the self-locking bolts if you can easily thread, them in.



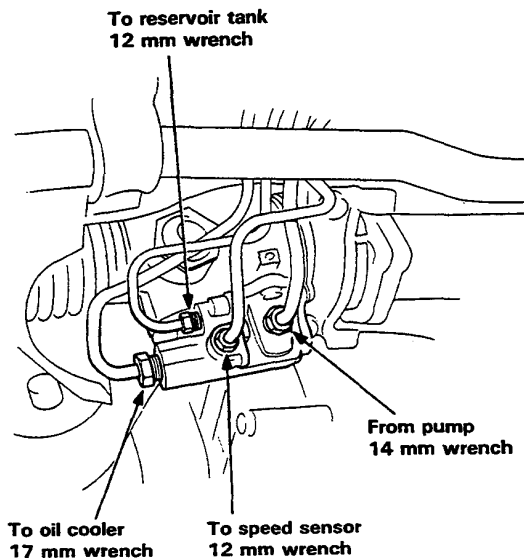
6. Remove the exhaust pipe.



7. Remove the splash guard.



8. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gear-box. Blow dry with compressed air.
9. Disconnect the four lines from the control unit.

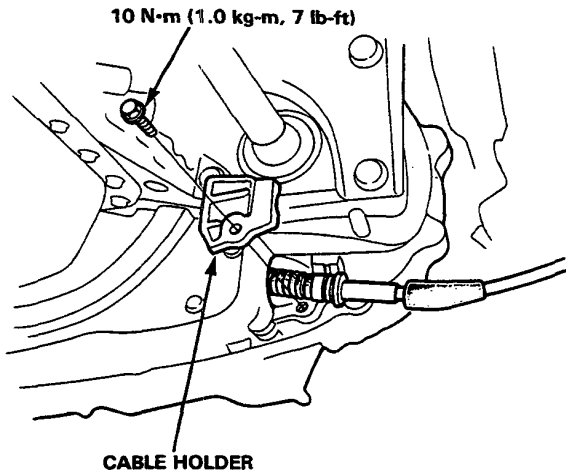


(cont'd)

# Steering Gearbox

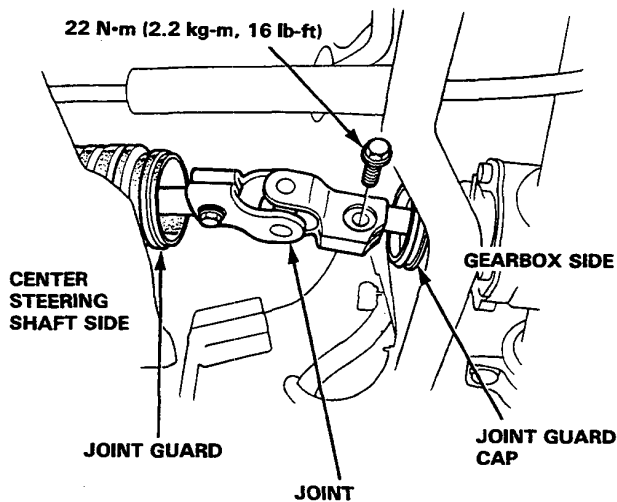
## Removal (cont'd)

10. Automatic transmission only.  
Remove the control cable from the clamp.



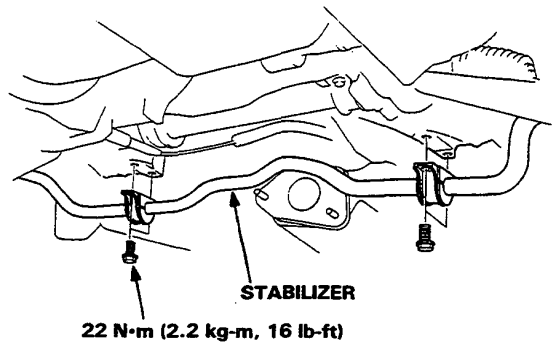
11. 4WS only.

- Separate the joint guard cap and the joint guard.
- Remove the joint bolt from the driven pinion side.



- Remove the joint bolt from the center steering shaft side, then slide the joint back to disconnect it from the driven pinion.

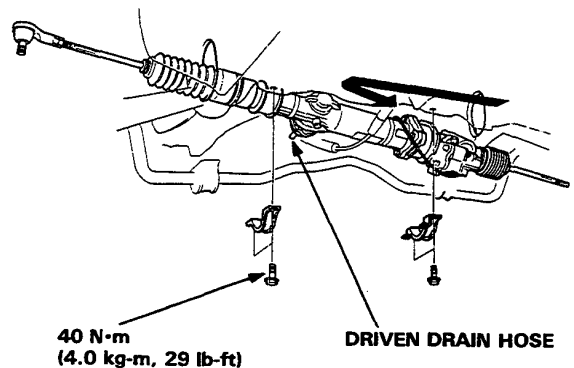
12. Remove the bolts, and lower the stabilizer.



13. Disconnect the driven drain hose.

14. Disconnect the tie-rod end (left side).

15. Slide the tie-rod all the way to the right side.

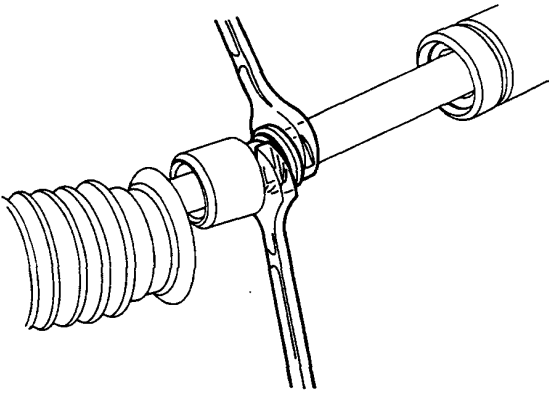


16. Slide the gearbox right so that the left tie rod clears the bottom of the rear beam, then remove the gearbox.

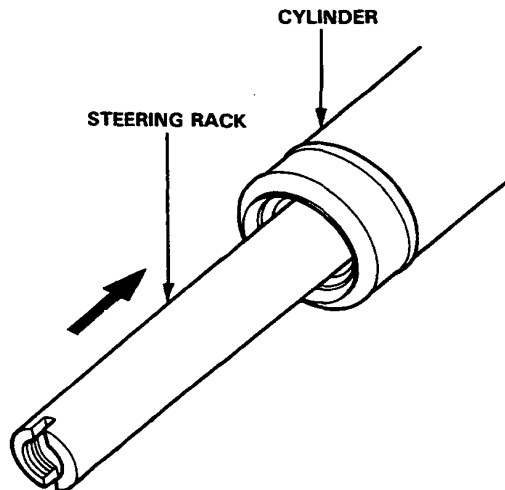


## Overhaul (2WS)

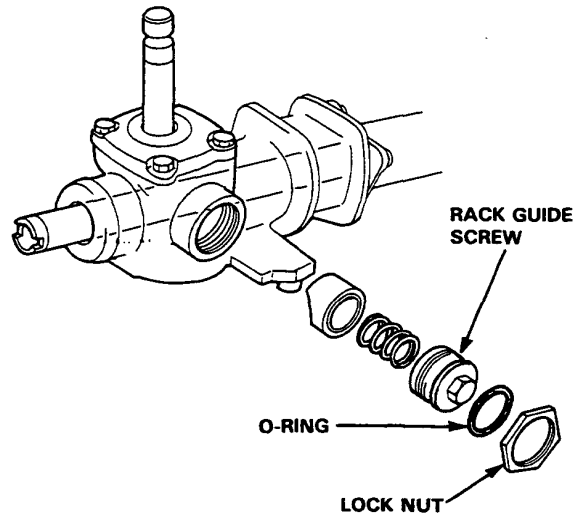
1. Remove the control unit as described on page 11-36.
2. Carefully clamp the gearbox in a vise with soft jaws.
3. Loosen the bands, pull the boots away from the ends of the gearbox, and straighten the tie-rod lock washers.



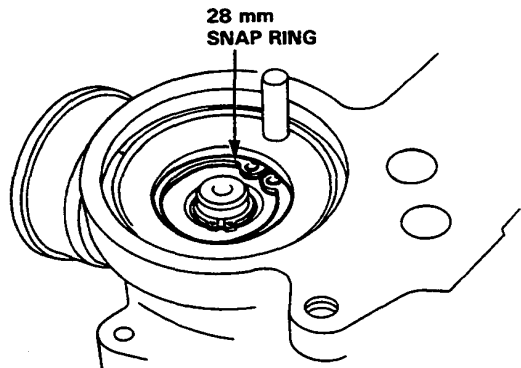
4. Push the right end of the rack back into the cylinder housing so the smooth surface that rides against the seal won't be damaged.



5. Loosen the rack screw lock nut, and remove the rack guide screw.



6. Remove the 28 mm snap ring from the bottom of the gear housing.

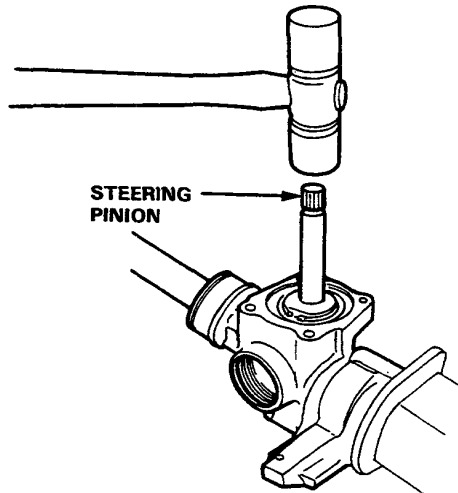


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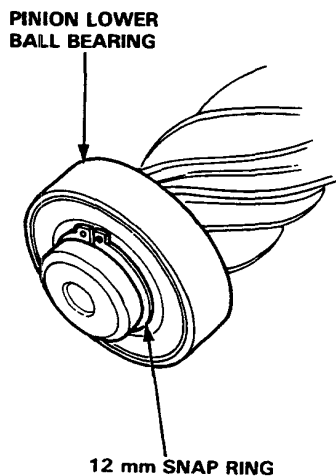
# Steering Gearbox

## Overhaul (2WS) (cont'd)

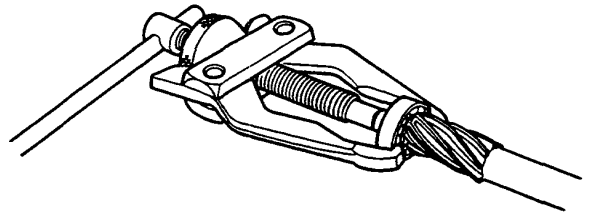
7. Remove the pinion from the gear housing by tapping it lightly.



8. Check the pinion lower ball bearing for play.

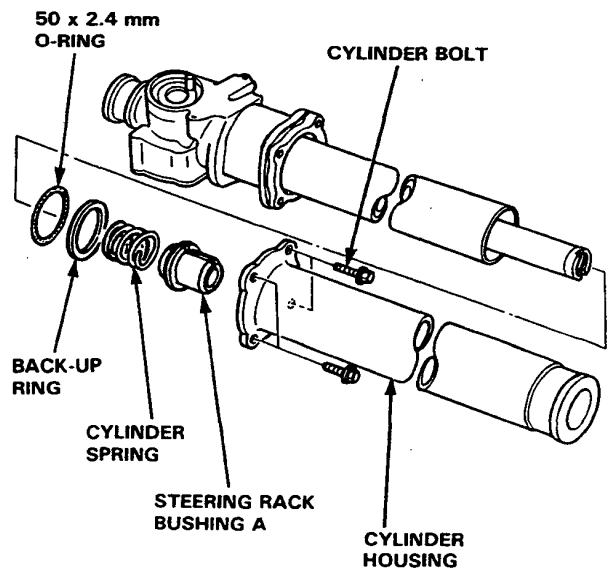


9. If the bearing is noisy or has excessive play, remove the 12 mm snap ring and remove the bearing using a commercially available bearing puller.



10. Remove the four bolts from the end of cylinder housing, then slide the housing off the rack.

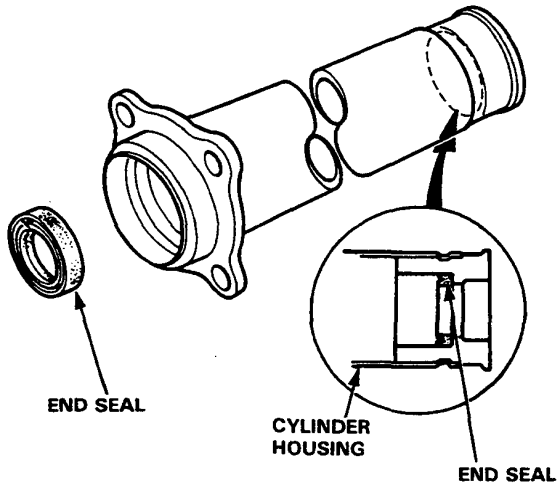
11. Remove the cylinder housing.



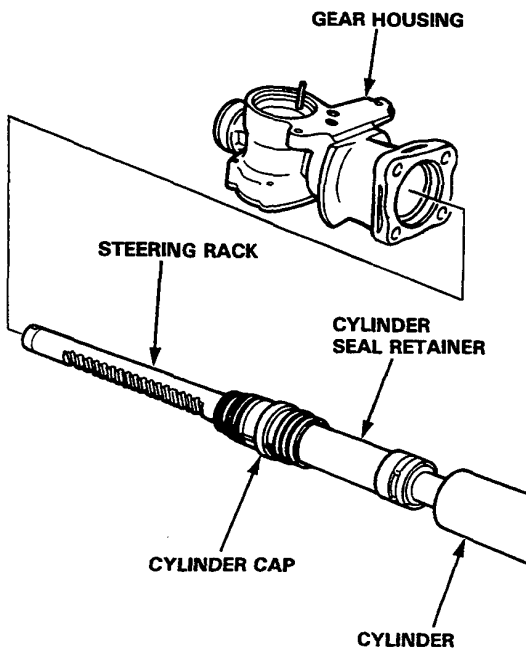
12. Remove the O-ring, back-up ring, steering rack bushing A and cylinder spring.



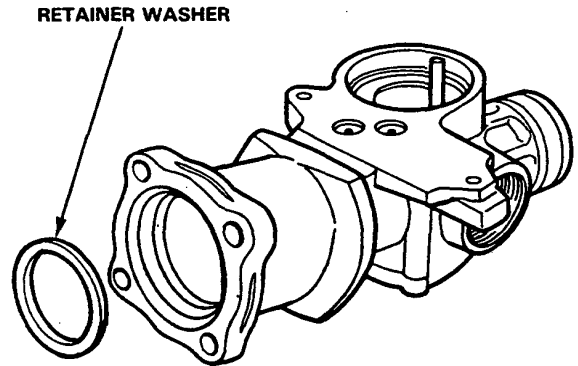
13. Remove the cylinder end seal from the cylinder housing.  
Use your fingers or a wooden stick to avoid damaging the housing.



14. Remove the cylinder, cylinder seal retainer, cylinder cap and steering rack from the gear housing.

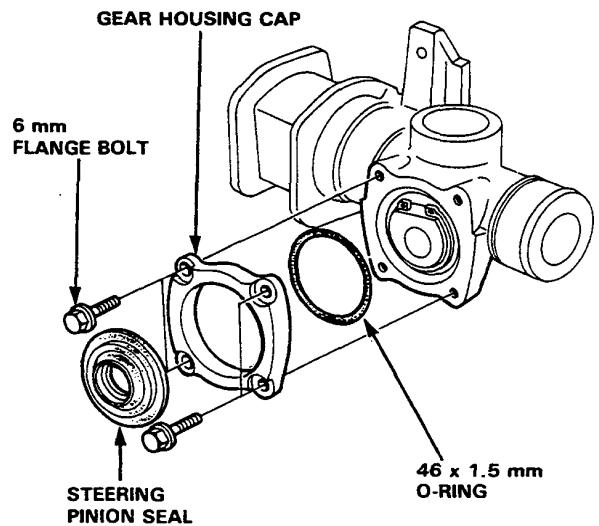


15. Remove the retainer washer from the gear housing.



16. Remove the gear housing cap from the gear housing by removing the four 6 mm flange bolts.

17. Remove the steering pinion seal from the gear housing cap.



18. Remove the O-ring from the gear housing.

(cont'd)

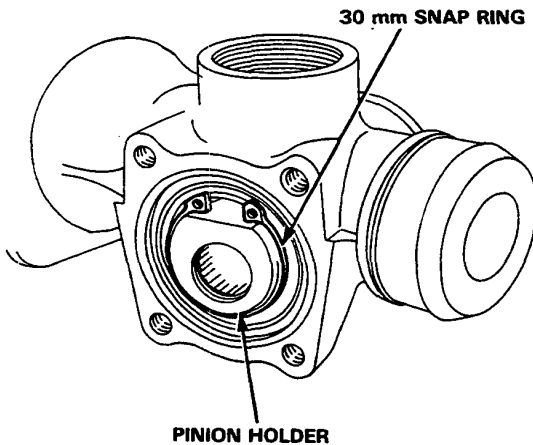
# Steering Gearbox

## Overhaul (2WS) (cont'd)

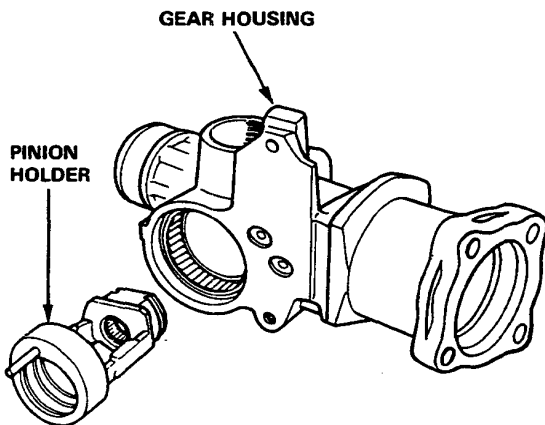
19. Check the upper bearing for faulty movement and excessive play; if it is good and the grease in it is clean, go on step 20.

If it is damaged, or if dirt has gone past the seal into the grease, replace the bearing.

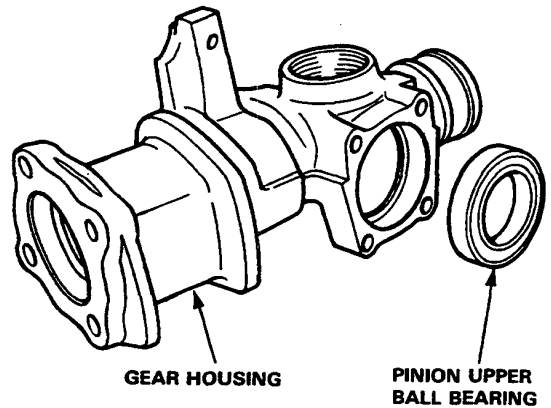
- Remove the 30 mm snap ring from the pinion holder.



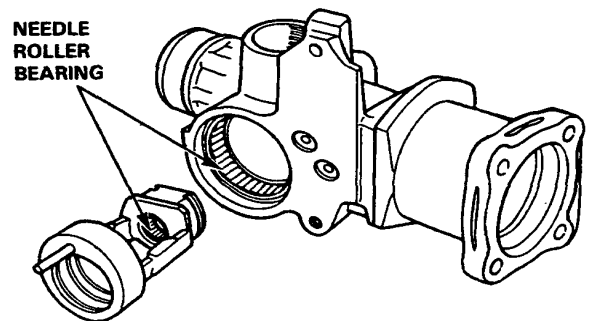
- Remove the pinion holder from the gear housing.



- Remove the pinion upper ball bearing from the gear housing.

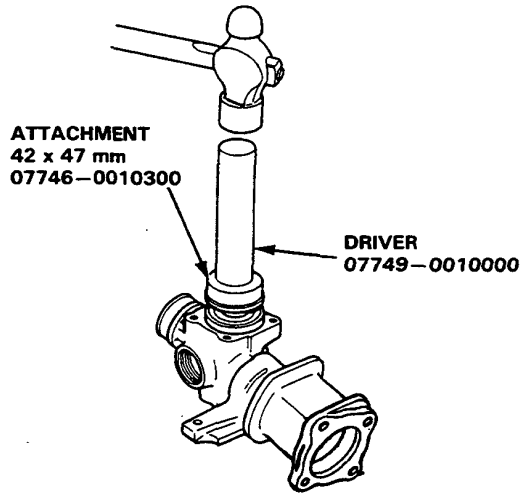


- Check the needle roller bearings in the pinion holder and in the gear housing for damage; if they are OK, pack them with grease. If the bearings are damaged, replace them as a set.

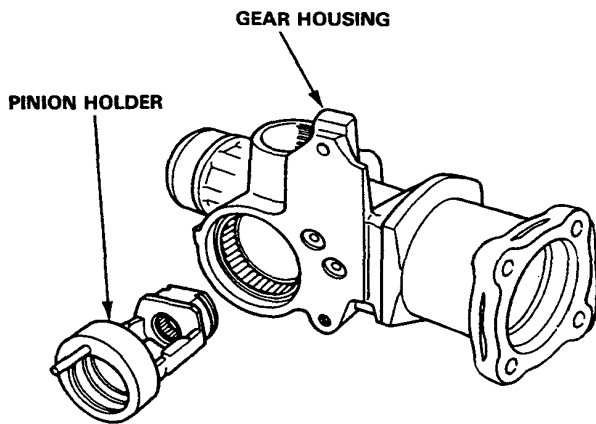




- Pack a new upper bearing with grease, then drive the bearing into the gear housing with its sealed side facing out.

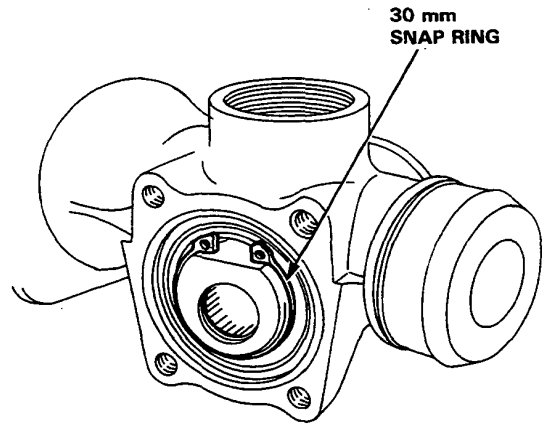


- Install the pinion holder in the gear housing.

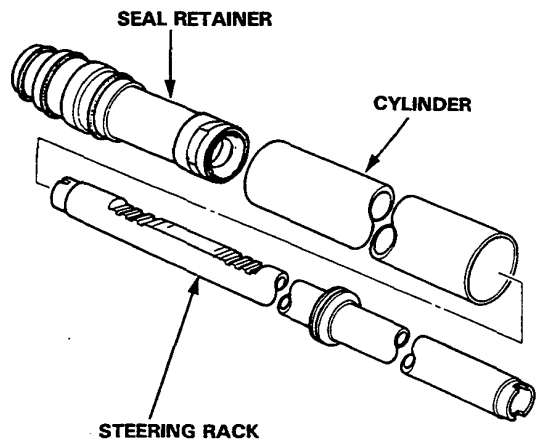


- Reinstall the 30 mm snap ring with its tapered side facing out.

NOTE: Snap ring ends must be aligned with the flat area.



20. Remove the cylinder and seal retainer from the steering rack.

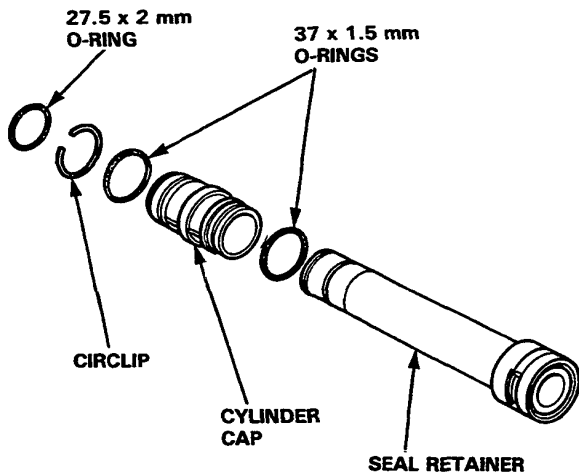




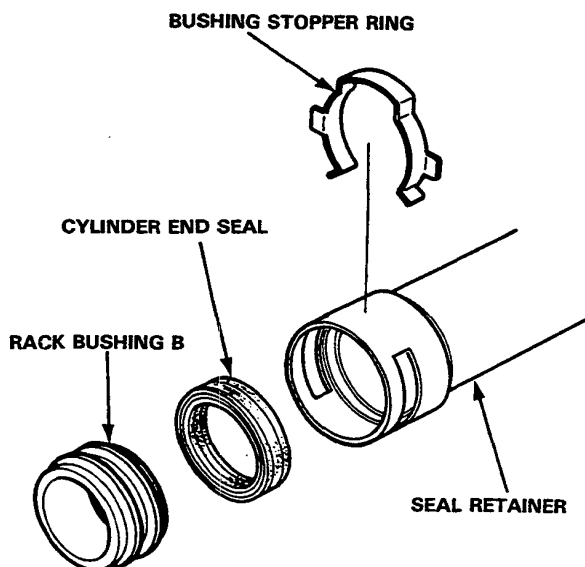
# Steering Gearbox

## Overhaul (2WS) (cont'd)

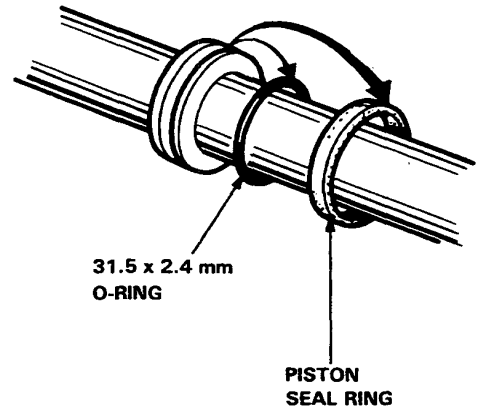
21. Remove the O-ring and circlip from the seal retainer, then remove the cylinder cap from the seal retainer.
22. Remove the O-rings from the cylinder cap.



23. Remove the bushing stopper ring from the seal retainer.
24. Remove the cylinder end seal.

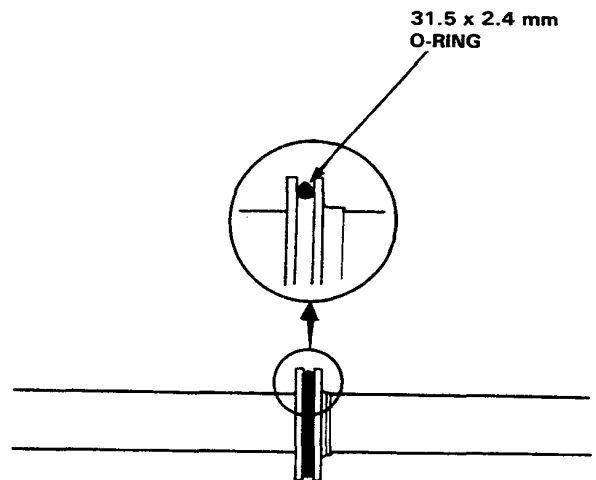


25. Carefully pry the piston seal ring and O-ring off the rack.



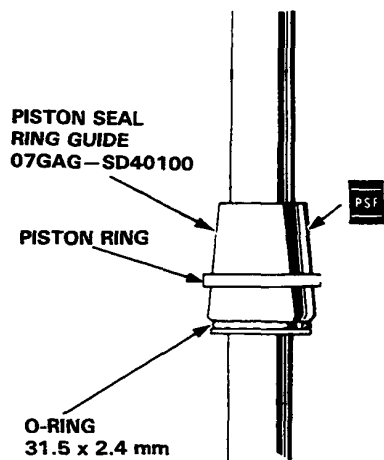
**NOTE:** Before reassembling any parts, inspect them as described on page 11-23, and make sure they are clean. Replace worn or damaged parts.

26. Install a new O-ring on the rack with its narrow edge facing out.

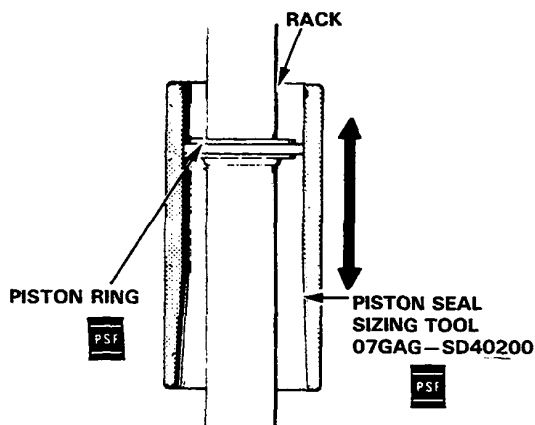




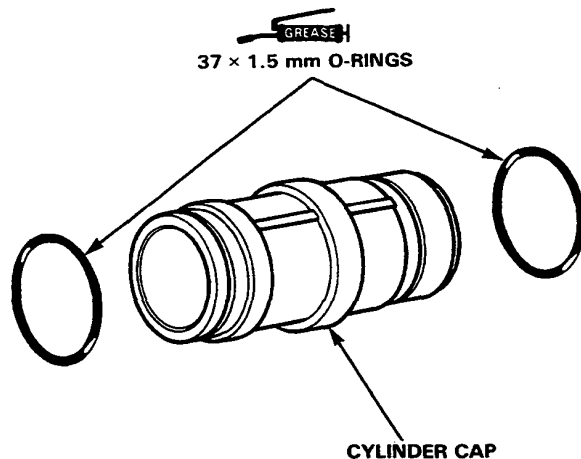
27. Coat the pinion seal ring guide with power steering fluid, and slide it onto the rack, big end first.
28. Position the new piston seal ring on the guide tool, slide it down to the big end of the tool, and then pull it off into the piston groove on top of the O-ring.



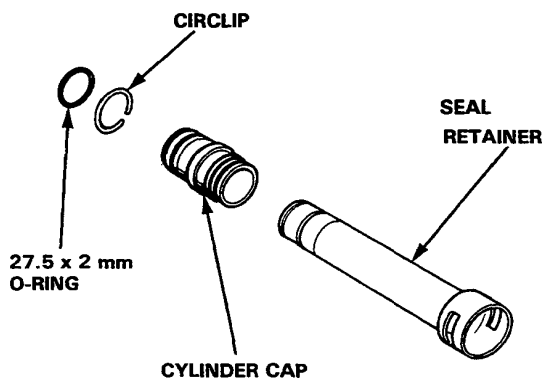
29. Coat the piston seal ring and inside of the sizing tool with power steering fluid. Carefully slide the tool onto the rack and over the piston ring, then rotate the tool as you move it up and down to seat the piston ring.



30. Coat new O-rings with grease and install them on the cylinder cap.



31. Slide the cylinder cap onto the seal retainer.
32. Install the circlip and O-ring on the seal retainer.

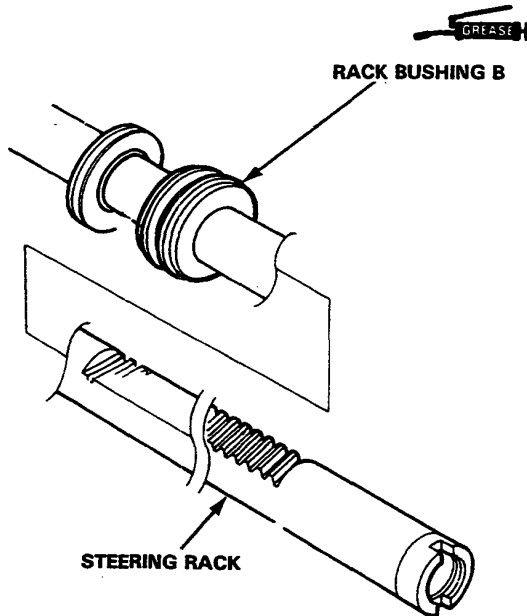


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# Steering Gearbox

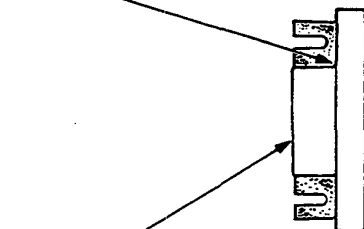
## Overhaul (2WS) (cont'd)

33. Grease the sliding surface of the steering rack bushing B, and install the bushing on the steering rack with the groove of the bushing facing the steering rack piston.



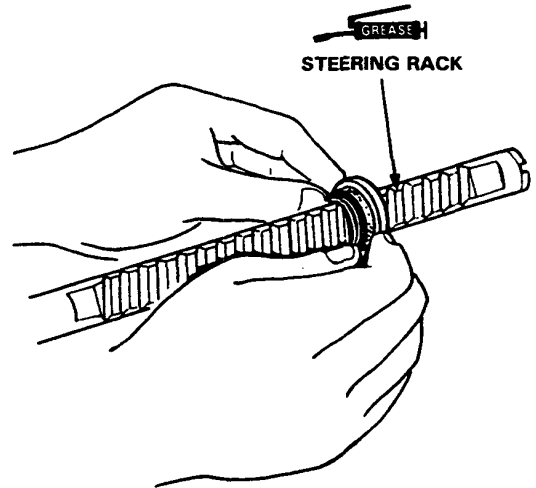
34. Grease the sliding surfaces of the new cylinder end seal and cylinder end seal slider, then set the seal on the seal slider with its grooved side facing opposite the slider.

Install end seal with its grooved side facing opposite seal slider.

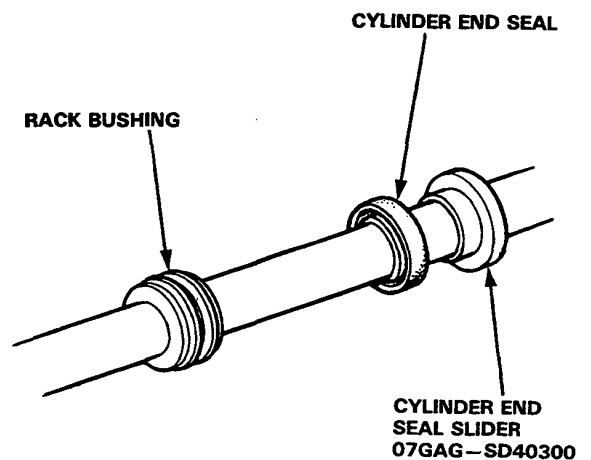


CYLINDER END SEAL SLIDER  
07GAG-SD40300

35. Grease the steering rack, and install the cylinder end seal.

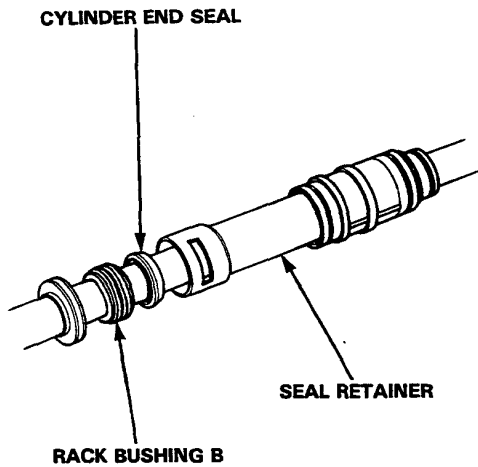


36. Remove the guide tool from the cylinder end seal, then separate the ends of the tool and remove it from the rack.

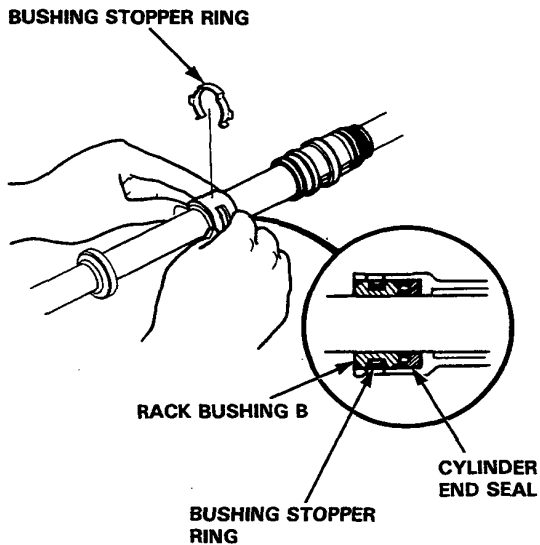




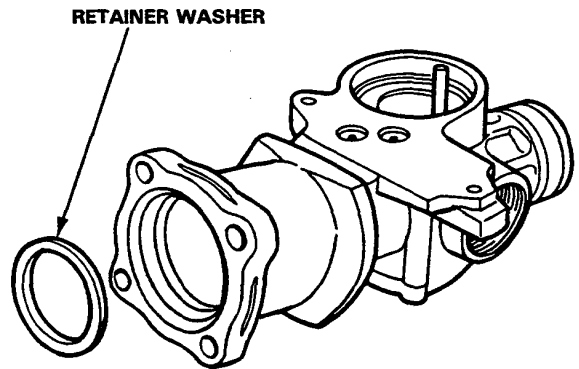
37. Fit the seal retainer on the steering rack.



38. Push the rack bushing B toward the seal retainer by hand until the cylinder end seal seated in the retainer. Fit the seal stopper ring in the groove of the seal retainer securely.

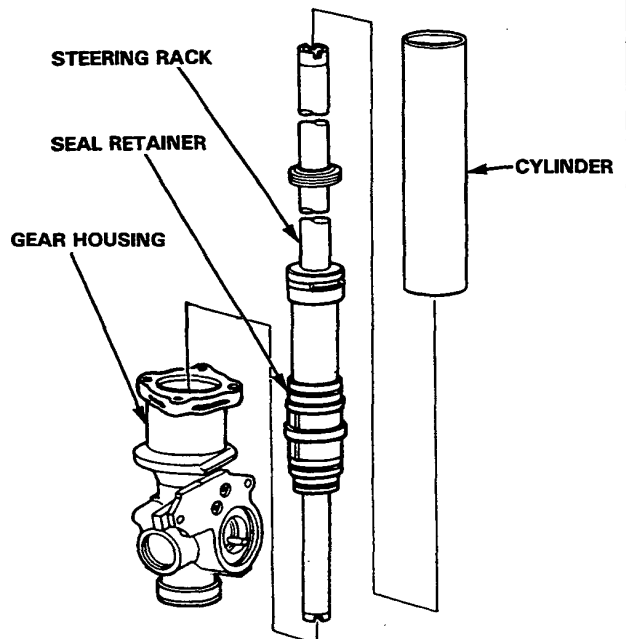


39. Install the retainer washer on the gear housing.



40. Place the gear housing on the work bench and insert the seal retainer and steering rack into the gear housing.

41. Coat the inside of the cylinder with power steering fluid, slide it over the rack and into the gear housing; press it into the housing until it seats.

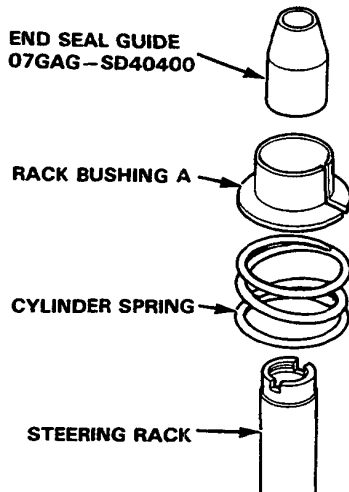


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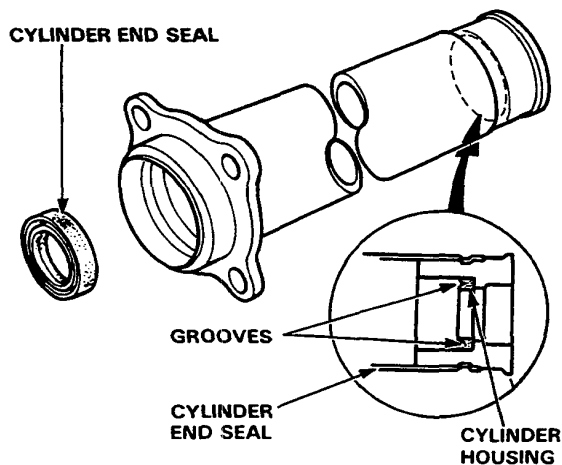
# Steering Gearbox

## Overhaul (2WS) (cont'd)

42. Install the cylinder spring over the rack, then coat the rack bushing A with power steering fluid and install it on the spring.
43. Grease the end guide and slip it onto the end of the steering rack.



44. Coat the inside surface of the cylinder with power steering fluid and install the cylinder end seal with its groove side facing out.

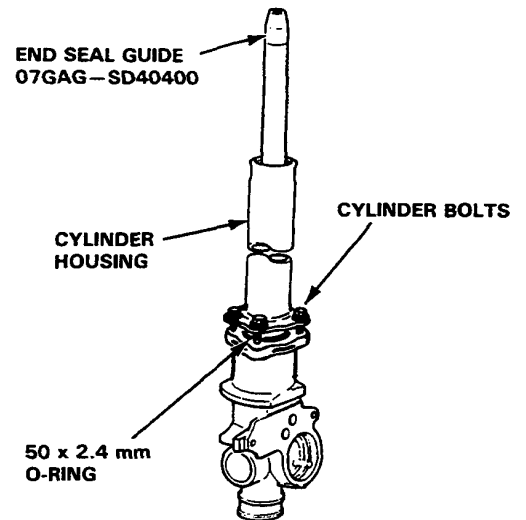


45. Install the O-ring and back-up ring on the gear housing.

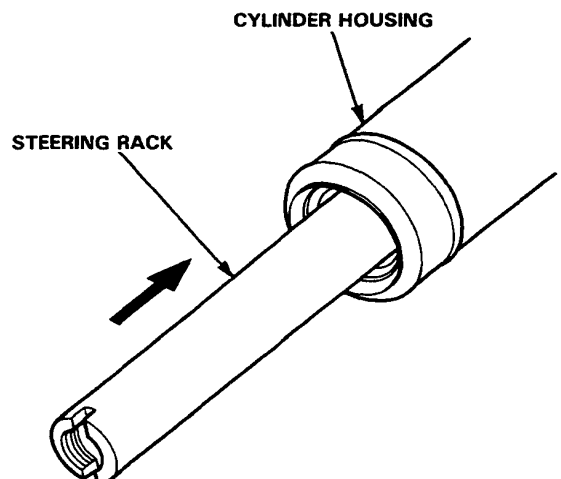
46. Carefully install the cylinder on the gear housing and loosely install with four bolts.

**CAUTION:** Be careful not to damage the end seal in the cylinder housing.

47. Remove the end seal guide from the steering rack.



48. Insert the steering rack into the cylinder housing being careful not to damage the steering rack sliding surface.

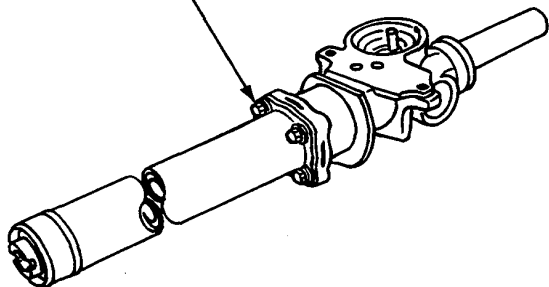




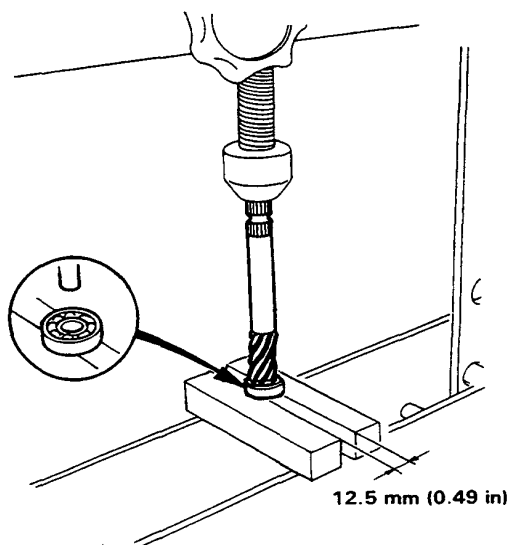
49. Tighten the cylinder housing to the gear housing with four bolts.

NOTE: Before tightening the bolts, make sure the mating surfaces of the cylinder and gear housings fit properly by pushing them together; hold them together while tightening the bolts.

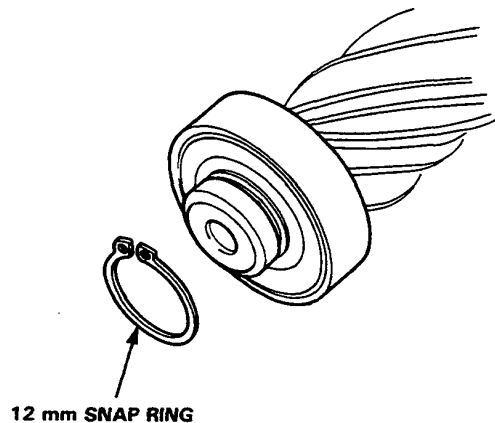
**CYLINDER BOLT**  
22 N·m  
(2.2 kg-m, 16 lb-ft)



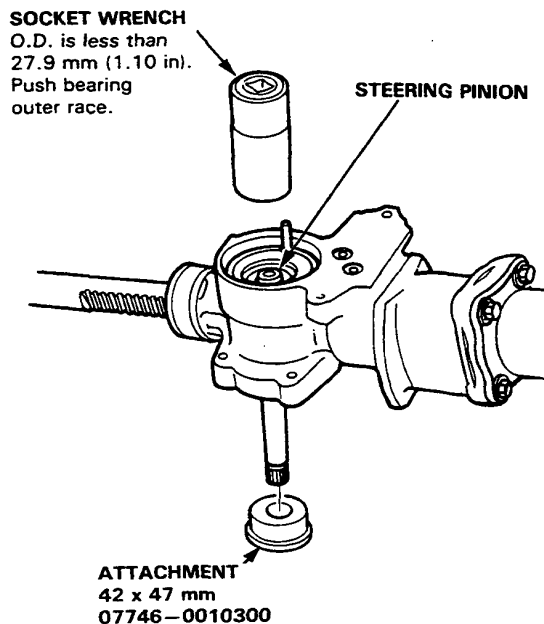
50. Press the lower ball bearing onto the pinion with its shielded side facing down.



51. Install the 12 mm snap ring on the steering pinion.



52. Install the steering pinion in the pinion holder.

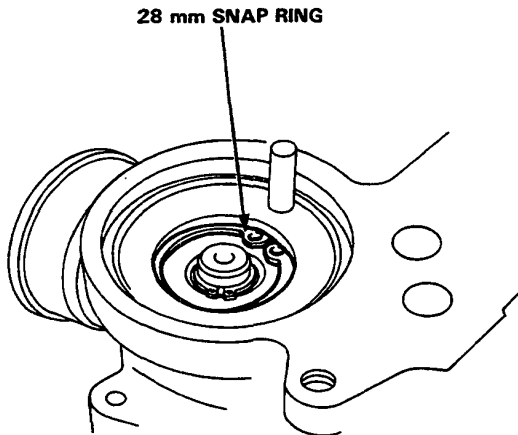


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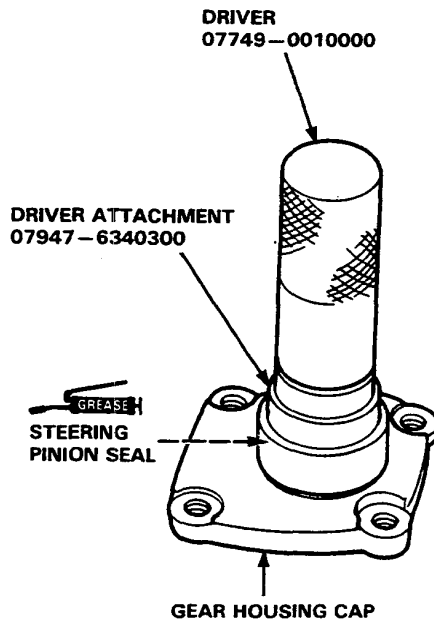
# Steering Gearbox

## Overhaul (2WS) (cont'd)

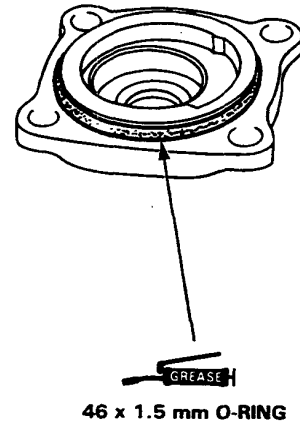
53. Install the 28 mm snap ring securely in the pinion holder groove.



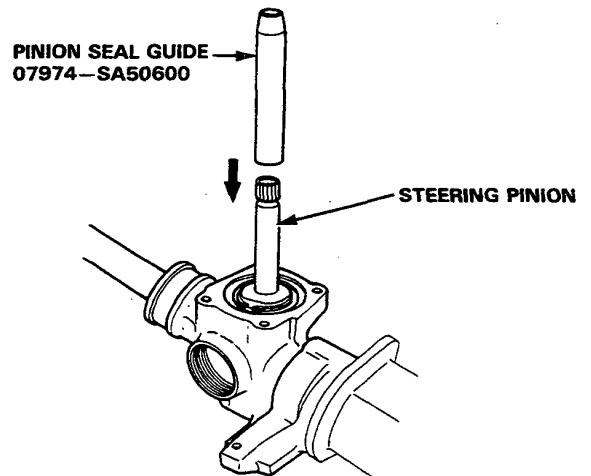
54. Grease the steering pinion seal, and install it on the gear housing using the special tools.



55. Grease the new O-ring and install it in the groove in the gear housing cap.

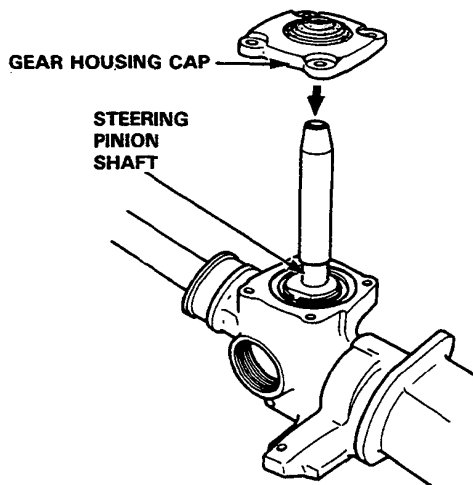


56. Grease the special tool and fit it over the steering pinion.

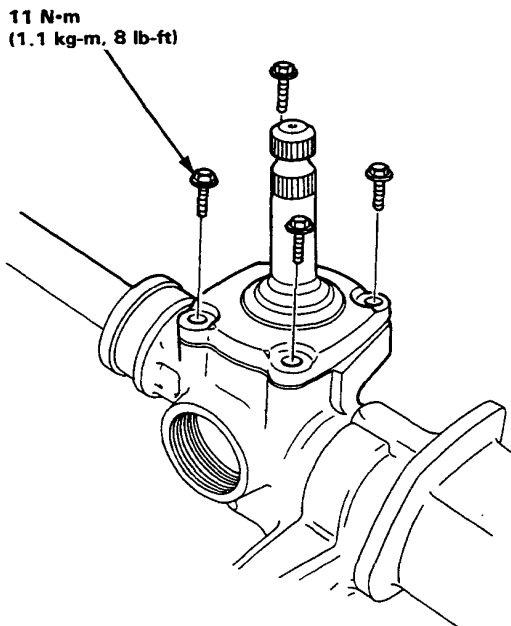




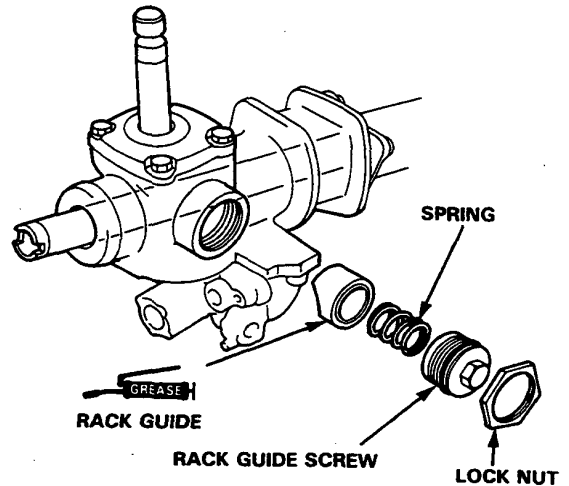
57. Install the gear housing cap being careful not to damage or distort the lip of the seal, or dislodge the seal spring.



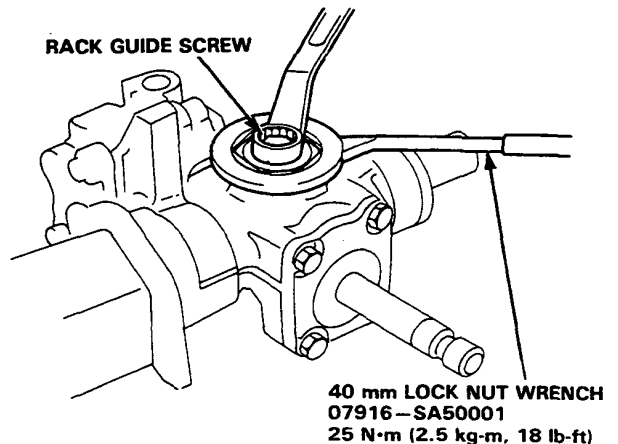
58. Remove the special tool.  
59. Tighten the four gear housing cap bolts.



60. Install the control valve unit on the gear housing.  
61. Coat the rack guide with grease.  
62. Install the rack guide, spring and rack guide screw on the gear housing.



63. Tighten the rack guide screw until it compresses the spring and seats against the rack guide, then loosen it. Retighten it to 3 N·m (0.3 kg·m, 2 lb-ft), back off about 20°–30° and install the lock nut on the rack guide screw.  
64. Tighten the lock nut while holding the rack guide screw with the lock nut wrench.



(cont'd)



# Steering Gearbox

## Overhaul (2WS) (cont'd)

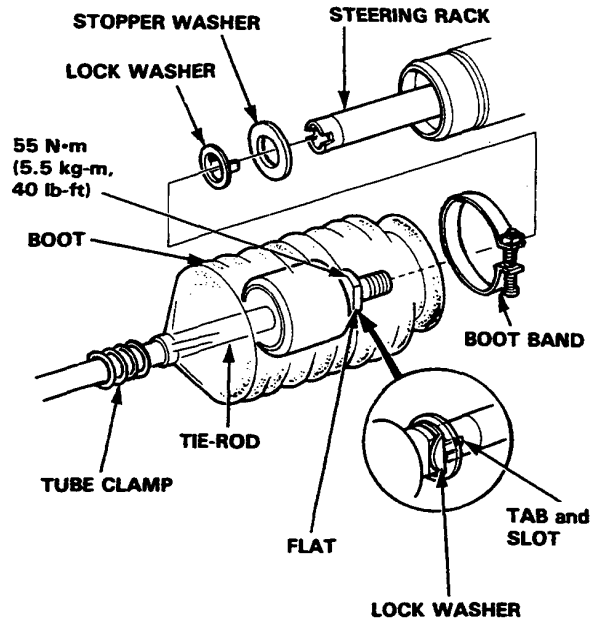
65. Screw each tie-rod into the rack while holding the lock washer so its tabs are in the slots in the rack end.

NOTE: Install the stopper washer with the chamfered side facing out.

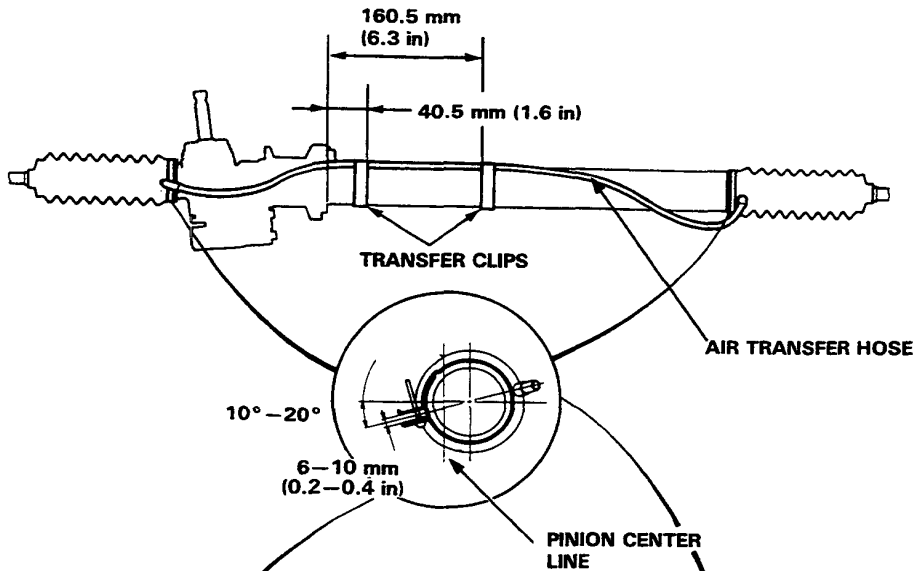
66. Tighten the tie-rod securely, then bend the lock washer back against the flat on the flange as shown.

67. Install the boots and secure with boot band and tube clamp.

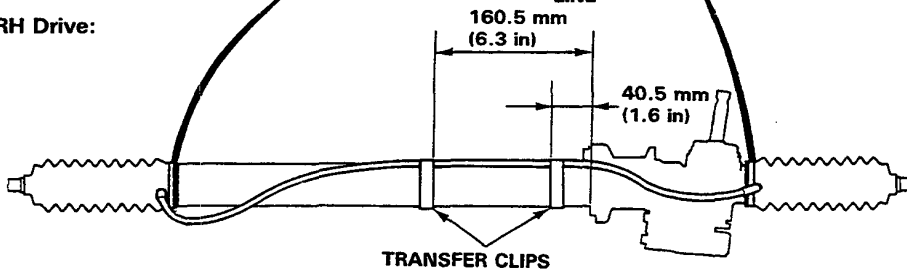
68. Install the air transfer hose and clamp with transfer clips as shown.



LH Drive:



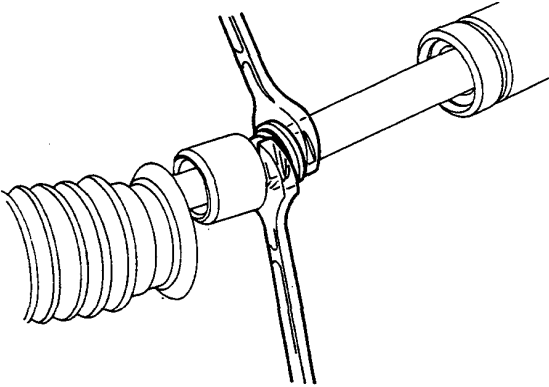
RH Drive:



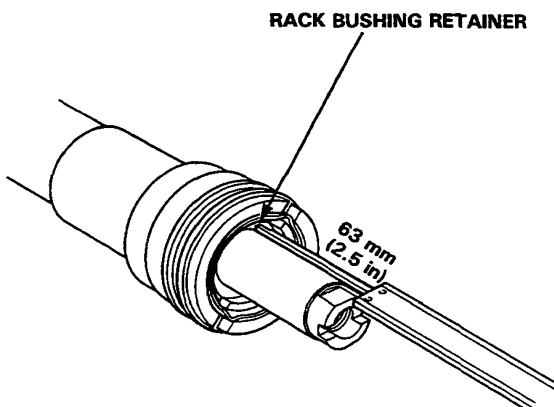


## Overhaul (4WS)

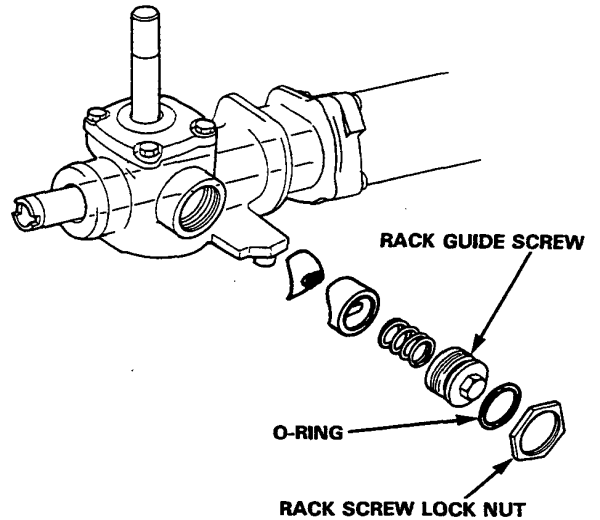
1. Remove the steering gearbox assembly (page 17-42).
2. Remove the control valve assembly (page 17-36).
3. Straighten the tab of the lock washer.
4. While holding the steering rack with a 22 mm wrench, remove the tie-rod with a 17 mm wrench.



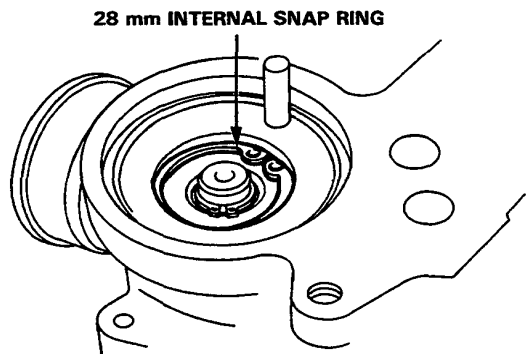
5. Slide the steering rack into the cylinder housing until the end is projected 63 mm (2.5 in.) from the rack bushing retainer.



6. Loosen the rack screw lock nut, and turn off the guide screw.



7. Remove the 28 mm internal snap ring from the bottom of the gear housing.

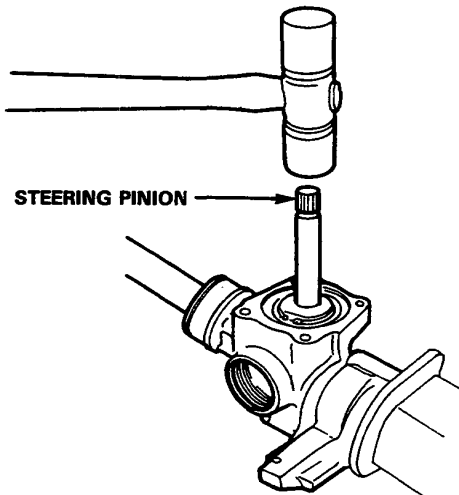


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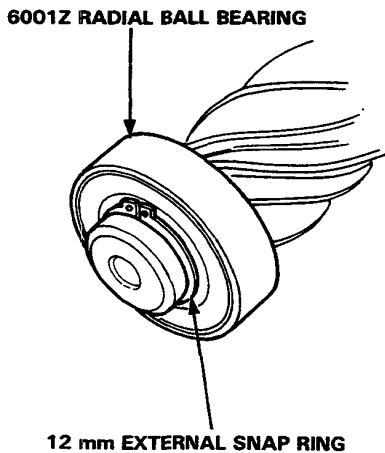
# Steering Gearbox

## Overhaul (4WS) (cont'd)

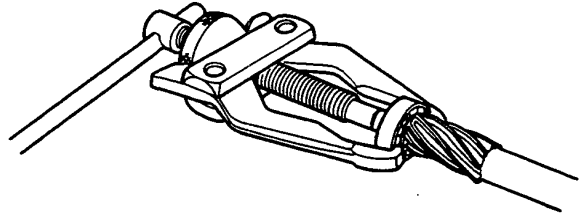
8. Remove the pinion from the gear housing by tapping it lightly.



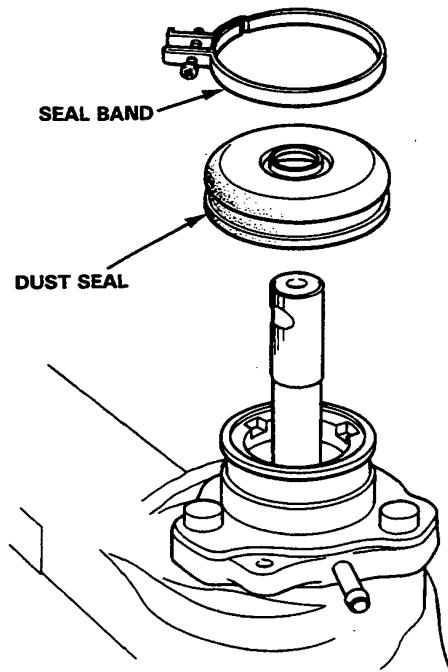
9. Check the pinion lower ball bearing for play.



10. If the bearing is noisy or has excessive play, remove the 12 mm snap ring and remove the bearing using a commercially available bearing puller.

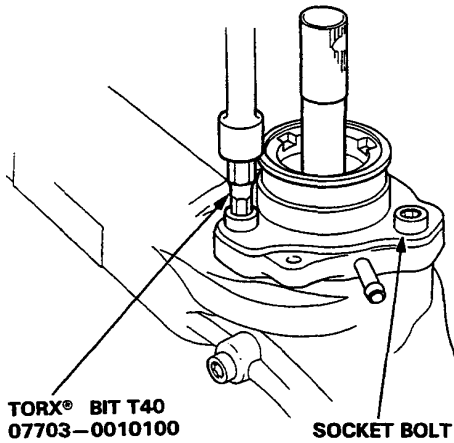


11. Remove the dust seal by removing the seal band.

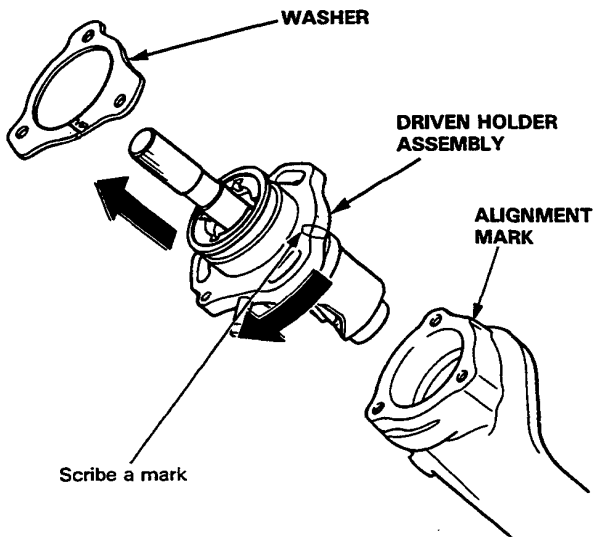




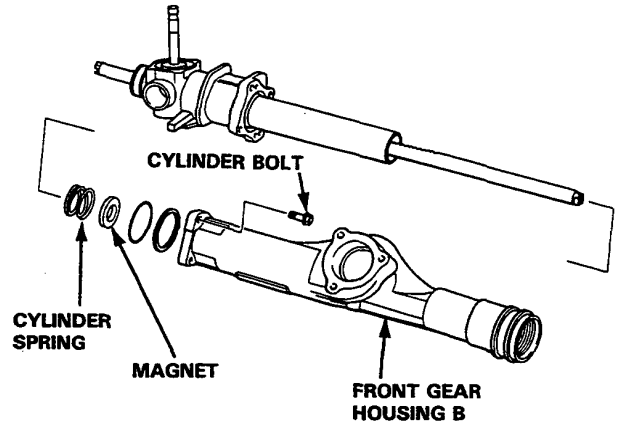
12. Remove the three driven pinion holder bolts using a TORX® bit T40.



13. Remove the washer from the driven pinion holder.
14. Scribe a mark on the edge of the holder which aligns up with the line mark on the front gear housing B.
15. Pull the pinion holder out of the front gear housing B while turning it clockwise.



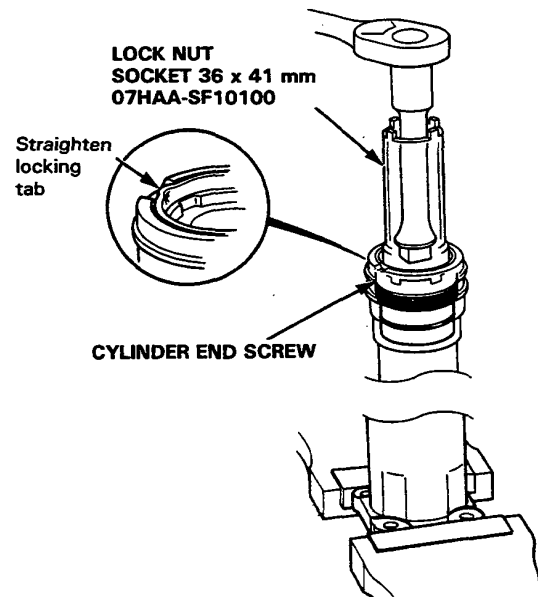
16. Remove the four bolts from the end of the cylinder housing.
17. Slide the front gear housing B off the rack.
18. Remove the magnet and cylinder spring from the gear housing.



19. Place a front gear housing B in a vise with soft jaws.

NOTE: Be careful not to damage the housing flange by over-tightening the vise.

20. Straighten the locking tab of the cylinder end screw, and remove the screw using the special tool.



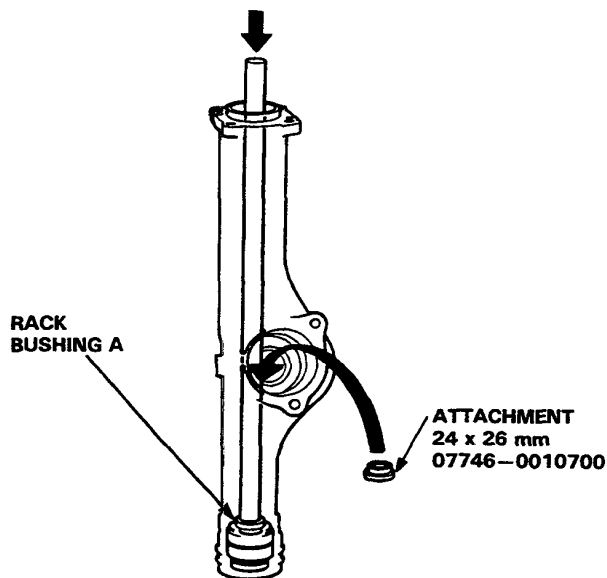
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# Steering Gearbox

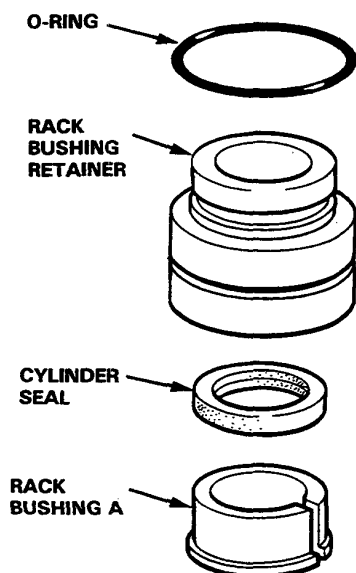
## Overhaul (4WS) (cont'd)

21. Reaching through the driven pinion hole of the front gear housing B, install the smaller diameter end of the special tool into the rack bushing A.
22. Remove the rack bushing retainer by lightly tapping the end of the special tool with a drift or equivalent.

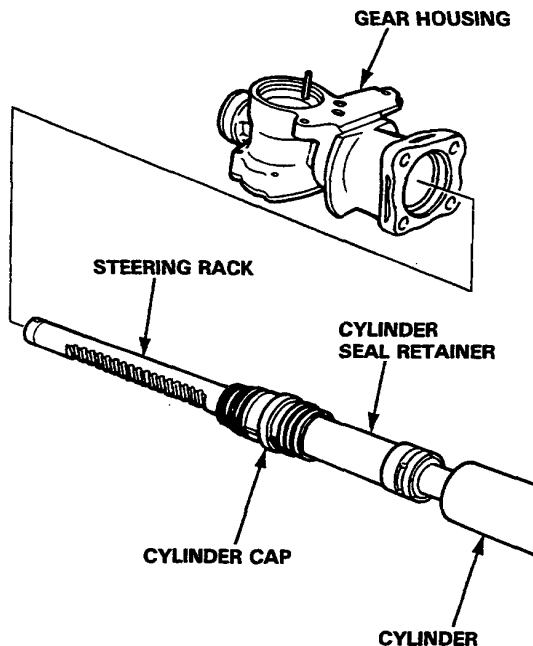
**CAUTION:** Take care not to damage the inner wall of the cylinder.



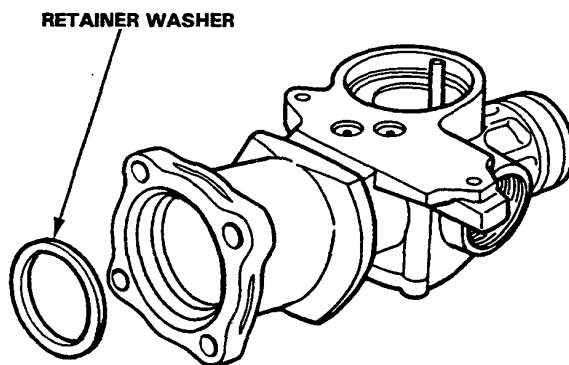
23. Remove the O-ring cylinder seal, and rack bushing A.



24. Remove the cylinder, cylinder seal retainer, cylinder cap and steering rack from the gear housing.

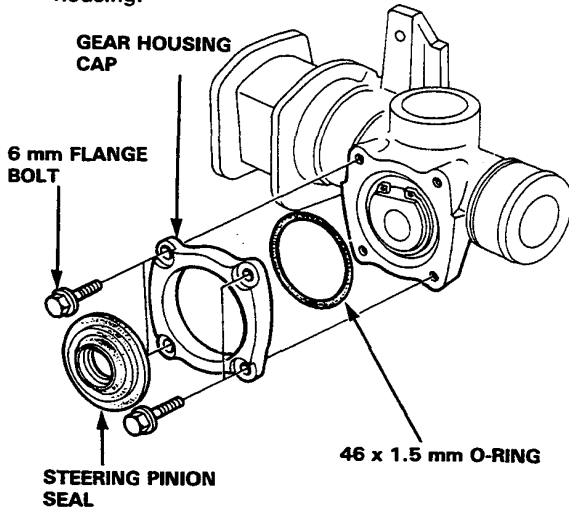


25. Remove the retainer washer from the gear housing.



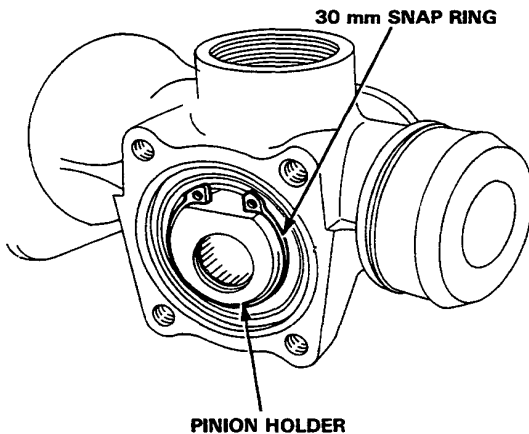


26. Remove the gear housing cap from the gear housing by removing the four 6 mm flange bolts.
27. Remove the steering pinion seal from the gear housing cap.
28. Remove the 46 x 1.5 mm O-ring from the gear housing.

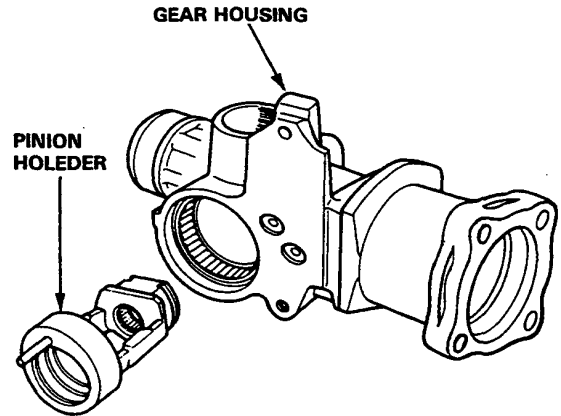


29. Check the upper bearing for faulty movement and excessive play, and for contaminated grease.

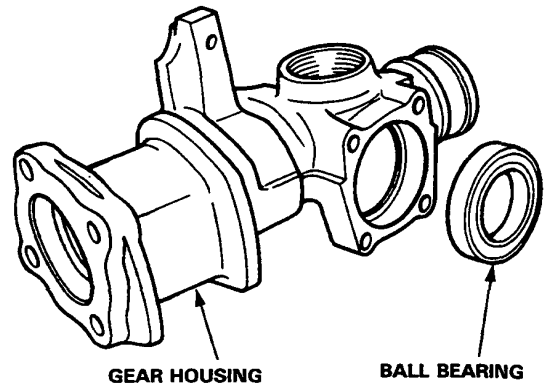
- Check the pinion holder for play. If they are good, go on step 30 in page 11-65.
- If the bearing is faulty, or pinion holder has excessive play, disassemble the gear housing in the following manner.
- Remove the 30 mm snap ring from the pinion holder.



- Remove the pinion holder from the gear housing.



- Remove the ball bearing from the gear housing.



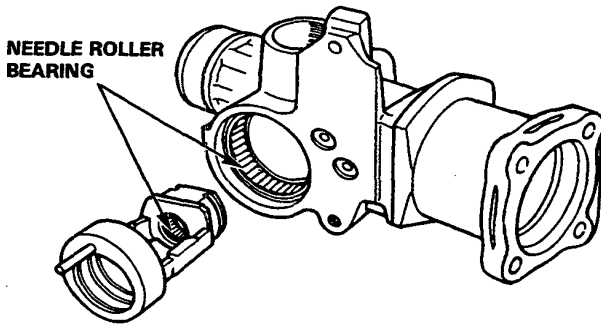
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# Steering Gearbox

## Overhaul (4WS) (cont'd)

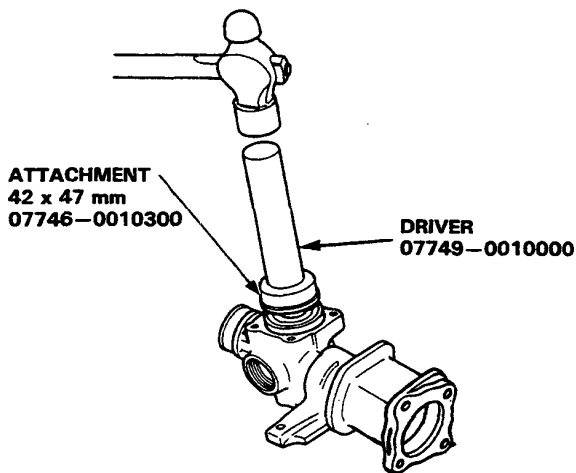
- Check the needle roller bearings in the pinion holder and in the gear housing for damage; if they are OK, pack them with grease.

NOTE: If the bearings are damaged, replace the gear housing as a sub-assembly.

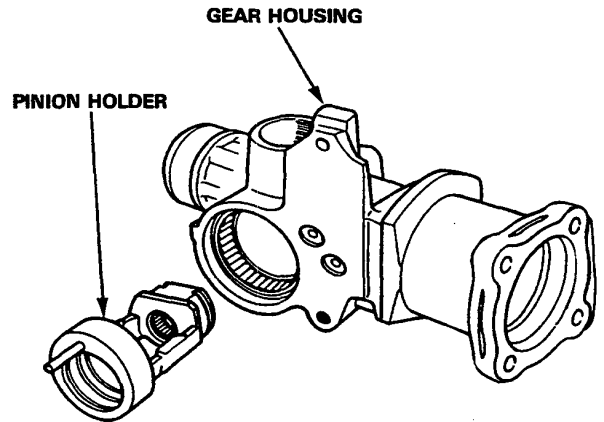


- Pack a new upper bearing with grease, then drive the bearing into the gear housing using the special tools.

NOTE: Install the bearing with its sealed end facing out.



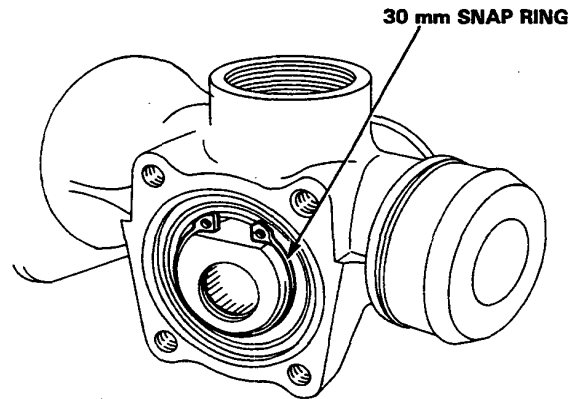
- Install the pinion holder in the gear housing.



- Reinstall the 30 mm snap ring in the pinion holder.

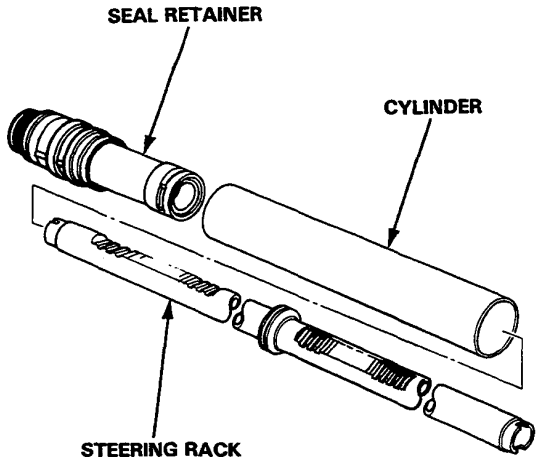
NOTE:

- Install the 30 mm snap ring with its tapered side facing out.
- Snap ring ends must be aligned with the flat areas of the pinion holder.



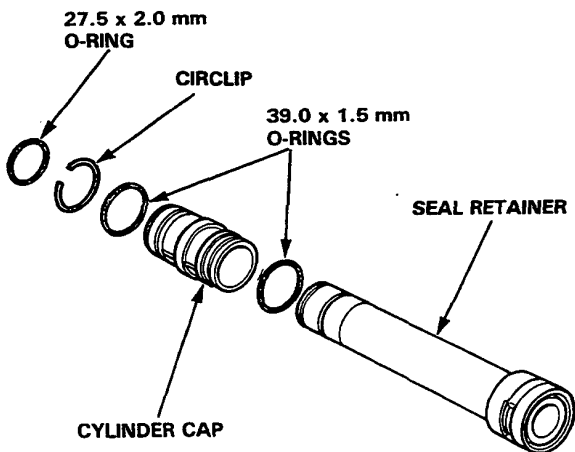


30. Remove the cylinder and seal retainer from the steering rack.



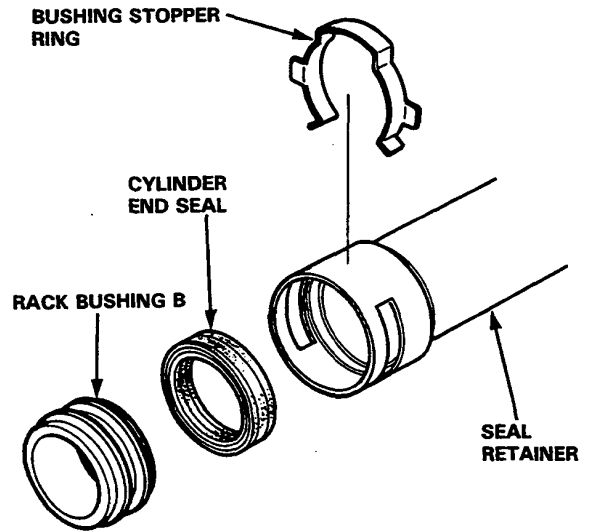
31. Remove the 27.5 mm O-ring and circlip from the seal retainer, then remove the cylinder cap.

32. Remove the 39.0 x 1.5 mm O-rings from the cylinder cap.



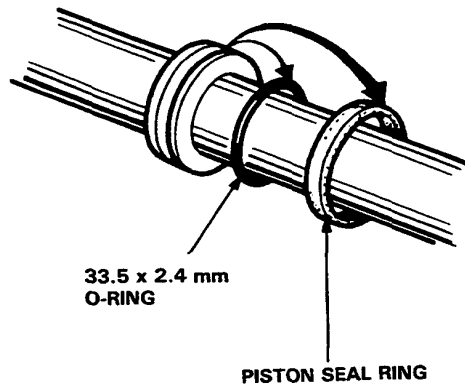
33. Remove the bushing stopper ring and rack bushing B from the seal retainer.

34. Remove the cylinder end seal.



35. Remove the piston seal ring from the steering rack using a narrow screwdriver.

36. Remove the 33.5 x 2.4 mm O-ring.



(cont'd)

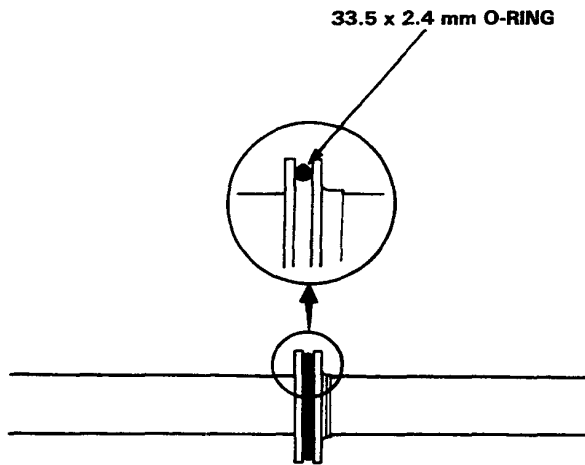


# Steering Gearbox

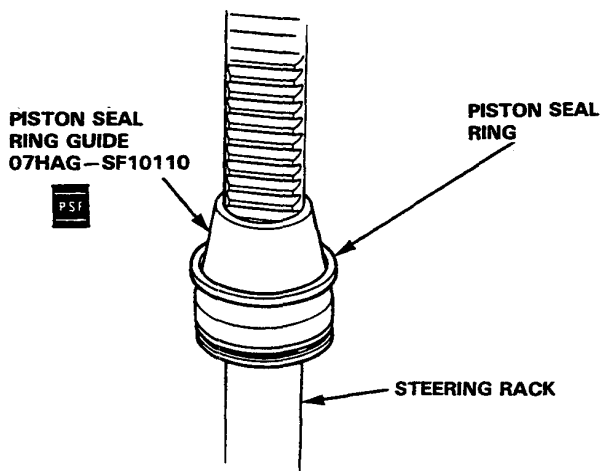
## Overhaul (4WS) (cont'd)

37. Fit a new 33.5 x 2.4 mm O-ring in the groove of the steering rack.

NOTE: Install the 33.5 mm x 2.4 mm O-ring with the projected side facing out.



38. Coat the special tool with power steering fluid, and slide the tool onto the steering rack starting with the larged end until it stop. Slide the piston seal ring over the special tool and into the groove on the steering rack.

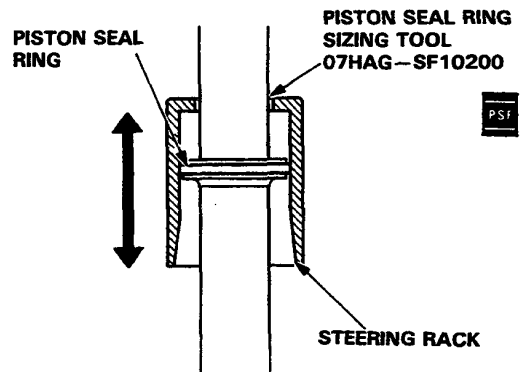


39. Coat the piston seal ring on the steering rack with power steering fluid.

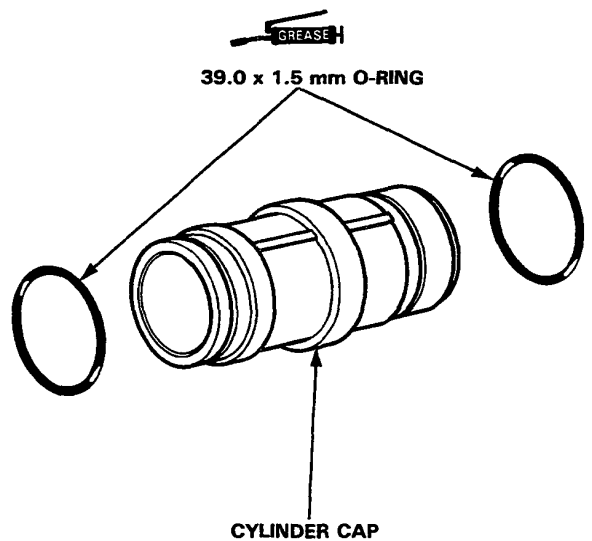
40. Coat the inner surfaces of the special tool "Piston Seal Ring Sizing Tool" with power steering fluid, and place the tool over the piston seal ring.

Move the tool up and down to seat the piston seal ring on the steering rack.

NOTE: Keep the piston seal ring in the non-tapered part of the tool.

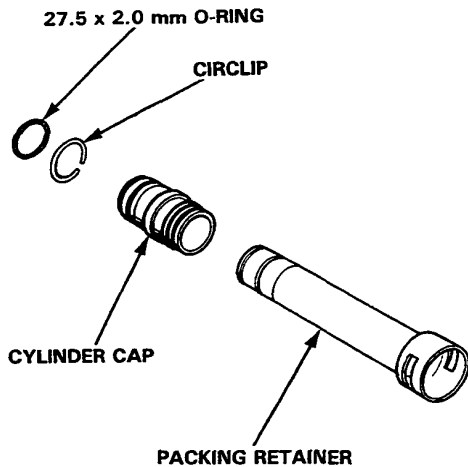


41. Grease the sliding surfaces of the two 39.0 x 1.5 mm O-rings, and fit them onto the cylinder cap.



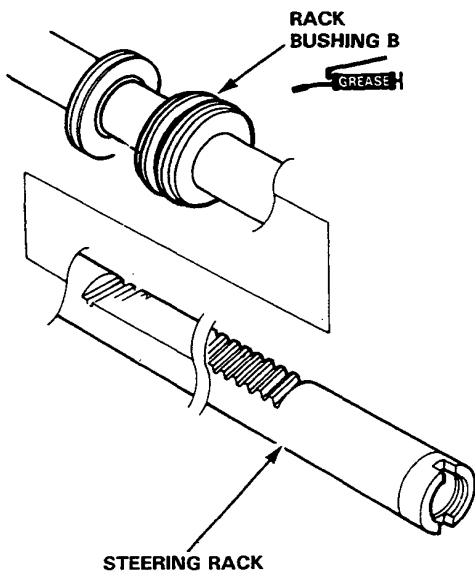


- 42. Install the cylinder cap on the seal retainer.
- 43. Install the circlip on the seal retainer.
- 44. Install the 27.5 x 2 mm O-ring on the seal retainer.



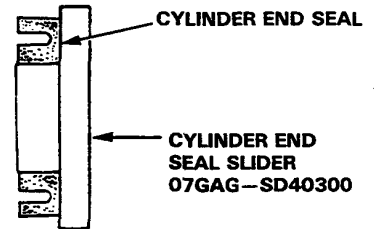
- 45. Install the rack bushing B on the steering rack.

NOTE: Grease the sliding surface of the steering rack bushing B before installing it on the steering rack.

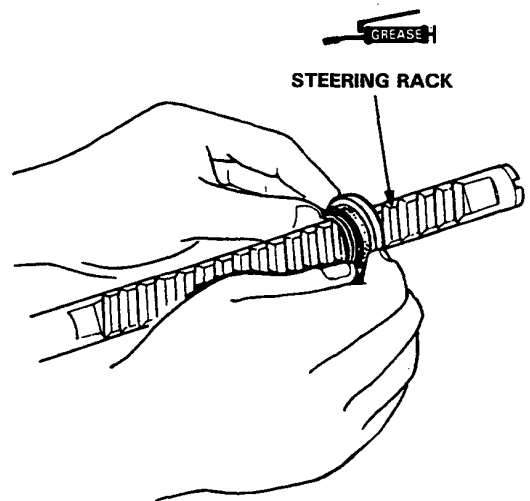


- 46. Grease the sliding surface of a new cylinder end seal and install it onto the special tool.

NOTE: The groove of the cylinder end seal should face away from the special tool.



- 47. Grease the steering rack, slide the special tool over the steering rack past the gear teeth area.

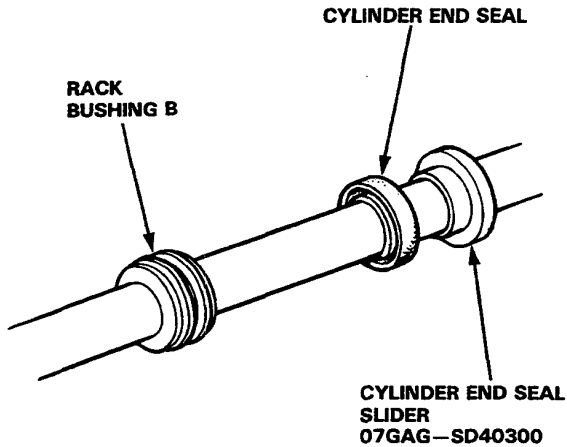


(cont'd)

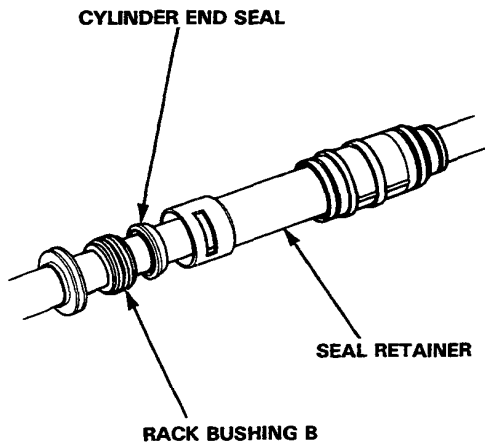
# Steering Gearbox

## Overhaul (4WS) (cont'd)

48. Slide the cylinder end seal off the special tool and remove the tool from the cylinder end seal.

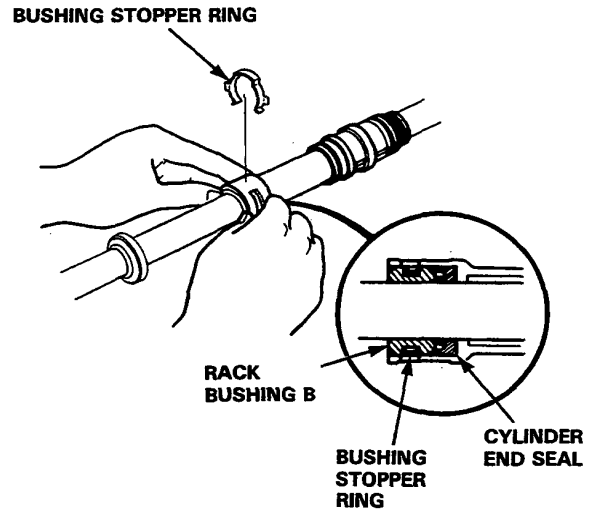


49. Fit the seal retainer on the steering rack.

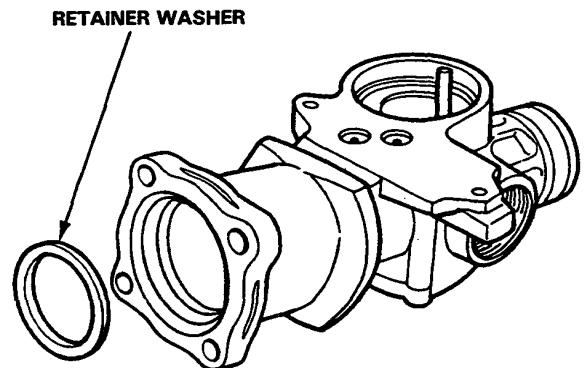


50. Push the rack bushing B toward the seal retainer by hand until the cylinder end seal is seated in the retainer.

Fit the bushing stopper ring in the groove of the seal retainer securely.

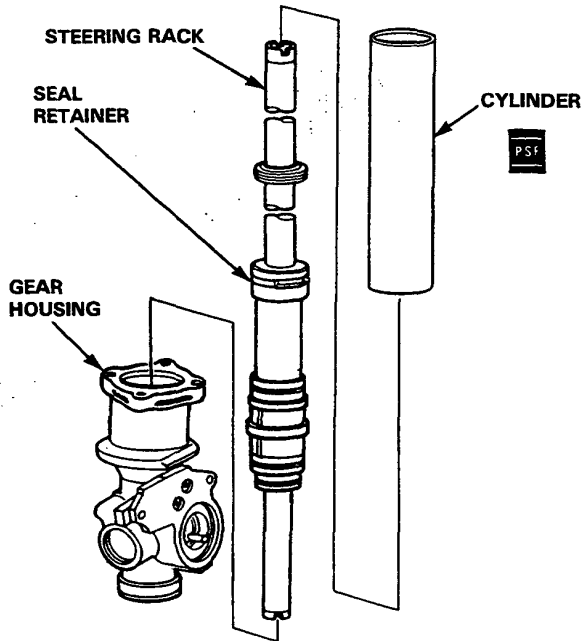


51. Install the retainer washer in the gear housing.

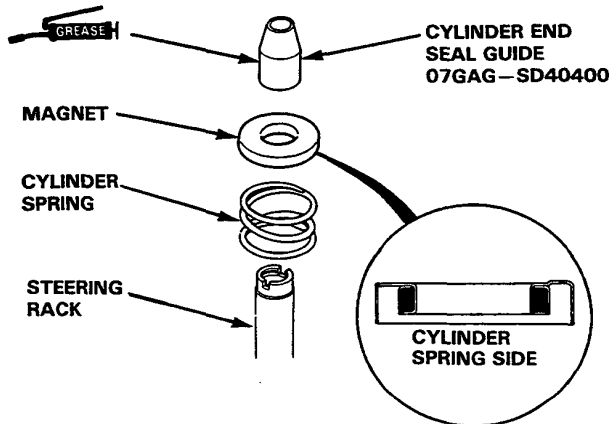




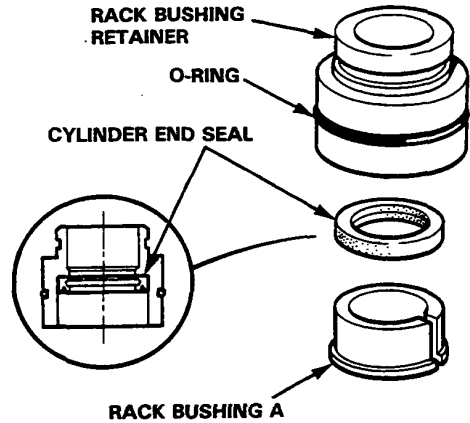
- 52. Place the gear housing on the work bench and insert the seal retainer and steering rack into the gear housing.
- 53. Coat the inside of the cylinder with power steering fluid, slide it over the rack and into the gear housing; press it into the housing until it seats.



- 54. Install the cylinder spring and magnet on the steering rack.
- 55. Grease the special tool and install it on the steering rack.



- 56. Coat the inside surface of the rack bushing retainer with power steering fluid, and install the cylinder end seal and rack bushing A in the retainer.

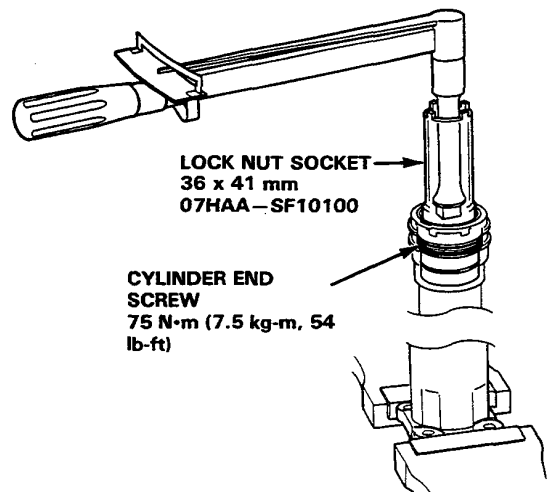


NOTE: Install the cylinder end seal with its grooved side facing rack bushing A.

- 57. Install the 41 x 2.0 mm O-ring.
- 58. Coat the outside surface of the rack bushing retainer with power steering fluid, and install it in the front gear housing.
- 59. Place the flange end of the front gear housing in a vise with soft jaws.

NOTE: Be careful not to damage the housing flange by over-tightening the vise.

- 60. Tighten the cylinder end screw with the special tool.

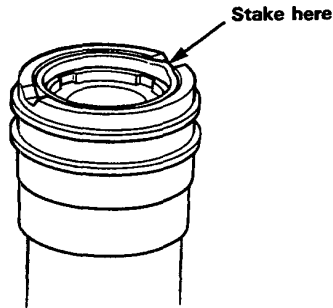


(cont'd)

# Steering Gearbox

## Overhaul (4WS) (cont'd)

61. Stake the end screw using a hammer and drift as shown.

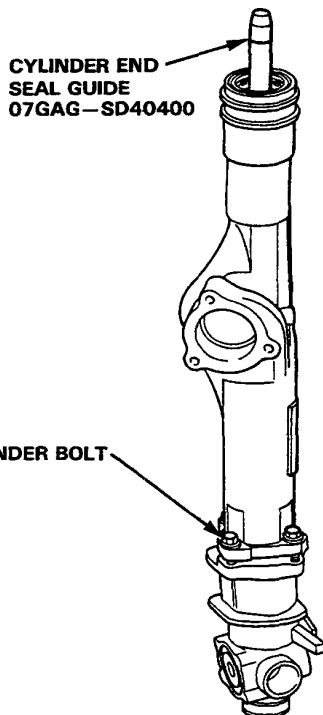


**CAUTION:** Take care not to damage or crack the front gear housing when staking the end screw.

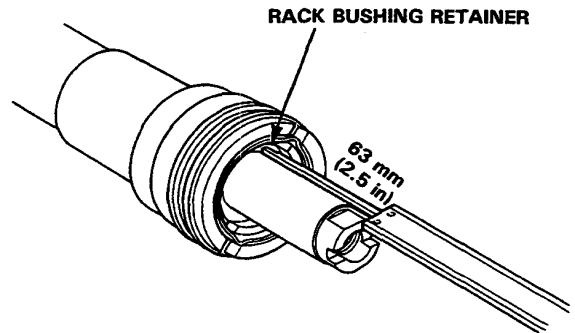
62. Install the cylinder on the gear housing and temporarily tighten the four cylinder bolts while holding the cylinder against the housing.

**CAUTION:** Avoid damaging the cylinder end seal.

63. Remove the special tool from the steering rack.



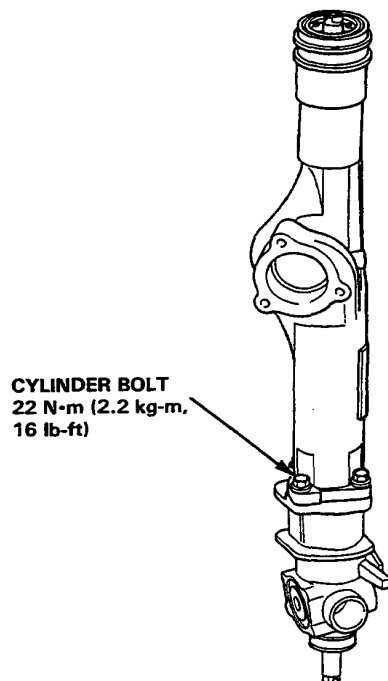
64. Slide the steering rack in the cylinder until the end of the rack projects 63 mm (2.5 in) from the rack bushing retainer.



**NOTE:** The system is in neutral when the rack end projects 63 mm (2.5 in) from the bushing retainer.

65. Tighten the four cylinder housing bolts.

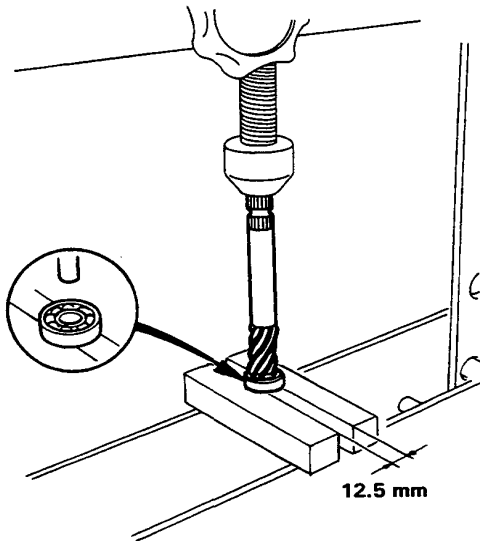
**NOTE:** Before tightening the bolts, make sure the mating surfaces of the cylinder and gear housing fit properly by pushing them together; hold them together while tightening the bolts.





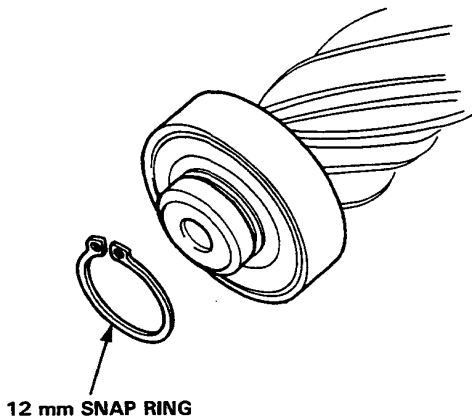
66. Press the steering pinion into the bearing.

NOTE: Install the bearing with its sealed end facing down.



67. Install the 12 mm snap ring on the steering pinion.

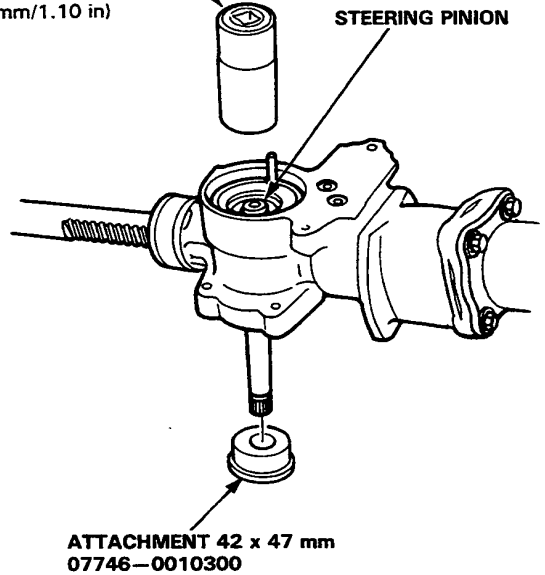
68. Pack the bearing cavities with grease, and check for smooth movement.



69. Install the steering pinion in the pinion holder.

SOCKET WRENCH  
(OD should be less than 27.9 mm/1.10 in)

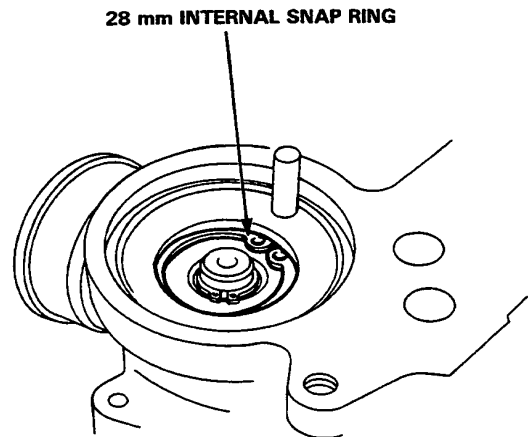
STEERING PINION



ATTACHMENT 42 x 47 mm  
07746-0010300

70. Seat the 28 mm snap ring in the groove of the pinion holder.

NOTE: Install the snap ring with its tapered side facing out.

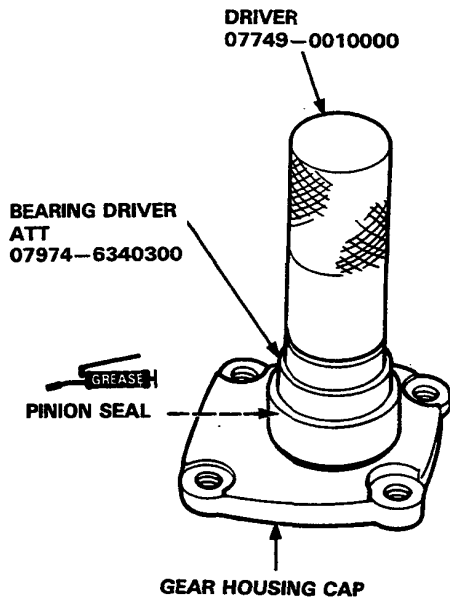


(cont'd)

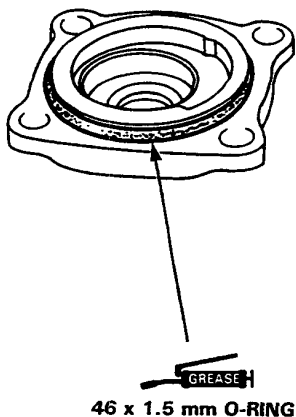
# Steering Gearbox

## Overhaul (4WS) (cont'd)

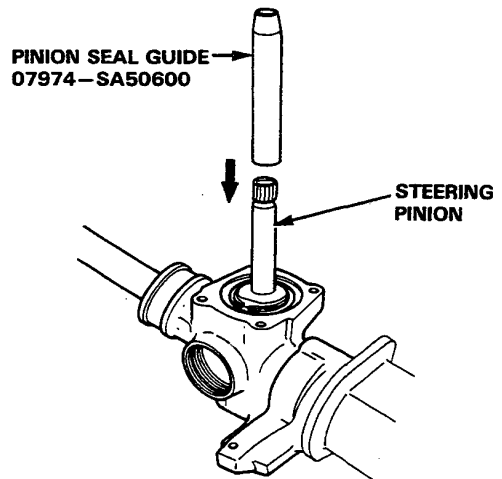
71. Grease the sealing lip of the pinion seal, and install the seal in the gear housing cap using the special tools.



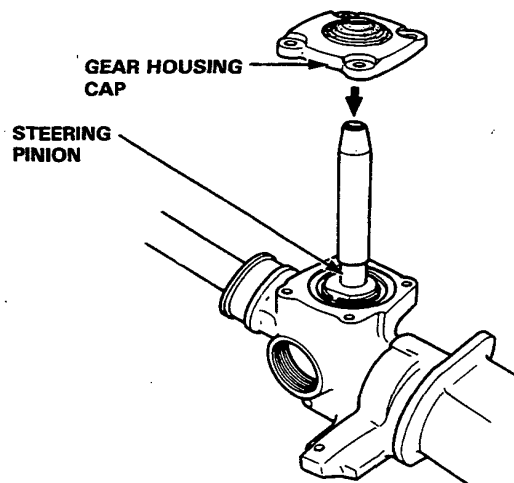
72. Grease the 46 x 1.5 mm O-ring, and install it in the gear housing cap.



73. Grease the special tool and fit it over the steering pinion.



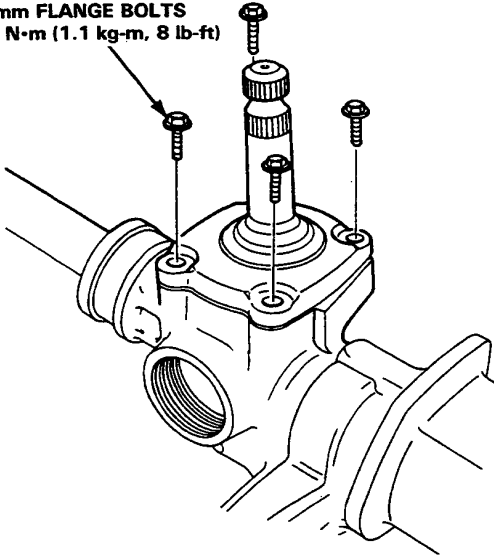
74. Slide the gear housing cap over the steering pinion, being careful not to damage the sealing lip of the pinion seal then remove the special tool.





75. Install and tighten the four 6 mm flange bolts.

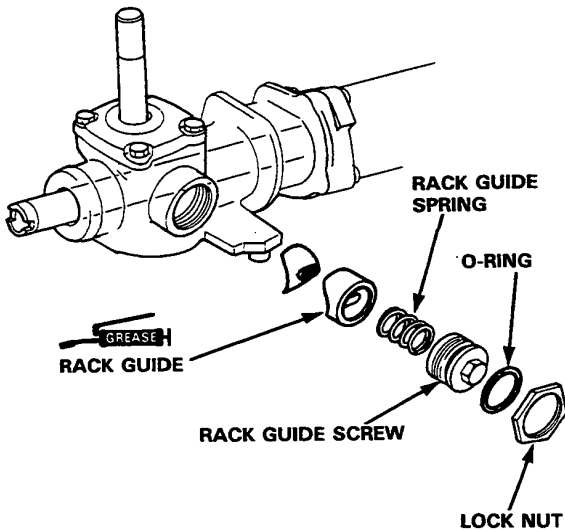
6 mm FLANGE BOLTS  
11 N·m (1.1 kg-m, 8 lb-ft)



76. Install the control valve unit on the gear housing (page 17-49).

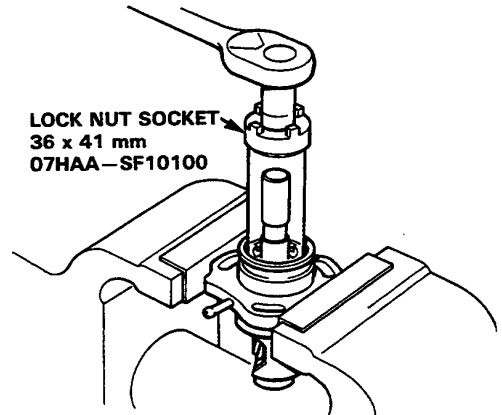
77. Grease the surface of the steering rack guide.

78. Temporarily install the rack guide, rack guide spring and rack guide screw in the gear housing.

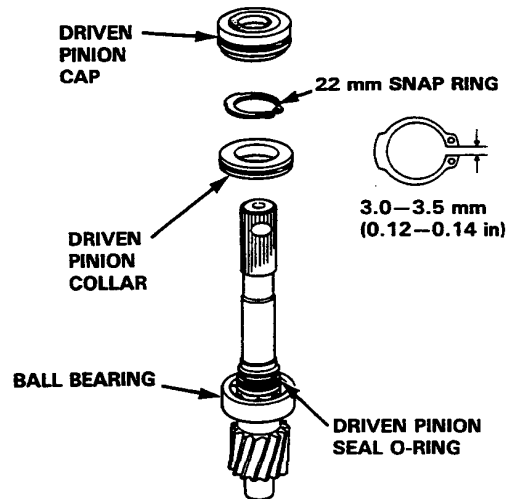


79. Place the driven pinion holder in a vise with soft jaws.

80. Remove the driven pinion screw using the special tool.



81. Slide the driven pinion out of the pinion holder.



82. Remove the driven pinion cap.

83. Remove the driven pinion collar by removing the 22 mm snap ring.

84. Remove the driven pinion seal O-ring.

85. Check the driven pinion ball bearing for play. If the bearing is noisy or has excessive play, replace the driven pinion.

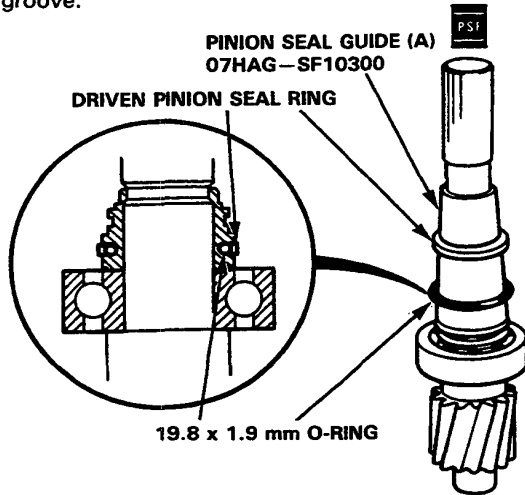
(cont'd)



# Steering Gearbox

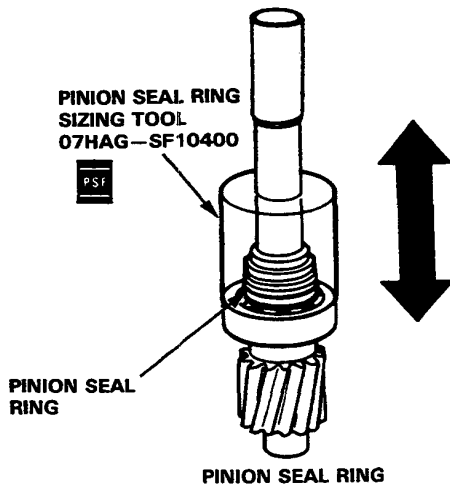
## Overhaul (4WS) (cont'd)

86. Coat the surface of the special tool with power steering fluid, and slide the 19.8 x 1.9 mm O-ring and driven seal ring over the guide and into the groove.



87. Coat the surface of the driven pinion seal ring with power steering fluid.

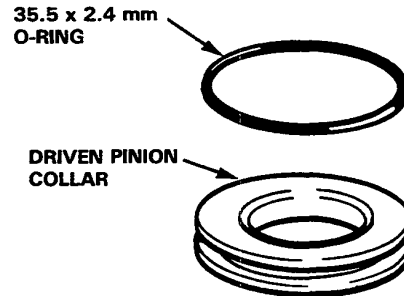
88. Coat the sliding surface of the special tool with power steering fluid, and place the tool over the pinion seal ring.



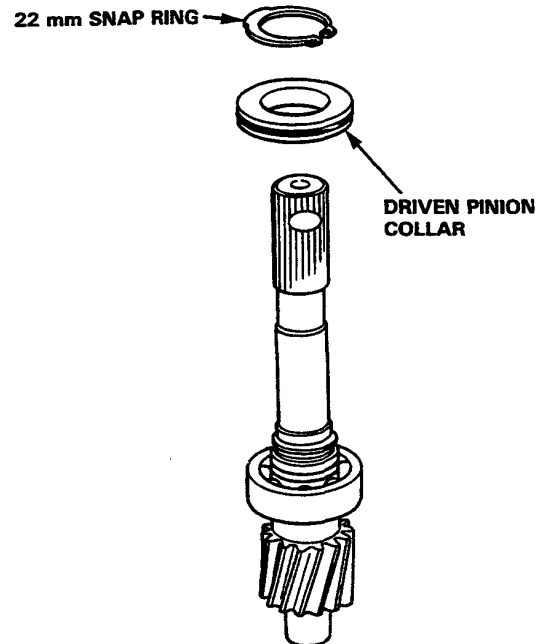
89. Move the sizing tool up and down to seat the driven pinion seal ring.

NOTE: Keep the driven pinion seal ring in the non-tapered part of the tool.

90. Install the 35.5 x 2.4 mm O-ring on the driven pinion collar.



- Coat the surface of the driven pinion seal ring with power steering fluid.

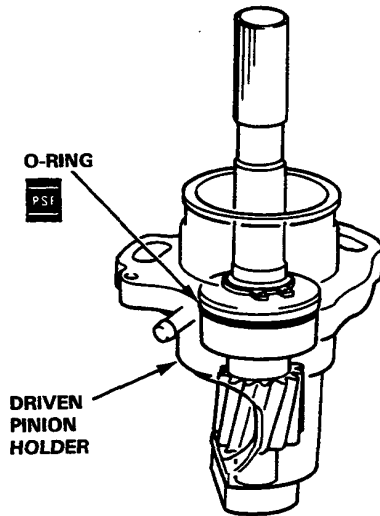


91. Install the driven pinion collar on the driven pinion seal ring, and install the 22 mm snap ring.

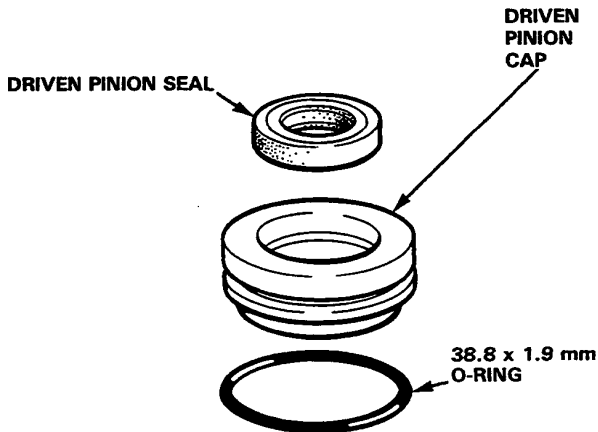
92. Check that the driven pinion collar moves freely.



93. Coat the O-ring on the driven pinion collar with power steering fluid, and slide the collar into the pinion holder until it seats against the holder.

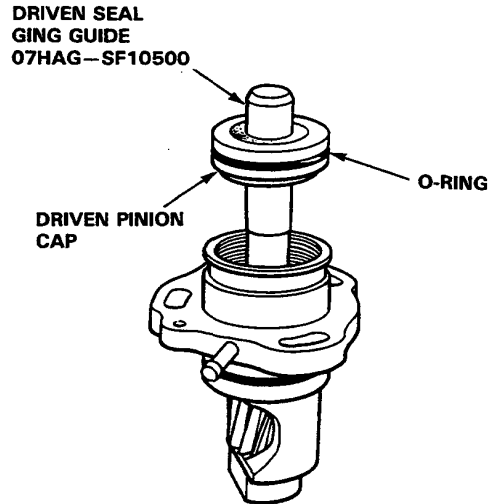


94. Install the driven pinion seal in the driven pinion cap with its sealing lip facing down.



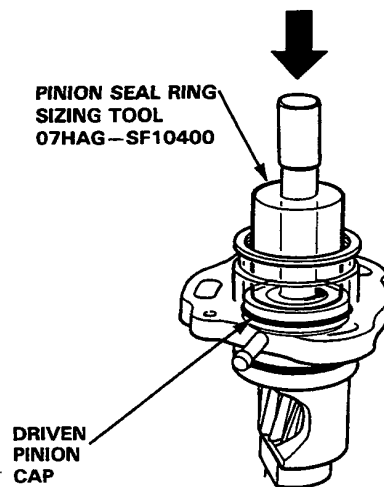
95. Install the 38.8 x 1.9 mm O-ring.

96. Grease the special tool and fit it over the driven pinion shaft.



97. Install the driven pinion cap in the driven pinion holder, being careful not to damage the sealing lip of the driven pinion cap seal and O-ring, then remove the special tool.

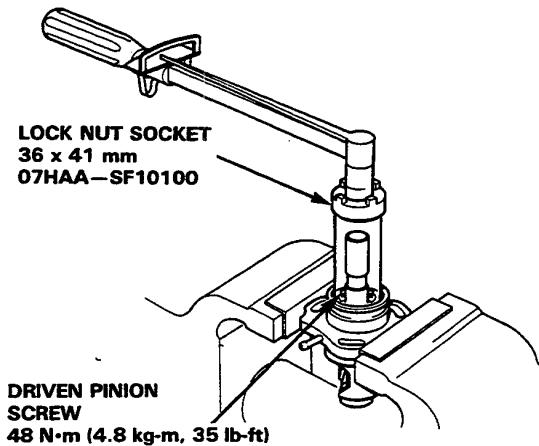
98. Install the driven pinion cap in the driven pinion holder using the special tool until it bottoms.



# Steering Gear Box

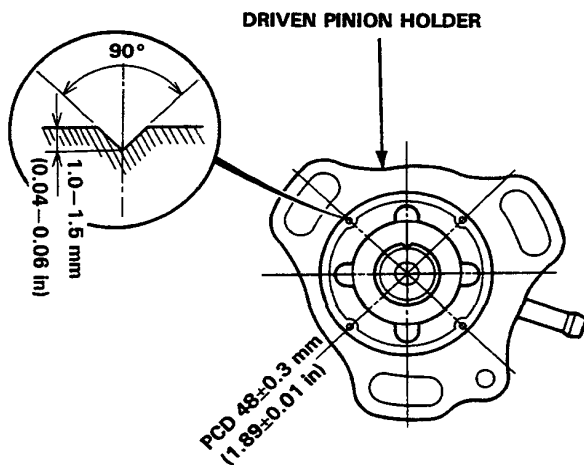
## Overhaul (4WS) (cont'd)

99. Place the flange end of the driven pinion holder in a vice with soft jaws.

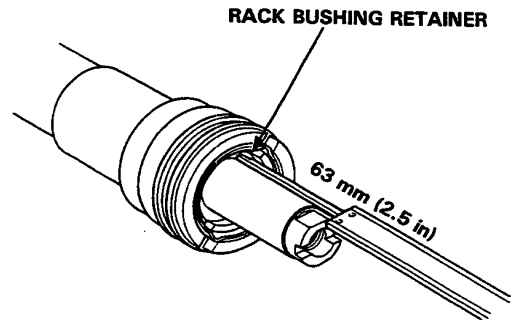


100. Tighten the driven pinion screw using the special tool.

101. When the driven pinion is replaced with new one, stake the driven pinion screw at four places with a punch.



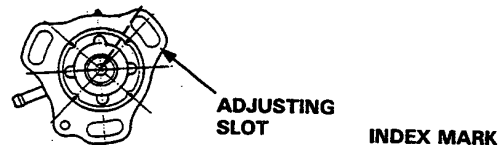
102. Slide the steering rack into the cylinder until the end of the rack is projected 63 mm (2.5 in) from the rack bushing retainer.



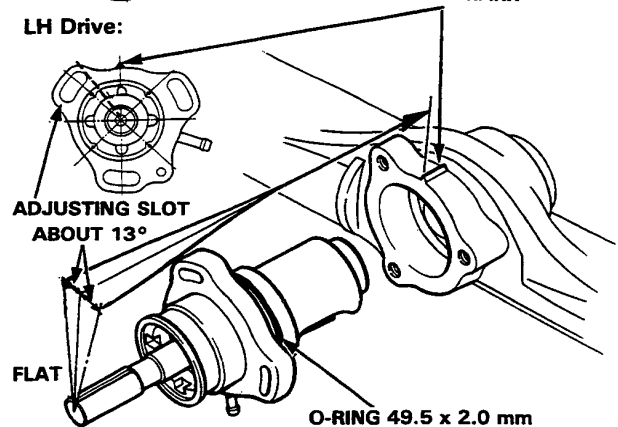
103. Install the 49.5 x 2.0 mm O-ring in the driven pinion holder.

104. Coat the surface of the O-ring with power steering fluid.

### RH Drive:



### LH Drive:

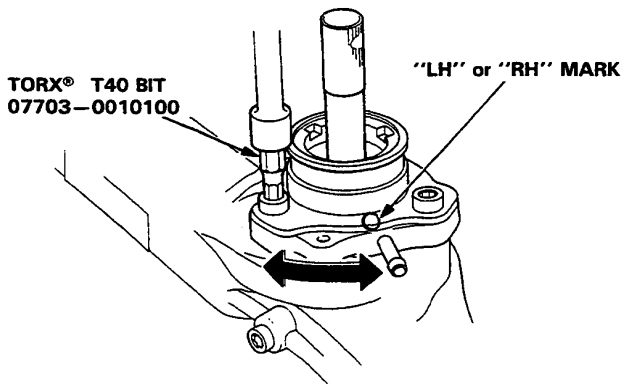


105. Install the pinion holder on the gear housing aligning the mark on the housing with the flat on the pinion shaft.

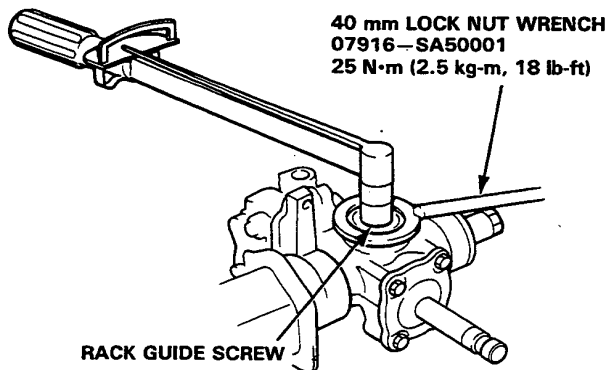
**NOTE:** Before installing, position the shaft flat about 13° to the left (LH Drive) or right (RH Drive) of the aligning mark (even with the end of the nearest adjusting slot). This will align the flat with the mark as the holder is inserted fully.



106. Install the driven holder washer with the mark on the same axis as the steering rack. Loosely install the driven pinion holder bolts using a TORX® T40 bit.



107. Tighten the rack guide screw until it compresses the spring and seats against the rack guide, then loosen it. Retighten it to 4 N·m (0.4 kg·m, 3 lb·ft), back it off about 30°–40°, and install the lock nut. Tighten the lock nut while holding the rack guide screw with the special tool.



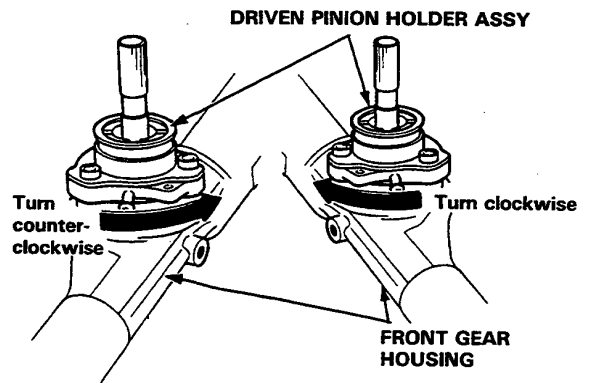
108. Turn the driven pinion holder:

LH Drive: clockwise

RH Drive: counterclockwise

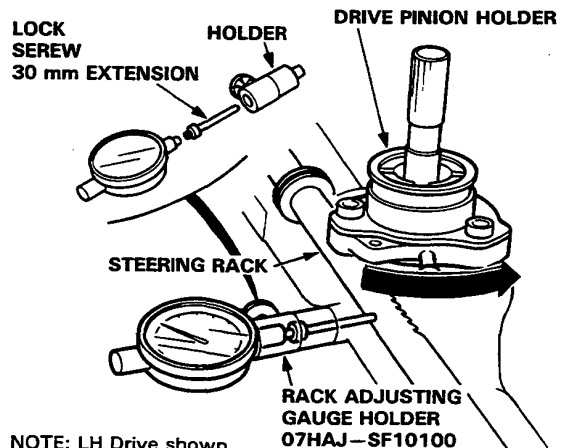
RH Drive

LH Drive



109. Remove the driven plug bolt and install the special tool "Dial Indicator Holder" on the front gear housing B.

110. Remove the existing spindle from the dial indicator and install 30 mm extension; then insert the dial indicator into the holder and secure with the lock screw.



NOTE: LH Drive shown, RH Drive is symenety.

111. Turn counterclockwise: LH Drive, or clockwise: RH Drive slowly until the steering rack is preloaded the proper amount.

**STANDARD: 0.10–0.20 mm (0.004–0.008 in)**

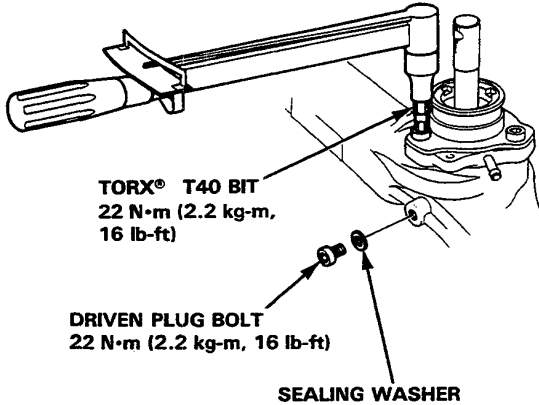
112. Remove the dial indicator and holder.

(cont'd)

# Steering Gear Box

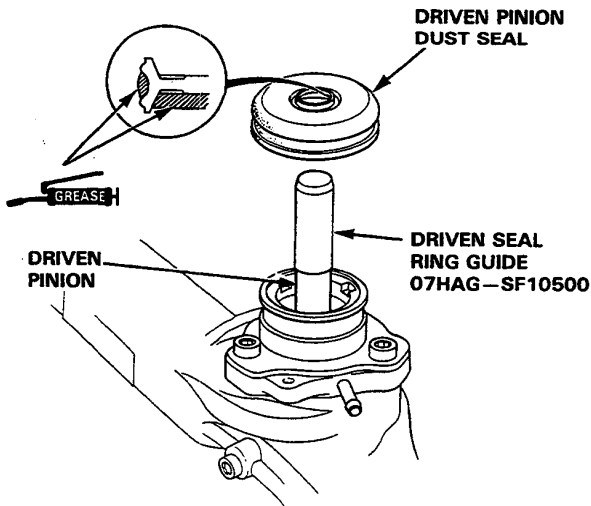
## Overhaul (4WS) (cont'd)

113. Tighten the driven holder bolts using a TORX® T40 bit.



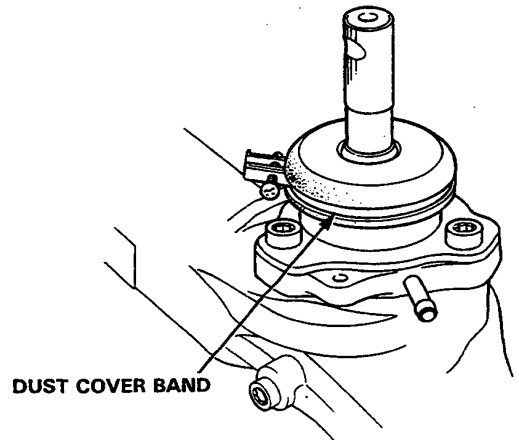
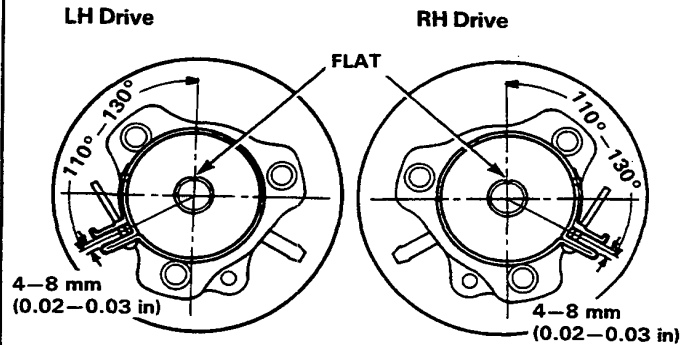
114. Tighten the driven pinion plug bolt with the seal-ing washer.

115. Grease the special tool and fit it the driven pinion.



116. Pack the sealing lip of the driven pinion dust seal with grease, and install it in the driven holder. then remove the special tool.

117. Install the dust cover; tighten the dust cover band screw.





118. Screw each tie-rod into the rack with the stopper and lock washer while holding the lock washer so its tabs are in the slots in the end of the rack.

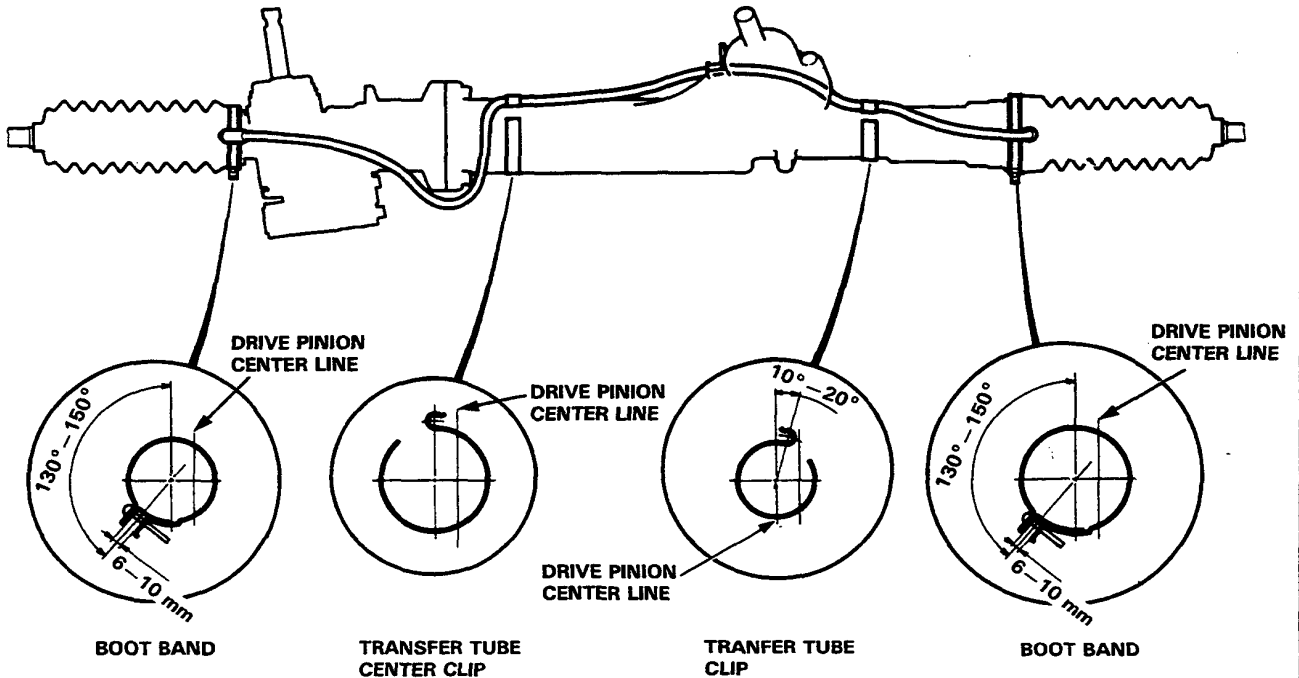
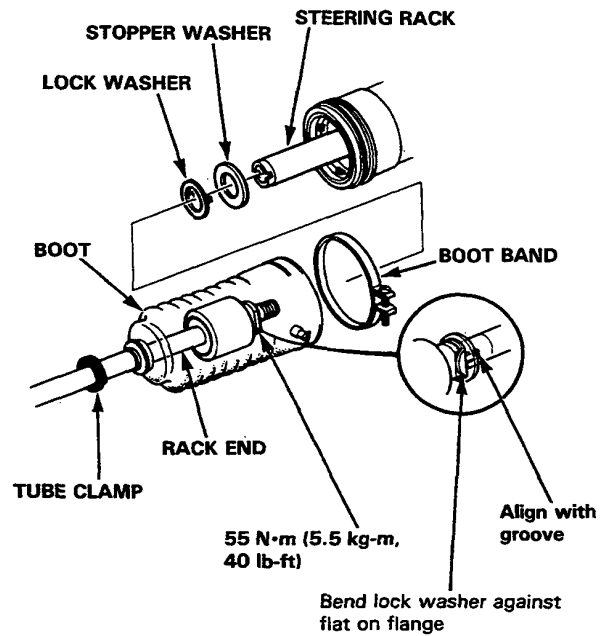
Tighten the tie-rod securely, then bend the lock washer back against the flat on the flange as shown.

Install the boots and secure with the boot band and tube clamp.

After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.

119. Install the air transfer tube with clips as shown.

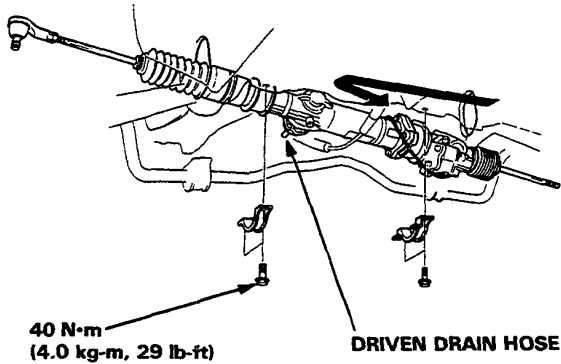
NOTE: LH Drive shown, RH Drive is symmetrically.



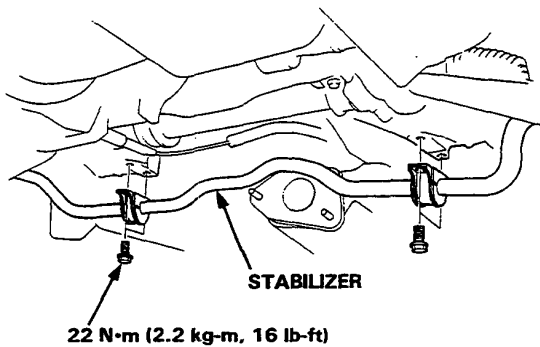
# Steering Gearbox

## Installation

1. Reinstall the gear box in the reverse order of removal.

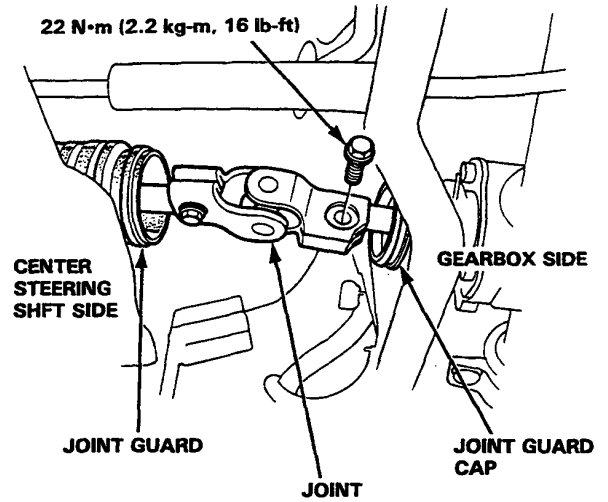


2. Tighten the stabilizer mounting bolts.



3. 4WS only

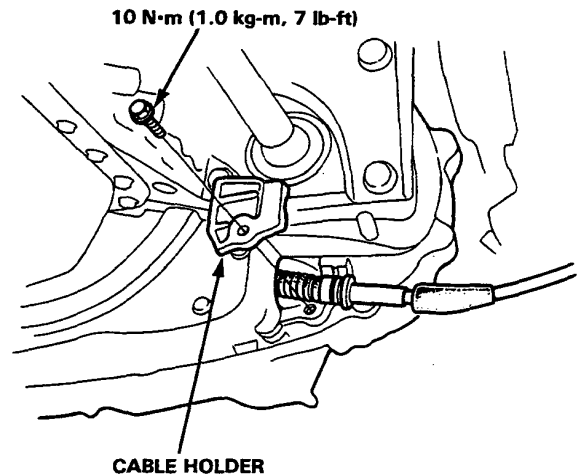
- Connect the joint and the driven pinion.



- Tighten the bolt at the driven pinion.
- Connect the joint guard and the joint guard cap.

4. Automatic transmission only

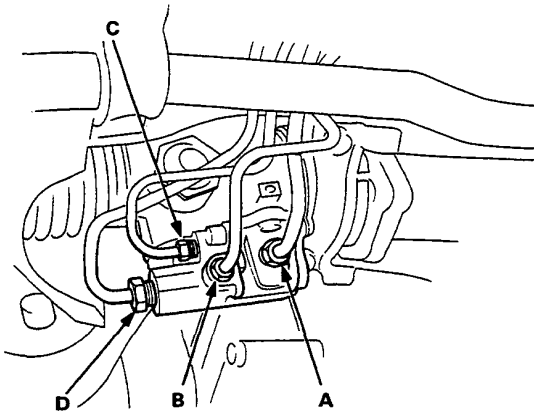
Install the control cable to the clamp.



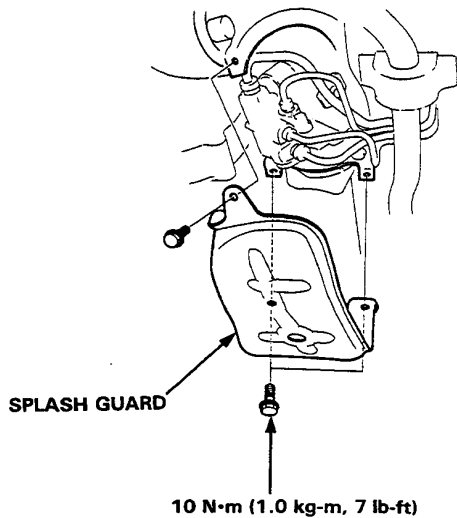


5. Connect the fluid lines to the control unit.

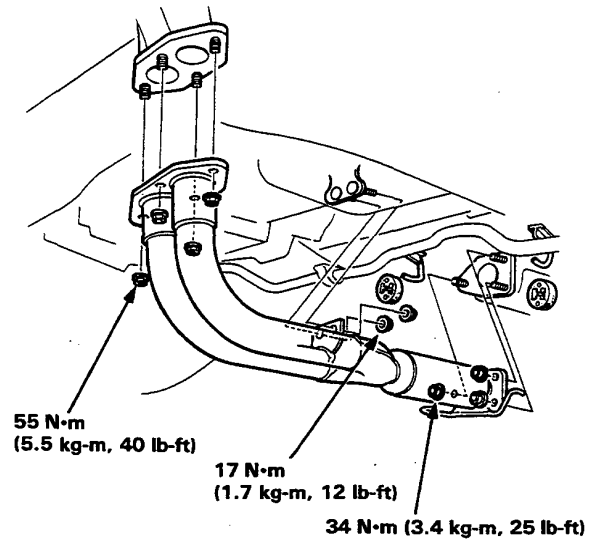
- A: From pump: 14 mm wrench  
38 N·m (3.8 kg-m, 28 lb-ft)
- B: To speed sensor: 12 mm wrench  
13 N·m (1.3 kg-m, 9 lb-ft)
- C: To reservoir: 12 mm wrench  
13 N·m (1.3 kg-m, 9 lb-ft)
- D: To oil cooler: 17 mm wrench  
29 N·m (2.9 kg-m, 20 lb-ft)



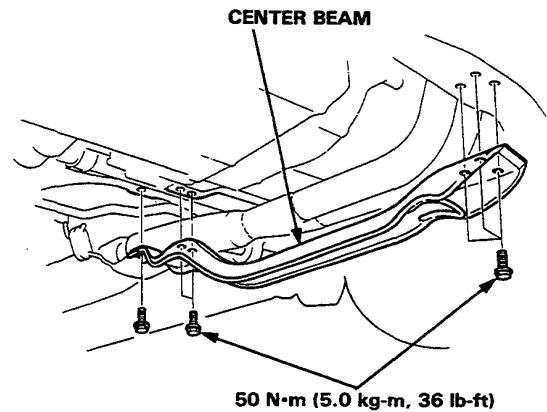
6. Install the splash guard.



7. Install the exhaust pipe.



8. Install the center beam and tighten the bolts.



(cont'd)

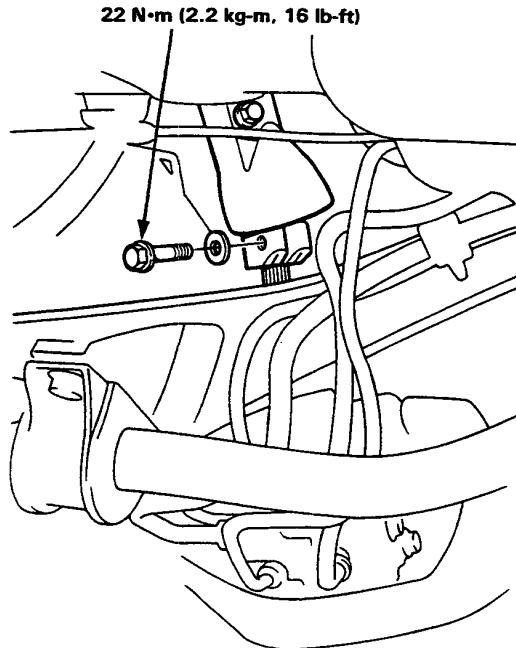


# Steering Gear Box

## Installation (cont'd)

9. Reconnect the tie-rods to the steering knuckles, tighten the castle nuts to specified torque, and install new cotter pins.
10. Reconnect the steering joint to the gearbox.

**CAUTION:** Before tightening the steering joint bolts, pull up the steering joint to make sure that the steering joint is not pulled out.



11. Align the wheels (see section 18).

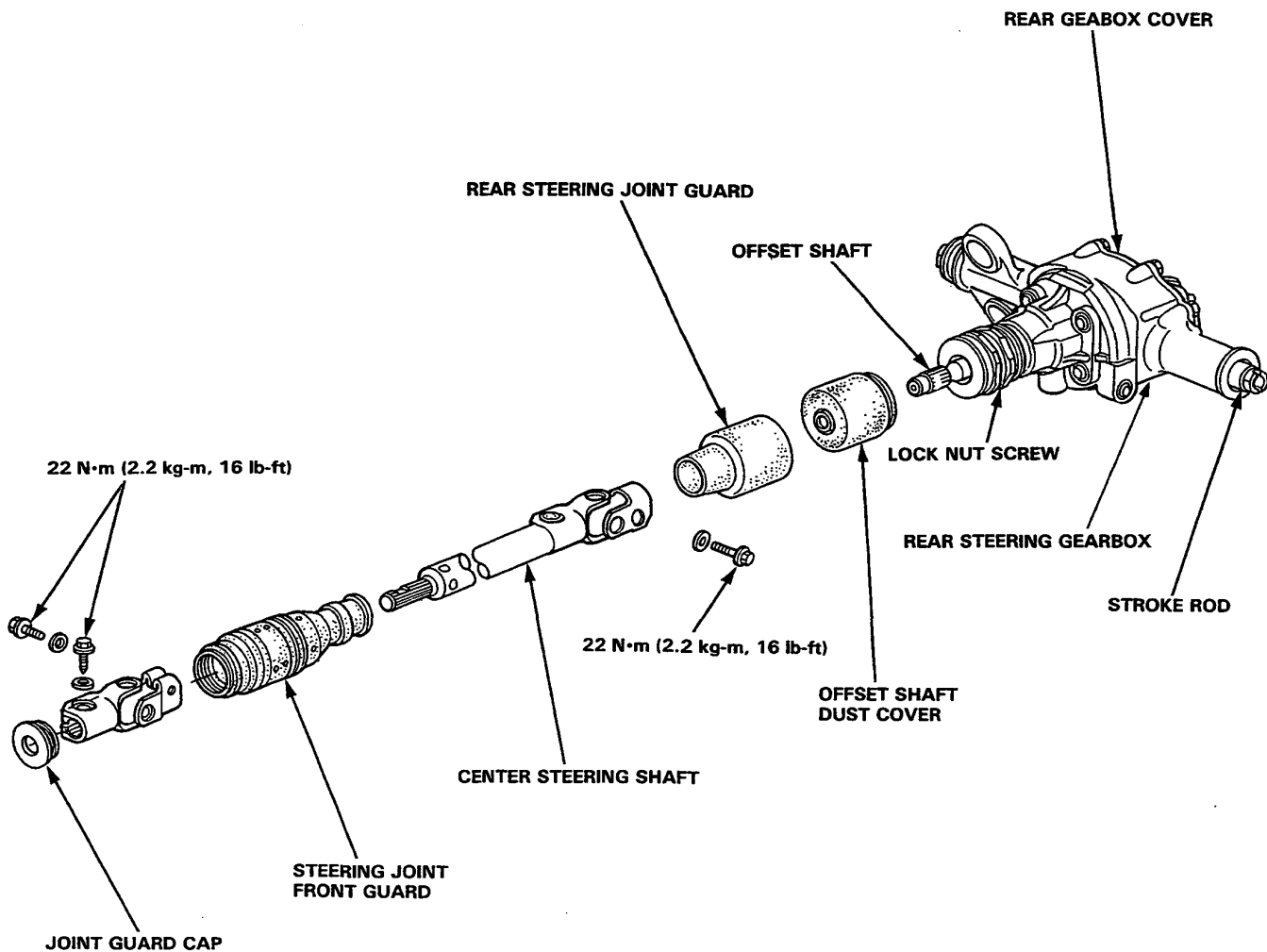


# Rear Steering Gearbox

## Illustrated Index

### CAUTION:

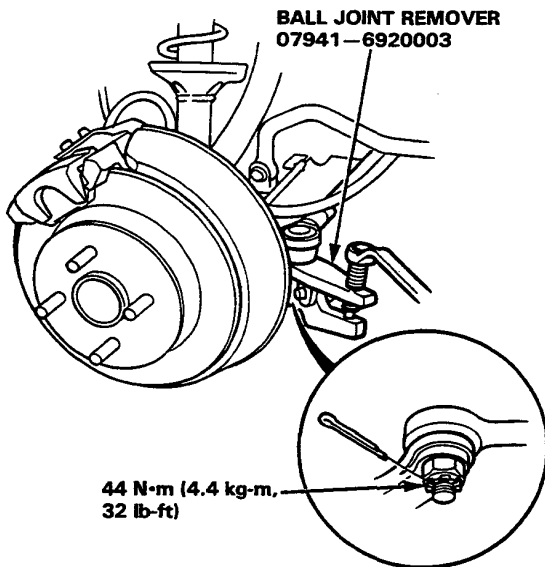
1. Do not apply torque of more than 0.1 kg-m (0.72 lb-ft) to the offset shaft.
2. Do not strike the stroke rod.
3. Never loosen the offset shaft and lock nut screw.
4. Do not remove the gearbox cover.
5. Use the special tool "Rear Steering Gearbox Center Lock Pin" when removing the rear steering gearbox, and leave it intact except when the gearbox is inspected for function, etc.
6. Also use the special tool "Rear Steering Gearbox Center Lock Pin" when removing the front or rear of the center shaft.



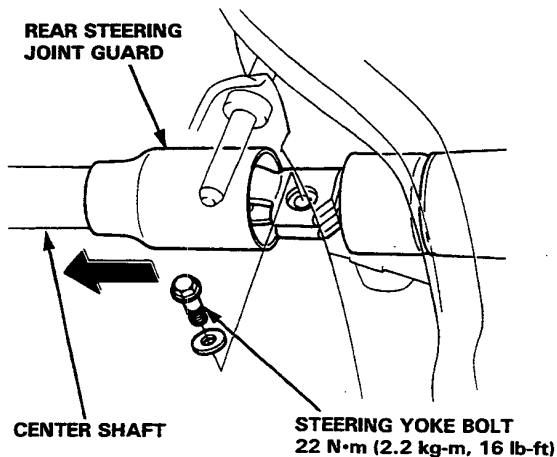
# Rear Steering Gearbox

## Replacement

1. Raise the rear of car and support of safety stands in the proper locations.
2. Remove the rear wheels.
3. Disconnect the tie-rods from the steering knuckles using the special tool.



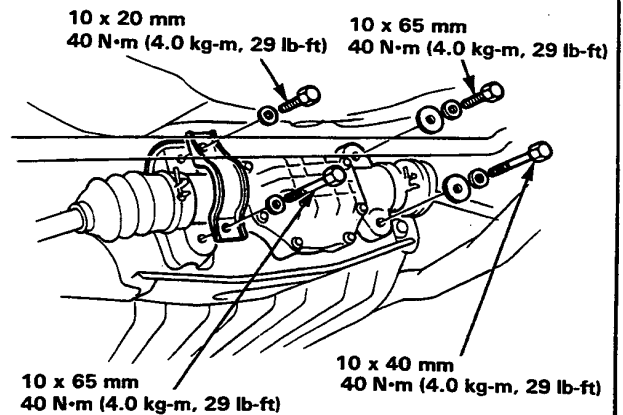
4. Slide the rear steering joint guard toward the front.



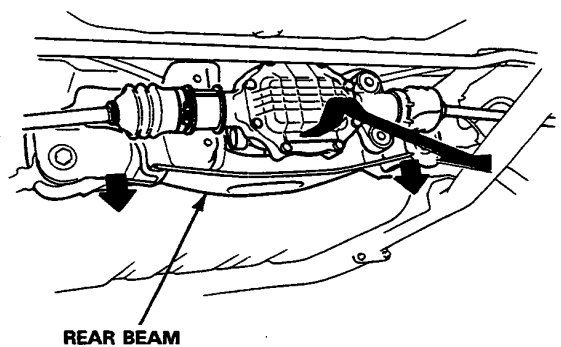
5. Remove the steering yoke bolt.

6. Remove the four rear steering gearbox bolts.

**NOTE:** Install the Rear Steering Center Lock Pin (see, page 17-85) before removing the gear box bolts.



7. Remove the rear steering gearbox assembly.

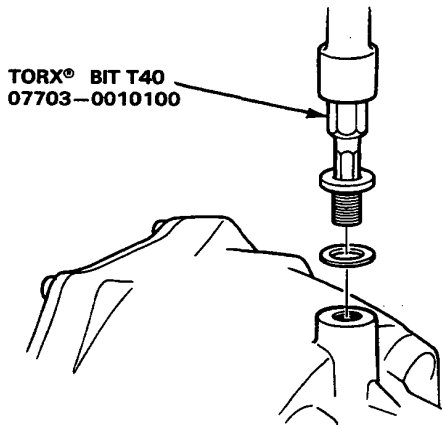


8. Reinstall the rear steering gearbox in the reverse order of removal.
9. Align the wheels (see section 18).

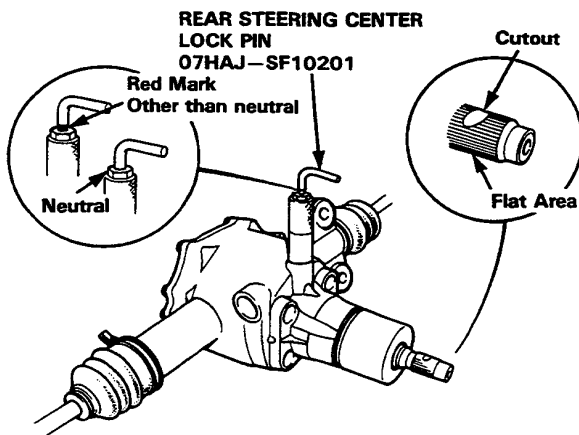


## Neutral Positioning Off-car

1. Remove the cap bolt from the gearbox using a "TORX® T40 BIT".



2. Position the offset shaft so the cutout faces the underside of the gearbox and the flat area faces the top.
3. Install the special tool in the gearbox.



4. Turn the offset shaft by hand to be certain that the steering gear box is in the neutral position.

	Red Mark	Offset Shaft
Other than Neutral	Visible	Movable
Neutral	Not visible	Locked

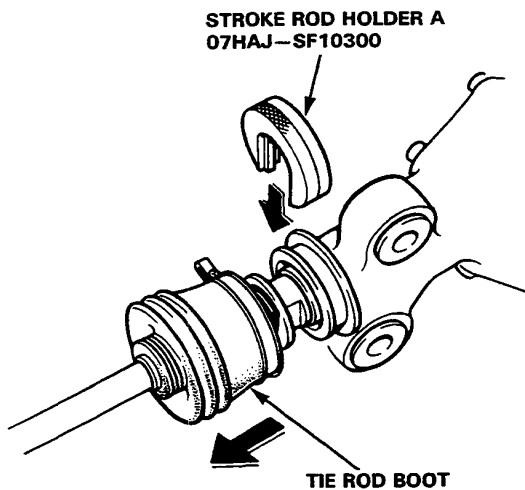
5. Slide the tie-rod boots away from the housing to make sure the stroke rod is centered in the gearbox housing.

# Rear Steering Gearbox

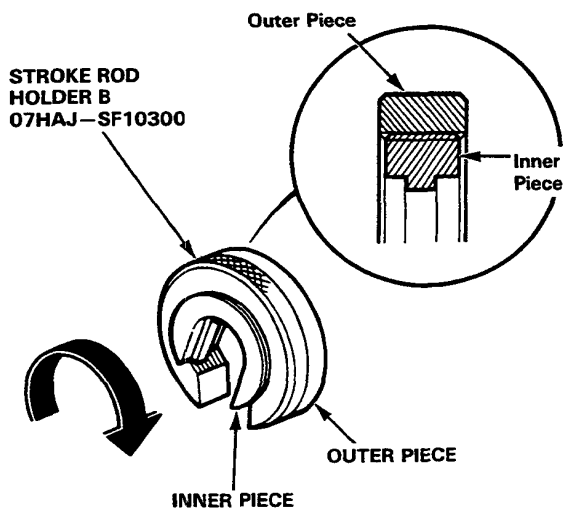
## Stroke Rod Holders

NOTE: The stroke rod holders are used for the function inspection and rear tie-rod replacement.

1. Set the gearbox in the neutral position (page 11-85).
2. Loosen the tie-rod boot band, and slide the boot away from the gearbox housing.

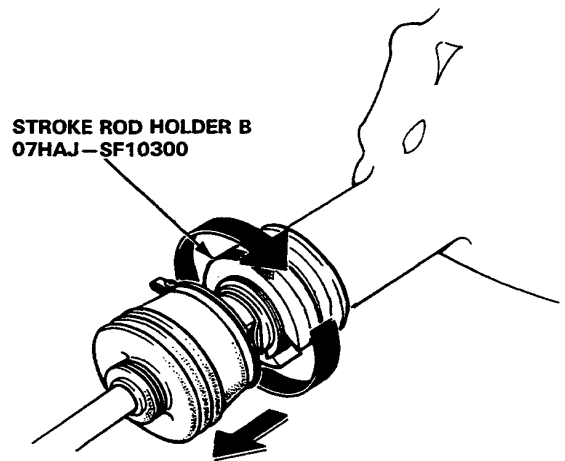


3. Slide the special tool between the tie-rod stopper washer and gearbox.
4. Screw the outer piece of the special tool onto the inner piece; align the cutouts.



5. Insert the tool between the tie-rod stopper washer and gearbox.
6. Remove the rear steering center lock pin from the gearbox housing.
7. Tighten stroke rod holder B (Turn counterclockwise to tighten).

NOTE: There should be no play between the stroke rod holders and the gearbox housing.

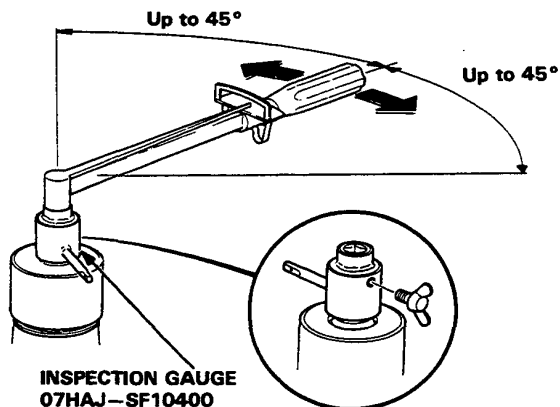




## Function Inspection

### Preload Inspection

1. Set the rear steering gearbox to neutral (page 11-85).
2. Remove the rear steering gearbox center lock pin.
3. Install the special tool in the offset shaft.



4. Install a torque wrench in the special tool, and check the starting torque when rotating the wrench in the clockwise and counterclockwise directions.

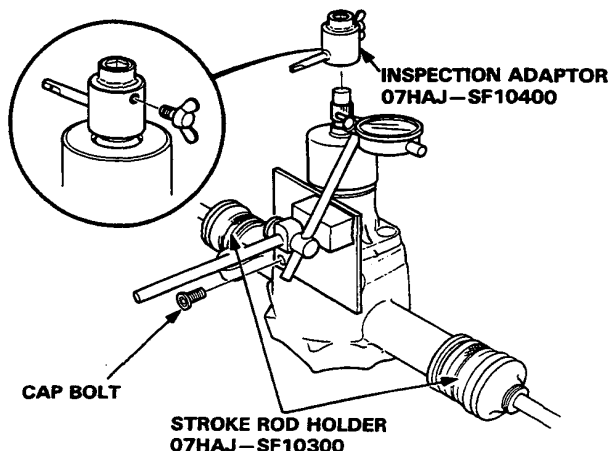
**Starting Torque: 1 N·m (0.1 kg·m, 0.7 lb-ft) or less**

#### NOTE:

- Check the torque after several rotations.
- Do not apply a torque of 5 N·m (0.5 kg·m, 4 lb-ft) or more to the offset shaft.

### Free-play Inspection

1. Set the rear steering gearbox to neutral (page 11-85).
2. Remove the rear steering gearbox center lockpin and install the stroke rod holders (page 11-86).
3. Install the special tool in the offset shaft.

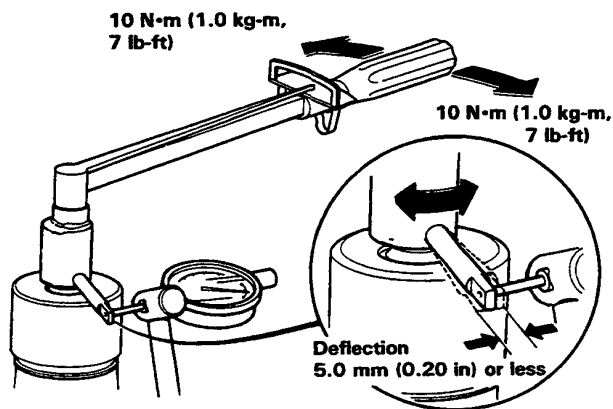


3. Install the dial indicator using a cap bolt.

**NOTE:** Set the dial indicator on the flat end of the special tool.

4. Install the torque wrench in the special tool, then read the dial gauge when applying a torque of 10 N·m (1.0 kg·m, 7 lb-ft) in the clockwise and counterclockwise directions, respectively.

The total deflection range when applying a torque of 10 N·m (1.0 kg·m, 7 lb-ft) in both directions should be 5.0 mm (0.20 in) or less.



**Example:** With a deflection of 2.50 mm (0.10 in) in the clockwise direction and 2.40 mm (0.09 in) in the counterclockwise direction, the gearbox is OK.

**NOTE:** If the total deflection is more than 5.0 mm (0.20 in) replace the rear steering gearbox assembly.

5. Remove the special tools, then screw in the cap bolt and sealing washer into place.

**Tightening Torque: 22 N·m (2.2 kg·m, 16 lb-ft)**

# Rear Steering Gearbox

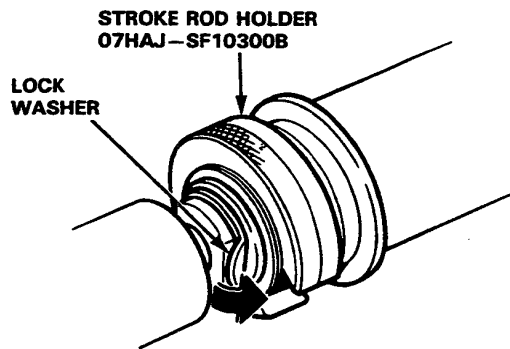
## Tie-Rod Replacement

**CAUTION:** Never strike the stroke rod.

1. Set the gearbox in Neutral (page 11-85).
3. Loosen the tie-rod boot band, and remove the dust seal.
4. Install the stroke rod holders (page 11-86).

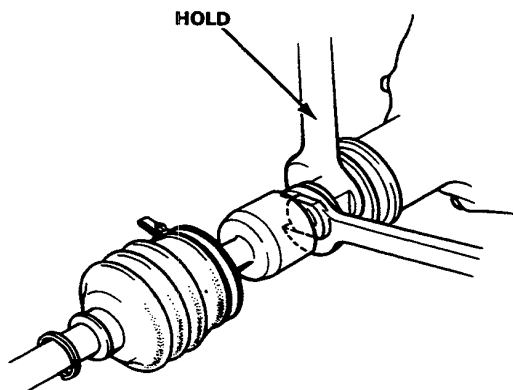
**NOTE:** Be sure to use the stroke rod holders so as not to rotate or move the stroke rod in an axial direction.

5. Straighten the tab of the lock washer.

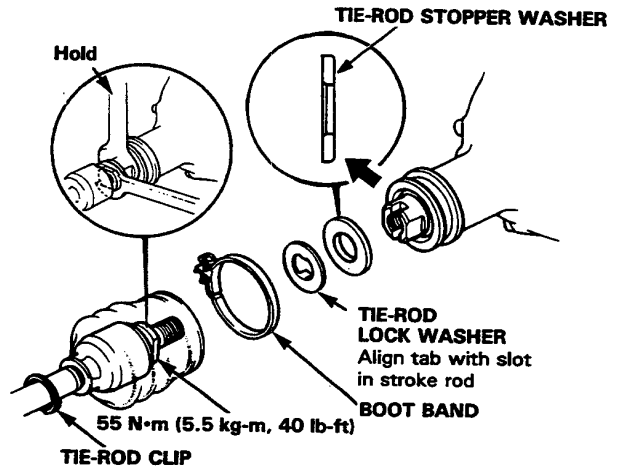


6. Remove the holder.
7. While holding the stroke rod with a 21 mm wrench, remove the tie-rod with a 17 mm wrench.

**CAUTION:** Be sure to hold the stroke rod securely to prevent it from being turned with the tie-rod. Never turn the stroke rod.

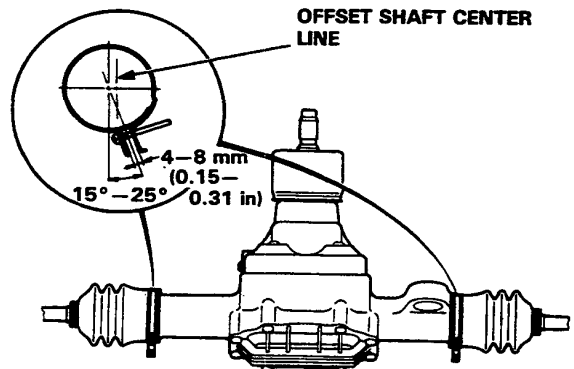


8. Install the tie-rod stopper washer, tie-rod lock washer and rack end on the stroke rod.



9. Hold the stroke rod with the special tool (page 11-86).
10. Bend the lock washer against the flat on the flange.
11. Remove the stroke rod holder.
12. Reinstall the tie rod dust seal.
13. Install the boot bands.

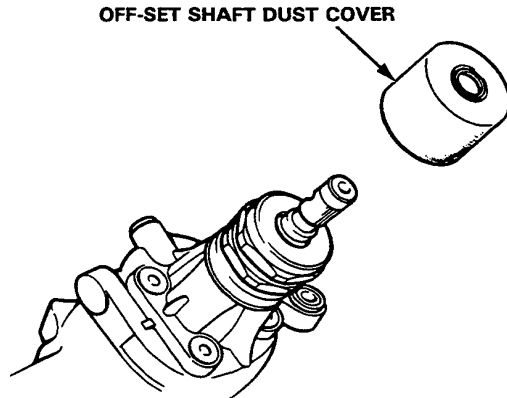
**NOTE:** After tightening the boot bands, check that the boots are not twisted or distorted.



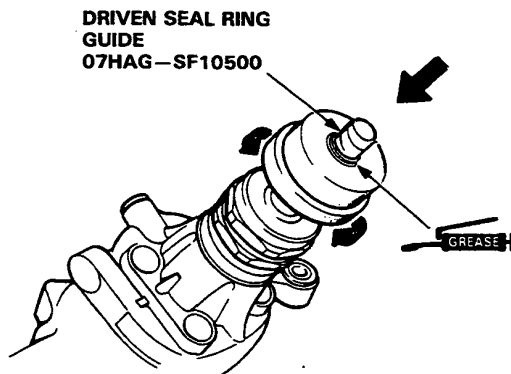


## Off-set Shaft Dust Cover Replacement

1. Remove the off-set shaft dust cover.



2. Grease the special tool and fit it over the off-set shaft.
3. Pack the sealing lip of the dust cover with grease.



4. Invert the inner end of the dust seal, then place the end over the lock nut.
5. Remove the special tool.



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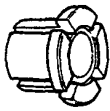
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# Special Tools

## Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07HGK-0010100	Wheel Alignment Gauge Attachment	1	
②	07703-0010100	TORX® T40 BIT	1	
③	07HAJ-SF10201	Rear Steering Center Lock Pin	1	
④	07HGJ-0010000	Toe Inspection Gauge Set	1	
⑤	07941-6920003	Ball Joint Remover	1	
⑥	07GAF-SE00100	Hub Assembly Pin	1	
⑦	07GAF-SD40700	Hub Dis/assembly Base	2	
⑧	07749-0010000	Driver	1	
⑨	07746-0010500	Attachment 62 x 68 mm	1	
⑩	07965-6920201	Front Hub Dis/assembly Tool B	1	
⑪	07HAD-SF10100	Hub Bearing Driver	1	
⑫	07GAF-SE00200	Hub Assembly Driver Attachment	1	
⑬	07965-SB00000	Ball Joint Dis/assembly Tool set	1	
⑬-1	07965-SB00100	Ball Joint Remover Base	1	
⑬-2	07965-SB00200	Ball Joint Installer Base	1	
⑬-3	07965-SB00300	Ball Joint Remover/Installer	1	
⑭	07974-SA50700	Ball Joint Boot Clip Installation Guide	1	
⑮	07974-SA50800	Ball Joint Boot Clip Installation Guide	1	
⑯	07GAE-SE00101	Spring Compressor	1	or 07GAE-SE00100
⑰	07746-0010400	Attachment 52 x 55 mm	1	
⑱	07965-SD90100	Supporting Base	1	



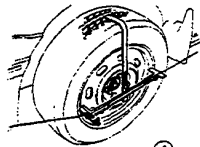
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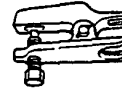
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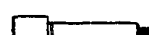
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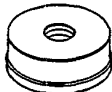
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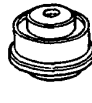
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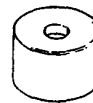
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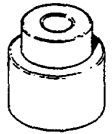
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⑬-1



⑬-2



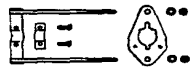
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⑭



⑮



⑯



⑰

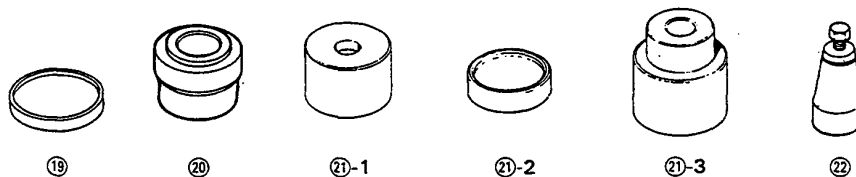


⑱



### Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
⑰	07GAF-SE00401	Front Hub Base	1	
⑳	07HAF-SF10200	Bearing Supporting Attachment	1	
㉑	07HAF-SF10100	Ball Joint Dis/assembly Too kit	1	
㉑-1	07HAF-SF10110	Ball Joint Remover Base	1	
㉑-2	07HAF-SF10120	Ball Joint Installer Base	1	
㉑-3	07HAF-SF10130	Ball Joint Remover/Installer	1	
㉒	07GAG-SD40700	Ball Joint Boot Clip Installation Guide	1	

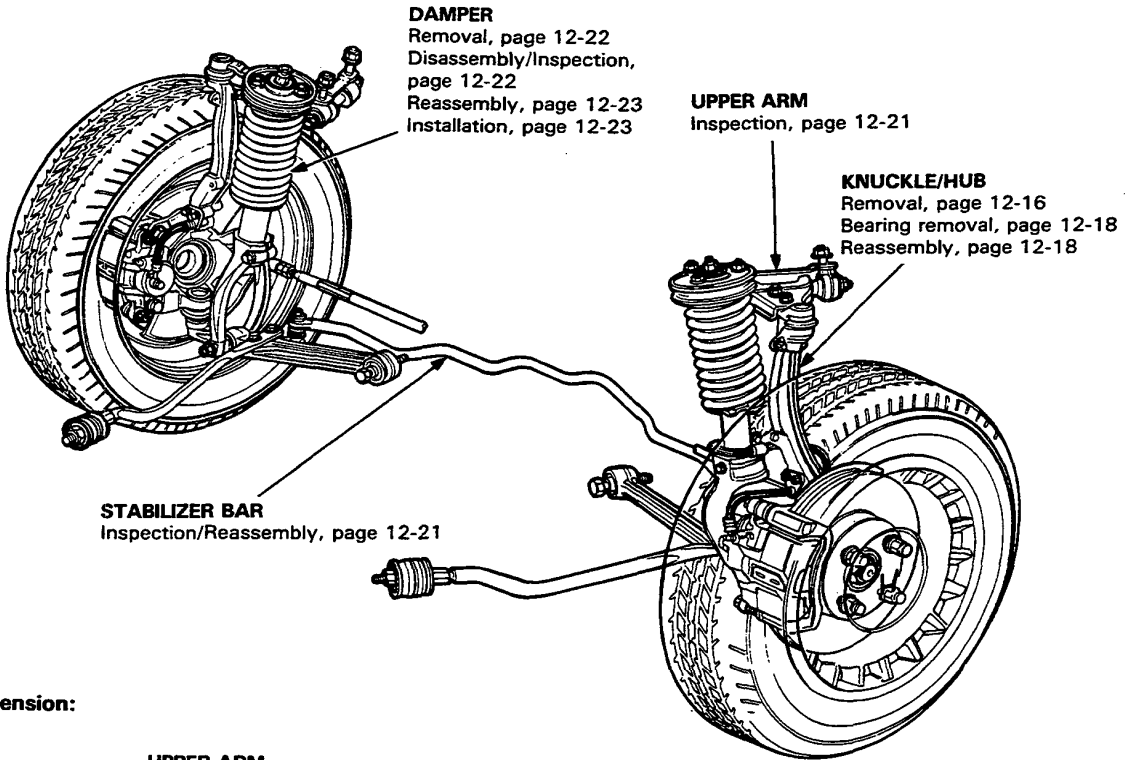


# Suspension

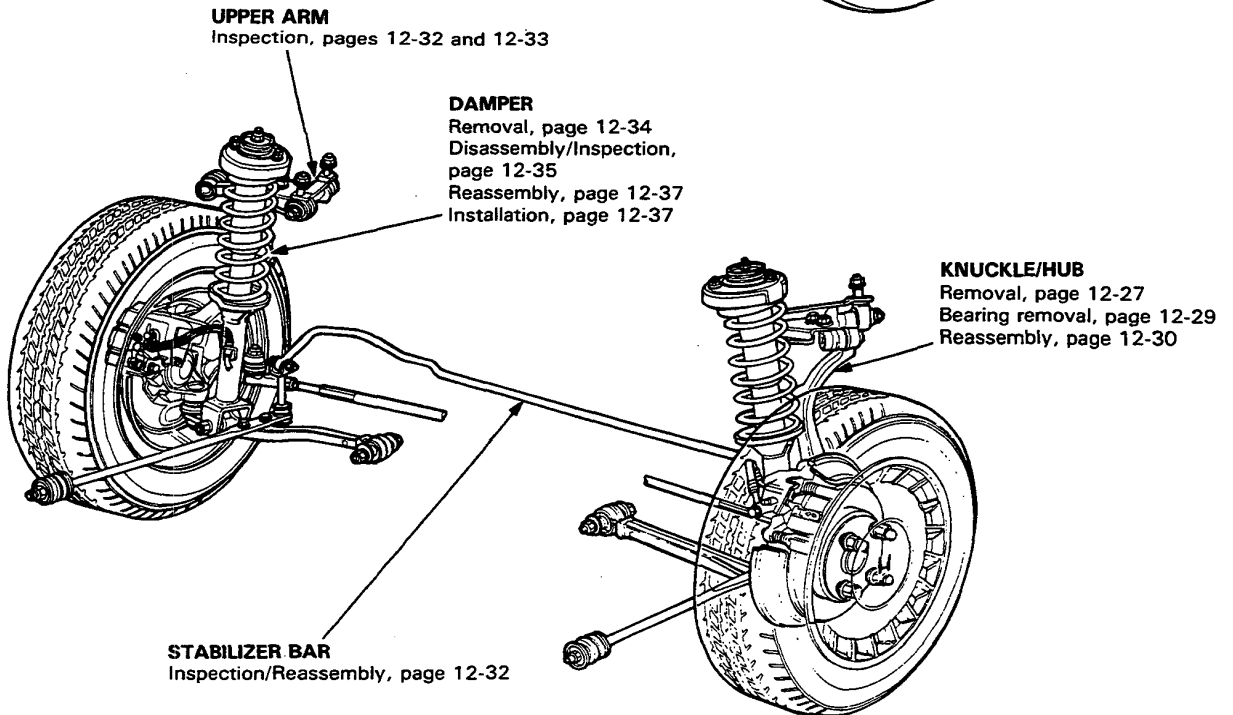
## Index

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### Front Suspension:



### Rear Suspension:



# Wheel Alignment



## Two Wheel Steering-2WS

### Preparation

1. Check the tire pressure.
2. Check the steering wheel angle. If significantly off center, it may be necessary to remove the steering wheel and reposition it on the splines. Turn the steering wheel to the straight-ahead position.
3. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

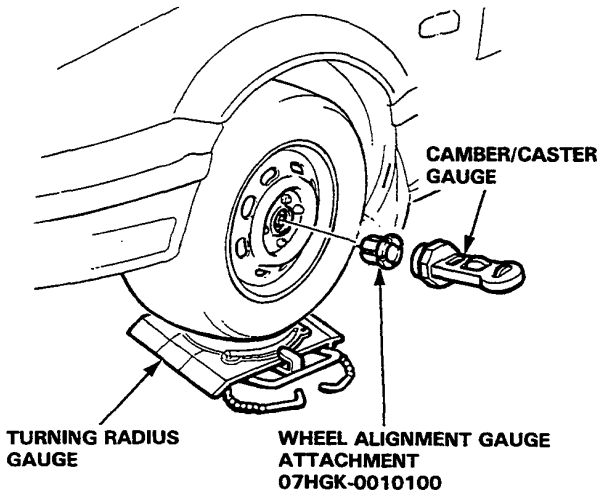
### Front Caster:

1. Install the Wheel Alignment Gauge Attachments on the wheels.

NOTE: Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachments.

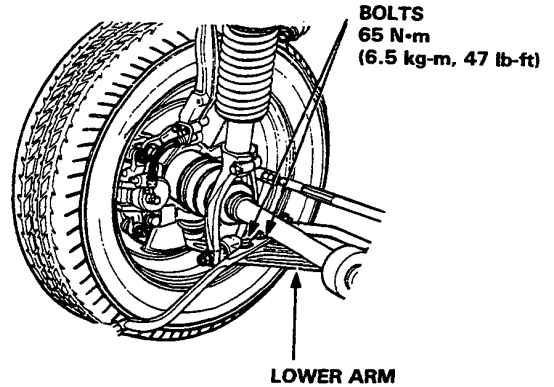
2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°.
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

Caster Angle: 2° 20' ± 30'



5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 11.

6. Loosen the radius rod attaching bolts at the lower arm.

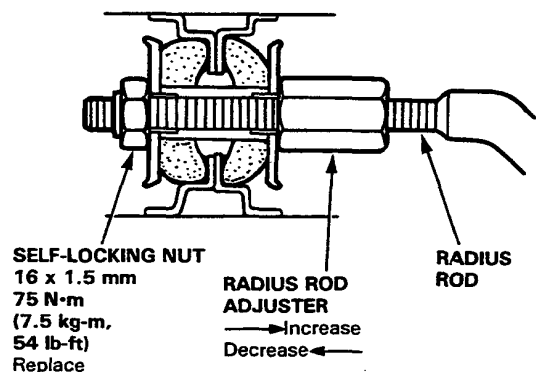


7. Loosen the self-locking nut on the end of the radius rod.
8. Adjust the caster by turning the radius rod adjuster as required.

To increase: Turn the adjuster in.

To decrease: Turn the adjuster out.

NOTE: Turning the adjuster one full turn moves the radius rod 1.5 mm (0.06 in) and changes the caster 0° 20'.



9. Tighten the radius rod attaching bolts at the lower arm.
10. Hold the radius rod adjuster nut in place and tighten self-locking nut.
11. Recheck the caster angle.

(cont'd)

# Wheel Alignment

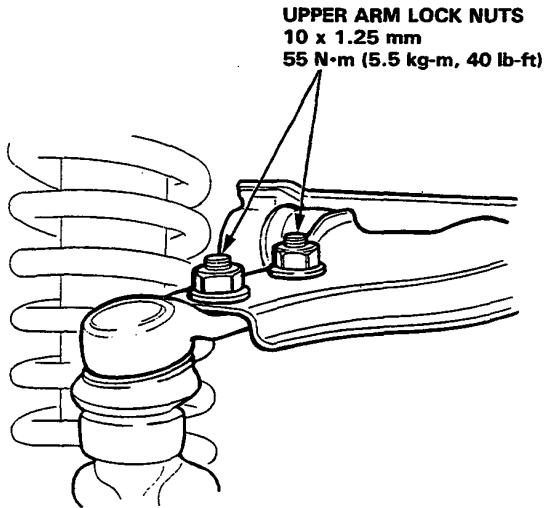
## Two Wheel Steering-2WS

### Front Camber:

12. Return the steering wheel to the straight-ahead position.
13. Read the front camber on the gauge with the bubble at the center of the gauge.

**Front Camber Angle:  $0^{\circ} 00' \pm 1^{\circ}$**

14. Adjust the camber by loosening the upper arm lock nut and moving the knuckle/hub assembly.

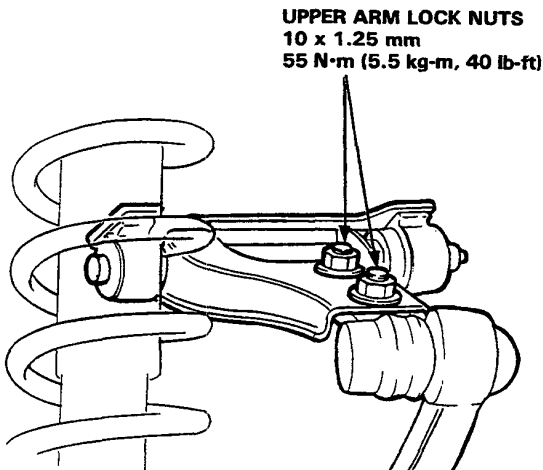


### Rear Camber:

15. Read the rear camber on the gauge with the bubble at the center of the gauge.

**Rear Camber:  $-0^{\circ} 20' \pm 1^{\circ}$**

16. Adjust the rear camber by loosening the upper arm lock nuts and moving the knuckle/hub assembly.



### Toe:

17. Check the rear toe-in.

**Right Rear: 1 mm**

**Left Rear: 1 mm**

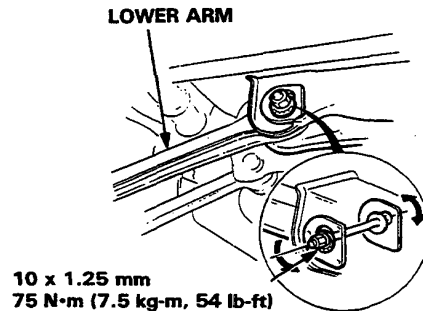
**Total:  $2 \pm 2$  mm ( $0.08 \pm 0.08$  in)**

**NOTE:** Left and right toe should be the same.

— If adjustment is required, go to step 18.

— If no adjustment is required, proceed to step 21.

18. Hold the adjusting bolt on the rear lower arm A and loosen the locknut.
19. Adjust the rear toe by turning the adjusting bolt until toe is correct.
20. Install a new locknut and tighten while holding the adjusting bolt.



21. Check the front toe-in:

**Right Front: 0 mm**

**Left Front: 0 mm**

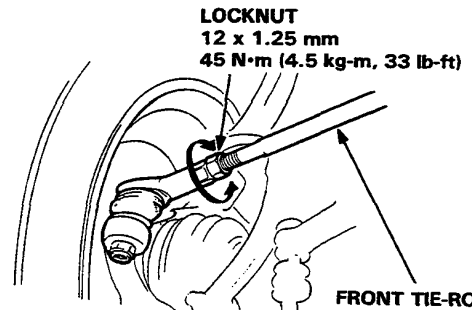
**Total:  $0 \pm 2$  mm ( $0 \pm 0.08$  in)**

— If adjustment is required, go to step 22.

— If no adjustment is required, proceed to step 24.

21. Loosen the tie-rod locknut and turn the tie-rod until toe-in is correct.
22. After adjusting, tighten the tie-rod locknuts.

**NOTE:** Reposition the tie-rod boots if twisted or displaced after adjustment has been made.



24. Recheck the camber. If camber still as specified alignment is finished.

**Front Camber Angle:  $0^{\circ} 0' \pm 1^{\circ}$**

**Rear Camber Angle:  $-0^{\circ} 20' \pm 1^{\circ}$**

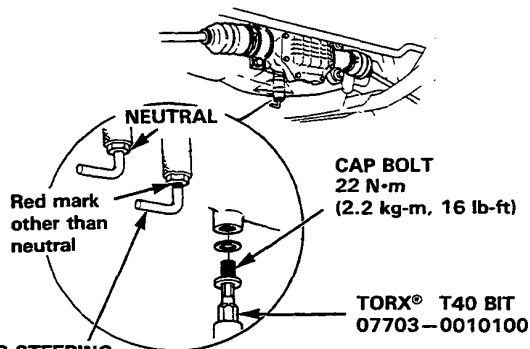


## Four Wheel Steering-4WS

### Using Toe Inspection Gauge:

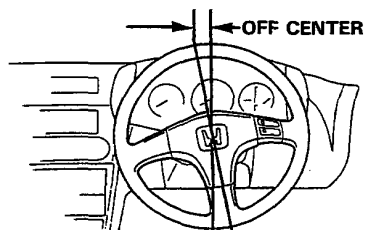
#### Preparation

1. Check the tire pressure.
2. Remove the cap bolt from the rear steering gearbox, install the center lock pin in the rear steering gearbox and determine the neutral position.



**REAR STEERING  
CENTER LOCK PIN  
07HAJ-SF10201**

3. Check the steering wheel angle.
  - If it is more than 20 mm (0.787 in) (6°) off center, adjust it as follows:



#### OFF CENTER

- 1) Remove the center lock pin from the rear steering gearbox.
- 2) Loosen the steering wheel nut. (Do not remove the steering wheel this time.)
- 3) Install the center lock pin in the rear steering gearbox.  
Turn the steering wheel right or left slightly until the center lock pin seats fully. The red mark on the pin should not be visible.  
Do not turn the steering wheel quickly when the center lock pin is seated and do not force past the locking point after the pin is set, or the gearbox may be damaged.
- 4) Remove the steering wheel and reset it in the position as close as to center.
- 5) Remove the center lock pin from the rear steering gearbox.

- 6) Tighten the steering wheel with a new steering wheel nut.

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

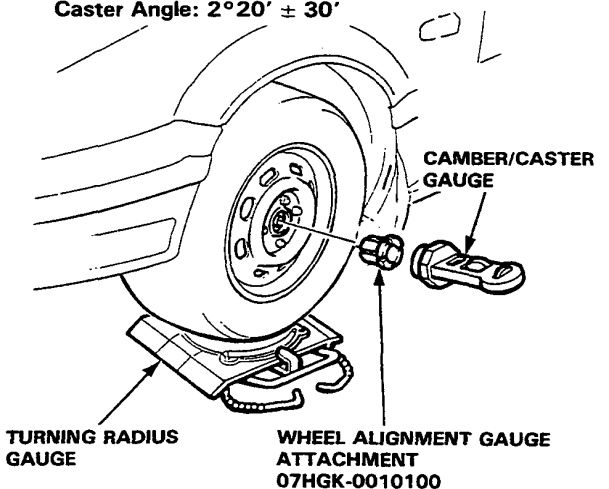
**NOTE:** On steering wheel nut removal/installation, be sure to remove the center lock pin from the rear steering gearbox to prevent damage to the gearbox.

4. Place the car on level surface.
5. Release the parking brake.
6. Move the car 1 m (3.28 ft.) forward and take off the slack in the bushing.
7. Turn the steering wheel to the straight-ahead position and hold it.
8. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

#### Front Caster:

1. Install the Wheel Alignment Gauge Attachments on the wheels.  
**NOTE:** Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachments.
2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

**Caster Angle: 2°20' ± 30'**



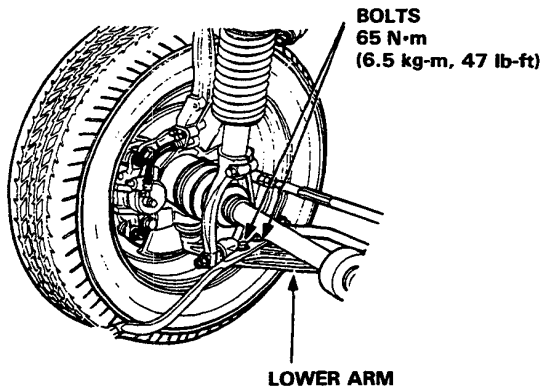
5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 11.

(cont'd)

# Wheel Alignment

## Four Wheel Steering (4WS) (cont'd)

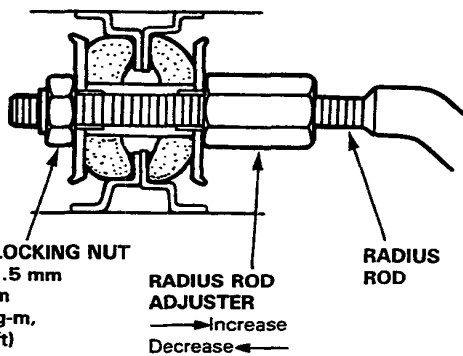
- Loosen the radius rod attaching bolts at the lower arm.



- Loosen the self-locking nut on the end of the radius rod.
- Adjust the caster by turning the radius rod adjuster as required.

**To increase:** Turn the adjuster in.  
**To decrease:** Turn the adjuster out.

**NOTE:** Turning the adjuster one full turn moves the radius rod 1.5 mm (0.06 in) and changes the caster  $0^{\circ} 20'$ .



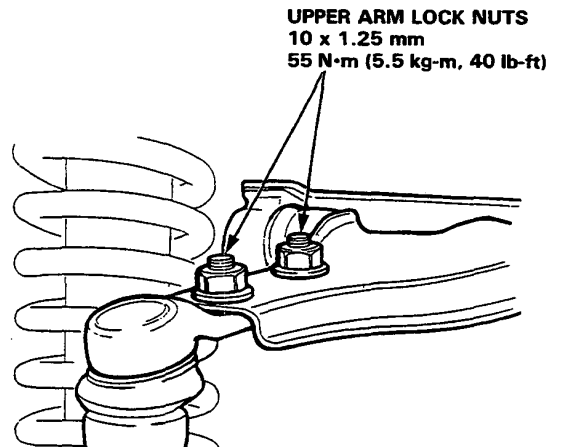
- Tighten the radius rod attaching bolts at the lower arm.
- Hold the radius rod adjuster nut in place and tighten self-locking nut.
- Recheck the caster angle.

### Front Camber:

- Return the steering wheel to the straight-ahead position.
- Read the front camber on the gauge with the bubble at the center of the gauge.

**Front Camber Angle:**  $0^{\circ} 00' \pm 1^{\circ}$

- Adjust the camber by loosening the upper arm lock nut and moving the knuckle/hub assembly.



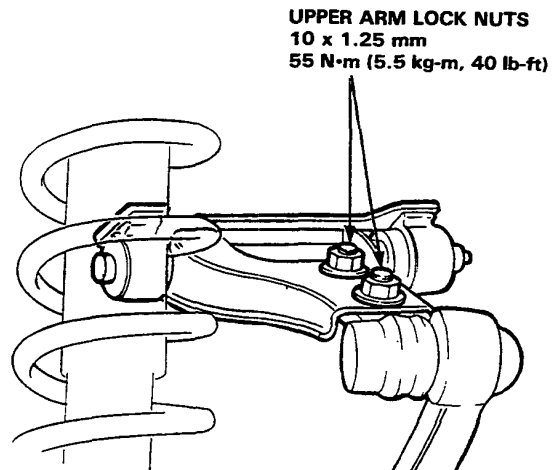
### Rear Camber:

- Read the rear camber on the gauge with the bubble at the center of the gauge.

**Rear Camber:**  $-0^{\circ} 20' \pm 30'$

**NOTE:** The difference between right and left camber should be within  $20'$ .

- Adjust the rear camber by loosening the upper arm lock nuts and moving the knuckle/hub assembly.



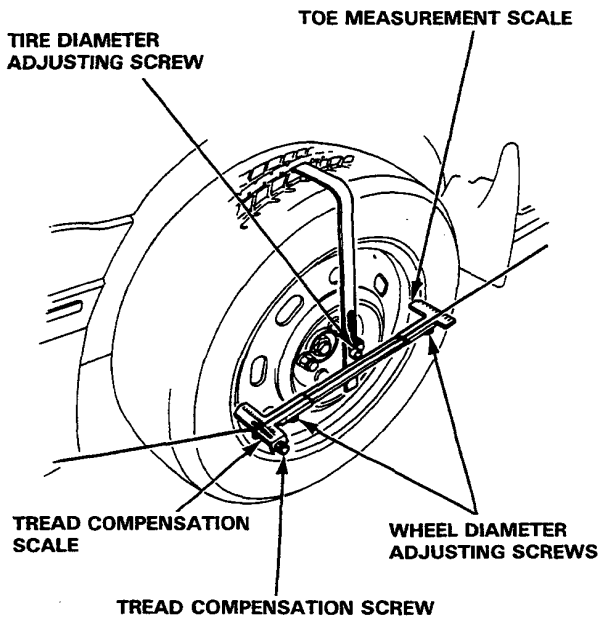




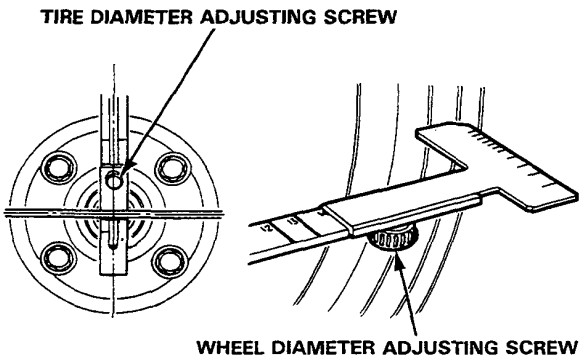
**Toe:**

17. Install the toe inspection gauge set attachment on each wheel and turn the wheel diameter adjusting screws and tire diameter adjusting screw right or left so that the attachment fits on the wheel disc securely.

- Be sure that the tread compensation screw is on the front of the front wheel disc and on the rear of the rear wheel disc.

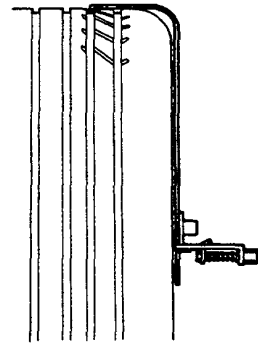


- Align the center of the gauge with the center of the wheel.

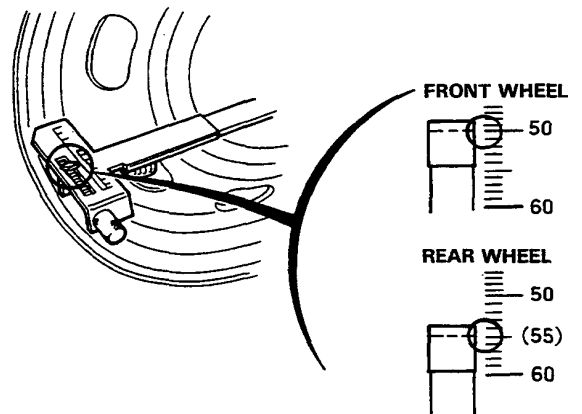


- Set the toe inspection gauge on each wheel so that it makes right angle to the wheel.

**NOTE:** Be sure that the toe gauge does not interfere with the balance weight of the wheel.



18. Set the tread compensation scale on the front wheel at 50 and on the rear wheel at 55.



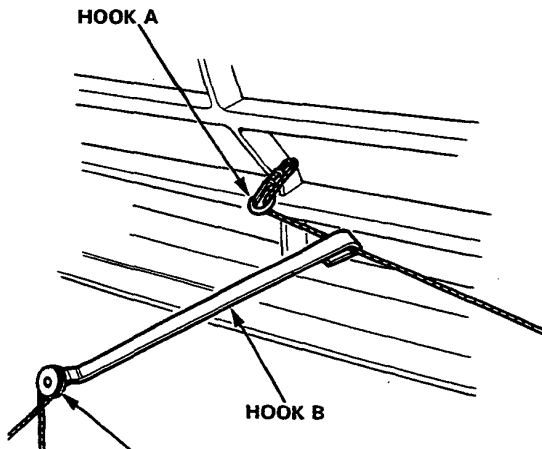
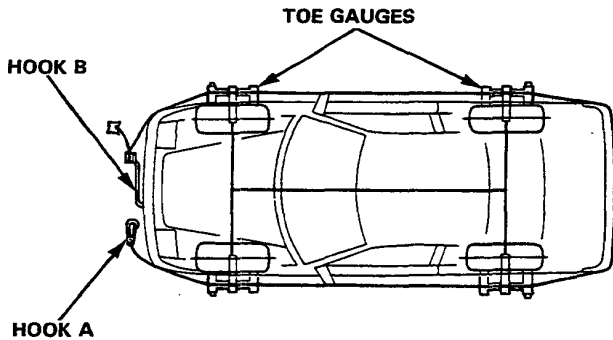
(cont'd)

# Wheel Alignment

## Four Wheel Steering (4WS) (cont'd)

19. Attach the string to the bumper and secure with the hook A.
20. Route the string around the car and secure with the hook B. Be sure that there is no slack in the string.

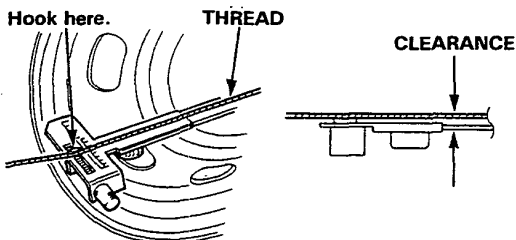
NOTE: Be sure that the string does not contact the exhaust pipe.



Secure the string; there should be no slack.

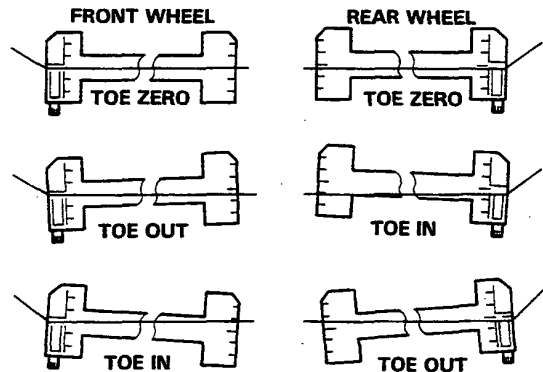
21. Hook the string on each tread compensation scale.

- Keep a slight clearance between the string and toe gauge.
- Be sure that the toe gauge is parallel with the ground.



22. Read the tread compensation scale and measurement scale and calculate their difference.

- Measurement varies according to the angle you are looking. Read all the measurements at the same height.
- Check the side of the string that is closer to a division of the tread compensation scale, and read the measurement scale at the same side of the string.
- Toe of all wheels is zero if the measurements of the tread compensation scale and measurement scale on each wheel are the same.

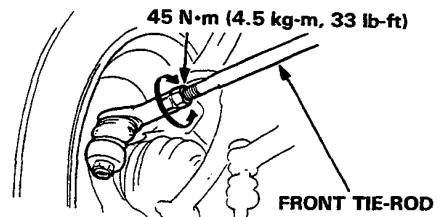


23. Adjust so that the front toe and rear toe are 0 when the front camber is  $0^\circ$  and rear camber  $-0^\circ 20'$ .

24. After the front and rear toe are adjusted to zero, loosen the right and left rear wheel tie-rods  $45^\circ$  and set the rear toe-in to 2 mm (0.079 in).

25. After adjusting, tighten the tie-rod locknuts.

NOTE: Reposition the tie-rod boots if twisted or displaced after adjustment has been made.



26. Recheck the camber. If camber still as specified alignment is finished.

Front Camber Angle:  $0^\circ 00' \pm 1^\circ$   
Rear Camber Angle:  $-0^\circ 20' \pm 30'$



## Using Full-floating Turn Table:

### Preparation

**NOTE:** Alignment equipment must be capable of 4 wheel alignment and must use full-floating turntables at all four wheels.

1. Check the tire pressure.
2. Jack up the car and temporarily place on safety stands.
3. Install the 4WS Center Lock Pin (see page 12-7). Install lock pins in the full floating turntables.
4. Lower the car onto the turntables. Remove the turntable lock pins and "settle" the suspension by pushing the car up and down several times. Remove the 4WS Center Lock Pin.
5. Check the steering wheel angle. If significantly off center, it may be necessary to remove the steering wheel and reposition it on the splines (page 12-7). Turn the steering wheel to the straight-ahead position.

**NOTE:** If the wheel removal is necessary, loosen the nut, then temporarily reinstall the 4WS Center Lock Pin before repositioning the wheel.

6. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

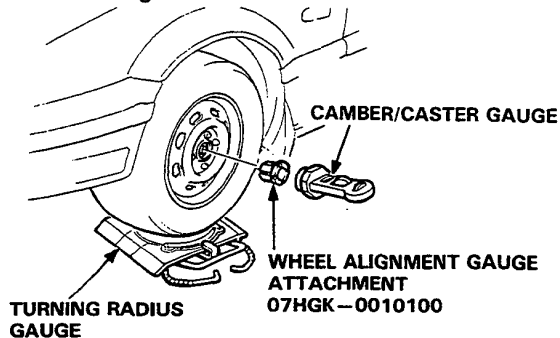
### Front Caster:

1. Install the Wheel Alignment Gauge Attachments on the Wheels.

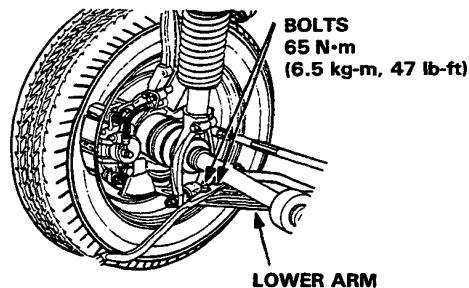
**NOTE:** Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachment.

2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°.
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

**Caster Angle: 2° 20' ± 30'**



5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 11.
6. Loosen the radius rod attaching bolts at the lower arm.

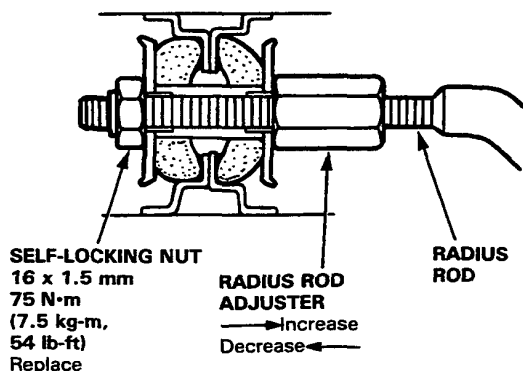


7. Loosen the self-locking nut on the end of the radius rod.
8. Adjust the caster by turning the radius rod adjuster as required.

**To increase: Turn the adjuster in.**

**To decrease: Turn the adjuster out.**

**NOTE:** Turning the adjuster one full turn moves the radius rod 1.5 mm (0.06 in) and changes the caster 0° 20'.



9. Tighten the radius rod attaching bolts at the lower arm.
10. Hold the radius rod adjuster nut in place and tighten self-locking nut.
11. Recheck the caster angle.

(cont'd)

# Wheel Alignment

## Four Wheel Steering-4WS (cont'd)

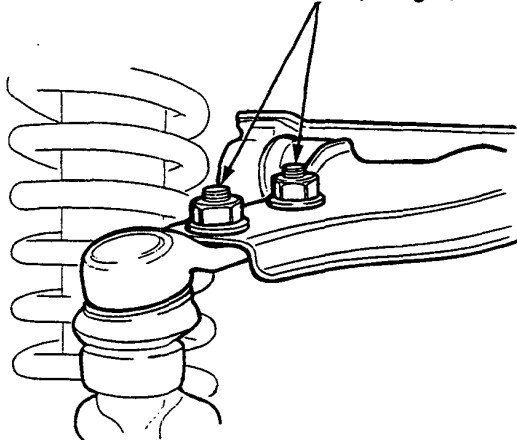
### Front Camber:

12. Return the steering wheel to the straight-ahead position.
13. Read the front camber on the gauge with the bubble at the center of the gauge.

**Front Camber Angle:  $0^{\circ} 00' \pm 1^{\circ}$**

14. Adjust the camber by loosening the upper arm lock nut and moving the knuckle/hub assembly.

**UPPER ARM LOCK NUTS**  
10 x 1.25 mm  
55 N·m (5.5 kg-m, 40 lb-ft)



### Rear Camber:

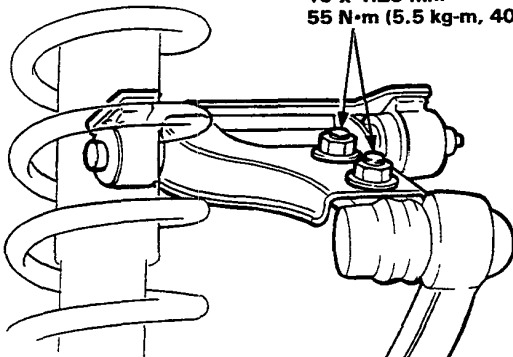
15. Read the rear camber on the gauge with the bubble at the center of the gauge.

**Rear Camber:  $-0^{\circ} 20' \pm 30'$**

**NOTE:** The difference between right and left camber should be within 20'.

16. Adjust the rear camber by loosening the upper arm lock nuts and moving the knuckle/hub assembly.

**UPPER ARM LOCK NUTS**  
10 x 1.25 mm  
55 N·m (5.5 kg-m, 40 lb-ft)



### Toe:

17. Check the rear toe-in.  
**Right Rear : 1 mm**  
**Left Rear : 1 mm**  
**Total :  $2 \pm 2$  mm ( $0.08 \pm 0.08$  in)**

**NOTE:** Left and right toe should be the same.

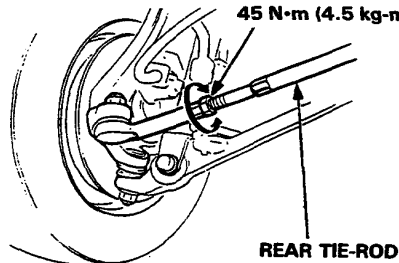
— If adjustment is required, go to step 18.

— If no adjustment is required, proceed to step 20.

18. Loosen the tie-rod locknuts.
19. After adjusting, tighten the tie-rod locknuts.

**NOTE:** Reposition the tie-rod boots if twisted or displaced after adjustment has been made.

**LOCKNUT**  
12 x 1.25 mm  
45 N·m (4.5 kg-m, 33 lb-ft)



20. Check the front toe-in:  
**Right Front : 0 mm**  
**Left Front : 0 mm**  
**Total :  $0 \pm 2$  mm ( $0 \pm 0.08$  in)**

**NOTE:** Left and right toe should be the same.

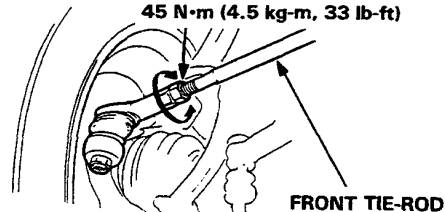
— If adjustment is required, go to step 21.

— If no adjustment is required, proceed to step 22.

21. Loosen the tie-rod locknut and turn the tie-rod until toe-in is correct.
22. After adjusting, tighten the tie-rod locknuts.

**NOTE:** Reposition the tie-rod boots if twisted or displaced after adjustment has been made.

**LOCKNUT**  
12 x 1.25 mm  
45 N·m (4.5 kg-m, 33 lb-ft)



23. Recheck the camber. If camber still as specified alignment is finished.

**Front Camber Angle:  $0^{\circ} 0' \pm 1^{\circ}$**   
**Rear Camber Angle:  $-0^{\circ} 20' \pm 30'$**

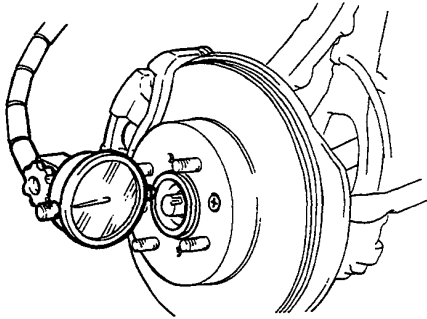
# On-Car Checks



## Bearing End Play

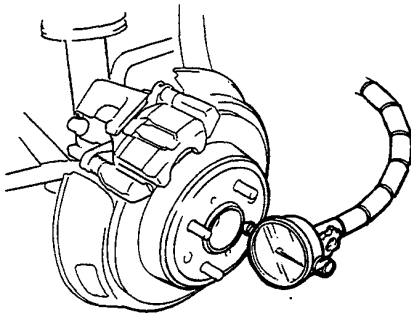
### Front Wheel End Play

Standard: 0–0.05 mm (0–0.002 in)



### Rear Wheel End Play

Standard: 0–0.05 mm (0–0.002 in)



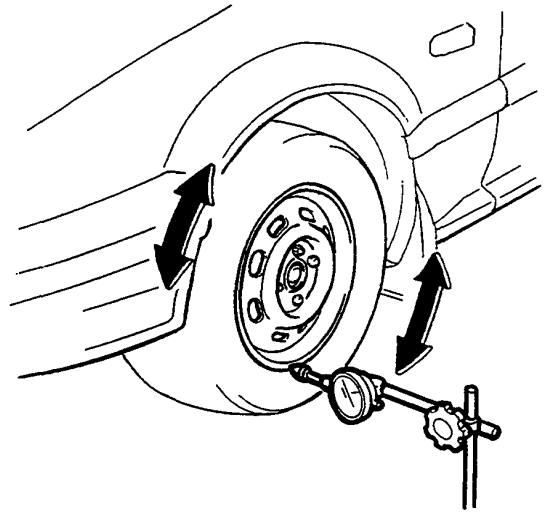
## Runout

### Front and Rear Wheel Axial Runout

Standard:

Aluminum Wheel: 0–0.7 mm (0–0.03 in)

Steel Wheel: 0–1.0 mm (0–0.04 in)

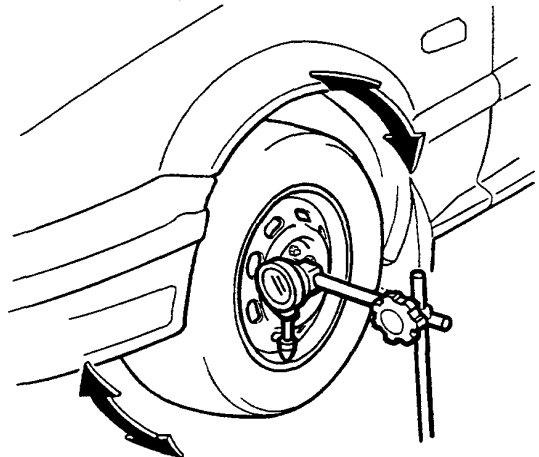


### Front and Rear Wheel Radial Runout

Standard:

Aluminum Wheel: 0–0.7 mm (0–0.03 in)

Steel Wheel: 0–1.0 mm (0–0.04 in)



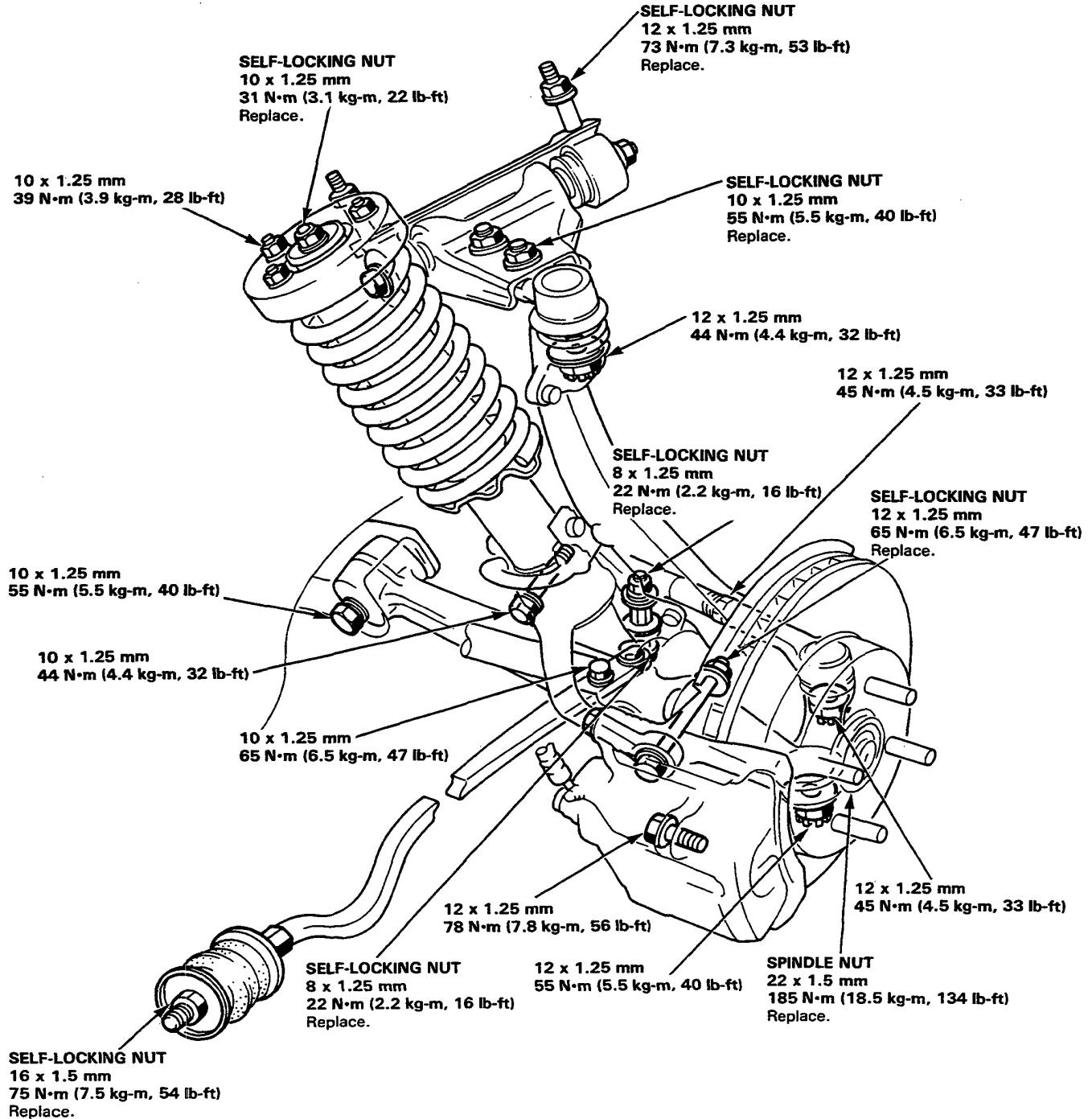
# Front Suspension

## Torque Specification

### CAUTION:

- Replace the self-locking nuts after removal.
- Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

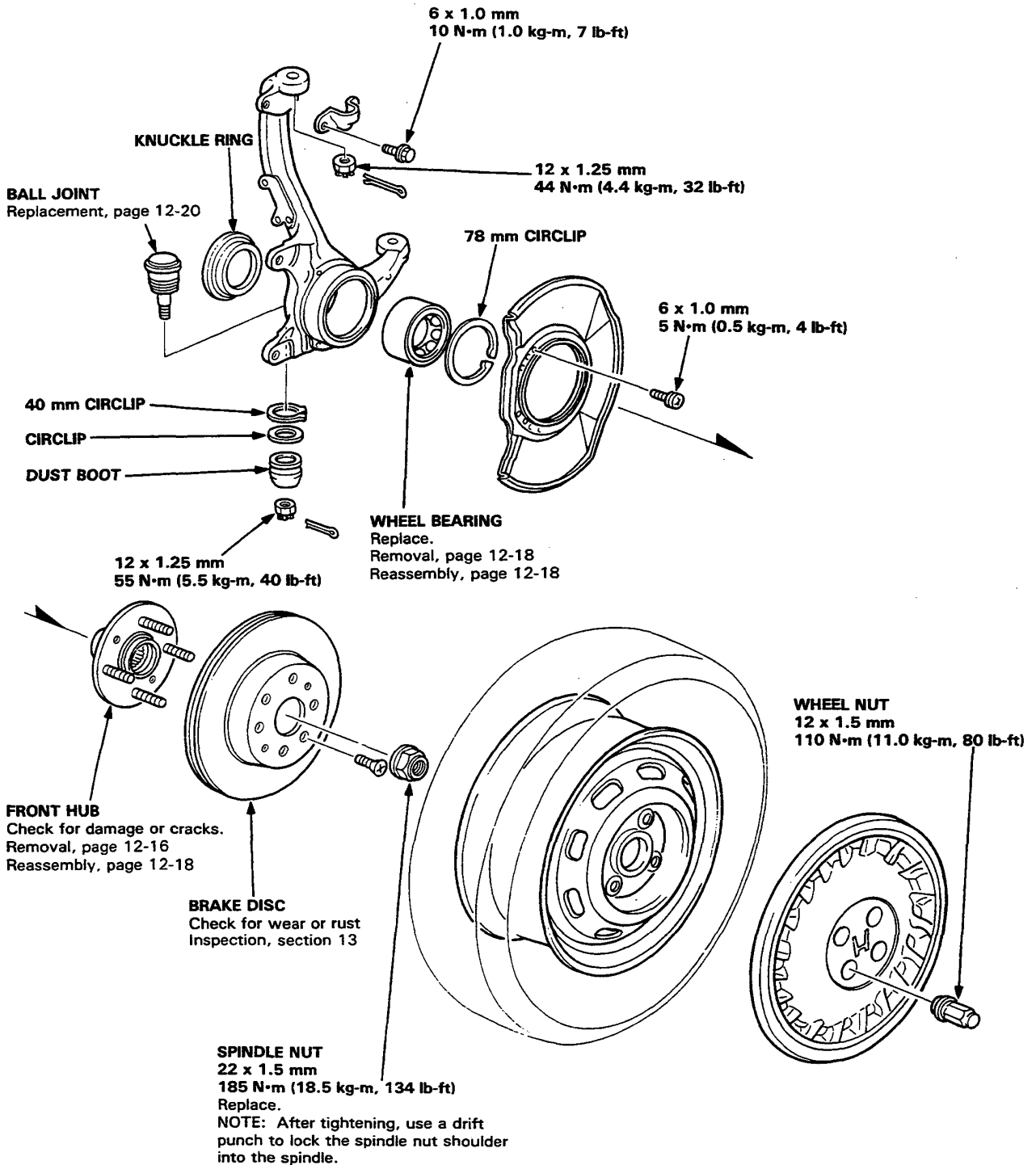


CAUTION: The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

# Knuckle/Hub



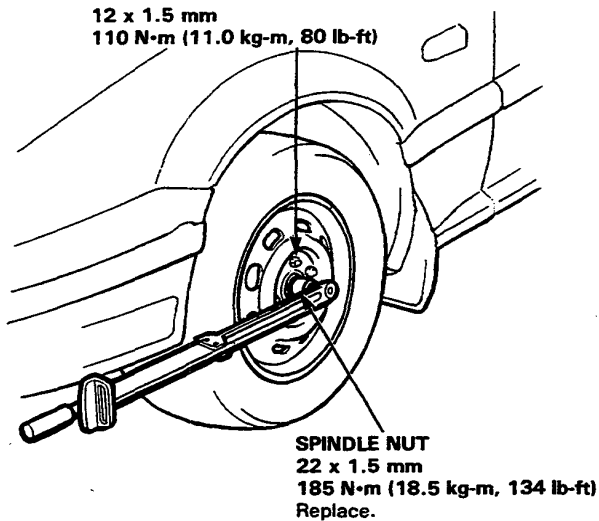
## Index



# Knuckle/Hub

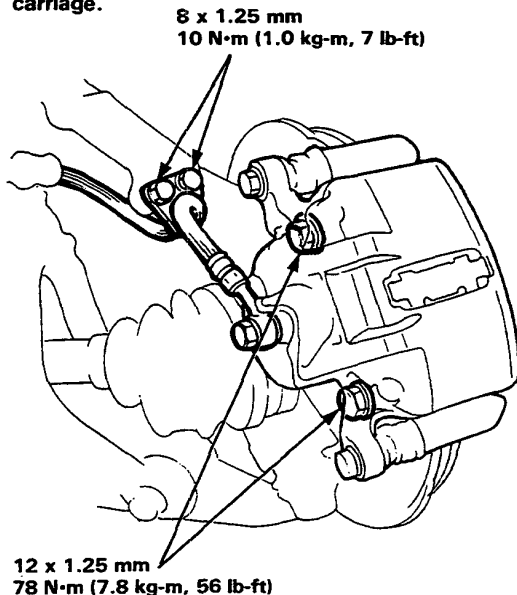
## Removal

1. Pry the spindle nut lock tab away from the spindle, then loosen the nut using a 32 mm socket.



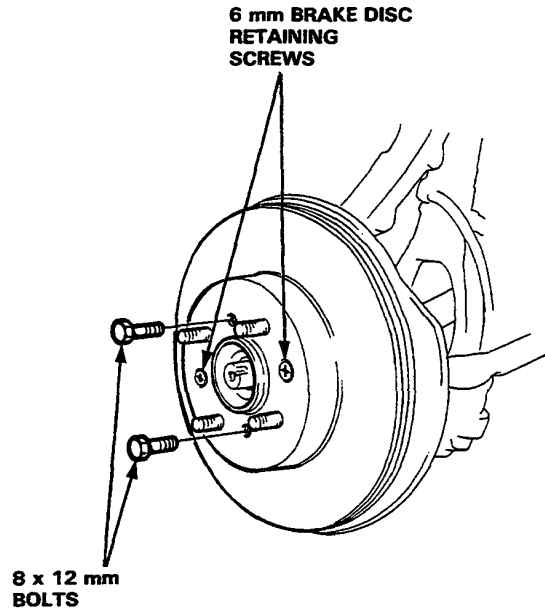
2. Loosen the lug nuts slightly.
3. Raise the front of car and support it with safety stands in proper locations.
4. Remove the lug nuts, wheel and spindle nut.
5. Remove the caliper mounting bolts, brake hose bolts and hang the caliper assembly to one side.

**CAUTION:** To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage.

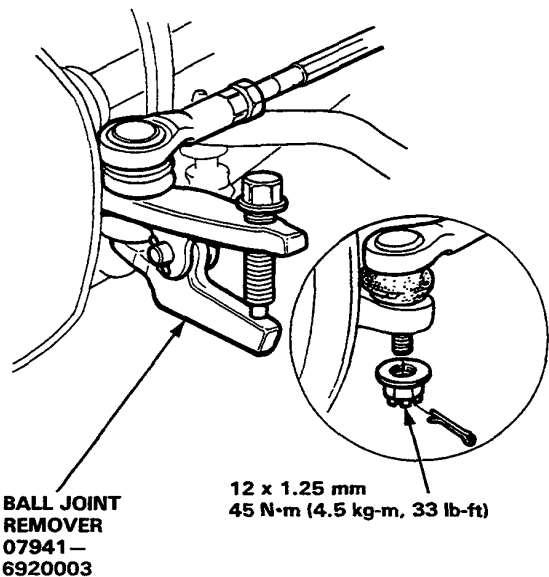


6. Remove the 6 mm brake disc retaining screws.
7. Screw two 8 x 12 mm bolts into the disc to push it away from the hub.

**NOTE:** Turn each bolt two turns at a time to prevent cocking disc excessively.



8. Remove the cotter pin from the tie-rod end and remove the castle nut.
9. Break loose the tie-rod ball joint using the Ball Joint Remover, then lift the tie-rod out of the knuckle.



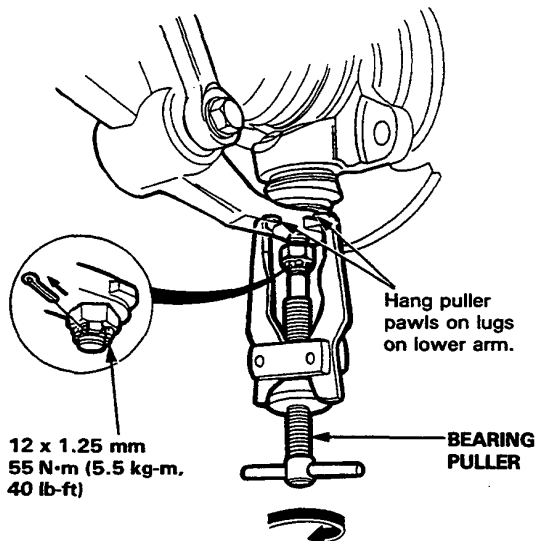




10. Pry the cotter pin off and loosen the lower arm ball joint nut half the length of the joint threads.
11. Separate the ball joint and lower arm using a puller with the pawls applied to the lower arm.

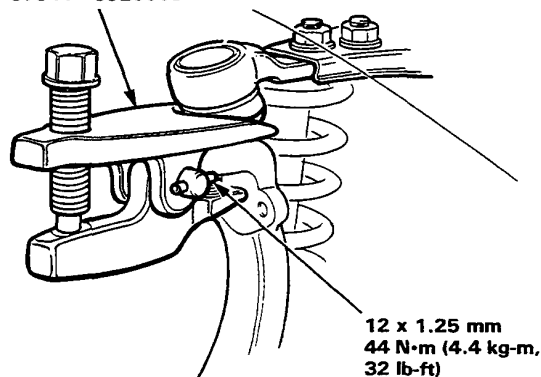
**CAUTION:** Avoid damaging the ball joint boot.

**NOTE:** If necessary, apply penetrating type lubricant to loosen the ball joint.

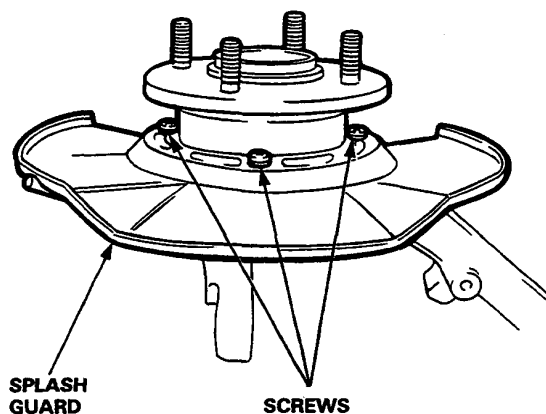


12. Pry off the cotter pin and remove the upper arm ball joint nut.
13. Separate the upper ball joint and knuckle using the Ball Joint Remover.
14. Remove the knuckle and hub by sliding them off the driveshaft.

**BALL JOINT  
REMOVER  
07941-6920003**



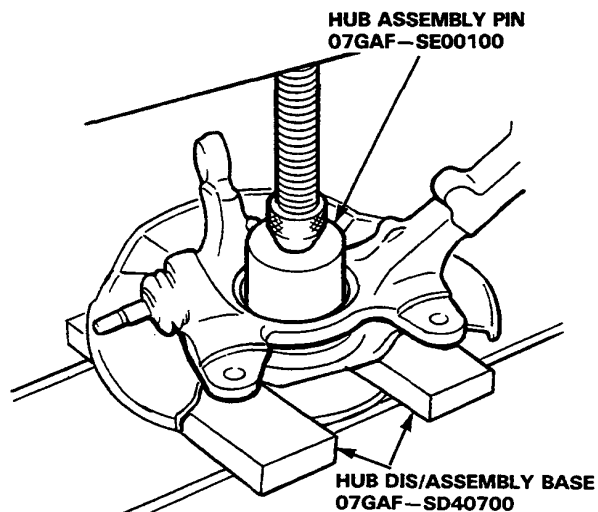
15. Remove the splash guard screws and knuckle ring from the knuckle.



16. Separate the hub from the knuckle using a hydraulic press and the special tools shown below.

**CAUTION:**

- Take care not to distort the splash guard.
- Hold onto the hub to keep it from falling when pressed clear.

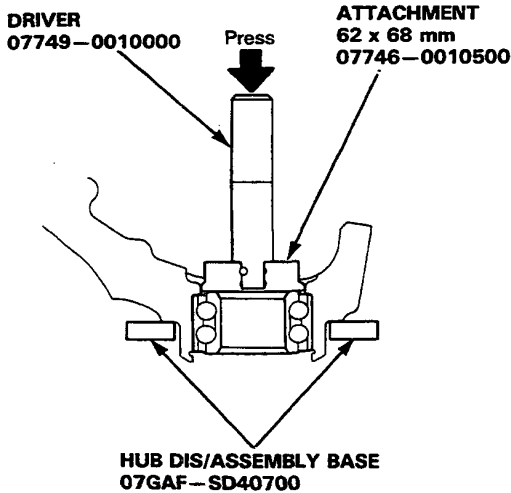


# Knuckle/Hub

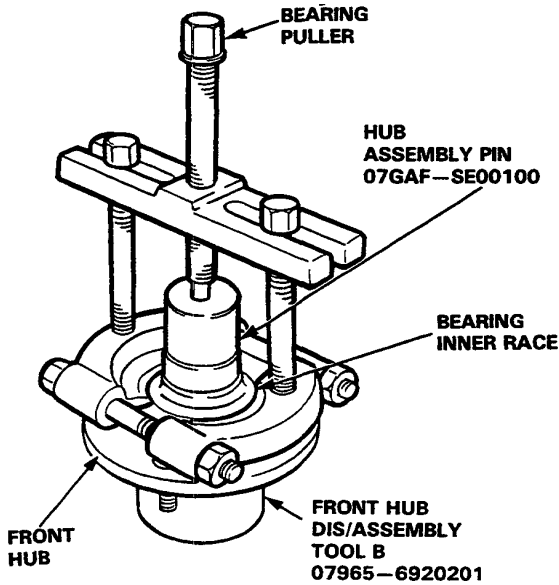
## Bearing Removal

NOTE: Replace the bearing with a new one after removal.

1. Remove the splash guard and 78 mm circlip from the knuckle.
2. Press the wheel bearing out of the knuckle using a hydraulic press and the special tools shown below.



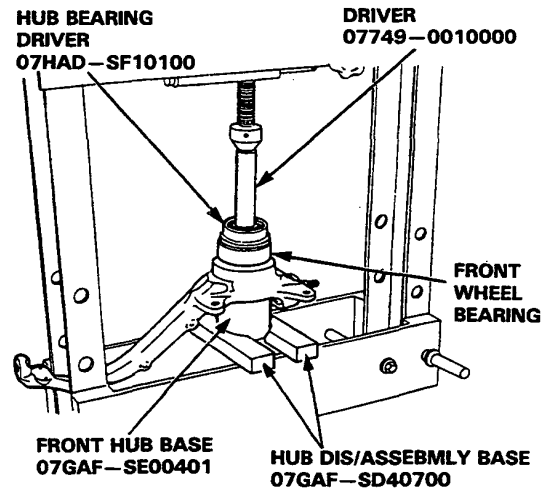
3. Remove the outboard bearing inner race from the hub using a bearing puller and the special tools shown below.



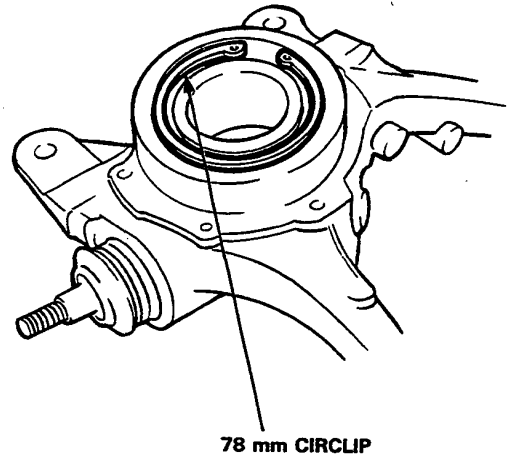
NOTE: Wash the knuckle and hub thoroughly before reassembly.

## Reassembly

1. Press a new wheel bearing into the hub using a hydraulic press and the special tools shown below.

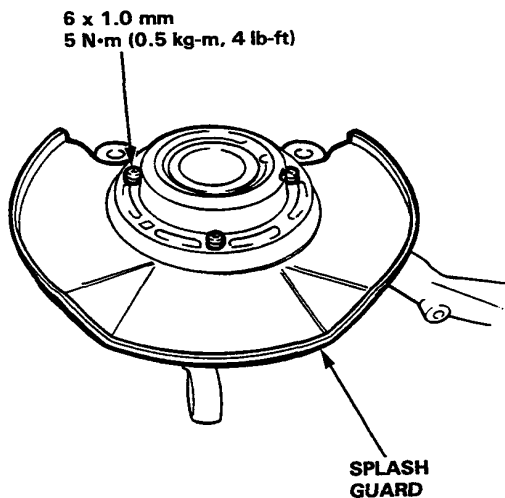


2. Install the 78 mm circlip securely in the knuckle groove.



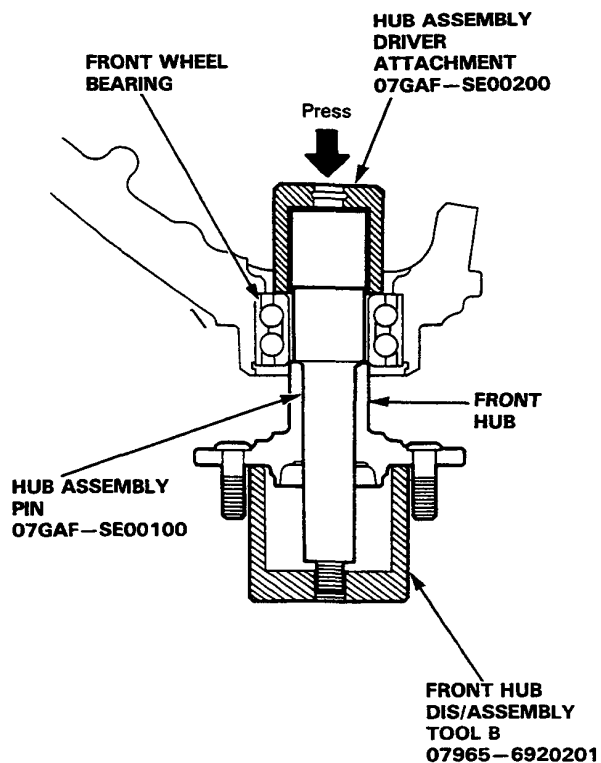


3. Install the splash guard and tighten the screws.

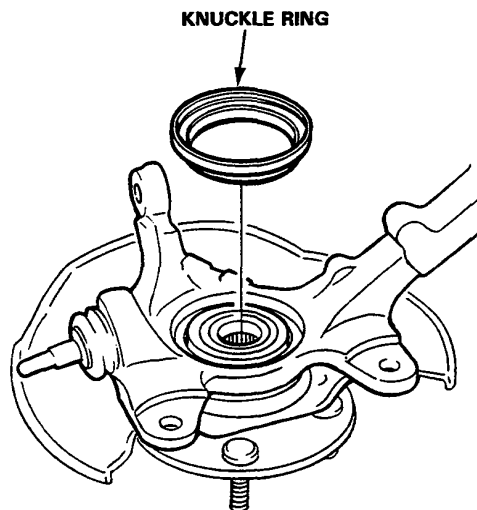


4. Place the front hub in special tool fixture, then set the knuckle in position and apply downward pressure with a hydraulic press.

**CAUTION: Maximum press load: 4 tons**



5. Install the knuckle ring on to the knuckle.

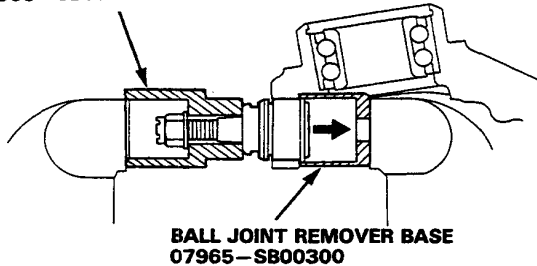


# Knuckle/Hub

## Lower Ball Joint Replacement

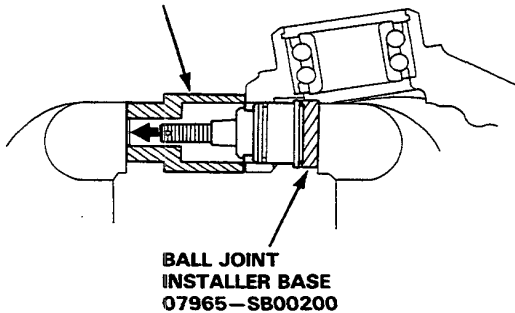
1. Remove the knuckle (page 12-16).
2. Remove the boot by prying the snap ring off.
3. Remove the 40 mm circlip.
4. Install the Ball Joint Remover/Installer on the ball joint and tighten the ball joint nut.
5. Position the Ball Joint Remover Base over the ball joint as shown below, then place the assembly in a vise. Press the ball joint out of the knuckle.

**BALL JOINT REMOVER/INSTALLER**  
07965-SB00100

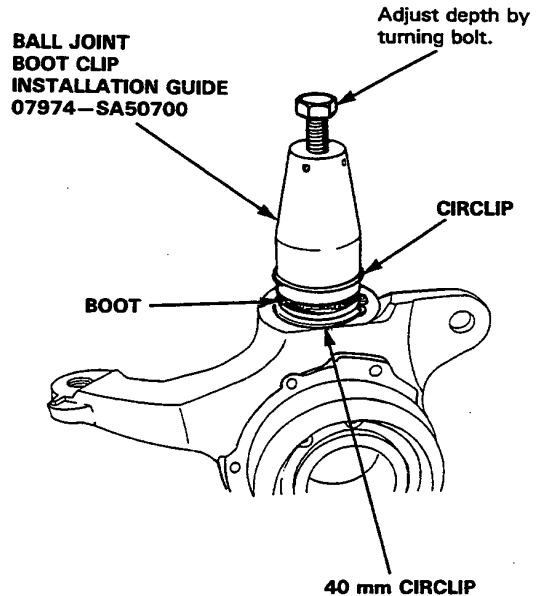


6. Place the new ball joint in position by hand.
7. Install the Ball Joint Installer Base over the ball joint as shown below, then press in the ball joint.

**BALL JOINT REMOVER/INSTALLER**  
07965-SB00100



8. Install the 40 mm circlip.
9. Install the boot and circlip using the Ball Joint Boot Clip Installation Guide.



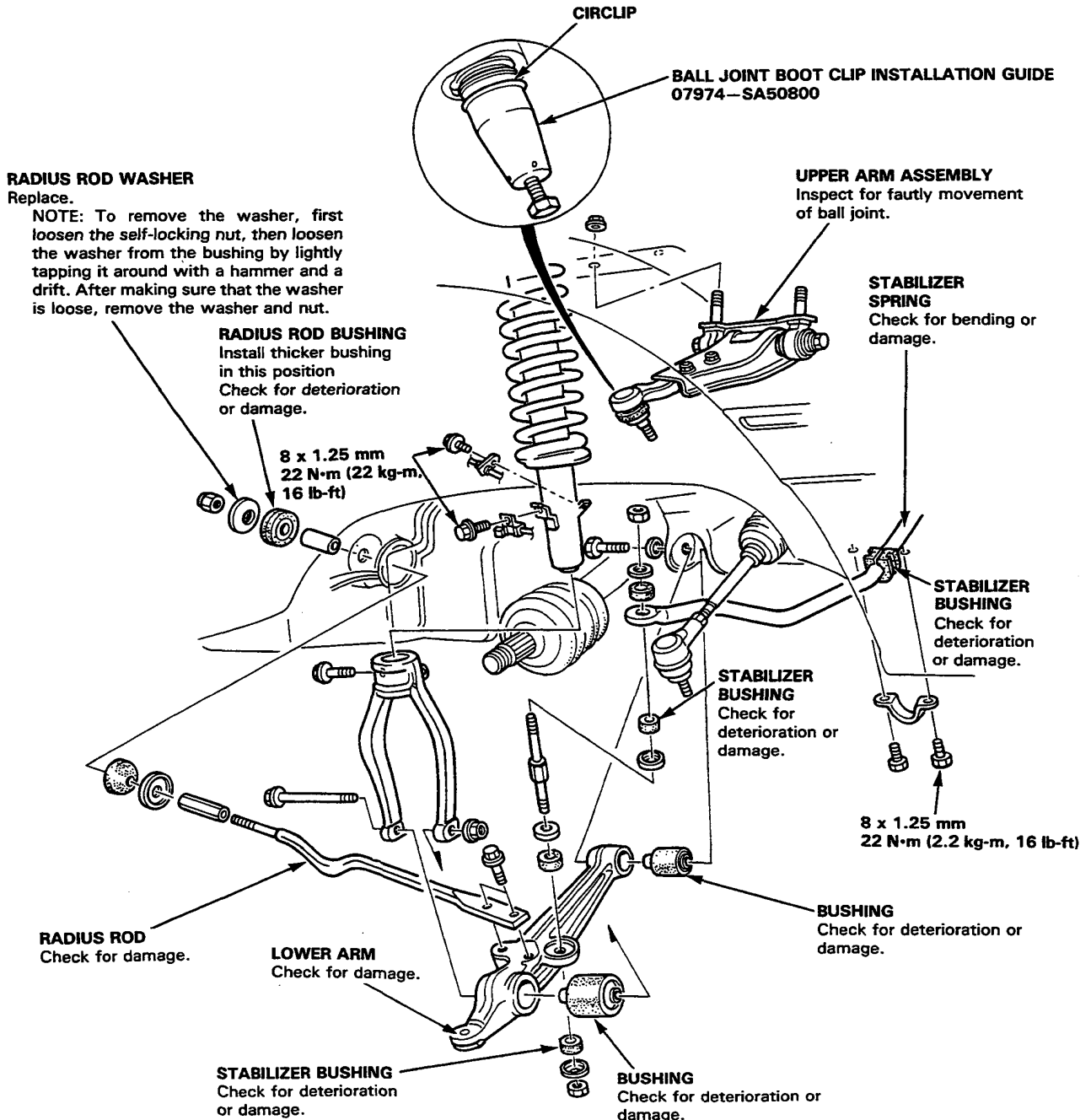
# Upper Arm/Stabilizer/Radius Rod/Lower Arm



## Index/Inspection

### CAUTION:

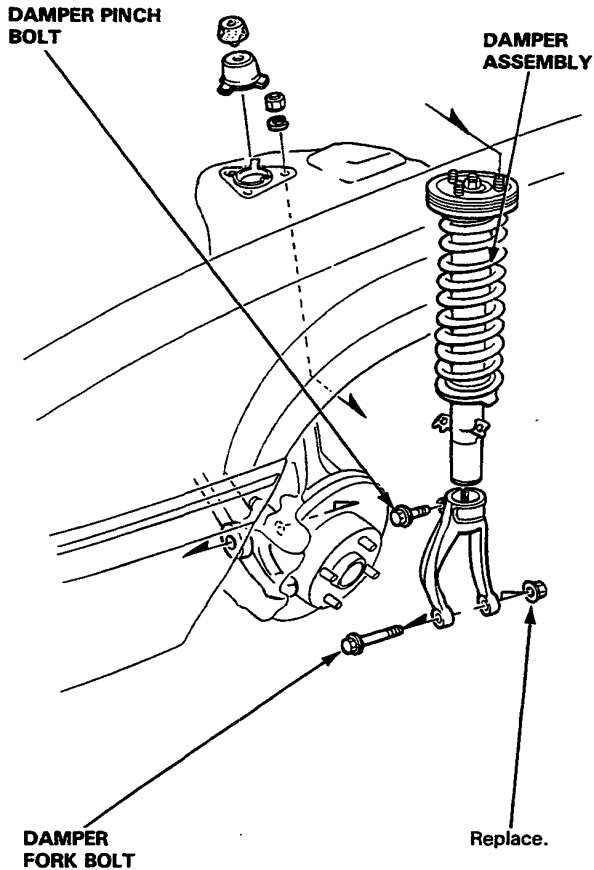
- The radius rod bushings can easily be incorrectly installed; the thick radius rod bushing should be installed in the front position.
- R or L mark is stamped on the rear end of the radius arm to prevent incorrect installation.



# Front Damper

## Removal

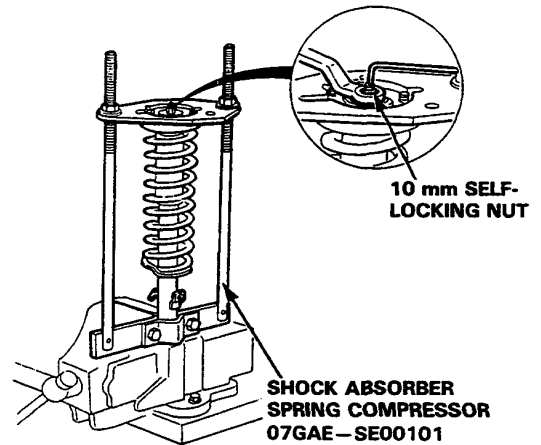
1. Remove the brake hose clamps from the damper.
2. Remove the damper pinch bolt.
3. Remove the damper fork bolt and remove the damper fork.
4. Remove the damper by removing the three 10 mm nuts.



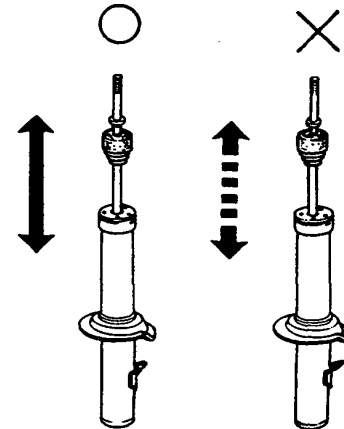
## Disassembly/Inspection

1. Compress the damper spring using spring compressor, then remove the self-locking nut.

**CAUTION:** Do not compress the spring more than necessary to remove the nut.



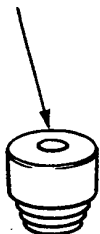
2. Remove the spring compressor, then disassemble the damper as shown on the next page.
3. Check for smooth operation through a full stroke, both compression and extension.



4. Also check for smooth operation in short strokes of 5–10 cm (2–4 in). Replace the damper if resistance is uneven or jerky.
5. Check for oil leaks, abnormal noises or binding during these tests.

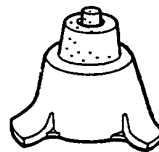


**BUMP STOP**  
Check for weakness or damage.

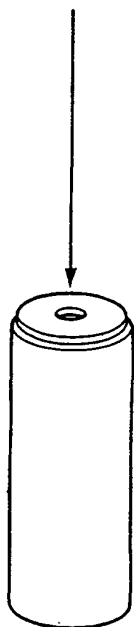


**10 mm SELF-LOCKING NUT**  
31 N·m (3.1 kg-m, 22 lb-ft)  
Replace.

**DAMPER MOUNTING WASHER**  
Check for weakness.

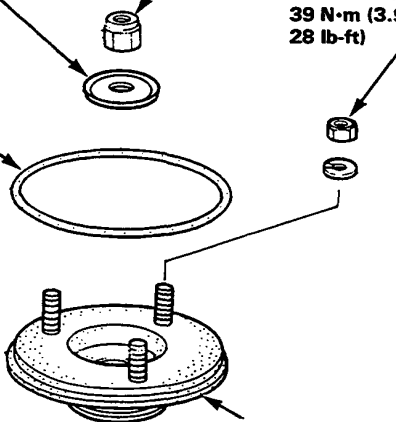


**DUST COVER**  
Check for bending or damage.



**10 x 1.25 mm**  
39 N·m (3.9 kg-m, 28 lb-ft)

**SEAL**  
Check for damage.

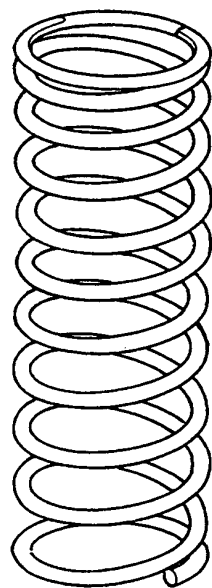


**DAMPER MOUNTING BASE**

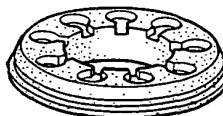
**DAMPER MOUNTING RUBBER**

**DAMPER MOUNTING COLLAR**

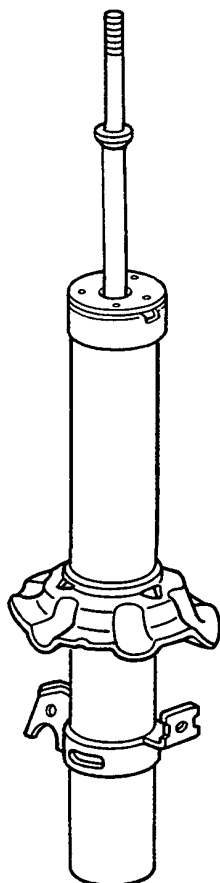
**DAMPER MOUNTING RUBBER**



**DAMPER SPRING**  
Check for weakness, compression or damage.



**SPRING MOUNTING RUBBER**  
Check for damage.



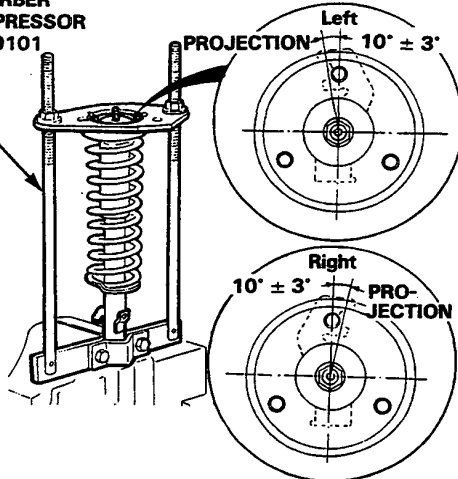
**DAMPER UNIT**  
• Check for leaks and faulty operation.  
• Check for rust.

# Front Damper

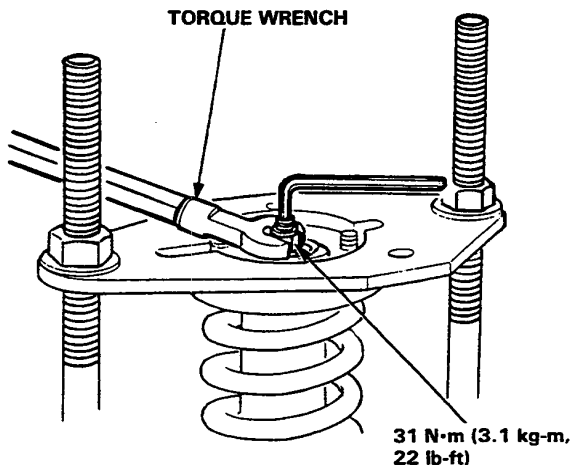
## Reassembly

1. Install the damper unit, bump stop, dust cover, damper spring, mounting collar, mounting rubber and spring mounting rubber on the spring compressor.
2. Install the damper mounting base on the damper unit as shown.

**SHOCK ABSORBER  
SPRING COMPRESSOR  
07GAE-SE00101**



3. Compress the damper spring.
4. Install the mounting rubber, mounting washer and 10 mm self-locking nut.
5. Hold the damper shaft and tighten the 10 mm self-locking nut.

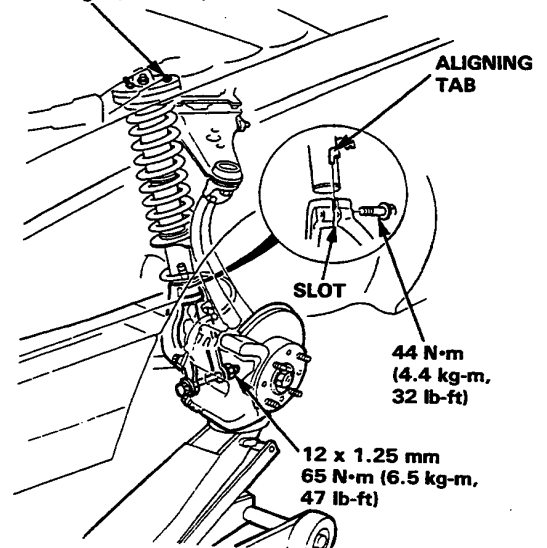


## Installation

1. Loosely install the damper on the frame with the aligning tab facing inside.
2. Install the damper fork on the driveshaft and lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.
3. Raise the knuckle with a floor jack until the car just lifts off the safety stands.

**NOTE:** The damper fork bolt should be tightened with the vehicle on the ground.

**10 x 1.25 mm  
39 N·m (3.9 kg-m, 28 lb-ft)**



4. Tighten the damper pinch bolt.
5. Secure the damper fork bolt with a new 12 mm self-locking nut.
6. Secure the damper assembly to the frame with the 10 mm mount nuts.
7. Install the brake hose clamps with the two bolts.



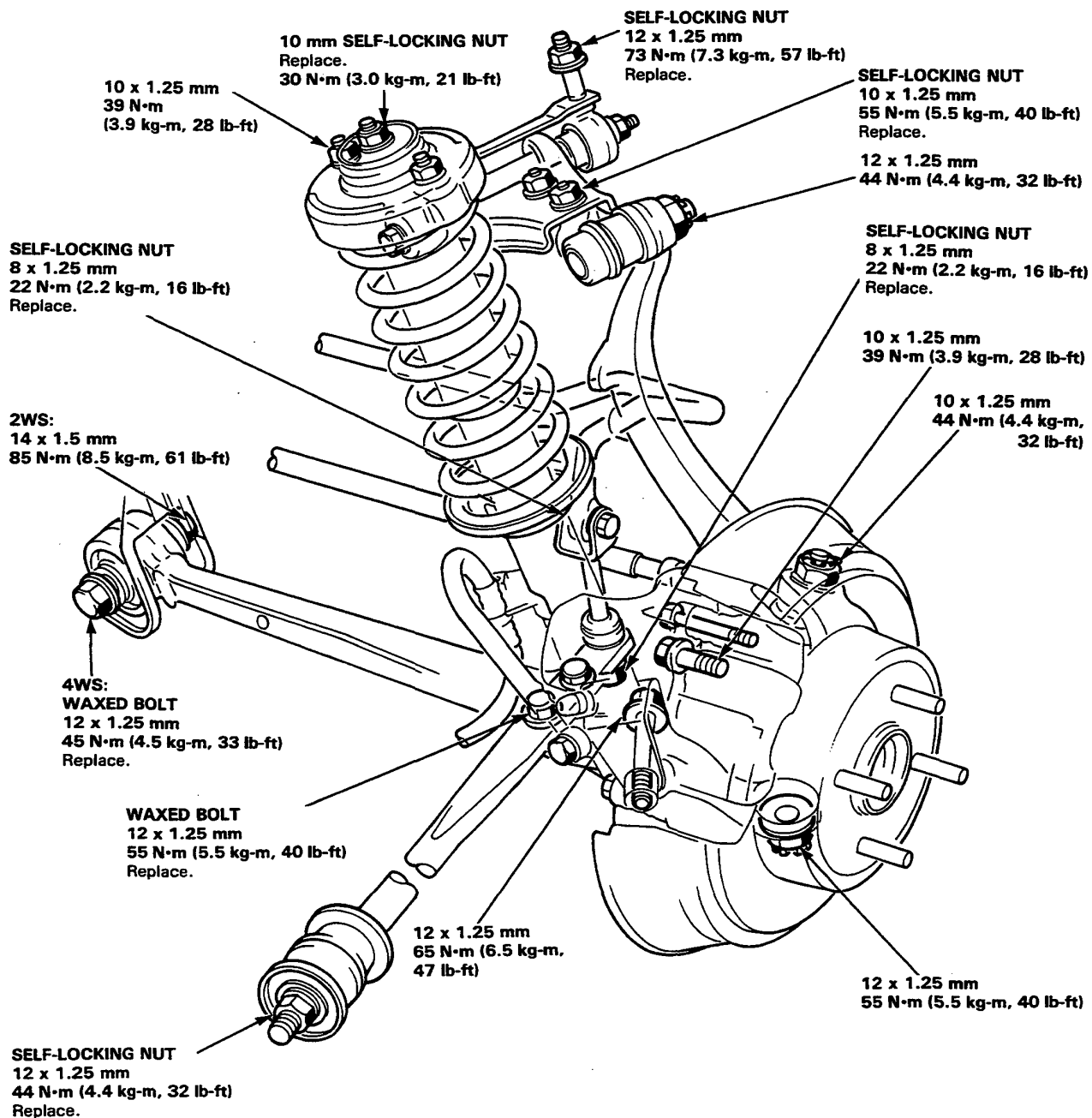


# Rear Suspension

## Torque Specification

### CAUTION:

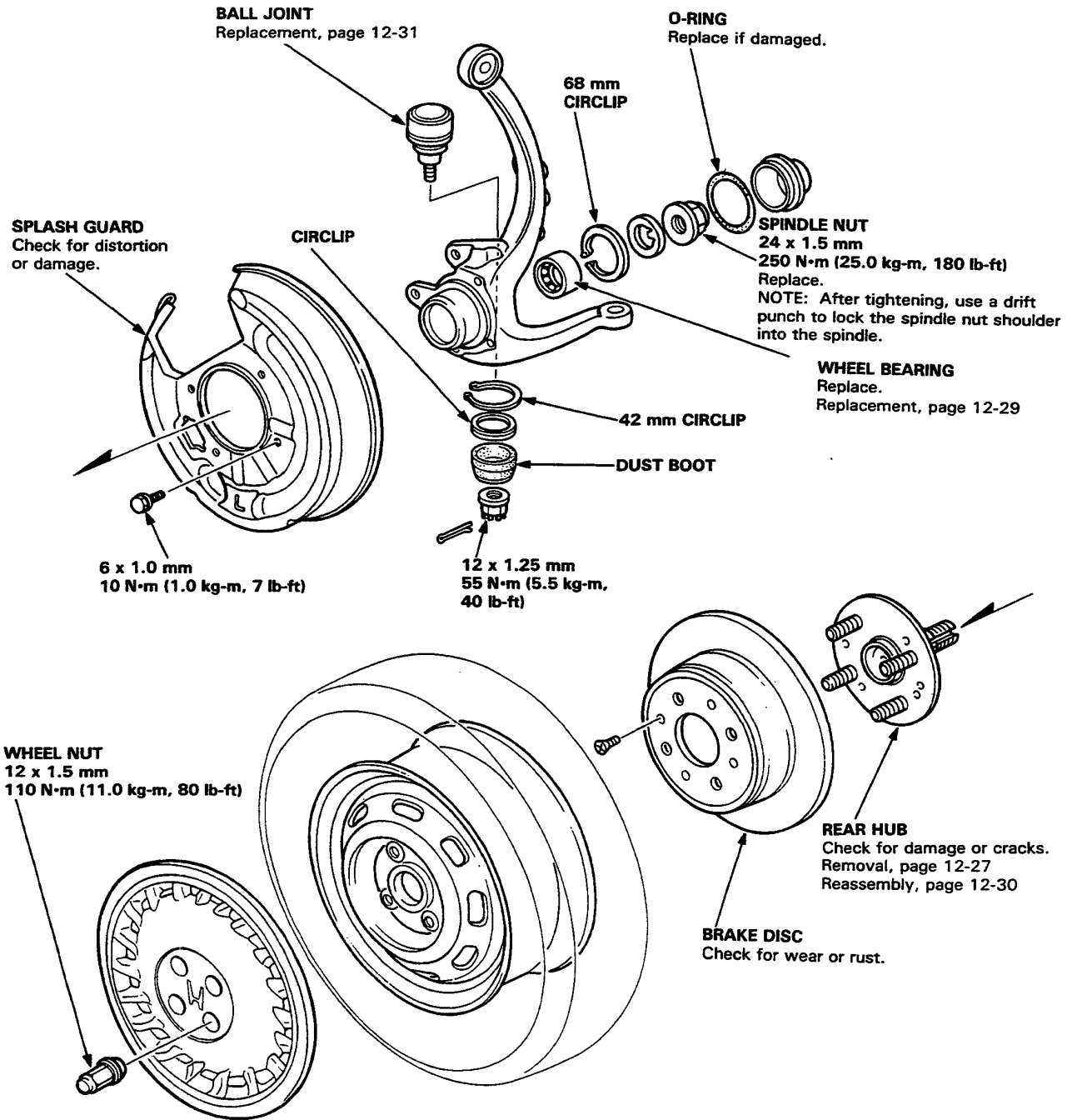
- Replace self-locking nuts after disassembly.
- Replace self-locking bolts if you can easily thread a nut past their nylon locking inserts.



**CAUTION:** The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

# Knuckle/Hub

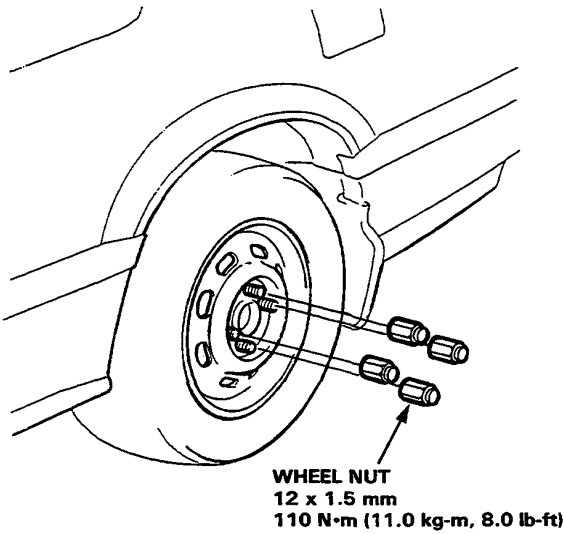
## Index



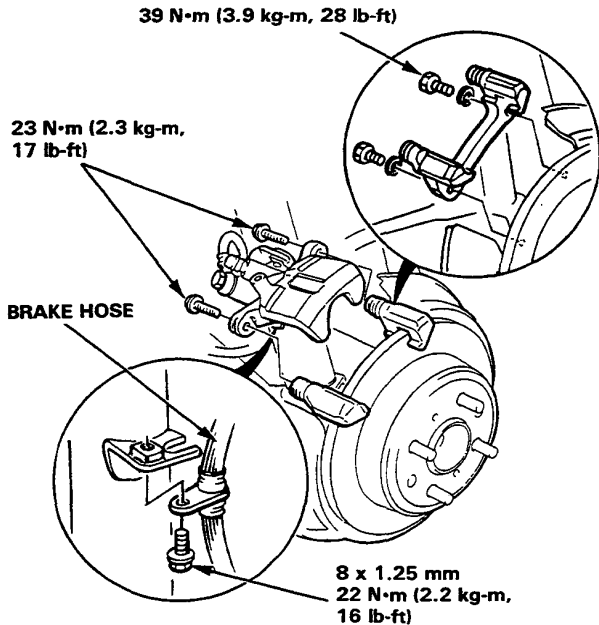


# Removal

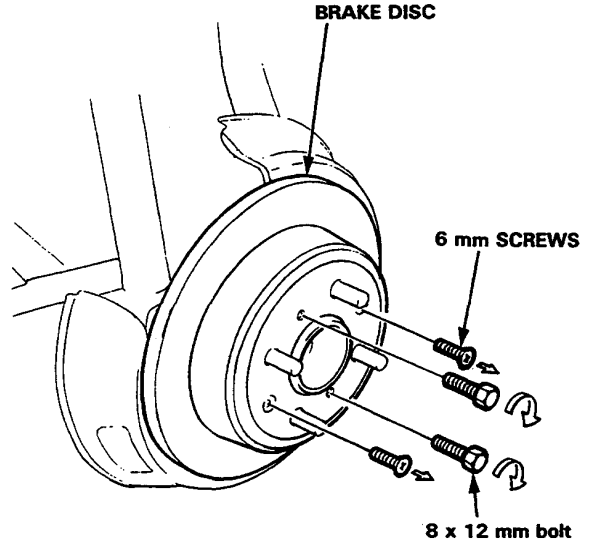
1. Remove the wheel nut.



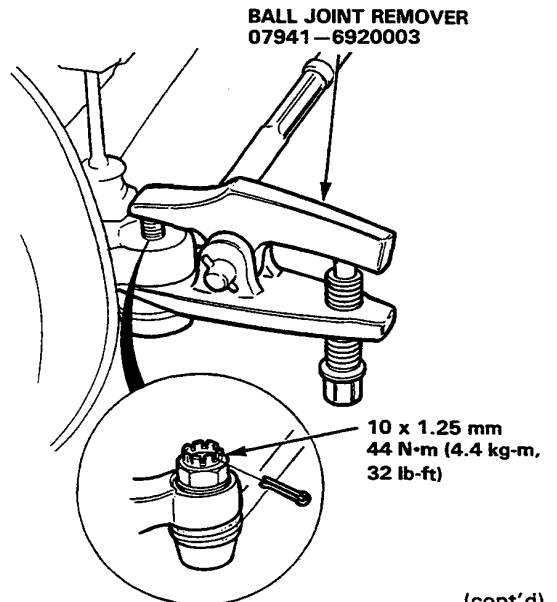
2. Raise the rear of the car using a jack, then place the safety stands on the side sill reinforcing section.
3. Remove the rear wheel.
4. Remove the two caliper mounting bolts, then remove the caliper assembly from the knuckle.
5. Remove the bolts in the brake hose clamp section, then hang the caliper assembly onto the body using wire.



6. Remove the 6 mm screws from the brake disc.
7. Tighten the 8 x 12 mm bolts evenly into the holes, then remove the brake disc from the rear hub.



8. Remove the cotter pin of the lower arm B or the tie-rod end, then remove the castle nut.
9. Separate the tie-rod ball joint using the Ball Joint Remover (special tool).



(cont'd)

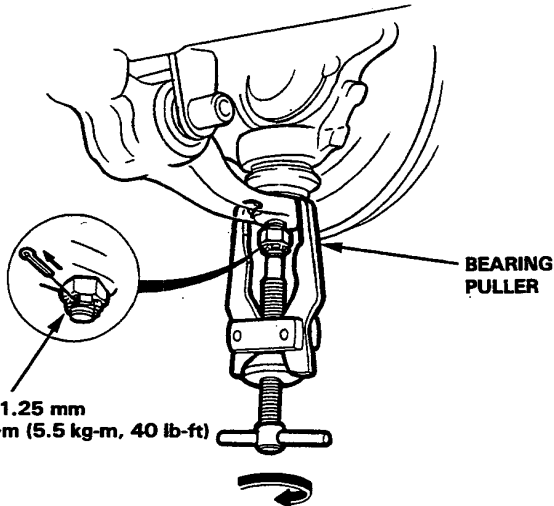
# Knuckle/Hub

## Removal (cont'd)

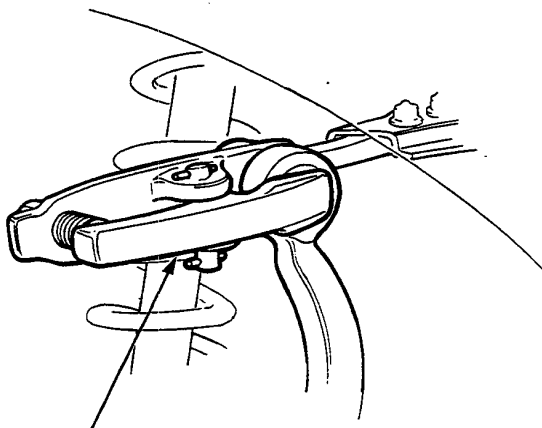
10. Pry the cotter pin off and loosen the lower arm ball joint nut half the length of the joint threads.
11. Separate the ball joint and lower arm using a puller with the pawls applied to the lower arm.

**CAUTION:** Avoid damaging the ball joint boot.

**NOTE:** If necessary, apply penetrating type lubricant to loosen the ball joint.

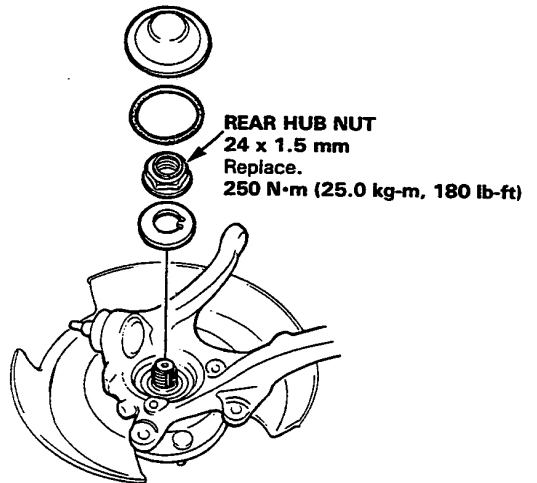


12. Remove the cotter pin, then remove the castle nut.
13. Separate the tie-rod ball joint using the Ball Joint Remover (special tool).
14. Tap the out-board joint of the driveshaft to extract it from the knuckle, then remove the knuckle.

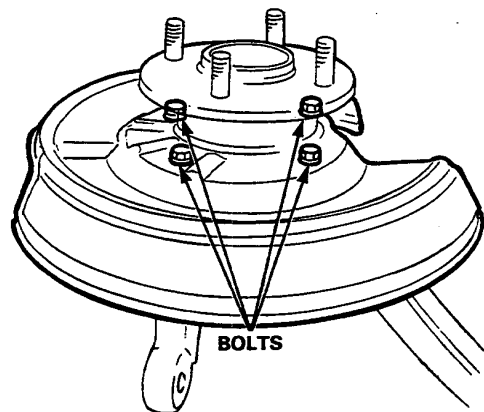


**BALL JOINT REMOVER**  
07941-6920003

15. Remove the rear hub nut from the rear hub.



16. Remove the splash guard mounting bolts.



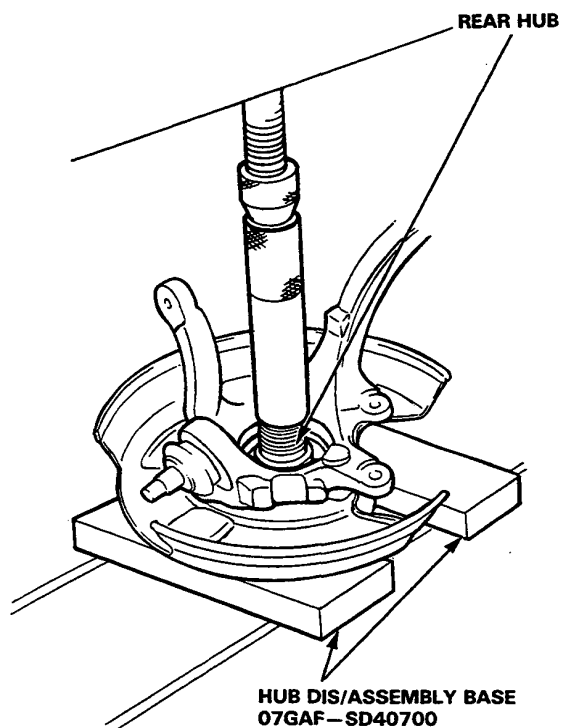


## Removal (cont'd)

17. Separate the hub from the knuckle using a hydraulic press and the special tools shown below.

### CAUTION:

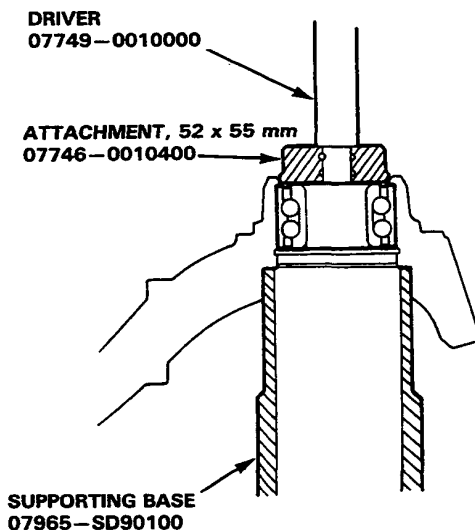
- Set the rear hub at the hub dis/assembly base firmly so that the knuckle will not tilt disassembly.
- Take care not to distort the splash guard.
- Hold onto the hub to keep it from falling when pressed clear.



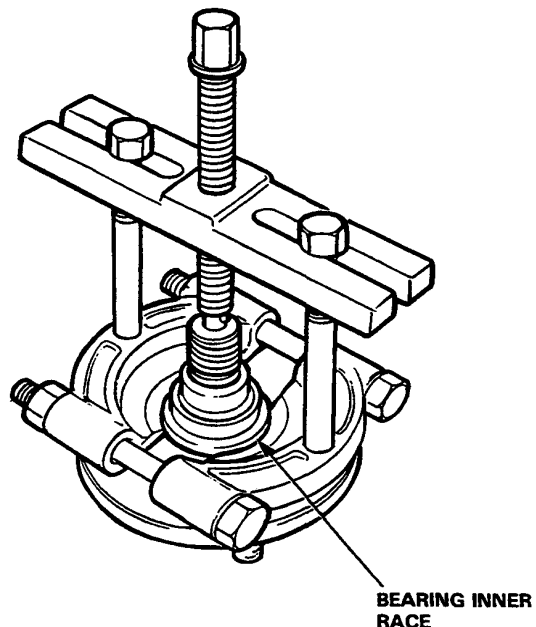
## Bearing Removal

NOTE: Replace the bearing with a new one after removal.

1. Remove the splash guard and 68 mm circlip from the knuckle.
2. Press the wheel bearing out of the knuckle using a hydraulic press and the special tools shown below.



3. Remove the bearing inner race using a commercially available bearing remover.

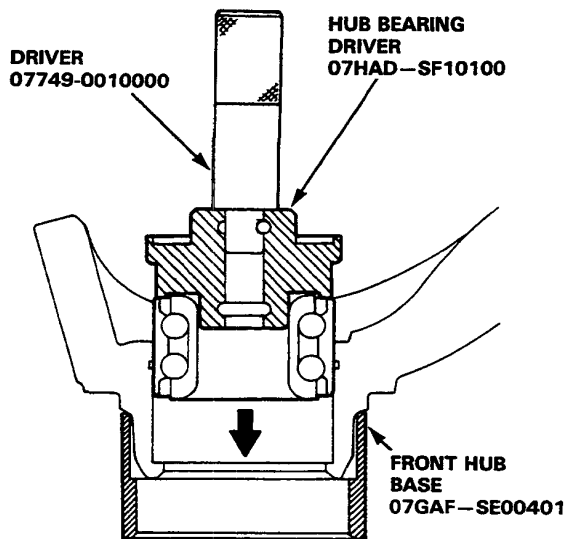


# Knuckle/Hub

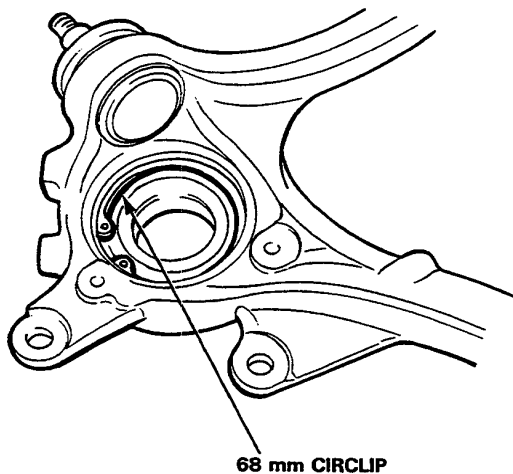
## Reassembly

1. Place the rear wheel bearing in special tool fixture, then set the knuckle in position and apply downward pressure with a hydraulic press.

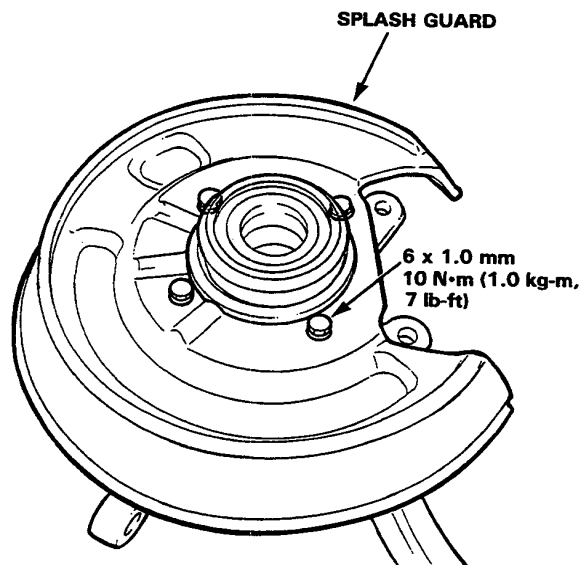
**CAUTION:** Maximum press load: 4 tons



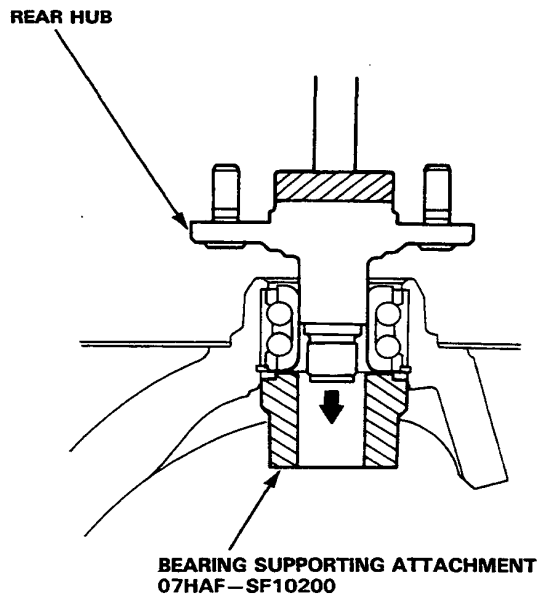
2. Fit the 68 mm circlip into the groove of the knuckle.



3. Install the splash guard.



4. Place the rear hub in special tool fixture, then set the knuckle in position and apply downward pressure with a hydraulic press.



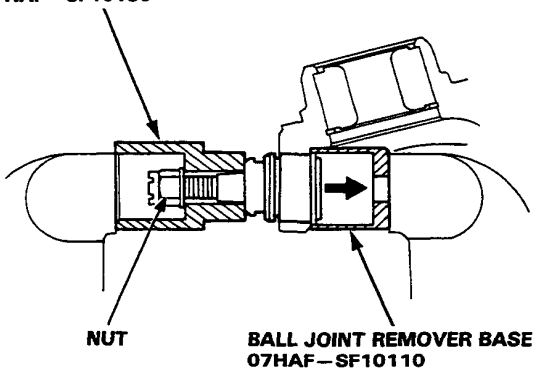
5. Place the rear hub nut and tighten it.



## Lower Ball Joint Replacement

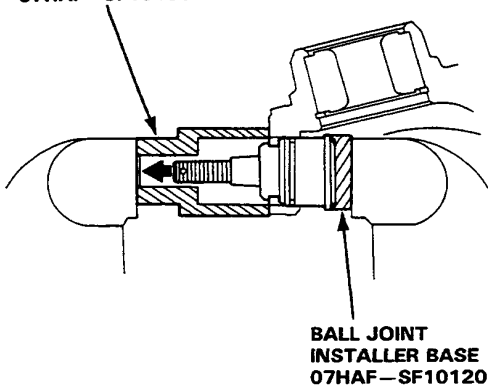
1. Remove the knuckle (page 12-27).
2. Remove the boot by prying the snap ring off.
3. Remove the 42 mm circlip.
4. Install the Ball Joint Remover/Installer on the ball joint and tighten the ball joint nut.
5. Position the Ball Joint Remover Base over the ball joint as shown below, then place the assembly in a vise. Press the ball joint out of the knuckle.

**BALL JOINT REMOVER/INSTALLER**  
07HAF-SF10130



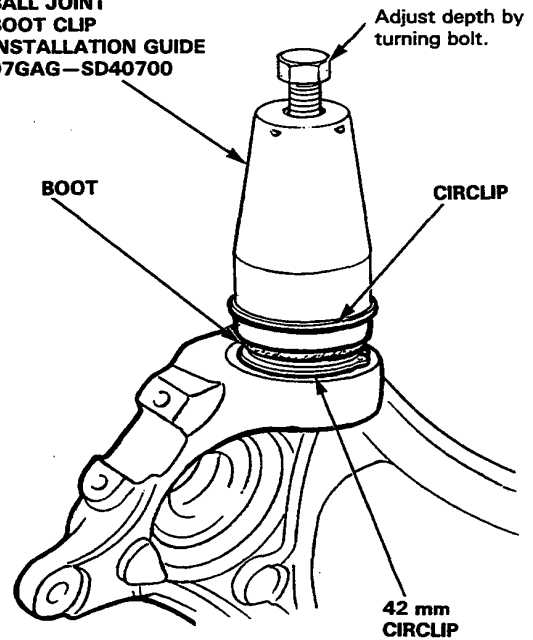
6. Place the new ball joint in position by hand.
7. Install the Ball Joint Installer Base over the ball joint as shown below, then press in the ball joint.

**BALL JOINT REMOVER/INSTALLER**  
07HAF-SF10130



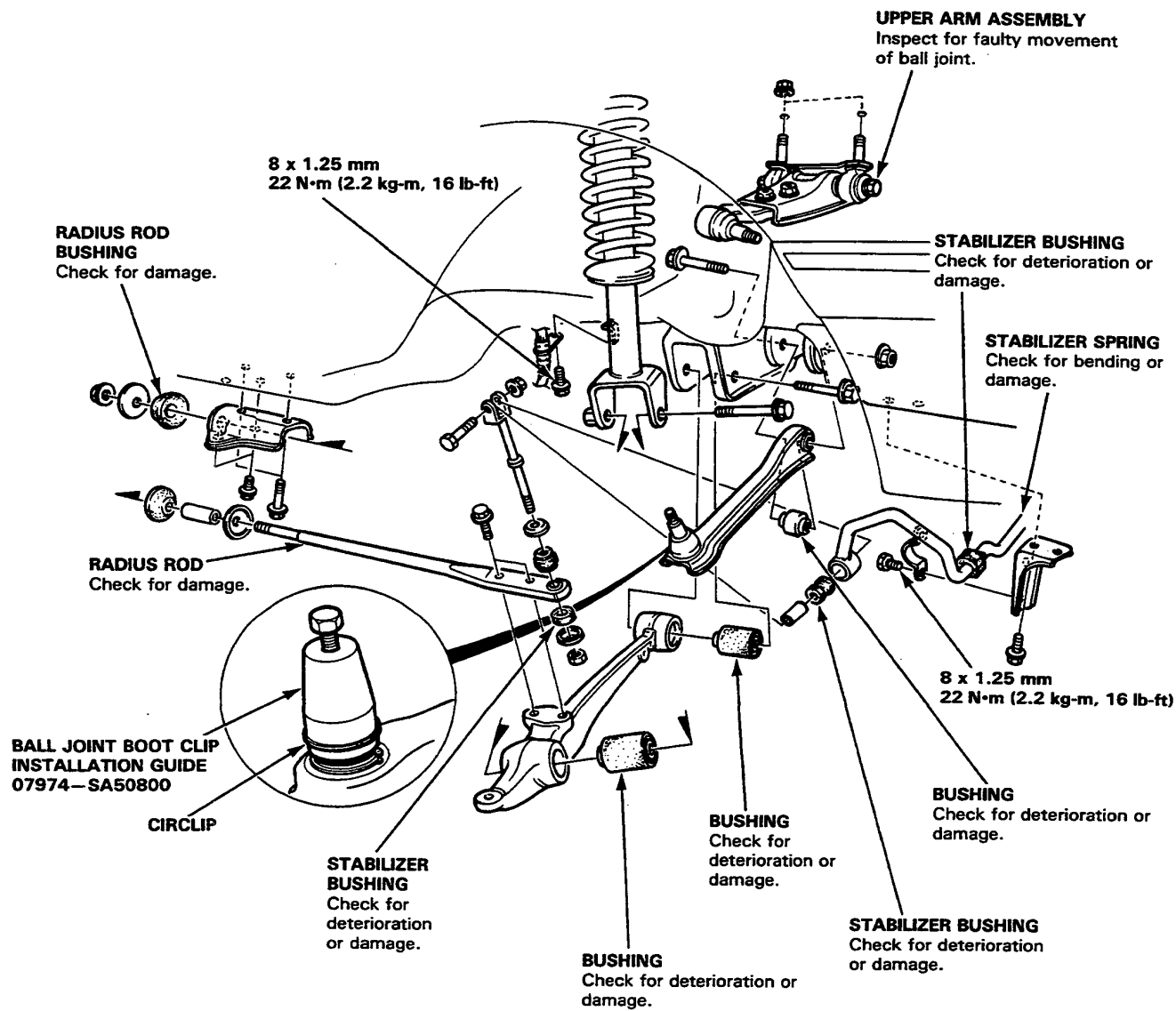
8. Install the 42 mm circlip.
9. Install the boot and circlip using the Ball Joint Boot Clip Installation Guide.

**BALL JOINT BOOT CLIP INSTALLATION GUIDE**  
07GAG-SD40700



# Upper Arm/Stabilizer/Radius Rod/Lower Arm

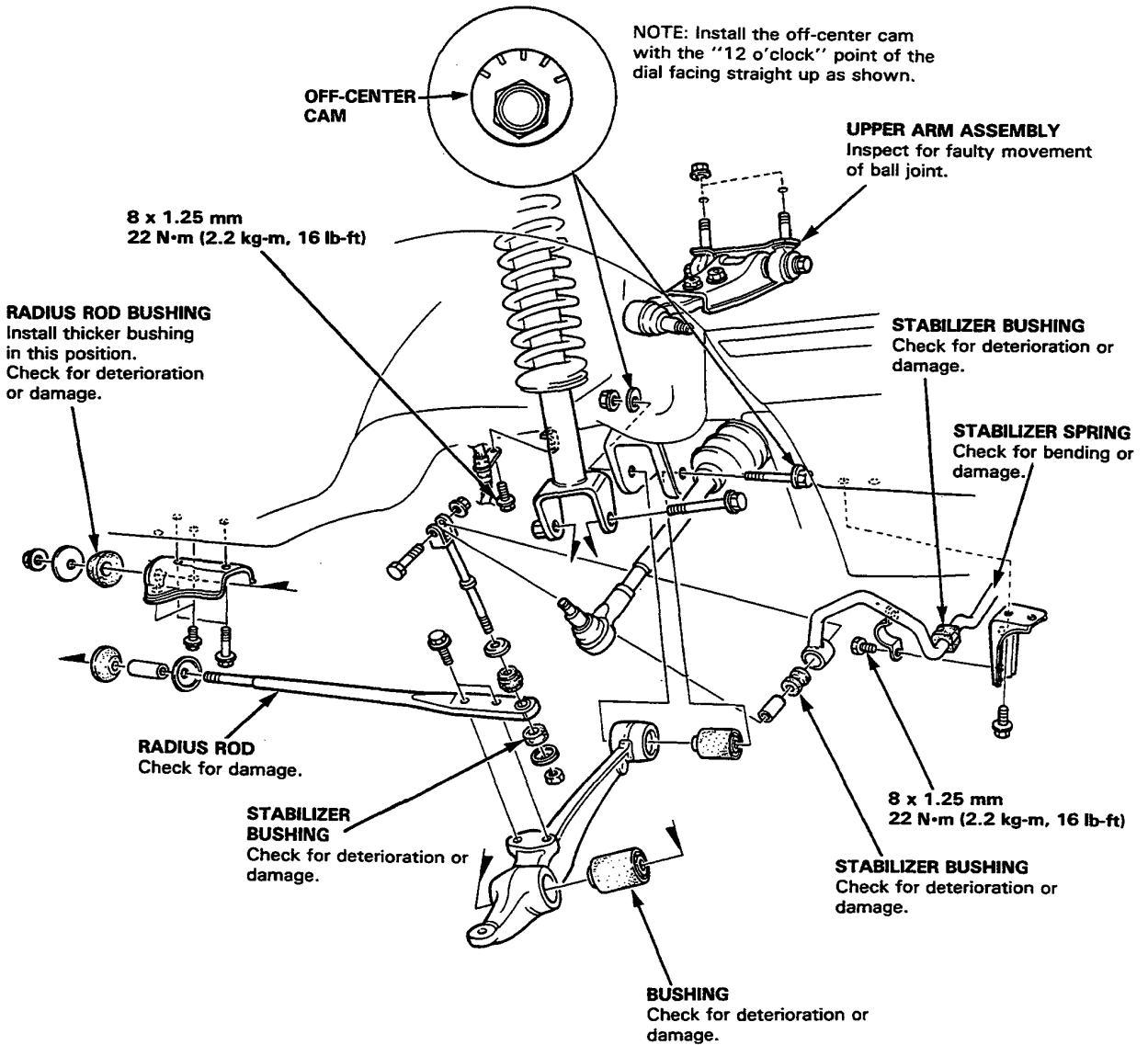
Index/Inspection (2WS)







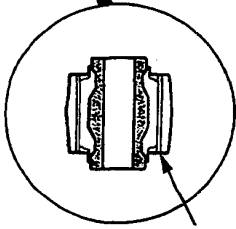
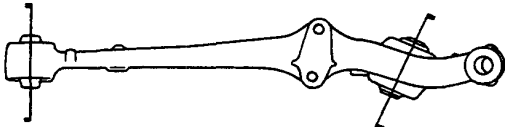
(4WS)



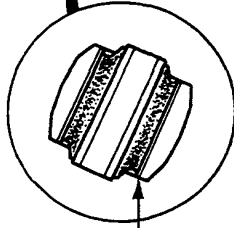
# Rear Suspension

## Bushing Installation

### Lower arm

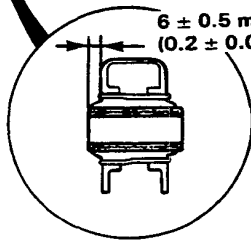


No projection



No projection

### Lower arm B

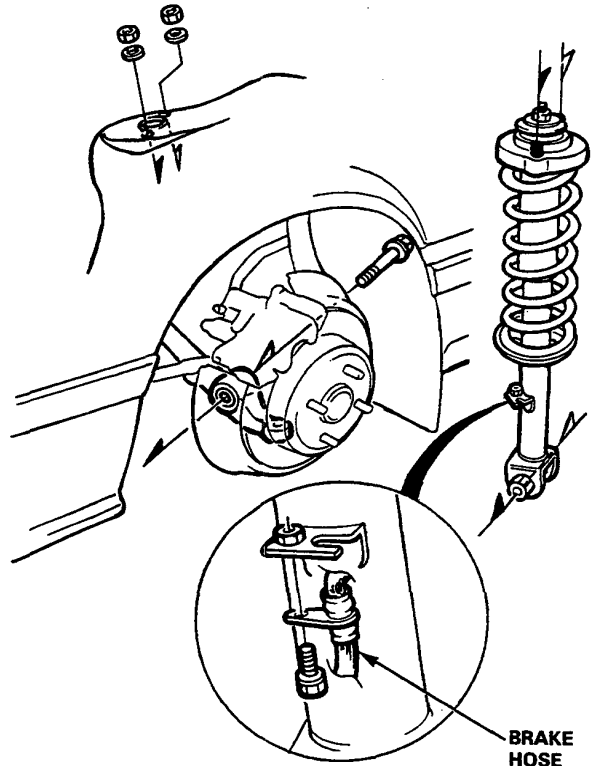


$6 \pm 0.5 \text{ mm}$   
 $(0.2 \pm 0.02 \text{ in})$

# Rear Damper

## Removal

1. Remove the bolt fixing the brake hose to the damper assembly.
2. Peel off the carpet in the luggage compartment, then remove the 10 mm nuts.
3. Remove the damper mounting bolt.
4. Depress the entire suspension, then remove the damper assembly.



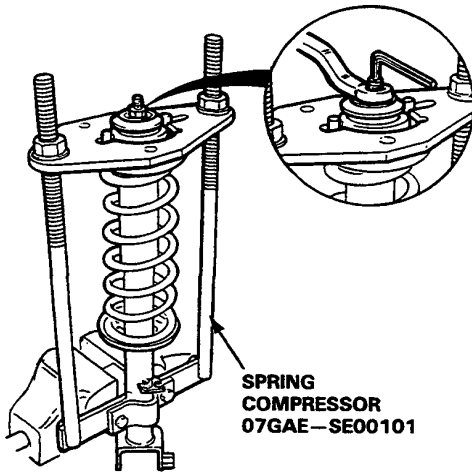


## Disassembly/Inspection

1. Compress the damper spring using a spring compressor.

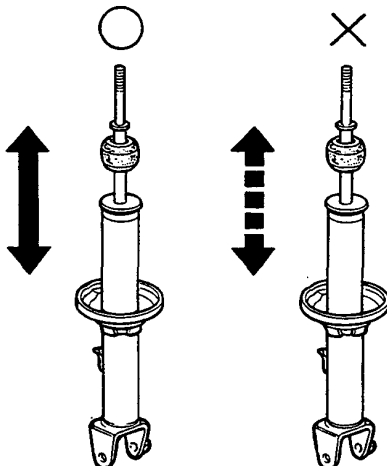
**CAUTION:** Do not compress the spring more than necessary to remove the 10 mm self-locking nut.

2. Remove the 10 mm self-locking nut from the damper assembly.



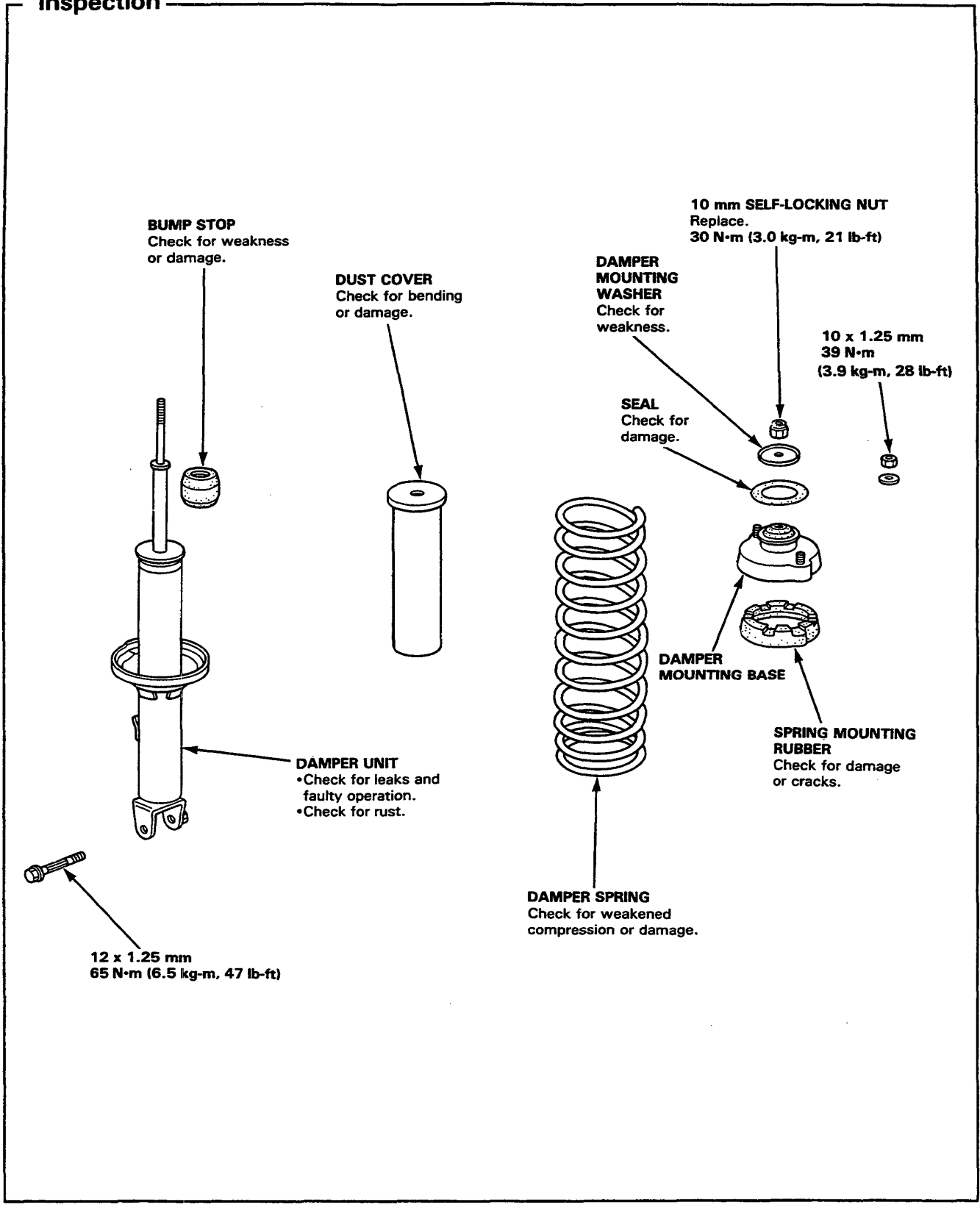
3. Remove the spring compressor and disassemble the damper as shown on next page.
4. Check for smooth operation through a full stroke, both compression and extension.
5. Also check for smooth operation in soft strokes of 5–10 cm (2–4 in). Replace the damper if resistance is uneven or jerky.

6. Check for oil leaks, abnormal noises or binding during these tests.



# Rear Damper

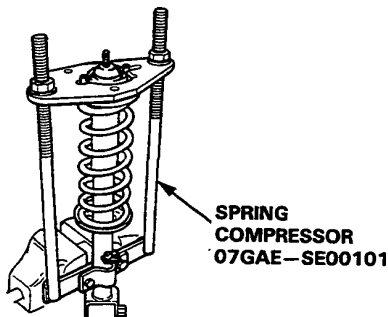
## Inspection



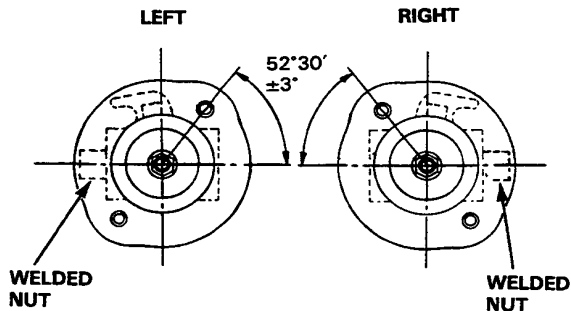


## Reassembly

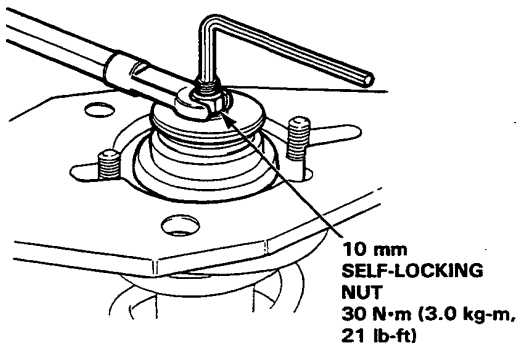
1. Install the damper unit on a spring compressor.
2. Install the spring seat, bump stop, dust cover sleeve, damper spring, bump stop plate, damper mounting collar, damper mounting rubber, spring mounting rubber and damper mounting base on the damper unit.
3. Compress the damper spring.



**CAUTION:** Install the damper mounting base so that the angle of the stud bolts is as shown.



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.

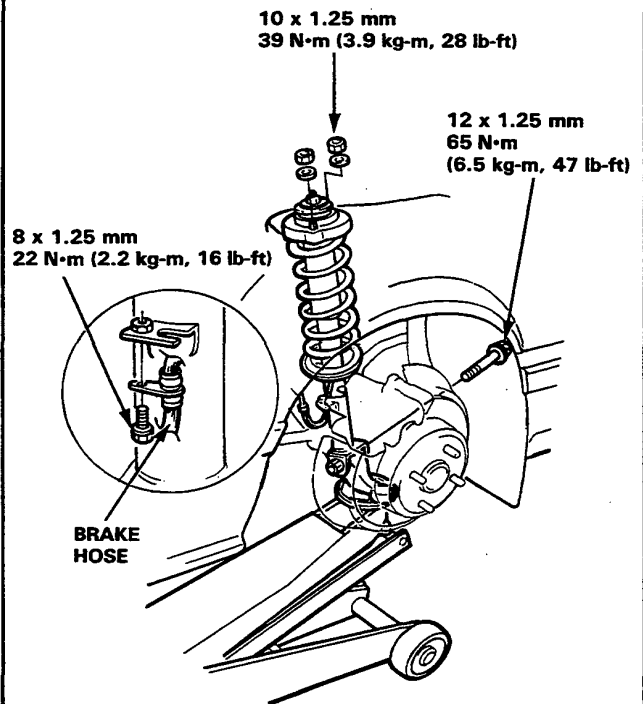


## Installation

1. Lower the rear suspension and set the damper assembly in its original position.
2. Loosely install the damper mounting bolts.
3. Install and tighten the damper mounting nuts.
4. Install and tighten the upper arm mounting bolts.
5. Raise the rear suspension with a floor jack until the weight of the car is on the damper.

**NOTE:** The damper mounting bolts should be tightened with the damper under vehicle load.

6. Tighten the damper mounting bolts.



## **Brakes**

<b>Conventional Brakes .....</b>	<b>13-1</b>
<b>ALB .....</b>	<b>13-39</b>



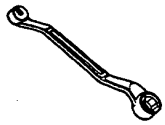
## Brakes

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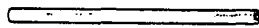


# Special Tools

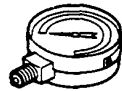
Special Tools				
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07921-0010001	Flare Nut Wrench	1	
②	07510-6340300	Vacuum Joint Tube A	1	
③	07404-5790300	Vacuum Gauge	1	
④	07410-5790500	Tube Joint Adaptor	1	
⑤	07406-5790200	Pressure Gauges	2	
⑥	07410-5790100	Pressure Gauge Attachment	2	
⑦	07510-6340100	Pressure Gauge Joint Pipe	2	
⑧	07749-0010000	Driver	1	
⑨	07947-6890300	Driver Attachment C	1	
⑩	07GAG-SE00100	Rod Bolt Adjustment Gauge	1	
⑪	07HAE-SG00100	Brake Spring Compressor	1	
⑫	07914-SA50000	Snap Ring Pliers	1	



①



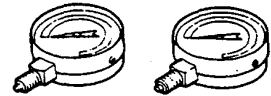
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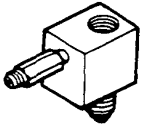
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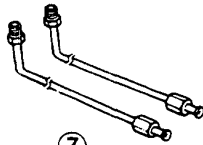
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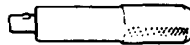
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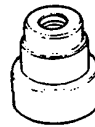
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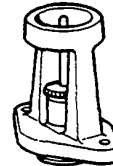
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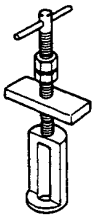
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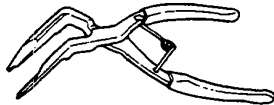
⑨



⑩



⑪

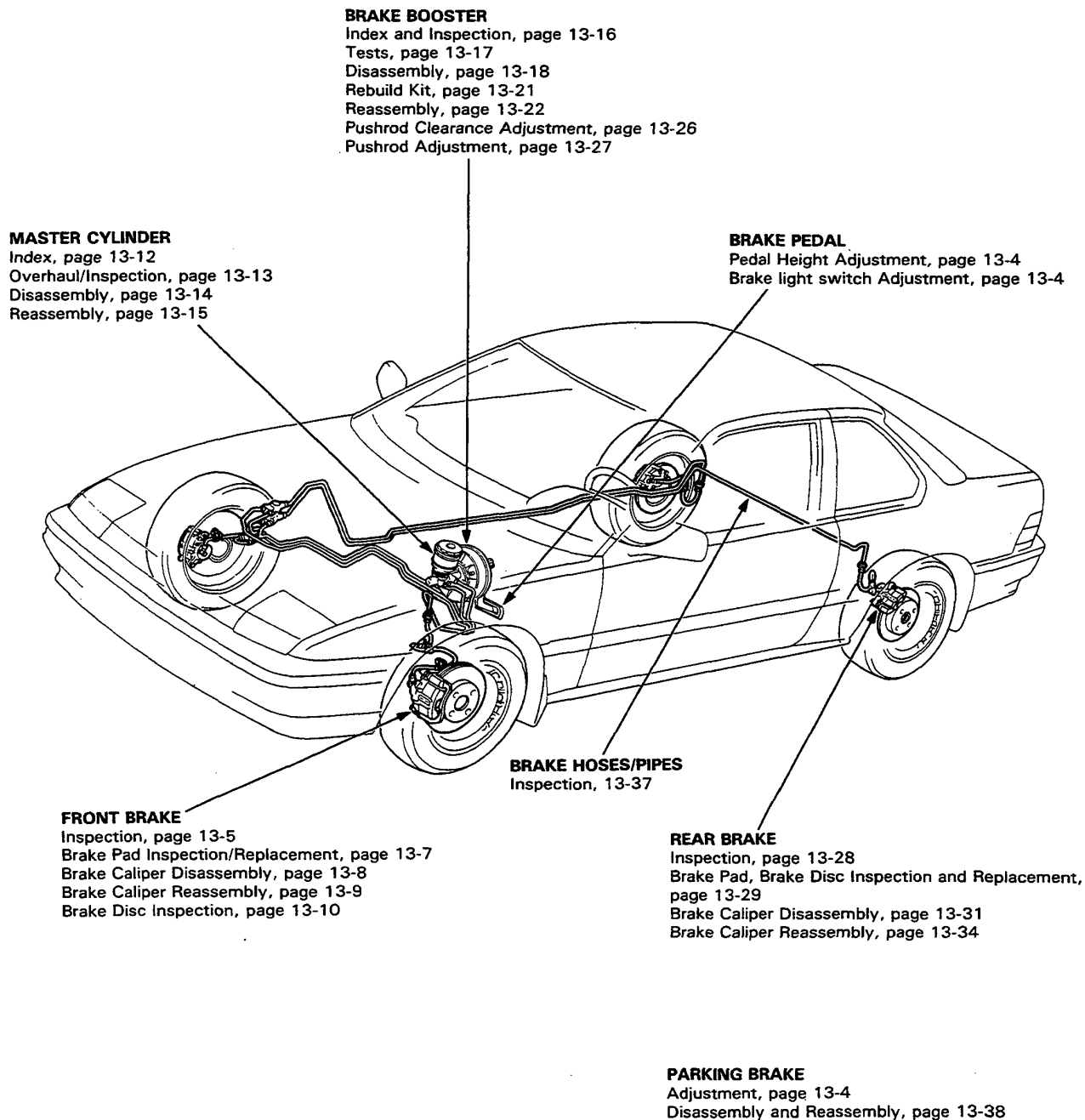


⑫



# Brakes

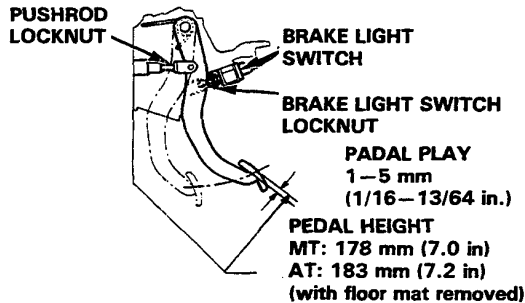
## Illustrated Index



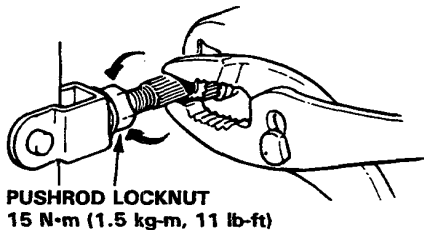
# Pedal Height

## Adjustment

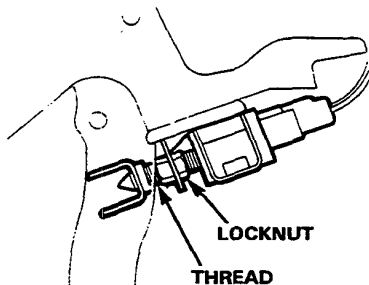
1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.



2. Loosen the pushrod locknut and screw the push rod in or out with pliers until the pedal height from the floor is 170.6 mm (6-11/16 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 lock nut 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 push rod depressed.

**CAUTION:** If the pedal free play is out of specification, brake drag may occur.

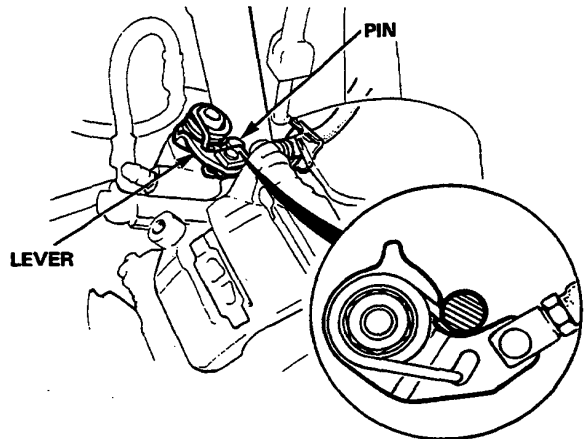
# Parking Brake

## Adjustment

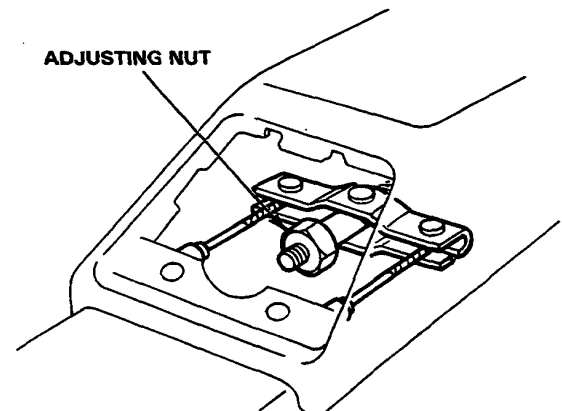
**NOTE:** After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brakes before adjusting the brake pedal.

**WARNING** Block the front wheels before jacking up the rear of the car.

1. Raise the rear wheels off the ground.
2. Make sure the lever of the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up one notch.
4. Tighten the adjusting nut until the rear wheels drag slightly when turned.
5. Release the parking lever and check that the rear wheels do not drag when turned. Readjust if necessary.
6. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 7 to 11 clicks.





# Front Brakes

## Inspection

### CARB:

**WARNING** Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.

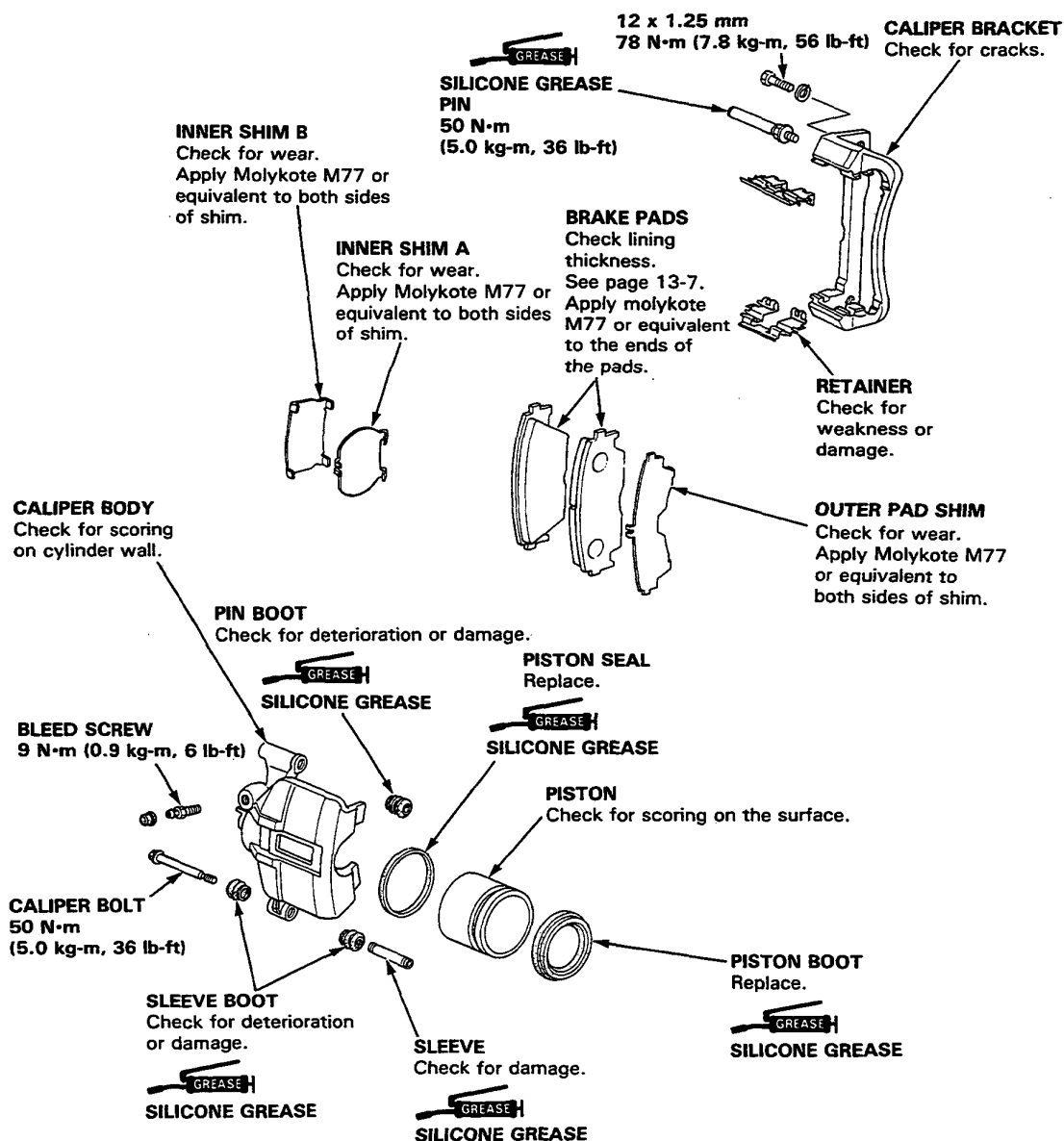
### CAUTION:

- 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.

### NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

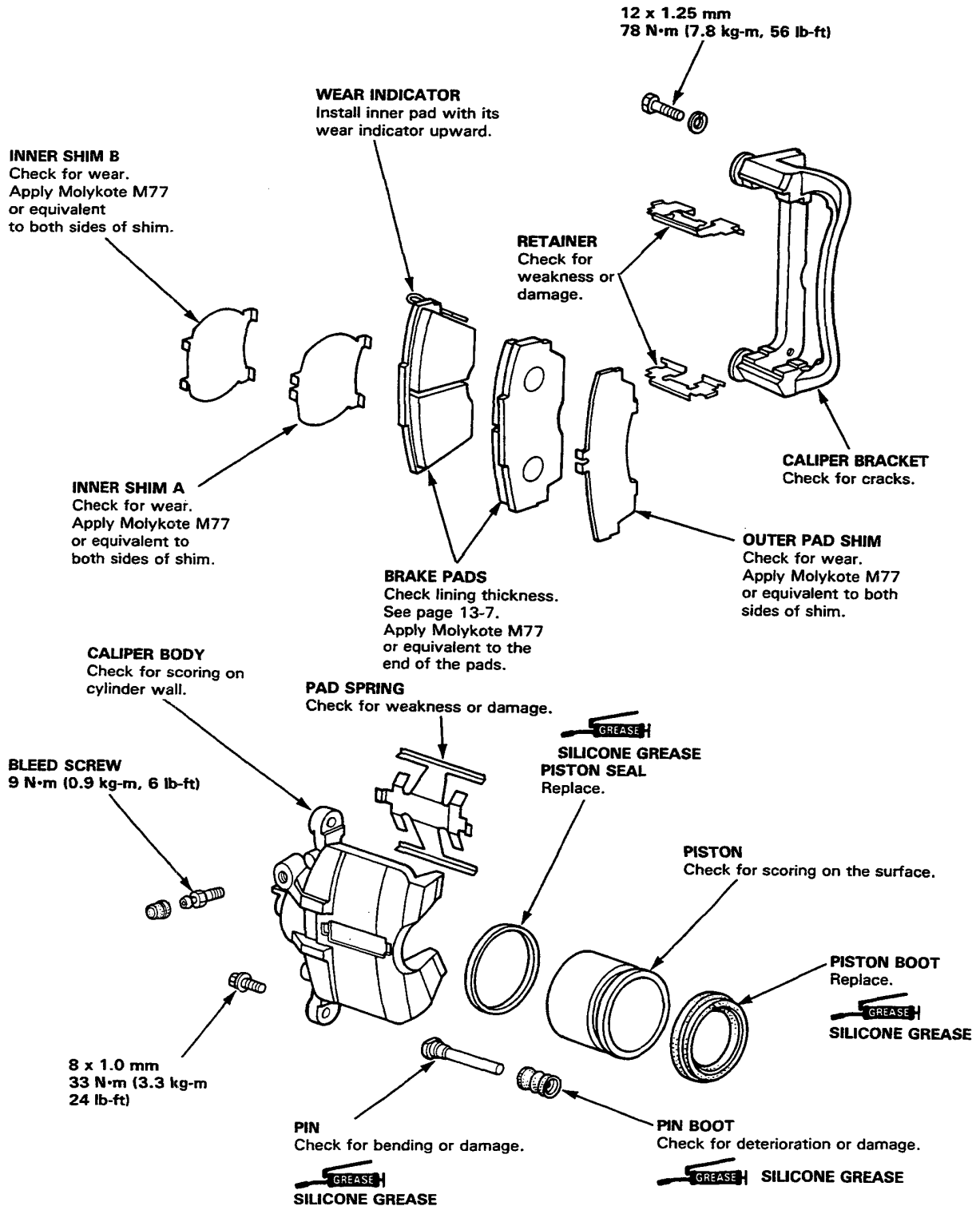


(cont'd)

# Front Brakes

## Inspection (cont'd)

PGM-FI



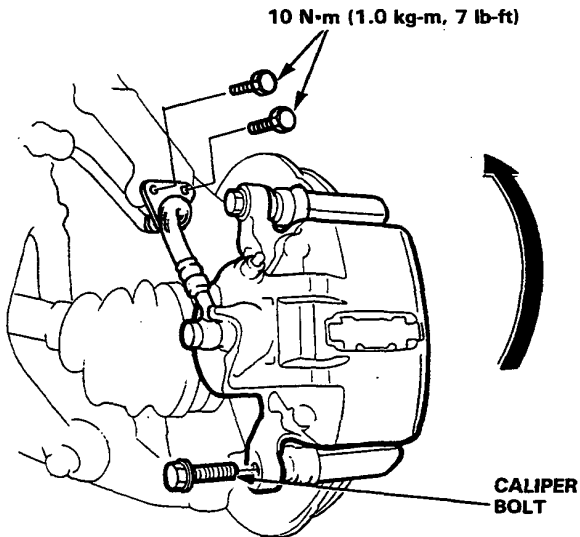
# Brake Pad



## Inspection/Replacement

**WARNING** Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.

1. Remove the front wheels and support the front of car on safety stands.
2. Remove caliper bolt, brake hose bolts and pivot caliper up out of the way.



3. Remove the pad shim, pad retainers and pads.
4. Using a vernier caliper, measure the thickness of each brake pad lining.

### Brake Pad Thickness:

#### CARB.

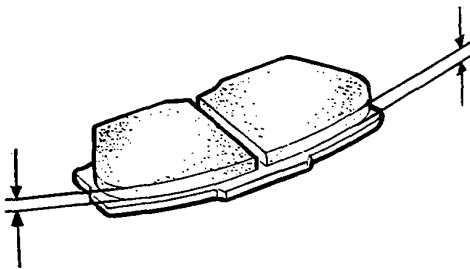
Standard: 9.0 mm (0.34 in)

Service Limit: 3.0 mm (0.12 in)

#### PGM-FI

Standard: 11.5 mm (0.45 in)

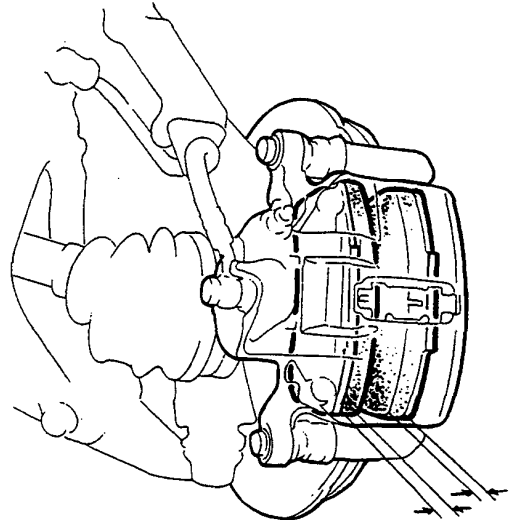
Service Limit: 1.6 mm (0.06 in)



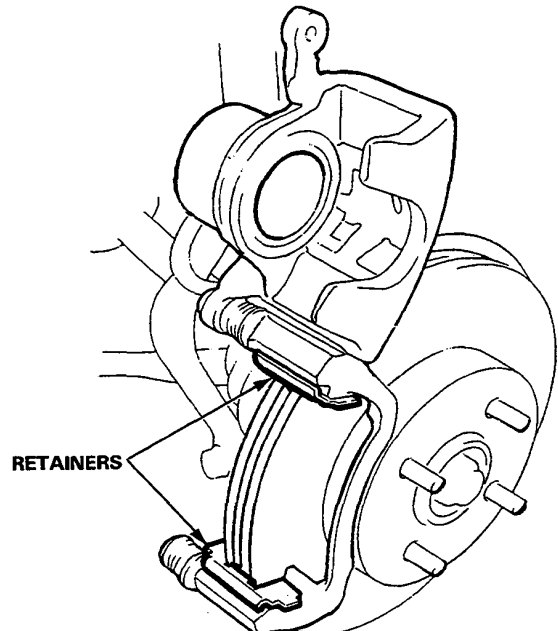
NOTE: Measurement does not include pad backing thickness.

5. If lining thickness is less than service limit, replace both 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.



6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
7. Install the pad retainers.



(cont'd)

# Brake Pad

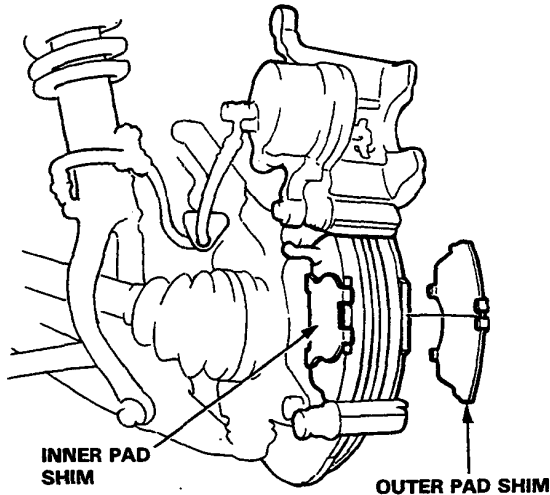
## Inspection/Replacement (cont'd)

8. Apply MOLYKOTE M77 or equivalent to both surfaces of the shim and back of the pads.

9. Install the brake pads.

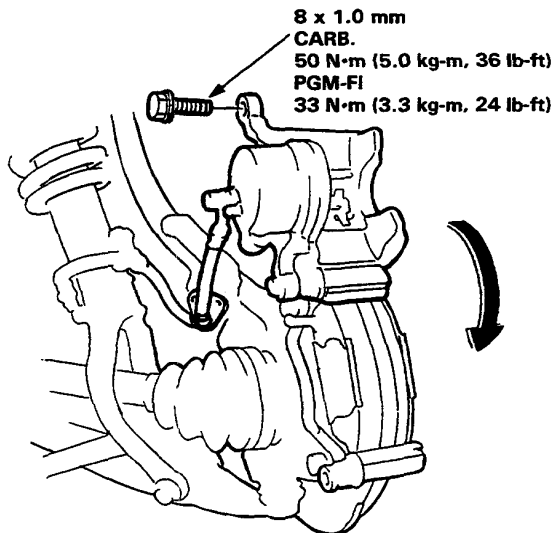
NOTE: Apply MOLYKOTE M77 or equivalent between the shims and pads.

10. Install the brake pad shims correctly.



11. Push in the piston so that the caliper will fit over the pads.

12. Pivot the caliper down into position, then install the caliper bolt and tighten it.



13. Connect the brake hose to the knuckle.

14. Depress the brake pedal several times to make sure the brakes work, then road-test.

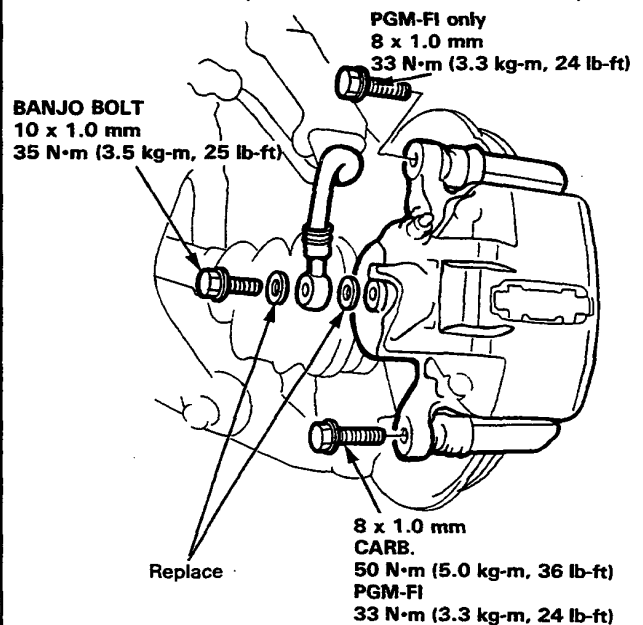
# Brake Caliper

## Disassembly

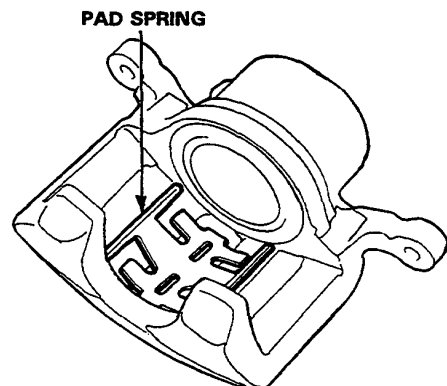
### CAUTION:

- 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 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.



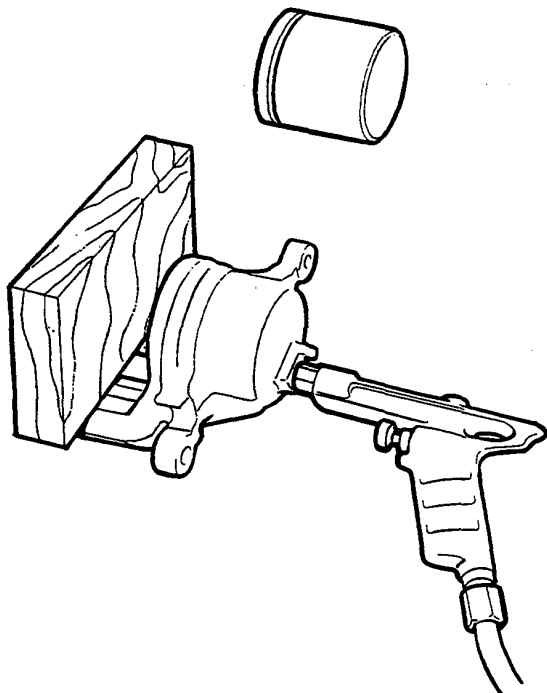
(cont'd)



4. Place a wooden block or shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

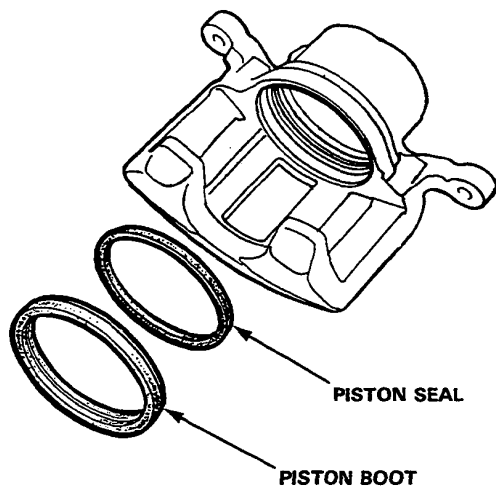
**WARNING**

- 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 boot and piston seal.

**CAUTION:** Take care not to damage the cylinder.

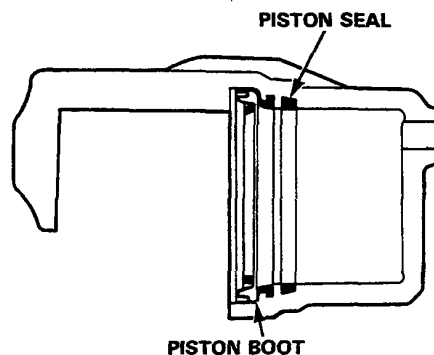


## Reassembly

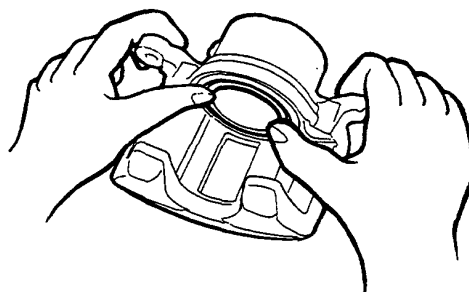
**CAUTION:**

- 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 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 piston and caliper bore with brake fluid and inspect for wear or damage.
2. Apply silicone grease to a new piston seal, then install the piston seal in the cylinder groove.
3. Apply silicone grease to a new piston boot, then install the piston boot.



4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



5. Reinstall the caliper in the reverse order of removal.
6. Fill the brake reservoir up and bleed the brake system (page 13-11).

# Brake Disc

## Run-Out Inspection

1. Remove the front wheels, and support the front of the car on safety stands.
2. Remove caliper pin bolt, then pivot the caliper up out of the way on the caliper pin bolt, and remove the pads and pad retainers.
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

### Brake Disc Runout:

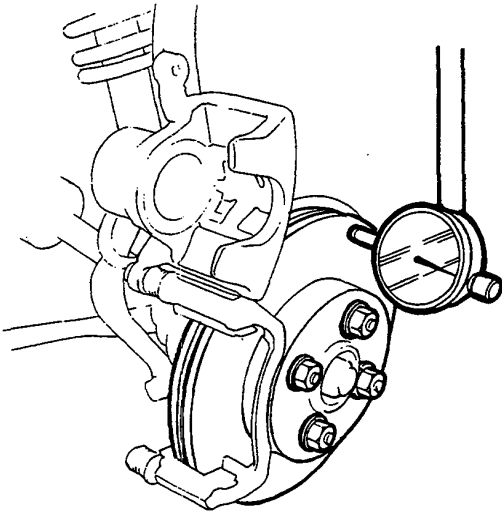
**Service Limit: 0.10 mm (0.004 in)**

### Max. Refinishing Limit:

**CARB.: 17.0 mm (0.67 in)**

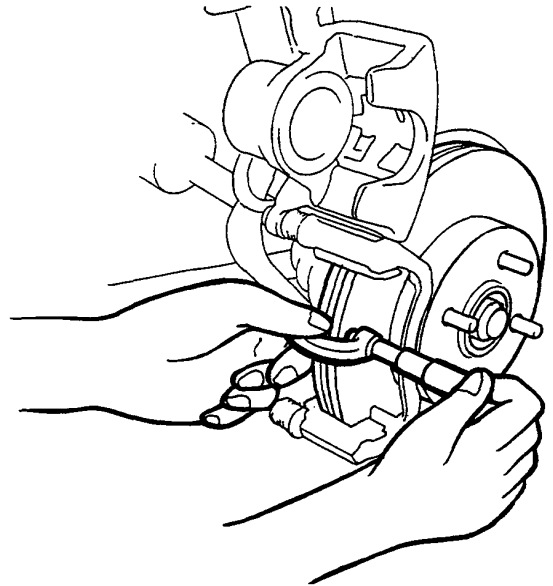
**PGM-FI: 19.0 mm (0.75 in)**

5. If the disc is beyond the service limit, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front brake disc lathe" offered by Snap-on Tools Co. are approved for this operation.



## Thickness and Parallelism Inspection

1. Remove the front wheels, and support the front of car on safety stands.
2. Move the caliper and pads out of the way as described in the preceding column.
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:

**CARB.**

**Standard: 19.0 mm (0.75 in)**

**Service Limit: 17.0 mm (0.67 in)**

**PGM-FI**

**Standard: 21 mm (0.83 in)**

**Service 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 with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front brake disc lathe" offered by Snap-on Tools Co. are approved for this operation.

**NOTE:** A new disc should be refinished if its run-out is greater than 0.10 mm (0.004 in.).



# Bleeding

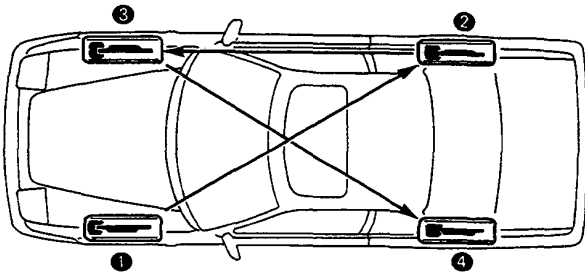


## CAUTION:

- Use only clean Brake fluid.
- Make sure not 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.

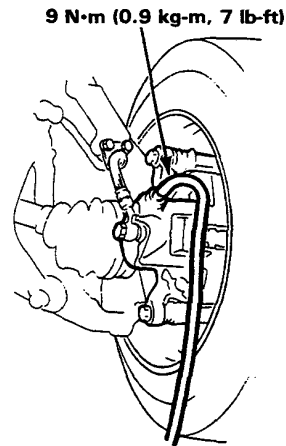
NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each wheel cylinder. Add fluid as required. Use only DOT 3 or 4 brake fluid.

## BLEEDING SEQUENCE

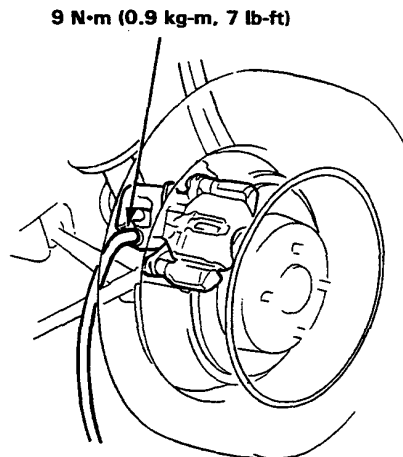


1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.

## FRONT



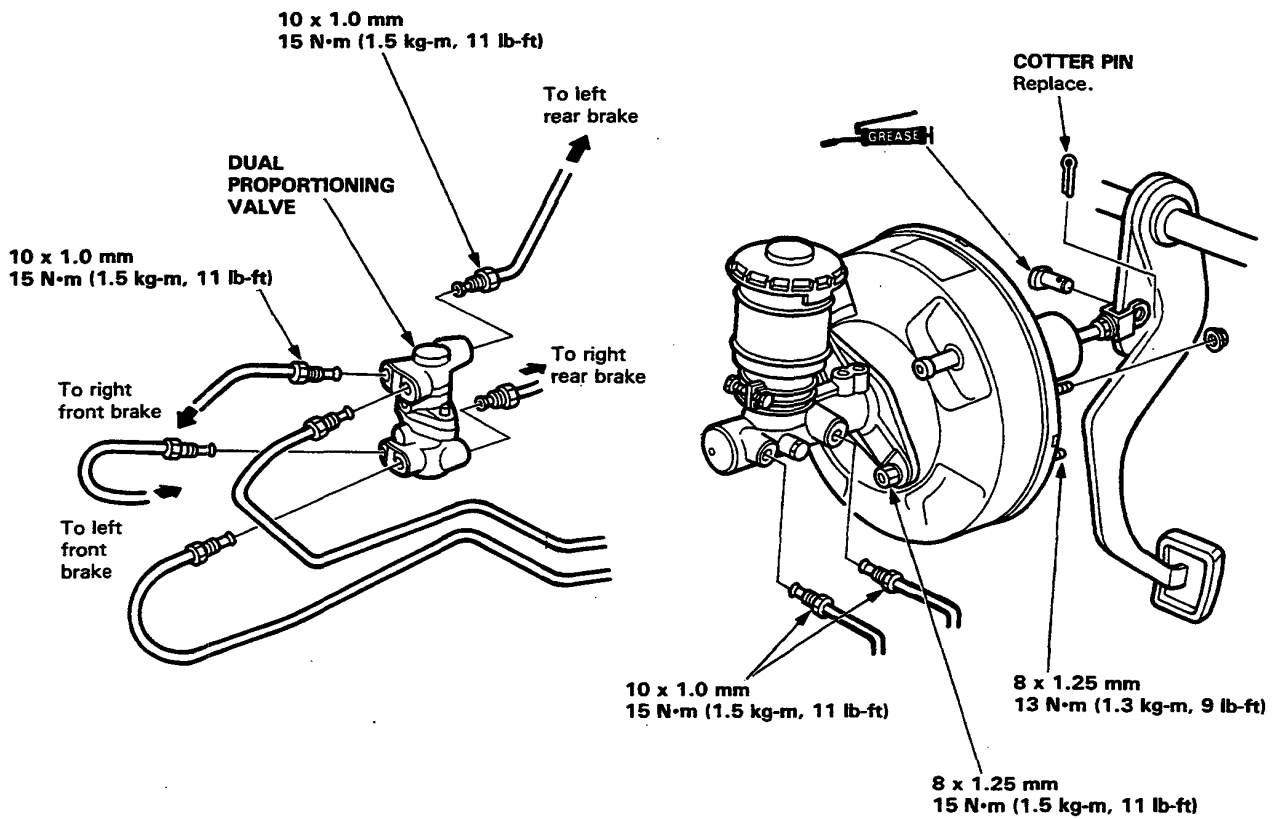
## REAR



# Master Cylinder, Brake Booster and Proportioning Valve

## Index

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# Master Cylinder

## Overhaul/Inspection

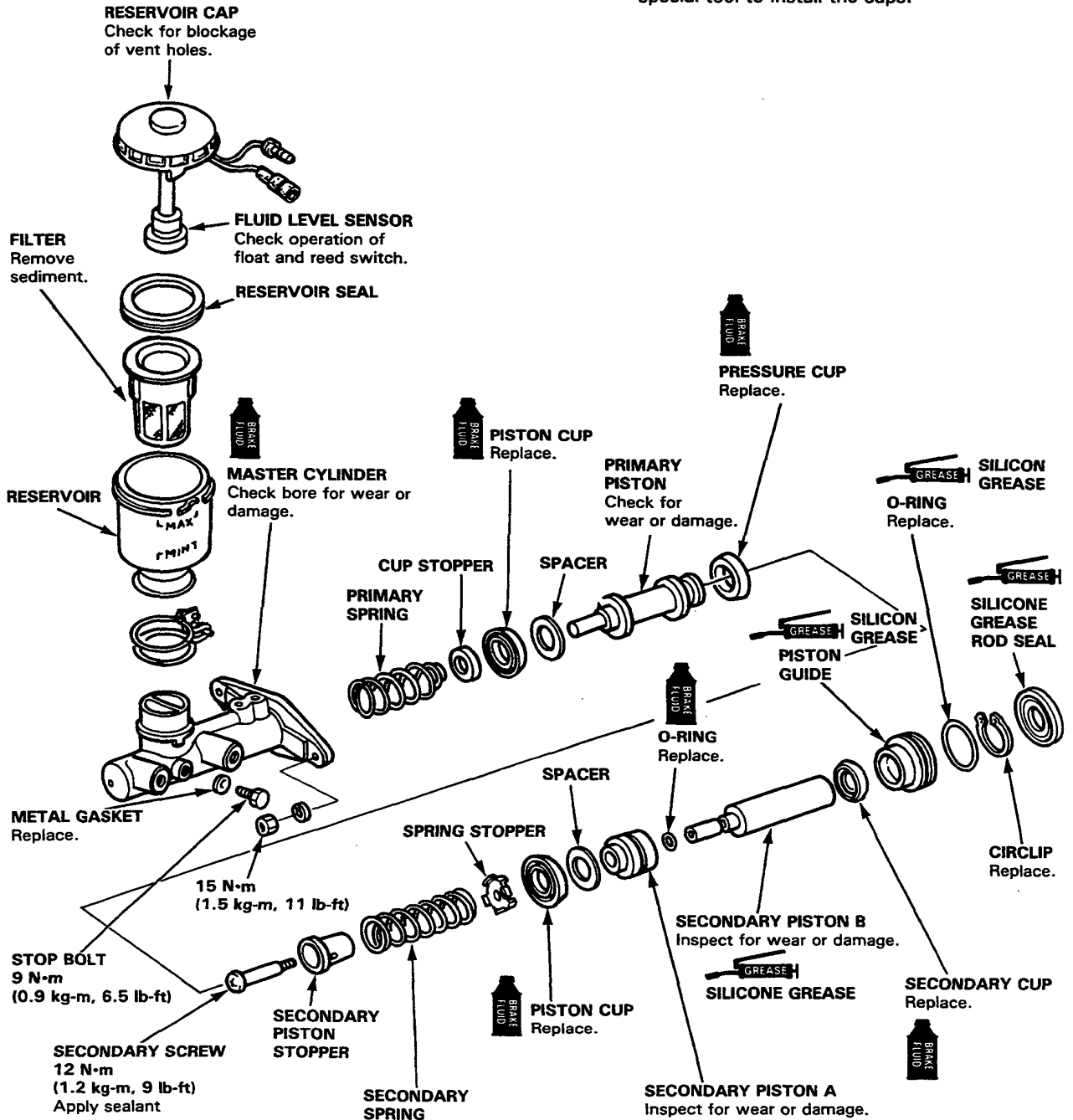


### CAUTION:

- Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.
-  This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.

### NOTE:

- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation. Use special tool to install the cups.



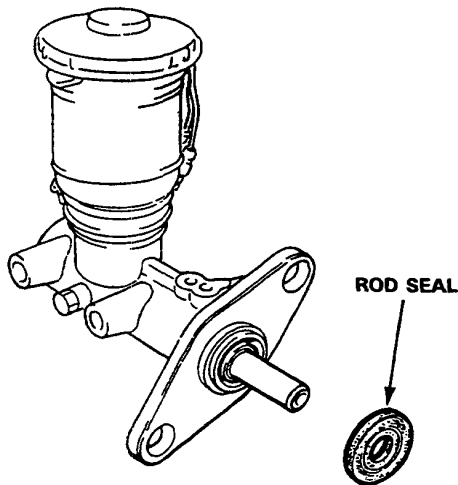
# Master Cylinder

## Disassembly

### CAUTION:

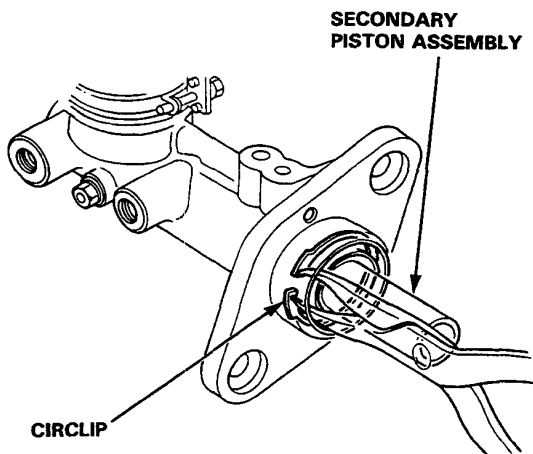
- Do not spill brake fluid on the car, it may damage the painted, plastic or rubber parts.
- To prevent spills, cover the hose joints with rags or shop towels.
- Use only new clean brake fluid.
- Clean all parts in brake fluid and air dry: blow out all passage with compressed air.
- Make sure not dirt or other foreign matter is allowed to contaminate the brake fluid.
- Be careful not to bend or damage the brake pipe when removing the master cylinder.

1. Remove the rod seal.

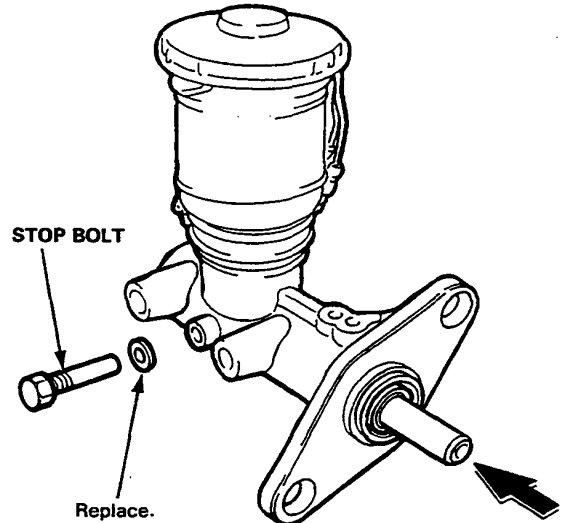


2. Push the secondary piston assembly, then remove the circlip.

**CAUTION:** Avoid damaging the master cylinder wall.



3. Remove the stop bolt while pushing in the secondary piston assembly.



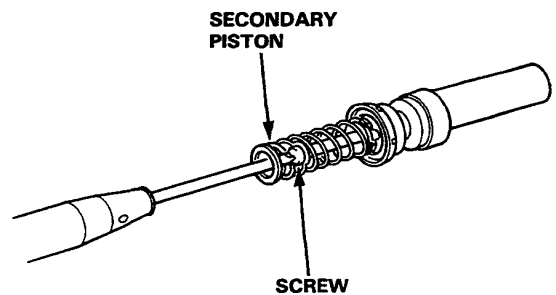
4. Remove the piston guide, secondary piston assembly and primary piston assembly.

**NOTE:** If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

### CAUTION:

- Do not use high pressure air or bring the nozzle too close to the inlet.
- Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.

5. Remove the screw from the secondary piston assembly, then remove the secondary spring.



6. Clean all parts with brake fluid.



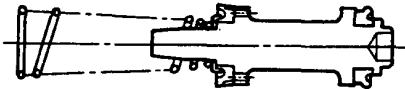
## Reassembly

### CAUTION:

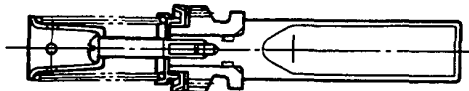
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Replace parts with new ones whenever specified to do so.
- Use only clean brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car, it may damage the painted, plastic or rubber parts.

1. Lubricate new piston assemblies with brake fluid then fit them together.

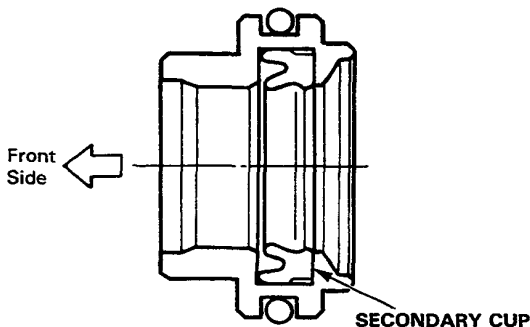
### PRIMARY PISTON ASSEMBLY



### SECONDARY PISTON ASSEMBLY



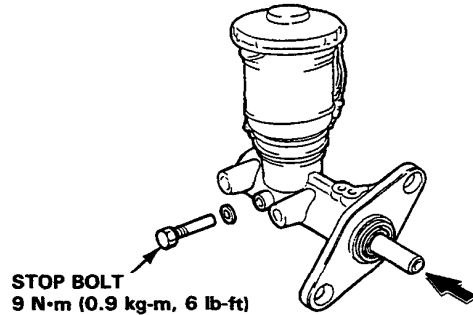
### PISTON GUIDE ASSEMBLY



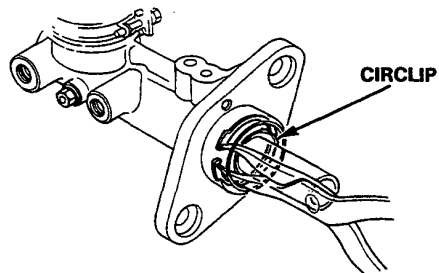
2. Install the piston assemblies in the master cylinder.

NOTE: To ease assembly, rotate the pistons while inserting.

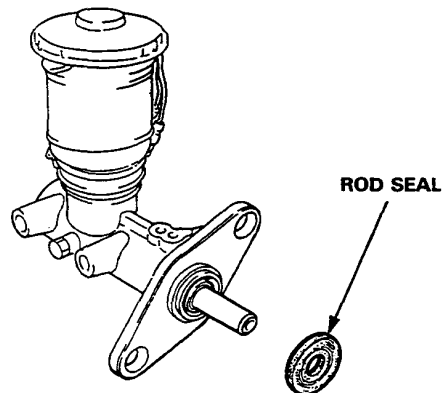
3. Install the stop bolt and new sealing washer while pushing in the secondary piston assembly, then tighten the stop bolt.



4. Install the snap ring while pushing in the secondary piston assembly.



5. Install a new rod seal.



CAUTION: When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.



# Brake Booster



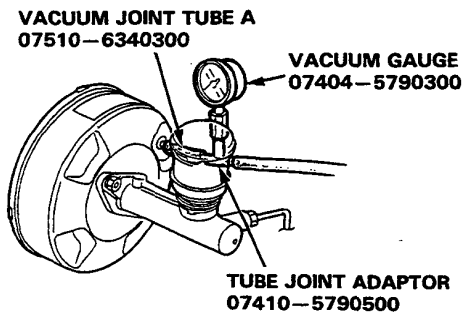
## Test

### Leak Test

1. Install the Brake Power Kit (07504-6340100) as shown.
2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 300-500 mmHg (11.8-19.7 inHg), then stop the engine.
3. Read the vacuum gauge.

If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.

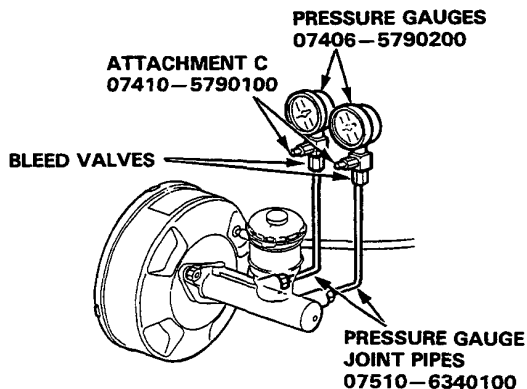
- Check valve
- Vacuum hose
- Seals
- Diaphragm
- Master cylinder O-ring and cup



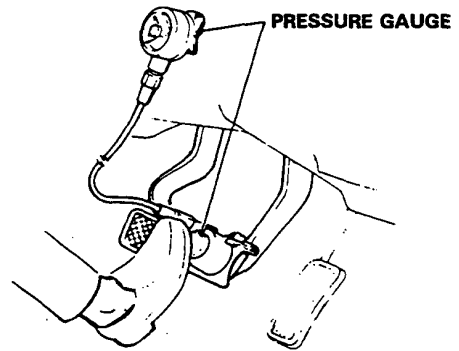
### Function Test

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

**CAUTION:** Avoid spilling brake fluid on painted, plastic or rubber parts as it may damage the finish.



4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.

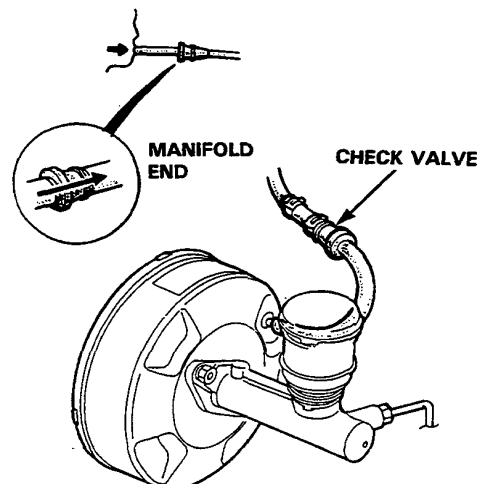


Vacuum mmHg	Line pressure kPa (kg/cm <sup>2</sup> , psi)	
	CARB.	PGM-FI
0	1285 (13.1, 186)	118 (11.4, 162)
300	5384 (54.9, 780)	4688 (47.8, 680)
500	8140 (830, 1181)	7090 (72.3, 1028)

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

### Check Valve Test

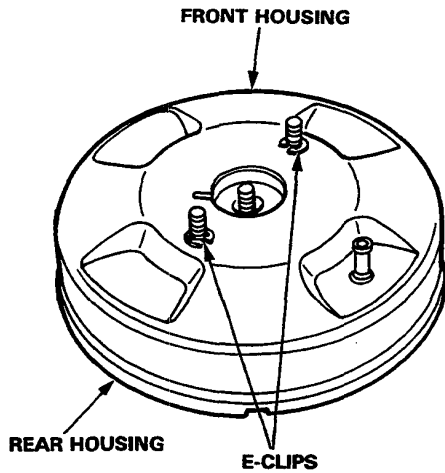
1. Remove the check valve, blow on one end of the hose and then the other; if you can blow through the booster end, but not through the manifold end, the check valve is OK.



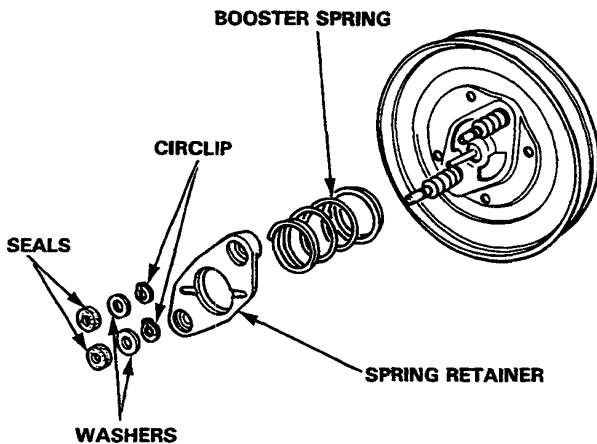
# Brake Booster

## Disassembly

1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the E-clips, and separate the front booster housing and the rear booster housing.

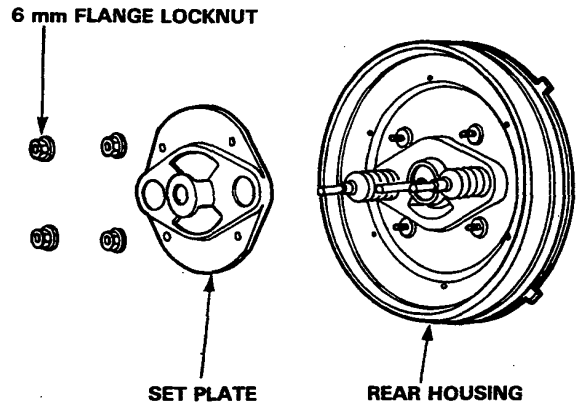


3. Remove the seals and washers from the spring retainer then remove the circlip.

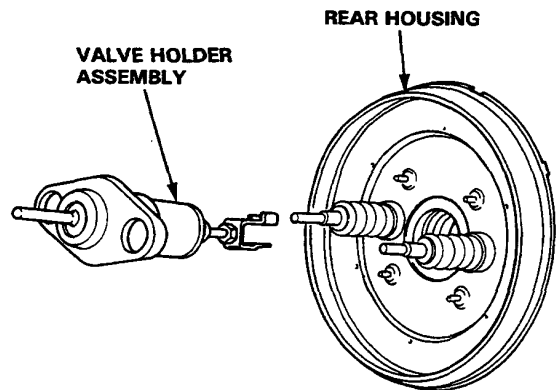


4. Remove the spring retainer and booster spring.

5. Remove the 6 mm flange locknuts and set plate.



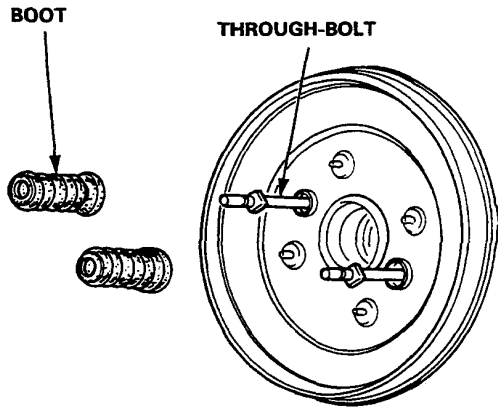
6. Remove the valve holder assembly from the rear housing.



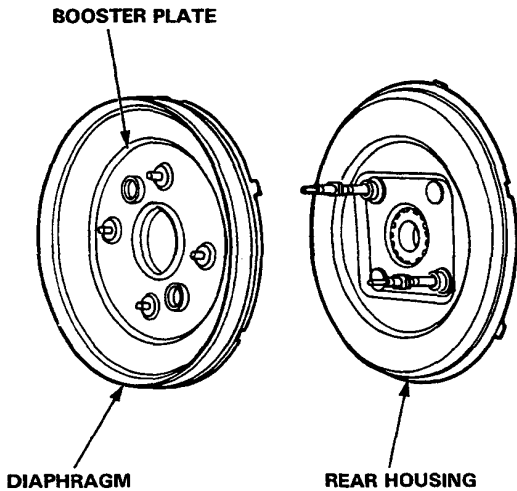




7. Remove the boots from the through-bolts.

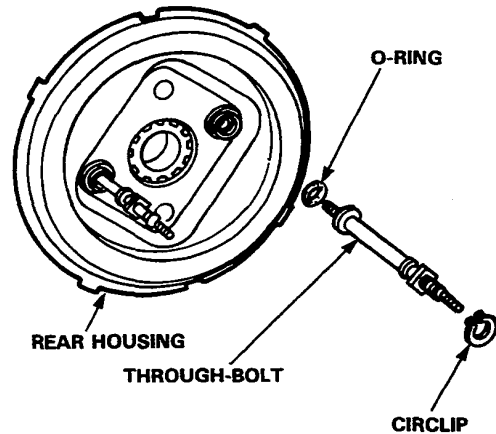


8. Remove the booster plate and diaphragm together from the rear housing.

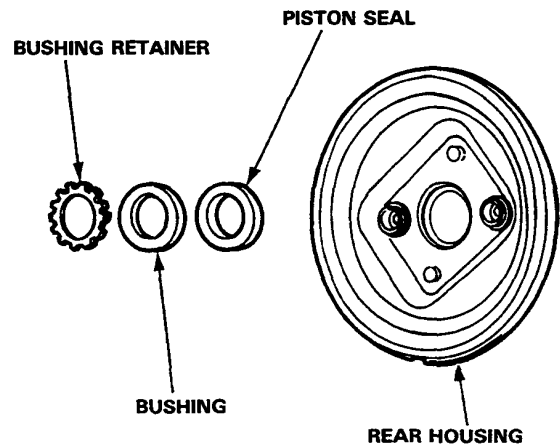


9. Remove the diaphragm from the booster plate.

10. Remove the circlip, then remove the through-bolts and O-rings from the rear housing.



11. Remove the bushing retainer, bushing and piston seal from the rear housing.

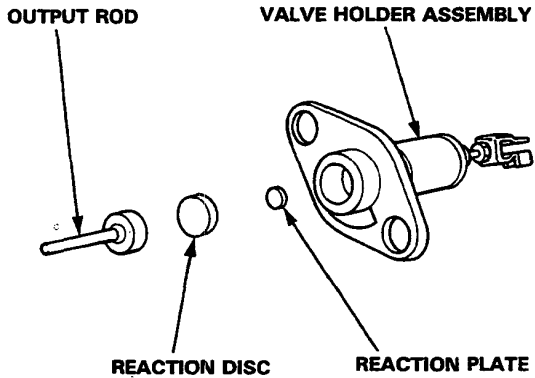


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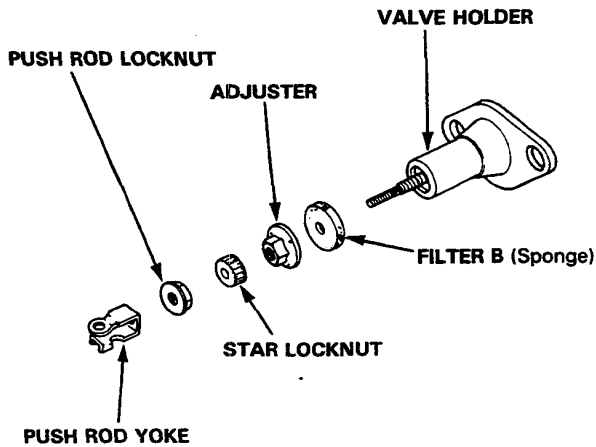
# Brake Booster

## Disassembly (cont'd)

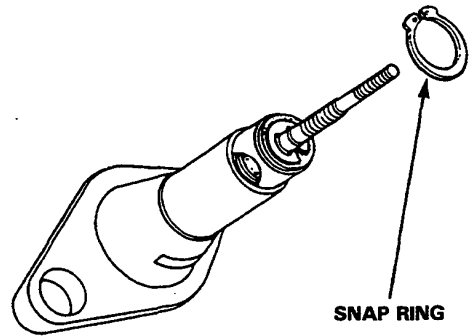
12. Remove the output rod, reaction disc and reaction plate from the valve holder assembly.



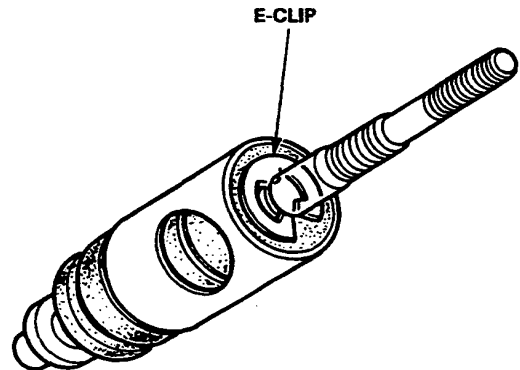
13. Remove the push rod yoke, locknut, star lock nut, adjuster and filter B from the valve holder.



14. Remove the push rod retainer, then remove the push rod from the valve holder assembly.

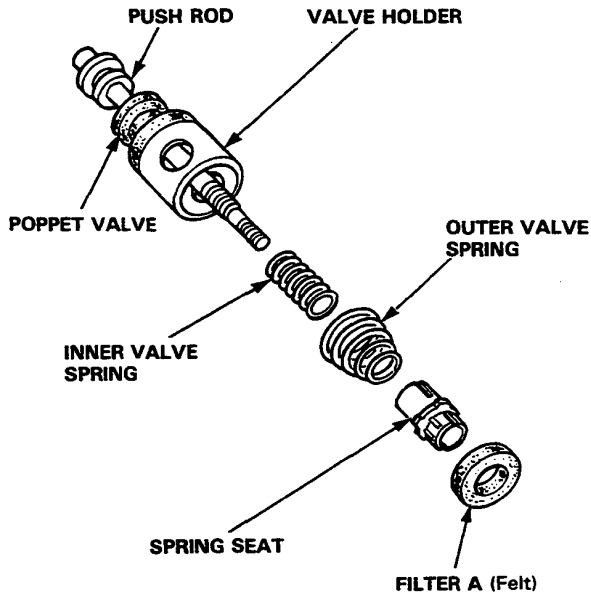


15. Remove the E-clip from the push rod.






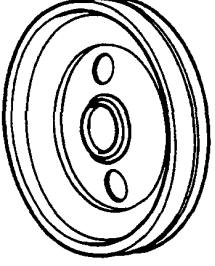
















16. Remove filter A, the spring seat, valve springs, valve holder and poppet valve from the push rod.



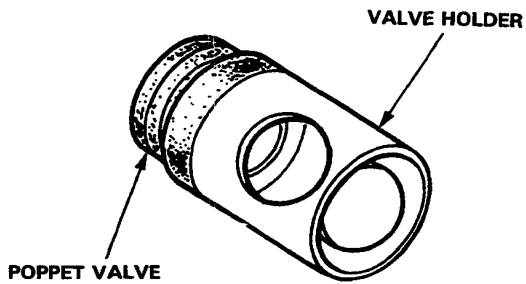
### Rebuild Kit

- |  |  |   |
|--|--|---|
| <br>E-CLIP              | <br>SEAL                    | <br>10 mm CIRCLIP      |
| <br>REACTION DISC       | <br>BOOT                   | <br>DIAPHRAGM          |
| <br>POPPET VALVE        | <br>FILTER A (Felt)       | <br>E-CLIP             |
| <br>FILTER B (Sponge) | <br>SNAP RING           | <br>BUSHING RETAINER |
| <br>BUSHING           | <br>PISTON SEAL          | <br>19 mm CIRCLIP    |
| <br>O-RING            | <br>6 mm FLANGE LOCKNUT | <br>SILICONE GREASE  |

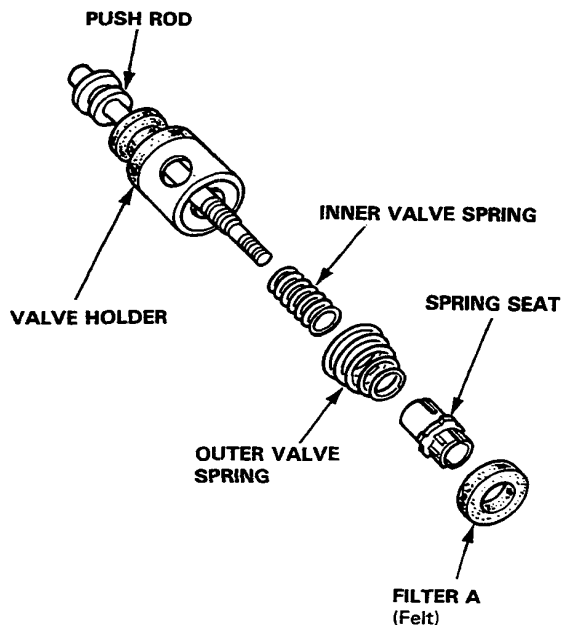
# Brake Booster

## Reassembly

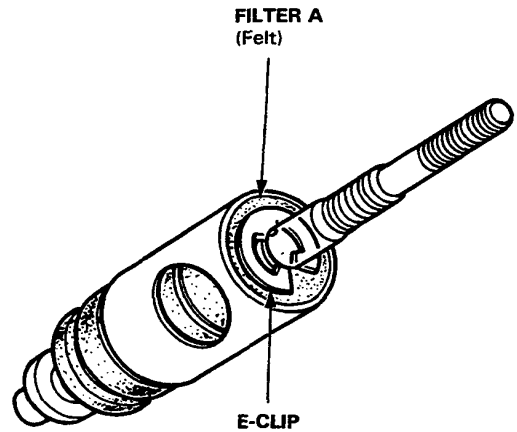
1. Install the poppet valve on the valve holder.



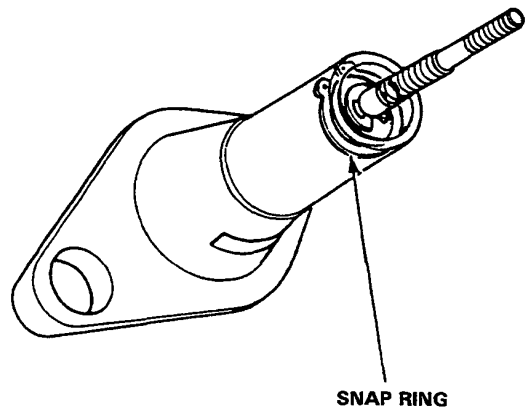
2. Install the valve holder, inner valve spring, outer valve spring and spring seat on the push rod.



3. Install filter A and the E-clip on the push rod.

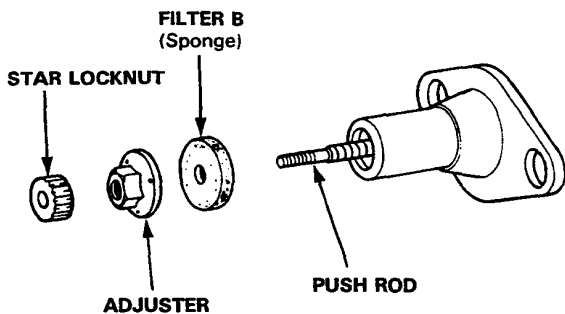


4. Apply silicone grease to the inner and outer surfaces of the tube of valve holder. Press the push rod assembly into the tube of valve holder, and install the push rod retainer.

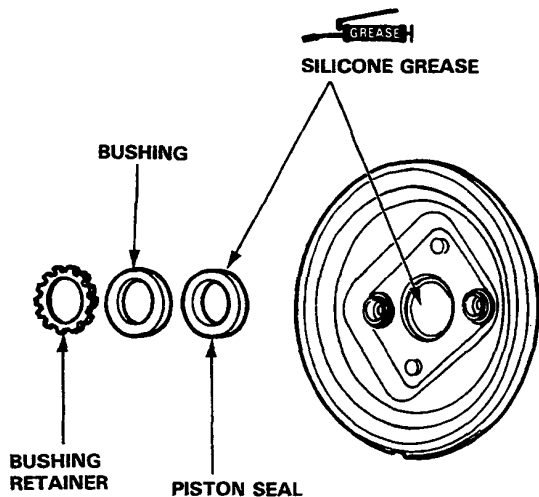




5. Slip filter B (sponge) over the end of the push rod. Thread the adjuster and star locknut onto the push rod but do not tighten.



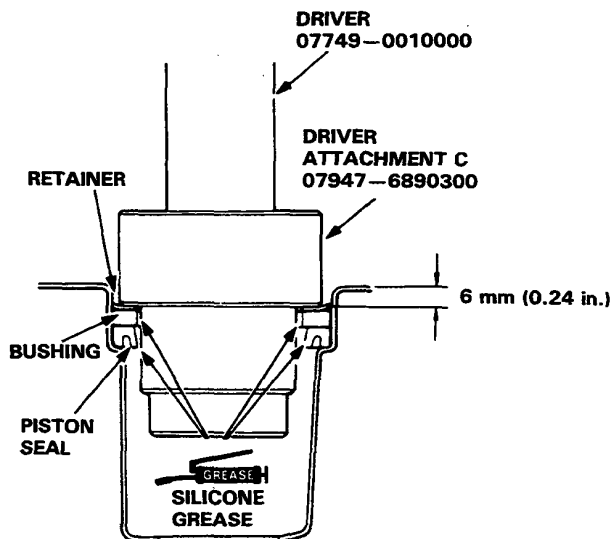
6. Apply silicone grease to piston seal, then set the seal in position on the housing.



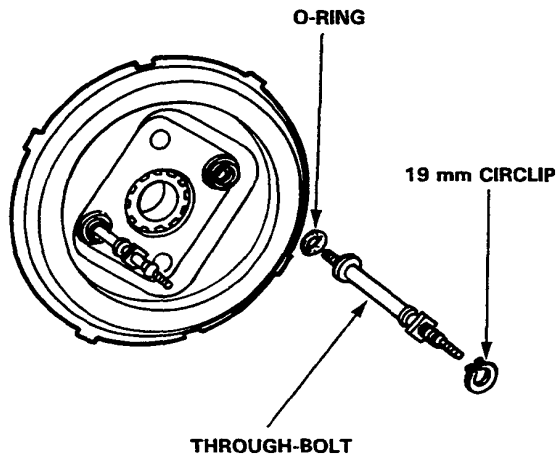
NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

7. Install the piston seal and bushing in the rear housing, and gently drive the retainer in until it is 6 mm below the edge of the rear housing.

CAUTION: If you drive in the retainer more than 6 mm, you may distort the piston seal.



8. Install both through-bolts, using the O-rings and 19 mm circlip.

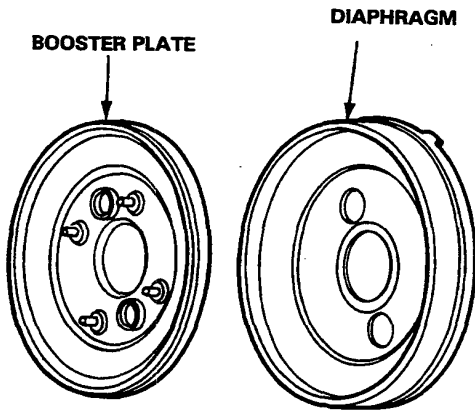


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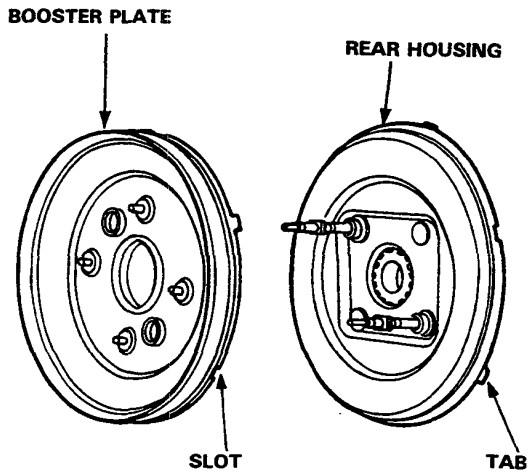
# Brake Booster

## Reassembly (cont'd)

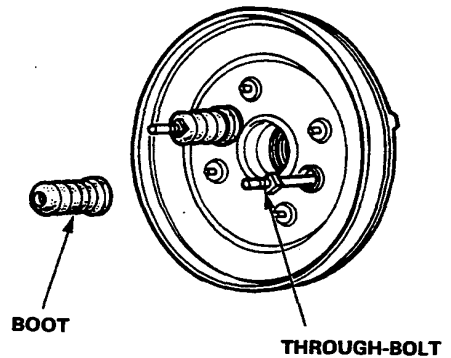
9. Install the diaphragm on the booster plate.



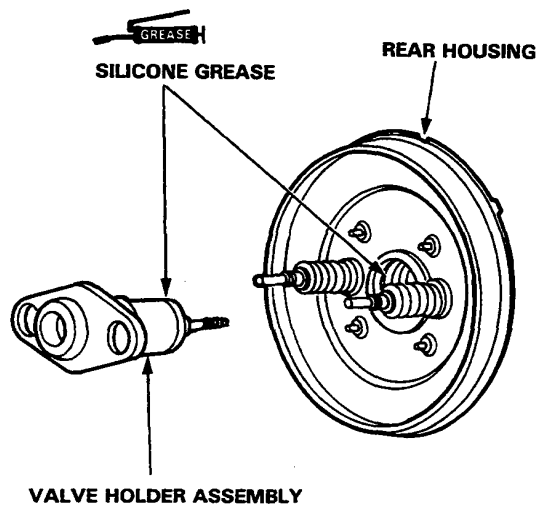
10. Attach the booster plate to the rear housing, aligning their tabs and slots.



11. Install the boots on the through-bolts.

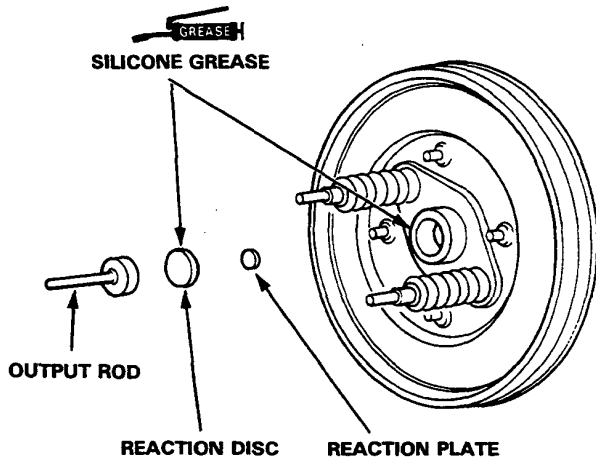


12. Apply silicone grease to the bore of the rear housing and the outer surface of the valve holder assembly. Install the valve holder assembly in the rear housing.

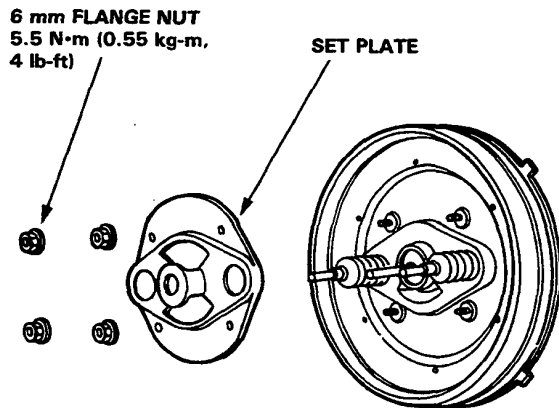




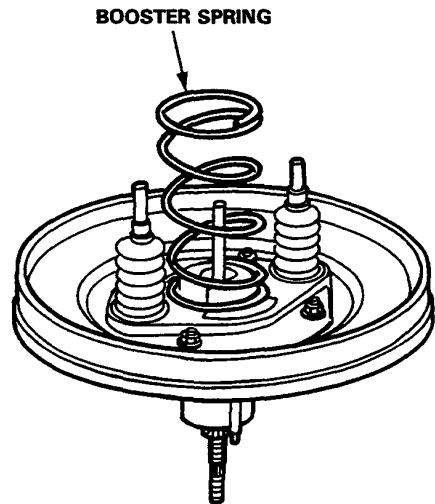
13. Apply silicone grease to the bore of the valve body, then install the reaction plate, reaction disc and output rod.



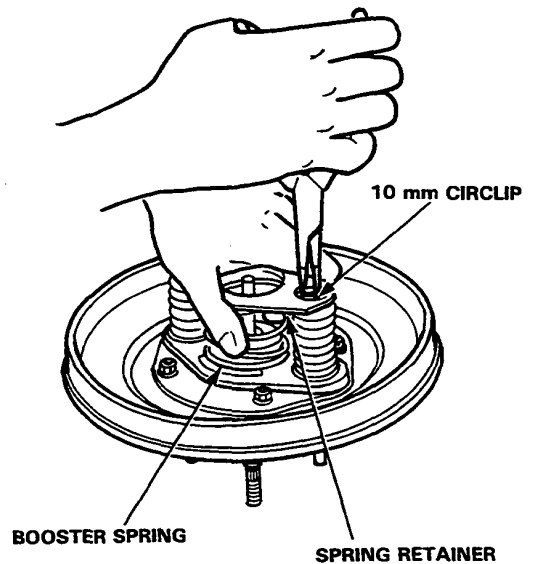
14. Install the set plate, and tighten the four 6 mm flange nuts.



15. Install the booster spring.



16. Install the spring retainer by compressing the booster spring, and installing the 10 mm circlip on the through bolts.

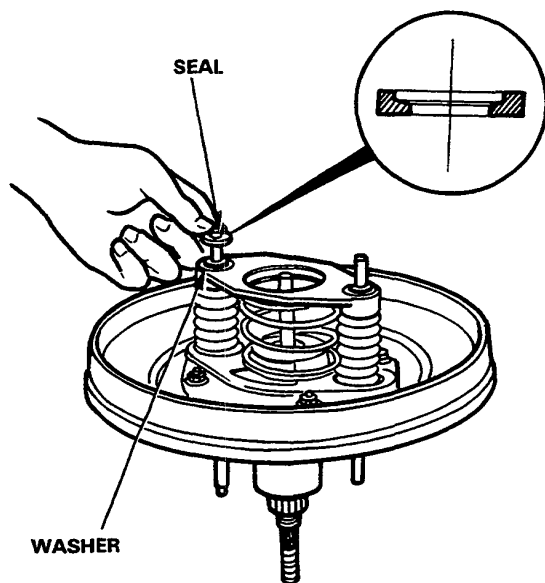


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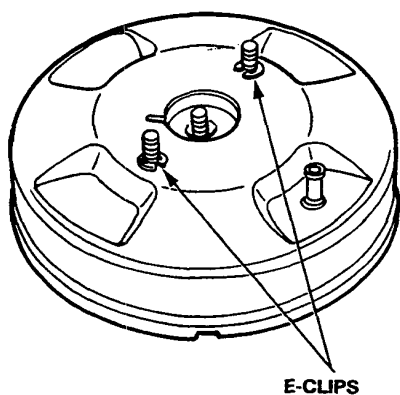
# Brake Booster

## Disassembly (cont'd)

17. Install the washers and seals.

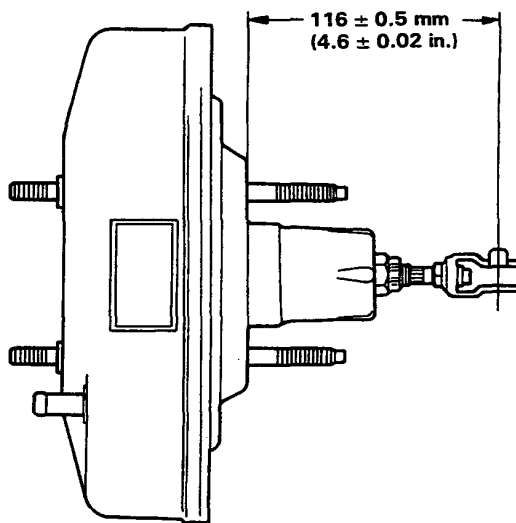


18. Assemble the front and rear housings. Press down on the front housing, then install the E-clips on the through bolts.



## Pushrod Adjustment

Install the locknut and pushrod yoke on the pushrod, adjust the pushrod length as shown.



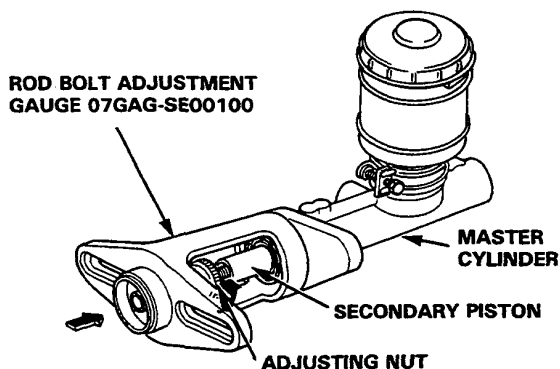




## Pushrod Clearance Adjustment

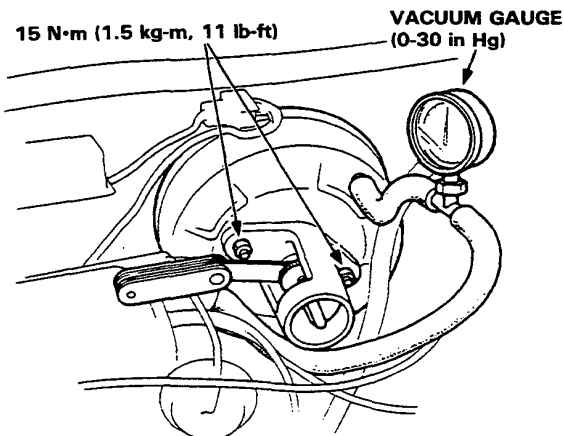
**NOTE:** Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Using the Rod Bolt Adjustment Gauge, adjust bolt so the top of it is flush with end of master cylinder piston.

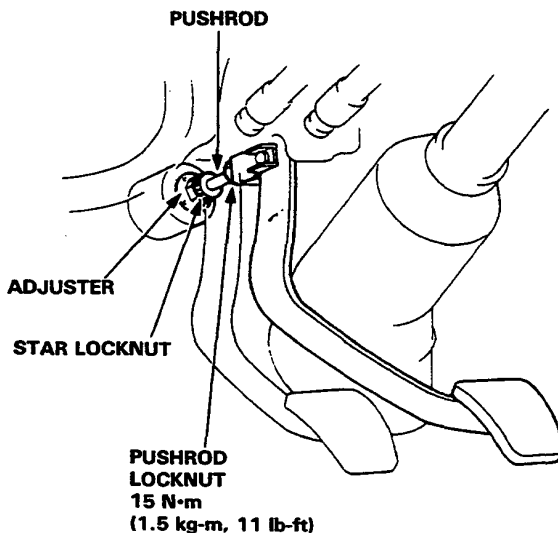


2. Without disturbing the adjusting bolt's position, install the master cylinder rod seal on the adjustment gauge and put the gauge upside down on the booster.
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge (0-750 mmHg/0-30 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:** 0-0.4 mm (0-0.016 in.)



6. If clearance is incorrect, loosen star locknut and turn adjuster in or out to adjust.
7. Tighten locknut securely.



8. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

### PEDAL HEIGHT FROM FLOOR:

MT: 178 mm (7.0 in)

AT: 183 mm (7.2 in)

(with floor mat removed)

The pedal should have

1-5 mm (0.04-0.20 in) free play.

9. Adjust the brake light switch (page 19-3).

# Rear Brakes

## Inspection

**WARNING** Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.

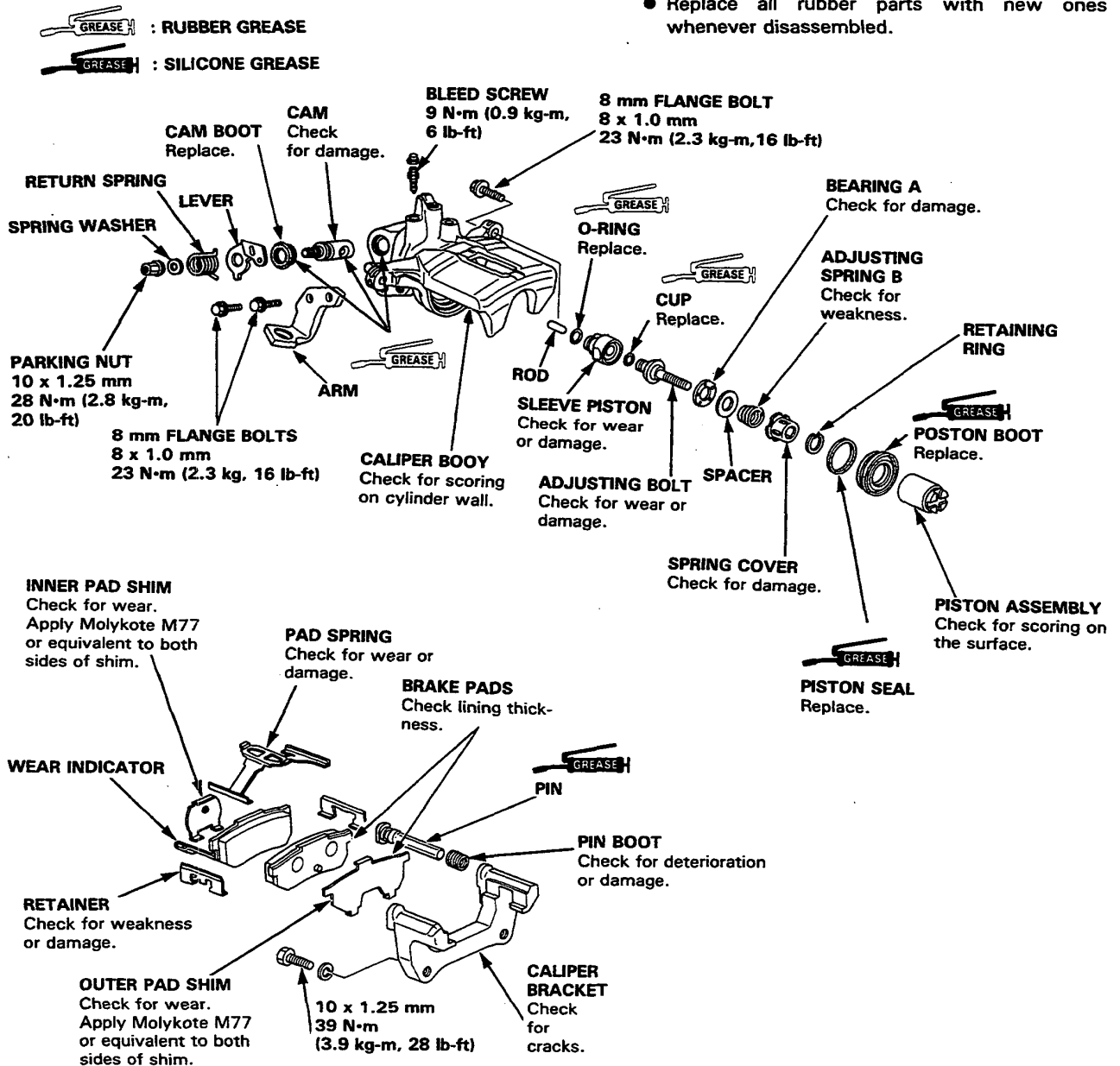
### CAUTION:

- 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.

### NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



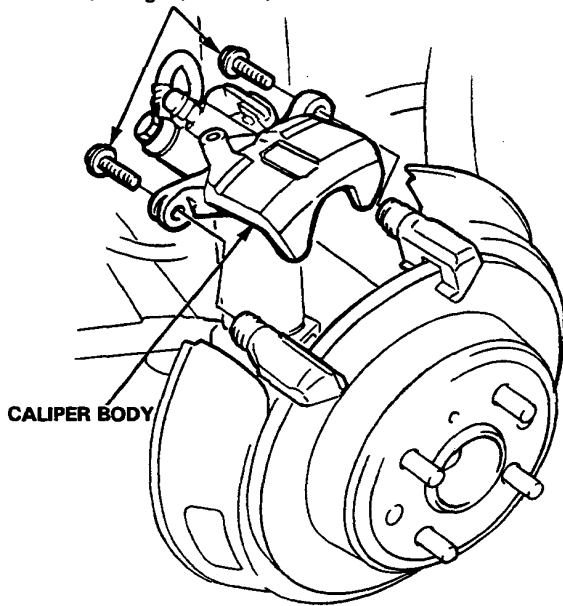


# Rear Brake Pad/Disc

## Inspection and Replacement

1. Block the front wheels, support the rear of car on safety stands, then remove the rear wheels.
2. Remove the two caliper mounting bolts and the caliper from the bracket.

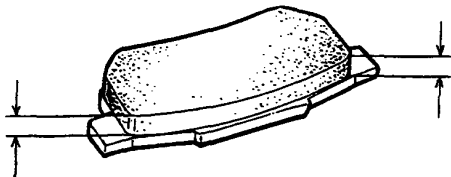
8 x 1.0 mm  
23 N·m  
(2.3 kg-m, 16 lb-ft)



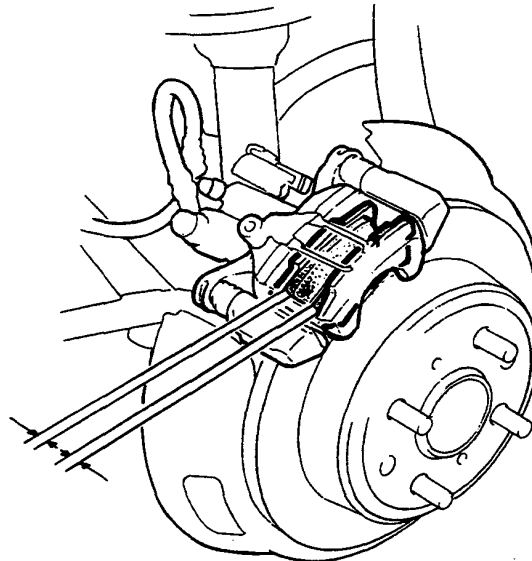
3. Remove the pads and measure the thickness of each brake pad lining using a vernier caliper.

### Brake Pad Thickness:

Standard: 8.0 mm (0.31 in)  
Service limit 1.6 mm (0.06 in)



4. If the lining thickness is less than service limit, replace the brake pads as a set.



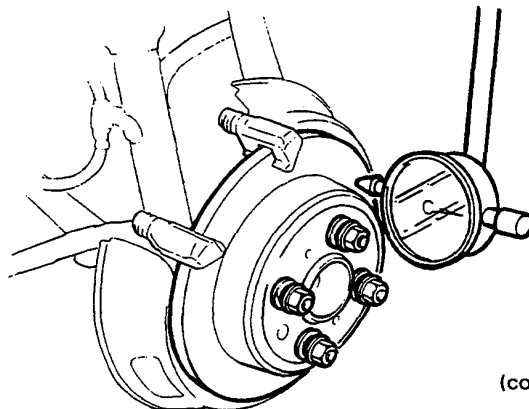
5. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
6. Mount dial indicator as shown and measure the run-out at 10 mm (0.39 in) from the outer edge of the disc.

**CAUTION:** Use wheel nuts and 3 mm thickness washers to hold the disc securely.

### Brake Disc Run-out:

Service Limit: 0.10 mm (0.004 in)

Replace the brake disc if beyond the service limit.

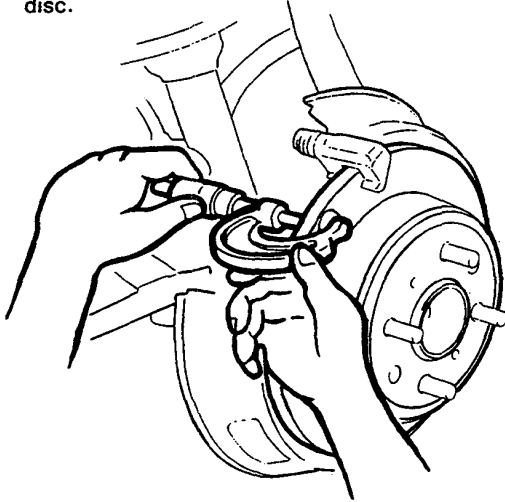


(cont'd)

# Rear Brake Pad/Disc

## Inspection and Replacement (cont'd)

7. Using a micrometer, measure the rear brake disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) from the outer edge of the disc.



8. Replace the disc if it exceeds the following service limits:

**Brake Disc Thickness:**

**Standard:** 10.0 mm (0.39 in)

**Service limit:** 8.0 mm (0.31 in)

**Brake Disc Parallelism:**

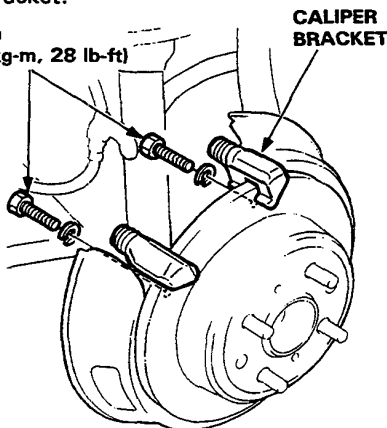
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

9. Replace the brake disc if beyond the limits.

**NOTE:** A new disc should be ground if its run-out is greater than 0.10 mm (0.004 in).

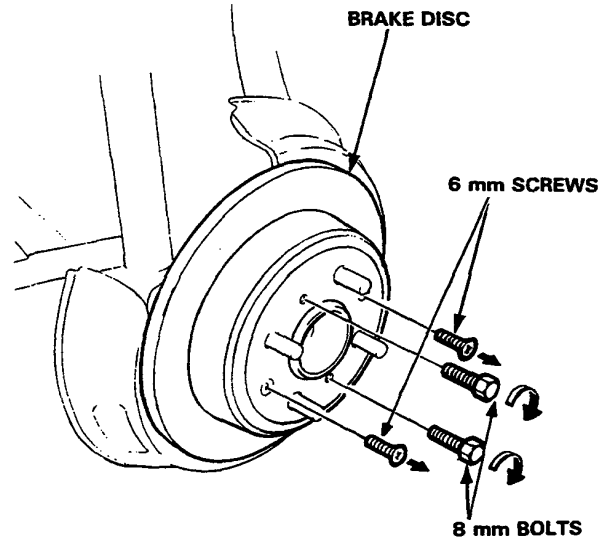
10. Remove the two caliper bracket mounting bolts and caliper bracket.

10 x 1.25 mm  
39 N·m (3.9 kg·m, 28 lb-ft)



11. Remove the two 6 mm screws and brake disc.

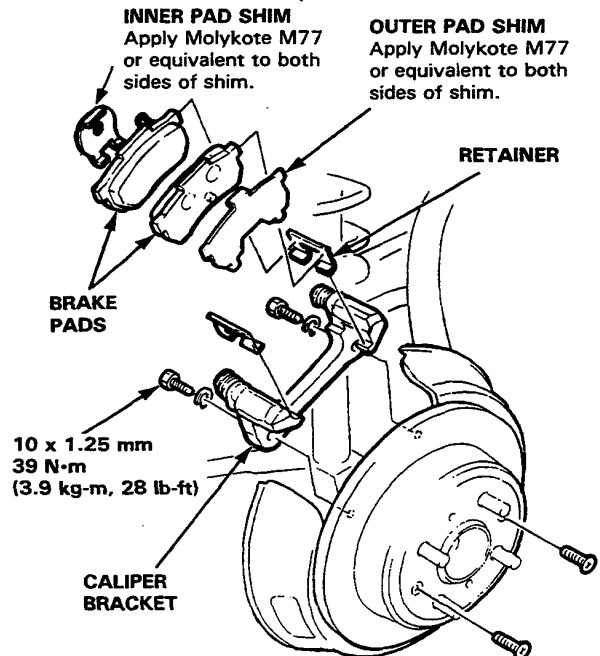
**NOTE:** If the brake disc is difficult to remove, install 8 mm bolts into the threaded holes and tighten them.



12. Install the new brake disc.

13. Clean the caliper bracket and retainers, then install the caliper bracket with two bolts and retainers.

14. Install the new brake pads and pad shims onto the caliper bracket.





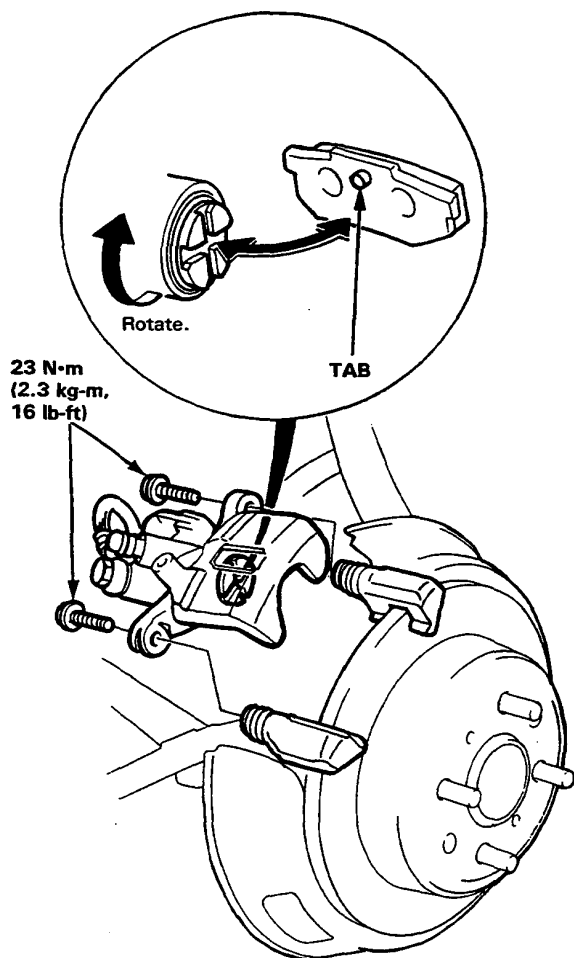
## Rear Caliper

### Disassembly

15. 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 to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

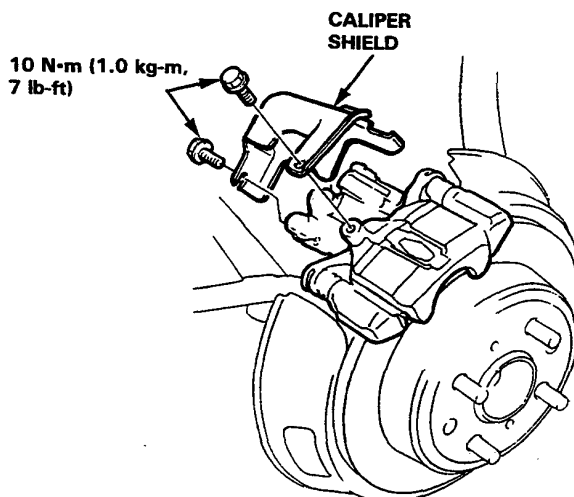
16. Install the brake caliper.



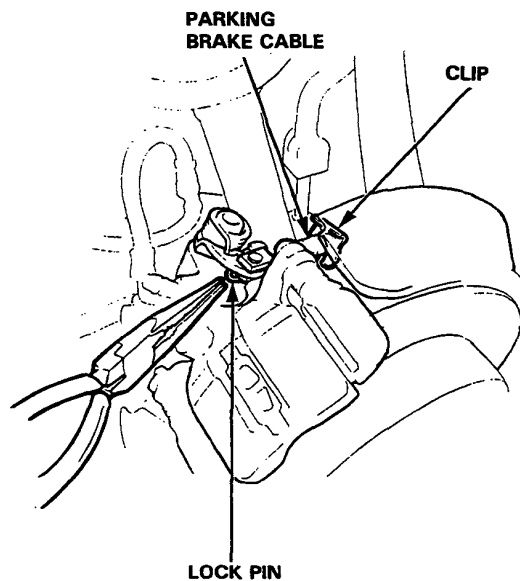
#### CAUTION:

- Make sure all parts are clean before reassembly.
- Use only new replacement parts.
- Use only new 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 its can damage the finish. Wash spilled brake fluid off immediately with clean water.

1. Remove the caliper shield.



2. Disconnect the parking brake cable from the lever on the caliper by removing the lock pin.



(cont'd)

# Rear Caliper

## Disassembly (cont'd)

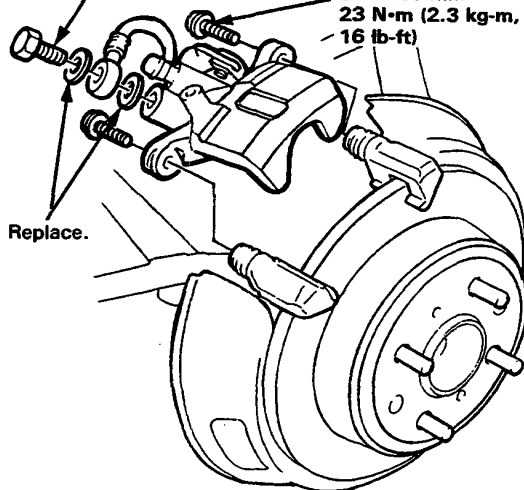
3. Remove the banjo bolt and disconnect the brake hose from the caliper.
4. Remove the two caliper mounting bolts and the caliper from the bracket.

### CAUTION:

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.
- Plug the end of the brake hose to prevent brake fluid from flowing out.

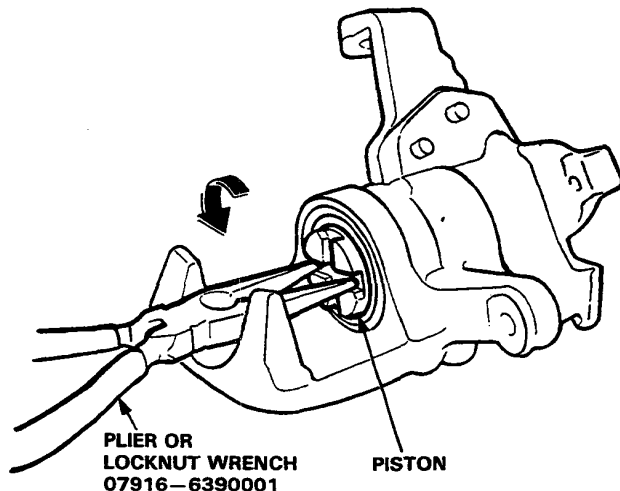
10 x 1.0 mm  
35 N·m  
(3.5 kg-m,  
26 lb-ft)

8 x 1.25 mm  
23 N·m (2.3 kg-m,  
16 lb-ft)

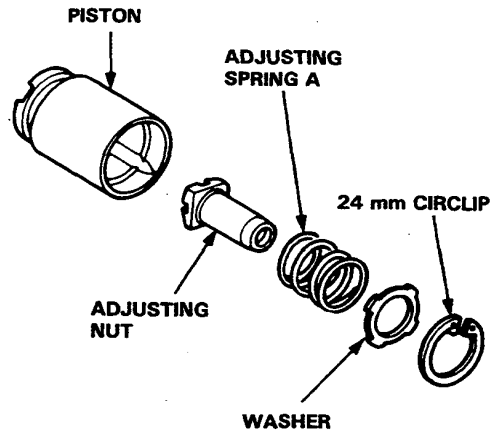


5. Remove the pad spring from the caliper.
6. Remove the piston and piston boot while rotating the piston.

**CAUTION:** Avoid damaging the piston and piston boot.

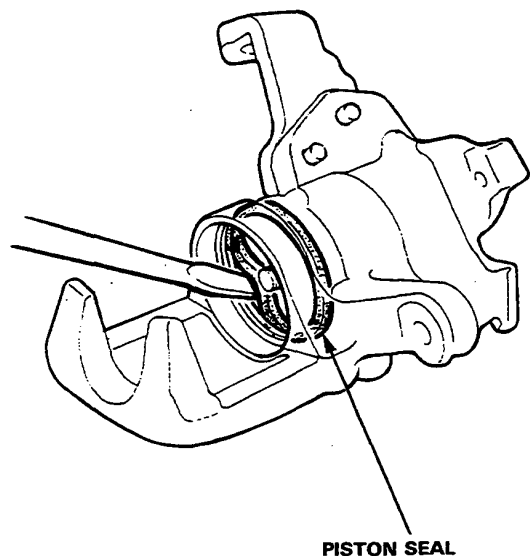


7. Remove the circlip, then washer, adjusting spring A, and the adjusting nut from the piston.



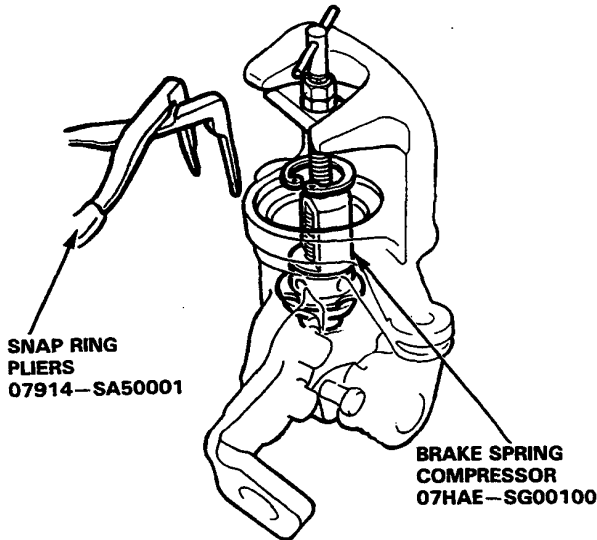
8. Remove the piston seal.

**CAUTION:** Take care not to damage the cylinder bore.

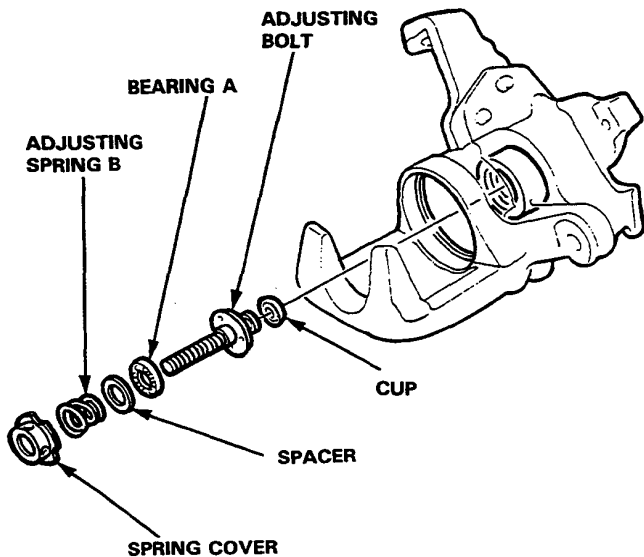




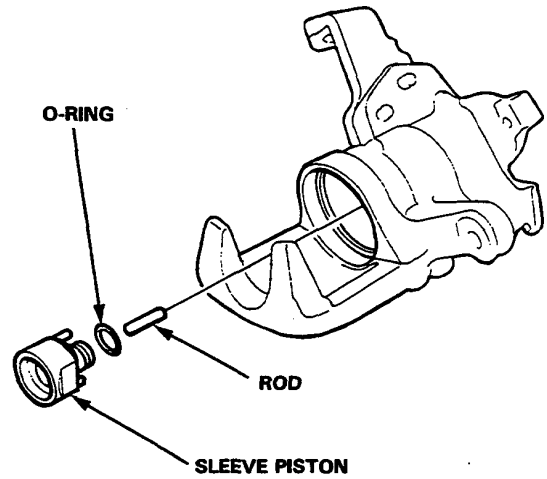
9. Install the special tool between the caliper body and spring guide as shown.
10. Compress the adjusting spring B by turning the shaft of the special tool, then remove the circlip with snap ring pliers.



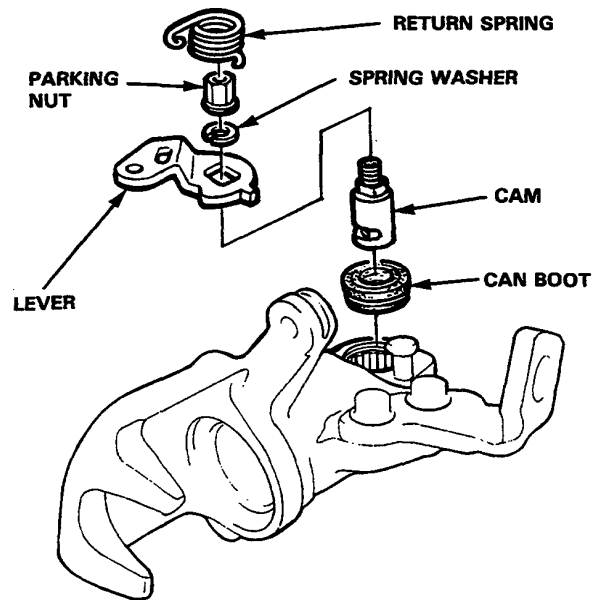
11. Remove the brake spring compressor from caliper body.
12. Remove the spring cover, adjusting spring B, spacer, bearing A, adjusting bolt and cup.



13. Remove the sleeve piston, then remove the rod from the cam.



14. Remove the return spring, parking nut, spring washer, lever, cam and cam boot.



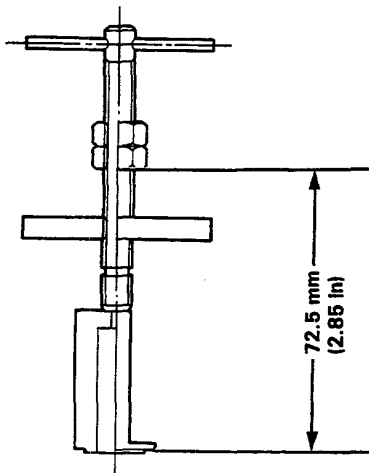
# Rear Caliper

## Reassembly

### CAUTION:

- Make sure all parts are clean before reassembly.
- Use only new replacement parts.
- Use only new 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 its can damage the finish. Wash spilled brake fluid off immediately with clean water.

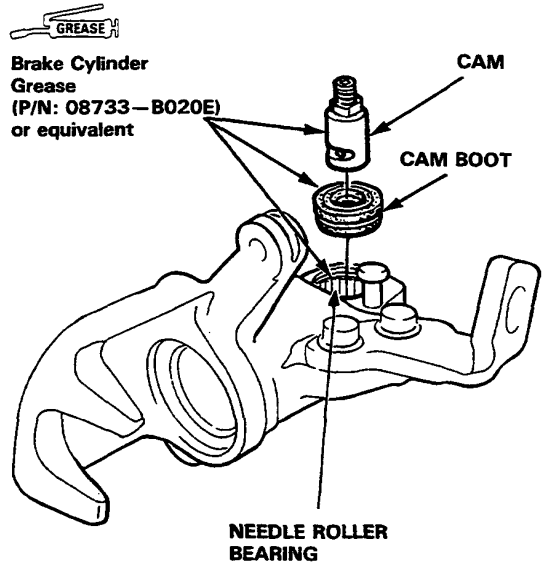
1. Adjust the brake spring compressor (special tool) as shown.



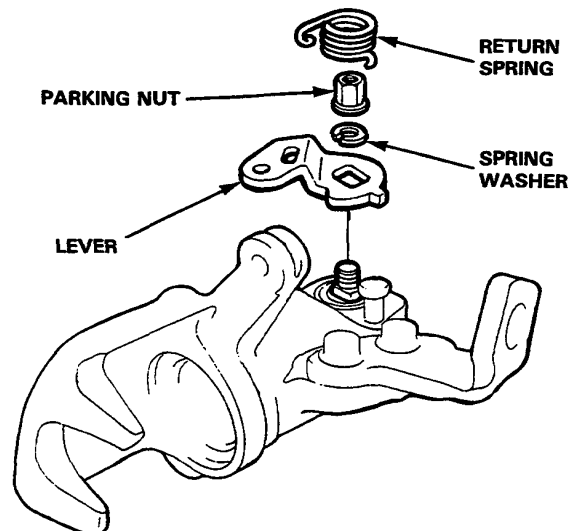
2. Pack all cavities of the needle bearing with Brake Cylinder Grease (P/N: 08733-B020E), or equivalent rubber grease.
3. Coat the new cam boot with Brake Cylinder Grease (P/N: 08733-B020E), or equivalent rubber grease and install in the caliper.

4. Install the cam with threaded end facing up.

**CAUTION:** Avoid damaging the cam boot since it must be installed before the cam.



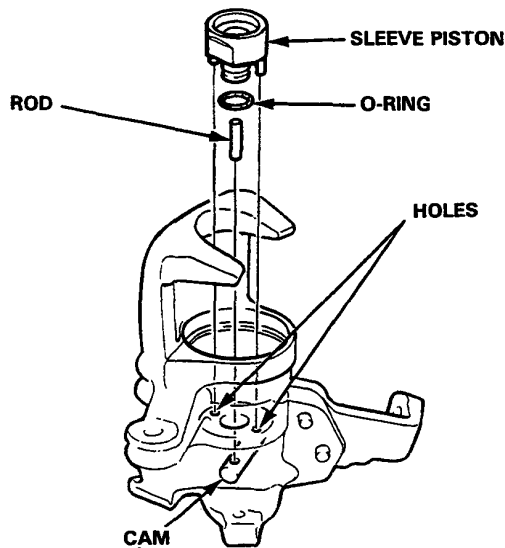
5. Install the lever, spring washer and parking nut, then tighten parking nut.
6. Install the return spring.



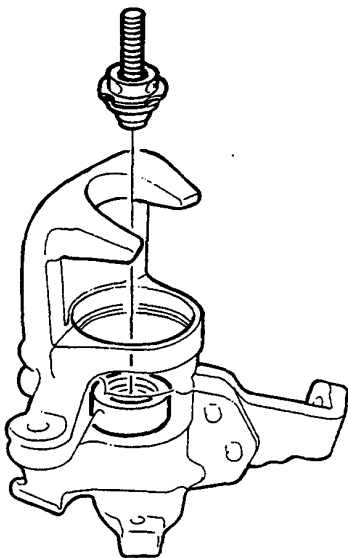




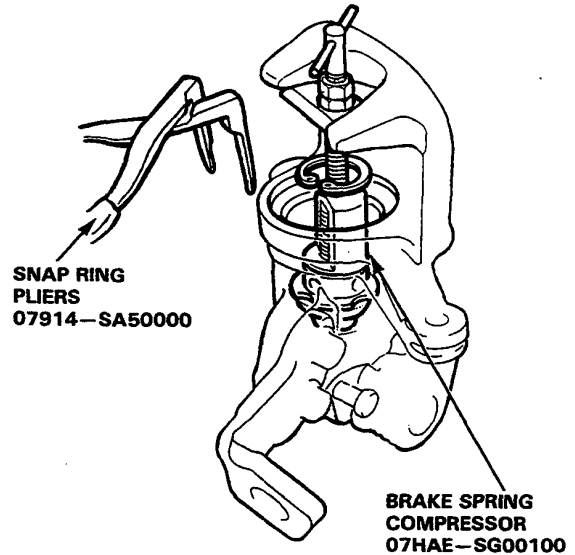
7. Install the rod in the cam.
8. Install a new O-ring on the sleeve piston.
9. Install the sleeve piston so the hole in the bottom of the piston is aligned with the rod in the cam, and two pins on the piston are aligned with the holes in the caliper.



10. Install a new cup with its groove facing the bearing A side on the adjusting bolt.
11. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install in the caliper cylinder.

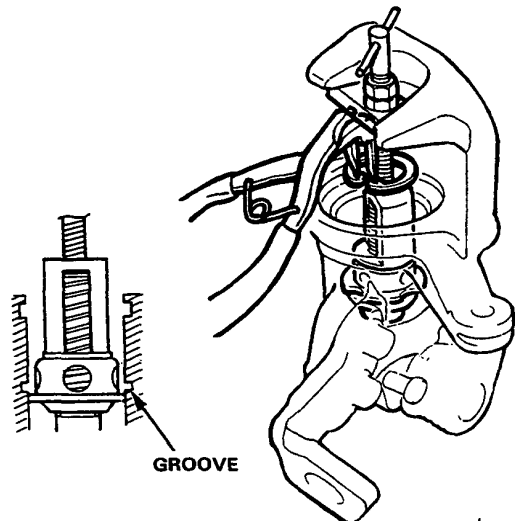


12. Install the brake spring compressor (special tool) as shown.



13. Compress the spring until it bottoms out.
14. Check that the flared end of the spring cover is below the circlip groove.
15. Install the circlip then remove the brake spring compressor.

NOTE: Check that the circlip is seated in the groove properly.

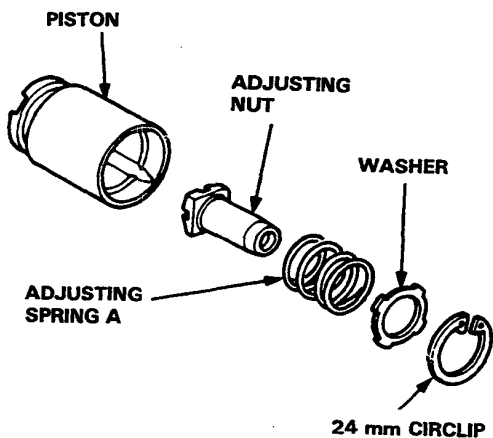


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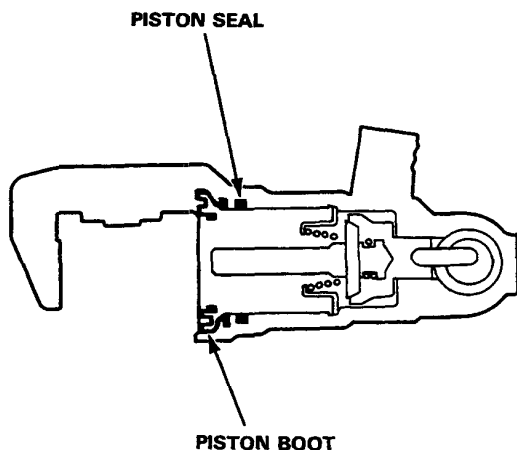
# Rear Caliper

## Reassembly (cont'd)

16. Install the adjusting nut, adjusting spring A, and washer, and secure with the circlip.

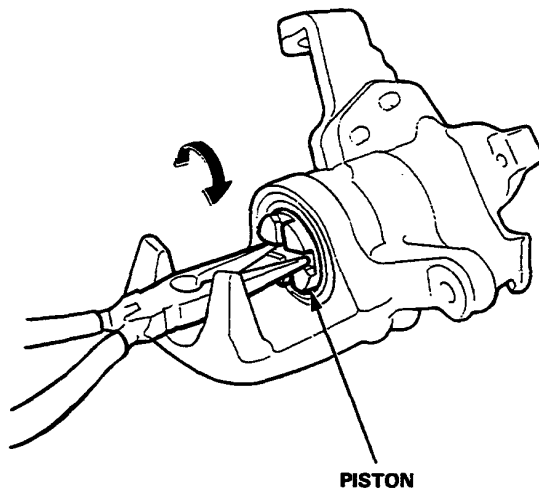


17. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.



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 springs 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 13-11).
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.

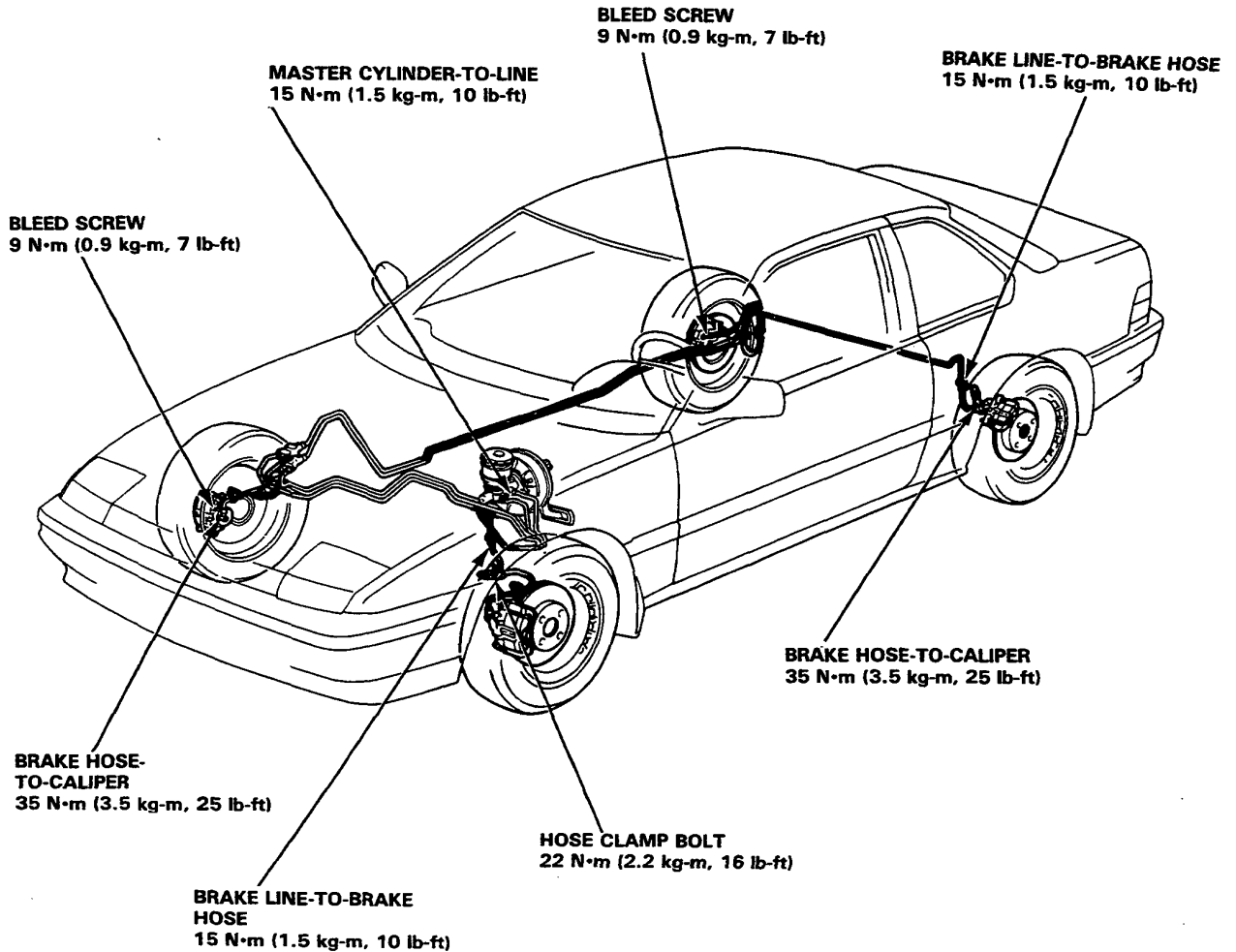


# Brake Hoses/Pipes

## Inspection

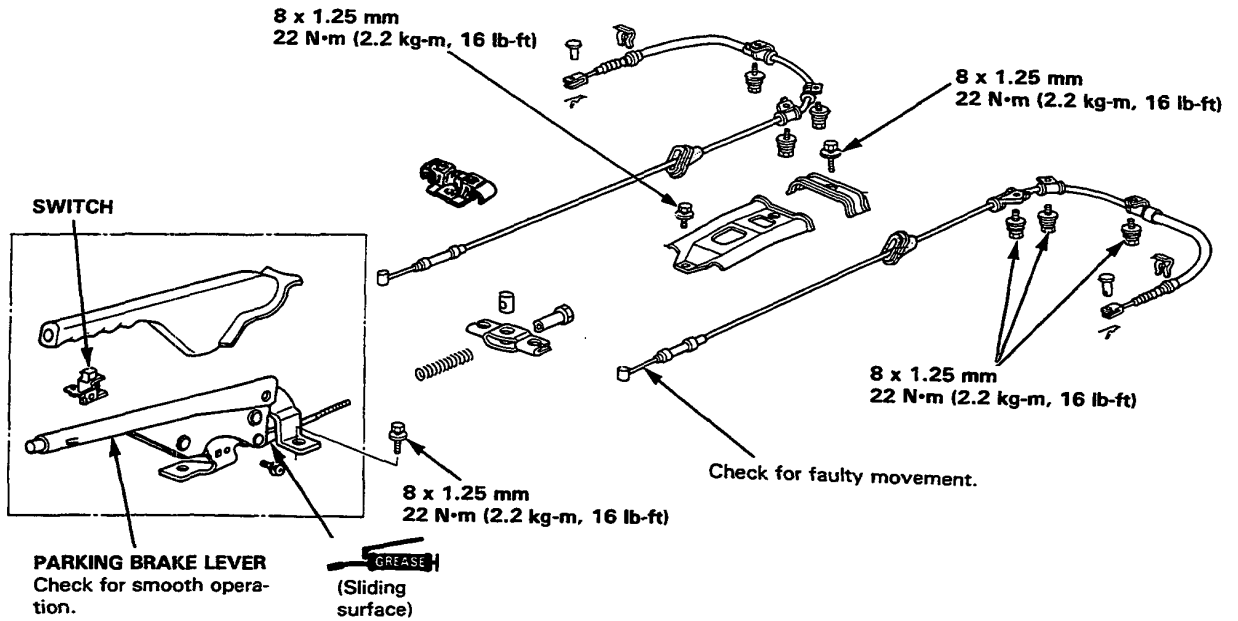
1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

**CAUTION:** Replace the brake hose clip whenever the brake hose is serviced.



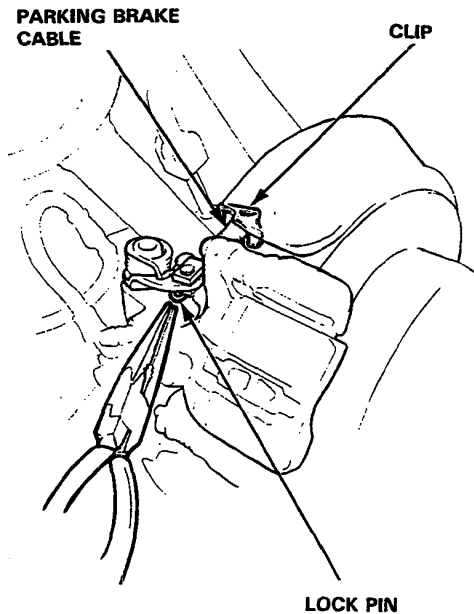
# Parking Brake

## Disassembly and Reassembly



NOTE: To disconnect the parking brake:

1. Pull out lock pin.
2. Remove clevis pin.
3. Remove clip.



# ALB

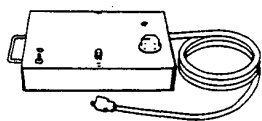
<b>Special Tools</b> .....	13-40	<b>Power Unit</b>	
<b>Illustrated Index</b> .....	13-41	<b>Index/Inspection</b> .....	13-78
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<b>ALB Checker</b>		<b>Reassembly</b> .....	13-80
<b>Function Test</b> .....	13-44	<b>Accumulator</b>	
<b>Troubleshooting</b>		<b>Index/Inspection</b> .....	13-81
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<b>Piston</b>			
<b>Removal</b> .....	13-76		
<b>Installation</b> .....	13-77		



# Special Tools

## Special Tools

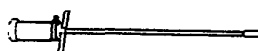
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07508-SB00000	ALB Checker	1	
②	07HAJ-SG00300	ALB Checker Adaptor	1	
③	07907-SB00000	ALB-T Wrench	1	
④	07921-0010001	Flair Nut Wrench	1	
⑤	07965-5790300	Cup Guide	1	
⑥	07510-6340300	Vacuum Joint Tube A	1	
⑦	07404-5790300	Vacuum Gauge	1	
⑧	07410-5790500	Vacuum Tube Joint Adaptor	1	
⑨	07406-5790200	Pressure Gauges	2	
⑩	07410-5790100	Pressure Gauge Attachment	2	
⑪	07510-6340100	Pressure Gauge Joint Pipe	1	
⑫	07HAK-SG00110	Pressure Gauge Joint Pipe	1	



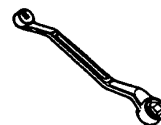
①



②



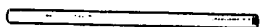
③



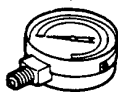
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⑤



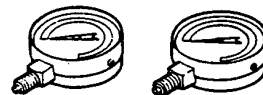
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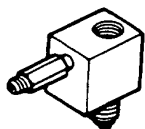
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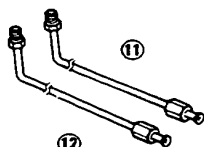
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⑨



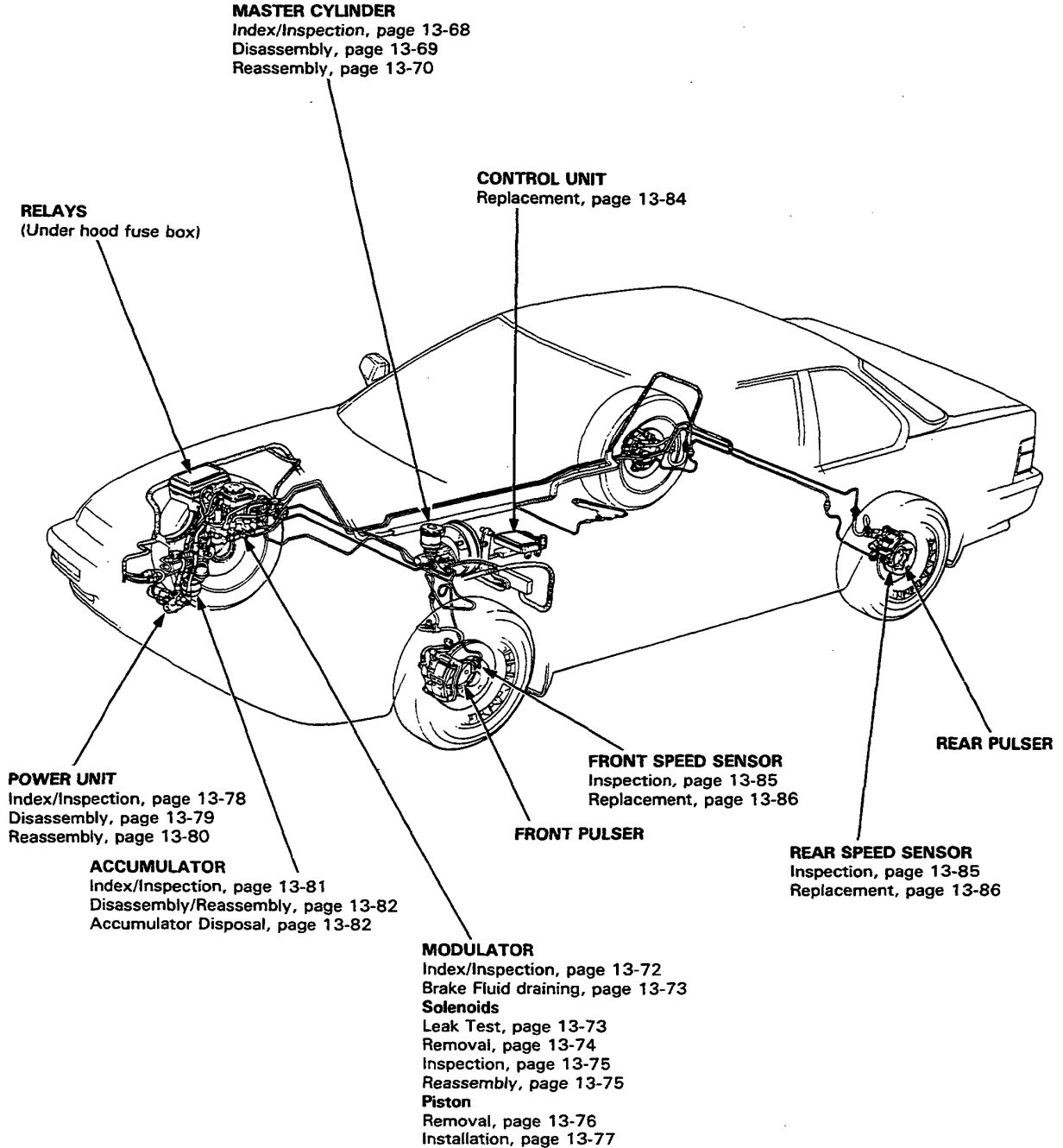
⑩



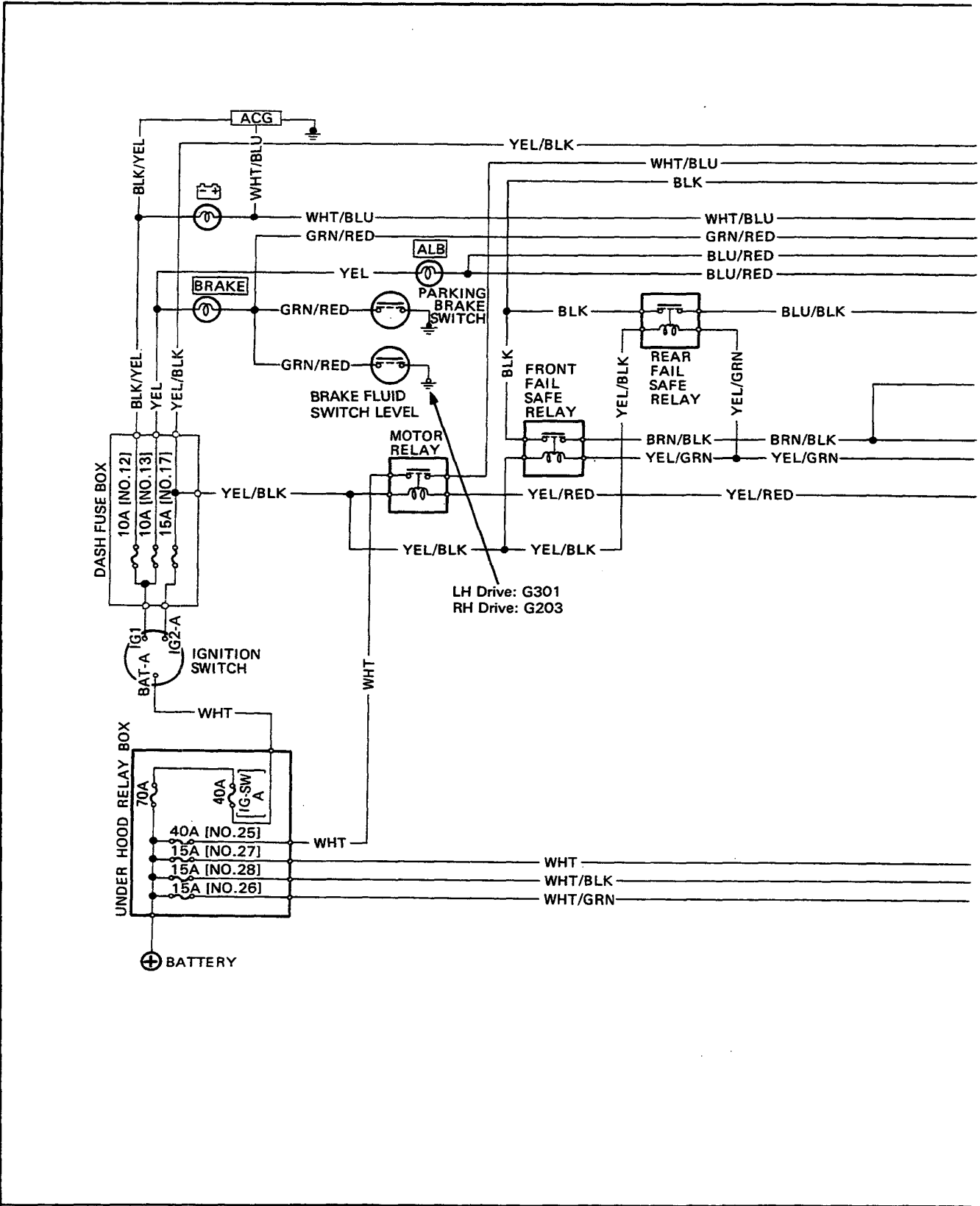
⑪

⑫

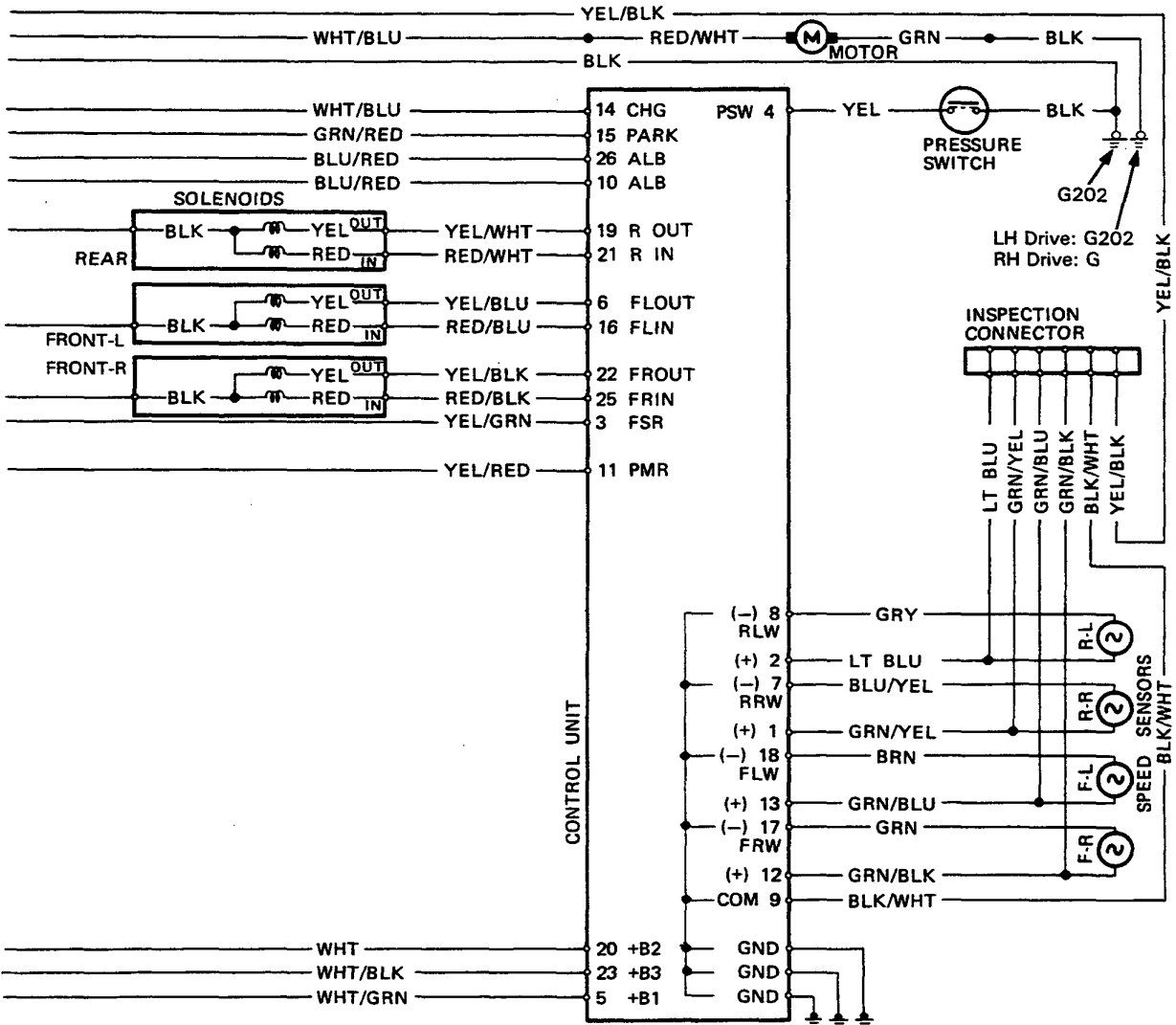
Illustrated Index



# Circuit Diagram







# ALB Checker

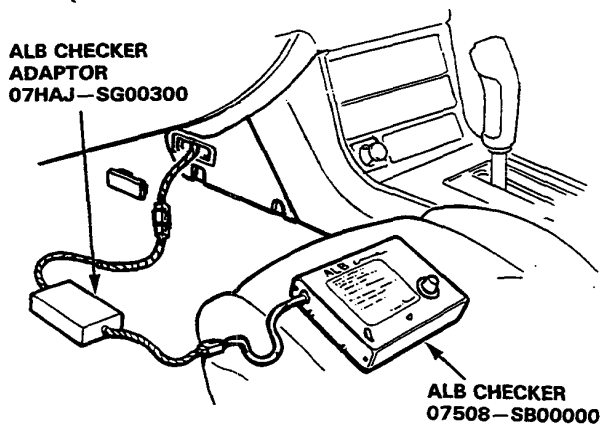
## Function Test

### NOTE:

- The ALB checker is designed to confirm proper operation of the ALB system by simulating each system function and operating condition. Before using the checker, confirm that the dash **ALB** warning 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 two seconds after the engine is started.
- The checker should be used through all modes, 1 to 6, to confirm proper operation of the system, in any one of the following situations:
  - After replacing any ALB system component.
  - After replacing or bleeding the system fluid.
  - After any body or suspension repair that may have affected the sensors or their wiring.
  - As part of P.D.I.

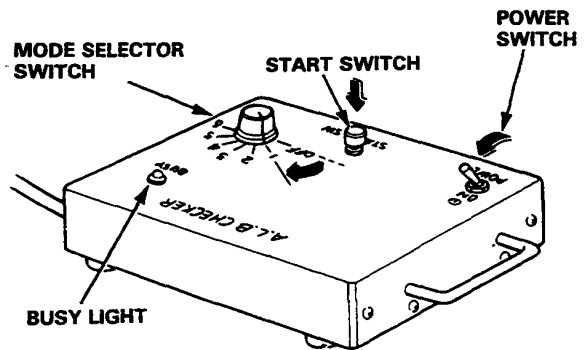
**WARNING** Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover on the right side of the front console and connect the 6-P inspection connector to the ALB checker and adaptor.

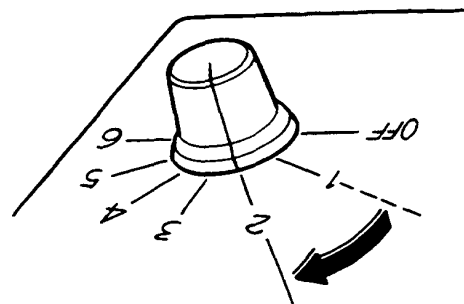


NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for Automatic transmission models.

2. Start the engine and release the parking brake,
3. Operate the ALB checker as follows,
  - (1) Turn the Power Switch ON.
  - (2) Turn the Mode Selector switch to "1."
  - (3) Push the Start Test switch:
    - The Busy light should come ON.
    - The dash **ALB** warning light should not come ON (If it comes on, follow the troubleshooting on page 13-46)

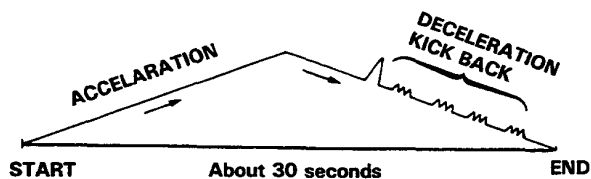


4. Turn the Mode Selector Switch further to "2".



5. Depress the brake pedal and push the Start Test switch.  
The dash ALB warning light should not go on while the Busy light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 13-46.

NOTE: The operation sequence simulated by Modes 2, 3, 4, 5 and 6:



6. Turn the Mode Selector switch to 3, 4, 5 and 6. 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 right 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 left 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 right 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 left wheel to the control unit. There should be kick back.

**Mode 6:**

Sends the driving signal of each wheel, then sends the lock signal of both front wheels to the control unit. There should be strong kickback.

NOTE: If little or no kickback is felt from the brake pedal in modes 2-6, repeat the function test of modes 1-6 several times before beginning to troubleshoot other parts of the system.

**Inspection points:**

1. The **ALB** warning light goes ON in mode 1.
  - Check the wiring. If there is good condition, the control unit is faulty.
  - If **ALB** warning light goes on 120 seconds later but the power unit stops, refer to page 13-50.
2. There are no kickback in modes 2 through 6.
  - Faulty pressure switch (remains ON)
  - Shorted wires
  - Faulty or disconnected power unit coupler
  - Faulty power unit relay
3. Weak kickback in modes 2 through 6.
  - 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 6.
  - Brake fluid leakage
  - Bleed power unit
  - Clogged power unit outlet
  - Clogged or deteriorated power unit hose

# Troubleshooting

## **ALB** Warning Light

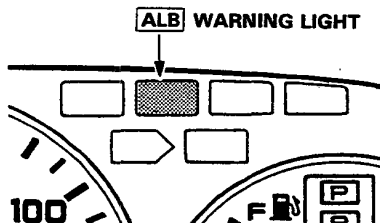
### Temporary Driving Conditions:

1. The **ALB** warning light will come on and the control unit memorizes the problem under certain conditions.

NOTE: Problem codes explained on page 13-48 and 13-49.

- The tire(s) adhesion is lost due to excessive cornering speed.  
Problem codes: 4-4, 4-8, 4-12.
- The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.  
Problem code: 5.
- 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 ALB system is OK, if the **ALB** warning light goes off after the engine is restarted.



2. If you receive a customer's report that the **ALB** warning light sometimes comes on, check the System using the ALB checker to confirm whether there is any trouble in the system.  
See page 13-42.
3. The **ALB** warning light will come on and the LED (see page 13-47) will display 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 **ALB** warning light will work normally after the engine is stopped and restarted.

However, after recharging the battery, the LED problem code must be cleared from the control unit's memory by disconnecting the No.27 fuse for at least 3 seconds.

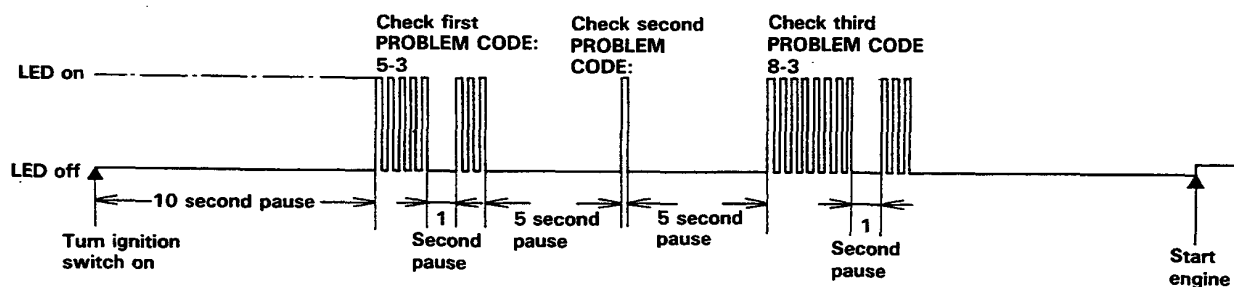
### Warning Light Circuit:

1. The **ALB** warning 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 known-good control unit and recheck:
  - Blown warning bulb.
  - Open circuit in YEL lead between No.13 fuse and combination meter.
  - Open circuit BLU/RED lead between combination meter and control unit.
  - Loose component grounding of the control unit to the body.
2. The **ALB** warning light remains ON or after the engine is started, however the LED on the control unit does not blink any code or sub-code, check for the following:
  - Loose or poor connection of the wire harness at the control unit.
  - Faulty No.27 fuse.
  - Open circuit in WHT lead between No.27 fuse and control unit.
  - Open circuit in YEL/BLK lead between fuse No.17 and fail safe relay(s).
  - Open or short circuit in the YEL/GRN lead between fail safe relay(s).
  - Short circuit in BLU/RED lead between combination meter and control unit.
  - Open circuit in WHT/BLU lead 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 **ALB** warning light comes on.
3. Restart the engine and check the **ALB** warning light.
  - There is no problem in the ALB system, if the **ALB** warning light goes off.
  - Go to step 4, if the **ALB** warning light remains on.
4. Stop the engine.
5. Remove the inspection hole lid on the right of the front console.
6. Turn the ignition switch on, but do not start the engine.
7. Record the blinking frequency of the LED on the control unit. The blinking frequency indicates the problem code.



**NOTE:**

- The control unit can indicate three problem codes (one, two or three problems).
- If the LED does not light, see Troubleshooting of Warning Light Circuit page 13-46, except alternator signal (WHT/BLU).
- If you miscount the blinking frequency, turn the ignition switch off, then turn on to blink the LED again.
- The LED lights faintly after starting the engine as the control unit uses the LED circuit to intercommunicate between its internal computers.
- After the repair is completed, disconnect the No.27 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 Component	-	-	-	-	13-50	-ALB fuse -Motor relay -Pressure Switch -Accumulator -Modulator	13-84	
2	-	Parking brake switch-related problem	-	-	-	-	13-53	Brake fluid level switch <b>BRAKE</b> light		
3	1	Front fail safe relay	-	-	-	-	13-84 (Function Test)			
	2	Rear fail safe relay	-	-	-	-				
3	13	Pulser (s)	○				—			
	14			○						
	15				○	○				
4	4	Speed sensor(s)			○		13-54	Modulator		
	8				○					
	12				○	○				
5 or 6 or 7	1	Speed sensor	○				13-55			
	2			○						
	4				○					
	8					○				
8	1	Front solenoid related problem (Open)	IN				13-56			
	2		OUT					Front R speed sensor	13-55	
	3		BOTH							
	4			IN						
	8			OUT					Front L speed sensor	13-55
	12			BOTH						
	15	Front fail safe relay	BOTH	BOTH			13-57	Solenoids misconnected		

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED			See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR			
9	—	Solenoid related problem (Open)			IN	13-59	Rear speed sensors	13-55
10	—				OUT			
11	—				BOTH	13-60	Rear fail safe relay	13-86
11	3		BOTH		BOTH	—		
	12			BOTH	BOTH			
	15		BOTH	BOTH	BOTH		Front or rear fail safe relay	
12	1	Solenoid related problem (Short)	IN			13-62		
	2		OUT					
	3		BOTH			13-63	No.28 fuse	
	4	Power supply problem		IN		13-62		
	8			OUT				
	12			BOTH		13-64	No.26 fuse	
	15		BOTH	BOTH		—	No.28 and/or No.26 fuse	
13	—	Solenoid related problem (Short)			IN	13-65		
14	—				OUT			
15	—				BOTH		No.28 fuse	
15	3		BOTH		BOTH			
	12			BOTH	BOTH			
LED stays ON:				BOTH	BOTH			

NOTE: The control unit can display a number of sub-codes other than those listed. Such sub-codes indicate unlikely combinations of multiple component failures, or more likely, a problem in a wire or connector common to a group of components. To troubleshoot, refer to the procedures for other sub-codes with the same main code.

# Troubleshooting

## Flow Chart

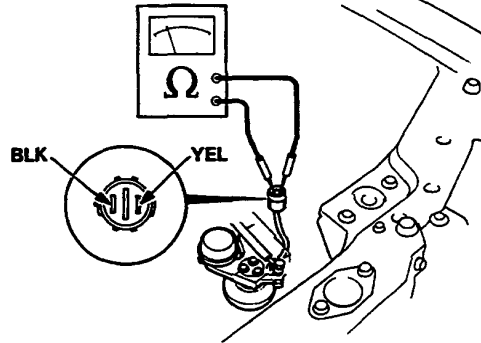
### Problem Code 1: Hydraulic Controlled Components.

NOTE: The LED 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 lead is shorted or the control unit is internally shorted (The motor stops when the ignition switch is turned off).

Pre test steps:

- Check No.25 (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 BLK and YEL terminals.

Is there continuity?

YES

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. See page 13-67.

NO

Check the continuity of pressure switch between BLK and YEL terminals.

Is there continuity?

YES

Faulty pressure switch (closed).

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench (see page 13-67). Jack up the front of car and support with safety stands, then run the engine in gear above 6 mph (10 km/h).

**WARNING** Block rear wheels before jacking up front of car.

(To page 13-51).



(From page 13-50)

Does the pump motor run? YES (To page 13-52)

NO

Disconnect the 21P connector from the control unit.

Check for continuity between the YEL terminal and body ground.

Is there continuity? YES Repair short in YEL wire between the control unit and pressure switch.

NO

Connect the YEL/RED terminal to body ground using a jumper wire. Turn the ignition switch ON.

Does the pump motor run? YES Faulty control unit.

NO

Remove the pump motor relay and check the pump motor relay (page 19-70).

Does it work properly? NO Faulty pump motor relay.

YES

Connect the WHT/BLU and WHT terminals using a jumper wire.

Does the pump motor run? NO (To page 13-53)

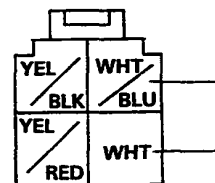
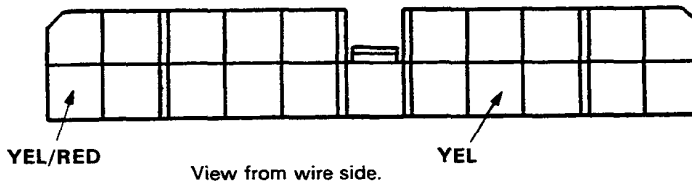
YES

Check voltage between the YEL/BLK (+) and body ground (-).

Is there battery voltage? NO Repair open in YEL/BLK wire between the No. 17 fuse and pump motor relay.

YES

Repair open in YEL/RED wire between the control unit and pump motor relay.



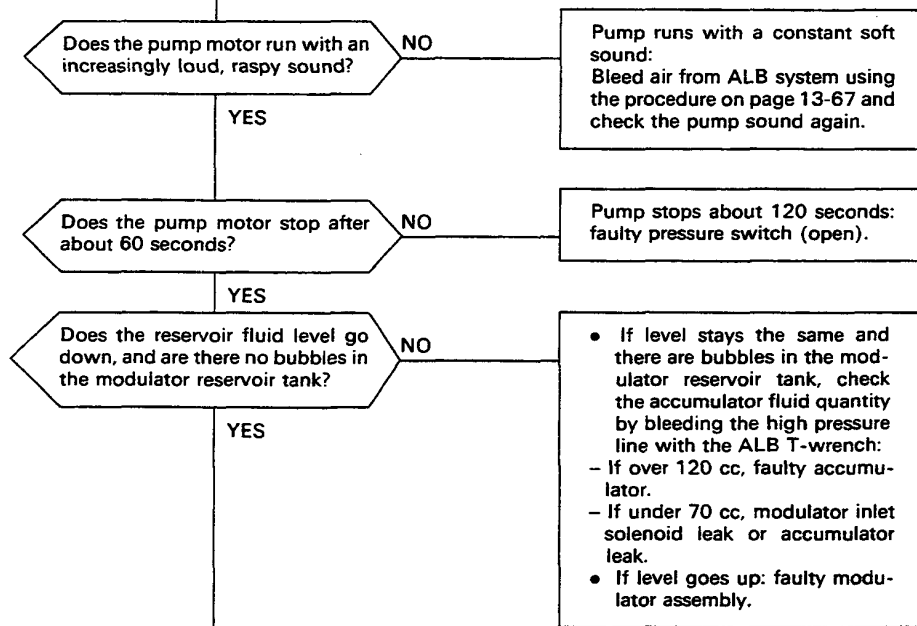
View from terminal side.  
CAUTION: If the motor runs disconnect the jumper wire immediately.

(cont'd)

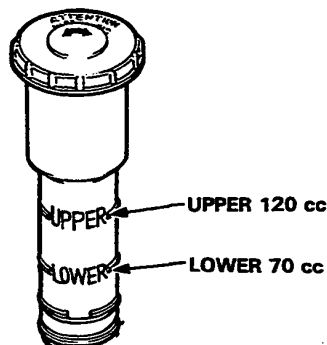
# Troubleshooting

## Flow Chart (cont'd)

(From page 13-51)



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.

(From page 13-51)

Measure voltage between the WHT terminal (+) and body ground (-).

Is there battery voltage?

NO Repair open in WHT wire between the fuse and pump motor relay.

YES

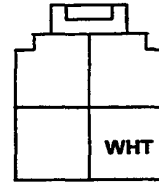
Measure voltage between the WHT/BLU terminal (+) of the pump motor and body ground (-).

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 (LH Drive: G202, RH Drive: G203).

YES

Faulty pump motor.



View from terminal side.



View from terminal side.

#### Problem code2: 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 No. 27 fuse for three seconds to clear the control unit's memory, then test drive the car.

If the **ALB** warning light and LED stay off, the probability is that the car was driving 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 lead is shorted between the **BRAKE** warning light and parking brake switch.
- GRN/RED lead is shorted between the **BRAKE** warning light and brake fluid level switch.
- The **BRAKE** warning light is blown.
- GRN/RED has an open between the **BRAKE** warning light and parking brake.
- GRN/RED has an open between the parking brake switch and control unit.

(cont'd)

# Troubleshooting

## Flow Chart (cont'd)

Problem code 4-4 to 4-12: Rear Speed Sensor

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500 — 1,000  $\Omega$ ? **NO**

Faulty speed sensor.

**YES**

Disconnect the 21P connector from the control unit.

Check the sensor wire for continuity between the control unit and each speed sensor:  
 BLU/YEL: Rear Right Negative  
 GRY: Rear Left Negative  
 GRN/YEL: Rear Right Positive  
 LT BLU: Rear Left Positive

Is there continuity? **NO**

Repair open in the sensor wire:  
 BLU/YEL: Rear Right Negative  
 GRY: Rear Left Negative  
 GRN/YEL: Rear Right Positive  
 LT BLU: Rear Left Positive

**YES**

Reconnect the 21P connector to the control unit and 2P connectors to the speed sensors.

Connect ALB checker to inspection connector.

Check ALB function in MODE 2 and 3.

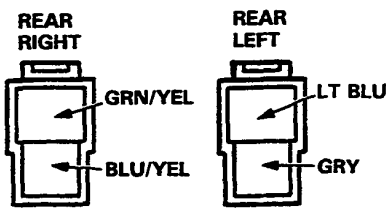
Does it work properly? **NO**

Faulty modulator.

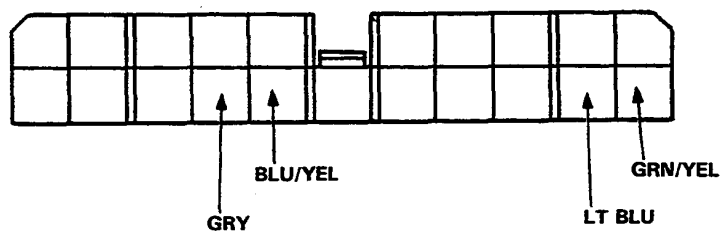
**YES**

Faulty control unit.

**SENSOR SIDE CONNECTOR**



View from terminal side.



View from wire side.

**Problem Code 5-1 to 7-8: Speed Sensor**

Disconnect wire harness from speed sensor.

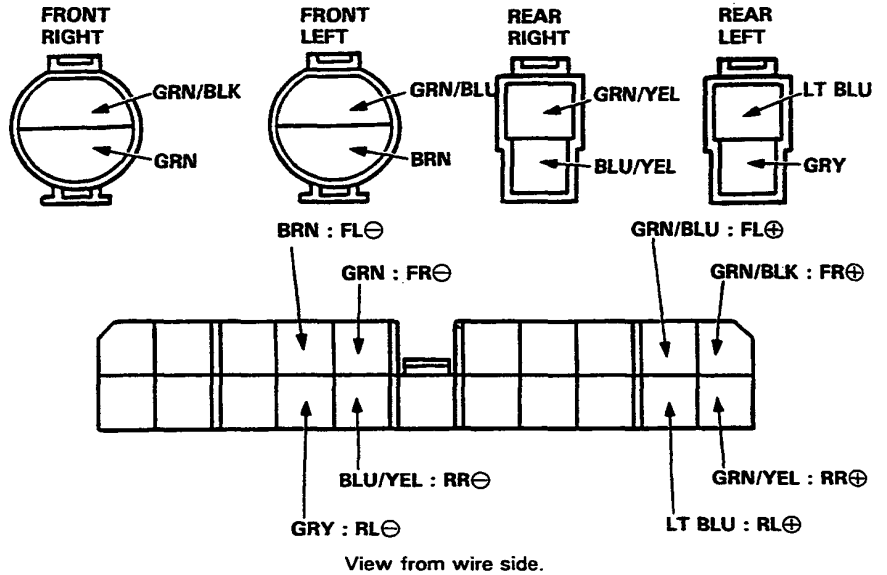
Check for resistance between sensor terminals.

Is there 500—1000 Ω? **NO** Faulty speed sensor.

**YES**

Disconnect the 21P connector from the control unit.

Check the each wires for continuity between the sensor and control unit:  
 GRN/BLK: Front Right Positive  
 GRN/BLU: 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



Is there continuity? **NO** Repair open in sensor wire:

**YES**

Check pulser air gap (page 13-85).

Is the air gap OK? **NO** Repair air gap or replace the pulser rotor and/or speed sensor

**YES**

Faulty control unit.

# Troubleshooting

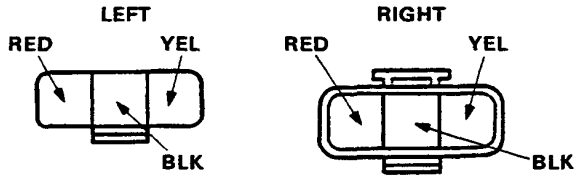
## Flow Chart (cont'd)

### Problem Code 8-1 to 8-12: Front Solenoid Related Problem

NOTE: Problem Code 8-2 or 8-8, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 13-55).

Disconnect wire harness from front solenoids.

Check for resistance between RED and BLK terminals of front solenoid.



View from terminal side.

Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

**YES**

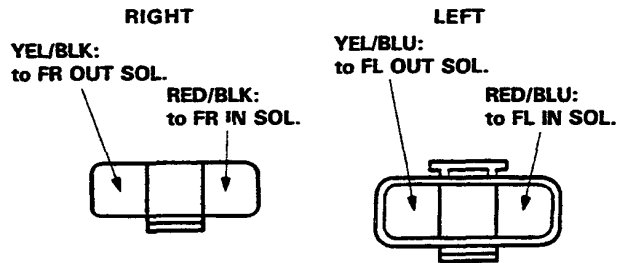
Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

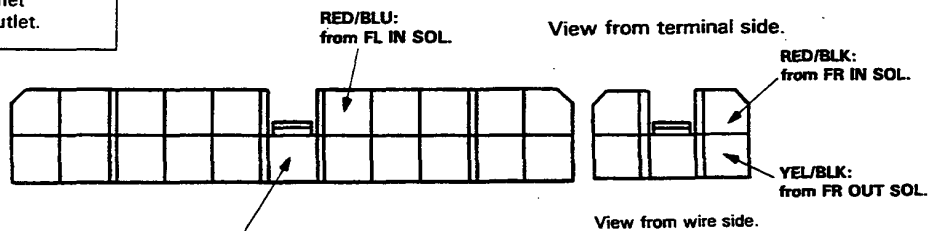
**YES**

Disconnect the 21P and 5P connectors from the control unit.



View from terminal side.

Check for continuity between control unit and front solenoid:  
 RED/BLK: Front Right Inlet  
 YEL/BLK: Front Right Outlet  
 RED/BLU: Front Left Inlet  
 YEL/BLU: Front Left Outlet.



View from wire side.

Is there continuity? **NO**

Repair open in wire:  
 RED/BLK: Front Right Inlet  
 YEL/BLK: Front Right Outlet  
 RED/BLU: Front Left Inlet  
 YEL/BLU: Front Left Outlet

**YES**

Faulty control unit.

**Problem 8-15: Front Fail Safe Relay Circuit**

Remove front fail safe relay.

Check relay function (page 13-84).

Does it work properly?

NO Faulty front fail safe relay.

YES

Check for continuity between BLK lead and body ground.

Is there continuity?

NO Repair open in BLK wire between the fail safe relay and ground or poor ground (G6).

YES

Turn ignition switch ON.

Check for voltage between YEL/BLK lead (+) and body ground (-).

Is battery voltage available?

NO Repair open in YEL/BLK wire between the fail safe relay and No.17 fuse.

YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

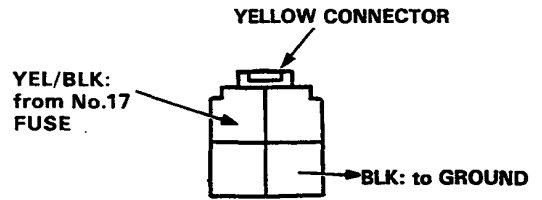
Check for continuity in BRN/BLK lead between fail safe relay and solenoids.

Is there continuity?

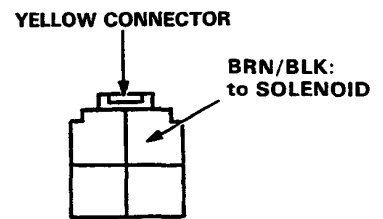
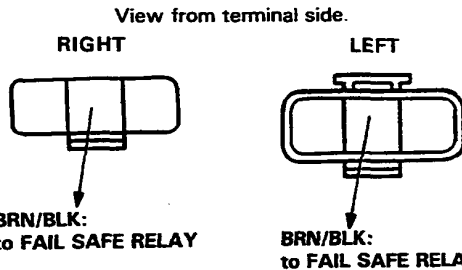
NO Repair open in BRN/BLK wire between the solenoids and fail safe relay.

YES

(To page 13-58)



View from terminal side.



View from terminal side.

(cont'd)

# Troubleshooting

## Flow Chart (cont'd)

(From page 13-57)

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3  $\Omega$ ? NO

Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3  $\Omega$ ? NO

Faulty solenoid.

YES

Disconnect the 21P and 5P connectors from the control unit.

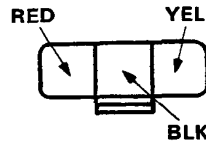
Check for continuity between control unit and front solenoid:  
 RED/BLK: Front Right Inlet  
 YEL/BLK: Front Right Outlet  
 RED/BLU: Front Left Inlet  
 YEL/BLU: Front Left Outlet.

Is there continuity? NO

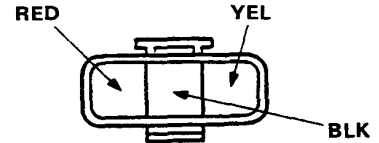
Repair open in wire:  
 RED/BLK: Front Right Inlet  
 YEL/BLK: Front Right Outlet  
 RED/BLU: Front Left Inlet  
 YEL/BLU: Front Left Outlet

Faulty control unit.

LEFT

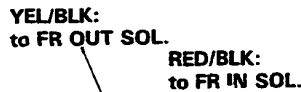


RIGHT



View from terminal side.

RIGHT

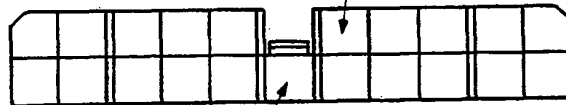


LEFT



View from terminal side.

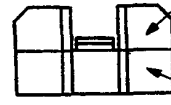
RED/BLU:  
from FL IN SOL.



YEL/BLU:  
from FL OUT SOL.

View from wire side.

RED/BLK:  
from FR IN SOL.



YEL/BLK:  
from FR OUT SOL.

View from wire side.

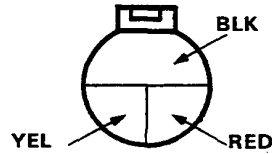


**Problem Code 9 or 10: Rear Solenoid Related Problem**

NOTE: Problem Code 10, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 19-47).

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.



View from terminal side.

Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of rear solenoid.

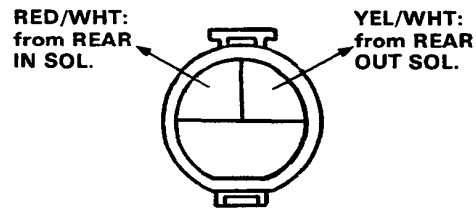
Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

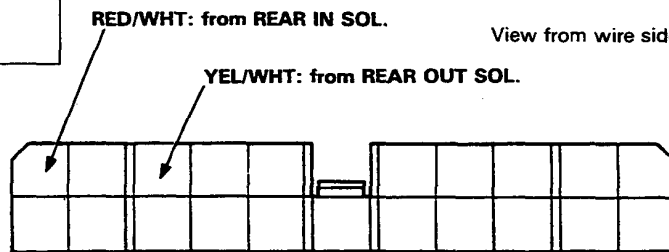
YES

Disconnect the 21P connector from the control unit.

Check for continuity between control unit and rear solenoid:  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet



View from wire side.



View from wire side.

Is there continuity? **NO**

Repair open in the wire between the rear solenoid and control unit  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet

YES

Faulty control unit.

(cont'd)

# Troubleshooting

## Flow Chart

### Problem Code 11: Rear Fail Safe Relay Circuit

NOTE: Also perform Troubleshooting of Problem Code 9 or 10 (page 13-59).

Remove rear fail safe relay.

Check relay function (page 13-86).

Does it work properly? **NO**

Faulty fail safe relay.

**YES**

Check for continuity between BLK lead of wire harness and body ground.

Is there continuity? **NO**

Repair open in BLK wire between the relay and ground or poor ground (G202).

**YES**

Turn ignition switch ON.

Check for voltage between YEL/BLK lead (+) of wire harness and body ground (-).

Is battery voltage available? **NO**

Repair open in YEL/BLK wire between the relay and No. 17 fuse.

**YES**

Turn ignition switch off.

Disconnect the 3P connector (PNK) from the rear solenoid.

Check for continuity in BLU/BLK lead between fail safe relay and solenoid.

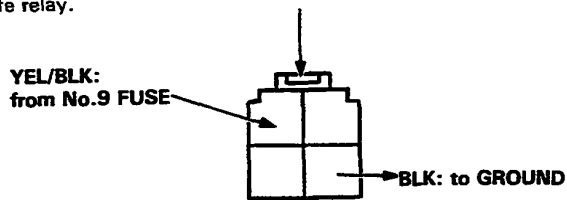
Is there continuity? **NO**

Repair open in BLU/BLK wire between the relay and solenoid.

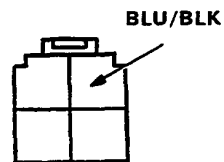
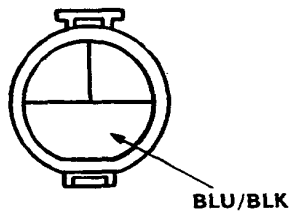
**YES**

(To page 13-61)

**PINK CONNECTOR**



View from terminal side.



View from terminal side.

(From page 13-60)

Disconnect the 21P connector from the control unit.

Check for continuity in YEL/GRN lead between fail safe relay and control unit.

Is there continuity? **NO**

Repair open in YEL/GRN wire between the relay and control unit.

**YES**

Check for continuity between control unit and rear solenoid.  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet

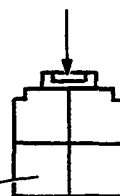
Is there continuity? **NO**

Repair open in wire between the solenoid and control unit.  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet

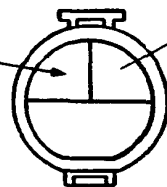
**YES**

Faulty control unit.

**PINK CONNECTOR**



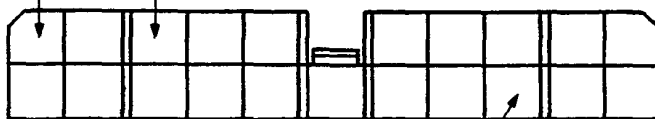
View from terminal side.



View from terminal side.

**RED/WHT: from REAR IN SOL.**

**YEL/WHT: from REAR OUT SOL.**



**YEL/GRN: from FAIL SAFE RELAY**

View from wire side.

(cont'd)

# Troubleshooting

## Flow Chart (cont'd)

**Problem Code 12-1, 12-2, 12-4 or 12-8: Front Solenoid**

Disconnect wire harness from front solenoids.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

**YES**

Check for resistance between YEL and BLK terminals of front solenoid.

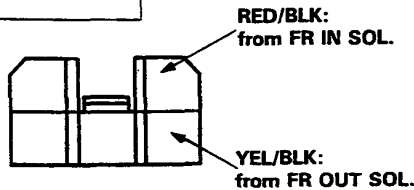
Is there 1-3  $\Omega$ ? **NO**

Faulty solenoid.

**YES**

Disconnect the 21P and 5P connectors from the control unit.

Check for continuity between wire harness and body ground.  
 RED/BLK: front Right Inlet  
 YEL/BLK: Front Right Outlet  
 RED/BLU: Front Left Inlet  
 YEL/BLU: Front Left Outlet



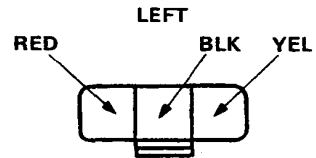
View from wire side.

Is there continuity? **YES**

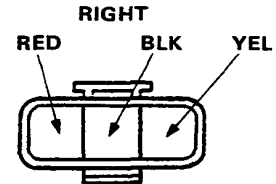
Repair short in wire between control unit and front solenoids.  
 RED/BLK: Front Right Inlet  
 RED/BLU: Front Left Inlet  
 YEL/BLK: Front Right Outlet  
 YEL/BLU: Front Left Outlet

**NO**

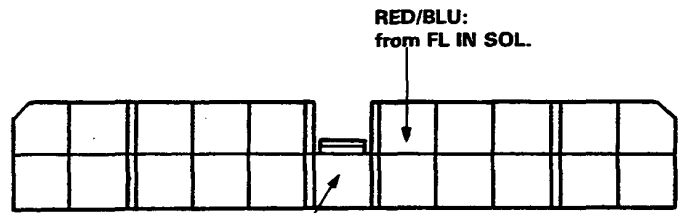
Faulty control unit.



View from terminal side.



View from terminal side.



View from wire side.

**RIGHT**

**LEFT**

YEL/BLK: to FR OUT SOL.

RED/BLK: to FR IN SOL.



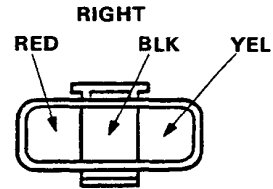
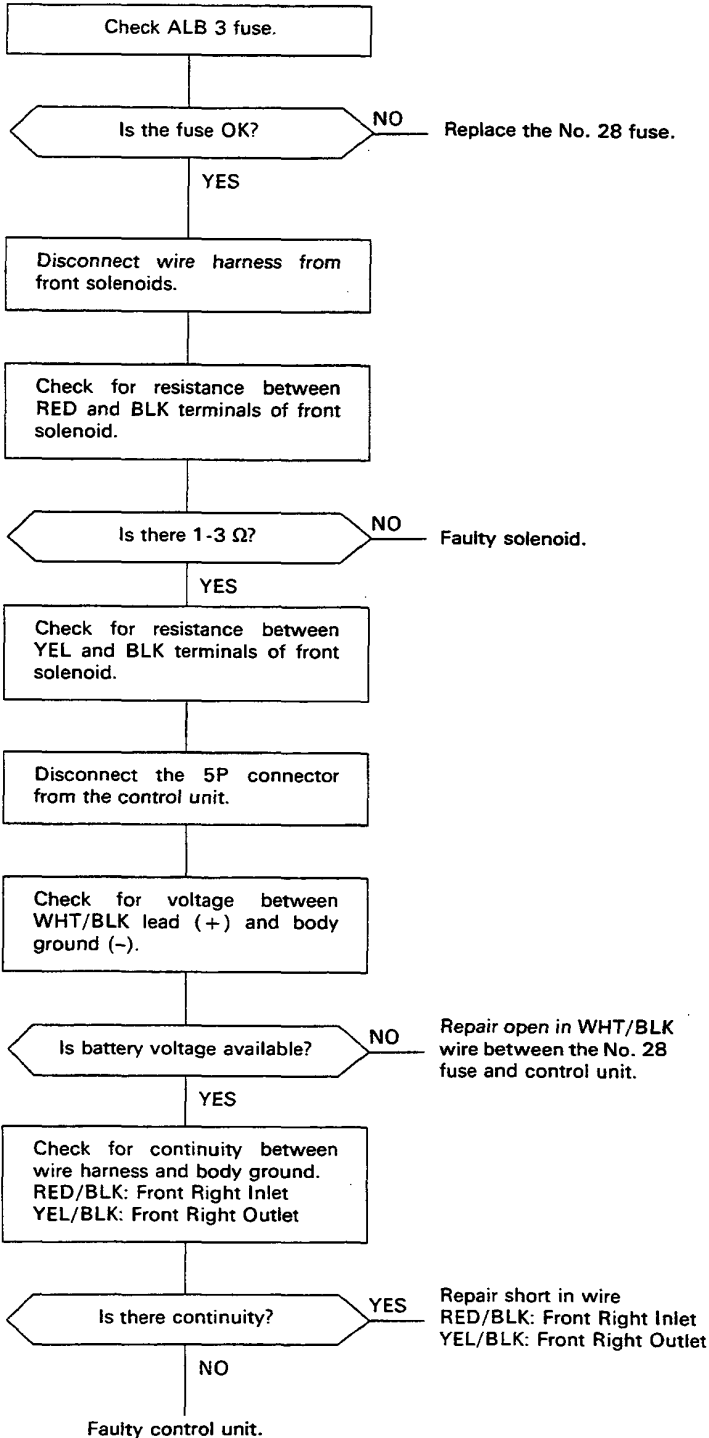
YEL/BLU: to FL OUT SOL.

RED/BLU: to FL IN SOL.



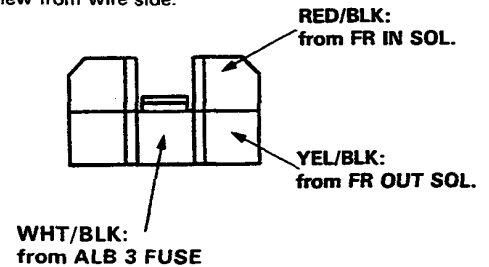
View from terminal side.

**Problem Code 12-3: Front Right Solenoid and/or Power Supply**



View from terminal side.

View from wire side.



(cont'd)

# Troubleshooting

## Flow Chart

**Problem Code 12-12: Front Left Solenoid and/or Power Supply Problem**

Check No. 26 fuse.

Is the fuse OK? **NO** Replace the fuse.

**YES**

Disconnect wire harness from front solenoid.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1—3  $\Omega$ ? **NO** Faulty solenoid.

**YES**

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1—3  $\Omega$ ? **NO** Faulty solenoid.

**YES**

Disconnect the 21P connector from the control unit.

Check for voltage between WHT/GRN lead (+) and body ground (-).

Is battery voltage available? **NO** Repair open in WHT/-GRN wire between the No. 26 fuse and control unit.

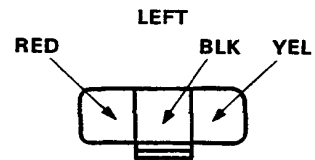
**YES**

Check for continuity between wire harness and body ground.  
RED/BLU: Front Left Inlet  
YEL/BLU: Front Left Outlet

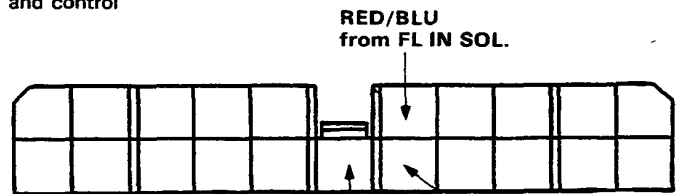
Is there continuity? **YES** Repair short in wire between the control unit and solenoid.  
RED/BLU: Front Left Inlet  
YEL/BLU: Front Left Outlet

**NO**

Faulty control unit.



View from terminal side.



View from wire side.

**Problem Code 13 or 14: Rear Solenoid Related Problem**

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.

Is there 1—3  $\Omega$ ? **NO**

Faulty solenoid.

**YES**

Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1—3  $\Omega$ ? **NO**

Faulty solenoid.

**YES**

Disconnect the 21P connector from the control unit.

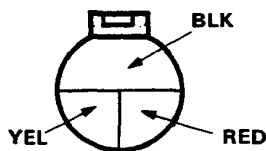
Check for continuity between wire harness and body ground.  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet

Is there continuity? **YES**

Repair short in wire between the solenoid and control unit.  
RED/WHT: Rear Inlet  
YEL/WHT: Rear Outlet

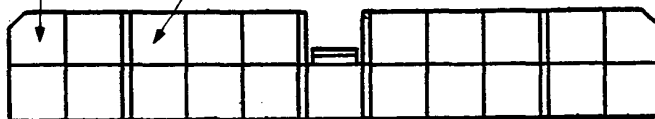
**NO**

Faulty control unit.



View from Terminal side.

RED/WHT: from REAR IN SOL.  
YEL/WHT: from REAR OUT SOL.



View from wire side.

# Hydraulic System

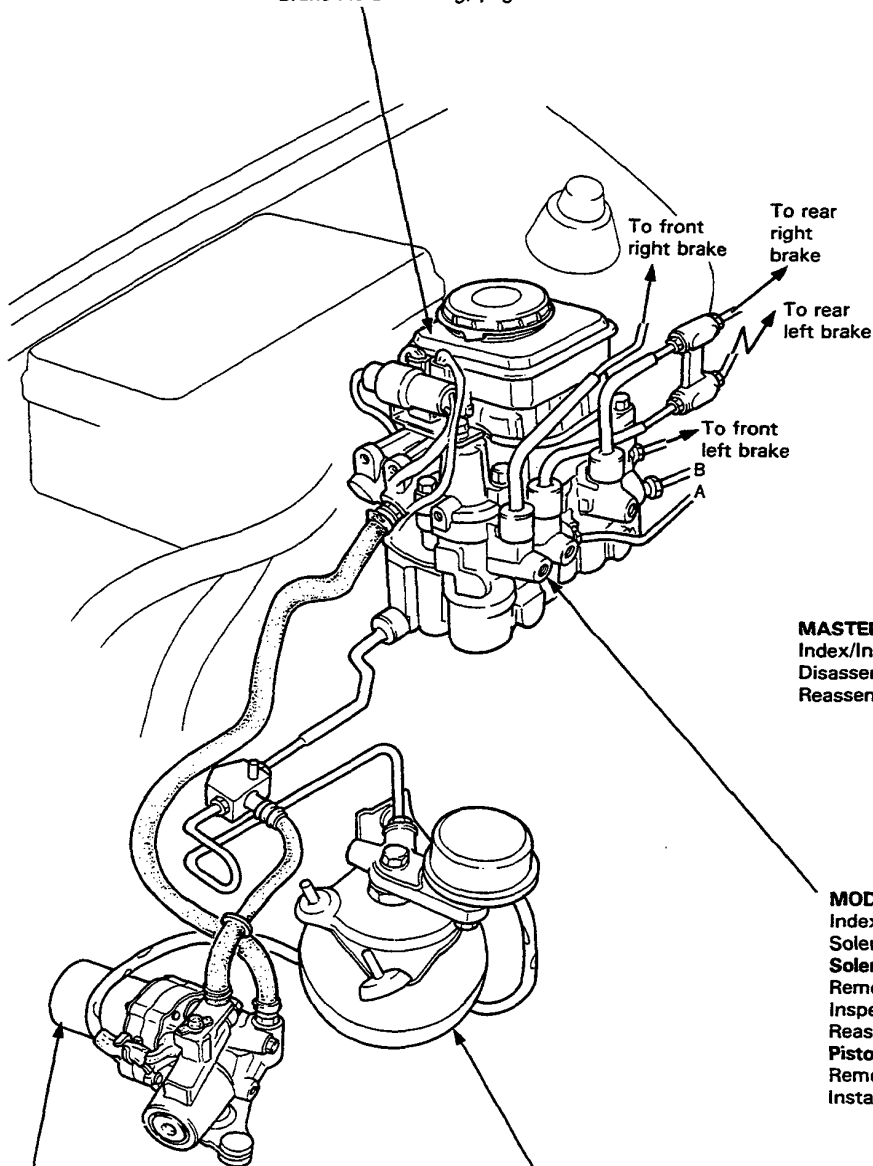
## Index

### 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.
- The flare nuts should be tightened to 15 N·m (1.5 kg·m, 11 lb·ft).
- The brake pipes and modulator fittings are color coded.

### RESERVOIR

Brake Fluid Draining, page 13-73



### MASTER CYLINDER

Index/Inspection, page 13-68  
Disassembly, page 13-69  
Reassembly, page 13-70

### MODULATOR

Index/Inspection, page 13-72  
Solenoid Leak Test, page 13-73  
**Solenoid**  
Removal, page 13-74  
Inspection, page 13-75  
Reassembly, page 13-75  
**Piston**  
Removal, page 13-76  
Installation, page 13-77

### ACCUMULATOR

Index/Inspection, page 13-81  
Disassembly/Reassembly,  
page 13-82  
Accumulator Disposal,  
page 13-82

### POWER UNIT

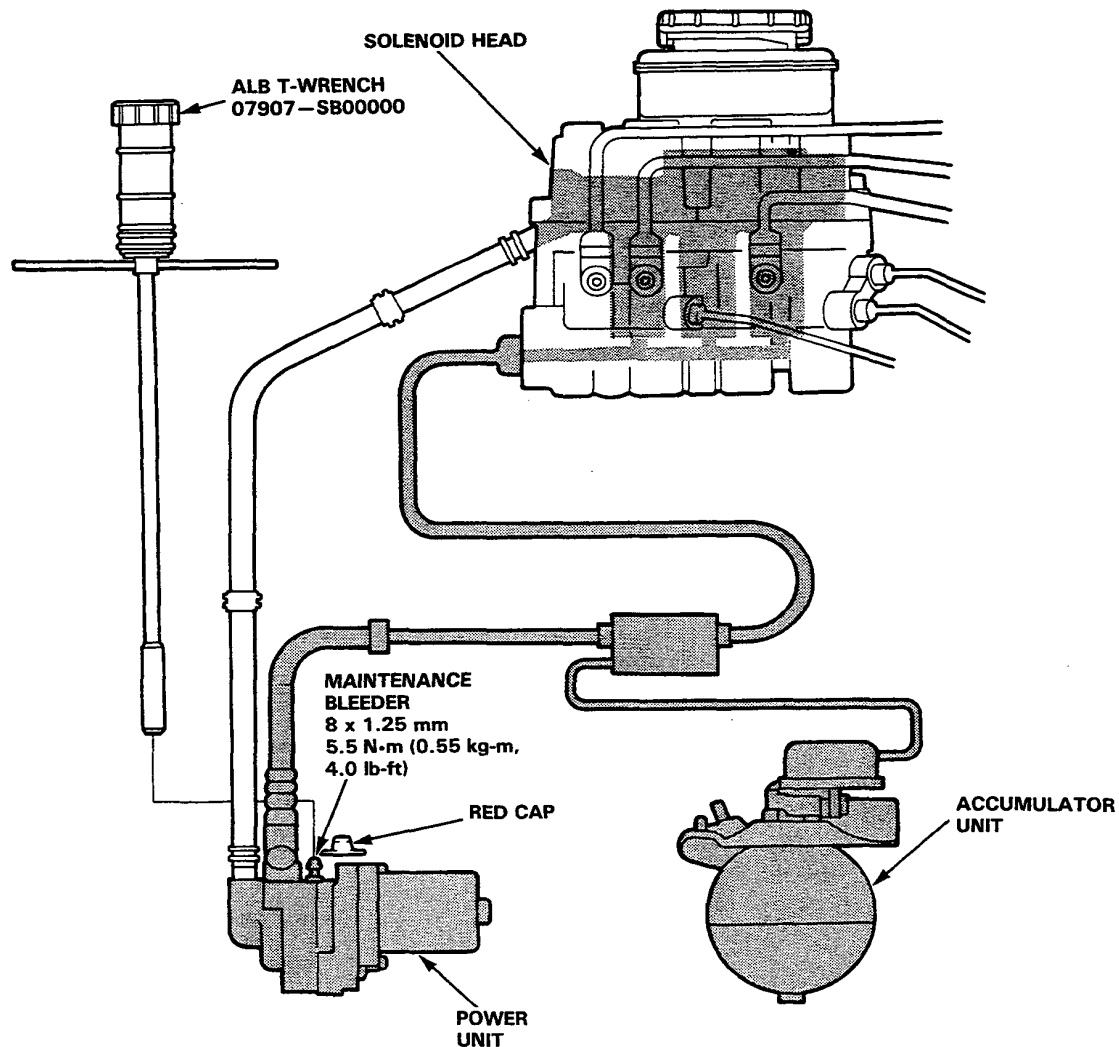
Index/Inspection, page 13-78  
Disassembly, page 13-79  
Reassembly, page 13-80



## Relieving Accumulator/Line Pressure

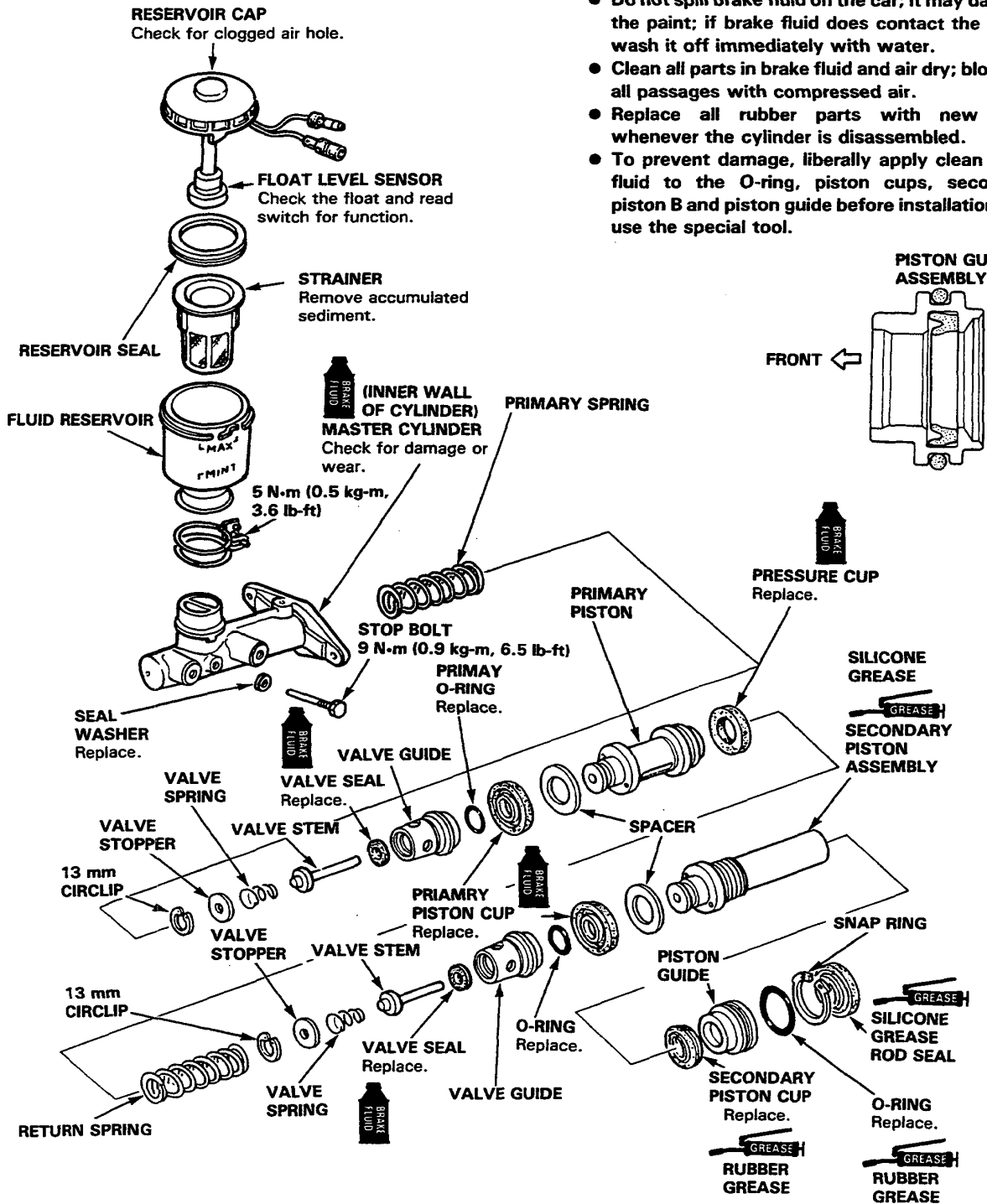
**WARNING** USE the ALB T-WRENCH before disassembling the parts shaded in the illustration.

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 ALB T-WRENCH on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into the reservoir. Turn the T-WRENCH out one complete turn to drain the brake fluid thoroughly.
4. Retighten the bleeder screw and discard the fluid.
5. Reinstall the red cap.



# Master Cylinder

## Index/Inspection



### CAUTION:

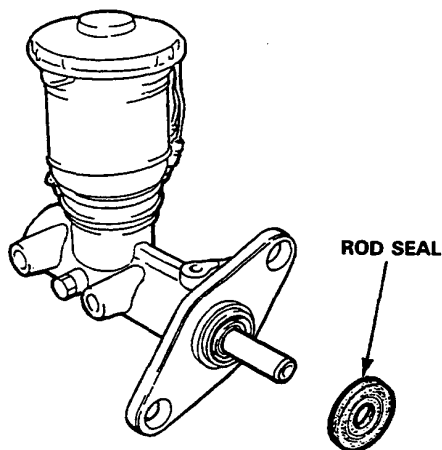
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the O-ring, piston cups, secondary piston B and piston guide before installation, and use the special tool.

## Disassembly

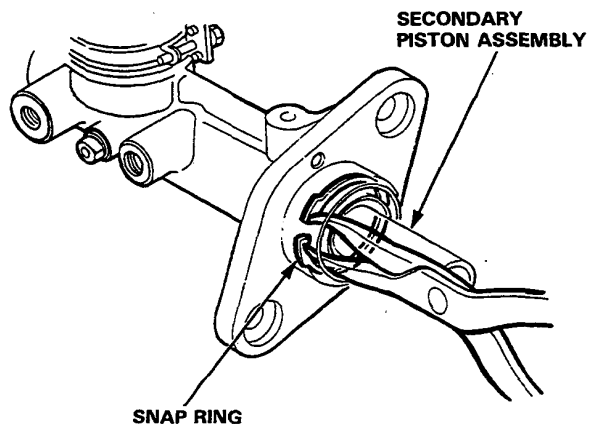
### CAUTION:

- 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.
- Use only new clean brake fluid.
- 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 bend or damage the brake pipes when disconnecting.

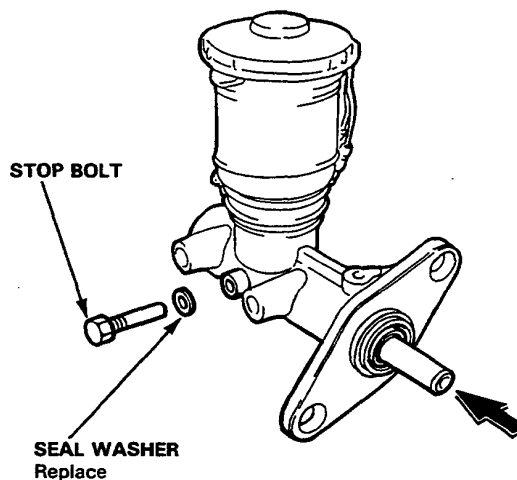
1. Remove the rod seal.



2. Press the secondary piston assembly in, then remove the snap ring.



3. Remove the stop bolt while pushing the secondary piston assembly.



4. Remove the piston guide assembly, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

### CAUTION:

Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.

5. Clean each component in brake fluid.

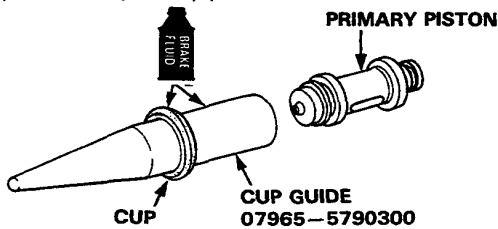
# Master Cylinder

## Reassembly

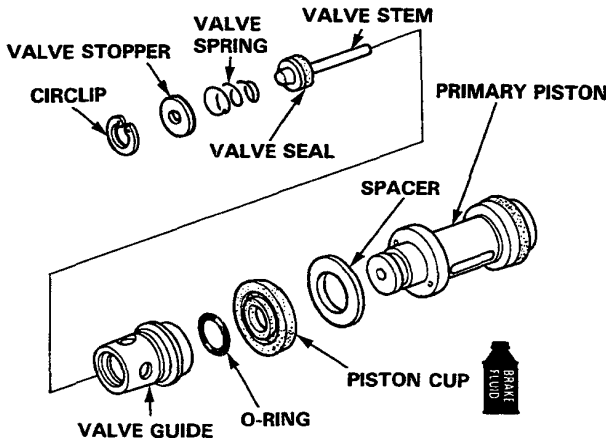
### CAUTION:

- 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.
- Use only new clean brake fluid.
- 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.

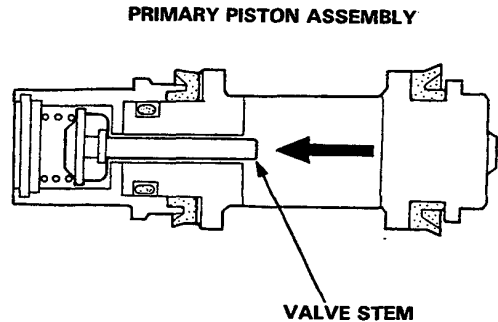
1. Coat the Cup Guide (special tool) with brake fluid, install the cup over the Cup Guide, then slide the cup onto the primary piston.



2. Install the spacer, piston cup and O-ring to the primary piston.
3. Install the valve seal on the valve stem with its flat face toward the front.
4. Install the valve stem, valve spring and valve stopper in the valve guide and secure them with the circlip.

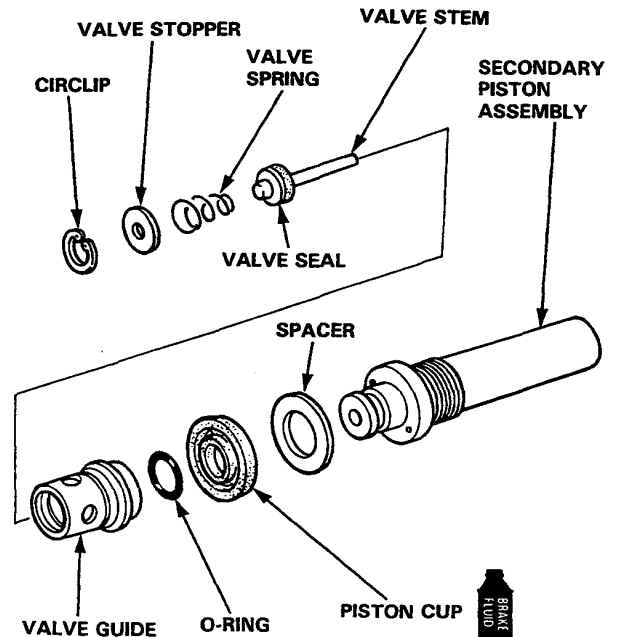


5. Install the valve guide to the primary piston.

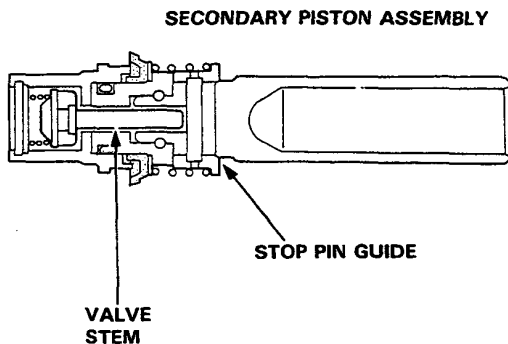


NOTE: Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.

6. Install the spacer, piston cup and O-ring on the secondary piston sub-assembly.
7. Install the valve seal on the valve stem with its flat face toward the front.
8. Install the valve stem, valve spring and valve stopper on the valve guide and secure with circlip.



7. Install the valve guide to the secondary piston assembly.



**NOTE:** Lightly press the stop pin guide to see if the valve stem moves smoothly.

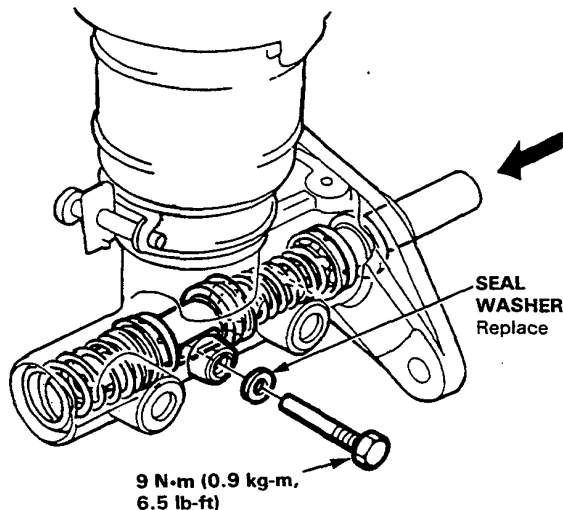
8. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

**NOTE:** Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

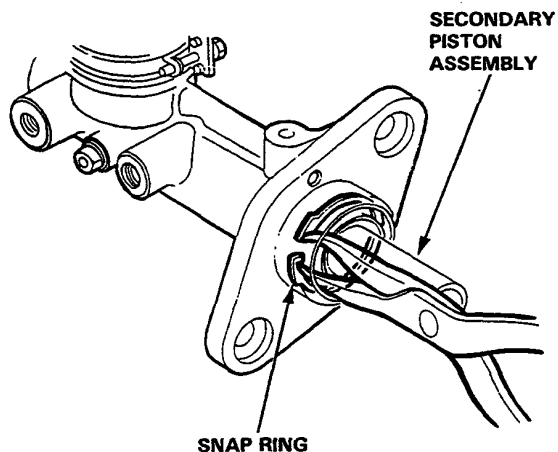
9. Push the secondary piston in until the slot aligns with the stop bolt hole, then install and tighten the stop bolt.

**CAUTION:**

- Replace the stop bolt seal washer with a new one whenever disassembled.
- Apply brake fluid to the inner wall of the cylinder and piston cups, being careful that they are not turned inside out during installation.

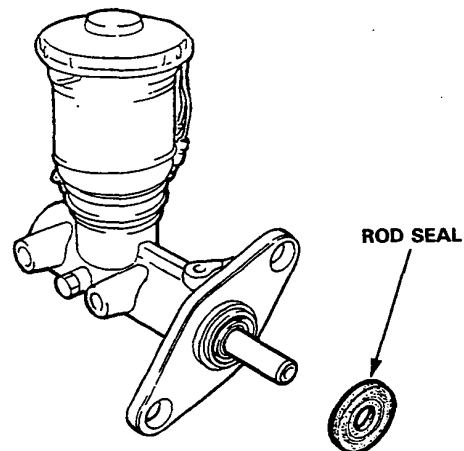


10. Press the secondary piston in and install the snap ring.



**CAUTION:** Avoid damaging the sliding surface of the secondary piston when installing the snap ring.

11. Install the rod seal.



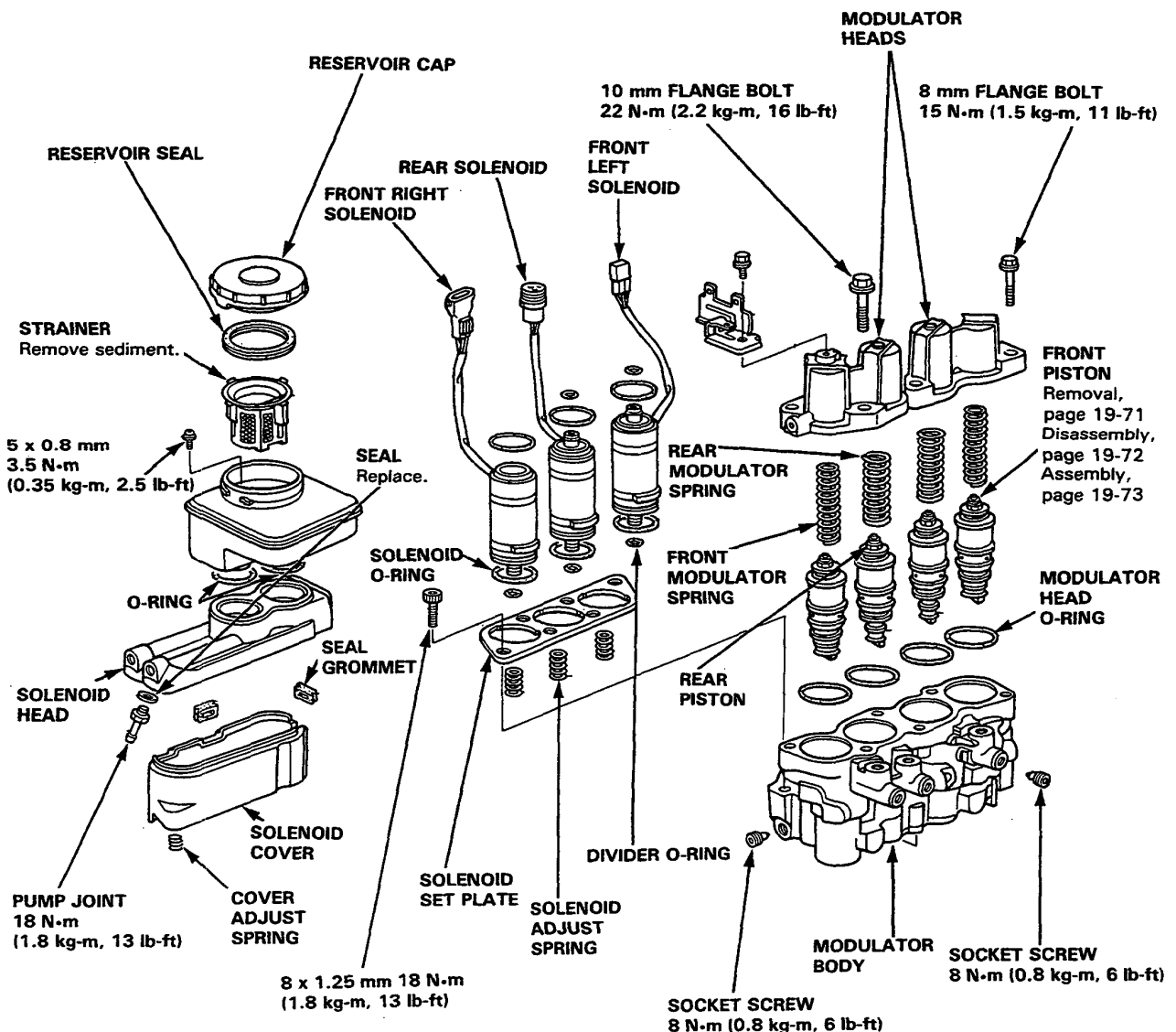
**CAUTION:** Make sure that there is no interference between the brake pipes and other parts when installing.

# Modulator

## Index/Inspection

### CAUTION:

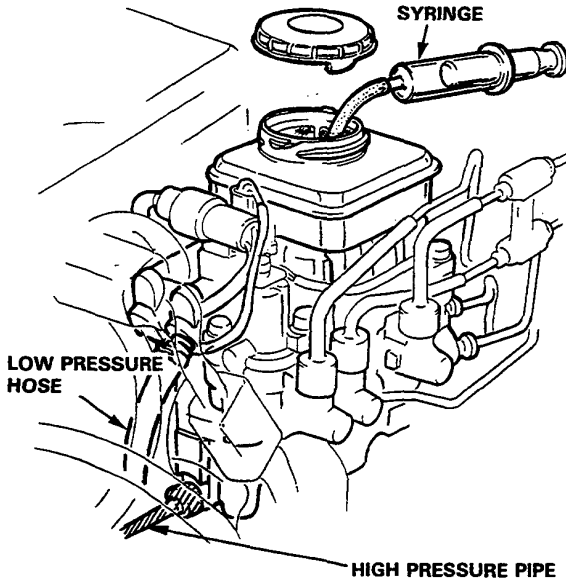
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- 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.
- Replace all rubber parts with new ones whenever the modulator is disassembled.



# Reservoir

## Brake Fluid Draining

1. Draining brake fluid from modulator tank:  
The brake fluid may be sucked out through the top of the modulator tank with a syringe. It may also be drained through the pump joint after disconnecting the pump hose.
2. Draining brake fluid from master cylinder:  
Loosen the bleed screw and pump the brake pedal to drain the brake fluid from the master cylinder.



### WARNING

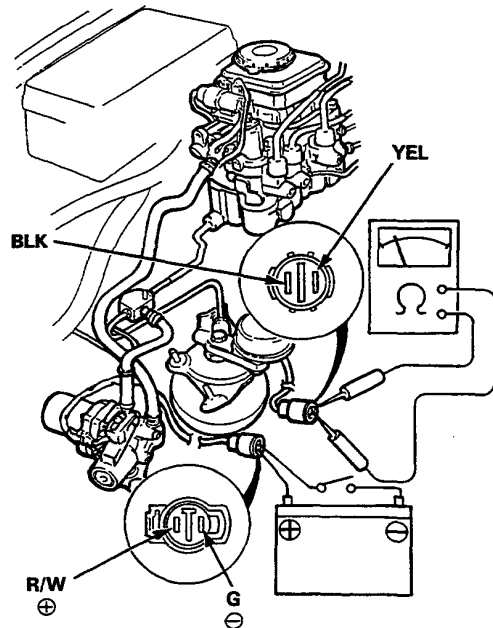
- High pressure fluid will squirt out if the tube shaded is removed or the solenoid head 8 mm and 10 mm bolts are loosened.
- To drain high pressure brake fluid, follow the procedure under *Draining of High Pressure Brake Fluid* on page 13-67.

# Solenoid



## Leak Test

1. Connect circuit tester ( $\Omega$  range) between the Black and Yellow terminals of the accumulator pressure switch coupler (pink).
2. Attach the positive (+) lead of a fully charged 12 V battery to the Red/White terminal of the power unit motor coupler (yellow) and a switched negative (-) lead to the Green terminal.
3. Turn the switch on to allow sufficient pressure to build up within the accumulator and check for continuity shown in the circuit tester. If the circuit tester shows continuity (pressure switch turned on), the power unit for 4 seconds more, then turn the switch off.



Check for continuity 1 minute after switch was turned off.

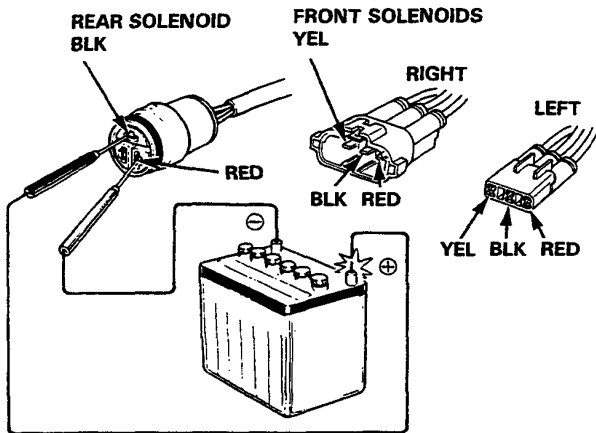
No continuity.....Leaky solenoid (if the pipe joint is tight) or faulty divider O-ring

(cont'd)

# Solenoid

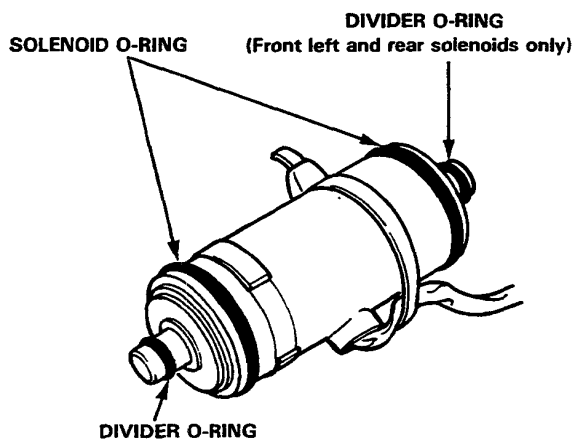
## Leak Test (cont'd)

4. Apply a 12 V across the BLK and RED terminals of the solenoid coupler (pink) momentarily.



- Make sure that the solenoid clicks into position and does not hiss or squeak after it has clicked into position. Replace with a new one if it hisses or squeaks.
- Check the pressure switch for continuity within one minute. It is normal if there is continuity. If there is no continuity, solenoid is faulty and must be replaced.

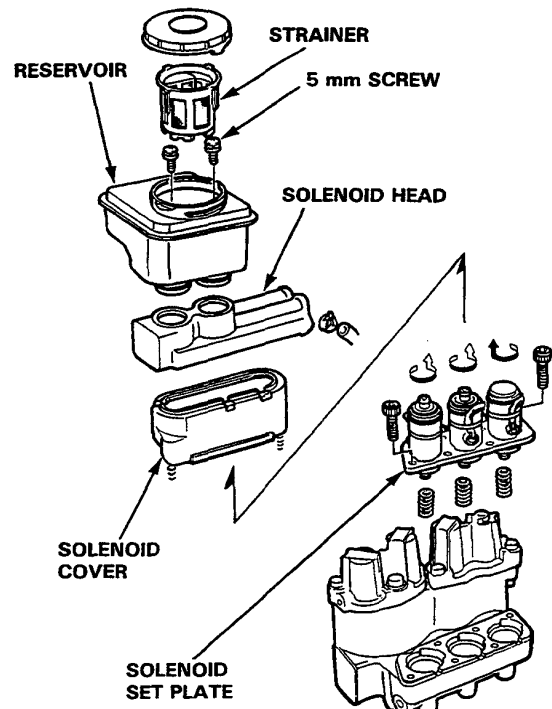
NOTE: If faulty, the solenoid must be replaced as a unit unless only the O-ring is faulty.



## Removal

1. Drain the brake fluid from the modulator tank.
2. Drain the high pressure brake hose (page 13-67).
3. Disconnect the inlet hose.
4. Remove the reservoir strainer.
5. Remove the 5 mm screws and remove the reservoir.
6. Screw the 6 mm bolt into the threaded hole in the center of the solenoid head, raise the solenoid head parallel to the ground and remove it.
7. Remove the solenoid cover.
8. Remove the hexagonal socket screws and loosen the solenoid set plate.
9. Turn the solenoid valves several times until they move freely and turn the solenoid valves 1/2 turn to align their projection with the cutout in the set plate. Remove the solenoid valves together with the set plate.

**CAUTION:** The solenoid valves are delicate parts. Be careful not to drop them.





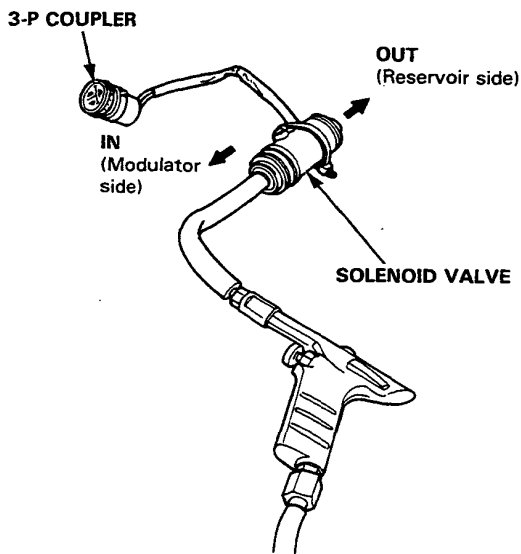
## Inspection

1. Connect a tube to the inlet of the solenoid valve. Apply compressed air to the solenoid valve through the tube.
2. Check the solenoid valve for proper operation by connecting a 12 V fully charged battery to the 3-P coupler terminals:

**Voltage not applied:** There should be no air flow.

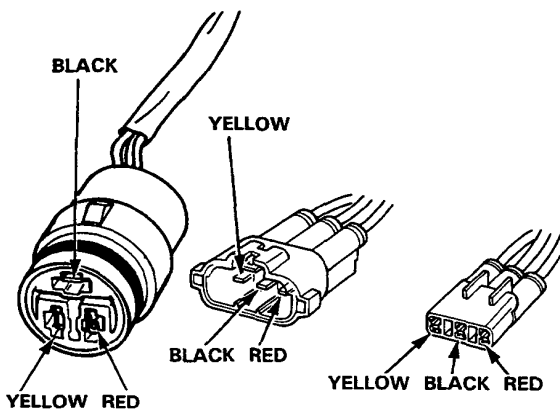
**Black — Red:** There should be air flow through IN and OUT.

**Black — Yellow:** There should be air flow through IN.



REAR SOLENOID

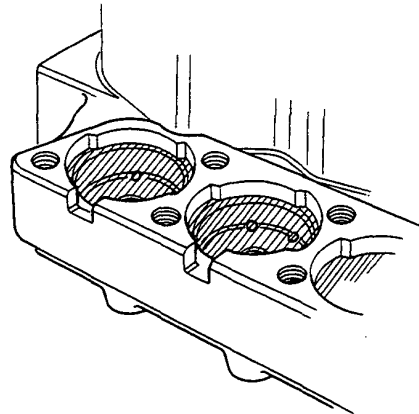
FRONT SOLENOID



## Reassembly

1. Fill the modulator body with brake fluid up to the step in the solenoid mounting hole.

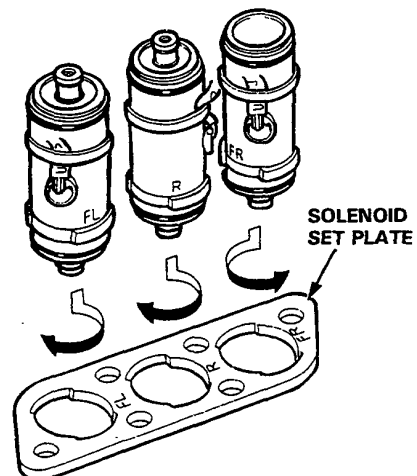
**NOTE:** On solenoid valve assembly, place shop rags over the solenoid valve and under the modulator valve to prevent the brake fluid from spilling on the valve.



2. Coat the O-ring with the clean brake fluid and install the O-ring onto the solenoid valve.
3. Install the solenoid valves on the set plate.

**WARNING** Each solenoid valve and set plate are marked for correct installation. If the solenoid valves are interchanged, the system will not work properly. Refer to the marks and be sure to install them in correct positions.

- Align the projection on the solenoid valve with the cutout in the set plate and turn the valve 1/2 turn. The solenoid wire should face rearward.

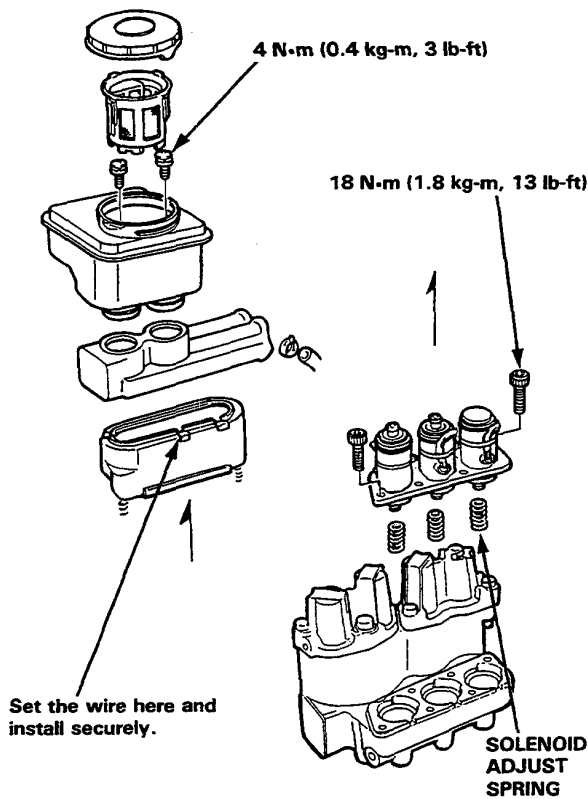


(cont'd)

# Solenoid

## Reassembly (cont'd)

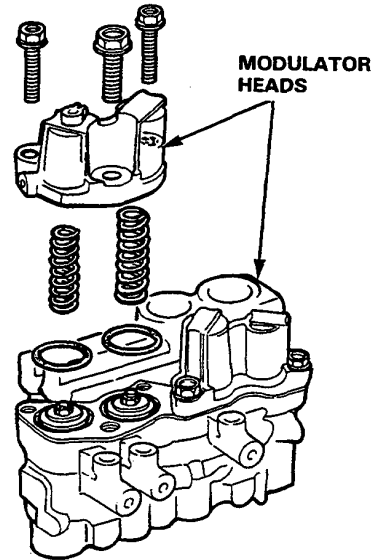
4. Install the solenoid adjust springs on the modulator body.
5. Install the solenoid valves and set plate and secure with the hexagonal socket screws.
6. Install the solenoid cover and solenoid head.
7. Install the reservoir tank.
8. Install the tank filter.
9. Connect the low pressure hose.



# Piston

## Removal

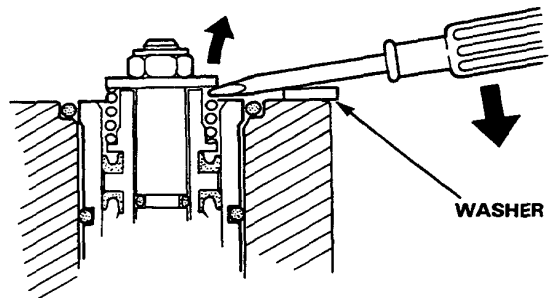
1. Remove the modulator heads.



2. Insert the driver into the spring, pry off the piston assembly until it lifts up slightly and pull the lock nut with a pair of pliers.

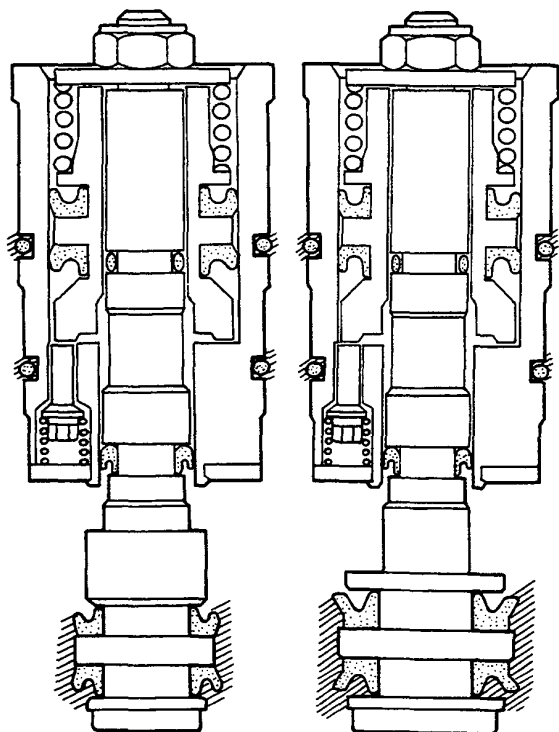
### CAUTION:

- Set the washer between the driver and modulator body to prevent damage to the body.
- Be careful not to damage the piston sleeve.

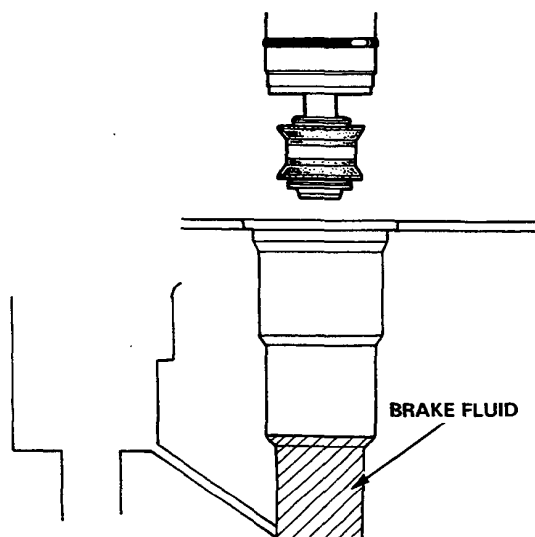


# Installation

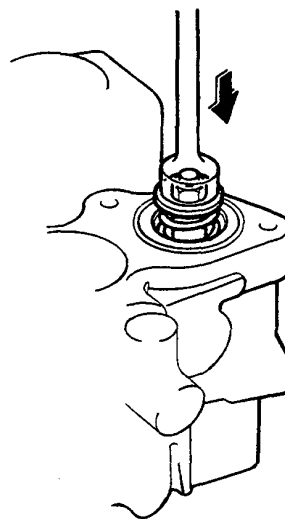
1. Apply rubber grease to the shaded sections of the piston assembly, shown in the drawing below.



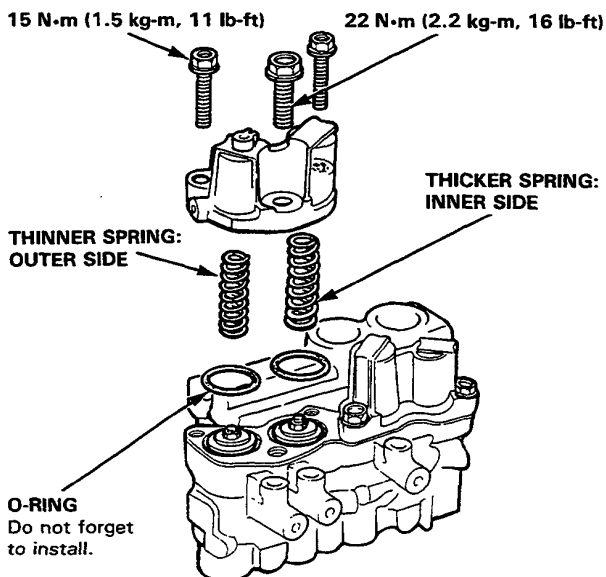
2. Adjust so that the brake fluid flows into the piston mounting hole in the modulator body.



3. Set the piston assembly in the piston mounting hole in the modulator body and push down on the piston.
4. Push on the piston about 5 times until no bubbles come out of the solenoid side.



5. Install the modulator springs.
6. Install the solenoid heads with care not to pinch the O-rings.

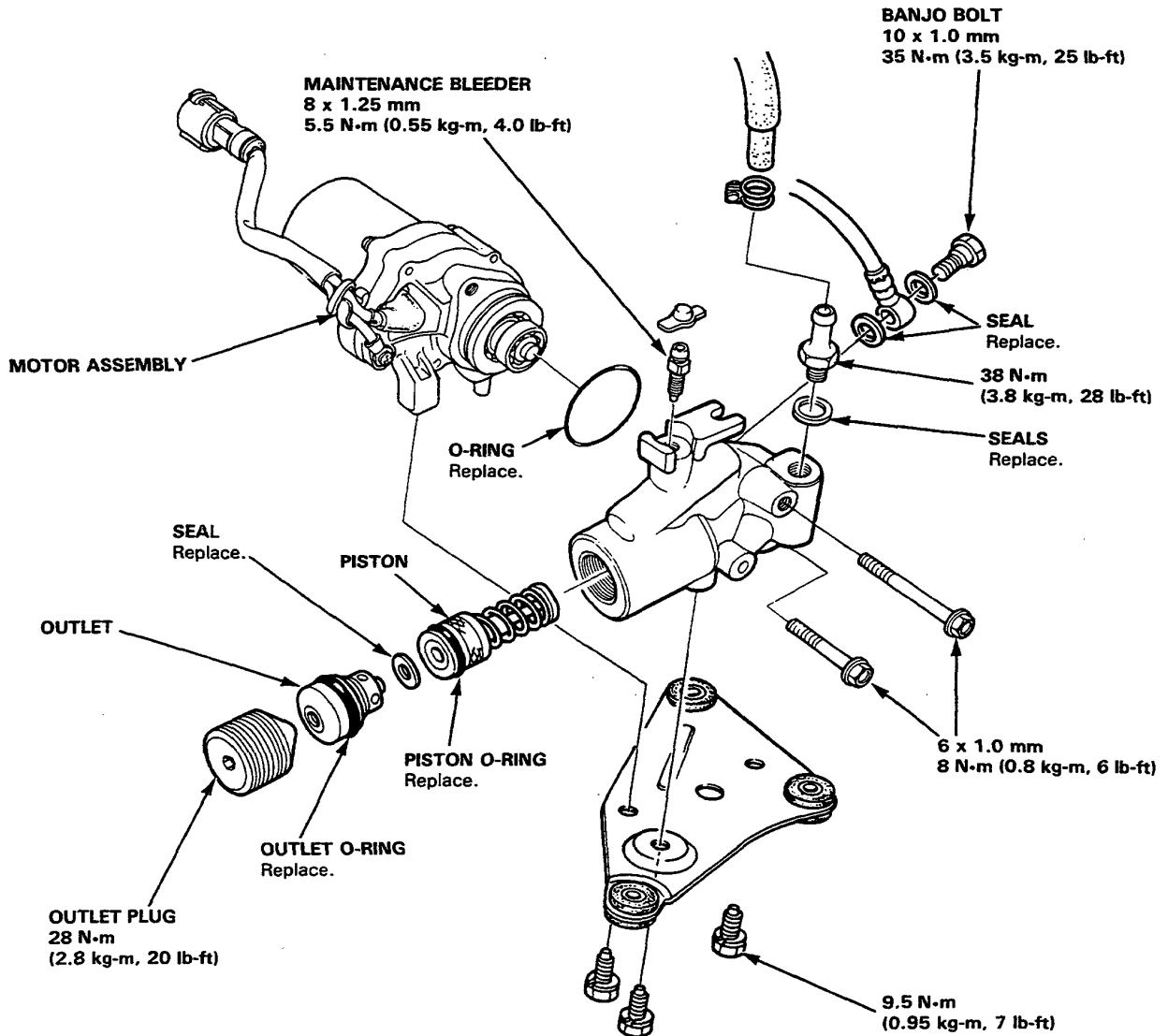


# Power Unit

## Index/Inspection

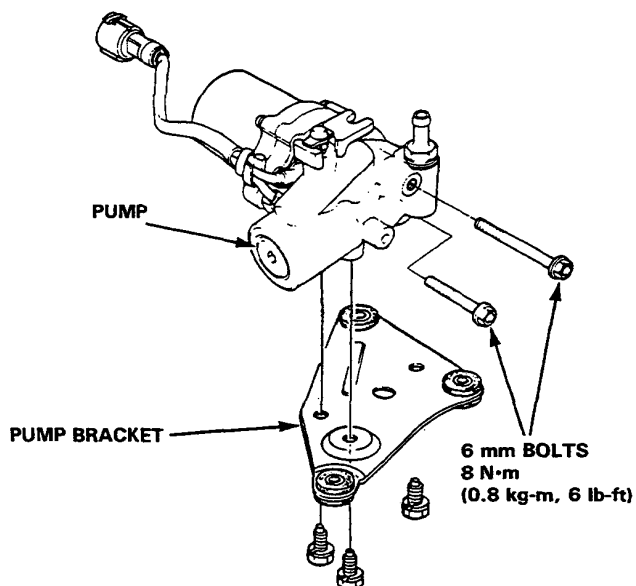
### CAUTION:

- Do not attempt to disassemble the power unit parts except for those shown exploded 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.

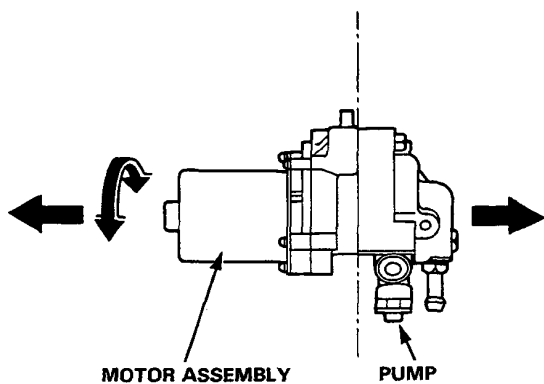


## Disassembly

1. Remove the pump bracket.
2. Remove the 6 mm bolts attaching the pump to the pump motor.

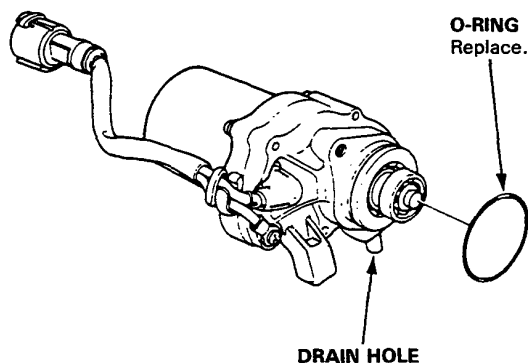


3. Separate the motor from the pump while rotating the pump right and left.



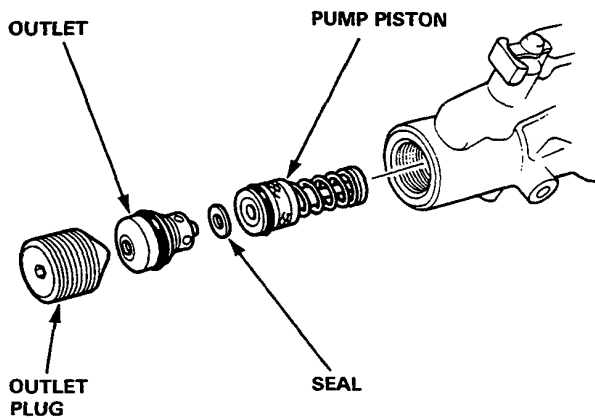
NOTE: About 10 cc (0.6 cu-in) of brake fluid will flow out when the motor is removed from the pump.

4. Wash the motor with clean brake fluid only on the exposed end and blow dry with compressed air.



NOTE: Do not wash or dip the motor in brake fluid. Also be careful not to allow oil or water to enter the inside through the water drain hole.

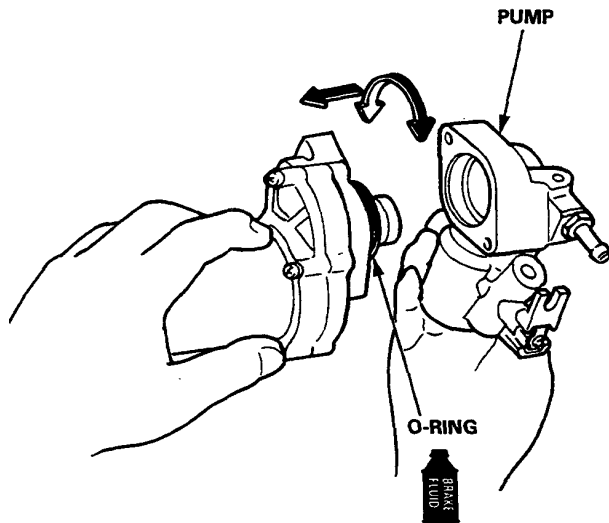
5. Remove the outlet plug from the mechanical pump with a hex. wrench.
6. Set the 6 mm bolt on the outlet and remove it by pulling the bolt.
7. Remove the gasket.
8. Press the piston out of the mechanical pump body.



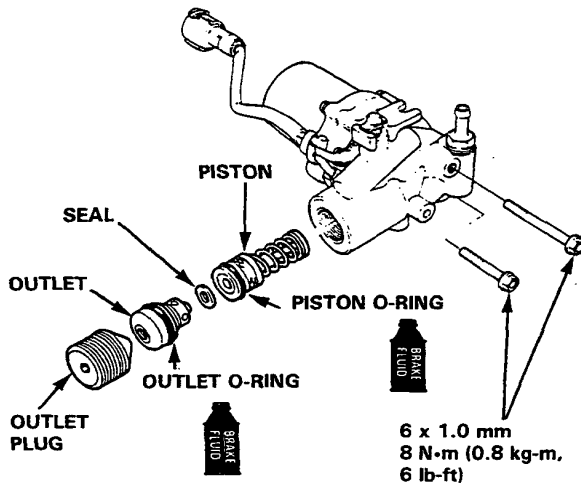
# Power Unit

## Reassembly

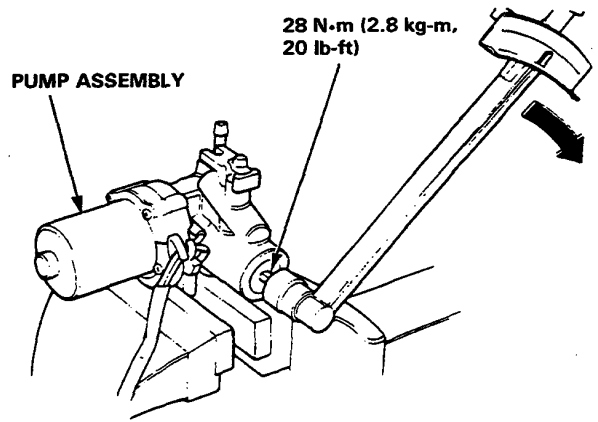
1. Install a new O-ring on the pump motor.
2. Coat the O-ring with clean brake fluid and install the pump on the motor while rotating it right and left by hand.



3. Install the 6 mm bolts and tighten.
4. Coat a new pump piston O-ring with the clean brake fluid and insert the pump piston into the pump.
5. Install the gasket.
6. Coat the outlet O-ring with the brake fluid and insert the outlet into the pump.
7. Loosely tighten the outlet plug.

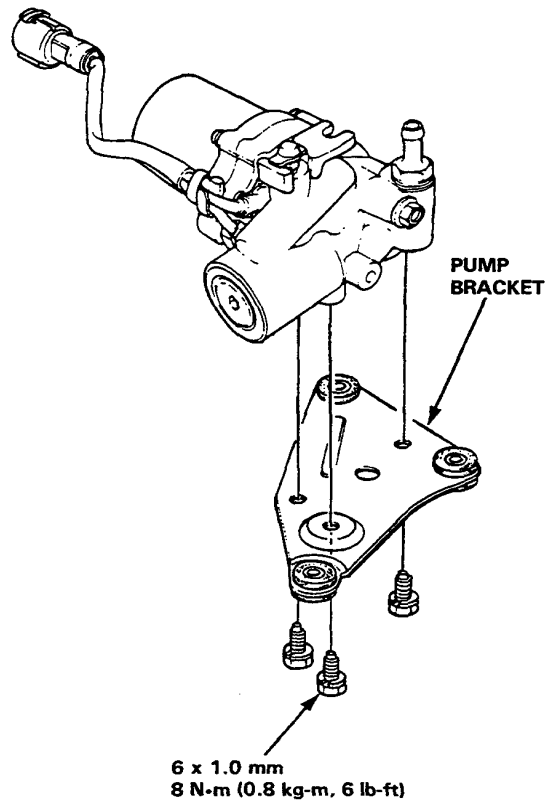


8. Place the motor in a vise as shown and tighten the outlet plug.



NOTE: Clamp the pump in a vise only as shown above.

9. Install the pump bracket.



# Accumulator

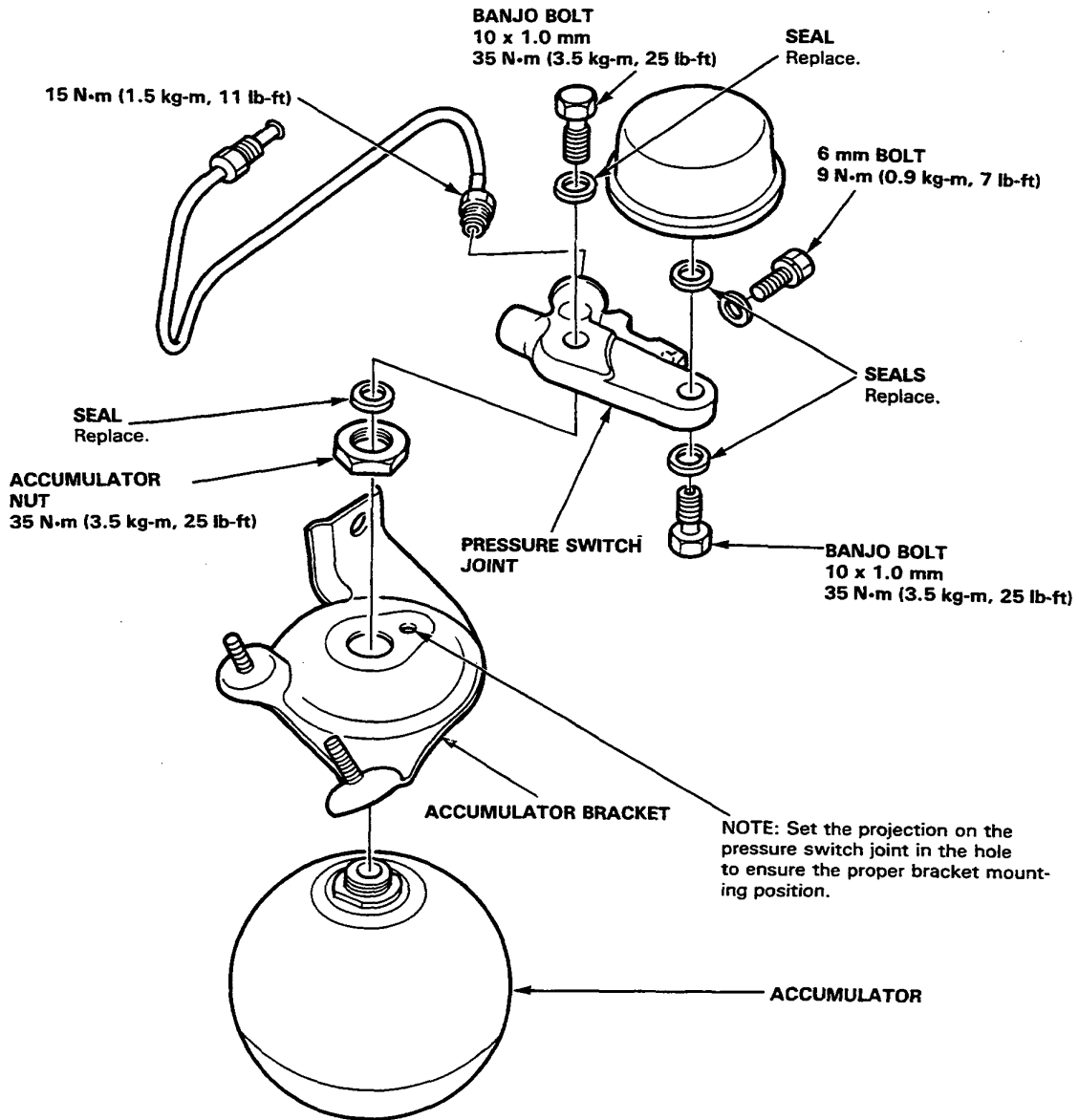
## Index/Inspection



**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.
- Use only new clean brake fluid.

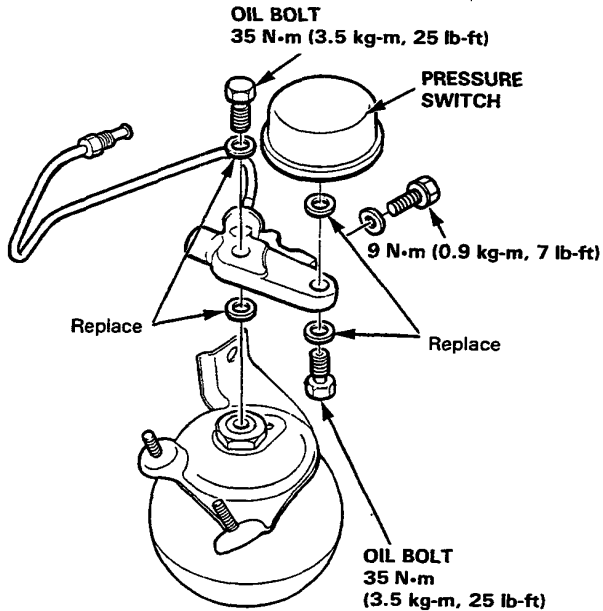
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.



# Accumulator

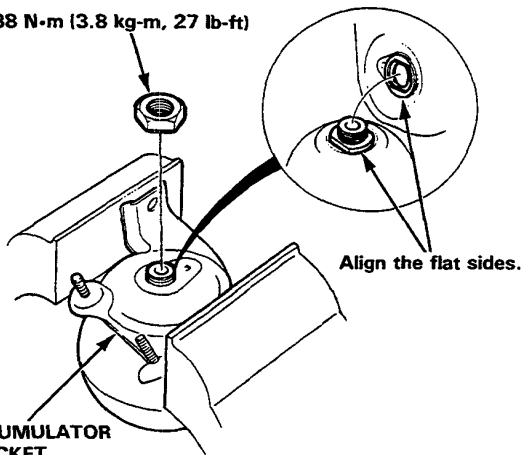
## Disassembly/Reassembly

1. Remove the oil bolts.
2. Remove the pressure switch from the pressure switch joint.



3. Set the accumulator bracket in a vise, hold the accumulator with your hand, and remove the accumulator nut with 27 mm socket and impact wrench.

38 N·m (3.8 kg·m, 27 lb·ft)



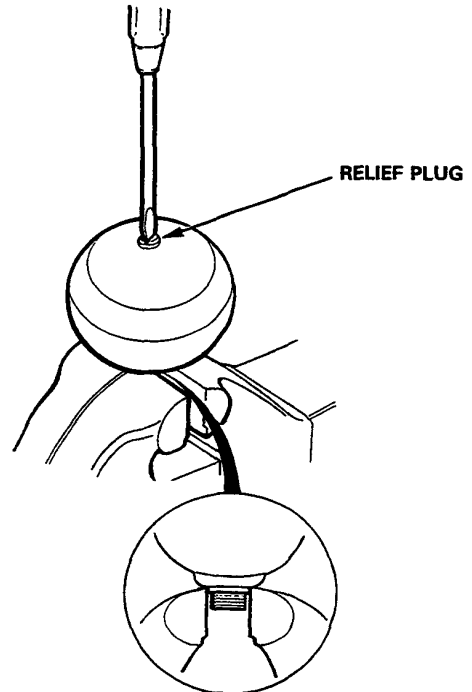
### NOTE:

- Be sure to align the accumulator and bracket aligning marks.
- Do not overtighten the accumulator bracket as it damages the bracket.
- Tighten the accumulator nut with a TORX® wrench.

## Accumulator Disposal

**WARNING** The accumulator contains high pressure nitrogen gas. Do not puncture, expose to the flame, or attempt to disassemble the accumulator or it may explode and 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.



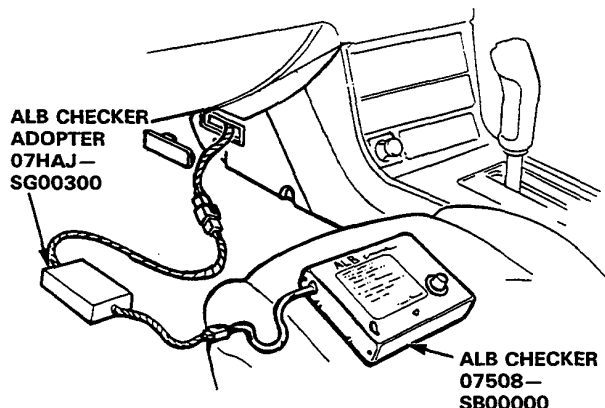


# Bleeding

## Air Bleeding with ALB Checker

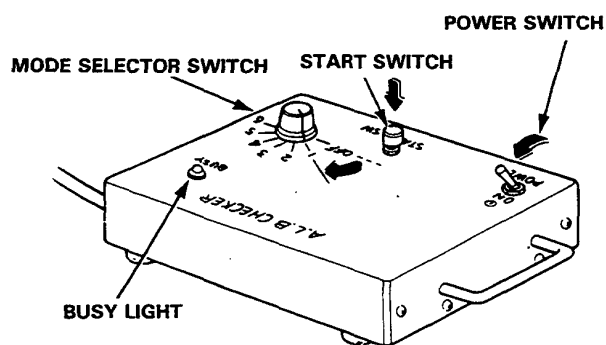
**NOTE:** Do not depress the brake pedal while using the ALB checker to bleed air from the system.

1. Fill the modulator reservoir with brake fluid up to the MAX level.
2. Disconnect the 6P coupler (PNK) from the cover mounted in front of the console and connect it to the ALB checker.



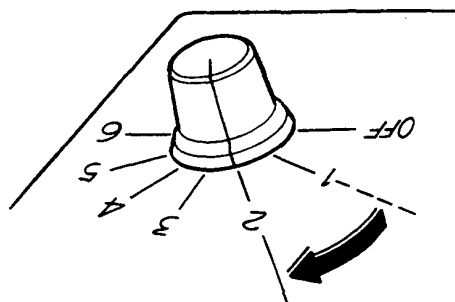
**CAUTION:** Place the car on level ground with the wheels blocked. Shift the transmission to P or Neutral.

3. Start the engine.
4. Release the parking brake.
5. Turn the power switch of ALB checker ON.

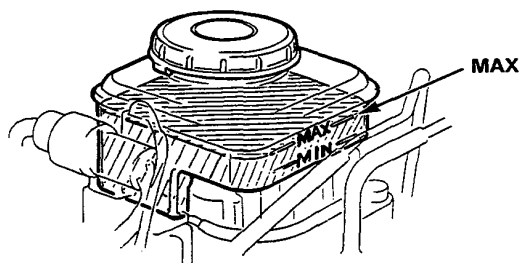


6. Turn the mode selector switch to 1.
7. Press the start switch.
8. Make sure that the motor runs.
9. Wait for the motor to stop.

10. Turn the mode switch to 2.



11. Press the start switch.
12. Brake fluid in the reservoir will bubble briskly for 20 seconds after the switch is pressed. Wait for 4 to 5 minutes until the brake fluid stops bubbling.
13. Turn the mode switch to 6.
14. Repeat steps 11 and 12.
15. Repeat steps 10 through 14 two or three times.
16. Fill the reservoir with brake fluid up to the MAX level.



17. Install the cap.
18. Check the ALB function in all modes (page 13-44). There should be kickback in modes 2 through 6.

**CAUTION:** If the kickback is weak, re-bleed air from the system.

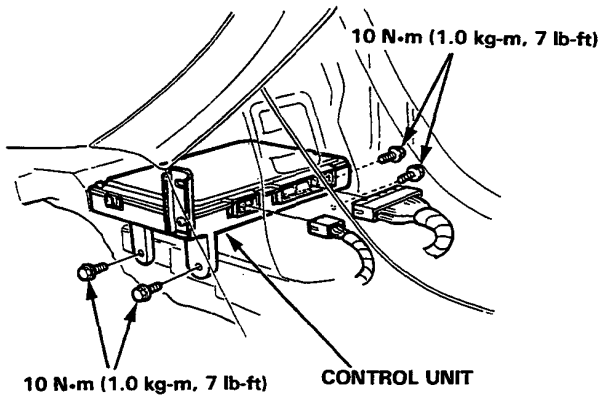
# Electronic Components

## Control Unit Replacement

1. Remove the cover that is mounted in front of the console.
2. Remove the control unit mounting bolts, then remove the control unit.

**CAUTION:**

- When the control unit mounting bolts are removed, the control unit's memory is cleared.
- Handle the control unit with care. Do not drop it.

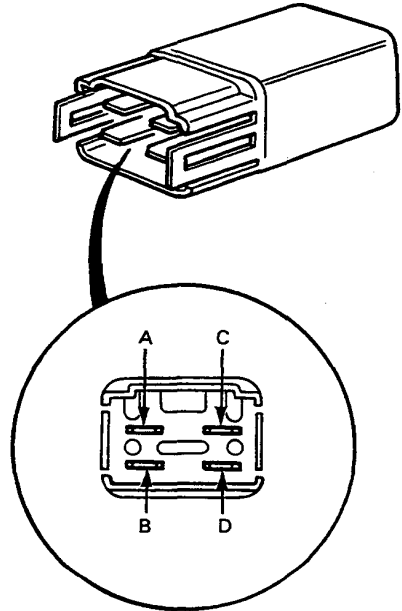


Installation is the reverse order of removal.

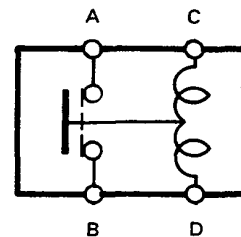
**NOTE:** Turn the ignition switch on and check the **ALB** warning light for operation.

## Relay Inspection

1. Check for continuity between the terminals A and B.  
There should be no continuity.
2. Connect a 12 V battery across the terminals C and D.  
There should be continuity between the terminals A and B.



### RELAY CIRCUIT



# Pulsers/Sensors



## Inspection

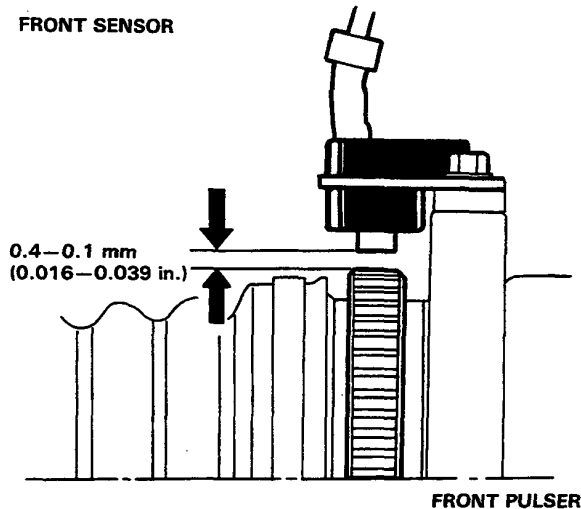
### Front

1. Check the pulser for chipped or damaged teeth and replace if necessary.
2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

**STANDARD: 0.4–1.0 mm (0.016–0.039 in.)**

**NOTE:** If the gap exceeds 1.0 mm (0.039 in.) at any point, the probability is a distorted knuckle which should be replaced.

FRONT SENSOR

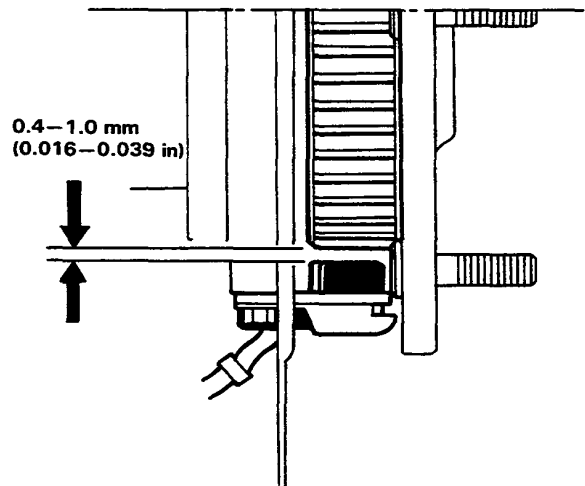


### Rear

1. Remove the rear caliper assembly.
2. Remove the rear brake disc.
3. Check the rear pulser for chipped or damaged teeth and replace if necessary.
4. Measure the air gap between the sensor and pulser all the way around while rotating the hub bearing unit by hand.

**Standard: 0.4–1.0 mm (0.016–0.039 in)**

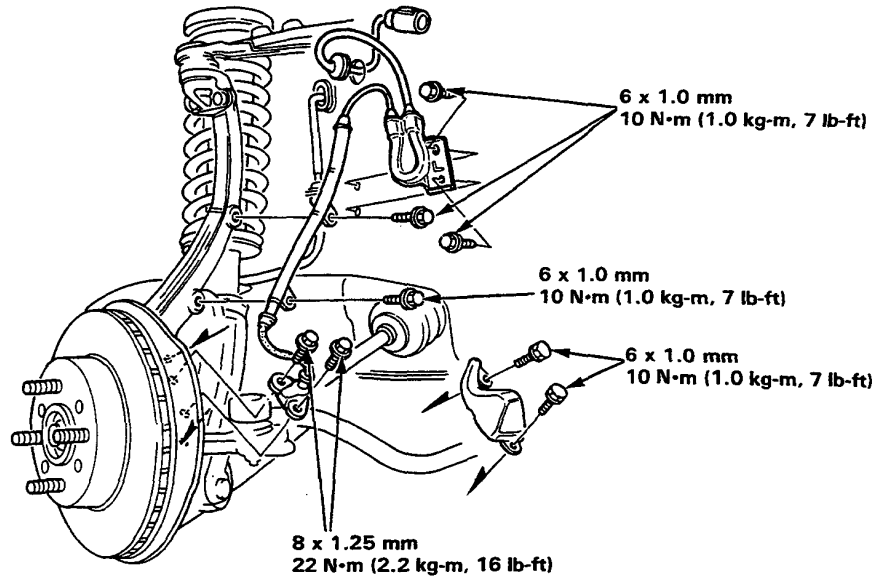
**NOTE:** If the gap exceeds 1.0 mm (0.039 in) at any point, the probability is a distorted knuckle which should be replaced.



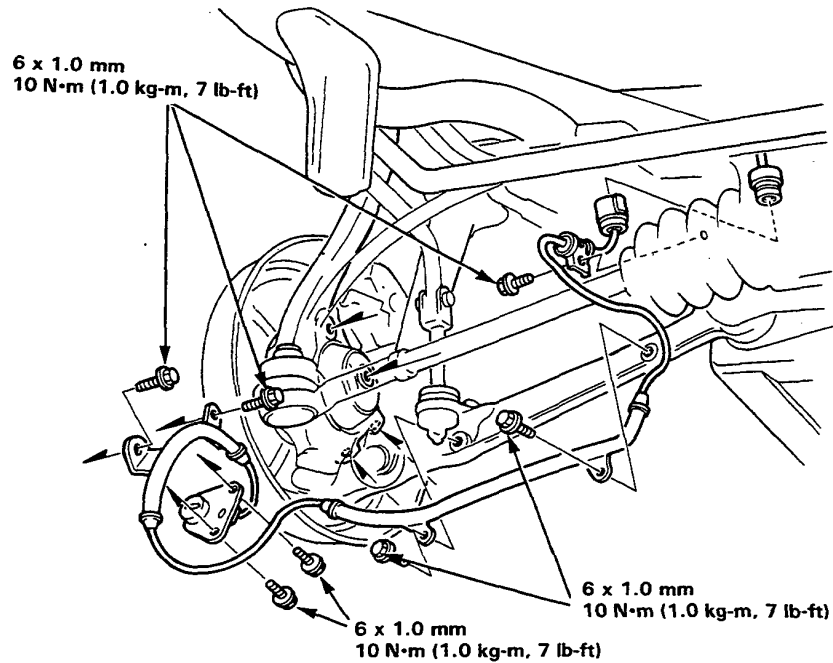
**NOTE:** Tighten the pulser mounting screw to 5 N·m (0.5 kg-m, 4 lb-ft). Set a new nut on the screw and check for the rotation. If it rotates freely, replace the screw.

# Pulsers/Sensors

## Front Sensor Replacement



## Rear Sensor Replacement



# Body

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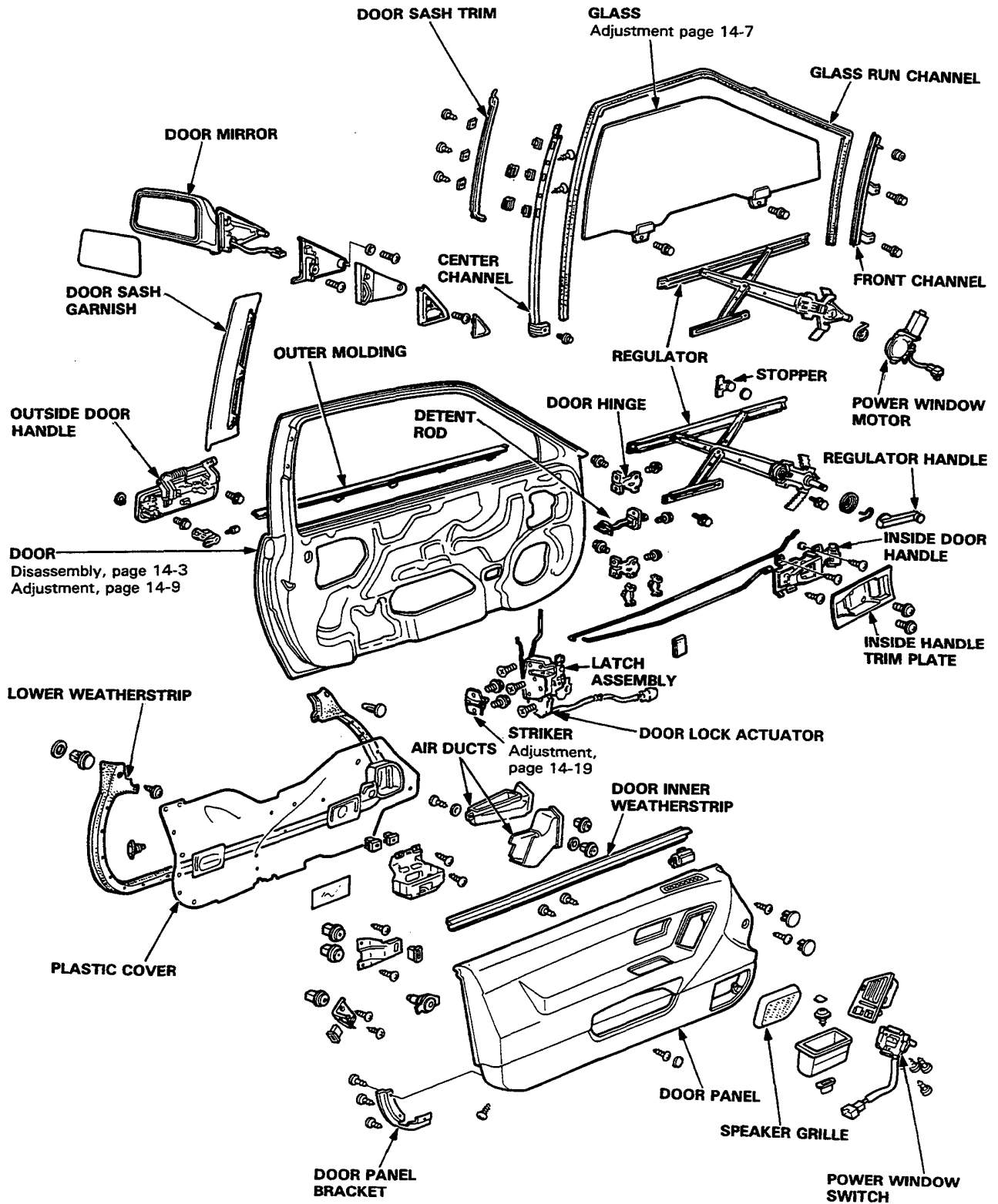
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# Door

## Index

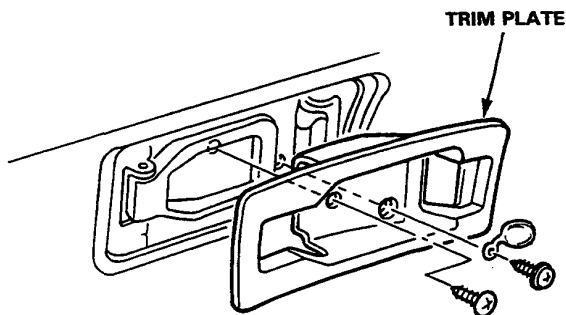


# Doors

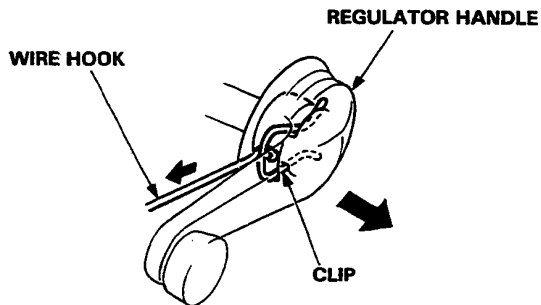


## Disassembly

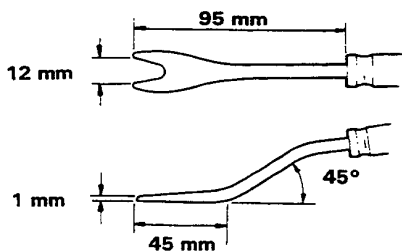
1. Remove the trim plate screws, then carefully remove the trim plate.



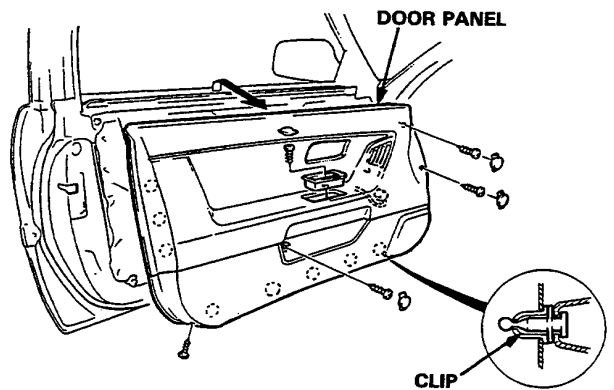
2. If applicable, remove the regulator handle by pulling the clip out with a wire hook.



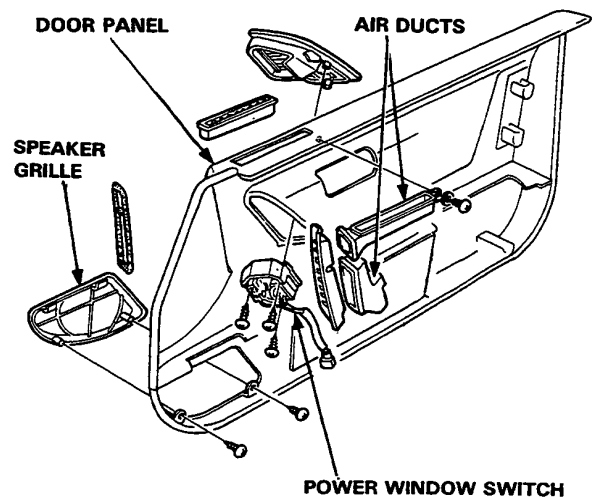
### DOOR PANEL RELEASE TOOL



3. Remove the 6 door panel screws, then pry apart the door panel clips. Lift the door panel straight up off the sill, and disconnect the power window wires.



4. Remove the power window switch, speaker grille and air duct, from the door panel as required.

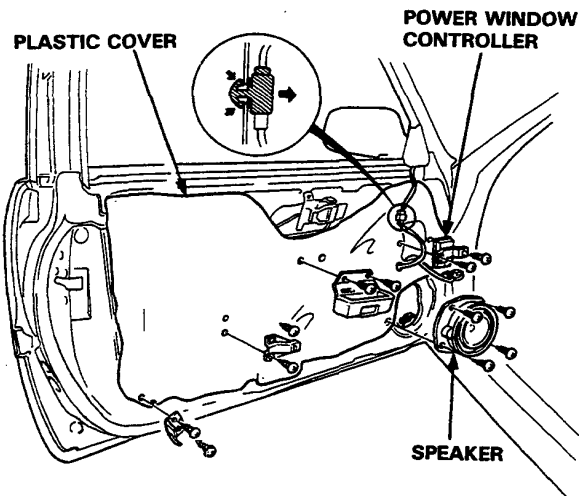


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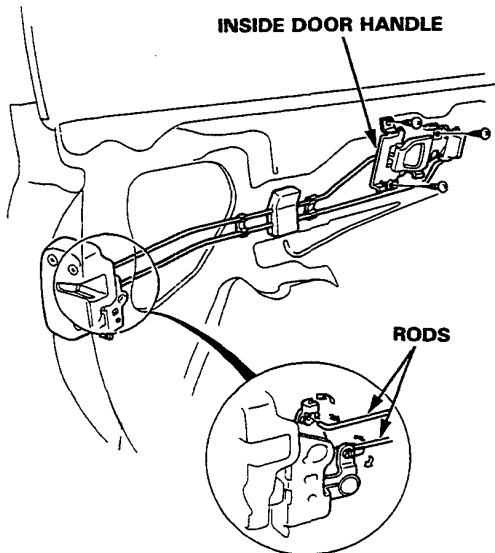
# Doors

## Disassembly (cont'd)

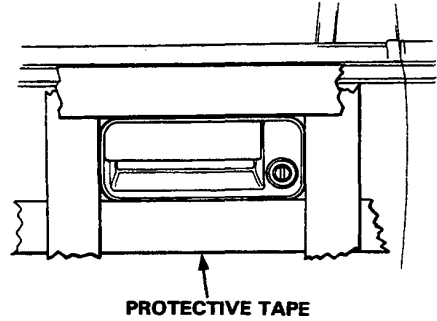
5. Remove the screws, then remove the power window controller and door panel bracket.
6. Carefully remove the plastic cover.



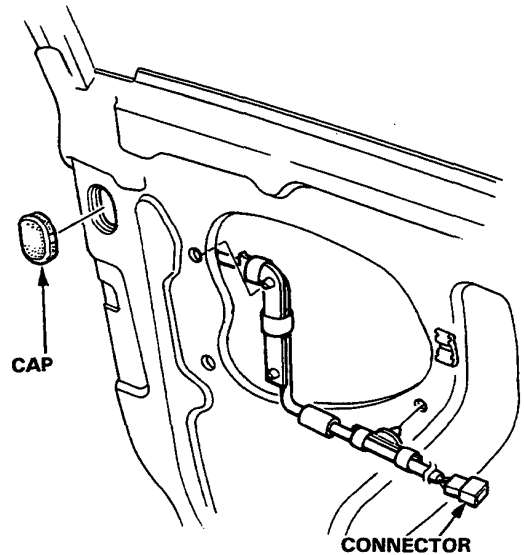
7. Remove the 3 screws, disconnect the latch rods, then remove the inside door handle.



8. Use protective tape around the edge of the door handle to prevent scratching the paint.



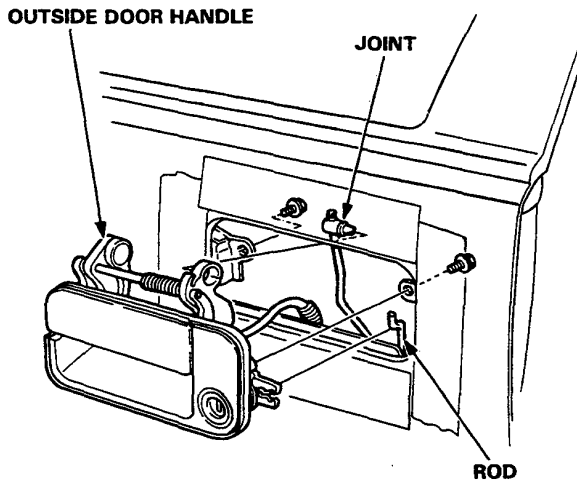
9. Reconnect the window switch or use a 12V battery to operate the window regulator.
10. Roll up the window fully.
11. Disconnect the outside door handle connector and remove the service hole cap.



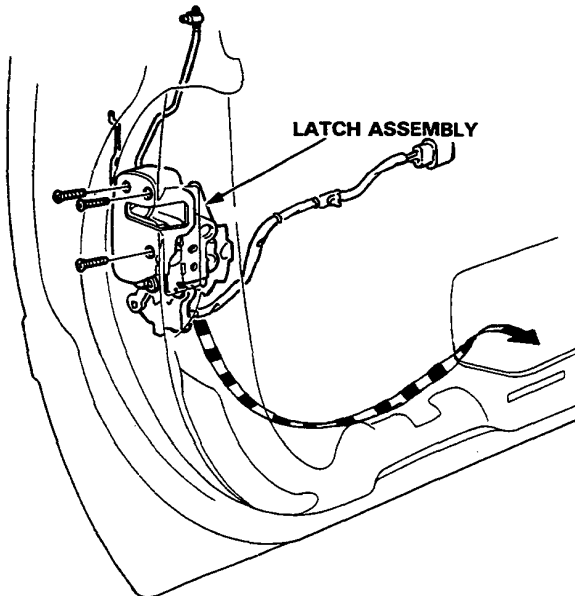




12. Remove the 2 bolts, then remove the outside door handle.
13. Pry the door handle latch rod out of its joint using a flat-tip screwdriver.

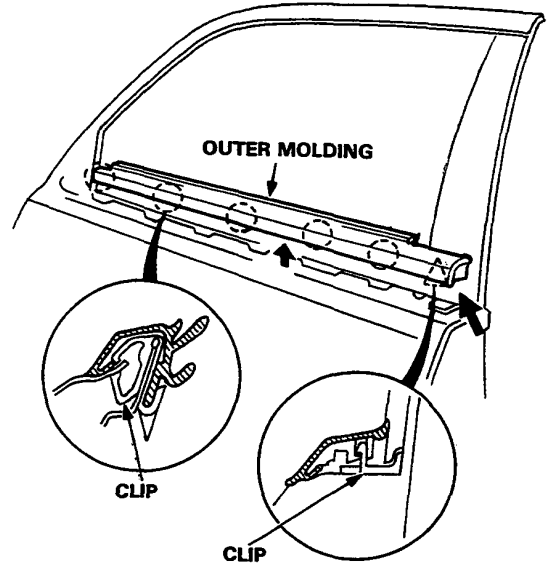


14. Remove the screws and take the latch assembly off the door, then push the latch assembly and rod inside the door.

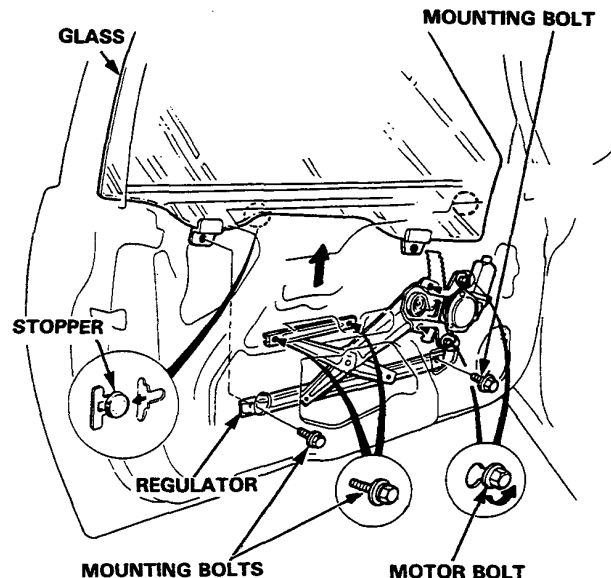


15. Open the window fully.

16. Remove the door mirror (page 14-10, 11).
17. Remove the 6 clips, then remove the outer molding.



18. Carefully raise the window until you can see its mounting bolts, then loosen the bolts. Pull the window out through the window slot.
19. Remove the 4 mounting bolts and loosen the 2 motor bolts, then take out the regulator assembly through the center hole in the door.



(cont'd)

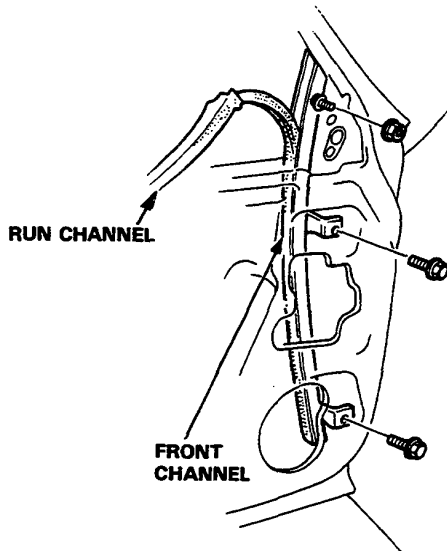
# Doors

## Disassembly (cont'd)

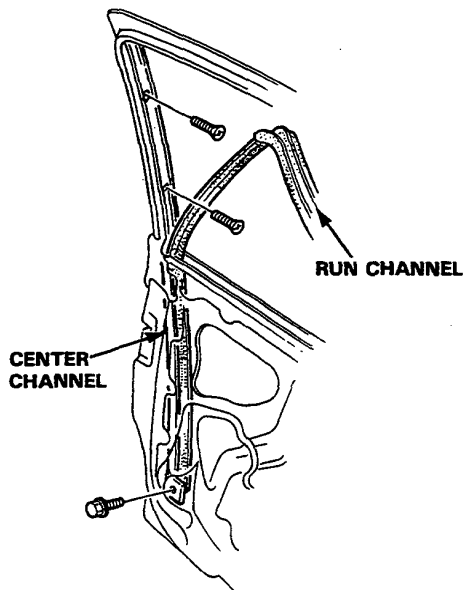
20. Remove the glass run channel.

21. Remove the front and center channel.

Front:



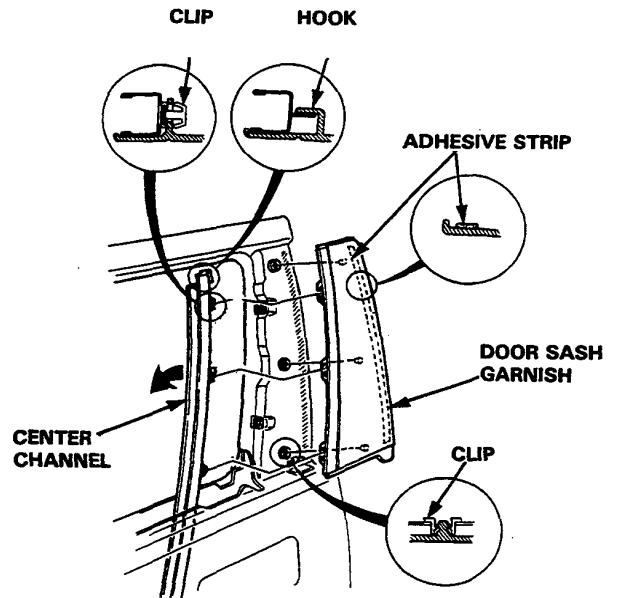
Center:



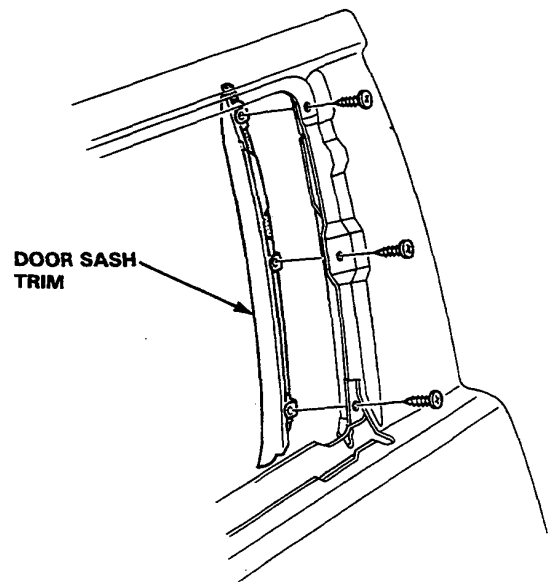
NOTE: Before installation insert the glass run channel into the front and center channel.

22. Remove the 6 clips, then remove the door sash garnish by prying, starting of the top.

NOTE: Remove the door sash garnish slowly and carefully; it is glued to the door.



23. Remove the 3 screws, then remove the door sash trim.

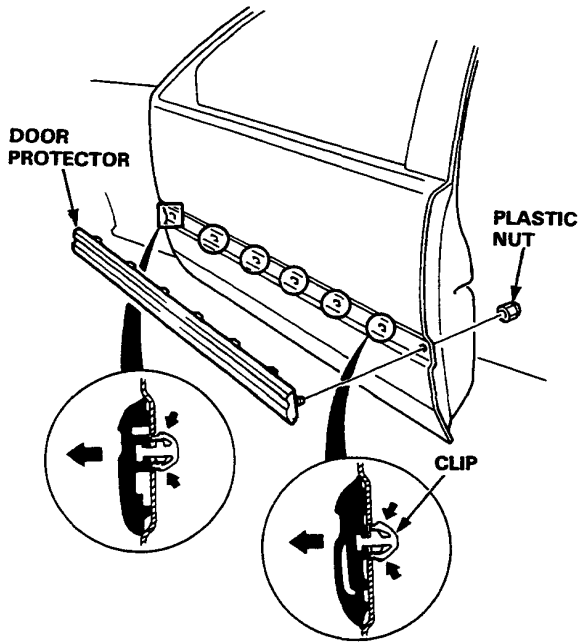




# Doors

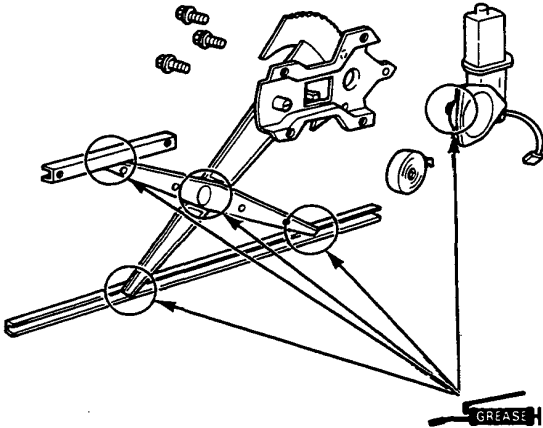
## Assembly

24. Remove the door protector by removing the nut and clips from the inside.

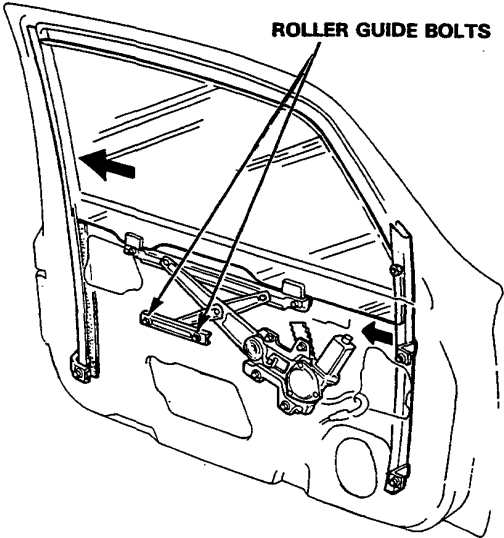


Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.



2. To adjust window fit in the door, raise the window as far up as possible and hold it against the door sash. Then, tighten the roller guide bolts or motor mount bolts.

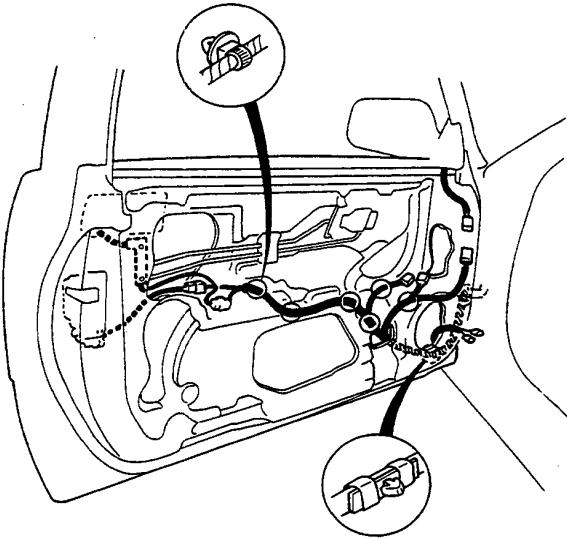


(cont'd)

# Doors

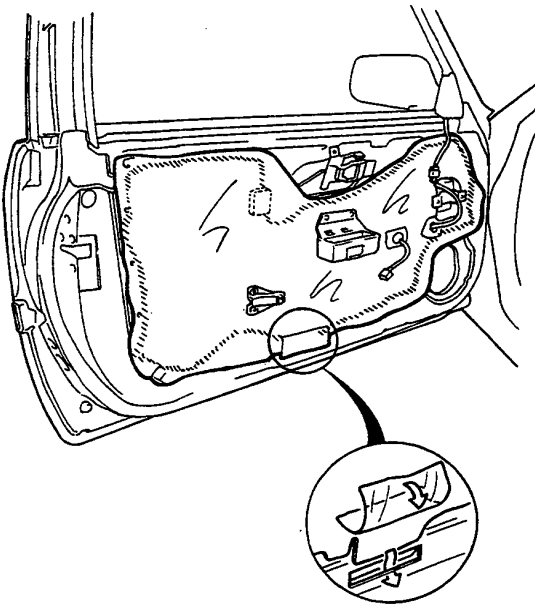
## Assembly (cont'd)

3. Fix the wire harness correctly on the door.

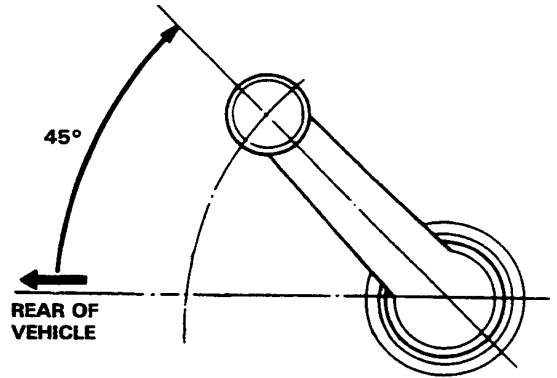


4. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.

**NOTE:** Repair any torn sections of the plastic cover.



5. Install the regulator handle so it points backward, and up at a 45 degree angle with the window closed.





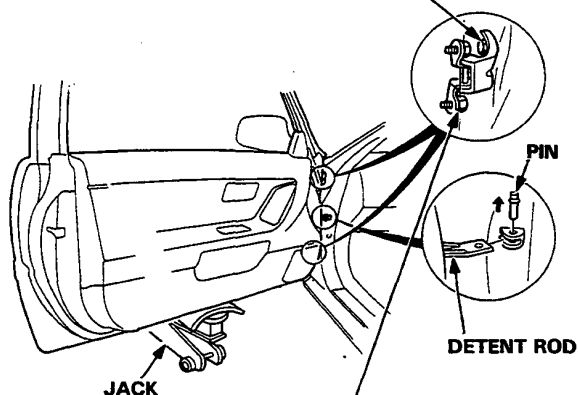
## Door Position Adjustment

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 rag or shop towel on the jack to prevent damage to the door when the hinge bolts are loosened for adjustment.

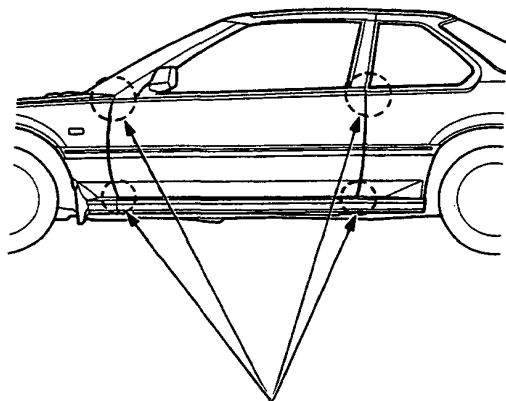
### HINGE MOUNTING BOLTS

Loosen the bolts, and move the door BACKWARD or FORWARD, UP or DOWN as necessary to equalize the gaps.



### DOOR MOUNTING BOLTS

Loosen the bolts slightly to move the door IN or OUT until flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.

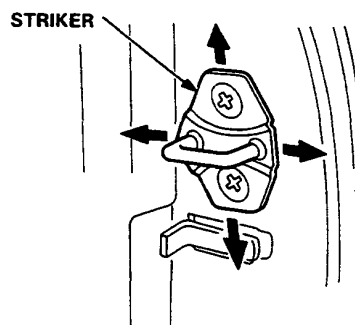


The door and body edges should be parallel.

## 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.



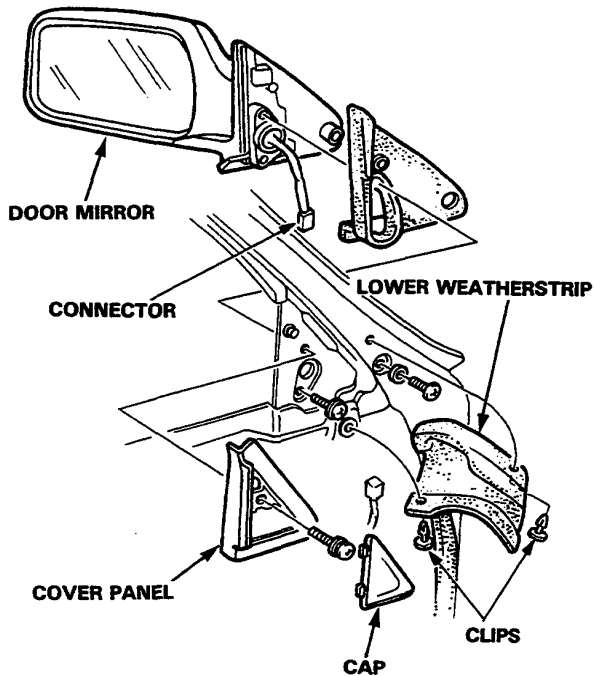
**NOTE:** Hold the outside handle out and push the door against the body to be sure the striker allows a flush fit.

3. If the door latches properly, tighten the screws and recheck.

# Power Door Mirror

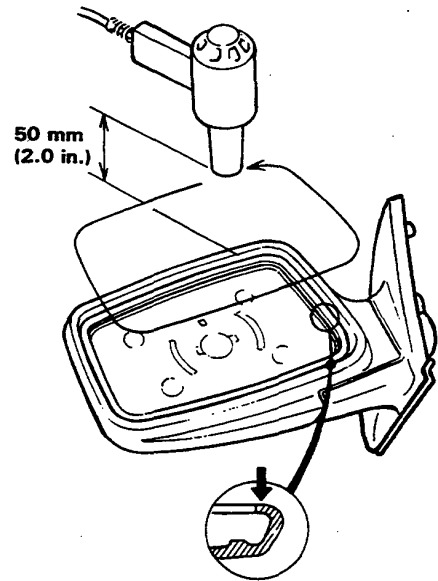
## Removal

1. Remove the door panel and disconnect the power mirror connector.
2. Pry out the cap with a flat-tip screwdriver and remove the screw, then remove the cover panel.
3. Remove the two clips and turn over the lower weatherstrip until the mirror mounting screws are visible.
4. Remove the mirror mounting screws while holding the mirror.

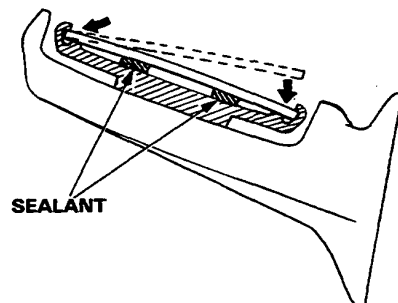
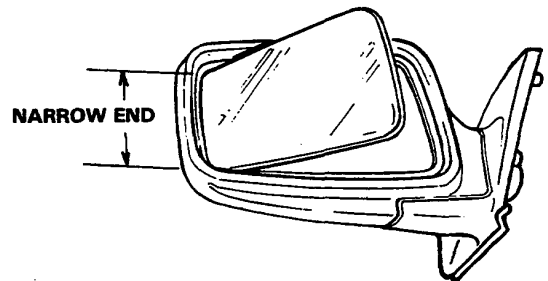


## Mirror Glass Replacement

1. Heat the edge of the glass with a low powered heat gun for several minutes, then remove the glass.



2. Install the glass in the mirror case, narrow end first.

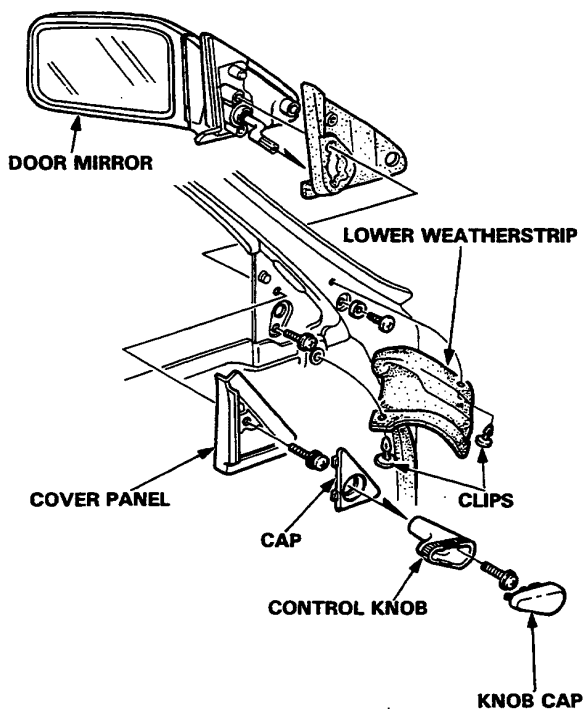


# Manual Door Mirror



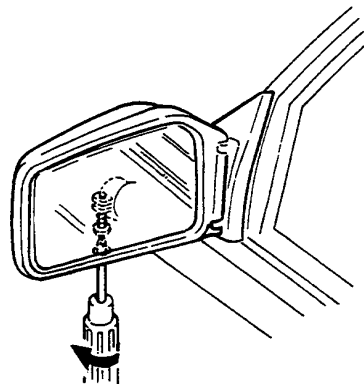
## Removal

1. Remove the door panel.
2. Remove the knob cap and screw, then remove the control knob.
3. Pry out the cap with a flat-tip screwdriver and remove the screw, then remove the cover panel.
4. Remove the two clips and turn over the lower weatherstrip until the mirror mounting screws are visible.
5. Remove the mirror mounting screws while holding the mirror.



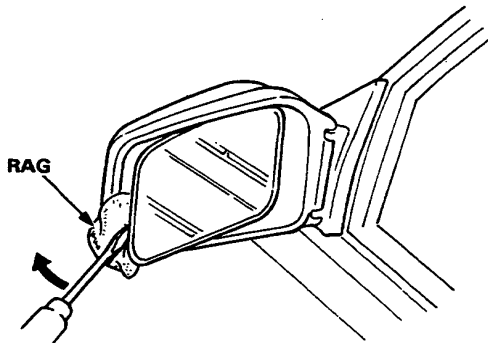
## Mirror Glass Replacement

1. Insert a screwdriver in the mirror through the service hole, and loosen the glass retaining screw.

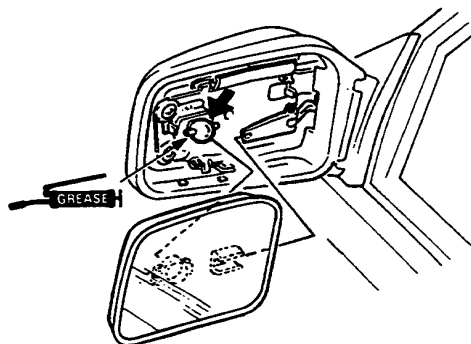


2. Carefully pry out the mirror with a screwdriver as shown.

**CAUTION:** To prevent damage to the mirror, wrap the end of the screwdriver with a rag or shop towel.

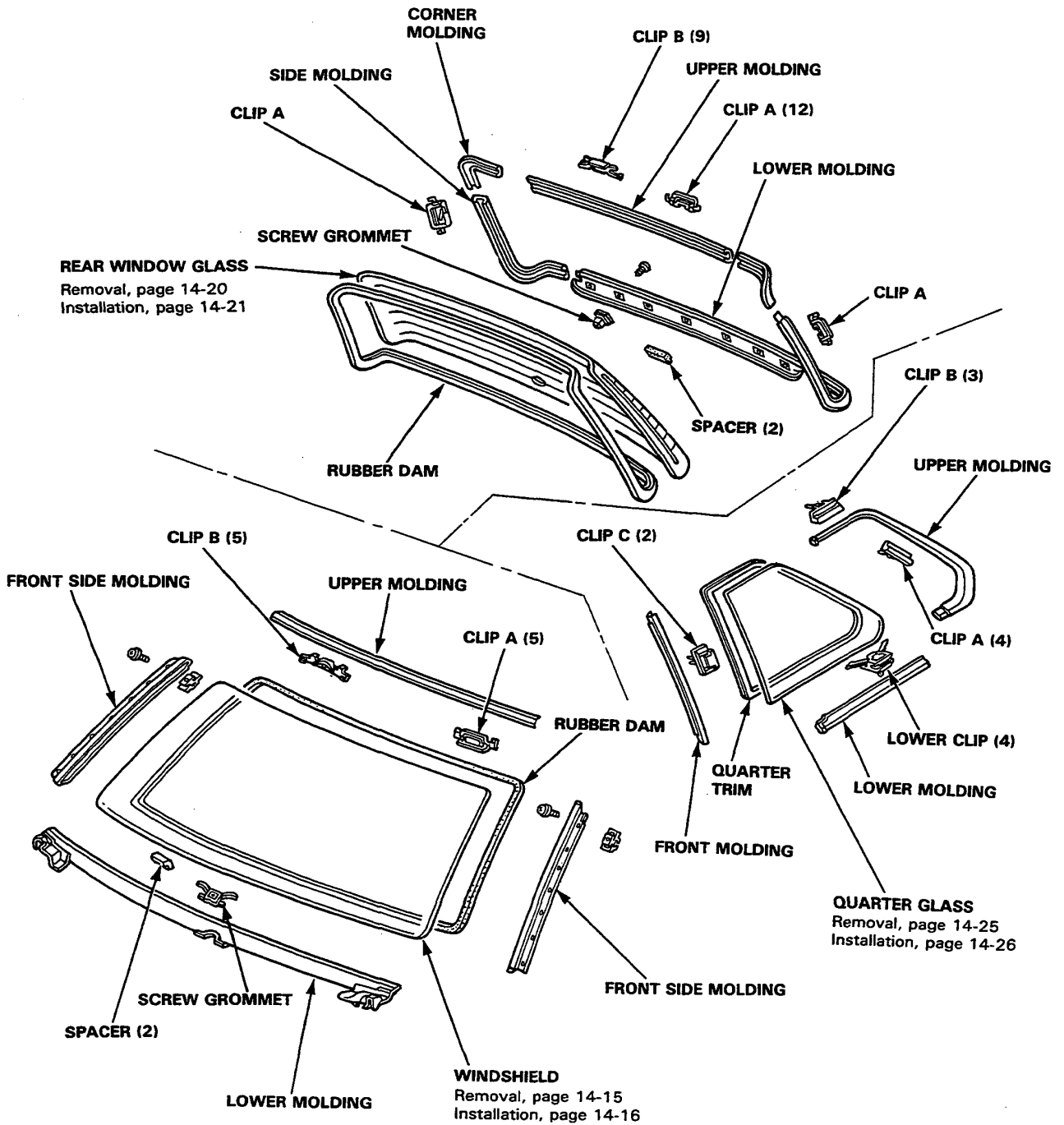


3. Install the mirror in the reverse order of removal, and also apply grease to the location shown.



# Windshield, Rear Window Glass, Quarter Glass

## Index

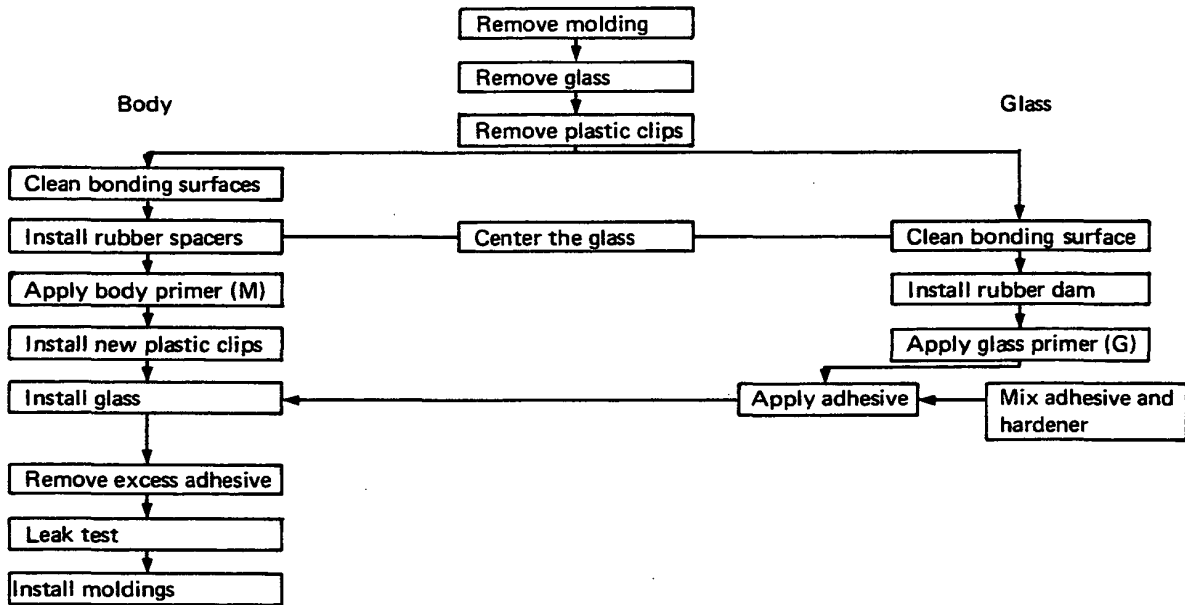


( ): Quantity of part used.





## Installation



## Parts

Part Number	Contents	Comment
Adhesive kit – Low temperature 08718–99960 High temperature 08718–99961	Adhesive sealant (500 g) Hardener (75 g) Glass primer G (20 g) Body primer M (20 g) Piano wire (0.6φ x 1 m (3f)) Gauze Cartridge Sponge	For glass primer (G) For applying primers

## Tools

Tool/Material	Remarks
Glass or steel plate Putty knife Caulking gun Suction cups	To mix adhesive and hardener on To mix adhesive and remove excess To apply bead of adhesive to windshield. To install windshield
Knife Awl Two wood sticks Toluene or alcohol	To scrape bonding surface around window opening To make hole through existing adhesive for piano wire To hold piano wire To clean bonding surfaces

# Windshield and Window Glass, Quarter Glass

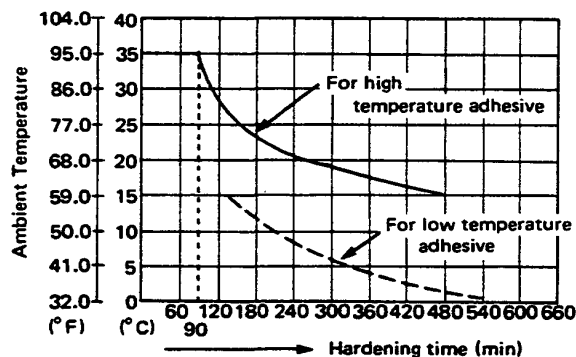
## Workable Time

Adhesive workable time varies widely according to temperature, so choose the correct adhesive kit for the temperature range you will be working in.

After mixing and applying adhesive, you should install the windshield within the time shown on the chart.

For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperature type adhesive.

Kit part numbers and contents are listed on the page before.



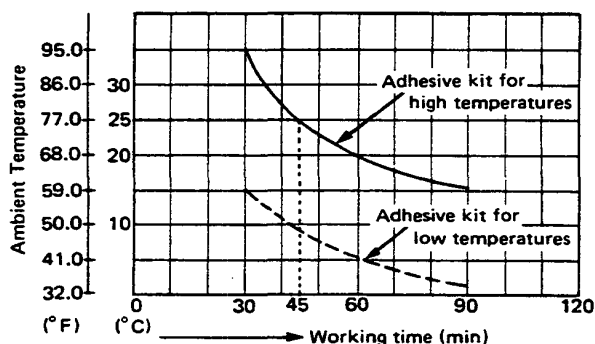
## Notes

- Both kits have two types of adhesive primer: one for the body (metal), and one for glass.
- Always use new genuine Honda adhesive, or equivalent.
- Do not use the adhesive if 6 months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

## Hardening Time

Hardening time can be shortened by heating with infrared light.

For example, the adhesive will start to harden within 270 minutes mixing at 20°C (63°F). If however, it is heated to 35°C (95°F), it will start to harden within 90 minutes.



## Broken Glass Removal

Remove as much broken glass as possible with a vacuum cleaner.

Blow out the glass in the heater and behind the dashboard with low pressure compressed air:

**WARNING** Wear eye protection while using the air gun.

- (1) Set the temperature control lever to COLD.
- (2) Push the HEAT button on the function panel.
- (3) Make sure the recirculation button is out (OFF).
- (4) Blow compressed air through the defroster center vent outlet.
- (5) Remove the blower duct, and remove any glass from the air mix chamber.
- (6) Remove the any glass from the top of the vent/defrost door.
- (7) Remove any glass from top and bottom of carpet and seats with a vacuum cleaner.

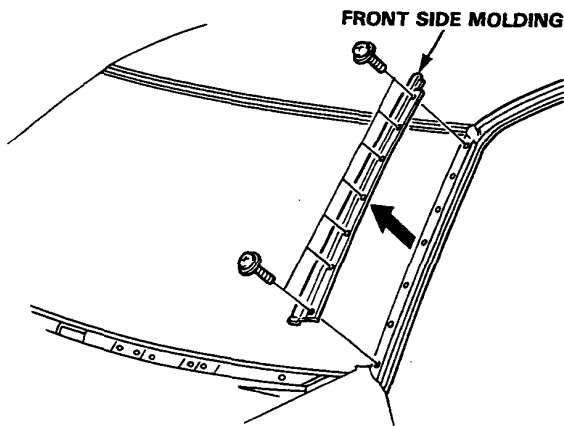
**NOTE:** It is recommended to remove the seats to shake off any glass (page 14-38).

# Windshield



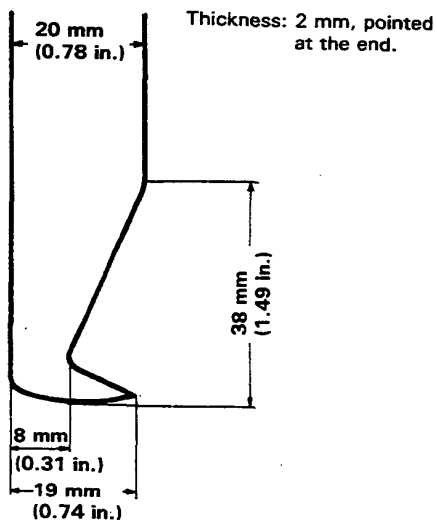
## Removal

1. To remove the windshield, first remove the:
  - Rearview mirror (page 14-43).
  - Sun visors and holders.
  - Front pillar trim (page 14-36).
  - Front wiper and air scoop.
  - Lower molding.
  - Front of weatherstrip.
2. Remove the screws, then remove the front side molding.

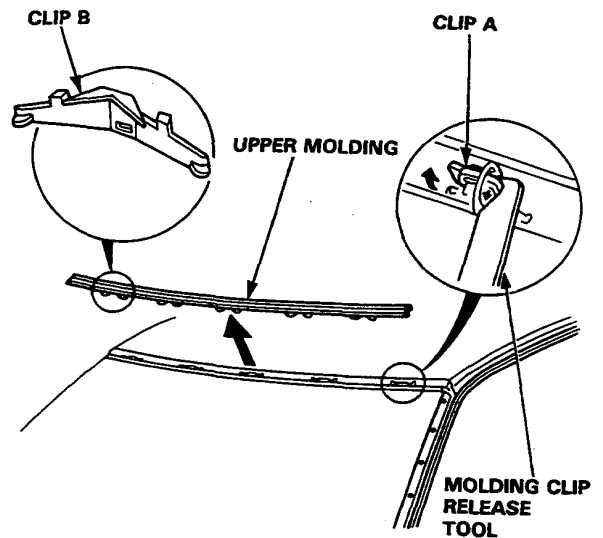


**NOTE:** You will need a molding clip release tool to remove some moldings. If necessary, make one that has the dimensions shown:

### Molding Clip Release Tool



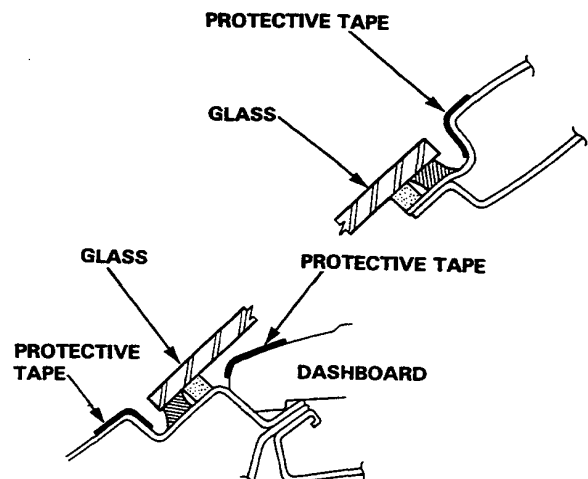
3. Raise the upper molding slightly away from the windshield at the locations where the molding clips are used, then fit the end of the molding clip release tool at each clip, and pull it toward you until the clip is clear of the molding.



4. Lower the front of the headliner.

**NOTE:** Take care not to bend the headliner excessively.

5. Apply protective tape along the edge of the dashboard and body next to the glass as shown.

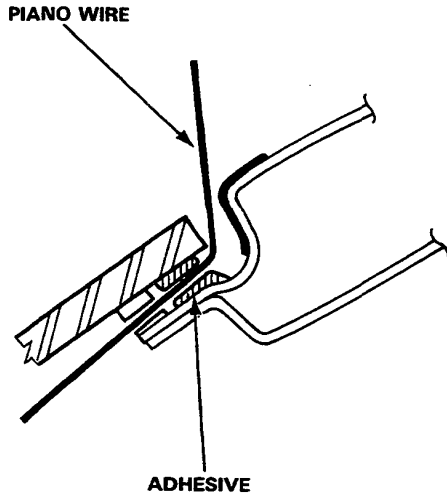


(cont'd)

# Windshield

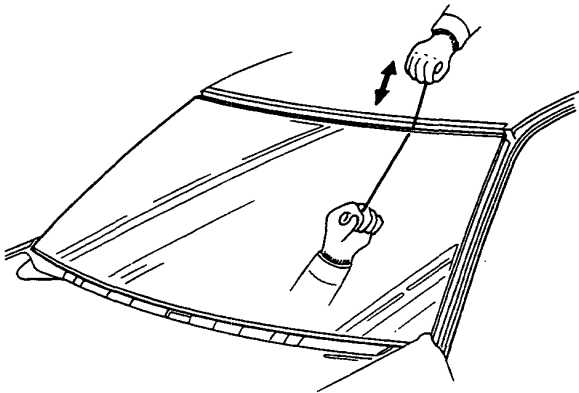
## Removal (cont'd)

- Using an awl, make a hole through the adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



- 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 glass.

**CAUTION:** Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.



- Remove the molding clips, and the rubber dam.

## Installation

- 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.

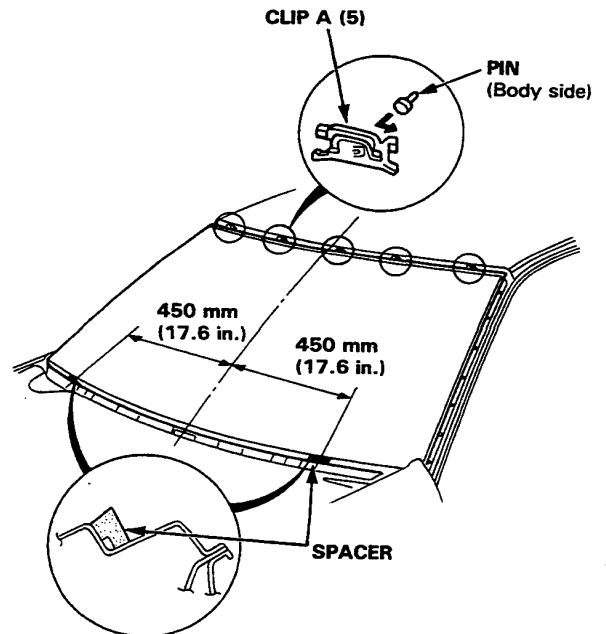
### NOTE:

- 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.

- Clean the body bonding surface with a sponge dampened in alcohol.

**NOTE:** After cleaning, keep oil, grease or water from getting on the surface.

- Install the molding clips as shown.



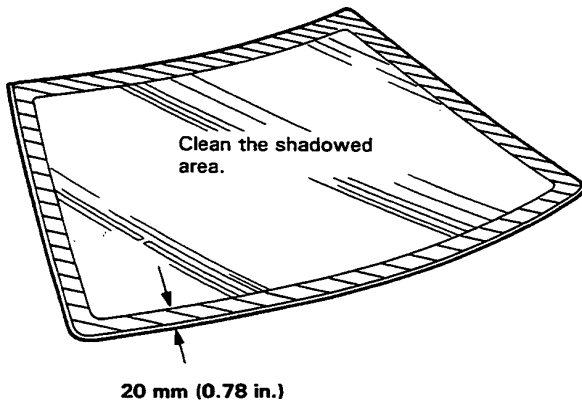
- Peel the backing off each spacer, then install the spacers by pressing them firmly into place at the locations shown.



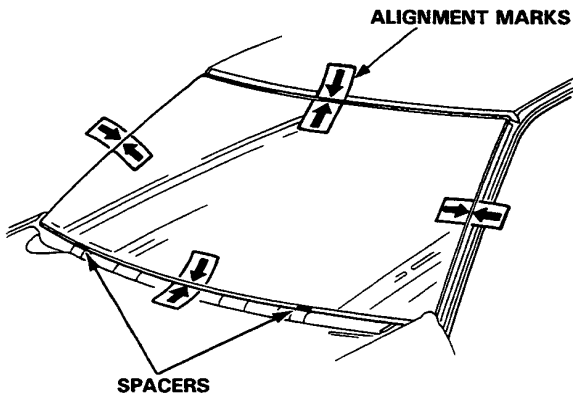
5. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

**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.



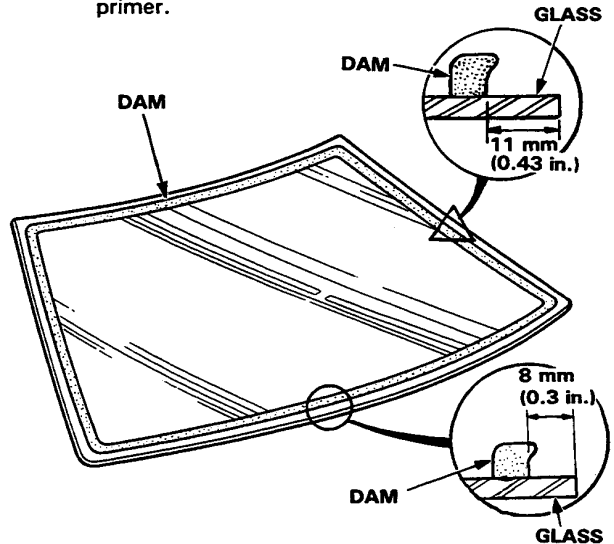
6. Set the glass upright on the spacers, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



7. Glue the rubber dam to the inside face of the windshield as shown, to contain the adhesive during installation.

**NOTE:**

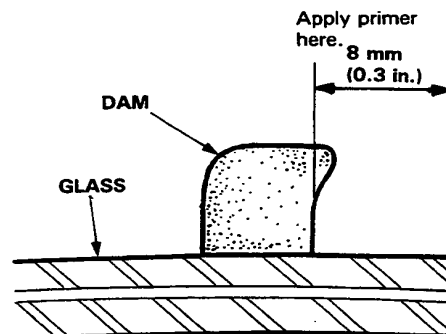
- Be careful not to touch the glass where adhesive will be applied.
- Mask off surrounding surfaces before applying primer.



8. With a sponge, apply a light coat of glass primer around the edge of the glass, 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.



(cont'd)

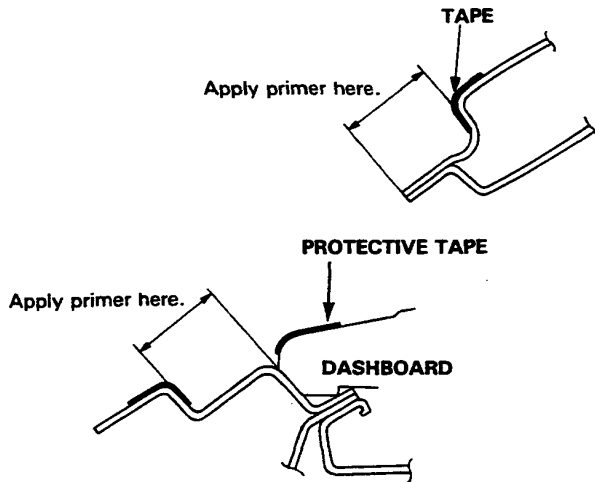
# Windshield

## Installation (cont'd)

9. 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.
- Mask off the dashboard before painting the flange.

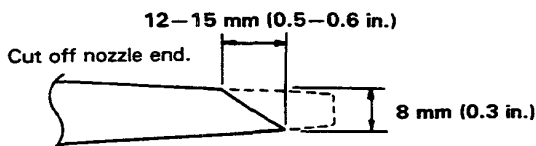


10. Thoroughly mix the adhesive and hardener together on a glass or metal plate.

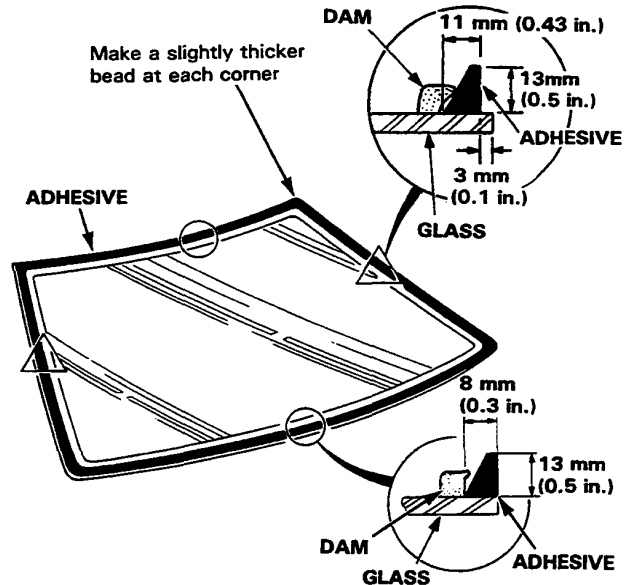
**NOTE:**

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

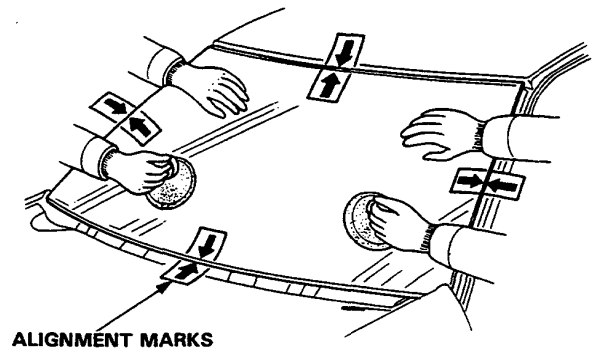


12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.



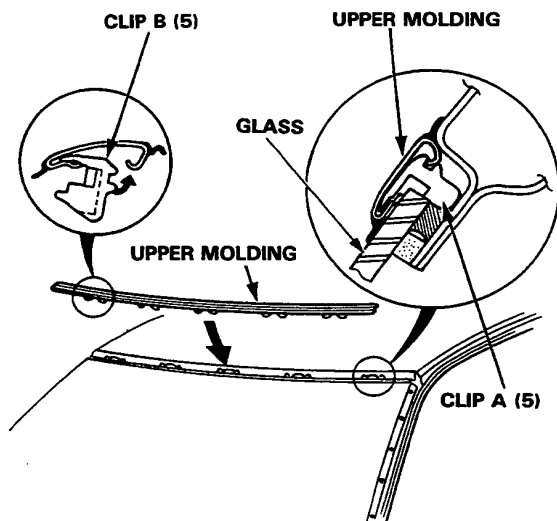
13. Use suction cups to hold the glass over the opening, align it with the marks made in step 6 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

**NOTE:** Do not open or close the doors until the adhesive is dry.





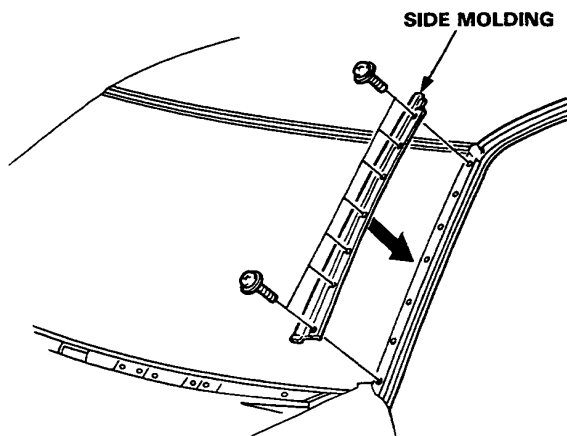
14. Attach the molding clips to the upper molding, then install the upper molding.



15. Scrape or wipe the excess adhesive off with a putty knife or gauze.

**NOTE:** Use a soft rag or towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

16. Install the side molding.



17. 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.

18. Fix the headliner back into position, then install:

- Front of weatherstrip.
- Lower molding.
- Air scoop and front wiper.
- Front pillar trim.
- Sunvisors and holders.
- Rearview mirror.

# Rear Window

## Removal

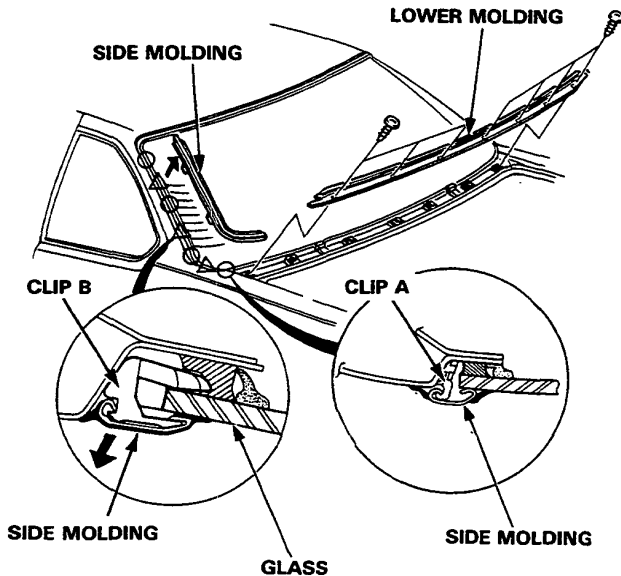
### CAUTION:

- Wear gloves to remove and install the glass.
- Do not damage the defroster grid lines.

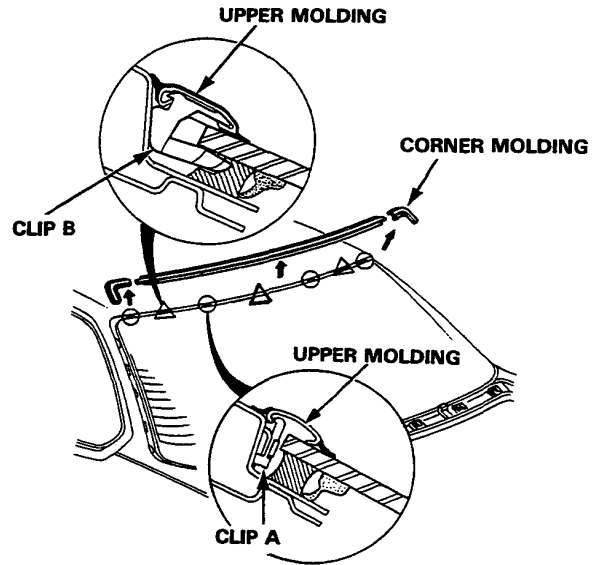
NOTE: You will need a molding clip release tool to remove some molding. If necessary, make one that has the dimensions shown on page 14-15.

1. To remove the rear glass, first remove:
  - Rear shelf (page 14-36).
  - Rear wiper.
  - Quarter window trim panel (page 14-36).
2. Disconnect the defroster leads, and remove their holders.

NOTE: Avoid scratching or scoring the glass with the cutter blade.
3. Remove the screws, then remove the lower molding.
4. Remove the side molding with a molding clip release tool.



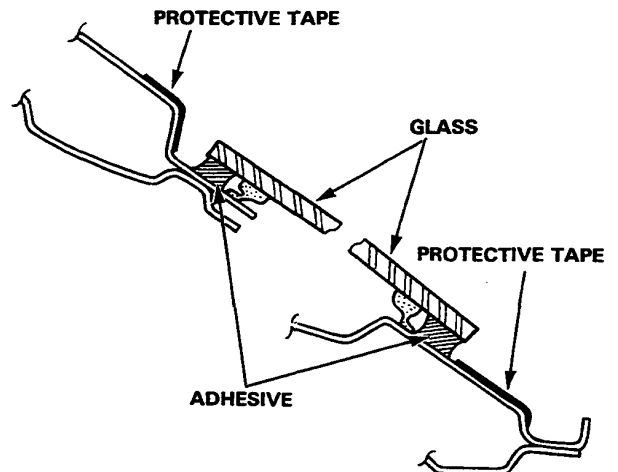
5. Detach the clips and remove the corner and upper moldings.



6. Lower the rear of the headliner.

CAUTION: Take care not to bend the headliner excessively.

7. Apply protective tape along the edge of the body next to the glass as shown.

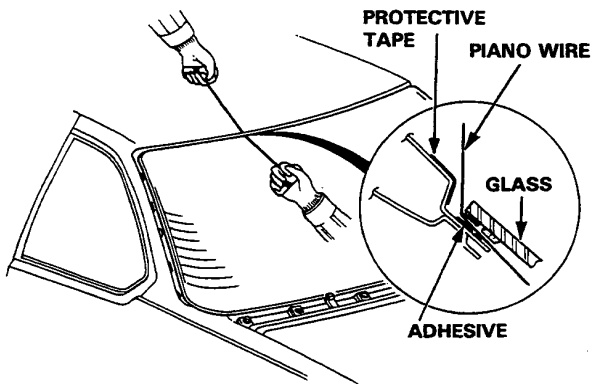






- Using an awl, make a hole through the glass adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.
- With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire glass.

**CAUTION:** Hold the piano wire as close to the glass as possible to prevent damage to the body.



- Remove the molding clips and the rubber dam.

## Installation

- 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.

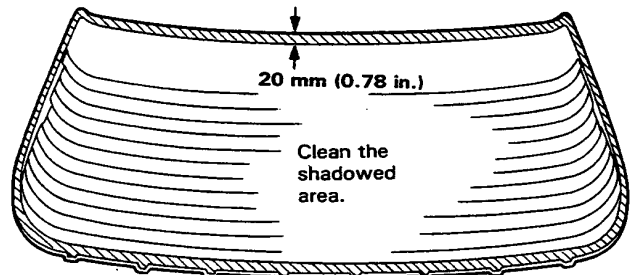
- Clean the body bonding surface with a sponge dampened in alcohol.

**NOTE:** After cleaning, keep oil, grease or water from getting on the surface.

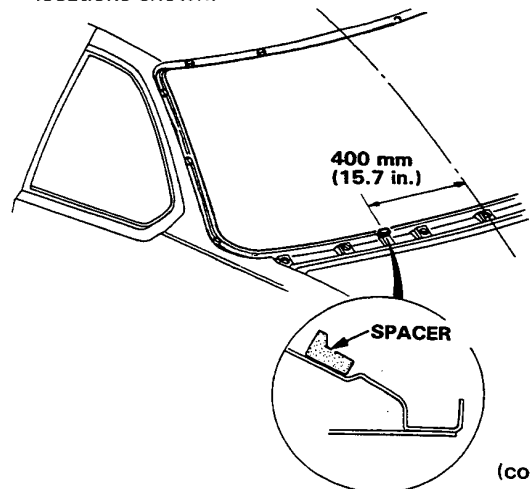
- If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

**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.



- Peel the backing off each spacer, then install the spacers by pressing them firmly into place at the locations shown.

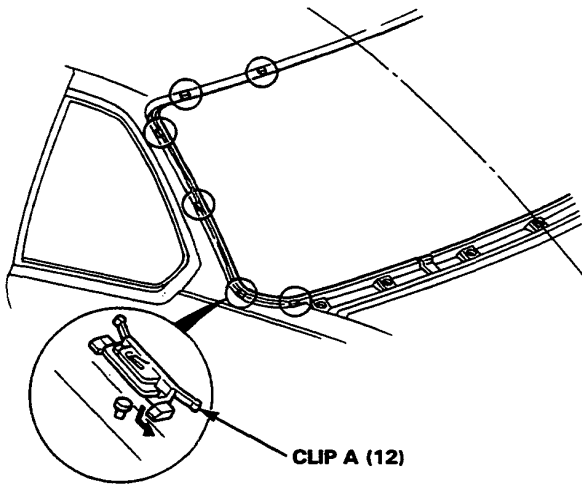


(cont'd)

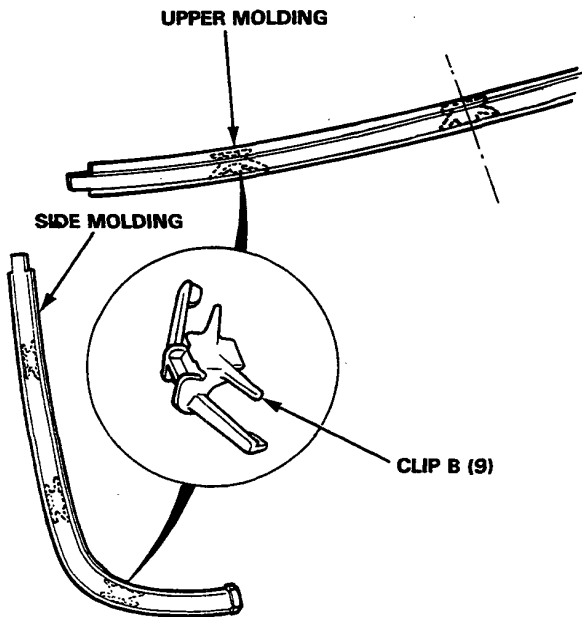
# Rear Window

## Installation (cont'd)

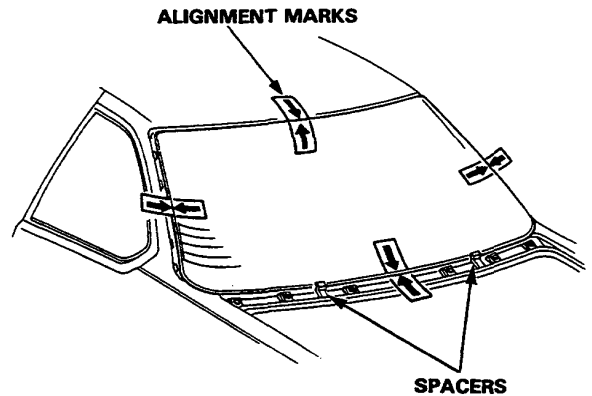
5. Install the molding clips as shown.



6. Attach the clips to the side and upper moldings as shown.

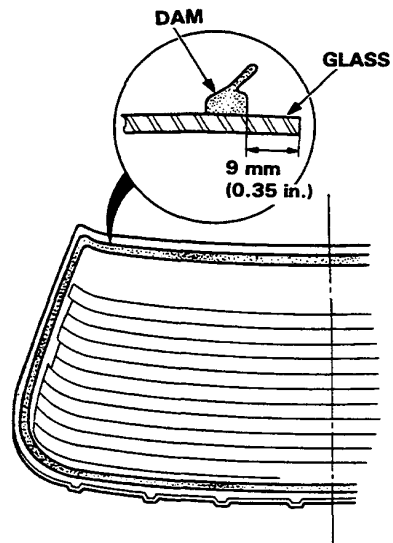


7. Set the glass upright on the spacers, and center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



8. Glue the rubber dam 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.

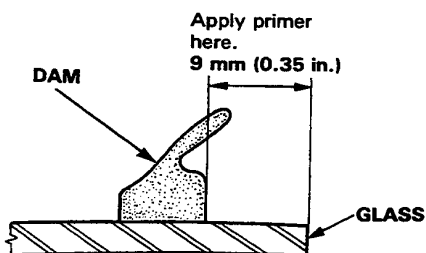




9. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

**NOTE:**

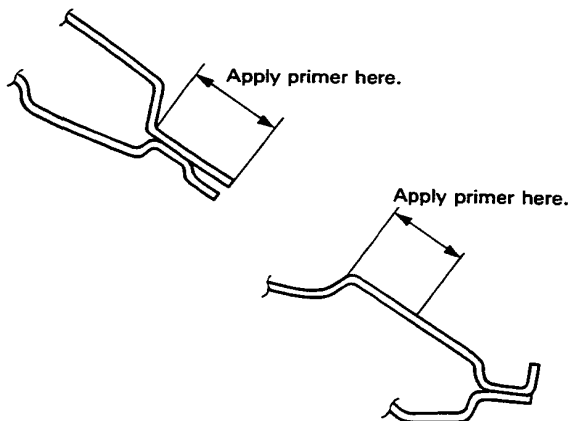
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



10. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

**NOTE:**

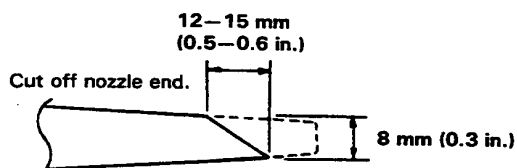
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.



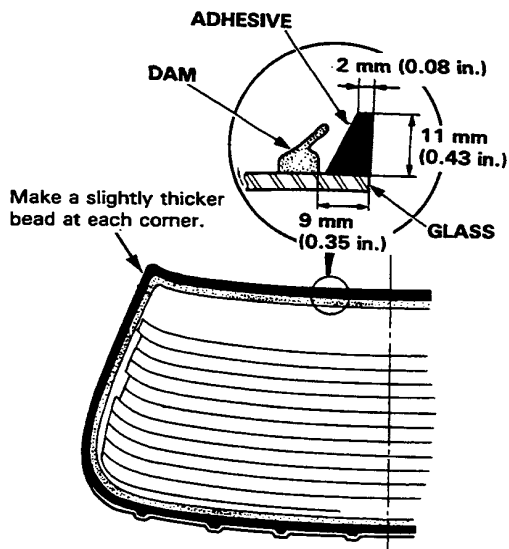
11. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

**NOTE:** Clean the plate with a sponge and alcohol before mixing.

12. Follow the instructions that came with the adhesive.
13. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



14. 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.



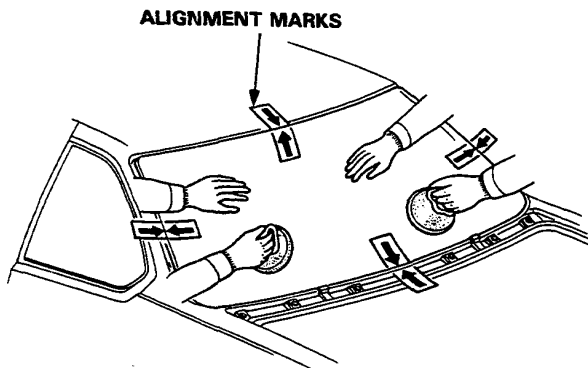
(cont'd)

# Rear Window

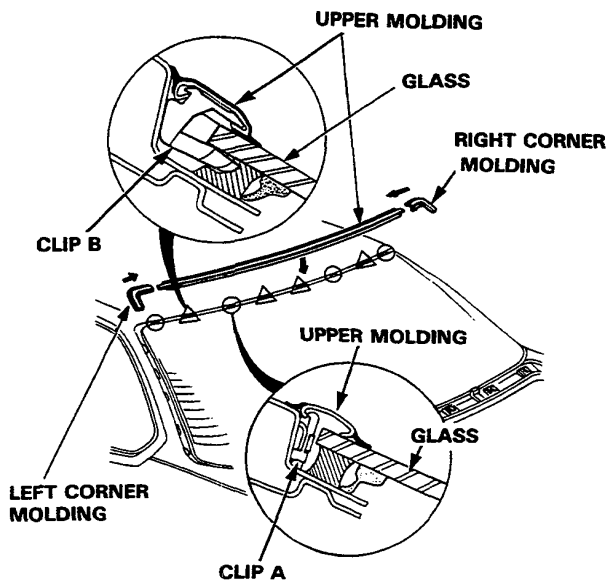
## Installation (cont'd)

15. Use suction cups to hold the glass over the opening, align it with the marks made in step 7 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.

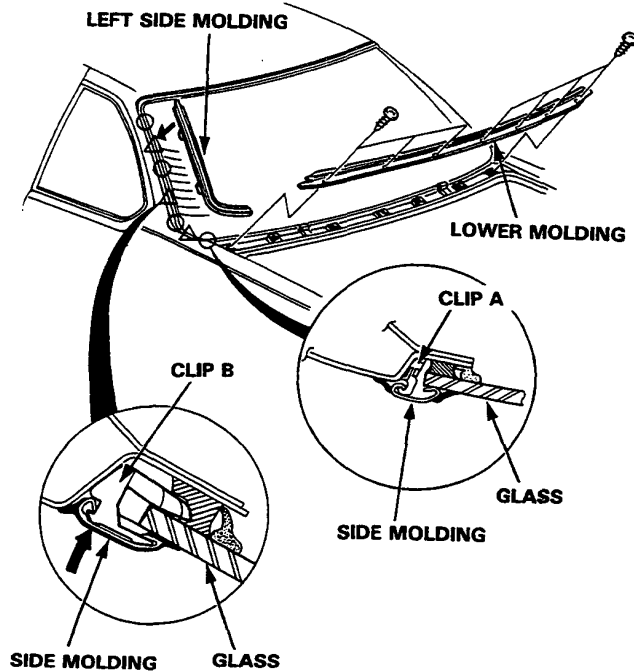
**NOTE:** Do not close or open the doors until adhesive is dry.



16. Install the upper molding and right and left corner moldings.



17. Install the right and left side molding, and the lower molding.



18. 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.

19. Fix the headliner back into position then install:

- Quarter window trim panel.
- Rear wiper.
- Rear shelf.

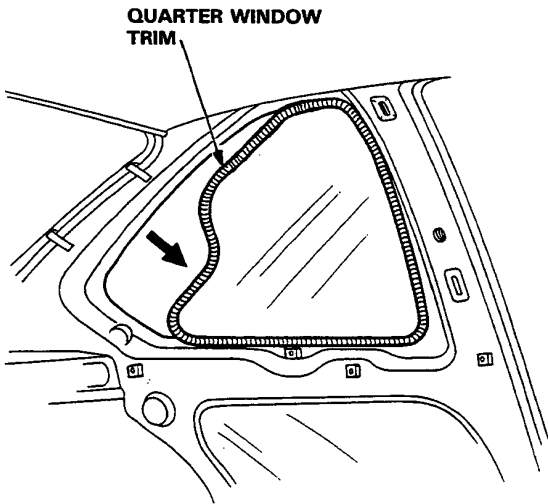
# Quarter Glass



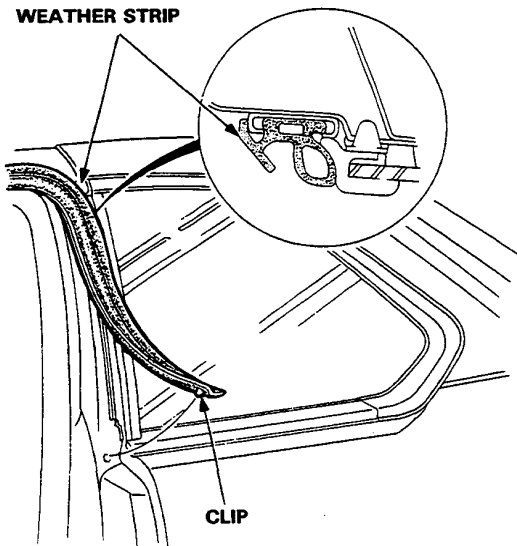
## Removal

**NOTE:** To remove the quarter glass, first remove the rear seat (page 14-40) and the quarter window trim panel and quarter trim panel (page 14-36).

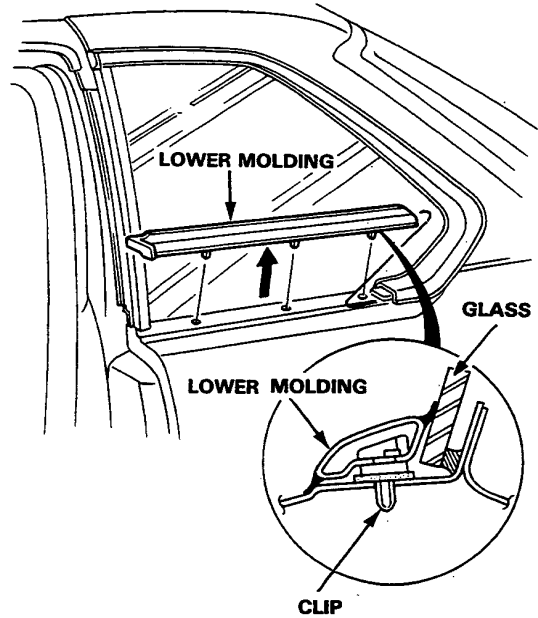
1. Remove the quarter window trim.



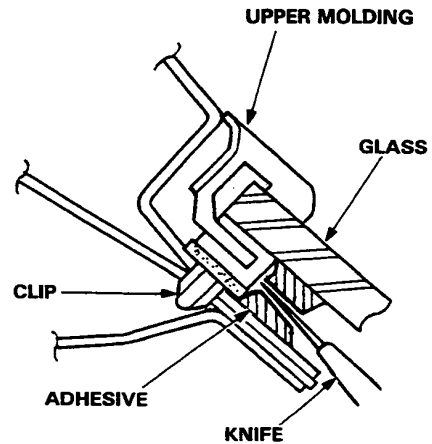
2. Pull away the weatherstrip.



3. Remove the lower molding; use new clips on reassembly.



4. Use a knife to cut through the glass adhesive from inside the car, all the way around.

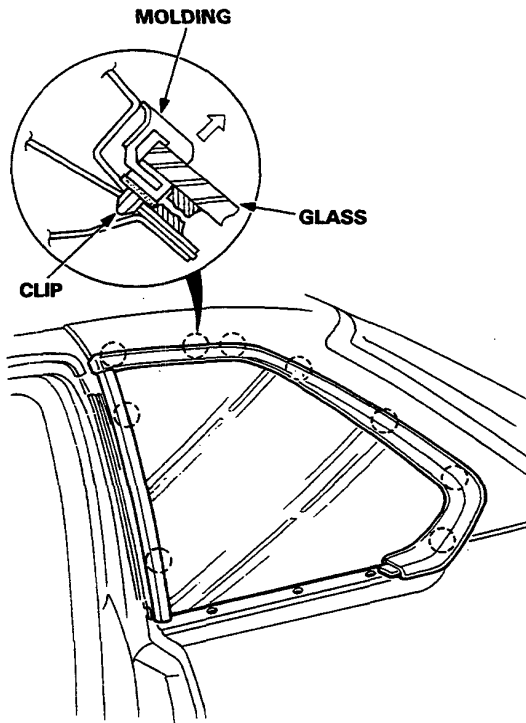


(cont'd)

# Quarter Glass

## Removal (cont'd)

5. As an assembly, pry the glass and upper and front moldings away from the car at the clip points shown.



## 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 window glass flange.

### NOTE:

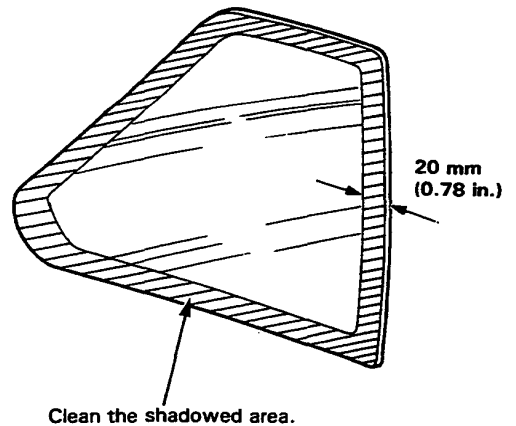
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before applying primer.

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.

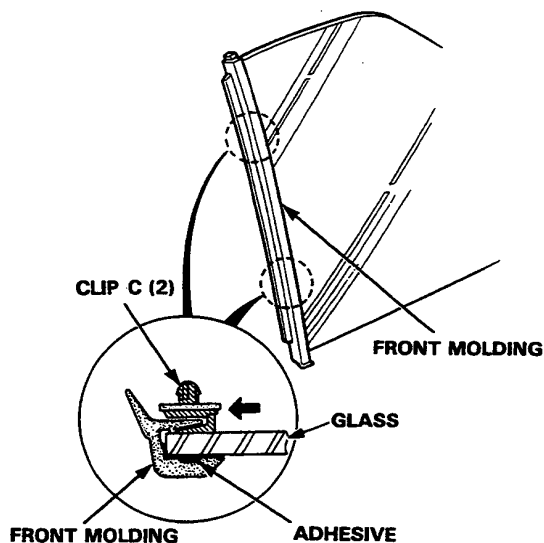
3. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

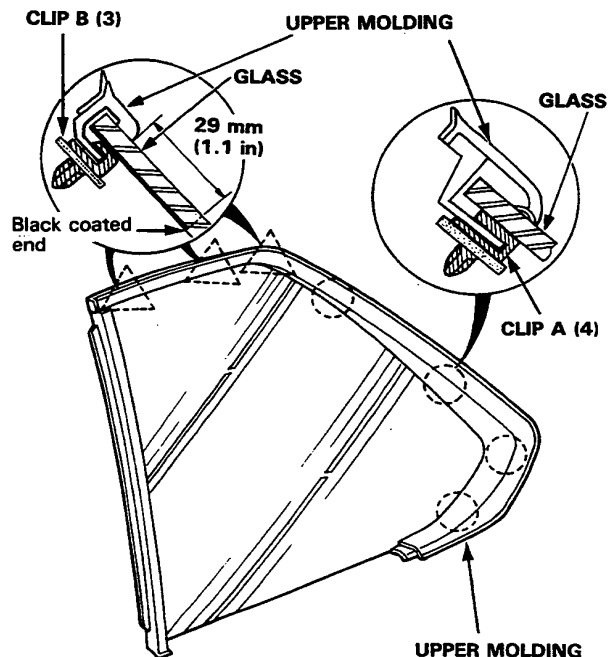




4. Adhere the front molding to the front edge of the quarter glass as shown.
5. Install the clips on the front molding.



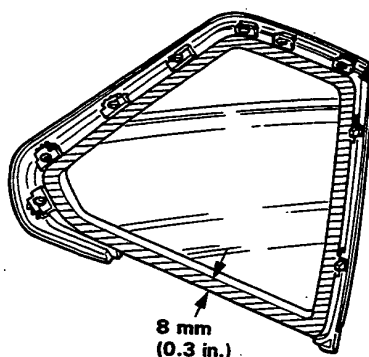
6. Install the upper molding on the glass by using the clips shown.



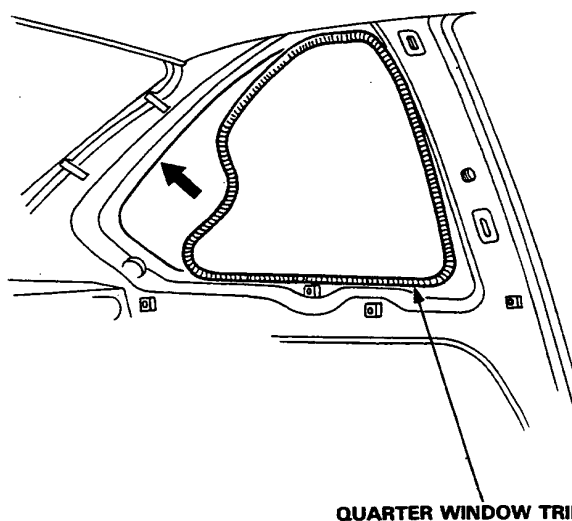
7. With a sponge, apply a light coat of glass primer around the edge of glass as shown, then lightly wipe it off with gauze or cheesecloth.

**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.



8. Install the quarter window trim.



(cont'd)

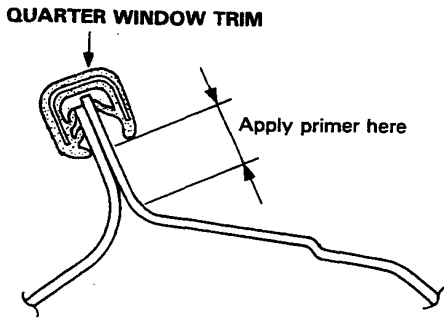
# Quarter Glass

## Installation (cont'd)

9. 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.

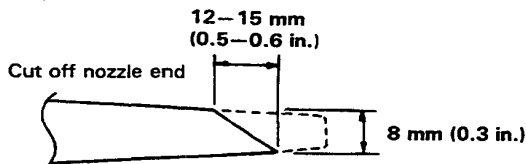


10. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

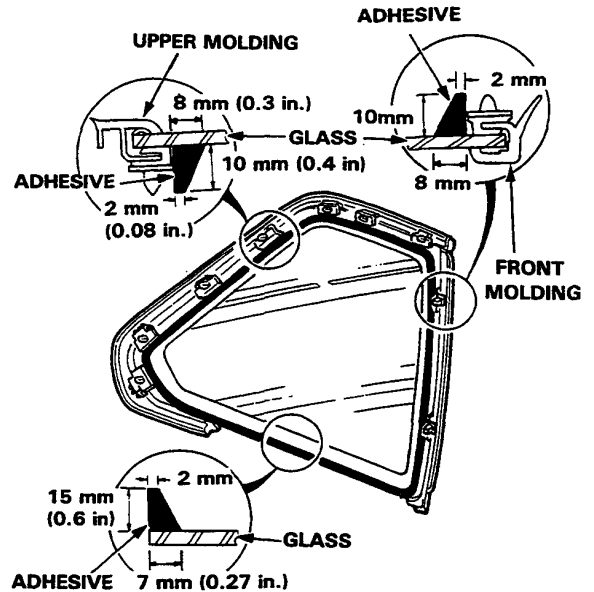
**NOTE:**

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

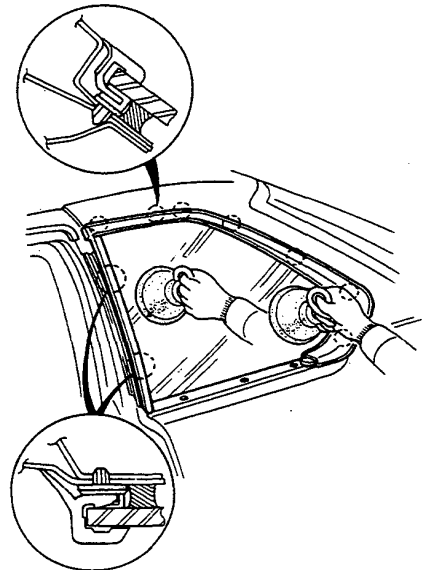


12. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulk gun, and run a bead of adhesive around the edge of the glass as shown.



13. Use suction cups to hold the glass over the opening, then 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 and close the doors until the adhesive is dry.



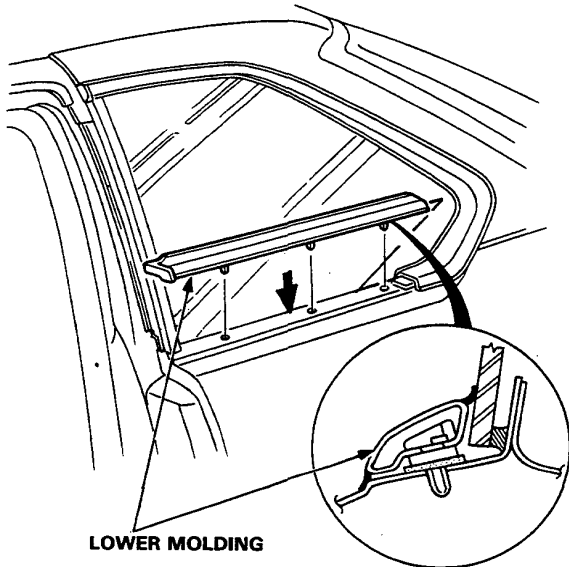




14. Scrape or wipe the excess adhesive off with a putty knife or gauze.

**NOTE:** Use a soft rag or towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

15. Install new clips on the lower molding, then install the lower molding.



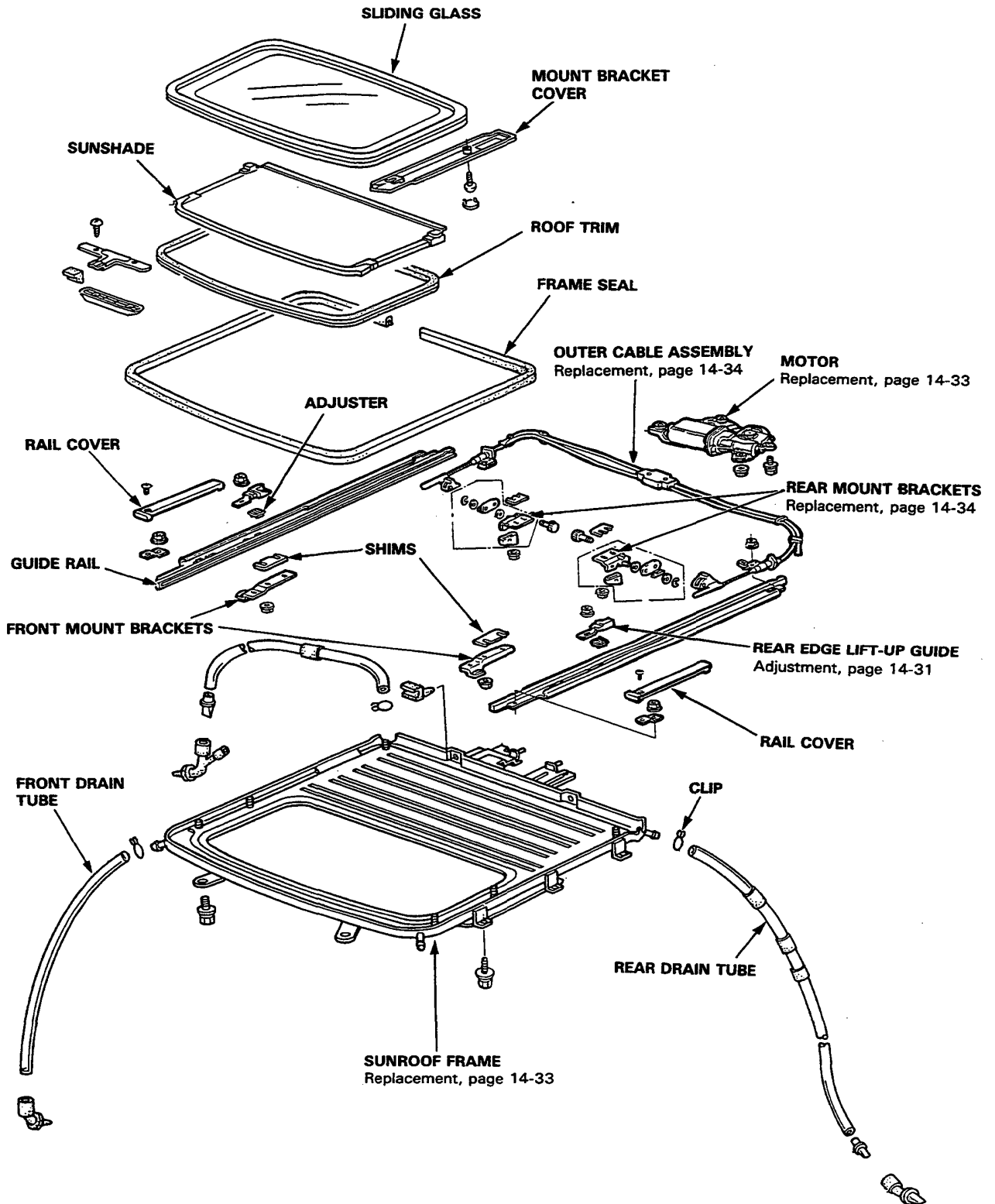
16. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

**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.

17. Reassemble all remaining removed parts.

# Sunroof

## Index

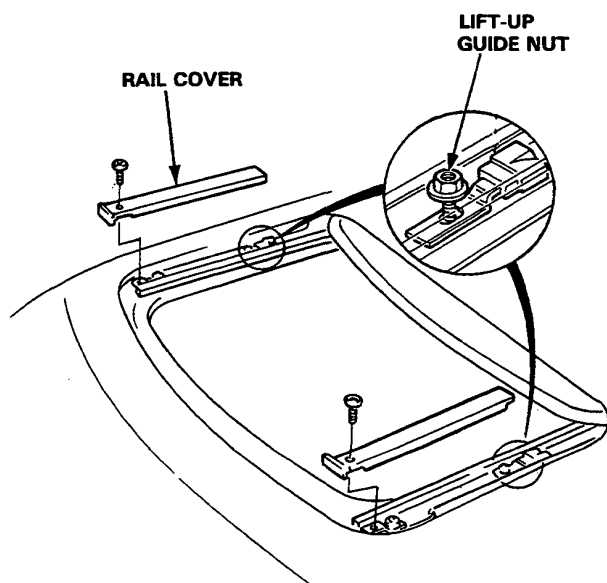




## Rear Edge Closing Adjustment

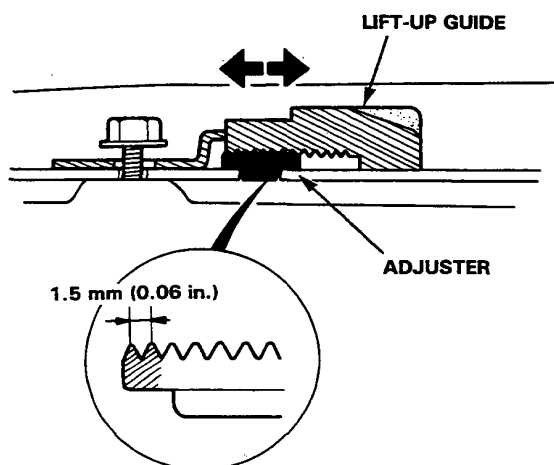
Open the glass about a foot, then close it to check where the rear edge begins to rise, if it rises too soon and seats too tightly against the roof molding, or too late and does not seat tightly enough, adjust it.

1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen lift-up guide nuts.



3. Move the guides forward or back, then tighten the nuts and recheck roof closing.

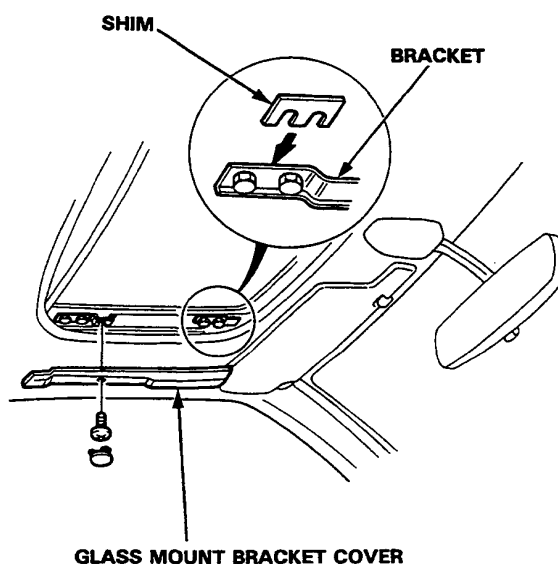
The guides have pitches of 1.5 mm (0.06 in.) each and can be adjusted 2 pitches forward or back.



## Glass Height Adjustment

Roof panel should be even with the glass weatherstrip, to within  $1 \pm 1.5$  mm ( $0.04 \pm 0.06$  in.) all the way around. If not, slide the sunshade back, and:

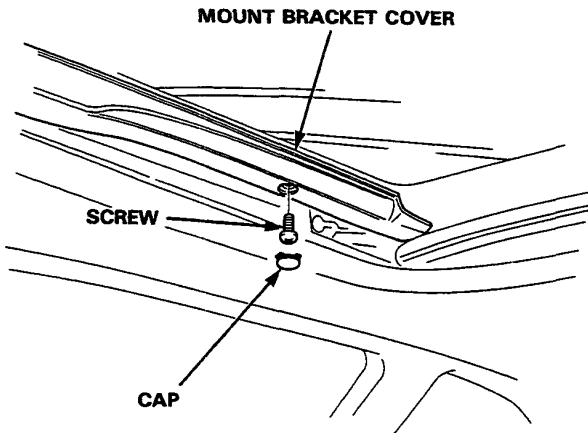
1. Pry the plug out of the glass mount bracket cover, remove screw, then slide the cover off to the rear.
2. Loosen the mount bracket nuts and install shims between the glass frame and bracket as shown.
3. Repeat on opposite side if necessary.



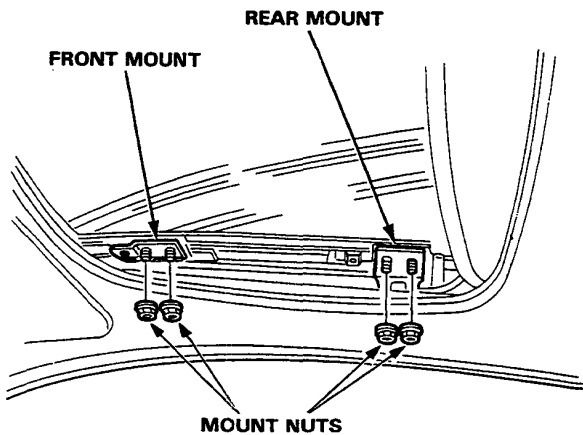
# Sunroof

## Glass and Sunshade Replacement

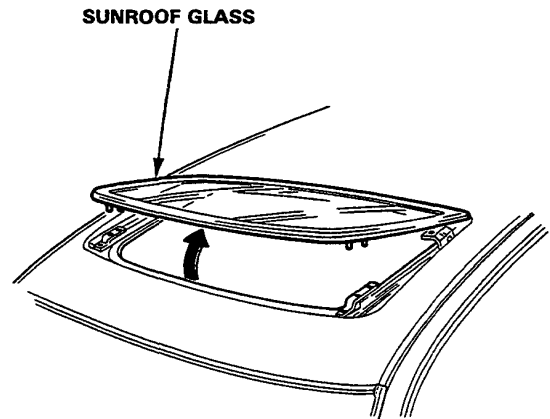
1. Slide the sunshade all the way back.
2. Pry the plug out of each bracket cover, remove the screw, and slide the cover off to the rear.



3. Close the glass fully.
4. Remove the mount nuts from front and rear mounts on both sides.

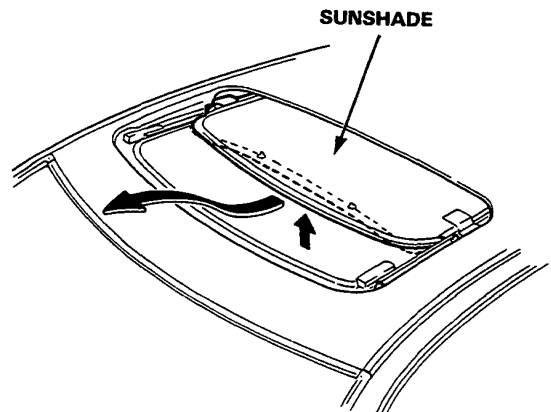


5. Remove the glass by lifting up and pulling forward as shown.



6. Remove the sunshade as shown.

**NOTE:** The sunshade may be bent slightly to ease removal.



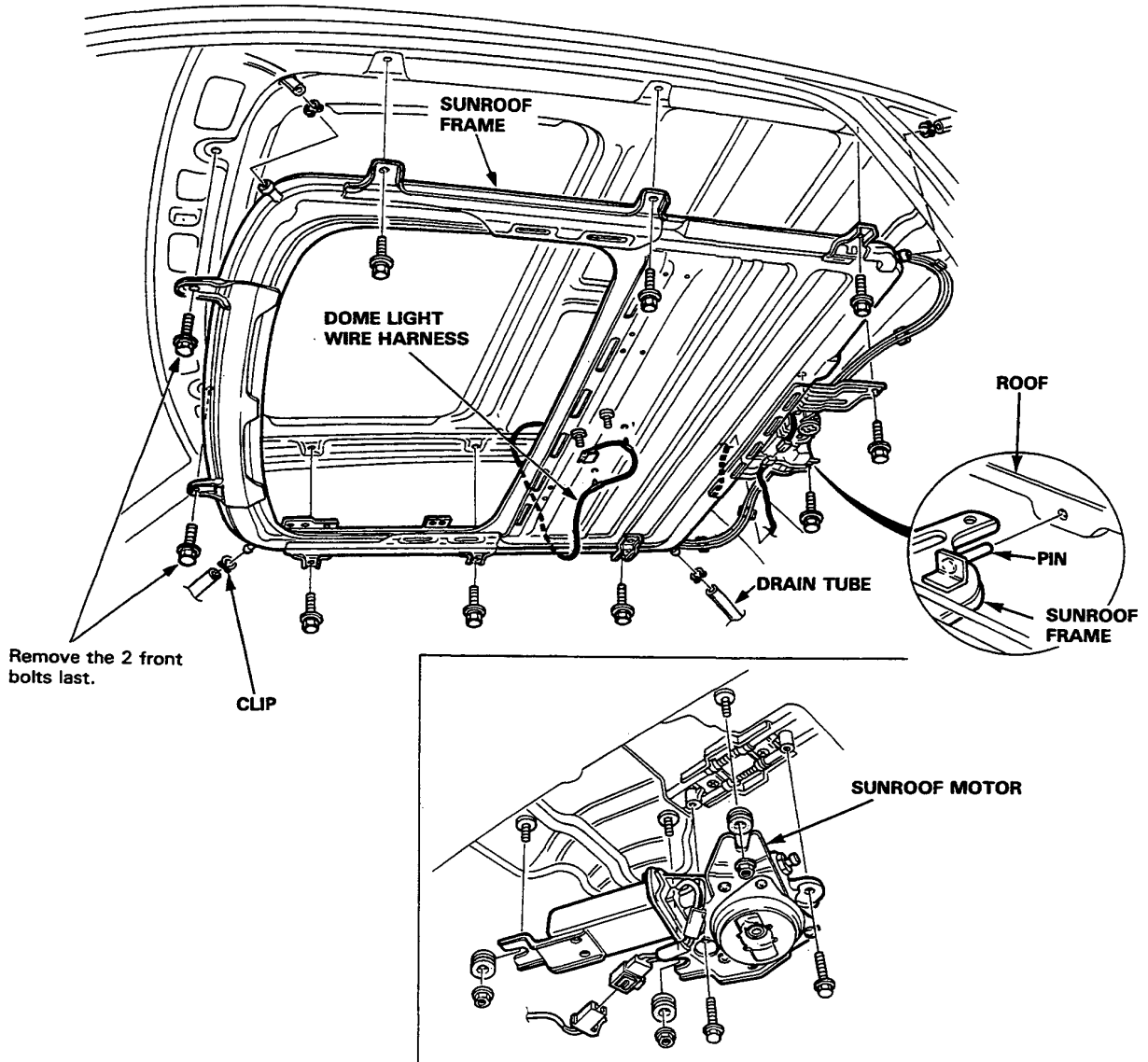


## Motor, Drain Tube, and Frame Replacement

**CAUTION:** Be careful not to damage the seats or other interior trim.

1. Remove the glass (page 14-32) and the headliner (page 14-37).
2. Disconnect the motor wire harness. Remove the clips securing the dome light wire harness.
3. Remove the sunroof motor by removing the two bolts and three nuts.
4. Disconnect the drain tubes.
5. Remove the ten 6 x 16 mm mounting bolts from the frame, and remove the frame from the car.

**NOTE:** You may require assistance when removing the frame.



5. To install, insert the frame's rear pins into the body holes, then install parts in the reverse order of removal.

**NOTE:**

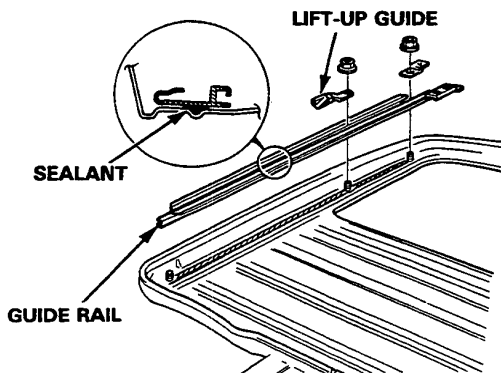
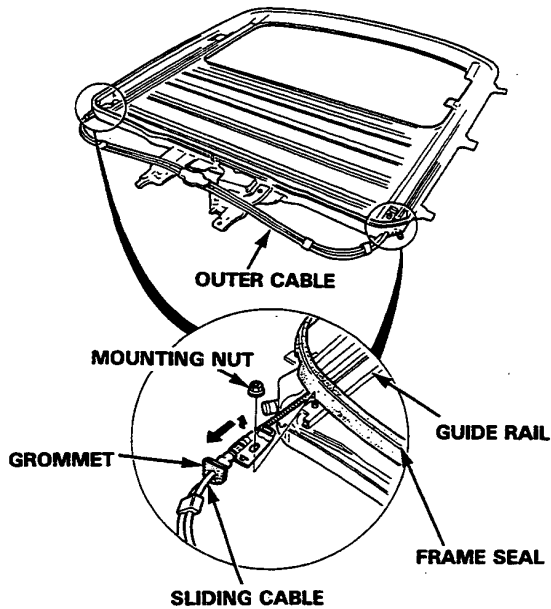
- Insert over 10 mm of the drain tube onto the nozzle.
- Install the tube clips with the ends facing the side to ease installation of the headliner.

# Sunroof

## Cable Replacement

With the sunroof out of the car, remove the guide rail mounting nuts, lift off the guide rails, and remove the cables with the rear mount brackets attached.

**NOTE:** Fill the groove in each grommet with sealant and apply molybdenum grease to the inner cable.

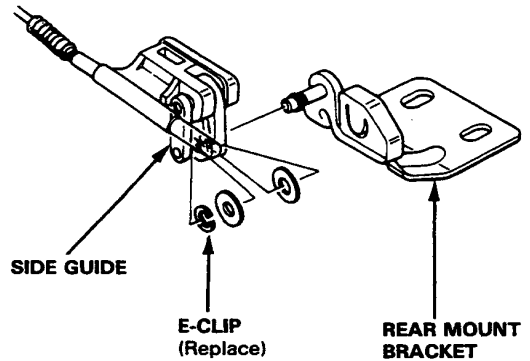


## Rear Mount Bracket Disassembly

1. Remove the side guides from the rear mount brackets.

**NOTE:** Replace the guides with new ones whenever they are disassembled.

2. Pry the E-clip off the pin, and remove the rear mount bracket from the cable.

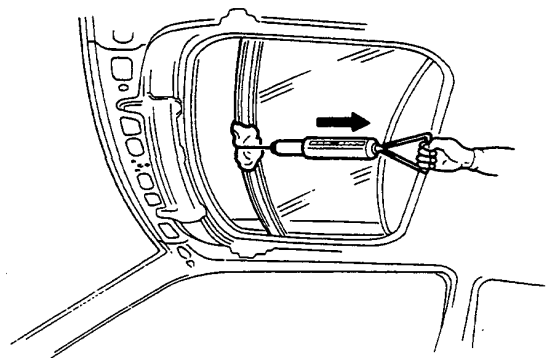


## Drag Check (Motor Removed)

Before installing the sunroof motor, measure effort required to close the glass using a spring scale as shown.

**CAUTION:** When using the spring scale, protect the leading edge of the sunroof with a shop rag.

If load is over 98 N (10 kg, 22 lb), check side clearance and glass height adjustment.





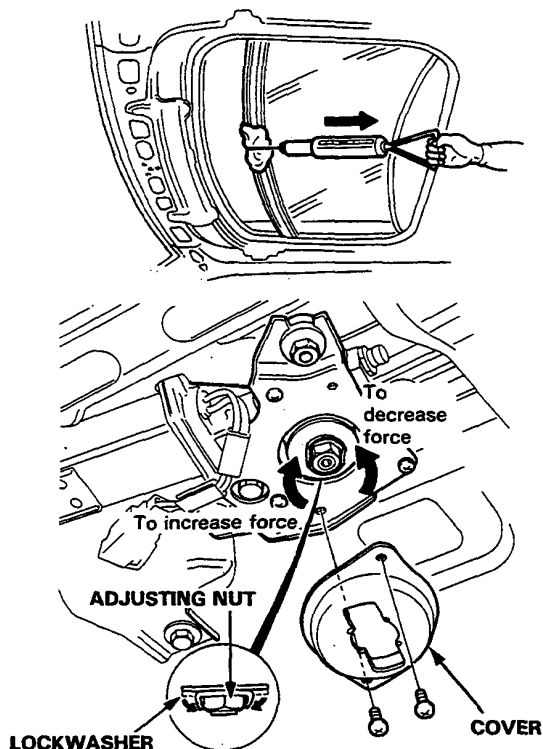
## Closing Force Check (Motor Installed)

1. After installing all removed parts, have a helper hold the switch to close the sunroof while you measure force required to stop it. Attach a spring scale as shown. Read force as soon as the glass stops moving, then immediately release the switch and spring scale.

**CAUTION:** When using the spring scale, protect the leading edge of the sunroof with a shop rag.

**Closing Force:** 196–245 N  
(20–30 kg, 44–55 lb)

2. If force is not within specification, adjust by turning the sunroof motor clutch adjusting nut. After adjusting, install a new lockwasher and bend it flat against the adjusting nut.



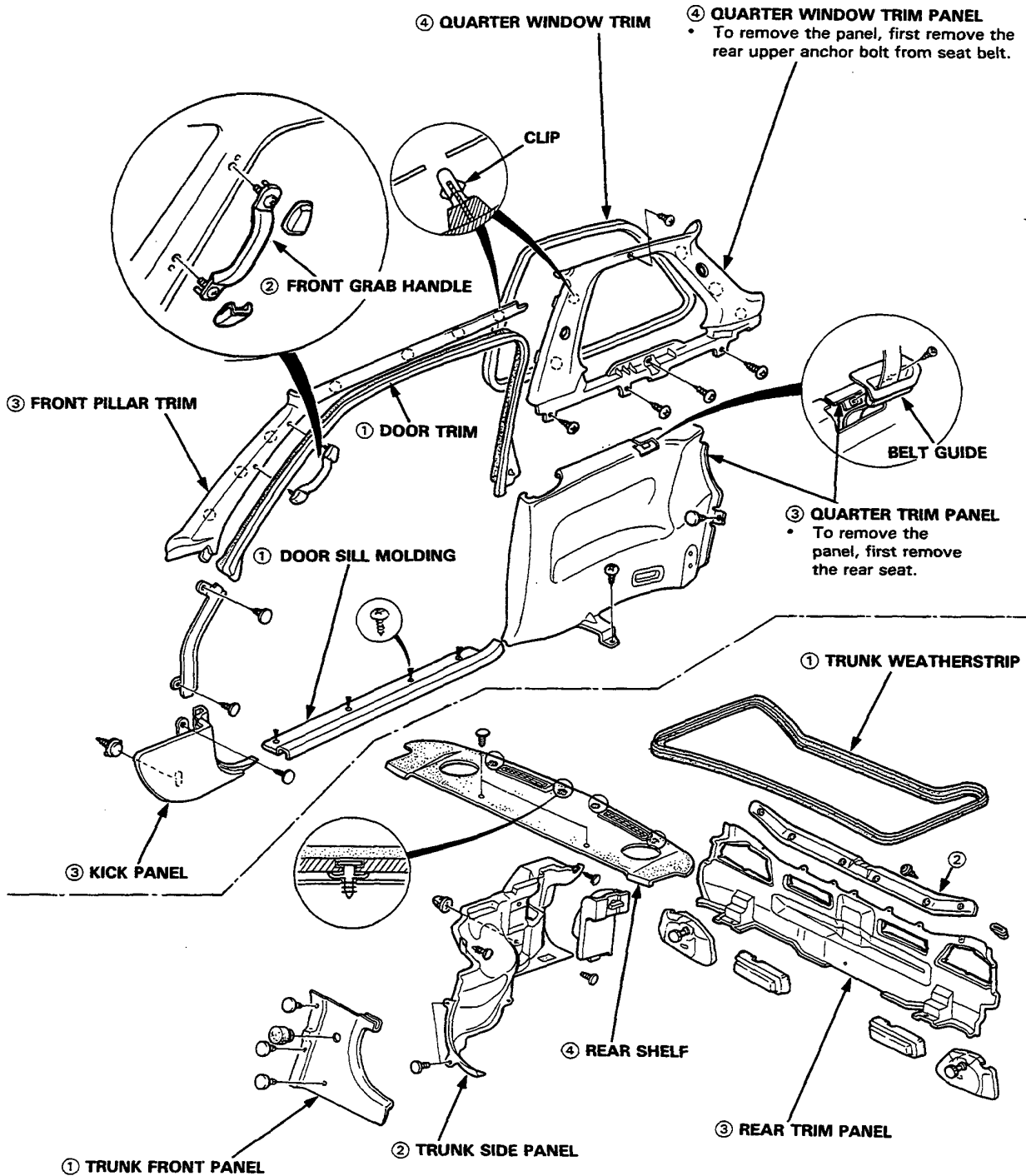
## Troubleshooting

Symptom	Probable Cause
Water leak	<ol style="list-style-type: none"> <li>1. Clogged drain tube.</li> <li>2. Gap between glass weatherstrip and roof panel.</li> <li>3. Defective or improperly installed glass weatherstrip.</li> </ol>
Wind noise	<ol style="list-style-type: none"> <li>1. Excessive clearance between glass weatherstrip and roof panel.</li> </ol>
Motor noise	<ol style="list-style-type: none"> <li>1. Loose motor.</li> <li>2. Worn gear or bearing.</li> <li>3. Outer cable deformed.</li> </ol>
Sliding glass does not move, but motor turns	<ol style="list-style-type: none"> <li>1. Clutch out of adjustment.</li> <li>2. Foreign matter stuck between guide rail and sliding glass panel.</li> <li>3. Outer cable loose.</li> <li>4. Outer cable not attached properly.</li> </ol>
Sliding glass does not move and motor does not turn (Sliding glass can be moved with sunroof wrench)	<ol style="list-style-type: none"> <li>1. Blown fuse.</li> <li>2. Faulty switch.</li> <li>3. Battery run down.</li> <li>4. Defective motor.</li> </ol>

# Interior Trim

## Replacement

Disassemble in numbered sequence



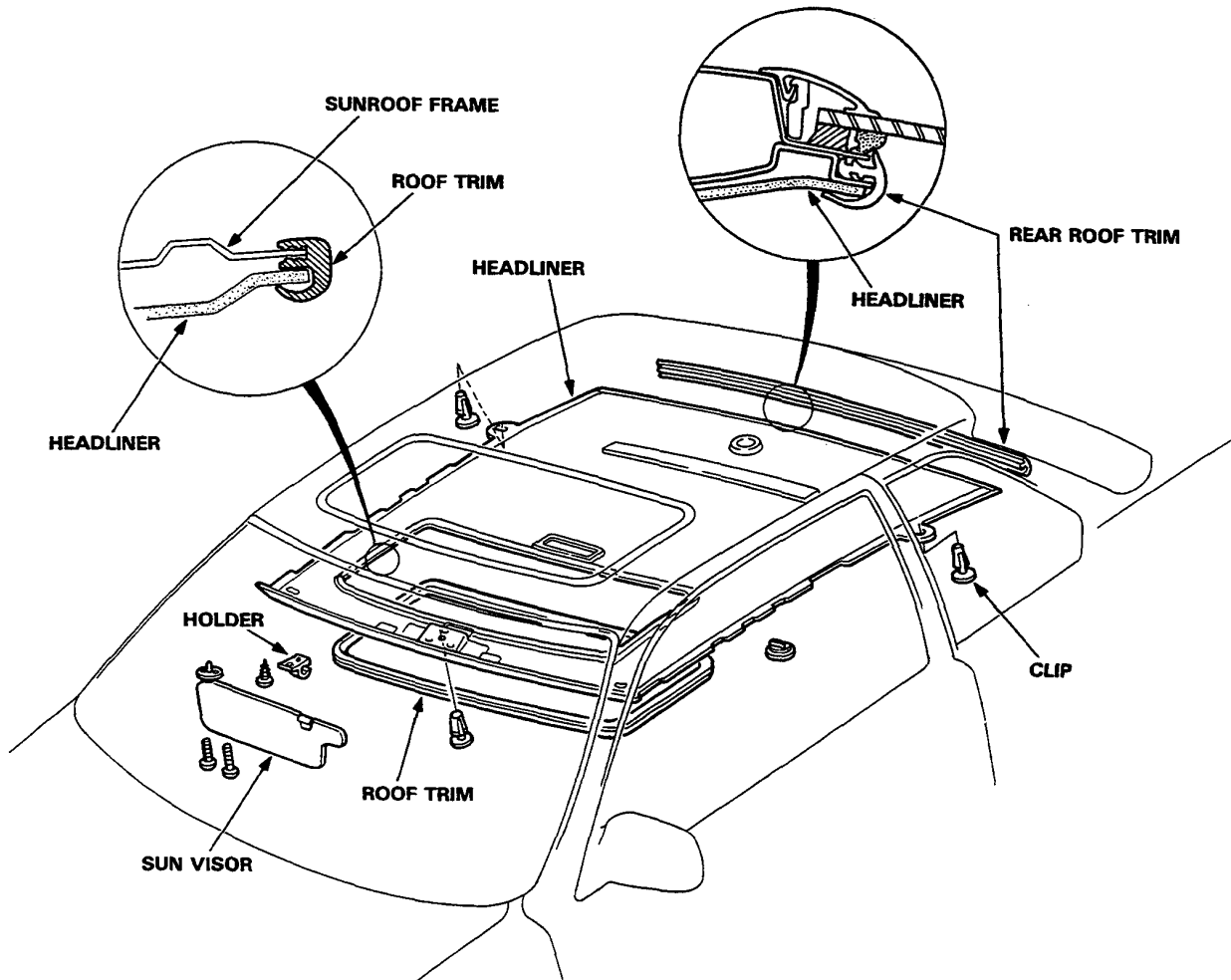




# Headliner

## Replacement

1. Remove:
  - Sun visors and holders.
  - Rearview mirror assembly (page 14-43).
  - Front pillar trim (page 14-36).
  - Quarter window trim panel (page 14-36).
  - Dome light.
  - Roof trim.
2. Remove the clips and rear roof trim, then remove the headliner.



3. Assemble the headliner in the reverse order of disassembly.

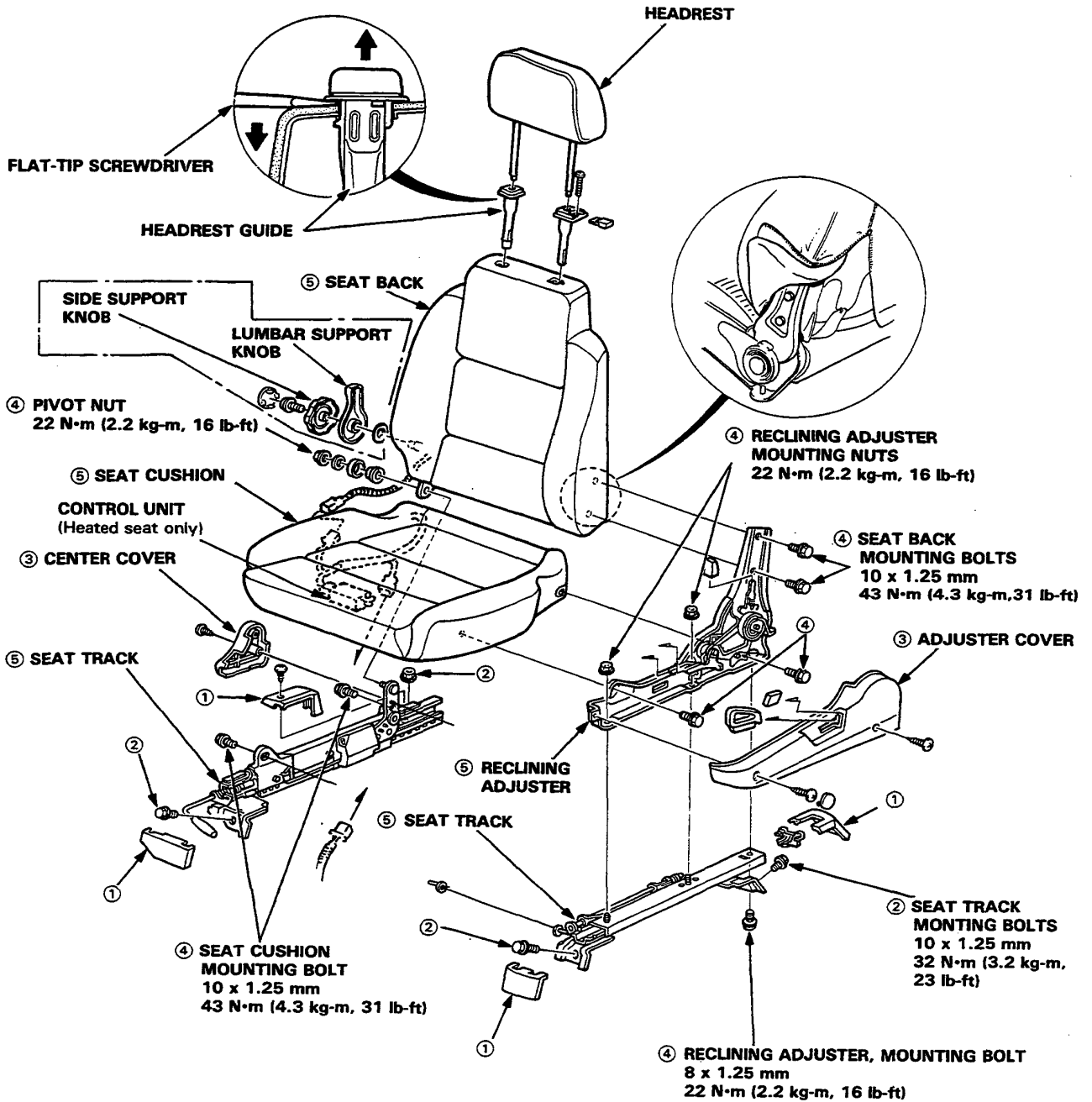
### NOTE:

- When installing the headliner inside the passenger cabin, be careful not to fold or bend it. Also, be careful not to scratch the body.
- Check that the two sides of the headliner are securely attached to the trim.

# Seats

## Front Disassembly

Disassemble in numbered sequence.

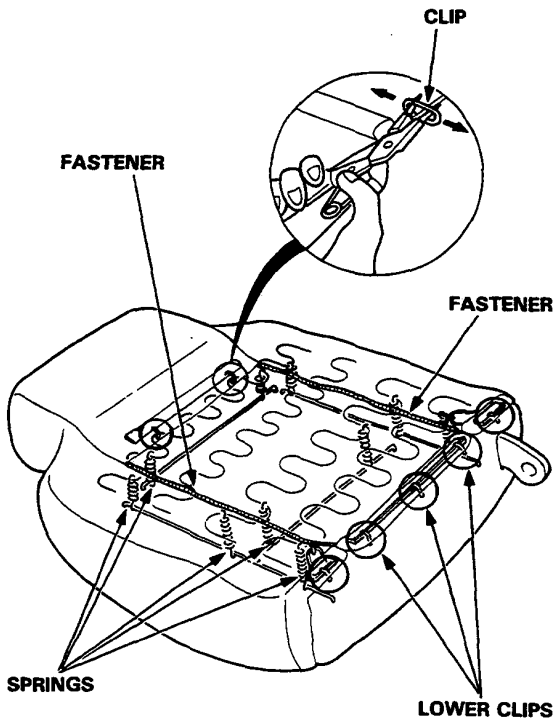




## Front Cover Replacement

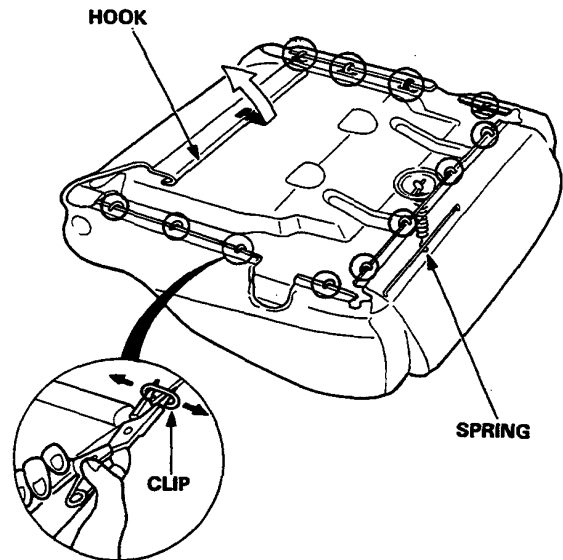
### Front Seat Back:

1. Separate the seat cushion and back. (page 14-38).
2. Remove the headrest and headrest guide (page 14-38).
3. Remove the lower clips, and fasteners.
4. Remove the inside clips and springs, then remove the trim cover.



### Front seat cushion:

5. Remove the 12 clips, and the hook.
6. Remove the spring, then remove the trim cover.

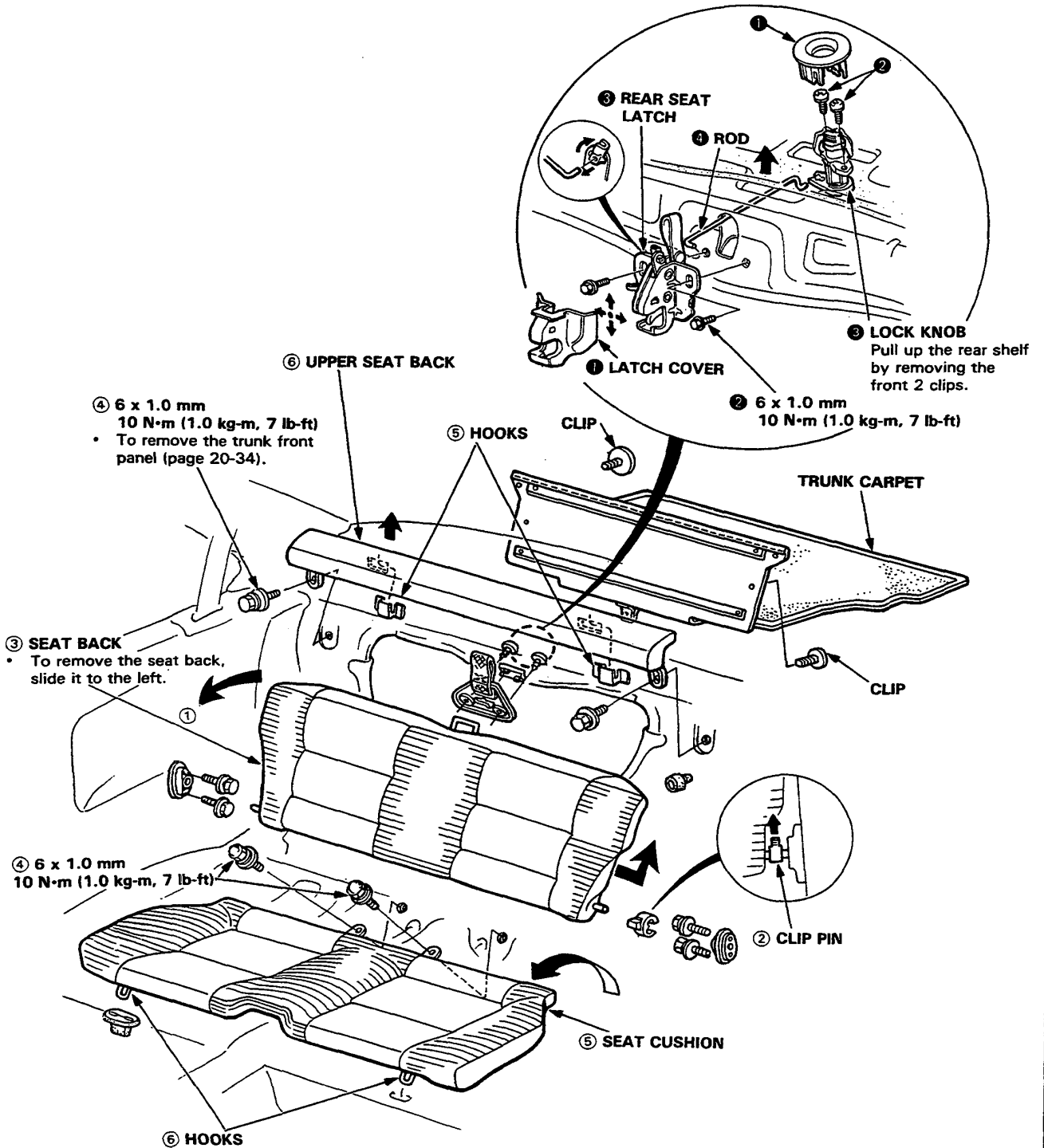


**NOTE:** To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the frame before securing all the clips.

# Seats

## Rear Disassembly

Disassemble in numbered sequence



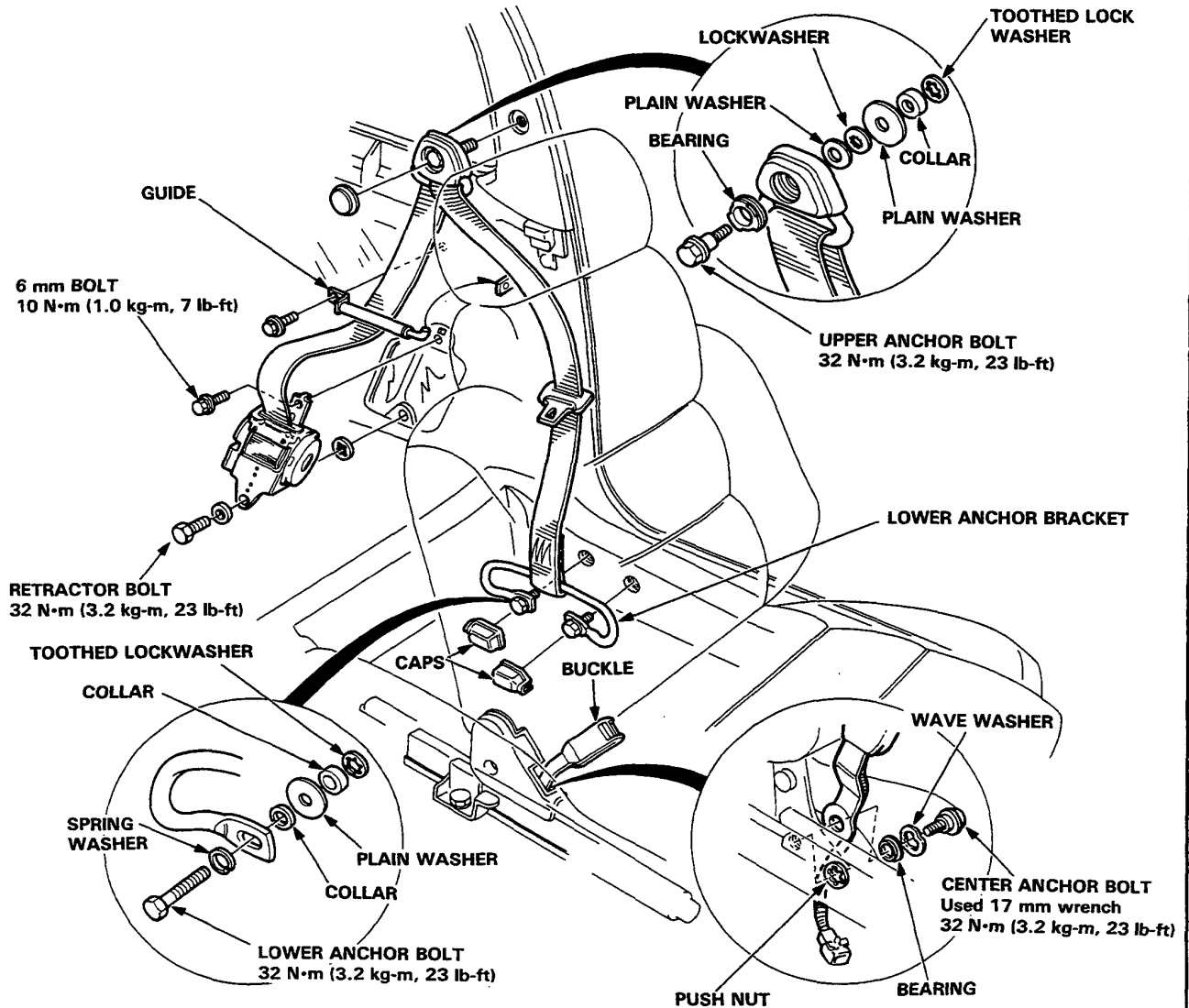
# Seat Belts



## Front Replacement

**CAUTION:** Check the seat belts for damage (page 14-43), and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the rear seat, then remove the quarter trim panel (page 14-36).
2. Remove the upper anchor bolt, lower anchor bolts and retractor bolt with a 17 mm socket or box-end wrench.
3. Remove the front seat, then remove the center anchor bolt.



4. Install the seat belt in the reverse order of removal. Make sure you assemble the washers and collars correctly on the upper and lower anchor bolts.

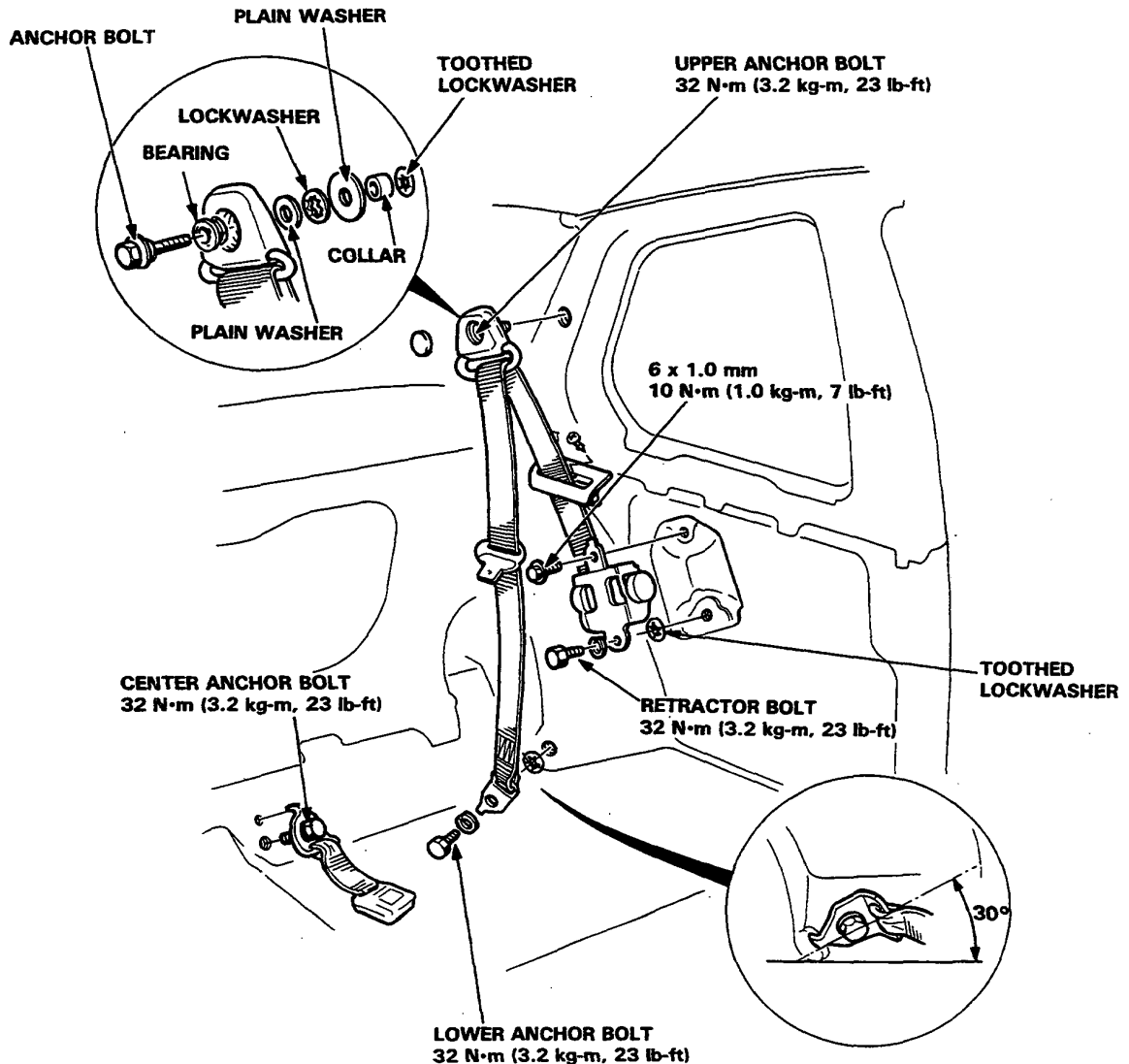
**NOTE:** Before attaching the quarter trim panel, make sure there are no twists in the belt.

# Seat Belts

## Rear Replacement

**CAUTION:** Check the seat belts for damage (page 14-43), and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the rear seat (page 14-40).
2. Remove the quarter trim panel.
3. Remove the upper anchor bolt, the lower anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.



4. Install the seat belt in the reverse order of removal.

**NOTE:** Before attaching the quarter trim panel and rear seat, make sure there are no twists in the belt.



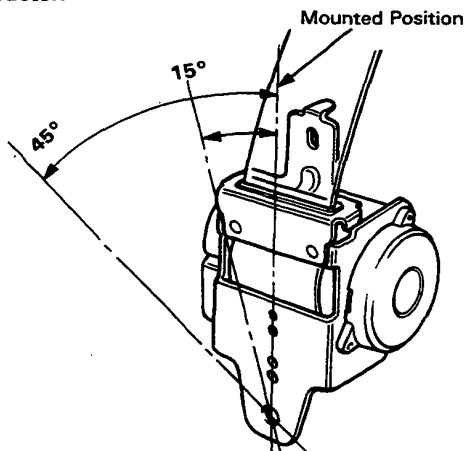
## Rear View Mirror

### 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 45°.

**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

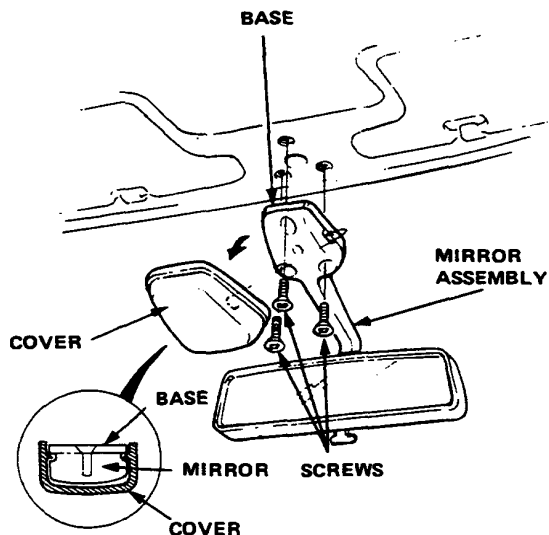
1. Check that the belt is not twisted or caught on anything.
2. After installing an anchor, check for free movement on its retaining bolt. If necessary, remove the bolt and check that the washers and other parts are not damaged or installed improperly (front seat belt only).
3. Check the belts for fouling, damage or discoloration. Clean with a shop towel if fouled.

**CAUTION:** Use only soap and water to clean.

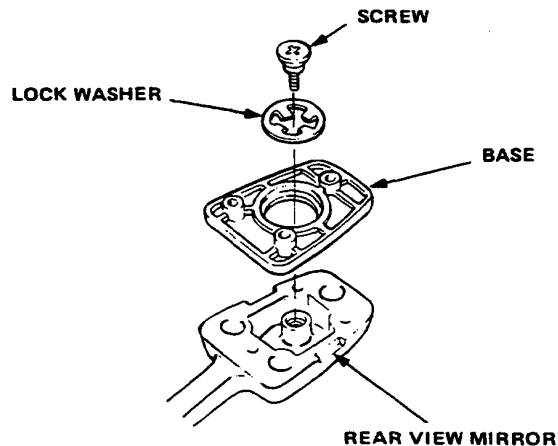
4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
5. Make sure that the belt will retract automatically when released.
6. Replace the belt with a new one if there is any abnormality.

### Replacement

1. Remove the rubber damper.
2. Pry the cover off using the end of a slot-head screwdriver.



3. Remove the 3 mounting screws from the mirror base, then remove the mirror assembly.
4. Remove the base from the bracket by removing the screw.



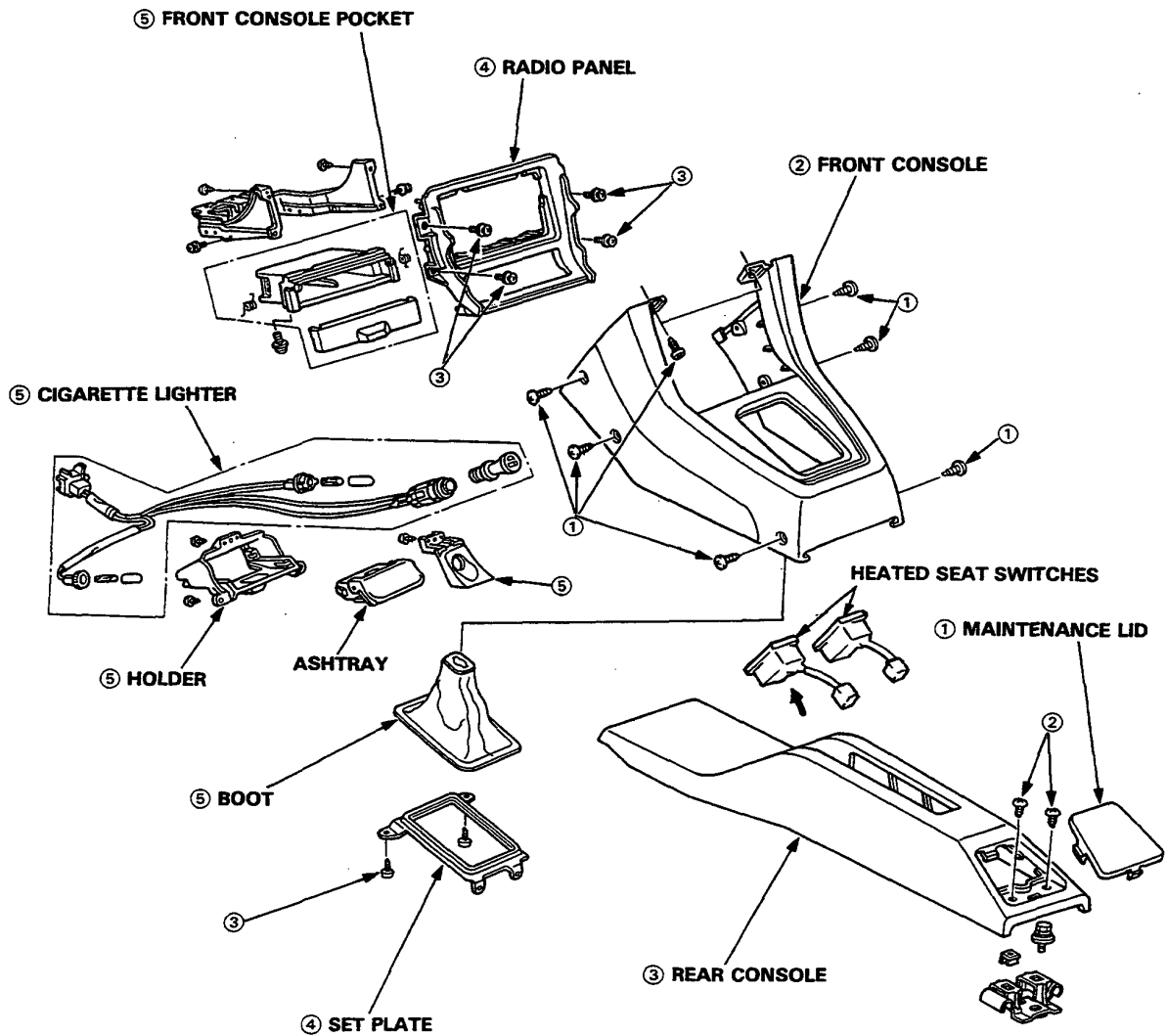
# Console

## Replacement

Disassemble in numbered sequence:

**NOTE:**

- Remove the rear console first, before front console removal.
- Lift up the parking brake lever.
- After removing the front console, disconnect the wire harness inside the console.
- For manual transmission models, remove the shift lever knob.



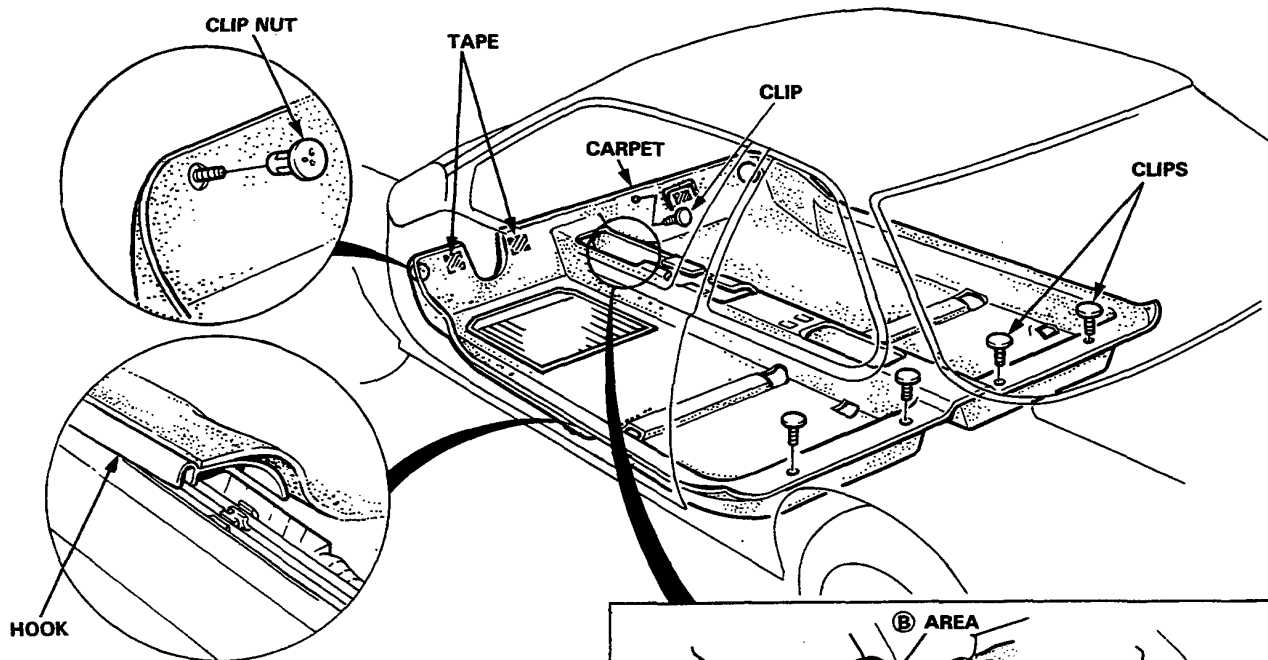


# Carpet



## Replacement

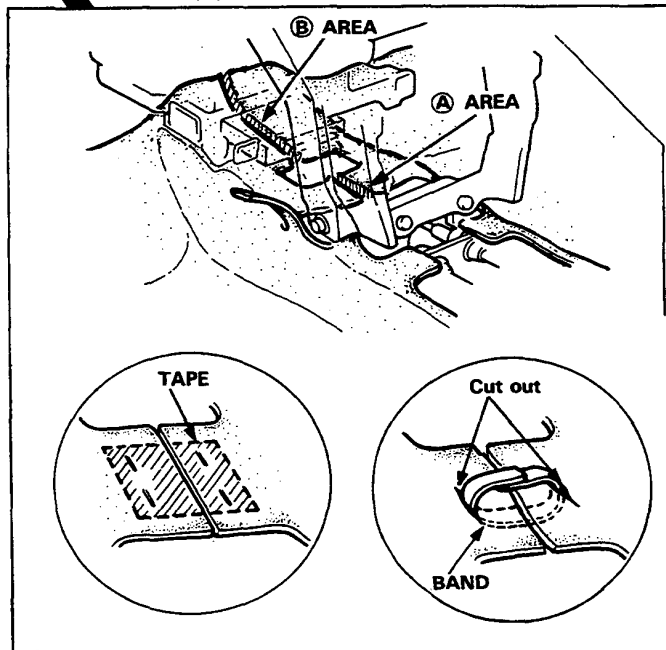
1. Remove:
  - Front seats.
  - Front seat belt lower anchor bolts (page 14-41).
  - Center console.
  - Right and left kick panels.
  - Door sill moldings.
  - Fuel filler door and trunk lid openers.
  - Right and left quarter trim panels.
2. Pry out the clips at the rear edge and under the dashboard, peel off the tape and remove the clip nuts.



3. Cut the (A) area first, then pull backward and cut the (B) area as shown.
4. Remove the carpet.
5. Install the carpet in the reverse order of removal.

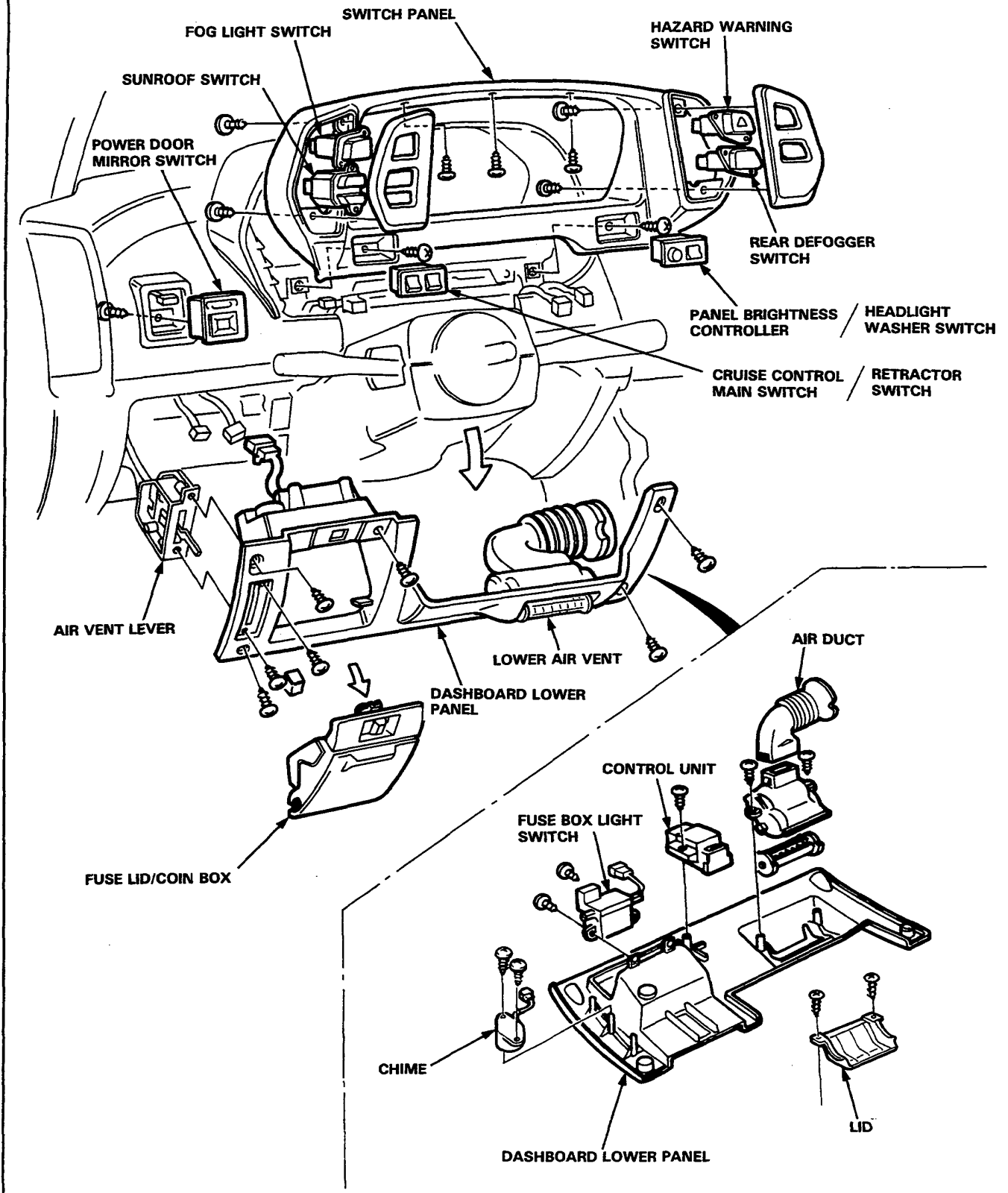
### NOTE:

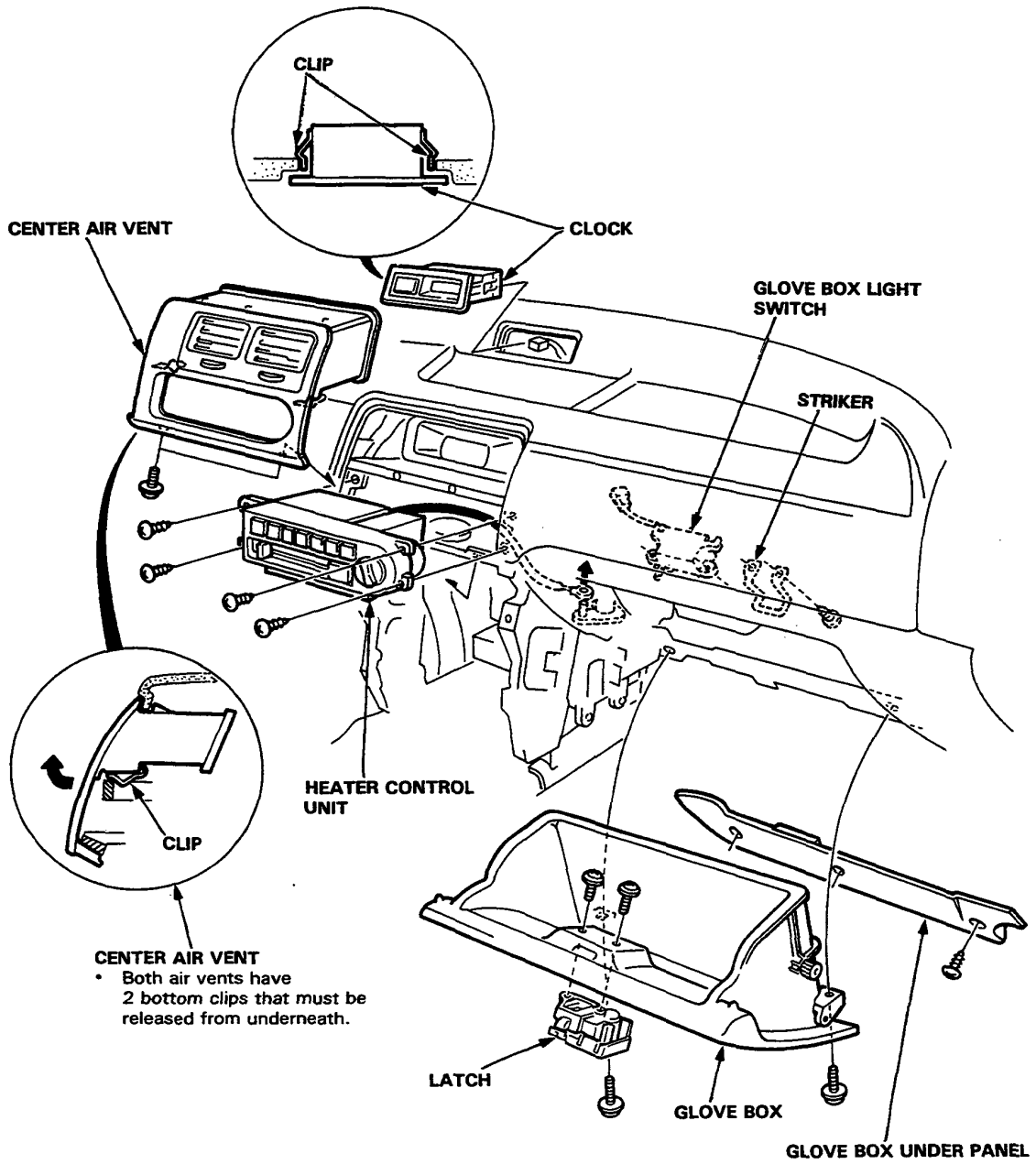
- Place (B) area under the heater unit.
- Reattach the cut areas with tape and tie bands as shown.



# Dashboard

## Component Removal/Installation

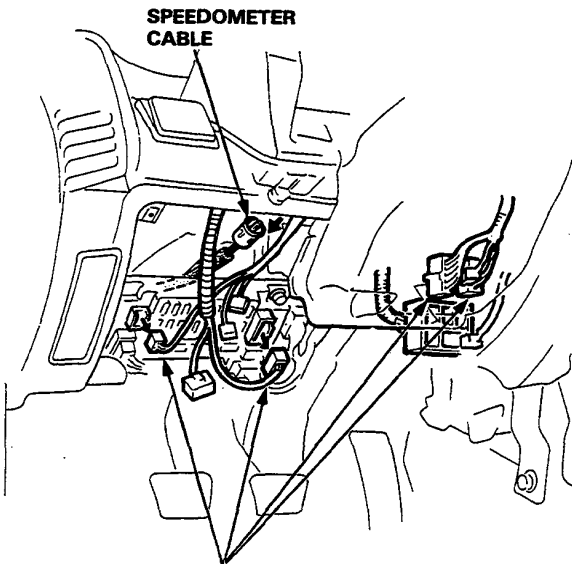




# Dashboard

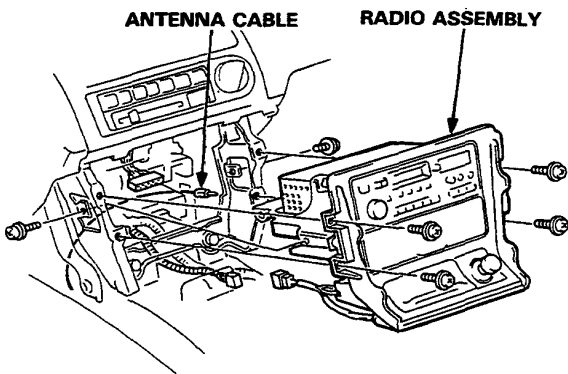
## Replacement

1. To remove the dashboard, first slide the seats back fully and remove the:
  - Dashboard lower panel (page 14-46).
  - Front consoles (page 14-44).
2. Disconnect the wire harnesses from the connector holder, and fuse box.
3. Disconnect the speedometer cable.

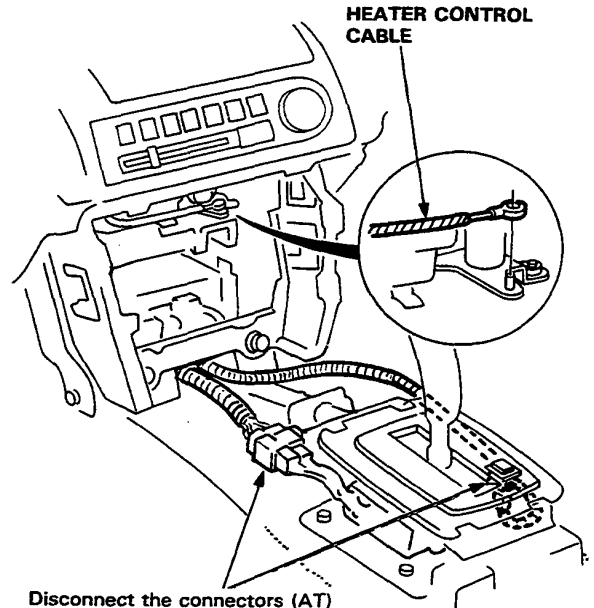


Disconnect the connectors

4. Remove the 6 screws and radio panel, then disconnect the wire connectors and antenna cable.
5. Remove the radio assembly.

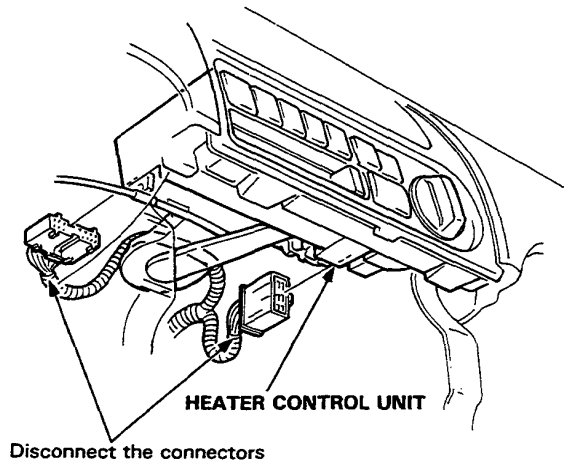


6. Disconnect the heater control cable.
7. Disconnect the shift position switch connectors (AT).



Disconnect the connectors (AT)

8. Disconnect the connector and wire harnesses from heater control unit.



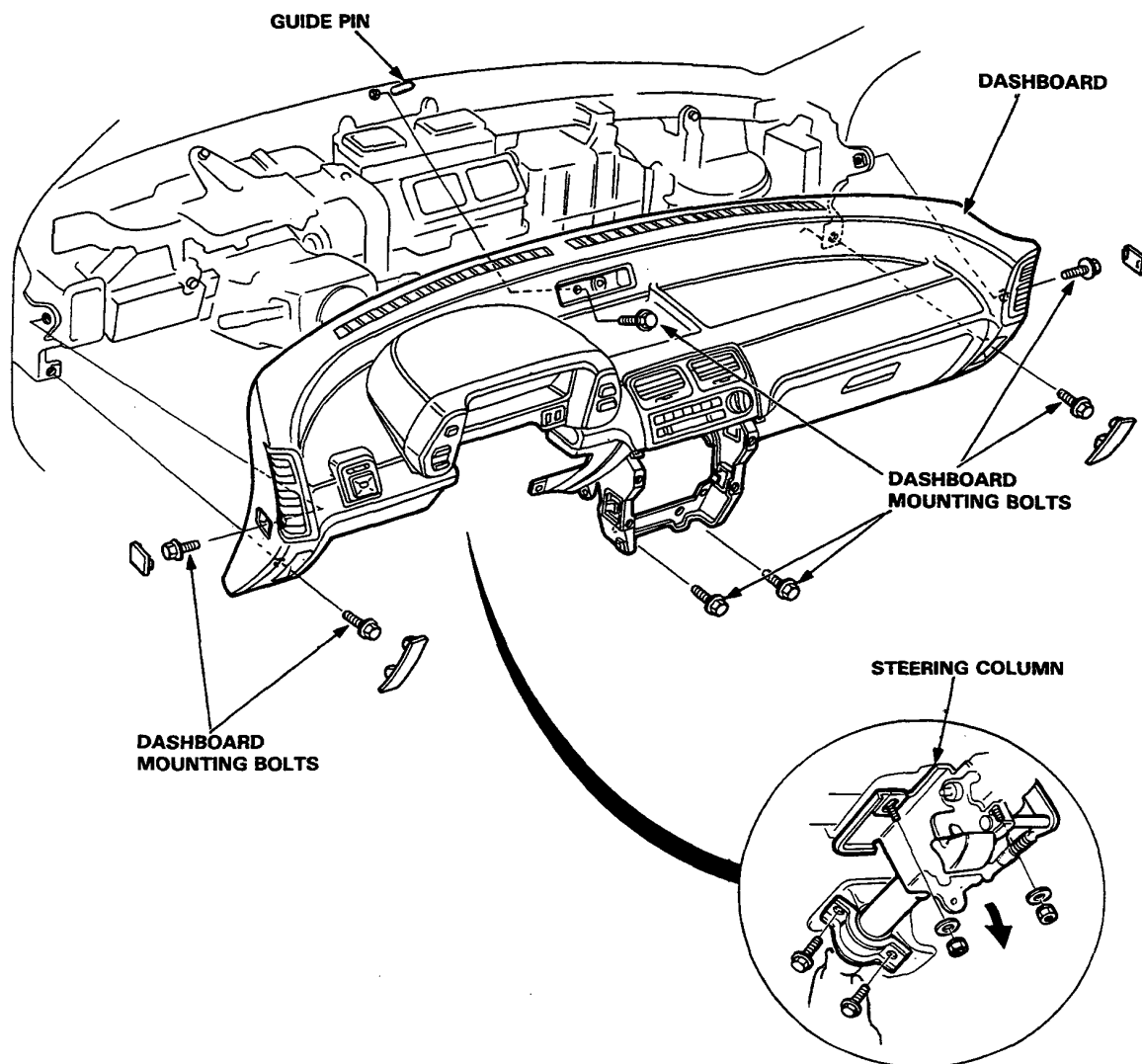
Disconnect the connectors



9. Remove the clock from the top of the dashboard (page 14-47).
10. Lower the steering column.
11. Remove the dashboard mounting bolts.
12. Lift the dashboard as you pull, so it will slide up and off the guide pin in the middle. Hold the dashboard from underneath so it won't fall when it comes off the pin.

**Reassembly NOTE:**

- Make sure the dashboard fits onto the guide pin correctly.
- Before tightening the dashboard bolts, make sure the dashboard wires are not pinched, and that the dashboard is not interfering with the heater control cable.
- For ease of installation, remove gauge assembly from dash.



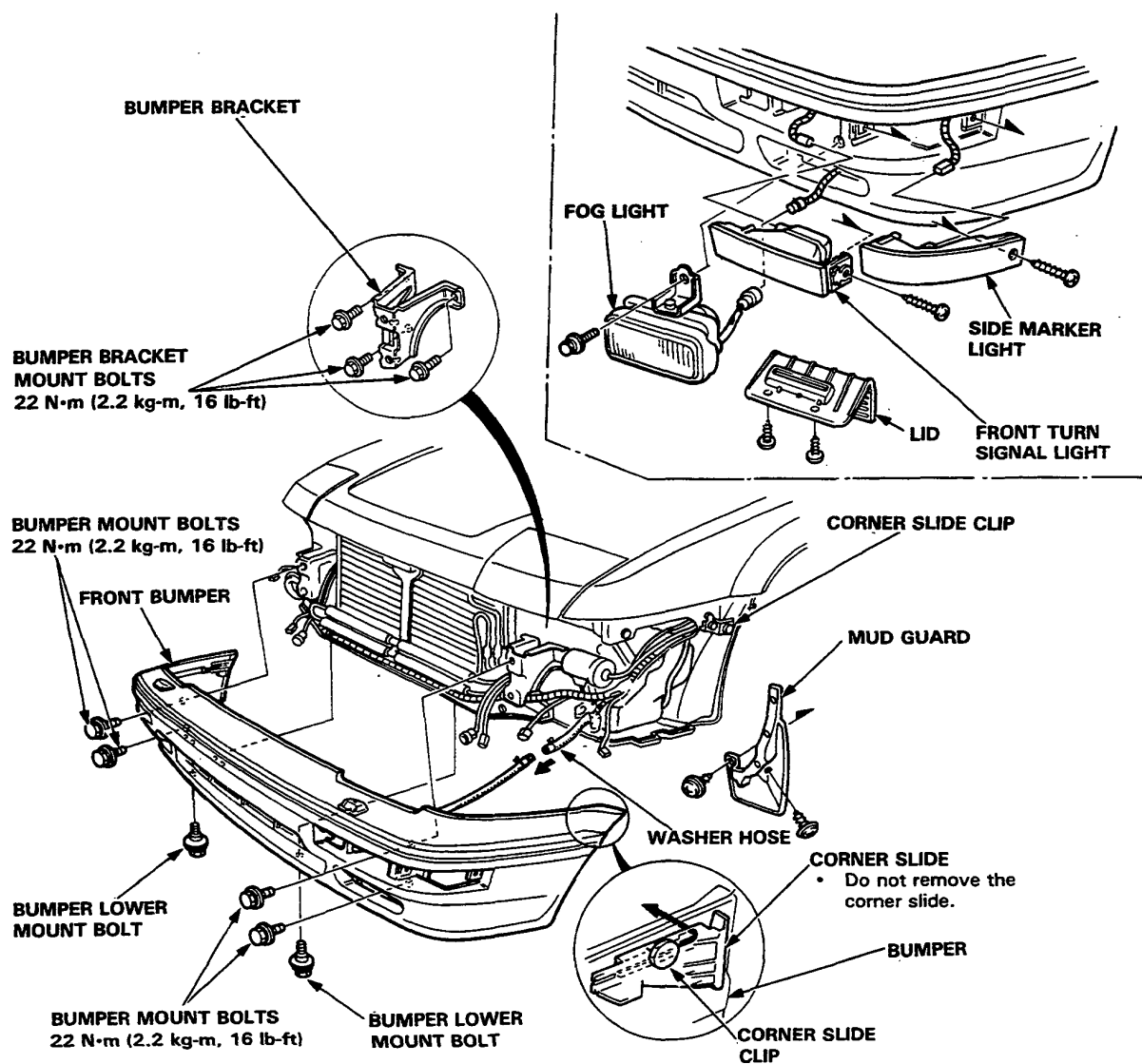
# Front Bumper

## Replacement

1. Remove the side marker lights and front turn signal lights.
2. Remove the fog lights or lids.
3. Remove the 2 bumper lower mount bolts and the 4 bumper mount bolts.
4. Disconnect the headlight washer hose.
5. Remove the bumper by sliding it forward.

If necessary:

6. Remove the bumper brackets by removing the bracket mount bolts.
7. Remove the screws, then remove the mud guards.



# Rear Bumper



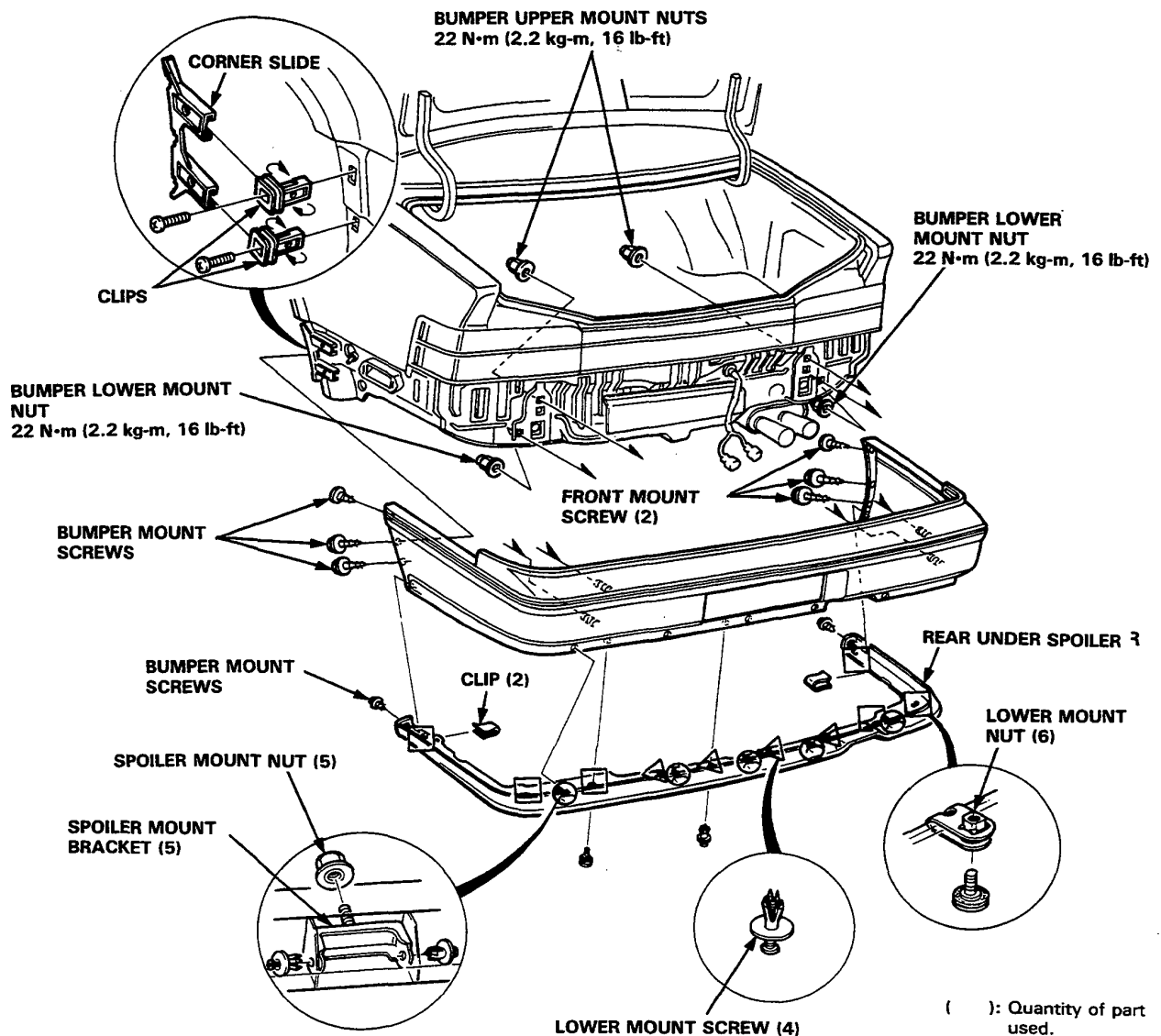
## Replacement

1. Disconnect the two license light wire connectors.
2. Remove the 3 bumper mount screws on each side at the corner edge of the bumper.
3. Remove the 2 bumper lower mount nuts from under the trunk floor.
4. Remove the 2 bumper upper mount nuts from the trunk area.
5. Remove the bumper by sliding it to the rear.

**NOTE:** Do not damage the threads of the bumper bolts.

If necessary:

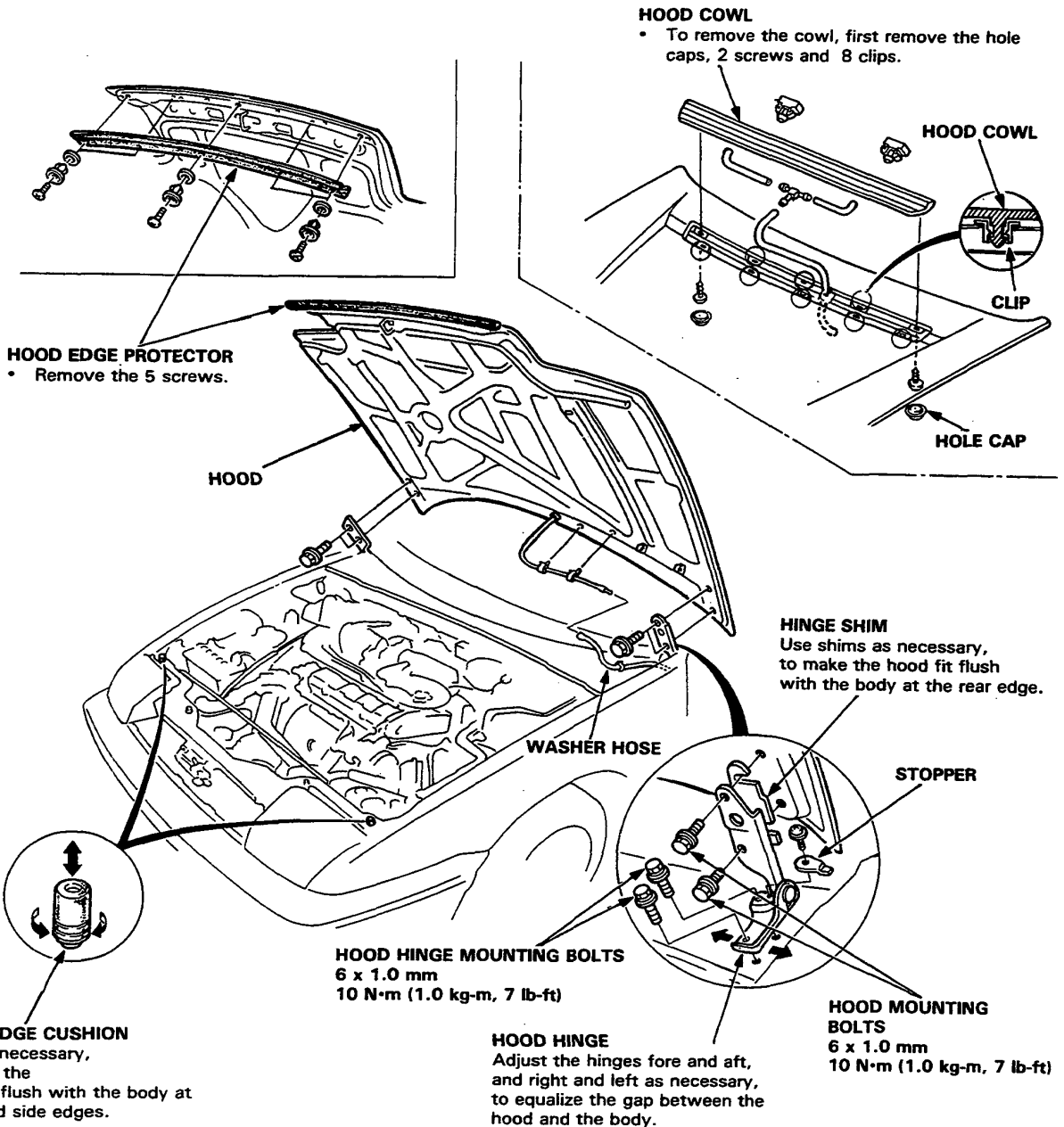
6. Remove the screws and nuts, then remove the rear under spoiler.



# Hood

## Replacement/Adjustment

1. Pull the windshield washer hose out of the hood.
2. Hold the hood up and remove the 2 hood mounting bolts on each side, then remove the hood.
3. Remove the hinge mounting bolts, then remove the hood hinge.
4. When installing the hood, don't tighten the hinge bolts until you've checked the adjustments shown below.



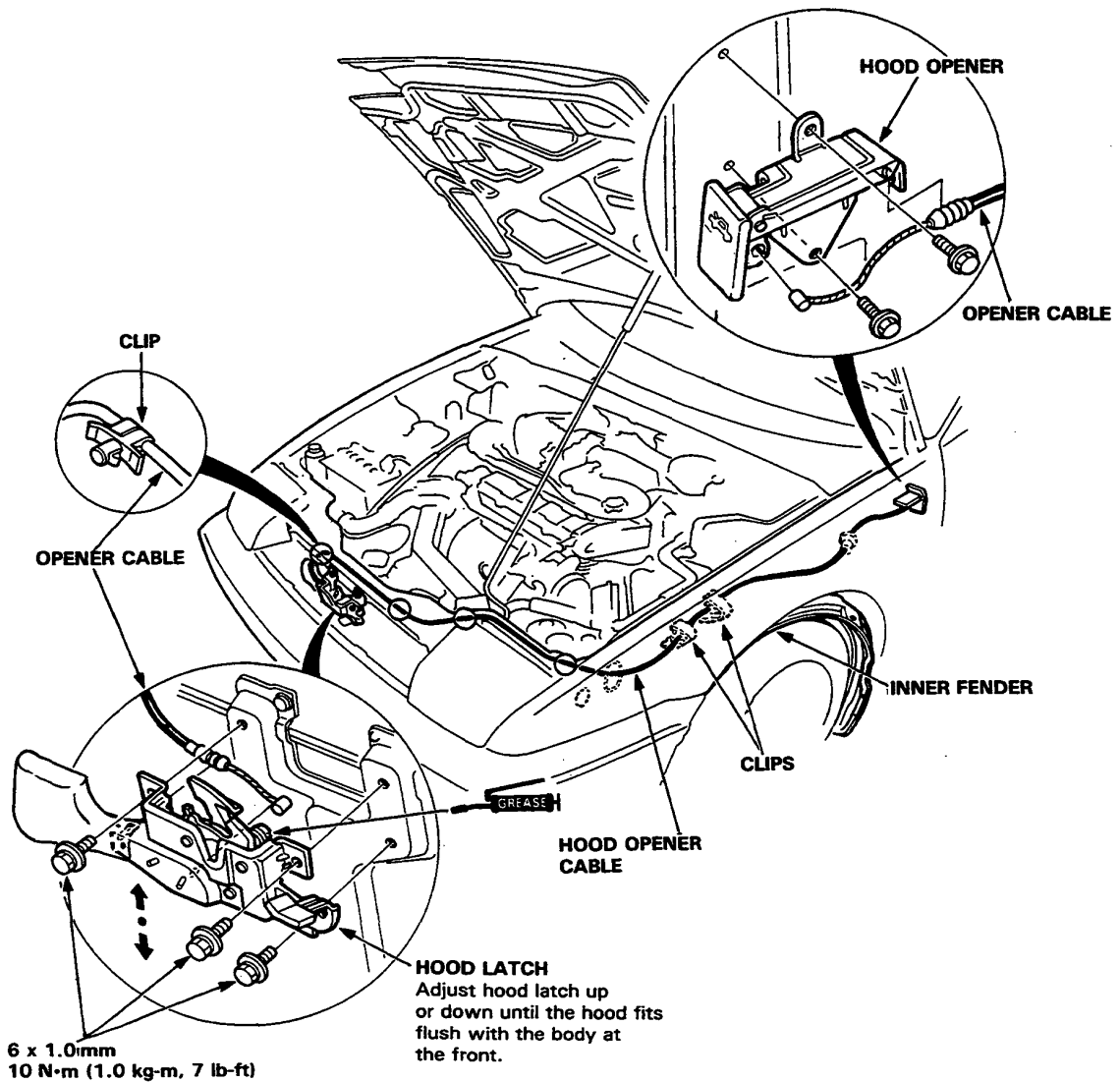




## Opener and Latch Replacement

1. Remove the left kick panel. (page 14-36).
2. Remove the bolts, then remove the hood opener and disconnect the opener cable.
3. Remove the 3 mounting bolts, then remove the hood latch and disconnect the opener cable.
4. Remove the 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.



# Trunk

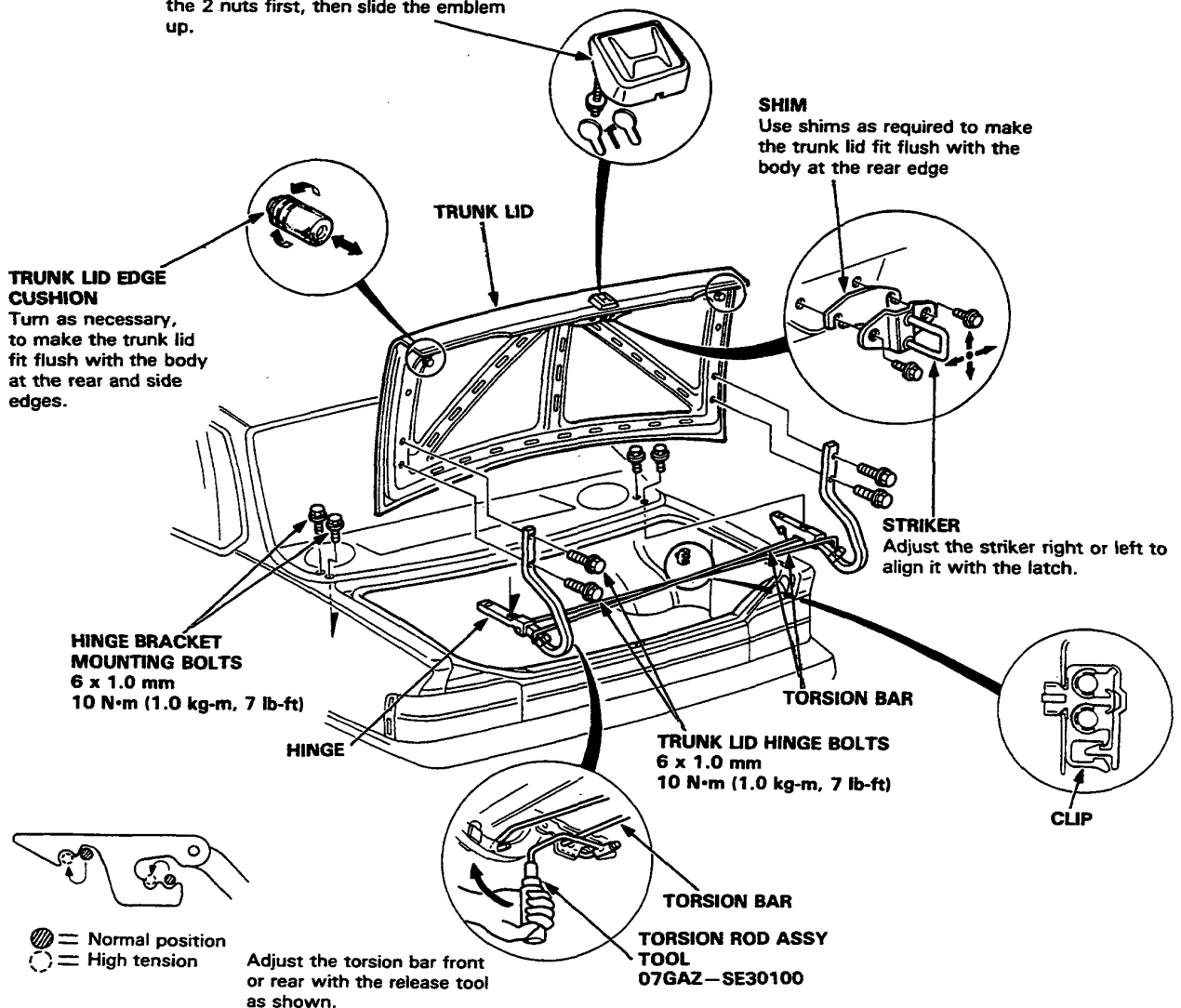
## Lid Replacement/Adjustment

1. Remove the trunk lid hinge bolts, then lift off the lid.
2. Remove the torsion bar using a release tool.
3. Remove the rear shelf.
4. Remove the hinge bracket mounting bolts, then remove the hinges from the trunk.
5. Assemble in the reverse order.

**NOTE:** Before tightening the hinge bolts, check the adjustments shown below:

### EMBLEM

- Loosen (do not remove) the 2 nuts first, then slide the emblem up.

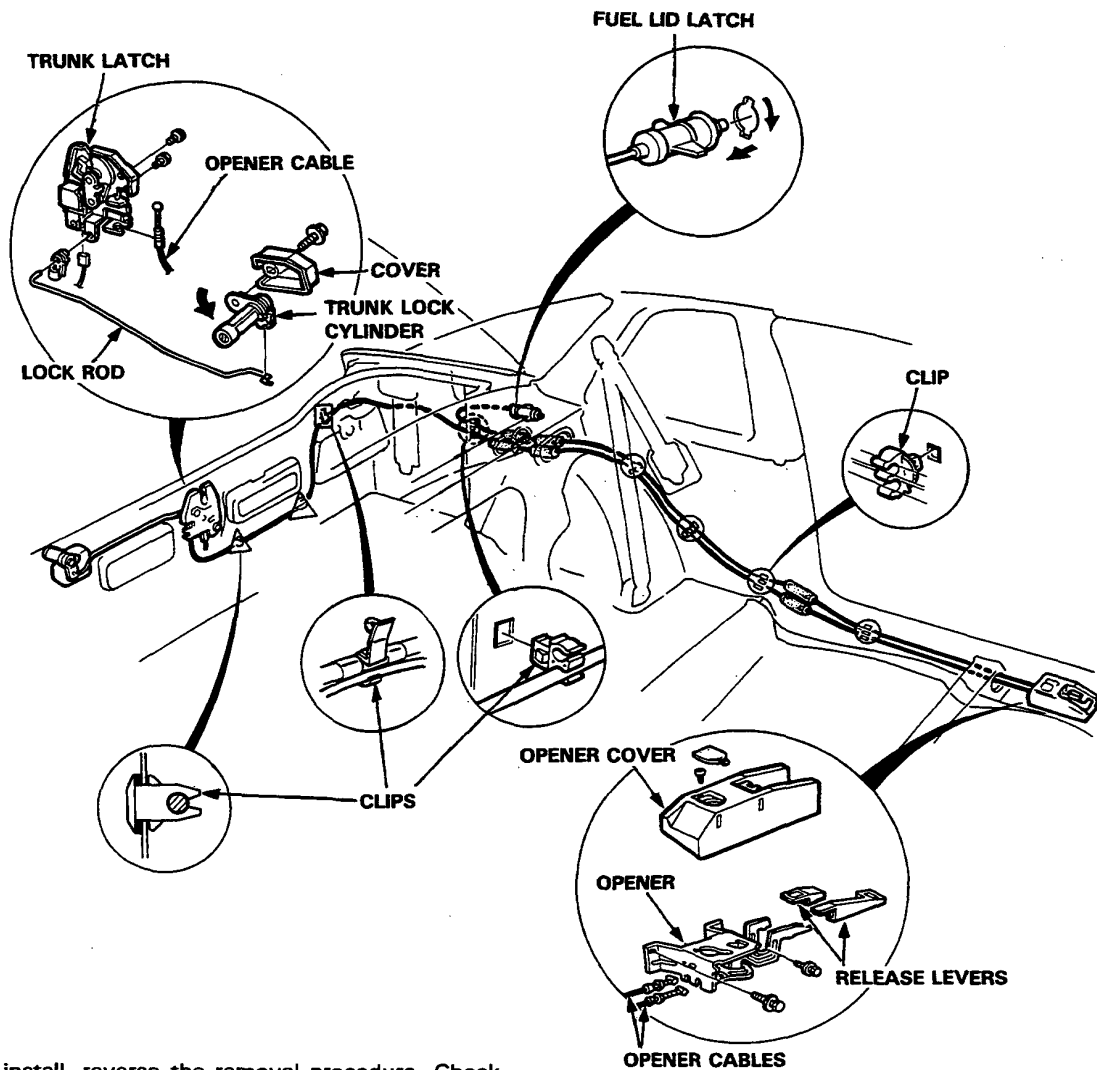




# Fuel Filler/Trunk Opener

## Replacement

1. To remove the opener cables, remove the following parts:
  - Left side door sill molding, left half of floor mat.
  - Left quarter trim panel, and left trunk side panel.
2. Remove the screw and the release levers, then remove the opener cover. Remove the opener by removing the 2 bolts.
3. Remove the fuel lid latch by turning it 90°.
4. Remove the bolts, then remove the cover and trunk lock cylinder.
5. Remove the 2 bolts, then remove the trunk latch.
6. Disconnect the opener cable, connector and lock rod.

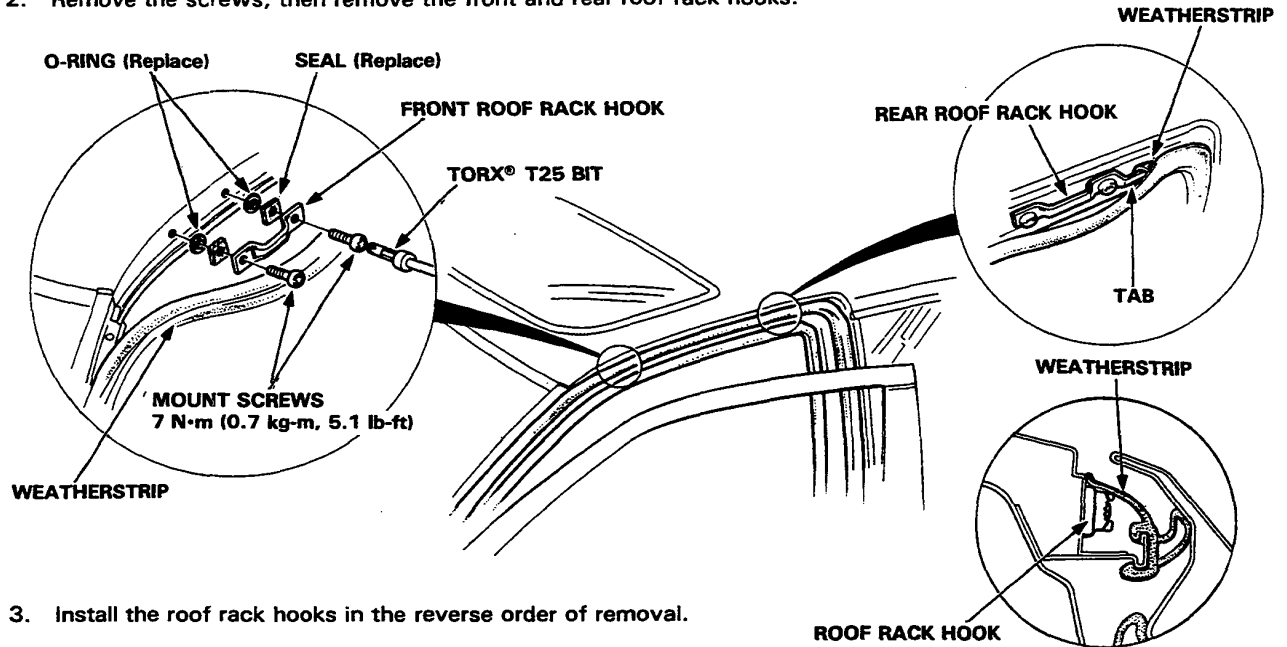


7. To install, reverse the removal procedure. Check that the trunk lid and fuel lid opener cables are routed and connected properly.

# Roof Rack Hooks/Rear Panel

## Roof Rack Hook Replacement

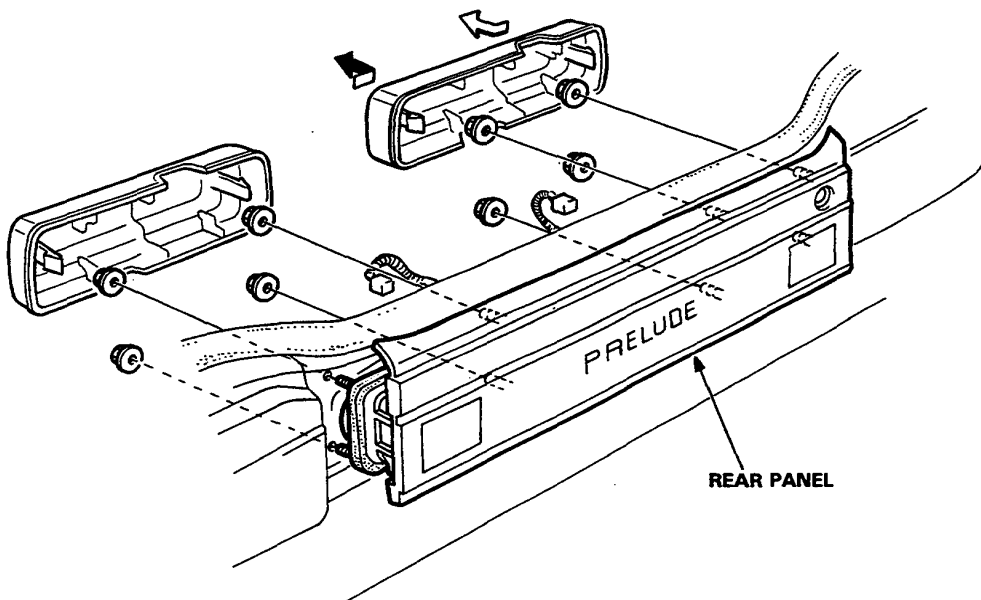
1. Remove the door weatherstrip.
2. Remove the screws, then remove the front and rear roof rack hooks.



3. Install the roof rack hooks in the reverse order of removal.

## Rear Panel Replacement

1. Open the trunk lid and remove the maintenance caps.
2. Disconnect the connector, then remove the panel by removing the 8 mount nuts.



3. Install the rear panel in the reverse order of removal.



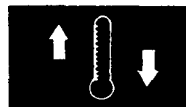
## **Heater and Air Conditioner**

<b>Heater .....</b>	<b>15-1</b>
<b>Air Conditioner .....</b>	<b>15-25</b>



## Heater

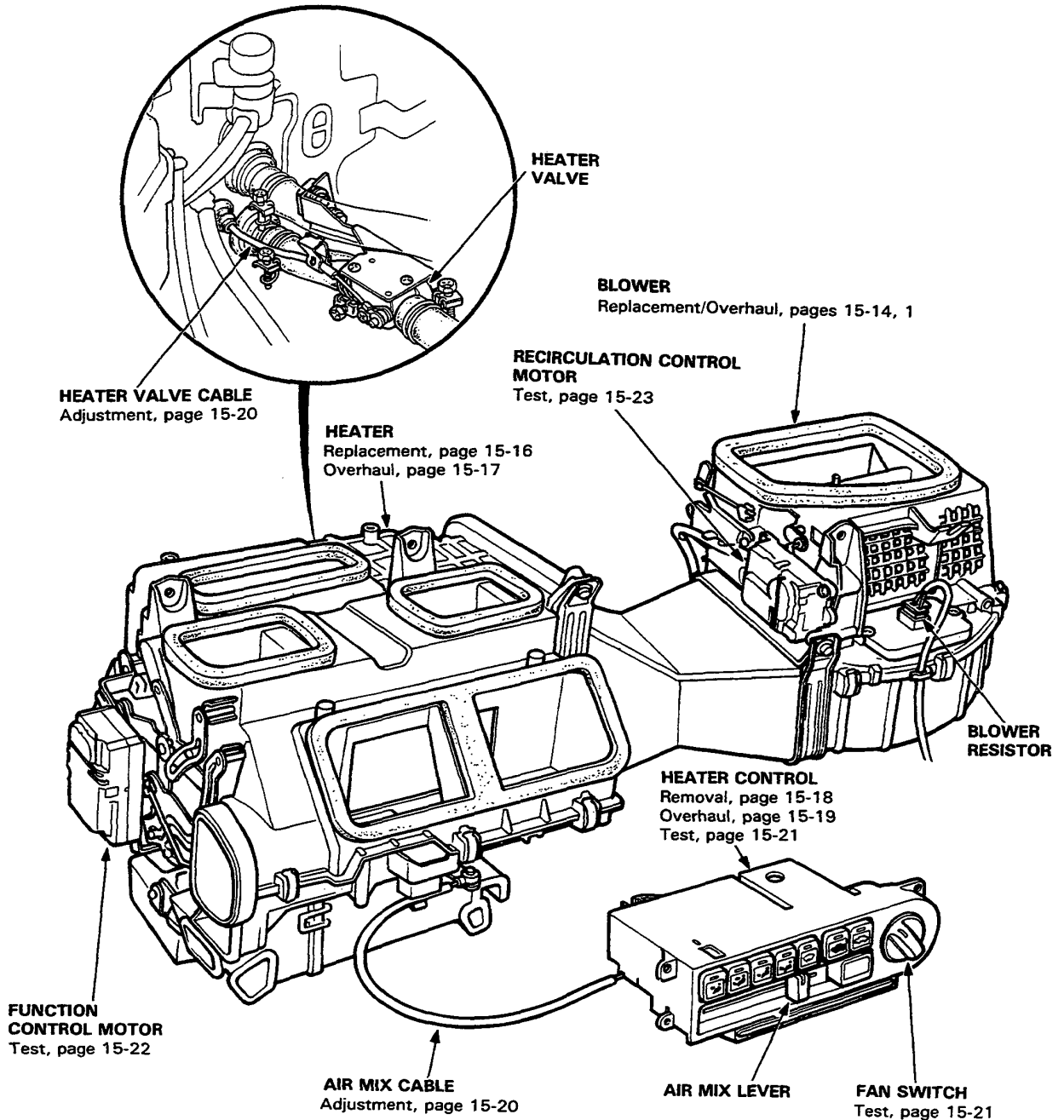
<b>Illustrated Index</b> .....	<b>15-2</b>
<b>Circuit Diagram</b> .....	<b>15-4</b>
<b>Troubleshooting</b>	
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<b>Function Control Motor</b> .....	<b>15-22</b>
<b>Recirculation Control Motor</b> .....	<b>15-23</b>



# Heater

## Illustrated Index

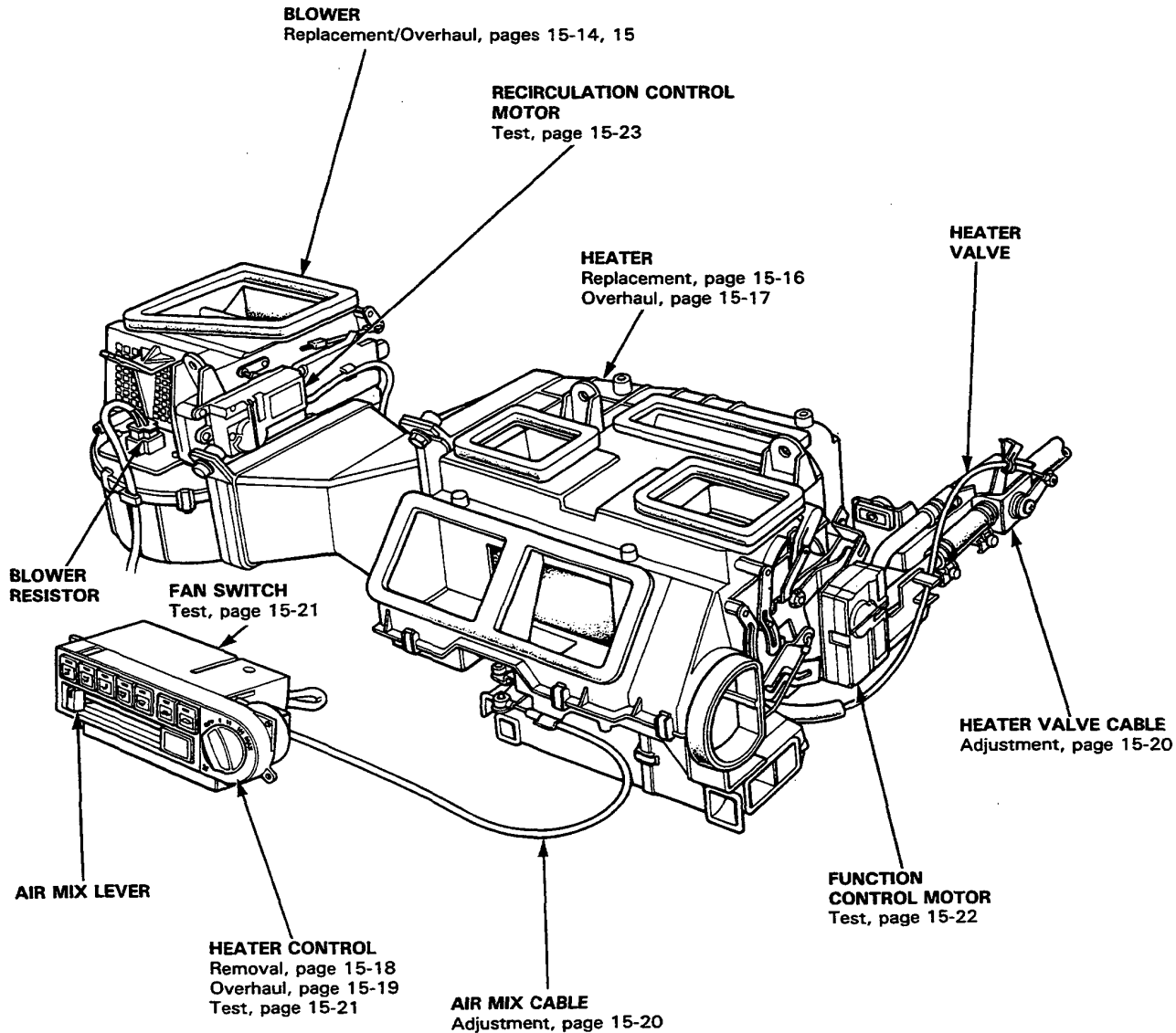
LH Drive:





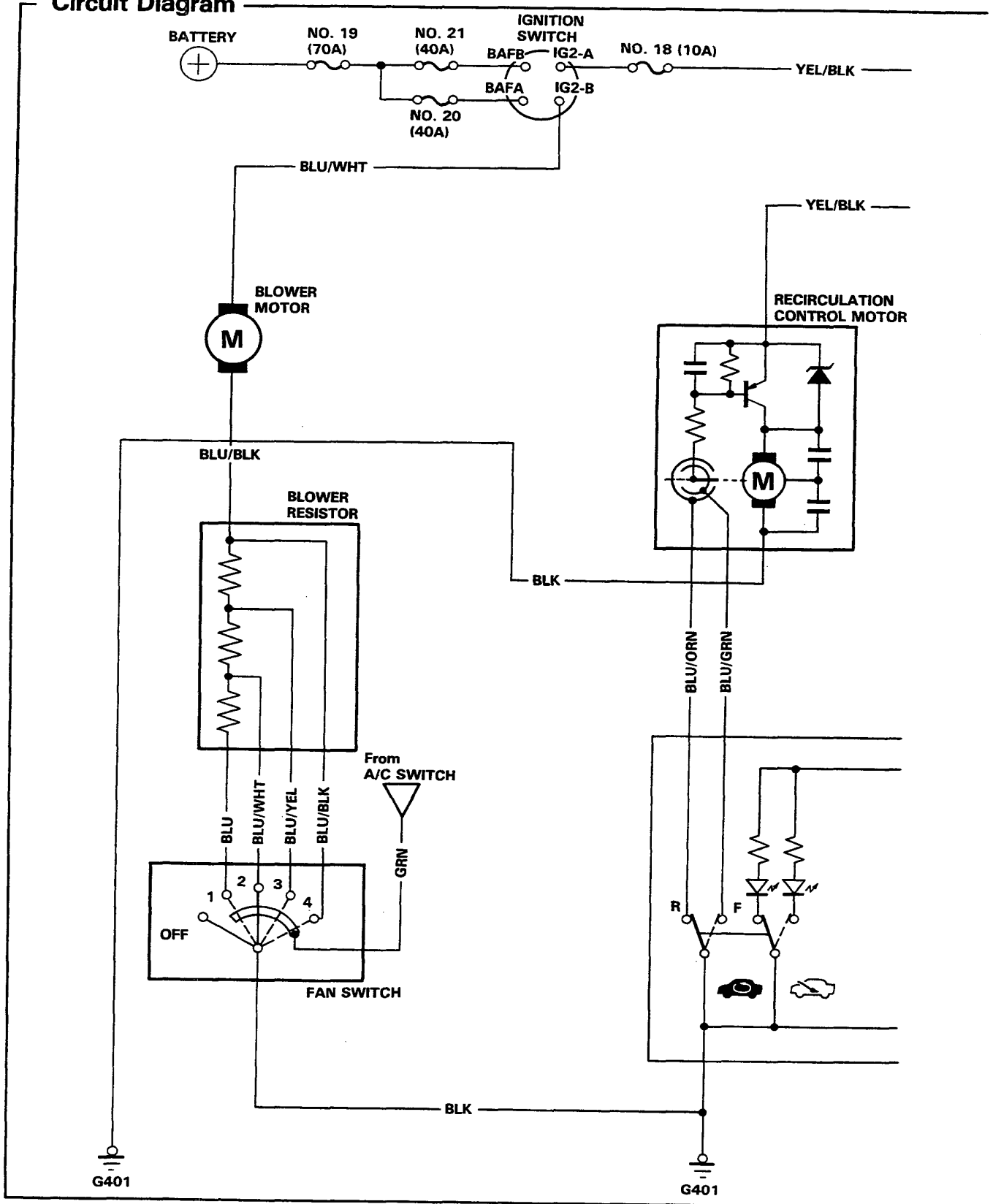


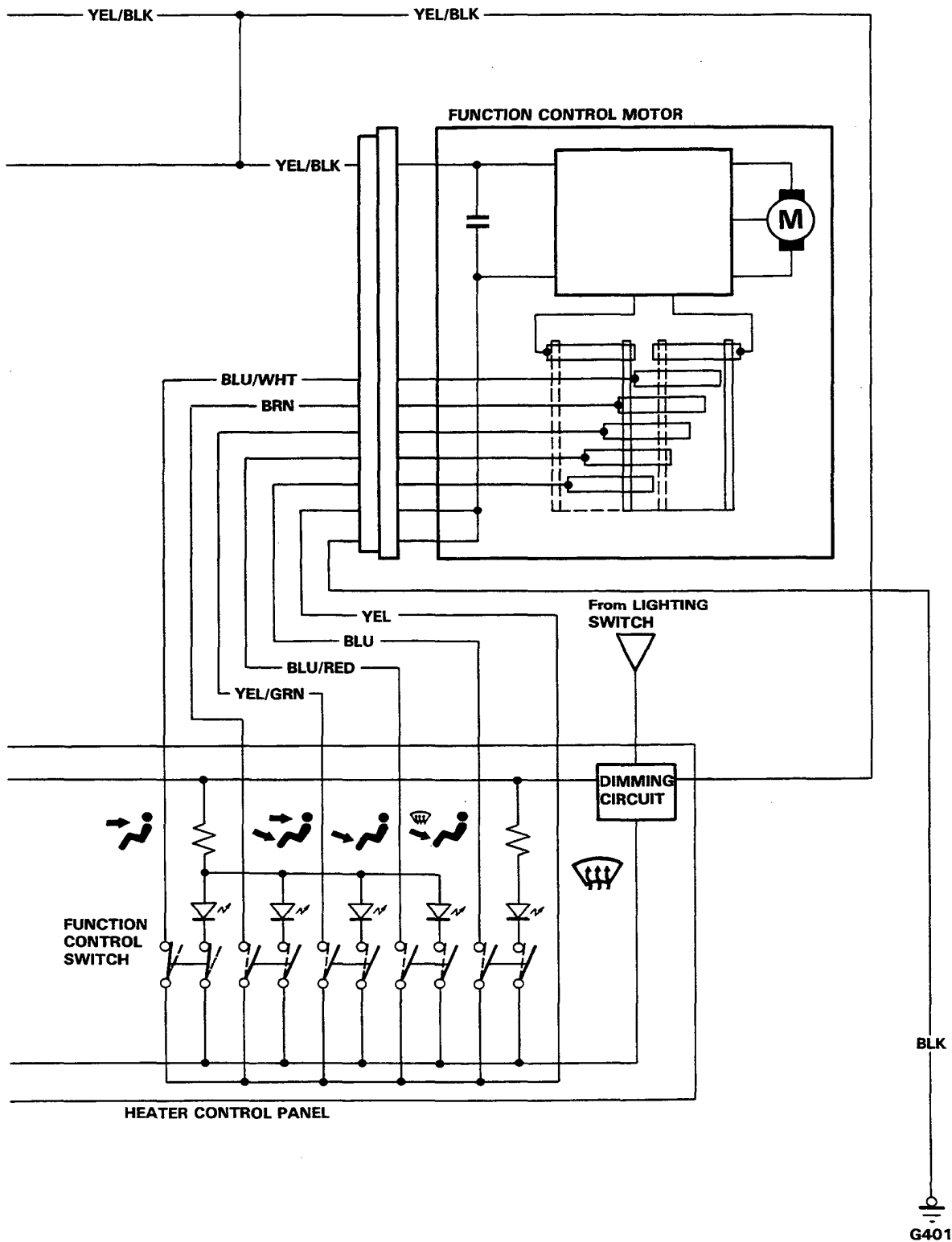
**RH Drive:**



# Heater

## Circuit Diagram





# Troubleshooting

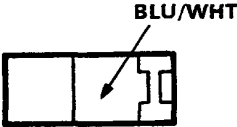
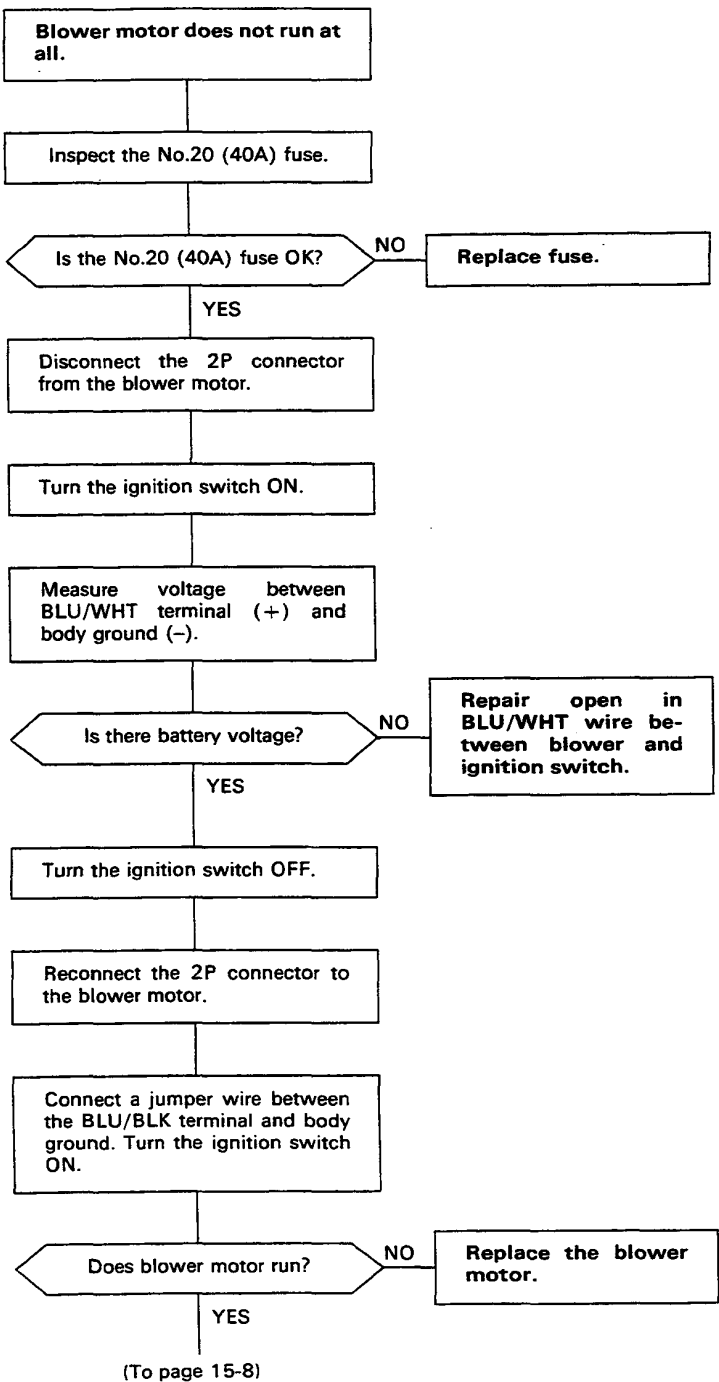
## Symptom Chart

---

SYMPTOM		REMEDY
No hot air flow	Blower motor does not run	Perform the flowchart (page 15-7)
	Blower motor runs	Check followings: <ul style="list-style-type: none"><li>• Clogged heater duct</li><li>• Clogged blower outlet</li><li>• Clogged heater valve</li><li>• Faulty air mix door</li><li>• Out of air mix cable adjustment</li><li>• Faulty thermostat (section 4) .</li></ul>
Hot air flow is low	Blower speed does not change	Perform flow chart (page 15-9)
	Blower runs properly	Check followings: <ul style="list-style-type: none"><li>• Clogged heater duct</li><li>• Clogged blower outlet</li><li>• Incorrect door position</li></ul>
Function does not change	Function control motor does not run	Perform flow chart (page 15-12)
	Function control motor runs	Check for the heater door linkage and cable adjustments.
Recirculation door does not change	Recirculation motor does not run	Perform flow chart (page 15-10)
	Recirculation motor run	Check for the door linkage or perform flow chart (page 15-10)



# Flow Chart-Blower



View from wire side



BLU/BLK

View from wire side

(To page 15-8)

(cont'd)

# Troubleshooting

## Flow Chart-Blower (cont'd)

(From page 15-7)

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the 6P connector from the fan switch.

Connect the jumper wire between the BLU/BLK terminal and body ground.

Turn the ignition switch ON.

Does the blower motor run?

NO: Repair open in BLU/BLK wire between blower and fan switch.

YES: Proceed to next step.

Turn the ignition switch OFF.

Remove the jumper wire.

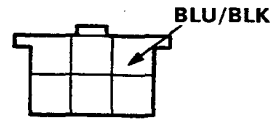
Inspect the fan switch (page 15-21).

Is the fan switch OK?

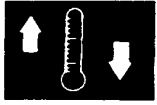
NO: Replace the fan switch.

YES: Proceed to next step.

Repair open in BLK wire between the fan switch and body ground (G401) or poor ground (G401).



View from wire side



**Blower motor running speed does not change.**

Disconnect the 4P connector from the blower resistor.

Check for continuity between the A and N terminals of the resistor.

Does continuity exist? **NO** → **Replace the resistor.**

**YES**

Reconnect the 4P connector to the resistor.

Disconnect the 6P connector from the fan switch.

Turn the ignition switch on.

Measure voltage between:  
• BLU/YEL terminal and body ground.  
• BLU/WHT terminal and body ground.  
• BLU terminal and body ground.

Is there battery voltage? **NO** → **Repair open in BLU/YEL, BLU/WHT and/or BLU wire(s) between the fan switch and resistor.**

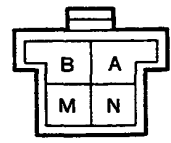
**YES**

Check for continuity from BLK terminal to body ground.

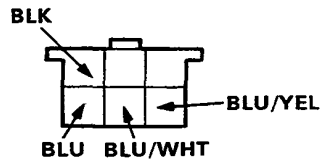
Is there continuity? **NO** → **Repair open in BLK wire between the fan switch and body ground (G401) or poor ground (G401).**

**YES**

**Replace the fan switch.**



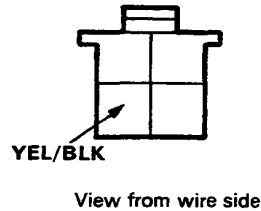
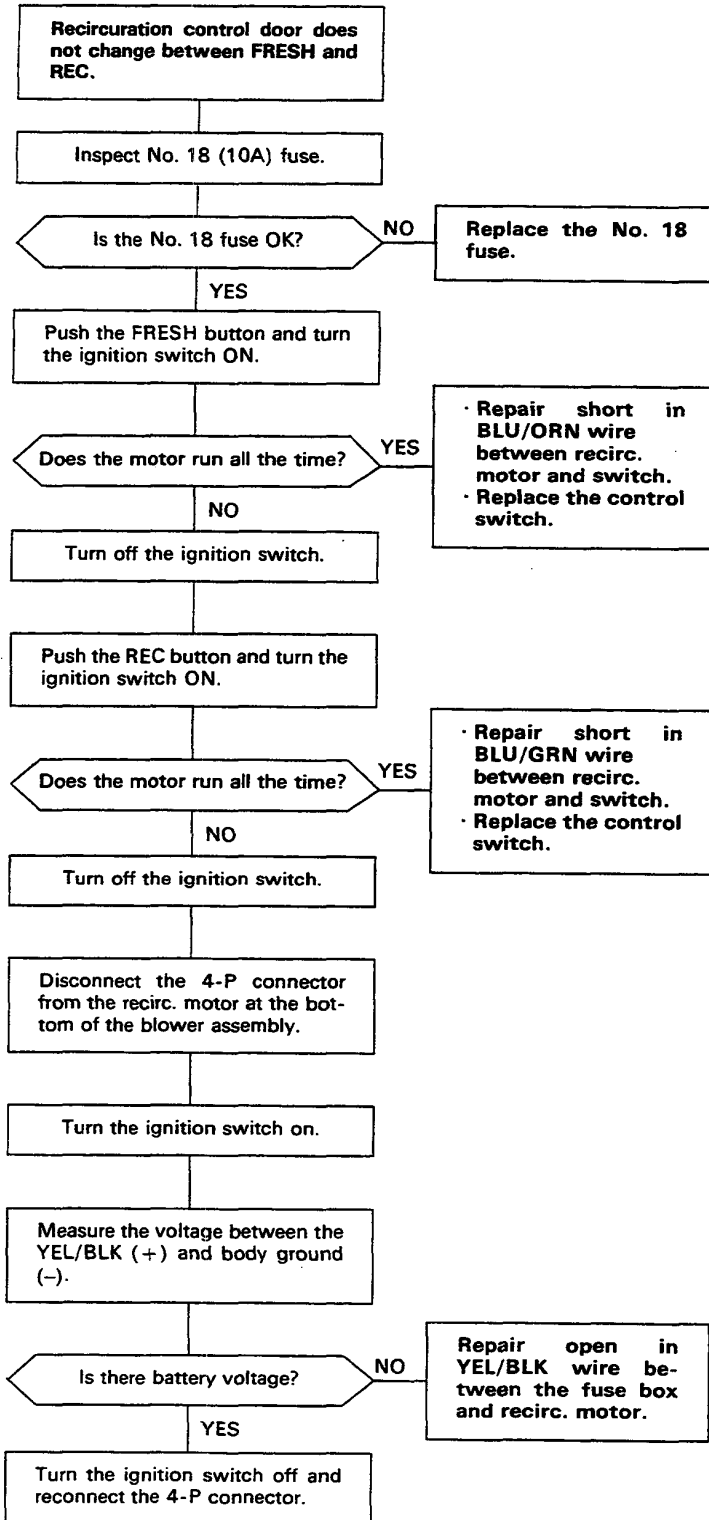
View from terminal side



View from wire side

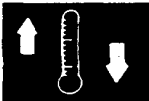
# Troubleshooting

## Flow Chart — Recirculation Control



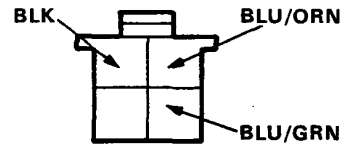
(To page 15-11)





(From page 15-10)

Connect the BLU/ORN and BLU/GRN terminals to the BLK terminal using a jumper wire. Turn the ignition switch on.



View from wire side

Does the motor run all the time? NO

Turn the ignition switch off and check for continuity between the BLK terminal and body ground.

Is there continuity? NO

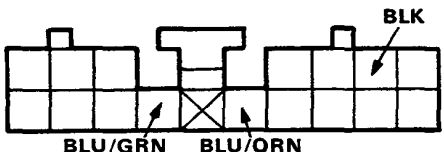
Repair open in BLK wire between the blower and G401 or poor ground.

YES

Replace the recirculation control motor.

Turn the ignition switch OFF. Remove the heater control panel and disconnect the 16-P connector.

Connect the BLU/GRN and BLU/ORN terminals to BLK terminal using a jumper wire.



View from wire side

Does the motor run all the time? YES

Replace the heater control panel.

NO

Check for continuity between the BLK terminal and body ground.

Is there continuity? NO

Repair the poor ground (G401) or open in BLK wire between the heater control panel and blower.

YES

Repair open in BLU/ORN or BLU/GRN between the heater control panel and blower.

# Troubleshooting

## Flow Chart — Function Control

Function control motor does not run.

Inspect the No.18 (10A) fuse.

Is the No.18 fuse OK?

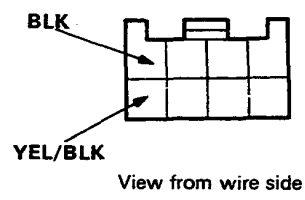
NO **Replace the fuse.**

YES

Disconnect the 8P connector from the function control motor.

Turn the ignition switch ON.

Measure voltage between YEL/BLK terminal and body ground.



Is there battery voltage?

NO **Repair open in YEL/BLK wire between heater wire control and fuse box.**

YES

Turn the ignition switch OFF.

Check for continuity from BLK terminal to body ground.

Is there continuity?

NO **Repair open in BLK wire between the function control motor and body ground (G401) or poor ground (G401).**

YES

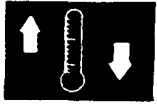
Inspect the function control motor (page 15-22).

Is the function control motor OK?

NO **Replace the function control motor.**

YES

(To page 15-13)



(From page 15-12)

Disconnect the 16P connector from the heater control panel.

Check for continuity at each wire (YEL, BLU/WHT, BRN, YEL/GRN, BLU/RED or BLU) between the 8P and 16P connectors.

Does continuity exist?

NO Repair open wire.

YES

Check for continuity from each wire (YEL, BLU/WHT, BRN, YEL/GRN, BLU/RED or BLU) to body ground.

Is there continuity?

YES Repair short to body ground in wire.

NO

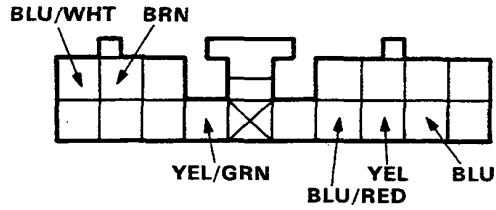
Check for continuity between BLK terminal to body ground.

Is there continuity?

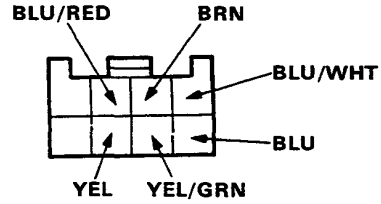
NO Repair open in BLK wire or poor ground (G401).

YES

Replace the heater control panel.



View from wire side



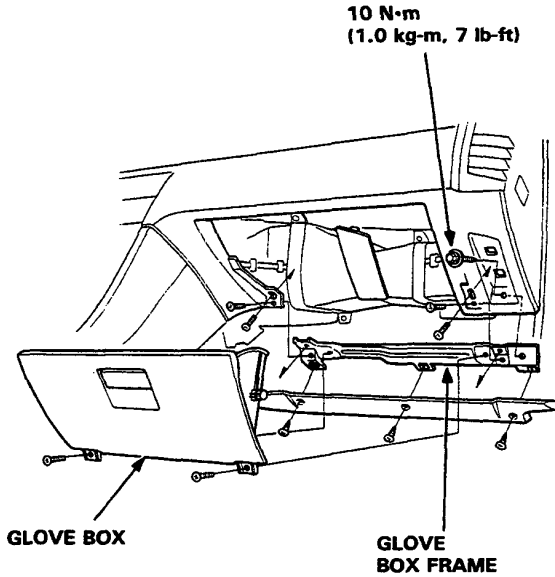
View from wire side

NOTE: If any of the wires are shorted to ground, the function control motor will not change positions.

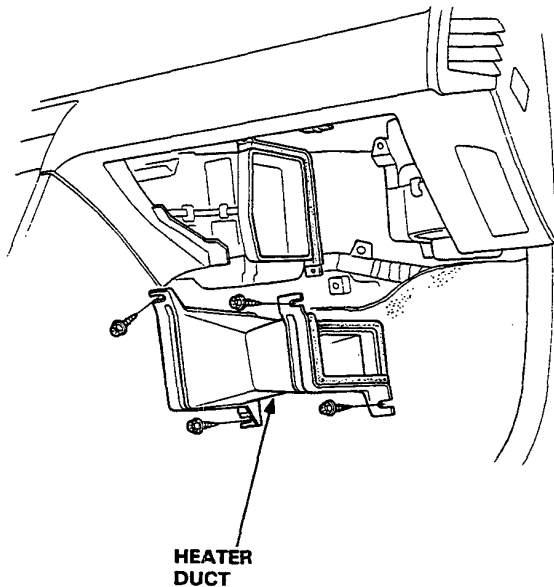
# Blower

## Replacement

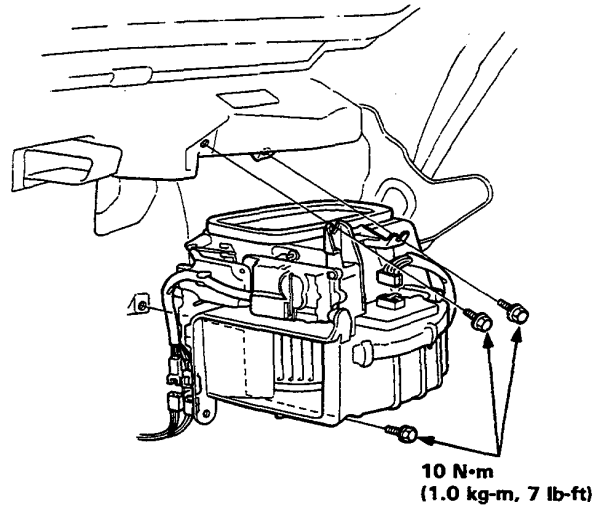
1. Disconnect the battery negative terminal.
2. Remove the glove box and glove box frame.



3. Remove the tapping screws (4) and remove the heater duct.



4. Remove the mounting bolts (3).
5. Disconnect the connectors from the blower motor, resistor and recirculation control motor, then remove the blower.



6. Install the blower in the reverse order of removal and make sure there is no air leakage.



## Overhaul

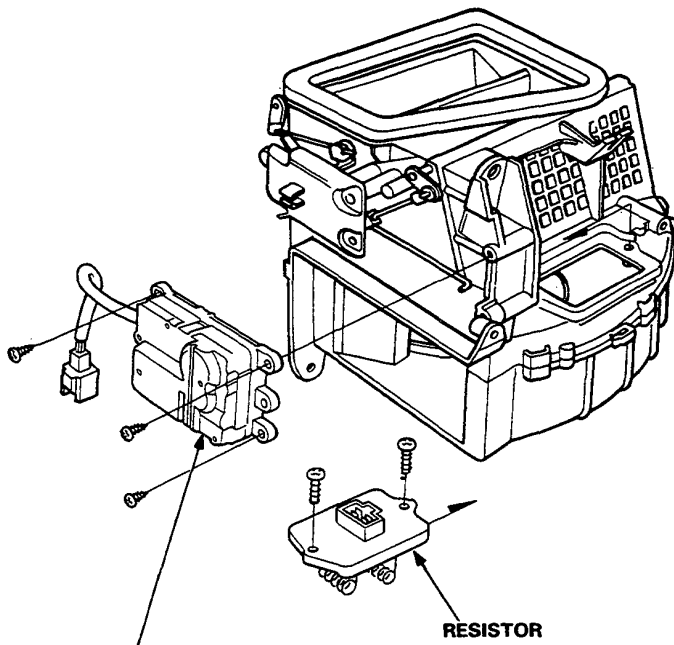
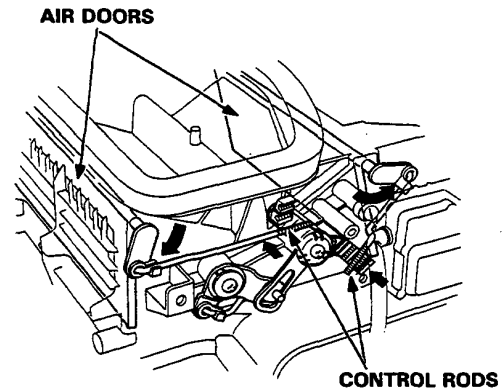
### NOTE:

- Before reassembly, make sure that the air door and linkage moves smoothly without binding.
- When re-attaching the actuator, make sure its positioning will not allow the air door to be pulled too far. Attach the actuator and all linkage, then apply battery voltage and watch the door movement. If necessary, loosen the holding screw and move the actuator up or down.

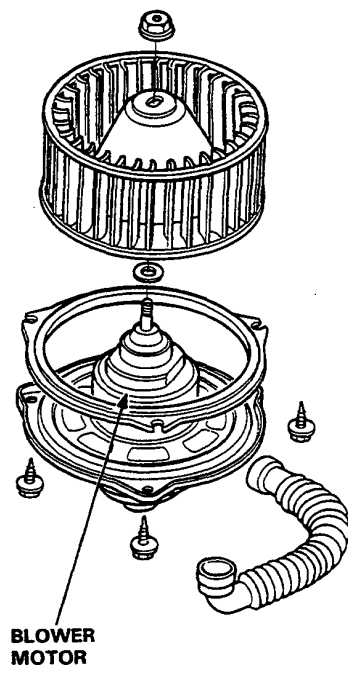
### To adjust the control rod:

Connect the recircu. control motor connector to the main wire harness, push the "FRESH" and open the air doors. Then connect the control rod to the arm while holding the air doors open.

NOTE: LH Drive shown, RH Drive is similar.



**RECIRCULATION CONTROL MOTOR**  
Test, page 15-23



**BLOWER MOTOR**

# Heater Assembly

## Replacement

1. When the engine is cool, drain coolant from the radiator (section 4).

### WARNING

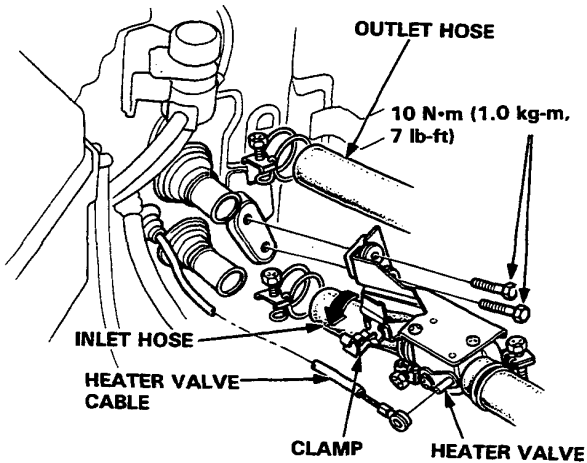
- Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.
- Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes, even after the engine is turned off.

**CAUTION:** Radiator coolant will damage paint. Quickly rinse any spilled coolant from painted surfaces.

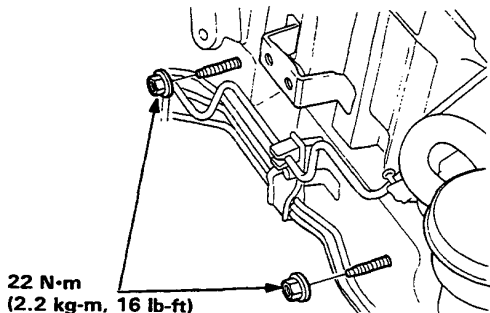
2. Disconnect the heater hoses at the heater.

**NOTE:** Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.

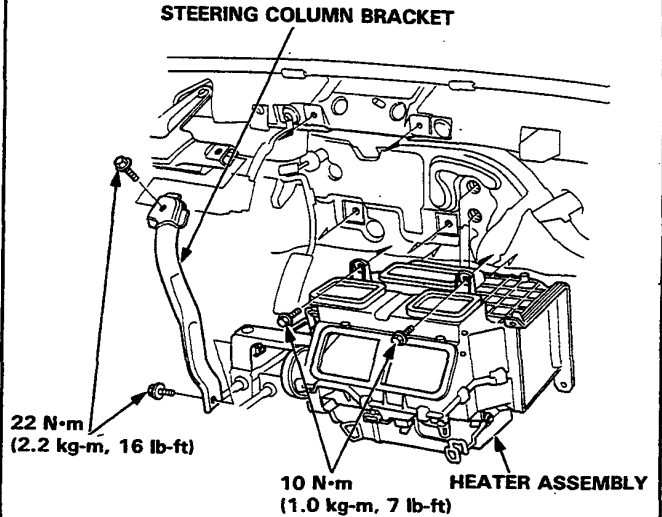
3. Disconnect the heater valve cable from the heater.



4. Remove the dashboard (section 14).
5. Remove the heater duct (page 15-14).
6. Remove the heater lower mounting nuts.



7. Remove the steering column bracket.
8. Remove the heater mounting bolts(2), disconnect the wire harness connector from the function control motor, and then remove the heater assembly.



9. Install in the reverse order of removal, and:

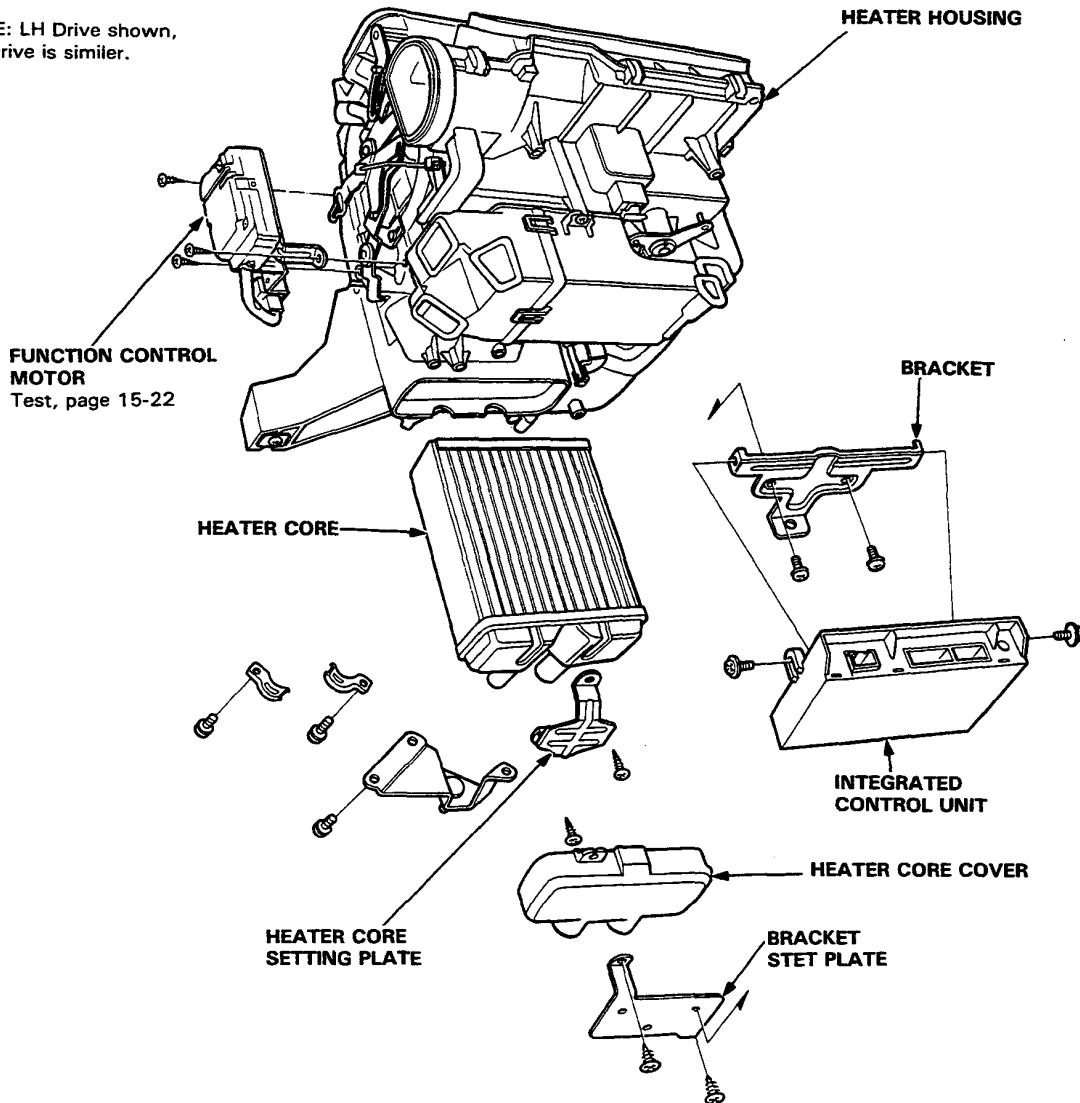
- Apply a sealant to the grommets.
- Do not interchange the inlet and outlet hoses. Make sure that the hose clamps are secure.
- Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture. Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.
- Connect all cables and make sure they are properly adjusted (page 15-20).



## Overhaul

1. Remove the heater assembly (page 15-16).
2. Remove the integrated control unit and bracket.
3. Remove the tapping screws (2), bracket, set plate and heater core cover.
4. Remove the tapping screws (2) and heater core setting plate and clamp.
5. Pull out the heater core from the heater housing.
6. Remove the function control motor if necessary.

NOTE: LH Drive shown,  
RH Drive is similar.



Install in the reverse order of removal and:

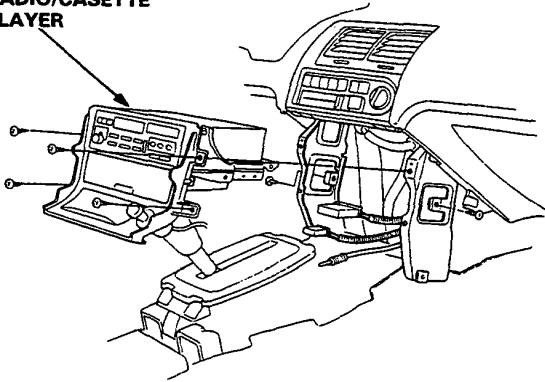
Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture. Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.

# Heater Control Panel

## Replacement

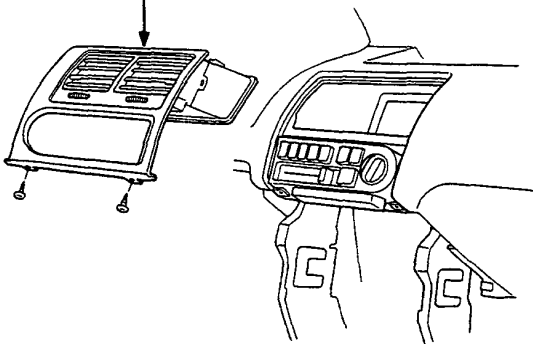
1. Remove the center console (section 14).
2. Remove the radio/cassette player.

**RADIO/CASETTE  
PLAYER**



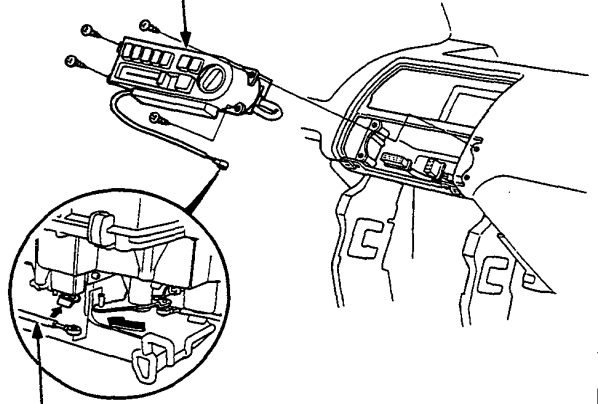
3. Remove the tapping screws (2) and remove the center air vent.

**CENTER AIR VENT**



4. Disconnect the air mix cable at the heater assembly.
5. Remove the tapping screws (4) and pull out the heater control and disconnect the wire harness connectors, then remove the heater control.

**HEATER CONTROL**



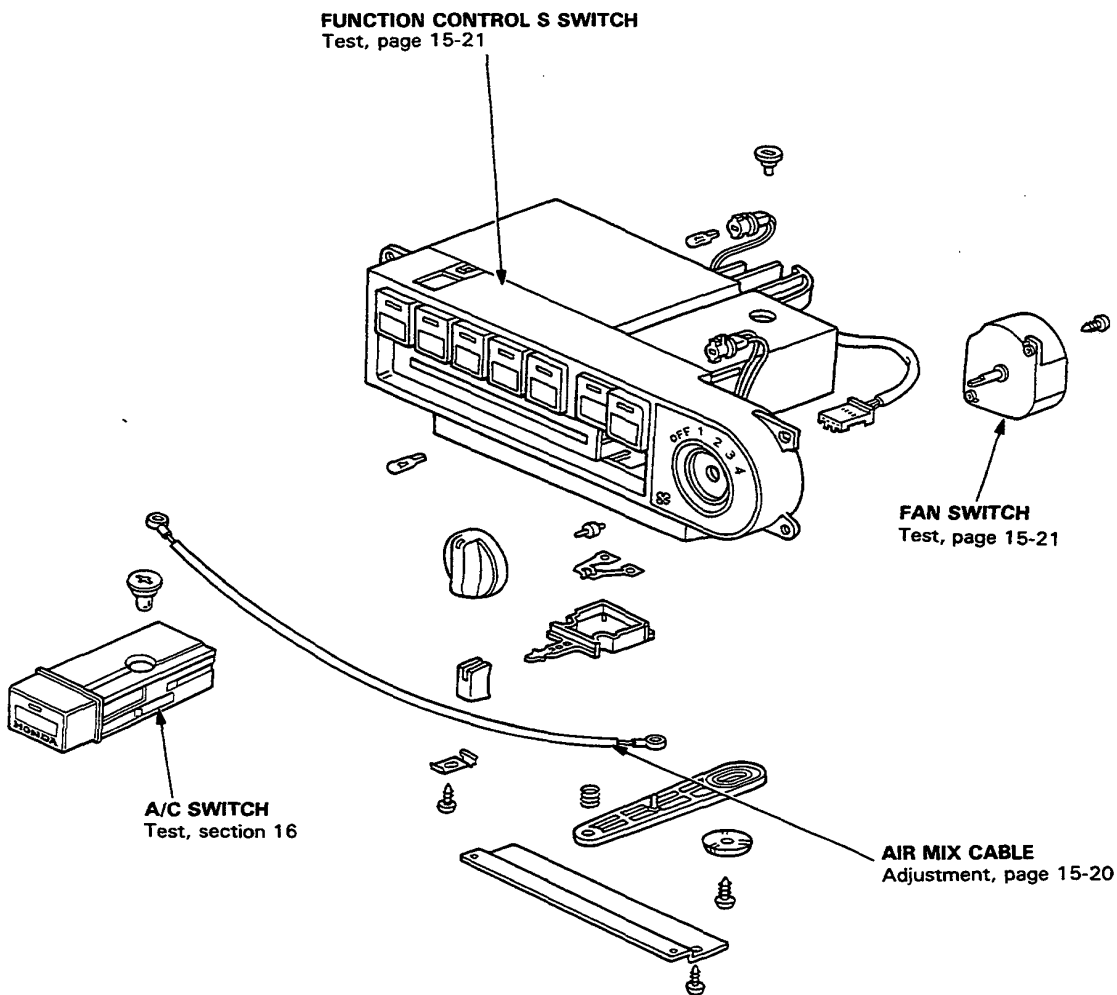
**AIR MIX CABLE**

Install in the reverse order of removal and connect and make sure that it is properly adjusted (page 15-20).





# Overhaul



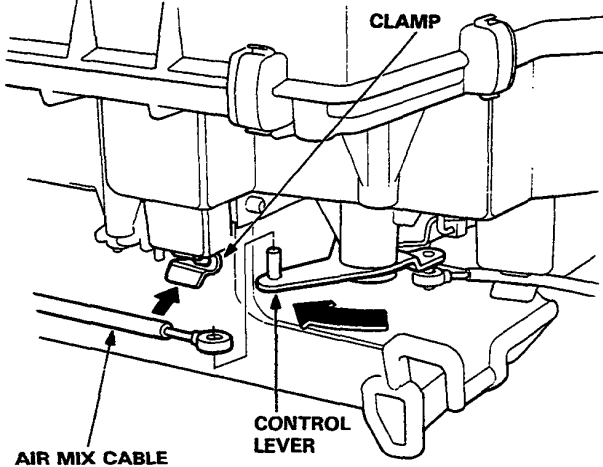
**NOTE:** After assembly check that the air mix lever slides smoothly, the full stroke right to left.

# Heater Control Cables

## Air Mix Cable Adjustment

1. Slide the temperature control lever to HOT.  
LH Drive: to HOT  
RH Drive: to COLD
2. Turn the air mix door shaft arm to the left: LH Drive, or right: RH Drive and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from end—enough to take up any slack in the cable, but not enough to make temperature control lever move—then snap the cable housing into the clamp.

LH Drive:

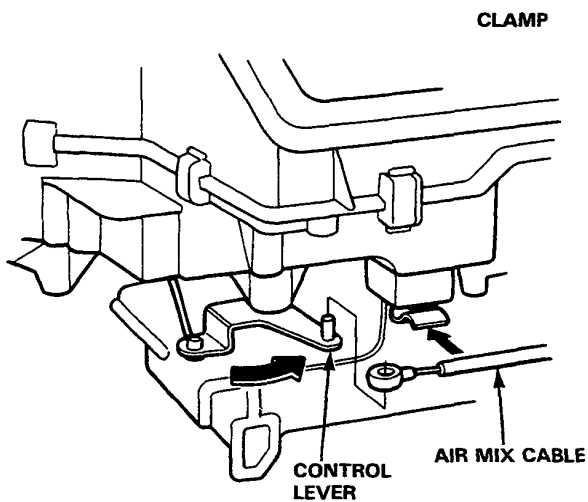


AIR MIX CABLE

CONTROL LEVER

CLAMP

RH Drive:



CONTROL LEVER

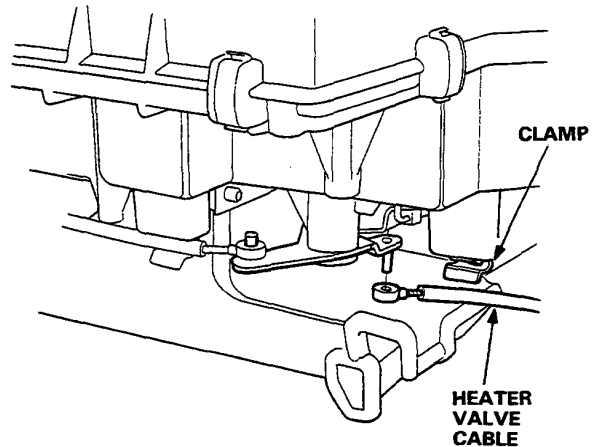
AIR MIX CABLE

CLAMP

NOTE: Heater valve cable should be adjusted if the air mix cable has been disconnected.

## Heater Valve Cable Adjustment

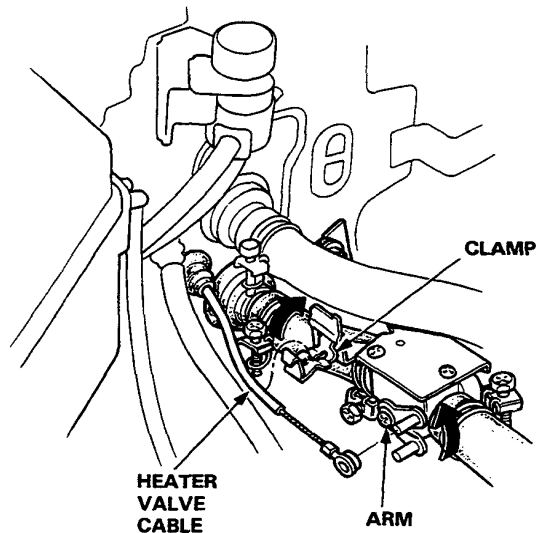
1. Slide the temperature control lever to HOT.
2. Connect the heater valve cable end to the arm and snap the cable housing into the clamp making sure that the arm turns full stroke smoothly.



HEATER VALVE CABLE

CLAMP

3. Slide the temperature control lever back to COLD.
4. Turn the heater valve arm to close and connect the cable end to the arm.
5. Gently slide the cable housing back from end—enough to take up any slack in the cable, but not enough to make the temperature control lever move—then hold the cable housing to snap the clamp.



HEATER VALVE CABLE

ARM

CLAMP

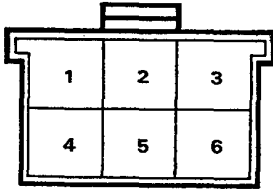
# Test



## Fan Switch

1. Disconnect the 6P connector from the fan switch.
2. Check for continuity between the terminals of the fan switch according to the table below.

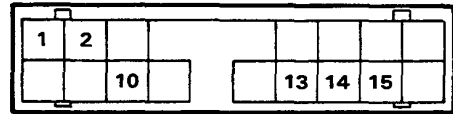
Terminal	1	2	3	4	5	6
Position						
OFF						
1	○	○	○			
2	○	○		○		
3	○	○			○	
4	○	○				○



## Function Control Switch

1. Disconnect the 16P connector from the heater control.
2. Check for continuity between the terminals according to the table.



Terminal	15	13	10	2	1	14
Position						
↗					○	○
↘				○		○
↖			○			○
↙		○				○
⊘	○					○

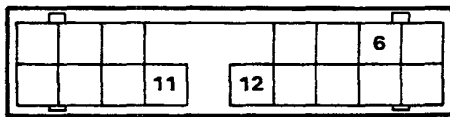


# Test

## Recirculation Control Switch

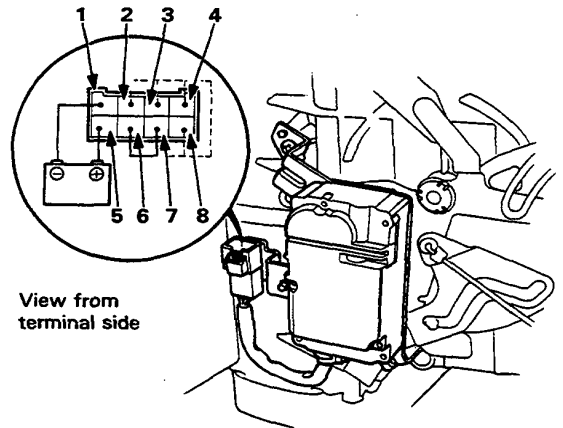
1. Disconnect the 16P connector from the heater control.
2. Check for continuity between the terminals according to the table.

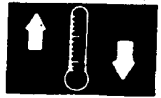
Terminal	12	11	6
Position			
	○	○	○
		○	○



## Function Control Motor

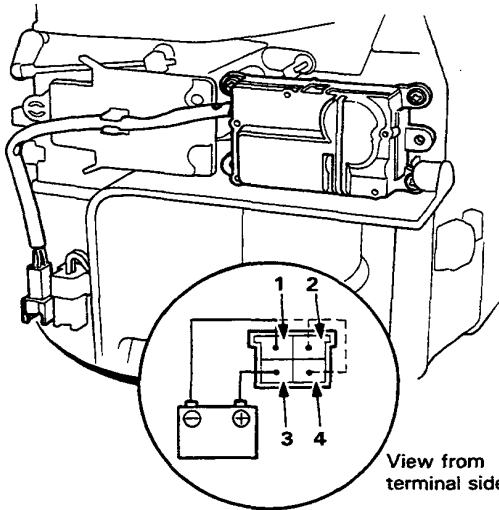
1. Connect the battery positive terminal to the 5 terminal of the function control motor and negative to the 1 terminal.
  2. Using a jumper wire short the 6 terminal to the 8, 7, 2, 3 and 4 terminals to follow the order.
- The motor should run each time the short circuit is made.





## Recirculation Control Motor

1. Connect the battery positive to the 3 terminal of the recirculation control motor connector and negative to 1 terminal.
2. Using a jumper wire connect the 1 terminal and 2 or 4 terminal.
  - On the recirculation door REC position, the motor should turn with the 1 terminal connected to 4 terminal.
  - On the door FRESH position, the motor should turn with the 1 terminal connected to 2 terminal.
4. The motor automatically stops after half turn with the jumper wire connected.




# Air Conditioner


<b>Illustrated Index</b> .....	<b>15-26</b>	<b>Compressor</b>	
<b>Wire Harness Routing</b> .....	<b>15-27</b>	<b>Troubleshooting</b> .....	<b>15-43</b>
<b>Wiring Diagram</b> .....	<b>15-28</b>	<b>Replacement</b> .....	<b>15-44</b>
<b>Compressor Control Unit</b>		<b>Clutch Inspection</b> .....	<b>15-47</b>
<b>Troubleshooting</b> .....	<b>15-30</b>	<b>Thermal Protector Inspection</b> .....	<b>15-48</b>
<b>Troubleshooting Flow Chart</b>		<b>Pick-up Sensor Inspection</b> .....	<b>15-48</b>
<b>Compressor</b> .....	<b>15-31</b>	<b>Clutch Overhaul</b> .....	<b>15-49</b>
<b>Cooling Fan</b> .....	<b>15-34</b>	<b>Shaft Seal Replacement</b> .....	<b>15-51</b>
<b>Service Tips</b> .....	<b>15-38</b>	<b>Thermal Protector/Pick-up sensor</b>	
<b>Discharge Procedure</b> .....	<b>15-40</b>	<b>Replacement</b> .....	<b>15-52</b>
<b>Condenser Replacement</b> .....	<b>15-40</b>	<b>Test</b>	
<b>Evaporator</b>		<b>Thermo Switch</b> .....	<b>15-53</b>
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<b>Overhaul</b> .....	<b>15-42</b>	<b>A/C switch</b> .....	<b>15-54</b>
		<b>System Charging</b>	
		<b>System Evacuation</b> .....	<b>15-54</b>
		<b>Leak Test</b> .....	<b>15-55</b>
		<b>Charging Procedure</b> .....	<b>15-56</b>
		<b>Performance Test</b> .....	<b>15-57</b>

## Special Tools

Ref. No	Tool Number	Description	Qty	Remarks
①	07HAF-SF10300	Shaft Seal Remover	1	
②	07HAF-SF10400	Shaft Seal Remover/Installer	1	



①



②



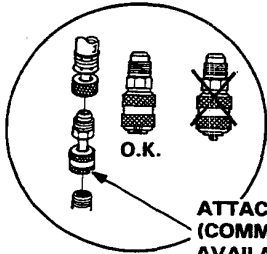
# Air Conditioner

## Illustrated Index

NOTE: LH Drive shown, RH Drive is similar.

### CHARGING and TESTING VALVES

Charging procedures, page 15-56  
Pressure test, page 15-57



ATTACHMENT  
(COMMERCIALY  
AVAILABLE)

NOTE: On high pressure side  
use an attachment (commercially  
available) to connect the gauge.

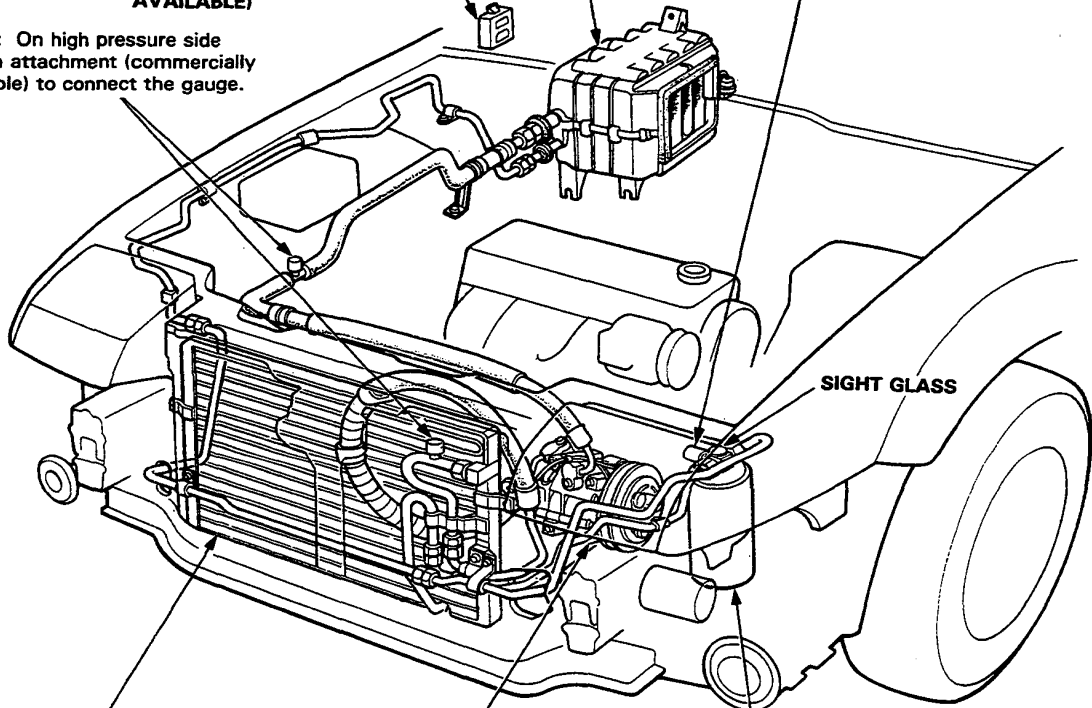
### EVAPORATOR

As refrigerant circulates, heat is  
absorbed from the surrounding  
passenger compartment air.  
Replacement, page 15-41  
Overhaul, page 15-42

### COMPRESSOR CONTROL UNIT

### DUAL PRESSURE SWITCH

When the refrigerant pressure is below 196 kPa (2.0 kg/cm<sup>2</sup>, 28 psi)  
due to refrigerant leakage or above 2350 kPa (25 kg/cm<sup>2</sup>, 340 psi)  
due to the coolant blockage the dual pressure  
switch opens the circuit to the A/C control  
unit and stops the air conditioner to  
protect the compressor.



### CONDENSER

Dissipates the heat which was  
absorbed by the refrigerant.  
Replacement, page 15-40

### SIGHT GLASS

### RECEIVER AND FILTER/DRYER

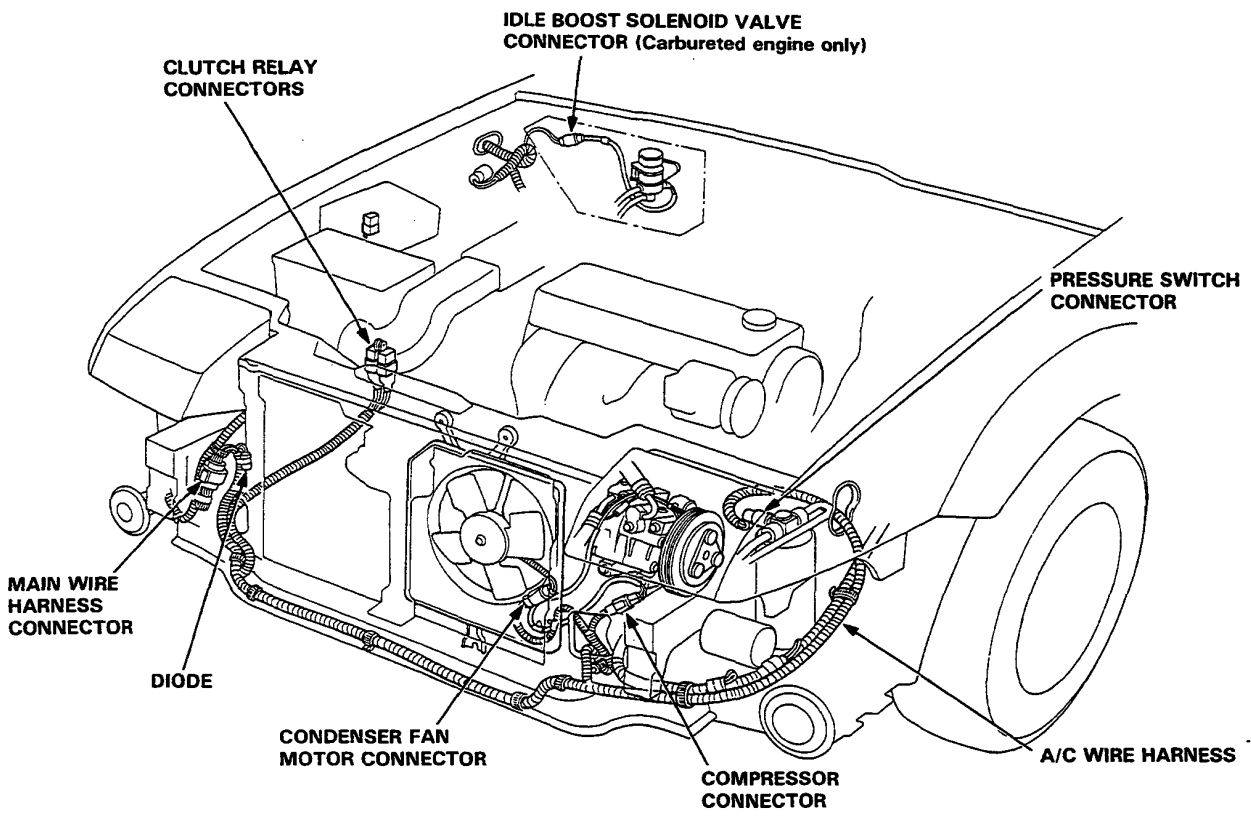
Serves as a reservoir which filters and  
removes moisture from the refrigerant.

### COMPRESSOR

Compresses the refrigerant and  
then forces it through the condenser.  
Compressor troubleshooting, page 15-43  
Replacement, page 15-44  
Clutch inspection, page 15-47  
Clutch overhaul, page 15-49  
Shaft Seal Replacement, page 15-51  
Pick-up sensor inspection, page 15-48  
Thermal protector inspection, page 15-48  
Pick-up sensor/Thermal protector  
Replacement, page 15-52



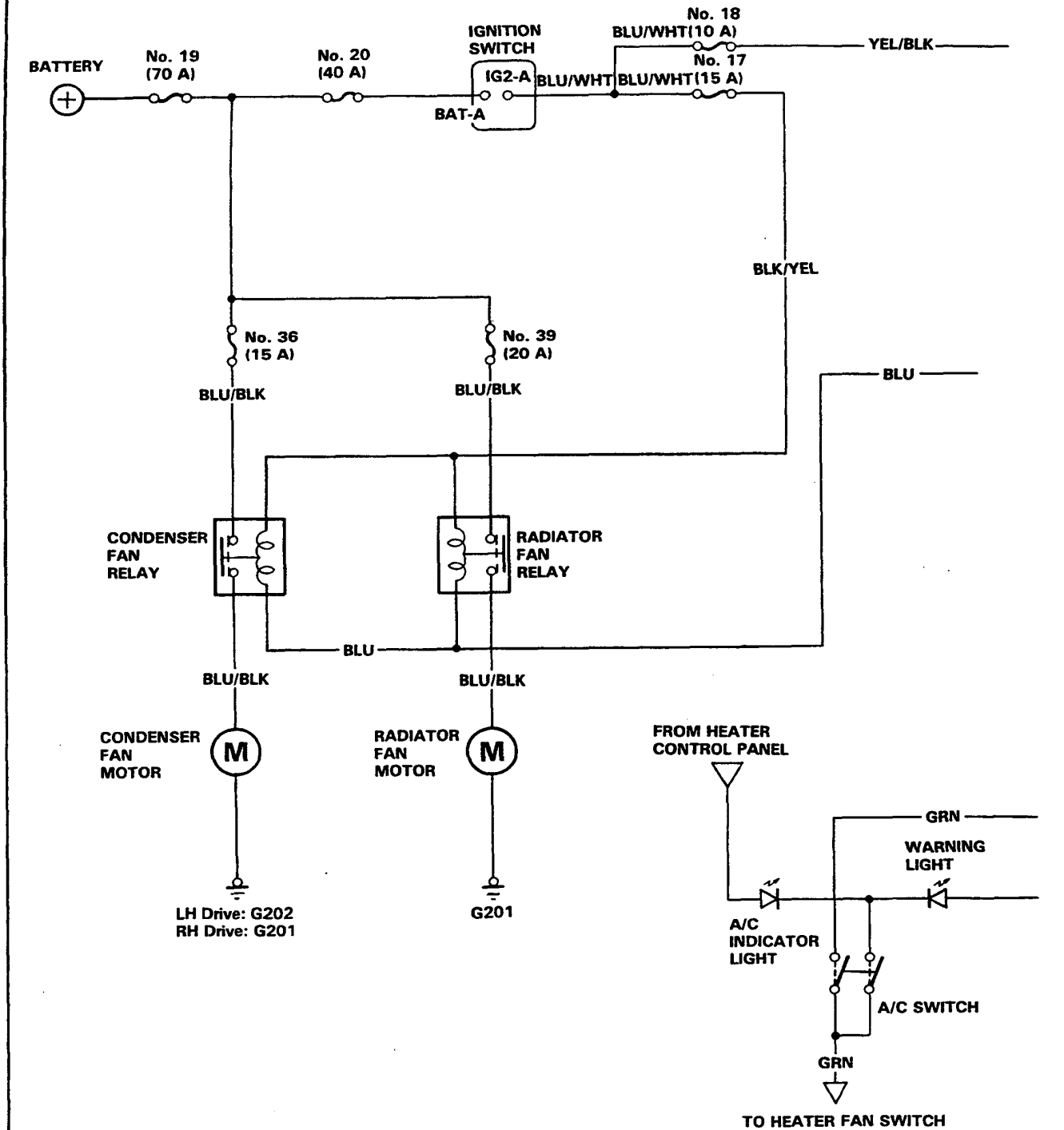
# Wire Harness Routing

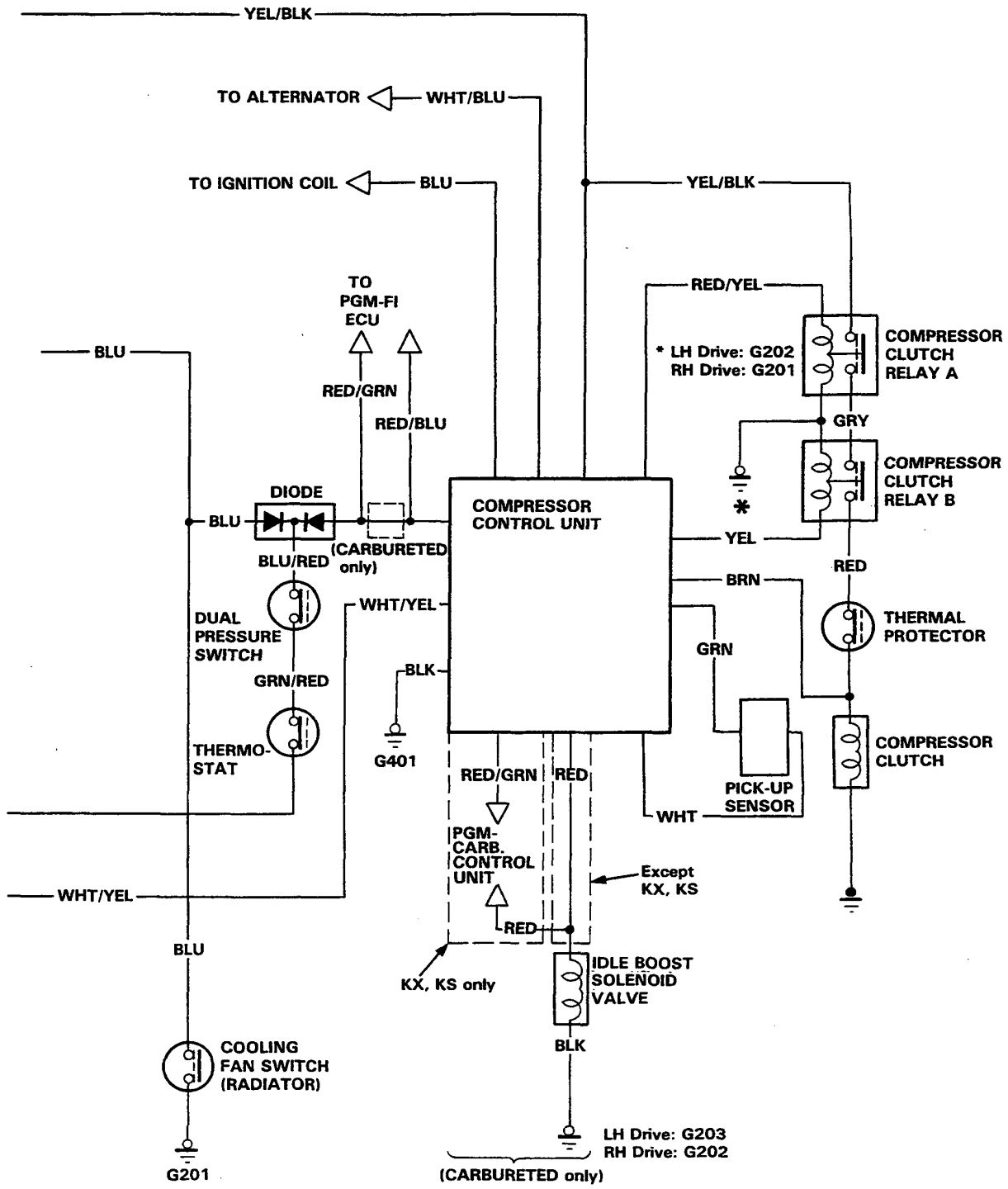




# Air Conditioner

## Wiring Diagram





# Compressor Control Unit

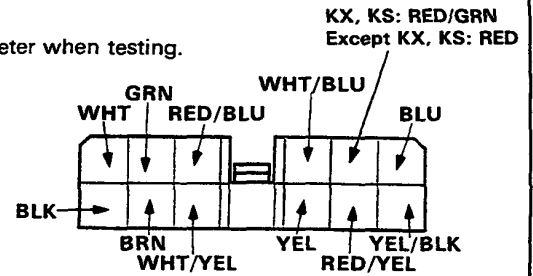
## Troubleshooting

- All tests should be performed with the key "ON" (unless specified otherwise) and the A/C compressor control unit plugged in.
- All tests are made from the wire side of connector.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a voltmeter and ammeter when testing.

Before performing any troubleshooting procedures check:

- Fuse No. 18 (10A).
- For compressor seizure and proper belt tension.
- All electrical connections are clean and tight.

NOTE: If the warning light is "ON", perform the troubleshooting on page 15-31.



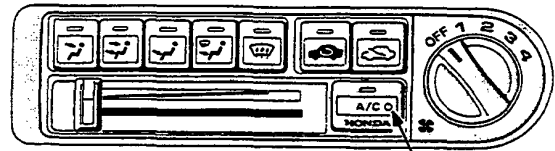
View from wire side

CIRCUIT	WIRE COLOR	TEST CONDITION	IF DESIRED RESULT(S) ARE NOT OBTAINED:
Ground	BLK	Check for continuity to ground.	Check for poor ground (G401) or open in BLK wire between the control unit and body ground (G401).
Power supply	YEL/BLK	Test for battery voltage to body ground	Check for open in YEL/BLK wire between the fuse box and control unit.
A/C switch	CARBURETED only: RED/BLU	With the A/C switch and heater fan switch on, check for continuity to body ground.	Check for open RED/BLU wire between the control unit and diode, faulty dual pressure switch or faulty thermostat (test on page 15-53) or faulty A/C switch (test on page 15-54). Check for open in BLU/RED, GRN/RED or GRN wires between the diode and A/C switch.
Ignition pulse	BLU	With engine running, check for system voltage to body ground.	Check for open in BLU wire between the control unit and control unit.
Alternator signal	WHT/BLU	With engine running, check for less than 1 volt to body ground.	Check for open in WHT/BLU between the control unit and alternator, if system voltage.
Compressor clutch relays	RED/YEL	With the ignition switch off, check for less than 200 $\Omega$ to body ground.	Check for open in RED/YEL wire between the control unit and clutch relay A.
	YEL	With the ignition switch off, check for less than 200 $\Omega$ to body ground.	Check for open in YEL wire between the control unit and clutch relay B.
Thermal protector	BRN	With the A/C system on, check for system voltage to body ground.	Check for faulty thermal protector (test on page 15-48) or compressor clutch (test on page 15-47). Go to troubleshooting flow chart (page 15-32).
Idle control	PGM-FI: RED/BLU CARB. KX, KS only: RED/GRN	With the A/C system ON, check for no voltage to ground. With the engine running check for battery voltage to ground.	Go to troubleshooting flow chart of idle control system (section 6).
	CARB Except KX, KS: RED	With the A/C system on and idle boost solenoid connector disconnected, check for battery voltage to ground.	
Warning light	WHT/YEL	With the A/C switch and heater fan switch on, check for continuity to body ground. NOTE: The warning light is LED, so the ohmmeter will register in only one polarity.	Check for open in WHT/YEL between the control unit and A/C switch (test on page 15-54).

# Troubleshooting



## Flow Chart — Compressor



WARNING LIGHT

Warning light comes ON.

Start the engine and turn on the A/C switch and heater fan switch.

Does the compressor clutch click one time?

NO

Replace the compressor clutch.

YES

Disconnect the compressor connector and check for 450-600Ω between the pick-up sensor terminals (page 15-48).

Is there continuity?

NO

Replace the pick-up sensor.

YES

Repair open in GRN or WHT between the control unit and compressor.

(cont'd)

# Troubleshooting

## Flow Chart — Compressor (cont'd)

Compressor does not come on and warning light does not come on.

Turn the A/C switch and heater fan switch on and turn the ignition switch on.

Does the compressor click one time?

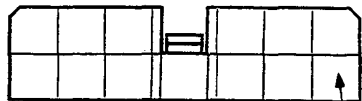
YES

Repair open or short in BLU wire between the control unit and ignition coil.

NO

Disconnect the 13-P connector from the control unit.

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



YEL/BLK

View from wire side

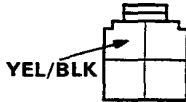
Is there battery voltage?

NO

Repair open in YEL/BLK wire between the fuse box and control unit.

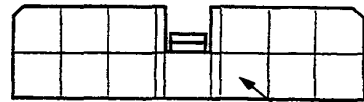
YES

Disconnect the 4-P connector from the compressor clutch relay A.



YEL/BLK

View from wire side



RED/YEL

View from wire side

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

Is there battery voltage?

NO

Repair open in YEL/BLK wire between the fuse box and compressor clutch relay A.

YES

Turn the ignition switch off and connect the 4-P connector to the relay A and check for continuity from RED/YEL terminal of control unit 13-P connector to body ground.



BLK

View from wire side

Is there continuity?

NO

Turn the ignition switch off and remove the compressor clutch relay A and test (page 15-53).

YES

Is the relay OK?

NO

Replace the relay A.

YES

Check for continuity between the BLK terminal of the 4-P relay A connector and body ground.

Is there continuity?

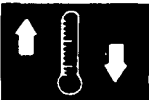
YES

Repair open in RED/YEL wire between the control unit and relay A.

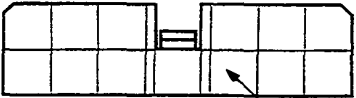
NO

Repair open in BLK wire between the relay A and body ground or poor ground (G202).

(to page 15-33)



(From page 15-32)



View from wire side YEL

Check for continuity from YEL terminal of the 13-P control unit connector to body ground.

Is there continuity?

YES

NO

Turn the ignition switch off and remove the compressor clutch relay B and test (page 15-53).

Is the relay OK?

NO

Replace the relay B.

YES

Check for continuity between the BLK terminal of the 4-P relay B connector and body ground.

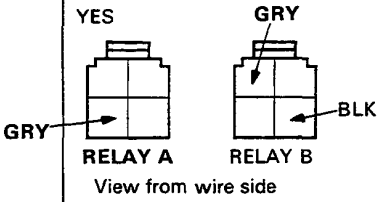
Is there continuity?

YES

Repair open in YEL wire between the control unit and relay B.

NO

Repair open in BLK wire between the relay B and body ground or poor ground (G202).



View from wire side

Check for continuity between the GRY terminals of the 4-P connectors of the relays.

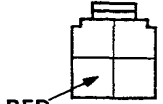
Is there continuity?

NO

Repair open in the GRY wire.

YES

Measure the resistance between the RED terminal and body ground.



View from wire side

Is there 2.5—3.5 Ω resistance?

YES

With 13-P control unit connector disconnected, turn the ignition switch and A/C and heater fan switches ON.

Inspect the cooling fans.

Do the cooling fans run?

YES

Replace the compressor control unit.

NO

Check thermal protector (page 15-48).

Is the thermal protector OK?

NO

Replace the thermal protector.

YES

Replace the compressor clutch.

PGM-CARB: Go to Cooling fan troubleshooting (page 15-34). PGM-FI: Go to Air conditioning signal flow chart (Section 6).

# Troubleshooting

## Flow Chart — Cooling Fan

Cooling fan does not run.

Turn the ignition, heater fan and A/C switches ON.

Inspect the cooling fan and condenser fan motors.

Does one fan motor run?

NO

(Both not running)

(To page 15-35)

YES

Turn the ignition switch OFF. Inspect the No. 36 or No. 39 fuses

Are the fuses OK?

NO

Replace the fuse(s).

YES

Inspect the relay of the fan motor that does not run (page 15-53).

Is the relay OK?

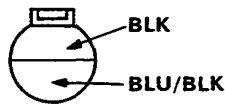
NO

Replace the relay.

YES

Disconnect the 2P connector of the motor stopped.

Measure voltage between the BLU/BLK terminal (+) and BLK terminal (-).



View from wire side

Is there battery voltage?

NO

Check for continuity between BLK terminal and body ground.

Does continuity exist?

NO

Repair open in BLK wire or poor ground (G202).

YES

YES

Repair open in BLU/BLK wire.

Replace the fan motor



(From page 15-34)

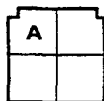
Inspect the fuses:  
· CARBURETED: No. 17  
· PGM-FI: No. 12 and No. 35

Are the fuses OK?

NO  
**Replace fuses.**

YES

Turn the ignition switch OFF and remove the cooling fan and condenser fan relays at the relay box.



View from terminal side

Turn the ignition switch ON.

Measure voltage between A terminal (+) and body ground on both relays.

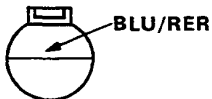
Is there battery voltage?

NO  
**Repair open in BLK/YEL wire between the relay box and fuse box.**

YES

Reinstall the relays.

Disconnect the dual pressure switch.



View from wire side

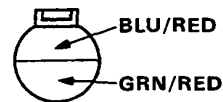
Connect the BLU/RED terminal to body ground.

Do both fan motors run?

NO  
**· Repair open in BLU wire between relay and diode. Repair open in BLU/RED between diode and pressure switch or the diode.**

YES

Connect a jumper wire between the BLU/RED and GRN/RED terminals.



View from wire side

Do both fan motors run?

YES  
**Replace the dual pressure switch.**

NO

(To page 15-36)

(cont'd)



# Troubleshooting

## Flow Chart — Cooling Fan (cont'd)

(From page 15-35)

Remove the jumper wire and reconnect the 2P connector to the pressure switch.

Disconnect the 2P connector from the thermo switch.

Connect the GRN/RED terminal to the body ground.

Turn the ignition switch ON.

Do both fan motors run?

NO

Repair open in GRN/RED wire between the pressure switch and thermo switch.

YES

Connect a jumper wire between the GRN and GRN/RED terminals of the thermo switch connector.

Do both fan motors run?

YES

Replace the thermo switch.

NO

Reconnect the 2P connector to the thermo switch. Disconnect the 16P connector from the heater control panel.

Connect the GRN terminal to body ground.

Do both fan motors run?

NO

Repair open in GRN (1) wire between the thermostwitch and control panel.

YES

Connect the GRN (1) and GRN (2) terminal with a jumper wire.

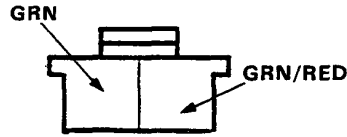
Do both fan motors run?

YES

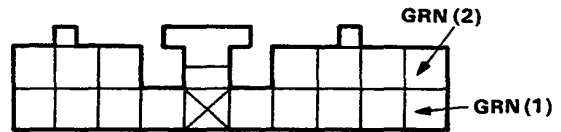
Replace the A/C switch.

NO

(To page 15-37)



View from wire side



View from wire side



(From page 15-36)

Check the heater blower switch  
(page 15-21)

Is the heater blower switch OK?

NO

Replace the heater blower switch.

YES

Reconnect the 16P connector to the heater control panel, and disconnect the 6P connector from the heater fan switch.

Connect the GRN terminal to body ground.

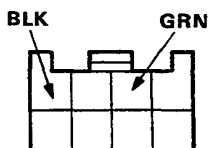
Do both fans and blower run?

NO

Repair open in GRN wire between the heater fan switch and heater control panel.

YES

Repair open in BLK wire between the heater fan switch and ground or poor ground (G401).



View from wire side

# Air Conditioner

## Service Tips

### CAUTION:

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 the lines are reconnected.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the seat of the O-ring or flare nut.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil after replacing the following parts:

Condenser .....	10 cc (1/3 fl oz)
Evaporator .....	20 cc (2/3 fl oz)
Line or hose .....	10 cc (1/3 fl oz)
Receiver .....	10 cc (1/3 fl oz)
Compressor .....	On compressor replacement, subtract the volume of oil drained from the removed compressor from 150 cc (5 fl oz) and drain the calculated volume of oil from the new compressor.

150 cc (5 fl oz) – subtract volume of removed compressor = Draining volumes

### 7. Torque specifications

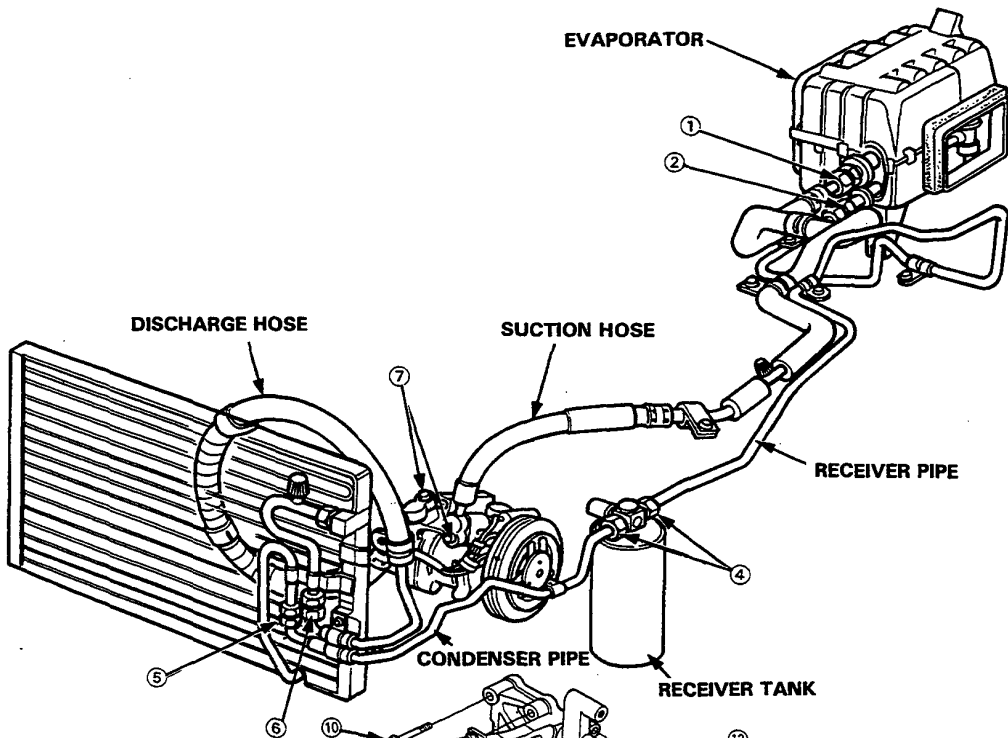
① Suction hose (Evaporator side) .....	32 N·m (3.2 kg-m, 23 lb-ft)
② Receiver pipe (Evaporator side) .....	17 N·m (1.7 kg-m, 12 lb-ft)
③ Receiver pipe .....	17 N·m (1.7 kg-m, 12 lb-ft)
④ Receiver tank assembly .....	17 N·m (1.7 kg-m, 12 lb-ft)
⑤ Condenser assembly (Condenser pipe) .....	17 N·m (1.7 kg-m, 12 lb-ft)
⑥ Condenser assembly (Discharge hose) .....	25 N·m (2.5 kg-m, 18 lb-ft)
⑦ Compressor hose mounting bolts .....	30 N·m (3.0 kg-m, 22 lb-ft)
⑧ Compressor assembly mounting bolts (8 x 130) .....	25 N·m (2.5 kg-m, 18 lb-ft)
⑨ Compressor bracket mounting bolts (10 x 40) .....	48 N·m (4.8 kg-m, 35 lb-ft)
⑩ Compressor bracket mounting bolt (10 x 70) .....	48 N·m (4.8 kg-m, 35 lb-ft)
⑪ Compressor bracket mounting bolt (10 x 55) .....	48 N·m (4.8 kg-m, 35 lb-ft)
⑫ Compressor bracket mounting bolt (10 x 65) .....	48 N·m (4.8 kg-m, 35 lb-ft)

### **WARNING** When handling refrigerant (R-12):

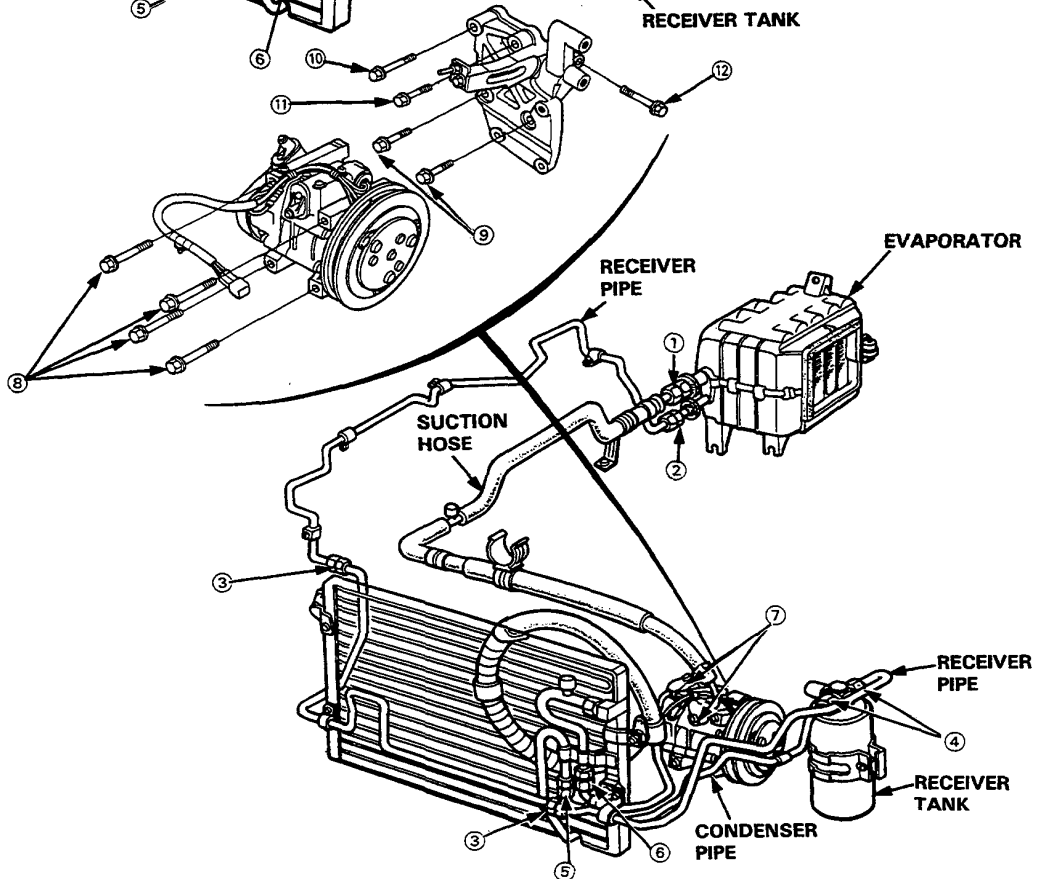
- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
  - Do not rub your eyes or skin.
  - Splash large quantities of cool water in your eyes or on your skin.
  - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- 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.



**RH Drive:**



**LH Drive:**



# Discharge Procedure

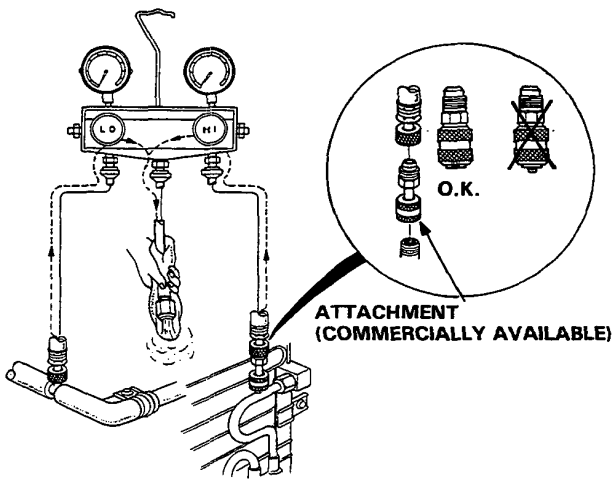
**WARNING**

- 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 the gauges as shown.
2. Disconnect the center hose of the gauge set and place the free end in a shop towel.
3. Slowly open the high side manifold valve slightly to let refrigerant flow from the center hose only. Do not open the valve too wide. Check the shop towel to make sure no oil is being discharged with the refrigerant.

**CAUTION:** If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

4. After the high pressure gauge reading has dropped below 1000 kPa (10 kg/cm<sup>2</sup>, 142 psi), open the low side valve to discharge both high and low sides of the system.
5. Note the gauge readings and, as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 kg/cm<sup>2</sup>, 0 psi).



**NOTE:** Set the attachment to the gauge hose at the high pressure side first, then install the gauge set as shown.

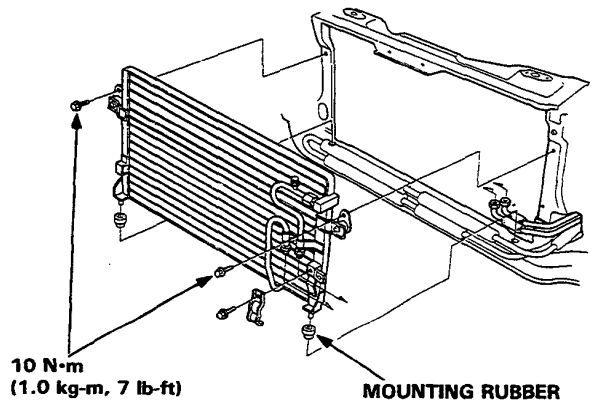
# Condenser

## Replacement

1. Discharge the refrigerant.
2. Remove the front bumper and engine hood lock (section 14).
3. Disconnect the condenser line and discharge line from the condenser.

**CAUTION:** Cap the open fittings immediately to keep moisture and dirt out of system.

4. Remove the mounting bolts (2) and condenser.



5. Install in the reverse order of removal, and charge the system (page 15-54) and test performance (page 15-57).

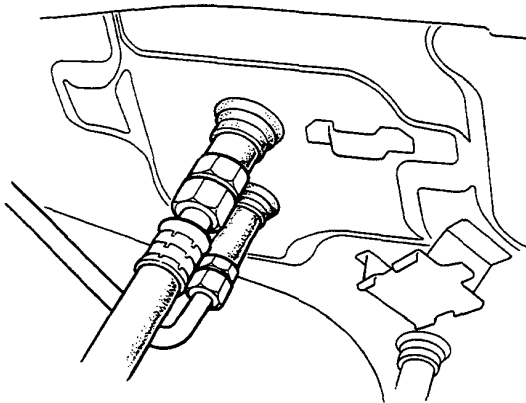
# Evaporator

## Replacement

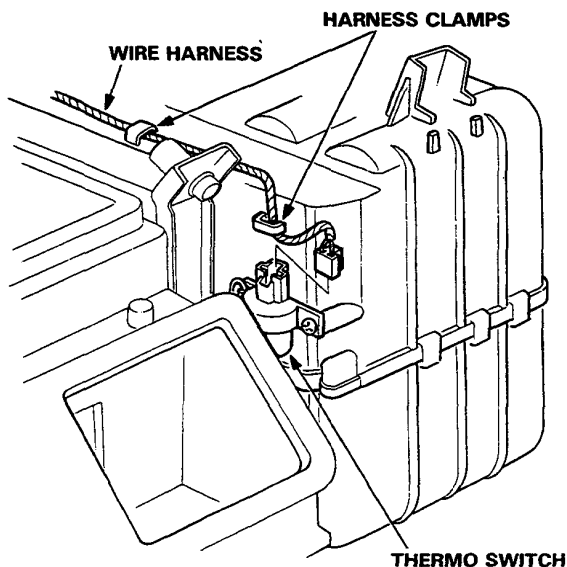


1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 15-40).
3. Disconnect the receiver line and suction hose from the evaporator.

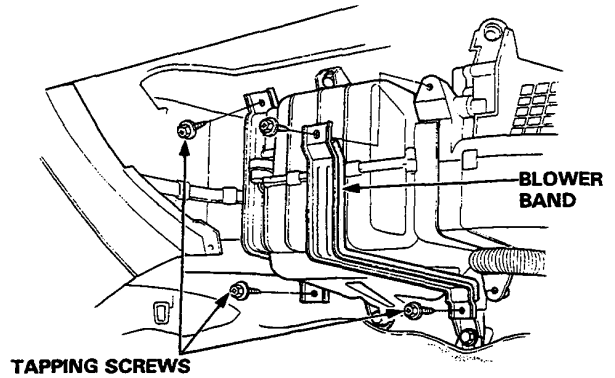
**CAUTION:** Cap the open fittings immediately to keep moisture out of the system.



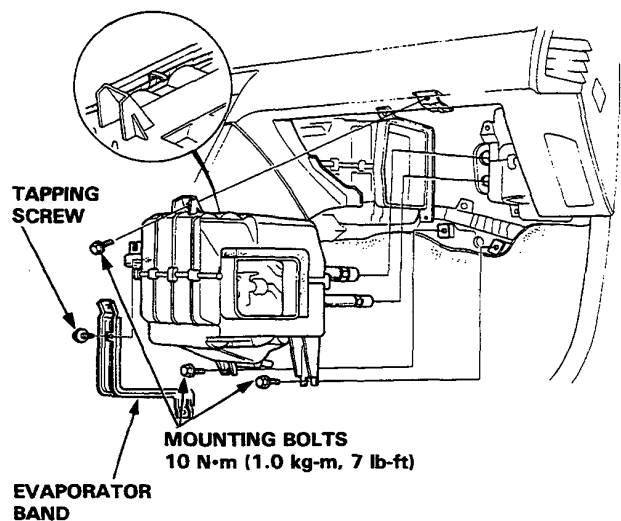
4. Remove the glove box (section 14).
5. Disconnect the connector from the thermoswitch and pull off the wire harness from the clamps.



6. Remove the tapping screws (4) and blower band.



7. Remove the mounting bolts (4) and evaporator.
8. Remove the tapping screw and evaporator band if necessary.



9. Install in the reverse order of removal, and:

- Apply a sealant to the grommets.
- Make sure that there is no air leakage.
- Charge the system (page 15-54) and test performance (page 15-57).

# Evaporator

## Overhaul

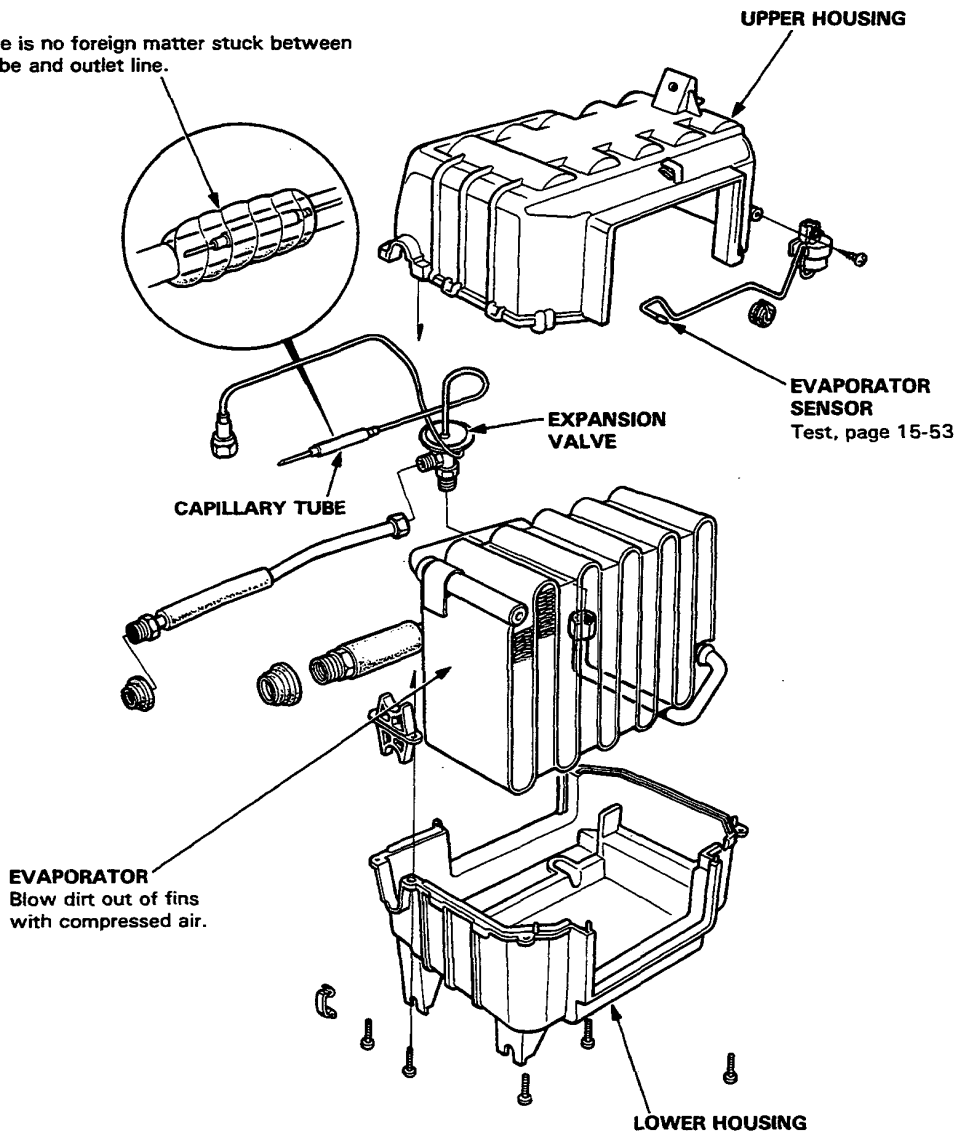
1. Pull out the evaporator sensor from the evaporator fins.
2. Remove the tapping screws and clips from the housing.
3. Carefully separate the housings and remove the evaporator covers.
4. Remove the expansion valve if necessary.

Assemble the evaporator in the reverse order of disassembly, and:  
Install the expansion valve capillary tube against the suction line, and wrap it with tape.  
Reinstall the evaporator sensor in its original location.

### TAPE

Repair

Make sure there is no foreign matter stuck between the capillary tube and outlet line.



# Compressor



## Troubleshooting

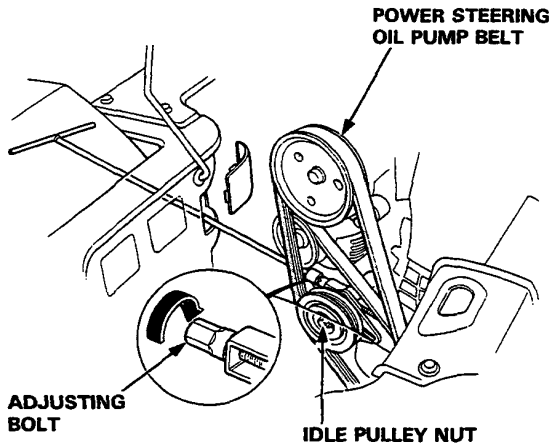
NOTE: Performance Test on page 15-57.

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 15-54 Recharging: page 15-56
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced or no air flow through condenser.	<ul style="list-style-type: none"> <li>• Clogged condenser or radiator fins</li> <li>• Condenser or radiator fan not working properly.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Check voltage and fan rpm</li> </ul>
	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	<ul style="list-style-type: none"> <li>• Charge system</li> <li>• Check for leak</li> </ul>
	High and low pressures are balanced soon after stopping compressor	<ul style="list-style-type: none"> <li>• Faulty compressor discharge or inlet valve</li> <li>• Faulty compressor seal</li> </ul>	Replace compressor Repair
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	• Faulty expansion valve	Repair or replace
Suction (low) pressure abnormal low	Excessive bubbles in sight glass; condenser is not hot Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	Insufficient refrigerant  <ul style="list-style-type: none"> <li>• Frozen expansion valve</li> <li>• Faulty expansion valve</li> </ul>	Check for leaks. Charge as required. 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 the thermostat and 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	<ul style="list-style-type: none"> <li>• Expansion valve open too long</li> <li>• Loose expansion valve</li> </ul>	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 balanced too equalized as soon as the compressor is stopped	<ul style="list-style-type: none"> <li>• Faulty gasket</li> <li>• Faulty high pressure valve</li> <li>• Foreign particle stuck in high pressure valve</li> </ul>	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	<ul style="list-style-type: none"> <li>• Clogged condenser or radiator fins</li> <li>• Condenser or radiator fan not working properly</li> </ul>	<ul style="list-style-type: none"> <li>• Clean condenser and radiator</li> <li>• Check voltage and fan rpm</li> </ul>
	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-driver.	Clogged high pressure line	Repair or replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor shaft seal
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor



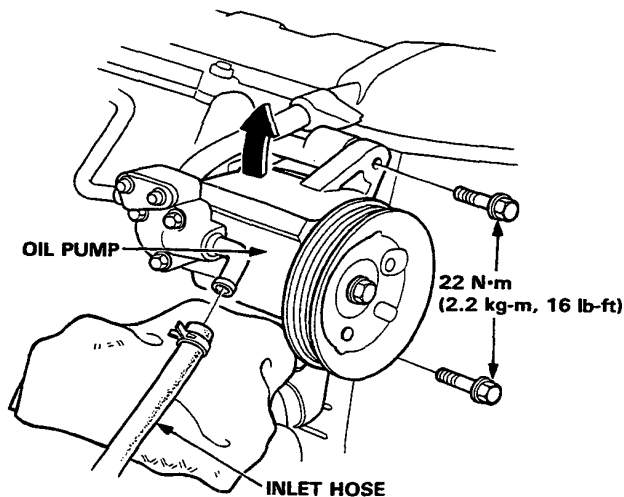
# Compressor Replacement

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system (page 15-40).
3. Loosen the idle pulley nut and adjusting bolt, and remove the power steering oil pump belt.

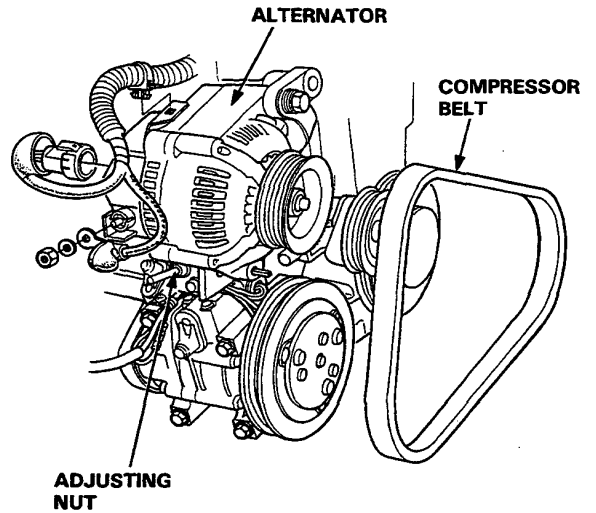


4. Disconnect the Power steering oil pump inlet hose.
5. Remove the mounting bolts (2) and power steering oil pump.

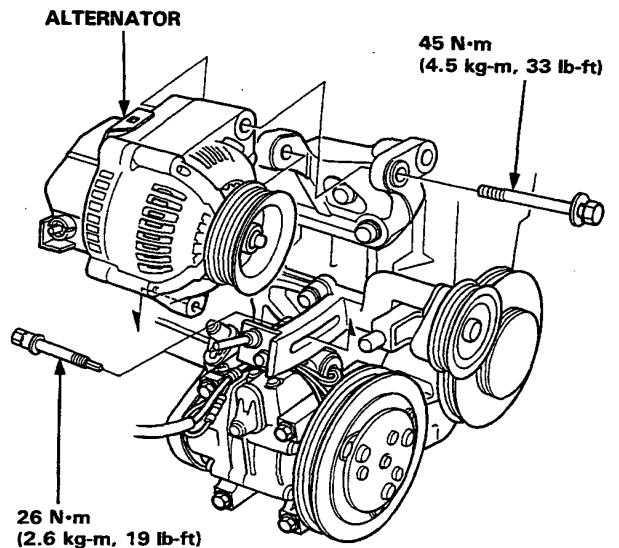
NOTE: Cover the alternator with shop towels.



6. Disconnect the alternator wire harness connectors for the alternator.
7. Loosen the adjusting nut and remove the compressor belt.

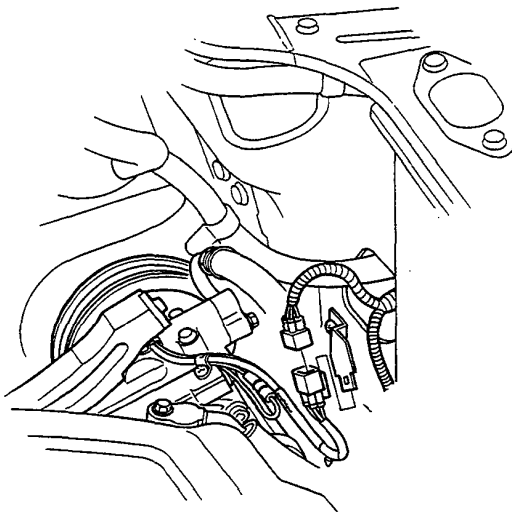


8. Remove the mounting bolts and alternator.





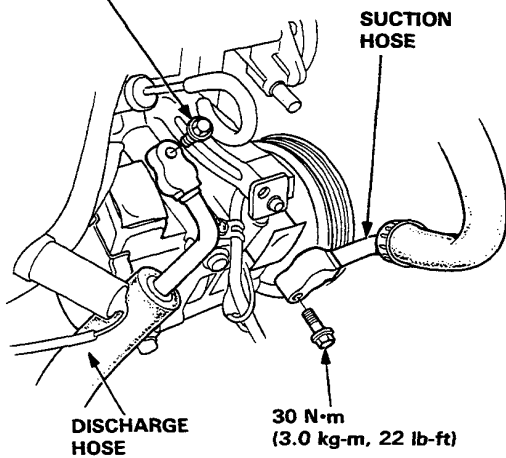
9. Disconnect the compressor connector.



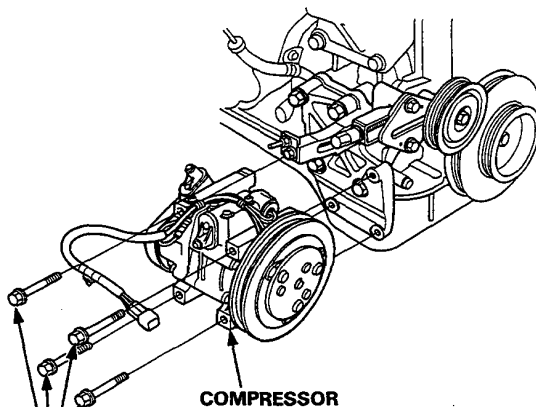
10. Disconnect the suction and discharge hoses from the compressor.

**CAUTION:** Cap the open fittings immediately to keep moisture and dirt out of the system.

30 N·m  
(3.0 kg-m, 22 lb-ft)

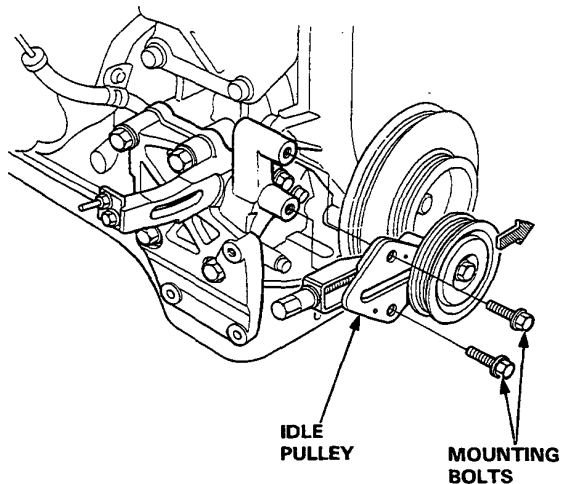


11. Remove the compressor mounting bolts (4) and compressor. Rest the compressor on the front beam.



25 N·m  
(2.5 kg-m, 18 lb-ft)

12. Remove the mounting bolt (2) and idle pulley.



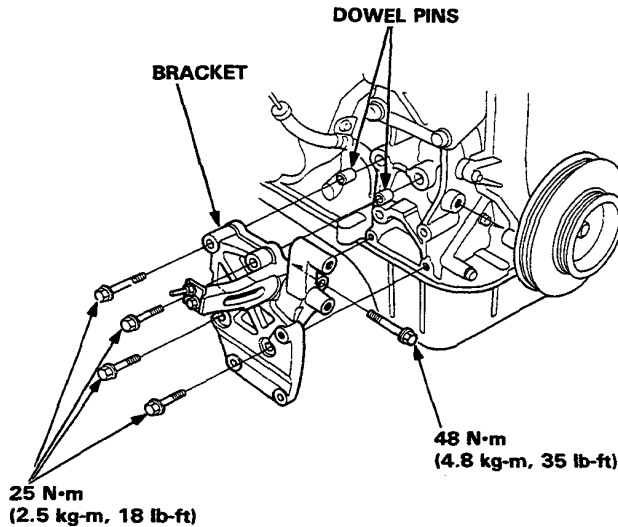
(cont'd)

# Compressor

## Replacement (cont'd)

13. Remove the mounting bolts (5) and compressor bracket.

14. Remove the dowel pins.



15. Remove the compressor.

16. Install in the reverse order of removal and:

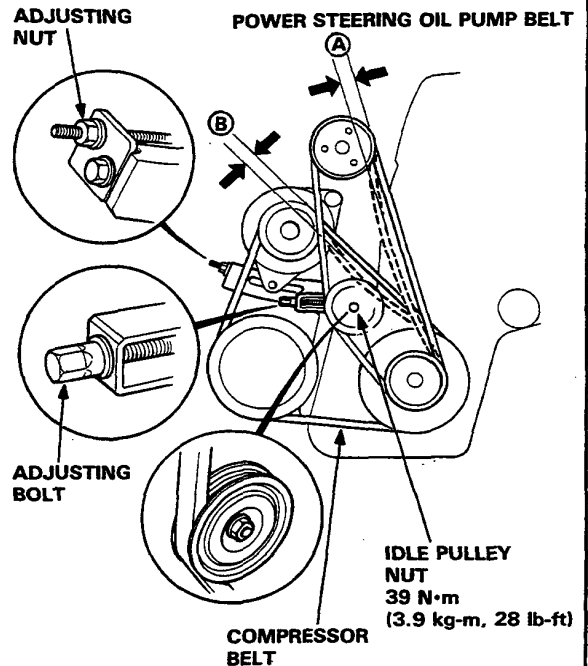
- If a new compressor is installed, calculate the refrigerant oil as below and drain through the suction fitting on the compressor.

Draining volumes =  
150 cc (5 fl oz) – subtract volume of removed compressor

- Adjust the belt

NOTE: Measure the deflection when 98 N (10 kg, 22 lb) force is applied between the pulleys.

- A : 11–13 mm (0.43–0.52 in)  
[9–11 mm (0.35–0.43 in) when new belt is installed]
- B : 10–12 mm (0.39–0.49 in)  
[6–8 mm (0.24–0.32 in) when new belt is installed]

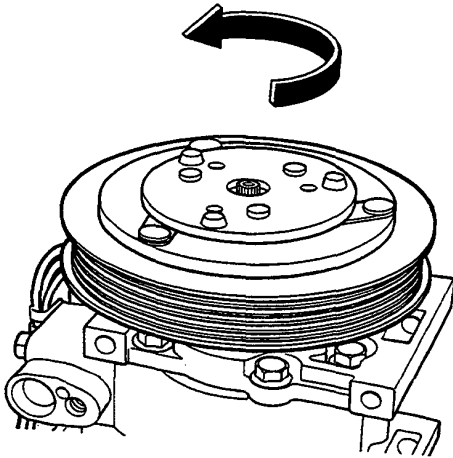


- Charge the system (page 15-54).
- Test the performance (page 15-57).



## Clutch Inspection

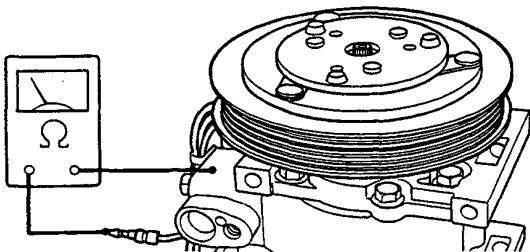
- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play and drag.



- Check resistance of the stator coil:

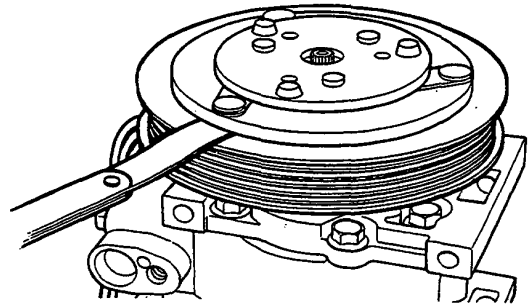
**Stator Coil Resistance:  $3.0 \pm 0.3$  ohm at  $20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ )**

If resistance is not within specifications, replace the coil.

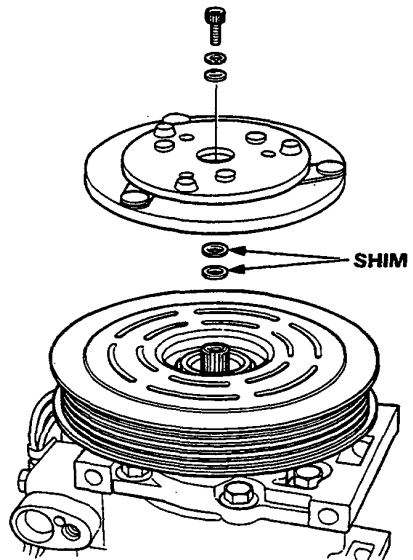


- Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

**CLEARANCE: 0.4–0.6 mm (0.016–0.024 in)**



**NOTE:** The shims are available in two sizes: 0.2 mm and 0.5 mm of thickness.



# Compressor

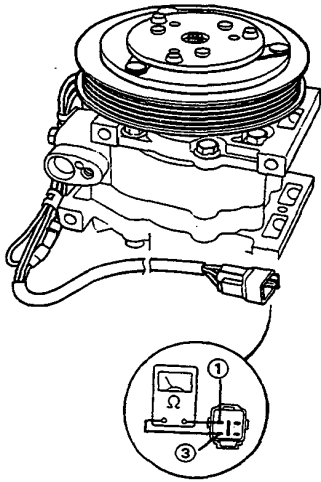
## Thermal Protector Inspection

Check for continuity between the 1 and 3 terminals of the compressor connector.

There should be continuity.

- If no continuity, replace the thermal protector (page 15-52).

NOTE: Replace the thermal protector and pick-up as a set.



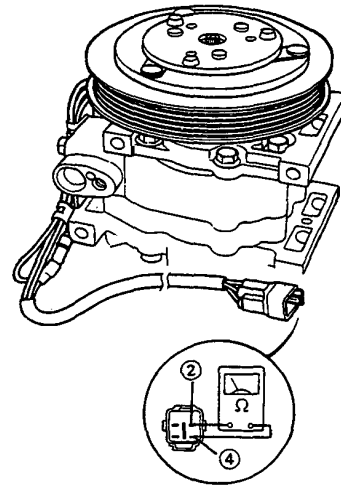
## Pick-up Sensor Inspection

Check for continuity between the 2 and 4 terminals of the compressor connector.

There should be continuity.

- If no continuity replace the pick-up sensor (page 15-52).

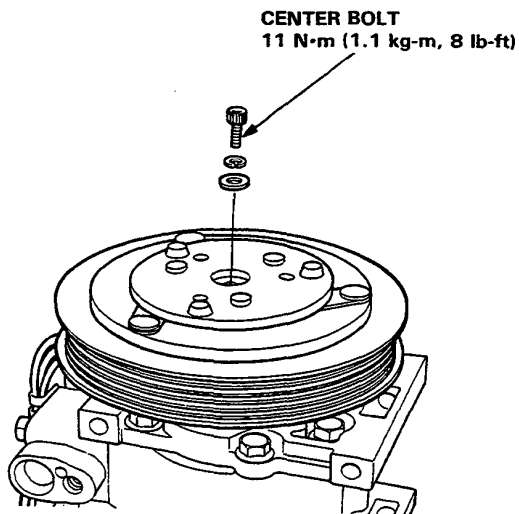
NOTE: Replace the pick-up sensor and thermal protector as a set.



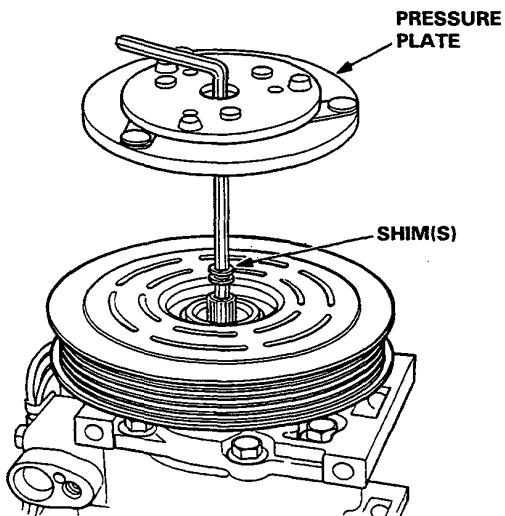


## Clutch Overhaul

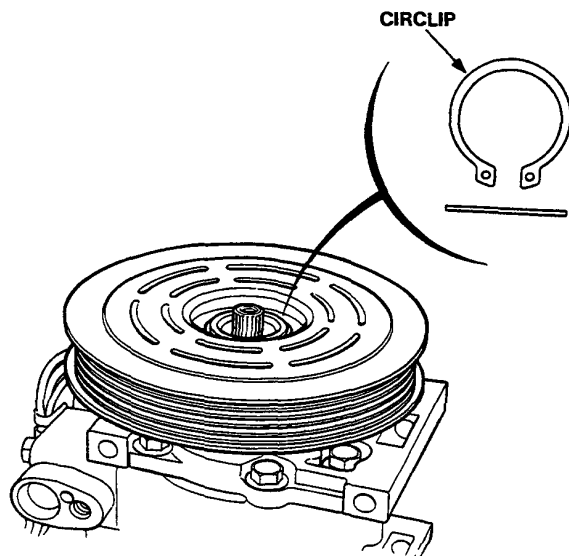
1. Remove the center bolt and washers.



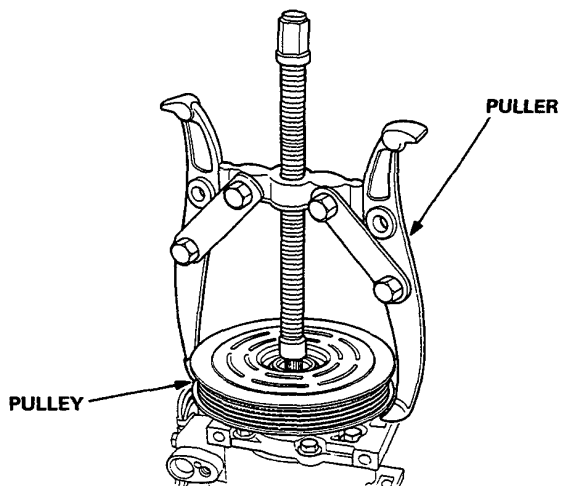
2. Remove the pressure plate and shim(s) taking care not to lost the shims.



3. Use circlip pliers to remove the circlip.



4. Remove the pulley from the shaft using a 2 or 3 jaw puller.
5. Check the pulley, replace the compressor assembly if the pulley is damaged or deformed.

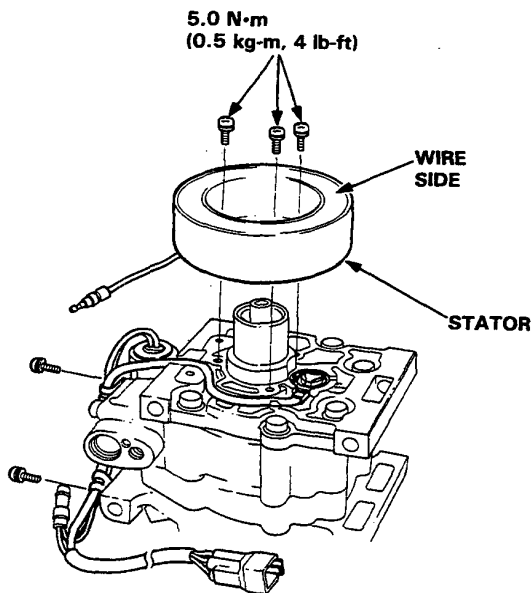


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# Compressor

## Clutch Overhaul (cont'd)

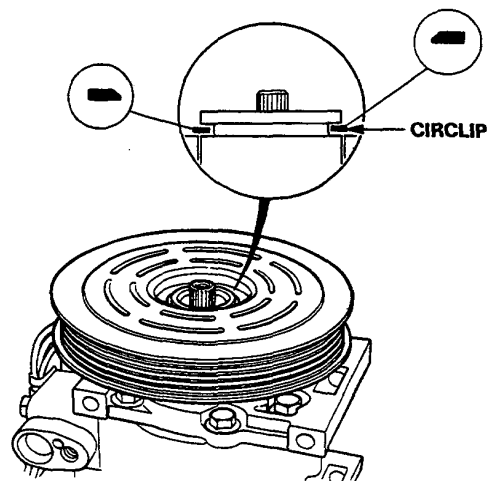
6. Remove screws (2) and disconnect the stator coil connector and remove the screws (2) and stator.



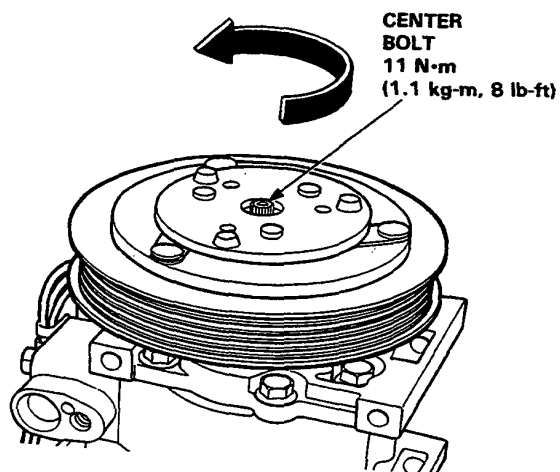
7. Install in the reverse order of removal and:

- Install the stator 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 is fitted to the groove properly.



- Apply locking agent to the thread of the center bolt and tighten it securely.
- Make sure that the pulley turns smoothly.





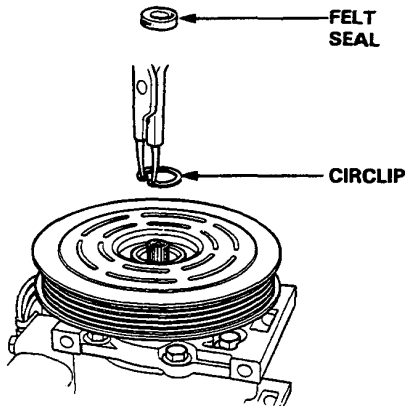
## Shaft Seal Replacement

NOTE: Make sure that the suction and discharge joints are plugged with the caps.

1. Remove the pressure plate (page 15-49).

NOTE: Removal of the clutch pulley and coil is not necessary.

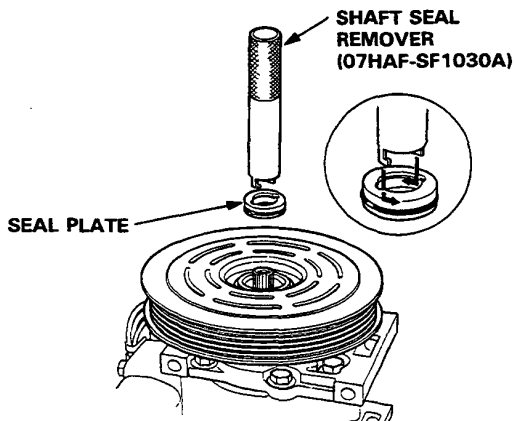
2. Remove the felt seal and circlip.



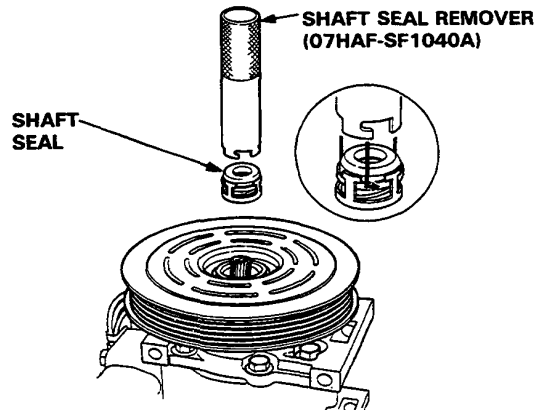
3. Remove the shim(s).

NOTE: After removing, place shim(s) safely in a parts rack.

4. Insert the Shaft Seal Remover into the compressor aligning the cutout of the remover with the groove of the seal seat.
5. Rotate the Shaft Seal Remover counterclockwise to make sure that the cutout is engaged with the seal seat.
6. Pull out the seal seat.



7. Insert the Shaft Seal Remover into the compressor aligning the cutout of the remover with the metal pawl of the seal case.
8. Rotate the Shaft Seal Remover counter clock wise to make sure that the cutout is engage with the metal pawl.



9. Withdraw the remover.
10. Lay down the compressor and clean the shaft seal contacting face of the compressor with cleaning solvent.

### CAUTION:

- Keep the cleaning solvent and dirt out of the compressor.
- Do not use any cloth for cleaning, clean only by rinsing with solvent.
- Do not spill the refrigerant oil from the compressor. Refill the same amount of the oil if the oil is spilled out.

11. Clean the new shaft seal thoroughly with cleaning solvent.
12. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS or equivalent) and install it on the shaft seal remover.

### NOTE:

- Use only clean refrigerant oil.
- Do not touch the sealing surfaces of the shaft seal after lubricating.

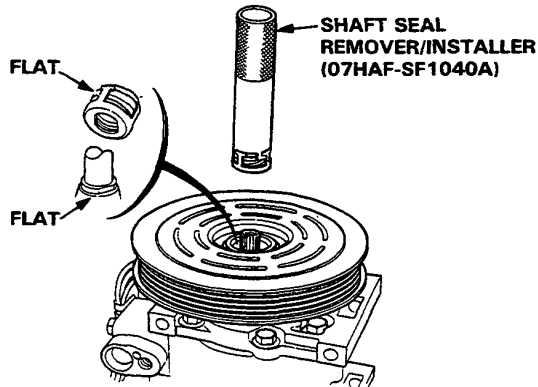
(cont'd)



# Compressor

## Shaft Seal Replacement (cont'd)

13. Liberally lubricate the compressor shaft with refrigerant oil.
14. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.



15. Clean the seal seat with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS or equivalent).

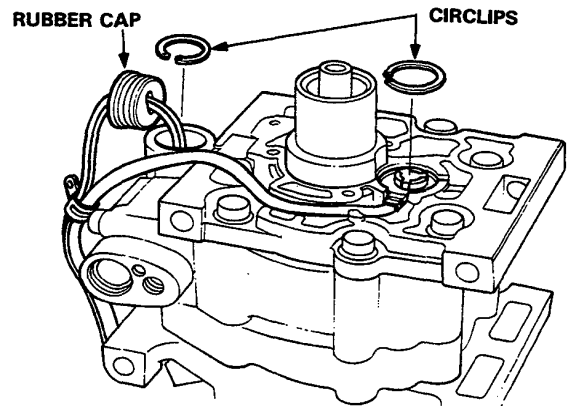
### NOTE:

- Use only clean refrigerant oil.
- Do not touch the sealing surface of the seal plate after lubricated.

16. First slide the seal seat into the compressor by hand as far as possible.
17. Press the seal seat with the grip side of the remover.
18. Install the circlip with its chamfered edge inside.
19. Press the circlip with the grip side of the remover, then install the felt seal.
20. Install the shim(s).
21. Install the pressure plate. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within the specified limits, 0.4–0.6 mm (0.016–0.024 in) shims must be added or removed as required.

## Thermal Protector/Pick-up Sensor Replacement

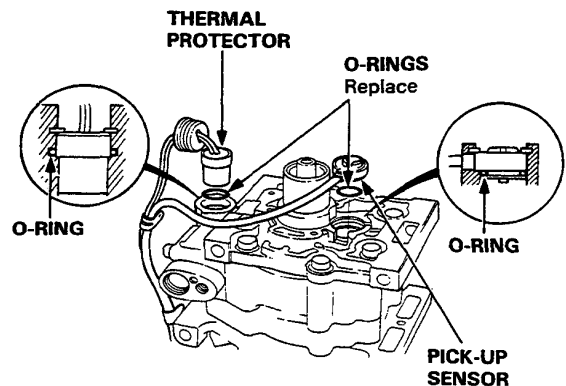
1. Remove the pressure plate and stator (page 15-49).
2. Pull the rubber cap out from the thermal protector.
3. Remove the screws and wire clips.
4. Remove the circlips and thermal protector and pick-up sensor.



5. Install in the reverse order of removal.

### NOTE:

- Replace the O-rings with new ones.
- Set the new O-rings in place as shown.



# Test



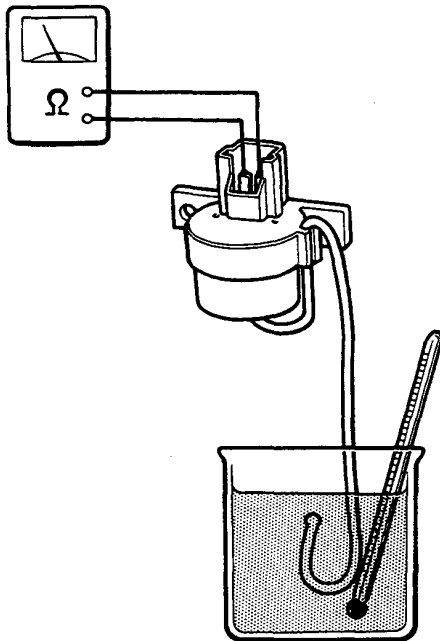
## Thermo Switch

Dip the evaporator sensor into a pan filled with ice water, and check for continuity between the terminals.

**Cut off 1.5--0.5°C (35--33°F)**

**Cut in 2.5--5°C (36--41°F)**

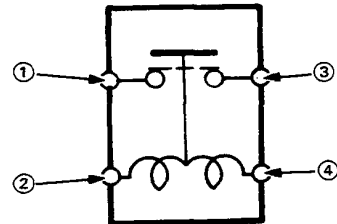
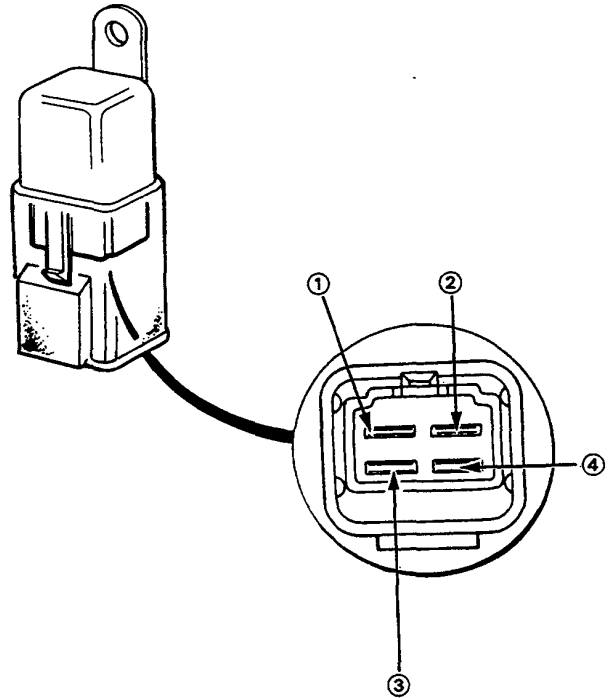
If cut off or cut in temperature is too lower too high, replace the thermo switch.



## Relay

**NOTE: All A/C system relays are similar.**

1. Check for continuity between terminals ① and ③.  
There should be no continuity.
2. Connect a 12 V battery across terminals ② and ④.  
There should be continuity between terminals ① and ③.

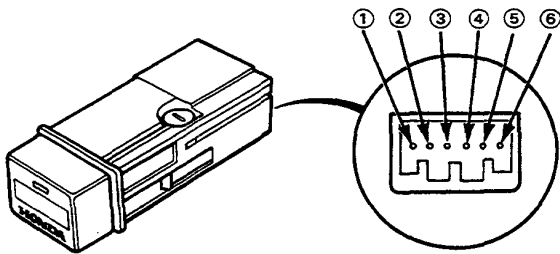


# Test

## A/C Switch

Check for continuity between the terminals according to the table.

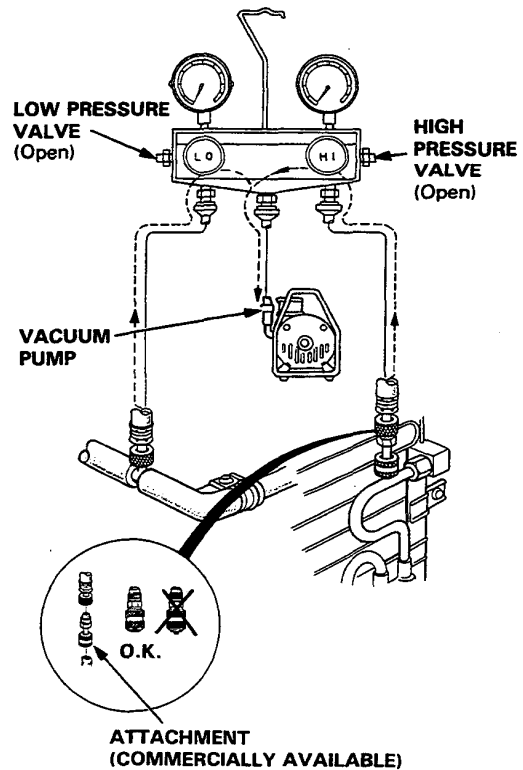
Terminal Position	④	③	②	⑤	⑥	⑦
OFF				○—○		
ON	○—○			○—○		
	○—○	○—○				
	○—○	○—○	○—○			○—○



# System Charging

## 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 a gauge set and pump as shown, connecting the center charging hose to the pump inlet.
3. Start the pump, then open both gauge valves. Run the pump for about 15 minutes. Close the valves and stop the pump. The low gauge should indicate above 700 mm Hg (27 in-Hg) and remain steady with the valves closed.  
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. Check for leaks, and repair (see Leak Test below).
4. If there are no leaks, open the valves and continue pumping for at least another 15 minutes, then close both valves, stop the pump and disconnect it from the center charging hose.



NOTE: Set the attachment to the gauge hose at high pressure side, then install the gauge set as shown.

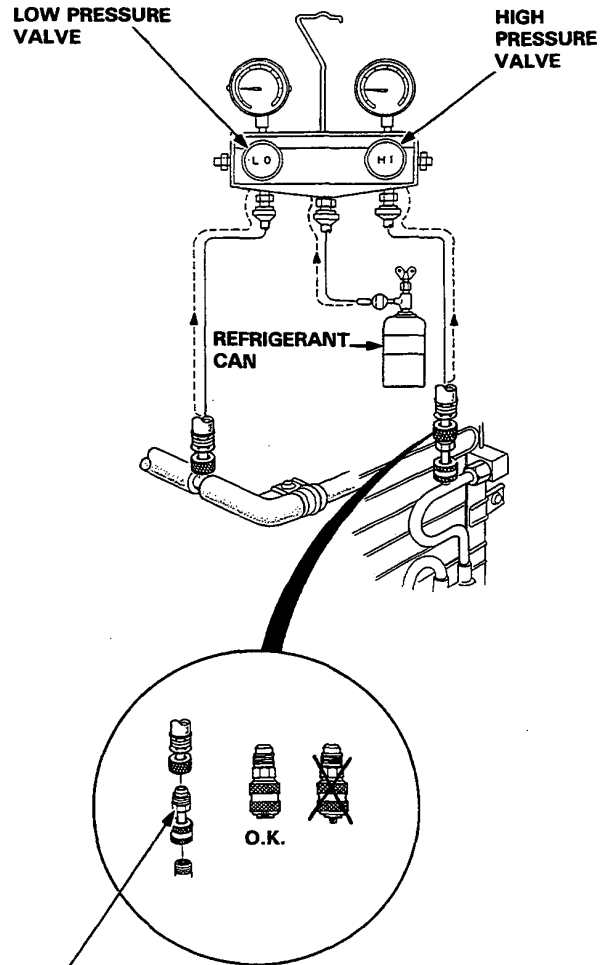


## Leak Test

**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 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).
- 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.

1. Attach a refrigerant supply and gauge set as shown, with all valves closed. Then open the refrigerant supply valve on the can.
2. Loosen the center charging hose fitting at the gauge to purge any air from the hose, until it hisses for a few seconds, then tighten it again.
3. Open both gauge valves to charge the system to about 100 kPa (1.0 kg/cm<sup>2</sup>, 14 psi), then close the supply valve.
4. Check the system for leaks using a leak detector.
5. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system according to the Discharge Procedure on page 15-40.
6. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 15-54).



**ATTACHMENT  
(COMMERCIALY AVAILABLE)**

NOTE: Set the attachment to the gauge hose at the high pressure side first, then install the gauge set as shown.

# System Charging

## Charging Procedures

**WARNING** Always wear eye protection when charging the system.

**CAUTION:** Do not overcharge the system; the compressor will be damaged.

1. Connect a gauge set and refrigerant can (right side up) as shown, with the gauge valves closed. Purge air from the charging hose by opening the refrigerant valve, then loosening the center connector at the gauge, letting it hiss for a few seconds, and tightening it.
2. Open the high gauge valve and charge with approximately 300 g (10.5 oz) of refrigerant.

**WARNING** Do not start the engine with high gauge valve open.

### NOTE:

- Be sure to charge with 300 g (10.5 oz) refrigerant. If low, the vane in the compressor (if new compressor is installed) will not operate.
- Do not open the low gauge valve.

3. After charging with 300 g (10.5 oz) refrigerant, close the high gauge valve.
4. Start the engine and turn on the A/C switch and heater fan switch and turn the air mix lever to "COLD".
5. Run the engine at 1500–2000  $\text{min}^{-1}$  (rpm), and check the vane comes out.

**NOTE:** As the vane comes out, the low gauge suddenly falls.

6. If the vane does not come out:
  - (a) Raise the engine speed to 2500  $\text{min}^{-1}$  (rpm) and turn the A/C switch ON and OFF. If the vane does not come out, turn the ignition switch OFF and wait for 1–2 minutes, then restart the engine and raise to 2500  $\text{min}^{-1}$  (rpm) and turn the A/C switch ON and OFF.
  - (b) If the vane still does not come out, stop the engine and close the low gauge valve and recharge with additional 100 g (3.5 oz) of refrigerant. Repeat step (a).
  - (c) If the vane does not come out after performing the procedure in step (a) several times. Stop the engine and re-evacuate and repeat steps 1 thru 6.

7. Open the low gauge valve and charge refrigerant with the engine running at 2500  $\text{min}^{-1}$  (rpm).

**WARNING** Do not open the high gauge valve and keep the refrigerant can right side-up.

8. Charge the system with specified volume of refrigerant until sight glass is free of any bubbles, indicating a full charge.

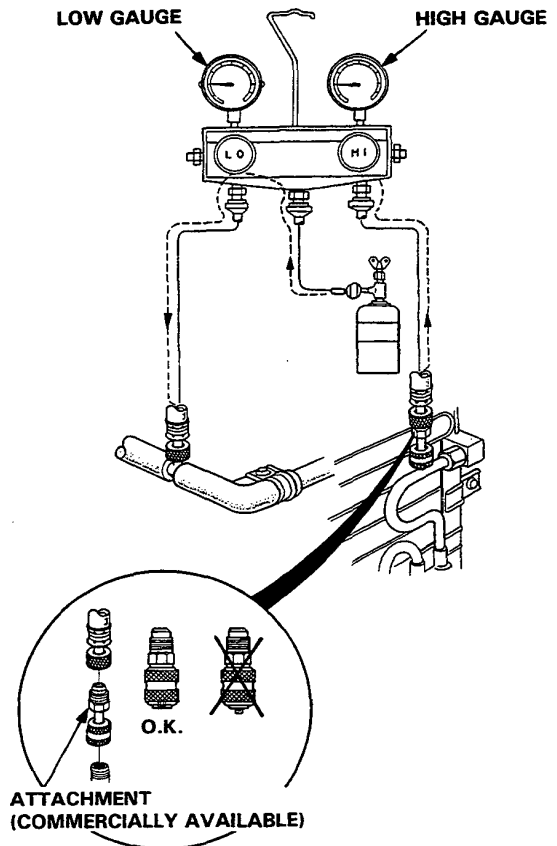
### REFRIGERANT VOLUME:

LH Drive: 950  $\pm$  50 g (34  $\pm$  2 oz)

RH Drive: 850  $\pm$  50 g (30  $\pm$  2 oz)

9. When fully charged, close the gauge valves, then the valve on the can. Slowly disconnect the refrigerant hose from the center gauge connection to allow excess refrigerant to escape. Quickly remove the gauges from the system to minimize refrigerant loss.

LOW GAUGE HIGH GAUGE



**ATTACHMENT**  
**(COMMERCIALY AVAILABLE)**

**NOTE:** Set the attachment to the gauge hose at high pressure side first, then install the gauge set as shown. When disconnecting the gauge hose at high pressure side, remove the attachment from the high pressure charging valve.

# Performance Test



NOTE: The graph (inspection data) below shows humidity between 30% and 90%, in increments of 10%.

Tolerance is  $\pm 10\%$  when taking a reading.

1. Connect gauges as shown.

NOTE: Set a attachment (commercially available) to the high pressure side hose first.

2. Insert a dry bulb thermometer in the cold air outlet, and place the psychrometer (dry and wet bulb thermometer) close to the inlet of blower. Do not spill wet bulb water.

3. Test conditions:

- Avoid direct sunlight.
- Open engine hood.
- Open front doors and windows.
- Set the temperature control dial to MAX COLD and push the VENT and FRESH buttons.
- Turn the fan switch to 4.
- Run the engine at  $1,500 \text{ min}^{-1}$  (rpm).
- No driver and passengers in car.

4. After running the system for about 10 minutes under the above conditions, read the thermometer and pressure valve.

5. The performance of the system is satisfactory if the measurements are within the range bands shown on the Performance Chart.

Proper intake/delivery pressure and temperature ranges are shown on the chart to right.

### Examples

#### Measurements:

Intake temperature

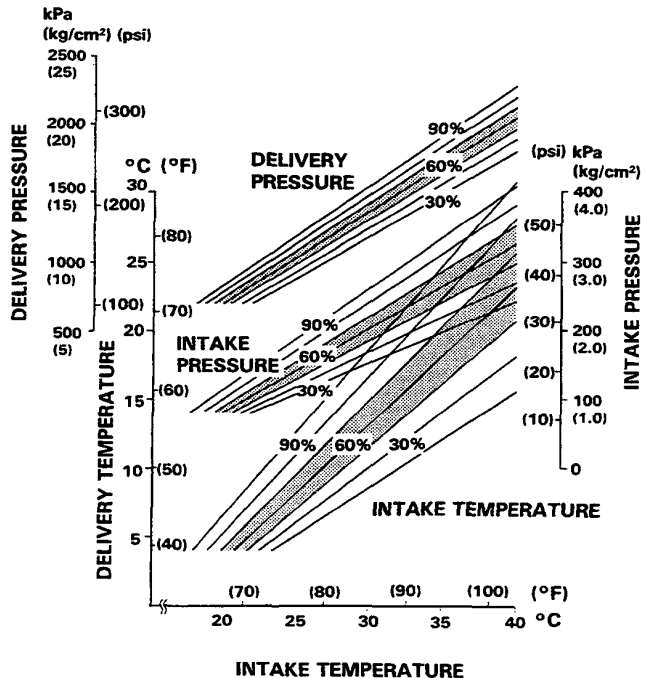
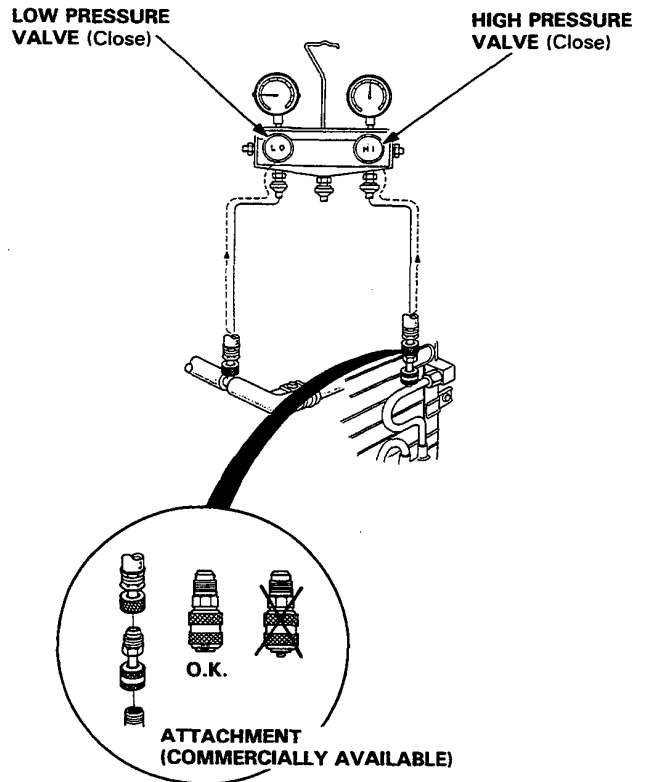
(Dry bulb):  $28^\circ\text{C}$  ( $84^\circ\text{F}$ )

Humidity: 60%

Delivery temperature:  $12^\circ\text{C}$  ( $53.6^\circ\text{F}$ )

Delivery pressure:  $1250 \text{ kPa}$  ( $12.5 \text{ kg/cm}^2$ ,  $178 \text{ psi}$ )

Intake pressure:  $180 \text{ kPa}$  ( $1.8 \text{ kg/cm}^2$ ,  $25.6 \text{ psi}$ )



Find your intake temperature across the bottom, and the relative intake and delivery pressures, and delivery temperature on the side. Draw a line through the chart at right angles to each of your measurement the vertical line should intersect each horizontal line within the range bands on the graph.

NOTE: After the test is complete, when the high pressure gauge hose is disconnected, remove the attachment from the high pressure test valve.

# Electrical

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# Troubleshooting

## Troubleshooting Precautions

### Before Troubleshooting

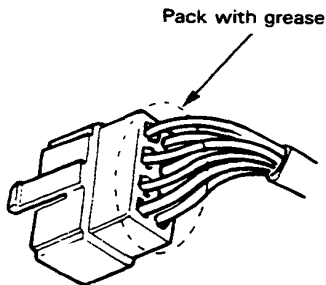
- Check the main fuse and the fuse box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

### 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).



### CAUTION:

- Do not pull the wires when disconnecting a connector, pull only the connector housings.
- When connecting a connector, push it until it clicks into place.

## Five-Step Troubleshooting

### 1. Verify The Complaint

Turn on all the components in the problem circuit to check the accuracy of 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.



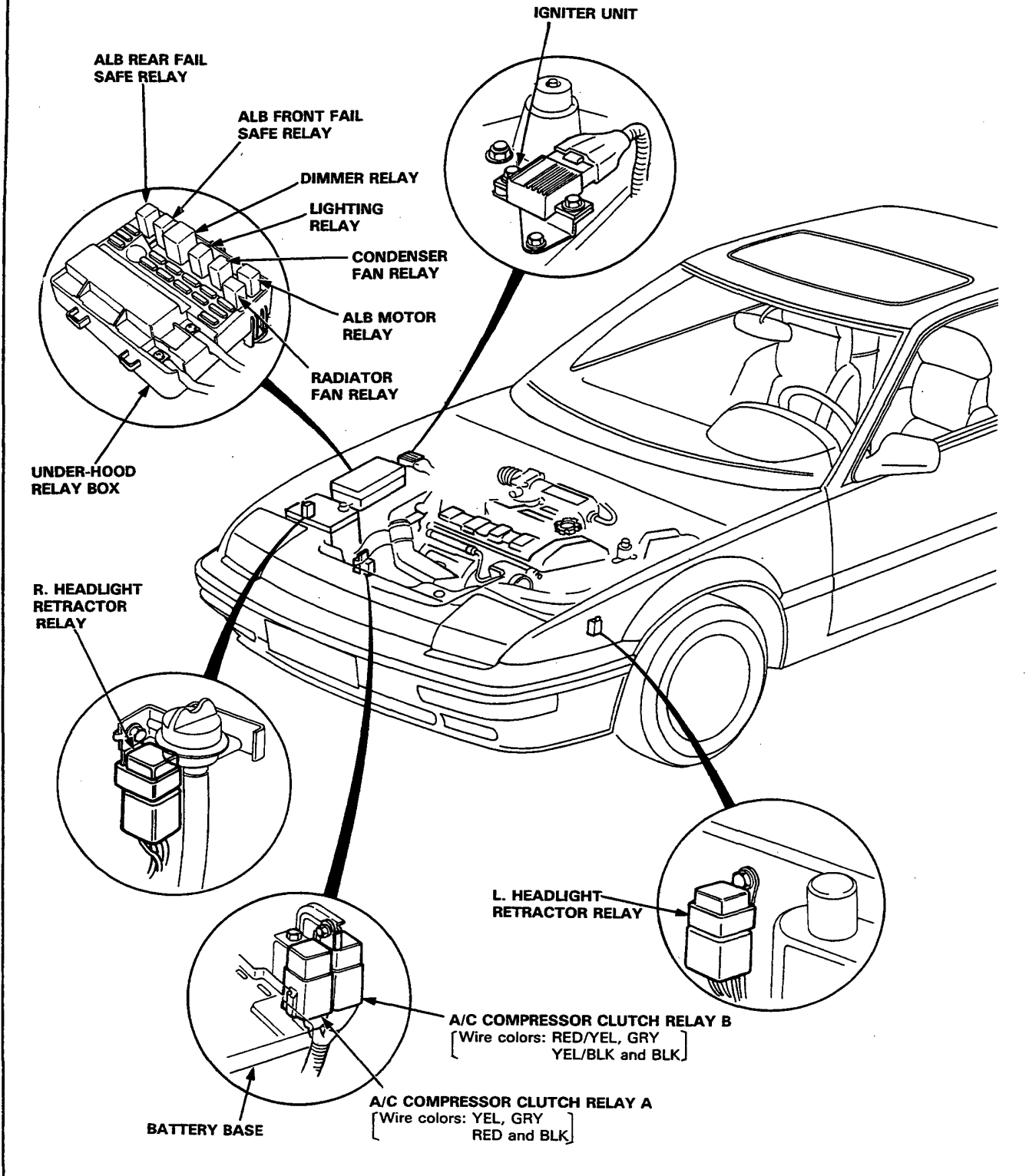


# Schematic Symbols

BATTERY		GROUND		FUSE	COIL, SOLENOID	CIGARETTE LIGHTER
 or 		Ground terminal 	Component ground 			
RESISTOR	VARIABLE RESISTOR	THERMISTOR	IGNITION SWITCH	BULB	HEATER	
MOTOR	PUMP	CIRCUIT BREAKER	HORN	DIODE	SPEAKER, BUZZER	
ANTENNA		TRANSISTOR (Tr)		<h2>Wire Color Codes</h2> <p>The following abbreviations are used to identify wire colors in the circuit schematics.</p> <ul style="list-style-type: none"> <li>WHT ..... White</li> <li>YEL ..... Yellow</li> <li>BLK ..... Black</li> <li>BLU ..... Blue</li> <li>GRN ..... Green</li> <li>RED ..... Red</li> <li>ORN ..... Orange</li> <li>PNK ..... Pink</li> <li>BRN ..... Brown</li> <li>GRY ..... Gray</li> <li>LT BLU ..... Light Blue</li> <li>LT GRN ..... Light Green</li> </ul> <p>Wire insulator has one color or one color with another color stripe. The second color is the stripe.</p>		
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 			

# Relays and Control Unit Locations

## Engine Compartment



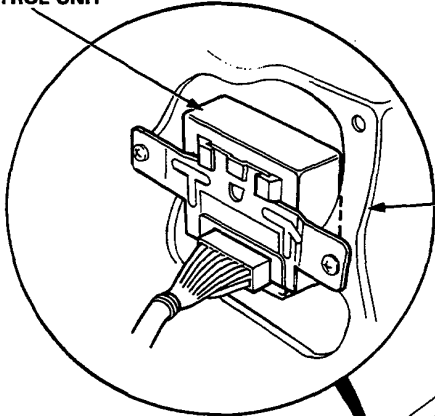


# Door and Floor

**NOTE:**

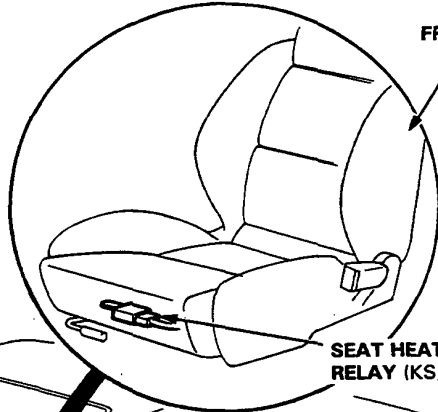
- The illustration is L.H. drive type.
- R.H. drive type is symmetrical to L.H. drive type.

**POWER DOOR LOCK CONTROL UNIT**

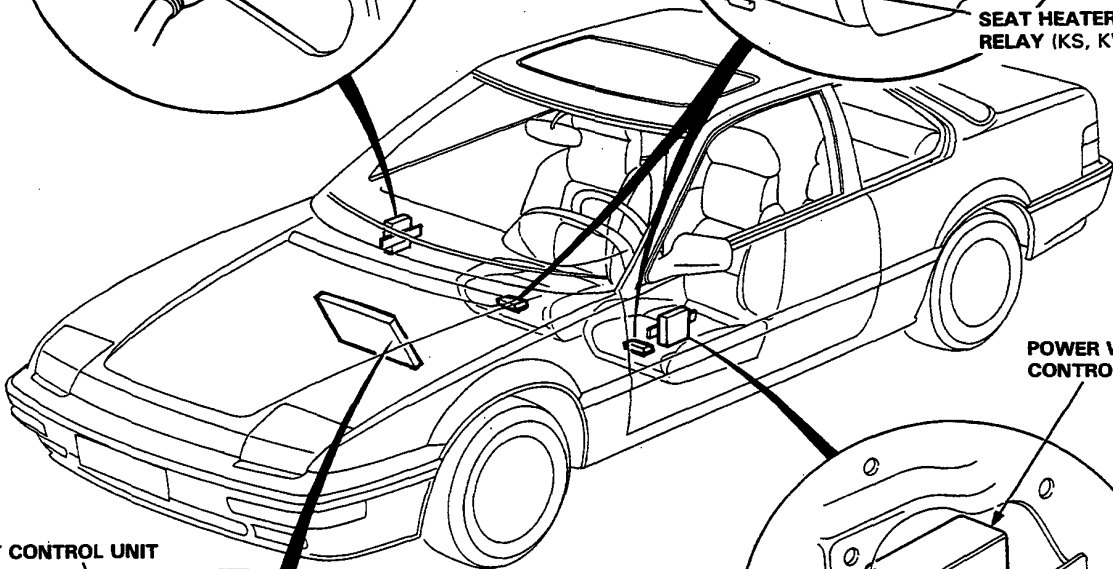


**R. DOOR INNER PANEL**

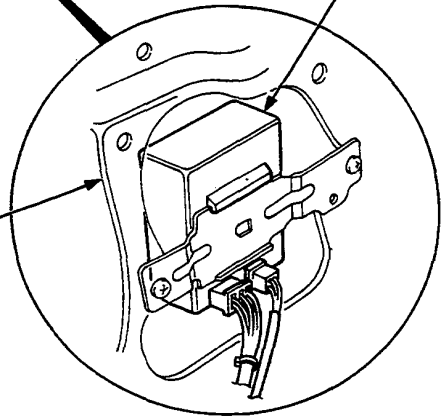
**FRONT SEAT**



**SEAT HEATER RELAY (KS, KW models)**

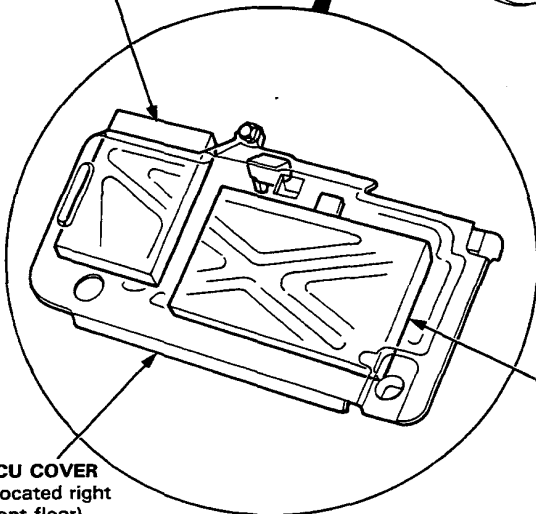


**POWER WINDOW CONTROL UNIT**



**L. DOOR INNER PANEL**

**A/T CONTROL UNIT**



**ECU COVER**  
(Located right front floor)

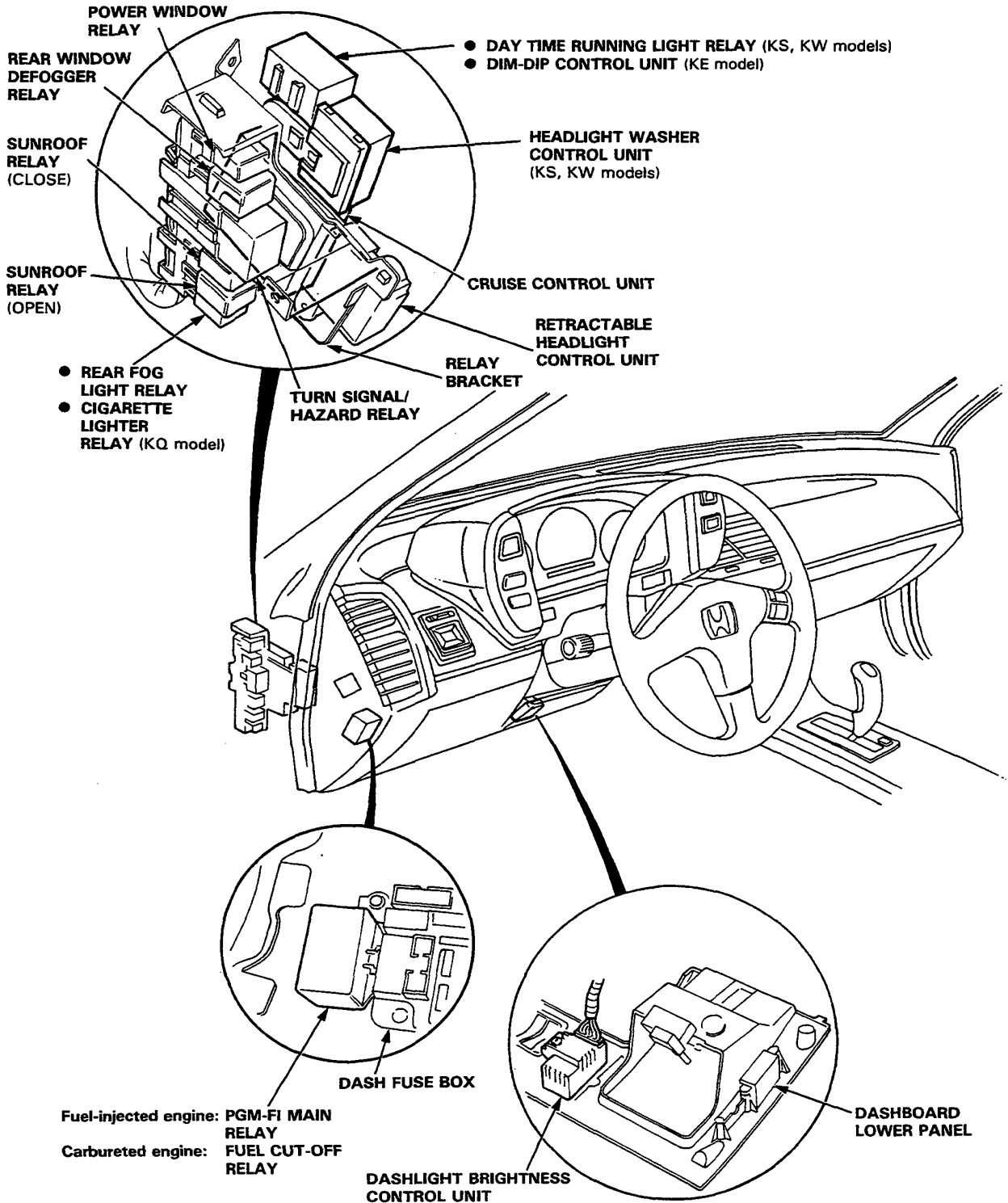
Fuel-injected engine: PGM-FI ECU  
Carbureted engine: PGM-CARB CONTROL UNIT

# Relays and Control Unit Locations

## Dashboard

### NOTE:

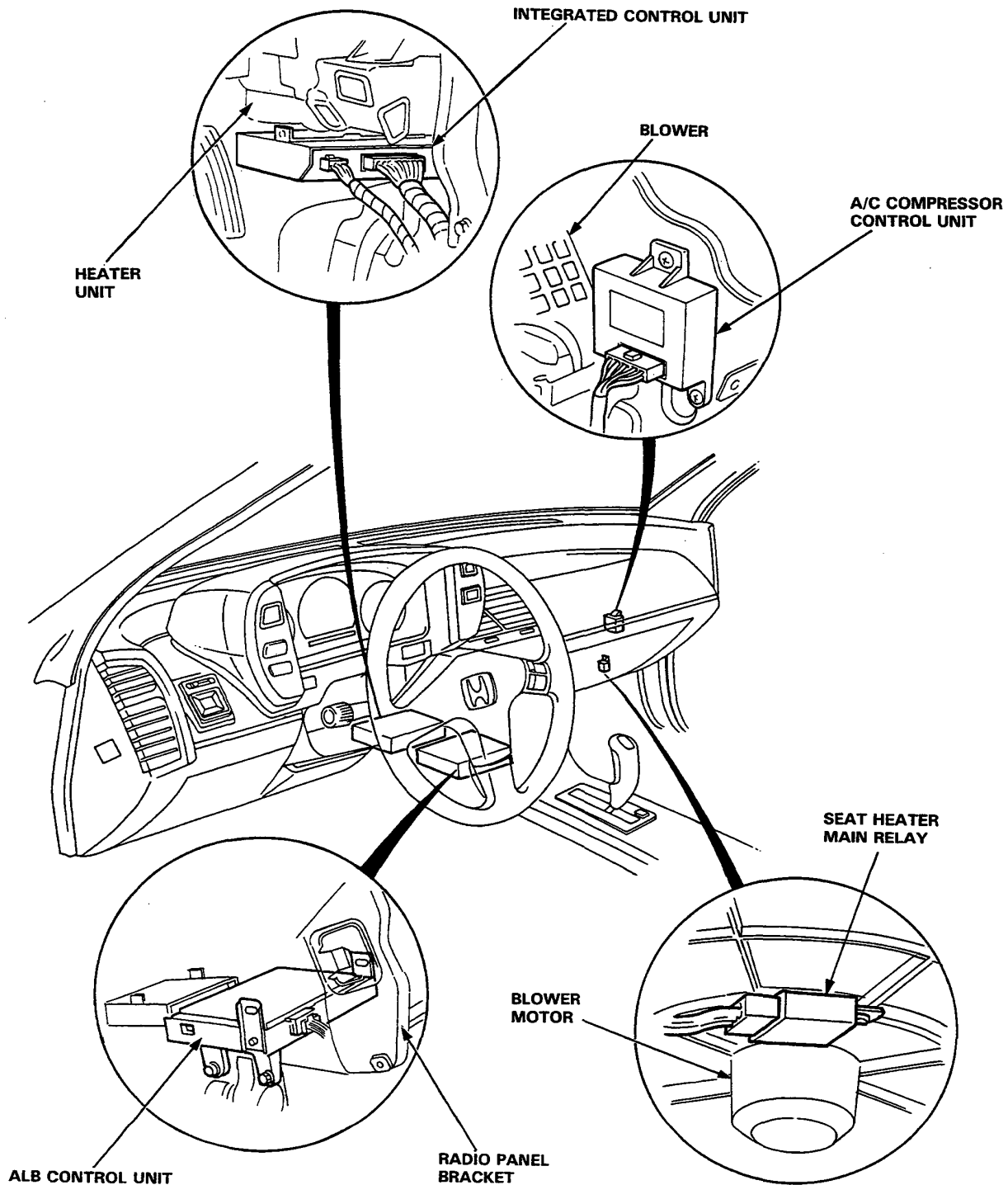
- The illustration is L.H. drive type.
- R.H. drive type is symmetrical to L.H. type.



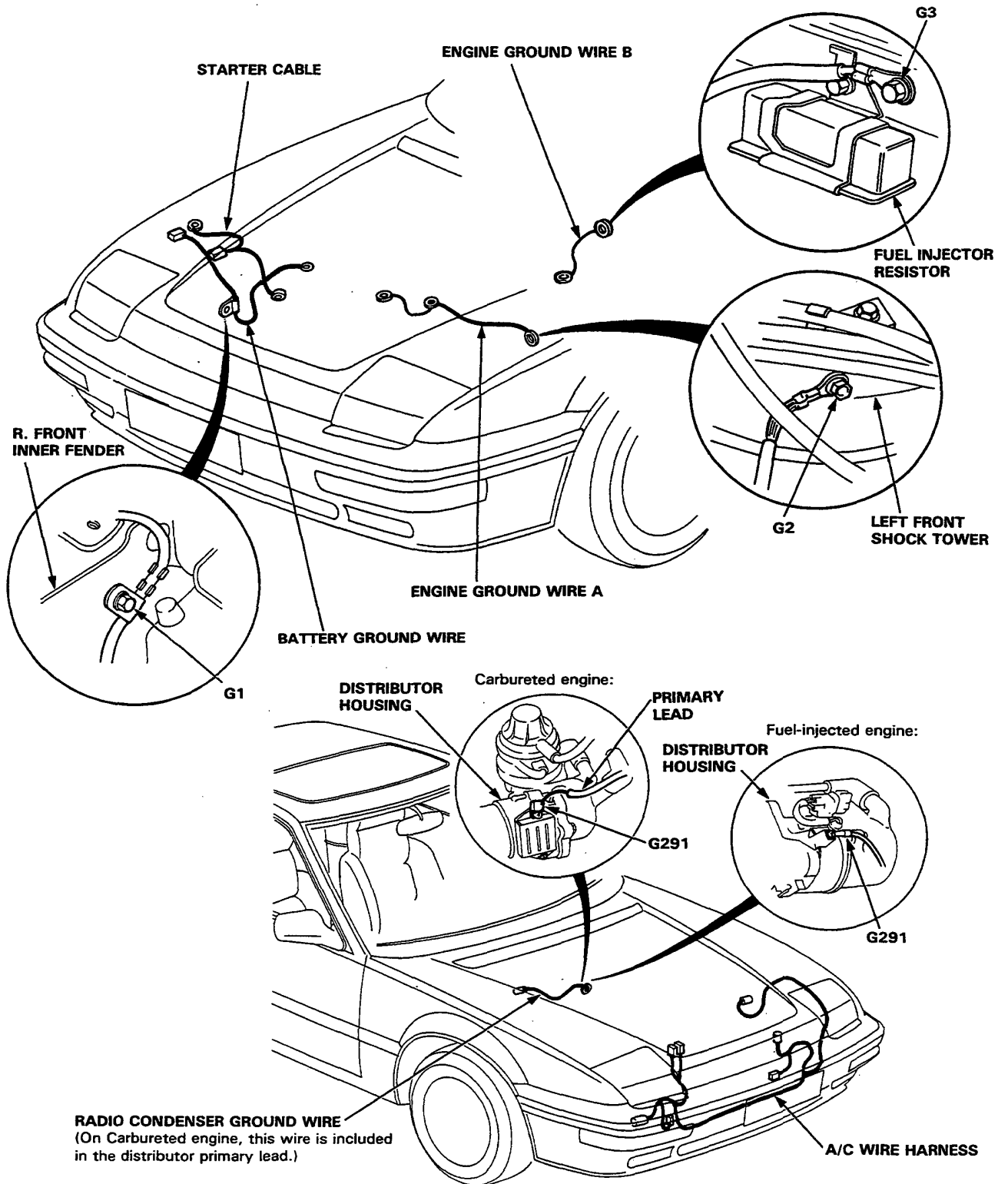


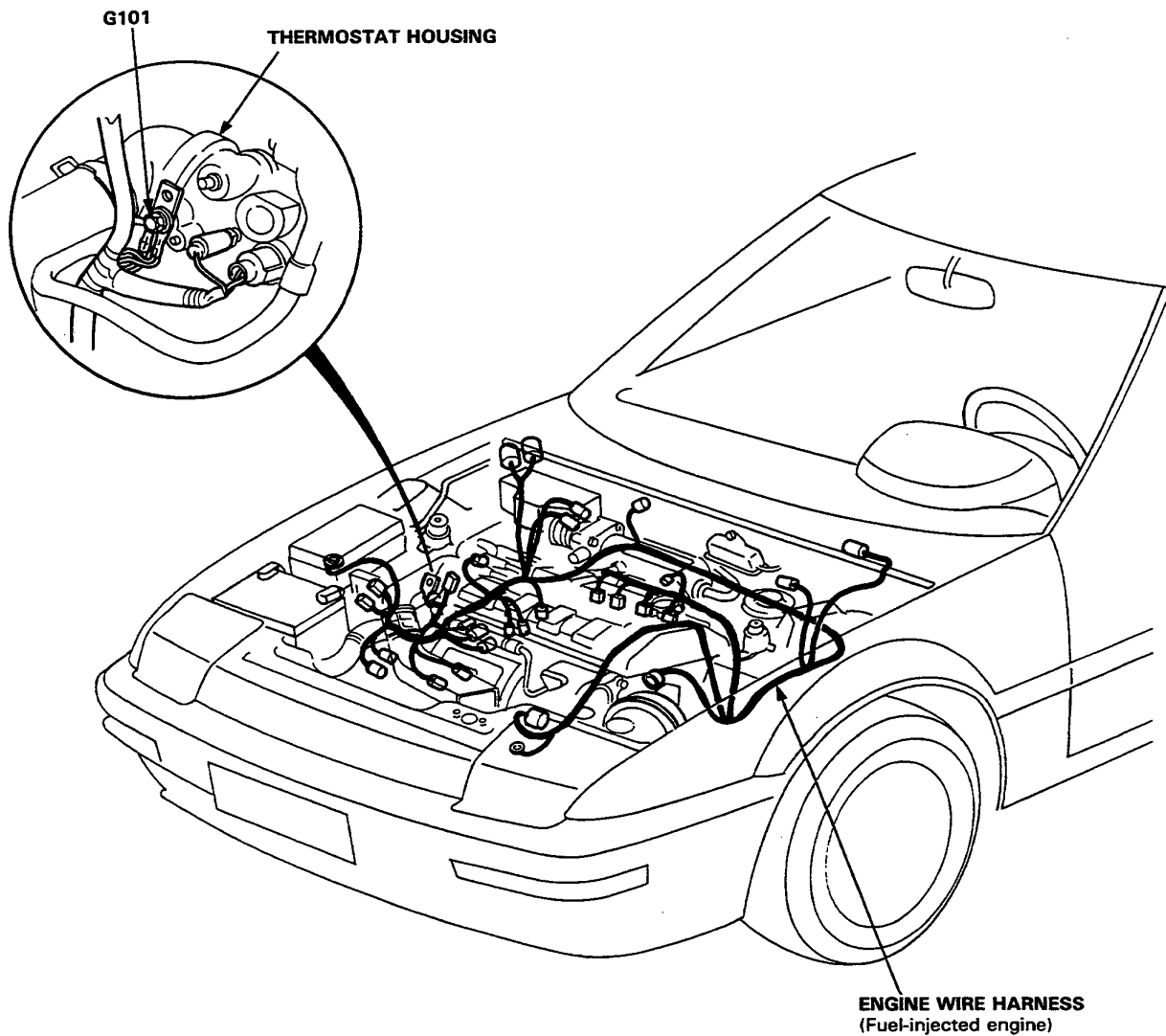
**NOTE:**

- The illustration is L.H. drive type.
- R.H. drive type is symmetrical to L.H. drive type.



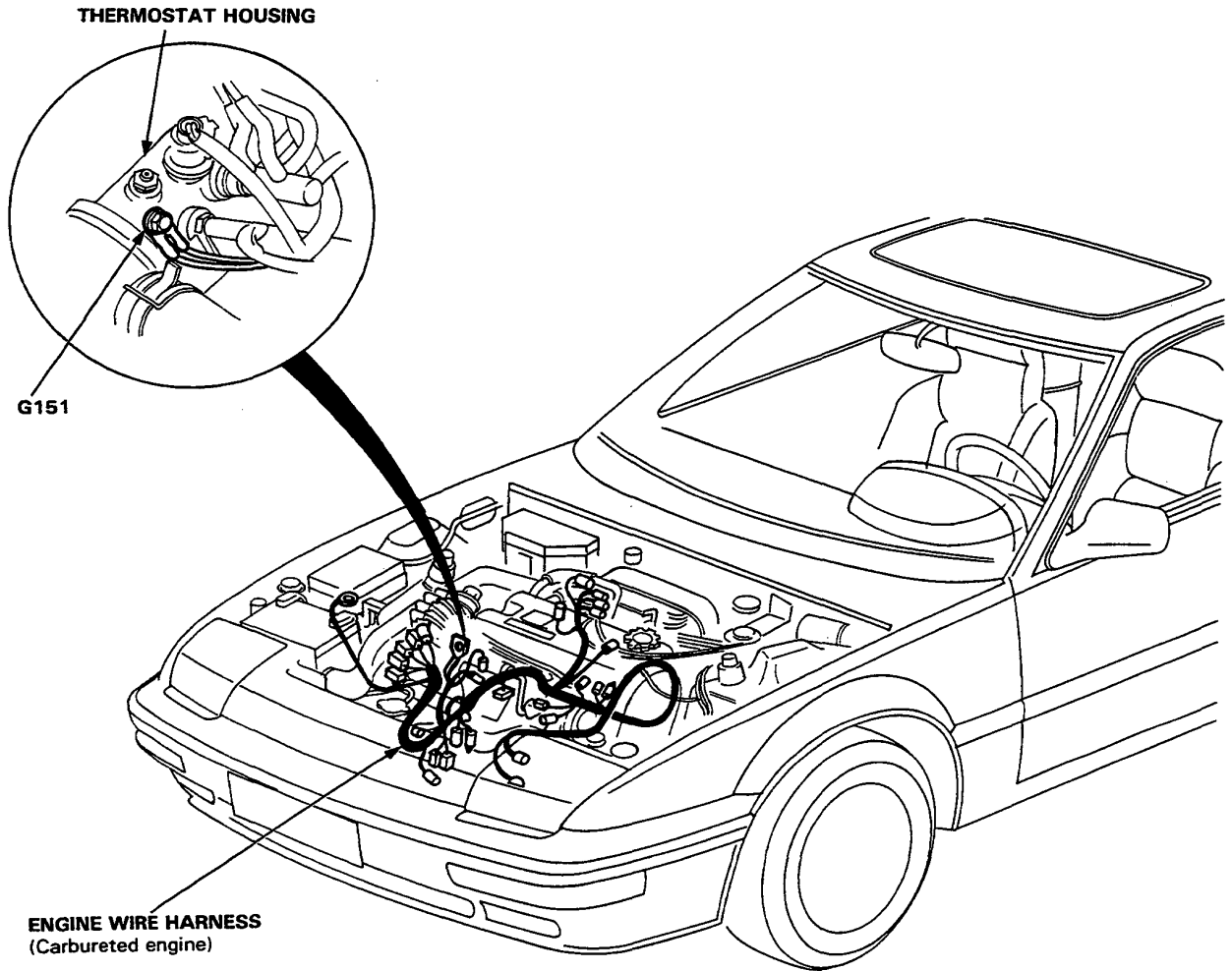
# Ground and Wire Harness Routing





# Ground and Wire Harness Routing

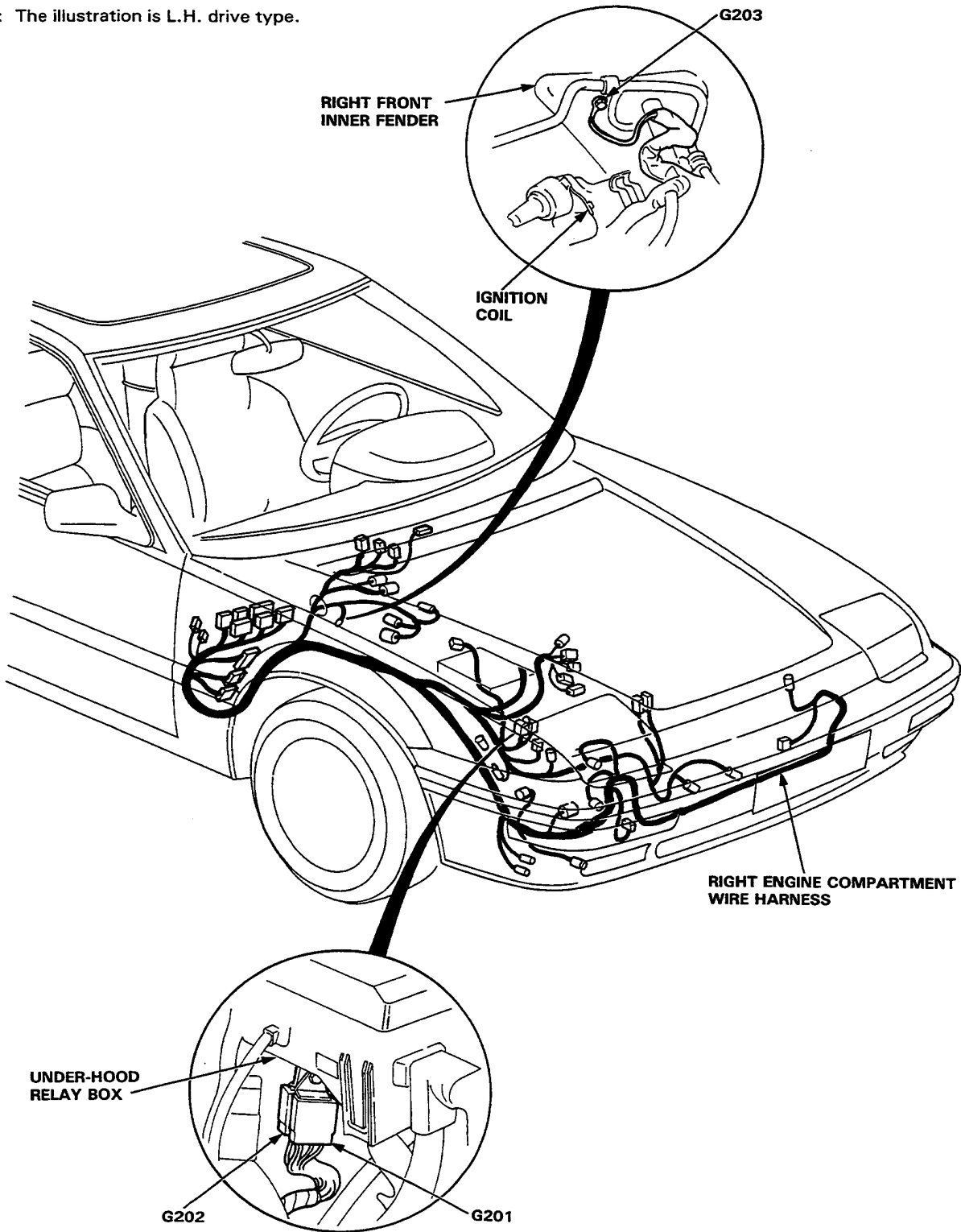
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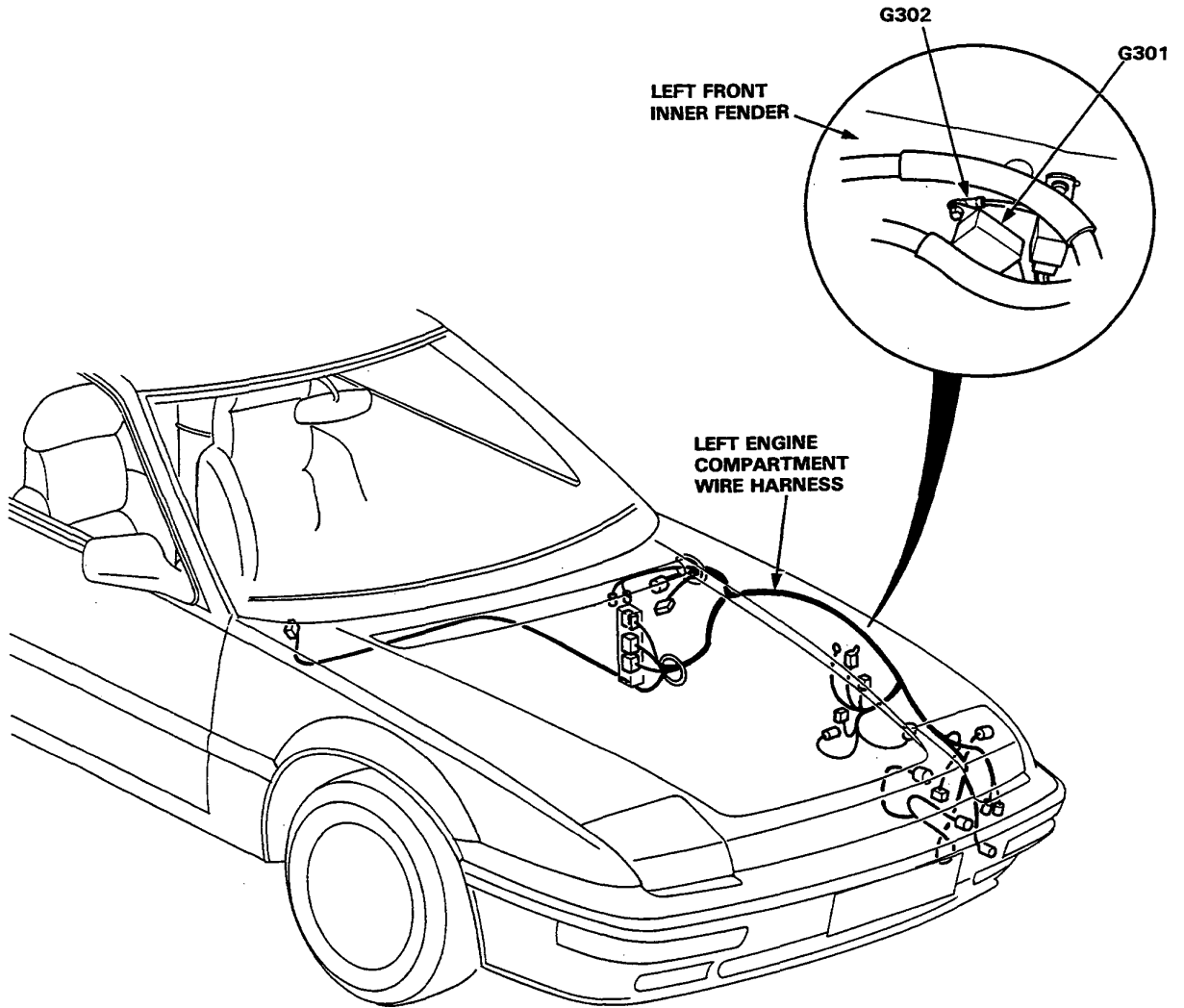
NOTE: The illustration is L.H. drive type.



# Ground and Wire Harness Routing

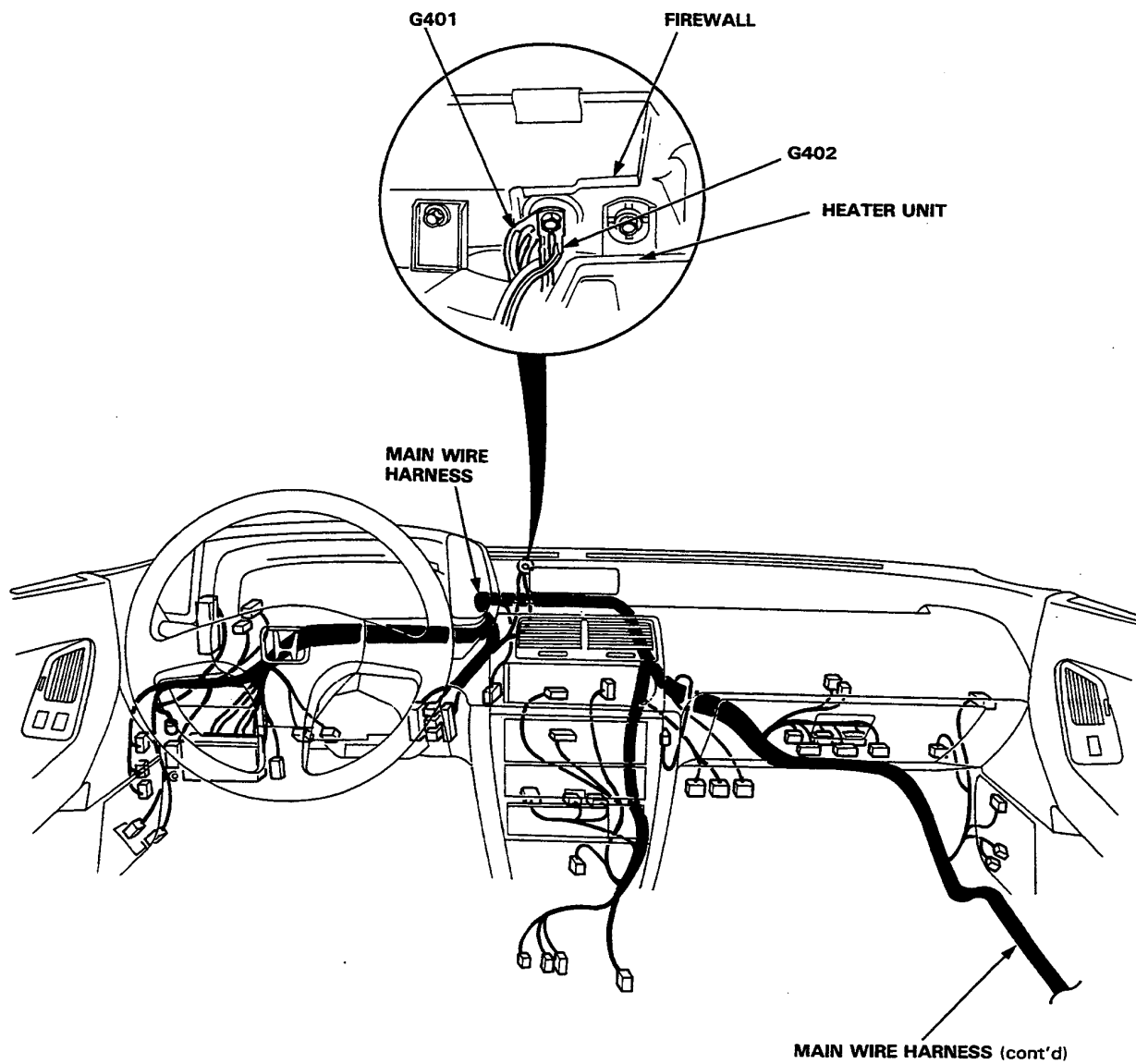
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NOTE: The illustration is L.H. drive type.



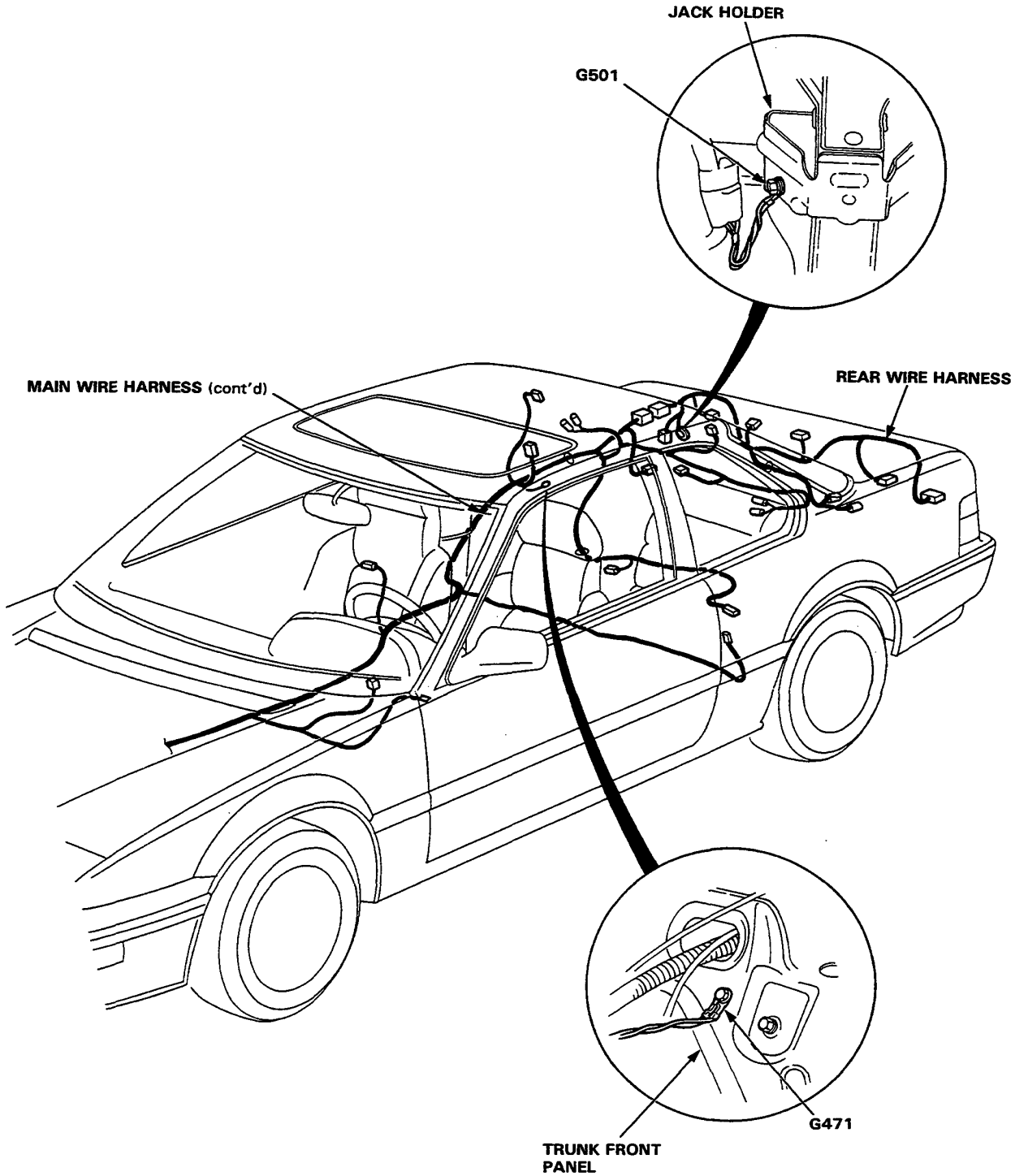


NOTE: The illustration is L.H. drive type.



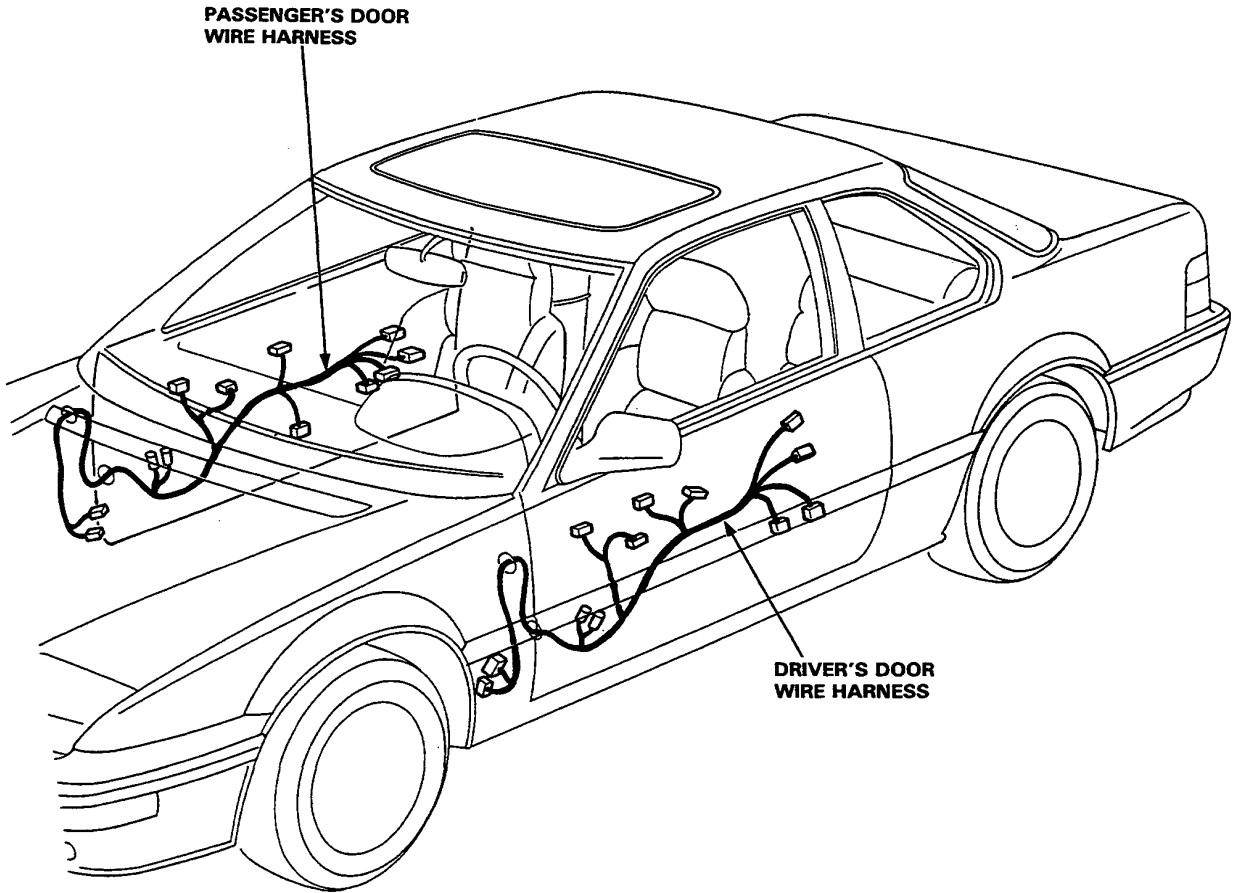
# Ground and Wire Harness Routing

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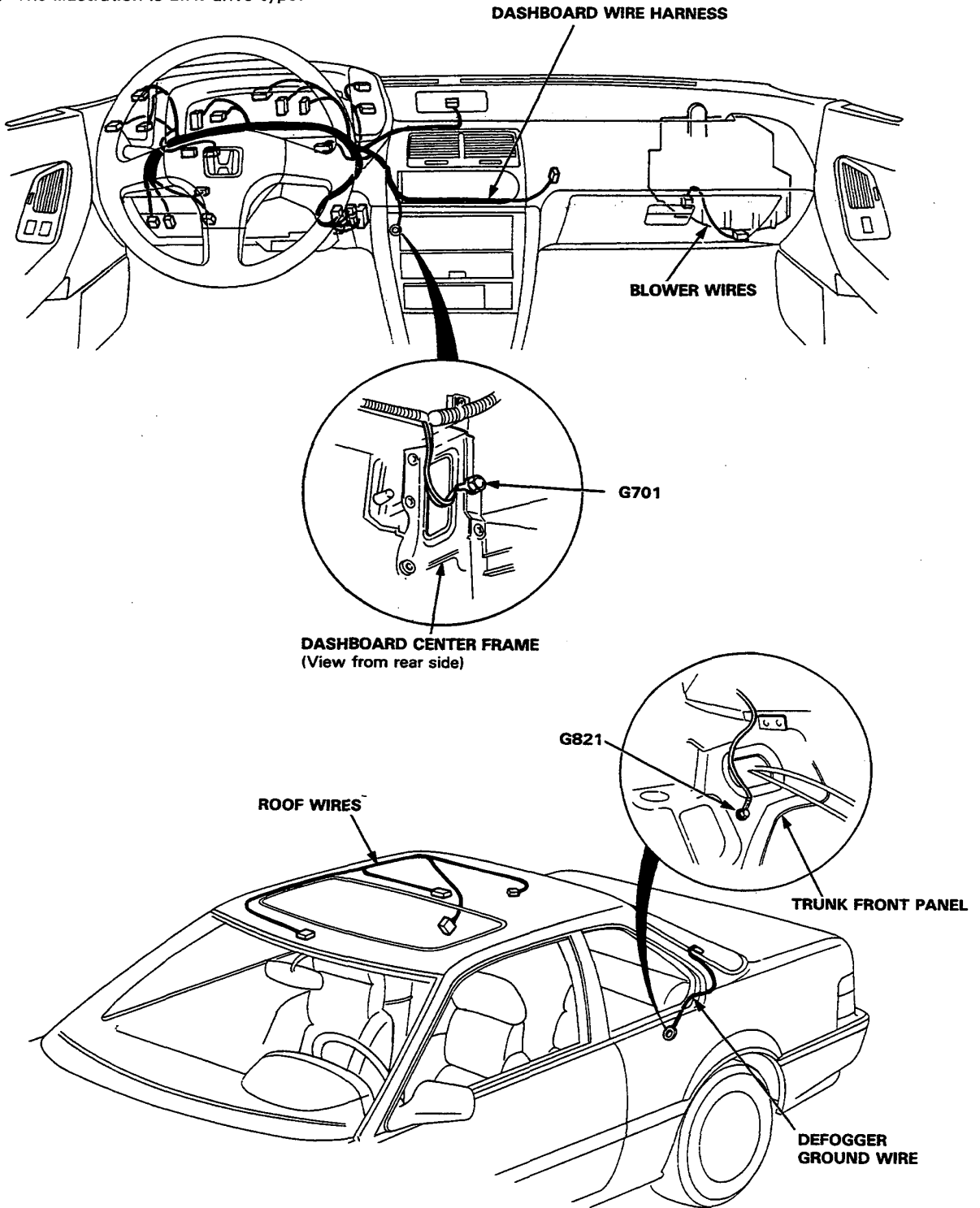


NOTE: The illustration is L.H. drive type.



# Ground and Wire Harness Routing

NOTE: The illustration is L.H. drive type.

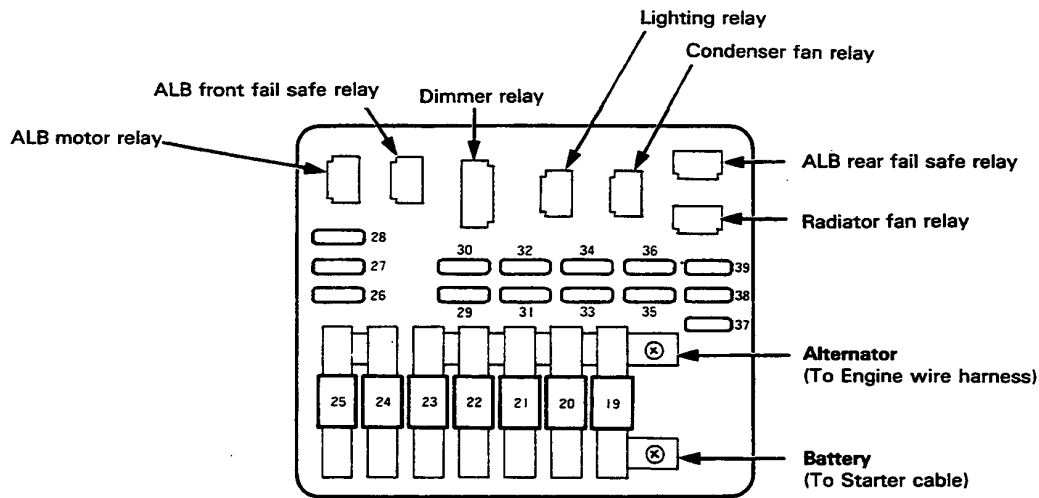




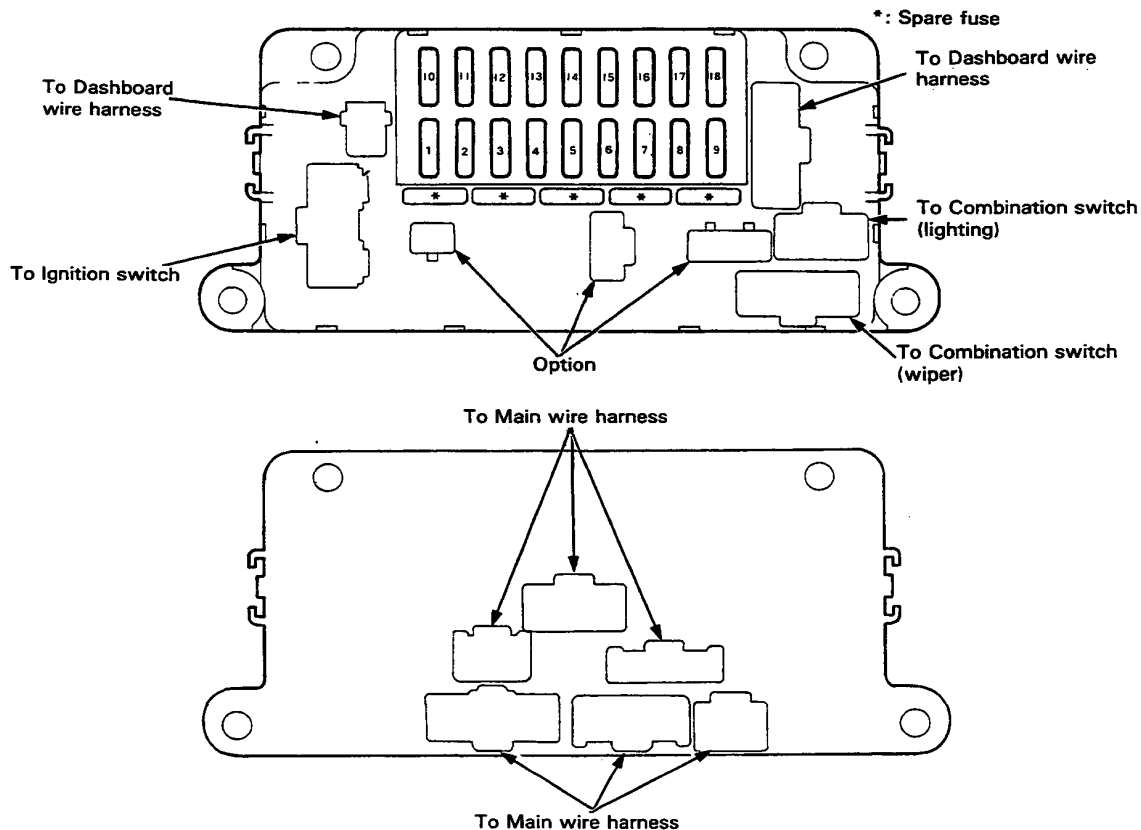
# Fuses

## Fuse/Relay Box

**Relay Box (Located in engine compartment, right side):**

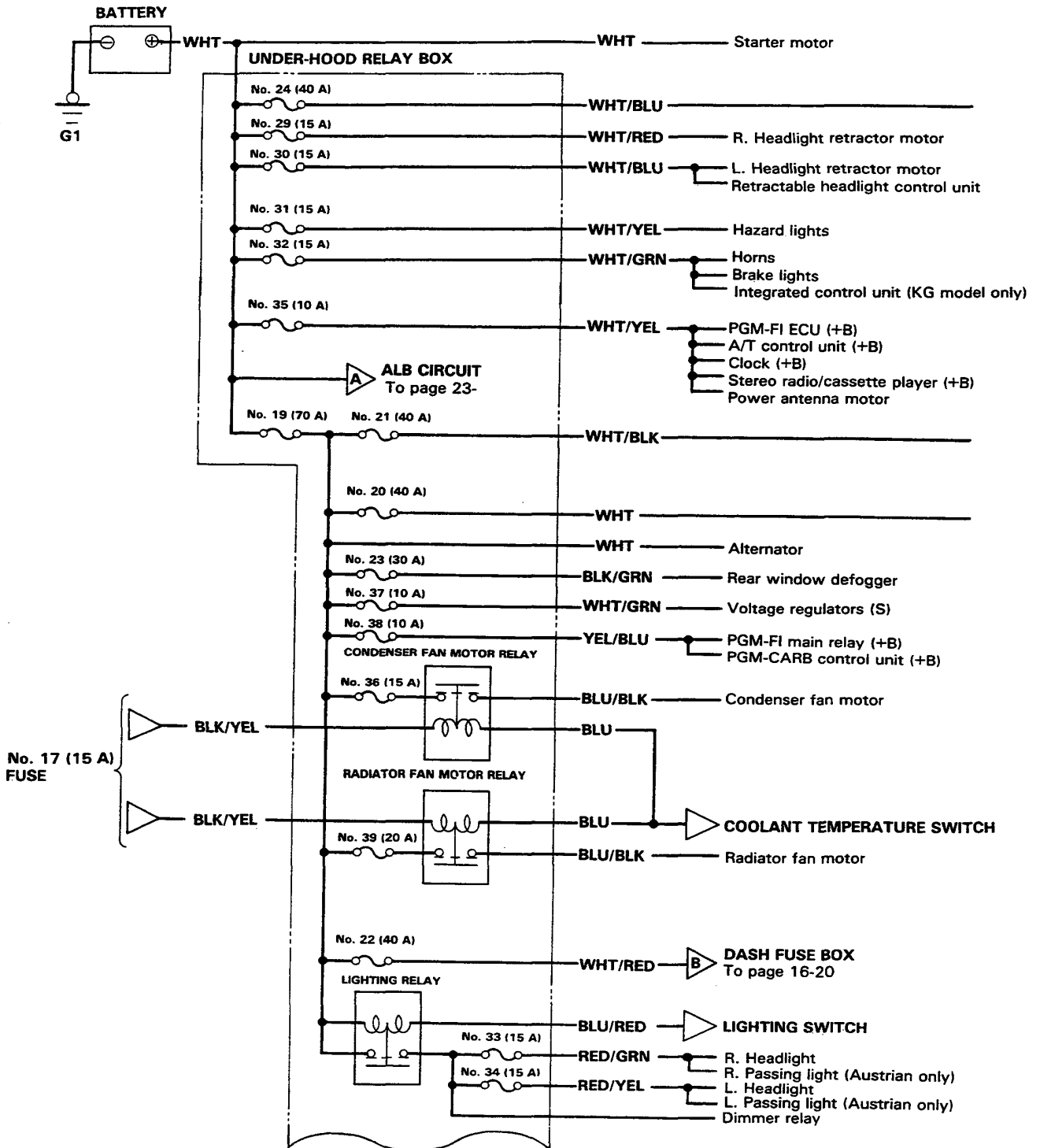


**Fuse Box (Located under dash, left side): L.H. Drive**  
**(Located under dash, right side): R.H. Drive**

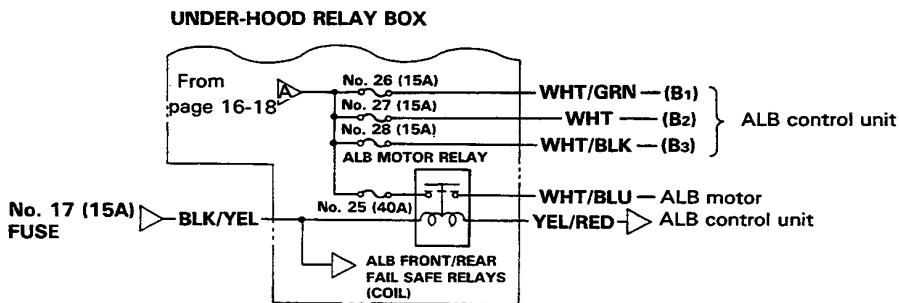
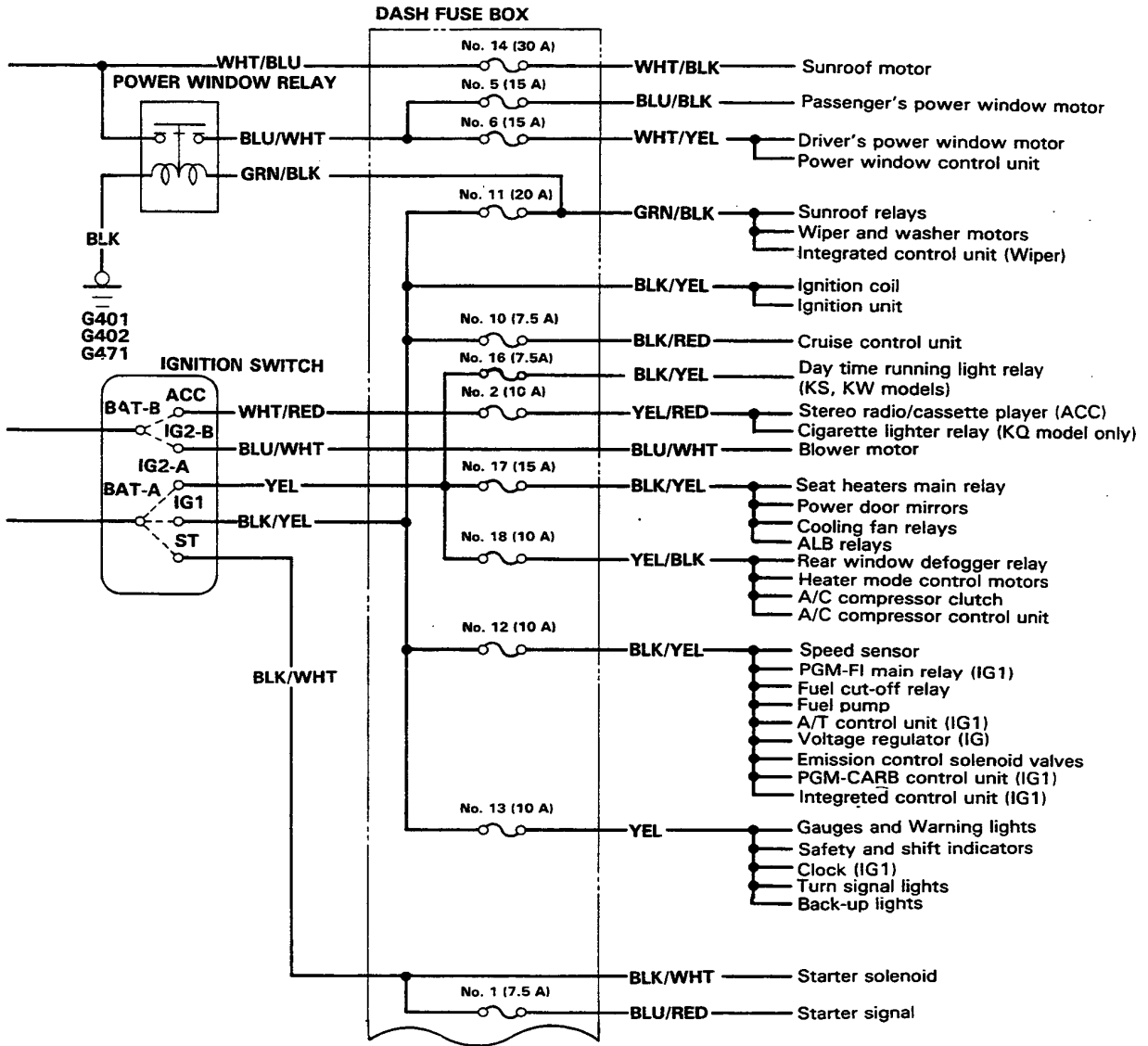


# Power Distribution

## Circuit Identification





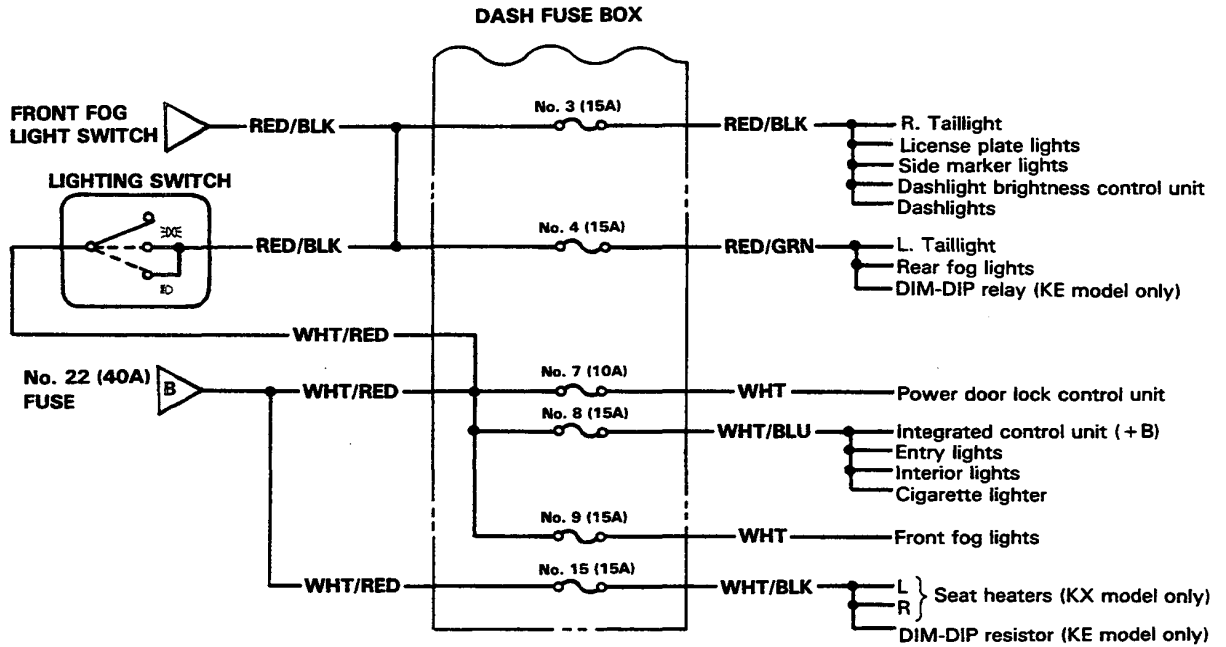


(cont'd)

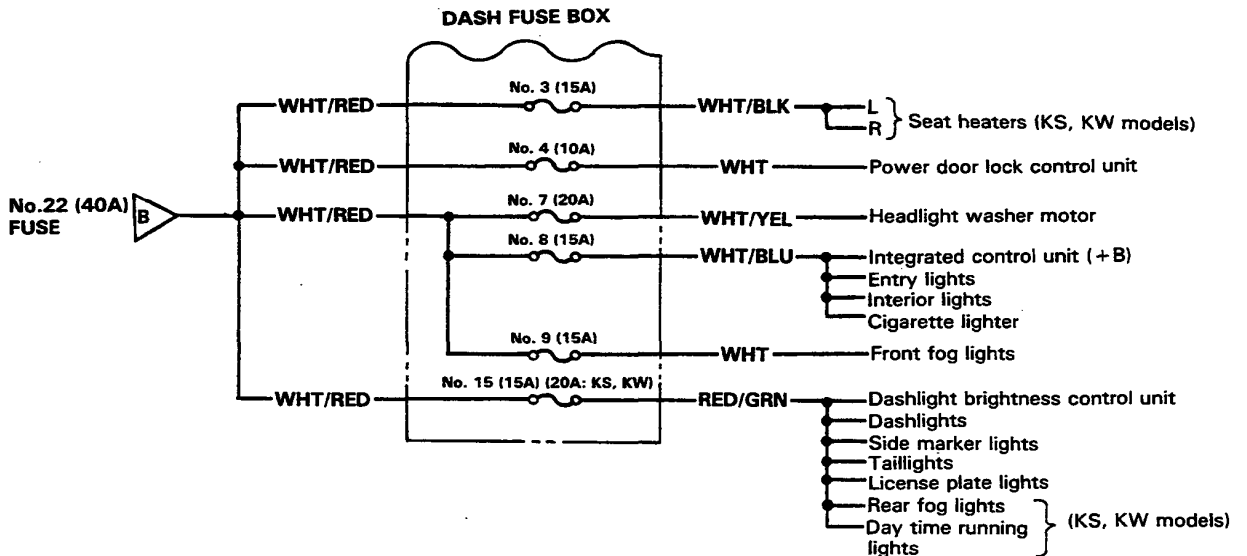
# Power Distribution

## Circuit Identification (cont'd)

<KG, KB, KX, KF, KE>



<KS, KW, KQ, KT, KY>

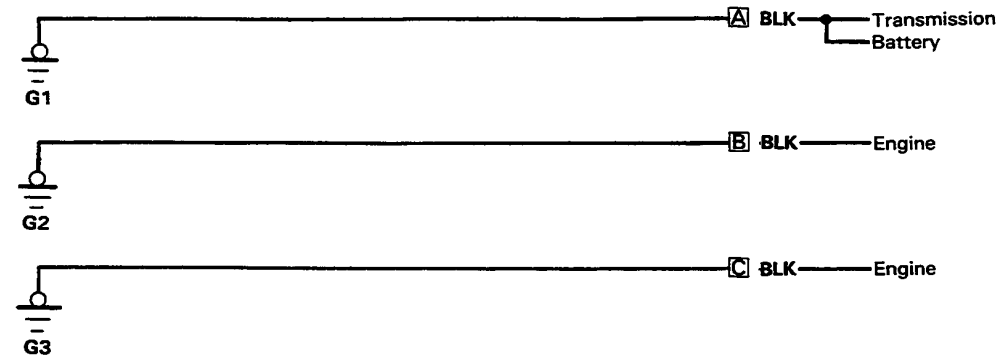




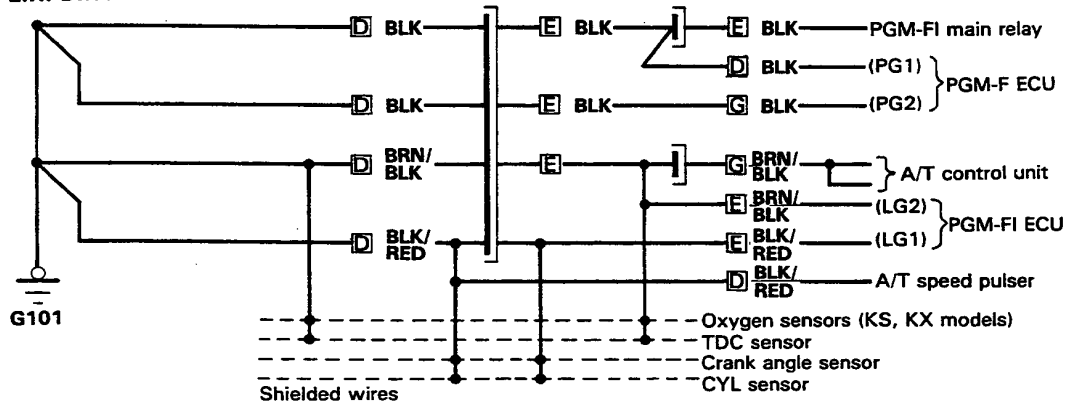
# Ground Distribution

## Circuit Identification

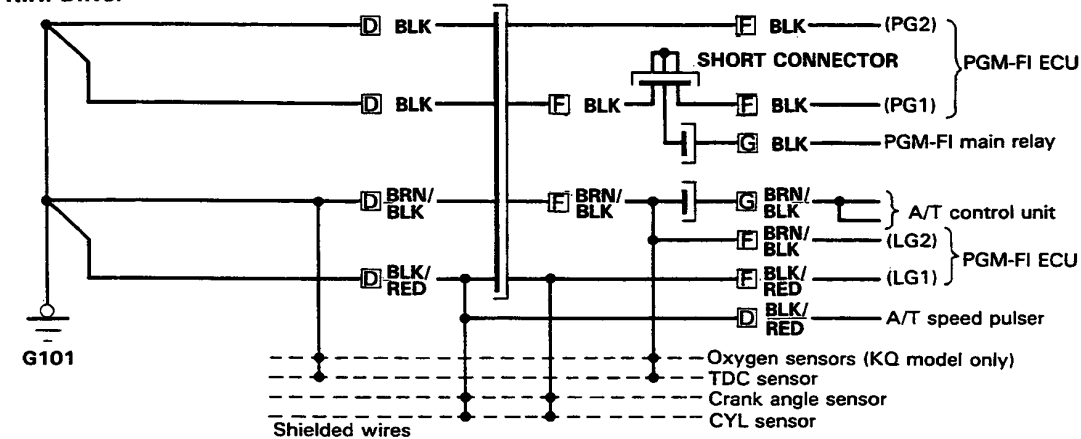
NOTE: See pages 16-8 and 9 for illustrated ground locations.



L.H. Drive:



R.H. Drive:



- A:** Battery ground wire
- B:** Engine ground wire A
- C:** Engine ground wire B

- D:** Engine wire harness
- E:** Right engine compartment wire harness
- F:** Left engine compartment wire harness

- G:** Main wire harness

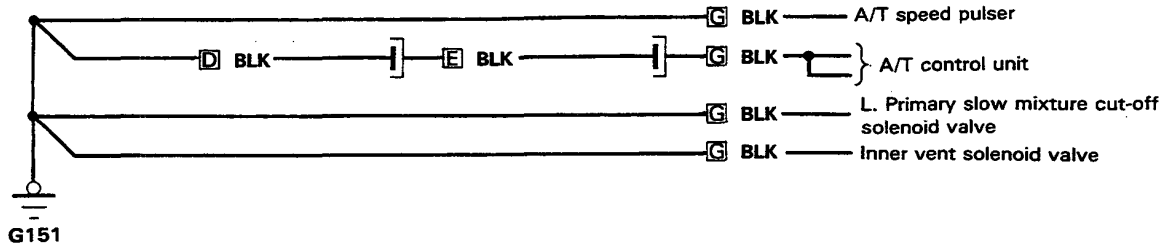
(cont'd)

# Ground Distribution

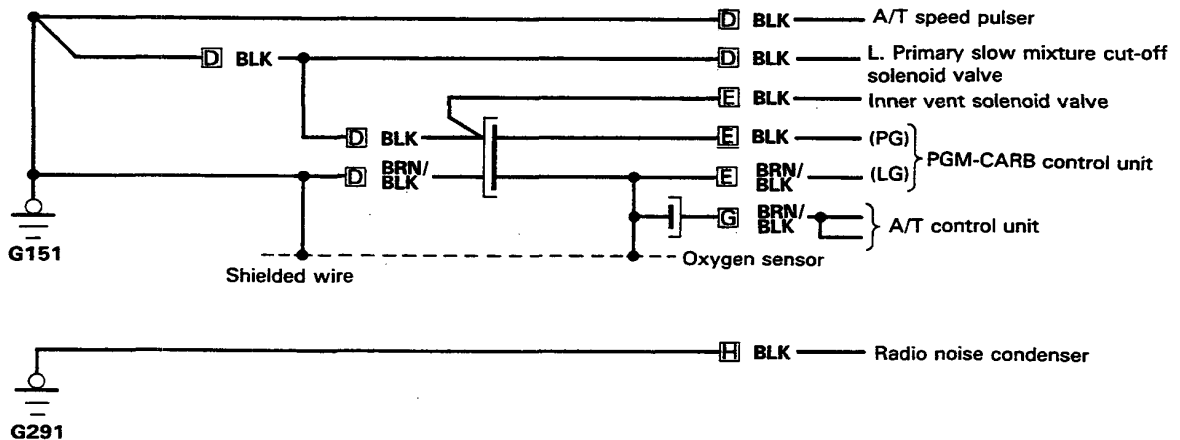
## Circuit Identification

NOTE: See pages 16-8 and 10 for illustrated ground locations.

Except KX, KS, KY models:



KX, KS, KY models:

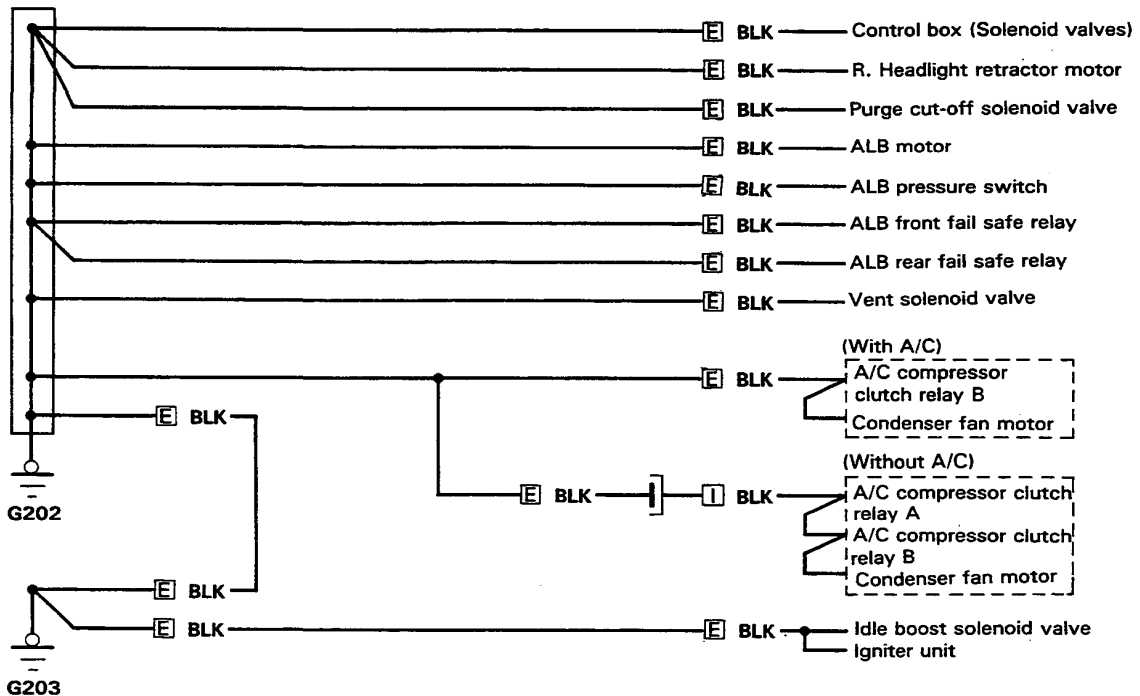
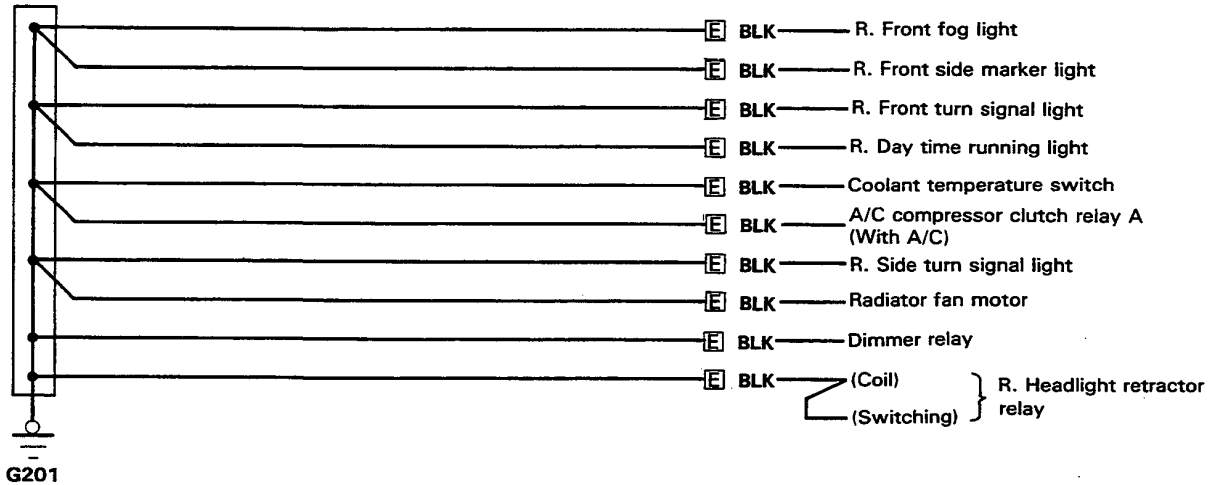


- D: Engine wire harness
- E: Right engine compartment wire harness
- G: Main wire harness
- H: Radio condenser ground wire (On Carbureted engine, this wire is included in the distributor primary lead)



**L.H. Drive:**

NOTE: See page 16-11 for illustrated ground locations.



E: Right engine compartment wire harness  
 I: A/C wire harness

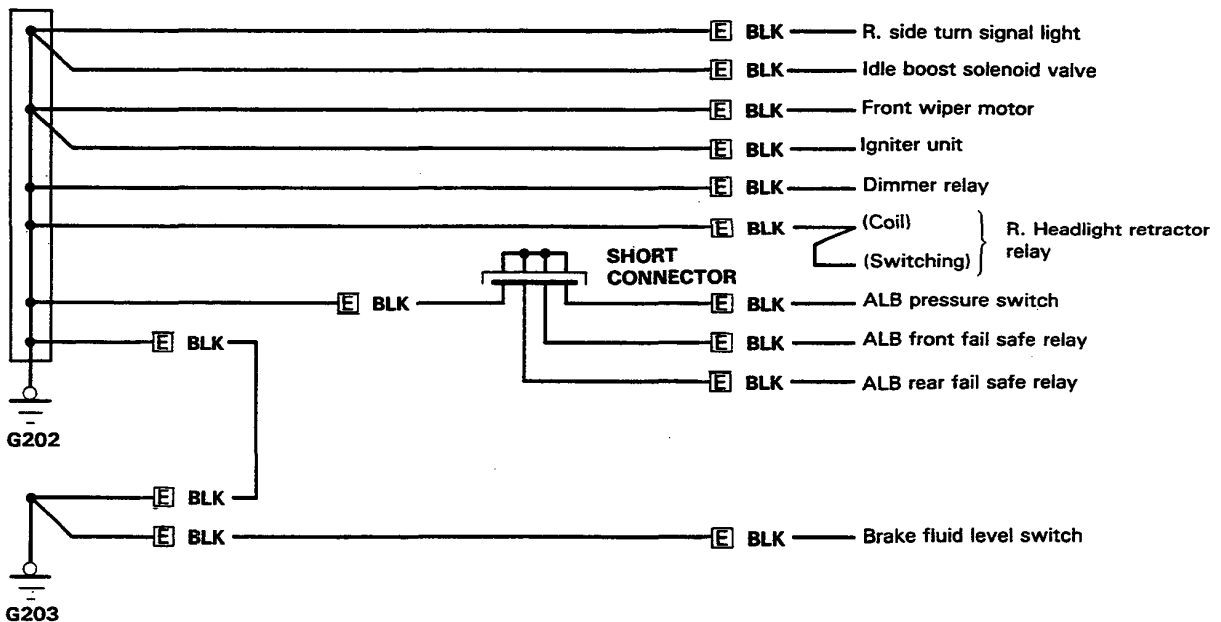
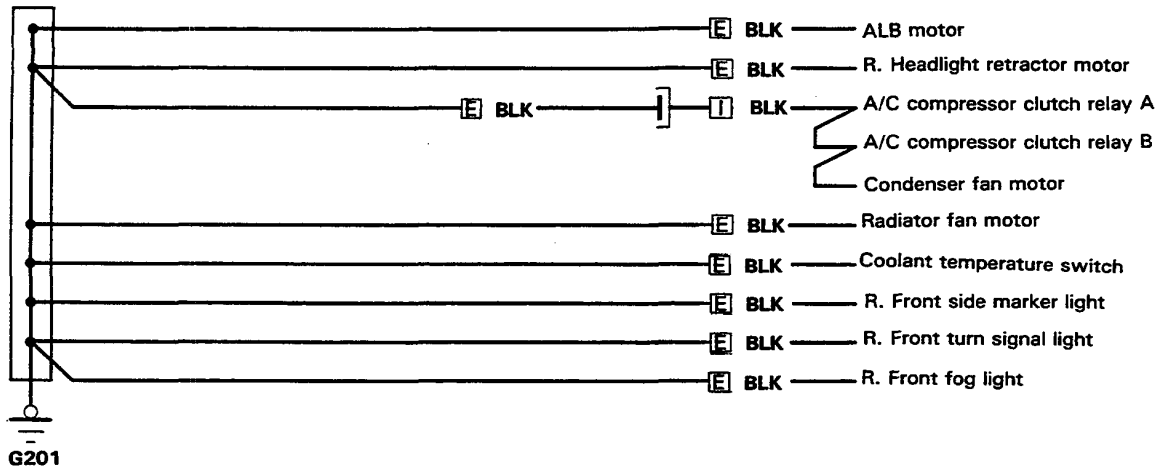
(cont'd)

# Ground Distribution

## Circuit Identification (cont'd)

R.H. Drive:

NOTE: See page 16-11 for illustrated ground locations.

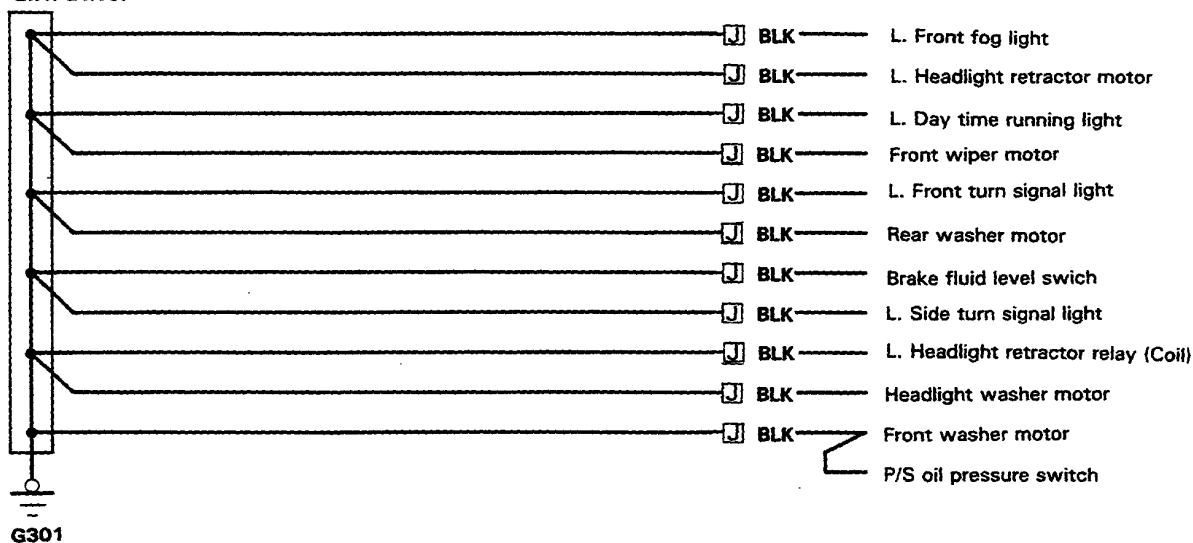


E: Right engine compartment wire harness  
I: A/C wire harness

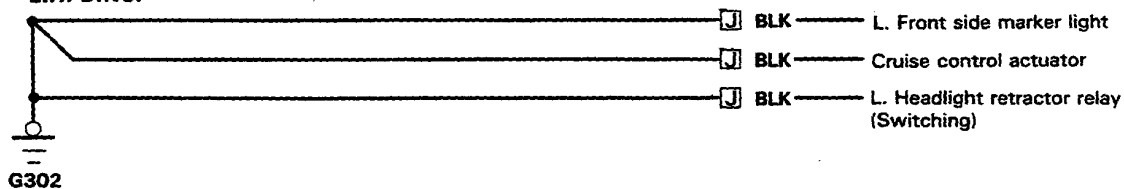


NOTE: See page 16-12 for illustrated ground locations.

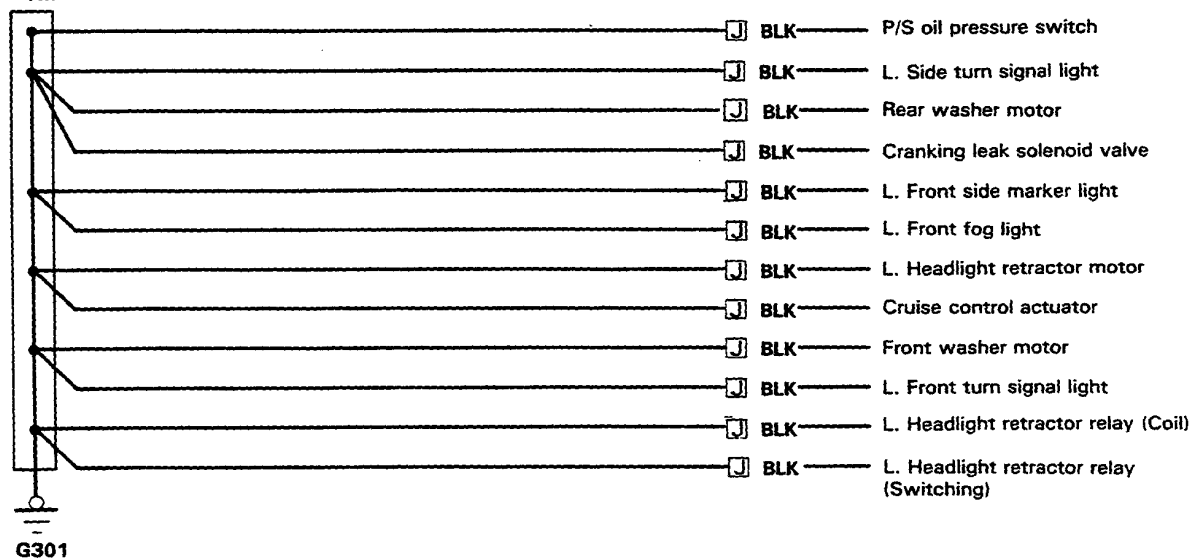
L.H. Drive:



L.H. Drive:



R.H. Drive:



Left engine compartment wire harness

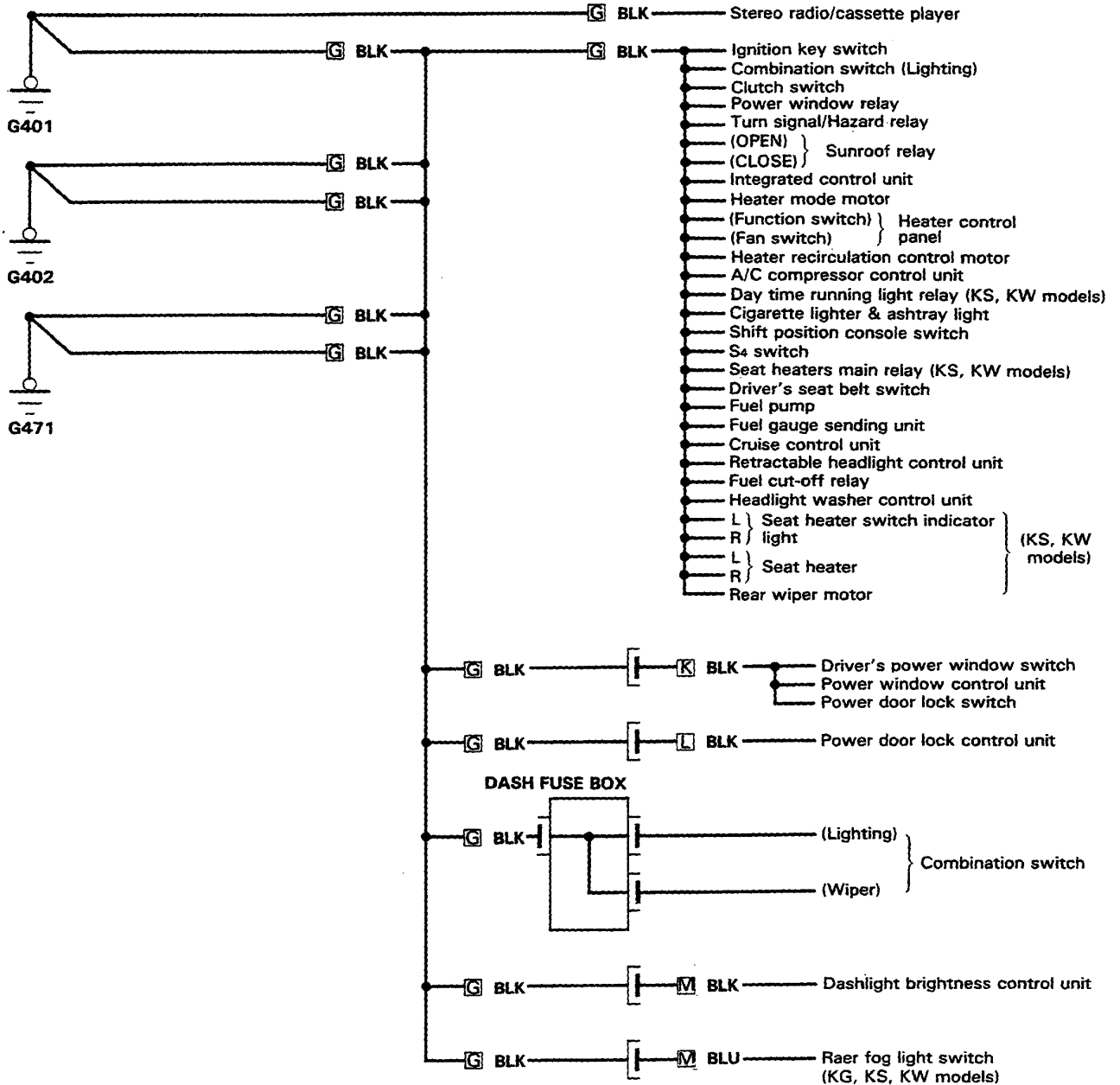
(cont'd)

# Ground Distribution

## Circuit Identification (cont'd)

L.H. Drive:

NOTE: See pages 16-13 and 14 for illustrated ground locations.



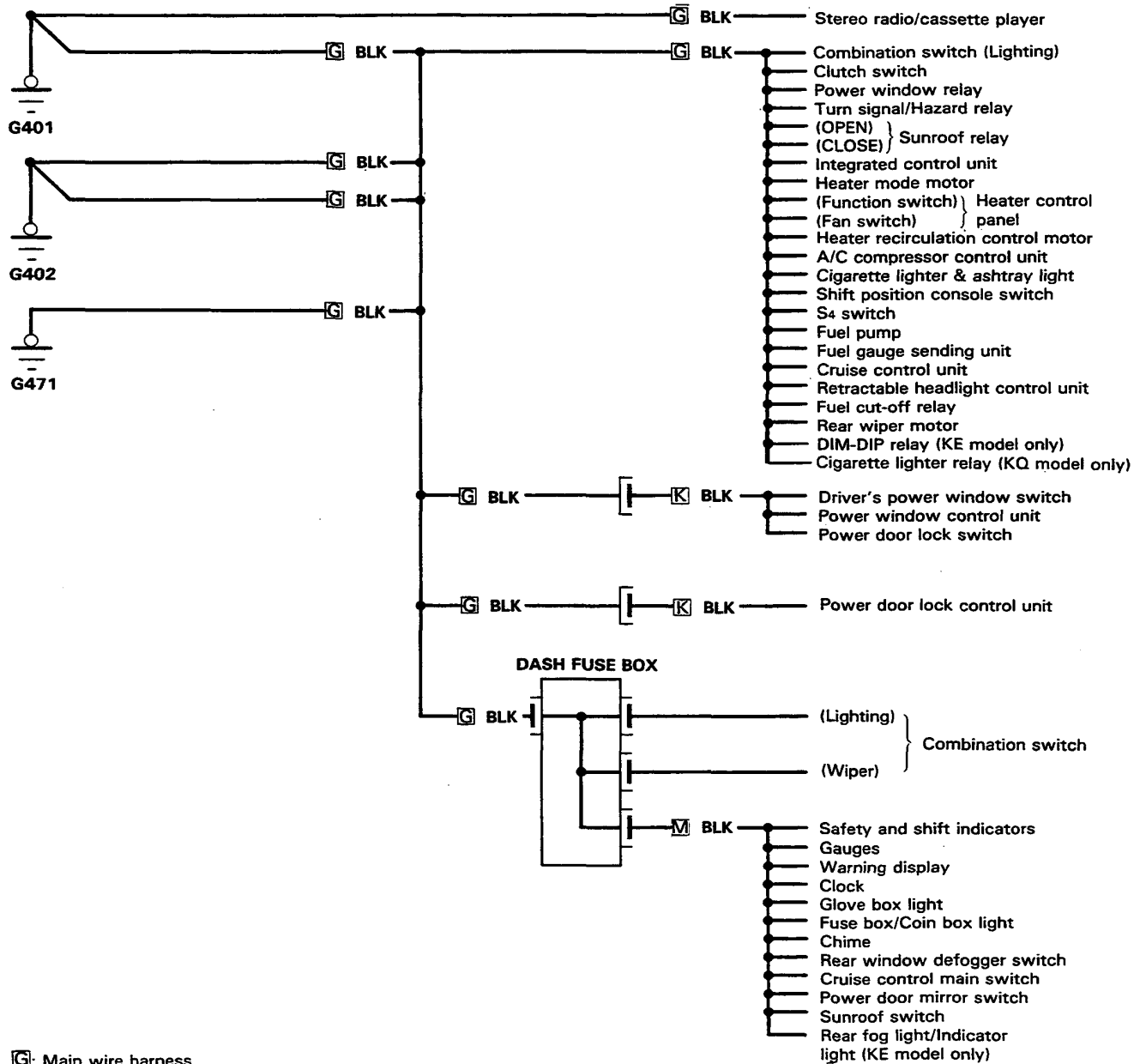
- G: Main wire harness
- K: Driver's door wire harness
- L: Passenger's door wire harness
- M: Dashboard wire harness





**R.H. Drive:**

NOTE: See pages 16-13 and 14 for illustrated ground locations.



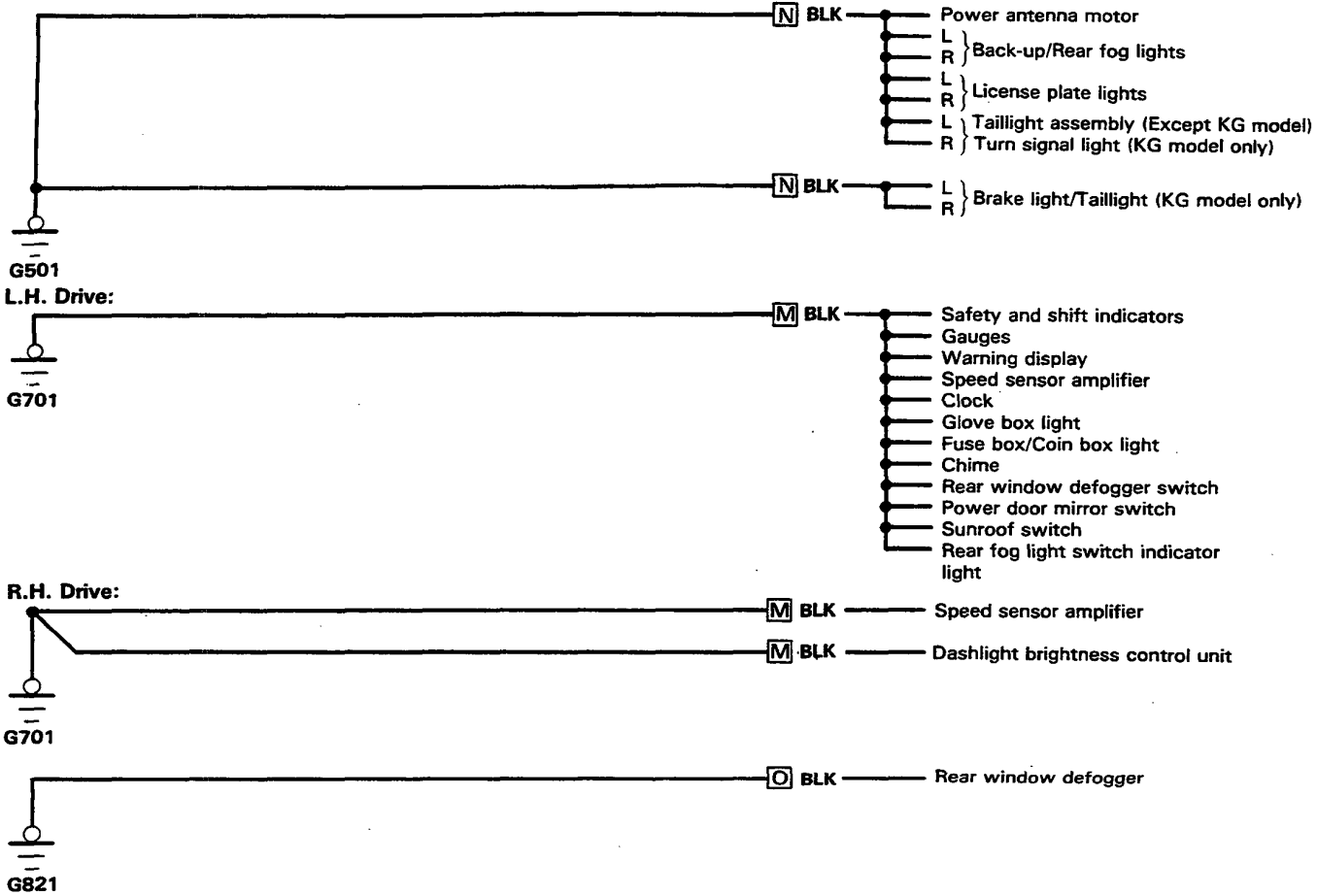
- G**: Main wire harness
- K**: Driver's door wire harness
- L**: Passenger's door wire harness
- M**: Dashboard wire harness

(cont'd)

# Ground Distribution

## Circuit Identification (cont'd)

NOTE: See pages 16-14 and 16 for illustrated ground locations.



- M:** Dashboard wire harness
- N:** Rear wire harness
- O:** Defogger ground wire

# Battery



## Test

**NOTE:** To get accurate results, the temperature of the electrolyte must be between 15 and 38°C (59 and 100°F) before testing.

### Test Equipment Required:

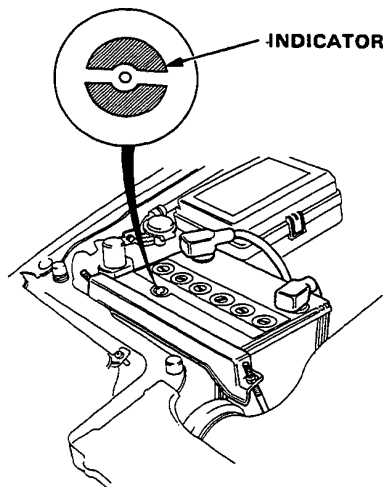
- Battery tester with:  
Voltmeter with 0–18 V scale, Ammeter with 0–100 A and 0–500 A scales, and a carbon pile with 0–300 W.
- 12 V Battery Charger:  
Fast charge capability of 50 A and slow charge capability of 5 A.

### Test Procedure:

**WARNING** Keep sparks, flames and cigarettes away while charging battery.

**CAUTION:** Battery electrolyte is a sulfuric acid solution.

- If it spills on painted surfaces, clothing, or skin, rinse it off with water immediately to minimize the damage.
  - Always wear safety goggles or a face shield when servicing a battery.
1. Check for damage: If the case is cracked or the posts are loose, replace the battery.
  2. Check indicator (for basic charge condition): Blue or Green is OK. If the indicator is red, peel the tape off, remove the caps, and add distilled water; then reinstall the caps and tape. If the indicator is clear, go to step 3.



3. Test battery load capacity by connecting a battery tester, and applying a load of 240 amps. When the load has been applied for exactly 15 seconds, the battery voltage reading should stay above 9.6 V.

- If the reading stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.
- If the reading is between 6.5 and 9.6 V, fast charge the battery by connecting a battery charger, for 3 minutes at an initial rate of 40 amps.

**CAUTION:** Amperage will drop as voltage increases; do not increase the amperage to compensate or you may damage the battery.

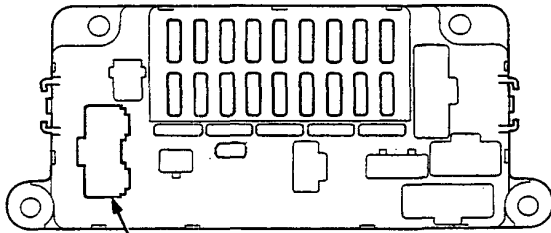
Watch the battery voltage during the entire 3 minutes; the highest reading should stay below 15.5 V.

- If the reading stays below 15.5 V, the battery is OK; clean its terminals and case, and reinstall it.
- If the reading exceeds 15.5 V any time during the 3 minutes of fast charge, the battery is no good; replace it.
- If the reading drops below 6.5 V, slow charge the battery by connecting a battery to charger, at 5 amps for no more than 24 hours, (or until the indicator shows full charge, or the specific gravity of the electrolyte is at least 1.250). Then test load capacity again.
  - If the voltage stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.
  - If the voltage still drops below 6.5 V, the battery is no good; replace it.

# Ignition Switch

## Test

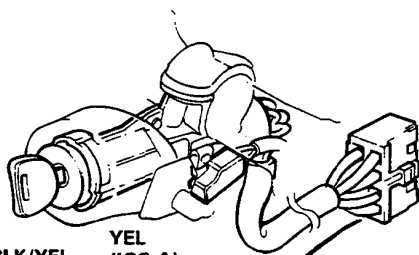
1. Disconnect the 7-P connector from the dash fuse box.



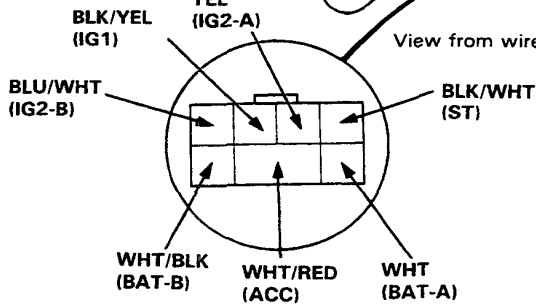
7-P CONNECTOR

2. 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)	YEL (IG2 -A)	BLK/WHT (ST)
0							
I	○	○					
II	○	○	○	○	○	○	
III				○	○		○

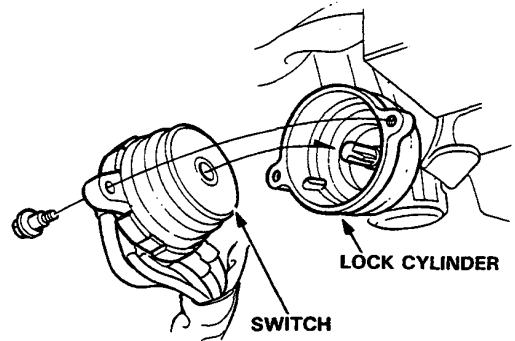


View from wire side



## Electrical Switch Replacement

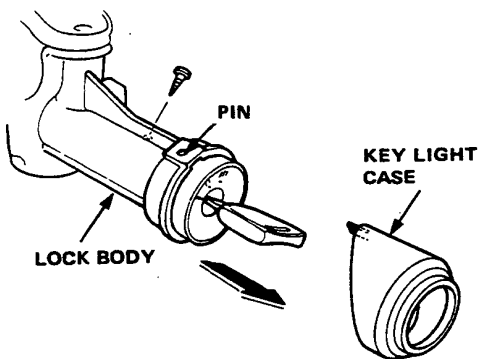
1. Remove the steering wheel, then remove the steering column lower cover.
2. Disconnect the 7-P connector from the dash fuse box.
3. Insert the key and turn it to "0."
4. Remove the 2 screws and replace the base of the switch.



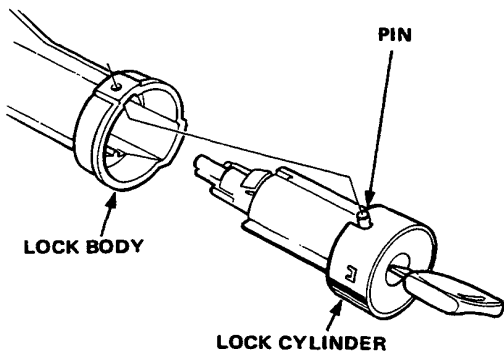


## Lock Cylinder Replacement

1. Remove the steering wheel, then remove the steering column covers.
2. Remove the bulb/socket from the key light case by turning the socket 45°, then remove the screw and the key light case from the lock body.
3. Turn the ignition key to "I."
4. Push the pin in and remove the lock cylinder from the lock body.



5. Turn the key to "O" and align the lock cylinder with the lock body.
6. Turn the key almost to "I" and insert the lock cylinder until the pin touches the body.
7. Turn the key to the "I", push the pin and insert the lock cylinder into the lock body until the pin clicks into place.

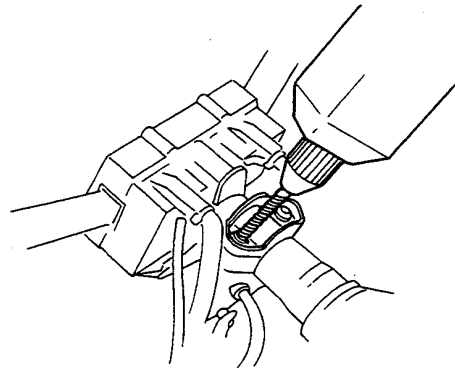


## Steering Lock Replacement

1. Remove the steering wheel, then remove the steering column covers.
2. Center punch each of the 2 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 heads.

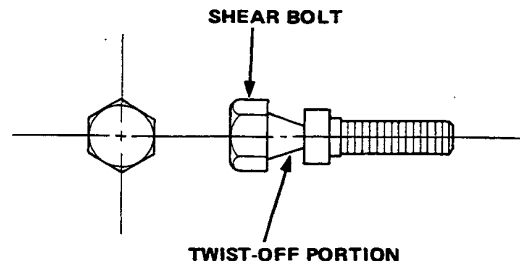
3. Remove the shear bolts from the switch body.



4. Install the new ignition switch without the key inserted.
5. Loosely tighten the new shear bolts.

**NOTE:** Make sure the projection on the ignition switch is aligned with the hole in the steering column.

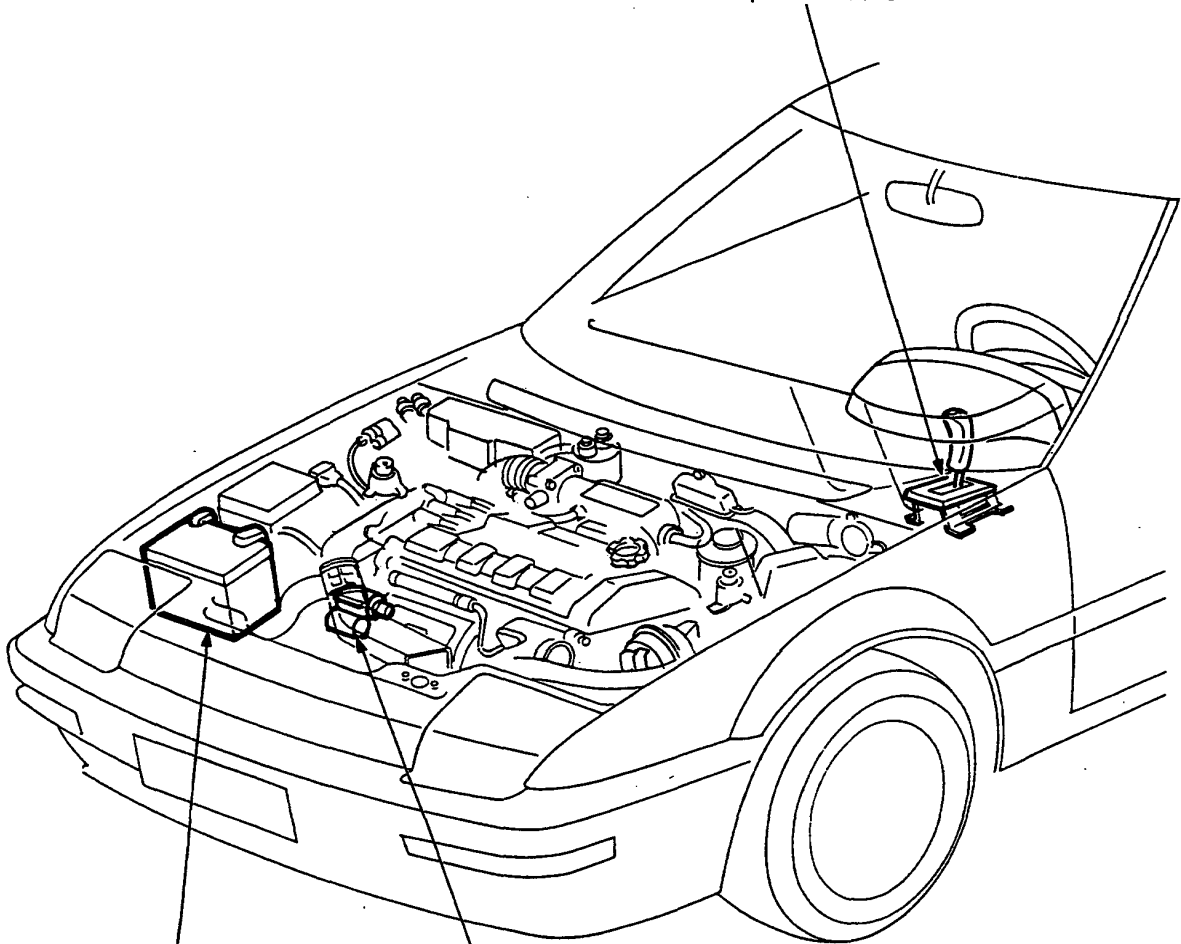
6. Insert the ignition key and check for proper operation of the steering wheel lock and that the ignition key turns freely.
7. Tighten the shear bolts until the hex heads twist off.



# Starting System

## Component Location Index

**SHIFT POSITION  
CONSOLE SWITCH  
(NEUTRAL SAFETY SWITCH)  
(A/T only)**  
Test, page 16-100  
Replacement, page 16-101

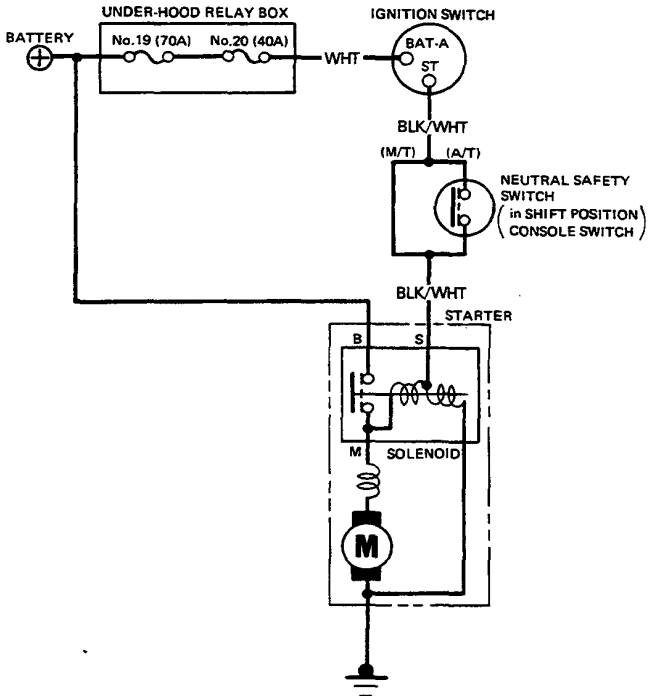


**BATTERY**  
Test, page 16-29

**STARTER**  
Test, page 16-34  
Solenoid Test, page 16-36  
Replacement, page 16-36  
Overhaul, page 16-37  
Reassembly, page 16-42



# Circuit Diagram



# Starting System

## Starter Test

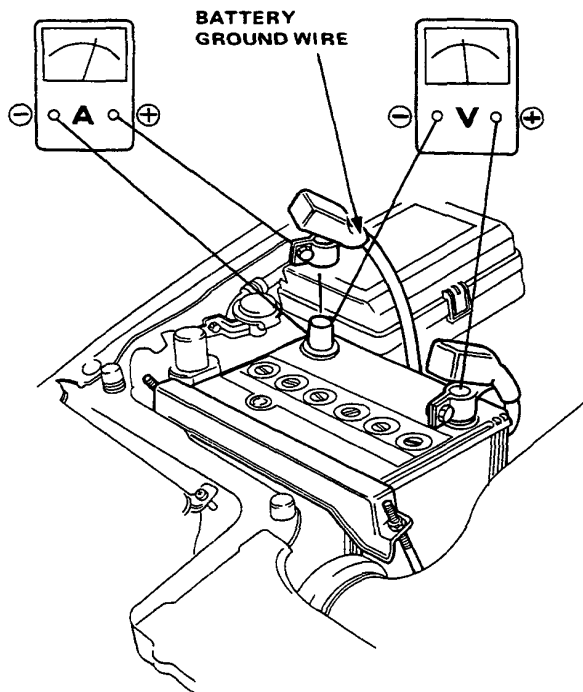
**NOTE:** The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

### Recommended Procedure:

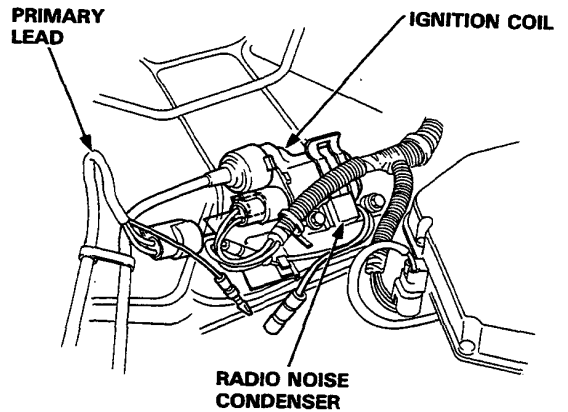
Use a starter system tester.  
Connect and operate the equipment in accordance with manufacturer's instructions.  
Test and troubleshoot as described.

### Alternate Procedure:

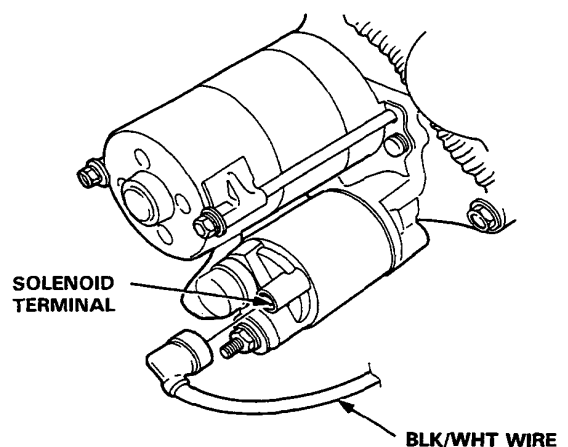
- Use the following equipment:
  - Ammeter, 0–400 A
  - Voltmeter, 0–20 V (accurate within 0.1 volt)
  - Tachometer, 0–1200 rpm
- Hook up voltmeter and ammeter as shown.



1. Disconnect the primary lead from the ignition coil.



2. Check the starter engagement:  
Turn the ignition switch to "Start." The starter should crank the engine.
  - If the starter does not crank the engine, check the battery, battery positive wire and 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.

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 and current should be no greater than specified below:

Power	Voltage	Current
1.0 KW	8.5 V	230 A
1.4 KW	8.0 V	350 A

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 min<sup>-1</sup> (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:  
Turn the ignition switch to "Start" and release to "Run". The starter drive gear should disengage from the flywheel ring gear.

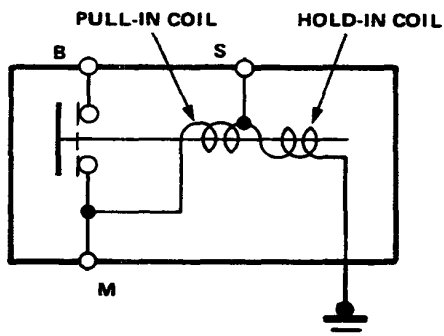
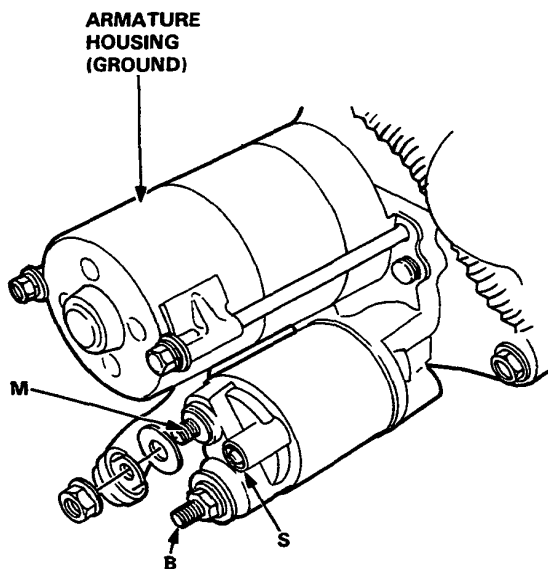
If the drive gear hangs up on the flywheel ring gear, check.

- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirty or damaged over-running clutch.

# Starting System

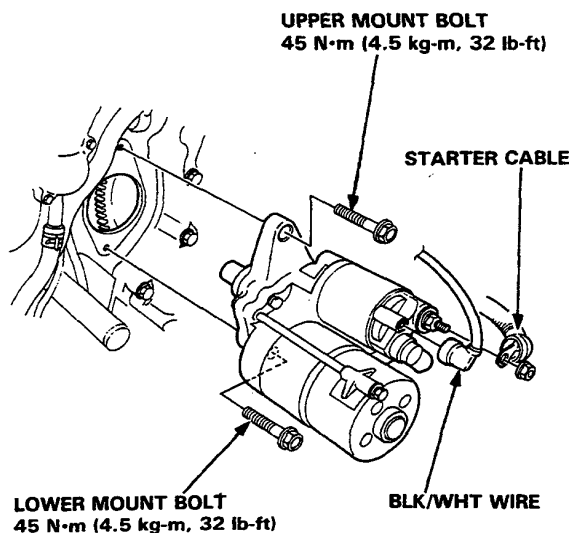
## Starter Solenoid Test

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

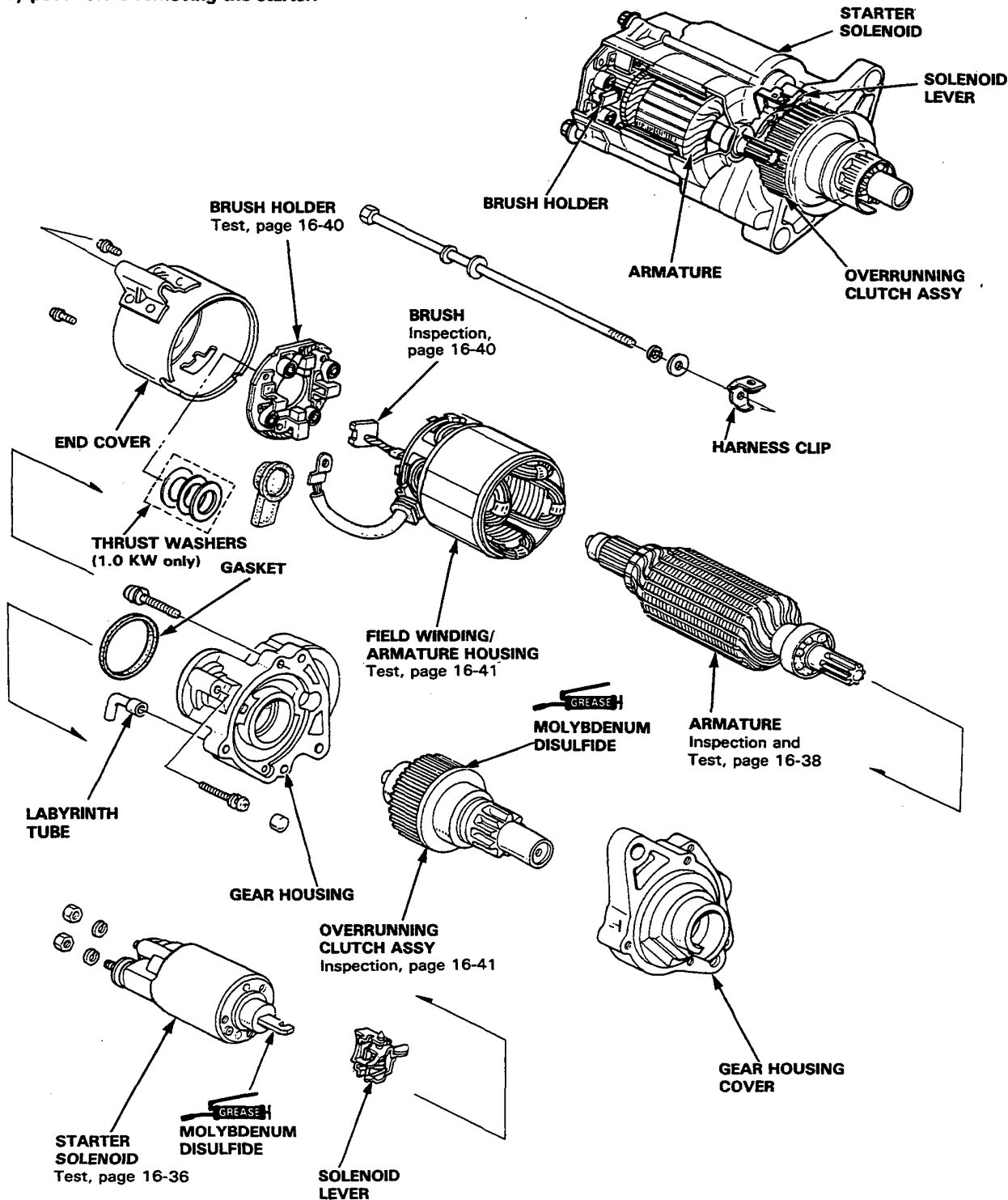
1. Disconnect the ground wire from the battery negative (-) post.
2. Disconnect the starter cable from the B terminal on the solenoid, and the BLK/WHT wire from the S terminal.
3. Remove the 2 bolts holding the starter, and remove the starter.





# Starter Overhaul (1.0 KW and 1.4 KW)

**CAUTION:** Disconnect the ground wire from the battery post before removing the starter.

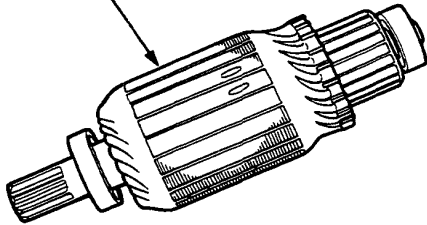


# Starting System

## Armature Inspection and Test

1. Inspect the armature for wear or damage due to contact with the field coil magnets.

Inspect for damage.

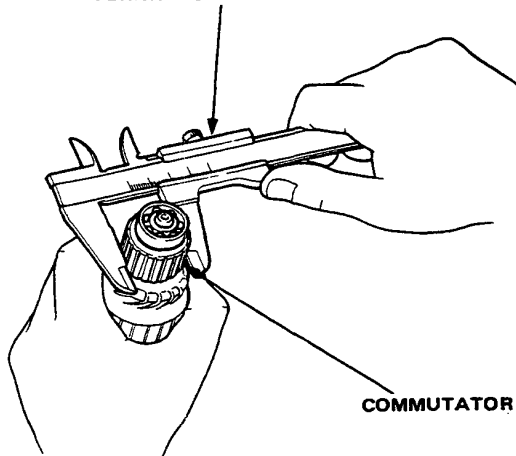


2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

### Commutator Diameter

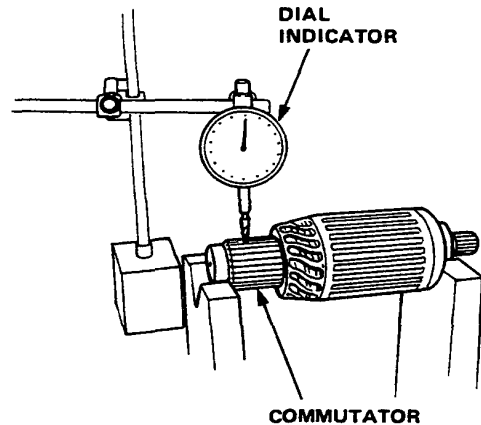
**Standard (New):** 28.0–28.1 mm  
(1.102–1.106 in)  
**Service Limit :** 27.5 mm (1.08 in)

VERNIER CALIPER

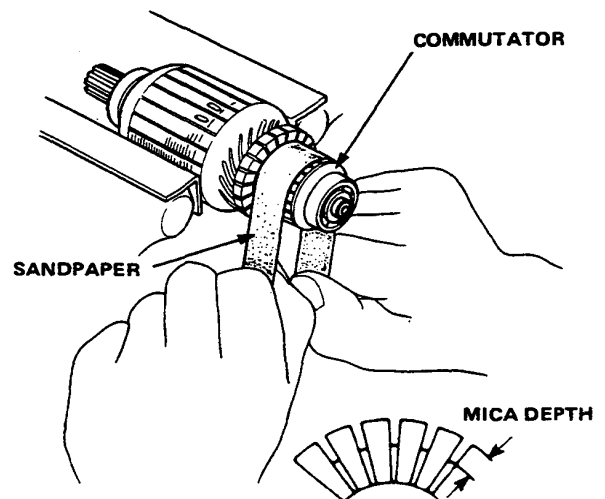


### Commutator Runout

**Standard (New):** 0–0.02 mm (0–0.0008 in)  
**Service Limit :** 0.05 mm (0.002 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.

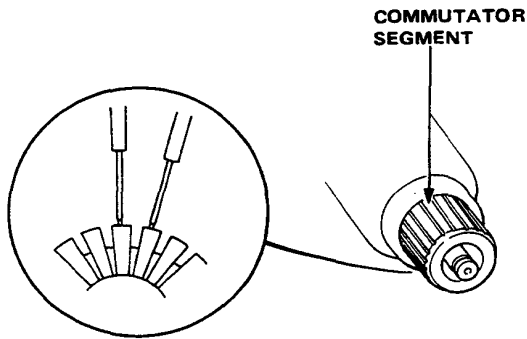


### Commutator Mica Depth

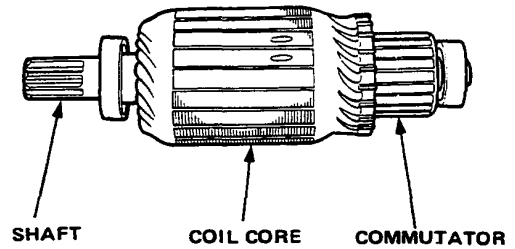
**Standard (New):** 0.4–0.5 mm (0.016–0.020 in)  
**Service Limit :** 0.15 mm (0.006 in)



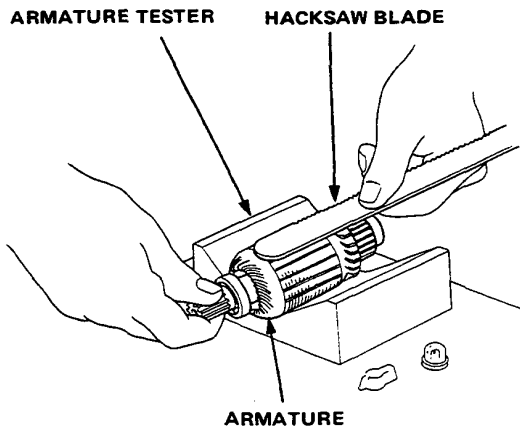
5. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.



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.



6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.

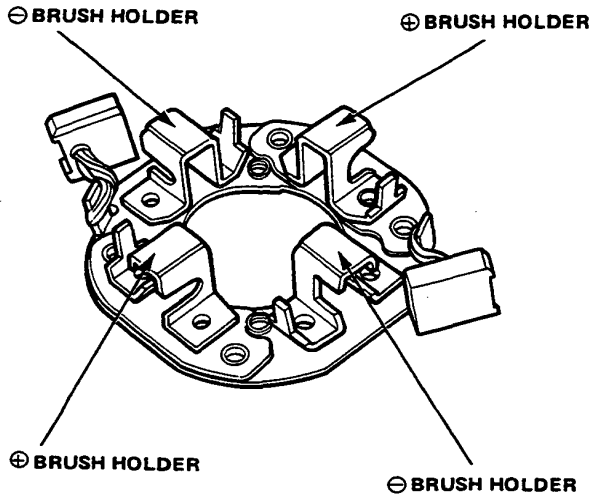


If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

# Starting System

## Starter Brush Holder Test

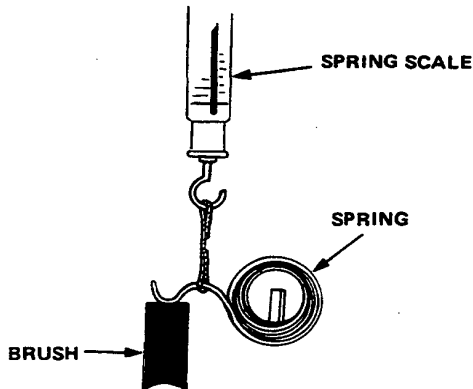
1. Check that there is no continuity between the ⊕ and ⊖ brush holders. If continuity exists, replace the brush holder assembly.



2. Insert the brush into the brush holder, and bring the brush into contact with commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.

### Spring Tension:

18.5–23.5 N (1.85–2.35 kg, 4.08–5.18 lb)



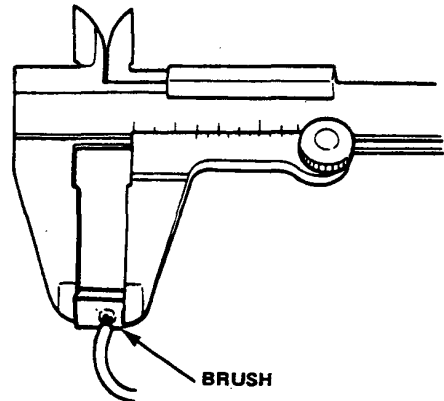
## Starter Brush Inspection

Measure brush length. If not within service limit, replace the armature housing and brush holder assembly.

### Brush Length

**Standard (New):** 14.3–14.7 mm (0.56–0.58 in)

**Service Limit :** 9.3 mm (0.37 in)

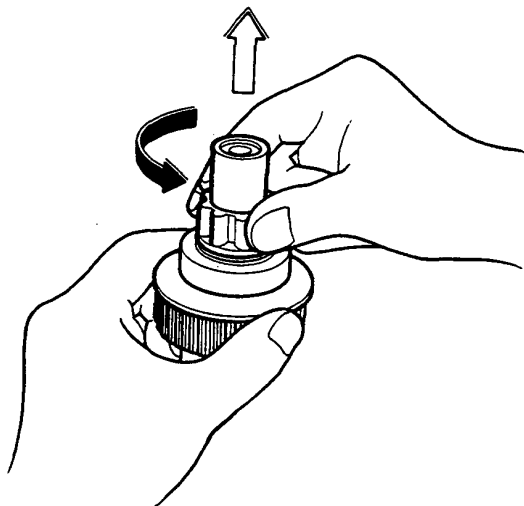


**NOTE:** To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.



## Overrunning Clutch Check

1. Check if the overrunning clutch moves along the shaft freely. If not, replace the overrunning clutch assembly.
2. Check if the overrunning clutch locks in one direction and rotates smoothly in reverse. If it does not lock in either direction or it locks in both directions, replace the overrunning clutch assembly.

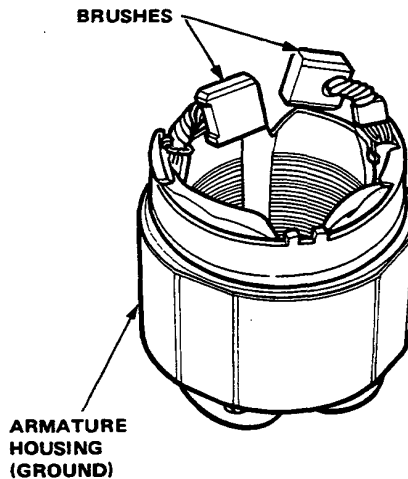


3. Check if the starter drive gear is worn or damaged. If the gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

**NOTE:** Check condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

## Starter Field Winding Test

1. Check for continuity between the brushes. If 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.

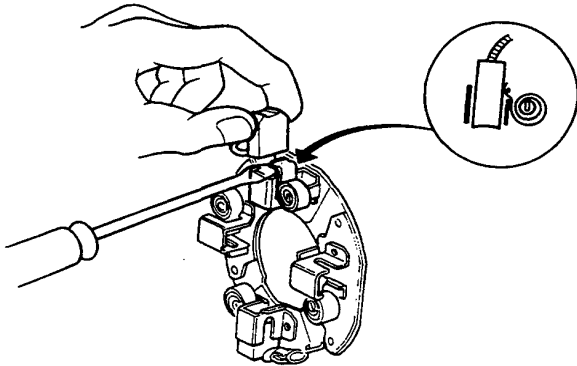


# Starting System

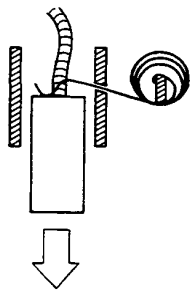
## Starter Reassembly

Reassemble the starter in the reverse order of disassembly.

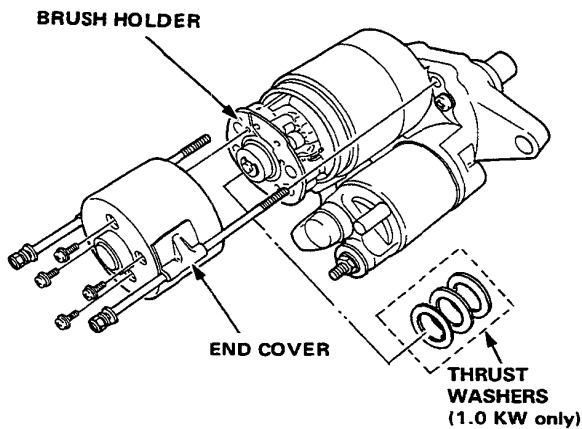
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



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.



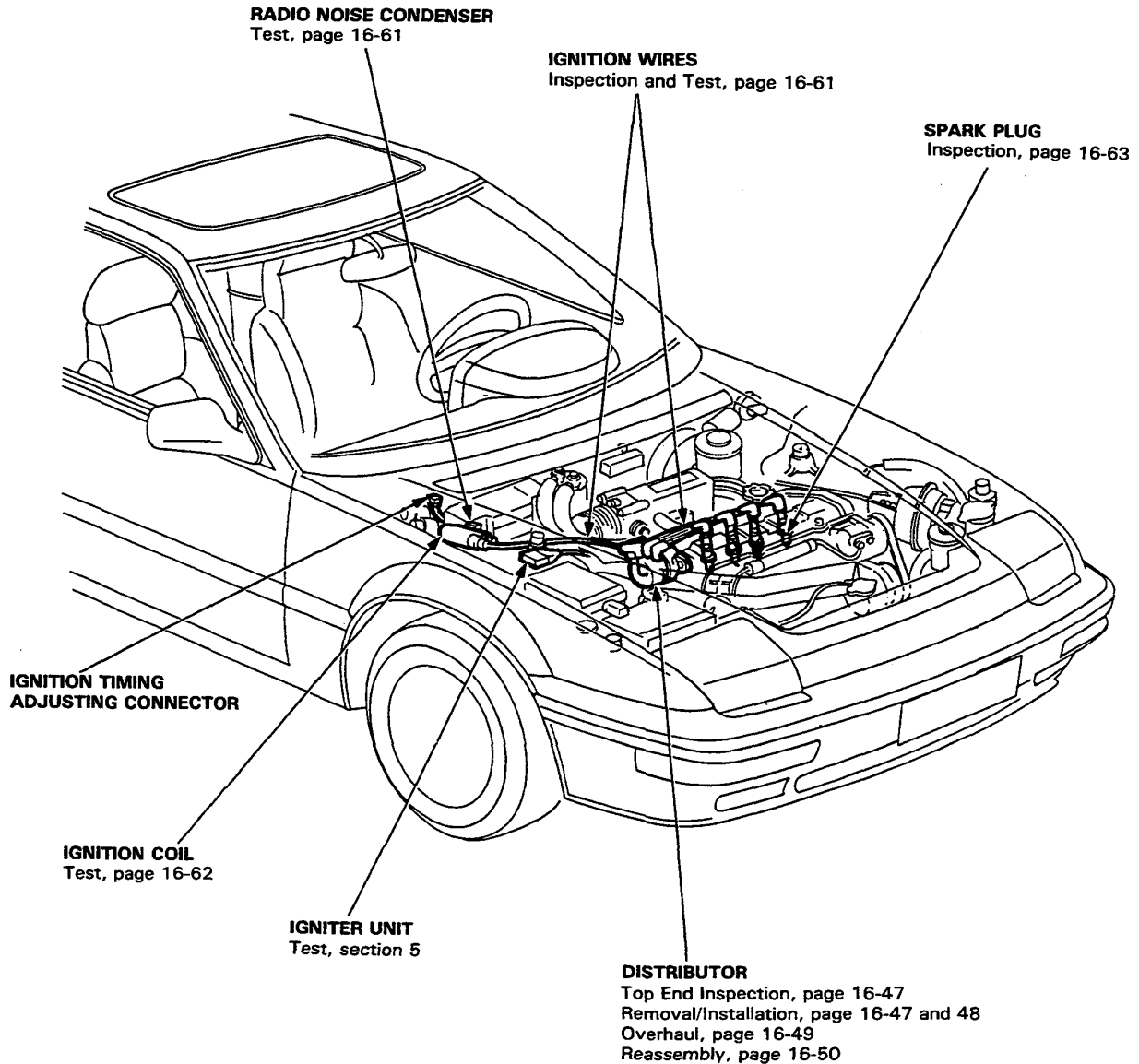




# Ignition System (Fuel-Injected Engine)

## Component Location Index

- **IGNITION TIMING CONTROL SYSTEM**  
Description, page 16-44  
Troubleshooting, section 5  
Inspection and Setting, page 16-46

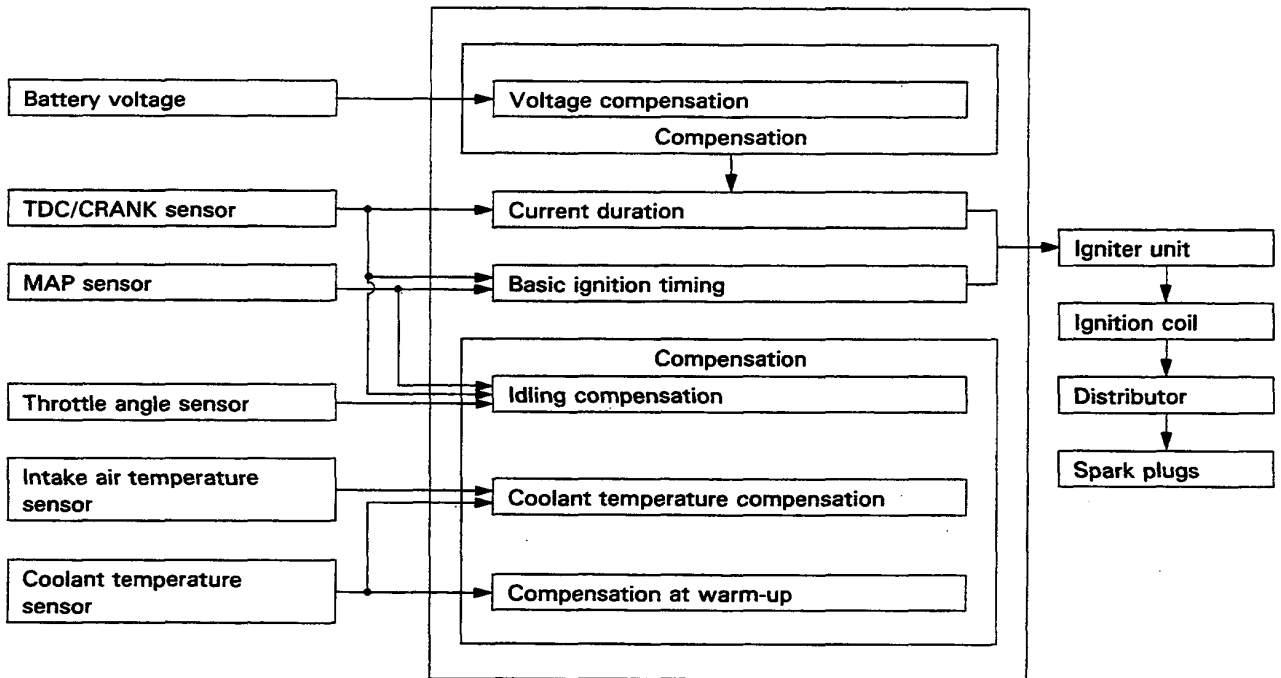


# Ignition System (Fuel-Injected Engine)

## 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 TDC/CRANK 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 or diaphragms.



### 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:

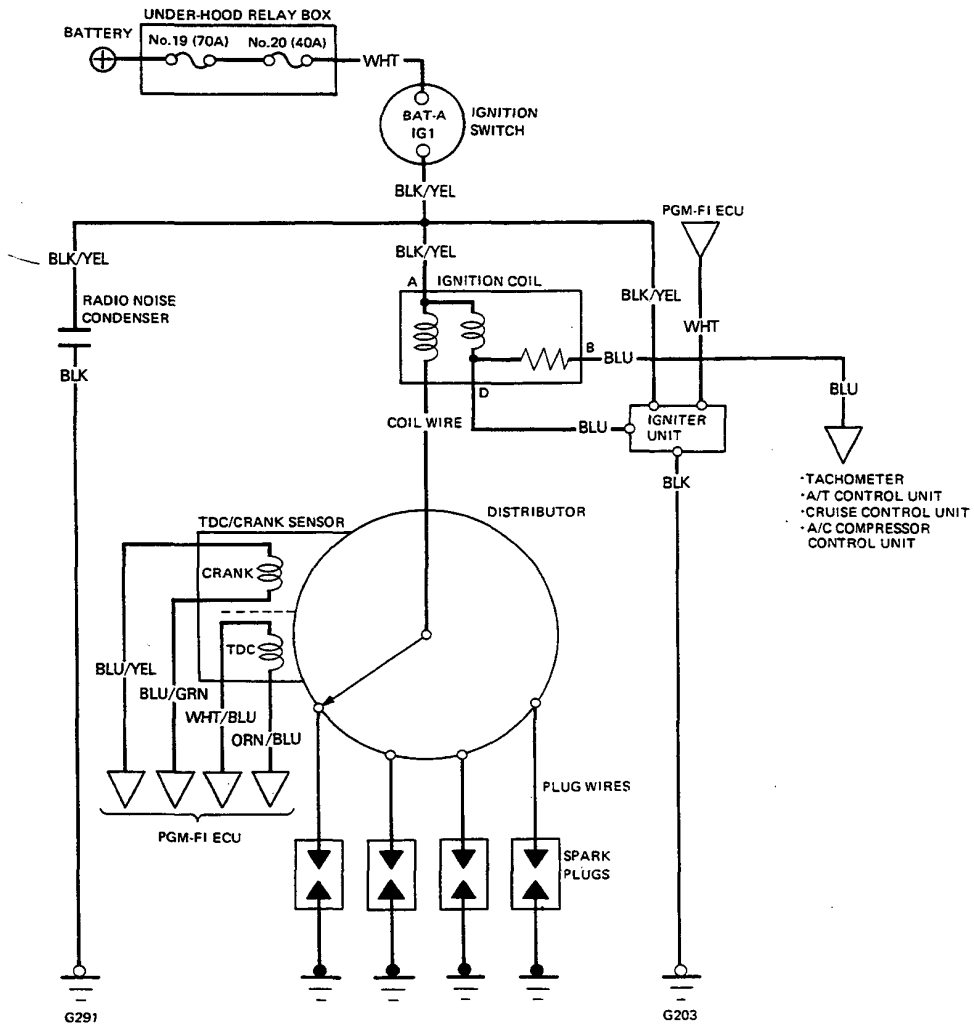
Compensation Item	Related Sensor and Information	Description
Idling	TDC/CRANK sensor MAP sensor Throttle angle sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.
Compensation at warm-up	Coolant temperature sensor	Lag angle is adjusted in accordance with the warming up conditions to bring about a good balance between operating performance and exhaust gas level.
Coolant temperature compensation	Coolant temperature sensor Intake air temperature sensor	Compensation for lead angle at a low coolant temperature and lag angle at high coolant temperature.

### Control at Start

Ignition timing is fixed at BTDC 10° for cranking. The cranking is detected by the TDC/CRANK sensor (cranking revolution) and starter signal.



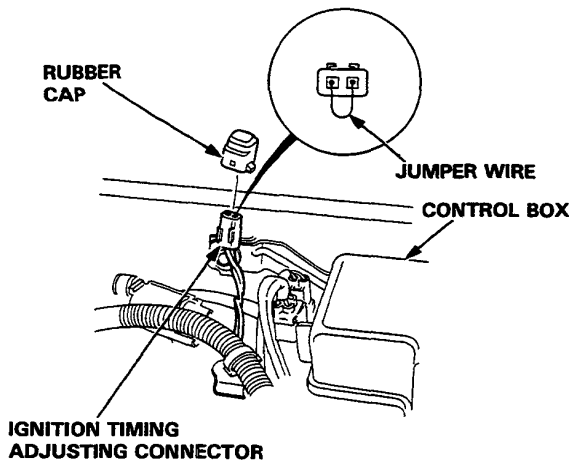
# Circuit Diagram



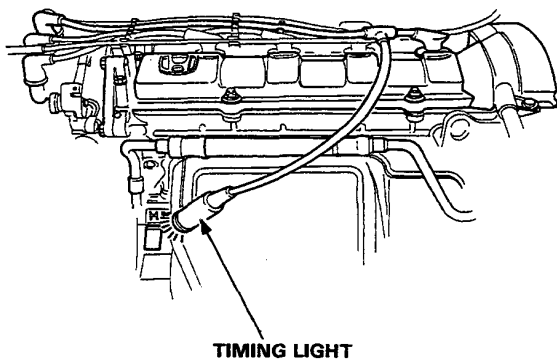
# Ignition System (Fuel-Injected Engine)

## Ignition Timing Inspection and Setting

1. Remove the rubber cap from the inspection window of the cylinder block.
2. Start the engine and allow it to warm up (cooling fan comes on).
3. Remove the rubber cap (BLK) from the ignition timing adjusting connector located behind the ignition coil and connect the BRN and GRN/WHT terminals with a jumper wire.



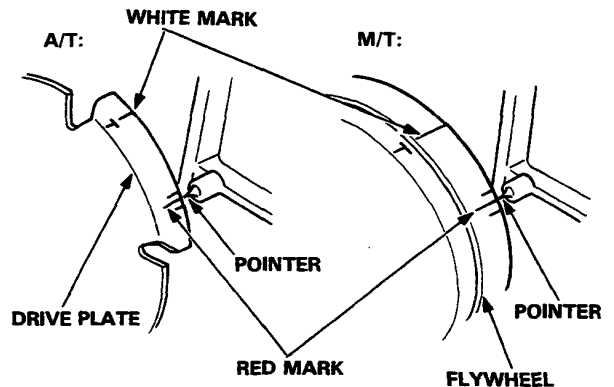
4. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



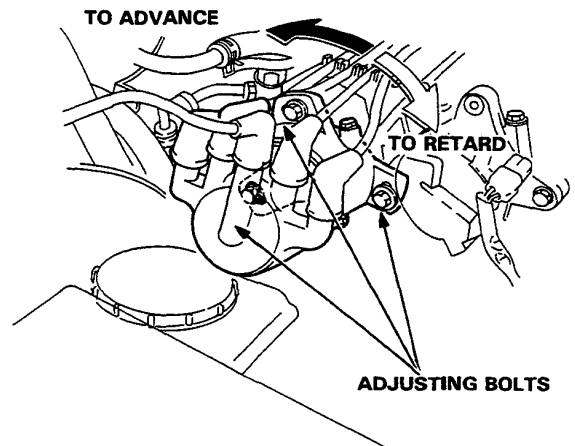
5. Adjust ignition timing, if necessary, to the following specifications:

### Ignition Timing

- Manual: All models:  
15 ± 2° BTDC (RED)  
at 750 ± 50 min<sup>-1</sup> (rpm) in neutral
- Automatic: All models:  
15 ± 2° BTDC (RED)  
at 750 ± 50 min<sup>-1</sup> (rpm) in neutral



6. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing counterclockwise to advance the timing, or clockwise to retard the timing.

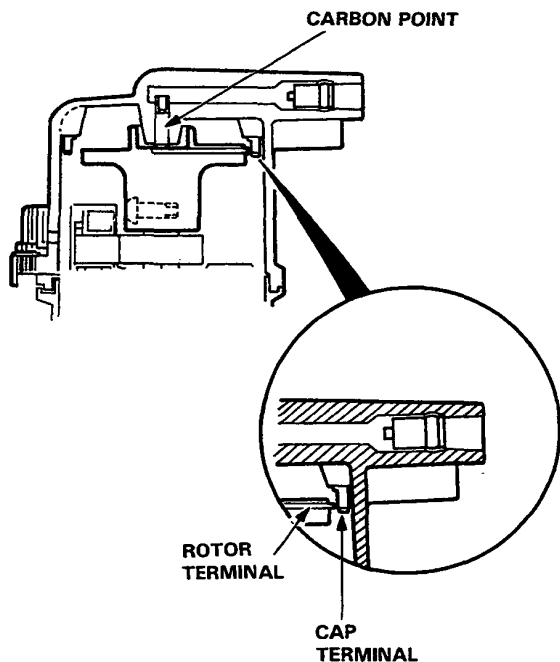


7. Tighten the adjusting bolts and recheck the timing.
8. Remove the jumper wire and install the rubber caps to the inspection window and adjusting connector.



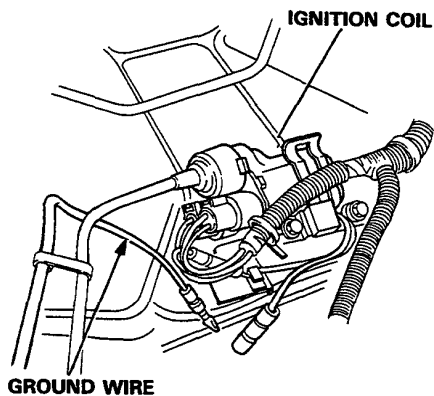
## Distributor Top End Inspection

1. Check for rough or pitted rotor and cap terminals.
2. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.
3. Check the distributor cap for cracks, wear and damages. If necessary, clean or replace it.

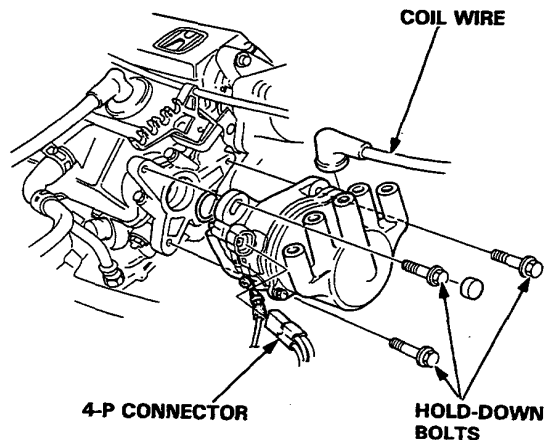


## Distributor Removal

1. Disconnect the ground wire from the radio noise condenser.



2. Disconnect the spark plug wires and coil wire from the distributor cap.
3. Remove the 4-P connector from the distributor.



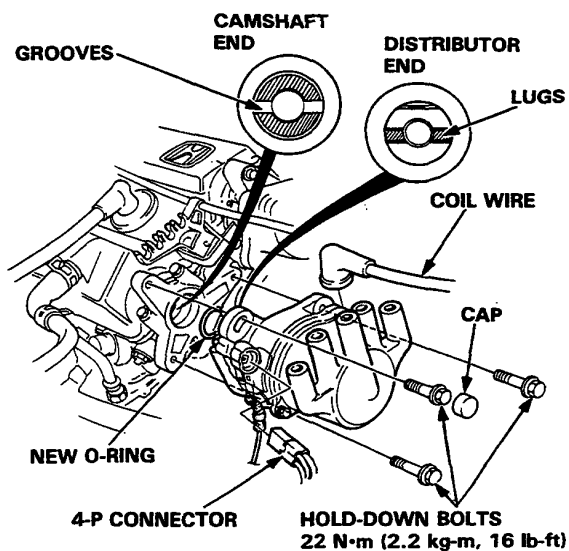
4. Remove the distributor hold-down bolts, then remove the distributor from the cylinder head.

# Ignition System (Fuel-Injected Engine)

## Distributor Installation

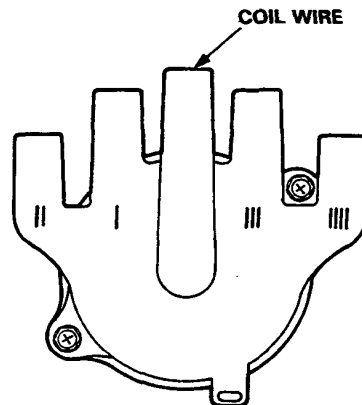
1. Coat a new O-ring with engine oil then install it.
2. Slip the distributor into position.

NOTE: The lugs on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.



3. Install the hold-down bolts and tighten temporarily.
4. Connect the 4-P connector to the distributor and ground wire to the radio noise condenser.

5. Connect the coil wire and the spark plug wires as shown.

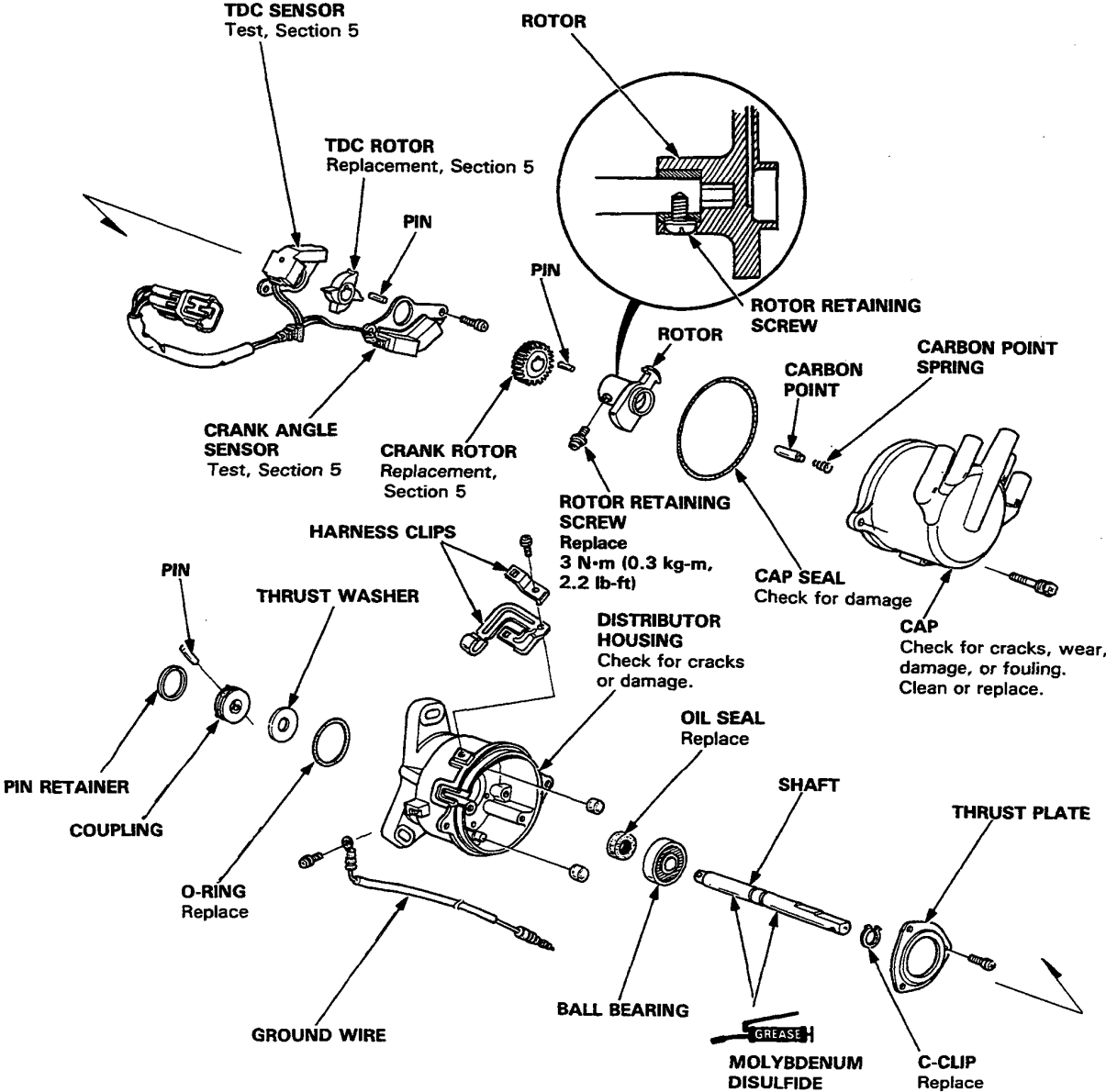


6. Set the timing with a timing light as shown on page 16-46.
7. After adjusting, tighten the hold-down bolts, then install the cap on the bolt.



# Distributor Overhaul

NOTE: After installing the TDC rotor, adjust the air gap between the TDC sensor and TDC rotor, then after installing the crank rotor, adjust the air gap between the crank angle sensor and crank rotor (see section 5).

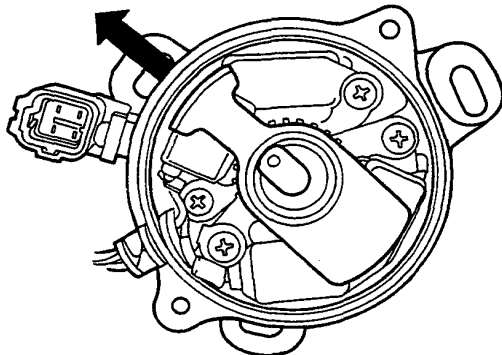


# Ignition System (Fuel-Injected Engine)

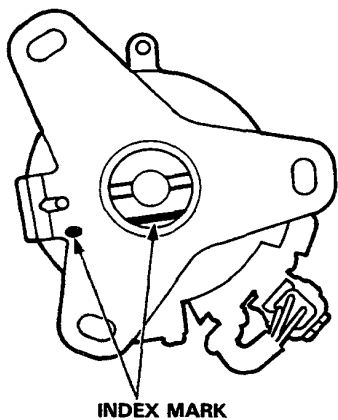
## Distributor Reassembly

Reassemble the distributor in the reverse order of disassembly.

1. Install the rotor, then turn it so that it faces in the direction shown (toward the No. 1 cylinder).



2. Set the thrust washer and coupling on the shaft.
3. Check that the rotor is still pointing toward the No. 1 cylinder, then align the index mark on the housing with the index mark on the coupling.



4. Drive in the pin and secure it with the pin retainer.



# Ignition System (Carbureted Engine)



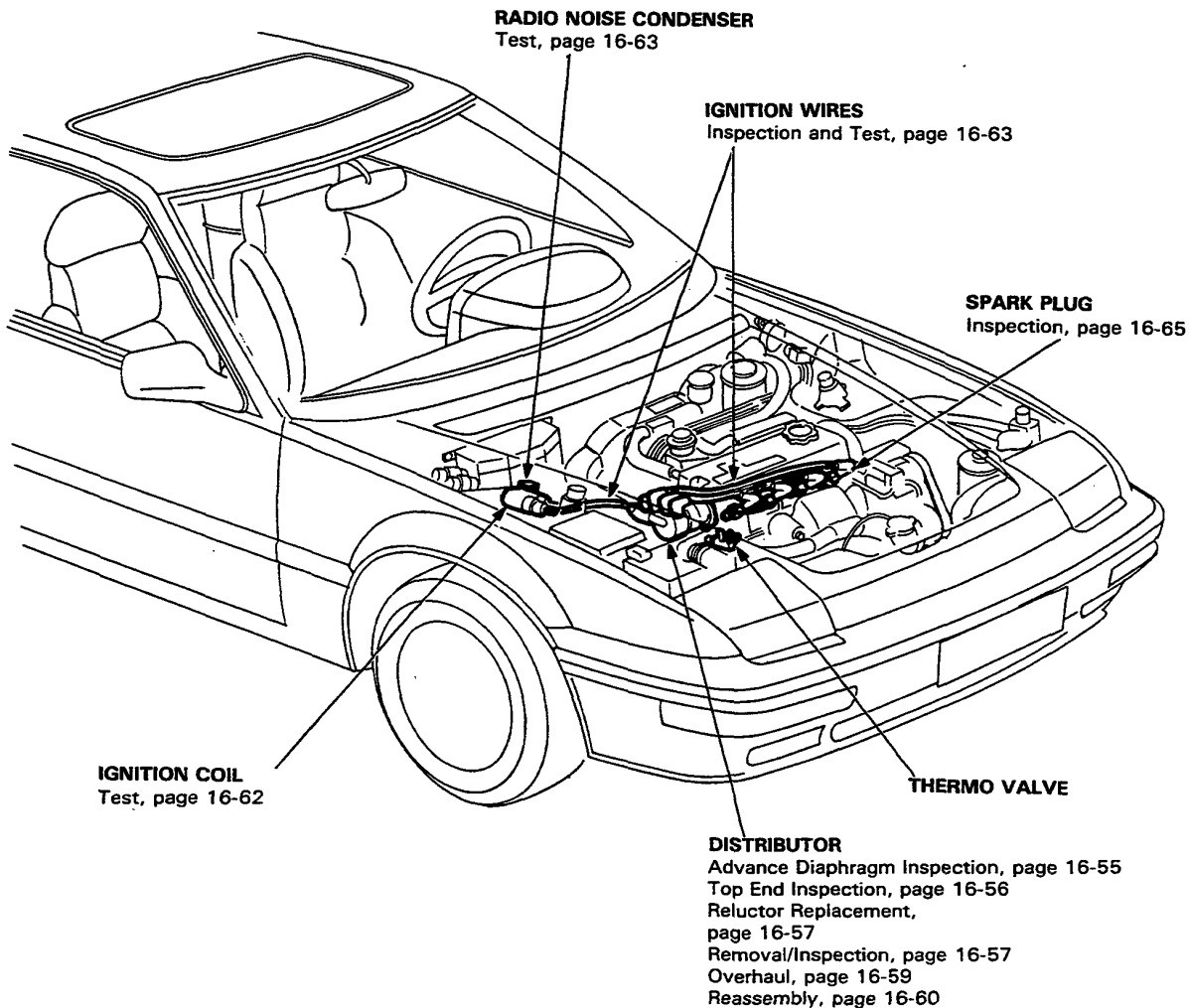
## Component Location Index

- **IGNITION TIMING CONTROL SYSTEM**

Description, page 16-52

Troubleshooting, section 6

Inspection and Setting, page 16-56



# Ignition System (Carbureted Engine)

## Description

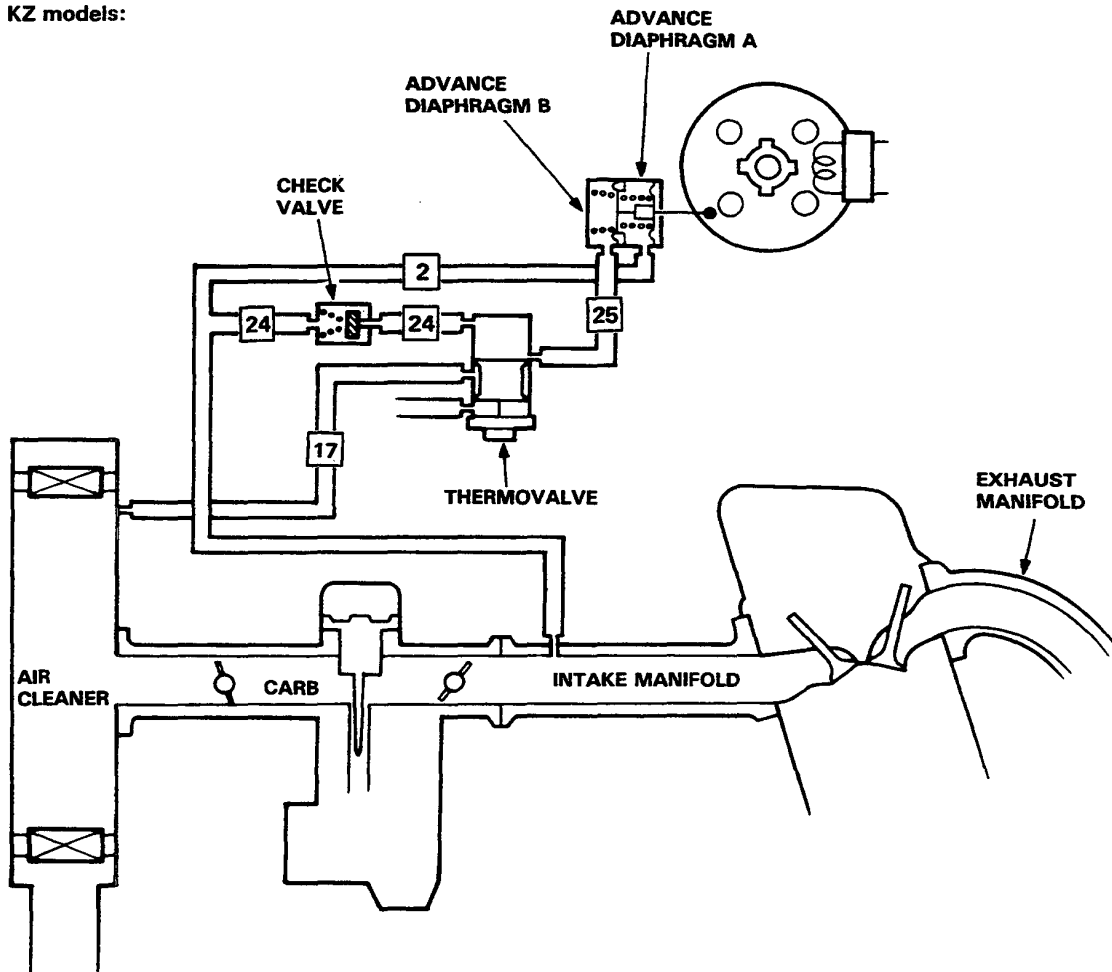
Ignition timing control, combined with the internal distributor control (centrifugal advance), affects the time at which each spark plug ignites the air-fuel mixture, in accordance with engine speed, load and coolant temperature. This control system gives vacuum advance in response to the manifold vacuum and coolant temperature. This optimizes ignition timing during and after engine warm-up to maximize fuel economy and engine performance.

This distributor has two separate vacuum advance diaphragms which operate on manifold vacuum. Diaphragm B also has a thermovalve in the line.

This system is provided to improve driveability at cold engine temperature by advancing the ignition timing.

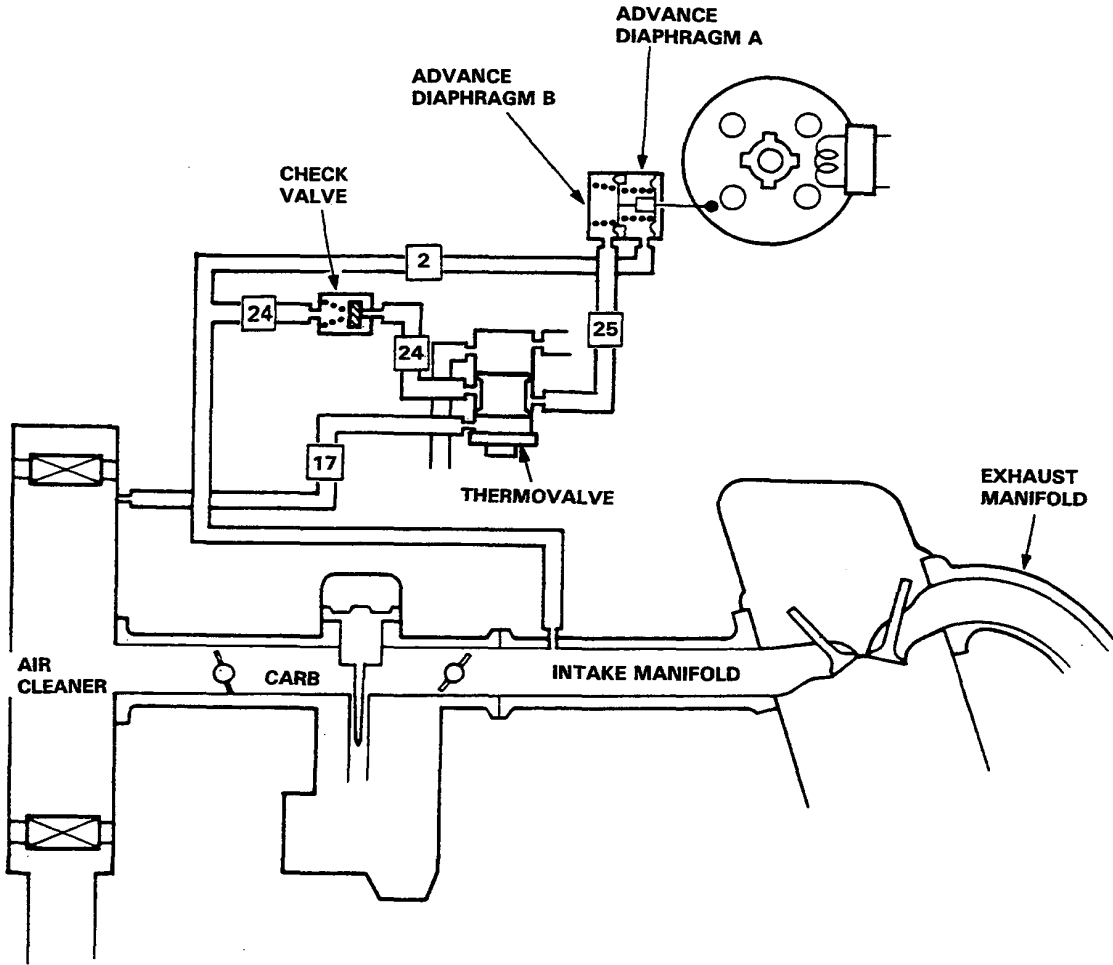
When the engine coolant temperature is below the set temperature of the thermovalve, manifold vacuum is applied through the check valve to the diaphragm of the vacuum advance unit. The thermovalve blocks the air entering the vacuum line and the diaphragms retract to turn the breaker plate of the distributor to advance the timing. When the coolant temperature is above the set value, vacuum in the thermovalve is released.

KX, KS, KZ models:





KF, KG, KW, KB, KE models:



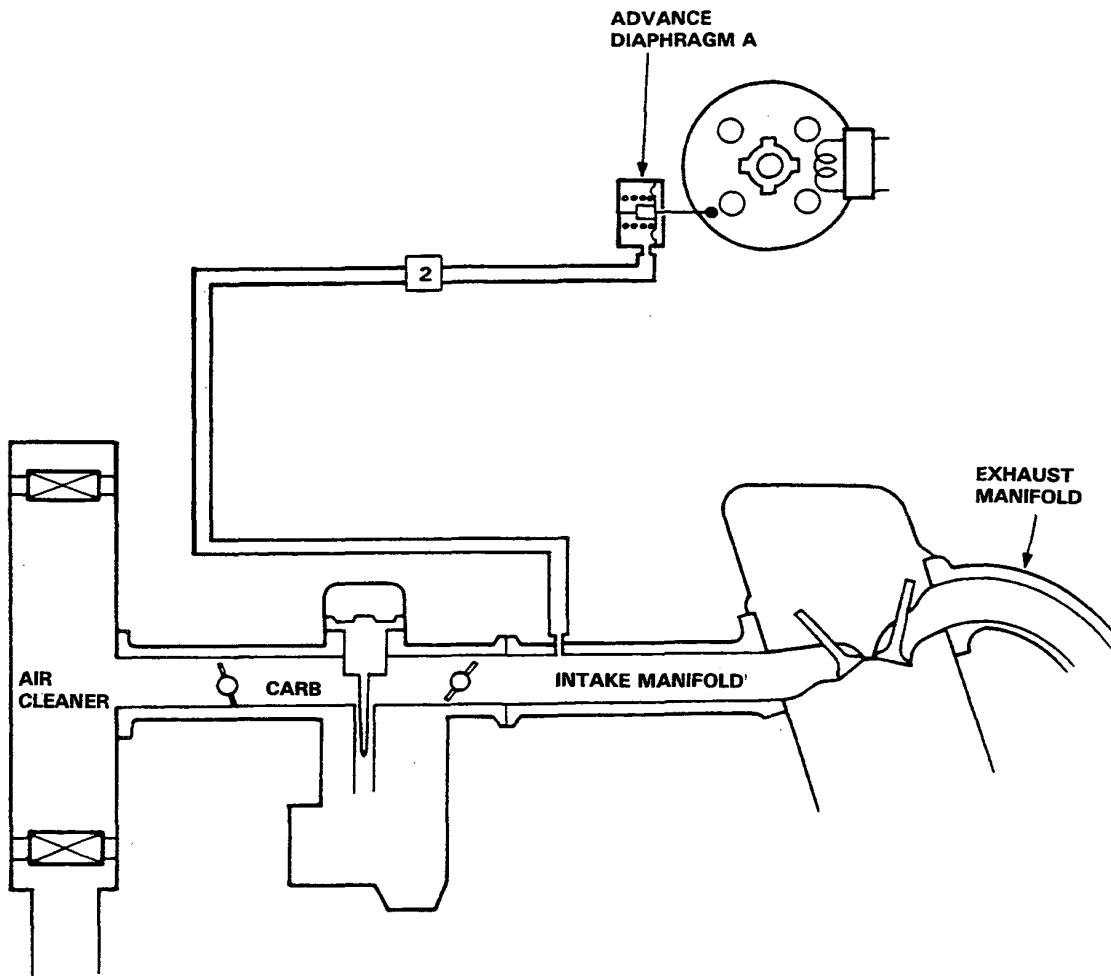
(cont'd)

# Ignition System (Carbureted Engine)

## Description (cont'd)

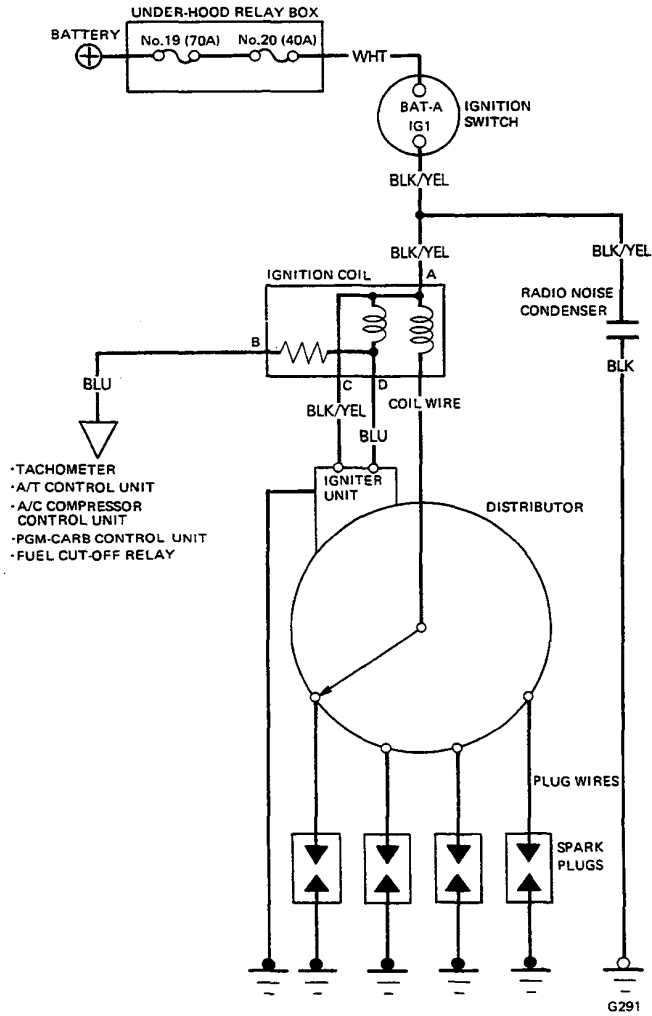
### KY, KT models:

Ignition timing control, combined with the internal distributor control (centrifugal advance), affects the time at which each spark plug ignites the air/fuel mixture. This control system gives vacuum advance in response to the manifold vacuum to optimize ignition timing to control emission levels while maximizing fuel economy and engine performance.





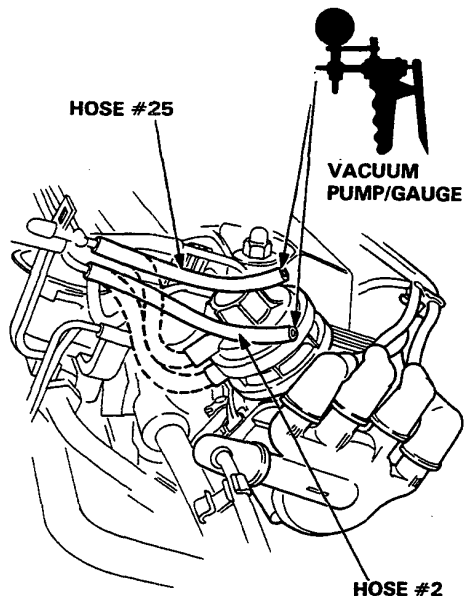
# Circuit Diagram



# Ignition System (Carbureted Engine)

## Ignition Timing Inspection and Setting

1. Disconnect the vacuum hoses from the vacuum advance diaphragm, then connect the vacuum pump/gauges to the vacuum hoses.



2. Start the engine and let it idle.
3. When the engine is cool (coolant temperature is below 140°F), check each hose for vacuum. The #2 and #25 hoses should have vacuum.

- If the #2 hose has no vacuum, check the #2 hose of proper connection, cracks, blockage or disconnected hose.
- If the #25 hose has no vacuum, check the #24 and #25 hoses for proper connections, cracks, blockage or disconnected hoses, and the check valve is not clogged. If the #24 and #25 hoses, and the check valve have no problem, replace the thermostatic valve and recheck the #25 hose for vacuum.

4. Connect the vacuum hoses to the vacuum advance diaphragm and allow the engine to warm up. (cooling fan comes on).

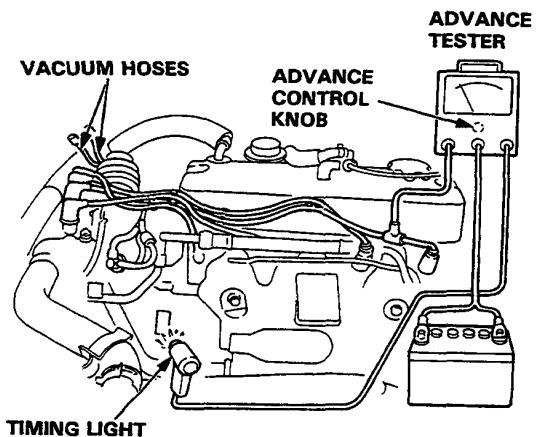
5. Disconnect the #25 hose from the vacuum advance diaphragm and connect the vacuum pump/gauge to the #25 hose.

6. Check the #25 hose for vacuum. The #25 hose should have no vacuum.

- If the #25 hose has vacuum, replace the thermostatic valve and recheck it.

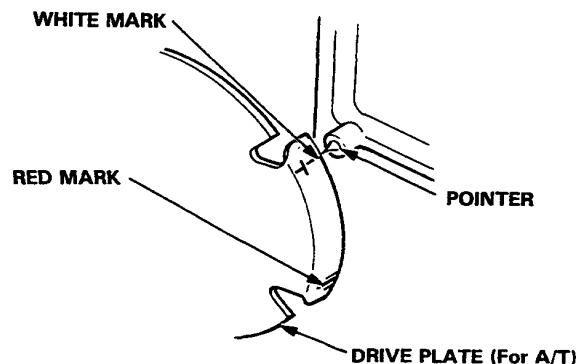
7. Disconnect the vacuum hoses from the vacuum advance diaphragm and plug them.

8. Connect a timing light and an advance tester, and remove the rubber cap from the inspection window of the cylinder block.



9. While the engine idles, point a timing light toward the flywheel (for M/T), or the drive plate (for A/T).

10. Align the timing mark (White) on the flywheel (for M/T) or the drive plate (for A/T) to the pointer by turning the advance control knob of the advance tester.



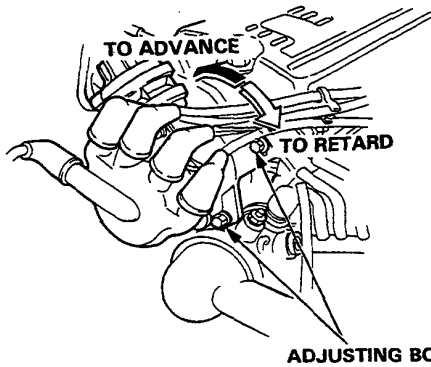


11. Read initial timing when timing mark (white) is aligned to the pointer.

**Initial Timing**

- **Manual Transmission** [at  $800 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]  
KX, KS, KT, KY, KZ models:  $4^\circ$  BTDC  
KG, KE, KB, KF, KW models:  $10^\circ$  BTDC
- **Automatic Transmission** [at  $750 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]  
KX, KS, KT, KY, KZ models:  $4^\circ$  BTDC  
KG, KE, KB, KF, KW models:  $10^\circ$  BTDC

12. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing clockwise to retard the timing, or counterclockwise to advance the timing.



**ADJUSTING BOLTS**

13. Tighten the distributor adjusting bolts, then recheck the timing.

14. Connect the vacuum hoses to the vacuum advance diaphragm and inspect ignition timing at idle.

**Ignition Timing**

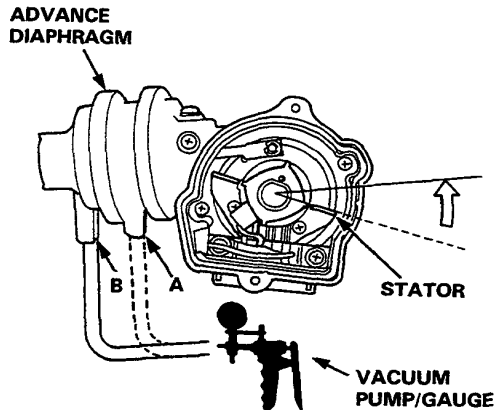
- **Manual Transmission** [at  $800 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]  
  
KT, KY models:  $15 \pm 2^\circ$  BTDC (Red)  
KG, KE, KB, KF, KW models:  $16 \pm 2^\circ$  BTDC (Red)  
KX, KS, KZ models:  $20 \pm 2^\circ$  BTDC (Red)
- **Automatic Transmission** [at  $750 \pm 50 \text{ min}^{-1}$  (rpm) in neutral]  
  
KT, KY models:  $10 \pm 2^\circ$  BTDC (Red)  
KG, KE, KB, KF, KW models:  $16 \pm 2^\circ$  BTDC (Red)  
KX, KS, KZ models:  $15 \pm 2^\circ$  BTDC (Red)

If advance is not as specified, check the vacuum advance diaphragm and distributor advance mechanism.

# Ignition System (Carbureted Engine)

## Advance Diaphragm Inspection

1. Remove the distributor cap and vacuum hoses (#2 and #25) from the advance diaphragm.
2. Connect a vacuum pump/gauge to the advance diaphragm A (inside port).



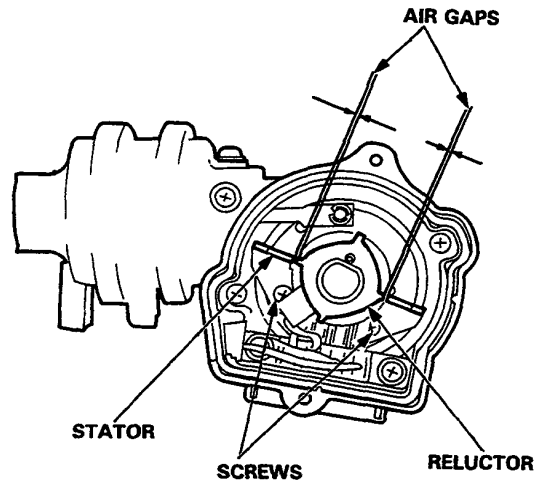
3. When vacuum (more than 500 mm Hg, 20 in. Hg) is applied to the diaphragm, the stator should turn counterclockwise and stay. If the stator does not turn or stay, replace the diaphragm.

When vacuum is released, the stator should return. If the stator does not return, repair or replace as necessary.

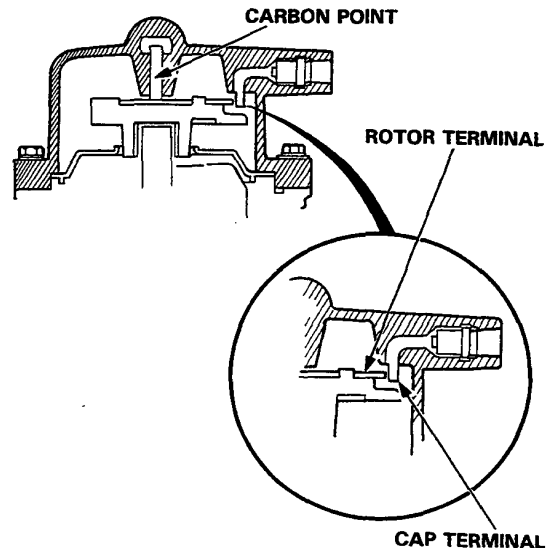
4. Repeat the step 2—3 for the advance diaphragm B (outside port).

## Distributor Top End Inspection

1. Check to be sure that the air gaps are equal.
2. If necessary, back off the screws and move the stator as required to adjust.



3. Check for rough or pitted rotor and cap terminals.
4. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.
5. Check the distributor cap for cracks, wear and damages. If necessary, clean or replace it.

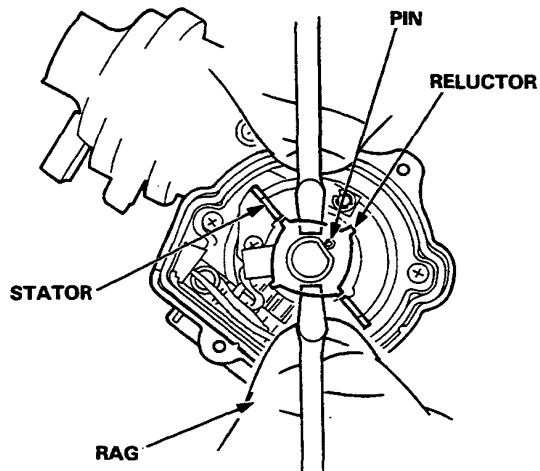






## Reluctor Replacement

1. Carefully pry up the reluctor by using two screwdrivers as shown. Do not damage the reluctor and stator.

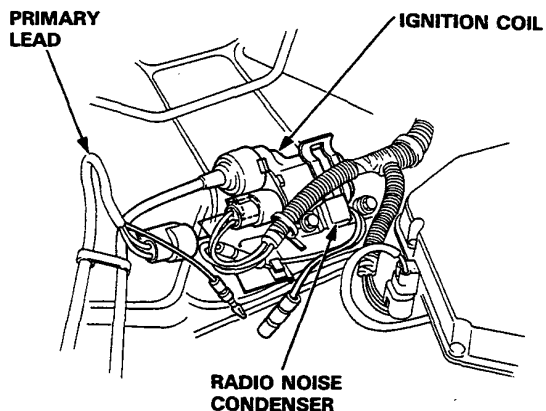


2. When installing the reluctor, be sure to drive in the pin with its gap away from the shaft.

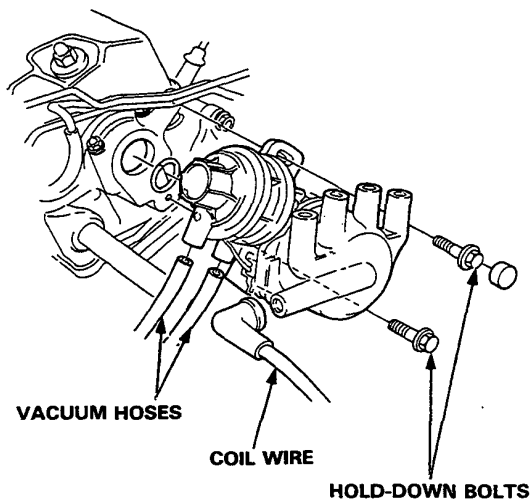
**NOTE:** The number or letter manufacturing code on the reluctor must always face up.

## Distributor Removal

1. Disconnect the primary lead from the ignition coil and radio noise condenser.



2. Disconnect the spark plug wires and coil wire from the distributor cap.
3. Disconnect the vacuum hoses from the advance diaphragm.



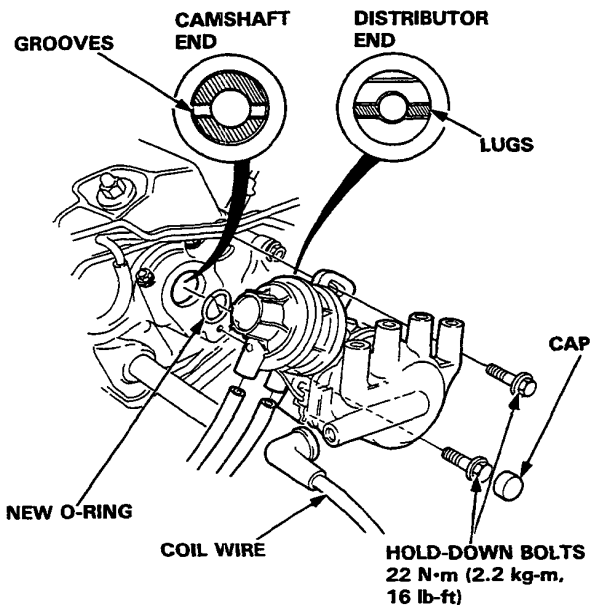
4. Remove the distributor hold-down bolt, then remove the distributor from the cylinder head.

# Ignition System (Carbureted Engine)

## Distributor Installation

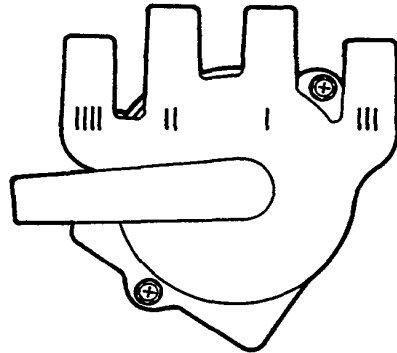
1. Coat a new O-ring with engine oil then install it.
2. Slip the distributor into position.

NOTE: The lugs on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.



3. Install the hold-down bolt and tighten temporarily.
4. Connect the coil wire to the distributor cap and the vacuum hoses to the advance diaphragm.
5. Connect the primary lead to the ignition coil and radio noise condenser.

6. Connect the spark plug wire as shown.

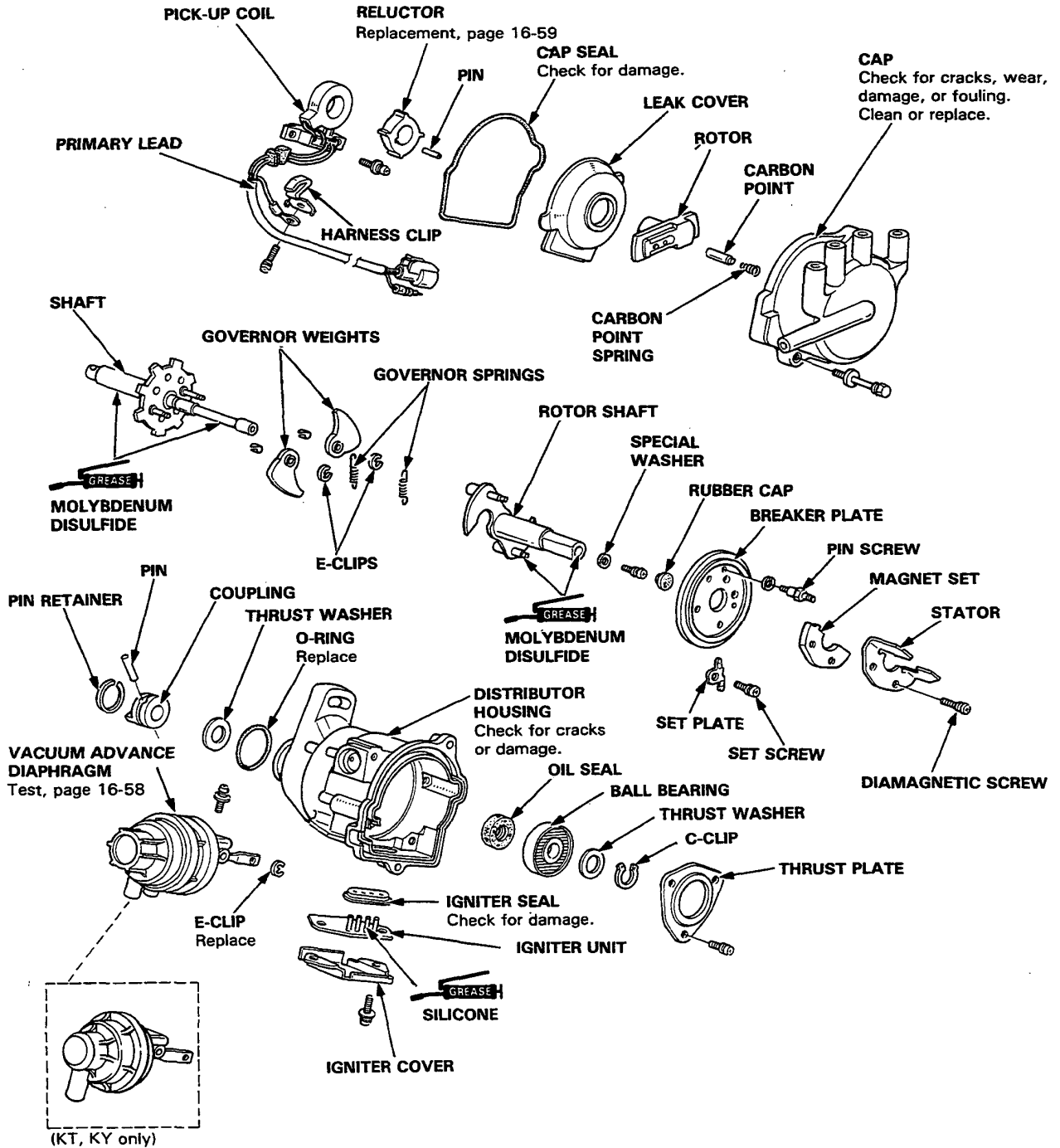


7. Set the timing with a timing light as shown on page 16-56.
8. After adjusting, tighten the hold-down bolt, then install the cap on the bolt.



# Distributor Overhaul

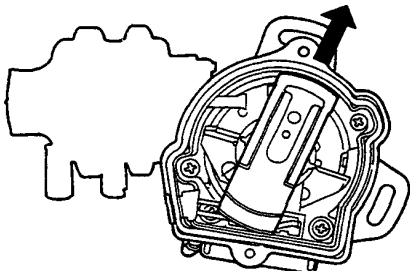
NOTE: After installing the reluctor, adjust the air gaps between the stator and reluctor (see page 16-56).



# Ignition System (Carbureted Engine)

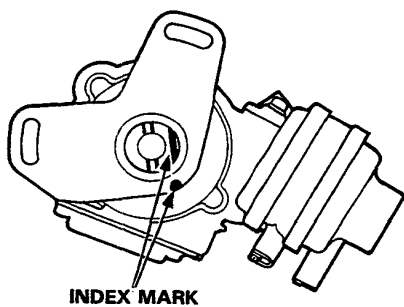
## Distributor Reassembly

1. Install the rotor, then turn it so that it faces in the direction shown (toward the No. 1 cylinder).



2. Set the thrust washer and coupling on the shaft.

Check that the rotor is still pointing toward the No. 1 cylinder, then align the index mark on the housing with the index mark on the coupling.



3. Drive in the pin and secure it with the pin retainer.

After installing the reluctor, adjust the air gaps between the stator and reluctor (see page 16-58).

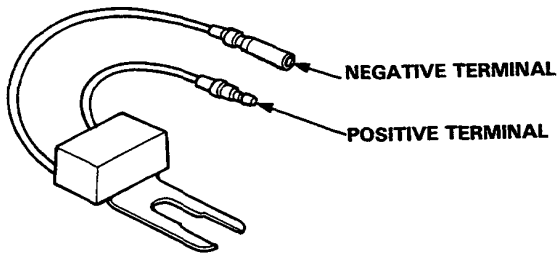
# Ignition System



## Radio Condenser Capacity Test

1. Use a commercially available condenser tester. Connect the tester probes and measure the condenser capacity. If tester not available, substitute a known good condenser.

Condenser Capacity:  $0.47 \pm 0.09$  microfarads ( $\mu\text{F}$ )



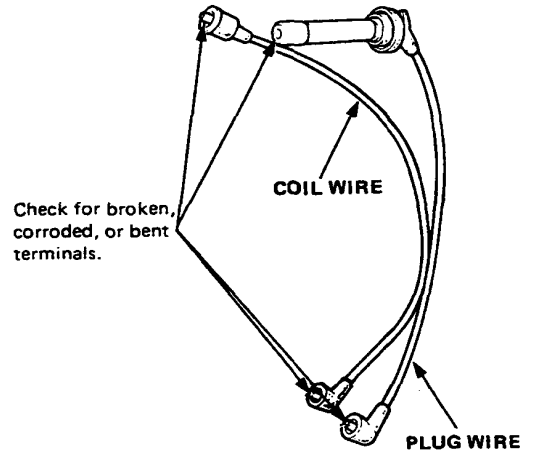
NOTE: The radio condenser is intended to reduce ignition noise; however, condenser failure may cause the engine to stop running.

2. If not within the specifications, replace the radio condenser.

## Ignition Wire Inspection and Test

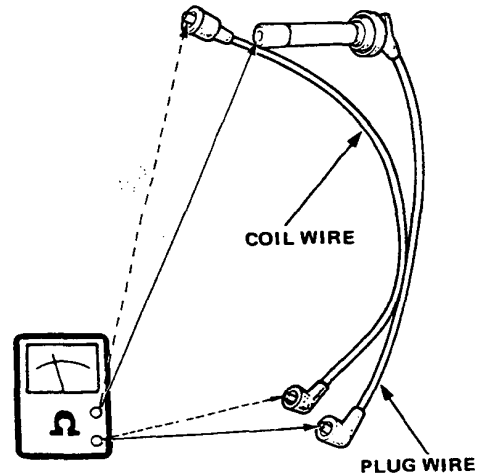
**CAUTION:** Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wire or the conductor may be broken.

1. Check the condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



2. Connect ohmmeter probes and measure resistance.

Ignition Wire Resistance:  
25,000 ohms max. at 20°C (70°F)



3. If resistance exceeds 25,000 ohms, replace the ignition wire.

# Ignition System

## Ignition Coil Test

1. With the ignition switch OFF, disconnect the primary connectors and the coil wire.
2. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.

NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (70°F).

**Primary Winding Resistance**  
(between the A and D terminals):

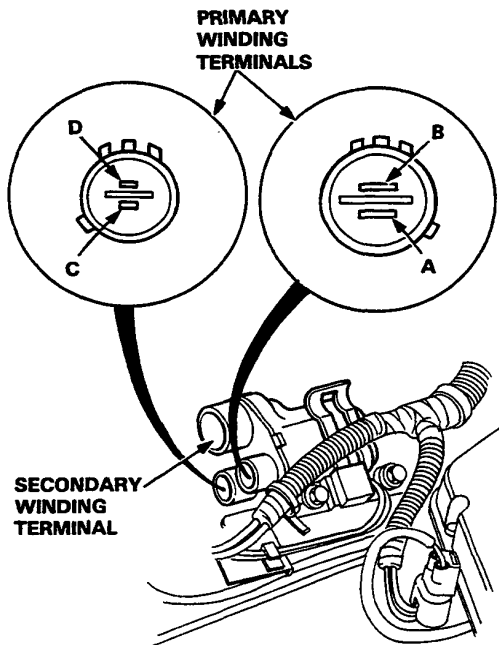
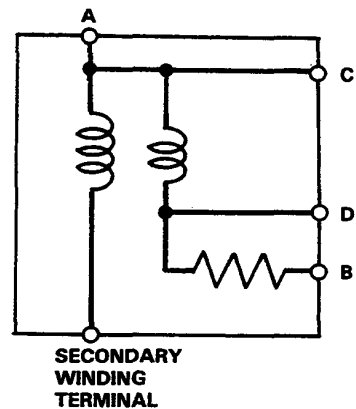
1.215–1.485 ohms

**Secondary Winding Resistance**  
(between the A and secondary winding terminals):

9,040–13,560 ohms

Resistance between the B and D terminals:  
2,090–2,310 ohms

NOTE: The C terminal is not used for fuel-injected engine.





## Spark Plug Inspection

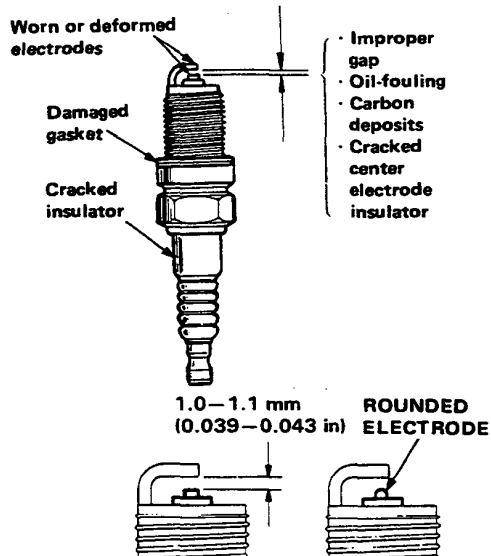
1. Inspect the electrodes and ceramic insulator for:

**Burned or worn electrodes may be caused by:**

- Lean fuel mixture
- Advanced ignition timing
- Loose spark plug
- Plug heat range too high
- Insufficient cooling

**Fouled plug may be caused by:**

- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires



2. Replace the plug if the center electrode is rounded as shown right:

**Fuel-injected engine:**

KX, KO, KS, KZ	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5EY-N11 (NGK) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3
KG, KE, KB, KF, KT, KW, KY	BCPR6E-11 (NGK) Q20PR-UL11 (ND) Q20PR-U11 (ND)	*1
	Q16PR-UL11 (ND) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	Q22PR-UL11 (ND) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3

**Carbureted engine:**

KG, KE, KB, KF, KT, KW, KY	BCPR6E-11 (NGK) Q20PR-U11 (ND) Q20PR-UL11 (ND)	*1
	BCPR5E-11 (NGK) Q16PR-U11 (ND) Q16PR-UL11 (ND)	*2
	BCPR7E-11 (NGK) Q22PR-U11 (ND) Q22PR-UL11 (ND)	*3
KS, KZ	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5EY-N11 (NGK) BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3
KX	BCPR6EY-N11 (NGK) BCPR6E-11 (NGK) Q20PR-U11 (ND)	*1
	BCPR5E-11 (NGK) Q16PR-U11 (ND)	*2
	BCPR7EY-N11 (NGK) BCPR7E-11 (NGK) Q22PR-U11 (ND)	*3

NOTE: \*1 For all normal driving.

\*2 For cold climates.

\*3 For hot climates or continuous high speed driving.

3. Adjust the gap with a suitable gapping tool.

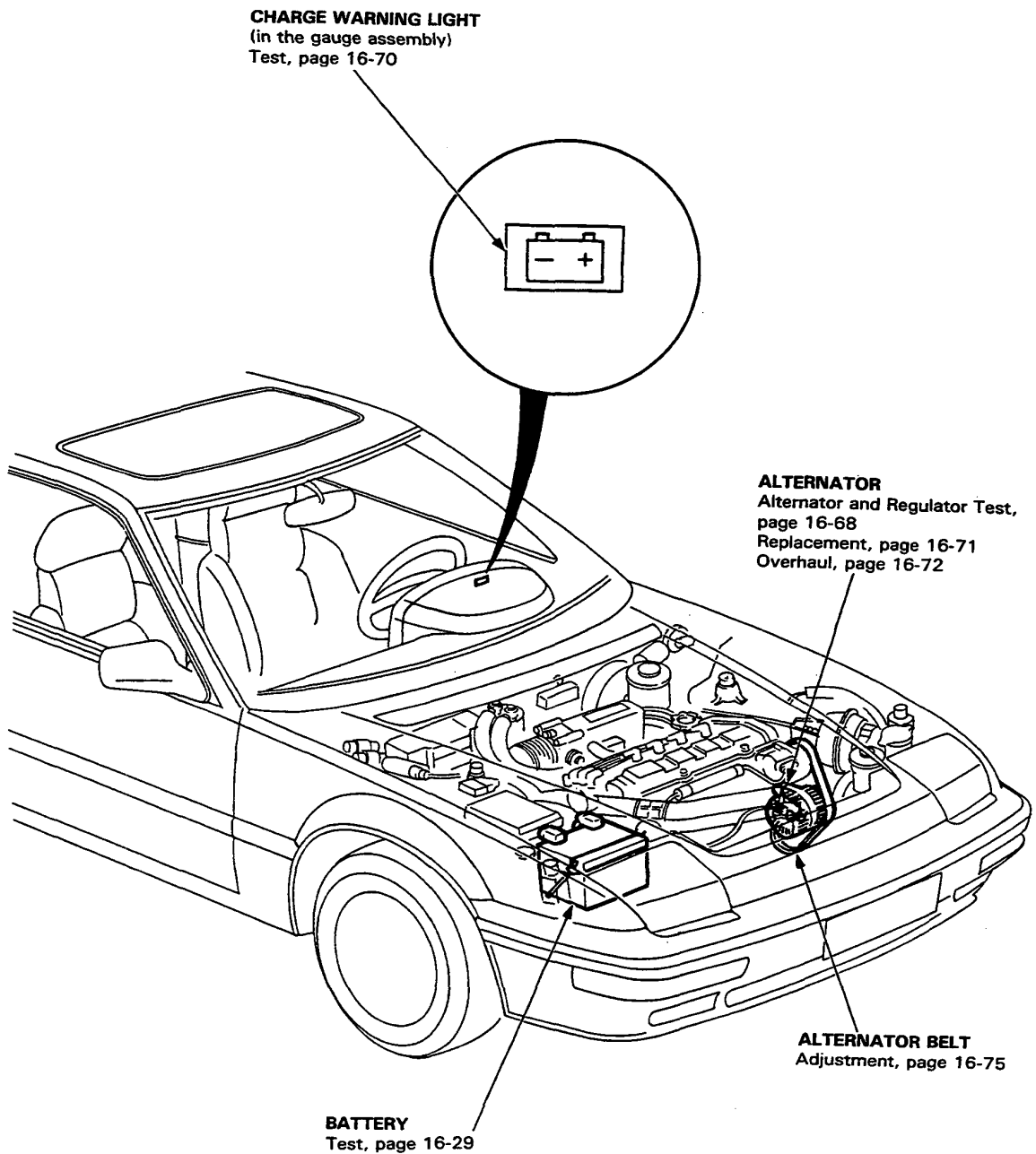
**Electrode Gap: 1.0–1.1 mm (0.039–0.043 in)**

4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N•m (1.8 kg-m, 13 lb-ft).

NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

# Charging System

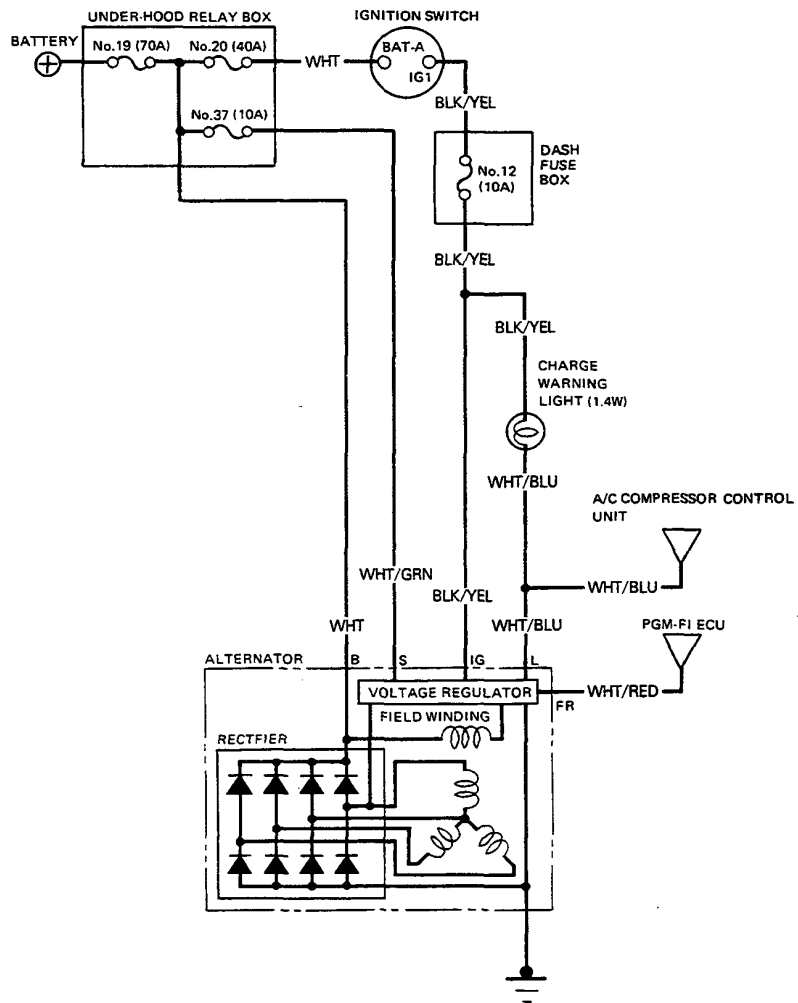
## Component Location Index







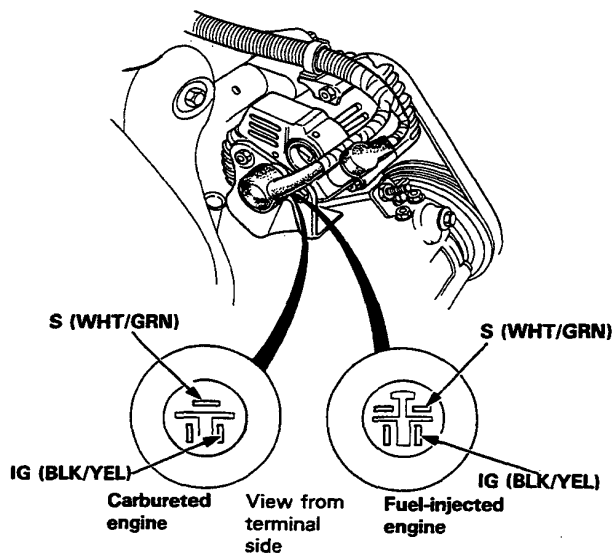
# Circuit Diagram



# Charging System

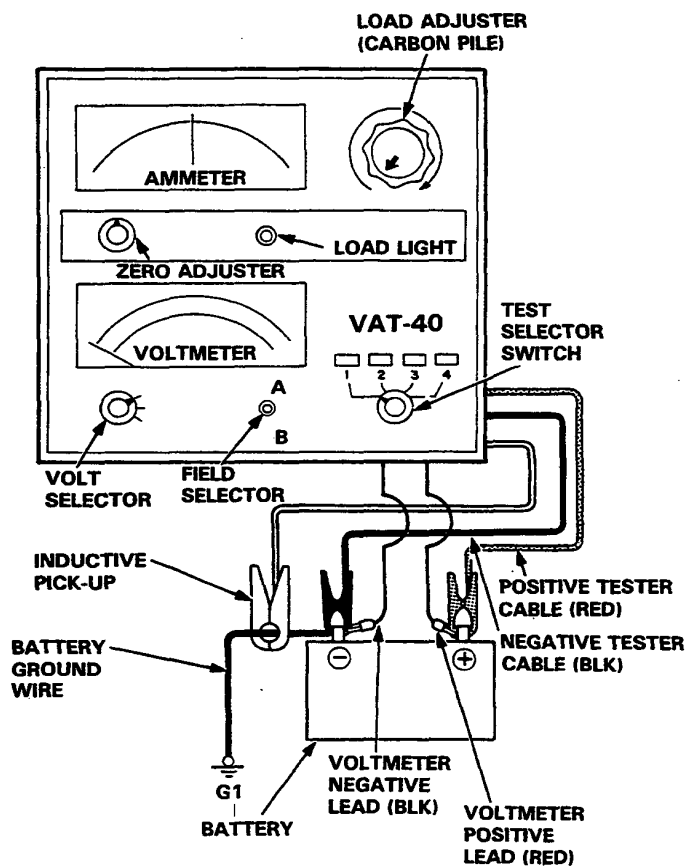
## Alternator and Regulator Test

1. First make sure you have a good battery, and that the alternator belt, and connections at the alternator and main fuses are good. Next, check the No. 12 (10 A) fuse in the dash fuse box and the No. 37 (10 A) fuse in the under-hood relay box. (If blown, the charge warning light will come on even if the system's working properly.)
2. Disconnect the alternator 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 (WHT/GRN) terminal and body ground.



- If there is no voltage, check for:
  - Blown No. 12 (10 A) fuse in the dash fuse box.
  - An open in the BLK/YEL wire between the dash fuse box and the voltage regulator, or the WHT/GRN wire between the under-hood relay box and the voltage regulator.
- If there is battery voltage, go to step 3.

3. Following the manufacturer's instructions, connect the SUN VAT-40 (or equivalent) and turn the test selector switch to the "Starting (No. 1)" position.

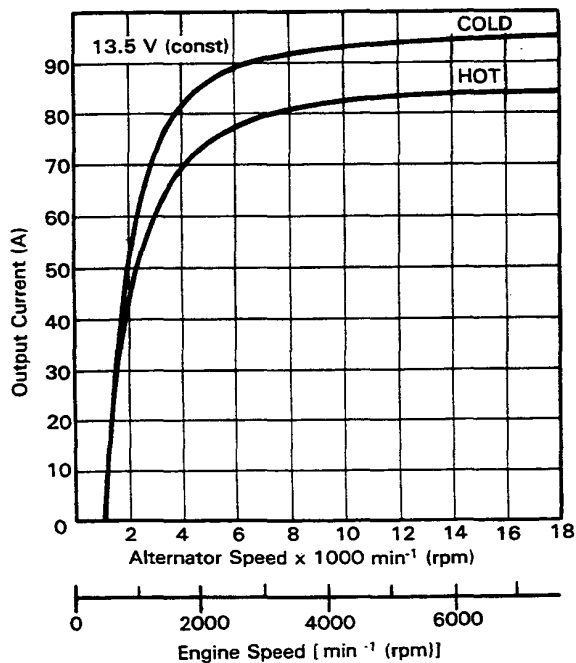


4. Start the engine. Turn off all accessories, move the test selector switch to the "Charging (No. 2)" position, remove the inductive pick-up, and zero the ammeter. Reconnect the inductive pick-up to the battery ground wire, so the arrow is pointing away from the battery.



5. Raise engine speed to  $2,000 \text{ min}^{-1}$  (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.

NOTE: Subtract 5 to 10 amperes from the maximum reading due to engine operation.



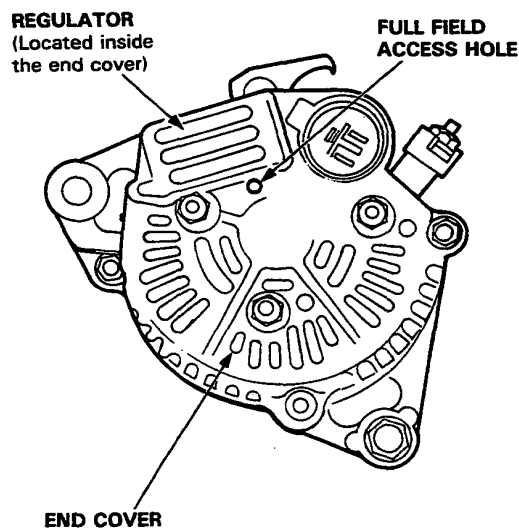
- If amperage is within specification, the system is OK: Proceed to the Charge Warning Light Test (see page 16-70).
- If amperage is not within specification, go to step 6.

6. Perform full field test: Attach a probe to the VAT-40 full field test lead and insert the probe into the full field access hole at the back of the alternator. Switch the field selector to the "A" (ground) position momentarily and check amperage reading.

NOTE:

- As an alternative, use a screwdriver and an ammeter.
- Before performing full field test, remove a protector from the alternator end cover.

**CAUTION:** The voltage will rise quickly when the alternator is full field. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.



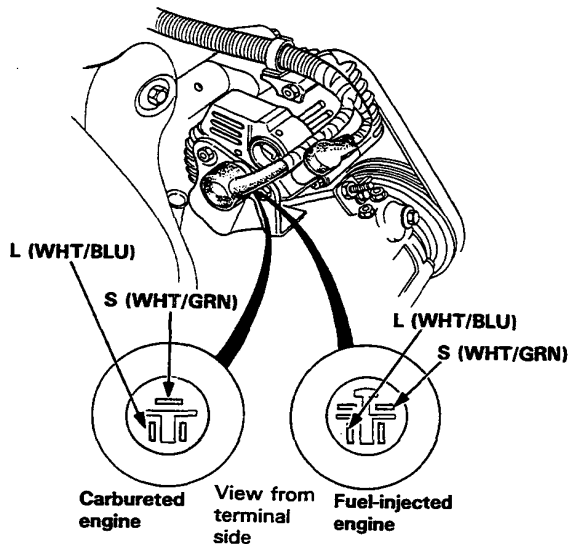
- If the amperage is within specification, replace the regulator.
- If the amperage is not within specification, replace the alternator.

# Charging System

## Charge Warning Light Test

**NOTE:** Before testing, check the wire harness connection and alternator belt tension.

1. Turn the ignition switch on. The charge warning light should come on. If it does not come on, unplug the alternator connector and short the pin of the L (WHT/BLU) terminal to ground.



- If the warning light still does not come on, check for:

- Blown No. 12 (10 A) fuse in the dash fuse box.
- Bad bulb.
- An open in the WHT/BLU wire between the warning light and voltage regulator.
- An open in the BLK/YEL wire between the warning 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 16-68).

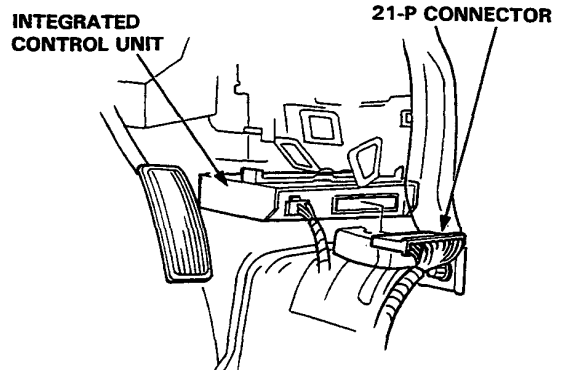
2. Start the engine and let it idle. The charge warning light should go off.

If it stays on this time, check the No. 37 (10 A) fuse in the under-hood relay box and the WHT/GRN wire between the under-hood relay box and the alternator.

If the fuse and wire are OK, check the alternator and regulator (see page 16-66).

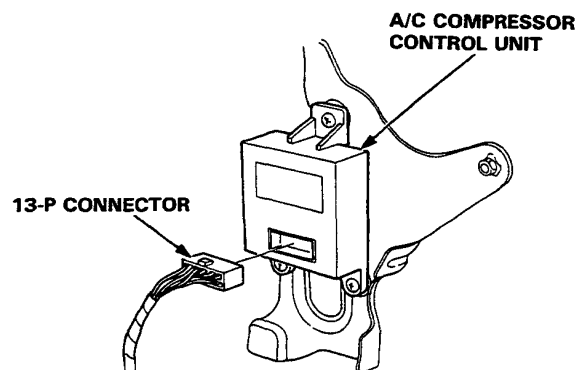
If the system is charged, proceed as follows.

3. Remove the front console, then disconnect the 21-P connector from the integrated control unit. With the engine running, the charge warning light should go out.



- If the light goes out, there is a short in the integrated control unit.
- If the light does not go out:  
Without A/C: There is short to ground in the WHT/BLU wire from the warning light to the control unit.  
With A/C: Go to step 4.

4. Remove the glove box, then disconnect the 13-P connector from the A/C compressor control unit. With the engine running, the charge warning light should go out.

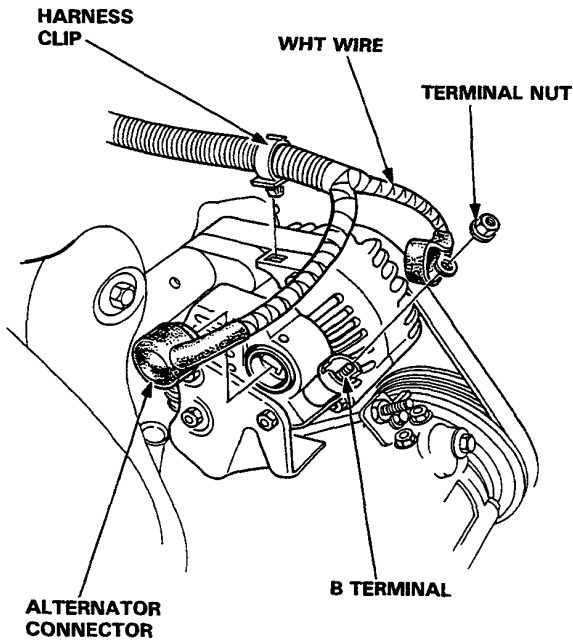


- If the light goes out, there is a short in the A/C compressor control unit.
- If the light does not go out, there is a short to ground in the WHT/BLU wire from the warning light to the control unit.

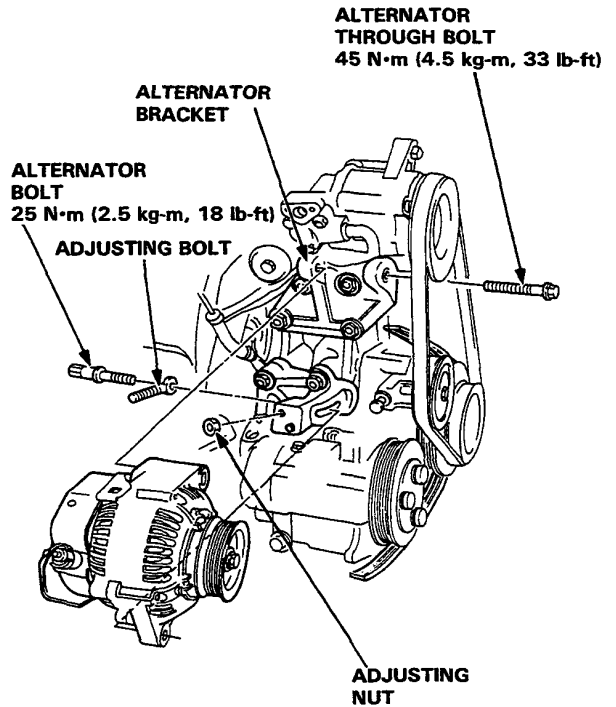


## Alternator Replacement

1. Disconnect the ground wire from the battery negative (-) post.
2. Disconnect the alternator connector from the alternator, and remove the clip from the harness bracket.
3. Remove the terminal nut and the WHT wire from the B terminal.



4. Loosen the through bolt and adjusting nut.
5. Remove the alternator bolt, then remove the belt from the pulley.
6. Remove the through bolt, then remove the alternator from the bracket.



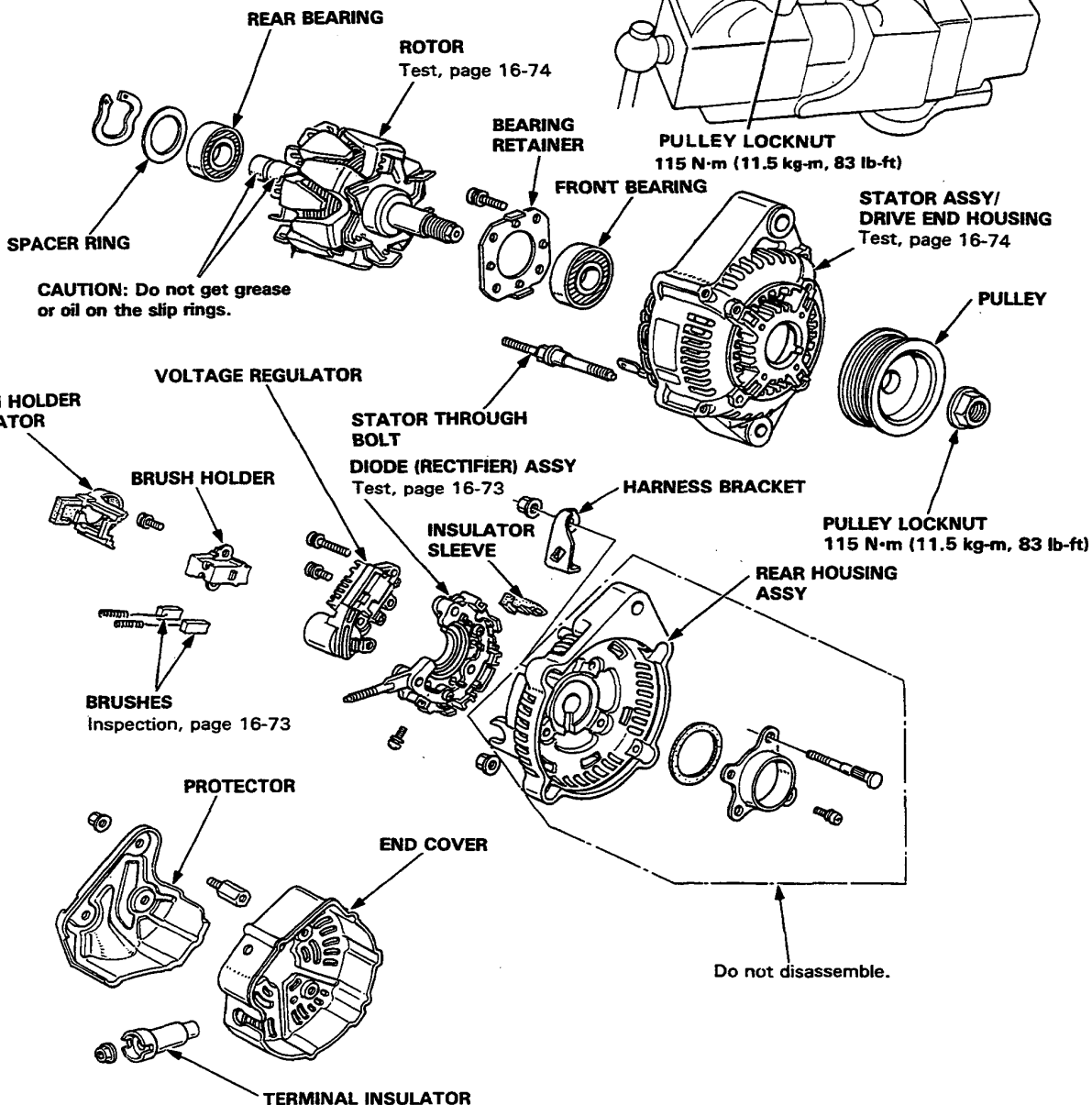
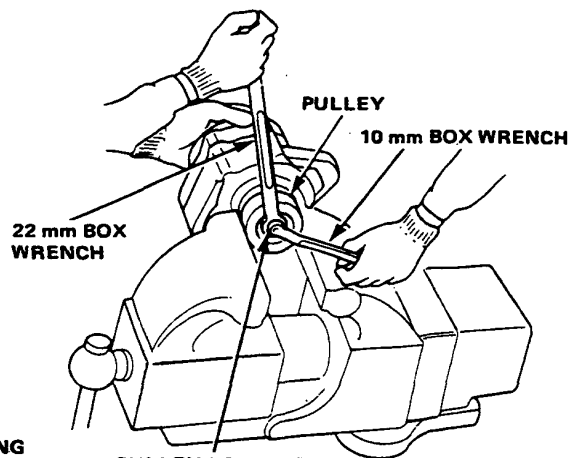
7. Adjust the alternator belt tension after installation (see page 16-75).

# Charging System

## 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.

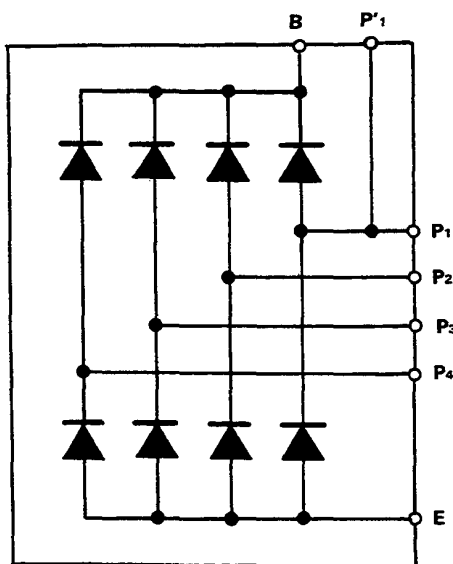
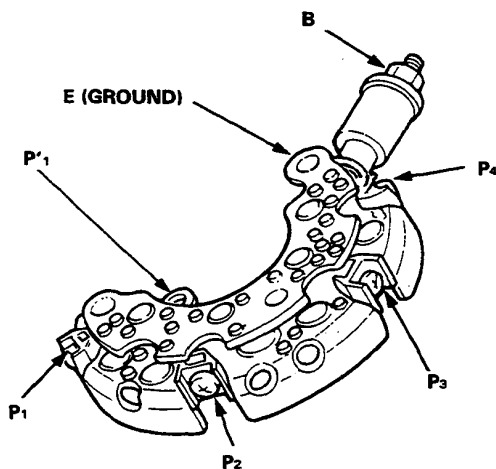




## Rectifier Test

**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.

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.)

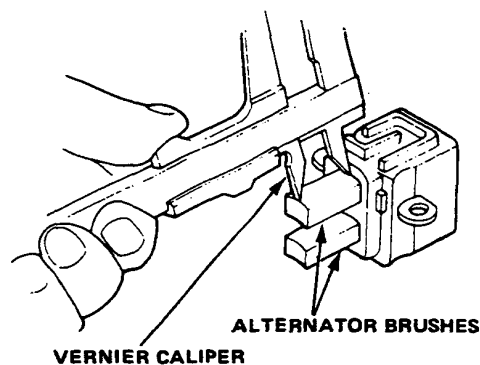
## Alternator Brush Inspection

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.

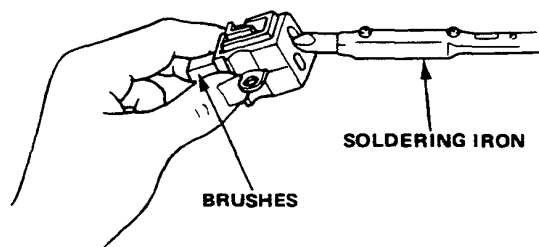
### Alternator Brush Length:

**Standard** : 10.5 mm (0.41 in)

**Service Limit:** 5.5 mm (0.22 in)



If the brushes are not within the service limit, replace them.

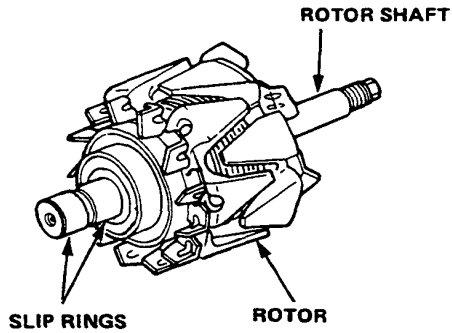


**CAUTION:** When replacing the brushes, use only a rosin core type solder or solder joints will corrode.

# Charging System

## Rotor Slip Ring Test

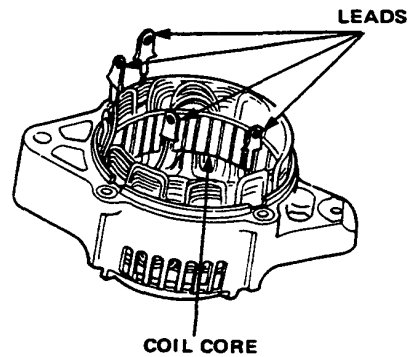
1. Check that there is continuity between the slip rings.
2. Check that there is no continuity between the rings and the rotor or rotor shaft.



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.



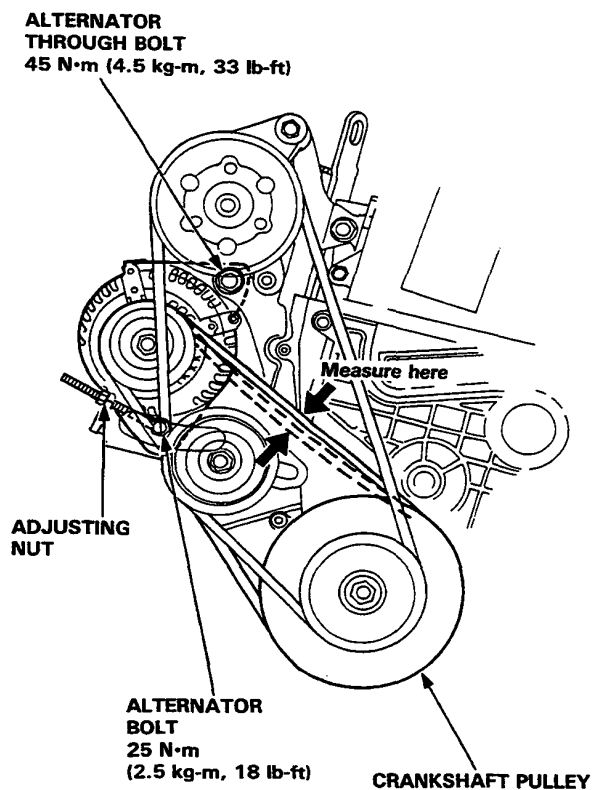


## Alternator Belt Adjustment

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection between the alternator and the crankshaft pulley.

**Deflection: 10–12 mm (0.39–0.47 in)**

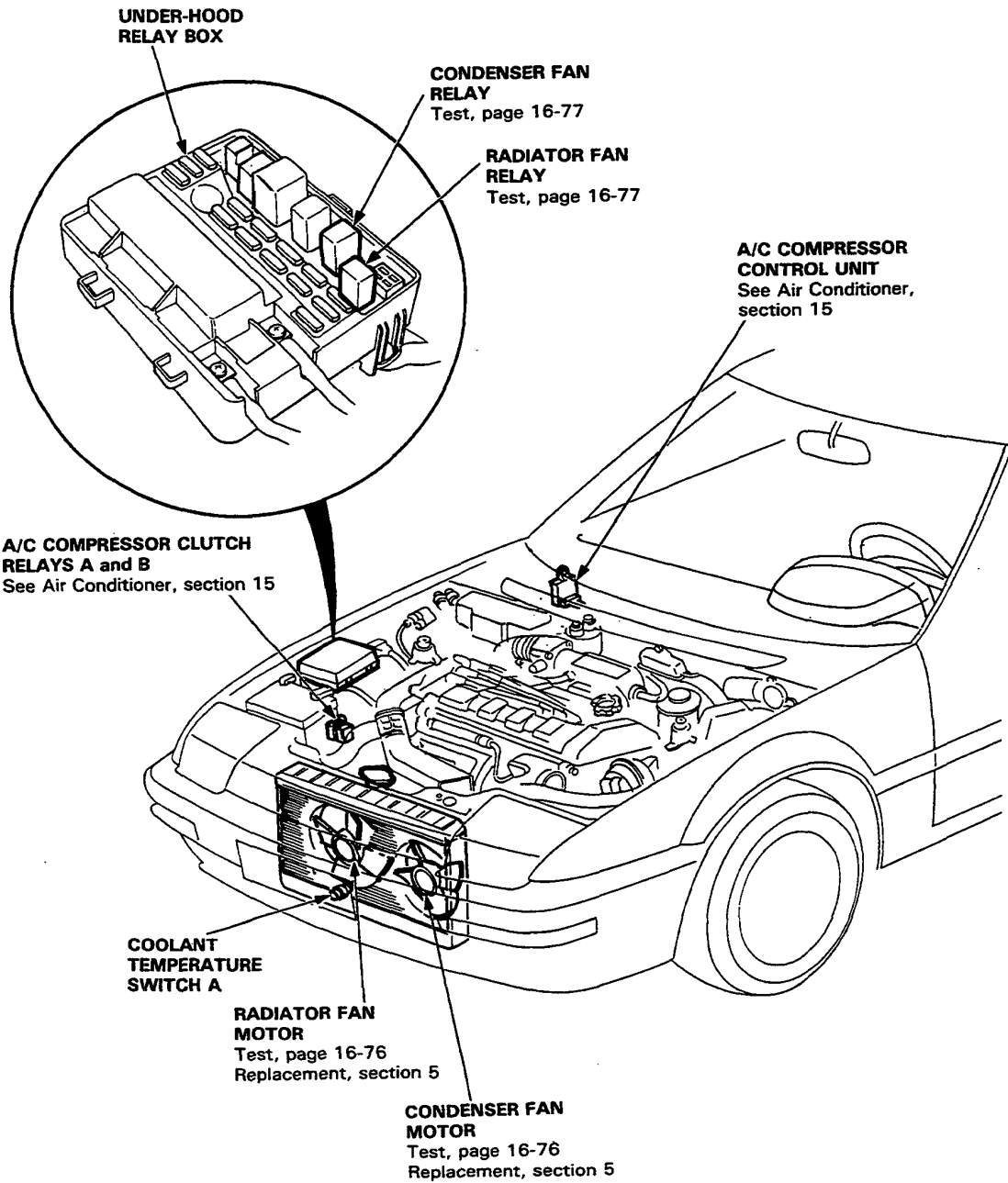
**NOTE:** On a brand-new belt, the deflection should be 8–10 mm (0.31–0.39 in) when first measured.



2. Loosen the alternator bolt and through bolt.
3. Move the alternator by turning the adjusting nut to obtain the proper belt tension, then retighten the alternator bolt and through bolt.
4. Recheck the deflection of the belt.

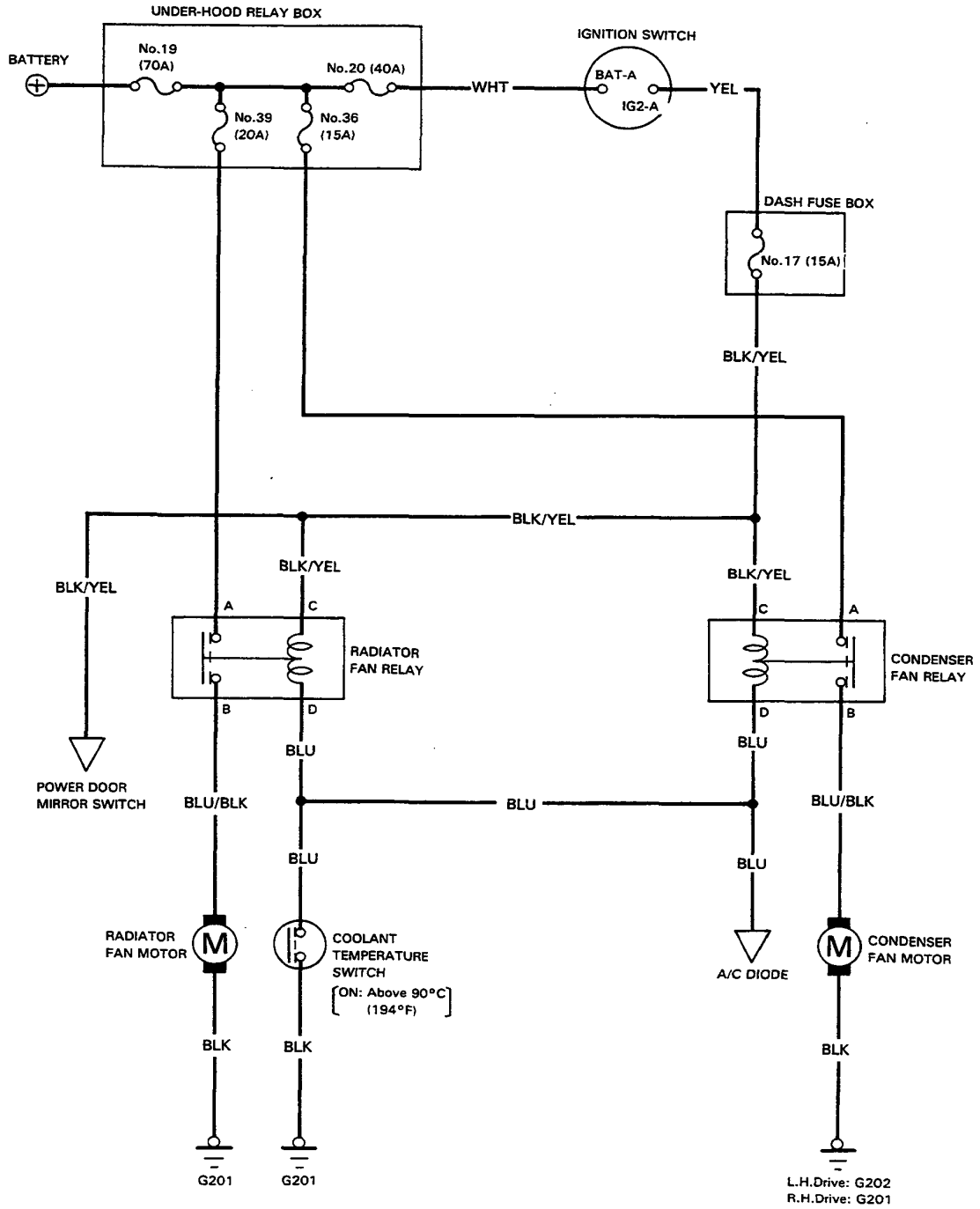
# Cooling Fan Control

## Component Location Index





# Circuit Diagram

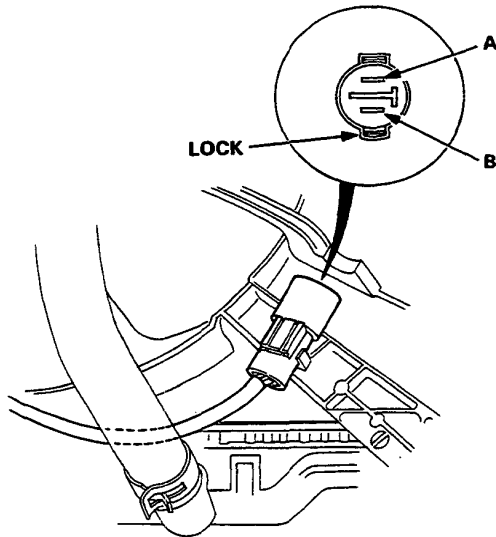


# Cooling Fan Control

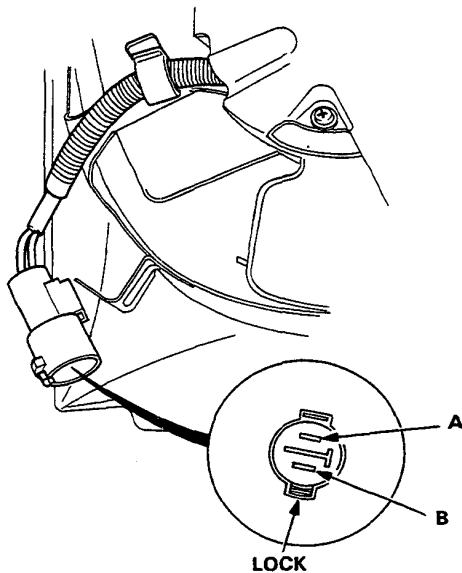
## Fan Motor Test

1. Disconnect the 2-P connector from the 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.

Radiator Fan Motor:

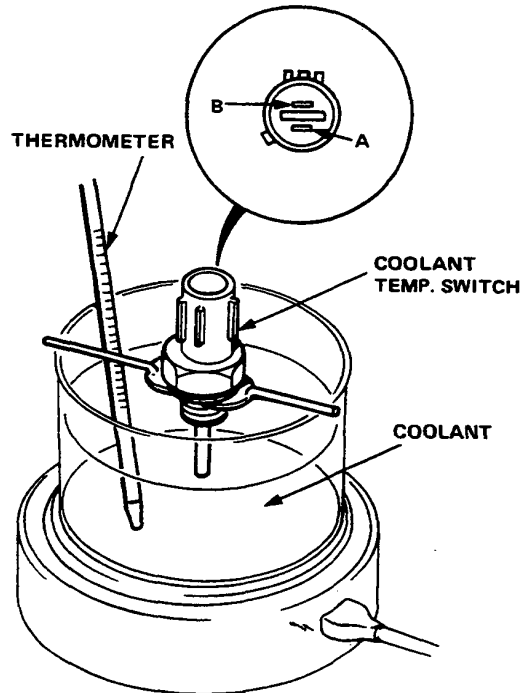


Condenser Fan Motor:



## Coolant Temperature Switch Test

1. Remove the coolant temperature switch from the radiator.
2. Suspend the coolant temperature switch in a container of coolant as shown.



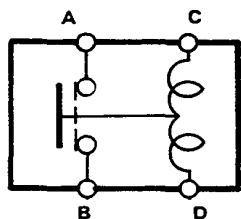
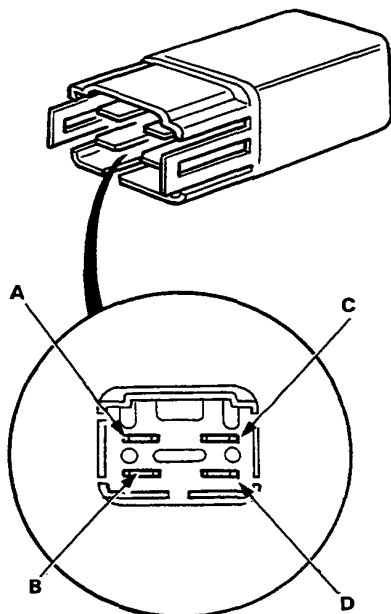
3. Heat the coolant and check coolant temperature with a thermometer.
4. Measure the resistance between the A and B terminals according to the table.

Temperature	Terminal	
	A	B
Above 87–93°C (189–199°F)	○	○
Below 80–91°C (176–196°F)		



## Relay Test

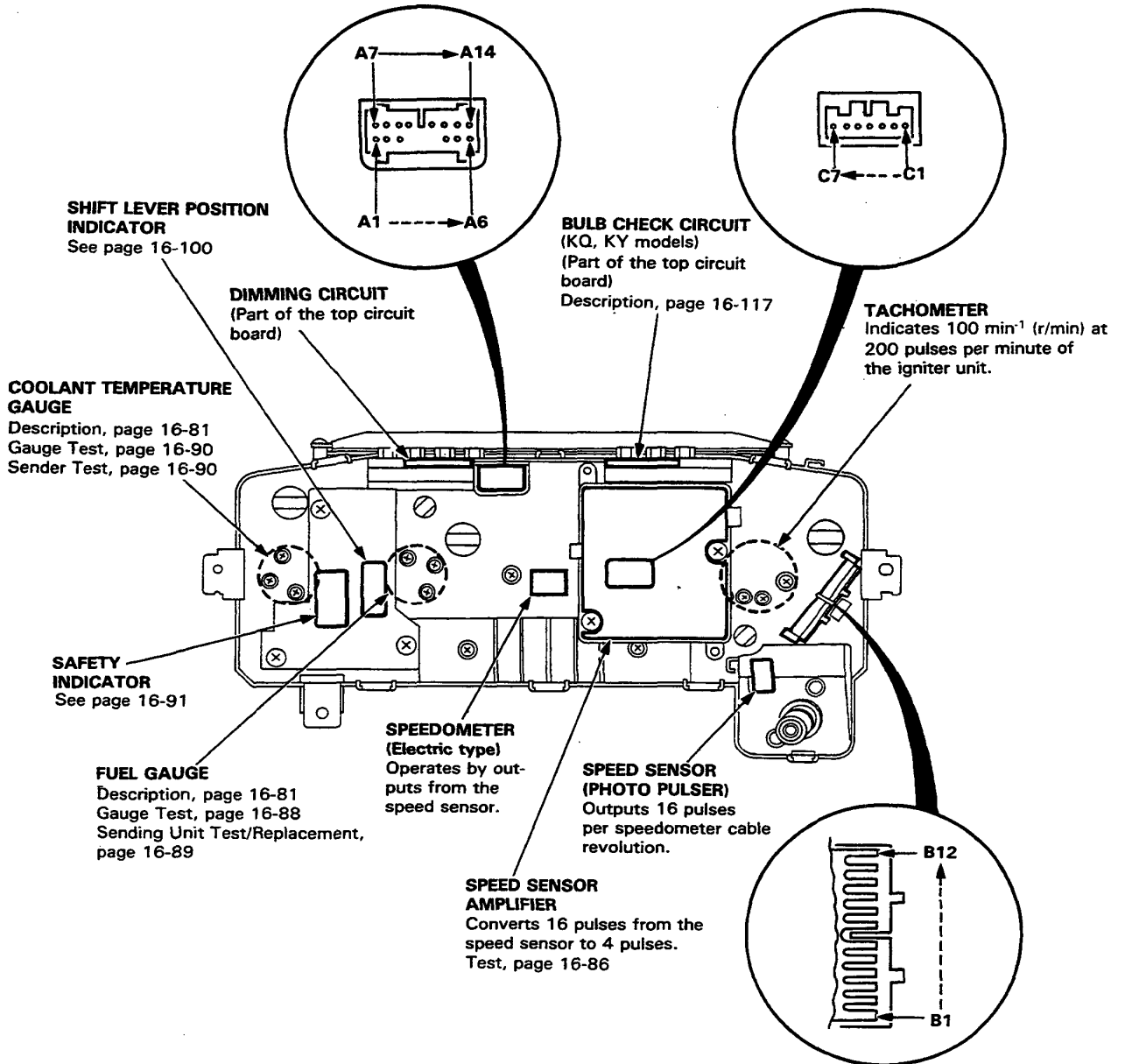
1. Remove the radiator or condenser relay in the under-hood relay box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.  
There should be no continuity when the battery is disconnected.



# Gauge Assembly

## Gauge/Indicator Location Index

- **GAUGE ASSEMBLY**  
Removal, page 16-85  
Disassembly, page 16-87
- **ODOMETER**  
Indicates 1 mile at  
1,026 revolutions of the  
speedometer cable.

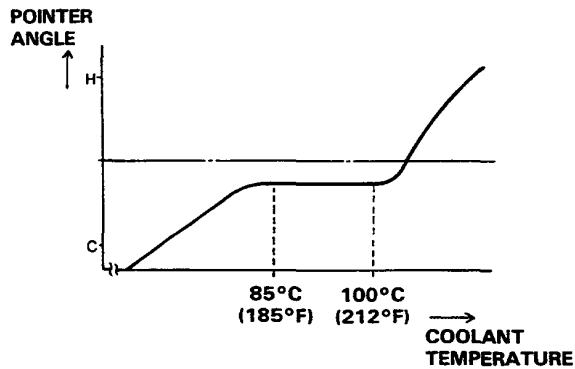




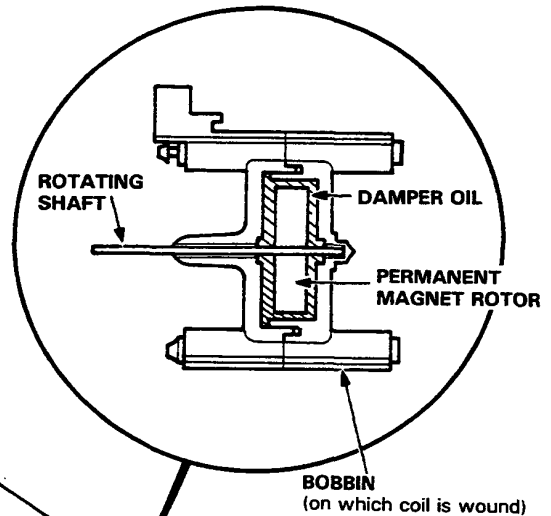
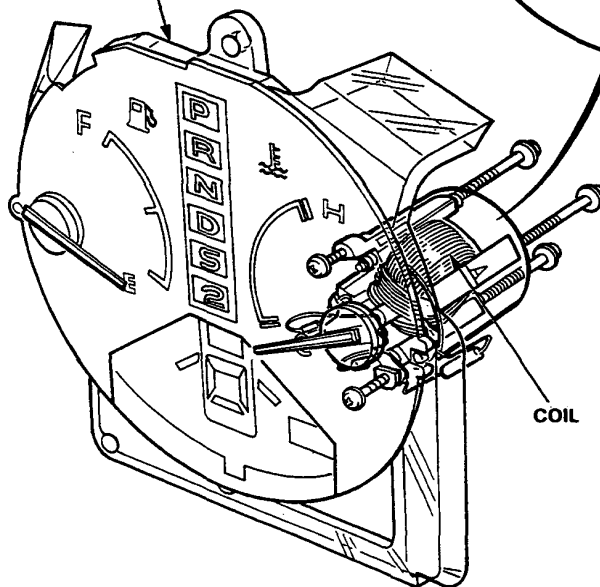
## Description

### Bobbin Type (Cross Coil Type) Gauge:

- A bobbin type gauge is an electromagnetic instrument in which two intersecting coils are wound around the permanent magnet rotor. By varying the resistance of the unit to vary the current which flows through the coil, the magnetic force which energizes the coil will vary, causing the rotor (pointer) to operate. A sliding resistance is employed in the fuel gauge just as in a bimetal type gauge, and a thermistor is used in the temperature gauge.
- The rotor of the fuel gauge is immersed in damper oil and its center of gravity lies roughly along the rotating shaft, hence the fuel level is indicated continuously even when the ignition switch is OFF.
- The coolant temperature gauge is a center point stable small indicating angle type which indicates the temperature of the cooling water over the range of between about 85°C (185°F) and 100°C (212°F).

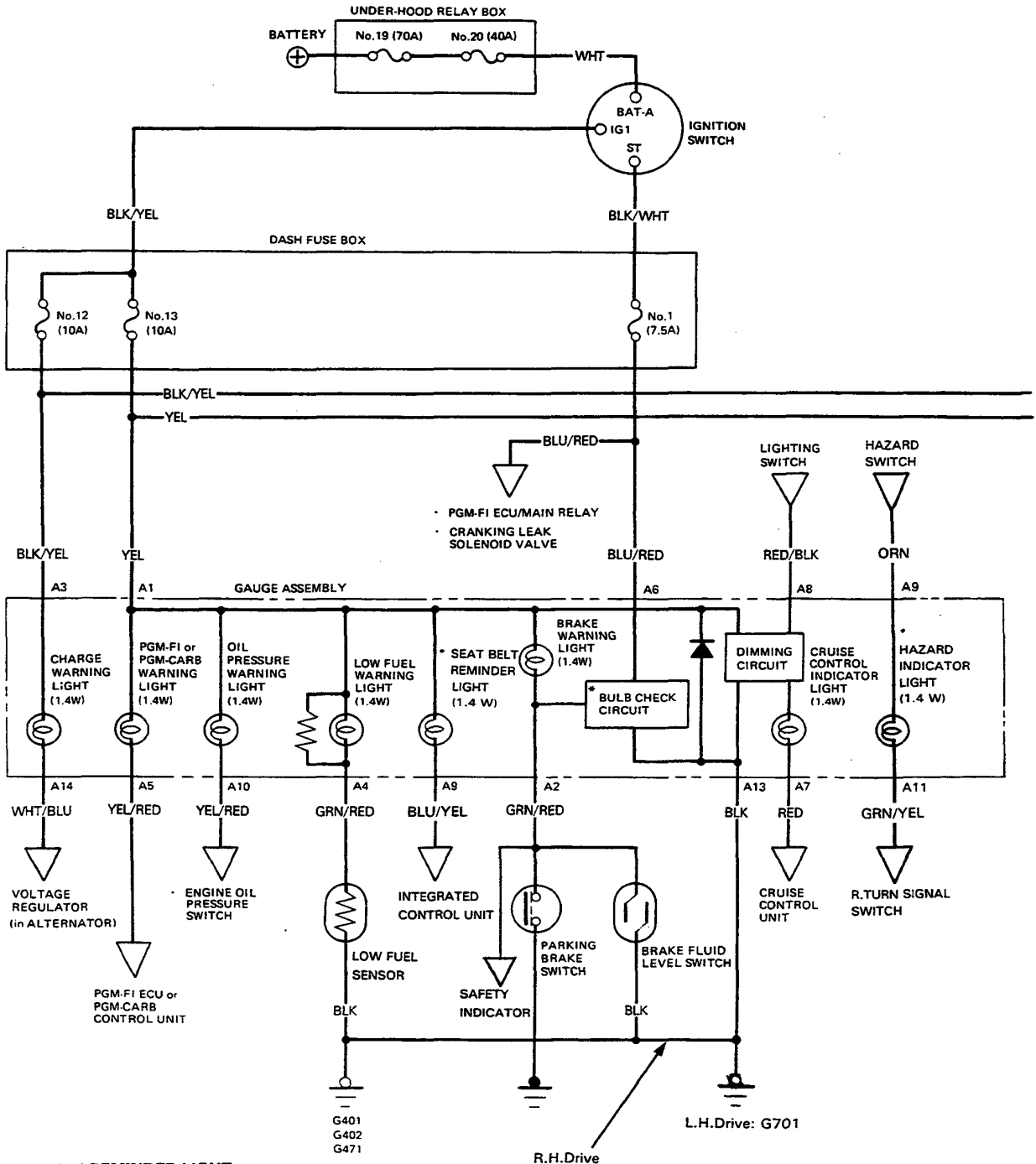


FUEL GAUGE/COOLANT TEMPERATURE GAUGE



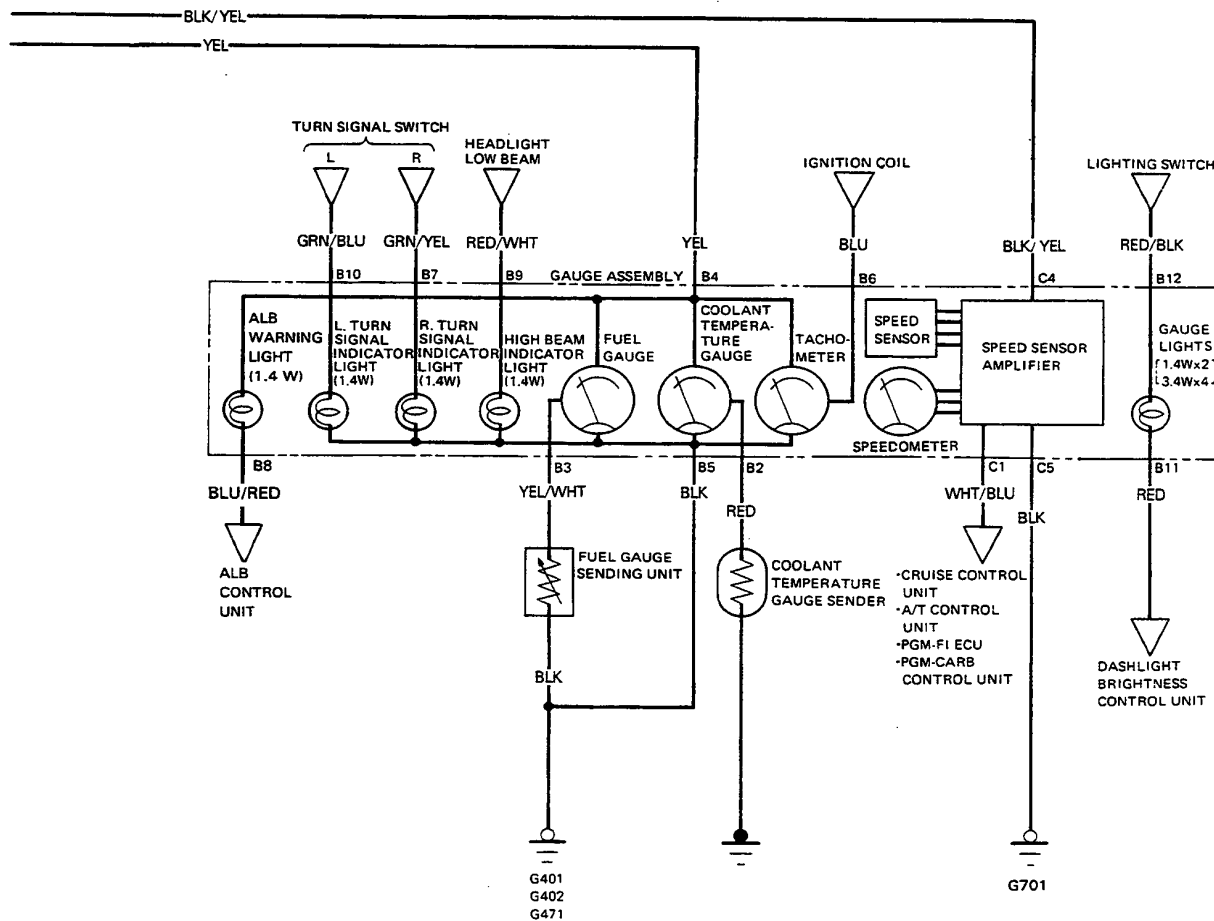
# Gauge Assembly

## Circuit Diagram



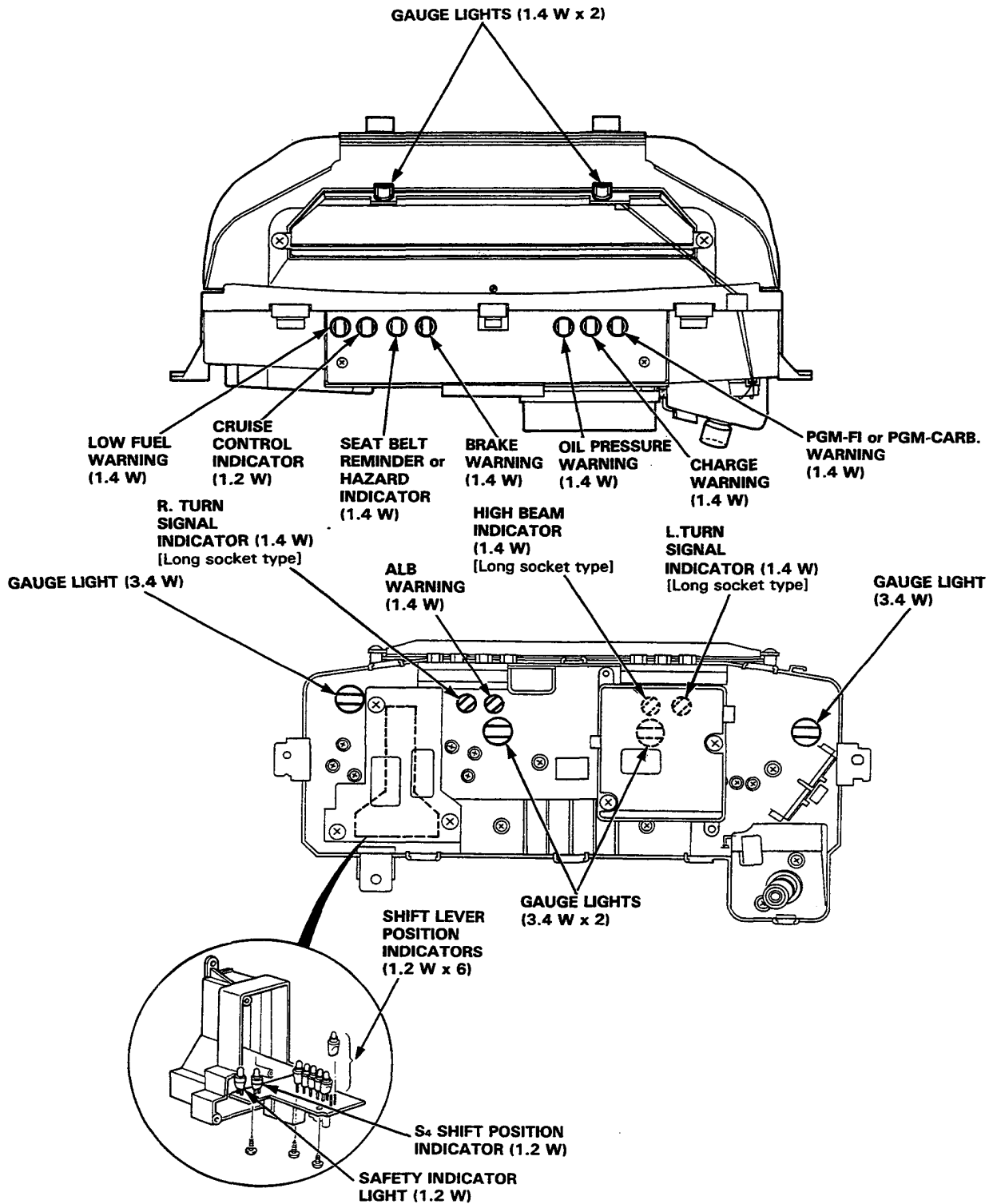
- \* SEAT BELT REMINDER LIGHT:  
(KY model only)
- \* HAZARD INDICATOR LIGHT:  
(European models only)
- \* BULB CHECK CIRCUIT:  
(KQ, KY models)





# Gauge Assembly

## Bulb Locations

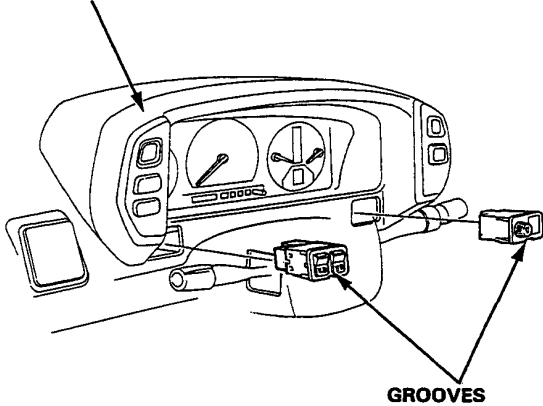




## Removal

1. Remove the switches from the instrument panel.

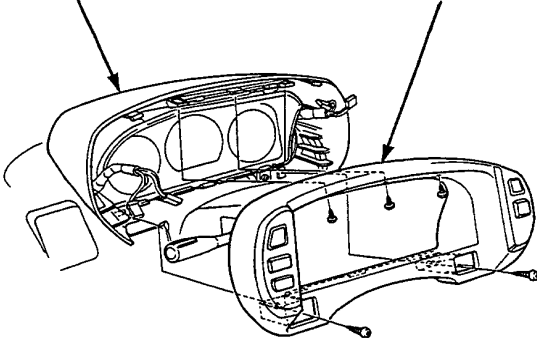
INSTRUMENT PANEL



2. Remove the 5 screws, then remove the instrument panel from the gauge visor.

GAUGE VISOR

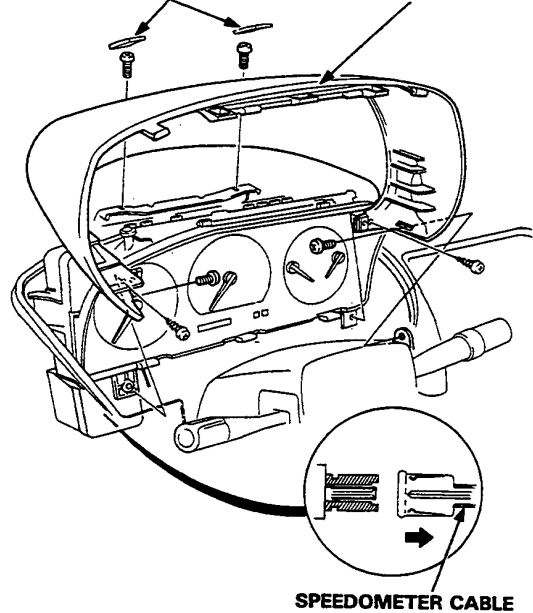
INSTRUMENT PANEL



3. Remove the cap and 6 screws, then remove the gauge visor from the dashboard.
4. Remove the dashboard lower panel, then disconnect the speedometer cable from the gauge assembly.

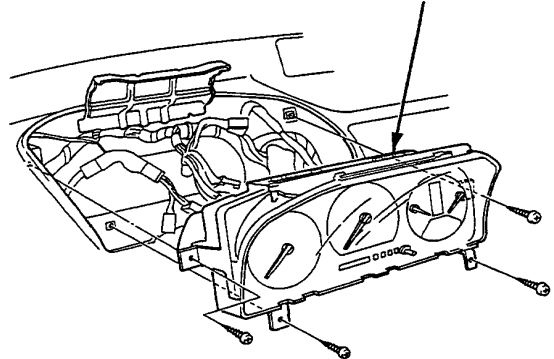
CAPS

GAUGE VISOR



5. Remove the 4 screws, then pull out the gauge assembly from the dashboard.

GAUGE ASSEMBLY



NOTE: Be careful not to pinch the wires when installing the gauge assembly.

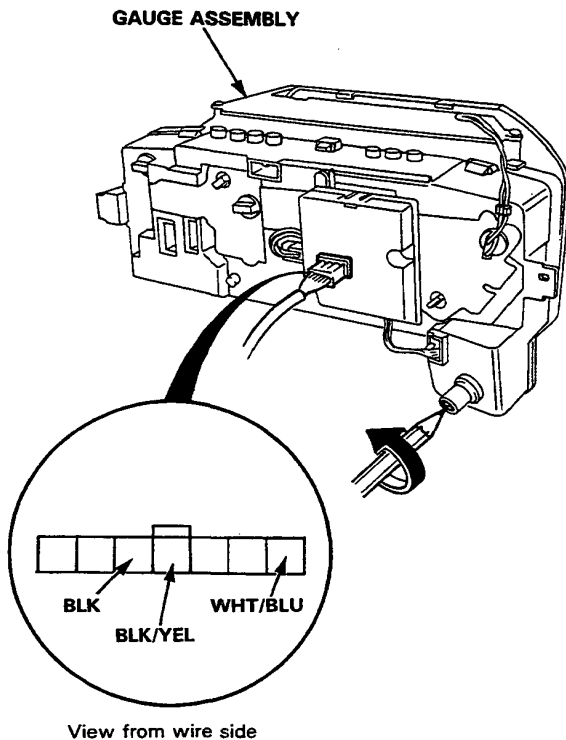
# Gauge Assembly

## Speed Sensor Test

1. Remove the gauge assembly from the dashboard (see page 16-85).
2. Connect the voltmeter positive probe to the BLK/YEL terminal and the negative probe to the BLK terminal of the 7-P (YEL) connector with the ignition switch ON.  
There should be battery voltage.
  - If there is no voltage, check for:
    - Blown the No. 12 (10 A) fuse in the dash fuse box.
    - Poor ground (G701).
3. Check voltage between the WHT/BLU terminal of the 7-P (YEL) connector and body ground with the ignition switch ON.  
There should be about 5 V.
  - If the voltage is not specified, check for an open in the WHT/BLU wire.
4. Connect the 7-P (YEL) connector to the speed sensor amplifier.

5. Connect the voltmeter positive probe to the WHT/BLU terminal and the negative probe to the BLK terminal.
6. Insert a pencil into the speedometer cable connector socket and turn it with the ignition switch ON.  
There should be 0-5-0-5 V repeatedly.

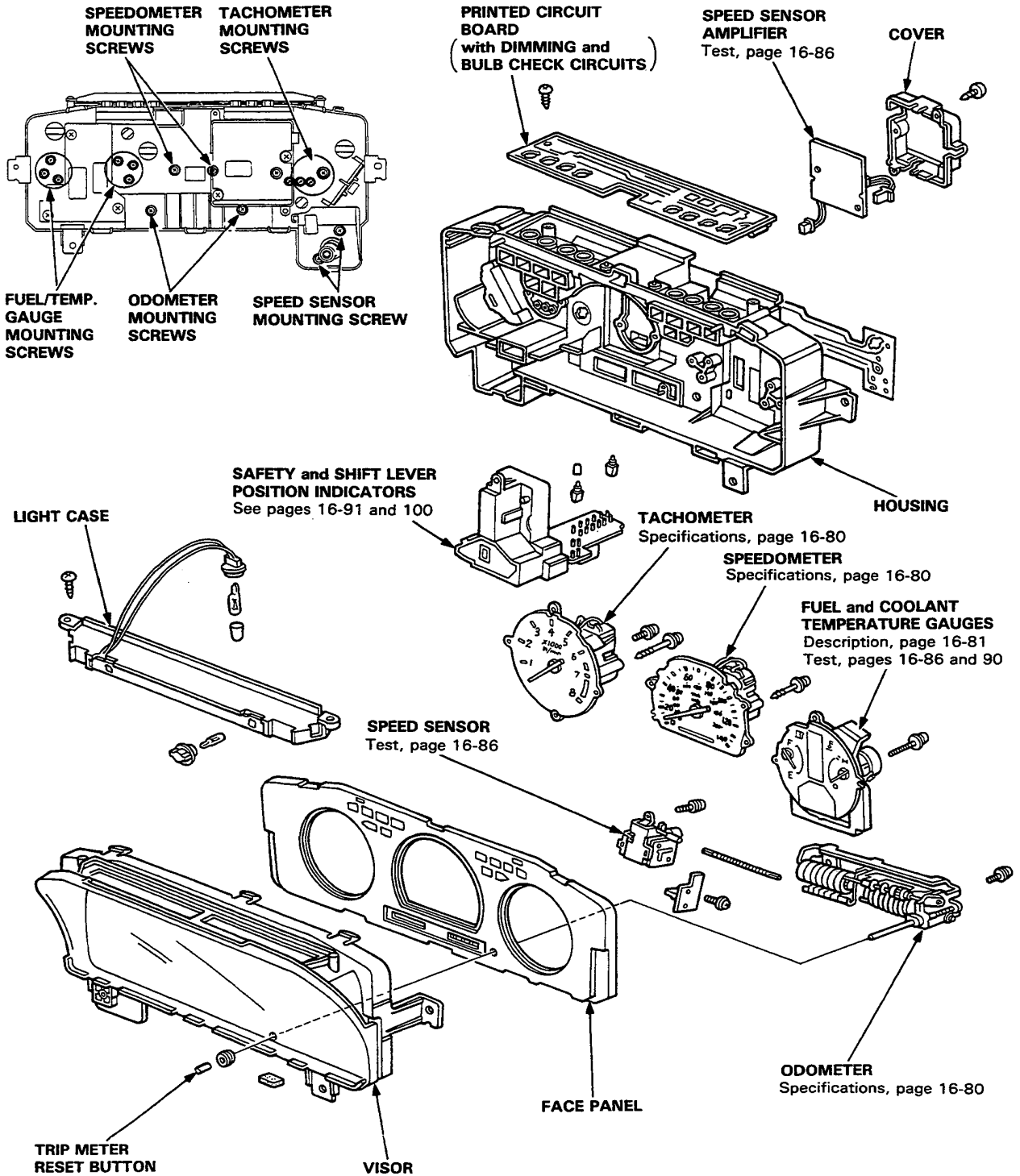
**NOTE:** Be careful not to pinch the wires when installing the gauge assembly.





# Disassembly

NOTE: Handle the terminals and printed circuits carefully to avoid damaging them.

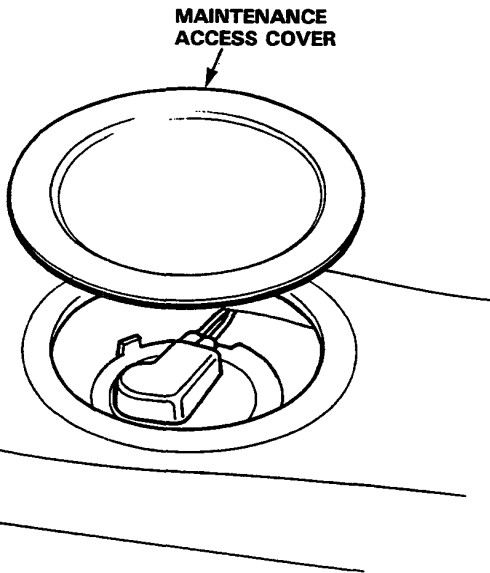


# Fuel Gauge

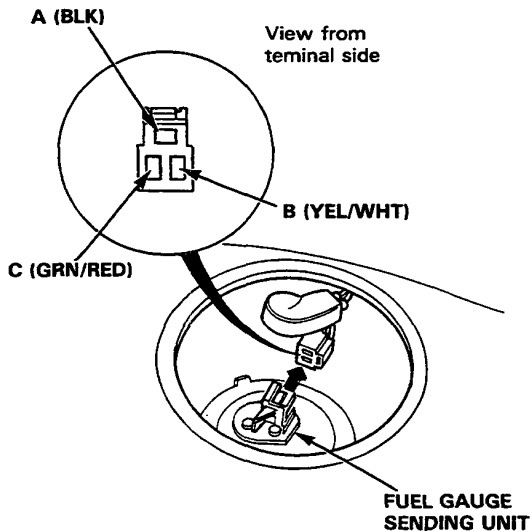
## Gauge Test

NOTE: Refer to page 16-83 for wiring description of the fuel gauge circuit.

1. Open the trunk lid, then remove the right rear seat back carpet (see section 14).
2. Remove the maintenance access cover in the luggage area.



3. Disconnect the 3-P connector from the sending unit.



4. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the A (BLK) terminal, then turn the ignition switch ON. There should be battery voltage.

- If the voltage is specified, go to step 4.
- If the voltage is not specified, check for:
  - Blown No. 13 (10 A) fuse in the dash fuse box.
  - An open in the YEL, YEL/WHT or BLK wire.
  - Poor ground (G401, 402, 471).

5. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and A (BLK) terminals.

6. 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 pointer 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.

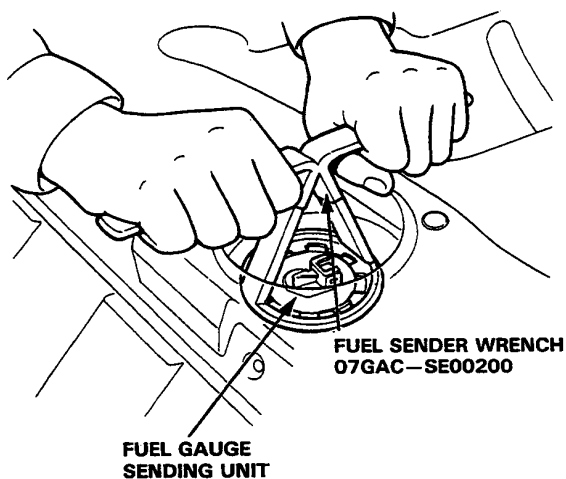
- If the pointer of the fuel gauge does not swing at all, replace the gauge.
- Inspect the fuel gauge sending unit if the gauge is OK.



## Sending Unit Test/Replacement

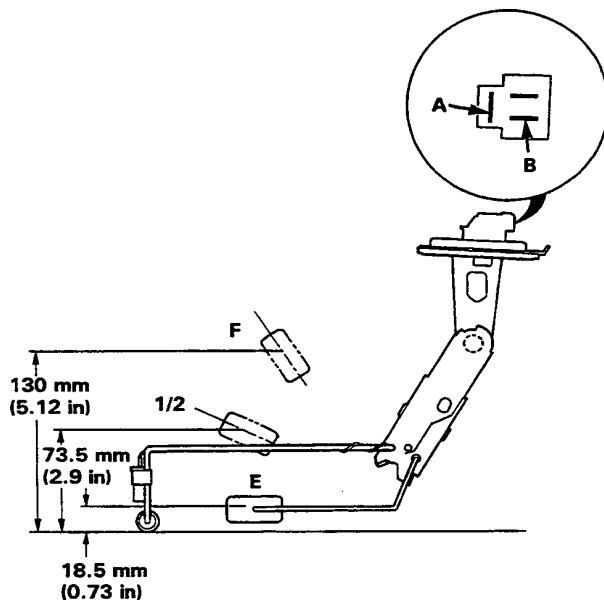
**WARNING** Do not smoke while working on fuel system. Keep open flame away from work area.

1. Open the trunk lid, then remove the right rear seat back carpet (see section 14).
2. Remove the maintenance access cover in the luggage area.
3. Check that the ignition switch is off, then disconnect the 3-P connector from the fuel gauge sending unit.
4. Remove the fuel gauge sending unit.



5. Measure the resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance ( $\Omega$ )	105-110	25.5-39.5	2-5



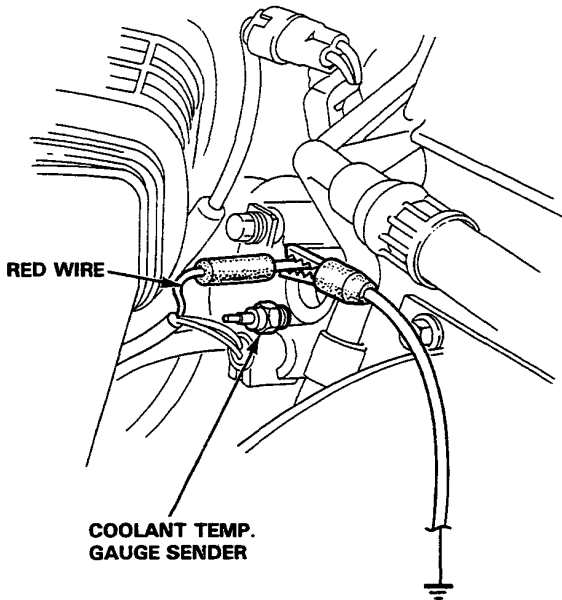
6. If unable to obtain the above readings, replace the fuel gauge sending unit.

# Coolant Temperature Gauge

## Gauge Test

NOTE: Refer to page 16-83 for wiring description of the coolant temperature gauge circuit.

1. Make sure the ignition switch is OFF, then disconnect the RED 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.

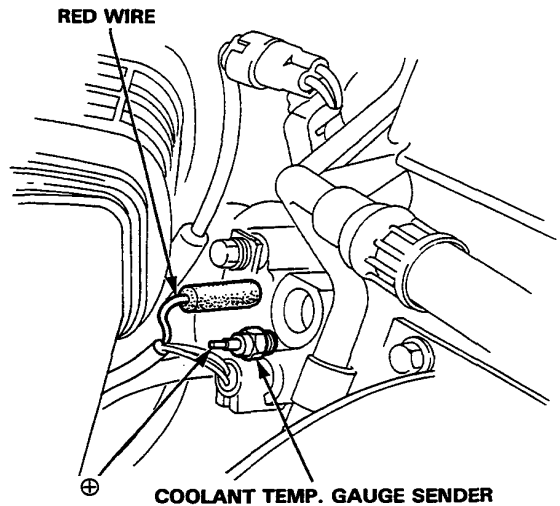
- If the pointer of the gauge does not swing at all, check for:
  - Blown No. 13 (10 A) fuse in the dash fuse box.
  - An open in the YEL or RED wire.

Replace the coolant temperature gauge if the fuse and wiring are normal.

- Inspect the gauge sender if the gauge is OK.

## Sender Test

1. Disconnect the RED 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 engine 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	32–49

5. If obtained readings are substantially different from specifications above, replace the gauge sender.



# Safety Indicator



## Component Location Index

**A/T CONTROL SYSTEM**  
See Automatic Transmission,  
section 9

**SAFETY INDICATOR**  
Troubleshooting, page 16-96  
Removal, page 16-85  
Input Test, page 16-98  
Bulb Replacement, page 16-84

**DOME LIGHT**  
Removal page 16-135  
Test, page 16-135

**R. DOOR SWITCH**  
Test, page 16-139

**TRUNK LIGHT**

**R. BRAKE LIGHTS**  
Replacement, page 16-138

**R. BRAKE LIGHT  
FAILURE SENSOR**  
(in the right taillight)  
Test, page 16-97

**TRUNK LATCH SWITCH**  
Test/Replacement, page 16-140

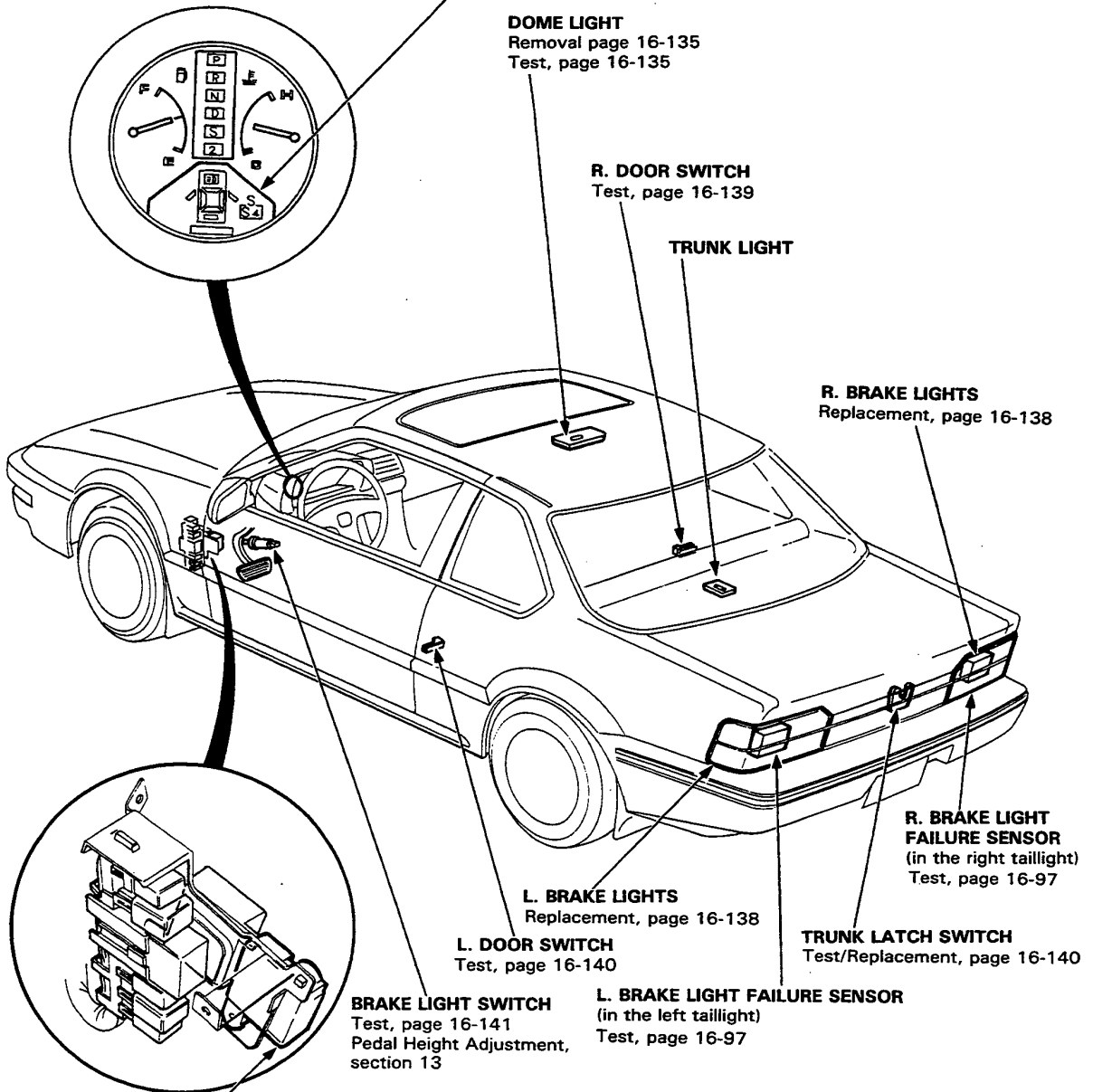
**L. BRAKE LIGHTS**  
Replacement, page 16-138

**L. DOOR SWITCH**  
Test, page 16-140

**L. BRAKE LIGHT FAILURE SENSOR**  
(in the left taillight)  
Test, page 16-97

**BRAKE LIGHT SWITCH**  
Test, page 16-141  
Pedal Height Adjustment,  
section 13

**RETRACTABLE HEADLIGHT  
CONTROL UNIT**  
Input Test, page 16-128







## Description

### Safety Indicator Warning System:

LED's are used to indicate when the trunk 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 functioning.

### Brake Light Bulb Failure Warning:

If all brake light bulbs are OK, the warning light stays off because the WHT/GRN<sup>2</sup> wire is constantly being grounded by the two brake light failure sensors connected in series. With the brakes off, the ground is provided through the diode, the failure sensor relay coils and bulb filaments to ground. With the brake lights on, all 4 relays, (2 in the left sensor, 2 in the right) connected in series, supply ground. If any of the 4 bulbs is not working, the chain is broken and the WHT/GRN<sup>2</sup> wire is not being grounded. The warning light comes on.

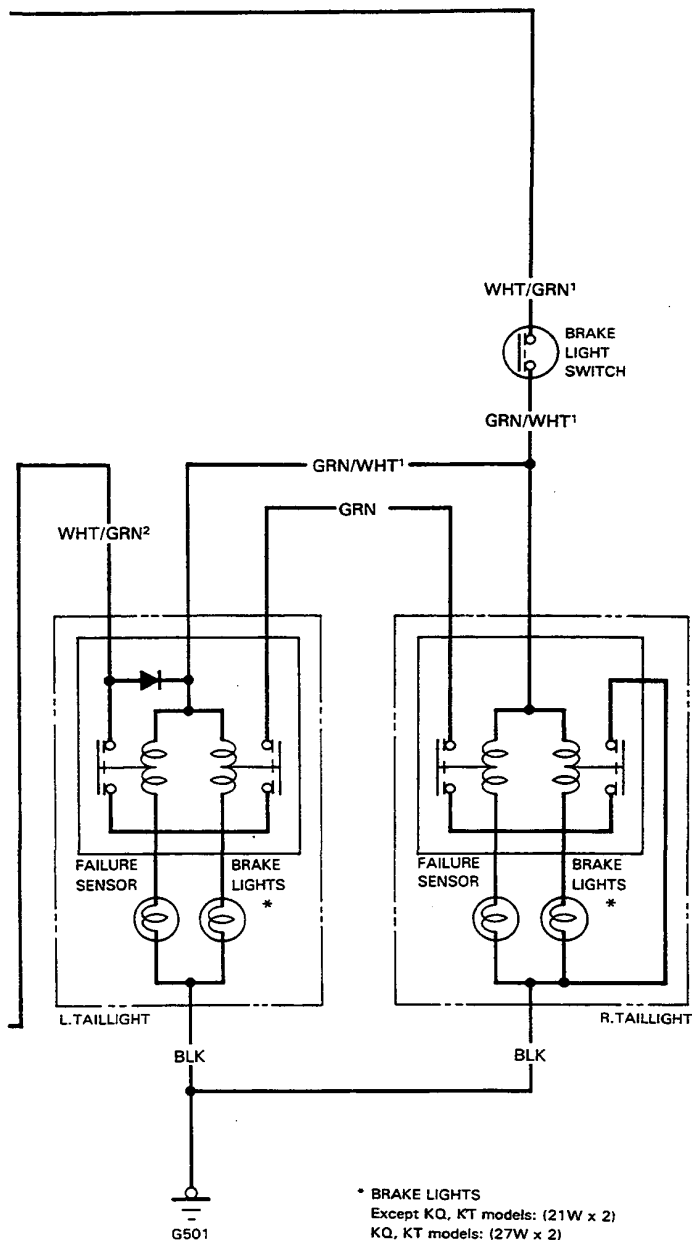
### S<sub>4</sub> Indicator:

The "S<sub>4</sub>" indicator light will remain on for about 2 seconds after the ignition switch has been turned on to show that the system circuit is functioning.

The shift lever position indicator is dimmed by the dimming circuit with the lighting switch on and also controlled by the dashlight brightness controller.

In the "S<sub>4</sub>" mode, which can be selected by the "S<sub>4</sub>" switch, the A/T control unit applies voltage to the "D11" terminal of the shift lever position indicator to light up the "S<sub>4</sub>" indicator. When the "S<sub>4</sub>" mode has been selected, the "S<sub>4</sub>" pilot light in the "S<sub>4</sub>" switch comes on.

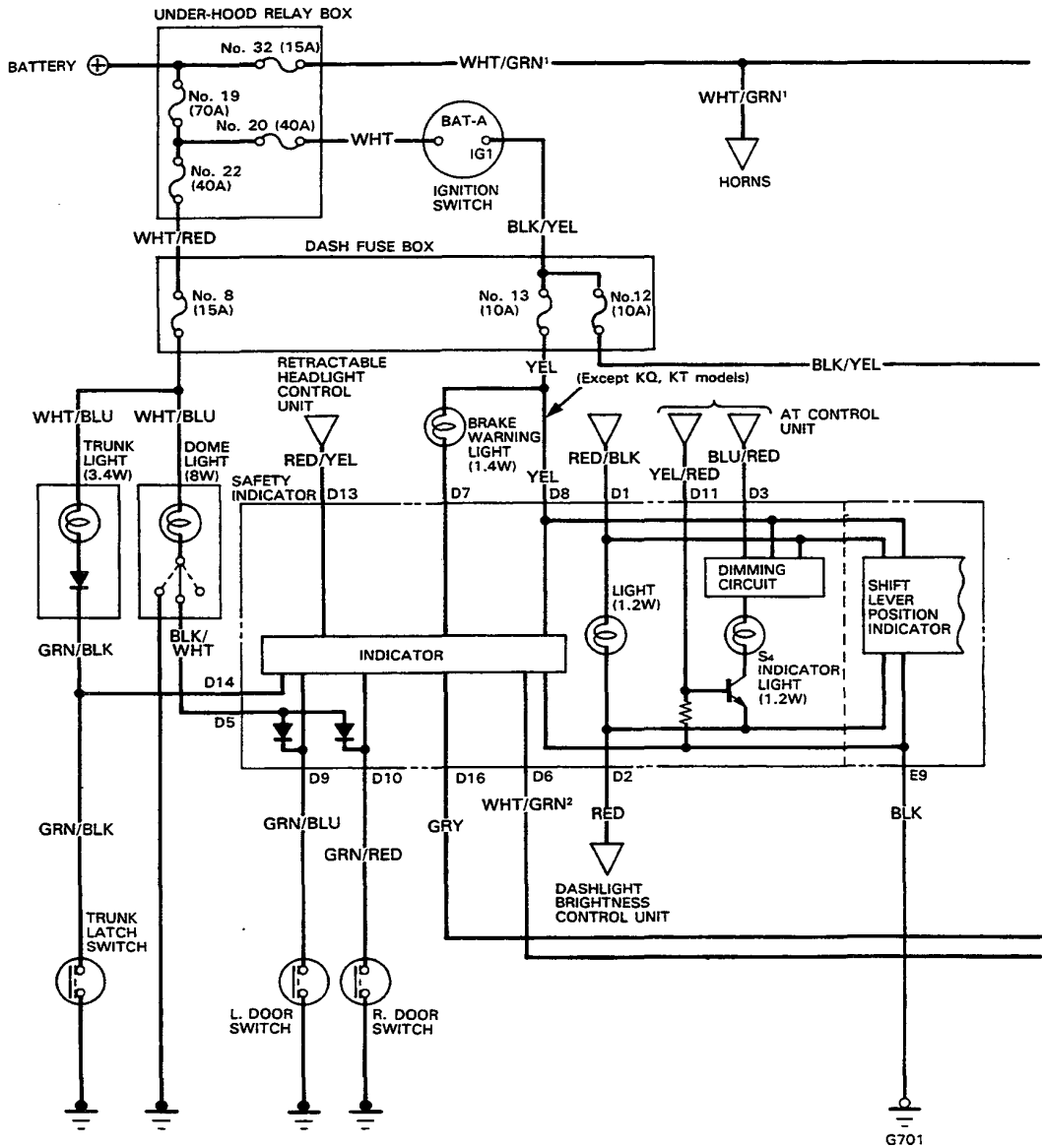
The "S<sub>4</sub>" indicator also functions as the warning indicator for the A/T control system. If some malfunction occurs in the A/T control system, the A/T control unit applies voltage to the "D11" terminal of the shift lever position indicator to make the "S<sub>4</sub>" indicator flash. The flashing "S<sub>4</sub>" indicator informs the driver of some malfunction in the A/T control system. When the "S<sub>4</sub>" indicator functions as the warning indicator, the A/T control unit sends a cancelling signal to the "D<sub>3</sub>" terminal of the shift lever position indicator so that the "S<sub>4</sub>" indicator light is not dimmed.



# Safety Indicator

## Circuit Diagram (KG model)

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example WHT/GRN<sup>1</sup> and WHT/GRN<sup>2</sup> are not the same).



G701



# Safety Indicator

## Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Items to be inspected	Blown No. 13 (10 A) fuse (in the dash fuse box)	Blown bulb	Door switch	Blown No. 8 (15 A) fuse (in the dash fuse box)	Trunk latch switch	Brake light failure sensor	Safety indicator (diodes)	Safety indicator input	Retractor control unit (see page 16-128)	A/T Control system	Brake light circuit failure warning system (see page 16-112)	Poor ground	Open circuit in wires or loose or disconnected terminals
No indicators operate.	1							2				L.H.Drive: G401, 402, 471 R.H.Drive: G701	
Indicator panel illumination not lit with lighting switch ON.		1											RED/BLK or RED
Warning lights fail to come on when ignition switch is turned to ON.								1					
Door warning lights not lit with doors opened.			1					2					GRN/BLU or GRN/RED
Trunk warning light not lit with trunk lid opened.				1	2			3					GRN/BLK
Brake light warning light not lit with blown brake light bulb.								1			[2]		WHT/ GRN <sup>2</sup> or GRN
Brake light warning light re- mains on with good brake light bulbs.						1		2			[3]	G501	
Dome light not operated with door opened (When switch position is in MIDDLE)							1						BLK/WHT
Retractor motor warning light remains on with good retractor motor.								1	2				
S <sub>4</sub> indicator light not lit run- ning at the "S <sub>4</sub> " shift posi- tion.		1						2		3			YEL/RED

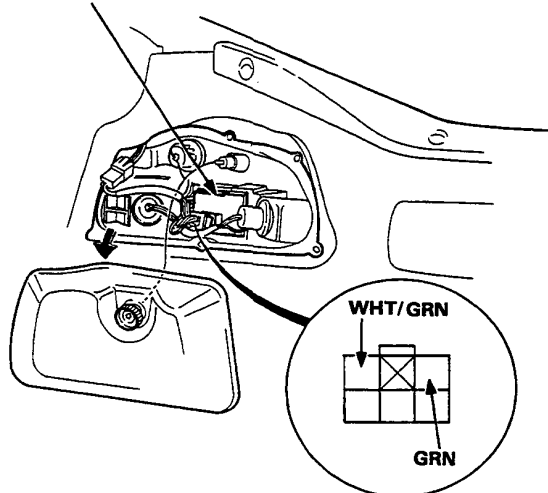
[ ]: KG model only



## 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 16-141).
  - 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 the maintenance lid of the left taillight. Make sure the **BRAKE LAMP** of the safety indicator does not come on when the WHT/GRN terminal of the 6-P connector is grounded and the ignition switch is turned OFF to ON.

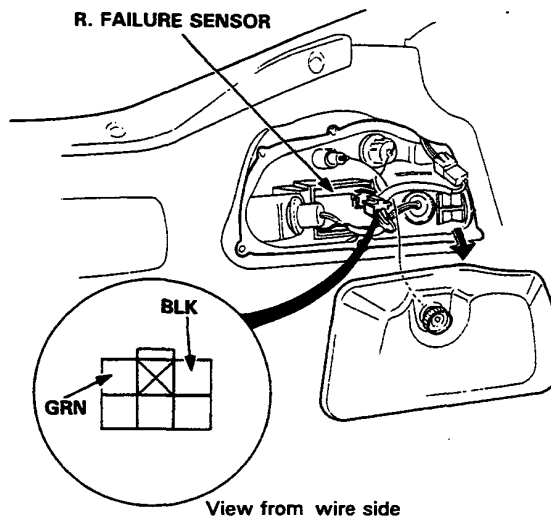
### L. FAILURE SENSOR



View from wire side

- If the **BRAKE LAMP** comes on, check for an open in the WHT/GRN wire between the safety indicator and the left failure sensor and whether the safety indicator 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 GRN terminal of the 6-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, go to step 4.

4. Open the maintenance lid of the right taillight. Make sure the **BRAKE LAMP** does not come on when the ignition switch is turned OFF to ON with the GRN terminal of the 6-P connector grounded and the brake pedal pressed.



View from wire side

- If the **BRAKE LAMP** comes on, there is an open in the 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 BLK terminal of the 6-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, check for an open in the BLK wire between the right failure sensor and ground, and check whether the G501 terminal is poor.

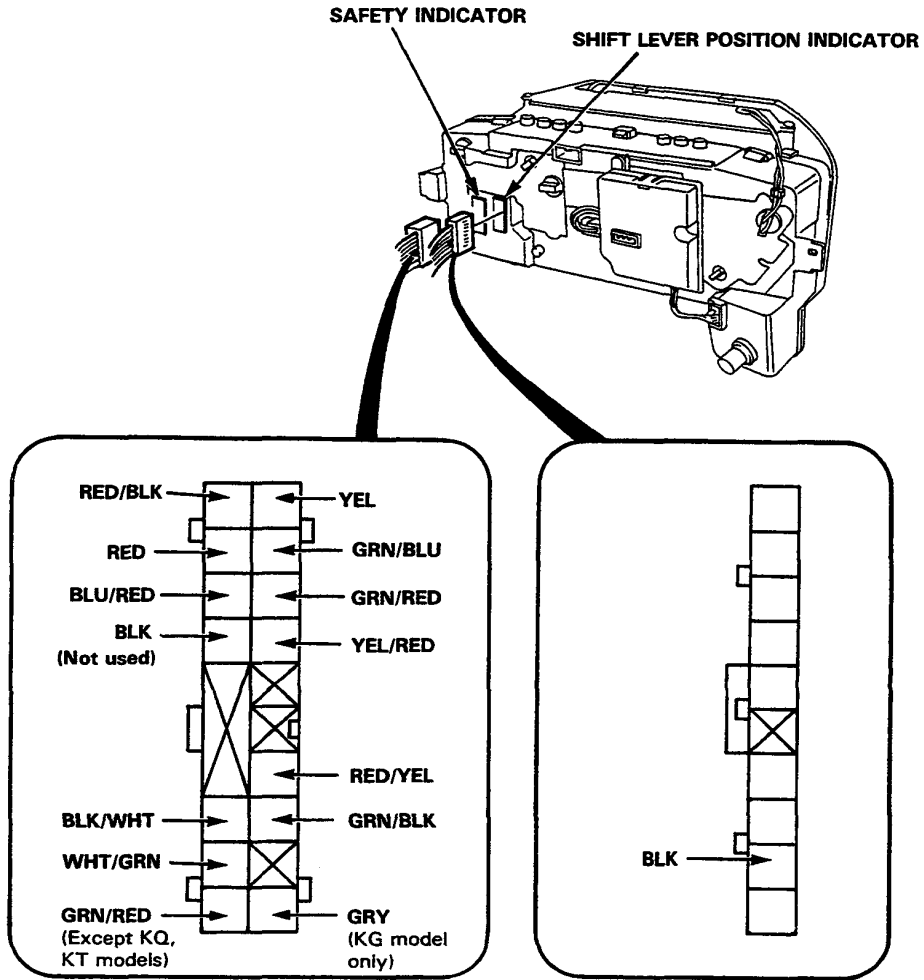
# Safety Indicator

## Indicator Input Test

Remove the gauge assembly from the dashboard to disconnect the 10-P and 16-P connector from the indicators.

Make the following input tests at the harness pins.

If all tests prove OK, yet the indicator still fails to work, replace the indicator assembly.



View from wire side

\* Used for shift lever position indicator.





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.	<ul style="list-style-type: none"> <li>• Poor ground (L.H.Drive: G701), (R.H.Drive: G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 13 (10 A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	WHT/GRN	Brake pedal pushed.	Check for continuity to ground: should be continuity with the pedal pushd.	<ul style="list-style-type: none"> <li>• Blown No. 32 (15 A) fuse.</li> <li>• Faulty brake light switch.</li> <li>• Blown brake light bulbs.</li> <li>• Faulty brake light failure sensors.</li> <li>• Poor ground (G501).</li> <li>• An open in the WHT/GRN or GRN/WHT wire.</li> </ul>
4	GRN/BLK	Trunk lid opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 8 (15 A) fuse.	<ul style="list-style-type: none"> <li>• Faulty trunk latch switch.</li> <li>• An open in the wire.</li> </ul>
5	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 voltage.	<ul style="list-style-type: none"> <li>• Faulty dashlight brightness control system.</li> <li>• An open in the wire.</li> </ul>
6	GRN/BLU	Left door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 8 (15 A) fuse.	<ul style="list-style-type: none"> <li>• Faulty door switch.</li> <li>• An open in the wire.</li> </ul>
	GRN/RED	Right door opened.		
7	BLK/WHT	Dome light switch in MIDDLE position.	Attach to ground: Dome light should come on.	<ul style="list-style-type: none"> <li>• Blown No. 8 (15 A) fuse.</li> <li>• Faulty dome light.</li> <li>• An open in the WHT/BLU or BLK/WHT wire.</li> </ul>
8	RED/YEL	Headlight retractor motor operated with retractor switch ON and OFF repeatedly.	Check for voltage to ground: should be 0 V.	<ul style="list-style-type: none"> <li>• Faulty retractor control unit.</li> <li>• Frozen, stuck, or improperly installed retractor linkage.</li> </ul>
9	GRN/RED	Ignition switch ON	Attach to ground; Brake warning light should come on.	<ul style="list-style-type: none"> <li>• Blown brake warning light bulb.</li> <li>• An open in the wire.</li> </ul>
10	BLU/RED or YEL/RED	Ignition switch ON, shift lever position S and S <sub>4</sub> switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty S<sub>4</sub> switch.</li> <li>• Faulty A/T control system.</li> <li>• An open in the wire.</li> </ul>

#### KG model only

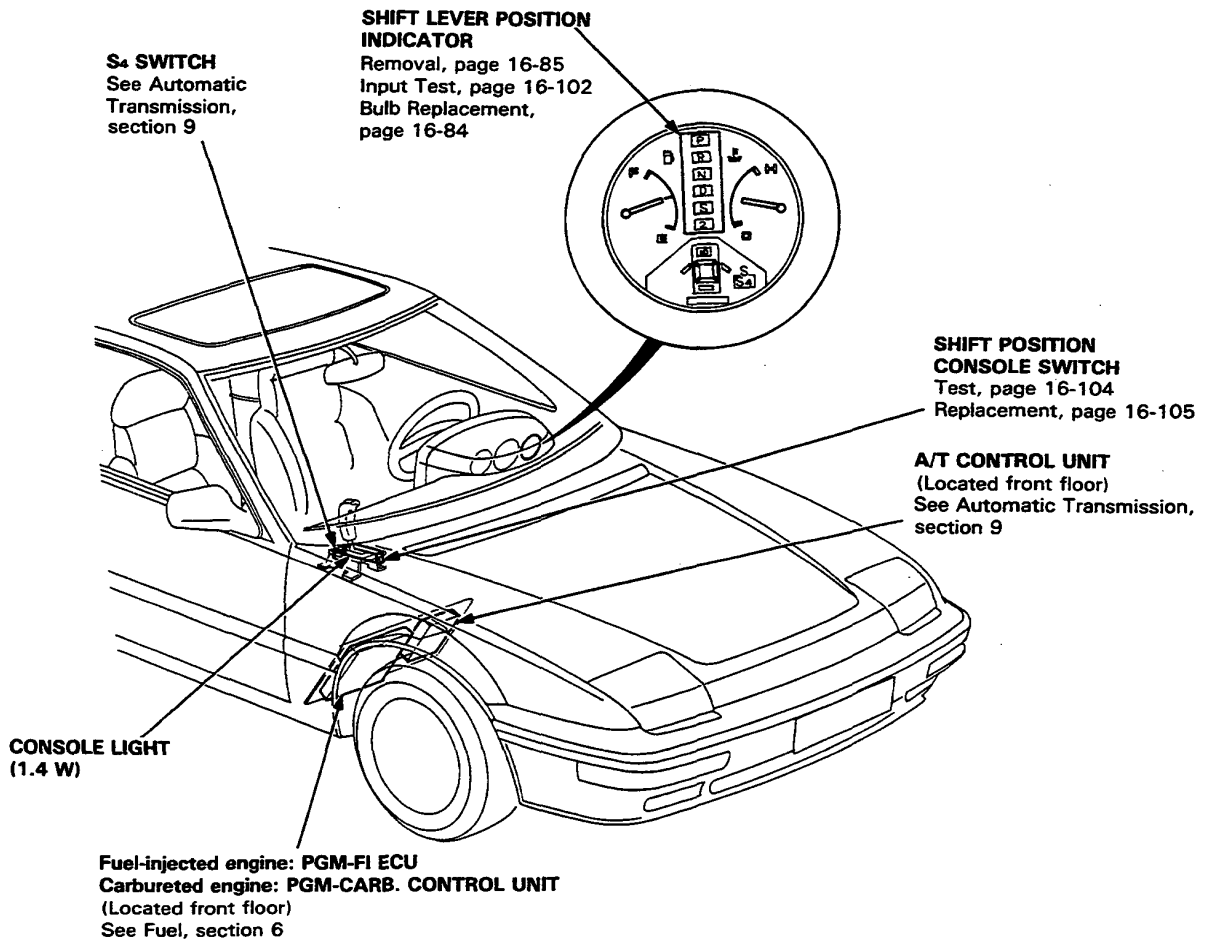
11	GRY	With brake pedal released, ignition switch OFF to ON.	Check for continuity in both directions between the G and BI terminals: should be continuity in only one direction as the ignition switch is turned ON, then no continuity in both directions with brake pedal pushed.	<ul style="list-style-type: none"> <li>• Faulty brake light circuit failure sensor.</li> </ul>
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# Shift Lever Position Indicator

## Component Location Index

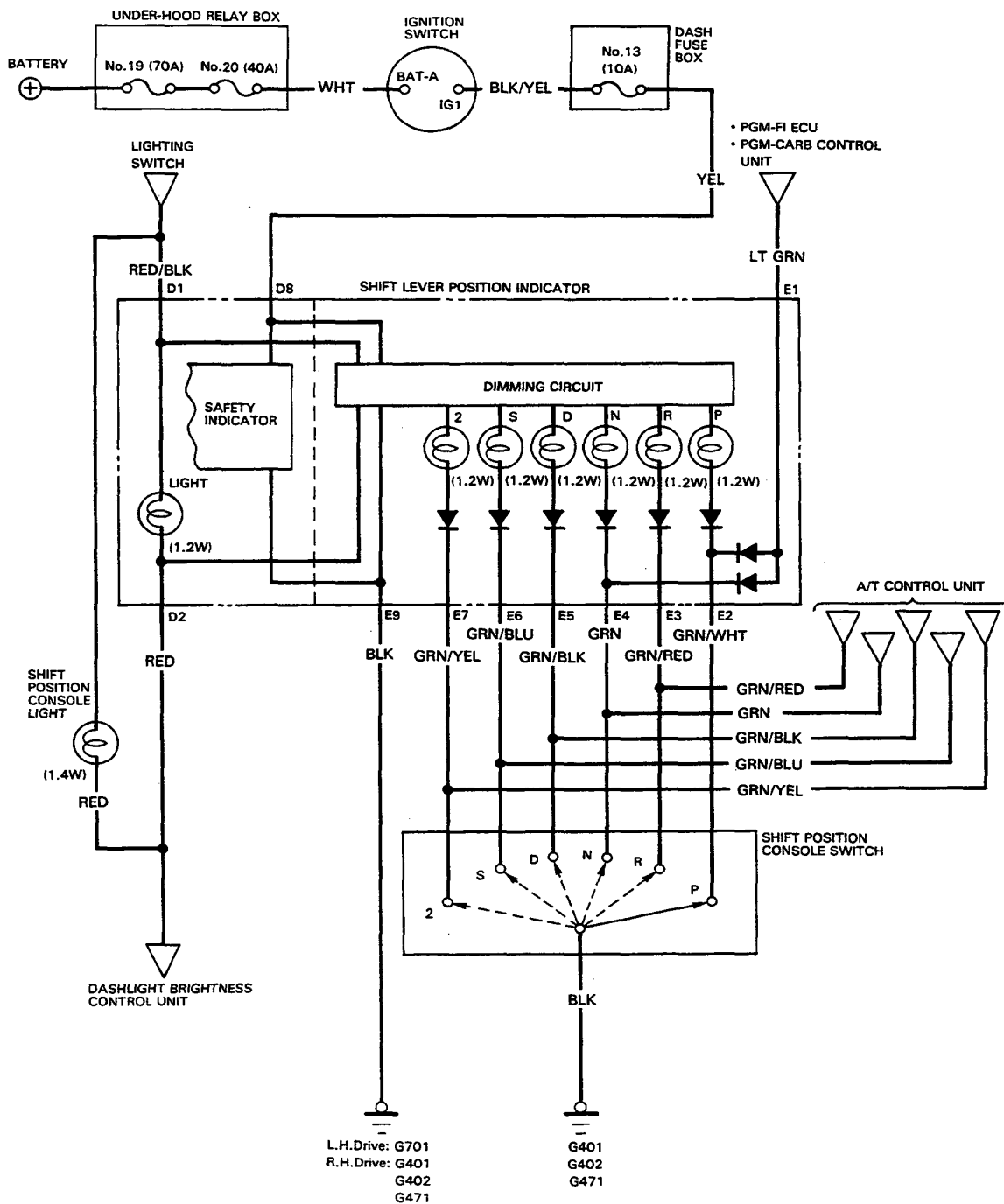
### A/T CONTROL SYSTEM

See Automatic Transmission, section 9





# Circuit Diagram



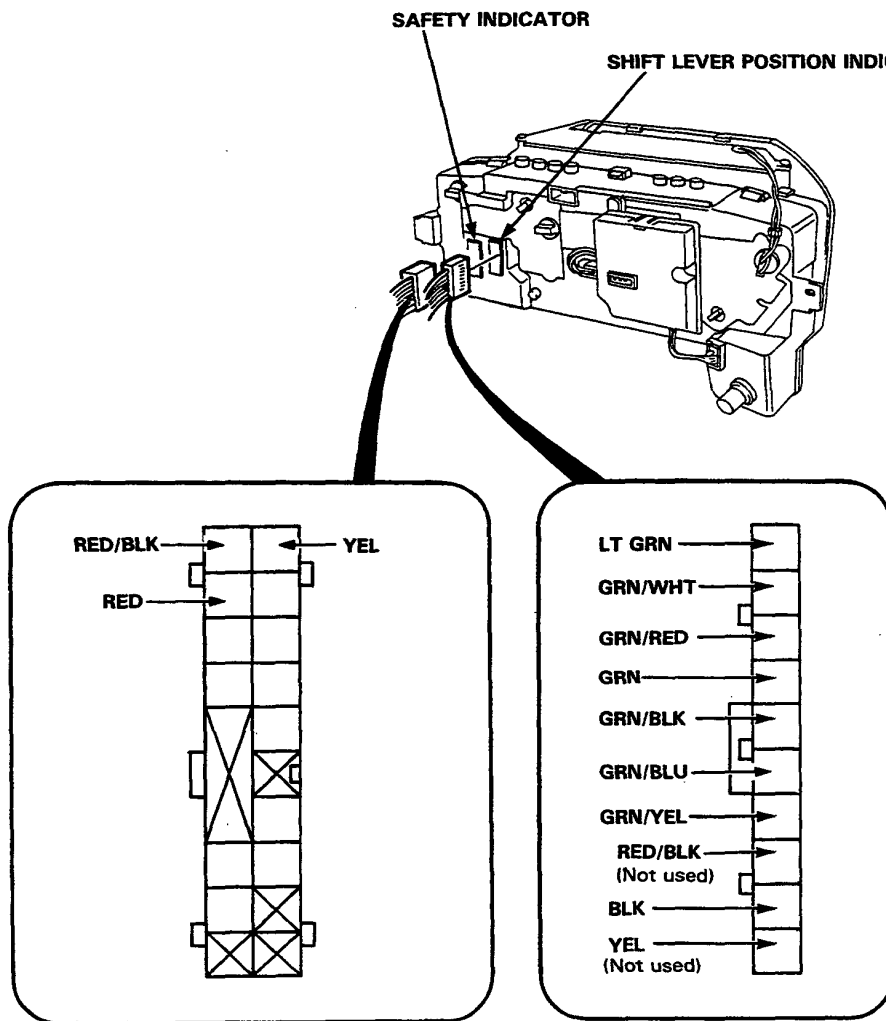
# Shift lever Position Indicator

## Indicator Input Test

Remove the gauge assembly from the dashboard to disconnect the 10-P and 16-P connectors from the indicators.

Make the following input tests at the harness pins.

If all tests prove OK, yet the indicator still fails to work, replace the indicator assembly.



View from wire side

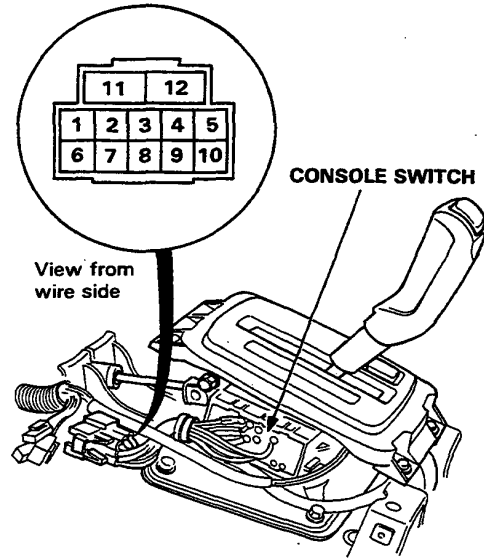


No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (L.H.Drive: G701) (R.H.Drive: G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 13 (10 A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	GRN/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty shift position console switch.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
	GRN/RED	Shift lever position in R.		
	GRN	Shift lever position in N.		
	GRN/BLK	Shift lever position in D.		
	GRN/BLU	Shift lever position in S.		
	GRN/YEL	Shift lever position in 2.		
4	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 voltage.	<ul style="list-style-type: none"> <li>• Faulty dashlight brightness control system.</li> <li>• An open in the wire.</li> </ul>
5	LT GRN	Ignition switch ON.	Check for voltage to ground: should be about 5 V.	<ul style="list-style-type: none"> <li>• Faulty PGM-FI system (Fuel-injected engine) or PGM-CARB system (Carbureted engine).</li> <li>• An open in the in wire.</li> </ul>

# Shift Lever Position Indicator

## Console Switch Test

1. Remove the front console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each switch position according to the tables.



**Indicator Switch**

Terminal Position	1	9	8	3	10	6	7
2	○	○					
S	○		○				
D	○			○			
N	○				○		
R	○					○	
P	○						○

**Shift Position Switch (for cruise control)**

Terminal Position	1	2
	○	○
	○	○
	○	○

(Internal connection)

**Neutral Safety Switch**

Terminal Position	11	12
2		
S		
D		
N	○	○
R		
P	○	○

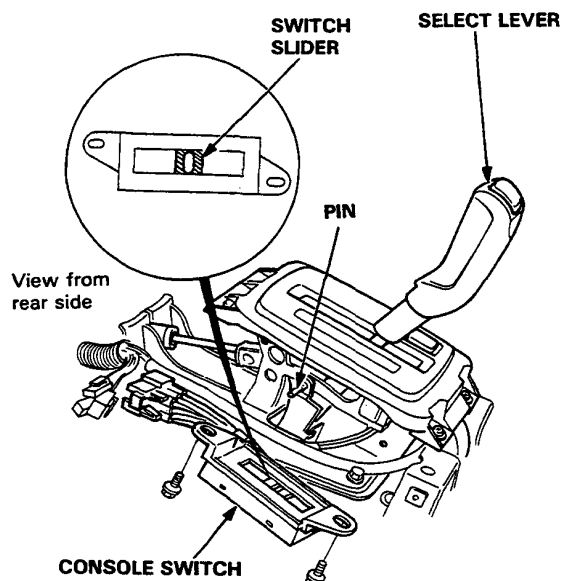
**Back-up Light Switch**

Terminal Position	4	5
	○	○



## Console Switch Replacement

1. Remove the front console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Remove the 2 bolts to replace the console switch.

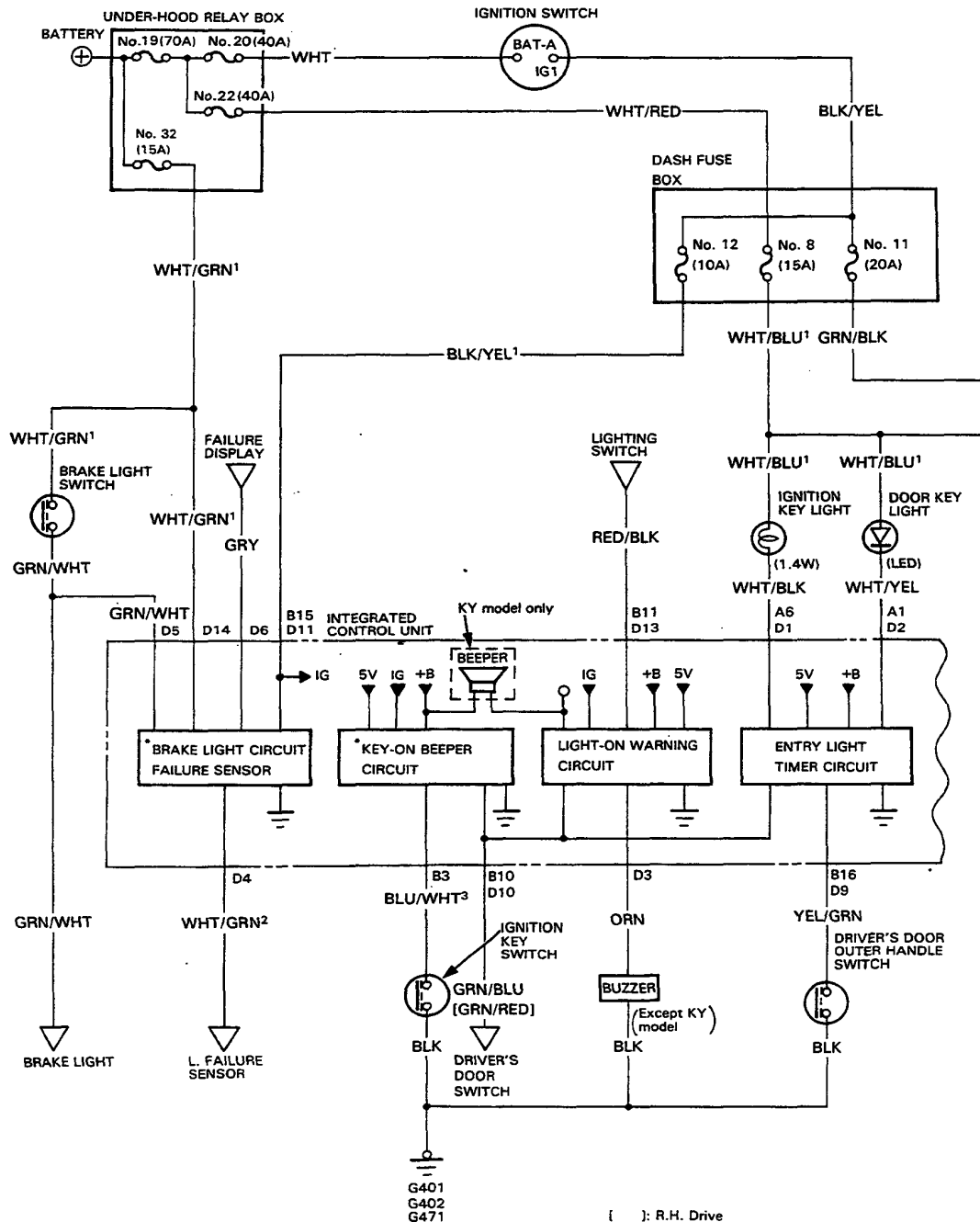


4. Position the switch slider to "Neutral" as shown above.
5. Shift the select lever to "Neutral", then slip the console switch into position.
6. Tighten the switch with the 2 bolts.

# 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 GRN/BLU<sup>1</sup> and GRN/BLU<sup>2</sup> are not the same).





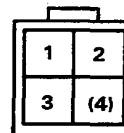
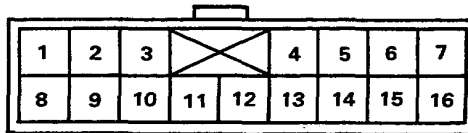
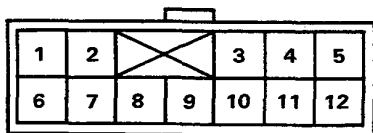


# Integrated Control Unit Terminals:

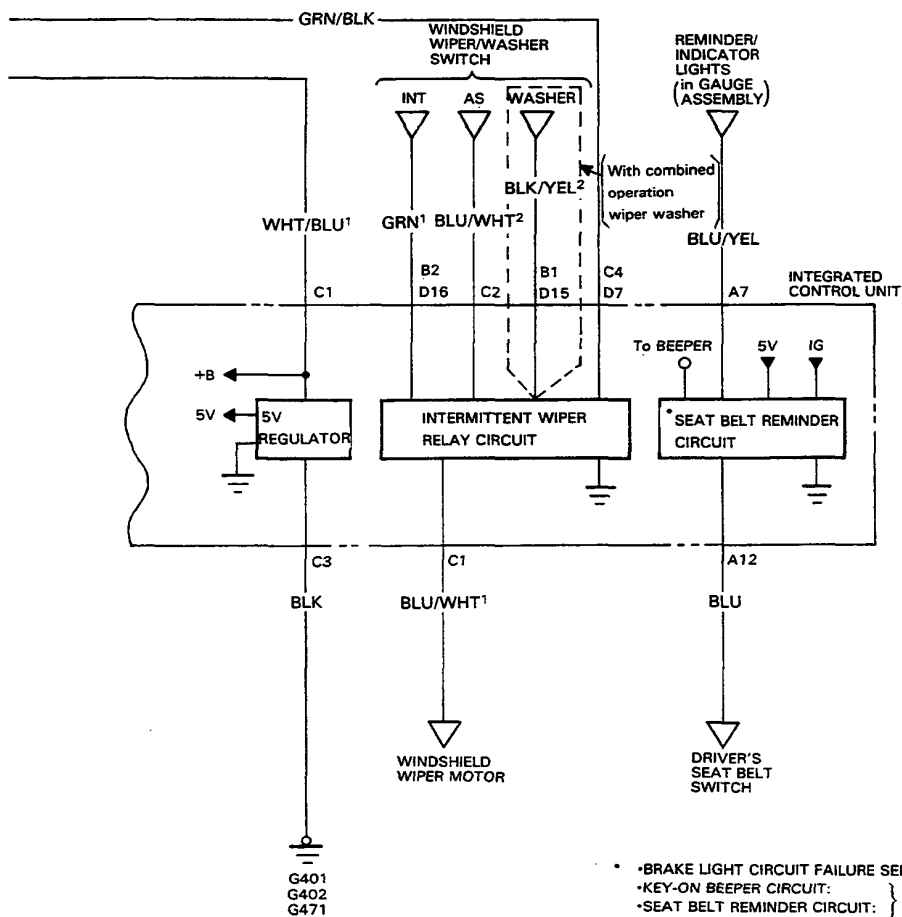
A terminal: KY model only

B terminal: KY model only  
D terminal: Except KY model

C terminal:



( ): KY model only



# Integrated Control Unit

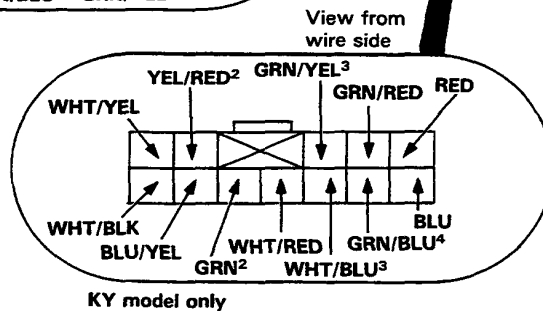
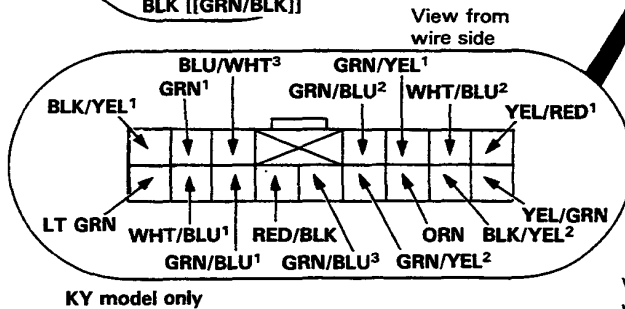
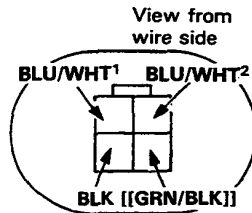
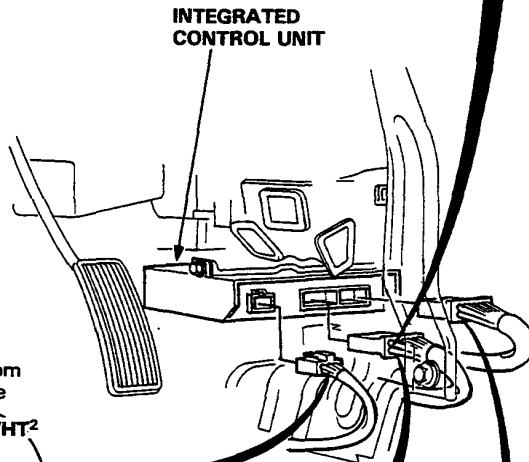
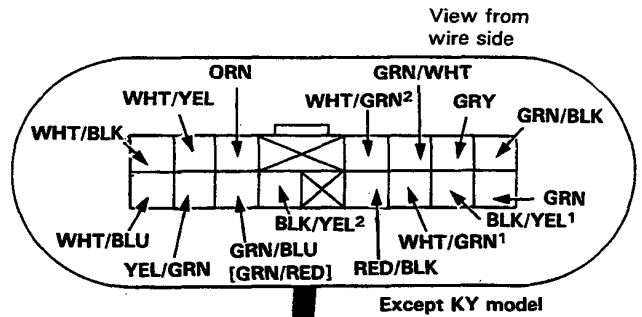
## Input Test

Remove the front console, then disconnect the 4-P, 12-P and 16-P connectors 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, replace the control unit.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN<sup>1</sup> and GRN<sup>2</sup> are not the same).

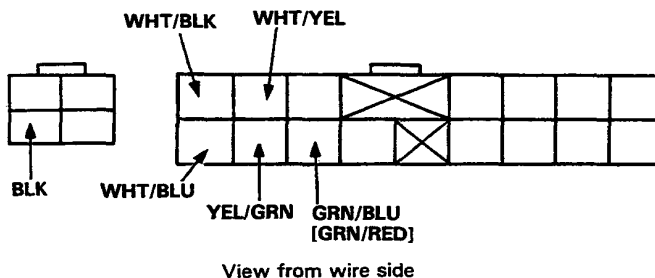
[ ] : R.H. Drive  
 [[ ]] : KY model only



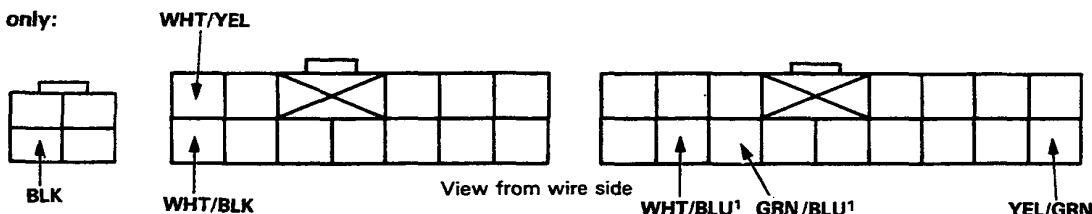


## Entry Light Timer System:

Except KY model:



KY model only:



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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/BLU [[WHT/BLU¹]]	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 8 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	YEL/GRN	Driver's door outer handle pulled.	Check for continuity to ground: should be continuity as the outer handle is pulled.	<ul style="list-style-type: none"> <li>• Faulty outer handle switch.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
4	WHT/BLK	Under all conditions.	Attach to ground: Ignition key light should come on.	<ul style="list-style-type: none"> <li>• Blown bulb or No. 8 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
5	GRN/BLU [[GRN/BLU¹]] [GRN/RED]	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 8 (15A) fuse.	<ul style="list-style-type: none"> <li>• Faulty left door switch.</li> <li>• An open in the wire.</li> </ul>
6	WHT/YEL	Under all conditions.	Check for voltage to ground: should be about 10V.	<ul style="list-style-type: none"> <li>• Faulty door key light.</li> <li>• An open in the wire.</li> </ul>

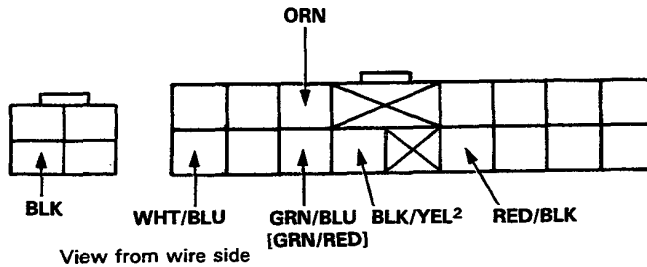
(cont'd)

# Integrated Control Unit

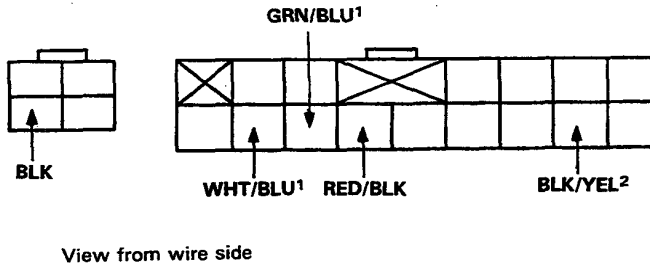
## Input Test (cont'd)

### Light-on Warning System:

Except KY model:



KY model only:

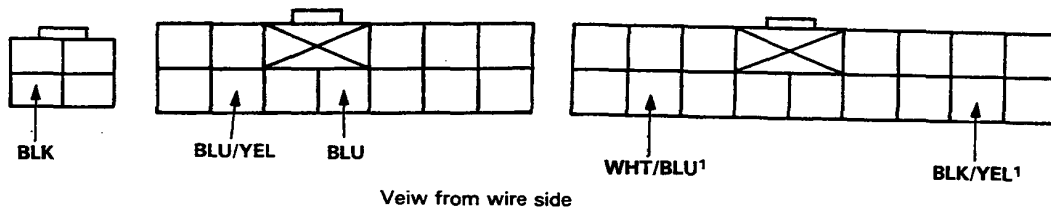


No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/BLU [[WHT/BLU¹]]	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 8 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	BLK/YEL²	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 12 (10A) fuse.</li> <li>• An open in the wire.</li> </ul>
4	GRN/BLU [[GRN/BLU¹]] [GRN/RED]	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 8 (15A) fuse.	<ul style="list-style-type: none"> <li>• Faulty left door switch.</li> <li>• An open in the wire.</li> </ul>
5	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty lighting system.</li> <li>• An open in the wire.</li> </ul>
6	ORN	Connect the WHT/BLU terminal to the ORN terminal.	Check chime operation: Chime should activate each time the battery is connected.	<ul style="list-style-type: none"> <li>• Faulty chime.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>



## Seat Belt Reminder System:

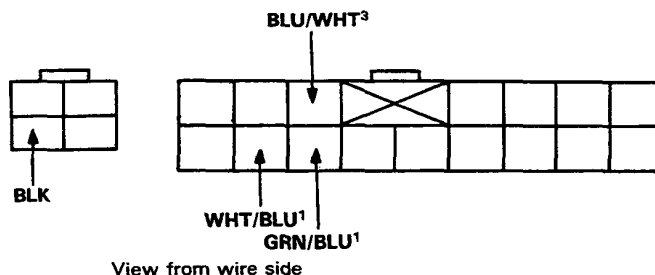
KY model only:



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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	BLK/YEL¹	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 12 (10A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	WHT/BLU¹	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 8 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
4	BLU/YEL	Ignition switch ON.	Attach to ground: Reminder light should come on.	<ul style="list-style-type: none"> <li>• An open in the wire.</li> </ul>
5	BLU	Driver's seat belt not buckled.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty seat belt switch.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>

## Key-on Warning System:

KY model only:



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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/BLU¹	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 8 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	GRN/BLU¹	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 8 (15A) fuse.	<ul style="list-style-type: none"> <li>• Faulty left door switch.</li> <li>• An open in the wire.</li> </ul>
4	BLU/WHT³	Ignition switch turned from "II" to "O" position.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty ignition key switch.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>

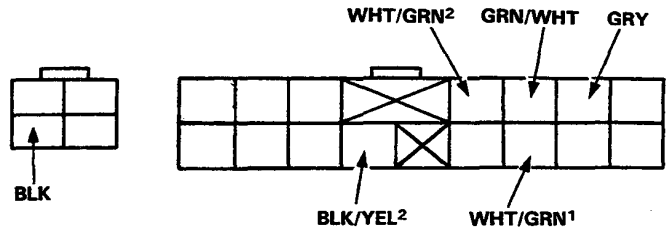
(cont'd)

# Integrated Control Unit

## Input Test (cont'd)

### Brake Light Circuit Failure System:

KG model only:



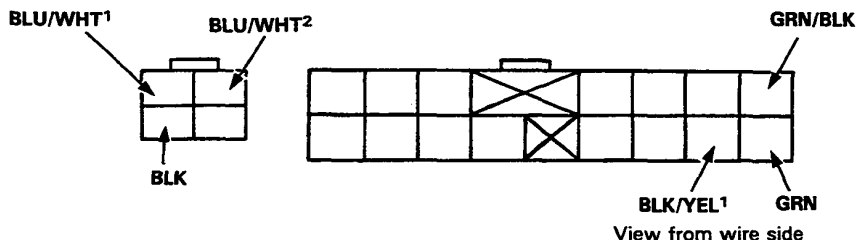
View from wire side

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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/GRN <sup>1</sup>	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 32 (15A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	BLK/YEL <sup>2</sup>	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 12 (10A) fuse.</li> <li>• An open in the wire.</li> </ul>
4	GRN/WHT	Brake pedal pushed.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 32 (15A) fuse.</li> <li>• Faulty brake light switch.</li> <li>• An open in the wire.</li> </ul>
5	WHT/GRN <sup>2</sup>	Brake pedal pushed.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Blown No. 32 (15A) fuse.</li> <li>• Faulty brake light switch.</li> <li>• Blown brake light bulbs.</li> <li>• Faulty brake light failure sensors.</li> <li>• An open in the wire.</li> </ul>
6	GRY	Ignition switch ON.	Attach to ground: Brake light warning light in the safety indicator should come on.	<ul style="list-style-type: none"> <li>• Faulty safety indicator.</li> <li>• An open in the wire.</li> </ul>

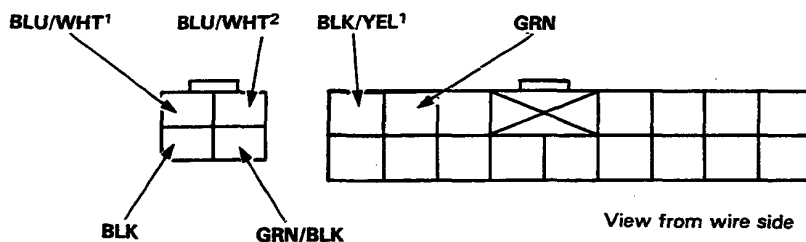


## Wiper System:

Except KY model:



KY model only:



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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	BLU/WHT <sup>1</sup> and BLU/WHT <sup>2</sup>	Wiper switch OFF or INT and wiper blades in park position.	Check for continuity between the BLU/WHT <sup>1</sup> and BLU/WHT <sup>2</sup> terminals: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty wiper switch.</li> <li>• Faulty wiper motor.</li> <li>• An open in the wire.</li> </ul>
3	GRN/BLK	Ignition switch ON	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 11 (20A) fuse.</li> <li>• An open in the wire.</li> </ul>
4	GRN	Ignition switch ON and wiper switch INT	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty wiper switch.</li> <li>• An open in the wire.</li> </ul>
5	BLK/YEL <sup>1</sup>	Ignition switch ON and washer switch ON	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 11 (20A) fuse.</li> <li>• Faulty washer switch.</li> <li>• An open in the wire.</li> </ul>

## Seat Belt Reminder System

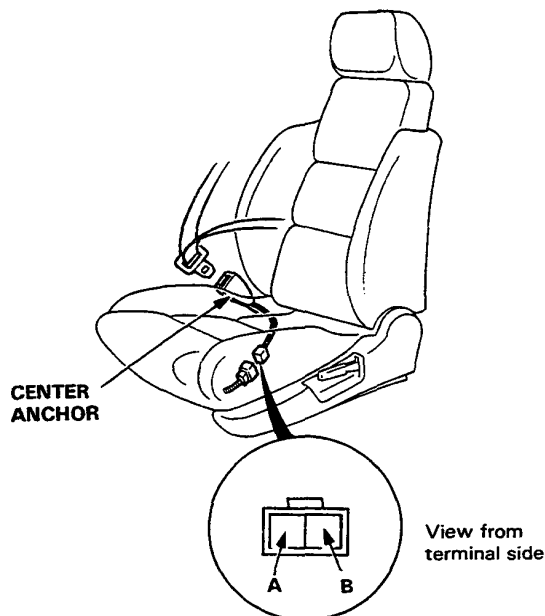
### Description

NOTE: Refer to page 16-106 for wiring description of the seat belt beeper/timer circuit.

With the ignition switch in "Run" or "Start", voltage is applied to the beeper/timer of the integrated control unit. When you unbuckle the driver's seat belt, the beeper/timer circuit senses ground. With voltage at the "B15 (D11)" terminal and ground at the "C3" terminal, the seat belt beeper sounds and the timer contacts close and open. This causes the seat belt reminder light to flash on and off. After 5 seconds the alarm stops and the contacts remain open.

### Seat Belt Switch Test

1. Slide the front seat forward until the seat belt center anchor bolt is accessible to disconnect the 2-P connector from the seat belt switch.
2. There should be continuity between the A and B terminals when the seat belt is not buckled. There should be no continuity when the seat belt is buckled.



## Oil Pressure Warning System

### Description

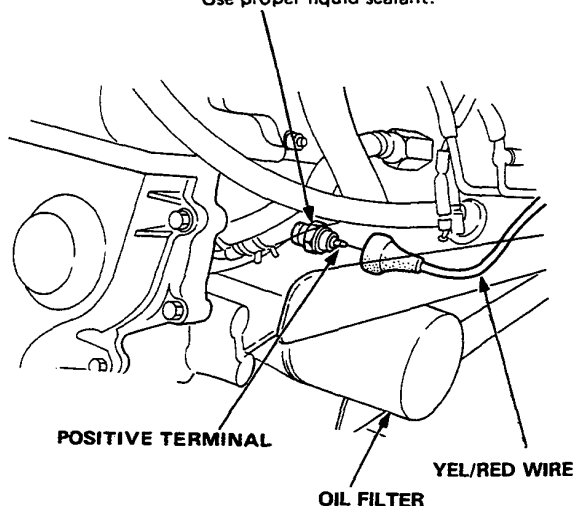
NOTE: Refer to page 16-82 for wiring description of the oil pressure warning circuit.

With the engine running and normal oil pressure, the oil pressure switch is open and the oil pressure warning light does not operate. If engine oil pressure falls below 29 kPa (0.3 kg/cm<sup>2</sup>, 4.3 psi), the oil pressure switch is close, current flows through the oil pressure warning light and the oil pressure switch to ground, and the oil pressure light goes on.

### Oil Pressure Switch Test

1. Remove the YEL/RED wire from the oil pressure switch.
2. 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.

**OIL PRESSURE SWITCH**  
18 N·m (1.8 kg·m, 13 lb-ft)  
1/8 in. BSP (British Standard  
Pipe Taper) 28 Threads/inch.  
Use proper liquid sealant.



3. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level is correct.



# Key-on Warning System



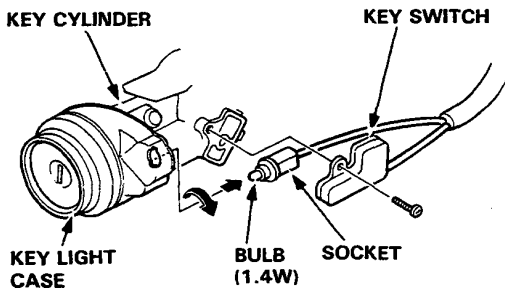
## Description

**NOTE:** Refer to page 16-106 for wiring description of the key-on beeper circuit, and page 16-108 for input test of the beeper circuit.

When the ignition key is turned from "II" to "0" position but 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 the "B3" and "B10 (D10)" terminals, the beeper sounds.

## Ignition Key Light/Switch Replacement

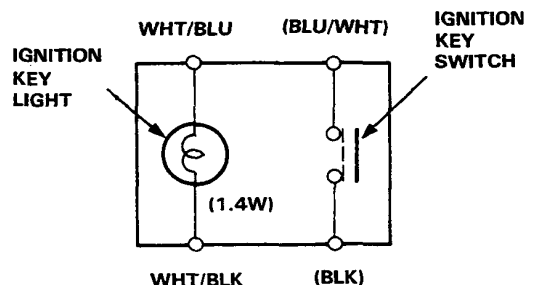
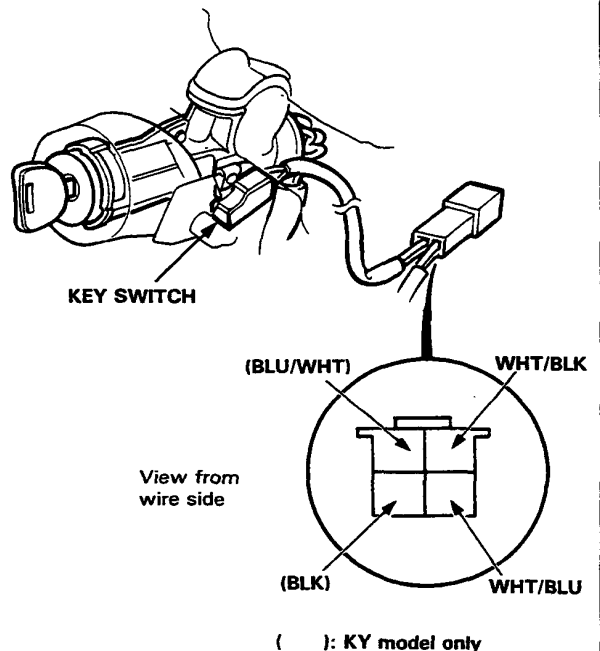
1. Remove the steering column lower cover, then disconnect the 4-P connector from the main wire harness.
2. Remove the bulb/socket from the key light case by turning the socket 45°.



3. Remove the key switch from the key cylinder by removing attaching screw.

## Ignition Key Switch Test

1. Remove the steering column lower cover, then disconnect the 4-P connector from the main wire harness.
2. There should be continuity between the BLU/WHT and BLK terminals when the ignition switch is turned from "II" to "0" position. There should be no continuity when the ignition key is removed.



# Light-on Warning System

## Description

NOTE: Refer to page 16-106 for wiring description of the light-on warning circuit, and page 16-108 for the input test of the warning circuit.

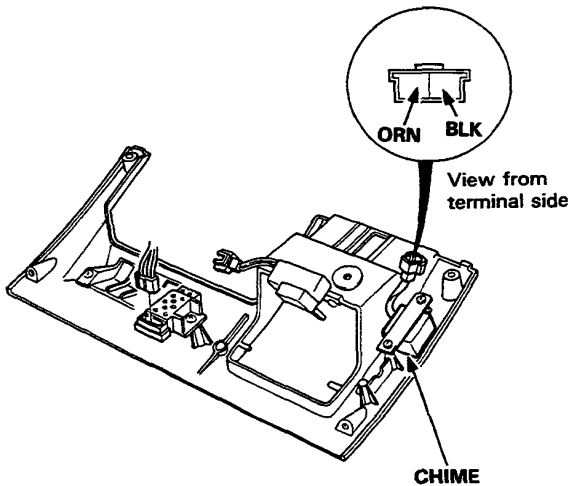
When the ignition key is turned to "Off" position and removed, with the lights on, voltage is applied to the warning circuit on the integrated control unit. When you open the driver's door, the warning circuit senses ground through the closed door switch.

With voltage at the "B11 (D13)" terminal, ground at the "B10 (D10)" terminal and no voltage at the "B15 (D11)" terminal, the chime is activated to remind the driver to turn off the lights.

## Chime Test

1. Remove the dashboard lower panel to disconnect the 2-P connector from the dashboard wire harness.
2. Test chime operation by connecting battery positive to the ORN terminal, and negative to the BLK terminal, and cycling the power on-off repeatedly.
3. If the chime fails to sound every time power is cycled, replace it.

NOTE: Except KY model



# Low Fuel Warning System

## Warning Light Test

NOTE: Refer to page 16-82 for wiring description of the low fuel warning circuit.

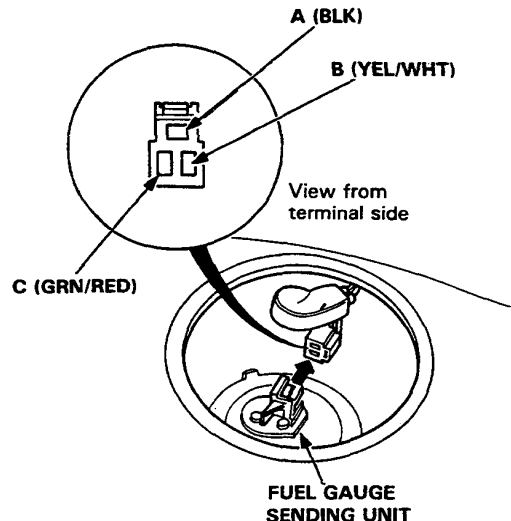
1. Park car on level ground.

**WARNING** Do not smoke while working on fuel system. 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 10 ℓ (2.6 U.S. Gal, 2.2 Imp. Gal) of fuel and turn the ignition switch on. The low fuel warning light should come on within 4 minutes.
4. Then add one more gallon of fuel [approx. 4 ℓ (1.1 U.S. Gal, 0.88 Imp. Gal)]. The light should go out within 4 minutes.

- If the warning light did not come on in step 3, remove the maintenance access cover and disconnect the 3-P connector from the fuel gauge sending unit. Connect the C (GRN/RED) terminal to the A (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 GRN/RED wire to the gauge assembly, no power to the gauge or bad bulb.



# Brake Warning System



## Description

NOTE: Refer to page 16-106 for wiring description of the circuit check system.

### Description:

The brake warning light goes on if the parking brake is applied, if the brake fluid level is low, and as a circuit test while cranking the engine.

### Parking Brake:

With the ignition switch in "Run" or "Start", and the parking brake switch closed, the brake warning light operates to remind the driver that the parking brake is applied.

### Brake Fluid Level:

With the ignition switch in "Run" or "Start", and the brake fluid level switch closed, the brake warning light operates to warn the driver of low brake fluid level in the brake master cylinder.

NOTE: Low fluid level indicates brake wear or system leaks; check brake pad wear before adding fluid.

### Circuit Check: KO, KY models

With the ignition switch in "Start" voltage is applied through the No. 1 (7.5 A) fuse in the dash fuse box to the circuit check built into the top circuit board in the gauge assembly. The circuit check transistor is on, and current flows through the No. 13 (10A) fuse in the dash fuse box, the brake warning light and the circuit check transistor to ground. The brake warning light operates. This operation tests the brake warning circuit and bulb.

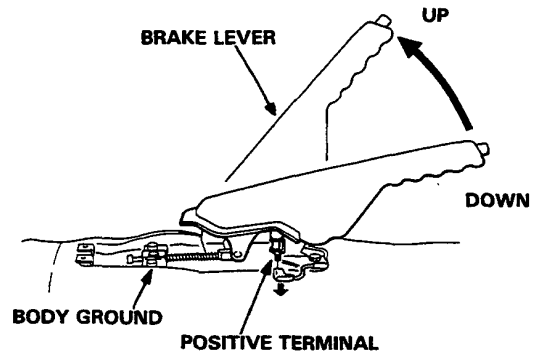
### Brake Lights:

With the ignition switch in "RUN" or "Start", a failure of one or both brake lights will be indicated by the brake warning light and the **BRAKE LAMP** in the safety indicator coming on.

NOTE: For KG model, the warning light indicate not only a defective light but also defects in the entire brake electrical circuit.

## Parking Brake Switch Test

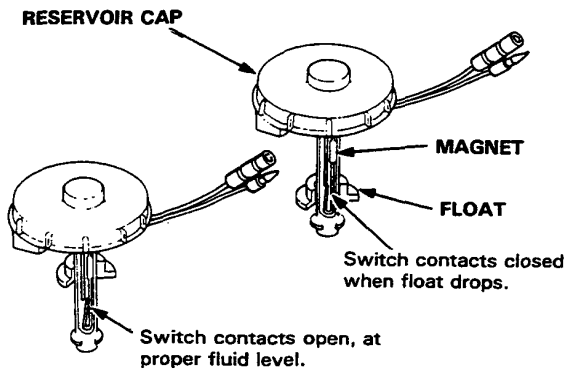
1. Remove the center console and disconnect the connector from the switch.
2. There should be continuity between the positive terminal and body ground with the brake lever up. There should be no continuity with the brake lever down.



# Brake Warning System

## Brake Fluid Level Switch Test

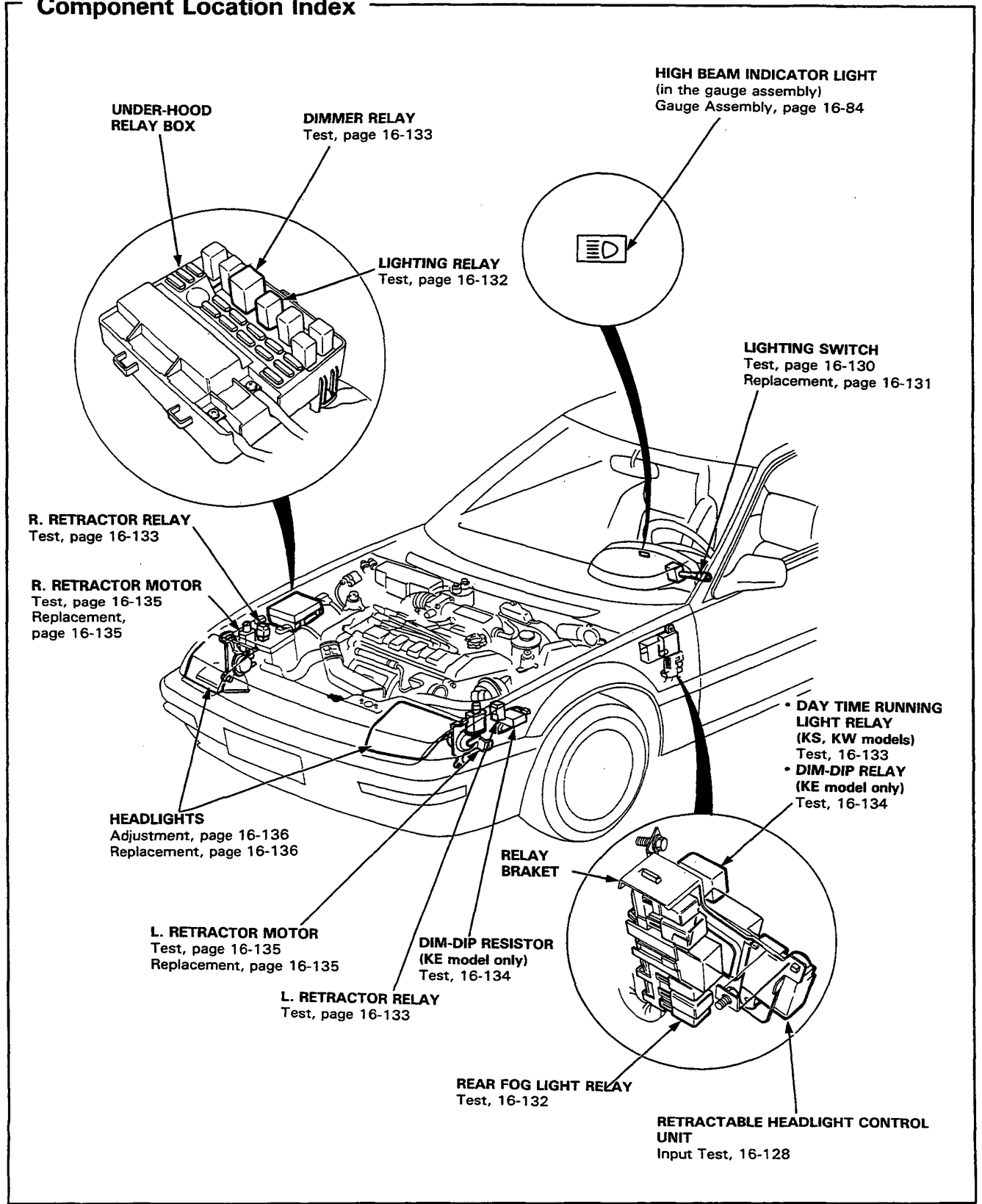
1. Remove the reservoir cap. Check that the float moves up and down freely.  
Replace the reservoir cap assembly if the float does not move freely.
2. Check for continuity between the terminals with the float up and down.  
There should be continuity with the float down and no continuity with the float up.  
Replace the reservoir cap assembly if necessary.



# Lighting System

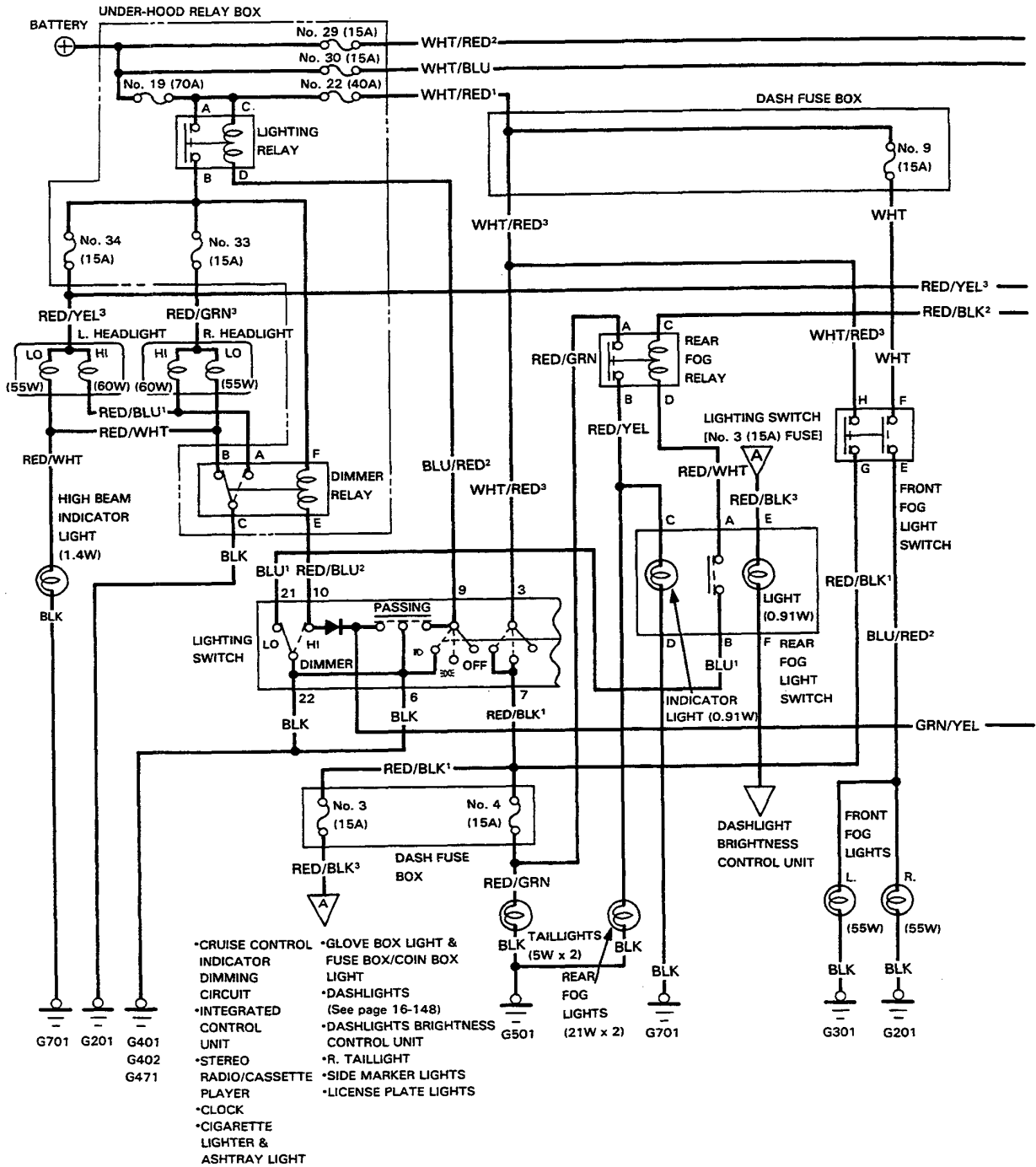


## Component Location Index

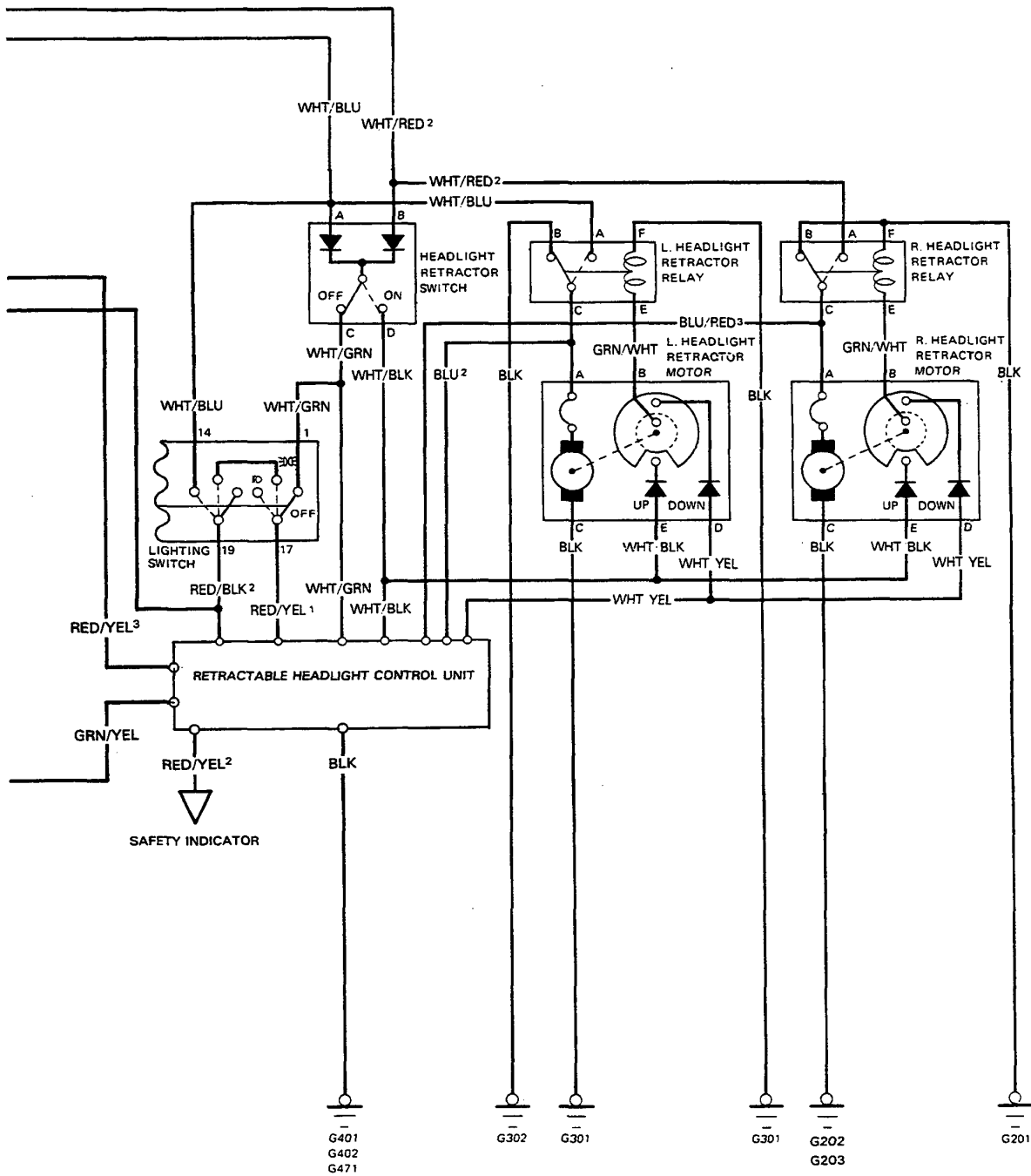


# Lighting System

## Circuit Diagram (KG, KF, KB and KX models)



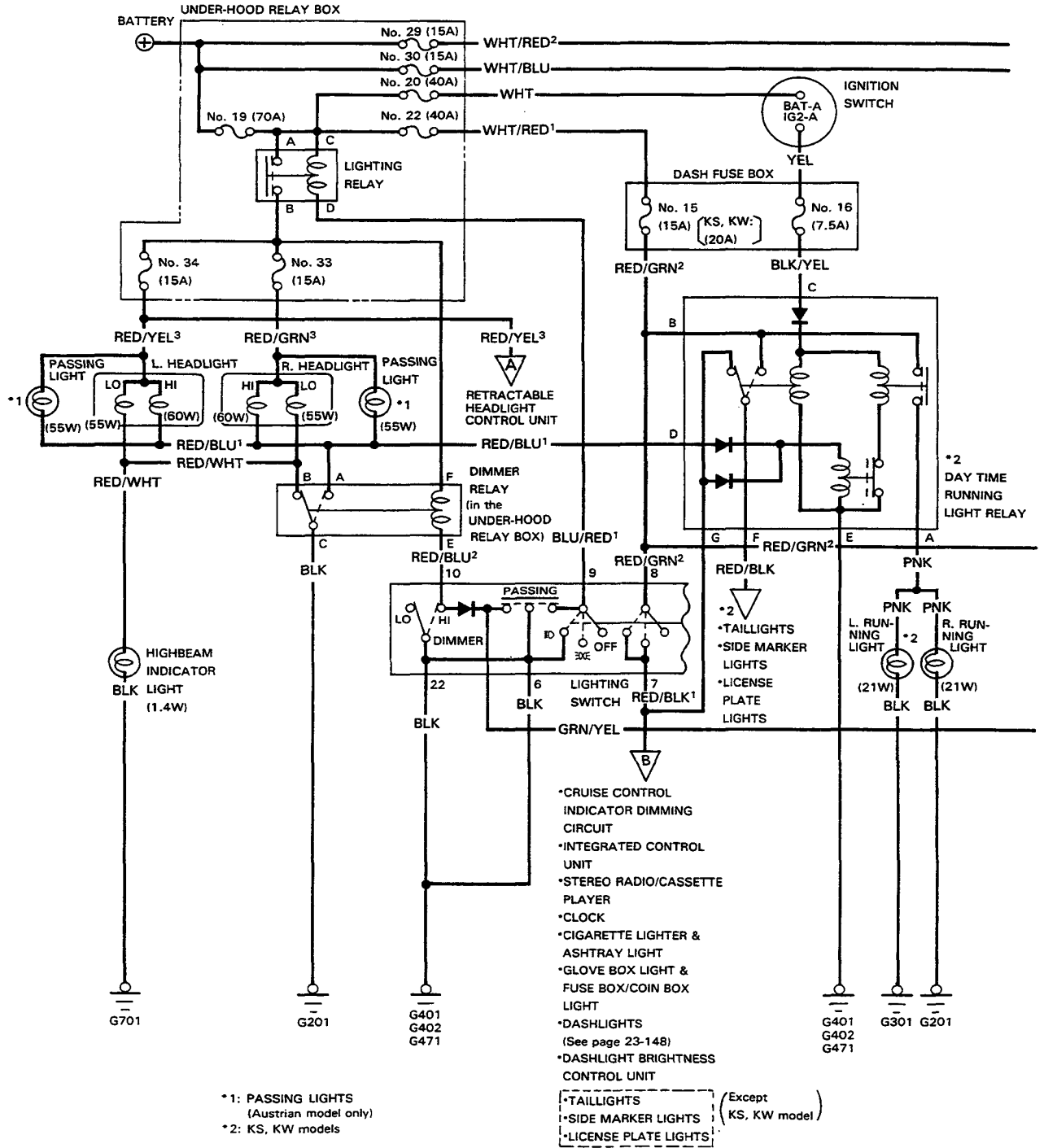
- CRUISE CONTROL
- GLOVE BOX LIGHT & FUSE BOX/COIN BOX LIGHT
- DASHLIGHTS
- DASHLIGHTS BRIGHTNESS CONTROL UNIT
- R. TAILLIGHT
- SIDE MARKER LIGHTS
- LICENSE PLATE LIGHTS
- INTEGRATED CONTROL UNIT
- STEREO
- RADIO/CASSETTE PLAYER
- CLOCK
- CIGARETTE LIGHTER & ASHTRAY LIGHT



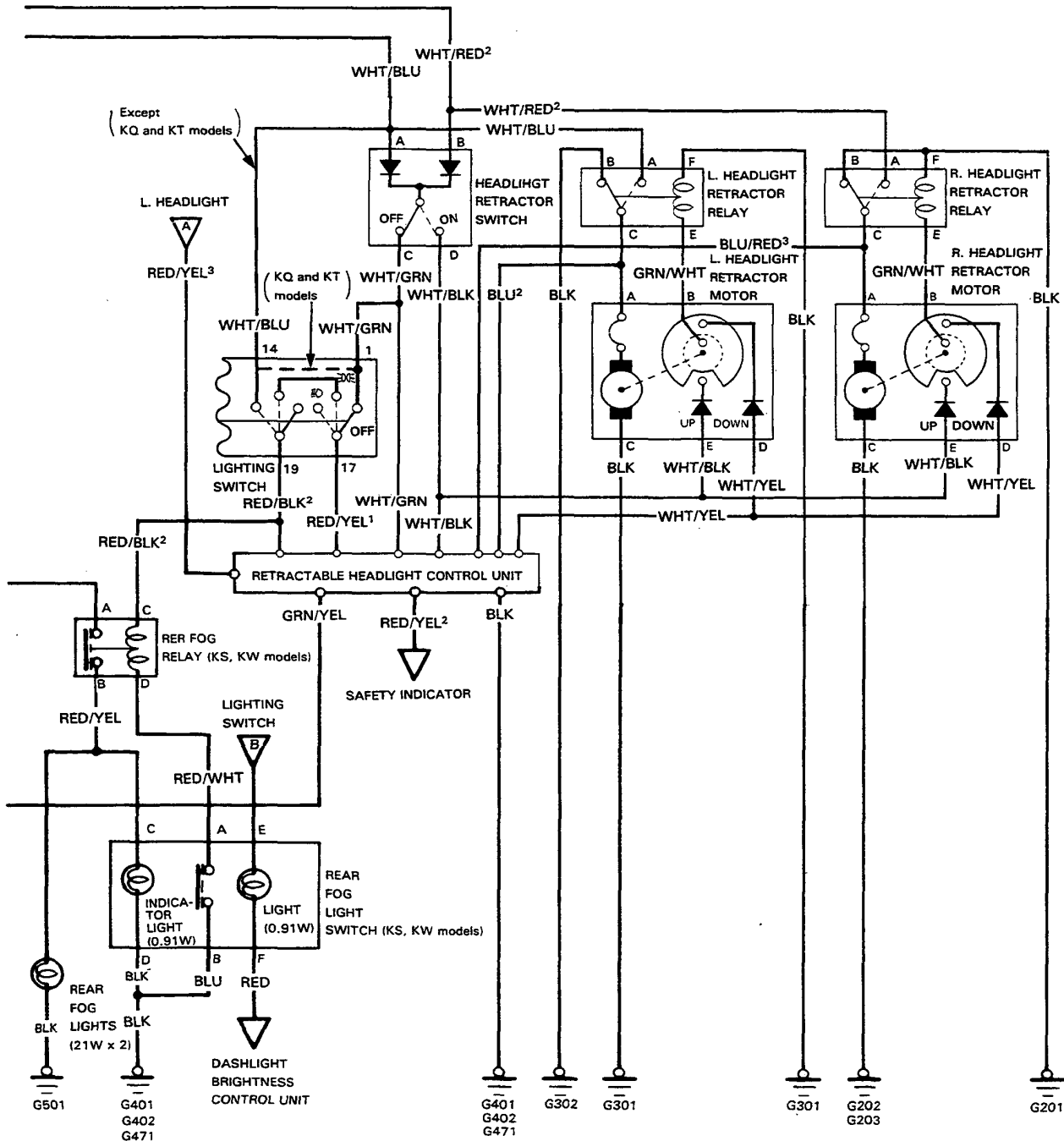
# Lighting System

## Circuit Diagram (KS, KW, KO, KT and KY models)

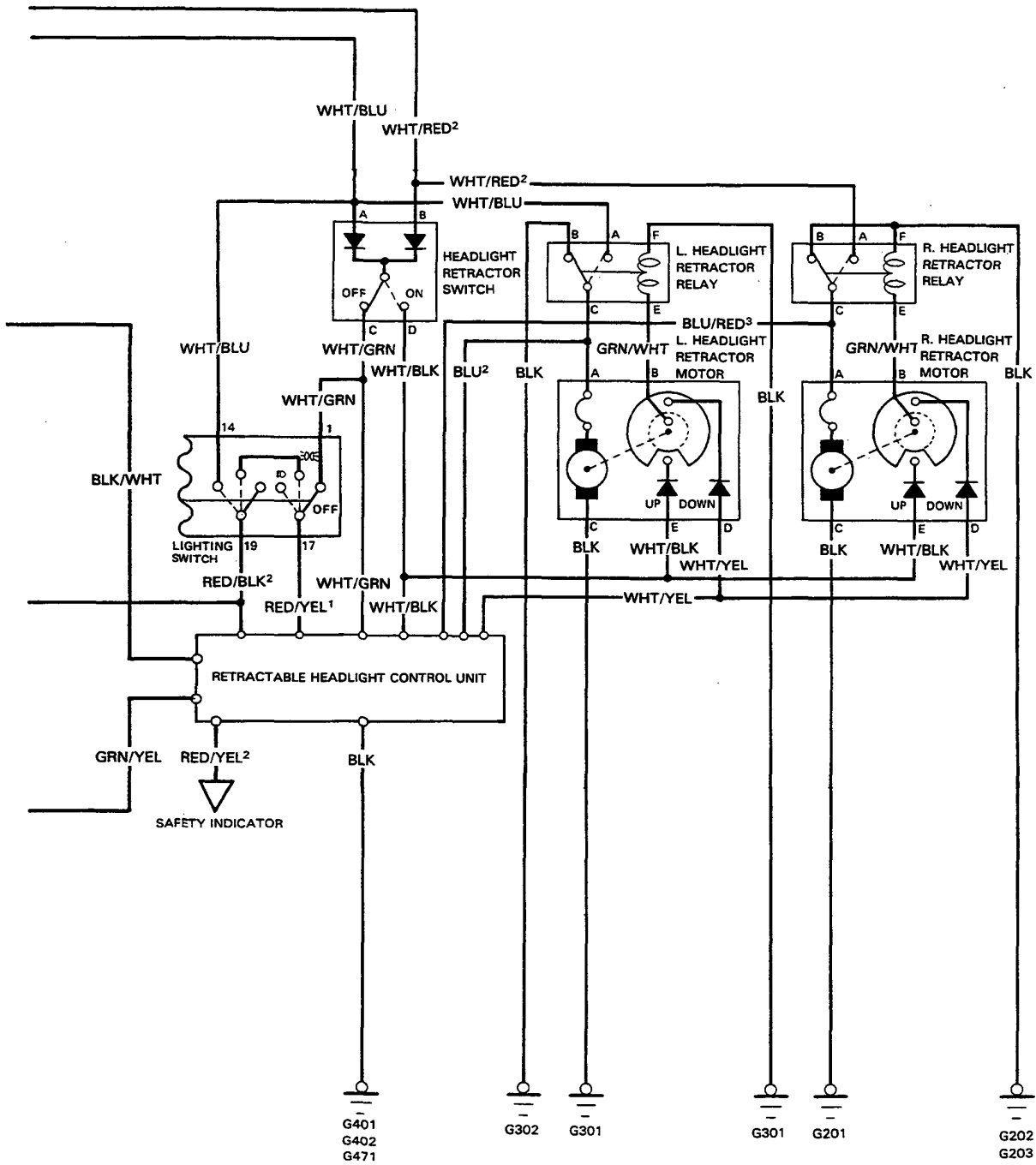
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example WHT/RED<sup>1</sup> and WHT/RED<sup>2</sup> are not the same).











# Lighting System

## Troubleshooting

Function: The retractor motors are controlled by their respective relays. The relays are energized by power to either the up-wire (WHT/BLK) or down-wire (WHT/YEL), through the slip ring in the retractor motors. The up-wire can be powered either by the lighting switch/control unit or via the retractor switch directly. The down-wire can only be powered by the control unit via either the lighting switch or the retractor switch. The control unit also senses any abnormality in the way the retractor motors operate and warns the driver by illuminating the safety indicator warning light.

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom		Items to be inspected								
		Blown No. 29 (15 A) and No. 30 (15 A) fuses (in the under-hood relay box)	Retractor relay	Retractor motor	Lighting switch	Retractor switch	Control unit	Frozen, stuck, or improperly installed retractor linkage	Poor ground	Open circuit in wires or loose or disconnected terminals
Warning light ON				3			2	1		
Both headlights won't open.	With either switch (lighting and retractor).	1	4	5		2		3	WHT/BLK	
	With lighting switch.				1	2				
	With retractor switch.					1				
Both headlights won't close.	With either switch.						2	1	G401, 402, 471	WHT/YEL
	With lighting switch. NOTE: All other switches OFF.					1				
	With retractor switch. NOTE: All other switches OFF.					1				
Headlights close when lighting switch is turned from "ID" to "3XE" NOTE: Other switches OFF.						1				RED/YEL <sup>2</sup> or RED/BLK <sup>2</sup>



**KE model only:**

**Description:**

When the lighting switch is set to the first position (☒) with the ignition switch ON, the headlights will light up as the Dim-Dip headlights. The light is dimmed to approx. ten percent of the headlights' brightness in the second position (☐) of the lighting switch.

NOTE: The numbers in the table show the troubleshooting sequence.

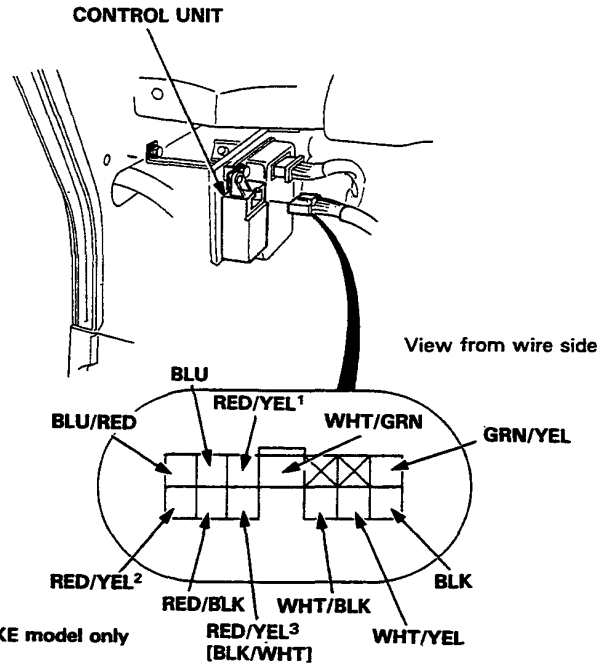
Symptom	Items to be inspected	Blown No. 22 (40 A) fuse (in the under-hood relay box)	Blown No. 15 (15 A) fuse (in the dash fuse box)	Blown No. 13 (10 A) fuse (in the dash fuse box)	Lighting switch	Dimmer switch	Lighting relay	Dimmer relay	Dim-Dip relay	Dim-Dip resistor	Poor ground	Open circuit in wires or loose or disconnected terminals
Lighting switch OFF to "☒"	None of lights to be on do not come on.	1			2							WHT/RED <sup>1</sup> or WHT/RED <sup>3</sup>
	Lighting effect of Dim-Dip headlights cannot be obtained.		2	1					3	4	G401 402 471	
Lighting switch "☒" to "☐"	Headlights are still dimmed.				1		2	3			G401 402 471	BLU/RED <sup>1</sup>
	Headlights go out with low beam.							1				
	Headlights go out with high beam.					1		2				

## Retractable headlight Control Unit Input Test

Remove the dashboard lower panel to disconnect the 13-P connector from the control unit. mark 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 O.K.
- Several different wires have the same color. They have been given a number suffix to distinguish them (for example RED/YEL<sup>1</sup> and RED/YEL<sup>2</sup> 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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/GRN	Retractor switch OFF.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 29 (15A) and No. 30 (15A) fuses.</li> <li>• Faulty retractor switch.</li> <li>• An open in the wire.</li> </ul>
3	RED/YEL <sup>1</sup>	Retractor switch OFF and lighting switch OFF	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 29 (15A) and No. 30 (15A) fuses.</li> <li>• Faulty retractor switch or lighting switch.</li> <li>• An open in the wire.</li> </ul>
4	RED/BLK	Lighting switch "ON".	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 30 (15A) fuse.</li> <li>• Faulty lighting switch.</li> <li>• An open in the wire.</li> </ul>
5	RED/YEL <sup>1</sup> and RED/BLK	Lighting switch "ON".	Check for continuity between the RED/YEL <sup>1</sup> and RED/BLK terminals: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty lighting switch.</li> <li>• An open in the wire.</li> </ul>
6	BLU or BLU/RED	Retractor motor stationary.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty retractor relay or motor.</li> <li>• Poor ground (G301, 302 or G201, 202, 203).</li> </ul>
7	RED/YEL <sup>2</sup>	Ignition switch ON and retractor switch OFF	Connect the WHT/GRN terminal to the RED/YEL <sup>2</sup> terminal: Safety indicator should work and retractor indicator light should come on.	<ul style="list-style-type: none"> <li>• Faulty safety indicator.</li> <li>• Poor ground (L.H. Drive: G701 (R.H Drive: G401, 402, 471)).</li> <li>• An open in the wire.</li> </ul>

# Lighting System



8	GRN/YEL	Passing switch ON and OFF repeatedly.	Check for voltage to ground: should be 0-12-0-12 V repeatedly.	<ul style="list-style-type: none"> <li>• Faulty passing switch.</li> <li>• Lighting relay.</li> <li>• An open in the wire.</li> </ul>
9	WHT/BLK or WHT/YEL	Raise the left headlight up to the middle position (see page 16-136). NOTE: Before testing, disconnect the ground wire from the battery negative (-) terminal. Right headlight similar.	Check for continuity in each direction between the WHT/BLK (or WHT/YEL) terminal and body ground.	<ul style="list-style-type: none"> <li>• Faulty L. or R. headlight motor.</li> <li>• Faulty L. or R. headlight retractor relay.</li> <li>• Poor ground (L.H. Drive: G201 or G301) (R.H. Drive: G201, 202 or G301)</li> <li>• An open in the wire.</li> </ul>

## Except KE model

10	RED/YEL <sup>3</sup>	Lighting switch "ID".	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 34 (15A) fuse.</li> <li>• Faulty lighting switch.</li> <li>• Faulty lighting relay.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
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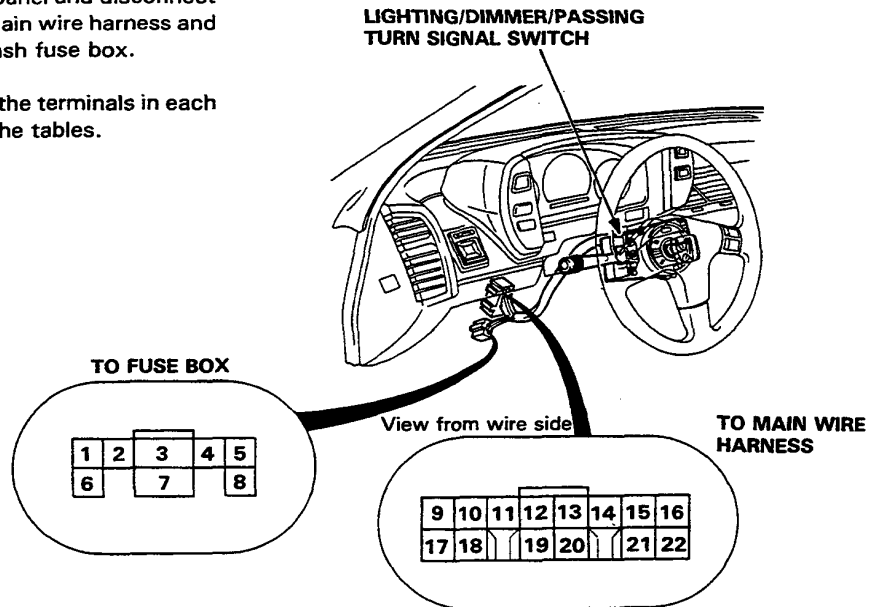
## KE model only

11	BLK/WHT	Ignition switch ON and lighting switch "30E" or "ID".	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 13 (10A) or No. 4 (15A) fuse.</li> <li>• Faulty lighting switch.</li> <li>• Faulty DIM-DIP relay.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
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# Lighting System

## Lighting/Turn Signal Switch Test

1. Remove the dashboard lower panel and disconnect the 14-P connector from the main wire harness and the 8-P connector from the dash fuse box.
2. Check for continuity between the terminals in each switch position according to the tables.



### Lighting/Dimmer/Passing Switch

Terminal		*1		*2												
Position		3	7	8	9	6	11		10	21	22	1	17	*3	14	19
Lighting switch	OFF											○	○			
		○	○	○	○								○			○
		○	○	○	○											○
Dimmer switch	LOW									○	○					
	HIGH								○		○					
Passing switch	OFF															
	ON				○	○	○	○	○							

(Internal connection)

### Turn Signal Switch

Terminal		5		4	2
Position					
R		○	→	○	
NEUTRAL					
L		○	→	○	

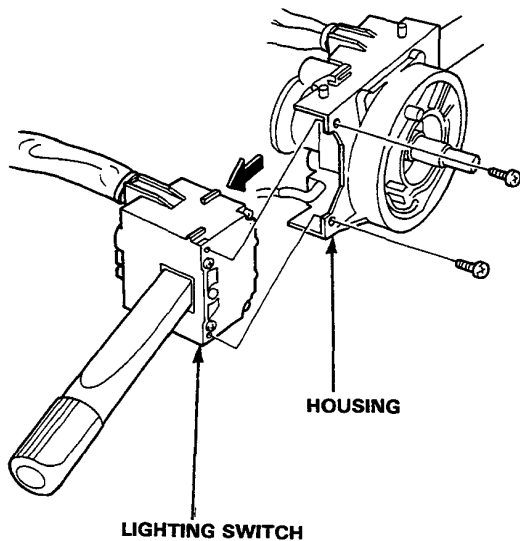
- \*1: KG, KE, KX, KF and KB models
- \*2: KS, KW, KQ, KT and KY models
- \*3: Except KQ and KT models





## Lighting Switch Replacement

1. Remove the steering wheel and dashboard lower panel, then disconnect the 14-P connector from the main wire harness and 8-P connector from the fuse box.
2. Remove the lower and upper covers from the steering column.
3. Disconnect the 3-P connector from the slip ring.
4. Remove the 2 screws and slide the lighting switch out of the housing as shown.



## Retractor/Front Fog Light Switch Test

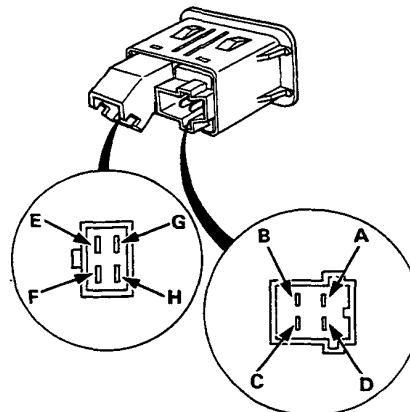
1. Remove the switch assembly.
2. Check for continuity between the terminals in each switch position according to the table.

### Retractor Switch

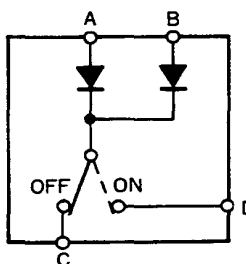
Terminal Position	A	B	C	D
OFF	○	→	○	→
ON	○	→	○	→

### Fog Light Switch

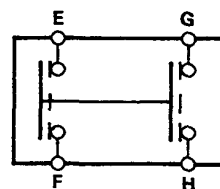
Terminal Position	E	F	G	H
OFF				
ON	○	○	○	○



### Retractor Switch



### Front Fog Light Switch

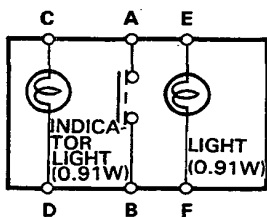
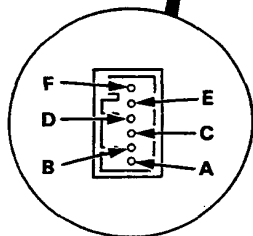
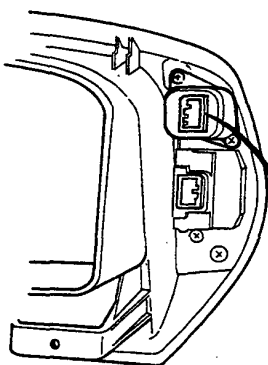


# Lighting System

## Rear Fog Light Switch Test

1. Remove the switch assembly.
2. Check for continuity between the terminals in each switch position according to the table.

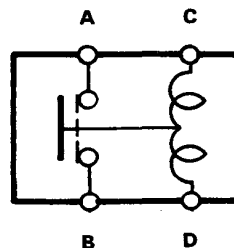
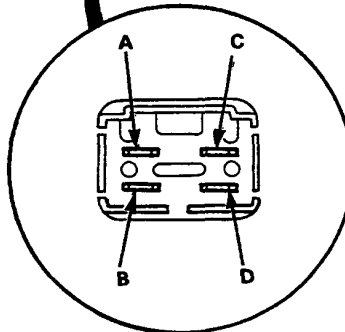
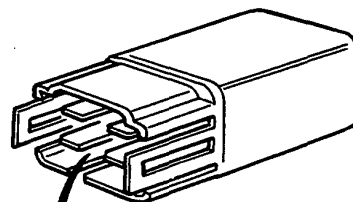
Terminal	A	B	C	D	E	F
Position						
OFF			○	○	○	○
ON	○	○			○	○



## Lighting/Rear Fog light 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.



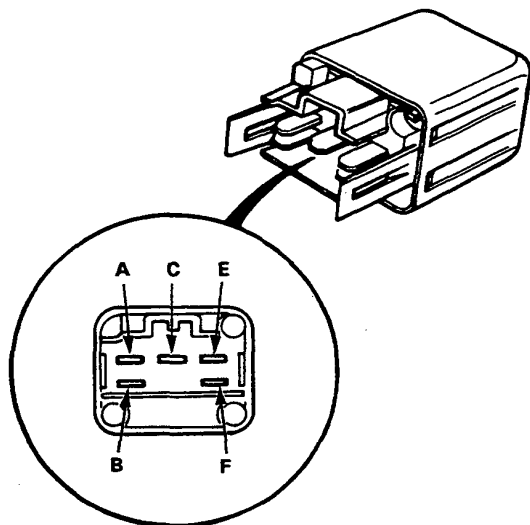


## Dimmer/Retractor Relay Test

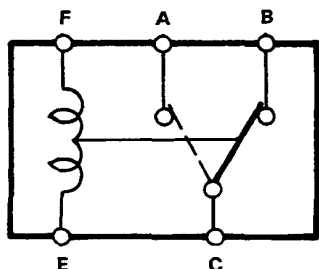
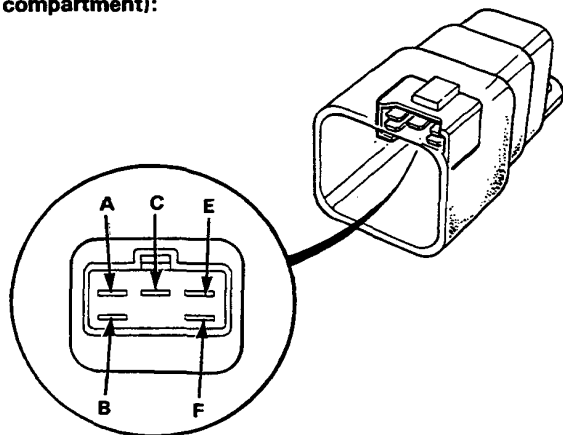
There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.

There should be continuity between the B and C terminals when the battery is disconnected.

**Dimmer Relay (in the under-hood relay box):**

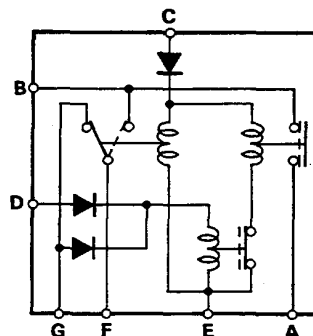
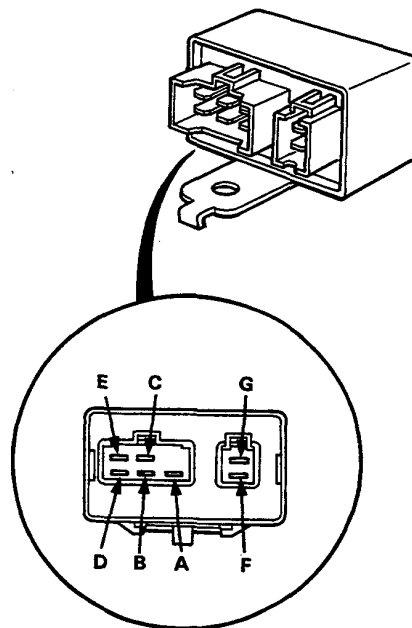


**Retractor Relays (Located left and right side engine compartment):**



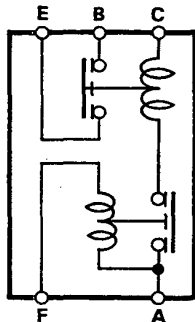
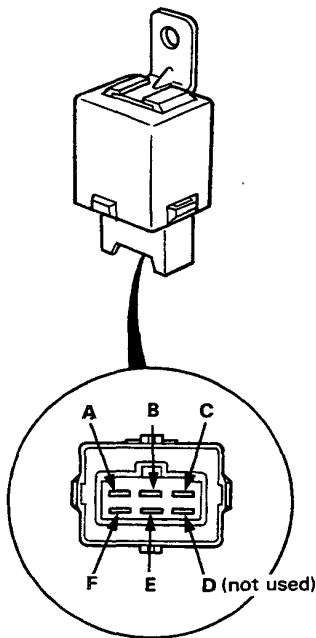
## Day Time Running Light Relay Test (KS, KW models)

1. Remove the dashboard lower panel and day time running light relay from the relay bracket.
2. There should be continuity between the F and G terminals.
3. There should be continuity between the A and B; B and F terminals with battery positive connected to the C terminal, connect negative to the E terminal.
4. There should be no continuity between the A and B terminal when the battery positive connected to the C and D or G terminals, connect negative to the E terminal.



## DIM-DIP Relay Test (KE model only)

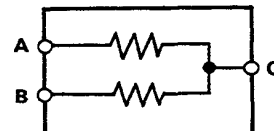
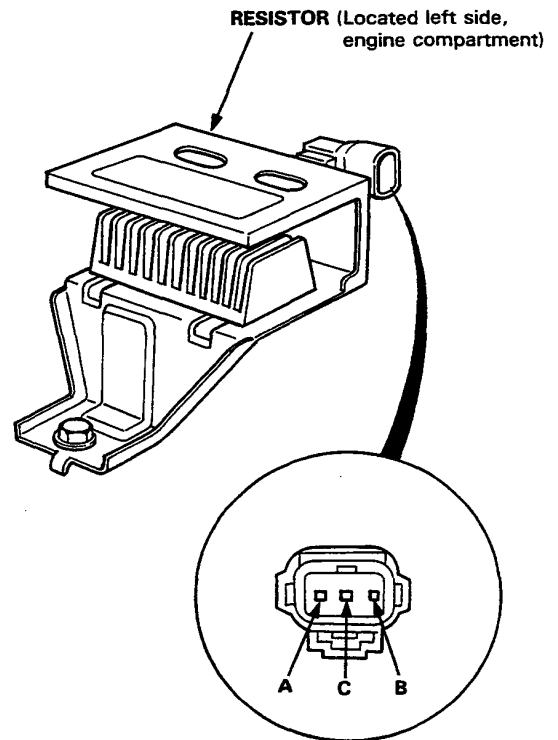
1. Remove the dashboard lower panel and DIM-DIP relay from the relay bracket.
2. There should be continuity between the B and E terminals with battery positive connected C and F terminals, connect negative to the A terminal. There should be no continuity when the battery is disconnected.



## DIM-DIP Resistor Test (KE model only)

**CAUTION:** Dim-Dip resistor becomes very hot in use of Dim-Dip headlights; do not touch it or the attaching hardware immediately after they have been turned off.

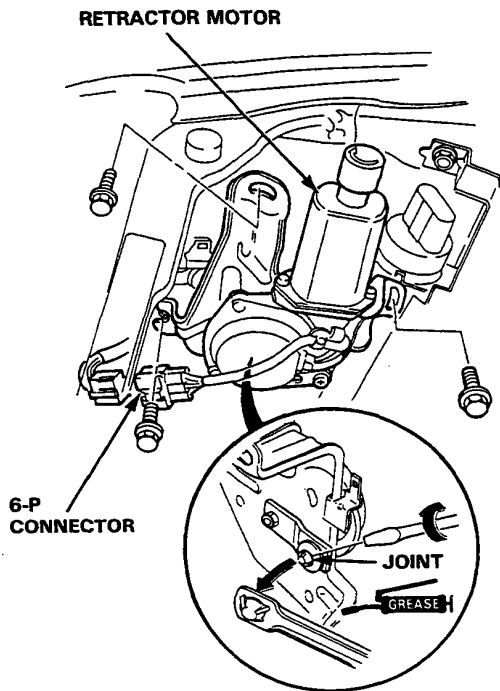
1. Disconnect the 3-P connector from the resistor.
2. There should be continuity between A and C; between B and C terminals.





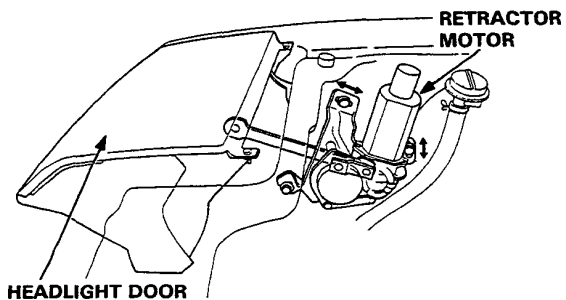
## Retractor Motor Replacement

1. Disconnect the ground wire from the battery negative (-) terminal.
2. Disconnect the 6-P connector and remove the 3 mount bolts.
3. Pry the retractor linkage off the motor arm.



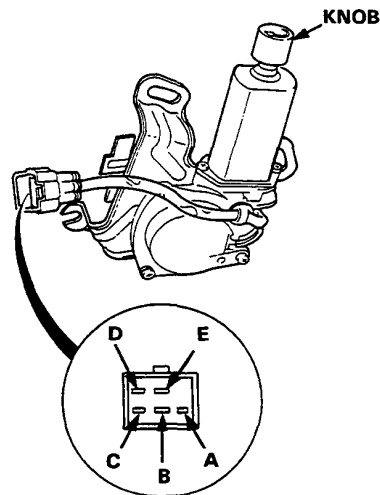
4. Install in the reverse order of the removal, and:

- Make sure there is no interference between the wire harness and linkage.
- Coat the joints with grease and make sure the linkage moves smoothly.
- Adjust the retractor motor fore or aft until the headlight doors fit flush with the front fender when the headlights are closed.



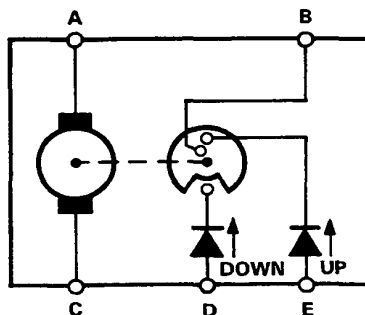
## Retractor Motor Test

1. Remove the retractor motor.
2. Test motor operation by connecting battery positive to the A terminal and negative to the C 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.

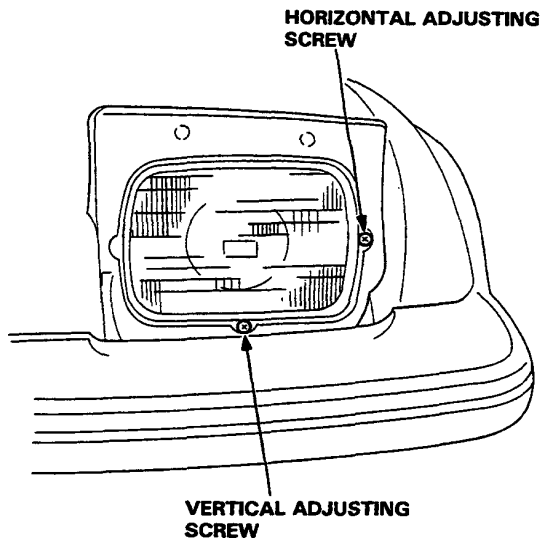
Terminal	B	D	E
Headlight position			
At closed position	○	—	○
At opened position	○	○	



# Headlights

## Adjustment

NOTE: Adjust the headlights to local requirements.

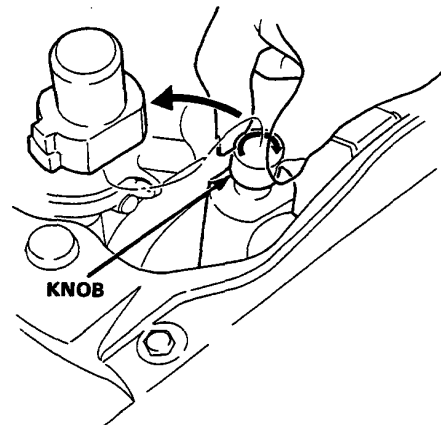


## Replacement

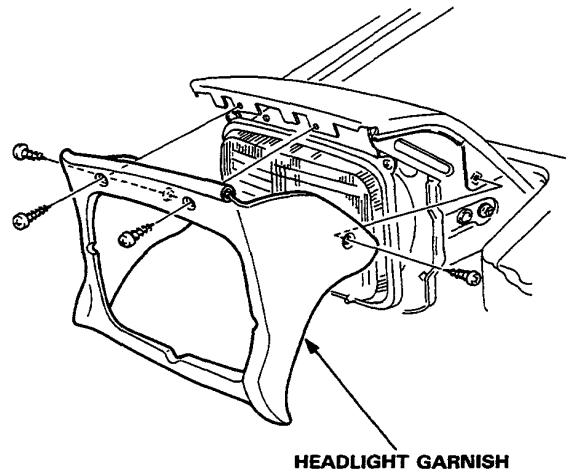
### CAUTION:

- Halogen headlights can become very hot in use; do not touch them on the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.

1. Disconnect the ground wire from the battery negative (-) terminal, then turn the knob clockwise to raise the headlight.



2. Remove the 4 screws and slide the headlight garnish upward to remove it.

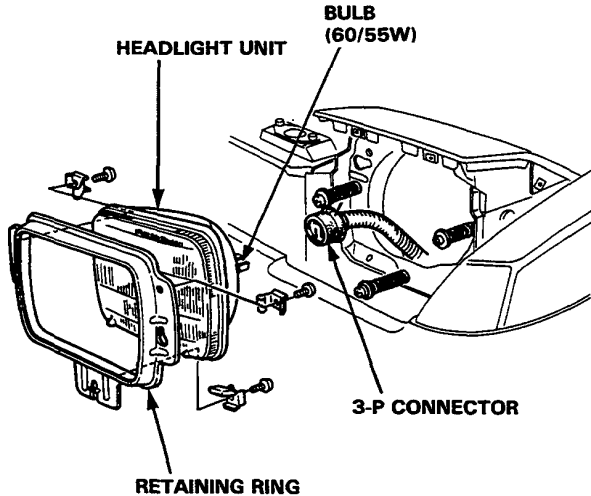




# Front Fog Lights

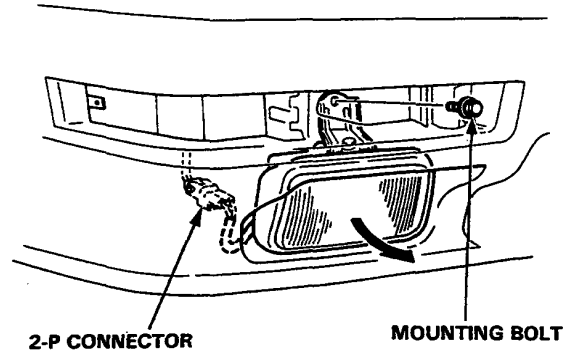
## Replacement

3. Push the headlight to the inside, slide it upwards, and remove it from the adjusting screw.

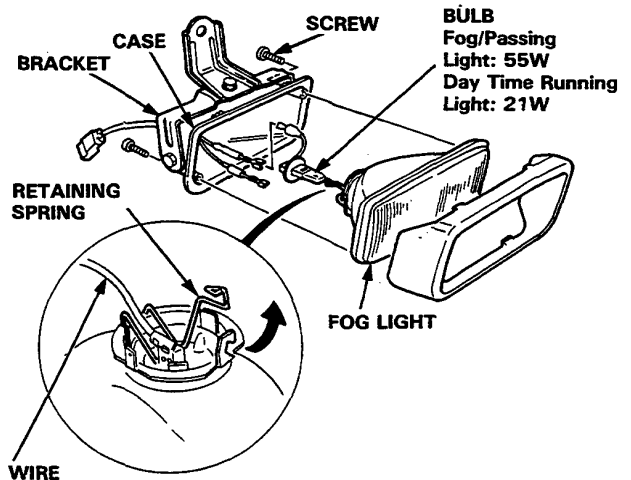


4. Disconnect the 3-P connector and remove the retaining ring.
5. After installing the unit, adjust the headlights to local requirements.

1. Remove the front turn signal/side maker light.
2. Remove the mounting bolt, then remove the fog light and disconnect the 2-P connector from the fog light assembly.



3. Remove the 2 screws behind the fog light assembly.
4. Pull out the fog light from the case, then disconnect the wires from behind the fog light.
5. Remove the retaining spring and the bulb.



**NOTE:**

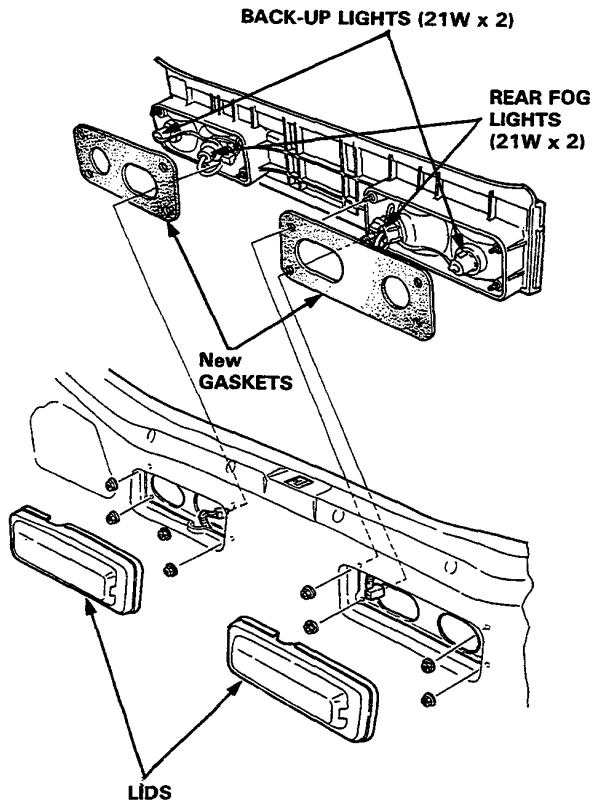
The case should not be removed from the bracket. If the case is removed from the bracket, the beam setting is required.

6. Install the fog light in the reverse order of removal.

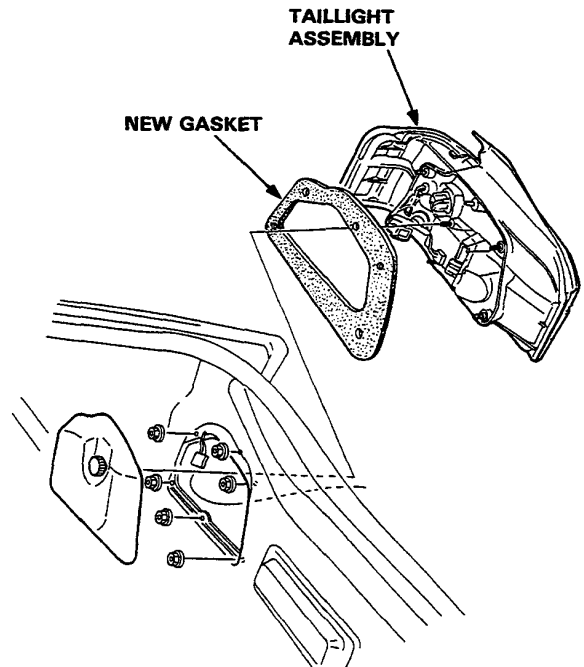
# Back-Up Lights/Rear Fog Lights/Taillight Assembly

## Replacement

1. Open the trunk lid and remove the back-up lights for maintenance lids of the back-up light.
2. Disconnect the 4-P connectors from behind the back-up lights.
3. Remove the 8 mount nuts and the back-up light assembly.



4. Remove the taillight maintenance lid, then disconnect the 8-P connector from behind the taillight.
5. Remove the 6 mount nuts and taillight assembly.



6. Inspect the gasket; replace if it is distorted or overly compressed.

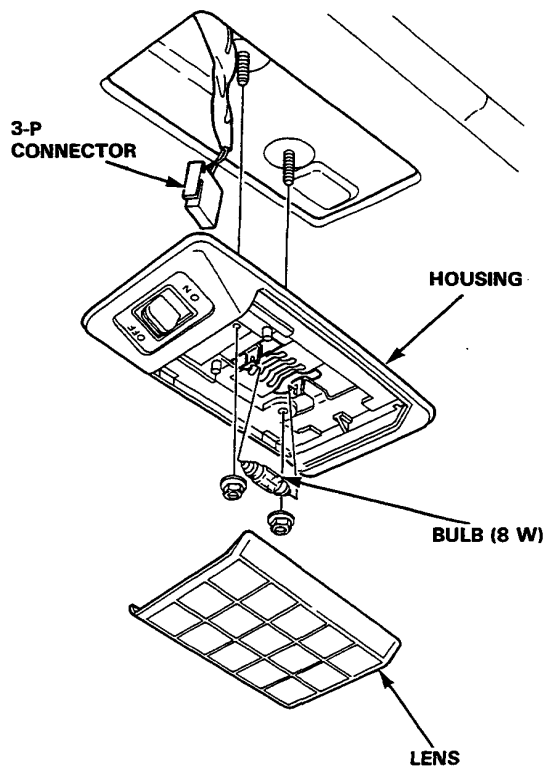


# Dome Light



## Removal

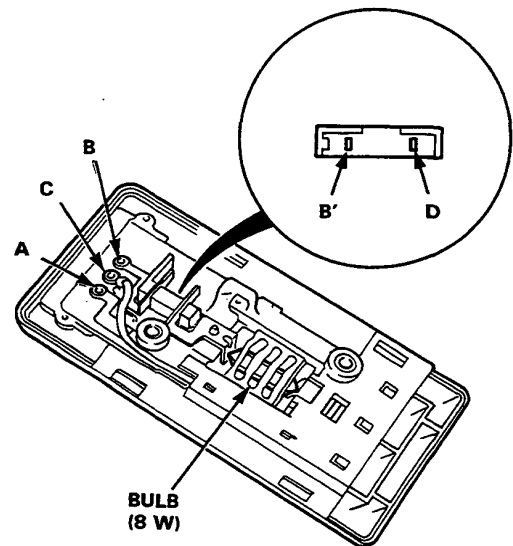
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the 2 nuts and the housing.
4. Disconnect the 3-P connector from the housing.



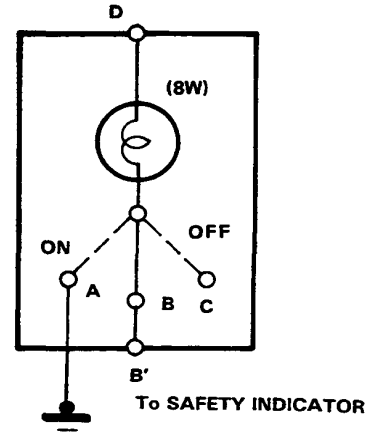
## Test

1. Remove the dome light.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	A	B or B'	C	D
OFF			○ — (D) — ○	
MIDDLE		○ — ○	○ — (D) — ○	
ON	○ — ○		○ — (D) — ○	



From No. 8 (15 A) FUSE

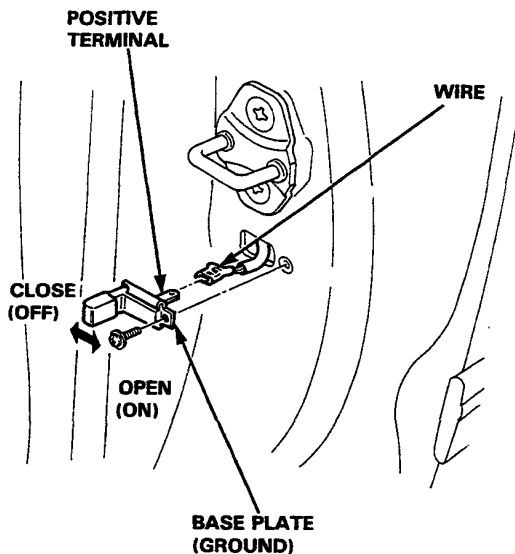


At MOUNTING NUT

# Door Switch

## Test

1. Open the door.
2. Remove the screw and pull out the door switch.
3. Disconnect the wire from the switch.

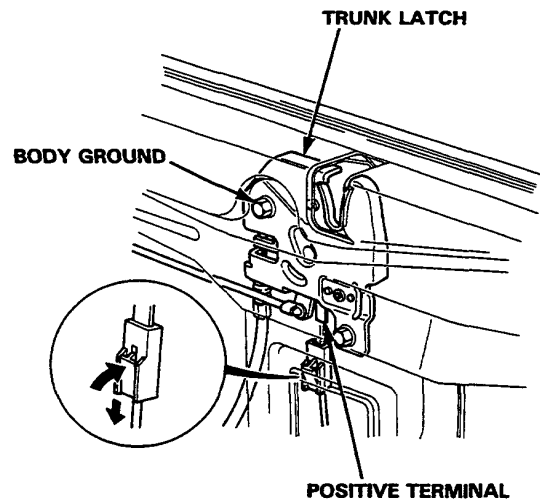


4. There should be continuity between the positive terminal and base plate (ground) with the switch released (door opened). There should be no continuity with the switch pushed (door closed).

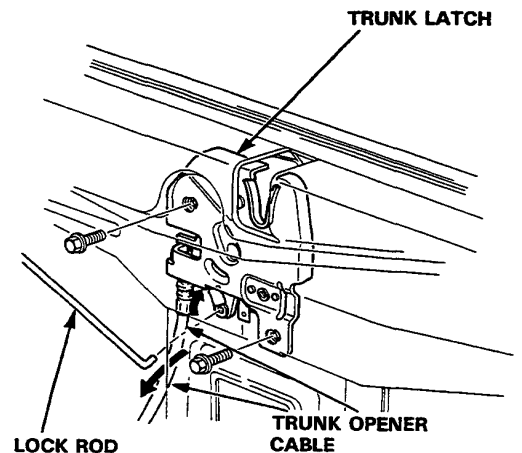
# Latch Switch

## Test/Replacement

1. Open the trunk lid and remove the trunk rear trim panel.
2. Disconnect the connector from the trunk latch.
3. There should be continuity between the positive terminal and body ground.



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.



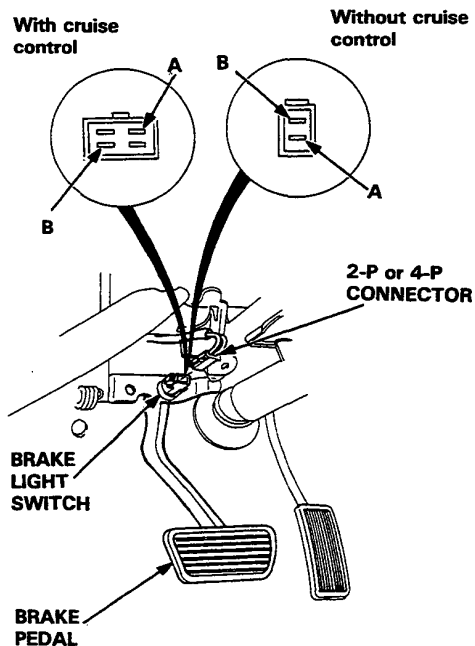
# Brake Lights



## Test

NOTE: Refer to page 16-92 for wiring description of the brake light circuit.

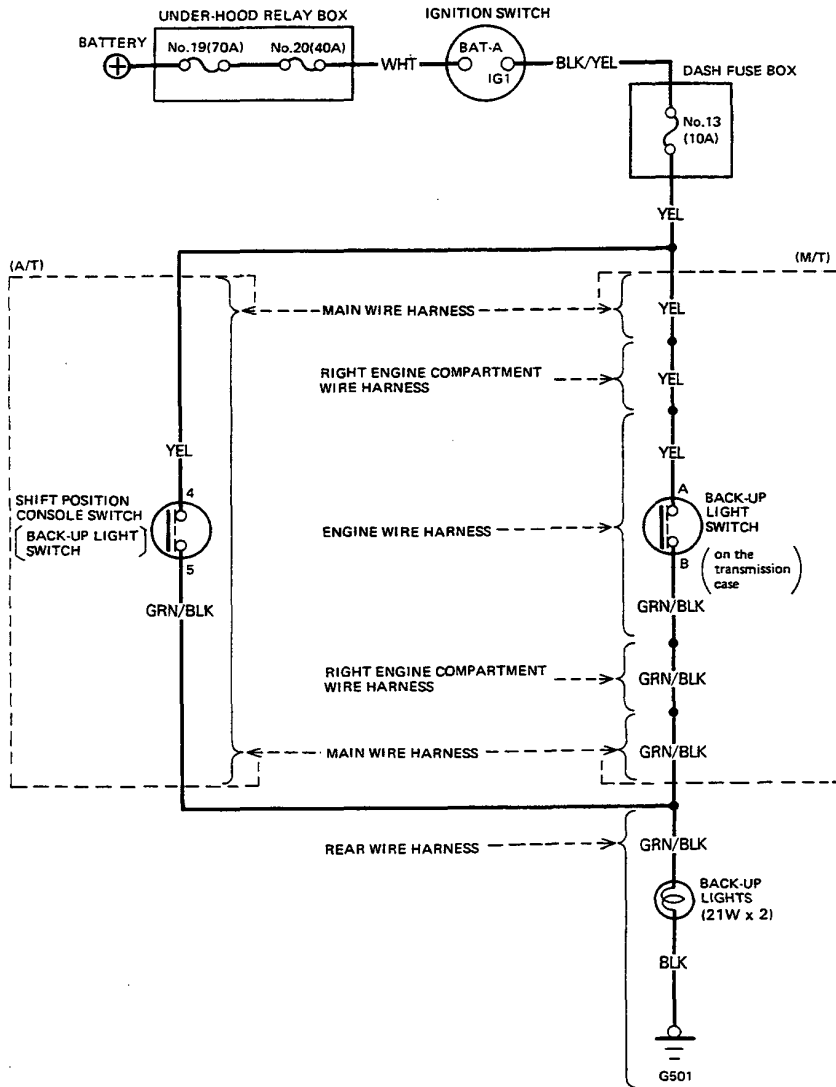
1. If the brake lights do not go on, check the No. 32 (15 A) fuse in the under-hood relay box, and the brake light bulbs in the taillight assembly and the high mount brake light.
2. If the fuse and bulbs are OK, disconnect the 2-P or 4-P connector from the brake light switch.



3. Check for continuity between the A and B terminals.  
There should be continuity with the brake pedal pushed.
- If no continuity, replace the switch or adjust pedal height (see section 13).
  - If there is continuity, but the brake lights do not go on:
    - Poor ground (G501).
    - An open in the WHT/GRN or GRN/WHT wire.
    - Faulty brake light failure sensors (see page 16-97).

# Back-Up Light

## Circuit Diagram

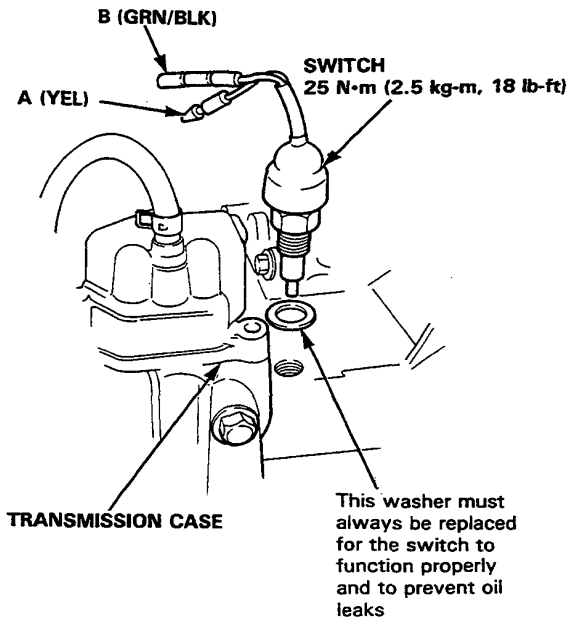




# Test

## Manual Transmission:

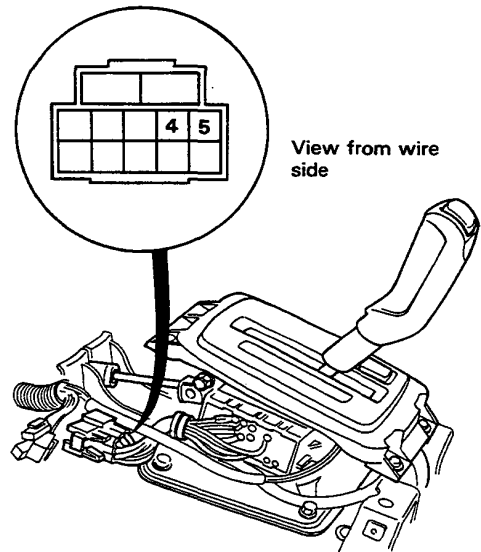
1. Test back-up light switch by placing the select lever in reverse and turning the ignition switch to ON.
2. If the back-up lights do not go on, check the No. 13 (10 A) fuse in the dash fuse box and the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the 2-P connector from the back-up light switch.



4. Check for continuity between the A and B wires with the switch installed to the transmission case. There should be continuity as the select lever engages "R".
  - If no continuity, replace the switch.
  - If there is continuity, but the back-up lights do not go on:
    - Poor ground (G501)
    - An open in the YEL or GRN/BLK wire.

## Automatic Transmission:

1. Test 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 No. 13 (10 A) fuse in the dash fuse box and the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, remove the front console and the center instrument panel, then disconnect the 10-P connector from the shift position console switch (back-up light switch).



4. Check for continuity between the No.4 and No.5 terminals. There should be continuity as the select lever engages "R".
  - If no continuity, replace the switch assembly (see page 16-105).
  - If there is continuity, but the back-up lights do not go on:
    - Poor ground (G501).
    - An open in the YEL, GRN/YEL or GRN/BLK wire.

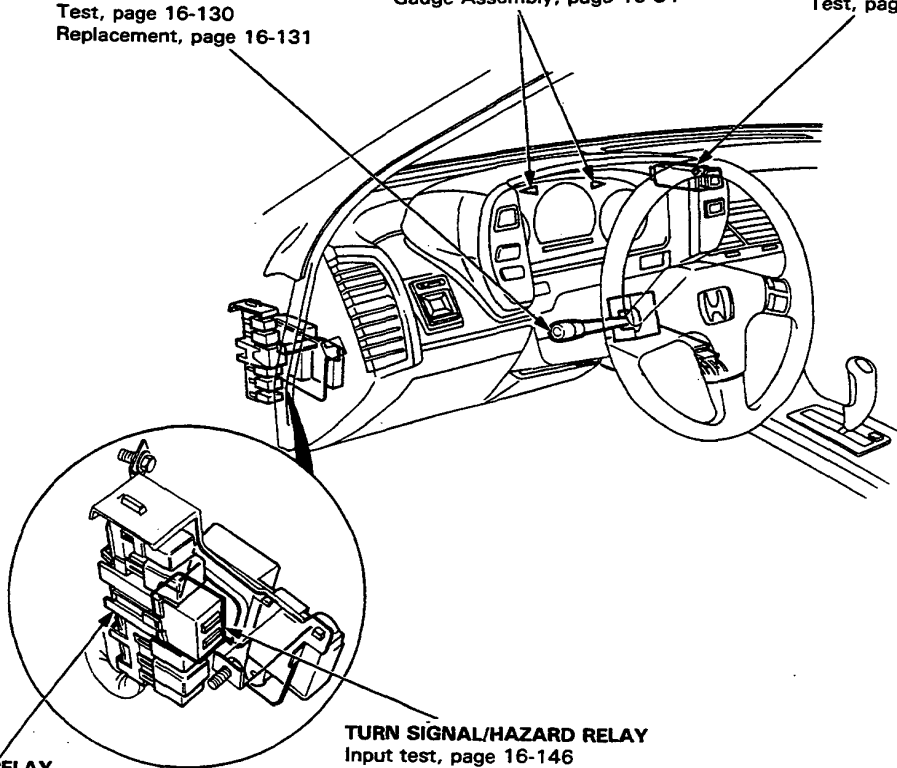
# Side Marker/Turn Signal/Hazard Flasher System

## Component Location Index

**LIGHTING/TURN SIGNAL SWITCH**  
Test, page 16-130  
Replacement, page 16-131

**TURN SIGNAL INDICATOR LIGHTS**  
(in the gauge assembly)  
Gauge Assembly, page 16-84

**HAZARD SWITCH**  
Removal, page 16-85  
Test, page 16-147

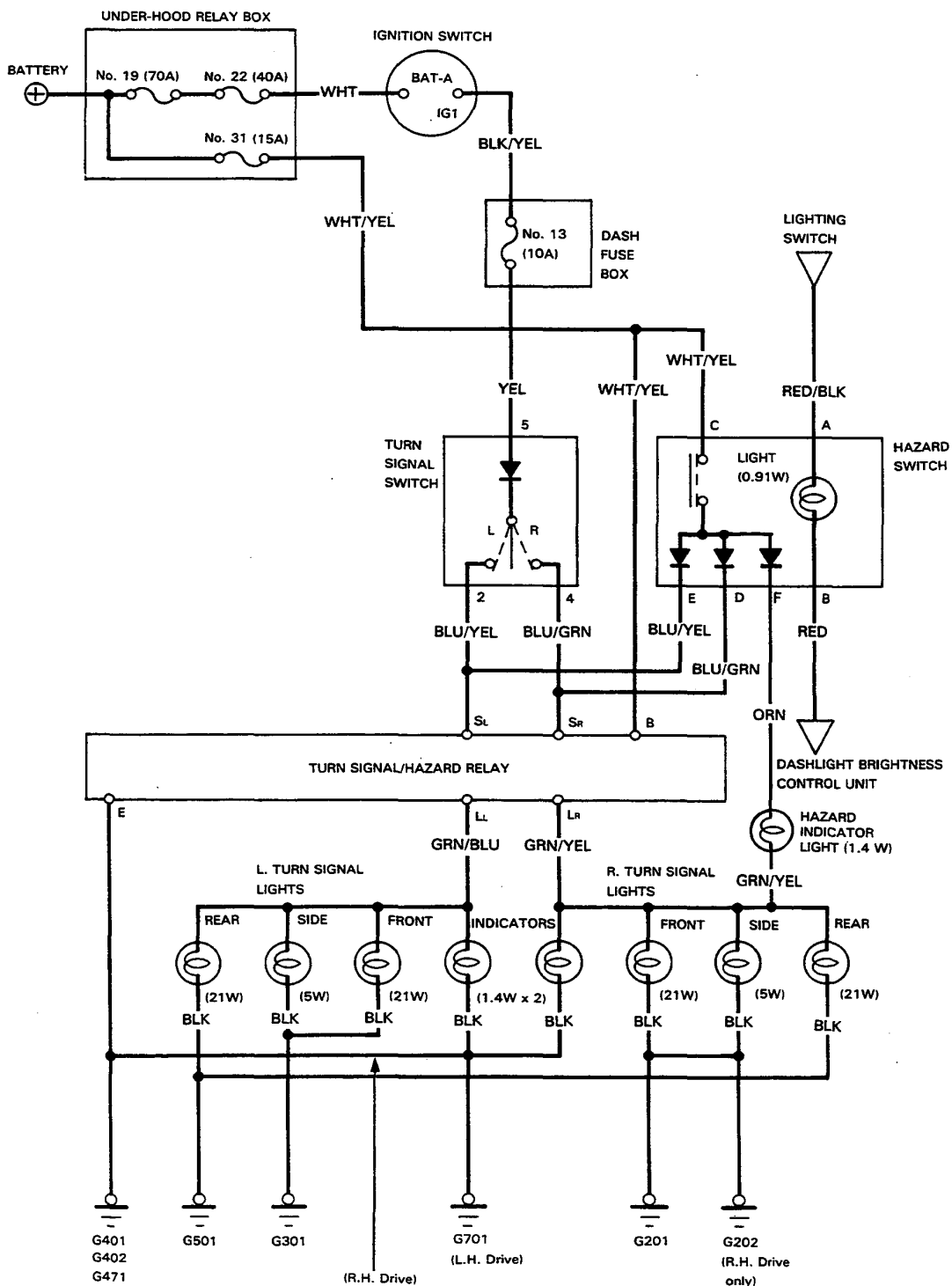


**DASH RELAY HOLDER**

**TURN SIGNAL/HAZARD RELAY**  
Input test, page 16-146



# Circuit Diagram

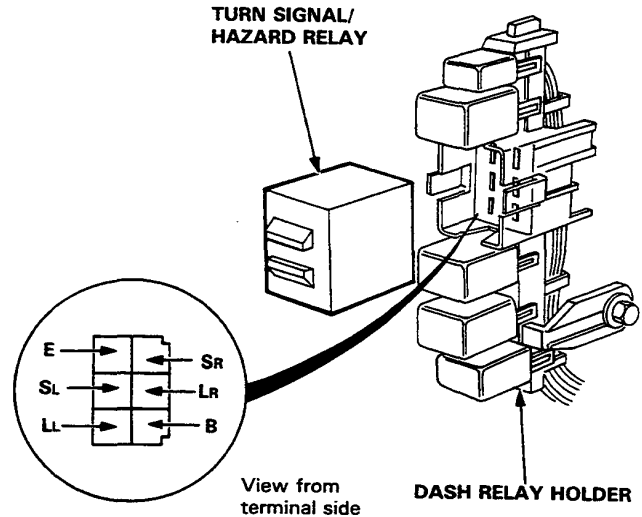


# Side Marker/Turn Signal/Hazard Flasher System

## Turn Signal/Hazard Relay Input Test

Remove the dashboard lower panel and the kick panel and the dash relay holder from the bracket to facilitate the input test, then remove the turn signal/hazard relay from the dash relay holder.

Make the following input tests at the relay holder pins. 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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the BLK wire.</li> </ul>
2	B	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 31 (15 A) fuse.</li> <li>• An open in the WHT/YEL wire.</li> </ul>
3	SR	Ignition switch ON and turn signal switch in R.	Check for voltage to ground: should have battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 13 (10 A) fuse.</li> <li>• Faulty turn signal switch.</li> <li>• An open in the YEL, BLU/GRN or BLU/YEL wire.</li> </ul>
	SL	Ignition switch ON and turn signal switch in L.		
4	SR	Hazard switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty hazard switch.</li> <li>• An open in the BLU/GRN or BLU/YEL wire.</li> </ul>
	SL			
5	LR	Connect the B terminal to the LR Terminal.	R. Turn signal lights should come on as the battery is connected	<ul style="list-style-type: none"> <li>• Blown bulb.</li> <li>• Poor ground (L.H. Drive: G201) (R.H. Drive: G201, 202)</li> <li>• An open in the GRN/YEL wire.</li> </ul>
6	LL	Connect the B terminal to the LL terminal.	L. Turn signal lights should come on as the battery is connected.	<ul style="list-style-type: none"> <li>• Blown bulb.</li> <li>• Poor ground (G301).</li> <li>• An open in the GRN/BLU wire.</li> </ul>

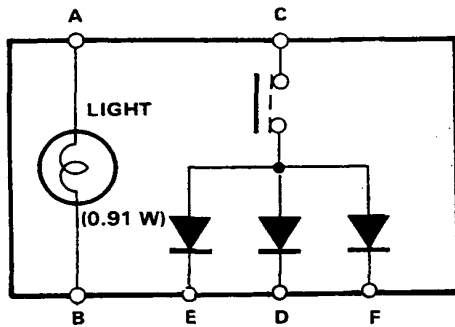
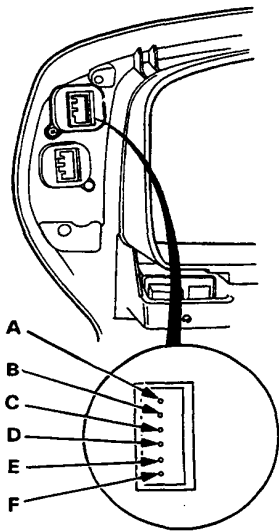




## Hazard Switch Test

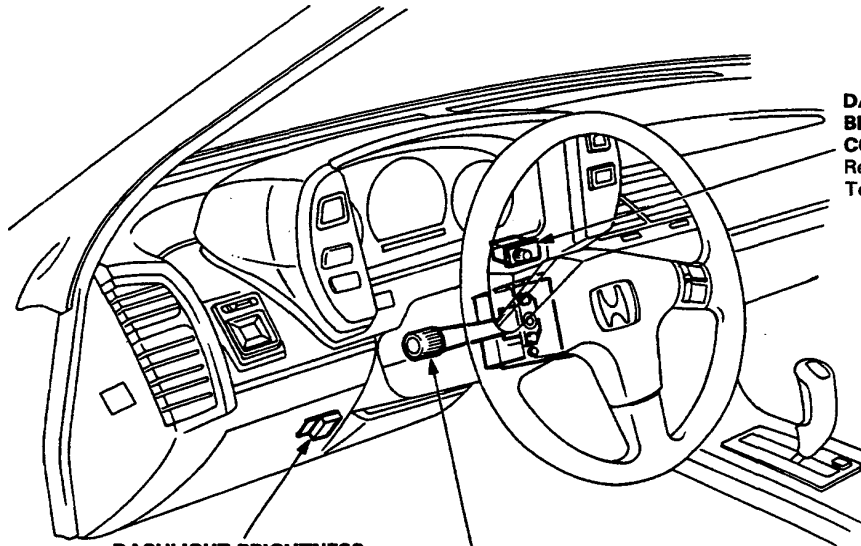
1. Remove the instrument panel from the meter visor.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	C	D	E	A	B
OFF					
ON	○ → ○	○ → ○		○ → ○	○ → ○



# Dashlight Brightness Control

## Component Location Index

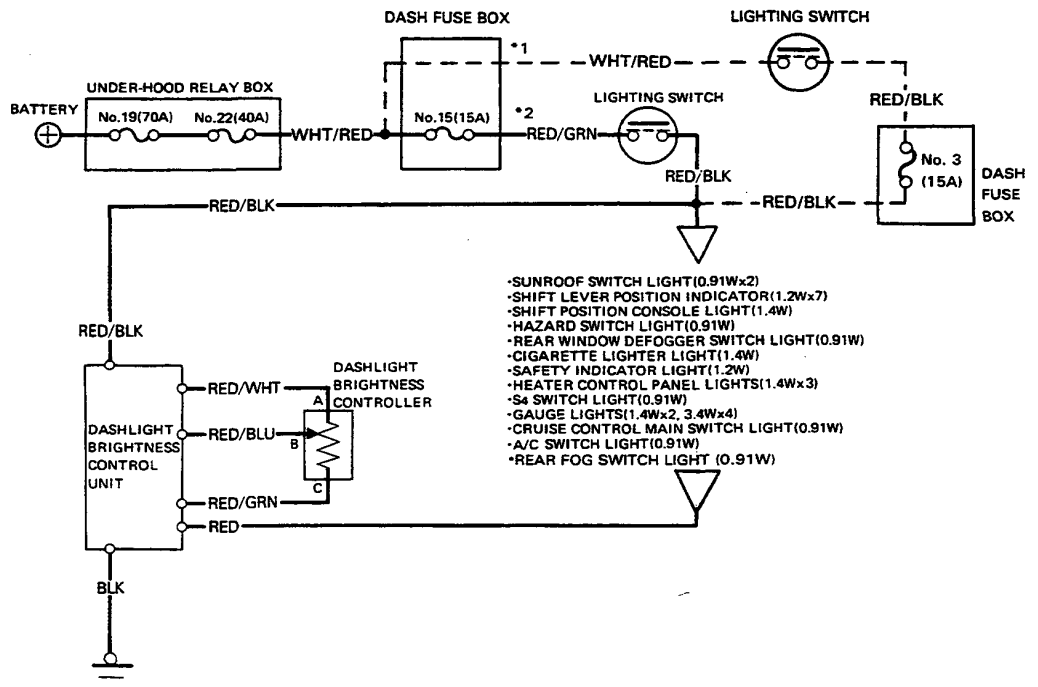


**DASHLIGHT BRIGHTNESS CONTROLLER**  
 Removal, page 16-85  
 Test, page 16-150

**DASHLIGHT BRIGHTNESS CONTROL UNIT**  
 (Located behind dash lower panel)  
 Input Test, page 16-149

**LIGHTING SWITCH**  
 Test, page 16-130  
 Replacement, page 16-131

## Circuit Diagram



G401, 402, 471 (L.H. Drive)  
 G701 (R.H. Drive)

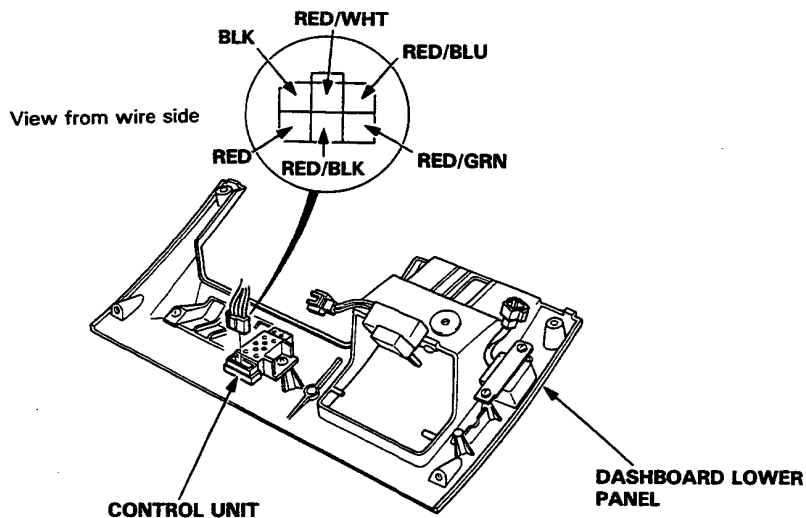
----- \*1: KG,KE,KX,KB,KF models  
 \_\_\_\_\_ \*2: KS,KW,KQ,KT,KY models



## Control Unit Input Test

Remove the dashboard lower panel and disconnect the 6-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 re-check.



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.	<ul style="list-style-type: none"> <li>• Poor ground (L.H. Drive: G401, 402, 471) (R.H. Drive: G701).</li> <li>• An open in the wire.</li> </ul>
2	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 15 (15 A) or No. 3 (15 A) fuse.</li> <li>• Faulty lighting switch.</li> <li>• An open in the wire.</li> </ul>
3	RED	Lighting switch ON.	Attach to ground: dashlights should come on full bright.	<ul style="list-style-type: none"> <li>• An open in the RED/BLK or RED wire.</li> </ul>
4	RED/GRN or RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/GRN and RED/WHT terminals: should be 8–12 k $\Omega$ at all time.	<ul style="list-style-type: none"> <li>• Faulty controller.</li> <li>• An open in the wire.</li> </ul>
5	RED/BLU and RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/BLU and RED/WHT terminals: should vary from 0 to 10,000 ohms as the dial is rotated.	

# Dashlight Brightness Control

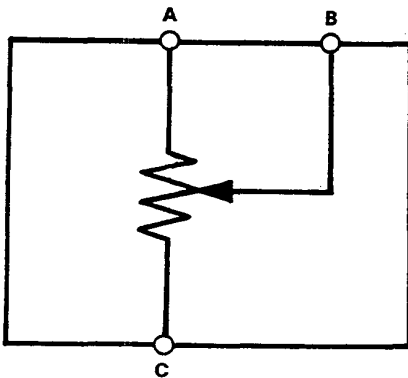
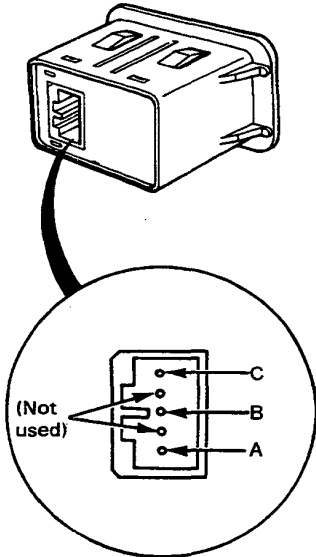
## Controller Test

1. Remove the dashlight brightness controller from the instrument panel (see page 16-85).
2. Measure resistance between the A and C terminals.

**Resistance: 8,000–12,000 ohms**

**NOTE:** Resistance will vary slightly with temperature.

3. Measure resistance between the B and C terminals while rotating the adjusting dial.  
Resistance should vary from 0 to 10,000 ohms as the dial is rotated.



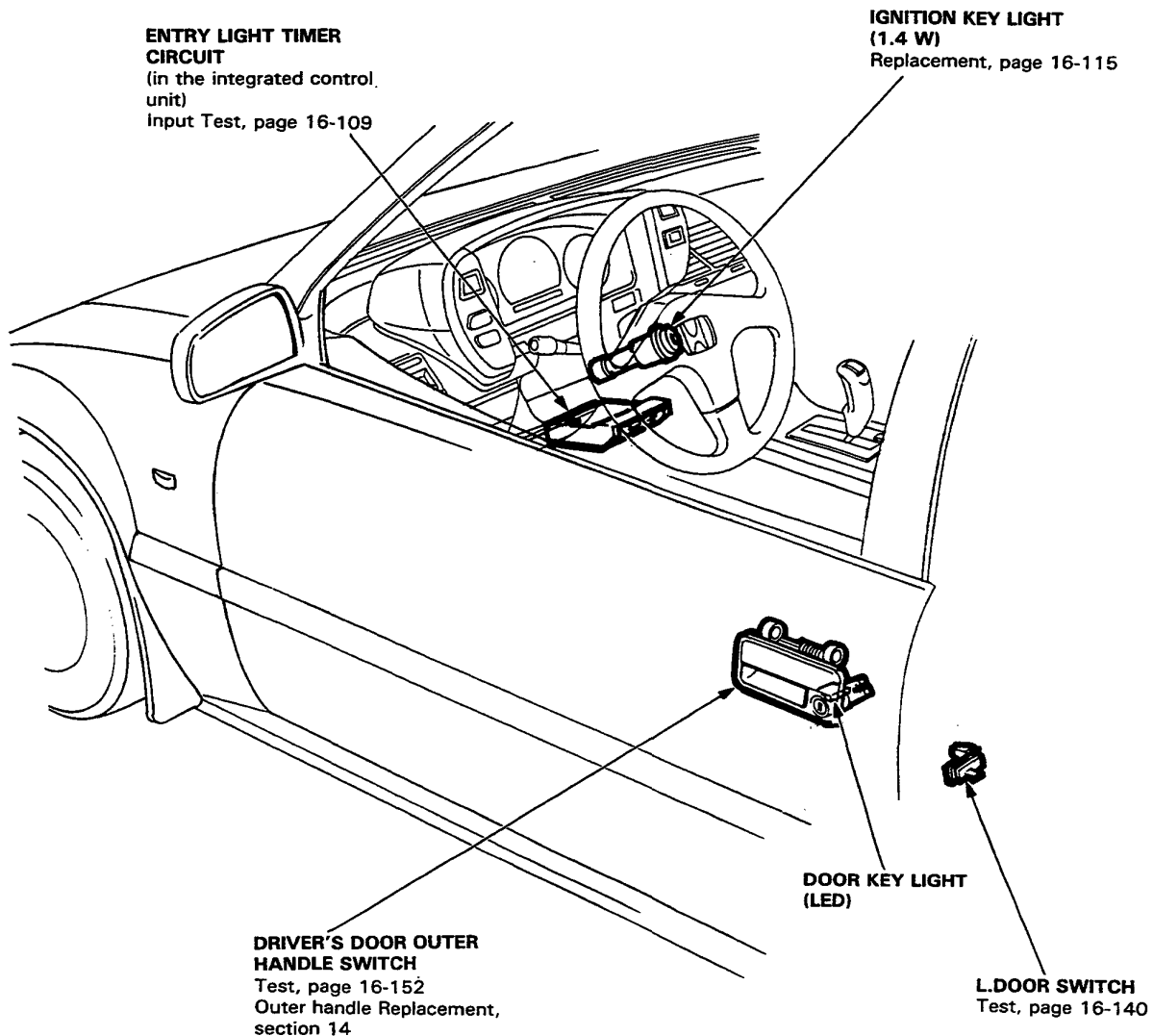


# Entry Light Timer System

## Component Location Index

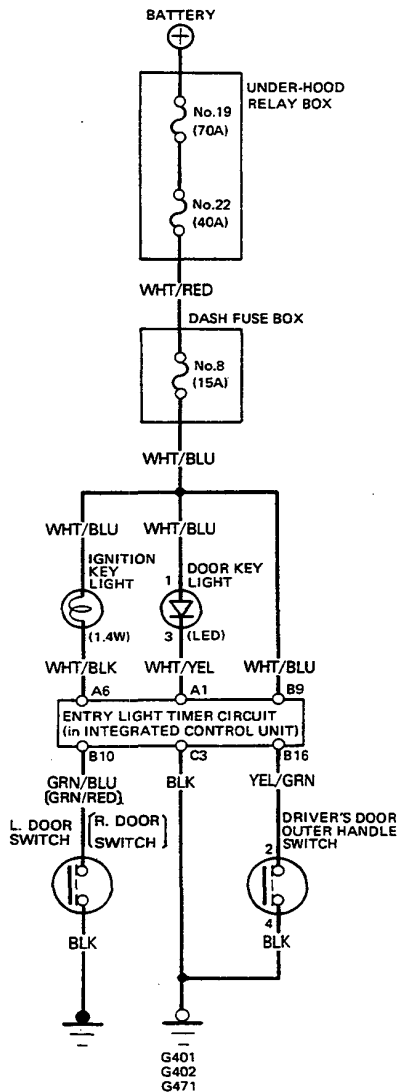
### Description:

If the driver's door has been opened by the outer handle, an LED at the door lock and a light at the ignition switch go on and stay on for about 8 seconds after the driver's door is closed.



# Entry Light Timer System

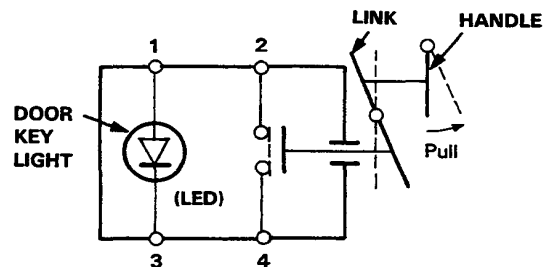
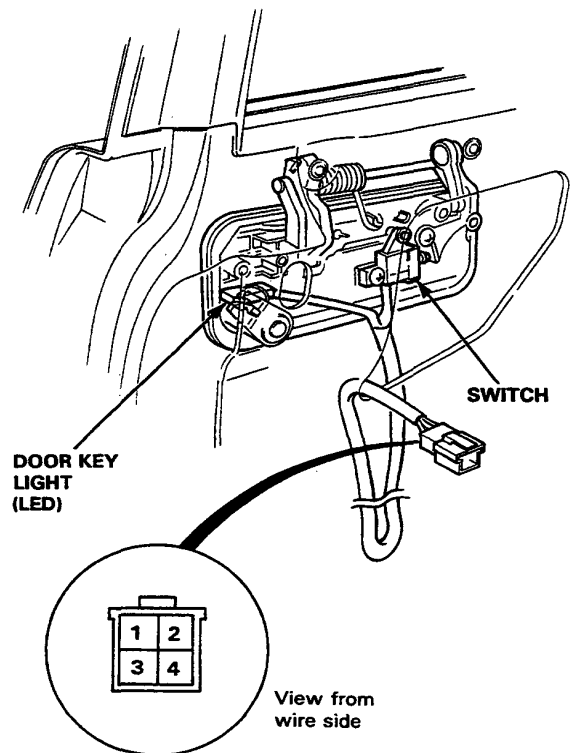
## Circuit Diagram



[ ]: R.H. Drive

## Outer Handle Switch Test

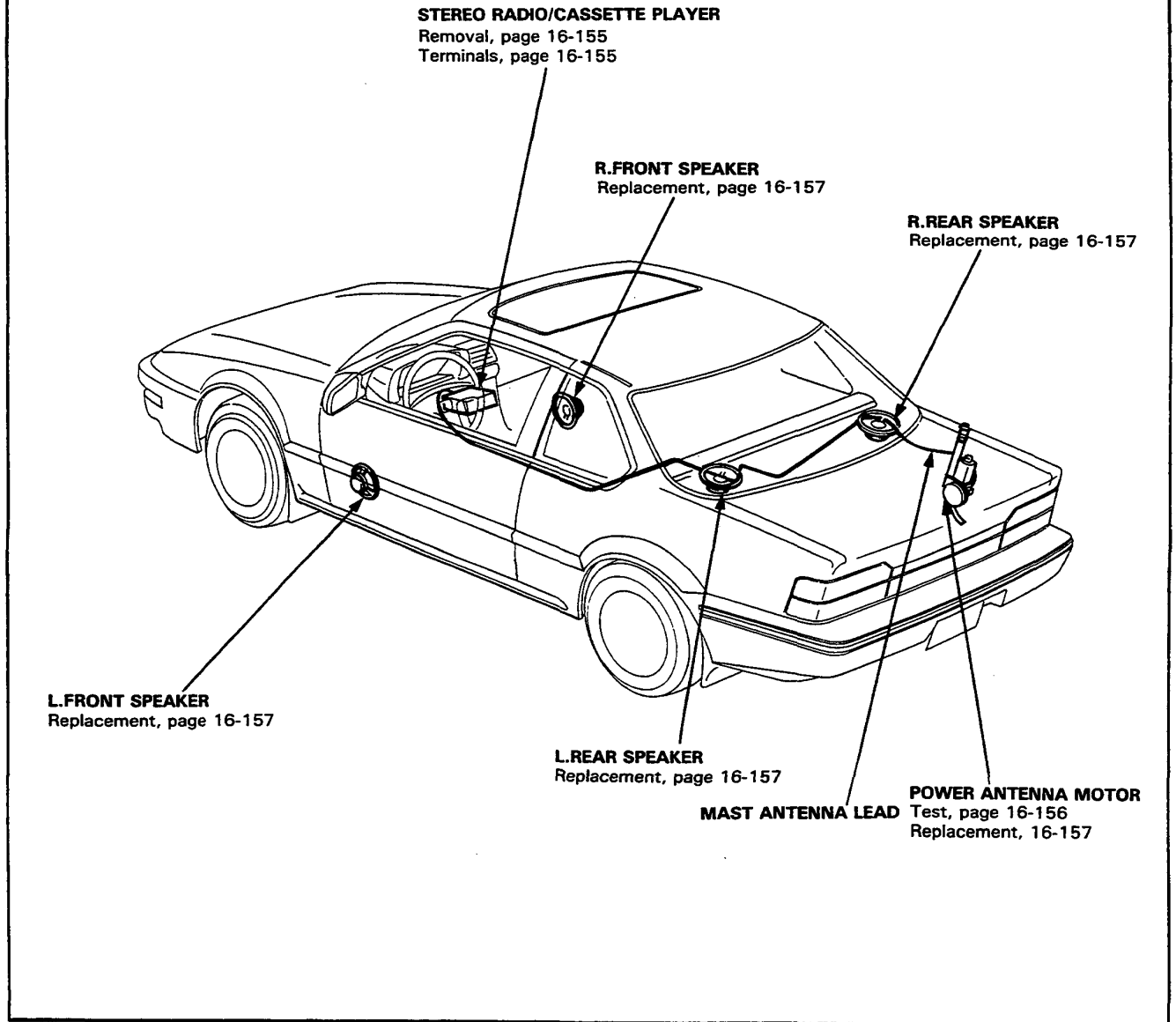
1. Remove the left door trim panel.
2. Disconnect the 4-P connector from the outer handle switch.
3. There should be continuity between the No. 2 and No. 4 terminals when the driver's door outer handle is pulled. There should be no continuity when the handle is released.





# Stereo Sound System

## Component Location Index

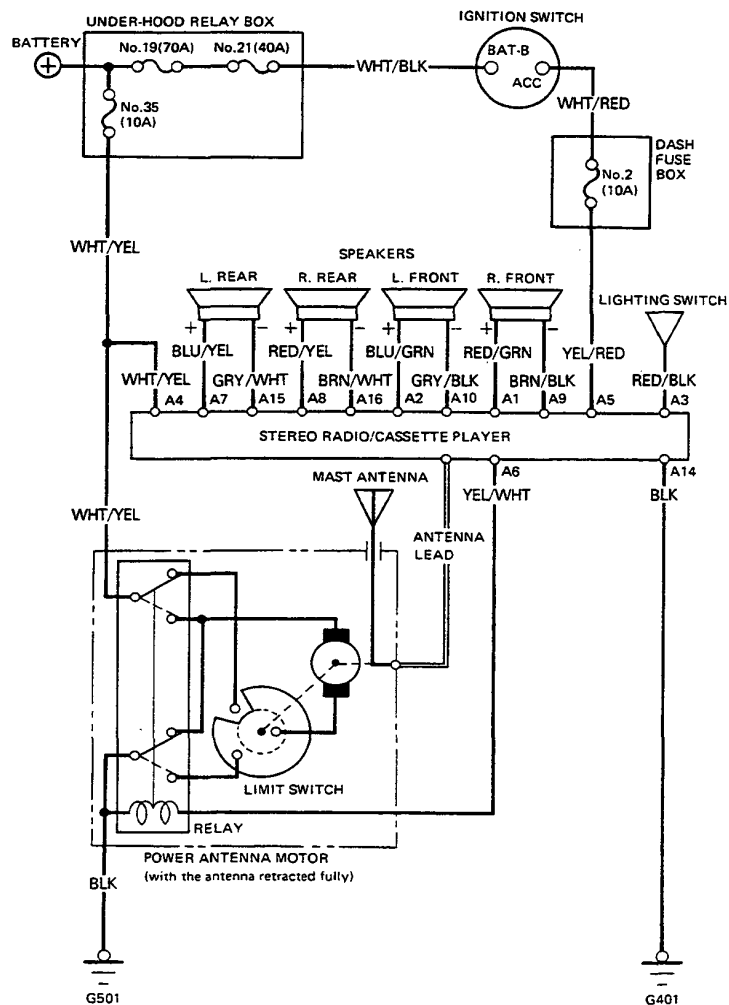


## Description

For the stereo radio/cassette player description, please see the owner's manual. The automatic antenna mast is controlled entirely by the radio ON/OFF switch. It will extend fully any time the radio switch is on and the ignition switch is on. When the radio is shut off, it retracts fully. The power antenna motor has a built-in relay together with a limit switch for this function.

# Stereo Sound System

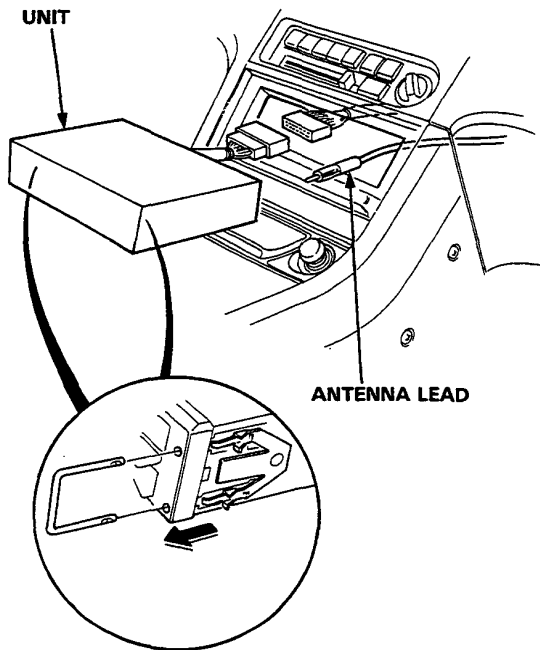
## Circuit Diagram



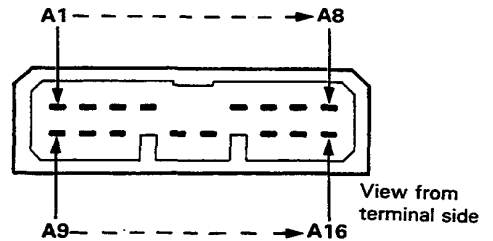




## Unit Removal



## Unit Terminals



Terminal	Wire	Destination
A1	RED/GRN	Right front speaker ⊕
A2	BLU/GRN	Left front speaker ⊕
A3	RED/BLK	Light-on signal
A4	WHT/YEL	Constant power (Tuning memory)
A5	YEL/RED	ACC (Main stereo power supply)
A6	YEL/WHT	Radio switched power (To antenna)
A7	BLU/YEL	Left rear speaker ⊕
A8	RED/YEL	Right rear speaker ⊕
A9	BRN/BLK	Right front speaker ⊖
A10	GRY/BLK	Left front speaker ⊖
A11		(Not used)
A12		(Not used)
A13		(Not used)
A14	BLK	Ground
A15	GRY/WHT	Left rear speaker ⊖
A16	BRN/WHT	Right rear speaker ⊖

# Stereo Sound System

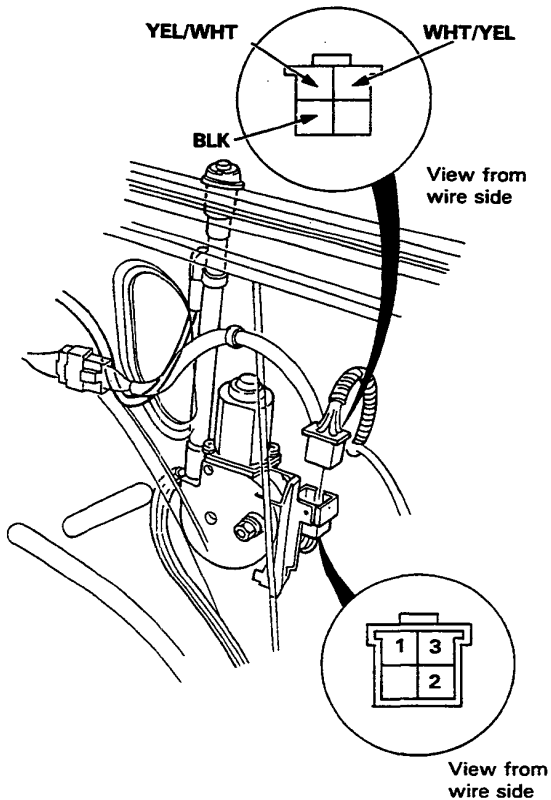
## Power Antenna Motor Test

1. Remove the trunk side trim panel.
2. Disconnect the 4-P connector from the motor and remove the connector from its clamp.
3. First check power to the motor at the harness pins: There should be battery voltage between the WHT/YEL (+) and BLK (-) terminals all the time. There should be battery voltage between the YEL/WHT (+) and BLK (-) terminals only with the ignition and radio switched ON.

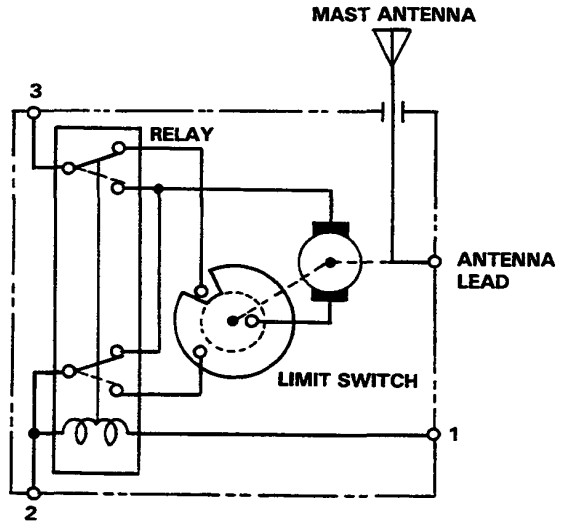
4. Test motor operation:

**FULL EXTEND:** Connect battery positive to the No.3 and No.1 terminals and negative to the No.2 terminal.

**RETRACTED:** Then disconnect battery positive from the No.1 terminal.



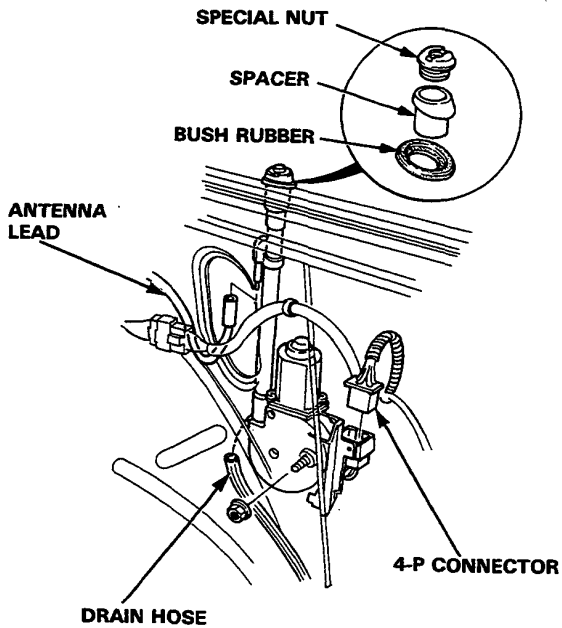
5. If the motor fails to operate properly, replace it.





## Power Antenna Motor Replacement

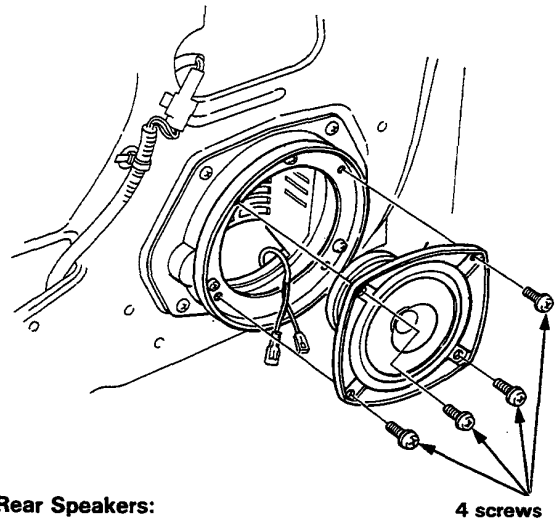
1. Remove the trunk side trim panel.
2. Disconnect the 4-P connector and antenna lead from the motor, then remove the special nut and mount nut to take out the motor with the mast antenna.



## Speaker Replacement

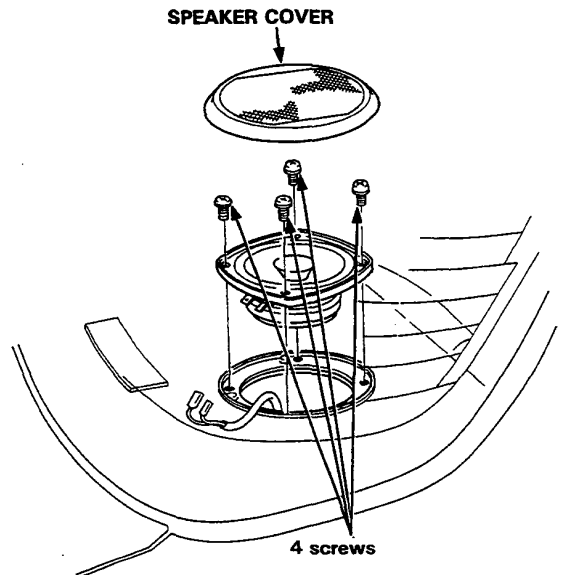
### Front Speakers:

1. Remove the door trim panel.
2. Remove the 4 screws, then disconnect the wires from the speaker.



### Rear Speakers:

1. Remove the speaker cover.
2. Remove the 4 screws, then disconnect the wires from the speaker.

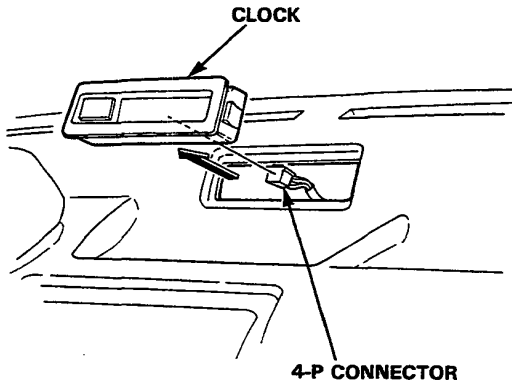


# Clock

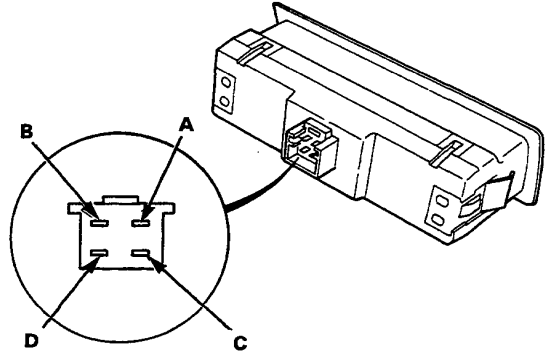
## Removal

Pull out the clock from the dashboad, then disconnect the 4-P connector from the clock.

**CAUTION:** Be careful not to damage the clock and dashboad.



## Terminals



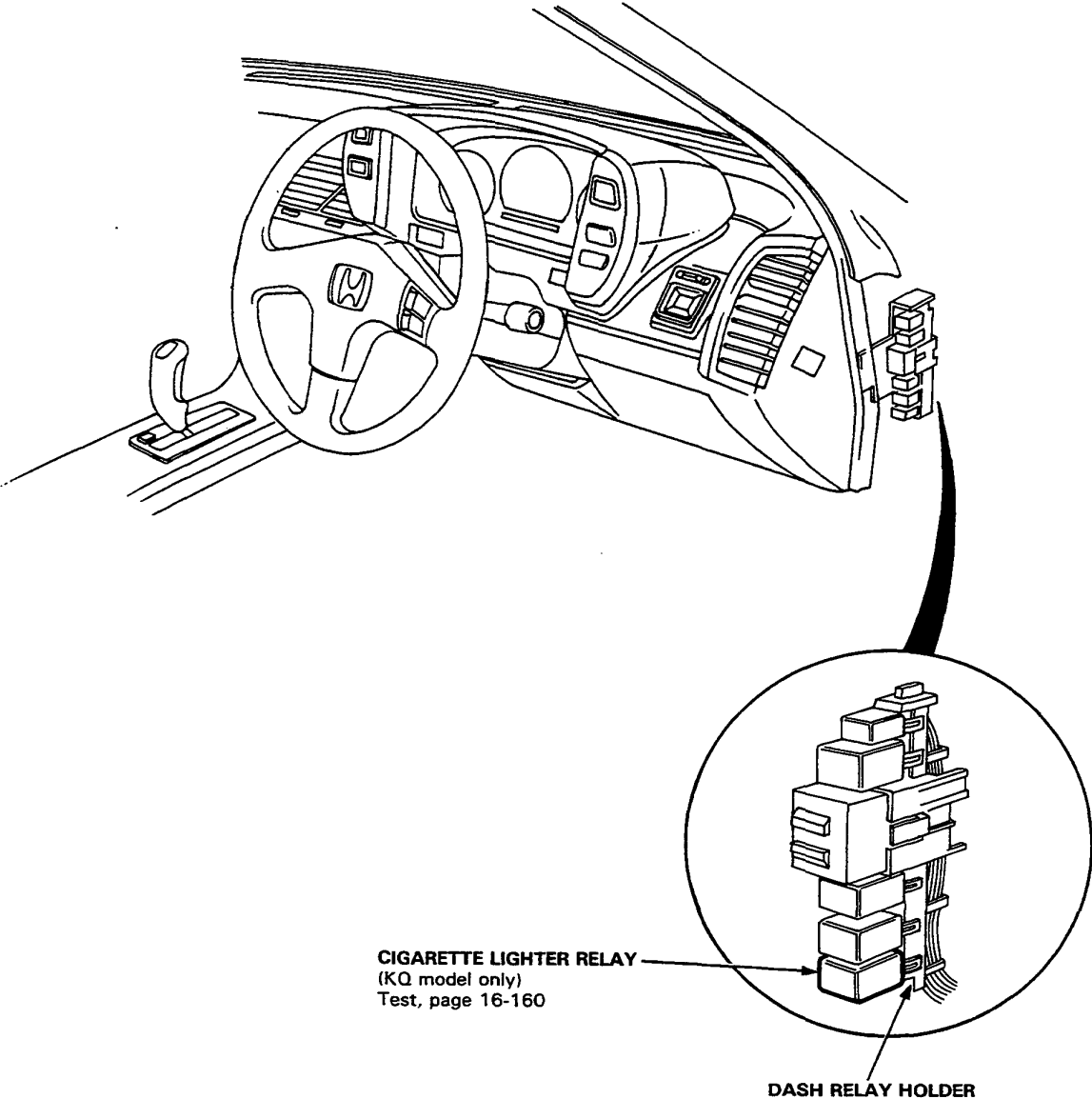
Terminal	Wire	Destination
A	WHT/YEL	Constant power (Time memory)
B	YEL	IG1 (Main clock power supply)
C	RED/BLK	Light-on signal
D	BLK	Ground



# Cigarette Lighter

## Component Location Index

- CIGARETTE LIGHTER  
Replacement, page 16-161

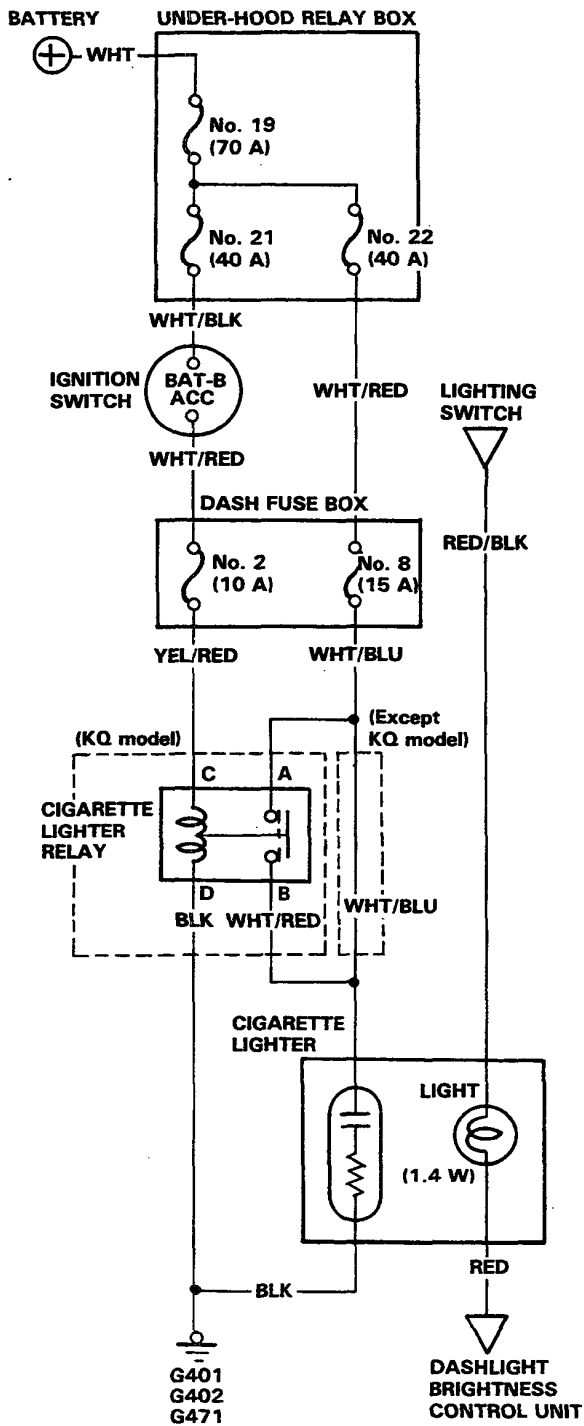


CIGARETTE LIGHTER RELAY  
(KQ model only)  
Test, page 16-160

DASH RELAY HOLDER

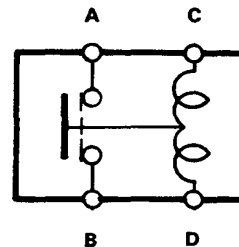
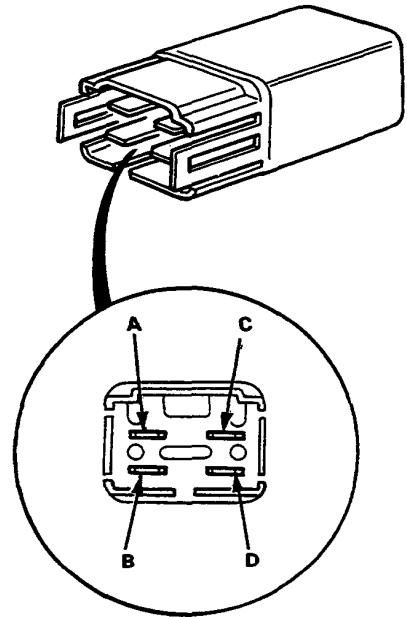
# Cigarette Lighter

## Circuit Diagram



## Cigarette Lighter 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.

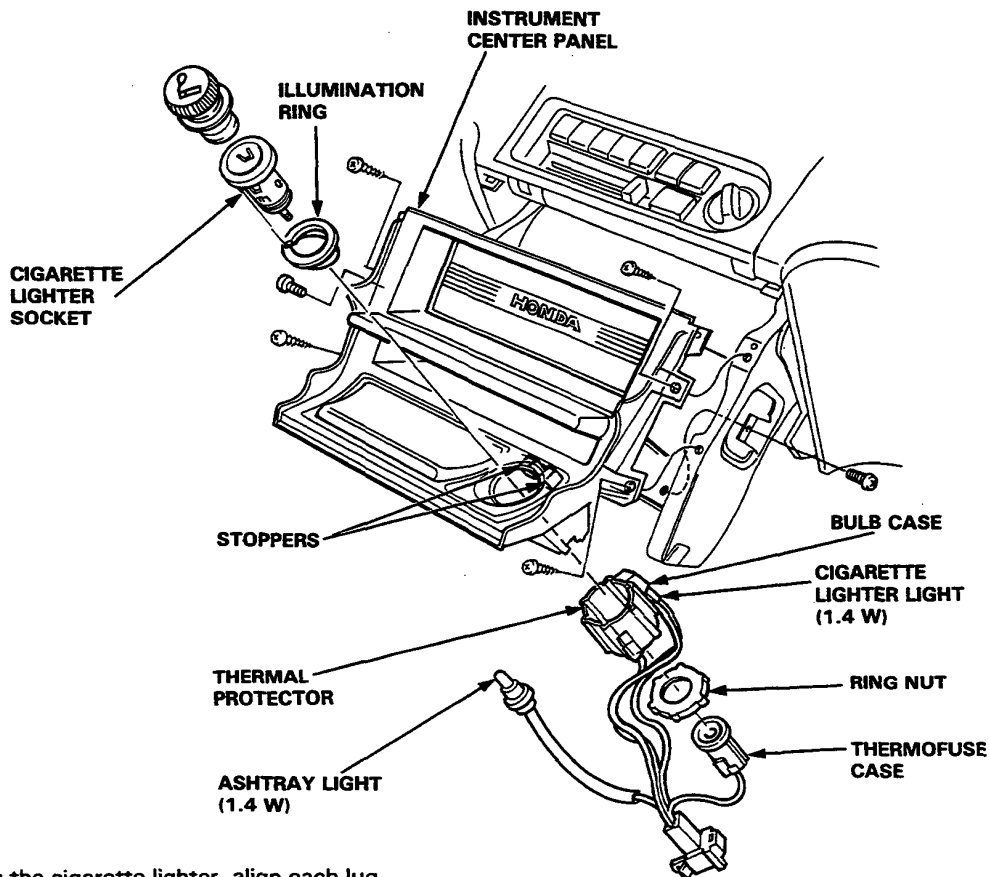


# Cigarette Lighter



## Replacement

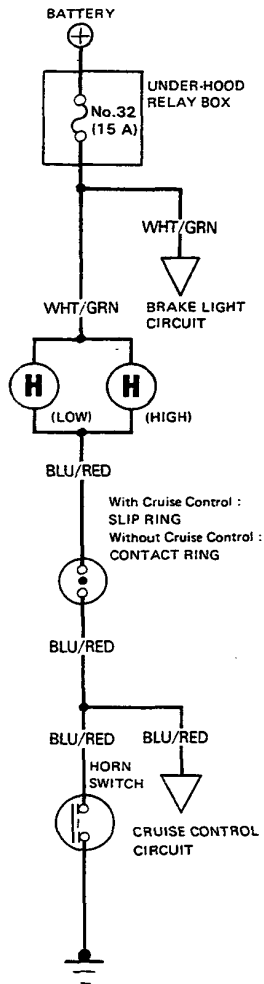
1. Remove the front console.
2. Remove the 6 screws and the center instrument panel with the stereo radio/cassette player, then disconnect the 16-P connector, the mast antenna lead, window antenna lead, and the 4-P connector from the cigarette lighter.
3. Disconnect the thermofuse case from the socket end.
4. Remove the ring nut and separate the cigarette lighter socket from the thermal protector.



5. When installing the cigarette lighter, align each lug on the 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 panel.
6. Make sure that the ground wire, bulb socket and thermo fuse case are seated to the cigarette lighter assembly.

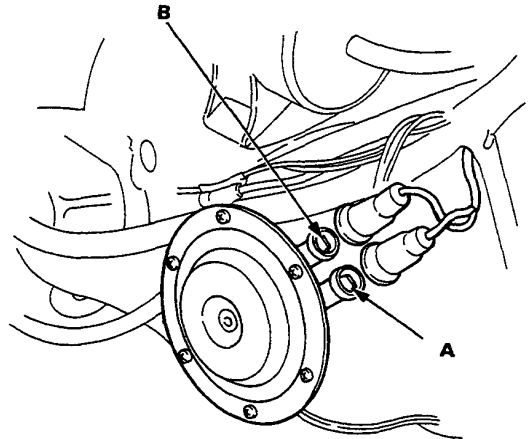
# Horns

## Circuit Diagram



## Horn Test

1. Remove the front bumper.
2. Disconnect the wires from the 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.

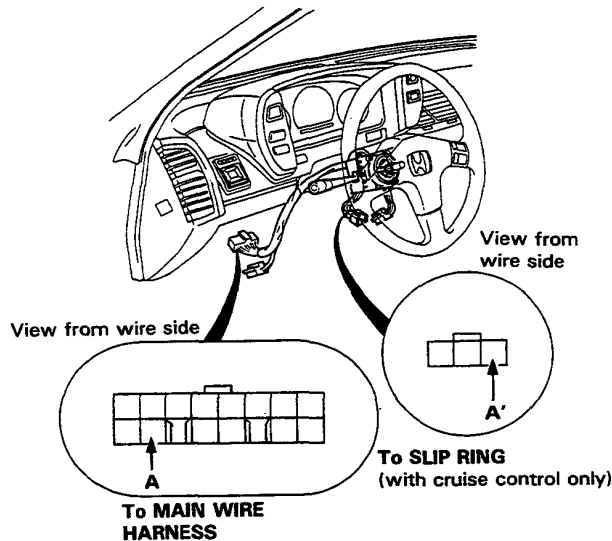






## Switch Test

1. Remove the dashboard lower panel and disconnect the 14-P connector from the main wire harness.



2. Check for continuity between the A terminal of the 14-P connector and body ground with the horn switch pressed.

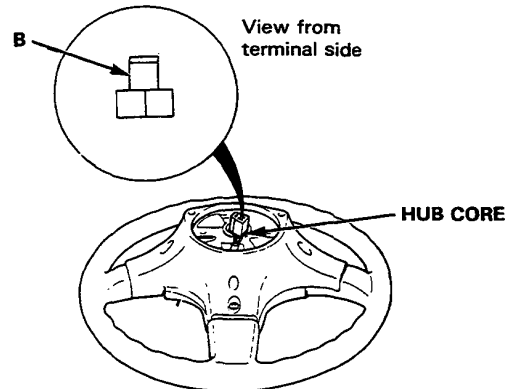
There should be continuity.

- If there is continuity, the horn switch is OK.
- If there is no continuity, remove the steering wheel, then turn it over and go to step 3.

3. With cruise control:

Check for continuity between the B terminal and the hub core on the steering wheel with the horn switch pressed.

There should be continuity.

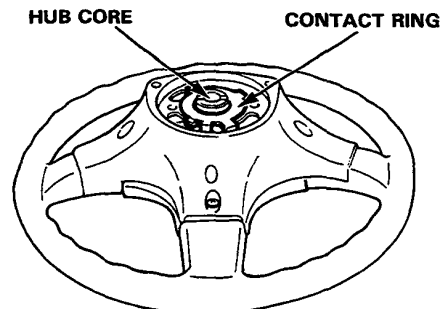


- If there is no continuity, repair the horn switch.
- If there is continuity, remove the steering column lower cover and disconnect the 3-P connector from the slip ring, then check for open in the lighting switch wire (between the A and A' terminals).  
If the wire is OK, check the slip ring (see page 23-214).

### Without cruise control:

Check for continuity between the contact ring and hub core on the steering wheel with the horn switch pressed.

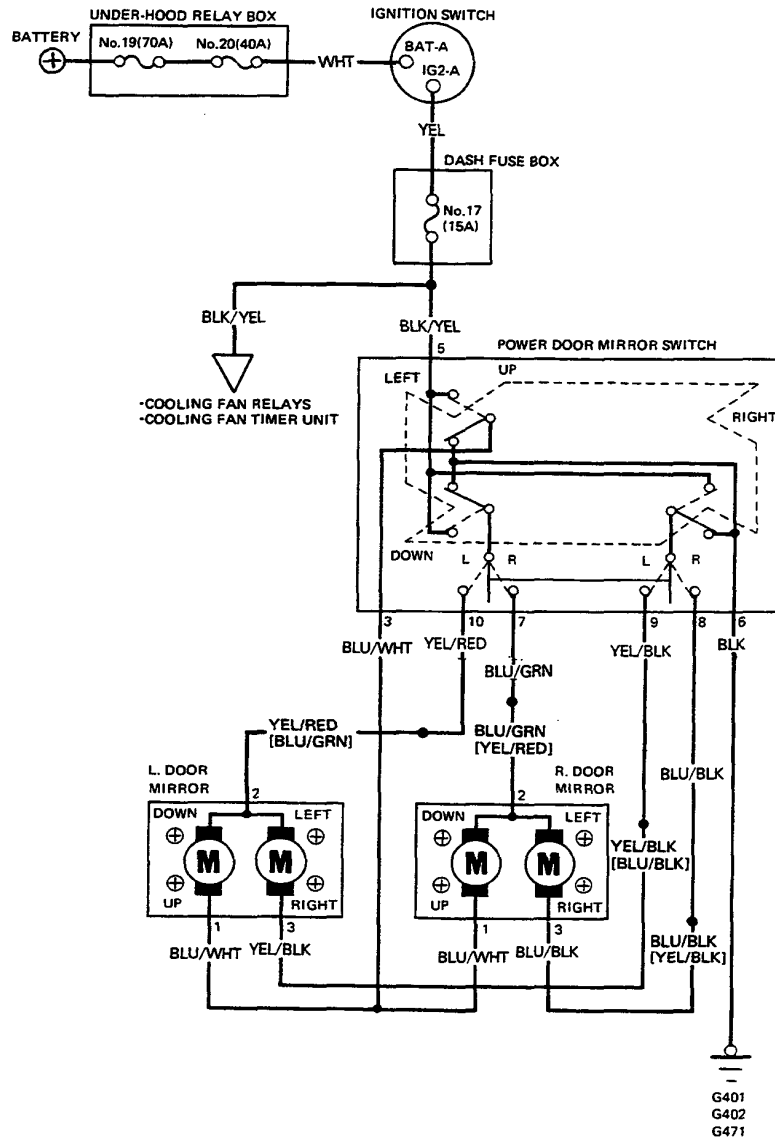
There should be continuity.



- If there is no continuity, repair the horn switch.
- If there is continuity, check for open in the lighting switch wire (between the A terminal and contact point on the lighting switch).  
If the wire is OK, check for contact between the contact point and contact ring.

# Power Door Mirrors

## Circuit Diagram

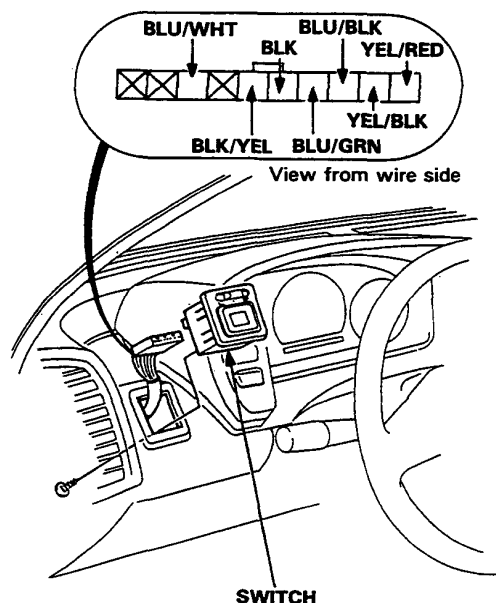


[ ]: R.H. Drive



## Function Test

**NOTE:** Before testing, remove the dashboard lower panel and push out the switch from behind the instrument panel, then disconnect the 10-P connector to remove the switch.



### MIRROR TEST

#### One or both inoperative:

1. Check for voltage between the BLK/YEL terminal and body ground with the ignition switch ON. There should be battery voltage.
  - If there is no voltage, check for
    - Blown No. 17 (15 A) fuse in the dash fuse box.
    - An open in the BLK/YEL wire.
  - If there is battery voltage, go to step 2.

2. Check for continuity between the BLK terminal and body ground.
  - If no continuity, check for open in the BLK wire.

#### Left inoperative:

Connect the BLK/YEL terminal of the 10-P connector to the YEL/RED terminal and the BLU/WHT (or YEL/BLK) terminal to body ground with jumper wires.

The left 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 left door trim panel and check for open in the BLU/WHT (or YEL/BLK [BLU/BLK]) wire between the left door mirror and the switch.
  - If the wire is OK, check the left door mirror.
- If the mirror neither tilts down nor swings left, repair the YEL/RED [BLU/GRN] wire.
- If the mirror operates properly, check the mirror switch.

#### Right inoperative:

Connect the BLK/YEL terminal of the 10-P connector to the BLU/GRN terminal and the BLU/WHT (or BLU/BLK) terminal to body ground with jumper wires.

The right mirror should tilt down (or swing left) when the ignition switch is turned ON.

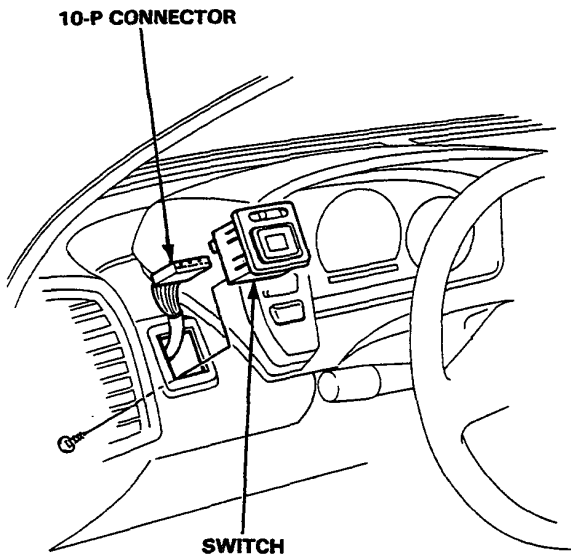
- If the mirror does not tilt down (or does not swing left), remove the right door trim panel and check for open in the BLU/WHT (or BLU/BLK [YEL/BLK]) wire between the right door mirror and the switch.
  - If the wire is OK, check the right door mirror.
- If the mirror neither tilts down nor swings left, repair the BLU/GRN [YEL/RED] wire.
- If the mirror operates properly, check the mirror switch.

[ ] : Door harness of R.H.Drive

# Power Door Mirrors

## Switch Removal

1. Remove the dashboard lower panel.
2. Remove the screw behind the instrument panel and pull out the switch, then disconnect the 10-P connector to remove the switch.

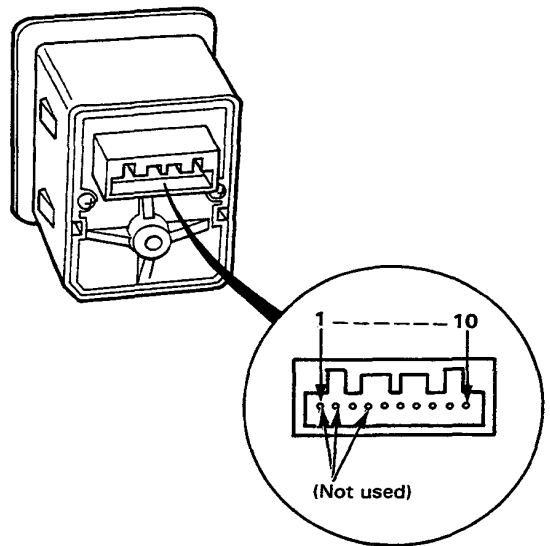


## Switch Test

1. Remove the power door mirror switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

### Mirror Switch

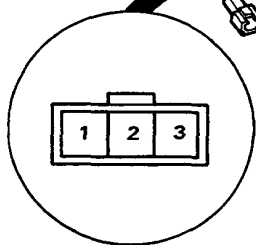
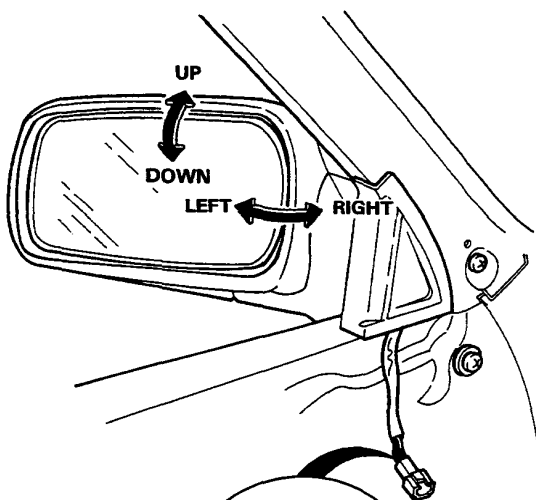
Terminal Position		3	5	6	7	8	9	10
R	OFF	○		○	○	○		
	UP	○	○					
	DOWN		○	○		○		
	LEFT	○	○		○			
	RIGHT		○			○		
L	OFF	○		○			○	○
	UP	○	○					
	DOWN		○	○			○	
	LEFT	○	○					○
	RIGHT		○				○	





## Door Mirror Test

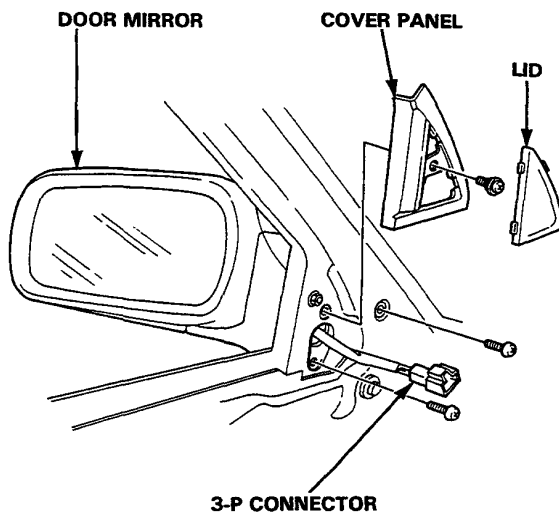
1. Remove the door trim panel, then disconnect the 3-P connector from the mirror.
2. Test actuator operation:  
TILT UP: Connect battery positive to the No. 1 terminal and negative to the No. 2 terminal.  
TILT DOWN: Connect battery positive to the No. 2 terminal and negative to the No. 1 terminal.  
SWING RIGHT: Connect battery positive to the No. 3 terminal and negative to the No. 2 terminal.  
SWING LEFT: Connect battery positive to the No. 2 terminal and negative to the No. 3 terminal.
3. If the mirror fails to operate properly, replace it.



View from wire side

## Door Mirror Replacement

1. Remove the door trim panel, then disconnect the 3-P connector from the mirror.
2. Carefully pry out the cover panel lid with a flat tip screwdriver, then remove the screw and the cover panel.
3. While holding the mirror with one hand, remove its mount screws with the other.

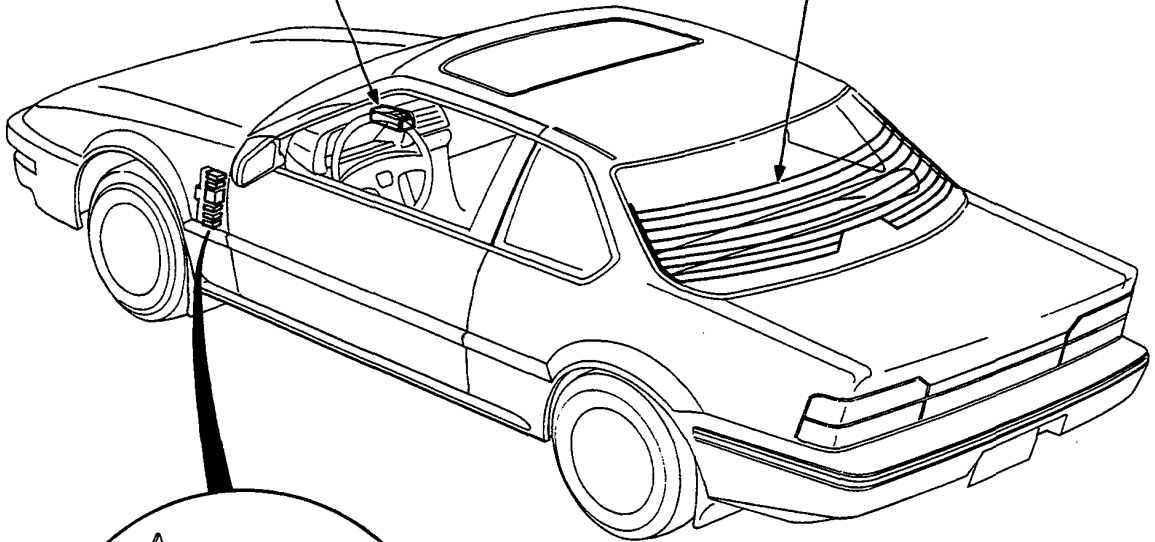


# Rear Window Defogger

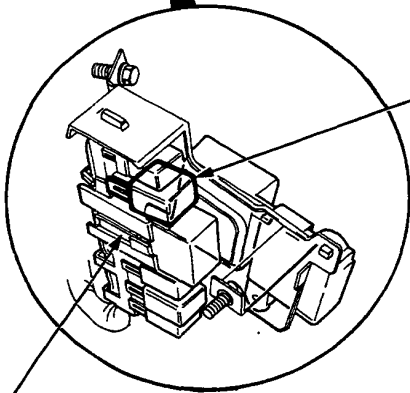
## Component Location Index

**DEFOGGER SWITCH**  
Removal, page 16-85  
Test, page 16-172

**REAR WINDOW DEFOGGER**  
Function Test, page 16-171  
Defogger Wire Repair, page 16-171



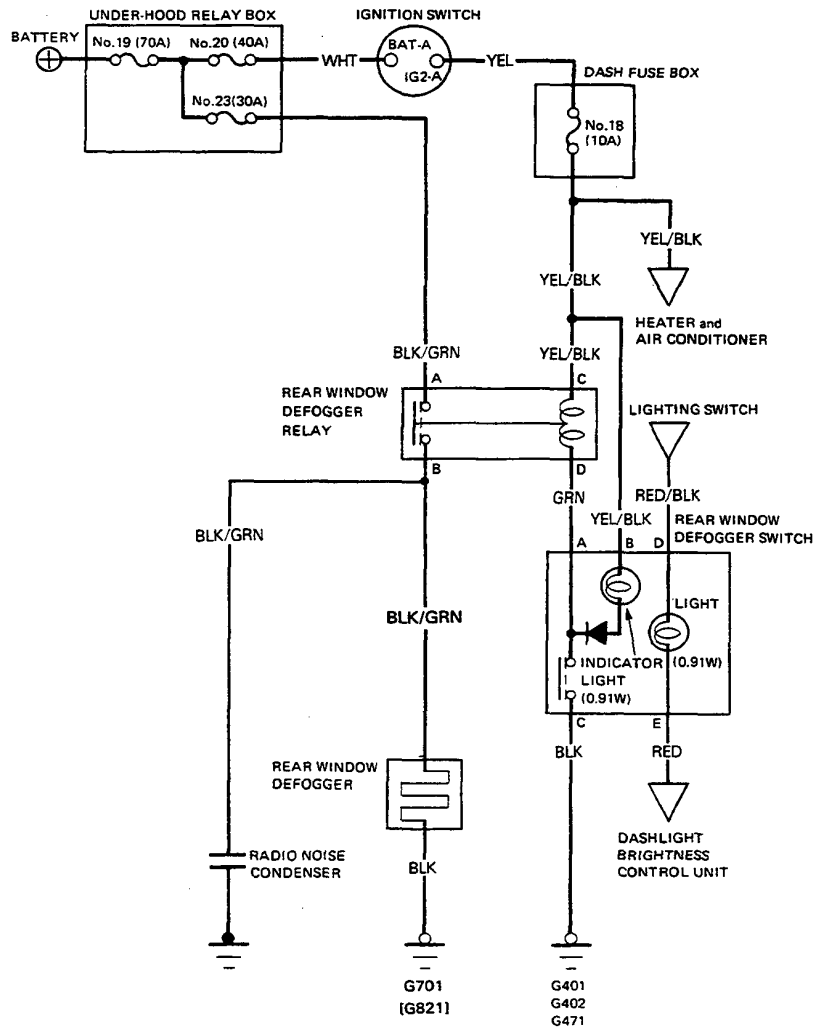
**DEFOGGER RELAY**  
Test, page 16-172



**DASH RELAY HOLDER**  
(Located under dash, left side)



# Circuit Diagram



[ ]: R.H. Drive

# Rear Window Defogger

## Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom	Item to be inspected							Poor ground	Open circuit in wires or loose or disconnected terminals
	Blown indicator light bulb	Blown No. 18 (10 A) fuse (in the dash fuse box)	Blown No. 23 (30 A) fuse (in the under-hood relay box)	Defogger switch	Function test	Defogger relay	Repair defogger wire		
Defogger operates, but indicator light does not go on.	1								
Defogger does not operate and indicator light does not go on.		1		2	3			G401, G402 G471, G701 [G821]	YEL/BLK or GRN
Defogger does not operate, but indicator light goes on.			1		2	3		G701 [G821]	BLK/GRN or GRN
Broken defogger wire							1		

[ ]: R.H.Drive



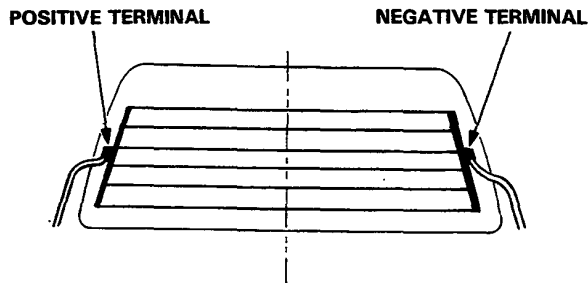
# Rear Window Defogger



## 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 or GRN wire.
  - If there is battery voltage, go to step 2.

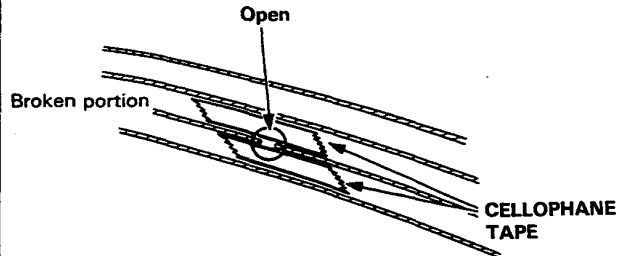


2. Check for continuity between the negative terminal and body ground.  
If no continuity, check for open in the defogger ground wire.
3. Lightly touch the voltmeter positive probe to the center of each defogger wire, and negative probe to the negative terminal.  
There should be approximately with the ignition switch and 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 of the center.
  - If there is no voltage the defogger wire is broken in the positive side of the center.

## Defogger Wire Repair

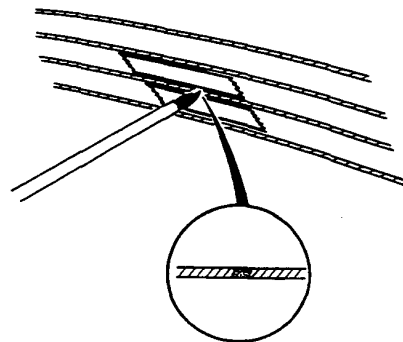
**NOTE:** Repair section must be no longer than one inch.

1. Lightly rub area around the break with fine steel wool, then clean with alcohol.
2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply heavy coat of silver conductive paint extending about 1/8 in. on both sides of the break. Allow 30 minutes to dry.

**NOTE:** Thoroughly mix paint before use.



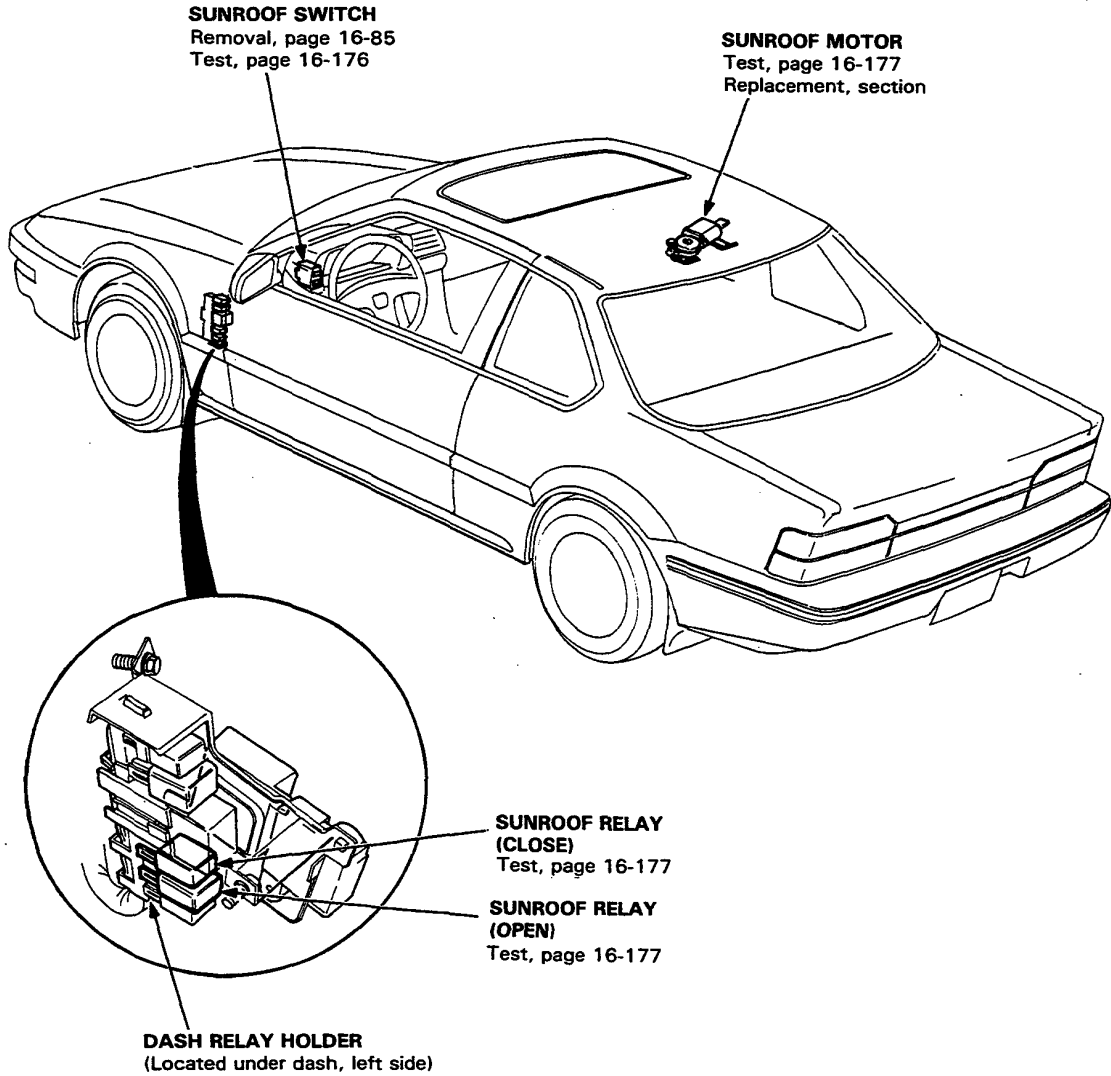
4. Check for proper operation with a voltmeter (approximately at the mid-point).
5. Apply a second coat of paint in the same manner. Dry 3 hours before removing tape.



# Sunroof



## Component Location Index







# Electrical Troubleshooting

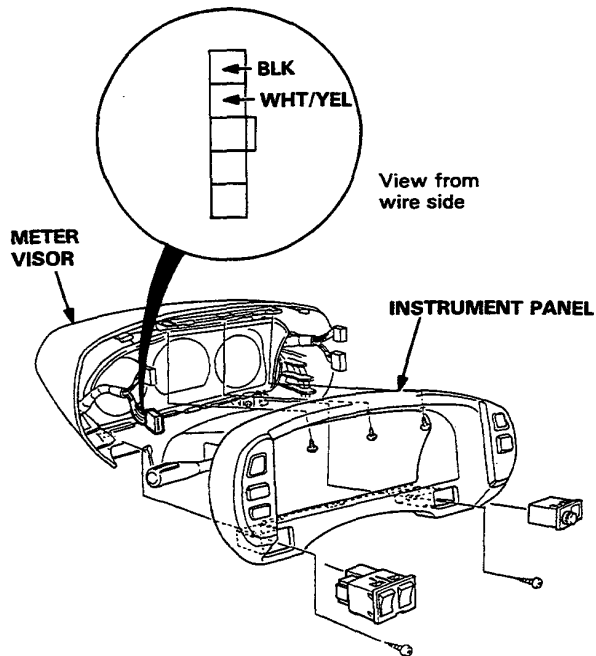
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom	Item to be inspected	Clutch out of adjustment, foreign matter stuck between guide rail and sunroof, or outer cable not attached properly	Blown No. 11 (20 A) or No. 14 (30 A) fuse (in the dash fuse box)	Function Test	Open relay	Close relay	Sunroof motor	Sunroof switch	Poor ground	Open circuit in wires or loose or disconnected terminals.
		1	2	3	1	2	5	4		
Sunroof does not move, but motor turns.		1								
Sunroof does not move and motor does not turn (sunroof can be moved with sunroof wrench).	With all switches		2	3				G401, 402, 471		WHT/BLK, GRN/BLK, GRN/YEL or GRN/RED
	With OPEN switch.				1	2		3		WHT/YEL
	With CLOSE switch.				2	1		3		WHT/RED

# Sunroof

## Function Test

1. Remove the instrument panel from the meter visor by removing the 5 screws.



2. Connect the WHT/YEL terminal to the BLK terminal with a jumper wire. The sunroof should open when the ignition switch is turned ON.

- If the sunroof opens, check the switch.
- If not, connect the WHT/YEL terminal to body ground.
  - If the sunroof opens, check for open in the BLK wire, and check whether the ground terminals (G401, 402, 471) are poor.
  - If not, remove the headlining and check the motor.

## Switch Test

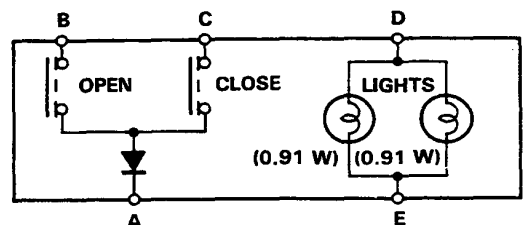
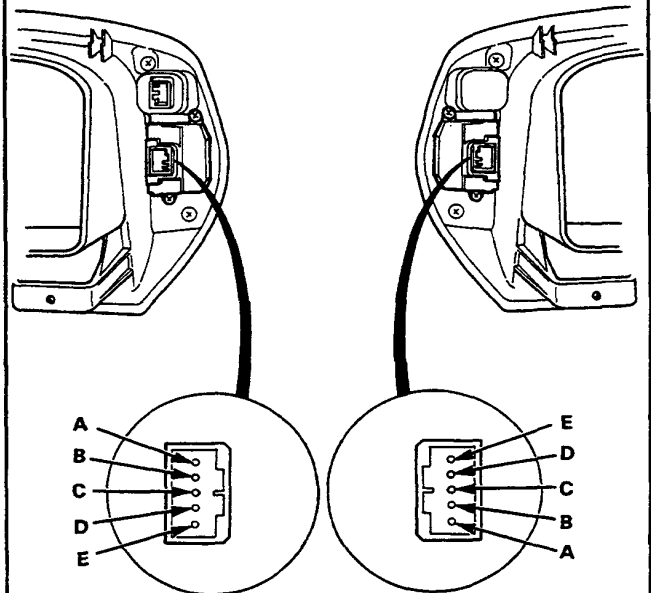
NOTE: For the switch removal, see page 16-85.

1. Remove the instrument panel from the meter visor.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	A	B	C	D	E
OFF					
OPEN					
CLOSE					

L.H. Drive

R.H. Drive

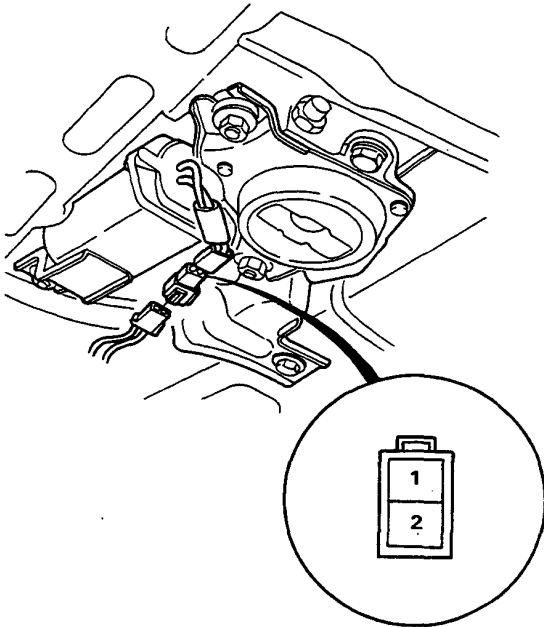




## Motor Test

1. Remove the headliner.
2. Disconnect the 2-P connector from the sunroof motor.
3. Test motor operation by connecting battery to the No.1 and No.2 terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.

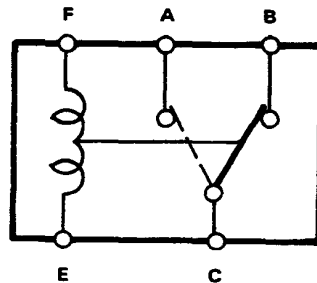
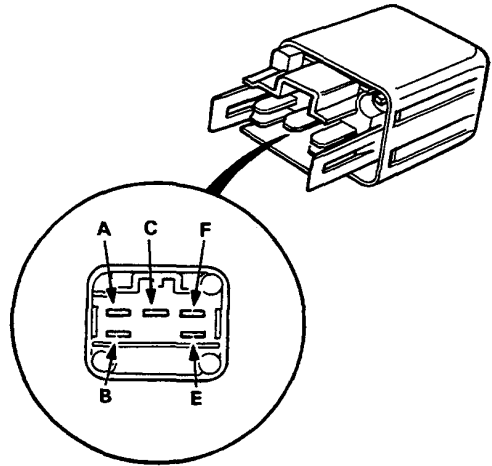
NOTE: See Closing Force Check in section 14 for motor clutch test.



View from wire side

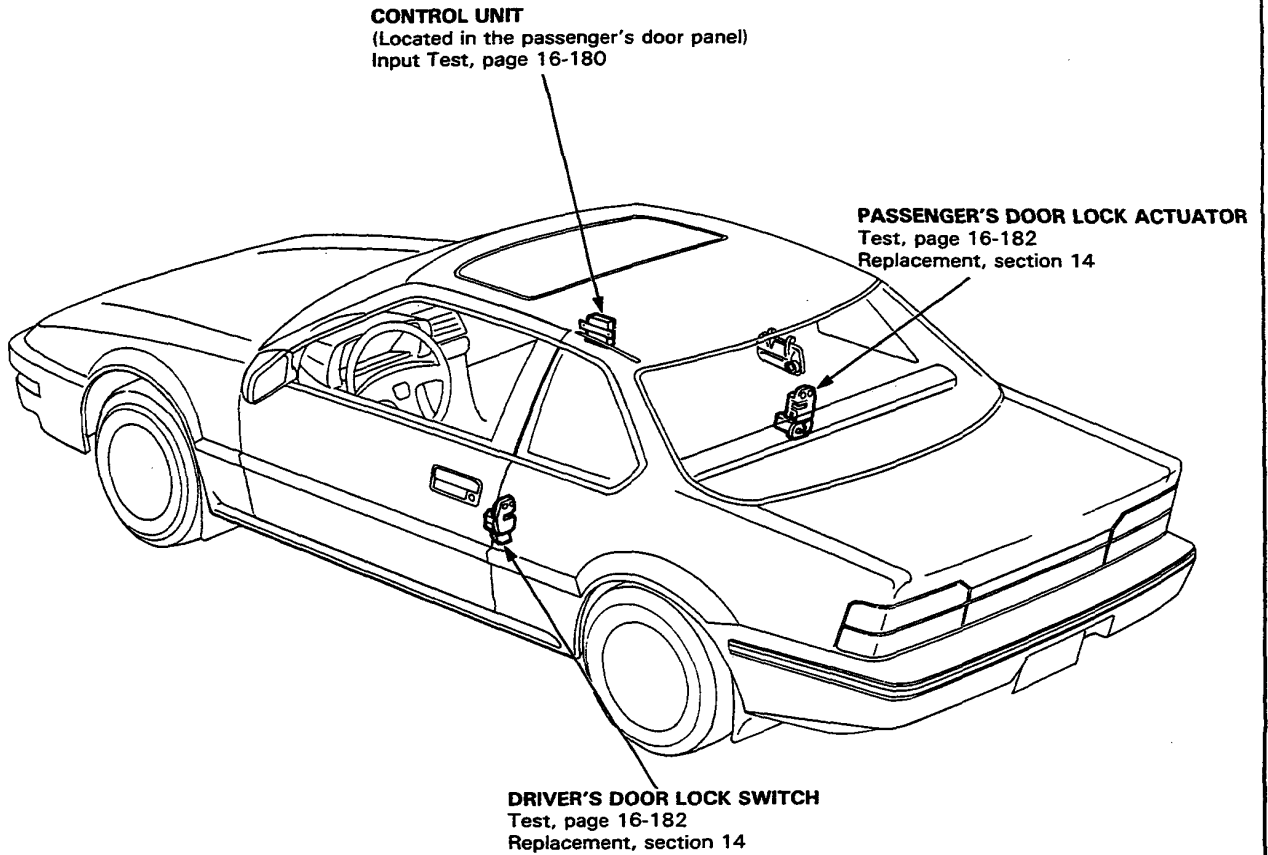
## Relay Test

1. Remove the sunroof relays in the dash relay holder.
2. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals. There should be continuity between the B and C terminals when the battery is disconnected.



# Power Door Locks

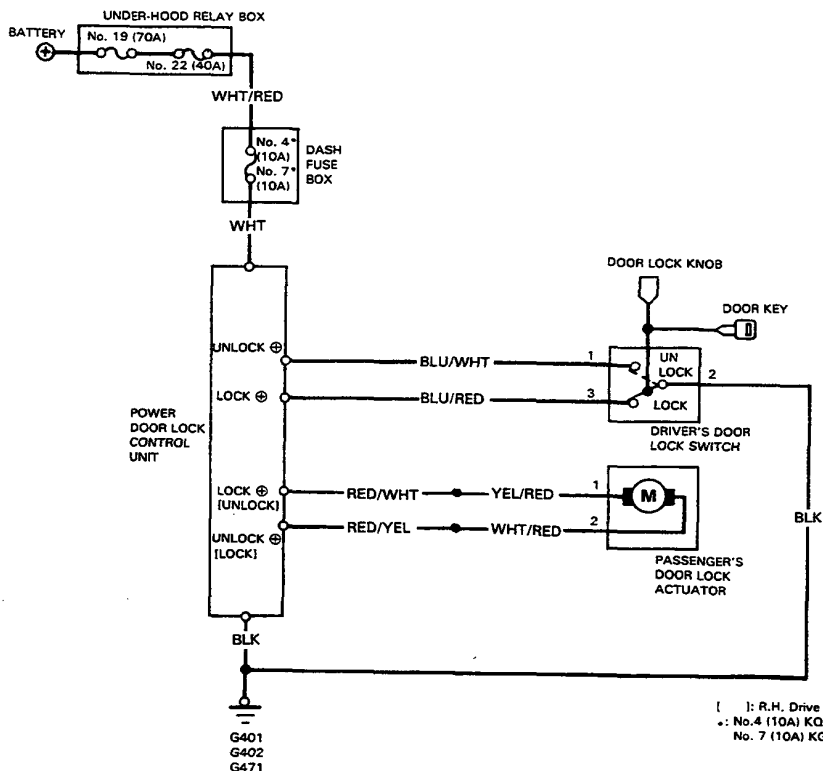
## Component Location Index







## Circuit Diagram



## Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected								
Symptom	Blown No. 22 (40 A) fuse (in the under-hood relay box)	Blown No. 4* (10 A), No. 7* (10 A) fuse (in the dash fuse box)	Disconnected or obstructed door lock rod/linkage	Passenger's door lock actuator	Driver's 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			3	G401, 402, 471	
Passenger's door doesn't lock or unlock with the driver's door lock knob or door key.			1	3	2	4		BLU/WHT, BLU/YEL RED/WHT, RED/YEL YEL/RED, WHT/RED

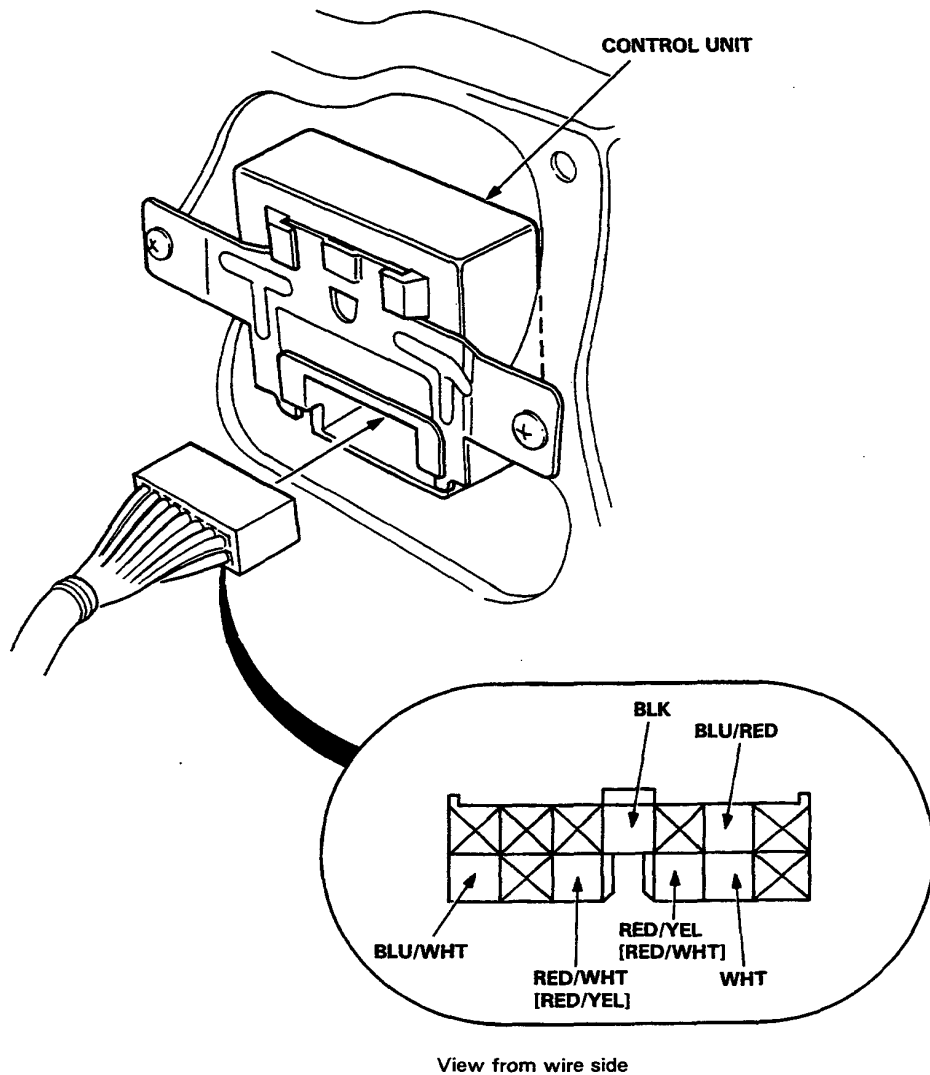
# Power Door Locks

## Control Unit Input Test

Remove the passenger's door trim panel, then disconnect the 13-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 the control unit, then replace the control unit if all input tests prove OK.

[ ]: R.H.Drive





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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 22 (40 A) or No. 4* (10 A) No. 7* (10 A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	BLU/RED	Door lock switch in LOCK.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty door lock switch.</li> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
	BLU/WHT	Door lock switch in UNLOCK.		
4	RED/WHT [RED/YEL] RED/YEL [RED/WHT]	Connect the RED/WHT [RED/YEL] terminal to the WHT terminal, and the RED/YEL [RED/WHT] terminal to the BLK terminal momentarily.	Check door lock operation: Passenger's door should lock as the battery is connected momentarily.	<ul style="list-style-type: none"> <li>• Faulty actuator.</li> <li>• An open in the wire.</li> </ul>
		Connect the RED/YEL [RED/WHT] terminal to the WHT terminal, and the RED/WHT [RED/YEL] terminal to the BLK terminal momentarily.	Check door lock operation: Passenger's door should unlock as the battery is connected momentarily.	

[ ]: R.H.Drive

\*: No. 4 (10 A) KQ, KS, KT, KW, KY models

: No. 7 (10 A) KG, KE, KX, KB, KQ models

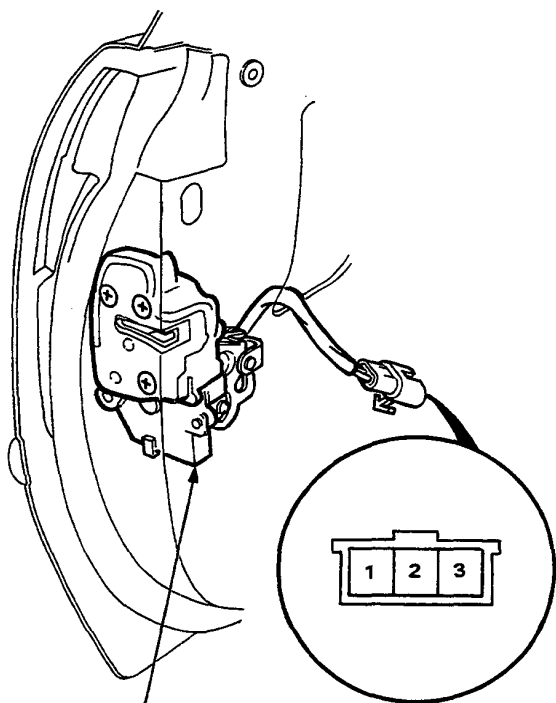
# Power Door Locks

## Door Lock Switch Test

1. Remove the driver's door trim panel.
2. Disconnect the 3-P connector from the switch.
3. Check for continuity between the terminals in each switch position according to the tables.

### Door Lock Switch

Terminal Position	1	2	3
UNLOCK		○ — ○	○
OFF			
LOCK	○ — ○		



DOOR LOCK SWITCH

View from terminal side

## Passenger's Door Actuator Test

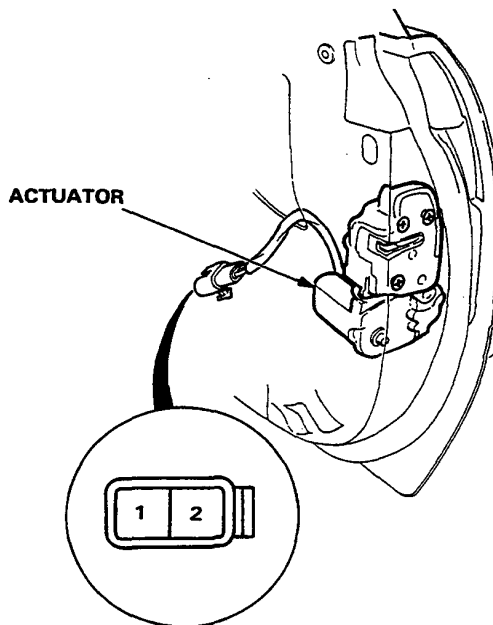
1. Remove the door trim panel.
2. Disconnect the 4-P connector from the actuator.
3. Test actuator operation:

**LOCK:** With battery positive connected to the No. 1 [2] terminal, connect negative to the No. 2 [1] terminal momentarily.

**UNLOCK:** With battery positive connected to the No. 2 [1] terminal, connect negative to the No. 1 [2] terminal momentarily.

**CAUTION:** To prevent damage to the motor, apply battery voltage momentarily.

[ ]: R.H.Drive



ACTUATOR

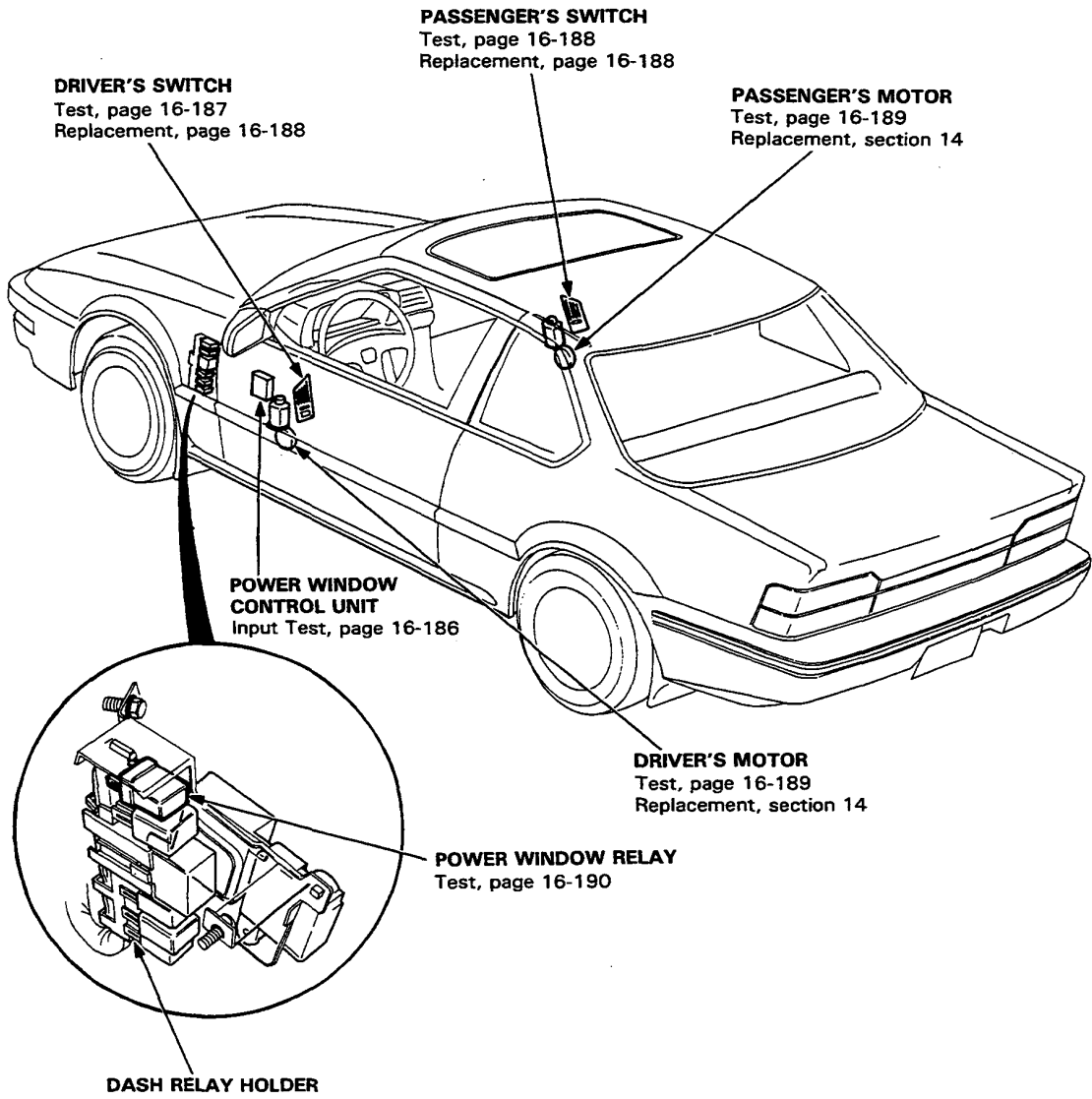
View from terminal side

4. If the actuator fails to operate properly, replace it.



# Power Windows

## Component Location Index

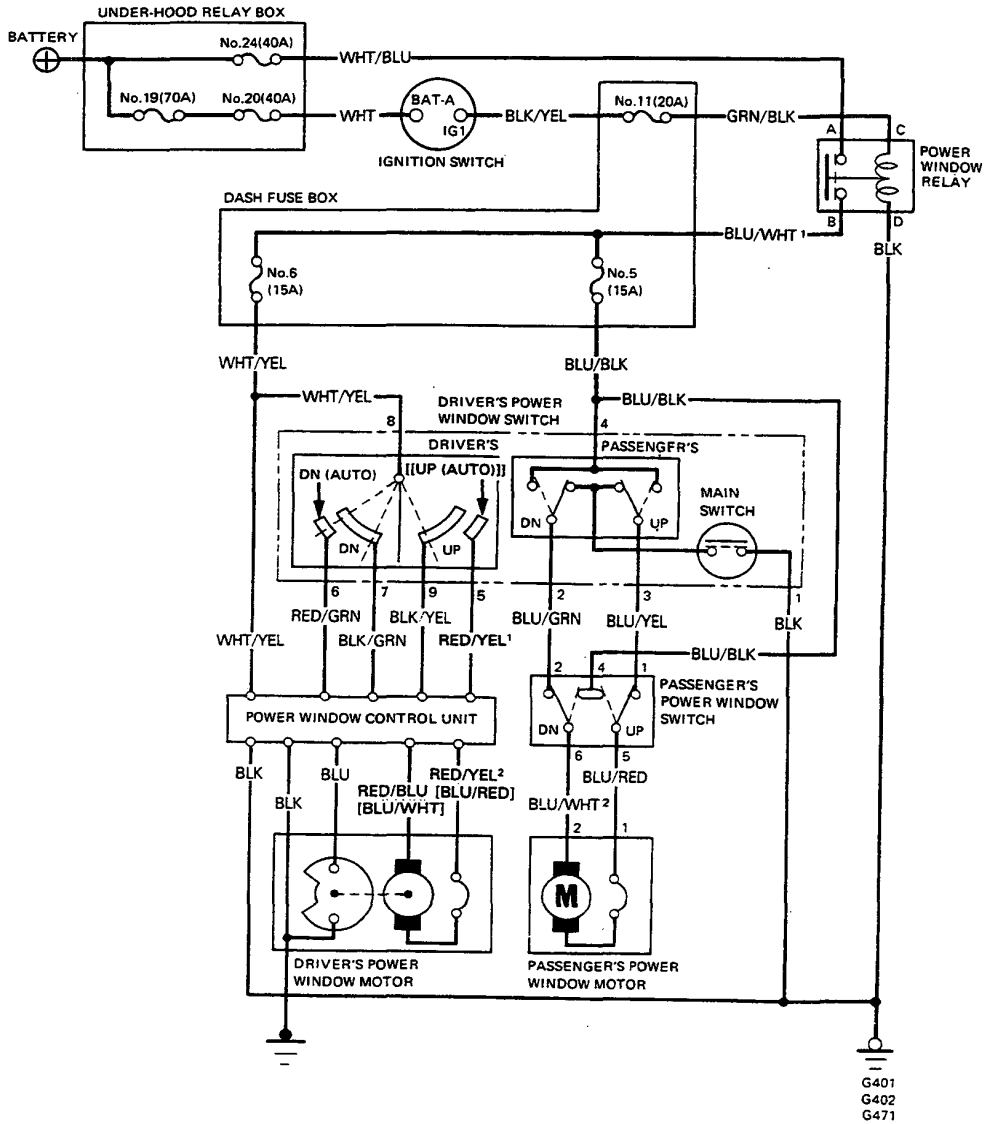


# Power Windows

## Circuit Diagram

**NOTE:**

- Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU/WHT<sup>1</sup> and BLU/WHT<sup>2</sup> are not the same).
- "DN" in the switch circuit denotes DOWN.



[ ]: R.H. Drive  
[ ]: Except KG, KB and KW models



# Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom	Item to be inspected	State of charge and clean and tight connections of battery	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	Poor ground	Open circuit in wires or loose or disconnected terminals
			No. 5 15 (A)	No. 6 15 (A)	No. 11 20 (A)									
All windows do not operate.		1	3		2								G401, 402, 471	GRN/BLK, WHT/BLU, BLU/WHT <sup>1</sup> or BLK
Driver's window does not operate in any position.				1	4	2		3			5			WHT/YEL
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			BLU/BLK

# Power Windows

## Control Unit Input Test

NOTE: The control unit only controls the driver's door window.

Remove the left door trim panel and disconnect the 4-P and 6-P connectors from the control unit.

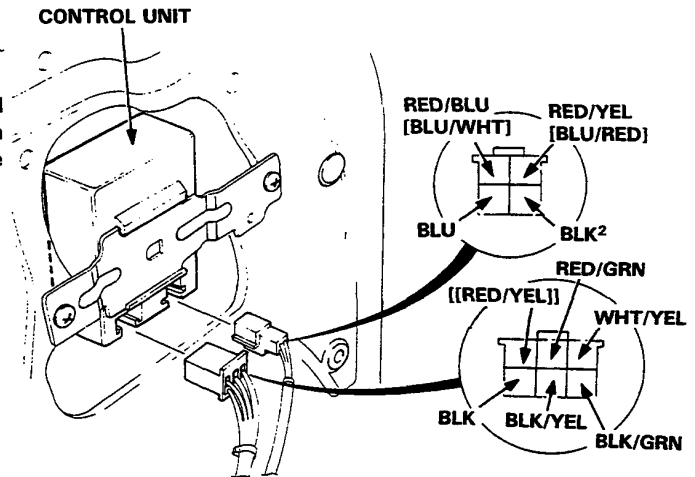
Make the following input tests at the harness pins.

**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.

[ ]: R.H.Drive

[[ ]]: Except KG, KB and KW models



View from wire side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK <sup>1</sup>	Under all conditions.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 6 (15 A) fuse.</li> <li>• Faulty power window relay.</li> <li>• An open in the wire.</li> </ul>
3	BLK/YEL	Ignition switch ON and Driver's switch DOWN.	Check for voltage to ground: should be battery voltage as the switch is turned.	<ul style="list-style-type: none"> <li>• Faulty driver's switch.</li> <li>• An open in the wire.</li> </ul>
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 BLK <sup>2</sup>	Ignition switch ON and connect the WHT/YEL terminal to the RED/YEL [BLU/RED] terminal, and the BLK <sup>1</sup> terminal to the RED/BLU [BLU/WHT] terminal.	Check for resistance between the BLU and BLK <sup>2</sup> terminals: should indicate between 20–50 ohms as the motor runs.	<ul style="list-style-type: none"> <li>• Faulty pulser.</li> <li>• Faulty driver's motor.</li> <li>• An open in the wire.</li> </ul>

Except KG, KB and KW models

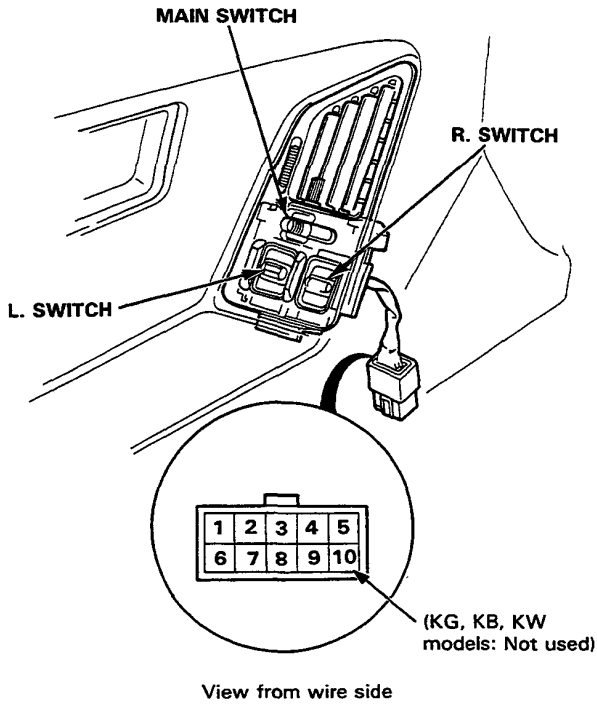
7	RED/YEL <sup>1</sup>	Ignition switch ON and driver's switch UP (AUTO).	Check for voltage to ground: should be battery voltage as the switch is turned.	<ul style="list-style-type: none"> <li>• Faulty driver's switch.</li> <li>• An open in the wire.</li> </ul>
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## Driver's Switch Test

1. Remove the door trim panel.
2. Check for continuity between the terminals in each switch position according to the tables.



### Driver's Switch

Terminal	6	7	8	9	10
Position					
[[UP (AUTO)]]			○	○	○
UP			○	○	
OFF					
DOWN		○	○		
DOWN (AUTO)	○	○	○		

### Passenger's Switch

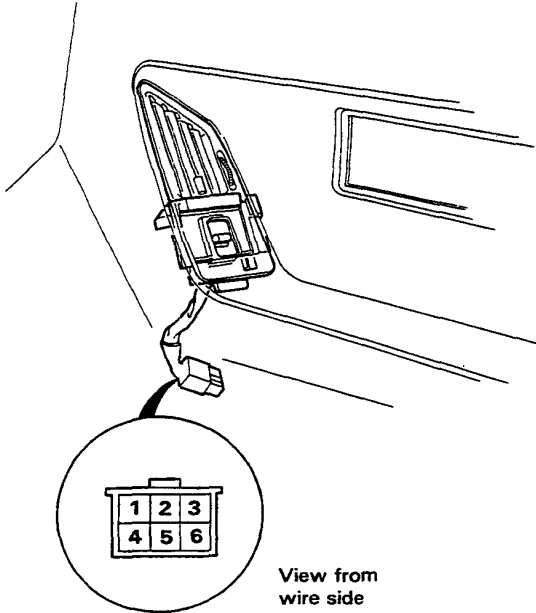
Terminal		1	2	3	4
Position	Main Switch				
	UP	○	○	○	○
UP	OFF			○	○
	OFF	○	○	○	
DOWN	ON	○	○	○	○
	OFF		○	○	○

[[ ]]: Except KG, KB and KW models

# Power Windows

## Passenger's Switch Test

1. Remove the door trim panel.
2. Check for continuity between the terminals in each switch position according to the table.

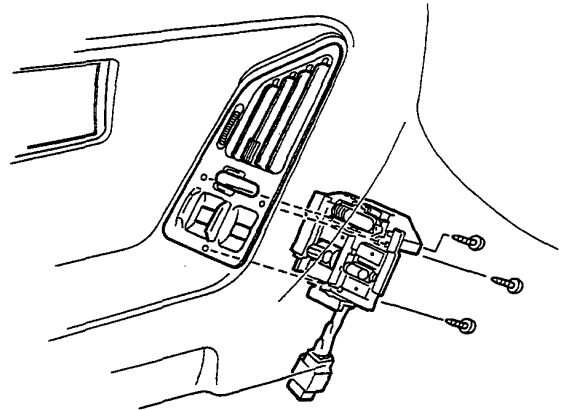


Terminal Position	1	2	4	5	6
UP		○	○	○	○
OFF	○	○		○	○
DOWN	○		○	○	○

## Switch Replacement

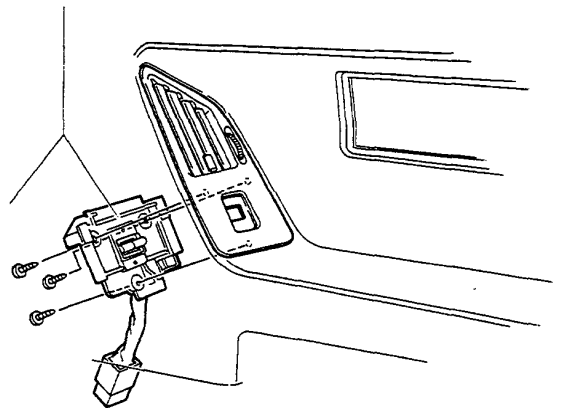
### Driver's Switch:

1. Remove the door trim panel.
2. Remove the switch from the door trim panel by releasing the 3 mounting screws.



### Passenger's Switch:

1. Remove the door trim panel.
2. Remove the switch from the door trim panel by releasing the 3 mounting screws.



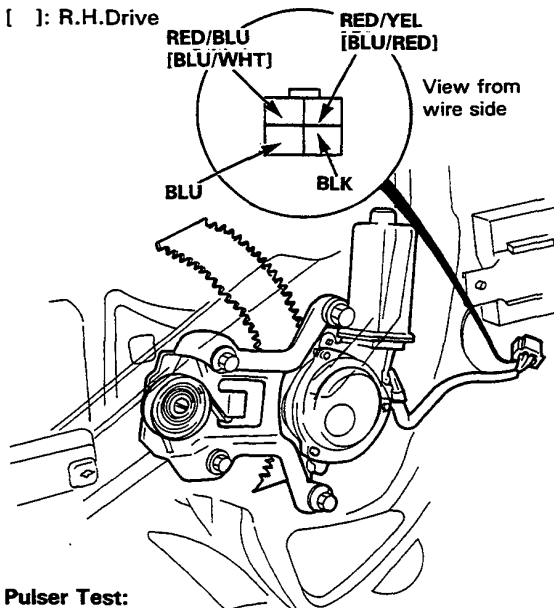


## Driver's Motor Test

### Motor Test:

1. Remove the door trim panel.
2. Disconnect the 4-P connector from the power window control unit.
3. Test motor operation by connecting battery voltage to the RED/YEL [BLU/RED] and RED/BLU [BLU/WHT] terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.

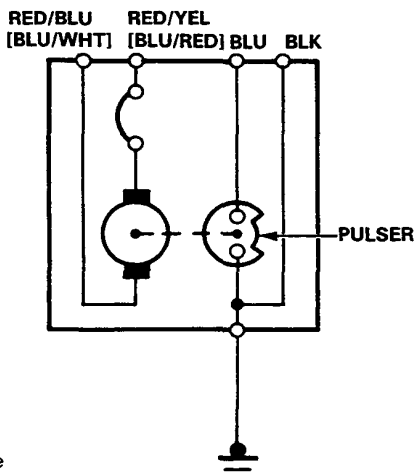
[ ]: R.H. Drive



### Pulser Test:

Measure resistance between the BLU and BLK terminals when running the motor by connecting battery voltage to the RED/YEL [BLU/RED] and RED/BLU [BLU/WHT] terminals.

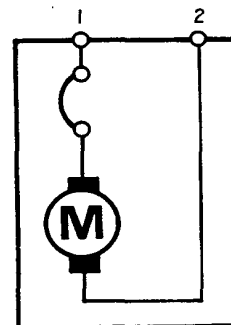
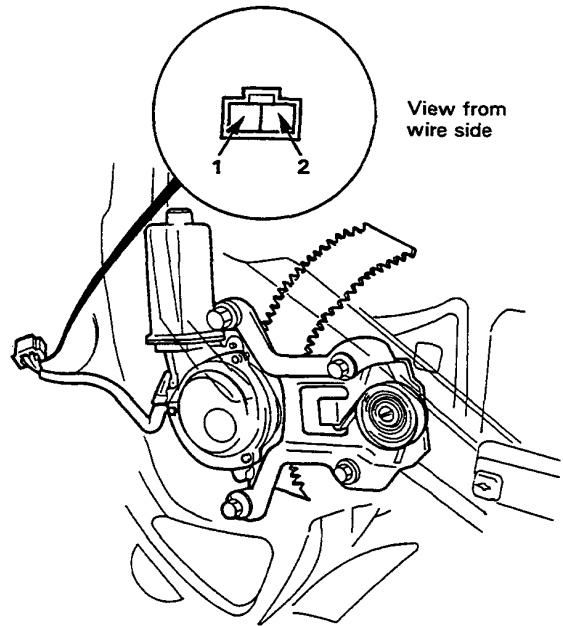
Ohmmeter should indicate between 20–50 ohms as the motor runs.



[ ]: R.H. Drive

## Passenger's Motor Test

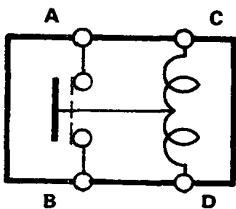
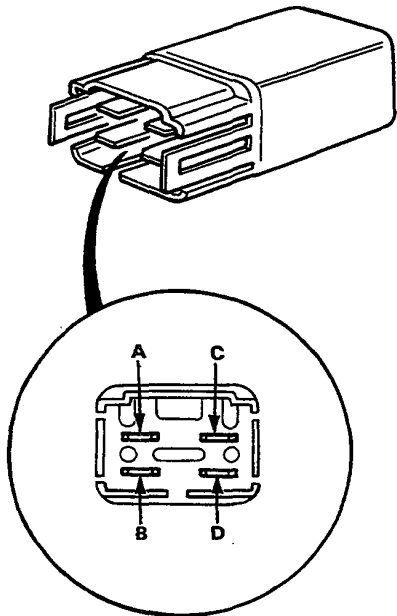
1. Remove the door trim panel.
2. Disconnect the 2-P connector from the motor.
3. Test motor operation by connecting battery voltage to the No. 1 and No. 2 terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.



# Power Windows

## Relay Test

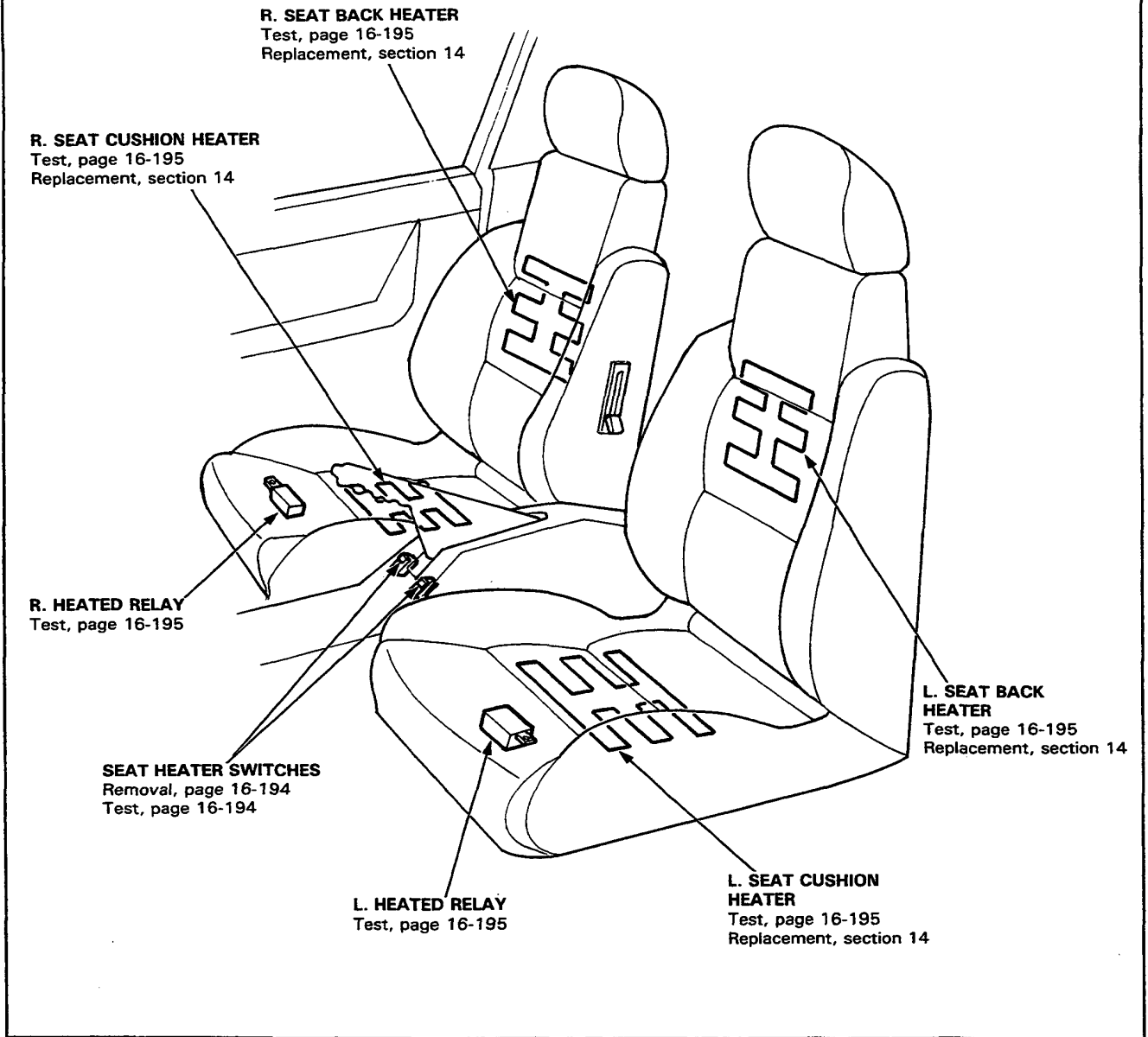
1. Remove the power window relay from the dash relay holder.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.  
There should be no continuity when the battery is disconnected.





# Seat Heaters (KX, KS, KW models)

## Component Location Index

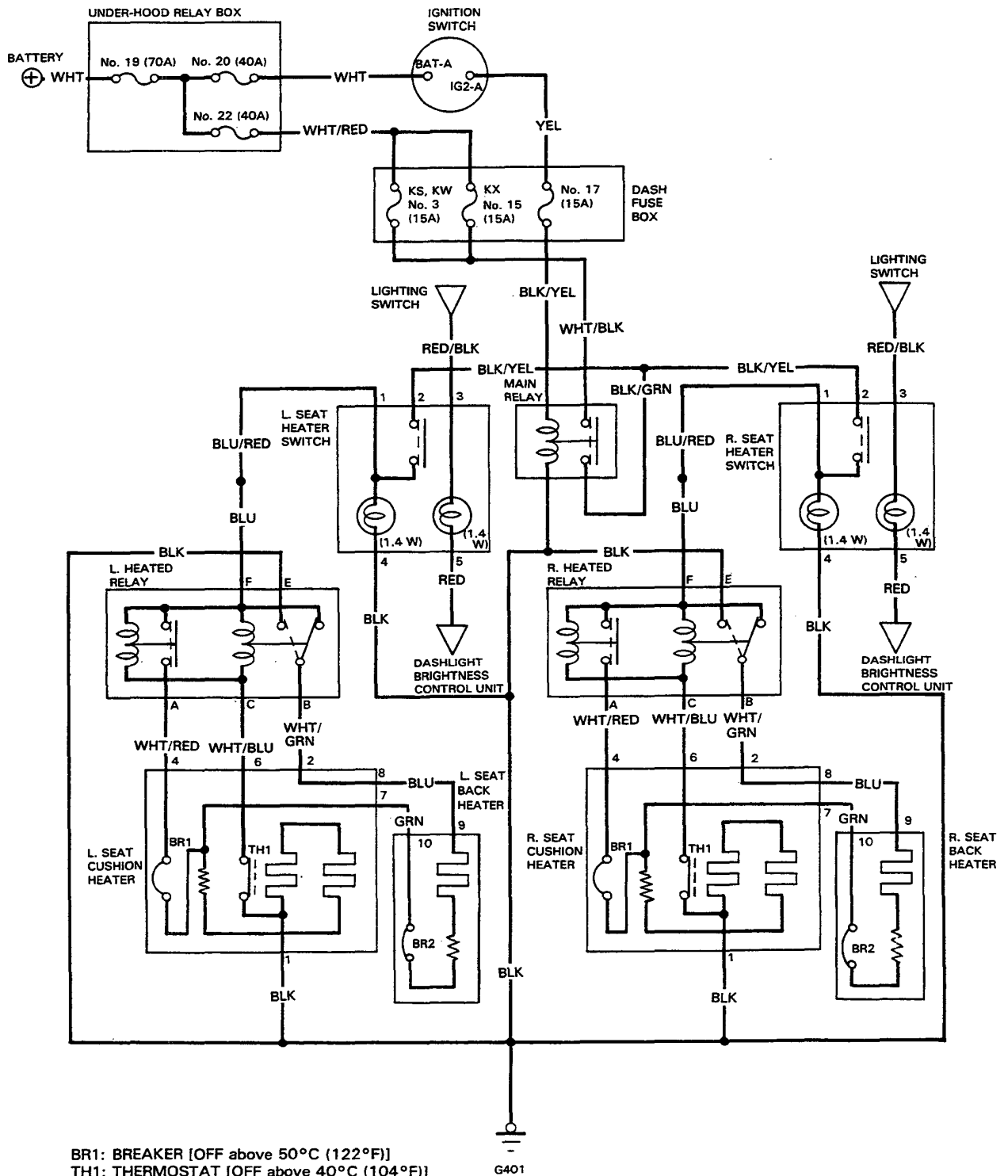


## Description

Two heaters are provided in each front seat; one in the seat cushion and one in the seat back. In normal use, temperature is automatically controlled by the thermostat [OFF above 40°C (104°F)] built in each seat cushion heater. In emergency case, the breaker 1 [OFF above 50°C (122°F)] and the breaker 2 [OFF above 70°C (158°F)] cut off the circuit to prevent abnormal temperature rise.

# Seat Heaters (KX, KS, KW models)

## Circuit Diagram





## Troubleshooting

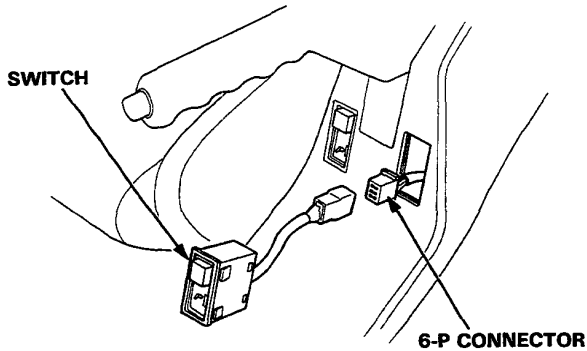
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom		Item to be inspected						Open circuit in wires or loose or disconnected terminals
		Blown No. 17 (15 A), No. 15 (15 A), or No. 3 (15 A) fuses (in the dash fuse box)	Blown indicator light bulb	Seat heater switch	Seat heater	Heated relay input	Poor ground	
Seat heaters operate, but indicator light does not go on.			1				G401	
Seat heaters do not operate and indicator light does not go on.		1		2			G401	BLK/YEL, WHT/BLK
Seat heaters do not operate, but indicator light goes on.	Left and Right seat					1	G401	BLK/YEL, WHT/BLK, BLU, GRN WHT/BLU, WHT/RED
Seat cushion heater or seat back heater does not operate, but indicator light goes on.					1			

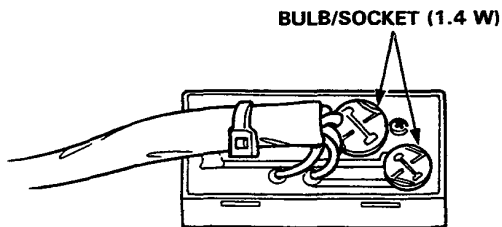
# Seat Heaters (KX, KS, KW models)

## Switch Removal

1. Remove the center console.
2. Disconnect the 6-P connector to remove the switch, then push the switch behind the console.

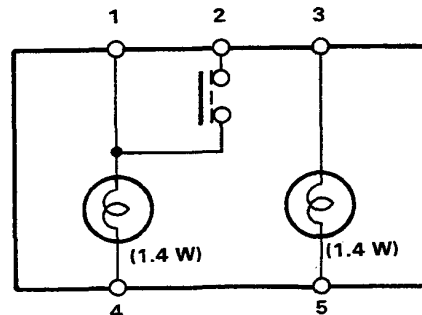
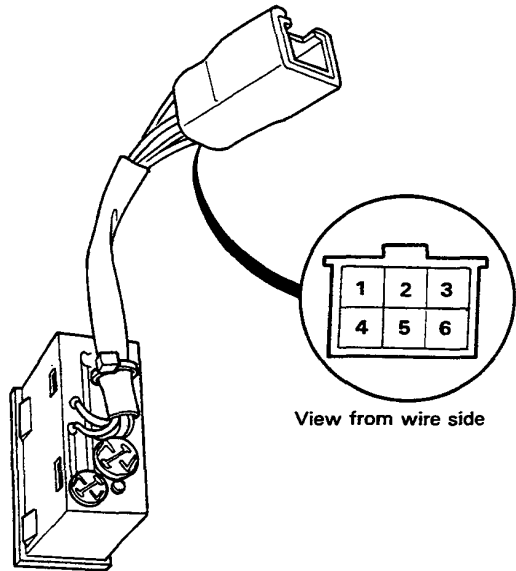


3. Turn the socket 45° counterclockwise to remove it.



## Switch Test

1. Remove the seat heater switch from the center console.
2. There should be continuity between the No. 1 and No. 2 terminals when the switch is clicked into ON. There should be no continuity when the switch is clicked into OFF.



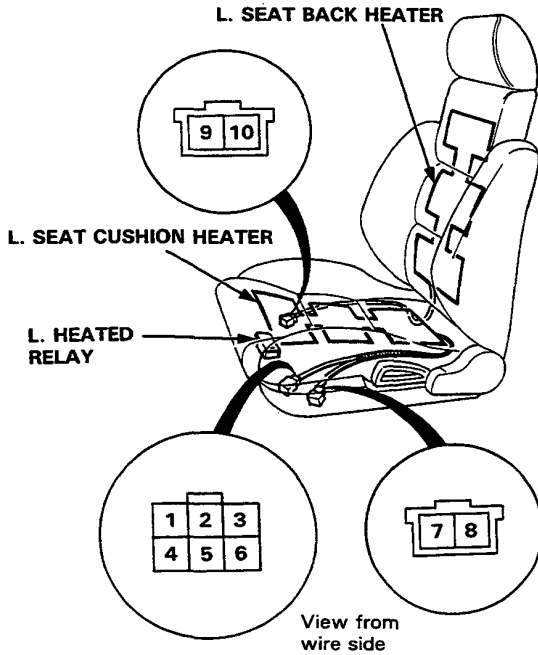




## Heater Test

1. Disconnect the 6-P connector from the heated relay, and the 2-P connector from the seat back heater.

NOTE: Left front seat shown, right front seat similar.

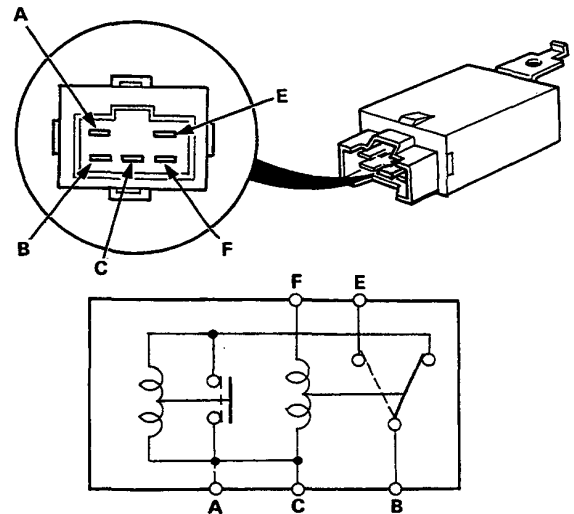


2. Check for continuity between the No. 1 and No. 4 terminals; between the No. 6 and No. 7 terminals; between the No. 9 and No. 10 terminals. (R x 10<sup>3</sup> scale)  
There should be continuity.

## Heated Relay and Main Relay Test

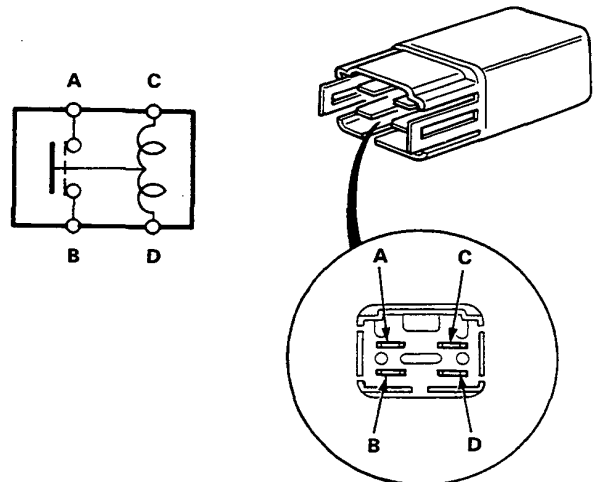
### Heated relay:

1. Remove the driver's seat, then remove the relay from the bottom of the seat.
2. There should be continuity between the A and C; between E and B terminals when the battery is connected to the E and F terminals. There should be continuity between the C and E terminals when the battery is disconnected.



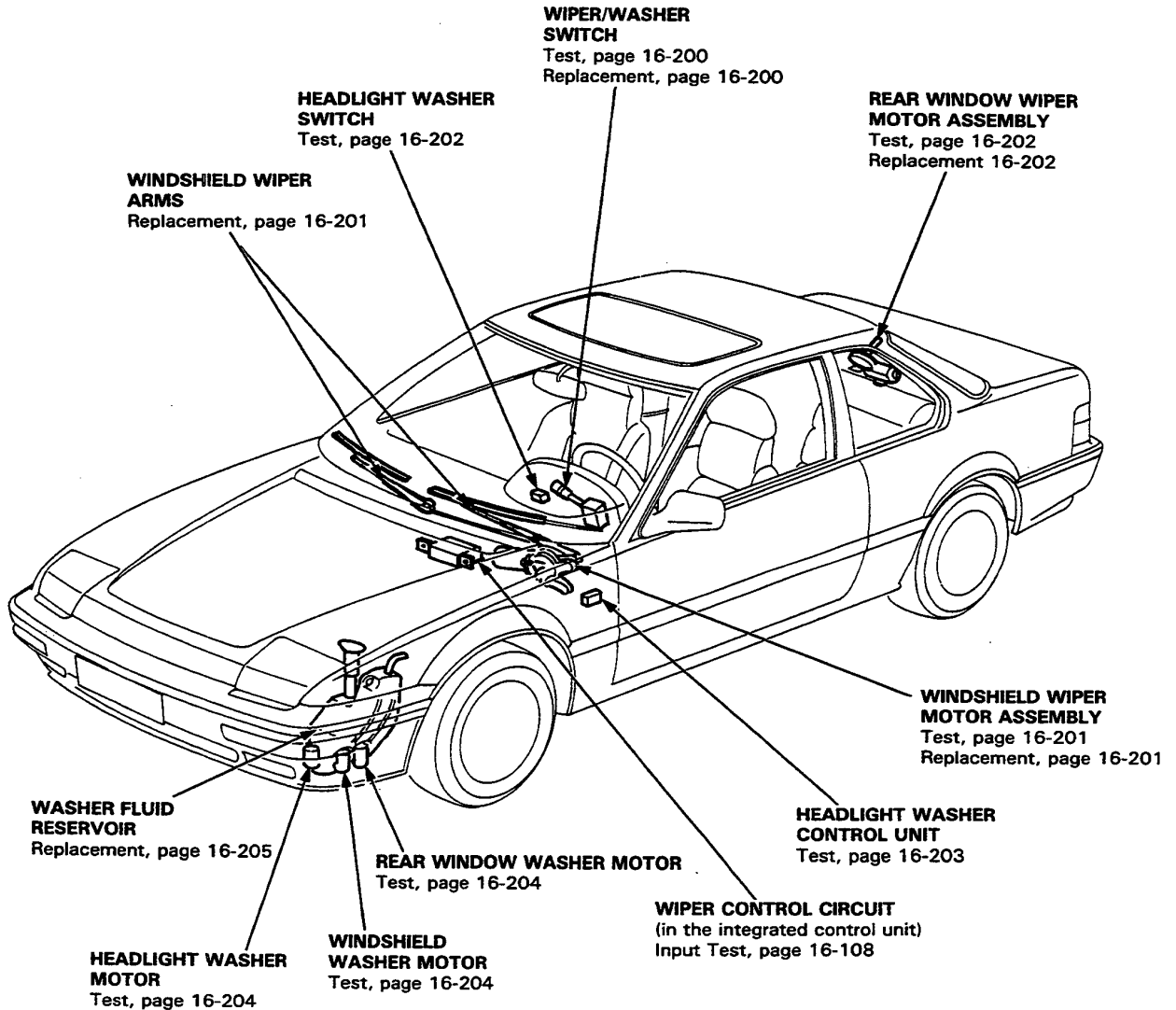
### Main relay:

- 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.



# Wipers/Washer

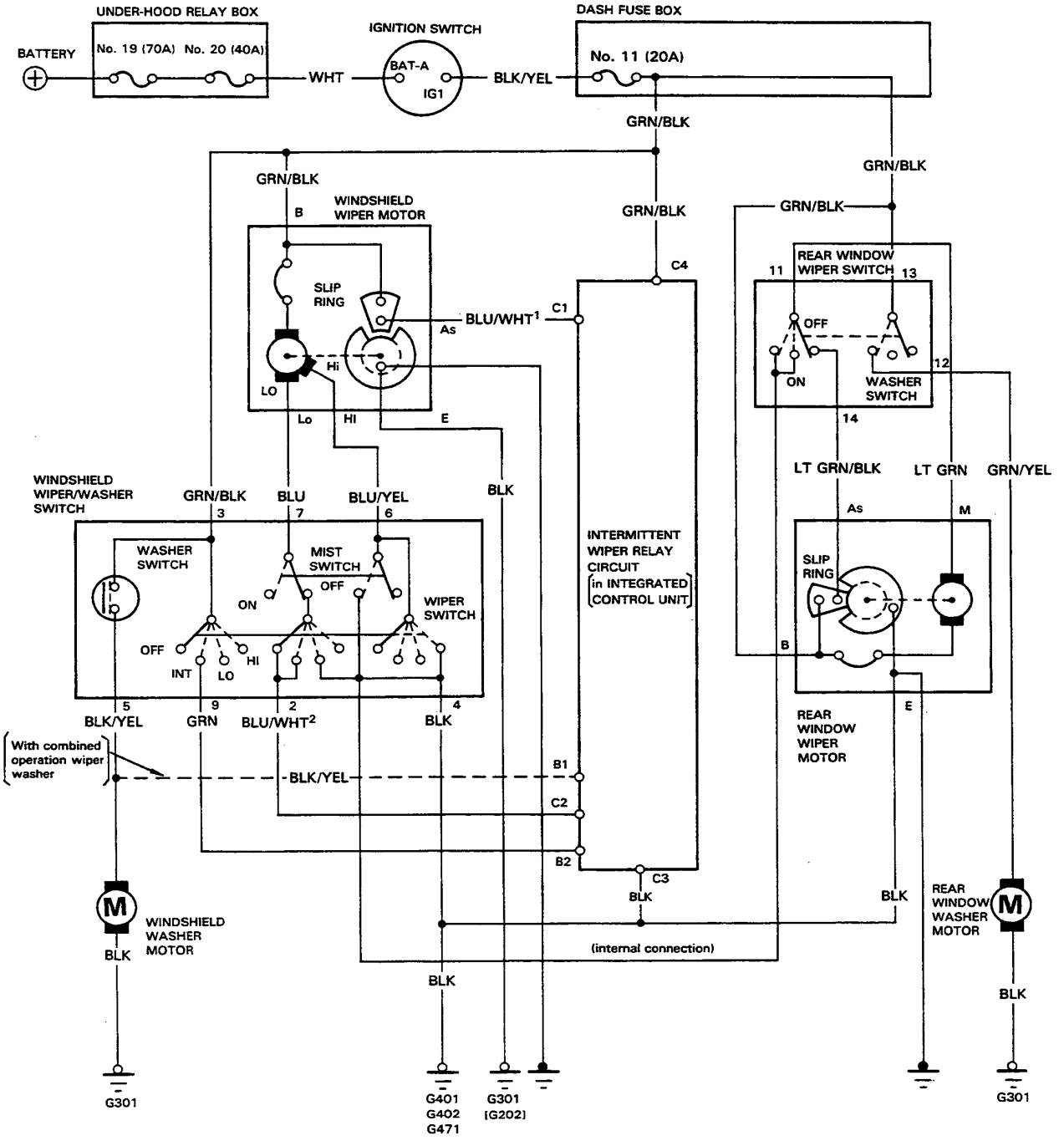
## Component Location Index





# Circuit Diagram

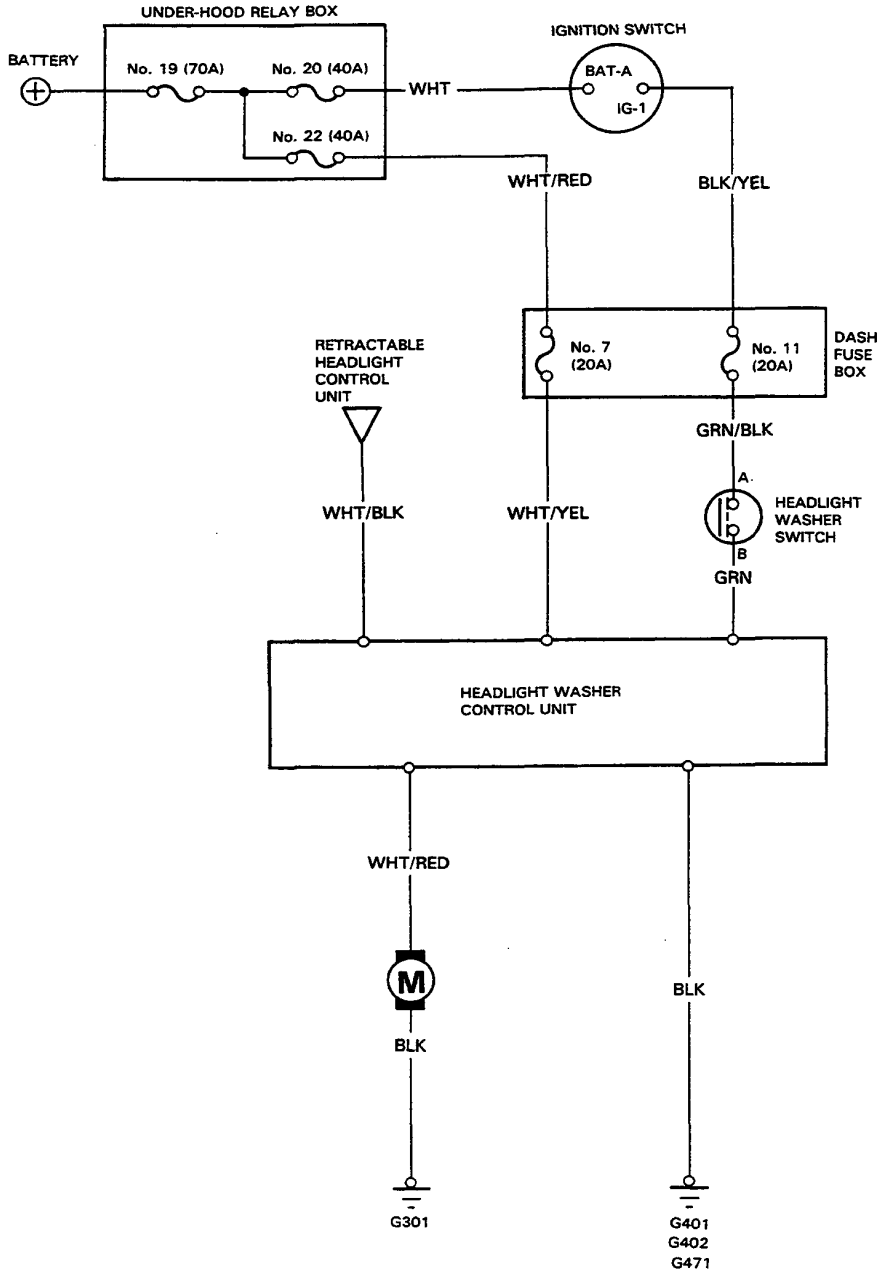
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example BLU/WHT<sup>1</sup> and BLU/WHT<sup>2</sup> are not the same).



[ ] : R.H. Drive

# Wipers/Washer

## Circuit Diagram (Headlight Washer)





## Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

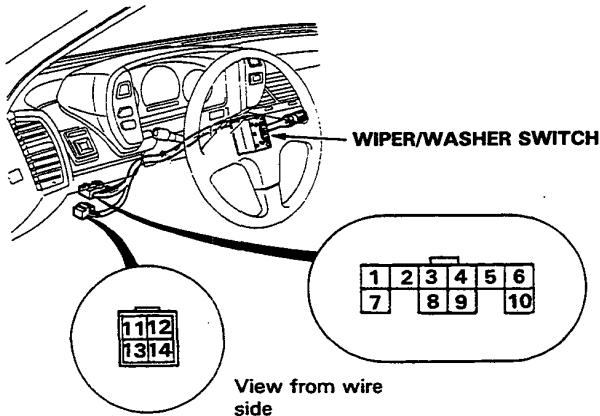
Item to be inspected		Blown No. 11 (20 A) fuse (in the dash fuse box)	Wiper switch	Wiper motor assembly	Washer switch	Washer motor	Wiper control circuit (in the integrated control unit)	Insufficient washer fluid in reservoir	Disconnected, blocked washer hose or clogged outlet	Disconnected wiper linkages	Poor ground	Open circuit in wires or loose or disconnected terminals
Wipers do not operate.	In all positions.	1	4	2						3	G301 [G202]	GRN/BLK
	In INT.		1			2						GRN, BLU/WHT <sup>2</sup>
	In LO or HI		1									
	In Mist.		1									
Blades do not return to park position when wipers are turned OFF.			2	1								BLU/WHT <sup>1</sup>
Erratic intermittent cycle or wipers do not operate intermittently.			1			2						
Little or no washer fluid is pumped.					4	3		1	2		G301	BLK/YEL
Wipers do not operate simultaneously with washer.							1					BLK/YEL

[ ]: R.H.Drive

# Wipers/Washer

## Wiper/Washer Switch Test

1. Remove the dashboard lower panel to disconnect the 10-P connector and 4-P connector from the dash fuse box.
2. Check for continuity between the terminals in each switch position according to the table.



### Windshield Wiper/Washer Switch

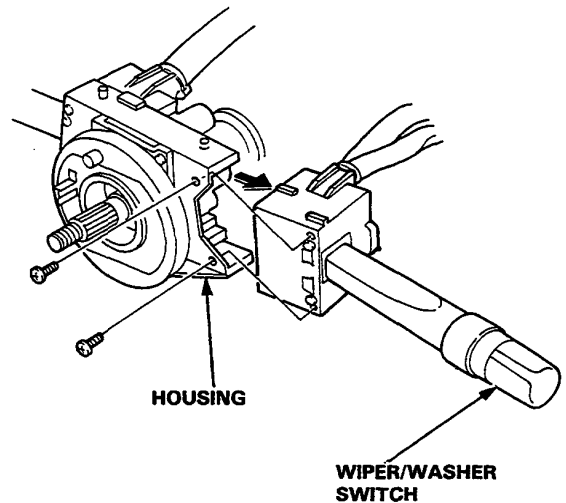
Terminal	2	3	4	5	6	7	9
Position							
OFF	○					○	
INT	○	○				○	○
LO			○	○		○	
HI			○	○	○		
Mist Switch "ON"			○	○	○		
Washer Switch "ON"		○	○				

### Rear Window Wiper/Washer Switch

Terminal	4	11	12	13	14
Position					
OFF		○			○
ON	○	○			
Washer Switch "ON"	○	○		○	○

## Wiper/Washer Switch Replacement

1. Remove the dashboard lower panel and disconnect the 10-P connector from the dash fuse box.
2. Remove the lower and upper covers from the steering column.
3. Remove the 2 screws and slide the wiper/washer switch out of the housing as shown.

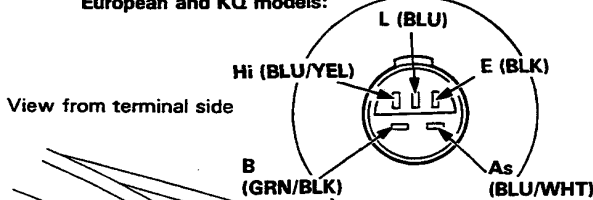




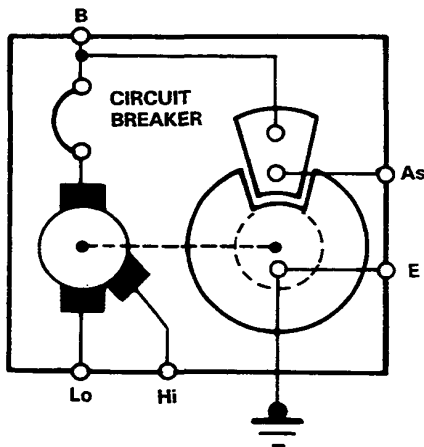
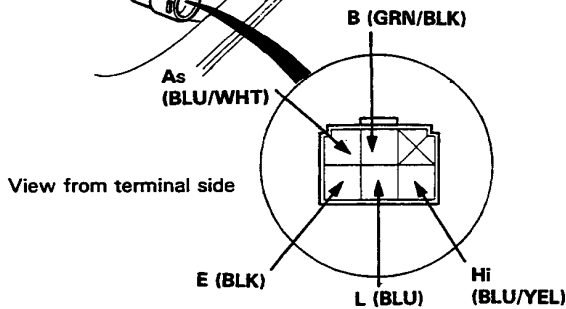
## Windshield Wiper Motor Test

1. Disconnect the 5-P connector of the wiper motor assembly.
2. Test motor operation:  
**LOW SPEED:** Connect battery positive to the B (GRN/BLK) terminal and negative to the Lo (BLU) terminal.  
**HIGH SPEED:** Connect battery positive to the B (GRN/BLK) terminal and negative to the Hi (BLU/YEL) terminal.
3. If the motor fails to run smoothly, replace it.

European and KQ models:

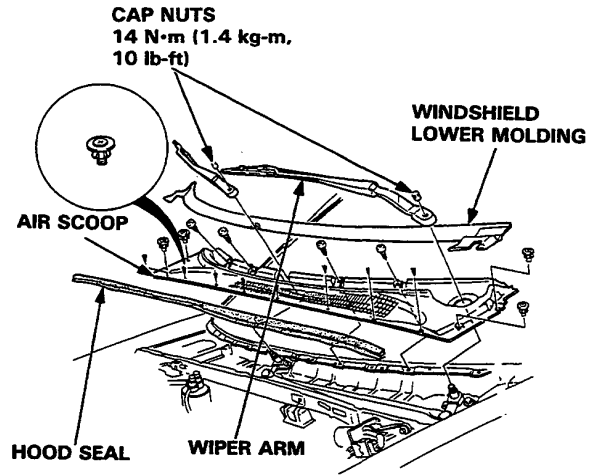


Others:

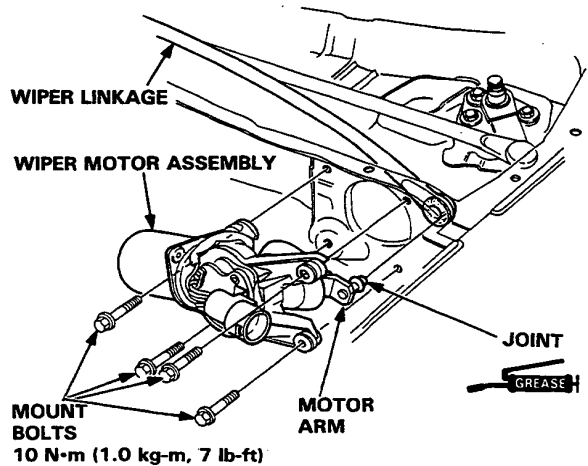


## Windshield Wiper Motor Test

1. Remove the cap nuts and the wiper arms.
2. Remove the hood seal, windshield lower molding and air scoops by prying off the trim clips and removing the screws.



3. Pry the wiper linkage off the motor arm with a screwdriver.
4. Disconnect the 5-P connector from the wiper motor assembly, then remove the 4 mount bolts and the wiper motor assembly.

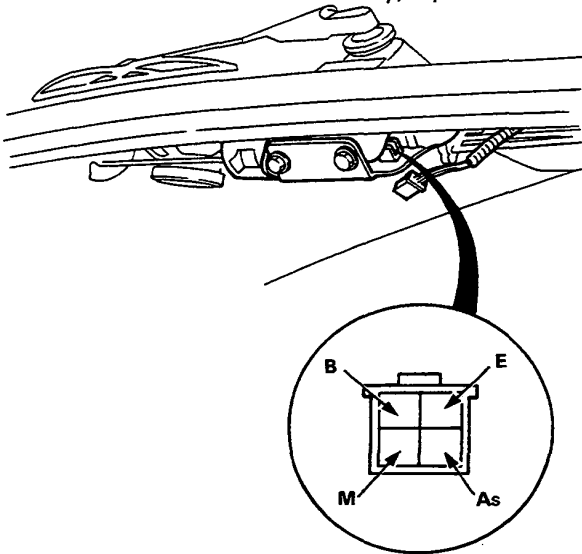


5. Install the wiper motor assembly in the reverse order of removal.

# Wiper/Washer

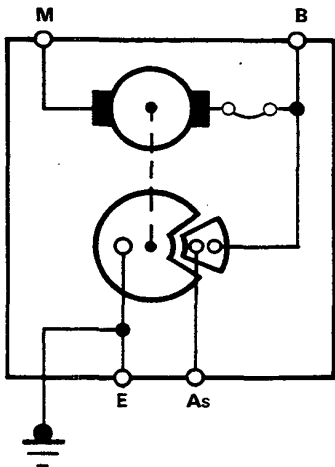
## Rear Window Wiper Motor Test

1. Open the trunk lid and disconnect the 4-P connector.
2. Test motor operation by connecting battery positive wire to B terminal and negative M terminal.
3. If the motor fails to run smoothly, replace it.



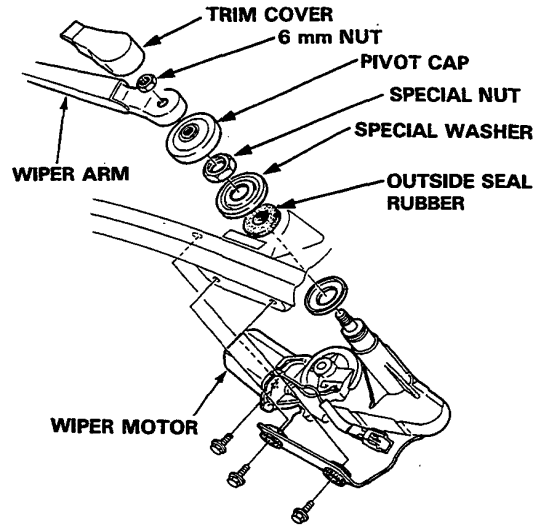
4. Check for continuity between the terminals according to the table.

Terminal	B	As	E
Wiper Blade			
At park position	○—○		
At center position		○—○	



## Rear Window Wiper Motor Replacement

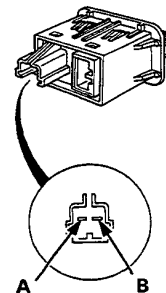
1. Open the trunk lid and disconnect the 4-P connector.
2. Remove the trim cover, 6 mm nut, wiper arm, pivot cap, special nut/washer and the outside seal rubber.
3. Remove the 3 mount bolts and the wiper motor.



## Headlight Washer Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

Terminal Position	A	B
OFF		
ON	○—○	○—○







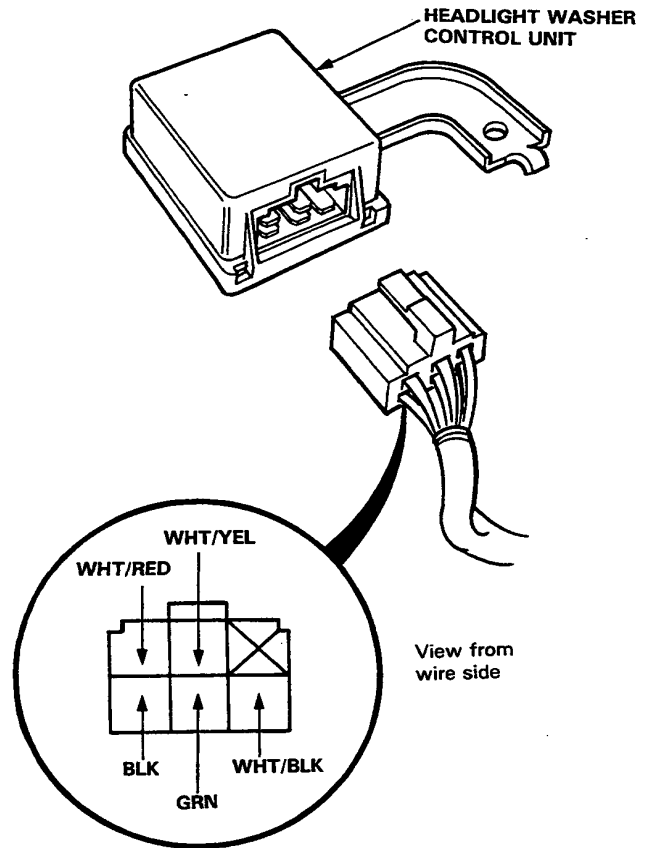
## Headlight Washer Control Unit Test

Remove the dashboard lower panel to disconnect the 6-P connector from the control unit.

Make the following input tests at the harness pins.

If all tests prove OK, yet the headlight washer still fails to work, replace the control unit.

**NOTE:** Before testing, check the No. 7 (20 A) and No. 11 (20 A) fuses in the dash fuse box.

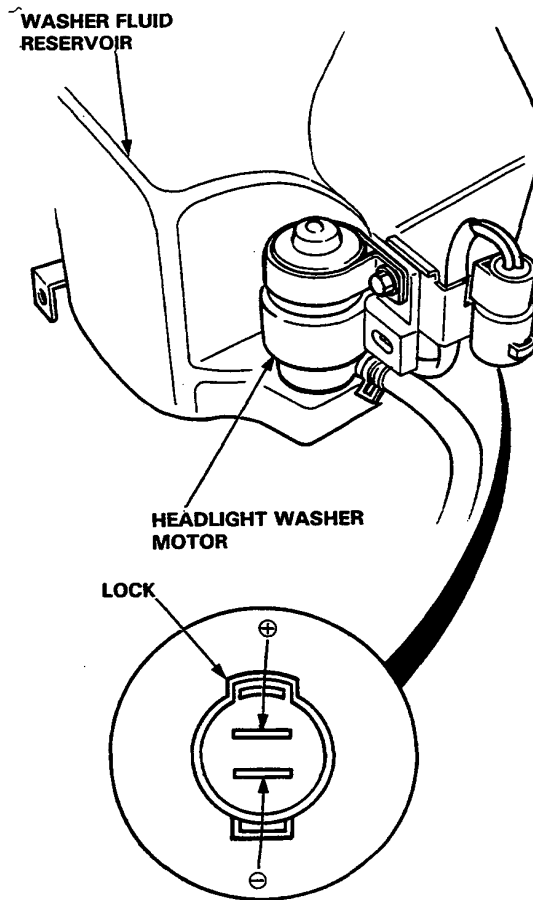
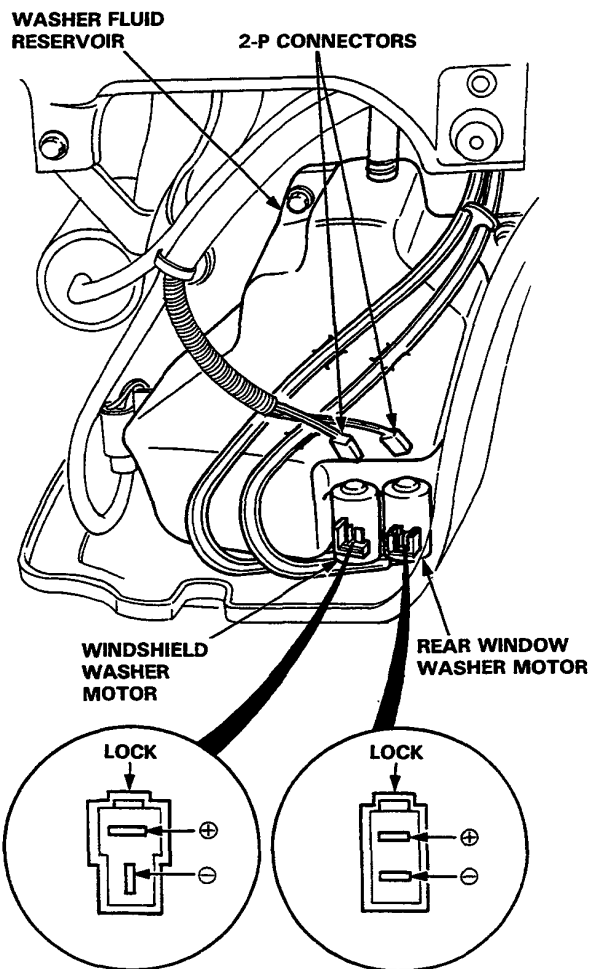


No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401, G402, G471).</li> <li>• An open in the wire.</li> </ul>
2	WHT/YEL	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 7 (20 A) fuse.</li> <li>• An open in the wire.</li> </ul>
3	GRN	Ignition switch and headlight washer switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 11 (20 A) fuse.</li> <li>• Faulty headlight washer switch.</li> <li>• An open in the wire.</li> </ul>
4	WHT/RED	Connect the WHT/YEL terminal to the WHT/RED terminal with jumper wire.	Check pump operation: Pump should run.	<ul style="list-style-type: none"> <li>• Faulty headlight washer pump.</li> <li>• An open in the wire.</li> <li>• Poor ground (G301).</li> </ul>
5	WHT/BLK	Headlight ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• An open in the wire.</li> <li>• Faulty retractable headlight control unit.</li> </ul>

# Wipers/Washers

## Washer Motor Test

1. Remove the front bumper and disconnect the 2-P connectors from the washer motors.
2. Test motor operation by connecting battery positive wire to the  $\oplus$  terminal and negative to the  $\ominus$  terminal.
3. If the motor fails to run, replace it.



- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly and little or no washer fluid is pumped, check for disconnected, blocked washer hose or clogged outlet and faulty pump in the motor.

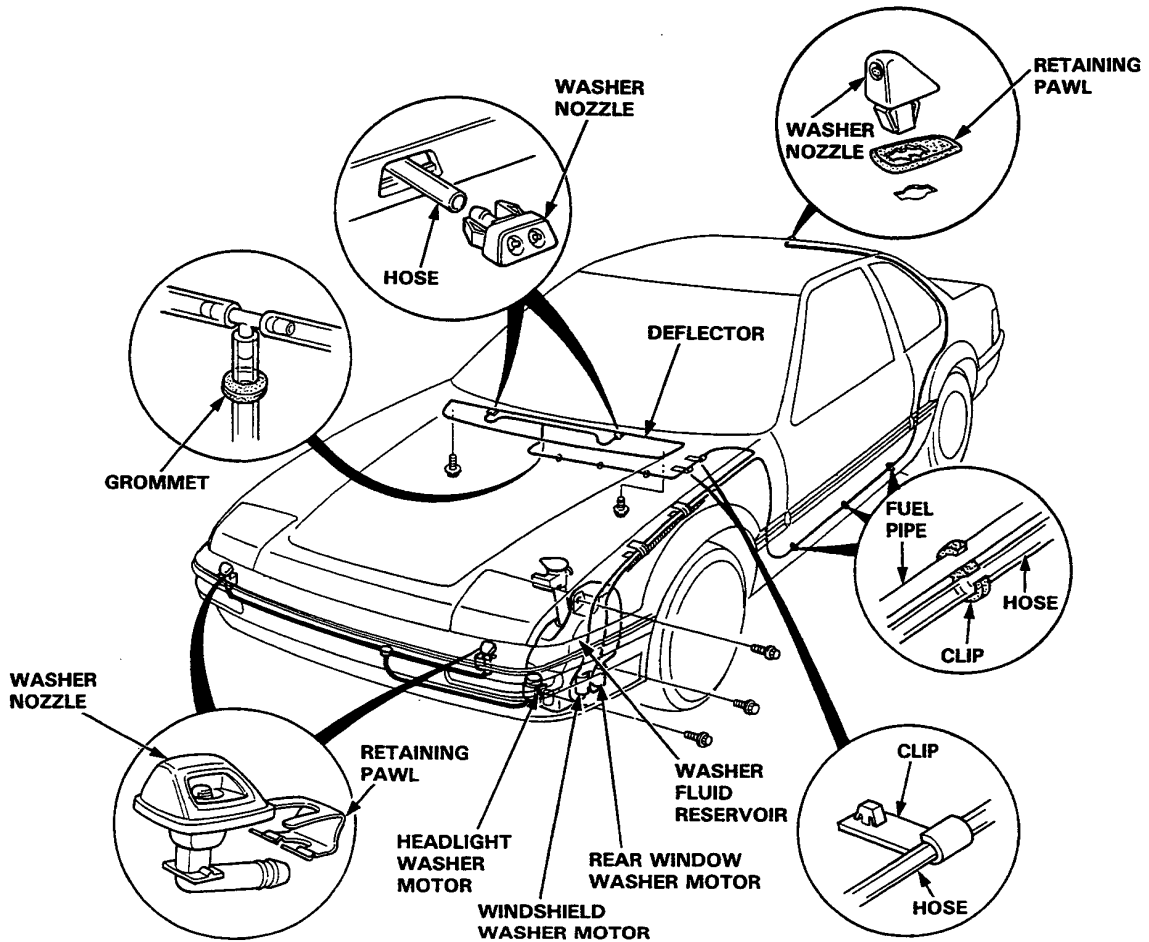


## Washer Replacement

1. Remove the bumper, then remove the washer reservoir by removing the 3 mount bolts.
2. Disconnect the hose and the 2-P connector from the washer motor.
3. Remove the deflector which has washer nozzles by removing the 2 screws and prying off the trim clips.
4. Remove the headliner then remove the rear washer nozzle by releasing the retaining pawl and pushing them out from the underside of the roof.
5. Remove the headlight washer nozzle by releasing the retaining pawl and pushing them out from the inside of the bumper.
6. Install the washer in the reverse order of removal.

### NOTE:

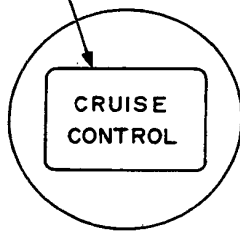
- Clamp the hoses with the wire harness in the left front fender.
- Take care not to pinch hoses during reinstallation.
- Install the grommets firmly.
- After installation, adjust the washer nozzles.



# Cruise Control

## Component Location Index

**INDICATOR LIGHT and DIMMING CIRCUIT**  
(in the gauge assembly)  
Gauge Assembly, page 16-80

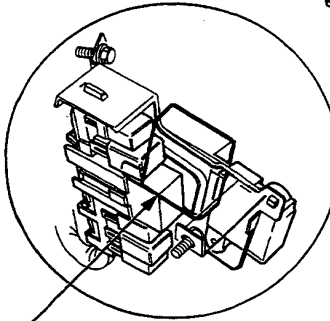


**SPEED SENSOR**  
(in the gauge assembly)  
Test, page 16-86

**SLIP RING**  
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Replacement, page 16-214

**SET/RESUME SWITCH**  
Test, page 16-213  
Replacement, page 16-214

**CRUISE CONTROL MAIN SWITCH**  
Removal, page 16-85  
Test, page 16-212



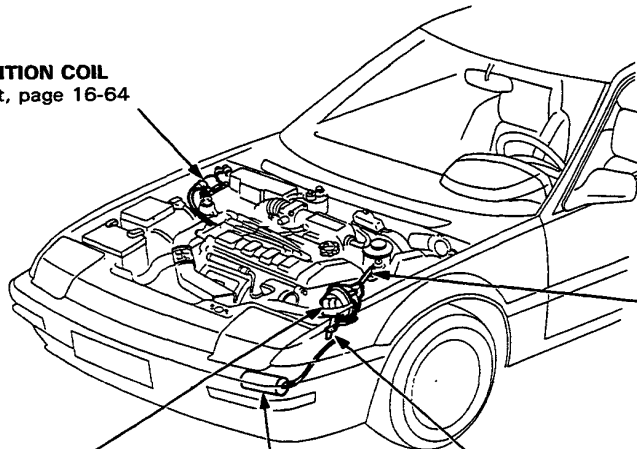
**BRAKE LIGHT SWITCH**  
Test, page 16-216  
Pedal Height Adjustment, section 13

**CLUTCH SWITCH**  
Test, page 16-215  
Pedal Height Adjustment, section 7

**SHIFT POSITION CONSOLE SWITCH**  
Test, page 16-215  
Replacement, page 16-105

**CONTROL UNIT**  
Input Test, page 16-210

**IGNITION COIL**  
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**ACTUATOR CABLE**  
Adjustment, page 16-218

**ACTUATOR**  
Solenoid Test, page 16-216  
Test, page 16-217  
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Disassembly, page 16-219

**VENT HOSE**

**VACUUM RESERVOIR**



## Description

The cruise control system uses mechanical, electrical and vacuum operated devices to maintain vehicle speed at a setting selected by the driver.

### System Description:

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, the ignition coil, the speed sensor, the clutch switch (with manual transmission), or the shift 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 position switch (automatic transmission), sends a disengage signal input to the control unit that also allows the throttle to close.

### System Operation:

The cruise control system will set and automatically maintain any speed above 40—45 kph (25—28 mph). 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.

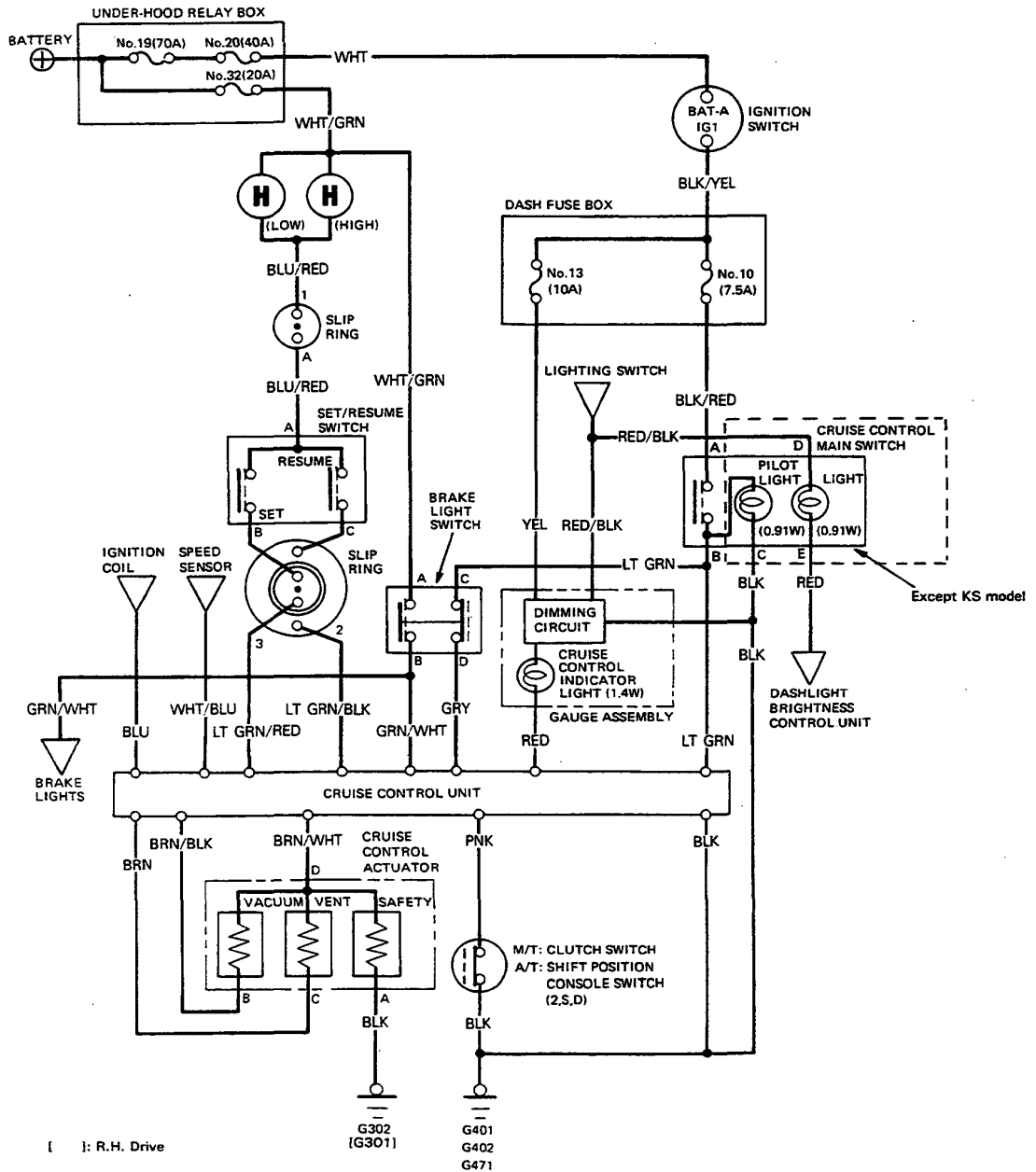
When the SET switch is depressed and the cruise control system is on, the "cruise control" indicator on the warning display will light up.

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 shift position switch, 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 acceleration without depressing the accelerator pedal, push the RESUME switch 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. For gradual deceleration without depressing the brake pedal, push the SET switch and hold it there until the desired speed is reached. 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.

# Cruise Control

## Circuit Diagram





## Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom	Item to be inspected													
	Blown No. 10 (7.5 A) fuse (in the dash fuse box)	Main switch	Indicator light and its dimming circuit (in the gauge assembly)	SET/RESUME switch	Actuator cable free play	Actuator	Disconnected, clogged or restricted vacuum lines/stuck check valve/leaky vacuum reservoir	Clutch switch and mounting (M/T)	Shift position console switch (A/T)	Blown No. 32 (20 A) fuse (in the under-hood relay box)	Brake light switch	Control unit input	Poor ground	Open circuit in wires or loose or disconnected terminals
Cruise control can't be set.	1	2										3	G302,[301] 401, 402 471	LT GRN or BLK/RED
Cruise control can be set, but indicator light does not go on.			1											RED or YEL
Cruise speed noticeably higher or lower than what was set.												1		
Excessive overshooting and/or undershooting when trying to set speed.					1	2						3		
Steady speed not held even on a flat road with cruise control set.					1	3	2					4		
Car does not decelerate or accelerate accordingly when SET or RESUME button is pushed.				1								2		
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	3		
Set speed not cancelled when CANCEL button is pushed.				1								2		
Set speed not resumed when RESUME button is pushed (with main switch on, but set speed temporarily cancelled).				1								2		

[ ]: R.H.Drive

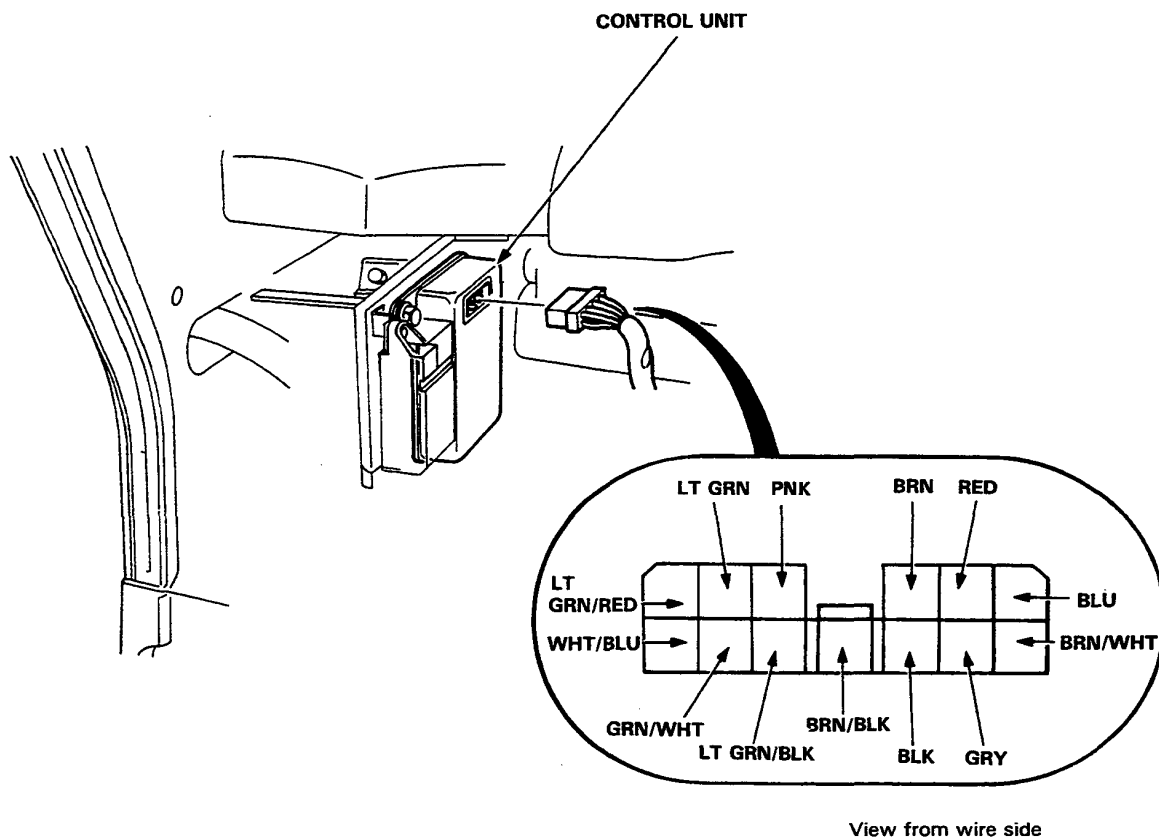
# Cruise Control

## Control Unit Input Test

Remove the dashboard lower panel to disconnect the 13-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 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.	<ul style="list-style-type: none"> <li>• Poor ground (G401, 402, 471)</li> <li>• An open in the wire.</li> </ul>
2	LT GRN	Ignition switch ON and main switch ON.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 10 (7.5 A) fuse.</li> <li>• Faulty main switch.</li> <li>• An open in the LT GRN or BLK/RED wire.</li> </ul>
3	LT GRN/BLK	RESUME button pushed.	Ground each terminal: Horns should sound as the switch is pushed.	<ul style="list-style-type: none"> <li>• Blown No. 32 (20 A) fuse.</li> <li>• Faulty SET/RESUME switch.</li> <li>• Faulty slip ring.</li> <li>• Faulty lighting switch.</li> <li>• An open in the WHT/GRN, BLU/RED, LT GRN/BLK or LT GRN/RED wire.</li> </ul>
4	LT GRN/RED	SET button pushed.		
5	PNK	M/T: Clutch pedal pushed. A/T: Shift lever in 2, S or D	Check for continuity to ground: should be continuity.	<ul style="list-style-type: none"> <li>• Faulty or misadjusted clutch switch (M/T).</li> <li>• Faulty shift position console switch (A/T).</li> <li>• Poor ground (G401, 402, 471)</li> <li>• An open in the wire.</li> </ul>
6	BLU	Start the engine.	Check for voltage to ground: should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty ignition system.</li> <li>• An open in the wire.</li> </ul>
7	WHT/BLU	Ignition switch ON and main switch ON. Raise the front of the car and rotate one wheel slowly.	Check for voltage between the LT GRN $\oplus$ and WHT/BLU $\ominus$ terminals: should be 0—12—0—12 V repeatedly.	<ul style="list-style-type: none"> <li>• Faulty speed sensor.</li> <li>• An open in the wire.</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Faulty brake light switch.</li> <li>• An open in the GRY or LT GRN wire.</li> </ul>
9	GRN/WHT	Brake pedal pushed, then released.	Check for voltage to ground: should be battery voltage with the pedal pushed, and 0 V with the pedal released.	<ul style="list-style-type: none"> <li>• Faulty brake light switch.</li> <li>• An open in the wire.</li> </ul>
10	RED	Ignition switch ON.	Attach to ground: Indicator light in the gauge assembly comes on.	<ul style="list-style-type: none"> <li>• Blown bulb.</li> <li>• Blown No. 13 (10 A) fuse.</li> <li>• Faulty dimming circuit in the gauge assembly.</li> <li>• An open in the wire.</li> </ul>
11	BRN	Under all conditions.	Check for resistance to ground: should be 80—120 $\Omega$ .	<ul style="list-style-type: none"> <li>• Faulty actuator solenoid.</li> <li>• Open or short in the wire.</li> </ul>
12	BRN/BLK	Under all conditions.	Check for resistance to ground: should be 70—110 $\Omega$ .	
13	BRN/WHT	Under all conditions.	Check for resistance to ground: should be 40—60 $\Omega$ .	

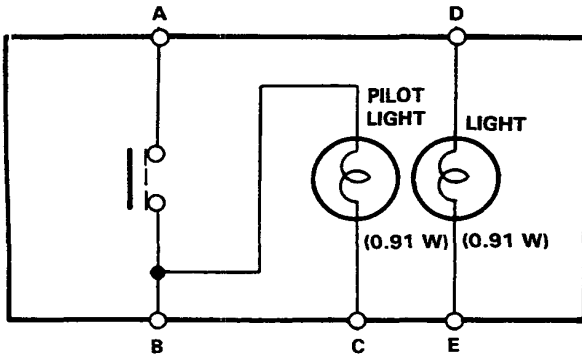
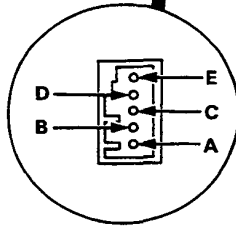
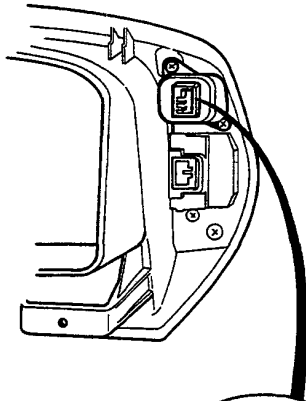
# Cruise Control

## Cruise Control Main Switch Test

**KQ, KY model:**

1. Remove the instrument panel from the meter visor.
2. Check for continuity between the terminals in each switch position according to the table.

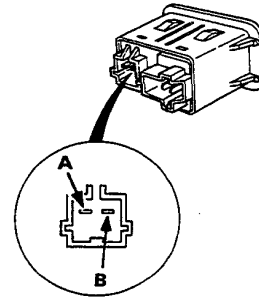
Terminal	A	B	C	D	E
Position					
OFF		○—○	○—○	○—○	○—○
ON	○—○	○—○	○—○	○—○	○—○



**KX, KS model:**

1. Remove the cruise control main switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

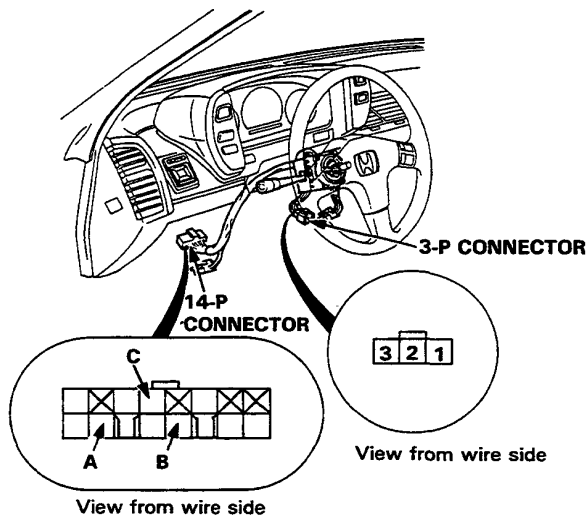
Terminal	A	B
Position		
OFF		
ON	○—○	○—○





## SET/RESUME Switch Test

1. Remove the dashboard lower panel and disconnect the 14-P connector from the main wire harness.

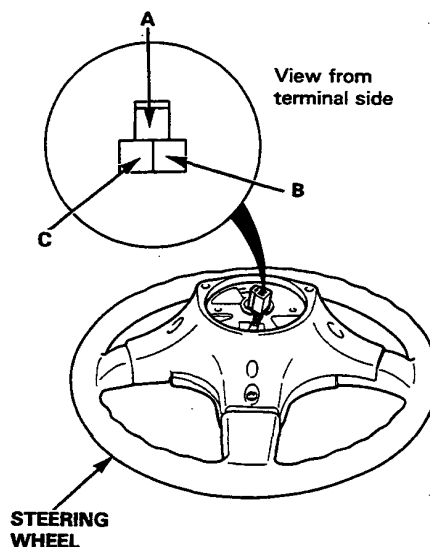


2. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	A		B	C
OFF				
SET (ON)	○	—	○	
RESUME (ON)	○	—		○

- If all of the continuity check is OK, the SET/RESUME switch is OK.
- If there is no continuity in one or some switch positions, go to step 3.

3. Remove the steering wheel and repeat step 2, but this time test at the 3-P connector of the steering wheel.

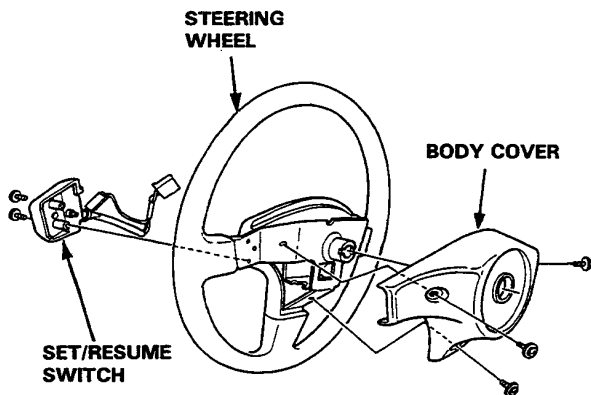


- If there is no continuity in one or some switch positions, repair the SET/RESUME switch.
  - If all of the continuity check is OK, go to step 4.
4. Remove the steering column lower cover and disconnect the 3-P connector from the slip ring, then check for continuity between the No. 1 and A terminals, the No. 2 and C terminals, and the No. 3 and B terminals.
- If there is no continuity in one or some switch positions, replace the lighting switch.
  - If all of the continuity check is OK, check the slip ring (page 16-124).

# Cruise Control

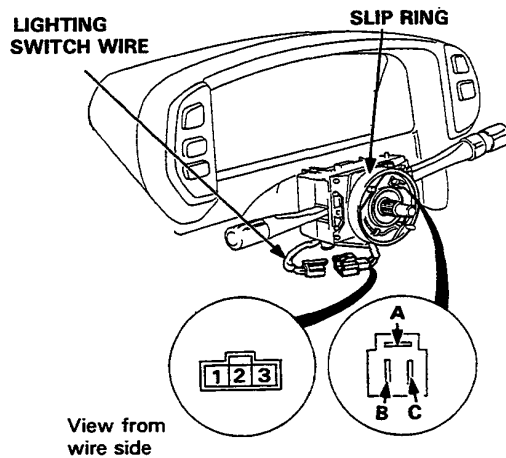
## SET/RESUME Switch Replacement

1. Remove the steering wheel.
2. Remove the body cover.
3. Remove the 2 screws and the SET/RESUME switch from the steering wheel.

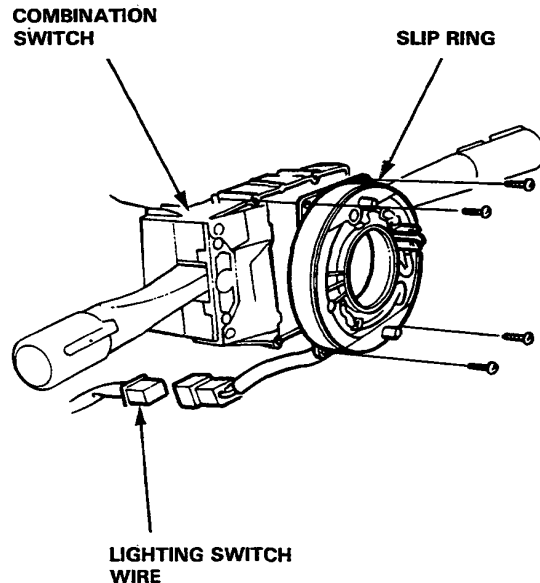


## Slip Ring Test/Replacement

1. Remove the steering column lower cover, then disconnect the 3-P connector from the lighting switch wire.
2. There should be continuity between the No. 1 and A terminals, the No. 3 and B terminals, and the No. 2 and C terminals, as you turn the slip ring.



3. If necessary, remove the steering column upper cover and the 4 screws to replace the slip ring.

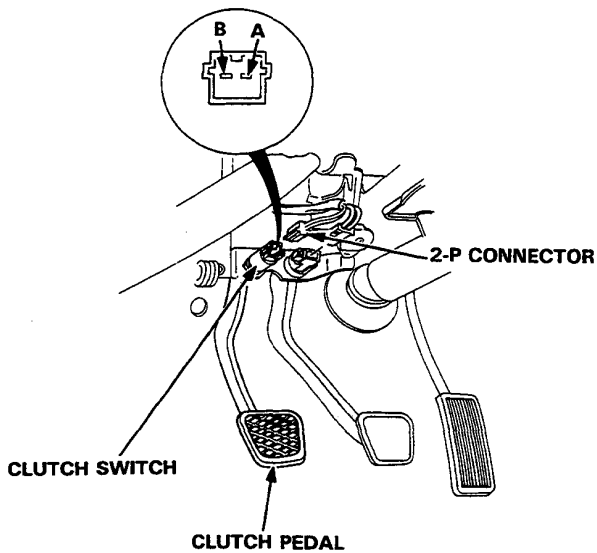




## Clutch Switch Test

1. Disconnect the 2-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal	A	B
Clutch Pedal		
RELEASED	○—○	○—○
PUSHED		

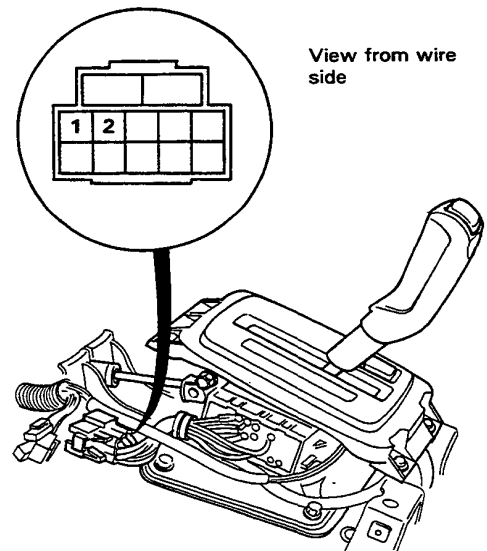


3. If necessary, replace the switch or adjust pedal height (see section 7).

## Shift Position Console Switch Test

1. Remove the front console, then disconnect the 10-P connector from the console switch.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2
Position		
2	○—○	○—○
S (S3, S4)	○—○	○—○
D	○—○	○—○
N		
R		
P		



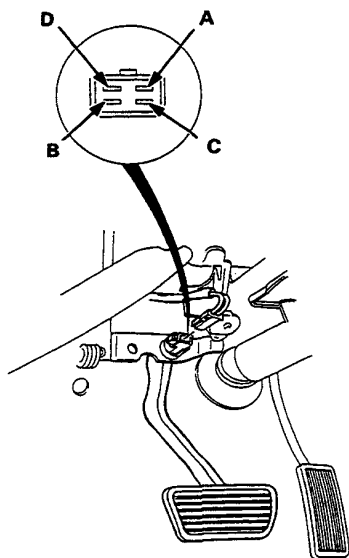
3. If necessary, replace the switch (see page 16-105).

# Cruise Control

## 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	A	B	C	D
Brake Pedal				
PUSHED	○	○		
RELEASED			○	○



3. If necessary, replace the switch or adjust pedal height (see section 13).

## Actuator Solenoid Test

1. Disconnect the 4-P connector from the actuator.
2. Measure resistance between the terminals.

### Resistance

**VACUUM SOLENOID (between B and D):**

30–50Ω

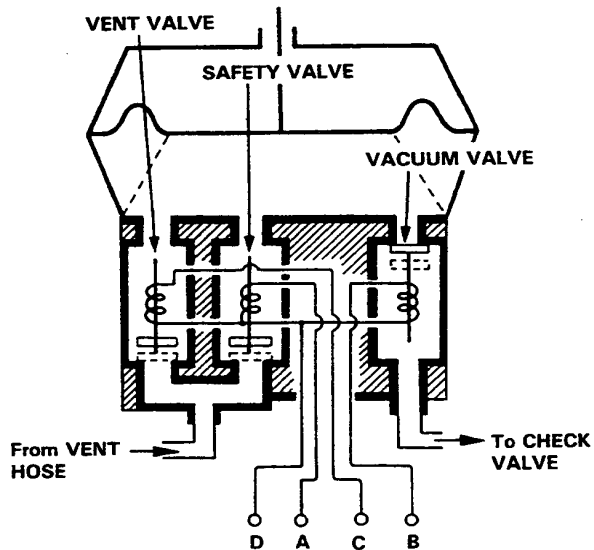
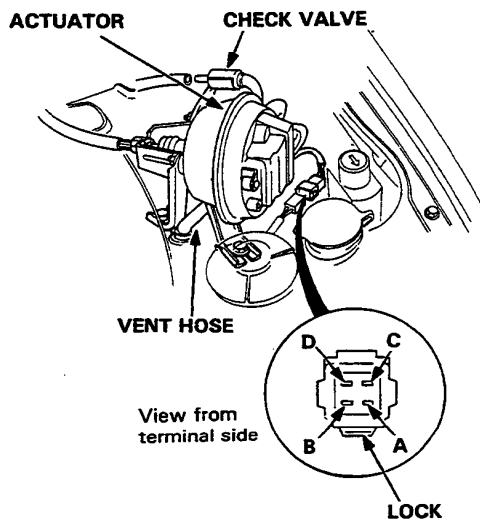
**VENT SOLENOID (between C and D):**

40–60Ω

**SAFETY SOLENOID (between A and D):**

40–60Ω

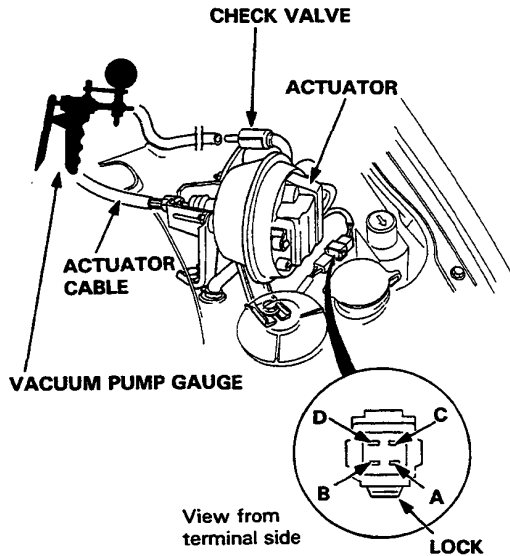
NOTE: Resistance will vary slightly with temperature; specified resistance is at 20°C (70°F).



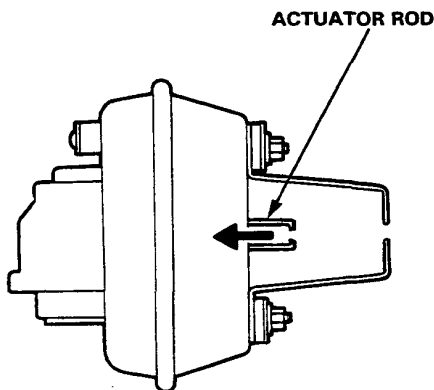


## Actuator Test

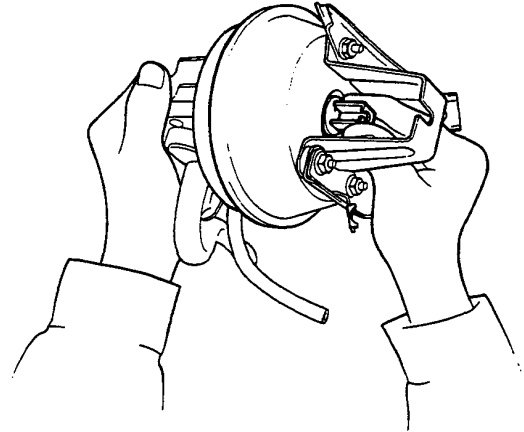
1. Disconnect the actuator cable from the actuator rod and the 4-P connector.
2. Connect battery positive to the D terminal and negative to the A, B and C terminals.
3. Connect a vacuum pump to the check valve. Then apply vacuum to the actuator.



4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.



5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it. If you can, it is defective.

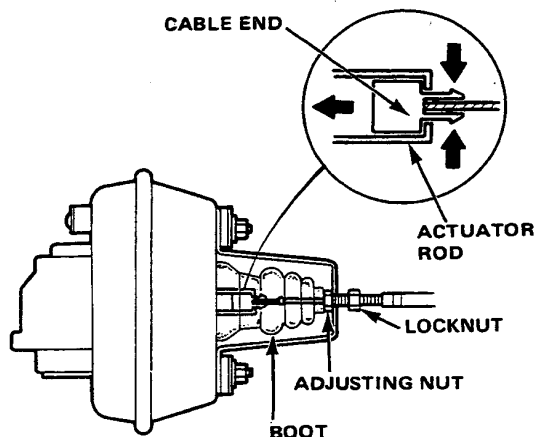


6. Disconnect battery negative from the C terminal. The actuator rod should return. If the actuator rod does not return, and the vent hose and filter are free, the solenoid valve assembly is defective.
7. Repeat steps 2-6, but this time disconnect battery negative from the A terminal. The actuator rod should return. If it does not return, and the vent hose and filter are free, the solenoid valve assembly is defective.
8. If the solenoid valve assembly is replaced, be sure to use new O-rings at each solenoid.

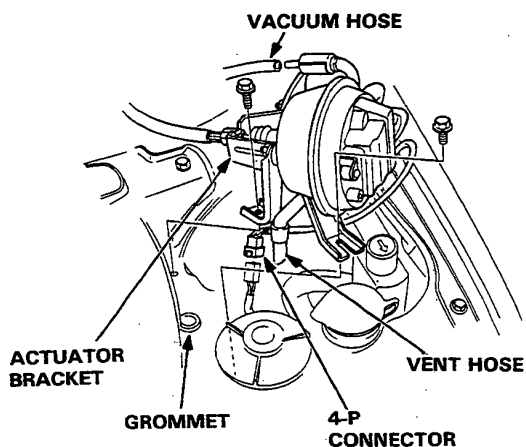
# Cruise Control

## Actuator/Cable Replacement

1. Pull back the boot and loosen the locknut, then disconnect the cable from the bracket.
2. Disconnect the cable end from the actuator rod.



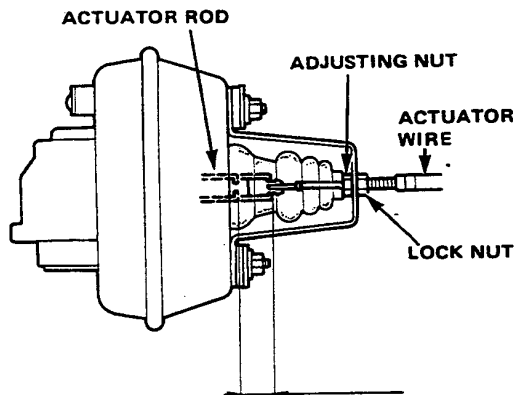
3. Disconnect the 4-P connector from the actuator.
4. Pull the vent hose from the grommet.
5. Disconnect the vacuum hose from the check valve.
6. Remove the 2 mount bolts and the actuator with the bracket and reservoir.



7. If necessary, disconnect the cable end from the linkage over the accelerator pedal, then turn the grommet 90° in the firewall and remove the cable.
8. Install in the reverse order of removal, and adjust free-play at actuator rod after connecting the cable (see next column).

## Actuator Cable Adjustment

1. Check that the actuator cable operates smoothly with no binding or sticking.
2. Start the engine.
3. Measure the amount of movement of the actuator rod until the cable pulls on the accelerator lever (engine speed starts to increase). Free play should be  $11 \pm 1.5$  mm ( $0.43 \pm 0.06$  in).



**LOCKNUT FREE PLAY:  $11 \pm 1.5$  mm ( $0.43 \pm 0.06$  in)**

4. If free play is not within specs, loosen the locknut and turn the adjusting nut as required.

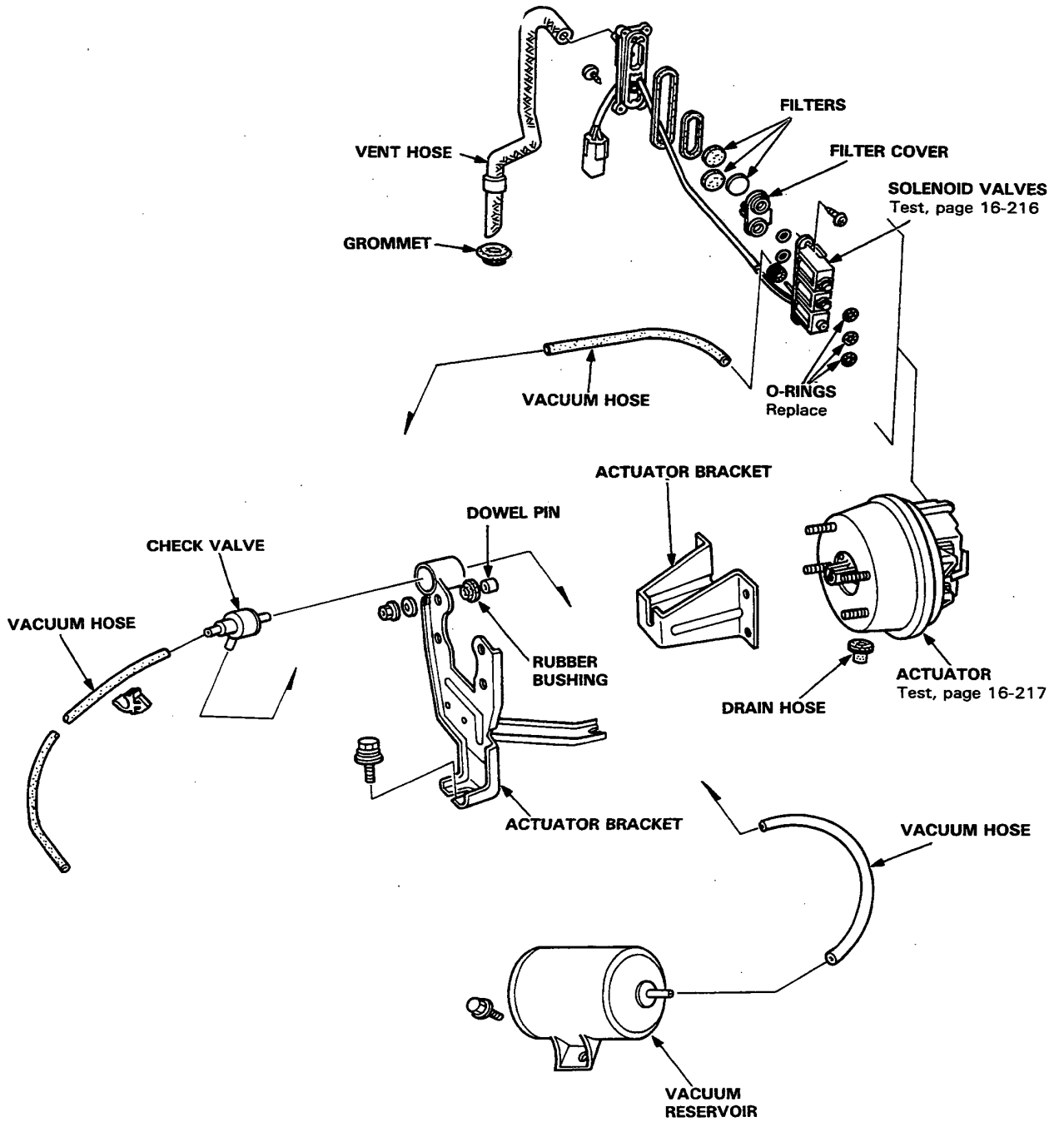
**NOTE:** If necessary, check the throttle cable free play (see section 6), then recheck the actuator rod free play.

5. Retighten the locknut and recheck the free play.





# Actuator Disassembly



# Wiring Diagrams

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